

HIGH DOSE RADIATION TEST REPORT ADAR3001S-CSL

October 2021

Radiation Test Report

Product:	ADAR3001S
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
65	7.55	7.33	0.954	0.954
2	7.953	8.069	1.003	1.006
3	8.921	8.914	0.990	0.988
8	8.652	8.550	0.995	0.994
12	9.220	9.194	0.999	0.999
15	8.096	8.013	0.982	0.982
21	10.374	10.398	0.984	0.986
24	9.618	9.667	1.007	1.010
32	11.265	11.359	1.015	1.019
33	9.632	9.572	0.998	0.997
35	11.425	11.291	0.965	0.963
38	10.421	10.145	0.983	0.982
45	10.036	10.073	1.014	1.018
46	11.133	11.056	1.009	1.011
51	8.241	8.153	0.968	0.968
52	9.529	9.517	0.995	0.998
53	8.819	8.664	1.001	0.997
54	10.325	9.981	0.985	0.977
61	9.193	9.240	1.011	1.015
62	9.404	9.333	1.008	1.009
MIN	7.95	8.01	0.965	0.963
MAX	11.43	11.36	1.015	1.019
MEAN	9.59	9.54	0.995	0.996
STD DEV. (σ)	1.04	1.03	0.015	0.016
MEAN+3(σ)	12.72	12.63	1.039	1.045
MEAN-3(σ)	6.46	6.45	0.952	0.946

SN	Vout VREG_2 (V)		Supply Current 1.2V (mA)	
	PRE	30k	PRE	30k
65	1.030	1.030	110.064	109.788
2	1.010	1.016	113.655	113.691
3	1.004	1.007	122.108	122.119
8	1.005	1.005	120.273	120.172
12	0.993	0.991	119.325	119.792
15	0.999	0.999	114.433	114.420
21	1.008	1.008	117.533	117.870
24	0.975	0.964	115.833	115.822
32	0.992	0.995	118.506	119.066
33	1.002	1.012	118.686	119.241
35	1.001	1.010	128.176	128.844
38	0.998	0.998	121.162	120.957
45	1.017	1.020	114.027	114.172
46	1.016	1.019	115.691	115.496
51	1.009	1.008	115.270	115.848
52	1.012	1.017	112.044	112.270
53	1.002	0.998	117.356	117.741
54	1.004	1.004	114.097	114.154
61	0.994	0.991	114.680	114.547
62	0.995	0.994	115.915	116.353
MIN	0.975	0.964	112.044	112.270
MAX	1.017	1.020	128.176	128.844
MEAN	1.002	1.003	117.304	117.504
STD DEV. (σ)	0.010	0.013	3.804	3.896
MEAN+3(σ)	1.031	1.043	128.715	129.193
MEAN-3(σ)	0.972	0.963	105.892	105.815

SN	Supply Current 1.2V - sleep (mA)		ADC0 Max DNL (LSB)	
	PRE	30k	PRE	30k
65	2.685	2.669	1.598	1.570
2	2.696	2.710	1.593	1.602
3	2.806	2.820	1.566	1.576
8	2.787	2.781	1.565	1.592
12	2.785	2.798	1.569	1.592
15	2.647	2.642	1.581	1.608
21	2.838	2.849	1.611	1.604
24	2.745	2.753	1.631	1.578
32	2.889	2.897	1.593	1.604
33	2.880	2.887	1.614	1.589
35	3.166	3.172	1.571	1.573
38	3.030	3.010	1.596	1.595
45	2.717	2.720	1.601	1.585
46	2.886	2.886	1.621	1.590
51	2.681	2.684	1.594	1.595
52	2.756	2.759	1.569	1.619
53	2.689	2.694	1.562	1.591
54	2.827	2.830	1.585	1.562
61	2.718	2.722	1.565	1.571
62	2.752	2.755	1.588	1.598
MIN	2.647	2.642	1.562	1.562
MAX	3.166	3.172	1.631	1.619
MEAN	2.805	2.809	1.588	1.591
STD DEV. (σ)	0.127	0.126	0.021	0.014
MEAN+3(σ)	3.187	3.187	1.650	1.633
MEAN-3(σ)	2.423	2.431	1.526	1.548

SN	ADC0 Max INL (LSB)		ADC1 Max DNL (LSB)	
	PRE	30k	PRE	30k
65	1.641	1.620	1.603	1.603
2	1.657	1.666	1.595	1.611
3	1.657	1.674	1.602	1.612
8	1.657	1.658	1.575	1.599
12	1.663	1.658	1.579	1.601
15	1.638	1.639	1.614	1.618
21	1.645	1.633	1.585	1.614
24	1.655	1.677	1.641	1.612
32	1.657	1.675	1.595	1.611
33	1.650	1.646	1.624	1.597
35	1.639	1.648	1.573	1.605
38	1.657	1.661	1.605	1.605
45	1.648	1.661	1.611	1.595
46	1.658	1.651	1.594	1.624
51	1.644	1.664	1.569	1.599
52	1.663	1.677	1.605	1.621
53	1.644	1.655	1.605	1.628
54	1.647	1.659	1.599	1.567
61	1.650	1.637	1.571	1.581
62	1.667	1.660	1.625	1.632
MIN	1.638	1.633	1.569	1.567
MAX	1.667	1.677	1.641	1.632
MEAN	1.652	1.658	1.598	1.607
STD DEV. (σ)	0.008	0.013	0.020	0.016
MEAN+3(σ)	1.677	1.697	1.658	1.654
MEAN-3(σ)	1.628	1.618	1.539	1.560

SN	ADC1 Max INL (LSB)		DAC Offset Voltage (mV)	
	PRE	30k	PRE	30k
65	1.659	1.659	2.500	-3.000
2	1.678	1.687	0.000	4.000
3	1.676	1.693	3.500	6.000
8	1.674	1.670	5.000	6.000
12	1.680	1.679	0.000	-2.500
15	1.650	1.656	3.500	7.000
21	1.664	1.650	2.500	2.500
24	1.676	1.690	1.000	-1.500
32	1.678	1.687	0.500	3.000
33	1.668	1.666	1.500	2.000
35	1.652	1.664	-1.000	-2.000
38	1.678	1.678	5.000	6.000
45	1.665	1.678	5.500	7.500
46	1.682	1.664	5.500	6.500
51	1.663	1.670	-0.500	1.500
52	1.681	1.690	0.500	0.000
53	1.650	1.673	3.500	3.500
54	1.670	1.677	4.000	-1.500
61	1.665	1.655	-1.000	4.500
62	1.689	1.676	4.000	0.000
MIN	1.650	1.650	-1.000	-2.500
MAX	1.689	1.693	5.500	7.500
MEAN	1.670	1.674	2.263	2.763
STD DEV. (σ)	0.011	0.013	2.287	3.293
MEAN+3(σ)	1.704	1.712	9.126	12.642
MEAN-3(σ)	1.637	1.636	-4.599	-7.116

SN	DAC Max Voltage (V)		DAC Max DNL (LSB)	
	PRE	30k	PRE	30k
65	1.734	1.732	0.577	0.505
2	1.774	1.776	0.500	0.500
3	1.775	1.770	0.594	0.522
8	1.773	1.775	0.768	0.500
12	1.771	1.767	0.583	0.500
15	1.776	1.773	0.500	0.621
21	1.770	1.771	0.512	0.546
24	1.773	1.771	0.612	0.573
32	1.770	1.766	0.500	0.500
33	1.772	1.770	0.581	0.511
35	1.746	1.745	0.534	0.574
38	1.772	1.769	0.500	0.578
45	1.772	1.768	0.573	0.570
46	1.771	1.768	0.533	0.500
51	1.760	1.765	0.500	0.559
52	1.771	1.771	0.697	0.549
53	1.772	1.772	0.574	0.542
54	1.765	1.758	0.500	0.566
61	1.773	1.771	0.538	0.500
62	1.773	1.772	0.497	0.500
MIN	1.746	1.745	0.497	0.500
MAX	1.776	1.776	0.768	0.621
MEAN	1.770	1.768	0.558	0.537
STD DEV. (σ)	0.007	0.007	0.073	0.037
MEAN+3(σ)	1.790	1.789	0.778	0.648
MEAN-3(σ)	1.750	1.748	0.338	0.427

SN	DAC Max INL (LSB)		Delay Error 28.5GHz VAP0 (ps)	
	PRE	30k	PRE	30k
65	0.536	0.500	0.935	0.902
2	2.634	2.878	0.888	0.928
3	0.428	0.410	0.955	0.969
8	0.648	0.404	0.931	0.968
12	1.417	1.421	0.951	0.854
15	0.462	0.531	0.920	0.756
21	0.440	0.658	0.965	0.936
24	0.717	1.382	0.927	0.929
32	2.107	2.317	1.002	1.047
33	0.715	0.701	0.989	1.053
35	0.426	0.482	0.966	1.159
38	1.171	1.050	0.958	0.974
45	1.763	2.464	1.058	0.964
46	2.603	2.711	0.998	0.984
51	0.981	0.834	1.046	0.850
52	0.604	0.452	1.098	0.891
53	1.424	1.031	0.928	0.800
54	0.451	0.411	1.003	0.978
61	1.319	1.847	0.949	0.927
62	1.909	2.149	0.919	0.980
MIN	0.426	0.404	0.888	0.756
MAX	2.634	2.878	1.098	1.159
MEAN	1.169	1.270	0.971	0.945
STD DEV. (σ)	0.738	0.862	0.053	0.092
MEAN+3(σ)	3.385	3.857	1.131	1.220
MEAN-3(σ)	-1.046	-1.317	0.811	0.669

SN	Delay Error 28.5GHz VAP1 (ps)		Delay Error 28.5GHz VAP2 (ps)	
	PRE	30k	PRE	30k
65	0.964	1.025	0.990	0.998
2	1.047	1.190	1.014	1.237
3	0.932	1.024	0.960	1.086
8	1.052	1.098	0.980	1.130
12	1.007	1.212	0.941	1.260
15	1.062	0.961	0.933	1.101
21	1.025	1.127	0.990	1.285
24	0.940	1.188	0.967	1.100
32	0.972	1.248	0.998	1.338
33	1.084	1.054	1.009	1.211
35	1.000	1.300	0.937	1.185
38	1.016	1.072	1.018	1.013
45	1.053	1.129	1.035	1.239
46	1.054	1.066	0.947	1.111
51	1.076	1.004	1.079	1.017
52	1.111	1.119	1.063	1.081
53	1.044	0.972	0.945	0.987
54	1.088	1.259	0.957	1.109
61	1.101	1.076	0.889	1.083
62	0.985	1.231	1.002	1.109
MIN	0.932	0.961	0.889	0.987
MAX	1.111	1.300	1.079	1.338
MEAN	1.034	1.123	0.982	1.141
STD DEV. (σ)	0.051	0.100	0.048	0.098
MEAN+3(σ)	1.188	1.423	1.126	1.434
MEAN-3(σ)	0.880	0.822	0.839	0.849

SN	Delay Error 28.5GHz VAP3 (ps)		Delay Error 28.5GHz VAP4 (ps)	
	PRE	30k	PRE	30k
65	1.014	1.009	0.982	1.036
2	0.955	1.040	0.950	0.951
3	1.003	1.144	1.015	1.005
8	1.000	1.132	1.069	1.053
12	0.986	1.031	1.007	0.959
15	1.009	0.912	1.061	0.881
21	0.962	1.030	1.141	0.997
24	0.996	1.136	1.010	1.048
32	1.008	1.147	1.031	1.037
33	1.036	1.147	0.996	0.993
35	1.003	1.271	1.068	1.128
38	0.973	0.964	1.112	1.000
45	1.084	0.995	1.143	0.933
46	0.993	1.173	1.113	0.945
51	1.084	0.913	1.095	0.881
52	1.146	0.980	1.111	0.882
53	0.995	1.077	1.091	0.971
54	1.085	1.176	1.128	0.947
61	1.003	1.150	1.080	0.930
62	0.996	1.144	1.082	1.031
MIN	0.955	0.912	0.950	0.881
MAX	1.146	1.271	1.143	1.128
MEAN	1.017	1.082	1.069	0.977
STD DEV. (σ)	0.049	0.099	0.054	0.065
MEAN+3(σ)	1.164	1.378	1.230	1.173
MEAN-3(σ)	0.869	0.786	0.907	0.782

SN	Delay Error 28.5GHz VAP5 (ps)		Delay Error 28.5GHz VAP6 (ps)	
	PRE	30k	PRE	30k
65	1.039	0.965	0.984	1.000
2	0.994	1.002	0.987	1.020
3	1.012	1.017	0.919	1.120
8	0.984	0.979	1.016	1.195
12	0.975	0.900	0.997	1.038
15	0.981	0.992	1.063	1.007
21	0.954	0.904	1.091	1.060
24	1.009	1.117	0.950	1.086
32	1.046	1.101	1.060	1.123
33	1.057	0.952	1.036	1.096
35	0.985	1.112	0.970	1.161
38	1.022	1.076	1.033	1.050
45	1.052	0.960	1.042	0.962
46	1.032	1.199	1.048	1.057
51	1.040	0.927	1.040	0.980
52	1.115	0.939	1.145	0.970
53	1.047	0.866	1.088	0.969
54	1.017	1.128	1.120	1.035
61	1.113	0.989	1.014	1.042
62	1.027	0.955	1.093	1.288
MIN	0.954	0.866	0.919	0.962
MAX	1.115	1.199	1.145	1.288
MEAN	1.024	1.006	1.037	1.066
STD DEV. (σ)	0.043	0.091	0.058	0.084
MEAN+3(σ)	1.153	1.280	1.210	1.319
MEAN-3(σ)	0.896	0.732	0.865	0.814

SN	Delay Error 28.5GHz VAP7 (ps)		Delay Error 28.5GHz VAP8 (ps)	
	PRE	30k	PRE	30k
65	0.927	1.002	1.013	0.941
2	0.964	0.911	0.954	1.035
3	0.969	0.895	0.885	1.051
8	1.000	1.065	1.065	0.996
12	0.918	0.845	1.006	1.025
15	0.915	0.863	1.080	0.945
21	0.926	0.832	1.008	1.049
24	0.976	0.912	0.983	0.990
32	0.999	1.202	1.032	1.174
33	1.006	1.049	1.135	1.025
35	0.944	0.972	0.935	1.155
38	1.034	1.035	1.061	0.965
45	1.117	0.935	1.088	1.037
46	1.060	0.962	0.992	1.020
51	1.042	0.838	1.116	0.910
52	1.058	0.898	1.080	0.962
53	0.991	0.880	0.992	0.912
54	1.067	0.955	1.081	0.944
61	1.065	0.933	1.023	0.961
62	1.032	0.934	1.050	1.029
MIN	0.915	0.832	0.885	0.910
MAX	1.117	1.202	1.135	1.174
MEAN	1.004	0.943	1.030	1.010
STD DEV. (σ)	0.057	0.092	0.064	0.070
MEAN+3(σ)	1.175	1.219	1.222	1.221
MEAN-3(σ)	0.833	0.666	0.837	0.799

SN	Delay Error 28.5GHz VAP9 (ps)		Delay Error 28.5GHz VAP10 (ps)	
	PRE	30k	PRE	30k
65	1.014	0.988	0.826	1.008
2	1.063	1.100	0.966	1.020
3	0.941	1.268	0.867	1.036
8	1.020	1.190	0.959	1.132
12	0.968	1.117	0.939	1.137
15	0.980	0.931	0.967	1.025
21	1.061	1.025	0.979	1.020
24	1.034	1.188	0.925	1.149
32	1.052	1.271	1.007	1.106
33	1.103	1.009	0.918	1.079
35	0.952	1.036	0.892	1.150
38	1.015	0.996	0.920	1.010
45	1.036	1.013	1.071	0.996
46	1.046	1.065	0.941	1.094
51	1.101	1.036	0.994	1.026
52	1.027	1.075	0.978	0.985
53	1.066	0.995	0.964	0.981
54	1.044	1.130	1.068	1.157
61	1.026	1.081	0.967	1.073
62	1.114	0.913	1.041	1.109
MIN	0.941	0.913	0.867	0.981
MAX	1.114	1.271	1.071	1.157
MEAN	1.034	1.076	0.966	1.068
STD DEV. (σ)	0.048	0.100	0.054	0.061
MEAN+3(σ)	1.179	1.376	1.129	1.250
MEAN-3(σ)	0.889	0.775	0.804	0.886

SN	Delay Error 28.5GHz VAP13 (ps)		Delay Error 28.5GHz VAP14 (ps)	
	PRE	30k	PRE	30k
65	0.958	0.985	0.831	1.025
2	0.993	1.099	1.017	1.134
3	0.991	1.145	0.989	1.150
8	1.034	1.139	0.995	1.176
12	0.907	1.135	0.977	1.327
15	0.947	1.017	1.015	1.064
21	1.012	1.165	1.057	1.212
24	0.960	1.029	0.954	1.264
32	1.002	1.100	0.998	1.212
33	1.013	1.218	0.928	1.131
35	0.905	1.122	0.981	1.177
38	1.004	0.898	0.923	1.139
45	1.037	1.097	0.986	1.238
46	1.078	1.011	1.004	1.216
51	1.100	1.036	1.158	1.082
52	1.056	1.103	1.060	1.055
53	1.042	1.053	1.032	1.106
54	1.047	1.114	1.086	1.097
61	1.018	1.060	0.947	1.061
62	1.053	1.130	1.063	1.167
MIN	0.905	0.898	0.923	1.055
MAX	1.100	1.218	1.158	1.327
MEAN	1.010	1.088	1.009	1.158
STD DEV. (σ)	0.052	0.071	0.058	0.074
MEAN+3(σ)	1.167	1.300	1.183	1.381
MEAN-3(σ)	0.853	0.875	0.835	0.936

SN	Delay Error 28.5GHz VAP15 (ps)		Attenuation Error 28.5GHz VAP0 (dB)	
	PRE	30k	PRE	30k
65	0.967	1.051	0.417	0.504
2	1.035	0.956	0.456	0.523
3	0.884	1.099	0.421	0.521
8	1.004	1.133	0.477	0.516
12	0.948	1.009	0.460	0.541
15	1.040	0.959	0.506	0.563
21	1.024	1.117	0.460	0.493
24	1.014	1.225	0.430	0.510
32	1.062	1.320	0.387	0.517
33	1.035	1.256	0.405	0.508
35	0.955	1.195	0.391	0.469
38	1.099	1.075	0.432	0.491
45	1.105	0.993	0.376	0.523
46	1.069	1.062	0.447	0.521
51	1.123	0.897	0.499	0.625
52	0.994	0.902	0.490	0.550
53	1.005	0.990	0.474	0.590
54	1.156	0.908	0.471	0.544
61	0.991	1.106	0.487	0.521
62	1.070	1.029	0.432	0.547
MIN	0.884	0.897	0.376	0.469
MAX	1.156	1.320	0.506	0.625
MEAN	1.032	1.065	0.447	0.530
STD DEV. (σ)	0.065	0.123	0.039	0.036
MEAN+3(σ)	1.229	1.434	0.564	0.637
MEAN-3(σ)	0.836	0.696	0.331	0.423

SN	Attenuation Error 28.5GHz VAP1 (dB)		Attenuation Error 28.5GHz VAP2 (dB)	
	PRE	30k	PRE	30k
65	0.199	0.256	0.189	0.215
2	0.197	0.478	0.297	0.188
3	0.196	0.298	0.248	0.272
8	0.255	0.258	0.210	0.229
12	0.216	0.323	0.253	0.204
15	0.197	0.319	0.194	0.379
21	0.231	0.314	0.173	0.281
24	0.162	0.218	0.249	0.227
32	0.207	0.352	0.228	0.241
33	0.248	0.325	0.176	0.222
35	0.220	0.373	0.209	0.312
38	0.215	0.280	0.211	0.175
45	0.164	0.268	0.251	0.321
46	0.236	0.355	0.202	0.317
51	0.228	0.303	0.220	0.280
52	0.216	0.295	0.196	0.354
53	0.253	0.315	0.239	0.314
54	0.223	0.438	0.243	0.250
61	0.215	0.250	0.150	0.289
62	0.170	0.309	0.190	0.349
MIN	0.162	0.218	0.150	0.175
MAX	0.255	0.478	0.297	0.379
MEAN	0.213	0.320	0.218	0.274
STD DEV. (σ)	0.027	0.062	0.035	0.058
MEAN+3(σ)	0.295	0.505	0.323	0.449
MEAN-3(σ)	0.131	0.134	0.112	0.099

SN	Attenuation Error 28.5GHz VAP3 (dB)		Attenuation Error 28.5GHz VAP4 (dB)	
	PRE	30k	PRE	30k
65	0.219	0.332	0.173	0.206
2	0.223	0.417	0.194	0.421
3	0.235	0.387	0.185	0.219
8	0.233	0.344	0.222	0.289
12	0.251	0.433	0.184	0.310
15	0.277	0.430	0.220	0.388
21	0.249	0.311	0.211	0.302
24	0.235	0.341	0.168	0.275
32	0.222	0.394	0.210	0.226
33	0.201	0.539	0.168	0.352
35	0.225	0.676	0.196	0.201
38	0.192	0.399	0.178	0.210
45	0.245	0.407	0.262	0.360
46	0.192	0.323	0.184	0.295
51	0.279	0.433	0.197	0.360
52	0.316	0.347	0.214	0.293
53	0.240	0.549	0.243	0.285
54	0.266	0.369	0.201	0.355
61	0.256	0.359	0.204	0.309
62	0.223	0.378	0.149	0.298
MIN	0.192	0.311	0.149	0.201
MAX	0.316	0.676	0.262	0.421
MEAN	0.240	0.412	0.199	0.303
STD DEV. (σ)	0.031	0.090	0.027	0.061
MEAN+3(σ)	0.333	0.681	0.280	0.485
MEAN-3(σ)	0.147	0.143	0.119	0.120

SN	Attenuation Error 28.5GHz VAP5 (dB)		Attenuation Error 28.5GHz VAP6 (dB)	
	PRE	30k	PRE	30k
65	0.162	0.219	0.169	0.213
2	0.251	0.325	0.193	0.209
3	0.190	0.273	0.230	0.219
8	0.251	0.274	0.200	0.240
12	0.215	0.404	0.139	0.213
15	0.199	0.315	0.218	0.223
21	0.246	0.377	0.173	0.418
24	0.134	0.269	0.159	0.205
32	0.184	0.306	0.183	0.193
33	0.188	0.311	0.148	0.241
35	0.190	0.315	0.239	0.176
38	0.196	0.223	0.240	0.215
45	0.162	0.379	0.181	0.207
46	0.219	0.325	0.176	0.190
51	0.250	0.253	0.216	0.311
52	0.241	0.391	0.194	0.241
53	0.246	0.279	0.214	0.277
54	0.240	0.257	0.222	0.296
61	0.197	0.374	0.201	0.213
62	0.159	0.356	0.190	0.247
MIN	0.134	0.223	0.139	0.176
MAX	0.251	0.404	0.240	0.418
MEAN	0.208	0.316	0.196	0.239
STD DEV. (σ)	0.035	0.052	0.029	0.056
MEAN+3(σ)	0.315	0.474	0.283	0.406
MEAN-3(σ)	0.102	0.159	0.109	0.071

SN	Attenuation Error 28.5GHz VAP7 (dB)		Attenuation Error 28.5GHz VAP8 (dB)	
	PRE	30k	PRE	30k
65	0.218	0.505	0.216	0.195
2	0.196	0.395	0.174	0.323
3	0.284	0.345	0.249	0.219
8	0.209	0.383	0.265	0.234
12	0.211	0.293	0.195	0.369
15	0.248	0.319	0.227	0.277
21	0.235	0.457	0.147	0.230
24	0.179	0.291	0.240	0.218
32	0.191	0.478	0.152	0.245
33	0.212	0.565	0.228	0.244
35	0.185	0.337	0.208	0.187
38	0.294	0.310	0.201	0.221
45	0.219	0.393	0.169	0.316
46	0.216	0.495	0.225	0.206
51	0.237	0.380	0.177	0.282
52	0.261	0.396	0.192	0.290
53	0.321	0.312	0.232	0.243
54	0.261	0.480	0.193	0.217
61	0.239	0.341	0.179	0.324
62	0.200	0.446	0.180	0.265
MIN	0.179	0.291	0.147	0.187
MAX	0.321	0.565	0.265	0.369
MEAN	0.231	0.390	0.202	0.258
STD DEV. (σ)	0.039	0.078	0.033	0.048
MEAN+3(σ)	0.348	0.624	0.301	0.404
MEAN-3(σ)	0.115	0.157	0.103	0.113

SN	Attenuation Error 28.5GHz VAP9 (dB)		Attenuation Error 28.5GHz VAP10 (dB)	
	PRE	30k	PRE	30k
65	0.171	0.248	0.164	0.281
2	0.158	0.319	0.186	0.216
3	0.228	0.227	0.268	0.199
8	0.247	0.230	0.203	0.243
12	0.189	0.261	0.199	0.219
15	0.177	0.236	0.173	0.313
21	0.187	0.275	0.149	0.235
24	0.167	0.202	0.163	0.243
32	0.149	0.273	0.183	0.224
33	0.181	0.238	0.194	0.324
35	0.231	0.210	0.250	0.202
38	0.195	0.205	0.275	0.217
45	0.205	0.271	0.187	0.250
46	0.189	0.252	0.207	0.307
51	0.218	0.324	0.185	0.203
52	0.245	0.204	0.179	0.251
53	0.204	0.287	0.270	0.324
54	0.210	0.269	0.267	0.210
61	0.170	0.305	0.189	0.245
62	0.150	0.224	0.197	0.194
MIN	0.149	0.202	0.149	0.194
MAX	0.247	0.324	0.275	0.324
MEAN	0.195	0.253	0.207	0.243
STD DEV. (σ)	0.030	0.038	0.039	0.043
MEAN+3(σ)	0.284	0.368	0.324	0.372
MEAN-3(σ)	0.105	0.138	0.089	0.114

SN	Attenuation Error 28.5GHz VAP11 (dB)		Attenuation Error 28.5GHz VAP12 (dB)	
	PRE	30k	PRE	30k
65	0.176	0.249	0.250	0.230
2	0.201	0.321	0.190	0.355
3	0.189	0.305	0.194	0.232
8	0.199	0.243	0.288	0.243
12	0.201	0.357	0.187	0.247
15	0.182	0.324	0.240	0.292
21	0.266	0.276	0.216	0.226
24	0.173	0.290	0.187	0.312
32	0.178	0.310	0.184	0.257
33	0.218	0.340	0.185	0.299
35	0.216	0.240	0.224	0.264
38	0.183	0.282	0.214	0.225
45	0.163	0.394	0.218	0.231
46	0.250	0.261	0.158	0.264
51	0.274	0.348	0.263	0.334
52	0.249	0.365	0.196	0.421
53	0.204	0.346	0.170	0.309
54	0.206	0.262	0.257	0.317
61	0.243	0.335	0.242	0.226
62	0.237	0.336	0.182	0.194
MIN	0.163	0.240	0.158	0.194
MAX	0.274	0.394	0.288	0.421
MEAN	0.212	0.312	0.210	0.276
STD DEV. (σ)	0.033	0.043	0.035	0.056
MEAN+3(σ)	0.310	0.443	0.314	0.444
MEAN-3(σ)	0.115	0.182	0.106	0.108

SN	Attenuation Error 28.5GHz VAP13 (dB)		Attenuation Error 28.5GHz VAP14 (dB)	
	PRE	30k	PRE	30k
65	0.176	0.238	0.195	0.222
2	0.259	0.304	0.229	0.331
3	0.176	0.291	0.270	0.352
8	0.217	0.249	0.231	0.279
12	0.217	0.252	0.196	0.209
15	0.204	0.285	0.199	0.277
21	0.210	0.354	0.185	0.245
24	0.156	0.299	0.167	0.305
32	0.186	0.299	0.191	0.227
33	0.171	0.206	0.264	0.231
35	0.251	0.223	0.230	0.205
38	0.170	0.261	0.308	0.228
45	0.182	0.241	0.244	0.328
46	0.179	0.266	0.211	0.291
51	0.168	0.273	0.222	0.358
52	0.264	0.228	0.168	0.299
53	0.263	0.255	0.279	0.297
54	0.197	0.286	0.206	0.361
61	0.205	0.275	0.200	0.276
62	0.196	0.246	0.217	0.212
MIN	0.156	0.206	0.167	0.205
MAX	0.264	0.354	0.308	0.361
MEAN	0.204	0.268	0.222	0.280
STD DEV. (σ)	0.034	0.034	0.038	0.052
MEAN+3(σ)	0.306	0.371	0.335	0.435
MEAN-3(σ)	0.102	0.165	0.108	0.124

SN	Attenuation Error 28.5GHz VAP15 (dB)		OP1dB Match 28.5GHz (dB)	
	PRE	30k	PRE	30k
65	0.202	0.290	0.983	0.758
2	0.160	0.532	0.498	0.691
3	0.189	0.277	0.727	0.969
8	0.249	0.408	0.494	0.827
12	0.201	0.476	0.552	0.418
15	0.179	0.243	0.573	0.459
21	0.223	0.280	0.527	0.442
24	0.238	0.295	0.517	0.537
32	0.220	0.482	0.449	0.585
33	0.189	0.484	0.735	0.710
35	0.187	0.240	1.425	1.776
38	0.176	0.509	0.577	0.623
45	0.234	0.405	0.838	0.841
46	0.192	0.324	0.475	0.383
51	0.212	0.439	0.548	0.451
52	0.258	0.376	0.998	1.160
53	0.239	0.461	0.445	0.579
54	0.220	0.344	1.142	0.993
61	0.235	0.303	0.544	0.620
62	0.157	0.457	0.465	0.628
MIN	0.157	0.240	0.445	0.383
MAX	0.258	0.532	1.425	1.776
MEAN	0.208	0.386	0.659	0.721
STD DEV. (σ)	0.030	0.095	0.267	0.333
MEAN+3(σ)	0.298	0.672	1.460	1.719
MEAN-3(σ)	0.118	0.100	-0.141	-0.278

Gain Match 28.5GHz (dB)		
SN	PRE	30k
65	0.951	0.924
2	0.480	0.749
3	0.975	0.904
8	0.622	0.467
12	0.376	0.649
15	0.550	0.542
21	0.464	0.534
24	0.476	0.436
32	0.482	0.589
33	0.403	0.816
35	1.183	1.737
38	0.623	0.440
45	0.962	1.061
46	0.359	0.600
51	0.458	0.544
52	1.158	1.167
53	0.452	0.509
54	1.181	1.771
61	0.427	0.469
62	0.410	0.569
MIN	0.359	0.436
MAX	1.183	1.771
MEAN	0.634	0.766
STD DEV. (σ)	0.294	0.405
MEAN+3(σ)	1.517	1.980
MEAN-3(σ)	-0.249	-0.448











