TMP461-SP (5962R1721801VXC) Neutron Displacement Damage Characterization

ABSTRACT

This report presents the effect of neutron displacement damage (NDD) on the TMP461-SP device (High-Accuracy Remote and Local Temperature Sensor). Results show that all devices were fully functional and within production test limits after having been irradiated up to 1.0E13 n/cm^2 (1-MeV equivalent). A sample size of fifteen units was exposed to radiation testing per (MIL-STD-883, Method 1017 for Neutron Irradiation) and an additional unirradiated sample device was used for correlation. All devices used in the experiment were from lot date code 1805A and assembly lot 8000686. Electrical testing was performed at Texas Instruments before and after neutron irradiation using the production test program for TMP461-SP.

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Trademarks

1 Overview

The TMP461-SP is a radiation hardened high-accuracy, low-power remote temperature sensor monitor with built-in local temperature sensor. Remote temperature sensors are typically low-cost discrete NPN or PNP transistors, or substrate thermal transistors or diodes that are integral parts of microprocessors, analog-to-digital converters (ADC), digital-to-analog converters (DAC), microcontrollers, or field-programmable gate arrays (FPGA). Temperature is represented as a 12-bit digital code for both; local and remote sensors, giving a resolution of 0.0625°C. The two-wire serial interface accepts the SMBus communication protocol with up to nine different pin-programmable addresses.

Advanced features such as series resistance cancellation, programmable non-ideality factor(η-factor), programmable offset, programmable temperature limits, and a programmable digital filter, are combined to provide a robust thermal monitoring solution with improved accuracy and noise immunity.

The TMP461-SP is ideal for multi-location, high-accuracy temperature measurements in a variety of distributed telemetry applications. The integrated local and remote temperature sensors simplify spacecraft housekeeping activities by providing an easy way of measuring temperature gradients. The device is specified for operation over a supply voltage range of 1.7 V to 3.6 V, and a temperature range of –55°C to 125°C.

General device information and testing conditions are listed in Table 1.

Table 1. Overview Information

TI Part Number	TMP461-SP
SMD Number	5962R1721801VXC
Device Function	Synchronous Buck Converter
Die Name	CTMP461AAV
Technology	LBC8LV
A/T Lot Number / Date Code	8000686 / 1805A
Unbiased Quantity Tested	15
Exposure Facility	VPT Rad
Neutron Fluence (1-MeV Equivalent)	1.2×10^{12}, 5.0×10^{12}, 1.0×10^{13} n/cm^2
Irradiation Temperature	25°C
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Figure 1. TMP461-SP Device

2 Test Procedures

The TMP461-SP was electrically pre-tested using the production automated test equipment program.

General test procedures were IAW MIL-STD-883, Method 1017 for Neutron Irradiation of TMP461-SP.

Table 2. Neutron Irradiation Conditions

Group	Sample Qty	Neutron Fluence (n/cm^2)	Bias
A	5	1.2×10^{12}	Unbiased
B	5	5.0×10^{12}	Unbiased
C	5	1.0×10^{13}	Unbiased

3 Facility

The University of Massachusetts's Fast Neutron Irradiation (FNI) facility is an experimental facility replaces three beam ports that originally existed on the left side of the research reactor. It is designed to give a fast flux level ≥ 1011 n / cm^2 –s, with relatively low thermal fluence and gamma dose rates. Samples with a cross-sectional area as large as 30 cm (12 in) × 30 cm (12 in) and up to 15 cm (6 in) thick can be irradiated. The fast neutron flux is designed to be nearly uniform over the 30 cm (12 in) × 30 cm (12 in) area facing the core, and the fast fluence variation through the sample thickness is minimized via a single 180° rotation of the sample canister at the midpoint of the irradiation period. The FNI facility offers a significantly larger sample volume than previously available within the University of Massachusetts Lowell Research Reactor (UMLRR).

The fluences are calculated based on 1-MeV equivalences.

Detailed information of the radiation facility is available at the following link:

https://www.uml.edu/docs/FNI%20Brochure_tcm18-90375.pdf

4 Results

There were no functional failures at any irradiation level. All parametric measurements remained well within all data sheet limits for all exposure levels. All parametric measurements remained well within the production test limits which are guard-banded from the data sheet limits. The full parameter list and graphs are found in Appendix A.

The TMP461-SP specification compliance matrix follows.

Table 3. Electrical Test Parameters

Test	Symbol	Conditions $-55°C \le T_A \ge +125°C$ +V = 1.7 V to 3.6 V unless otherwise specified	Group A Subgroups	Device Type	Limits		Unit	Test Number
					MIN	MAX		
Temperature Measurement								
Local temperature sensor accuracy	$T_{A(LOCAL)}$	T_A = –55°C to +125°C, +V = 1.7 V to 3.6 V	1, 2, 3	1	–2	2	°C	4.24, 4.26, 4.27
Remote temperature sensor accuracy	$T_{A(REMOTE)}$	T_A = –55°C to +125°C, T_D = –55°C to +150°C, +V = 1.7 V to 3.6 V	1, 2, 3	1	–1.5	1.5	°C	4.10, 4.11, 4.12, 1.14, 4.15, 4.17, 4.18
Temperature sensor error versus supply (local or remote)		+V = 1.7 V to 3.6 V	1, 2, 3	1	–0.3	0.3	°C/V	4.29
Analog-to-digital converter (ADC) conversion time		One-shot mode, per channel (local or remote)	9, 10, 11	1		17	ms	4.3
Remote sensor source current high		Series resistance 1 kΩ (max)	1, 2, 3	1	88	152	µA	4.4
Remote sensor source current medium		Series resistance 1 kΩ (max)	1, 2, 3	1	33	57	µA	4.2
Remote sensor source current low		Series resistance 1 kΩ (max)	1, 2, 3	1	5.5	9.5	µA	4.0
Serial Interface								
High level input voltage	V_{IH}		1, 2, 3	1	1.4		V	
Low level input voltage	V_{IL}		1, 2, 3	1		0.45	V	
SDA output low sink current			1, 2, 3	1	6		mA	
Low level output voltage	V_{OL}	IOUT = –6 mA	1, 2, 3	1		0.4	V	2.4, 2.5, 2.6
Serial bus input leakage current		$0 \le V_{IN} \le 3.6$ V	1, 2, 3	1	–1	3	µA	
Serial bus clock frequency			4, 5, 6	1	0.001	2.17	MHz	
Serial bus timeout			9, 10, 11	1	20	30	ms	2.24
Digital Inputs (A0, A1)								
High level input voltage	V_{IH}		1, 2, 3	1	0.9(+V)	(+V) + 0.3	V	
Low level input voltage	V_{IL}		1, 2, 3	1	–0.3	0.1(+V)	V	
Input leakage current		$0 \le V_{IN} \le 3.6$ V	1, 2, 3	1	–1	1	µA	
Digital Outputs (THERM, ALERT/THERM2)								
Output low sink current			1, 2, 3	1	6		mA	
Low level output voltage	V_{OL}	I_{OUT} = –6 mA	1, 2, 3	1		0.4	V	
High level output leakage current	I_{OH}	V_{OUT} = +V	1, 2, 3	1		1	µA	
Power Supply								
Specified supply voltage range	+V		1, 2, 3	1	1.7	3.6	V	

Table 3. Electrical Test Parameters (continued)

Test	Symbol	Conditions –55°C ≤ T_A ≥ +125°C +V = 1.7 V to 3.6 V unless otherwise specified		Group A Subgroups	Device Type	Limits		Unit	Test Number
						MIN	MAX		
Quiescent current	I_Q	Active conversion, local sensor		1, 2, 3	1		375	µA	1.11, 5.2
		Active conversion, remote sensor		1, 2, 3			600		1.12, 5.3
		Standby mode (between conversions)		1, 2, 3			35		1.1, 5.1
		Shutdown mode, serial bus inactive		1, 2, 3			8		1.9, 5.0
			R	1			25		1.9, 5.0
Power-on reset threshold	POR	Rising edge		1, 2, 3	1		1.55	V	Built-in Test
Two-wire timing requirements 1/									
SCL operating frequency	$f_{(SCL)}$	Fast mode		4, 5, 6	1	0.001	0.4	MHz	
		High speed mode				0.001	2.17		
Bus free time between stop and start condition	$t_{(BUF)}$	Fast mode		9, 10, 11	1	1300		ns	
		High speed mode				160			
Hold time after repeated start condition. After this period, the first clock is generated.	$t_{(HDSTA)}$	Fast mode		9, 10, 11	1	600		ns	
		High speed mode				160			

Test Results

This appendix contains the detailed test results.

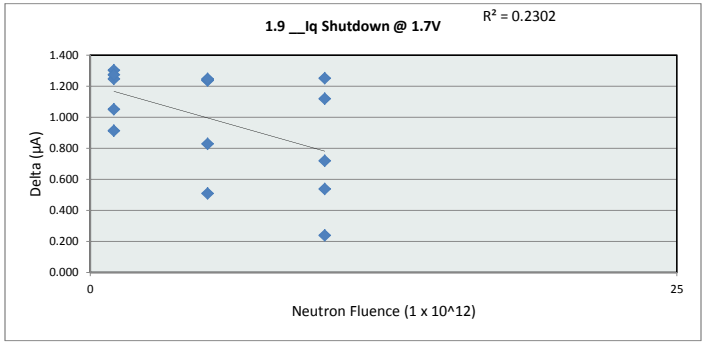
Delta Threshold 10.00%

NDD Report
TMP461HKU (5962R1721801VXC)

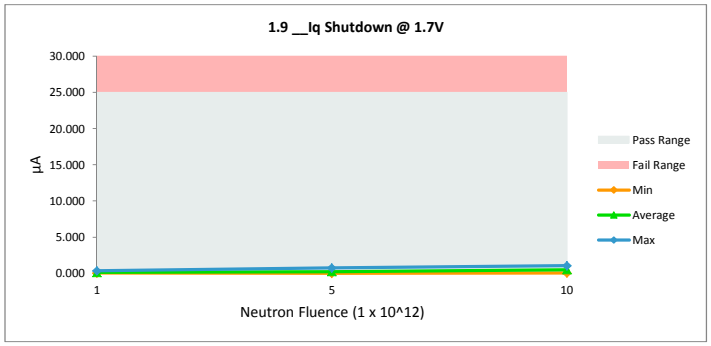
NDD Report
TMP461HKU (5962R1721801VXC)

1.9 __Iq Shutdown @ 1.7V		
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	µA	µA
Max Limit	25	25
Min Limit	0	0

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	1.293	0.046	1.247
1	89	1.260	0.348	0.912
1	90	1.302	0.000	1.302
1	91	1.298	0.247	1.051
1	92	1.274	0.000	1.274
5	93	1.241	0.000	1.241
5	95	1.283	0.046	1.237
5	96	1.259	0.750	0.509
5	97	1.278	0.449	0.829
5	98	1.247	0.000	1.247
10	99	1.268	0.549	0.719
10	100	1.297	0.046	1.251
10	101	1.265	0.147	1.118
10	102	1.291	1.052	0.239
10	103	1.288	0.750	0.538
	Max	1.302	1.052	1.302
	Average	1.276	0.295	0.981
	Min	1.241	0.000	0.239
	Std Dev	0.019	0.342	0.341

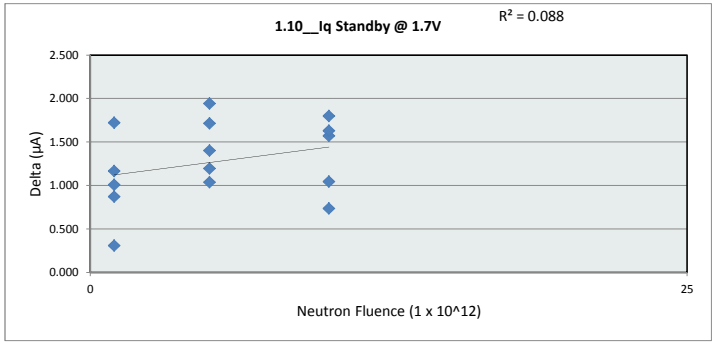


1.9 __Iq Shutdown @ 1.7V			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	25	µA	
Min Limit	0	µA	
Neutron Fluence (1 x	1	5	10
LL	0.000	0.000	0.000
Min	0.046	0.000	0.046
Average	0.128	0.249	0.509
Max	0.348	0.750	1.052
UL	25.000	25.000	25.000

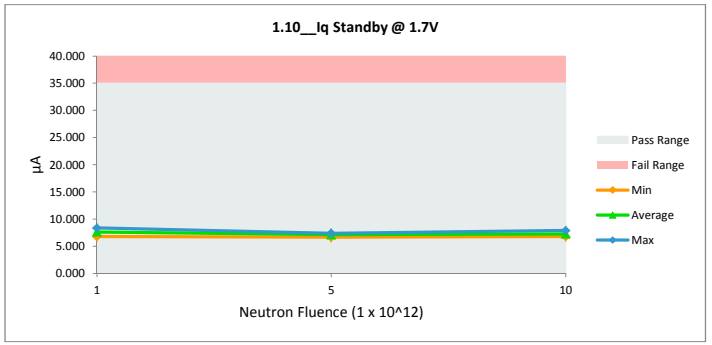


NDD Report
TMP461HKU (5962R1721801VXC)

1.10__Iq Standby @ 1.7V				
Test Site		Junkins	Junkins	
Tester		ETS36401	ETS36401	
Test Number		EF901401	EF901401	
Unit		µA	µA	
Max Limit		35	35	
Min Limit		0	0	
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	8.504	6.784	1.720
1	89	8.634	7.762	0.872
1	90	8.745	7.578	1.167
1	91	8.584	7.578	1.006
1	92	8.681	8.373	0.308
5	93	8.431	7.395	1.036
5	95	8.604	6.661	1.943
5	96	8.802	7.089	1.713
5	97	8.590	7.395	1.195
5	98	8.492	7.089	1.403
10	99	8.584	6.784	1.800
10	100	8.683	7.639	1.044
10	101	8.621	7.884	0.737
10	102	8.600	7.028	1.572
10	103	8.719	7.089	1.630
	Max	8.802	8.373	1.943
	Average	8.618	7.342	1.276
	Min	8.431	6.661	0.308
	Std Dev	0.099	0.472	0.457

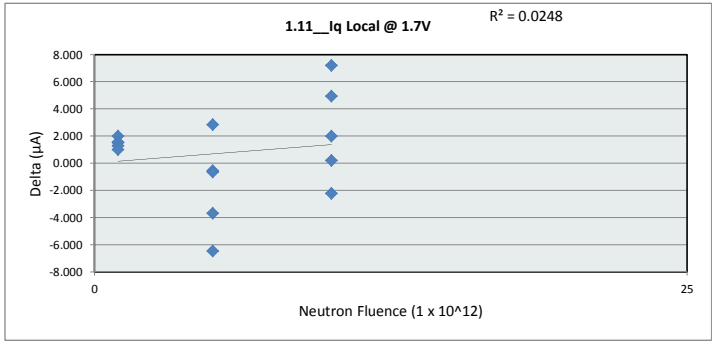


1.10__Iq Standby @ 1.7V			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	35	µA	
Min Limit	0	µA	
Neutron Fluence (1 x	1	5	10
LL	0.000	0.000	0.000
Min	6.784	6.661	6.784
Average	7.615	7.126	7.285
Max	8.373	7.395	7.884
UL	35.000	35.000	35.000

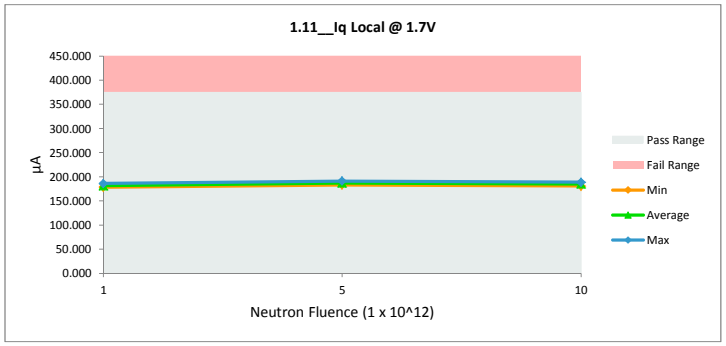


NDD Report
TMP461HKU (5962R1721801VXC)

1.11__Iq Local @ 1.7V			
Test Site	Junkins	Junkins	
Tester	ETS36401	ETS36401	
Test Number	EF901401	EF901401	
Unit	µA	µA	
Max Limit	375	375	
Min Limit	0	0	
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	180.062	178.538	1.524
1	89	183.042	181.044	1.998
1	90	187.848	186.300	1.548
1	91	184.167	182.877	1.290
1	92	180.110	179.088	1.022
5	93	181.479	185.139	-3.660
5	95	187.102	187.645	-0.543
5	96	188.356	188.990	-0.634
5	97	186.030	183.183	2.847
5	98	184.555	191.007	-6.452
10	99	185.880	180.922	4.958
10	100	188.254	186.239	2.015
10	101	188.907	188.684	0.223
10	102	183.835	186.056	-2.221
10	103	191.261	184.039	7.222
	Max	191.261	191.007	7.222
	Average	185.393	184.650	0.742
	Min	180.062	178.538	-6.452
	Std Dev	3.329	3.711	3.303



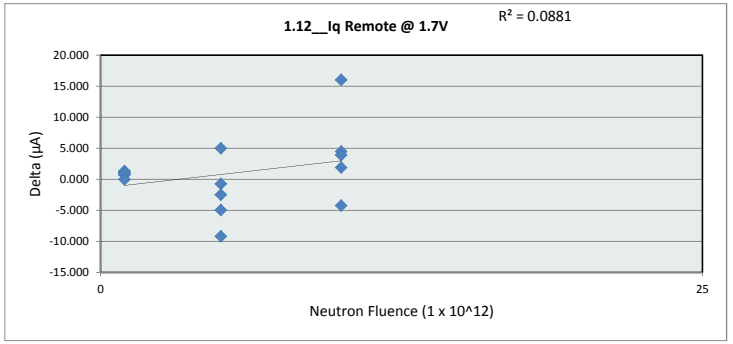
1.11__Iq Local @ 1.7V			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	375	µA	
Min Limit	0	µA	
Neutron Fluence (1 x	1	5	10
LL	0.000	0.000	0.000
Min	178.538	183.183	180.922
Average	181.569	187.193	185.188
Max	186.300	191.007	188.684
UL	375.000	375.000	375.000



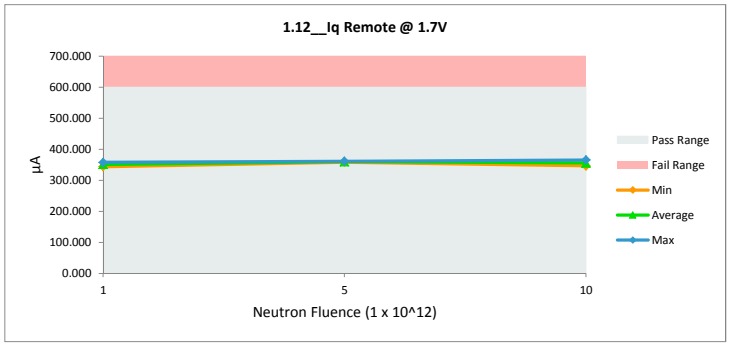
NDD Report
TMP461HKU (5962R1721801VXC)

	1.12__Iq Remote @ 1.7V	
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	µA	µA
Max Limit	600	600
Min Limit	0	0

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	354.407	353.715	0.692
1	89	349.134	347.786	1.348
1	90	358.729	357.627	1.102
1	91	353.878	352.981	0.897
1	92	343.470	343.507	-0.037
5	93	350.215	359.399	-9.184
5	95	356.379	361.355	-4.976
5	96	365.435	360.438	4.997
5	97	357.200	357.932	-0.732
5	98	357.044	359.521	-2.477
10	99	362.387	346.380	16.007
10	100	360.001	355.548	4.453
10	101	361.080	365.328	-4.248
10	102	357.543	353.654	3.889
10	103	359.320	357.443	1.877
	Max	365.435	365.328	16.007
	Average	356.415	355.508	0.907
	Min	343.470	343.507	-9.184
	Std Dev	5.588	5.978	5.641

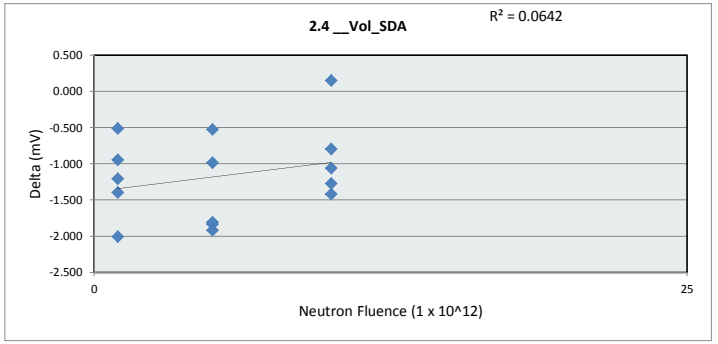


	1.12__Iq Remote @ 1.7V		
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	600	µA	
Min Limit	0	µA	
Neutron Fluence (1 x	1	5	10
LL	0.000	0.000	0.000
Min	343.507	357.932	346.380
Average	351.123	359.729	355.671
Max	357.627	361.355	365.328
UL	600.000	600.000	600.000

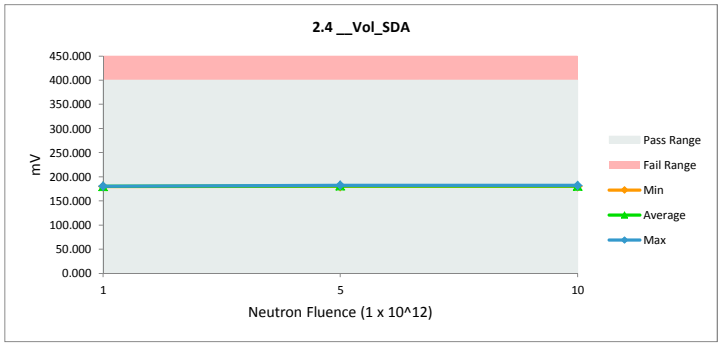


NDD Report
TMP461HKU (5962R1721801VXC)

2.4 __Vol_SDA			
Test Site	Junkins	Junkins	
Tester	ETS36401	ETS36401	
Test Number	EF901401	EF901401	
Unit	mV	mV	
Max Limit	400	400	
Min Limit	0	0	
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	178.874	180.083	-1.209
1	89	179.185	180.133	-0.948
1	90	178.538	179.934	-1.396
1	91	179.347	179.859	-0.512
1	92	178.388	180.394	-2.006
5	93	179.472	180.457	-0.985
5	95	178.911	180.743	-1.832
5	96	179.795	180.320	-0.525
5	97	180.567	182.374	-1.807
5	98	179.671	181.589	-1.918
10	99	179.833	180.631	-0.798
10	100	179.160	180.432	-1.272
10	101	179.459	180.880	-1.421
10	102	180.978	182.038	-1.060
10	103	180.430	180.282	0.148
Max		180.978	182.374	0.148
Average		179.507	180.677	-1.169
Min		178.388	179.859	-2.006
Std Dev		0.735	0.754	0.601



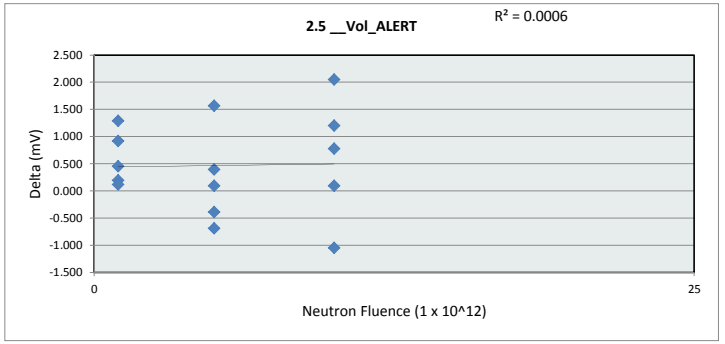
2.4 __Vol_SDA			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	400	mV	
Min Limit	0	mV	
Neutron Fluence (1 x	1	5	10
LL	0.000	0.000	0.000
Min	179.859	180.320	180.282
Average	180.081	181.097	180.853
Max	180.394	182.374	182.038
UL	400.000	400.000	400.000



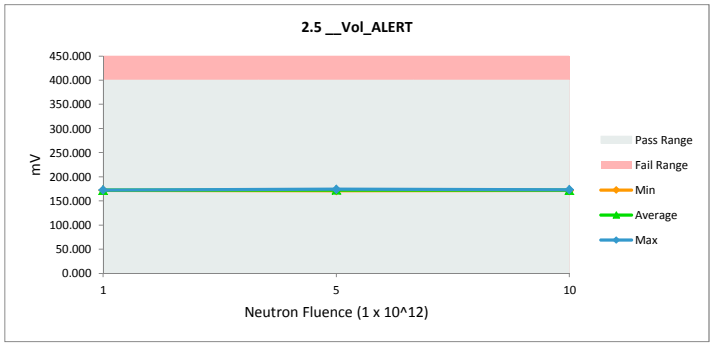
NDD Report
TMP461HKU (5962R1721801VXC)

	2.5 __Vol_ALERT	
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	mV	mV
Max Limit	400	400
Min Limit	0	0

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	173.761	172.470	1.291
1	89	172.976	172.520	0.456
1	90	172.279	172.084	0.195
1	91	172.005	171.885	0.120
1	92	173.063	172.146	0.917
5	93	172.652	172.259	0.393
5	95	172.378	172.283	0.095
5	96	172.715	171.150	1.565
5	97	173.761	174.152	-0.391
5	98	172.453	173.143	-0.690
10	99	172.204	172.109	0.095
10	100	172.528	171.748	0.780
10	101	171.669	172.719	-1.050
10	102	174.458	173.255	1.203
10	103	173.512	171.461	2.051
	Max	174.458	174.152	2.051
	Average	172.828	172.359	0.469
	Min	171.669	171.150	-1.050
	Std Dev	0.762	0.750	0.849



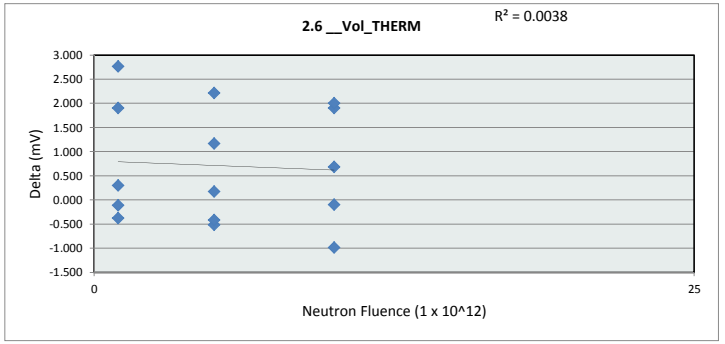
	2.5 __Vol_ALERT		
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	400	mV	
Min Limit	0	mV	
Neutron Fluence (1 x	1	5	10
LL	0.000	0.000	0.000
Min	171.885	171.150	171.461
Average	172.221	172.597	172.258
Max	172.520	174.152	173.255
UL	400.000	400.000	400.000



NDD Report
TMP461HKU (5962R1721801VXC)

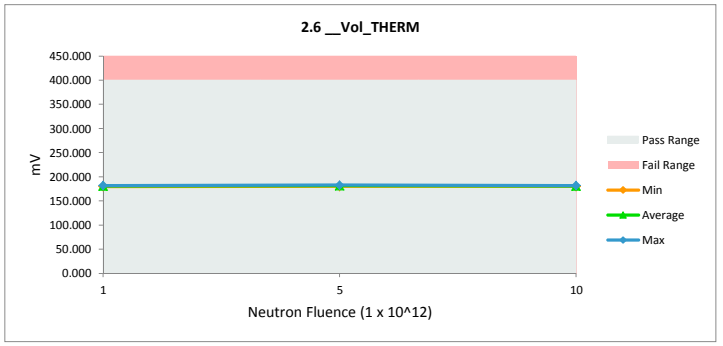
	2.6 __Vol_THERM	
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	mV	mV
Max Limit	400	400
Min Limit	0	0

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	182.537	179.773	2.764
1	89	181.653	181.766	-0.113
1	90	181.503	181.878	-0.375
1	91	181.441	181.143	0.298
1	92	181.902	179.997	1.905
5	93	181.615	180.445	1.170
5	95	181.478	181.990	-0.512
5	96	182.300	180.084	2.216
5	97	183.184	183.011	0.173
5	98	181.603	182.015	-0.412
10	99	181.043	181.143	-0.100
10	100	181.541	180.856	0.685
10	101	180.881	181.865	-0.984
10	102	182.885	180.981	1.904
10	103	182.350	180.346	2.004
	Max	183.184	183.011	2.764
	Average	181.861	181.153	0.708
	Min	180.881	179.773	-0.984
	Std Dev	0.657	0.924	1.190



	2.6 __Vol_THERM	
Test Site	Junkins	
Tester	ETS36401	
Test Number	EF901401	
Max Limit	400	mV
Min Limit	0	mV

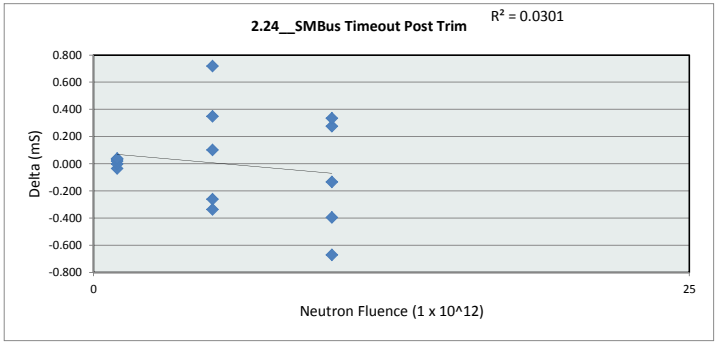
Neutron Fluence (1 x	1	5	10
LL	0.000	0.000	0.000
Min	179.773	180.084	180.346
Average	180.911	181.509	181.038
Max	181.878	183.011	181.865
UL	400.000	400.000	400.000



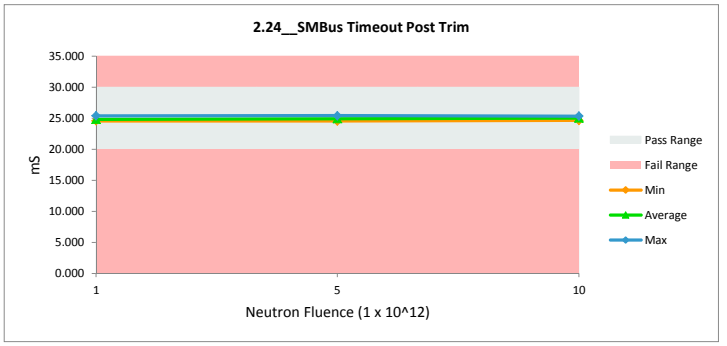
NDD Report
TMP461HKU (5962R1721801VXC)

	2.24__SMBus Timeout Post Trim	
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	mS	mS
Max Limit	30	30
Min Limit	20	20

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	25.350	25.386	-0.036
1	89	24.755	24.722	0.033
1	90	24.647	24.650	-0.003
1	91	24.788	24.768	0.020
1	92	24.601	24.564	0.037
5	93	25.137	25.398	-0.261
5	95	24.617	24.516	0.101
5	96	25.110	24.760	0.350
5	97	25.342	24.623	0.719
5	98	24.912	25.249	-0.337
10	99	25.369	25.094	0.275
10	100	24.511	24.644	-0.133
10	101	24.724	25.120	-0.396
10	102	24.651	25.323	-0.672
10	103	25.261	24.927	0.334
	Max	25.369	25.398	0.719
	Average	24.918	24.916	0.002
	Min	24.511	24.516	-0.672
	Std Dev	0.311	0.316	0.343

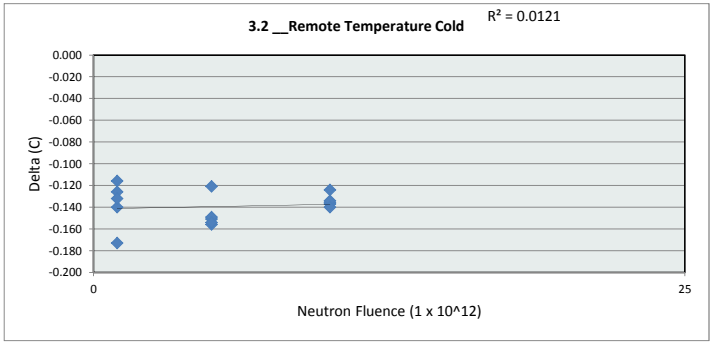


	2.24__SMBus Timeout Post Tri		
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	30	mS	
Min Limit	20	mS	
Neutron Fluence (1 x	1	5	10
LL	20.000	20.000	20.000
Min	24.564	24.516	24.644
Average	24.818	24.909	25.022
Max	25.386	25.398	25.323
UL	30.000	30.000	30.000

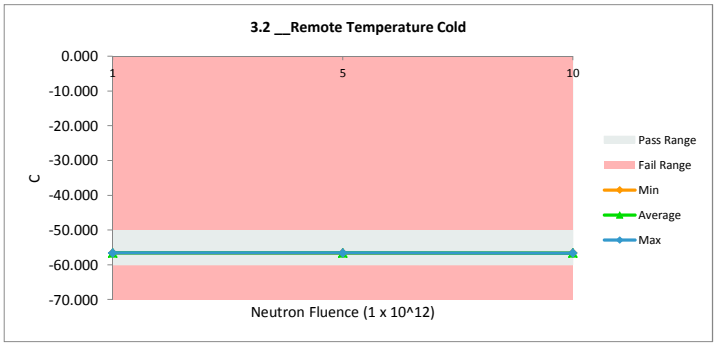


NDD Report
TMP461HKU (5962R1721801VXC)

3.2 __Remote Temperature Cold			
Test Site	Junkins	Junkins	
Tester	ETS36401	ETS36401	
Test Number	EF901401	EF901401	
Unit	C	C	
Max Limit	-50	-50	
Min Limit	-60	-60	
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	-56.720	-56.604	-0.116
1	89	-56.719	-56.593	-0.126
1	90	-56.728	-56.588	-0.140
1	91	-56.730	-56.598	-0.132
1	92	-56.760	-56.587	-0.173
5	93	-56.754	-56.603	-0.151
5	95	-56.754	-56.605	-0.149
5	96	-56.754	-56.598	-0.156
5	97	-56.754	-56.600	-0.154
5	98	-56.754	-56.633	-0.121
10	99	-56.753	-56.616	-0.137
10	100	-56.754	-56.630	-0.124
10	101	-56.754	-56.618	-0.136
10	102	-56.754	-56.620	-0.134
10	103	-56.754	-56.614	-0.140
	Max	-56.719	-56.587	-0.116
	Average	-56.746	-56.607	-0.139
	Min	-56.760	-56.633	-0.173
	Std Dev	0.014	0.014	0.015



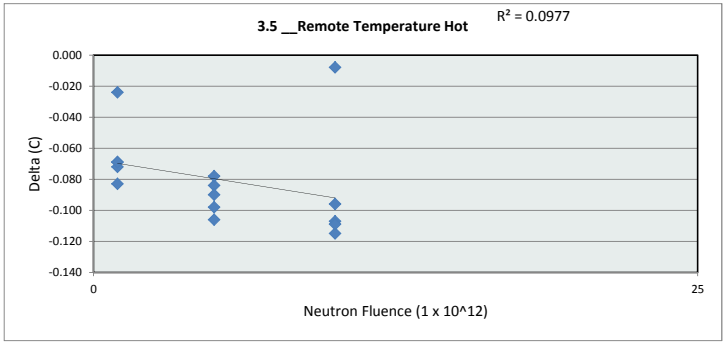
3.2 __Remote Temperature Co			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	-50	C	
Min Limit	-60	C	
Neutron Fluence (1 x	1	5	10
LL	-60.000	-60.000	-60.000
Min	-56.604	-56.633	-56.630
Average	-56.594	-56.608	-56.620
Max	-56.587	-56.598	-56.614
UL	-50.000	-50.000	-50.000



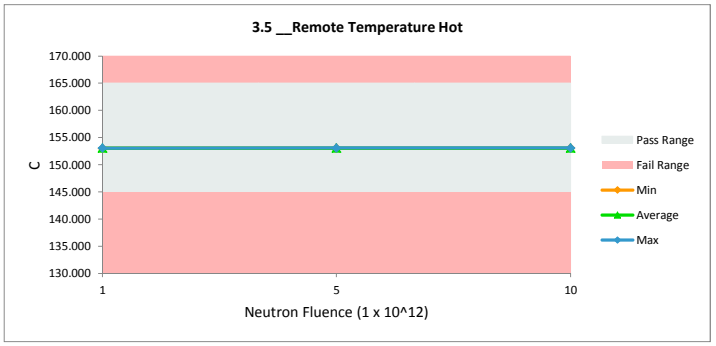
NDD Report
TMP461HKU (5962R1721801VXC)

	3.5 __Remote Temperature Hot	
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	C	C
Max Limit	165	165
Min Limit	145	145

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	152.980	153.052	-0.072
1	89	152.998	153.022	-0.024
1	90	152.972	153.055	-0.083
1	91	152.984	153.053	-0.069
1	92	152.992	153.061	-0.069
5	93	152.967	153.051	-0.084
5	95	152.967	153.073	-0.106
5	96	152.967	153.057	-0.090
5	97	152.967	153.045	-0.078
5	98	152.967	153.065	-0.098
10	99	153.044	153.052	-0.008
10	100	152.967	153.063	-0.096
10	101	152.967	153.082	-0.115
10	102	152.967	153.074	-0.107
10	103	152.967	153.076	-0.109
	Max	153.044	153.082	-0.008
	Average	152.978	153.059	-0.081
	Min	152.967	153.022	-0.115
	Std Dev	0.021	0.015	0.030

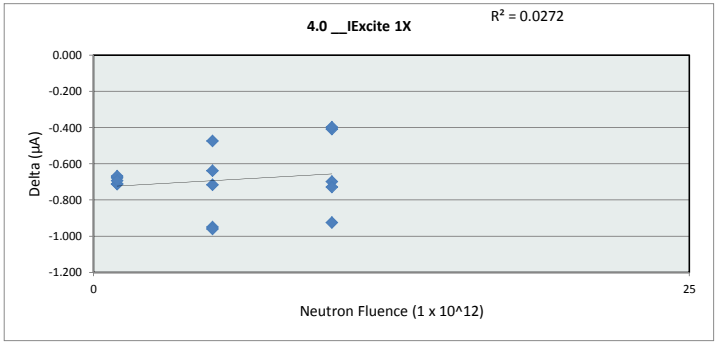


	3.5 __Remote Temperature Ho		
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	165	C	
Min Limit	145	C	
Neutron Fluence (1 x	1	5	10
LL	145.000	145.000	145.000
Min	153.022	153.045	153.052
Average	153.049	153.058	153.069
Max	153.061	153.073	153.082
UL	165.000	165.000	165.000

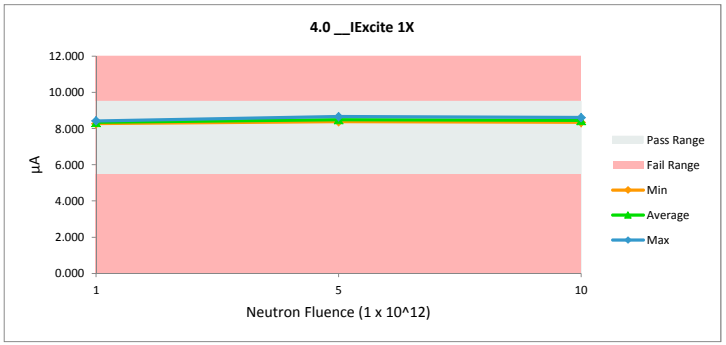


NDD Report
TMP461HKU (5962R1721801VXC)

	4.0 __IExcite 1X		
Test Site	Junkins	Junkins	
Tester	ETS36401	ETS36401	
Test Number	EF901401	EF901401	
Unit	µA	µA	
Max Limit	9.5	9.5	
Min Limit	5.5	5.5	
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	7.561	8.272	-0.711
1	89	7.554	8.266	-0.712
1	90	7.720	8.398	-0.678
1	91	7.753	8.422	-0.669
1	92	7.651	8.345	-0.694
5	93	7.635	8.584	-0.949
5	95	7.677	8.393	-0.716
5	96	7.902	8.376	-0.474
5	97	7.779	8.417	-0.638
5	98	7.699	8.659	-0.960
10	99	7.928	8.337	-0.409
10	100	7.691	8.390	-0.699
10	101	7.677	8.602	-0.925
10	102	7.741	8.470	-0.729
10	103	8.013	8.411	-0.398
	Max	8.013	8.659	-0.398
	Average	7.732	8.423	-0.691
	Min	7.554	8.266	-0.960
	Std Dev	0.130	0.114	0.172

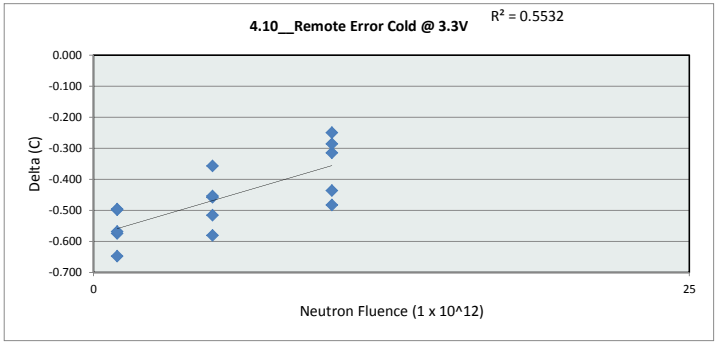


	4.0 __IExcite 1X		
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	9.5	µA	
Min Limit	5.5	µA	
Neutron Fluence (1 x	1	5	10
LL	5.500	5.500	5.500
Min	8.266	8.376	8.337
Average	8.341	8.486	8.442
Max	8.422	8.659	8.602
UL	9.500	9.500	9.500

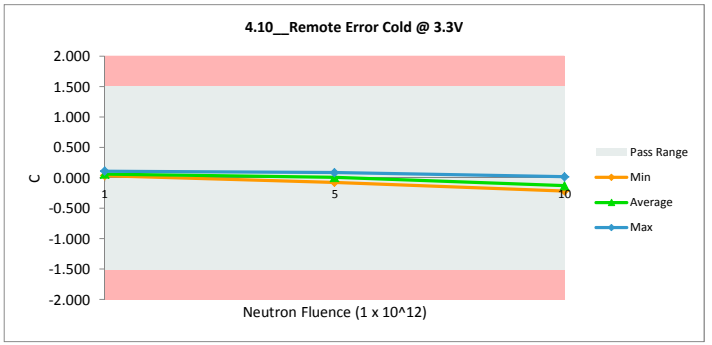


NDD Report
TMP461HKU (5962R1721801VXC)

4.10__Remote Error Cold @ 3.3V			
Test Site	Junkins	Junkins	
Tester	ETS36401	ETS36401	
Test Number	EF901401	EF901401	
Unit	C	C	
Max Limit	1.5	1.5	
Min Limit	-1.5	-1.5	
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	-0.593	0.055	-0.648
1	89	-0.500	0.075	-0.575
1	90	-0.459	0.039	-0.498
1	91	-0.457	0.111	-0.568
1	92	-0.458	0.038	-0.496
5	93	-0.559	0.022	-0.581
5	95	-0.371	0.087	-0.458
5	96	-0.371	-0.014	-0.357
5	97	-0.496	0.020	-0.516
5	98	-0.527	-0.073	-0.454
10	99	-0.465	-0.215	-0.250
10	100	-0.465	0.018	-0.483
10	101	-0.496	-0.181	-0.315
10	102	-0.465	-0.179	-0.286
10	103	-0.527	-0.091	-0.436
	Max	-0.371	0.111	-0.250
	Average	-0.481	-0.019	-0.461
	Min	-0.593	-0.215	-0.648
	Std Dev	0.060	0.104	0.116



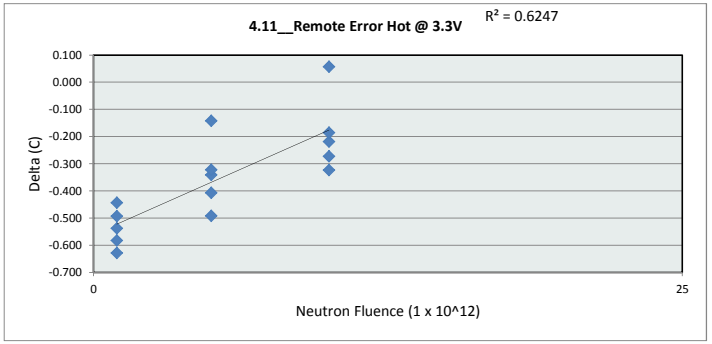
4.10__Remote Error Cold @ 3.3			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	1.5	C	
Min Limit	-1.5	C	
Neutron Fluence (1 x	1	5	10
LL	-1.500	-1.500	-1.500
Min	0.038	-0.073	-0.215
Average	0.064	0.008	-0.130
Max	0.111	0.087	0.018
UL	1.500	1.500	1.500



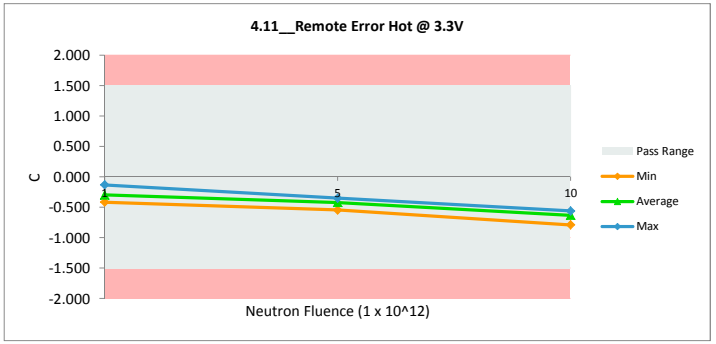
NDD Report
TMP461HKU (5962R1721801VXC)

	4.11__Remote Error Hot @ 3.3V	
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	C	C
Max Limit	1.5	1.5
Min Limit	-1.5	-1.5

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	-0.761	-0.132	-0.629
1	89	-0.841	-0.259	-0.582
1	90	-0.847	-0.354	-0.493
1	91	-0.859	-0.415	-0.444
1	92	-0.867	-0.329	-0.538
5	93	-0.842	-0.350	-0.492
5	95	-0.842	-0.435	-0.407
5	96	-0.686	-0.544	-0.142
5	97	-0.748	-0.407	-0.341
5	98	-0.686	-0.364	-0.322
10	99	-0.732	-0.789	0.057
10	100	-0.904	-0.581	-0.323
10	101	-0.904	-0.631	-0.273
10	102	-0.779	-0.561	-0.218
10	103	-0.779	-0.594	-0.185
	Max	-0.686	-0.132	0.057
	Average	-0.805	-0.450	-0.355
	Min	-0.904	-0.789	-0.629
	Std Dev	0.072	0.167	0.185

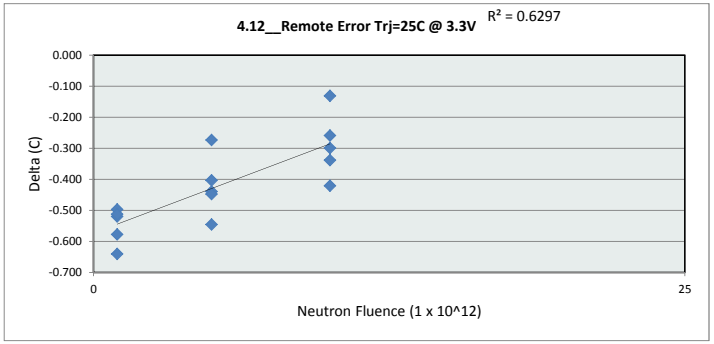


	4.11__Remote Error Hot @ 3.3		
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	1.5	C	
Min Limit	-1.5	C	
Neutron Fluence (1 x	1	5	10
LL	-1.500	-1.500	-1.500
Min	-0.415	-0.544	-0.789
Average	-0.298	-0.420	-0.631
Max	-0.132	-0.350	-0.561
UL	1.500	1.500	1.500

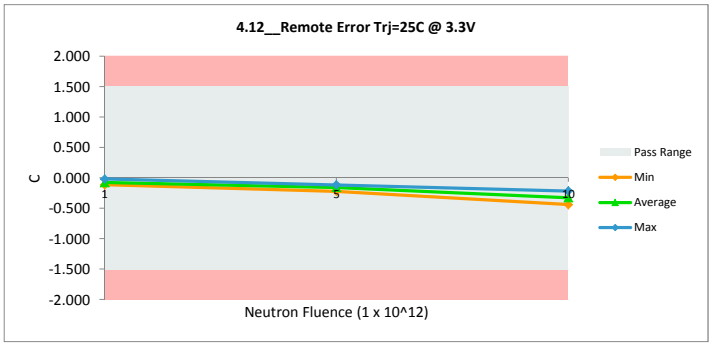


NDD Report
TMP461HKU (5962R1721801VXC)

4.12__Remote Error Trj=25C @ 3			
Test Site		Junkins	Junkins
Tester		ETS36401	ETS36401
Test Number		EF901401	EF901401
Unit		C	C
Max Limit		1.5	1.5
Min Limit		-1.5	-1.5
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t
1	88	-0.658	-0.018
1	89	-0.633	-0.055
1	90	-0.611	-0.114
1	91	-0.614	-0.094
1	92	-0.618	-0.105
5	93	-0.669	-0.123
5	95	-0.555	-0.116
5	96	-0.494	-0.220
5	97	-0.594	-0.146
5	98	-0.589	-0.186
10	99	-0.569	-0.438
10	100	-0.636	-0.215
10	101	-0.655	-0.356
10	102	-0.587	-0.328
10	103	-0.626	-0.287
	Max	-0.494	-0.018
	Average	-0.607	-0.187
	Min	-0.669	-0.438
	Std Dev	0.045	0.120



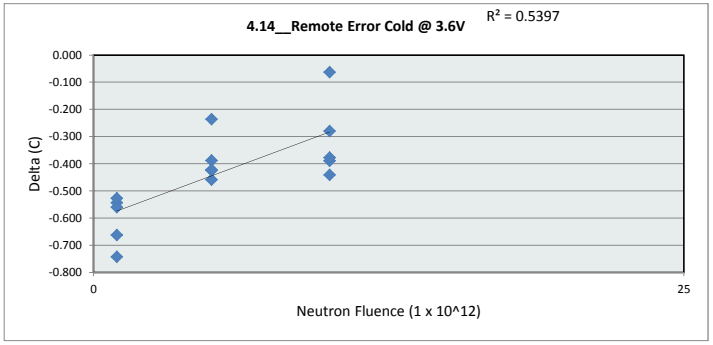
4.12__Remote Error Trj=25C @		
Test Site	Junkins	
Tester	ETS36401	
Test Number	EF901401	
Max Limit	1.5	C
Min Limit	-1.5	C
Neutron Fluence (1 x	1	5	10
LL	-1.500	-1.500	-1.500
Min	-0.114	-0.220	-0.438
Average	-0.077	-0.158	-0.325
Max	-0.018	-0.116	-0.215
UL	1.500	1.500	1.500



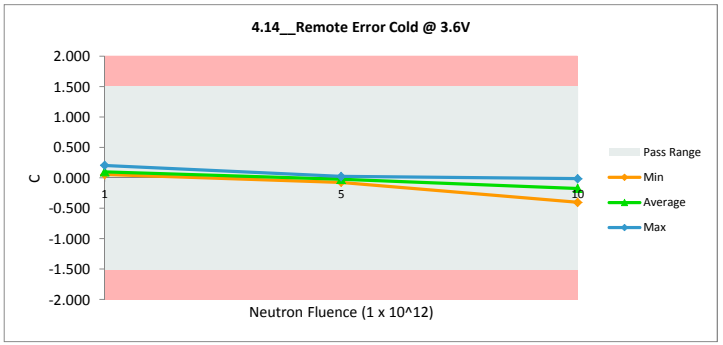
NDD Report
TMP461HKU (5962R1721801VXC)

	4.14__Remote Error Cold @ 3.6V	
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	C	C
Max Limit	1.5	1.5
Min Limit	-1.5	-1.5

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	-0.687	0.055	-0.742
1	89	-0.469	0.075	-0.544
1	90	-0.459	0.101	-0.560
1	91	-0.457	0.205	-0.662
1	92	-0.458	0.069	-0.527
5	93	-0.465	-0.040	-0.425
5	95	-0.434	0.025	-0.459
5	96	-0.402	-0.014	-0.388
5	97	-0.434	-0.012	-0.422
5	98	-0.309	-0.073	-0.236
10	99	-0.465	-0.402	-0.063
10	100	-0.402	-0.013	-0.389
10	101	-0.527	-0.150	-0.377
10	102	-0.527	-0.086	-0.441
10	103	-0.496	-0.216	-0.280
	Max	-0.309	0.205	-0.063
	Average	-0.466	-0.032	-0.434
	Min	-0.687	-0.402	-0.742
	Std Dev	0.081	0.146	0.167

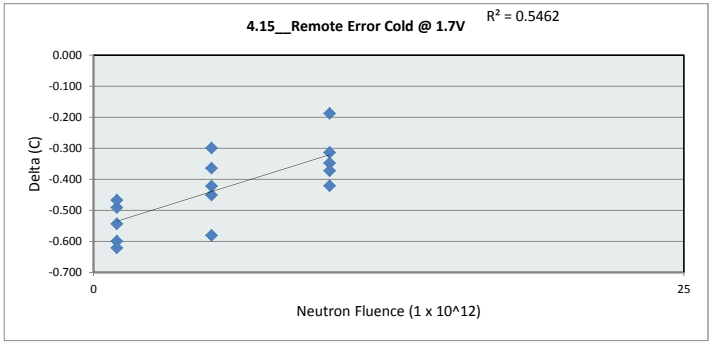


	4.14__Remote Error Cold @ 3.6		
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	1.5	C	
Min Limit	-1.5	C	
Neutron Fluence (1 x	1	5	10
LL	-1.500	-1.500	-1.500
Min	0.055	-0.073	-0.402
Average	0.101	-0.023	-0.173
Max	0.205	0.025	-0.013
UL	1.500	1.500	1.500

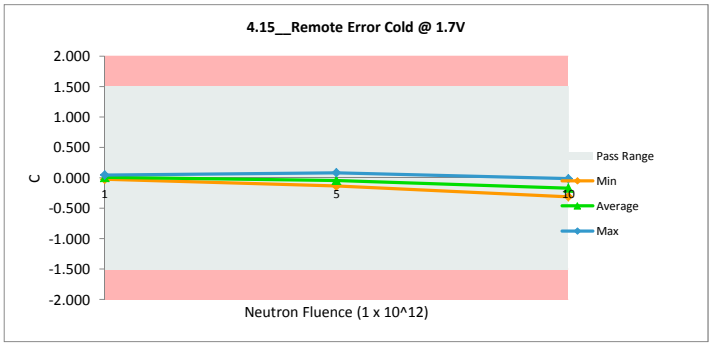


NDD Report
TMP461HKU (5962R1721801VXC)

4.15__Remote Error Cold @ 1.7V			
Test Site		Junkins	Junkins
Tester		ETS36401	ETS36401
Test Number		EF901401	EF901401
Unit		C	C
Max Limit		1.5	1.5
Min Limit		-1.5	-1.5
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t
1	88	-0.499	-0.008
1	89	-0.531	0.013
1	90	-0.491	-0.024
1	91	-0.551	0.048
1	92	-0.615	0.006
5	93	-0.496	0.085
5	95	-0.402	-0.038
5	96	-0.496	-0.045
5	97	-0.496	-0.074
5	98	-0.434	-0.135
10	99	-0.497	-0.309
10	100	-0.434	-0.013
10	101	-0.527	-0.213
10	102	-0.496	-0.148
10	103	-0.527	-0.154
	Max	-0.402	0.085
	Average	-0.499	-0.067
	Min	-0.615	-0.309
	Std Dev	0.051	0.106



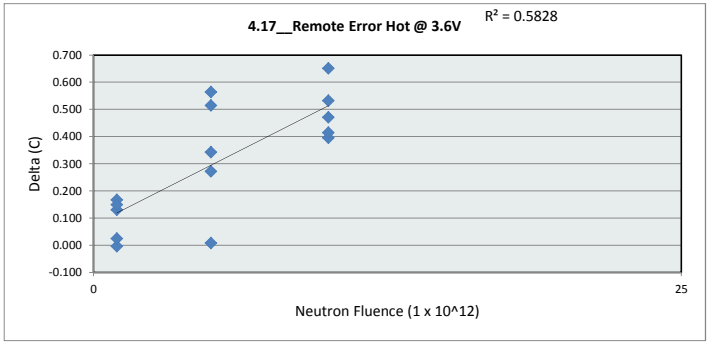
4.15__Remote Error Cold @ 1.7			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	1.5	C	
Min Limit	-1.5	C	
Neutron Fluence (1 x	1	5	10
LL	-1.500	-1.500	-1.500
Min	-0.024	-0.135	-0.309
Average	0.007	-0.041	-0.167
Max	0.048	0.085	-0.013
UL	1.500	1.500	1.500



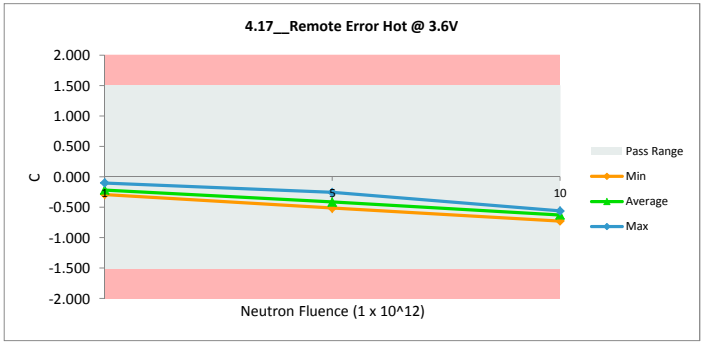
NDD Report
TMP461HKU (5962R1721801VXC)

	4.17__Remote Error Hot @ 3.6V	
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	C	C
Max Limit	1.5	1.5
Min Limit	-1.5	-1.5

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	-0.105	-0.101	-0.004
1	89	-0.123	-0.290	0.167
1	90	-0.035	-0.166	0.131
1	91	-0.266	-0.290	0.024
1	92	-0.085	-0.235	0.150
5	93	-0.248	-0.256	0.008
5	95	-0.123	-0.466	0.343
5	96	0.002	-0.513	0.515
5	97	0.064	-0.500	0.564
5	98	-0.061	-0.333	0.272
10	99	-0.075	-0.726	0.651
10	100	-0.217	-0.612	0.395
10	101	-0.217	-0.631	0.414
10	102	-0.029	-0.561	0.532
10	103	-0.123	-0.594	0.471
	Max	0.064	-0.101	0.651
	Average	-0.109	-0.418	0.309
	Min	-0.266	-0.726	-0.004
	Std Dev	0.095	0.191	0.218

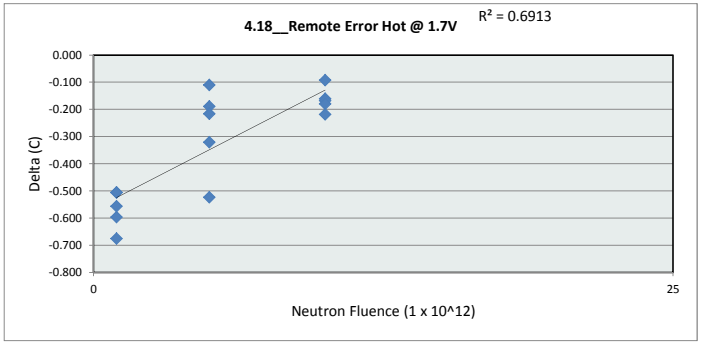


	4.17__Remote Error Hot @ 3.6		
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	1.5	C	
Min Limit	-1.5	C	
Neutron Fluence (1 x	1	5	10
LL	-1.500	-1.500	-1.500
Min	-0.290	-0.513	-0.726
Average	-0.216	-0.414	-0.625
Max	-0.101	-0.256	-0.561
UL	1.500	1.500	1.500

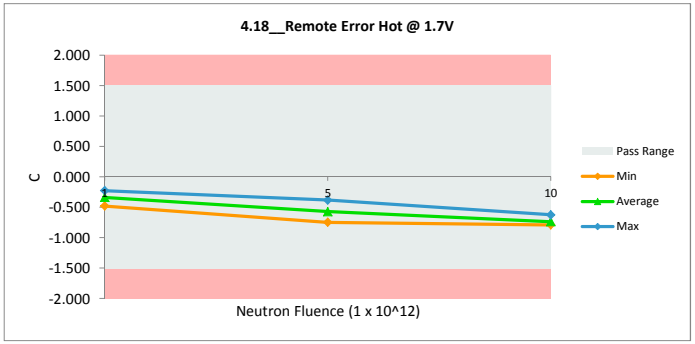


NDD Report
TMP461HKU (5962R1721801VXC)

4.18__Remote Error Hot @ 1.7V			
Test Site		Junkins	Junkins
Tester		ETS36401	ETS36401
Test Number		EF901401	EF901401
Unit		C	C
Max Limit		1.5	1.5
Min Limit		-1.5	-1.5
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t
1	88	-0.823	-0.226
1	89	-0.966	-0.290
1	90	-0.941	-0.385
1	91	-0.984	-0.478
1	92	-0.804	-0.298
5	93	-0.904	-0.381
5	95	-0.936	-0.747
5	96	-0.748	-0.638
5	97	-0.748	-0.532
5	98	-0.873	-0.552
10	99	-0.950	-0.789
10	100	-0.936	-0.768
10	101	-0.967	-0.787
10	102	-0.842	-0.624
10	103	-0.811	-0.719
	Max	-0.748	-0.226
	Average	-0.882	-0.548
	Min	-0.984	-0.789
	Std Dev	0.081	0.196



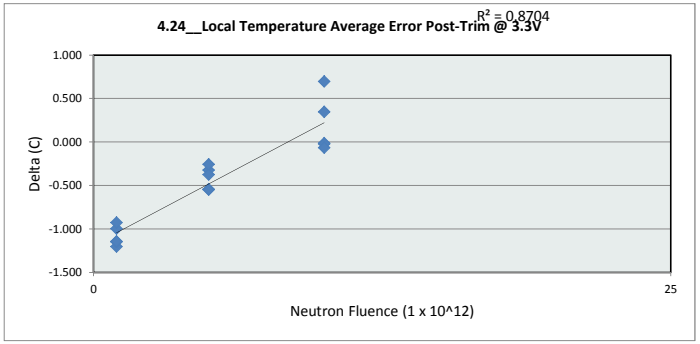
4.18__Remote Error Hot @ 1.7		
Test Site	Junkins	
Tester	ETS36401	
Test Number	EF901401	
Max Limit	1.5	C
Min Limit	-1.5	C
Neutron Fluence (1 x	1	5	10
LL	-1.500	-1.500	-1.500
Min	-0.478	-0.747	-0.789
Average	-0.335	-0.570	-0.737
Max	-0.226	-0.381	-0.624
UL	1.500	1.500	1.500



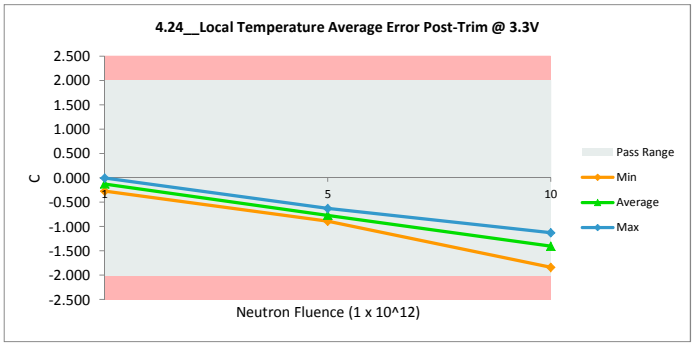
NDD Report
TMP461HKU (5962R1721801VXC)

	4.24__Local Temperature Averag	
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	C	C
Max Limit	2	2
Min Limit	-2	-2

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	-1.246	-0.043	-1.203
1	89	-1.148	-0.002	-1.146
1	90	-1.270	-0.274	-0.996
1	91	-1.187	-0.262	-0.926
1	92	-1.193	-0.048	-1.144
5	93	-1.181	-0.635	-0.546
5	95	-1.176	-0.852	-0.324
5	96	-1.266	-0.890	-0.376
5	97	-1.101	-0.845	-0.256
5	98	-1.177	-0.629	-0.547
10	99	-1.256	-1.240	-0.016
10	100	-1.263	-1.241	-0.022
10	101	-1.222	-1.569	0.347
10	102	-1.190	-1.126	-0.064
10	103	-1.138	-1.836	0.698
	Max	-1.101	-0.002	0.698
	Average	-1.201	-0.766	-0.435
	Min	-1.270	-1.836	-1.203
	Std Dev	0.051	0.570	0.574

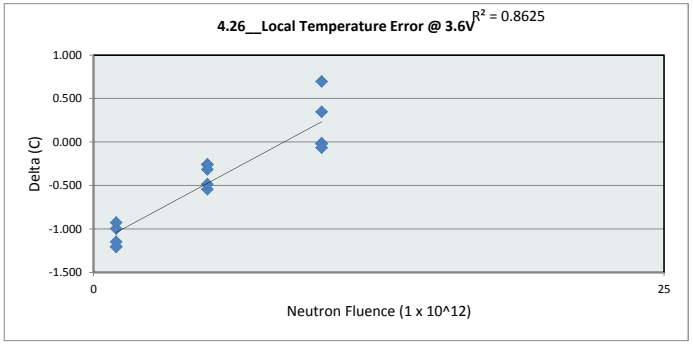


	4.24__Local Temperature Aver		
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	2	C	
Min Limit	-2	C	
Neutron Fluence (1 x	1	5	10
LL	-2.000	-2.000	-2.000
Min	-0.274	-0.890	-1.836
Average	-0.126	-0.770	-1.402
Max	-0.002	-0.629	-1.126
UL	2.000	2.000	2.000

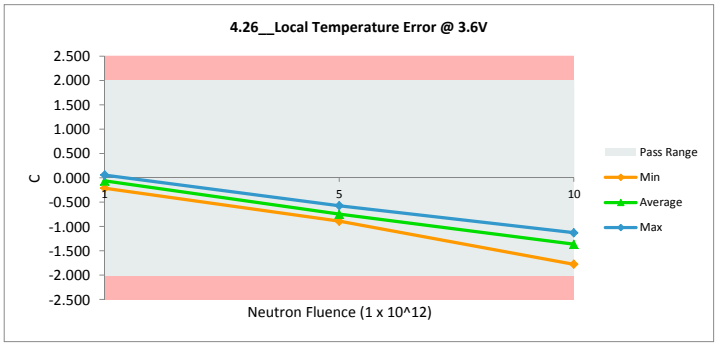


NDD Report
TMP461HKU (5962R1721801VXC)

4.26__Local Temperature Error @				
Test Site		Junkins	Junkins	
Tester		ETS36401	ETS36401	
Test Number		EF901401	EF901401	
Unit		C	C	
Max Limit		2	2	
Min Limit		-2	-2	
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	-1.183	0.020	-1.203
1	89	-1.086	0.060	-1.146
1	90	-1.207	-0.211	-0.996
1	91	-1.125	-0.199	-0.926
1	92	-1.193	0.014	-1.207
5	93	-1.118	-0.573	-0.546
5	95	-1.114	-0.852	-0.262
5	96	-1.204	-0.890	-0.314
5	97	-1.039	-0.783	-0.256
5	98	-1.114	-0.629	-0.485
10	99	-1.193	-1.178	-0.016
10	100	-1.201	-1.178	-0.022
10	101	-1.222	-1.569	0.347
10	102	-1.190	-1.126	-0.064
10	103	-1.076	-1.774	0.698
	Max	-1.039	0.060	0.698
	Average	-1.151	-0.725	-0.426
	Min	-1.222	-1.774	-1.207
	Std Dev	0.058	0.581	0.580



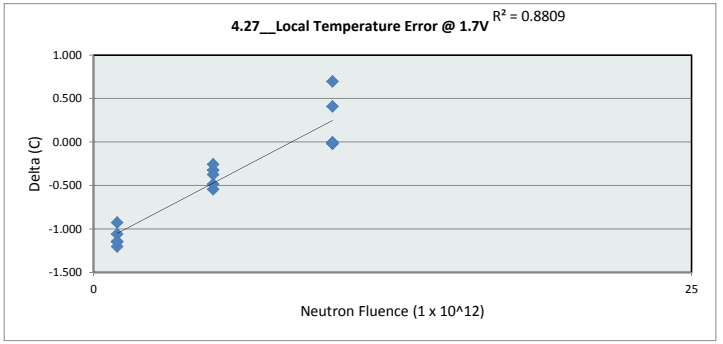
4.26__Local Temperature Error			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	2	C	
Min Limit	-2	C	
Neutron Fluence (1 x	1	5	10
LL	-2.000	-2.000	-2.000
Min	-0.211	-0.890	-1.774
Average	-0.063	-0.745	-1.365
Max	0.061	-0.573	-1.126
UL	2.000	2.000	2.000



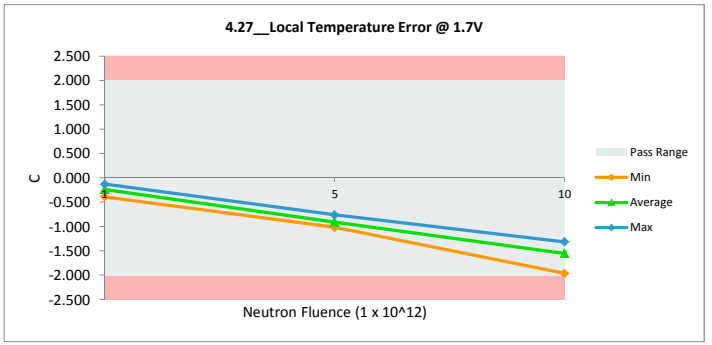
NDD Report
TMP461HKU (5962R1721801VXC)

	4.27__Local Temperature Error @	
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	C	C
Max Limit	2	2
Min Limit	-2	-2

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	-1.371	-0.168	-1.203
1	89	-1.273	-0.127	-1.146
1	90	-1.395	-0.336	-1.059
1	91	-1.312	-0.387	-0.926
1	92	-1.318	-0.173	-1.144
5	93	-1.306	-0.760	-0.546
5	95	-1.301	-0.977	-0.324
5	96	-1.391	-1.015	-0.376
5	97	-1.226	-0.970	-0.256
5	98	-1.302	-0.817	-0.485
10	99	-1.381	-1.365	-0.016
10	100	-1.388	-1.366	-0.022
10	101	-1.347	-1.756	0.409
10	102	-1.315	-1.314	-0.001
10	103	-1.263	-1.961	0.698
	Max	-1.226	-0.127	0.698
	Average	-1.326	-0.900	-0.426
	Min	-1.395	-1.961	-1.203
	Std Dev	0.051	0.583	0.587



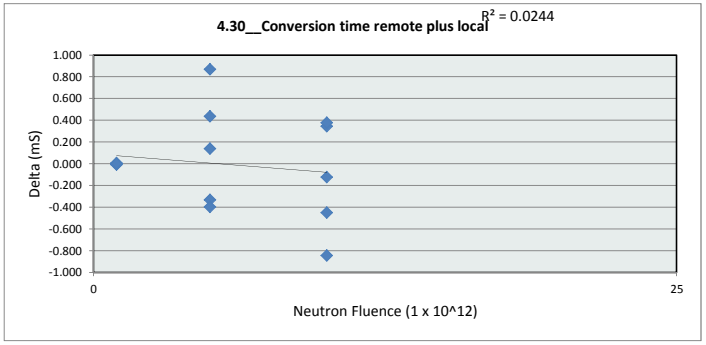
	4.27__Local Temperature Error		
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	2	C	
Min Limit	-2	C	
Neutron Fluence (1 x	1	5	10
LL	-2.000	-2.000	-2.000
Min	-0.387	-1.015	-1.961
Average	-0.238	-0.908	-1.552
Max	-0.127	-0.760	-1.314
UL	2.000	2.000	2.000



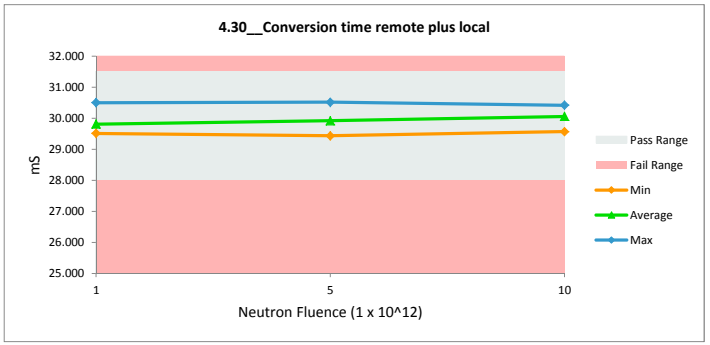
NDD Report
TMP461HKU (5962R1721801VXC)

	4.30__Conversion time remote pl	
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	mS	mS
Max Limit	34	31.5
Min Limit	28	28

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	30.492	30.500	-0.008
1	89	29.706	29.706	0.000
1	90	29.576	29.575	0.001
1	91	29.748	29.743	0.005
1	92	29.510	29.511	-0.001
5	93	30.182	30.513	-0.331
5	95	29.572	29.434	0.138
5	96	30.146	29.711	0.435
5	97	30.438	29.570	0.868
5	98	29.949	30.347	-0.398
10	99	30.516	30.172	0.344
10	100	29.442	29.565	-0.123
10	101	29.710	30.159	-0.449
10	102	29.570	30.414	-0.844
10	103	30.341	29.964	0.377
	Max	30.516	30.513	0.868
	Average	29.927	29.926	0.001
	Min	29.442	29.434	-0.844
	Std Dev	0.390	0.390	0.416



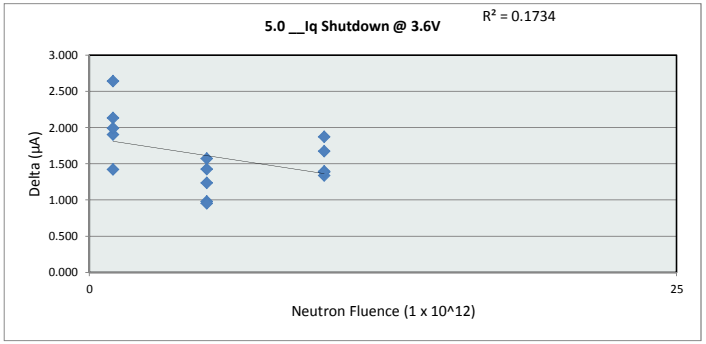
	4.30__Conversion time remote		
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	31.5	mS	
Min Limit	28	mS	
Neutron Fluence (1 x	1	5	10
LL	28.000	28.000	28.000
Min	29.511	29.434	29.565
Average	29.807	29.915	30.055
Max	30.500	30.513	30.414
UL	31.500	31.500	31.500



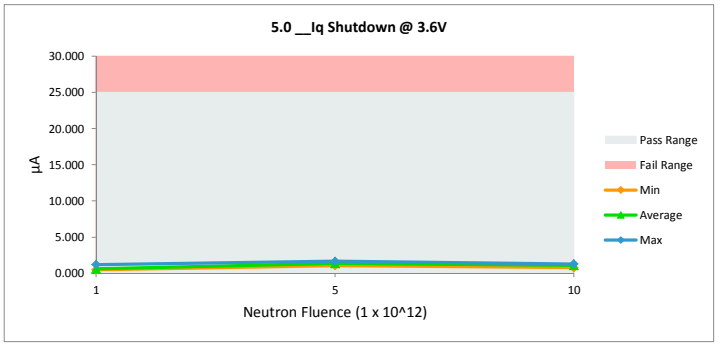
NDD Report
TMP461HKU (5962R1721801VXC)

5.0 __Iq Shutdown @ 3.6V		
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	µA	µA
Max Limit	25	25
Min Limit	0	0

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	2.659	0.757	1.902
1	89	2.638	0.000	2.638
1	90	2.641	0.508	2.133
1	91	2.625	0.632	1.993
1	92	2.637	1.214	1.423
5	93	2.568	1.588	0.980
5	95	2.639	1.214	1.425
5	96	2.660	1.089	1.571
5	97	2.624	1.671	0.953
5	98	2.573	1.339	1.234
10	99	2.639	0.965	1.674
10	100	2.651	1.256	1.395
10	101	2.634	1.297	1.337
10	102	2.670	0.798	1.872
10	103	2.641	1.256	1.385
	Max	2.670	1.671	2.638
	Average	2.633	1.039	1.594
	Min	2.568	0.000	0.953
	Std Dev	0.028	0.438	0.451



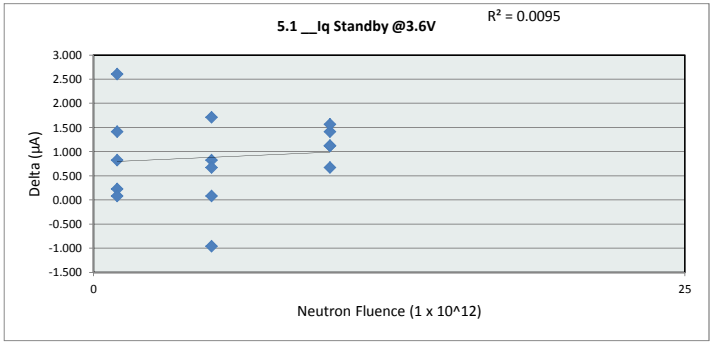
5.0 __Iq Shutdown @ 3.6V			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	25	µA	
Min Limit	0	µA	
Neutron Fluence (1 x	1	5	10
LL	0.000	0.000	0.000
Min	0.508	1.089	0.798
Average	0.622	1.380	1.114
Max	1.214	1.671	1.297
UL	25.000	25.000	25.000



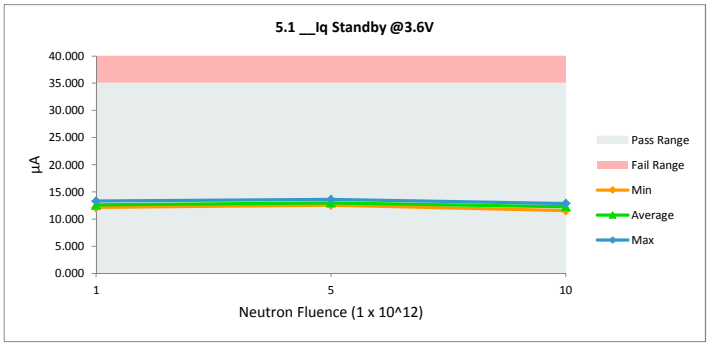
NDD Report
TMP461HKU (5962R1721801VXC)

5.1 __Iq Standby @3.6V		
Test Site	Junkins	Junkins
Tester	ETS36401	ETS36401
Test Number	EF901401	EF901401
Unit	µA	µA
Max Limit	35	35
Min Limit	0	0

Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	12.652	12.424	0.228
1	89	13.395	13.315	0.080
1	90	14.731	12.127	2.604
1	91	13.246	12.424	0.822
1	92	14.137	12.721	1.416
5	93	13.543	12.721	0.822
5	95	12.652	13.612	-0.960
5	96	14.285	12.573	1.712
5	97	13.246	13.167	0.079
5	98	13.543	12.870	0.673
10	99	12.207	11.534	0.673
10	100	14.285	12.870	1.415
10	101	13.246	12.127	1.119
10	102	13.840	12.721	1.119
10	103	13.691	12.127	1.564
	Max	14.731	13.612	2.604
	Average	13.513	12.622	0.891
	Min	12.207	11.534	-0.960
	Std Dev	0.688	0.528	0.845

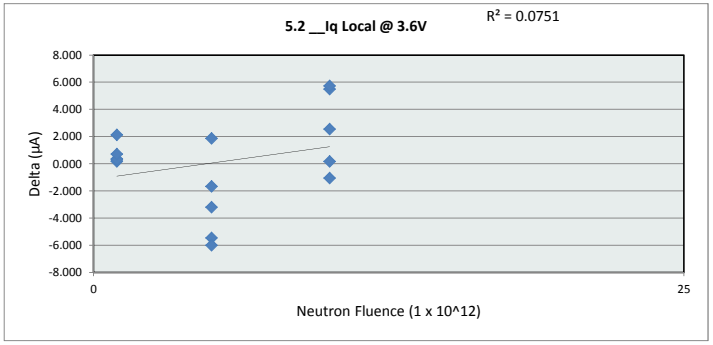


5.1 __Iq Standby @3.6V			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	35	µA	
Min Limit	0	µA	
Neutron Fluence (1 x	1	5	10
LL	0.000	0.000	0.000
Min	12.127	12.573	11.534
Average	12.602	12.989	12.276
Max	13.315	13.612	12.870
UL	35.000	35.000	35.000

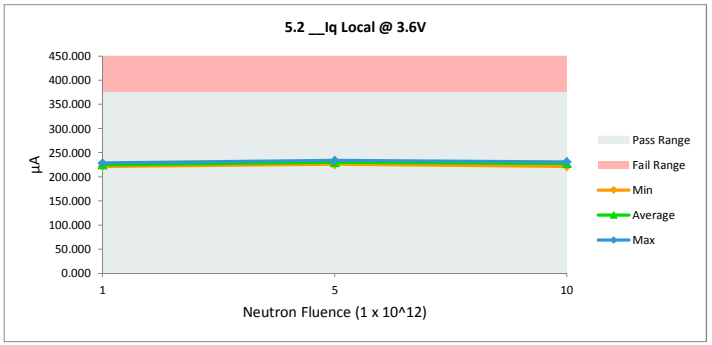


NDD Report
TMP461HKU (5962R1721801VXC)

5.2 __Iq Local @ 3.6V				
Test Site		Junkins	Junkins	
Tester		ETS36401	ETS36401	
Test Number		EF901401	EF901401	
Unit		µA	µA	
Max Limit		375	375	
Min Limit		0	0	
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	222.099	221.751	0.348
1	89	224.972	224.807	0.165
1	90	230.778	228.658	2.120
1	91	227.111	226.825	0.286
1	92	224.055	223.341	0.714
5	93	221.610	227.069	-5.459
5	95	229.373	232.570	-3.197
5	96	229.006	230.675	-1.669
5	97	227.783	225.908	1.875
5	98	227.906	233.915	-6.009
10	99	227.111	221.629	5.482
10	100	232.673	230.125	2.548
10	101	231.084	230.920	0.164
10	102	226.255	227.313	-1.058
10	103	234.385	228.658	5.727
	Max	234.385	233.915	5.727
	Average	227.747	227.611	0.136
	Min	221.610	221.629	-6.009
	Std Dev	3.653	3.716	3.358

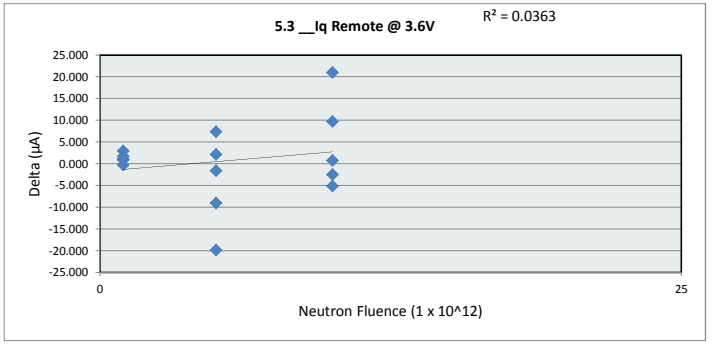


5.2 __Iq Local @ 3.6V			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	375	µA	
Min Limit	0	µA	
Neutron Fluence (1 x	1	5	10
LL	0.000	0.000	0.000
Min	221.751	225.908	221.629
Average	225.076	230.027	227.729
Max	228.658	233.915	230.920
UL	375.000	375.000	375.000

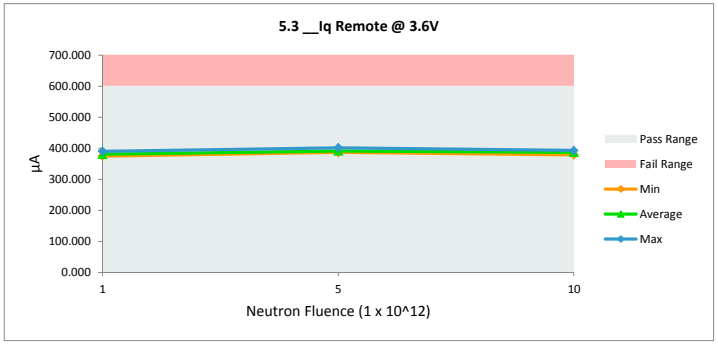


NDD Report
TMP461HKU (5962R1721801VXC)

5.3 __Iq Remote @ 3.6V				
Test Site		Junkins	Junkins	
Tester		ETS36401	ETS36401	
Test Number		EF901401	EF901401	
Unit		µA	µA	
Max Limit		600	600	
Min Limit		0	0	
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	381.511	380.364	1.147
1	89	378.577	377.675	0.902
1	90	389.518	389.838	-0.320
1	91	382.305	379.325	2.980
1	92	376.254	374.558	1.696
5	93	378.638	387.699	-9.061
5	95	391.107	388.982	2.125
5	96	394.102	386.721	7.381
5	97	390.129	391.733	-1.604
5	98	381.633	401.513	-19.880
10	99	388.418	378.714	9.704
10	100	388.296	390.755	-2.459
10	101	387.623	392.772	-5.149
10	102	392.269	391.488	0.781
10	103	402.415	381.403	21.012
	Max	402.415	401.513	21.012
	Average	386.853	386.236	0.617
	Min	376.254	374.558	-19.880
	Std Dev	7.020	7.315	8.928

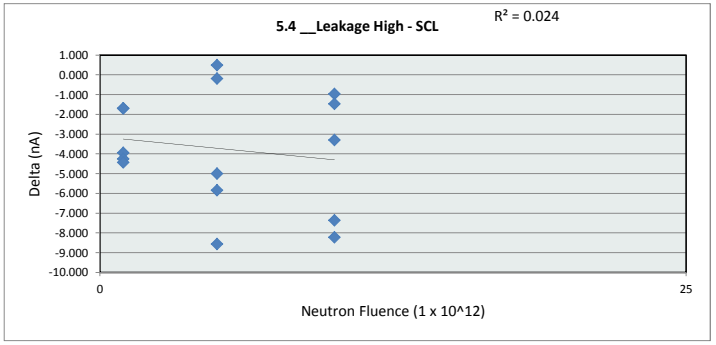


5.3 __Iq Remote @ 3.6V			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	600	µA	
Min Limit	0	µA	
Neutron Fluence (1 x	1	5	10
LL	0.000	0.000	0.000
Min	374.558	386.721	378.714
Average	380.352	391.330	387.026
Max	389.838	401.513	392.772
UL	600.000	600.000	600.000

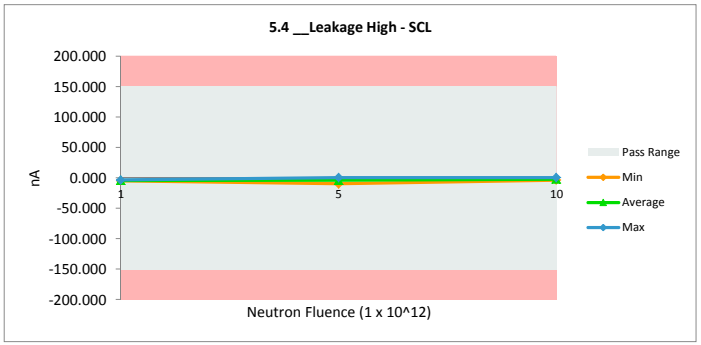


NDD Report
TMP461HKU (5962R1721801VXC)

5.4 __Leakage High - SCL			
Test Site	Junkins	Junkins	
Tester	ETS36401	ETS36401	
Test Number	EF901401	EF901401	
Unit	nA	nA	
Max Limit	150	150	
Min Limit	-150	-150	
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	-7.490	-3.536	-3.954
1	89	-6.230	-4.541	-1.689
1	90	-8.989	-4.736	-4.253
1	91	-7.910	-3.476	-4.434
1	92	-6.245	-4.556	-1.689
5	93	-5.406	0.439	-5.845
5	95	-4.716	-5.201	0.485
5	96	-9.859	-9.670	-0.189
5	97	-9.049	-4.046	-5.003
5	98	-9.679	-1.121	-8.558
10	99	-4.626	-3.656	-0.970
10	100	-7.685	0.543	-8.228
10	101	-5.211	-3.746	-1.465
10	102	-9.514	-2.156	-7.358
10	103	-5.076	-1.781	-3.295
	Max	-4.626	0.543	0.485
	Average	-7.179	-3.416	-3.763
	Min	-9.859	-9.670	-8.558
	Std Dev	1.934	2.496	2.868



5.4 __Leakage High - SCL			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	150	nA	
Min Limit	-150	nA	
Neutron Fluence (1 x	1	5	10
LL	-150.000	-150.000	-150.000
Min	-4.736	-9.670	-3.746
Average	-4.169	-3.920	-2.159
Max	-3.476	0.439	0.543
UL	150.000	150.000	150.000



NDD Report
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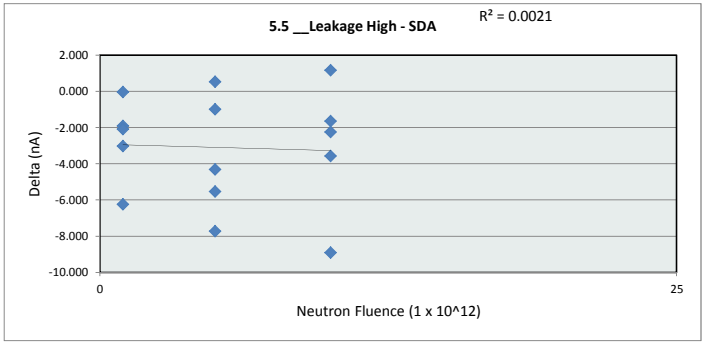
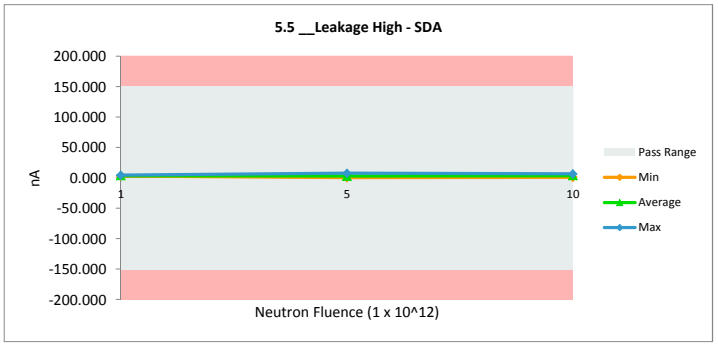
5.5 __Leakage High - SDA			
Test Site	Junkins	Junkins	
Tester	ETS36401	ETS36401	
Test Number	EF901401	EF901401	
Unit	nA	nA	
Max Limit	150	150	
Min Limit	-150	-150	
Neutron Fluence (1 x 10^12)	Serial #	Pre NDD	MP461 NDDredo.t	Delta
1	88	1.215	3.135	-1.920
1	89	4.470	4.515	-0.045
1	90	1.260	3.345	-2.085
1	91	0.285	3.315	-3.030
1	92	-2.369	3.870	-6.239
5	93	1.095	0.569	0.526
5	95	-2.369	1.950	-4.319
5	96	1.425	2.415	-0.990
5	97	-3.284	2.250	-5.534
5	98	0.030	7.756	-7.726
10	99	2.940	6.511	-3.571
10	100	-4.349	4.560	-8.909
10	101	2.160	0.990	1.170
10	102	0.480	2.130	-1.650
10	103	1.710	3.960	-2.250
	Max	4.470	7.756	1.170
	Average	0.313	3.418	-3.105
	Min	-4.349	0.569	-8.909
	Std Dev	2.424	1.921	2.965



5.5 __Leakage High - SDA			
Test Site	Junkins		
Tester	ETS36401		
Test Number	EF901401		
Max Limit	150	nA	
Min Limit	-150	nA	
Neutron Fluence (1 x	1	5	10
LL	-150.000	-150.000	-150.000
Min	3.135	0.569	0.990
Average	3.636	2.988	3.630
Max	4.515	7.756	6.511
UL	150.000	150.000	150.000



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