

HIGH DOSE RADIATION TEST REPORT ADAR3000S-CSL

October 2021

Radiation Test Report

Product:	ADAR3000S
Gamma:	0, 30k
Gamma Source:	Co60
Dose Rate:	107 Rad/s
Facilities:	VPT RAD
Tested:	10/04/21

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SN	Supply Current 1.8V (mA)		Vout VREG_1 (V)	
	PRE	30k	PRE	30k
5	6.93	6.85	0.970	0.969
1	6.517	6.495	0.967	0.960
2	7.165	7.138	0.975	0.972
3	7.700	7.602	0.993	0.990
4	7.720	7.725	1.022	1.022
11	8.873	8.955	1.013	1.015
12	9.265	9.334	0.999	1.000
13	12.008	12.181	1.003	1.002
14	8.628	8.418	0.989	0.980
21	8.812	8.723	0.995	0.992
22	8.190	7.957	0.983	0.973
23	8.254	8.179	0.993	0.990
24	8.569	8.678	1.023	1.026
31	7.557	7.504	1.006	1.002
32	8.382	8.273	1.004	0.999
33	8.471	8.511	1.005	1.007
34	10.471	10.431	0.973	0.969
41	7.770	7.754	0.996	0.995
42	7.714	7.683	0.996	0.995
43	9.495	9.699	1.016	1.021
44	7.688	7.686	0.986	0.983
51	7.502	7.403	1.012	1.015
52	9.077	9.212	1.009	1.018
53	8.802	8.706	1.000	0.999
54	8.962	8.851	1.002	1.000
61	10.987	10.886	0.999	0.999
62	9.997	9.868	0.991	0.987
63	8.669	8.595	1.000	0.999
64	7.480	7.407	0.980	0.975
MIN	6.52	6.50	0.967	0.960
MAX	12.01	12.18	1.023	1.026
MEAN	8.60	8.57	0.998	0.996
STD DEV. (σ)	1.20	1.23	0.014	0.017
MEAN+3(σ)	12.19	12.26	1.039	1.047
MEAN-3(σ)	5.00	4.88	0.956	0.945

SN	Vout VREG_2 (V)		Supply Current 1.2V (mA)	
	PRE	30k	PRE	30k
5	0.998	0.997	134.872	134.418
1	1.009	1.012	129.330	129.782
2	0.980	0.980	130.136	130.429
3	0.996	0.997	137.414	137.667
4	0.973	0.971	133.633	133.657
11	1.010	1.015	145.426	145.876
12	1.000	1.000	138.742	139.619
13	0.995	0.990	149.766	149.849
14	0.994	0.994	146.406	146.825
21	0.976	0.973	139.632	140.161
22	0.970	0.960	141.441	141.619
23	0.979	0.976	143.322	143.927
24	1.005	1.005	141.341	141.887
31	1.020	1.029	131.103	131.837
32	0.995	0.995	133.279	130.554
33	0.979	0.969	132.616	132.886
34	0.997	0.999	139.907	140.487
41	1.017	1.022	139.785	139.890
42	1.038	1.046	140.727	141.499
43	1.008	1.009	141.860	142.313
44	1.007	1.009	138.490	139.255
51	0.988	0.993	133.472	133.784
52	1.003	1.002	135.118	135.738
53	1.019	1.024	134.666	134.785
54	1.005	1.002	134.303	134.007
61	1.011	1.012	155.142	156.191
62	0.980	0.968	142.109	142.422
63	1.003	1.003	143.587	144.347
64	1.003	1.002	133.704	134.132
MIN	0.970	0.960	129.330	129.782
MAX	1.038	1.046	155.142	156.191
MEAN	0.999	0.998	138.802	139.122
STD DEV. (σ)	0.016	0.020	6.084	6.313
MEAN+3(σ)	1.047	1.059	157.054	158.062
MEAN-3(σ)	0.950	0.938	120.550	120.183

SN	Supply Current 1.2V - sleep (mA)		ADC0 Max DNL (LSB)	
	PRE	30k	PRE	30k
5	2.714	2.629	1.569	1.573
1	2.475	2.491	1.569	1.604
2	2.541	2.554	1.549	1.576
3	2.588	2.592	1.598	1.585
4	2.525	2.532	1.608	1.618
11	2.733	2.748	1.587	1.588
12	2.712	2.726	1.565	1.592
13	3.091	3.101	1.605	1.602
14	2.699	2.709	1.585	1.592
21	2.751	2.766	1.612	1.612
22	2.705	2.718	1.552	1.597
23	2.738	2.747	1.622	1.592
24	2.677	2.694	1.588	1.586
31	2.530	2.544	1.589	1.585
32	3.338	2.574	1.579	1.592
33	2.613	2.624	1.595	1.606
34	2.833	2.857	1.581	1.557
41	2.599	2.609	1.605	1.602
42	2.613	2.624	1.602	1.598
43	2.729	2.746	1.594	1.608
44	2.634	2.653	1.548	1.582
51	2.484	2.478	1.580	1.588
52	2.650	2.653	1.604	1.605
53	2.676	2.675	1.605	1.612
54	2.710	2.712	1.604	1.606
61	2.927	2.931	1.562	1.598
62	2.877	2.889	1.595	1.582
63	2.685	2.689	1.583	1.618
64	2.609	2.619	1.552	1.582
MIN	2.475	2.478	1.548	1.557
MAX	3.338	3.101	1.622	1.618
MEAN	2.705	2.688	1.586	1.595
STD DEV. (σ)	0.183	0.137	0.021	0.014
MEAN+3(σ)	3.254	3.099	1.648	1.636
MEAN-3(σ)	2.157	2.276	1.525	1.554

SN	ADC0 Max INL (LSB)		ADC1 Max DNL (LSB)	
	PRE	30k	PRE	30k
5	1.663	1.641	1.579	1.583
1	1.627	1.660	1.576	1.605
2	1.629	1.658	1.585	1.551
3	1.646	1.647	1.608	1.595
4	1.653	1.670	1.618	1.592
11	1.646	1.670	1.624	1.597
12	1.657	1.631	1.602	1.601
13	1.650	1.673	1.616	1.612
14	1.644	1.658	1.621	1.602
21	1.638	1.662	1.622	1.619
22	1.642	1.648	1.554	1.602
23	1.665	1.658	1.602	1.625
24	1.667	1.673	1.595	1.597
31	1.646	1.644	1.598	1.621
32	1.652	1.658	1.588	1.603
33	1.661	1.675	1.632	1.612
34	1.649	1.640	1.555	1.589
41	1.678	1.645	1.613	1.639
42	1.673	1.678	1.611	1.638
43	1.658	1.653	1.604	1.579
44	1.632	1.649	1.581	1.587
51	1.658	1.667	1.614	1.634
52	1.661	1.650	1.614	1.616
53	1.678	1.666	1.616	1.625
54	1.633	1.654	1.614	1.614
61	1.644	1.639	1.608	1.605
62	1.664	1.668	1.605	1.592
63	1.658	1.656	1.593	1.628
64	1.638	1.649	1.587	1.555
MIN	1.638	1.649	1.587	1.555
MAX	1.664	1.668	1.605	1.628
MEAN	1.653	1.658	1.595	1.592
STD DEV. (σ)	0.014	0.010	0.009	0.037
MEAN+3(σ)	1.694	1.686	1.622	1.701
MEAN-3(σ)	1.612	1.629	1.568	1.482

SN	ADC1 Max INL (LSB)		DAC Offset Voltage (mV)	
	PRE	30k	PRE	30k
5	1.680	1.658	5.000	3.500
1	1.654	1.676	6.000	5.000
2	1.647	1.649	-0.500	-3.500
3	1.663	1.664	1.500	3.500
4	1.674	1.694	-0.500	3.500
11	1.664	1.663	2.000	-1.000
12	1.675	1.651	-1.000	1.000
13	1.668	1.666	3.000	4.500
14	1.662	1.676	-1.000	1.500
21	1.655	1.674	8.500	9.500
22	1.655	1.666	-0.500	3.500
23	1.676	1.671	5.500	4.500
24	1.678	1.663	3.500	0.500
31	1.666	1.662	2.500	0.000
32	1.673	1.648	6.500	5.500
33	1.679	1.690	2.500	3.500
34	1.640	1.657	1.500	2.500
41	1.662	1.667	0.500	1.000
42	1.694	1.671	-0.500	0.000
43	1.675	1.667	2.000	2.500
44	1.649	1.667	1.500	5.500
51	1.675	1.686	4.000	2.000
52	1.678	1.668	3.000	0.500
53	1.668	1.689	0.000	0.000
54	1.650	1.674	4.000	-1.000
61	1.660	1.678	2.500	3.500
62	1.681	1.686	3.000	4.500
63	1.648	1.673	9.000	7.000
64	1.660	1.644	7.500	8.000
MIN	1.640	1.644	-1.000	-3.500
MAX	1.694	1.694	9.000	9.500
MEAN	1.665	1.669	2.714	2.768
STD DEV. (σ)	0.013	0.013	2.853	2.930
MEAN+3(σ)	1.703	1.708	11.272	11.557
MEAN-3(σ)	1.627	1.631	-5.844	-6.021

SN	DAC Max Voltage (V)		DAC Max DNL (LSB)	
	PRE	30k	PRE	30k
5	1.775	1.775	0.591	0.518
1	1.737	1.724	0.463	0.550
2	1.750	1.749	0.604	0.532
3	1.776	1.774	0.586	0.554
4	1.776	1.773	0.589	0.500
11	1.774	1.770	0.563	0.703
12	1.770	1.768	0.554	0.516
13	1.770	1.766	0.645	0.609
14	1.772	1.770	0.548	0.629
21	1.775	1.771	0.571	0.611
22	1.759	1.737	0.603	0.500
23	1.774	1.776	0.515	0.554
24	1.773	1.771	0.675	0.500
31	1.774	1.773	0.500	0.544
32	1.770	1.772	0.514	0.592
33	1.774	1.773	0.586	0.510
34	1.753	1.750	0.530	0.500
41	1.776	1.773	0.540	0.577
42	1.778	1.773	0.607	0.537
43	1.771	1.768	0.735	0.519
44	1.750	1.750	0.500	0.500
51	1.776	1.778	0.532	0.465
52	1.773	1.770	0.544	0.499
53	1.774	1.773	0.536	0.538
54	1.771	1.768	0.475	0.478
61	1.770	1.768	0.500	0.542
62	1.768	1.763	0.500	0.527
63	1.773	1.773	0.464	0.799
64	1.770	1.757	0.710	0.463
MIN	1.737	1.724	0.463	0.463
MAX	1.778	1.778	0.735	0.799
MEAN	1.769	1.765	0.560	0.548
STD DEV. (σ)	0.010	0.013	0.069	0.072
MEAN+3(σ)	1.798	1.803	0.768	0.765
MEAN-3(σ)	1.739	1.728	0.353	0.331

SN	DAC Max INL (LSB)		Delay Error 19.7GHz VAP0 (ps)	
	PRE	30k	PRE	30k
5	0.434	0.450	1.132	1.455
1	0.500	0.495	1.018	1.526
2	0.829	1.029	1.038	1.484
3	0.403	0.512	1.098	1.427
4	3.527	3.481	1.144	1.488
11	2.218	2.475	1.221	1.552
12	0.416	0.530	1.104	1.449
13	2.047	2.033	1.086	1.417
14	0.599	0.411	1.190	1.569
21	2.026	1.776	1.201	1.525
22	0.429	0.442	1.186	1.447
23	0.407	0.658	1.221	1.503
24	1.858	2.216	1.232	1.518
31	0.944	0.472	1.165	1.555
32	0.358	0.519	1.127	1.532
33	0.449	0.538	1.136	1.556
34	0.439	0.472	1.162	1.536
41	1.247	0.816	1.117	1.487
42	1.277	1.383	1.187	1.518
43	3.256	3.933	1.206	1.531
44	0.552	0.637	1.160	1.524
51	1.657	1.972	1.121	1.523
52	0.544	1.806	1.153	1.498
53	1.424	0.913	1.197	1.528
54	0.739	0.578	1.295	1.567
61	1.515	1.551	1.169	1.618
62	0.489	0.660	1.237	1.552
63	0.985	0.610	1.206	1.547
64	0.530	0.434	1.076	1.481
MIN	0.358	0.411	1.018	1.417
MAX	3.527	3.933	1.295	1.618
MEAN	1.131	1.191	1.159	1.516
STD DEV. (σ)	0.865	0.953	0.063	0.045
MEAN+3(σ)	3.725	4.051	1.347	1.652
MEAN-3(σ)	-1.463	-1.669	0.971	1.381

SN	Delay Error 19.7GHz VAP1 (ps)		Delay Error 19.7GHz VAP2 (ps)	
	PRE	30k	PRE	30k
5	1.031	1.257	1.028	1.307
1	0.982	1.190	1.042	1.211
2	1.049	1.197	1.019	1.246
3	0.968	1.217	1.057	1.273
4	0.951	1.194	1.007	1.225
11	0.963	1.205	1.094	1.184
12	1.011	1.161	1.028	1.204
13	0.877	1.089	0.910	1.107
14	1.020	1.203	1.011	1.254
21	0.877	1.093	0.909	1.031
22	0.913	1.069	0.903	1.065
23	0.984	1.119	0.988	1.168
24	1.039	1.219	1.020	1.155
31	1.086	1.249	1.081	1.209
32	1.095	1.257	1.035	1.255
33	1.089	1.265	1.070	1.257
34	0.991	1.208	1.048	1.207
41	1.075	1.254	1.030	1.254
42	1.024	1.251	1.033	1.258
43	1.021	1.282	1.037	1.237
44	1.083	1.238	1.064	1.262
51	1.025	1.248	1.069	1.236
52	1.069	1.283	1.118	1.302
53	1.084	1.272	1.093	1.322
54	1.041	1.202	0.961	1.255
61	0.988	1.246	1.076	1.211
62	1.037	1.215	1.044	1.211
63	1.078	1.268	1.061	1.287
64	1.056	1.235	1.104	1.273
MIN	0.877	1.069	0.903	1.031
MAX	1.095	1.283	1.118	1.322
MEAN	1.017	1.212	1.033	1.220
STD DEV. (σ)	0.062	0.058	0.056	0.066
MEAN+3(σ)	1.202	1.387	1.201	1.419
MEAN-3(σ)	0.832	1.036	0.864	1.021

SN	Delay Error 19.7GHz VAP3 (ps)		Delay Error 19.7GHz VAP4 (ps)	
	PRE	30k	PRE	30k
5	1.021	1.254	1.063	1.257
1	0.947	1.213	0.936	1.209
2	1.061	1.243	0.977	1.169
3	0.961	1.186	0.996	1.169
4	0.999	1.204	1.012	1.234
11	1.005	1.210	1.007	1.197
12	1.010	1.280	0.986	1.279
13	0.824	1.094	0.980	1.159
14	1.040	1.205	1.022	1.182
21	0.896	1.107	0.914	1.095
22	0.848	1.094	0.940	1.135
23	0.973	1.183	1.031	1.223
24	1.061	1.209	0.961	1.238
31	1.017	1.283	1.014	1.248
32	1.060	1.271	1.007	1.225
33	0.987	1.275	1.014	1.197
34	1.031	1.190	0.997	1.221
41	0.978	1.275	1.007	1.205
42	1.021	1.261	1.054	1.209
43	1.021	1.200	1.035	1.229
44	1.053	1.287	1.039	1.259
51	1.064	1.261	1.001	1.155
52	1.086	1.240	1.039	1.262
53	1.088	1.295	1.067	1.272
54	1.000	1.248	1.010	1.268
61	1.071	1.230	1.116	1.227
62	1.037	1.179	0.984	1.256
63	1.074	1.310	1.064	1.251
64	1.062	1.257	1.056	1.219
MIN	0.824	1.094	0.914	1.095
MAX	1.088	1.310	1.116	1.279
MEAN	1.010	1.225	1.010	1.214
STD DEV. (σ)	0.067	0.058	0.043	0.044
MEAN+3(σ)	1.210	1.399	1.139	1.347
MEAN-3(σ)	0.809	1.050	0.880	1.081

SN	Delay Error 19.7GHz VAP5 (ps)		Delay Error 19.7GHz VAP6 (ps)	
	PRE	30k	PRE	30k
5	0.996	1.209	1.026	1.253
1	1.000	1.232	0.986	1.226
2	0.980	1.179	1.018	1.198
3	0.959	1.241	0.977	1.165
4	1.015	1.197	1.053	1.226
11	1.018	1.206	1.018	1.253
12	1.047	1.164	1.002	1.222
13	0.944	1.164	0.921	1.106
14	1.014	1.275	0.958	1.219
21	0.963	1.138	0.897	1.084
22	0.956	1.129	0.903	1.154
23	1.010	1.175	0.998	1.174
24	0.999	1.218	1.025	1.208
31	1.027	1.243	1.072	1.200
32	1.017	1.215	1.037	1.244
33	1.069	1.219	1.061	1.231
34	1.085	1.189	1.016	1.225
41	1.066	1.252	1.041	1.170
42	1.015	1.196	1.080	1.203
43	1.040	1.273	1.057	1.231
44	0.982	1.223	1.083	1.252
51	1.018	1.249	1.037	1.215
52	1.063	1.216	1.153	1.206
53	1.055	1.234	1.055	1.240
54	1.028	1.167	1.118	1.295
61	1.061	1.223	1.034	1.217
62	1.056	1.251	1.046	1.232
63	1.053	1.257	1.063	1.294
64	1.081	1.214	1.089	1.225
MIN	0.944	1.129	0.897	1.084
MAX	1.085	1.275	1.153	1.295
MEAN	1.022	1.212	1.029	1.211
STD DEV. (σ)	0.039	0.038	0.060	0.046
MEAN+3(σ)	1.140	1.327	1.207	1.350
MEAN-3(σ)	0.904	1.097	0.850	1.073

SN	Delay Error 19.7GHz VAP7 (ps)		Delay Error 19.7GHz VAP8 (ps)	
	PRE	30k	PRE	30k
5	1.015	1.215	1.045	1.264
1	0.948	1.179	0.959	1.233
2	0.977	1.166	1.006	1.219
3	0.998	1.221	1.020	1.275
4	1.018	1.257	0.980	1.241
11	0.982	1.171	0.975	1.171
12	0.963	1.207	1.046	1.239
13	0.964	1.119	0.947	1.170
14	1.010	1.207	1.065	1.244
21	0.908	1.099	0.882	1.099
22	0.929	1.117	1.030	1.131
23	1.038	1.208	1.018	1.196
24	0.988	1.251	1.051	1.202
31	1.064	1.251	1.095	1.228
32	1.104	1.161	1.070	1.257
33	1.031	1.222	1.028	1.203
34	1.028	1.291	1.017	1.245
41	1.050	1.279	1.013	1.241
42	1.028	1.207	1.029	1.192
43	1.035	1.203	1.057	1.298
44	1.060	1.288	1.045	1.266
51	1.038	1.244	1.034	1.271
52	1.051	1.198	1.012	1.276
53	1.044	1.285	1.073	1.248
54	1.109	1.219	1.061	1.212
61	1.019	1.248	1.051	1.277
62	1.103	1.264	1.040	1.224
63	0.994	1.283	1.066	1.259
64	1.083	1.222	1.083	1.223
MIN	0.908	1.099	0.882	1.099
MAX	1.109	1.291	1.095	1.298
MEAN	1.020	1.217	1.027	1.226
STD DEV. (σ)	0.051	0.053	0.046	0.045
MEAN+3(σ)	1.174	1.375	1.165	1.362
MEAN-3(σ)	0.866	1.059	0.889	1.091

SN	Delay Error 19.7GHz VAP9 (ps)		Delay Error 19.7GHz VAP10 (ps)	
	PRE	30k	PRE	30k
5	0.996	1.290	1.057	1.280
1	0.988	1.255	1.001	1.257
2	1.028	1.195	1.042	1.240
3	1.007	1.200	1.060	1.242
4	0.966	1.175	0.989	1.265
11	0.977	1.218	1.015	1.168
12	1.012	1.189	0.997	1.241
13	0.862	1.056	0.900	1.058
14	0.989	1.189	0.993	1.166
21	0.943	1.104	0.937	1.029
22	0.970	1.156	0.957	1.097
23	1.042	1.146	0.979	1.171
24	1.020	1.201	1.015	1.225
31	1.053	1.252	1.124	1.251
32	1.028	1.219	0.983	1.195
33	1.009	1.181	1.092	1.319
34	1.007	1.193	1.081	1.265
41	1.053	1.161	1.093	1.266
42	1.056	1.198	1.036	1.316
43	1.038	1.286	1.059	1.205
44	1.043	1.219	1.085	1.256
51	1.092	1.249	1.054	1.305
52	1.044	1.232	1.115	1.264
53	1.043	1.292	1.031	1.269
54	1.025	1.194	1.065	1.244
61	1.018	1.252	1.079	1.170
62	1.023	1.236	1.027	1.250
63	1.053	1.224	1.046	1.287
64	1.046	1.262	1.065	1.245
MIN	0.862	1.056	0.900	1.029
MAX	1.092	1.292	1.124	1.319
MEAN	1.016	1.205	1.033	1.224
STD DEV. (σ)	0.044	0.051	0.054	0.071
MEAN+3(σ)	1.149	1.359	1.194	1.438
MEAN-3(σ)	0.882	1.050	0.872	1.010

SN	Delay Error 19.7GHz VAP13 (ps)		Delay Error 19.7GHz VAP14 (ps)	
	PRE	30k	PRE	30k
5	0.956	1.246	1.014	1.287
1	0.961	1.208	0.974	1.216
2	0.994	1.182	1.008	1.223
3	0.940	1.256	1.019	1.286
4	1.021	1.241	1.005	1.225
11	0.965	1.154	0.901	1.157
12	1.006	1.291	1.040	1.227
13	0.869	1.067	0.900	1.069
14	0.963	1.156	0.946	1.187
21	0.824	1.057	0.826	1.027
22	0.860	1.106	0.851	1.128
23	0.945	1.171	0.940	1.109
24	1.043	1.209	1.037	1.137
31	1.057	1.196	1.083	1.223
32	1.062	1.200	1.020	1.261
33	1.013	1.222	1.064	1.219
34	1.041	1.282	0.968	1.193
41	1.012	1.296	1.003	1.267
42	1.058	1.238	1.044	1.189
43	1.039	1.242	0.990	1.166
44	1.067	1.239	1.044	1.233
51	1.062	1.257	1.095	1.249
52	1.031	1.266	1.012	1.254
53	1.075	1.254	1.032	1.240
54	1.051	1.249	1.071	1.243
61	1.017	1.194	0.963	1.203
62	1.016	1.225	1.037	1.183
63	1.071	1.256	1.084	1.290
64	1.100	1.263	1.112	1.235
MIN	0.824	1.057	0.826	1.027
MAX	1.100	1.296	1.112	1.290
MEAN	1.006	1.213	1.002	1.201
STD DEV. (σ)	0.069	0.062	0.071	0.063
MEAN+3(σ)	1.212	1.398	1.216	1.389
MEAN-3(σ)	0.800	1.029	0.789	1.013

SN	Delay Error 19.7GHz VAP15 (ps)		Attenuation Error 19.7GHz VAP0 (dB)	
	PRE	30k	PRE	30k
5	1.006	1.294	0.854	1.084
1	0.947	1.212	0.741	0.993
2	0.992	1.236	0.758	0.990
3	0.991	1.233	0.781	0.968
4	1.006	1.250	0.788	0.951
11	0.983	1.169	0.831	0.883
12	1.019	1.230	0.822	0.938
13	0.911	1.042	0.620	0.569
14	0.980	1.173	0.836	0.918
21	0.854	1.065	0.818	0.761
22	0.866	1.098	0.831	0.805
23	0.997	1.158	0.871	0.936
24	0.959	1.197	0.883	0.939
31	0.989	1.212	0.969	1.146
32	1.055	1.211	0.935	1.087
33	0.986	1.201	0.883	1.061
34	1.028	1.215	0.772	0.872
41	0.988	1.235	0.893	1.080
42	1.024	1.238	0.912	1.043
43	1.022	1.234	0.862	0.883
44	1.056	1.265	0.906	0.985
51	1.066	1.272	0.979	1.287
52	1.056	1.234	0.921	1.169
53	1.067	1.261	0.921	1.132
54	1.008	1.219	0.868	0.956
61	1.090	1.218	0.830	0.933
62	1.041	1.201	0.792	0.806
63	1.059	1.233	0.965	1.062
64	1.040	1.257	0.959	1.134
MIN	0.854	1.042	0.620	0.569
MAX	1.090	1.272	0.979	1.287
MEAN	1.003	1.206	0.855	0.975
STD DEV. (σ)	0.057	0.056	0.081	0.145
MEAN+3(σ)	1.174	1.375	1.099	1.408
MEAN-3(σ)	0.832	1.037	0.611	0.541

SN	Attenuation Error 19.7GHz VAP1 (dB)		Attenuation Error 19.7GHz VAP2 (dB)	
	PRE	30k	PRE	30k
5	0.919	1.181	0.925	1.137
1	0.831	1.069	0.830	1.023
2	0.884	1.068	0.834	1.047
3	0.863	1.025	0.849	0.975
4	0.863	1.058	0.866	1.035
11	0.905	1.021	0.885	0.936
12	0.888	1.106	0.837	1.012
13	0.739	0.696	0.742	0.670
14	0.897	1.014	0.861	1.022
21	0.857	0.850	0.870	0.831
22	0.920	0.902	0.925	0.893
23	0.961	1.008	0.910	0.993
24	0.941	1.035	0.962	0.962
31	1.028	1.268	1.002	1.171
32	0.999	1.244	0.957	1.185
33	0.935	1.157	0.929	1.123
34	0.819	0.947	0.868	0.988
41	0.924	1.146	0.976	1.112
42	0.969	1.147	0.970	1.107
43	0.956	0.991	0.938	0.964
44	0.996	1.167	0.949	1.098
51	1.023	1.352	1.014	1.325
52	0.971	1.226	1.003	1.177
53	1.000	1.263	1.000	1.154
54	0.929	1.087	0.921	1.060
61	0.923	1.066	0.932	1.061
62	0.889	0.959	0.897	0.923
63	0.990	1.156	0.998	1.152
64	1.010	1.289	1.046	1.297
MIN	0.739	0.696	0.742	0.670
MAX	1.028	1.352	1.046	1.325
MEAN	0.925	1.083	0.920	1.046
STD DEV. (σ)	0.069	0.143	0.070	0.136
MEAN+3(σ)	1.131	1.513	1.131	1.454
MEAN-3(σ)	0.720	0.653	0.709	0.639

SN	Attenuation Error 19.7GHz VAP3 (dB)		Attenuation Error 19.7GHz VAP4 (dB)	
	PRE	30k	PRE	30k
5	0.826	1.023	0.850	1.124
1	0.745	0.972	0.722	1.053
2	0.699	0.952	0.810	1.094
3	0.780	0.911	0.798	0.971
4	0.820	0.993	0.821	0.995
11	0.791	0.845	0.849	0.997
12	0.778	0.958	0.858	1.098
13	0.656	0.611	0.757	0.749
14	0.810	0.934	0.862	1.011
21	0.802	0.781	0.820	0.828
22	0.816	0.778	0.786	0.799
23	0.835	0.874	0.819	0.903
24	0.847	0.932	0.927	0.970
31	0.920	1.088	0.936	1.223
32	0.909	1.097	0.907	1.175
33	0.833	1.045	0.906	1.157
34	0.775	0.864	0.809	0.954
41	0.839	1.019	0.911	1.156
42	0.917	1.011	0.935	1.128
43	0.831	0.837	0.927	0.992
44	0.895	0.972	0.934	1.041
51	0.942	1.174	0.962	1.280
52	0.889	1.108	0.961	1.207
53	0.895	1.077	0.957	1.210
54	0.870	1.015	0.926	1.106
61	0.888	0.951	0.862	0.995
62	0.812	0.837	0.853	0.922
63	0.893	1.064	0.971	1.145
64	0.912	1.127	1.011	1.225
MIN	0.656	0.611	0.722	0.749
MAX	0.942	1.174	1.011	1.280
MEAN	0.836	0.958	0.878	1.049
STD DEV. (σ)	0.069	0.125	0.072	0.136
MEAN+3(σ)	1.042	1.334	1.096	1.458
MEAN-3(σ)	0.629	0.582	0.661	0.641

SN	Attenuation Error 19.7GHz VAP5 (dB)		Attenuation Error 19.7GHz VAP6 (dB)	
	PRE	30k	PRE	30k
5	0.958	1.232	0.971	1.202
1	0.859	1.157	0.867	1.106
2	0.942	1.218	0.903	1.182
3	0.921	1.138	0.918	1.102
4	0.957	1.157	0.951	1.139
11	0.972	1.139	0.973	1.062
12	1.002	1.197	0.955	1.199
13	0.893	0.893	0.852	0.848
14	0.945	1.119	0.938	1.126
21	0.914	0.937	0.921	0.950
22	0.906	0.903	0.901	0.892
23	0.963	1.021	0.935	0.982
24	1.019	1.102	1.006	1.095
31	1.070	1.300	1.053	1.269
32	1.020	1.334	1.020	1.225
33	1.054	1.320	0.964	1.239
34	0.928	1.117	0.945	1.061
41	1.036	1.269	1.044	1.238
42	1.070	1.267	1.045	1.233
43	1.036	1.159	1.083	1.182
44	1.030	1.203	1.061	1.212
51	1.071	1.450	1.037	1.422
52	1.026	1.376	1.047	1.303
53	1.072	1.373	1.056	1.283
54	1.031	1.253	1.022	1.225
61	0.968	1.137	0.993	1.120
62	0.992	1.062	0.994	1.024
63	1.025	1.272	1.044	1.250
64	1.091	1.381	1.111	1.354
MIN	0.859	0.893	0.852	0.848
MAX	1.091	1.450	1.111	1.422
MEAN	0.993	1.188	0.987	1.154
STD DEV. (σ)	0.063	0.143	0.068	0.135
MEAN+3(σ)	1.182	1.618	1.190	1.558
MEAN-3(σ)	0.805	0.758	0.784	0.751

SN	Attenuation Error 19.7GHz VAP7 (dB)		Attenuation Error 19.7GHz VAP8 (dB)	
	PRE	30k	PRE	30k
5	0.879	1.109	0.859	1.064
1	0.782	1.052	0.765	1.018
2	0.830	1.113	0.835	1.106
3	0.845	1.065	0.793	0.986
4	0.916	1.118	0.813	0.983
11	0.853	0.927	0.894	0.994
12	0.907	1.110	0.845	1.073
13	0.801	0.793	0.837	0.775
14	0.882	1.025	0.891	1.026
21	0.838	0.835	0.808	0.825
22	0.873	0.823	0.844	0.835
23	0.870	0.943	0.859	0.882
24	0.924	0.998	0.852	0.937
31	1.002	1.216	0.941	1.160
32	0.937	1.177	0.945	1.157
33	0.937	1.160	0.925	1.147
34	0.881	1.019	0.864	0.946
41	0.956	1.161	0.933	1.096
42	0.946	1.093	0.939	1.122
43	0.945	1.055	0.941	1.026
44	0.965	1.109	0.927	1.033
51	0.968	1.325	0.940	1.264
52	0.998	1.270	0.985	1.279
53	1.012	1.256	0.907	1.196
54	0.987	1.169	0.961	1.100
61	0.928	1.071	0.893	1.016
62	0.888	0.954	0.888	0.966
63	1.023	1.220	0.967	1.177
64	1.009	1.219	0.994	1.228
MIN	0.782	0.793	0.765	0.775
MAX	1.023	1.325	0.994	1.279
MEAN	0.918	1.081	0.892	1.048
STD DEV. (σ)	0.066	0.136	0.061	0.131
MEAN+3(σ)	1.117	1.490	1.074	1.440
MEAN-3(σ)	0.719	0.673	0.710	0.657

SN	Attenuation Error 19.7GHz VAP9 (dB)		Attenuation Error 19.7GHz VAP10 (dB)	
	PRE	30k	PRE	30k
5	0.986	1.215	0.955	1.158
1	0.928	1.185	0.919	1.135
2	0.960	1.245	0.921	1.125
3	0.913	1.140	0.888	1.127
4	0.944	1.173	0.922	1.041
11	1.036	1.158	0.953	1.067
12	1.001	1.260	0.976	1.160
13	0.910	0.946	0.930	0.878
14	1.025	1.146	0.968	1.081
21	0.946	0.962	0.897	0.899
22	0.941	0.975	0.938	0.917
23	1.012	1.049	0.936	1.008
24	0.978	1.095	0.943	1.043
31	1.105	1.340	1.014	1.259
32	1.052	1.341	1.010	1.199
33	1.062	1.266	1.026	1.182
34	0.961	1.159	0.951	1.089
41	1.045	1.288	1.025	1.225
42	1.036	1.292	1.042	1.201
43	1.070	1.190	1.048	1.136
44	1.061	1.187	0.994	1.163
51	1.049	1.399	1.016	1.318
52	1.095	1.402	1.003	1.296
53	1.075	1.368	1.013	1.256
54	1.068	1.289	1.044	1.212
61	0.990	1.155	0.977	1.126
62	1.004	1.098	0.978	1.068
63	1.049	1.338	1.046	1.235
64	1.086	1.419	1.061	1.305
MIN	0.910	0.946	0.888	0.878
MAX	1.105	1.419	1.061	1.318
MEAN	1.014	1.209	0.980	1.134
STD DEV. (σ)	0.058	0.133	0.050	0.117
MEAN+3(σ)	1.189	1.608	1.131	1.486
MEAN-3(σ)	0.840	0.811	0.829	0.782

SN	Attenuation Error 19.7GHz VAP11 (dB)		Attenuation Error 19.7GHz VAP12 (dB)	
	PRE	30k	PRE	30k
5	0.871	1.061	0.809	1.028
1	0.809	1.060	0.727	0.856
2	0.842	1.111	0.719	0.947
3	0.817	0.998	0.690	0.844
4	0.885	1.027	0.782	0.924
11	0.891	1.007	0.824	0.919
12	0.909	1.066	0.758	0.970
13	0.842	0.832	0.715	0.695
14	0.896	1.032	0.808	0.922
21	0.851	0.813	0.775	0.727
22	0.878	0.863	0.766	0.740
23	0.898	0.905	0.818	0.848
24	0.897	0.934	0.832	0.917
31	0.962	1.179	0.889	1.061
32	0.949	1.108	0.813	1.013
33	0.984	1.180	0.858	0.990
34	0.871	1.008	0.776	0.877
41	0.973	1.119	0.891	1.029
42	0.962	1.137	0.859	0.987
43	1.000	1.049	0.909	0.905
44	0.924	1.063	0.886	1.009
51	0.953	1.185	0.920	1.200
52	0.985	1.233	0.911	1.156
53	0.982	1.147	0.909	1.042
54	1.031	1.113	0.872	0.965
61	0.918	1.031	0.804	0.903
62	0.911	1.006	0.825	0.843
63	0.974	1.221	0.898	1.063
64	0.999	1.234	0.874	1.120
MIN	0.809	0.813	0.690	0.695
MAX	1.031	1.234	0.920	1.200
MEAN	0.921	1.059	0.825	0.945
STD DEV. (σ)	0.060	0.116	0.067	0.121
MEAN+3(σ)	1.100	1.407	1.027	1.310
MEAN-3(σ)	0.742	0.712	0.624	0.581

SN	Attenuation Error 19.7GHz VAP13 (dB)		Attenuation Error 19.7GHz VAP14 (dB)	
	PRE	30k	PRE	30k
5	0.947	1.197	0.913	1.122
1	0.848	1.072	0.809	0.961
2	0.882	1.098	0.840	1.010
3	0.847	0.994	0.807	0.972
4	0.894	1.096	0.879	1.029
11	0.957	1.059	0.891	0.941
12	0.903	1.103	0.882	0.993
13	0.836	0.824	0.824	0.830
14	0.910	1.055	0.889	1.004
21	0.879	0.860	0.883	0.822
22	0.887	0.856	0.876	0.787
23	0.938	1.003	0.896	0.912
24	0.968	1.050	0.960	0.985
31	0.998	1.219	0.975	1.123
32	0.933	1.171	0.942	1.099
33	0.970	1.135	0.935	1.101
34	0.895	0.996	0.894	0.987
41	0.990	1.207	0.971	1.147
42	0.998	1.197	0.977	1.103
43	0.999	1.076	0.969	1.042
44	1.012	1.153	0.926	1.077
51	1.034	1.395	1.005	1.291
52	1.049	1.364	1.001	1.237
53	1.048	1.267	1.013	1.136
54	1.018	1.163	0.996	1.099
61	0.931	1.063	0.931	1.052
62	0.949	1.030	0.948	0.968
63	1.016	1.215	0.996	1.142
64	1.035	1.290	0.986	1.169
MIN	0.836	0.824	0.807	0.787
MAX	1.049	1.395	1.013	1.291
MEAN	0.951	1.108	0.925	1.036
STD DEV. (σ)	0.065	0.139	0.062	0.119
MEAN+3(σ)	1.146	1.523	1.110	1.393
MEAN-3(σ)	0.756	0.692	0.740	0.680

SN	Attenuation Error 19.7GHz VAP15 (dB)		OP1dB Match F2 (dB)	
	PRE	30k	PRE	30k
5	0.859	1.047	1.082	0.720
1	0.714	0.929	0.957	0.612
2	0.765	0.956	1.386	0.539
3	0.730	0.939	1.065	0.787
4	0.803	0.977	1.021	0.913
11	0.850	0.896	1.041	0.892
12	0.782	0.928	0.761	0.477
13	0.775	0.705	1.231	1.888
14	0.823	0.922	0.618	0.654
21	0.768	0.726	0.767	0.938
22	0.822	0.736	0.773	1.073
23	0.871	0.886	0.793	0.775
24	0.856	0.895	0.842	0.903
31	0.945	1.060	0.495	0.545
32	0.878	0.999	1.041	0.803
33	0.916	1.028	1.071	0.574
34	0.824	0.885	0.927	0.998
41	0.917	1.054	0.773	0.603
42	0.897	0.998	0.793	0.683
43	0.905	0.924	1.118	0.857
44	0.913	0.965	0.908	0.589
51	0.909	1.194	1.274	0.716
52	0.924	1.162	0.582	0.792
53	0.924	1.039	0.935	0.986
54	0.907	1.015	1.056	1.152
61	0.858	0.948	0.671	0.609
62	0.876	0.888	0.808	0.939
63	0.932	1.028	0.793	0.590
64	0.909	1.115	0.703	0.872
MIN	0.714	0.705	0.495	0.477
MAX	0.945	1.194	1.386	1.888
MEAN	0.857	0.957	0.900	0.813
STD DEV. (σ)	0.066	0.115	0.213	0.276
MEAN+3(σ)	1.054	1.303	1.539	1.642
MEAN-3(σ)	0.659	0.611	0.261	-0.016

Gain Match F2 (dB)		
SN	PRE	30k
5	0.698	0.964
1	0.612	0.898
2	0.919	1.180
3	0.801	0.902
4	0.744	0.838
11	0.694	0.757
12	0.623	0.739
13	1.438	1.317
14	0.626	0.840
21	0.587	0.779
22	0.788	0.901
23	0.736	0.764
24	0.795	1.036
31	0.488	0.741
32	0.511	0.958
33	0.749	1.112
34	0.730	1.025
41	0.672	0.864
42	0.531	0.786
43	0.735	0.961
44	0.636	0.918
51	0.540	0.943
52	0.535	0.703
53	0.772	1.157
54	0.908	1.136
61	0.681	0.905
62	0.767	1.029
63	0.591	0.819
64	0.479	0.626
MIN	0.479	0.626
MAX	1.438	1.317
MEAN	0.703	0.916
STD DEV. (σ)	0.187	0.163
MEAN+3(σ)	1.263	1.405
MEAN-3(σ)	0.143	0.426











