

National Semiconductor
Hi-Rel Operations Radiation Engineering/RHA Programs
2900 Semiconductor Drive
Santa Clara, CA 95052

Total Ionizing Dose (TID) Report
ADC14155W-MLS
Advanced Analog to Digital Converter
14-Bit. 155 MSPS
from the PowerWise® Family
Wafer Run V00837JQCA – Wafer # 1
Lot STM9837JQ



Date: July 16, 2008

Radiation Engineer: Kirby Kruckmeyer
Phone # : +1 (408) 721-3548
Email ID: Kirby.Kruckmeyer @nsc.com



ADC14155W-MLS Total Ionizing Dose Report

The ADC14155W-MLS passes Total Ionizing Dose (TID) to 100 krad(Si).

Product Details:

The ADC14155W-MLS is a high-performance CMOS analog-to-digital converter capable of converting analog input signals into 14-bit digital words at rates up to 155 Mega Samples Per Second (MS/s). This converter uses a differential, pipelined architecture with digital error correction and an on chip sample-and-hold circuit to minimize power consumption and the external component count, while providing excellent dynamic performance. A unique sample-and-hold stage yields a full-power bandwidth of 1.1 GHz. The ADC14155W-MLS operates from dual +3.3V and +1.8V power supplies and consumes typically 974 mW of power at 155 MSPS. The separate +1.8V supply for the digital output interface allows lower power operation with reduced noise. A power-down feature reduces the power consumption to 5 mW with the clock input disabled, while still allowing fast wake-up time to full operation.

The ADC14155W-MLS is manufactured on National Semiconductor's 180 nm CMOS9 process, a pure CMOS process.

Test Details:

Product was tested according to MIL-STD-883, Test Method 1019, Condition A. Units were irradiated 3, 10, 30, 50, and 100 krad(Si). During irradiation, the supply voltages are set at 2.0 and 3.9 V and the input clock is set at 125 MHz, so that the circuit is active. Complete electrical testing of all datasheet and SMD parameters was performed at each radiation level.

MIL-STD-883G, Test Method 1019.7 also requires that MOS products go through the MOS Accelerated Annealing Test (MAAT). Units are irradiated to 1.5 times the rated radiation level (150 krad(Si), in this case). The units are then put through a 100°C anneal for 168 hours, with the units biased under the same condition as during irradiation. The parts are then put through parametric testing and must pass all tests to the post irradiation test limits.

National Semiconductor tests and qualifies each wafer. This is a report from one wafer. Lot and wafer number and test details are listed on page 3. TID test results and graphs are shown starting page 6 and the MAAT results start on page 18.

**National Semiconductor Corporation
Radiation Effects Laboratory
Santa Clara, California 95052**

ANALOG TOTAL DOSE RADIATION REPORT

Customer: Rad Wafer Qual.

Part Type: ADC14155W-MLS

Input Bias Circuit: 06422IR

Dose Rate: 181.96(Si)/sec

Test Program Used: ADC14155_HI_REL_QA

Tester: CAT#6 Operator: Thang Trinh

Wafer Run Number: V00837JQCA

Wafer Number: 1

Package Type: DCQFP048

Production Lot #: STM9837JQ

IPI #: N/A

Disposition: Passes 100K

Summary:

Passes Room Temp @: Pre-rad, Post 3Krad, Post 10Krad,
Post 30Krad, Post 50Krad, Post 100Krad, Post MOS
Accelerated Anneal

Part Out of Room Temp Spec @: N/A

Functional Failed @: N/A

Parameters over Limit: N/A

Prepared by:	Thang Trinh	16-July-08
Reviewed by Product Engineer:	Harry Ng	16-July-08
Approved by Radiation Engineer:	Kirby Kruckmeyer	16-July-08

**Standard Test Flow Sheet For Rad Testing
Customer Special Attachment
Rad Tolerant Linear**

NSID# ADC14155W-MLS LOT# STM9837JQ W#1 IPI N/A

Test Program: ADC14155_HI_REL_QA

Machine: CAT#6 **Operator:** Thang Trinh **Bias Board:** 06422IR

Start Time__13__:40__

Finish Time__16__:17__

Start Date: 08/July/08

Finish Date: 08/July/08

QA: 16/July/08

Control Units s/n: #__1__ #____ #____ #____

Duts : #__2__ #__3__ #__4__ #__5__ #____

Duts : #____ #____ #____ #____ #____

Duts : #____ #____ #____ #____ #____

Duts : #____ #____ #____ #____ #____

Location Step	Operation Mtd/Cond	Qty In	Qty Out	Var	Mech	Rej	FF
PASS	Pre - Rad Read/Rec. Tp1	4	4	0	0	0	0
	<i>Irradiation</i> 3k <i>Level</i>	4	4	0	0	N/A	N/A
PASS	Post Rad Read/Rec. Tp2	4	4	0	0	0	0
	<i>Irradiation</i> 10k <i>Level</i>	4	4	0	0	N/A	N/A
PASS	Post Rad Read/Rec. Tp3	4	4	0	0	0	0

**Standard Test Flow Sheet For Rad Testing
Customer Special Attachment
Rad Tolerant Linear**

NSID# ADC14155W-MLS LOT# STM9837JQ W#1 IPI# N/A

Location Step	Operation Mtd/Cond	Qty In	Qty Out	Var	Mech	Rej	FF
	<i>Irradiation</i> 30k <i>Level</i>	4	4	0	0	N/A	N/A
PASS	Post Rad Read/Rec. Tp4	4	4	0	0	0	0
	<i>Irradiation</i> 50k <i>Level</i>	4	4	0	0	N/A	N/A
PASS	Post Rad Read/Rec. Tp5	4	4	0	0	0	0
	<i>Irradiation</i> 100k <i>Level</i>	4	4	0	0	N/A	N/A
PASS	Post Rad Read/Rec. Tp6	4	4	0	0	0	0
	<i>Irradiation</i> 150k <i>Level</i>	4	4	0	0	N/A	N/A
	MOS Accelerated. BI Anneal	4	4	0	0	0	0
PASS	Post MOS Read/Rec. Tp7	4	4	0	0	0	0

Notes: All irradiation's are done per (SC)RPI-3-217

Fail¹: Number of devices that were outside Microcircuit Datasheet Sub Group 1 limit.

“Post MOS Read/Rec. Tp7 is the MOS accelerated anneal test as described in MIL-STD-883G, 1019.7, section 3.12

The test results from the individual units are plotted on the following graphs.

Dotted lines indicate the average reading.

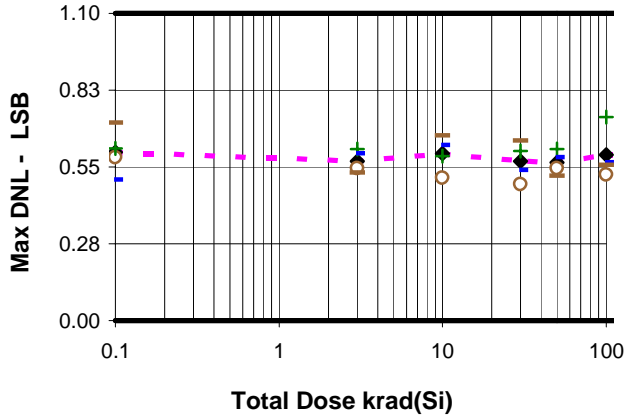
Solid lines indicate minimum and maximum limits of the Microcircuit Data Sheet (MDS)

Test Conditions as Test #/Test Name/VA/VD/Fclk/Fin/Vref (0=internal ref)/duty cycle/VCM/Input Power

**ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
Total Dose Radiation Test Characteristics**

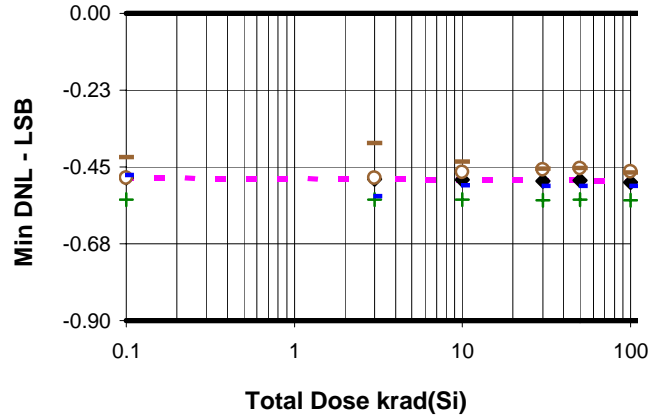
200. MAX_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB

Vs Total Dose



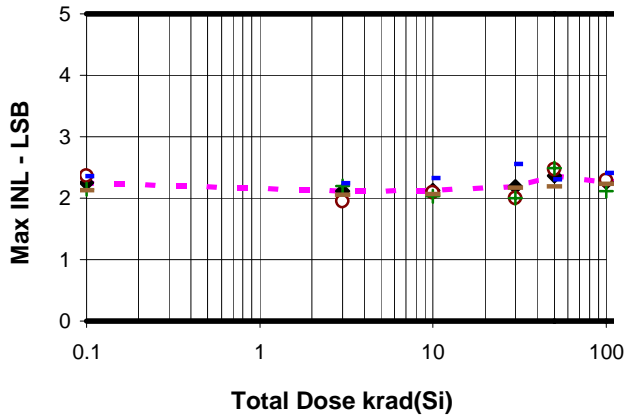
201. MIN_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB

Vs Total Dose



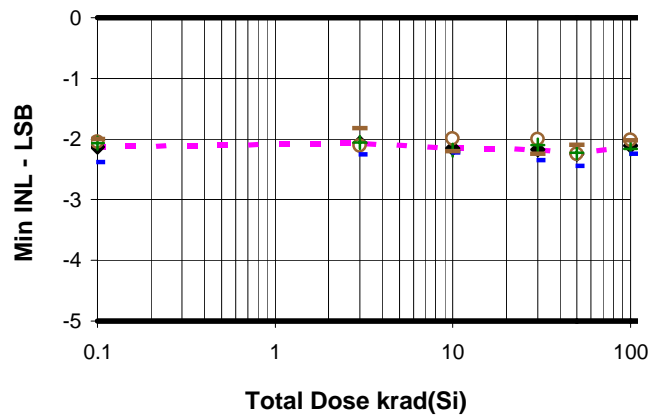
202. MAX_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB

Vs Total Dose



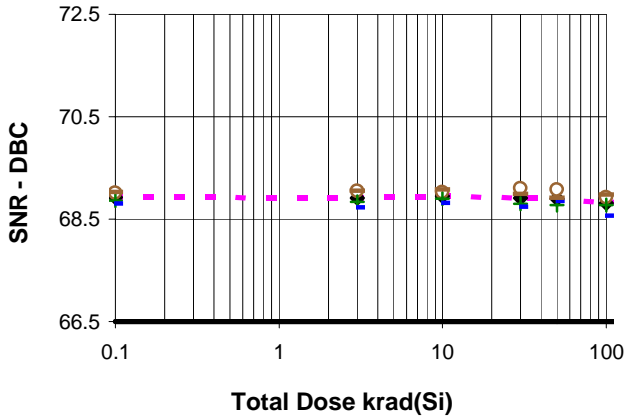
203. MIN_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB

Vs Total Dose



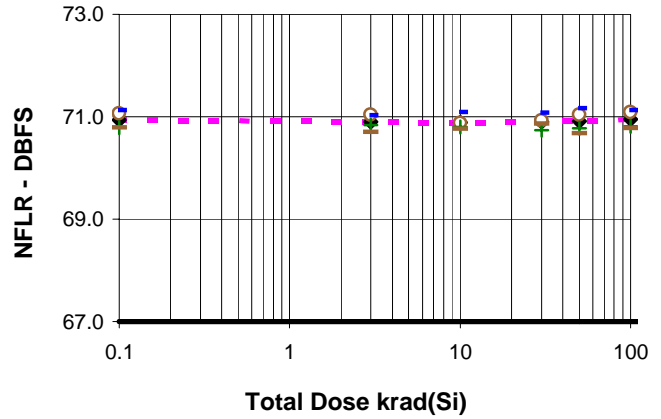
250. SNR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



251. NFLR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
Total Dose Radiation Test Characteristics

200. MAX_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	0.603	0.503	0.708	0.085	0
3	0.571	0.530	0.614	0.040	0
10	0.598	0.512	0.663	0.065	0
30	0.570	0.488	0.644	0.070	0
50	0.566	0.519	0.614	0.042	0
100	0.593	0.522	0.729	0.092	0

201. MIN_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	-0.481	-0.546	-0.423	0.051	0
3	-0.487	-0.547	-0.381	0.076	0
10	-0.488	-0.546	-0.434	0.049	0
30	-0.492	-0.547	-0.456	0.043	0
50	-0.490	-0.547	-0.453	0.045	0
100	-0.496	-0.547	-0.464	0.039	0

202. MAX_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	2.246	2.123	2.361	0.130	0
3	2.110	1.947	2.235	0.134	0
10	2.128	2.032	2.320	0.130	0
30	2.183	2.001	2.556	0.261	0
50	2.360	2.183	2.488	0.144	0
100	2.261	2.115	2.408	0.122	0

203. MIN_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	-2.127	-2.383	-2.004	0.173	0
3	-2.063	-2.262	-1.828	0.180	0
10	-2.152	-2.225	-1.995	0.106	0
30	-2.177	-2.353	-2.002	0.155	0
50	-2.252	-2.442	-2.099	0.142	0
100	-2.111	-2.242	-2.019	0.109	0

250. SNR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	68.923	68.795	69.020	0.114	0
3	68.915	68.723	69.049	0.161	0
10	68.952	68.815	69.071	0.118	0
30	68.908	68.743	69.099	0.164	0
50	68.902	68.772	69.075	0.129	0
100	68.813	68.568	68.975	0.183	0

251. NFLR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	70.940	70.783	71.124	0.177	0
3	70.900	70.697	71.042	0.166	0
10	70.882	70.768	71.088	0.144	0
30	70.900	70.731	71.079	0.145	0
50	70.914	70.674	71.163	0.228	0
100	70.950	70.779	71.125	0.180	0

**ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
Total Dose Radiation Test Characteristics**

200. MAX_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	0.584	0.616	0.503	0.708
3	0.545	0.614	0.598	0.530
10	0.512	0.590	0.628	0.663
30	0.488	0.608	0.539	0.644
50	0.546	0.614	0.584	0.519
100	0.522	0.729	0.565	0.558

201. MIN_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	-0.482	-0.546	-0.474	-0.423
3	-0.482	-0.547	-0.536	-0.381
10	-0.465	-0.546	-0.504	-0.434
30	-0.458	-0.547	-0.506	-0.456
50	-0.453	-0.547	-0.506	-0.454
100	-0.464	-0.547	-0.506	-0.467

202. MAX_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	2.3608	2.1453	2.3554	2.1230
3	1.9469	2.2021	2.2349	2.0559
10	2.0943	2.0320	2.3199	2.0675
30	2.0028	2.0013	2.5565	2.1716
50	2.4662	2.4878	2.3015	2.1829
100	2.2931	2.1145	2.4077	2.2293

203. MIN_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	-2.051	-2.069	-2.383	-2.004
3	-2.105	-2.057	-2.262	-1.828
10	-1.995	-2.188	-2.225	-2.200
30	-2.002	-2.103	-2.353	-2.250
50	-2.244	-2.223	-2.442	-2.099
100	-2.019	-2.161	-2.242	-2.023

250. SNR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	69.017	68.859	68.795	69.020
3	69.047	68.839	68.723	69.049
10	69.027	68.897	68.815	69.071
30	69.099	68.802	68.743	68.986
50	69.075	68.772	68.848	68.914
100	68.931	68.780	68.568	68.975

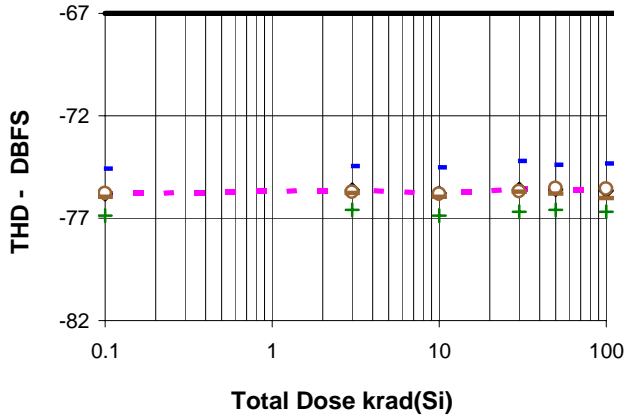
251. NFLR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	71.058	70.783	71.124	70.794
3	71.042	70.832	71.028	70.697
10	70.871	70.799	71.088	70.768
30	70.930	70.731	71.079	70.860
50	71.043	70.775	71.163	70.674
100	71.083	70.811	71.125	70.779

**ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
Total Dose Radiation Test Characteristics**

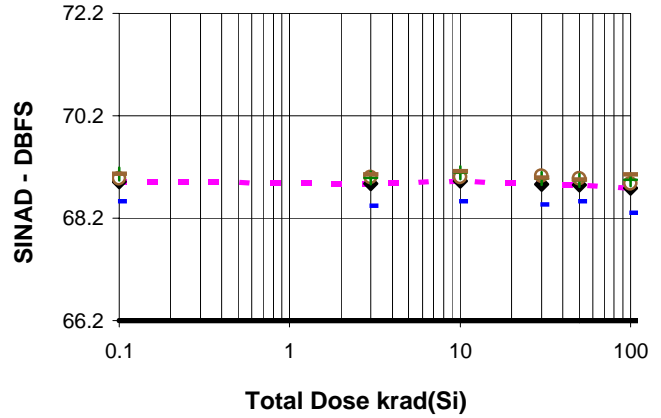
252. THD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



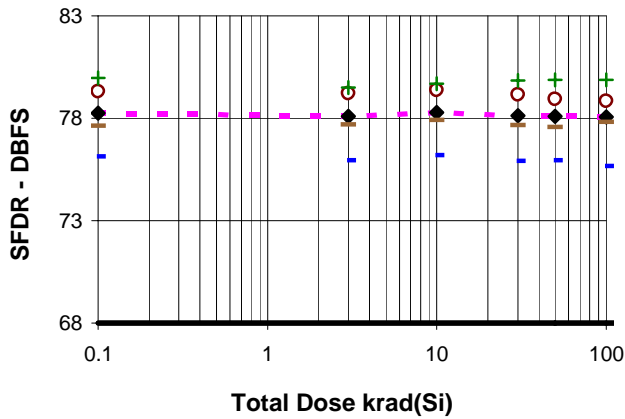
253. SINAD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



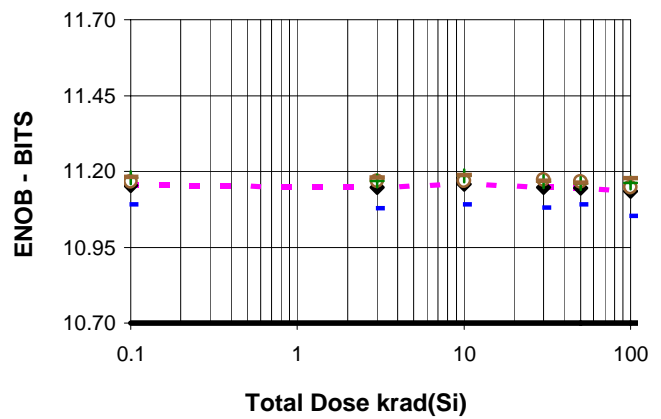
254. SFDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



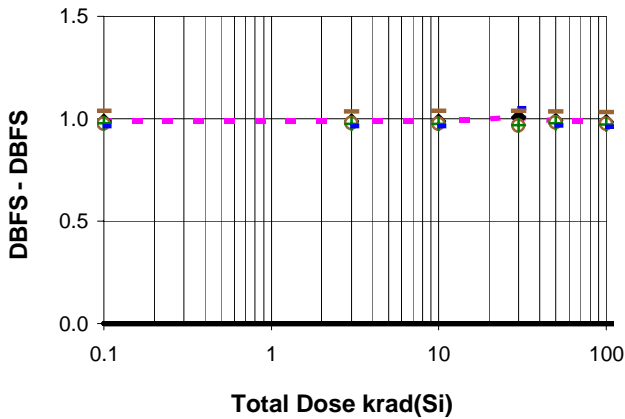
255. ENOB/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



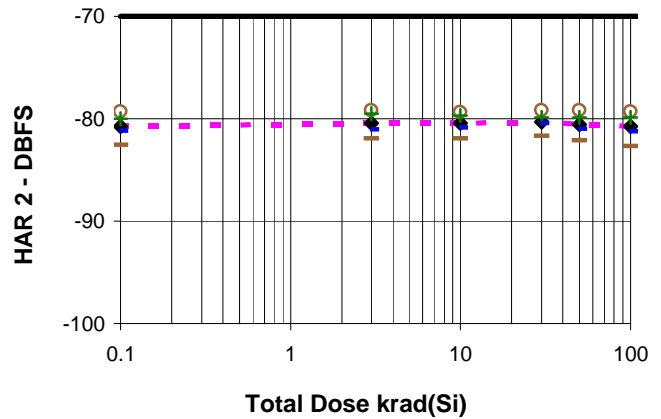
256. DBFS/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



257. HAR2/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
Total Dose Radiation Test Characteristics

252. THD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	-75.799	-76.871	-74.580	0.942	0
3	-75.640	-76.601	-74.462	0.883	0
10	-75.792	-76.871	-74.523	0.967	0
30	-75.581	-76.699	-74.217	1.023	0
50	-75.586	-76.595	-74.402	0.908	0
100	-75.656	-76.680	-74.343	0.987	0

253. SINAD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	68.908	68.526	69.067	0.258	0
3	68.870	68.442	69.051	0.287	0
10	68.931	68.526	69.109	0.274	0
30	68.862	68.459	69.021	0.269	0
50	68.849	68.523	68.980	0.218	0
100	68.791	68.294	69.044	0.338	0

254. SFDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	78.264	76.120	79.982	1.736	0
3	78.091	75.951	79.511	1.635	0
10	78.284	76.173	79.682	1.604	0
30	78.135	75.900	79.845	1.749	0
50	78.081	75.942	79.883	1.717	0
100	78.053	75.671	79.885	1.800	0

255. ENOB/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	11.154	11.091	11.181	0.043	0
3	11.148	11.077	11.178	0.048	0
10	11.158	11.091	11.188	0.046	0
30	11.146	11.080	11.173	0.045	0
50	11.144	11.090	11.166	0.036	0
100	11.135	11.052	11.177	0.056	0

256. DBFS/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	0.989	0.963	1.038	0.033	0
3	0.987	0.962	1.034	0.032	0
10	0.988	0.963	1.037	0.033	0
30	1.005	0.966	1.049	0.043	0
50	0.990	0.965	1.034	0.030	0
100	0.985	0.960	1.032	0.032	0

257. HAR2/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	-80.762	-82.573	-79.316	1.432	0
3	-80.424	-81.938	-79.215	1.285	0
10	-80.454	-81.920	-79.365	1.167	0
30	-80.289	-81.704	-79.179	1.073	0
50	-80.554	-82.130	-79.194	1.290	0
100	-80.771	-82.681	-79.296	1.507	0

**ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
Total Dose Radiation Test Characteristics**

252. THD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	-75.788	-76.871	-74.580	-75.956
3	-75.720	-76.601	-74.462	-75.779
10	-75.813	-76.871	-74.523	-75.960
30	-75.697	-76.699	-74.217	-75.712
50	-75.533	-76.595	-74.402	-75.814
100	-75.565	-76.680	-74.343	-76.037

253. SINAD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	68.981	69.060	68.526	69.067
3	68.994	68.993	68.442	69.051
10	68.996	69.091	68.526	69.109
30	69.021	68.976	68.459	68.991
50	68.980	68.940	68.523	68.953
100	68.870	68.955	68.294	69.044

254. SFDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	79.316	79.982	76.120	77.640
3	79.215	79.511	75.951	77.687
10	79.365	79.682	76.173	77.915
30	79.146	79.845	75.900	77.649
50	78.945	79.883	75.942	77.555
100	78.847	79.885	75.671	77.810

255. ENOB/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	11.166	11.179	11.091	11.181
3	11.168	11.168	11.077	11.178
10	11.169	11.185	11.091	11.188
30	11.173	11.165	11.080	11.168
50	11.166	11.160	11.090	11.162
100	11.148	11.162	11.052	11.177

256. DBFS/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	0.975	0.979	0.963	1.038
3	0.977	0.976	0.962	1.034
10	0.976	0.976	0.963	1.037
30	0.966	0.970	1.049	1.037
50	0.982	0.979	0.965	1.034
100	0.976	0.970	0.960	1.032

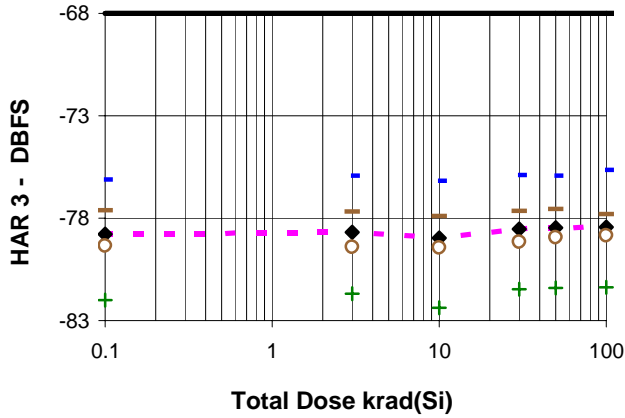
257. HAR2/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	-79.316	-79.982	-81.178	-82.573
3	-79.215	-79.511	-81.032	-81.938
10	-79.365	-79.682	-80.851	-81.920
30	-79.179	-79.845	-80.429	-81.704
50	-79.194	-79.883	-81.007	-82.130
100	-79.296	-79.885	-81.220	-82.681

**ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
Total Dose Radiation Test Characteristics**

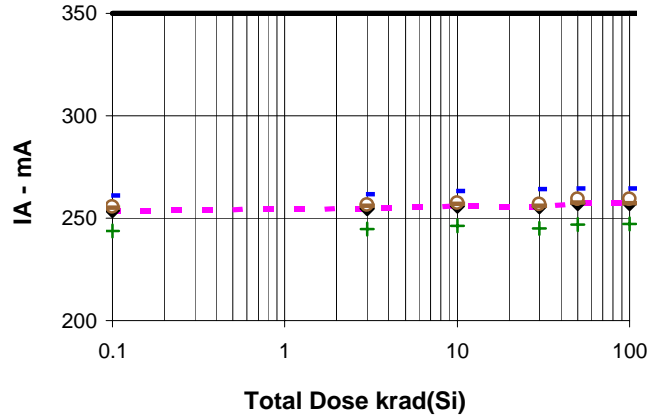
258. HAR3/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



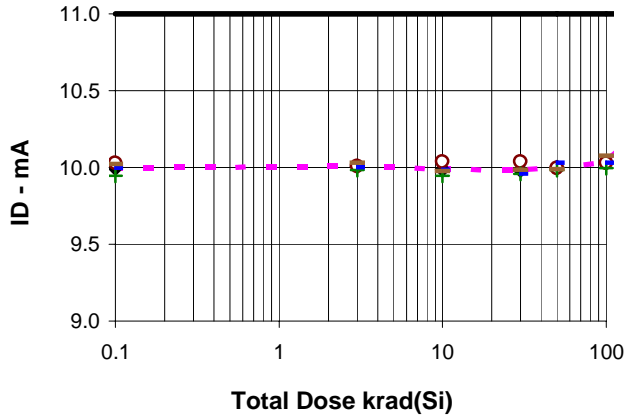
259. IA/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



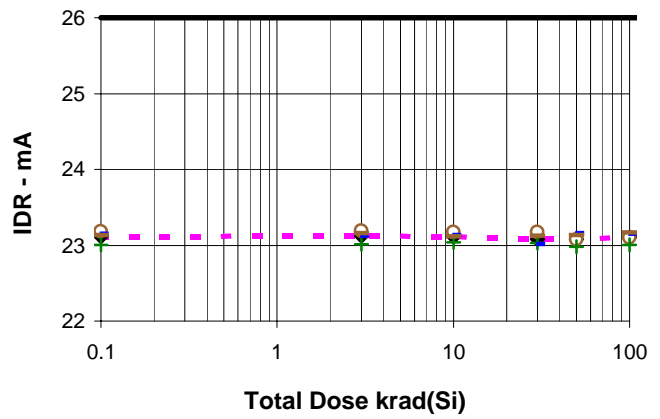
260. ID/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



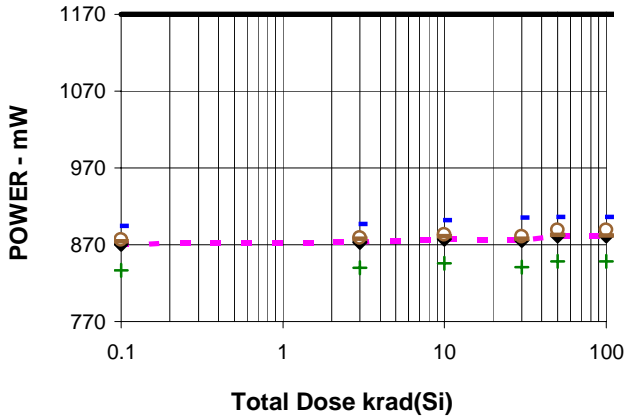
261. IDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



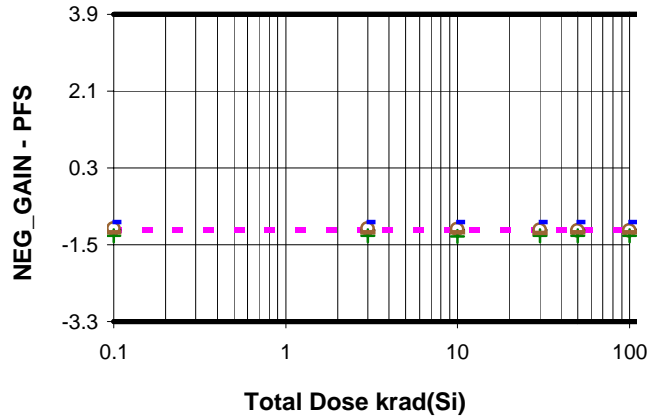
262. POWER/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose



300. NEG_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB

Vs Total Dose



ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
Total Dose Radiation Test Characteristics

258. HAR3/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	-78.775	-82.005	-76.120	2.522	0
3	-78.682	-81.673	-75.951	2.445	0
10	-78.971	-82.364	-76.173	2.625	0
30	-78.541	-81.468	-75.900	2.360	0
50	-78.460	-81.397	-75.942	2.311	0
100	-78.430	-81.391	-75.671	2.376	0

259. IA/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	253.797	243.625	260.938	7.289	0
3	254.656	244.562	261.688	7.215	0
10	256.024	246.375	263.188	7.018	0
30	255.477	244.906	264.188	7.955	0
50	257.078	246.969	264.438	7.356	0
100	257.047	247.125	264.531	7.294	0

260. ID/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	9.997	9.944	10.028	0.038	0
3	10.006	9.985	10.029	0.018	0
10	9.987	9.948	10.038	0.038	0
30	9.985	9.957	10.038	0.038	0
50	9.999	9.982	10.029	0.021	0
100	10.033	9.998	10.076	0.032	0

261. IDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	23.117	23.006	23.184	0.077	0
3	23.120	23.016	23.191	0.076	0
10	23.114	23.041	23.175	0.056	0
30	23.083	23.013	23.169	0.075	0
50	23.084	22.978	23.156	0.078	0
100	23.102	23.006	23.166	0.071	0

262. POWER/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	870.520	836.777	894.084	24.148	0
3	873.387	840.007	896.572	23.842	0
10	877.834	845.865	901.470	23.229	0
30	876.024	841.059	904.677	26.265	0
50	881.355	847.938	905.739	24.332	0
100	881.363	848.505	906.049	24.120	0

300. NEG_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB

Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	-1.154	-1.293	-0.974	0.137	0
3	-1.153	-1.294	-0.979	0.136	0
10	-1.158	-1.306	-0.970	0.142	0
30	-1.158	-1.292	-0.970	0.139	0
50	-1.161	-1.292	-0.977	0.134	0
100	-1.161	-1.284	-0.977	0.132	0

**ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
Total Dose Radiation Test Characteristics**

258. HAR3/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	-79.337	-82.005	-76.120	-77.640
3	-79.418	-81.673	-75.951	-77.687
10	-79.431	-82.364	-76.173	-77.915
30	-79.146	-81.468	-75.900	-77.649
50	-78.945	-81.397	-75.942	-77.555
100	-78.847	-81.391	-75.671	-77.810

259. IA/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	255.719	243.625	260.938	254.906
3	256.469	244.562	261.688	255.906
10	257.625	246.375	263.188	256.906
30	256.906	244.906	264.188	255.906
50	259.500	246.969	264.438	257.406
100	259.312	247.125	264.531	257.219

260. ID/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	10.028	9.944	9.997	10.019
3	10.010	9.985	10.001	10.029
10	10.038	9.948	9.985	9.976
30	10.038	9.960	9.957	9.985
50	9.998	9.982	10.029	9.988
100	10.029	9.998	10.029	10.076

261. IDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

Dose	D2	D3	D4	D5
0.1	23.184	23.006	23.147	23.131
3	23.191	23.016	23.119	23.156
10	23.175	23.041	23.128	23.113
30	23.169	23.028	23.013	23.122
50	23.075	22.978	23.156	23.128
100	23.094	23.006	23.144	23.166

262. POWER/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB Vs Total Dose

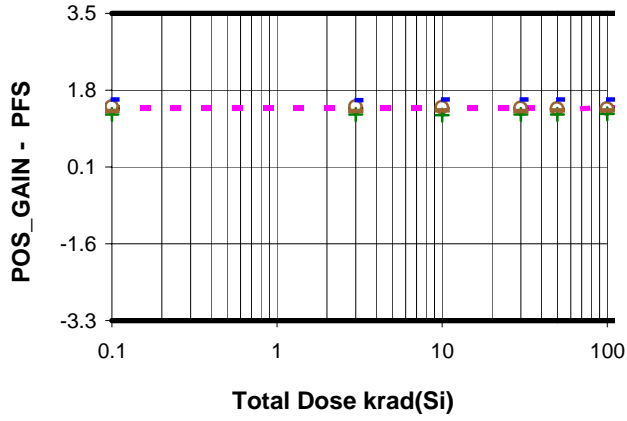
Dose	D2	D3	D4	D5
0.1	876.965	836.777	894.084	874.253
3	879.381	840.007	896.572	877.586
10	883.289	845.865	901.470	880.711
30	880.917	841.059	904.677	877.442
50	889.342	847.938	905.739	882.402
100	888.827	848.505	906.049	882.072

300. NEG_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB Vs Total Dose

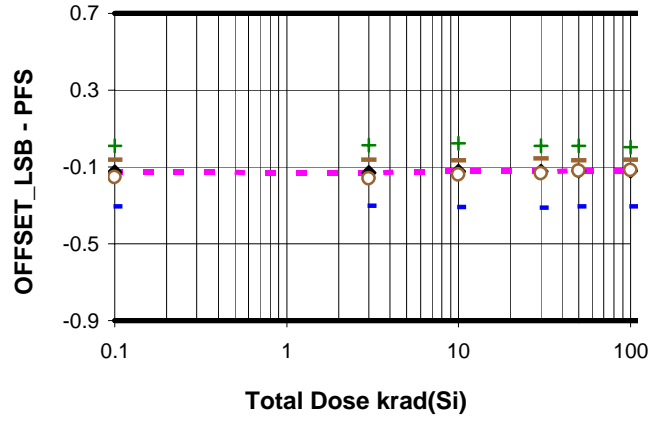
Dose	D2	D3	D4	D5
0.1	-1.129	-1.293	-0.974	-1.218
3	-1.122	-1.294	-0.979	-1.218
10	-1.141	-1.306	-0.970	-1.214
30	-1.148	-1.292	-0.970	-1.224
50	-1.163	-1.292	-0.977	-1.214
100	-1.165	-1.284	-0.977	-1.217

**ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
Total Dose Radiation Test Characteristics**

**301. POS_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB
Vs Total Dose**



**302. OFFSET_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB
Vs Total Dose**



ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
Total Dose Radiation Test Characteristics

301. POS_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB
Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	1.404	1.264	1.584	0.137	0
3	1.404	1.263	1.578	0.136	0
10	1.400	1.251	1.587	0.142	0
30	1.399	1.265	1.588	0.139	0
50	1.396	1.265	1.581	0.134	0
100	1.397	1.273	1.581	0.132	0

302. OFFSET_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB
Vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	-0.128	-0.308	0.011	0.137	0
3	-0.128	-0.303	0.012	0.136	0
10	-0.124	-0.311	0.024	0.142	0
30	-0.123	-0.312	0.010	0.139	0
50	-0.120	-0.305	0.010	0.134	0
100	-0.121	-0.305	0.002	0.132	0

**ADC14155W-MLS_Lot STM9837JQ_Wafer Run V00837JQCA_Wafer #1
 Total Dose Radiation Test Characteristics**
301. POS_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB
Vs Total Dose

Dose	D2	D3	D4	D5
0.1	1.428	1.264	1.584	1.339
3	1.435	1.263	1.578	1.339
10	1.417	1.251	1.587	1.344
30	1.410	1.265	1.588	1.333
50	1.394	1.265	1.581	1.343
100	1.392	1.273	1.581	1.340

302. OFFSET_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB
Vs Total Dose

Dose	D2	D3	D4	D5
0.1	-0.152	0.011	-0.308	-0.063
3	-0.160	0.012	-0.303	-0.064
10	-0.141	0.024	-0.311	-0.068
30	-0.134	0.010	-0.312	-0.057
50	-0.118	0.010	-0.305	-0.068
100	-0.116	0.002	-0.305	-0.065

Unit 2							
Test #	Pre_Rad	Post MAAT	Meas	Test name & Conditions	L_Limit	H_Limit	Result
200	0.58424	0.57033	LSB	MAX_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	0	1.1	Pass
201	-0.4825	-0.457436	LSB	MIN_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-0.9	0	Pass
202	2.36082	1.92345	LSB	MAX_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	0	5	Pass
203	-2.0506	-2.0974	LSB	MIN_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-5	0	Pass
250	69.0168	69.0529	DBC	SNR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	66.5		Pass
251	69.997	70.0662	DBFS	NFLR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	67		Pass
252	-75.788	-75.3084	DBFS	THD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-67	Pass
253	68.9811	68.9298	DBFS	SINAD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	66.2		Pass
254	79.3156	78.6813	DBFS	SFDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	68		Pass
255	11.1663	11.1578	BITS	ENOB/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	10.7		Pass
256	0.9752	1.00729	DBFS	DBFS/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	0		Pass
257	-79.316	-78.7243	DBFS	HAR2/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-71	Pass
258	-79.337	-78.6813	DBFS	HAR3/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-68	Pass
259	255.719	259.125	mA	IA/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		335	Pass
260	10.0283	9.97823	mA	ID/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		11	Pass
261	23.1844	23.0031	mA	IDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		26	Pass
262	876.965	888.041	mW	POWER/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		1170	Pass
300	-1.1295	-1.15095	PFS	NEG_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-3.3	3.9	Pass
301	1.42792	1.40643	PFS	POS_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-3.3	3.5	Pass
302	-0.1523	-0.13079	PFS	OFFSET_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-0.9	0.7	Pass
Unit 3							
Test #	Pre_Rad	Post MAAT	Meas	Test name & Conditions	L_Limit	H_Limit	Result
200	0.61588	0.669799	LSB	MAX_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	0	1.1	Pass
201	-0.5463	-0.54885	LSB	MIN_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-0.9	0	Pass
202	2.14527	2.00949	LSB	MAX_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	0	5	Pass
203	-2.0694	-2.09459	LSB	MIN_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-5	0	Pass
250	68.8593	68.8038	DBC	SNR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	66.5		Pass
251	69.8459	69.8136	DBFS	NFLR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	67		Pass
252	-76.871	-76.4623	DBFS	THD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-67	Pass
253	69.06	68.963	DBFS	SINAD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	66.2		Pass
254	79.9819	79.3594	DBFS	SFDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	68		Pass
255	11.1794	11.1633	BITS	ENOB/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	10.7		Pass
256	0.97876	1.00134	DBFS	DBFS/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	0		Pass
257	-79.982	-79.3594	DBFS	HAR2/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-71	Pass
258	-82.005	-81.5729	DBFS	HAR3/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-68	Pass
259	243.625	246.375	mA	IA/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		335	Pass
260	9.94379	9.90001	mA	ID/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		11	Pass
261	23.0062	22.9406	mA	IDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		26	Pass
262	836.777	845.707	mW	POWER/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		1170	Pass
300	-1.293	-1.29766	PFS	NEG_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-3.3	3.9	Pass
301	1.26442	1.25972	PFS	POS_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-3.3	3.5	Pass
302	0.01121	0.015917	PFS	OFFSET_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-0.9	0.7	Pass

Unit 4							
Test #	Pre_Rad	Post MAAT	Meas	Test name & Conditions	L_Limit	H_Limit	Result
200	0.5032	0.601452	LSB	MAX_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	0	1.1	Pass
201	-0.4742	-0.538109	LSB	MIN_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-0.9	0	Pass
202	2.35537	2.33376	LSB	MAX_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	0	5	Pass
203	-2.3829	-2.36359	LSB	MIN_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-5	0	Pass
250	68.7951	68.8761	DBC	SNR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	66.5		Pass
251	69.764	69.8775	DBFS	NFLR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	67		Pass
252	-74.58	-74.2046	DBFS	THD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-67	Pass
253	68.5257	68.5127	DBFS	SINAD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	66.2		Pass
254	76.12	75.8749	DBFS	SFDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	68		Pass
255	11.0906	11.0885	BITS	ENOB/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	10.7		Pass
256	0.96335	0.993611	DBFS	DBFS/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	0		Pass
257	-81.178	-80.2316	DBFS	HAR2/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-71	Pass
258	-76.12	-75.8749	DBFS	HAR3/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-68	Pass
259	260.938	264.188	mA	IA/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		335	Pass
260	9.99699	9.99075	mA	ID/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		11	Pass
261	23.1469	23.1469	mA	IDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		26	Pass
262	894.084	904.788	mW	POWER/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		1170	Pass
300	-0.9736	-0.978249	PFS	NEG_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-3.3	3.9	Pass
301	1.5838	1.57912	PFS	POS_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-3.3	3.5	Pass
302	-0.3082	-0.303489	PFS	OFFSET_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-0.9	0.7	Pass
Unit 5							
Test #	Pre_Rad	Post MAAT	Meas	Test name & Conditions	L_Limit	H_Limit	Result
200	0.70797	0.576555	LSB	MAX_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	0	1.1	Pass
201	-0.4228	-0.489046	LSB	MIN_DNL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-0.9	0	Pass
202	2.12296	2.15953	LSB	MAX_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	0	5	Pass
203	-2.004	-2.17948	LSB	MIN_INL/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-5	0	Pass
250	69.0204	69.1124	DBC	SNR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	66.5		Pass
251	70.0615	70.1009	DBFS	NFLR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	67		Pass
252	-75.956	-75.4946	DBFS	THD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-67	Pass
253	69.0669	68.999	DBFS	SINAD/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	66.2		Pass
254	77.6395	77.5104	DBFS	SFDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	68		Pass
255	11.1805	11.1693	BITS	ENOB/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	10.7		Pass
256	1.03771	0.980544	DBFS	DBFS/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB	0		Pass
257	-82.573	-81.2531	DBFS	HAR2/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-71	Pass
258	-77.64	-77.5104	DBFS	HAR3/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		-68	Pass
259	254.906	257.906	mA	IA/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		335	Pass
260	10.0189	10.0095	mA	ID/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		11	Pass
261	23.1313	23.0938	mA	IDR/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		26	Pass
262	874.253	884.122	mW	POWER/3.30/1.8/155M/70M/0.00/50%/1.50/1.00DB		1170	Pass
300	-1.2184	-1.21192	PFS	NEG_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-3.3	3.9	Pass
301	1.33899	1.34545	PFS	POS_GAIN_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-3.3	3.5	Pass
302	-0.0634	-0.069815	PFS	OFFSET_LSB/3.30/1.8/155M/0M/0.00/50%/1.50/0.00DB	-0.9	0.7	Pass