Radiation Report

INA1H94-SEP Radiation-Tolerant, High Common-Mode Voltage Difference Amplifier TID Report

ABSTRACT

This report covers the radiation characterization results of the INA1H94-SEP, a high common-mode voltage difference amplifier. The study was done to determine Total Ionizing Dose (TID) effects under high dose rate (HDR) up to the specified 30krad(Si) dose level. Additional devices were submitted to a higher dose of 50krad(Si) for information purposes only.

All of the samples passed within the specified data sheet limits for all measured parameters.

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Trademarks

1 Device Information

1.1 Product Description

The INA1H94-SEP is a radiation-tolerant precision unity-gain difference amplifier with a very high input common-mode voltage range. The INA1H94-SEP is a single, monolithic device that consists of a precision op amp and an integrated thin-film resistor network. The INA1H94-SEP can accurately measure small differential voltages in the presence of common-mode signals up to ±150V. In many applications where galvanic isolation in not required, the INA1H94-SEP can replace isolation amplifiers. The excellent 0.0005% typical non-linearity, high common mode, and 500kHz bandwidth of the INA1H94-SEP makes for a compelling sensor readout device.

Radiation lot acceptance testing (RLAT) for the INA1H94-SEP is performed with high dose rate condition A as specified in MIL-STD-883, method 1019. The radiation end point limits for the specified parameters are guaranteed only for the conditions as specified in MIL-STD-883, method 1019, condition A, to a maximum total dose of 30krad(Si).

1.2 Device Details

Table 1-1 lists the device information used in the initial TID characterization and qualification of HDR tests. Devices used for one-time HDR characterization were built on the 8-pin, SOIC (SO-8) package.

Table 1-1. HDR Device and Exposure Details

TID HDR Details: Up to 50krad(Si)	
TI Device Number	INA1H94DTSEP (INA1H94-SEP)
Package	8-pin, SOIC(D)
Technology	BICOM-3XHV
Quantity Tested	8 biased and 8 unbiased units at 30krad(Si) levels • 8 biased and 8 unbiased units at 50krad(Si) levels • 2 control/correlation units with no exposure
Die Lot Number	3178283
A/T Lot Number | Date Code	5322461 | 55A2CHK
Lot Accept/Reject	Devices passed 20krad(Si), 30krad(Si), 50krad(Si)
HDR Radiation Facility	HDR: Texas Instruments Inc., CLAB, Dallas, TX
HDR Dose Level	20krad(Si), 30krad(Si), 50krad(Si)
HDR Dose Rate	159.2rads(Si)/s ionizing radiation dose rate
HDR Radiation Source	HDR: Gamma rays provided by Hopewell GR420 Co60 source. Dosimetry performed by Hopewell via GEX using GEX Alanine dosimeters
Irradiation Temperature	Ambient, room temperature controlled to 25°C (±6°C) per MILSTD-883 and MIL-STD-750.

2 Total Dose Test Setup

2.1 Test Overview

The INA1H94-SEP samples were irradiated at a high dose rate of 159.2rads(Si)/s up to the specified maximum dose of 30krad(Si). Additional devices were submitted to a higher dose of 50krad(Si) for information purposes only. All units are put through full electrical parametric testing on the production Automated Test Equipment (ATE). All devices were functional and passed all electrical parametric tests with readings within guard bands of the Vendor Item Drawing (VID) electrical specification limits. INA1H94-SEP is ELDRS free, Qualified By Similarity (QBS).

2.2 Test Description and Facilities

The INA1H94-SEP HDR exposure was performed on biased devices in a Cobalt-60 gamma cell at TI facility in Dallas, Texas. The unattenuated dose rate of this cell is 300rad(Si)/s. After exposure, the devices were packed in dry ice (per MIL-STD-883, Method 1019.9, Section 3.10) and returned to TI Dallas for a full post-radiation electrical evaluation using Texas Instruments ATE. ATE guard-band test limits are set within datasheet electrical limits to provide a minimum Cpk and test error margin based on initial qualification and characterization data. Post-radiation measurements were taken within 30 minutes of removal of the devices from the dry ice container. The devices were allowed to reach room temperature prior to electrical post-radiation measurements.

The exposure boards are housed in a lead-aluminum box (as specified in MIL-STD-883, Method 1019.9) to harden the gamma spectrum and minimize dose enhancement effects. The irradiator calibration is maintained by Logmire Laboratories using Thermoluminescence Dosimeters (TLDs) traceable to the National Institute of Standards and Technology (NIST) and the dosimetry was verified using TLDs prior to the radiation exposures. ATE guard-band test limits are set within data sheet electrical limits to provide a minimum Cpk and test error margin based on initial qualification and characterization data.

2.3 Test Setup Details

For unbiased HDR testing, devices conductive foam was used to short all pins and prevent uneven charging. For biased HDR testing, the devices were tested in biased conditions as described below:

2.3.1 Biased Device Configuration

Figure 2-1 shows the bias conditions for each pin during irradiation. A bipolar supply of ±9V was used for V+ and V- and a 150V source was connected to the INA1H94-SEP inputs and a 2kΩ load to GND is connected to the device output. Figure 2-2 shows an example of one of the bias boards used for the testing.

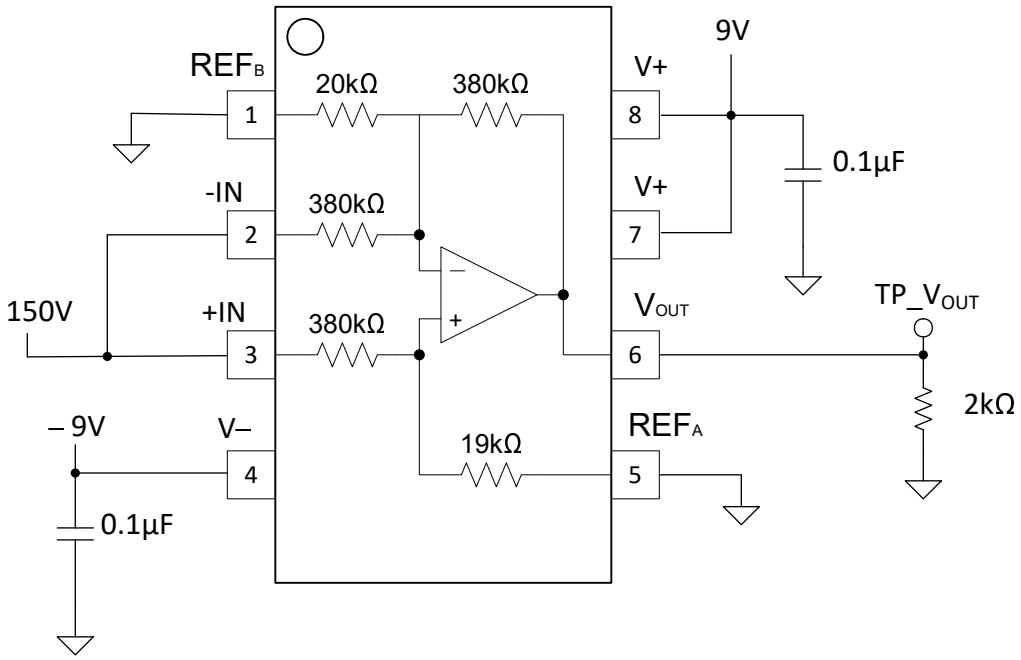


Figure 2-1. INA1H94-SEP Bias Diagram

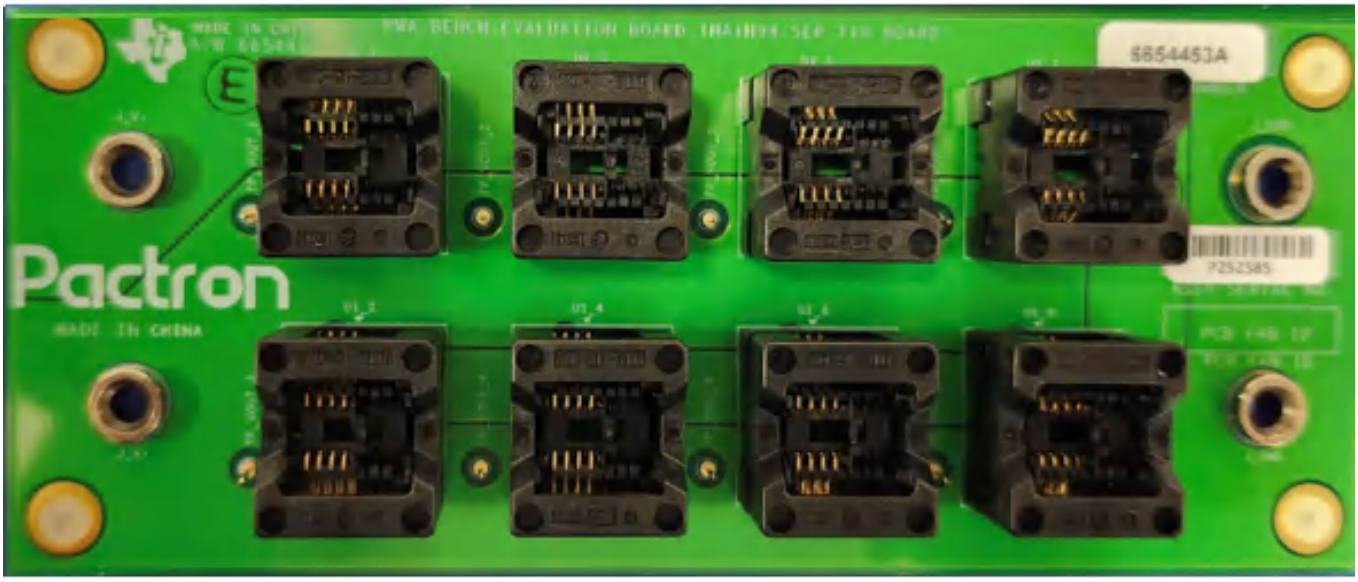


Figure 2-2. INA1H94-SEP TID Bias Board

2.4 Test Configuration and Condition

Table 2-1 and Table 2-2 list the serialized samples used for HDR characterization, as well as the specification compliance matrix for the device. The INA1H94-SEP input and output voltage linear range is tested during the gain error accuracy test, common-mode rejection test, and by measuring the output voltage swing capability to the rail supplies during various tests in the sequence.

Table 2-1. HDR≤ 50-300rad(Si) / s Biased Device Information (HDR)

HDR ≤ 50-300rad(Si) / s			
Total Samples: 24 (+ 2 control)			
Exposure Levels			
0krad (Si)	20krad(Si)	30krad(Si)	50krad(Si)
49, 50	1, 2, 3, 4, 5, 6, 7, 8	17, 18, 19, 20, 21, 22, 23, 24	33, 34, 35, 36, 37, 38, 39, 40

Table 2-2. HDR≤ 50-300rad(Si) / s Unbiased Device Information (HDR)

HDR ≤ 50-300rad(Si) / s			
Total Samples: 24 (+ 2 control)			
Exposure Levels			
0krad (Si)	20krad(Si)	30krad(Si)	50krad(Si)
49, 50	9, 10, 11, 12, 13, 14, 15, 16	25, 26, 27, 28, 29, 30, 31, 32	41, 42, 43, 44, 45, 46, 47, 48

Table 2-3. INA1H94-SEP Specification Compliance Matrix

Parameter	Test Condition	INA1H94-SEP Data Sheet				Test Number
		MIN	TYP	MAX	Unit	
Gain error	V_S =±9, V_{OUT} = ±7.5V, T_A = –55°C to 125°C, V_{CM} = REF_A = REF_B = GND	–0.067	±0.025	0.067	%FSR	55.13
	V+ = 5V and V– = 0V, V_{OUT} = 1.5V to 3.5V, T_A = –55°C to +125°C, V_{CM} = REF_A = REF_B = 2.5V	–0.067	±0.025	0.067	%FSR	55.11
Input offset voltage	V_S =±9 T_A = 25°C, V_{CM} = REF_A = REF_B = GND	–4000	±750	4000	µV	45.2
	V+ = 5V and V– = 0V, T_A = 25°C, V_{CM} = REF_A = REF_B = 2.5V	–4000	±750	4000		45.1
Power-supply rejection ratio	V_S = ±2V to ±9V, T_A = –55°C to +125°C	90 ±31.6	120 ±1		dB µV/V	45.9
	V_S = 4V to 5V, T_A = –55°C to +125°C		102 ±8		dB µV/V	45.8
Common-mode rejection ratio	V_S =±9V, f = DC, VCM = ±150V, T_A = –55°C to +125°C, REF_A = REF_B = 0V	84 ±63	100 ±10		dB µV/V	65.1
	V_S =±9V, f = DC, VCM = ±150V, T_A = –55°C to +125°C, REF_A = REF_B = 0V Flight model post HDR/LDR exposure	80 ±100				
	V_S = ±2.5V, f = DC, VCM = ±20V, T_A = –55°C to +125°C, REF_A = REF_B = GND	80 ±100	100 ±10		dB µV/V	65.0
	V_S =±2.5V, f = DC, VCM = ±20V, T_A = –55°C to +125°C, REF_A = REF_B = GND Flight model post HDR/LDR exposure	76 ±159				
Input and output voltage range	V_S =±9V, V_{DIFF} = ±7.5V T_A = –55°C to +125°C, V_{CM} = REF_A = REF_B = GND	–7.5		7.5	V	70.2, 70.3
	V_S =±2.5V, V_{DIFF} = ±1V T_A = –55°C to +125°C, V_{CM} = REF_A = REF_B = GND	–1		1		70.0, 70.1
Output short-circuit range	V_S =±9V T_A = 25°C, V_{CM} = REF_A = REF_B = GND		±15		mA	75.2
	V+ = 5V and V– = 0V T_A = 25°C, V_{CM} = REF_A = REF_B = 2.5V		±15		mA	75.0
Quiescent current	V_S =±9V, T_A = –55°C to +125°C, I_O = 0mA	500	810	1100	µA	30.4, 30.5
	V+ = 5V and V– = 0V, T_A = –55°C to +125°C, I_O = 0mA	500	810	1100	µA	30.2, 30.3

3 Total Ionizing Dose Characterization Test Results

3.1 HDR Characterization Results

The parametric data for the INA1H94-SEP show the device passes up to the maximum specified 30krad(Si) dose level, and up to 50krad(Si) for information purposes only. No functional failures were observed on any samples, and all tested parameters were found to remain within the limits of the production ATE test program (and thus within the data sheet limits).

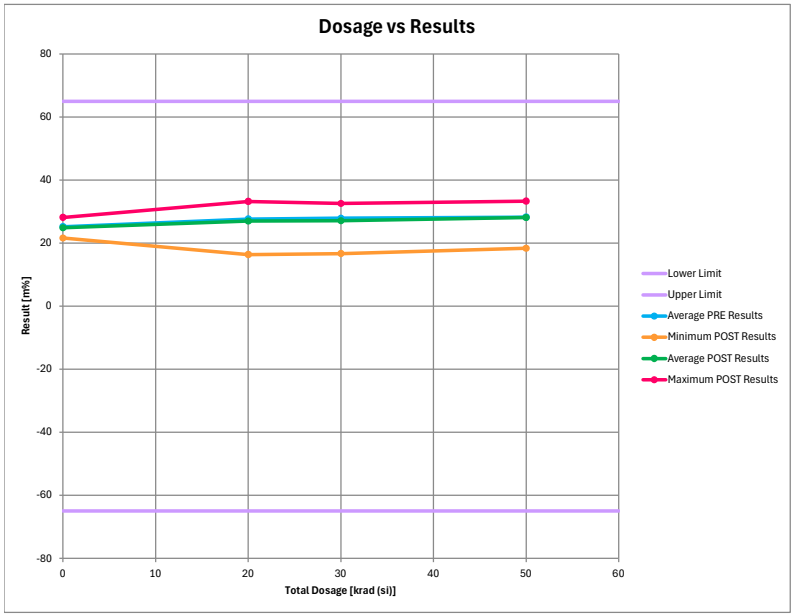
3.2 Summary of Results

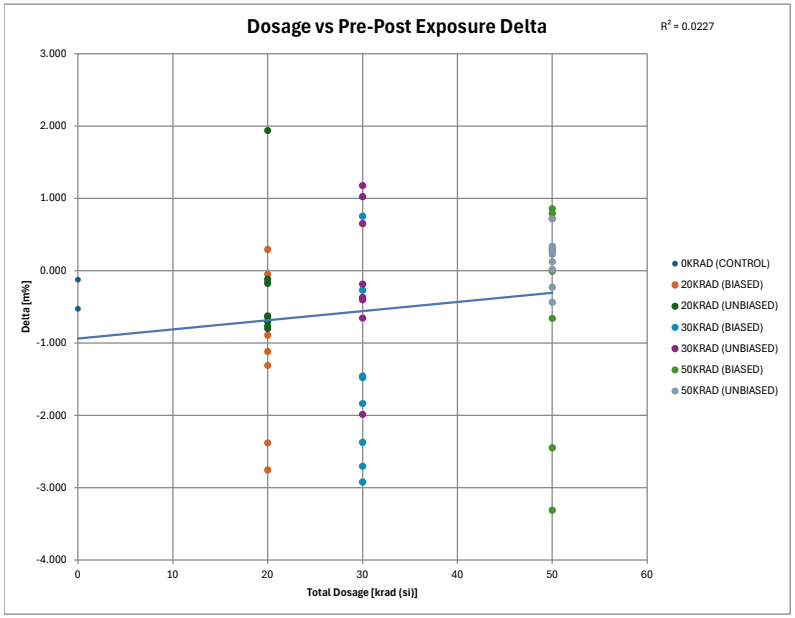
The parametric data for the INA1H94-SEP show the device passes up to the specified level of 30krad(Si) under HDR. Additional devices were submitted to a higher dose of 50krad(Si) for information purposes only. No functional failures were observed on any samples, and all tested parameters were found to remain within the limits of the production ATE test program (and thus within the data sheet limits) at 20krad(Si), 30krad(Si), and 50krad(Si).

A High Dose Rate Total Ionizing Dose Report

This appendix provides the INA1H94-SEP HDR TID report. The report shows the variation for each parameter up to the maximum specified dose of 30krad(Si). Additional devices were submitted to a higher dose of 50krad(Si) for information purposes only.

DEVICE TEST: 55.11 Gain error @ +/- 2.5V [m%]





TEST RESULT (LOWER LIMIT = -65| UPPER LIMIT = 65) [m%]

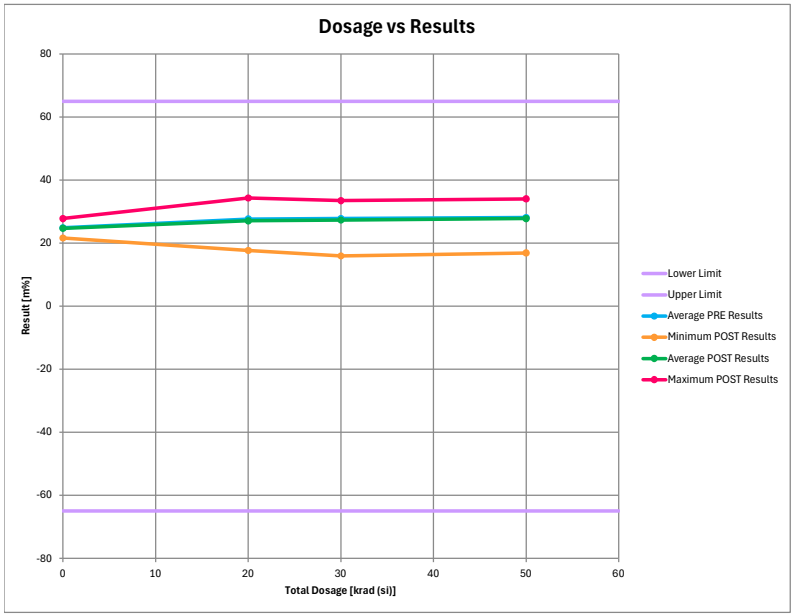
Serial #	Dosage [krad (Si)	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	28.274	28.149	-0.125
unit 50	0	CONTROL	22.123	21.595	-0.527
unit 1	20	BIASED	24.401	23.090	-1.311
unit 2	20	BIASED	35.941	33.186	-2.755
unit 3	20	BIASED	27.760	26.643	-1.117
unit 4	20	BIASED	32.279	32.229	-0.050
unit 5	20	BIASED	23.168	22.276	-0.892
unit 6	20	BIASED	31.953	29.572	-2.380
unit 7	20	BIASED	32.096	31.950	-0.146
unit 8	20	BIASED	21.373	21.667	0.294
unit 9	20	UNBIASED	33.094	32.294	-0.800
unit 10	20	UNBIASED	32.525	31.899	-0.626
unit 11	20	UNBIASED	24.265	23.625	-0.640
unit 12	20	UNBIASED	30.696	30.519	-0.176
unit 13	20	UNBIASED	22.950	24.886	1.936
unit 14	20	UNBIASED	26.516	25.751	-0.765
unit 15	20	UNBIASED	26.203	26.088	-0.115
unit 16	20	UNBIASED	17.085	16.380	-0.705
unit 17	30	BIASED	31.077	28.373	-2.704
unit 18	30	BIASED	29.528	27.692	-1.835
unit 19	30	BIASED	29.749	26.827	-2.922
unit 20	30	BIASED	21.952	20.495	-1.457
unit 21	30	BIASED	22.695	22.426	-0.268
unit 22	30	BIASED	29.139	29.893	0.753
unit 23	30	BIASED	32.907	30.533	-2.373
unit 24	30	BIASED	29.412	27.934	-1.478
unit 25	30	UNBIASED	33.363	31.378	-1.985
unit 26	30	UNBIASED	29.885	29.698	-0.187
unit 27	30	UNBIASED	27.034	26.663	-0.371
unit 28	30	UNBIASED	32.940	32.539	-0.401
unit 29	30	UNBIASED	23.373	24.024	0.651
unit 30	30	UNBIASED	33.233	32.577	-0.657
unit 31	30	UNBIASED	24.582	25.604	1.023
unit 32	30	UNBIASED	15.518	16.694	1.175
unit 33	50	BIASED	28.785	28.779	-0.006
unit 34	50	BIASED	32.569	33.288	0.719
unit 35	50	BIASED	26.418	23.107	-3.311
unit 36	50	BIASED	18.042	18.318	0.277
unit 37	50	BIASED	24.261	25.117	0.856
unit 38	50	BIASED	29.510	27.062	-2.448
unit 39	50	BIASED	21.217	20.556	-0.660
unit 40	50	BIASED	30.719	31.510	0.791
unit 41	50	UNBIASED	25.198	25.536	0.338

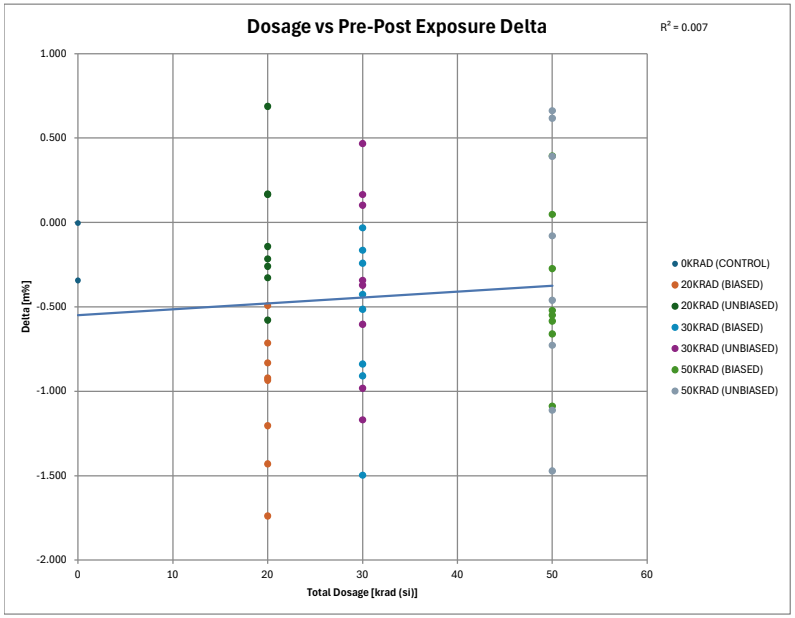
Serial #	Dosage [krad (Si)	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	31.973	32.199	0.226
unit 43	50	UNBIASED	30.985	31.702	0.717
unit 44	50	UNBIASED	28.758	29.062	0.304
unit 45	50	UNBIASED	29.453	29.017	-0.435
unit 46	50	UNBIASED	29.732	29.749	0.018
unit 47	50	UNBIASED	32.971	32.744	-0.228
unit 48	50	UNBIASED	31.244	31.367	0.123

TEST STATISTICS [m%]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	22.123	25.198	28.274	-	21.595	24.872	28.149	-	-0.527	-0.326	-0.125	-
	20	17.085	27.644	35.941	5.226	16.380	27.003	33.186	4.888	-2.755	-0.641	1.936	1.061
	30	15.518	27.899	33.363	5.038	16.694	27.084	32.577	4.417	-2.922	-0.815	1.175	1.335
	50	18.042	28.240	32.971	4.206	18.318	28.070	33.288	4.469	-3.311	-0.170	0.856	1.152
BIASED	20	21.373	28.621	35.941	5.223	21.667	27.577	33.186	4.784	-2.755	-1.045	0.294	1.095
	30	21.952	28.307	32.907	3.895	20.495	26.772	30.533	3.524	-2.922	-1.536	0.753	1.250
	50	18.042	26.440	32.569	4.977	18.318	25.967	33.288	5.211	-3.311	-0.473	0.856	1.584
UNBIASED	20	17.085	26.667	33.094	5.392	16.380	26.430	32.294	5.249	-0.800	-0.237	1.936	0.915
	30	15.518	27.491	33.363	6.232	16.694	27.397	32.577	5.400	-1.985	-0.094	1.175	1.034
	50	25.198	30.039	32.971	2.396	25.536	30.172	32.744	2.352	-0.435	0.133	0.717	0.356

DEVICE TEST: 55.13 Gain error @ +/- 9V [m%]





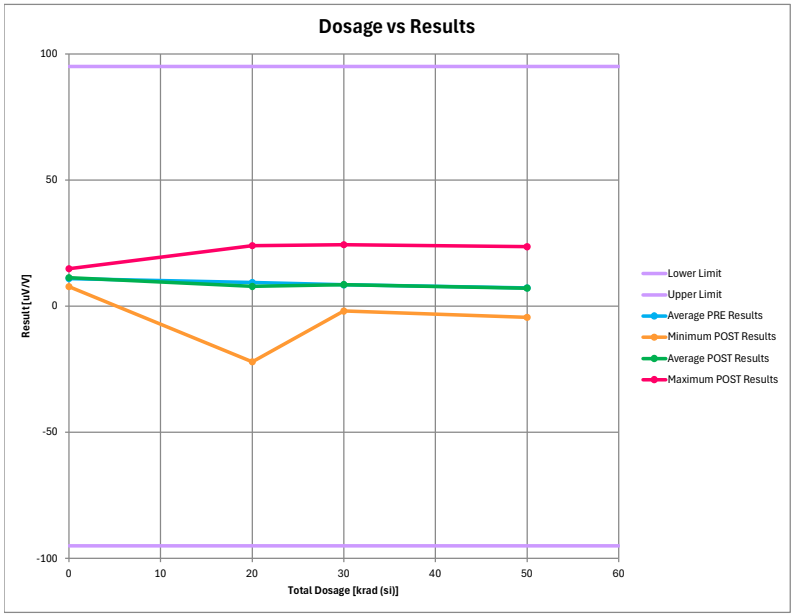
TEST RESULT (LOWER LIMIT = -65| UPPER LIMIT = 65) [m%]

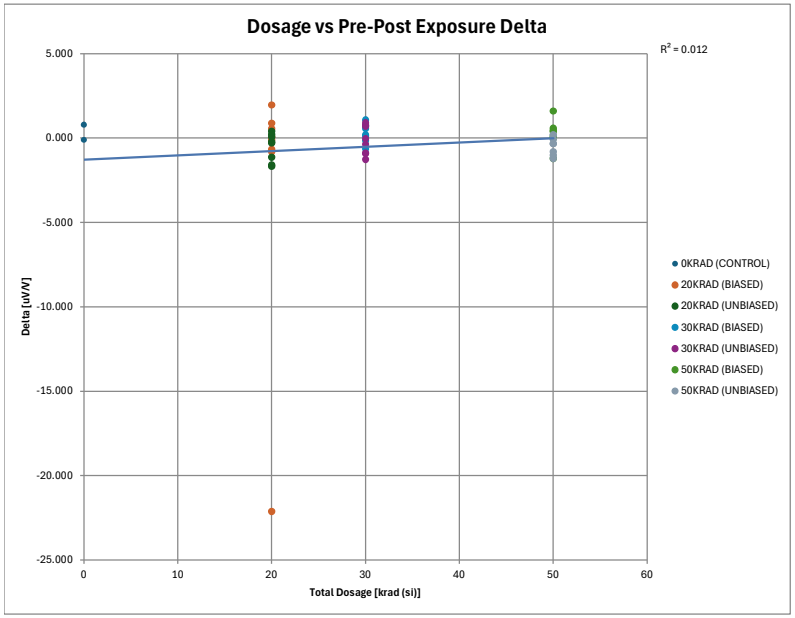
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	28.135	27.792	-0.343
unit 50	0	CONTROL	21.627	21.624	-0.003
unit 1	20	BIASED	24.510	23.306	-1.204
unit 2	20	BIASED	34.785	34.293	-0.492
unit 3	20	BIASED	26.364	25.442	-0.921
unit 4	20	BIASED	31.371	30.538	-0.832
unit 5	20	BIASED	22.425	20.686	-1.739
unit 6	20	BIASED	32.035	30.605	-1.430
unit 7	20	BIASED	32.331	31.616	-0.715
unit 8	20	BIASED	22.136	21.201	-0.934
unit 9	20	UNBIASED	32.359	33.047	0.687
unit 10	20	UNBIASED	32.919	32.704	-0.216
unit 11	20	UNBIASED	23.322	22.743	-0.578
unit 12	20	UNBIASED	31.209	31.066	-0.143
unit 13	20	UNBIASED	25.579	25.318	-0.260
unit 14	20	UNBIASED	24.370	24.540	0.169
unit 15	20	UNBIASED	28.163	28.329	0.166
unit 16	20	UNBIASED	17.955	17.628	-0.327
unit 17	30	BIASED	28.980	28.141	-0.839
unit 18	30	BIASED	27.553	27.312	-0.241
unit 19	30	BIASED	27.432	26.523	-0.909
unit 20	30	BIASED	21.910	21.879	-0.031
unit 21	30	BIASED	23.894	22.397	-1.497
unit 22	30	BIASED	29.759	29.594	-0.165
unit 23	30	BIASED	32.862	32.347	-0.515
unit 24	30	BIASED	28.109	27.684	-0.426
unit 25	30	UNBIASED	33.335	33.438	0.102
unit 26	30	UNBIASED	31.384	31.041	-0.343
unit 27	30	UNBIASED	26.895	26.523	-0.372
unit 28	30	UNBIASED	33.453	32.850	-0.603
unit 29	30	UNBIASED	23.957	24.123	0.166
unit 30	30	UNBIASED	32.604	31.435	-1.169
unit 31	30	UNBIASED	26.459	25.477	-0.982
unit 32	30	UNBIASED	15.482	15.950	0.468
unit 33	50	BIASED	29.200	28.113	-1.087
unit 34	50	BIASED	33.637	34.032	0.395
unit 35	50	BIASED	24.965	24.444	-0.521
unit 36	50	BIASED	17.469	16.884	-0.585
unit 37	50	BIASED	24.332	23.783	-0.549
unit 38	50	BIASED	28.351	28.399	0.048
unit 39	50	BIASED	19.319	19.046	-0.273
unit 40	50	BIASED	32.839	32.179	-0.660
unit 41	50	UNBIASED	25.614	26.005	0.392
unit 42	50	UNBIASED	31.565	30.453	-1.112
unit 43	50	UNBIASED	29.975	29.515	-0.460
unit 44	50	UNBIASED	29.454	29.375	-0.079
unit 45	50	UNBIASED	28.443	26.971	-1.472
unit 46	50	UNBIASED	31.047	31.664	0.617
unit 47	50	UNBIASED	32.553	31.826	-0.727
unit 48	50	UNBIASED	31.237	31.899	0.662

TEST STATISTICS [m%]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	21.627	24.881	28.135	-	21.624	24.708	27.792	-	-0.343	-0.173	-0.003	-
	20	17.955	27.615	34.785	4.938	17.628	27.067	34.293	5.110	-1.739	-0.548	0.687	0.632
	30	15.482	27.754	33.453	4.822	15.950	27.295	33.438	4.676	-1.497	-0.460	0.468	0.525
	50	17.469	28.125	33.637	4.694	16.884	27.787	34.032	4.803	-1.472	-0.338	0.662	0.635
BIASED	20	22.136	28.245	34.785	4.961	20.686	27.211	34.293	5.199	-1.739	-1.034	-0.492	0.404
	30	21.910	27.562	32.862	3.394	21.879	26.985	32.347	3.481	-1.497	-0.578	-0.031	0.483
	50	17.469	26.264	33.637	5.875	16.884	25.860	34.032	5.995	-1.087	-0.404	0.395	0.457
UNBIASED	20	17.955	26.985	32.919	5.170	17.628	26.922	33.047	5.374	-0.578	-0.063	0.687	0.392
	30	15.482	27.946	33.453	6.181	15.950	27.605	33.438	5.876	-1.169	-0.342	0.468	0.570
	50	25.614	29.986	32.553	2.189	26.005	29.714	31.899	2.237	-1.472	-0.272	0.662	0.804

DEVICE TEST: 65.0 Common Mode Rejection Ratio @ +/- 2.5V, VCM = +/-20V [uV/V]





TEST RESULT (LOWER LIMIT = -95| UPPER LIMIT = 95) [uV/V]

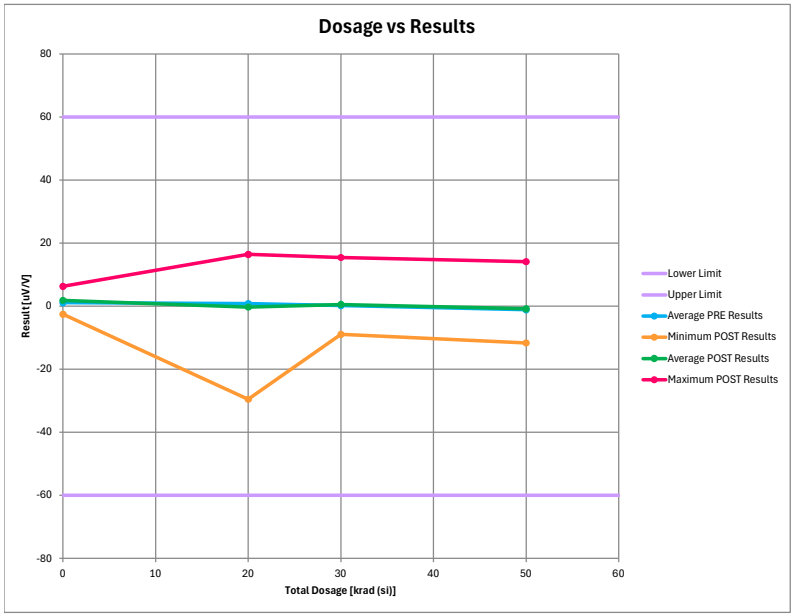
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	7.818	7.712	-0.107
unit 50	0	CONTROL	14.069	14.867	0.797
unit 1	20	BIASED	0.097	-22.018	-22.115
unit 2	20	BIASED	2.574	1.771	-0.803
unit 3	20	BIASED	14.679	14.748	0.069
unit 4	20	BIASED	12.951	13.511	0.560
unit 5	20	BIASED	4.672	6.641	1.968
unit 6	20	BIASED	-6.614	-5.729	0.886
unit 7	20	BIASED	13.768	13.103	-0.665
unit 8	20	BIASED	20.205	20.100	-0.106
unit 9	20	UNBIASED	3.967	3.755	-0.212
unit 10	20	UNBIASED	-6.109	-7.780	-1.672
unit 11	20	UNBIASED	14.650	13.517	-1.132
unit 12	20	UNBIASED	15.784	14.197	-1.588
unit 13	20	UNBIASED	1.282	0.996	-0.286
unit 14	20	UNBIASED	14.505	14.720	0.215
unit 15	20	UNBIASED	23.863	23.945	0.082
unit 16	20	UNBIASED	19.236	19.643	0.407
unit 17	30	BIASED	3.189	3.752	0.564
unit 18	30	BIASED	16.594	16.449	-0.145
unit 19	30	BIASED	7.450	7.652	0.203
unit 20	30	BIASED	7.234	7.366	0.132
unit 21	30	BIASED	-0.324	0.379	0.703
unit 22	30	BIASED	2.231	1.591	-0.640
unit 23	30	BIASED	13.085	13.833	0.748
unit 24	30	BIASED	4.504	5.582	1.078
unit 25	30	UNBIASED	-1.042	-1.931	-0.889
unit 26	30	UNBIASED	1.743	2.508	0.765
unit 27	30	UNBIASED	25.588	24.326	-1.261
unit 28	30	UNBIASED	19.226	19.931	0.705
unit 29	30	UNBIASED	2.205	2.183	-0.022
unit 30	30	UNBIASED	3.938	3.032	-0.906
unit 31	30	UNBIASED	11.782	12.698	0.916
unit 32	30	UNBIASED	17.804	17.441	-0.363
unit 33	50	BIASED	3.988	4.444	0.457
unit 34	50	BIASED	-4.466	-4.450	0.015
unit 35	50	BIASED	15.254	15.344	0.090
unit 36	50	BIASED	1.906	0.702	-1.204
unit 37	50	BIASED	19.710	21.315	1.606
unit 38	50	BIASED	11.324	11.910	0.586
unit 39	50	BIASED	2.338	2.730	0.392
unit 40	50	BIASED	10.005	10.001	-0.004
unit 41	50	UNBIASED	0.213	-0.801	-1.014

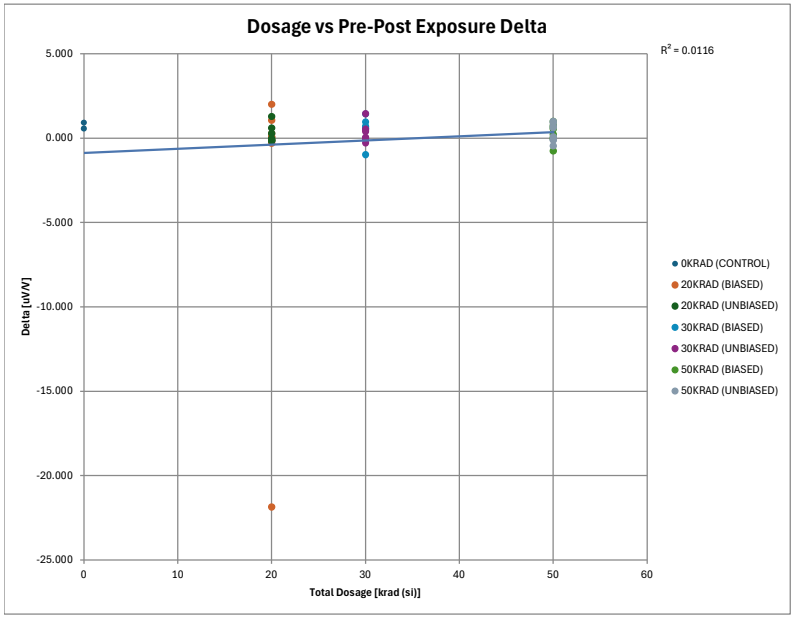
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	-2.549	-2.363	0.186
unit 43	50	UNBIASED	10.542	10.214	-0.328
unit 44	50	UNBIASED	21.417	21.621	0.203
unit 45	50	UNBIASED	0.361	0.029	-0.332
unit 46	50	UNBIASED	24.778	23.570	-1.208
unit 47	50	UNBIASED	1.465	0.656	-0.809
unit 48	50	UNBIASED	-0.404	-0.466	-0.062

TEST STATISTICS [uV/V]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	7.818	10.944	14.069	-	7.712	11.289	14.867	-	-0.107	0.345	0.797	-
	20	-6.614	9.344	23.863	9.397	-22.018	7.820	23.945	12.105	-22.115	-1.524	1.968	5.567
	30	-1.042	8.450	25.588	7.967	-1.931	8.550	24.326	7.881	-1.261	0.099	1.078	0.736
	50	-4.466	7.243	24.778	9.121	-4.450	7.153	23.570	9.290	-1.208	-0.089	1.606	0.733
BIASED	20	-6.614	7.792	20.205	9.005	-22.018	5.266	20.100	13.726	-22.115	-2.526	1.968	7.965
	30	-0.324	6.745	16.594	5.682	0.379	7.076	16.449	5.633	-0.640	0.330	1.078	0.554
	50	-4.466	7.507	19.710	7.960	-4.450	7.750	21.315	8.441	-1.204	0.242	1.606	0.781
UNBIASED	20	-6.109	10.897	23.863	10.130	-7.780	10.374	23.945	10.521	-1.672	-0.523	0.407	0.824
	30	-1.042	10.155	25.588	9.853	-1.931	10.024	24.326	9.817	-1.261	-0.132	0.916	0.855
	50	-2.549	6.978	24.778	10.712	-2.363	6.557	23.570	10.625	-1.208	-0.421	0.203	0.538

DEVICE TEST: 65.1 Common Mode Rejection Ratio @ +/- 9V, VCM = +/-150V [uV/V]





TEST RESULT (LOWER LIMIT = -60| UPPER LIMIT = 60) [uV/V]

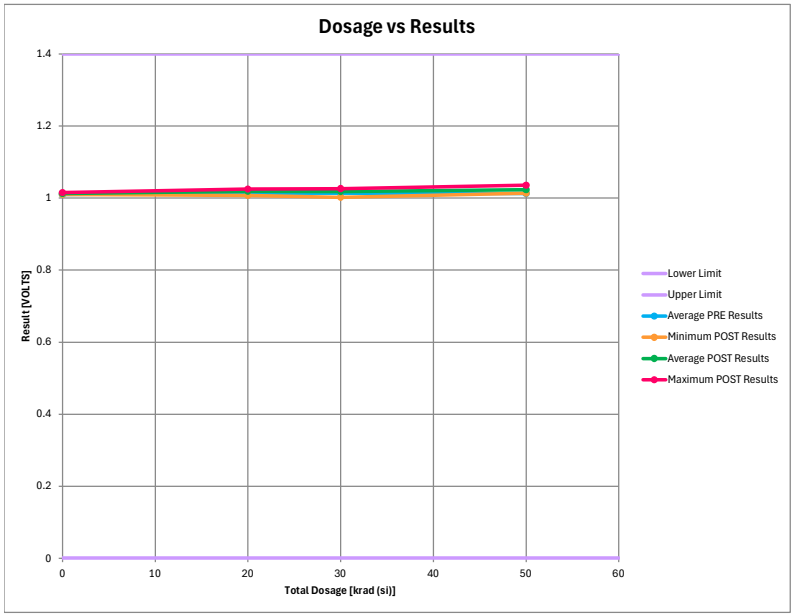
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	-3.147	-2.579	0.568
unit 50	0	CONTROL	5.338	6.254	0.916
unit 1	20	BIASED	-7.639	-29.498	-21.859
unit 2	20	BIASED	-7.099	-7.420	-0.321
unit 3	20	BIASED	7.894	7.734	-0.160
unit 4	20	BIASED	4.681	4.754	0.074
unit 5	20	BIASED	-3.126	-1.124	2.002
unit 6	20	BIASED	-13.214	-12.165	1.049
unit 7	20	BIASED	5.398	5.674	0.275
unit 8	20	BIASED	10.326	10.394	0.068
unit 9	20	UNBIASED	-5.052	-5.145	-0.093
unit 10	20	UNBIASED	-17.784	-17.952	-0.168
unit 11	20	UNBIASED	5.332	5.605	0.273
unit 12	20	UNBIASED	7.023	6.906	-0.117
unit 13	20	UNBIASED	-7.403	-7.440	-0.038
unit 14	20	UNBIASED	5.551	6.149	0.598
unit 15	20	UNBIASED	16.544	16.388	-0.157
unit 16	20	UNBIASED	10.831	12.101	1.270
unit 17	30	BIASED	-9.927	-8.971	0.956
unit 18	30	BIASED	10.120	10.067	-0.053
unit 19	30	BIASED	-2.700	-2.137	0.562
unit 20	30	BIASED	-0.185	0.516	0.701
unit 21	30	BIASED	-7.534	-6.881	0.653
unit 22	30	BIASED	-5.541	-6.526	-0.985
unit 23	30	BIASED	4.680	5.248	0.568
unit 24	30	BIASED	-0.722	0.703	1.424
unit 25	30	UNBIASED	-8.719	-8.335	0.384
unit 26	30	UNBIASED	-7.487	-6.043	1.444
unit 27	30	UNBIASED	15.722	15.439	-0.283
unit 28	30	UNBIASED	12.175	12.213	0.039
unit 29	30	UNBIASED	-6.182	-5.719	0.463
unit 30	30	UNBIASED	-6.538	-6.595	-0.058
unit 31	30	UNBIASED	5.158	5.697	0.538
unit 32	30	UNBIASED	10.308	10.291	-0.017
unit 33	50	BIASED	-4.446	-3.465	0.980
unit 34	50	BIASED	-11.618	-11.670	-0.052
unit 35	50	BIASED	7.215	7.854	0.639
unit 36	50	BIASED	-8.570	-9.327	-0.757
unit 37	50	BIASED	12.638	13.390	0.751
unit 38	50	BIASED	2.580	3.109	0.529
unit 39	50	BIASED	-4.867	-4.652	0.216
unit 40	50	BIASED	1.372	1.379	0.007
unit 41	50	UNBIASED	-6.265	-6.356	-0.091

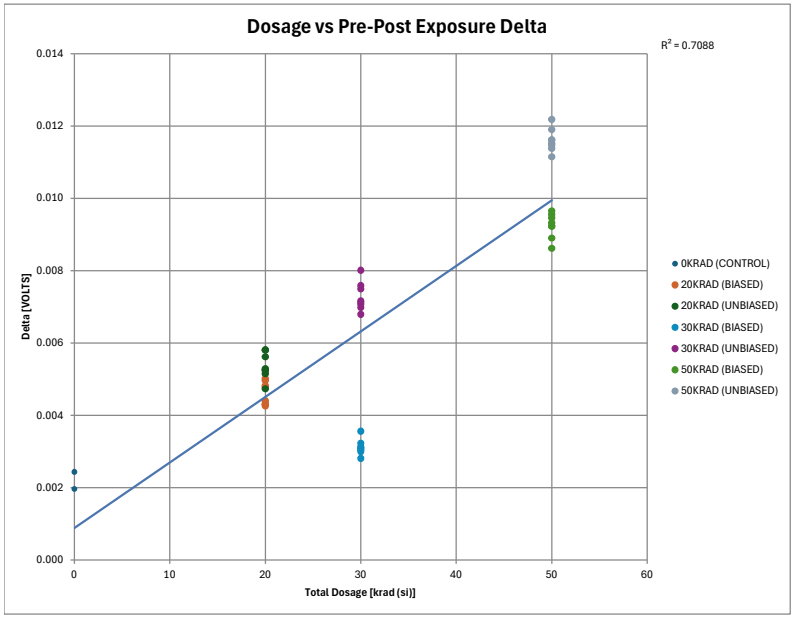
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	-9.725	-9.042	0.683
unit 43	50	UNBIASED	1.990	1.869	-0.121
unit 44	50	UNBIASED	12.894	13.500	0.606
unit 45	50	UNBIASED	-9.704	-8.809	0.896
unit 46	50	UNBIASED	14.034	14.109	0.075
unit 47	50	UNBIASED	-6.738	-7.195	-0.457
unit 48	50	UNBIASED	-9.140	-8.151	0.989

TEST STATISTICS [uV/V]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	-3.147	1.096	5.338	-	-2.579	1.838	6.254	-	0.568	0.742	0.916	-
	20	-17.784	0.767	16.544	9.660	-29.498	-0.315	16.388	12.197	-21.859	-1.082	2.002	5.577
	30	-9.927	0.164	15.722	8.403	-8.971	0.560	15.439	8.196	-0.985	0.396	1.444	0.621
	50	-11.618	-1.147	14.034	8.852	-11.670	-0.841	14.109	8.947	-0.757	0.306	0.989	0.529
BIASED	20	-13.214	-0.347	10.326	8.554	-29.498	-2.706	10.394	13.301	-21.859	-2.359	2.002	7.916
	30	-9.927	-1.476	10.120	6.555	-8.971	-0.998	10.067	6.510	-0.985	0.478	1.424	0.721
	50	-11.618	-0.712	12.638	8.178	-11.670	-0.423	13.390	8.518	-0.757	0.289	0.980	0.556
UNBIASED	20	-17.784	1.881	16.544	11.135	-17.952	2.077	16.388	11.348	-0.168	0.196	1.270	0.509
	30	-8.719	1.805	15.722	10.108	-8.335	2.119	15.439	9.799	-0.283	0.314	1.444	0.539
	50	-9.725	-1.582	14.034	10.029	-9.042	-1.259	14.109	9.929	-0.457	0.323	0.989	0.537

DEVICE TEST: 70.0 Neg. output swing to the rail @ +/- 2.5V [VOLTS]





TEST RESULT (LOWER LIMIT = 0.001| UPPER LIMIT = 1.4) [VOLTS]

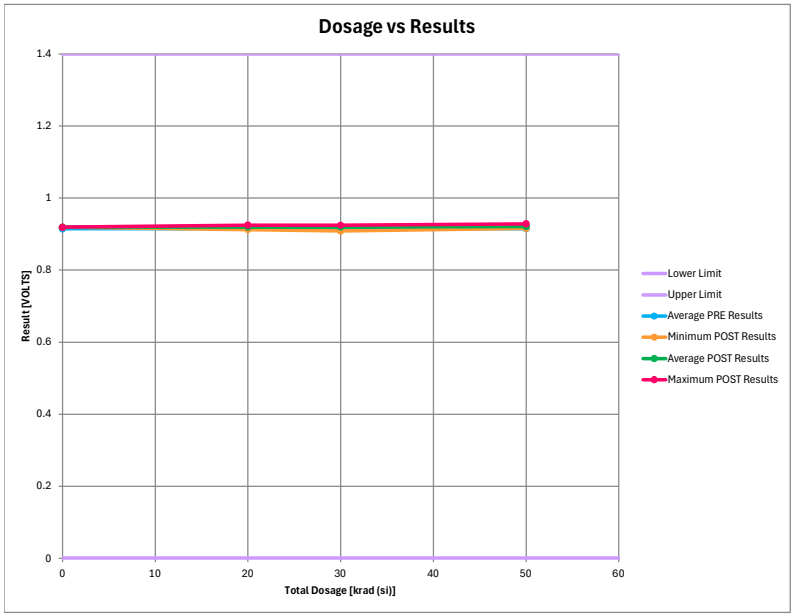
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	1.013	1.015	0.002
unit 50	0	CONTROL	1.008	1.010	0.002
unit 1	20	BIASED	1.015	1.019	0.004
unit 2	20	BIASED	1.018	1.022	0.004
unit 3	20	BIASED	1.015	1.019	0.005
unit 4	20	BIASED	1.002	1.007	0.005
unit 5	20	BIASED	1.007	1.012	0.005
unit 6	20	BIASED	1.011	1.016	0.004
unit 7	20	BIASED	1.015	1.020	0.005
unit 8	20	BIASED	1.014	1.018	0.004
unit 9	20	UNBIASED	1.013	1.018	0.005
unit 10	20	UNBIASED	1.018	1.022	0.005
unit 11	20	UNBIASED	1.012	1.018	0.005
unit 12	20	UNBIASED	1.016	1.022	0.006
unit 13	20	UNBIASED	1.020	1.025	0.005
unit 14	20	UNBIASED	1.019	1.025	0.005
unit 15	20	UNBIASED	1.017	1.023	0.006
unit 16	20	UNBIASED	1.007	1.013	0.006
unit 17	30	BIASED	1.011	1.014	0.003
unit 18	30	BIASED	1.009	1.013	0.004
unit 19	30	BIASED	0.999	1.002	0.003
unit 20	30	BIASED	1.018	1.020	0.003
unit 21	30	BIASED	1.015	1.018	0.003
unit 22	30	BIASED	1.014	1.017	0.003
unit 23	30	BIASED	1.012	1.015	0.003
unit 24	30	BIASED	1.014	1.018	0.003
unit 25	30	UNBIASED	1.019	1.026	0.007
unit 26	30	UNBIASED	1.019	1.026	0.007
unit 27	30	UNBIASED	1.017	1.025	0.008
unit 28	30	UNBIASED	1.019	1.026	0.007
unit 29	30	UNBIASED	1.016	1.023	0.007
unit 30	30	UNBIASED	1.011	1.019	0.008
unit 31	30	UNBIASED	1.012	1.019	0.007
unit 32	30	UNBIASED	1.006	1.013	0.007
unit 33	50	BIASED	1.005	1.015	0.009
unit 34	50	BIASED	1.014	1.023	0.009
unit 35	50	BIASED	1.015	1.024	0.009
unit 36	50	BIASED	1.008	1.018	0.010
unit 37	50	BIASED	1.004	1.013	0.009
unit 38	50	BIASED	1.009	1.018	0.010
unit 39	50	BIASED	1.006	1.016	0.009
unit 40	50	BIASED	1.017	1.025	0.009
unit 41	50	UNBIASED	1.023	1.035	0.012

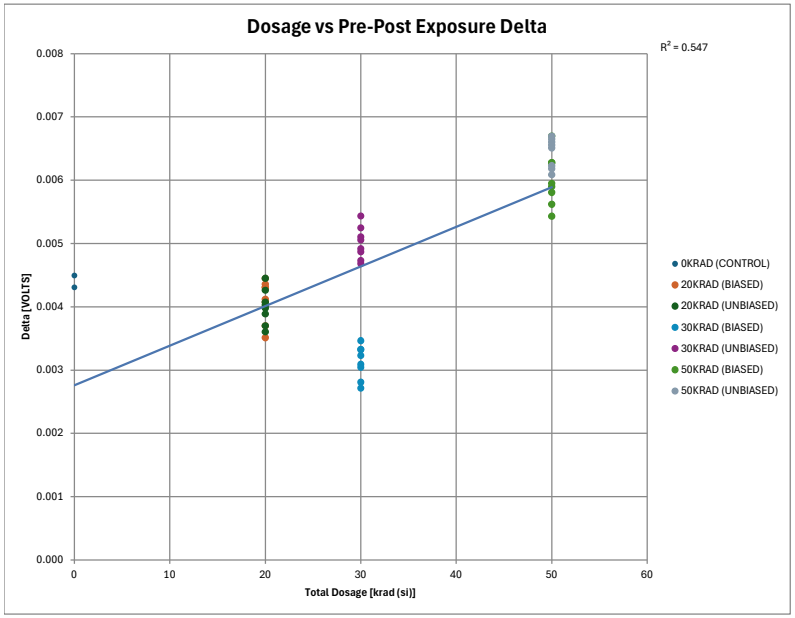
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	1.019	1.030	0.011
unit 43	50	UNBIASED	1.017	1.029	0.012
unit 44	50	UNBIASED	1.018	1.030	0.012
unit 45	50	UNBIASED	1.013	1.024	0.011
unit 46	50	UNBIASED	1.015	1.026	0.011
unit 47	50	UNBIASED	1.014	1.026	0.012
unit 48	50	UNBIASED	1.011	1.022	0.012

TEST STATISTICS [VOLTS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	1.008	1.010	1.013	-	1.010	1.012	1.015	-	0.002	0.002	0.002	-
	20	1.002	1.014	1.020	0.005	1.007	1.019	1.025	0.005	0.004	0.005	0.006	0.001
	30	0.999	1.013	1.019	0.005	1.002	1.018	1.026	0.006	0.003	0.005	0.008	0.002
	50	1.004	1.013	1.023	0.005	1.013	1.023	1.035	0.006	0.009	0.010	0.012	0.001
BIASED	20	1.002	1.012	1.018	0.005	1.007	1.017	1.022	0.005	0.004	0.005	0.005	0.000
	30	0.999	1.012	1.018	0.006	1.002	1.015	1.020	0.006	0.003	0.003	0.004	0.000
	50	1.004	1.010	1.017	0.005	1.013	1.019	1.025	0.005	0.009	0.009	0.010	0.000
UNBIASED	20	1.007	1.015	1.020	0.004	1.013	1.021	1.025	0.004	0.005	0.005	0.006	0.000
	30	1.006	1.015	1.019	0.005	1.013	1.022	1.026	0.005	0.007	0.007	0.008	0.000
	50	1.011	1.016	1.023	0.004	1.022	1.028	1.035	0.004	0.011	0.012	0.012	0.000

DEVICE TEST: 70.1 Pos. output swing to the rail @ +/- 2.5V [VOLTS]





TEST RESULT (LOWER LIMIT = 0.001| UPPER LIMIT = 1.4) [VOLTS]

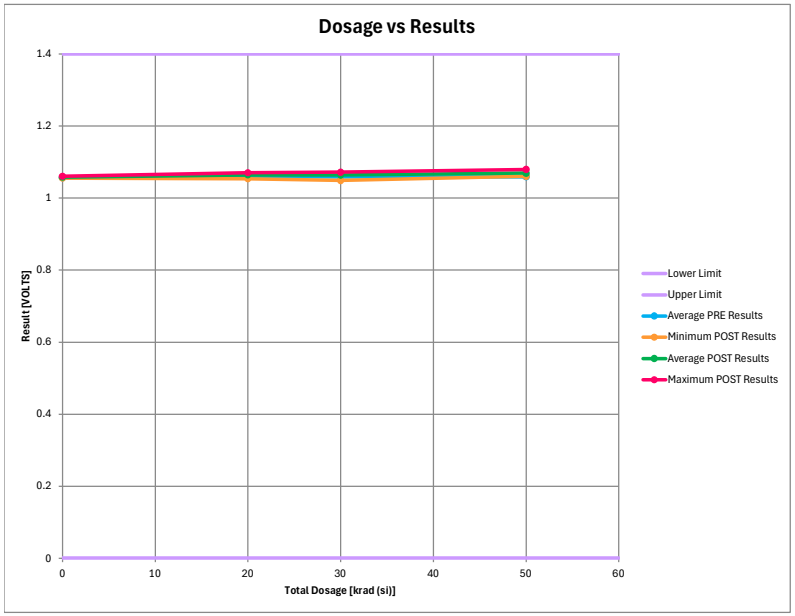
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	0.914	0.919	0.004
unit 50	0	CONTROL	0.915	0.919	0.004
unit 1	20	BIASED	0.916	0.920	0.004
unit 2	20	BIASED	0.918	0.922	0.004
unit 3	20	BIASED	0.916	0.920	0.004
unit 4	20	BIASED	0.909	0.913	0.004
unit 5	20	BIASED	0.908	0.913	0.004
unit 6	20	BIASED	0.912	0.915	0.004
unit 7	20	BIASED	0.918	0.921	0.004
unit 8	20	BIASED	0.914	0.919	0.004
unit 9	20	UNBIASED	0.915	0.919	0.004
unit 10	20	UNBIASED	0.917	0.921	0.004
unit 11	20	UNBIASED	0.915	0.919	0.004
unit 12	20	UNBIASED	0.916	0.920	0.004
unit 13	20	UNBIASED	0.920	0.924	0.004
unit 14	20	UNBIASED	0.921	0.925	0.004
unit 15	20	UNBIASED	0.917	0.921	0.004
unit 16	20	UNBIASED	0.913	0.917	0.004
unit 17	30	BIASED	0.915	0.919	0.003
unit 18	30	BIASED	0.916	0.919	0.003
unit 19	30	BIASED	0.905	0.908	0.003
unit 20	30	BIASED	0.917	0.920	0.003
unit 21	30	BIASED	0.918	0.921	0.003
unit 22	30	BIASED	0.915	0.918	0.003
unit 23	30	BIASED	0.914	0.917	0.003
unit 24	30	BIASED	0.916	0.919	0.003
unit 25	30	UNBIASED	0.919	0.924	0.005
unit 26	30	UNBIASED	0.920	0.925	0.005
unit 27	30	UNBIASED	0.917	0.922	0.005
unit 28	30	UNBIASED	0.918	0.923	0.005
unit 29	30	UNBIASED	0.916	0.920	0.005
unit 30	30	UNBIASED	0.912	0.918	0.005
unit 31	30	UNBIASED	0.916	0.922	0.005
unit 32	30	UNBIASED	0.910	0.915	0.005
unit 33	50	BIASED	0.910	0.916	0.006
unit 34	50	BIASED	0.915	0.921	0.006
unit 35	50	BIASED	0.916	0.922	0.006
unit 36	50	BIASED	0.912	0.919	0.007
unit 37	50	BIASED	0.911	0.916	0.005
unit 38	50	BIASED	0.912	0.918	0.006
unit 39	50	BIASED	0.911	0.917	0.006
unit 40	50	BIASED	0.916	0.922	0.006
unit 41	50	UNBIASED	0.922	0.928	0.006

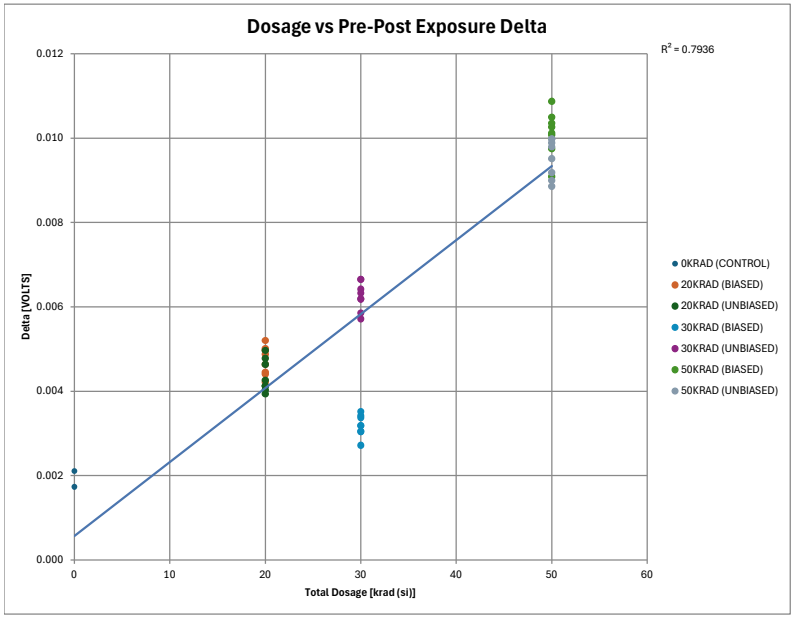
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	0.919	0.925	0.006
unit 43	50	UNBIASED	0.919	0.925	0.006
unit 44	50	UNBIASED	0.918	0.925	0.007
unit 45	50	UNBIASED	0.915	0.921	0.007
unit 46	50	UNBIASED	0.917	0.924	0.007
unit 47	50	UNBIASED	0.915	0.921	0.007
unit 48	50	UNBIASED	0.914	0.921	0.007

TEST STATISTICS [VOLTS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	0.914	0.914	0.915	-	0.919	0.919	0.919	-	0.004	0.004	0.004	-
	20	0.908	0.915	0.921	0.003	0.913	0.919	0.925	0.003	0.004	0.004	0.004	0.000
	30	0.905	0.915	0.920	0.004	0.908	0.919	0.925	0.004	0.003	0.004	0.005	0.001
	50	0.910	0.915	0.922	0.003	0.916	0.921	0.928	0.003	0.005	0.006	0.007	0.000
BIASED	20	0.908	0.914	0.918	0.004	0.913	0.918	0.922	0.004	0.004	0.004	0.004	0.000
	30	0.905	0.915	0.918	0.004	0.908	0.918	0.921	0.004	0.003	0.003	0.003	0.000
	50	0.910	0.913	0.916	0.002	0.916	0.919	0.922	0.002	0.005	0.006	0.007	0.000
UNBIASED	20	0.913	0.917	0.921	0.003	0.917	0.921	0.925	0.003	0.004	0.004	0.004	0.000
	30	0.910	0.916	0.920	0.003	0.915	0.921	0.925	0.003	0.005	0.005	0.005	0.000
	50	0.914	0.917	0.922	0.003	0.921	0.924	0.928	0.003	0.006	0.006	0.007	0.000

DEVICE TEST: 70.2 Neg. output swing to the rail @ +/- 9V [VOLTS]





TEST RESULT (LOWER LIMIT = 0.001| UPPER LIMIT = 1.4) [VOLTS]

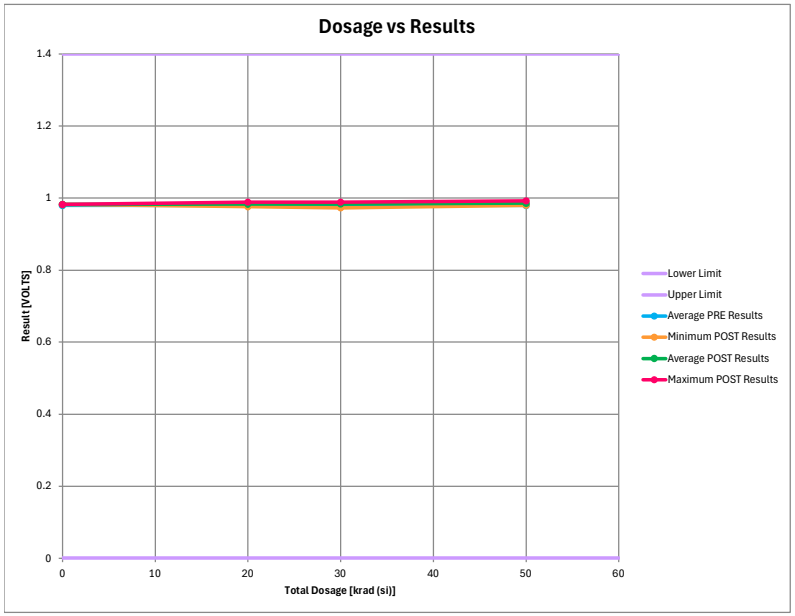
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	1.059	1.061	0.002
unit 50	0	CONTROL	1.053	1.055	0.002
unit 1	20	BIASED	1.061	1.066	0.005
unit 2	20	BIASED	1.064	1.069	0.005
unit 3	20	BIASED	1.062	1.066	0.004
unit 4	20	BIASED	1.048	1.053	0.005
unit 5	20	BIASED	1.054	1.059	0.005
unit 6	20	BIASED	1.058	1.062	0.004
unit 7	20	BIASED	1.062	1.066	0.004
unit 8	20	BIASED	1.060	1.064	0.005
unit 9	20	UNBIASED	1.059	1.063	0.004
unit 10	20	UNBIASED	1.063	1.067	0.004
unit 11	20	UNBIASED	1.057	1.062	0.005
unit 12	20	UNBIASED	1.062	1.066	0.004
unit 13	20	UNBIASED	1.066	1.070	0.004
unit 14	20	UNBIASED	1.066	1.070	0.004
unit 15	20	UNBIASED	1.064	1.068	0.005
unit 16	20	UNBIASED	1.053	1.058	0.005
unit 17	30	BIASED	1.058	1.061	0.003
unit 18	30	BIASED	1.055	1.058	0.003
unit 19	30	BIASED	1.045	1.049	0.003
unit 20	30	BIASED	1.064	1.067	0.004
unit 21	30	BIASED	1.062	1.064	0.003
unit 22	30	BIASED	1.059	1.063	0.003
unit 23	30	BIASED	1.058	1.061	0.003
unit 24	30	BIASED	1.060	1.063	0.003
unit 25	30	UNBIASED	1.065	1.072	0.007
unit 26	30	UNBIASED	1.065	1.071	0.006
unit 27	30	UNBIASED	1.063	1.070	0.006
unit 28	30	UNBIASED	1.065	1.071	0.006
unit 29	30	UNBIASED	1.062	1.068	0.006
unit 30	30	UNBIASED	1.058	1.065	0.006
unit 31	30	UNBIASED	1.058	1.064	0.006
unit 32	30	UNBIASED	1.052	1.058	0.007
unit 33	50	BIASED	1.051	1.061	0.010
unit 34	50	BIASED	1.060	1.070	0.010
unit 35	50	BIASED	1.061	1.071	0.010
unit 36	50	BIASED	1.054	1.065	0.011
unit 37	50	BIASED	1.050	1.061	0.010
unit 38	50	BIASED	1.055	1.065	0.010
unit 39	50	BIASED	1.052	1.062	0.010
unit 40	50	BIASED	1.063	1.072	0.009
unit 41	50	UNBIASED	1.069	1.079	0.010

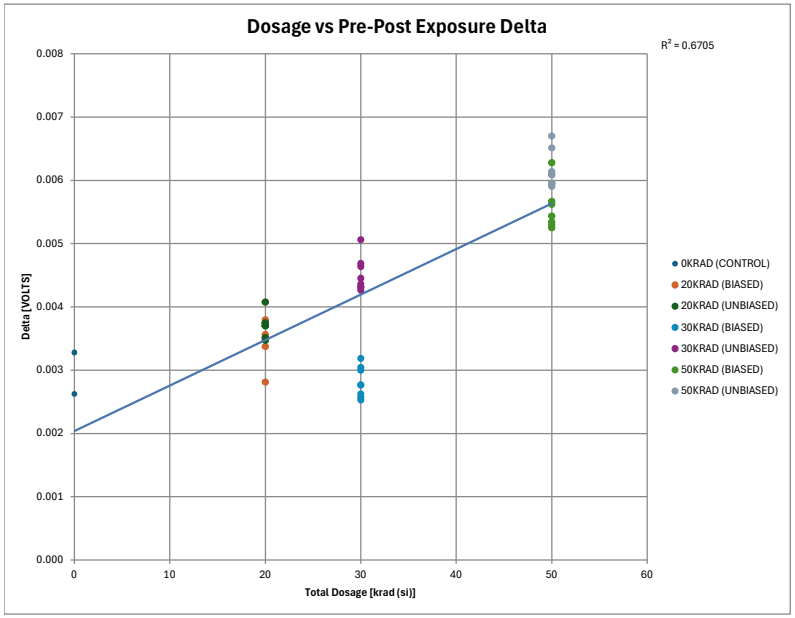
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	1.065	1.074	0.010
unit 43	50	UNBIASED	1.064	1.074	0.010
unit 44	50	UNBIASED	1.064	1.073	0.009
unit 45	50	UNBIASED	1.060	1.068	0.009
unit 46	50	UNBIASED	1.061	1.071	0.010
unit 47	50	UNBIASED	1.061	1.070	0.009
unit 48	50	UNBIASED	1.057	1.067	0.010

TEST STATISTICS [VOLTS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	1.053	1.056	1.059	-	1.055	1.058	1.061	-	0.002	0.002	0.002	-
	20	1.048	1.060	1.066	0.005	1.053	1.064	1.070	0.005	0.004	0.005	0.005	0.000
	30	1.045	1.059	1.065	0.005	1.049	1.064	1.072	0.006	0.003	0.005	0.007	0.002
	50	1.050	1.059	1.069	0.006	1.061	1.069	1.079	0.005	0.009	0.010	0.011	0.001
BIASED	20	1.048	1.058	1.064	0.005	1.053	1.063	1.069	0.005	0.004	0.005	0.005	0.000
	30	1.045	1.058	1.064	0.006	1.049	1.061	1.067	0.006	0.003	0.003	0.004	0.000
	50	1.050	1.056	1.063	0.005	1.061	1.066	1.072	0.005	0.009	0.010	0.011	0.001
UNBIASED	20	1.053	1.061	1.066	0.004	1.058	1.066	1.070	0.004	0.004	0.004	0.005	0.000
	30	1.052	1.061	1.065	0.005	1.058	1.067	1.072	0.005	0.006	0.006	0.007	0.000
	50	1.057	1.062	1.069	0.004	1.067	1.072	1.079	0.004	0.009	0.010	0.010	0.000

DEVICE TEST: 70.3 Pos. output swing to the rail @ +/- 9V [VOLTS]





TEST RESULT (LOWER LIMIT = 0.001| UPPER LIMIT = 1.4) [VOLTS]

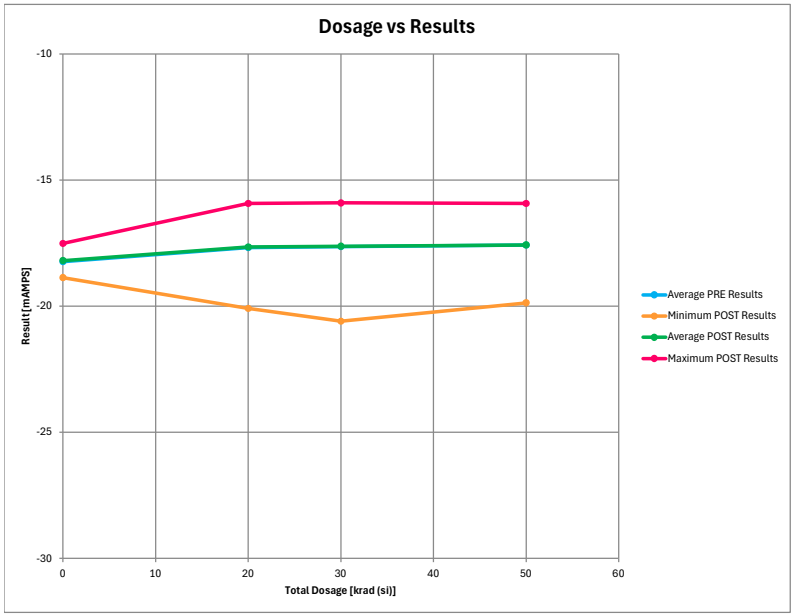
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	0.979	0.982	0.003
unit 50	0	CONTROL	0.980	0.982	0.003
unit 1	20	BIASED	0.980	0.984	0.004
unit 2	20	BIASED	0.982	0.986	0.003
unit 3	20	BIASED	0.980	0.984	0.004
unit 4	20	BIASED	0.973	0.977	0.004
unit 5	20	BIASED	0.972	0.976	0.004
unit 6	20	BIASED	0.976	0.979	0.004
unit 7	20	BIASED	0.982	0.986	0.004
unit 8	20	BIASED	0.979	0.982	0.003
unit 9	20	UNBIASED	0.980	0.984	0.004
unit 10	20	UNBIASED	0.981	0.985	0.004
unit 11	20	UNBIASED	0.979	0.983	0.004
unit 12	20	UNBIASED	0.981	0.985	0.004
unit 13	20	UNBIASED	0.984	0.988	0.004
unit 14	20	UNBIASED	0.985	0.989	0.004
unit 15	20	UNBIASED	0.982	0.985	0.004
unit 16	20	UNBIASED	0.977	0.981	0.003
unit 17	30	BIASED	0.980	0.983	0.003
unit 18	30	BIASED	0.981	0.984	0.003
unit 19	30	BIASED	0.970	0.973	0.003
unit 20	30	BIASED	0.982	0.985	0.003
unit 21	30	BIASED	0.983	0.985	0.003
unit 22	30	BIASED	0.979	0.982	0.003
unit 23	30	BIASED	0.978	0.981	0.003
unit 24	30	BIASED	0.981	0.983	0.003
unit 25	30	UNBIASED	0.984	0.989	0.004
unit 26	30	UNBIASED	0.984	0.989	0.005
unit 27	30	UNBIASED	0.982	0.987	0.004
unit 28	30	UNBIASED	0.983	0.987	0.004
unit 29	30	UNBIASED	0.980	0.985	0.004
unit 30	30	UNBIASED	0.977	0.982	0.005
unit 31	30	UNBIASED	0.981	0.986	0.005
unit 32	30	UNBIASED	0.975	0.979	0.004
unit 33	50	BIASED	0.974	0.980	0.006
unit 34	50	BIASED	0.979	0.985	0.005
unit 35	50	BIASED	0.981	0.986	0.005
unit 36	50	BIASED	0.977	0.983	0.006
unit 37	50	BIASED	0.975	0.980	0.005
unit 38	50	BIASED	0.977	0.982	0.006
unit 39	50	BIASED	0.976	0.982	0.006
unit 40	50	BIASED	0.980	0.986	0.005
unit 41	50	UNBIASED	0.987	0.993	0.006

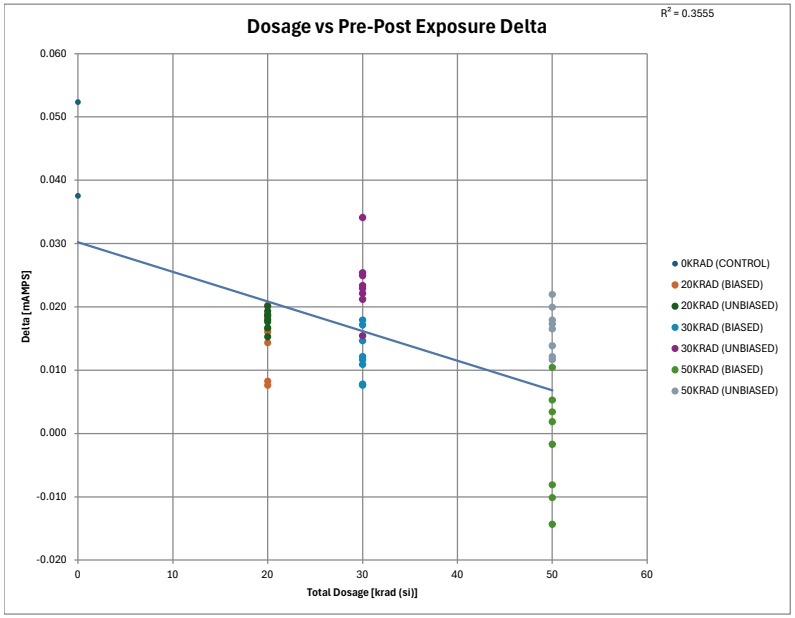
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	0.983	0.989	0.006
unit 43	50	UNBIASED	0.983	0.989	0.006
unit 44	50	UNBIASED	0.983	0.989	0.007
unit 45	50	UNBIASED	0.979	0.985	0.006
unit 46	50	UNBIASED	0.982	0.988	0.006
unit 47	50	UNBIASED	0.979	0.985	0.006
unit 48	50	UNBIASED	0.979	0.985	0.007

TEST STATISTICS [VOLTS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	0.979	0.979	0.980	-	0.982	0.982	0.982	-	0.003	0.003	0.003	-
	20	0.972	0.980	0.985	0.004	0.976	0.983	0.989	0.004	0.003	0.004	0.004	0.000
	30	0.970	0.980	0.984	0.004	0.973	0.984	0.989	0.004	0.003	0.004	0.005	0.001
	50	0.974	0.980	0.987	0.003	0.980	0.985	0.993	0.004	0.005	0.006	0.007	0.000
BIASED	20	0.972	0.978	0.982	0.004	0.976	0.982	0.986	0.004	0.003	0.004	0.004	0.000
	30	0.970	0.979	0.983	0.004	0.973	0.982	0.985	0.004	0.003	0.003	0.003	0.000
	50	0.974	0.977	0.981	0.003	0.980	0.983	0.986	0.002	0.005	0.006	0.006	0.000
UNBIASED	20	0.977	0.981	0.985	0.003	0.981	0.985	0.989	0.003	0.003	0.004	0.004	0.000
	30	0.975	0.981	0.984	0.003	0.979	0.985	0.989	0.003	0.004	0.005	0.005	0.000
	50	0.979	0.982	0.987	0.003	0.985	0.988	0.993	0.003	0.006	0.006	0.007	0.000

DEVICE TEST: 75.0 Short circuit output drive current (sink) @ +/-2.5V [mAMPS]





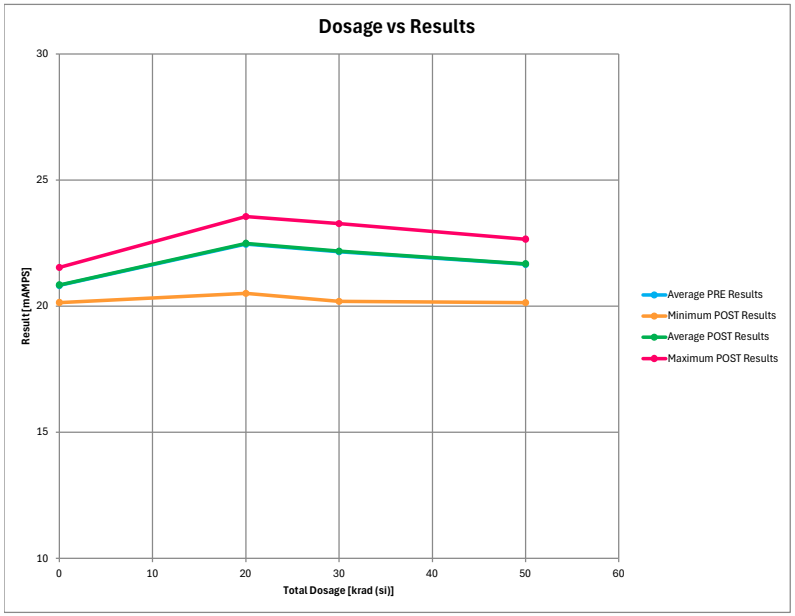
TEST RESULT [mAMPS]

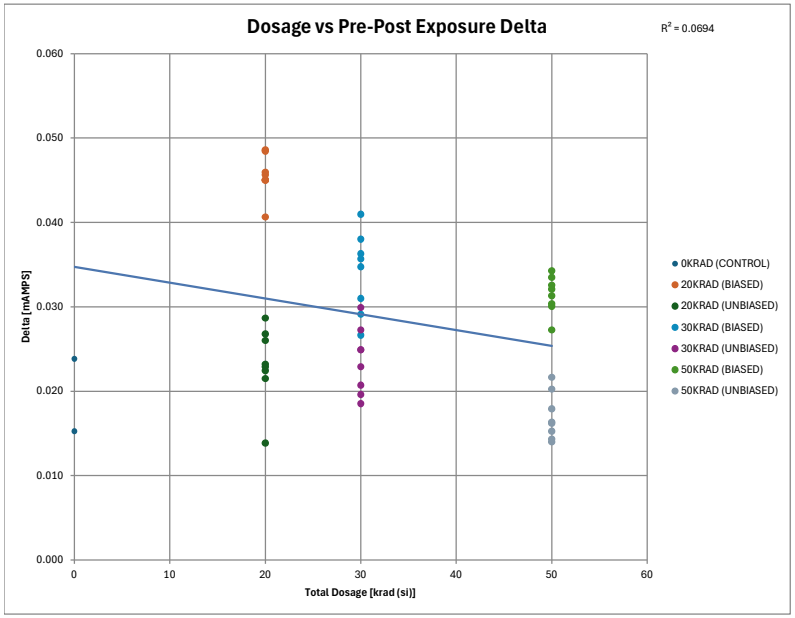
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	-17.570	-17.518	0.052
unit 50	0	CONTROL	-18.905	-18.868	0.038
unit 1	20	BIASED	-17.381	-17.366	0.014
unit 2	20	BIASED	-15.947	-15.926	0.020
unit 3	20	BIASED	-16.383	-16.365	0.018
unit 4	20	BIASED	-19.401	-19.394	0.008
unit 5	20	BIASED	-19.387	-19.371	0.016
unit 6	20	BIASED	-17.919	-17.900	0.019
unit 7	20	BIASED	-16.634	-16.617	0.017
unit 8	20	BIASED	-16.457	-16.449	0.008
unit 9	20	UNBIASED	-16.974	-16.956	0.019
unit 10	20	UNBIASED	-18.548	-18.530	0.018
unit 11	20	UNBIASED	-18.630	-18.614	0.015
unit 12	20	UNBIASED	-18.250	-18.231	0.019
unit 13	20	UNBIASED	-17.778	-17.762	0.017
unit 14	20	UNBIASED	-16.282	-16.262	0.020
unit 15	20	UNBIASED	-16.659	-16.641	0.018
unit 16	20	UNBIASED	-20.111	-20.092	0.019
unit 17	30	BIASED	-20.611	-20.599	0.012
unit 18	30	BIASED	-18.978	-18.967	0.012
unit 19	30	BIASED	-19.743	-19.725	0.017
unit 20	30	BIASED	-16.060	-16.042	0.018
unit 21	30	BIASED	-16.582	-16.567	0.015
unit 22	30	BIASED	-18.629	-18.622	0.008
unit 23	30	BIASED	-18.913	-18.906	0.008
unit 24	30	BIASED	-18.615	-18.605	0.011
unit 25	30	UNBIASED	-17.028	-17.006	0.022
unit 26	30	UNBIASED	-16.300	-16.275	0.025
unit 27	30	UNBIASED	-16.323	-16.307	0.015
unit 28	30	UNBIASED	-16.150	-16.129	0.021
unit 29	30	UNBIASED	-15.932	-15.909	0.023
unit 30	30	UNBIASED	-16.467	-16.443	0.023
unit 31	30	UNBIASED	-17.185	-17.151	0.034
unit 32	30	UNBIASED	-18.743	-18.717	0.025
unit 33	50	BIASED	-18.815	-18.812	0.003
unit 34	50	BIASED	-17.116	-17.110	0.005
unit 35	50	BIASED	-16.545	-16.535	0.010
unit 36	50	BIASED	-19.577	-19.585	-0.008
unit 37	50	BIASED	-19.842	-19.852	-0.010
unit 38	50	BIASED	-19.853	-19.868	-0.014
unit 39	50	BIASED	-19.528	-19.530	-0.002
unit 40	50	BIASED	-15.933	-15.931	0.002
unit 41	50	UNBIASED	-17.500	-17.484	0.017
unit 42	50	UNBIASED	-17.269	-17.258	0.012
unit 43	50	UNBIASED	-16.838	-16.826	0.012
unit 44	50	UNBIASED	-16.469	-16.455	0.014
unit 45	50	UNBIASED	-15.983	-15.965	0.018
unit 46	50	UNBIASED	-16.981	-16.961	0.020
unit 47	50	UNBIASED	-16.156	-16.139	0.017
unit 48	50	UNBIASED	-16.895	-16.873	0.022

TEST STATISTICS [mAMPS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	-18.905	-18.238	-17.570	-	-18.868	-18.193	-17.518	-	0.038	0.045	0.052	-
	20	-20.111	-17.671	-15.947	1.283	-20.092	-17.655	-15.926	1.284	0.008	0.017	0.020	0.004
	30	-20.611	-17.641	-15.932	1.507	-20.599	-17.623	-15.909	1.510	0.008	0.018	0.034	0.007
	50	-19.853	-17.581	-15.933	1.435	-19.868	-17.574	-15.931	1.444	-0.014	0.007	0.022	0.011
BIASED	20	-19.401	-17.439	-15.947	1.354	-19.394	-17.424	-15.926	1.356	0.008	0.015	0.020	0.005
	30	-20.611	-18.516	-16.060	1.515	-20.599	-18.504	-16.042	1.516	0.008	0.012	0.018	0.004
	50	-19.853	-18.401	-15.933	1.612	-19.868	-18.403	-15.931	1.619	-0.014	-0.002	0.010	0.009
UNBIASED	20	-20.111	-17.904	-16.282	1.253	-20.092	-17.886	-16.262	1.254	0.015	0.018	0.020	0.002
	30	-18.743	-16.766	-15.932	0.905	-18.717	-16.742	-15.909	0.903	0.015	0.024	0.034	0.005
	50	-17.500	-16.762	-15.983	0.525	-17.484	-16.745	-15.965	0.526	0.012	0.016	0.022	0.004

DEVICE TEST: 75.1 Short circuit output drive current (source) @ +/-2.5V [mAMPS]





TEST RESULT [mAMPS]

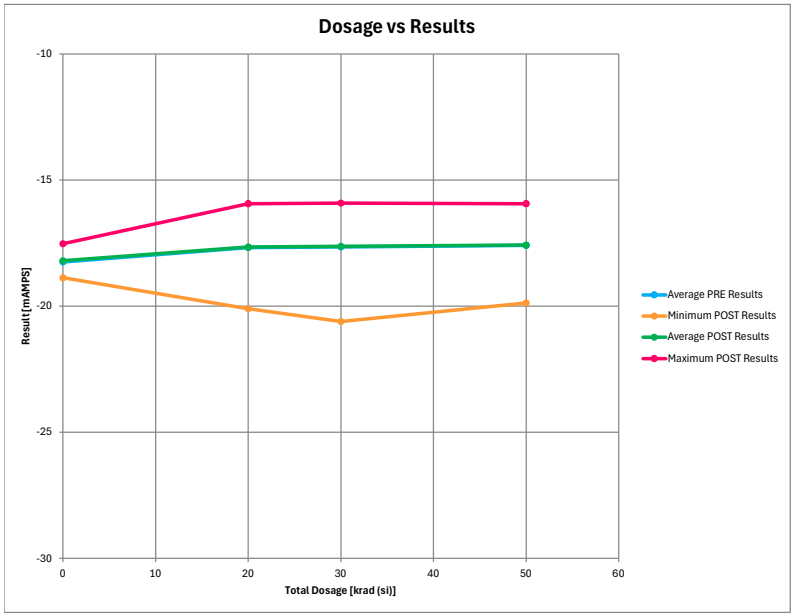
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	21.512	21.535	0.024
unit 50	0	CONTROL	20.132	20.147	0.015
unit 1	20	BIASED	22.292	22.338	0.046
unit 2	20	BIASED	22.824	22.873	0.048
unit 3	20	BIASED	22.614	22.662	0.049
unit 4	20	BIASED	21.872	21.918	0.046
unit 5	20	BIASED	23.508	23.553	0.045
unit 6	20	BIASED	21.738	21.778	0.041
unit 7	20	BIASED	22.570	22.615	0.045
unit 8	20	BIASED	22.558	22.603	0.045
unit 9	20	UNBIASED	22.452	22.475	0.023
unit 10	20	UNBIASED	22.296	22.324	0.029
unit 11	20	UNBIASED	22.178	22.204	0.026
unit 12	20	UNBIASED	22.936	22.958	0.022
unit 13	20	UNBIASED	23.388	23.414	0.027
unit 14	20	UNBIASED	23.398	23.420	0.022
unit 15	20	UNBIASED	22.160	22.183	0.023
unit 16	20	UNBIASED	20.494	20.508	0.014
unit 17	30	BIASED	21.912	21.948	0.036
unit 18	30	BIASED	20.406	20.435	0.029
unit 19	30	BIASED	20.162	20.189	0.027
unit 20	30	BIASED	22.995	23.030	0.035
unit 21	30	BIASED	23.240	23.271	0.031
unit 22	30	BIASED	22.716	22.754	0.038
unit 23	30	BIASED	22.341	22.382	0.041
unit 24	30	BIASED	22.065	22.101	0.036
unit 25	30	UNBIASED	22.136	22.157	0.021
unit 26	30	UNBIASED	22.999	23.022	0.023
unit 27	30	UNBIASED	23.017	23.042	0.025
unit 28	30	UNBIASED	22.524	22.551	0.027
unit 29	30	UNBIASED	22.138	22.157	0.019
unit 30	30	UNBIASED	21.810	21.840	0.030
unit 31	30	UNBIASED	21.902	21.927	0.025
unit 32	30	UNBIASED	22.144	22.163	0.020
unit 33	50	BIASED	21.726	21.757	0.031
unit 34	50	BIASED	21.818	21.852	0.034
unit 35	50	BIASED	21.929	21.963	0.034
unit 36	50	BIASED	20.184	20.214	0.030
unit 37	50	BIASED	20.582	20.609	0.027
unit 38	50	BIASED	20.613	20.645	0.033
unit 39	50	BIASED	20.108	20.139	0.030
unit 40	50	BIASED	22.050	22.082	0.032
unit 41	50	UNBIASED	22.359	22.381	0.022

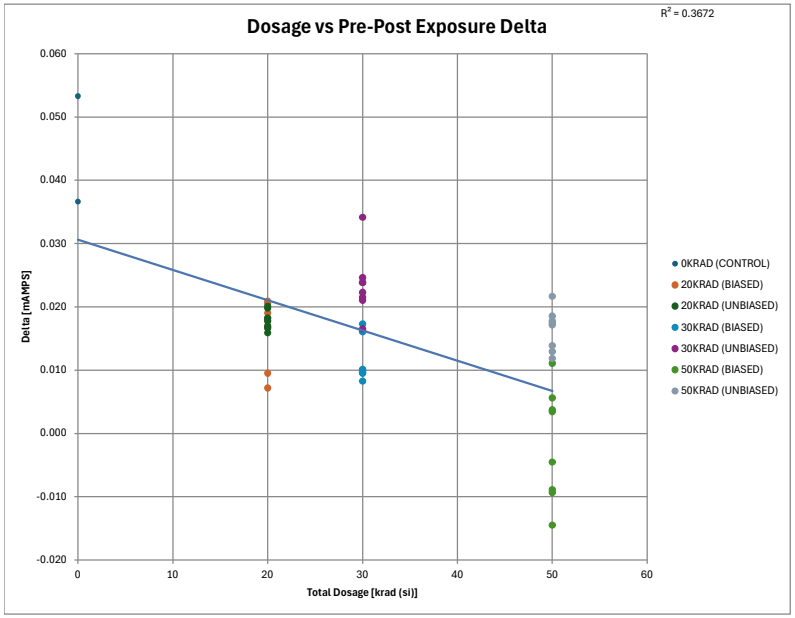
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	22.477	22.497	0.020
unit 43	50	UNBIASED	22.297	22.312	0.015
unit 44	50	UNBIASED	22.325	22.343	0.018
unit 45	50	UNBIASED	21.928	21.942	0.014
unit 46	50	UNBIASED	22.641	22.657	0.016
unit 47	50	UNBIASED	21.797	21.813	0.016
unit 48	50	UNBIASED	21.667	21.681	0.014

TEST STATISTICS [mAMPS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	20.132	20.822	21.512	-	20.147	20.841	21.535	-	0.015	0.020	0.024	-
	20	20.494	22.455	23.508	0.739	20.508	22.489	23.553	0.742	0.014	0.034	0.049	0.012
	30	20.162	22.157	23.240	0.860	20.189	22.185	23.271	0.861	0.019	0.029	0.041	0.007
	50	20.108	21.656	22.641	0.823	20.139	21.681	22.657	0.819	0.014	0.024	0.034	0.008
BIASED	20	21.738	22.497	23.508	0.556	21.778	22.542	23.553	0.557	0.041	0.046	0.049	0.002
	30	20.162	21.980	23.240	1.139	20.189	22.014	23.271	1.142	0.027	0.034	0.041	0.005
	50	20.108	21.126	22.050	0.830	20.139	21.158	22.082	0.831	0.027	0.031	0.034	0.002
UNBIASED	20	20.494	22.413	23.398	0.926	20.508	22.436	23.420	0.929	0.014	0.023	0.029	0.004
	30	21.810	22.334	23.017	0.466	21.840	22.357	23.042	0.466	0.019	0.024	0.030	0.004
	50	21.667	22.186	22.641	0.347	21.681	22.203	22.657	0.348	0.014	0.017	0.022	0.003

DEVICE TEST: 75.2 Short circuit output drive current (sink) @ +/-9V [mAMPS]





TEST RESULT [mAMPS]

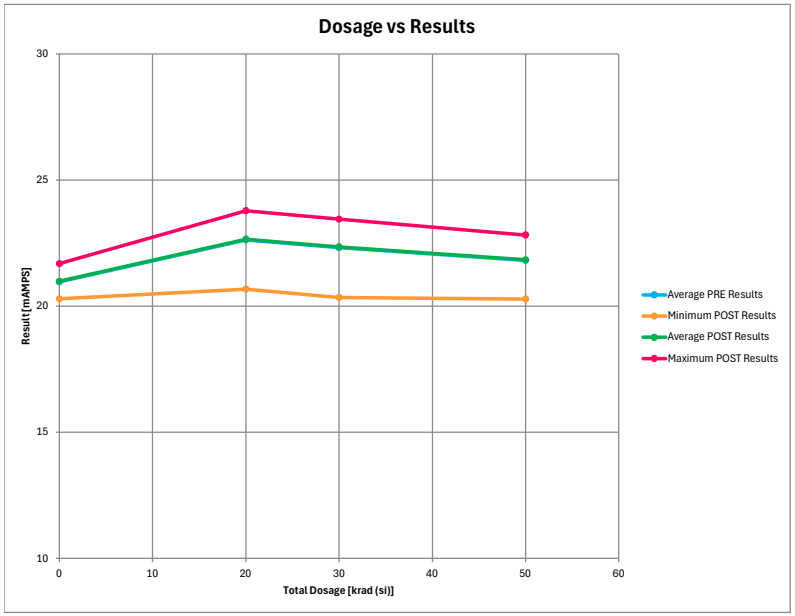
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	-17.576	-17.523	0.053
unit 50	0	CONTROL	-18.911	-18.874	0.037
unit 1	20	BIASED	-17.388	-17.371	0.017
unit 2	20	BIASED	-15.953	-15.933	0.021
unit 3	20	BIASED	-16.392	-16.371	0.021
unit 4	20	BIASED	-19.410	-19.401	0.010
unit 5	20	BIASED	-19.396	-19.380	0.017
unit 6	20	BIASED	-17.926	-17.907	0.019
unit 7	20	BIASED	-16.640	-16.622	0.018
unit 8	20	BIASED	-16.462	-16.455	0.007
unit 9	20	UNBIASED	-16.980	-16.962	0.018
unit 10	20	UNBIASED	-18.554	-18.536	0.018
unit 11	20	UNBIASED	-18.636	-18.619	0.017
unit 12	20	UNBIASED	-18.254	-18.235	0.020
unit 13	20	UNBIASED	-17.783	-17.767	0.016
unit 14	20	UNBIASED	-16.286	-16.268	0.018
unit 15	20	UNBIASED	-16.663	-16.646	0.017
unit 16	20	UNBIASED	-20.117	-20.097	0.020
unit 17	30	BIASED	-20.617	-20.606	0.010
unit 18	30	BIASED	-18.983	-18.974	0.010
unit 19	30	BIASED	-19.749	-19.733	0.016
unit 20	30	BIASED	-16.063	-16.046	0.017
unit 21	30	BIASED	-16.588	-16.571	0.016
unit 22	30	BIASED	-18.634	-18.625	0.010
unit 23	30	BIASED	-18.919	-18.911	0.008
unit 24	30	BIASED	-18.621	-18.611	0.010
unit 25	30	UNBIASED	-17.032	-17.010	0.022
unit 26	30	UNBIASED	-16.305	-16.281	0.024
unit 27	30	UNBIASED	-16.327	-16.310	0.017
unit 28	30	UNBIASED	-16.156	-16.135	0.021
unit 29	30	UNBIASED	-15.938	-15.914	0.024
unit 30	30	UNBIASED	-16.472	-16.450	0.022
unit 31	30	UNBIASED	-17.191	-17.157	0.034
unit 32	30	UNBIASED	-18.749	-18.724	0.025
unit 33	50	BIASED	-18.823	-18.819	0.004
unit 34	50	BIASED	-17.122	-17.116	0.006
unit 35	50	BIASED	-16.551	-16.540	0.011
unit 36	50	BIASED	-19.583	-19.592	-0.009
unit 37	50	BIASED	-19.849	-19.858	-0.009
unit 38	50	BIASED	-19.858	-19.873	-0.014
unit 39	50	BIASED	-19.534	-19.538	-0.005
unit 40	50	BIASED	-15.940	-15.936	0.003
unit 41	50	UNBIASED	-17.506	-17.488	0.018

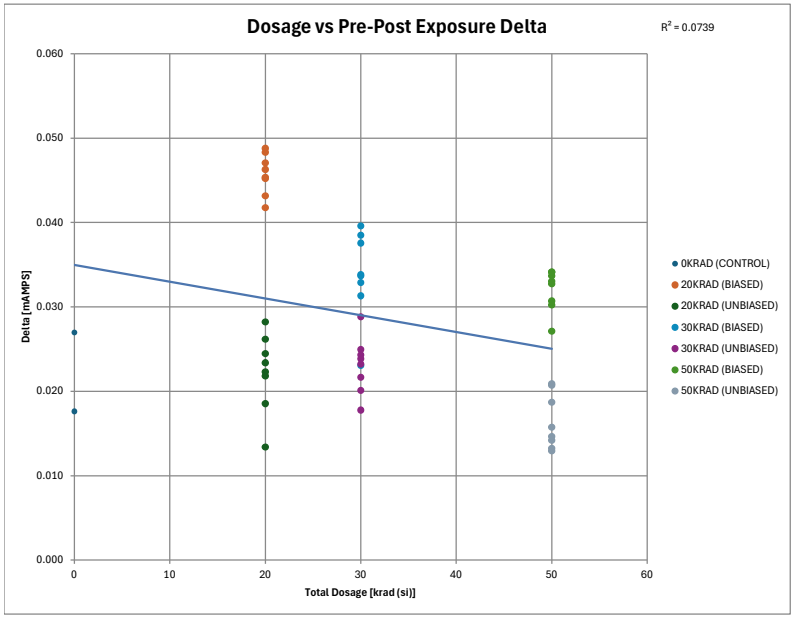
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	-17.275	-17.263	0.012
unit 43	50	UNBIASED	-16.843	-16.830	0.013
unit 44	50	UNBIASED	-16.474	-16.460	0.014
unit 45	50	UNBIASED	-15.989	-15.970	0.019
unit 46	50	UNBIASED	-16.985	-16.968	0.017
unit 47	50	UNBIASED	-16.162	-16.145	0.017
unit 48	50	UNBIASED	-16.900	-16.878	0.022

TEST STATISTICS [mAMPS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	-18.911	-18.244	-17.576	-	-18.874	-18.199	-17.523	-	0.037	0.045	0.053	-
	20	-20.117	-17.677	-15.953	1.284	-20.097	-17.660	-15.933	1.284	0.007	0.017	0.021	0.004
	30	-20.617	-17.646	-15.938	1.507	-20.606	-17.629	-15.914	1.511	0.008	0.018	0.034	0.007
	50	-19.858	-17.587	-15.940	1.435	-19.873	-17.580	-15.936	1.445	-0.014	0.007	0.022	0.011
BIASED	20	-19.410	-17.446	-15.953	1.355	-19.401	-17.430	-15.933	1.357	0.007	0.016	0.021	0.005
	30	-20.617	-18.522	-16.063	1.515	-20.606	-18.509	-16.046	1.517	0.008	0.012	0.017	0.004
	50	-19.858	-18.407	-15.940	1.612	-19.873	-18.409	-15.936	1.620	-0.014	-0.002	0.011	0.009
UNBIASED	20	-20.117	-17.909	-16.286	1.254	-20.097	-17.891	-16.268	1.253	0.016	0.018	0.020	0.001
	30	-18.749	-16.771	-15.938	0.905	-18.724	-16.748	-15.914	0.903	0.017	0.023	0.034	0.005
	50	-17.506	-16.767	-15.989	0.525	-17.488	-16.750	-15.970	0.526	0.012	0.016	0.022	0.003

DEVICE TEST: 75.3 Short circuit output drive current (source) @ +/-9V [mAMPS]





TEST RESULT [mAMPS]

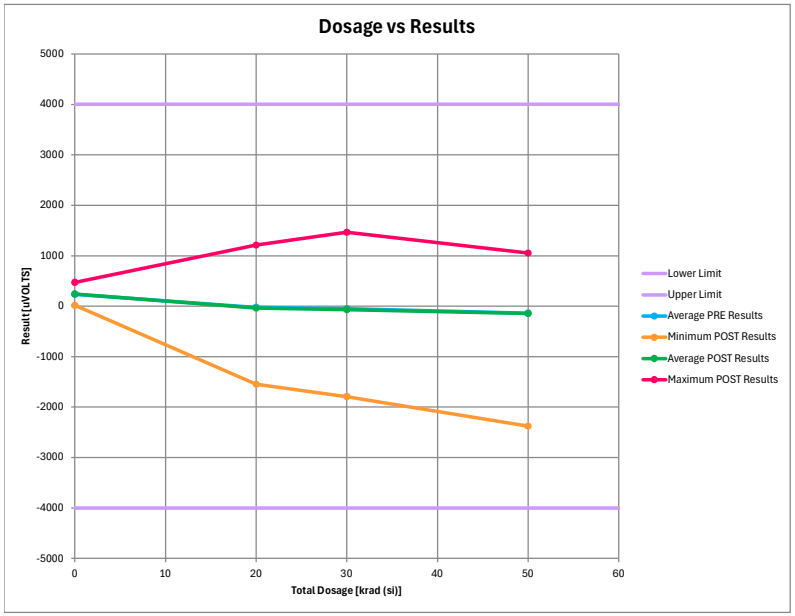
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	21.658	21.685	0.027
unit 50	0	CONTROL	20.271	20.288	0.018
unit 1	20	BIASED	22.447	22.491	0.043
unit 2	20	BIASED	22.987	23.036	0.049
unit 3	20	BIASED	22.775	22.822	0.046
unit 4	20	BIASED	22.057	22.105	0.048
unit 5	20	BIASED	23.737	23.784	0.047
unit 6	20	BIASED	21.895	21.937	0.042
unit 7	20	BIASED	22.731	22.776	0.045
unit 8	20	BIASED	22.715	22.761	0.045
unit 9	20	UNBIASED	22.609	22.633	0.024
unit 10	20	UNBIASED	22.448	22.475	0.026
unit 11	20	UNBIASED	22.331	22.355	0.023
unit 12	20	UNBIASED	23.109	23.131	0.022
unit 13	20	UNBIASED	23.567	23.595	0.028
unit 14	20	UNBIASED	23.579	23.598	0.019
unit 15	20	UNBIASED	22.319	22.341	0.022
unit 16	20	UNBIASED	20.659	20.672	0.013
unit 17	30	BIASED	22.115	22.155	0.040
unit 18	30	BIASED	20.552	20.584	0.031
unit 19	30	BIASED	20.323	20.346	0.023
unit 20	30	BIASED	23.166	23.200	0.034
unit 21	30	BIASED	23.412	23.445	0.033
unit 22	30	BIASED	22.880	22.919	0.038
unit 23	30	BIASED	22.501	22.538	0.038
unit 24	30	BIASED	22.213	22.247	0.034
unit 25	30	UNBIASED	22.292	22.312	0.020
unit 26	30	UNBIASED	23.164	23.189	0.025
unit 27	30	UNBIASED	23.180	23.203	0.023
unit 28	30	UNBIASED	22.676	22.700	0.024
unit 29	30	UNBIASED	22.285	22.303	0.018
unit 30	30	UNBIASED	21.963	21.992	0.029
unit 31	30	UNBIASED	22.058	22.081	0.024
unit 32	30	UNBIASED	22.333	22.355	0.022
unit 33	50	BIASED	21.905	21.939	0.034
unit 34	50	BIASED	21.973	22.007	0.034
unit 35	50	BIASED	22.086	22.119	0.034
unit 36	50	BIASED	20.333	20.363	0.031
unit 37	50	BIASED	20.748	20.775	0.027
unit 38	50	BIASED	20.779	20.812	0.033
unit 39	50	BIASED	20.250	20.280	0.030
unit 40	50	BIASED	22.197	22.229	0.033
unit 41	50	UNBIASED	22.520	22.541	0.021

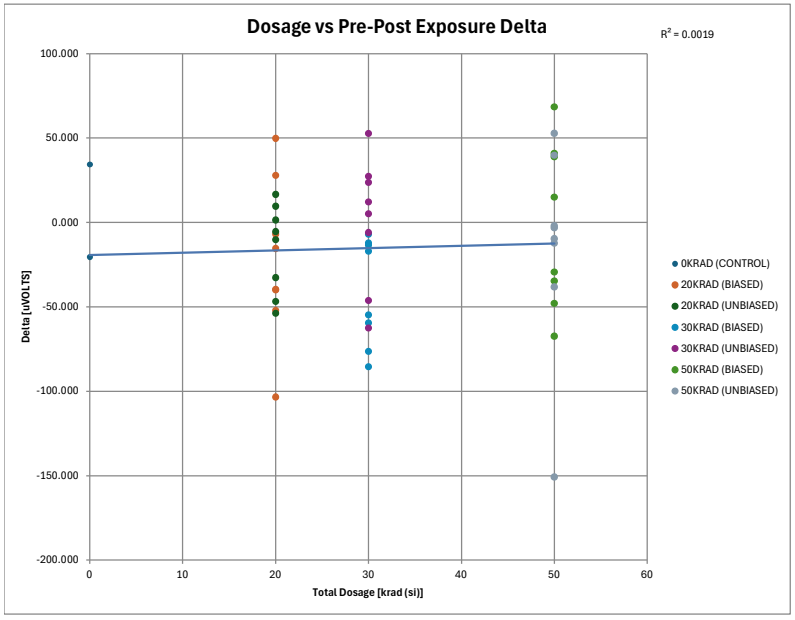
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	22.637	22.658	0.021
unit 43	50	UNBIASED	22.452	22.467	0.015
unit 44	50	UNBIASED	22.476	22.494	0.019
unit 45	50	UNBIASED	22.071	22.084	0.013
unit 46	50	UNBIASED	22.804	22.820	0.016
unit 47	50	UNBIASED	21.942	21.955	0.013
unit 48	50	UNBIASED	21.813	21.827	0.014

TEST STATISTICS [mAMPS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	20.271	20.964	21.658	-	20.288	20.987	21.685	-	0.018	0.022	0.027	-
	20	20.659	22.623	23.737	0.749	20.672	22.657	23.784	0.752	0.013	0.034	0.049	0.013
	30	20.323	22.320	23.412	0.864	20.346	22.348	23.445	0.865	0.018	0.028	0.040	0.007
	50	20.250	21.812	22.804	0.824	20.280	21.836	22.820	0.820	0.013	0.024	0.034	0.009
BIASED	20	21.895	22.668	23.737	0.571	21.937	22.714	23.784	0.572	0.042	0.046	0.049	0.002
	30	20.323	22.145	23.412	1.145	20.346	22.179	23.445	1.148	0.023	0.034	0.040	0.005
	50	20.250	21.284	22.197	0.833	20.280	21.316	22.229	0.834	0.027	0.032	0.034	0.002
UNBIASED	20	20.659	22.578	23.579	0.933	20.672	22.600	23.598	0.936	0.013	0.022	0.028	0.005
	30	21.963	22.494	23.180	0.468	21.992	22.517	23.203	0.468	0.018	0.023	0.029	0.003
	50	21.813	22.339	22.804	0.354	21.827	22.356	22.820	0.356	0.013	0.016	0.021	0.003

DEVICE TEST: 45.1 VOS @ +/- 2.5V [uVOLTS]





TEST RESULT (LOWER LIMIT = -4000 | UPPER LIMIT = 4000) [uVOLTS]

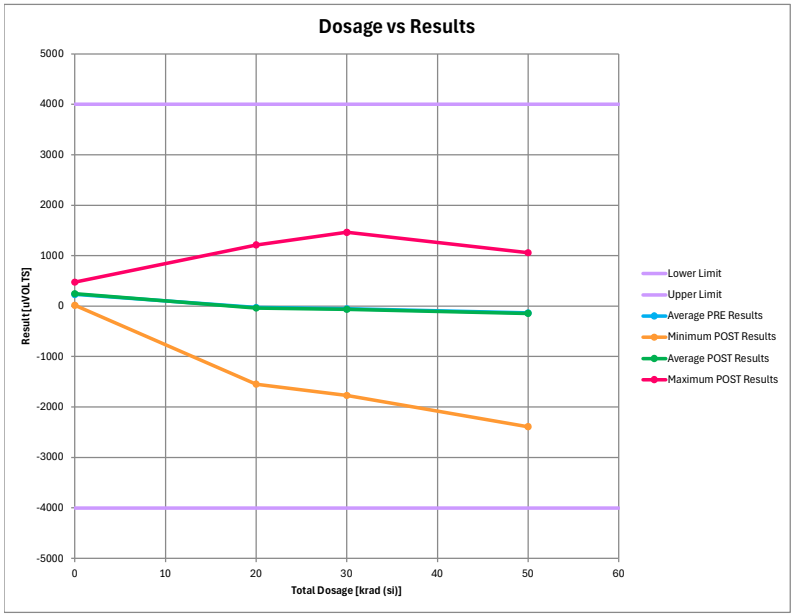
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	37.052	16.595	-20.457
unit 50	0	CONTROL	436.337	470.719	34.382
unit 1	20	BIASED	385.472	435.327	49.855
unit 2	20	BIASED	145.194	105.278	-39.916
unit 3	20	BIASED	-384.979	-400.384	-15.405
unit 4	20	BIASED	-1542.500	-1549.366	-6.866
unit 5	20	BIASED	-275.335	-247.440	27.896
unit 6	20	BIASED	436.290	384.230	-52.061
unit 7	20	BIASED	149.273	109.698	-39.575
unit 8	20	BIASED	-214.575	-317.921	-103.346
unit 9	20	UNBIASED	-1065.652	-1119.368	-53.716
unit 10	20	UNBIASED	231.145	225.776	-5.368
unit 11	20	UNBIASED	-1294.523	-1304.763	-10.240
unit 12	20	UNBIASED	570.707	538.038	-32.669
unit 13	20	UNBIASED	1201.472	1211.117	9.645
unit 14	20	UNBIASED	-681.489	-679.998	1.491
unit 15	20	UNBIASED	792.183	745.407	-46.777
unit 16	20	UNBIASED	1193.813	1210.455	16.641
unit 17	30	BIASED	-719.629	-731.717	-12.088
unit 18	30	BIASED	-1731.838	-1791.328	-59.489
unit 19	30	BIASED	-1584.519	-1591.494	-6.975
unit 20	30	BIASED	345.438	331.947	-13.491
unit 21	30	BIASED	53.517	-22.849	-76.366
unit 22	30	BIASED	1296.891	1279.809	-17.083
unit 23	30	BIASED	1550.407	1464.930	-85.477
unit 24	30	BIASED	216.558	161.810	-54.748
unit 25	30	UNBIASED	323.202	328.420	5.218
unit 26	30	UNBIASED	-73.857	-21.106	52.750
unit 27	30	UNBIASED	245.068	239.139	-5.928
unit 28	30	UNBIASED	2.697	30.025	27.328
unit 29	30	UNBIASED	177.807	115.305	-62.502
unit 30	30	UNBIASED	-926.246	-972.442	-46.196
unit 31	30	UNBIASED	826.004	849.712	23.708
unit 32	30	UNBIASED	-747.021	-734.854	12.167
unit 33	50	BIASED	304.457	345.345	40.888
unit 34	50	BIASED	-199.420	-228.733	-29.314
unit 35	50	BIASED	116.073	131.107	15.034
unit 36	50	BIASED	-672.241	-720.143	-47.902
unit 37	50	BIASED	-826.706	-861.395	-34.689
unit 38	50	BIASED	440.663	509.145	68.482
unit 39	50	BIASED	-2311.705	-2379.025	-67.320
unit 40	50	BIASED	1013.516	1052.515	38.999
unit 41	50	UNBIASED	-210.636	-220.138	-9.502

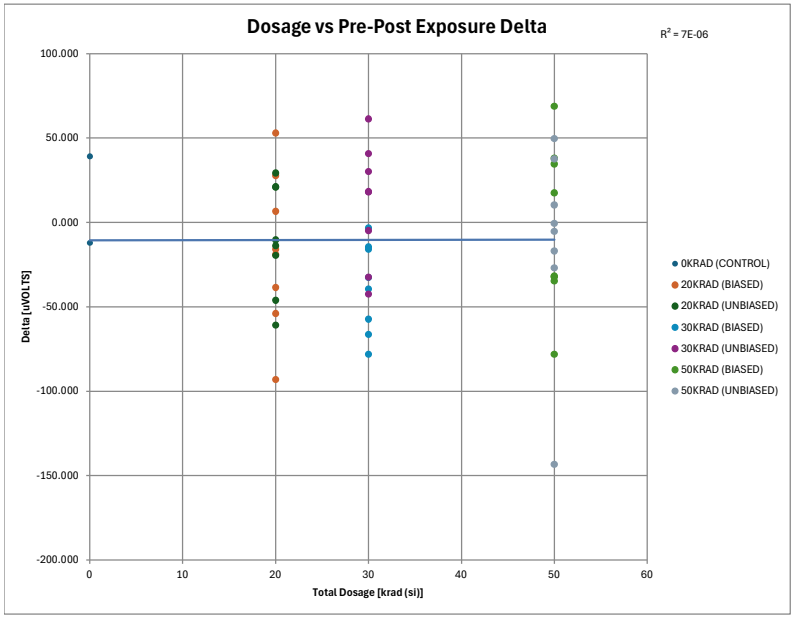
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	-950.825	-911.003	39.822
unit 43	50	UNBIASED	-80.454	-92.769	-12.315
unit 44	50	UNBIASED	643.892	493.140	-150.752
unit 45	50	UNBIASED	-597.383	-635.550	-38.167
unit 46	50	UNBIASED	768.370	821.236	52.866
unit 47	50	UNBIASED	304.184	302.213	-1.971
unit 48	50	UNBIASED	67.449	64.239	-3.210

TEST STATISTICS [uVOLTS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	37.052	236.694	436.337	-	16.595	243.657	470.719	-	-20.457	6.963	34.382	-
	20	-1542.500	-22.094	1201.472	823.614	-1549.366	-40.870	1211.117	828.756	-103.346	-18.776	49.855	37.509
	30	-1731.838	-46.595	1550.407	914.612	-1791.328	-66.543	1464.930	913.398	-85.477	-19.948	52.750	40.265
	50	-2311.705	-136.923	1013.516	814.884	-2379.025	-145.614	1052.515	834.302	-150.752	-8.691	68.482	54.534
BIASED	20	-1542.500	-162.645	436.290	634.715	-1549.366	-185.072	435.327	633.515	-103.346	-22.427	49.855	47.920
	30	-1731.838	-71.647	1550.407	1209.577	-1791.328	-112.361	1464.930	1201.008	-85.477	-40.715	-6.975	31.806
	50	-2311.705	-266.920	1013.516	1019.572	-2379.025	-268.898	1052.515	1062.188	-67.320	-1.978	68.482	49.232
UNBIASED	20	-1294.523	118.457	1201.472	1002.781	-1304.763	103.333	1211.117	1011.397	-53.716	-15.124	16.641	26.232
	30	-926.246	-21.543	826.004	572.730	-972.442	-20.725	849.712	583.575	-62.502	0.818	52.750	38.428
	50	-950.825	-6.925	768.370	587.179	-911.003	-22.329	821.236	573.212	-150.752	-15.404	52.866	62.016

DEVICE TEST: 45.2 VOS @ +/- 9V [uVOLTS]





TEST RESULT (LOWER LIMIT = -4000 | UPPER LIMIT = 4000) [uVOLTS]

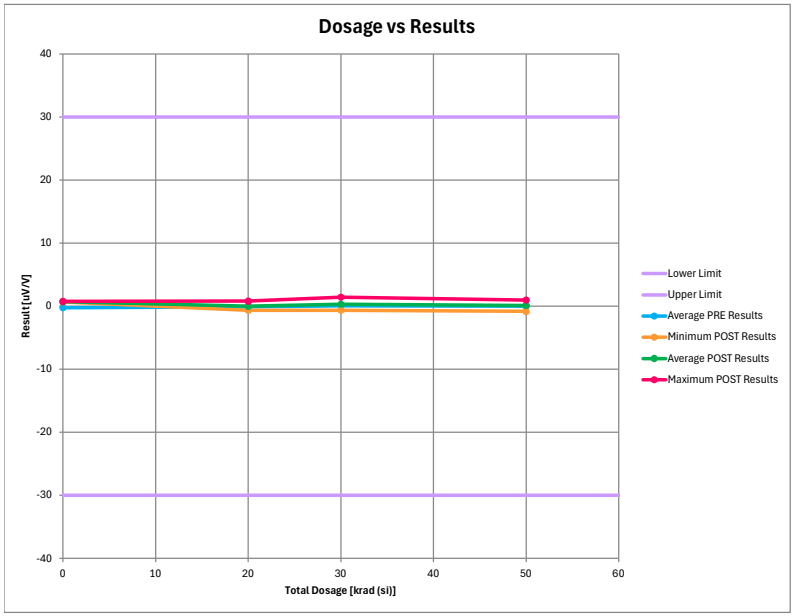
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	28.215	16.226	-11.989
unit 50	0	CONTROL	435.926	475.104	39.178
unit 1	20	BIASED	378.694	431.762	53.068
unit 2	20	BIASED	134.005	115.149	-18.856
unit 3	20	BIASED	-392.910	-408.747	-15.837
unit 4	20	BIASED	-1551.659	-1544.958	6.700
unit 5	20	BIASED	-278.060	-250.225	27.835
unit 6	20	BIASED	429.315	390.830	-38.485
unit 7	20	BIASED	151.521	97.618	-53.902
unit 8	20	BIASED	-221.269	-314.275	-93.005
unit 9	20	UNBIASED	-1068.431	-1114.515	-46.083
unit 10	20	UNBIASED	233.160	222.882	-10.278
unit 11	20	UNBIASED	-1289.056	-1302.756	-13.700
unit 12	20	UNBIASED	568.925	549.484	-19.441
unit 13	20	UNBIASED	1191.572	1212.756	21.185
unit 14	20	UNBIASED	-691.033	-661.651	29.382
unit 15	20	UNBIASED	800.189	739.478	-60.711
unit 16	20	UNBIASED	1193.251	1214.221	20.970
unit 17	30	BIASED	-694.313	-726.893	-32.580
unit 18	30	BIASED	-1730.803	-1770.155	-39.352
unit 19	30	BIASED	-1591.063	-1594.240	-3.177
unit 20	30	BIASED	343.129	328.693	-14.437
unit 21	30	BIASED	46.038	-20.227	-66.265
unit 22	30	BIASED	1303.919	1288.179	-15.740
unit 23	30	BIASED	1541.717	1463.712	-78.005
unit 24	30	BIASED	216.426	159.202	-57.224
unit 25	30	UNBIASED	315.140	333.486	18.345
unit 26	30	UNBIASED	-84.839	-23.472	61.367
unit 27	30	UNBIASED	251.536	246.747	-4.789
unit 28	30	UNBIASED	-5.490	35.348	40.839
unit 29	30	UNBIASED	169.904	127.516	-42.388
unit 30	30	UNBIASED	-938.624	-970.907	-32.283
unit 31	30	UNBIASED	823.313	853.473	30.160
unit 32	30	UNBIASED	-750.874	-732.756	18.117
unit 33	50	BIASED	319.526	357.664	38.138
unit 34	50	BIASED	-191.604	-226.185	-34.581
unit 35	50	BIASED	112.233	129.796	17.564
unit 36	50	BIASED	-687.073	-718.778	-31.705
unit 37	50	BIASED	-825.854	-857.957	-32.103
unit 38	50	BIASED	443.940	512.790	68.850
unit 39	50	BIASED	-2311.045	-2389.048	-78.003
unit 40	50	BIASED	1023.290	1057.943	34.652
unit 41	50	UNBIASED	-209.760	-210.303	-0.543

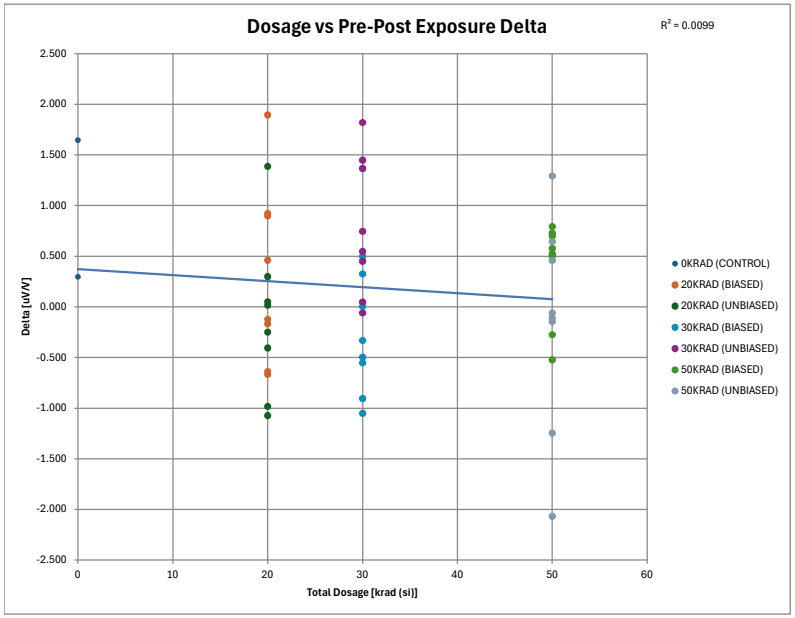
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	-954.241	-916.563	37.678
unit 43	50	UNBIASED	-73.882	-90.716	-16.834
unit 44	50	UNBIASED	639.896	496.657	-143.239
unit 45	50	UNBIASED	-605.198	-632.057	-26.859
unit 46	50	UNBIASED	773.671	823.344	49.673
unit 47	50	UNBIASED	288.688	299.086	10.398
unit 48	50	UNBIASED	74.967	69.716	-5.251

TEST STATISTICS [uVOLTS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	28.215	232.070	435.926	-	16.226	245.665	475.104	-	-11.989	13.595	39.178	-
	20	-1551.659	-25.737	1193.251	824.181	-1544.958	-38.934	1214.221	827.595	-93.005	-13.197	53.068	38.923
	30	-1730.803	-49.055	1541.717	914.180	-1770.155	-62.643	1463.712	911.938	-78.005	-13.588	61.367	39.785
	50	-2311.045	-136.403	1023.290	817.159	-2389.048	-143.413	1057.943	837.466	-143.239	-7.010	68.850	52.776
BIASED	20	-1551.659	-168.795	429.315	635.722	-1544.958	-185.356	431.762	632.732	-93.005	-16.560	53.068	46.422
	30	-1730.803	-70.619	1541.717	1207.898	-1770.155	-108.966	1463.712	1197.860	-78.005	-38.347	-3.177	26.893
	50	-2311.045	-264.573	1023.290	1023.345	-2389.048	-266.722	1057.943	1066.991	-78.003	-2.148	68.850	49.256
UNBIASED	20	-1289.056	117.322	1193.251	1002.330	-1302.756	107.487	1214.221	1009.117	-60.711	-9.835	29.382	32.643
	30	-938.624	-27.492	823.313	575.115	-970.907	-16.321	853.473	585.056	-42.388	11.171	61.367	35.600
	50	-954.241	-8.232	773.671	588.309	-916.563	-20.104	823.344	574.168	-143.239	-11.872	49.673	59.061

DEVICE TEST: 45.8 Power supply rejection ration V=2...9V [uV/V]





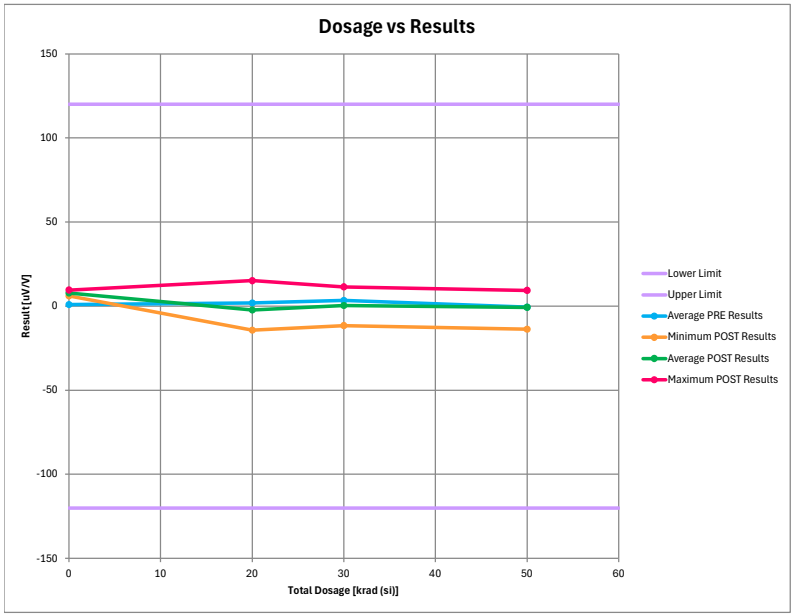
TEST RESULT (LOWER LIMIT = -30| UPPER LIMIT = 30) [uV/V]

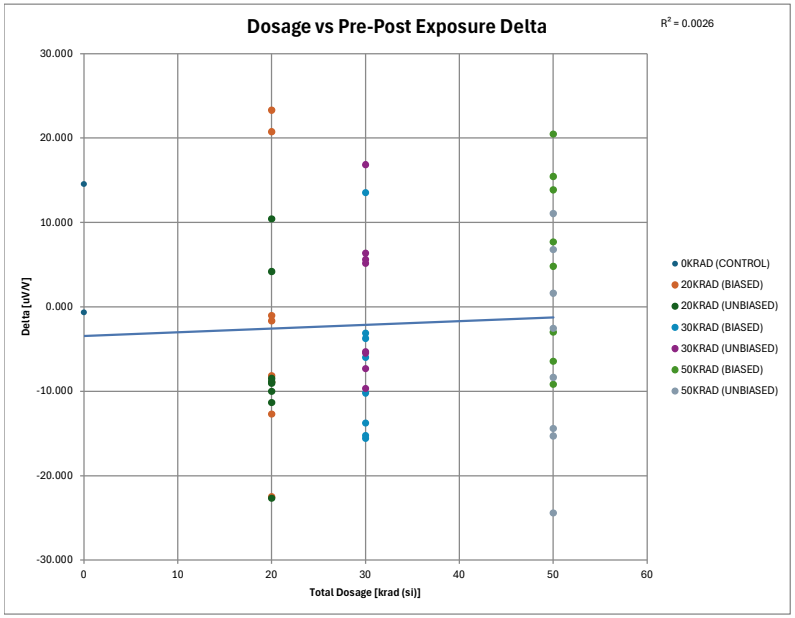
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	-0.983	0.662	1.645
unit 50	0	CONTROL	0.449	0.745	0.296
unit 1	20	BIASED	-1.613	0.281	1.894
unit 2	20	BIASED	-0.135	0.786	0.921
unit 3	20	BIASED	0.104	-0.564	-0.668
unit 4	20	BIASED	0.276	-0.363	-0.638
unit 5	20	BIASED	-0.132	-0.254	-0.122
unit 6	20	BIASED	-0.332	0.565	0.897
unit 7	20	BIASED	-0.241	0.218	0.459
unit 8	20	BIASED	0.472	0.304	-0.168
unit 9	20	UNBIASED	0.403	-0.671	-1.074
unit 10	20	UNBIASED	0.359	-0.625	-0.984
unit 11	20	UNBIASED	-0.146	-0.095	0.051
unit 12	20	UNBIASED	-0.432	-0.133	0.299
unit 13	20	UNBIASED	0.090	0.105	0.015
unit 14	20	UNBIASED	-0.643	0.744	1.387
unit 15	20	UNBIASED	0.172	-0.078	-0.250
unit 16	20	UNBIASED	-0.216	-0.622	-0.406
unit 17	30	BIASED	1.037	0.540	-0.497
unit 18	30	BIASED	0.436	0.760	0.325
unit 19	30	BIASED	-0.384	-0.380	0.004
unit 20	30	BIASED	1.038	-0.014	-1.051
unit 21	30	BIASED	-0.324	0.174	0.499
unit 22	30	BIASED	1.749	1.417	-0.332
unit 23	30	BIASED	-0.096	-0.650	-0.554
unit 24	30	BIASED	0.724	-0.183	-0.906
unit 25	30	UNBIASED	0.002	0.549	0.546
unit 26	30	UNBIASED	-1.357	0.463	1.819
unit 27	30	UNBIASED	0.340	0.790	0.450
unit 28	30	UNBIASED	-0.814	0.552	1.366
unit 29	30	UNBIASED	-0.704	0.042	0.746
unit 30	30	UNBIASED	-0.858	0.589	1.448
unit 31	30	UNBIASED	0.493	0.432	-0.061
unit 32	30	UNBIASED	-0.212	-0.166	0.046
unit 33	50	BIASED	0.173	0.967	0.793
unit 34	50	BIASED	-0.447	0.281	0.728
unit 35	50	BIASED	-0.316	0.208	0.524
unit 36	50	BIASED	0.136	0.637	0.501
unit 37	50	BIASED	0.261	-0.016	-0.276
unit 38	50	BIASED	-0.457	0.120	0.577
unit 39	50	BIASED	-0.847	-0.148	0.699
unit 40	50	BIASED	0.323	-0.201	-0.524
unit 41	50	UNBIASED	-0.110	0.348	0.458
unit 42	50	UNBIASED	0.496	-0.749	-1.246
unit 43	50	UNBIASED	1.232	-0.835	-2.068
unit 44	50	UNBIASED	-0.384	-0.445	-0.061
unit 45	50	UNBIASED	-0.376	0.917	1.293
unit 46	50	UNBIASED	0.290	0.178	-0.112
unit 47	50	UNBIASED	-0.209	-0.354	-0.145
unit 48	50	UNBIASED	0.148	0.792	0.644

TEST STATISTICS [uV/V]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	-0.983	-0.267	0.449	-	0.662	0.704	0.745	-	0.296	0.971	1.645	-
	20	-1.613	-0.126	0.472	0.507	-0.671	-0.025	0.786	0.482	-1.074	0.101	1.894	0.839
	30	-1.357	0.067	1.749	0.827	-0.650	0.307	1.417	0.517	-1.051	0.240	1.819	0.831
	50	-0.847	-0.005	1.232	0.494	-0.835	0.106	0.967	0.552	-2.068	0.112	1.293	0.849
BIASED	20	-1.613	-0.200	0.472	0.632	-0.564	0.122	0.786	0.471	-0.668	0.322	1.894	0.888
	30	-0.384	0.522	1.749	0.756	-0.650	0.208	1.417	0.672	-1.051	-0.314	0.499	0.555
	50	-0.847	-0.147	0.323	0.426	-0.201	0.231	0.967	0.399	-0.524	0.378	0.793	0.495
UNBIASED	20	-0.643	-0.052	0.403	0.373	-0.671	-0.172	0.744	0.476	-1.074	-0.120	1.387	0.779
	30	-1.357	-0.389	0.493	0.647	-0.166	0.406	0.790	0.313	-0.061	0.795	1.819	0.684
	50	-0.384	0.136	1.232	0.544	-0.835	-0.019	0.917	0.676	-2.068	-0.155	1.293	1.067

DEVICE TEST: 45.9 Power supply rejection ration V=2...9V [uV/V]





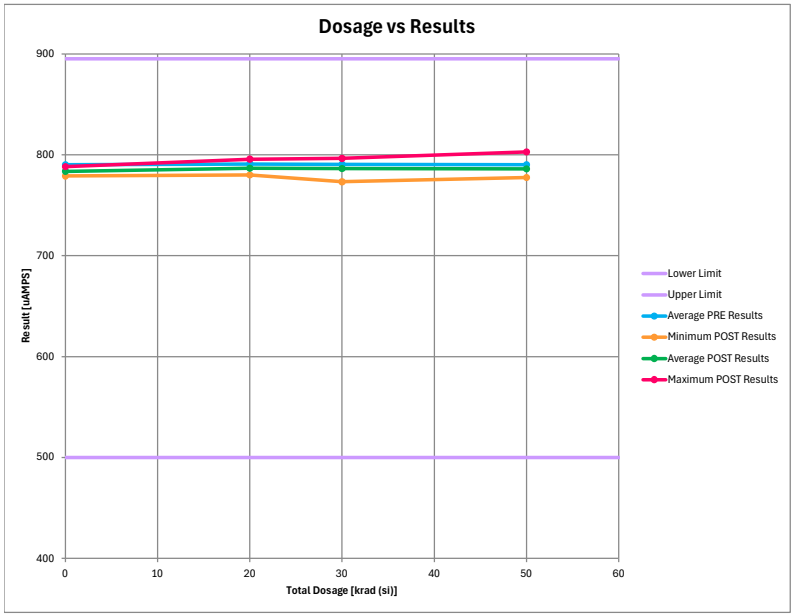
TEST RESULT (LOWER LIMIT = -120 | UPPER LIMIT = 120) [uV/V]

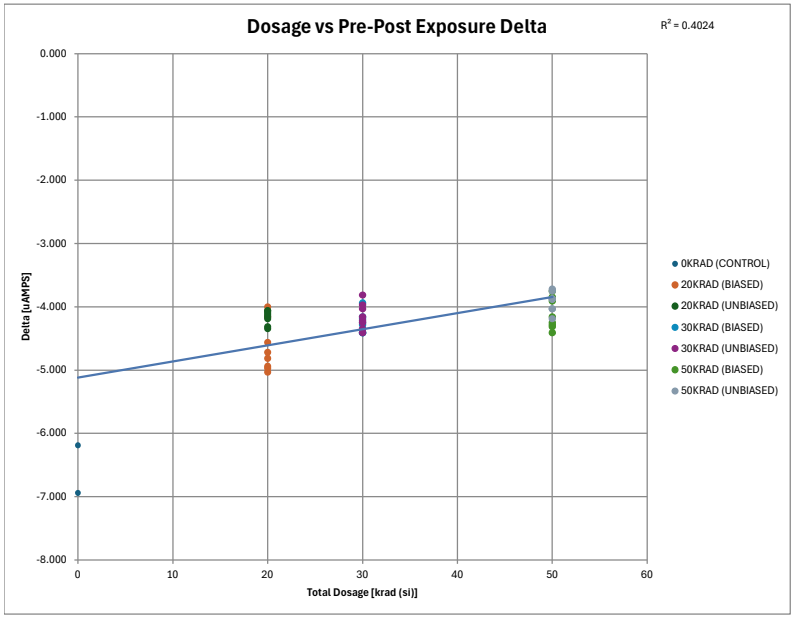
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	-4.921	9.639	14.561
unit 50	0	CONTROL	6.696	6.049	-0.647
unit 1	20	BIASED	-15.808	7.500	23.308
unit 2	20	BIASED	9.293	1.130	-8.163
unit 3	20	BIASED	9.392	0.471	-8.920
unit 4	20	BIASED	13.020	-9.484	-22.504
unit 5	20	BIASED	0.881	-0.774	-1.654
unit 6	20	BIASED	2.328	1.313	-1.015
unit 7	20	BIASED	-5.621	15.136	20.756
unit 8	20	BIASED	13.298	0.608	-12.691
unit 9	20	UNBIASED	8.417	-14.253	-22.670
unit 10	20	UNBIASED	3.014	-5.852	-8.866
unit 11	20	UNBIASED	-7.516	-3.338	4.178
unit 12	20	UNBIASED	-4.270	-13.313	-9.043
unit 13	20	UNBIASED	11.160	-0.167	-11.327
unit 14	20	UNBIASED	0.541	-7.933	-8.474
unit 15	20	UNBIASED	-5.599	4.831	10.430
unit 16	20	UNBIASED	-2.460	-12.480	-10.020
unit 17	30	BIASED	-10.794	2.736	13.530
unit 18	30	BIASED	5.063	-10.526	-15.589
unit 19	30	BIASED	1.169	-2.572	-3.741
unit 20	30	BIASED	16.835	3.063	-13.772
unit 21	30	BIASED	2.938	-0.180	-3.118
unit 22	30	BIASED	17.455	11.464	-5.991
unit 23	30	BIASED	7.349	-7.877	-15.226
unit 24	30	BIASED	10.263	0.051	-10.212
unit 25	30	UNBIASED	8.092	2.616	-5.476
unit 26	30	UNBIASED	-8.009	8.844	16.853
unit 27	30	UNBIASED	-1.706	3.456	5.162
unit 28	30	UNBIASED	-3.202	2.405	5.606
unit 29	30	UNBIASED	-1.957	-11.623	-9.667
unit 30	30	UNBIASED	0.363	6.717	6.354
unit 31	30	UNBIASED	9.594	2.290	-7.304
unit 32	30	UNBIASED	0.888	-4.419	-5.307
unit 33	50	BIASED	-12.643	1.212	13.856
unit 34	50	BIASED	-14.068	1.384	15.453
unit 35	50	BIASED	-0.583	4.226	4.808
unit 36	50	BIASED	16.736	7.556	-9.180
unit 37	50	BIASED	2.796	-3.655	-6.450
unit 38	50	BIASED	-9.671	-1.964	7.707
unit 39	50	BIASED	-12.513	7.957	20.470
unit 40	50	BIASED	-5.257	-8.242	-2.985
unit 41	50	UNBIASED	-2.419	-4.962	-2.543
unit 42	50	UNBIASED	10.366	-4.931	-15.297
unit 43	50	UNBIASED	10.679	-13.750	-24.430
unit 44	50	UNBIASED	-1.380	-9.749	-8.369
unit 45	50	UNBIASED	2.555	9.348	6.792
unit 46	50	UNBIASED	-1.235	0.387	1.622
unit 47	50	UNBIASED	12.566	-1.832	-14.398
unit 48	50	UNBIASED	-5.452	5.604	11.056

TEST STATISTICS [uV/V]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	-4.921	0.888	6.696	-	6.049	7.844	9.639	-	-0.647	6.957	14.561	-
	20	-15.808	1.879	13.298	8.442	-14.253	-2.288	15.136	8.015	-22.670	-4.167	23.308	13.203
	30	-10.794	3.396	17.455	7.977	-11.623	0.403	11.464	6.496	-15.589	-2.993	16.853	9.851
	50	-14.068	-0.595	16.736	9.462	-13.750	-0.713	9.348	6.703	-24.430	-0.118	20.470	12.523
BIASED	20	-15.808	3.348	13.298	10.134	-9.484	1.987	15.136	7.050	-22.504	-1.360	23.308	15.932
	30	-10.794	6.285	17.455	9.131	-10.526	-0.480	11.464	6.824	-15.589	-6.765	13.530	9.602
	50	-14.068	-4.400	16.736	10.480	-8.242	1.059	7.957	5.578	-9.180	5.460	20.470	10.880
UNBIASED	20	-7.516	0.411	11.160	6.714	-14.253	-6.563	4.831	6.795	-22.670	-6.974	10.430	10.085
	30	-8.009	0.508	9.594	5.825	-11.623	1.286	8.844	6.487	-9.667	0.778	16.853	9.123
	50	-5.452	3.210	12.566	6.995	-13.750	-2.486	9.348	7.615	-24.430	-5.696	11.056	12.107

DEVICE TEST: 30.2 Pos. supply quiesent current @ +/- 2.5V [uAMPS]





TEST RESULT (LOWER LIMIT = 500 | UPPER LIMIT = 895) [uAMPS]

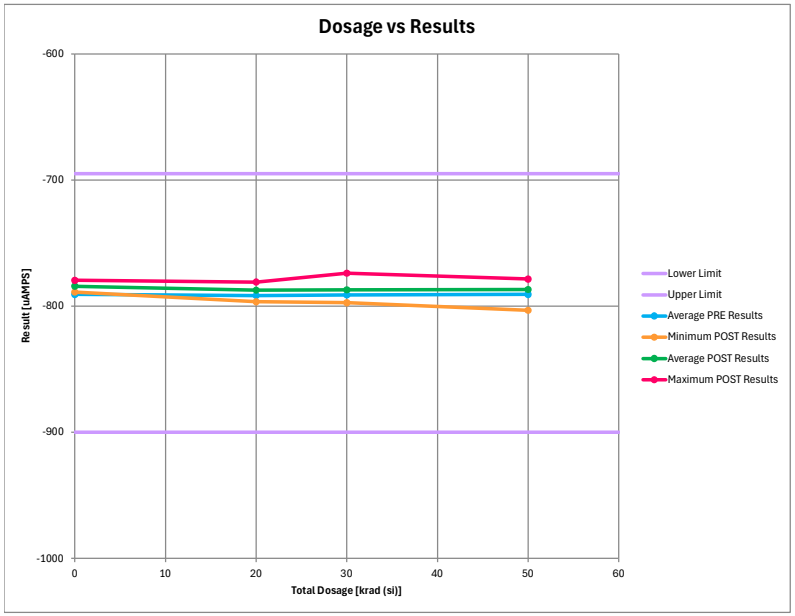
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	785.924	778.987	-6.937
unit 50	0	CONTROL	794.455	788.268	-6.187
unit 1	20	BIASED	786.581	781.768	-4.812
unit 2	20	BIASED	786.362	781.331	-5.031
unit 3	20	BIASED	789.205	784.268	-4.937
unit 4	20	BIASED	788.768	784.206	-4.562
unit 5	20	BIASED	784.956	779.987	-4.969
unit 6	20	BIASED	790.893	786.174	-4.719
unit 7	20	BIASED	790.862	786.706	-4.156
unit 8	20	BIASED	784.956	780.956	-4.000
unit 9	20	UNBIASED	785.393	781.268	-4.125
unit 10	20	UNBIASED	793.893	789.831	-4.063
unit 11	20	UNBIASED	789.174	785.081	-4.094
unit 12	20	UNBIASED	795.612	791.424	-4.187
unit 13	20	UNBIASED	798.799	794.487	-4.312
unit 14	20	UNBIASED	795.393	791.049	-4.344
unit 15	20	UNBIASED	794.549	790.487	-4.062
unit 16	20	UNBIASED	799.893	795.737	-4.156
unit 17	30	BIASED	797.830	793.674	-4.156
unit 18	30	BIASED	800.830	796.424	-4.406
unit 19	30	BIASED	787.581	783.174	-4.406
unit 20	30	BIASED	789.393	784.987	-4.406
unit 21	30	BIASED	791.206	786.956	-4.250
unit 22	30	BIASED	792.612	788.424	-4.187
unit 23	30	BIASED	790.174	786.237	-3.937
unit 24	30	BIASED	791.518	787.237	-4.281
unit 25	30	UNBIASED	799.268	795.455	-3.812
unit 26	30	UNBIASED	795.455	791.299	-4.156
unit 27	30	UNBIASED	790.705	786.674	-4.031
unit 28	30	UNBIASED	791.143	786.737	-4.406
unit 29	30	UNBIASED	783.456	779.237	-4.219
unit 30	30	UNBIASED	777.518	773.268	-4.250
unit 31	30	UNBIASED	786.049	781.706	-4.344
unit 32	30	UNBIASED	784.362	780.393	-3.969
unit 33	50	BIASED	784.112	779.799	-4.312
unit 34	50	BIASED	786.174	782.018	-4.156
unit 35	50	BIASED	782.893	778.612	-4.281
unit 36	50	BIASED	794.862	790.612	-4.250
unit 37	50	BIASED	789.487	785.643	-3.844
unit 38	50	BIASED	792.549	788.643	-3.906
unit 39	50	BIASED	795.143	790.737	-4.406
unit 40	50	BIASED	782.924	779.174	-3.750
unit 41	50	UNBIASED	806.612	802.737	-3.875

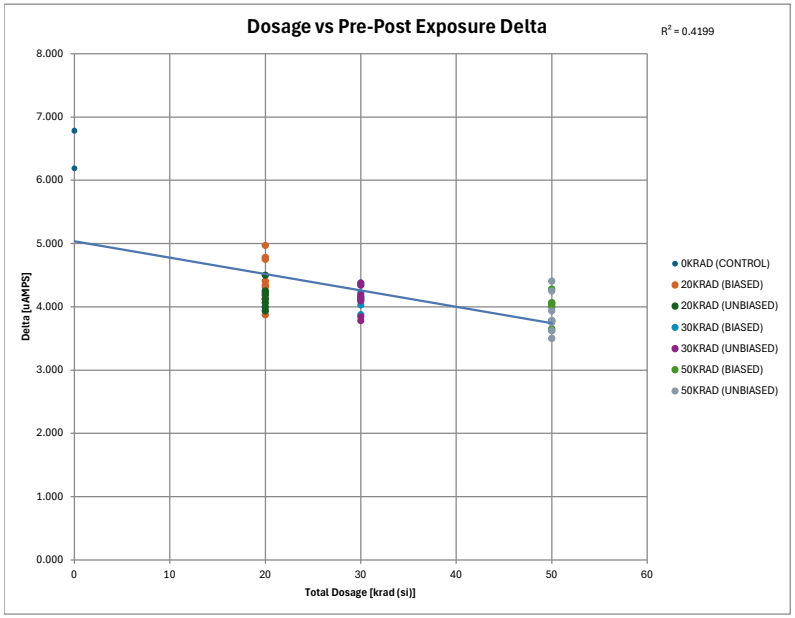
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	799.487	795.737	-3.750
unit 43	50	UNBIASED	795.424	791.393	-4.031
unit 44	50	UNBIASED	790.393	786.674	-3.719
unit 45	50	UNBIASED	781.456	777.581	-3.875
unit 46	50	UNBIASED	794.049	790.174	-3.875
unit 47	50	UNBIASED	783.706	779.674	-4.031
unit 48	50	UNBIASED	782.081	777.893	-4.187

TEST STATISTICS [uAMPS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	785.924	790.190	794.455	-	778.987	783.627	788.268	-	-6.937	-6.562	-6.187	-
	20	784.956	790.956	799.893	4.889	779.987	786.547	795.737	5.053	-5.031	-4.408	-4.000	0.369
	30	777.518	790.569	800.830	6.076	773.268	786.368	796.424	6.105	-4.406	-4.201	-3.812	0.184
	50	781.456	790.084	806.612	7.275	777.581	786.069	802.737	7.325	-4.406	-4.016	-3.719	0.223
BIASED	20	784.956	787.823	790.893	2.437	779.987	783.174	786.706	2.513	-5.031	-4.648	-4.000	0.384
	30	787.581	792.643	800.830	4.465	783.174	788.389	796.424	4.461	-4.406	-4.254	-3.937	0.162
	50	782.893	788.518	795.143	5.198	778.612	784.405	790.737	5.154	-4.406	-4.113	-3.750	0.245
UNBIASED	20	785.393	794.088	799.893	4.780	781.268	789.920	795.737	4.733	-4.344	-4.168	-4.062	0.108
	30	777.518	788.495	799.268	7.024	773.268	784.346	795.455	7.115	-4.406	-4.148	-3.812	0.200
	50	781.456	791.651	806.612	8.988	777.581	787.733	802.737	9.059	-4.187	-3.918	-3.719	0.157

DEVICE TEST: 30.3 Neg. supply quiesent current @ +/- 2.5V [uAMPS]





TEST RESULT (LOWER LIMIT = -900 | UPPER LIMIT = -695) [uAMPS]

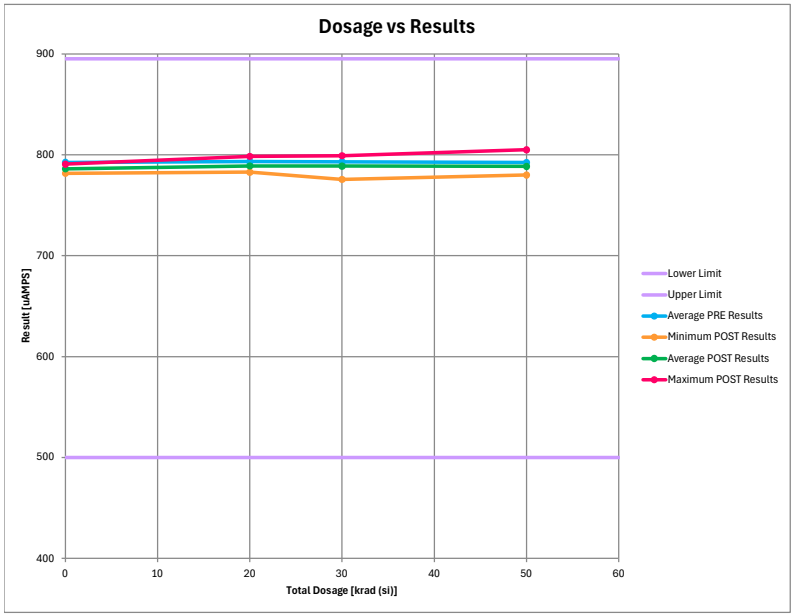
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	-786.329	-779.548	6.781
unit 50	0	CONTROL	-794.984	-788.797	6.187
unit 1	20	BIASED	-786.922	-782.142	4.781
unit 2	20	BIASED	-786.985	-782.017	4.968
unit 3	20	BIASED	-789.578	-784.829	4.750
unit 4	20	BIASED	-789.203	-784.860	4.343
unit 5	20	BIASED	-785.329	-780.923	4.406
unit 6	20	BIASED	-791.422	-787.110	4.312
unit 7	20	BIASED	-791.422	-787.547	3.875
unit 8	20	BIASED	-785.860	-781.735	4.125
unit 9	20	UNBIASED	-786.079	-782.142	3.937
unit 10	20	UNBIASED	-794.672	-790.609	4.062
unit 11	20	UNBIASED	-789.797	-785.298	4.500
unit 12	20	UNBIASED	-796.046	-792.047	4.000
unit 13	20	UNBIASED	-799.609	-795.359	4.250
unit 14	20	UNBIASED	-795.953	-791.828	4.125
unit 15	20	UNBIASED	-795.296	-791.078	4.218
unit 16	20	UNBIASED	-800.671	-796.484	4.187
unit 17	30	BIASED	-798.484	-794.390	4.093
unit 18	30	BIASED	-801.421	-797.296	4.125
unit 19	30	BIASED	-787.797	-783.641	4.156
unit 20	30	BIASED	-789.891	-785.673	4.218
unit 21	30	BIASED	-791.953	-787.579	4.375
unit 22	30	BIASED	-793.515	-789.172	4.343
unit 23	30	BIASED	-790.953	-786.922	4.031
unit 24	30	BIASED	-791.984	-788.110	3.875
unit 25	30	UNBIASED	-799.796	-796.015	3.781
unit 26	30	UNBIASED	-796.265	-791.922	4.343
unit 27	30	UNBIASED	-791.328	-787.485	3.843
unit 28	30	UNBIASED	-791.828	-787.454	4.375
unit 29	30	UNBIASED	-784.235	-780.048	4.187
unit 30	30	UNBIASED	-777.986	-773.830	4.156
unit 31	30	UNBIASED	-786.704	-782.579	4.125
unit 32	30	UNBIASED	-785.204	-781.110	4.093
unit 33	50	BIASED	-784.516	-780.517	4.000
unit 34	50	BIASED	-786.829	-782.767	4.062
unit 35	50	BIASED	-783.610	-779.329	4.281
unit 36	50	BIASED	-795.453	-791.422	4.031
unit 37	50	BIASED	-790.078	-786.454	3.625
unit 38	50	BIASED	-793.140	-789.485	3.656
unit 39	50	BIASED	-795.515	-791.453	4.062
unit 40	50	BIASED	-783.454	-779.673	3.781
unit 41	50	UNBIASED	-807.576	-803.327	4.250

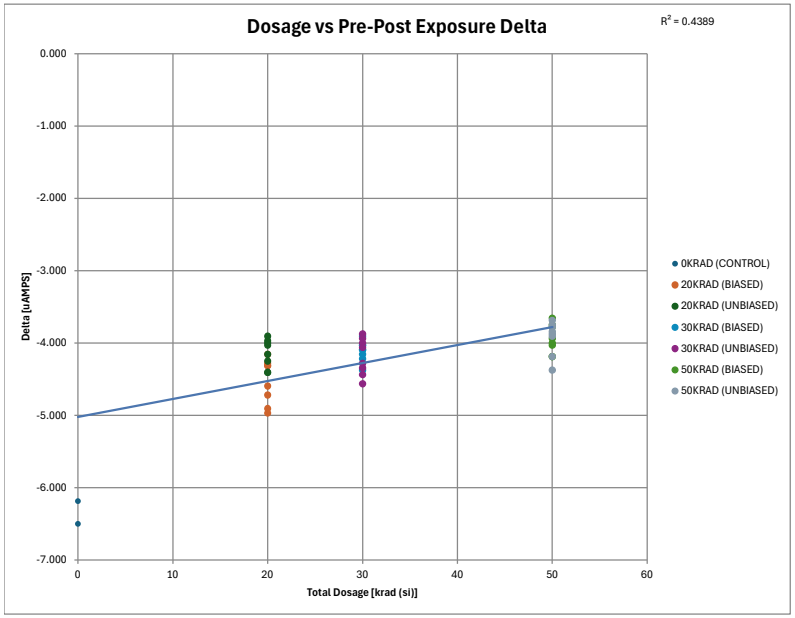
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	-800.108	-796.359	3.750
unit 43	50	UNBIASED	-795.796	-792.297	3.500
unit 44	50	UNBIASED	-790.984	-787.204	3.781
unit 45	50	UNBIASED	-782.235	-778.611	3.625
unit 46	50	UNBIASED	-794.609	-790.672	3.937
unit 47	50	UNBIASED	-784.204	-780.423	3.781
unit 48	50	UNBIASED	-782.985	-778.580	4.406

TEST STATISTICS [uAMPS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	-794.984	-790.656	-786.329	-	-788.797	-784.173	-779.548	-	6.187	6.484	6.781	-
	20	-800.671	-791.553	-785.329	4.948	-796.484	-787.250	-780.923	5.076	3.875	4.302	4.968	0.314
	30	-801.421	-791.209	-777.986	6.092	-797.296	-787.077	-773.830	6.120	3.781	4.132	4.375	0.183
	50	-807.576	-790.693	-782.235	7.285	-803.327	-786.786	-778.580	7.293	3.500	3.908	4.406	0.263
BIASED	20	-791.422	-788.340	-785.329	2.401	-787.547	-783.895	-780.923	2.552	3.875	4.445	4.968	0.366
	30	-801.421	-793.250	-787.797	4.532	-797.296	-789.098	-783.641	4.547	3.875	4.152	4.375	0.163
	50	-795.515	-789.074	-783.454	5.168	-791.453	-785.137	-779.329	5.218	3.625	3.937	4.281	0.228
UNBIASED	20	-800.671	-794.765	-786.079	4.808	-796.484	-790.606	-782.142	4.792	3.937	4.160	4.500	0.175
	30	-799.796	-789.168	-777.986	7.033	-796.015	-785.055	-773.830	7.088	3.781	4.113	4.375	0.211
	50	-807.576	-792.312	-782.235	9.002	-803.327	-788.434	-778.580	8.975	3.500	3.878	4.406	0.308

DEVICE TEST: 30.4 Pos. supply quiesent current @ +/- 9V [uAMPS]





TEST RESULT (LOWER LIMIT = 500 | UPPER LIMIT = 895) [uAMPS]

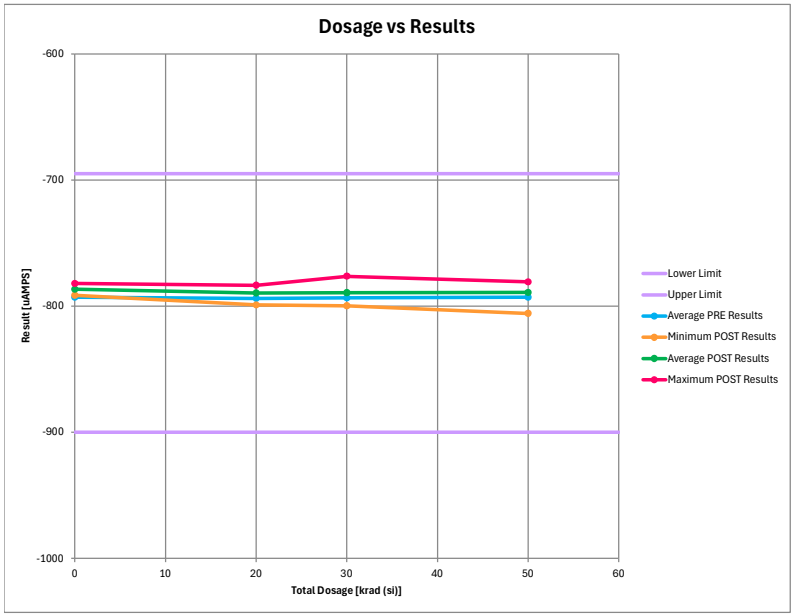
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	788.112	781.612	-6.500
unit 50	0	CONTROL	796.893	790.706	-6.187
unit 1	20	BIASED	788.456	783.862	-4.594
unit 2	20	BIASED	788.612	783.706	-4.906
unit 3	20	BIASED	791.299	786.581	-4.719
unit 4	20	BIASED	791.299	787.018	-4.281
unit 5	20	BIASED	787.768	782.799	-4.969
unit 6	20	BIASED	793.174	788.862	-4.312
unit 7	20	BIASED	793.362	789.049	-4.312
unit 8	20	BIASED	787.456	783.299	-4.156
unit 9	20	UNBIASED	787.831	783.424	-4.406
unit 10	20	UNBIASED	796.018	792.049	-3.969
unit 11	20	UNBIASED	791.456	787.299	-4.156
unit 12	20	UNBIASED	797.580	793.674	-3.906
unit 13	20	UNBIASED	801.112	796.705	-4.406
unit 14	20	UNBIASED	797.612	793.362	-4.250
unit 15	20	UNBIASED	796.955	792.924	-4.031
unit 16	20	UNBIASED	802.487	798.487	-4.000
unit 17	30	BIASED	800.424	796.330	-4.094
unit 18	30	BIASED	803.205	799.174	-4.031
unit 19	30	BIASED	789.955	785.924	-4.031
unit 20	30	BIASED	791.549	787.174	-4.375
unit 21	30	BIASED	793.549	789.393	-4.156
unit 22	30	BIASED	795.268	791.049	-4.219
unit 23	30	BIASED	792.549	788.643	-3.906
unit 24	30	BIASED	793.674	789.581	-4.094
unit 25	30	UNBIASED	801.643	797.705	-3.938
unit 26	30	UNBIASED	797.768	793.330	-4.437
unit 27	30	UNBIASED	792.830	788.768	-4.062
unit 28	30	UNBIASED	793.143	788.862	-4.281
unit 29	30	UNBIASED	785.956	781.393	-4.562
unit 30	30	UNBIASED	779.518	775.643	-3.875
unit 31	30	UNBIASED	788.424	784.081	-4.344
unit 32	30	UNBIASED	787.112	783.112	-4.000
unit 33	50	BIASED	786.518	782.518	-4.000
unit 34	50	BIASED	788.518	784.487	-4.031
unit 35	50	BIASED	785.206	781.018	-4.187
unit 36	50	BIASED	797.549	793.362	-4.187
unit 37	50	BIASED	792.112	788.456	-3.656
unit 38	50	BIASED	795.143	791.393	-3.750
unit 39	50	BIASED	797.487	793.549	-3.937
unit 40	50	BIASED	785.081	781.299	-3.781
unit 41	50	UNBIASED	809.143	804.955	-4.187

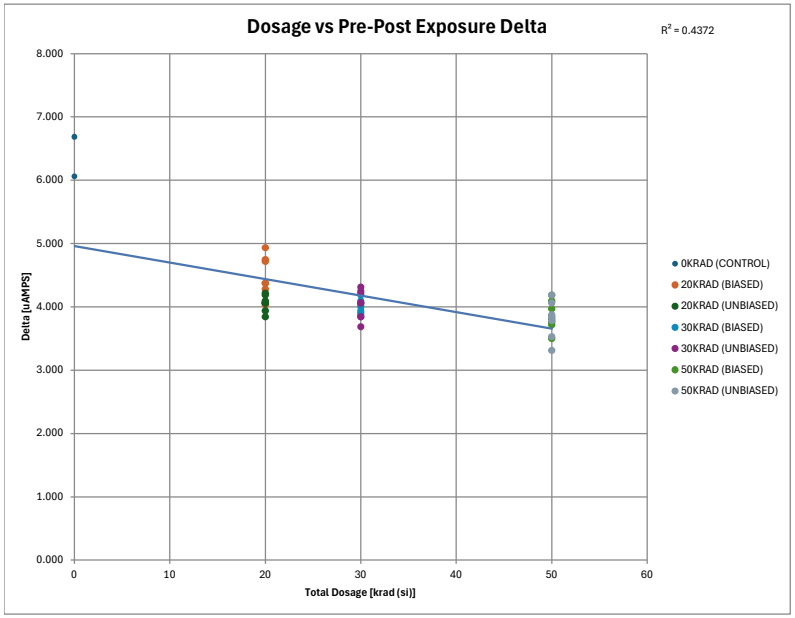
Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	801.705	797.924	-3.781
unit 43	50	UNBIASED	797.580	793.705	-3.875
unit 44	50	UNBIASED	792.580	788.893	-3.687
unit 45	50	UNBIASED	783.956	780.049	-3.906
unit 46	50	UNBIASED	796.362	792.518	-3.844
unit 47	50	UNBIASED	785.768	782.018	-3.750
unit 48	50	UNBIASED	784.612	780.237	-4.375

TEST STATISTICS [uAMPS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	788.112	792.502	796.893	-	781.612	786.159	790.706	-	-6.500	-6.344	-6.187	-
	20	787.456	793.280	802.487	4.862	782.799	788.944	798.487	5.060	-4.969	-4.336	-3.906	0.321
	30	779.518	792.911	803.205	6.116	775.643	788.760	799.174	6.130	-4.562	-4.150	-3.875	0.201
	50	783.956	792.457	809.143	7.305	780.049	788.524	804.955	7.312	-4.375	-3.934	-3.656	0.211
BIASED	20	787.456	790.178	793.362	2.398	782.799	785.647	789.049	2.542	-4.969	-4.531	-4.156	0.309
	30	789.955	795.022	803.205	4.536	785.924	790.909	799.174	4.563	-4.375	-4.113	-3.906	0.141
	50	785.081	790.952	797.549	5.321	781.018	787.010	793.549	5.338	-4.187	-3.941	-3.656	0.199
UNBIASED	20	787.831	796.381	802.487	4.788	783.424	792.241	798.487	4.854	-4.406	-4.141	-3.906	0.196
	30	779.518	790.799	801.643	7.028	775.643	786.612	797.705	7.011	-4.562	-4.187	-3.875	0.253
	50	783.956	793.963	809.143	8.991	780.049	790.038	804.955	8.990	-4.375	-3.926	-3.687	0.236

DEVICE TEST: 30.5 Neg. supply quiesent current @ +/- 9V [uAMPS]





TEST RESULT (LOWER LIMIT = -900 | UPPER LIMIT = -695) [uAMPS]

Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 49	0	CONTROL	-788.703	-782.017	6.687
unit 50	0	CONTROL	-797.359	-791.297	6.062
unit 1	20	BIASED	-789.235	-784.485	4.750
unit 2	20	BIASED	-789.016	-784.079	4.937
unit 3	20	BIASED	-791.734	-787.360	4.375
unit 4	20	BIASED	-791.766	-787.485	4.281
unit 5	20	BIASED	-788.110	-783.392	4.718
unit 6	20	BIASED	-793.859	-789.485	4.375
unit 7	20	BIASED	-793.703	-789.641	4.062
unit 8	20	BIASED	-787.953	-783.923	4.031
unit 9	20	UNBIASED	-788.141	-784.298	3.843
unit 10	20	UNBIASED	-796.890	-792.953	3.937
unit 11	20	UNBIASED	-791.797	-787.735	4.062
unit 12	20	UNBIASED	-798.202	-794.109	4.093
unit 13	20	UNBIASED	-801.827	-797.609	4.218
unit 14	20	UNBIASED	-798.265	-794.078	4.187
unit 15	20	UNBIASED	-797.577	-793.515	4.062
unit 16	20	UNBIASED	-803.108	-799.046	4.062
unit 17	30	BIASED	-801.140	-797.078	4.062
unit 18	30	BIASED	-803.608	-799.671	3.937
unit 19	30	BIASED	-790.516	-786.422	4.093
unit 20	30	BIASED	-791.984	-787.954	4.031
unit 21	30	BIASED	-794.047	-789.860	4.187
unit 22	30	BIASED	-795.390	-791.484	3.906
unit 23	30	BIASED	-793.109	-789.110	4.000
unit 24	30	BIASED	-794.015	-790.141	3.875
unit 25	30	UNBIASED	-802.014	-798.171	3.843
unit 26	30	UNBIASED	-798.390	-794.172	4.218
unit 27	30	UNBIASED	-793.484	-789.641	3.843
unit 28	30	UNBIASED	-793.797	-789.547	4.250
unit 29	30	UNBIASED	-786.235	-782.173	4.062
unit 30	30	UNBIASED	-780.361	-776.299	4.062
unit 31	30	UNBIASED	-788.828	-784.516	4.312
unit 32	30	UNBIASED	-787.297	-783.610	3.687
unit 33	50	BIASED	-786.954	-782.985	3.968
unit 34	50	BIASED	-788.922	-785.110	3.812
unit 35	50	BIASED	-785.704	-781.610	4.093
unit 36	50	BIASED	-798.171	-793.984	4.187
unit 37	50	BIASED	-792.672	-788.953	3.718
unit 38	50	BIASED	-795.890	-792.141	3.750
unit 39	50	BIASED	-797.890	-794.109	3.781
unit 40	50	BIASED	-785.516	-782.017	3.500
unit 41	50	UNBIASED	-809.607	-805.764	3.843

Serial #	Dosage [krad (Si)]	Exposure Conditions	Pre Result	Post Result	Delta
unit 42	50	UNBIASED	-802.077	-798.765	3.312
unit 43	50	UNBIASED	-797.984	-794.453	3.531
unit 44	50	UNBIASED	-793.265	-789.485	3.781
unit 45	50	UNBIASED	-784.579	-780.736	3.843
unit 46	50	UNBIASED	-796.765	-792.890	3.875
unit 47	50	UNBIASED	-786.454	-782.392	4.062
unit 48	50	UNBIASED	-784.954	-780.767	4.187

TEST STATISTICS [uAMPS]

	Dosage [krad (Si)]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
OVERALL	0	-797.359	-793.031	-788.703	-	-791.297	-786.657	-782.017	-	6.062	6.374	6.687	-
	20	-803.108	-793.824	-787.953	4.959	-799.046	-789.574	-783.392	5.091	3.843	4.250	4.937	0.311
	30	-803.608	-793.388	-780.361	6.099	-799.671	-789.365	-776.299	6.119	3.687	4.023	4.312	0.169
	50	-809.607	-792.963	-784.579	7.291	-805.764	-789.135	-780.736	7.378	3.312	3.828	4.187	0.244
BIASED	20	-793.859	-790.672	-787.953	2.403	-789.641	-786.231	-783.392	2.567	4.031	4.441	4.937	0.330
	30	-803.608	-795.476	-790.516	4.548	-799.671	-791.465	-786.422	4.574	3.875	4.011	4.187	0.104
	50	-798.171	-791.465	-785.516	5.381	-794.109	-787.614	-781.610	5.347	3.500	3.851	4.187	0.221
UNBIASED	20	-803.108	-796.976	-788.141	4.922	-799.046	-792.918	-784.298	4.838	3.843	4.058	4.218	0.122
	30	-802.014	-791.301	-780.361	7.005	-798.171	-787.266	-776.299	7.016	3.687	4.035	4.312	0.224
	50	-809.607	-794.461	-784.579	8.934	-805.764	-790.656	-780.736	9.097	3.312	3.804	4.187	0.277

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