Radiation Report

INA1H182-SEP Neutron Displacement Damage (NDD) Characterization

ABSTRACT

The INA1H182-SEP was subjected to a one-time characterization to determine the effects of neutron displacement damage (NDD) to the device parameters. A sample size of twelve units was exposed to radiation testing per MIL-STD-883 (method 1017 for neutron irradiation). The samples were dosed to exposure levels of 1 × 10^{12} n/cm^2, 5 × 10^{12} n/cm^2, and 1 × 10^{13} n/cm^2, with four samples evaluated per exposure level. Electrical testing was performed at Texas Instruments before and after neutron irradiation using the production test program for the device. Some level of degradation on the input bias current and output stage offset voltage specifications was observed and is discussed herein.

Table of Contents

1 Overview....2
2 Test Procedures....3
3 Facility....3
4 Results....4
  4.1 Input Bias Current Parametric Shift....4
  4.2 Output Stage Offset Voltage Parametric Shift....5
5 Summary of Results....5
A Test Results....6

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1 Overview

The INA1H182-SEP is a radiation-hardened precision unity-gain difference amplifier with a very high input common-mode voltage range. The INA1H182-SEP is a radiation-tolerant, high precision instrumentation amplifier that offers low power consumption and operates over a wide single or dual-supply. A single external resistor sets any gain from 1 to 10,000. The device has high precision as a result of super-beta input transistors, which provide low input offset voltage, offset voltage drift, low input bias current, and low noise. The inputs of the INA1H182-SEP device are individually protected for over voltages up to ±40V.

Table 1-1 lists general device information and NDD testing conditions.

Table 1-1. Overview Information

TI Part Number	INA1H182-SEP
DLA VID	V62/25653
Device Function	IINA1H182-SEP radiation-tolerant, low offset, low-noise, high-precision instrumentation amplifier
Technology	BICOM3-HV
Device Package	8-pin, VSSOP (DGK)
Unbiased Quantity Tested	12 units irradiated and 2 control/correlation units with no exposure
Lot Number | Date Code	5573522 | 55AL0ZK
Exposure Facility	VPT Rad, Chelmsford, MA
Neutron Fluence (1MeV Equivalent)	1.0×10^{12}, 5.0×10^{12}, 1.0×10^{13} n/cm^2
Irradiation Temperature	25°C
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2 Test Procedures

The INA1H182-SEP samples was electrically pre-tested using the production automated test equipment program. General test procedures were as per MIL-STD-883, method 1017.

Table 2-1. Neutron Irradiation Conditions

Serial Numbers	Sample Quantity	Neutron Fluence (n/cm^2)	Bias
33, 34, 35, 36	4	1.0×10^{12}	Unbiased
37, 38, 39, 40	4	5.0×10^{12}	Unbiased
41, 42, 43, 44	4	1.0×10^{13}	Unbiased

Table 2-2. INA1H182-SEP Specification Compliance Matrix

Parameter	Test Condition	INA1H182-SEP Data Sheet				Test Number
		MIN	TYP	MAX	Unit	
V_{OSI} - Input stage offset voltage	V_S = ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 1		10	55	µV	3.136, 7.136
V_{OSO} - Output stage offset voltage	V_S = ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 1		50	500	µV	3.157, 7.157
PSRR - Power-supply rejection ratio	V_S = ±2.25 to ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 1	110 ±3.16	120 1		dB µV/V	3.168, 7.168
	V_S = ±2.25 to ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 10	114 ±2	130 0.32		dB µV/V	3.169, 7.169
CMRR - Common-mode rejection ratio	V_S = ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 1	90 ±31.62	102 7.08		dB µV/V	3.174, 7.174
	V_S = ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 10	110 ±3.162	120 1.00		dB µV/V	3.181, 7.181
IBN - Input bias current	V_S = ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 1		150	500	pA	8.10
IBP- Input bias current	V_S = ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 1		150	500	pA	8.31
IOS - Input offset current	V_S = ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 1		150	500	pA	8.52
GE - Gain error G=1	V_S = ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 1, V_O = ±5V		±0.007	±0.035	%	2.67
GE - Gain error G=10	V_S = ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 10, V_O = ±5V		±0.032	±0.22	%	2.74
Output voltage swing	V_S = ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 10	(–VS) + 0.15		(+VS) – 0.15	V	2.82, 2.83
Quiescent current	V_S = ±9V, R_L = 10kΩ, V_{REF} = 0V, G = 1, VIN = 0		600	650	µA	3.10, 7.10

3 Facility

VPT Rad performed neutron displacement damage irradiations in a low-enriched, open-pool, water moderated, thermal neutron reactor at the University of Massachusetts Lowell. The reactor uses flat-plate type fuel and has a maximum thermal energy output of up to 1MW. The fast neutron irradiator (FNI) faces one side of the reactor core. The experimental facility replaces three beam ports that originally existed on the left side of the research reactor. The FNI is designed to give a fast flux level ≥ 10^{11} n/cm^2–s, with relatively low thermal fluence and gamma dose rates. Samples with a cross-sectional area as large as 30cm (12in) × 30cm (12in) and up to 15cm (6in) thick can be irradiated. The fast neutron flux is designed to be nearly uniform over the 30cm (12in) × 30cm (12in) area facing the core, and the fast fluence variation through the sample thickness is minimized through a single 180° rotation of the sample canister at the midpoint of the irradiation period. The fluences are calculated based on 1MeV equivalences.

The neutron fluence rate is determined using the previously-measured neutron radiation field for the FNI, performed in accordance with ASTM standards (ASTM F1190), and correlated to the measured reactor power level. The neutron dose is timed to meet the fluence specified for the irradiation. Neutron dosimetry meeting

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ASTM standards (ASTM E265) is used to track and make sure that irradiations meet the required minimum. The facility retains source design with the Defense Logistics Agency (DLA) Laboratory Suitability Program for ASTM Test Method 1017.

4 Results

There were no functional failures at any irradiation level. Some devices experienced parametric drift for input bias current specifications (IBP, IBN, IOS), although input currents remain relatively low below < ±5nA. Some devices experienced parametric drift for output stage offset voltage (V_{OSO}), where the worst case parametric shift is slightly above spec. All other tested parameters were observed to be within the test limits of the ATE program for the device, and, as a result, within the data sheet specifications.

4.1 Input Bias Current Parametric Shift

Input bias current (IBP, IBN) and input offset current (IOS) for the INA1H182-SEP is specified as ±0.5nA maximum at 25°C and ±2nA maximum Over the extended temperature range of T_A = –55°C to +125°C.

All of the devices exposed to neutron irradiation were found to have a shift in the input bias current and input offset current. Values reported below are for the IBP, IBN and IOS tests with a supply V_S = ±9V. Full data for all ATE tests performed are included in the report appendix.

- Of the four samples tested to 1 × 10^{12}n/cm^2, the worst case average delta occurs for IOS. The maximum recorded magnitude change in IOS was 0.925nA.
- Of the four samples tested to 5× 10^{12}n/cm^2, the worst case average delta occurs for IBN/ The maximum recorded magnitude change in IBN was 4.163nA.
- Of the four samples tested to 1 × 10^{13}n/cm^2, the worst case average delta occurs for IBN. The maximum recorded magnitude change in IBN was 4.404nA.

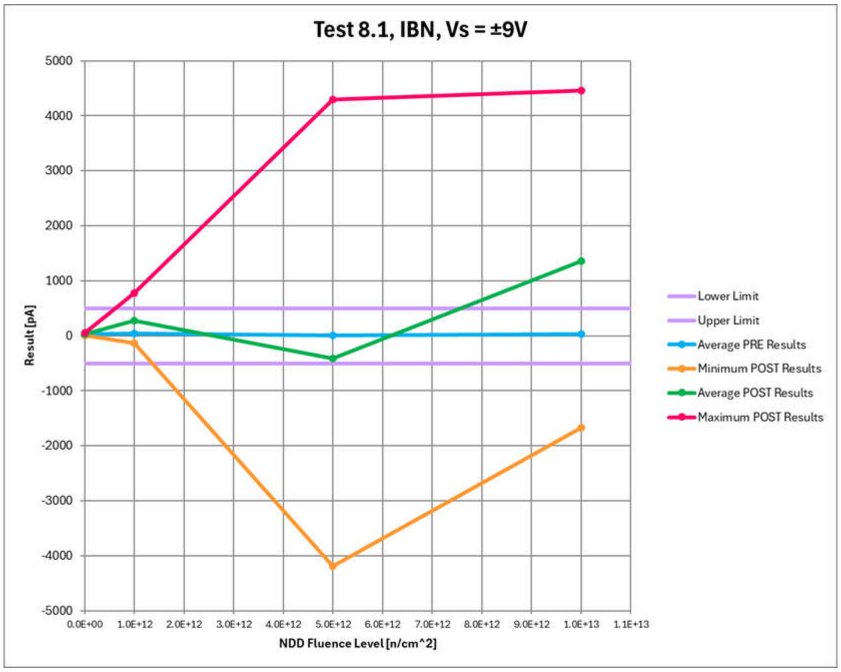

Figure 4-1. Sample IBN NDD Graph

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4.2 Output Stage Offset Voltage Parametric Shift

Output stage offset voltage (V_{OSO}) for the INA1H182-SEP is specified as ±50μV typical, ±500μV maximum at T_A = 25°C and ±900μV maximum over the temperature range of T_A = -55°C to 125°C. The output stage offset voltage shifted slightly above the ±500μV maximum specification at T_A = 25°C.

The devices exposed to neutron irradiation were found to have a measured input offset voltage within of the specified data sheet limits; but present offset error shifts. Values reported below are from one example test with the maximum supply V_S = ± 9V (test number 3.157, 7.157). Full data for all ATE tests performed are included in the report appendix.

- Of the four samples tested to 1 × 10^{12}n/cm^2, the maximum recorded magnitude change in V_{OSO} was 555μV.
- Of the four samples tested to 5 × 10^{12}n/cm^2, the maximum recorded magnitude change in V_{OSO} was 458μV.
- Of the four samples tested to 1 × 10^{13}n/cm^2, the maximum recorded magnitude change in V_{OSO} was 140μV.

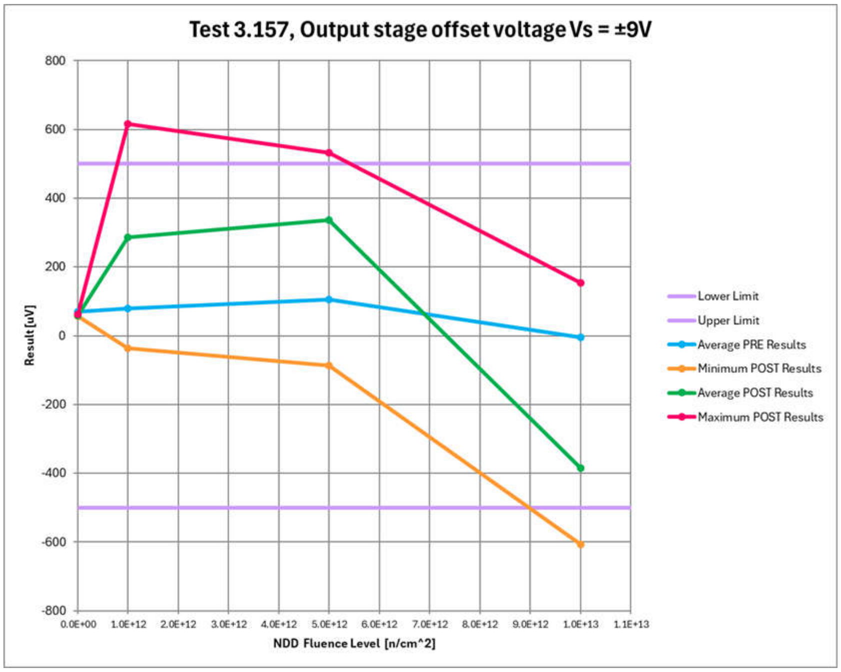

Figure 4-2. Sample Output Stage Offset Voltage NDD Graph

5 Summary of Results

While there were no functional failures at any irradiation level, parametric shift of parameters was readily apparent for the device when exposed to neutron irradiation. The specifications affected were the input bias current and output stage offset voltage.

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A Test Results

This appendix contains the detailed test results.

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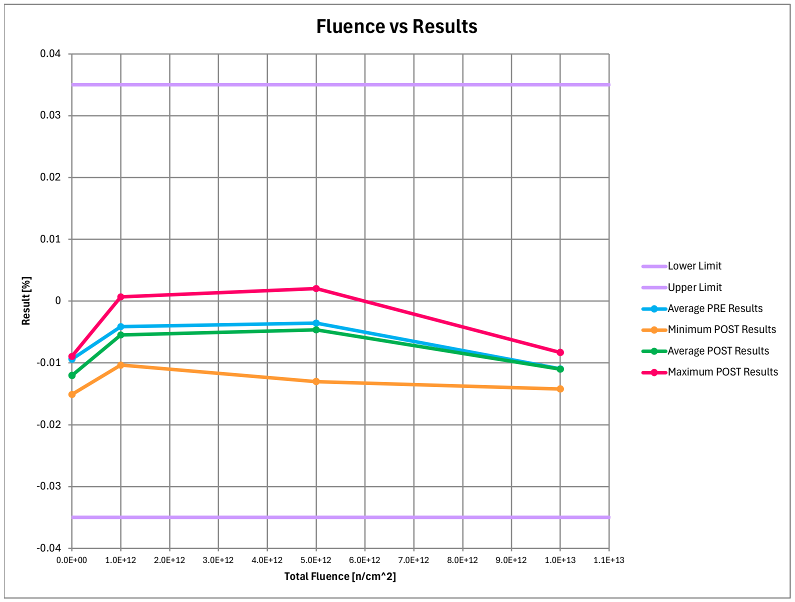
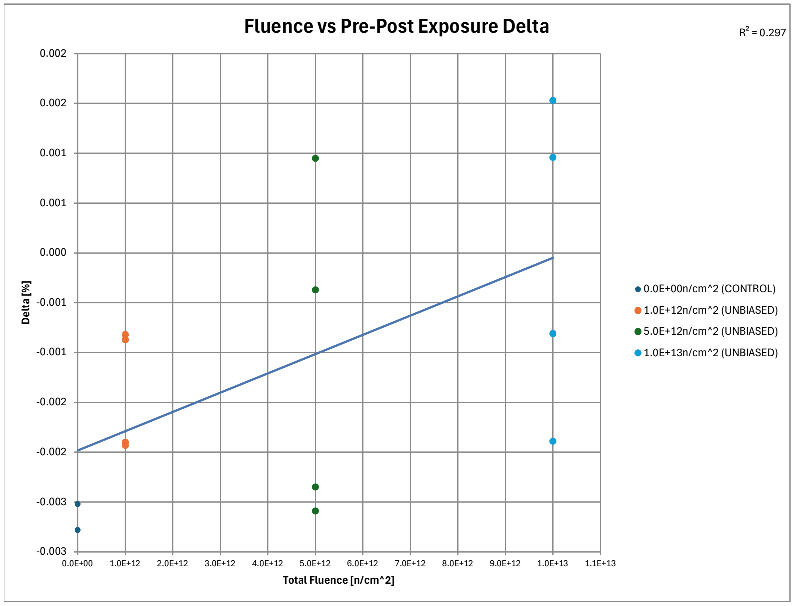
DEVICE TEST: GE_G1_18P000_P0P000 [%]





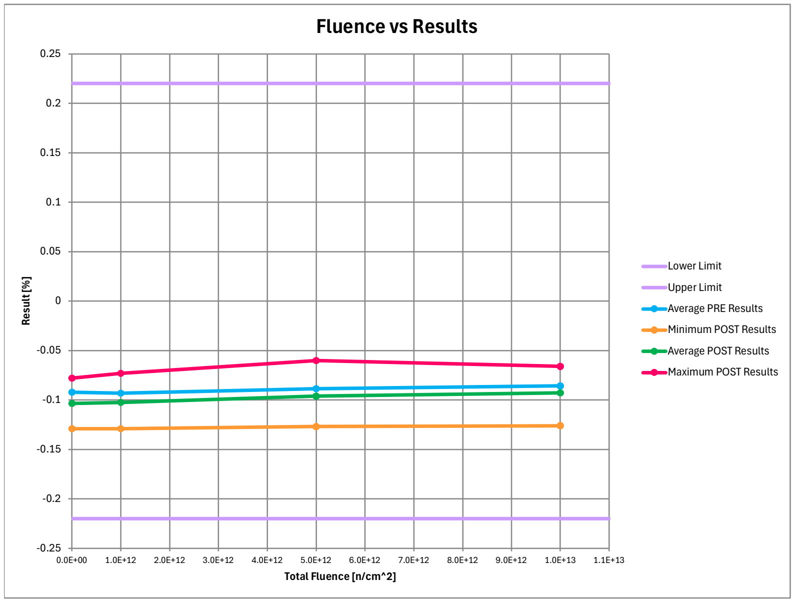
TEST RESULT (LOWER LIMIT = -0.035 | UPPER LIMIT = 0.035) [%]

Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	-0.012	-0.015	-0.003
unit 46	0.0E+00	CONTROL	-0.006	-0.009	-0.003
unit 33	1.0E+12	UNBIASED	-0.001	-0.003	-0.002
unit 34	1.0E+12	UNBIASED	0.002	0.001	-0.001
unit 35	1.0E+12	UNBIASED	-0.008	-0.009	-0.001
unit 36	1.0E+12	UNBIASED	-0.008	-0.010	-0.002
unit 37	5.0E+12	UNBIASED	0.002	0.002	0.000
unit 38	5.0E+12	UNBIASED	-0.010	-0.013	-0.003
unit 39	5.0E+12	UNBIASED	-0.007	-0.006	0.001
unit 40	5.0E+12	UNBIASED	0.001	-0.002	-0.002
unit 41	1.0E+13	UNBIASED	-0.009	-0.011	-0.002
unit 42	1.0E+13	UNBIASED	-0.013	-0.014	-0.001
unit 43	1.0E+13	UNBIASED	-0.010	-0.008	0.002
unit 44	1.0E+13	UNBIASED	-0.012	-0.011	0.001

TEST STATISTICS [%]

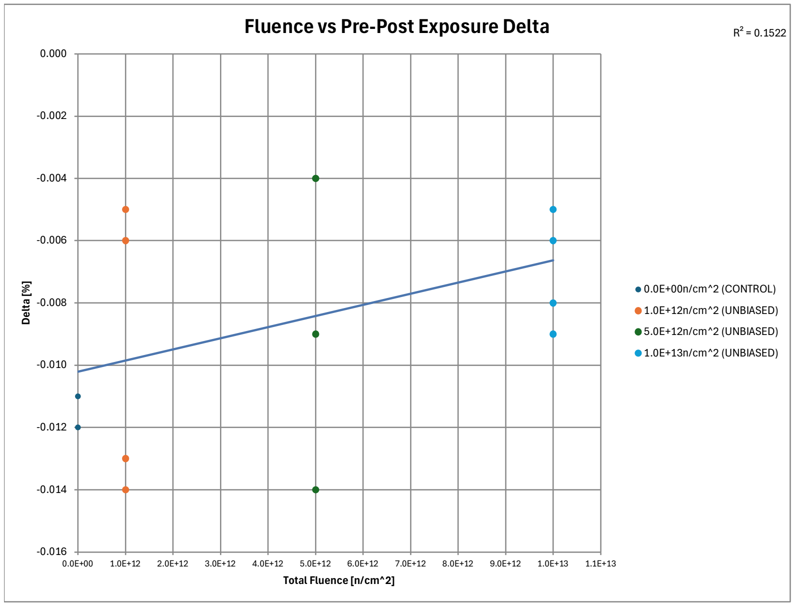
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	-0.012	-0.009	-0.006	-	-0.015	-0.012	-0.009	-	-0.003	-0.003	-0.003	-
1.0E+12	-0.008	-0.004	0.002	0.005	-0.010	-0.006	0.001	0.005	-0.002	-0.001	-0.001	0.001
5.0E+12	-0.010	-0.004	0.002	0.006	-0.013	-0.005	0.002	0.006	-0.003	-0.001	0.001	0.002
1.0E+13	-0.013	-0.011	-0.009	0.002	-0.014	-0.011	-0.008	0.002	-0.002	0.000	0.002	0.002

DEVICE TEST: GE_G10_18P000_P0P000 [%]



TEST RESULT (LOWER LIMIT = -0.22 | UPPER LIMIT = 0.22) [%]

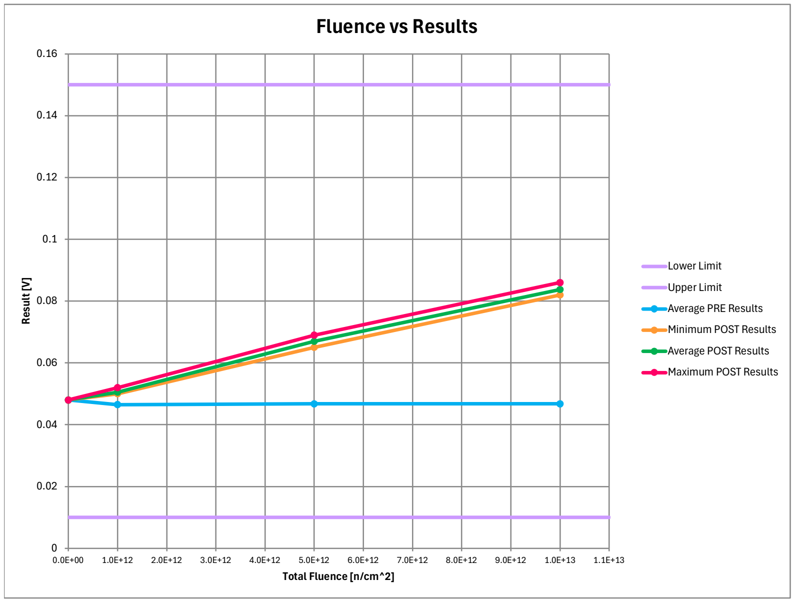
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	-0.067	-0.078	-0.011
unit 46	0.0E+00	CONTROL	-0.117	-0.129	-0.012
unit 33	1.0E+12	UNBIASED	-0.108	-0.114	-0.006
unit 34	1.0E+12	UNBIASED	-0.059	-0.073	-0.014
unit 35	1.0E+12	UNBIASED	-0.116	-0.129	-0.013
unit 36	1.0E+12	UNBIASED	-0.089	-0.094	-0.005
unit 37	5.0E+12	UNBIASED	-0.069	-0.078	-0.009
unit 38	5.0E+12	UNBIASED	-0.056	-0.060	-0.004
unit 39	5.0E+12	UNBIASED	-0.116	-0.120	-0.004
unit 40	5.0E+12	UNBIASED	-0.113	-0.127	-0.014
unit 41	1.0E+13	UNBIASED	-0.060	-0.066	-0.006
unit 42	1.0E+13	UNBIASED	-0.095	-0.103	-0.008
unit 43	1.0E+13	UNBIASED	-0.117	-0.126	-0.009
unit 44	1.0E+13	UNBIASED	-0.071	-0.076	-0.005



TEST STATISTICS [%]

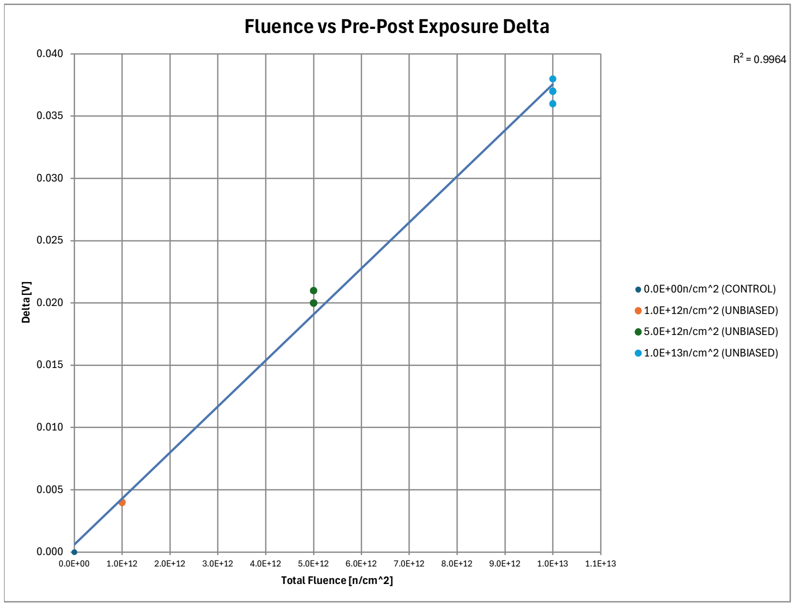
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	-0.117	-0.092	-0.067	-	-0.129	-0.104	-0.078	-	-0.012	-0.012	-0.011	-
1.0E+12	-0.116	-0.093	-0.059	0.025	-0.129	-0.103	-0.073	0.024	-0.014	-0.010	-0.005	0.005
5.0E+12	-0.116	-0.089	-0.056	0.031	-0.127	-0.096	-0.060	0.032	-0.014	-0.008	-0.004	0.005
1.0E+13	-0.117	-0.086	-0.060	0.025	-0.126	-0.093	-0.066	0.027	-0.009	-0.007	-0.005	0.002

DEVICE TEST: SWING_G10_10K_NEG_18 [V]



TEST RESULT (LOWER LIMIT = 0.01| UPPER LIMIT = 0.15) [V]

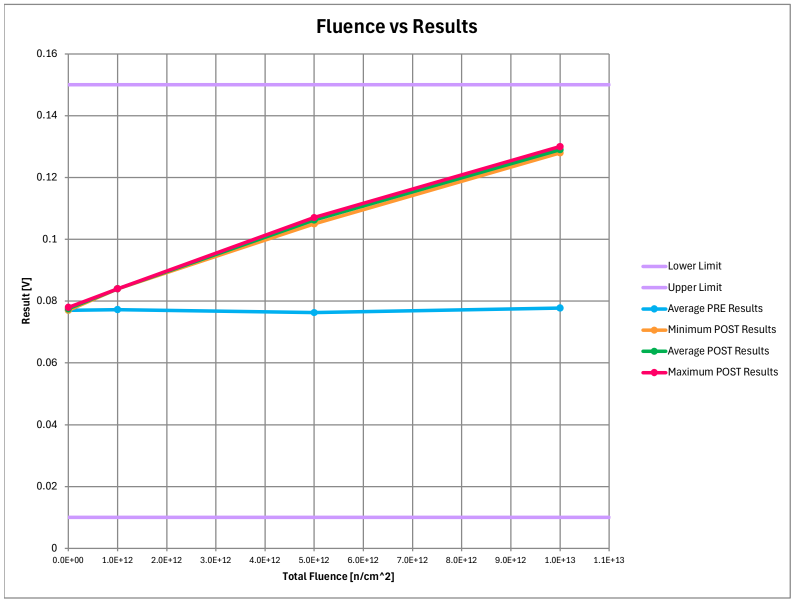
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	0.048	0.048	0.000
unit 46	0.0E+00	CONTROL	0.048	0.048	0.000
unit 33	1.0E+12	UNBIASED	0.046	0.050	0.004
unit 34	1.0E+12	UNBIASED	0.048	0.052	0.004
unit 35	1.0E+12	UNBIASED	0.046	0.050	0.004
unit 36	1.0E+12	UNBIASED	0.046	0.050	0.004
unit 37	5.0E+12	UNBIASED	0.048	0.068	0.020
unit 38	5.0E+12	UNBIASED	0.048	0.069	0.021
unit 39	5.0E+12	UNBIASED	0.046	0.066	0.020
unit 40	5.0E+12	UNBIASED	0.045	0.065	0.020
unit 41	1.0E+13	UNBIASED	0.048	0.086	0.038
unit 42	1.0E+13	UNBIASED	0.046	0.082	0.036
unit 43	1.0E+13	UNBIASED	0.047	0.084	0.037
unit 44	1.0E+13	UNBIASED	0.046	0.083	0.037



TEST STATISTICS [V]

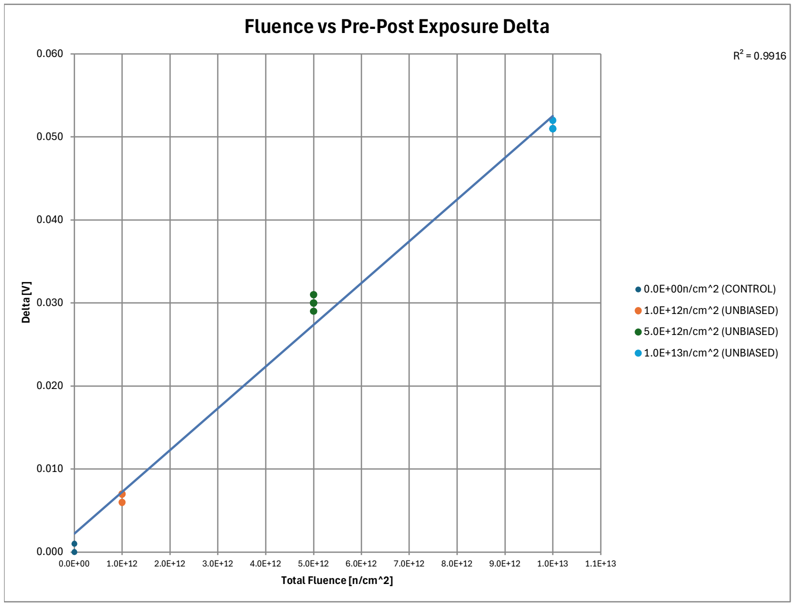
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	0.048	0.048	0.048	-	0.048	0.048	0.048	-	0.000	0.000	0.000	-
1.0E+12	0.046	0.047	0.048	0.001	0.050	0.051	0.052	0.001	0.004	0.004	0.004	0.000
5.0E+12	0.045	0.047	0.048	0.002	0.065	0.067	0.069	0.002	0.020	0.020	0.021	0.001
1.0E+13	0.046	0.047	0.048	0.001	0.082	0.084	0.086	0.002	0.036	0.037	0.038	0.001

DEVICE TEST: SWING_G10_10K_POS_18 [V]



TEST RESULT (LOWER LIMIT = 0.01| UPPER LIMIT = 0.15) [V]

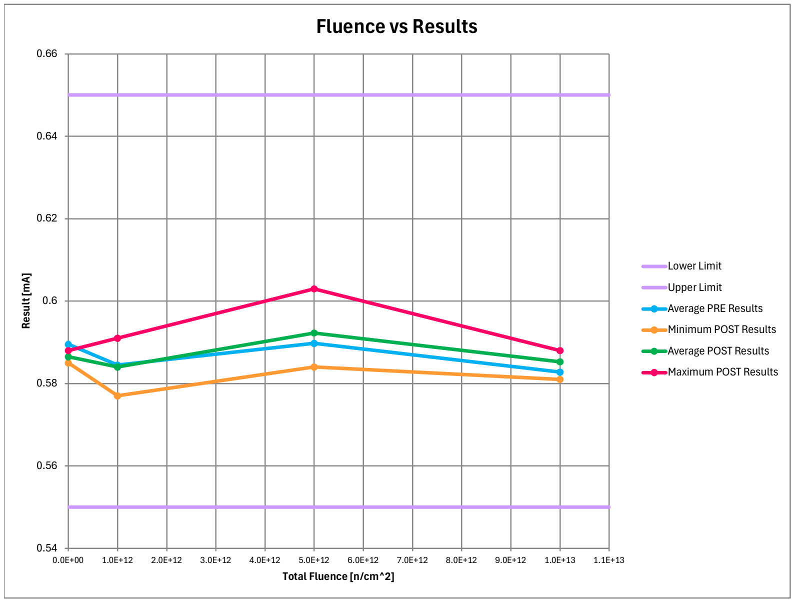
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	0.077	0.077	0.000
unit 46	0.0E+00	CONTROL	0.077	0.078	0.001
unit 33	1.0E+12	UNBIASED	0.077	0.084	0.007
unit 34	1.0E+12	UNBIASED	0.077	0.084	0.007
unit 35	1.0E+12	UNBIASED	0.077	0.084	0.007
unit 36	1.0E+12	UNBIASED	0.078	0.084	0.006
unit 37	5.0E+12	UNBIASED	0.076	0.106	0.030
unit 38	5.0E+12	UNBIASED	0.074	0.105	0.031
unit 39	5.0E+12	UNBIASED	0.078	0.107	0.029
unit 40	5.0E+12	UNBIASED	0.077	0.107	0.030
unit 41	1.0E+13	UNBIASED	0.076	0.128	0.052
unit 42	1.0E+13	UNBIASED	0.078	0.129	0.051
unit 43	1.0E+13	UNBIASED	0.078	0.129	0.051
unit 44	1.0E+13	UNBIASED	0.079	0.130	0.051



TEST STATISTICS [V]

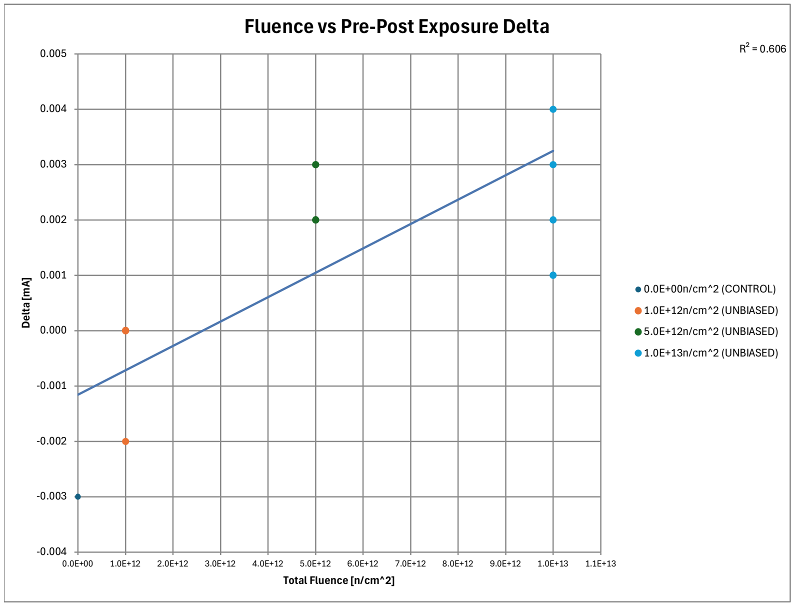
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	0.077	0.077	0.077	-	0.077	0.078	0.078	-	0.000	0.001	0.001	-
1.0E+12	0.077	0.077	0.078	0.001	0.084	0.084	0.084	0.000	0.006	0.007	0.007	0.001
5.0E+12	0.074	0.076	0.078	0.002	0.105	0.106	0.107	0.001	0.029	0.030	0.031	0.001
1.0E+13	0.076	0.078	0.079	0.001	0.128	0.129	0.130	0.001	0.051	0.051	0.052	0.001

DEVICE TEST: Icc_G1_18P000_P0P000 [mA]



TEST RESULT (LOWER LIMIT = 0.55| UPPER LIMIT = 0.65) [mA]

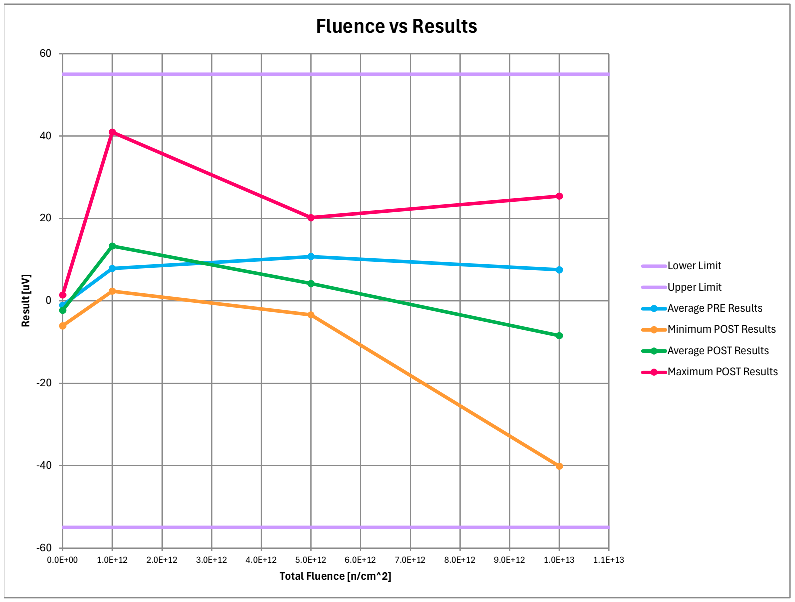
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	0.591	0.588	-0.003
unit 46	0.0E+00	CONTROL	0.588	0.585	-0.003
unit 33	1.0E+12	UNBIASED	0.579	0.577	-0.002
unit 34	1.0E+12	UNBIASED	0.586	0.586	0.000
unit 35	1.0E+12	UNBIASED	0.582	0.582	0.000
unit 36	1.0E+12	UNBIASED	0.591	0.591	0.000
unit 37	5.0E+12	UNBIASED	0.590	0.592	0.002
unit 38	5.0E+12	UNBIASED	0.601	0.603	0.002
unit 39	5.0E+12	UNBIASED	0.581	0.584	0.003
unit 40	5.0E+12	UNBIASED	0.587	0.590	0.003
unit 41	1.0E+13	UNBIASED	0.586	0.587	0.001
unit 42	1.0E+13	UNBIASED	0.584	0.588	0.004
unit 43	1.0E+13	UNBIASED	0.579	0.581	0.002
unit 44	1.0E+13	UNBIASED	0.582	0.585	0.003



TEST STATISTICS [mA]

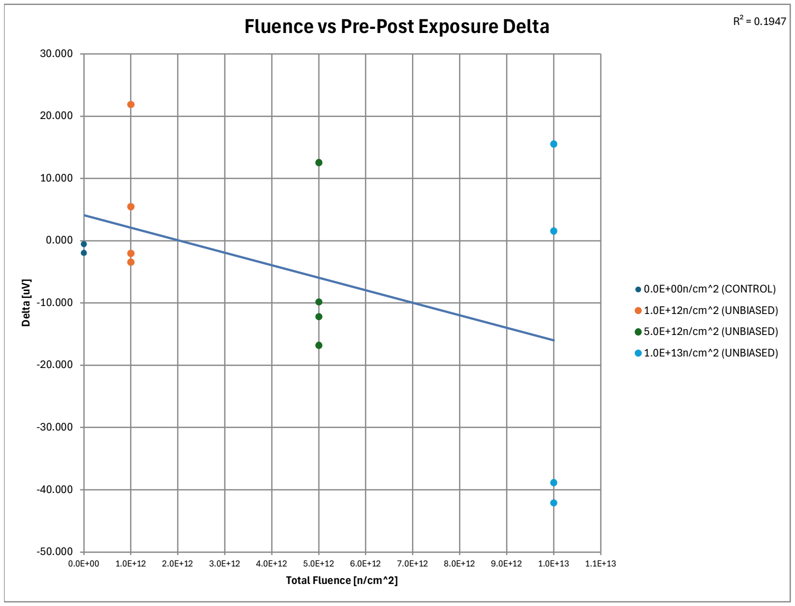
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	0.588	0.590	0.591	-	0.585	0.587	0.588	-	-0.003	-0.003	-0.003	-
1.0E+12	0.579	0.585	0.591	0.005	0.577	0.584	0.591	0.006	-0.002	-0.001	0.000	0.001
5.0E+12	0.581	0.590	0.601	0.008	0.584	0.592	0.603	0.008	0.002	0.003	0.003	0.001
1.0E+13	0.579	0.583	0.586	0.003	0.581	0.585	0.588	0.003	0.001	0.003	0.004	0.001

DEVICE TEST: vosi_18P000_P0P000 [uV]



TEST RESULT (LOWER LIMIT = -55| UPPER LIMIT = 55) [uV]

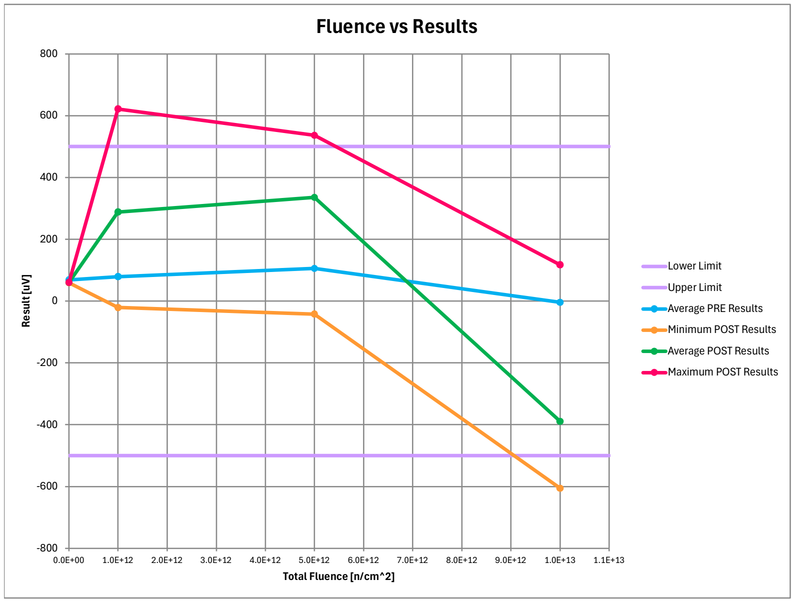
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	1.959	1.410	-0.549
unit 46	0.0E+00	CONTROL	-4.098	-6.059	-1.961
unit 33	1.0E+12	UNBIASED	8.412	4.965	-3.447
unit 34	1.0E+12	UNBIASED	4.387	2.325	-2.062
unit 35	1.0E+12	UNBIASED	19.090	40.967	21.877
unit 36	1.0E+12	UNBIASED	-0.427	5.017	5.444
unit 37	5.0E+12	UNBIASED	7.646	20.179	12.533
unit 38	5.0E+12	UNBIASED	6.433	-3.419	-9.852
unit 39	5.0E+12	UNBIASED	13.722	-3.102	-16.824
unit 40	5.0E+12	UNBIASED	15.287	3.083	-12.204
unit 41	1.0E+13	UNBIASED	1.988	-40.126	-42.114
unit 42	1.0E+13	UNBIASED	9.917	25.432	15.515
unit 43	1.0E+13	UNBIASED	-2.554	-1.018	1.536
unit 44	1.0E+13	UNBIASED	20.817	-18.050	-38.867



TEST STATISTICS [uV]

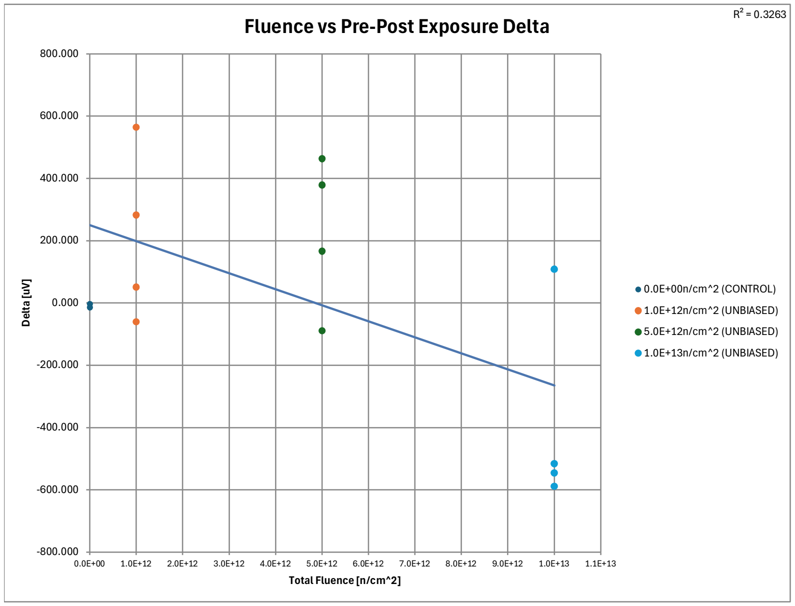
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	-4.098	-1.070	1.959	-	-6.059	-2.325	1.410	-	-1.961	-1.255	-0.549	-
1.0E+12	-0.427	7.866	19.090	8.310	2.325	13.319	40.967	18.475	-3.447	5.453	21.877	11.625
5.0E+12	6.433	10.772	15.287	4.385	-3.419	4.185	20.179	11.075	-16.824	-6.587	12.533	13.071
1.0E+13	-2.554	7.542	20.817	10.241	-40.126	-8.441	25.432	27.681	-42.114	-15.983	15.515	28.900

DEVICE TEST: voso_18P000_P0P000 [uV]



TEST RESULT (LOWER LIMIT = -500 | UPPER LIMIT = 500) [uV]

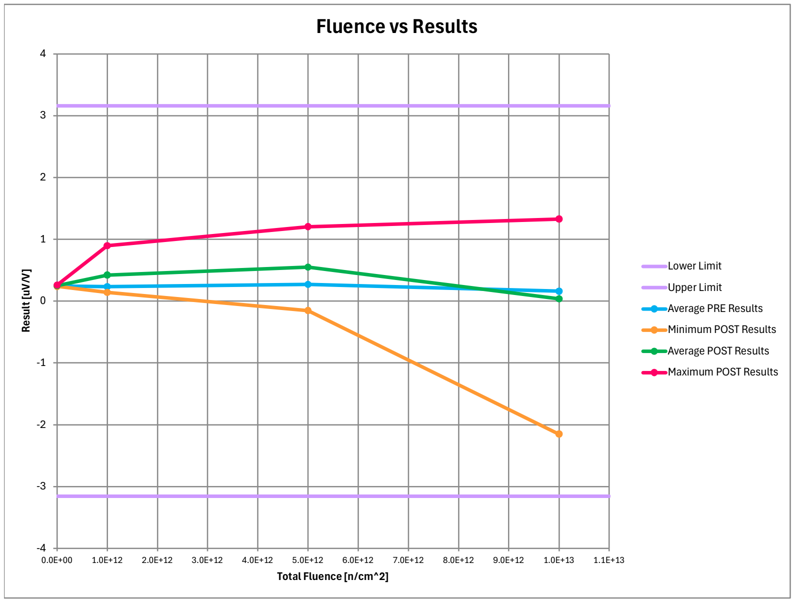
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	63.677	60.655	-3.022
unit 46	0.0E+00	CONTROL	73.648	59.425	-14.223
unit 33	1.0E+12	UNBIASED	39.405	-21.096	-60.501
unit 34	1.0E+12	UNBIASED	138.494	189.731	51.237
unit 35	1.0E+12	UNBIASED	81.328	364.153	282.825
unit 36	1.0E+12	UNBIASED	57.673	621.889	564.216
unit 37	5.0E+12	UNBIASED	73.242	536.758	463.516
unit 38	5.0E+12	UNBIASED	47.219	-41.669	-88.888
unit 39	5.0E+12	UNBIASED	124.738	503.615	378.877
unit 40	5.0E+12	UNBIASED	177.783	344.433	166.650
unit 41	1.0E+13	UNBIASED	7.507	-508.409	-515.916
unit 42	1.0E+13	UNBIASED	28.235	-560.366	-588.601
unit 43	1.0E+13	UNBIASED	8.968	117.475	108.507
unit 44	1.0E+13	UNBIASED	-60.001	-605.525	-545.524



TEST STATISTICS [uV]

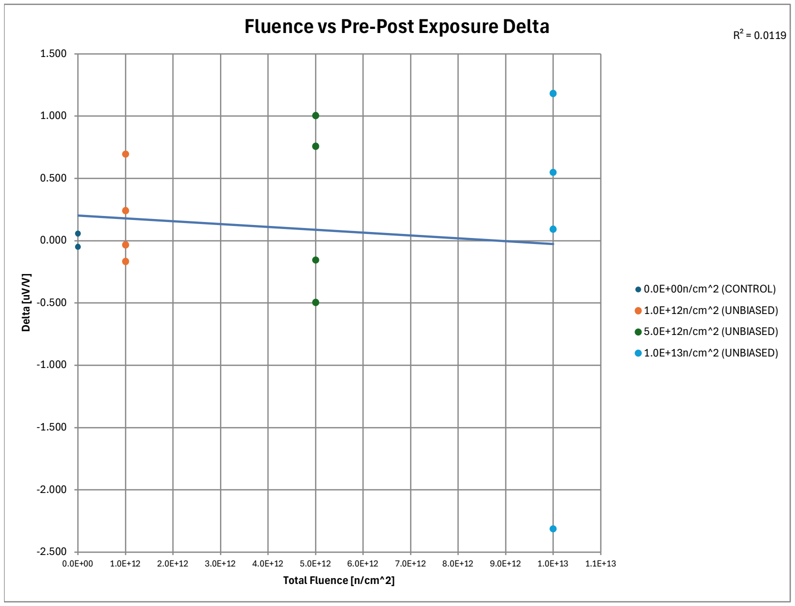
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	63.677	68.663	73.648	-	59.425	60.040	60.655	-	-14.223	-8.623	-3.022	-
1.0E+12	39.405	79.225	138.494	43.079	-21.096	288.669	621.889	272.321	-60.501	209.444	564.216	276.374
5.0E+12	47.219	105.746	177.783	57.827	-41.669	335.784	536.758	265.269	-88.888	230.039	463.516	246.574
1.0E+13	-60.001	-3.823	28.235	38.625	-605.525	-389.206	117.475	340.110	-588.601	-385.384	108.507	330.610

DEVICE TEST: PSRR_G1_36P000_P0P000 [uV/V]



TEST RESULT (LOWER LIMIT = -3.16| UPPER LIMIT = 3.16) [uV/V]

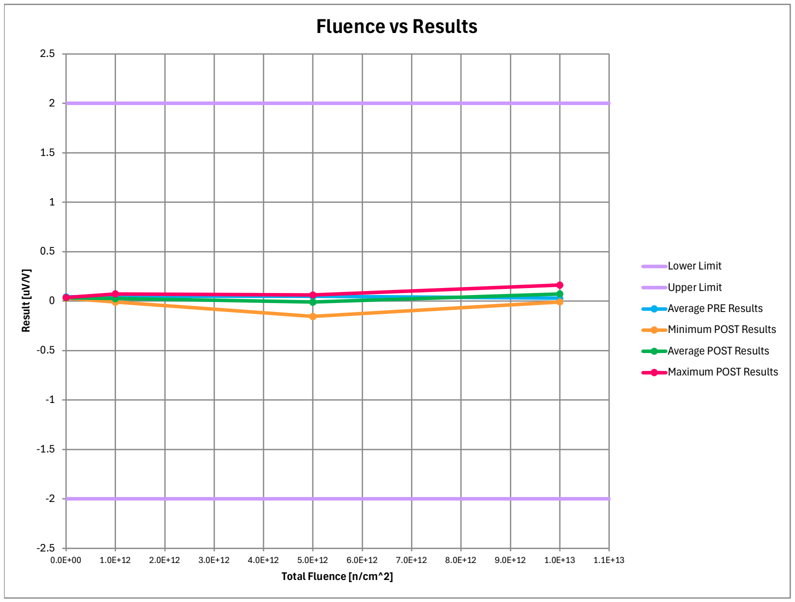
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	0.180	0.237	0.057
unit 46	0.0E+00	CONTROL	0.308	0.259	-0.049
unit 33	1.0E+12	UNBIASED	0.174	0.141	-0.033
unit 34	1.0E+12	UNBIASED	0.352	0.186	-0.166
unit 35	1.0E+12	UNBIASED	0.214	0.456	0.242
unit 36	1.0E+12	UNBIASED	0.202	0.898	0.696
unit 37	5.0E+12	UNBIASED	0.343	-0.153	-0.496
unit 38	5.0E+12	UNBIASED	0.436	0.281	-0.155
unit 39	5.0E+12	UNBIASED	0.104	0.862	0.758
unit 40	5.0E+12	UNBIASED	0.200	1.204	1.004
unit 41	1.0E+13	UNBIASED	0.162	-2.151	-2.313
unit 42	1.0E+13	UNBIASED	0.235	0.327	0.092
unit 43	1.0E+13	UNBIASED	0.146	1.328	1.182
unit 44	1.0E+13	UNBIASED	0.095	0.644	0.549



TEST STATISTICS [uV/V]

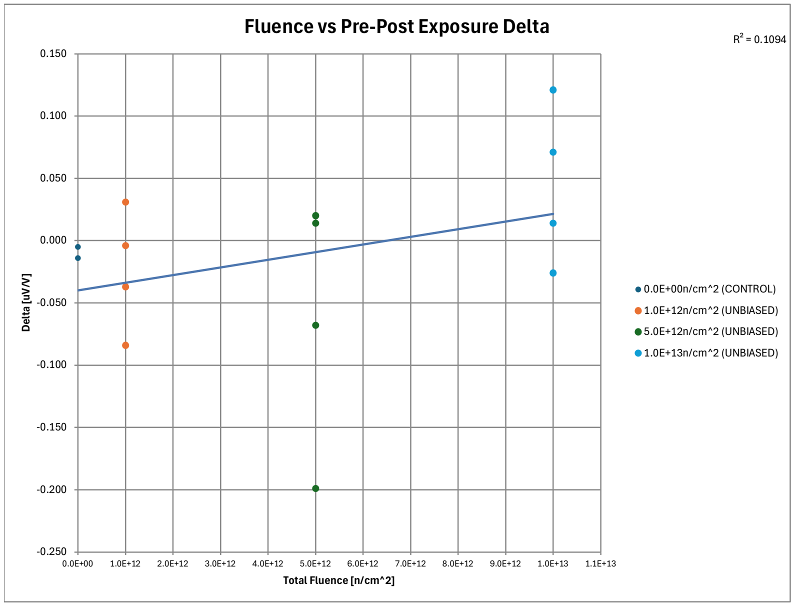
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	0.180	0.244	0.308	-	0.237	0.248	0.259	-	-0.049	0.004	0.057	-
1.0E+12	0.174	0.236	0.352	0.079	0.141	0.420	0.898	0.348	-0.166	0.185	0.696	0.381
5.0E+12	0.104	0.271	0.436	0.148	-0.153	0.549	1.204	0.603	-0.496	0.278	1.004	0.717
1.0E+13	0.095	0.160	0.235	0.058	-2.151	0.037	1.328	1.517	-2.313	-0.123	1.182	1.527

DEVICE TEST: PSRR_G10_36P000_P0P000 [uV/V]



TEST RESULT (LOWER LIMIT = -2| UPPER LIMIT = 2) [uV/V]

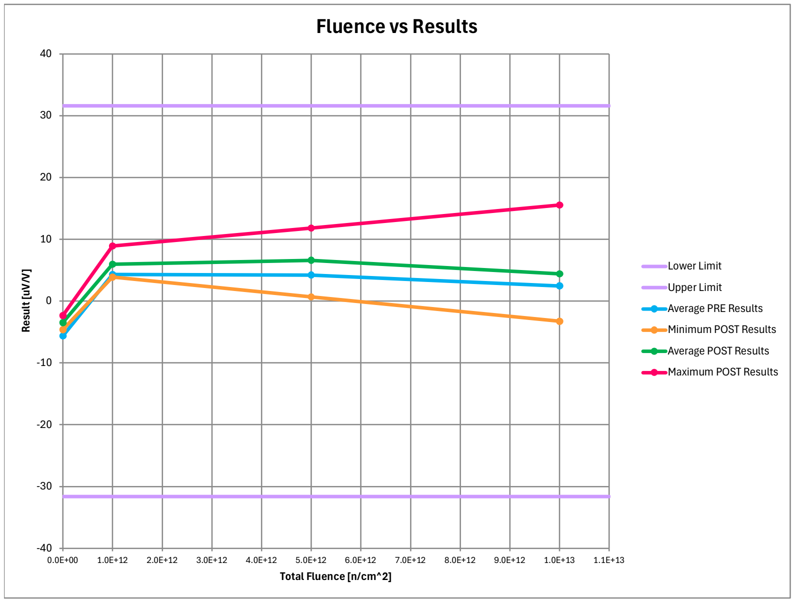
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	0.034	0.029	-0.005
unit 46	0.0E+00	CONTROL	0.051	0.037	-0.014
unit 33	1.0E+12	UNBIASED	0.040	0.003	-0.037
unit 34	1.0E+12	UNBIASED	0.074	-0.010	-0.084
unit 35	1.0E+12	UNBIASED	0.038	0.034	-0.004
unit 36	1.0E+12	UNBIASED	0.042	0.073	0.031
unit 37	5.0E+12	UNBIASED	0.044	0.064	0.020
unit 38	5.0E+12	UNBIASED	0.061	-0.007	-0.068
unit 39	5.0E+12	UNBIASED	0.043	-0.156	-0.199
unit 40	5.0E+12	UNBIASED	0.045	0.059	0.014
unit 41	1.0E+13	UNBIASED	0.031	0.045	0.014
unit 42	1.0E+13	UNBIASED	0.022	0.093	0.071
unit 43	1.0E+13	UNBIASED	0.019	-0.007	-0.026
unit 44	1.0E+13	UNBIASED	0.041	0.162	0.121



TEST STATISTICS [uV/V]

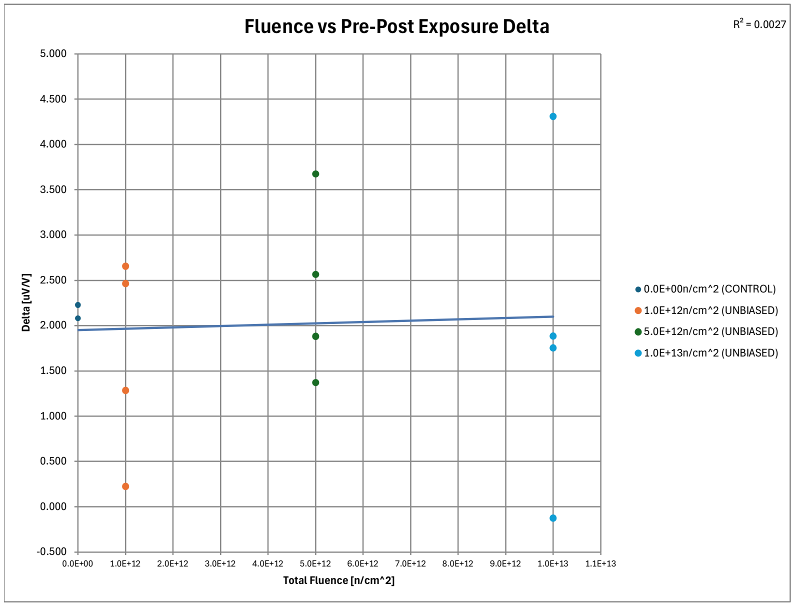
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	0.034	0.043	0.051	-	0.029	0.033	0.037	-	-0.014	-0.010	-0.005	-
1.0E+12	0.038	0.049	0.074	0.017	-0.010	0.025	0.073	0.037	-0.084	-0.024	0.031	0.049
5.0E+12	0.043	0.048	0.061	0.009	-0.156	-0.010	0.064	0.103	-0.199	-0.058	0.020	0.102
1.0E+13	0.019	0.028	0.041	0.010	-0.007	0.073	0.162	0.072	-0.026	0.045	0.121	0.064

DEVICE TEST: CMRR_G1_18P000_P0P000 [uV/V]



TEST RESULT (LOWER LIMIT = -31.62| UPPER LIMIT = 31.62) [uV/V]

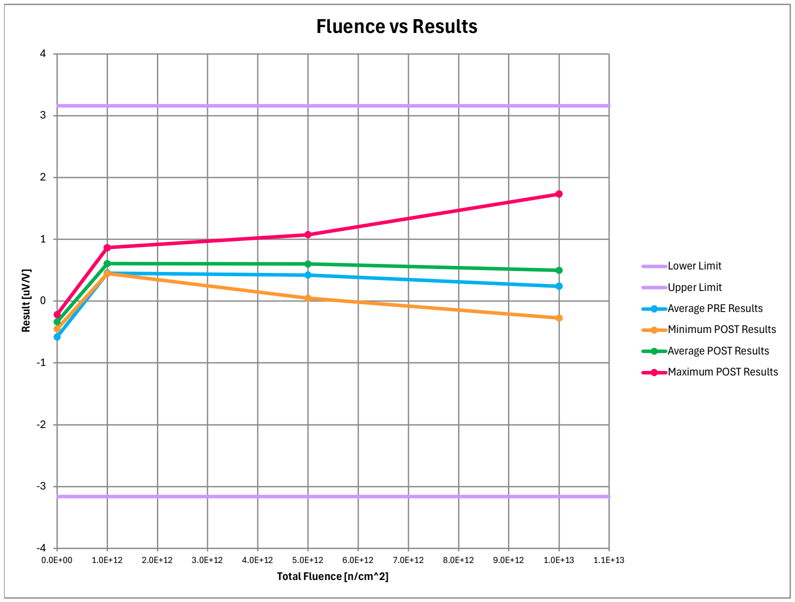
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	-6.688	-4.609	2.079
unit 46	0.0E+00	CONTROL	-4.569	-2.342	2.227
unit 33	1.0E+12	UNBIASED	5.448	6.732	1.284
unit 34	1.0E+12	UNBIASED	6.446	8.910	2.464
unit 35	1.0E+12	UNBIASED	1.698	4.353	2.655
unit 36	1.0E+12	UNBIASED	3.665	3.889	0.224
unit 37	5.0E+12	UNBIASED	10.464	11.835	1.371
unit 38	5.0E+12	UNBIASED	-1.866	0.699	2.565
unit 39	5.0E+12	UNBIASED	1.443	5.117	3.674
unit 40	5.0E+12	UNBIASED	6.890	8.771	1.881
unit 41	1.0E+13	UNBIASED	4.006	3.880	-0.126
unit 42	1.0E+13	UNBIASED	-0.196	1.557	1.753
unit 43	1.0E+13	UNBIASED	11.234	15.542	4.308
unit 44	1.0E+13	UNBIASED	-5.161	-3.277	1.884



TEST STATISTICS [uV/V]

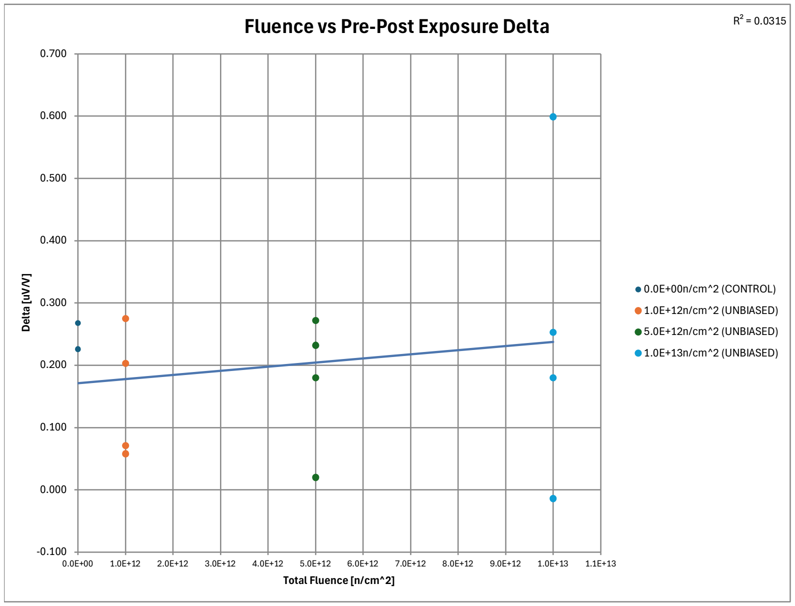
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	-6.688	-5.629	-4.569	-	-4.609	-3.476	-2.342	-	2.079	2.153	2.227	-
1.0E+12	1.698	4.314	6.446	2.089	3.889	5.971	8.910	2.322	0.224	1.657	2.655	1.131
5.0E+12	-1.866	4.233	10.464	5.504	0.699	6.606	11.835	4.801	1.371	2.373	3.674	0.996
1.0E+13	-5.161	2.471	11.234	6.940	-3.277	4.426	15.542	7.988	-0.126	1.955	4.308	1.818

DEVICE TEST: CMRR_G10_18P000_P0P000 [uV/V]



TEST RESULT (LOWER LIMIT = -3.162| UPPER LIMIT = 3.162) [uV/V]

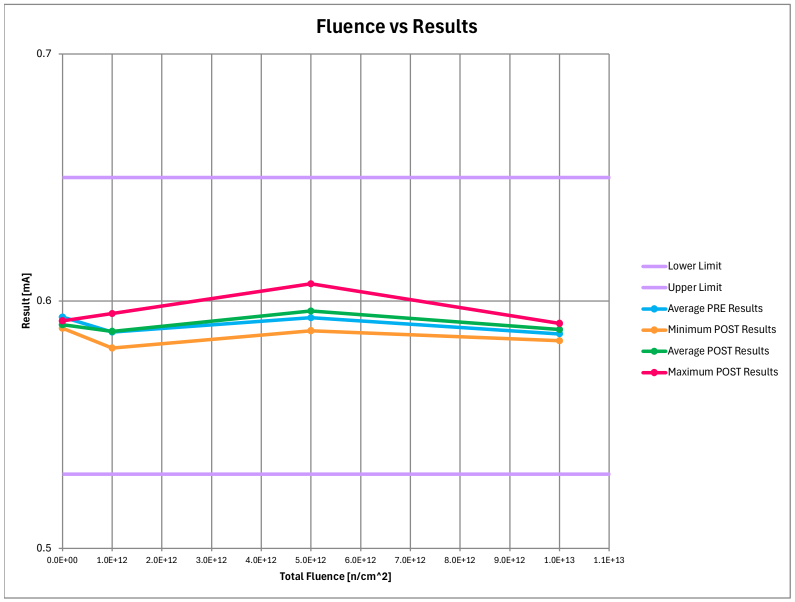
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	-0.676	-0.450	0.226
unit 46	0.0E+00	CONTROL	-0.486	-0.218	0.268
unit 33	1.0E+12	UNBIASED	0.593	0.664	0.071
unit 34	1.0E+12	UNBIASED	0.661	0.864	0.203
unit 35	1.0E+12	UNBIASED	0.177	0.452	0.275
unit 36	1.0E+12	UNBIASED	0.386	0.444	0.058
unit 37	5.0E+12	UNBIASED	1.055	1.075	0.020
unit 38	5.0E+12	UNBIASED	-0.186	0.046	0.232
unit 39	5.0E+12	UNBIASED	0.128	0.308	0.180
unit 40	5.0E+12	UNBIASED	0.693	0.965	0.272
unit 41	1.0E+13	UNBIASED	0.429	0.609	0.180
unit 42	1.0E+13	UNBIASED	-0.068	-0.082	-0.014
unit 43	1.0E+13	UNBIASED	1.134	1.733	0.599
unit 44	1.0E+13	UNBIASED	-0.526	-0.273	0.253



TEST STATISTICS [uV/V]

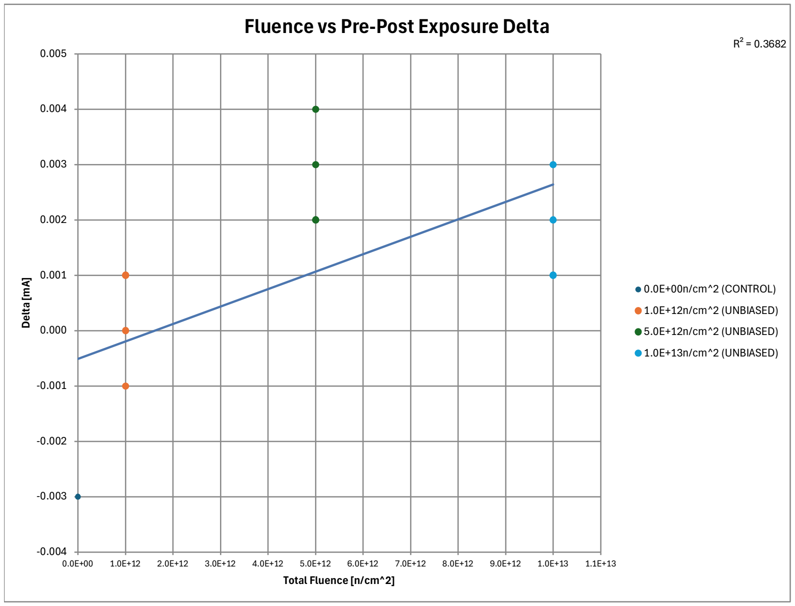
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	-0.676	-0.581	-0.486	-	-0.450	-0.334	-0.218	-	0.226	0.247	0.268	-
1.0E+12	0.177	0.454	0.661	0.219	0.444	0.606	0.864	0.200	0.058	0.152	0.275	0.105
5.0E+12	-0.186	0.423	1.055	0.557	0.046	0.599	1.075	0.500	0.020	0.176	0.272	0.111
1.0E+13	-0.526	0.242	1.134	0.711	-0.273	0.497	1.733	0.907	-0.014	0.255	0.599	0.256

DEVICE TEST: Icc_G1_last_18P000_P0P000 [mA]



TEST RESULT (LOWER LIMIT = 0.53| UPPER LIMIT = 0.65) [mA]

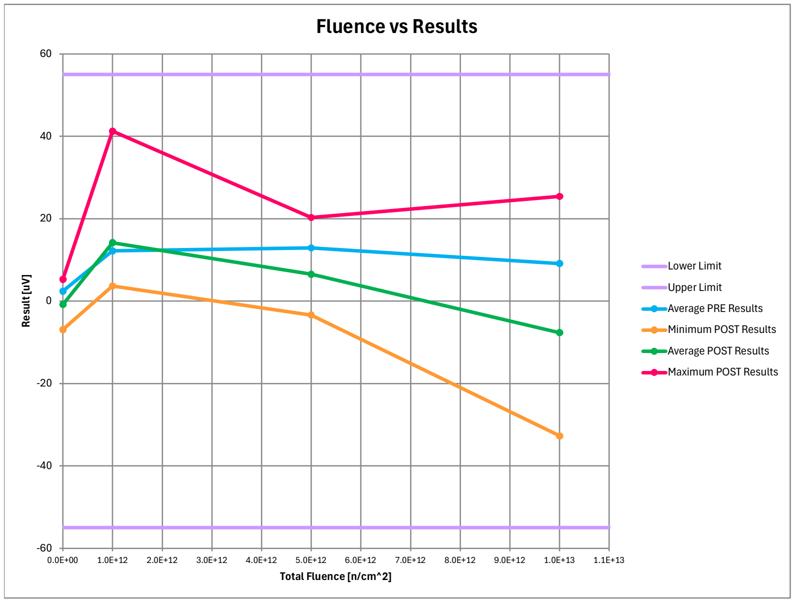
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	0.595	0.592	-0.003
unit 46	0.0E+00	CONTROL	0.592	0.589	-0.003
unit 33	1.0E+12	UNBIASED	0.582	0.581	-0.001
unit 34	1.0E+12	UNBIASED	0.589	0.590	0.001
unit 35	1.0E+12	UNBIASED	0.585	0.585	0.000
unit 36	1.0E+12	UNBIASED	0.594	0.595	0.001
unit 37	5.0E+12	UNBIASED	0.594	0.596	0.002
unit 38	5.0E+12	UNBIASED	0.604	0.607	0.003
unit 39	5.0E+12	UNBIASED	0.584	0.588	0.004
unit 40	5.0E+12	UNBIASED	0.591	0.593	0.002
unit 41	1.0E+13	UNBIASED	0.590	0.591	0.001
unit 42	1.0E+13	UNBIASED	0.588	0.591	0.003
unit 43	1.0E+13	UNBIASED	0.583	0.584	0.001
unit 44	1.0E+13	UNBIASED	0.586	0.588	0.002



TEST STATISTICS [mA]

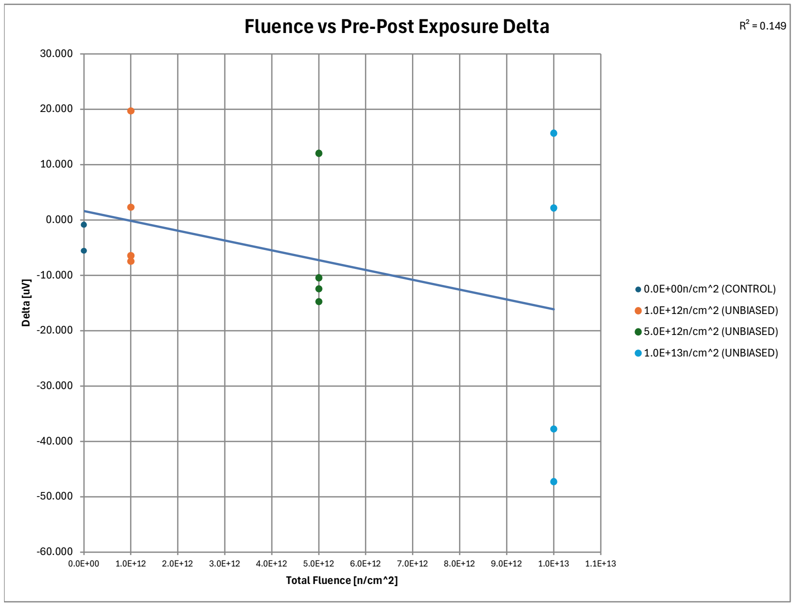
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	0.592	0.594	0.595	-	0.589	0.591	0.592	-	-0.003	-0.003	-0.003	-
1.0E+12	0.582	0.588	0.594	0.005	0.581	0.588	0.595	0.006	-0.001	0.000	0.001	0.001
5.0E+12	0.584	0.593	0.604	0.008	0.588	0.596	0.607	0.008	0.002	0.003	0.004	0.001
1.0E+13	0.583	0.587	0.590	0.003	0.584	0.589	0.591	0.003	0.001	0.002	0.003	0.001

DEVICE TEST: vosi_last_18P000_P0P000 [uV]



TEST RESULT (LOWER LIMIT = -55| UPPER LIMIT = 55) [uV]

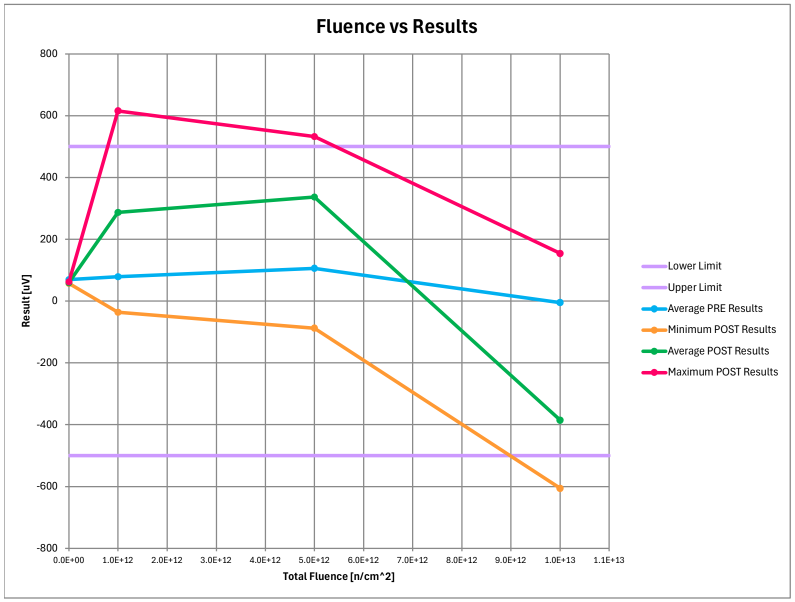
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	6.134	5.272	-0.862
unit 46	0.0E+00	CONTROL	-1.321	-6.905	-5.584
unit 33	1.0E+12	UNBIASED	13.310	6.843	-6.467
unit 34	1.0E+12	UNBIASED	11.159	3.673	-7.486
unit 35	1.0E+12	UNBIASED	21.538	41.232	19.694
unit 36	1.0E+12	UNBIASED	2.716	4.990	2.274
unit 37	5.0E+12	UNBIASED	8.310	20.329	12.019
unit 38	5.0E+12	UNBIASED	9.076	-3.361	-12.437
unit 39	5.0E+12	UNBIASED	17.031	6.568	-10.463
unit 40	5.0E+12	UNBIASED	17.227	2.462	-14.765
unit 41	1.0E+13	UNBIASED	5.063	-32.718	-37.781
unit 42	1.0E+13	UNBIASED	9.788	25.453	15.665
unit 43	1.0E+13	UNBIASED	-3.226	-1.067	2.159
unit 44	1.0E+13	UNBIASED	25.007	-22.280	-47.287



TEST STATISTICS [uV]

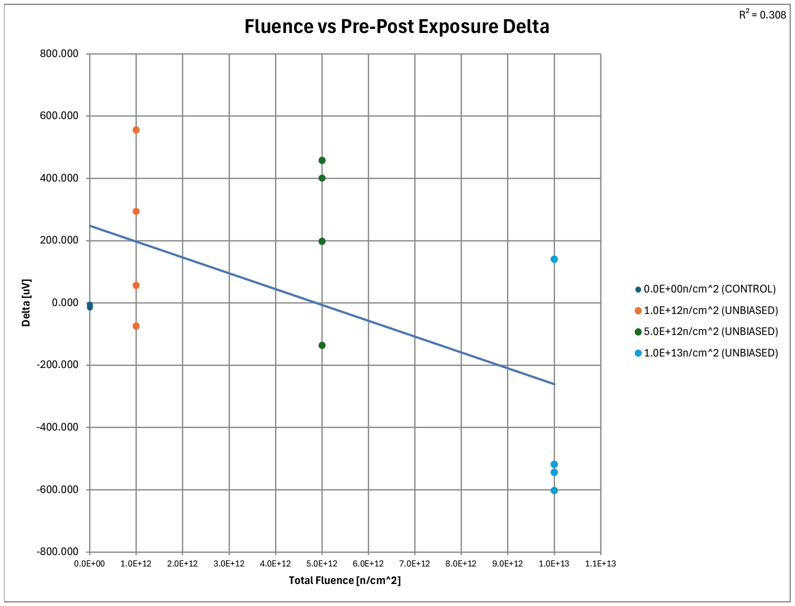
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	-1.321	2.407	6.134	-	-6.905	-0.817	5.272	-	-5.584	-3.223	-0.862	-
1.0E+12	2.716	12.181	21.538	7.734	3.673	14.185	41.232	18.078	-7.486	2.004	19.694	12.581
5.0E+12	8.310	12.911	17.227	4.881	-3.361	6.500	20.329	10.080	-14.765	-6.412	12.019	12.412
1.0E+13	-3.226	9.158	25.007	11.856	-32.718	-7.653	25.453	25.701	-47.287	-16.811	15.665	30.458

DEVICE TEST: voso_last_18P000_P0P000 [uV]



TEST RESULT (LOWER LIMIT = -500 | UPPER LIMIT = 500) [uV]

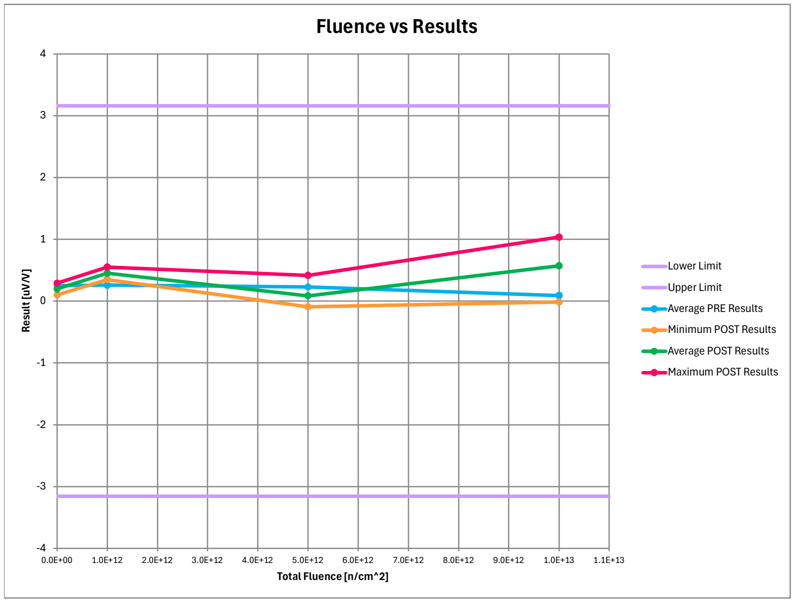
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	62.425	56.941	-5.484
unit 46	0.0E+00	CONTROL	76.994	62.538	-14.456
unit 33	1.0E+12	UNBIASED	38.452	-35.671	-74.123
unit 34	1.0E+12	UNBIASED	133.848	190.535	56.687
unit 35	1.0E+12	UNBIASED	83.303	377.884	294.581
unit 36	1.0E+12	UNBIASED	59.816	615.598	555.782
unit 37	5.0E+12	UNBIASED	74.421	532.837	458.416
unit 38	5.0E+12	UNBIASED	48.749	-87.403	-136.152
unit 39	5.0E+12	UNBIASED	123.285	524.599	401.314
unit 40	5.0E+12	UNBIASED	178.922	377.269	198.347
unit 41	1.0E+13	UNBIASED	3.805	-513.981	-517.786
unit 42	1.0E+13	UNBIASED	26.414	-575.574	-601.988
unit 43	1.0E+13	UNBIASED	13.512	154.252	140.740
unit 44	1.0E+13	UNBIASED	-62.088	-605.782	-543.694



TEST STATISTICS [uV]

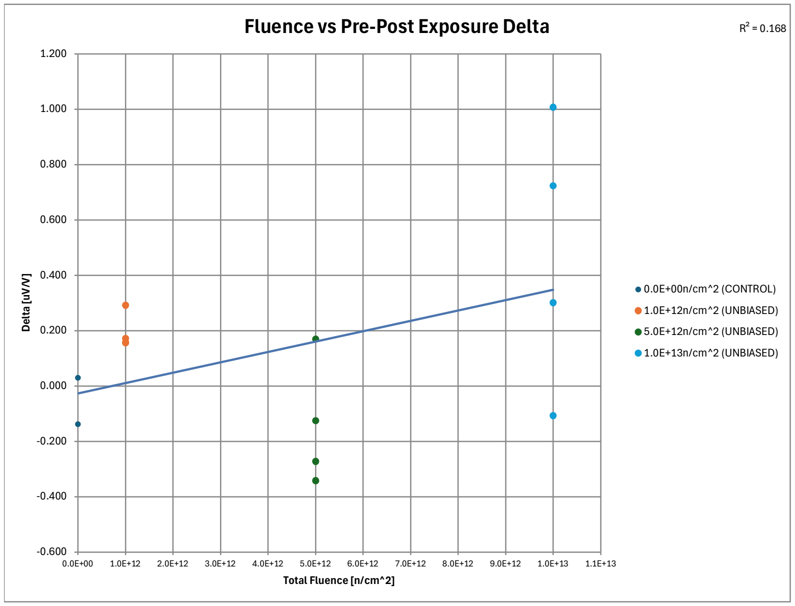
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	62.425	69.710	76.994	-	56.941	59.740	62.538	-	-14.456	-9.970	-5.484	-
1.0E+12	38.452	78.855	133.848	40.983	-35.671	287.087	615.598	276.682	-74.123	208.232	555.782	277.451
5.0E+12	48.749	106.344	178.922	57.419	-87.403	336.826	532.837	291.710	-136.152	230.481	458.416	268.695
1.0E+13	-62.088	-4.589	26.414	39.435	-605.782	-385.271	154.252	361.705	-601.988	-380.682	140.740	349.394

DEVICE TEST: PSRR_last_G1_36P000_P0P000 [uV/V]



TEST RESULT (LOWER LIMIT = -3.16| UPPER LIMIT = 3.16) [uV/V]

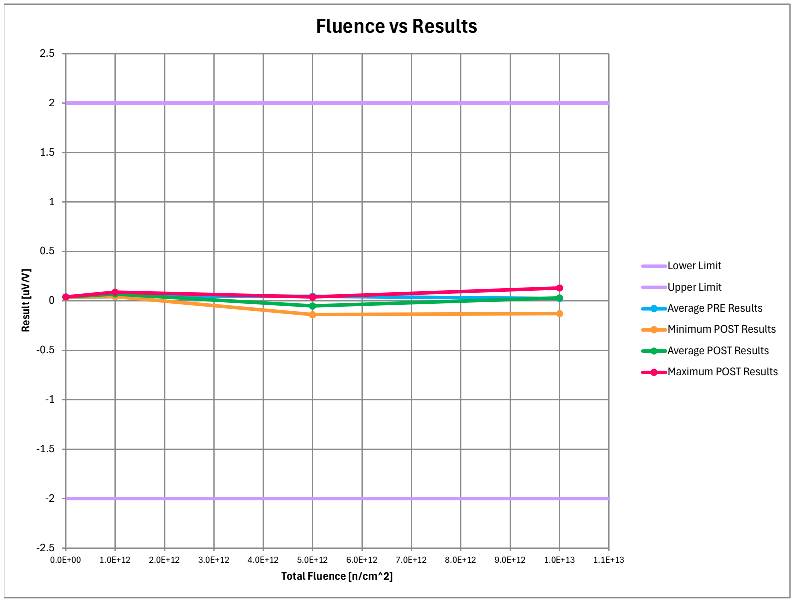
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	0.239	0.101	-0.138
unit 46	0.0E+00	CONTROL	0.261	0.291	0.030
unit 33	1.0E+12	UNBIASED	0.194	0.350	0.156
unit 34	1.0E+12	UNBIASED	0.328	0.500	0.172
unit 35	1.0E+12	UNBIASED	0.260	0.552	0.292
unit 36	1.0E+12	UNBIASED	0.248	0.406	0.158
unit 37	5.0E+12	UNBIASED	0.252	-0.090	-0.342
unit 38	5.0E+12	UNBIASED	0.312	0.040	-0.272
unit 39	5.0E+12	UNBIASED	0.101	-0.024	-0.125
unit 40	5.0E+12	UNBIASED	0.247	0.417	0.170
unit 41	1.0E+13	UNBIASED	0.114	0.415	0.301
unit 42	1.0E+13	UNBIASED	0.131	0.855	0.724
unit 43	1.0E+13	UNBIASED	0.028	1.035	1.007
unit 44	1.0E+13	UNBIASED	0.091	-0.016	-0.107



TEST STATISTICS [uV/V]

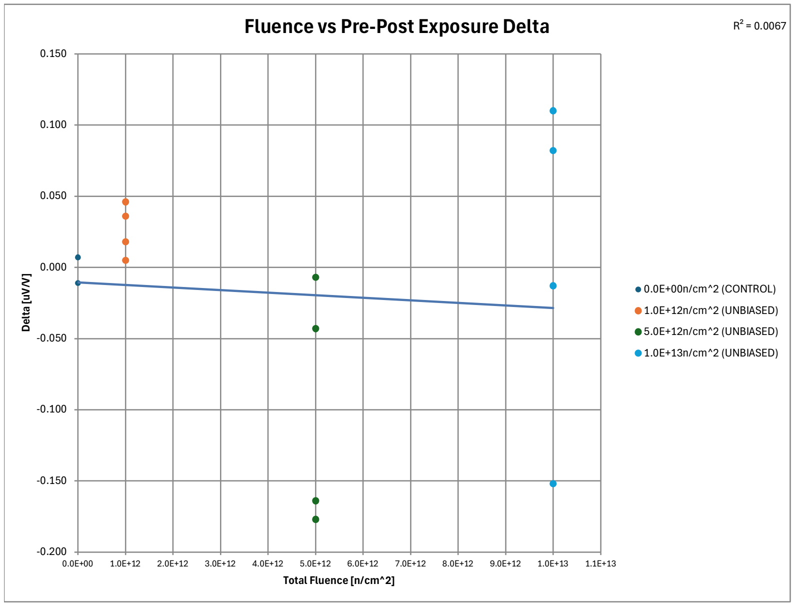
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	0.239	0.250	0.261	-	0.101	0.196	0.291	-	-0.138	-0.054	0.030	-
1.0E+12	0.194	0.258	0.328	0.055	0.350	0.452	0.552	0.091	0.156	0.195	0.292	0.065
5.0E+12	0.101	0.228	0.312	0.090	-0.090	0.086	0.417	0.227	-0.342	-0.142	0.170	0.227
1.0E+13	0.028	0.091	0.131	0.045	-0.016	0.572	1.035	0.471	-0.107	0.481	1.007	0.488

DEVICE TEST: PSRR_last_G10_36P000_P0P000 [uV/V]



TEST RESULT (LOWER LIMIT = -2| UPPER LIMIT = 2) [uV/V]

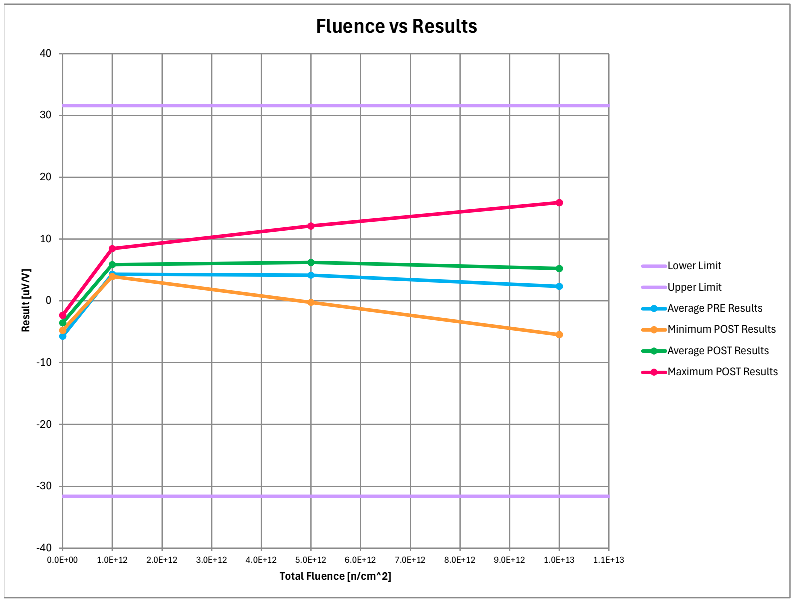
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	0.034	0.041	0.007
unit 46	0.0E+00	CONTROL	0.049	0.038	-0.011
unit 33	1.0E+12	UNBIASED	0.026	0.044	0.018
unit 34	1.0E+12	UNBIASED	0.060	0.065	0.005
unit 35	1.0E+12	UNBIASED	0.042	0.078	0.036
unit 36	1.0E+12	UNBIASED	0.044	0.090	0.046
unit 37	5.0E+12	UNBIASED	0.045	0.002	-0.043
unit 38	5.0E+12	UNBIASED	0.057	-0.107	-0.164
unit 39	5.0E+12	UNBIASED	0.037	-0.140	-0.177
unit 40	5.0E+12	UNBIASED	0.045	0.038	-0.007
unit 41	1.0E+13	UNBIASED	0.024	-0.128	-0.152
unit 42	1.0E+13	UNBIASED	0.015	0.002	-0.013
unit 43	1.0E+13	UNBIASED	0.020	0.130	0.110
unit 44	1.0E+13	UNBIASED	0.039	0.121	0.082



TEST STATISTICS [uV/V]

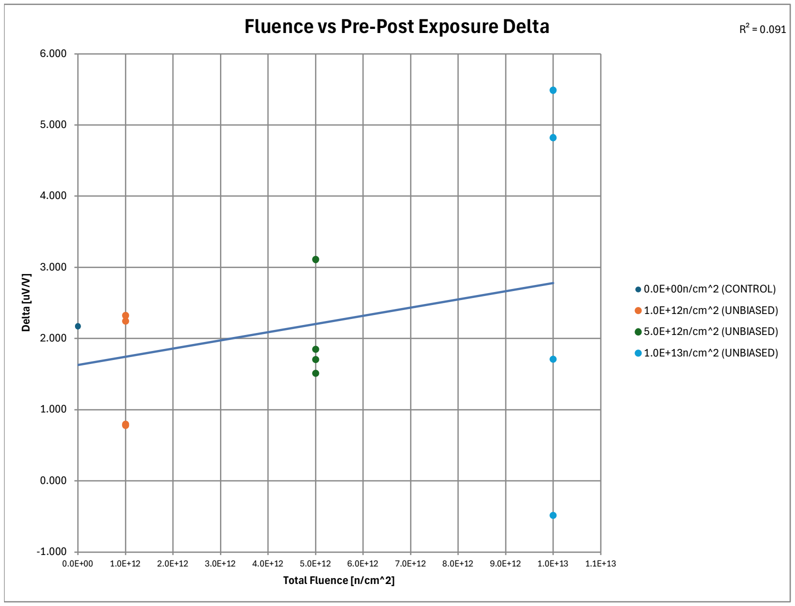
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	0.034	0.042	0.049	-	0.038	0.040	0.041	-	-0.011	-0.002	0.007	-
1.0E+12	0.026	0.043	0.060	0.014	0.044	0.069	0.090	0.020	0.005	0.026	0.046	0.018
5.0E+12	0.037	0.046	0.057	0.008	-0.140	-0.052	0.038	0.085	-0.177	-0.098	-0.007	0.085
1.0E+13	0.015	0.025	0.039	0.010	-0.128	0.031	0.130	0.121	-0.152	0.007	0.110	0.118

DEVICE TEST: CMRR_last_G1_18P000_P0P000 [uV/V]



TEST RESULT (LOWER LIMIT = -31.62 | UPPER LIMIT = 31.62) [uV/V]

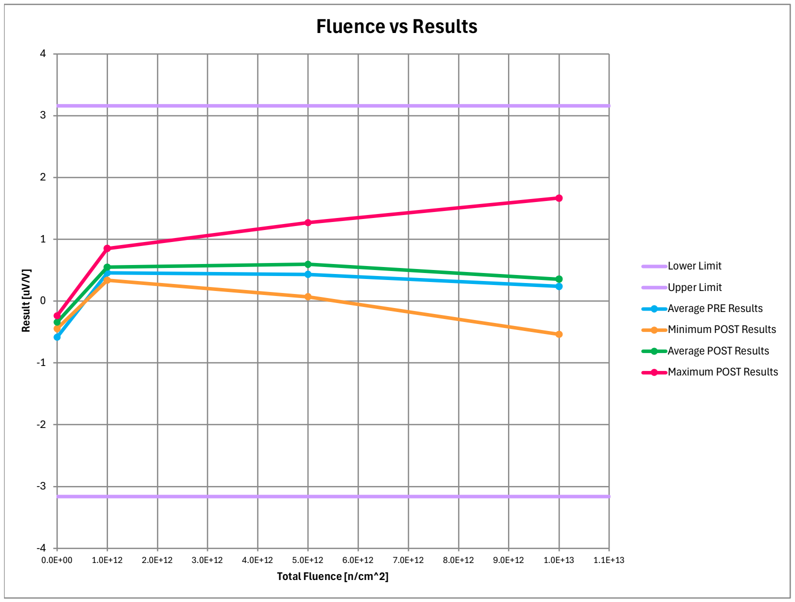
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	-6.937	-4.771	2.166
unit 46	0.0E+00	CONTROL	-4.509	-2.334	2.175
unit 33	1.0E+12	UNBIASED	5.576	6.372	0.796
unit 34	1.0E+12	UNBIASED	6.229	8.472	2.243
unit 35	1.0E+12	UNBIASED	1.612	3.936	2.324
unit 36	1.0E+12	UNBIASED	3.882	4.662	0.780
unit 37	5.0E+12	UNBIASED	10.271	12.119	1.848
unit 38	5.0E+12	UNBIASED	-1.937	-0.233	1.704
unit 39	5.0E+12	UNBIASED	1.388	4.498	3.110
unit 40	5.0E+12	UNBIASED	6.909	8.420	1.511
unit 41	1.0E+13	UNBIASED	4.030	5.740	1.710
unit 42	1.0E+13	UNBIASED	-0.745	4.743	5.488
unit 43	1.0E+13	UNBIASED	11.065	15.886	4.821
unit 44	1.0E+13	UNBIASED	-4.972	-5.457	-0.485



TEST STATISTICS [uV/V]

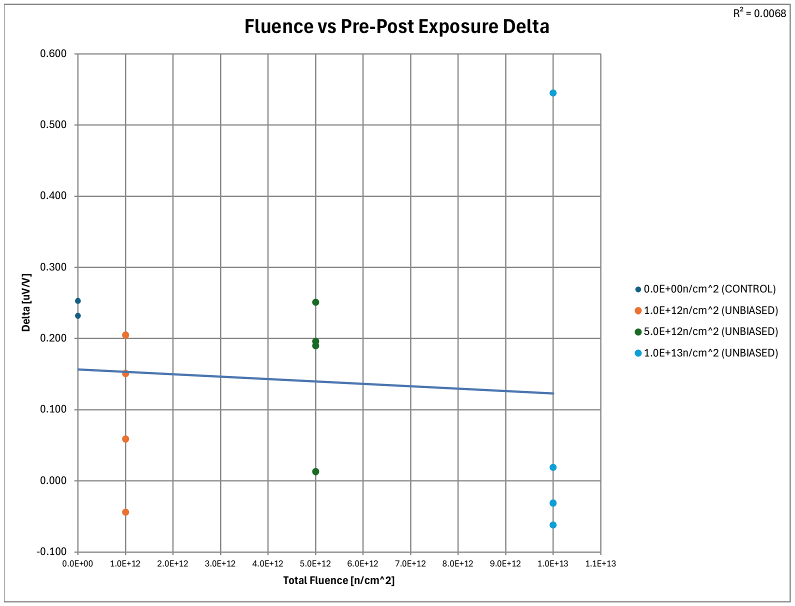
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	-6.937	-5.723	-4.509	-	-4.771	-3.553	-2.334	-	2.166	2.171	2.175	-
1.0E+12	1.612	4.325	6.229	2.061	3.936	5.861	8.472	2.018	0.780	1.536	2.324	0.864
5.0E+12	-1.937	4.158	10.271	5.470	-0.233	6.201	12.119	5.299	1.511	2.043	3.110	0.724
1.0E+13	-4.972	2.345	11.065	6.879	-5.457	5.228	15.886	8.723	-0.485	2.884	5.488	2.785

DEVICE TEST: CMRR_last_G10_18P000_P0P000 [uV/V]



TEST RESULT (LOWER LIMIT = -3.162| UPPER LIMIT = 3.162) [uV/V]

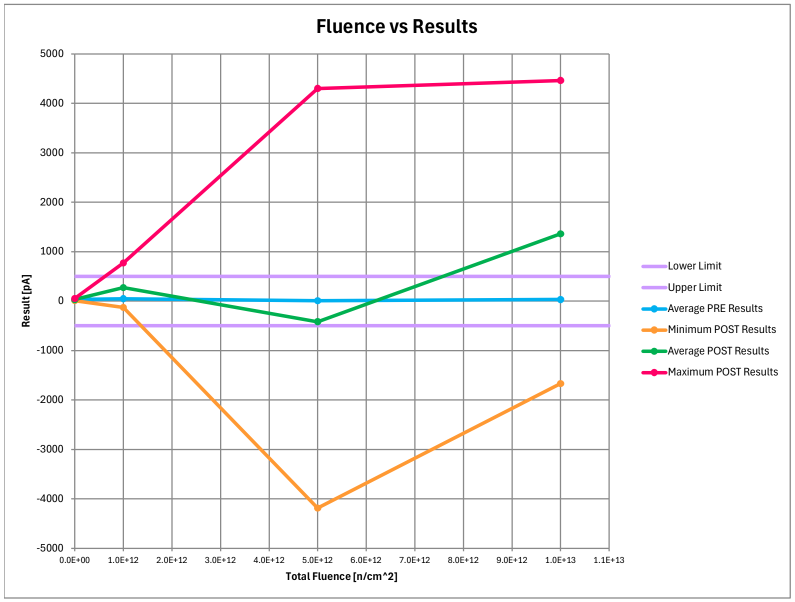
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	-0.700	-0.447	0.253
unit 46	0.0E+00	CONTROL	-0.468	-0.236	0.232
unit 33	1.0E+12	UNBIASED	0.598	0.657	0.059
unit 34	1.0E+12	UNBIASED	0.647	0.852	0.205
unit 35	1.0E+12	UNBIASED	0.187	0.338	0.151
unit 36	1.0E+12	UNBIASED	0.392	0.348	-0.044
unit 37	5.0E+12	UNBIASED	1.073	1.269	0.196
unit 38	5.0E+12	UNBIASED	-0.179	0.072	0.251
unit 39	5.0E+12	UNBIASED	0.126	0.316	0.190
unit 40	5.0E+12	UNBIASED	0.709	0.722	0.013
unit 41	1.0E+13	UNBIASED	0.408	0.427	0.019
unit 42	1.0E+13	UNBIASED	-0.073	-0.135	-0.062
unit 43	1.0E+13	UNBIASED	1.121	1.666	0.545
unit 44	1.0E+13	UNBIASED	-0.507	-0.538	-0.031



TEST STATISTICS [uV/V]

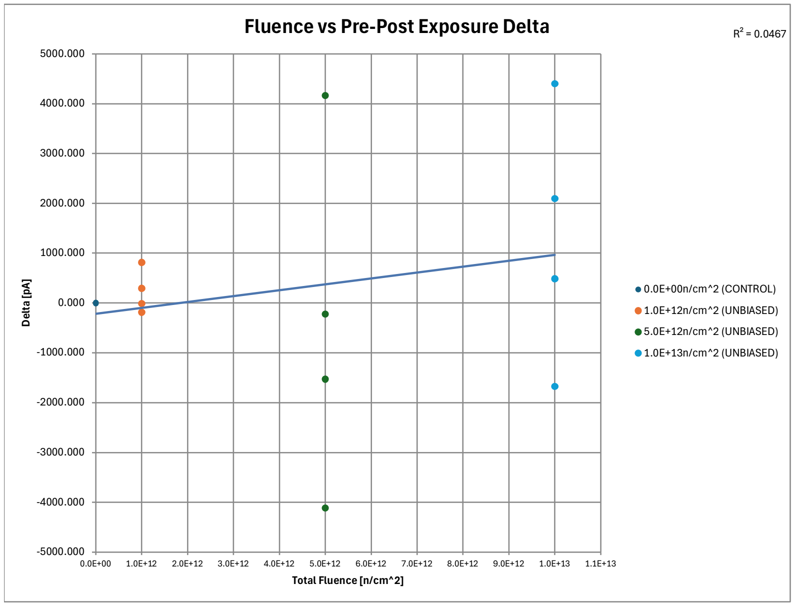
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	-0.700	-0.584	-0.468	-	-0.447	-0.342	-0.236	-	0.232	0.243	0.253	-
1.0E+12	0.187	0.456	0.647	0.211	0.338	0.549	0.852	0.251	-0.044	0.093	0.205	0.109
5.0E+12	-0.179	0.432	1.073	0.564	0.072	0.595	1.269	0.523	0.013	0.163	0.251	0.103
1.0E+13	-0.507	0.237	1.121	0.698	-0.538	0.355	1.666	0.959	-0.062	0.118	0.545	0.287

DEVICE TEST: IBN_last_18P000_P0P000 [pA]



TEST RESULT (LOWER LIMIT = -500 | UPPER LIMIT = 500) [pA]

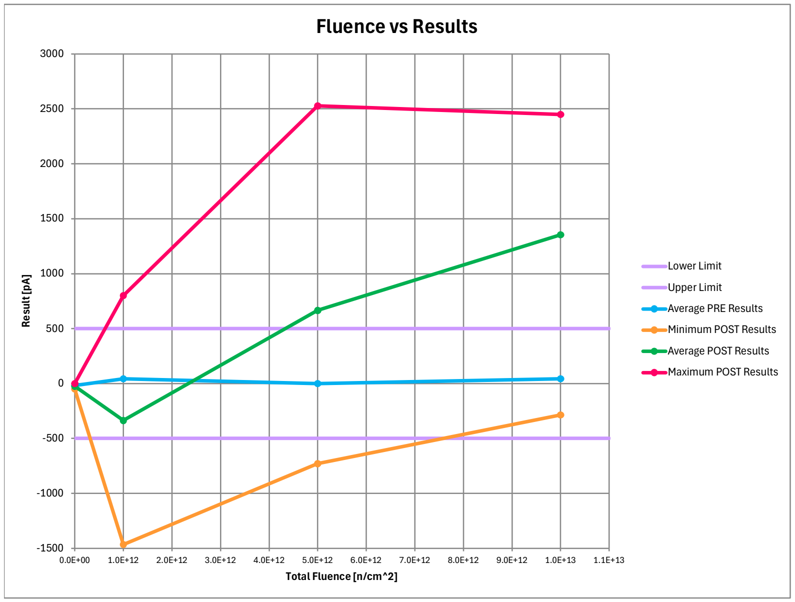
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	59.863	52.560	-7.303
unit 46	0.0E+00	CONTROL	5.004	10.379	5.375
unit 33	1.0E+12	UNBIASED	57.197	-129.251	-186.448
unit 34	1.0E+12	UNBIASED	97.006	85.954	-11.052
unit 35	1.0E+12	UNBIASED	-42.974	770.913	813.887
unit 36	1.0E+12	UNBIASED	75.812	368.571	292.759
unit 37	5.0E+12	UNBIASED	55.774	-166.708	-222.482
unit 38	5.0E+12	UNBIASED	135.848	4299.387	4163.539
unit 39	5.0E+12	UNBIASED	-84.974	-1612.422	-1527.448
unit 40	5.0E+12	UNBIASED	-70.728	-4186.446	-4115.718
unit 41	1.0E+13	UNBIASED	-14.183	472.611	486.794
unit 42	1.0E+13	UNBIASED	3.431	-1668.334	-1671.765
unit 43	1.0E+13	UNBIASED	59.331	4463.589	4404.258
unit 44	1.0E+13	UNBIASED	75.971	2173.431	2097.460



TEST STATISTICS [pA]

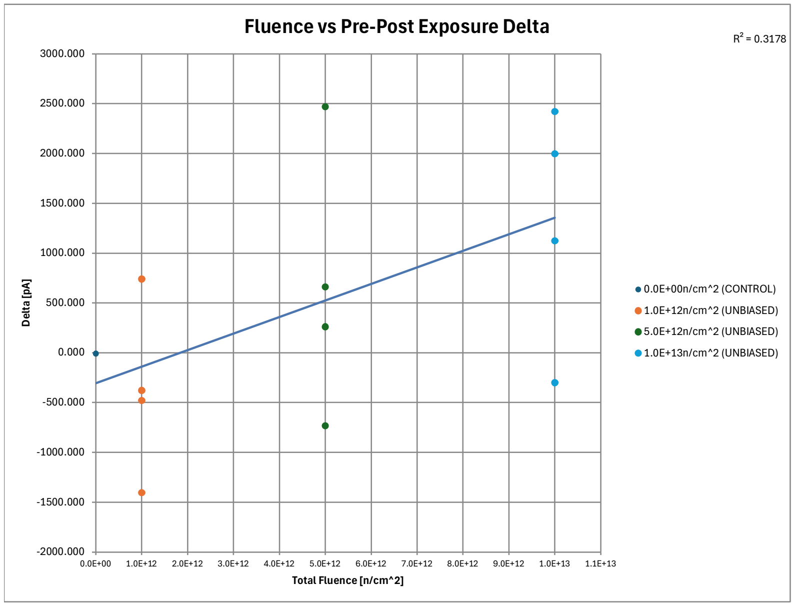
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	5.004	32.434	59.863	-	10.379	31.470	52.560	-	-7.303	-0.964	5.375	-
1.0E+12	-42.974	46.760	97.006	61.994	-129.251	274.047	770.913	388.947	-186.448	227.287	813.887	438.318
5.0E+12	-84.974	8.980	135.848	105.619	-4186.446	-416.547	4299.387	3556.436	-4115.718	-425.527	4163.539	3460.852
1.0E+13	-14.183	31.138	75.971	43.307	-1668.334	1360.324	4463.589	2598.217	-1671.765	1329.187	4404.258	2566.557

DEVICE TEST: IBP_last_18P000_P0P000 [pA]



TEST RESULT (LOWER LIMIT = -500 | UPPER LIMIT = 500) [pA]

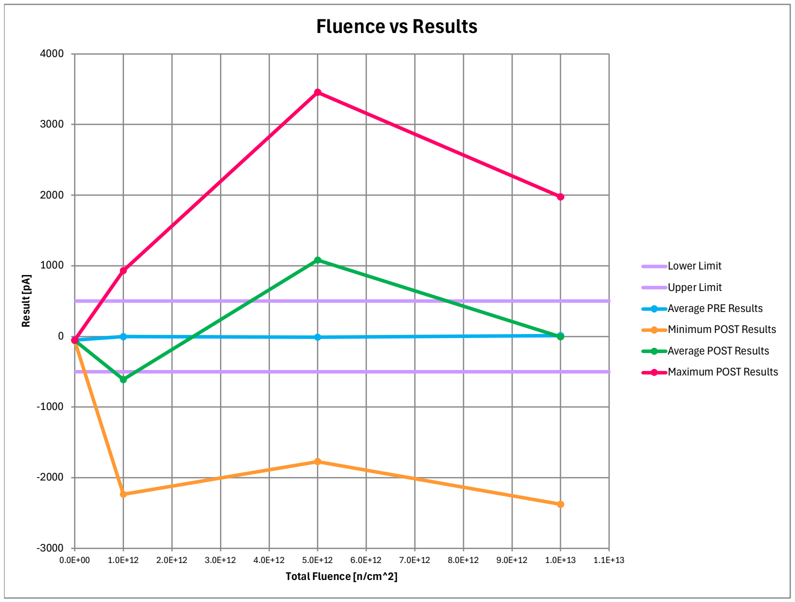
Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	6.053	-0.520	-6.573
unit 46	0.0E+00	CONTROL	-40.818	-49.189	-8.371
unit 33	1.0E+12	UNBIASED	61.918	801.392	739.474
unit 34	1.0E+12	UNBIASED	66.069	-312.278	-378.347
unit 35	1.0E+12	UNBIASED	-61.226	-1464.744	-1403.518
unit 36	1.0E+12	UNBIASED	106.368	-372.031	-478.399
unit 37	5.0E+12	UNBIASED	43.758	704.400	660.642
unit 38	5.0E+12	UNBIASED	58.113	2527.147	2469.034
unit 39	5.0E+12	UNBIASED	-104.811	156.572	261.383
unit 40	5.0E+12	UNBIASED	3.286	-729.341	-732.627
unit 41	1.0E+13	UNBIASED	26.808	2448.341	2421.533
unit 42	1.0E+13	UNBIASED	14.528	-285.778	-300.306
unit 43	1.0E+13	UNBIASED	87.516	2085.489	1997.973
unit 44	1.0E+13	UNBIASED	47.217	1171.345	1124.128



TEST STATISTICS [pA]

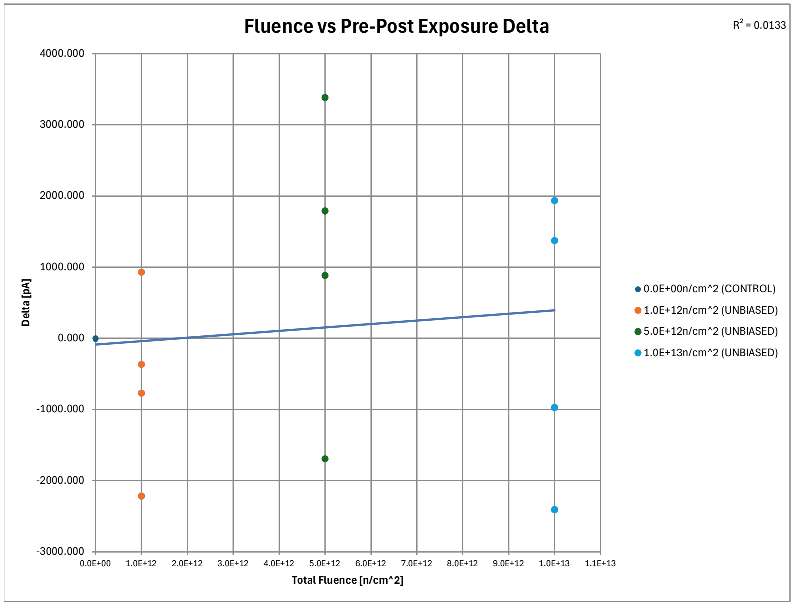
Fluence [n/cm^2]	Pre Exposure Min	Pre Exposure Avg	Pre Exposure Max	Pre Exposure Std Dev	Post Exposure Min	Post Exposure Avg	Post Exposure Max	Post Exposure Std Dev	Min Delta	Avg Delta	Max Delta	Std Dev Delta
0.0E+00	-40.818	-17.383	6.053	-	-49.189	-24.855	-0.520	-	-8.371	-7.472	-6.573	-
1.0E+12	-61.226	43.282	106.368	72.499	-1464.744	-336.915	801.392	925.487	-1403.518	-380.198	739.474	877.591
5.0E+12	-104.811	0.087	58.113	73.684	-729.341	664.695	2527.147	1374.994	-732.627	664.608	2469.034	1338.012
1.0E+13	14.528	44.017	87.516	31.980	-285.778	1354.849	2448.341	1218.591	-300.306	1310.832	2421.533	1202.282

DEVICE TEST: IOS_last_18P000_P0P000 [pA]



TEST RESULT (LOWER LIMIT = -500 | UPPER LIMIT = 500) [pA]

Serial #	Fluence [n/cm^2]	Exposure Conditions	Pre Result	Post Result	Delta
unit 45	0.0E+00	CONTROL	-53.810	-53.079	0.731
unit 46	0.0E+00	CONTROL	-45.821	-59.567	-13.746
unit 33	1.0E+12	UNBIASED	4.721	930.643	925.922
unit 34	1.0E+12	UNBIASED	-30.937	-398.231	-367.294
unit 35	1.0E+12	UNBIASED	-18.252	-2235.657	-2217.405
unit 36	1.0E+12	UNBIASED	30.556	-740.603	-771.159
unit 37	5.0E+12	UNBIASED	-12.016	871.108	883.124
unit 38	5.0E+12	UNBIASED	-77.735	-1772.240	-1694.505
unit 39	5.0E+12	UNBIASED	-19.837	1768.994	1788.831
unit 40	5.0E+12	UNBIASED	74.014	3457.105	3383.091
unit 41	1.0E+13	UNBIASED	40.991	1975.731	1934.740
unit 42	1.0E+13	UNBIASED	11.097	1382.555	1371.458
unit 43	1.0E+13	UNBIASED	28.184	-2378.100	-2406.284
unit 44	1.0E+13	UNBIASED	-28.754	-1002.086	-973.332



TEST STATISTICS [pA]

Fluence [n/cm^2]	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
0.0E+00	-53.810	-49.816	-45.821	-	-59.567	-56.323	-53.079	-	-13.746	-6.508	0.731	-
1.0E+12	-30.937	-3.478	30.556	27.067	-2235.657	-610.962	930.643	1301.056	-2217.405	-607.484	925.922	1294.560
5.0E+12	-77.735	-8.894	74.014	62.563	-1772.240	1081.242	3457.105	2183.594	-1694.505	1090.135	3383.091	2124.688
1.0E+13	-28.754	12.880	40.991	30.337	-2378.100	-5.475	1975.731	2039.149	-2406.284	-18.354	1934.740	2029.807

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