

# SCPI Command Reference Volume 2

## Agilent Technologies E4428C/38C ESG Signal Generators

This guide applies to the following signal generator models:

**E4428C ESG Analog Signal Generator**

**E4438C ESG Vector Signal Generator**

Due to our continuing efforts to improve our products through firmware and hardware revisions, signal generator design and operation may vary from descriptions in this guide. We recommend that you use the latest revision of this guide to ensure you have up-to-date product information. Compare the print date of this guide (see bottom of page) with the latest revision, which can be downloaded from the following website:

*<http://www.agilent.com/find/esg>*



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# SCPI Command Reference, Volume 1

<b>1. SCPI Basics</b> .....	<b>1</b>
Command Reference Information .....	2
SCPI Command Listings .....	2
Key and Data Field Cross Reference .....	2
Supported Field .....	2
SCPI Basics .....	3
Common Terms .....	3
Command Syntax .....	4
Command Types .....	5
Command Tree .....	6
Command Parameters and Responses .....	7
Program Messages .....	12
File Name Variables .....	13
File Types and Directory Structure .....	14
MSUS (Mass Storage Unit Specifier) Variable .....	16
Quote Usage with SCPI Commands .....	17
Binary, Decimal, Hexadecimal, and Octal Formats .....	18
<b>2. Basic Function Commands</b> .....	<b>19</b>
Correction Subsystem ([[:SOURce]:CORRection]) .....	20
:FLATness:LOAD .....	20
:FLATness:PAIR .....	20
:FLATness:POINts .....	20
:FLATness:PRESet .....	21
:FLATness:STORe .....	21
[:STATe] .....	21
Digital Modulation Subsystem—E4438C ([[:SOURce]]). .....	22
:BURSt:SOURce .....	22
:BURSt:STATe .....	22
:DM:EXTernal:ALC:BANDwidth BWIDTH .....	22
:DM:EXTernal:HCRest[:STATe] .....	23
:DM:EXTernal:FILTer .....	23
:DM:EXTernal:FILTer:AUTO .....	23
:DM:EXTernal:POLarity .....	24
:DM:EXTernal:SOURce .....	24

---

## Contents

:DM:IQADjustment:BBG:QSKew . . . . .	25
:DM:IQADjustment:EXTernal:COFFset . . . . .	26
:DM:IQADjustment:EXTernal:DIOFFset . . . . .	26
:DM:IQADjustment:EXTernal:DQOFFset . . . . .	27
:DM:IQADjustment:EXTernal:GAIN . . . . .	27
:DM:IQADjustment:EXTernal:IOFFset . . . . .	27
:DM:IQADjustment:EXTernal:IQATten . . . . .	28
:DM:IQADjustment:EXTernal:QOFFset . . . . .	28
:DM:IQADjustment:GAIN . . . . .	29
:DM:IQADjustment:IOFFset . . . . .	29
:DM:IQADjustment:QOFFset . . . . .	30
:DM:IQADjustment:QSKew . . . . .	30
:DM:IQADjustment:SKEW . . . . .	31
:DM:IQADjustment:SKEW:Path . . . . .	32
:DM:IQADjustment[:STATe] . . . . .	32
:DM:MODulation:FILTer . . . . .	32
:DM:MODulation:FILTer:AUTO . . . . .	33
:DM:MODulation:ATTen . . . . .	33
:DM:MODulation:ATTen:AUTO . . . . .	34
:DM:POLarity[:ALL] . . . . .	34
:DM:SKEW:PATH . . . . .	35
:DM:SKEW[:STATe] . . . . .	35
:DM:SOURce . . . . .	35
:DM:SRATio . . . . .	36
:DM:STATe . . . . .	37
Frequency Subsystem ([:SOURce]) . . . . .	38
:FREQuency:CHANnels:BAND . . . . .	38
:FREQuency:CHANnels:NUMBer . . . . .	40
:FREQuency:CHANnels[:STATe] . . . . .	41
:FREQuency:FIXed . . . . .	41
:FREQuency:MODE . . . . .	42
:FREQuency:MULTiplier . . . . .	42
:FREQuency:OFFSet . . . . .	43
:FREQuency:OFFSet:STATe . . . . .	43
:FREQuency:REFerence . . . . .	43
:FREQuency:REFerence:STATe . . . . .	44
:FREQuency:STARt . . . . .	44
:FREQuency:STOP . . . . .	45

:FREQuency:SYNThesis	45
:FREQuency[:CW]	46
:FREQuency[:CW]:STEP[:INCRement]	47
:PHASe:REFerence	47
:PHASe[:ADJust]	47
:ROSCillator:SOURce	47
:ROSCillator:SOURce:AUTO	48
List/Sweep Subsystem ([:SOURce])	49
:LIST:DIRection	50
:LIST:DWELl	50
:LIST:DWELl:POINts	51
:LIST:DWELl:TYPE	51
:LIST:FREQuency	51
:LIST:FREQuency:POINts	52
:LIST:MANual	52
:LIST:MODE	53
:LIST:POWer	53
:LIST:POWer:POINts	53
:LIST:RETRace	54
:LIST:TRIGger:SOURce	54
:LIST:TYPE	55
:LIST:TYPE:LIST:INITialize:FSTep	55
:LIST:TYPE:LIST:INITialize:PRESet	56
:SWEep:DWELl	56
:SWEep:POINts	57
Power Subsystem ([:SOURce]:POWer)	58
:ALC:BANdwidth BWIDth	58
:ALC:BANdwidth	59
:ALC:LEVel	60
:ALC:SEARch	60
:ALC:SEARch:REFerence	61
:ALC:SEARch:SPAN:START	61
:ALC:SEARch:SPAN:STOP:SPAN:STOP	61
:ALC:SEARch:SPAN:TYPE	62
:ALC:SEARch:SPAN[:STATe]	62
:ALC[:STATe]	62
:ALTErnate:AMPLitude	63
:ALTErnate:MANual	63

---

## Contents

:ALternate:STATe . . . . .	64
:ALternate:TRIGger[:SOURce]. . . . .	64
:ATTenuation. . . . .	65
:ATTenuation:AUTO . . . . .	65
:MODE . . . . .	66
:REFerence . . . . .	66
:REFerence:STATe . . . . .	67
:STARt . . . . .	67
:STOP . . . . .	68
[:LEVel][:IMMediate]:OFFSet . . . . .	68
[:LEVel][:IMMediate][:AMPLitude] . . . . .	69
[:LEVel][:IMMediate][:AMPLitude]:STEP . . . . .	69
<b>3. System Commands . . . . .</b>	<b>71</b>
Calibration Subsystem (:CALibration). . . . .	72
:DCFM . . . . .	72
:IQ . . . . .	72
:IQ:DC . . . . .	72
:IQ:DEFault . . . . .	73
:IQ:FULL . . . . .	73
:IQ:STARt . . . . .	74
:IQ:STOP . . . . .	74
Communication Subsystem (:SYSTem:COMMunicate). . . . .	75
:GPIB:ADDRess . . . . .	75
:GTLocal . . . . .	75
:LAN:CONFig . . . . .	75
:LAN:GATEway . . . . .	76
:LAN:HOSTname . . . . .	76
:LAN:IP . . . . .	76
:LAN:SUBNet . . . . .	77
:PMETer:ADDRess. . . . .	77
:PMETer:CHANnel . . . . .	77
:PMETer:IDN . . . . .	78
:PMETer:TIMEout . . . . .	78
:SERial:BAUD . . . . .	79
:SERial:ECHO . . . . .	79
:SERial:RESet. . . . .	79
:SERial:TOUT . . . . .	80

Diagnostic Subsystem (:DIAGnostic[:CPU]:INFORMATION) . . . . .	81
:BOARDs . . . . .	81
:CCOut:ATTenuator . . . . .	81
:CCOut:PON . . . . .	81
:CCOut:PROTection . . . . .	81
:DISPlay:OTIME . . . . .	82
:LIcense:AUXiliary . . . . .	82
:LIcense:WAVEform . . . . .	82
:OPTions . . . . .	83
:OPTions:DETail . . . . .	83
:OTIME . . . . .	83
:REVision . . . . .	83
:SDATe . . . . .	84
:WLIcense[:VALue] . . . . .	84
Display Subsystem (:DISPlay) . . . . .	85
:ANNotation:AMPLitude:UNIT . . . . .	85
:ANNotation:CLOCK:DATE:FORMat . . . . .	85
:ANNotation:CLOCK[:STATe] . . . . .	85
:BRIGHtness . . . . .	86
:CAPTure . . . . .	86
:CONTRast . . . . .	86
:INVerse . . . . .	87
:REMote . . . . .	87
[:WINDow][:STATe] . . . . .	87
IEEE 488.2 Common Commands . . . . .	88
*CLS . . . . .	88
*ESE . . . . .	88
*ESE? . . . . .	88
*ESR? . . . . .	89
*IDN? . . . . .	89
*OPC . . . . .	89
*OPC? . . . . .	90
*OPT? . . . . .	90
*PSC . . . . .	90
*PSC? . . . . .	90
*RCL . . . . .	90
*RST . . . . .	91
*SAV . . . . .	91

---

# Contents

*SRE	91
*SRE?	92
*STB?	92
*TRG	92
*TST?	92
*WAI	93
Memory Subsystem (:MEMory)	94
:CATalog:BINary	94
:CATalog:BIT	94
:CATalog:CDMa	95
:CATalog:CDMA	95
:CATalog:DMOD	95
:CATalog:DWCDma	96
:CATalog:FCDMa	96
:CATalog:FIR	97
:CATalog:FSK	97
:CATalog:IQ	98
:CATalog:LIST	98
:CATalog:MCDMa	99
:CATalog:MDMod	99
:CATalog:MDWCdma	100
:CATalog:MFCdma	100
:CATalog:MTONE	101
:CATalog:RCDMa	101
:CATalog:SEQ	102
:CATalog:SHAPE	102
:CATalog:STATe	103
:CATalog:UFLT	103
:CATalog:UWCDma	104
:CATalog[:ALL]	104
:COPY[:NAME]	105
:DATA	105
:DATA:APPend	106
:DATA:BIT	107
:DATA:FIR	108
:DATA:FSK	109
:DATA:IQ	110
:DATA:PRAM:FILE:BLOCK	112



:DATA:PRAM:FILE:LIST . . . . .	113
:DATA:PRAM . . . . .	114
:DATA:PRAM:BLOCK . . . . .	114
:DATA:PRAM:LIST . . . . .	114
:DATA:SHAPE . . . . .	114
:DATA:SHAPE . . . . .	115
:DATA:UNPRotected . . . . .	116
:DELeTe:ALL . . . . .	117
:DELeTe:BINary . . . . .	118
:DELeTe:BIT . . . . .	118
:DELeTe:CDMa . . . . .	118
:DELeTe:CDMA . . . . .	118
:DELeTe:DMOD . . . . .	118
:DELeTe:DWCDma . . . . .	119
:DELeTe:FCDMa . . . . .	119
:DELeTe:FIR . . . . .	119
:DELeTe:FSK . . . . .	119
:DELeTe:IQ . . . . .	119
:DELeTe:LIST . . . . .	120
:DELeTe:MCDMa . . . . .	120
:DELeTe:MMod . . . . .	120
:DELeTe:MDWCdma . . . . .	120
:DELeTe:MFCdma . . . . .	120
:DELeTe:MTONE . . . . .	121
:DELeTe:RCDMa . . . . .	121
:DELeTe:SEQ . . . . .	121
:DELeTe:SHAPE . . . . .	121
:DELeTe:STATe . . . . .	121
:DELeTe:UFLT . . . . .	122
:DELeTe:UWCDma . . . . .	122
:DELeTe[:NAME] . . . . .	122
:FREE[:ALL] . . . . .	122
:LOAD:LIST . . . . .	123
:MOVE . . . . .	123
:STATe:COMMeNt . . . . .	123
:STORe:LIST . . . . .	123
Mass Memory Subsystem (:MMEMory) . . . . .	124
:CATalog . . . . .	124

---

# Contents

:COPY	124
:DATA	125
:DELeTe:NVWFm	125
:DELeTe:WFM	125
:DELeTe:WFM1	125
:DELeTe[:NAME]	126
:HEADer:CLEAr	126
:HEADer:DESCRiption	126
:LOAD:LIST	127
:MOVE	127
:STORe:LIST	127
Output Subsystem (:OUTPut)	128
:BLANKing:AUTO	128
:BLANKing:STATe	128
:MODulation[:STATe]	129
[:STATe]	129
Route Subsystem (:ROUte:HARDware:DGENerator)	130
:INPut:BPOLarity	130
:INPut:CPOLarity	130
:INPut:DPOLarity	131
:INPut:SPOLarity	131
:IPOLarity:BGATe	131
:IPOLarity:CLOCK	132
:IPOLarity:DATA	132
:IPOLarity:SSYNc	132
:OPOLarity:CLOCK	133
:OPOLarity:DATA	133
:OPOLarity:SSYNc	134
:OUTPut:CPOLarity	134
:OUTPut:DCS[:STATe]	135
:OUTPut:DPOLarity	135
:OUTPut:SPOLarity	135
Status Subsystem (:STATus)	136
:OPERation:BASeband:CONDition	136
:OPERation:BASeband:ENABle	136
:OPERation:BASeband:NTRansition	137
:OPERation:BASeband:PTRansition	137
:OPERation:BASeband[:EVENT]	138

:OPERation:CONDition	138
:OPERation:ENABle	139
:OPERation:NTRansition	139
:OPERation:PTRansition	140
:OPERation[::EVENT]	140
:PRESet	140
:QUEStionable:BERT:CONDition	141
:QUEStionable:BERT:ENABle	141
:QUEStionable:BERT:NTRansition	142
:QUEStionable:BERT:PTRansition	142
:QUEStionable:BERT[::EVENT]	143
:QUEStionable:CALibration:CONDition	143
:QUEStionable:CALibration:ENABle	143
:QUEStionable:CALibration:NTRansition	144
:QUEStionable:CALibration:PTRansition	144
:QUEStionable:CALibration[::EVENT]	145
:QUEStionable:CONDition	145
:QUEStionable:ENABle	146
:QUEStionable:FREQuency:CONDition	146
:QUEStionable:FREQuency:ENABle	146
:QUEStionable:FREQuency:NTRansition	147
:QUEStionable:FREQuency:PTRansition	147
:QUEStionable:FREQuency[::EVENT]	147
:QUEStionable:MODulation:CONDition	148
:QUEStionable:MODulation:ENABle	148
:QUEStionable:MODulation:NTRansition	149
:QUEStionable:MODulation:PTRansition	149
:QUEStionable:MODulation[::EVENT]	149
:QUEStionable:NTRansition	150
:QUEStionable:POWer:CONDition	150
:QUEStionable:POWer:ENABle	151
:QUEStionable:POWer:NTRansition	151
:QUEStionable:POWer:PTRansition	151
:QUEStionable:POWer[::EVENT]	152
:QUEStionable:PTRansition	152
:QUEStionable[::EVENT]	153
System Subsystem (::SYSTem)	154
:CAPability	154

---

# Contents

:DATE	154
:ERRor[:NEXT]	155
:ERRor:SCPI[:SYNTAX]	155
:FILEsystem:SAFEmode	155
:HELP:MODE	156
:IDN	156
:LANGuage	156
:OPT	157
:PON:TYPE	157
:PRESet	158
:PRESet:ALL	158
:PRESet:LANGuage	158
:PRESet:PERsistent	159
:PRESet:PN9	159
:PRESet:TYPE	160
:PRESet[:USER]:SAVE	160
:SECurity:DISPlay	160
:SECurity:ERASeall	161
:SECurity:LEVel	161
:SECurity:LEVel:STATe	162
:SECurity:OVERwrite	163
:SECurity:SANitize	163
:SSAVer:DELay	163
:SSAVer:MODE	164
:SSAVer:STATe	164
:TIME	165
:VERSion	165
Trigger Subsystem	166
:ABORt	166
:INITiate:CONTInuous[:ALL]	166
:INITiate[:IMMediate][:ALL]	167
:TRIGger:OUTPut:POLarity	167
:TRIGger[:SEQuence]:SLOPe	168
:TRIGger[:SEQuence]:SOURce	168
:TRIGger[:SEQuence][:IMMediate]	169
Unit Subsystem (:UNIT)	170
:POWer	170

<b>4. Analog Commands</b> .....	<b>171</b>
Amplitude Modulation Subsystem ([:SOURce]) .....	172
:AM[1]2.... .....	172
:AM:INteRnal:FREQuency:STEP[:INCRement] .....	172
:AM:WIDeband:STATe..... .....	173
:AM[1]2:EXteRnal[1]2:COUPLing .....	173
:AM[1]2:INteRnal[1]:FREQuency..... .....	174
:AM[1]2:INteRnal[1]:FREQuency:ALteRnate..... .....	174
:AM[1]2:INteRnal[1]:FREQuency:ALteRnate:AMPLitude:PERCent..... .....	175
:AM[1]2:INteRnal[1]:FUNctIon:SHAPE..... .....	175
:AM[1]2:INteRnal[1]:SWEep:TIME .....	175
:AM[1]2:INteRnal[1]:SWEep:TRIGger..... .....	176
:AM[1]2:SOURce..... .....	176
:AM[1]2:STATe .....	177
:AM[1]2[:DEPT]h .....	177
:AM[1]2[:DEPT]h:TRACk .....	178
:AM[:DEPT]h:STEP[:INCRement] .....	178
Frequency Modulation Subsystem ([:SOURce]) .....	179
:FM[1]2.... .....	179
:FM:INteRnal:FREQuency:STEP[:INCRement] .....	180
:FM[1]2:EXteRnal[1]2:COUPLing .....	180
:FM[1]2:INteRnal[1]:FREQuency .....	181
:FM[1]2:INteRnal[1]:FREQuency:ALteRnate .....	181
:FM[1]2:INteRnal[1]:FREQuency:ALteRnate:AMPLitude:PERCent..... .....	182
:FM[1]2:INteRnal[1]:FUNctIon:SHAPE..... .....	182
:FM[1]2:INteRnal[1]:SWEep:TIME .....	183
:FM[1]2:INteRnal[1]:SWEep:TRIGger..... .....	183
:FM[1]2:SOURce..... .....	184
:FM[1]2:STATe..... .....	184
:FM[1]2[:DEV]iation .....	185
:FM[1]2[:DEV]iation:TRACk .....	185
Low Frequency Output Subsystem ([:SOURce]:LFOutput) .....	186
:AMPLitude..... .....	186
:FUNctIon[1]:FREQuency .....	186
:FUNctIon[1]:FREQuency:ALteRnate .....	187
:FUNctIon[1]:FREQuency:ALteRnate:AMPLitude:PERCent..... .....	187
:FUNctIon[1]:PERiod..... .....	188
:FUNctIon[1]:PWIDth..... .....	188

---

## Contents

:FUNction[1]:SHApe .....	189
:FUNction[1]:SWEep:TIME .....	189
:FUNction[1]:SWEep:TRIGger .....	189
:SOURce .....	190
:STATe .....	190
Phase Modulation Subsystem ([:SOURce]) .....	191
:PM[1]2.....	191
:PM:INternal:FREQuency:STEP[:INCRement] .....	192
:PM[1]2:BANDwidth BWIDth .....	192
:PM[1]2:EXternal[1]:COUPling .....	193
:PM[1]2:INternal[1]:FREQuency .....	193
:PM[1]2:INternal[1]:FREQuency:ALtErnate .....	194
:PM[1]2:INternal[1]:FREQuency:ALtErnate:AMPLitude:PERCent .....	194
:PM[1]2:INternal[1]:FUNction:SHApe .....	195
:PM[1]2:INternal[1]:SWEep:TIME .....	195
:PM[1]2:INternal[1]:SWEep:TRIGger .....	195
:PM[1]2:SOURce .....	196
:PM[1]2:STATe .....	196
:PM[1]2[:DEVIation] .....	197
:PM[1]2[:DEVIation]:TRACk .....	197
:PM[:DEVIation]:STEP[:INCRement] .....	198
Pulse Modulation Subsystem ([:SOURce]:PULM) .....	199
:INternal[1]:FREQuency .....	199
:INternal[1]:FREQuency:STEP .....	199
:INternal[1]:FUNction:SHApe .....	200
:INternal[1]:PERiod .....	200
:INternal[1]:PERiod:STEP[:INCRement] .....	200
:INternal[1]:PWIDth .....	201
:INternal[1]:PWIDth:STEP .....	201
:SOURce .....	202
:STATe .....	202
<b>5. Component Test Digital Commands .....</b>	<b>203</b>
All Subsystem–Option 001/601 or 002/602 ([:SOURce]) .....	204
:RADio:ALL:OFF .....	204
AWGN ARB Subsystem–Option 403 ([:SOURce]:RADio:AWGN:ARB) .....	205
:BWIDth .....	205
:IQ:EXternal:FILTer .....	205

:IQ:EXternal:FILTer:AUTO . . . . .	206
:HEADer:CLEar . . . . .	206
:HEADer:SAVE. . . . .	206
:IQ:MODulation:ATTen . . . . .	207
:IQ:MODulation:ATTen:AUTO . . . . .	207
:IQ:MODulation:FILTer . . . . .	208
:IQ:MODulation:FILTer:AUTO . . . . .	208
:MDEStination:AAMPLitude. . . . .	209
:MDEStination:ALCHold . . . . .	209
:MDEStination:PULSe . . . . .	210
:MPOLarity:MARKer1 2 3 4. . . . .	212
:LENgth. . . . .	212
:REFerence:EXternal:FREQuency. . . . .	212
:REFerence[:SOURce] . . . . .	213
:SCLock:RATE . . . . .	213
:SEED . . . . .	214
[:STATe] . . . . .	214
CDMA ARB Subsystem–Option 401 ([:SOURce]:RADio:CDMA:ARB) . . . . .	215
:CLIPping:I . . . . .	215
:CLIPping:POSition . . . . .	215
:CLIPping:Q . . . . .	215
:CLIPping:TYPE. . . . .	216
:CLIPping[:IJQ] . . . . .	216
:CRATe . . . . .	216
:IQ:EXternal:FILTer. . . . .	217
:IQ:EXternal:FILTer:AUTO. . . . .	217
:FILTer. . . . .	218
:FILTer:ALPHa . . . . .	219
:FILTer:BBT . . . . .	219
:FILTer:CHANnel . . . . .	220
:HEADer:CLEar . . . . .	220
:HEADer:SAVE. . . . .	220
:IQMap . . . . .	221
:IQ:MODulation:ATTen . . . . .	221
:IQ:MODulation:ATTen:AUTO . . . . .	221
:IQ:MODulation:FILTer . . . . .	222
:IQ:MODulation:FILTer:AUTO . . . . .	222
:MDEStination:AAMPLitude. . . . .	222

---

# Contents

:MDEStination:ALCHold . . . . .	223
:MDEStination:PULSe . . . . .	224
:MPOLarity:MARKer1 2 3 4 . . . . .	226
:OSAMple . . . . .	226
:REFErrence:EXTErnal:FREQUency . . . . .	226
:REFErrence[:SOURce] . . . . .	227
:RETRigger . . . . .	227
:SCLock:RATE . . . . .	228
:SETup . . . . .	228
:SETup:CHANnel . . . . .	229
:SETup:MCARrier . . . . .	230
:SETup:MCARrier:STORE . . . . .	231
:SETup:MCARrier:TABLE . . . . .	231
:SETup:STORE . . . . .	232
:TRIGger:TYPE . . . . .	233
:TRIGger:TYPE:CONTInuous[:TYPE] . . . . .	234
:TRIGger:TYPE:GATE:ACTive . . . . .	235
:TRIGger[:SOURce] . . . . .	235
:TRIGger[:SOURce]:EXTErnal:DELAy . . . . .	236
:TRIGger[:SOURce]:EXTErnal:DELAy:STATe . . . . .	237
:TRIGger[:SOURce]:EXTErnal:SLOPe . . . . .	237
:TRIGger[:SOURce]:EXTErnal[:SOURce] . . . . .	238
:WLENgth . . . . .	238
[:STATe] . . . . .	239
CDMA2000 ARB Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000:ARB) . . . . .	240
:CLIPping:I . . . . .	240
:CLIPping:POSition . . . . .	240
:CLIPping:Q . . . . .	240
:CLIPping:TYPE . . . . .	241
:CLIPping[:IJQ] . . . . .	241
:IQ:EXTErnal:FILTer . . . . .	241
:IQ:EXTErnal:FILTer:AUTO . . . . .	242
:FILTer . . . . .	242
:FILTer:ALPHa . . . . .	243
:FILTer:BBT . . . . .	244
:FILTer:CHANnel . . . . .	244
:HEADer:CLEAr . . . . .	245
:HEADer:SAVE . . . . .	245



:IQ:MODulation:ATTen	245
:IQ:MODulation:ATTen:AUTO	246
:IQ:MODulation:FILTer	246
:IQ:MODulation:FILTer:AUTO	246
:IQMap	247
:LINK	247
:LINK:FORWard:SETup	247
:LINK:FORWard:SETup:MCARrier	248
:LINK:FORWard:SETup:MCARrier:STORE	249
:LINK:FORWard:SETup:MCARrier:TABLE	249
:LINK:FORWard:SETup:MCARrier:TABLE:NCARriers	250
:LINK:FORWard:SETup:STORE	251
:LINK:FORWard:SETup:TABLE:APPLY	251
:LINK:FORWard:SETup:TABLE:CHANnel	252
:LINK:FORWard:SETup:TABLE:NCHannels	253
:LINK:FORWard:SETup:TABLE:PADJust	253
:LINK:REVerse:RCONfig	253
:LINK:REVerse:SETup	254
:LINK:REVerse:SETup:STORE	254
:LINK:REVerse:SETup:TABLE:APPLY	255
:LINK:REVerse:SETup:TABLE:CHANnel	255
:LINK:REVerse:SETup:TABLE:NCHannels	256
:LINK:REVerse:SETup:TABLE:PADJust	256
:MDEStination:AAMPLitude	257
:MDEStination:ALCHold	257
:MDEStination:PULSe	258
:MPOLarity:MARKer1 2 3 4	260
:REFerence:EXTernal:FREQuency	260
:REFerence[:SOURce]	260
:RETRigger	261
:REVision	261
:SCLock:RATE	262
:SPReading:RATE	262
:SPReading:TYPE	263
:SPReading:TYPE:MCARrier:SPACing	263
:TRIGger:TYPE	263
:TRIGger:TYPE:CONtinuous[:TYPE]	265
:TRIGger:TYPE:GATE:ACTive	266

---

## Contents

:TRIGger[:SOURce]	266
:TRIGger[:SOURce]:EXTernal:DELay	267
:TRIGger[:SOURce]:EXTernal:DELay:STATe	268
:TRIGger[:SOURce]:EXTernal:SLOPe	268
:TRIGger[:SOURce]:EXTernal[:SOURce]	269
[:STATe]	269
Dmodulation Subsystem–Option 001/601 or 002/602 ([:SOURce]:RADio:DMODulation:ARB)	270
:IQ:EXTernal:FILTer	270
:IQ:EXTernal:FILTer:AUTO	270
:FILTer	271
:FILTer:ALPHa	272
:FILTer:BBT	272
:FILTer:CHANnel	273
:HEADer:CLEar	273
:HEADer:SAVE	273
:IQ:MODulation:ATTen	274
:IQ:MODulation:ATTen:AUTO	274
:IQ:MODulation:FILTer	275
:IQ:MODulation:FILTer:AUTO	275
:MDESTination:AAMPLitude	276
:MDESTination:ALCHold	276
:MDESTination:PULSe	277
:MODulation:FSK[:DEViation]	279
:MODulation[:TYPE]	279
:MPOLarity:MARKer1 2 3 4	280
:REFerence:EXTernal:FREQuency	280
:REFerence[:SOURce]	281
:RETRigger	281
:SCLock:RATE	282
:SETup	282
:SETup:MCARrier	283
:SETup:MCARrier:PHASe	283
:SETup:MCARrier:STORE	284
:SETup:MCARrier:TABLE	284
:SETup:MCARrier:TABLE:NCARriers	285
:SETup:STORE	285
:SRAtE	286
:TRIGger:TYPE	287

:TRIGger:TYPE:CONTinuous[:TYPE]	288
:TRIGger:TYPE:GATE:ACTive	289
:TRIGger[:SOURce]	290
:TRIGger[:SOURce]:EXTernal:DELay	291
:TRIGger[:SOURce]:EXTernal:DELay:STATe	291
:TRIGger[:SOURce]:EXTernal:SLOPe	292
:TRIGger[:SOURce]:EXTernal[:SOURce]	292
[:STATe]	293
Dual ARB Subsystem–Option 001/601 or 002/602 ([:SOURce]:RADio:ARB)	294
:CLIPping	294
:GENerate:SINE	294
:HEADer:CLEar	295
:HEADer:RMS	295
:HEADer:SAVE	297
:HCRest[:STATe]	297
:IQ:EXTernal:FILTer	298
:IQ:EXTernal:FILTer:AUTO	298
:IQ:MODulation:ATTen	298
:IQ:MODulation:ATTen:AUTO	299
:IQ:MODulation:FILTer	299
:IQ:MODulation:FILTer:AUTO	300
:MARKer:CLEar	300
:MARKer:CLEar:ALL	301
:MARKer:ROTate	302
:MARKer:[SET]	302
:MDESTination:AAMPLitude	305
:MDESTination:ALCHold	305
:MDESTination:PULSe	306
:MPOLarity:MARKer1 2 3 4	308
:NOISe:BFACtor	308
:NOISe:CBWidth	309
:NOISe:CN	309
:NOISe[:STATe]	310
:REFerence:EXTernal:FREQuency	310
:REFerence[:SOURce]	311
:RETRigger	311
:RSCALing	312
:SCALing	312

---

## Contents

:SCLock:RATE	313
:SEquence	313
:TRIGger:TYPE	315
:TRIGger:TYPE:CONTInuous[:TYPE]	317
:TRIGger:TYPE:GATE:ACTive	317
:TRIGger:TYPE:SADVance[:TYPE]	318
:TRIGger:TYPE:SADVance[:TYPE]	318
:TRIGger[:SOURce]	320
:TRIGger[:SOURce]:EXTernal:DELay:SAMPles	321
:TRIGger[:SOURce]:EXTernal:DELay:STATe OFF ON 1 0	321
:TRIGger[:SOURce]:EXTernal:DELay:STATe	321
:TRIGger[SOURce]:EXTernal:DELay[:TIME]	322
:TRIGger[:SOURce]:EXTernal:SLOPe	322
:TRIGger[:SOURce]:EXTernal[:SOURce]	323
:WAVEform	323
:Waveform:NHEADers	324
[:STATe]	324
Multitone Subsystem—Option 001/601 or 002/602 ([:SOURce]:RADio:MTONe:ARB)	326
Creating a Multitone Waveform	326
:HEADer:CLEAr	326
:HEADer:SAVE	326
:IQ:EXTernal:FILTer	327
:IQ:EXTernal:FILTer:AUTO	327
:IQ:MODulation:ATTen	328
:IQ:MODulation:ATTen:AUTO	328
:IQ:MODulation:FILTer	329
:IQ:MODulation:FILTer:AUTO	329
:MDESTination:AAMPLitude	329
:MDESTination:ALCHold	330
:MDESTination:PULSe	331
:MPOLarity:MARKer1 2 3 4	333
:REFerence:EXTernal:FREQUency	333
:REFerence[:SOURce]	333
:ROW	334
:RSCAling	335
:SCLock:RATE	335
:SETup	336
:SETup:STORe	336

:SETup:TABLE	336
:SETup:TABLE:FSPacing	337
:SETup:TABLE:NTONes	337
:SETup:TABLE:PHASe:INITialize	338
:SETup:TABLE:PHASe:INITialize:SEED	338
[:STATe]	339
Wideband CDMA ARB Subsystem–Option 400	
([:SOURce]:RADio:WCDMa:TGPP:ARB)	340
:CLIPping:I	340
:CLIPping:POSition	340
:CLIPping:Q	340
:CLIPping:TYPE	341
:CLIPping[:IJQ]	341
:CRATe	342
:FILTer	342
:FILTer:ALPHa	343
:FILTer:BBT	343
:FILTer:CHANnel	344
:HEADer:CLEar	344
:HEADer:SAVE	344
:IQ:EXTernal:FILTer	344
:IQ:EXTernal:FILTer:AUTO	345
:IQMap	345
:IQ:MODulation:ATTen	346
:IQ:MODulation:ATTen:AUTO	346
:IQ:MODulation:FILTer	346
:IQ:MODulation:FILTer:AUTO	347
:LINK	347
:LINK:DOWN:OACP	347
:LINK:DOWN:SETup	348
:LINK:DOWN:SETup:MCARrier	349
:LINK:DOWN:SETup:MCARrier:CLIPping:I	350
:LINK:DOWN:SETup:MCARrier:CLIPping:Q	351
:LINK:DOWN:SETup:MCARrier:CLIPping:TYPE	351
:LINK:DOWN:SETup:MCARrier:CLIPping[:IJQ]	351
:LINK:DOWN:SETup:MCARrier:SCODE:AINCrement	352
:LINK:DOWN:SETup:MCARrier:STORE	352
:LINK:DOWN:SETup:MCARrier:TABLE	353
:LINK:DOWN:SETup:MCARrier:TABLE:NCARriers	355

---

## Contents

:LINK:DOWN:SETup:MCARrier:TOFFset:AInCrement	355
:LINK:DOWN:SETup:STORe	355
:LINK:DOWN:SETup:TABLE:APPLy	356
:LINK:DOWN:SETup:TABLE:CHANnel	356
:LINK:DOWN:SETup:TABLE:NCHannels?	361
:LINK:DOWN:SETup:TABLE:PADJust	361
:LINK:DOWN:TFCI	361
:LINK:UP:OACP	362
:LINK:UP:SCRAMBLE	362
:LINK:UP:SDPDch	362
:LINK:UP:SETup	363
:LINK:UP:SETup:STORe	364
:LINK:UP:SETup:TABLE:APPLy	364
:LINK:UP:SETup:TABLE:CHANnel	364
:LINK:UP:SETup:TABLE:GUNit	366
:LINK:UP:SETup:TABLE:NCHannel	366
:LINK:UP:TFCI	366
:MDEStination:AAMPLitude	367
:MDEStination:ALCHold	367
:MDEStination:PULSe	368
:MPOLarity:MARKer1 2 3 4	370
:REFerence:EXTernal:FREQuency	370
:REFerence[:SOURce]	370
:RETRigger	371
:REVision	371
:SCLock:RATE	372
:TRIGger:TYPE	372
:TRIGger:TYPE:CONTinuous[:TYPE]	374
:TRIGger:TYPE:GATE:ACTive	374
:TRIGger[:SOURce]	375
:TRIGger[:SOURce]:EXTernal:DELay	376
:TRIGger[:SOURce]:EXTernal:DELay:STATe	376
:TRIGger[:SOURce]:EXTernal:SLOPe	377
:TRIGger[:SOURce]:EXTernal[:SOURce]	377
[:STATe]	378

# SCPI Command Reference, Volume 2

<b>6. Digital Signal Interface Module Commands</b> .....	<b>379</b>
Digital Subsystem—Option 003 and 004 ([:SOURce]) .....	380
:DIgital:CLOCK:CPS 1 2 4 .....	380
:DIgital:CLOCK:PHASe .....	380
:DIgital:CLOCK:POLarity .....	381
:DIgital:CLOCK:RATE .....	382
:DIgital:CLOCK:REFerence:FREQuency .....	382
:DIgital:CLOCK:SKEW .....	383
:DIgital:CLOCK:SOURCe .....	383
:DIgital:DATA:ALIGNment .....	384
:DIgital:DATA:BORDER .....	384
:DIgital:DATA:DIRection .....	385
:DIgital:DATA:IGain .....	385
:DIgital:DATA:INEGate .....	386
:DIgital:DATA:IOFFset .....	386
:DIgital:DATA:IQSWap .....	387
:DIgital:DATA:NFORmat .....	387
:DIgital:DATA:POLarity:FRAMe .....	387
:DIgital:DATA:POLarity:IQ .....	388
:DIgital:DATA:QGain .....	388
:DIgital:DATA:QNEGate .....	389
:DIgital:DATA:QOFFset .....	390
:DIgital:DATA:ROTation .....	390
:DIgital:DATA:SCALing .....	391
:DIgital:DATA:SIZE .....	391
:DIgital:DATA:STYPe .....	392
:DIgital:DATA:TYPE .....	392
:DIgital:DIAGnostic:LOOPback .....	393
:DIgital:LOGic[:TYPE] .....	393
:DIgital:PCONfig .....	394
:DIgital:PRESet:PTHRough .....	395
:DIgital[:STATe] .....	395
<b>7. Bit Error Rate Test (BERT) Commands</b> .....	<b>397</b>
Calculate Subsystem—Option UN7 and 300 (:CALCulate:BERT) .....	398

---

# Contents

:BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria:ERATe	398
:BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria[:SElect]	398
:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria:ERATe	399
:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria[:SElect]	399
:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria:ERATe	399
:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria[:SElect]	400
:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria:ERATe	400
:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria[:SElect]	401
:BTS:LOOPback:GSM:CS1:COMParator:CRITeria:ERATe	401
:BTS:LOOPback:GSM:CS1:COMParator:CRITeria[:SElect]	402
:BTS:LOOPback:GSM:CS4:COMParator:CRITeria:ERATe	402
:BTS:LOOPback:GSM:CS4:COMParator:CRITeria[:SElect]	402
:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria:ERATe	403
:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria[:SElect]	403
:BTS:LOOPback:GSM:COMParator:CRITeria:CIB	404
:BTS:LOOPback:GSM:COMParator:CRITeria:CII	404
:BTS:LOOPback:GSM:COMParator:CRITeria:FERasure	404
:BTS:LOOPback:GSM:COMParator:CRITeria[:SElect]	405
[:BAsEband]:COMParator:MODE	405
[:BAsEband]:COMParator:THReshold	406
[:BAsEband]:COMParator[:STATe]	406
[:BAsEband]:DISPlay:MODE:	407
[:BAsEband]:DISPlay:UPDate:	407
Data Subsystem–Option UN7 and 300 (:DATA)	408
:BERT:BTS:LOOPback:EDGE:ETCH:F43[:DATA]	408
:BERT:BTS:LOOPback:EDGE:MCS5[:DATA]	409
:BERT:BTS:LOOPback:EDGE:MCS9[:DATA]	410
:BERT:BTS:LOOPback:EDGE:UNCoded[:DATA]	410
:BERT:BTS:LOOPback:GSM[:DATA]	410
:BERT:BTS:LOOPback:GSM:CS1[:DATA]	412
:BERT:BTS:LOOPback:GSM:CS4[:DATA]	413
:BERT:BTS:LOOPback:GSM:MCS1[:DATA]	413
:BERT:AUXout	413
[:DATA]	415
Input Subsystem–Option UN7 (:INPut:BERT[: BAsEband])	416
:CGATe:DELAy:CLOCK	416
:CGATe:DELAy:MODE	416
:CGATe:DELAy:TIME	417



:CGATe:DELAy[:STATe]. . . . .	417
:CGATe:POLarity . . . . .	418
:CGATe[:STATe]. . . . .	418
:CLOCK:DELAy:RESolution . . . . .	418
:CLOCK:DELAy:TIME. . . . .	419
:CLOCK:DELAy[:STATe]. . . . .	419
:CLOCK:POLarity . . . . .	420
:DATA:POLarity . . . . .	420
:IMPedance . . . . .	420
:THReshold . . . . .	421
Measure Subsystem—Option 300 (:MEASure[:SCALar]:BERT:BTS:LOOPback) . . . . .	422
:EDGE:MCS5[:SENSitivity] . . . . .	422
:EDGE:MCS9[:SENSitivity] . . . . .	422
:EDGE:UNCoded[:SENSitivity]. . . . .	423
:GSM[:SENSitivity] . . . . .	424
Sense Subsystem—Options UN7 and 300 ([:SOURce]:SENSe:BERT) . . . . .	425
:BTS:LOOPback:EDGE:ETCH:F43:BLOCK:COUNt. . . . .	425
:BTS:LOOPback:EDGE:ETCH:F43:CONTAin . . . . .	425
:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria:EBLock . . . . .	426
:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria[:SElect] . . . . .	426
:BTS:LOOPback:EDGE:FTRIgger:EXTernal:DELAy . . . . .	427
:BTS:LOOPback:EDGE:FTRIgger:EXTernal:POLarity . . . . .	427
:BTS:LOOPback:EDGE:FTRIgger[SElect] . . . . .	428
:BTS:LOOPback:EDGE:MCS5:BLOCK:COUNt. . . . .	428
:BTS:LOOPback:EDGE:MCS5:CONTAin . . . . .	429
:BTS:LOOPback:EDGE:MCS5:ESENSitivity . . . . .	429
:BTS:LOOPback:EDGE:MCS5:HAMPLitude . . . . .	429
:BTS:LOOPback:EDGE:MCS5:LAMPLitude. . . . .	430
:BTS:LOOPback:EDGE:MCS5:PAMPLitude . . . . .	430
:BTS:LOOPback:EDGE:MCS5:SBLock:COUNt . . . . .	430
:BTS:LOOPback:EDGE:MCS5:SBLock:INITial. . . . .	431
:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria:EBLock. . . . .	431
:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria[:SElect] . . . . .	431
:BTS:LOOPback:EDGE:MCS9:BLOCK:COUNt. . . . .	432
:BTS:LOOPback:EDGE:MCS9:CONTAin . . . . .	432
:BTS:LOOPback:EDGE:MCS9:ESENSitivity . . . . .	432
:BTS:LOOPback:EDGE:MCS9:HAMPLitude . . . . .	433
:BTS:LOOPback:EDGE:MCS9:LAMPLitude. . . . .	433

---

# Contents

:BTS:LOOPback:EDGE:MCS9:PAMPlitude . . . . .	434
:BTS:LOOPback:EDGE:MCS9:SBLock:COUNT . . . . .	434
:BTS:LOOPback:EDGE:MCS9:SBLock:INITial . . . . .	434
:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria:EBLock . . . . .	435
:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria[:SElect] . . . . .	435
:BTS:LOOPback:EDGE:MEASurement:STOP . . . . .	435
:BTS:LOOPback:EDGE:MEASurement:TSLot . . . . .	436
:BTS:LOOPback:EDGE:MEASurement[:MODE] . . . . .	436
:BTS:LOOPback:EDGE:SINVert . . . . .	437
:BTS:LOOPback:EDGE:SYNC:AGAIN . . . . .	437
:BTS:LOOPback:EDGE:SYNC:RF . . . . .	437
:BTS:LOOPback:EDGE:SYNC[:SOURce] . . . . .	438
:BTS:LOOPback:EDGE:TRIGger[:SOURce] . . . . .	438
:BTS:LOOPback:EDGE:ULINK:OFFSet . . . . .	439
:BTS:LOOPback:EDGE:UNCoded:BIT:COUNT . . . . .	439
:BTS:LOOPback:EDGE:UNCoded:ESENSitivity . . . . .	439
:BTS:LOOPback:EDGE:UNCoded:HAMPLitude . . . . .	440
:BTS:LOOPback:EDGE:UNCoded:LAMPLitude . . . . .	440
:BTS:LOOPback:EDGE:UNCoded:PAMPLitude . . . . .	441
:BTS:LOOPback:EDGE:UNCoded:SBIT:COUNT . . . . .	441
:BTS:LOOPback:EDGE:UNCoded:SBIT:INITial . . . . .	441
:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria:EBIT . . . . .	442
:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria[:SElect] . . . . .	442
:BTS:LOOPback:EDGE[:STATE] . . . . .	442
:BTS:LOOPback:GSM:CS1:BLOCK:COUNT . . . . .	443
:BTS:LOOPback:GSM:CS1:CONTain . . . . .	443
:BTS:LOOPback:GSM:CS1:STOP:CRITeria:EBLock . . . . .	444
:BTS:LOOPback:GSM:CS1:STOP:CRITeria[:SElect] . . . . .	444
:BTS:LOOPback:GSM:CS4:BLOCK:COUNT . . . . .	444
:BTS:LOOPback:GSM:CS4:CONTain . . . . .	445
:BTS:LOOPback:GSM:CS4:STOP:CRITeria:EBLock . . . . .	445
:BTS:LOOPback:GSM:CS4:STOP:CRITeria[:SElect] . . . . .	446
:BTS:LOOPback:GSM:ESENSitivity . . . . .	446
:BTS:LOOPback:GSM:FRAME:CIB . . . . .	446
:BTS:LOOPback:GSM:FRAME:CII . . . . .	446
:BTS:LOOPback:GSM:FRAME:COUNT . . . . .	447
:BTS:LOOPback:GSM:HAMPLitude . . . . .	447
:BTS:LOOPback:GSM:LAMPLitude . . . . .	447

:BTS:LOOPback:GSM:MCS1:BLOCK:COUNT	448
:BTS:LOOPback:GSM:MCS1:CONTain	448
:BTS:LOOPback:GSM:MCS1:STOP:CRITeria:EBLock	448
:BTS:LOOPback:GSM:MCS1:STOP:CRITeria[:SELEct]	449
:BTS:LOOPback:GSM:MEASurement:STOP	449
:BTS:LOOPback:GSM:MEASurement:TSLot	449
:BTS:LOOPback:GSM:MEASurement[:MODE]	450
:BTS:LOOPback:GSM:PAMplitude	450
:BTS:LOOPback:GSM:SFRame:COUNT	450
:BTS:LOOPback:GSM:SFRame:INITial	451
:BTS:LOOPback:GSM:SINVert	451
:BTS:LOOPback:GSM:STOP:CRITeria:CIB	451
:BTS:LOOPback:GSM:STOP:CRITeria:CII	452
:BTS:LOOPback:GSM:STOP:CRITeria:FERasure	452
:BTS:LOOPback:GSM:STOP:CRITeria[:SELEct]	452
:BTS:LOOPback:GSM:SYNC:RF	453
:BTS:LOOPback:GSM:SYNC[:SOURce]	454
:BTS:LOOPback:GSM:TRIGger[:SOURce]	454
:BTS:LOOPback:GSM:ULINK:OFFSet	455
:BTS:LOOPback:GSM[:STATe]	455
[:BASeband]:PRBS:FUNcTION:SPIGnore:DATA	455
[:BASeband]:PRBS:FUNcTION:SPIGnore[:STATe]	456
[:BASeband]:PRBS[:DATA]	456
[:BASeband]:RSYNc:THReshold	456
[:BASeband]:RSYNc[:STATe]	457
[:BASeband]:STATe	457
[:BASeband]:STOP:CRITeria:EBIT	457
[:BASeband]:STOP:CRITeria[:SELEct]	458
[:BASeband]:TBITs	458
[:BASeband]:TRIGger:BDELay	459
[:BASeband]:TRIGger:BDELay:STATe	459
[:BASeband]:TRIGger:COUNT	459
[:BASeband]:TRIGger:POLarity	460
[:BASeband]:TRIGger[:SOURce]	460

**8. Receiver Test Digital Commands . . . . . 461**

All Subsystem—Option 001/601 or 002/602 ([:SOURce])	462
:RADio:ALL:OFF	462

---

# Contents

AWGN Real-Time Subsystem–Option 403 ([:SOURce]:RADio:AWGN:RT) . . . . .	463
:BWIDth . . . . .	463
[:STATe] . . . . .	463
Bluetooth Subsystem–Option 406 ([:SOURce]:RADio:BLUEtooth:ARB) . . . . .	464
:AMADdr . . . . .	464
:BDADdr . . . . .	464
:BURSt[:STATe] . . . . .	464
:CGDelay . . . . .	465
:DATA . . . . .	465
:IQ:EXTernal:FILTer . . . . .	466
:IQ:EXTernal:FILTer:AUTO . . . . .	466
:HEADer:CLEar . . . . .	467
:HEADer:SAVE . . . . .	467
:IMPairments . . . . .	467
:IMPairments:AWGN . . . . .	468
:IMPairments:AWGN:CNR . . . . .	468
:IMPairments:AWGN:NSEed . . . . .	469
:IMPairments:DDEVIation . . . . .	469
:IMPairments:FDType . . . . .	470
:IMPairments:FOFFset . . . . .	470
:IMPairments:MINdex . . . . .	471
:IMPairments:STERror . . . . .	472
:IQ:MODulation:ATTen . . . . .	472
:IQ:MODulation:ATTen:AUTO . . . . .	473
:IQ:MODulation:FILTer . . . . .	473
:IQ:MODulation:FILTer:AUTO . . . . .	474
:MDEStination:AAMplitude . . . . .	474
:MDEStination:ALCHold . . . . .	474
:MDEStination:PULSe . . . . .	475
:MPOLarity:MARKer1 2 3 4 . . . . .	475
:MPOLarity:MARKer1 . . . . .	475
:MPOLarity:MARKer2 . . . . .	476
:MPOLarity:MARKer3 . . . . .	476
:MPOLarity:MARKer4 . . . . .	476
:PACKet . . . . .	476
:REFerence:EXTernal:FREQuency . . . . .	477
:REFerence[:SOURce] . . . . .	477
:RSYMBOLs . . . . .	478

:SCLock:RATE .....	478
[:STATe] .....	478
CDMA2000 BBG Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000[:BBG]) .....	479
:LMODe .....	479
[:FORWard]:BBCLock .....	480
[:FORWard]:CHIPrate .....	480
[:FORWard]:ESDelay .....	480
[:FORWard]:FILTer .....	481
[:FORWard]:FILTer:ALPHa .....	482
[:FORWard]:FILTer:BBT .....	482
[:FORWard]:FILTer:CHANnel .....	482
[:FORWard]:LCState .....	483
[:FORWard]:FFCH:DATA .....	483
[:FORWard]:FFCH:DATA:FIX4 .....	484
[:FORWard]:FFCH:EBNO .....	484
[:FORWard]:FFCH:FOFFset .....	485
[:FORWard]:FFCH:LCMask .....	485
[:FORWard]:FFCH:LCMask:ESN .....	486
[:FORWard]:FFCH:LCMask:HEADer .....	486
[:FORWard]:FFCH:POWer .....	486
[:FORWard]:FFCH:PRAMp .....	487
[:FORWard]:FFCH:PRTime .....	487
[:FORWard]:FFCH:QOF .....	487
[:FORWard]:FFCH:RATE .....	488
[:FORWard]:FFCH:RCONfig .....	488
[:FORWard]:FFCH:WALSh .....	488
[:FORWard]:FFCH[:STATe] .....	489
[:FORWard]:FPCH:DATA .....	489
[:FORWard]:FPCH:EBNO .....	489
[:FORWard]:FPCH:LCMask .....	490
[:FORWard]:FPCH:LCMask:F1 .....	490
[:FORWard]:FPCH:LCMask:F2 .....	490
[:FORWard]:FPCH:LCMask:F3 .....	491
[:FORWard]:FPCH:MESSage .....	491
[:FORWard]:FPCH:POWer .....	491
[:FORWard]:FPCH:RATE .....	492
[:FORWard]:FPCH:WALSh .....	492
[:FORWard]:FPCH[:STATe] .....	492

---

## Contents

[:FORWARD]:FPICH:ECNO . . . . .	493
[:FORWARD]:FPICH:POWER . . . . .	493
[:FORWARD]:FPICH[:STATe]. . . . .	494
[:FORWARD]:FSCH[1]2:DATA. . . . .	494
[:FORWARD]:FSCH[1]2:DATA:FIX4. . . . .	494
[:FORWARD]:FSCH[1]2:EBNO . . . . .	495
[:FORWARD]:FSCH[1]2:FOFFset . . . . .	495
[:FORWARD]:FSCH[1]2:LCMask . . . . .	496
[:FORWARD]:FSCH[1]2:LCMask:ESN . . . . .	496
[:FORWARD]:FSCH[1]2:LCMask:HEADer . . . . .	496
[:FORWARD]:FSCH[1]2:POWER . . . . .	497
[:FORWARD]:FSCH[1]2:QOF . . . . .	497
[:FORWARD]:FSCH[1]2:RATE. . . . .	497
[:FORWARD]:FSCH[1]2:RCONfig . . . . .	498
[:FORWARD]:FSCH[1]2:TCode . . . . .	498
[:FORWARD]:FSCH[1]2:WALSh . . . . .	498
[:FORWARD]:FSCH[1]2[:STATe] . . . . .	499
[:FORWARD]:FSYNc:CFRequency . . . . .	499
[:FORWARD]:FSYNc:DAYLt. . . . .	499
[:FORWARD]:FSYNc:EBNO . . . . .	500
[:FORWARD]:FSYNc:ECFRequency . . . . .	500
[:FORWARD]:FSYNc:LPSec . . . . .	501
[:FORWARD]:FSYNc:LTMoff . . . . .	501
[:FORWARD]:FSYNc:MPREv . . . . .	501
[:FORWARD]:FSYNc:MSGType . . . . .	502
[:FORWARD]:FSYNc:NID . . . . .	502
[:FORWARD]:FSYNc:POWER. . . . .	502
[:FORWARD]:FSYNc:PRATe . . . . .	503
[:FORWARD]:FSYNc:PREV . . . . .	503
[:FORWARD]:FSYNc:RESErved . . . . .	503
[:FORWARD]:FSYNc:SID . . . . .	504
[:FORWARD]:FSYNc:STYPe. . . . .	504
[:FORWARD]:FSYNc:SYSTime. . . . .	504
[:FORWARD]:FSYNc:WALSh . . . . .	505
[:FORWARD]:FSYNc[:STATe]. . . . .	505
[:FORWARD]:NOISe:CN . . . . .	505
[:FORWARD]:NOISe[:STATe] . . . . .	506
[:FORWARD]:OCNS:EBNO . . . . .	506

[:FORWard]:OCNS:POWer	507
[:FORWard]:OCNS:WALSh	508
[:FORWard]:OCNS[:STATe]	508
[:FORWard]:PADJust	508
[:FORWard]:POLarity	509
[:FORWard]:QPCH:CCI	509
[:FORWard]:QPCH:EBNO	509
[:FORWard]:QPCH:PI	510
[:FORWard]:QPCH:POWer	510
[:FORWard]:QPCH:RATE	511
[:FORWard]:QPCH:WALSh	511
[:FORWard]:QPCH[:STATe]	511
[:FORWard]:SRATe	511
:PNOFfset	512
:REVerse:BBCLock	512
:REVerse:CHIPrate	513
:REVerse:ESDelay	513
:REVerse:FILTer	514
:REVerse:FILTer:ALPHa	515
:REVerse:FILTer:BBT	515
:REVerse:FILTer:CHANnel	516
:REVerse:LCMask	516
:REVerse:LCSTate	516
:REVerse:PADJust	517
:REVerse:POLarity[:ALL]	517
:REVerse:NOISe:CN	517
:REVerse:NOISe[:STATe]	518
:REVerse:RC12:ACCess:RACH:DATA	518
:REVerse:RC12:ACCess:RACH:DATA:FIX4	519
:REVerse:RC12:ACCess:RACH:EBNO	519
:REVerse:RC12:ACCess:RACH:FLENgth	520
:REVerse:RC12:ACCess:RACH:FOFFset	520
:REVerse:RC12:ACCess:RACH:POWer	520
:REVerse:RC12:ACCess:RACH:RCONfig	521
:REVerse:RC12:ACCess:RACH:RATE	521
:REVerse:RC12:ACCess:RACH[:STATe]	521
:REVerse:RC12:TRAFfic:RSCH:DATA	522
:REVerse:RC12:TRAFfic:RSCH:DATA:FIX4	522

---

# Contents

:REVerse:RC12:TRAFfic:RSCH:FLENgth	522
:REVerse:RC12:TRAFfic:RSCH:FOFFset	523
:REVerse:RC12:TRAFfic:RSCH:POWer	523
:REVerse:RC12:TRAFfic:RSCH:RATE	523
:REVerse:RC12:TRAFfic:RSCH:RCONfig	524
:REVerse:RC12:TRAFfic:RSCH[:STATe]	524
:REVerse:RC34:CCONtrol:RCCCh:DATA	524
:REVerse:RC34:CCONtrol:RCCCh:DATA:FIX4	525
:REVerse:RC34:CCONtrol:RCCCh:EBNO	525
:REVerse:RC34:CCONtrol:RCCCh:FLENgth	526
:REVerse:RC34:CCONtrol:RCCCh:FOFFset	526
:REVerse:RC34:CCONtrol:RCCCh:POWer	526
:REVerse:RC34:CCONtrol:RCCCh:RCONfig	527
:REVerse:RC34:CCONtrol:RCCCh:RATE	527
:REVerse:RC34:CCONtrol:RCCCh:WALSh	527
:REVerse:RC34:CCONtrol:RCCCh[:STATe]	528
:REVerse:RC34:CCONtrol:RPICh:ECNO	528
:REVerse:RC34:CCONtrol:RPICh:GRATe	529
:REVerse:RC34:CCONtrol:RPICh:POWer	529
:REVerse:RC34:CCONtrol:RPICh:WALSh	529
:REVerse:RC34:CCONtrol:RPICh[:STATe]	530
:REVerse:RC34:EACCess:REACH:DATA	530
:REVerse:RC34:EACCess:REACH:DATA:FIX4	530
:REVerse:RC34:EACCess:REACH:EBNO	531
:REVerse:RC34:EACCess:REACH:FOFFset	531
:REVerse:RC34:EACCess:REACH:POWer	532
:REVerse:RC34:EACCess:REACH:RCONfig	532
:REVerse:RC34:EACCess:REACH:RATE	532
:REVerse:RC34:EACCess:REACH:WALSh	533
:REVerse:RC34:EACCess:REACH[:STATe]	533
:REVerse:RC34:EACCess:RPICh:ECNO	533
:REVerse:RC34:EACCess:RPICh:GRATe	534
:REVerse:RC34:EACCess:RPICh:POWer	534
:REVerse:RC34:EACCess:RPICh:WALSh	534
:REVerse:RC34:EACCess:RPICh[:STATe]	535
:REVerse:RC34:TRAFfic:RDCCh:DATA	535
:REVerse:RC34:TRAFfic:RDCCh:DATA:FIX4	535
:REVerse:RC34:TRAFfic:RDCCh:EBNO	536



:REVerse:RC34:TRAFfic:RDCCh:FLENgth	536
:REVerse:RC34:TRAFfic:RDCCh:FOFFset	536
:REVerse:RC34:TRAFfic:RDCCh:POWer	537
:REVerse:RC34:TRAFfic:RDCCh:RATE	537
:REVerse:RC34:TRAFfic:RDDCh:RCONfig	537
:REVerse:RC34:TRAFfic:RDCCh:WALSh	538
:REVerse:RC34:TRAFfic:RDCCh[:STATe]	538
:REVerse:RC34:TRAFfic:RFCH:DATA	538
:REVerse:RC34:TRAFfic:RFCH:DATA:FIX4	539
:REVerse:RC34:TRAFfic:RFCH:EBNO	539
:REVerse:RC34:TRAFfic:RFCH:FLENgth	540
:REVerse:RC34:TRAFfic:RFCH:FOFFset	540
:REVerse:RC34:TRAFfic:RFCH:POWer	540
:REVerse:RC34:TRAFfic:RFCH:RCONfig	541
:REVerse:RC34:TRAFfic:RFCH:RATE	541
:REVerse:RC34:TRAFfic:RFCH:WALSh	541
:REVerse:RC34:TRAFfic:RFCH[:STATe]	541
:REVerse:RC34:TRAFfic:RSCH[1]2:DATA	542
:REVerse:RC34:TRAFfic:RSCH[1]2:DATA:FIX4	542
:REVerse:RC34:TRAFfic:RSCH[1]2:DATA:EBNO	542
:REVerse:RC34:TRAFfic:RSCH[1]2:FLENgth	543
:REVerse:RC34:TRAFfic:RSCH[1]2:FOFFset	543
:REVerse:RC34:TRAFfic:RSCH[1]2:POWer	544
:REVerse:RC34:TRAFfic:RSCH[1]2:RCONfig	544
:REVerse:RC34:TRAFfic:RSCH[1]2:RATE	544
:REVerse:RC34:TRAFfic:RSCH[1]2:TCODE	545
:REVerse:RC34:TRAFfic:RSCH[1]2:WALSh	545
:REVerse:RC34:TRAFfic:RSCH[1]2[:STATe]	545
:REVerse:REFeRence:EXTeRnal:FREQuency	546
:REVerse:REFeRence[:SOURce]	546
:REVerse:TADVance	546
:REVerse:TEDGe	547
:REVerse:SRATe	547
[:STATe]	547
Custom Subsystem–Option 001/601or 002/602 ([:SOURce]:RADio:CUSTom)	548
:ALPha	548
:ASK	548
:BBCLock	549

---

# Contents

:BBT	549
:BRATe	550
:BURSt:SHAPe:FALL:DELay	552
:BURSt:SHAPe:FALL:TIME	552
:BURSt:SHAPe:FDELay	553
:BURSt:SHAPe:FTIME	553
:BURSt:SHAPe:RDELay	554
:BURSt:SHAPe:RISE:DELay	554
:BURSt:SHAPe:RISE:TIME	555
:BURSt:SHAPe:RTIME	556
:BURSt:SHAPe[:TYPE]	556
:CHANnel	557
:DATA	557
:DATA:FIX4	558
:DATA:PRAM	558
:DENCode	559
:EDATa:DELay	559
:EDCLock	559
:EREFerence	560
:EREFerence:VALue	560
:FILTer	561
:IQ:SCALE	562
:MODulation:FSK[:DEViation]	563
:MODulation:MSK[:PHASe]	563
:MODulation:UFSK	564
:MODulation:UIQ	564
:MODulation[:TYPE]	564
:POLarity[:ALL]	565
:SRATe	565
:STANdard:SELEct	567
:TRIGger:TYPE	567
:TRIGger:TYPE:CONTInuous[:TYPE]	568
:TRIGger:TYPE:GATE:ACTive	568
:TRIGger[:SOURce]	569
:TRIGger[:SOURce]:EXTernal:DELay	570
:TRIGger[:SOURce]:EXTernal:DELay:STATe	570
:TRIGger[:SOURce]:EXTernal:SLOPe	571
:TRIGger[:SOURce]:EXTernal[:SOURce]	571

[.STATe]	572
DECT Subsystem–Option 402 ([.SOURce]:RADio:DECT)	573
:ALPha	573
:BBCLock	573
:BBT	574
:BRATe	574
:BURSt:PN9	575
:BURSt:SHAPe:FALL:DELay	576
:BURSt:SHAPe:FALL:TIME	576
:BURSt:SHAPe:FDELay	577
:BURSt:SHAPe:FTIME	577
:BURSt:SHAPe:RDELay	578
:BURSt:SHAPe:RISE:DELay	578
:BURSt:SHAPe:RISE:TIME	579
:BURSt:SHAPe:RTIME	580
:BURSt:SHAPe[:TYPE]	580
:BURSt[:STATe]	581
:CHANnel	581
:DATA	582
:DATA:FIX4	582
:DATA:PRAM	583
:DEFault	583
:EDATa:DELay	583
:EDCLock	584
:EREFerence	584
:EREFerence:VALue	585
:FILTer	585
:IQ:SCALE	586
:MODulation:FSK[:DEViation]	586
:MODulation:MSK[:PHASe]	587
:MODulation:UFSK	587
:MODulation:UIQ	588
:MODulation[:TYPE]	588
:POLarity[:ALL]	588
:PPart:SLOT0 [1] 2 3 4 5 6 7 8 9 10 11[:TYPE]	589
:PPart:SLOT0 [1] 2 3 4 5 6 7 8 9 10 11:CUSTom	589
:PPart:SLOT0 [1] 2 3 4 5 6 7 8 9 10 11:CUSTom:FIX4	590
:PPart:SLOT0 [1] 2 3 4 5 6 7 8 9 10 11:LCAPacity:A	590

---

## Contents

:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:LCAPacity:P	591
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:LCAPacity:S	591
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:LCAPacity[:B]	592
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:LCAPacity[:B]:FIX4	592
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:LCAPacity:POWer	593
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:STATe	593
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:TRAFfic:A	593
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:TRAFfic:P	594
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:TRAFfic:S	594
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:TRAFfic[:B]	595
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:TRAFfic[:B]:FIX4	595
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZLCapacity:A	596
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZLCapacity:P	596
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZLCapacity:A	596
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZLCapacity[:B]	597
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZLCapacity[:B]:FIX4	597
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZTRaffic:A	598
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZTRaffic:P	598
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZTRaffic:S	598
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZTRaffic[:B]	599
:PPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZTRaffic[:B]:FIX4	599
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11[:TYPE]	600
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:CUSTom	600
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:CUSTom:FIX4	601
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:DUMM2:A	601
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:DUMM2:P	602
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:DUMM2:S	602
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:DUMM[1]:A	602
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:DUMM[1]:P	603
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:DUMM[1]:S	603
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:LCAPacity:A	603
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:LCAPacity:P	604
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:LCAPacity:S	604
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:LCAPacity[:B]	604
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:LCAPacity[:B]:FIX4	605
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:LCAPacity:POWer	605
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:STATe	606
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:TRAFfic:A	606

:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:TRAFfic:P	606
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:TRAFfic:S	607
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:TRAFfic[:B]	607
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:TRAFfic[:B]:FIX4	608
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZLCapacity:A	608
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZLCapacity:P	608
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZLCapacity:S	609
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZLCapacity[:B]	609
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZLCapacity[:B]:FIX4	610
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZTRAffic:A	610
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZTRAffic:P	610
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZTRAffic:S	611
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZTRAffic[:B]	611
:RFPart:SLOT0[1]2 3 4 5 6 7 8 9 10 11:ZTRAffic[:B]:FIX4	612
:SECondary:RECall	612
:SECondary:SAVE	612
:SECondary:TRIGger[:SOURce]	613
:SECondary[:STATe]	613
:SOUT	614
:SOUT:OFFSet	614
:SOUT:SLOT	615
:SRATe	615
:TRIGger:TYPE	616
:TRIGger:TYPE:CONTInuous[:TYPE]	617
:TRIGger:TYPE:GATE:ACTive	618
:TRIGger[:SOURce]	618
:TRIGger[:SOURce]:EXTernal:DELay	619
:TRIGger[:SOURce]:EXTernal:SLOPe	620
:TRIGger[:SOURce]:EXTernal[:SOURce]	620
:TRIGger[:SOURce]:EXTernal:DELay:STATe	621
[:STATe]	621
EDGE Subsystem–Option 402 ([:SOURce]:RADio:EDGE)	622
:ALPHa	622
:BBCLock	622
:BBT	623
:BURSt:SHAPe:FALL:DELay	623
:BURSt:SHAPe:FDELay	624
:BURSt:SHAPe:FALL:TIME	625

---

## Contents

:BURSt:SHAPe:FTIME	625
:BURSt:SHAPe:RDElay	626
:BURSt:SHAPe:RISE:DElay	627
:BURSt:SHAPe:RISE:TIME	627
:BURSt:SHAPe:RTIME	628
:BURSt:SHAPe[:TYPE]	629
:BURSt[:STATe]	629
:CHANnel	630
:DATA	630
:DATA:PRAM	631
:DATA:FIX4	631
:DEFault	632
:EDATa:DElay	632
:EDCLock	632
:EREFerence	633
:EREFerence:VALue	633
:FILTer	634
:IQ:SCALE	635
:MODulation:FSK[:DEViation]	635
:MODulation:MSK[:PHASe]	636
:MODulation:UFSK	636
:MODulation:UIQ	636
:MODulation[:TYPE]	637
:POLarity[:ALL]	637
:SECondary:RECall	638
:SECondary:SAVE	638
:SECondary:TRIGger[:SOURce]	638
:SECondary[:STATe]	639
:SLOT0[1]2 3 4 5 6 7:CUSTom	639
:SLOT0[1]2 3 4 5 6 7:CUSTom:FIX4	640
:SLOT0[1]2 3 4 5 6 7:CUSTom:GUARd	640
:SLOT0[1]2 3 4 5 6 7:GMSK:ENCryption	641
:SLOT0[1]2 3 4 5 6 7:GMSK:ENCryption:CS1:DATA	642
:SLOT0[1]2 3 4 5 6 7:GMSK:ENCryption:CS4:DATA	643
:SLOT0[1]2 3 4 5 6 7:GMSK:ENCryption:DLINK:MCS1:DATA	643
:SLOT0[1]2 3 4 5 6 7:GMSK:ENCryption:FIX4	643
:SLOT0[1]2 3 4 5 6 7:GMSK:ENCryption:TCH:FS:DATA	644
:SLOT0[1]2 3 4 5 6 7:GMSK:ENCryption:ULINK:MCS1:DATA	644

:SLOT0[1] 2 3 4 5 6 7:GMSK:STeal	645
:SLOT0[1] 2 3 4 5 6 7:GMSK:TSEquence	645
:SLOT0[1] 2 3 4 5 6 7:MULTIslot	646
:SLOT0[1] 2 3 4 5 6 7:NORMAl:ENCryption	646
:SLOT0:NORMAl:ENCryption:BCH:BCC	648
:SLOT0:NORMAl:ENCryption:BCH:CELLId	649
:SLOT0:NORMAl:ENCryption:BCH:LAC	649
:SLOT0:NORMAl:ENCryption:BCH:MCC	649
:SLOT0:NORMAl:ENCryption:BCH:MNC	650
:SLOT0:NORMAl:ENCryption:BCH:PLMN	650
:SLOT0[1] 2 3 4 5 6 7:NORMAl:ENCryption:DLINK:MCS5:DATA	650
:SLOT0[1] 2 3 4 5 6 7:NORMAl:ENCryption:DLINK:MCS9:DATA	651
:SLOT0[1] 2 3 4 5 6 7:NORMAl:ENCryption:ETCH:F43:DATA	651
:SLOT0[1] 2 3 4 5 6 7:NORMAl:ENCryption:FIX4	652
:SLOT0[1] 2 3 4 5 6 7:NORMAl:ENCryption:ULINK:MCS5:DATA	652
:SLOT0[1] 2 3 4 5 6 7:NORMAl:ENCryption:ULINK:MCS9:DATA	653
:SLOT0[1] 2 3 4 5 6 7:NORMAl:ENCryption:UNCoded	653
:SLOT0[1] 2 3 4 5 6 7:NORMAl:GUARd	654
:SLOT0[1] 2 3 4 5 6 7:NORMAl:T1	654
:SLOT0[1] 2 3 4 5 6 7:NORMAl:T2	655
:SLOT0[1] 2 3 4 5 6 7:NORMAl:TSEquence	655
:SLOT0[1] 2 3 4 5 6 7:LCAPacity:POWer	655
:SLOT0[1] 2 3 4 5 6 7:STATe	656
:SLOT0[1] 2 3 4 5 6 7[:TYPE]	656
:SOUT:	657
:SOUT:OFFSet	657
:SOUT:SLOT	658
:SRATe	658
:TRIGger:TYPE	660
:TRIGger:TYPE:CONTInuous[:TYPE]	660
:TRIGger:TYPE:GATE:ACTive	661
:TRIGger[:SOURce]	662
:TRIGger[:SOURce]:EXTernal:DELay	663
:TRIGger[:SOURce]:EXTernal:DELay:FINE	663
:TRIGger[:SOURce]:EXTernal:DELay:STATe	664
:TRIGger[:SOURce]:EXTernal:SLOPe	664
:TRIGger[:SOURce]:EXTernal[:SOURce]	665
[:STATe]	665

**SCPI Command Reference, Volume 3**

<b>9. Receiver Test Digital Commands (continued)</b> .....	<b>667</b>
3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURce]:RADio:WCDMa:HSPA[:BBG]) ..	668
File Overview .....	668
Managing ESG Setting Conflicts and Error Messages .....	670
:DLINK:APPLy .....	671
:DLINK:AWGN:CN .....	671
:DLINK:AWGN[:STATe] .....	672
:DLINK:BBCLock[:SOURce] .....	672
:DLINK:CPICH:CCODE .....	672
:DLINK:CPICH:POWer .....	673
:DLINK:CPICH[:STATe] .....	673
:DLINK:DPCH:CCODE .....	673
:DLINK:DPCH:DATA .....	674
:DLINK:DPCH:DATA:FIX4 .....	674
:DLINK:DPCH:DCH[1] 2 3 4 5 6:BSIZe .....	675
:DLINK:DPCH:DCH[1] 2 3 4 5 6:CRC .....	675
:DLINK:DPCH:DCH[1] 2 3 4 5 6:CTYPe .....	676
:DLINK:DPCH:DCH[1] 2 3 4 5 6:DATA .....	676
:DLINK:DPCH:DCH[1] 2 3 4 5 6:DATA:FIX4 .....	677
:DLINK:DPCH:DCH[1] 2 3 4 5 6:NBLocks .....	677
:DLINK:DPCH:DCH[1] 2 3 4 5 6:RMATtribute .....	678
:DLINK:DPCH:DCH[1] 2 3 4 5 6:TTI .....	678
:DLINK:DPCH:DCH[1] 2 3 4 5 6[:STATe] .....	678
:DLINK:DPCH:POWer .....	679
:DLINK:DPCH:SFORmat .....	679
:DLINK:DPCH:SSCoffset .....	680
:DLINK:DPCH:TFCI .....	680
:DLINK:DPCH:TOFFset .....	681
:DLINK:DPCH:TPC:NSTeps .....	681
:DLINK:DPCH:TPC:PATtern .....	681
:DLINK:DPCH:TRPosition .....	682
:DLINK:DPCH[:STATe] .....	682
:DLINK:EAGCh:AGSCOpe .....	683
:DLINK:EAGCh:AGValue .....	683
:DLINK:EAGCh:CCODE .....	684
:DLINK:EAGCh:ERNTI .....	685



:DLINK:EAGCh:Power	685
:DLINK:EAGCh[:STATe]	685
:DLINK:EHICH:CCODE	686
:DLINK:EHICH:INDicator	686
:DLINK:EHICH:POWer	687
:DLINK:EHICH:SSINdex	687
:DLINK:EHICH:TOFFset	687
:DLINK:EHICH[:STATe]	688
:DLINK:ERGCh:CCODE	688
:DLINK:ERGCh:POWer	688
:DLINK:ERGCh:RGValue	689
:DLINK:ERGCh:SSINdex	689
:DLINK:ERGCh:TOFFset	690
:DLINK:ERGCh[:STATe]	690
:DLINK:FILTer	690
:DLINK:FILTer:ALPHa	691
:DLINK:FILTer:BBT	692
:DLINK:FILTer:CHANnel	692
:DLINK:HSBurst	692
:DLINK:HSDPa:AMC:CQIMapping:UECategory	693
:DLINK:HSDPa:AMC:CPATtern	693
:DLINK:HSDPa:FCONtrol	694
:DLINK:HSDPa:HARQ:APATtern	695
:DLINK:HSDPa:HARQ:MNHTrans	696
:DLINK:HSDPa:HARQ:RVSequence[1] 2 3 4 5 6 7 8	696
:DLINK:HSDPa[1] 2 3 4:BSINfo	697
:DLINK:HSDPa[1] 2 3 4:HSPDSch:COFFset	697
:DLINK:HSDPa[1] 2 3 4:HSPDSch:DATA	698
:DLINK:HSDPa[1] 2 3 4:HSPDSch:DATA:FIX4	698
:DLINK:HSDPa:HSPDSch:DSCH:DATA	699
:DLINK:HSDPa:HSPDSch:DSCH:DATA:FIX4	699
:DLINK:HSDPa:HSPDSch:DSCH:IRBSize	700
:DLINK:HSDPa:HSPDSch:NCODe	700
:DLINK:HSDPa[1] 2 3 4:HSPDSch:POWer	700
:DLINK:HSDPa[1] 2 3 4:HSPDSch:SFORmat	701
:DLINK:HSDPa[1] 2 3 4:HSPDSch[:STATe]	701
:DLINK:HSDPa[1] 2 3 4:HSSCch:CCODE	702
:DLINK:HSDPa[1] 2 3 4:HSSCch:DATA	702

---

# Contents

:DLINK:HSDPa[1] 2 3 4:HSSCch:DATA:FIX4	703
:DLINK:HSDPa[1] 2 3 4:HSSCch:POWer	703
:DLINK:HSDPa[1] 2 3 4:ITTI	704
:DLINK:HSDPa[1] 2 3 4:ITTI:PATtern	704
:DLINK:HSDPa:NHPRocess	705
:DLINK:HSDPa[1] 2 3 4:RVParameter	705
:DLINK:HSDPa[1] 2 3 4:UEID	706
:DLINK:HSDPa[1] 2 3 4[:STATe]	706
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:CCODE	707
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:DATA	707
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:MODulation	708
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:POWer	708
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:SF	708
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:SSCOffset	709
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:TOFFset	709
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16[:STATe]	710
:DLINK:PCCPch:BCH:DATA	710
:DLINK:PCCPch:BCH:DATA:FIX4	710
:DLINK:PCCPch:CCODE	711
:DLINK:PCCPch:POWer	711
:DLINK:PCCPch[:STATe]	712
:DLINK:PICH:CCODE	712
:DLINK:PICH:DATA	712
:DLINK:PICH:DATA:FIX4	713
:DLINK:PICH:POWer	713
:DLINK:PICH[:STATe]	714
:DLINK:POLarity	714
:DLINK:PSCH:POWer	714
:DLINK:PSCH[:STATe]	715
:DLINK:SCRamblecode	715
:DLINK:SSCH:POWer	715
:DLINK:SSCH[:STATe]	716
:DLINK:TXDiversity	716
:LINK	716
:ULINK:APPLY	717
:ULINK:AWGN:CN	717
:ULINK:AWGN[:STATe]	718
:ULINK:BBReference:EXTernal:MRATE	718

:ULINK:BBReference:EXTeRnal[:SOURce]. . . . .	718
:ULINK:CRATe . . . . .	719
:ULINK:DPCCh:CCODE. . . . .	719
:ULINK:DPCCh:DATA . . . . .	719
:ULINK:DPCCh:DATA:FIX4 . . . . .	720
:ULINK:DPCCh:FBI:PATTeRn . . . . .	720
:ULINK:DPCCh:FBI:PATTeRn:FIX . . . . .	720
:ULINK:DPCCh:POWeR . . . . .	721
:ULINK:DPCCh:SFORmat . . . . .	721
:ULINK:DPCCh:TFCI . . . . .	722
:ULINK:DPCCh:TPC:NSTePs . . . . .	722
:ULINK:DPCCh:TPC:PATTeRn . . . . .	722
:ULINK:DPCCh[:STATe] . . . . .	723
. . . . .	723
:ULINK:DPDCh:DATA . . . . .	724
:ULINK:DPDCh:DATA:FIX4 . . . . .	724
:ULINK:DPDCh:DCH[1]2 3 4 5 6:BSIZe. . . . .	725
:ULINK:DPDCh:DCH[1]2 3 4 5 6:CRC. . . . .	725
:ULINK:DPDCh:DCH[1]2 3 4 5 6:CTYPe . . . . .	726
:ULINK:DPDCh:DCH[1]2 3 4 5 6:DATA . . . . .	726
:ULINK:DPDCh:DCH[1]2 3 4 5 6:DATA:FIX4 . . . . .	727
:ULINK:DPDCh:DCH[1]2 3 4 5 6:NBLocks . . . . .	727
:ULINK:DPDCh:DCH[1]2 3 4 5 6:RMATtribute . . . . .	728
:ULINK:DPDCh:DCH[1]2 3 4 5 6:TTI . . . . .	728
:ULINK:DPDCh:DCH2 3 4 5 6[:STATe]. . . . .	728
:ULINK:DPDCh:POWeR . . . . .	729
:ULINK:DPDCh:SFORmat . . . . .	729
:ULINK:DPDCh[:STATe] . . . . .	730
:ULINK:FCLock:INTeRval . . . . .	730
:ULINK:FCLock:POLarity . . . . .	730
:ULINK:FILTeR . . . . .	731
:ULINK:FILTeR:ALPHa. . . . .	731
:ULINK:FILTeR:BBT . . . . .	732
:ULINK:FILTeR:CHANnel. . . . .	732
:ULINK:FOFFset. . . . .	733
:ULINK:HCONfig . . . . .	733
:ULINK:HSDPcch:APATteRn . . . . .	733
:ULINK:HSDPcch:APOWeR . . . . .	734

---

# Contents

:ULINK:HSDPcch:CCODE	734
:ULINK:HSDPcch:CPATtern	735
:ULINK:HSDPcch:CPOWer	735
:ULINK:HSDPcch:NPOWer	736
:ULINK:HSDPcch:SFDelay	736
:ULINK:HSDPcch[:STATe]	736
.....	737
:ULINK:HSUPa:EDPCch:DATA:FIX4	737
:ULINK:HSUPa:EDPCch:POWer	737
:ULINK:HSUPa:EDPCch[:STATe]	738
:ULINK:HSUPa:EDPDch:DATA	738
:ULINK:HSUPa:EDPDch:DATA:FIX4	738
:ULINK:HSUPa:EDPDch:EDCH:DATA	739
:ULINK:HSUPa:EDPDch:EDCH:DATA:FIX4	739
:ULINK:HSUPa:EDPDch:MCCodes	740
:ULINK:HSUPa:EDPDch:PLNMax	741
:ULINK:HSUPa:EDPDch:POWer	741
:ULINK:HSUPa:EDPDch:SNPHchs	741
:ULINK:HSUPa:EDPDch[:STATe]	742
:ULINK:HSUPa:ETABLE	742
:ULINK:HSUPa:ETFCi	743
:ULINK:HSUPa:HARQ:APATtern	743
:ULINK:HSUPa:HARQ:APATtern[:EXTernal]:DELay	744
:ULINK:HSUPa:HARQ:APATtern[:EXTernal]:INPut	744
:ULINK:HSUPa:HARQ:APATtern[:EXTernal]:POLarity	745
:ULINK:HSUPa:HARQ:MNRTrans	745
:ULINK:HSUPa:HARQ[:MODE]	745
:ULINK:HSUPa:HARQ:HBIT	746
:ULINK:HSUPa:HPRocess	746
:ULINK:HSUPa:RSN	747
:ULINK:HSUPa:RVINdex	747
:ULINK:HSUPa:TFC:EPATtern[:EXTernal]:DELay	747
:ULINK:HSUPa:TFC:EPATtern[:EXTernal]:INPut	748
:ULINK:HSUPa:TFC:EPATtern[:EXTernal]:POLarity	748
:ULINK:HSUPa:TFC:EPATtern	749
:ULINK:HSUPa:TFC[:ALT]:EDPCch:POWer	749
:ULINK:HSUPa:TFC[:ALT]:EDPDch:EDCH:DATA	750
:ULINK:HSUPa:TFC[:ALT]:EDPDch:EDCH:DATA:FIX4	750

:ULINK:HSUPa:TFC[:ALT]:EDPDch:POWer	751
:ULINK:HSUPa:TFC[:ALT]EDPDch:SNPHchs	751
:ULINK:HSUPa:TFC[:ALT]:ETABle	752
:ULINK:HSUPa:TFC[:ALT]:ETFCI	752
:ULINK:HSUPa:TTI	752
:ULINK:HSUPa[:STATe]	753
:ULINK:NMDPch	753
:ULINK:POLarity	753
:ULINK:SCRamblecode	754
:ULINK:SDElay	754
:ULINK:SFNRst:POLarity	754
:ULINK:SYNC:MODE	755
:ULINK:SYNC[:SOURce]	755
:ULINK:TGAP:PSI[1]:CFN	756
:ULINK:TGAP:PSI[1]:D	756
:ULINK:TGAP:PSI[1]:L1	756
:ULINK:TGAP:PSI[1]:L2	757
:ULINK:TGAP:PSI[1]:PL1	757
:ULINK:TGAP:PSI[1]:PRC	757
:ULINK:TGAP:PSI[1]:PS	757
:ULINK:TGAP:PSI[1]:SN	758
:ULINK:TOFFset	758
:ULINK:TPControl:PATtern	759
:ULINK:TPControl:PATtern[:EXternal]:INPut	759
:ULINK:TPControl:PATtern[:EXternal]:POLarity	759
:ULINK:TPControl:POWer:INITial	760
:ULINK:TPControl:POWer:MAXimum	760
:ULINK:TPControl:POWer:MINimum	761
:ULINK:TPControl:POWer:STEP	761
:ULINK:TPControl[:STATe]	762
[:STATe]	762
Real Time GPS Subsystem–Option 409	
([:SOURce]:RADio[1] 2 3 4:GPS)	763
:DATA	763
:DMODE	763
:DSHift	764
:FILTer	764
:FILTer:ALPHa	765
:FILTer:BBT	766

---

# Contents

:FILTer:CHANnel . . . . .	766
:IQPHase . . . . .	767
:PCODE . . . . .	767
:RCODE . . . . .	767
:REFClk . . . . .	768
:REFFreq . . . . .	768
:SATid . . . . .	769
[:STATE] . . . . .	769
Real Time MSGPS Subsystem–Option 409 ([:SOURCE]:RADio[1]2 3 4:MSGPs) . . . . .	770
:IQPHase . . . . .	770
:PLAYmode . . . . .	770
:REFClk . . . . .	771
:REFFreq . . . . .	771
:REStart . . . . .	771
:SCENario . . . . .	772
:SCENario:SATellites . . . . .	772
:SCENario:STATus . . . . .	772
[:STATE] . . . . .	772
GSM Subsystem–Option 402 ([:SOURCE]:RADio:GSM) . . . . .	773
:ALpha . . . . .	773
:BBCLock . . . . .	773
:BBT . . . . .	774
:BRATe . . . . .	774
:BURSt:PN9 . . . . .	775
:BURSt:SHAPe:FALL:DELay . . . . .	776
:BURSt:SHAPe:FALL:TIME . . . . .	776
:BURSt:SHAPe:FDELay . . . . .	777
:BURSt:SHAPe:FTIME . . . . .	778
:BURSt:SHAPe:RDELay . . . . .	778
:BURSt:SHAPe:RISE:DELay . . . . .	779
:BURSt:SHAPe:RISE:TIME . . . . .	780
:BURSt:SHAPe:RTIME . . . . .	780
:BURSt:SHAPe[:TYPE] . . . . .	781
:BURSt[:STATE] . . . . .	781
:CHANnel . . . . .	782
:DATA . . . . .	782
:DATA:PRAM . . . . .	783
:DATA:FIX4 . . . . .	783

:DEFault	783
:DENCode	784
EDATa:DELAy	784
:EDCLock	784
:EREference	785
:EREference:VALue	785
:FILTer	786
:IQ:SCALE	787
:MODulation:FSK[:DEViation]	787
:MODulation:MSK[:PHASe]	788
:MODulation:UFSK	788
:MODulation:UIQ	788
:MODulation[:TYPE]	789
:POLarity[:ALL]	789
:SECondary:RECall	790
:SECondary:SAVE	790
:SECondary:TRIGger[:SOURce]	790
:SECondary[:STATe]	791
:SLOT0[1]2 3 4 5 6 7:ACCess:ENCRyption	791
:SLOT0[1]2 3 4 5 6 7:ACCess:ENCRyption:FIX4	791
:SLOT0[1]2 3 4 5 6 7:ACCess:ETAil	792
:SLOT0[1]2 3 4 5 6 7:ACCess:SSEquence	792
:SLOT0[1]2 3 4 5 6 7:ACCess:CUSTom	792
:SLOT0[1]2 3 4 5 6 7:CUSTom:FIX4	793
:SLOT0[1]2 3 4 5 6 7:DUMMy:TSEQUence	793
:SLOT0[1]2 3 4 5 6 7:MULTIslot	793
SLOT0[1]2 3 4 5 6 7:NORMal:ENCRyption	794
:SLOT0:NORMal:ENCRyption:BCH1:BCC	796
:SLOT0:NORMal:ENCRyption:BCH1:CELLid	796
:SLOT0:NORMal:ENCRyption:BCH1:LAC	796
:SLOT0:NORMal:ENCRyption:BCH1:MCC	797
:SLOT0:NORMal:ENCRyption:BCH1:MNC	797
:SLOT0:NORMal:ENCRyption:BCH1:PLMN	797
:SLOT0[1]2 3 4 5 6 7:NORMal:ENCRyption:CS1:DATA	798
:SLOT0[1]2 3 4 5 6 7:NORMal:ENCRyption:CS4:DATA	798
:SLOT0[1]2 3 4 5 6 7:NORMal:ENCRyption:DLINK:MCS1:DATA	798
:SLOT0[1]2 3 4 5 6 7:NORMal:ENCRyption:FIX4	799
:SLOT0[1]2 3 4 5 6 7:NORMal:ENCRyption:TCH:FS:DATA	799

---

# Contents

:SLOT0[1]2 3 4 5 6 7:NORMAl:ENCRYption:ULINK:MCS1:DATA	799
:SLOT0[1]2 3 4 5 6 7:NORMAl:STeal	800
:SLOT0[1]2 3 4 5 6 7:NORMAl:TSEquence.	800
:SLOT0[1]2 3 4 5 6 7:POWer	801
:SLOT0[1]2 3 4 5 6 7:STAtE	801
:SLOT0[1]2 3 4 5 6 7:SYNC:ENCRYption	801
:SLOT0[1]2 3 4 5 6 7:SYNC:ENCRYption:FIX4	802
:SLOT0[1]2 3 4 5 6 7:SYNC:TSEquence.	802
:SLOT0[1]2 3 4 5 6 7[:TYPE]	802
:SOUT	803
:SOUT:OFFSet	803
:SOUT:SLOT	804
:SRAtE	804
:TRIGger:EXTernal:DELay	805
:TRIGger:TYPE	806
:TRIGger:TYPE:CONTInuous[:TYPE]	806
:TRIGger:TYPE:GATE:ACTive.	807
:TRIGger[:SOURce]	807
:TRIGger[:SOURce]:EXTernal:DELay	808
:TRIGger[:SOURce]:EXTernal:DELay:FINe	809
:TRIGger[:SOURce]:EXTernal:DELay:STAtE	809
:TRIGger[:SOURce]:EXTernal:SLOPe	809
:TRIGger[:SOURce]:EXTernal[:SOURce]	810
[:STAtE]	811
HSDPA over W-CDMA Subsystem–Option 418 ([:SOURce]:RADio:WCDMa:HSDPa[:BBG])	812
File Overview	812
Managing ESG Setting Conflicts and Error Messages.	814
:DLINK:APPLy	814
:DLINK:AWGN:CN	815
:DLINK:AWGN[:STAtE]	815
:DLINK:BBCLock[:SOURce]	815
:DLINK:CPICH:CCODE	816
:DLINK:CPICH:POWer.	816
:DLINK:CPICH[:STAtE]	816
:DLINK:DPCH:CCODE	816
:DLINK:DPCH:DATA.	817
:DLINK:DPCH:DATA:FIX4.	817
:DLINK:DPCH:DCH[1]2 3 4 5 6:BSIZe	818



:DLINK:DPCH:DCH[1] 2 3 4 5 6:CTYPe . . . . .	818
:DLINK:DPCH:DCH[1] 2 3 4 5 6:CRC . . . . .	819
:DLINK:DPCH:DCH[1] 2 3 4 5 6:DATA . . . . .	819
:DLINK:DPCH:DCH[1] 2 3 4 5 6:DATA:FIX4 . . . . .	819
:DLINK:DPCH:DCH[1] 2 3 4 5 6:NBLocks . . . . .	820
:DLINK:DPCH:DCH[1] 2 3 4 5 6:RMATtribute . . . . .	820
:DLINK:DPCH:DCH[1] 2 3 4 5 6:TTI . . . . .	821
:DLINK:DPCH:DCH2 3 4 5 6[:STATe] . . . . .	821
:DLINK:DPCH:POWer . . . . .	821
:DLINK:DPCH:SFORmat . . . . .	822
:DLINK:DPCH:SSCOffset . . . . .	822
:DLINK:DPCH:TFCI . . . . .	823
:DLINK:DPCH:TOFFset . . . . .	823
:DLINK:DPCH:TPC:NSTeps . . . . .	824
:DLINK:DPCH:TPC:PATern . . . . .	824
:DLINK:DPCH:TRPosition . . . . .	825
:DLINK:DPCH[:STATe] . . . . .	825
:DLINK:FILTer . . . . .	825
:DLINK:FILTer:ALPHa . . . . .	826
:DLINK:FILTer:BBT . . . . .	826
:DLINK:FILTer:CHANnel . . . . .	827
:DLINK:HSBurst . . . . .	827
:DLINK:HSDPa:AMC:CQIMapping:UECategory . . . . .	828
:DLINK:HSDPa:AMC:CPATern . . . . .	828
:DLINK:HSDPa:FCONtrol . . . . .	829
:DLINK:HSDPa:HARQ:APATern . . . . .	830
:DLINK:HSDPa:HARQ:MNHTrans . . . . .	830
:DLINK:HSDPa:HARQ:RVSequence[1] 2 3 4 5 6 7 8 . . . . .	831
:DLINK:HSDPa[1] 2 3 4:BSINfo . . . . .	832
:DLINK:HSDPa[1] 2 3 4:HSPDSch:COFFset . . . . .	832
:DLINK:HSDPa[1] 2 3 4:HSPDSch:DATA . . . . .	832
:DLINK:HSDPa[1] 2 3 4:HSPDSch:DATA:FIX4 . . . . .	833
:DLINK:HSDPa:HSPDSch:DSCH:DATA . . . . .	833
:DLINK:HSDPa:HSPDSch:DSCH:DATA:FIX4 . . . . .	834
:DLINK:HSDPa:HSPDSch:DSCH:IRBSize . . . . .	834
:DLINK:HSDPa:HSPDSch:NCODe . . . . .	835
:DLINK:HSDPa[1] 2 3 4:HSPDSch:POWer . . . . .	835
:DLINK:HSDPa[1] 2 3 4:HSPDSch:SFORmat . . . . .	836

---

## Contents

:DLINK:HSDPa[1] 2 3 4:HSPDSch[:STATe]	836
:DLINK:HSDPa[1] 2 3 4:HSSCch:CCODE	837
:DLINK:HSDPa[1] 2 3 4:HSSCch:DATA	837
:DLINK:HSDPa[1] 2 3 4:HSSCch:DATA:FIX4	838
:DLINK:HSDPa[1] 2 3 4:HSSCch:POWer	838
:DLINK:HSDPa[1] 2 3 4:ITTI	839
:DLINK:HSDPa[1] 2 3 4:ITTI:PATtern	839
:DLINK:HSDPa:NHPRocess	840
:DLINK:HSDPa[1] 2 3 4:RVParameter	840
:DLINK:HSDPa[1] 2 3 4:UEID	841
:DLINK:HSDPa[1] 2 3 4[:STATe]	841
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:CCODE	842
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:DATA	842
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:POWer	843
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:SSCOffset	843
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:TOFFset	844
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16[:STATe]	844
:DLINK:PCCPch:BCH:DATA	844
:DLINK:PCCPch:BCH:DATA:FIX4	845
:DLINK:PCCPch:CCODE	845
:DLINK:PCCPch:POWer	846
:DLINK:PCCPch[:STATe]	846
:DLINK:PICH:CCODE	846
:DLINK:PICH:DATA	847
:DLINK:PICH:DATA:FIX4	847
:DLINK:PICH:POWer	848
:DLINK:PICH[:STATe]	848
:DLINK:POLarity	848
:DLINK:PSCH:POWer	849
:DLINK:PSCH[:STATe]	849
:DLINK:SCRamblecode	849
:DLINK:SSCH:POWer	850
:DLINK:SSCH[:STATe]	850
:DLINK:TXDiversity	850
:LINK	851
:ULINK:APPLY	851
:ULINK:AWGN:CN	851
:ULINK:AWGN[:STATe]	852

:ULINK:BBReference:EXTernal:MRATe . . . . .	852
:ULINK:BBReference[:SOURce] . . . . .	852
:ULINK:DPCCh:CCODE. . . . .	853
:ULINK:DPCCh:DATA . . . . .	853
:ULINK:DPCCh:DATA:FIX4 . . . . .	854
:ULINK:DPCCh:FBI:PATtern . . . . .	854
:ULINK:DPCCh:FBI:PATtern:FIX . . . . .	855
:ULINK:DPCCh:POWer . . . . .	855
:ULINK:DPCCh:SFORmat . . . . .	856
:ULINK:DPCCh[:STATe] . . . . .	856
:ULINK:DPCCh:TFCI . . . . .	856
:ULINK:DPCCh:TPC:NSTeps . . . . .	857
:ULINK:DPCCh:TPC:PATtern . . . . .	857
:ULINK:DPDCh:CCODE . . . . .	858
:ULINK:DPDCh:DATA . . . . .	858
:ULINK:DPDCh:DATA:FIX4 . . . . .	858
:ULINK:DPDCh:DCH[1]2 3 4 5 6:BSIZe . . . . .	859
:ULINK:DPDCh:DCH[1]2 3 4 5 6:CRC . . . . .	859
:ULINK:DPDCh:DCH[1]2 3 4 5 6:CTYPe . . . . .	859
:ULINK:DPDCh:DCH[1]2 3 4 5 6:DATA . . . . .	860
:ULINK:DPDCh:DCH[1]2 3 4 5 6:DATA:FIX4 . . . . .	860
:ULINK:DPDCh:DCH[1]2 3 4 5 6:NBLocks . . . . .	861
:ULINK:DPDCh:DCH[1]2 3 4 5 6:RMATtribute . . . . .	861
:ULINK:DPDCh:DCH[1]2 3 4 5 6:TTI . . . . .	862
:ULINK:DPDCh:DCH2 3 4 5 6[:STATe] . . . . .	862
:ULINK:DPDCh:POWer . . . . .	863
:ULINK:DPDCh:SFORmat . . . . .	863
:ULINK:DPDCh[:STATe] . . . . .	863
:ULINK:FCLock:INTerval . . . . .	864
:ULINK:FCLock:POLarity . . . . .	864
:ULINK:FILTer . . . . .	865
:ULINK:FILTer:ALPHa . . . . .	865
:ULINK:FILTer:BBT . . . . .	866
:ULINK:FILTer:CHANnel . . . . .	866
:ULINK:FOFFset . . . . .	867
:ULINK:HSDPcch:APATtern . . . . .	867
:ULINK:HSDPcch:APOWer . . . . .	868
:ULINK:HSDPcch:CCODE . . . . .	868

---

## Contents

:ULINK:HSDPcch:CPATtern	868
:ULINK:HSDPcch:CPOWer	869
:ULINK:HSDPcch:NPOWer	869
:ULINK:HSDPcch:SFDelay	869
:ULINK:HSDPcch[:STATe]	870
:ULINK:POLarity	870
:ULINK:SCRamblecode	870
:ULINK:SDELay	871
:ULINK:SFNRst:POLarity	871
:ULINK:SYNC:MODE	872
:ULINK:SYNC[:SOURce]	872
:ULINK:TOFFset	872
[:STATe]	873
NADC Subsystem–Option 402 ([:SOURce]:RADio[:NADC])	874
:ALPha	874
:BBCLock	874
:BBT	875
:BRATe	875
:BURSt:PN9	876
:BURSt:SHAPe[:TYPE]	877
:BURSt:SHAPe:FALL:DELay	877
:BURSt:SHAPe:FALL:TIME	878
:BURSt:SHAPe:FDELay	878
:BURSt:SHAPe:FTIME	879
:BURSt:SHAPe:RDELay	880
:BURSt:SHAPe:RISE:DELay	880
:BURSt:SHAPe:RISE:TIME	881
:BURSt:SHAPe:RTIME	882
:BURSt[:STATe]	882
:BURSt:SHAPe[:TYPE]	883
:CHANnel	883
:DATA	884
:DATA:PRAM	884
:DATA:FIX4	885
:DEFault	885
:EDATa:DELay	885
:EDCLock	886
:EREFerence	886

:EREFerence:VALue . . . . .	887
:FILTer . . . . .	887
:FRATe . . . . .	888
:IQ:SCALE . . . . .	888
:MODulation:FSK[:DEViation] . . . . .	889
:MODulation:MSK[:PHASe] . . . . .	889
:MODulation:UFSK . . . . .	889
:MODulation:UIQ . . . . .	890
:MODulation[:TYPE] . . . . .	890
:REPeat . . . . .	891
:POLarity[:ALL] . . . . .	891
:SECondary:RECall . . . . .	891
:SECondary:SAVE . . . . .	892
:SECondary:TRIGger[:SOURce] . . . . .	892
:SECondary[:STATe] . . . . .	892
:SLOT[1] 2 3 4 5 6:DCUStom . . . . .	893
:SLOT[1] 2 3 4 5 6:DCUStom:FIX4 . . . . .	893
:SLOT[1] 2 3 4 5 6:DTCHannel:CDLocator . . . . .	894
:SLOT[1] 2 3 4 5 6:DTCHannel:CDVCcode . . . . .	894
:SLOT[1] 2 3 4 5 6:DTCHannel:SACChannel . . . . .	894
:SLOT[1] 2 3 4 5 6:DTCHannel:SWORd . . . . .	895
:SLOT[1] 2 3 4 5 6:DTCHannel[:DATA] . . . . .	895
:SLOT[1] 2 3 4 5 6:DTCHannel[:DATA]FIX4 . . . . .	896
:SLOT[1] 2 3 4 5 6:POWer . . . . .	896
:SLOT[1] 2 3 4 5 6:STATe . . . . .	896
:SLOT[1] 2 3 4 5 6:UCUStom . . . . .	897
:SLOT[1] 2 3 4 5 6:UCUStom:FIX4 . . . . .	897
:SLOT[1] 2 3 4 5 6:UTCHannel:CDVCcode . . . . .	897
:SLOT[1] 2 3 4 5 6:UTCHannel:SACChannel . . . . .	898
:SLOT[1] 2 3 4 5 6:UTCHannel:SWORd . . . . .	898
:SLOT[1] 2 3 4 5 6:UTCHannel[:DATA] . . . . .	898
:SLOT[1] 2 3 4 5 6:UTCHannel[:DATA]:FIX4 . . . . .	899
:SLOT[1] 2 3 4 5 6[:TYPE] . . . . .	899
:SOUT . . . . .	900
:SOUT:OFFSet . . . . .	900
:SOUT:SLOT . . . . .	901
:SRATe . . . . .	901
:TRIGger:TYPE . . . . .	902

---

## Contents

:TRIGger:TYPE:CONTInuous[:TYPE]	903
:TRIGger:TYPE:GATE:ACTive	904
:TRIGger[:SOURce]	904
:TRIGger[:SOURce]:EXTernal:DELay	905
:TRIGger[:SOURce]:EXTernal:DELay:STATe	906
:TRIGger[:SOURce]:EXTernal:SLOPe	906
:TRIGger[:SOURce]:EXTernal[:SOURce]	906
	907
PDC Subsystem–Option 402 ([:SOURce]:RADio:PDC)	908
:ALPha	908
:BBCLock	908
:BBT	909
:BRATe	909
:BURSt:PN9	910
:BURSt:SHAPe:FALL:DELay	911
:BURSt:SHAPe:FALL:TIME	911
:BURSt:SHAPe:FDELay	912
:BURSt:SHAPe:FTIME	913
:BURSt:SHAPe:RDELay	913
:BURSt:SHAPe:RISE:DELay	914
:BURSt:SHAPe:RISE:TIME	915
:BURSt:SHAPe:RTIME	915
:BURSt:SHAPe[:TYPE]	916
:BURSt[:STATe]	916
:CHANnel	917
:DATA	917
:DATA:PRAM	918
:DATA:FIX4	918
:DEFault	918
:EDATa:DELay	919
:EDCLock	919
:EREFerence	919
:EREFerence:VALue	920
:FILTer	920
:FRATe	921
:IQ:SCALE	921
:MODulation:FSK[:DEViation]	922
:MODulation:MSK[:PHASe]	922

:MODulation:UFSK	923
:MODulation:UIQ	923
:MODulation[:TYPE]	923
:POLarity[:ALL]	924
:SECondary:RECall	924
:SECondary:SAVE	924
:SECondary:TRIGger[:SOURce]	925
:SECondary[:STATe]	925
:SLOT0[1]2 3 4 5:DCUStom	926
:SLOT0[1]2 3 4 5:DCUSTom:FIX4	926
:SLOT0[1]2 3 4 5:DTCHannel:CCODE	926
:SLOT0[1]2 3 4 5:DTCHannel:SACChannel	927
:SLOT0[1]2 3 4 5:DTCHannel:SWORd	927
:SLOT0[1]2 3 4 5:DTCHannel[:TCHannel]	927
:SLOT0[1]2 3 4 5:DTCHannel[:TCHannel]:FIX4	928
:SLOT0[1]2 3 4:POWer	928
:SLOT0[1]2 3 4 5:STATe	929
:SLOT0[1]2 3 4 5:UCUStom	929
:SLOT0[1]2 3 4 5:UCUStom:FIX4	929
:SLOT0[1]2 3 4 5:UTCHannel:CCODE	930
:SLOT0[1]2 3 4 5:UTCHannel:SACChannel	930
:SLOT0[1]2 3 4 5:UTCHannel:SWORd	930
:SLOT0[1]2 3 4 5:UTCHannel[:TCHannel]	931
:SLOT0[1]2 3 4 5:UTCHannel[:TCHannel]:FIX4	931
:SLOT0[1]2 3 4 5:UVOX:CCODE	932
:SLOT0[1]2 3 4 5:UVOX:SACChannel	932
:SLOT0[1]2 3 4 5:UVOX:SWORd	932
:SLOT0[1]2 3 4 5[:TYPE]	933
:SOUT	933
:SOUT:OFFSet	933
:SOUT:SLOT	934
:SRATe	934
:TRIGger:TYPE	936
:TRIGger:TYPE:CONTInuous[:TYPE]	936
:TRIGger:TYPE:GATE:ACTive	937
:TRIGger[:SOURce]	937
:TRIGger[:SOURce]:EXTernal:DELay	938
:TRIGger[:SOURce]:EXTernal:DELay:STATe	939

---

## Contents

:TRIGger[:SOURce]:EXTernal:SLOPe . . . . .	939
:TRIGger[:SOURce]:EXTernal[:SOURce] . . . . .	940
[:STATe] . . . . .	940
PHS Subsystem–Option 402 ([:SOURce]:RADio:PHS) . . . . .	941
:ALPha . . . . .	941
:BBCLock . . . . .	941
:BBT . . . . .	942
:BRATe . . . . .	942
:BURSt:PN9 . . . . .	943
:BURSt:SCRamble:SEED . . . . .	944
:BURSt:SCRamble[:STATe]. . . . .	944
:BURSt:SHAPe:FALL:DELay . . . . .	945
:BURSt:SHAPe:FALL:TIME . . . . .	945
:BURSt:SHAPe:FDELay . . . . .	946
:BURSt:SHAPe:FTIME . . . . .	947
:BURSt:SHAPe:RDELay . . . . .	947
:BURSt:SHAPe:RISE:DELay . . . . .	948
:BURSt:SHAPe:RISE:TIME . . . . .	949
:BURSt:SHAPe:RTIME . . . . .	949
:BURSt:SHAPe[:TYPE]. . . . .	950
:BURSt[:STATe] . . . . .	950
:CHANnel . . . . .	951
:DATA . . . . .	951
:DATA:PRAM . . . . .	952
:DATA:FIX4 . . . . .	952
:DEFault . . . . .	952
:DLINK:SLOT[1] 2 3 4:CUSTom . . . . .	953
:DLINK:SLOT[1] 2 3 4:CUSTom:FIX4 . . . . .	953
:DLINK:SLOT[1] 2 3 4:POWer . . . . .	953
:DLINK:SLOT[1] 2 3 4:SCHannel:CSID . . . . .	954
:DLINK:SLOT[1] 2 3 4:SCHannel:IDLE . . . . .	954
:DLINK:SLOT[1] 2 3 4:SCHannel:PSID . . . . .	954
:DLINK:SLOT[1] 2 3 4:SCHannel:UWORd. . . . .	955
:DLINK:SLOT[1] 2 3 4:STATe . . . . .	955
:DLINK:SLOT[1] 2 3 4:TCHannel:SACChannel . . . . .	955
:DLINK:SLOT[1] 2 3 4:TCHannel:UWORd. . . . .	956
:DLINK:SLOT[1] 2 3 4:TCHannel[:TCHannel] . . . . .	956
:DLINK:SLOT[1] 2 3 4:TCHannel[:TCHannel]:FIX4 . . . . .	956



:DLINK: SLOT[1] 2 3 4[:TYPE]	957
:EDATa: DELay	957
:EDCLock	957
:EREFerence	958
:EREFerence: VALue	958
:FILTer	959
:IQ: SCALe	960
:MODulation: FSK[:DEViation]	960
:MODulation: MSK[:PHASe]	961
:MODulation: UFSK	961
:MODulation: UIQ	961
:MODulation[:TYPE]	962
:POLarity[:ALL]	962
:SECOndary: RECALL	962
:SECOndary: SAVE	963
:SECOndary: TRIGger[:SOURce]	963
:SECOndary[:STATe]	963
:SOUT	964
:SOUT: OFFSet	964
:SOUT: SLOT	965
:SRATe	965
:TRIGger: TYPE	966
:TRIGger: TYPE: CONTinuous[:TYPE]	967
:TRIGger: TYPE: GATE: ACTive	968
:TRIGger[:SOURce]: EXTernal: DELay	968
:TRIGger[:SOURce]: EXTernal: DELay: STATe	969
:TRIGger[:SOURce]: EXTernal: SLOPe	969
:TRIGger[:SOURce]: EXTernal[:SOURce]	969
:TRIGger[:SOURce]	970
:ULINK: SLOT[1] 2 3 4: CUSTom	971
:ULINK: SLOT[1] 2 3 4: CUSTom: FIX4	972
:ULINK: SLOT[1] 2 3 4: POWer	972
:ULINK: SLOT[1] 2 3 4: SCHannel: CSID	972
:ULINK: SLOT[1] 2 3 4: SCHannel: IDLE	973
:ULINK: SLOT[1] 2 3 4: SCHannel: PSID	973
:ULINK: SLOT[1] 2 3 4: SCHannel: UWORd	973
:ULINK: SLOT[1] 2 3 4: STATe	974
:ULINK: SLOT[1] 2 3 4: TCHannel: SACChannel	974

---

## Contents

:ULINK:SLOT[1] 2 3 4:TCHannel:UWORD.	974
:ULINK:SLOT[1] 2 3 4:TCHannel[:TCHannel]	975
:ULINK:SLOT[1] 2 3 4:TCHannel[:TCHannel:FIX4]	975
:ULINK:SLOT[1] 2 3 4[:TYPE]	975
[:STATE]	976
TETRA Subsystem–Option 402 ([:SOURce]:RADio:TETRa)	977
:ALPha	977
:BBCLock	977
:BBT	978
:BRATe	978
:BURSt:PN9	979
:BURSt:SCRamble:SEED	980
:BURSt:SCRamble[:STATe]	980
:BURSt:SHAPe:FALL:DELay	980
:BURSt:SHAPe:FALL:TIME	981
:BURSt:SHAPe:FDELay	982
:BURSt:SHAPe:FTIME	982
:BURSt:SHAPe:RDELay	983
:BURSt:SHAPe:RISE:DELay	984
:BURSt:SHAPe:RISE:TIME	984
:BURSt:SHAPe:RTIME	985
:BURSt:SHAPe[:TYPE]	986
:BURSt[:STATe]	986
:CHANnel	987
:DATA	987
:DATA:PRAM.	988
:DATA:FIX4	988
:DEFault	989
:EDATa:DELay	989
:EDCLock	989
:EREFerence	990
:EREFerence:VALue.	990
:FILTer	991
:IQ:SCALE	992
:MODulation:FSK[:DEViation]	992
:MODulation:MSK[:PHASe]	993
:MODulation:UFSK	993
:MODulation:UIQ	993

:MODulation[:TYPE]	.994
:POLarity[:ALL]	.994
:SECondary:RECall	.995
:SECondary:SAVE	.995
:SECondary:TRIGger[:SOURce]	.995
:SECondary[:STATe]	.996
:SLOT[1] 2 3 4:DCCustom	.996
:SLOT[1] 2 3 4:DCCustom:FIX4	.996
:DCNormal:B1	.997
:DCNormal:B2	.997
:SLOT[1] 2 3 4:DCNormal:TSEquence	.997
:SLOT[1] 2 3 4:DCNormal[:DATA]	.998
:SLOT[1] 2 3 4:DCNormal[:DATA]:FIX4	.998
:SLOT[1] 2 3 4:DCSync:B	.999
:SLOT[1] 2 3 4:DCSync:FCOR	.999
:SLOT[1] 2 3 4:DCSync:SSB	.999
:SLOT[1] 2 3 4:DCSync:STS	1000
:SLOT[1] 2 3 4:DCSync[:DATA]	1000
:SLOT[1] 2 3 4:DCSync[:DATA]:FIX4	1000
:SLOT[1] 2 3 4:DDCustom	1001
:SLOT[1] 2 3 4:DDCustom:FIX4	1001
:SLOT[1] 2 3 4:DDNormal:B1	1002
:SLOT[1] 2 3 4:DDNormal:B2	1002
:SLOT[1] 2 3 4:DDNormal:TSEquence	1002
:SLOT[1] 2 3 4:DDNormal[:DATA]	1003
:SLOT[1] 2 3 4:DDNormal[:DATA]:FIX4	1003
:SLOT[1] 2 3 4:DDSync:B	1004
:SLOT[1] 2 3 4:DDSync:FCOR	1004
:SLOT[1] 2 3 4:DDSync:SSB	1004
:SLOT[1] 2 3 4:DDSync:STS	1005
:SLOT[1] 2 3 4:DDSync[:DATA]	1005
:SLOT[1] 2 3 4:DDSync[:DATA]:FIX4	1005
:SLOT[1] 2 3 4:POWEr	1006
:SLOT[1] 2 3 4:STATe	1006
:SLOT[1] 2 3 4:UC1:TSEquence	1006
:SLOT[1] 2 3 4:UC1[:DATA]	1007
:SLOT[1] 2 3 4:UC1[:DATA]:FIX4	1007
:SLOT[1] 2 3 4:UC2:TSEquence	1007

---

# Contents

:SLOT[1] 2 3 4:UC2[:DATA]	1008
:SLOT[1] 2 3 4:UC2[:DATA]:FIX4	1008
:SLOT[1] 2 3 4:UCUStom	1008
:SLOT[1] 2 3 4:UCUStom:FIX4	1009
:SLOT[1] 2 3 4:UNORmal:TSEquence	1009
:SLOT[1] 2 3 4:UNORmal[:DATA]	1009
:SLOT[1] 2 3 4:UNORmal[:DATA]:FIX4	1010
:SLOT[1] 2 3 4[:TYPE]	1010
:SOUT	1011
:SOUT:OFFSet	1011
:SOUT:SLOT	1012
:SRATe	1012
:TRIGger:TYPE	1014
:TRIGger:TYPE:CONTInuous[:TYPE]	1014
:TRIGger:TYPE:GATE:ACTive	1015
:TRIGger[:SOURce]	1016
:TRIGger[:SOURce]:EXTernal:DELay	1017
:TRIGger[:SOURce]:EXTernal:DELay:STATe	1017
:TRIGger[:SOURce]:EXTernal:SLOPe	1018
:TRIGger[:SOURce]:EXTernal[:SOURce]	1018
[:STATe]	1019
Wideband CDMA Base Band Generator Subsystem–Option 400	
([:SOURce]:RADio:WCDMa:TGPP[:BBG])	1020
:BBCLock	1020
:BBCLock:EXT:RATE	1020
:DLINK:APPLy	1021
:DLINK:AWGN:CN	1021
:DLINK:AWGN:CPOWer	1021
:DLINK:AWGN:ECNO	1022
:DLINK:AWGN:ECRPower	1022
:DLINK:AWGN:ECRef	1022
:DLINK:AWGN:FNBW	1023
:DLINK:AWGN:NPOWer	1023
:DLINK:AWGN:TICPower	1023
:DLINK:AWGN[:STATe]	1024
:DLINK:BBCLock	1024
:DLINK:CARB:CMODE:CCODE	1024
:DLINK:CARB:CMODE:DATA	1025
:DLINK:CARB:CMODE:FOFFset	1025

:DLINK:CARB:CMODE:FSTRuct . . . . .	1025
:DLINK:CARB:CMODE:POWer. . . . .	1026
:DLINK:CARB:CMODE:PRATio . . . . .	1026
:DLINK:CARB:CMODE:SCTYpe. . . . .	1026
:DLINK:CARB:CMODE:SFORmat . . . . .	1027
:DLINK:CARB:CMODE:SSCodeos . . . . .	1027
:DLINK:CARB:CMODE:TFIRst. . . . .	1028
:DLINK:CARB:CMODE:TGL . . . . .	1028
:DLINK:CARB:CMODE[:STATe]. . . . .	1028
:DLINK:CPICH:CCODE . . . . .	1029
:DLINK:CPICH:POWer . . . . .	1029
:DLINK:CPICH[:STATe] . . . . .	1029
:DLINK:CRATe . . . . .	1030
:DLINK:DPCH[1]:BALance . . . . .	1030
:DLINK:DPCH[1]:BINitalize . . . . .	1030
:DLINK:DPCH[1]2:ALL[:STATe] . . . . .	1031
:DLINK:DPCH[1]2:CCODE . . . . .	1031
:DLINK:DPCH[1]2:DATA . . . . .	1031
:DLINK:DPCH[1]2:DATA:FIX4 . . . . .	1032
:DLINK:DPCH[1]2:POWer . . . . .	1032
:DLINK:DPCH[1]2:RCSetup. . . . .	1033
:DLINK:DPCH[1]2:SLOTformat . . . . .	1034
:DLINK:DPCH[1]2:SRATe. . . . .	1034
:DLINK:DPCH[1]2:SSCodeos . . . . .	1034
:DLINK:DPCH[1]2:TFCI:PATtern . . . . .	1035
:DLINK:DPCH[1]2:TOFFset . . . . .	1035
:DLINK:DPCH[1]2:TPC:NUMSteps . . . . .	1036
:DLINK:DPCH[1]2:TPC:PATtern . . . . .	1036
:DLINK:DPCH[1]2[:STATe] . . . . .	1037
:DLINK:FILTer . . . . .	1037
:DLINK:FILTer:ALPHA. . . . .	1038
:DLINK:FILTer:BBT . . . . .	1038
:DLINK:FILTer:CHANnel. . . . .	1039
:DLINK:MSYNc . . . . .	1039
:DLINK:OCNS[1]2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:ALL[:STATe]. . . . .	1039
:DLINK:OCNS[1]2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:CCODE . . . . .	1040
:DLINK:OCNS[1]2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:DATA . . . . .	1040
:DLINK:OCNS[1]2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:POWer. . . . .	1040

---

# Contents

:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:SRATe . . . . .	1041
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:SSCodeos . . . . .	1041
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:TOFFset . . . . .	1042
:DLINK:OCNS[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16[:STATe]. . . . .	1042
:DLINK:OOSTest[:STATe] . . . . .	1042
:DLINK:OOSTest:DTXGate:POLarity . . . . .	1043
:DLINK:PADJust. . . . .	1043
:DLINK:PCCPch:BCHData . . . . .	1043
:DLINK:PCCPch:BCHData:FIX4. . . . .	1044
:DLINK:PCCPch:CCODE . . . . .	1044
:DLINK:PCCPch:POWer . . . . .	1044
:DLINK:PCCPch[:STATe]. . . . .	1045
:DLINK:PICH:CCODE . . . . .	1045
:DLINK:PICH:DATA . . . . .	1045
:DLINK:PICH:DATA:FIX4. . . . .	1046
:DLINK:PICH:PIBits . . . . .	1046
:DLINK:PICH:PINDicator . . . . .	1046
:DLINK:PICH:POWer. . . . .	1047
:DLINK:PICH[:STATe]. . . . .	1047
:DLINK:POLarity . . . . .	1047
:DLINK:PSCH:POWer . . . . .	1048
:DLINK:PSCH[:STATe] . . . . .	1048
:DLINK:RPANel:INPut:ALTPower . . . . .	1048
:DLINK:RPANel:INPut:BBGRef . . . . .	1049
:DLINK:RPANel:INPut:BGATE . . . . .	1049
:DLINK:RPANel:INPut:PTRigger1 . . . . .	1049
:DLINK:RPANel:INPut:PTRigger2 . . . . .	1050
:DLINK:RPANel:OUTPut:DCLock . . . . .	1050
:DLINK:RPANel:OUTPut:DOUT . . . . .	1052
:DLINK:RPANel:OUTPut:EVENT1 . . . . .	1053
:DLINK:RPANel:OUTPut:EVENT2 . . . . .	1053
:DLINK:RPANel:OUTPut:EVENT3 . . . . .	1054
:DLINK:RPANel:OUTPut:EVENT4 . . . . .	1054
:DLINK:RPANel:OUTPut:SSYNc . . . . .	1055
:DLINK:SCH[:STATe] . . . . .	1055
:DLINK:SCRamblecode . . . . .	1055
:DLINK:SDElay . . . . .	1056
:DLINK:SSCH:POWer . . . . .	1056

:DLINK:SSCH:SSGRoup	1056
:DLINK:SSCH[:STATe]	1057
:DLINK:TGAP:FSTRuct	1057
:DLINK:TGAP:POFFset	1057
:DLINK:TGAP:PSI[1]:CFN	1058
:DLINK:TGAP:PSI[1]:CMMethod	1058
:DLINK:TGAP:PSI[1]:D	1059
:DLINK:TGAP:PSI[1]:L1	1059
:DLINK:TGAP:PSI[1]:L2	1059
:DLINK:TGAP:PSI[1]:PL1	1060
:DLINK:TGAP:PSI[1]:PL2	1060
:DLINK:TGAP:PSI[1]:PRC	1060
:DLINK:TGAP:PSI[1]:PS	1061
:DLINK:TGAP:PSI[1]:SN	1061
:DLINK:TGAP:RPARameter	1061
:DLINK:TGAP:SCFN	1062
:DLINK:TGAP:START:TRIGger	1062
:DLINK:TGAP:START:TRIGger:POLarity	1062
:DLINK:TGAP:STOP:TRIGger	1063
:DLINK:TGAP:STOP:TRIGger:POLarity	1063
:DLINK:TGAP[:STATe]	1063
:DLINK:TSETup	1064
:DLINK:TXDV	1065
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:BLKSize	1066
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:BPFRame	1067
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:BRATe	1067
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:BSSize	1067
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:CODE	1068
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:CRC	1069
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:DATA	1069
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:DATA:EINsert	1070
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:DATA:FIX4	1070
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:NBLocks	1071
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:POStion	1072
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:PPERcentage	1072
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:RMATch	1073
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:TTI	1073
:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6[:STATe]	1074

---

## Contents

:LINK	1074
:POLarity[:ALL]	1074
:ULINK:APPLY	1075
:ULINK:AWGN:CN	1075
:ULINK:AWGN:CPOWer	1076
:ULINK:AWGN:DRATe	1076
:ULINK:AWGN:EBNO	1076
:ULINK:AWGN:EBRef	1077
:ULINK:AWGN:FNBW	1077
:ULINK:AWGN:NPOWer	1078
:ULINK:AWGN:TICPower	1078
:ULINK:AWGN[:STATe]	1078
:ULINK:CRATe	1079
:ULINK:DPCCh:BETA	1079
:ULINK:DPCCh:CCODE	1080
:ULINK:DPCCh:DATA	1080
:ULINK:DPCCh:DATA:FIX4	1081
:ULINK:DPCCh:FBI:PATtern	1081
:ULINK:DPCCh:FBI:PATtern:FIX	1082
:ULINK:DPCCh:FBI[:STATe]	1082
:ULINK:DPCCh:POWer	1083
:ULINK:DPCCh:RATE	1083
:ULINK:DPCCh:SLOTformat	1083
:ULINK:DPCCh:TFCI:PATtern	1084
:ULINK:DPCCh:TFCI:PATtern:FIX	1084
:ULINK:DPCCh:TFCI[:STATe]	1085
:ULINK:DPCCh:TPC:NSTeps	1085
:ULINK:DPCCh:TPC:PATtern	1086
:ULINK:DPCCh:TPC:PATtern:FIX4	1087
:ULINK:DPCCh:TPC:PATtern:TRIGger:POLarity	1087
:ULINK:DPCCh:TPC:PATtern:TRIGger[:STATe]	1088
:ULINK:DPCCh:TPOWer	1088
:ULINK:DPCCh[:STATe]	1089
:ULINK:DPDCh:BETA	1089
:ULINK:DPDCh:CCODE	1090
:ULINK:DPDCh:DATA	1091
:ULINK:DPDCh:DATA:FIX4	1091
:ULINK:DPDCh:POWer	1092



:ULINK:DPDCh:RATE	1092
:ULINK:DPDCh:RBER	1093
:ULINK:DPDCh:SLOTformat	1094
:ULINK:DPDCh:TBER[:CLENgth]	1095
:ULINK:DPDCh:TBER:ELENgth	1095
:ULINK:DPDCh:TPOWer	1096
:ULINK:DPDCh[:STATe]	1096
:ULINK:FCLock:INTerval	1096
:ULINK:FCLock:POLarity	1097
:ULINK:FILTer	1097
:ULINK:FILTer:ALPHa	1098
:ULINK:FILTer:BBT	1099
:ULINK:FILTer:CHANnel	1099
:ULINK:FOFFset	1100
:ULINK:PADJust	1100
:ULINK:PHYSical[1]:TYPE	1100
:ULINK:PMODE:TPControl:HOLD	1101
:ULINK:PMODE:TPControl:POWer:INITial	1101
:ULINK:PMODE:TPControl:POWer:MAXimum	1102
:ULINK:PMODE:TPControl:POWer:MINimum	1102
:ULINK:PMODE:TPControl:POWer:RESet	1103
:ULINK:PMODE:TPControl:POWer:STEP	1103
:ULINK:PMODE:TPControl:TRIGger:POLarity	1104
:ULINK:PMODE[:SElect]	1104
:ULINK:PRACH:AICH:NUMBER	1104
:ULINK:PRACH:AICH:POLarity	1105
:ULINK:PRACH:AWGN:CN	1105
:ULINK:PRACH:AWGN:CPOWer	1106
:ULINK:PRACH:AWGN:DRATE	1106
:ULINK:PRACH:AWGN:EBNO	1106
:ULINK:PRACH:AWGN:ECNO	1107
:ULINK:PRACH:AWGN:EREF	1107
:ULINK:PRACH:AWGN:NPOWer	1108
:ULINK:PRACH:AWGN:TICPower	1108
:ULINK:PRACH:AWGN[:STATe]	1108
:ULINK:PRACH:MESSAge:CPART:BETA	1109
:ULINK:PRACH:MESSAge:CPART:DATA	1109
:ULINK:PRACH:MESSAge:CPART:DATA:FIX4	1110

---

# Contents

:ULINK:PRACH:MESSAge:CPART:POWer	1110
:ULINK:PRACH:MESSAge:CPART:RATE	1111
:ULINK:PRACH:MESSAge:CPART:SLOTformat	1111
:ULINK:PRACH:MESSAge:CPART:TFCI:PATtern	1112
:ULINK:PRACH:MESSAge:CPART:TFCI:PATtern:FIX	1112
:ULINK:PRACH:MESSAge:CPART:TFCI[:STATe]	1113
:ULINK:PRACH:MESSAge:DPART:BETA	1113
:ULINK:PRACH:MESSAge:DPART:DATA	1114
:ULINK:PRACH:MESSAge:DPART:DATA:FIX4	1114
:ULINK:PRACH:MESSAge:DPART:POWer	1115
:ULINK:PRACH:MESSAge:DPART:RATE	1115
:ULINK:PRACH:MESSAge:DPART:SLOTformat	1116
:ULINK:PRACH:MODE[:SElect]	1117
:ULINK:PRACH:MULTi:MESSAge:TPOWer	1118
:ULINK:PRACH:MULTi:MESSAge[:STATe]	1118
:ULINK:PRACH:MULTi:NUMBer	1118
:ULINK:PRACH:MULTi:PREAmble:NUMBer	1119
:ULINK:PRACH:MULTi:PREAmble:POWer:INITial	1119
:ULINK:PRACH:MULTi:PREAmble:POWer:MAX	1120
:ULINK:PRACH:MULTi:PREAmble:POWer:RSTep	1120
:ULINK:PRACH:MULTi:PREAmble:PPM	1120
:ULINK:PRACH:MULTi:UE[1] 2 3 4 5 6 7 8:MESSAge:CPART:CCODE	1121
:ULINK:PRACH:MULTi:UE[1] 2 3 4 5 6 7 8:MESSAge:DPART:CCODE	1121
:ULINK:PRACH:MULTi:UE[1] 2 3 4 5 6 7 8:PREAmble:SIGNature	1121
:ULINK:PRACH:MULTi:UE[1] 2 3 4 5 6 7 8:SPOsition[1] 2 3 4 5 6 7 8[:ASLot]	1122
:ULINK:PRACH:MULTi:UE[1] 2 3 4 5 6 7 8[:STATe]	1123
:ULINK:PRACH:PREAmble:POWer:AVERAge	1123
:ULINK:PRACH:PREAmble:POWer:MODE	1124
:ULINK:PRACH:RPARAmeter	1124
:ULINK:PRACH:SCRAmblecode	1125
:ULINK:PRACH:SDELay	1125
:ULINK:PRACH:SUBChannel	1126
:ULINK:PRACH:TOFFset	1126
:ULINK:PRACH:TPA	1127
:ULINK:PRACH:TPM	1127
:ULINK:PRACH:TPOWer	1128
:ULINK:PRACH:TPP	1128
:ULINK:PRACH:TRIGger	1129

:ULINK:PRACH:TRIGGER:POLarity . . . . .	1129
:ULINK:PRACH:TRIGGER:SOURce . . . . .	1129
:ULINK:PRACH:TTI . . . . .	1130
:ULINK:PRACH[:SINGLE]:MESSAge[:STATe] . . . . .	1130
:ULINK:PRACH[:SINGLE]:NUMBer . . . . .	1131
:ULINK:PRACH[:SINGLE]:MESSAge:CPARt:CCODE . . . . .	1131
:ULINK:PRACH[:SINGLE]:MESSAge:DPARt:CCODE . . . . .	1132
:ULINK:PRACH[:SINGLE]:MESSAge:TPOWer . . . . .	1133
:ULINK:PRACH[:SINGLE]:NUMBer . . . . .	1133
:ULINK:PRACH[:SINGLE]:PREAmble:NUMBer . . . . .	1134
:ULINK:PRACH[:SINGLE]:PREAmble:POWer:INITial . . . . .	1134
:ULINK:PRACH[:SINGLE]:PREAmble:POWer:MAX . . . . .	1135
:ULINK:PRACH[:SINGLE]:PREAmble:POWer:RSTep . . . . .	1135
:ULINK:PRACH[:SINGLE]:PREAmble:PPM . . . . .	1136
:ULINK:PRACH[:SINGLE]:PREAmble:SIGNature . . . . .	1136
:ULINK:RMCHannel . . . . .	1137
:ULINK:RPANel:DPCH:INPut:ALTPower . . . . .	1137
:ULINK:RPANel:DPCH:INPut:BBGRef . . . . .	1138
:ULINK:RPANel:DPCH:INPut:BGATe . . . . .	1138
:ULINK:RPANel:DPCH:INPut:PTRigger1 . . . . .	1138
:ULINK:RPANel:DPCH:INPut:PTRigger2 . . . . .	1139
:ULINK:RPANel:DPCH:OUTPut:DCLock . . . . .	1139
:ULINK:RPANel:DPCH:OUTPut:DOUT . . . . .	1140
:ULINK:RPANel:DPCH:OUTPut:EVENT1 . . . . .	1141
:ULINK:RPANel:DPCH:OUTPut:EVENT2 . . . . .	1141
:ULINK:RPANel:DPCH:OUTPut:EVENT3 . . . . .	1142
:ULINK:RPANel:DPCH:OUTPut:EVENT4 . . . . .	1142
:ULINK:RPANel:DPCH:OUTPut:SSYNc . . . . .	1143
:ULINK:RPANel:PRACH:INPut:ALTPower . . . . .	1143
:ULINK:RPANel:PRACH:INPut:BBGRef . . . . .	1144
:ULINK:RPANel:PRACH:INPut:BGATe . . . . .	1144
:ULINK:RPANel:PRACH:INPut:PTRigger1 . . . . .	1144
:ULINK:RPANel:PRACH:INPut:PTRigger2 . . . . .	1145
:ULINK:RPANel:PRACH:OUTPut:DCLock . . . . .	1145
:ULINK:RPANel:PRACH:OUTPut:DOUT . . . . .	1147
:ULINK:RPANel:PRACH:OUTPut:EVENT1 . . . . .	1147
:ULINK:RPANel:PRACH:OUTPut:EVENT2 . . . . .	1148
:ULINK:RPANel:PRACH:OUTPut:EVENT3 . . . . .	1149

---

# Contents

:ULINK:RPANel:PRACH:OUTPut:EVENT4	1149
:ULINK:RPANel:PRACH:OUTPut:SSYNc	1150
:ULINK:SCRamblecode	1151
:ULINK:SDElay	1151
:ULINK:SFNRst:POLarity	1151
:ULINK:SYNC:MODE	1152
:ULINK:SYNC[:SOURce]	1152
:ULINK:TGAP:POFFset	1154
:ULINK:TGAP:PSI[1] 2 3 4 5 6:CFN	1154
:ULINK:TGAP:PSI[1]:CMMethod	1155
:ULINK:TGAP:PSI[1] 2 3 4 5 6:D	1155
:ULINK:TGAP:PSI[1] 2 3 4 5 6:L1	1156
:ULINK:TGAP:PSI[1] 2 3 4 5 6:L2	1156
:ULINK:TGAP:PSI[1] 2 3 4 5 6:PL1	1156
:ULINK:TGAP:PSI[1] 2 3 4 5 6:PL2	1157
:ULINK:TGAP:PSI[1] 2 3 4 5 6:POWer	1157
:ULINK:TGAP:PSI[1] 2 3 4 5 6:PRC	1157
:ULINK:TGAP:PSI[1] 2 3 4 5 6:PS	1158
:ULINK:TGAP:PSI[1] 2 3 4 5 6:SN	1158
:ULINK:TGAP:RPARameter	1158
:ULINK:TGAP:SCFN	1159
:ULINK:TGAP[:STATe]	1159
:ULINK:TGAP:START:TRIGger	1160
:ULINK:TGAP:START:TRIGger:POLarity	1160
:ULINK:TGAP:STOP:TRIGger	1160
:ULINK:TGAP:STOP:TRIGger:POLarity	1160
:ULINK:TOFFset	1161
:ULINK:TSTatus:COMPressed	1161
:ULINK:TSTatus:RACH	1161
:ULINK:TSTatus:RECeive	1162
:ULINK:TSTatus:SYNC	1162
:ULINK:[TGRoup[1]]:DCH[1] 2 3 3 5 6:BLKSize	1162
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:BPFRame	1163
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:BRATe	1163
:ULINK:[TGRoup[1]]:DCH[1] 2 3 3 5 6:CODE	1163
:ULINK:[TGRoup[1]]:DCH[1] 2 3 3 5 6:CRC	1164
:ULINK:[TGRoup[1]]:DCH[1] 2 3 3 5 6:DATA	1164
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:DATA:BER:ACTual	1165

:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:DATA:BER:ERRor:BIT	1165
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:DATA:BER:TOTal:BIT	1165
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:DATA:BER[:VALue]	1166
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:DATA:BLER:ACTual	1166
:ULINK[:TGRoup[1]]2:DCH[1] 2 3 4 5 6:DATA:BLER:ERRor:BLOCK	1166
:ULINK[:TGRoup[1]]2:DCH[1] 2 3 4 5 6:DATA:BLER:TOTal:BLOCK	1167
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:DATA:BLER[:VALue]	1167
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:DATA:EINsert	1168
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:DATA:FIX4	1168
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:NBlock	1169
:ULINK[:TGRoup [1]]:DCH[1] 2 3 4 5 6:PPERcentage	1169
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:RMATch	1169
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6:TTI	1170
:ULINK[:TGRoup[1]]:DCH[1] 2 3 4 5 6[:STATe]	1170
:ULINK[:TGRoup[1]]:RACH[1]:BLKSize	1170
:ULINK[:TGRoup [1]]:RACH[1]:BPFRame	1171
:ULINK[:TGRoup [1]]:RACH[1]:BRATe	1171
:ULINK[:TGRoup[1]]:RACH[1]:CODE	1171
:ULINK[:TGRoup[1]]:RACH[1]:CRC	1171
:ULINK[:TGRoup[1]]:RACH[1]:DATA	1172
:ULINK[:TGRoup[1]]:RACH[1]:DATA:BER:ACTual	1172
:ULINK[:TGRoup[1]]:RACH[1]:DATA:BER:ERRor:BIT	1172
:ULINK[:TGRoup[1]]:RACH[1]:DATA:BER:TOTal:BIT	1173
:ULINK[:TGRoup[1]]:RACH[1]:DATA:BER[:VALue]	1173
:ULINK[:TGRoup[1]]:RACH[1]:DATA:BLER:ACTual	1173
:ULINK[:TGRoup[1]]:RACH[1]:DATA:BLER:ERRor:BLOCK	1174
:ULINK[:TGRoup[1]]:RACH[1]:DATA:BLER:TOTal:BLOCK	1174
:ULINK[:TGRoup[1]]:RACH[1]:DATA:BLER[:VALue]	1174
:ULINK[:TGRoup[1]]:RACH[1]:DATA:EINsert	1175
:ULINK[:TGRoup[1]]:RACH[1]:DATA:FIX4	1175
:ULINK[:TGRoup[1]]:RACH[1]:NBlock	1176
:ULINK[:TGRoup [1]]:RACH[1]:PPERcentage	1176
:ULINK[:TGRoup[1]]:RACH[1]:RMATch	1176
:ULINK[:TGRoup[1]]:RACH[1]:TTI	1177
:ULINK[:TGRoup[1]]:RACH[1][:STATe]	1177
[:STATe]	1177

---

# Contents

# Documentation Overview

## Installation Guide

- Safety Information
- Getting Started
- Operation Verification
- Regulatory Information

## User's Guide

- E4428C Analog Signal Generator Overview
- E4423C Analog Signal Generator Overview
- Basic Operation
- Basic Digital Operation
- AWGN Waveform Generator
- Analog Modulation
- Digital Signal Interface Module
- Bluetooth Signals
- BERT
- CDMA Digital Modulation
- GPS Modulation
- Multitone Waveform Generator
- Custom Digital Modulation
- Real Time TDMA Formats
- W-CDMA Digital Modulation for Component Test
- W-CDMA Uplink Digital Modulation for Receiver Test
- W-CDMA Downlink Digital Modulation for Receiver Test
- Troubleshooting

## Programming Guide

- Getting Started with Remote Operation
- Using IO Interfaces
- Programming Examples
- Programming the Status Register System
- Creating and Downloading Waveform Files
- Creating and Downloading User-Data Files

## **SCPI Reference**

### Volume 1:

- SCPI Basics
- Basic Function Commands
- System Commands
- Analog Commands
- Component Test Digital Commands

### Volume 2:

- Digital Signal Interface Module Commands
- Bit Error Rate Test (BERT) Commands
- Receiver Test Digital Commands

### Volume 3:

- Receiver Test Digital Commands (continued)

## **Compatibility with E44xxB SCPI Commands**

- Overview
- E4428C/38C SCPI Commands
- ESG E44xxB Commands
- 8648A/B/C/D Commands
- 8658B, 8657A/B/D/J Programming Codes

## **Service Guide**

- Troubleshooting
- Replaceable Parts
- Assembly Replacement
- Post-Repair Procedures
- Safety and Regulatory

## **Key and Data Field Reference**

### Volume 1:

- Symbols, Numerics, A-H

### Volume 2:

- Volume 2: I-Z



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## 6 Digital Signal Interface Module Commands

This chapter provides SCPI descriptions for commands available with the N5102A Digital Signal Interface Module. Refer to the *E4428C/38C ESG Signal Generators User's Guide* and *E4428C/38C ESG Signal Generators Key and Data Field Reference* for more information on the N5102A module.

- [“Digital Subsystem—Option 003 and 004 \(\[:SOURce\]\)” on page 380](#)

## Digital Subsystem—Option 003 and 004 ([:SOURce])

### :DIGital:CLOCK:CPS 1|2|4

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:CPS 1|2|4  
:DIGital:CLOCK:CPS?
```

This command selects the number of clock cycles per sample. The command is used with parallel or parallel interleaved port configurations. If this command is executed with a serial port configuration or an IF signal type, the parameter value is changed, but it is not used by the interface module until the port configuration is changed to parallel or parallel interleaved, *and* the signal type is changed to IQ.

The query returns the currently set value. Regardless of the port configuration, you must query all four states (clocks per sample, port configuration, data direction, and signal type) to know the interface module's current setup.

#### Example

```
:DIG:CLOC:CPS 2
```

The preceding example sets two clock cycles for each sample.

**\*RST** 1

**Range** 1,2,or 4

**Key Entry** **Clocks Per Sample**

### :DIGital:CLOCK:PHASe

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:PHASe <val>  
:DIGital:CLOCK:PHASe?
```

This command sets the phase for the clock relative to the leading edge transition of the data. At 0 degrees the clock and leading edge of the data signal are aligned. Any phase value between 0 and 360 degrees can be used in the command, however, the signal generator rounds up or down to get 90, 180, 270 and 0 degree settings. For example, entering 140 degrees will cause the signal generator to use the 180 degree setting.

If this command is executed when the clock rate is less than 10 MHz or greater than 200 MHz, the resolution changes to 180 degrees, and the maximum phase defaults to 180 degrees.

### Example

```
:DIG:CLOC:PHAS 90DEG
```

The preceding example sets the clock phase to 90 degrees. The clock signal leading edge transition will be delayed by 1/4 of a clock period relative to the leading edge data transition.

**\*RST** +0.00000000E+000

**Range** 0 – 360 deg

**Key Entry** **Clock Phase**

### :DIGital:CLOCK:POLarity

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:POLarity POSitive|NEGative  
:DIGital:CLOCK:POLarity?
```

This command sets the alignment for the clock signal to positive or negative. Positive selects the leading edge transition of the clock signal to align with the leading edge data transition and negative selects the falling edge transition of the clock signal to align with the leading edge of the data.

### Example

```
:DIG:CLOC:POL NEG
```

The preceding example sets the clock falling edge transition to align with the leading edge data transition.

**\*RST** POS

**Key Entry** **Clock Polarity**

## :DIGital:CLOCK:RATE

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:RATE <val>  
:DIGital:CLOCK:RATE?
```

This command sets the clock rate. If an external clock is used, the rate set with this command must match the external clock rate. Only clock phase settings of 0 or 180 degrees are valid for a clock rate setting below 10 MHz or above 200 MHz. The variable <val> is expressed in hertz

### Example

```
:DIG:CLOC:RATE 200MHZ
```

The preceding example sets the clock rate to 200 megahertz.

**\*RST** +1.00000000E+008

**Range** 1 kHz–400 MHz

**Key Entry** **Clock Rate**

## :DIGital:CLOCK:REFerence:FREQuency

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:REFerence:FREQuency <freq>  
:DIG:CLOC:REF:FREQ?
```

This command allows you to specify the frequency of the external reference supplied to the Freq Ref connector. This command is valid only when the clock source is set to internal.

If this command is executed when the clock source is not set to internal, the parameter value is changed, but it is not used by the signal generator until the clock source is changed to internal.

Because a query returns the currently set value, regardless of the clock source, you must query both states (reference frequency and clock source) to know the signal generator's current setup.

### Example

```
:DIG:CLOC:REF:FREQ 50MHZ
```

The preceding example specifies a 50 megahertz external reference frequency.

**\*RST** +1.00000000E+007

**Range** 1kHz–100 MHz

**Key Entry** **Reference Frequency**

## :DIGital:CLOCK:SKEW

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:SKEW <val>  
:DIGital:CLOCK:SKEW?
```

This command sets the clock signal skew value. The skew is a fine-tune adjustment for the course tune clock phase function and helps to align the clock with valid data states. This is useful at high clock rates and available only for clock frequencies above 10 megahertz. The variable <val> is expressed in nanoseconds.

### Example

```
:DIG:CLOC:SKEW 2NS
```

The preceding example sets the clock skew to 2 nanoseconds.

**\*RST** +0.00000000E+000

**Range** -5ns to 5ns

**Key Entry** **Clock Skew**

## :DIGital:CLOCK:SOURce

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:SOURce INTernal | EXTernal | DEVice  
:DIG:CLOC:SOURce?
```

This command selects one of three possible clock sources.

### Example

```
:DIG:CLOC:SOUR DEV
```

The preceding example uses the “Device Interface Connector” input clock.

**\*RST** INT

**Key Entry** **Clock Source**

### **:DIGital:DATA:ALIGnment**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:ALIGnment MSB|LSB  
:DIGital:DATA:ALIGment?
```

This command selects the bit alignment for a word less than 16 bits in length. The MSB (most significant bit) selection maintains the MSB of the word on the same data line while the LSB (least significant bit) will move depending on the word size. The opposite effect occurs when the alignment is set to LSB.

#### **Example**

```
:DIG:DATA:ALIG MSB
```

The preceding example sets the MSB word format.

**\*RST** LSB

**Key Entry** Word Alignment

### **:DIGital:DATA:BORDER**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:BORDER MSB|LSB  
:DIGital:DATA:BORD?
```

This command selects the bit order for data transmitted through the N5102A module. Data can be in least significant (LSB) bit first or most significant (MSB) bit first.

#### **Example**

```
:DIG:DATA:BORD MSB
```

The preceding example specifies data in MSB first format.

**\*RST** LSB

**Key Entry** Bit Order

## :DIGital:DATA:DIRection

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:DIRection OUTPut | INPut  
:DIGital:DATA:DIRection?
```

This command selects an input or output direction for data flow through the N5102A module.

### Example

```
:DIG:DATA:DIR INP
```

The preceding example selects input as the direction of data flow.

**\*RST** OUTP (unless only Option 004 is installed)

**Key Entry**            **Direction**

## :DIGital:DATA:IGain

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:IGain <val>  
:DIGital:DATA:IGain?
```

This command adjust the gain of the I data in the N5102A module. The adjustment does not affect the Q data.

The variable <val> is expressed as a percentage delta from 100%. The offset is an adjustment to the analog level that is represented by the digital sample. The analog voltage is limited to a 16-bit data sample.

### Example

```
:DIG:DATA:IG 10
```

The preceding example sets the I data gain to 10%.

**\*RST** +0.00000000E+000

**Range** -12.5 through 12.5

**Key Entry**            **I Gain**

### :DIGital:DATA:INEGate

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:INEGate OFF|ON|0|1  
:DIGital:DATA:INEGate?
```

This command enables or disables the negation of the I data sample. Negation changes the sample by expressing it in two's complement form, multiplying by negative one, and converting back to the selected numeric format. This can be done for I samples, Q samples, or both.

The sample or word represents a quantized analog voltage level. This analog voltage can be added or multiplied. For a 16-bit sample, the range is from 0 to 65535 in offset binary or -32768 to +32767 in 2's complement mode.

#### Example

```
:DIG:DATA:INEG ON
```

The preceding example enables negation of the I data.

```
*RST 0
```

**Key Entry**            **Negate I**

### :DIGital:DATA:IOFFset

Supported E4438C Option with option 003

```
:DIGital:DATA:IOFFset <val>  
:DIGital:DATA:IOFFset?
```

This command adjusts the DC offset for I data. The command is available for the N5102A module output mode. The variable <val> is expressed as a +/- 100% of the full scale value.

#### Example

```
:DIG:DATA:IOFF 40
```

The preceding example sets the I offset to 40% of full scale.

```
*RST +0.00000000E+000
```

**Range**                -100 to +100

**Key Entry**            **I Offset**



### **:DIGital:DATA:IQSWap**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:IQSWap OFF|ON|0|1  
:DIGital:DATA:IQSWap?
```

This command enables or disables swapping of the I and Q data. When enabled, the I data is sent to the N5102A's Q bus and the Q data is sent to the I bus.

#### **Example**

```
:DIG:DATA:IQSW ON
```

The preceding example enables swapping of I and Q data.

**\*RST** 0

**Key Entry** **Swap IQ**

### **:DIGital:DATA:NFORmat**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:NFORmat OBINary|TCOMplement  
:DIGital:DATA:NFORmat?
```

This command selects the binary format used to represent the transmitted data values. The selections are offset binary or 2's complement.

#### **Example**

```
:DIG:DATA:NFOR OBIN
```

The preceding example selects the offset binary format to represent data values.

**\*RST** TCOM

**Key Entry** **Numeric Format**

### **:DIGital:DATA:POLarity:FRAME**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:POLarity:FRAME POSitive|NEGative  
:DIGital:DATA:POLarity:FRAME?
```

This command selects the polarity of the frame marker for serial transmission. The frame marker indicates the beginning of each sample or byte of data. The command is valid for serial transmission only.

## Digital Signal Interface Module Commands

### Digital Subsystem—Option 003 and 004 ([:SOURce])

POS                    This choice selects a positive polarity. The frame marker is high for the first data sample.

NEG                    This choice selects a negative polarity. The frame marker is low for the first data sample.

#### Example

```
:DIG:DATA:POL:FRAM NEG
```

The preceding example selects a negative polarity for the frame marker.

**\*RST**                    POS

**Key Entry**                **Frame Polarity**

### :DIGital:DATA:POLarity:IQ

Supported                E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:POLarity:IQ POSitive|NEGative  
:DIGital:DATA:POLarity:IQ?
```

This command selects the logic level for I and Q data. Positive selects a high logic level at the output as a digital one and negative selects a low logic level at the output as a digital one.

POS                    This choice selects a logic high level as digital one.

NEG                    This choice selects a logic low level as a digital one.

#### Example

```
:DIG:DATA:POL:IQ NEG
```

The preceding example sets low level logic.

**\*RST**                    POS

**Key Entry**                **IQ Polarity**

### :DIGital:DATA:QGain

Supported                E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:QGain <val>  
:DIGital:DATA:QGain?
```

This command adjusts the gain for Q data in the N5102A module. The adjustment does not affect the I data.

The variable <val> is expressed as a percentage delta from 100%. The offset is an adjustment to the analog level that is represented by the digital sample. The analog voltage is limited to a 16-bit data sample.

### Example

```
:DIG:DATA:QG 10
```

The preceding example increases the gain for Q data by 10%.

**\*RST** +0.00000000E+000

**Range** -12.5 through 12.5

**Key Entry** **Q Gain**

## :DIGital:DATA:QNEGate

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:QNEGate OFF|ON|0|1
```

```
:DIGital:DATA:QNEGate?
```

This command enables or disables the negation of the Q data sample. Negation changes the sample by expressing it in two's complement form, multiplying by negative one, and converting back to the selected numeric format.

The sample or word represents a quantized analog voltage level. This analog voltage can be added or multiplied. For a 16-bit sample, the range is from 0 to 65535 in offset binary or -32768 to +32767 in 2's complement mode.

### Example

```
:DIG:DATA:QNEG ON
```

The preceding example enables negation of the Q data.

**\*RST** 0

**Key Entry** **Negate Q**

### :DIGital:DATA:QOFFset

Supported E4438C Option with option 003

```
:DIGital:DATA:QOFFset <val>  
:DIGital:DATA:QOFFset?
```

This command adjusts the DC offset for Q data. The command is available for the N5102A module output mode. The variable <val> is expressed as a +/- 100% of the full scale value.

#### Example

```
:DIG:DATA:QOFF 40
```

The preceding example sets the Q offset to 40% of full scale.

**\*RST** +0.00000000E+000

**Range** -100 through 100

**Key Entry** **Q Offset**

### :DIGital:DATA:ROTation

Supported E4438C Option with option 003

```
:DIGital:DATA:ROTation <val>  
:DIGital:DATA:ROTation?
```

This command rotates the IQ data in the IQ plane. This command is valid for the N5102A output mode. The variable <val> is expressed in degrees with a range from 0 to 360.

#### Example

```
:DIG:DATA:ROT 45
```

The preceding example rotates the IQ constellation 45 degrees.

**\*RST** +1.00000000E+000

**Range** 0–360

**Key Entry** **Rotation**

### **:DIGital:DATA:SCALing**

Supported E4438C Option with option 003

:DIGital:DATA:SCALing <val>

:DIGital:DATA:SCALing?

This command enables scaling of the I and Q data to the level indicated by the <val> variable. This command is valid for the N5102A output mode. The variable <val> is expressed as a percentage.

#### **Example**

:DIG:DATA:SCAL 50

The preceding example scales the I and Q data to amplitude to 50%.

**\*RST** +1.00000000E+002

**Range** -100 through 100

**Key Entry** **Scaling**

### **:DIGital:DATA:SIZE**

Supported E4438C Option with option 003 or 004 or both

:DIGital:DATA:SIZE <val>

:DIGital:DATA:SIZE?

This command selects the number of bits in each sample. A sample can have a maximum word length of 16 bits.

#### **Example**

:DIG:DATA:SIZE 8

The preceding example sets the sample word size to eight bits.

**\*RST** +1.600000000E+001

**Range** 4–16

**Key Entry** **Word Size**

## :DIGital:DATA:STYPe

Supported E4438C Option with option 003

```
:DIGital:DATA:STYPe IQ|IF  
:DIGital:DATA:STYPe?
```

This command selects the output format for the IQ data. The IQ selection outputs digital I and Q data. Whereas the IF (intermediate frequency) selection modulates the I and Q data onto the IF frequency. The IF is calculated as 1/4 the clock sample rate. This command is valid only for the N5102A output mode.

**IQ** This choice outputs I and Q digital data.

**IF** This choice outputs a modulated signal.

### Example

```
:DIG:DATA:STYP IF
```

The preceding example sets the I and Q output data to modulate the intermediate frequency.

```
*RST IQ
```

**Key Entry** **Signal Type**

## :DIGital:DATA:TYPE

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:TYPE SAMPlEs|PFSSamPlEs  
:DIGital:DATA:TYPE?
```

This command selects filtered baseband data or unfiltered baseband data as the transmitted data type.

If this command is executed while an ARB modulation format is active, the parameter choice is changed, but it is not *used* by the interface module until a real-time modulation format is turned on.

Because a query returns the current choice, regardless of whether or not an ARB format is active, you must query both states (data type and the modulation format) to know the signal generator's current setup.

**SAMPlEs** This choice selects DAC samples as the data transmitted.

**PFSSamPlEs** This choice selects pre-filtered samples which are unfiltered I and Q data.

**Example**

```
:DIG:DATA:TYPE PFS
```

The preceding example sets the data type to pre-filtered I and Q data.

```
*RST          SAMP
```

**Key Entry**            **Data Type**

**:DIGital:DIAGnostic:LOOPback**

Supported            E4438C Option with option 003 or 004 or both

```
:DIGital:DIAGnostic:LOOPback? DIGBus|CABLe|N5102A|DEVice
```

This command selects and executes a loop back test that validates the integrity of digital data. Refer to the E4428C/38C ESG Signal Generators Key and Data Field Reference for more information.

DIGBus            This choice selects a loop back test on the ESG Digital Bus connector at the signal generator side.

CABLe            This choice selects a loop back test using the Digital Bus Loop Back Fixture test board.

N5102A            This choice selects a loop back test for the N5102A module.

DEVice            This choice selects a loop back test using the LOOP BACK TEST SINGLE ENDED IO DUAL 40 PIN board.

**Example**

```
:DIG:DIAG:LOOP? DEV
```

The preceding example runs the diagnostic test on the Single Ended IO Dual 40 Pin device and returns a pass or fail condition.

```
*RST          Device Intfc
```

**Key Entry**            **Loop Back Test Type**

**:DIGital:LOGic[:TYPE]**

Supported            E4438C Option with option 003 or 004 or both

```
:DIGital:LOGic[:TYPE] LVDS|LVTT1|CMOS15|CMOS18|CMOS25|CMOS33|SSI
:DIGital:LOGic[:TYPE]?
```

This command selects the logic data type used by the device being tested.

LVDS            This choice selects low voltage differential signaling as the logic data type.

### Digital Subsystem—Option 003 and 004 ([:SOURce])

LVTT1	This choice selects a low voltage TTL signal as the logic data type.
CMOS15	This choice selects a 1.5 volt CMOS signal as the logic data type.
CMOS18	This choice selects a 1.8 volt CMOS signal as the logic data type.
CMOS25	This choice selects a 2.5 volt CMOS signal as the logic data type.
CMOS33	This choice selects a 3.3 volt CMOS signal as the logic data type.
SSI	This key sets the logic type of the device interface to SSI. This logic type uses single ended I/O and a 3.3 volt supply. This is a special serial interface.

#### Example

```
:DIG:LOG CMOS15
```

The preceding example selects 1.5 volt CMOS as the logic data type.

```
*RST CMOS33
```

**Key Entry**            **Logic Type**

### :DIGital:PCONfig

Supported            E4438C Option with option 003 or 004 or both

```
:DIGital:PCONfig PARallel | SERIAL | PINTIQ | PINTQI  
:DIGital:PCONfig?
```

This command selects the data transmission type used for communication between the N5102A module and the device under test. Refer to the E4428C/38C ESG Signal Generators Key and Data Field Reference for more information.

PARallel	This choice selects parallel data transmission.
SERial	This choice selects serial data transmission.
PINTIQ	This choice selects parallel interleaving data transmission. The I data is transmitted on the rising clock edge and the Q data on the falling edge.
PINTQI	This choice selects parallel interleaving data transmission. The Q data is transmitted on the rising clock edge and the I data on the falling edge.

#### Example

```
:DIG:PCON PINTQI
```

The preceding example selects parallel interleaving format

```
*RST PAR
```

**Key Entry**            **Port Config**



## **:DIGital:PRESet:PTHRough**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:PRESet:PTHRough
```

This command sets up the preset condition for the N5102A module and allows transmission of data through the module with no modifications. The command is valid only when a modulation format is active.

### **Example**

```
:DIG:PRESet:PTHR
```

The preceding example sets the N5102A module to a preset condition and allows data to pass through unmodified.

**Key Entry**            **Pass Through Preset**

## **:DIGital[:STATe]**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital[:STATe] 0|1|OFF|ON  
:DIGital[:STATe]?
```

This command enables or disables the operating state of the N5102A module.

### **Example**

```
:DIG ON
```

The preceding example turns on the N5102A module.

**\*RST**            **OFF**

**Key Entry**            **N5102A Off On**



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## 7 Bit Error Rate Test (BERT) Commands

This chapter provides SCPI description for commands dedicated to BERT testing using the E4438C ESG Vector Signal Generator. This chapter contains the following sections:

- “Calculate Subsystem–Option UN7 and 300 (:CALCulate:BERT)” on page 398
- “Data Subsystem–Option UN7 and 300 (:DATA)” on page 408
- “Input Subsystem–Option UN7 (:INPut:BERT[: BASeband])” on page 416
- “Measure Subsystem–Option 300 (:MEASure[:SCALar]:BERT:BTS:LOOPback)” on page 422
- “Sense Subsystem–Options UN7 and 300 ([:SOURce]:SENSE:BERT)” on page 425

**Calculate Subsystem–Option UN7 and 300 (:CALCulate:BERT)**

---

## Calculate Subsystem–Option UN7 and 300 (:CALCulate:BERT)

### **:BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria:ERATe**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria:

ERATe <val>

:CALCulate:BERT:BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria:ERATe?

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +1.00000000E-001

**Range** 0.0–1.0

**Key Entry** Error Rate

### **:BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria[:SElect]**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:EDGE:ETCH:F43:COMParator:

CRITeria[:SElect] ERATe|NOLimit

:CALCulate:BERT:BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria[:SElect]?

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

**ERATe** This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.

**NOLimit** This choice disables the pass/fail indication.

**\*RST** NOLimit

**Key Entry** **Error Rate** **No Limits**

**:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria:ERATe**

**Supported**            E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria:ERATe <val>
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria:ERATe?
```

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST**                    +1.00000000E-001

**Range**                 0.0–1.0

**Key Entry**            **Error Rate**

**:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria[:SElect]**

**Supported**            E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS5:COMParator:
CRITeria[:SElect] ERATe|NOLimit
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria[:SElect]?
```

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

**ERATe**                 This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.

**NOLimit**              This choice disables the pass/fail indication.

**\*RST**                    NOLimit

**Key Entry**            **Error Rate**        **No Limits**

**:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria:ERATe**

**Supported**            E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria:ERATe <val>
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria:ERATe?
```

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST**                    +1.00000000E-001

**Range**                 0.0–1.0

**Key Entry**            **Error Rate**

**Calculate Subsystem—Option UN7 and 300 (:CALCulate:BERT)**

**:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria[:SElect]**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:EDGE:MCS9:COMParator:  
CRITeria[:SElect] ERATe|NOLimit

:CALCulate:BERT:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria[:SElect]?

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

**ERATe** This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.

**NOLimit** This choice disables the pass/fail indication.

**\*RST** NOLimit

**Key Entry** **Error Rate** **No Limits**

**:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria:ERATe**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria:  
ERATe <val>

:CALCulate:BERT:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria:ERATe?

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +2.00000000E-002

**Range** 0.0–1.0

**Key Entry** **Error Rate**

### **:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria[:SElect]**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:EDGE:UNCoded:COMParator:

CRITeria[:SElect] ERATe|NOLimit

:CALCulate:BERT:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria[:SElect]?

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

**ERATe** This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.

**NOLimit** This choice disables the pass/fail indication.

**\*RST** NOLimit

**Key Entry** **Error Rate** **No Limits**

### **:BTS:LOOPback:GSM:CS1:COMParator:CRITeria:ERATe**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:GSM:CS1:COMParator:CRITeria:

ERATe <val>

:CALCulate:BERT:BTS:LOOPback:GSM:CS1:COMParator:CRITeria:ERATe?

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +1.00000000E-001

**Range** 0.0–1.0

**Key Entry** **Error Rate**

**Calculate Subsystem–Option UN7 and 300 (:CALCulate:BERT)**

**:BTS:LOOPback:GSM:CS1:COMPArator:CRITeria[:SElect]**

**Supported** E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:GSM:CS1:COMPArator:
CRITeria[:SElect] ERATe|NOLimit
:CALCulate:BERT:BTS:LOOPback:GSM:CS1:COMPArator:CRITeria[:SElect]?
```

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

**ERATe** This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.

**NOLimit** This choice disables the pass/fail indication.

**\*RST** NOLimit

**Key Entry** Error Rate No Limits

**:BTS:LOOPback:GSM:CS4:COMPArator:CRITeria:ERATe**

**Supported** E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:GSM:CS4:COMPArator:CRITeria:
ERATe <val>
:CALCulate:BERT:BTS:LOOPback:GSM:CS4:COMPArator:CRITeria:ERATe?
```

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +1.00000000E-001

**Range** 0.0–1.0

**Key Entry** Error Rate

**:BTS:LOOPback:GSM:CS4:COMPArator:CRITeria[:SElect]**

**Supported** E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:GSM:CS4:COMPArator:
CRITeria[:SElect] ERATe|NOLimit
:CALCulate:BERT:BTS:LOOPback:GSM:CS4:COMPArator:CRITeria[:SElect]?
```

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.



ERATe	This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.	
NOLimit	This choice disables the pass/fail indication.	
<b>*RST</b>	NOLimit	
<b>Key Entry</b>	<b>Error Rate</b>	<b>No Limits</b>

**:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria:ERATe**

<b>Supported</b>	E4438C with Option 300	
	:CALCulate:BERT:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria: ERATe <val> :CALCulate:BERT:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria:ERATe?	
	This command sets the error rate pass/fail threshold value.	
	The variable <val> is a decimal notation representing a percentage value.	
<b>*RST</b>	+1.00000000E-001	
<b>Range</b>	0.0–1.0	
<b>Key Entry</b>	<b>Error Rate</b>	

**:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria[:SElect]**

<b>Supported</b>	E4438C with Option 300	
	:CALCulate:BERT:BTS:LOOPback:GSM:MCS1:COMParator: CRITeria[:SElect] ERATe NOLimit :CALCulate:BERT:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria[:SElect]?	
	This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.	
ERATe	This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.	
NOLimit	This choice disables the pass/fail indication.	
<b>*RST</b>	ERAT	
<b>Key Entry</b>	<b>Error Rate</b>	<b>No Limits</b>

**Calculate Subsystem–Option UN7 and 300 (:CALCulate:BERT)**

**:BTS:LOOPback:GSM:COMParator:CRITeria:CIB**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:CIB <val>

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:CIB?

This command sets the Class II residual bit error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +4.00000000E-003

**Range** 0.0–1.0

**Key Entry** **Class Ib RBER**

**:BTS:LOOPback:GSM:COMParator:CRITeria:CII**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:CII <val>

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:CII?

This command sets the Class Ib residual bit error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +2.00000000E-002

**Range** 0.0–1.0

**Key Entry** **Class II RBER**

**:BTS:LOOPback:GSM:COMParator:CRITeria:FERasure**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:FERasure <val>

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:FERasure?

This command sets the frame erasure rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +1.00000000E-003

**Range** 0.0–1.0

**Key Entry** **Frame Erasure**

**:BTS:LOOPback:GSM:COMParator:CRITeria[:SElect]**

**Supported**            E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria[:SElect] FERasure|
CLIB|CLII|ANY|NOLimit
:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria[:SElect]?
```

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

**FERasure**            This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for frame erasure ratio.

**CLIB**                This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the number of Class Ib errors detected in the measurement.

**CLII**                This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the number of Class II errors detected in the measurement.

**ANY**                This choice reports, on the front panel display of the signal generator, the pass or fail status compared to all of the specified comparator criteria.

**NOLimit**            This choice disables the pass/fail indication.

**\*RST**                NOLimit

<b>Key Entry</b>	<b>Frame Erasure</b>	<b>Class Ib RBER</b>	<b>Class II RBER</b>	<b>Exceeds Any Limit</b>
------------------	----------------------	----------------------	----------------------	--------------------------

**No Limits**

**[:BASEband]:COMParator:MODE**

**Supported**            E4438C with Option UN7

```
:CALCulate:BERT[:BASEband]:COMParator:MODE CEND|FHOLD
:CALCulate:BERT[:BASEband]:COMParator:MODE?
```

This command selects the pass/fail judgement mode of the comparator function.

**CEND**                This choice selects the cycle end mode and each BER measurement result is compared with the limit value to make a pass/fail assessment at the end of a cycle.

**FHOLD**              This choice selects the fail hold mode and only one fail judgement is allowed during that BER measurement loop. Any failed judgement after the first failure is ignored.

## Bit Error Rate Test (BERT) Commands

### Calculate Subsystem–Option UN7 and 300 (:CALCulate:BERT)

<b>*RST</b>	CEND
<b>Key Entry</b>	<b>Cycle End      Fail Hold</b>
<b>Remarks</b>	For automated tests, the results of this command can be accessed from the rear panel BER TEST OUT pin on the AUX I/O connector. For more information about the rear panel AUX I/O connector pin configuration, refer to the <i>E4428C/38C ESG Signal Generators User's Guide</i> .

### [ :BASEband]:COMParator:THReshold

<b>Supported</b>	E4438C with Option UN7
	:CALCulate:BERT[:BASEband]:COMParator:THReshold <val> :CALCulate:BERT[:BASEband]:COMParator:THReshold?
	This command specifies the threshold value for the pass/fail judgement function. The variable <val> is a decimal notation representing a percentage value.
<b>*RST</b>	+1.00000000E-002
<b>Range</b>	0.0000001–1.00
<b>Key Entry</b>	<b>Pass/Fail Limits</b>
<b>Remarks</b>	This command is valid only while the BER pass/fail command is active. Refer to “[ :BASEband]:COMParator[:STATe]” on page 406.

### [ :BASEband]:COMParator[:STATe]

<b>Supported</b>	E4438C with Option UN7
	:CALCulate:BERT[:BASEband]:COMParator[:STATe] ON OFF 1 0 :CALCulate:BERT[:BASEband]:COMParator[:STATe]?
	This command enables or disables the pass/fail judgement function.
<b>*RST</b>	0
<b>Key Entry</b>	<b>Pass/Fail Off On</b>

### **[ :BASEband ] :DISPlay:MODE:**

**Supported** E4438C with Option UN7

```
:CALCulate:BERT[:BASEband]:DISPlay:MODE PERCent|SCientific  
:CALCulate:BERT[:BASEband]:DISPlay:MODE?
```

This command selects the display mode for the bit error rate (BER) measurement.

**PERCent** This choice reports measurement results as a percentage.

**SCientific** This choice reports measurement results in scientific notation.

**\*RST** PERC

**Key Entry** **BER Display % Exp**

### **[ :BASEband ] :DISPlay:UPDate:**

**Supported** E4438C with Option UN7

```
:CALCulate:BERT[:BASEband]:DISPlay:UPDate CEND|CONT  
:CALCulate:BERT[:BASEband]:DISPlay:UPDate?
```

This command selects the display update mode during bit error rate (BER) measurements.

**CEND** This choice selects the cycle end mode and the previous BER measurement result is displayed during the current measurement cycle.

**CONT** This choice selects the continuous mode and the display shows the real-time intermediate results during that BER measurement cycle.

**\*RST** CONT

**Key Entry** **Update Display Cycle End Cont**

---

## Data Subsystem—Option UN7 and 300 (:DATA)

### :BERT:BTS:LOOPback:EDGE:ETCH:F43[:DATA]

**Supported** E4438C with Option 300

```
:DATA:BERT:BTS:LOOPback:EDGE:ETCH:F43[:DATA]? IEC|IEBC|DEFc|BCO|IER|IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGE|STOP|SCAuse
```

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFc|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGE|STOP|SCAuse are not updated until the next BER measurement is completed.

IEC	This choice provides the intermediate error count with the following range: <Integer> 0 to 1500000.
IEBC	This choice provides the intermediate non-erased bit error blocks with the following range: <Integer> 0 to 1500000.
DEFc	This choice provides the intermediate downlink error frame count with the following range: <Integer> 0 to 750000.
BCO	This choice provides the intermediate block or bit count with the following range: <Integer> 0 to 1500000 (block).
IER	This choice provides the intermediate error ratio with the following range: <Real> 0 to 1 (0 to 100%).
IABer	This choice provides the intermediate average BER within blocks that have errors. The range is as follows: <Real> 0 to 1.
ALL	This choice returns all intermediate values (IEC, IEBC, DEFc, BCO, IER, and IABer) at the same time.
TEC	This choice provides the total error count with the following range: <Integer> 0 to 1500000 (block).
TEBC	This choice provides the total non-erased bit error blocks count with the following range: <Integer> 0 to 1500000.
TDEFc	This choice provides the total downlink error frame count with the following range: <Integer> 0 to 65535.

TBCO	This choice provides the total block count with the following range: <Integer> 0 to 1500000 (block).
TER	This choice provides the total error ratio with the following range: <Real> 0 to 1 (0 to 100%).
TABer	This choice provides the total average BER within blocks that have errors. The range is as follows: <Real> 0 to 1.
TALL	This choice returns all total values (TEC, TEBC, TDEFc, TBCO, TER, TABer, JUDGE, STOP, and SCAuse) at the same time. If accidental TCH synchronization loss caused the measurement to stop, TSLoss is returned.
JUDGE	This choice provides the pass or fail string. If pass/fail criteria is NOLimit, NONE is returned.
STOP	This choice checks to see if the stop threshold is met and returns one of the following values: <Enumerated set> TRUE FALSE. When threshold to stop criteria is NONE, FALSE is returned.
SCAuse	This choice provides the stop cause by returning one of the following values: <Enumerated set> NONE Ebit EBlock TSL. If accidental TCH synchronization loss caused the measurement to stop, TSL is returned.

### **:BERT:BTS:LOOPback:EDGE:MCS5[:DATA]**

**Supported** E4438C with Option 300

:DATA:BERT:BTS:LOOPback:EDGE:MCS5[:DATA]? IEC|IEBC|DEFc|BCO|IER|IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGE|STOP|SCAuse

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFc|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGE|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

**:BERT:BTS:LOOPback:EDGE:MCS9[:DATA]**

**Supported** E4438C with Option 300

:DATA:BERT:BTS:LOOPback:EDGE:MCS9[:DATA]? IEC|IEBC|DEFC|BCO|IER|IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGE|STOP|SCAuse

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFC|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGE|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

**:BERT:BTS:LOOPback:EDGE:UNCoded[:DATA]**

**Supported** E4438C with Option 300

:DATA:BERT:BTS:LOOPback:EDGE:UNCoded[:DATA]? IEC|IEBC|DEFC|BCO|IER|IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGE|STOP|SCAuse

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFC|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGE|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

**:BERT:BTS:LOOPback:GSM[:DATA]**

**Supported** E4438C with Option 300

:DATA:BERT:BTS:LOOPback:GSM[:DATA]? IBC|IIC|FEC|DFEC|FRC|IBBer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGE|STOP|SCAuse

This data query returns the measurement result value for each variable.

IBC|IIC|FEC|DFEC|FRC|IBBer|IIBer|FER are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns intermediate values at the same time.



At the end of the measurement, the final values are stored to:

TIBC | TIIC | TFEC | TDEFc | TFRC | TIBBer | TIIBer | TFER variables. These variables and JUDGE | JCAuse | STOP | SCAuse are not updated until the next BER measurement is completed. TALL returns all of the total values at the same time.

IBC	This choice provides the intermediate class Ib error count with the following range: <Integer> 0 to 792000000.
IIC	This choice provides the intermediate class II error count with the following range: <Integer> 0 to 468000000.
FEC	This choice provides the intermediate frame erasure count with the following range: <Integer> 0 to 6000000.
DEFc	This choice provides the intermediate downlink error frame count with the following range: <Integer> 0 to 65535.
FRC	This choice provides the intermediate frame count with the following range: <Integer> 0 to 6000000.
IBBer	This choice provides the intermediate class Ib error ratio with the following range: <Real> 0 to 1 (0 to 100%).
IIBer	This choice provides the intermediate class II error ratio with the following range: <Real> 0 to 1 (0 to 100%).
FER	This choice provides the intermediate frame erasure ratio with the following range: <Real> 0 to 1 (0 to 100%).
ALL	This choice provides all intermediate values (IBC, IIC, FEC, DEFc, FRC, IBBer, IIBer, FER) at the same time.
TIBC	This choice provides the total class Ib bit error count with the following range: <Integer> 0 to 792000000.
TIIC	This choice provides the total class II bit error count with the following range: <Integer> 0 to 468000000.
TFEC	This choice provides the total frame erasure count with the following range: <Integer> 0 to 6000000.
TDEFc	This choice provides the total downlink error frame count with the following range: <Integer> 0 to 65535.
TFRC	This choice provides the total frame count with the following range: <Integer> 0 to 6000000.
TIBBer	This choice provides the total class Ib error ratio with the following range: <Real> 0 to 1 (0 to 100%).

## Bit Error Rate Test (BERT) Commands

### Data Subsystem—Option UN7 and 300 (:DATA)

TIIBer	This choice provides the total class II error ratio with the following range: <Real> 0 to 1 (0 to 100%).
TFER	This choice provides the total frame erasure ratio with the following range: <Real> 0 to 1 (0 to 100%).
TALL	This choice returns all total values (TIBC TIIC TFEC TDEFc TFRC TIIBer TIIIBer TFER JUDGE JCAuse STOP SCAuse) at the same time. If accidental TCH synchronization loss caused the measurement to stop, TSLoss is returned.
JUDGE	This choice provides the comparator result (TEST OUT) with the following values: <Enumerated set> FAIL PASS NONE. If pass/fail criteria is NOLimit, NONE is returned
JCAuse	This choice provides which limit was met to cause the comparator result by returning one of the following values: <Enumerated set> NOLimit FER CIB CII
STOP	This choice checks to see if the stop threshold is met and returns one of the following values: <Enumerated set> TRUE FALSE. When threshold to stop criteria is NONE, FALSE is returned.
SCAuse	This choice provides the stop cause by returning one of the following values: <Enumerated set> NONE FE CIB CII TSLoss. If accidental TCH synchronization loss caused the measurement to stop, TSLoss is returned.

### :BERT:BTS:LOOPback:GSM:CS1[:DATA]

**Supported** E4438C with Option 300

:DATA:BERT:BTS:LOOPback:GSM:CS1[:DATA]? IEC|IEBC|DEFc|BCO|IER|IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGE|STOP|SCAuse

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFc|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGE|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

## **:BERT:BTS:LOOPback:GSM:CS4[:DATA]**

**Supported** E4438C with Option 300

```
:DATA:BERT:BTS:LOOPback:GSM:CS4[:DATA]? IEC|IEBC|DEFC|BCO|IER|IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGE|STOP|SCAuse
```

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFC|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGE|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

## **:BERT:BTS:LOOPback:GSM:MCS1[:DATA]**

**Supported** E4438C with Option 300

```
:DATA:BERT:BTS:LOOPback:GSM:MCS1[:DATA]? IEC|IEBC|DEFC|BCO|IER|IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGE|STOP|SCAuse
```

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFC|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGE|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

## **:BERT:AUXout**

**Supported** E4438C with Option UN7

```
:DATA:BERT[:BASeband]:AUXout ERRor|REFerence|PN9  
:DATA:BERT[:BASeband]:AUXout?
```

This command selects a pre-defined output signal configuration for pins on the AUX I/O rear panel connector. Refer to [Table 7-1](#) for the output pin configuration and signal type.

**ERRor** This choice selects the bit error rate (BER) information output.

**REFerence** This choice selects the reference information output.

PN9 This choice selects a pseudo-random data output.

**Table 7-1 AUX I/O pin configurations**

Pin#	ERRor	REFerence	PN9
1	BER Meas End	BER Data Out	PN9 Data
4	BER Sync Loss	Sync Start	No signal
20	BER Test Out	BER Clock Out	PN9 Clock
21	BER Error Out	BER Error Out	BER Error Out
22	BER No Data	Reference Data	No signal

**BER Meas End** A signal at this pin indicates the status of the bit error rate (BER) measurements. BER measurements are being executed when the signal is high.

**BER Sync loss** A low signal at this pin indicates that the synchronization is lost. This signal is valid only when the signal at the BER Meas End pin is high.

**BER Test Out** A signal at this pin indicates the test result of the bit error rate measurements. The result is guaranteed at the falling edge of the BER Meas End signal. The result is pass when the signal is low; the result is fail when the signal is high. The signal is also high when the pass/fail judgment is set to off.

**BER Error Out** A signal at this pin indicates the number of the error bits. The output is normally low. One pulse signal (pulse width matches the input clock) indicates one error bit. Pulses for the error bits of one measurement cycle are not synchronized with the rear panel connector BER CLK IN signal and are output when the BER Meas End signal is high.

**BER No Data** A low signal at this pin indicates the no data status. The no data status is reported when there has been no clock inputs for more than 3 seconds or there has been no data change for more than 200 bits. This signal is valid only when the signal of the BER Meas End output signal is high.

**BER Clock Out** The BER Clock Out signal monitors the rear panel BER CLK IN signal after polarity control, delay control, and gate control (if applicable) have taken place.

**BER Data Out** This is a data stream for the bit error rate measurements. The clock signal is used to trigger the reading of the data.

**Sync Start** This signal indicates the timing when the PN generator starts to generate a PN sequence. This signal can also indicate if the hardware is triggering a PN synchronization or making a measurement when the signal is high.

PN9 Clock	This signal is the clock signal for the PN9 Data. The falling edge of the PN9 Clock indicates the center of PN9 Data. The PN9 Clock rate is 37.5Mbits per second.		
PN9 Data	This signal is PN9 data for the self-loopback test.		
Reference Data	This signal uses the pseudo-random bit stream as the reference signal.		
*RST	ERRor		
<b>Key Entry</b>	<b>Error Out</b>	<b>Reference Out</b>	<b>PN9 Out</b>

**[ :DATA ]**

**Supported** E4438C with Option UN7

:DATA [ :DATA ] ? BEC | BITC | BER | ALL | TBEC | TBIT | TBER | JUDGE

This query returns the data measurement for the selected variable.

BEC	This choice provides the intermediate bit error count result.
BITC	This choice provides the intermediate bit count result.
BER	This choice provides the intermediate bit error rate result.
ALL	This choice provides the values of the bit error count, bit error rate, and bit count in the following format: <bit count>, <error count>, <bit error rate>
TBEC	This choice provides the total bit error count at the end of each cycle.
TBIT	This choice provides the total bit count at the end of each cycle.
TBER	This choice provides the total bit error rate at the end of each cycle.
JUDGE	This choice provides the pass or fail string.

## **Input Subsystem—Option UN7 (:INPut:BERT[: BASEband])**

### **:CGATe:DELAy:CLOCK**

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:CGATe:DELAy:CLOCK <val>
:INPut:BERT[:BASEband]:CGATe:DELAy:CLOCK?
```

This command sets the number of delay bits for the signal applied to the BER GATE IN rear panel connector.

One bit corresponds with one bit of delay for the input clock.

**\*RST** 1

**Range** 1–16384

**Key Entry** **Gate Clk Delay**

**Remarks** The gate delay mode must be set to CLOCK for this command to work. Refer to [“:CGATe:DELAy:MODE”](#). Also, the gate and gate delay must be enabled for this command to work. Refer to [“:CGATe\[:STATe\]” on page 418](#) and [“:CGATe:DELAy\[:STATe\]” on page 417](#).

### **:CGATe:DELAy:MODE**

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:CGATe:DELAy:MODE TIME|CLOCK
:INPut:BERT[:BASEband]:CGATe:DELAy:MODE:?
```

This command selects the operating mode of the gate delay.

**TIME** This choice selects the time mode which makes it possible to set the gate time delay in absolute time and the resolution.

**CLOCK** This choice selects the clock mode which enables you to set the gate delay by a set number of bits.

**\*RST** TIME

**Key Entry** **Gate Mode Time Clk**

**Remarks** The gate state and gate delay state must be enabled for this command to work. Refer to [“:CGATe\[:STATe\]” on page 418](#) and [“:CGATe:DELAy\[:STATe\]” on page 417](#).

## :CGATe:DELAy:TIME

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:CGATe:DELAy:TIME <val><unit>  
:INPut:BERT[:BASEband]:CGATe:DELAy:TIME?
```

This command sets the delay time of the gate signal. The gate delay time must be the multiple of the minimum resolution value and if not, the delay resolution is automatically rounded to the nearest multiplied value of the gate time delay value.

The variable <val> is expressed in units of seconds (s), milliseconds (ms), microseconds ( $\mu$ s), and nanoseconds (ns).

**\*RST** +2.67000000E-008

**Range** 2.67 ns–1.0 s

**Key Entry** **Gate Time Delay**

**Remarks** **Gate Delay Off On** must be set to **On** and **Gate Mode Time Clk** set to **Time** for this command to work. Refer to “:CGATe:DELAy[:STATe]” on page 417 and “:CGATe:DELAy:MODE” on page 416.

To set the resolution, refer to “:CLOCK:DELAy:RESolution” on page 418.

## :CGATe:DELAy[:STATe]

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:CGATe:DELAy[:STATe] ON|OFF|1|0  
:INPut:BERT[:BASEband]:CGATe:DELAy[:STATe]?
```

This command enables or disables the operating state of the gate delay.

**ON** This choice enables the gate delay adjustment function.

**OFF** This choice disables the gate delay adjustment function.

**\*RST** 0

**Key Entry** **Gate Delay Off On**

**Remarks** The gate must be enabled for this command to work. To enable the gate, refer to “:CGATe[:STATe]” on page 418.

**Input Subsystem—Option UN7 (:INPut:BERT[: BASEband])**

**:CGATe:POLarity**

**Supported** E4438C with Option UN7

:INPut:BERT[:BASEband]:CGATe:POLarity POSitive|NEGative  
:INPut:BERT[:BASEband]:CGATe:POLarity?

This command sets the input polarity of the gate signal supplied to the BER GATE IN rear panel connector.

**POS** With this choice, the signal is valid when the gate signal is high.

**NEG** With this choice, the signal is valid when the gate signal is low.

**\*RST** POS

**Key Entry** Gate Polarity Neg Pos

**:CGATe[:STATe]**

**Supported** E4438C with Option UN7

:INPut:BERT[:BASEband]:CGATe[:STATe] ON|OFF|1|0  
:INPut:BERT[:BASEband]:CGATe[:STATe]?

This command sets the operating state of the clock gate function.

**ON** This choice enables the clock gate function.

**OFF** This choice disables the clock gate function.

**\*RST** 0

**Key Entry** Gate Off On

**:CLOCK:DELAy:RESolution**

**Supported** E4438C with Option UN7

:INPut:BERT[:BASEband]:CLOCK:DELAy:RESolution <val><unit>  
:INPut:BERT[:BASEband]:CLOCK:DELAy:RESolution?

This command sets the resolution of the clock delay. The minimum resolution is 13.3 ns and it corresponds to 1/75 MHz. The 75 MHz is the sampling clock for the BERT board. The input value must be a multiple of the minimum resolution. If the set value is not a multiple value, the delay resolution is automatically rounded to the nearest multiple value with reference to the set value.

**\*RST** +1.33000000E-008

**Range** 13.3ns–80µs



<b>Key Entry</b>	<b>Resolution</b>
<b>Remarks</b>	The clock delay or the gate delay must be enabled for this command to work. Refer to “:CLOCK:DELAy[:STATe]” on page 419 and “:CGATE:DELAy[:STATe]” on page 417. A change in the resolution value can affect both the clock and the gate delay time automatically.

### **:CLOCK:DELAy:TIME**

<b>Supported</b>	E4438C with Option UN7
	:INPut:BERT[:BASEband]:CLOCK:DELAy:TIME <val><unit>
	:INPut:BERT[:BASEband]:CLOCK:DELAy:TIME?

This command sets the clock signal delay time.

The variable <val> is expressed in units of seconds (s), milliseconds (ms), microseconds (μs), and nanoseconds (ns).

**\*RST**                    +2.67000000E-008

**Range**                    26.7ns–999.9967600ms

**Key Entry**                **Clock Time Delay**

**Remarks**                The clock delay must be enabled for this command to work. Refer to “:CLOCK:DELAy[:STATe]” on page 419.

### **:CLOCK:DELAy[:STATe]**

<b>Supported</b>	E4438C with Option UN7
	:INPut:BERT[:BASEband]:CLOCK:DELAy[:STATe] ON OFF 1 0
	:INPut:BERT[:BASEband]:CLOCK:DELAy[:STATe]?

This command sets the operating state of the clock delay function.

ON                        This choice enables the clock delay adjustment.

OFF                      This choice disables the clock delay adjustment.

**\*RST**                      0

**Key Entry**                **Clock Delay Off On**

### :CLOCK:POLarity

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:CLOCK:POLarity POSitive|NEGative  
:INPut:BERT[:BASEband]:CLOCK:POLarity?
```

This command sets the input polarity of the clock signal supplied to the BER CLK IN rear panel connector.

**POS** With this choice, the signal is valid when the clock signal is high.

**NEG** With this choice, the signal is valid when the clock signal is low.

**\*RST** POS

**Key Entry** **Clock Polarity Neg Pos**

### :DATA:POLarity

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:DATA:POLarity POSitive|NEGative  
:INPut:BERT[:BASEband]:DATA:POLarity?
```

This command sets the input polarity of the data signal supplied to the BER DATA IN rear panel connector.

**POS** With this choice, the signal is valid when the data signal is high.

**NEG** With this choice, the signal is valid when the data signal is low.

**\*RST** POS

**Key Entry** **Data Polarity Neg Pos**

### :IMPedance

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:IMPedance OHM_75|HIGH  
:INPut:BERT[:BASEband]:IMPedance?
```

This command sets the input termination mode of the BER CLK IN, BER DATA IN, and BER GATE IN rear panel connectors.

**\*RST** HIGH

**Key Entry** **Impedance 75 Ohm High**

## :THReshold

**Supported** E4438C with Option UN7

:INPut:BERT[:BASEband]:THReshold V0\_7|V1\_4|V1\_65|V2\_5  
:INPut:BERT[:BASEband]:THReshold?

This command sets the threshold voltage level of the BER CLK IN, BER DATA IN, and BER GATE IN rear panel connectors.

- V0\_7 This choice selects 0.7 volts (normal TTL) as the turn-on voltage for the input signal.
- V1\_4 This choice selects 1.4 volts (Schmit TTL) as the turn-on voltage for the input signal.
- V1\_65 This choice selects 1.65 volts (CMOS 3.3 volts is the maximum operating range) as the turn-on voltage for the input signal.
- V2\_5 This choice selects 2.5 volts (CMOS 5 volts is the maximum operating range) as the turn-on voltage for the input signal.

**\*RST** V1\_4

**Key Entry** 0.7V 1.4V 1.65V 2.5V

---

## Measure Subsystem—Option 300 (:MEASure[:SCALar]:BERT:BTS:LOOPback)

### :EDGE:MCS5[:SENSitivity]

**Supported** E4438C with Option 300

```
:MEASure[:SCALAR]:BERT:BTS:LOOPback:EDGE:MCS5[:SENSitivity]?  
<high amplitude><unit>,<low amplitude><unit>,<pass amplitude><unit>,  
<error sensitivity limit>,<block count>,<initial block count>
```

This query returns either PASS or FAIL and the result for the measured sensitivity level. When this command is executed before the signal generator is synchronized with the BTS, the message “Fail, -999.00” is displayed.

There are two other status errors that may be returned; SERR or DERR.

SERR This indicates that RF synchronization is lost during search and the search is aborted.

DERR This indicates that a downlink error occurred during search and the search is aborted.

When these errors are returned, the sensitivity search returns a value of -1.0.

This command can be used in both the BER% measurement or the sensitivity search mode. After this command is executed, the measurement mode is in the sensitivity search mode.

**Remarks** The trigger source must be set to IMMEDIATE to execute this command. If the trigger source selection is BUS, error “-214 Trigger deadlock” is generated and no data is returned.

### :EDGE:MCS9[:SENSitivity]

**Supported** E4438C with Option 300

```
:MEASure[:SCALAR]:BERT:BTS:LOOPback:EDGE:MCS9[:SENSitivity]?  
<high amplitude><unit>,<low amplitude><unit>,<pass amplitude><unit>,  
<error sensitivity limit>,<block count>,<initial block count>
```

This query returns either PASS or FAIL and the result for the measured sensitivity level. When this command is executed before the signal generator is synchronized with the BTS, the message “Fail, -999.00” is displayed.

**Measure Subsystem—Option 300 (:MEASure[:SCALar]:BERT:BTS:LOOPback)**

There are two other status errors that may be returned; SERR or DERR.

SERR	This indicates that RF synchronization is lost during search and the search is aborted.
DERR	This indicates that a downlink error occurred during search and the search is aborted.

When these errors are returned, the sensitivity search returns a value of  $-1.0$ .

This command can be used in both the BER% measurement or the sensitivity search mode. After this command is executed, the measurement mode is in the sensitivity search mode.

**Remarks** The trigger source must be set to IMMEDIATE to execute this command. If the trigger source selection is BUS, error “-214 Trigger deadlock” is generated and no data is returned.

**:EDGE:UNCoded[:SENSitivity]**

**Supported** E4438C with Option 300

```
:MEASure[:SCALAR]:BERT:BTS:LOOPback:EDGE:UNCoded[:SENSitivity]?
<high amplitude><unit>, <low amplitude><unit>, <pass amplitude><unit>,
<error sensitivity limit>, <block count>, <initial block count>
```

This query returns either PASS or FAIL and the result for the measured sensitivity level. When this command is executed before the signal generator is synchronized with the BTS, the message “Fail, -999.00” is displayed.

There are two other status errors that may be returned; SERR or DERR.

SERR	This indicates that RF synchronization is lost during search and the search is aborted.
DERR	This indicates that a downlink error occurred during search and the search is aborted.

When these errors are returned, the sensitivity search returns a value of  $-1.0$ .

This command can be used in both the BER% measurement or the sensitivity search mode. After this command is executed, the measurement mode is in the sensitivity search mode.

**Remarks** The trigger source must be set to IMMEDIATE to execute this command. If the trigger source selection is BUS, error “-214 Trigger deadlock” is generated and no data is returned.

**Measure Subsystem—Option 300 (:MEASure[:SCALar]:BERT:BTS:LOOPback)**

**:GSM[:SENSitivity]**

**Supported** E4438C with Option 300

```
:MEASure[:SCALAR]:BERT:BTS:LOOPback:GSM[:SENSitivity]?  
<high amplitude><unit>,<low amplitude><unit>,<pass amplitude><unit>,  
<error sensitivity limit>,<block count>,<initial block count>
```

This query returns either PASS or FAIL and the result for the measured sensitivity level. When this command is executed before the signal generator is synchronized with the BTS, the message “Fail, -999.00” is displayed.

There are two other status errors that may be returned; SERR or DERR.

SERR This indicates that RF synchronization is lost during search and the search is aborted.

DERR This indicates that a downlink error occurred during search and the search is aborted.

When these errors are returned, the sensitivity search returns a value of -1.0.

This command can be used in both the BER% measurement or the sensitivity search mode. After this command is executed, the measurement mode is in the sensitivity search mode.

**Remarks** The trigger source must be set to IMMEDIATE to execute this command. If the trigger source selection is BUS, error “-214 Trigger deadlock” is generated and no data is returned.

---

## Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)

### :BTS:LOOPback:EDGE:ETCH:F43:BLOCK:COUNT

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:ETCH:F43:BLOCK:COUNT <val>  
:SENSE:BERT:BTS:LOOPback:EDGE:ETCH:F43:BLOCK:COUNT?
```

This command specifies the total number of blocks to be measured.

**\*RST** +600

**Range** 1–1500000

**Key Entry** **Block Count**

### :BTS:LOOPback:EDGE:ETCH:F43:CONTain

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:ETCH:F43:CONTain ON|OFF|1|0  
:SENSE:BERT:BTS:LOOPback:EDGE:ETCH:F43:CONTain?
```

This command enables or disables the BER measurement for ETCH/F43 channels in addition to the BLER measurement.

**ON** With this choice, data bits of the specified number of blocks are measured.

**OFF** This choice disables the measurement.

**\*RST** 1

**Key Entry** **BER Mode Off On**

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)**

**:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria:EBLock**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria:EBLock <val>
:SENSE:BERT:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria:EBLock?
```

This command specifies the number of erased blocks that contain bit errors for the threshold limit to stop the measurement.

**\*RST** +60

**Range** 0–1500000

**Key Entry** **Block Erasure**

**:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria[:SELEct]**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria[:SELEct] EBLock|
NONE
:SENSE:BERT:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria[:SELEct]?
```

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBLock** This choice enables you to specify the number of erased blocks.

**NONE** This choice disables the stop measurement threshold criteria function.

**\*RST** NONE

**Key Entry** **Block Erasure No Thresholds**



### **:BTS:LOOPback:EDGE:FTRigger:EXTernal:DELay**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:FTRigger:EXTernal:DELay <val>  
:SENSe:BERT:BTS:LOOPback:EDGE:FTRigger:EXTernal:DELay?
```

This command specifies the delay time of the external frame trigger. This delay is the offset from the beginning of timeslot 0.

The variable <val> is expressed in symbols with a resolution of 0.25.

**\*RST** +0.00000000E+000

**Range** -1250 to 1250

**Key Entry** **Ext Frame Trigger Delay**

**Remarks** Refer to the *E4428C/38C ESG Signal Generators User's Guide* for information on how to calculate the delay value.

### **:BTS:LOOPback:EDGE:FTRigger:EXTernal:POLarity**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:FTRigger:EXTernal:POLarity POSitive|  
NEGative  
:SENSe:BERT:BTS:LOOPback:EDGE:FTRigger:EXTernal:POLarity?
```

This command specifies the external frame trigger polarity.

**POS** This selects the reference edge to be the rising edge of the pulse.

**NEG** This selects the reference edge to be the falling edge of the pulse.

**\*RST** POS

**Key Entry** **External Frame Trigger Polarity Neg Pos**

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSe:BERT)**

**:BTS:LOOPback:EDGE:FTRigger[SElect]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:FTRigger[:SElect] INTernal|EXTernal

:SENSe:BERT:BTS:LOOPback:EDGE:FTRigger[:SElect]?

This command specifies the frame trigger source to be used by the baseband generator.

INTernal This choice enables internal triggering.

EXTernal This choice enables the triggering by an externally applied signal at the rear panel connector.

**\*RST** INT

**Key Entry** Frame Trigger Source Int Ext

**Remarks** To enable this command, the frame trigger synchronization source must be PDCH. Refer to “:BTS:LOOPback:EDGE:SYNC[:SOURCE]” on page 438.

**:BTS:LOOPback:EDGE:MCS5:BLOCK:COUNT**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:BLOCK:COUNT <value>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:BLOCK:COUNT?

This command specifies the total number of blocks to be measured.

**\*RST** +600

**Range** 1–1500000

**Key Entry** **Block Count**

### **:BTS:LOOPback:EDGE:MCS5:CONTain**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:CONTain ON|OFF|1|0  
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:CONTain?
```

This command enables or disables the BER measurement for MCS-5 channels in addition to the BLER measurement.

**ON** With this choice, data bits of the specified number of blocks are measured.

**OFF** This choice disables the measurement.

**\*RST** 1

**Key Entry** **BER Mode Off On**

### **:BTS:LOOPback:EDGE:MCS5:ESENSitivity**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:ESENSitivity <val>  
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:ESENSitivity?
```

This command specifies the target error rate when performing a sensitivity search.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +1.00000000E-001

**Range** 1E-6 to 1

**Key Entry** **Target BER %**

### **:BTS:LOOPback:EDGE:MCS5:HAMPLitude**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:HAMPLitude <val>  
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:HAMPLitude?
```

This command specifies the maximum amplitude level for performing a sensitivity search. The high amplitude value can not be lower than the low amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST** -9.00000000E+001

**Range** -136 to 20

**Key Entry** **High Amplitude**

### :BTS:LOOPback:EDGE:MCS5:LAMPlitude

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:LAMPlitude <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:LAMPlitude?

This command specifies the minimum amplitude level for performing a sensitivity search. The low amplitude value can not be higher than the high amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST** -1.10000000E+002

**Range** -136.0 to 20

**Key Entry** **Low Amplitude**

### :BTS:LOOPback:EDGE:MCS5:PAMPlitude

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:PAMPlitude <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:PAMPlitude?

This command specifies the threshold amplitude for pass/fail comparator results when performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** -1.01000000E+002

**Range** -136.0 to 20

**Key Entry** **Pass Amplitude**

### :BTS:LOOPback:EDGE:MCS5:SBLock:COUNT

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:SBLock:COUNT <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:SBLock:COUNT?

This command specifies the total number of blocks for each measurement during the sensitivity search.

**\*RST** +1200

**Range** 1-1500000

**Key Entry** **Block Count**

### **:BTS:LOOPback:EDGE:MCS5:SBLock:INITial**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:SBLock:INITial <val>  
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:SBLock:INITial?
```

This command specifies the total number of blocks to be measured at the beginning of each measurement during the sensitivity search.

**\*RST** +600

**Range** 1–1500000

**Key Entry** **Initial Block Count**

### **:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria:EBLock**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria:EBLock <val>  
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria:EBLock?
```

This command specifies the number of erased blocks that contain bit errors for the threshold limit to stop the measurement.

**\*RST** +60

**Range** 0–1500000

**Key Entry** **Block Erasure**

### **:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria[:SElect] EBLock|NONE  
:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria[:SElect]?
```

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBLock** This choice enables you to specify the number of erased blocks or bit errors.

**NONE** This choice disables the stop measurement threshold criteria function.

**Key Entry** **Block Erasure No Thresholds**

### **:BTS:LOOPback:EDGE:MCS9:BLOCK:COUNT**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:BLOCK:COUNT <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:BLOCK:COUNT?

This command specifies the total number of blocks to be measured.

Only even values can be entered. If odd numbers are entered, the value increments by one to make it an even value.

**\*RST** +600

**Range** 2–1500000

**Key Entry** **Block Count**

### **:BTS:LOOPback:EDGE:MCS9:CONTain**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:CONTain ON|OFF|1|0

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:CONTain?

This command enables or disables the BER measurement for MCS-9 channels in addition to the BLER measurement.

**ON** With this choice, data bits of the specified number of blocks are measured.

**OFF** This choice disables the measurement.

**\*RST** 1

**Key Entry** **BER Mode Off On**

### **:BTS:LOOPback:EDGE:MCS9:ESENSitivity**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:ESENSitivity <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:ESENSitivity?

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +1.00000000E-001

**Range** 1E–6 to 1

**Key Entry** **Target BER %**

### **:BTS:LOOPback:EDGE:MCS9:HAMplitude**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:HAMplitude <val>  
:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:HAMplitude?
```

This command specifies the maximum amplitude level for performing a sensitivity search. The high amplitude value can not be lower than the low amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST** -8.00000000E+001

**Range** -136.0 to 20

**Key Entry** **High Amplitude**

### **:BTS:LOOPback:EDGE:MCS9:LAMplitude**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:LAMplitude <val>  
:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:LAMplitude?
```

This command specifies the minimum amplitude level for performing a sensitivity search. The low amplitude value can not be higher than the high amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST** -1.00000000E+002

**Range** -136.0 to 20

**Key Entry** **Low Amplitude**

### **:BTS:LOOPback:EDGE:MCS9:PAMplitude**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:PAMplitude <val>

:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:PAMplitude?

This command specifies the threshold amplitude for pass/fail comparator results when performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** -9.15000000E+001

**Range** -136.0 to 20

**Key Entry** Pass Amplitude

### **:BTS:LOOPback:EDGE:MCS9:SBlock:COUNT**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:SBlock:COUNT <val>

:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:SBlock:COUNT?

This command specifies the total number of blocks to be measured at each measurement during the sensitivity search.

Only even values can be entered. If odd numbers are entered, the value increments by one to make it an even value.

**\*RST** +1200

**Range** 2–1500000

**Key Entry** Block Count

### **:BTS:LOOPback:EDGE:MCS9:SBlock:INITial**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:SBlock:INITial <val>

:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:SBlock:INITial?

This command specifies the total number of blocks to be measured at the beginning of each measurement during the sensitivity search.

Only even values can be entered. If odd numbers are entered, the value increments by one to make it an even value.

**\*RST** +600



**Range** 2–1500000  
**Key Entry** **Initial Block Count**

**:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria:EBLock**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria:EBLock <val>  
:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria:EBLock?

This command specifies the number of erased blocks that contain bit errors for the threshold limit to stop the measurement.

**\*RST** +60  
**Range** 0–1500000  
**Key Entry** **Block Erasure**

**:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria[:SElect] EBlock|NONE  
:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria[:SElect]?

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBlock** This choice enables you to specify the number of non-erased blocks that contain bit errors.  
**NONE** This choice disables the stop measurement threshold criteria function.  
**\*RST** NONE  
**Key Entry** **Block Erasure No Thresholds**

**:BTS:LOOPback:EDGE:MEASurement:STOP**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MEASurement:STOP

This command immediately stops any current measurement and releases the PRBS synchronization. After the synchronization is released, a new PRBS synchronization is attempted.

**Key Entry** **Stop Measurement**

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)**

**:BTS:LOOPback:EDGE:MEASurement:TSLot**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MEASurement:TSLot 0|1|2|3|4|5|6|7  
:SENSe:BERT:BTS:LOOPback:EDGE:MEASurement:TSLot?
```

This command specifies the timeslot number in which the measurement is to be performed.

The following EDGE timeslot configuration conditions will generate error message “-221 Settings Conflict”:

- If the specified timeslot does not have one of the BLER/BER measurable channel types, which are uncoded, E-TCH/43.2NT, MCS-9, and MCS-5.
- If the specified timeslot type is not set to “NORMAL.”

**\*RST** +0

**Key Entry** **Timeslot**

**Remarks** This command couples the selected timeslot number with the EDGE configuration.

Changing the timeslot configuration with EDGE on will not generate an error message if EDGE BERT is off and the timeslot is off.

**:BTS:LOOPback:EDGE:MEASurement[:MODE]**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MEASurement[:MODE] BLER|SSEarch  
:SENSe:BERT:BTS:LOOPback:EDGE:MEASurement[:MODE]?
```

This command specifies the measurement mode.

**BLER** This choice specifies BLER% as the measurement mode.

**SSEarch** This choice specifies sensitivity search as the measurement mode.

**\*RST** BLER

**Key Entry** **Measurement Mode BLER% Search**

**Remarks** If the BLER% measurement is already running, this command will abort the BLER% measurement.

### **:BTS:LOOPback:EDGE:SINVert**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:SINVert ON|OFF|1|0  
:SENSE:BERT:BTS:LOOPback:EDGE:SINVert?
```

This command sets the operating state of the spectrum inverting function.

**ON** This choice specifies that the EDGE demodulator invert the spectrum of the received RF signal.

**OFF** This choice leaves the spectrum of the received RF signal unaffected.

**\*RST** 1

**Key Entry** **Spectrum Invert Off On**

### **:BTS:LOOPback:EDGE:SYNC:AGAI**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:SYNC:AGAI
```

This command adjusts the input signal level of the internal demodulator. Use this adjustment when switching from BCH synchronization to PDCH synchronization.

**Key Entry** **Adjust Gain**

**Remarks** This command is ignored unless the status displays "Waiting for PDCH."

### **:BTS:LOOPback:EDGE:SYNC:RF**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:SYNC:RF
```

This command releases the current synchronization with the BTS and immediately starts to try to synchronize to either a BCH or PDCH signal as selected with the SYNC[:SOURCE] command. This command will also stop the current measurement.

**Key Entry** **Synchronize to BCH/PDCH**

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSe:BERT)**

**:BTS:LOOPback:EDGE:SYNC[:SOURCE]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:SYNC[:SOURCE] BCH|PDCH  
 :SENSe:BERT:BTS:LOOPback:EDGE:SYNC[:SOURCE]?

This command specifies the synchronization source from the BTS under test.

**BCH** This choice specifies the traffic channel as the synchronization source.

**PDCH** This choice specifies the packet data channel as the synchronization source.

**\*RST** BCH

**Key Entry** Sync Source BCH PDCH

**:BTS:LOOPback:EDGE:TRIGger[:SOURCE]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:TRIGger[:SOURCE] IMMEDIATE|KEY|EXT|BUS  
 :SENSe:BERT:BTS:LOOPback:EDGE:TRIGger[:SOURCE]?

This command determines the trigger source for the EDGE loopback bit error rate measurement.

**IMMEDIATE** This choice begins the measurement directly after synchronization has been achieved.

**KEY** This choice begins the measurement when the front panel **Trigger** key is pressed, provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.

**EXT** This choice begins the measurement as soon as a trigger signal is applied to the rear panel connector provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**\*RST** KEY

**Key Entry** Immediate Trigger Key Ext Bus

**Remarks** An inherent variable delay will always exist when starting a measurement because the measurement must await the start of the next speech frame after the trigger. The delay can vary between 0 and 23 ms (5 frames) depending on where the trigger falls within the TDMA multiframe.

A trigger is ignored unless the EDGE loopback operating state is turned on.

### **:BTS:LOOPback:EDGE:ULINK:OFFSet**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:ULINK:OFFSet <val>

:SENSE:BERT:BTS:LOOPback:EDGE:ULINK:OFFSet?

This command specifies, in symbols, the amount of compensation for the insertion of equipment such as fading simulators into the uplink RF path.

**\*RST** +0

**Range** -500 to 10000

**Key Entry** Uplink Timing Advance

### **:BTS:LOOPback:EDGE:UNCoded:BIT:COUNT**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:BIT:COUNT <value>

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:BIT:COUNT?

This command specifies the total number of bits to be measured for the uncoded channel.

**\*RST** +139200

**Range** 1392-2147483647

**Key Entry** Bit Count

### **:BTS:LOOPback:EDGE:UNCoded:ESENSitivity**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:ESENSitivity <val>

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:ESENSitivity?

This command specifies the target error rate when performing a sensitivity search.

**\*RST** +2.00000000E-002

**Range** 1E-6 to 1

**Key Entry** Target BER %

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)**

**:BTS:LOOPback:EDGE:UNCoded:HAMPlitude**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:HAMPlitude <val>

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:HAMPlitude?

This command specifies the maximum amplitude level for performing a sensitivity search. The high amplitude value can not be lower than the low amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST** -8.50000000E+001

**Range** -136.0 to 20

**Key Entry** **High Amplitude**

**:BTS:LOOPback:EDGE:UNCoded:LAMPlitude**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:LAMPlitude <val>

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:LAMPlitude?

This command specifies the minimum amplitude level for performing a sensitivity search. The low amplitude value can not be higher than the high amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST** -1.05000000E+002

**Range** -136.0 to 20

**Key Entry** **Low Amplitude**

### **:BTS:LOOPback:EDGE:UNCoded:PAMPlitude**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:UNCoded:PAMPlitude <val>  
:SENSe:BERT:BTS:LOOPback:EDGE:UNCoded:PAMPlitude?

This command specifies the threshold amplitude for pass/fail comparator results when performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** -9.50000000E+001

**Range** -136.0 to 20

**Key Entry** **Pass Amplitude**

### **:BTS:LOOPback:EDGE:UNCoded:SBIT:COUNT**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:UNCoded:SBIT:COUNT <val>  
:SENSe:BERT:BTS:LOOPback:EDGE:UNCoded:SBIT:COUNT?

This command specifies the total number of bits to be measured during a sensitivity search for the uncoded channel.

**\*RST** +139200

**Range** 1392–2147483647

**Key Entry** **Bit Count**

### **:BTS:LOOPback:EDGE:UNCoded:SBIT:INITIAL**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:UNCoded:SBIT:INITIAL <val>  
:SENSe:BERT:BTS:LOOPback:EDGE:UNCoded:SBIT:INITIAL?

This command specifies the total number of bits to be measured at the beginning of the sensitivity search for the uncoded channel.

**\*RST** +13920

**Range** 1392–2147483647

**Key Entry** **Initial Bit Count**

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)**

**:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria:EBIT**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria:EBIT <val>

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria:EBIT?

This command specifies the number of block erasures or bit errors, depending on the measurement channel type, for the threshold limit to stop the measurement.

**\*RST** +2784

**Range** 0–2147483647

**Key Entry** **Error Count**

**:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria[:SElect] EBIT|NONE

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria[:SElect]?

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBIT** This choice enables you to specify the number of bit errors.

**NONE** This choice disables the stop measurement threshold criteria function.

**\*RST** NONE

**Key Entry** **Error Count No Thresholds**

**:BTS:LOOPback:EDGE[:STATe]**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE[:STATe] ON|OFF|1|0

:SENSE:BERT:BTS:LOOPback:EDGE[:STATe]?

This command sets the operating state of the EDGE loopback bit error rate (BER) function.

**ON** This choice enables the EDGE loopback BER function.

**OFF** This choice disables the EDGE loopback BER function.

**\*RST** 0

**Key Entry** **EDGE BERT Off On**



**Remarks**                    Although you can configure the measurement parameters while the operating state is off, any command triggers sent will be ignored until the operating state is turned on.

### **:BTS:LOOPback:GSM:CS1:BLOCK:COUNT**

**Supported**                    E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:CS1:BLOCK:COUNT <val>  
:SENSE:BERT:BTS:LOOPback:GSM:CS1:BLOCK:COUNT?
```

This command specifies the total number of blocks to be measured.

**\*RST**                         +600

**Range**                        1–1500000

**Key Entry**                   **Block Count**

### **:BTS:LOOPback:GSM:CS1:CONTain**

**Supported**                    E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:CS1:CONTain ON|OFF|1|0  
:SENSE:BERT:BTS:LOOPback:GSM:CS1:CONTain?
```

This command enables or disables the BER measurement for CS-1 channels in addition to the BLER measurement.

**ON**                            With this choice, data bits of the specified number of blocks are measured.

**OFF**                           This choice disables the BER measurement.

**\*RST**                         1

**Key Entry**                   **BER Mode Off On**

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)**

**:BTS:LOOPback:GSM:CS1:STOP:CRITeria:EBLock**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:CS1:STOP:CRITeria:EBLock <val>

:SENSe:BERT:BTS:LOOPback:GSM:CS1:STOP:CRITeria:EBLock?

This command specifies the number of erased blocks that contain bit errors for the threshold limit to stop the measurement.

**\*RST** +60

**Range** 0–1500000

**Key Entry** **Block Erasure**

**:BTS:LOOPback:GSM:CS1:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:CS1:STOP:CRITeria[:SElect] EBlock|NONE

:SENSe:BERT:BTS:LOOPback:GSM:CS1:STOP:CRITeria[:SElect]?

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBlock** This choice enables you to specify the number of erased blocks.

**NONE** This choice disables the stop measurement threshold criteria function.

**\*RST** NONE

**Key Entry** **Block Erasure No Thresholds**

**:BTS:LOOPback:GSM:CS4:BLOCK:COUNT**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:CS4:BLOCK:COUNT <value>

:SENSe:BERT:BTS:LOOPback:GSM:CS4:BLOCK:COUNT?

This command specifies the total number of blocks to be measured.

**\*RST** +600

**Range** 1 to 1500000

**Key Entry** **Block Count**

### **:BTS:LOOPback:GSM:CS4:CONTain**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:CS4:CONTain ON|OFF|1|0  
:SENSE:BERT:BTS:LOOPback:GSM:CS4:CONTain?
```

This command enables or disables the BER measurement for CS-4 channels in addition to the BLER measurement.

**ON** With this choice, data bits of the specified number of blocks are measured.

**OFF** This choice disables the BER measurement.

**\*RST** 1

**Key Entry** **BER Mode Off On**

### **:BTS:LOOPback:GSM:CS4:STOP:CRITeria:EBLock**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:CS4:STOP:CRITeria:EBLock <val>  
:SENSE:BERT:BTS:LOOPback:GSM:CS4:STOP:CRITeria:EBLock?
```

This command specifies the threshold limit to stop the measurement which is the number of erased blocks that contain bit errors.

**\*RST** +60

**Range** 0–1500000

**Key Entry** **Block Erasure**

**:BTS:LOOPback:GSM:CS4:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:CS4:STOP:CRITeria[:SElect] EBLock|NONE  
:SENSe:BERT:BTS:LOOPback:GSM:CS4:STOP:CRITeria[:SElect]?
```

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBLock** This choice enables you to specify the number of erased blocks.

**NONE** This choice disables the stop measurement threshold criteria function.

**\*RST** NONE

**Key Entry** **Block Erasure** **No Thresholds**

**:BTS:LOOPback:GSM:ESENSitivity**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:ESENSitivity <val>  
:SENSe:BERT:BTS:LOOPback:GSM:ESENSitivity?
```

This command specifies the target error rate when performing a sensitivity search.

**\*RST** +2.00000000E-002

**Range** 1E-6 to 1

**Key Entry** **Target BER%**

**:BTS:LOOPback:GSM:FRAME:CIB**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:FRAME:CIB?
```

This query returns the total number of Class Ib bits to be measured which are calculated from the total number of frames specified to be measured.

**:BTS:LOOPback:GSM:FRAME:CII**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:FRAME:CII?
```

This query returns the total number of Class II bits to be measured which are calculated from the total number of frames specified to be measured.

### **:BTS:LOOPback:GSM:FRAME:COUNT**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:FRAME:COUNT <val>

:SENSE:BERT:BTS:LOOPback:GSM:FRAME:COUNT?

This command determines the length of the measurement specified by the total number of frames included in one measurement.

**\*RST** +100

**Range** 1–6000000

**Key Entry** **Frame Count**

### **:BTS:LOOPback:GSM:HAMPLitude**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:HAMPLitude <val>

:SENSE:BERT:BTS:LOOPback:GSM:HAMPLitude?

This command specifies the maximum amplitude level for performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** -9.00000000E+001

**Range** -136.0 to 20

**Key Entry** **High Amplitude**

### **:BTS:LOOPback:GSM:LAMPLitude**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:LAMPLitude <val>

:SENSE:BERT:BTS:LOOPback:GSM:LAMPLitude?

This command specifies the minimum amplitude level for performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** -1.15000000E+002

**Range** -136.0 to 20

**Key Entry** **Low Amplitude**

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)**

**:BTS:LOOPback:GSM:MCS1:BLOCK:COUNT**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:BLOCK:COUNT <val>

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:BLOCK:COUNT?

This command specifies the total number of blocks to be measured.

**\*RST** +600

**Range** 1–1500000

**Key Entry** **Block Count**

**:BTS:LOOPback:GSM:MCS1:CONTain**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:CONTain ON|OFF|1|0

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:CONTain?

This command enables or disables the BER measurement for MCS-1 channels in addition to the BLER measurement.

**ON** With this choice, data bits of the specified number of blocks are measured.

**OFF** This choice disables the BER measurement.

**\*RST** 1

**Key Entry** **BER Mode Off On**

**:BTS:LOOPback:GSM:MCS1:STOP:CRITeria:EBLock**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:STOP:CRITeria:EBLock <val>

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:STOP:CRITeria:EBLock?

This command specifies the number of erased blocks that contain bit errors for the threshold limit to stop the measurement.

**\*RST** +60

**Range** 0–1500000

**Key Entry** **Block Erasure**

### **:BTS:LOOPback:GSM:MCS1:STOP:CRITeria[:SElect]**

**Supported**            E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:MCS1:STOP:CRITeria[:SElect] EBLock|NONE
:SENSe:BERT:BTS:LOOPback:GSM:MCS1:STOP:CRITeria[:SElect]?
```

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBLock**                This choice enables you to specify the number of erased blocks.

**NONE**                 This choice disables the stop measurement threshold criteria function.

**\*RST**                 NONE

**Key Entry**            **Block Erasure    No Thresholds**

### **:BTS:LOOPback:GSM:MEASurement:STOP**

**Supported**            E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:MEASurement:STOP
```

This command stops any current measurement and releases the current PRBS synchronization. After the synchronization is released, a new PRBS synchronization is attempted.

**Key Entry**            **Stop Measurement**

### **:BTS:LOOPback:GSM:MEASurement:TSLot**

**Supported**            E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:MEASurement:TSLot 0|1|2|3|4|5|6|7
:SENSe:BERT:BTS:LOOPback:GSM:MEASurement:TSLot?
```

This command specifies the timeslot number in which the measurement is to be performed. This command couples the selected timeslot number with the GSM configuration.

The following GSM timeslot configuration conditions will generate error message “-221 Settings Conflict”:

- If the specified timeslot E field fails to designate either MPN9 or MPN15.
- If the specified timeslot is not set to “Normal.”

**\*RST**                 +0

**Key Entry**            **Timeslot**

**Remarks**            Changing the timeslot configuration with GSM on will not generate error messages if GSM BERT is off and the timeslot is off.

**:BTS:LOOPback:GSM:MEASurement[:MODE]**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:MEASurement[:MODE] BER|SSEarch
:SENSe:BERT:BTS:LOOPback:GSM:MEASurement[:MODE]?
```

This command specifies the measurement mode.

**BER** This choice specifies BER% as the measurement mode.

**SSEarch** This choice specifies sensitivity search as the measurement mode.

**\*RST** BER

**Key Entry** **Measurement Mode BER% Search**

**Remarks** If the BER% measurement is already running, this command will abort the BER% measurement.

**:BTS:LOOPback:GSM:PAMPlitude**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:PAMPlitude <val>
:SENSe:BERT:BTS:LOOPback:GSM:PAMPlitude?
```

This command specifies the threshold amplitude for pass/fail comparator results when performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** -1.04000000E+002

**Range** -136.0 to 20

**Key Entry** **Pass Amplitude**

**:BTS:LOOPback:GSM:SFRame:COUNT**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:SFRame:COUNT <val>
:SENSe:BERT:BTS:LOOPback:GSM:SFRame:COUNT?
```

This command specifies the total number of frames to be measured for the final measurements during the sensitivity search.

**\*RST** +100

**Range** 1-6000000

**Key Entry** **Frame Count**



### **:BTS:LOOPback:GSM:SFRame:INITial**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:SFRame:INITial <val>  
:SENSe:BERT:BTS:LOOPback:GSM:SFRame:INITial?
```

This command specifies the number of frames to be measured while sensitivity search is running rough searching to gain search speed. It is the first phase of sensitivity search.

**\*RST** +26

**Range** 1–6000000

**Key Entry** Initial Frame Count

### **:BTS:LOOPback:GSM:SINVert**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:SINVert ON|OFF|1|0  
:SENSe:BERT:BTS:LOOPback:GSM:SINVert?
```

This command sets the operating state of the spectrum inverting function.

**ON** This choice specifies that the GSM demodulator invert the spectrum of the received RF signal.

**OFF** This choice leaves the spectrum of the received RF signal unaffected.

**\*RST** 1

**Key Entry** Spectrum Invert Off On

### **:BTS:LOOPback:GSM:STOP:CRITeria:CIB**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria:CIB <val>  
:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria:CIB?
```

This command specifies the threshold number of Class Ib errors to stop the measurement.

**\*RST** 300

**Range** 0–1000000

**Key Entry** Class Ib Bit Error

**Remarks** Refer to “[:BTS:LOOPback:GSM:STOP:CRITeria[:SElect]]” on page 452 for information on the use of the file variables.

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)**

**:BTS:LOOPback:GSM:STOP:CRITeria:CII**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria:CII <val>

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria:CII?

This command specifies the threshold number of Class II errors to stop the measurement.

**\*RST** 300

**Range** 0–1000000

**Key Entry** **Class II Bit Error**

**Remarks** Refer to “:BTS:LOOPback:GSM:STOP:CRITeria[:SElect]” on page 452 for information on the use of the file variables.

**:BTS:LOOPback:GSM:STOP:CRITeria:FERasure**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria:FERasure <val>

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria:FERasure?

This command specifies the threshold number of erased frames to stop the measurement.

**\*RST** 120

**Range** 0–1000000

**Key Entry** **Frame Erasure**

**Remarks** Refer to “:BTS:LOOPback:GSM:STOP:CRITeria[:SElect]” for information on the use of the file variables.

**:BTS:LOOPback:GSM:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria[:SElect] FERasure|CIB|CII|

ANY|NONE

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria[:SElect]?

This command sets the threshold criteria used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

FERasure	This selection ends the measurement when the number of erased frames exceeds the specified threshold.						
CIB	This selection ends the measurement when the number of Class Ib errors detected exceeds the specified threshold.						
CII	This selection ends the measurement when the number of Class II errors detected exceeds the specified threshold.						
ANY	This selection ends the measurement when any of the above stop measurement threshold criteria is exceeded.						
NONE	This selection disables the stop measurement threshold criteria function, so that the measurement runs for the specified number of speech frames.						
*RST	NONE						
<b>Key Entry</b>	<table border="0" style="width: 100%;"> <tr> <td style="width: 33%;"><b>Frame Erasure</b></td> <td style="width: 33%;"><b>Class Ib Bit Error</b></td> <td style="width: 33%;"><b>Class II Bit Error</b></td> </tr> <tr> <td><b>Exceeds Any Thresholds</b></td> <td><b>No Thresholds</b></td> <td></td> </tr> </table>	<b>Frame Erasure</b>	<b>Class Ib Bit Error</b>	<b>Class II Bit Error</b>	<b>Exceeds Any Thresholds</b>	<b>No Thresholds</b>	
<b>Frame Erasure</b>	<b>Class Ib Bit Error</b>	<b>Class II Bit Error</b>					
<b>Exceeds Any Thresholds</b>	<b>No Thresholds</b>						

**:BTS:LOOPback:GSM:SYNC:RF**

**Supported**      E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:SYNC:RF

This command releases the current synchronization with the BTS and immediately starts to try to synchronize to either a BCH or TCH signal as selected with the SYNC [:SOURCE] command. This command will also stop the current measurement.

**Key Entry**      **Synchronize to BCH/TCH**

**Remarks**      The test equipment can use a BCH signal from the BTS to determine the required transmit timeslot, frame and multiframe timing. The BCH signal is always transmitted in timeslot 0 and contains multiframe information. Use BCH when a BCH subset is present which contains SCH bursts with a properly coded T2 parameter.

Use TCH when providing a TCH/FS training sequence from the BTS. However, only one timeslot from the BTS can be active at a time and you must specify to the receiver which timeslot is being received since it has no absolute reference (unlike a BCH signal, which is always transmitted in timeslot 0).

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)**

**:BTS:LOOPback:GSM:SYNC[:SOURCE]**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:SYNC[:SOURCE] BCH|TCH  
 :SENSE:BERT:BTS:LOOPback:GSM:SYNC[:SOURCE] ?

This command specifies the synchronization source from the BTS under test.

**BCH** This choice specifies the broadcast channel as the synchronization source.

**TCH** This choice specifies the traffic channel as the synchronization source.

**\*RST** BCH

**Key Entry** Sync Source BCH TCH

**:BTS:LOOPback:GSM:TRIGger[:SOURCE]**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:TRIGger[:SOURCE] IMMEDIATE|KEY|EXT|BUS  
 :SENSE:BERT:BTS:LOOPback:GSM:TRIGger[:SOURCE] ?

This command determines the trigger source for the GSM loopback bit error rate measurement.

**IMMEDIATE** This choice begins the measurement directly after synchronization has been achieved.

**KEY** This choice begins the measurement when the front panel **Trigger** key is pressed, provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.

**EXT** This choice begins the measurement as soon as a trigger signal is applied to the rear panel connector provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**\*RST** KEY

**Key Entry** Immediate Trigger Key Ext Bus Aux

**Remarks** An inherent variable delay will always exist when starting a measurement because the measurement must await the start of the next speech frame after the trigger. The delay can vary between 0 and 23 ms (5 frames) depending on where the trigger falls within the TDMA multiframe.

A trigger is ignored unless the GSM loopback operating state is turned on.

### **:BTS:LOOPback:GSM:ULINK:OFFSet**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:ULINK:OFFSet <value>

:SENSe:BERT:BTS:LOOPback:GSM:ULINK:OFFSet?

This command specifies the amount of compensation for the insertion of equipment such as fading simulators into the uplink RF path.

**\*RST** +0

**Range** -500 to 10000

**Key Entry** Uplink Timing Advance

### **:BTS:LOOPback:GSM[:STATe]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM[:STATe] ON|OFF|1|0

:SENSe:BERT:BTS:LOOPback:GSM[:STATe]?

This command enables (1) or disables (0) the operating state of the GSM loopback bit error rate function. Although you can configure the measurement parameters while the operating state is off, any command triggers sent will be ignored until the operating state is turned on.

**\*RST** 0

**Key Entry** GSM BERT Off On

### **[:BASEband]:PRBS:FUNCTION:SPIgnore:DATA**

**Supported** E4438C with Option UN7

:SENSe:BERT[:BASEband]:PRBS:FUNCTION:SPIgnore:DATA ALL\_0|ALL\_1

:SENSe:BERT[:BASEband]:PRBS:FUNCTION:SPIgnore:DATA?

This command selects the bit parameter of the special pattern ignore function.

**ALL\_0** This choice ignores a bit pattern of 160 or more consecutive 0's.

**ALL\_1** This choice ignores a bit pattern of 160 or more consecutive 1's.

**\*RST** ALL\_0

**Key Entry** Spcl Pattern 0's 1's

**Remarks** This command is valid only when the special pattern ignore function is enabled (On). Refer to "[[:BASEband]:PRBS:FUNCTION:SPIgnore[:STATe]]". The special pattern of 160 or more 1's or 0's can appear at any position in the bit stream.

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)**

**[:BASEband]:PRBS:FUNCTion:SPIgnore[:STATe]**

**Supported** E4438C with Option UN7

```
:SENSe:BERT[:BASEband]:PRBS:FUNCTion:SPIgnore[:STATe] ON|OFF|1|0
:SENSe:BERT[:BASEband]:PRBS:FUNCTion:SPIgnore[:STATe]?
```

This command enables (1) or disables (0) the special pattern ignore function.

**ON** This choice detects 160 or more consecutive bits of 0's or 1's in the incoming bit stream and ignores these bits when making BER measurements. To select 0's or 1's refer to "[\[:BASEband\]:PRBS:FUNCTion:SPIgnore:DATA](#)"

**OFF** This choice disables the special pattern ignore mode for the BER measurement.

**\*RST** 0

**Key Entry** **Spcl Pattern Ignore Off On**

**[:BASEband]:PRBS[:DATA]**

**Supported** E4438C with Option UN7

```
:SENSe:BERT[:BASEband]:PRBS[:DATA] PN9|PN11|PN15|PN20|PN23
:SENSe:BERT[:BASEband]:PRBS[:DATA]?
```

This command selects the incoming data pattern for making BER measurements.

**PN9–PN23** These choices select an internally generated pseudo-random pattern for BER measurements.

**\*RST** PN9

**Key Entry** **PN9 PN11 PN15 PN20 PN23**

**[:BASEband]:RSYNc:THReshold**

**Supported** E4438C with Option UN7

```
:SENSe:BERT[:BASEband]:RSYNc:THReshold <val>
:SENSe:BERT[:BASEband]:RSYNc:THReshold?
```

This command specifies the threshold level for the resynchronizing function.

**\*RST** 0.40

**Range** 0.05–0.40

**Key Entry** **Resync Limits**

**Remarks** This command is valid only when the BERT resynchronizing function is on. Refer to "[\[:BASEband\]:RSYNc\[:STATe\]](#)" on page 457.

### **[:BAsEband]:RSYNc[:STATe]**

**Supported**            E4438C with Option UN7

```
:SENSe:BERT[:BAsEband]:RSYNc[:STATe] ON|OFF|1|0  
:SENSe:BERT[:BAsEband]:RSYNc[:STATe] ?
```

This command sets the operating state of the resynchronization function.

**ON**                    This choice enables the resynchronization function.

**OFF**                   This choice disables the resynchronization function.

**\*RST**                 1

**Key Entry**            **BERT Resync Off On**

### **[:BAsEband]:STATe**

**Supported**            E4438C with Option UN7

```
:SENSe:BERT[:BAsEband]:STATe ON|OFF|1|0  
:SENSe:BERT[:BAsEband]:STATe ?
```

This command sets the operating state of the bit error rate test (BERT) measurement.

**ON**                    This choice enables the BERT measurement.

**OFF**                   This choice disables the BERT measurement.

**\*RST**                 0

**Key Entry**            **BERT Off On**

### **[:BAsEband]:STOP:CRITeria:EBIT**

**Supported**            E4438C with Option UN7

```
:SENSe:BERT[:BAsEband]:STOP:CRITeria:EBIT <val>  
:SENSe:BERT[:BAsEband]:STOP:CRITeria:EBIT ?
```

This command specifies the threshold limit to stop the measurement.

**\*RST**                 100

**Range**                0–1000000000

**Key Entry**            **Error Count**

**Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)**

**Remarks** When the stop mode criteria is set to EBIT, the signal generator monitors the error bits and when it exceeds the set value, the signal generator stops the current BER measurement and waits for the next trigger.

EBIT must be the selection for this command to work. To select EBIT refer to “[:BASEband]:STOP:CRITeria[:SElect]”.

**[:BASEband]:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option UN7

:SENSE:BERT[:BASEband]:STOP:CRITeria[:SElect] EBIT|NONE  
:SENSE:BERT[:BASEband]:STOP:CRITeria[:SElect]?

This command determines which threshold criteria is used to prematurely stop the measurement.

**EBIT** This choice enables a specified number of bit errors to prematurely stop the measurement.

**NONE** This choice disables the stop measurement threshold criteria function.

**\*RST** NONE

**Key Entry** **Error Count** **No Thresholds**

**Remarks** The measurement will terminate no later than 200 ms after the threshold is exceeded.

**[:BASEband]:TBITs**

**Supported** E4438C with Option UN7

:SENSE:BERT[:BASEband]:TBITs <val>  
:SENSE:BERT[:BASEband]:TBITs?

This command specifies the total bit count to be measured in one measurement cycle.

**\*RST** +10000

**Range** 100–4294967295

**Key Entry** **Total Bits**



### **[:BASEband]:TRIGger:BDElay**

**Supported** E4438C with Option UN7

:SENSe:BERT[:BASEband]:TRIGger:BDElay <val>

:SENSe:BERT[:BASEband]:TRIGger:BDElay?

This command specifies the number of bits to delay the trigger signal.

**\*RST** 0

**Range** 0–65535

**Key Entry** **Delay Bits**

**Remarks** This command is valid only when the trigger bit delay function is on. Refer to “[:BASEband]:TRIGger:BDElay:STATe”.

### **[:BASEband]:TRIGger:BDElay:STATe**

**Supported** E4438C with Option UN7

:SENSe:BERT[:BASEband]:TRIGger:BDElay:STATe ON|OFF|1|0

:SENSe:BERT[:BASEband]:TRIGger:BDElay:STATe?

This command sets the operating state of the trigger delay function.

**ON** This choice enables the trigger delay function.

**OFF** This choice disables the trigger delay function.

**\*RST** 0

**Key Entry** **Bit Delay Off On**

**Remarks** This command needs to be set to ON before the number of bits for the trigger delay can be set. Refer to “[:BASEband]:TRIGger:BDElay”.

### **[:BASEband]:TRIGger:COUNT**

**Supported** E4438C with Option UN7

:SENSe:BERT[:BASEband]:TRIGger:COUNT <val>

:SENSe:BERT[:BASEband]:TRIGger:COUNT?

This command sets the number of times the bit error rate test (BERT) measurements will repeat.

**\*RST** 1

**Range** 0–65535

**Key Entry** **Cycle Count**

## Bit Error Rate Test (BERT) Commands

### Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)

**Remarks** With 0 set, the BER measurements are repeated until you set the BERT operating state is set to off. Refer to “[:BASEband]:STATE” on page 457.

#### [:BASEband]:TRIGger:POLarity

**Supported** E4438C with Option UN7

```
:SENSe:BERT[:BASEband]:TRIGger:POLarity POSitive|NEGative  
:SENSe:BERT[:BASEband]:TRIGger:POLarity?
```

This command selects the polarity of the trigger signal.

**POSitive** This choice triggers on the rising edge of the input data signal.

**NEGative** This choice triggers on the falling edge of the input data signal.

**\*RST** POS

**Key Entry** **Aux I/O Trigger Polarity Pos Neg**

**Key Entry** **Aux I/O Trigger Polarity Pos Neg**

#### [:BASEband]:TRIGger[:SOURCE]

**Supported** E4438C with Option UN7

```
:SENSe:BERT[:BASEband]:TRIGger[:SOURCE] IMMEDIATE|KEY|EXT|BUS|AUX  
:SENSe:BERT[:BASEband]:TRIGger[:SOURCE]?
```

This command selects the triggering type for starting the bit error rate test (BERT) measurements.

**IMMEDIATE** This choice begins the measurement directly after synchronization has been achieved.

**KEY** This choice begins the measurement when the front panel **Trigger** key is pressed, provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.

**EXT** This choice begins the measurement as soon as a trigger signal is applied to the rear panel connector provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**AUX** This choice triggers an event using the rear panel AUX I/O connector pin #22. Refer to the *E4428C/38C ESG Signal Generators User's Guide*.

**\*RST** KEY

**Key Entry** **Immediate Trigger Key Ext Bus Aux I/O**

---

## 8 Receiver Test Digital Commands

This chapter provides SCPI descriptions for commands dedicated to digital real-time testing using the E4438C ESG Vector Signal Generator. This chapter contains the following sections:

- “All Subsystem–Option 001/601or 002/602 ([:SOURce])” on page 462
- “AWGN Real-Time Subsystem–Option 403 ([:SOURce]:RADio:AWGN:RT)” on page 463
- “Bluetooth Subsystem–Option 406 ([:SOURce]:RADio:BLUetooth:ARB)” on page 464
- “CDMA2000 BBG Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000[:BBG])” on page 479
- “Custom Subsystem–Option 001/601or 002/602 ([:SOURce]:RADio:CUSTom)” on page 548
- “DECT Subsystem–Option 402 ([:SOURce]:RADio:DECT)” on page 573
- “EDGE Subsystem–Option 402 ([:SOURce]:RADio:EDGE)” on page 622

## **All Subsystem–Option 001/601or 002/602 (:SOURce)**

### **:RADio:ALL:OFF**

**Supported** E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio:ALL:OFF

This command disables all digital modulation personalities on a particular baseband.

**Remarks** This command does not affect analog modulation.

---

## AWGN Real-Time Subsystem—Option 403 ([:SOURce]:RADio:AWGN:RT)

### :BWIDth

**Supported** E4438C with Option 403

[:SOURce]:RADio:AWGN:RT:BWIDth <val>

[:SOURce]:RADio:AWGN:RT:BWIDth?

This command adjusts the real-time AWGN bandwidth value.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.00000000E+006

**Range** 5E4–8E7

**Key Entry** **Bandwidth**

### [:STATe]

**Supported** E4438C with Option 403

[:SOURce]:RADio:AWGN:RT[:STATe] ON|OFF|1|0

[:SOURce]:RADio:AWGN:RT[:STATe]?

This command enables or disables the operating state of real-time AWGN.

**\*RST** 0

**Key Entry** **Real-time AWGN Off On**

---

## Bluetooth Subsystem—Option 406 ([:SOURCE]:RADio:BLUEtooth:ARB)

### :AMADdr

**Supported** E4438C with Option 406406

[ :SOURCE ] :RADio:BLUEtooth:ARB:AMADdr <val>

[ :SOURCE ] :RADio:BLUEtooth:ARB:AMADdr?

This command sets the 3-bit active member address (AM\_ADDR).

**\*RST** +1

**Range** 0–7

**Key Entry** **AM\_ADDR**

**Remarks** In a piconet, one or more slaves are connected to a single master; a temporary 3-bit address (AM\_ADDR) is used to identify each active slave.

### :BDADdr

**Supported** E4438C with Option 406

[ :SOURCE ] :RADio:BLUEtooth:ARB:BDADdr <val>

[ :SOURCE ] :RADio:BLUEtooth:ARB:BDADdr?

This command sets the unique hexadecimal Bluetooth device address (BD\_ADDR) with up to 48 bits.

**\*RST** #H0000000000008

**Range** #H0–#HFFFFFFFFFFFFFF

**Key Entry** **BD\_ADDR**

**Remarks** The address is derived from the IEEE802 standard.

### :BURSt[:STATe]

**Supported** E4438C with Option 406

[ :SOURCE ] :RADio:BLUEtooth:ARB:BURSt[:STATe] ON|OFF|1|0

[ :SOURCE ] :RADio:BLUEtooth:ARB:BURSt[:STATe]?

This command enables or disables the burst function.

ON(1) This choice will ramp up the signal power prior to transmitting the packet and ramp it down after the end of the packet transmission.

OFF(0)	This choice provides a linked series of packet transmissions with no power ramping.
*RST	1
<b>Key Entry</b>	<b>Burst Off On</b>

**:CGDelay**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:CGDelay <val>
[ :SOURCE ] :RADio:BLUetooth:ARB:CGDelay?
```

This command sets the number of symbols to shift the output symbol clock (EVENT 1 rear panel connector) and gate (EVENT 2 rear panel connector) signals relative to the Bluetooth signal. The shifting of these signals is used to compensate for any packet delay through the DUT during BER tests.

\*RST +0.00000000E+000

**Range** 0.0–24999.9

**Key Entry** **Clock/Gate Delay**

**Remarks** This command is only effective with a continuous PN9 (CPN9) payload data and is intended for bit error rate testing (BERT, Option UN7). Refer to “:DATA” on [page 465](#) for selecting the CPN9 data choice.

When the clock and gate delay is set to zero (0), the rising edge of the symbol clock lines up with the middle of each symbol and the gate is high during the user payload field (PN9 data).

**:DATA**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:DATA TPN9 | CPN9 | <val>
[ :SOURCE ] :RADio:BLUetooth:ARB:DATA?
```

This command sets the user payload data type; user payload data is the voice or data information (less the payload header) that is carried in a packet.

TPN9 This choice places a truncated PN9 sequence consisting of 216 bits into a single packet.

CPN9 This choice places 8 continuous PN9 sequences into 19 packets, followed by one packet with no user payload. This ensures that the SEQN bit is properly alternated which is a requirement to filter out packet re-transmission at the destination.

**Bluetooth Subsystem—Option 406 ([:SOURce]:RADio:BLUetooth:ARB)**

<val>	This variable lets you set your own 8 bit data pattern for a single packet. A change in the user payload data type resets the eight bit pattern to a value of 00000000.		
<b>*RST</b>	TPN9		
<b>Range</b>	<val>: #B0–#B11111111 or 0–255		
<b>Key Entry</b>	<b>Truncated PN9</b>	<b>Continuous PN9</b>	<b>8 Bit Pattern</b>
<b>Remarks</b>	The PN9 sequence (511 bits) is standard based. The sequence begins with the first one of nine consecutive ones.		

**:IQ:EXTernal:FILTer**

**Supported** E4438C with Option 406

```
[ :SOURce ] :RADio:BLUetooth:ARB:IQ:EXTernal:FILTer 40e6 |THRough
[ :SOURce ] :RADio:BLUetooth:ARB:IQ:EXTernal:FILTer?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter with this command will automatically set “:IQ:EXTernal:FILTer:AUTO” on [page 466](#) to OFF (0) mode.

40e6 This choice applies a 40 MHz baseband filter.

THRough This choice bypasses filtering.

**\*RST** THR

**Key Entry** **40.000 MHz** **Through**

**:IQ:EXTernal:FILTer:AUTO**

**Supported** E4438C with Option 406

```
[ :SOURce ] :RADio:BLUetooth:ARB:IQ:EXTernal:FILTer:AUTO ON |OFF | 1 | 0
[ :SOURce ] :RADio:BLUetooth:ARB:IQ:EXTernal:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON (1) This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF (0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXTernal:FILTer” on [page 466](#) for selecting a filter or through path.

**\*RST** 1

**Key Entry** **I/Q Output Filter Manual Auto**



**:HEADER:CLEAR**

**Supported** E4438C with Option 406

[ :SOURCE ] :RADIO:BLUETOOTH:ARB:HEADER:CLEAR

This command clears the header information from the header file used by this format.

**Key Entry** **Clear Header**

**Remarks** The **Bluetooth Off On** softkey must be set to On for this command to function.

**:HEADER:SAVE**

**Supported** E4438C with Option 406

[ :SOURCE ] :RADIO:BLUETOOTH:ARB:HEADER:SAVE

This command saves the header information to the header file used by this format.

**Key Entry** **Save Setup To Header**

**Remarks** The **Bluetooth Off On** must be set to On for this command to function.

**:IMPAIRMENTS**

**Supported** E4438C with Option 406

[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPAIRMENTS ON|OFF|1|0

[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPAIRMENTS?

This command enables or disables the Bluetooth signal impairment function.

ON(1) This choice enables the current impairment settings.

OFF(0) This choice disables the impairments.

**\*RST** 0

**Key Entry** **Impairments Off On**

**:IMPAIRMENTS:AWGN**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPAIRMENTS:AWGN ON|OFF|1|0  
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPAIRMENTS:AWGN?
```

This choice enables or disables the additive white gaussian noise (AWGN) impairment.

**\*RST** 0

**Key Entry** **AWGN Off On**

**Remarks** The AWGN impairment is not added to the signal until the Bluetooth signal impairment function is enabled. Refer to “[:IMPAIRMENTS](#)” for enabling the impairments.

**:IMPAIRMENTS:AWGN:CNR**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPAIRMENTS:AWGN:CNR <val>  
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPAIRMENTS:AWGN:CNR?
```

This command sets the carrier to noise ratio expressed in a 1 MHz bandwidth for the additive white gaussian noise (AWGN) impairment.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +21

**Range** 10–40

**Key Entry** **C/N[1MHz]**

**Remarks** The value set by this command does not affect the Bluetooth signal until both the AWGN impairment and the Bluetooth signal impairment function are enabled. Refer to “[:IMPAIRMENTS:AWGN](#)” on [page 468](#) for more information.

**:IMPairments:AWGN:NSEed**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:AWGN:NSEed <val>
```

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:AWGN:NSEed?
```

This command sets the noise seed value for the additive white gaussian noise (AWGN) impairment.

**\*RST** +1

**Range** 1–65535

**Key Entry** **Noise Seed**

**Remarks** A change in the seed value changes the noise pattern.

The value set by this command does not affect the Bluetooth signal until both the AWGN impairment and the Bluetooth signal impairment function are enabled. Refer to “:IMPairments:AWGN” on page 468 for more information.

**:IMPairments:DDEVIation**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:DDEVIation <val>
```

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:DDEVIation?
```

This command sets the maximum linear or sinusoidal carrier frequency drift deviation during the Bluetooth packet transmission.

The variable <val> is expressed in units of kilohertz (–kHz to kHz) with a minimum resolution of 1 kHz.

**\*RST** +0.00000000E+000

**Range** –1E5 to –1E3, 0, 1E3 to 1E5

**Key Entry** **Drift Deviation**

**Remarks** Refer to “:IMPairments:FDType” on page 470 for selecting either a linear or sinusoidal frequency drift.

The value set by this command does not affect the Bluetooth signal until the Bluetooth signal impairment function is enabled. Refer to “:IMPairments” on page 467 for more information.

**:IMPairments:FDFType**

**Supported** E4438C with Option 406

```
[:SOURCE]:RADio:BLUEtooth:ARB:IMPairments:FDFType LINear|SINE
[:SOURCE]:RADio:BLUEtooth:ARB:IMPairments:FDFType?
```

This command sets the carrier frequency drift impairment type that will occur during the length of the Bluetooth packet transmission.

**LINear** This choice enables the carrier frequency to drift linearly from the signal generator carrier frequency setting to the value entered for the frequency drift.

**SINE** This choice enables the carrier frequency to drift sinusoidally above and below the signal generator carrier frequency setting. For example, if the carrier signal generator setting is 2.4 GHz and the drift value was 100 kHz, the carrier frequency would sinusoidally drift to 2.4001 GHz, back to 2.4 GHz and continue drifting to frequency values less than 2.4 GHz until the packet transmission ends. With a negative drift value, the carrier frequency deviation would begin drifting toward 2.3999 GHz at the beginning of the drift cycle.

**\*RST** SINE

**Key Entry** **Freq Drift Type Linear Sine**

**Remarks** To set a drift value, refer to “:IMPairments:DDEVIation” on page 469.

The value set by this command does not affect the Bluetooth signal until the Bluetooth signal impairment function is enabled. Refer to “:IMPairments” on page 467 for more information.

The carrier frequency value on the signal generator display does not change during the drift impairment.

**:IMPairments:FDFset**

**Supported** E4438C with Option 406

```
[:SOURCE]:RADio:BLUEtooth:ARB:IMPairments:FDFset <val>
[:SOURCE]:RADio:BLUEtooth:ARB:IMPairments:FDFset?
```

This command sets a carrier frequency offset impairment value as part of a Bluetooth setup.

The variable <val> is expressed in units of kilohertz (–kHz to kHz) with a minimum resolution of 1 kHz.

**\*RST** +0.00000000E+000

**Range** –1E5 to –1E3, 0, 1E3 to 1E5

<b>Key Entry</b>	<b>Freq Offset</b>
<b>Remarks</b>	The value set by this command does not affect the Bluetooth signal until the Bluetooth signal impairment function is enabled. Refer to “:IMPairments” on page 467 for more information.  The carrier frequency value on the signal generator display does not change during the offset impairment.

**:IMPairments:MINdex**

**Supported** E4438C with Option 406

[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:MINdex <val>

[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:MINdex?

This command sets the modulation index impairment value for the Bluetooth waveform.

**\*RST** +3.1500000E-001

**Range** 2.5E-1 to 4E-1

**Key Entry** **Mod Index**

**Remarks** The value set by this command does not affect the Bluetooth signal until the Bluetooth signal impairment function is enabled. Refer to “:IMPairments” on page 467 for more information.

Only the peak-to-peak frequency deviation is changed by this command; the bit rate (1 MHz) remains constant. The modulation index is derived from the following formula:

$$\text{Mod Index} = \frac{\text{Peak-to-Peak Frequency Deviation}}{\text{Bit Rate}}$$

**:IMPairments:STERror**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:STERror <val>
```

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:STERror?
```

This command sets the symbol timing error impairment value for the Bluetooth waveform.

The variable <val> is expressed in units of parts per million (ppm) and in units of hertz (Hz). A 20 ppm timing error corresponds to a 20 Hz shift in the symbol rate. The range value indicated below applies to both units of measurement.

**\*RST** +0

**Range** -50 to 50

**Key Entry** **Symbol Timing Err**

**Remarks** The value set by this command does not affect the Bluetooth signal until the Bluetooth signal impairment function is enabled. Refer to “:IMPairments” on [page 467](#) for more information.

**:IQ:MODulation:ATTen**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IQ:MODulation:ATTen <val>
```

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IQ:MODulation:ATTen?
```

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” on [page 472](#) for setting the attenuation value.

**\*RST** +2.00000000E+000

**Range** 0–40

**Key Entry** **Modulator Atten Manual Auto**

**:IQ:MODulation:ATTen:AUTO**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUeetooth:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0
[ :SOURCE ] :RADio:BLUeetooth:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

**\*RST** 1

**Key Entry** **Modulator Atten Manual Auto**

**:IQ:MODulation:FILTer**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUeetooth:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THRough
[ :SOURCE ] :RADio:BLUeetooth:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter with this command will set “:IQ:MODulation:ATTen:AUTO” on page 473 to OFF(0) mode.

2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THRough This choice bypasses filtering.

**\*RST** THR

**Key Entry** **2.100 MHz 40.000 MHz Through**

**:IQ:MODulation:FILTer:AUTO****Supported** E4438C with Option 406

```
[:SOURCE]:RADio:BLUetooth:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURCE]:RADio:BLUetooth:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “[:IQ:MODulation:FILTer](#)” on page 473 for selecting a filter or through path.

**\*RST** 1**Key Entry** I/Q Mod Filter Manual Auto**:MDEStination:AAMPlitude****Supported** E4438C with Option 406

```
[:SOURCE]:RADio:BLUetooth:ARB:MDEStination:AAMPlitude NONE|M1|M2|M3|M4
[:SOURCE]:RADio:BLUetooth:ARB:MDEStination:AAMPlitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

**\*RST** NONE**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4**:MDEStination:ALCHold****Supported** E4438C with Option 406

```
[:SOURCE]:RADio:BLUetooth:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURCE]:RADio:BLUetooth:ARB:MDEStination:ALCHold?
```

This command routes the selected marker to the ALC Hold function. The NONE parameter clears the marker for the ALC Hold function.

**\*RST** NONE**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4



### **:MDEStination:PULSe**

**Supported**            E4438C with Option 406

```
[:SOURCE]:RADio:BLUeetooth:ARB:MDEStination:PULSe NONE |M1 |M2 |M3 |M4
[:SOURCE]:RADio:BLUeetooth:ARB:MDEStination:PULSe?
```

This command routes the selected marker to the Pulse/Rf Blanking function. The NONE parameter clears the marker for the Pulse/Rf Blanking function.

**\*RST**                    NONE

**Key Entry**            **None    Marker 1    Marker 2    Marker 3    Marker 4**

### **:MPOLarity:MARKer1 | 2 | 3 | 4**

**Supported**            E4438C with Option 406

```
[:SOURCE]:RADio:BLUeetooth:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 NEGative | POSitive
[:SOURCE]:RADio:BLUeetooth:ARB:MPOLarity:MARKer1 | 2 | 3 | 4?
```

This command sets the polarity for the selected marker. For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

#### **Example**

```
:RAD:ARB:MPOL:MARK3 NEG
```

The preceding example sets the polarity for marker 3 to negative.

**\*RST**                    POS

**Key Entry**            **Marker 1 Polarity Neg Pos    Marker 2 Polarity Neg Pos    Marker 3 Polarity Neg Pos**  
**Marker 4 Polarity Neg Pos**

### **:MPOLarity:MARKer1**

**Supported**            E4438C with Option 406

```
[:SOURCE]:RADio:BLUeetooth:ARB:MPOLarity:MARKer1 NEGative | POSitive
[:SOURCE]:RADio:BLUeetooth:ARB:MPOLarity?
```

This command sets the polarity for marker 1.

**\*RST**                    POS

**Key Entry**            **Marker 1 Polarity Neg Pos**

### **:MPOLarity:MARKer2**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer2 NEGative|POSitive  
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

**\*RST** POS

**Key Entry** **Marker 2 Polarity Neg Pos**

### **:MPOLarity:MARKer3**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer3 NEGative|POSitive  
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

**\*RST** POS

**Key Entry** **Marker 3 Polarity Neg Pos**

### **:MPOLarity:MARKer4**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer4 NEGative|POSitive  
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

**\*RST** POS

**Key Entry** **Marker 4 Polarity Neg Pos**

### **:PACKet**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUETOOTH:ARB:PACKet DH1  
[ :SOURCE ] :RADio:BLUETOOTH:ARB:PACKet?
```

This command selects a DH1 packet.

**\*RST** DH1

**Choices** DH1

<b>Key Entry</b>	<b>Packet (DH1)</b>
<b>Remarks</b>	A DH1 packet covers a single timeslot.

**:REFerence:EXTernal:FREQuency**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:REFerence:EXTernal:FREQuency <val>
[ :SOURCE ] :RADio:BLUetooth:ARB:REFerence:EXTernal:FREQuency?
```

This command sets the lock frequency of the internal ARB waveform clock to match the externally applied ARB waveform clock reference at the BASEBAND GEN REF IN connector.

The variable <val> is expressed in units of hertz (Hz–MHz).

**\*RST** +1.00000000+007

**Range** 2.5E5–1E8

**Key Entry** **Reference Freq**

**Remarks** Use this command when EXTernal is the ARB waveform clock reference source. Refer to “[:REFerence[:SOURCE]]” on page 477 for selecting either the internal or an external source.

**:REFerence[:SOURCE]**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:REFerence[ :SOURCE ] INTernal | EXTernal
[ :SOURCE ] :RADio:BLUetooth:ARB:REFerence[ :SOURCE ]?
```

This command selects either an internal or external reference for the ARB waveform clock.

**\*RST** INT

**Key Entry** **ARB Reference Ext Int**

**Remarks** If the EXTernal choice is selected, the frequency of the external reference must be entered into the signal generator and the signal must be applied to the BASEBAND GEN REF IN connector. Refer to “[:REFerence:EXTernal:FREQuency]” on page 477 for entering the frequency value.

**:RSYMBOLS**

**Supported** E4438C with Option 406

[ :SOURCE ] :RADIO:BLUETOOTH:ARB:RSYMBOLS <val>

[ :SOURCE ] :RADIO:BLUETOOTH:ARB:RSYMBOLS?

This command controls how long it takes the RF burst to ramp up at the beginning of the packet transmission and down at the end.

The variable <val> is expressed in symbols (1 symbol interval equals 1  $\mu$ s).

**\*RST** +6

**Range** 1–10

**Key Entry** **Burst Power Ramp**

**:SLOCK:RATE**

**Supported** E4438C with Option 406

[ :SOURCE ] :RADIO:BLUETOOTH:ARB:SLOCK:RATE <val>

[ :SOURCE ] :RADIO:BLUETOOTH:ARB:SLOCK:RATE?

This command sets the sample clock rate for the Bluetooth modulation format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** **ARB Sample Clock**

**[:STATE]**

**Supported** E4438C with Option 406

[ :SOURCE ] :RADIO:BLUETOOTH:ARB[:STATE] ON|OFF|1|0

[ :SOURCE ] :RADIO:BLUETOOTH:ARB[:STATE]?

This command enables or disables the Bluetooth waveform generator.

**\*RST** 0

**Key Entry** **Bluetooth Off On**

---

## CDMA2000 BBG Subsystem—Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])

### :LMODE

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:LMODE FORWARD|RT12|RA12|RT34|RE34|RC34
[:SOURCE]:RADIO:CDMA2000[:BBG]:LMODE?
```

This command selects either forward or reverse link Real Time CDMA2000.

**FORWARD** This choice selects the forward link mode.

**RT12** This choice selects the reverse traffic channel for radio configurations one and two.

**RA12** This choice selects the reverse access channel for radio configurations one and two.

**RT34** This choice selects the reverse traffic channel for radio configurations three and four.

**RE34** This choice selects the reverse enhanced access channel for radio configurations three and four.

**RC34** This choice selects the reverse common control channel for radio configurations three and four.

**\*RST** FORW

<b>Key Entry</b>	<b>Link Forward</b>	<b>Reverse</b>	<b>RadioConfig 1/2 Traffic</b>	<b>RadioConfig 1/2 Access</b>
	<b>RadioConfig 3/4 Traffic</b>		<b>RadioConfig 3/4 Enhanced Access</b>	
	<b>RadioConfig 3/4 Common Control</b>			

**CDMA2000 BBG Subsystem–Option 401 ([:SOURCE]:RADio:CDMA2000[:BBG])**

**[:FORWARD]:BBClock**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:BBClock INT[1] | EXT[1]  
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:BBClock?
```

This command selects the baseband data clock source for the forward link.

**\*RST** INT

**Field Entry** BBG Data Clock

**Remarks** If the EXT choice is selected, the external frequency must be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

**[:FORWARD]:CHIPrate**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:CHIPrate <val>  
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:CHIPrate?
```

This command adjusts the chip rate value.

The variable <val> is expressed in units of chips per second (cps–Mcps).

**\*RST** +1.22880000E+006

**Range** 1E3–1.3E6

**Field Entry** Chip Rate

**Remarks** The default value (1.228800 Mcps) is in accordance with the IS-2000 specification.

**[:FORWARD]:ESDelay**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:ESDelay <val>  
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:ESDelay?
```

This command modifies the even second clock pulse.

**\*RST** +2.00000000E+001

**Range** 0.5–128.0

**Field Entry** Even Second Delay

**Remarks** The even second clock pulse sets the delay to align the RF with the trigger. When the noise function is set to ON, this value will increase. Refer to “[:FORWARD]:NOISE[:STATE]” on page 506 for more information.

## [:FORWARD]:FILTER

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FILTER RNYQuist|NYQuist|
GAUSSian|RECTangle|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|
"<user FIR>" |
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FILTER?
```

This command specifies the filter type.

**IS95** This choice selects a filter that meets the criteria of the IS-95 standard.

**IS95\_EQ** This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

**IS95\_MOD** This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.

**IS95\_MOD\_EQ** This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.

**AC4Fm** This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.

**UGGaussian** This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.

**"<user FIR>"** This variable is any filter file that you have stored into memory.

**\*RST** IS95\_EQ

<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 MOD w/EQ</b>	<b>APCO 25 C4FM</b>	<b>UN3/4 GSM</b>	<b>Gaussian</b>	
	<b>User FIR</b>					

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**[:FORWARD]:FILTER:ALPHA**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FILTER:ALPHA <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FILTER:ALPHA?
```

This command changes the Nyquist or root Nyquist filter's alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +2.20000000E-001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “[:FORWARD]:FILTER” on page 481.

**[:FORWARD]:FILTER:BBT**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FILTER:BBT <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FILTER:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time filter value.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E-001

**Range** 0.000–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “[:FORWARD]:FILTER” on page 481.

**[:FORWARD]:FILTER:CHANNEL**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FILTER:CHANNEL EVM|ACP
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FILTER:CHANNEL?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).



<b>EVM</b>	This choice provides the most ideal passband.
<b>ACP</b>	This choice improves stopband rejection.
<b>*RST</b>	EVM
<b>Key Entry</b>	<b>Optimize FIR For EVM ACP</b>
<b>Remarks</b>	To change the current filter type, refer to “[:FORWARD]:FILTER” on page 481.

**[:FORWARD]:LCSTATE**

<b>Supported</b>	E4438C with Option 401
	<code>[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:LCSTATE &lt;val&gt;</code> <code>[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:LCSTATE?</code>
	This command sets the long code seed used to generate the long code for the forward link.
<b>*RST</b>	#H0000000000
<b>Range</b>	#H0–#H3FFFFFFFF
<b>Field Entry</b>	Long Code State
<b>Remarks</b>	The storage register for the long code state allows a 42-bit binary number to be entered.

**[:FORWARD]:FFCH:DATA**

<b>Supported</b>	E4438C with Option 401
	<code>[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:DATA PN9 PN15 FIX4 </code> <code>"&lt;file name&gt;" EXT</code> <code>[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:DATA?</code>
	This command configures the data field for the forward fundamental channel.
<b>*RST</b>	PN9
<b>Key Entry</b>	<b>PN9   PN15   FIX4   User File   Ext</b>
<b>Remarks</b>	Refer to “File Name Variables” on page 13 for information on the file name syntax.

## [:FORWARD]:FFCH:DATA:FIX4

**Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:DATA:FIX4 <val>

[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:DATA:FIX4?

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

## [:FORWARD]:FFCH:EBNO

**Supported** E4438C with Options 401 and 403

[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:EBNO <val>

[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:EBNO?

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the forward fundamental channel.

**\*RST** +0.00000000E+000

**Range** min EbNo:  $10\log_{10}\left[\frac{\text{Chip Rate}}{1000(\text{Bit Rate})}\right] + \text{Normalized Power} + \text{RCFactor}$

max EbNo:  $10\log_{10}\left[\frac{1000(\text{Chip Rate})}{\text{Bit Rate}}\right] + \text{Normalized Power} + \text{RCFactor}$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[:FORWARD]:PADJust” on page 508 for adjusting the code domain power.

RCFactor is dependent on the selected radio configuration. The following table shows the RCFactor by radio configuration.

RC	RCFactor
1	$10\log_{10}\left[\frac{1}{2}\left(\frac{11}{11 + \frac{9600}{\text{Bit Rate}}}\right)\right]$
2	$10\log_{10}\left[\frac{1}{2}\left(\frac{23}{23 + \frac{14400}{\text{Bit Rate}}}\right)\right]$

RC	RCFactor
3, 4	$10\log_{10} \left[ \frac{11}{11 + \frac{9600}{\text{Bit Rate}}} \right]$
5	$10\log_{10} \left[ \frac{11}{11 + \frac{14400}{\text{Bit Rate}}} \right]$

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

### [:FORWARD]:FFCH:FOFFset

**Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH:FOFFset <val>

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH:FOFFset?

This command sets the frame offset value for the forward fundamental channel.

**\*RST** +0

**Range** 0–15

**Field Entry** Frame Offset

**Remarks** Changing this value also changes the frame offset value for the forward supplemental channels (FSCH1 and FSCH2).

### [:FORWARD]:FFCH:LCMask

**Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH:LCMask?

This command outputs the contents of the long code mask field for the forward fundamental channel.

**\*RST** #H3180000000

**Remarks** This value is shared by the forward supplemental channels (FSCH1 and FSCH2).

**[[:FORWARD]:FFCH:LCMask:ESN]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] [ :FORWARD ] :FFCH:LCMask:ESN <val>
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] [ :FORWARD ] :FFCH:LCMask:ESN?
```

This command sets the permuted electronic serial number (ESN) for the long code mask, which is used to identify a particular mobile.

**\*RST** #H00000000

**Range** #H0–#HFFFFFFF

**Field Entry** Permuted ESN

**Remarks** Changing this value also changes the permuted ESN for the long code mask in the forward supplemental channels (FSCH1 and FSCH2).

**[[:FORWARD]:FFCH:LCMask:HEADer]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] [ :FORWARD ] :FFCH:LCMask:HEADer <val>
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] [ :FORWARD ] :FFCH:LCMask:HEADer?
```

This command sets the header for the long code mask, which is used to identify a particular mobile.

**\*RST** #H318

**Range** 000–3FF

**Field Entry** Header

**Remarks** Changing this value also changes the header for the long code mask in the forward supplemental channels (FSCH1 and FSCH2).

**[[:FORWARD]:FFCH:POWer]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] [ :FORWARD ] :FFCH:POWer <val>
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] [ :FORWARD ] :FFCH:POWer?
```

This command sets the power for the forward fundamental channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** –40 to 0

**Field Entry** Power

**[:FORWARD]:FFCH:PRAMP****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:PRAMP ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:PRAMP?
```

This command sets the power puncturing operating state for the forward fundamental channel.

**\*RST** 1**Field Entry** Ramp**[:FORWARD]:FFCH:PRTIME****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:PRTIME <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:PRTIME?
```

This command sets the power ramp time indicator values for the forward fundamental channel.

Power frame indicators are used to command the mobile (increasing or decreasing power). For example, if 4 is the selected value, it will cause the mobile to respond with 4 sequential power increases, then 4 power decreases. This pattern will continue indefinitely.

The variable <val> is expressed in

**\*RST** +1**Range** 1–80**Field Entry** Ramp Time**[:FORWARD]:FFCH:QOF****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:QOF <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:QOF?
```

This command sets the quasi-orthogonal function channel value.

**\*RST** +0**Range** 0–3**Field Entry** QOF

**[[:FORWARD]:FFCH:RATE**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FFCH : RATE 1.2kbps | 1.5kbps |  
1.8kbps | 2.4kbps | 2.7kbps | 3.6kbps | 4.8kbps | 7.2kbps | 9.6kbps | 14.4kbps  
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FFCH : RATE?
```

This command sets the data rate for the forward paging channel.

The variable <val> is expressed in units of bits per second (bps–Mbps).

**\*RST** +9.60000000E+003

**Range** 1.2E3–1.44E4

**Field Entry** Bit Rate

**[[:FORWARD]:FFCH:RCONfig**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FFCH : RCONfig <val>  
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FFCH : RCONfig?
```

This command sets the radio configuration value for the forward fundamental channel.

**\*RST** +3

**Range** 1–5

**Field Entry** Radio Config

**[[:FORWARD]:FFCH:WALSh**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FFCH : WALSh <val>  
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FFCH : WALSh?
```

Execute this command to set the Walsh code for the forward fundamental channel.

**\*RST** +10

**Range** RC1,2,3, & 5: 0–63 RC4: 0–127

**Field Entry** Walsh

**[[:FORWARD]:FFCH[:STATE]]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH[:STATE] ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH[:STATE] ?
```

This command enables or disables the operating state of the forward fundamental channel.

**\*RST** 0**Field Entry** State**[[:FORWARD]:FPCH:DATA]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FPCH:DATA DEFAULT|"<file name>"
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FPCH:DATA ?
```

This command configures the data field for the forward paging channel.

**\*RST** DEFAULT**Key Entry** **Default** **User File****Remarks** A user-defined file can have a maximum length of 512 bytes.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**[[:FORWARD]:FPCH:EBNO]****Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FPCH:EBNO <val>
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FPCH:EBNO ?
```

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the forward paging channel.

**\*RST** +0.00000000E+000

**CDMA2000 BBG Subsystem–Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])**

**Range**

$$\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[:FORWARD]:PADJUST” on page 508 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**[:FORWARD]:FPCH:LCMask**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask?
```

This command outputs the contents of the long code mask field for the forward paging channel.

**\*RST** +0.00000000E+000

**[:FORWARD]:FPCH:LCMask:F1**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F1 <val>
```

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F1?
```

This command sets the value of field one for the forward paging channel long code mask.

**\*RST** #H18CD

**Range** #H0–#H1FFF

**Field Entry** Field 1

**[:FORWARD]:FPCH:LCMask:F2**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F2 <val>
```

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F2?
```

This command sets the value of field two for the forward paging channel long code mask.



**\*RST** #H00  
**Range** #H00–#H1F  
**Field Entry** Field 2

**[:FORWARD]:FPCH:LCMask:F3**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F3 <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F3?
```

This command sets the value of field three for the forward paging channel long code mask.

**\*RST** #H000  
**Range** #H0–#HFFF  
**Field Entry** Field 3

**[:FORWARD]:FPCH:MESSAge**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:MESSAge <bit_count>,
<datablock>
```

This command sends a bit count and a data block (to queue up messaging), generated as a one-time paging message (asynchronous paging message), to the paging channel.

After a one-time paging message is generated, the signal generator reverts to synchronous paging file messages.

**[:FORWARD]:FPCH:POWer**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:POWer <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:POWer?
```

Execute this command to set the power for the forward paging channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000  
**Range** –40 to 0  
**Field Entry** Power

**[:FORWARD]:FPCH:RATE**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:RATE 4.8kbps|9.6kbps  
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:RATE?
```

This command sets the data rate for the forward paging channel.

The variable <val> is expressed in units of bits per second (bps–Mbps).

**\*RST** +9.60000000E+003

**Field Entry** Bit Rate

**[:FORWARD]:FPCH:WALSh**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:WALSh <val>  
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH:WALSh?
```

This command sets the Walsh code for the forward paging channel.

**\*RST** +1

**Range** 0–63

**Field Entry** Walsh

**[:FORWARD]:FPCH[:STATE]**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH[:STATE] ON|OFF|1|0  
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPCH[:STATE]?
```

Execute this command to set the operating state for the forward paging channel.

**\*RST** 0

**Field Entry** State

**[:FORWARD]:FPICH:ECNO**

**Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPICH:ECNO <val>
```

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPICH:ECNO?
```

This command sets the ratio of energy per chip to the noise power spectral density (expressed in dB) for the forward pilot channel.

**\*RST** +0.00000000E+000

**Range** min EcNo: -30 + Normalized Power

max EcNo: 30 + Normalized Power

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[:FORWARD]:PADJust” on page 508 for adjusting the code domain power.

**Field Entry** EcNo

**Remarks** Changes to the EcNo values also change the EbNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**[:FORWARD]:FPICH:POWER**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPICH:POWER <val>
```

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPICH:POWER?
```

This command sets the power for the forward pilot channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -40 to 0

**Field Entry** Power

**CDMA2000 BBG Subsystem—Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])****[:FORWARD]:FPICH[:STATE]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FPICH[:STATE] ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FPICH[:STATE]?
```

This command enables or disables the operating state of the forward pilot channel.

**\*RST** 1**Field Entry** State**[:FORWARD]:FSCH[1]|2:DATA****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1]|2:DATA PN9|PN15|FIX4|
"<file name>"|EXT
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1]|2:DATA?
```

This command configures the data field for the forward supplemental traffic channels.

**\*RST** PN9**Key Entry** PN9 PN15 FIX4 User File EXT**[:FORWARD]:FSCH[1]|2:DATA:FIX4****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1]|2:DATA:FIX4 <val>
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1]|2:DATA:FIX4?
```

This command selects a fixed 4-bit data pattern that repeats as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** FIX4

**[[:FORWARD]:FSCH[1] | 2:EBNO**

**Supported** E4438C with Options 401 and 403

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [ 1 ] | 2 :EBNO <val>
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [ 1 ] | 2 :EBNO?
```

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the reverse access channel.

**\*RST** +0.00000000E+000

**Range**

$$\text{min EbNo: } 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\text{max EbNo: } 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[[:FORWARD]:PADJust” on page 508 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**[[:FORWARD]:FSCH[1] | 2:FOFFset**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [ 1 ] | 2 :FOFFset <val>
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [ 1 ] | 2 :FOFFset?
```

This command sets the frame offset value for the forward supplemental traffic channels.

**\*RST** +0

**Range** 0–15

**Field Entry** Frame Offset

**Remarks** Changing this value also changes the frame offset value for the forward fundamental channel (FFCH).

## [:FORWARD]:FSCH[1] | 2:LCMask

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2:LCMask?
```

This query outputs the contents of the long code mask field for the forward supplemental traffic channels.

**\*RST** 0

**Remarks** This value is shared with the forward fundamental channel (FFCH).

## [:FORWARD]:FSCH[1] | 2:LCMask:ESN

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2:LCMask:ESN <val>
```

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2:LCMask:ESN?
```

This command defines the permuted electronic serial number (ESN) for the long code mask, which is used to identify a particular mobile.

**\*RST** #H00000000

**Range** #H0–#HFFFFFFF

**Field Entry** Permuted ESN

**Remarks** Changing this value also changes the permuted ESN for the long code mask in the forward fundamental channel (FFCH).

## [:FORWARD]:FSCH[1] | 2:LCMask:HEADer

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2:LCMask:HEADer <val>
```

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2:LCMask:HEADer?
```

This command sets the header for the long code mask, which is used to identify a particular mobile.

**\*RST** #H318

**Range** 000–3FF

**Field Entry** Header

**Remarks** Changing this value also changes the header for the long code mask in the forward fundamental channel (FFCH).

**[[:FORWARD]:FSCH[1]|2:POWER****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:POWER <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:POWER?
```

This command sets the power for the forward supplemental traffic channels.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** -40 to 0**Field Entry** Power**[[:FORWARD]:FSCH[1]|2:QOF****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:QOF <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:QOF?
```

This command sets the quasi-orthogonal function value for the forward supplemental traffic channels.

**\*RST** +0**Range** 0–3**Field Entry** QOF**[[:FORWARD]:FSCH[1]|2:RATE****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:RATE 19.2kbps |
28.8kbps | 38.4kbps | 57.6kbps | 76.8kbps | 115.2kbps | 153.6kbps | 230.4kbps |
307.2kbps
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:RATE?
```

This command sets the data rate for the forward supplemental traffic channels.

**\*RST** +1.92000000E+004**Field Entry** Bit Rate**Remarks** Values preceded by an asterisk indicate data rate values that are eligible for turbo coding.

**[[:FORWARD]:FSCH[1]|2:RCONfig]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [ 1 ] | 2 :RCONfig 3 | 4 | 5
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [ 1 ] | 2 :RCONfig?
```

This command sets the radio configuration value for the forward supplemental channels.

**\*RST** +3

**Field Entry** Radio Config

**[[:FORWARD]:FSCH[1]|2:TCODE]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [ 1 ] | 2 :TCODE ON | OFF | 1 | 0
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [ 1 ] | 2 :TCODE?
```

This command enables or disables the turbo coding operating state for the forward supplemental traffic channels.

**\*RST** 0

**Field Entry** Turbo Coding

**Remarks** Turbo coding is available for all data rates, excluding the following radio configurations (highest data rate of each radio configuration):

RC3: 153.6  
RC4: 307.2  
RC5: 230.4

To change the data rate for the forward supplemental traffic channel, refer to “[[:FORWARD]:FSCH[1]|2:RATE]” on page 497.

**[[:FORWARD]:FSCH[1]|2:WALSh]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [ 1 ] | 2 :WALSh <val>
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [ 1 ] | 2 :WALSh?
```

This command sets the Walsh code for the forward supplemental traffic channels.

**\*RST** FSCH1: 12 FSCH2: 14



## CDMA2000 BBG Subsystem—Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])

Range	RC3	RC4	RC5
	Data Rate=19.2: 0–31	Data Rate=19.2: 0–63	Data Rate=28.8: 0–31
	Data Rate=38.4: 0–15	Data Rate=38.4: 0–31	Data Rate=57.6: 0–15
	Data Rate=76.8: 0–7	Data Rate=76.8: 0–15	Data Rate=115.2: 0–7
	Data Rate=307.2: 0–3	Data Rate=153.6: 0–7	Data Rate=230.4: 0–3
		Data Rate=307.2: 0–3	
Field Entry	Walsh		

## [:FORWARD]:FSCH[1] | 2[:STATE]

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2[:STATE] ON|OFF | 1 | 0
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2[:STATE] ?
```

This command enables or disables the operating state of the forward supplemental traffic channel.

**\*RST** 0

**Field Entry** State

## [:FORWARD]:FSYNc:CFrequency

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:CFrequency <val>
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:CFrequency ?
```

This command directs the mobile station to a CDMA channel having a primary paging channel.

**\*RST** +50

**Range** 0–2047

**Field Entry** CDMA Freq

## [:FORWARD]:FSYNc:DAYLt

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:DAYLt 1 | 0
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:DAYLt ?
```

This command sets the daylight savings time offset for the forward synchronization channel, where 1 = on and 0 = off.

**\*RST** +0

**Field Entry** DAYLT

## [:FORWARD]:FSYNc:EBNO

**Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:EBNO <val>
```

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:EBNO?
```

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the quick paging channel.

**\*RST** +0.00000000E+000

**Range**

$$\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[:FORWARD]:PADJust” on page 508 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

## [:FORWARD]:FSYNc:ECFRequency

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:ECFRequency <val>
```

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:ECFRequency?
```

This command direct the mobile station to a CDMA channel having a primary paging channel. The mobile tunes to the Ext CDMA Freq field when it has a protocol revision level of 6 or greater, and it supports either the quick paging channel or radio configurations greater than 2. Otherwise, the mobile tunes to the CDMA Freq field for the CDMA channel.

This command sets the extended CDMA frequency for the forward synchronization channel.

**\*RST** +0

**Range** 0–2047

**Field Entry** Ext CDMA Freq

**[[:FORWARD]:FSYNc:LPSec****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:LPSec <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:LPSec?
```

This command sets the leap seconds value for the forward synchronization channel.

**\*RST** +0**Range** 0–255**Field Entry** Leap Seconds**[[:FORWARD]:FSYNc:LTMoff****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:LTMoff <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:LTMoff?
```

This command sets the current local time offset from the basestation for the forward synchronization channel, where 1= 30 minutes, 2= 60 minutes, 3= 90 minutes, and so on.

**\*RST** +0**Range** 0–63**Field Entry** LTM OFF**[[:FORWARD]:FSYNc:MPREv****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:MPREv <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:MPREv?
```

This command sets the minimum protocol revision level for the forward synchronization channel.

**\*RST** +1**Range** 0–255**Field Entry** P Rev Min

**[[:FORWARD]:FSYNc:MSGType**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FSYNc : MSGType <val>  
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FSYNc : MSGType?
```

This command sets the message type value for the forward synchronization channel.

**\*RST** +1

**Range** 0–255

**Field Entry** Message Type

**[[:FORWARD]:FSYNc:NID**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FSYNc : NID <val>  
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FSYNc : NID?
```

This command sets the network identification value for the forward synchronization channel.

**\*RST** +1

**Range** 0–65535

**Key Entry** Network ID

**[[:FORWARD]:FSYNc:POWER**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FSYNc : POWER <val>  
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : FSYNc : POWER?
```

This command sets the power for the forward synchronization channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** –40 to 0

**Field Entry** Power

**[[:FORWARD]:FSYNc:PRATe**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADIo:CDMA2000 [ :BBG ] [ :FORWard ] :FSYNc:PRATe <val>
[ :SOURce ] :RADIo:CDMA2000 [ :BBG ] [ :FORWard ] :FSYNc:PRATe?
```

This command sets the base station paging rate for the forward supplemental channel.

**\*RST** +0

**Range** 0–3

**Field Entry** PRAT

**[[:FORWARD]:FSYNc:PREV**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADIo:CDMA2000 [ :BBG ] [ :FORWard ] :FSYNc:PREV <val>
[ :SOURce ] :RADIo:CDMA2000 [ :BBG ] [ :FORWard ] :FSYNc:PREV?
```

This command sets the protocol revision level for the forward synchronization channel.

**\*RST** +1

**Range** 0–255

**Field Entry** P Rev

**[[:FORWARD]:FSYNc:RESErved**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADIo:CDMA2000 [ :BBG ] [ :FORWard ] :FSYNc:RESErved <val>
[ :SOURce ] :RADIo:CDMA2000 [ :BBG ] [ :FORWard ] :FSYNc:RESErved?
```

This command sets the reserved field value for the forward synchronization channel.

**\*RST** +0

**Range** 0–7

**Key Entry** **Reserved**

**Remarks** Currently, base stations and mobiles ignore reserved bits, so the reserved field should be set to “0” with the query returning the same value.

**CDMA2000 BBG Subsystem–Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])**

**[[:FORWARD]:FSYNc:SID**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSYNc:SID <val>  
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSYNc:SID?
```

This command sets the system identification for the forward synchronization channel.

**\*RST** +7

**Range** 0–32767

**Field Entry** System ID

**[[:FORWARD]:FSYNc:STYPe**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSYNc:STYPe IS95 | JSTD8 | IS2000  
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSYNc:STYPe?
```

This command selects the forward synchronization channel type.

**IS95** This choice selects a channel type that is compatible with the IS95 CDMA standard.

**JSTD8** This choice selects a channel type that is compatible with PCS CDMA standard personal station requirements for 1.9 to 2.0 GHz.

**IS2000** This choice selects a channel type that is compatible with the IS2000 CDMA standard.

**\*RST** JSTD8

**Key Entry** **IS95** **JSTD8** **IS2000**

**[[:FORWARD]:FSYNc:SYSTime**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSYNc:SYSTime <val>  
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSYNc:SYSTime?
```

This command sets the system time value for the forward synchronization channel.

**\*RST** #H000000000

**Range** #H0–#HFFFFFFF

**Field Entry** Time

**[[:FORWARD]:FSYNc:WALSh]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:WALSh <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:WALSh?
```

This command sets the Walsh code for the forward synchronization channel.

**\*RST** +32**Range** 0–63**Field Entry** Walsh**[[:FORWARD]:FSYNc[:STATe]]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc[:STATe] ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc[:STATe]?
```

This command enables or disables the operating state for the forward synchronization channel.

**\*RST** 0**Field Entry** State**[[:FORWARD]:NOISe:CN]****Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:NOISe:CN <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:NOISe:CN?
```

This command sets the carrier to noise ratio for the forward link.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** –30 to 30**Key Entry** **C/N****Remarks** The carrier to noise ratio is the ratio of the carrier power to in-channel noise power.

A change to the carrier to noise ratio will change all EbNo/EcNo field values.

**[:FORWARD]:NOISE[:STATE]**

**Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:NOISE[:STATE] ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:NOISE[:STATE]?
```

This command enables or disables the noise function for the CDMA2000 baseband forward link.

---

**NOTE** When this command is enabled, an immediate increase in the Even Second Delay value will occur. The Even Second Delay value will increase by an increment of 11.5 chips. The chip increase will be seen in the appropriate fields on the display.

Changes to Even Second Delay and Trigger Advance will not affect synchronization; automatic compensation is performed internally.

---

**\*RST** 0

**Key Entry** Noise Off On

**Remarks** Both the carrier and noise power value will be adjusted to match the specified carrier to noise ratio. Refer to “[[:FORWARD]:NOISE:CN]” on page 505 to change the carrier to noise ratio.

The noise function can only be turned on with Option 403 installed.

**[:FORWARD]:OCNS:EBNO**

**Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO[1]|2|3|4:CDMA2000[:BBG][:FORWARD]:OCNS:EBNO <val>
[:SOURCE]:RADIO[1]|2|3|4:CDMA2000[:BBG][:FORWARD]:OCNS:EBNO?
```

This command sets the energy per bit to noise power (EbNo) density ratio for the forward link orthogonal channel noise simulator (OCNS).

The variable <val> is expressed in units of decibels (dB).

**Range** min EbNo:  $10\log_{10}\left(\frac{\text{Chip Rate}}{1000(\text{Bit Rate})}\right) + \text{Normalized Power}$

max EbNo:  $10\log_{10}\left(\frac{1000(\text{Chip Rate})}{\text{Bit Rate}}\right) + \text{Normalized Power}$

The OCNS bit rate is fixed at 19.2 kilo-bits per second.



**CDMA2000 BBG Subsystem—Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])**

The Normalized Power is the channel amplitude after adjusting the code domain power to 0 dB. Refer “[:FORWARD]:PADJUST” on page 508.

**Range**

$$\text{min EbNo: } 10\log_{10} \left( \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right) + \text{Normalized Power}$$

$$\text{max EbNo: } 10\log_{10} \left( \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right) + \text{Normalized Power}$$

The OCNS bit rate is fixed at 19.2 kilo-bits per second.

The Normalized Power is the channel amplitude after adjusting the code domain power to 0 dB. Refer “[:FORWARD]:PADJUST” on page 508.

**Field Entry** EbNo

**Remarks** EbNo is available for all channels except the pilot channel.

The noise function must be turned on for this setting to work. Refer to “[:FORWARD]:NOISE[:STATE]” on page 506 for turning on the noise.

**[:FORWARD]:OCNS:POWER**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : OCNS : POWER <val>
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :FORWARD ] : OCNS : POWER ?
```

This command sets the power level for the orthogonal channel noise simulator.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -40 to 0

**Field Entry** Power

**CDMA2000 BBG Subsystem—Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])****[:FORWARD]:OCNS:WALSh**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:OCNS:WALSh <val>
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:OCNS:WALSh?
```

This command sets the Walsh code for the orthogonal channel noise simulator.

**\*RST** +61

**Range** 0–63

**Field Entry** Walsh

**[:FORWARD]:OCNS[:STATE]**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:OCNS[:STATE] ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:OCNS[:STATE]?
```

This command turns the orthogonal channel noise simulator on or off.

**\*RST** 0

**Field Entry** State

**[:FORWARD]:PADJust**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:PADJust EQUal|SCALE
```

This command sets the code domain power (the relative power in each of the channels).

**EQUal** Sets all channels to equal power, and the total power to 0 dB.

**SCALE** Scales all of the current channel powers so that the total power equals 0 dB, keeping the previous power ratios between the individual channels.

**Key Entry** **Equal Powers**      **Scale To 0dB**

**[:FORWARD]:POLarity****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:POLarity NORMAL|INVERTed
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:POLarity?
```

This command sets the rotation direction for the phase modulation vector.

**NORMAL** This choice selects normal phase polarity.

**INVERTed** This choice inverts the internal Q signal.

**\*RST** NORM

**Field Entry** Phase Polarity

**[:FORWARD]:QPCH:CCI****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:CCI <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:CCI?
```

This command selects the configuration change indicator for the quick paging channel.

**\*RST** +3

**Range** 0–3

**Field Entry** Change

**[:FORWARD]:QPCH:EBNO****Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:EBNO <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:EBNO?
```

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the quick paging channel.

**\*RST** +0.00000000E+000

**Range**

$$\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to

**CDMA2000 BBG Subsystem–Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])**

0 dB. Refer to “[:FORWARD]:PADJUST” on page 508 for adjusting the code domain power.

**Field Entry**

EbNo

**Remarks**

Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**[:FORWARD]:QPCH:PI****Supported**

E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:PI <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:PI?
```

This command selects the paging slots for the quick paging channel.

**\*RST**

+0

**Field Entry**

Paging Indicator

**Remarks**

When the bit rate is 2400, a value of 191 turns all paging slots on.

When the bit rate is 4800, a value of 383 turns all paging slots on.

When the bit rate is either 2400 or 4800, a value of –1 turns all paging slots off.

To change the bit rate value, refer to “[:FORWARD]:QPCH:RATE” on page 511.

**[:FORWARD]:QPCH:POWER****Supported**

E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:POWER <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:POWER?
```

This command sets the power value for the quick paging channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST**

+0.00000000E+000

**Range**

–40 to 0

**Field Entry**

Power

**[:FORWARD]:QPCH:RATE**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:RATE 2.4kbps|4.8kbps
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:RATE?
```

This command sets the bit rate for the quick paging channel.

**\*RST** +4.80000000E+003

**Field Entry** Bit Rate

**[:FORWARD]:QPCH:WALSH**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:WALSH <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH:WALSH?
```

This command sets the Walsh code for the quick paging channel.

**\*RST** +80

**Range** 0–127

**Field Entry** Walsh

**[:FORWARD]:QPCH[:STATE]**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH[:STATE] ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:QPCH[:STATE]?
```

This command enables or disables the operating state of the quick paging channel.

**\*RST** 0

**Field Entry** State

**[:FORWARD]:SRATE**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:SRATE?
```

This command returns the value of the current spreading rate.

**\*RST** +1

**CDMA2000 BBG Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000[:BBG])**

**:PNOffset**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA2000 [ :BBG ] :PNOffset <val>
```

```
[ :SOURce ] :RADio:CDMA2000 [ :BBG ] :PNOffset?
```

This command sets the current pseudorandom number (PN) offset value.

**\*RST** +1

**Range** 0–511

**Field Entry** PN Offset

**Remarks** The PN offset value is the time offset in the short code assigned to each basestation, allotting a unique identity for each.

**:REVerse:BBCLock**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA2000 [ :BBG ] :REVerse:BBCLock INT [1] | EXT [1]
```

```
[ :SOURce ] :RADio:CDMA2000 [ :BBG ] :REVerse:BBCLock?
```

This command selects the data clock source.

**\*RST** INT

**Key Entry** **Internal** **External**

**Remarks** If the EXT choice is selected, the REFERENCE selection will automatically be set to internal. The external data clock source must be connected to the DATA CLOCK front panel BNC input connector, and its frequency must match the specified chip rate.

**:REVERSE:CHIPRATE**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : CHIPRATE <val>
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : CHIPRATE?
```

Execute this command to adjust the chip rate.

The variable <val> is expressed in units of chips per second (cps–Mcps).

**\*RST** +1.22880000E+006

**Range** 1E3–1.3E6

**Field Entry** Chip Rate

**Remarks** The default value (1.228800 Mcps) is in accordance with the IS-2000 specification.

**:REVERSE:ESDELAY**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : ESDelay <val>
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : ESDelay?
```

This command modifies the even second clock pulse.

**\*RST** +2.75000000E+001

**Range** 0.5–128.0

**Field Entry** Even Second Delay

**Remarks** The even second clock pulse sets the delay to align the RF with the trigger.

When the noise function is set to ON, this value will increase. Refer to [“:REVERSE:NOISE\[:STATE\]” on page 518](#) for more information.

**:REVERSE:FILTER**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:FILTER RNYQuist|NYQuist|GAUSSian|
RECTangle|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|
"<user FIR>"
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:FILTER?
```

This command specifies the filter type for the reverse link.

**IS95** This choice selects a filter that meets the criteria of the IS-95 standard.

**IS95\_EQ** This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

**IS95\_MOD** This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.

**IS95\_MOD\_EQ** This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.

**AC4Fm** This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.

**UGGaussian** This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.

**"<user FIR>"** This variable is any filter file that you have stored into memory.

**\*RST**

<b>IS95</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 MOD w/EQ</b>	<b>APCO 25 C4FM</b>	<b>UN3/4</b>	<b>GSM</b>	<b>Gaussian</b>
	<b>User FIR</b>					

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.



**:REVERSE:FILTER:ALPHA**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : FILTER : ALPHA <val>
```

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : FILTER : ALPHA ?
```

This command changes the alpha value on the Nyquist or root Nyquist filter.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +2.20000000E-001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** This command is effective only after choosing the root Nyquist or Nyquist filter. It does not effect other types of filters.

To change the current filter type, refer to “[:REVERSE:FILTER](#)” on page 514.

**:REVERSE:FILTER:BBT**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : FILTER : BBT <val>
```

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : FILTER : BBT ?
```

This command changes the bandwidth-multiplied-by-bit-time filter value.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E-001

**Range** 0.500–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing the Gaussian filter. It does not effect other types of filters.

To change the current filter type, refer to “[:REVERSE:FILTER](#)” on page 514.

**:REVERSE:FILTER:CHANNEL**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:FILTER:CHANNEL EVM|ACP
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:FILTER:CHANNEL?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “[:REVERSE:FILTER](#)” on page 514.

**:REVERSE:LCMASK**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:LCMASK <val>
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:LCMASK?
```

This command specifies a unique serial number code to identify a mobile station.

**\*RST** #H0000000000

**Range** #H0–#H3FFFFFFFF

**Field Entry** Long Code Mask

**:REVERSE:LCSTATE**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:LCSTATE <val>
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:LCSTATE?
```

This command sets a unique code to address a mobile station.

**\*RST** #H0000000000

**Range** #H0–#H3FFFFFFFF

**Field Entry** Long Code State

**Remarks** The storage register for the long code state allows a 42-bit binary number to be entered.

**:REVERSE:PADJUST**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:PADJUST EQUAL | SCALE
```

Execute this command to set the code domain power.

**EQUAL** Sets all channels to equal power, and the total power to 0 dB.

**SCALE** Scales all of the current channel powers so that the total power equals 0 dB, keeping the previous power ratios between the individual channels.

**Key Entry**      **Equal Powers**      **Scale To 0dB**

**:REVERSE:POLARITY[:ALL]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:POLARITY [ :ALL ] NORMAL | INVERTED
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:POLARITY [ :ALL ] ?
```

This command sets the phase polarity to either normal or inverted.

**NORMAL** This choice selects normal phase polarity.

**INVERTED** This choice inverts the internal Q signal.

**\*RST**            **NORM**

**Key Entry**      **Normal**      **Inverted**

**:REVERSE:NOISE:CN**

**Supported** E4438C with Options 401 and 403

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:NOISE:CN <val>
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:NOISE:CN?
```

This command sets the carrier to noise ratio for the reverse link.

The variable <val> is expressed in units of decibels (dB).

**\*RST**            +0.00000000E+000

**Range**            -30 to 30

**CDMA2000 BBG Subsystem–Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])****Key Entry** C/N**Remarks** The carrier to noise ratio is the ratio of the carrier power to in-channel noise power, expressed in decibels (dB).

A change to the carrier to noise ratio will only align the EbNo/EcNo field values in the active operating mode.

**:REVERSE:NOISE[:STATE]****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:NOISE[:STATE] ON|OFF|1|0  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:NOISE[:STATE] ?

This command enables or disables the noise function for the baseband reverse link.

---

**NOTE** When this command is enabled, an immediate increase in the Even Second Delay and Trigger Advance values will occur. The Even Second Delay value will increase by an increment of 11.5 chips and the Trigger Advance value will increase by an increment of 12 chips. The chip increase will be seen in the appropriate field on the display.Changes to Even Second Delay and Trigger Advance will not affect synchronization; automatic compensation is performed internally.

---

**\*RST** 0**Key Entry** **Noise Off On****Remarks** Both the carrier and noise power value will be adjusted to match the specified carrier to noise ratio. Refer to “[:REVERSE:NOISE:CN](#)” on page 517 to change the carrier to noise ratio.

The noise function can only be turned on with Option 403 installed.

**:REVERSE:RC12:ACCESS:RACH:DATA****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH:DATA PN9|PN15|  
FIX4|"<file name>"  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH:DATA?

Execute this command to configure the data field for the reverse access channel.

<b>*RST</b>	PN9
<b>Key Entry</b>	<b>PN9 PN15 FIX4 User File</b>
<b>Remarks</b>	Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:REVERSE:RC12:ACCESS:RACH:DATA:FIX4**

<b>Supported</b>	E4438C with Option 401
	[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC12:ACCESS:RACH:DATA:FIX4 <val> [ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC12:ACCESS:RACH:DATA:FIX4?

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

<b>*RST</b>	#B0000
<b>Range</b>	#B0000–#B1111 or 0–15
<b>Key Entry</b>	FIX4

**:REVERSE:RC12:ACCESS:RACH:EBNO**

<b>Supported</b>	E4438C with Options 401 and 403
	[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC12:ACCESS:RACH:EBNO <val> [ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC12:ACCESS:RACH:EBNO?

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the reverse access channel.

<b>*RST</b>	+0.00000000E+000
<b>Range</b>	$\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$ $\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJUST” on page 517 for adjusting the code domain power.

<b>Field Entry</b>	EbNo
<b>Remarks</b>	Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).  Queries of this command are only valid for the current operating state.

**:REVerse:RC12:ACCess:RACH:FLENgth****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:FLENgth?

This command queries the frame length for the reverse access channel.

The frame length is expressed as seconds (ms).

**\*RST** +20**Field Entry** Frame Length**:REVerse:RC12:ACCess:RACH:FOFFset****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:FOFFset &lt;val&gt;

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:FOFFset?

This command sets the frame offset value for the reverse access channel.

**\*RST** +0**Range** 0–15**Field Entry** Frame Offset**:REVerse:RC12:ACCess:RACH:POWer****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:POWer &lt;val&gt;

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:POWer?

This command sets the power for the reverse access channel.

The variable &lt;val&gt; is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** –40 to 0**Field Entry** Power

**:REVERSE:RC12:ACCESS:RACH:RCONfig****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH:RCONfig 1|2  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH:RCONfig?

This command select the radio configuration value for the reverse access channel.

**\*RST** +1**Field Entry** Radio Config**:REVERSE:RC12:ACCESS:RACH:RATE****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH:RATE?

This command queries the data rate for the reverse access channel.

**\*RST** +4.80000000E+003**Field Entry** Bit Rate**:REVERSE:RC12:ACCESS:RACH[:STATE]****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH[:STATE] ON|OFF|  
1|0  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH[:STATE]?

This command enables or disables the operating state for the reverse access channel.

**\*RST** +1**Field Entry** State

**:REVERSE:RC12:TRAFFIC:RSCH:DATA**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC12 : TRAFFIC : RSCH : DATA PN9 | PN15 |
FIX4 | "<file name>"
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC12 : TRAFFIC : RSCH : DATA?
```

This command configures the data field for the reverse supplemental traffic channel.

**\*RST** PN9

**Key Entry** PN9 PN15 FIX4 User File

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:REVERSE:RC12:TRAFFIC:RSCH:DATA:FIX4**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC12 : TRAFFIC : RSCH : DATA : FIX4 <val>
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC12 : TRAFFIC : RSCH : DATA : FIX4?
```

This command sets a fixed 4-bit data pattern that repeats as necessary to fill the selected data area.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** FIX4

**:REVERSE:RC12:TRAFFIC:RSCH:FLENGTH**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC12 : TRAFFIC : RSCH : FLENGTH?
```

This command queries the frame length value for the reverse supplemental traffic channel.

**\*RST** +20



**:REVERSE:RC12:TRAFFIC:RSCH:FOFFset****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:FOFFset <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:FOFFset?
```

This command sets the frame offset value for the reverse supplemental traffic channel.

**\*RST** +0**Range** 0–15**Field Entry** Frame Offset**:REVERSE:RC12:TRAFFIC:RSCH:POWER****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:POWER <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:POWER?
```

This command sets the power for the reverse supplemental traffic channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** –40 to 0**Field Entry** Power**:REVERSE:RC12:TRAFFIC:RSCH:RATE****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:RATE 1.2kbps |
1.8kbps | 2.4kbps | 3.6kbps | 4.8kbps | 7.2kbps | 9.6kbps | 14.4kbps
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:RATE?
```

This command sets the data rate for the reverse supplemental traffic channel.

**\*RST** +9.60000000E+003**Field Entry** Bit Rate

**:REVERSE:RC12:TRAFFIC:RSCH:RCONFIG****Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC12:TRAFFIC:RSCH:RCONFIG 1 | 2
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC12:TRAFFIC:RSCH:RCONFIG?
```

This command sets the data rate for the reverse supplemental traffic channel.

**\*RST** +1**Field Entry** Radio Config**:REVERSE:RC12:TRAFFIC:RSCH[:STATE]****Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC12:TRAFFIC:RSCH [ :STATE ] ON | OFF |
1 | 0
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC12:TRAFFIC:RSCH [ :STATE ] ?
```

This command sets the operating state for the reverse supplemental traffic channel.

**\*RST** 0**Field Entry** State**:REVERSE:RC34:CCONTROL:RCCCH:DATA****Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:CCONTROL:RCCCH:DATA PN9 |
PN15 | FIX4 | "<file name>"
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:CCONTROL:RCCCH:DATA?
```

This command configures the data field for the reverse common control channel.

**\*RST** PN9**Key Entry** **PN9** **PN15** **FIX4** **User File**

**Remarks** Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:REVERSE:RC34:CControl:RCCCh:DATA:FIX4****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RCCCh:DATA:  
FIX4 <val>

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RCCCh:DATA:FIX4?

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****:REVERSE:RC34:CControl:RCCCh:EBNO****Supported** E4438C with Options 401 and 403

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RCCCh:EBNO &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RCCCh:EBNO?

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the reverse common control channel.

**\*RST** +0.00000000E+000**Range**  $\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$  $\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$ 

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJust” on page 517 for adjusting the code domain power.

**Field Entry** EbNo**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVERSE:RC34:CCONTROL:RCCCh:FLENGth****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:FLENGth 5|10|20

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:FLENGth?

This command sets the frame length value for the reverse common control channel.

The frame length is expressed as seconds (ms).

**\*RST** +20**Field Entry** Frame Length**:REVERSE:RC34:CCONTROL:RCCCh:FOFFset****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:FOFFset &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:FOFFset?

This command sets the frame offset value for the reverse common control channel.

The frame offset value is expressed as seconds (ms).

**\*RST** +0

**Range** Frame Length=5: 0–3  
 Frame Length=10: 0–7  
 Frame Length=20: 0–20

**Field Entry** Frame Offset**:REVERSE:RC34:CCONTROL:RCCCh:POWER****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:POWER &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:POWER?

This command sets the power for the reverse common control channel.

The variable &lt;val&gt; is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** –40 to 0**Field Entry** Power

**:REVERSE:RC34:CControl:RCCCh:RCONfig****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RCCCh:RCONfig 3|4  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RCCCh:RCONfig?

This command selects the radio configuration value for the reverse common control channel.

**\*RST** +3**Field Entry** Radio Config**:REVERSE:RC34:CControl:RCCCh:RATE****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RCCCh:RATE 9.6kbps|  
19.2kbps|38.4kbps  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RCCCh:RATE?

This command adjusts the data rate value for the reverse common control channel.

**\*RST** +9.60000000E+003**Field Entry** Bit Rate**:REVERSE:RC34:CControl:RCCCh:WALSh****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RCCCh:WALSh?

This command queries the Walsh code for the reverse common control channel.

**\*RST** +2**Field Entry** Walsh

**:REVERSE:RC34:CCONTROL:RCCCh[:STATe]****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh[:STATe] ON|OFF|1|0

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh[:STATe] ?

This command sets the operating state for the reverse common control channel.

**\*RST** 0**Field Entry** State**:REVERSE:RC34:CCONTROL:RPICh:ECNO****Supported** E4438C with Options 401 and 403

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RPICh:ECNO &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RPICh:ECNO?

This command sets the ratio of energy per chip to the noise power spectral density (expressed in dB) for the reverse common control pilot channel.

**\*RST** +0.00000000E+000**Range** min EcNo: -30 + Normalized Power

max EcNo: 30 + Normalized Power

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJust” on page 517 for adjusting the code domain power.

**Field Entry** EcNo**Remarks** Changes to the EcNo values also change the EbNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVERSE:RC34:CControl:RPIC:GRATE****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RPIC:GRATE FULL |
HALF | QUARTER
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RPIC:GRATE?
```

This command configures the gating data field for the reverse common control pilot channel.

**FULL** This choice transmits all sixteen power control bits.

**HALF** This choice transmits eight power control bits.

**QUARTER** This choice transmits four power control bits.

**\*RST** FULL

**Key Entry** Full Half Quarter

**:REVERSE:RC34:CControl:RPIC:POWER****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RPIC:POWER <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RPIC:POWER?
```

This command sets the power for the reverse common control pilot channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -40 to 0

**Field Entry** Power

**:REVERSE:RC34:CControl:RPIC:WALSH****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CControl:RPIC:WALSH?
```

This command queries the Walsh code for the reverse common control pilot channel.

**\*RST** +0

**Field Entry** Walsh

**:REVERSE:RC34:CControl:RPICh[:STATE]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : CCONTROL : RPIC h [ : STATE ] ON | OFF | 1 | 0
```

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : CCONTROL : RPIC h [ : STATE ] ?
```

This command sets the operating state for the reverse common control pilot channel.

**\*RST** 1

**Field Entry** State

**:REVERSE:RC34:EACcEss:REACH:DATA**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : EACC ESS : REACH : DATA PN9 | PN15 | FIX4 | "<file name>"
```

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : EACC ESS : REACH : DATA ?
```

This command configures the data field for the reverse enhanced access channel.

**\*RST** PN9

**Key Entry** **PN9 PN15 FIX4 User File**

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:REVERSE:RC34:EACcEss:REACH:DATA:FIX4**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : EACC ESS : REACH : DATA : FIX4 <val>
```

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : EACC ESS : REACH : DATA : FIX4 ?
```

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**



**:REVERSE:RC34:EACCESS:REACH:EBNO**

**Supported** E4438C with Options 401 and 403

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:REACH:EBNO <val>

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:REACH:EBNO?

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the reverse enhanced access channel.

**\*RST** +0.00000000E+000

**Range**  $\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$   
 $\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJUST” on page 517 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVERSE:RC34:EACCESS:REACH:FOFFset**

**Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:REACH:FOFFset <val>

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:REACH:FOFFset?

This command sets the frame offset value for the reverse enhanced access channel.

**\*RST** +0

**Range** Frame Length=5: 0–3    Frame Length=10: 0–7  
 Frame Length=20: 0–15

**Field Entry** Frame Offset

**:REVERSE:RC34:EACCESS:REACH:POWER**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : EACCESS : REACH : POWER <val>  
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : EACCESS : REACH : POWER?
```

This command sets the power level for the reverse enhanced access channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -40 to 0

**Field Entry** Power

**:REVERSE:RC34:EACCESS:REACH:RCONFIG**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : EACCESS : REACH : RCONFIG 3 | 4  
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : EACCESS : REACH : RCONFIG?
```

This command sets the radio configuration for the reverse enhanced access channel.

**\*RST** +3

**Field Entry** Radio Config

**:REVERSE:RC34:EACCESS:REACH:RATE**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : EACCESS : REACH : RATE 9.6kbps |  
19.2kbps | 38.4kbps  
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : EACCESS : REACH : RATE?
```

This command adjusts the data rate value for the reverse enhanced access channel.

**\*RST** +9.60000000E+003

**Field Entry** Bit Rate

**:REVERSE:RC34:EACCESS:REACH:WALSH****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:REACH:WALSH?

This command queries the Walsh code for the reverse enhanced access channel.

**\*RST** +2**Field Entry** Walsh**:REVERSE:RC34:EACCESS:REACH[:STATE]****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:REACH[:STATE] ON|OFF|1|0

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:REACH[:STATE]?

This command sets the operating state for the reverse enhanced access channel.

**\*RST** 0**Field Entry** State**:REVERSE:RC34:EACCESS:RPICH:ECNO****Supported** E4438C with Options 401 and 403

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH:ECNO &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH:ECNO?

This command sets the ratio of energy per chip to the noise power spectral density (expressed in dB) for the reverse enhanced access pilot channel.

**\*RST** +0.00000000E+000**Range** min EcNo: -30 + Normalized Power

max EcNo: 30 + Normalized Power

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[:REVERSE:PADJUST](#)” on page 517 for adjusting the code domain power.**Field Entry** EcNo**Remarks** Changes to the EcNo values also change the EbNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVERSE:RC34:EACCESS:RPICH:GRATE****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH:GRATE FULL|
HALF|QUARTER
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH:GRATE?
```

This command configures the gating data field for the reverse enhanced access pilot channel.

**FULL** This choice transmits all sixteen power control bits.

**HALF** This choice transmits eight power control bits.

**QUARTER** This choice transmits four power control bits.

**\*RST** FULL

**Key Entry** Full Half Quarter

**:REVERSE:RC34:EACCESS:RPICH:POWER****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH:POWER <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH:POWER?
```

This command sets the power for the reverse enhanced access pilot channel.

The variable <val> is expressed in unit of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -40 to 0

**Field Entry** Power

**:REVERSE:RC34:EACCESS:RPICH:WALSH****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH:WALSH?
```

This command queries the Walsh code for the reverse enhanced access pilot channel.

**\*RST** +0

**Field Entry** Walsh

**:REVERSE:RC34:EACCESS:RPICH[:STATE]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH[:STATE] ON|
OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH[:STATE] ?
```

This command sets the operating state for the reverse enhanced access pilot channel.

**\*RST** 1**Field Entry** State**:REVERSE:RC34:TRAFFIC:RDCCH:DATA****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCH:DATA PN9|
PN15|FIX4|"<file name>"
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCH:DATA ?
```

This command configures the data field for the reverse traffic dedicated control channel.

**\*RST** PN9**Key Entry** **PN9** **PN15** **FIX4** **User File****Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.**:REVERSE:RC34:TRAFFIC:RDCCH:DATA:FIX4****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCH:DATA:
FIX4 <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCH:DATA:FIX4 ?
```

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4**

**:REVERSE:RC34:TRAFFIC:RDCCh:EBNO**

**Supported** E4438C with Options 401 and 403

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:TRAFFIC:RDCCh:EBNO <val>
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:TRAFFIC:RDCCh:EBNO?
```

This command sets the ratio of energy per bit, per the noise power spectral density (expressed in dB) for the reverse traffic dedicated control channel.

**\*RST** +0.00000000E+000

**Range**

$$\text{min EbNo: } 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\text{max EbNo: } 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJust” on page 517 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVERSE:RC34:TRAFFIC:RDCCh:FLENgth**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:TRAFFIC:RDCCh:FLENgth 5 | 20
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:TRAFFIC:RDCCh:FLENgth?
```

This command sets the frame length value for the reverse traffic dedicated control channel.

The frame length is expressed as seconds (ms).

**\*RST** +20

**Field Entry** Frame Length

**:REVERSE:RC34:TRAFFIC:RDCCh:FOFFset**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:TRAFFIC:RDCCh:FOFFset <val>
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:TRAFFIC:RDCCh:FOFFset?
```

This command sets the frame offset value for the reverse traffic dedicated control channel.

**\*RST** +0  
**Range** Frame Length=5: 0–3 Frame Length=20: 0–7  
**Field Entry** Frame Offset

**:REVERSE:RC34:TRAFFIC:RDCCh:POWer**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh:POWer <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh:POWer?
```

This command sets the power for the reverse traffic dedicated control channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0  
**Range** –40 to 0  
**Field Entry** Power

**:REVERSE:RC34:TRAFFIC:RDCCh:RATE**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh:RATE?
```

This command queries the data rate for the reverse traffic dedicated control channel.

**\*RST** Frame Length=5: RC3/4= +9.60000000E+003  
Frame Length=10: RC3= +9.60000000E+003  
Frame Length=20: RC3= +1.44000000E+004  
**Field Entry** Bit Rate

**:REVERSE:RC34:TRAFFIC:RDDCh:RCONfig**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDDCh:RCONfig 3 | 4
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDDCh:RCONfig?
```

This command selects the radio configuration value for the reverse traffic dedicated control channel.

**\*RST** +3  
**Field Entry** Radio Config

**:REVERSE:RC34:TRAFFIC:RDCCh:WALSh****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh:WALSh?

This command queries the Walsh code for the reverse traffic dedicated control channel.

**\*RST** +8**Range** 0–15**Field Entry** Walsh**:REVERSE:RC34:TRAFFIC:RDCCh[:STATE]****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh[:STATE] ON|OFF|1|0

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh[:STATE]?

This command sets the operating state for the reverse traffic dedicated control channel.

**\*RST** 0**Field Entry** State**:REVERSE:RC34:TRAFFIC:RFCH:DATA****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:DATA PN9|PN15|FIX4|"&lt;file name&gt;"

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:DATA?

This command configures the data field for the reverse fundamental traffic channel.

**\*RST** PN9**Key Entry** **PN9** **PN15** **FIX4** **User File****Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.



**:REVERSE:RC34:TRAFFIC:RFCH:DATA:FIX4****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:DATA:FIX4 <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:DATA:FIX4?
```

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****:REVERSE:RC34:TRAFFIC:RFCH:EBNO****Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:EBNO <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:EBNO?
```

This command sets the ratio of energy per bit, per the noise power spectral density (expressed in dB) for the reverse fundamental traffic channel.

**\*RST** +0.00000000E+000

**Range**

$$\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJust” on page 517 for adjusting the code domain power.

**Field Entry** EbNo**Remarks** Changes to the EbNo values also change the EcNo values for all other

channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVERSE:RC34:TRAFFIC:RFCH:FLENGTH**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RFCH : FLENGTH 5 | 20
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RFCH : FLENGTH ?
```

This command sets the frame length value for the reverse fundamental traffic channel.

The frame length is expressed as seconds (ms).

**\*RST** +20

**Field Entry** Frame Length

**:REVERSE:RC34:TRAFFIC:RFCH:FOFFSET**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RFCH : FOFFSET <val>
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RFCH : FOFFSET ?
```

This command sets the frame offset value for the reverse fundamental traffic channel.

**\*RST** +0

**Range** Frame Length=5: 0–3  
Frame Length=20: 0–15

**Field Entry** Frame Offset

**:REVERSE:RC34:TRAFFIC:RFCH:POWER**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RFCH : POWER <val>
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RFCH : POWER ?
```

This command sets the power for the reverse fundamental traffic channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** –40 to 0

**Field Entry** Power

**:REVERSE:RC34:TRAFFIC:RFCH:RCONfig****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:RCONfig 3|4  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:RCONfig?

This command sets the radio configuration value for the reverse fundamental traffic channel.

**\*RST** +3**Field Entry** Radio Config**:REVERSE:RC34:TRAFFIC:RFCH:RATE****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:RATE 1.2kbps|  
1.5kbps|1.8kbps|2.7kbps|3.6kbps|4.8kbps|7.2kbps|9.6kbps|14.4kbps  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:RATE?

This command sets the data rate value for the reverse fundamental traffic channel.

**\*RST** +9.60000000E+003**Field Entry** Bit Rate**:REVERSE:RC34:TRAFFIC:RFCH:WALSh****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:WALSh?

This command queries the Walsh code for the reverse fundamental traffic channel.

**\*RST** +4**Field Entry** Walsh**:REVERSE:RC34:TRAFFIC:RFCH[:STATE]****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH[:STATE] ON|OFF|  
1|0  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH[:STATE] ?

This command sets the operating state for the reverse fundamental traffic channel.

**\*RST** 0**Field Entry** State

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:DATA**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RSCH [ 1 ] | 2 : DATA PN9 |
PN15 | FIX4 | "<file name>"
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RSCH [ 1 ] | 2 : DATA ?
```

This command configures the data field for the reverse supplemental channels.

**\*RST** PN9

**Key Entry** **PN9 PN15 FIX4 User File**

**Remarks** Refer to “[File Name Variables](#)” on [page 13](#) for information on the file name syntax.

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:DATA:FIX4**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RSCH [ 1 ] | 2 : DATA :
FIX4 <val>
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RSCH [ 1 ] | 2 : DATA : FIX4 ?
```

This command sets a fixed 4-bit data pattern that repeats as necessary to fill the selected data area.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:DATA:EBNO**

**Supported** E4438C with Options 401 and 403

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RSCH [ 1 ] | 2 : EBNO <val>
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : RC34 : TRAFFIC : RSCH [ 1 ] | 2 : EBNO ?
```

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the reverse supplemental traffic channels.

**\*RST** +0.00000000E+000

## CDMA2000 BBG Subsystem—Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])

**Range**

$$\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJUST” on page 517 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:FLENGTH**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:
FLENGTH 20 | 40 | 80
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:FLENGTH?
```

This command sets the frame length value for the reverse supplemental channels.

**\*RST** +20

**Field Entry** Frame Length

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:FOFFSET**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:
FOFFSET <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:FOFFSET?
```

This command sets the frame offset value for the reverse supplemental channels.

**\*RST** +0

**Range** 0–63

**Range** Frame Length=20: 0–15    Frame Length=40: 0–31  
 Frame Length=80: 0–63

**Field Entry** Frame Offset

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:POWER****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:  
POWER <val>

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:POWER?

This command sets the power level for the reverse supplemental channels.

The variable &lt;val&gt; is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** -40 to 0**Field Entry** Power**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:RCONFIG****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:RCONFIG 3 |  
4

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:RCONFIG?

This command selects the radio configuration value for the reverse supplemental channels.

**\*RST** +3**Field Entry** Radio Config**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:RATE****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:  
RATE 1.2kbps | 1.350kbps | 1.5kbps | 1.8kbps | 2.4kbps | 2.7kbps | 3.6kbps | 4.8kbps |  
7.2kbps | 9.6kbps | 14.4kbps

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:RATE?

Execute this command to set the data rate for the reverse supplemental channels.

**\*RST** +9.60000000E+003**Field Entry** Bit Rate**Remarks** To change the frame length value, refer to  
“:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:LENGTH” on page 543

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:TCODE****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:TCODE ON | OFF | 1 | 0

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:TCODE?

This command enables or disables the operating state of the turbo coding function for the reverse supplemental channels.

**\*RST** 0**Field Entry** Turbo Coding

**Remarks** To ensure that this function is being executed with the correct data rate, refer to “:REVERSE:RC34:TRAFFIC:RSCH[1]2:RATE” on page 544.

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:WALSH****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH1:WALSH &lt;1 | 2&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH2:WALSH &lt;2 | 6&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:WALSH?

This command sets the Walsh code value for the reverse supplemental channels.

**\*RST** Channel 1: +1 Channel 2: +2**Field Entry** Walsh**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2[:STATE]****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2[:STATE] ON | OFF | 1 | 0

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2[:STATE]?

This command enables or disables the operating state of the reverse supplemental channels.

**\*RST** 0**Field Entry** State

**:REVerse:REFeRence:EXTeRnal:FREQuency****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:REFeRence:EXTeRnal:FREQuency &lt;val&gt;&lt;unit&gt;

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:REFeRence:EXTeRnal:FREQuency?

This command sets the expected frequency of the external reference signal.

**\*RST** +1.96608000E+007**Range** 1–100 MHz**Field Entry** Ext BBG Ref Freq**Remarks** This setting must match the frequency of the signal that is supplied to the BASEBAND GEN REF IN rear panel BNC connector.**:REVerse:REFeRence[:SOURce]****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:REFeRence[:SOURce] INTernal | EXTeRnal

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:REFeRence[:SOURce]?

This command selects the reference clock source.

**EXTeRnal** This choice sets the instrument to use an external reference signal. The external reference frequency must be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.**INTernal** This choice sets the instrument to use the internal reference.**\*RST** INT**Field Entry** BBG Reference**Remarks** If the EXT choice is selected, the BBCLock selection will automatically be set to internal.**:REVerse:TADVance****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:TADVance &lt;val&gt;

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:TADVance?

This command selects the number of chips to advance the trigger time slot for the reverse link.



<b>*RST</b>	+28
<b>Range</b>	0–2457599
<b>Field Entry</b>	Trigger Advance
<b>Remarks</b>	When the noise function is set to ON, this value will increase. Refer to “:REVERSE:NOISE[:STATE]” on page 518 for more information.

**:REVERSE:TEDGE**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : TEDGE RISING | FALLING
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : TEDGE ?
```

This command selects a falling or rising trigger edge state for the reverse link.

**RISING** This choice selects a trigger on the rising edge of the signal applied to the PATT TRIG IN rear panel connector.

**FALLING** This choice selects a trigger on the falling edge of the signal applied to the PATT TRIG IN rear panel connector.

**\*RST** FALL

**Key Entry** **Rising** **Falling**

**:REVERSE:SRATE**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] : REVERSE : SRATE ?
```

This command returns the value of the current spreading rate for the reverse channel.

**\*RST** +1

**[:STATE]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :STATE ] ON | OFF | 1 | 0
[ :SOURCE ] : RADIO : CDMA2000 [ :BBG ] [ :STATE ] ?
```

This command enables or disables the CDMA2000 baseband generator modulation format.

**\*RST** 0

**Key Entry** CDMA2000 Off On

---

## Custom Subsystem—Option 001/601or 002/602 ([:SOURce]:RADio:CUSTom)

### :ALPha

**Supported** E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio :CUSTom :ALPha <val>

[ :SOURce ] :RADio :CUSTom :ALPha ?

This command changes the Nyquist or root Nyquist filter's alpha value.

The filter alpha value can be set to a minimum level (0), a maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +3.50000000E-001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “:FILTer” on page 561.

### :ASK

**Supported** E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio [ 1 ] | 2 | 3 | 4 :CUSTom :ASK [ :DEPT h ] <val>

[ :SOURce ] :RADio [ 1 ] | 2 | 3 | 4 :CUSTom :ASK [ :DEPT h ] ?

This command changes the depth for the amplitude shift keying (ASK) modulation. Depth is set as a percentage of the full power on level.

**\*RST** +???

**Range** 0–100

**Key Entry** **ASK**

**Remarks** The modulation is applied to the I signal, the Q value is always kept at zero.

**:BBCLock**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURCE]:RADio:CUSTom:BBClock INT[1] |EXT[1]
```

```
[:SOURCE]:RADio:CUSTom:BBClock?
```

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

**INT[1]** This choice selects the signal generator internal data clock.

**EXT[1]** This choice selects an external data clock input.

**\*RST** INT

**Key Entry** **BBG Data Clock Ext Int**

**Remarks** A data clock or continuous symbol sync input must be supplied when external mode is used.

This will be ignored if the external reference is set to EXTERNAL. To change the external reference type, refer to “:EREFERENCE” on page 560.

**:BBT**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURCE]:RADio:CUSTom:BBT <val>
```

```
[:SOURCE]:RADio:CUSTom:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999).

**\*RST** +5.00000000E–001

**Range** 0.100–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTER” on page 561.

**:BRATe**

Supported E4438C with Option 402

[:SOURCE]:RADIO:CUSTOM:BRATe &lt;val&gt;

[:SOURCE]:RADIO:CUSTOM:BRATe?

This command sets the bit rate in bits per second (bps–Mbps). The maximum bit rate is dependent on the modulation type and filter as shown in the following tables.

The IQ digital data stream is shaped by a FIR filter. The filter length and associated latency and frequency response are dependent on the bit rate as shown in the following tables. The signal generator selects the filter length.

For higher bit rates, the signal generator may truncate the FIR filter length (if the minimum filter size allows it). This will impact the relative timing of the modulated data, as well as the actual filter response (see the symbol rate command “:SRATe” on page 565). Refer to “:FILTer” on page 561 for information on filter symbol widths.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 564.

When the bit rate is changed, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the bit rate: lower bit rates require more time.

\*RST +4.68000000E+004

Range	Modulation Type	Bit Rate Range for PRAM or External Serial Data		
		<i>16 Symbol Wide Filter</i>	<i>32 Symbol Wide Filter</i>	<i>64 Symbol Wide Filter</i>
	BPSK, FSK2, MSK	1bps–50Mbps	1bps–25Mbps	1bps–12.5Mbps
	C4FM, OQPSK, FSK4	2bps–50Mbps	2bps–25Mbps	2bps–12.5Mbps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3bps–50Mbps	3bps–25Mbps	3bps–12.5Mbps

FSK16, PSK16, QAM16	4bps–50Mbps	4bps–25Mbps	4bps–12.5Mbps
QAM32	5bps–50Mbps	5bps–25Mbps	5bps–12.5Mbps
QAM64	6bps–50Mbps	6bps–25Mbps	6bps–12.5Mbps
QAM128	7bps–50Mbps	7bps–25Mbps	7bps–12.5Mbps
QAM256	8bps–50Mbps	8bps–25Mbps	8bps–12.5Mbps

---

**NOTE** Using I/Q skew will half the minimum number of symbols for the selected filter.

---

The previous table lists the range for PRAM or external serial data in the Custom format.

The Custom format has two modes for processing data, serial and parallel. When the data-rate exceeds 50 Mbps, the signal generator processes the data in parallel mode (symbol by symbol) versus serial mode where the data is processed bit by bit. This capability exists when using a continuous data stream, which means it does not apply to a PRAM file. The following table shows the various data rates by modulation type and filter width.

Range	Modulation Type	Bit Rate Range for Internal Data		
		<i>16 Symbol Wide Filter</i>	<i>32 Symbol Wide Filter</i>	<i>64 Symbol Wide Filter</i>
	BPSK, FSK2, MSK	1bps–50Mbps	1bps–25 Mbps	1bps–12.5Mbps
	C4FM, OQPSK, FSK4	2bps–100Mbps	2bps–50Mbps	2bps–25Mbps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3bps–150Mbps	3bps–75Mbps	3bps–37.5Mbps
	FSK16, PSK16, QAM16	4bps–200Mbps	4bps–100Mbps	4bps–50Mbps
	QAM32	5bps–250Mbps	5bps–125Mbps	5bps–62.5Mbps
	QAM64	6bps–300Mbps	6bps–150Mbps	6bps–75Mbps
	QAM128	7bps–350Mbps	7bps–175Mbps	7bps–87.5Mbps
	QAM256	8bps–400Mbps	8bps–200Mbps	8bps–100Mbps

---

**NOTE** Using I/Q skew will half the minimum number of symbols for the selected filter.

---

**Key Entry**            **Symbol Rate**

### **:BURSt:SHAPe:FALL:DELay**

**Supported**            E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio:CUSTom: BURSt: SHAPe: FALL: DELay <val>

[ :SOURce ] :RADio:CUSTom: BURSt: SHAPe: FALL: DELay?

This command sets the burst shape fall delay.

The variable <val> is expressed in bits.

**\*RST**                    +0.00000000E+000

**Range**                    -22.3750 to 99

**Key Entry**            **Fall Delay**

**Remarks**            To change the modulation type, refer to “:MODulation[:TYPE]” on page 564.  
Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FDELay” on page 553 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### **:BURSt:SHAPe:FALL:TIME**

**Supported**            E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio:CUSTom: BURSt: SHAPe: FALL: TIME <val>

[ :SOURce ] :RADio:CUSTom: BURSt: SHAPe: FALL: TIME?

This command sets the burst shape fall time.

The variable <val> is expressed in bits.

**\*RST**                    +1.00000000E+001

**Range**                    0.1250–255.8750

**Key Entry**            **Fall Time**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPE:FTIME” on page 553 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPE:FDElay**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom: BURSt:SHAPE:FDElay <val>
[ :SOURCE ] :RADio:CUSTom: BURSt:SHAPE:FDElay?
```

This command sets the burst shape fall delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** –22.3750 to 99

**Key Entry** **Fall Delay**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPE:FALL:DElay” on page 552 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPE:FTIME**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom: BURSt:SHAPE:FTIME <val>
[ :SOURCE ] :RADio:CUSTom: BURSt:SHAPE:FTIME?
```

This command sets the burst shape fall time.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

<b>Range</b>	0.1250–255.8750
<b>Key Entry</b>	<b>Fall Time</b>
<b>Remarks</b>	<p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPE:FALL:TIME” on page 552 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

**:BURSt:SHAPE:RDElay**

<b>Supported</b>	E4438C with Option 001/601or 002/602
	[:SOURce]:RADio:CUSTom:BURSt:SHAPE:RDElay <val> [:SOURce]:RADio:CUSTom:BURSt:SHAPE:RDElay?
	This command sets the burst shape rise delay.
	The variable <val> is expressed in bits.
<b>*RST</b>	+0.00000000E+000
<b>Range</b>	–17.3750 to 99
<b>Key Entry</b>	<b>Rise Delay</b>
<b>Remarks</b>	<p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPE:RISE:DElay” on page 554 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

**:BURSt:SHAPE:RISE:DElay**

<b>Supported</b>	E4438C with Option 001/601or 002/602
	[:SOURce]:RADio:CUSTom:BURSt:SHAPE:RISE:DElay <val> [:SOURce]:RADio:CUSTom:BURSt:SHAPE:RISE:DElay?
	This command sets the burst shape rise delay.
	The variable <val> is expressed in bits.



<b>*RST</b>	+0.00000000E+000
<b>Range</b>	−17.3750 to 99
<b>Key Entry</b>	<b>Rise Delay</b>
<b>Remarks</b>	<p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPE:RDELay” on page 554 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

### :BURSt:SHAPE:RISE:TIME

<b>Supported</b>	E4438C with Option 001/601 or 002/602
	[:SOURCE]:RADio:CUSTom:BURSt:SHAPE:RISE:TIME <val> [:SOURCE]:RADio:CUSTom:BURSt:SHAPE:RISE:TIME?
	This command sets the burst shape rise time.
	The variable <val> is expressed in bits.
<b>*RST</b>	+1.00000000E+001
<b>Range</b>	0.1250–121.5000
<b>Key Entry</b>	<b>Rise Time</b>
<b>Remarks</b>	<p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPE:RTIME” on page 556 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

**:BURSt:SHAPe:RTIME**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom: BURSt:SHAPe:RTIME <val>
```

```
[ :SOURCE ] :RADio:CUSTom: BURSt:SHAPe:RTIME?
```

This command sets the burst shape rise time.

The variable <val> is expressed in bits.

**\*RST** +1.00000000E+001

**Range** 0.1250–121.5000

**Key Entry** **Rise Time**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:TIME” on page 555 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe[:TYPE]**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom: BURSt:SHAPe[:TYPE] SINE | "<file name>"
```

```
[ :SOURCE ] :RADio:CUSTom: BURSt:SHAPe[:TYPE] ?
```

This command specifies the burst shape ("<file name>").

**SINE** This choice selects a state that is defined by the burst rise and fall \*RST values, as the default burst shape type.

"<file name>" This choice selects a user designated file from signal generator memory (non-volatile).

**\*RST** SINE

**Key Entry** **Sine User File**

**:CHANnel**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADIO:CUSTOM:CHANnel EVM|ACP

[ :SOURCE ] :RADIO:CUSTOM:CHANnel?

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** ACP

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to [“.FILTER” on page 561](#).

**:DATA**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADIO:CUSTOM:DATA PN9|PN11|PN15|PN20|PN23|FIX4| "<file name>" |

EXT|P4|P8|P16|P32|P64|PRAM

[ :SOURCE ] :RADIO:CUSTOM:DATA?

This command sets the data pattern for unframed transmission.

**\*RST** PN23

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>				
	<b>64 1's &amp; 64 0's</b>	<b>PRAM File</b>						

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:DATA:FIX4**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURce]:RADio:CUSTom:DATA:FIX4 <val>
```

```
[:SOURce]:RADio:CUSTom:DATA:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the custom modulation format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must be already be defined as the data type.

**:DATA:PRAM**

**Supported** E4438C with Option 001/601or 002/602001/601or 002/602

```
[:SOURce]:RADio:CUSTom:DATA:PRAM "<file_name>"
```

```
[:SOURce]:RADio:CUSTom:DATA:PRAM?
```

This command selects a pattern RAM (PRAM) file as the pattern data type for a custom communications format.

"<file\_name>" This variable designates the PRAM file in WFM1. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**Key Entry** **PRAM File**

**Remarks** Selecting this data source forces the burst source to INTERNAL to allow framing control.

The PRAM file must reside in the signal generator’s volatile memory (WFM1) in order to be accessed by this command. For more information on PRAM files, refer to [“:DATA:PRAM:FILE:BLOCK” on page 112](#).

**:DENCode**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURce ] :RADio:CUSTom:DENCode ON | OFF | 1 | 0

[ :SOURce ] :RADio:CUSTom:DENCode?

This command enables or disables the differential data encoding function.

**\*RST** 0

**Key Entry** **Diff Data Encode Off On**

**Remarks** Executing this command encodes the data bits prior to modulation; each modulated bit is 1 if the data bit is different from the previous one, or 0 if the data bit is the same as the previous one.

**:EDATa:DELAy**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURce ] :RADio:CUSTom:EDATa:DELAy?

This query returns the amount of delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear panel connectors and the front panel RF OUTPUT connector.

**Remarks** When the format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

**:EDCLock**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURce ] :RADio:CUSTom:EDCLock SYMBol | NORMal

[ :SOURce ] :RADio:CUSTom:EDCLock?

This command sets the external data clock use.

**SYMBol** This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMal** This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

**\*RST** NORM

**Key Entry** **Ext Data Clock Normal Symbol**

**Custom Subsystem—Option 001/601or 002/602 ([:SOURCE]:RADio:CUSTom)**

**Remarks** Both choices have no effect in internal clock mode. Refer to “:BBClock” on page 549 to select EXT as the data clock type.

**:EREFerence**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom:EREFerence INTernal | EXTernal
[ :SOURCE ] :RADio:CUSTom:EREFerence?
```

This command selects either an internal or external bit-clock reference for the data generator.

**\*RST** INT

**Key Entry** **BBG Ref Ext Int**

**Remarks** If the EXTernal choice is selected, the external frequency value must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:EREFerence:VALue” on page 560 to enter the external reference frequency.

**:EREFerence:VALue**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom:EREFerence:VALue <val>
[ :SOURCE ] :RADio:CUSTom:EREFerence:VALue?
```

This command conveys the expected reference frequency value of an externally applied reference to the signal generator.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.30000000E+007

**Range** 2.5E5–1E8

**Key Entry** **Ext BBG Ref Freq**

**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:EREFerence” on page 560 to select EXTernal as the reference for the bit clock reference of the data generator.

**:FILTer**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURce]:RADio:CUSTom:FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|IS95|
IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|"<user FIR>"
[:SOURce]:RADio:CUSTom:FILTer?
```

This command selects the pre-modulation filter type.

IS95	This choice selects a filter that meets the criteria of the IS-95 standard.
IS95_EQ	This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.
IS95_MOD	This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
IS95_MOD_EQ	This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
AC4Fm	This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
"<user FIR>"	This variable is any filter file that you have stored into memory. Refer to <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.

The following table shows the filter type and minimum number of symbols. Refer to [“:SRATe” on page 565](#) for information on symbol rate. User-defined filters are not truncated. Internal filters are typically run with 16 or 32 symbols unless the minimum size is larger.

Filter	Minimum Number of Symbols
Gaussian, Nyquist, Root Nyquist, Rectangle	0
Edge	5
UN3/4 GSM Gaussian	8
IS-95, IS-95 w/EQ	16
IS-95 Mod, IS-95 Mod w/EQ	24
IS-2000	27
APCO 25 C4FM	32

**\*RST** RNYQ  
**Key Entry** Root Nyquist Nyquist Gaussian Rectangle IS-95 IS-95 w/EQ  
IS-95 Mod IS-95 Mod w/EQ APCO 25 C4FM UN3/4 GSM Gaussian  
User FIR

**:IQ:SCALE**

**Supported** E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio:CUSTom:IQ:SCALE <val>  
[ :SOURce ] :RADio:CUSTom:IQ:SCALE?

This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.

The variable <val> is expressed in units of percent.

**\*RST** +70

**Range** 1–200

**Key Entry** I/Q Scaling

**Remarks** This command has no effect with MSK or FSK modulation.



**:MODulation:FSK[:DEVIation]**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADIO:CUSTOM:MODulation:FSK[:DEVIation] <val>
```

```
[ :SOURCE ] :RADIO:CUSTOM:MODulation:FSK[:DEVIation] ?
```

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by four, limited to 20 MHz.

**\*RST** +4.00000000E+002

**Range** 0–2E7

**Key Entry** **Freq Dev**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 564.

Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.

To set an asymmetric FSK deviation value, refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.

**:MODulation:MSK[:PHASe]**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADIO:CUSTOM:MODulation:MSK[:PHASe] <val>
```

```
[ :SOURCE ] :RADIO:CUSTOM:MODulation:MSK[:PHASe] ?
```

This command sets the MSK phase deviation value.

The variable <val> is expressed in units of degrees.

**\*RST** +9.00000000E+001

**Range** 0–100

**Key Entry** **Phase Dev**

**:MODulation:UFSK**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURCE]:RADio:CUSTom:MODulation:UFSK "<file name>"
```

```
[:SOURCE]:RADio:CUSTom:MODulation:UFSK?
```

This command selects a user-defined FSK file from the signal generator memory.

**Key Entry** **User FSK**

**Remarks** The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. Refer to [“:MODulation\[:TYPE\]” on page 564](#) to change the current modulation type.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:MODulation:UIQ**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURCE]:RADio:CUSTom:MODulation:UIQ "<file name>"
```

```
[:SOURCE]:RADio:CUSTom:MODulation:UIQ?
```

This command selects a user-defined I/Q file from the signal generator memory.

**Key Entry** **User I/Q**

**Remarks** The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to [“:MODulation\[:TYPE\]” on page 564](#) to change the current modulation type.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:MODulation[:TYPE]**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURCE]:RADio:CUSTom:MODulation[:TYPE] BPSK|QPSK|IS95QPSK|GRAYQPSK|
OQPSK|IS95OQPSK|P4DQPSK|PSK8|PSK16|D8PSK|MSK|FSK2|FSK4|FSK8|FSK16|C4FM|
QAM4|QAM16|QAM32|QAM64|QAM128|QAM256|UIQ|UFSK
[:SOURCE]:RADio:CUSTom:MODulation[:TYPE]?
```

This command sets the modulation type for the Custom personality.

## Custom Subsystem—Option 001/601or 002/602 ([:SOURce]:RADio:CUSTom)

<b>*RST</b>	P4DQPSK							
<b>Key Entry</b>	<b>BPSK</b>	<b>QPSK</b>	<b>IS-95 QPSK</b>	<b>Gray Coded QPSK</b>		<b>OQPSK</b>		
	<b>IS-95 OQPSK</b>	$\pi/4$ <b>DQPSK</b>	<b>8PSK</b>	<b>16PSK</b>	<b>D8PSK</b>	<b>MSK</b>	<b>2-Lvl FSK</b>	
	<b>4-Lvl FSK</b>	<b>8-Lvl FSK</b>	<b>16-Lvl FSK</b>	<b>C4FM</b>	<b>4QAM</b>	<b>16QAM</b>	<b>32QAM</b>	
	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>	<b>User I/Q</b>	<b>User FSK</b>			

**:POLarity[:ALL]**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURce]:RADio:CUSTom:POLarity[:ALL] NORMal|INVerted
[:SOURce]:RADio:CUSTom:POLarity[:ALL]?
```

This command sets the rotation direction of the phase modulation vector.

**NORMal** This choice selects normal phase polarity.

**INVerted** This choice inverts the internal Q signal.

**\*RST** **NORM**

**Key Entry** **Phase Polarity Normal Invert**

**:SRATe**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURce]:RADio:CUSTom:SRATe <val>
[:SOURce]:RADio:CUSTom:SRATe?
```

This command sets the transmission symbol rate. Symbol rate is the bit rate divided by the bits per symbol. A change in the symbol rate affects the bit rate. Refer to “:BRATe” on page 550 for information on bit rate.

The variable <val> is expressed in units of symbols per second (sps–Mps) and the maximum symbol rate depends on the filter. Refer to “:FILTer” on page 561 for minimum filter symbol widths.

The filter may have to be truncated down to 32 or 16 symbols wide to achieve the highest symbol rate. The signal generator’s internal filters are not truncated below their minimum filter length and user-defined FIR filters are not truncated. If the filter cannot be truncated then the symbol rate is limited to the maximum rate of the narrowest filter size possible.

The relative timing of the modulated data, as well as the actual filter response is affected when the filter is truncated.

When the symbol rate changes, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the symbol rate: lower symbol rates require more time.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 564.

\*RST +2.43000000E+004

The following table shows the symbol range for internal Custom data operation.

Range	16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
	1sps–50Msps	1sps–25Msps	1sps–12.5Msps

The limits shown in the following table apply to Custom PRAM and Custom external serial data.

Range	Modulation Type	Symbol Rate For PRAM and External Serial Data		
		16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
		<i>16 Symbol Wide Filter</i>	<i>32 Symbol Wide Filter</i>	<i>64 Symbol Wide Filter</i>
	BPSK, FSK2, MSK	1sps–50Msps	1sps–25Msps	1sps–12.5Msps
	C4FM, OQPSK, FSK4	2sps–25Msps	2sps–12.5Msps	2sps–6.25Msps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3sps–16.666666666 Msps	3sps–8.333333333 Msps	3sps–4.166666666Msps
	FSK16, PSK16, QAM16	4sps–12.5Msps	4sps–6.25Msps	4sps–3.125Msps
	QAM32	5sps–10Msps	5sps–5Msps	5sps–2.5Msps
	QAM64	6sps–8.333333333 Msps	6sps–4.166666666 Msps	6sps–2.083333333 Msps
	QAM128	7sps–7.142857142 Msps	7sps–3.571428572 Msps	7sps–1.785714285 Msps
	QAM256	8sps–6.25Msps	8sps–3.125 Msps	8sps–1.5625 Msps

**Key Entry                      Symbol Rate**

**:STANdard:SElect**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURCE]:RADio:CUSTom:STANdard:SElect NONE|AC4Fm|ACQPsk|BLUeetooth|CDPD
[:SOURCE]:RADio:CUSTom:STANdard:SElect?
```

This command selects a predefined setup for Custom (with the appropriate defaults) and/or clears the selection.

**NONE** This choice clears the current predefined Custom format.

**AC4Fm** This choice sets up an Association of Public Safety Communications Officials (APCO) compliant, compatible 4-level frequency modulation (C4FM) format.

**ACQPsk** This choice sets up an Association of Public Safety Communications Officials (APCO) compliant, compatible quadrature phase shift keying (CQPSK) format.

**BLUeetooth** This choice sets up a Bluetooth (2-level frequency shift keying) format.

**CDPD** This choice sets up a minimum shift keying Cellular Digital Packet Data (CDPD) format.

**\*RST** NONE

**Key Entry**      **None**    **APCO 25w/C4FM**    **APCO 25 w/CQPSK**    **Bluetooth**    **CDPD**

**:TRIGger:TYPE**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURCE]:RADio:CUSTom:TRIGger:TYPE CONTinuous|SINGle|GATE
[:SOURCE]:RADio:CUSTom:TRIGger:TYPE?
```

This command sets the trigger type.

**CONTinuous** The framed data sequence repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to [“:TRIGger:TYPE:CONTinuous\[:TYPE\]” on page 568](#).

**SINGle** The framed data sequence plays once for every trigger received.

**GATE** An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set to high or low.

**\*RST** CONT

**Key Entry**      **Continuous**      **Single**      **Gated**

**:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURCE]:RADio:CUSTom:TRIGger:TYPE:CONTInuous[:TYPE] FREE|TRIGger|RESet
[:SOURCE]:RADio:CUSTom:TRIGger:TYPE:CONTInuous[:TYPE] ?
```

This command selects the waveform's response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see [“:TRIGger:TYPE” on page 567](#).

The following list describes the waveform's response to each of the command choices:

FREE	Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.
TRIGger	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.
RESet	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.
<b>*RST</b>	FREE
<b>Key Entry</b>	<b>Free Run      Trigger &amp; Run      Reset &amp; Run</b>

**:TRIGger:TYPE:GATE:ACTive**

**Supported** E4438C with Option 001/601or 002/602

```
[:SOURCE]:RADio:CUSTom:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[:SOURCE]:RADio:CUSTom:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see [“:TRIGger:TYPE” on page 567](#).

The following list describes the ESG's gating behavior for the polarity selections:

LOW	The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).
HIGH	The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).
*RST	HIGH
<b>Key Entry</b>	<b>Gate Active Low High</b>

### :TRIGger[:SOURce]

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] KEY | EXT | BUS
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] ?
```

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 567. The following list describes the command choices:

KEY	This choice enables manual triggering by pressing the front-panel <b>Trigger</b> hardkey.
EXT	An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURce]:EXternal[:SOURce]” on page 571.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User's Guide*.

- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 568
  - continuous and single modes, see “:TRIGger[:SOURce]:EXternal:SLOPe” on page 571
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[:SOURce]:EXternal:DELay” on page 570
  - turning the delay on, see “:TRIGger[:SOURce]:EXternal:DELay:STATe” on page 570

**Custom Subsystem—Option 001/601or 002/602 ([:SOURCE]:RADio:CUSTom)**

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

**Key Entry**      **Trigger Key**      **Ext**      **Bus**

**:TRIGger[:SOURce]:EXTernal:DELay**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] : RADio : CUSTom : TRIGger [ :SOURCE ] : EXTernal : DELay <val>
[ :SOURCE ] : RADio : CUSTom : TRIGger [ :SOURCE ] : EXTernal : DELay?
```

This command sets the number of bits to delay the ESG's response to an external trigger.

The bit delay is a delay between when the ESG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the ESG receives the trigger and the set number of delay bits (clocks) occurs, the ESG transmits the data pattern.

The delay occurs after you enable the state. See “[:TRIGger\[:SOURce\]:EXTernal:DELay:STATE](#)” on [page 570](#). You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see “[:TRIGger\[:SOURce\]](#)” on [page 569](#).

**\*RST** +0

**Range** 0–1048575

**Key Entry**      **Ext Delay Bits**

**:TRIGger[:SOURce]:EXTernal:DELay:STATE**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] : RADio : CUSTom : TRIGger [ :SOURCE ] : EXTernal : DELay : STATE ON | OFF | 1 | 0
[ :SOURCE ] : RADio : CUSTom : TRIGger [ :SOURCE ] : EXTernal : DELay : STATE?
```

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “[:TRIGger\[:SOURce\]:EXTernal:DELay](#)” on [page 570](#), and for more information on configuring an external source, see “[:TRIGger\[:SOURce\]](#)” on [page 569](#).

**\*RST** 0

**Key Entry**      **Ext Delay Off On**



**:TRIGger[:SOURce]:EXTernal:SLOPe**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] :EXTernal:SLOPe POSitive|NEGative
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] :EXTernal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 568.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 569.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos

**:TRIGger[:SOURce]:EXTernal[:SOURce]**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] :EXTernal [ :SOURce ] EPT1|EPT2 |
EPTRIGGER1 | EPTRIGGER2
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] :EXTernal [ :SOURce ] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 569. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.

**Custom Subsystem—Option 001/601or 002/602 ([:SOURce]:RADio:CUSTom)**

**\*RST**                    EPT1  
**Key Entry**            **Patt Trig In 1**      **Patt Trig In 2**

**[ :STATe ]**

**Supported**            E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio :CUSTom [ :STATe ] ON | OFF | 1 | 0  
[ :SOURce ] :RADio :CUSTom [ :STATe ] ?

This command enables or disables the Custom modulation.

**\*RST**                    0  
**Key Entry**            Custom Off On

**Remarks**            Although the Custom modulation is enabled with this command, the RF carrier is not modulated unless you also activate the front panel **Mod On/Off** hardkey.

---

## DECT Subsystem–Option 402 ([:SOURce]:RADio:DECT)

### :ALPha

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:DECT:ALPha <val>  
[:SOURce]:RADio:DECT:ALPha?
```

This command changes the Nyquist or root Nyquist filter’s alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “:FILTer” on page 585.

### :BBCLock

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:DECT:BBCLock INT[1] | EXT[1]  
[:SOURce]:RADio:DECT:BBCLock?
```

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

**INT[1]** This choice selects the signal generator internal data clock.

**EXT[1]** This choice selects an external data clock input.

**\*RST** INT

**Key Entry** **BBG Data Clock Ext Int**

**Remarks** A data clock or continuous symbol sync input must be supplied when external mode is used.

**:BBT**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:BBT <val>
```

```
[ :SOURCE ] :RADIO:DECT:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999).

**\*RST** +5.00000000E-001

**Range** 0.100–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTER” on page 585.

**:BRATe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:BRATe <val><units>
```

```
[ :SOURCE ] :RADIO:DECT:BRATe?
```

This command sets the bit rate in bits per second (bps–Mbps). The maximum bit rate is dependent on the modulation type and filter as shown in the following tables

The IQ digital data stream is shaped by a FIR filter. The filter length and associated latency and frequency response are dependent on the bit rate as shown in the following tables. The signal generator selects a filter length.

For higher bit rates, the FIR filter length may be truncated (if the minimum filter size allows it) which will impact the relative timing of the modulated data, as well as the actual filter response (see the symbol rate command “:SRATe” on page 658). Refer to “:FILTER” on page 585 for information on filter symbol widths.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 588.

When the bit rate is changed, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the bit rate: lower bit rates require more time.

**\*RST** +1.1520000E+004

Range	Modulation Type	Bit Rate Range		
		16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
	BPSK, FSK2, MSK	1bps–50Mbps	1bps–25Mbps	1bps–12.5Mbps
	C4FM, OQPSK, FSK4	2bps–50Mbps	2bps–25Mbps	2bps–12.5Mbps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3bps–50Mbps	3bps–25Mbps	3bps–12.5Mbps
	FSK16, PSK16, QAM16	4bps–50Mbps	4bps–25Mbps	4bps–12.5Mbps
	QAM32	5bps–50Mbps	5bps–25Mbps	5bps–12.5Mbps
	QAM64	6bps–50Mbps	6bps–25Mbps	6bps–12.5Mbps
	QAM128	7bps–50Mbps	7bps–25Mbps	7bps–12.5Mbps
	QAM256	8bps–50Mbps	8bps–25Mbps	8bps–12.5Mbps

**Key Entry**                      **Symbol Rate**

**:BURSt:PN9**

**Supported**                      E4438C with Option 402

[ :SOURCE ] :RADio:DECT: BURSt: PN9 NORMal | QUICk

[ :SOURCE ] :RADio:DECT: BURSt: PN9?

This command controls the software PN9 generation.

**NORMal**                      This choice produces a maximum length PN9 sequence.

**QUICk**                      This choice produces a truncated PN9 sequence.

**\*RST**                      NORM

**Key Entry**                      **PN9 Mode Normal Quick**

**Remarks**                      Use Normal mode for bit-error-rate tests where a maximum length PN9 sequence is required.

**:BURSt:SHAPe:FALL:DELay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:FALL:DELay <val>
```

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:FALL:DELay?
```

This command sets the burst shape fall delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** -10.5625 to 99

**Key Entry** **Fall Delay**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FDELay” on page 577 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:FALL:TIME**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:FALL:TIME <val>
```

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:FALL:TIME?
```

This command sets the burst shape fall time.

The variable <val> is expressed in bits.

**\*RST** +1.00000000E+001

**Range** 0.0625–127.9375

**Key Entry** **Fall Time**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FTIME” on page 577 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## :BURSt:SHAPe:FDElay

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:BURSt:SHAPe:FDElay <val>

[ :SOURce ] :RADio:DECT:BURSt:SHAPe:FDElay?

This command sets the burst shape fall delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** -10.5625 to 99

**Key Entry** **Fall Delay**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:DElay” on page 576 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## :BURSt:SHAPe:FTIME

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:BURSt:SHAPe:FTIME <val>

[ :SOURce ] :RADio:DECT:BURSt:SHAPe:FTIME?

This command sets the burst shape fall time.

The variable <val> is expressed in bits.

**\*RST** +1.00000000E+001

**Range** 0.0625–127.9375

**Key Entry** **Fall Time**

**DECT Subsystem—Option 402 [:SOURCE]:RADio:DECT)**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPE:FALL:TIME” on page 576 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPE:RDElay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:BURSt:SHAPE:RDElay <val>
[ :SOURCE ] :RADio:DECT:BURSt:SHAPE:RDElay?
```

This command sets the burst shape rise delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** -0.5625 to 99

**Key Entry** **Rise Delay**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPE:RISE:DElay” on page 578 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPE:RISE:DElay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:BURSt:SHAPE:RISE:DElay <val>
[ :SOURCE ] :RADio:DECT:BURSt:SHAPE:RISE:DElay?
```

This command sets the burst shape rise delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000



<b>Range</b>	–0.5625 to 99
<b>Key Entry</b>	<b>Rise Delay</b>
<b>Remarks</b>	<p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPE:RDElay” on page 578 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

### **:BURSt:SHAPE:RISE:TIME**

<b>Supported</b>	E4438C with Option 402
	<pre>[ :SOURCE ] :RADio:DECT:BURSt:SHAPE:RISE:TIME &lt;val&gt; [ :SOURCE ] :RADio:DECT:BURSt:SHAPE:RISE:TIME?</pre>
	<p>This command sets the burst shape rise time.</p> <p>The variable &lt;val&gt; is expressed in bits.</p>
<b>*RST</b>	+1.00000000E+001
<b>Range</b>	0.0625–10.6250
<b>Key Entry</b>	<b>Rise Time</b>
<b>Remarks</b>	<p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPE:RTIME” on page 580 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

**:BURSt:SHAPe:RTIME**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:RTIME <val>
```

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:RTIME?
```

This command sets the burst shape rise time.

The variable <val> is expressed in bits.

**\*RST** +1.00000000E+001

**Range** 0.0625–10.6250

**Key Entry** **Rise Time**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:TIME” on page 579 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe[:TYPE] SINE | "<file name>"
```

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe[:TYPE] ?
```

This command specifies the burst shape as either SINE or a user-defined file ("<file name>").

SINE This choice selects a state that is defined by the burst rise and fall \*RST values, as the default burst shape type.

"<file name>" This choice selects a user-defined file from signal generator memory (non-volatile).

**\*RST** SINE

**Key Entry** **Sine User File**

## :BURSt[:STATe]

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:DECT:BURSt [ :STATe ] ON | OFF | 1 | 0  
[ :SOURCE ] :RADIo:DECT:BURSt [ :STATe ] ?
```

This command enables or disables the burst function.

ON (1) This choice enables the transmission of framed data. If all timeslots which are switched on are up traffic channels or custom, you will be bursting the timeslots that are on; there will be no RF carrier during the off timeslots.

If you have switched on any timeslot that you have configured as a down traffic channel, the RF carrier is not switched off between any of the timeslots. The off timeslots are transmitted as a continuous series of ones for the time period of the off timeslots.

OFF (0) This choice enables the transmission of unframed data.

**\*RST** 0

**Key Entry** **Data Format Pattern Framed**

## :CHANnel

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:DECT:CHANnel EVM | ACP  
[ :SOURCE ] :RADIo:DECT:CHANnel ?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

EVM This choice provides the most ideal passband.

ACP This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “:FILTer” on page 585.

**DECT Subsystem—Option 402 ([:SOURCE]:RADIO:DECT)****:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:DATA PN9 | PN11 | PN15 | PN20 | PN23 | FIX4 | "<file name>" | EXT |
P4 | P8 | P16 | P32 | P64 | PRAM
[ :SOURCE ] :RADIO:DECT:DATA?
```

This command sets the data pattern type (pseudo-random number sequence, 4-bit pattern, sequence of 1's and 0's, data from an external source, or a user file) for unframed data transmission.

**\*RST** PN23

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>
	<b>4 1's &amp; 4 0's</b>		<b>8 1's &amp; 8 0's</b>		<b>16 1's &amp; 16 0's</b>		<b>32 1's &amp; 32 0's</b>	
	<b>64 1's &amp; 64 0's</b>	<b>PRAM File</b>						

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:DATA:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:DATA:FIX4 <val>
[ :SOURCE ] :RADIO:DECT:DATA:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the DECT modulation format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. To change the data type, refer to [“:DATA” on page 582](#).

## :DATA:PRAM

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:DATA:PRAM "<file_name>"
```

```
[ :SOURCE ] :RADio:DECT:DATA:PRAM?
```

This command selects a pattern RAM (PRAM) file as the pattern data type for the DECT (Digital Enhanced Cordless Telecommunications) format.

"<file\_name>" This variable designates the PRAM file in WFM1. No directory path name is needed. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**Key Entry** **PRAM File**

**Remarks** Selecting this data source forces the burst source to INTERNAL to allow framing control.

The PRAM file must reside in the signal generator’s volatile memory (WFM1) in order to be accessed by this command. For more information on PRAM files, refer to [“:DATA:PRAM:FILE:BLOCK” on page 112](#).

## :DEFault

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:DEFault
```

This command returns all of the DECT modulation format parameters to factory settings. It does not affect any other signal generator parameters.

**Key Entry** **Restore Dect Factory Default**

## :EDATa:DELay

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:EDATa:DELay?
```

This query returns the amount of delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear panel connectors and the front panel RF OUTPUT connector.

**Remarks** When the format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

**DECT Subsystem—Option 402 ([:SOURCE]:RADIO:DECT)****:EDCLock**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:DECT:EDCLock SYMBOL | NORMAl

[ :SOURCE ] :RADIO:DECT:EDCLock?

This command sets the external data clock use.

**SYMBOL** This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMAl** This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

**\*RST** NORM

**Key Entry** **Ext Data Clock Normal Symbol**

**Remarks** Both choices have no effect in internal clock mode. Refer to “:BBCLock” on page 573 to select EXT as the data clock type.

**:EREFerence**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:DECT:EREFerence INT | EXT

[ :SOURCE ] :RADIO:DECT:EREFerence?

This command selects either an internal or external bit-clock reference for the data generator.

**\*RST** INT

**Key Entry** **BBG Ref Ext Int**

**Remarks** If the EXT choice is selected, the external source’s frequency value must be applied to the BASEBAND GEN REF IN rear panel connector. The external reference and external data clock are not applicable at the same time. If both are selected, then the external reference takes precedence.

Refer to, “:EREFerence:VALue” on page 585 to enter the external reference frequency setting.

## **:EREFerence:VALue**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:DECT:EREFerence:VALue <val>
```

```
[:SOURCE]:RADio:DECT:EREFerence:VALue?
```

This command sets the expected bit-clock reference frequency value for an externally applied reference signal.

The variable <val> is expressed in units of hertz (Hz–MHz).

**\*RST** +1.30000000E+007

**Range** 2.5E5–1E8

**Key Entry** **Ext BBG Ref Freq**

**Remarks** The value specified by this command is effective only when you are using an external reference applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “[:EREFerence](#)” on page 584 to select EXT (external source) as the reference for the bit-clock.

## **:FILTer**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:DECT:FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|IS95|
```

```
IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian| "<user FIR>"
```

```
[:SOURCE]:RADio:DECT:FILTer?
```

This command specifies the pre-modulation filter type.

**IS95** This choice selects a filter that meets the criteria of the IS-95 standard.

**IS95\_EQ** This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

**IS95\_MOD** This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.

**IS95\_MOD\_EQ** This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.

**AC4Fm** This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.

**DECT Subsystem—Option 402 ([:SOURce]:RADio:DECT)**

UGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.					
"<user FIR>"	This variable is any filter file that you have stored into memory.					
*RST	GAUS					
<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>UN3/4 GSM Gaussian</b>		<b>APCO 25 C4FM</b>	
	<b>User FIR</b>					
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.					

**:IQ:SCALe**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:IQ:SCALe <val>

[ :SOURce ] :RADio:DECT:IQ:SCALe?

This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.

The variable <val> is expressed in units of percent.

\*RST +100

**Range** 1–200

**Key Entry** **I/Q Scaling**

**Remarks** This command has no effect with MSK or FSK modulation.

**:MODulation:FSK[:DEViation]**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:MODulation:FSK[:DEViation] <val>

[ :SOURce ] :RADio:DECT:MODulation:FSK[:DEViation]?

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by four, limited to 20 MHz.

\*RST +2.88000000E+005

**Range** 0–2E7



<b>Key Entry</b>	<b>Freq Dev</b>
<b>Remarks</b>	To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values. To set an asymmetric FSK deviation value, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i> for more information.

### :MODulation:MSK[:PHASe]

<b>Supported</b>	E4438C with Option 402
	<code>[:SOURCE]:RADio:DECT:MODulation:MSK[:PHASe] &lt;val&gt;</code> <code>[:SOURCE]:RADio:DECT:MODulation:MSK[:PHASe]?</code>
	This command sets the MSK phase deviation value. The variable <val> is expressed in units of degrees.
<b>*RST</b>	+9.00000000E+001
<b>Range</b>	0–100
<b>Key Entry</b>	<b>Phase Dev</b>

### :MODulation:UFSK

<b>Supported</b>	E4438C with Option 402
	<code>[:SOURCE]:RADio:DECT:MODulation:UFSK "&lt;file name&gt;"</code> <code>[:SOURCE]:RADio:DECT:MODulation:UFSK?</code>
	This command selects a user-defined FSK file from the signal generator memory.
<b>Key Entry</b>	<b>User FSK</b>
<b>Remarks</b>	The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. Refer to “:MODulation[:TYPE]” on page 588 to change the current modulation type. Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:MODulation:UIQ**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:MODulation:UIQ "<file name>"
```

```
[ :SOURCE ] :RADio:DECT:MODulation:UIQ?
```

This command selects a user-defined I/Q file from the signal generator memory.

**Key Entry** **User I/Q**

**Remarks** The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to “[:MODulation\[:TYPE\]](#)” on page 588 to change the current modulation type.

Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:MODulation[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:MODulation[:TYPE] BPSK | QPSK | IS95QPSK | GRAYQPSK |
OQPSK | IS95OQPSK | P4DQPSK | PSK8 | PSK16 | D8PSK | MSK | FSK2 | FSK4 | FSK8 | FSK16 | C4FM |
QAM4 | QAM16 | QAM32 | QAM64 | QAM128 | QAM256 | UIQ | UFSK
[ :SOURCE ] :RADio:DECT:MODulation[:TYPE] ?
```

This command sets the modulation type for the DECT personality.

**\*RST** FSK2

<b>Key Entry</b>	<b>BPSK</b>	<b>QPSK</b>	<b>IS-95 QPSK</b>	<b>Gray Coded QPSK</b>			<b>OQPSK</b>	
	<b>IS-95 OQPSK</b>	$\pi/4$ <b>DQPSK</b>	<b>8PSK</b>	<b>16PSK</b>	<b>D8PSK</b>	<b>MSK</b>	<b>2-Lvl FSK</b>	
	<b>4-Lvl FSK</b>	<b>8-Lvl FSK</b>	<b>16-Lvl FSK</b>	<b>C4FM</b>	<b>4QAM</b>	<b>16QAM</b>	<b>32QAM</b>	
	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>	<b>User I/Q</b>	<b>User FSK</b>			

**:POLarity[:ALL]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:POLarity[:ALL] NORMal | INVerted
```

```
[ :SOURCE ] :RADio:DECT:POLarity[:ALL] ?
```

This command sets the rotation direction of the phase modulation vector.

**NORMal** This choice selects normal phase polarity.

INVerted                      This choice inverts the internal Q signal.

**\*RST**                         NORM

**Key Entry**                 **Phase Polarity Normal Invert**

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11[:TYPE]**

**Supported**                 E4438C with Option 402

```
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11[:TYPE]
CUSTom|TRAFfic|LCAPacity|ZTRAffic|ZLCapacity
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11[:TYPE]?
```

This command specifies the timeslot type for the selected timeslot in the portable part link.

**\*RST**                         Timeslot 0: TRAF      Timeslots 1–4: CUST

**Key Entry**                 **Custom      Traffic Bearer      Low Capacity      Traffic Bearer with Z field**  
**Low Capacity with Z field**

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom**

**Supported**                 E4438C with Option 402

```
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom PN9|
PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|FDEV1_FS|FDEV2_FS|
FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom?
```

This command customizes the selected custom timeslot for a portable part link.

**\*RST**                         PN9

**Key Entry**                 **PN9    PN11    PN15    PN20    PN23    FIX4    User File    Ext    FDEV1\_HS**  
**FDEV1\_FS    FDEV2\_FS    FACC    DM1    DM0    4 1's & 4 0's**  
**8 1's & 8 0's    16 1's & 16 0's    32 1's & 32 0's    64 1's & 64 0's**

**Remarks**                 Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**DECT Subsystem—Option 402 ([:SOURCE]:RADIO:DECT)**

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom:FIX4**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom:  
FIX4 <val>

[ :SOURCE ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom:FIX4?

This command sets the binary, 4-bit repeating sequence data pattern which is used in the portable part custom data field of the selected timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. To change the data type, refer to “:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom” on page 589.

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:A**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:  
A <val>

[ :SOURCE ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:A?

This command customizes the A field for the selected low-capacity timeslot in the portable part link.

**\*RST** #H0000FFFF0000FFFF

**Range** #H0–#HFFFFFFFFFFFFFFFF

**Key Entry** **A field**

**Remarks** The A field carries signaling data (48 bits) and error correction (16 bits).

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:P**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:  
P <val>

[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:P?

This command customizes the preamble (P) field of the selected low-capacity timeslot in the portable part link.

**\*RST** #H5555

**Range** #H0–#HFFFF

**Key Entry** P

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:S**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:  
S <val>

[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:S?

This command customizes the synchronization pattern of the selected low-capacity timeslot in the portable part link.

**\*RST** #H1675

**Range** #H0–#HFFFF

**Key Entry** S

**DECT Subsystem—Option 402 (:SOURce):RADio:DECT)****:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity[:B]****Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|
FDEV1_FS|FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURce]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B]?
```

This command sets the data pattern type (pseudo-random number sequence, 4-bit pattern, sequence of 1's and 0's, data from an external source, or a user file) for the B field of the selected portable part low-capacity timeslot.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
	<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1's &amp; 4 0's</b>			
	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>					

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity[:B]:FIX4****Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B]:FIX4 <val>
[:SOURce]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected portable part low-capacity timeslot B field.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. Refer to “:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity[:B]” on page 592 to change the data type.

## **:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:POWer**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:  
POWER MAIN|DELTA  
[:SOURce]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:  
POWER?
```

This command defines the RF output power level for the selected timeslot.

**MAIN** This choice specifies RF output as the main power level.

**DELTA** This choice specifies RF output as the alternative power level.

**\*RST** MAIN

**Key Entry** Timeslot Ampl Main Delta

## **:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATe**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATe ON|OFF|  
1|0  
[:SOURce]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATe?
```

This command enables or disables the operating state of the selected portable part timeslot.

**\*RST** Timeslot 0: 1 Timeslots 1–11: 0

**Key Entry** Timeslot Off On

## **:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:A**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:  
A <val>  
[:SOURce]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:A?
```

This command customizes the A field for the selected traffic bearer timeslot in the portable part link. The A field carries signaling data (48 bits) and error correction (16 bits).

**\*RST** #H0000FFFF0000FFFF

**Range** #H0–#HFFFFFFFFFFFFFFFF

**Key Entry** A field

**DECT Subsystem—Option 402 ([:SOURCE]:RADIO:DECT)****:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:P****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:

P &lt;val&gt;

[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:P?

This command customizes the preamble (P) field of the selected traffic bearer timeslot in the portable part link.

**\*RST** #H5555**Range** #H0–#HFFFF**Key Entry** P**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:S****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:

S &lt;val&gt;

[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:

S?

This command sets the synchronization pattern for the selected traffic bearer timeslot in the portable part link.

**\*RST** #H1675**Range** #H0–#HFFFF**Key Entry** S



**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
TRAFfic[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|
FDEV1_FS|FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURce]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]?
```

This command sets the B field data pattern for the selected traffic bearer timeslot in the portable part link.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
	<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1's &amp; 4 0's</b>			
	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>					

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]:FIX4**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]:
FIX4 <val>
[:SOURce]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]:
FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the portable part traffic bearer B field of the selected timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**DECT Subsystem—Option 402 ([:SOURCE]:RADio:DECT)**

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:A**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:  
A <val>

[ :SOURCE ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:A?

This command customizes the A field for the selected low-capacity with Z field timeslot in the portable part link.

The A field carries signaling data (48 bits) and error correction (16 bits).

**\*RST** #H0000FFFF0000FFFF

**Range** #H0–#HFFFFFFFFFFFFFFFF

**Key Entry** A

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:P**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:  
P <val>

[ :SOURCE ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:P?

This command customizes the preamble (P) field of the selected low-capacity with Z field timeslot in the portable part link.

**\*RST** #H5555

**Range** #H0–#HFFFF

**Key Entry** P

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:S**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:  
S <val>

[ :SOURCE ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:S?

This command customizes the synchronization pattern of the selected low-capacity with Z field timeslot in the portable part link.

**\*RST** #H1675

**Range** #H0–#HFFFF

**Key Entry** S

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity[:B]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|
FDEV1_FS|FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURce]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B]?
```

This command sets the data pattern for the B field of the selected portable part low-capacity with Z field timeslot.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
	<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1's &amp; 4 0's</b>			
	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>					

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity[:B]:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B]:FIX4 <val>
[:SOURce]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the portable part low-capacity with Z field B field of the selected timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**DECT Subsystem—Option 402 ([:SOURCE]:RADIO:DECT)****:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:A****Supported** E4438C with Option 402[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:  
A <val>

[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:A?

This command customizes the A field for the selected traffic bearer with Z field timeslot in the portable part link. The A field carries signaling data (48 bits) and error correction (16 bits).

**\*RST** #H0000FFFF0000FFFF**Range** #H0–#HFFFFFFFFFFFFFFFF**Key Entry** A field**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:P****Supported** E4438C with Option 402[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:  
P <val>

[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:P?

This command customizes the preamble (P) field of the selected traffic bearer with Z field timeslot in the portable part link.

**\*RST** #H5555**Range** #H0–#HFFFF**Key Entry** P**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:S****Supported** E4438C with Option 402[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:  
S <val>

[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:S?

This command sets the synchronization pattern for the selected traffic bearer with Z field timeslot in the portable part link.

**\*RST** #H1675**Range** #H0–#HFFFF**Key Entry** S

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZTRaffic[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|
FDEV1_FS|FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]?
```

This command sets the B field data pattern for the selected traffic bearer with Z field timeslot in the portable part link.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
	<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1's &amp; 4 0's</b>			
	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>					

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]:FIX4**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]:
FIX4 <val>
[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]:
FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the portable part traffic bearer with Z field B field of the selected timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. Refer to [“:PPart:SLOT0|\[1\]|2|3|4|5|6|7|8|9|10|11:ZTRaffic\[:B\]” on page 599](#) to change the data type.

**DECT Subsystem—Option 402 ([:SOURCE]:RADIO:DECT)****:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11[:TYPE]****Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11[:TYPE]
CUSTOm|DUMM[1]|DUMM2|TRAFfic|LCAPacity|ZTRaffic|ZLCapacity
[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11[:TYPE]?
```

This command selects the timeslot type for the selected timeslot in the radio fixed part link.

**\*RST** Timeslot 0: TRAF Timeslots 1–4: CUST

**Key Entry**            **Custom**    **Dummy Bearer 1**    **Dummy Bearer 2**    **Traffic Bearer**  
**Low Capacity**        **Traffic Bearer with Z field**    **Low Capacity with Z field**

**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTOm****Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTOm PN9|
PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|FDEV1_FS|FDEV2_FS|
FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTOm?
```

This command sets the data pattern for the data field of the selected custom timeslot in the radio fixed part link.

**\*RST** PN9

**Key Entry**            **PN9**    **PN11**    **PN15**    **PN20**    **PN23**    **FIX4**    **User File**    **Ext**    **FDEV1\_HS**  
**FDEV1\_FS**    **FDEV2\_FS**    **FACC**    **DM1**    **DM0**    **4 1's & 4 0's**  
**8 1's & 8 0's**    **16 1's & 16 0's**    **32 1's & 32 0's**    **64 1's & 64 0's**

**Remarks**            Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

### **:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom:  
FIX4 <val>
```

```
[ :SOURce ] :RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom:  
FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected radio fixed part custom timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. Refer to  
“:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom” on page 600 to change the  
data type.

### **:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:A**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:  
A <val>
```

```
[ :SOURce ] :RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:A?
```

This command customizes the A field for the selected dummy 2 timeslot in the radio fixed part link.

**\*RST** #H0000FFFF0000FFFF

**Range** #H0–#HFFFFFFFFFFFFFFFF

**Key Entry** **A field**

**Remarks** The A field carries signaling data (48 bits) and error correction (16 bits).

**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:P****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:

P &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:P?

This command customizes the preamble (P) field for the selected dummy 2 timeslot in the radio fixed part link.

**\*RST** #HAAAA**Range** #H0–#HFFFF**Key Entry** P**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:S****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:

S &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:S?

This command customizes the synchronization (S) field of the selected dummy 2 timeslot in the radio fixed part link.

**\*RST** #HE98A**Range** #H0–#HFFFF**Key Entry** S**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1]:A****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1]:

A &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1]:A?

This command customizes the A field for the selected dummy 1 timeslot in the radio fixed part link.

**\*RST** #H0000FFFF0000FFFF**Range** #H0–#HFFFFFFFFFFFFFFFFFFFF**Key Entry** A field

**Remarks** The 64-bit A field carries signaling data (48 bits) and error correction (16 bits).



**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1]:P**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1] :

P <val>

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1] :P?

This command customizes the preamble (P) field for the selected dummy 1 timeslot in the radio fixed part link.

**\*RST** #HAAAA

**Range** #H0–#HFFFF

**Key Entry** P

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1]:S**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1] :

S <val>

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1] :S?

This command customizes the synchronization (S) field of the selected dummy 1 timeslot in the radio fixed part link.

**\*RST** #HE98A

**Range** #H0–#HFFFF

**Key Entry** S

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:A**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:

A <val>

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:A?

This command customizes the A field for the selected low-capacity timeslot in the radio fixed part link.

**\*RST** #H0000FFFF0000FFFF

**Range** #H0–#HFFFFFFFFFFFFFFFF

**Key Entry** A field

**DECT Subsystem—Option 402 ([:SOURCE]:RADIO:DECT)****:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPACITY:P****Supported** E4438C with Option 402[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPACITY:  
P <val>

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPACITY:P?

This command customizes the preamble (P) field of the selected low-capacity timeslot in the portable part link.

**\*RST** #HAAAA**Range** #H0–#H1111**Key Entry** P**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPACITY:S****Supported** E4438C with Option 402[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPACITY:  
S <val>

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPACITY:S?

This command customizes the synchronization pattern of the selected low-capacity timeslot in the portable part link.

**\*RST** #HE98A**Range** #H0–#H1111**Key Entry** S**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPACITY[:B]****Supported** E4438C with Option 402[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:  
LCAPACITY[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1\_HS|  
FDEV1\_FS|FDEV2\_FS|FACCURACY|DM1|DM0|P4|P8|P16|P32|P64[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:  
LCAPACITY[:B]?

This command sets the data pattern for the B field of the selected portable part low-capacity timeslot.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9 PN11 PN15 PN20 PN23 FIX4 User File Ext FDEV1_HS</b> <b>FDEV1_FS FDEV2_FS FACC DM1 DM0 4 1's &amp; 4 0's</b> <b>8 1's &amp; 8 0's 16 1's &amp; 16 0's 32 1's &amp; 32 0's 64 1's &amp; 64 0's</b>
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity[:B]:FIX4**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B]:FIX4 <val>
[:SOURCE]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected radio fixed part low-capacity timeslot B field.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:POWer**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:POWer MAIN|
DELTA
[:SOURCE]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:POWer?
```

This command defines the RF output power level for the selected timeslot.

**MAIN** This choice specifies RF output as the main power level.

**DELTA** This choice specifies RF output as the alternative power level.

**\*RST** MAIN

**Key Entry** **Timeslot Ampl Main Delta**

**DECT Subsystem—Option 402 ([:SOURCE]:RADIO:DECT)**

**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATE**

**Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATE ON|OFF|1|0

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATE?

This command enables or disables the operating state of the selected timeslot in the radio fixed part.

**\*RST** Timeslot 0: 1 Timeslots 1–11: 0

**Key Entry** Timeslot Off On

**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFFIC:A**

**Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFFIC:A <val>

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFFIC:A?

This command customizes the A field for the selected traffic bearer timeslot in the portable part link.

**\*RST** #H0000FFFF0000FFFF

**Range** #H0–#HFFFFFFFFFFFFFFFF

**Key Entry** A field

**Remarks** The A field carries signaling data (48 bits) and error correction (16 bits).

**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFFIC:P**

**Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFFIC:P <val>

[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFFIC:P?

This command customizes the preamble (P) field of the selected traffic bearer timeslot in the radio fixed part link.

**\*RST** #HAAAA

**Range** #H0–#HFFFF

**Key Entry** P

**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFFIC:S**

**Supported**            E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:RFPART:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:TRAFFIC:
S <val>
[ :SOURCE ] :RADIO:DECT:RFPART:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:TRAFFIC:S?
```

This command customizes the synchronization (S) field of the selected traffic bearer timeslot in the radio fixed part link.

**\*RST**                #HE98A  
**Range**              #H0–#HFFFF  
**Key Entry**         S

**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFFIC[:B]**

**Supported**            E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:RFPART:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:
TRAFFIC[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|
FDEV1_FS|FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[ :SOURCE ] :RADIO:DECT:RFPART:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:TRAFFIC[:B]?
```

This command sets the B field’s data pattern for the selected traffic bearer timeslot in the radio fixed part during framed data transmission.

**\*RST**                PN9  
**Key Entry**         **PN9    PN11    PN15    PN20    PN23    FIX4    User File    Ext    FDEV1\_HS**  
**FDEV1\_FS    FDEV2\_FS    FACC    DM1    DM0    4 1’s & 4 0’s**  
**8 1’s & 8 0’s    16 1’s & 16 0’s    32 1’s & 32 0’s    64 1’s & 64 0’s**

**Remarks**            Refer to “[File Name Variables](#)” on [page 13](#) for information on the file name syntax.

**DECT Subsystem—Option 402 (:SOURce):RADio:DECT)****:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]:FIX4****Supported** E4438C with Option 402

[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]:FIX4 &lt;val&gt;

[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]:FIX4?

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected radio fixed part traffic bearer timeslot B field.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type, refer to “:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]” on page 607.

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:A****Supported** E4438C with Option 402

[:SOURce]:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:A &lt;val&gt;

[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:A?

This command customizes the A field for the selected low-capacity with Z field timeslot in the radio fixed part link. The A field carries signaling data (48 bits) and error correction (16 bits).

**\*RST** #H0000FFFF0000FFFF**Range** #H0–#HFFFFFFFFFFFFFFFF**Key Entry** **A field****:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:P****Supported** E4438C with Option 402

[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:P &lt;val&gt;

[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:P?

This command customizes the preamble (P) field of the selected low-capacity with Z field timeslot in the radio fixed part link.

**\*RST**               #HAAAA  
**Range**             #H0–#HFFFF  
**Key Entry**        **P**

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:S**

**Supported**        E4438C with Option 402

```
[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:
S <val>
[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:
S?
```

This command customizes the synchronization (S) field of the selected low-capacity with Z field timeslot in the radio fixed part link.

**\*RST**               #HE98A  
**Range**             #H0–#HFFFF  
**Key Entry**        **S**

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity[:B]**

**Supported**        E4438C with Option 402

```
[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|
FDEV1_FS|FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B]?
```

This command sets the B field’s data pattern for the selected low-capacity with Z field timeslot in the radio fixed part during framed data transmission.

**\*RST**               PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
	<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1’s &amp; 4 0’s</b>			
	<b>8 1’s &amp; 8 0’s</b>	<b>16 1’s &amp; 16 0’s</b>	<b>32 1’s &amp; 32 0’s</b>	<b>64 1’s &amp; 64 0’s</b>					

**Remarks**        Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**DECT Subsystem—Option 402 ([:SOURCE]:RADIO:DECT)****:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity[:B]:FIX4**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B]:FIX4 <val>
[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected radio fixed part low-capacity with Z field timeslot B field.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:A**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:
A <val>
[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:A?
```

This command customizes the A field for the selected traffic bearer timeslot in the radio fixed part link. The A field carries signaling data (48 bits) and error correction (16 bits).

**\*RST** #H0000FFFF0000FFFF

**Range** #H0–#HFFFFFFFFFFFFFFFF

**Key Entry** **A field**

**:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:P**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:
P <val>
[:SOURCE]:RADIO:DECT:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:P?
```

This command customizes the preamble (P) field of the selected traffic bearer with Z field timeslot in the radio fixed part link.



**\*RST**               #HAAAA  
**Range**             #H0–#HFFFF  
**Key Entry**         **P**

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:S**

**Supported**        E4438C with Option 402

```
[:SOURCE]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:
S <val>
[:SOURCE]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:S?
```

This command customizes the synchronization (S) field of the selected traffic bearer with Z field timeslot in the radio fixed part link.

**\*RST**               #HE98A  
**Range**             #H0–#HFFFF  
**Key Entry**         **S**

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]**

**Supported**        E4438C with Option 402

```
[:SOURCE]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZTRaffic[:B] PN9|PN15|FIX4|"<file name>"|EXT|FDEV1_HS|FDEV1_FS|
FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURCE]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZTRaffic[:B]?
```

This command sets the B field data pattern for the selected traffic bearer with Z field timeslot in the portable part link.

**\*RST**               PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
	<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1's &amp; 4 0's</b>			
	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>					

**Remarks**         Refer to “File Name Variables” on page 13 for information on the file name syntax.

**DECT Subsystem—Option 402 ([:SOURCE]:RADIO:DECT)****:RFPART:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRAFFIC[:B]:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:RFPART:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:
ZTRAFFIC[:B]:FIX4 <val>
[ :SOURCE ] :RADIO:DECT:RFPART:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:
ZTRAFFIC[:B]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected radio fixed part traffic bearer with Z field timeslot B field.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**:SECONDARY:RECALL**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:SECONDARY:RECALL
```

This command recalls the secondary frame configuration, overwriting the current state.

**Key Entry** **Recall Secondary Frame State**

**Remarks** To save a secondary frame state, refer to “[:SECONDARY:SAVE](#)” on page 612.

A secondary frame is not active until the secondary state is enabled. To activate a secondary frame, refer to “[:SECONDARY\[:STATE\]](#)” on page 613.

**:SECONDARY:SAVE**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:SECONDARY:SAVE
```

This command saves the current frame configuration as the secondary frame with the filename DECT\_SECONDARY\_FRAME.

**Key Entry** **Save Secondary Frame State**

**Remarks** To recall the secondary frame (saved in non-volatile signal generator memory), refer to “[:SECONDARY:RECALL](#)” on page 612.

### **:SECondary:TRIGger[:SOURce]**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:SECondary:TRIGger [ :SOURce ] KEY | EXT | BUS
[ :SOURce ] :RADio:DECT:SECondary:TRIGger [ :SOURce ] ?
```

This command selects the type of triggering for the secondary frame.

- KEY**                    This choice enables triggering by pressing the front panel **Trigger** hardkey.
- EXT**                   This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to [“:TRIGger\[:SOURce\]:EXTernal\[:SOURce\]” on page 620](#).
- BUS**                    This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**Key Entry**            **Trigger Key      Ext      Bus**

### **:SECondary[:STATe]**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:SECondary [ :STATe ] ON | OFF | 1 | 0
[ :SOURce ] :RADio:DECT:SECondary [ :STATe ] ?
```

This command enables or disables the ability to switch to the secondary frame.

**\*RST**                    0

**Key Entry**            **Secondary Frame Off On**

**Remarks**            A frame must already be saved as the secondary frame in order to turn the secondary state function on.

To save a frame as the secondary frame, refer to [“:SECondary:SAVE” on page 612](#).

**:SOUT**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:SOUT FRAME|SLOT|ALL
[:SOURCE]:RADIO:DECT:SOUT?
```

This command sets the synchronization location (within the pattern of data) and the type of output at the EVENT 1 rear panel connector.

**FRAME** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a framed data pattern.

**SLOT** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a selected timeslot.

**ALL** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for all active timeslots.

**\*RST** FRAME

<b>Key Entry</b>	<b>Begin Frame</b>	<b>Begin Timeslot #</b>	<b>All Timeslots</b>
------------------	--------------------	-------------------------	----------------------

**:SOUT:OFFSet**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:SOUT:OFFSet <val>
[:SOURCE]:RADIO:DECT:SOUT:OFFSet?
```

This command sets the offset value for the location of the output synchronization signal on the EVENT1 rear panel connector relative to the beginning of the framed data pattern or timeslot.

The variable <val> is expressed in bits.

**\*RST** +0

**Range** -479 to 479

**Key Entry** **Sync Out Offset**

**Remarks** Negative values move the synchronization output signal earlier; positive values move it later.

To change the output of the EVENT1 rear panel connector to SLOT, refer to “:SOUT” on page 614.

## :SOUT:SLOT

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:SOUT:SLOT <val>  
[ :SOURce ] :RADio:DECT:SOUT:SLOT?
```

This command selects the timeslot that will trigger a 1-bit signal at the EVENT 1 rear panel connector.

**\*RST** +1

**Range** Radio Fixed Part Link: 0–12      Portable Part Link: 1–11

**Key Entry** **Begin Timeslot #**

**Remarks** To change the output of the EVENT1 rear panel connector to SLOT, refer to [“:SOUT” on page 614](#).

## :SRATe

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DECT:SRATe <val>  
[ :SOURce ] :RADio:DECT:SRATe?
```

This command sets the transmission symbol rate. Symbol rate is the bit rate divided by the bits per symbol. A change in the symbol rate affects the bit rate. Refer to [“:BRATe” on page 574](#) for information on bit rate.

The variable <val> is expressed in units of symbols per second (sps–Msp) and the maximum symbol rate depends on the filter. Refer to [“:FILTer” on page 585](#) for minimum filter symbol width

The filter may have to be truncated down to 32 or 16 symbols wide to achieve the highest symbol rate. The signal generator’s internal filters are not truncated below their minimum filter length and user-defined FIR filters are not truncated. If the filter cannot be truncated then the symbol rate is limited to the maximum rate of the narrowest filter size possible.

The relative timing of the modulated data, as well as the actual filter response is affected when the filter is truncated.

When the symbol rate changes, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the symbol rate: lower symbol rates require more time.

To change the modulation type, refer to [“:MODulation\[:TYPE\]” on page 588](#).

**\*RST** +1.15200000E+006

Receiver Test Digital Commands  
**DECT Subsystem—Option 402 ([:SOURce]:RADio:DECT)**

Range	Modulation Type	Symbol Rate Range		
		16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
	BPSK, FSK2, MSK	1sps–50Msps	1sps–25Msps	1sps–12.5Msps
	C4FM, OQPSK, FSK4	2sps–25Msps	2sps–12.5Msps	2sps–6.25Msps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3sps–16.666666666 Msps	3sps–8.333333333 Msps	3sps–4.166666666Msps
	FSK16, PSK16, QAM16	4sps–12.5Msps	4sps–6.25Msps	4sps–3.125Msps
	QAM32	5sps–10Msps	5sps–5Msps	5sps–2.5Msps
	QAM64	6sps–8.333333333 Msps	6sps–4.166666666 Msps	6sps–2.083333333 Msps
	QAM128	7sps–7.142857142 Msps	7sps–3.571428572 Msps	7sps–1.785714285 Msps
	QAM256	8sps–6.25Msps	8sps–3.125 Msps	8sps–1.5625 Msps

---

**NOTE** Using I/Q skew will half the minimum number of symbols for the selected filter.

---

**Key Entry**            **Symbol Rate**

**:TRIGger:TYPE**

**Supported**            E4438C with Option 402

[ :SOURce ]:RADio:DECT:TRIGger:TYPE CONTInuous | SINGle | GATE  
 [ :SOURce ]:RADio:DECT:TRIGger:TYPE?

This command sets the trigger type.

**CONTInuous**            The framed data sequence repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to “:TRIGger:TYPE:CONTInuous[:TYPE]” on page 617.

**SINGle**                    The framed data sequence plays once for every trigger received.

**GATE**                    An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set to high or low.

**\*RST**                    **CONT**

**Key Entry**            **Continuous**        **Single**        **Gated**

**:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported**            E4438C with Option 402

[ :SOURCE ] :RADio:DECT:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE | TRIGger | RESet  
 [ :SOURCE ] :RADio:DECT:TRIGger:TYPE:CONTInuous [ :TYPE ] ?

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see “:TRIGger:TYPE” on page 616.

The following list describes the waveform’s response to each of the command choices:

**FREE**                    Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.

**TRIGger**                The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.

**RESet**                    The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.

**\*RST**                    **FREE**

**Key Entry**            **Free Run**        **Trigger & Run**        **Reset & Run**

**:TRIGger:TYPE:GATE:ACTive**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[ :SOURCE ] :RADio:DECT:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 616.

The following list describes the ESG’s gating behavior for the polarity selections:

LOW The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).

HIGH The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).

\*RST HIGH

**Key Entry** Gate Active Low High

**:TRIGger[:SOURCE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] KEY|EXT|BUS
[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] ?
```

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 616. The following list describes the command choices:

KEY This choice enables manual triggering by pressing the front-panel **Trigger** hardkey.

EXT An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 620.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User’s Guide*.



- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 618
  - continuous and single modes, see “:TRIGger[:SOURce]:EXTernal:SLOPe” on page 620
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[:SOURce]:EXTernal:DELay” on page 619
  - turning the delay on, see “:TRIGger[:SOURce]:EXTernal:DELay:STATe” on page 621

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

<b>Key Entry</b>	<b>Trigger Key</b>	<b>Ext</b>	<b>Bus</b>
------------------	--------------------	------------	------------

### **:TRIGger[:SOURce]:EXTernal:DELay**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:TRIGger [ :SOURce ] :EXTernal:DELay <val>
[ :SOURce ] :RADio:DECT:TRIGger [ :SOURce ] :EXTernal:DELay?
```

This command sets the number of bits to delay the ESG’s response to an external trigger.

The bit delay is a delay between when the ESG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the ESG receives the trigger and the set number of delay bits (clocks) occurs, the ESG transmits the data pattern.

The delay occurs after you enable the state. See “:TRIGger[:SOURce]:EXTernal:DELay:STATe” on page 621. You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 618.

**\*RST** +0

**Range** 0–1048575

**Key Entry** Ext Delay Bits

**:TRIGger[:SOURCE]:EXternal:SLOPe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] :EXternal:SLOPe POSitive |NEGative
[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] :EXternal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 618.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 618.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos

**:TRIGger[:SOURCE]:EXternal[:SOURCE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] :EXternal [ :SOURCE ] EPT1 |EPT2 |
EPTRIGGER1 |EPTRIGGER2
[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] :EXternal [ :SOURCE ] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 618. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.

**\*RST** EPT1  
**Key Entry** Patt Trig In 1 Patt Trig In 2

### **:TRIGger[:SOURCE]:EXtErnal:DELay:STATe**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] :EXtErnal:DELay:STATe ON|OFF|1|0  
[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] :EXtErnal:DELay:STATe?

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “[\[:TRIGger\[:SOURCE\]:EXtErnal:DELay\]](#)” on page 619, and for more information on configuring an external source, see “[\[:TRIGger\[:SOURCE\]\]](#)” on page 618.

**\*RST** 0  
**Key Entry** Ext Delay Off On

### **[:STATe]**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:DECT[:STATe] ON|OFF|1|0  
[ :SOURCE ] :RADio:DECT[:STATe]?

This command enables or disables the DECT modulation format.

**\*RST** 0  
**Key Entry** Dect Off On

**Remarks** Although the DECT modulation is enabled with this command, the RF carrier is not modulated unless you enable the modulation by pressing the front panel **Mod On/Off** hardkey.

---

## EDGE Subsystem—Option 402 ([:SOURCE]:RADIO:EDGE)

### :ALPHA

**Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:ALPHA <val>

[:SOURCE]:RADIO:EDGE:ALPHA?

This command changes the Nyquist or root Nyquist filter's alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E-001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “:FILTER” on page 634.

### :BBCLOCK

**Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:BBCLOCK INT[1] | EXT[1]

[:SOURCE]:RADIO:EDGE:BBCLOCK?

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

INT[1] This choice selects the signal generator internal data clock.

EXT[1] This choice selects an external data clock input.

**\*RST** INT

**Key Entry** **Ext Data Clock Ext Int**

**Remarks** A data clock or continuous symbol sync input must be supplied when external mode is used.

This will be ignored if the external reference is set to EXTERNAL. To change the external reference type, refer to “:REFERENCE” on page 633.

## :BBT

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:BBT <val>
```

```
[ :SOURCE ] :RADIO:EDGE:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999).

**\*RST** +3.00000000E-001

**Range** 0.100–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTER” on page 634.

## :BURSt:SHAPE:FALL:DELAy

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:BURSt:SHAPE:FALL:DELAy <val>
```

```
[ :SOURCE ] :RADIO:EDGE:BURSt:SHAPE:FALL:DELAy?
```

This command sets the period of time that the start of the burst fall is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** -16.2000 to 99

**Key Entry** **Fall Delay**

**EDGE Subsystem—Option 402 ([:SOURCE]:RADIO:EDGE)**

**Remarks**                    The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:FDELaY” on page 624 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:FDELaY**

**Supported**                    E4438C with Option 402

```
[ :SOURCE ] :RADIo:EDGE:BURSt:SHAPe:FDELaY <val>  
[ :SOURCE ] :RADIo:EDGE:BURSt:SHAPe:FDELaY?
```

This command sets the period of time that the start of the burst fall is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST**                            +0.00000000E+000

**Range**                            –16.2000 to 99

**Key Entry**                    **Fall Delay**

**Remarks**                    The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:DELaY” on page 623 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## :BURSt:SHAPe:FALL:TIME

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:FALL:TIME <val>

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:FALL:TIME?

This command sets the period of time where the burst decreases from full power to minimum power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +1.00000000E+001

**Range** 0.2000–409.2000

**Key Entry** **Fall Time**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:FTIME” on page 625 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## :BURSt:SHAPe:FTIME

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:FTIME <val>

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:FTIME?

This command sets the period of time where the burst decreases from full power to minimum power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** 0.2000–409.2000

**Key Entry** **Fall Time**

**EDGE Subsystem—Option 402 ([:SOURCE]:RADIO:EDGE)**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPE:FALL:TIME” on page 625 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPE:RDElay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:BURSt:SHAPE:RDElay <val>
```

```
[ :SOURCE ] :RADio:EDGE:BURSt:SHAPE:RDElay?
```

This command sets the period of time that the start of the burst rise is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** -7.2000 to 99

**Key Entry** **Rise Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPE:RISE:DElay” on page 627 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.



## **:BURSt:SHAPe:RISE:DELay**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:RISE:DELay <val>

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:RISE:DELay?

This command sets the period of time that the start of the burst rise is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** -7.2000 to 99

**Key Entry** **Rise Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:RDELay” on page 626 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## **:BURSt:SHAPe:RISE:TIME**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:RISE:TIME <val>

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:RISE:TIME?

This command sets the period of time where the burst increases from a minimum power to full power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +1.00000000E+001

**Range** 0.2000–16.4000

**Key Entry** **Rise Time**

<b>Remarks</b>	<p>The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.</p> <p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPE:RTIME” on page 628 performs the same function. In compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>
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**:BURSt:SHAPE:RTIME**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:BURSt:SHAPE:RTIME <val>

[ :SOURCE ] :RADIO:EDGE:BURSt:SHAPE:RTIME?

This command sets the period of time where the burst increases from a minimum power to full power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +1.00000000E+001

**Range** 0.2000–16.4000

**Key Entry** **Rise Time**

<b>Remarks</b>	<p>The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.</p> <p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPE:RISE:TIME” on page 627 performs the same function. In compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>
----------------	--

## :BURSt:SHAPE[:TYPE]

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:BURSt:SHAPE[:TYPE] SINE | "<file name>"  
[ :SOURCE ] :RADio:EDGE:BURSt:SHAPE[:TYPE] ?
```

This command sets the burst shape type.

**SINE** This choice selects a burst shape defined by the burst rise and fall \*RST values.

"<file name>" This choice selects a user-defined file from signal generator memory.

**\*RST** SINE

**Key Entry** **Sine User File**

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

## :BURSt[:STATe]

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:BURSt[:STATe] ON | OFF | 1 | 0  
[ :SOURCE ] :RADio:EDGE:BURSt[:STATe] ?
```

This command enables or disables the burst function.

**ON (1)** This choice enables the transmission of framed data. If all timeslots which are switched on are up traffic channels or custom, you will be bursting the timeslots that are on; there will be no RF carrier during the off timeslots.

If you have switched on any timeslot that you have configured as a down traffic channel, the RF carrier is not switched off between any of the timeslots. The off timeslots are transmitted as a continuous series of ones for the time period of the off timeslots.

**OFF (0)** This choice enables the transmission of unframed data.

**\*RST** 0

**Key Entry** **Data Format Pattern Framed**

**:CHANnel****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:CHANnel EVM|ACP

[:SOURCE]:RADIO:EDGE:CHANnel?

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

EVM This choice provides the most ideal passband.

ACP This choice improves stopband rejection.

**\*RST** ACP**Key Entry** **Optimize FIR For EVM ACP****Remarks** To change the current filter type, refer to “:FILTer” on page 634.**:DATA****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:DATA PN9|PN11|PN15|PN20|PN23|FIX4|"&lt;file name&gt;"|EXT|

P4|P8|P16|P32|P64|PRAM

[:SOURCE]:RADIO:EDGE:DATA?

This command sets the data pattern type (pseudo-random number sequence, 4-bit pattern, sequence of 1's and 0's, data from an external source, or a user file) for unframed data transmission.

**\*RST** PN9**Key Entry** **PN9 PN11 PN15 PN20 PN23 FIX4 User File Ext****4 1's & 4 0's 8 1's & 8 0's 16 1's & 16 0's 32 1's & 32 0's****64 1's & 64 0's PRAM File****Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

## :DATA:PRAM

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO :EDGE :DATA :PRAM "<file_name>"
```

```
[ :SOURCE ] :RADIO :EDGE :DATA :PRAM?
```

This command selects a pattern RAM (PRAM) file as the pattern data type for the EDGE (Enhanced Data GSM Environment) format.

"<file\_name>" This variable designates the PRAM file in WFM1. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**Key Entry** **PRAM File**

**Remarks** Selecting this data source forces the burst source to INTERNAL to allow framing control.

The PRAM file must reside in the signal generator’s volatile memory (WFM1) in order to be accessed by this command. For more information on PRAM files, refer to [“:DATA:PRAM:FILE:BLOCK” on page 112](#)

## :DATA:FIX4

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO :EDGE :DATA :FIX4 <val>
```

```
[ :SOURCE ] :RADIO :EDGE :DATA :FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the EDGE modulation format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

To change the data type, refer to [“:DATA” on page 630](#).

**EDGE Subsystem—Option 402 ([:SOURCE]:RADIO:EDGE)**

**:DEFault**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:DEFault

This command returns all of the EDGE modulation format parameters to factory settings. It does not affect any other signal generator parameters.

**Key Entry** Restore EDGE Factory Default

**:EDATa:DELay**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:EDATa:DELay?

This query returns the amount of delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear panel connectors and the front panel RF OUTPUT connector.

**\*RST** +0.00000000E+000

**Remarks** When the EDGE format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

**:EDCLock**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:EDCLock SYMBOL | NORMal

[ :SOURCE ] :RADIO:EDGE:EDCLock?

This command sets the external data clock use.

**SYMBOL** This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMal** This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

**\*RST** NORM

**Key Entry** Ext Data Clock Normal Symbol

**Remarks** Both choices have no effect in internal clock mode. Refer to “[:BBClock](#)” on [page 622](#) to select EXT as the data clock type.

## :EREFerence

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:EREFerence INT | EXT

[ :SOURce ] :RADio:EDGE:EREFerence?

This command selects either an internal or external bit-clock reference for the data generator.

**\*RST** INT

**Key Entry** **BBG Ref Ext Int**

**Remarks** If the EXT choice is selected, the external source's frequency value must be applied to the BASEBAND GEN REF IN rear panel connector. The external reference and external data clock are not applicable at the same time. If both are selected, then the external reference takes precedence.

Refer to, “:EREFerence:VALue” on page 633 to enter the external reference frequency setting.

## :EREFerence:VALue

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:EREFerence:VALue <val>

[ :SOURce ] :RADio:EDGE:EREFerence:VALue?

This command sets the expected bit-clock reference frequency value for an externally applied reference signal.

The variable <val> is expressed in units of hertz (Hz–MHz).

**\*RST** +1.30000000E+007

**Range** 2.5E5–1E8

**Key Entry** **Ext BBG Ref Freq**

**Remarks** The value specified by this command is effective only when you are using an external reference applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:EREFerence” on page 633 to select EXT (external source) as the reference for the bit-clock.

**:FILTer**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:EDGE:FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|IS95|
IS95_EQ|IS95_MOD|IS95_MOD_EQ|EDGE|AC4Fm|UGGaussian|"<user FIR>"
[:SOURCE]:RADIO:EDGE:FILTer?
```

This command selects the pre-modulation filter type.

IS95	This choice selects a filter that meets the criteria of the IS-95 standard.
IS95_EQ	This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.
IS95_MOD	This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
IS95_MOD_EQ	This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
EDGE	This choice selects Laurant's decomposition of a Gaussian filter with a 0.300 fixed BbT.
AC4Fm	This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
"<user FIR>"	This variable is any filter file that you have stored into memory.

**\*RST** EDGE

<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>EDGE</b>	<b>APCO 25 C4FM</b>		
	<b>UN3/4 GSM Gaussian</b>	<b>User FIR</b>				

**Remarks** Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.



## **:IQ:SCALE**

**Supported** E4438C with Option 402

`[:SOURCE]:RADIO:EDGE:IQ:SCALE <val>`

`[:SOURCE]:RADIO:EDGE:IQ:SCALE?`

This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.

The variable <val> is expressed in units of percent.

**\*RST** +113

**Range** 1–200

**Key Entry** **I/Q Scaling**

**Remarks** This command has no effect with MSK or FSK modulation.

## **:MODulation:FSK[:DEVIation]**

**Supported** E4438C with Option 402

`[:SOURCE]:RADIO:EDGE:MODulation:FSK[:DEVIation] <val>`

`[:SOURCE]:RADIO:EDGE:MODulation:FSK[:DEVIation]?`

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by four, limited to 20 MHz.

**\*RST** +4.00000000E+002

**Range** 0–2E7

**Key Entry** **Freq Dev**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 637.  
Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

To set an asymmetric FSK deviation value, refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.

**:MODulation:MSK[:PHASe]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:MODulation:MSK[:PHASe] <val>
[ :SOURCE ] :RADio:EDGE:MODulation:MSK[:PHASe]?
```

This command sets the MSK phase deviation value.

The variable <val> is expressed in units of degrees.

**\*RST** +9.00000000E+001

**Range** 0–100

**Key Entry** **Phase Dev**

**:MODulation:UFSK**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:MODulation:UFSK "<file name>"
[ :SOURCE ] :RADio:EDGE:MODulation:UFSK?
```

This command selects a user-defined FSK file from the signal generator memory.

**Key Entry** **User FSK**

**Remarks** The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. Refer to [“:MODulation\[:TYPE\]” on page 637](#) to change the current modulation type.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:MODulation:UIQ**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:MODulation:UIQ "<file name>"
[ :SOURCE ] :RADio:EDGE:MODulation:UIQ?
```

This command selects a user-defined I/Q file from the signal generator memory.

**Key Entry** **User I/Q**

**Remarks**                   The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to “[:MODulation[:TYPE]]” on page 637 to change the current modulation type.

Refer to “File Name Variables” on page 13 for information on the file name syntax.

### **:MODulation[:TYPE]**

**Supported**                   E4438C with Option 402

```
[:SOURCE]:RADio:EDGE:MODulation[:TYPE] BPSK|QPSK|IS95QPSK|GRAYQPSK|
OQPSK|IS95OQPSK|P4DQPSK|PSK8|PSK16|D8PSK|MSK|FSK2|FSK4|FSK8|FSK16|C4FM|
QAM4|QAM16|QAM32|QAM64|QAM128|QAM256|EDGE|UIQ|UFSK
[:SOURCE]:RADio:EDGE:MODulation[:TYPE]?
```

This command sets the modulation type for the EDGE personality.

**\*RST**                         EDGE

<b>Key Entry</b>	<b>BPSK</b>	<b>QPSK</b>	<b>IS-95 QPSK</b>	<b>Gray Coded QPSK</b>	<b>OQPSK</b>			
	<b>IS-95 OQPSK</b>	$\pi/4$ <b>DQPSK</b>	<b>8PSK</b>	<b>16PSK</b>	<b>D8PSK</b>	<b>MSK</b>	<b>2-Lvl FSK</b>	
	<b>4-Lvl FSK</b>	<b>8-Lvl FSK</b>	<b>16-Lvl FSK</b>	<b>C4FM</b>	<b>4QAM</b>	<b>16QAM</b>	<b>32QAM</b>	
	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>	<b>EDGE</b>	<b>User I/Q</b>	<b>User FSK</b>		

### **:POLarity[:ALL]**

**Supported**                   E4438C with Option 402

```
[:SOURCE]:RADio:EDGE:POLarity[:ALL] NORMal|INVerted
[:SOURCE]:RADio:EDGE:POLarity[:ALL]?
```

This command sets the rotation direction for the phase modulation vector.

**NORMal**                   This choice selects normal phase polarity.

**INVerted**                 This choice inverts the internal Q signal.

**\*RST**                         NORM

**Key Entry**                 **Phase Polarity Normal Invert**

**:SECondary:RECall**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:SECondary:RECall

This command recalls the secondary frame configuration, overwriting the current frame.

**Key Entry** **Recall Secondary Frame State**

**Remarks** To save a secondary frame state, refer to “:SECondary:SAVE” on page 638.

A secondary frame is not active until the secondary state is enabled. To activate a secondary frame, refer to “:SECondary[:STATE]” on page 639.

**:SECondary:SAVE**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:SECondary:SAVE

This command saves the current frame configuration as the secondary frame with the filename EDGE\_SECONDARY\_FRAME.

**Key Entry** **Save Secondary Frame State**

**Remarks** To recall the secondary frame (saved in non-volatile signal generator memory), refer to “:SECondary:RECall” on page 638.

**:SECondary:TRIGger[:SOURCE]**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:SECondary:TRIGger [ :SOURCE ] KEY | EXT | BUS  
[ :SOURCE ] :RADIO:EDGE:SECondary:TRIGger [ :SOURCE ] ?

This command selects the type of triggering for the secondary frame.

**KEY** This choice enables triggering by pressing the front panel **Trigger** hardkey.

**EXT** This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connection, refer to “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 665.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**Key Entry** **Trigger Key Ext Bus**

## **:SECondary[:STATe]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:EDGE:SECondary[:STATe] ON|OFF|1|0
[:SOURCE]:RADIO:EDGE:SECondary[:STATe]?
```

This command enables or disables the ability to switch to the secondary frame.

**\*RST** 0

**Key Entry** **Secondary Frame Off On**

**Remarks** A frame must already be saved as the secondary frame in order to turn the secondary state function on.

To save a frame as the secondary frame, refer to “[:SECondary:SAVE](#)” on [page 638](#).

## **:SLOT0|[1]|2|3|4|5|6|7:CUSTom**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom PN9|PN11|PN15|PN20|
PN23|FIX4|"<file name>"|EXT|P4|P8|P16|P32|P64
[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom?
```

This command sets the data pattern type (pseudo-random number sequence, 4-bit pattern, sequence of 1's and 0's, data from an external source, or a user file) for framed data transmission.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN15</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>
	<b>16 1's &amp; 16 0's</b>		<b>32 1's &amp; 32 0's</b>		<b>64 1's &amp; 64 0's</b>		

**Remarks** Refer to “[File Name Variables](#)” on [page 13](#) for information on the file name syntax.

Refer to “[:SLOT0|\[1\]|2|3|4|5|6|7\[:TYPE\]](#)” on [page 656](#)

**:SLOT0|[1]|2|3|4|5|6|7:CUSTom:FIX4****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom:FIX4 &lt;val&gt;

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom:FIX4?

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected custom timeslot.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****Remarks** FIX4 must already be defined as the data type.

To change the data type, refer to “:SLOT0|[1]|2|3|4|5|6|7:CUSTom” on page 639.

**:SLOT0|[1]|2|3|4|5|6|7:CUSTom:GUARd****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom:

GUARd &lt;24 or 27 bit\_pattern&gt;

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom:GUARd?

This command defines the hexadecimal value for the guard time field in the selected custom timeslot.

**\*RST** Timeslots 0 & 4: #H7FFFFFFF

Timeslots: 1, 2, 3, 5, 6, &amp;7: #H0FFFFFFF

**Range** Timeslots 0 & 4: #H0–#H7FFFFFFF

Timeslots: 1, 2, 3, 5, 6, &amp;7: #H0–#H0FFFFFFF

**Key Entry** **G****Remarks** The guard time field is always modulated (but not bursted), even when the timeslot is off.

If the guard time and T2 symbols of the current timeslot and the T1 symbols of the next timeslot do not match, the burst shape may not be smooth (even if the current timeslot is turned off).

To change the current timeslot type, refer to “:SLOT0|[1]|2|3|4|5|6|7[:TYPE]” on page 656.

## **:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCryption**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCryption PN9|PN15|
FIX4| "<file name>" |P4|P8|P16|P32|P64|TCHFS|CS1|CS4|DMCS1|UMCS1
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCryption?
```

This command selects the data pattern type or the multiframe channel (structure) for the selected GMSK timeslot.

There are two types of multiframe structures, a 26 and a 52 frame structure. The 26 frame structure has the following attributes:

- frame 12 contains the slow associated control channel (SACCH)
- frame 25 is idle and incorporates RF blanking

The 52 frame structure has the following attributes:

- frames 12 and 38 contain tail and control bits with the payload bits set to zero.
- Frames 25 and 51 are idle and incorporate RF blanking.

**PN9, PN15** These choices are standard PN sequences. For bursted data, the PN sequences continuously repeat from one timeslot in a frame to the matching timeslot in the next frame.

**FIX4** This choice selects a repeating 4-bit pattern.

**"<file name>"** This choice selects a user-defined data file from signal generator memory. The file must supply enough bits to fill the desired number of timeslots. In timeslots where there is not enough bits to fill the encryption fields, the ESG ignores the data.

**P4** This choice selects a data pattern with four ones followed by four zeros. The pattern repeats as needed to fill the encryption fields.

**P8** This choice selects a data pattern with eight ones followed by eight zeros. The pattern repeats as needed to fill the encryption fields.

**P16** This choice selects a data pattern with 16 ones followed by 16 zeros. The pattern repeats as needed to fill the encryption fields.

**P32** This choice selects a data pattern with 32 ones followed by 32 zeros. The pattern repeats as needed to fill the encryption fields.

**P64** This choice selects a data pattern with 64 ones followed by 64 zeros. The pattern repeats as needed to fill the encryption fields.

**TCHFS** This multiframe choice selects a traffic channel with full rate speech (TCH/FS).

**EDGE Subsystem—Option 402 ([:SOURCE]:RADIO:EDGE)**

CS-1	This multiframe choice selects the packet data traffic channel that uses the packet data block type 1 coding scheme in accordance with the 3GPP standard GSM 05.03.					
CS4	This multiframe choice selects the packet data traffic channel that uses the packet data block type 4 coding scheme in accordance with the 3GPP standard GSM 05.03.					
DMCS1	This multiframe choice selects the downlink packet data traffic channel that uses the packet data block type 5 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03.					
UMCS1	This multiframe choice selects the uplink packet data traffic channel that uses the packet data block type 5 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03.					
<b>*RST</b>	PN9					
<b>Key Entry</b>	<b>PN9</b>	<b>PN15</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>4 1's &amp; 4 0's</b>
	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>	<b>TCH/FS</b>	<b>CS-1</b>	
	<b>CS-4</b>	<b>Downlink MCS-1</b>	<b>Uplink MCS-1</b>			

**:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCRyption:CS1:DATA**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:CS1:DATA PN9 | PN15

[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:CS1:DATA?

This command selects the encryption field data for the selected GMSK timeslot that uses the packet data block type 1 coding scheme.

**\*RST** PN9

**Key Entry** **PN9 PN15**

**Remarks** Refer to “:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCRyption” on page 641 for selecting the coding scheme.



## **:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCRyption:CS4:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:CS4:DATA PN9 |  
PN15
```

```
[ :SOURCE ] :RADIo:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:CS4:DATA?
```

This command selects the encryption field data for the selected GMSK timeslot that uses the packet data block type 4 coding scheme.

**\*RST** PN9

**Key Entry** PN9 PN15

**Remarks** Refer to “[:SLOT0|\[1\]|2|3|4|5|6|7:GMSK:ENCRyption](#)” on page 641 for selecting the coding scheme.

## **:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCRyption:DLINK:MCS1:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:DLINK:MCS1:  
DATA PN9 | PN15
```

```
[ :SOURCE ] :RADIo:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:DLINK:MCS1:  
DATA?
```

This command selects the encryption field data for the selected GMSK timeslot that uses the downlink packet data block type 5 modulation and coding scheme.

**\*RST** PN9

**Key Entry** PN9 PN15

**Remarks** Refer to “[:SLOT0|\[1\]|2|3|4|5|6|7:GMSK:ENCRyption](#)” on page 641 for selecting the coding scheme.

## **:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCRyption:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:FIX4 <val>  
[ :SOURCE ] :RADIo:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:FIX4?
```

This command sets the encryption field with a 4-bit binary repeating data pattern for the selected GMSK timeslot.

**EDGE Subsystem—Option 402 ([:SOURCE]:RADIO:EDGE)**

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** #B0000

**Range** 0–15

**Key Entry** **FIX4**

**Remarks** Refer to “[:SLOT0|\[1\]|2|3|4|5|6|7:GMSK:ENCRyption](#)” on page 641 for selecting the data type.

**:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCRyption:TCH:FS:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:TCH:FS :
DATA PN9 | PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:TCH:FS:DATA?
```

This command sets the encryption field data for the selected GMSK timeslot configured as the traffic channel with full speech (TCH/FS).

**\*RST** PN9

**Key Entry** **PN9 PN15**

**Remarks** Refer to “[:SLOT0|\[1\]|2|3|4|5|6|7:GMSK:ENCRyption](#)” on page 641 for selecting the TCH/FS.

**:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCRyption:ULINK:MCS1:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:ULINK:MCS1 :
DATA { PN9 } | PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:ULINK:MCS1 :
DATA?
```

This command selects the encryption field data for the selected GMSK timeslot that uses the uplink packet data block type 5 modulation and coding scheme.

**\*RST** PN9

**Key Entry** **PN9 PN15**

**Remarks** Refer to “[:SLOT0|\[1\]|2|3|4|5|6|7:GMSK:ENCRyption](#)” on page 641 for selecting the coding scheme.

### **:SLOT0|[1]|2|3|4|5|6|7:GMSK:STeal**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:GMSK:STeal 0|1
[:SOURce]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:GMSK:STeal?
```

This command specifies the stealing bit (1-bit S field) for the selected GMSK timeslot. The single bit defines the value for both stealing (S) fields.

The stealing flag field accepts values in binary, hexadecimal, or decimal format, however the query returns only hexadecimal values.

**\*RST** #H0

**Key Entry** **S**

### **:SLOT0|[1]|2|3|4|5|6|7:GMSK:TSEquence**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:GMSK:TSEquence TSC0|TSC1|
TSC2|TSC3|TSC4|TSC5|TSC6|TSC7|<26-bit pattern>
[:SOURce]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:GMSK:TSEquence?
```

This command changes the 26-bit training sequence (TS) for the selected GMSK timeslot.

The query returns the current training sequence hexadecimal value. Use the following table to match the hexadecimal values to the training sequences of TSC0–TSC7.

<b>Training Sequence</b>	<b>Hexadecimal Value</b>
TSC0	0970897
TSC1	0B778B7
TSC2	10EE90E
TSC3	11ED11E
TSC4	06B906B
TSC5	13AC13A
TSC6	29F629F
TSC7	3BC4BBC

**\*RST** #H0970897

**EDGE Subsystem—Option 402 ([:SOURCE]:RADIO:EDGE)**

<b>Range</b>	<26-bit pattern>: #H0–#H3FFFFFF							
<b>Key Entry</b>	<b>TSC0</b>	<b>TSC1</b>	<b>TSC2</b>	<b>TSC3</b>	<b>TSC4</b>	<b>TSC5</b>	<b>TSC6</b>	<b>TSC7</b>
	<b>Custom TS</b>							

**:SLOT0|[1]|2|3|4|5|6|7:MULTIslot**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :MULTIslot ON | OFF | 1 | 0
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :MULTIslot?
```

This command turns bursting (ramping) on or off between the selected timeslot and the next higher numbered adjacent timeslot.

ON (1) This choice turns ramping off between timeslots.

OFF (0) This choice turns ramping on between timeslots.

\*RST 0

**Key Entry** **Multislot Off On**

**Remarks** Turning multislot on between an EDGE and GSMK timeslot may produce undesired spectral content. The undesired spectral content is a byproduct of the transition between two different modulation types without ramping.

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCryption**

**Supported** E4438C with Options 402 or 416

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCryption PN9 | PN11 |
PN15 | PN20 | PN23 | FIX4 | "<filename>" | EXT | P4 | P8 | P16 | P32 | P64 | DMCS9 | UMCS9 | DMCS5
| UMCS5 | ETCHF43 | UNcOded | EBCH1 | EBCH2
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCryption?
```

This command selects the data pattern type or the multiframe channel (structure) for the selected normal timeslot.

There are two types of multiframe structures, a 26 and a 52 frame structure. The 26 frame structure has the following attributes:

- frame 12 contains the slow associated control channel (SACCH)
- frame 25 is idle and incorporates RF blanking

The 52 frame structure has the following attributes:

- frames 12 and 38 contain tail and control bits with the payload bits set to zero.

- Frames 25 and 51 are idle and incorporate RF blanking.

PN9–23	These choices are standard PN sequences. For bursted data, the PN sequences continuously repeat from one timeslot in a frame to the matching timeslot in the next frame.
FIX4	This choice selects a repeating 4-bit binary pattern.
"<filename>"	This choice selects a user-defined data file from signal generator memory. The file must supply enough bits to fill the desired number of timeslots. In timeslots where there are not enough bits to fill the encryption fields, the ESG ignores the data.
EXT	This choice selects an external user signal as the modulating data stream. Connect the externally supplied serial data signal to the front panel DATA BNC connector.

---

<b>NOTE</b>	The EXT selection is not available when configuring both GMSK and EDGE normal timeslots for the same signal.
-------------	--

---

P4	This choice selects a data pattern with four ones followed by four zeros. The pattern repeats as needed to fill the encryption fields.
P8	This choice selects a data pattern with eight ones followed by eight zeros. The pattern repeats as needed to fill the encryption fields.
P16	This choice selects a data pattern with 16 ones followed by 16 zeros. The pattern repeats as needed to fill the encryption fields.
P32	This choice selects a data pattern with 32 ones followed by 32 zeros. The pattern repeats as needed to fill the encryption fields.
P64	This choice selects a data pattern with 64 ones followed by 64 zeros. The pattern repeats as needed to fill the encryption fields.
DMCS9	This multiframe choice selects the downlink packet data traffic channel that uses the packet data block type 13 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03.
UMCS9	This multiframe choice selects the uplink packet data traffic channel that uses the packet data block type 13 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03.
DMCS5	This multiframe choice selects the downlink packet data traffic channel that uses the packet data block type 9 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03.
UMCS5	This multiframe choice selects the uplink packet data traffic channel that uses the packet data block type 9 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03.

## Receiver Test Digital Commands

### EDGE Subsystem—Option 402 ([:SOURCE]:RADIO:EDGE)

ETCH43	This multiframe choice selects an enhanced circuit switched full rate traffic channel with a user data rate of 43.2k-bits per second																																
Uncoded	This choice selects an uncoded channel.																																
EBCH1	This multiframe choice selects a <i>non-combined</i> broadcast channel for timeslot zero. Use this selection when timeslot zero is the only multiframe timeslot within the frame (timeslots 0–7). Trying to use a multiframe choice for another timeslot (timeslots 1–7) when timeslot zero is configured as a BCH, will create a settings conflict error.																																
EBCH2	This multiframe choice selects a <i>combined</i> broadcast channel for timeslot zero. Use this selection when timeslot zero is the only multiframe timeslot within the frame (timeslots 0–7). Trying to use a multiframe choice for another timeslot (timeslots 1–7) when timeslot zero is configured as a BCH, will create a settings conflict error.																																
*RST	PN9																																
Key Entry	<table><tr><td><b>PN9</b></td><td><b>PN11</b></td><td><b>PN15</b></td><td><b>PN20</b></td><td><b>PN23</b></td><td><b>FIX4</b></td><td><b>User File</b></td><td><b>EXT</b></td></tr><tr><td><b>4 1's &amp; 4 0's</b></td><td><b>8 1's &amp; 8 0's</b></td><td><b>16 1's &amp; 16 0's</b></td><td><b>32 1's &amp; 32 0's</b></td><td></td><td></td><td></td><td></td></tr><tr><td><b>64 1's &amp; 64 0's</b></td><td><b>Downlink MCS-9</b></td><td><b>Uplink MCS-9</b></td><td><b>Downlink MCS-5</b></td><td></td><td></td><td></td><td></td></tr><tr><td><b>Uplink MCS-5</b></td><td><b>E-TCH/F43.2</b></td><td><b>Uncoded</b></td><td></td><td></td><td></td><td></td><td></td></tr></table>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>					<b>64 1's &amp; 64 0's</b>	<b>Downlink MCS-9</b>	<b>Uplink MCS-9</b>	<b>Downlink MCS-5</b>					<b>Uplink MCS-5</b>	<b>E-TCH/F43.2</b>	<b>Uncoded</b>					
<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>																										
<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>																														
<b>64 1's &amp; 64 0's</b>	<b>Downlink MCS-9</b>	<b>Uplink MCS-9</b>	<b>Downlink MCS-5</b>																														
<b>Uplink MCS-5</b>	<b>E-TCH/F43.2</b>	<b>Uncoded</b>																															
Remarks	Refer to “ <a href="#">File Name Variables</a> ” on page 13 for information on the file name syntax.  To change the current timeslot type, refer to “ <a href="#">:SLOT0[1 2 3 4 5 6 7[:TYPE]]</a> ” on page 656.																																

### :SLOT0:NORMAL:ENCRyption:BCH:BCC

**Supported** E4438C with Option 416416

`[:SOURCE]:RADIO:EDGE:SLOT0:NORMAL:ENCRyption:BCH:BCC <val>`

`[:SOURCE]:RADIO:EDGE:SLOT0:NORMAL:ENCRyption:BCH:BCC?`

This command sets the broadcast control code (BCC) which is used to indicate what training sequence is being used by the basestation in the forward channels. This code will allow the mobile station to decode the other channels in the broadcast channel.

\*RST 0

Range 0–7

### **:SLOT0:NORMAL:ENCRyption:BCH:CELLid**

**Supported** E4438C with Option 416

```
[ :SOURCE ] : RADIO : EDGE : SLOT0 : NORMAL : ENCRyption : BCH : CELLid <val>  
[ :SOURCE ] : RADIO : EDGE : SLOT0 : NORMAL : ENCRyption : BCH : CELLid?
```

This command sets the cell identification. The purpose of the cell identity information element is to identify a cell within a location area.

**\*RST** 0

**Range** 0–65535

### **:SLOT0:NORMAL:ENCRyption:BCH:LAC**

**Supported** E4438C with Option 416

```
[ :SOURCE ] : RADIO : EDGE : SLOT0 : NORMAL : ENCRyption : BCH : LAC <val>  
[ :SOURCE ] : RADIO : EDGE : SLOT0 : NORMAL : ENCRyption : BCH : LAC?
```

This command sets the location area code (LAC). The location area code provides 16 bits to allow the administrator to define a location.

**\*RST** 0

**Range** 0–65535

### **:SLOT0:NORMAL:ENCRyption:BCH:MCC**

**Supported** E4438C with Option 416

```
[ :SOURCE ] : RADIO : EDGE : SLOT0 : NORMAL : ENCRyption : BCH : MCC <val>  
[ :SOURCE ] : RADIO : EDGE : SLOT0 : NORMAL : ENCRyption : BCH : MCC?
```

This command sets the mobile country code (MCC). The mobile country code is a 12 bit number used to represent the country where the basestation is located.

**\*RST** 0

**Range** 0–4095

**:SLOT0:NORMAL:ENCRyption:BCH:MNC****Supported** E4438C with Option 416

[:SOURCE]:RADIO:EDGE:SLOT0:NORMAL:ENCRyption:BCH:MNC &lt;val&gt;

[:SOURCE]:RADIO:EDGE:SLOT0:NORMAL:ENCRyption:BCH:MNC?

This command sets the mobile network code (MNC). The mobile network code is the individual number a network will be assigned.

**\*RST** 0**Range** 0–255

**Remarks** Federal regulation mandates that a 3-digit MNC will be used. For the ESG implementation the upper four bits are set to 1111.

**:SLOT0:NORMAL:ENCRyption:BCH:PLMN****Supported** E4438C with Option 416

[:SOURCE]:RADIO:EDGE:SLOT0:NORMAL:ENCRyption:BCH:PLMN &lt;val&gt;

[:SOURCE]:RADIO:EDGE:SLOT0:NORMAL:ENCRyption:BCH:PLMN?

This command is used to set the Public Land Mobile Network (PLMN) which is used to indicate the country the phone is in. PLMN is also referred to as the National Country Code (NCC).

**\*RST** 0**Range** 0–7**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:DLINK:MCS5:DATA****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:DLINK:MCS5:DATA PN9|PN15

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:DLINK:MCS5:DATA?

This command sets the data type (pseudo-random number sequence) for the enhanced general packet radio service (EGPRS) modulation and coding scheme 5 (MCS-5) downlink channel.

**\*RST** PN9**Key Entry** **PN9 PN15**

**Remarks** To select downlink MCS-5 as the multiframe channel type, refer to “:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.



## **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:DLINK:MCS9:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:DLINK:MCS9 :  
DATA PN9 | PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:DLINK:MCS9 :  
DATA?
```

This command sets the data type (pseudo-random number sequence) for the enhanced general packet radio service (EGPRS) modulation and coding scheme 9 (MCS-9) downlink channel.

**\*RST** PN9

**Key Entry** PN9 PN15

**Remarks** To select downlink MCS-9 as the multiframe channel type, refer to  
[“:SLOT0|\[1\]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.](#)

## **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:ETCH:F43:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:ETCH:F43 :  
DATA PN9 | PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:ETCH:F43 :  
DATA?
```

This command sets the data type (pseudo-random number sequence) for the enhanced, circuit switched, full-rate traffic channel with 43.2k-bits per second of user data (E-TCH/F43.2).

**\*RST** PN9

**Key Entry** PN9 PN15

**Remarks** To select E-TCH/F43.2 as the multiframe channel type, refer to  
[“:SLOT0|\[1\]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.](#)

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:FIX4 <val>
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for framed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the EDGE modulation format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be selected as the data type.

To select FIX4 as the data type, refer to  
[“:SLOT0|\[1\]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.](#)

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:ULINK:MCS5:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:ULINK:MCS5:
DATA PN9 | PN15
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:ULINK:MCS5:
DATA?
```

This command sets the data type (pseudo-random number sequence) for the enhanced general packet radio service (EGPRS) modulation and coding scheme 5 (MCS-5) uplink channel.

**\*RST** PN9

**Key Entry** **PN9 PN15**

**Remarks** To select uplink MCS-5 as the multiframe channel type, refer to  
[“:SLOT0|\[1\]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.](#)

## **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:ULINK:MCS9:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:ULINK:MCS9:
DATA PN9 | PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:ULINK:MCS9:
DATA?
```

This command sets the data type (pseudo-random number sequence) for the enhanced general packet radio service (EGPRS) modulation and coding scheme 9 (MCS-9) uplink channel.

**\*RST** PN9

**Key Entry** PN9 PN15

**Remarks** To select uplink MCS-9 as the multiframe channel type, refer to  
[“:SLOT0|\[1\]|2|3|4|5|6|7:NORMAL:ENCRyption”](#) on page 646.

## **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:UNCoded**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:
UNCoded PN9 | PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:
UNCoded?
```

This command sets the data type (pseudo-random number sequence) for an uncoded channel.

**\*RST** PN9

**Key Entry** PN9 PN15

**Remarks** To select uncoded as the multiframe channel type, refer to  
[“:SLOT0|\[1\]|2|3|4|5|6|7:NORMAL:ENCRyption”](#) on page 646.

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:GUARD****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:

GUARD &lt;24 or 27 bit\_pattern&gt;

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:GUARD?

This command sets the hexadecimal value for the guard time field in the selected normal timeslot.

**\*RST** Timeslots 0 & 4: #H7FFFFFFF

Timeslots: 1, 2, 3, 5, 6, &amp;7: #H0FFFFFFF

**Range** Timeslots 0 & 4: #H0–#H7FFFFFFF

Timeslots: 1, 2, 3, 5, 6, &amp;7: #H0–#H0FFFFFFF

**Key Entry** **G****Remarks** The guard time field is always modulated (but not bursted), even when the timeslot is off.

If the guard time and T2 symbols of the current timeslot and the T1 symbols of the next timeslot do not match, the burst shape may not be smooth (even if the current timeslot is turned off).

To change the current timeslot type, refer to “[:SLOT0|\[1\]|2|3|4|5|6|7\[:TYPE\]](#)” on [page 656](#).

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:T1****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:T1 &lt;9 bit\_pattern&gt;

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:T1?

This command sets the hexadecimal value for the leading 9-bit tail field in the selected normal timeslot.

**\*RST** #H11FF**Range** #H0–#H11FF**Key Entry** **T1**

**:SLOT0|[1]|2|3|4|5|6|7:NORMal:T2**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMal:T2 <9 bit_pattern>
[:SOURce]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMal:T2?
```

This command sets the hexadecimal value for the trailing 9-bit tail field in the selected normal timeslot.

**\*RST** #H1FF

**Range** #H0–#H1FF

**Key Entry** T2

**:SLOT0|[1]|2|3|4|5|6|7:NORMal:TSEQuence**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMal:TSEQuence TSC0|TSC1|
TSC2|TSC3|TSC4|TSC5|TSC6|TSC7|<78 bit_pattern>
[:SOURce]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMal:TSEQuence?
```

This command sets the 78-bit training sequence code for a normal timeslot to one of eight values or to create a custom value.

**\*RST** #H3F3F9E49FFF3FF3F9E49

**Range** <78 bit\_pattern>: #H0–#H3FFFFFFFFFFFFFFFFFFFF

**Key Entry** TSC0 TSC1 TSC2 TSC3 TSC4 TSC5 TSC6 TSC7  
**Custom TS**

**:SLOT0|[1]|2|3|4|5|6|7:LCAPacity:POWer**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:POWer MAIN|DELTA
[:SOURce]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:POWer?
```

This command toggles the RF output power level function for the selected timeslot.

**MAIN** This choice specifies RF output as the main power level.

**DELTA** This choice specifies RF output as the alternative power level.

**\*RST** MAIN

**Key Entry** Timeslot Ampl Main Delta

**:SLOT0|[1]|2|3|4|5|6|7:STATe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 [ 1 ] | 2 | 3 | 4 | 5 | 6 | 7 :STATe ON | OFF | 1 | 0
[ :SOURCE ] :RADIO:EDGE:SLOT0 [ 1 ] | 2 | 3 | 4 | 5 | 6 | 7 :STATe?
```

This command enables or disables the operating state of the selected timeslot.

**\*RST** Timeslot 0: 1 Timeslots 1–7: 0

**Key Entry** Timeslot Off On

**:SLOT0|[1]|2|3|4|5|6|7[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 [ 1 ] | 2 | 3 | 4 | 5 | 6 | 7 [ :TYPE ] CUSTom | NORMAl | GSMK |
NORMAL_ALL
[ :SOURCE ] :RADIO:EDGE:SLOT0 [ 1 ] | 2 | 3 | 4 | 5 | 6 | 7 [ :TYPE ] ?
```

This command sets the timeslot type for the selected timeslot.

**CUSTom** This choice selects a generic, non-standard timeslot configuration that consists of a data field and a guard field.

**NORMAl** This choice selects a normal timeslot configuration for an EDGE signal.

**GMSK** This choice selects a normal GSM timeslot (GMSK modulation). Selecting a different EDGE modulation type does not change the GMSK modulation for a GMSK configured timeslot.

**NORMAL\_ALL** This choice sets all timeslots to a normal timeslot configuration for an EDGE signal, regardless of the timeslot number selected.

**\*RST** NORM

**Key Entry** Custom Normal GMSK Normal All

## **:SOUT:**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:SOUT FRAME | SLOT | ALL
[ :SOURCE ] :RADio:EDGE:SOUT?
```

This command sets the synchronization location (within the pattern of data) and the type of output at the EVENT 1 rear panel connector.

**FRAME** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a framed data pattern.

**SLOT** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a selected timeslot.

**ALL** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for all active timeslots.

**\*RST** FRAME

**Key Entry** **Begin Frame**      **Begin Timeslot #**      **All Timeslots**

**Remarks** To change the synchronization output offset value, refer to “[:SOUT:OFFSet” on page 657.

## **:SOUT:OFFSet**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:SOUT:OFFSet <val>
[ :SOURCE ] :RADio:EDGE:SOUT:OFFSet?
```

This command sets the offset value for the location of the output synchronization signal on the EVENT1 rear panel connector relative to the beginning of the framed data pattern or timeslot.

The variable <val> is expressed in bits.

**\*RST** +0

**Range** –155 to 155

**Key Entry** **Sync Out Offset**

**Remarks** Negative values move the synchronization output signal earlier; positive values move it later.

To change the output of the EVENT1 rear panel connector to SLOT, refer to “[:SOUT:” on page 657.

**:SOUT:SLOT**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:SOUT:SLOT <val>

[ :SOURCE ] :RADIO:EDGE:SOUT:SLOT?

This command selects the timeslot that will trigger a 1-bit output signal at the EVENT 1 rear panel connector.

**\*RST** +0

**Range** 0–7

**Key Entry** **Begin Timeslot #**

**Remarks** To change the output of the EVENT1 rear panel connector to SLOT, refer to “:SOUT:” on page 657.

**:SRATe**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:SRATe <val>

[ :SOURCE ] :RADIO:EDGE:SRATe?

This command sets the transmission symbol rate.

The variable <val> is expressed in units of symbols per second (sps–Msps) and the maximum range value depends on the modulation type, and filter.

---

**NOTE** When using EDGE and GMSK, or multiframe EDGE, limit the symbol rate to no more than 271 ksps. Although higher rates may work, they are not supported.

---

**\*RST** +2.70833333E+005



**Range**

Modulation Type	Bits per Symbol	Internal Data		
BPSK	1	1sps–50 Msps		
FSK2				
MSK				
C4FM	2	1sps–50 Msps		
FSK4				
OQPSK				
OQPSK195				
P4QPPSK				
QAM4				
QPSK				
QPSKIS95				
GRAYQPSK				
D8PSK			3	1sps–33.33 Msps
EDGE				
FSK8				
PSK8				
FSK16	4	1sps–25 Msps		
PSK16				
QAM16				
QAM32	5	1sps–20 Msps		
QAM64	6	1sps–16.67 Msps		
QAM256	8	1sps–12.50 Msps		

**Key Entry**

**Symbol Rate**

**Remarks**

When user-defined filters are selected using the command in section “[:FILTer](#)” on [page 634](#), the upper bit rate will be restricted in line with the following symbol rate restriction:

- FIR filter length > 32 symbols: upper limit is 12.5 Msps
- FIR filter length > 16 symbols: upper limit is 25 Msps

When internal FIR filters are used, the limits of the above table always apply. For higher symbol rates, the FIR filter length will be truncated as follows:

- Above 12.5 Msps, the FIR length will be truncated to 32 symbols
- Above 25 Msps, the FIR length will be truncated to 16 symbols

This will impact the relative timing of the modulated data, as well as the actual filter response.

When the symbol rate is changed, the ESG will reconfigure the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the symbol rate: lower symbol rates require more time.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637.

---

**NOTE** In the EDGE format with a GMSK modulated timeslot, the maximum symbol rate is 25 Msps for up to 16 symbol wide filters. For 32 symbol wide filters, the limit is 12.5 Msps.

---

## :TRIGger:TYPE

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:TRIGger:TYPE CONTInuous | SINGLE | GATE
[ :SOURCE ] :RADIO:EDGE:TRIGger:TYPE?
```

This command sets the trigger type.

**CONTInuous** The framed data sequence repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to “:TRIGger:TYPE:CONTInuous[:TYPE]” on page 660.

**SINGLE** The framed data sequence plays once for every trigger received.

**GATE** An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set to high or low.

**\*RST** CONT

**Key Entry**      **Continuous**      **Single**      **Gated**

## :TRIGger:TYPE:CONTInuous[:TYPE]

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE | TRIGger | RESet
[ :SOURCE ] :RADIO:EDGE:TRIGger:TYPE:CONTInuous [ :TYPE ] ?
```

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see “:TRIGger:TYPE” on page 660.

The following list describes the waveform’s response to each of the command choices:

FREE	Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.
TRIGger	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.
RESet	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.
<b>*RST</b>	FREE
<b>Key Entry</b>	<b>Free Run      Trigger &amp; Run      Reset &amp; Run</b>

**:TRIGger:TYPE:GATE:ACTive**

**Supported**      E4438C with Option 402

```
[:SOURce]:RADio:EDGE:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[:SOURce]:RADio:EDGE:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 660.

The following list describes the ESG’s gating behavior for the polarity selections:

LOW	The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).
HIGH	The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).
<b>*RST</b>	HIGH
<b>Key Entry</b>	<b>Gate Active Low High</b>

**:TRIGger[:SOURce]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] KEY | EXT | BUS
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] ?
```

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 660. The following list describes the command choices:

**KEY** This choice enables manual triggering by pressing the front-panel **Trigger** hardkey.

**EXT** An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURce]:EXTErnal[:SOURce]” on page 665.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User's Guide*.

- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 661
  - continuous and single modes, see “:TRIGger[:SOURce]:EXTErnal:SLOPe” on page 664
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[:SOURce]:EXTErnal:DELAy” on page 663
  - turning the delay on, see “:TRIGger[:SOURce]:EXTErnal:DELAy:STATe” on page 664

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

Key Entry	Trigger Key	Ext	Bus
-----------	-------------	-----	-----

## :TRIGger[:SOURce]:EXtErnal:DELay

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXtErnal:DELay <val>  
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXtErnal:DELay?
```

This command sets the number of bits to delay the ESG's response to an external trigger.

The bit delay is a delay between when the ESG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the ESG receives the trigger and the set number of delay bits (clocks) occurs, the ESG transmits the data pattern.

The delay occurs after you enable the state. See “:TRIGger[:SOURce]:EXtErnal:DELay:STATE” on page 664. You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 662.

### Example

```
:RAD:CUST:TRIG:EXT:DELay 200000
```

The preceding example sets the delay for an external trigger for 200K bits.

**\*RST** +0

**Range** 0–1048575

**Key Entry** Ext Delay Bits

**Remarks** For most TDMA formats, there is one bit per symbol. However, there are 3 bits per symbol for the EDGE format. If the selected number of delay bits is not a multiple of the number of bits per symbol, the entered value is rounded down to the next whole symbol value.

## :TRIGger[:SOURce]:EXtErnal:DELay:FINE

**Supported** E4438C with Option 416

```
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXtErnal:DELay:FINE <val>  
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXtErnal:DELay:FINE?
```

This command sets the fine trigger delay for synchronizing the ESG.

The fine delay value is added to the coarse delay setting (see “:TRIGger[:SOURce]:EXtErnal:DELay” on page 663).

The variable <val> is expressed as a fraction of one symbol. For the EDGE format, there are 3 bits per symbol.

**EDGE Subsystem—Option 402 (:SOURCE):RADIO:EDGE)**

**\*RST** +0.00000000E+000

**Range** 0–1

**:TRIGger[:SOURCE]:EXternal:DElay:STATe**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:EDGE:TRIGger [ :SOURCE ] :EXternal:DElay:STATe ON | OFF | 1 | 0  
 [ :SOURCE ] :RADio:EDGE:TRIGger [ :SOURCE ] :EXternal:DElay:STATe?

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “:TRIGger[:SOURCE]:EXternal:DElay” on page 663, and for more information on configuring an external source, see “:TRIGger[:SOURCE]” on page 662.

**\*RST** 0

**Key Entry** Ext Delay Off On

**:TRIGger[:SOURCE]:EXternal:SLOPe**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:EDGE:TRIGger [ :SOURCE ] :EXternal:SLOPe POSitive | NEGative  
 [ :SOURCE ] :RADio:EDGE:TRIGger [ :SOURCE ] :EXternal:SLOPe?

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 661.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 662.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos

## **:TRIGger[:SOURce]:EXTernal[:SOURce]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXTernal [ :SOURce ] EPT1 | EPT2 |
EPTRIGGER1 | EPTRIGGER2
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXTernal [ :SOURce ] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 662. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
<b>*RST</b>	EPT1
<b>Key Entry</b>	<b>Patt Trig In 1      Patt Trig In 2</b>

## **[:STATe]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:EDGE[:STATe] ON | OFF | 1 | 0
[ :SOURce ] :RADio:EDGE[:STATe] ?
```

This command enables or disables the EDGE modulation format.

**\*RST** 0

**Key Entry** **EDGE Off On**

**Remarks** Although the EDGE modulation is enabled with this command, the RF carrier is not modulated unless you also activate the front panel **Mod On/Off** hardkey.

Receiver Test Digital Commands

**EDGE Subsystem—Option 402 ([:SOURce]:RADio:EDGE)**



**Symbols**

# of Blocks field, [1071](#)  
 # of Carriers softkey, [283](#), [285](#)  
 # Points softkey, [57](#)  
 # Skipped Points softkey, [302](#)  
 ΦM Dev, [197](#)  
 ΦM Dev Couple Off On, [197](#)  
 FM ΦM Normal High BW, [192](#)  
 ΦM Off On, [196](#)  
 ΦM Path 1 2, [191](#)  
 ΦM Stop Rate, [194](#)  
 ΦM Sweep Time, [195](#)  
 ΦM Tone 2 Ampl Percent of Peak, [194](#)

**Numerics**

0.7V,1.4V,1.65V,2.5V softkey, [421](#)  
 1 DPCH softkey, [348](#), [353](#)  
 1.23 MHz softkey, [263](#)  
 1.25 MHz softkey, [263](#)  
 1/2 Conv softkey, [1068](#), [1070](#), [1163](#)  
 1/3 Conv softkey, [1068](#), [1070](#), [1163](#)  
 10 msec softkey, [1096](#)  
 1048576 softkey, [212](#)  
 10ms Frame Pulse (DRPS11) softkey, [1050](#), [1052](#),  
[1053](#), [1054](#), [1055](#)  
 10ms Frame Pulse (RPS6) softkey  
*See* wideband CDMA base band generator  
 subsystem keys and fields  
 12.2 kbps (34.121) softkey, [1033](#)  
 128QAM softkey  
*See* custom subsystem keys  
*See* DECT subsystem keys  
*See* Dmodulation subsystem keys  
*See* EDGE subsystem keys  
*See* GSM subsystem keys  
*See* NADC subsystem keys  
*See* PDC subsystem keys  
*See* PHS subsystem keys  
*See* TETRA subsystem keys  
 131072 softkey, [212](#)  
 144 kbps (34.121) softkey, [1033](#)  
 16 1's & 16 0's softkey  
*See* custom subsystem keys  
*See* DECT subsystem keys

*16 1's & 16 0's softkey (continued)*

*See* EDGE subsystem keys  
*See* GSM subsystem keys  
*See* NADC subsystem keys  
*See* PDC subsystem keys  
*See* PHS subsystem keys  
*See* TETRA subsystem keys  
 16384 softkey, [212](#)  
 16-Lvl FSK softkey  
*See* DECT subsystem keys  
*See* PHS subsystem keys  
 16PSK softkey  
*See* custom subsystem keys  
*See* DECT subsystem keys  
*See* Dmodulation subsystem keys  
*See* EDGE subsystem keys  
*See* GSM subsystem keys  
*See* NADC subsystem keys  
*See* PDC subsystem keys  
*See* PHS subsystem keys  
*See* TETRA subsystem keys  
 16QAM softkey  
*See* custom subsystem keys  
*See* DECT subsystem keys  
*See* Dmodulation subsystem keys  
*See* EDGE subsystem keys  
*See* GSM subsystem keys  
*See* NADC subsystem keys  
*See* PDC subsystem keys  
*See* PHS subsystem keys  
*See* TETRA subsystem keys  
 2 Carriers softkey, [349](#)  
 2 SR3 Carriers softkey, [248](#)  
 2.100 MHz softkey, [32](#), [208](#), [222](#), [246](#), [275](#), [299](#),  
[329](#), [346](#), [473](#)  
 20 msec softkey, [1096](#)  
 2560 msec softkey, [1096](#)  
 256QAM softkey  
*See* custom subsystem keys  
*See* DECT subsystem keys  
*See* Dmodulation subsystem keys  
*See* EDGE subsystem keys  
*See* GSM subsystem keys  
*See* NADC subsystem keys  
*See* PDC subsystem keys

---

# Index

256QAM softkey (*continued*)

See PHS subsystem keys

See TETRA subsystem keys

262144 softkey, [212](#)

2-Lvl FSK softkey

See custom subsystem keys

See DECT subsystem keys

See Dmodulation subsystem keys

See EDGE subsystem keys

See GSM subsystem keys

See NADC subsystem keys

See PDC subsystem keys

See PHS subsystem keys

See TETRA subsystem keys

2nd Scr Offset field, [1034](#), [1041](#)

3 Carriers softkey, [230](#), [248](#), [349](#)

3 DPCH softkey, [348](#), [353](#)

3.84MHz chip-clk (DRPS4) softkey, [1050](#), [1052](#),  
[1053](#), [1054](#), [1055](#)

32 1's & 32 0's softkey

See custom subsystem keys

See DECT subsystem keys

See EDGE subsystem keys

See GSM subsystem keys

See NADC subsystem keys

See PDC subsystem keys

See PHS subsystem keys

See TETRA subsystem keys

32 Ch Fwd softkey, [228](#), [231](#)

32768 softkey, [212](#)

32QAM softkey

See custom subsystem keys

See DECT subsystem keys

See Dmodulation subsystem keys

See EDGE subsystem keys

See GSM subsystem keys

See NADC subsystem keys

See PDC subsystem keys

See PHS subsystem keys

See TETRA subsystem keys

384 kbps (34.121) softkey, [1033](#)

3GPP W-CDMA HSPA SCPI commands, [668](#)

4 1's & 4 0's softkey

See custom subsystem keys

See DECT subsystem keys

4 1's & 4 0's softkey (*continued*)

See EDGE subsystem keys

See GSM subsystem keys

See NADC subsystem keys

See PDC subsystem keys

See PHS subsystem keys

See TETRA subsystem keys

4 Carriers softkey, [230](#), [248](#), [349](#)

40 msec softkey, [1096](#)

40.000 MHz softkey, [32](#), [205](#), [208](#), [217](#), [222](#), [241](#),  
[246](#), [270](#), [275](#), [298](#), [299](#), [327](#), [329](#), [344](#), [346](#),  
[466](#), [473](#)

4-Lvl FSK softkey

See custom subsystem keys

See DECT subsystem keys

See Dmodulation subsystem keys

See EDGE subsystem keys

See GSM subsystem keys

See NADC subsystem keys

See PDC subsystem keys

See PHS subsystem keys

See TETRA subsystem keys

4QAM softkey

See custom subsystem keys

See DECT subsystem keys

See Dmodulation subsystem keys

See EDGE subsystem keys

See GSM subsystem keys

See NADC subsystem keys

See PDC subsystem keys

See PHS subsystem keys

See TETRA subsystem keys

5 Channel softkey, [254](#)

524288 softkeys, [212](#)

64 1's & 64 0's softkey

See custom subsystem keys

See DECT subsystem keys

See EDGE subsystem keys

See GSM subsystem keys

See NADC subsystem keys

See PDC subsystem keys

See PHS subsystem keys

See TETRA subsystem keys

64 Ch Fwd softkey, [228](#), [231](#)

64 kbps (34.121) softkey, [1033](#)

- 64QAM softkey
    - See* custom subsystem keys
    - See* DECT subsystem keys
    - See* Dmodulation subsystem keys
    - See* EDGE subsystem keys
    - See* GSM subsystem keys
    - See* NADC subsystem keys
    - See* PDC subsystem keys
    - See* PHS subsystem keys
    - See* TETRA subsystem keys
  - 65536 softkey, [212](#)
  - 8 1's & 8 0's softkey
    - See* custom subsystem keys
    - See* DECT subsystem keys
    - See* EDGE subsystem keys
    - See* GSM subsystem keys
    - See* NADC subsystem keys
    - See* PDC subsystem keys
    - See* PHS subsystem keys
    - See* TETRA subsystem keys
  - 8 Bit Pattern softkey, [465](#)
  - 8 Channel softkey, [254](#)
  - 80 msec softkey, [1096](#)
  - 80ms Frame Pulse (DRPS13) softkey, [1050](#), [1052](#),  
[1053](#), [1054](#), [1055](#)
  - 80ms Frame Pulse (RPS20) softkey
    - See* wideband CDMA base band generator  
subsystem keys and fields
  - 8648A/B/C/D softkey, [156](#), [158](#)
  - 8656B,8657A/B softkey, [156](#), [158](#)
  - 8657D NADC softkey, [156](#), [158](#)
  - 8657D PDC softkey, [156](#), [158](#)
  - 8657J PHS softkey, [156](#), [158](#)
  - 8-Lvl FSK softkey
    - See* DECT subsystem keys
    - See* PHS subsystem keys
  - 8PSK softkey
    - See* custom subsystem keys
    - See* DECT subsystem keys
    - See* Dmodulation subsystem keys
    - See* EDGE subsystem keys
    - See* GSM subsystem keys
    - See* NADC subsystem keys
    - See* PDC subsystem keys
    - See* PHS subsystem keys
  - 8PSK softkey (continued)
    - See* TETRA subsystem keys
  - 9 Ch Fwd softkey, [228](#), [231](#)
  - 9 Channel softkey, [247](#)
- ## A
- A field softkey
    - See* DECT subsystem keys
  - A softkey, [1025](#)
  - abort list/step sweep, [166](#)
  - Access denied, [116](#)
  - Access softkey, [802](#)
  - ACS softkey, [1064](#)
  - Activate Secure Display softkey, [160](#)
  - Active softkey, [1061](#)
  - Actual BER softkey, [1172](#)
  - Actual BLER field, [1166](#), [1173](#)
  - Add Comment To Seq[n] Reg[nn] softkey, [123](#)
  - Adjust Gain softkey, [437](#)
  - Adjust Phase softkey, [47](#)
  - AICH softkey, [1130](#)
  - AICH Trigger Polarity Pos Neg softkey, [1105](#)
  - ALC
    - BW
      - 100 Hz, 1 kHz, 10 kHz, [58](#)
      - Auto, [58](#), [59](#)
      - Off,On, [58](#), [59](#)
    - ALC BW Normal Narrow, [22](#)
    - ALC BW Setting
      - Auto, [58](#), [59](#)
  - alc hold markers
    - awgn subsystem, [209](#)
    - cdma subsystem, [223](#)
    - cdma2000 arb subsystem, [257](#)
    - dmodulation subsystem, [276](#)
    - dual arb subsystem, [305](#)
    - multitone subsystem, [330](#), [331](#)
    - wideband CDMA ARB subsystem, [367](#)
    - wideband CDMA ARBsubsystem, [367](#)
  - ALC level, [60](#)
  - ALC Off On softkey, [62](#)
  - All Down softkey, [1036](#), [1086](#)
  - All softkey, [104](#), [122](#)
  - All Timeslots softkey
    - See* DECT subsystem keys

---

## Index

*All Timeslots softkey (continued)*

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

All Up softkey, [1036](#), [1086](#)

Alt Amp Delta softkey, [63](#)

Alt Ampl Off On softkey, [64](#)

Alt power in field, [1143](#)

alternate amplitude markers

awgn arb subsystem, [209](#)

cdma subsystem, [222](#)

cdma2000 arb subsystem, [257](#)

dmodulation subsystem, [276](#)

dual arb subsystem, [305](#)

multitone arb subsystem, [329](#)

multitone subsystem, [329](#)

wideband CDMA ARB subsystem, [367](#)

AM softkeys

AM Depth, [177](#)

AM Depth Couple Off On, [178](#)

AM Off On, [177](#)

AM Off On softkey, [173](#)

AM Path 1 2, [172](#)

AM Stop Rate, [174](#)

AM Sweep Rate, [175](#)

AM Tone 2 Ampl Percent Of Peak, [175](#)

AM Tone 2 Rate, [174](#)

AM wideband, [173](#)

AM\_ADDR softkey, [464](#)

Ampl softkeys

Ampl, [49](#), [66](#)

Ampl Offset, [68](#)

Ampl Ref Off On, [67](#)

Ampl Ref Set, [66](#)

Ampl Start, [49](#), [67](#)

Ampl Stop, [49](#), [68](#)

Amplitude hardkey, [66](#), [69](#)

amplitude modulation subsystem keys

AM Depth, [177](#)

AM Depth Couple Off On, [178](#)

AM Off On, [173](#), [177](#)

AM Path 1 2, [172](#)

amplitude modulation subsystem keys *(continued)*

AM Stop Rate, [174](#)

AM Sweep Rate, [175](#)

AM Tone 2 Ampl Percent Of Peak, [175](#)

AM Tone 2 Rate, [174](#)

Bus, [176](#)

Dual-Sine, [175](#)

Ext, [176](#)

Ext Coupling DC AC, [173](#)

Ext1, [176](#)

Ext2, [176](#)

Free Run softkey, [176](#)

Incr Set, [172](#), [178](#)

Internal, [176](#)

Noise, [175](#)

Ramp, [175](#)

Sine, [175](#)

Square, [175](#)

Swept-Sine, [175](#)

Triangle, [175](#)

Trigger Key, [176](#)

amplitude step, [69](#)

AMR 12.2 kbps softkey, [1033](#), [1137](#)

APCO 25 C4FM softkey

*See* CDMA ARB subsystem keys

*See* CDMA2000 ARB subsystem keys

*See* CDMA2000 BBG subsystem keys and fields

*See* custom subsystem keys

*See* DECT subsystem keys

*See* Dmodulation subsystem keys

*See* EDGE subsystem keys

*See* GPS subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

*See* wideband CDMA ARB subsystem keys

*See* wideband CDMA base band generator  
subsystem keys and fields

APCO 25 w/C4FM softkey, [282](#), [283](#), [284](#)

APCO 25 w/C4QPSK softkey, [282](#), [283](#), [284](#)

APCO 25 w/CQPSK softkey, [567](#)

Apply Channel Setup softkey, [251](#), [255](#), [356](#), [364](#),  
[1021](#), [1075](#)

- Apply to Waveform softkey, [300](#), [302](#)  
Arb AWGN Off On softkey, [214](#)  
ARB Off On softkey, [324](#)  
ARB Reference Ext Int softkey  
  *See* AWGN subsystem keys  
  *See* bluetooth subsystem keys  
  *See* CDMA ARB subsystem keys  
  *See* CDMA2000 ARB subsystem keys  
  *See* Dmodulation subsystem keys  
  *See* dual ARB subsystem keys  
  *See* multitone subsystem keys  
  *See* wideband CDMA ARB subsystem keys  
ARB Sample Clock softkey, [213](#), [228](#), [262](#), [282](#),  
  [313](#), [335](#), [372](#), [478](#)  
arbitrary waveform  
  runtime scaling, [312](#), [335](#)  
  scaling files, [312](#)  
Atten Hold Off On softkey, [65](#)  
Auto softkey, [58](#), [59](#)  
automatic leveling control, [62](#)  
Aux I/O Trigger Polarity Pos Neg softkey, [460](#)  
Aux softkey  
  *See* sense subsystem keys  
Auxiliary Software Options softkey, [82](#)  
AWGN Off On softkey, [468](#)  
AWGN subsystem keys  
  1048576, [212](#)  
  131072, [212](#)  
  16384, [212](#)  
  2.100 MHz, [208](#)  
  262144, [212](#)  
  32768, [212](#)  
  40.000 MHz, [205](#), [208](#)  
  524288, [212](#)  
  65536, [212](#)  
  Arb AWGN Off On, [214](#)  
  ARB Reference Ext Int, [213](#)  
  ARB Sample Clock, [213](#)  
  Bandwidth, [205](#)  
  Clear Header, [206](#)  
  I/Q Mod Filter Manual Auto, [208](#)  
  I/Q Output Filter Manual Auto, [206](#)  
  Marker 1, [209](#), [210](#)  
  Marker 1 Polarity Neg Pos, [212](#)  
  Marker 2, [209](#), [210](#)  
  AWGN subsystem keys (*continued*)  
    Marker 2 Polarity Neg Pos, [212](#)  
    Marker 3, [209](#), [210](#)  
    Marker 3 Polarity Neg Pos, [212](#)  
    Marker 4, [209](#), [210](#)  
    Marker 4 Polarity Neg Pos, [212](#)  
    Modulator Atten Manual Auto, [207](#)  
    Noise Seed Fixed Random, [214](#)  
    None, [209](#), [210](#)  
    Reference Freq, [212](#)  
    Save Setup To Header, [206](#)  
    Through, [205](#), [208](#)  
    Waveform Length, [212](#)
- B**  
B softkey, [999](#), [1004](#), [1025](#)  
B1 softkey, [997](#), [1002](#)  
B2 softkey, [997](#), [1002](#)  
Bandwidth softkey, [205](#), [463](#)  
Base Delay Tp-a softkey, [1127](#)  
BBG Chip Clock Ext Int softkey  
  *See* wideband CDMA base band generator  
  subsystem keys and fields  
BBG Data Clock Ext Int softkey  
  *See* custom subsystem keys  
  *See* DECT subsystem keys  
  *See* GSM subsystem keys  
  *See* NADC subsystem keys  
  *See* PHS subsystem keys  
  *See* TETRA subsystem keys  
BBG Data Clock field, [480](#)  
BBG Ref Ext Int softkey  
  *See* custom subsystem keys  
  *See* DECT subsystem keys  
  *See* EDGE subsystem keys  
  *See* GSM subsystem keys  
  *See* NADC subsystem keys  
  *See* PDC subsystem keys  
  *See* PHS subsystem keys  
  *See* TETRA subsystem keys  
BBG1 softkey, [24](#), [35](#)  
BD\_ADDR softkey, [464](#)  
Begin Data Format Pattern Framed softkey  
  *See* DECT subsystem keys  
  *See* EDGE subsystem keys

---

## Index

*Begin Data Format Pattern Framed softkey*

*(continued)*

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

**Begin Frame softkey**

*See* DECT subsystem keys

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

**Begin Timeslot # softkey**

*See* DECT subsystem keys

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

**BER Display % Exp softkey, 407**

**BER field, 1166, 1173**

**BER Mode Off On softkey**

*See* sense subsystem keys

**BER softkey, 1168, 1175**

**BERT Off On softkey, 457**

**BERT Resync Off On softkey, 457**

**Beta field, 1079, 1089**

**Binary softkey, 94, 124**

**binary values, 18**

**Bit Count softkey**

*See* sense subsystem keys

**Bit Delay Off On softkey, 459**

**Bit Order softkey, 384**

**Bit Rate field**

*See* CDMA2000 BBG subsystem keys and fields

**Bit softkey, 94**

**BLER field, 1167, 1174**

**BLER softkey, 1168, 1175**

**Blk Set Size field, 1067**

**Blk Size field, 1066, 1162, 1170**

**Block Count softkey**

*See* calculate subsystem keys

*See* sense subsystem keys

**Block Erasure softkey**

*See* sense subsystem keys

**Blocking softkey, 1064**

**Bluetooth Off On softkey, 478**

**Bluetooth softkey, 567**

**bluetooth subsystem keys**

2.100 MHz, 473

40.000 MHz, 466, 473

8 Bit Pattern, 465

AM\_ADDR, 464

ARB Reference Ext Int, 477

ARB Sample Clock, 478

AWGN Off On, 468

BD\_ADDR, 464

Bluetooth Off On, 478

Burst Off On, 464

Burst Power Ramp, 478

C/N[1 MHz], 468

Clear Header, 467

Clock/Gate Delay, 465

Continuous PN9, 465

Drift Deviation, 469

Freq Drift Type Linear Sine, 470

Freq Offset, 470

I/Q Mod Filter Manual Auto, 474

I/Q Output Filter Manual Auto, 466

Impairments Off On, 467

Marker 1, 474, 475

Marker 1 Polarity Neg Pos, 475

Marker 2, 474, 475

Marker 2 Polarity Neg Pos, 476

Marker 3, 474, 475

Marker 3 Polarity Neg Pos, 476

Marker 4, 474, 475

Marker 4 Polarity Neg Pos, 476

Mod Index, 471

Modulator Atten Manual Auto, 472, 473

Noise Seed, 469

None, 474, 475

Packet (DH1), 476

Reference Freq, 477

Save Setup To Header, 467

bluetooth subsystem keys (*continued*)

Symbol Timing Err, 472

Through, 466, 473

Truncated PN9, 465

## boolean SCPI parameters, 10

## boolean, numeric response data, 11

## BPSK softkey

*See* custom subsystem keys

*See* DECT subsystem keys

*See* Dmodulation subsystem keys

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

## Brightness softkey, 86

## Build New Waveform Sequence softkey, 313

## burst

shape, 115

## Burst Envelope Int Ext Off softkey, 22

## Burst gate in field, 1144

## Burst Gate In Polarity Neg Pos softkey, 130, 131

## Burst Off On softkey, 464

## Burst Power Ramp softkey, 478

## Bus softkey

list trigger source, 54

*See* amplitude modulation subsystem keys

*See* CDMA ARB subsystem keys

*See* CDMA2000 ARB subsystem keys

*See* DECT subsystem keys

*See* Dmodulation subsystem keys

*See* dual ARB subsystem keys

*See* EDGE subsystem keys

*See* frequency modulation subsystem keys

*See* GSM subsystem keys

*See* low frequency output subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* phase modulation subsystem keys

*See* PHS subsystem keys

*See* sense subsystem keys

*See* TETRA subsystem keys

*See* trigger subsystem keys

*See* wideband CDMA ARB subsystem keys

**C**

C Power field, 1076, 1106

C/N softkey, 505, 517

C/N value field, 1021, 1075, 1105

C/N[1 MHz] softkey, 468

C4FM softkey, 962

## calculate subsystem keys

BER Display % Exp, 407

Block Count, 425

Class II RBER, 404, 405

Class Ib RBER, 404, 405

Cycle End, 405

Error Rate, 398, 399, 400, 401, 402, 403

Exceeds Any Limit, 405

Fail Hold, 405

Frame Erasure, 404, 405

No Limits, 399, 402, 403, 405

Pass/Fail Limits, 406

Pass/Fail Off On, 406

Update Display Cycle End Cont, 407

## calibration subsystem keys

DCFM/DCΦM Cal, 72

Execute Cal, 72, 73

I/Q Calibration, 72

Revert to Default Cal Settings, 73

Start Frequency, 74

Stop Frequency, 74

Carrier Bandwidth softkey, 309

Carrier Phases Fixed Random softkey, 283

Carrier to Noise Ratio softkey, 309

CC softkey, 926, 930, 932

CDL softkey, 894

## CDMA ARB subsystem keys

2.100 MHz, 222

3 Carriers, 230

32 Ch Fwd, 228, 231

4 Carriers, 230

40.000 MHz, 217, 222

64 Ch Fwd, 228, 231

9 Ch Fwd, 228, 231

APCO 25 C4FM, 218

ARB Reference Ext Int, 227

ARB Sample Clock, 228

Bus, 235

CDMA Off On, 239

---

## Index

### CDMA ARB subsystem keys (*continued*)

- Chip Rate, [216](#)
- Clear Header, [220](#)
- Clip |I+jQ| To, [216](#)
- Clip |I| To, [215](#)
- Clip |Q| To, [215](#)
- Clip At PRE POST FIR Filter, [215](#)
- Clipping Type |I+jQ| |I|,|Q|, [216](#)
- Continuous, [233](#), [263](#)
- CPICH, [357](#)
- Custom CDMA Multicarrier, [230](#)
- Custom CDMA State, [228](#), [231](#)
- Equal Powers, [229](#)
- Ext, [235](#)
- Ext Delay Off On, [237](#)
- Ext Delay Time, [236](#)
- Ext Polarity Neg Pos, [237](#)
- Filter Alpha, [219](#)
- Filter BbT, [219](#)
- Free Run, [234](#)
- Gate Active Low High, [235](#)
- Gated, [233](#), [263](#)
- Gaussian, [218](#)
- I/Q Mapping Normal Invert, [221](#)
- I/Q Mod Filter Manual Auto, [222](#)
- I/Q Output Filter Manual Auto, [217](#)
- Immediate, [227](#)
- IS-2000 SR3 DS, [218](#)
- IS-95, [218](#)
- IS-95 Mod, [218](#)
- IS-95 Mod w/EQ, [218](#)
- IS-95 w/EQ, [218](#)
- IS-97 Levels, [229](#)
- Marker 1, [222](#), [223](#), [224](#)
- Marker 1 Polarity Neg Pos, [226](#)
- Marker 2, [222](#), [223](#), [224](#)
- Marker 2 Polarity Neg Pos, [226](#)
- Marker 3, [222](#), [223](#), [224](#)
- Marker 3 Polarity Neg Pos, [226](#)
- Marker 4, [222](#), [223](#), [224](#)
- Marker 4 Polarity Neg Pos, [226](#)
- Modulator Atten Manual Auto, [221](#)
- Multicarrier Off On, [228](#)
- None, [222](#), [223](#), [224](#)
- Nyquist, [218](#)

### CDMA ARB subsystem keys (*continued*)

- Off, [227](#)
- On, [227](#)
- Optimize FIR For EVM ACP, [220](#)
- Oversample Ratio, [226](#)
- Paging, [229](#)
- Patt Trig In 1, [238](#)
- Patt Trig In 2, [238](#)
- Pilot, [228](#), [229](#), [231](#)
- Rectangle, [218](#)
- Reference Freq, [226](#)
- Reset & Run, [234](#)
- Reverse, [228](#)
- Root Nyquist, [218](#)
- Save Setup To Header, [220](#)
- Scale to 0dB, [229](#)
- Single, [233](#), [263](#)
- Store Custom CDMA State, [232](#)
- Store Custom Multicarrier, [231](#)
- Sync, [229](#)
- Through, [217](#), [222](#)
- Traffic, [229](#)
- Trigger & Run, [234](#)
- Trigger Key, [235](#)
- UN3/4 GSM Gaussian, [218](#)
- User FIR, [218](#)
- Waveform Length, [238](#)
- WCDMA, [218](#)

### CDMA Freq field, [499](#)

### CDMA Off On softkey, [239](#)

### CDMA softkey, [95](#)

### CDMA2000 ARB subsystem keys

- 1.23 MHz, [263](#)
- 1.25 MHz, [263](#)
- 2 SR3 Carriers, [248](#)
- 2.100 MHz, [246](#)
- 3 Carriers, [248](#)
- 4 Carriers, [248](#)
- 40.000 MHz, [241](#), [246](#)
- 5 Channel, [254](#)
- 8 Channel, [254](#)
- 9 Channel, [247](#)
- APCO 25 C4FM, [242](#)
- Apply Channel Setup, [251](#), [255](#)
- ARB Reference Ext Int, [260](#)



CDMA2000 ARB subsystem keys (*continued*)

ARB Sample Clock, 262  
Bus, 266  
CDMA2000 Off On, 269  
Clear Header, 245  
Clip |I+jQ| To, 241  
Clip |I| To, 240  
Clip |Q| To, 240  
Clip At PRE POST FIR Filter, 240  
Clipping Type |I+jQ| |I|,|Q|, 241  
Config, 252, 255  
Continuous, 263  
Custom CDMA2000 Carrier, 247, 249  
Custom CDMA2000 Multicarrier, 248  
Custom CDMA2000 State, 254  
Edit Channel Setup, 252, 255  
Equal Powers, 253, 256  
Ext, 266  
Ext Delay Off On, 268  
Ext Delay Time, 267  
Ext Polarity Neg Pos, 268  
Filter Alpha, 243  
Filter BbT, 244  
Free Run, 265  
Gate Active Low High, 266  
Gated, 263  
Gaussian, 242  
I/Q Mapping Normal Invert, 247  
I/Q Mod Filter Manual Auto, 246  
I/Q Output Filter Manual Auto, 242  
Immediate, 261  
Insert Row, 252, 255  
IS-2000 SR3 DS, 242  
IS-95, 242  
IS-95 Mod, 242  
IS-95 Mod w/EQ, 242  
IS-95 w/EQ, 242  
Link Forward Reverse, 247  
Marker 1, 257, 258  
Marker 1 Polarity Neg Pos, 260  
Marker 2, 257, 258  
Marker 2 Polarity Neg Pos, 260  
Marker 3, 257, 258  
Marker 3 Polarity Neg Pos, 260  
Marker 4, 257, 258

CDMA2000 ARB subsystem keys (*continued*)

Marker 4 Polarity Neg Pos, 260  
Modulator Atten Manual Auto, 245, 246  
Multicarrier Off On, 247  
None, 257, 258  
Nyquist, 242  
Off, 261  
On, 261  
Optimize FIR For EVM ACP, 244  
Patt Trig In 1, 269  
Patt Trig In 2, 269  
Pilot, 247, 254  
PN Offset, 252, 255  
Radio Config, 253  
Rate, 252, 255  
Rectangle, 242  
Reference Freq, 260  
Reset & Run, 265  
Root Nyquist, 242  
Save Setup To Header, 245  
Scale to 0dB, 253, 256  
Single, 263  
Spread Rate 1, 247, 254, 262  
Spread Rate 3, 247, 254, 262  
Spreading Type Direct Mcarrier, 247, 263  
SR1 9 Channel, 249  
SR1 Pilot, 249  
SR3 Direct 9 Channel, 249  
SR3 Direct Pilot, 249  
SR3 Mcarrier 9 Channel, 249  
SR3 MCarrier Pilot, 249  
Store Custom CDMA State, 251, 254  
Store Custom Multicarrier, 249  
Through, 241, 246  
Trigger & Run, 265  
Trigger Key, 266  
UN3/4 GSM Gaussian, 242  
User FIR, 242  
Walsh Code, 252, 255  
WCDMA, 242  
CDMA2000 BBG subsystem keys and fields  
APCO 25 C4FM, 481, 514  
BBG Data Clock, 480  
Bit Rate, 488, 492, 497, 511, 521, 523, 527, 532,  
537, 541, 544

---

## Index

### CDMA2000 BBG subsystem keys and fields

*(continued)*

C/N, [505](#), [517](#)  
CDMA Freq, [499](#)  
CDMA2000 Off On, [547](#)  
Change, [509](#)  
Chip Rate, [480](#), [513](#)  
DAYLT, [499](#)  
EbNo, [484](#), [489](#), [495](#), [500](#), [506](#), [509](#), [519](#), [525](#),  
[527](#), [531](#), [536](#), [539](#), [542](#)  
EcNo, [493](#), [528](#), [533](#)  
Equal Powers, [508](#), [517](#)  
Even Second Delay, [480](#), [513](#)  
Ext, [483](#), [494](#), [522](#)  
Ext CDMA Freq, [500](#)  
External, [512](#)  
Falling, [547](#)  
Field 1, [490](#)  
Field 2, [490](#)  
Field 3, [491](#)  
Filter Alpha, [482](#), [515](#)  
Filter BbT, [482](#), [485](#), [515](#)  
FIX4, [483](#), [484](#), [494](#), [518](#), [519](#), [522](#), [524](#), [525](#), [530](#),  
[535](#), [539](#), [542](#)  
Frame Length, [520](#), [522](#), [526](#), [536](#), [540](#), [543](#)  
Frame Offset, [495](#), [520](#), [523](#), [526](#), [531](#), [536](#), [540](#),  
[543](#)  
FSYNCH Type, [504](#)  
Full, [529](#), [534](#)  
Gaussian, [481](#), [514](#)  
Half, [529](#), [534](#)  
Header, [486](#), [496](#)  
Internal, [512](#)  
Inverted, [517](#)  
IS-95, [481](#), [514](#)  
IS-95 MOD, [514](#)  
IS-95 Mod, [481](#)  
IS-95 MOD w/EQ, [514](#)  
IS-95 Mod w/EQ, [481](#)  
IS-95 w/EQ, [481](#), [514](#)  
Leap Seconds, [501](#)  
Link Forward Reverse, [479](#)  
Long Code Mask, [516](#)  
Long Code State, [483](#), [516](#)  
LTM OFF, [501](#)

### CDMA2000 BBG subsystem keys and fields

*(continued)*

Message Type, [502](#)  
Network ID, [502](#)  
Noise Off On, [506](#), [518](#)  
Normal, [517](#)  
Nyquist, [481](#), [514](#)  
Optimize FIR For EVM ACP, [482](#), [516](#)  
P Rev, [503](#)  
P Rev Min, [501](#)  
Paging Indicator, [510](#)  
Permuted ESN, [486](#), [496](#)  
Phase Polarity, [509](#)  
PN Offset, [512](#)  
PN15, [483](#), [494](#), [518](#), [522](#), [524](#), [530](#), [535](#), [538](#), [542](#)  
PN9, [483](#), [494](#), [518](#), [522](#), [524](#), [530](#), [535](#), [538](#), [542](#)  
Power, [486](#), [491](#), [493](#), [497](#), [502](#), [507](#), [510](#), [520](#),  
[523](#), [526](#), [529](#), [532](#), [534](#), [537](#), [540](#), [544](#)  
PRAT, [503](#)  
QOF, [487](#), [497](#)  
Quarter, [529](#), [534](#)  
Radio Config, [488](#), [498](#), [521](#), [524](#), [532](#), [537](#), [541](#),  
[544](#)  
RadioConfig 1/2 Access, [479](#)  
RadioConfig 1/2 Traffic, [479](#)  
RadioConfig 3/4 Common Control, [479](#)  
RadioConfig 3/4 Enhanced Access, [479](#)  
RadioConfig 3/4 Traffic, [479](#)  
Ramp, [487](#)  
Ramp Time, [487](#)  
Rectangle, [481](#), [514](#)  
Reserved, [503](#)  
Rising, [547](#)  
Root Nyquist, [481](#), [514](#)  
Scale to OdB, [508](#), [517](#)  
Spread Rate, [511](#)  
State, [492](#), [494](#), [499](#), [505](#), [508](#), [511](#), [521](#), [524](#), [528](#),  
[530](#), [533](#), [535](#), [538](#), [541](#), [545](#)  
State field, [489](#)  
System ID, [504](#)  
Time, [504](#)  
Trigger Advance, [546](#)  
Turbo Coding, [498](#), [545](#)  
UN3/4 GSM Gaussian, [481](#), [514](#)

- CDMA2000 BBG subsystem keys and fields  
(*continued*)  
 User File, 483, 489, 494, 518, 522, 524, 530, 535,  
 538, 542  
 User FIR, 481, 514  
 Walsh, 492, 498, 505, 508, 511, 527, 529, 533,  
 534, 538, 541, 545  
 Walsh field, 488  
 CDMA2000 Off On softkey, 269, 547  
 CDPD softkey, 282, 283, 284, 567  
 CDVCC softkey, 894, 897  
 CFN #0 Frame Pulse (RPS10) softkey  
*See* wideband CDMA base band generator  
 subsystem keys and fields  
 Chan Code field, 1031, 1040  
 Chan Code softkey, 1030  
 Change field, 509  
 Channel Code field, 1090, 1131  
*See* wideband CDMA base band generator  
 subsystem keys and fields  
 Channel Number softkey, 40  
 Channel softkey, 356, 364  
 Channel State field, 1089, 1096  
 Channel State Off On softkey, 1108  
*See* wideband CDMA base band generator  
 subsystem keys and fields  
 ChCode Ctl field, 1121  
 ChCode Dat field, 1121  
 Chip Clock (RPS1) softkey  
*See* wideband CDMA base band generator  
 subsystem keys and fields  
 Chip Rate field, 480, 513, 1030, 1079  
 Chip Rate softkey, 216, 342  
 Class Ib Bit Error softkey, 451, 452  
 Class II Bit Error softkey, 452  
 Class II RBER softkey, 404, 405  
 Class Ib RBER softkey, 404, 405  
 Clear Header softkey, 206, 220, 245, 273, 295, 326,  
 344, 467  
 clearing markers, 300  
 Clip |I+jQ| To softkey, 216, 241  
 Clip |I| To softkey, 215, 240, 340, 350  
 Clip |Q| To softkey, 215, 240, 340, 351  
 Clip At PRE POST FIR Filter, 215  
 Clip At PRE POST FIR Filter softkey, 240, 340  
 Clip Type |I+jQ| To softkey, 341, 351  
 Clipping Type |I+jQ| |I|,|Q| softkey, 216, 241, 294,  
 341, 351  
 Clock Delay Off On softkey, 419  
 Clock Per Sample softkey, 380  
 Clock Phase softkey, 380  
 Clock Polarity Neg Pos softkey, 420  
 Clock Polarity softkey, 381  
 Clock Rate softkey, 382  
 Clock Skew softkey, 383  
 Clock Source softkey, 383  
 Clock Time Delay softkey, 419  
 Clock/Gate Delay softkey, 465  
 command tree, SCPI, 6, 7  
 Common Mode I/Q Offset softkey, 26  
 communication subsystem keys  
 Default Gateway, 76  
 GPIB Address, 75  
 Hostname, 76  
 IP Address, 76  
 LAN Config, 75  
 Meter Address, 77  
 Meter Channel A B, 77  
 Meter Timeout, 78  
 Power Meter, 78  
 Reset RS-232, 79  
 RS-232 Baud Rate, 79  
 RS-232 ECHO Off On, 79  
 RS-232 Timeout, 80  
 Subnet Mask, 77  
 Comp Mode Start Trigger Polarity Neg Pos softkey,  
 1160  
 Comp Mode Start Trigger Polarity Pos Neg softkey,  
 1062, 1063  
 Comp Mode Stop Trigger Polarity Neg Pos softkey,  
 1160  
 Comp Mode Stop Trigger Polarity Pos Neg softkey,  
 1063  
 Compressed Frame (RPS8) softkey  
*See* wideband CDMA base band generator  
 subsystem keys and fields  
 Compressed Mode Off On softkey, 1159  
 Compressed Mode Start Trigger softkey, 1039,  
 1062, 1160  
 Compressed Mode Stop Trigger softkey, 1063, 1160

---

## Index

- Config softkey, [252](#), [255](#)
- Configure Cal Array softkey, [20](#)
- continuous
  - segment advance, [318](#)
- Continuous PN9 softkey, [465](#)
- Continuous softkey
  - dual ARB subsystem keys, [318](#)
  - See* CDMA ARB subsystem keys
  - See* CDMA2000 ARB subsystem keys
  - See* custom subsystem keys
  - See* DECT subsystem keys
  - See* Dmodulation subsystem keys
  - See* dual ARB subsystem keys
  - See* EDGE subsystem keys
  - See* GSM subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* PHS subsystem keys
  - See* TETRA subsystem keys
  - See* wideband CDMA ARB subsystem keys
- Copy File softkey, [105](#), [114](#), [124](#)
- correction subsystem keys
  - Configure Cal Array, [20](#)
  - Flatness Off On, [21](#)
  - Load From Selected File, [20](#)
  - Preset List, [21](#)
  - Store To File, [21](#)
- CPICH softkey, [357](#)
- CRC Size field, [1069](#), [1164](#), [1171](#)
- creating a waveform
  - sequence, dual ARB, [313](#)
- creating a waveform, multitone, [326](#)
- CS-1 softkey, [641](#), [642](#), [794](#)
- CS-4 softkey, [641](#), [643](#), [798](#)
- CSID softkey, [954](#), [972](#)
- Ctrl Beta field, [1109](#)
- Ctrl Pwr field, [1110](#)
- Custom CDMA Multicarrier softkey, [230](#)
- Custom CDMA State softkey, [228](#), [231](#)
- Custom CDMA2000 Carrier softkey, [247](#), [249](#)
- Custom CDMA2000 Multicarrier softkey, [248](#)
- Custom CDMA2000 State softkey, [254](#)
- Custom Digital Mod State softkey, [283](#), [284](#)
- Custom Off On softkey, [572](#)
- Custom softkey, [589](#), [600](#), [656](#), [802](#), [957](#)
- custom subsystem keys
  - 128QAM, [564](#)
  - 16 1's & 16 0's, [557](#)
  - 16PSK, [564](#)
  - 16QAM, [564](#)
  - 256QAM, [564](#)
  - 2-Lvl FSK, [564](#)
  - 32 1's & 32 0's, [557](#)
  - 32QAM, [564](#)
  - 4 1's & 4 0's, [557](#)
  - 4-Lvl FSK, [564](#)
  - 4QAM, [564](#)
  - 64 1's & 64 0's, [557](#)
  - 64QAM, [564](#)
  - 8 1's & 8 0's, [557](#)
  - 8PSK, [564](#)
  - APCO 25 C4FM, [561](#)
  - APCO 25 w/CQPSK, [567](#)
  - BBG Data Clock Ext Int, [549](#)
  - BBG Ref Ext Int, [560](#)
  - Bit Rate, [550](#)
  - Bluetooth, [567](#)
  - BPSK, [564](#)
  - Bus, [569](#)
  - CDPD, [567](#)
  - Continuous, [567](#)
  - Custom Off On, [572](#)
  - D8PSK, [564](#)
  - Diff Data Encode Off On, [559](#)
  - Ext, [557](#), [569](#)
  - Ext BBG Ref Freq, [560](#)
  - Ext Data Clock Normal Symbol, [559](#)
  - Ext Delay Bits, [570](#)
  - Ext Delay Off On, [570](#)
  - Ext Polarity Neg Pos, [571](#)
  - Fall Delay, [552](#), [553](#)
  - Fall Time, [552](#), [553](#)
  - Filter Alpha, [548](#)
  - Filter BbT, [549](#)
  - FIX4, [557](#), [558](#)
  - Free Run, [568](#)
  - Freq Dev, [563](#)
  - Gate Active Low High, [568](#)
  - Gated, [567](#)
  - Gaussian, [561](#)

custom subsystem keys (*continued*)

Gray Coded QPSK, 564  
 I/Q Scaling, 562  
 IS-95, 561  
 IS-95 Mod, 561  
 IS-95 Mod w/EQ, 561  
 IS-95 OQPSK, 564  
 IS-95 QPSK, 564  
 IS-95 w/EQ, 561  
 MSK, 564  
 None, 567  
 Nyquist, 561  
 Optimize FIR For EVM ACP, 557  
 OQPSK, 564  
 $\pi/4$  DQPSK, 564  
 Patt Trig In 1, 571  
 Patt Trig In 2, 571  
 Phase Dev, 563  
 Phase Polarity Normal Invert, 565  
 PN11, 557  
 PN15, 557  
 PN20, 557  
 PN23, 557  
 PN9, 557  
 PRAM Files, 558  
 QPSK, 564  
 Rectangle, 561  
 Reset & Run, 568  
 Rise Delay, 554  
 Rise Time, 555, 556  
 Root Nyquist, 561  
 Single, 567  
 Symbol Rate, 565  
 Trigger & Run, 568  
 Trigger Key, 569  
 UN3/4 GSM Gaussian, 561  
 User File, 557  
 User FIR, 561  
 User FSK, 564  
 User I/Q, 564  
 Custom TS softkey, 645, 655, 793, 800  
 Custom WCDMA State softkey, 363  
 Cycle Count softkey, 459  
 Cycle End softkey, 405

**D**

D8PSK softkey  
   *See* custom subsystem keys  
   *See* DECT subsystem keys  
   *See* Dmodulation subsystem keys  
   *See* EDGE subsystem keys  
   *See* GSM subsystem keys  
   *See* NADC subsystem keys  
   *See* PDC subsystem keys  
   *See* PHS subsystem keys  
   *See* TETRA subsystem keys  
 data  
   memory subsystem, 105  
 data append  
   memory subsystem, 106  
 Data Beta field, 1113  
 data bit, 107  
 data block, 114  
 Data Clock Out Neg Pos softkey, 133  
 Data Clock Polarity Neg Pos softkey, 130, 132, 134  
 Data field, 1091, 1175  
 data files, 105  
 data FSK, 109  
 data IQ, 110  
 Data Mode Raw Enc TLM softkey, 763, 764  
 Data Out Polarity Neg Pos softkey, 133, 135  
 Data Polarity Neg Pos softkey, 131, 132, 420  
 Data Pwr field, 1115  
 Data Rate field, 1041  
 data subsystem keys  
   Error Out, 413  
   PN9, 413  
   Reference Out, 413  
 Data Type softkey, 392  
 DATA/CLK/SYNC Rear Outputs Off On softkey, 135  
 DAYLT field, 499  
 dBm softkey, 170  
 dBuV softkey, 170  
 dBuVemf softkey, 170  
 DC softkey, 189  
 DCFM/DCΦM Cal softkey, 72  
 DCH1 softkey, 1077  
 DCH2 softkey, 1077  
 DCH3 softkey, 1077

---

## Index

- DCH4 softkey, [1077](#)
- DCH5 softkey, [1077](#)
- DCH6 softkey, [1077](#)
- decimal values, [18](#)
- Dect Off On softkey, [621](#)
- DECT softkey, [282](#), [283](#), [284](#)
- DECT subsystem keys
  - 128QAM, [588](#)
  - 16 1's & 16 0's, [582](#), [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#)
  - 16-Lvl FSK, [582](#)
  - 16PSK, [588](#)
  - 16QAM, [588](#)
  - 256QAM, [588](#)
  - 2-Lvl FSK, [588](#)
  - 32 1's & 32 0's, [582](#), [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#)
  - 32QAM, [588](#)
  - 4 1's & 4 0's, [582](#), [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#)
  - 4-Lvl FSK, [588](#)
  - 4QAM, [588](#)
  - 64 1's & 64 0's, [582](#), [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#)
  - 64QAM, [588](#)
  - 8 1's & 8 0's, [582](#), [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#)
  - 8-Lvl FSK, [582](#)
  - 8PSK, [588](#)
- A field, [590](#), [593](#), [596](#), [598](#), [601](#), [602](#), [603](#), [606](#), [608](#), [610](#)
- All Timeslots, [614](#)
- APCO 25 C4FM, [585](#)
- BBG Data Clock Ext Int, [573](#)
- BBG Ref Ext Int, [584](#)
- Begin Frame, [614](#)
- Begin Timeslot #, [614](#), [615](#)
- Bit Rate, [574](#)
- BPSK, [588](#)
- Bus, [613](#), [618](#)
- Continuous, [616](#)
- Custom, [589](#), [600](#)
- D8PSK, [588](#)
- Data Format Pattern Framed, [581](#)
- Dect Off On, [621](#)
- DECT subsystem keys (*continued*)
  - DM0, [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#)
  - DM1, [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#)
  - Dummy Bearer 1, [600](#)
  - Dummy Bearer 2, [600](#)
  - Ext, [582](#), [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#), [613](#), [618](#)
  - Ext Data Clock Normal Symbol, [584](#)
  - Ext Delay Bits, [619](#)
  - Ext Delay Off On, [621](#)
  - Ext Polarity Neg Pos, [620](#)
  - FACC, [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#)
  - Fall Delay, [576](#), [577](#)
  - Fall Time, [576](#), [577](#)
  - FDEV1\_FS, [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#)
  - FDEV1\_HS, [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#)
  - FDEV2\_FS, [589](#), [592](#), [595](#), [597](#), [599](#), [600](#), [604](#), [607](#), [609](#), [611](#)
  - Filter Alpha, [573](#)
  - Filter BbT, [574](#)
  - FIX4, [582](#), [589](#), [590](#), [592](#), [595](#), [597](#), [599](#), [600](#), [601](#), [604](#), [605](#), [607](#), [608](#), [609](#), [610](#), [611](#), [612](#)
  - Free Run, [617](#)
  - Freq Dev, [586](#)
  - Gate Active Low High, [618](#)
  - Gated, [616](#)
  - Gaussian, [585](#)
  - Gray Coded QPSK, [588](#)
  - I/Q Scaling, [586](#)
  - IS-95, [585](#)
  - IS-95 Mod, [585](#)
  - IS-95 Mod w/EQ, [585](#)
  - IS-95 OQPSK, [588](#)
  - IS-95 QPSK, [588](#)
  - IS-95 w/EQ, [585](#)
  - Low Capacity, [589](#), [600](#)
  - Low Capacity with Z field, [589](#), [600](#)
  - MSK, [588](#)
  - Nyquist, [585](#)
  - Optimize FIR For EVM ACP, [581](#)

- DECT subsystem keys (*continued*)
- OQPSK, 588
  - P, 591, 594, 596, 598, 602, 603, 604, 606, 608, 610
  - $\pi/4$  DQPSK, 588
  - Patt Trig In 1, 620
  - Patt Trig In 2, 620
  - Phase Dev, 587
  - Phase Polarity Normal Invert, 588
  - PN11, 582, 589, 592, 595, 597, 599, 600, 607, 609, 611
  - PN15, 582, 589, 592, 595, 597, 599, 600, 604, 607, 609, 611
  - PN20, 582, 589, 592, 595, 597, 599, 600, 607, 609, 611
  - PN23, 582, 589, 592, 595, 597, 599, 600, 607, 609, 611
  - PN9, 582, 589, 592, 595, 597, 599, 600, 604, 607, 609, 611
  - PN9 Mode Normal Quick, 575
  - QPSK, 588
  - Recall Secondary Frame State, 612
  - Rectangle, 585
  - Reset & Run, 617
  - Restore DECT Factory Default, 583
  - Rise Delay, 578
  - Rise Time, 579, 580
  - Root Nyquist, 585
  - S, 591, 594, 596, 598, 602, 603, 604, 607, 609, 611
  - Save Secondary Frame State, 612
  - Secondary Frame Off On, 613
  - Sine, 556, 580
  - Single, 616
  - Sync Out Offset, 614
  - Timeslot Ampl Main Delta, 593, 605
  - Timeslot Off On, 593, 606
  - Traffic Bearer, 589, 600
  - Traffic Bearer with Z field, 589, 600
  - Trigger & Run, 617
  - Trigger Key, 613, 618
  - UN3/4 GSM Gaussian, 585
  - User File, 556, 580, 582, 589, 592, 595, 597, 599, 600, 604, 607, 609, 611
  - User FIR, 585
  - User FSK, 587, 588
  - User I/Q, 588
  - dect subsystem keys
    - PRAM File, 583
  - DECT subsystem keys
    - Symbol Rate, 615
  - Default Gateway softkey, 76
  - Delay Bits softkey, 459
  - Delete All NVWFM Files softkey, 125
  - Delete All WFM Files softkey, 125
  - Delete All WFM1 Files softkey, 125
  - Delete File softkey, 126
  - Delete softkeys
    - Delete All ARB CDMA Files, 118
    - Delete All ARB DMOD Files, 118
    - Delete All ARB DWCDMA Files, 119
    - Delete All ARB FCDMA Files, 119
    - Delete All ARB MCDMA Files, 120
    - Delete All ARB MDMOD Files, 120
    - Delete All ARB MDWCDMA Files, 120
    - Delete All ARB MFCDMA Files, 120
    - Delete All ARB MTONE Files, 121
    - Delete All ARB RCDMA Files, 121
    - Delete All ARB UWCDMA Files, 122
    - Delete All Binary Files, 118
    - Delete All Bit Files, 118
    - Delete All Files, 117
    - Delete All FIR Files, 119
    - Delete All FSK Files, 119
    - Delete All I/Q Files, 119
    - Delete All List Files, 120
    - Delete All SEQ Files, 121
    - Delete All SHAPE Files, 121
    - Delete All State Files, 121
    - Delete All UFLT Files, 122
    - Delete File, 122
  - DHCP, 75
  - Diagnostic Info softkey, 81, 82, 83, 84, 89
  - diagnostic subsystem keys
    - Auxiliary Software Options, 82
    - Diagnostic Info, 81, 82, 83, 84
    - Installed Board Info, 81
    - Options Info, 83
  - diagnostic subsystem softkeys
    - Waveform Licenses, 82, 84
  - Diff Data Encode Off On softkey, 559, 784
  - Diff. Mode I Offset softkey, 26

---

## Index

- Diff. Mode Q Offset softkey, [27](#)
- Digital Modulation Off On softkey, [293](#)
- digital modulation subsystem keys
  - 2.100 MHz, [32](#)
  - 40.000 MHz, [32](#)
  - ALC BW Normal Narrow, [22](#)
  - BBG1, [24, 35](#)
  - Burst Envelope Int Ext Off, [22](#)
  - Common Mode I/Q Offset, [26](#)
  - Diff. Mode I Offset, [26](#)
  - Diff. Mode Q Offset, [27](#)
  - Ext 50 Ohm, [24, 35](#)
  - Ext 600 Ohm, [24, 35](#)
  - Ext In 600 Ohm I Offset, [27](#)
  - Ext In 600 Ohm Q Offset, [28](#)
  - High Crest Mode Off On, [23](#)
  - I Offset, [29](#)
  - I/Q Adjustments Off On, [32](#)
  - I/Q Gain Balance Source 1, [29](#)
  - I/Q Mod Filter Manual Auto, [33](#)
  - I/Q Off On, [37](#)
  - I/Q Out Gain Balance, [27](#)
  - I/Q Output Atten, [28](#)
  - I/Q Timing Skew, [31](#)
  - I/Q Timing Skew Path softkey, [32](#)
  - Int I/Q Skew Corrections RF BB Off, [35](#)
  - Int Phase Polarity Normal Invert, [24, 34](#)
  - Modulator Atten Manual Auto, [33, 34](#)
  - Off, [24, 35](#)
  - Q Offset, [30](#)
  - Quadrature Angle Adjustment, [25, 30](#)
  - Sum, [24](#)
  - Summing Ratio (SRC1/SRC2) x.xx dB, [36](#)
  - Through, [32](#)
- digital signal interface module, [380](#)
- digital subsystem softkeys, [387](#)
  - Bit Order, [384](#)
  - Clock Per Sample, [380](#)
  - Clock Phase, [380](#)
  - Clock Polarity, [381](#)
  - Clock Rate, [382](#)
  - Clock Skew, [383](#)
  - Clock Source, [383](#)
  - Data Type, [392](#)
  - Direction, [385](#)
  - digital subsystem softkeys, [387](#) (*continued*)
    - Frame Polarity, [387](#)
    - I Gain, [385](#)
    - I Offset, [386](#)
    - IQ Polarity, [388](#)
    - Logic Type, [393](#)
    - Loop Back Test Type, [393](#)
    - N5102A Off On, [395](#)
    - Negate I, [386](#)
    - Negate Q, [389](#)
    - Pass Through Preset, [395](#)
    - Port Config, [394](#)
    - Q Gain, [388](#)
    - Q Offset, [390](#)
    - Reference Frequency, [382](#)
    - Rotation, [390](#)
    - Scaling, [391](#)
    - Signal Type, [392](#)
    - Swap IQ, [387](#)
    - Word Alignment, [384](#)
    - Word Size, [391](#)
  - Direction softkey, [385](#)
  - discrete response data, [11](#)
  - discrete SCPI parameters, [9](#)
  - display
    - secure mode, [160](#)
  - display contrast hardkeys, [86](#)
  - display subsystem keys
    - Brightness, [86](#)
    - display contrast, [86](#)
    - Inverse Video Off On, [87](#)
    - Update in Remote Off On, [87](#)
  - DL Reference 1.1 softkey, [1158](#)
    - wideband CDMA base band generator subsystem softkeys
      - DL Reference 1.1, [1061](#)
  - DL Reference 1.2 softkey, [1158](#)
    - wideband CDMA base band generator subsystem softkeys
      - DL Reference 1.2, [1061](#)
  - DL Reference 2.1 softkey, [1158](#)
    - wideband CDMA base band generator subsystem softkeys
      - DL Reference 2.1, [1061](#)



- DL Reference 2.2 softkey, [1158](#)
  - wideband CDMA base band generator subsystem
    - softkeys
      - DL Reference 2.2, [1061](#)
- DM0 softkey
  - See DECT subsystem keys
- DM1 softkey
  - See DECT subsystem keys
- DMOD softkey, [95](#)
- Dmodulation subsystem keys
  - # of Carriers, [283](#), [285](#)
  - 128QAM, [279](#)
  - 16PSK, [279](#)
  - 16QAM, [279](#)
  - 2.100 MHz, [275](#)
  - 256QAM, [279](#)
  - 2-Lvl FSK, [279](#)
  - 32QAM, [279](#)
  - 40.000 MHz, [270](#), [275](#)
  - 4-Lvl FSK, [279](#)
  - 4QAM, [279](#)
  - 64QAM, [279](#)
  - 8PSK, [279](#)
  - APCO 25 C4FM, [271](#)
  - APCO 25 w/C4FM, [282](#), [283](#), [284](#)
  - APCO 25 w/C4QPSK, [282](#), [283](#), [284](#)
  - ARB Reference Ext Int, [281](#)
  - ARB Sample Clock, [282](#)
  - BPSK, [279](#)
  - Bus, [290](#)
  - Carrier Phases Fixed Random, [283](#)
  - CDPD, [282](#), [283](#), [284](#)
  - Clear Header, [273](#)
  - Continuous, [287](#)
  - Custom Digital Mod State, [283](#), [284](#)
  - D8PSK, [279](#)
  - DECT, [282](#), [283](#), [284](#)
  - Digital Modulation Off On, [293](#)
  - EDGE, [282](#), [283](#), [284](#)
  - Ext, [290](#)
  - Ext Delay Off On, [291](#)
  - Ext Delay Time, [291](#)
  - Ext Polarity Neg Pos, [292](#)
  - Filter Alpha, [272](#)
  - Filter BbT, [272](#)
  - Dmodulation subsystem keys (*continued*)
    - Free Run, [288](#)
    - Freq Dev, [279](#)
    - Freq Spacing, [283](#)
    - Gate Active Low High, [289](#)
    - Gated, [287](#)
    - Gaussian, [271](#)
    - Gray Coded QPSK, [279](#)
    - GSM, [282](#), [283](#), [284](#)
    - I/Q Mod Filter Manual Auto, [275](#)
    - I/Q Output Filter Manual Auto, [270](#)
    - Immediate, [281](#)
    - Initialize Table, [284](#)
    - Insert Row, [249](#), [284](#)
    - IS-2000 SR3 DS, [271](#)
    - IS-95, [271](#)
    - IS-95 Mod, [271](#)
    - IS-95 Mod w/EQ, [271](#)
    - IS-95 OQPSK, [279](#)
    - IS-95 QPSK, [279](#)
    - IS-95 w/EQ, [271](#)
    - Load/Store, [284](#)
    - Marker 1, [276](#), [277](#)
    - Marker 1 Polarity Neg Pos, [280](#)
    - Marker 2, [276](#), [277](#)
    - Marker 2 Polarity Neg Pos, [280](#)
    - Marker 3, [276](#), [277](#)
    - Marker 3 Polarity Neg Pos, [280](#)
    - Marker 4, [276](#), [277](#)
    - Marker 4 Polarity Neg Pos, [280](#)
    - Modulator Atten Manual Auto, [274](#)
    - MSK, [279](#)
    - Multicarrier Off On, [282](#)
    - NADC, [282](#), [283](#), [284](#)
    - None, [276](#), [277](#)
    - Nyquist, [271](#)
    - Off, [281](#)
    - On, [281](#)
    - Optimize FIR For EVM ACP, [273](#)
    - OQPSK, [279](#)
    - $\pi/4$  DQPSK, [279](#)
    - Patt Trig In 1, [292](#)
    - Patt Trig In 2, [292](#)
    - PDC, [282](#), [283](#), [284](#)
    - PHS, [282](#), [283](#), [284](#)

---

## Index

Dmodulation subsystem keys (*continued*)

- PWT, [282](#), [283](#), [284](#)
- QPSK, [279](#)
- Rectangle, [271](#)
- Reference Freq, [212](#), [280](#)
- Reset & Run, [288](#)
- Root Nyquist, [271](#)
- Save Setup To Header, [273](#)
- Select File, [249](#), [282](#)
- Single, [287](#)
- Store Custom Dig Mod State, [285](#)
- Symbol Rate, [286](#)
- TETRA, [282](#), [283](#), [284](#)
- Through, [270](#), [275](#)
- Trigger & Run, [288](#)
- Trigger Key, [290](#)
- UN3/4 GSM Gaussian, [271](#)
- User FIR, [271](#)
- WCDMA, [271](#)
- Dn Custom Cont softkey, [1010](#)
- Dn Normal Cont softkey, [1010](#)
- Dn Normal Disc softkey, [1010](#)
- Dn Sync Cont softkey, [1010](#)
- Dn Sync Disc softkey, [1010](#)
- Do Power Search softkey, [60](#), [62](#)
- documentation, [lxxiii](#)
- Doppler Shift softkey, [764](#)
- Down Custom softkey, [899](#), [933](#)
- Down TCH All softkey, [899](#), [933](#)
- Down TCH softkey, [899](#), [933](#)
- Down/Up softkey, [1036](#), [1086](#)
- Downlink MCS-1 softkey, [641](#), [643](#), [794](#)
- Downlink MCS-5 softkey, [646](#)
- Downlink MCS-9 softkey, [646](#)
- downloading files, [116](#)
- DPCCH + 1 DPDCH softkey, [363](#)
- DPCCH + 2 DPDCH softkey, [363](#)
- DPCCH + 3 DPCCH softkey, [363](#)
- DPCCH + 4 DPDCH softkey, [363](#)
- DPCCH + 5 DPDCH softkey, [363](#)
- DPCCH Pilot data-clk (DRPS23) softkey, [1050](#),  
[1052](#), [1053](#), [1054](#), [1055](#)
- DPCCH Power field, [1083](#)
- DPCCH Raw Data (RPS4) softkey  
*See* wideband CDMA base band generator  
subsystem keys and fields
- DPCCH Raw Data Clock (RPS5) softkey  
*See* wideband CDMA base band generator  
subsystem keys and fields
- DPCCH softkey, [363](#), [1077](#), [1100](#)
- DPCCH TFC I data-clk (DRPS22) softkey, [1050](#),  
[1052](#), [1053](#), [1054](#), [1055](#)
- DPCCH TPC indicator (DRPS21) softkey, [1050](#),  
[1052](#), [1053](#), [1054](#), [1055](#)
- DPCH + 1 softkey, [1022](#), [1023](#)
- DPCH + 2 softkey, [1022](#), [1023](#)
- DPCH Channel Balance softkey, [1030](#)
- DPCH Compressed Frame Indicator (DRPS32)  
softkey, [1050](#), [1052](#), [1053](#), [1054](#), [1055](#)
- DPCH data stream (DRPS24) softkey, [1050](#), [1052](#),  
[1053](#), [1054](#), [1055](#)
- DPCH data-clk (0) (DRPS28) softkey, [1050](#), [1052](#),  
[1053](#), [1054](#), [1055](#)
- DPCH Gap Indicator (DRPS33) softkey, [1050](#),  
[1052](#), [1053](#), [1054](#), [1055](#)
- DPCH softkey, [357](#)
- DPCH TimeSlot pulse (DRPS25) softkey, [1050](#),  
[1052](#), [1053](#), [1054](#), [1055](#)
- DPCH10ms Frame-Pulse (DRPS26) softkey, [1050](#),  
[1052](#), [1053](#), [1054](#), [1055](#)
- DPDCH data-clk withDTX (DRPS20) softkey,  
[1050](#), [1052](#), [1053](#), [1054](#), [1055](#)
- DPDCH data-clk WithOutDTX (DRPS30) softkey,  
[1050](#), [1052](#), [1053](#), [1054](#), [1055](#)
- DPDCH Power field, [1092](#)
- DPDCH Raw Data (RPS2) softkey  
*See* wideband CDMA base band generator  
subsystem keys and fields
- DPDCH Raw DataClock (RPS3) softkey  
*See* wideband CDMA base band generator  
subsystem keys and fields
- DPDCH softkey, [1077](#)
- Drift Deviation softkey, [469](#)
- dual ARB subsystem  
generate sine, [294](#)  
markers, *See* markers  
runtime scaling, [312](#)  
scaling waveform files, [312](#)

- dual ARB subsystem (*continued*)  
 Through, 298
- dual ARB subsystem keys  
 # Skipped Points, 302  
 2.100 MHz, 299  
 40.000 MHz, 298, 299  
 Apply to Waveform, 300, 302  
 ARB Off On, 324  
 ARB Reference Ext Int, 23, 311  
 ARB Sample Clock, 313  
 Build New Waveform Sequence, 313  
 Bus, 320  
 Carrier Bandwidth, 309  
 Carrier to Noise Ratio, 309  
 Clear Header, 295  
 Clipping Type  $|I+jQ|$   $|I|,|Q|$ , 294  
 Continuous, 318  
 Edit Repetitions, 313  
 Ext, 320  
 Ext Delay, 321  
 Ext Delay Samples, 321  
 Ext Delay Time, 322  
 Ext Polarity Neg Pos, 322  
 First Mkr Point, 300, 302  
 Free Run, 317  
 Gate Active Low High, 317  
 Gated, 315  
 Header RMS, 295  
 I/Q Mod Filter Manual Auto, 300  
 I/Q Output Filter Manual Auto, 297, 298  
 Immediate, 311  
 Insert Waveform, 313  
 Last Mkr Point, 300, 302  
 Marker 1, 305  
 Marker 1 2 3 4, 300  
 Marker 2, 305  
 Marker 3, 305  
 Marker 4, 305  
 Marker Polarity Neg Pos, 308, 333, 370, 475  
 Markers, 302, 306  
 Modulator Atten Manual Auto, 298, 299  
 Name and Store, 313  
 Noise Bandwidth Factor, 308  
 None, 305, 306  
 Off, 311, 321
- dual ARB subsystem keys (*continued*)  
 On, 311  
 Patt Trig In 1, 323  
 Patt Trig In 2, 323  
 Real-time Noise Off On, 310  
 Reference Freq, 310  
 Reset & Run, 317  
 Samples, 321  
 Save Setup To Header, 297  
 Scale Waveform Data, 312  
 Scaling, 312  
 Segment Advance, 315  
 Select Waveform, 323, 324  
 Set Marker Off All Points, 301  
 Set Marker Off Range Of Points, 300  
 Set Marker On Range Of Points, 302  
 Single, 315, 318  
 Through, 298, 299  
 Time, 321  
 Toggle Marker 1 2 3 4, 313  
 Trigger & Run, 317  
 Trigger Key, 320  
 Waveform Runtime Scaling, 312
- Dual-Sine softkey, 175, 182, 189, 195  
 Dummy Bearer 1 softkey, 600  
 Dummy Bearer 2 softkey, 600  
 Dummy softkey, 802  
 DWCDMA softkey, 96  
 Dwell Type List Step softkey, 51
- E**
- Eb/No field, 1106  
 Eb/No value (dB) field, 1076  
 EbNo field, 506  
*See* CDMA2000 BBG subsystem keys and fields  
 Ec/No value field, 1022, 1107  
 EcNo field, 493, 528, 533  
 EDGE BERT Off On softkey, 442  
 EDGE Off On softkey, 665  
 EDGE softkey, 282, 283, 284, 634  
 EDGE subsystem keys  
 128QAM, 637  
 16 1's & 16 0's, 630, 639, 641, 646  
 16PSK, 637  
 16QAM, 637

---

## Index

### EDGE subsystem keys *(continued)*

- 256QAM, 637
- 2-Lvl FSK, 637
- 32 1's & 32 0's, 630, 639, 641, 646
- 32QAM, 637
- 4 1's & 4 0's, 630, 639, 641, 646
- 4-Lvl FSK, 637
- 4QAM, 637
- 64 1's & 64 0's, 630, 639, 641, 646
- 64QAM, 637
- 8 1's & 8 0's, 630, 639, 641, 646
- 8PSK, 637
- All Timeslots, 657
- APCO 25 C4FM, 634
- BBG Ref Ext Int, 633
- Begin Frame, 657
- Begin Timeslot #, 657, 658
- BPSK, 637
- Bus, 638, 662
- Continuous, 660
- CS-1, 641, 642
- CS-4, 641, 643
- Custom, 656
- Custom TS, 645, 655
- D8PSK, 637
- Data Format Pattern Framed, 629
- Downlink MCS-1, 641, 643
- Downlink MCS-5, 646
- Downlink MCS-9, 646
- EDGE, 634
- EDGE Off On, 665
- E-TCH/F43.2, 646
- Ext, 630, 638, 639, 646, 662
- Ext BBG Ref Freq, 633
- Ext Data Clock Ext Int, 622
- Ext Data Clock Normal Symbol, 632
- Ext Delay Bits, 663
- Ext Delay Off On, 664
- Ext Polarity Neg Pos, 664
- Fall Delay, 623, 624
- Fall Time, 625
- Filter Alpha, 622
- Filter BbT, 623
- FIX4, 630, 631, 639, 640, 641, 643, 646, 652
- Free Run, 660

### EDGE subsystem keys *(continued)*

- Freq Dev, 635
- G, 640, 654
- Gate Active Low High, 661
- Gated, 660
- Gaussian, 634
- GMSK, 656
- Gray Coded QPSK, 637
- I/Q Scaling, 635
- IS-95, 634
- IS-95 Mod, 634
- IS-95 Mod w/EQ, 634
- IS-95 OQPSK, 637
- IS-95 QPSK, 637
- IS-95 w/EQ, 634
- MSK, 637
- Multislot Off On, 646
- Normal, 656
- Normal All, 656
- Nyquist, 634
- Optimize FIR For EVM ACP, 630
- OQPSK, 637
- $\pi/4$  DQPSK, 637
- Patt Trig In 1, 665
- Patt Trig In 2, 665
- Phase Dev, 636
- Phase Polarity Normal Invert, 637
- PN11, 630, 639, 646
- PN15, 630, 639, 641, 642, 643, 644, 646, 650, 651, 652, 653
- PN20, 630, 639, 646
- PN23, 630, 639, 646
- PN9, 630, 639, 641, 642, 643, 644, 646, 650, 651, 652, 653
- QPSK, 637
- Recall Secondary Frame State, 638
- Rectangle, 634
- Reset & Run, 660
- Restore EDGE Factory Default, 632
- Rise Delay, 626, 627
- Rise Time, 627, 628
- Root Nyquist, 634
- S, 645
- Save Secondary Frame State, 638
- Secondary Frame Off On, 639

EDGE subsystem keys (*continued*)

Sine, [629](#)  
 Single, [660](#)  
 Symbol Rate, [658](#)  
 Sync Out Offset, [657](#)  
 T1, [654](#)  
 T2, [655](#)  
 TCH/FS, [641](#), [644](#)  
 Timeslot Ampl Main Delta, [655](#)  
 Timeslot Off On, [656](#)  
 Trigger & Run, [660](#)  
 Trigger Key, [638](#), [662](#)  
 TSC0, [645](#), [655](#)  
 TSC1, [645](#), [655](#)  
 TSC2, [645](#), [655](#)  
 TSC3, [645](#), [655](#)  
 TSC4, [645](#), [655](#)  
 TSC5, [645](#), [655](#)  
 TSC6, [645](#), [655](#)  
 TSC7, [645](#), [655](#)  
 UN3/4 GSM Gaussian, [634](#)  
 Uncoded, [646](#)  
 Uplink MCS-1, [641](#), [644](#)  
 Uplink MCS-5, [646](#)  
 Uplink MCS-9, [646](#)  
 User File, [629](#), [630](#), [639](#), [641](#), [646](#)  
 User FIR, [634](#)  
 User FSK, [636](#), [637](#)  
 User I/Q, [636](#), [637](#)  
 edge subsystem keys  
   PRAM File, [631](#)  
 Edit Channel Setup softkey, [252](#), [255](#)  
 Edit Repetitions softkey, [313](#)  
 Enter Secure Mode softkey, [162](#)  
 Equal Energy per Symbol softkey, [361](#)  
 Equal Powers softkey  
   *See* CDMA ARB subsystem keys  
   *See* CDMA2000 ARB subsystem keys  
   *See* CDMA2000 BBG subsystem keys and fields  
   *See* wideband CDMA base band generator  
     subsystem keys and fields  
 Erase All softkey, [161](#)  
 Erase and Overwrite All softkey, [163](#)  
 Erase and Sanitize All softkey, [163](#)  
 Erase softkey, [161](#)

## ERROR

221, [116](#)  
 Error BER softkey, [1172](#)  
 Error Bits softkey, [1165](#)  
 Error Blocks field, [1166](#)  
 Error Count softkey, [442](#)  
   *See* sense subsystem keys  
 Error Info softkey, [155](#)  
 error messages, resolving, [670](#), [814](#)  
 Error Out softkey, [413](#)  
 Error Rate softkey  
   *See* calculate subsystem keys  
   *See* calculate subsystem keys  
 ESG file overview, [668](#), [812](#)  
 ET softkey, [792](#)  
 E-TCH/F43.2 softkey, [646](#)  
 Even Second Delay field, [480](#), [513](#)  
 Exceeds Any Limit softkey, [405](#)  
 Exceeds Any Thresholds softkey  
   *See* sense subsystem keys  
 Execute Cal softkey, [72](#), [73](#)  
 Ext 50 Ohm softkey, [24](#), [35](#)  
 Ext 600 Ohm softkey, [24](#), [35](#)  
 Ext BBG Ref Freq softkey  
   *See* custom subsystem keys  
   *See* EDGE subsystem keys  
   *See* GSM subsystem keys  
   *See* NADC subsystem keys  
   *See* PDC subsystem keys  
   *See* PHS subsystem keys  
   *See* TETRA subsystem keys  
 Ext CDMA Freq field, [500](#)  
 Ext Clock Rate x1 x2 x4 softkey, [1020](#)  
 Ext Data Clock Ext Int softkey  
   *See* EDGE subsystem keys  
   *See* PDC subsystem keys  
 Ext Data Clock Normal Symbol softkey  
   *See* custom subsystem keys  
   *See* DECT subsystem keys  
   *See* EDGE subsystem keys  
   *See* GSM subsystem keys  
   *See* NADC subsystem keys  
   *See* PDC subsystem keys  
   *See* PHS subsystem keys  
   *See* TETRA subsystem keys

---

# Index

## Ext Delay Bits softkey

- See custom subsystem keys
- See DECT subsystem keys
- See EDGE subsystem keys
- See GSM subsystem keys
- See NADC subsystem keys
- See PDC subsystem keys
- See PHS subsystem keys
- See TETRA subsystem keys

## Ext Delay Off On softkey

- See CDMA ARB subsystem keys
- See CDMA2000 ARB subsystem keys
- See custom subsystem keys
- See DECT subsystem keys
- See Dmodulation subsystem keys
- See EDGE subsystem keys
- See GSM subsystem keys
- See NADC subsystem keys
- See PDC subsystem keys
- See PHS subsystem keys
- See TETRA subsystem keys
- See wideband CDMA ARB subsystem keys

## Ext Delay Samples softkey, 321

## Ext Delay softkey, 321

## Ext Delay Time softkey, 236, 267, 291, 322, 376

## Ext Frame Trigger Delay softkey, 427

## Ext In 600 Ohm I Offset softkey, 27

## Ext In 600 Ohm Q Offset softkey, 28

## Ext Polarity Neg Pos softkey

- See CDMA ARB subsystem keys
- See CDMA2000 ARB subsystem keys
- See custom subsystem keys
- See DECT subsystem keys
- See Dmodulation subsystem keys
- See dual ARB subsystem keys
- See EDGE subsystem keys
- See GSM subsystem keys
- See NADC subsystem keys
- See PDC subsystem keys
- See PHS subsystem keys
- See TETRA subsystem keys
- See wideband CDMA ARB subsystem keys

## Ext softkey

- List/Sweep subsystem, 54
- See amplitude modulation subsystem keys

## Ext softkey (continued)

- See CDMA ARB subsystem keys
- See CDMA2000 ARB subsystem keys
- See CDMA2000 BBG subsystem keys and fields
- See custom subsystem keys
- See DECT subsystem keys
- See Dmodulation subsystem keys
- See dual ARB subsystem keys
- See EDGE subsystem keys
- See frequency modulation subsystem keys
- See GSM subsystem keys
- See low frequency output subsystem keys
- See NADC subsystem keys
- See PDC subsystem keys
- See phase modulation subsystem keys
- See PHS subsystem keys
- See sense subsystem keys
- See TETRA subsystem keys
- See trigger subsystem keys
- See wideband CDMA ARB subsystem keys
- See wideband CDMA base band generator subsystem keys and fields

## Ext softkeys

### Ext Coupling DC AC, 173, 180, 193

### Ext Detector, 63

### Ext Pulse, 202

### Ext1, 176, 184, 196

### Ext2, 176, 184, 196

## extended numeric SCPI parameter, 8

## External Frame Trigger Polarity Neg Pos softkey, 427

## External softkey, 512

## F

### FACC softkey

- See DECT subsystem keys

### Fail Hold softkey, 405

### Fall Delay softkey

- See custom subsystem keys
- See DECT subsystem keys
- See EDGE subsystem keys
- See GSM subsystem keys
- See NADC subsystem keys
- See PDC subsystem keys
- See PHS subsystem keys

*Fall Delay softkey (continued)*

*See* TETRA subsystem keys

Fall Time softkey

*See* custom subsystem keys

*See* DECT subsystem keys

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

Falling softkey, [547](#)

FBI State field, [1082](#)

FCDMA softkey, [96](#)

FCOR softkey, [999](#), [1004](#)

FCorr softkey, [802](#)

FDEV1\_FS softkey

*See* DECT subsystem keys

FDEV1\_HS softkey

*See* DECT subsystem keys

FDEV2\_FS softkey

*See* DECT subsystem keys

Field 1 field, [490](#)

Field 2 field, [490](#)

Field 3 field, [491](#)

file

names, [105](#)

retrieval, [116](#)

systems, [14](#)

types, [14](#)

file overview, HSDPA, [812](#)

file overview, HSPA, [668](#)

Filter Alpha softkey, [1098](#)

*See* CDMA ARB subsystem keys

*See* CDMA2000 ARB subsystem keys

*See* CDMA2000 BBG subsystem keys and fields

*See* custom subsystem keys

*See* DECT subsystem keys

*See* Dmodulation subsystem keys

*See* EDGE subsystem keys

*See* GPS subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*Filter Alpha softkey, 1098 (continued)*

*See* TETRA subsystem keys

*See* wideband CDMA ARB subsystem keys

*See* wideband CDMA base band generator subsystem keys and fields

Filter BbT softkey, [1099](#)

*See* CDMA ARB subsystem keys

*See* CDMA2000 ARB subsystem keys

*See* CDMA2000 BBG subsystem keys and fields

*See* custom subsystem keys

*See* DECT subsystem keys

*See* Dmodulation subsystem keys

*See* EDGE subsystem keys

*See* GPS subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

*See* wideband CDMA ARB subsystem keys

*See* wideband CDMA base band generator subsystem keys and fields

FIR data, [108](#)

FIR softkey, [97](#)

First Mkr Point softkey, [300](#), [302](#)

First Spread Code softkey, [356](#), [364](#)

FIX softkey, [1082](#)

FIX4 softkey, [643](#), [1081](#), [1110](#), [1114](#)

*See* CDMA2000 BBG subsystem keys and fields

*See* custom subsystem keys

*See* DECT subsystem keys

*See* EDGE subsystem keys

*See* GPS subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

*See* wideband CDMA baseband generator subsystem keys and fields

Flat Noise BW field, [1077](#)

Flatness Off On softkey, [21](#)

FM softkeys

FM Dev, [185](#)

FM Dev Couple Off On, [185](#)

---

## Index

### FM softkeys (*continued*)

- FM Off On, [184](#)
- FM Path 1 2, [179](#)
- FM Stop Rate, [181](#)
- FM Sweep Rate, [183](#)
- FM Tone 2 Amp Percent of Peak, [182](#)
- FM Tone 2 Rate, [181](#)
- forgiving listening and precise talking, [7](#)
- Frame Clock Polarity Neg Pos softkey, [1097](#)
- Frame Count softkey
  - See* sense subsystem keys
- Frame Erasure softkey, [452](#)
  - See* calculate subsystem keys
- Frame Length field
  - See* CDMA2000 BBG subsystem keys and fields
- Frame Offset field
  - See* CDMA2000 BBG subsystem keys and fields
- Frame offset field, [536](#)
- Frame Polarity softkey, [387](#)
- Frame Repeat Single Cont softkey, [891](#)
- Frame Struct field, [1057](#)
- Frame Sync Trigger Mode Single Cont softkey, [1152](#)
- Frame Trigger Source Int Ext softkey, [428](#)
- Free Run softkey
  - list trigger source, [54](#)
  - See* amplitude modulation subsystem keys
  - See* CDMA ARB subsystem keys
  - See* CDMA2000 ARB subsystem keys
  - See* custom subsystem keys
  - See* DECT subsystem keys
  - See* Dmodulation subsystem keys
  - See* dual ARB subsystem keys
  - See* EDGE subsystem keys
  - See* frequency modulation subsystem keys
  - See* GSM subsystem keys
  - See* low frequency output subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* phase modulation subsystem keys
  - See* PHS subsystem keys
  - See* TETRA subsystem keys
  - See* trigger subsystem keys
  - See* wideband CDMA ARB subsystem keys

### Freq Dev softkey

- See* custom subsystem keys
  - See* DECT subsystem keys
  - See* Dmodulation subsystem keys
  - See* EDGE subsystem keys
  - See* GSM subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* TETRA subsystem keys
- ### Freq softkeys
- Freq, [42, 49](#)
  - Freq & Ampl, [49](#)
  - Freq Channels Off On, [41](#)
  - Freq Drift Type Linear Sine, [470](#)
  - Freq Multiplier, [42](#)
  - Freq Offset, [43, 470](#)
  - Freq Ref Off On, [44](#)
  - Freq Ref Set, [43](#)
  - Freq Spacing, [283, 336, 337](#)
  - Freq Start, [44, 49](#)
  - Freq Stop, [45, 49](#)
- ### Frequency hardkey, [38, 41, 42, 45, 46](#)
- ### frequency modulation subsystem keys
- Bus, [183](#)
  - Dual-Sine, [182](#)
  - Ext, [183](#)
  - Ext Coupling DC AC, [180](#)
  - Ext1, [184](#)
  - Ext2, [184](#)
  - FM Dev, [185](#)
  - FM Dev Couple Off On, [185](#)
  - FM Off On, [184](#)
  - FM Path 1 2, [179](#)
  - FM Stop Rate, [181](#)
  - FM Sweep Rate, [183](#)
  - FM Tone 2 Amp Percent of Peak, [182](#)
  - FM Tone 2 Rate, [181](#)
  - Free Run, [183](#)
  - Incr Set, [180](#)
  - Internal 1, [184](#)
  - Internal 2, [184](#)
  - Noise, [182](#)
  - Ramp, [182](#)
  - Sine, [182](#)
  - Square, [182](#)



- frequency modulation subsystem keys (*continued*)  
 Swept-Sine, 182  
 Triangle, 182  
 Trigger Key, 183
- frequency subsystem keys  
 Adjust Phase, 47  
 Channel Number, 40  
 Freq, 42, 49  
 Freq Channels Off On, 41  
 Freq Multiplier, 42  
 Freq Offset, 43  
 Freq Ref Off On, 44  
 Freq Ref Set, 43  
 Freq Start, 44, 49  
 Freq Stop, 45, 49  
 Frequency, 38, 41, 42, 45, 46  
 Off, 42, 49  
 Phase Ref Set, 47  
 Ref Oscillator Source Auto Off On, 48
- FSK softkey, 97
- FSYNCH Type field, 504
- Full softkey, 529, 534
- Function Generator softkey, 190
- G**
- G softkey, 640, 654
- Gain Unit dB Lin Index softkey, 366
- Gate Active Low High softkey  
*See* CDMA ARB subsystem keys  
*See* CDMA2000 ARB subsystem keys  
*See* custom subsystem keys  
*See* DECT subsystem keys  
*See* Dmodulation subsystem keys  
*See* dual ARB subsystem keys  
*See* EDGE subsystem keys  
*See* GSM subsystem keys  
*See* NADC subsystem keys  
*See* PDC subsystem keys  
*See* PHS subsystem keys  
*See* TETRA subsystem keys  
*See* wideband CDMA ARB subsystem keys
- Gate Clk Delay softkey, 416
- Gate Delay Off On softkey, 417
- Gate Mode Time Clk softkey, 416
- Gate Off On softkey, 418
- Gate Polarity Neg Pos softkey, 418
- Gate Time Delay softkey, 417
- Gated softkey  
*See* CDMA ARB subsystem keys  
*See* CDMA2000 ARB subsystem keys  
*See* custom subsystem keys  
*See* DECT subsystem keys  
*See* Dmodulation subsystem keys  
*See* dual ARB subsystem keys  
*See* EDGE subsystem keys  
*See* GSM subsystem keys  
*See* NADC subsystem keys  
*See* PDC subsystem keys  
*See* PHS subsystem keys  
*See* TETRA subsystem keys  
*See* wideband CDMA ARB subsystem keys
- Gaussian softkey  
*See* CDMA ARB subsystem keys  
*See* CDMA2000 ARB subsystem keys  
*See* CDMA2000 BBG subsystem keys and fields  
*See* custom subsystem keys  
*See* DECT subsystem keys  
*See* Dmodulation subsystem keys  
*See* EDGE subsystem keys  
*See* GPS subsystem keys  
*See* GSM subsystem keys  
*See* NADC subsystem keys  
*See* PDC subsystem keys  
*See* PHS subsystem keys  
*See* TETRA subsystem keys  
*See* wideband CDMA ARB subsystem keys  
*See* wideband CDMA base band generator  
 subsystem keys and fields
- generate sine, 294
- GMSK softkey, 656
- Goto Row softkey, 334
- GPIO Address softkey, 75
- GPS Ref (f0) softkey, 768, 771
- GPS Ref Clk Ext Int softkey, 768, 771
- GPS subsystem  
 Data Mode Raw Enc TLM, 764
- GPS subsystem keys  
 APCO 25 C4FM, 764  
 Data Mode Raw Enc TLM, 763  
 Doppler Shift, 764

---

## Index

### GPS subsystem keys (*continued*)

Filter Alpha, 765  
Filter BbT, 766  
FIX4, 763  
Gaussian, 764  
GPS Ref (f0), 768  
GPS Ref Clk Ext Int, 768  
IQ Phase Normal Invert, 767  
IS-95, 764  
IS-95 Mod, 764  
IS-95 Mod w/EQ, 764  
IS-95 w/EQ, 764  
Nyquist, 764  
Optimize FIR For EVM ACP, 766  
P Code Pwr, 767  
PN15, 763  
PN9, 763  
Ranging Code C/A P C/A+P, 767  
Real-time GPS Off On, 769  
Rectangle, 764  
Root Nyquist, 764  
Satellite ID, 769  
UN3/4 GSM Gaussian, 764  
User File, 763  
User FIR, 764

### Gray Coded QPSK softkey

*See* custom subsystem keys  
*See* DECT subsystem keys  
*See* Dmodulation subsystem keys  
*See* EDGE subsystem keys  
*See* GSM subsystem keys  
*See* NADC subsystem keys  
*See* PDC subsystem keys  
*See* PHS subsystem keys  
*See* TETRA subsystem keys

### GSM BERT Off On softkey, 455

### GSM Off On softkey, 811

### GSM softkey, 282, 283, 284

### GSM subsystem keys

128QAM, 789  
16 1's & 16 0's, 782, 791, 792, 794, 801  
16PSK, 789  
16QAM, 789  
256QAM, 789  
2-Lvl FSK, 789

### GSM subsystem keys (*continued*)

32 1's & 32 0's, 782, 791, 792, 794, 801  
32QAM, 789  
4 1's & 4 0's, 782, 791, 792, 794, 801  
4-Lvl FSK, 789  
4QAM, 789  
64 1's & 64 0's, 782, 791, 792, 794, 801  
64QAM, 789  
8 1's & 8 0's, 782, 791, 792, 794, 801  
8PSK, 789  
Access, 802  
All Timeslots, 803  
APCO 25 C4FM, 786  
BBG Data Clock Ext Int, 773  
BBG Ref Ext Int, 785  
Begin Frame, 803  
Begin Timeslot #, 803, 804  
Bit Rate, 774  
BPSK, 789  
Bus, 790, 807  
Continuous, 806  
CS-1, 794  
CS-4, 798  
Custom, 802  
Custom TS, 793, 800  
D8PSK, 789  
Data Format Pattern Framed, 781  
Diff Data Encode Off On, 784  
Downlink MCS-1, 794  
Dummy, 802  
ET, 792  
Ext, 782, 790, 791, 792, 801, 807  
Ext BBG Ref Freq, 585, 785  
Ext Data Clock Normal Symbol, 784  
Ext Delay Bits, 808  
Ext Delay Off On, 809  
Ext Polarity Neg Pos, 809  
Fall Delay, 776, 777  
Fall Time, 776, 778  
FCorr, 802  
Filter Alpha, 773  
Filter BbT, 774  
FIX4, 782, 783, 791, 792, 793, 794, 799, 801, 802  
Free Run, 806  
Freq Dev, 787

GSM subsystem keys (*continued*)

Gate Active Low High, 807  
 Gated, 806  
 Gaussian, 786  
 Gray Coded QPSK, 789  
 GSM Off On, 811  
 I/Q Scaling, 787  
 IS-95, 786  
 IS-95 Mod, 786  
 IS-95 Mod w/EQ, 786  
 IS-95 OQPSK, 789  
 IS-95 QPSK, 789  
 IS-95 w/EQ, 786  
 MSK, 789  
 Multislot Off On, 793  
 Normal, 802  
 Normal All, 802  
 Nyquist, 786  
 Optimize FIR For EVM ACP, 782  
 OQPSK, 789  
 $\pi/4$  DQPSK, 789  
 Patt Trig In 1, 810  
 Patt Trig In 2, 810  
 Phase Dev, 788  
 Phase Polarity Normal Invert, 789  
 PN11, 782, 801  
 PN15, 782, 791, 792, 794, 798, 799, 801  
 PN20, 782, 801  
 PN23, 782, 801  
 PN9, 782, 791, 792, 794, 798, 799, 801  
 PN9 Mode Normal Quick, 775  
 QPSK, 789  
 Recall Secondary Frame State, 790  
 Rectangle, 786  
 Reset & Run, 806  
 Restore Factory Default, 783  
 Rise Delay, 778, 779  
 Rise Time, 780  
 Root Nyquist, 786  
 S, 800  
 Save Secondary Frame State, 790  
 Secondary Frame Off On, 791  
 Sine, 781  
 Single, 806  
 SS, 792

GSM subsystem keys (*continued*)

Symbol Rate, 804  
 Sync, 802  
 Sync Out Offset, 803  
 TCH/FS, 794  
 Timeslot Ampl Main Delta, 801  
 Timeslot Off On, 801  
 Trigger & Run, 806  
 Trigger Key, 790, 807  
 TS, 802  
 TSC0, 793, 800  
 TSC1, 793, 800  
 TSC2, 793, 800  
 TSC3, 793, 800  
 TSC4, 793, 800  
 TSC5, 793, 800  
 TSC6, 793, 800  
 TSC7, 793, 800  
 UN3/4 GSM Gaussian, 786  
 Uplink MCS-1, 794  
 User File, 781, 782, 791, 792, 794, 801  
 User FIR, 786  
 User FSK, 788, 789  
 User I/Q, 788, 789  
 gsm subsystem keys  
   PRAM Files, 783  
 guides, lxxiii

**H**

Half softkey, 529, 534  
 Header field, 486, 496  
 Help Mode Single Cont softkey, 156  
 hexadecimal values, 18  
 High Amplitude softkey  
   *See* sense subsystem keys  
 High Crest Mode Off On softkey, 23  
 Higher Layer softkey, 1155  
 Hostname softkey, 76  
 HSDPA file overview, 812  
 HSDPA over W-CDMA SCPI commands, 812  
 HSDPA user files, 812  
 HSPA file overview, 668  
 HSPA user files, 668

---

## Index

- I
- I Gain softkey, 385
- I Offset softkey, 29, 386
- I/Q Adjustments Off On softkey, 32
- I/Q Calibration softkey, 72
- I/Q Gain Balance Source 1 softkey, 29
- I/Q Mapping Normal Invert softkey, 221, 247, 345
- I/Q Mod Filter Manual Auto softkey, 33, 208, 222, 246, 275, 300, 329, 347, 474
- I/Q Off On softkey, 37
- I/Q Out Gain Balance softkey, 27
- I/Q Output Atten softkey, 28
- I/Q Output Filter Manual Auto softkey, 206, 217, 242, 270, 297, 298, 327, 345, 466
- I/Q Scaling softkey
  - See custom subsystem keys
  - See DECT subsystem keys
  - See EDGE subsystem keys
  - See GSM subsystem keys
  - See NADC subsystem keys
  - See PDC subsystem keys
  - See PHS subsystem keys
  - See TETRA subsystem keys
- I/Q softkey, 98
- I/Q Timing Skew Path, 32
- I/Q timing Skew softkey, 31
- IDLE softkey, 954, 973
- IEEE 488.2 common command keys
  - Diagnostic Info, 89
  - Instrument Options, 90
  - RECALL Reg, 90
  - Run Complete Self Test, 92
  - Save Reg, 91
  - Save Seq[n] Reg[nn], 91
  - Select Seq, 90
- Immediate softkey, 227, 261, 281, 311
  - See sense subsystem keys
- Impairments Off On softkey, 467
- Impedance 75 Ohm High softkey, 420
- Incr Set hardkey, 69
  - See amplitude modulation subsystem keys
  - See frequency modulation subsystem keys
  - See phase modulation subsystem keys
- Increment Scramble Code softkey, 352
- Increment Timing Offset softkey, 355
- Infinity softkey, 1060, 1157
- Init Power field, 1101
- Init Pwr field, 1119, 1134
- Initial Bit Count softkey, 441
- Initial Block Count softkey, 431, 434
- Initial Frame Count softkey, 451
- Initialize Phase Fixed Random softkey, 338
- Initialize Table softkey, 284
- input subsystem keys
  - 0.7V, 421
  - 1.4V, 421
  - 1.6V, 421
  - 2.5V, 421
  - Clock Delay Off On, 419
  - Clock Polarity Neg Pos, 420
  - Clock Time Delay, 419
  - Data Polarity Neg Pos, 420
  - Gate Clk Delay, 416
  - Gate Delay Off On, 417
  - Gate Mode Time Clk, 416
  - Gate Off On, 418
  - Gate Polarity Neg Pos, 418
  - Gate Time Delay, 417
  - Impedance 75 Ohm High, 420
  - Resolution, 418
- Insert Row softkey, 249, 252, 255, 284
- Insert Waveform softkey, 313
- installation guide, lxxiii
- Installed Board Info softkey, 81
- Instrument Options softkey, 90
- Int I/Q Skew Corrections RF BB Off softkey, 35
- Int softkeys
  - Int Doublet, 202
  - Int Free-Run, 202
  - Int Gated, 202
  - Int Phase Polarity Normal Invert, 24, 34
  - Int Triggered, 202
- integer response data, 11
- Intermod softkey, 1064
- Internal softkeys
  - Internal, 63, 176, 512
  - Internal 1, 184, 196
  - Internal 2, 184, 196
  - Internal Monitor, 190
  - Internal Square, 202

- Inverse Video Off On softkey, 87
- Inverted softkey, 517
- IP address, 75
- IP Address softkey, 76
- IQ Phase Normal Invert softkey, 767, 770
- IQ Polarity softkey, 388
- IS-2000 SR3 DS softkey
  - See CDMA ARB subsystem keys
  - See CDMA2000 ARB subsystem keys
  - See Dmodulation subsystem keys
  - See wideband CDMA ARB subsystem keys
- IS-95 Mod softkey
  - See CDMA ARB subsystem keys
  - See CDMA2000 ARB subsystem keys
  - See CDMA2000 BBG subsystem keys and fields
  - See custom subsystem keys
  - See DECT subsystem keys
  - See Dmodulation subsystem keys
  - See EDGE subsystem keys
  - See GPS subsystem keys
  - See GSM subsystem keys
  - See NADC subsystem keys
  - See PDC subsystem keys
  - See PHS subsystem keys
  - See TETRA subsystem keys
  - See wideband CDMA ARB subsystem keys
  - See wideband CDMA base band subsystem keys and fields
- IS-95 Mod w/EQ softkey
  - See CDMA ARB subsystem keys
  - See CDMA2000 ARB subsystem keys
  - See CDMA2000 BBG subsystem keys and fields
  - See custom subsystem keys
  - See DECT subsystem keys
  - See Dmodulation subsystem keys
  - See EDGE subsystem keys
  - See GPS subsystem keys
  - See GSM subsystem keys
  - See NADC subsystem keys
  - See PDC subsystem keys
  - See PHS subsystem keys
  - See TETRA subsystem keys
  - See wideband CDMA ARB subsystem keys
  - See wideband CDMA base band generator subsystem keys and fields
- IS-95 OQPSK softkey
  - See custom subsystem keys
  - See DECT subsystem keys
  - See Dmodulation subsystem keys
  - See EDGE subsystem keys
  - See GSM subsystem keys
  - See NADC subsystem keys
  - See PDC subsystem keys
  - See PHS subsystem keys
  - See TETRA subsystem keys
- IS-95 QPSK softkey
  - See custom subsystem keys
  - See DECT subsystem keys
  - See Dmodulation subsystem keys
  - See EDGE subsystem keys
  - See GSM subsystem keys
  - See NADC subsystem keys
  - See PDC subsystem keys
  - See PHS subsystem keys
  - See TETRA subsystem keys
- IS-95 softkey
  - See CDMA ARB subsystem keys
  - See CDMA2000 ARB subsystem keys
  - See CDMA2000 BBG subsystem keys and fields
  - See custom subsystem keys
  - See DECT subsystem keys
  - See Dmodulation subsystem keys
  - See EDGE subsystem keys
  - See GPS subsystem keys
  - See GSM subsystem keys
  - See NADC subsystem keys
  - See PDC subsystem keys
  - See PHS subsystem keys
  - See TETRA subsystem keys
  - See wideband CDMA ARB subsystem keys
  - See wideband CDMA base band generator subsystem keys and fields
- IS-95 w/EQ softkey
  - See CDMA ARB subsystem keys
  - See CDMA2000 ARB subsystem keys
  - See CDMA2000 BBG subsystem keys and fields
  - See custom subsystem keys
  - See DECT subsystem keys
  - See Dmodulation subsystem keys
  - See EDGE subsystem keys

---

## Index

IS-95 w/EQ softkey (*continued*)

See GPS subsystem keys

See GSM subsystem keys

See NADC subsystem keys

See PDC subsystem keys

See PHS subsystem keys

See TETRA subsystem keys

See wideband CDMA ARB subsystem keys

IS-97 Levels softkey, 229

## J

jy, 935

## L

LAN Config softkey, 75

Last Mkr Point softkey, 300, 302

Leap Seconds field, 501

Left Alternate softkey, 356

Left softkey, 1026

LF Out softkeys

LF Out Amplitude, 186

LF Out Off On, 190

LF Out Stop Freq, 186, 187, 193

LF Out Sweep Rate, 188

LF Out Sweep Time, 189

LF Out Tone 2 Ampl % of Peak, 187

LF Out Tone 2 Freq, 186, 187, 193

Link Down Up softkey, 347, 1074

Link Forward Reverse softkey, 247, 479

list data, 114

List softkey, 98, 124

list/sweep subsystem keys

# Points, 57

Ampl, 49, 66

Ampl Start, 49, 67

Ampl Stop, 49, 68

Dwell Type List Step, 51

Freq, 42, 49

Freq & Ampl, 49

Freq Start, 44, 49

Freq Stop, 45, 49

Load List From Step Sweep, 55

Manual Mode Off On, 53

Manual Point, 52

list/sweep subsystem keys (*continued*)

Off, 42, 49, 66

Preset List, 56

Step Dwell, 56

Sweep Direction Down Up, 50

Sweep Retrace Off On, 54

Sweep Type List Step, 55

Load From Selected File softkey, 20, 123, 127, 336

Load List From Step Sweep softkey, 55

Load/Store softkey, 284

Logic Type softkey, 393

Long Code Mask field, 516

Long Code State field, 483, 516

Loop Back Test Type softkey, 393

Low Amplitude softkey, 430, 433

See sense subsystem keys

Low Capacity softkey, 589, 600

Low Capacity with Z field softkey, 589, 600

low frequency output subsystem keys

Bus, 189

DC, 189

Dual-Sine, 189

Ext, 189

Free Run, 189

Function Generator, 190

Internal Monitor, 190

LF Out Amplitude, 186

LF Out Off On, 190

LF Out Stop Freq, 186, 187, 193

LF Out Sweep Rate, 188

LF Out Sweep Time, 189

LF Out Tone 2 Ampl % of Peak, 187

LF Out Tone 2 Freq, 186, 187, 193

Noise, 189

Ramp, 189

Sine, 189

Square, 189

Swept-Sine, 189

Triangle, 189

Trigger Key, 189

LTM OFF field, 501

## M

Manual Mode Off On softkey, 53

Manual Point softkey, 52

- Marker 1 2 3 4 softkey, [302](#)
- Marker 1 Polarity Neg Pos softkey, [212](#), [226](#), [260](#), [280](#), [475](#)
  - dual ARB subsystem, [308](#), [333](#), [475](#)
  - wideband CDMA ARB subsystem, [370](#)
- Marker 1 softkey, [209](#), [210](#), [222](#), [223](#), [224](#), [257](#), [258](#), [276](#), [277](#), [305](#), [329](#), [330](#), [331](#), [367](#), [368](#), [474](#), [475](#)
  - dual ARB subsystem, [306](#)
- Marker 2 Polarity Neg Pos softkey, [212](#), [226](#), [260](#), [280](#), [476](#)
  - dual ARB subsystem, [308](#), [333](#), [370](#), [475](#)
- Marker 2 softkey, [209](#), [210](#), [222](#), [223](#), [224](#), [257](#), [258](#), [276](#), [277](#), [305](#), [329](#), [330](#), [331](#), [367](#), [368](#), [474](#), [475](#)
  - dual ARB subsystem, [306](#)
- Marker 3 Polarity Neg Pos softkey, [212](#), [226](#), [260](#), [280](#), [476](#)
  - dual ARB subsystem, [308](#), [333](#), [475](#)
  - wideband CDMA ARB subsystem, [370](#)
- Marker 3 softkey, [209](#), [210](#), [222](#), [223](#), [224](#), [257](#), [258](#), [276](#), [277](#), [305](#), [329](#), [330](#), [331](#), [367](#), [368](#), [474](#), [475](#)
  - dual ARB subsystem, [306](#)
- Marker 4 Polarity Neg Pos softkey, [212](#), [226](#), [260](#), [280](#), [476](#)
  - dual ARB subsystem, [308](#), [333](#), [475](#)
  - wideband CDMA ARB subsystem, [370](#)
- Marker 4 softkey, [209](#), [210](#), [222](#), [223](#), [224](#), [257](#), [258](#), [276](#), [277](#), [305](#), [329](#), [330](#), [331](#), [367](#), [368](#), [474](#), [475](#)
  - dual ARB subsystem, [306](#)
- marker polarity, [212](#)
- Marker softkey, [300](#)
- Markers, [300](#)
- markers
  - alc hold
    - AWGN subsystem, [209](#)
    - CDMA ARB subsystem, [223](#)
    - CDMA2000 ARB subsystem, [257](#)
    - Dmodulation subsystem, [276](#)
    - dual ARB subsystem, [305](#)
    - multitone subsystem, [330](#), [331](#)
    - wideband CDMA ARB subsystem, [367](#)
  - alternate amplitude
    - AWGN subsystem, [209](#)
    - CDMA ARB subsystem, [222](#)
    - CDMA2000 ARB subsystem, [257](#)
    - Dmodulation subsystem, [276](#)
- markers (*continued*)
  - alternate amplitude
    - dual ARB subsystem, [305](#)
    - multitone subsystem, [329](#)
    - wideband CDMA ARB subsystem, [367](#)
  - clearing, [300](#)
  - marker polarity
    - CDMA ARB subsystem, [226](#)
    - CDMA2000 ARB subsystem, [260](#)
    - Dmodulation subsystem, [280](#)
    - dual ARB subsystem, [308](#), [475](#)
    - multitone subsystem, [333](#)
    - wideband CDMA ARB subsystem, [370](#)
  - polarity
    - AWGN subsystem, [212](#)
  - RF blanking/pulse
    - AWGN subsystem, [210](#)
    - CDMA ARB subsystem, [224](#)
    - CDMA2000 ARB subsystem, [258](#)
    - Demodulation subsystem, [277](#)
    - dual ARB subsystem, [306](#)
    - wideband CDMA ARB subsystem, [368](#)
  - setting, [302](#)
  - shifting points, [302](#)
- mass memory subsystem keys
  - Binary, [124](#)
  - Copy File, [124](#)
  - Delete All NVWFM Files, [125](#)
  - Delete All WFM Files, [125](#)
  - Delete All WFM1 Files, [125](#)
  - Delete File, [126](#)
  - List, [124](#)
  - Load From Selected File, [127](#)
  - Rename File, [127](#)
  - State, [124](#)
  - Store To File, [127](#)
  - User Flatness, [124](#)
- Max Input softkey, [1064](#)
- Max Power field, [1102](#)
- Max Pwr field, [1120](#), [1135](#)
- MCDMA softkey, [99](#)
- MDMOD softkey, [99](#)
- MDWCDMA softkey, [100](#)
- Measurement Mode BER% Search softkey, [450](#)
- Measurement Mode BLER% Search softkey, [436](#)

---

## Index

- memory subsystem, [107](#), [109](#), [110](#)
- memory subsystem keys, [113](#), [115](#)
  - Add Comment To Seq[n] Reg[nn], [123](#)
  - All, [104](#), [122](#)
  - Binary, [94](#)
  - Bit, [94](#)
  - CDMA, [95](#)
  - Copy File, [105](#), [114](#)
  - Data PRAM, [112](#)
  - Delete All ARB CDMA Files, [118](#)
  - Delete All ARB DMOD Files, [118](#)
  - Delete All ARB DWCDMA Files, [119](#)
  - Delete All ARB FCDMA Files, [119](#)
  - Delete All ARB MCDMA Files, [120](#)
  - Delete All ARB MDWCDMA Files, [120](#)
  - Delete All ARB MTONE Files, [121](#)
  - Delete All ARB RCDMA Files, [121](#)
  - Delete All ARB UWCDMA Files, [122](#)
  - Delete All Binary Files, [118](#)
  - Delete All Bit Files, [118](#)
  - Delete All Files, [117](#)
  - Delete All FIR Files, [119](#)
  - Delete All FSK Files, [119](#)
  - Delete All I/Q Files, [119](#)
  - Delete All List Files, [120](#)
  - Delete All MDMOD Files, [120](#)
  - Delete All MFCDMA Files, [120](#)
  - Delete All SEQ Files, [121](#)
  - Delete All SHAPE Files, [121](#)
  - Delete All State Files, [121](#)
  - Delete All UFLT Files, [122](#)
  - Delete File, [122](#)
  - DMOD, [95](#)
  - DWCDMA, [96](#)
  - FCDMA, [96](#)
  - FIR, [97](#)
  - FSK, [97](#)
  - I/Q, [98](#)
  - List, [98](#)
  - Load From Selected File, [123](#)
  - MCDMA, [99](#)
  - MDMOD, [99](#)
  - MDWCDMA, [100](#)
  - MFCDMA, [100](#)
  - MTONE, [101](#)
  - memory subsystem keys, [113](#), [115](#) (*continued*)
    - Oversample Ratio, [108](#)
    - RCDMA, [101](#)
    - Rename File, [123](#)
    - SEQ, [102](#)
    - SHAPE, [102](#)
    - State, [103](#)
    - Store To File, [123](#)
    - User Flatness, [103](#)
    - UWCDMA, [104](#)
  - Message Data Raw Data (RPS11) softkey
    - See* wideband CDMA base band generator subsystem keys and fields
  - Message Part field, [1118](#)
  - Message Pulse (RPS22) softkey
    - See* wideband CDMA base band generator subsystem keys and fields
  - Message Type field, [502](#)
  - Message-Control Raw Data Clock (RPS12) softkey
    - See* wideband CDMA base band generator subsystem keys and fields
  - Meter Address softkeys, [77](#)
  - Meter Channel A B softkey, [77](#)
  - Meter Timeout softkey, [78](#)
  - MFCDMA softkey, [100](#)
  - Min Power field, [1102](#)
  - Mod Index softkey, [471](#)
  - Mod On/Off hardkey, [129](#)
  - Modulator Atten Manual Auto softkey, [33](#), [34](#), [207](#), [221](#), [245](#), [246](#), [274](#), [298](#), [299](#), [328](#), [346](#), [472](#), [473](#)
  - Msg Ctrl softkey, [1107](#)
  - Msg Data softkey, [1107](#)
  - Msg Pwr field, [1118](#), [1133](#)
  - MSGPS subsystem keys
    - GPS Ref (f0), [771](#)
    - GPS Ref Clk Ext Int, [771](#)
    - IQ Phase Normal Invert, [770](#)
    - Number of Satellites, [772](#)
    - Pause/Resume, [770](#)
    - Real-time MSGPS Off On, [772](#)
    - Restart, [771](#)
    - Scenario, [772](#)
    - Select Scenario, [772](#)
  - MSK softkey
    - See* custom subsystem keys



*MSK softkey (continued)*

See DECT subsystem keys  
 See Dmodulation subsystem keys  
 See EDGE subsystem keys  
 See GSM subsystem keys  
 See NADC subsystem keys  
 See PDC subsystem keys  
 See PHS subsystem keys  
 See TETRA subsystem keys  
 MTONE softkey, [101](#)  
 multicarrier, [348](#)  
 Multicarrier Off On softkey, [228](#), [247](#), [282](#)  
 Multicarrier softkey, [348](#)  
 Multislot Off On softkey, [646](#), [793](#)  
 Multitone Off On softkey, [339](#)  
 multitone subsystem keys  
   2.100 MHz, [329](#)  
   40.000 MHz, [327](#), [329](#)  
   ARB Reference Ext Int, [333](#)  
   ARB Sample Clock, [335](#)  
   Clear Header, [326](#)  
   Freq Spacing, [336](#), [337](#)  
   Goto Row, [334](#)  
   I/Q Mod Filter Manual Auto, [329](#)  
   I/Q Output Filter Manual Auto, [327](#)  
   Initialize Phase Fixed Random, [338](#)  
   Load From Selected File, [336](#)  
   Marker 1, [329](#), [330](#), [331](#)  
   Marker 2, [329](#), [330](#), [331](#)  
   Marker 3, [329](#), [330](#), [331](#)  
   Marker 4, [329](#), [330](#), [331](#)  
   Modulator Atten Manual Auto, [328](#)  
   Multitone Off On, [339](#)  
   None, [329](#), [330](#), [331](#)  
   Number Of Tones, [336](#), [337](#)  
   Random Seed Fixed Random, [338](#)  
   Reference Freq, [333](#)  
   Save Setup To Header, [326](#)  
   Store To File, [336](#)  
   Through, [327](#), [329](#)  
   Toggle State, [334](#), [336](#)  
   Waveform Runtime Scaling, [335](#)  
 mV softkey, [170](#)  
 mVemf softkey, [170](#)

**N**

N Power field, [1078](#), [1108](#)  
 N5102A, [380](#)  
   See digital subsystem  
 N5102A Off On softkey, [395](#)  
 NADC Off On softkey, [907](#)  
 NADC softkey, [282](#), [283](#), [284](#)  
 NADC subsystem keys  
   128QAM, [890](#)  
   16 1's & 16 0's, [884](#), [893](#), [895](#), [897](#), [898](#)  
   16PSK, [890](#)  
   16QAM, [890](#)  
   256QAM, [890](#)  
   2-Lvl FSK, [890](#)  
   32 1's & 32 0's, [884](#), [893](#), [895](#), [897](#), [898](#)  
   32QAM, [890](#)  
   4 1's & 4 0's, [884](#), [893](#), [895](#), [897](#), [898](#)  
   4-Lvl FSK, [890](#)  
   4QAM, [890](#)  
   64 1's & 64 0's, [884](#), [893](#), [895](#), [897](#), [898](#)  
   64QAM, [890](#)  
   8 1's & 8 0's, [884](#), [893](#), [895](#), [897](#), [898](#)  
   8PSK, [890](#)  
   All Timeslots, [900](#)  
   APCO 25 C4FM, [887](#)  
   BBG Data Clock Ext Int, [874](#)  
   BBG Ref Ext Int, [886](#)  
   Begin Frame, [900](#)  
   Begin Timeslot #, [900](#), [901](#)  
   Bit Rate, [875](#)  
   BPSK, [890](#)  
   Bus, [892](#), [904](#)  
   CDL, [894](#)  
   CDVCC, [894](#), [897](#)  
   Continuous, [902](#)  
   D8PSK, [890](#)  
   Data Format Pattern Framed, [882](#)  
   Down Custom, [899](#)  
   Down TCH, [899](#)  
   Down TCH All, [899](#)  
   Ext, [884](#), [892](#), [893](#), [895](#), [897](#), [898](#), [904](#)  
   Ext BBG Ref Freq, [887](#)  
   Ext Data Clock Normal Symbol, [886](#)  
   Ext Delay Bits, [905](#)  
   Ext Delay Off On, [906](#)

---

## Index

### NADC subsystem keys (*continued*)

Ext Polarity Neg Pos, 906  
Fall Delay, 877, 878  
Fall Time, 878, 879  
Filter Alpha, 874  
Filter BbT, 875  
FIX4, 884, 885, 893, 895, 896, 897, 898, 899  
Frame Repeat Single Cont, 891  
Free Run, 903  
Freq Dev, 889  
Gate Active Low High, 904  
Gated, 902  
Gaussian, 887  
Gray Coded QPSK, 890  
I/Q Scaling, 888  
IS-95, 887  
IS-95 Mod, 887  
IS-95 Mod w/EQ, 887  
IS-95 OQPSK, 890  
IS-95 QPSK, 890  
IS-95 w/EQ, 887  
MSK, 890  
NADC Off On, 907  
Nyquist, 887  
Optimize FIR For EVM ACP, 883  
OQPSK, 890  
 $\pi/4$  DQPSK, 890  
Patt Trig In 1, 906  
Patt Trig In 2, 906  
Phase Dev, 889  
PN11, 884, 893, 895, 897, 898  
PN15, 884, 893, 895, 897, 898  
PN20, 884, 893, 895, 897, 898  
PN23, 884, 893, 895, 897, 898  
PN9, 884, 893, 895, 897, 898  
PN9 Mode Normal Quick, 876  
Polarity Normal Invert, 891  
QPSK, 890  
Rate Full Half, 888  
Recall Secondary Frame State, 891  
Rectangle, 887  
Reset & Run, 903  
Restore NADC Factory Default, 885  
Rise Delay, 880  
Rise Time, 881, 882

### NADC subsystem keys (*continued*)

Root Nyquist, 887  
SACCH, 894, 898  
Save Secondary Frame State, 892  
Secondary Frame Off On, 892  
Sine, 877, 883  
Single, 902  
Symbol Rate, 901  
SYNC, 895, 898  
Sync Out Offset, 900  
Timeslot Ampl Main Delta, 896  
Timeslot Off On, 896  
Trigger & Run, 903  
Trigger Key, 892, 904  
UN3/4 GSM Gaussian, 887  
Up Custom, 899  
Up TCH, 899  
Up TCH All, 899  
User File, 877, 883, 884, 893, 895, 897, 898  
User FIR, 887  
User FSK, 889, 890  
User I/Q, 890  
nadc subsystem keys  
  PRAM Files, 884  
Name and Store softkey, 313  
Negate I softkey, 386  
Negate Q softkey, 389  
Network ID field, 502  
No Limits softkey  
  *See* calculate subsystem keys  
No Thresholds softkey  
  *See* sense subsystem keys  
Noise Bandwidth Factor softkey, 308  
Noise Off On softkey, 506, 518  
Noise Seed Fixed Random softkey, 214  
Noise Seed softkey, 469  
Noise softkey, 175, 182, 189, 195  
NONE (RPS0) softkey  
  *See* wideband CDMA base band generator  
  subsystem keys and fields  
NONE softkey, 1163  
None softkey, 161, 209, 210, 222, 223, 224, 257,  
  258, 276, 277, 305, 306, 329, 330, 331, 367,  
  368, 474, 475, 567, 1068, 1070, 1168, 1175  
Normal All softkey, 656, 802

- Normal softkey, [517](#), [656](#), [802](#), [1026](#)  
 Num of Blk field, [1169](#), [1176](#)  
 Num of Pre field, [1119](#), [1134](#)  
 Number of AICH field, [1104](#)  
 Number of PRACH 80ms field, [1118](#)  
 Number of PRACH field, [1131](#), [1133](#)  
 Number of Preamble field, [1134](#)  
 Number of Satellites softkey, [772](#)  
 Number Of Tones softkey, [336](#), [337](#)  
 numeric boolean response data, [11](#)  
 Numeric Format, [387](#)  
 Numeric Format softkey, [387](#)  
 numeric SCPI parameter, [8](#)  
 numeric, extended SCPI parameter, [8](#)  
 Nyquist softkey  
   *See* CDMA ARB subsystem keys  
   *See* CDMA2000 ARB subsystem keys  
   *See* CDMA2000 BBG subsystem keys and fields  
   *See* custom subsystem keys  
   *See* DECT subsystem keys  
   *See* Dmodulation subsystem keys  
   *See* EDGE subsystem keys  
   *See* GPS subsystem keys  
   *See* GSM subsystem keys  
   *See* NADC subsystem keys  
   *See* PDC subsystem keys  
   *See* PHS subsystem keys  
   *See* TETRA subsystem keys  
   *See* wideband CDMA ARB subsystem keys  
   *See* wideband CDMA base band generator  
     subsystem keys and fields
- 0**
- OCNS softkey, [357](#)  
 octal values, [18](#)  
 Off softkey, [24](#), [35](#), [42](#), [49](#), [66](#), [227](#), [261](#), [281](#), [311](#),  
[1130](#)  
 Off softkey, dual ARB trigger delay, [321](#)  
 Omitted softkey, [1060](#), [1157](#)  
 On softkey, [227](#), [261](#), [281](#), [311](#), [1130](#)  
 On/Off field, [1042](#), [1123](#)  
 OpenLoop Ant1 SCH TSTD OFF softkey, [1065](#)  
 OpenLoop Ant1 softkey, [1065](#)  
 OpenLoop Ant2 SCH TSTD OFF softkey, [1065](#)  
 OpenLoop Ant2 softkey, [1065](#)
- Optimize ACP ADJ ALT softkey, [347](#), [362](#)  
 Optimize FIR For EVM ACP softkey, [1099](#)  
   *See* CDMA ARB subsystem keys  
   *See* CDMA2000 ARB subsystem keys  
   *See* CDMA2000 BBG subsystem keys and fields  
   *See* custom subsystem keys  
   *See* DECT subsystem keys  
   *See* Dmodulation subsystem keys  
   *See* EDGE subsystem keys  
   *See* GPS subsystem keys  
   *See* GSM subsystem keys  
   *See* NADC subsystem keys  
   *See* PDC subsystem keys  
   *See* PHS subsystem keys  
   *See* TETRA subsystem keys  
   *See* wideband CDMA ARB subsystem keys  
   *See* wideband CDMA base band generator  
     subsystem keys and fields
- options
- 001/002  
   all subsystem, [204](#), [462](#)  
   custom subsystem, [548](#)  
   Dmodulation subsystem, [270](#)  
   dual ARB subsystem, [294](#)  
   multitone subsystem, [326](#)
- 400  
   wideband CDMA ARB subsystem, [340](#)  
   wideband CDMA base band generator  
     subsystem, [1020](#)
- 401  
   CDMA ARB subsystem, [215](#)  
   CDMA2000 ARB subsystem, [240](#)  
   CDMA2000 BBG subsystem, [479](#)
- 402  
   DECT subsystem, [573](#)  
   EDGE subsystem, [622](#)  
   GSM subsystem, [773](#)  
   NADC subsystem, [874](#)  
   PDC subsystem, [908](#)  
   PHS subsystem, [941](#)  
   TETRA subsystem, [977](#)
- 403  
   AWGN real-time subsystem, [463](#)  
   AWGN subsystem, [205](#)

---

## Index

options (*continued*)

406

    bluetooth subsystem, [464](#)

409

    GPS subsystem, [763](#)

424

    GPS subsystem, [763](#)

    MSGPS subsystem, [770](#)

UN7/300

    calculate subsystem, [398](#)

    data subsystem, [408](#)

    input subsystem, [416](#), [422](#)

    sense subsystem, [425](#)

Options Info softkey, [83](#)

OQPSK softkey

*See* custom subsystem keys

*See* DECT subsystem keys

*See* Dmodulation subsystem keys

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

Output Blanking Off On Auto softkey, [128](#)

output subsystem keys

    Mod On/Off, [129](#)

    Output Blanking Off On Auto, [128](#)

    RF On/Off, [129](#)

Oversample Ratio softkey, [108](#), [226](#)

Overwrite softkey, [161](#)

## P

P Code Pwr softkey, [767](#)

P Rev field, [503](#)

P Rev Min field, [501](#)

P softkey, [591](#)

$\pi/4$  DQPSK softkey

*See* custom subsystem keys

*See* DECT subsystem keys

*See* Dmodulation subsystem keys

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

$p/4$  DQPSK softkey (*continued*)

*See* PHS subsystem keys

*See* TETRA subsystem keys

Packet (DH1) softkey, [476](#)

Paging Indicator field, [510](#), [1046](#)

Paging softkey, [229](#)

parameter types. *See* SCPI commands parameter types

Pass Amplitude softkey, [430](#), [434](#)

*See* sense subsystem keys

Pass Through Preset softkey, [395](#)

Pass/Fail Limits softkey, [406](#)

Pass/Fail Off On softkey, [406](#)

paths, SCPI command tree, [7](#)

Patt Trig In 1 softkey

*See* CDMA ARB subsystem keys

*See* CDMA2000 ARB subsystem keys

*See* custom subsystem keys

*See* DECT subsystem keys

*See* Dmodulation subsystem keys

*See* dual ARB subsystem keys

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

*See* wideband CDMA ARB subsystem keys  
    subsystem keys

Patt Trig In 2 softkey

*See* CDMA ARB subsystem keys

*See* CDMA2000 ARB subsystem keys

*See* custom subsystem keys

*See* DECT subsystem keys

*See* Dmodulation subsystem keys

*See* dual ARB subsystem keys

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

*See* wideband CDMA ARB subsystem keys  
    subsystem keys

Pattern trigger in 1 field, [1144](#)

- Pattern trigger in 2 field, 1145
- Pause/Resume softkey, 770
- PCCPCH + SCH + 3 DPCH softkey, 348, 353
- PCCPCH + SCH +1 DPCH softkey, 348, 353
- PCCPCH + SCH softkey, 348, 353
- P-CCPCH data (DRPS39) softkey, 1050, 1052, 1053, 1054, 1055
- P-CCPCH data-clk (DRPS38) softkey, 1050, 1052, 1053, 1054, 1055
- PCCPCH softkey, 1022, 1023
- PDC Off On softkey, 940
- PDC softkey, 282, 283, 284
- PDC subsystem keys
- 128QAM, 923
  - 16 1's & 16 0's, 917, 926, 927, 929, 931
  - 16PSK, 923
  - 16QAM, 923
  - 256QAM, 923
  - 2-Lvl FSK, 923
  - 32 1's & 32 0's, 917, 926, 927, 929, 931
  - 32QAM, 923
  - 4 1's & 4 0's, 917, 926, 927, 929, 931
  - 4-Lvl FSK, 923
  - 4QAM, 923
  - 64 1's & 64 0's, 917, 926, 927, 929, 931
  - 64QAM, 923
  - 8 1's & 8 0's, 917, 926, 927, 929, 931
  - 8PSK, 923
  - All Timeslots, 933
  - APCO 25 C4FM, 920
  - BBG Ref Ext Int, 919
  - Begin Frame, 933
  - Begin Timeslot #, 933, 934
  - Bit Rate, 909
  - BPSK, 923
  - Bus, 925, 937
  - CC, 926, 930, 932
  - Continuous, 936
  - D8PSK, 923
  - Data Format Pattern Framed, 916
  - Down Custom, 933
  - Down TCH, 933
  - Down TCH All, 933
  - Ext, 917, 925, 926, 927, 929, 931, 937
  - Ext BBG Ref Freq, 920
- PDC subsystem keys (*continued*)
- Ext Data Clock Ext Int, 908
  - Ext Data Clock Normal Symbol, 919
  - Ext Delay Bits, 938
  - Ext Delay Off On, 939
  - Ext Polarity Neg Pos, 939
  - Fall Delay, 911, 912
  - Fall Time, 911, 913
  - Filter Alpha, 908
  - Filter BbT, 909
  - FIX4, 917, 918, 926, 927, 928, 929, 931
  - Free Run, 936
  - Freq Dev, 922
  - Gate Active Low High, 937
  - Gated, 936
  - Gaussian, 920
  - Gray Coded QPSK, 923
  - I/Q Scaling, 921
  - IS-95, 920
  - IS-95 Mod, 920
  - IS-95 Mod w/EQ, 920
  - IS-95 OQPSK, 923
  - IS-95 QPSK, 923
  - IS-95 w/EQ, 920
  - MSK, 923
  - Nyquist, 920
  - Optimize FIR For EVM ACP, 917
  - OQPSK, 923
  - $\pi/4$  DQPSK, 923
  - Patt Trig In 1, 940
  - Patt Trig In 2, 940
  - PDC Off On, 940
  - Phase Dev, 922
  - Phase Polarity Normal Invert, 924
  - PN11, 917, 927, 929, 931
  - PN15, 917, 926, 927, 929, 931
  - PN20, 917, 927, 929, 931
  - PN23, 917, 927, 929, 931
  - PN9, 917, 926, 927, 929, 931
  - PN9 Mode Normal Quick, 910
  - QPSK, 923
  - Rate Full Half, 921
  - Recall Secondary Frame State, 924
  - Rectangle, 920
  - Reset & Run, 936

### PDC subsystem keys (*continued*)

- Restore PDC Factory Default, [918](#)
  - Rise Delay, [913](#), [914](#)
  - Rise Time, [915](#)
  - Root Nyquist, [920](#)
  - SACCH, [927](#), [930](#), [932](#)
  - Save Secondary Frame State, [924](#)
  - Secondary Frame Off On, [925](#)
  - Sine, [916](#)
  - Single, [936](#)
  - SW, [927](#), [930](#), [932](#)
  - Symbol Rate, [934](#)
  - Sync Out Offset, [933](#)
  - Timeslot Ampl Main Delta, [928](#)
  - Timeslot Off On, [929](#)
  - Trigger & Run, [936](#)
  - Trigger Key, [925](#), [937](#)
  - UN3/4 GSM Gaussian, [920](#)
  - Up Custom, [933](#)
  - Up TCH, [933](#)
  - Up TCH All, [933](#)
  - Up VOX, [933](#)
  - User File, [916](#), [917](#), [926](#), [927](#), [929](#), [931](#)
  - User FIR, [920](#)
  - User FSK, [923](#)
  - User I/Q, [923](#)
- pdcc subsystem keys
- PRAM Files, [918](#)
- Performance Req softkey, [1064](#)
- Permuted ESN field, [486](#), [496](#)
- Phase Dev softkey
- See* custom subsystem keys
  - See* DECT subsystem keys
  - See* EDGE subsystem keys
  - See* GSM subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* PHS subsystem keys
  - See* TETRA subsystem keys
- phase modulation subsystem keys
- ΦM Sweep Time softkey, [195](#)
  - FM ΦM Normal High BW softkey, [192](#)
  - ΦM Dev Couple Off On, [197](#)
  - ΦM Dev softkey, [197](#)
  - ΦM Off On softkey, [196](#)

### πηασε μολυλατιον σολβσψστεμ κεψσ (*continued*)

- ΦM Path 1 2, [191](#)
  - ΦM Tone 2 Ampl Percent of Peak, [194](#)
  - ΦM Tone 2 Rate, [194](#)
  - Bus, [195](#)
  - Dual-Sine, [195](#)
  - Ext, [195](#)
  - Ext Coupling DC AC, [193](#)
  - Ext1, [196](#)
  - Ext2, [196](#)
  - Free Run, [195](#)
  - Incr Set, [192](#), [198](#)
  - Internal 1, [196](#)
  - Internal 2, [196](#)
  - Noise, [195](#)
  - Ramp, [195](#)
  - Sine, [195](#)
  - Square, [195](#)
  - Swept-Sine, [195](#)
  - Triangle, [195](#)
  - Trigger Key, [195](#)
- Phase Polarity field, [509](#)
- Phase Polarity Normal Invert softkey
- See* custom subsystem keys
  - See* DECT subsystem keys
  - See* EDGE subsystem keys
  - See* GSM subsystem keys
  - See* PDC subsystem keys
  - See* PHS subsystem keys
  - See* TETRA subsystem keys
  - See* wideband CDMA base band generator subsystem keys and fields
- Phase Polarity Normal Inverted softkey, [1074](#)
- Phase Ref Set softkey, [47](#)
- PHS Off On softkey, [976](#)
- PHS softkey, [282](#), [283](#), [284](#)
- PHS subsystem keys
- 128QAM, [962](#)
  - 16 1's & 16 0's, [951](#), [953](#), [956](#), [971](#), [975](#)
  - 16-Lvl FSK, [962](#)
  - 16PSK, [962](#)
  - 16QAM, [962](#)
  - 256QAM, [962](#)
  - 2-Lvl FSK, [962](#)

PHS subsystem keys (*continued*)

32 1's & 32 0's, [951](#), [953](#), [956](#), [971](#), [975](#)  
32QAM, [962](#)  
4 1's & 4 0's, [951](#), [953](#), [956](#), [971](#), [975](#)  
4-Lvl FSK, [962](#)  
4QAM, [962](#)  
64 1's & 64 0's, [951](#), [953](#), [956](#), [971](#), [975](#)  
64QAM, [962](#)  
8 1's & 8 0's, [951](#), [953](#), [956](#), [971](#), [975](#)  
8-Lvl FSK, [962](#)  
8PSK, [962](#)  
All Timeslots, [964](#)  
APCO 25 C4FM, [959](#)  
BBG Data Clock Ext Int, [941](#)  
BBG Ref Ext Int, [958](#)  
Begin Frame, [964](#)  
Begin Timeslot #, [964](#), [965](#)  
Bit Rate, [942](#)  
BPSK, [962](#)  
Bus, [963](#), [970](#)  
C4FM, [962](#)  
Continuous, [966](#)  
CSID, [954](#), [972](#)  
Custom, [957](#)  
D8PSK, [962](#)  
Data Format Pattern Framed, [950](#)  
Ext, [951](#), [953](#), [956](#), [963](#), [970](#), [971](#), [975](#)  
Ext BBG Ref Freq, [958](#)  
Ext Data Clock Normal Symbol, [957](#)  
Ext Delay Bits, [968](#)  
Ext Delay Off On, [969](#)  
Ext Polarity Neg Pos, [969](#)  
Fall Delay, [945](#), [946](#)  
Fall Time, [945](#), [947](#)  
Filter Alpha, [941](#)  
Filter BbT, [942](#)  
FIX4, [951](#), [952](#), [953](#), [956](#), [971](#), [972](#), [975](#)  
Free Run, [967](#)  
Gate Active Low High, [968](#)  
Gated, [966](#)  
Gaussian, [959](#)  
Gray Coded QPSK, [962](#)  
I/Q Scaling, [960](#)  
IDLE, [954](#), [973](#)  
IS-95, [959](#)

PHS subsystem keys (*continued*)

IS-95 Mod, [959](#)  
IS-95 Mod w/EQ, [959](#)  
IS-95 OQPSK, [962](#)  
IS-95 QPSK, [962](#)  
IS-95 w/EQ, [959](#)  
MSK, [962](#)  
Nyquist, [959](#)  
Optimize FIR For EVM ACP, [951](#)  
OQPSK, [962](#)  
 $\pi/4$  DQPSK, [962](#)  
Patt Trig In 1, [969](#)  
Patt Trig In 2, [969](#)  
Phase Dev, [960](#), [961](#)  
Phase Polarity Normal Invert, [962](#)  
PHS Off On, [976](#)  
PN11, [951](#), [953](#), [956](#), [971](#), [975](#)  
PN15, [951](#), [953](#), [956](#), [971](#), [975](#)  
PN20, [951](#), [953](#), [956](#), [971](#), [975](#)  
PN23, [951](#), [953](#), [956](#), [971](#), [975](#)  
PN9, [951](#), [953](#), [956](#), [971](#), [975](#)  
PN9 Mode Normal Quick, [943](#)  
PSID, [954](#), [973](#)  
QPSK, [962](#)  
Recall Secondary Frame State, [962](#)  
Rectangle, [959](#)  
Reset & Run, [967](#)  
Restore PHS Factory Default, [952](#)  
Rise Delay, [947](#), [948](#)  
Rise Time, [949](#)  
Root Nyquist, [959](#)  
SA, [955](#), [974](#)  
Save Secondary Frame State, [963](#)  
Scramble Off On, [944](#)  
Scramble Seed, [944](#)  
Secondary Frame Off On, [963](#)  
Sine, [950](#)  
Single, [966](#)  
Symbol Rate, [965](#)  
SYNC, [957](#)  
Sync Out Offset, [964](#)  
TCH, [957](#)  
TCH All, [957](#)  
Timeslot Ampl Main Delta, [953](#), [972](#)  
Timeslot Off On, [955](#), [974](#)

---

# Index

## PHS subsystem keys (*continued*)

- Timeslot Type, 975
- Trigger & Run, 967
- Trigger Key, 963, 970
- UN3/4 GSM Gaussian, 959
- User File, 950, 951, 953, 956, 971, 975
- User FIR, 959
- User FSK, 961, 962
- User I/Q, 961, 962
- UW, 955, 956, 973, 974

## phs subsystem keys

- PRAM Files, 952

## PI Bits field, 1046

## PICH 10ms FramePulse (DRPS37) softkey, 1050, 1052, 1053, 1054, 1055

## PICH data (DRPS35) softkey, 1050, 1052, 1053, 1054, 1055

## PICH data-clk (DRPS34) softkey, 1050, 1052, 1053, 1054, 1055

## PICH softkey, 357, 1022, 1023

## PICH TimeSlot Pulse (DRPS36) softkey, 1050, 1052, 1053, 1054, 1055

## Pilot softkey, 228, 229, 231, 247, 254

## Playback Ratio field, 1026

## PN Offset field, 512

## PN Offset softkey, 252, 255

## PN11 softkey

- See* custom subsystem keys
- See* DECT subsystem keys
- See* EDGE subsystem keys
- See* GSM subsystem keys
- See* NADC subsystem keys
- See* PDC subsystem keys
- See* PHS subsystem keys
- See* sense subsystem keys
- See* TETRA subsystem keys

## PN15 softkey

- See* CDMA2000 BBG subsystem keys and fields
- See* custom subsystem keys
- See* DECT subsystem keys
- See* EDGE subsystem keys
- See* GPS subsystem keys
- See* GSM subsystem keys
- See* NADC subsystem keys
- See* PDC subsystem keys

## PN15 softkey (*continued*)

- See* PHS subsystem keys
- See* sense subsystem keys
- See* TETRA subsystem keys
- See* wideband CDMA base band generator subsystem keys and fields

## PN20 softkey

- See* custom subsystem keys
- See* DECT subsystem keys
- See* EDGE subsystem keys
- See* GSM subsystem keys
- See* NADC subsystem keys
- See* PDC subsystem keys
- See* PHS subsystem keys
- See* sense subsystem keys
- See* TETRA subsystem keys

## PN23 softkey

- See* custom subsystem keys
- See* DECT subsystem keys
- See* EDGE subsystem keys
- See* GSM subsystem keys
- See* NADC subsystem keys
- See* PDC subsystem keys
- See* PHS subsystem keys
- See* sense subsystem keys
- See* TETRA subsystem keys

## PN9 Mode Normal Quick softkey

- See* DECT subsystem keys
- See* GSM subsystem keys
- See* NADC subsystem keys
- See* PDC subsystem keys
- See* PHS subsystem keys
- See* TETRA subsystem keys

## PN9 Mode Preset softkey, 159

## PN9 softkey

- See* CDMA2000 BBG subsystem keys and fields
- See* custom subsystem keys
- See* data subsystem keys
- See* DECT subsystem keys
- See* EDGE subsystem keys
- See* GPS subsystem keys
- See* GSM subsystem keys
- See* NADC subsystem keys
- See* PDC subsystem keys
- See* PHS subsystem keys



- PN9 softkey (continued)*  
*See* sense subsystem keys  
*See* TETRA subsystem keys  
*See* wideband CDMA base band generator  
 subsystem keys and fields
- polarity  
 awgn subsystem, 212  
 markers  
 cdma arb subsystem, 226  
 cdma2000 arb subsystem, 260  
 dmodulation subsystem, 280  
 dual ARB subsystem, 308, 475  
 multitone subsystem, 333  
 wideband CDMA ARB subsystem, 370
- polarity markers  
 awgn subsystem, 212
- Polarity Normal Invert softkey, 891
- Port Config softkey, 394
- Power Control Signal Polarity Neg Pos softkey, 1104
- Power field  
*See* CDMA2000 BBG subsystem keys and fields  
*See* wideband CDMA baseband generator  
 subsystem keys and fields
- Power Hold Off On softkey, 1101
- Power Meter softkey, 78
- Power Mode Norm TPC softkey, 1104
- Power On Last Preset softkey, 157
- Power Search Manual Auto softkey, 60, 62
- Power Search Reference Fixed Mod softkey, 61
- Power softkey, 364
- power subsystem keys  
 ALC Off On, 62  
 Alt Amp Delta, 63  
 Alt Ampl Off On, 64  
 Ampl, 49, 66  
 Ampl Offset, 68  
 Ampl Ref Off On, 67  
 Ampl Ref Set, 66  
 Ampl Start, 49, 67  
 Ampl Stop, 49, 68  
 Amplitude, 66, 69  
 Atten Hold Off On, 65  
 Auto, 58, 59  
 Do Power Search, 60, 62
- power subsystem keys (*continued*)  
 Ext Detector, 63  
 Internal, 63  
 Off, 49, 66  
 Power Search Manual Auto, 60, 62  
 Power Search Reference Fixed Mod, 61  
 Set ALC Level, 60  
 Set Atten, 65  
 Source Module, 63  
 Span Type User Full softkey, 62  
 Start Frequency, 61  
 step, 69  
 Stop Frequency, 61
- PPCCPCH softkey, 357, 358
- Pp-m field, 1120, 1136
- PRACH Mode Single Multi softkey, 1117
- PRACH Power Setup Mode Pp-m Total softkey, 1124
- PRACH Processing (RPS19) softkey  
*See* wideband CDMA base band generator  
 subsystem keys and fields
- PRACH Scrambling Code field, 1125
- PRACH softkey, 1100
- PRACH Trigger Polarity Neg Pos softkey, 1129
- PRACH Trigger softkey, 1129
- PRACH Trigger Source Immedi Trigger softkey, 1129
- PRAM  
 downloads, 112  
 list, 113
- PRAM DATA BLOCK, 114
- pram files  
 CUSTOM subsystem keys, 558  
 DECTsubsystem keys, 583  
 EDGE subsystem keys, 631  
 GSM subsystem keys, 783  
 NADC subsystem keys, 884  
 PDC subsystem keys, 918  
 PHS subsystem keys, 952  
 TETRA subsystem keys, 988
- PRAM LIST, 114
- PRAM?, 114
- PRAT field, 503
- Pre Sig field, 1121
- Preamble power average field, 1123

---

## Index

Preamble Pulse (RPS21) softkey  
*See* wideband CDMA base band generator subsystem keys and fields

Preamble Raw Data (RPS15) softkey  
*See* wideband CDMA base band generator subsystem keys and fields

Preamble Raw Data Clock (RPS16) softkey  
*See* wideband CDMA base band generator subsystem keys and fields

Preamble softkey, [1107](#)

precise talking and forgiving listening, [7](#)

Preset hardkey, [158](#)

Preset List softkey, [21](#), [56](#)

Preset Normal User softkey, [160](#)

programming guide, [lxxiii](#)

PSCH softkey, [357](#)

PSCH State field, [1048](#)

PSID softkey, [954](#), [973](#)

pulse modulation subsystem keys

- Ext Pulse, [202](#)
- Int Doublet, [202](#)
- Int Free-Run, [202](#)
- Int Gated, [202](#)
- Int Triggered, [202](#)
- Internal Square, [202](#)
- Pulse Off On, [202](#)
- Pulse Period, [200](#)
- Pulse Rate, [199](#)
- Pulse Width, [201](#)

Pulse softkeys

- Pulse Off On, [202](#)
- Pulse Period, [200](#)
- Pulse Rate, [199](#)
- Pulse Width, [201](#)

Pulse/RF blanking, [306](#)

pulse/RF blanking markers

- awgn subsystem, [210](#)
- cdma arb subsystem, [224](#)
- cdma2000 arb, [258](#)
- dmodulation, [277](#)
- dual ARB subsystem, [306](#)
- wideband cdma arb, [368](#)

Puncture fields, [1169](#), [1176](#)

Puncture softkey, [1058](#)

PwrOffs field, [1057](#), [1154](#)

PWT softkey, [282](#), [283](#), [284](#)

## Q

Q Gain softkey, [388](#)

Q Offset softkey, [30](#), [390](#)

QOF field, [487](#), [497](#)

QPSK softkey

- See* custom subsystem keys
- See* DECT subsystem keys
- See* Dmodulation subsystem keys
- See* EDGE subsystem keys
- See* GSM subsystem keys
- See* NADC subsystem keys
- See* PDC subsystem keys
- See* PHS subsystem keys
- See* TETRA subsystem keys

Quadrature Angle Adjustment softkey, [25](#), [30](#)

Quarter softkey, [529](#), [534](#)

quotes, SCPI command use of, [17](#)

## R

RACH TrCH softkey, [1107](#)

Radio Config field

- See* CDMA2000 BBG subsystem keys and fields

Radio Config softkey, [253](#)

RadioConfig 1/2 Access softkey, [479](#)

RadioConfig 1/2 Traffic softkey, [479](#)

RadioConfig 3/4 Common Control softkey, [479](#)

RadioConfig 3/4 Enhanced Access softkey, [479](#)

RadioConfig 3/4 Traffic softkey, [479](#)

Ramp field, [487](#)

Ramp softkey, [175](#), [182](#), [189](#), [195](#)

Ramp Step field, [1120](#), [1135](#)

Ramp Time field, [487](#)

Random Seed Fixed Random softkey, [338](#)

Random softkey, [356](#), [364](#)

Ranging Code C/A P C/A+P softkey, [767](#)

Rate Full Half softkey, [888](#), [921](#)

Rate Match Attr field, [1073](#), [1169](#), [1176](#)

Rate softkey, [252](#), [255](#)

RCDMA softkey, [101](#)

real response data, [10](#)

Real-time AWGN Off On softkey, [463](#)

- real-time AWGN subsystem keys
  - Bandwidth, [463](#)
  - Real-time AWGN Off On, [463](#)
- Real-time GPS Off On softkey, [769](#)
- Real-time MSGPS Off On softkey, [772](#)
- Real-time Noise softkey, [310](#)
- RECALL Reg softkey, [90](#)
- Recall Secondary Frame State softkey
  - See* DECT subsystem keys
  - See* EDGE subsystem keys
  - See* GSM subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* PHS subsystem keys
  - See* TETRA subsystem keys
- Rectangle softkey
  - See* CDMA ARB subsystem keys
  - See* CDMA2000 ARB subsystem keys
  - See* CDMA2000 BBG subsystem keys and fields
  - See* custom subsystem keys
  - See* DECT subsystem keys
  - See* Dmodulation subsystem keys
  - See* EDGE subsystem keys
  - See* GPS subsystem keys
  - See* GSM subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* PHS subsystem keys
  - See* TETRA subsystem keys
  - See* wideband CDMA ARB subsystem keys
  - See* wideband CDMA base band generator subsystem keys and fields
- Ref Data Rate field, [1076](#), [1106](#)
- Ref Oscillator Source Auto Off On softkey, [48](#)
- Ref Sensitivity softkey, [1064](#)
- Reference Freq softkey, [477](#)
  - See* AWGN subsystem keys
  - See* bluetooth subsystem keys
  - See* CDMA ARB subsystem keys
  - See* CDMA2000 ARB subsystem keys
  - See* Dmodulation subsystem keys
  - See* dual ARB subsystem keys
  - See* multitone subsystem keys
  - See* wideband CDMA ARB subsystem keys
- Reference Frequency softkey, [382](#)
- Reference Out softkey, [413](#)
- references, [lxxiii](#)
- Rename File, [123](#)
- Rename File softkey, [127](#)
- Reserved field, [503](#)
- Reset & Run softkey
  - See* CDMA ARB subsystem keys
  - See* CDMA2000 ARB subsystem keys
  - See* custom subsystem keys
  - See* DECT subsystem keys
  - See* Dmodulation subsystem keys
  - See* dual ARB subsystem keys
  - See* EDGE subsystem keys
  - See* GSM subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* PHS subsystem keys
  - See* TETRA subsystem keys
  - See* wideband CDMA ARB subsystem keys
- Reset RS-232 softkey, [79](#)
- Reset to Initial Power softkey, [1103](#)
- Resolution softkey, [418](#)
- resolving error messages/setting conflicts, [670](#), [814](#)
- response data types. *See* SCPI commands response types
- Restart softkey, [771](#)
- Restore DECT Factory Default softkey, [583](#)
- Restore EDGE Factory Default softkey, [632](#)
- Restore Factory Default softkey, [783](#)
- Restore NADC Factory Default softkey, [885](#)
- Restore PDC Factory Default softkey, [918](#)
- Restore PHS Factory Default softkey, [952](#)
- Restore Sys Defaults softkey, [159](#)
- Restore TETRA Factory Default softkey, [989](#)
- Resync Limits softkey, [456](#)
- Retrigger Mode Off On softkey, [371](#)
- Reverse softkey, [228](#)
- Revert to Default Cal Settings softkey, [73](#)
- rf blanking, [306](#)
- RF blanking/pulse markers
  - awgn subsystem, [210](#)
  - cdma arb subsystem, [224](#)
  - cdma2000 arb subsystem, [258](#)
  - dmodulation subsystem, [277](#)
  - dual ARB subsystem, [306](#)

---

## Index

RF blanking/pulse markers (*continued*)

wideband cdma arb subsystem, [368](#)

RF On/Off hardkey, [129](#)

Right Alternate softkey, [356](#)

Right softkey, [1026](#)

Rise Delay softkey

*See* custom subsystem keys

*See* DECT subsystem keys

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

Rise Time softkey

*See* custom subsystem keys

*See* DECT subsystem keys

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

Rising softkey, [547](#)

RMC 144 kbps (25.141) softkey, [1137](#)

RMC 384 kbps (25.141) softkey, [1137](#)

RMC 64 kbps (25.141) softkey, [1137](#)

RMC122 kbps (25.141) softkey, [1137](#)

RMS header info, [295](#)

Root Nyquist softkey

*See* CDMA ARB subsystem keys

*See* CDMA2000 ARB subsystem keys

*See* CDMA2000 BBG subsystem keys and fields

*See* custom subsystem keys

*See* DECT subsystem keys

*See* Dmodulation subsystem keys

*See* EDGE subsystem keys

*See* GPS subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

*See* wideband CDMA ARB subsystem keys

*Root Nyquist softkey (continued)*

*See* wideband CDMA base band generator  
subsystem keys and fields

rotate markers, [302](#)

Rotation softkey, [390](#)

route subsystem keys

Burst Gate In Polarity Neg Pos, [130](#), [131](#)

Data Clock Out Neg Pos, [133](#)

Data Clock Polarity Neg Pos, [130](#), [132](#), [134](#)

Data Out Polarity Neg Pos, [133](#), [135](#)

Data Polarity Neg Pos, [131](#), [132](#)

DATA/CLK/SYNC Rear Outputs Off On, [135](#)

Symbol Sync OUT Polarity Neg Pos, [134](#), [135](#)

Symbol Sync Polarity Neg Pos, [131](#), [132](#)

RS-232 Baud Rate softkey, [79](#)

RS-232 ECHO Off On softkeys, [79](#)

RS-232 Timeout softkeys, [80](#)

Run Complete Self Test softkey, [92](#)

runtime scaling, [312](#), [335](#)

## S

S softkey, [645](#), [800](#)

*See* DECT subsystem keys

SA softkey, [955](#), [974](#)

SACCH softkey, [894](#), [898](#), [927](#), [930](#), [932](#)

Samples softkey, dual ARB trigger delay, [321](#)

Sanitize softkey, [161](#)

Satellite ID softkey, [769](#)

Save Reg softkey, [91](#)

Save Secondary Frame State softkey

*See* DECT subsystem keys

*See* EDGE subsystem keys

*See* GSM subsystem keys

*See* NADC subsystem keys

*See* PDC subsystem keys

*See* PHS subsystem keys

*See* TETRA subsystem keys

Save Seq[n] Reg[nn] softkey, [91](#)

Save Setup To Header softkey, [206](#), [220](#), [245](#), [273](#),  
[297](#), [326](#), [344](#), [467](#)

Save User Preset softkey, [160](#)

Scale to 0dB softkey

*See* CDMA ARB subsystem keys

*See* CDMA2000 ARB subsystem keys

*See* CDMA2000 BBG subsystem keys and fields

*Scale to 0dB softkey (continued)*

See wideband CDMA ARB subsystem keys

See wideband CDMA base band generator  
subsystem keys and fields

Scale Waveform Data softkey, 312

scaling

during playback, 312, 335

waveform files, 312

Scaling softkey, 312, 391

SCCPCH softkey, 357, 358

Scenario softkey, 772

SCFN field, 1062, 1159

SCH slot-pulse (DRPS10) softkey, 1050, 1052,  
1053, 1054, 1055

SCPI

errors, 155

SCPI command subsystems

3GPP W-CDMA HSPA, 668

all, 462

amplitude modulation, 172

AWGN, 205

AWGN real-time, 463

bluetooth, 464

calculate, 398

calibration, 72

CDMA ARB, 215

CDMA2000 ARB, 240

CDMA2000 BBG, 479

communication, 75

correction, 20

custom, 548

data, 408

DECT, 573

diagnostic, 81

digital, 380

digital modulation, 22

display, 85

Dmodulation, 270

Dual ARB, 294

E4438C, 204

EDGE, 622

frequency, 38

frequency modulation, 179

GPS subsystem, 763

GSM, 773

SCPI command subsystems (*continued*)

HSDPA over W-CDMA, 812

IEEE 488.2 common commands, 88

input, 416, 422

list/sweep, 49

low frequency output, 186

mass memory, 124

memory, 94

MSGPS subsystem, 770

multitone, 326

N5102A, 380

NADC, 874

output, 128

PDC, 908

phase modulation, 191

PHS, 941

power, 58

pulse modulation, 199

route, 130

sense, 425

status, 136

system, 154

TETRA, 977

trigger, 166

unit, 170

wideband CDMA ARB, 340

wideband CDMA base band generator, 1020

SCPI commands

command tree paths, 7

parameter and response types, 7

parameter types

boolean, 10

discrete, 9

extended numeric, 8

numeric, 8

string, 10

response data types

discrete, 11

integer, 11

numeric boolean, 11

real, 10

string, 11

root command, 6

SCPI reference, lxxiii

SCPI softkey, 156, 158

---

## Index

- Scramble Code softkey, [356](#), [362](#), [364](#)
- Scramble Off On softkey, [944](#), [980](#)
- Scramble Offset softkey, [356](#), [364](#)
- Scramble Seed softkey, [944](#), [980](#)
- Scrambling Code field, [1055](#), [1056](#), [1151](#)
- Screen Saver Delay
  - 1 hr softkey, [163](#)
- Screen Saver Mode softkeys, [164](#)
- Screen Saver Off On softkeys, [164](#)
- Second DPDCH I Q softkey, [362](#)
- Secondary Frame Off On softkey
  - See DECT subsystem keys
  - See EDGE subsystem keys
  - See GSM subsystem keys
  - See NADC subsystem keys
  - See PDC subsystem keys
  - See PHS subsystem keys
  - See TETRA subsystem keys
- secure wave directory, [116](#)
- security functions
  - erase, [161](#)
  - none, [161](#)
  - overwrite, [161](#), [163](#)
  - sanitize, [161](#), [163](#)
  - secure display, [160](#)
  - secure mode, [162](#)
- segment advance
  - trigger response, [318](#)
- Segment Advance softkey, [315](#)
- Select File softkey, [249](#), [282](#)
- Select Scenario softkey, [772](#)
- Select Seq softkey, [90](#)
- Select Waveform softkey, [323](#), [324](#)
- sense subsystem keys
  - Adjust Gain, [437](#)
  - Aux, [438](#), [454](#), [460](#)
  - Aux I/O Trigger Polarity Pos Neg, [460](#)
  - BER Mode Off On, [425](#), [429](#), [448](#)
  - BERT Off On, [457](#)
  - BERT Resync Off On, [457](#)
  - Bit Count, [439](#), [441](#)
  - Bit Delay Off On, [459](#)
  - Block Count, [428](#), [430](#), [432](#), [444](#), [448](#)
  - Block Erasure, [426](#), [431](#), [444](#), [445](#), [446](#), [448](#), [449](#)
  - Bus, [438](#), [454](#), [460](#)
  - sense subsystem keys (*continued*)
    - Class Ib Bit Error, [451](#), [452](#)
    - Class II Bit Error, [452](#)
    - Cycle Count, [459](#)
    - Delay Bits, [459](#)
    - EDGE BERT Off On, [442](#)
    - Error Count, [442](#), [457](#)
    - Exceeds Any Thresholds, [452](#)
    - Ext, [438](#), [454](#), [460](#)
    - Ext Frame Trigger Delay, [427](#)
    - External Frame Polarity Net Pos, [427](#)
    - Frame Count, [447](#), [450](#)
    - Frame Erasure, [452](#)
    - Frame Trigger Source Int Ext, [428](#)
    - GSM BERT Off On, [455](#)
    - High Amplitude, [429](#), [433](#), [440](#)
    - Immediate, [438](#), [454](#), [460](#)
    - Initial Bit Count, [441](#)
    - Initial Block Count, [431](#), [434](#)
    - Initial Frame Count, [451](#)
    - Low Amplitude, [430](#), [433](#), [440](#), [447](#)
    - Measurement Mode BER% Search, [450](#)
    - Measurement Mode BLER% Search, [436](#)
    - No Thresholds, [426](#), [431](#), [446](#), [449](#), [452](#), [458](#)
    - Pass Amplitude, [430](#), [434](#), [441](#)
    - PN11, [456](#)
    - PN15, [456](#)
    - PN20, [456](#)
    - PN23, [456](#)
    - PN9, [456](#)
    - Resync Limits, [456](#)
    - Spcl Pattern 0's 1's, [455](#)
    - Spcl Pattern Ignore Off On, [456](#)
    - Spectrum Invert Off On, [437](#), [451](#)
    - Stop Measurement, [435](#), [449](#)
    - Sync Source BCH PDCH, [438](#)
    - Sync Source BCH TCH, [454](#)
    - Synchronize to BCH/PDCH, [437](#)
    - Synchronize to BCH/TCH, [453](#)
    - Target BER %, [429](#), [432](#)
    - Timeslot, [436](#), [449](#)
    - Total Bits, [458](#)
    - Trigger Key, [438](#), [454](#), [460](#)
    - Uplink Timing Advance, [439](#), [455](#)
  - SEQ softkey, [102](#)

- sequence, creating, [313](#)
- service
  - guide, [lxxiii](#)
- Set ALC Level softkey, [60](#)
- Set Atten softkey, [65](#)
- Set Marker Off All Points softkey, [301](#)
- Set Marker Off Range Of Points softkey, [300](#)
- Set Marker On Range Of Points softkey, [302](#)
- setting conflicts, resolving, [670](#), [814](#)
- setting markers, [302](#)
- setup sweep, [49](#)
- SF/2 softkey, [1155](#)
- SF2 softkey, [1058](#)
- SFN reset-signal (DRPS5) softkey, [1050](#), [1052](#),  
[1053](#), [1054](#), [1055](#)
- SFN RST Polarity softkey, [1151](#)
- SFN-CFN Frame Offset softkey, [1100](#)
- SHAPE softkey, [102](#)
- shift markers, [302](#)
- Signal Type softkey, [392](#)
- Signature field, [1136](#)
- Sine softkey
  - See* amplitude modulation subsystem keys
  - See* DECT subsystem keys
  - See* EDGE subsystem keys
  - See* frequency modulation subsystem keys
  - See* GSM subsystem keys
  - See* low frequency output subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* phase modulation subsystem keys
  - See* PHS subsystem keys
  - See* TETRA subsystem keys
- single
  - segment advance, [318](#)
- Single softkey
  - dual ARB subsystem keys, [318](#)
    - See* CDMA ARB subsystem keys
    - See* CDMA2000 ARB subsystem keys
    - See* custom subsystem keys
    - See* DECT subsystem keys
    - See* Dmodulation subsystem keys
    - See* dual ARB subsystem keys
    - See* EDGE subsystem keys
    - See* GSM subsystem keys
  - Single softkey (continued)*
    - See* NADC subsystem keys
    - See* PDC subsystem keys
    - See* PHS subsystem keys
    - See* TETRA subsystem keys
    - See* wideband CDMA ARB subsystem keys
- Single Sweep softkey, [167](#)
- skew, [31](#), [32](#)
- skew, quadrature (angle) adjustment
  - BBG, [25](#)
  - RF path, [30](#)
- Slot Format field, [1027](#), [1034](#), [1083](#), [1094](#), [1111](#),  
[1116](#)
- softkey, [123](#)
- software options, [82](#)
- Source Module softkey, [63](#)
- Span Type User Full softkey, [62](#)
- Spcl Pattern 0's 1's softkey, [455](#)
- Spcl Pattern Ignore Off On softkey, [456](#)
- Spectrum Invert Off On softkey
  - See* sense subsystem keys
- Spread Rate 1 softkey, [247](#), [254](#), [262](#)
- Spread Rate 3, [254](#)
- Spread Rate 3 softkey, [247](#), [262](#)
- Spread Rate field, [511](#)
- Spreading Type Direct Mcarrier, [247](#)
- Spreading Type Direct Mcarrier softkey, [263](#)
- Spurious Response softkey, [1064](#)
- Square softkey, [175](#), [182](#), [189](#), [195](#)
- square wave pulse rate
  - internally generated, [199](#)
- SR1 9 Channel softkey, [249](#)
- SR1 Pilot softkey, [249](#)
- SR3 Direct 9 Channel softkey, [249](#)
- SR3 Direct Pilot softkey, [249](#)
- SR3 Mcarrier 9 Channel softkey, [249](#)
- SR3 MCarrier Pilot softkey, [249](#)
- SS softkey, [792](#)
- SSB softkey, [999](#), [1004](#)
- SSCH 2nd Scramble Group field, [1056](#)
- SSCH Power field, [1056](#)
- SSCH softkey, [357](#)
- SSCH State field, [1057](#)
- Standard softkey, [356](#)
- Start Access Slot Position in 80ms Period field, [1122](#)

---

## Index

- Start Frequency softkey, [61](#), [74](#)
- Start Sub-Channel# field, [1126](#)
- State field
  - See* CDMA2000 BBG subsystem keys and fields
- State softkey, [103](#), [124](#)
- STD softkey, [1080](#)
- Step Dwell softkey, [56](#)
- Step Power field, [1103](#)
- Stop Frequency softkey, [61](#), [74](#)
- Stop Measurement softkey
  - See* sense subsystem keys
- Store Custom CDMA State softkey, [232](#), [251](#), [254](#)
- Store Custom Dig Mod State softkey, [285](#)
- Store Custom Multicarrier softkey, [231](#), [249](#)
- Store Custom W-CDMA State softkey, [352](#), [355](#)
- Store To File softkey, [21](#), [123](#), [127](#), [336](#), [364](#)
- string response data, [11](#)
- string SCPI parameter, [10](#)
- strings, quote usage, [17](#)
- STS softkey, [1000](#), [1005](#)
- Sub Channel Timing (RPS17) softkey
  - See* wideband CDMA base band generator subsystem keys and fields
- Subnet Mask softkey, [77](#)
- subsystems, SCPI commands
  - See* SCPI command subsystems
- Sum softkey, [24](#)
- Summing Ratio (SRC1/SRC2) x.xx dB softkey, [36](#)
- SW softkey, [927](#), [930](#), [932](#)
- Swap IQ softkey, [387](#)
- Sweep Direction Down Up softkey, [50](#)
- Sweep Repeat Single Cont softkey, [166](#)
- Sweep Retrace Off On softkey, [54](#)
- sweep setup, [49](#)
- Sweep Type List Step softkey, [55](#)
- sweep/list subsystem keys
  - Load From Selected File
    - Store to File, [49](#)
- Swept-Sine softkey, [175](#), [182](#), [189](#), [195](#)
- Symbol Out Polarity Neg Pos softkey, [134](#)
- Symbol Rate field, [1083](#), [1092](#), [1115](#)
- Symbol Rate softkey, [286](#), [356](#), [364](#), [658](#), [1111](#)
- Symbol Sync Out Polarity Neg Pos softkey, [135](#)
- Symbol Sync Polarity Neg Pos softkey, [131](#), [132](#)
- Symbol Timing Err softkey, [472](#)
- Sync Out Offset softkey, [614](#), [657](#), [803](#), [900](#), [933](#), [964](#), [1011](#)
- SYNC softkey, [895](#), [898](#), [957](#)
- Sync softkey, [229](#), [802](#)
- Sync Source BCH PDCH softkey, [438](#)
- Sync Source BCH TCH softkey, [454](#)
- Sync Source SFN FCIk ESG softkey, [1152](#)
- Synchronize to BCH/PDCH softkey, [437](#)
- Synchronize to BCH/TCH softkey, [453](#)
- System ID field, [504](#)
- system subsystem keys
  - 8648A/B/C/D, [156](#), [158](#)
  - 8656B,8657A/B, [156](#), [158](#)
  - 8657D NADC, [156](#), [158](#)
  - 8657D PDC, [156](#), [158](#)
  - 8657J PHS, [156](#), [158](#)
  - Activate Secure Display, [160](#)
  - Enter Secure Mode, [162](#)
  - erase, [161](#)
  - Erase All, [161](#)
  - Erase and Overwrite All, [163](#)
  - Erase and Sanitize All, [163](#)
  - Error Info, [155](#)
  - Help Mode Single Cont, [156](#)
  - none, [161](#)
  - overwrite, [161](#)
  - PN9 Mode Preset, [159](#)
  - Power On Last Preset, [157](#)
  - Preset, [158](#)
  - Preset Normal User, [160](#)
  - Restore Sys Defaults, [159](#)
  - sanitize, [161](#)
  - Save User Preset, [160](#)
  - SCPI, [156](#), [158](#)
  - Screen Saver Delay
    - 1 hr, [163](#)
  - Screen Saver Mode, [164](#)
  - Screen Saver Off On, [164](#)
  - Time/Date, [154](#), [165](#)
  - View Next Error Message, [155](#)

## T

- T1 softkey, [654](#)
- T2 softkey, [655](#)



- Target BER % softkey
  - See sense subsystem keys
- TCH All softkey, 957
- TCH softkey, 957
- TCH/FS softkey, 641, 644, 794
- tDPCH Offset field, 1035
- Test Model 1 w/16 DPCH softkey, 348, 353
- Test Model 1 w/32 DPCH softkey, 348, 353
- Test Model 1 w/64 DPCH softkey, 348, 353
- Test Model 2 softkey, 348, 353
- Test Model 3 w/16 DPCH softkey, 348, 353
- Test Model 3 w/32 DPCH softkey, 348, 353
- Test Model 4 softkey, 348, 353
- Test Model 5 w/2HSPDSCH softkey, 348, 353
- Test Model 5 w/4HSPDSCH softkey, 348, 353
- Test Model 5 w/8HSPDSCH softkey, 348, 353
- TETRA Off On softkey, 1019
- TETRA softkey, 282, 283, 284
- TETRA subsystem keys
  - 128QAM, 994
  - 16 1's & 16 0's, 987, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009
  - 16PSK, 994
  - 16QAM, 994
  - 256QAM, 994
  - 2-Lvl FSK, 994
  - 32 1's & 32 0's, 987, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009
  - 32QAM, 994
  - 4 1's & 4 0's, 987, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009
  - 4-Lvl FSK, 994
  - 4QAM, 994
  - 64 1's & 64 0's, 987, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009
  - 64QAM, 994
  - 8 1's & 8 0's, 987, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009
  - 8PSK, 994
  - All Timeslots, 1011
  - APCO 25 C4FM, 991
  - B, 999, 1004
  - B1, 997, 1002
  - B2, 997, 1002
  - BBG Data Clock Ext Int, 977
  - TETRA subsystem keys (*continued*)
    - BBG Ref Ext Int, 990
    - Begin Frame, 1011
    - Begin Timeslot #, 1011, 1012
    - Bit Rate, 978
    - BPSK, 994
    - Bus, 995, 1016
    - Continuous, 1014
    - D8PSK, 994
    - Data Format Pattern Framed, 986
    - Dn Custom Cont, 1010
    - Dn Normal Cont, 1010
    - Dn Normal Disc, 1010
    - Dn Sync Cont, 1010
    - Dn Sync Disc, 1010
    - Ext, 987, 995, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009, 1016
    - Ext BBG Ref Freq, 990
    - Ext Data Clock Normal Symbol, 989
    - Ext Delay Bits, 1017
    - Ext Delay Off On, 1017
    - Ext Polarity Neg Pos, 1018
    - Fall Delay, 980, 982
    - Fall Time, 981, 982
    - FCOR, 999, 1004
    - Filter Alpha, 977
    - Filter BbT, 978
    - FIX4, 987, 988, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009, 1010
    - Free Run, 1014
    - Freq Dev, 992
    - Gate Active Low High, 1015
    - Gated, 1014
    - Gaussian, 991
    - Gray Coded QPSK, 994
    - I/Q Scaling, 992
    - IS-95, 991
    - IS-95 Mod, 991
    - IS-95 Mod w/EQ, 991
    - IS-95 OQPSK, 994
    - IS-95 QPSK, 994
    - IS-95 w/EQ, 991
    - MSK, 994
    - Nyquist, 991
    - Optimize FIR For EVM ACP, 987

---

## Index

### TETRA subsystem keys (*continued*)

OQPSK, 994  
 $\pi/4$  DQPSK, 994  
Patt Trig In 1, 1018  
Patt Trig In 2, 1018  
Phase Dev, 993  
Phase Polarity Normal Invert, 994  
PN11, 987, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009  
PN15, 987, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009  
PN20, 987, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009  
PN23, 987, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009  
PN9, 987, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009  
PN9 Mode Normal Quick, 979  
QPSK, 994  
Recall Secondary Frame State, 995  
Rectangle, 991  
Reset & Run, 1014  
Restore TETRA Factory Default, 989  
Rise Delay, 983, 984  
Rise Time, 984, 985  
Root Nyquist, 991  
Save Secondary Frame State, 995  
Scramble Off On, 980  
Scramble Seed, 980  
Secondary Frame Off On, 996  
Sine, 986  
Single, 1014  
SSB, 999, 1004  
STS, 1000, 1005  
Symbol Rate, 1012  
Sync Out Offset, 1011  
TETRA Off On, 1019  
Timeslot Ampl Main Delta, 1006  
Timeslot Off On, 1006  
Trigger & Run, 1014  
Trigger Key, 995, 1016  
TS, 997, 1002, 1006, 1007, 1009  
UN3/4 GSM Gaussian, 991  
Up Control 1, 1010  
Up Control 2, 1010

### TETRA subsystem keys (*continued*)

Up Custom, 1010  
Up Normal, 1010  
User File, 986, 987, 996, 998, 1000, 1001, 1003, 1005, 1007, 1008, 1009  
User FIR, 991  
User FSK, 993, 994  
User I/Q, 993, 994  
tetra subsystem keys  
  PRAM Files, 988  
TFCI Field Off On softkey, 356, 361, 364, 366  
TFCI Pat field, 1035  
TFCI Pattern field, 1084, 1112  
TFCI State field, 1085, 1113  
Tfirst field, 1028  
TGCFN field, 1058, 1154  
TGD field, 1059, 1155  
Tgl field, 1028  
TGL1 field, 1059, 1156  
TGL2 field, 1059, 1156, 1157  
TGPL1 field, 1060, 1156  
TGPRC field, 1157  
TGPS Inactive Active softkey, 1158  
TGSN field, 1061, 1158  
Through softkey, 32, 205, 208, 217, 222, 241, 246, 270, 275, 298, 299, 327, 329, 344, 346, 466, 473  
Time field, 504  
Time softkey, dual ARB trigger delay, 321  
Time/Date softkey, 154, 165  
Timeslot Ampl Main Delta softkey  
  *See* DECT subsystem keys  
  *See* EDGE subsystem keys  
  *See* NADC subsystem keys  
  *See* PDC subsystem keys  
  *See* PHS subsystem keys  
  *See* TETRA subsystem keys  
Timeslot Off On softkey  
  *See* DECT subsystem keys  
  *See* EDGE subsystem keys  
  *See* GSM subsystem keys  
  *See* NADC subsystem keys  
  *See* PHS subsystem keys  
  *See* TETRA subsystem keys  
Timeslot Offset softkey, 1125

- Timeslot softkey
  - See* sense subsystem keys
- Timeslot Type softkey, 975
- Timing Offset softkey, 1126, 1151, 1161
- tOCNS Offset field, 1042
- Toggle Marker 1 2 3 4 softkey, 313
- Toggle State softkey, 334, 336
- Total Bits field, 1165
- Total Bits softkey, 458
- Total Block field, 1167
- TotalPwr field, 1078, 1108
- TPC Pat Steps field, 1085
- TPC Pat Trig Polarity Neg Pos softkey, 1087
- TPC Pattern field, 1087
- TPC Steps field, 1036
- TPC UserFile Trig field, 1088
- Tp-m field, 1127
- Tp-p field, 1128
- Traffic Bearer softkey, 589, 600
- Traffic Bearer with Z field softkey, 589, 600
- Traffic softkey, 229
- Transp Chan A softkey, 1031
- Transp Chan B softkey, 1031
- Transp Position Flexible Fixed softkey, 1072
- Transport CH softkey, 1043
- TrCH BER field, 1093
- TrCh BlkSize 168 softkey, 1124
- TrCh BlkSize 360 softkey, 1124
- TrCH State Off On softkey, 1177
- TrCHI State Off On softkey, 1074
- Triangle softkey, 175, 182, 189, 195
- Trigger & Run softkey
  - See* CDMA ARB subsystem keys
  - See* CDMA2000 ARB subsystem keys
  - See* custom subsystem keys
  - See* DECT subsystem keys
  - See* Dmodulation subsystem keys
  - See* dual ARB subsystem keys
  - See* EDGE subsystem keys
  - See* GSM subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* PHS subsystem keys
  - See* TETRA subsystem keys
  - See* wideband CDMA ARB subsystem keys
- Trigger Advance field, 546
- Trigger In Polarity Neg Pos softkey, 168
- Trigger Key softkey
  - list/sweep subsystem, 54
  - See* amplitude modulation subsystem keys
  - See* CDMA ARB subsystem keys
  - See* CDMA2000 ARB subsystem keys
  - See* DECT subsystem keys
  - See* Dmodulation subsystem keys
  - See* dual ARB subsystem keys
  - See* EDGE subsystem keys
  - See* frequency modulation subsystem keys
  - See* GSM subsystem keys
  - See* low frequency output subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* phase modulation subsystem keys
  - See* PHS subsystem keys
  - See* sense subsystem keys
  - See* TETRA subsystem keys
  - See* trigger subsystem keys
  - See* wideband CDMA ARB subsystem keys
- Trigger Out Polarity Neg Pos softkey, 167
- trigger source, list sweep, 54
- trigger subsystem keys
  - Bus, 168, 546
  - Ext, 168, 546
  - Free Run, 168, 546
  - Single Sweep, 167
  - Sweep Repeat Single Cont, 166
  - Trigger In Polarity Neg Pos, 168
  - Trigger Key, 168, 546
  - Trigger Out Polarity Neg Pos, 167
- Trigger Sync Reply (RPS7) softkey
  - See* wideband CDMA base band generator subsystem keys and fields
- triggers
  - response selection
    - segment advance mode, dual ARB, 318
- Truncated PN9 softkey, 465
- TS softkey, 802, 997, 1002, 1006, 1007, 1009
- TSC0 softkey, 645, 655, 793, 800
- TSC1 softkey, 645, 655, 793, 800
- TSC2 softkey, 645, 655, 793, 800
- TSC3 softkey, 645, 655, 793, 800

---

## Index

- TSC4 softkey, [645](#), [655](#), [793](#), [800](#)
- TSC5 softkey, [645](#), [655](#), [793](#), [800](#)
- TSC6 softkey, [645](#), [655](#), [793](#), [800](#)
- TSC7, [645](#), [793](#), [800](#)
- TSC7 softkey, [645](#), [655](#), [793](#), [800](#)
- TTI field, [1073](#), [1130](#), [1170](#), [1177](#)
- TTI Frame Clock (RPS9) softkey
  - See* wideband CDMA base band generator
  - subsystem keys and fields
- Turbo Coding field, [498](#), [545](#)
- Turbo softkey, [1068](#), [1070](#), [1163](#)
- Type softkey, [356](#), [364](#)
  
- U**
- UDI 64 kbps softkey, [1137](#)
- UDI ISDN (25.101) softkey, [1033](#)
- UN3/4 GSM Gaussian softkey
  - See* CDMA ARB subsystem keys
  - See* CDMA2000 ARB subsystem keys
  - See* CDMA2000 BBG subsystem keys and fields
  - See* custom subsystem keys
  - See* DECT subsystem keys
  - See* Dmodulation subsystem keys
  - See* EDGE subsystem keys
  - See* GPS subsystem keys
  - See* GSM subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* PHS subsystem keys
  - See* TETRA subsystem keys
  - See* wideband CDMA ARB subsystem keys
  - See* wideband CDMA base band generator
    - subsystem keys and fields
- Uncoded softkey, [646](#)
- unit subsystem keys
  - dBm, [170](#)
  - dBuV, [170](#)
  - dBuVemf, [170](#)
  - mV, [170](#)
  - mVemf, [170](#)
  - uV, [170](#)
  - uVemf, [170](#)
- unprotected
  - memory subsystem, [116](#)
- unspecified RMS, [295](#)
  
- Up Control 1 softkey, [1010](#)
- Up Control 2 softkey, [1010](#)
- Up Custom softkey, [899](#), [933](#), [1010](#)
- Up Normal softkey, [1010](#)
- Up TCH All softkey, [899](#), [933](#)
- Up TCH softkey, [899](#), [933](#)
- Up VOX softkey, [933](#)
- Up/Down softkey, [1036](#), [1086](#)
- Update Display Cycle End Cont softkey, [407](#)
- Update in Remote Off On softkey, [87](#)
- Uplink MCS-1 softkey, [641](#), [644](#), [794](#)
- Uplink MCS-5 softkey, [646](#)
- Uplink MCS-9 softkey, [646](#)
- Uplink Timing Advance softkey
  - See* sense subsystem keys
- uploading files, [116](#)
- user
  - documentation, [lxxiii](#)
- User File softkey
  - See* CDMA2000 BBG subsystem keys and fields
  - See* custom subsystem keys
  - See* DECT subsystem keys
  - See* EDGE subsystem keys
  - See* GPS subsystem keys
  - See* GSM subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys
  - See* PHS subsystem keys
  - See* TETRA subsystem keys
  - See* wideband CDMA base band generator
    - subsystem keys and fields
- user files, HSDPA, [812](#)
- user files, HSPA, [668](#)
- User FIR softkey
  - See* CDMA ARB subsystem keys
  - See* CDMA2000 ARB subsystem keys
  - See* CDMA2000 BBG subsystem keys and fields
  - See* custom subsystem keys
  - See* DECT subsystem keys
  - See* Dmodulation subsystem keys
  - See* EDGE subsystem keys
  - See* GPS subsystem keys
  - See* GSM subsystem keys
  - See* NADC subsystem keys
  - See* PDC subsystem keys

- User FIR softkey (continued)*  
See PHS subsystem keys  
See TETRA subsystem keys  
See wideband CDMA ARB subsystem keys  
See wideband CDMA base band generator subsystem keys and fields
- User Flatness softkey, [103](#), [124](#)
- User FSK softkey  
See custom subsystem keys  
See DECT subsystem keys  
See EDGE subsystem keys  
See GSM subsystem keys  
See NADC subsystem keys  
See PDC subsystem keys  
See PHS subsystem keys  
See TETRA subsystem keys
- User I/Q softkey  
See custom subsystem keys  
See DECT subsystem keys  
See EDGE subsystem keys  
See GSM subsystem keys  
See NADC subsystem keys  
See PDC subsystem keys  
See PHS subsystem keys  
See TETRA subsystem keys
- uV softkey, [170](#)
- uVemf softkey, [170](#)
- UW softkey, [955](#), [956](#), [973](#), [974](#)
- UWCDMA softkey, [104](#)
- V**
- View Next Error Message softkey, [155](#)
- W**
- Walsh Code softkey, [252](#), [255](#)
- Walsh field  
See CDMA2000 BBG subsystem keys and fields
- waveform  
sequence, dual ARB, [313](#)
- Waveform Length softkey, [212](#), [238](#)
- waveform license time remaining, [84](#)
- Waveform Licenses softkey, [82](#), [84](#)
- Waveform Runtime Scaling softkey, [312](#), [335](#)
- waveform scaling  
during playback, [312](#), [335](#)  
files, [312](#)
- waveform, creating a multitone, [326](#)
- W-CDMA Off On softkey, [378](#), [1177](#)
- WCDMA softkey  
See CDMA ARB subsystem keys  
See CDMA2000 ARB subsystem keys  
See Dmodulation subsystem keys  
See wideband CDMA ARB subsystem keys
- wideband AM, [173](#)
- wideband CDMA ARB subsystem keys  
1 DPCH, [348](#), [353](#)  
2 Carriers, [349](#)  
2.100 MHz, [346](#)  
3 Carriers, [349](#)  
3 DPCH, [348](#), [353](#)  
4 Carriers, [349](#)  
40.000 MHz, [344](#), [346](#)  
APCO 25 C4FM, [342](#)  
Apply Channel Setup, [356](#), [364](#)  
ARB Reference Ext Int, [370](#)  
ARB Sample Clock, [372](#)  
Bus, [375](#)  
Channel, [356](#), [364](#)  
Chip Rate, [342](#)  
Clear Header, [344](#)  
Clip |I| To, [340](#), [350](#)  
Clip |Q| To, [340](#), [351](#)  
Clip At PRE POST FIR Filter, [340](#)  
Clip Type |I+jQ| To, [341](#), [351](#)  
Clipping Type |I+jQ| |I|,|Q|, [341](#), [351](#)  
Continuous, [372](#)  
Custom WCDMA State, [363](#)  
DPCCH, [363](#)  
DPCCH + 1 DPDCH, [363](#)  
DPCCH + 2 DPDCH, [363](#)  
DPCCH + 3 DPDCH, [363](#)  
DPCCH + 4 DPDCH, [363](#)  
DPCCH + 5 DPDCH, [363](#)  
DPCH, [357](#)  
Equal Energy per Symbol, [361](#)  
Ext Delay Off On, [376](#)  
Ext Delay Time, [376](#)  
Ext Key, [375](#)

---

## Index

### wideband CDMA ARB subsystem keys (*continued*)

Ext Polarity Neg Pos, [377](#)  
Filter Alpha, [343](#)  
Filter BbT, [343](#)  
First Spread Code, [356](#), [364](#)  
Free Run, [374](#)  
Gain Unit dB Lin Index, [366](#)  
Gate Active Low High, [374](#)  
Gated, [372](#)  
Gaussian, [342](#)  
I/Q Mapping Norma Invert, [345](#)  
I/Q Mod Filter Manual Auto, [347](#)  
I/Q Output Filter Manual Auto, [345](#)  
Increment Scramble Code, [352](#)  
Increment Timing Offset, [355](#)  
IS-2000 SR3 DS, [342](#)  
IS-95, [342](#)  
IS-95 Mod, [342](#)  
IS-95 Mod w/EQ, [342](#)  
IS-95 w/EQ, [342](#)  
Left Alternate, [356](#)  
Link Down Up, [347](#)  
Marker 1, [367](#), [368](#)  
Marker 2, [367](#), [368](#)  
Marker 3, [367](#), [368](#)  
Marker 4, [367](#), [368](#)  
Marker Polarity Neg Pos, [370](#)  
Modulator Atten Manual Auto, [346](#)  
None, [367](#), [368](#)  
Nyquist, [342](#)  
OCNS, [357](#)  
Optimize ACP ADJ ALT, [347](#), [362](#)  
Optimize FIR For EVM ACP, [344](#)  
Patt Trig In 1, [377](#)  
Patt Trig In 2, [377](#)  
PCCPCH + SCH, [348](#), [353](#)  
PCCPCH + SCH + 1 DPCH, [348](#), [353](#)  
PCCPCH + SCH + 3 DPCH, [348](#), [353](#)  
PICH, [357](#)  
Power, [364](#)  
PPCCPCH, [357](#), [358](#)  
PSCH, [357](#)  
Random, [356](#), [364](#)  
Rectangle, [342](#)  
Reference Freq, [370](#)

### wideband CDMA ARB subsystem keys (*continued*)

Reset & Run, [374](#)  
Retrigger Mode Off On, [371](#)  
Right Alternate, [356](#)  
Root Nyquist, [342](#)  
Save Setup To Header, [344](#)  
Scale to 0dB, [361](#)  
SCCPCH, [357](#), [358](#)  
Scramble Code, [356](#), [362](#), [364](#)  
Scramble Offset, [356](#), [364](#)  
Second DPDCH I Q, [362](#)  
Single, [372](#)  
SSCH, [357](#)  
Standard, [356](#)  
Store Custom W-CDMA State, [352](#), [355](#)  
Store To File, [364](#)  
Symbol Rate, [356](#), [364](#)  
Test Model 1 w/16 DPCH, [348](#), [353](#)  
Test Model 1 w/32 DPPCH, [348](#), [353](#)  
Test Model 1 w/64 DPCH, [348](#), [353](#)  
Test Model 2, [348](#), [353](#)  
Test Model 3 w/16 DPCH, [348](#), [353](#)  
Test Model 3 w/32 DPCH, [348](#), [353](#)  
Test Model 4, [348](#), [353](#)  
Test Model 5 w/2HSPDSCH, [348](#), [353](#)  
Test Model 5 w/4HSPDSCH, [348](#), [353](#)  
Test Model 5 w/8HSPDSCH, [348](#), [353](#)  
TFCI Field Off On, [356](#), [361](#), [364](#), [366](#)  
Through, [344](#), [346](#)  
Trigger & Run, [374](#)  
Trigger Key, [375](#)  
Type, [356](#), [364](#)  
UN3/4 GSM Gaussian, [342](#)  
User FIR, [342](#)  
WCDMA, [342](#)  
W-CDMA Off On, [378](#)

### wideband CDMA base band generator subsystem

keys and fields  
# of Blocks, [1071](#)  
1/2 Conv, [1068](#), [1070](#), [1163](#)  
1/3 Conv, [1068](#), [1070](#), [1163](#)  
10 msec, [1096](#)  
10ms Frame Pulse (DRPS11), [1050](#), [1052](#), [1053](#),  
[1054](#), [1055](#)

- wideband CDMA base band generator subsystem  
  keys and fields (*continued*)  
  10ms Frame Pulse (RPS6), 1145, 1147, 1148,  
    1149, 1150  
  12.2 kbps (34.121), 1033  
  144 kbps (34.121), 1033  
  20 msec, 1096  
  2560 msec, 1096  
  2nd Scr Offset, 1034, 1041  
  3.84MHz chip-clk (DRPS4), 1050, 1052, 1053,  
    1054, 1055  
  384 kbps (34.121), 1033  
  40 msec, 1096  
  64 kbps (34.121), 1033  
  80 msec, 1096  
  80ms Frame Pulse (DRPS13), 1050, 1052, 1053,  
    1054, 1055  
  80ms Frame Pulse (RPS20), 1145, 1147, 1148,  
    1149, 1150  
  A, 1025  
  ACS, 1064  
  Active, 1061  
  Actual BER, 1172  
  Actual BLER, 1166, 1173  
  AICH, 1130  
  AICH Trigger Polarity Pos Neg, 1105  
  All Down, 1036, 1086  
  All Up, 1036, 1086  
  Alt power in, 1143  
  AMR 12.2 kbps, 1033, 1137  
  APCO 25 C4FM, 1037, 1097  
  Apply Channel Setup, 1021, 1075  
  B, 1025  
  Base Delay Tp-a, 1127  
  BBG Chip Clock Ext Int, 1020  
  BBG Data Clock Ext In, 1024  
  BER, 1166, 1168, 1173, 1175  
  Beta, 1079, 1089  
  BLER, 1167, 1168, 1174, 1175  
  Blk Set Size, 1067  
  Blk Size, 1066, 1162, 1170  
  Blocking, 1064  
  Burst gate in, 1144  
  C Power, 1076  
  C Power value, 1106
- wideband CDMA base band generator subsystem  
  keys and fields (*continued*)  
  C/N value, 1021, 1075, 1105  
  CFN #0 Frame Pulse (RPS10), 1139  
  Chan Code, 1030, 1031, 1040  
  Channel Code, 1045, 1080, 1090, 1131, 1132  
  Channel Code field, 1044  
  Channel State, 1089, 1096  
  Channel State Off On, 1024, 1028, 1029, 1031,  
    1037, 1039, 1042, 1043, 1045, 1047, 1055,  
    1078, 1108, 1163, 1170, 1171  
  ChCode Ctl, 1121  
  ChCode Dat, 1121  
  Chip Clock (RPS1), 1139, 1145, 1147, 1148, 1149,  
    1150  
  Chip Rate, 1030, 1079  
  Comp Mode Start Trigger Polarity Neg Pos, 1160  
  Comp Mode Start Trigger Polarity Pos Neg, 1062,  
    1063  
  Comp Mode Stop Trigger Polarity Neg Pos, 1160  
  Comp Mode Stop Trigger Polarity Pos Neg, 1063  
  Compressed Mode Off On, 1159  
  Compressed Mode Start Trigger, 1039, 1062, 1160  
  Compressed Mode Stop Trigger, 1063, 1160  
  CRC Size, 1069, 1164, 1171  
  Ctrl Beta, 1109  
  Ctrl Pwr, 1110  
  Data, 1091  
  Data Beta, 1113  
  Data field, 1175  
  Data Pwr, 1115  
  Data Rate, 1041  
  DCH1, 1077  
  DCH2, 1077  
  DCH3, 1077  
  DCH4, 1077  
  DCH5, 1077  
  DCH6, 1077  
  DL Reference 1.1, 1158  
  DL Reference 1.2, 1158  
  DL Reference 2.1, 1158  
  DL Reference 2.2, 1158  
  Down/Up, 1036, 1086  
  DPCCH, 1077, 1100

---

## Index

wideband CDMA base band generator subsystem  
  keys and fields (*continued*)  
  DPCCH Pilot data-clk (DRPS23), 1050, 1052,  
    1053, 1054, 1055  
  DPCCH Power, 1083  
  DPCCH Raw Data (RPS4), 1139  
  DPCCH Raw Data Clock (RPS5), 1139  
  DPCCH TFCI data-clk (DRPS22), 1050, 1052,  
    1053, 1054, 1055  
  DPCCH TPC indicator (DRPS21), 1050, 1052,  
    1053, 1054, 1055  
  DPCH + 1, 1022, 1023  
  DPCH + 2, 1022, 1023  
  DPCH 10ms Frame-Pulse (DRPS26), 1050, 1052,  
    1053, 1054, 1055  
  DPCH Channel Balance, 1030  
  DPCH Compressed Frame Indicator (DRPS32),  
    1050, 1052, 1053, 1054, 1055  
  DPCH data stream (DRPS24), 1050, 1052, 1053,  
    1054, 1055  
  DPCH data-clk (0) (DRPS28), 1050, 1052, 1053,  
    1054, 1055  
  DPCH Gap Indicator (DRPS33), 1050, 1052,  
    1053, 1054, 1055  
  DPCH TimeSlot pulse (DRPS25), 1050, 1052,  
    1053, 1054, 1055  
  DPDCH, 1077  
  DPDCH data-clk withDTX (DRPS20), 1050,  
    1052, 1053, 1054, 1055  
  DPDCH data-clk WithOutDTX (DRPS30), 1050,  
    1052, 1053, 1054, 1055  
  DPDCH Power, 1092  
  DPDCH Raw Data (RPS2), 1139  
  DPDCH Raw Data Clock (RPS3), 1139  
  Eb/No, 1106  
  Eb/No value (dB), 1076  
  Ec/No value, 1022, 1107  
  Equal Powers, 1043, 1100  
  Error BER, 1172  
  Error Bits, 1165  
  Error Blocks, 1166  
  Ext, 1036  
  Ext Clock Rate x1 x2 x4, 1020  
  FBI State, 1082  
  Filter Alpha, 1038, 1098

wideband CDMA base band generator subsystem  
  keys and fields (*continued*)  
  Filter BbT, 1038, 1099  
  FIX, 1082  
  FIX4, 1032, 1043, 1044, 1045, 1046, 1069, 1070,  
    1081, 1091, 1109, 1110, 1112, 1114, 1168,  
    1172  
  Flat Noise BW, 1077  
  Frame Clock Polarity Neg Pos, 1097  
  Frame Struct, 1057  
  Frame Sync Trigger Mode Single Cont, 1152  
  Gaussian, 1037, 1097  
  Higher Layer, 1155  
  Infinity, 1060, 1157  
  Init Power, 1101  
  Init Pwr, 1119, 1134  
  Intermod, 1064  
  IS-95, 1037, 1097  
  IS-95 Mod, 1037, 1097  
  IS-95 Mod w/EQ, 1037, 1097  
  IS-95 w/EQ, 1097  
  Left, 1026  
  Link Down Up, 1074  
  Max Input, 1064  
  Max Power, 1102  
  Max Pwr, 1120, 1135  
  Message Data Raw Data (RPS11), 1145, 1147,  
    1148, 1149, 1150  
  Message Part, 1118  
  Message Pulse (RPS22), 1145, 1147, 1148, 1149,  
    1150  
  Message-Control Raw Data (RPS13), 1147, 1148,  
    1149, 1150  
  Message-Control Raw Data Clock (RPS12), 1145,  
    1147, 1148, 1149, 1150  
  Min Power, 1102  
  Msg Ctrl, 1107  
  Msg Data, 1107  
  Msg Pwr, 1118, 1133  
  N Power, 1078, 1108  
  NONE, 1163  
  None, 1068, 1070, 1168, 1175  
  NONE (RPS0), 1139, 1145, 1147, 1148, 1149,  
    1150  
  Normal, 1026



- wideband CDMA base band generator subsystem  
 keys and fields (*continued*)  
 Num of Blk, 1169, 1176  
 Num of Pre, 1119, 1134  
 Number of AICH, 1104  
 Number of PRACH, 1131, 1133  
 Number of PRACH 80ms, 1118  
 Number of Preamble, 1134  
 Nyquist, 1037, 1097  
 Off, 1130  
 Omitted, 1060, 1157  
 On, 1130  
 On/Off, 1042, 1123  
 OpenLoop Ant1, 1065  
 OpenLoop Ant1 SCH TSTD OFF, 1065  
 OpenLoop Ant2, 1065  
 OpenLoop Ant2 SCH TSTD OFF, 1065  
 Optimize FIR For EVM ACP, 1039, 1099  
 Paging Indicator, 1046  
 Pattern trigger in 1, 1144  
 Pattern trigger in 2, 1145  
 PCCPCH, 1022, 1023  
 P-CCPCH data (DRPS39), 1050, 1052, 1053,  
 1054, 1055  
 P-CCPCH data-clk (DRPS38), 1050, 1052, 1053,  
 1054, 1055  
 Performance Req, 1064  
 Phase Polarity Normal Invert, 1047  
 Phase Polarity Normal Inverted, 1074  
 PI Bits, 1046  
 PICH, 1022, 1023  
 PICH 10ms FramePulse (DRPS37), 1050, 1052,  
 1053, 1054, 1055  
 PICH data (DRPS35), 1050, 1052, 1053, 1054,  
 1055  
 PICH data-clk (DRPS34), 1050, 1052, 1053,  
 1054, 1055  
 PICH TimeSlot Pulse (DRPS36), 1050, 1052,  
 1053, 1054, 1055  
 Playback Ratio, 1026  
 PN15, 1025, 1031, 1040, 1043, 1045, 1080, 1081,  
 1084, 1086, 1091, 1109, 1112, 1114  
 PN9, 1025, 1031, 1040, 1043, 1045, 1069, 1080,  
 1081, 1084, 1086, 1091, 1109, 1112, 1114,  
 1164, 1172
- wideband CDMA base band generator subsystem  
 keys and fields (*continued*)  
 Power, 1026, 1029, 1032, 1040, 1044, 1047, 1048  
 Power Control Signal Polarity Neg Pos, 1104  
 Power Hold Off On, 1101  
 Power Mode Norm TPC, 1104  
 Pp-m, 1120, 1136  
 PRACH, 1100  
 PRACH Mode Single Multi, 1117  
 PRACH Power Setup Mode Pp-m Total, 1124  
 PRACH Processing (RPS19), 1145, 1147, 1148,  
 1149, 1150  
 PRACH Scrambling Code, 1125  
 PRACH Trigger, 1129  
 PRACH Trigger Polarity Neg Pos, 1129  
 PRACH Trigger Source Immedi Trigger, 1129  
 Pre Sig, 1121  
 Preamble, 1107  
 Preamble power average, 1123  
 Preamble Pulse (RPS21), 1145, 1147, 1148, 1149,  
 1150  
 Preamble Raw Data (RPS15), 1145, 1147, 1148,  
 1149, 1150  
 Preamble Raw Data Clock (RPS16), 1145, 1147,  
 1148, 1149, 1150  
 PSCH State, 1048  
 Puncture, 1058, 1169, 1176  
 PwrOffs, 1057, 1154  
 RACH TrCH, 1107  
 Ramp Step, 1120, 1135  
 Rate Match Attr, 1073, 1169, 1176  
 Rectangle, 1037, 1097  
 Ref Data Rate, 1076, 1106  
 Ref Sensitivity, 1064  
 Reset to Initial Power, 1103  
 Right, 1026  
 RMC 144 kbps (25.141), 1137  
 RMC 384 kbps (25.141), 1137  
 RMC 64 kbps (25.141), 1137  
 RMC122 kbps (25.141), 1137  
 Root Nyquist, 1037, 1097  
 Scale to 0dB, 1043, 1100  
 SCFN, 1062, 1159  
 SCH slot-pulse (DRPS10), 1050, 1052, 1053,  
 1054, 1055

---

## Index

wideband CDMA base band generator subsystem  
  keys and fields (*continued*)  
  Scrambling Code, [1055](#), [1056](#), [1151](#)  
  SF/2, [1155](#)  
  SF2, [1058](#)  
  SFN reset-signal (DRPS5), [1050](#), [1052](#), [1053](#),  
    [1054](#), [1055](#)  
  SFN RST Polarity, [1151](#)  
  SFN-CFN Frame Offset, [1100](#)  
  Signature, [1136](#)  
  Slot Format, [1027](#), [1034](#), [1083](#), [1094](#), [1111](#), [1116](#)  
  Spurious Response, [1064](#)  
  SSCH 2nd Scramble Group, [1056](#)  
  SSCH Power, [1056](#)  
  SSCH State, [1057](#)  
  Start Access Slot Position in 80ms Period, [1122](#)  
  Start Sub-Channel#, [1126](#)  
  STD, [1080](#)  
  Step Power, [1103](#)  
  Sub Channel Timing (RPS17), [1145](#), [1147](#), [1148](#),  
    [1149](#), [1150](#)  
  Symbol Rate, [1083](#), [1092](#), [1111](#), [1115](#)  
  Sync Source SFN FCik ESG, [1152](#)  
  tDPCH Offset, [1035](#)  
  TFCI Pat, [1035](#)  
  TFCI Pattern, [1084](#), [1112](#)  
  TFCI State, [1085](#), [1113](#)  
  Tfirst, [1028](#)  
  TGCFN, [1058](#), [1154](#)  
  TGD, [1059](#), [1155](#)  
  Tgl, [1028](#)  
  TGL1, [1059](#), [1156](#)  
  TGL2, [1059](#), [1156](#)  
  TGPL1, [1060](#), [1156](#)  
  TGPL2, [1157](#)  
  TGPRC, [1157](#)  
  TGPS Inactive Active, [1158](#)  
  TGSN, [1061](#), [1158](#)  
  Timeslot Offset, [1125](#)  
  Timing Offset, [1126](#), [1151](#), [1161](#)  
  tOCNS Offset, [1042](#)  
  Total Bits, [1165](#)  
  Total Blocks, [1167](#)  
  TotalPwr, [1078](#), [1108](#)  
  TPC Pat Steps, [1085](#)

wideband CDMA base band generator subsystem  
  keys and fields (*continued*)  
  TPC Pat Trig Polarity Neg Pos, [1087](#)  
  TPC Pattern, [1087](#)  
  TPC Steps, [1036](#)  
  TPC UserFile Trig, [1088](#)  
  Tp-m, [1127](#)  
  Tp-p, [1128](#)  
  Transp Chan A, [1031](#)  
  Transp Chan B, [1031](#)  
  Transp Position Flexible Fixed, [1072](#)  
  Transport CH, [1043](#)  
  TrCH BER, [1093](#)  
  TrCh BlkSize 168, [1124](#)  
  TrCh BlkSize 360, [1124](#)  
  TrCH State Off On, [1074](#), [1177](#)  
  Trigger Sync Reply (RPS7), [1145](#), [1147](#), [1148](#),  
    [1149](#), [1150](#)  
  TTI, [1073](#), [1130](#), [1170](#), [1177](#)  
  TTI Frame Clock (RPS9), [1139](#)  
  Turbo, [1068](#), [1070](#), [1163](#)  
  UDI 64 kbps, [1137](#)  
  UDI ISDN (25.101), [1033](#)  
  UN3/4 GSM Gaussian, [1037](#)  
  Up/Down, [1036](#), [1086](#)  
  User File, [1031](#), [1036](#), [1043](#), [1045](#), [1069](#), [1080](#),  
    [1081](#), [1084](#), [1091](#), [1109](#), [1112](#), [1114](#), [1164](#),  
    [1172](#)  
  User FIR, [1037](#), [1097](#)  
  W-CDMA Off On, [1177](#)  
  Word Alignment softkey, [384](#)  
  Word Size softkey, [391](#)