

# National Semiconductor

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

## Total Ionizing Dose (TID) Report ADC08D1520WGFQV - Low Power, 8-Bit, Dual 1.5 GSPS or Single 3.0 GSPS A/D Converter from the PowerWise® Family

**Wafer Run V00733JJ – Wafer # 21  
Lot STM82234**



**Date: October 26, 2007**

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## ADC08D1520WGFQV Total Ionizing Dose Report

The ADC08D1520WGFQV (DSCC SMD# 5962F0721401VZC) passes Total Ionizing Dose (TID) to 300 krad(Si).

### Product Details:

The ADC08D1520WGFQV is a dual, high performance, low power monolithic analog to digital converter capable of converting analog input signals into 8-bit words at 1.5 GS/s (Gigasamples per second). It employs two 1.9 V dc power supplies and power consumption is 1 W per channel.

The ADC08D1520WGFQV 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, 100 and 300 krad(Si). During irradiation, the supply voltage is set at 2.0 V and the input clock is set at 1 GHz, 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 irradiate to 1.5 times the rated radiation level (450 krad(Si), in this case). No electrical testing is done at this point. 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 on listed on page 3. Parametric test descriptions are shown starting on page 6. Results and plots are shown starting on page 9. The final 3 pages shows the MAAT results for selected tests.

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

ANALOG TOTAL DOSE RADIATION REPORT

Part Type: ADC08D1520WGFQV

Input Bias Circuit: 06417IR

Dose Rate: 200.81Rads(Si)/sec

Test Program Used: TMT18D1520\_B0

Tester: Ultra Flex Operator: Thang Trinh, Tom Santiago

Wafer Run Number: V00733JJ

Wafer Number: 21

Number of Units Tested: 3.

Package Type: DCQGP128

Production Lot #: STM82234

IPI #: N/A

Disposition: Passes Up To 300Krad

Summary:

Passes Room Temp @:

Pre-Rad, Post 3Krad, Post 10Krad, Post 30Krad, Post  
50Krad, Post 100Krad, Post 300Krad, Post MOS  
Accelerated Anneal Test

Part Out of Room Temp Spec @: N/A

Functional Failed @: N/A

Parameters over Limit: N/A

Review By: Rob Rennie, Larry McGee

Michael Adams

26-Oct-07

Reviewed By QA: Kirby Kruckmeyer

26-Oct-07

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

NSID# ADC08D1520WGFQV    LOT# STM82234    W#21    IPI N/A

**Test Program: TMT18D1520\_B0**

**Machine: Ultra Flex    Operator: Thang & Tom    Bias Board: 06417IR**

**Start Time** \_\_17\_\_:\_\_15\_\_

**Finish Time** \_\_23\_\_:\_\_32\_\_

**Start Date:** 09 / Oct / 07    **Finish Date:** 09 / Oct / 07    **QA:** 26 / Oct / 07

**Control Units s/n:** #\_\_7\_\_    #\_\_\_\_    #\_\_\_\_    #\_\_\_\_

**Duts :** #\_\_8\_\_    #\_\_11\_\_    #\_\_12\_\_    #\_\_\_\_    #\_\_\_\_

**Duts :** #\_\_\_\_    #\_\_\_\_    #\_\_\_\_    #\_\_\_\_    #\_\_\_\_

**Duts :** #\_\_\_\_    #\_\_\_\_    #\_\_\_\_    #\_\_\_\_    #\_\_\_\_

**Duts :** #\_\_\_\_    #\_\_\_\_    #\_\_\_\_    #\_\_\_\_    #\_\_\_\_

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

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

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

NSID# ADC08D1520WGFQV    LOT# STM82234 W#21    IPI N/A

Location Step	Operation Mtd/Cond	Qty In	Qty Out	Var	Mech	Rej	FF
	<i>Irradiation</i>  30k  <i>Level</i>	3	3	0	0	N/A	N/A
PASS	Post Rad Read/Rec. Tp4	3	3	0	0	0	0
	<i>Irradiation</i>  50k  <i>Level</i>	3	3	0	0	N/A	N/A
PASS	Post Rad Read/Rec. Tp5	3	3	0	0	0	0
	<i>Irradiation</i>  100k  <i>Level</i>	3	3	0	0	N/A	N/A
PASS	Post Rad Read/Rec. Tp6	3	3	0	0	0	0
	<i>Irradiation</i>  300k  <i>Level</i>	3	3	0	0	N/A	N/A
PASS	Post Rad Read/Rec. Tp7	3	3	0	0	0	0
	<i>MOS Accelerated Anneal</i>	3	3	0	0	0	0

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

## ADC08D1520WG-QV TOTAL DOSE RADIATION

### TEST CHARACTERISTICS

#### Summary

This Report shows total dose radiation test data for ADC08D1520WGFQV.

The first section shows the data for the exposure up to 300k rads and data was collected after 0k, 3, 10, 30, 50, 100 and 300 krads exposure.

The second section (last 3 pages) shows the results from 6 selected tests for the MOS Accelerated Annealing Test. As described in Mil-Std-883, 1019, units were exposed to 50% addition radiation (total of 450 krads in this case) and annealed at 100°C for 168 hours, while biased.

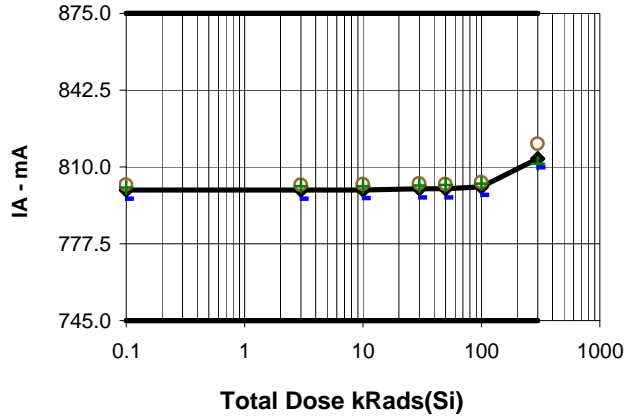
Test Id	Test Description
410	Va supply current, Va=1.9V=Vdr, FS=870mV, I and Q both 748MHz input, OUTV=high(Va), normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
411	Vdr supply current, Va=1.9V=Vdr, FS=870mV, OUTV=high(Va), I and Q both 748MHz input, normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
412	Power consumption, Va=1.9V=Vdr, FS=870mV, OUTV=high(Va), I and Q both 748MHz input, normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
413	Va supply current, with Q channel powered down, Va=1.9V=Vdr, FS=870mV, OUTV=high(Va), I and Q both 748MHz input, normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
414	Vdr supply current, with Q channel powered down, Va=1.9V=Vdr, FS=870mV, OUTV=high(Va), I and Q both 748MHz input, normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
415	Power consumption, with Q channel powered down, Va=1.9V=Vdr, FS=870mV, OUTV=high(Va), I and Q both 748MHz input, normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
550	Bandgap voltage, Va=1.9V=Vdr, FS=870mV, OUTV=Low(Gnd), bandgap pin floating, I=Q=no input, clock freq=1.5GHz
551	Bandgap voltage, Va=1.9V=Vdr, FS=870mV, OUTV=Low(Gnd), with Vbg pin sinking 100uA, I=Q=no input, clock freq=1.5GHz
552	Bandgap voltage, Va=1.9V=Vdr, FS=870mV, OUTV=Low(Gnd), with Vbg pin sourcing 100uA, I=Q=no input, clock freq=1.5GHz
686	LVDS output Pin I0 VODH, Va=1.9V=Vdr, FS=650mV, OUTV=high (Va), I=Q=no input, normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
718	LVDS output Pin I0 VODL, Va=1.9V=Vdr, FS=650mV, OUTV=high (Va), I=Q=no input, normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
986	LVDS output Pin Q0 VODH, Va=1.9V=Vdr, SF=650mV, OUTV=high (Va), I=Q=no input, normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%

1018	LVDS output Pin Q0 VODL, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=high(V_a)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
1436	LVDS output Pin ID0 VODH, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=high(V_a)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
1468	LVDS output Pin ID0 VODL, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=high(V_a)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
1736	LVDS output Pin QD0 VODH, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=high(V_a)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
2216	LVDS output Pin I0 VODH, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=Low(Gnd)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
2248	LVDS output Pin I0 VODL, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=Low(Gnd)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
2516	LVDS output Pin Q0 VODH, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=Low(Gnd)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
2548	LVDS output Pin Q0 VODL, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=Low(Gnd)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
3016	LVDS output Pin ID0 VODH, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=Low(Gnd)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
3048	LVDS output Pin ID0 VODL, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=Low(Gnd)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
3316	LVDS output Pin QD0 VODH, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=Low(Gnd)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
3348	LVDS output Pin QD0 VODL, $V_a=1.9V=V_{dr}$ , $FS=650mV$ , $OUTV=Low(Gnd)$ , $I=Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
7026	Signal To Noise Ratio, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=373MHz$ , $Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
7027	Total Harmonic Distortion, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=373MHz$ , $Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
7028	Spurious Free Dynamic Range, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=373MHz$ , $Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
7029	Signal To Noise Including Distortion, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=373MHz$ , $Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
7030	Effective Number Of Bits, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=373MHz$ , $Q=no\ input$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
7226	Signal To Noise Ratio, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=no\ input$ , $Q=373MHz$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
7227	Total Harmonic Distortion, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=no\ input$ , $Q=373MHz$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
7228	Spurious Free Dynamic Range, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , no input, $Q=373MHz$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
7229	Signal To Noise Including Distortion, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=no\ input$ , $Q=373MHz$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
7230	Effective Number Of Bits, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=no\ input$ , $Q=373MHz$ , normal (non-DES) mode, clock freq=1.5GHz, 0 offset, 0 phase shift, duty cycle=50%
7411	Max DNL, I channel, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , Input freq= $I=Q=1MHz$ , clock freq=1.5GHz, normal (non-DES) mode, 0 offset, 0 phase shift, 50% clock duty cycle
7412	MinDNL, I channel, $V_a=1.9V=V_{dr}$ , $OUTV=high(V_a)$ , $FS=870mV$ , Input freq= $I=Q=1MHz$ , clock freq=1.5GHz, normal (non-DES) mode, 0 offset, 0 phase shift, 50% clock duty cycle

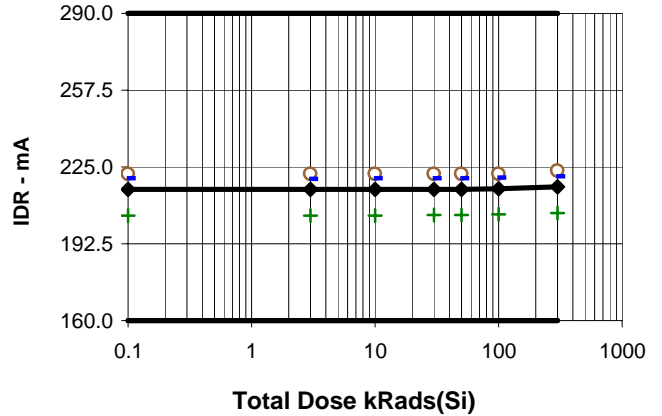
7413	Max INL, I channel, $V_a=1.9V=V_{dr}$ , $OUTV=high(V_a)$ , $FS=870mV$ , Input freq= $I=Q=1MHz$ , clock freq= $1.5GHz$ , normal (non-DES) mode, 0 offset, 0 phase shift, 50% clock duty cycle
7414	Min INL, I channel, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , Input freq= $I=Q=1MHz$ , clock freq= $1.5GHz$ , normal (non-DES) mode, 0 offset, 0 phase shift, 50% clock duty cycle
7441	Max DNL, Q channel, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , Input freq= $I=Q=1MHz$ , clock freq= $1.5GHz$ , normal (non-DES) mode, 0 offset, 0 phase shift, 50% clock duty cycle
7442	Min DNL, Q channel, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , Input freq= $I=Q=1MHz$ , clock freq= $1.5GHz$ , normal (non-DES) mode, 0 offset, 0 phase shift, 50% clock duty cycle
7443	Max INL, Q channel, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , Input freq= $I=Q=1MHz$ , clock freq= $1.5GHz$ , normal (non-DES) mode, 0 offset, 0 phase shift, 50% clock duty cycle
7444	Min INL, Q channel, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , Input freq= $I=Q=1MHz$ , clock freq= $1.5GHz$ , normal (non-DES) mode, 0 offset, 0 phase shift, 50% clock duty cycle
17926	Signal To Noise Ratio, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=373MHz$ , $Q=no\ input$ , DES mode, clock freq= $1.5GHz$ , 0 offset, 0 phase shift, duty cycle=50%
17927	Total Harmonic Distortion, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=373MHz$ , $Q=no\ input$ , DES mode, clock freq= $1.5GHz$ , 0 offset, 0 phase shift, duty cycle=50%
17928	Spurious Free Dynamic Range, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=373MHz$ , $Q=no\ input$ , DES mode, clock freq= $1.5GHz$ , 0 offset, 0 phase shift, duty cycle=50%
17929	Signal To Noise Including Distortion, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=373MHz$ , $Q=no\ input$ , DES mode, clock freq= $1.5GHz$ , 0 offset, 0 phase shift, duty cycle=50%
17930	Effective Number Of Bits, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , $I=373MHz$ , $Q=no\ input$ , DES mode, clock freq= $1.5GHz$ , 0 offset, 0 phase shift, duty cycle=50%
8810	Offset Error, I channel, $FS=870mV$ , $OUTV=high(V_a)$ , $V_a=1.9V=V_{dr}$ , $OUTV=low(Gnd)$ , clock freq= $1.5GHz$
8841	Negative Full Scale Error, I channel, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , clock freq= $1.5GHz$
8871	Positive Full Scale Error, I channel, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , clock freq= $1.5GHz$
8900	Offset Error, Q channel, $V_a=1.9V=V_{dr}$ , $FS=870mV$ , $OUTV=high(V_a)$ , clock freq= $1.5GHz$ , normal (non-DES) mode
8931	Negative Full Scale Error, Q channel, $V_a=1.9V=V_{dr}$ , $FS=870mV$
8961	Positive Full Scale Error, Q channel, $V_a=1.9V=V_{dr}$ , $FS=870mV$
9761	Input impedance, Q channel, $V_a=1.9V=V_{dr}$ , $I=Q=no\ input$ , clock freq= $1.5GHz$ , 0 offset, 0 phase shift, duty cycle=50%
9792	Ratio of DCLK high time to period (50% duty cycle)
9793	Ratio of DCLK low time to period (50% duty cycle)
9866	DQ5 output leakage to $V_a$ , $V_a=1.9V=V_{dr}$ , 1:1 mode, clock freq= $1GHz$
9867	DQ5 output leakage to $V_a$ , $V_a=1.9V=V_{dr}$ , 1:1 mode, clock freq= $1GHz$
9882	DI5 output leakage to Gnd, $V_a=1.9V=V_{dr}$ , 1:1 mode, clock freq= $1GHz$
9883	DI5 output leakage to Gnd, $V_a=1.9V=V_{dr}$ , 1:1 mode, clock freq= $1GHz$

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

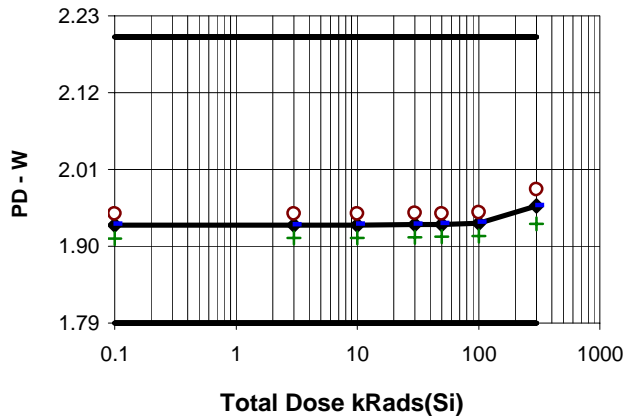
**Test # 410. Analog Supply Current PD=PDQ=Low vs Total Dose**



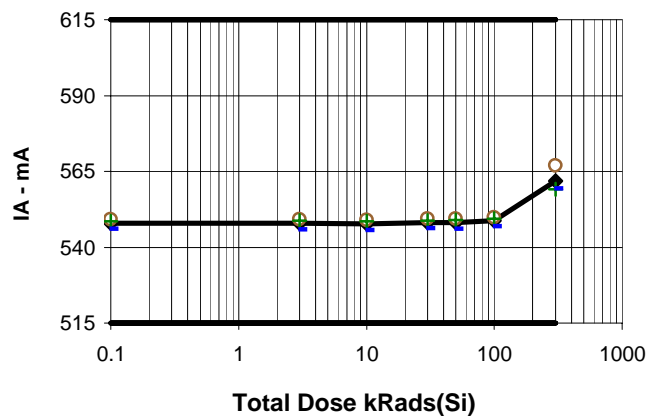
**Test # 411. Output Driver Supply Current PD=PDQ=Low vs Total Dose**



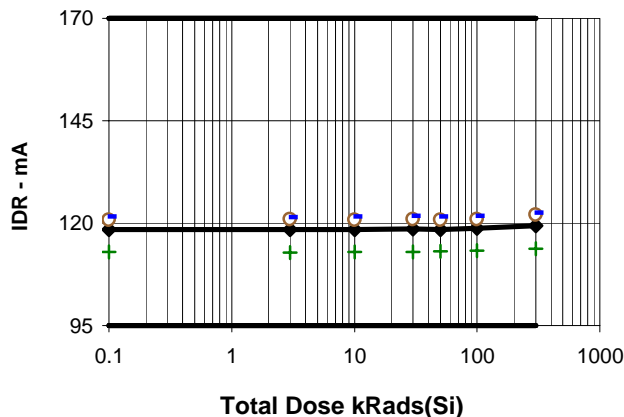
**Test # 412. Power Consumption PD=PDQ=Low vs Total Dose**



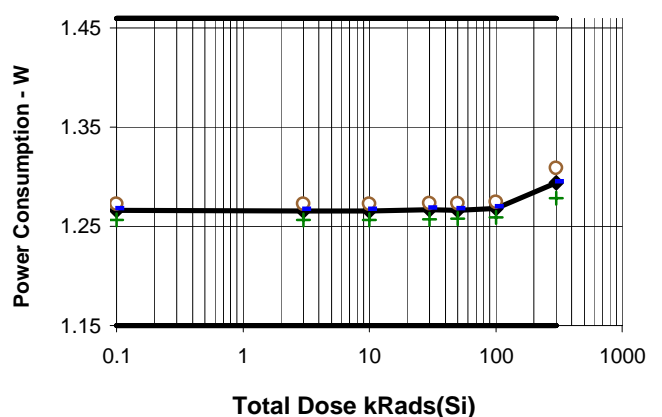
**Test # 413. Analog Supply Current PD=PDQ=High vs Total Dose**



**Test # 414. Output Driver Supply Current PD=PDQ=High vs Total Dose**



**Test # 415. Power Consumption PD=PDQ=High vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 410. Analog Supply Current PD=PDQ=Low vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	800.184	796.590	802.520	3.159	0
3	800.260	796.526	802.482	3.253	0
10	800.383	796.767	802.558	3.153	0
30	800.717	797.071	802.977	3.187	0
50	800.716	797.096	802.761	3.144	0
100	801.498	797.996	803.585	3.051	0
300	813.626	809.845	819.692	5.306	0

**Test # 411. Output Driver Supply Current PD=PDQ=Low vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	215.570	204.411	222.119	9.713	0
3	215.507	204.449	222.132	9.639	0
10	215.562	204.538	222.094	9.601	0
30	215.634	204.766	222.119	9.470	0
50	215.558	204.728	221.891	9.424	0
100	215.811	205.032	222.081	9.376	0
300	216.609	205.589	223.360	9.624	0

**Test # 412. Power Consumption PD=PDQ=Low vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	1.930	1.911	1.947	0.018	0
3	1.930	1.912	1.947	0.018	0
10	1.930	1.912	1.947	0.017	0
30	1.931	1.913	1.948	0.017	0
50	1.931	1.913	1.947	0.017	0
100	1.933	1.915	1.949	0.017	0
300	1.957	1.932	1.982	0.025	0

**Test # 413. Analog Supply Current PD=PDQ=High vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	547.835	545.921	549.090	1.684	0
3	547.823	545.706	549.090	1.845	0
10	547.742	545.630	549.014	1.842	0
30	548.131	546.150	549.445	1.746	0
50	548.071	545.959	549.330	1.841	0
100	548.743	546.859	549.901	1.646	0
300	561.759	559.127	566.832	4.395	0

**Test # 414. Output Driver Supply Current PD=PDQ=High vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	118.448	112.896	121.611	4.824	0
3	118.381	112.782	121.471	4.857	0
10	118.414	112.896	121.560	4.795	0
30	118.529	113.036	121.649	4.771	0
50	118.499	113.112	121.560	4.680	0
100	118.689	113.327	121.750	4.659	0
300	119.407	113.694	122.535	4.955	0

**Test # 415. Power Consumption PD=PDQ=High vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	1.266	1.257	1.273	0.008	0
3	1.266	1.257	1.273	0.008	0
10	1.266	1.257	1.273	0.008	0
30	1.267	1.257	1.274	0.008	0
50	1.266	1.258	1.273	0.008	0
100	1.268	1.259	1.275	0.008	0
300	1.294	1.278	1.309	0.015	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 410. Analog Supply Current PD=PDQ=Low**

vs Total Dose

Dose	D8	D11	D12
0.1	802.520	801.443	796.590
3	802.482	801.773	796.526
10	802.558	801.823	796.767
30	802.977	802.102	797.071
50	802.761	802.292	797.096
100	803.585	802.913	797.996
300	819.692	811.341	809.845

**Test # 411. Output Driver Supply Current PD=PDQ=Low**

vs Total Dose

Dose	D8	D11	D12
0.1	222.119	204.411	220.181
3	222.132	204.449	219.940
10	222.094	204.538	220.054
30	222.119	204.766	220.016
50	221.891	204.728	220.054
100	222.081	205.032	220.320
300	223.360	205.589	220.878

**Test # 412. Power Consumption PD=PDQ=Low**

vs Total Dose

Dose	D8	D11	D12
0.1	1.95	1.91	1.93
3	1.95	1.91	1.93
10	1.95	1.91	1.93
30	1.95	1.91	1.93
50	1.95	1.91	1.93
100	1.95	1.92	1.93
300	1.98	1.93	1.96

**Test # 413. Analog Supply Current PD=PDQ=High**

vs Total Dose

Dose	D8	D11	D12
0.1	549.09	548.49	545.92
3	549.09	548.67	545.71
10	549.01	548.58	545.63
30	549.45	548.80	546.15
50	549.33	548.93	545.96
100	549.90	549.47	546.86
300	566.83	559.13	559.32

**Test # 414. Output Driver Supply Current PD=PDQ=High**

vs Total Dose

Dose	D8	D11	D12
0.1	120.838	112.896	121.611
3	120.889	112.782	121.471
10	120.787	112.896	121.560
30	120.901	113.036	121.649
50	120.825	113.112	121.560
100	120.99	113.327	121.75
300	121.991	113.694	122.535

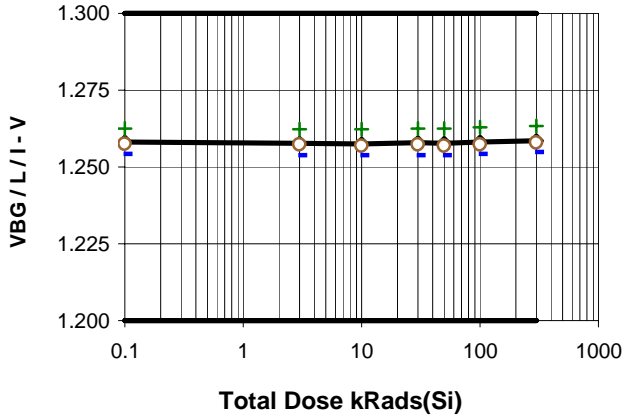
**Test # 415. Power Consumption PD=PDQ=High**

vs Total Dose

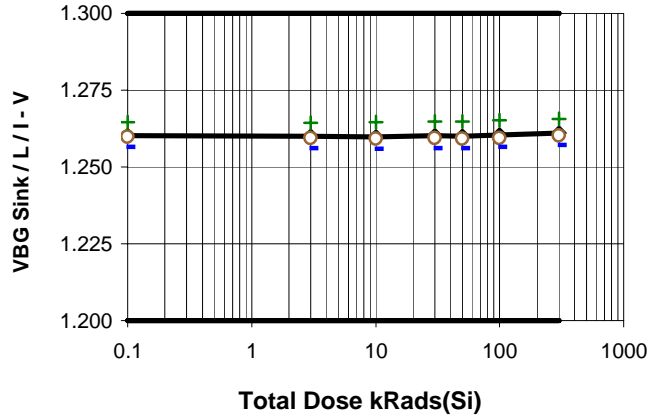
Dose	D8	D11	D12
0.1	1.273	1.257	1.268
3	1.273	1.257	1.268
10	1.273	1.257	1.268
30	1.274	1.257	1.269
50	1.273	1.258	1.268
100	1.275	1.259	1.270
300	1.309	1.278	1.296

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

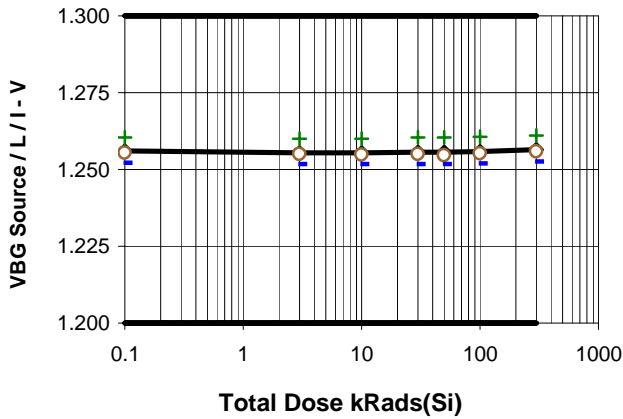
**Test # 550. Bandgap Reference Output Voltage vs Total Dose**



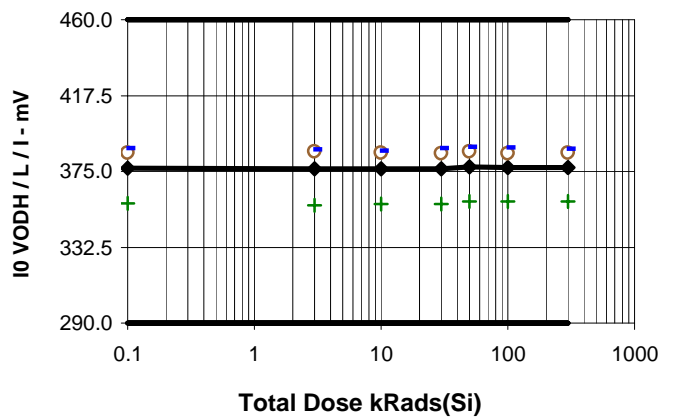
**Test # 551. Bandgap Reference Output Voltage Sink vs Total Dose**



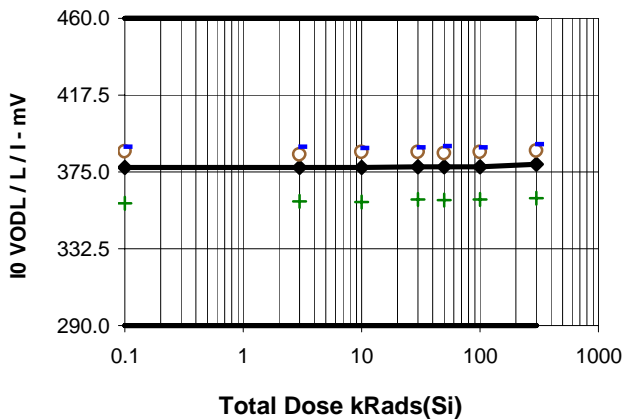
**Test # 552. Bandgap Reference Output Voltage Source vs Total Dose**



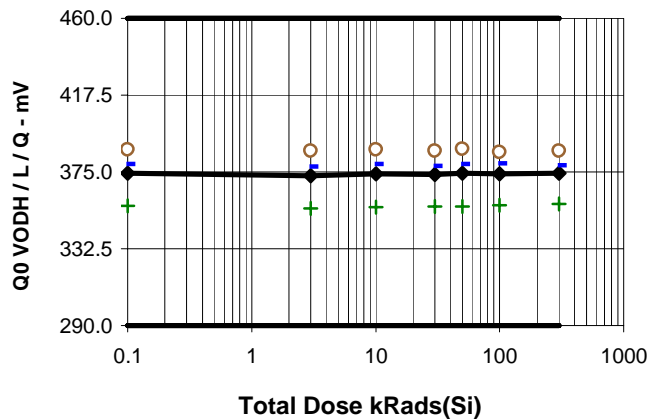
**Test # 686 LVDS Differential Output Voltage-I Channel vs Total Dose**



**Test # 718 LVDS Differential Output Voltage-I Channel vs Total Dose**



**Test # 986 LVDS Differential Output Voltage-Q Channel vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 550. Bandgap Reference Output Voltage vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	1.258	1.254	1.262	0.004	0
3	1.258	1.254	1.262	0.004	0
10	1.258	1.254	1.262	0.004	0
30	1.258	1.254	1.263	0.004	0
50	1.258	1.254	1.263	0.004	0
100	1.258	1.254	1.263	0.004	0
300	1.259	1.255	1.263	0.004	0

**Test # 551. Bandgap Reference Output Voltage Sink vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	1.260	1.256	1.265	0.004	0
3	1.260	1.256	1.264	0.004	0
10	1.260	1.256	1.265	0.004	0
30	1.260	1.256	1.265	0.004	0
50	1.260	1.256	1.265	0.004	0
100	1.260	1.256	1.265	0.004	0
300	1.261	1.257	1.266	0.004	0

**Test # 552. Bandgap Reference Output Voltage Source vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	1.256	1.252	1.260	0.004	0
3	1.256	1.252	1.260	0.004	0
10	1.255	1.252	1.260	0.004	0
30	1.256	1.252	1.260	0.004	0
50	1.256	1.252	1.260	0.004	0
100	1.256	1.252	1.261	0.004	0
300	1.256	1.253	1.261	0.004	0

**Test # 686 LVDS Differential Output Voltage-I Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	376.790	357.067	387.870	17.124	0
3	376.485	356.152	387.260	17.619	0
10	376.282	356.762	386.651	16.916	0
30	376.587	356.762	387.871	17.223	0
50	377.501	357.982	388.480	16.948	0
100	377.095	357.982	388.175	16.622	0
300	376.993	357.982	387.565	16.499	0

**Test # 718 LVDS Differential Output Voltage-I Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	377.627	357.804	388.912	17.222	0
3	377.424	358.719	388.912	16.339	0
10	377.424	358.414	387.997	16.498	0
30	377.932	359.634	388.302	15.894	0
50	377.932	359.329	389.217	16.233	0
100	377.932	359.634	388.302	15.894	0
300	379.152	360.549	390.132	16.198	0

**Test # 986 LVDS Differential Output Voltage-Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	374.3	356.3	387.5	16.125	0
3	373.0	354.8	386.5	16.375	0
10	374.0	355.4	387.5	16.636	0
30	373.7	356.0	386.8	15.909	0
50	374.333	356.026	387.757	16.419	0
100	374.027	356.636	385.926	15.398	0
300	374.129	357.246	386.536	15.149	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 550. Bandgap Reference Output Voltage**

vs Total Dose

Dose	D8	D11	D12
0.1	1.258	1.262	1.254
3	1.257	1.262	1.254
10	1.257	1.262	1.254
30	1.257	1.263	1.254
50	1.257	1.263	1.254
100	1.257	1.263	1.254
300	1.258	1.263	1.255

**Test # 551. Bandgap Reference Output Voltage Sink**

vs Total Dose

Dose	D8	D11	D12
0.1	1.260	1.265	1.256
3	1.259	1.264	1.256
10	1.259	1.265	1.256
30	1.259	1.265	1.256
50	1.259	1.265	1.256
100	1.259	1.265	1.256
300	1.260	1.266	1.257

**Test # 552. Bandgap Reference Output Voltage Source**

vs Total Dose

Dose	D8	D11	D12
0.1	1.26	1.26	1.25
3	1.25	1.26	1.25
10	1.25	1.26	1.25
30	1.25	1.26	1.25
50	1.25	1.26	1.25
100	1.26	1.26	1.25
300	1.26	1.26	1.25

**Test # 686 LVDS Differential Output Voltage-I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	385.43	357.07	387.87
3	386.04	356.15	387.26
10	385.43	356.76	386.65
30	385.13	356.76	387.87
50	386.04	357.98	388.48
100	385.13	357.98	388.18
300	385.43	357.98	387.57

**Test # 718 LVDS Differential Output Voltage-I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	386.166	357.804	388.912
3	384.641	358.719	388.912
10	385.861	358.414	387.997
30	385.861	359.634	388.302
50	385.251	359.329	389.217
100	385.861	359.634	388.302
300	386.776	360.549	390.132

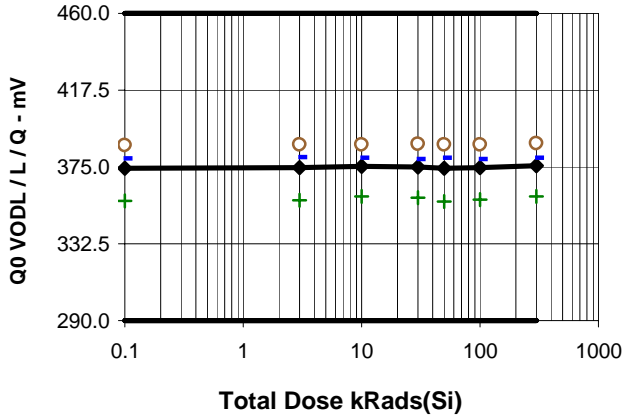
**Test # 986 LVDS Differential Output Voltage-Q Channel**

vs Total Dose

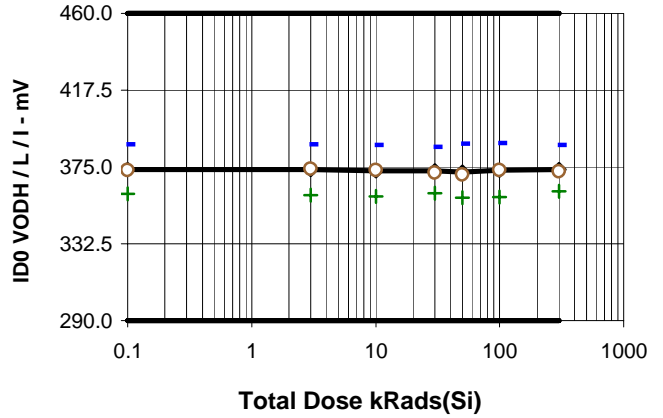
Dose	D8	D11	D12
0.1	387.452	356.331	379.215
3	386.536	354.805	377.689
10	387.452	355.416	379.215
30	386.841	356.026	378.300
50	387.757	356.026	379.215
100	385.926	356.636	379.520
300	386.536	357.246	378.605

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

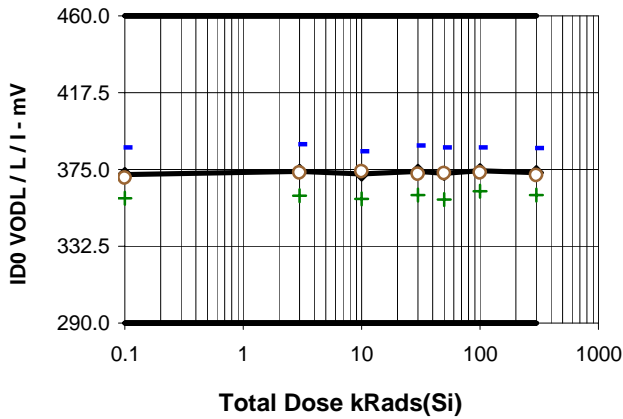
**Test # 1018 LVDS Differential Output Voltage-Q Channel vs Total Dose**



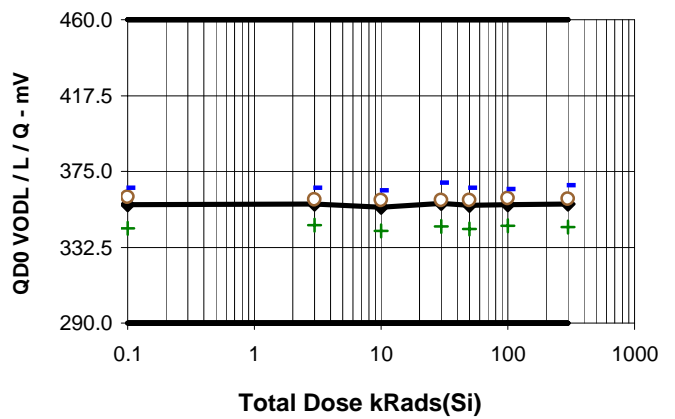
**Test # 1436 LVDS Differential Output Voltage-I Channel vs Total Dose**



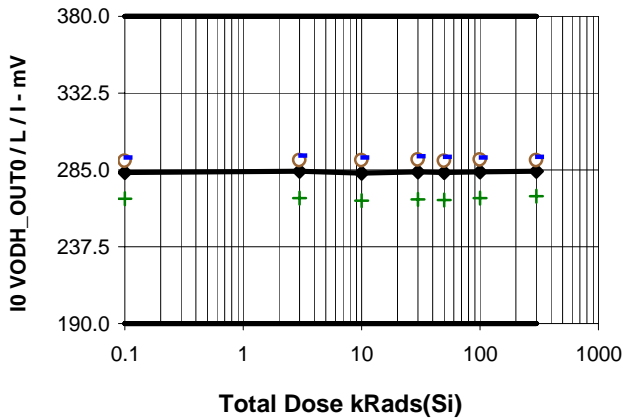
**Test # 1468 LVDS Differential Output Voltage-I Channel vs Total Dose**



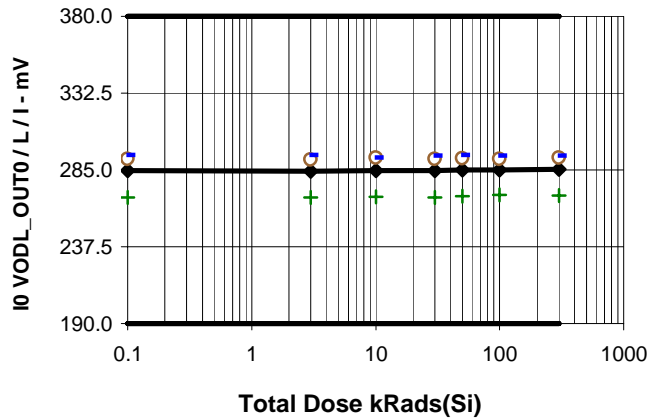
**Test # 1736 LVDS Differential Output Voltage-Q Channel vs Total Dose**



**Test # 2216 LVDS Differential Output Voltage-I Channel vs Total Dose**



**Test # 2248 LVDS Differential Output Voltage-I Channel vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 1018 LVDS Differential Output Voltage-Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	374.213	356.110	386.927	16.100	0
3	374.722	356.720	387.233	15.981	0
10	375.231	358.551	387.233	14.902	0
30	375.027	357.941	387.843	15.402	0
50	374.315	355.805	387.233	16.443	0
100	374.620	357.025	387.538	15.785	0
300	375.536	358.551	388.148	15.275	0

**Test # 1436 LVDS Differential Output Voltage-I Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	373.707	360.288	387.431	13.574	0
3	373.605	359.373	387.431	14.033	0
10	372.996	358.763	387.126	14.182	0
30	372.792	360.593	385.906	12.681	0
50	372.182	358.153	387.736	14.850	0
100	373.199	358.458	388.041	14.792	0
300	373.707	361.508	387.126	12.853	0

**Test # 1468 LVDS Differential Output Voltage-I Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	372.265	359.151	387.209	14.118	0
3	374.095	360.371	388.734	14.204	0
10	372.468	358.846	384.769	13.012	0
30	373.892	360.981	388.124	13.620	0
50	372.773	358.236	387.209	14.487	0
100	374.400	362.811	387.209	12.245	0
300	373.180	360.981	386.599	12.853	0

**Test # 1736 LVDS Differential Output Voltage-Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	356.485	343.162	365.740	11.826	0
3	356.689	344.993	365.740	10.623	0
10	354.959	341.637	364.214	11.825	0
30	357.095	344.078	368.486	12.285	0
50	355.875	342.857	365.740	11.763	0
100	356.383	344.383	364.824	10.675	0
300	356.790	343.772	366.960	11.853	0

**Test # 2216 LVDS Differential Output Voltage-I Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	283.467	267.099	292.718	14.215	0
3	284.077	267.709	293.632	14.241	0
10	283.162	266.184	292.413	14.723	0
30	283.772	266.794	293.327	14.742	0
50	283.365	266.489	293.022	14.666	0
100	283.873	267.709	292.412	14.006	0
300	284.178	268.624	293.022	13.513	0

**Test # 2248 LVDS Differential Output Voltage-I Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	284.6	268.1	294.1	14.314	0
3	284.4	267.8	294.1	14.416	0
10	284.5	268.4	292.5	13.910	0
30	284.5	268.1	293.8	14.214	0
50	285.015	268.750	294.063	14.116	0
100	285.015	269.665	293.758	13.336	0
300	285.218	269.360	293.758	13.747	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 1018 LVDS Differential Output Voltage-Q Channel**

**vs Total Dose**

Dose	D8	D11	D12
0.1	386.927	356.110	379.603
3	387.233	356.720	380.214
10	387.233	358.551	379.909
30	387.843	357.941	379.298
50	387.233	355.805	379.908
100	387.538	357.025	379.298
300	388.148	358.551	379.908

**Test # 1436 LVDS Differential Output Voltage-I Channel**

**vs Total Dose**

Dose	D8	D11	D12
0.1	373.402	360.288	387.431
3	374.012	359.373	387.431
10	373.098	358.763	387.126
30	371.878	360.593	385.906
50	370.658	358.153	387.736
100	373.097	358.458	388.041
300	372.487	361.508	387.126

**Test # 1468 LVDS Differential Output Voltage-I Channel**

**vs Total Dose**

Dose	D8	D11	D12
0.1	370.44	359.15	387.21
3	373.18	360.37	388.73
10	373.79	358.85	384.77
30	372.57	360.98	388.12
50	372.88	358.24	387.21
100	373.18	362.81	387.21
300	371.96	360.98	386.60

**Test # 1736 LVDS Differential Output Voltage-Q Channel**

**vs Total Dose**

Dose	D8	D11	D12
0.1	360.55	343.16	365.74
3	359.33	344.99	365.74
10	359.03	341.64	364.21
30	358.72	344.08	368.49
50	359.03	342.86	365.74
100	359.94	344.38	364.82
300	359.64	343.77	366.96

**Test # 2216 LVDS Differential Output Voltage-I Channel**

**vs Total Dose**

Dose	D8	D11	D12
0.1	290.584	267.099	292.718
3	290.889	267.709	293.632
10	290.889	266.184	292.413
30	291.194	266.794	293.327
50	290.584	266.489	293.022
100	291.499	267.709	292.412
300	290.889	268.624	293.022

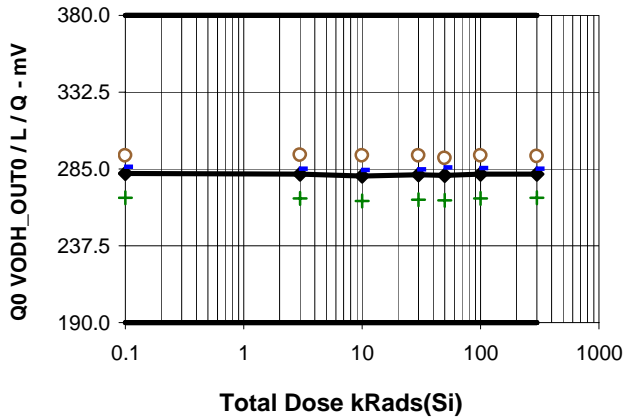
**Test # 2248 LVDS Differential Output Voltage-I Channel**

**vs Total Dose**

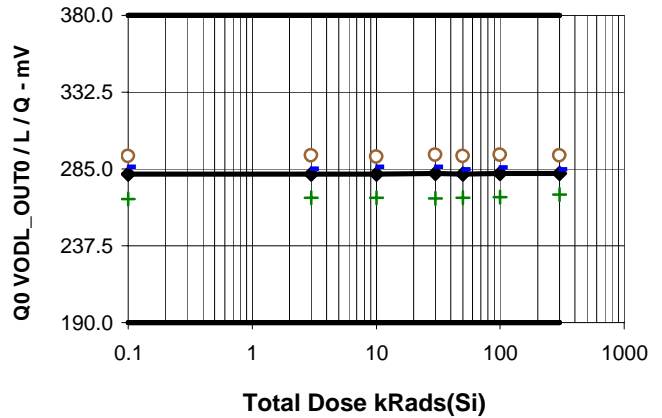
Dose	D8	D11	D12
0.1	291.622	268.140	294.063
3	291.317	267.835	294.063
10	292.537	268.445	292.538
30	291.622	268.140	293.758
50	292.232	268.750	294.063
100	291.622	269.665	293.758
300	292.537	269.360	293.758

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

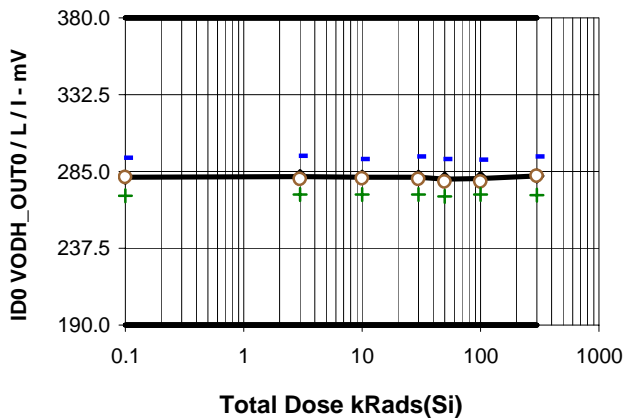
**Test # 2516 LVDS Differential Output Voltage-Q Channel vs Total Dose**



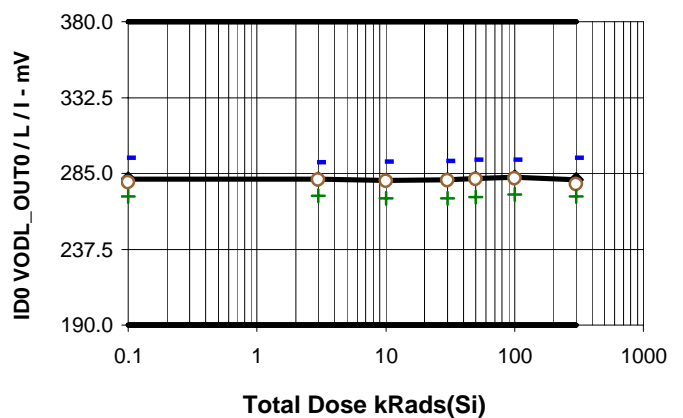
**Test # 2548 LVDS Differential Output Voltage-Q Channel vs Total Dose**



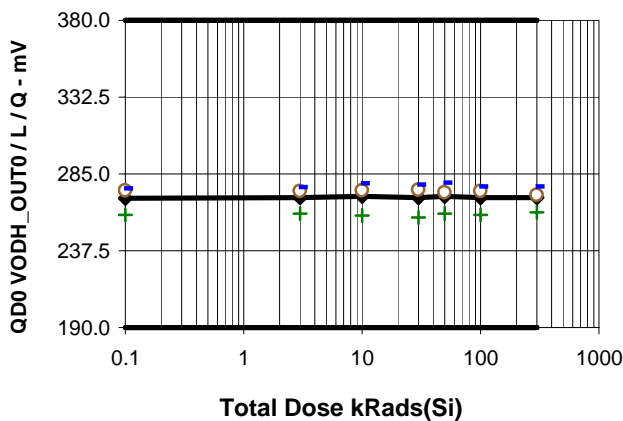
**Test # 3016 LVDS Differential Output Voltage-Q Channel vs Total Dose**



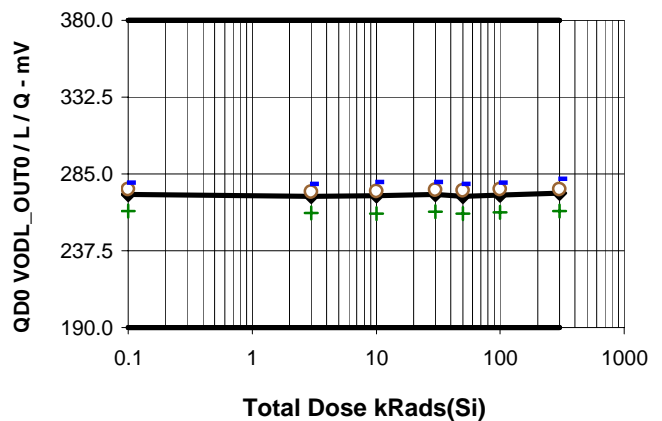
**Test # 3048 LVDS Differential Output Voltage-I Channel vs Total Dose**



**Test # 3316 LVDS Differential Output Voltage-Q Channel vs Total Dose**



**Test # 3348 LVDS Differential Output Voltage-Q Channel vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 2516 LVDS Differential Output Voltage-Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	282.289	267.237	293.476	13.540	0
3	281.882	266.932	293.781	13.682	0
10	280.764	265.102	293.171	14.315	0
30	281.272	266.017	293.171	13.885	0
50	281.069	265.712	291.646	13.612	0
100	281.781	266.627	293.171	13.666	0
300	281.679	267.237	292.866	13.121	0

**Test # 2548 LVDS Differential Output Voltage-Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	281.866	266.407	292.953	13.803	0
3	281.866	267.322	293.258	13.252	0
10	281.968	267.017	292.648	13.339	0
30	282.171	266.712	293.563	13.880	0
50	281.663	267.322	292.953	13.085	0
100	282.375	267.627	293.563	13.329	0
300	282.375	269.153	293.258	12.221	0

**Test # 3016 LVDS Differential Output Voltage-Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	281.604	270.015	293.193	11.589	0
3	281.808	270.625	294.413	11.958	0
10	281.401	270.930	292.583	10.844	0
30	281.604	270.625	294.108	11.815	0
50	280.181	269.405	292.583	11.674	0
100	280.689	270.930	292.278	10.791	0
300	282.214	270.320	294.108	11.894	0

**Test # 3048 LVDS Differential Output Voltage-I Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	281.484	270.403	294.801	12.352	0
3	281.280	271.013	291.751	10.370	0
10	280.569	269.183	292.361	11.594	0
30	280.975	269.488	292.666	11.590	0
50	281.687	270.098	293.581	11.744	0
100	282.399	271.928	293.581	10.844	0
300	280.975	270.403	294.496	12.314	0

**Test # 3316 LVDS Differential Output Voltage-Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	270.040	259.565	276.040	9.104	0
3	270.447	260.480	276.650	8.717	0
10	270.955	259.260	279.091	10.384	0
30	270.447	258.039	278.176	10.853	0
50	271.158	260.480	279.396	9.691	0
100	270.345	259.565	277.260	9.459	0
300	270.243	261.395	277.260	8.089	0

**Test # 3348 LVDS Differential Output Voltage-Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	272.3	261.9	279.5	9.286	0
3	271.2	260.9	278.6	9.185	0
10	271.6	260.6	279.9	9.900	0
30	272.2	261.5	279.9	9.527	0
50	271.310	260.632	278.633	9.458	0
100	272.124	261.242	279.548	9.630	0
300	273.141	261.852	281.989	10.288	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

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**Test # 2516 LVDS Differential Output Voltage-Q Channel**

**vs Total Dose**

Dose	D8	D11	D12
0.1	293.476	267.237	286.155
3	293.781	266.932	284.934
10	293.171	265.102	284.019
30	293.171	266.017	284.629
50	291.646	265.712	285.850
100	293.171	266.627	285.545
300	292.866	267.237	284.934

**Test # 2548 LVDS Differential Output Voltage-Q Channel**

**vs Total Dose**

Dose	D8	D11	D12
0.1	292.953	266.407	286.239
3	293.258	267.322	285.018
10	292.648	267.017	286.239
30	293.563	266.712	286.239
50	292.953	267.322	284.713
100	293.563	267.627	285.934
300	293.258	269.153	284.713

**Test # 3016 LVDS Differential Output Voltage-Q Channel**

**vs Total Dose**

Dose	D8	D11	D12
0.1	281.61	270.02	293.19
3	280.39	270.63	294.41
10	280.69	270.93	292.58
30	280.08	270.63	294.11
50	278.56	269.41	292.58
100	278.86	270.93	292.28
300	282.22	270.32	294.11

**Test # 3048 LVDS Differential Output Voltage-I Channel**

**vs Total Dose**

Dose	D8	D11	D12
0.1	279.25	270.40	294.80
3	281.08	271.01	291.75
10	280.16	269.18	292.36
30	280.77	269.49	292.67
50	281.38	270.10	293.58
100	281.69	271.93	293.58
300	278.03	270.40	294.50

**Test # 3316 LVDS Differential Output Voltage-Q Channel**

**vs Total Dose**

Dose	D8	D11	D12
0.1	274.515	259.565	276.040
3	274.210	260.480	276.650
10	274.515	259.260	279.091
30	275.125	258.039	278.176
50	273.599	260.480	279.396
100	274.21	259.565	277.26
300	272.074	261.395	277.26

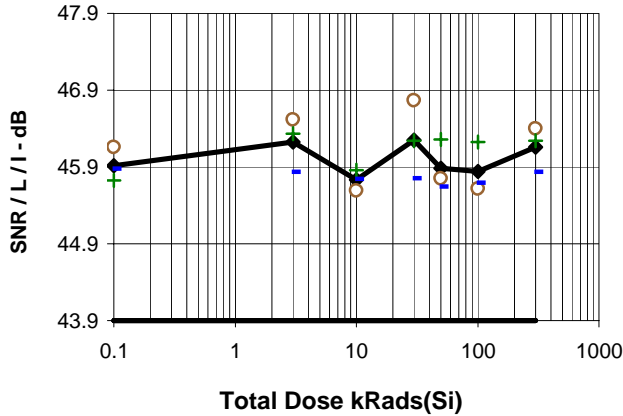
**Test # 3348 LVDS Differential Output Voltage-Q Channel**

**vs Total Dose**

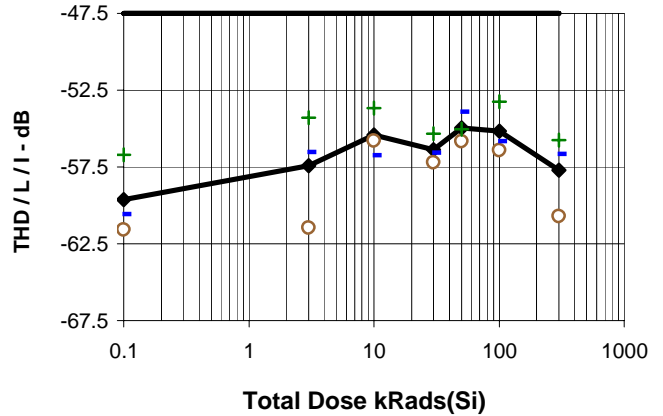
Dose	D8	D11	D12
0.1	275.582	261.852	279.548
3	274.056	260.937	278.633
10	274.361	260.632	279.853
30	275.277	261.547	279.853
50	274.666	260.632	278.633
100	275.582	261.242	279.548
300	275.582	261.852	281.989

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

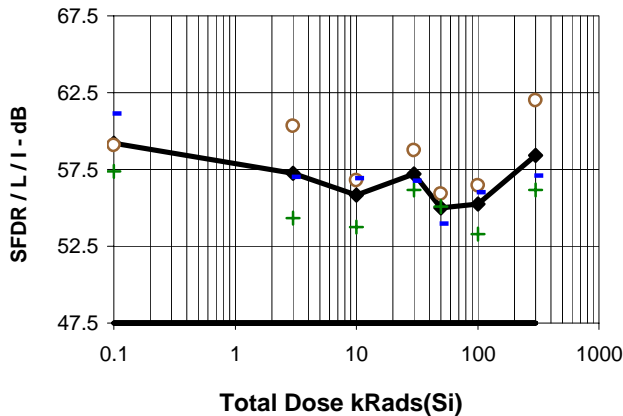
**Test # 7026 Signal-to-Noise Ratio - I Channel vs Total Dose**



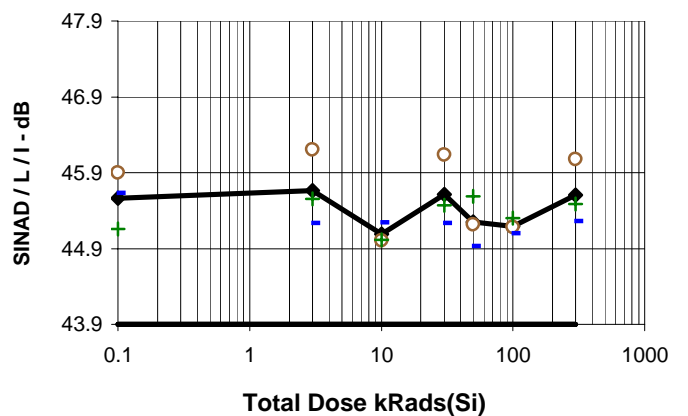
**Test # 7027 Total Harmonic Distortion - I Channel vs Total Dose**



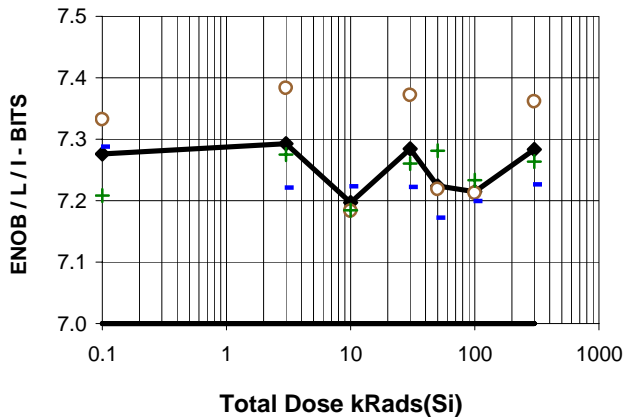
**Test # 7028 Spurious-Free dynamic Range - I Channel vs Total Dose**



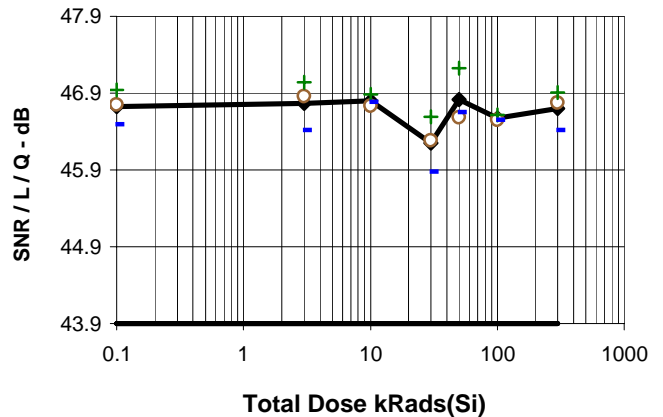
**Test # 7029 Signal to Noise Plus Distortion Ratio I Channel vs Total Dose**



**Test # 7030 Effective Number of Bits I Channel vs Total Dose**



**Test # 7226 Signal-to-Noise Ratio - Q Channel vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 7026 Signal-to-Noise Ratio - I Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	45.917	45.725	46.154	0.218	0
3	46.228	45.831	46.521	0.357	0
10	45.732	45.592	45.861	0.135	0
30	46.253	45.752	46.767	0.507	0
50	45.883	45.642	46.261	0.331	0
100	45.845	45.621	46.223	0.330	0
300	46.160	45.836	46.402	0.292	0

**Test # 7027 Total Harmonic Distortion - I Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-59.616	-61.577	-56.704	2.572	0
3	-57.432	-61.445	-54.306	3.651	0
10	-55.409	-56.769	-53.665	1.587	0
30	-56.378	-57.225	-55.325	0.966	0
50	-54.939	-55.838	-53.927	0.961	0
100	-55.171	-56.410	-53.255	1.683	0
300	-57.717	-60.724	-55.744	2.646	0

**Test # 7028 Spurious-Free dynamic Range - I Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	59.197	57.379	61.132	1.879	0
3	57.231	54.343	60.337	3.003	0
10	55.823	53.761	56.921	1.787	0
30	57.226	56.172	58.764	1.362	0
50	54.984	53.950	55.912	0.985	0
100	55.240	53.274	56.457	1.719	0
300	58.415	56.157	61.984	3.127	0

**Test # 7029 Signal to Noise Plus Distortion Ratio I Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	45.563	45.157	45.900	0.376	0
3	45.663	45.232	46.205	0.496	0
10	45.086	45.003	45.243	0.136	0
30	45.615	45.236	46.139	0.469	0
50	45.246	44.933	45.590	0.330	0
100	45.194	45.097	45.304	0.104	0
300	45.607	45.260	46.074	0.420	0

**Test # 7030 Effective Number of Bits I Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	7.276	7.209	7.332	0.063	0
3	7.293	7.221	7.383	0.082	0
10	7.197	7.183	7.223	0.023	0
30	7.285	7.222	7.372	0.078	0
50	7.224	7.172	7.281	0.055	0
100	7.215	7.199	7.233	0.017	0
300	7.284	7.226	7.361	0.070	0

**Test # 7226 Signal-to-Noise Ratio - Q Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	46.7	46.5	46.9	0.227	0
3	46.8	46.4	47.0	0.322	0
10	46.8	46.7	46.9	0.080	0
30	46.3	45.9	46.6	0.360	0
50	46.819	46.582	47.225	0.353	0
100	46.573	46.553	46.614	0.035	0
300	46.701	46.419	46.910	0.253	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 7026 Signal-to-Noise Ratio - I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	46.154	45.725	45.872
3	46.521	46.333	45.831
10	45.592	45.861	45.743
30	46.767	46.239	45.752
50	45.746	46.261	45.642
100	45.621	46.223	45.690
300	46.402	46.241	45.836

**Test # 7027 Total Harmonic Distortion - I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	-61.577	-56.704	-60.568
3	-61.445	-54.306	-56.546
10	-55.792	-53.665	-56.769
30	-57.225	-55.325	-56.583
50	-55.838	-55.052	-53.927
100	-56.410	-53.255	-55.847
300	-60.724	-55.744	-56.684

**Test # 7028 Spurious-Free dynamic Range - I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	59.08	57.38	61.13
3	60.34	54.34	57.01
10	56.79	53.76	56.92
30	58.76	56.17	56.74
50	55.91	55.09	53.95
100	56.46	53.27	55.99
300	61.98	56.16	57.10

**Test # 7029 Signal to Noise Plus Distortion Ratio I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	45.90	45.16	45.63
3	46.20	45.55	45.23
10	45.00	45.01	45.24
30	46.14	45.47	45.24
50	45.22	45.59	44.93
100	45.18	45.30	45.10
300	46.07	45.49	45.26

**Test # 7030 Effective Number of Bits I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	7.332	7.209	7.287
3	7.383	7.275	7.221
10	7.183	7.185	7.223
30	7.372	7.261	7.222
50	7.219	7.281	7.172
100	7.21283	7.23323	7.1989
300	7.3611	7.26373	7.22593

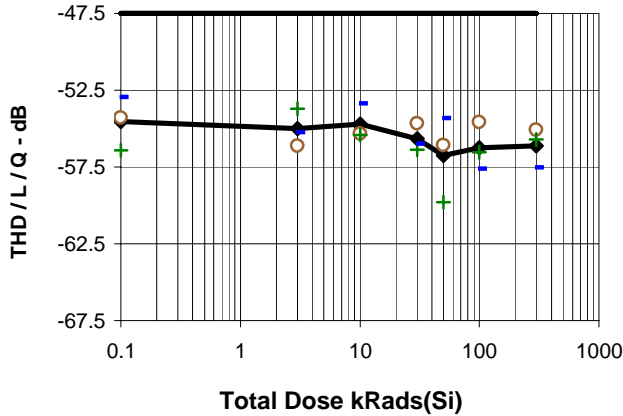
**Test # 7226 Signal-to-Noise Ratio - Q Channel**

vs Total Dose

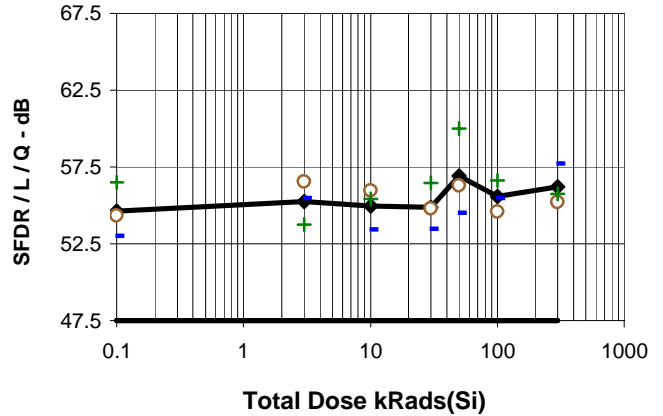
Dose	D8	D11	D12
0.1	46.750	46.944	46.491
3	46.855	47.042	46.414
10	46.730	46.887	46.780
30	46.286	46.593	45.877
50	46.582	47.225	46.649
100	46.553	46.614	46.553
300	46.774	46.910	46.419

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

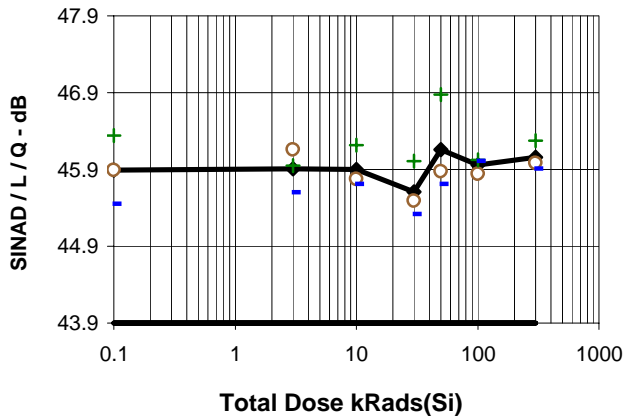
**Test # 7227 Total Harmonic Distortion - Q Channel vs Total Dose**



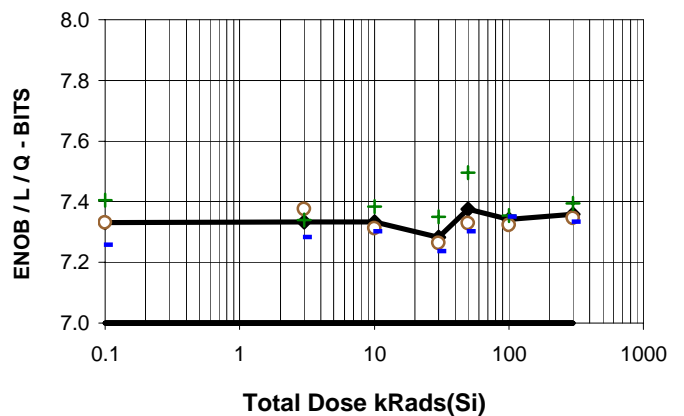
**Test # 7228 Spurious-Free dynamic Range - Q Channel vs Total Dose**



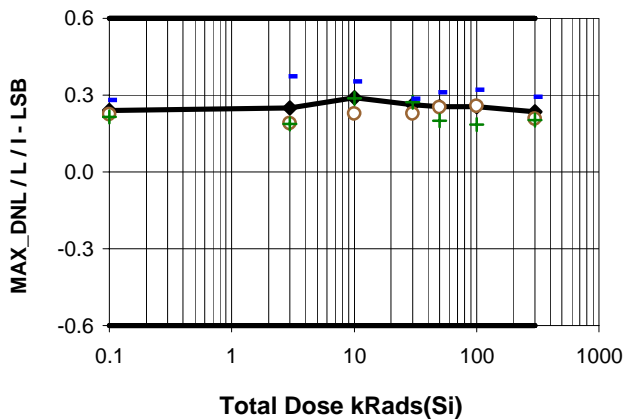
**Test # 7229 Signal to Noise Plus Distortion Ratio Q Channel vs Total Dose**



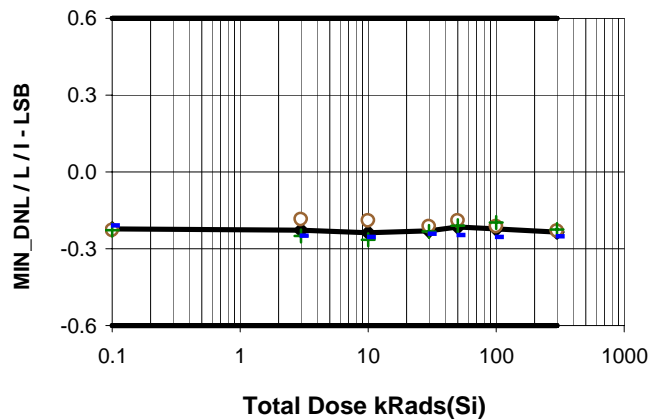
**Test # 7230 Effective Number of Bits Q Channel vs Total Dose**



**Test # 7411 Max Differential Non-Linearity I Channel vs Total Dose**



**Test # 7412 Min Differential Non-Linearity I Channel vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 7227 Total Harmonic Distortion - Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-54.539	-56.399	-52.949	1.741	0
3	-55.016	-56.109	-53.703	1.218	0
10	-54.704	-55.412	-53.365	1.160	0
30	-55.686	-56.388	-54.684	0.891	0
50	-56.746	-59.807	-54.349	2.789	0
100	-56.256	-57.641	-54.587	1.547	0
300	-56.114	-57.526	-55.096	1.262	0

**Test # 7228 Spurious-Free dynamic Range - Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	54.606	52.984	56.491	1.768	0
3	55.254	53.758	56.542	1.403	0
10	54.942	53.424	55.970	1.342	0
30	54.895	53.448	56.464	1.512	0
50	56.923	54.481	59.999	2.813	0
100	55.565	54.603	56.616	1.009	0
300	56.225	55.210	57.723	1.324	0

**Test # 7229 Signal to Noise Plus Distortion Ratio Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	45.893	45.451	46.338	0.443	0
3	45.905	45.603	46.160	0.281	0
10	45.900	45.710	46.213	0.273	0
30	45.607	45.321	46.011	0.360	0
50	46.157	45.712	46.879	0.631	0
100	45.959	45.843	46.029	0.101	0
300	46.055	45.907	46.271	0.191	0

**Test # 7230 Effective Number of Bits Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	7.331	7.258	7.405	0.074	0
3	7.333	7.283	7.375	0.047	0
10	7.332	7.301	7.384	0.045	0
30	7.283	7.236	7.351	0.060	0
50	7.375	7.301	7.495	0.105	0
100	7.342	7.323	7.354	0.017	0
300	7.358	7.333	7.394	0.032	0

**Test # 7411 Max Differential Non-Linearity I Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	0.240	0.216	0.280	0.035	0
3	0.250	0.188	0.372	0.105	0
10	0.289	0.227	0.353	0.063	0
30	0.262	0.228	0.286	0.030	0
50	0.255	0.200	0.311	0.055	0
100	0.255	0.186	0.319	0.067	0
300	0.234	0.203	0.292	0.050	0

**Test # 7412 Min Differential Non-Linearity I Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-0.2	-0.2	-0.2	0.009	0
3	-0.2	-0.3	-0.2	0.038	0
10	-0.2	-0.3	-0.2	0.040	0
30	-0.2	-0.2	-0.2	0.015	0
50	-0.216	-0.248	-0.189	0.030	0
100	-0.222	-0.255	-0.199	0.029	0
300	-0.236	-0.253	-0.225	0.015	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 7227 Total Harmonic Distortion - Q Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	-54.271	-56.399	-52.949
3	-56.109	-53.703	-55.235
10	-55.336	-55.412	-53.365
30	-54.684	-56.388	-55.985
50	-56.083	-59.807	-54.349
100	-54.587	-56.540	-57.641
300	-55.096	-55.719	-57.526

**Test # 7228 Spurious-Free dynamic Range - Q Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	54.344	56.491	52.984
3	56.542	53.758	55.461
10	55.970	55.432	53.424
30	54.774	56.464	53.448
50	56.290	59.999	54.481
100	54.603	56.616	55.475
300	55.210	55.742	57.723

**Test # 7229 Signal to Noise Plus Distortion Ratio Q Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	45.89	46.34	45.45
3	46.16	45.95	45.60
10	45.78	46.21	45.71
30	45.49	46.01	45.32
50	45.88	46.88	45.71
100	45.84	46.03	46.01
300	45.99	46.27	45.91

**Test # 7230 Effective Number of Bits Q Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	7.33	7.40	7.26
3	7.38	7.34	7.28
10	7.31	7.38	7.30
30	7.26	7.35	7.24
50	7.33	7.49	7.30
100	7.32	7.35	7.35
300	7.35	7.39	7.33

**Test # 7411 Max Differential Non-Linearity I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	0.225	0.216	0.280
3	0.190	0.188	0.372
10	0.227	0.287	0.353
30	0.228	0.271	0.286
50	0.253	0.200	0.311
100	0.25874	0.18618	0.31904
300	0.20827	0.20326	0.29157

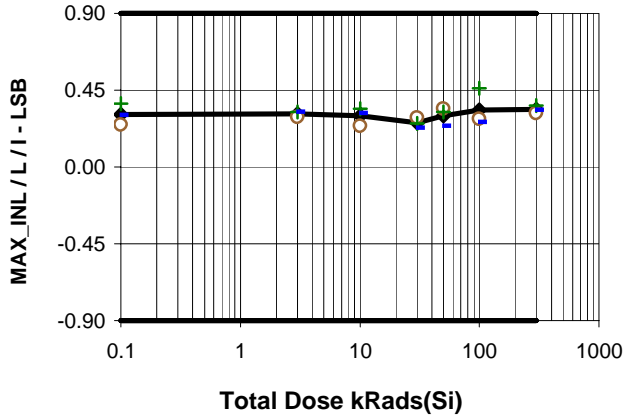
**Test # 7412 Min Differential Non-Linearity I Channel**

vs Total Dose

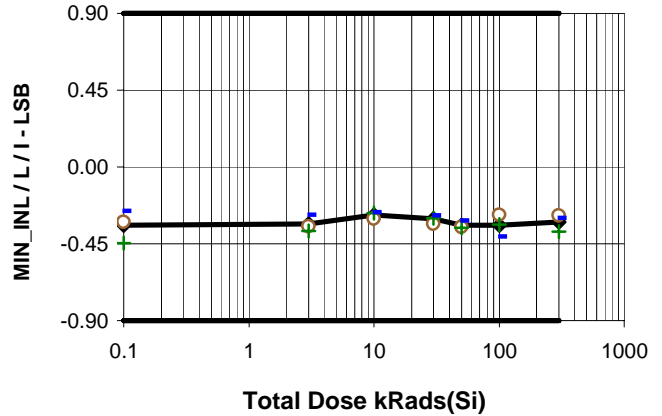
Dose	D8	D11	D12
0.1	-0.227	-0.228	-0.211
3	-0.184	-0.250	-0.251
10	-0.190	-0.264	-0.255
30	-0.213	-0.233	-0.242
50	-0.189	-0.211	-0.248
100	-0.213	-0.199	-0.255
300	-0.229	-0.225	-0.253

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

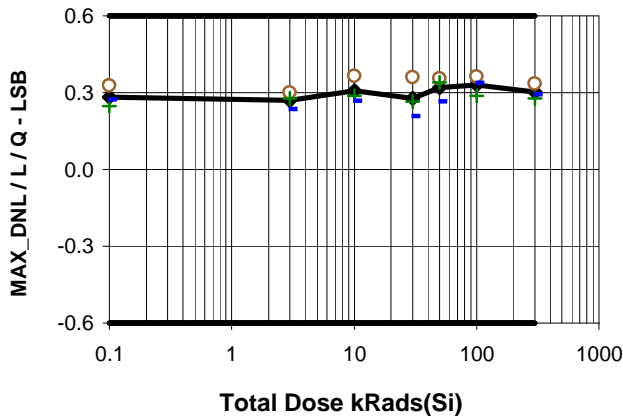
**Test # 7413 Max Integral Non-Linearity I Channel vs Total Dose**



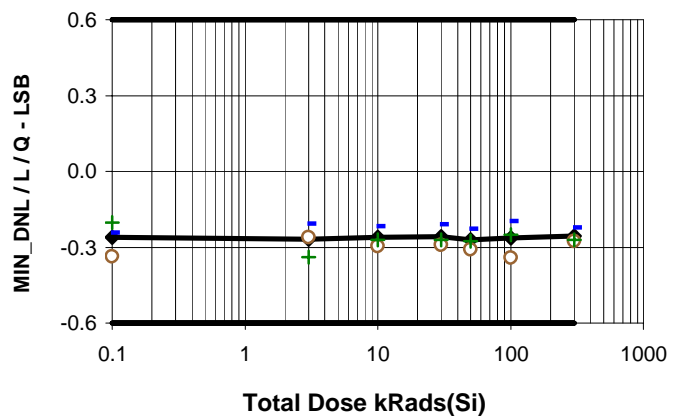
**Test # 7414 Min Integral Non-Linearity I Channel vs Total Dose**



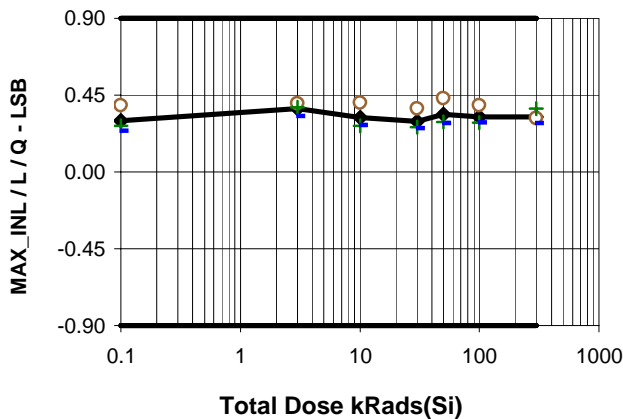
**Test # 7441 Max Differential Non-Linearity Q Channel vs Total Dose**



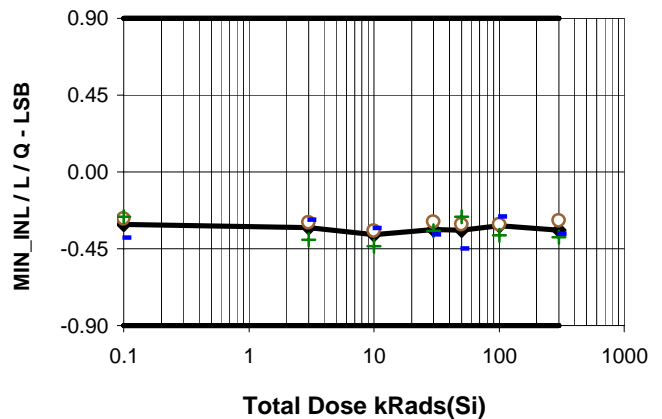
**Test # 7442 Min Differential Non-Linearity Q Channel vs Total Dose**



**Test # 7443 Max Integral Non-Linearity Q Channel vs Total Dose**



**Test # 7444 Min Integral Non-Linearity Q Channel vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 7413 Max Integral Non-Linearity I Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	0.307	0.246	0.373	0.064	0
3	0.313	0.292	0.324	0.018	0
10	0.299	0.240	0.341	0.053	0
30	0.258	0.230	0.288	0.029	0
50	0.300	0.239	0.340	0.054	0
100	0.336	0.263	0.463	0.111	0
300	0.336	0.316	0.360	0.022	0

**Test # 7414 Min Integral Non-Linearity I Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-0.342	-0.446	-0.259	0.095	0
3	-0.335	-0.376	-0.280	0.050	0
10	-0.281	-0.305	-0.266	0.021	0
30	-0.305	-0.333	-0.283	0.025	0
50	-0.341	-0.356	-0.316	0.022	0
100	-0.342	-0.409	-0.281	0.064	0
300	-0.321	-0.380	-0.284	0.051	0

**Test # 7441 Max Differential Non-Linearity Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	0.283	0.248	0.328	0.041	0
3	0.271	0.236	0.299	0.032	0
10	0.307	0.268	0.366	0.052	0
30	0.278	0.207	0.360	0.077	0
50	0.319	0.265	0.354	0.048	0
100	0.329	0.288	0.362	0.038	0
300	0.302	0.277	0.335	0.030	0

**Test # 7442 Min Differential Non-Linearity Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-0.260	-0.337	-0.202	0.070	0
3	-0.269	-0.339	-0.208	0.066	0
10	-0.261	-0.295	-0.218	0.040	0
30	-0.258	-0.291	-0.210	0.042	0
50	-0.271	-0.310	-0.227	0.042	0
100	-0.263	-0.342	-0.197	0.074	0
300	-0.256	-0.276	-0.222	0.030	0

**Test # 7443 Max Integral Non-Linearity Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	0.300	0.240	0.389	0.079	0
3	0.370	0.327	0.403	0.039	0
10	0.317	0.272	0.406	0.077	0
30	0.296	0.255	0.370	0.064	0
50	0.336	0.284	0.431	0.083	0
100	0.322	0.288	0.390	0.059	0
300	0.324	0.285	0.372	0.044	0

**Test # 7444 Min Integral Non-Linearity Q Channel vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-0.3	-0.4	-0.3	0.068	0
3	-0.3	-0.4	-0.3	0.064	0
10	-0.4	-0.4	-0.3	0.057	0
30	-0.3	-0.4	-0.3	0.038	0
50	-0.340	-0.450	-0.261	0.099	0
100	-0.313	-0.372	-0.261	0.056	0
300	-0.343	-0.382	-0.285	0.051	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 7413 Max Integral Non-Linearity I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	0.246	0.373	0.303
3	0.292	0.324	0.323
10	0.240	0.341	0.317
30	0.288	0.256	0.230
50	0.340	0.321	0.239
100	0.280	0.463	0.263
300	0.316	0.360	0.333

**Test # 7414 Min Integral Non-Linearity I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	-0.321	-0.446	-0.259
3	-0.348	-0.376	-0.280
10	-0.305	-0.271	-0.266
30	-0.333	-0.299	-0.283
50	-0.352	-0.356	-0.316
100	-0.281	-0.336	-0.409
300	-0.284	-0.380	-0.300

**Test # 7441 Max Differential Non-Linearity Q Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	0.33	0.25	0.27
3	0.30	0.28	0.24
10	0.37	0.29	0.27
30	0.36	0.27	0.21
50	0.35	0.34	0.26
100	0.36	0.29	0.34
300	0.34	0.28	0.29

**Test # 7442 Min Differential Non-Linearity Q Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	-0.34	-0.20	-0.24
3	-0.26	-0.34	-0.21
10	-0.30	-0.27	-0.22
30	-0.29	-0.27	-0.21
50	-0.31	-0.28	-0.23
100	-0.34	-0.25	-0.20
300	-0.28	-0.27	-0.22

**Test # 7443 Max Integral Non-Linearity Q Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	0.389	0.270	0.240
3	0.403	0.381	0.327
10	0.406	0.272	0.273
30	0.370	0.264	0.255
50	0.431	0.293	0.284
100	0.38997	0.2877	0.28769
300	0.31574	0.37218	0.28451

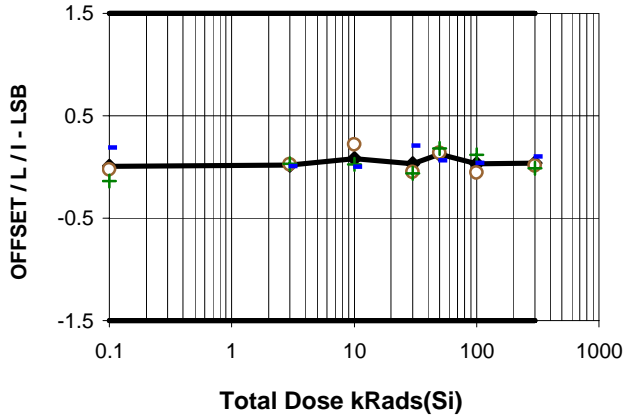
**Test # 7444 Min Integral Non-Linearity Q Channel**

vs Total Dose

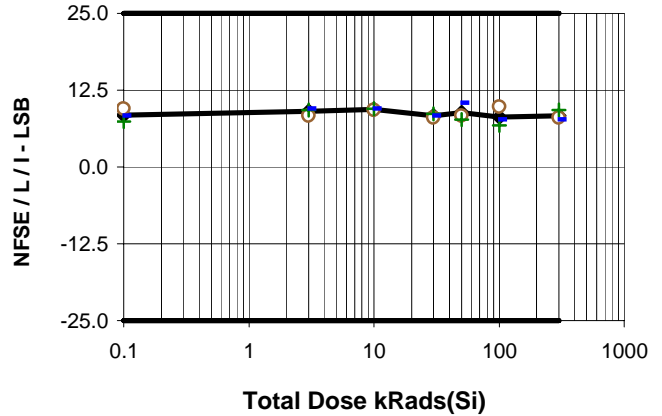
Dose	D8	D11	D12
0.1	-0.272	-0.263	-0.385
3	-0.295	-0.398	-0.280
10	-0.343	-0.433	-0.329
30	-0.294	-0.345	-0.368
50	-0.308	-0.261	-0.450
100	-0.306	-0.372	-0.261
300	-0.285	-0.382	-0.362

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

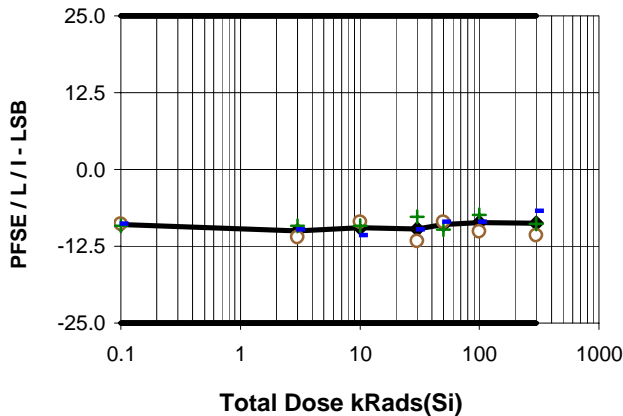
**Test # 8810 Offset Error I Channel vs Total Dose**



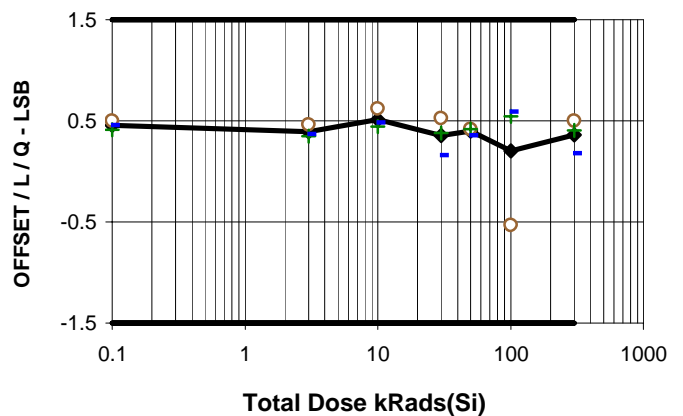
**Test # 8841 Negative Full-Scale Error - I Channel vs Total Dose**



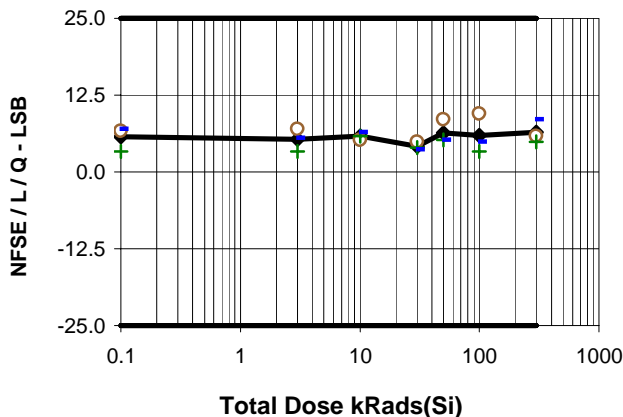
**Test # 8871 Positive Full-Scale error - I Channel vs Total Dose**



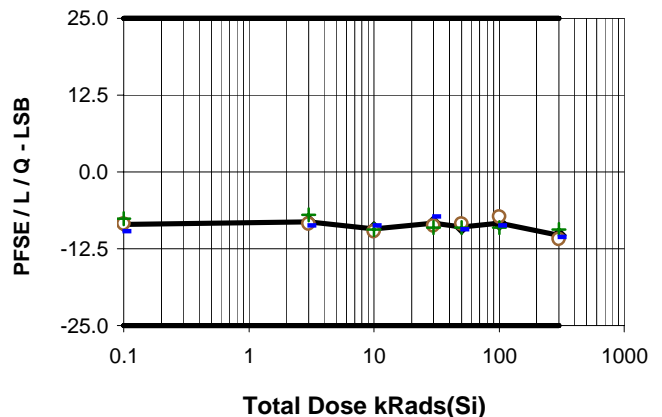
**Test # 8900 Offset Error Q Channel vs Total Dose**



**Test # 8931 Negative Full-Scale Error - Q Channel vs Total Dose**



**Test # 8961 Positive Full-Scale error - Q Channel vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 8810 Offset Error I Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	0.009	-0.135	0.187	0.164	0
3	0.021	0.006	0.032	0.014	0
10	0.083	0.003	0.219	0.118	0
30	0.028	-0.065	0.203	0.151	0
50	0.126	0.060	0.178	0.060	0
100	0.032	-0.057	0.116	0.087	0
300	0.035	-0.011	0.102	0.059	0

**Test # 8841 Negative Full-Scale Error - I Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	8.407	7.389	9.526	1.072	0
3	9.017	8.306	9.526	0.634	0
10	9.423	9.221	9.526	0.175	0
30	8.305	8.001	8.609	0.304	0
50	8.814	7.694	10.441	1.442	0
100	8.102	6.779	9.831	1.566	0
300	8.305	7.696	9.219	0.806	0

**Test # 8871 Positive Full-Scale error - I Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-8.998	-9.203	-8.896	0.177	0
3	-10.015	-11.031	-9.203	0.931	0
10	-9.507	-10.727	-8.591	1.100	0
30	-9.710	-11.641	-7.678	1.984	0
50	-8.998	-9.813	-8.591	0.706	0
100	-8.693	-10.116	-7.373	1.374	0
300	-8.795	-10.726	-6.761	1.985	0

**Test # 8900 Offset Error Q Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	0.455	0.414	0.497	0.041	0
3	0.391	0.346	0.462	0.062	0
10	0.513	0.443	0.618	0.093	0
30	0.356	0.161	0.527	0.184	0
50	0.397	0.352	0.419	0.038	0
100	0.201	-0.533	0.589	0.636	0
300	0.360	0.176	0.499	0.166	0

**Test # 8931 Negative Full-Scale Error - Q Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	5.696	3.359	7.018	2.030	0
3	5.289	3.359	7.017	1.838	0
10	5.798	5.187	6.408	0.610	0
30	4.171	3.662	4.881	0.634	0
50	6.306	5.187	8.543	1.937	0
100	5.899	3.359	9.458	3.174	0
300	6.408	4.884	8.543	1.904	0

**Test # 8961 Positive Full-Scale error - Q Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-8.6	-9.7	-7.6	1.073	0
3	-8.1	-8.8	-7.0	0.982	0
10	-9.3	-9.7	-8.8	0.466	0
30	-8.4	-9.1	-7.3	0.980	0
50	-8.992	-9.399	-8.484	0.466	0
100	-8.382	-9.092	-7.264	0.980	0
300	-10.314	-10.925	-9.397	0.809	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 8810 Offset Error I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	-0.024	-0.135	0.187
3	0.025	0.032	0.006
10	0.219	0.027	0.003
30	-0.052	-0.065	0.203
50	0.140	0.178	0.060
100	-0.057	0.116	0.039
300	0.015	-0.011	0.102

**Test # 8841 Negative Full-Scale Error - I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	9.526	7.389	8.305
3	8.306	9.219	9.526
10	9.221	9.524	9.526
30	8.001	8.609	8.306
50	8.306	7.694	10.441
100	9.831	6.779	7.696
300	8.001	9.219	7.696

**Test # 8871 Positive Full-Scale error - I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	-8.90	-9.20	-8.90
3	-11.03	-9.20	-9.81
10	-8.59	-9.20	-10.73
30	-11.64	-7.68	-9.81
50	-8.59	-9.81	-8.59
100	-10.12	-7.37	-8.59
300	-10.73	-8.90	-6.76

**Test # 8900 Offset Error Q Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	0.50	0.41	0.45
3	0.46	0.35	0.37
10	0.62	0.44	0.48
30	0.53	0.38	0.16
50	0.42	0.42	0.35
100	-0.53	0.55	0.59
300	0.50	0.40	0.18

**Test # 8931 Negative Full-Scale Error - Q Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	6.712	3.359	7.018
3	7.017	3.359	5.492
10	5.187	5.800	6.408
30	4.881	3.969	3.662
50	8.543	5.189	5.187
100	9.45772	3.35867	4.88169
300	5.7965	4.88396	8.54285

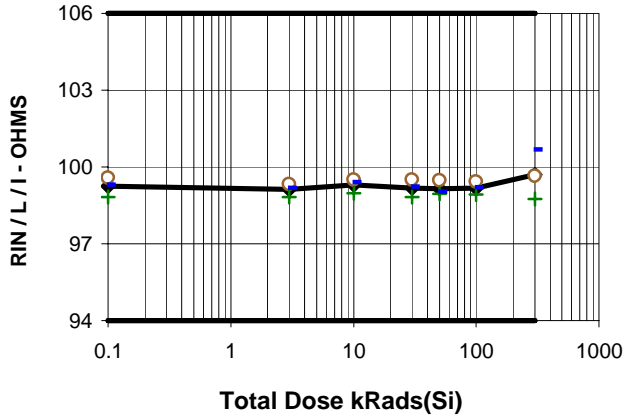
**Test # 8961 Positive Full-Scale error - Q Channel**

vs Total Dose

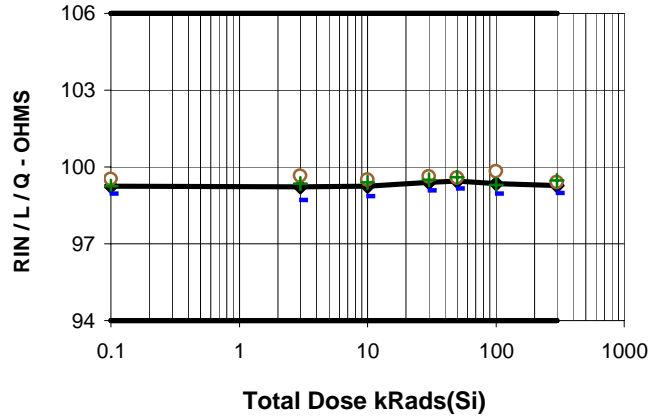
Dose	D8	D11	D12
0.1	-8.484	-7.566	-9.704
3	-8.484	-6.956	-8.789
10	-9.705	-9.397	-8.789
30	-8.790	-9.092	-7.264
50	-8.484	-9.092	-9.399
100	-7.264	-9.092	-8.789
300	-10.925	-9.397	-10.620

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

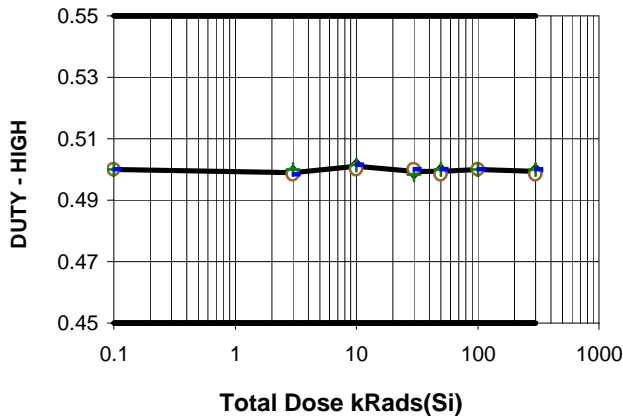
**Test # 9741 Differential Input Resistance -I Channel vs Total Dose**



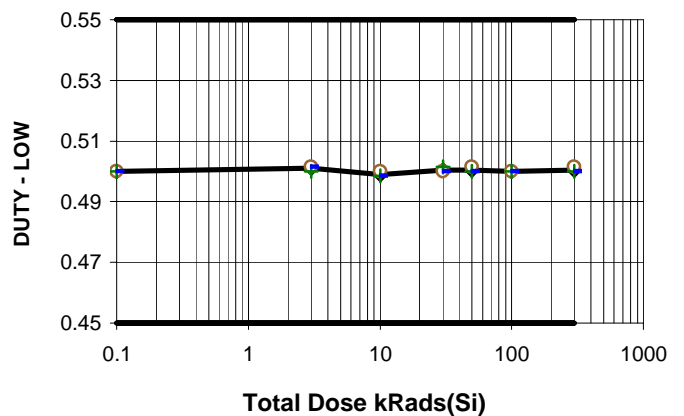
**Test # 9761 Diiferential Input Resistance -Q Channel vs Total Dose**



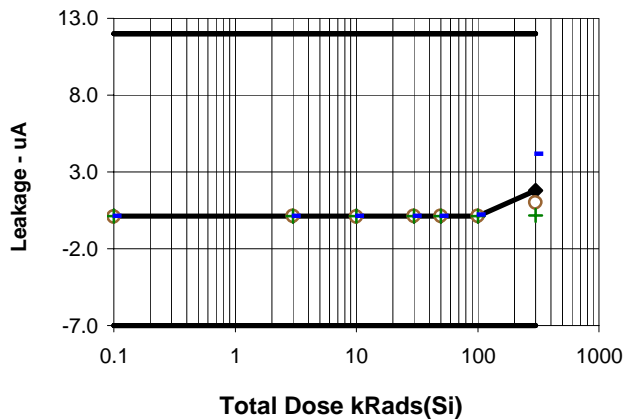
**Test # 9792 DCLK Duty Cycle High vs Total Dose**



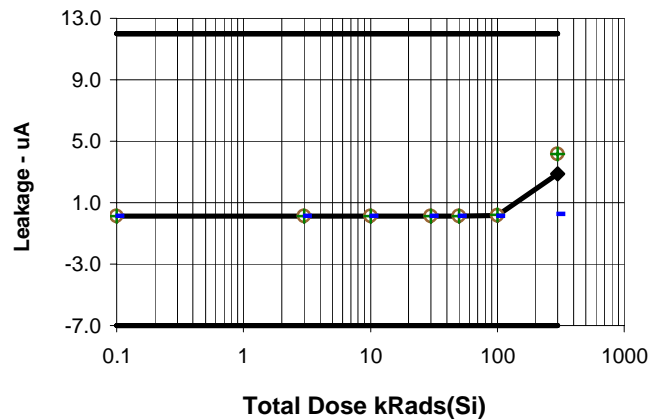
**Test # 9793 DCLK Duty Cycle Low vs Total Dose**



**Test # 9866 DQ5PIH/L/I vs Total Dose**



**Test # 9867 DQ5NH/L/I vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 9741 Differential Input Resistance -I Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	99.239	98.826	99.584	0.384	0
3	99.113	98.817	99.335	0.267	0
10	99.288	98.974	99.492	0.276	0
30	99.184	98.826	99.510	0.343	0
50	99.153	98.956	99.473	0.280	0
100	99.184	98.937	99.418	0.241	0
300	99.692	98.752	100.666	0.957	0

**Test # 9761 Diiferential Input Resistance -Q Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	99.248	98.955	99.528	0.287	0
3	99.229	98.696	99.639	0.483	0
10	99.248	98.844	99.510	0.355	0
30	99.405	99.085	99.630	0.285	0
50	99.451	99.159	99.612	0.254	0
100	99.350	98.946	99.815	0.438	0
300	99.285	98.964	99.482	0.280	0

**Test # 9792 DCLK Duty Cycle High  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	0.500	0.500	0.500	0.000	0
3	0.499	0.498	0.500	0.001	0
10	0.501	0.500	0.502	0.001	0
30	0.499	0.498	0.500	0.001	0
50	0.499	0.498	0.500	0.001	0
100	0.500	0.500	0.500	0.000	0
300	0.499	0.498	0.500	0.001	0

**Test # 9793 DCLK Duty Cycle Low  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	0.500	0.500	0.500	0.000	0
3	0.501	0.500	0.502	0.001	0
10	0.499	0.498	0.500	0.001	0
30	0.501	0.500	0.502	0.001	0
50	0.501	0.500	0.502	0.001	0
100	0.500	0.500	0.500	0.000	0
300	0.501	0.500	0.502	0.001	0

**Test # 9866 DQ5PIH/LI  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	0.108	0.098	0.121	0.012	0
3	0.111	0.104	0.122	0.010	0
10	0.110	0.100	0.122	0.011	0
30	0.117	0.108	0.127	0.010	0
50	0.118	0.106	0.131	0.013	0
100	0.145	0.107	0.216	0.062	0
300	1.782	0.163	4.184	2.122	0

**Test # 9867 DQ5NH/LI  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	0.1	0.1	0.1	0.012	0
3	0.1	0.1	0.1	0.009	0
10	0.1	0.1	0.1	0.010	0
30	0.1	0.1	0.1	0.007	0
50	0.126	0.117	0.137	0.010	0
100	0.175	0.135	0.218	0.042	0
300	2.858	0.260	4.157	2.250	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 9741 Differential Input Resistance -I Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	99.584	98.826	99.307
3	99.335	98.817	99.187
10	99.492	98.974	99.399
30	99.510	98.826	99.214
50	99.473	98.956	99.030
100	99.418	98.937	99.196
300	99.658	98.752	100.666

**Test # 9761 Diiferential Input Resistance -Q Channel**

vs Total Dose

Dose	D8	D11	D12
0.1	99.528	99.260	98.955
3	99.639	99.353	98.696
10	99.510	99.390	98.844
30	99.630	99.501	99.085
50	99.584	99.612	99.159
100	99.815	99.288	98.946
300	99.408	99.482	98.964

**Test # 9792 DCLK Duty Cycle High**

vs Total Dose

Dose	D8	D11	D12
0.1	0.50	0.50	0.50
3	0.50	0.50	0.50
10	0.50	0.50	0.50
30	0.50	0.50	0.50
50	0.50	0.50	0.50
100	0.50	0.50	0.50
300	0.50	0.50	0.50

**Test # 9793 DCLK Duty Cycle Low**

vs Total Dose

Dose	D8	D11	D12
0.1	0.50	0.50	0.50
3	0.50	0.50	0.50
10	0.50	0.50	0.50
30	0.50	0.50	0.50
50	0.50	0.50	0.50
100	0.50	0.50	0.50
300	0.50	0.50	0.50

**Test # 9866 DQ5PIH/L/I**

vs Total Dose

Dose	D8	D11	D12
0.1	0.098	0.106	0.121
3	0.104	0.106	0.122
10	0.100	0.110	0.122
30	0.108	0.115	0.127
50	0.106	0.116	0.131
100	0.10663	0.11152	0.21555
300	0.99982	0.16341	4.18412

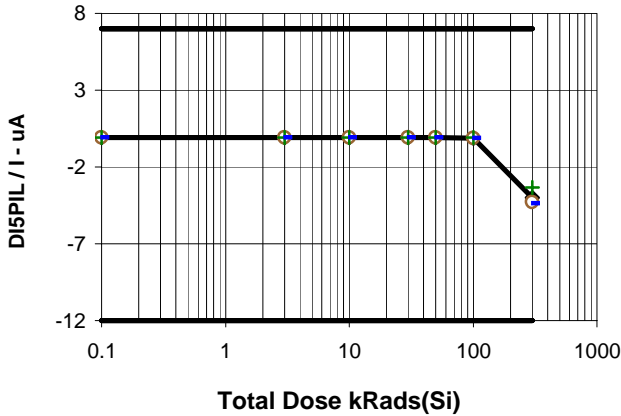
**Test # 9867 DQ5NH/L/I**

vs Total Dose

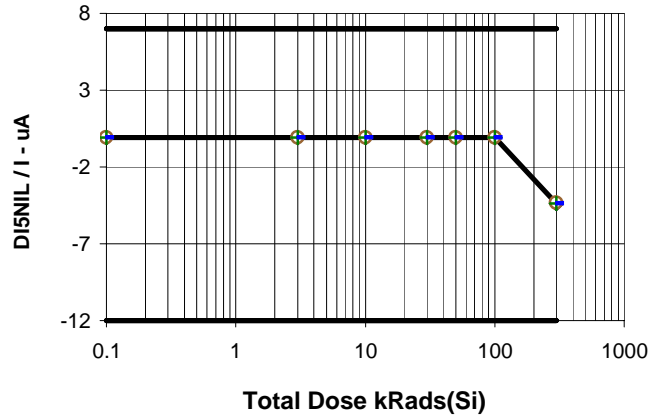
Dose	D8	D11	D12
0.1	0.108	0.113	0.131
3	0.114	0.113	0.129
10	0.111	0.118	0.130
30	0.120	0.125	0.134
50	0.117	0.126	0.137
100	0.171	0.218	0.135
300	4.157	4.157	0.260

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

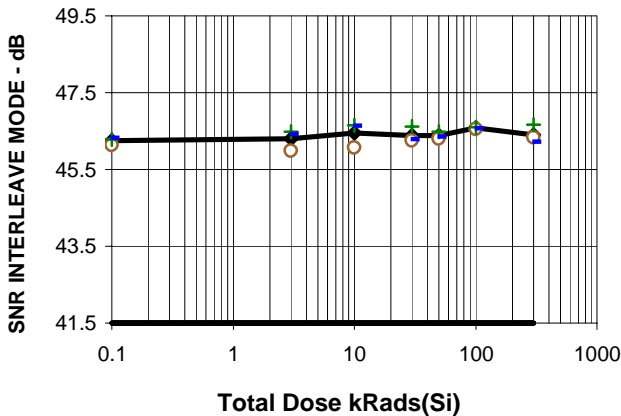
**Test # 9882 Digital Leakage Pin vs Total Dose**



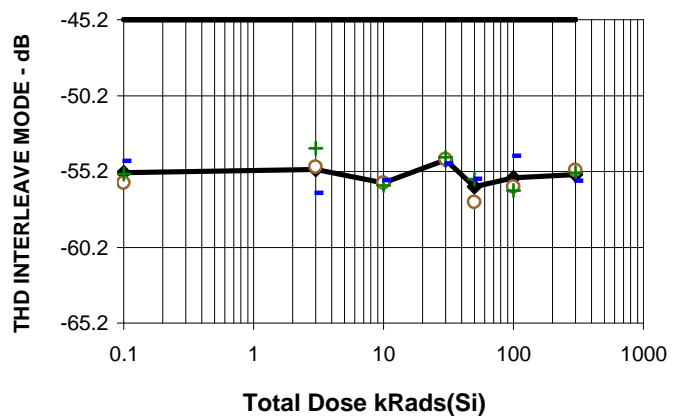
**Test # 9883 Digital Leakage Pin vs Total Dose**



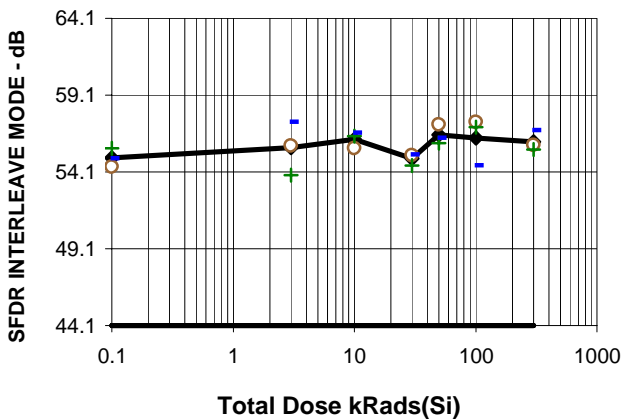
**Test # 17926 SNR INTERLEAVE MODE vs Total Dose**



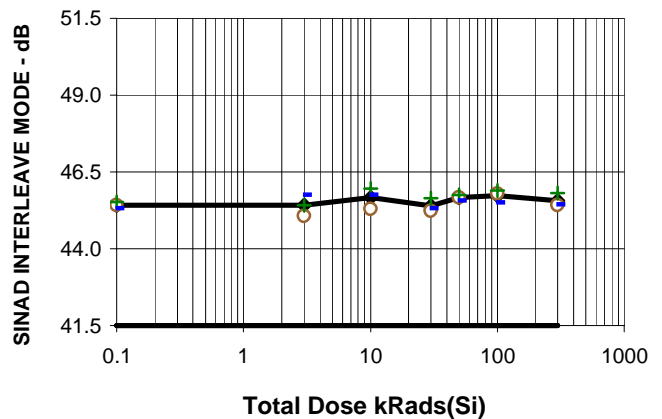
**Test # 17927 THD INTERLEAVE MODE vs Total Dose**



**Test # 17928 SFDR INTERLEAVE MODE vs Total Dose**



**Test # 17929 SINAD INTERLEAVE MODE vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 9882 Digital Leakage Pin**

**vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-0.091	-0.097	-0.088	0.005	0
3	-0.092	-0.097	-0.088	0.005	0
10	-0.091	-0.097	-0.088	0.005	0
30	-0.096	-0.099	-0.093	0.003	0
50	-0.094	-0.098	-0.089	0.005	0
100	-0.110	-0.125	-0.093	0.016	0
300	-3.991	-4.359	-3.313	0.588	0

**Test # 9883 Digital Leakage Pin**

**vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-0.085	-0.090	-0.081	0.005	0
3	-0.087	-0.091	-0.085	0.003	0
10	-0.085	-0.089	-0.081	0.004	0
30	-0.089	-0.091	-0.087	0.002	0
50	-0.088	-0.092	-0.082	0.005	0
100	-0.096	-0.099	-0.092	0.004	0
300	-4.363	-4.388	-4.316	0.041	0

**Test # 17926 SNR INTERLEAVE MODE**

**vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	46.246	46.134	46.317	0.099	0
3	46.297	45.980	46.487	0.277	0
10	46.449	46.067	46.643	0.330	0
30	46.383	46.256	46.610	0.197	0
50	46.379	46.303	46.478	0.090	0
100	46.576	46.555	46.599	0.022	0
300	46.404	46.215	46.665	0.234	0

**Test # 17927 THD INTERLEAVE MODE**

**vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-55.289	-55.953	-54.546	0.707	0
3	-55.079	-56.649	-53.670	1.496	0
10	-55.963	-56.147	-55.775	0.186	0
30	-54.458	-54.686	-54.288	0.205	0
50	-56.216	-57.234	-55.704	0.881	0
100	-55.624	-56.465	-54.174	1.261	0
300	-55.418	-55.838	-55.135	0.371	0

**Test # 17928 SFDR INTERLEAVE MODE**

**vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	55.019	54.420	55.653	0.618	0
3	55.672	53.885	57.331	1.727	0
10	56.239	55.650	56.650	0.523	0
30	54.975	54.499	55.236	0.413	0
50	56.500	55.982	57.194	0.625	0
100	56.303	54.531	57.355	1.544	0
300	56.076	55.557	56.822	0.663	0

**Test # 17929 SINAD INTERLEAVE MODE**

**vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	45.4	45.3	45.5	0.094	0
3	45.4	45.1	45.7	0.337	0
10	45.7	45.3	46.0	0.343	0
30	45.4	45.2	45.7	0.229	0
50	45.657	45.560	45.740	0.091	0
100	45.732	45.509	45.902	0.201	0
300	45.559	45.418	45.816	0.223	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 9882 Digital Leakage Pin**

vs Total Dose

Dose	D8	D11	D12
0.1	-0.088	-0.088	-0.097
3	-0.091	-0.088	-0.097
10	-0.088	-0.089	-0.097
30	-0.093	-0.094	-0.099
50	-0.089	-0.094	-0.098
100	-0.125	-0.093	-0.111
300	-4.300	-3.313	-4.359

**Test # 9883 Digital Leakage Pin**

vs Total Dose

Dose	D8	D11	D12
0.1	-0.081	-0.086	-0.090
3	-0.085	-0.085	-0.091
10	-0.081	-0.087	-0.089
30	-0.087	-0.091	-0.089
50	-0.082	-0.090	-0.092
100	-0.099	-0.092	-0.097
300	-4.316	-4.388	-4.387

**Test # 17926 SNR INTERLEAVE MODE**

vs Total Dose

Dose	D8	D11	D12
0.1	46.13	46.29	46.32
3	45.98	46.49	46.42
10	46.07	46.64	46.64
30	46.26	46.61	46.28
50	46.30	46.48	46.36
100	46.56	46.60	46.57
300	46.33	46.66	46.21

**Test # 17927 THD INTERLEAVE MODE**

vs Total Dose

Dose	D8	D11	D12
0.1	-55.95	-55.37	-54.55
3	-54.92	-53.67	-56.65
10	-55.97	-56.15	-55.78
30	-54.40	-54.29	-54.69
50	-57.23	-55.71	-55.70
100	-56.23	-56.46	-54.17
300	-55.13	-55.28	-55.84

**Test # 17928 SFDR INTERLEAVE MODE**

vs Total Dose

Dose	D8	D11	D12
0.1	54.420	55.653	54.983
3	55.801	53.885	57.331
10	55.650	56.416	56.650
30	55.191	54.499	55.236
50	57.194	55.982	56.324
100	57.3552	57.0238	54.5308
300	55.848	55.5566	56.8222

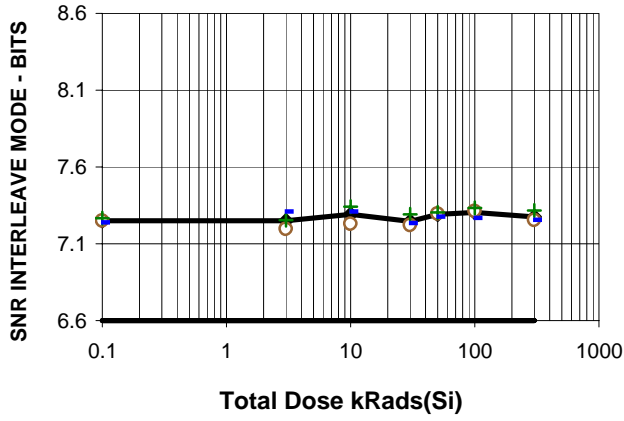
**Test # 17929 SINAD INTERLEAVE MODE**

vs Total Dose

Dose	D8	D11	D12
0.1	45.415	45.511	45.323
3	45.072	45.427	45.745
10	45.289	45.960	45.750
30	45.219	45.651	45.305
50	45.671	45.740	45.560
100	45.784	45.902	45.509
300	45.418	45.816	45.442

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 17930 ENOB INTERLEAVE MODE  
vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**Test # 17930 ENOB INTERLEAVE MODE**

**vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	7.252	7.236	7.268	0.016	0
3	7.252	7.195	7.306	0.056	0
10	7.293	7.231	7.342	0.057	0
30	7.248	7.219	7.291	0.038	0
50	7.292	7.276	7.306	0.015	0
100	7.304	7.267	7.333	0.033	0
300	7.275	7.252	7.318	0.037	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

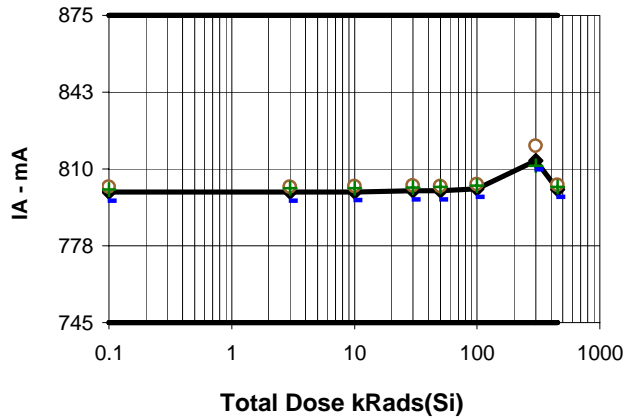
**Test # 17930 ENOB INTERLEAVE MODE**

**vs Total Dose**

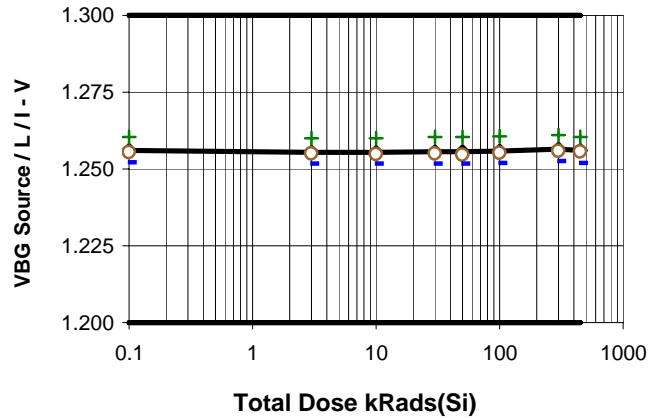
Dose	D8	D11	D12
0.1	7.252	7.268	7.236
3	7.195	7.254	7.306
10	7.231	7.342	7.307
30	7.219	7.291	7.233
50	7.294	7.306	7.276
100	7.313	7.333	7.267
300	7.252	7.318	7.256

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report  
with Mos Accelerated Anneal Test**

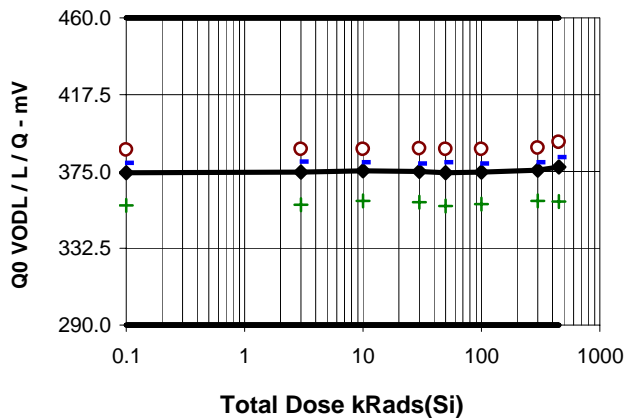
**Test # 410. Analog Supply Current PD=PDQ=Low vs Total Dose**



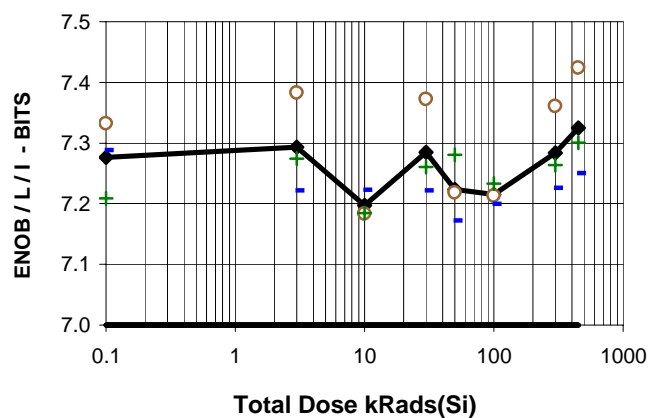
**Test # 552. Bandgap Reference Output Voltage Source vs Total Dose**



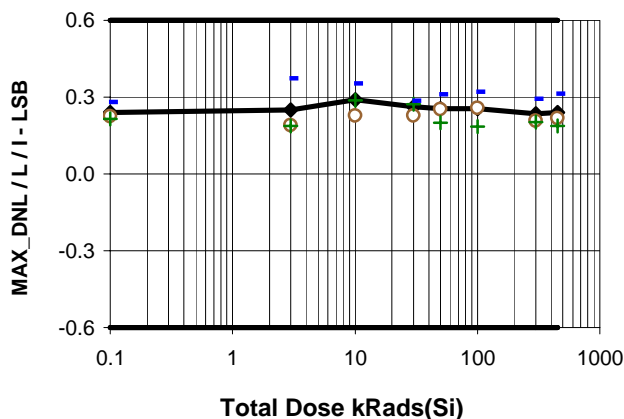
**Test # 1018. LVDS Differential Output Voltage Q Channel vs Total Dose**



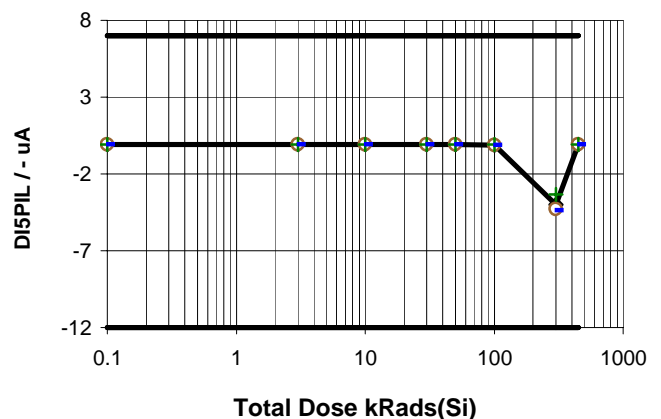
**Test # 7030. Effective Number of Bits I Channel vs Total Dose**



**Test # 7411. Max Differential Non-Linearity I Channel vs Total Dose**



**Test # 9882. Digital Leakage Pin vs Total Dose**



Note: Solid lines indicate minimum and maximum limits of the Military Data Sheet (MDS).

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report  
with Mos Accelerated Anneal Test**

**Test # 410. Analog Supply Current PD=PDQ=Low  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	800.184	796.590	802.520	3.159	0
3	800.260	796.526	802.482	3.253	0
10	800.383	796.767	802.558	3.153	0
30	800.717	797.071	802.977	3.187	0
50	800.716	797.096	802.761	3.144	0
100	801.498	797.996	803.585	3.051	0
300	813.626	809.845	819.692	5.306	0
450	801.283	798.186	803.281	2.719	0

**Test # 552. Bandgap Reference Output Voltage Source  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	1.256	1.252	1.260	0.004	0
3	1.256	1.252	1.260	0.004	0
10	1.255	1.252	1.260	0.004	0
30	1.256	1.252	1.260	0.004	0
50	1.256	1.252	1.260	0.004	0
100	1.256	1.252	1.261	0.004	0
300	1.256	1.253	1.261	0.004	0
450	1.256	1.252	1.260	0.004	0

**Test # 1018. LVDS Differential Output Voltage Q Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	374.213	356.110	386.927	16.100	0
3	374.722	356.720	387.233	15.981	0
10	375.231	358.551	387.233	14.902	0
30	375.027	357.941	387.843	15.402	0
50	374.315	355.805	387.233	16.443	0
100	374.620	357.025	387.538	15.785	0
300	375.536	358.551	388.148	15.275	0
450	377.468	358.246	391.199	17.149	0

**Test # 7030. Effective Number of Bits I Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	7.276	7.209	7.332	0.063	0
3	7.293	7.221	7.383	0.082	0
10	7.197	7.183	7.223	0.023	0
30	7.285	7.222	7.372	0.078	0
50	7.224	7.172	7.281	0.055	0
100	7.215	7.199	7.233	0.017	0
300	7.284	7.226	7.361	0.070	0
450	7.325	7.250	7.424	0.090	0

**Test # 7411. Max Differential Non-Linearity I Channel  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	0.240	0.216	0.280	0.035	0
3	0.250	0.188	0.372	0.105	0
10	0.289	0.227	0.353	0.063	0
30	0.262	0.228	0.286	0.030	0
50	0.255	0.200	0.311	0.055	0
100	0.255	0.186	0.319	0.067	0
300	0.234	0.203	0.292	0.050	0
450	0.239	0.188	0.312	0.065	0

**Test # 9882. Digital Leakage Pin  
vs Total Dose**

Dose	Avg.	Min.	Max.	S. Dev.	Fail <sup>1</sup>
0.1	-0.1	-0.1	-0.1	0.005	0
3	-0.1	-0.1	-0.1	0.005	0
10	-0.1	-0.1	-0.1	0.005	0
30	-0.1	-0.1	-0.1	0.003	0
50	-0.094	-0.098	-0.089	0.005	0
100	-0.110	-0.125	-0.093	0.016	0
300	-3.991	-4.359	-3.313	0.588	0
450	-0.096	-0.104	-0.089	0.008	0

Fail<sup>1</sup>: Number of devices that were outside MDS sub group 1 limit:

**ADC08D1520WG-QV, V00733JJ WAFER #21 Total Ionizing Dose Report**

**with Mos Accelerated Anneal Test**

**Test # 410. Analog Supply Current PD=PDQ=Low** vs Total Dose

Dose	D8	D11	D12
0.1	802.520	801.443	796.590
3	802.482	801.773	796.526
10	802.558	801.823	796.767
30	802.977	802.102	797.071
50	802.761	802.292	797.096
100	803.585	802.913	797.996
300	819.692	811.341	809.845
450	803.281	802.381	798.186

**Test # 552. Bandgap Reference Output Voltage Source** vs Total Dose

Dose	D8	D11	D12
0.1	1.255	1.260	1.252
3	1.255	1.260	1.252
10	1.255	1.260	1.252
30	1.255	1.260	1.252
50	1.255	1.260	1.252
100	1.255	1.261	1.252
300	1.256	1.261	1.253
450	1.256	1.260	1.252

**Test # 1018. LVDS Differential Output Voltage Q Channel** vs Total Dose

Dose	D8	D11	D12
0.1	386.93	356.11	379.60
3	387.23	356.72	380.21
10	387.23	358.55	379.91
30	387.84	357.94	379.30
50	387.23	355.81	379.91
100	387.54	357.03	379.30
300	388.15	358.55	379.91
450	391.20	358.25	382.96

**Test # 7030. Effective Number of Bits I Channel** vs Total Dose

Dose	D8	D11	D12
0.1	7.33	7.21	7.29
3	7.38	7.27	7.22
10	7.18	7.18	7.22
30	7.37	7.26	7.22
50	7.22	7.28	7.17
100	7.21	7.23	7.20
300	7.36	7.26	7.23
450	7.42	7.30	7.25

**Test # 7411. Max Differetial Non-Linearity I Channel** vs Total Dose

Dose	D8	D11	D12
0.1	0.225	0.216	0.280
3	0.190	0.188	0.372
10	0.227	0.287	0.353
30	0.228	0.271	0.286
50	0.253	0.200	0.311
100	0.25874	0.18618	0.31904
300	0.20827	0.20326	0.29157
450	0.21782	0.18838	0.31204

**Test # 9882. Digital Leakage Pin** vs Total Dose

Dose	D8	D11	D12
0.1	-0.088	-0.088	-0.097
3	-0.091	-0.088	-0.097
10	-0.088	-0.089	-0.097
30	-0.093	-0.094	-0.099
50	-0.089	-0.094	-0.098
100	-0.125	-0.093	-0.111
300	-4.300	-3.313	-4.359
450	-0.095	-0.089	-0.104