



## ***Radiation Lot Acceptance Testing (RLAT) of the Radiation Assured Devices RAD1419 14-Bit, 800ksps Sampling A/D Converter with Shutdown***

**Customer:** Radiation Assured Devices

**RAD Job Number:** 10-009

**Part Type Tested/SMD:** Radiation Assured Devices RAD1419 14-Bit, 800ksps Sampling A/D Converter with Shutdown

**Traceability Information:** Wafer Lot: W0945251-05, Wafer 3, Lot Date code: 1012; see Appendix A for a photograph of a sample unit-under-test.

**Quantity of Units:** 7 units total, 5 units for biased irradiation and 2 control units. Serial numbers 31, 32, 34-36 were biased during irradiation. Serial numbers 1 and 2 was used as the control. See Appendix B for the radiation bias connection table.

**Traveler:** RAD 10-009 1419, 1200-903-Rev. 4-3-09

**TID Dose Rate and Test Increments:** 50-300rad(Si)/s with readings at pre-irradiation, 10krad(Si), 30krad(Si), 50krad(Si) and 100krad(Si).

**TID Overtest and Post-Irradiation Anneal:** No overttest or anneal included in this report.

**Referenced TID Test Standard:** MIL-STD-883G, Method 1019.7, Condition A

**TID Electrical Test Conditions:** Pre-irradiation, and within one hour following each radiation exposure.

**Test Hardware:** Static Tests: LTS-2020 Entity ID TS03, calibration performed on 04/28/2010 calibration due on 04/28/2011. LTS2200 family board, Entity ID: FB03 and RAD1419W BGSS-090815 DUT Board; Test program RAD1419.SRC. Dynamic Tests: LTC1419W BGSS-090816, Stanford Research DS360, Entity ID: SG08, RAD100128 Rev 1.0 Dynamic Filter, Entity ID: FLT01, Test Program: LTC1419w\_b

**Facility and Radiation Source:** Radiation Assured Devices Longmire Laboratories, Colorado Springs, CO using the JLSA 81-24 high dose rate Co60 source. Dosimetry performed by CaF TLDs traceable to NIST. RAD's dosimetry has been audited by DSCC and RAD has been awarded Laboratory Suitability for MIL-STD-750 TM 1019 and MIL-STD-883 TM1019.

**Irradiation and Test Temperature:** Room temperature for irradiation and test controlled to  $24^{\circ}\text{C} \pm 6^{\circ}\text{C}$  per MIL-STD-883.

**RLAT Result: Units PASSED to the maximum tested dose level of 100krad(Si) with all parameters remaining within their post-irradiation datasheet limits.**



## **1.0. Overview and Background**

It is well known that total dose ionizing radiation can cause parametric degradation and ultimately functional failure in electronic devices. The damage occurs via electron-hole pair production, transport and trapping in the dielectric and interface regions. In discrete devices the bulk of the damage is frequently manifested as a reduction in the gain and/or breakdown voltage of the device. The damage will usually anneal with time following the end of the radiation exposure. Due to this annealing, and to ensure a worst-case test condition MIL-STD-883 TM1019.7 calls out a dose rate of 50 to 300rad(Si)/s as Condition A and further specifies that the time from the end of an incremental radiation exposure and electrical testing shall be 1-hour or less and the total time from the end of one incremental irradiation to the beginning of the next incremental radiation step should be 2-hours or less. The work described in this report was performed to meet MIL-STD-883 TM1019.7 Condition A.

## **2.0. Radiation Test Apparatus**

The total ionizing dose testing described in this final report was performed using the facilities at Radiation Assured Devices' Longmire Laboratories in Colorado Springs, CO. The high dose rate total ionizing dose (TID) source is a JLSA 84-21 irradiator modified to provide a panoramic exposure. The Co-60 rods are held in the base of the irradiator heavily shielded by lead, during the radiation exposures the rod is raised by an electronic timer/controller and the exposure is performed in air. The dose rate for this irradiator in this configuration ranges from <1rad(Si)/s to a maximum of approximately 120rad(Si)/s, determined by the distance from the source. For high-dose rate experiments the bias boards are placed in a radial fashion equidistant from the raised Co-60 rods with the distance adjusted to provide the required dose rate. The irradiator calibration is maintained by Radiation Assured Devices Longmire Laboratories using thermoluminescent dosimeters (TLDs) traceable to the National Institute of Standards and Technology (NIST). Figure 2.1 shows a photograph of the JLSA 81-24 Co-60 irradiator at RAD's Longmire Laboratory facility.

RAD is currently certified by the Defense Supply Center Columbus (DSCC) for Laboratory Suitability under MIL-STD-750 and MIL-STD-883. Additional details regarding Radiation Assured Devices dosimetry for TM1019 Condition A testing are available in RAD's report to DSCC entitled: "Dose Rate Mapping of the J.L. Shepherd and Associates Model 81 Irradiator Installed by Radiation Assured Devices"



Figure 2.1. Radiation Assured Devices' high dose rate Co-60 irradiator. The dose rate is obtained by positioning the device-under-test at a fixed distance from the gamma cell. The dose rate for this irradiator varies from approximately 120rad(Si)/s close to the rods down to 1rad(Si)/s at a distance of approximately 2-feet.



### **3.0. Radiation Test Conditions**

The RAD1419 14-Bit, 800ksps Sampling A/D Converter with Shutdown described in this final report was irradiated in a dynamic configuration using a split supply potential of 5.5V on  $V_{DD}$  and  $V_{SS}$ . See the TID Bias Table in Appendix B for the full bias circuits. In our opinion, this bias circuits satisfy the requirements of MIL-STD-883G TM1019.7 Section 3.9.3 Bias and Loading Conditions for units irradiated under electrical bias which states “The bias applied to the test devices shall be selected to produce the greatest radiation induced damage or the worst-case damage for the intended application, if known. While maximum voltage is often worst case some bipolar linear device parameters (e.g. input bias current or maximum output load current) exhibit more degradation with 0 V bias.”

The devices were irradiated to a maximum total ionizing dose level of 100krad(Si) with incremental readings at 10krad(Si), 30krad(Si) and 50krad(Si). Electrical testing occurred within one hour following the end of each irradiation segment. For intermediate irradiations, the parts were tested and returned to total dose exposure within two hours from the end of the previous radiation increment.

The TID bias board was positioned in the Co-60 cell to provide the required dose rate range of 50rad(Si)/s to 300rad(Si)/s and was located inside a lead-aluminum enclosure. The lead-aluminum enclosure is required under MIL-STD-883G TM1019.7 Section 3.4 that reads as follows: “Lead/Aluminum (Pb/Al) container. Test specimens shall be enclosed in a Pb/Al container to minimize dose enhancement effects caused by low-energy, scattered radiation. A minimum of 1.5 mm Pb, surrounding an inner shield of at least 0.7 mm Al, is required. This Pb/Al container produces an approximate charged particle equilibrium for Si and for TLDs such as CaF<sub>2</sub>. The radiation field intensity shall be measured inside the Pb/Al container (1) initially, (2) when the source is changed, or (3) when the orientation or configuration of the source, container, or test-fixture is changed. This measurement shall be performed by placing a dosimeter (e.g., a TLD) in the device-irradiation container at the approximate test-device position. If it can be demonstrated that low energy scattered radiation is small enough that it will not cause dosimetry errors due to dose enhancement, the Pb/Al container may be omitted”.

The final dose rate within the lead-aluminum enclosure was determined based on TLD dosimetry measurements (see previous section). The final dose rate for this work was 55.8rad(Si)/s with a precision of  $\pm 5\%$ .



#### 4.0. Tested Parameters

During the radiation lot acceptance testing the following electrical parameters were measured pre- and post-irradiation:

1. Power Supply Current,  $I_{CC}$  SHDN=1 CS=0
2. Power Supply Current, Nap Mode,  $I_{CC}$  SHDN=0 CS=0
3. Power Supply Current, Sleep Mode,  $I_{CC}$  SHDN=0 CS=1
4. Power Supply Current,  $I_{EE}$ , SHDN=1 CS=0
5. Power Supply Current, Nap Mode,  $I_{EE}$  SHDN=0 CS=0
6. Power Supply Current, Sleep Mode,  $I_{EE}$  SHDN=0 CS=1
7. Output Reference Voltage,  $V_{REF}$
8.  $V_{OL}$  @ 1.6mA Outputs D0-D13
9.  $V_{OH}$  @ 1.6mA Outputs D0-D13
10.  $V_{OH}$  @ 0.2mA BUSY
11.  $I_{OZH}$  @  $V_O=5V$  Outputs D0-D13
12.  $I_{OZL}$  @  $V_O=5V$  Outputs D0-D13
13.  $I_{IL}$  CS @ 0V
14.  $I_{IL}$  RD @ 0V
15.  $I_{IL}$  SHDN @ 0V
16.  $I_{IL}$  CONVST @ 0V
17.  $I_{IH}$  CS @ 5V
18.  $I_{IH}$  RD @ 5V
19.  $I_{IH}$  SHDN @ 5V
20.  $I_{IH}$  CONVST @ 5V
21. Analog Input Leakage Current  $I_{IN}$ ,  $V_{AIN}=2.5V$
22. Analog Input Leakage Current  $I_{IN}$ ,  $V_{AIN}=-2.5V$
23. Bipolar Offset
24. Bipolar Gain Error
25. Integral Linearity Error, Positive
26. Integral Linearity Error, Negative
27. Differential Linearity Error CODEWIDTH LONG
28. Differential Linearity Error CODEWIDTH SHORT
29. Spurious Free Dynamic Range, SFDR
30. Total Harmonic Distortion, THD
31. Signal-to-Noise + Distortion Ratio, SINAD

Appendix C details the measured parameters, test conditions, pre-irradiation specification and measurement resolution for each of the measurements.

The parametric data was obtained as read and record and all the raw data plus an attributes summary are contained in this report as well as in a separate Excel file. The attributes data contains the average,



standard deviation and the average with the KTL values applied. The KTL value used in this work is 2.742 per MIL-HDBK-814 using one sided tolerance limits of 90/90 and a 5-piece sample size. The 90/90 KTL values were selected to match the statistical levels specified in the MIL-PRF-38535 sampling plan for the qualification of a radiation hardness assured (RHA) component. Note that the following criterion must be met for a device to pass the RLAT: following the radiation exposure each of the 5 pieces irradiated under electrical bias shall pass the specification value. The KTL statistics are included in this report for reference only. If any of the 5 pieces irradiated under electrical bias exceed the datasheet specifications, then the lot could be logged as a failure.

### **5.0. Total Ionizing Dose Test Results**

Based on the criterion established above, the units-under-test (from the lot date code / traceability information provided on the first page of this report) PASSED to the maximum tested total dose of 100krad(Si) with the all of the units-under-test remaining within their post-irradiation datasheet limits.

Figures 5.1 and 5.83 show plots of all the measured parameters versus total ionizing dose while Tables 5.1 – 5.83 show the corresponding raw data for each of these parameters. Appendix D lists all the figures used in this section for convenience in locating a particular parameter.

In the data plots the solid diamonds are the average of the measured data points for the sample irradiated under electrical bias while the black lines (solid or dashed) are the average of the data points after application of the KTL statistics on the sample irradiated in the biased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.

The control units, as expected, show no significant changes throughout the test indicating that the electrical testing remained in control for the duration of the radiation exposures.

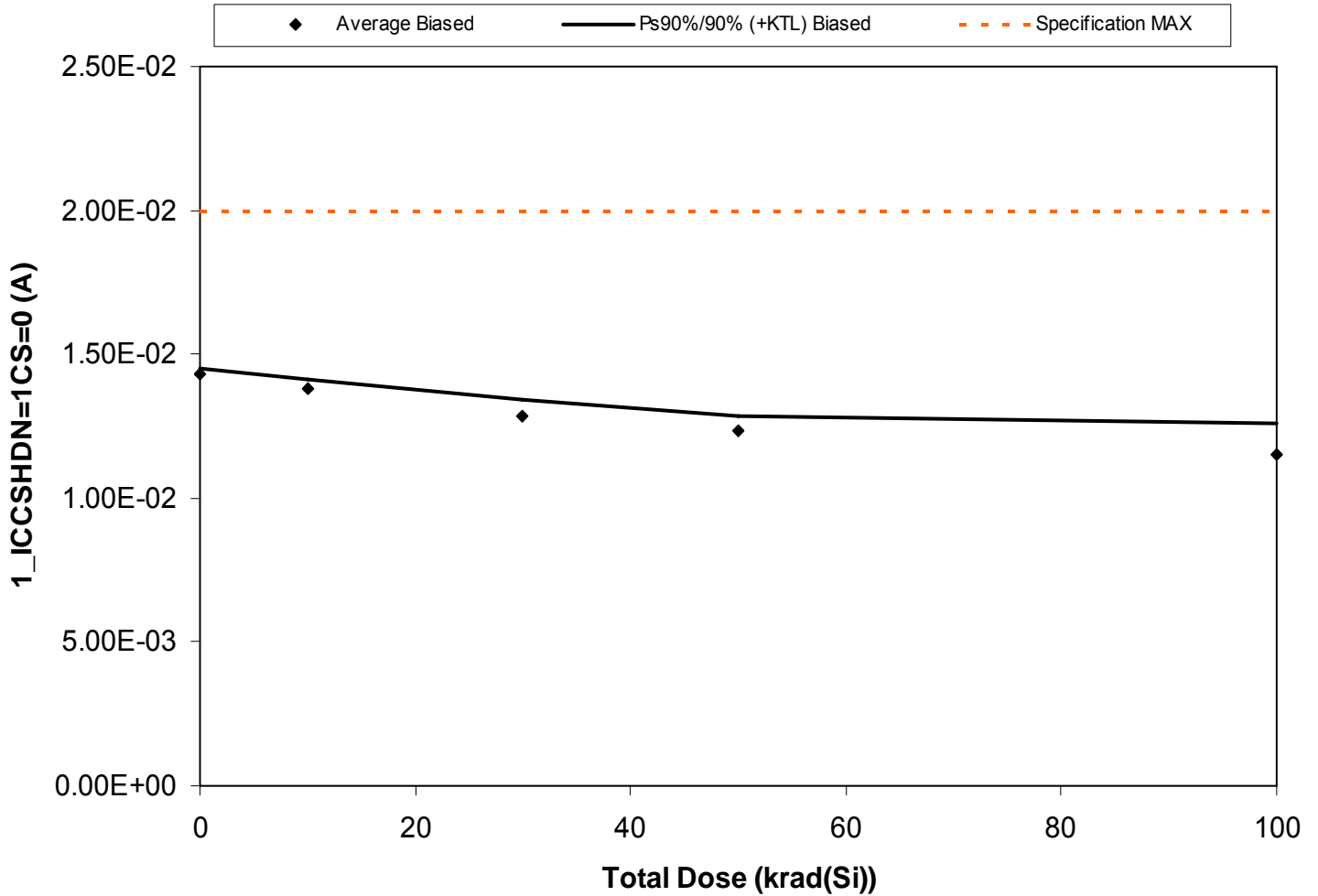


Figure 5.1. Plot of  $1\_ICCSDN=1CS=0$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.1. Raw data for 1\_ICCSDN=1CS=0 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

1_ICCSDN=1CS=0 (A)		Total Dose (krad(Si))				
Device		0	10	30	50	100
31		1.42E-02	1.37E-02	1.27E-02	1.24E-02	1.18E-02
32		1.43E-02	1.39E-02	1.30E-02	1.24E-02	1.17E-02
34		1.43E-02	1.38E-02	1.30E-02	1.24E-02	1.16E-02
35		1.44E-02	1.39E-02	1.31E-02	1.25E-02	1.17E-02
36		1.42E-02	1.36E-02	1.26E-02	1.20E-02	1.09E-02
1		1.39E-02	1.39E-02	1.39E-02	1.40E-02	1.39E-02
2		1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02
<b>Biased Statistics</b>						
Average Biased		1.43E-02	1.38E-02	1.29E-02	1.23E-02	1.15E-02
Std Dev Biased		8.50E-05	1.18E-04	1.94E-04	1.96E-04	3.77E-04
Ps90%/90% (+KTL) Biased		1.45E-02	1.41E-02	1.34E-02	1.29E-02	1.26E-02
Ps90%/90% (-KTL) Biased		1.41E-02	1.35E-02	1.23E-02	1.18E-02	1.05E-02
<b>Specification MAX</b>		<b>2.00E-02</b>	<b>2.00E-02</b>	<b>2.00E-02</b>	<b>2.00E-02</b>	<b>2.00E-02</b>
Status		PASS	PASS	PASS	PASS	PASS

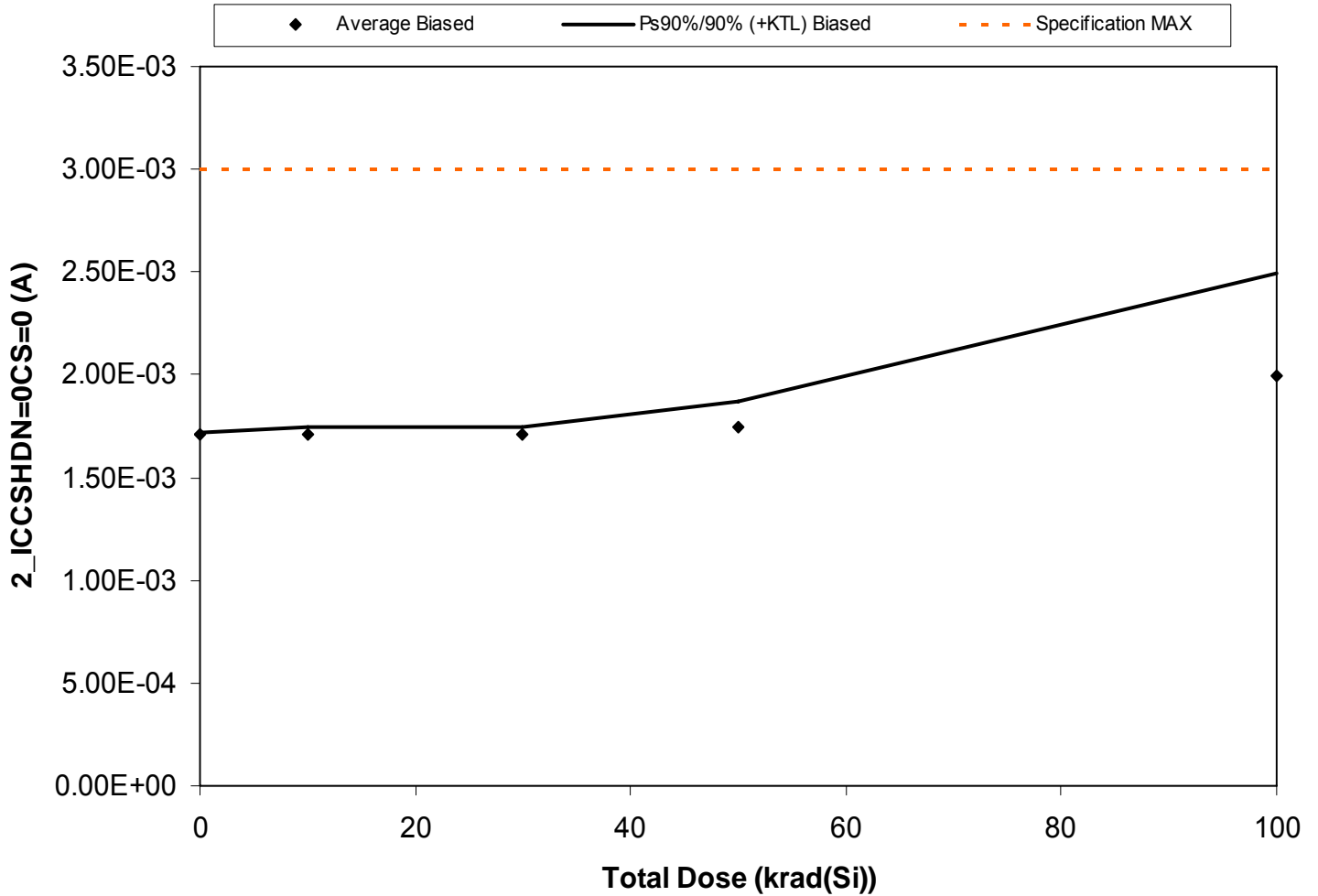


Figure 5.2. Plot of  $2_{\text{ICCSHDN=0CS=0}}$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.2. Raw data for 2\_ICCSDN=0CS=0 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

2_ICCSDN=0CS=0 (A)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	1.71E-03	1.72E-03	1.73E-03	1.79E-03	2.18E-03
32	1.71E-03	1.70E-03	1.71E-03	1.76E-03	2.04E-03
34	1.70E-03	1.71E-03	1.71E-03	1.74E-03	2.00E-03
35	1.70E-03	1.69E-03	1.72E-03	1.76E-03	2.05E-03
36	1.71E-03	1.72E-03	1.70E-03	1.67E-03	1.69E-03
1	1.70E-03	1.71E-03	1.71E-03	1.70E-03	1.71E-03
2	1.69E-03	1.70E-03	1.68E-03	1.69E-03	1.68E-03
<b>Biased Statistics</b>					
Average Biased	1.71E-03	1.71E-03	1.71E-03	1.74E-03	1.99E-03
Std Dev Biased	5.48E-06	1.30E-05	1.14E-05	4.51E-05	1.82E-04
Ps90%/90% (+KTL) Biased	1.72E-03	1.74E-03	1.75E-03	1.87E-03	2.49E-03
Ps90%/90% (-KTL) Biased	1.69E-03	1.67E-03	1.68E-03	1.62E-03	1.49E-03
<b>Specification MAX</b>	<b>3.00E-03</b>	<b>3.00E-03</b>	<b>3.00E-03</b>	<b>3.00E-03</b>	<b>3.00E-03</b>
Status	PASS	PASS	PASS	PASS	PASS

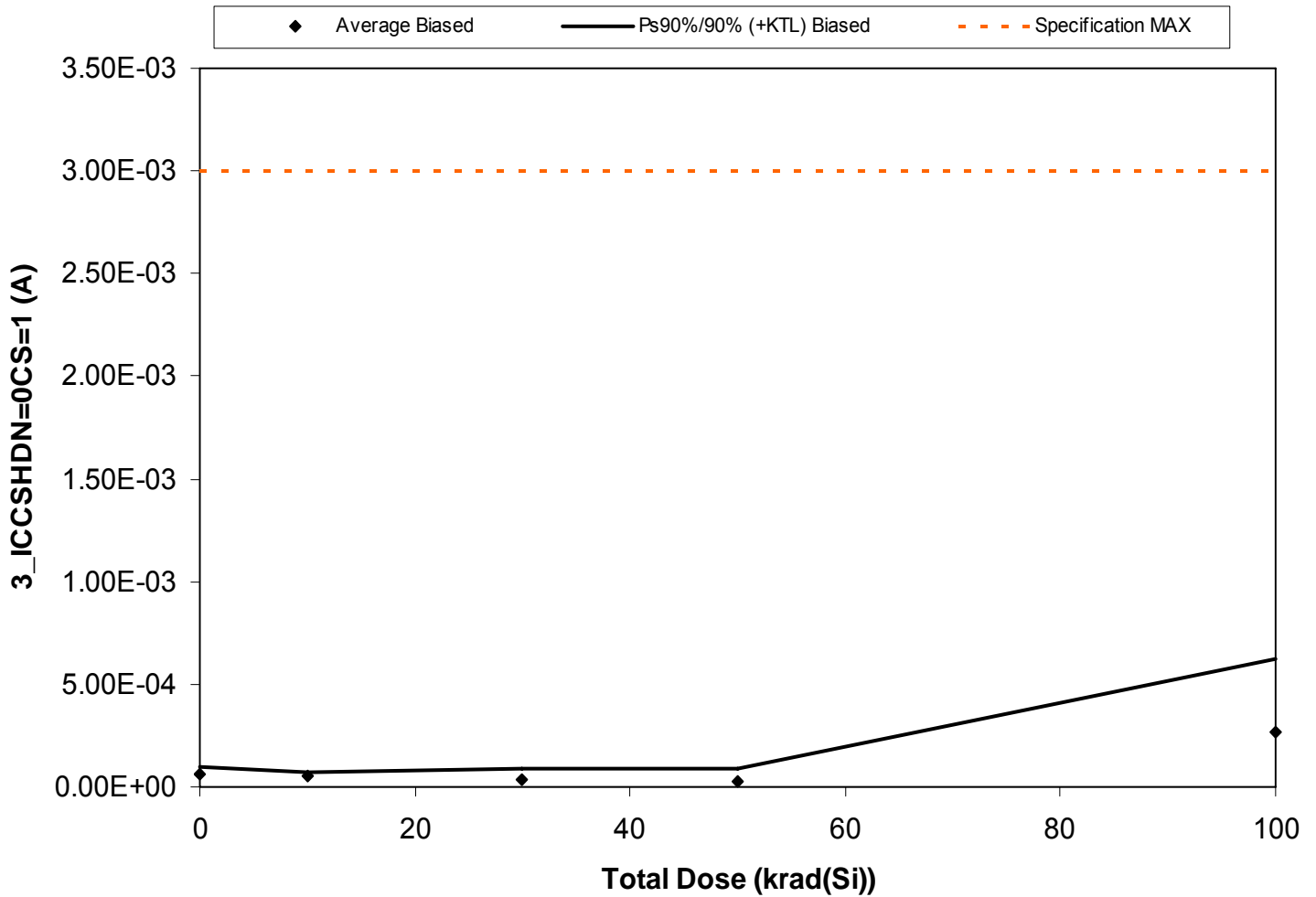


Figure 5.3. Plot of  $3\_ICCSHDN=0CS=1$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.3. Raw data for 3\_ICCSDN=0CS=1 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

3_ICCSDN=0CS=1 (A)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	8.00E-05	6.00E-05	1.00E-05	4.00E-05	4.10E-04
32	6.00E-05	5.00E-05	4.00E-05	1.00E-05	2.90E-04
34	7.00E-05	5.00E-05	4.00E-05	1.00E-05	2.40E-04
35	5.00E-05	5.00E-05	4.00E-05	2.00E-05	3.20E-04
36	5.00E-05	6.00E-05	6.00E-05	6.00E-05	6.00E-05
1	8.00E-05	6.00E-05	6.00E-05	6.00E-05	7.00E-05
2	7.00E-05	6.00E-05	7.00E-05	6.00E-05	6.00E-05
<b>Biased Statistics</b>					
Average Biased	6.20E-05	5.40E-05	3.80E-05	2.80E-05	2.64E-04
Std Dev Biased	1.30E-05	5.48E-06	1.79E-05	2.17E-05	1.30E-04
Ps90%/90% (+KTL) Biased	9.78E-05	6.90E-05	8.71E-05	8.74E-05	6.20E-04
Ps90%/90% (-KTL) Biased	2.62E-05	3.90E-05	-1.11E-05	-3.14E-05	-9.17E-05
<b>Specification MAX</b>	<b>3.00E-03</b>	<b>3.00E-03</b>	<b>3.00E-03</b>	<b>3.00E-03</b>	<b>3.00E-03</b>
Status	PASS	PASS	PASS	PASS	PASS

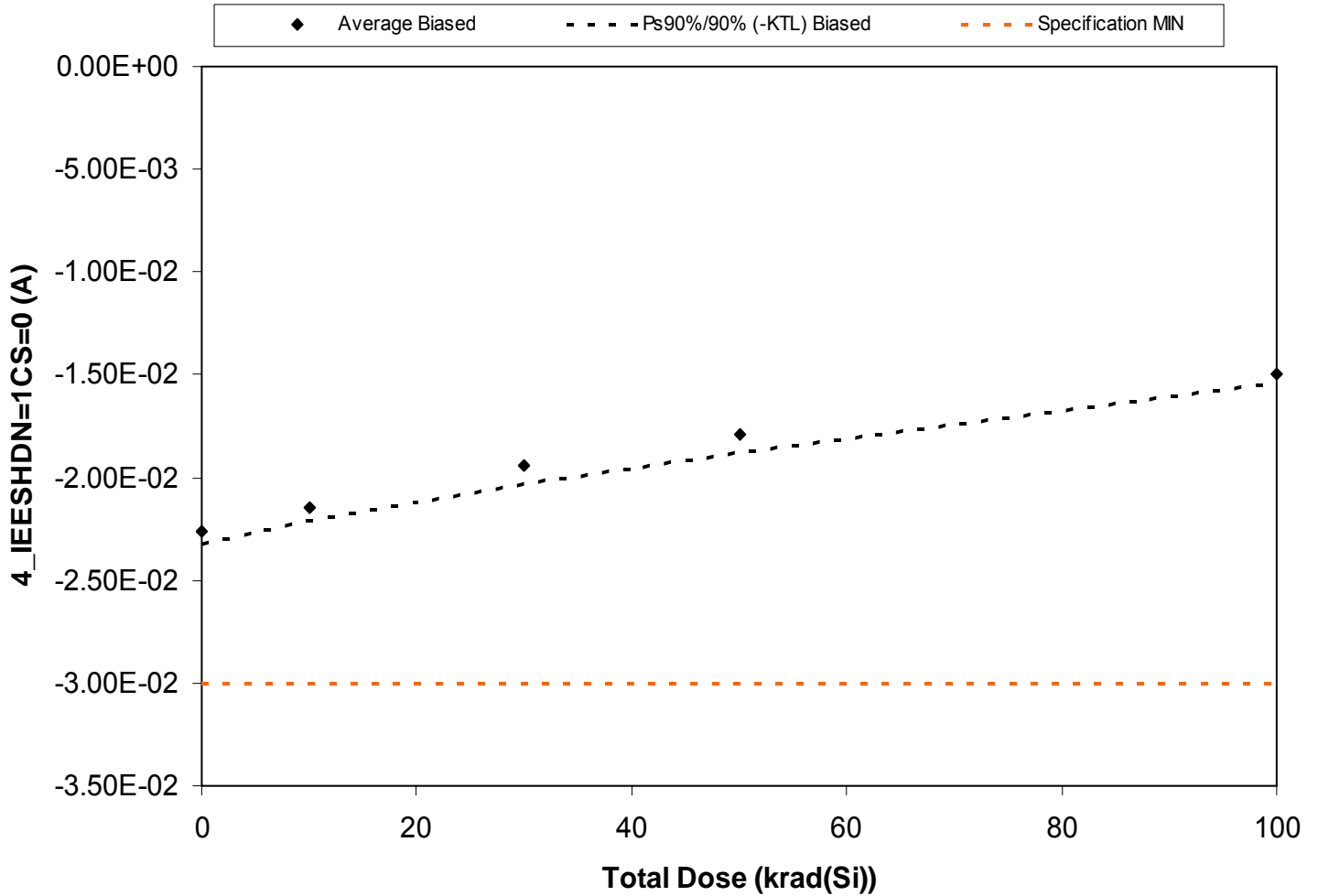


Figure 5.4. Plot of  $4\_IEESH\ DN=1CS=0$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.4. Raw data for 4\_IEESH DN=1CS=0 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

4_IEESH DN=1CS=0 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-2.28E-02	-2.15E-02	-1.96E-02	-1.81E-02	-1.50E-02
	32	-2.28E-02	-2.16E-02	-1.95E-02	-1.79E-02	-1.50E-02
	34	-2.24E-02	-2.13E-02	-1.93E-02	-1.77E-02	-1.49E-02
	35	-2.29E-02	-2.18E-02	-1.98E-02	-1.83E-02	-1.52E-02
	36	-2.26E-02	-2.13E-02	-1.90E-02	-1.75E-02	-1.49E-02
	1	-2.27E-02	-2.27E-02	-2.27E-02	-2.27E-02	-2.28E-02
	2	-2.24E-02	-2.23E-02	-2.23E-02	-2.23E-02	-2.24E-02
<b>Biased Statistics</b>						
	Average Biased	-2.27E-02	-2.15E-02	-1.94E-02	-1.79E-02	-1.50E-02
	Std Dev Biased	2.04E-04	2.15E-04	3.17E-04	3.39E-04	1.50E-04
	Ps90%/90% (+KTL) Biased	-2.21E-02	-2.09E-02	-1.86E-02	-1.70E-02	-1.46E-02
	Ps90%/90% (-KTL) Biased	-2.32E-02	-2.21E-02	-2.03E-02	-1.88E-02	-1.54E-02
	<b>Specification MIN</b>	<b>-3.00E-02</b>	<b>-3.00E-02</b>	<b>-3.00E-02</b>	<b>-3.00E-02</b>	<b>-3.00E-02</b>
	Status	PASS	PASS	PASS	PASS	PASS

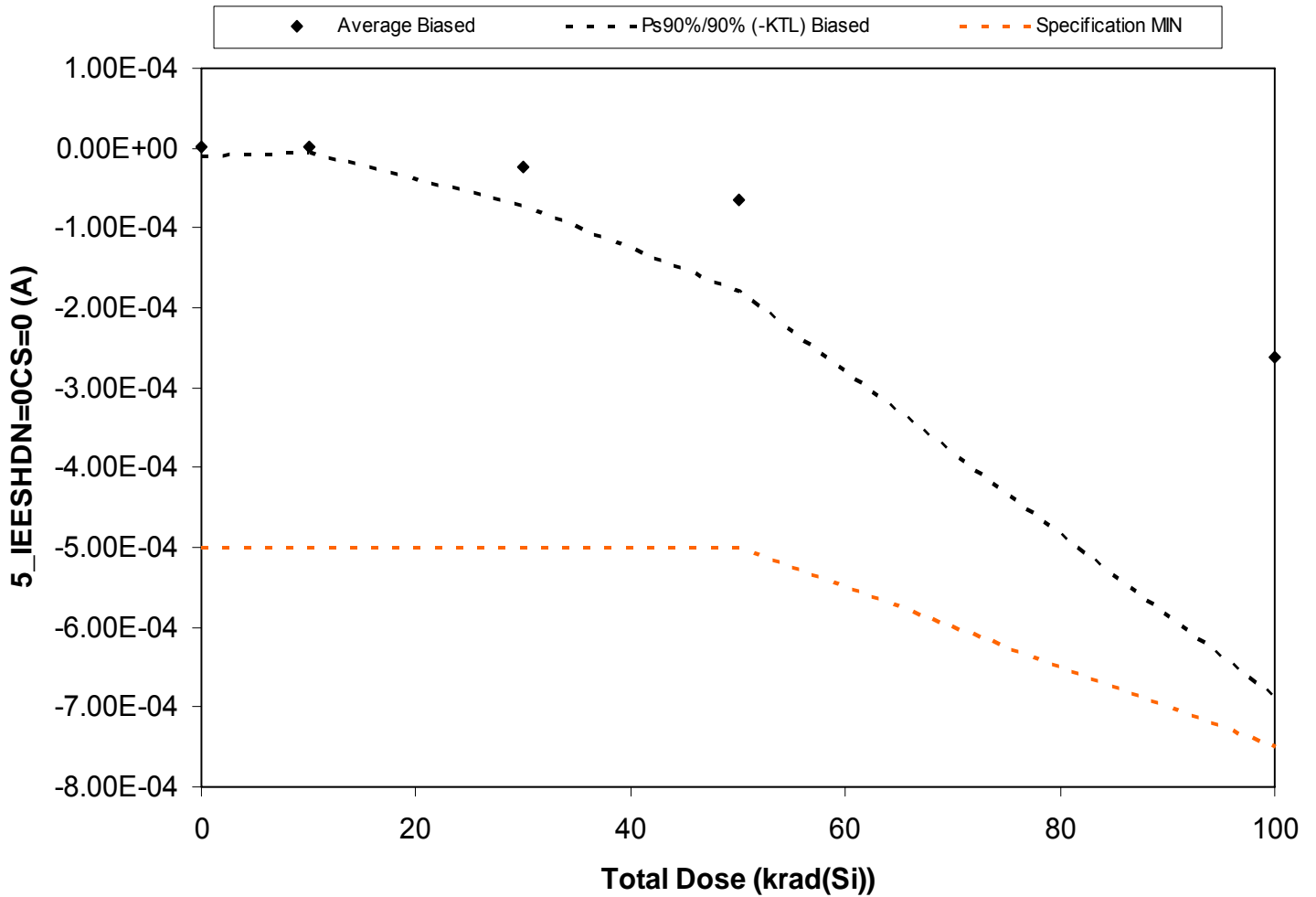


Figure 5.5. Plot of 5\_IEESH DN=0CS=0 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.5. Raw data for 5\_IEESH DN=0CS=0 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

5_IEESH DN=0CS=0 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	3.70E-06	-1.20E-06	-4.52E-05	-1.09E-04	-4.12E-04
	32	3.70E-06	3.70E-06	-2.57E-05	-6.97E-05	-2.90E-04
	34	3.70E-06	3.70E-06	-2.08E-05	-6.48E-05	-2.65E-04
	35	-6.10E-06	-1.20E-06	-3.06E-05	-8.43E-05	-3.39E-04
	36	3.70E-06	3.70E-06	3.70E-06	3.70E-06	-1.20E-06
	1	-1.20E-06	3.70E-06	3.70E-06	3.70E-06	3.60E-06
	2	3.70E-06	3.70E-06	3.70E-06	-1.20E-06	3.60E-06
<b>Biased Statistics</b>						
	Average Biased	1.74E-06	1.74E-06	-2.37E-05	-6.48E-05	-2.61E-04
	Std Dev Biased	4.38E-06	2.68E-06	1.78E-05	4.19E-05	1.56E-04
	Ps90%/90% (+KTL) Biased	1.38E-05	9.10E-06	2.52E-05	5.02E-05	1.66E-04
	Ps90%/90% (-KTL) Biased	-1.03E-05	-5.62E-06	-7.26E-05	-1.80E-04	-6.89E-04
	<b>Specification MIN</b>	<b>-5.00E-04</b>	<b>-5.00E-04</b>	<b>-5.00E-04</b>	<b>-5.00E-04</b>	<b>-7.50E-04</b>
	Status	PASS	PASS	PASS	PASS	PASS

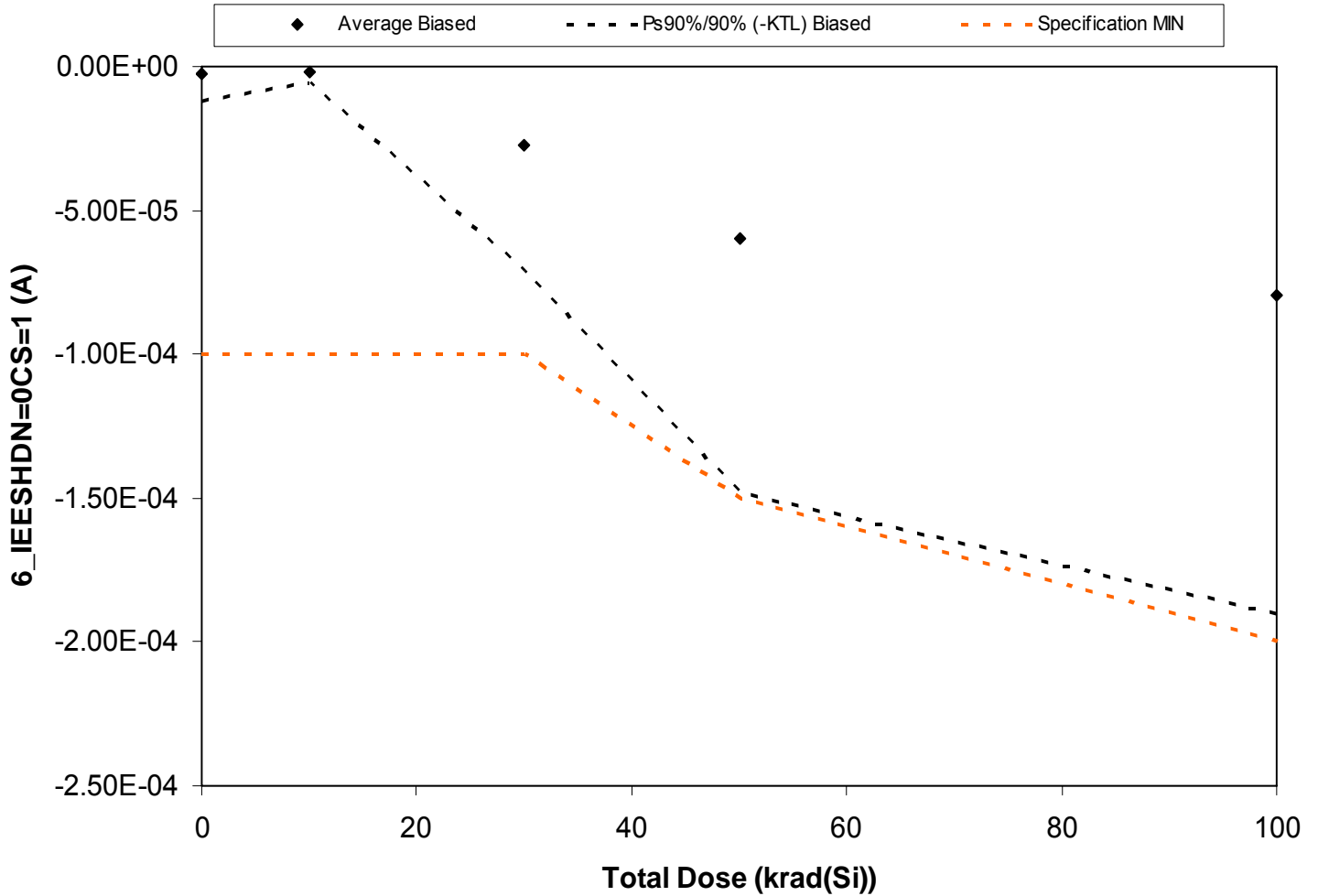


Figure 5.6. Plot of 6\_IEESH DN=0CS=1 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.6. Raw data for 6\_IEESH DN=0CS=1 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

6_IEESH DN=0CS=1 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-7.00E-07	-2.70E-06	-4.50E-05	-8.05E-05	-1.03E-04
	32	-7.00E-07	-1.70E-06	-2.95E-05	-7.28E-05	-9.49E-05
	34	-7.00E-07	-7.00E-07	-2.35E-05	-6.46E-05	-9.38E-05
	35	-8.70E-06	-4.10E-06	-3.59E-05	-7.83E-05	-9.85E-05
	36	-7.00E-07	-9.00E-07	-2.60E-06	-3.40E-06	-7.30E-06
	1	-7.00E-07	-6.00E-07	-5.00E-07	-6.00E-07	-6.00E-07
	2	-7.00E-07	-7.00E-07	-6.00E-07	-6.00E-07	-7.00E-07
<b>Biased Statistics</b>						
	Average Biased	-2.30E-06	-2.02E-06	-2.73E-05	-5.99E-05	-7.94E-05
	Std Dev Biased	3.58E-06	1.40E-06	1.59E-05	3.22E-05	4.04E-05
	Ps90%/90% (+KTL) Biased	7.51E-06	1.83E-06	1.64E-05	2.83E-05	3.15E-05
	Ps90%/90% (-KTL) Biased	-1.21E-05	-5.87E-06	-7.10E-05	-1.48E-04	-1.90E-04
	<b>Specification MIN</b>	<b>-1.00E-04</b>	<b>-1.00E-04</b>	<b>-1.00E-04</b>	<b>-1.50E-04</b>	<b>-2.00E-04</b>
	Status	PASS	PASS	PASS	PASS	PASS

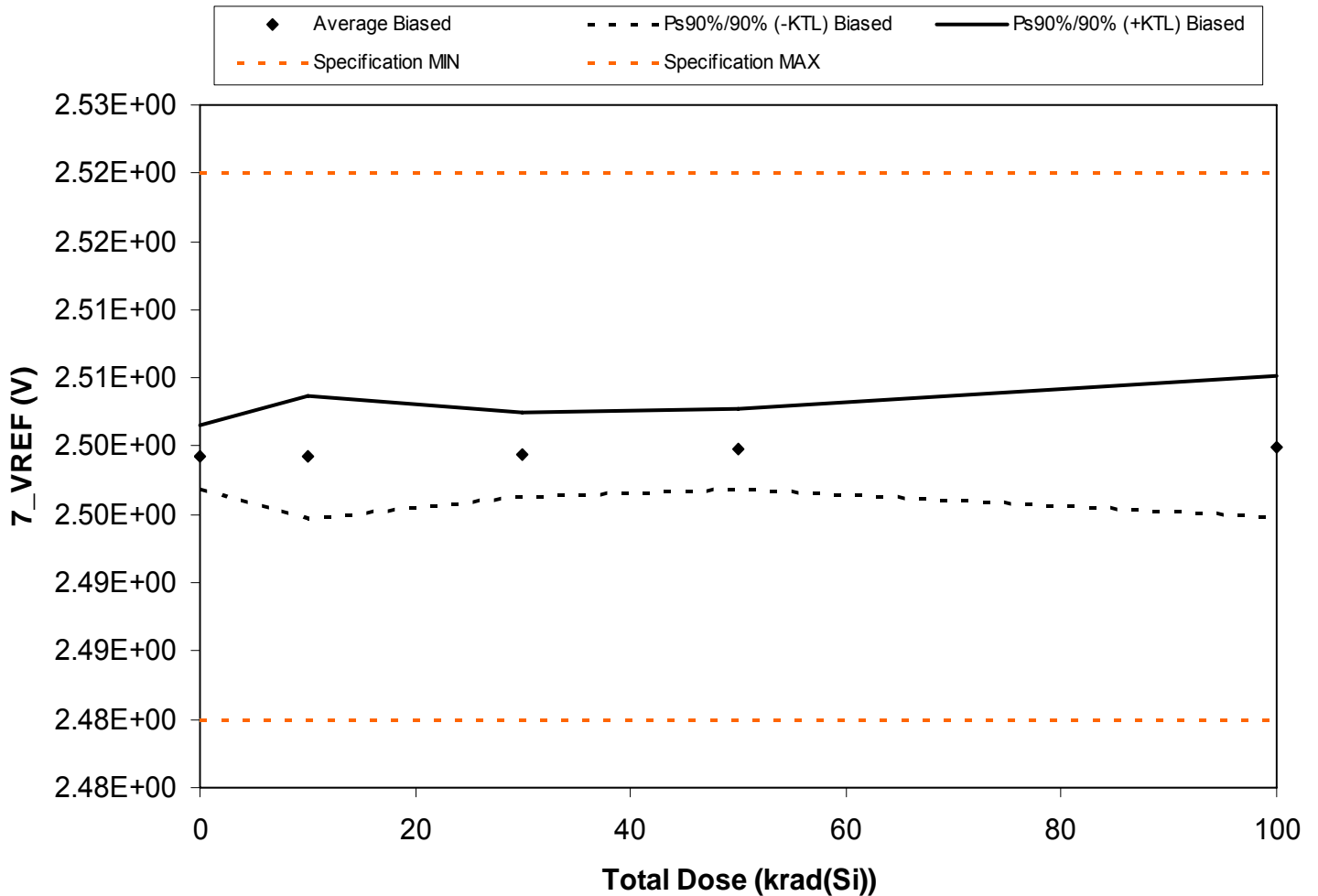


Figure 5.7. Plot of 7\_VREF (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.7. Raw data for 7\_VREF (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

7_VREF (V)	Total Dose (krad(Si))				
Device	0	10	30	50	100
31	2.50E+00	2.50E+00	2.50E+00	2.50E+00	2.50E+00
32	2.50E+00	2.50E+00	2.50E+00	2.50E+00	2.50E+00
34	2.50E+00	2.50E+00	2.50E+00	2.50E+00	2.50E+00
35	2.50E+00	2.50E+00	2.50E+00	2.50E+00	2.50E+00
36	2.50E+00	2.50E+00	2.50E+00	2.50E+00	2.50E+00
1	2.50E+00	2.50E+00	2.50E+00	2.50E+00	2.50E+00
2	2.50E+00	2.50E+00	2.50E+00	2.50E+00	2.50E+00
<b>Biased Statistics</b>					
Average Biased	2.50E+00	2.50E+00	2.50E+00	2.50E+00	2.50E+00
Std Dev Biased	8.37E-04	1.64E-03	1.14E-03	1.10E-03	1.87E-03
Ps90%/90% (+KTL) Biased	2.50E+00	2.50E+00	2.50E+00	2.50E+00	2.51E+00
Ps90%/90% (-KTL) Biased	2.50E+00	2.49E+00	2.50E+00	2.50E+00	2.49E+00
<b>Specification MIN</b>	<b>2.48E+00</b>	<b>2.48E+00</b>	<b>2.48E+00</b>	<b>2.48E+00</b>	<b>2.48E+00</b>
Status	PASS	PASS	PASS	PASS	PASS
<b>Specification MAX</b>	<b>2.52E+00</b>	<b>2.52E+00</b>	<b>2.52E+00</b>	<b>2.52E+00</b>	<b>2.52E+00</b>
Status	PASS	PASS	PASS	PASS	PASS

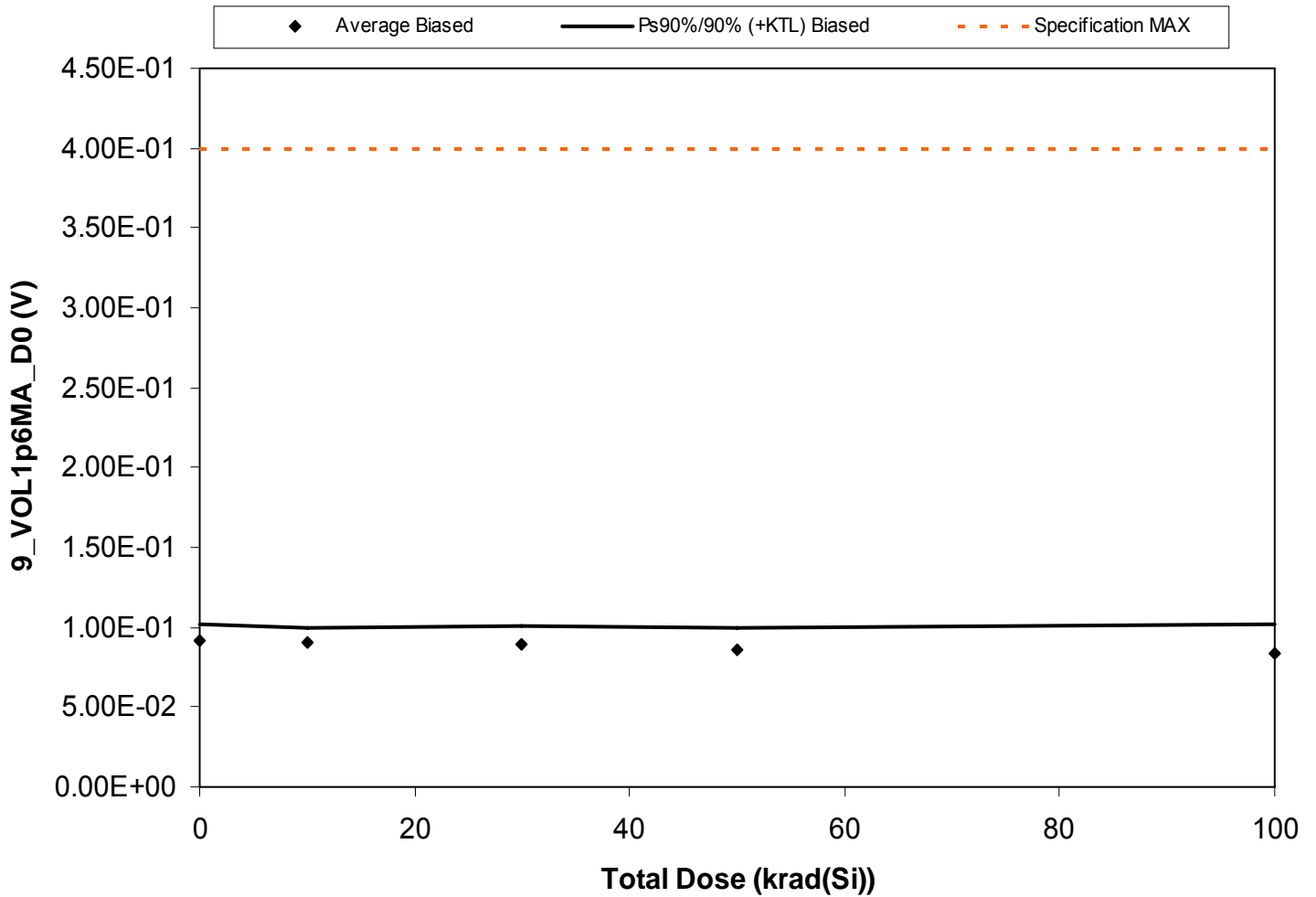


Figure 5.8. Plot of 9\_VOL1p6MA\_D0 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.8. Raw data for 9\_VOL1p6MA\_D0 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

9_VOL1p6MA_D0 (V)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	9.50E-02	9.40E-02	9.20E-02	8.80E-02	8.40E-02
32	8.90E-02	8.90E-02	8.60E-02	8.30E-02	8.00E-02
34	9.00E-02	8.90E-02	8.60E-02	8.30E-02	8.00E-02
35	8.90E-02	8.80E-02	8.50E-02	8.30E-02	7.90E-02
36	9.70E-02	9.50E-02	9.50E-02	9.40E-02	9.50E-02
1	9.70E-02	9.70E-02	9.60E-02	9.70E-02	9.70E-02
2	8.80E-02	8.80E-02	8.80E-02	8.70E-02	8.80E-02
<b>Biased Statistics</b>					
Average Biased	9.20E-02	9.10E-02	8.88E-02	8.62E-02	8.36E-02
Std Dev Biased	3.74E-03	3.24E-03	4.44E-03	4.87E-03	6.66E-03
Ps90%/90% (+KTL) Biased	1.02E-01	9.99E-02	1.01E-01	9.95E-02	1.02E-01
Ps90%/90% (-KTL) Biased	8.17E-02	8.21E-02	7.66E-02	7.29E-02	6.53E-02
<b>Specification MAX</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>
Status	PASS	PASS	PASS	PASS	PASS

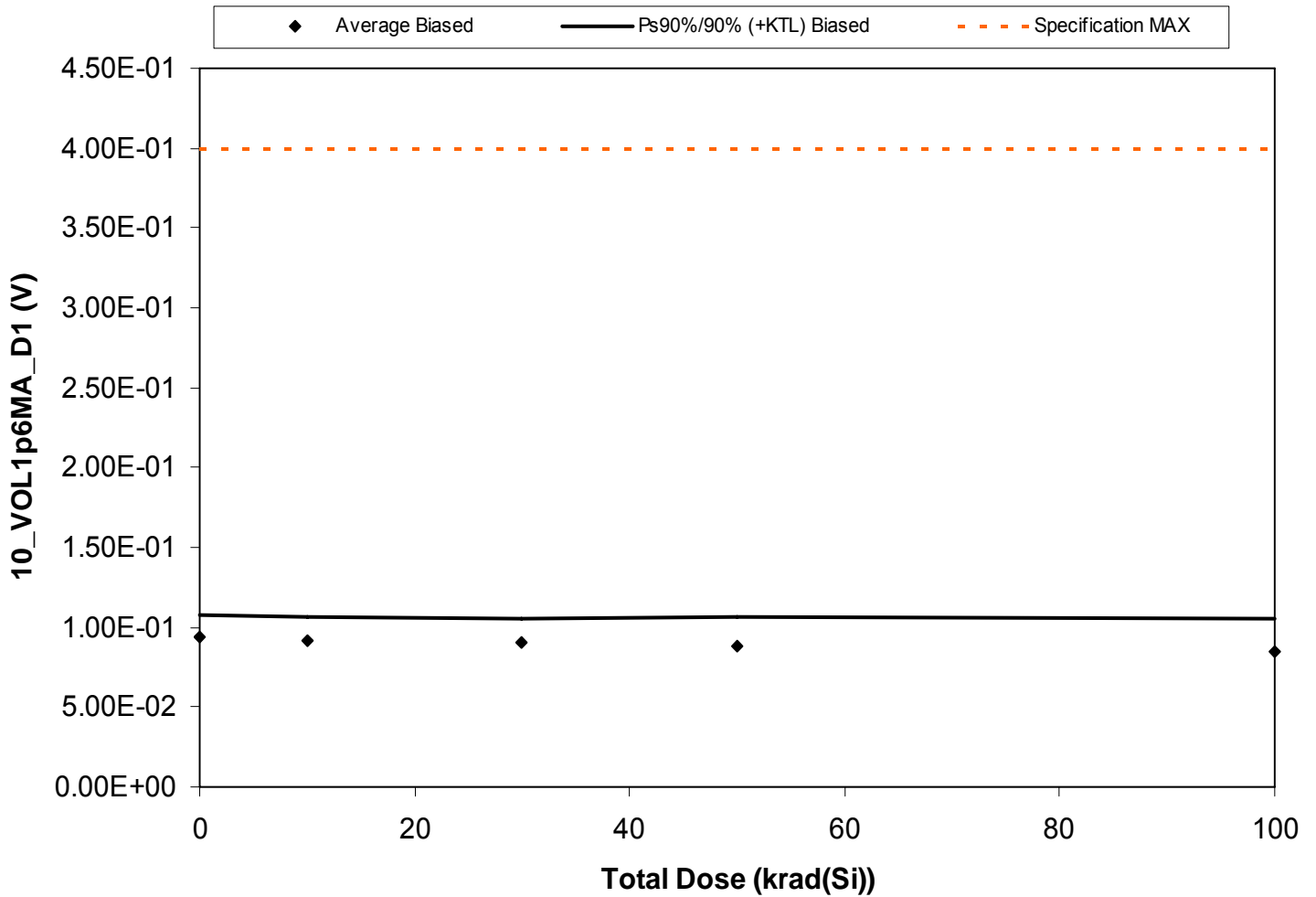


Figure 5.9. Plot of 10\_VOL1p6MA\_D1 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.9. Raw data for 10\_VOL1p6MA\_D1 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

10_VOL1p6MA_D1 (V)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	9.80E-02	9.60E-02	9.40E-02	9.10E-02	8.70E-02
32	8.90E-02	8.90E-02	8.60E-02	8.30E-02	7.90E-02
34	8.90E-02	8.80E-02	8.60E-02	8.30E-02	7.90E-02
35	9.10E-02	8.80E-02	8.60E-02	8.40E-02	8.00E-02
36	1.00E-01	9.90E-02	9.80E-02	9.80E-02	9.70E-02
1	1.00E-01	1.01E-01	1.00E-01	1.00E-01	1.00E-01
2	8.60E-02	8.70E-02	8.80E-02	8.80E-02	8.70E-02
<b>Biased Statistics</b>					
Average Biased	9.34E-02	9.20E-02	9.00E-02	8.78E-02	8.44E-02
Std Dev Biased	5.22E-03	5.15E-03	5.66E-03	6.61E-03	7.80E-03
Ps90%/90% (+KTL) Biased	1.08E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01
Ps90%/90% (-KTL) Biased	7.91E-02	7.79E-02	7.45E-02	6.97E-02	6.30E-02
<b>Specification MAX</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>
Status	PASS	PASS	PASS	PASS	PASS

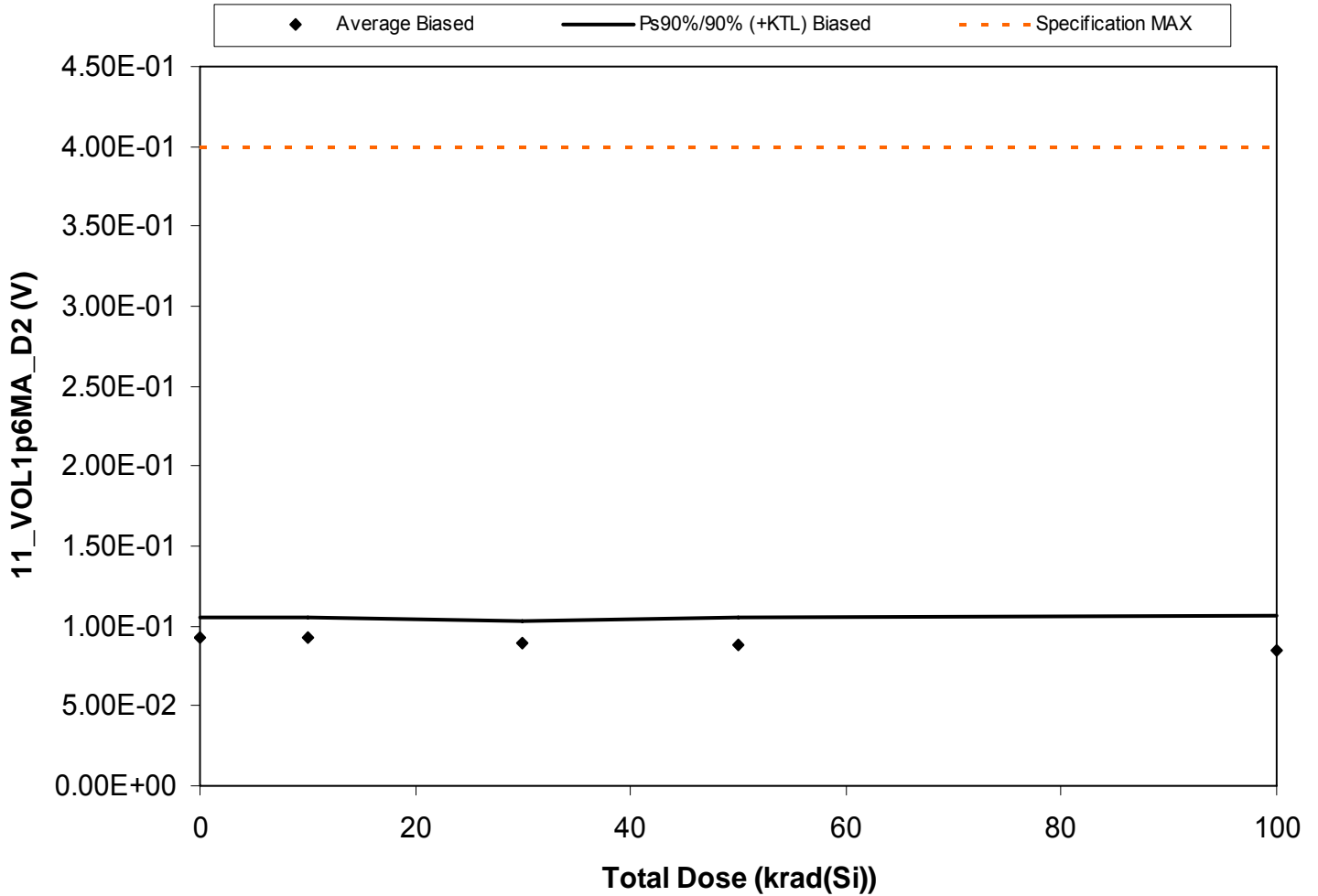


Figure 5.10. Plot of 11\_VOL1p6MA\_D2 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.10. Raw data for 11\_VOL1p6MA\_D2 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

11_VOL1p6MA_D2 (V)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	9.70E-02	9.60E-02	9.30E-02	9.20E-02	8.70E-02
32	9.00E-02	8.80E-02	8.60E-02	8.30E-02	7.90E-02
34	8.90E-02	8.90E-02	8.60E-02	8.30E-02	7.90E-02
35	9.10E-02	8.90E-02	8.70E-02	8.40E-02	8.10E-02
36	9.90E-02	9.90E-02	9.70E-02	9.70E-02	9.80E-02
1	9.90E-02	1.00E-01	9.90E-02	9.90E-02	1.00E-01
2	8.60E-02	8.80E-02	8.80E-02	8.80E-02	8.80E-02
<b>Biased Statistics</b>					
Average Biased	9.32E-02	9.22E-02	8.98E-02	8.78E-02	8.48E-02
Std Dev Biased	4.49E-03	4.97E-03	4.97E-03	6.38E-03	8.07E-03
Ps90%/90% (+KTL) Biased	1.06E-01	1.06E-01	1.03E-01	1.05E-01	1.07E-01
Ps90%/90% (-KTL) Biased	8.09E-02	7.86E-02	7.62E-02	7.03E-02	6.27E-02
<b>Specification MAX</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>
Status	PASS	PASS	PASS	PASS	PASS

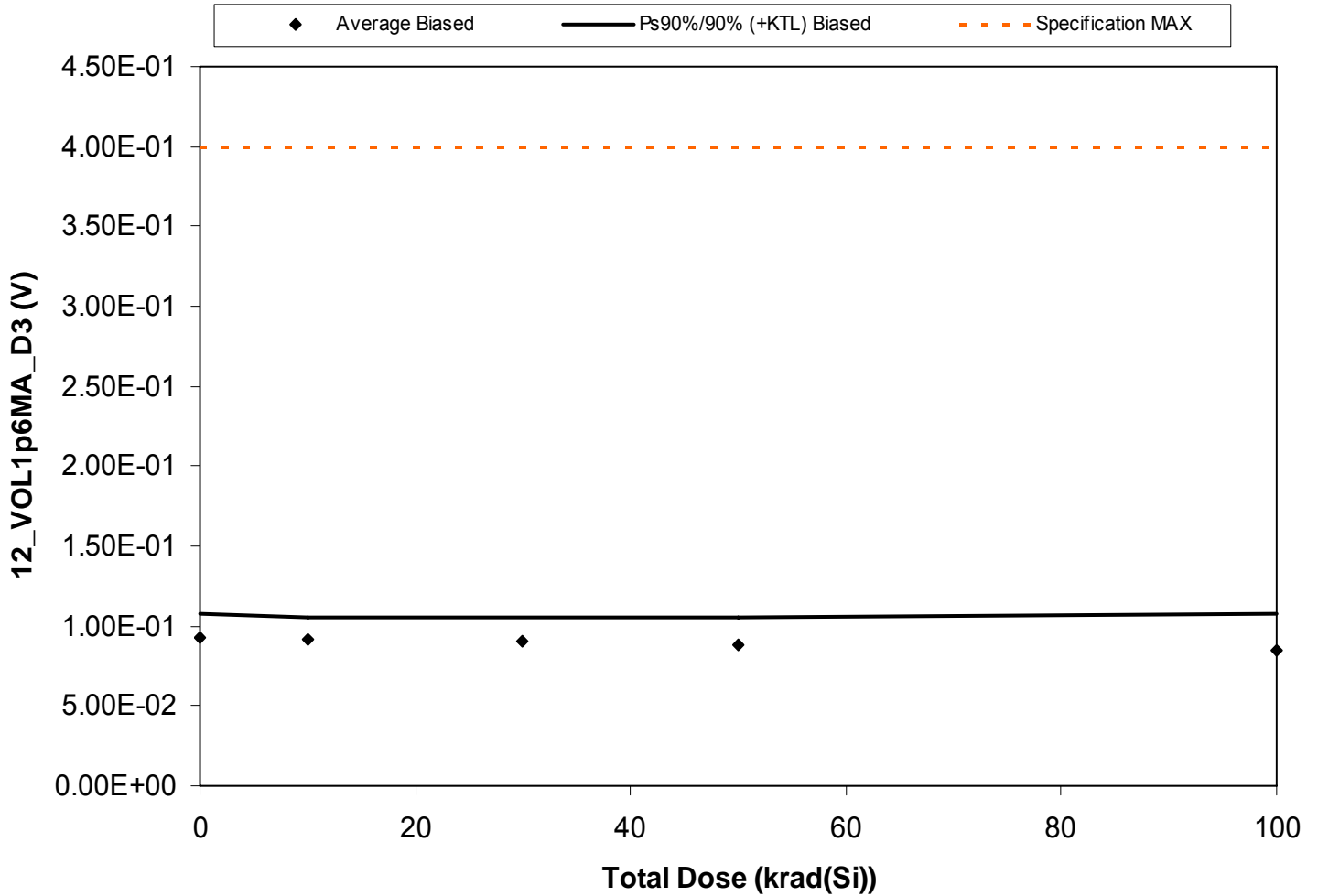


Figure 5.11. Plot of 12\_VOL1p6MA\_D3 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.11. Raw data for 12\_VOL1p6MA\_D3 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

12_VOL1p6MA_D3 (V)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	9.80E-02	9.70E-02	9.40E-02	9.20E-02	8.70E-02
32	8.90E-02	8.80E-02	8.60E-02	8.30E-02	7.90E-02
34	8.80E-02	8.80E-02	8.60E-02	8.40E-02	7.90E-02
35	9.10E-02	8.90E-02	8.70E-02	8.40E-02	8.00E-02
36	9.90E-02	9.80E-02	9.80E-02	9.70E-02	9.80E-02
1	9.90E-02	1.01E-01	9.90E-02	1.00E-01	1.00E-01
2	8.60E-02	8.80E-02	8.70E-02	8.70E-02	8.80E-02
<b>Biased Statistics</b>					
Average Biased	9.30E-02	9.20E-02	9.02E-02	8.80E-02	8.46E-02
Std Dev Biased	5.15E-03	5.05E-03	5.50E-03	6.20E-03	8.20E-03
Ps90%/90% (+KTL) Biased	1.07E-01	1.06E-01	1.05E-01	1.05E-01	1.07E-01
Ps90%/90% (-KTL) Biased	7.89E-02	7.82E-02	7.51E-02	7.10E-02	6.21E-02
<b>Specification MAX</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>
Status	PASS	PASS	PASS	PASS	PASS

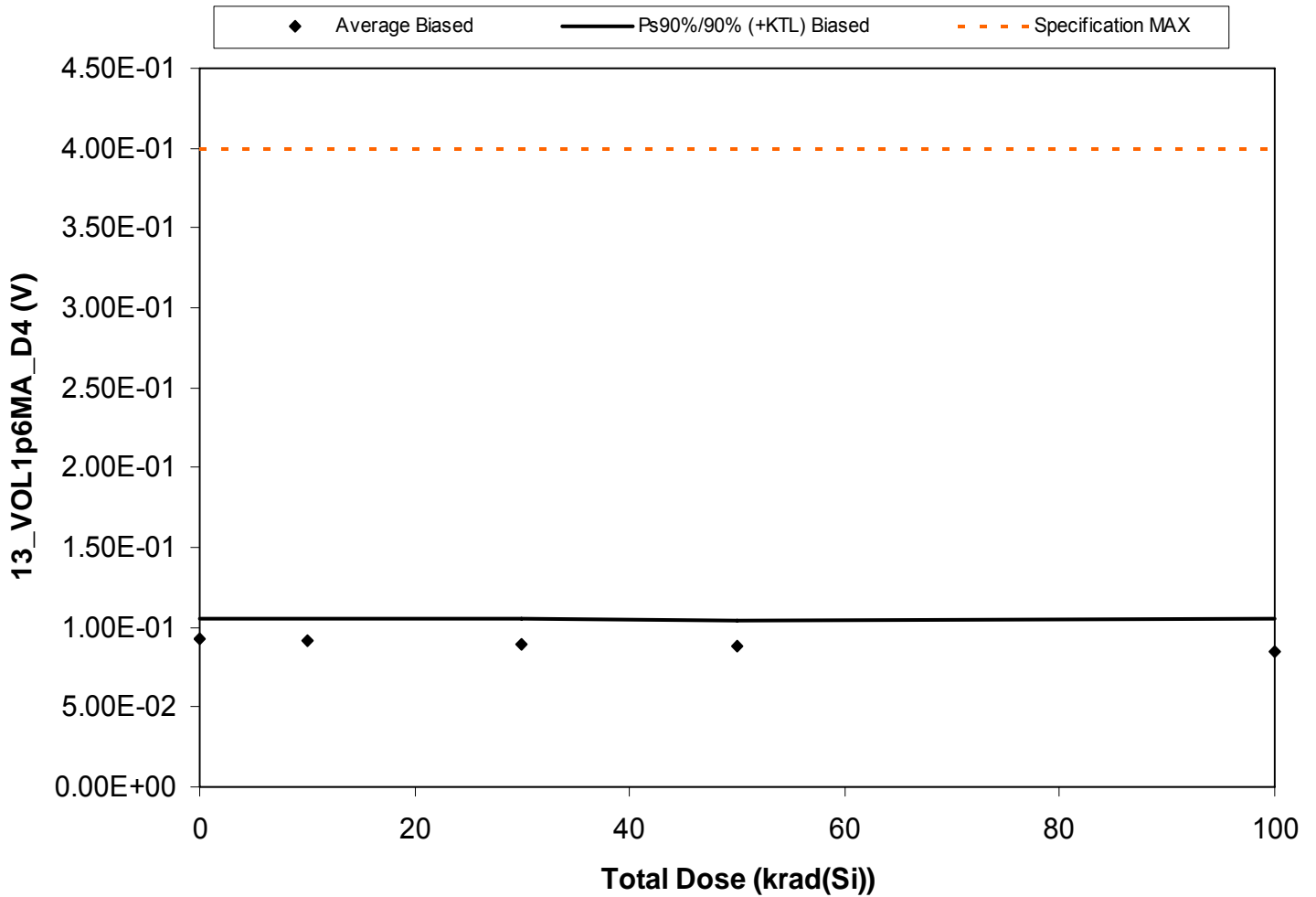


Figure 5.12. Plot of 13\_VOL1p6MA\_D4 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.12. Raw data for 13\_VOL1p6MA\_D4 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

13_VOL1p6MA_D4 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	9.80E-02	9.70E-02	9.40E-02	9.20E-02	8.70E-02
	32	8.90E-02	8.80E-02	8.50E-02	8.30E-02	7.90E-02
	34	8.90E-02	8.80E-02	8.50E-02	8.20E-02	7.90E-02
	35	9.10E-02	8.90E-02	8.70E-02	8.50E-02	8.00E-02
	36	9.80E-02	9.80E-02	9.70E-02	9.60E-02	9.70E-02
	1	9.90E-02	1.00E-01	9.90E-02	1.00E-01	1.00E-01
	2	8.70E-02	8.70E-02	8.70E-02	8.70E-02	8.70E-02
Biased Statistics						
	Average Biased	9.30E-02	9.20E-02	8.96E-02	8.76E-02	8.44E-02
	Std Dev Biased	4.64E-03	5.05E-03	5.55E-03	6.11E-03	7.80E-03
	Ps90%/90% (+KTL) Biased	1.06E-01	1.06E-01	1.05E-01	1.04E-01	1.06E-01
	Ps90%/90% (-KTL) Biased	8.03E-02	7.82E-02	7.44E-02	7.09E-02	6.30E-02
	Specification MAX	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01
	Status	PASS	PASS	PASS	PASS	PASS

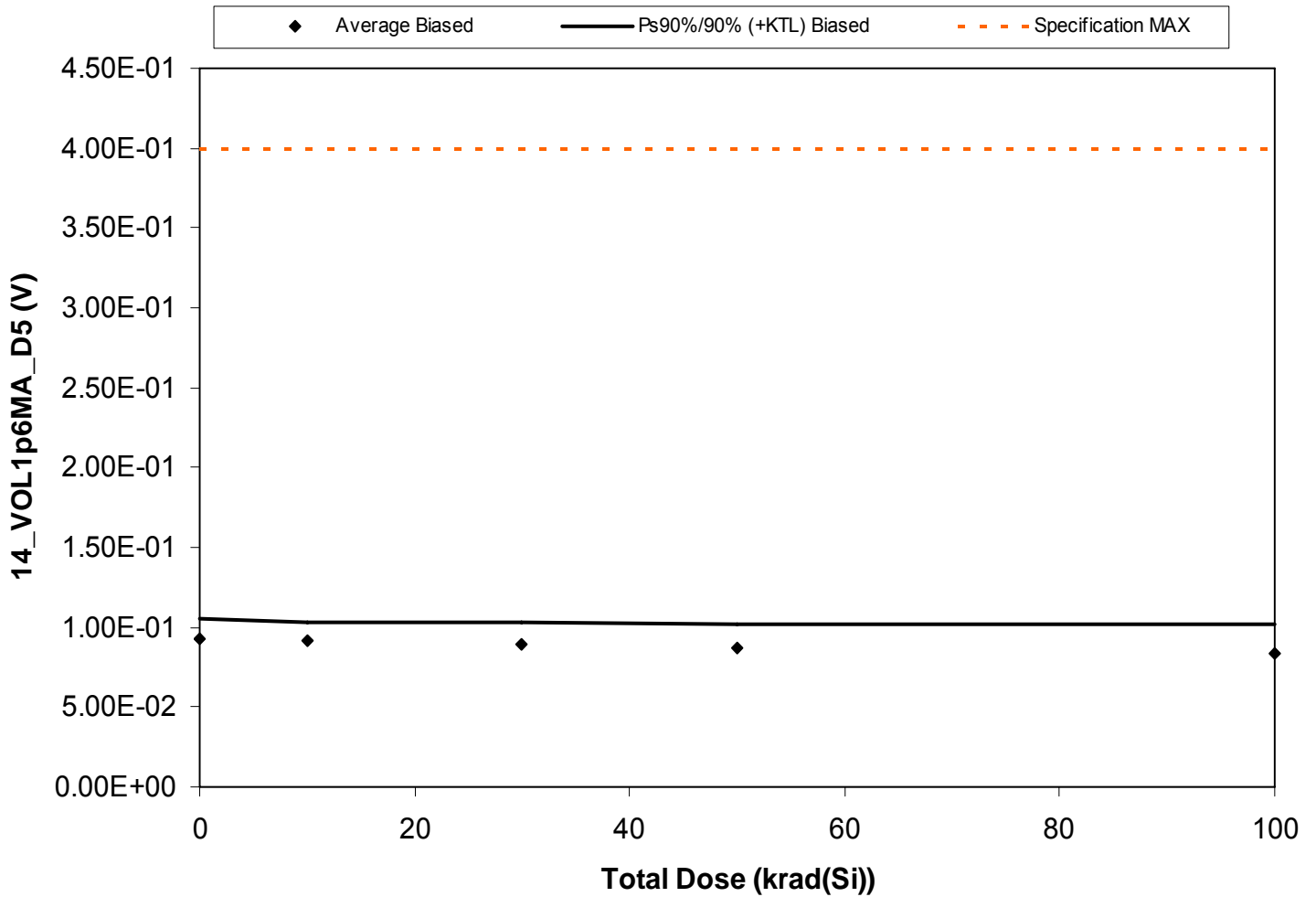


Figure 5.13. Plot of 14\_VOL1p6MA\_D5 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.13. Raw data for 14\_VOL1p6MA\_D5 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

14_VOL1p6MA_D5 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	9.80E-02	9.60E-02	9.40E-02	9.00E-02	8.60E-02
	32	8.80E-02	8.80E-02	8.50E-02	8.20E-02	7.90E-02
	34	8.90E-02	8.80E-02	8.50E-02	8.30E-02	7.90E-02
	35	8.90E-02	8.90E-02	8.60E-02	8.40E-02	8.00E-02
	36	9.70E-02	9.60E-02	9.50E-02	9.50E-02	9.40E-02
	1	9.90E-02	9.90E-02	9.90E-02	9.80E-02	9.90E-02
	2	8.60E-02	8.70E-02	8.70E-02	8.70E-02	8.70E-02
Biased Statistics						
	Average Biased	9.22E-02	9.14E-02	8.90E-02	8.68E-02	8.36E-02
	Std Dev Biased	4.87E-03	4.22E-03	5.05E-03	5.54E-03	6.50E-03
	Ps90%/90% (+KTL) Biased	1.06E-01	1.03E-01	1.03E-01	1.02E-01	1.01E-01
	Ps90%/90% (-KTL) Biased	7.89E-02	7.98E-02	7.52E-02	7.16E-02	6.58E-02
	Specification MAX	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01
	Status	PASS	PASS	PASS	PASS	PASS

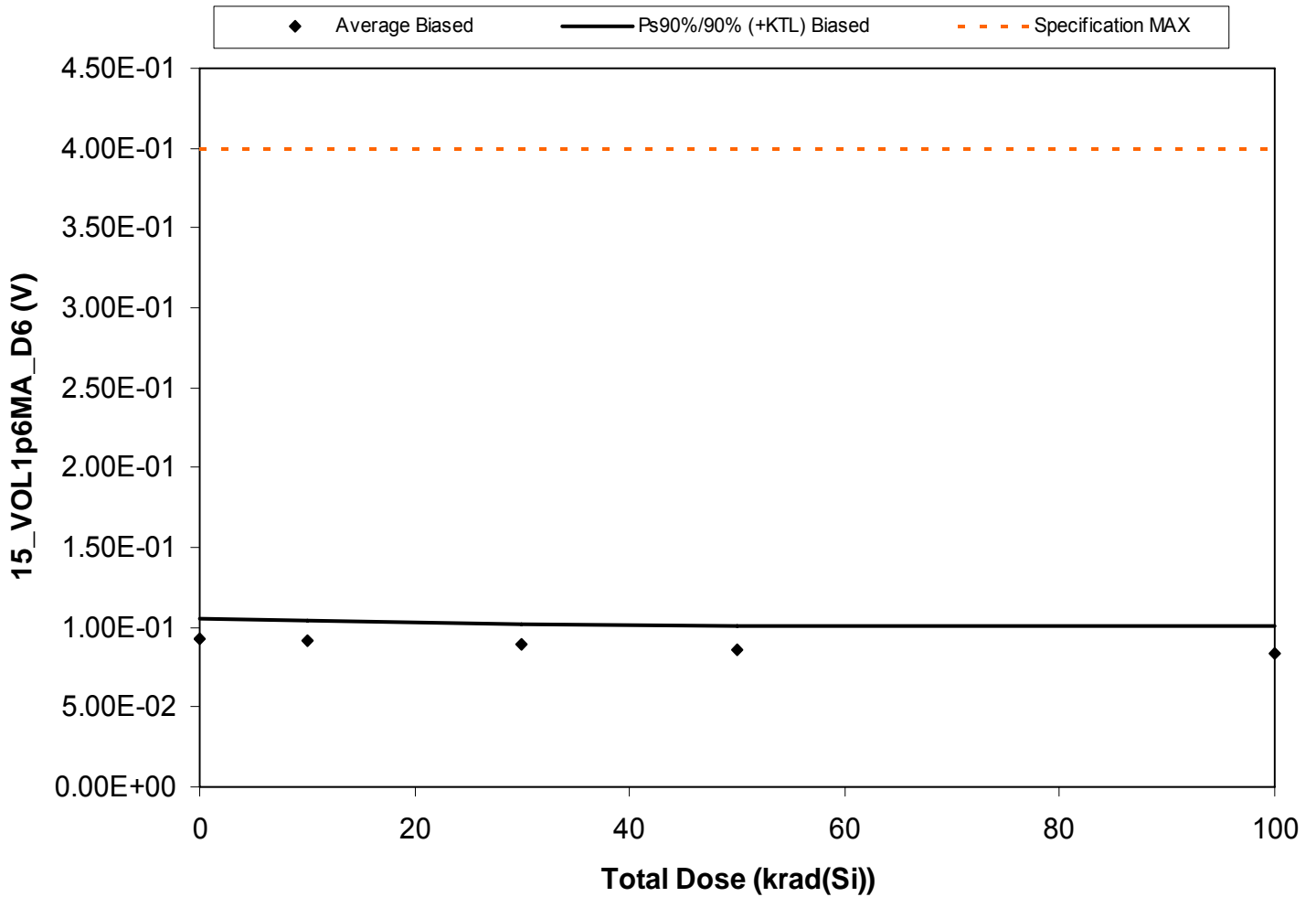


Figure 5.14. Plot of 15\_VOL1p6MA\_D6 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.14. Raw data for 15\_VOL1p6MA\_D6 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

15_VOL1p6MA_D6 (V)	Total Dose (krad(Si))				
	Device	0	10	30	50
31	9.90E-02	9.70E-02	9.40E-02	9.10E-02	8.70E-02
32	8.90E-02	8.80E-02	8.50E-02	8.20E-02	7.90E-02
34	8.80E-02	8.70E-02	8.50E-02	8.20E-02	7.90E-02
35	8.90E-02	8.80E-02	8.60E-02	8.40E-02	8.00E-02
36	9.60E-02	9.60E-02	9.40E-02	9.30E-02	9.30E-02
1	9.90E-02	1.00E-01	9.80E-02	9.80E-02	9.80E-02
2	8.60E-02	8.80E-02	8.80E-02	8.80E-02	8.80E-02
<b>Biased Statistics</b>					
Average Biased	9.22E-02	9.12E-02	8.88E-02	8.64E-02	8.36E-02
Std Dev Biased	4.97E-03	4.87E-03	4.76E-03	5.22E-03	6.23E-03
Ps90%/90% (+KTL) Biased	1.06E-01	1.05E-01	1.02E-01	1.01E-01	1.01E-01
Ps90%/90% (-KTL) Biased	7.86E-02	7.79E-02	7.57E-02	7.21E-02	6.65E-02
<b>Specification MAX</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>
Status	PASS	PASS	PASS	PASS	PASS

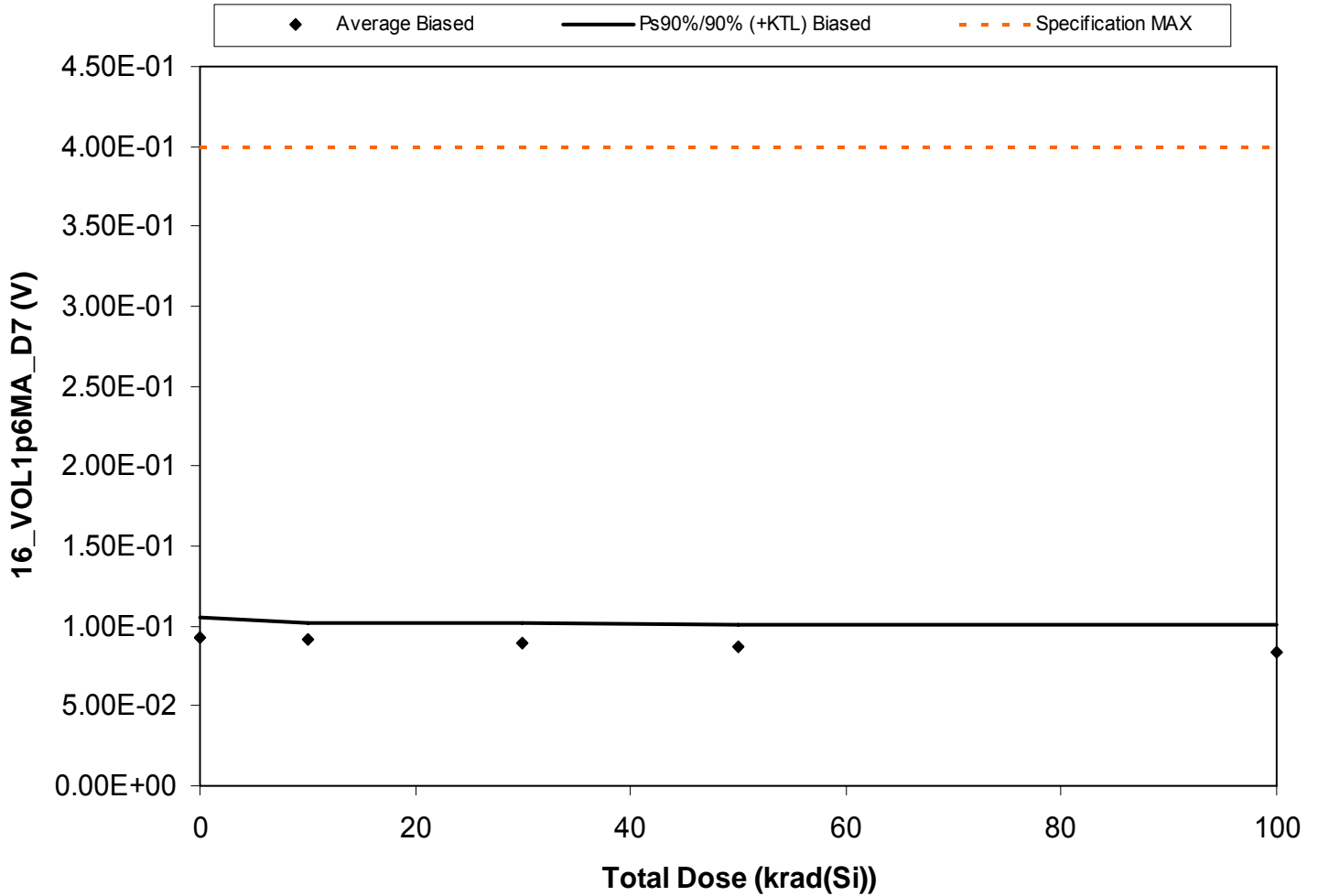


Figure 5.15. Plot of 16\_VOL1p6MA\_D7 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.15. Raw data for 16\_VOL1p6MA\_D7 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

16_VOL1p6MA_D7 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	9.90E-02	9.70E-02	9.40E-02	9.20E-02	8.70E-02
	32	9.00E-02	8.80E-02	8.50E-02	8.30E-02	7.90E-02
	34	8.90E-02	8.80E-02	8.60E-02	8.30E-02	7.90E-02
	35	9.00E-02	9.00E-02	8.70E-02	8.40E-02	8.00E-02
	36	9.60E-02	9.40E-02	9.40E-02	9.30E-02	9.30E-02
	1	1.00E-01	1.01E-01	9.90E-02	9.90E-02	1.00E-01
	2	8.90E-02	9.00E-02	8.80E-02	8.80E-02	8.90E-02
Biased Statistics						
	Average Biased	9.28E-02	9.14E-02	8.92E-02	8.70E-02	8.36E-02
	Std Dev Biased	4.44E-03	3.97E-03	4.44E-03	5.05E-03	6.23E-03
	Ps90%/90% (+KTL) Biased	1.05E-01	1.02E-01	1.01E-01	1.01E-01	1.01E-01
	Ps90%/90% (-KTL) Biased	8.06E-02	8.05E-02	7.70E-02	7.32E-02	6.65E-02
	Specification MAX	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01
	Status	PASS	PASS	PASS	PASS	PASS

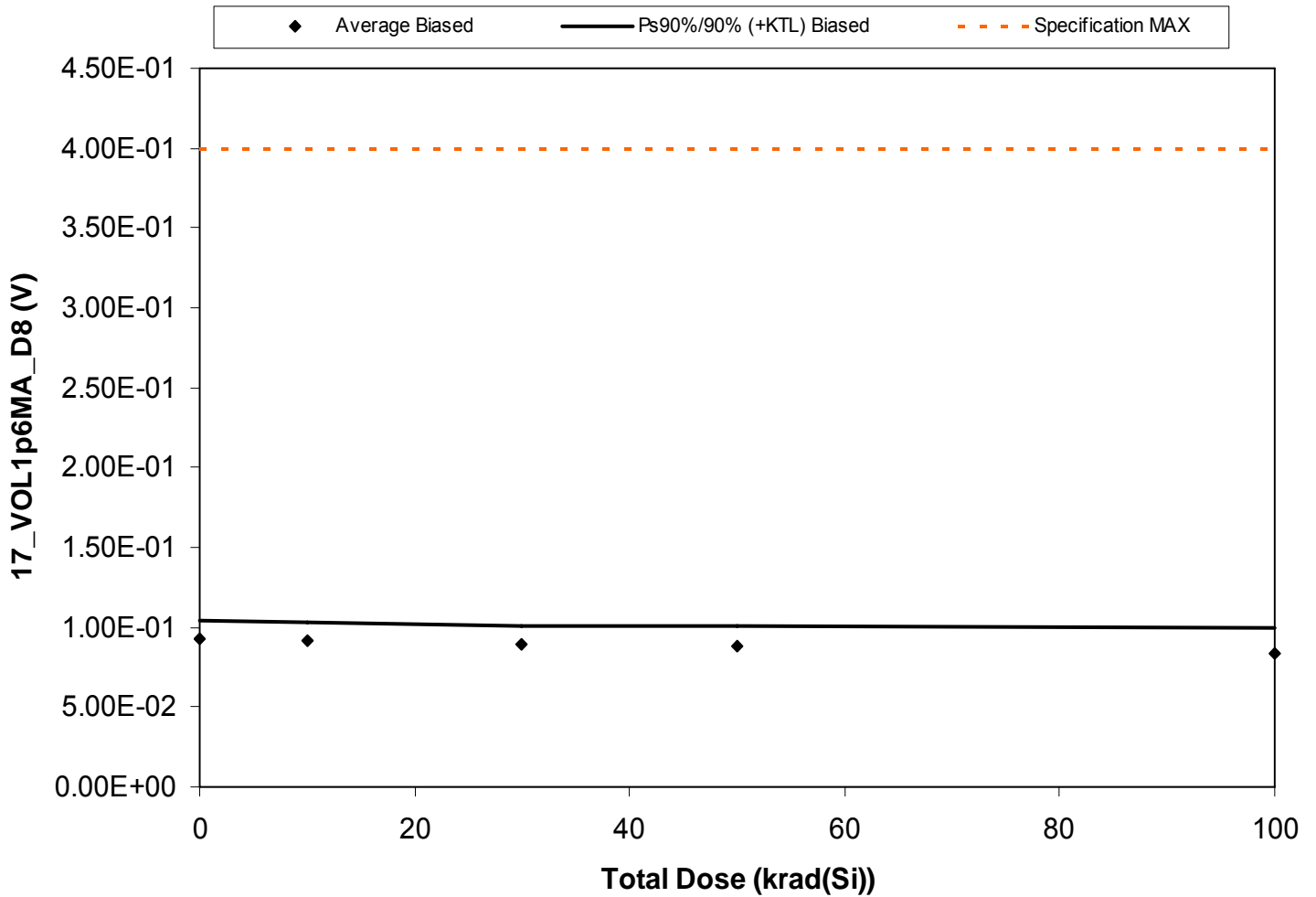


Figure 5.16. Plot of 17\_VOL1p6MA\_D8 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.16. Raw data for 17\_VOL1p6MA\_D8 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

17_VOL1p6MA_D8 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	9.90E-02	9.80E-02	9.50E-02	9.30E-02	8.80E-02
	32	9.00E-02	8.90E-02	8.70E-02	8.40E-02	8.00E-02
	34	8.90E-02	8.80E-02	8.60E-02	8.30E-02	7.90E-02
	35	9.10E-02	9.00E-02	8.70E-02	8.50E-02	8.10E-02
	36	9.50E-02	9.40E-02	9.30E-02	9.30E-02	9.20E-02
	1	1.00E-01	1.01E-01	1.00E-01	1.00E-01	1.00E-01
	2	8.80E-02	8.90E-02	8.90E-02	8.90E-02	8.90E-02
Biased Statistics						
	Average Biased	9.28E-02	9.18E-02	8.96E-02	8.76E-02	8.40E-02
	Std Dev Biased	4.15E-03	4.15E-03	4.10E-03	4.98E-03	5.70E-03
	Ps90%/90% (+KTL) Biased	1.04E-01	1.03E-01	1.01E-01	1.01E-01	9.96E-02
	Ps90%/90% (-KTL) Biased	8.14E-02	8.04E-02	7.84E-02	7.39E-02	6.84E-02
	Specification MAX	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01
	Status	PASS	PASS	PASS	PASS	PASS

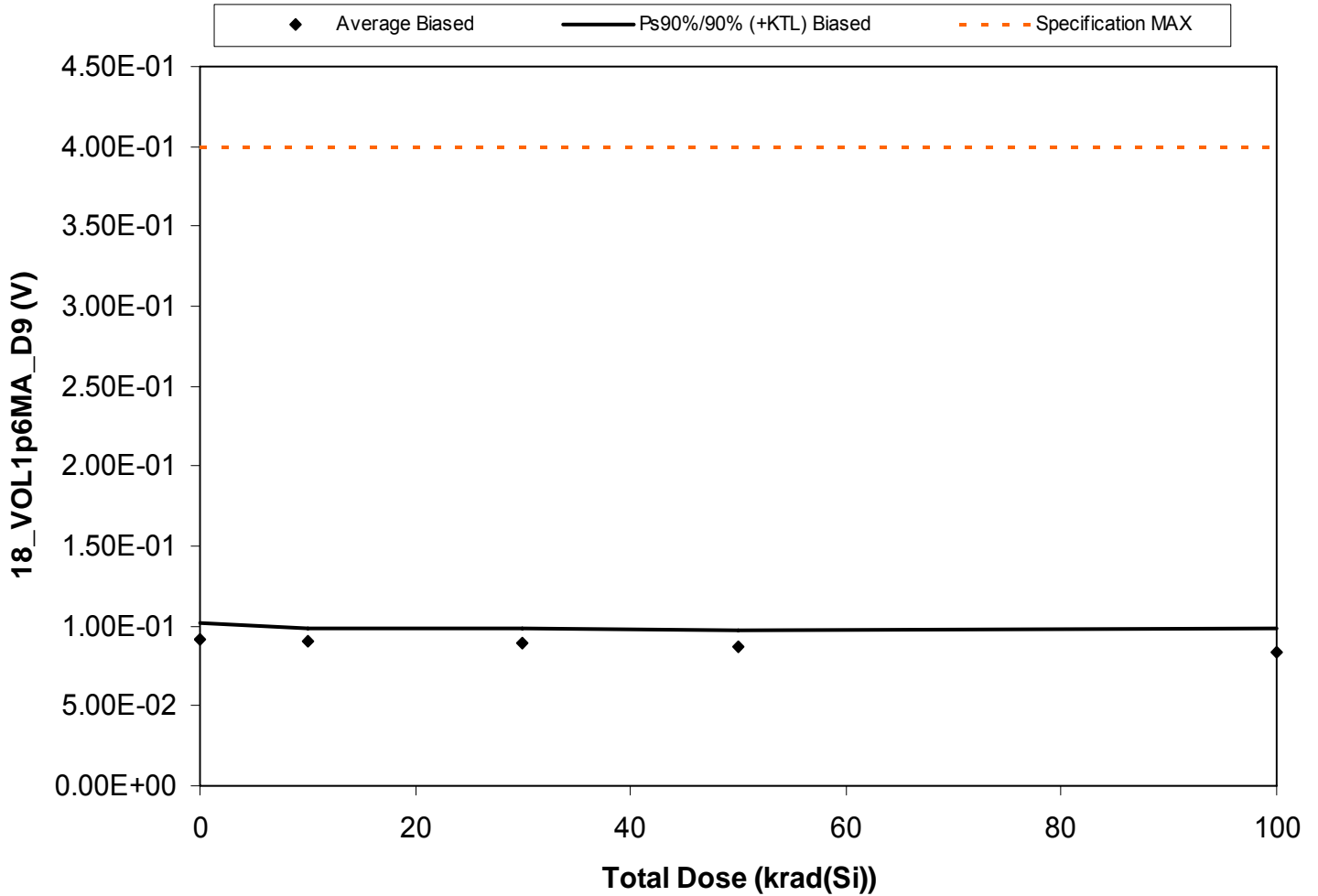


Figure 5.17. Plot of 18\_VOL1p6MA\_D9 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.17. Raw data for 18\_VOL1p6MA\_D9 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

18_VOL1p6MA_D9 (V)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	9.60E-02	9.30E-02	9.20E-02	9.00E-02	8.60E-02
32	8.80E-02	8.90E-02	8.70E-02	8.50E-02	8.00E-02
34	8.90E-02	8.80E-02	8.50E-02	8.40E-02	8.00E-02
35	9.00E-02	8.80E-02	8.70E-02	8.50E-02	8.10E-02
36	9.50E-02	9.40E-02	9.30E-02	9.20E-02	9.20E-02
1	9.60E-02	9.70E-02	9.70E-02	9.60E-02	9.70E-02
2	8.90E-02	8.90E-02	8.80E-02	8.90E-02	8.90E-02
<b>Biased Statistics</b>					
Average Biased	9.16E-02	9.04E-02	8.88E-02	8.72E-02	8.38E-02
Std Dev Biased	3.65E-03	2.88E-03	3.49E-03	3.56E-03	5.22E-03
Ps90%/90% (+KTL) Biased	1.02E-01	9.83E-02	9.84E-02	9.70E-02	9.81E-02
Ps90%/90% (-KTL) Biased	8.16E-02	8.25E-02	7.92E-02	7.74E-02	6.95E-02
<b>Specification MAX</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>
Status	PASS	PASS	PASS	PASS	PASS

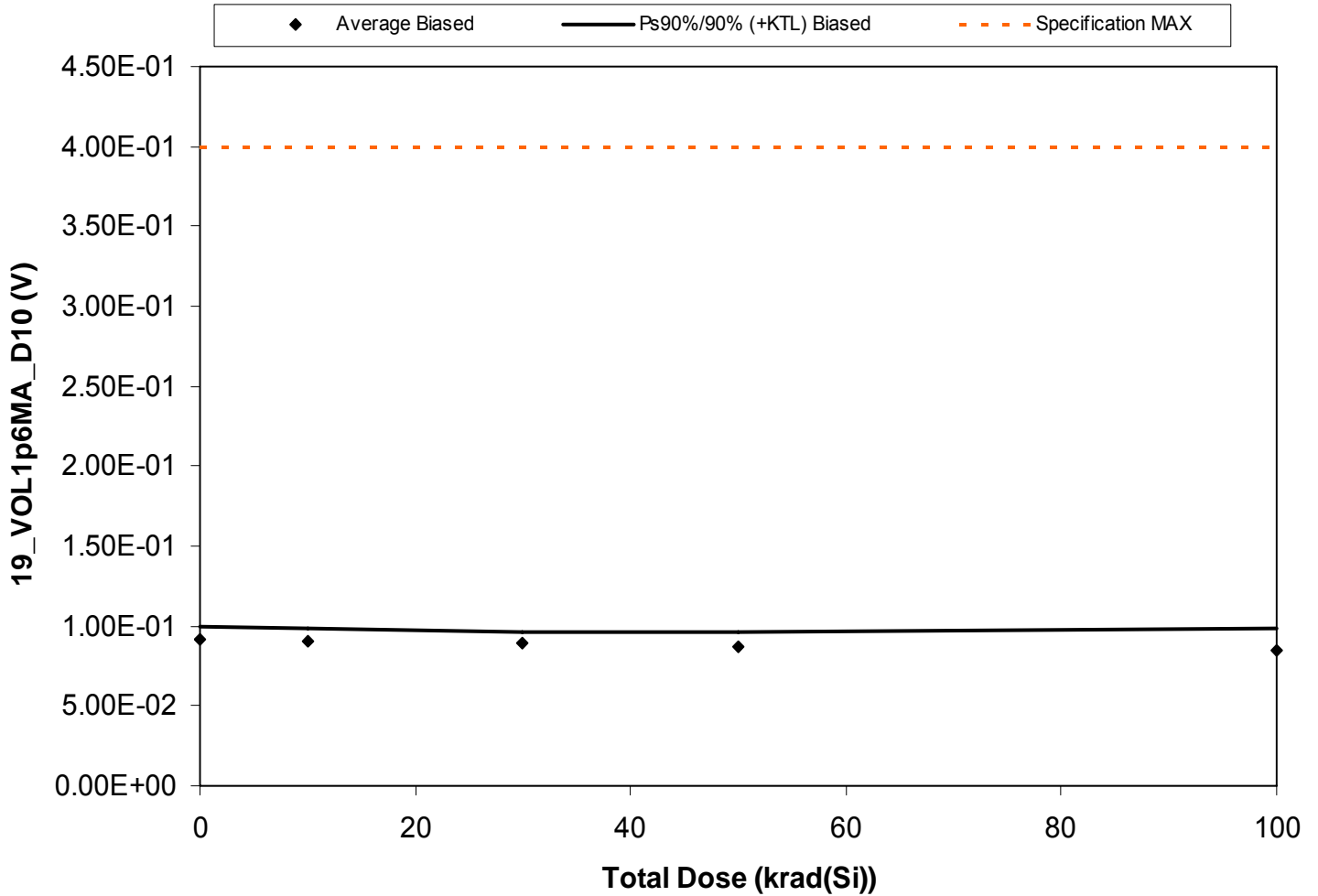


Figure 5.18. Plot of 19\_VOL1p6MA\_D10 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.18. Raw data for 19\_VOL1p6MA\_D10 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

19_VOL1p6MA_D10 (V)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	9.60E-02	9.40E-02	9.10E-02	9.00E-02	8.70E-02
32	9.00E-02	8.90E-02	8.70E-02	8.50E-02	8.10E-02
34	8.90E-02	8.80E-02	8.70E-02	8.50E-02	8.10E-02
35	8.90E-02	8.90E-02	8.70E-02	8.50E-02	8.10E-02
36	9.30E-02	9.30E-02	9.20E-02	9.20E-02	9.20E-02
1	9.60E-02	9.70E-02	9.60E-02	9.70E-02	9.60E-02
2	8.90E-02	8.80E-02	8.90E-02	8.90E-02	8.90E-02
<b>Biased Statistics</b>					
Average Biased	9.14E-02	9.06E-02	8.88E-02	8.74E-02	8.44E-02
Std Dev Biased	3.05E-03	2.70E-03	2.49E-03	3.36E-03	4.98E-03
Ps90%/90% (+KTL) Biased	9.98E-02	9.80E-02	9.56E-02	9.66E-02	9.81E-02
Ps90%/90% (-KTL) Biased	8.30E-02	8.32E-02	8.20E-02	7.82E-02	7.07E-02
<b>Specification MAX</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>
Status	PASS	PASS	PASS	PASS	PASS

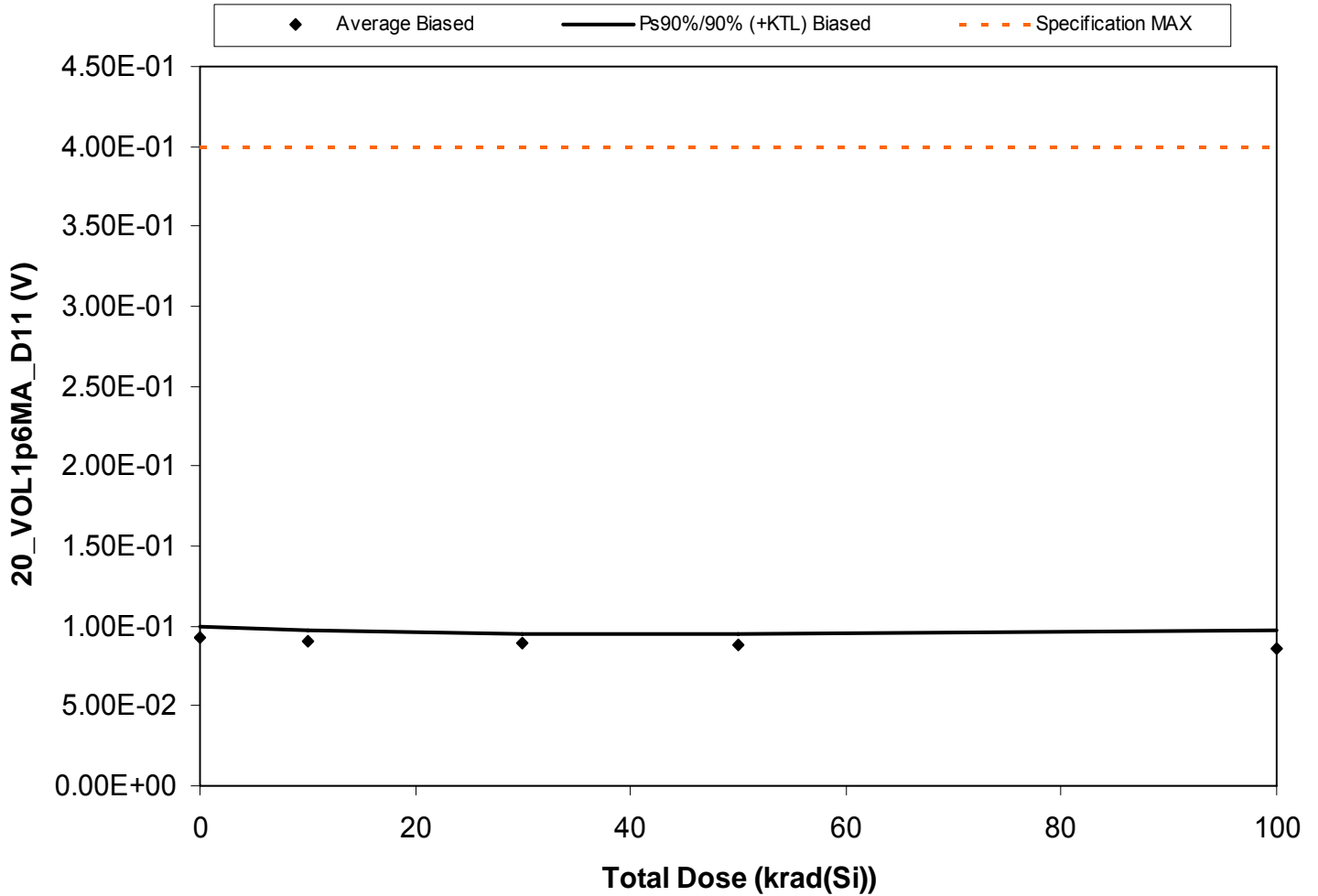


Figure 5.19. Plot of 20\_VOL1p6MA\_D11 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.19. Raw data for 20\_VOL1p6MA\_D11 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

20_VOL1p6MA_D11 (V)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	9.60E-02	9.40E-02	9.20E-02	9.00E-02	8.50E-02
32	9.00E-02	8.90E-02	8.80E-02	8.60E-02	8.30E-02
34	9.10E-02	8.90E-02	8.80E-02	8.70E-02	8.30E-02
35	9.20E-02	9.00E-02	8.80E-02	8.70E-02	8.30E-02
36	9.40E-02	9.30E-02	9.20E-02	9.20E-02	9.30E-02
1	9.70E-02	9.80E-02	9.70E-02	9.70E-02	9.60E-02
2	8.90E-02	9.00E-02	9.00E-02	9.00E-02	9.00E-02
<b>Biased Statistics</b>					
Average Biased	9.26E-02	9.10E-02	8.96E-02	8.84E-02	8.54E-02
Std Dev Biased	2.41E-03	2.35E-03	2.19E-03	2.51E-03	4.34E-03
Ps90%/90% (+KTL) Biased	9.92E-02	9.74E-02	9.56E-02	9.53E-02	9.73E-02
Ps90%/90% (-KTL) Biased	8.60E-02	8.46E-02	8.36E-02	8.15E-02	7.35E-02
<b>Specification MAX</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>
Status	PASS	PASS	PASS	PASS	PASS

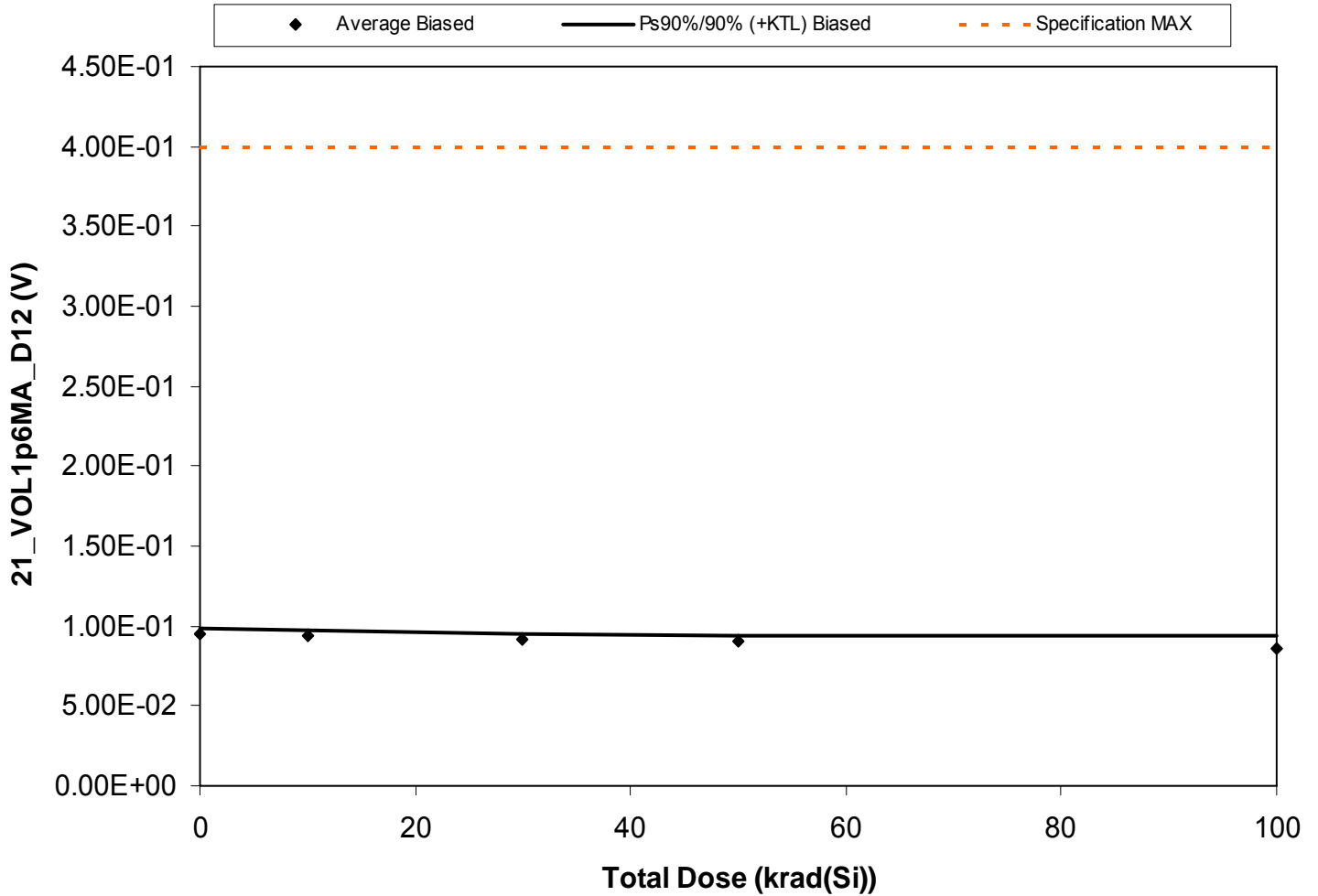


Figure 5.20. Plot of 21\_VOL1p6MA\_D12 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.20. Raw data for 21\_VOL1p6MA\_D12 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

21_VOL1p6MA_D12 (V)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	9.70E-02	9.50E-02	9.30E-02	9.10E-02	8.60E-02
32	9.40E-02	9.20E-02	9.00E-02	8.80E-02	8.40E-02
34	9.40E-02	9.50E-02	9.10E-02	9.00E-02	8.60E-02
35	9.50E-02	9.30E-02	9.10E-02	8.90E-02	8.50E-02
36	9.40E-02	9.40E-02	9.20E-02	9.20E-02	9.10E-02
1	9.60E-02	9.70E-02	9.60E-02	9.60E-02	9.70E-02
2	9.40E-02	9.40E-02	9.30E-02	9.40E-02	9.30E-02
<b>Biased Statistics</b>					
Average Biased	9.48E-02	9.38E-02	9.14E-02	9.00E-02	8.64E-02
Std Dev Biased	1.30E-03	1.30E-03	1.14E-03	1.58E-03	2.70E-03
Ps90%/90% (+KTL) Biased	9.84E-02	9.74E-02	9.45E-02	9.43E-02	9.38E-02
Ps90%/90% (-KTL) Biased	9.12E-02	9.02E-02	8.83E-02	8.57E-02	7.90E-02
<b>Specification MAX</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>
Status	PASS	PASS	PASS	PASS	PASS

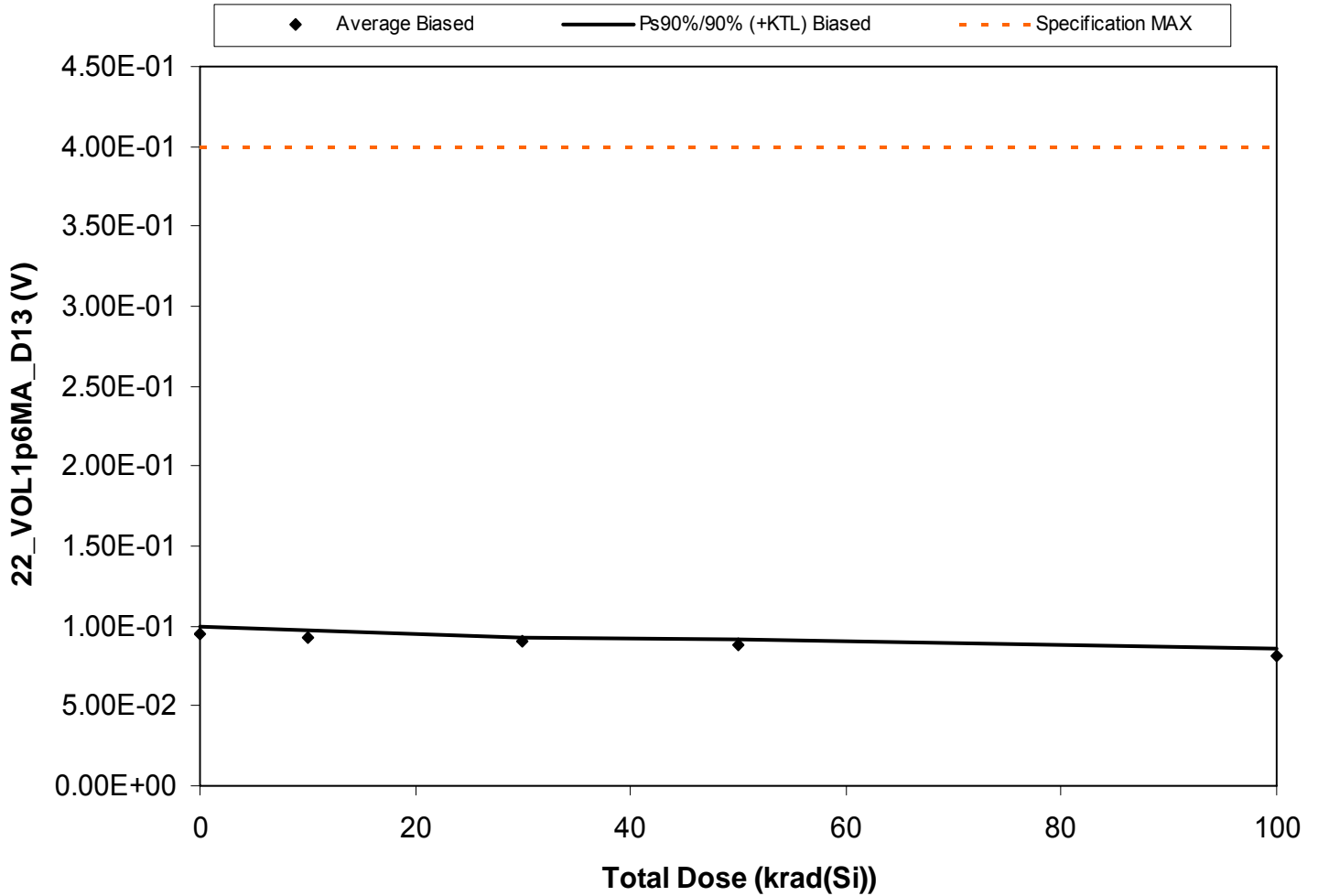


Figure 5.21. Plot of 22\_VOL1p6MA\_D13 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.21. Raw data for 22\_VOL1p6MA\_D13 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

22_VOL1p6MA_D13 (V)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	9.70E-02	9.50E-02	9.10E-02	8.80E-02	8.10E-02
32	9.30E-02	9.20E-02	9.00E-02	8.70E-02	7.90E-02
34	9.60E-02	9.40E-02	9.20E-02	8.80E-02	8.10E-02
35	9.50E-02	9.30E-02	9.10E-02	8.80E-02	7.90E-02
36	9.40E-02	9.20E-02	9.10E-02	9.00E-02	8.40E-02
1	9.60E-02	9.70E-02	9.60E-02	9.70E-02	9.70E-02
2	9.30E-02	9.50E-02	9.40E-02	9.50E-02	9.50E-02
<b>Biased Statistics</b>					
Average Biased	9.50E-02	9.32E-02	9.10E-02	8.82E-02	8.08E-02
Std Dev Biased	1.58E-03	1.30E-03	7.07E-04	1.10E-03	2.05E-03
Ps90%/90% (+KTL) Biased	9.93E-02	9.68E-02	9.29E-02	9.12E-02	8.64E-02
Ps90%/90% (-KTL) Biased	9.07E-02	8.96E-02	8.91E-02	8.52E-02	7.52E-02
<b>Specification MAX</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>	<b>4.00E-01</b>
Status	PASS	PASS	PASS	PASS	PASS

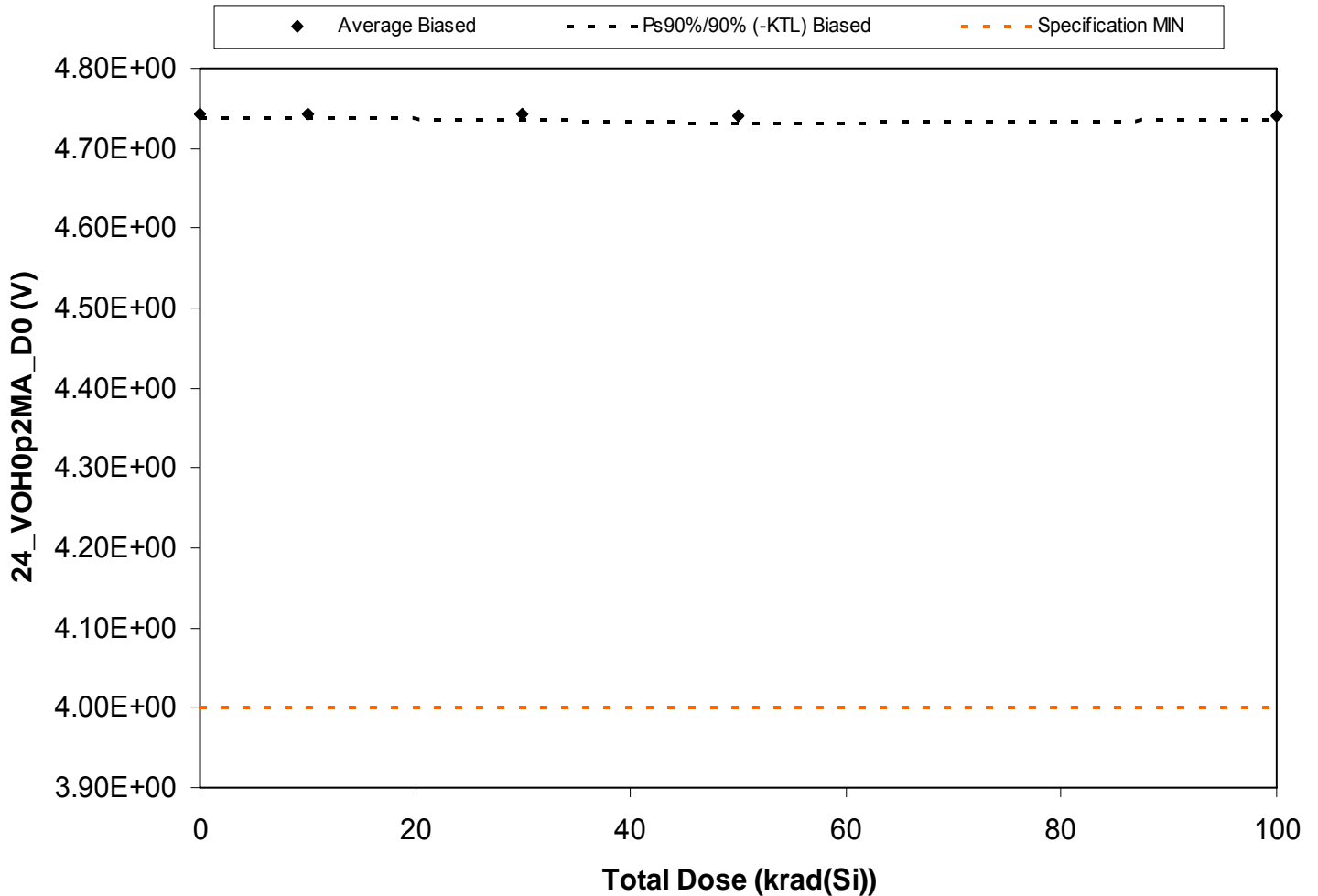


Figure 5.22. Plot of 24\_VOH0p2MA\_D0 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.22. Raw data for 24\_VOH0p2MA\_D0 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

24_VOH0p2MA_D0 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.75E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	1.79E-03	1.79E-03	2.19E-03	3.58E-03	2.19E-03
	Ps90%/90% (+KTL) Biased	4.75E+00	4.75E+00	4.75E+00	4.75E+00	4.75E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.73E+00	4.74E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

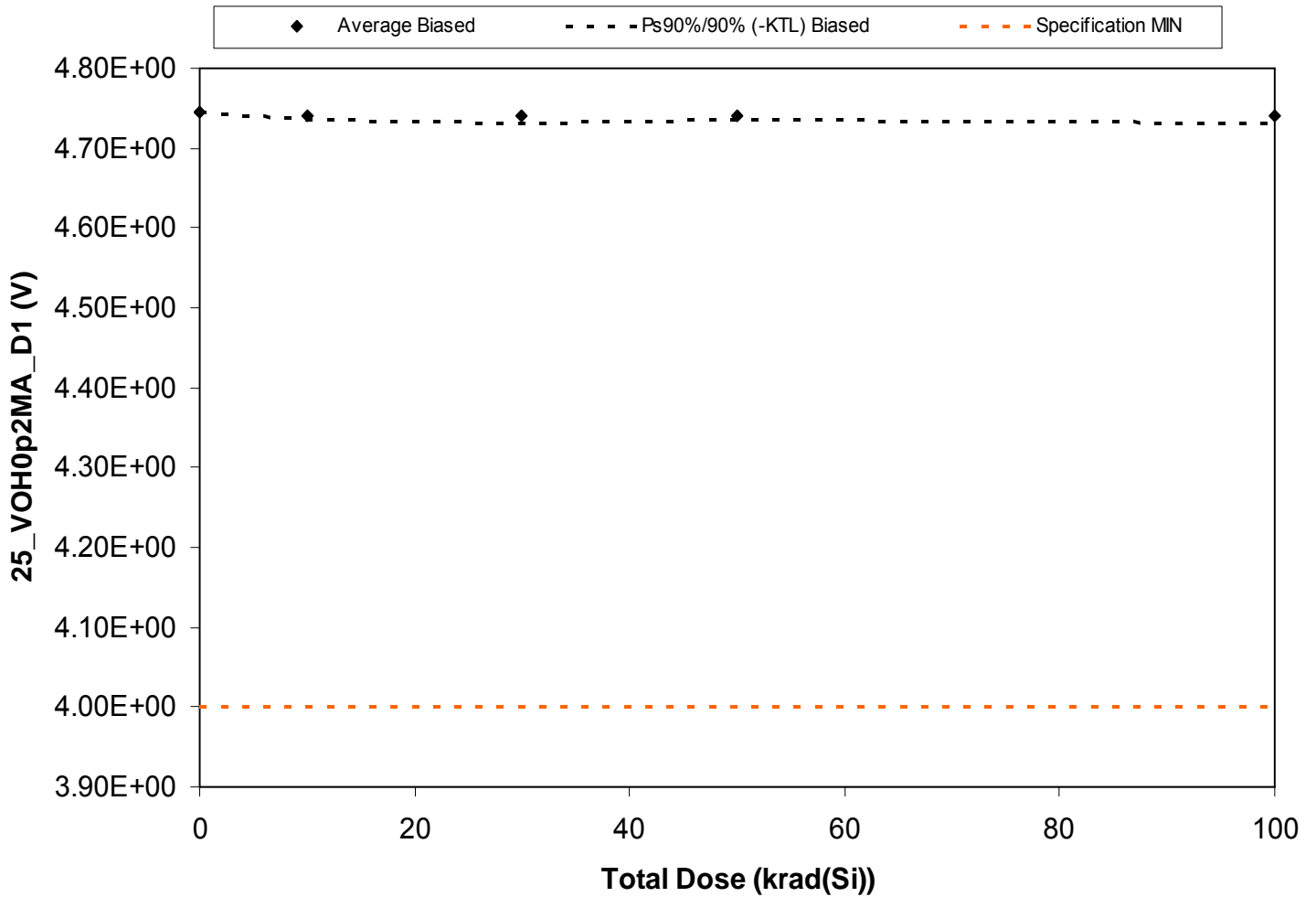


Figure 5.23. Plot of 25\_VOH0p2MA\_D1 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.23. Raw data for 25\_VOH0p2MA\_D1 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

25_VOH0p2MA_D1 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	0.00E+00	2.19E-03	3.35E-03	1.79E-03	3.35E-03
	Ps90%/90% (+KTL) Biased	4.74E+00	4.75E+00	4.75E+00	4.74E+00	4.75E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.73E+00	4.73E+00	4.73E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

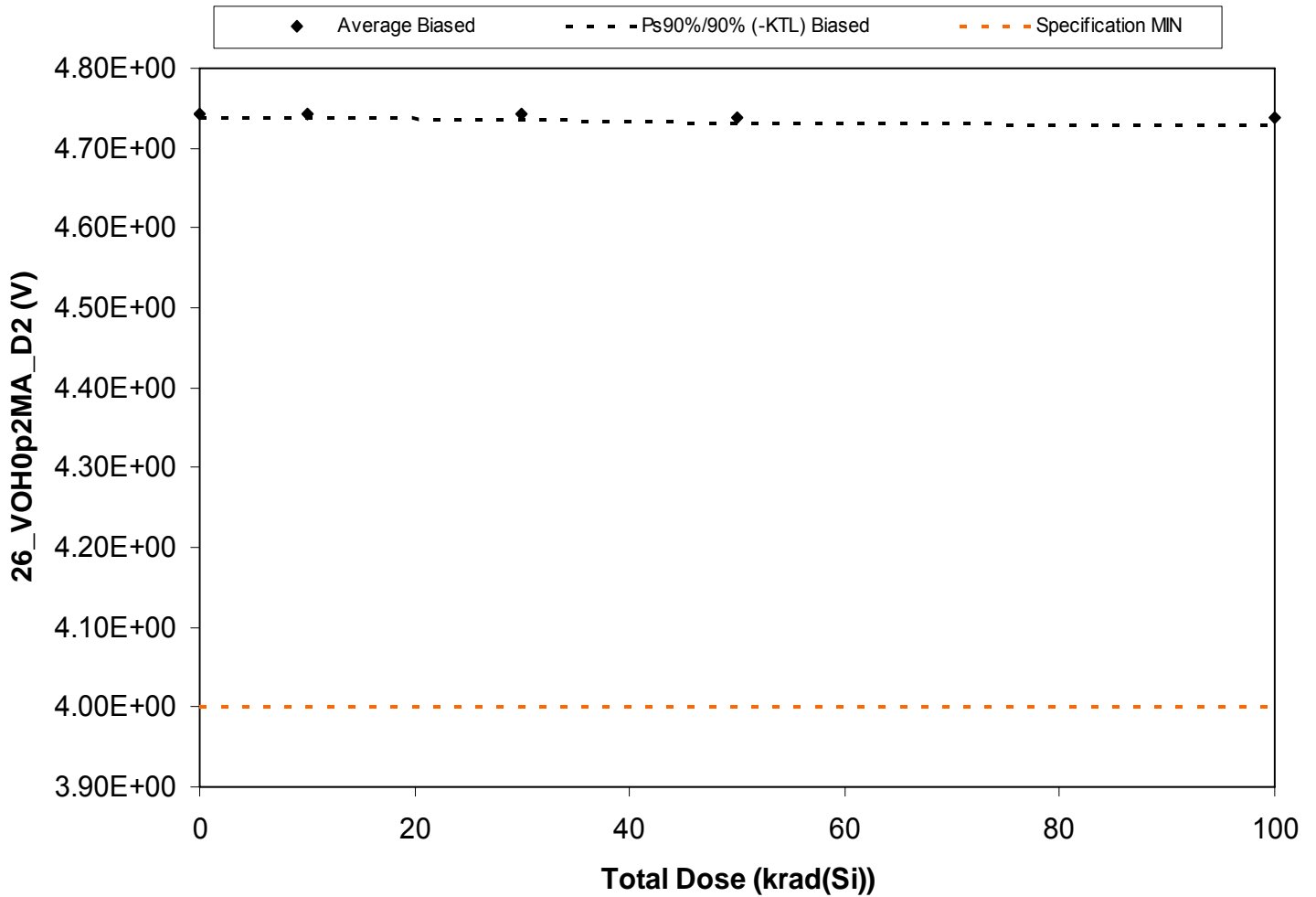


Figure 5.24. Plot of 26\_VOH0p2MA\_D2 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.24. Raw data for 26\_VOH0p2MA\_D2 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

26_VOH0p2MA_D2 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.75E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	1.79E-03	1.79E-03	2.19E-03	2.83E-03	3.35E-03
	Ps90%/90% (+KTL) Biased	4.75E+00	4.75E+00	4.75E+00	4.75E+00	4.75E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.73E+00	4.73E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

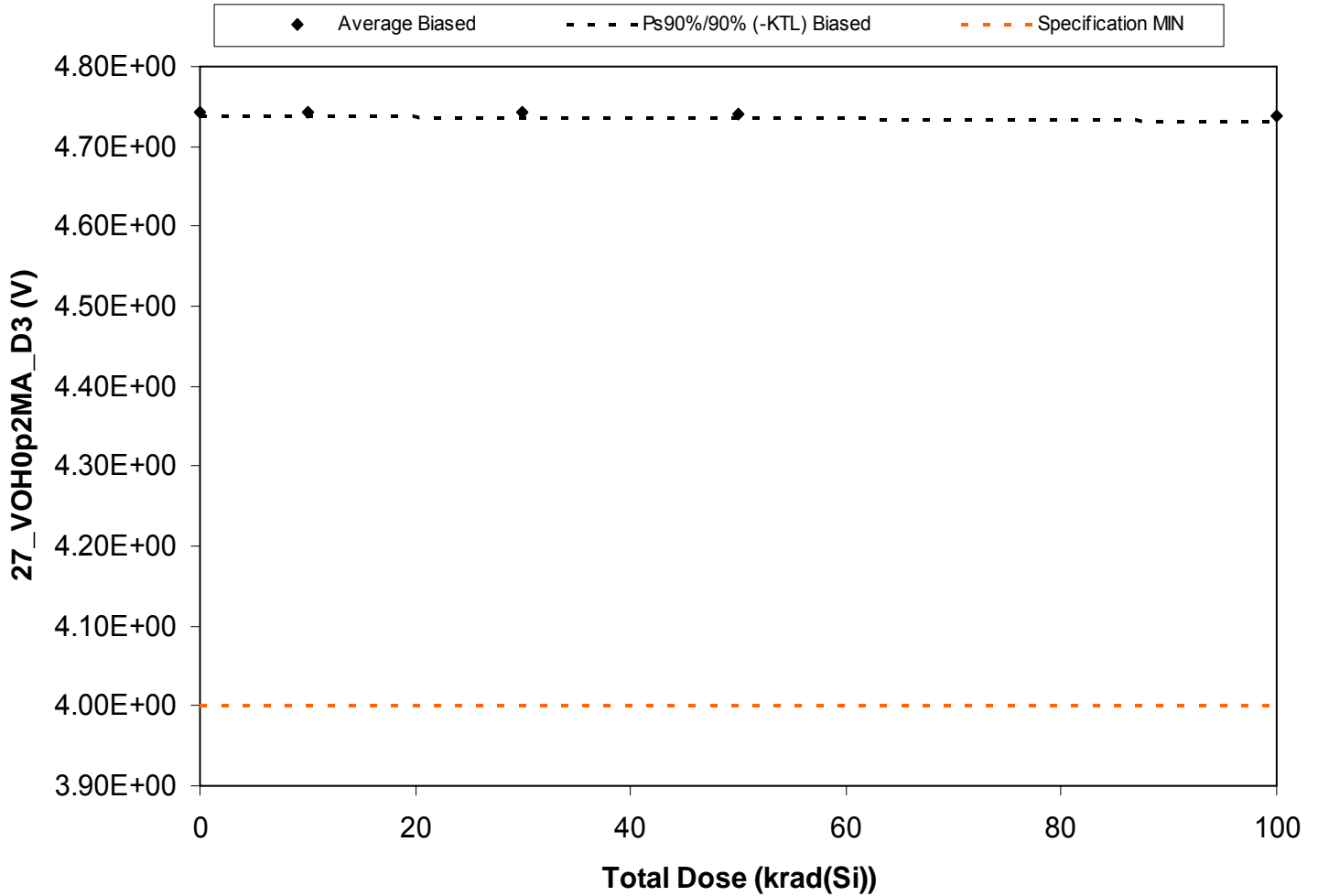


Figure 5.25. Plot of 27\_VOH0p2MA\_D3 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.25. Raw data for 27\_VOH0p2MA\_D3 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

27_VOH0p2MA_D3 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	1.79E-03	1.79E-03	2.19E-03	1.79E-03	2.19E-03
	Ps90%/90% (+KTL) Biased	4.75E+00	4.75E+00	4.75E+00	4.74E+00	4.74E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.73E+00	4.73E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

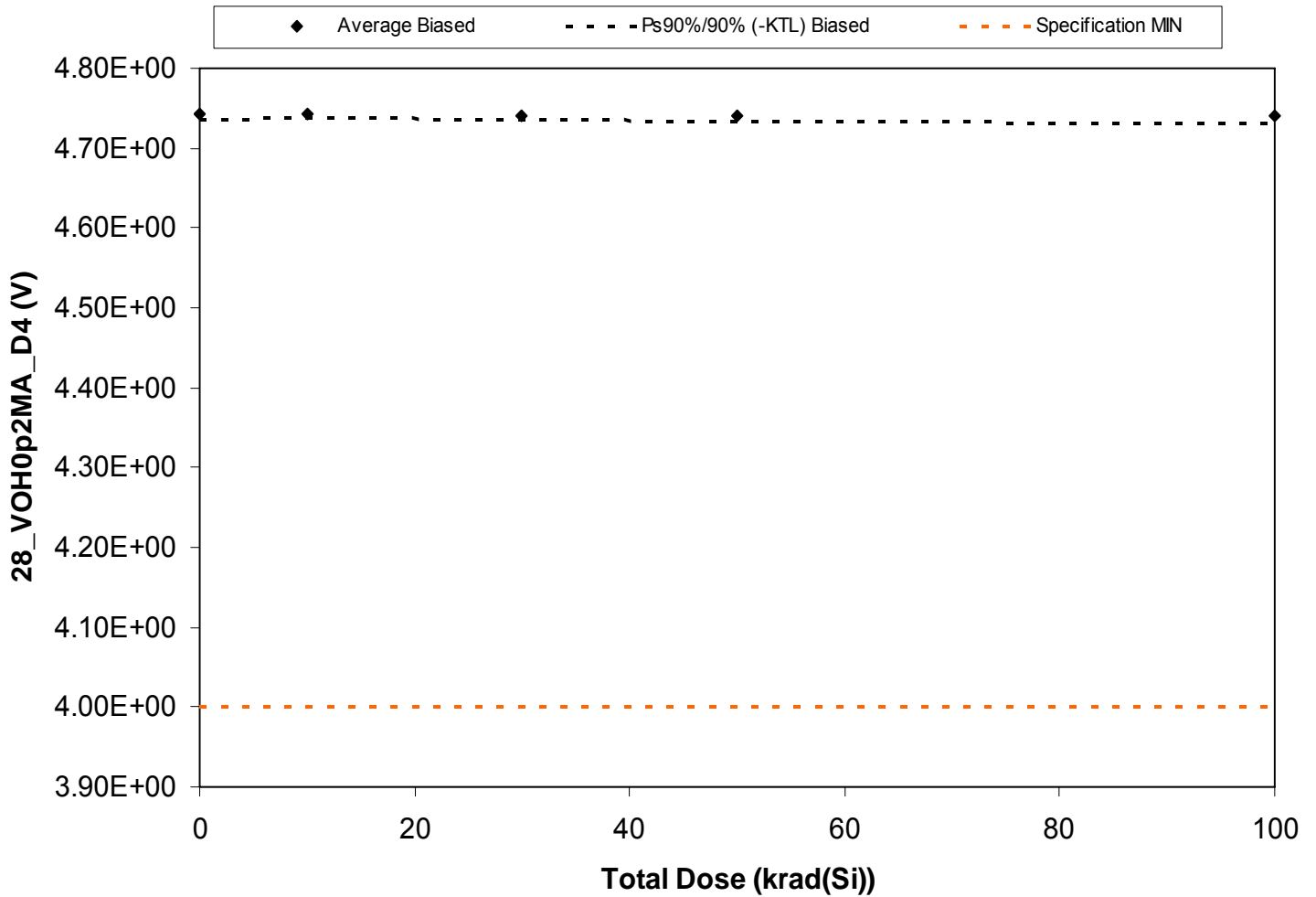


Figure 5.26. Plot of 28\_VOH0p2MA\_D4 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.26. Raw data for 28\_VOH0p2MA\_D4 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

28_VOH0p2MA_D4 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	2.19E-03	1.79E-03	2.19E-03	2.19E-03	2.83E-03
	Ps90%/90% (+KTL) Biased	4.75E+00	4.75E+00	4.75E+00	4.75E+00	4.75E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.73E+00	4.73E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

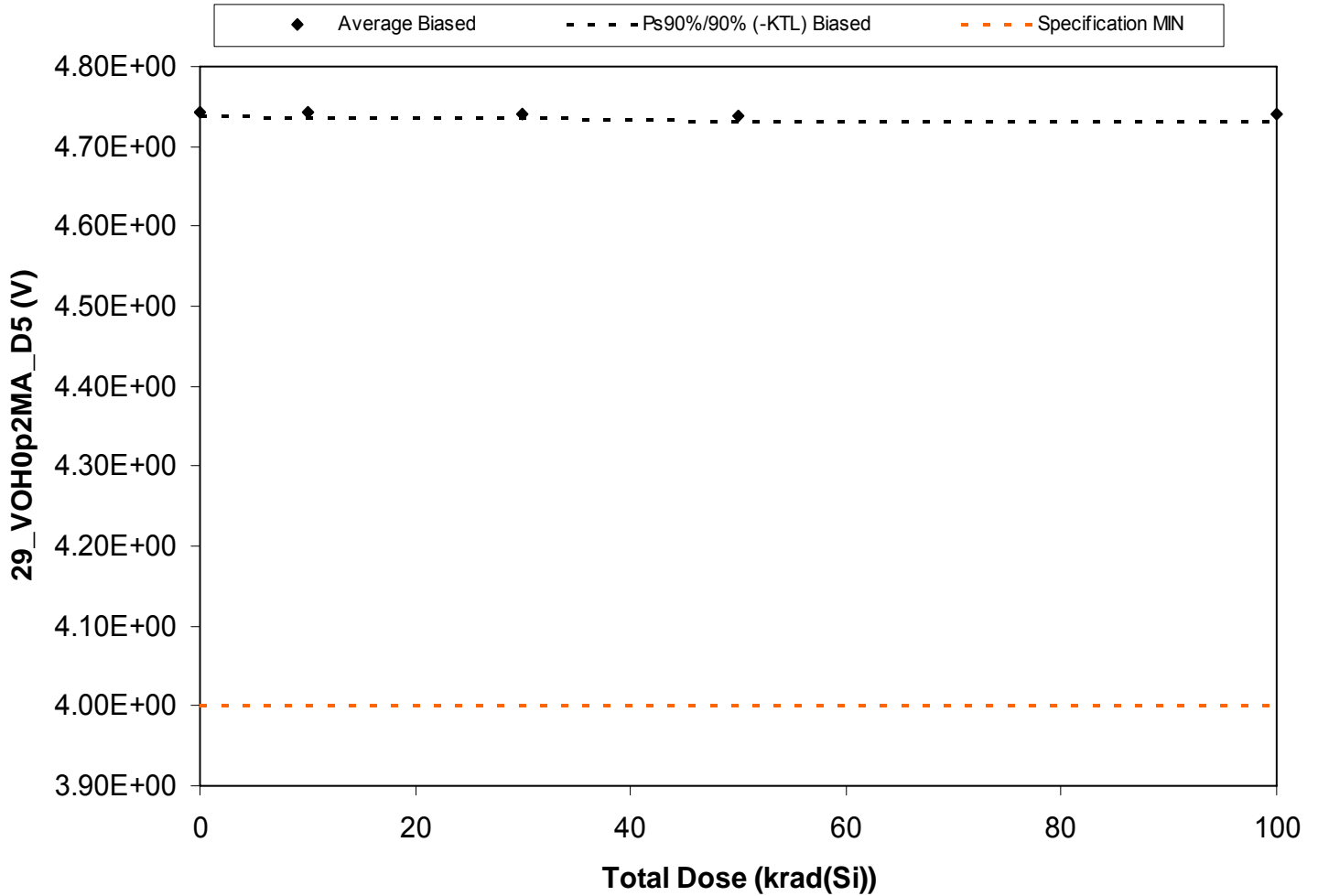


Figure 5.27. Plot of 29\_VOH0p2MA\_D5 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.27. Raw data for 29\_VOH0p2MA\_D5 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

29_VOH0p2MA_D5 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	1.79E-03	2.19E-03	1.79E-03	2.83E-03	2.83E-03
	Ps90%/90% (+KTL) Biased	4.75E+00	4.75E+00	4.75E+00	4.75E+00	4.75E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.73E+00	4.73E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

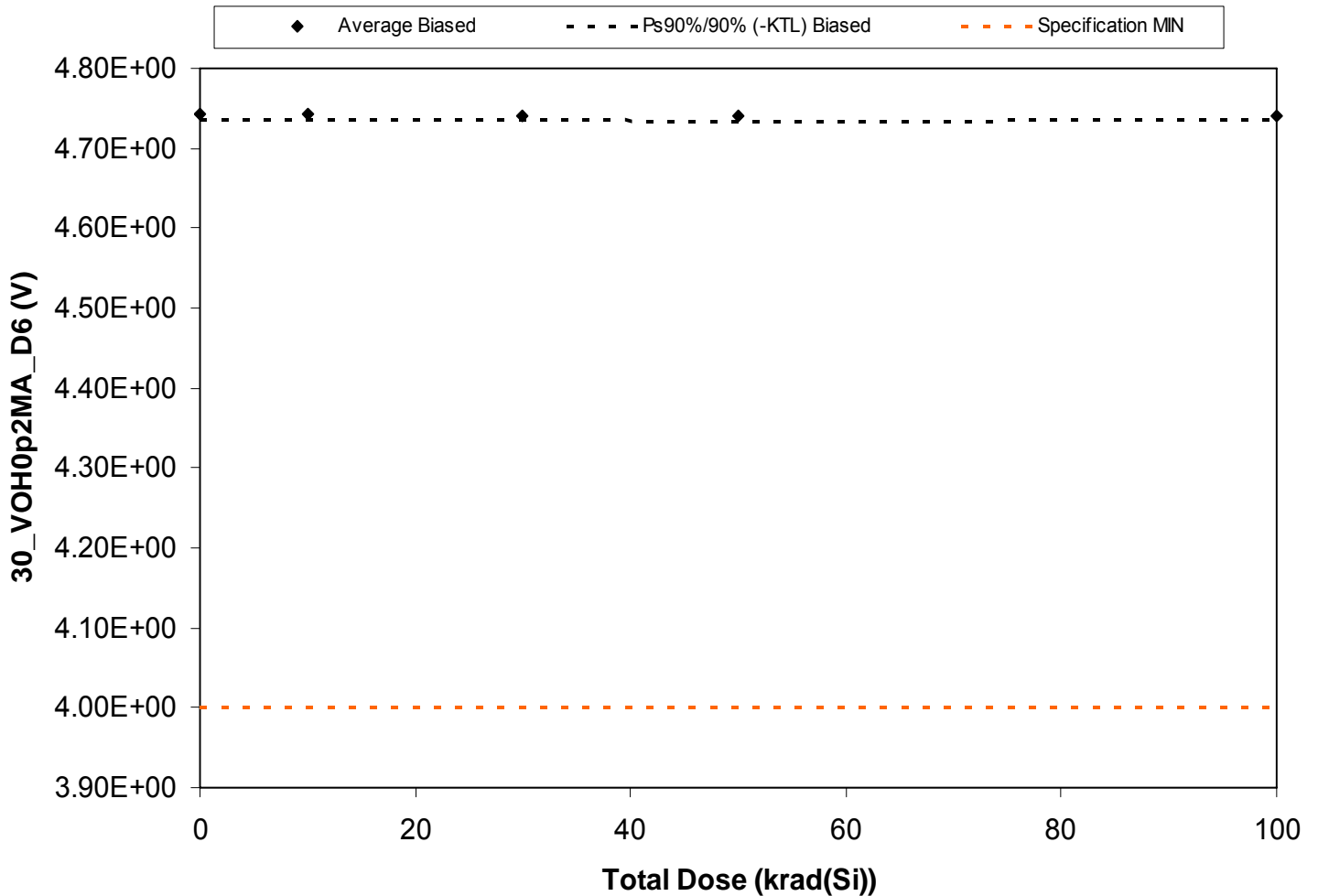


Figure 5.28. Plot of 30\_VOH0p2MA\_D6 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.28. Raw data for 30\_VOH0p2MA\_D6 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

30_VOH0p2MA_D6 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	2.19E-03	2.19E-03	1.79E-03	2.19E-03	1.79E-03
	Ps90%/90% (+KTL) Biased	4.75E+00	4.75E+00	4.75E+00	4.75E+00	4.75E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.73E+00	4.74E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

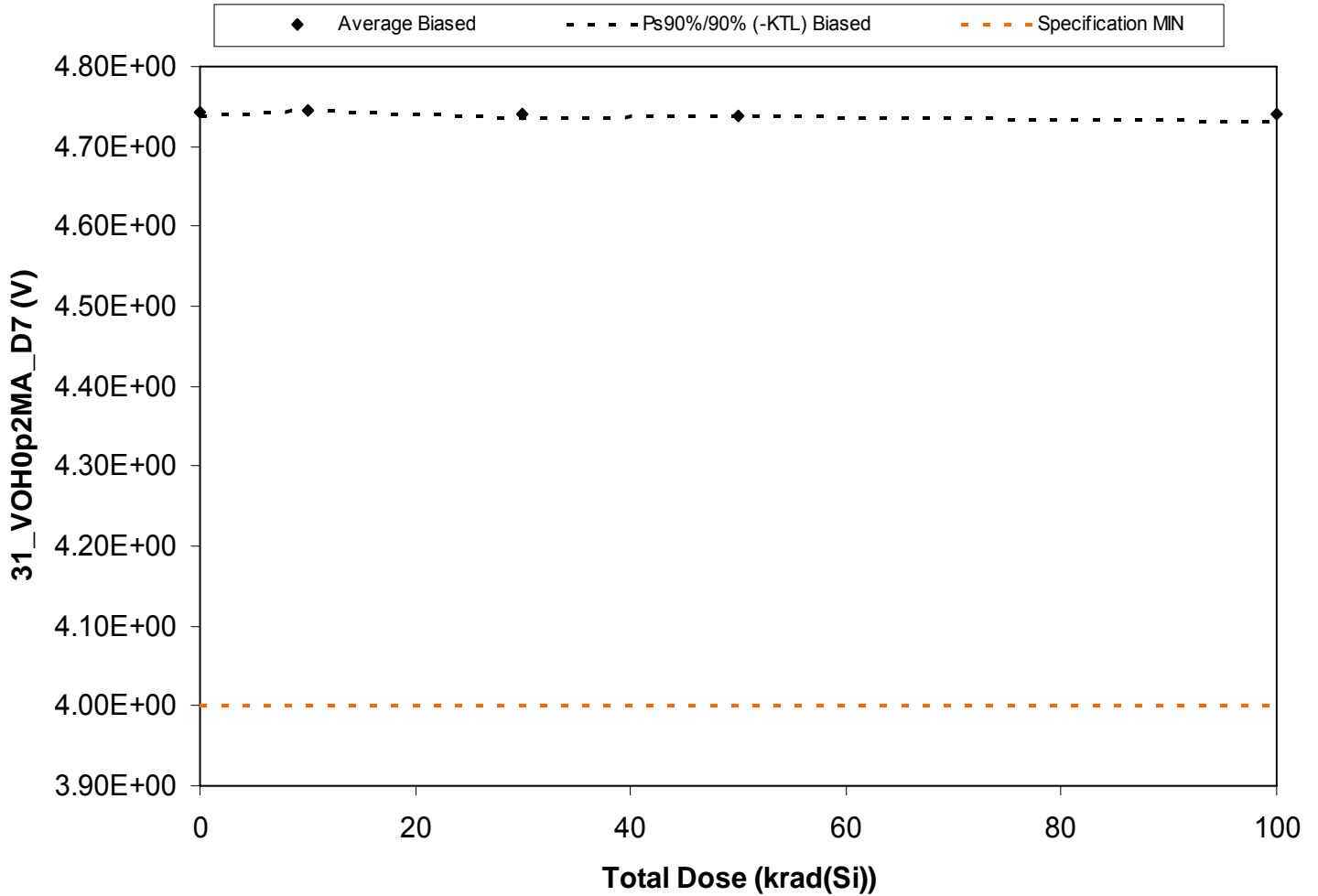


Figure 5.29. Plot of 31\_VOH0p2MA\_D7 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.29. Raw data for 31\_VOH0p2MA\_D7 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

31_VOH0p2MA_D7 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	1.79E-03	0.00E+00	1.79E-03	0.00E+00	3.35E-03
	Ps90%/90% (+KTL) Biased	4.75E+00	4.74E+00	4.75E+00	4.74E+00	4.75E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.73E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

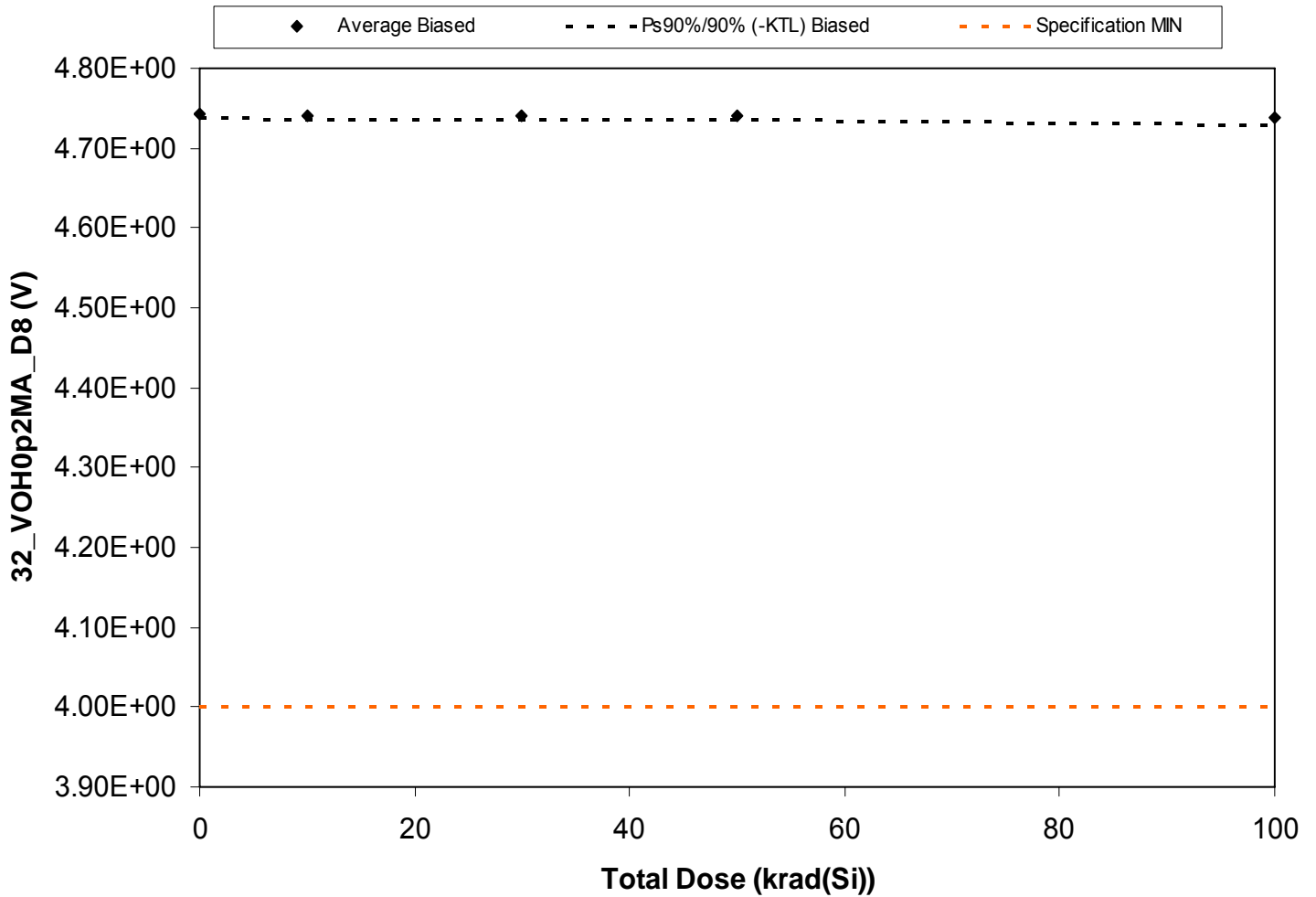


Figure 5.30. Plot of 32\_VOH0p2MA\_D8 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.30. Raw data for 32\_VOH0p2MA\_D8 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

32_VOH0p2MA_D8 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	1.79E-03	2.19E-03	2.19E-03	2.19E-03	3.35E-03
	Ps90%/90% (+KTL) Biased	4.75E+00	4.75E+00	4.75E+00	4.75E+00	4.75E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.73E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

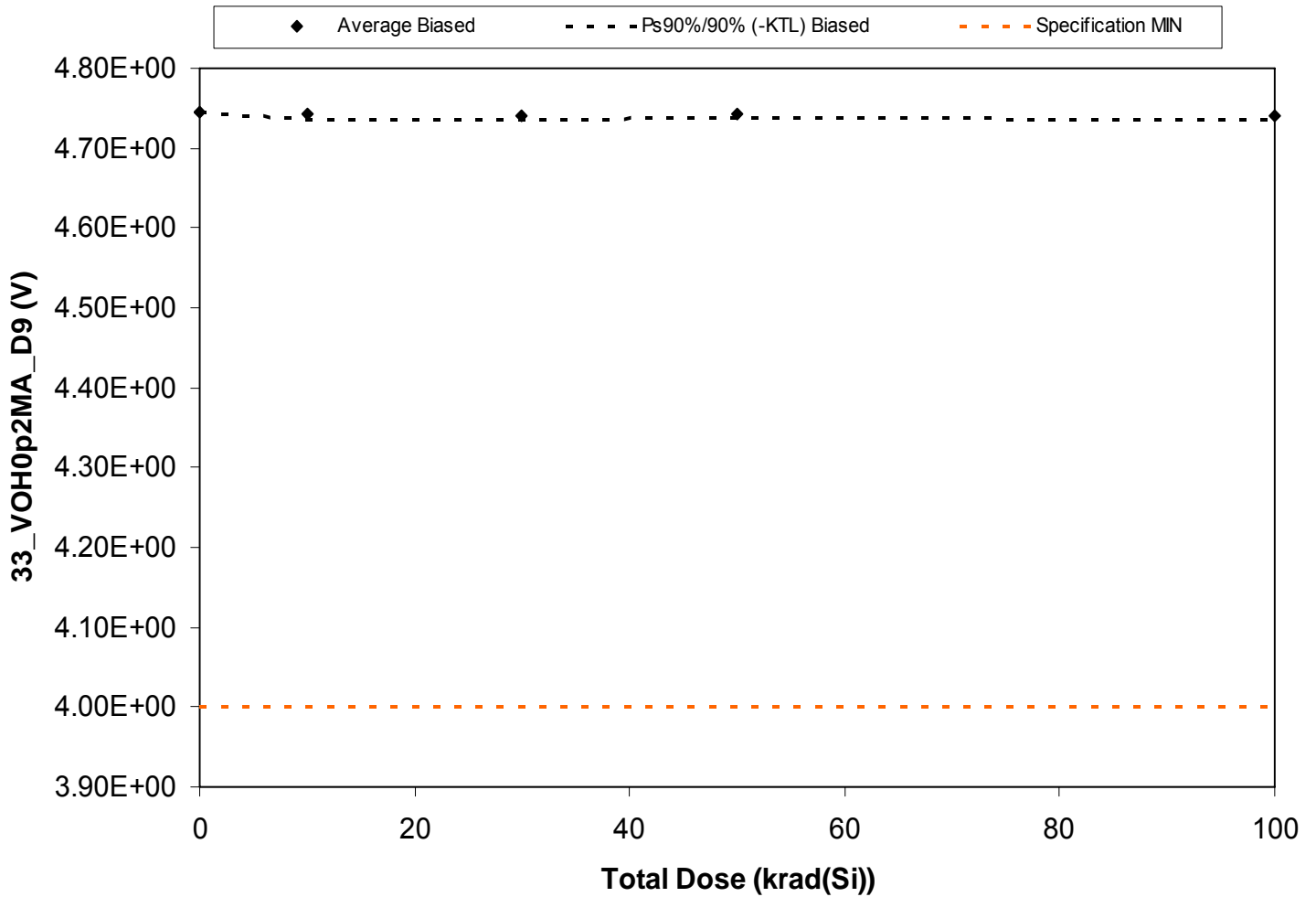


Figure 5.31. Plot of 33\_VOH0p2MA\_D9 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.31. Raw data for 33\_VOH0p2MA\_D9 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

33_VOH0p2MA_D9 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	0.00E+00	2.19E-03	1.79E-03	1.79E-03	1.79E-03
	Ps90%/90% (+KTL) Biased	4.74E+00	4.75E+00	4.75E+00	4.75E+00	4.75E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

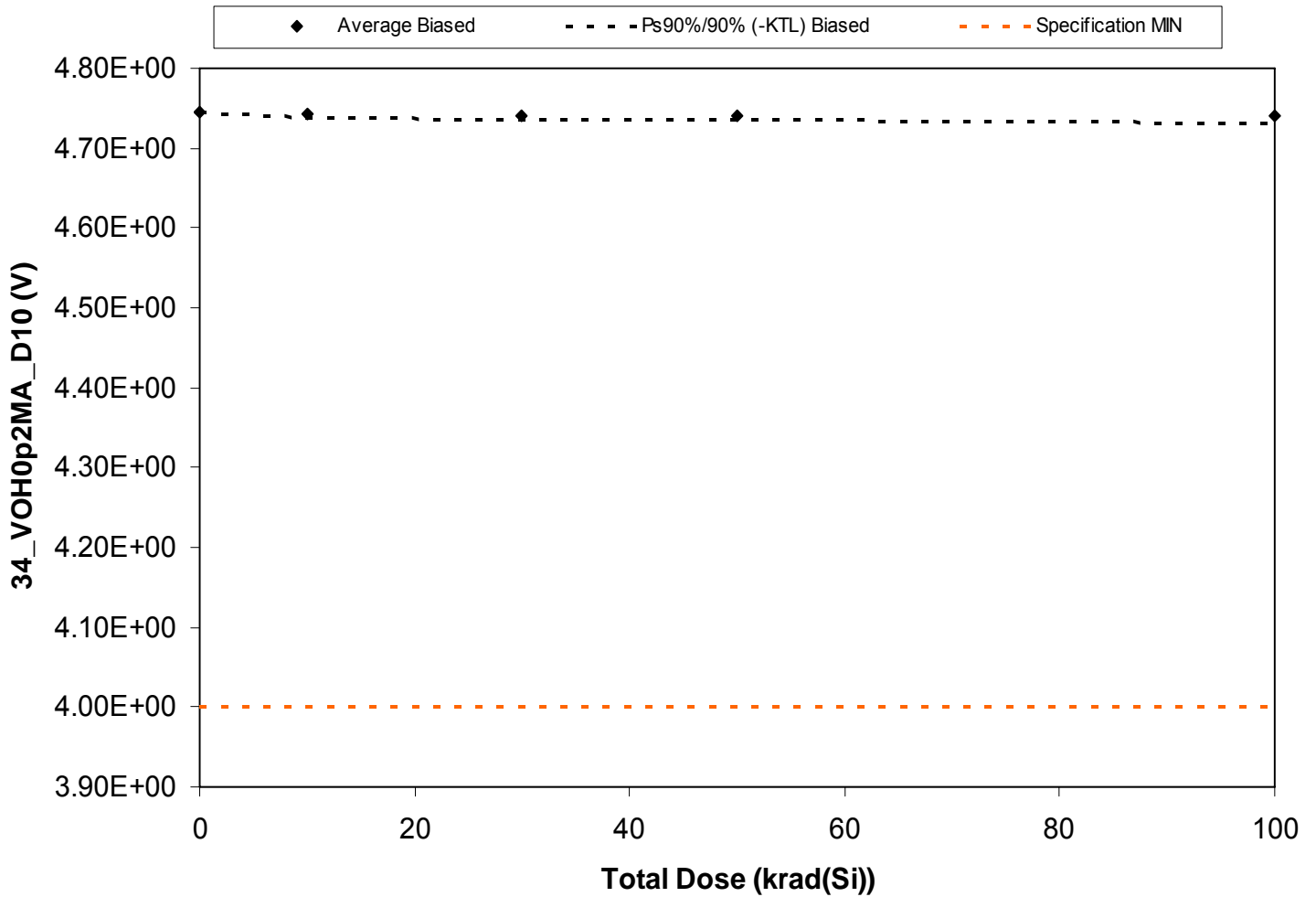


Figure 5.32. Plot of 34\_VOH0p2MA\_D10 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.32. Raw data for 34\_VOH0p2MA\_D10 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

34_VOH0p2MA_D10 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	0.00E+00	1.79E-03	2.19E-03	1.79E-03	2.83E-03
	Ps90%/90% (+KTL) Biased	4.74E+00	4.75E+00	4.75E+00	4.74E+00	4.75E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.73E+00	4.73E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

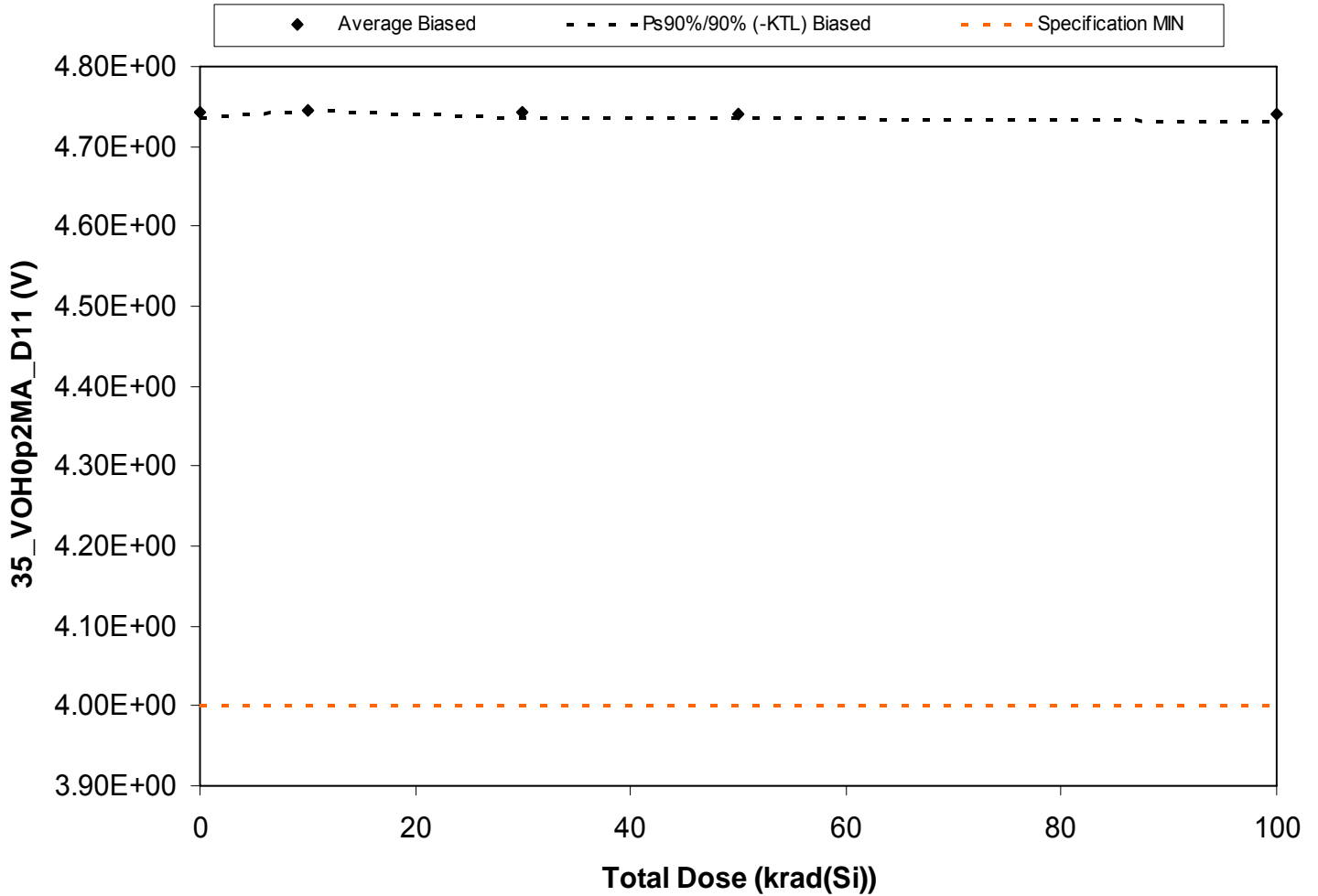


Figure 5.33. Plot of 35\_VOH0p2MA\_D11 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.33. Raw data for 35\_VOH0p2MA\_D11 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

35_VOH0p2MA_D11 (V)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>					
Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
Std Dev Biased	2.19E-03	0.00E+00	2.19E-03	2.19E-03	2.83E-03
Ps90%/90% (+KTL) Biased	4.75E+00	4.74E+00	4.75E+00	4.75E+00	4.75E+00
Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.73E+00
<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
Status	PASS	PASS	PASS	PASS	PASS

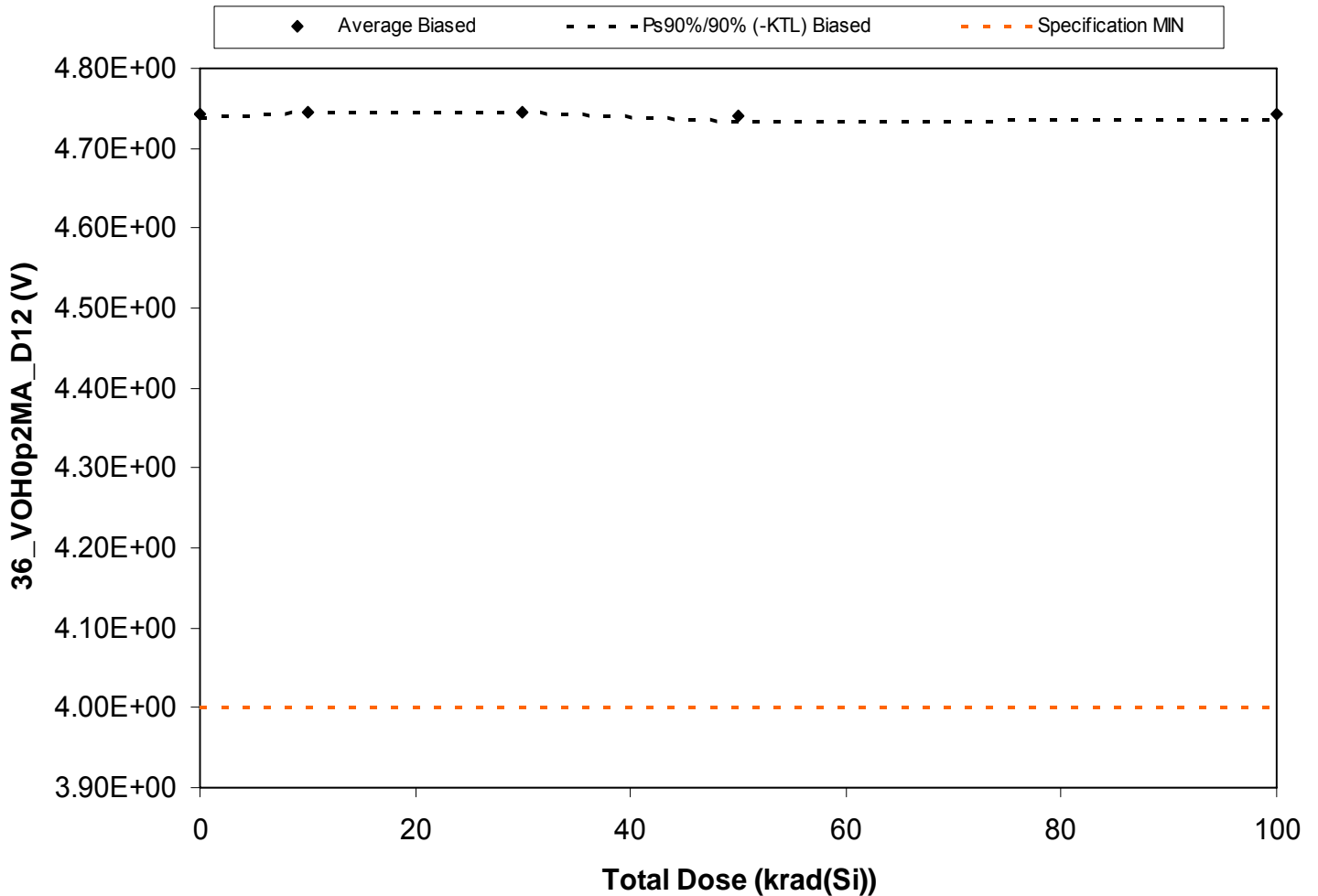


Figure 5.34. Plot of 36\_VOH0p2MA\_D12 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.34. Raw data for 36\_VOH0p2MA\_D12 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

36_VOH0p2MA_D12 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	1.79E-03	0.00E+00	0.00E+00	2.19E-03	2.19E-03
	Ps90%/90% (+KTL) Biased	4.75E+00	4.74E+00	4.74E+00	4.75E+00	4.75E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.73E+00	4.74E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

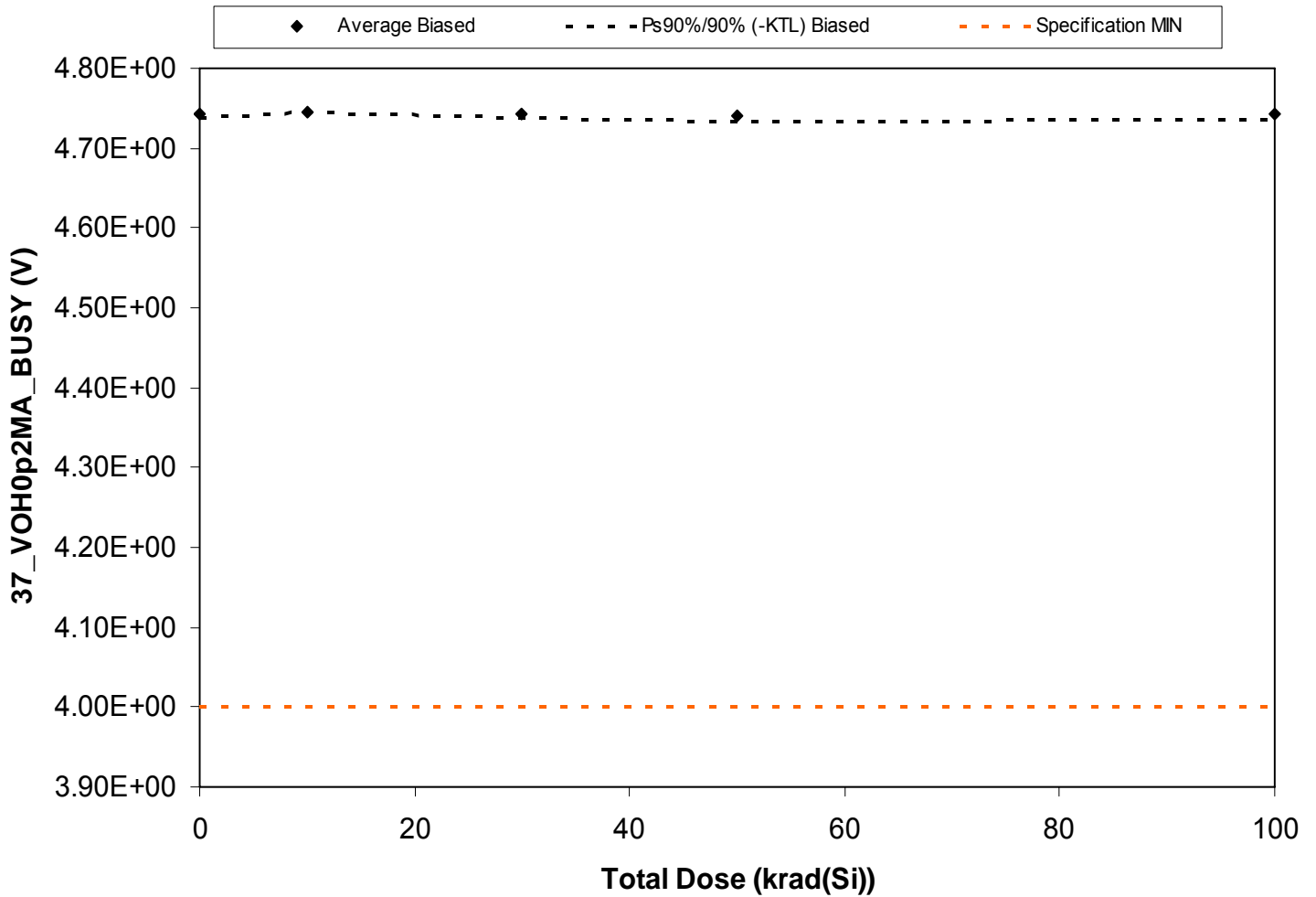


Figure 5.35. Plot of 37\_VOH0p2MA\_BUSY (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.35. Raw data for 37\_VOH0p2MA\_BUSY (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

37_VOH0p2MA_BUSY (V)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>					
Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
Std Dev Biased	1.79E-03	0.00E+00	1.79E-03	2.19E-03	2.19E-03
Ps90%/90% (+KTL) Biased	4.75E+00	4.74E+00	4.75E+00	4.75E+00	4.75E+00
Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.73E+00	4.74E+00
<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
Status	PASS	PASS	PASS	PASS	PASS

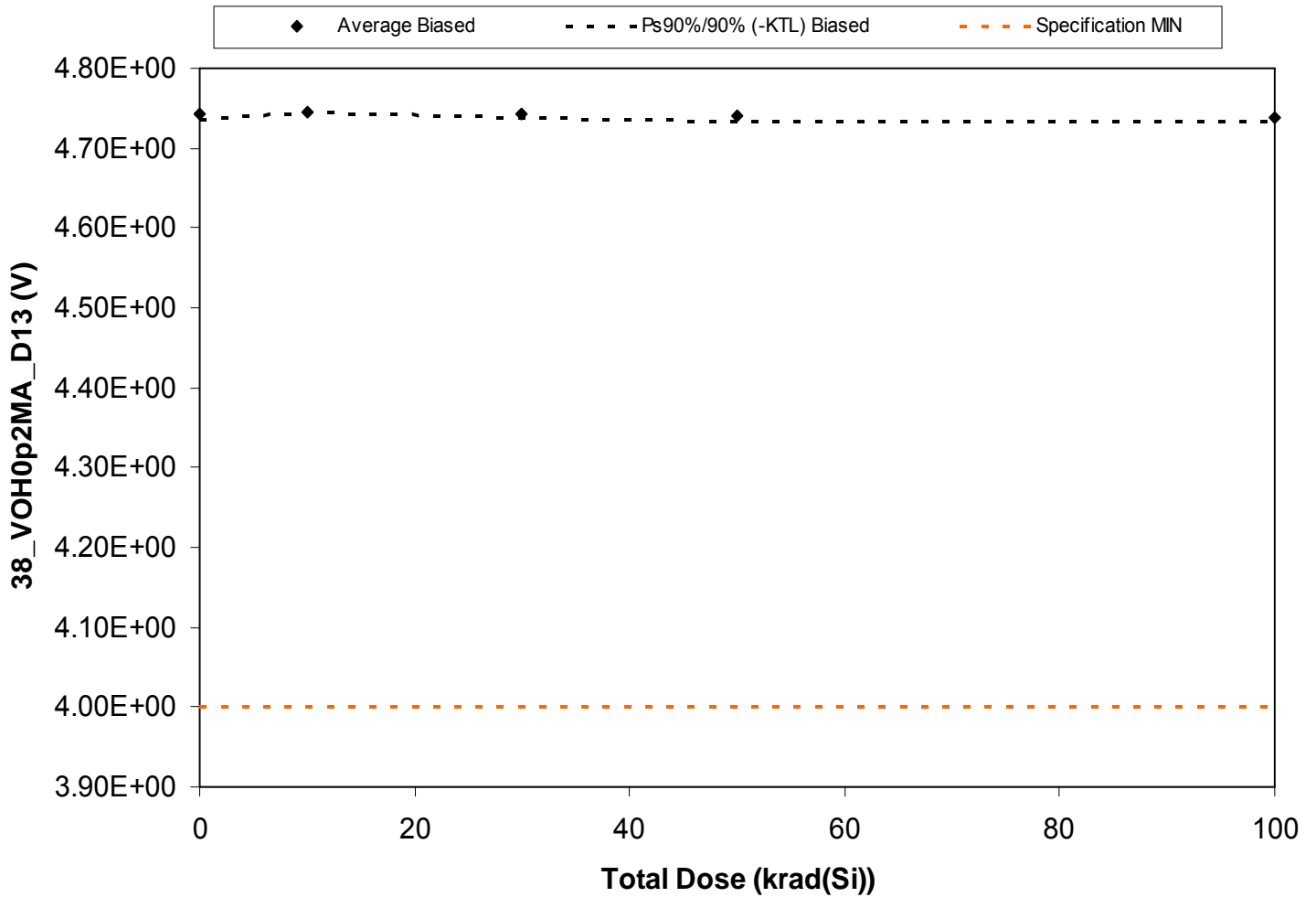


Figure 5.36. Plot of 38\_VOH0p2MA\_D13 (V) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.36. Raw data for 38\_VOH0p2MA\_D13 (V) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

38_VOH0p2MA_D13 (V)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	32	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	34	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	35	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	36	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	1	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	2	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
<b>Biased Statistics</b>						
	Average Biased	4.74E+00	4.74E+00	4.74E+00	4.74E+00	4.74E+00
	Std Dev Biased	2.19E-03	0.00E+00	1.79E-03	2.19E-03	1.79E-03
	Ps90%/90% (+KTL) Biased	4.75E+00	4.74E+00	4.75E+00	4.75E+00	4.74E+00
	Ps90%/90% (-KTL) Biased	4.74E+00	4.74E+00	4.74E+00	4.73E+00	4.73E+00
	<b>Specification MIN</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>	<b>4.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

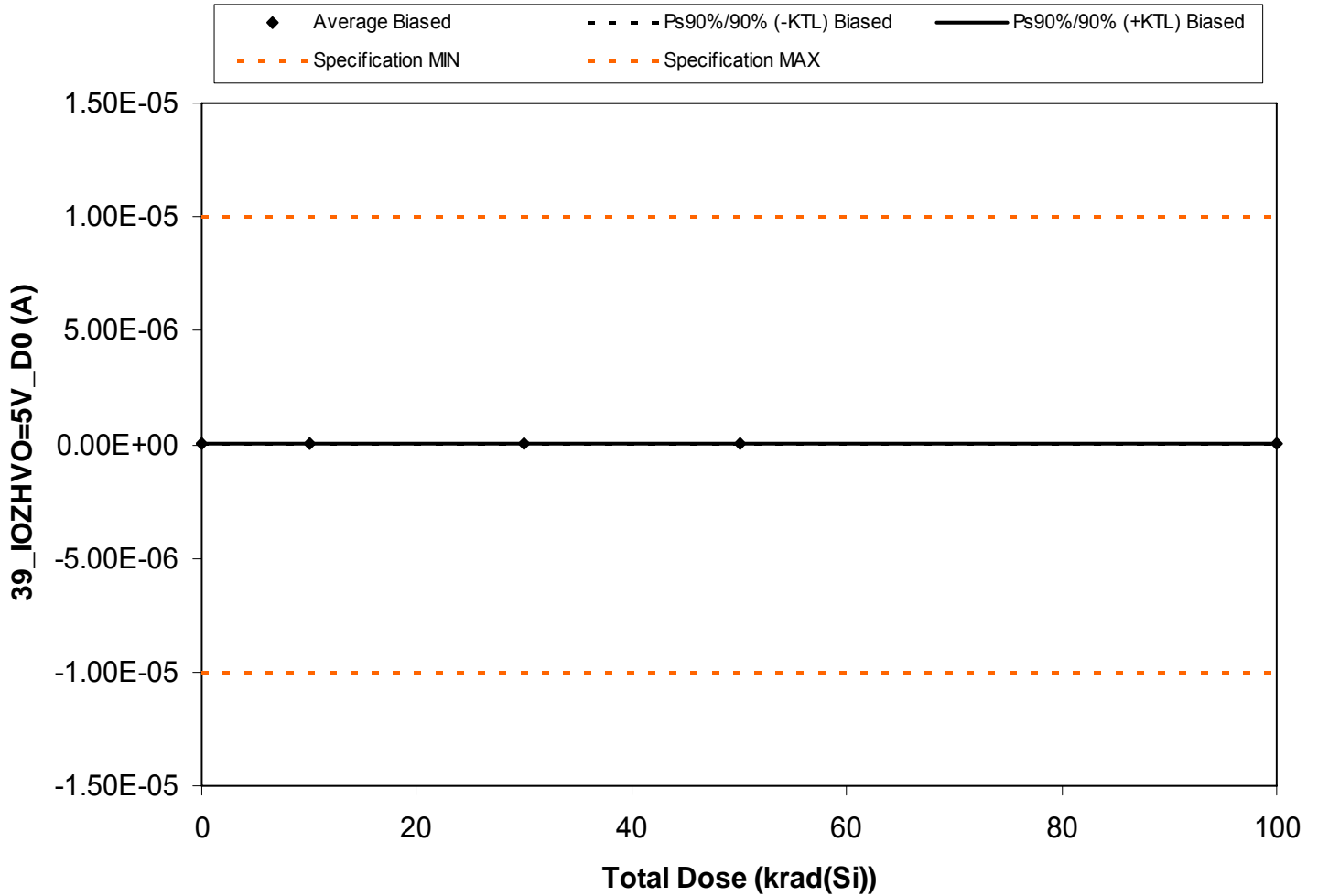


Figure 5.37. Plot of 39\_IOZHVO=5V\_D0 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.37. Raw data for 39\_IOZHVO=5V\_D0 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

39_IOZHVO=5V_D0 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	5.60E-08	5.60E-08	5.10E-08	5.50E-08	5.10E-08
	32	5.10E-08	4.90E-08	4.90E-08	5.00E-08	5.10E-08
	34	5.00E-08	5.10E-08	4.70E-08	5.00E-08	4.90E-08
	35	4.60E-08	5.00E-08	5.00E-08	4.80E-08	5.20E-08
	36	5.00E-08	5.00E-08	5.00E-08	4.80E-08	5.20E-08
	1	4.90E-08	4.80E-08	4.70E-08	4.60E-08	5.00E-08
	2	5.20E-08	4.90E-08	4.60E-08	5.00E-08	5.00E-08
<b>Biased Statistics</b>						
	Average Biased	5.06E-08	5.12E-08	4.94E-08	5.02E-08	5.10E-08
	Std Dev Biased	3.58E-09	2.77E-09	1.52E-09	2.86E-09	1.22E-09
	Ps90%/90% (+KTL) Biased	6.04E-08	5.88E-08	5.36E-08	5.81E-08	5.44E-08
	Ps90%/90% (-KTL) Biased	4.08E-08	4.36E-08	4.52E-08	4.23E-08	4.76E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

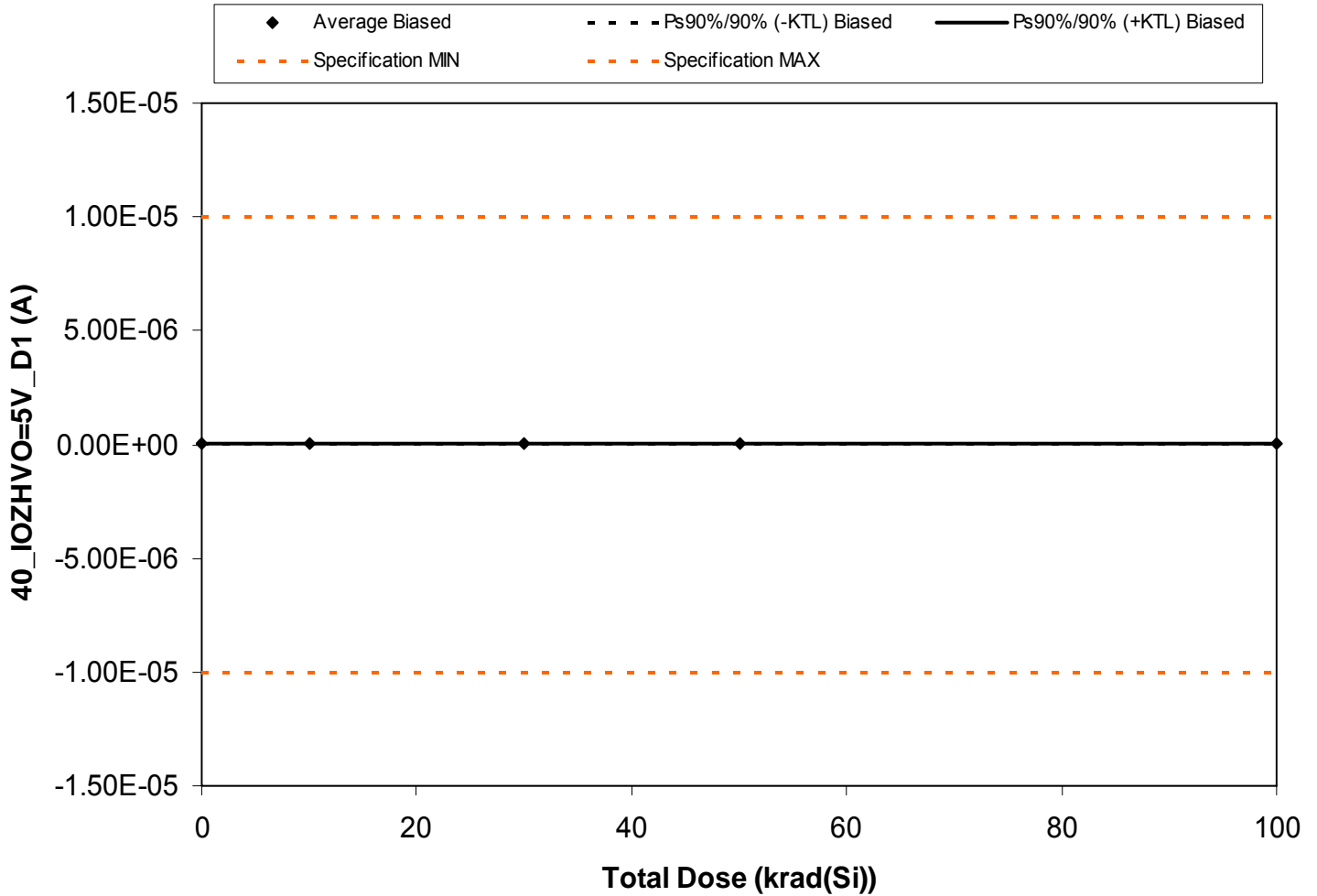


Figure 5.38. Plot of 40\_IOZHVO=5V\_D1 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.38. Raw data for 40\_IOZHVO=5V\_D1 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

40_IOZHVO=5V_D1 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	6.70E-08	7.00E-08	6.50E-08	6.80E-08	6.30E-08
	32	6.80E-08	7.10E-08	6.50E-08	6.50E-08	6.40E-08
	34	6.60E-08	6.80E-08	6.50E-08	6.80E-08	6.60E-08
	35	6.70E-08	6.80E-08	6.60E-08	6.60E-08	6.60E-08
	36	6.80E-08	6.70E-08	6.30E-08	6.40E-08	6.60E-08
	1	6.50E-08	6.50E-08	6.20E-08	6.30E-08	6.70E-08
	2	6.90E-08	6.40E-08	6.50E-08	6.40E-08	6.50E-08
<b>Biased Statistics</b>						
	Average Biased	6.72E-08	6.88E-08	6.48E-08	6.62E-08	6.50E-08
	Std Dev Biased	8.37E-10	1.64E-09	1.10E-09	1.79E-09	1.41E-09
	Ps90%/90% (+KTL) Biased	6.95E-08	7.33E-08	6.78E-08	7.11E-08	6.89E-08
	Ps90%/90% (-KTL) Biased	6.49E-08	6.43E-08	6.18E-08	6.13E-08	6.11E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

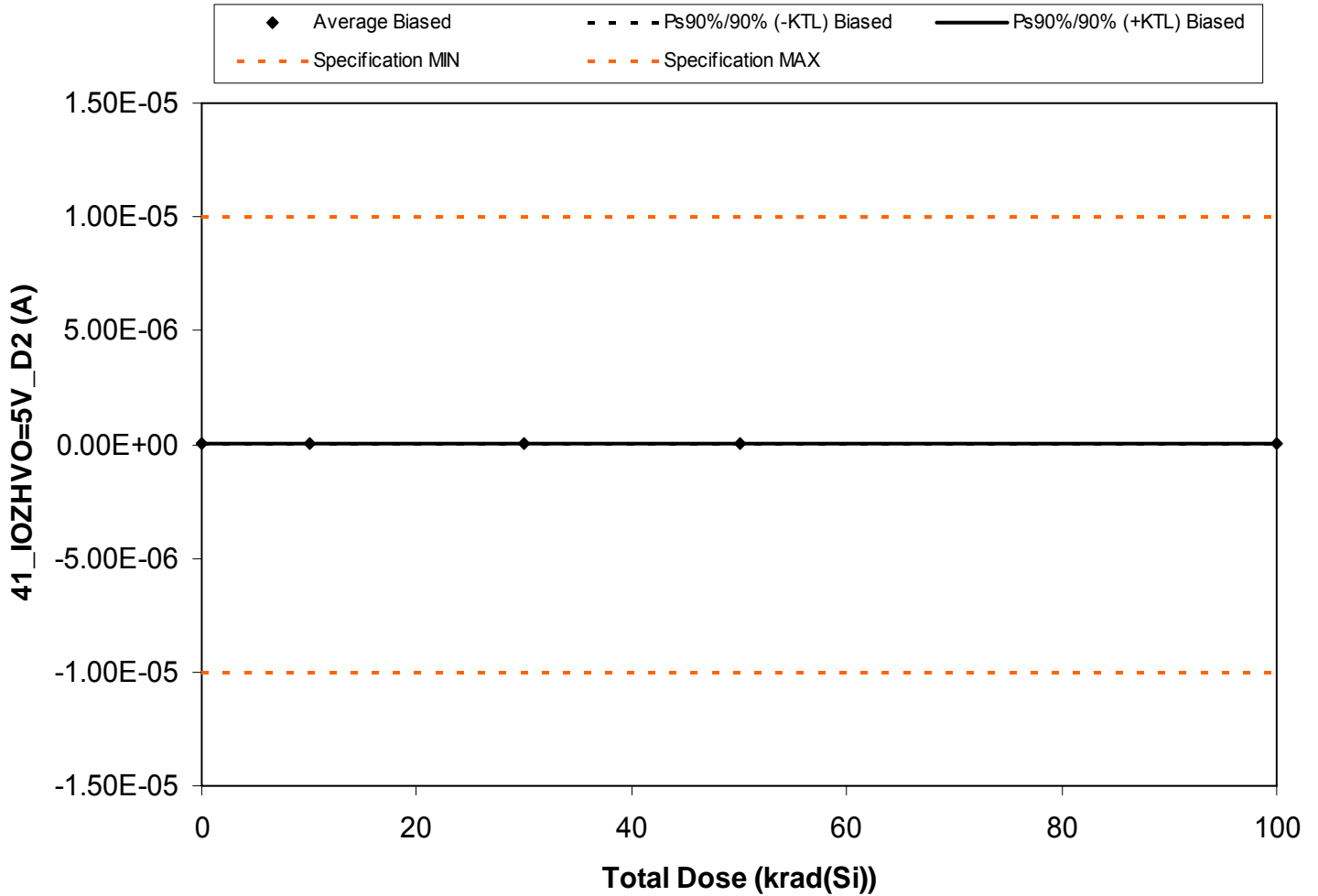


Figure 5.39. Plot of 41\_IOZHVO=5V\_D2 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.39. Raw data for 41\_IOZHVO=5V\_D2 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

41_IOZHVO=5V_D2 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	6.90E-08	7.30E-08	6.90E-08	7.20E-08	6.70E-08
	32	7.00E-08	7.30E-08	6.80E-08	6.90E-08	6.80E-08
	34	6.90E-08	7.50E-08	6.70E-08	6.70E-08	6.80E-08
	35	7.30E-08	7.50E-08	6.90E-08	7.10E-08	7.00E-08
	36	7.00E-08	7.00E-08	6.80E-08	7.20E-08	7.00E-08
	1	7.20E-08	7.10E-08	6.90E-08	7.00E-08	7.20E-08
	2	7.10E-08	6.80E-08	6.90E-08	6.70E-08	7.10E-08
<b>Biased Statistics</b>						
	Average Biased	7.02E-08	7.32E-08	6.82E-08	7.02E-08	6.86E-08
	Std Dev Biased	1.64E-09	2.05E-09	8.37E-10	2.17E-09	1.34E-09
	Ps90%/90% (+KTL) Biased	7.47E-08	7.88E-08	7.05E-08	7.61E-08	7.23E-08
	Ps90%/90% (-KTL) Biased	6.57E-08	6.76E-08	6.59E-08	6.43E-08	6.49E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

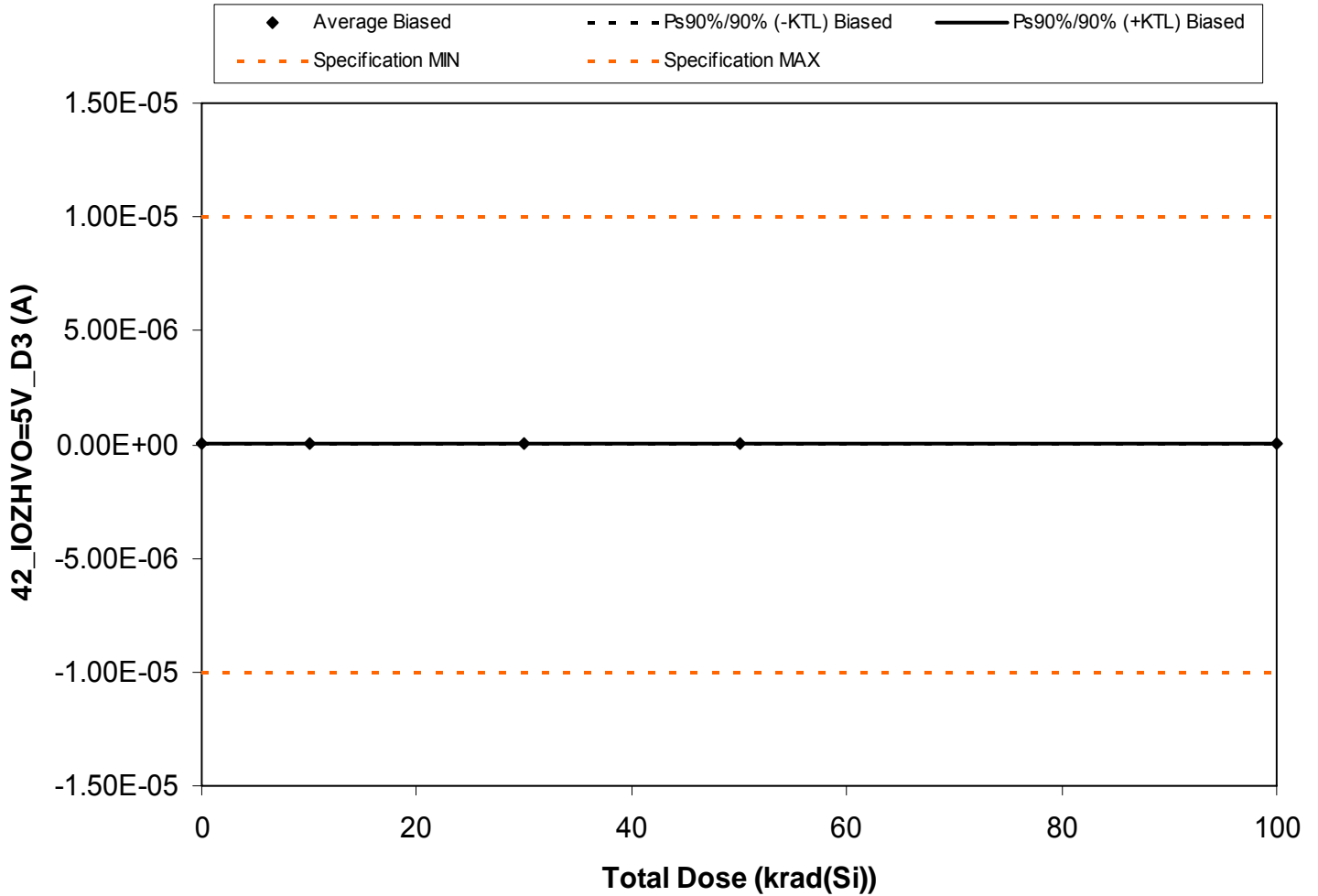


Figure 5.40. Plot of  $42\_IOZHVO=5V\_D3$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.40. Raw data for 42\_IOZHVO=5V\_D3 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

42_IOZHVO=5V_D3 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	7.60E-08	7.60E-08	7.10E-08	7.60E-08	7.30E-08
	32	7.30E-08	7.60E-08	7.40E-08	7.40E-08	7.60E-08
	34	7.20E-08	7.30E-08	6.90E-08	7.20E-08	7.10E-08
	35	7.30E-08	7.70E-08	7.30E-08	7.30E-08	7.10E-08
	36	7.20E-08	7.30E-08	7.00E-08	7.30E-08	7.20E-08
	1	7.20E-08	7.20E-08	6.90E-08	6.90E-08	7.30E-08
	2	7.30E-08	7.00E-08	7.20E-08	6.90E-08	7.40E-08
<b>Biased Statistics</b>						
	Average Biased	7.32E-08	7.50E-08	7.14E-08	7.36E-08	7.26E-08
	Std Dev Biased	1.64E-09	1.87E-09	2.07E-09	1.52E-09	2.07E-09
	Ps90%/90% (+KTL) Biased	7.77E-08	8.01E-08	7.71E-08	7.78E-08	7.83E-08
	Ps90%/90% (-KTL) Biased	6.87E-08	6.99E-08	6.57E-08	6.94E-08	6.69E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

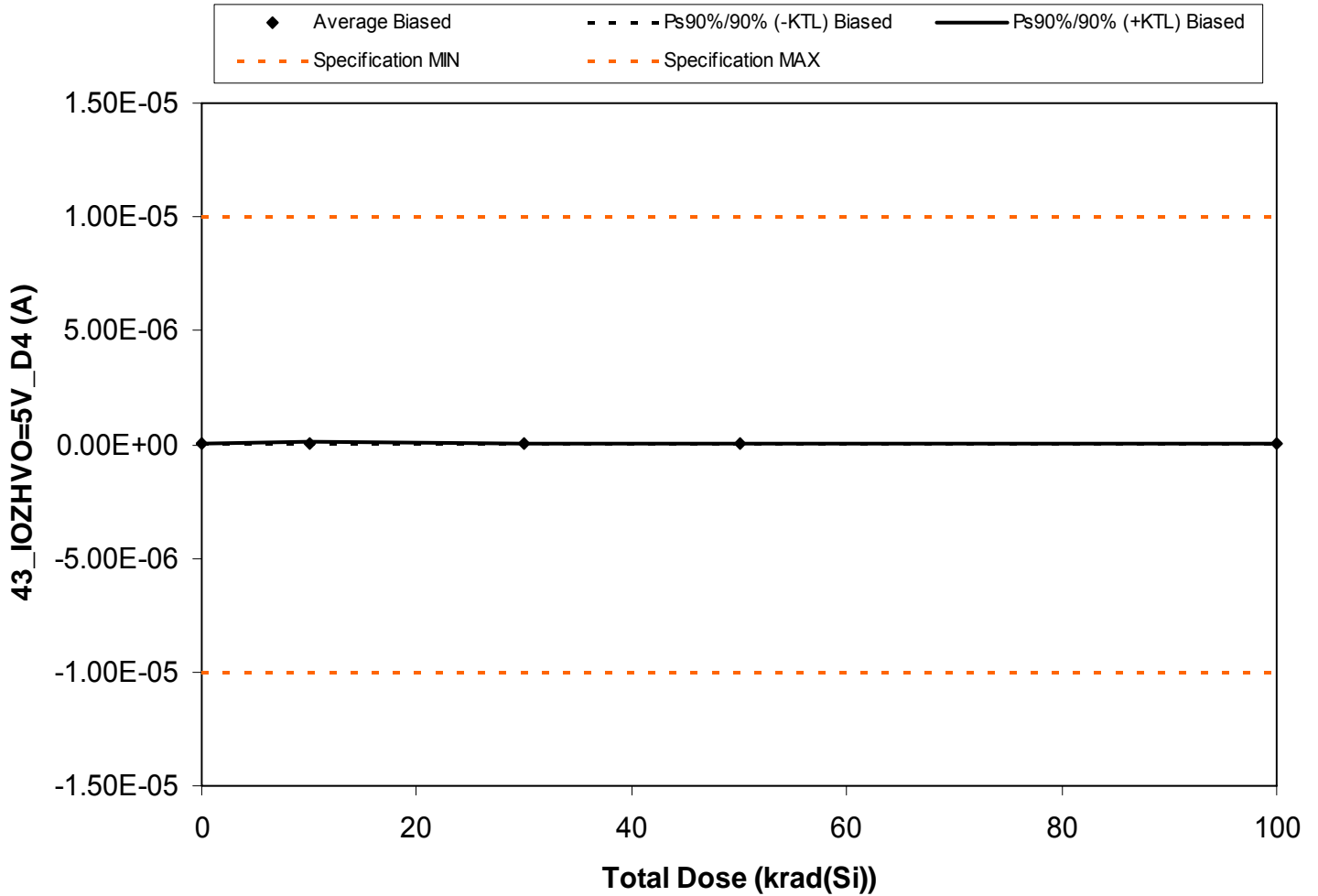


Figure 5.41. Plot of 43\_IOZHVO=5V\_D4 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.41. Raw data for 43\_IOZHVO=5V\_D4 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

43_IOZHVO=5V_D4 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	7.50E-08	7.80E-08	7.20E-08	7.40E-08	7.30E-08
	32	7.80E-08	7.70E-08	7.10E-08	7.50E-08	7.50E-08
	34	7.40E-08	7.80E-08	7.40E-08	7.60E-08	7.30E-08
	35	7.60E-08	8.00E-08	7.10E-08	7.30E-08	7.40E-08
	36	7.50E-08	7.50E-08	7.10E-08	7.30E-08	7.40E-08
	1	7.40E-08	7.30E-08	7.10E-08	7.10E-08	7.60E-08
	2	7.60E-08	7.40E-08	7.10E-08	7.40E-08	7.50E-08
<b>Biased Statistics</b>						
	Average Biased	7.56E-08	7.76E-08	7.18E-08	7.42E-08	7.38E-08
	Std Dev Biased	1.52E-09	1.82E-09	1.30E-09	1.30E-09	8.37E-10
	Ps90%/90% (+KTL) Biased	7.98E-08	8.26E-08	7.54E-08	7.78E-08	7.61E-08
	Ps90%/90% (-KTL) Biased	7.14E-08	7.26E-08	6.82E-08	7.06E-08	7.15E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

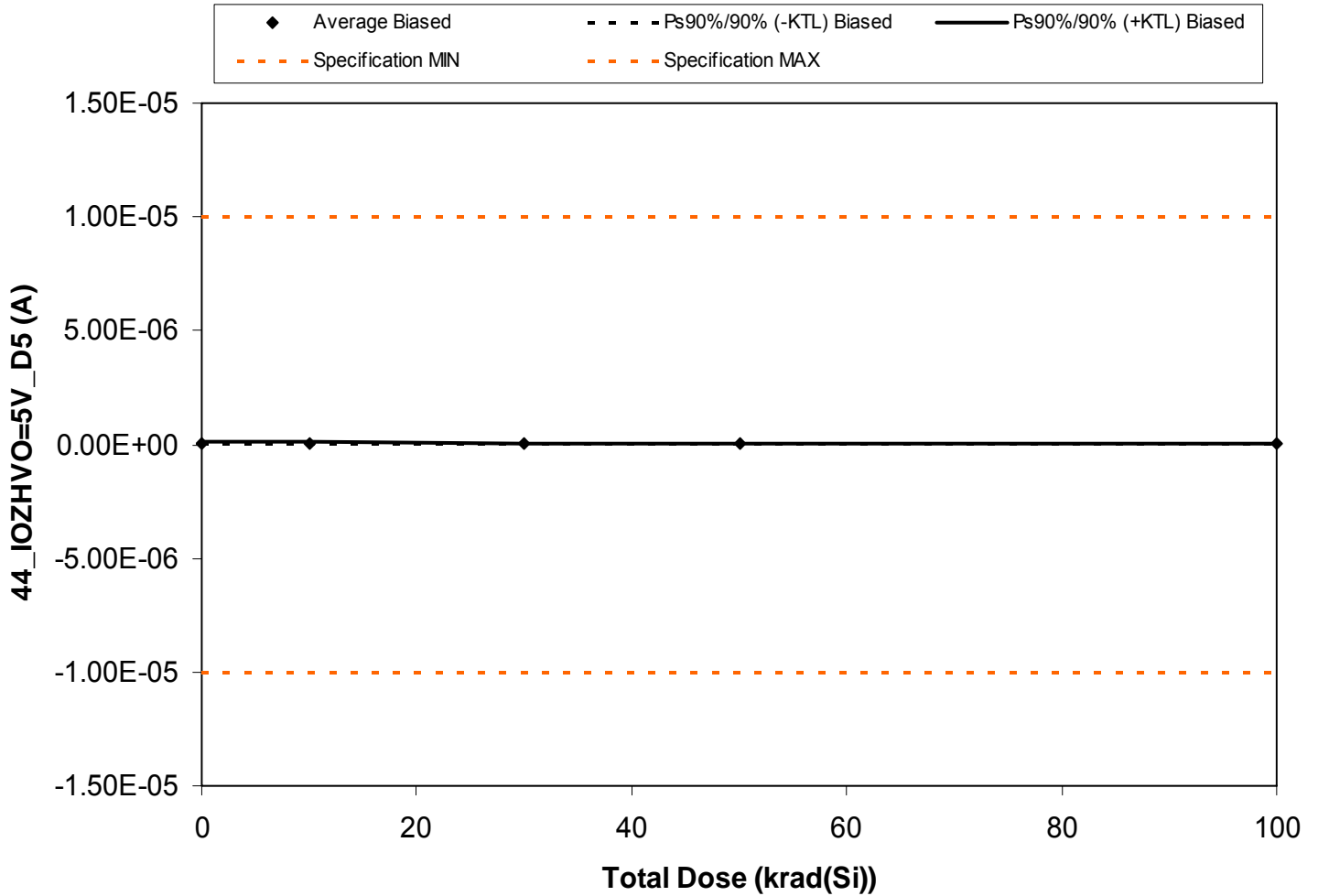


Figure 5.42. Plot of 44\_IOZHVO=5V\_D5 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.42. Raw data for 44\_IOZHVO=5V\_D5 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

44_IOZHVO=5V_D5 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	7.20E-08	7.80E-08	7.10E-08	7.60E-08	7.00E-08
	32	7.80E-08	7.70E-08	7.10E-08	7.40E-08	7.40E-08
	34	7.40E-08	7.40E-08	6.90E-08	7.60E-08	7.10E-08
	35	7.30E-08	7.70E-08	7.00E-08	7.20E-08	7.00E-08
	36	7.20E-08	7.40E-08	7.20E-08	7.40E-08	7.30E-08
	1	7.20E-08	7.20E-08	7.00E-08	6.80E-08	7.40E-08
	2	7.40E-08	7.20E-08	7.00E-08	7.20E-08	7.20E-08
<b>Biased Statistics</b>						
	Average Biased	7.38E-08	7.60E-08	7.06E-08	7.44E-08	7.16E-08
	Std Dev Biased	2.49E-09	1.87E-09	1.14E-09	1.67E-09	1.82E-09
	Ps90%/90% (+KTL) Biased	8.06E-08	8.11E-08	7.37E-08	7.90E-08	7.66E-08
	Ps90%/90% (-KTL) Biased	6.70E-08	7.09E-08	6.75E-08	6.98E-08	6.66E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

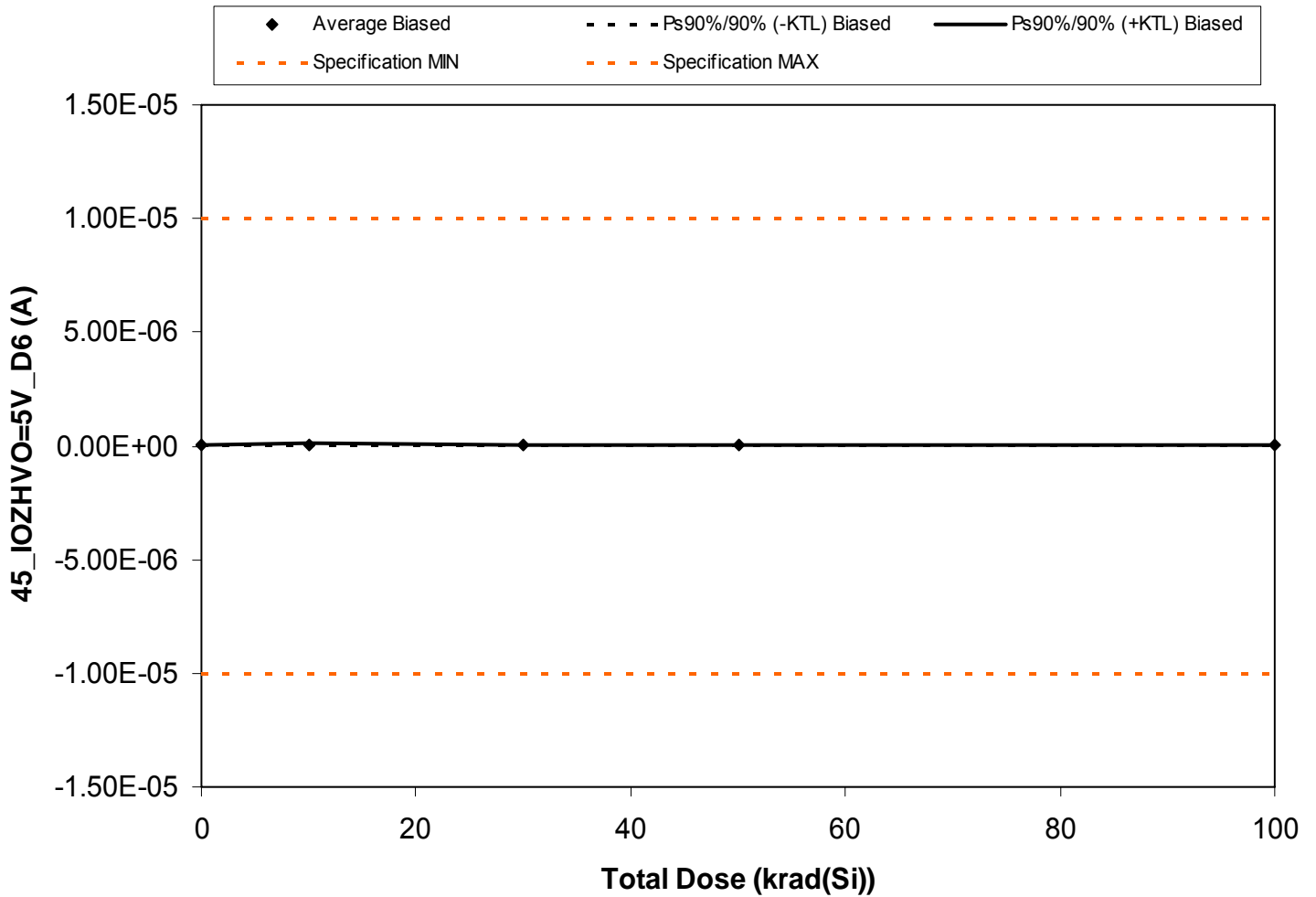


Figure 5.43. Plot of  $45\_IOZHVO=5V\_D6$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.43. Raw data for 45\_IOZHVO=5V\_D6 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

45_IOZHVO=5V_D6 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	7.40E-08	8.00E-08	7.30E-08	7.50E-08	7.30E-08
	32	7.50E-08	7.70E-08	7.40E-08	7.20E-08	7.40E-08
	34	7.40E-08	7.80E-08	7.20E-08	7.60E-08	7.30E-08
	35	7.50E-08	7.60E-08	7.30E-08	7.30E-08	7.60E-08
	36	7.50E-08	7.60E-08	7.20E-08	7.40E-08	7.30E-08
	1	7.40E-08	7.30E-08	7.10E-08	7.00E-08	7.40E-08
	2	7.50E-08	7.20E-08	7.20E-08	7.10E-08	7.60E-08
<b>Biased Statistics</b>						
	Average Biased	7.46E-08	7.74E-08	7.28E-08	7.40E-08	7.38E-08
	Std Dev Biased	5.48E-10	1.67E-09	8.37E-10	1.58E-09	1.30E-09
	Ps90%/90% (+KTL) Biased	7.61E-08	8.20E-08	7.51E-08	7.83E-08	7.74E-08
	Ps90%/90% (-KTL) Biased	7.31E-08	7.28E-08	7.05E-08	6.97E-08	7.02E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

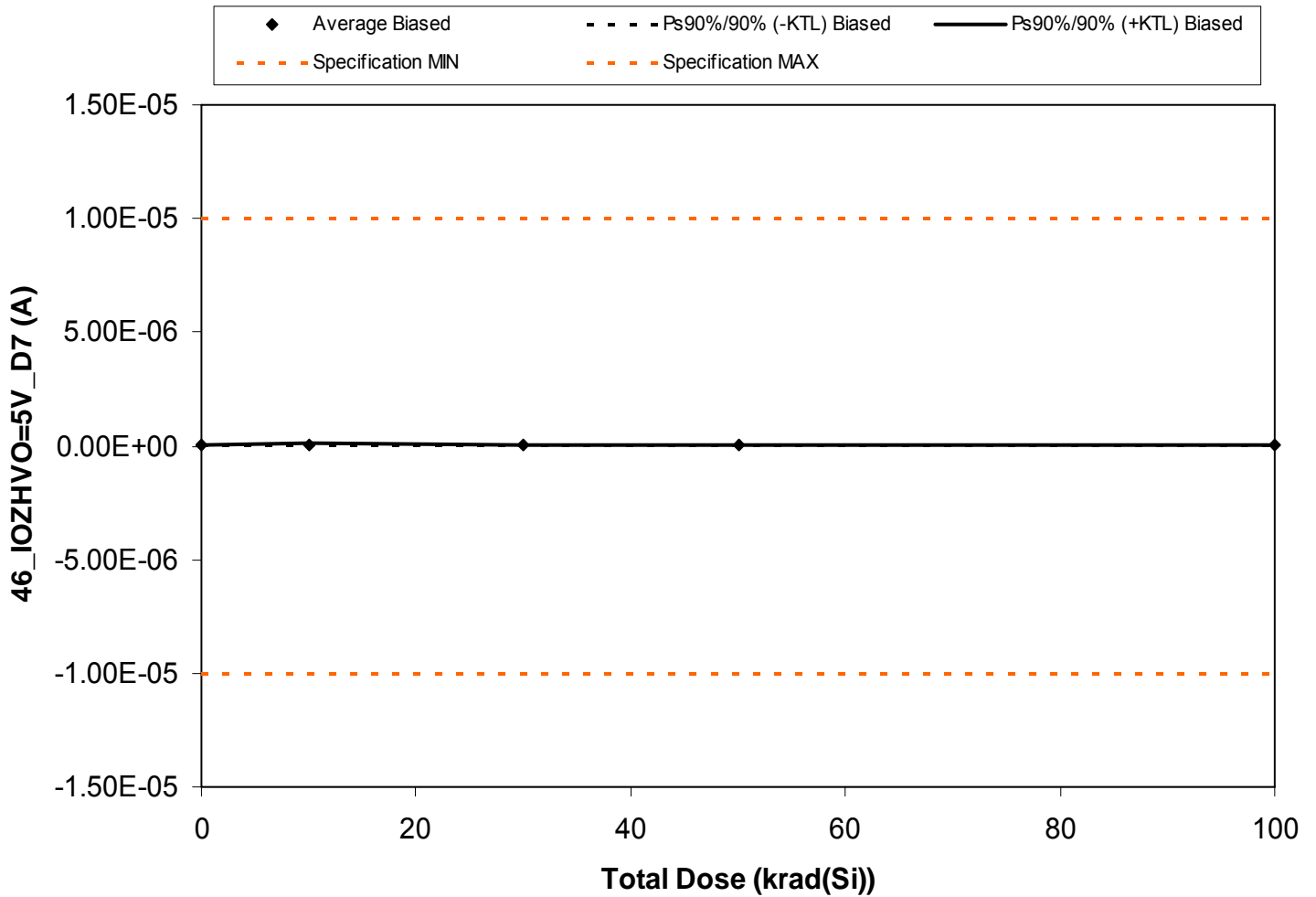


Figure 5.44. Plot of  $46\_IOZHVO=5V\_D7$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.44. Raw data for 46\_IOZHVO=5V\_D7 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

46_IOZHVO=5V_D7 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	7.50E-08	7.90E-08	7.40E-08	7.70E-08	7.50E-08
	32	7.60E-08	8.20E-08	7.70E-08	7.70E-08	7.50E-08
	34	7.40E-08	8.20E-08	7.30E-08	7.30E-08	7.60E-08
	35	7.60E-08	7.90E-08	7.60E-08	7.50E-08	7.40E-08
	36	7.40E-08	7.90E-08	7.50E-08	7.40E-08	7.50E-08
	1	7.60E-08	7.60E-08	7.30E-08	7.10E-08	7.70E-08
	2	7.80E-08	7.60E-08	7.20E-08	7.30E-08	7.50E-08
<b>Biased Statistics</b>						
	Average Biased	7.50E-08	8.02E-08	7.50E-08	7.52E-08	7.50E-08
	Std Dev Biased	1.00E-09	1.64E-09	1.58E-09	1.79E-09	7.07E-10
	Ps90%/90% (+KTL) Biased	7.77E-08	8.47E-08	7.93E-08	8.01E-08	7.69E-08
	Ps90%/90% (-KTL) Biased	7.23E-08	7.57E-08	7.07E-08	7.03E-08	7.31E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

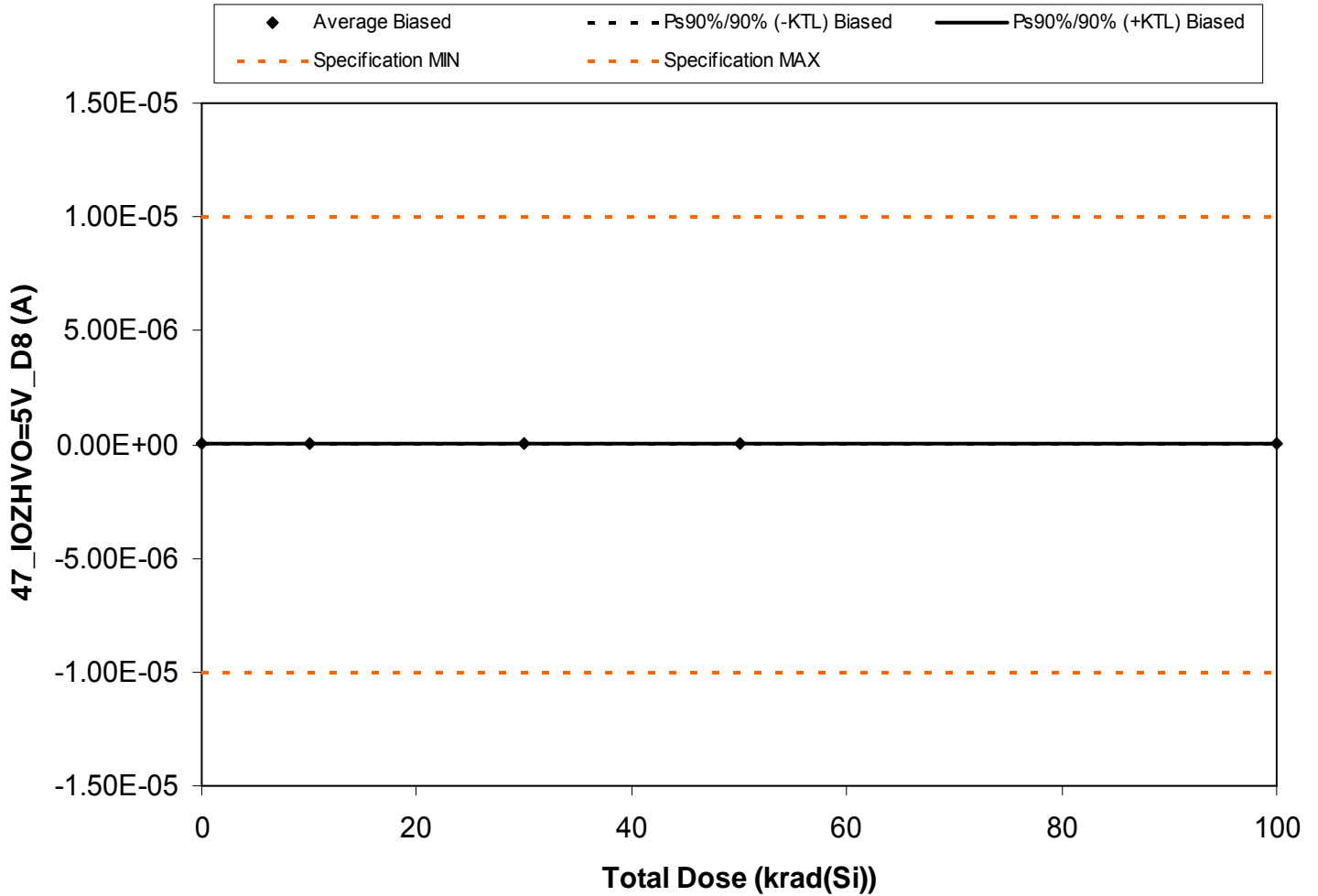


Figure 5.45. Plot of  $47\_IOZHVO=5V\_D8$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.45. Raw data for 47\_IOZHVO=5V\_D8 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

47_IOZHVO=5V_D8 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	7.30E-08	7.70E-08	7.40E-08	7.60E-08	7.30E-08
	32	7.40E-08	7.70E-08	7.10E-08	7.40E-08	7.20E-08
	34	7.20E-08	7.80E-08	7.20E-08	7.30E-08	7.10E-08
	35	7.60E-08	7.70E-08	7.10E-08	7.20E-08	7.20E-08
	36	7.50E-08	7.50E-08	7.10E-08	7.30E-08	7.20E-08
	1	7.50E-08	7.20E-08	6.90E-08	6.90E-08	7.40E-08
	2	7.20E-08	7.50E-08	7.10E-08	6.90E-08	7.20E-08
<b>Biased Statistics</b>						
	Average Biased	7.40E-08	7.68E-08	7.18E-08	7.36E-08	7.20E-08
	Std Dev Biased	1.58E-09	1.10E-09	1.30E-09	1.52E-09	7.07E-10
	Ps90%/90% (+KTL) Biased	7.83E-08	7.98E-08	7.54E-08	7.78E-08	7.39E-08
	Ps90%/90% (-KTL) Biased	6.97E-08	7.38E-08	6.82E-08	6.94E-08	7.01E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

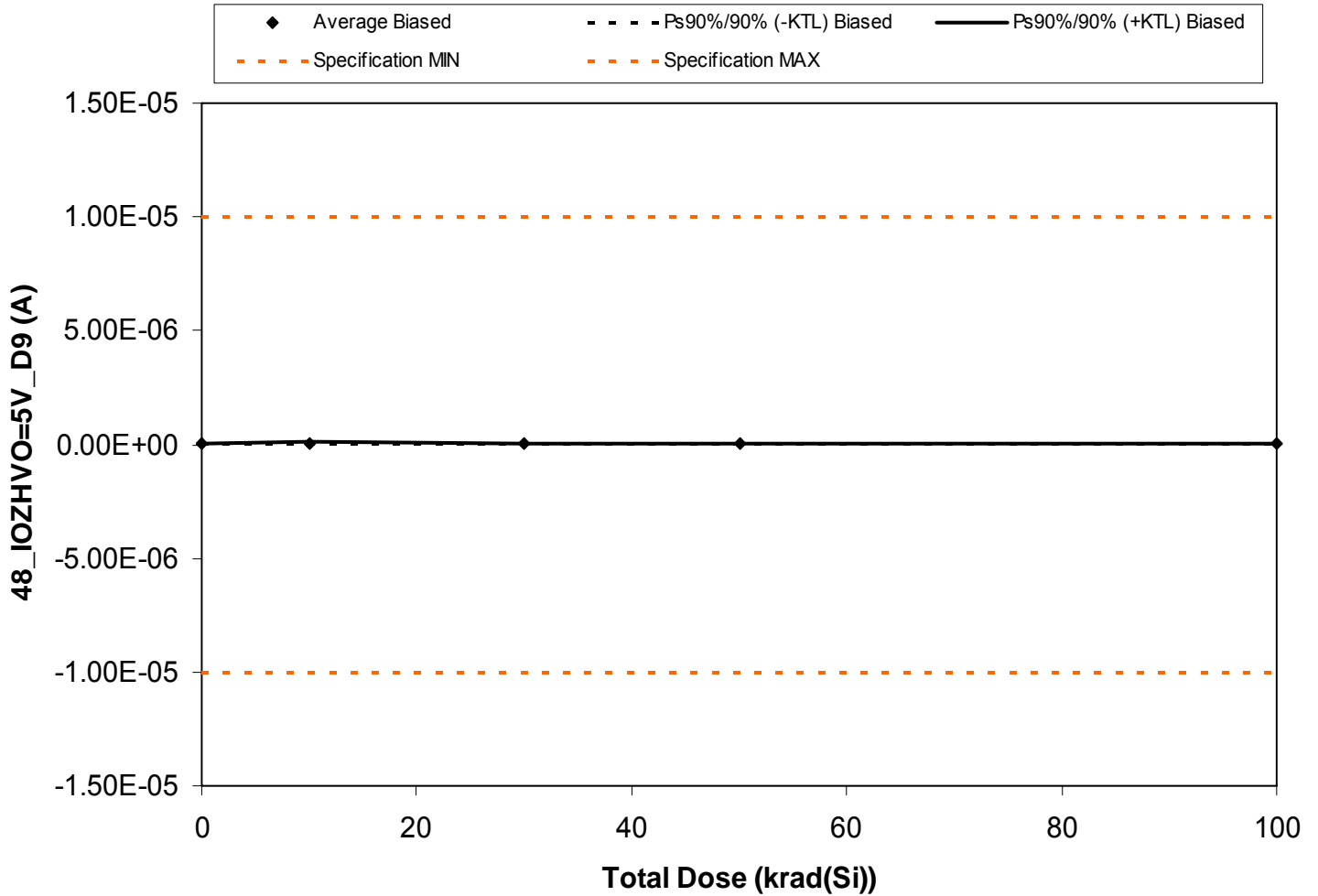


Figure 5.46. Plot of  $48\_IOZHVO=5V\_D9$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.46. Raw data for 48\_IOZHVO=5V\_D9 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

48_IOZHVO=5V_D9 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	7.40E-08	7.90E-08	7.30E-08	7.50E-08	7.30E-08
	32	7.60E-08	8.00E-08	7.20E-08	7.30E-08	7.50E-08
	34	7.60E-08	7.80E-08	7.20E-08	7.30E-08	7.30E-08
	35	7.40E-08	7.60E-08	7.30E-08	7.40E-08	7.60E-08
	36	7.40E-08	7.50E-08	7.30E-08	7.50E-08	7.30E-08
	1	7.50E-08	7.40E-08	7.40E-08	7.20E-08	7.50E-08
	2	7.60E-08	7.30E-08	7.30E-08	7.40E-08	7.30E-08
<b>Biased Statistics</b>						
	Average Biased	7.48E-08	7.76E-08	7.26E-08	7.40E-08	7.40E-08
	Std Dev Biased	1.10E-09	2.07E-09	5.48E-10	1.00E-09	1.41E-09
	Ps90%/90% (+KTL) Biased	7.78E-08	8.33E-08	7.41E-08	7.67E-08	7.79E-08
	Ps90%/90% (-KTL) Biased	7.18E-08	7.19E-08	7.11E-08	7.13E-08	7.01E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

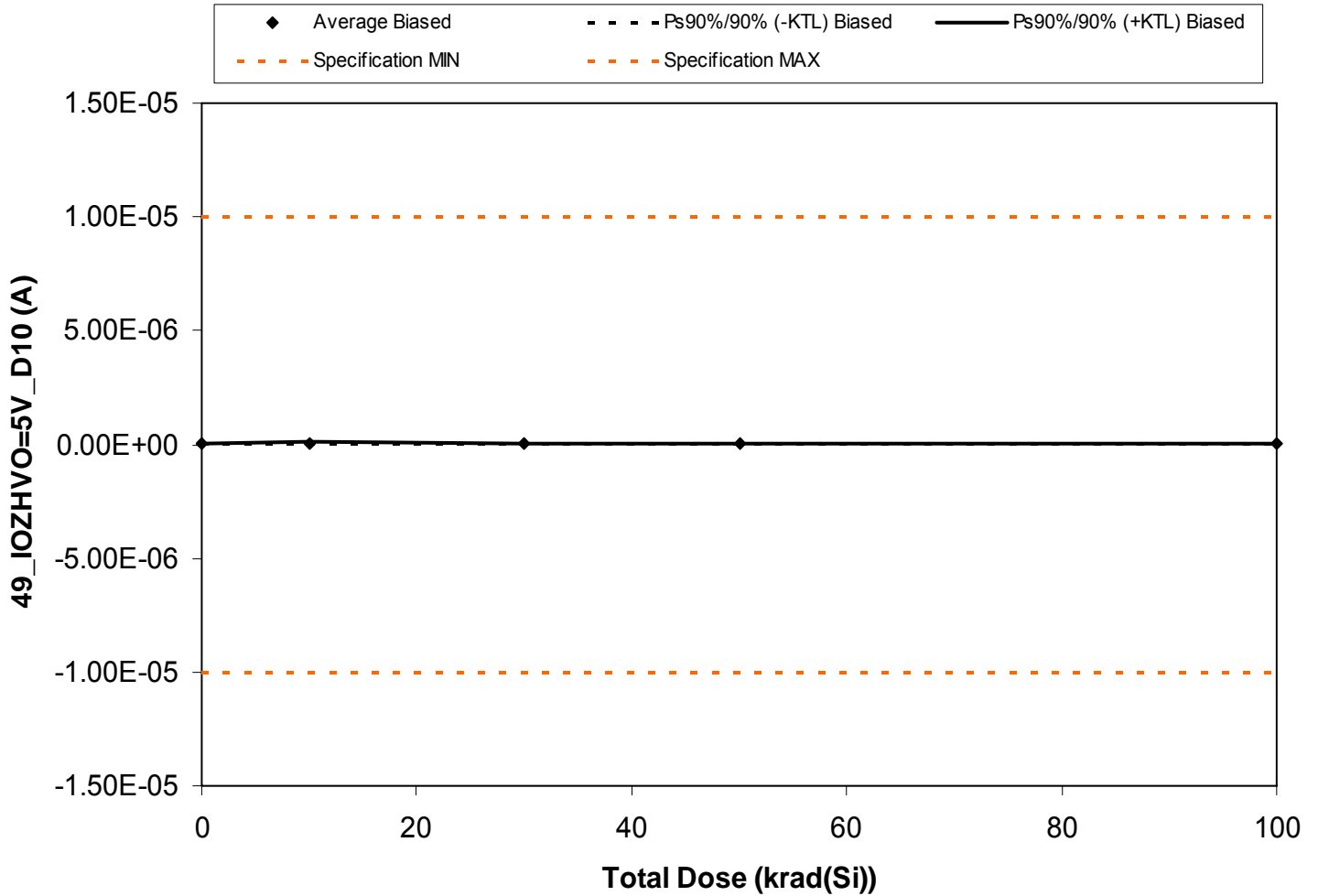


Figure 5.47. Plot of 49\_IOZHVO=5V\_D10 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.47. Raw data for 49\_IOZHVO=5V\_D10 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

49_IOZHVO=5V_D10 (A)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	7.50E-08	8.00E-08	7.30E-08	7.70E-08	7.40E-08
32	7.40E-08	7.90E-08	7.20E-08	7.30E-08	7.40E-08
34	7.50E-08	7.80E-08	7.40E-08	7.60E-08	7.20E-08
35	7.40E-08	7.80E-08	7.10E-08	7.50E-08	7.30E-08
36	7.40E-08	7.60E-08	7.20E-08	7.40E-08	7.30E-08
1	7.50E-08	7.30E-08	7.10E-08	6.90E-08	7.50E-08
2	7.50E-08	7.40E-08	7.00E-08	7.10E-08	7.30E-08
<b>Biased Statistics</b>					
Average Biased	7.44E-08	7.82E-08	7.24E-08	7.50E-08	7.32E-08
Std Dev Biased	5.48E-10	1.48E-09	1.14E-09	1.58E-09	8.37E-10
Ps90%/90% (+KTL) Biased	7.59E-08	8.23E-08	7.55E-08	7.93E-08	7.55E-08
Ps90%/90% (-KTL) Biased	7.29E-08	7.41E-08	6.93E-08	7.07E-08	7.09E-08
<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
Status	PASS	PASS	PASS	PASS	PASS
<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
Status	PASS	PASS	PASS	PASS	PASS

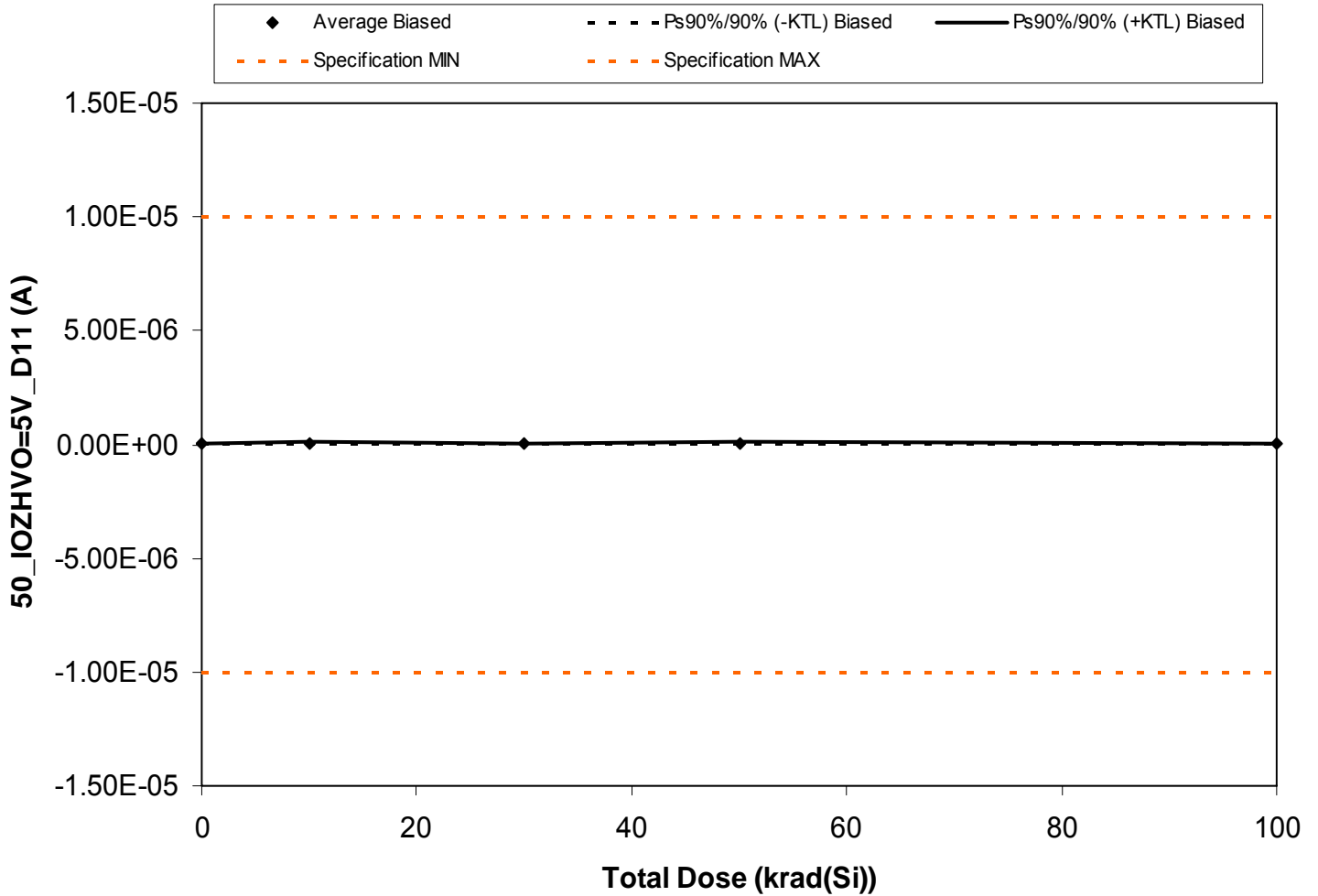


Figure 5.48. Plot of 50\_IOZHVO=5V\_D11 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.48. Raw data for 50\_IOZHVO=5V\_D11 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

50_IOZHVO=5V_D11 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	7.70E-08	7.90E-08	7.10E-08	7.90E-08	7.20E-08
	32	7.60E-08	7.90E-08	7.40E-08	7.50E-08	7.40E-08
	34	7.30E-08	7.90E-08	7.40E-08	7.60E-08	7.40E-08
	35	7.60E-08	7.50E-08	7.30E-08	7.20E-08	7.60E-08
	36	7.60E-08	7.50E-08	7.00E-08	7.30E-08	7.30E-08
	1	7.40E-08	7.30E-08	7.00E-08	6.90E-08	7.50E-08
	2	7.50E-08	7.50E-08	6.90E-08	7.40E-08	7.20E-08
<b>Biased Statistics</b>						
	Average Biased	7.56E-08	7.74E-08	7.24E-08	7.50E-08	7.38E-08
	Std Dev Biased	1.52E-09	2.19E-09	1.82E-09	2.74E-09	1.48E-09
	Ps90%/90% (+KTL) Biased	7.98E-08	8.34E-08	7.74E-08	8.25E-08	7.79E-08
	Ps90%/90% (-KTL) Biased	7.14E-08	7.14E-08	6.74E-08	6.75E-08	6.97E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

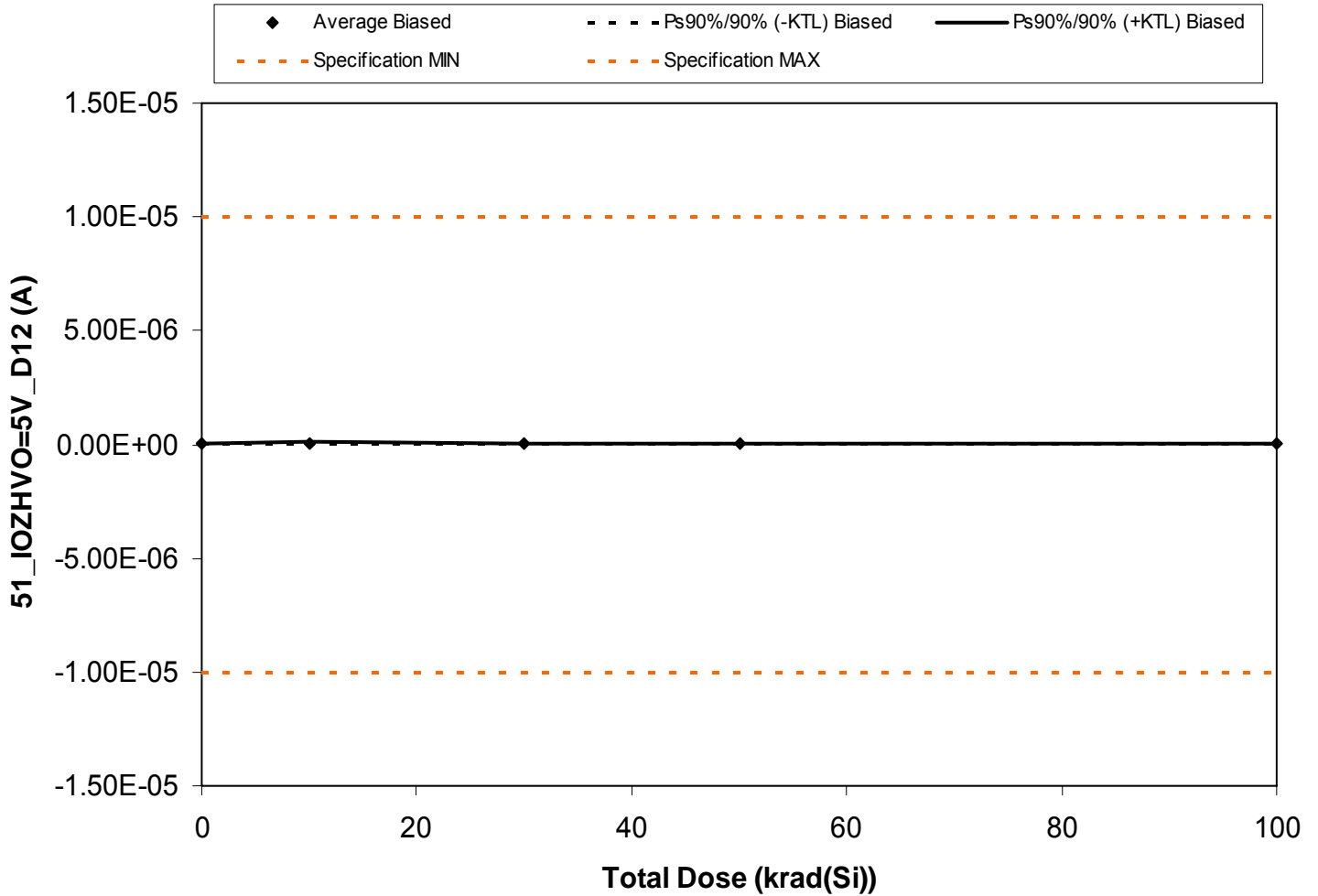


Figure 5.49. Plot of 51\_IOZHVO=5V\_D12 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.49. Raw data for 51\_IOZHVO=5V\_D12 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

51_IOZHVO=5V_D12 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	7.70E-08	7.80E-08	7.30E-08	7.50E-08	7.20E-08
	32	7.40E-08	7.70E-08	7.40E-08	7.50E-08	7.20E-08
	34	7.50E-08	7.50E-08	7.40E-08	7.30E-08	7.40E-08
	35	7.60E-08	7.40E-08	7.30E-08	7.70E-08	7.30E-08
	36	7.40E-08	7.40E-08	7.00E-08	7.30E-08	7.30E-08
	1	7.60E-08	7.40E-08	7.10E-08	7.20E-08	7.70E-08
	2	7.20E-08	7.40E-08	7.20E-08	7.10E-08	7.60E-08
<b>Biased Statistics</b>						
	Average Biased	7.52E-08	7.56E-08	7.28E-08	7.46E-08	7.28E-08
	Std Dev Biased	1.30E-09	1.82E-09	1.64E-09	1.67E-09	8.37E-10
	Ps90%/90% (+KTL) Biased	7.88E-08	8.06E-08	7.73E-08	7.92E-08	7.51E-08
	Ps90%/90% (-KTL) Biased	7.16E-08	7.06E-08	6.83E-08	7.00E-08	7.05E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

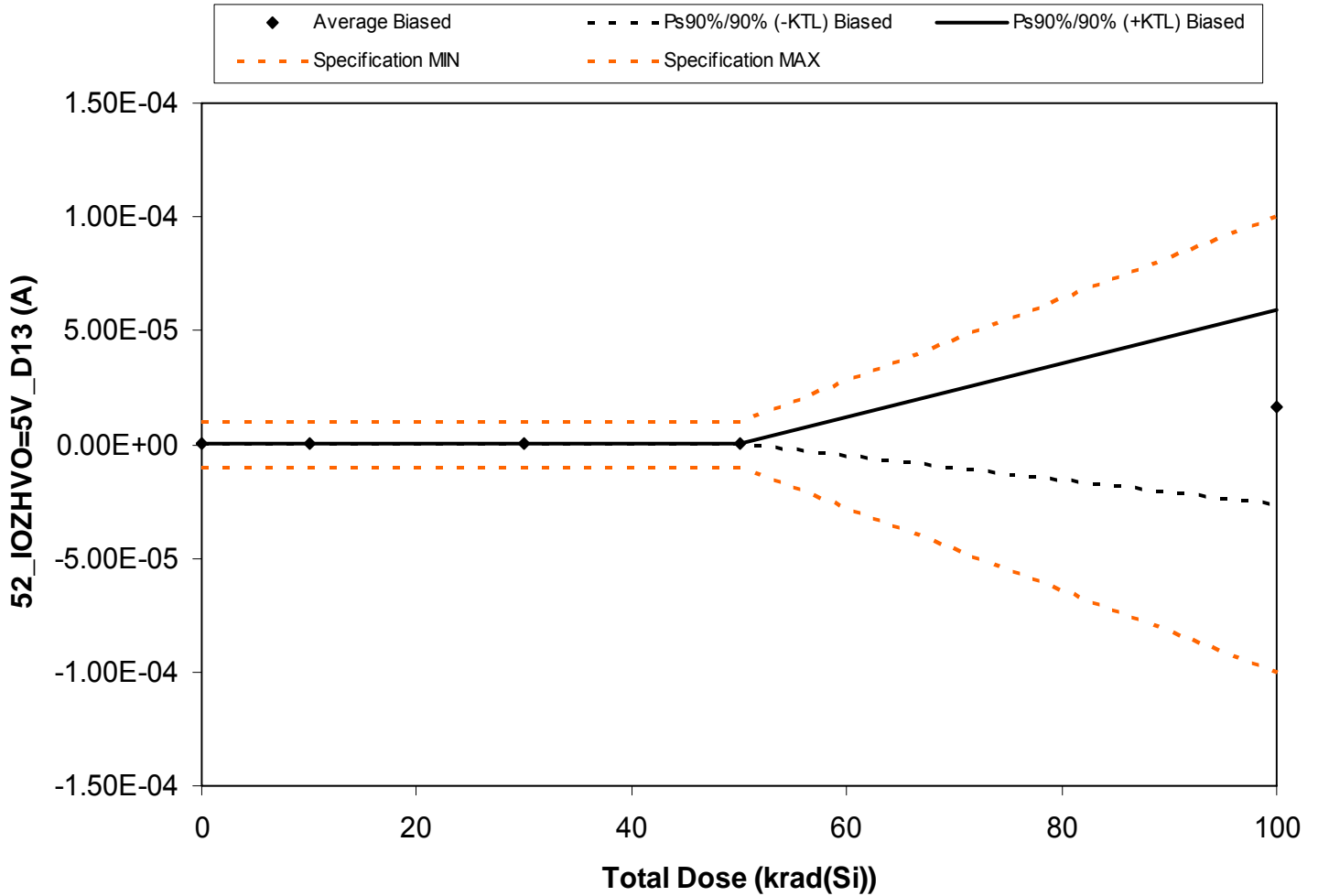


Figure 5.50. Plot of 52\_IOZHVO=5V\_D13 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.50. Raw data for 52\_IOZHVO=5V\_D13 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

52_IOZHVO=5V_D13 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	7.40E-08	7.90E-08	7.20E-08	7.60E-08	4.20E-05
	32	7.50E-08	7.60E-08	7.10E-08	7.20E-08	1.27E-05
	34	7.30E-08	7.60E-08	7.00E-08	7.20E-08	1.53E-05
	35	7.70E-08	7.60E-08	7.10E-08	7.30E-08	1.23E-05
	36	7.20E-08	7.30E-08	7.00E-08	7.10E-08	7.10E-08
	1	7.30E-08	7.20E-08	6.90E-08	6.90E-08	7.40E-08
	2	7.40E-08	7.40E-08	6.90E-08	7.00E-08	7.20E-08
<b>Biased Statistics</b>						
	Average Biased	7.42E-08	7.60E-08	7.08E-08	7.28E-08	1.65E-05
	Std Dev Biased	1.92E-09	2.12E-09	8.37E-10	1.92E-09	1.54E-05
	Ps90%/90% (+KTL) Biased	7.95E-08	8.18E-08	7.31E-08	7.81E-08	5.87E-05
	Ps90%/90% (-KTL) Biased	6.89E-08	7.02E-08	6.85E-08	6.75E-08	-2.58E-05
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-04</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-04</b>
	Status	PASS	PASS	PASS	PASS	PASS

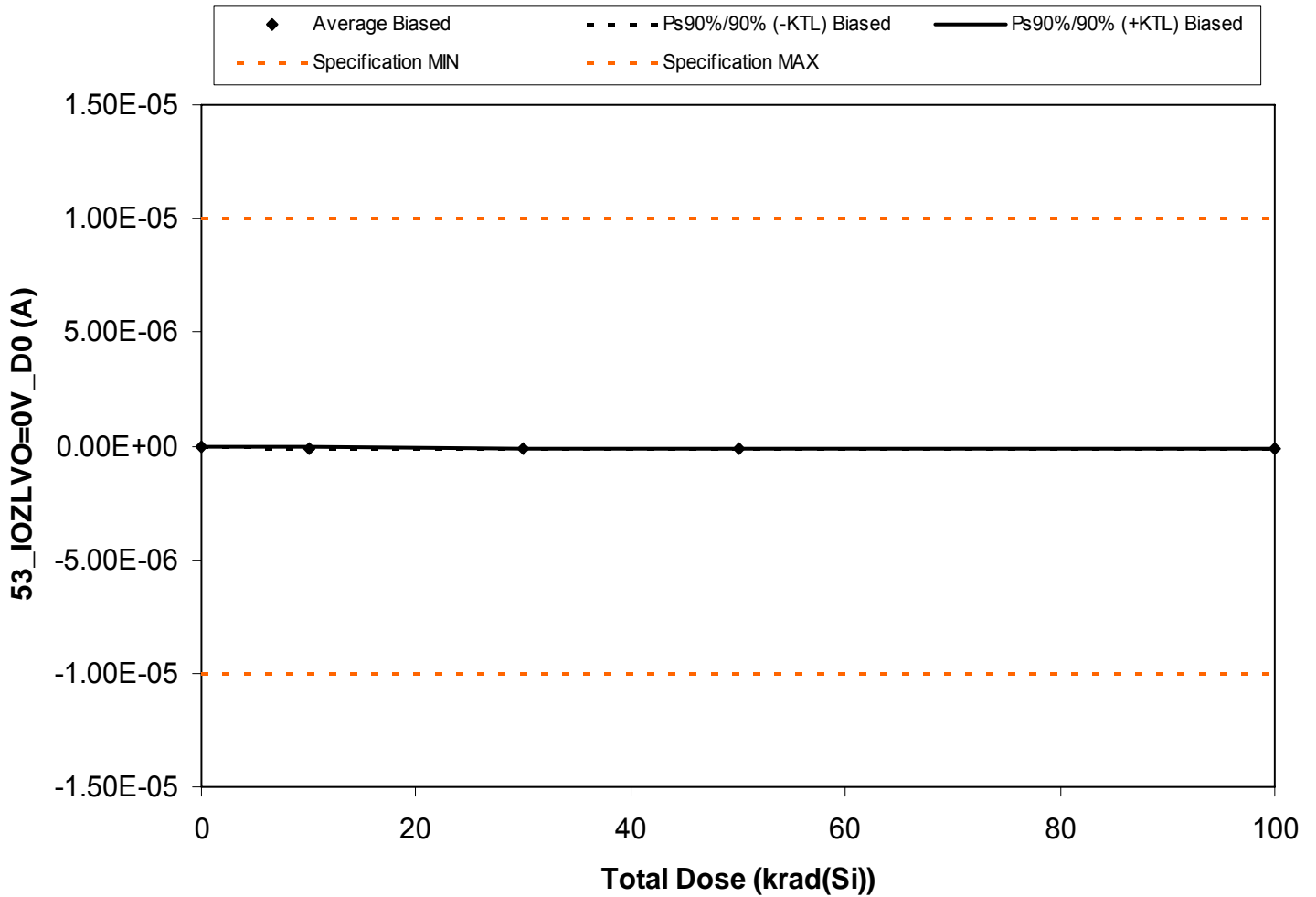


Figure 5.51. Plot of  $53\_IOZLVO=0V\_D0$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.51. Raw data for 53\_IOZLVO=0V\_D0 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

53_IOZLVO=0V_D0 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-7.70E-08	-8.20E-08	-9.10E-08	-8.80E-08	-9.50E-08
	32	-7.70E-08	-8.50E-08	-8.60E-08	-8.70E-08	-9.00E-08
	34	-7.60E-08	-8.30E-08	-8.60E-08	-8.80E-08	-8.80E-08
	35	-7.70E-08	-8.40E-08	-8.80E-08	-8.90E-08	-9.10E-08
	36	-7.80E-08	-8.50E-08	-8.80E-08	-8.70E-08	-8.80E-08
	1	-7.80E-08	-8.60E-08	-9.20E-08	-8.90E-08	-8.90E-08
	2	-7.60E-08	-8.50E-08	-8.90E-08	-8.40E-08	-8.40E-08
<b>Biased Statistics</b>						
	Average Biased	-7.70E-08	-8.38E-08	-8.78E-08	-8.78E-08	-9.04E-08
	Std Dev Biased	7.07E-10	1.30E-09	2.05E-09	8.37E-10	2.88E-09
	Ps90%/90% (+KTL) Biased	-7.51E-08	-8.02E-08	-8.22E-08	-8.55E-08	-8.25E-08
	Ps90%/90% (-KTL) Biased	-7.89E-08	-8.74E-08	-9.34E-08	-9.01E-08	-9.83E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

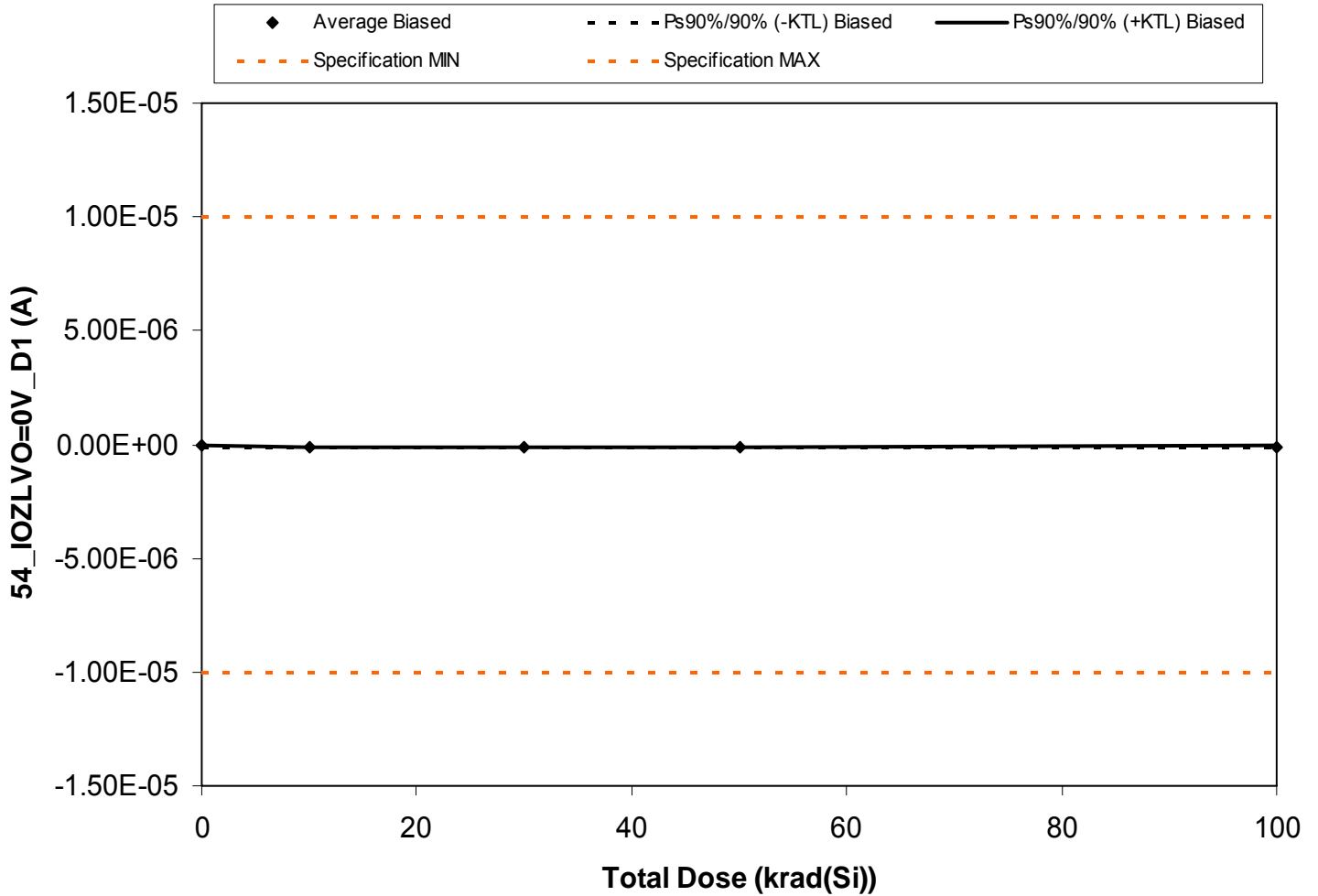


Figure 5.52. Plot of  $54\_IOZLVO=0V\_D1$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.52. Raw data for 54\_IOZLVO=0V\_D1 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

54_IOZLVO=0V_D1 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-7.90E-08	-8.50E-08	-9.30E-08	-9.00E-08	-1.05E-07
	32	-7.80E-08	-8.60E-08	-8.80E-08	-9.10E-08	-9.20E-08
	34	-7.90E-08	-8.50E-08	-9.00E-08	-9.00E-08	-9.40E-08
	35	-7.90E-08	-8.50E-08	-9.10E-08	-9.00E-08	-9.00E-08
	36	-7.70E-08	-8.60E-08	-8.80E-08	-9.00E-08	-9.10E-08
	1	-8.10E-08	-9.00E-08	-9.40E-08	-9.20E-08	-9.20E-08
	2	-8.00E-08	-8.70E-08	-8.90E-08	-9.00E-08	-8.90E-08
<b>Biased Statistics</b>						
	Average Biased	-7.84E-08	-8.54E-08	-9.00E-08	-9.02E-08	-9.44E-08
	Std Dev Biased	8.94E-10	5.48E-10	2.12E-09	4.47E-10	6.11E-09
	Ps90%/90% (+KTL) Biased	-7.59E-08	-8.39E-08	-8.42E-08	-8.90E-08	-7.77E-08
	Ps90%/90% (-KTL) Biased	-8.09E-08	-8.69E-08	-9.58E-08	-9.14E-08	-1.11E-07
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

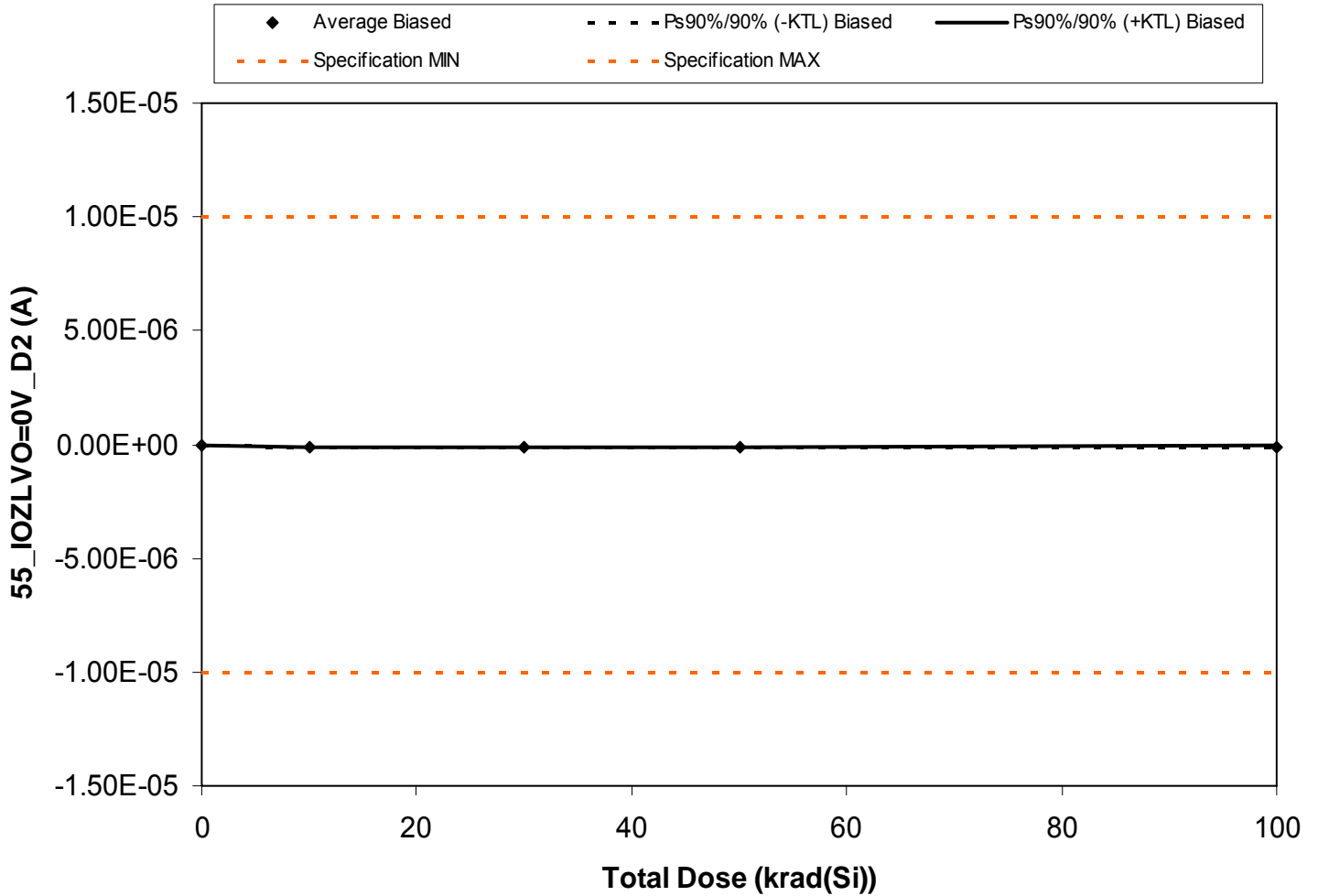


Figure 5.53. Plot of  $55\_IOZLVO=0V\_D2$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.53. Raw data for 55\_IOZLVO=0V\_D2 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

55_IOZLVO=0V_D2 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-7.70E-08	-8.50E-08	-9.10E-08	-8.80E-08	-1.05E-07
	32	-7.80E-08	-8.50E-08	-8.70E-08	-8.70E-08	-8.80E-08
	34	-7.60E-08	-8.40E-08	-8.60E-08	-8.70E-08	-8.90E-08
	35	-7.60E-08	-8.30E-08	-8.70E-08	-8.80E-08	-9.00E-08
	36	-7.70E-08	-8.40E-08	-8.80E-08	-9.00E-08	-8.60E-08
	1	-7.80E-08	-8.70E-08	-9.30E-08	-9.00E-08	-8.80E-08
	2	-7.60E-08	-8.50E-08	-8.70E-08	-8.70E-08	-8.60E-08
<b>Biased Statistics</b>						
	Average Biased	-7.68E-08	-8.42E-08	-8.78E-08	-8.80E-08	-9.16E-08
	Std Dev Biased	8.37E-10	8.37E-10	1.92E-09	1.22E-09	7.64E-09
	Ps90%/90% (+KTL) Biased	-7.45E-08	-8.19E-08	-8.25E-08	-8.46E-08	-7.07E-08
	Ps90%/90% (-KTL) Biased	-7.91E-08	-8.65E-08	-9.31E-08	-9.14E-08	-1.13E-07
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

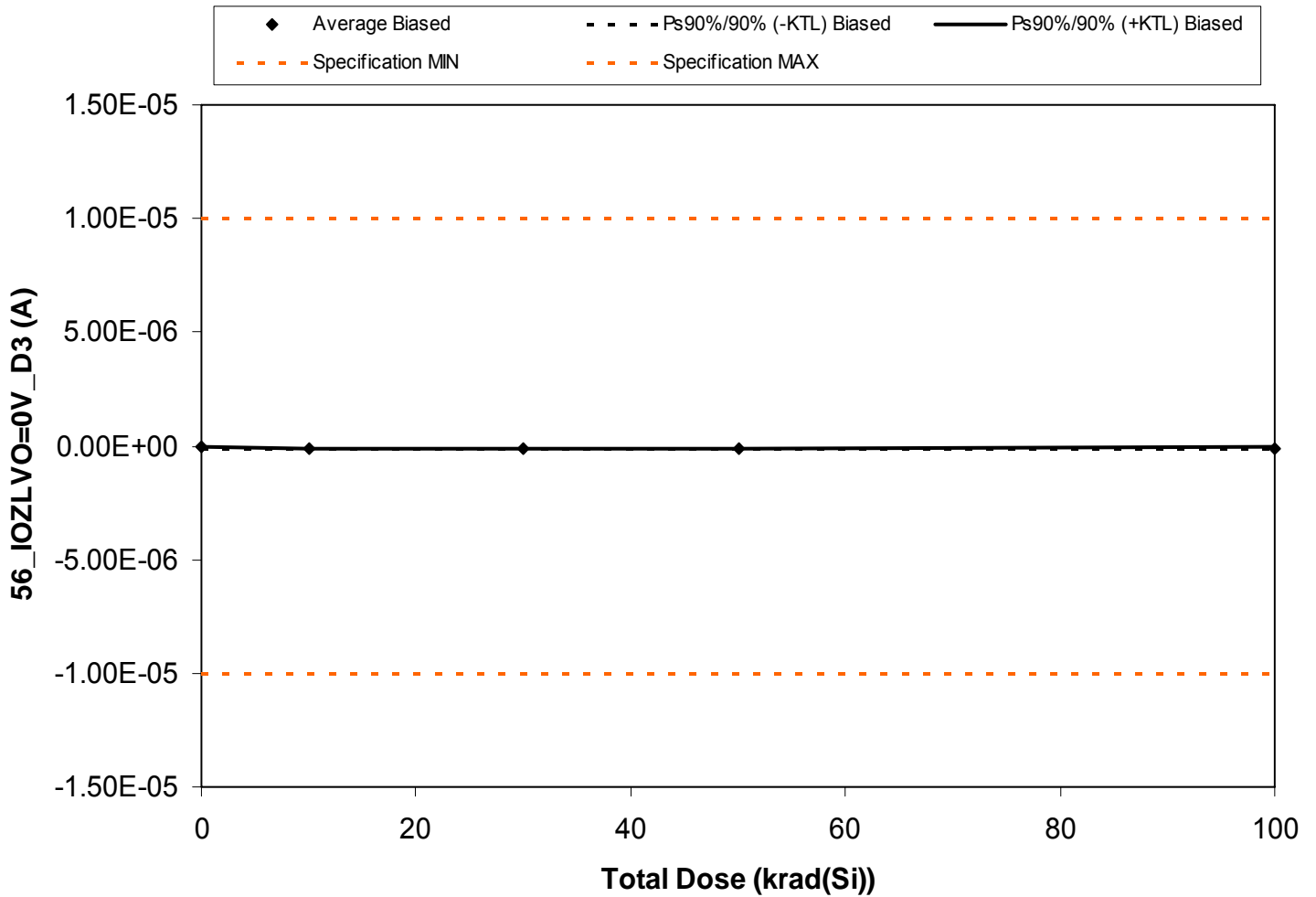


Figure 5.54. Plot of 56\_IOZLVO=0V\_D3 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.54. Raw data for 56\_IOZLVO=0V\_D3 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

56_IOZLVO=0V_D3 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-7.90E-08	-8.80E-08	-9.20E-08	-9.10E-08	-1.05E-07
	32	-7.90E-08	-8.70E-08	-9.10E-08	-8.80E-08	-9.30E-08
	34	-7.80E-08	-8.70E-08	-8.80E-08	-9.10E-08	-9.20E-08
	35	-7.70E-08	-8.50E-08	-9.00E-08	-9.00E-08	-9.20E-08
	36	-7.90E-08	-8.70E-08	-8.80E-08	-9.20E-08	-9.00E-08
	1	-8.20E-08	-9.00E-08	-9.30E-08	-9.20E-08	-9.20E-08
	2	-7.60E-08	-8.70E-08	-9.10E-08	-8.70E-08	-8.70E-08
<b>Biased Statistics</b>						
	Average Biased	-7.84E-08	-8.68E-08	-8.98E-08	-9.04E-08	-9.44E-08
	Std Dev Biased	8.94E-10	1.10E-09	1.79E-09	1.52E-09	6.02E-09
	Ps90%/90% (+KTL) Biased	-7.59E-08	-8.38E-08	-8.49E-08	-8.62E-08	-7.79E-08
	Ps90%/90% (-KTL) Biased	-8.09E-08	-8.98E-08	-9.47E-08	-9.46E-08	-1.11E-07
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

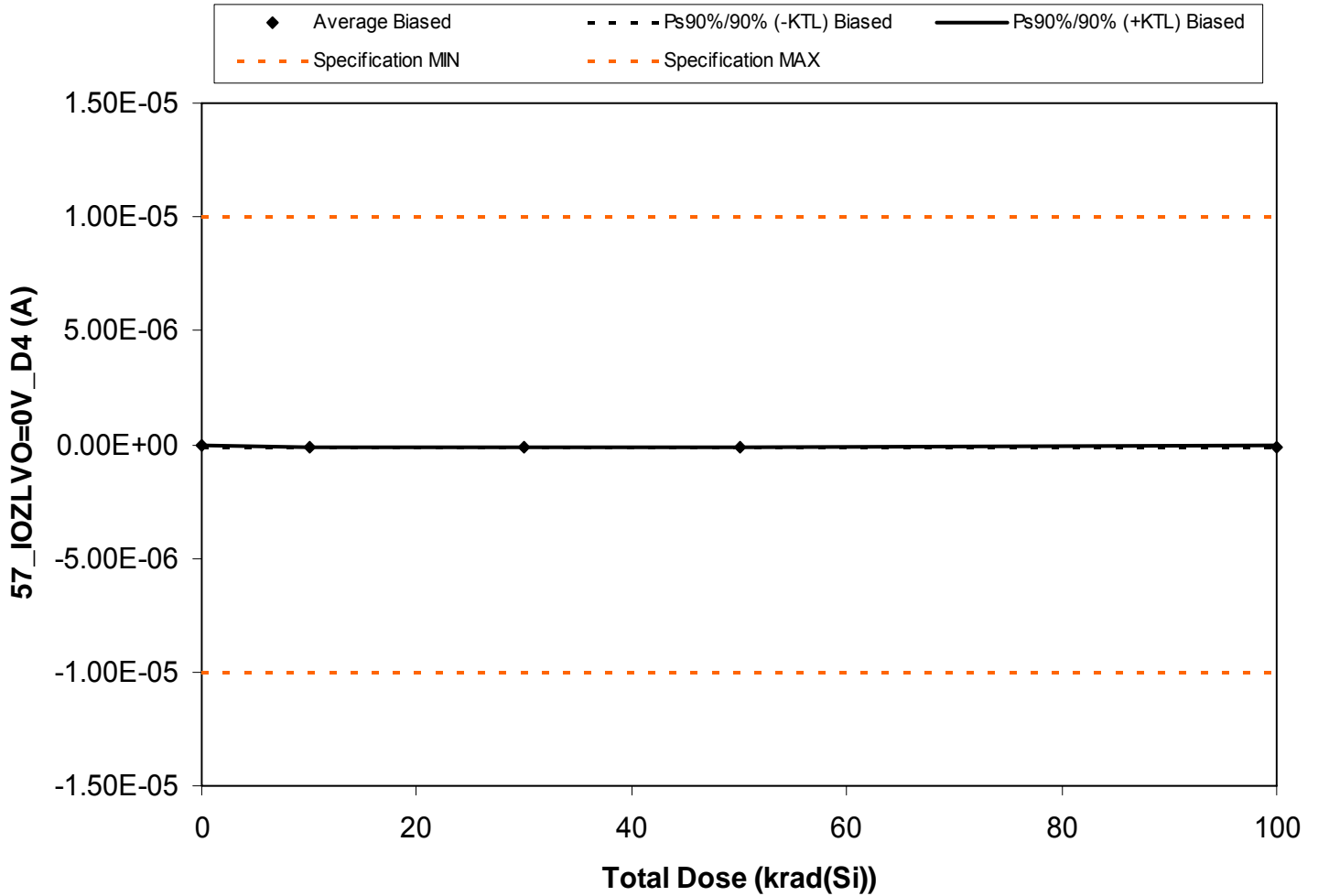


Figure 5.55. Plot of 57\_IOZLVO=0V\_D4 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.55. Raw data for 57\_IOZLVO=0V\_D4 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

57_IOZLVO=0V_D4 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-7.70E-08	-8.50E-08	-9.20E-08	-9.10E-08	-1.06E-07
	32	-7.90E-08	-8.70E-08	-8.70E-08	-9.00E-08	-9.30E-08
	34	-7.80E-08	-8.60E-08	-8.80E-08	-9.10E-08	-9.40E-08
	35	-7.80E-08	-8.50E-08	-8.90E-08	-9.00E-08	-9.30E-08
	36	-7.90E-08	-8.70E-08	-8.90E-08	-8.70E-08	-8.70E-08
	1	-7.80E-08	-8.80E-08	-9.30E-08	-9.10E-08	-9.00E-08
	2	-7.50E-08	-8.70E-08	-9.10E-08	-8.80E-08	-8.60E-08
<b>Biased Statistics</b>						
	Average Biased	-7.82E-08	-8.60E-08	-8.90E-08	-8.98E-08	-9.46E-08
	Std Dev Biased	8.37E-10	1.00E-09	1.87E-09	1.64E-09	6.95E-09
	Ps90%/90% (+KTL) Biased	-7.59E-08	-8.33E-08	-8.39E-08	-8.53E-08	-7.55E-08
	Ps90%/90% (-KTL) Biased	-8.05E-08	-8.87E-08	-9.41E-08	-9.43E-08	-1.14E-07
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

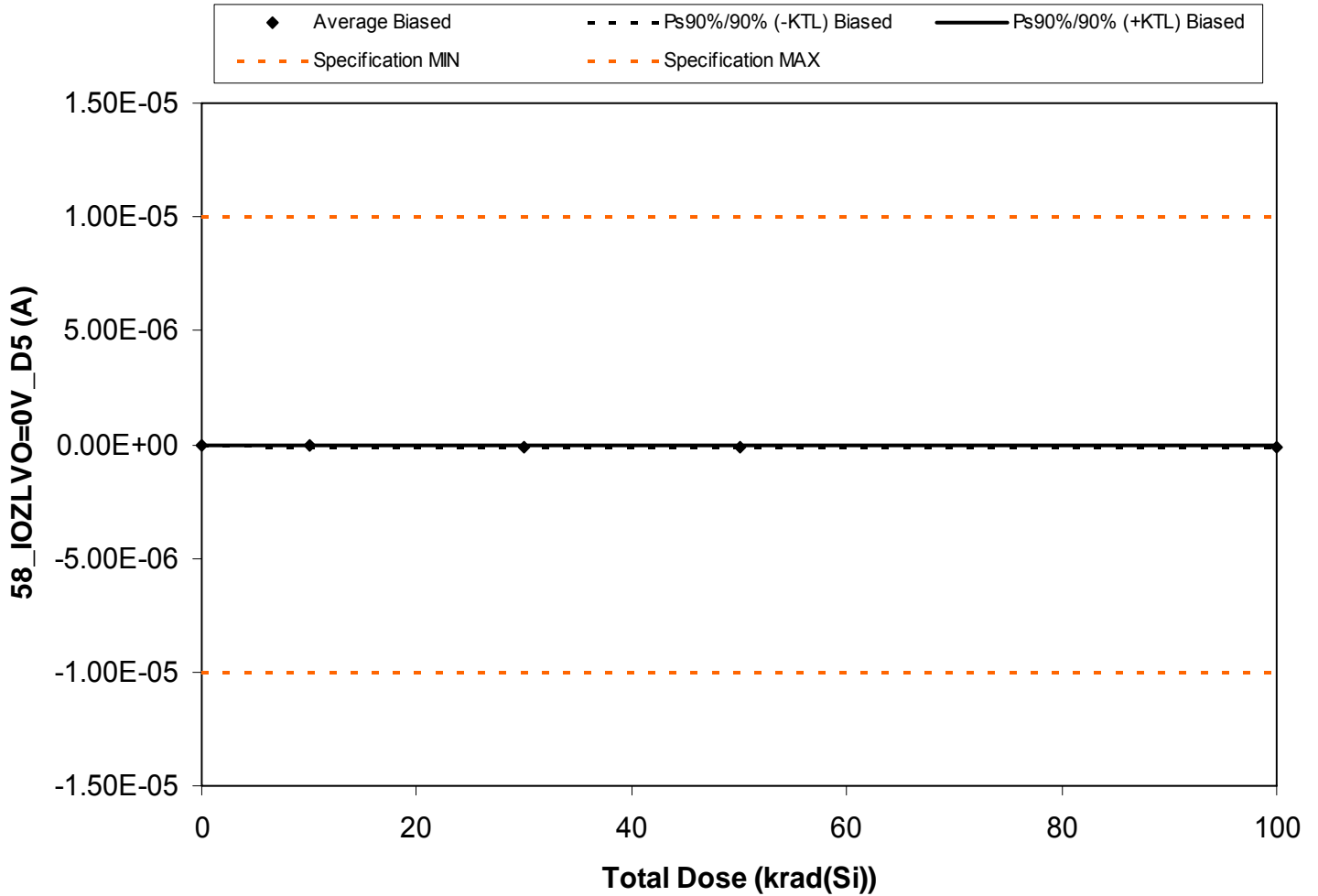


Figure 5.56. Plot of 58\_IOZLVO=0V\_D5 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.56. Raw data for 58\_IOZLVO=0V\_D5 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

58_IOZLVO=0V_D5 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-7.10E-08	-7.90E-08	-8.70E-08	-8.50E-08	-1.01E-07
	32	-7.30E-08	-7.90E-08	-8.30E-08	-8.10E-08	-8.60E-08
	34	-7.00E-08	-7.90E-08	-8.20E-08	-8.20E-08	-8.80E-08
	35	-7.40E-08	-8.10E-08	-8.40E-08	-8.50E-08	-8.80E-08
	36	-7.30E-08	-7.90E-08	-8.40E-08	-8.30E-08	-8.40E-08
	1	-7.40E-08	-8.20E-08	-8.60E-08	-8.70E-08	-8.60E-08
	2	-7.30E-08	-8.00E-08	-8.50E-08	-8.30E-08	-8.20E-08
<b>Biased Statistics</b>						
	Average Biased	-7.22E-08	-7.94E-08	-8.40E-08	-8.32E-08	-8.94E-08
	Std Dev Biased	1.64E-09	8.94E-10	1.87E-09	1.79E-09	6.69E-09
	Ps90%/90% (+KTL) Biased	-6.77E-08	-7.69E-08	-7.89E-08	-7.83E-08	-7.10E-08
	Ps90%/90% (-KTL) Biased	-7.67E-08	-8.19E-08	-8.91E-08	-8.81E-08	-1.08E-07
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

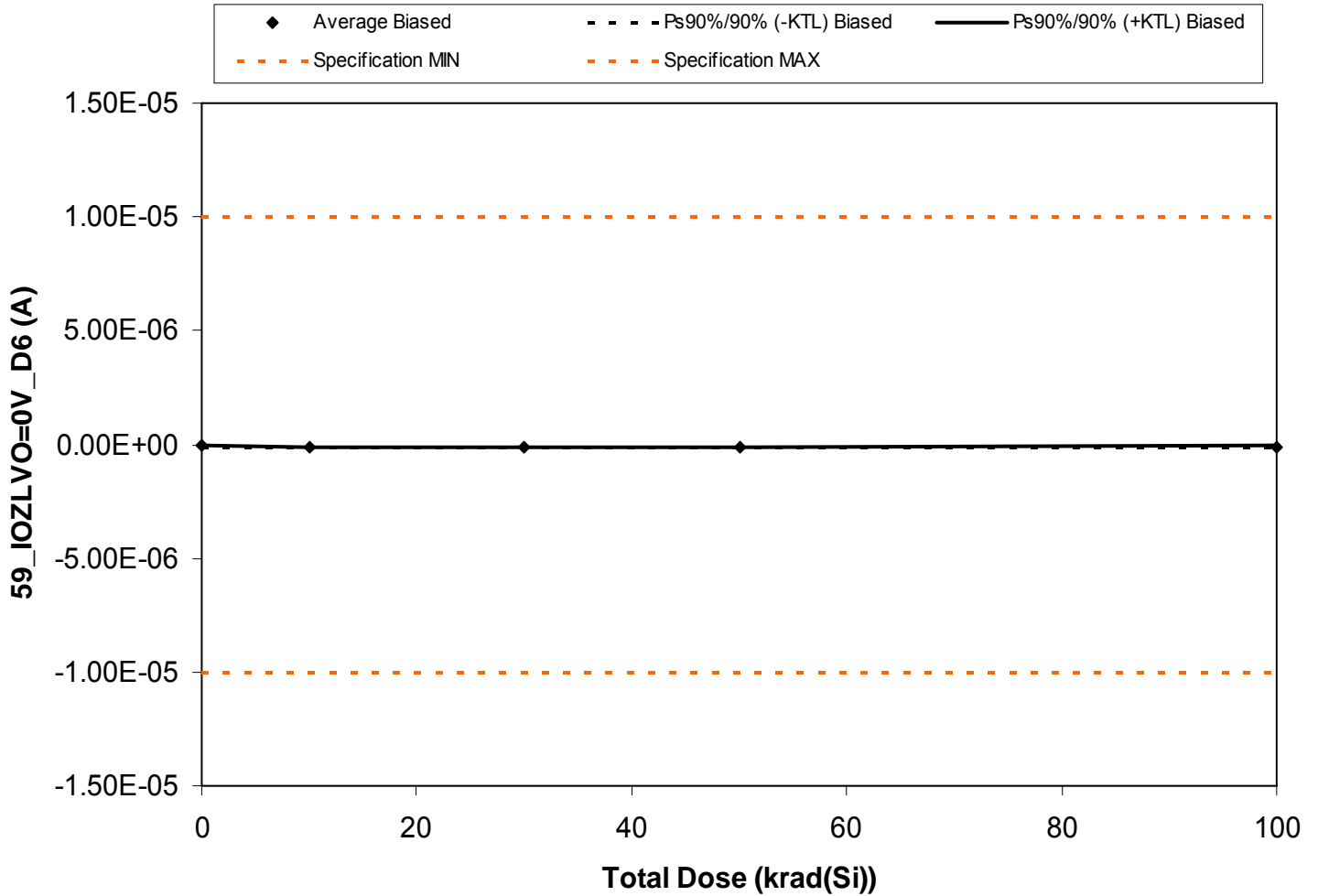


Figure 5.57. Plot of 59\_IOZLVO=0V\_D6 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.57. Raw data for 59\_IOZLVO=0V\_D6 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

59_IOZLVO=0V_D6 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-7.80E-08	-8.30E-08	-9.10E-08	-9.10E-08	-1.09E-07
	32	-7.70E-08	-8.70E-08	-9.00E-08	-9.00E-08	-9.30E-08
	34	-7.70E-08	-8.50E-08	-8.80E-08	-8.90E-08	-9.20E-08
	35	-7.90E-08	-8.60E-08	-8.90E-08	-9.10E-08	-9.10E-08
	36	-7.90E-08	-8.40E-08	-9.00E-08	-9.10E-08	-8.90E-08
	1	-8.00E-08	-8.60E-08	-9.30E-08	-9.10E-08	-9.00E-08
	2	-7.60E-08	-8.70E-08	-9.10E-08	-8.70E-08	-8.70E-08
<b>Biased Statistics</b>						
	Average Biased	-7.80E-08	-8.50E-08	-8.96E-08	-9.04E-08	-9.48E-08
	Std Dev Biased	1.00E-09	1.58E-09	1.14E-09	8.94E-10	8.07E-09
	Ps90%/90% (+KTL) Biased	-7.53E-08	-8.07E-08	-8.65E-08	-8.79E-08	-7.27E-08
	Ps90%/90% (-KTL) Biased	-8.07E-08	-8.93E-08	-9.27E-08	-9.29E-08	-1.17E-07
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

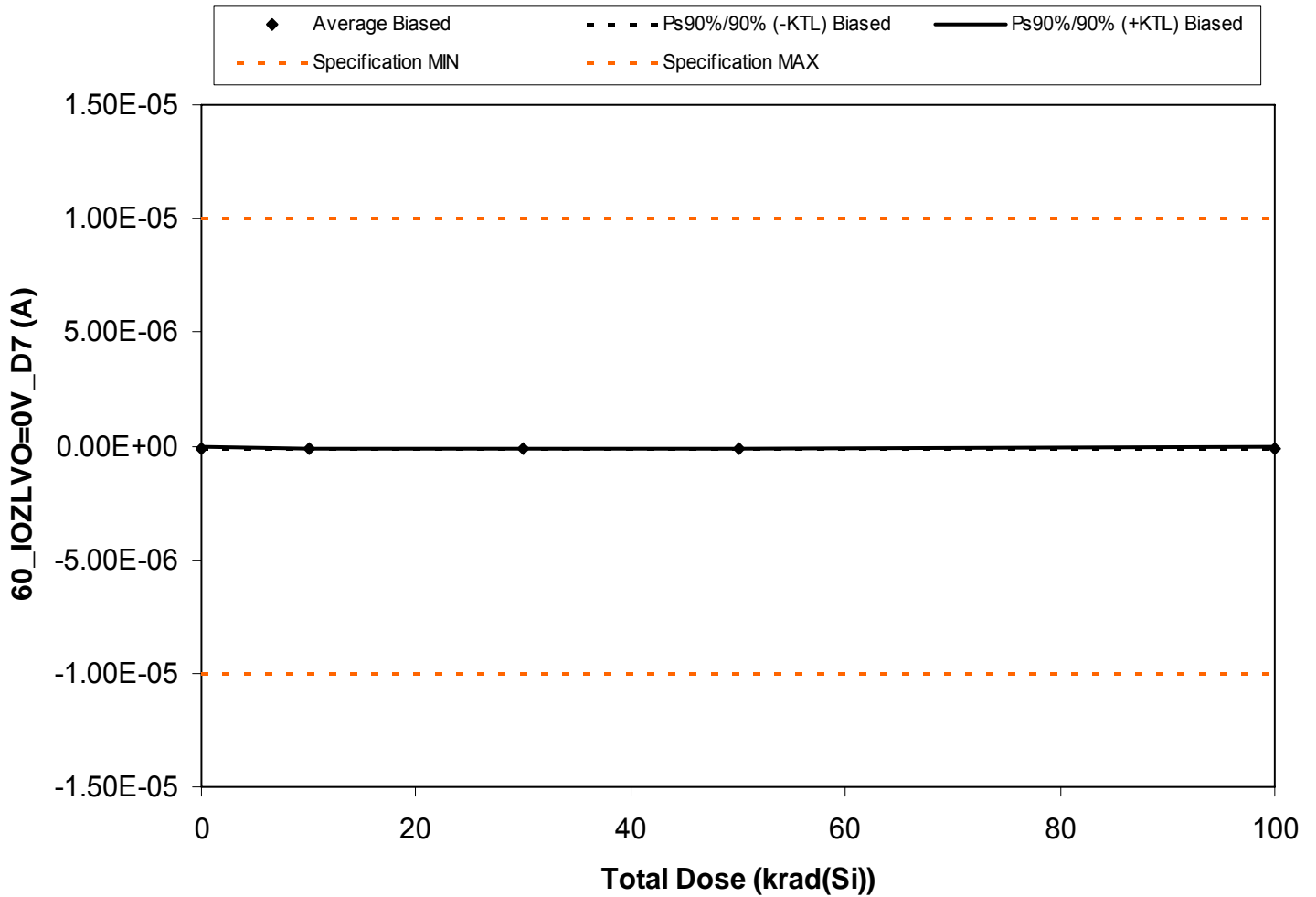


Figure 5.58. Plot of 60\_IOZLVO=0V\_D7 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.58. Raw data for 60\_IOZLVO=0V\_D7 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

60_IOZLVO=0V_D7 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-8.30E-08	-8.90E-08	-9.60E-08	-9.40E-08	-1.14E-07
	32	-8.30E-08	-9.10E-08	-9.00E-08	-9.40E-08	-9.50E-08
	34	-8.10E-08	-8.90E-08	-9.30E-08	-9.30E-08	-9.60E-08
	35	-8.10E-08	-9.00E-08	-9.40E-08	-9.50E-08	-9.60E-08
	36	-8.20E-08	-9.00E-08	-9.30E-08	-9.60E-08	-9.60E-08
	1	-8.30E-08	-9.10E-08	-9.80E-08	-9.50E-08	-9.40E-08
	2	-8.30E-08	-9.10E-08	-9.40E-08	-9.20E-08	-9.00E-08
<b>Biased Statistics</b>						
	Average Biased	-8.20E-08	-8.98E-08	-9.32E-08	-9.44E-08	-9.94E-08
	Std Dev Biased	1.00E-09	8.37E-10	2.17E-09	1.14E-09	8.17E-09
	Ps90%/90% (+KTL) Biased	-7.93E-08	-8.75E-08	-8.73E-08	-9.13E-08	-7.70E-08
	Ps90%/90% (-KTL) Biased	-8.47E-08	-9.21E-08	-9.91E-08	-9.75E-08	-1.22E-07
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

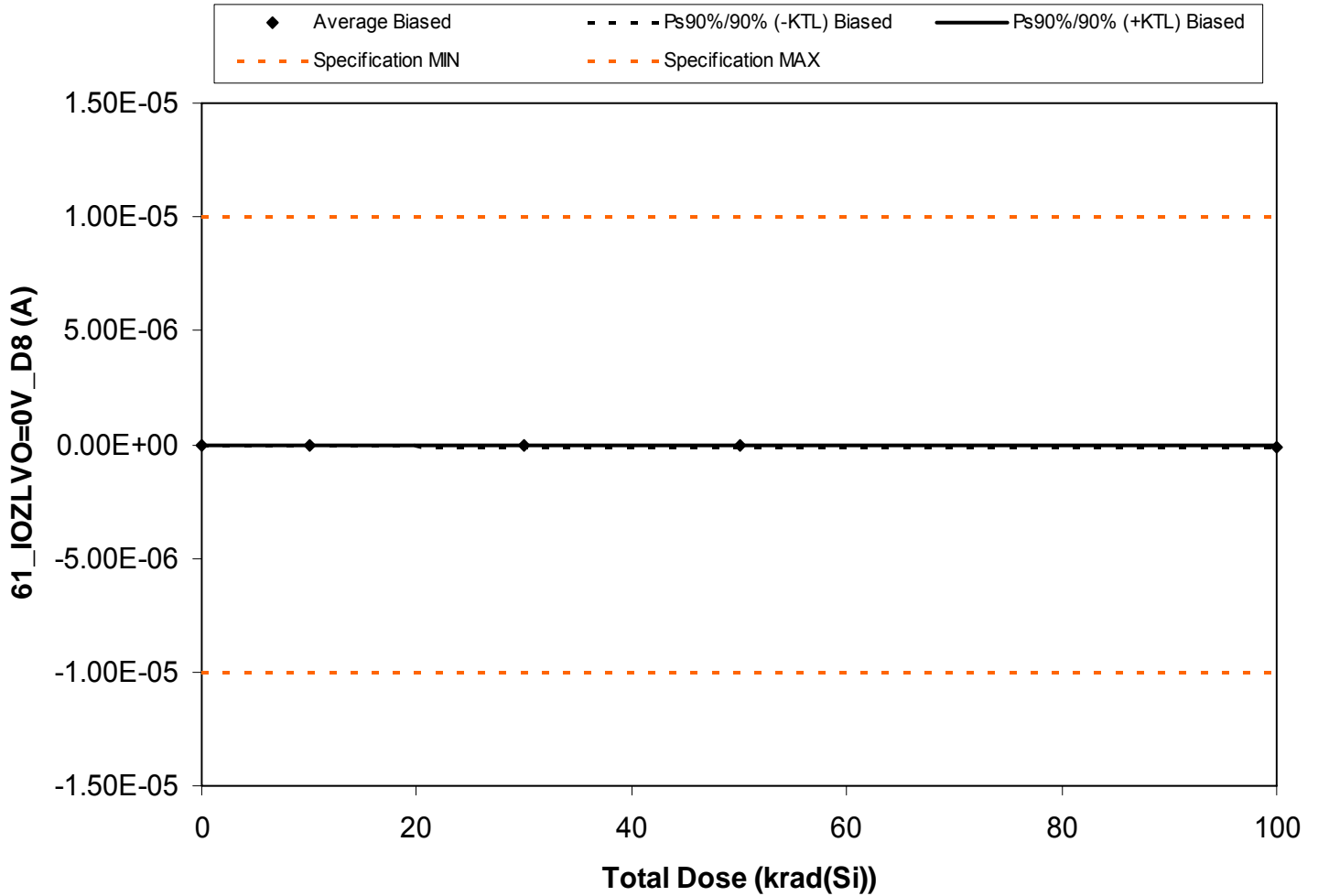


Figure 5.59. Plot of 61\_IOZLVO=0V\_D8 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.59. Raw data for 61\_IOZLVO=0V\_D8 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

61_IOZLVO=0V_D8 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-6.70E-08	-7.40E-08	-8.00E-08	-7.40E-08	-9.80E-08
	32	-6.70E-08	-7.60E-08	-7.60E-08	-7.70E-08	-8.20E-08
	34	-6.70E-08	-7.20E-08	-7.50E-08	-7.90E-08	-8.10E-08
	35	-6.80E-08	-7.30E-08	-8.00E-08	-7.80E-08	-8.00E-08
	36	-6.80E-08	-7.20E-08	-7.90E-08	-7.80E-08	-7.60E-08
	1	-6.80E-08	-7.60E-08	-8.00E-08	-7.80E-08	-7.70E-08
	2	-6.70E-08	-7.40E-08	-7.80E-08	-7.40E-08	-7.50E-08
<b>Biased Statistics</b>						
	Average Biased	-6.74E-08	-7.34E-08	-7.80E-08	-7.72E-08	-8.34E-08
	Std Dev Biased	5.48E-10	1.67E-09	2.35E-09	1.92E-09	8.47E-09
	Ps90%/90% (+KTL) Biased	-6.59E-08	-6.88E-08	-7.16E-08	-7.19E-08	-6.02E-08
	Ps90%/90% (-KTL) Biased	-6.89E-08	-7.80E-08	-8.44E-08	-8.25E-08	-1.07E-07
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

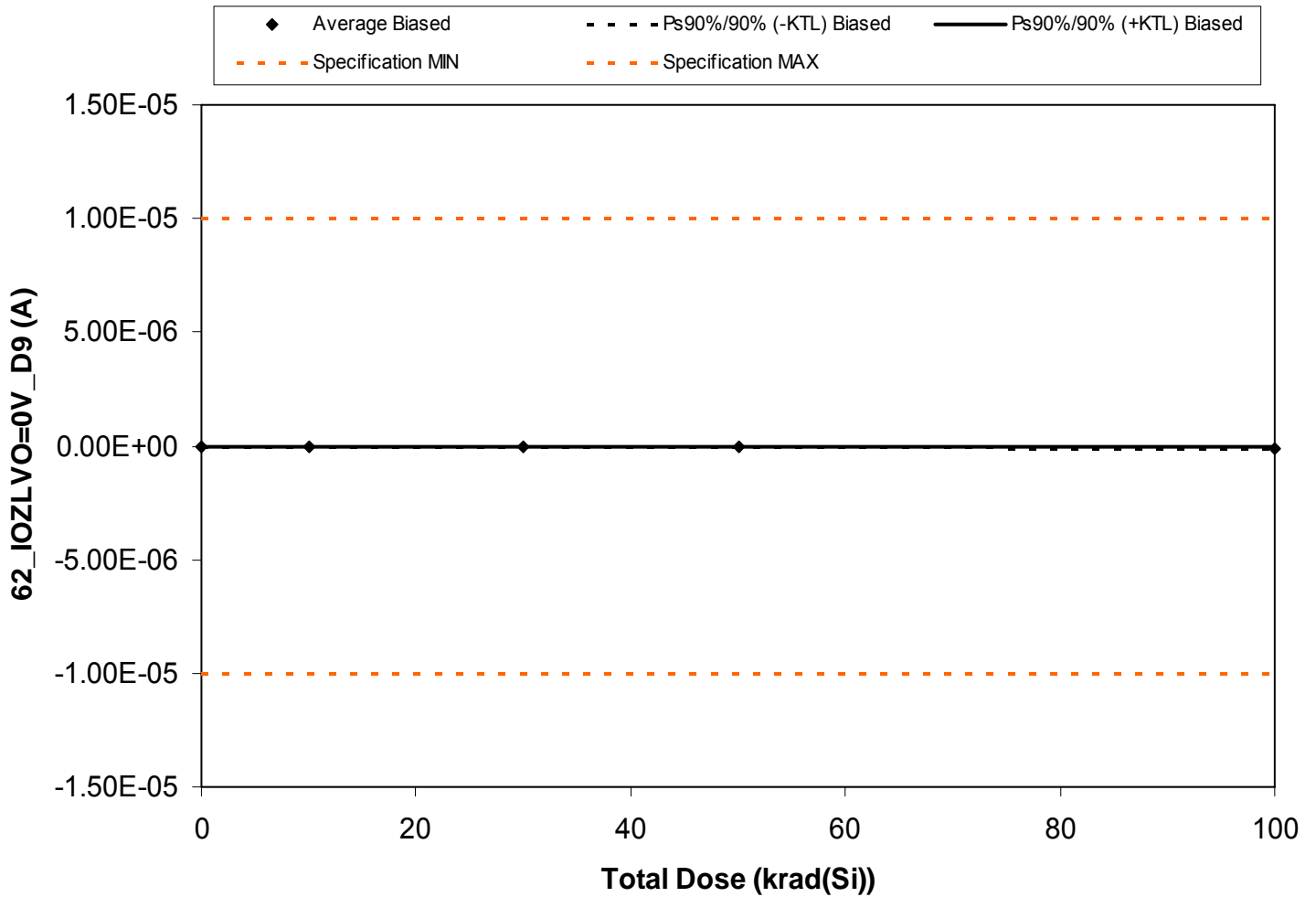


Figure 5.60. Plot of  $62\_IOZLVO=0V\_D9$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.60. Raw data for 62\_IOZLVO=0V\_D9 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

62_IOZLVO=0V_D9 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-6.80E-08	-7.70E-08	-7.90E-08	-7.90E-08	-9.80E-08
	32	-6.90E-08	-7.50E-08	-7.80E-08	-7.90E-08	-7.90E-08
	34	-6.90E-08	-7.50E-08	-7.70E-08	-7.90E-08	-8.00E-08
	35	-6.90E-08	-7.50E-08	-7.80E-08	-7.80E-08	-8.00E-08
	36	-6.90E-08	-7.50E-08	-7.80E-08	-7.90E-08	-8.00E-08
	1	-6.90E-08	-7.60E-08	-8.20E-08	-7.90E-08	-7.80E-08
	2	-6.90E-08	-7.80E-08	-8.00E-08	-7.60E-08	-7.60E-08
<b>Biased Statistics</b>						
	Average Biased	-6.88E-08	-7.54E-08	-7.80E-08	-7.88E-08	-8.34E-08
	Std Dev Biased	4.47E-10	8.94E-10	7.07E-10	4.47E-10	8.17E-09
	Ps90%/90% (+KTL) Biased	-6.76E-08	-7.29E-08	-7.61E-08	-7.76E-08	-6.10E-08
	Ps90%/90% (-KTL) Biased	-7.00E-08	-7.79E-08	-7.99E-08	-8.00E-08	-1.06E-07
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

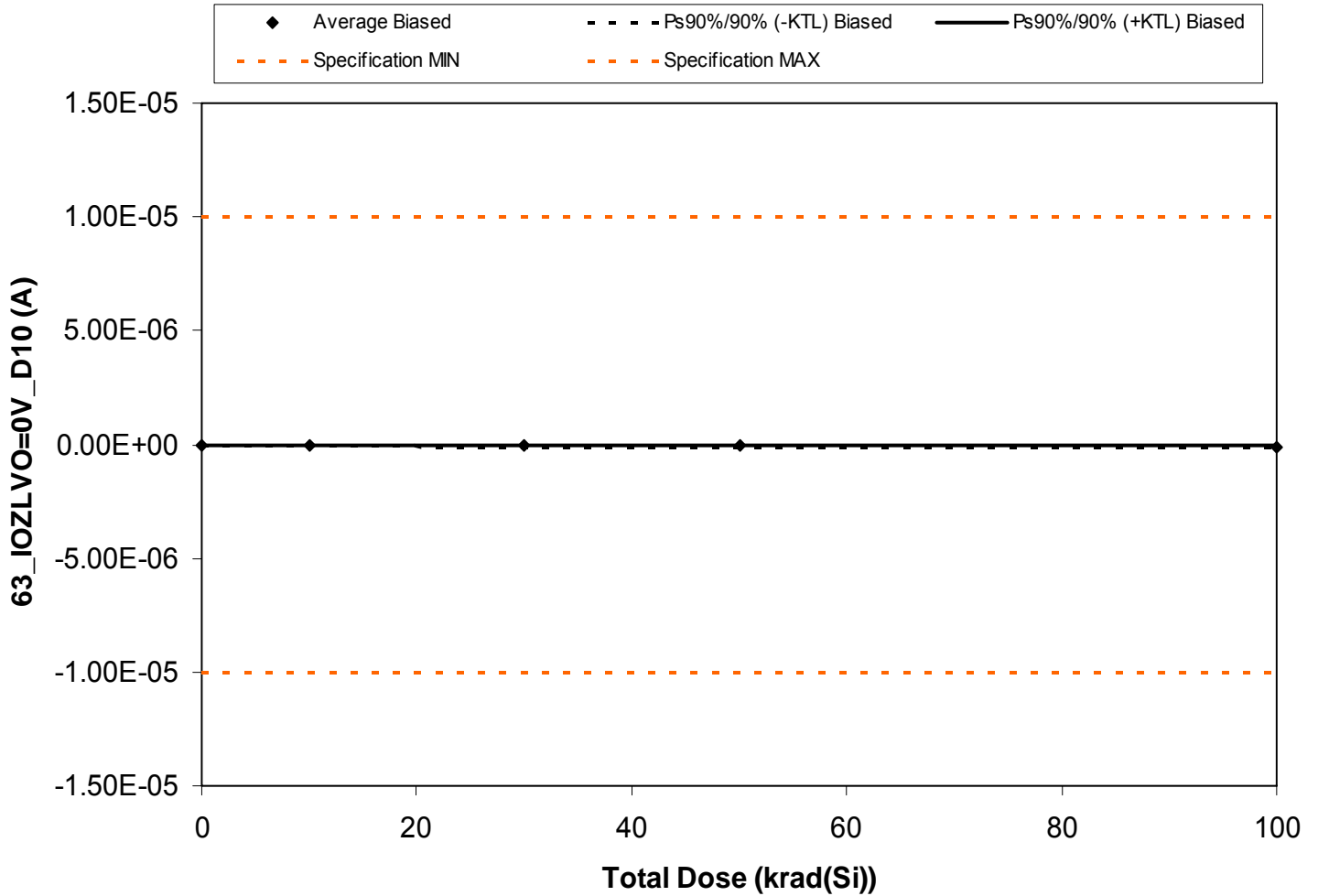


Figure 5.61. Plot of 63\_IOZLVO=0V\_D10 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.61. Raw data for 63\_IOZLVO=0V\_D10 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

63_IOZLVO=0V_D10 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-6.70E-08	-7.60E-08	-8.00E-08	-7.70E-08	-9.80E-08
	32	-6.90E-08	-7.40E-08	-7.80E-08	-7.90E-08	-8.10E-08
	34	-6.80E-08	-7.60E-08	-7.70E-08	-7.60E-08	-8.00E-08
	35	-6.90E-08	-7.50E-08	-7.70E-08	-7.80E-08	-8.10E-08
	36	-6.70E-08	-7.50E-08	-7.80E-08	-7.80E-08	-8.00E-08
	1	-6.80E-08	-7.70E-08	-8.20E-08	-7.90E-08	-7.80E-08
	2	-6.70E-08	-7.40E-08	-7.90E-08	-7.60E-08	-7.50E-08
<b>Biased Statistics</b>						
	Average Biased	-6.80E-08	-7.52E-08	-7.80E-08	-7.76E-08	-8.40E-08
	Std Dev Biased	1.00E-09	8.37E-10	1.22E-09	1.14E-09	7.84E-09
	Ps90%/90% (+KTL) Biased	-6.53E-08	-7.29E-08	-7.46E-08	-7.45E-08	-6.25E-08
	Ps90%/90% (-KTL) Biased	-7.07E-08	-7.75E-08	-8.14E-08	-8.07E-08	-1.06E-07
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

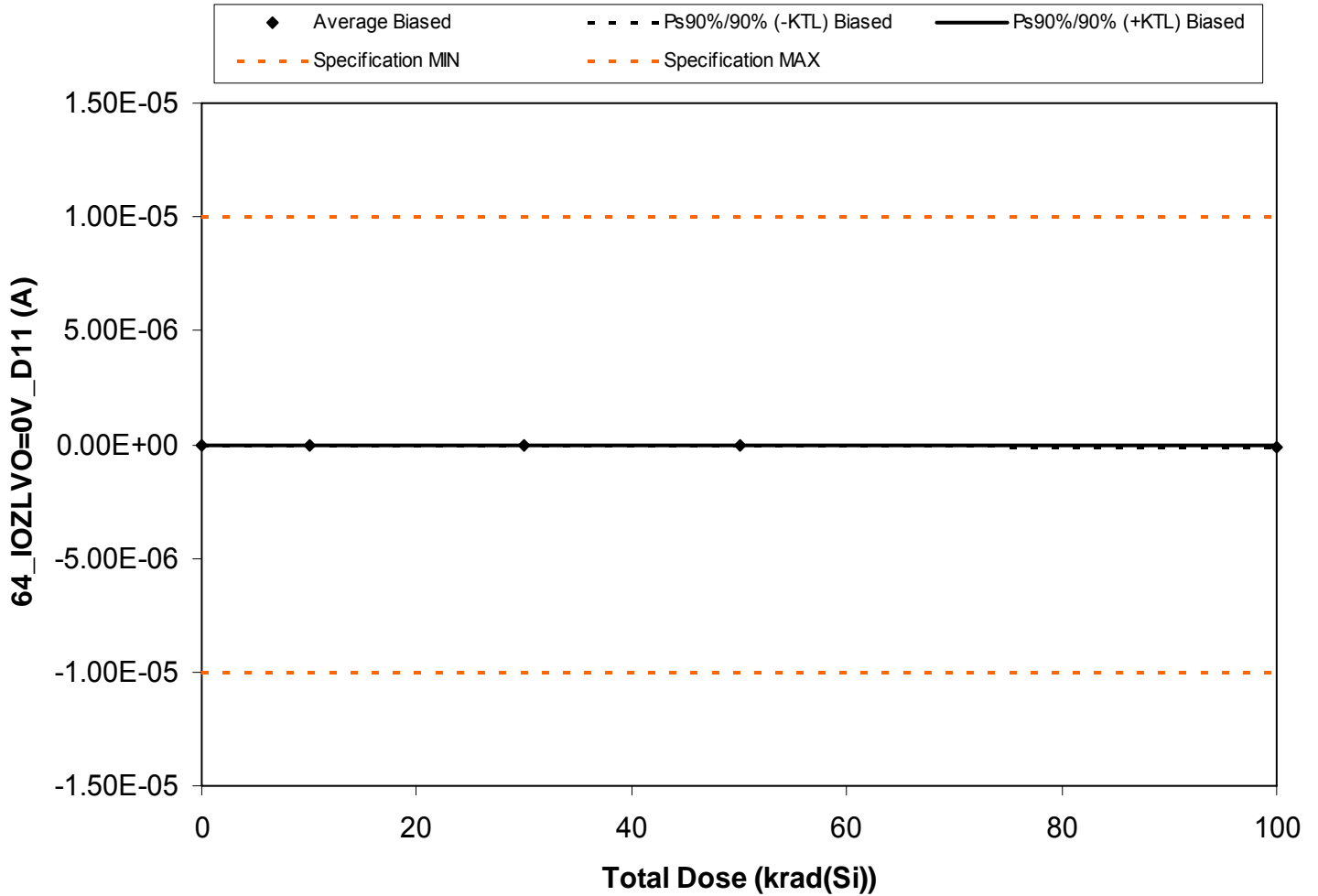


Figure 5.62. Plot of 64\_IOZLVO=0V\_D11 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.62. Raw data for 64\_IOZLVO=0V\_D11 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

64_IOZLVO=0V_D11 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-6.80E-08	-7.50E-08	-7.80E-08	-7.50E-08	-9.70E-08
	32	-6.60E-08	-7.40E-08	-7.50E-08	-7.50E-08	-7.90E-08
	34	-6.60E-08	-7.20E-08	-7.60E-08	-7.70E-08	-7.90E-08
	35	-6.60E-08	-7.10E-08	-7.60E-08	-7.60E-08	-7.90E-08
	36	-6.70E-08	-7.30E-08	-7.60E-08	-7.70E-08	-7.70E-08
	1	-6.80E-08	-7.30E-08	-8.00E-08	-7.70E-08	-7.40E-08
	2	-6.40E-08	-7.40E-08	-7.60E-08	-7.70E-08	-7.40E-08
Biased Statistics						
	Average Biased	-6.66E-08	-7.30E-08	-7.62E-08	-7.60E-08	-8.22E-08
	Std Dev Biased	8.94E-10	1.58E-09	1.10E-09	1.00E-09	8.32E-09
	Ps90%/90% (+KTL) Biased	-6.41E-08	-6.87E-08	-7.32E-08	-7.33E-08	-5.94E-08
	Ps90%/90% (-KTL) Biased	-6.91E-08	-7.73E-08	-7.92E-08	-7.87E-08	-1.05E-07
	Specification MIN	-1.00E-05	-1.00E-05	-1.00E-05	-1.00E-05	-1.00E-05
	Status	PASS	PASS	PASS	PASS	PASS
	Specification MAX	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
	Status	PASS	PASS	PASS	PASS	PASS

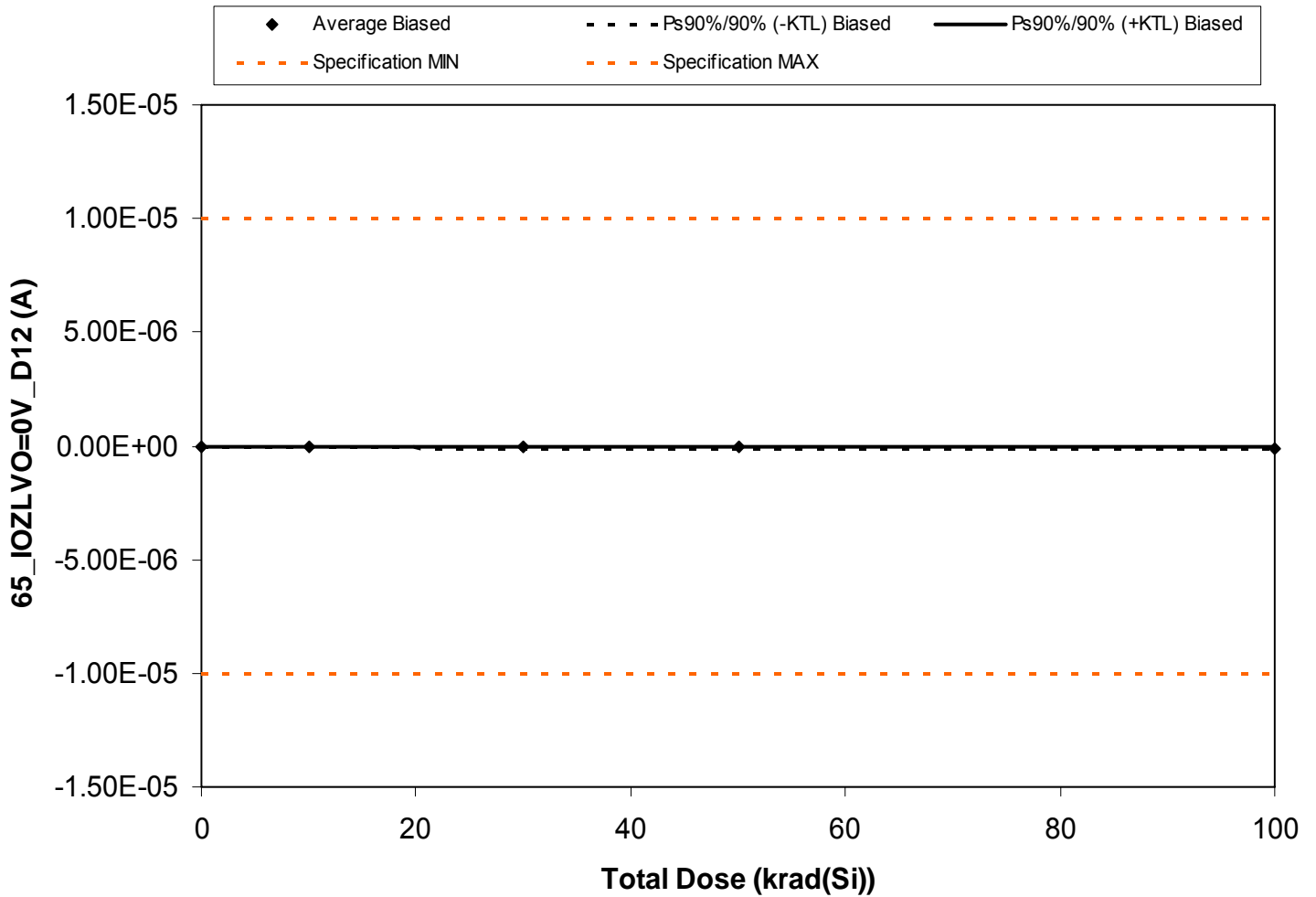


Figure 5.63. Plot of 65\_IOZLVO=0V\_D12 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.63. Raw data for 65\_IOZLVO=0V\_D12 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

65_IOZLVO=0V_D12 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-7.20E-08	-7.60E-08	-8.00E-08	-7.90E-08	-9.90E-08
	32	-6.90E-08	-7.70E-08	-7.70E-08	-8.00E-08	-8.40E-08
	34	-7.10E-08	-7.70E-08	-7.70E-08	-8.00E-08	-8.20E-08
	35	-7.20E-08	-7.60E-08	-8.00E-08	-7.90E-08	-8.20E-08
	36	-7.10E-08	-7.80E-08	-7.90E-08	-8.00E-08	-7.90E-08
	1	-7.00E-08	-7.70E-08	-8.20E-08	-8.10E-08	-7.90E-08
	2	-7.00E-08	-7.90E-08	-8.00E-08	-7.80E-08	-7.70E-08
<b>Biased Statistics</b>						
	Average Biased	-7.10E-08	-7.68E-08	-7.86E-08	-7.96E-08	-8.52E-08
	Std Dev Biased	1.22E-09	8.37E-10	1.52E-09	5.48E-10	7.92E-09
	Ps90%/90% (+KTL) Biased	-6.76E-08	-7.45E-08	-7.44E-08	-7.81E-08	-6.35E-08
	Ps90%/90% (-KTL) Biased	-7.44E-08	-7.91E-08	-8.28E-08	-8.11E-08	-1.07E-07
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

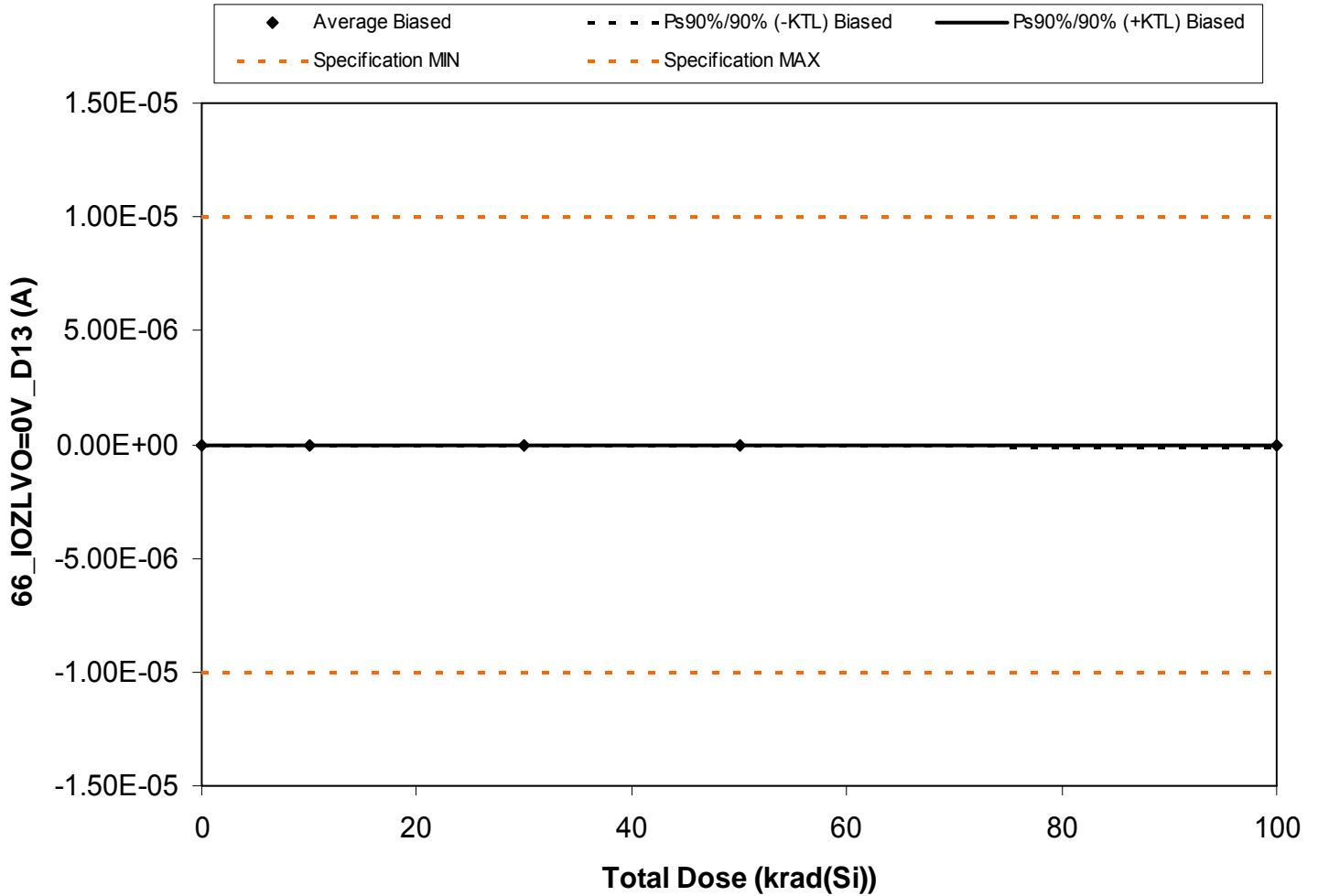


Figure 5.64. Plot of 66\_IOZLVO=0V\_D13 (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.64. Raw data for 66\_IOZLVO=0V\_D13 (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

66_IOZLVO=0V_D13 (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-6.60E-08	-7.20E-08	-7.80E-08	-7.60E-08	-5.20E-08
	32	-6.80E-08	-7.40E-08	-7.40E-08	-7.60E-08	-6.40E-08
	34	-6.80E-08	-7.40E-08	-7.60E-08	-7.60E-08	-6.30E-08
	35	-6.80E-08	-7.30E-08	-7.60E-08	-7.80E-08	-6.50E-08
	36	-6.80E-08	-7.20E-08	-7.50E-08	-7.50E-08	-7.50E-08
	1	-6.80E-08	-7.30E-08	-8.00E-08	-7.70E-08	-7.50E-08
	2	-6.80E-08	-7.40E-08	-7.60E-08	-7.60E-08	-7.70E-08
<b>Biased Statistics</b>						
	Average Biased	-6.76E-08	-7.30E-08	-7.58E-08	-7.62E-08	-6.38E-08
	Std Dev Biased	8.94E-10	1.00E-09	1.48E-09	1.10E-09	8.17E-09
	Ps90%/90% (+KTL) Biased	-6.51E-08	-7.03E-08	-7.17E-08	-7.32E-08	-4.14E-08
	Ps90%/90% (-KTL) Biased	-7.01E-08	-7.57E-08	-7.99E-08	-7.92E-08	-8.62E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

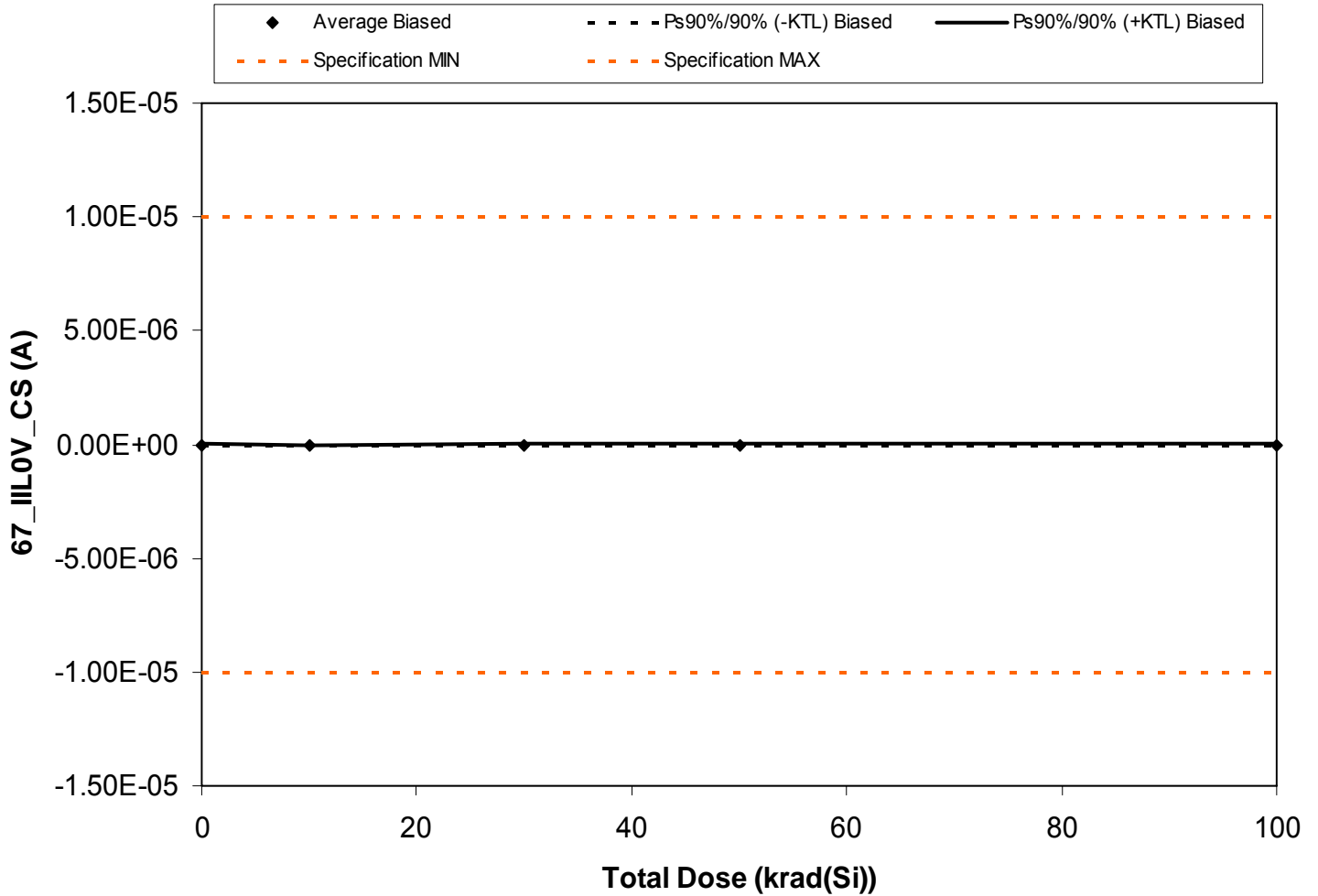


Figure 5.65. Plot of 67\_IIL0V\_CS (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.65. Raw data for 67\_IIL0V\_CS (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

67_IIL0V_CS (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-4.00E-09	-3.00E-09	-3.00E-09	-2.00E-09	-2.00E-09
	32	0.00E+00	-2.00E-09	-3.00E-09	-4.00E-09	-2.00E-09
	34	0.00E+00	-3.00E-09	-1.00E-09	-5.00E-09	-3.00E-09
	35	-4.00E-09	-3.00E-09	-5.00E-09	0.00E+00	0.00E+00
	36	-4.00E-09	-3.00E-09	-4.00E-09	-3.00E-09	3.00E-09
	1	-4.00E-09	-3.00E-09	-2.00E-09	-5.00E-09	-2.00E-09
	2	-1.00E-09	-4.00E-09	-3.00E-09	-4.00E-09	-4.00E-09
<b>Biased Statistics</b>						
	Average Biased	-2.40E-09	-2.80E-09	-3.20E-09	-2.80E-09	-8.00E-10
	Std Dev Biased	2.19E-09	4.47E-10	1.48E-09	1.92E-09	2.39E-09
	Ps90%/90% (+KTL) Biased	3.61E-09	-1.57E-09	8.67E-10	2.47E-09	5.75E-09
	Ps90%/90% (-KTL) Biased	-8.41E-09	-4.03E-09	-7.27E-09	-8.07E-09	-7.35E-09
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

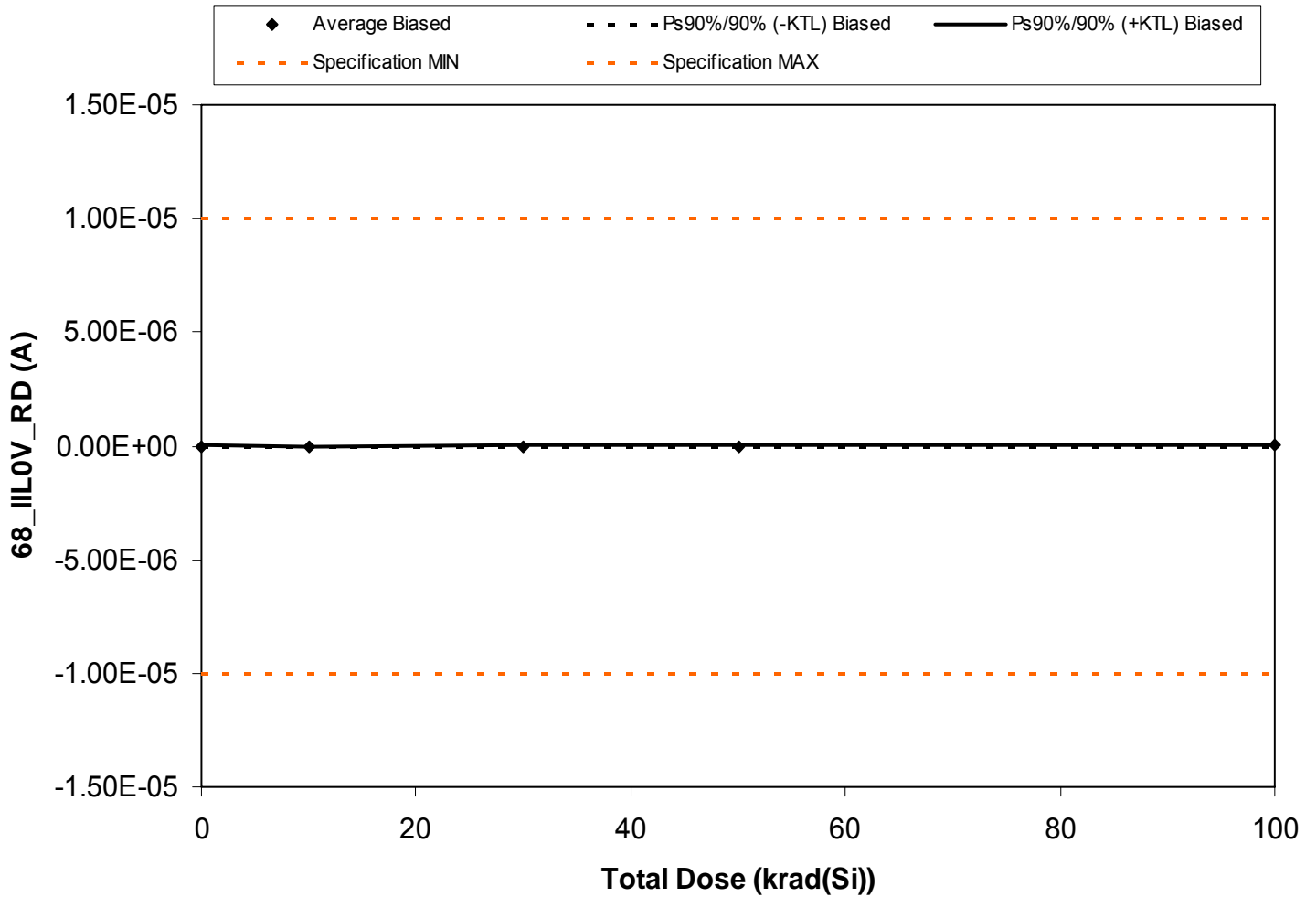


Figure 5.66. Plot of 68\_ILOV\_RD (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.66. Raw data for 68\_IIL0V\_RD (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

68_IIL0V_RD (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-2.00E-09	-2.00E-09	-3.00E-09	-5.00E-09	-2.00E-09
	32	-3.00E-09	-4.00E-09	-3.00E-09	-4.00E-09	0.00E+00
	34	0.00E+00	-2.00E-09	-1.00E-09	0.00E+00	0.00E+00
	35	-5.00E-09	-3.00E-09	-3.00E-09	-3.00E-09	-2.00E-09
	36	-4.00E-09	-3.00E-09	-1.00E-09	-2.00E-09	5.00E-09
	1	-3.00E-09	-3.00E-09	-2.00E-09	-3.00E-09	-2.00E-09
	2	-2.00E-09	-3.00E-09	-2.00E-09	-3.00E-09	-2.00E-09
<b>Biased Statistics</b>						
	Average Biased	-2.80E-09	-2.80E-09	-2.20E-09	-2.80E-09	2.00E-10
	Std Dev Biased	1.92E-09	8.37E-10	1.10E-09	1.92E-09	2.86E-09
	Ps90%/90% (+KTL) Biased	2.47E-09	-5.06E-10	8.04E-10	2.47E-09	8.05E-09
	Ps90%/90% (-KTL) Biased	-8.07E-09	-5.09E-09	-5.20E-09	-8.07E-09	-7.65E-09
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

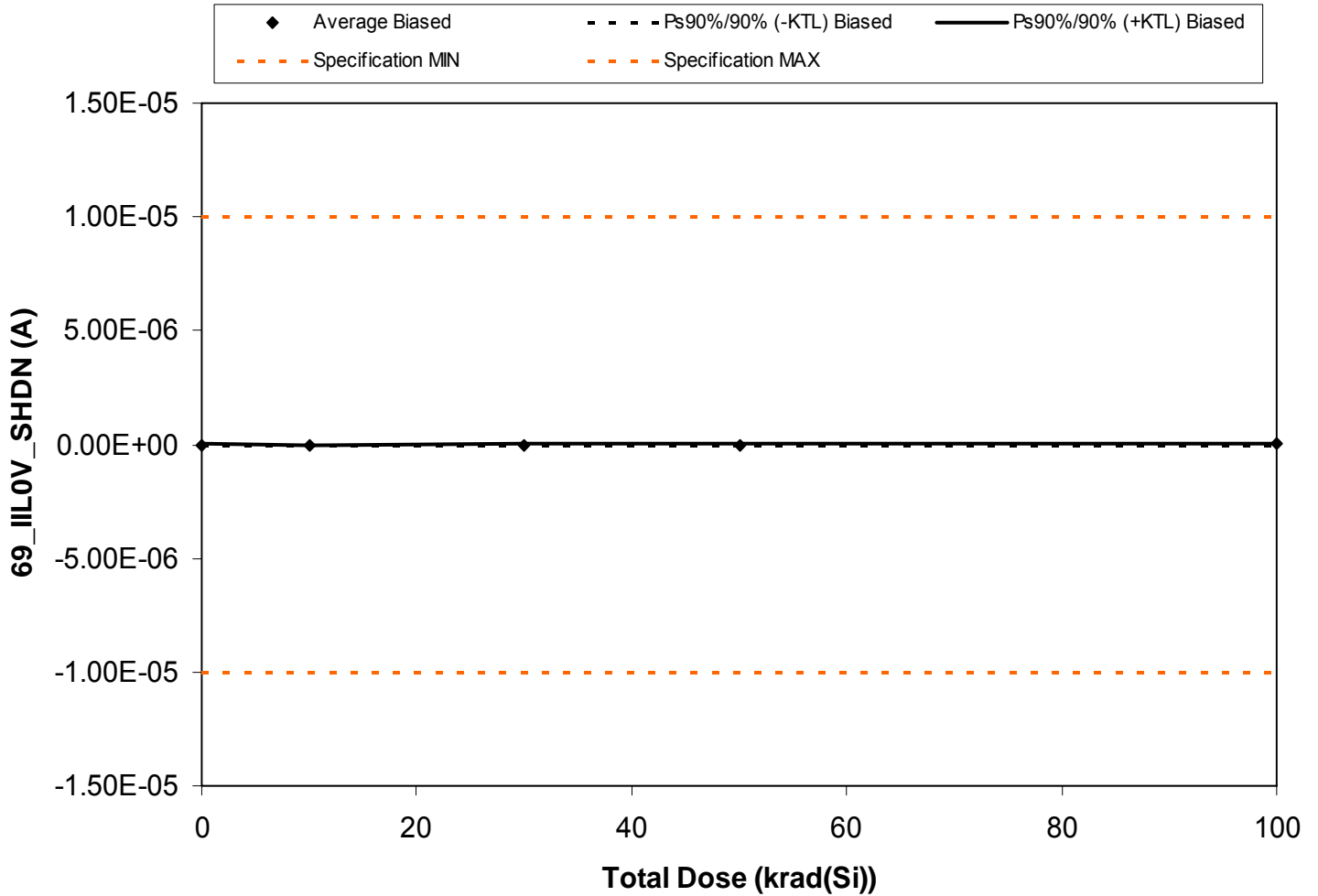


Figure 5.67. Plot of 69\_IIL0V\_SHDN (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.67. Raw data for 69\_IIL0V\_SHDN (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

69_IIL0V_SHDN (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	0.00E+00	-2.00E-09	-3.00E-09	-4.00E-09	2.50E-08
	32	-3.00E-09	-4.00E-09	-3.00E-09	-2.00E-09	4.10E-08
	34	-4.00E-09	-4.00E-09	-4.00E-09	-3.00E-09	3.20E-08
	35	-3.00E-09	-4.00E-09	-4.00E-09	-5.00E-09	1.90E-08
	36	-3.00E-09	-3.00E-09	-1.00E-09	0.00E+00	7.00E-09
	1	-3.00E-09	-3.00E-09	-2.00E-09	-3.00E-09	-4.00E-09
	2	-1.00E-09	-3.00E-09	-3.00E-09	-3.00E-09	-2.00E-09
<b>Biased Statistics</b>						
	Average Biased	-2.60E-09	-3.40E-09	-3.00E-09	-2.80E-09	2.48E-08
	Std Dev Biased	1.52E-09	8.94E-10	1.22E-09	1.92E-09	1.29E-08
	Ps90%/90% (+KTL) Biased	1.56E-09	-9.47E-10	3.58E-10	2.47E-09	6.01E-08
	Ps90%/90% (-KTL) Biased	-6.76E-09	-5.85E-09	-6.36E-09	-8.07E-09	-1.05E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

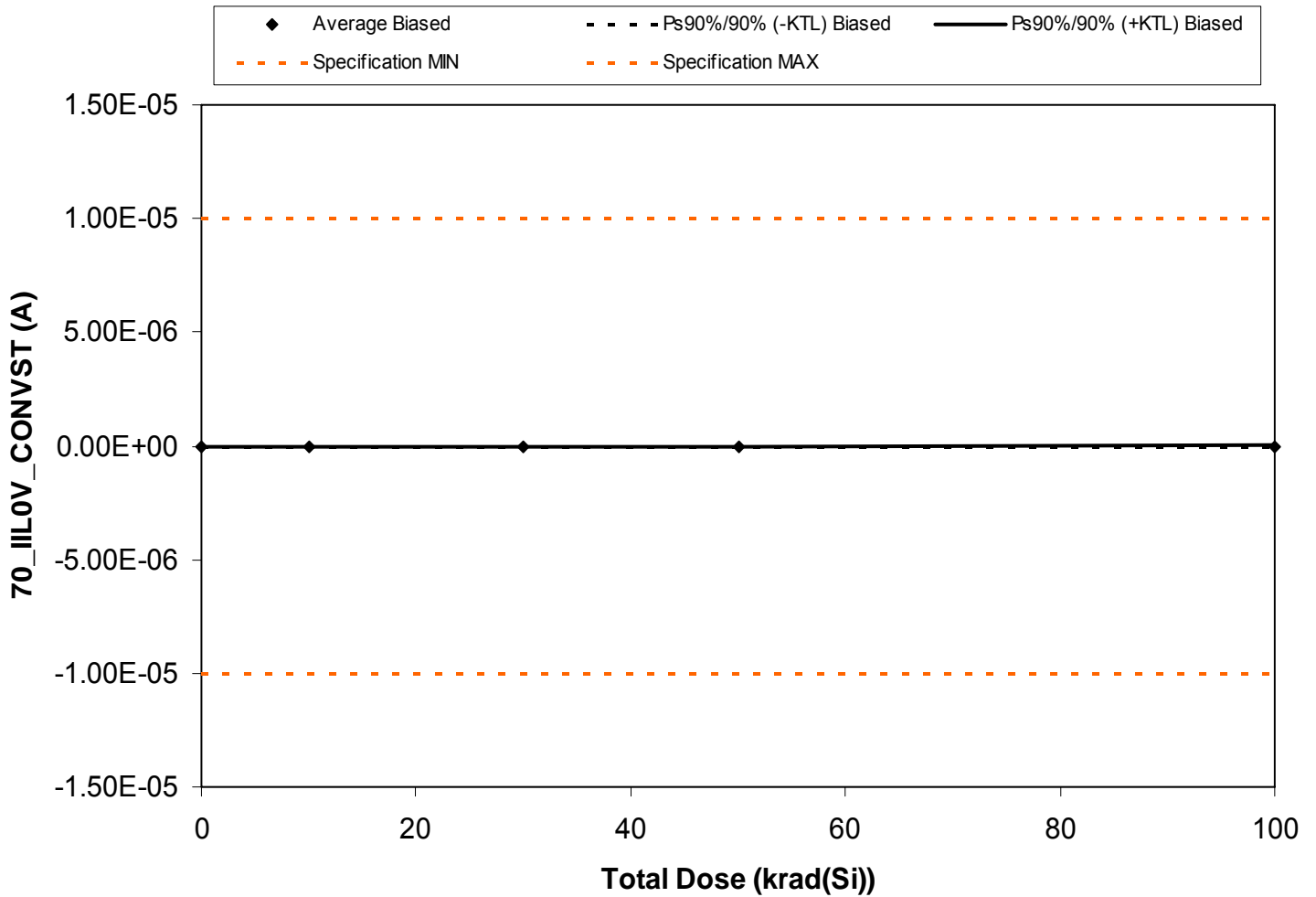


Figure 5.68. Plot of 70\_IIL0V\_CONVST (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.68. Raw data for 70\_IIL0V\_CONVST (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

70_IIL0V_CONVST (A)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	-3.10E-08	-3.00E-08	-2.60E-08	-2.80E-08	-6.00E-09
32	-3.10E-08	-3.10E-08	-2.40E-08	-2.80E-08	1.40E-08
34	-2.80E-08	-3.10E-08	-2.60E-08	-2.60E-08	0.00E+00
35	-3.10E-08	-2.70E-08	-2.50E-08	-2.50E-08	-1.60E-08
36	-3.00E-08	-3.10E-08	-2.60E-08	-2.70E-08	-1.60E-08
1	-2.80E-08	-2.80E-08	-2.80E-08	-3.00E-08	-2.70E-08
2	-2.70E-08	-3.20E-08	-3.00E-08	-3.00E-08	-2.50E-08
<b>Biased Statistics</b>					
Average Biased	-3.02E-08	-3.00E-08	-2.54E-08	-2.68E-08	-4.80E-09
Std Dev Biased	1.30E-09	1.73E-09	8.94E-10	1.30E-09	1.25E-08
Ps90%/90% (+KTL) Biased	-2.66E-08	-2.53E-08	-2.29E-08	-2.32E-08	2.96E-08
Ps90%/90% (-KTL) Biased	-3.38E-08	-3.47E-08	-2.79E-08	-3.04E-08	-3.92E-08
<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
Status	PASS	PASS	PASS	PASS	PASS
<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
Status	PASS	PASS	PASS	PASS	PASS

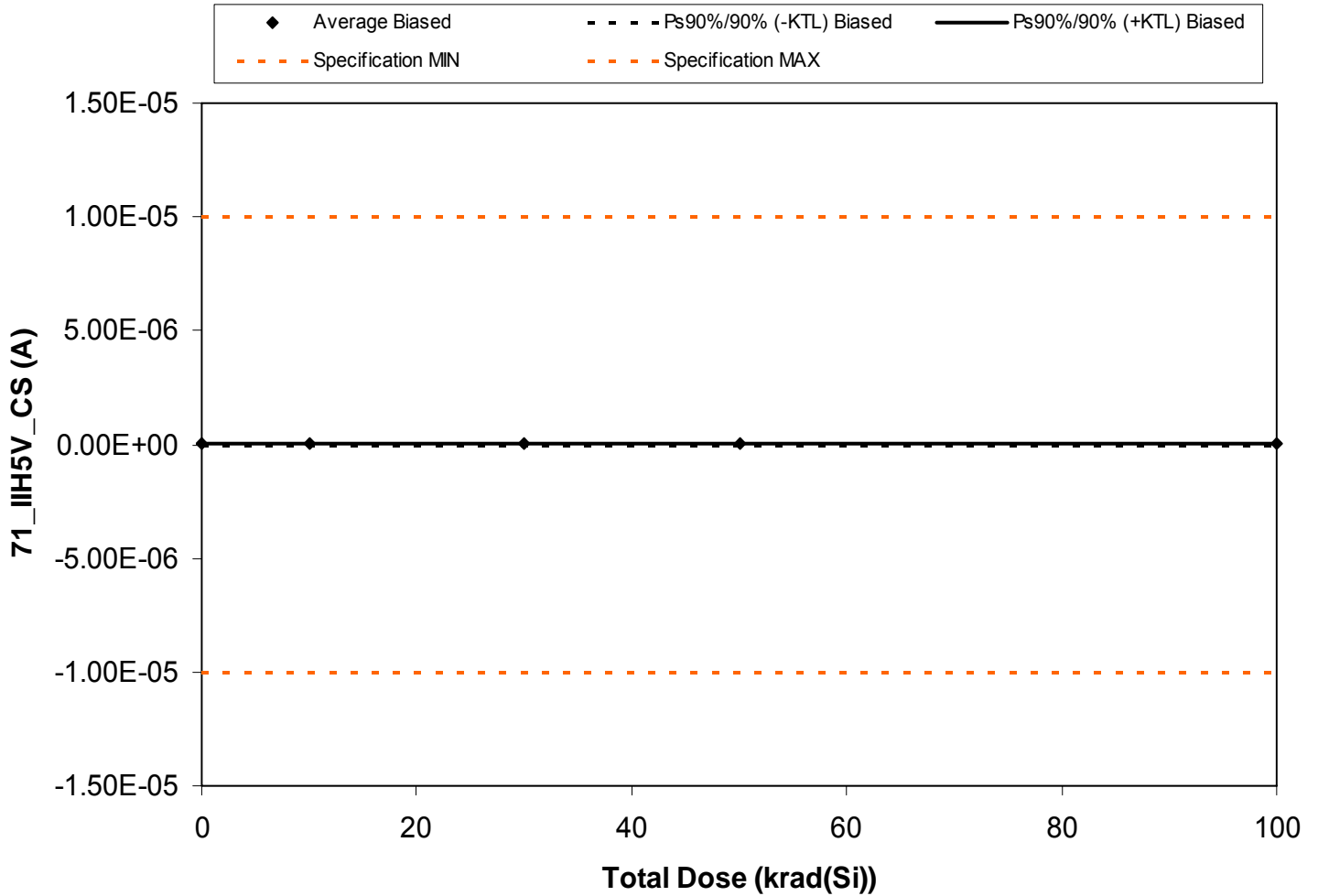


Figure 5.69. Plot of 71\_IH5V\_CS (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.69. Raw data for 71\_IIH5V\_CS (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

71_IIH5V_CS (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	0.00E+00	2.00E-09	0.00E+00	2.00E-09	1.00E-09
	32	2.00E-09	-3.00E-09	0.00E+00	1.00E-09	5.00E-09
	34	2.00E-09	1.00E-09	3.00E-09	0.00E+00	2.00E-09
	35	0.00E+00	2.00E-09	-1.00E-09	2.00E-09	1.00E-09
	36	2.00E-09	0.00E+00	0.00E+00	0.00E+00	7.00E-09
	1	2.00E-09	0.00E+00	2.00E-09	0.00E+00	1.00E-09
	2	0.00E+00	2.00E-09	1.00E-09	2.00E-09	0.00E+00
<b>Biased Statistics</b>						
	Average Biased	1.20E-09	4.00E-10	4.00E-10	1.00E-09	3.20E-09
	Std Dev Biased	1.10E-09	2.07E-09	1.52E-09	1.00E-09	2.68E-09
	Ps90%/90% (+KTL) Biased	4.20E-09	6.09E-09	4.56E-09	3.74E-09	1.06E-08
	Ps90%/90% (-KTL) Biased	-1.80E-09	-5.29E-09	-3.76E-09	-1.74E-09	-4.16E-09
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

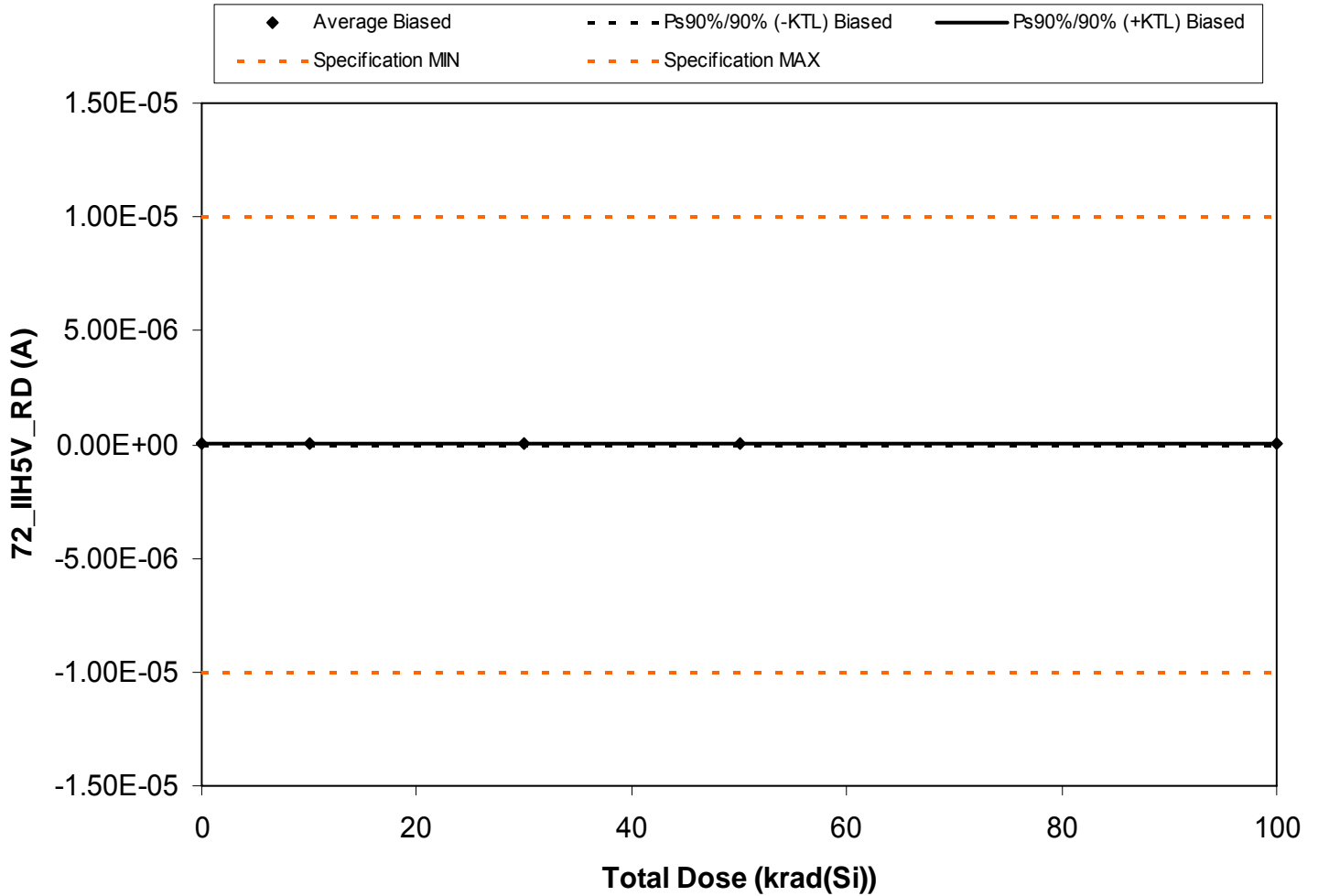


Figure 5.70. Plot of 72\_IH5V\_RD (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.70. Raw data for 72\_IIH5V\_RD (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

72_IIH5V_RD (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	1.00E-09	0.00E+00	2.00E-09	2.00E-09	2.00E-09
	32	0.00E+00	0.00E+00	1.00E-09	1.00E-09	5.00E-09
	34	0.00E+00	0.00E+00	2.00E-09	0.00E+00	2.00E-09
	35	0.00E+00	1.00E-09	0.00E+00	2.00E-09	3.00E-09
	36	0.00E+00	2.00E-09	3.00E-09	2.00E-09	7.00E-09
	1	2.00E-09	1.00E-09	2.00E-09	1.00E-09	2.00E-09
	2	2.00E-09	3.00E-09	1.00E-09	0.00E+00	0.00E+00
<b>Biased Statistics</b>						
	Average Biased	2.00E-10	6.00E-10	1.60E-09	1.40E-09	3.80E-09
	Std Dev Biased	4.47E-10	8.94E-10	1.14E-09	8.94E-10	2.17E-09
	Ps90%/90% (+KTL) Biased	1.43E-09	3.05E-09	4.73E-09	3.85E-09	9.74E-09
	Ps90%/90% (-KTL) Biased	-1.03E-09	-1.85E-09	-1.53E-09	-1.05E-09	-2.14E-09
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

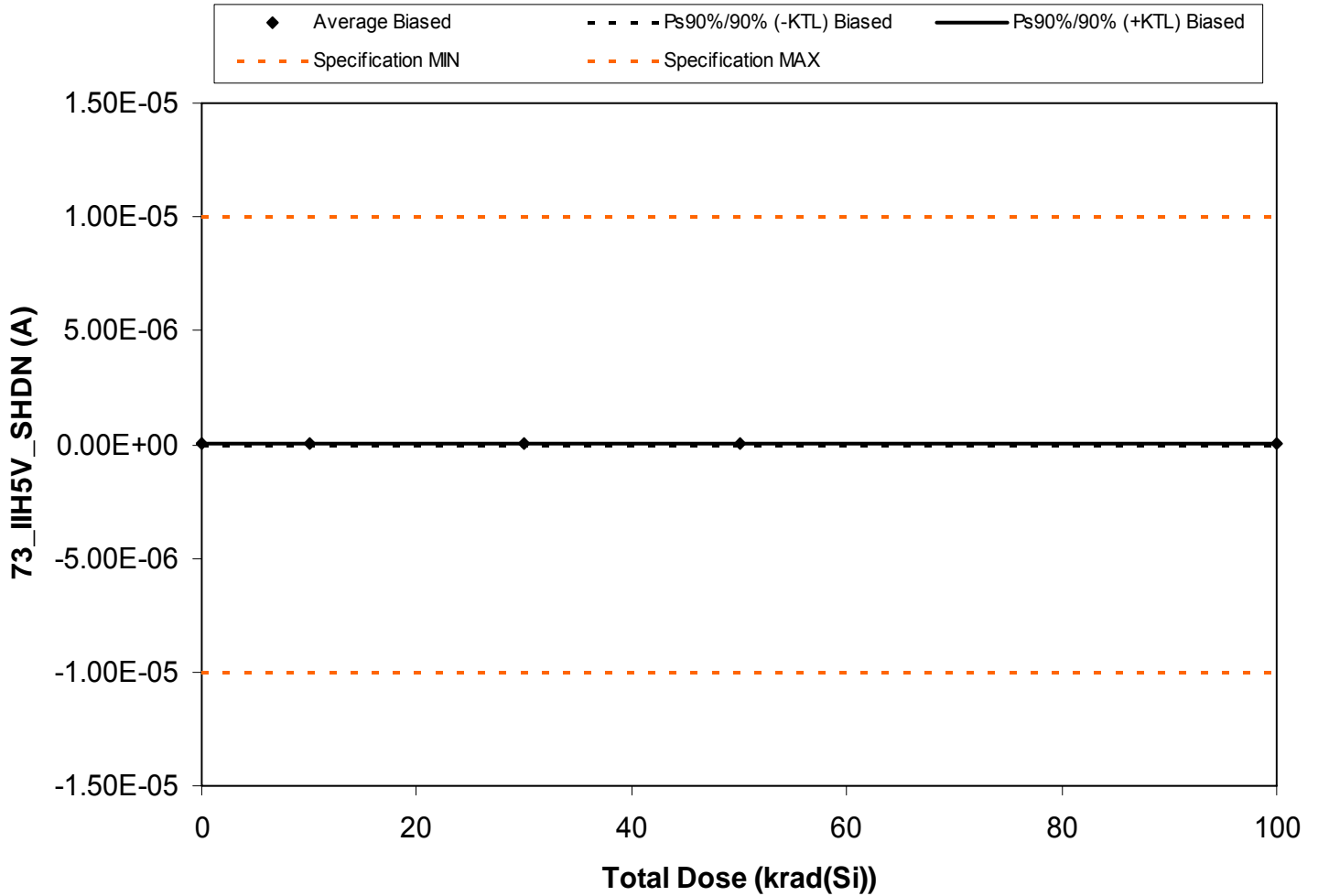


Figure 5.71. Plot of 73\_IH5V\_SHDN (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.71. Raw data for 73\_IIH5V\_SHDN (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

73_IIH5V_SHDN (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	1.00E-09	2.00E-09	1.00E-09	0.00E+00	3.30E-08
	32	1.00E-09	2.00E-09	3.00E-09	3.00E-09	5.10E-08
	34	0.00E+00	2.00E-09	2.00E-09	0.00E+00	3.80E-08
	35	2.00E-09	0.00E+00	2.00E-09	0.00E+00	2.80E-08
	36	2.00E-09	0.00E+00	1.00E-09	3.00E-09	1.60E-08
	1	0.00E+00	2.00E-09	2.00E-09	0.00E+00	2.00E-09
	2	0.00E+00	0.00E+00	3.00E-09	0.00E+00	3.00E-09
<b>Biased Statistics</b>						
	Average Biased	1.20E-09	1.20E-09	1.80E-09	1.20E-09	3.32E-08
	Std Dev Biased	8.37E-10	1.10E-09	8.37E-10	1.64E-09	1.29E-08
	Ps90%/90% (+KTL) Biased	3.49E-09	4.20E-09	4.09E-09	5.71E-09	6.85E-08
	Ps90%/90% (-KTL) Biased	-1.09E-09	-1.80E-09	-4.94E-10	-3.31E-09	-2.10E-09
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

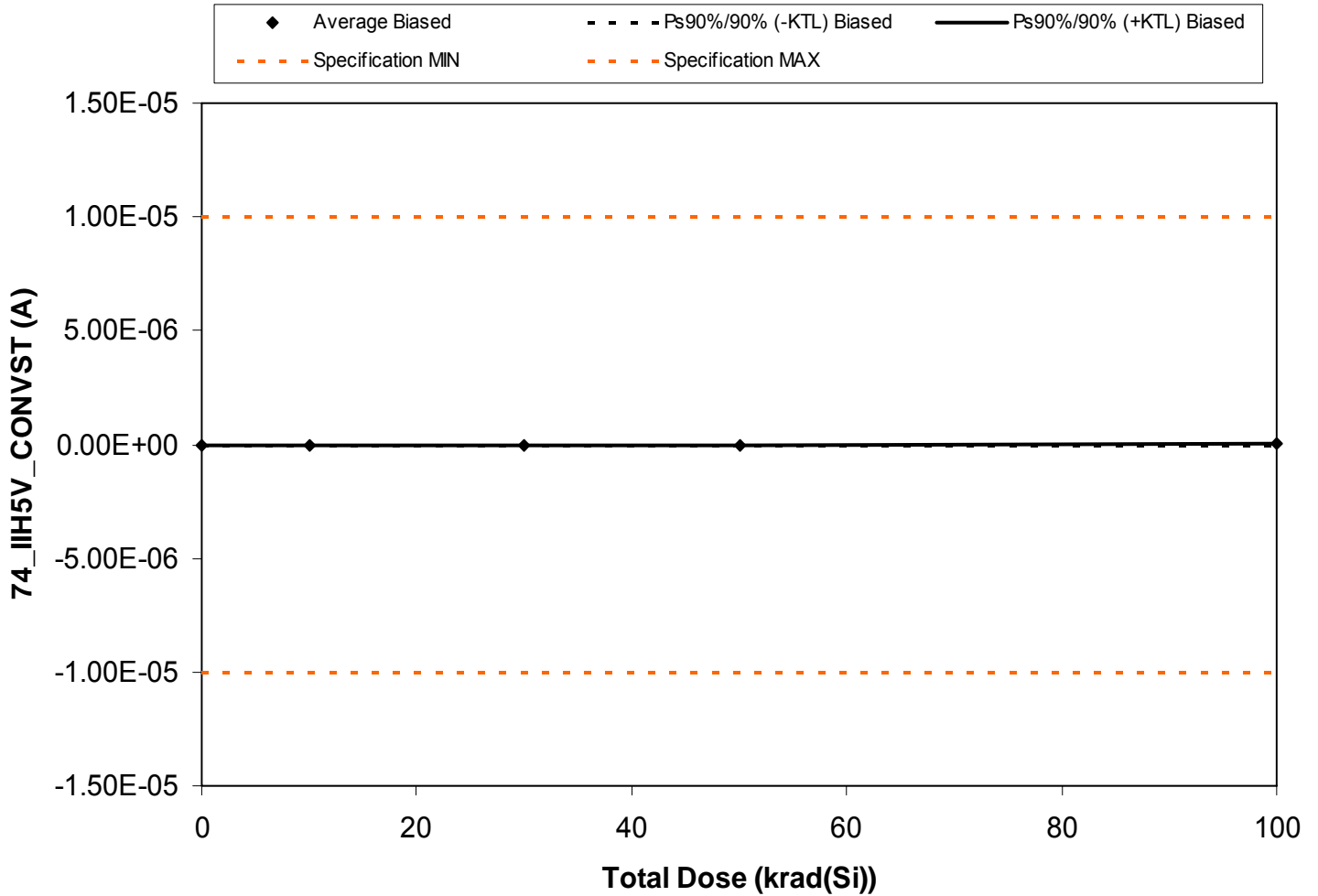


Figure 5.72. Plot of  $74\_IH5V\_CONVST$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.72. Raw data for 74\_IIH5V\_CONVST (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

74_IIH5V_CONVST (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-1.40E-08	-1.50E-08	-1.40E-08	-1.60E-08	1.00E-08
	32	-1.10E-08	-1.50E-08	-1.40E-08	-1.50E-08	3.50E-08
	34	-1.50E-08	-1.50E-08	-1.60E-08	-1.70E-08	2.10E-08
	35	-1.60E-08	-1.30E-08	-1.60E-08	-1.60E-08	0.00E+00
	36	-1.80E-08	-1.50E-08	-1.30E-08	-1.40E-08	-4.00E-09
	1	-1.50E-08	-1.60E-08	-1.50E-08	-1.30E-08	-1.60E-08
	2	-1.40E-08	-1.80E-08	-1.90E-08	-1.80E-08	-1.40E-08
<b>Biased Statistics</b>						
	Average Biased	-1.48E-08	-1.46E-08	-1.46E-08	-1.56E-08	1.24E-08
	Std Dev Biased	2.59E-09	8.94E-10	1.34E-09	1.14E-09	1.59E-08
	Ps90%/90% (+KTL) Biased	-7.70E-09	-1.21E-08	-1.09E-08	-1.25E-08	5.60E-08
	Ps90%/90% (-KTL) Biased	-2.19E-08	-1.71E-08	-1.83E-08	-1.87E-08	-3.12E-08
	<b>Specification MIN</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>	<b>-1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>	<b>1.00E-05</b>
	Status	PASS	PASS	PASS	PASS	PASS

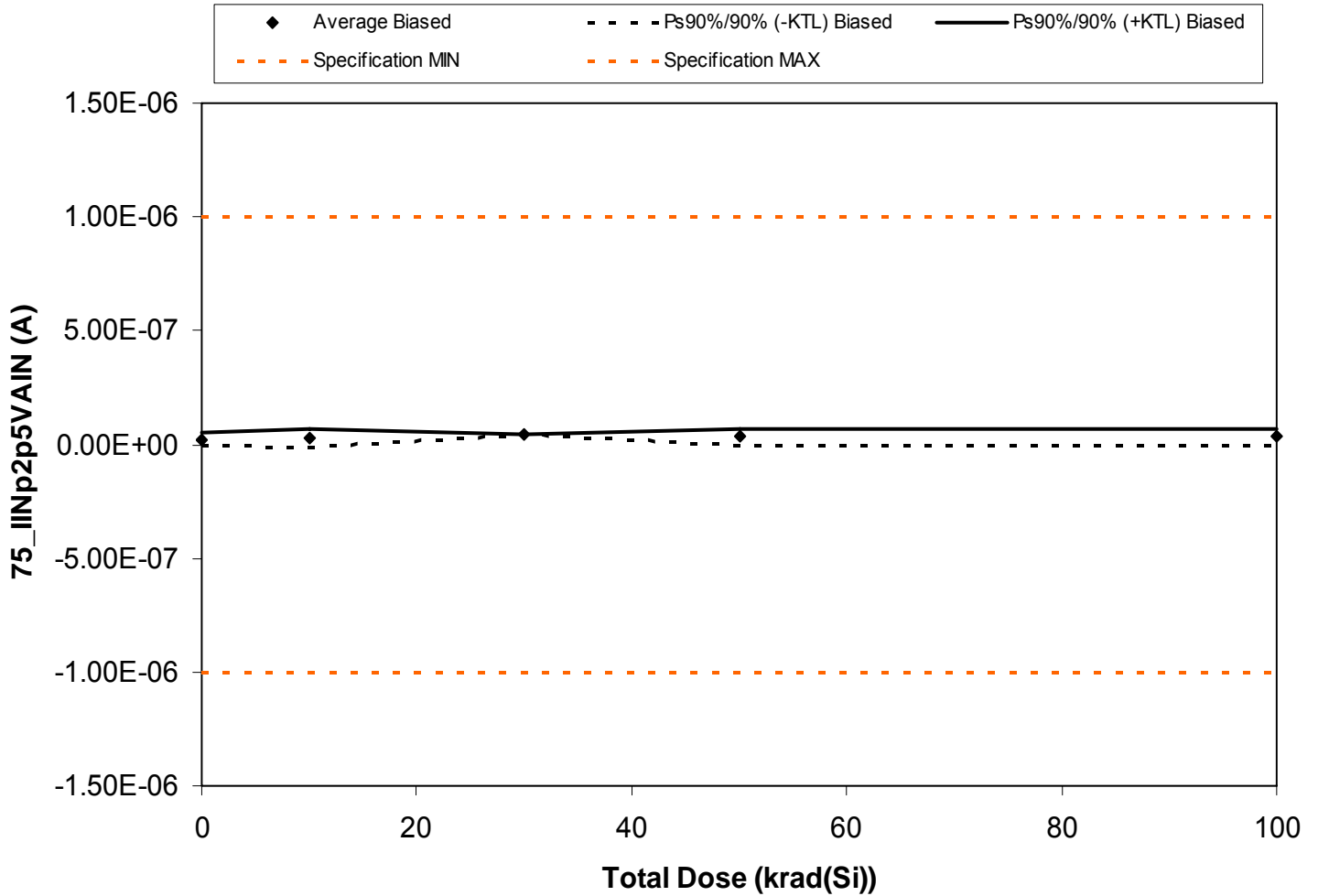


Figure 5.73. Plot of  $75\_IINp2p5VAIN$  (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.73. Raw data for 75\_IINp2p5VAIN (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

75_IINp2p5VAIN (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	1.80E-08	1.80E-08	4.30E-08	4.30E-08	4.30E-08
	32	1.80E-08	4.30E-08	4.30E-08	1.80E-08	4.30E-08
	34	1.80E-08	1.80E-08	4.30E-08	1.80E-08	4.30E-08
	35	4.30E-08	4.30E-08	4.30E-08	4.30E-08	1.80E-08
	36	1.80E-08	1.80E-08	4.30E-08	4.30E-08	1.80E-08
	1	1.80E-08	1.80E-08	4.30E-08	1.80E-08	4.30E-08
	2	1.80E-08	4.30E-08	1.80E-08	4.30E-08	1.80E-08
<b>Biased Statistics</b>						
	Average Biased	2.30E-08	2.80E-08	4.30E-08	3.30E-08	3.30E-08
	Std Dev Biased	1.12E-08	1.37E-08	0.00E+00	1.37E-08	1.37E-08
	Ps90%/90% (+KTL) Biased	5.37E-08	6.55E-08	4.30E-08	7.05E-08	7.05E-08
	Ps90%/90% (-KTL) Biased	-7.66E-09	-9.55E-09	4.30E-08	-4.55E-09	-4.55E-09
	<b>Specification MIN</b>	<b>-1.00E-06</b>	<b>-1.00E-06</b>	<b>-1.00E-06</b>	<b>-1.00E-06</b>	<b>-1.00E-06</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-06</b>	<b>1.00E-06</b>	<b>1.00E-06</b>	<b>1.00E-06</b>	<b>1.00E-06</b>
	Status	PASS	PASS	PASS	PASS	PASS

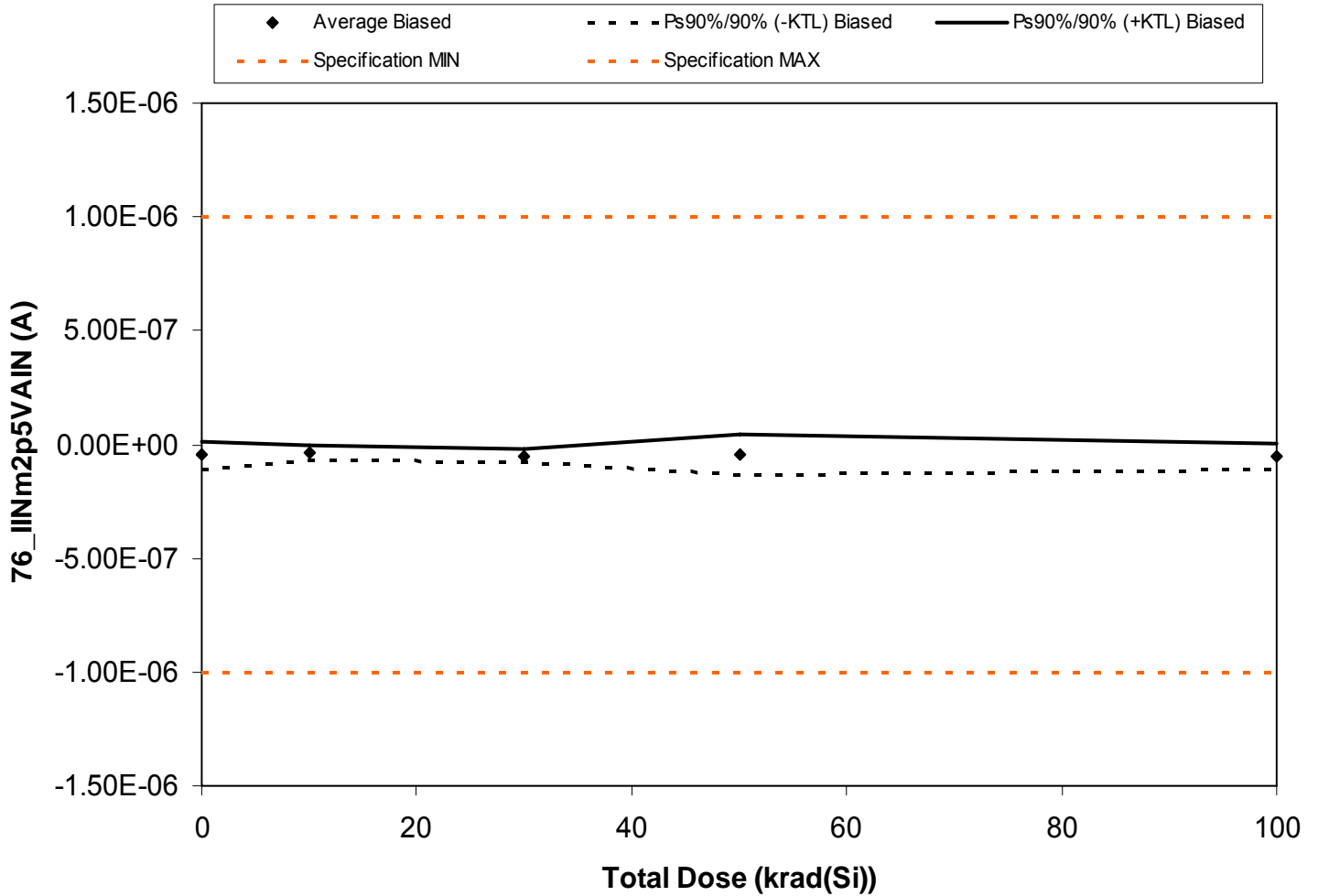


Figure 5.74. Plot of 76\_IINm2p5VAIN (A) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.74. Raw data for 76\_IINm2p5VAIN (A) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

76_IINm2p5VAIN (A)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	-5.50E-08	-3.10E-08	-5.50E-08	-3.10E-08	-3.10E-08
	32	-3.00E-08	-3.10E-08	-5.50E-08	-3.10E-08	-3.10E-08
	34	-7.90E-08	-3.10E-08	-5.50E-08	-3.10E-08	-5.50E-08
	35	-3.00E-08	-3.10E-08	-5.50E-08	-1.04E-07	-5.50E-08
	36	-3.00E-08	-5.50E-08	-3.10E-08	-3.10E-08	-7.90E-08
	1	-5.50E-08	-3.10E-08	-5.50E-08	-3.10E-08	-3.10E-08
	2	-3.00E-08	-5.50E-08	-5.50E-08	-5.50E-08	-5.50E-08
<b>Biased Statistics</b>						
	Average Biased	-4.48E-08	-3.58E-08	-5.02E-08	-4.56E-08	-5.02E-08
	Std Dev Biased	2.20E-08	1.07E-08	1.07E-08	3.26E-08	2.01E-08
	Ps90%/90% (+KTL) Biased	1.54E-08	-6.37E-09	-2.08E-08	4.39E-08	4.86E-09
	Ps90%/90% (-KTL) Biased	-1.05E-07	-6.52E-08	-7.96E-08	-1.35E-07	-1.05E-07
	<b>Specification MIN</b>	<b>-1.00E-06</b>	<b>-1.00E-06</b>	<b>-1.00E-06</b>	<b>-1.00E-06</b>	<b>-1.00E-06</b>
	Status	PASS	PASS	PASS	PASS	PASS
	<b>Specification MAX</b>	<b>1.00E-06</b>	<b>1.00E-06</b>	<b>1.00E-06</b>	<b>1.00E-06</b>	<b>1.00E-06</b>
	Status	PASS	PASS	PASS	PASS	PASS

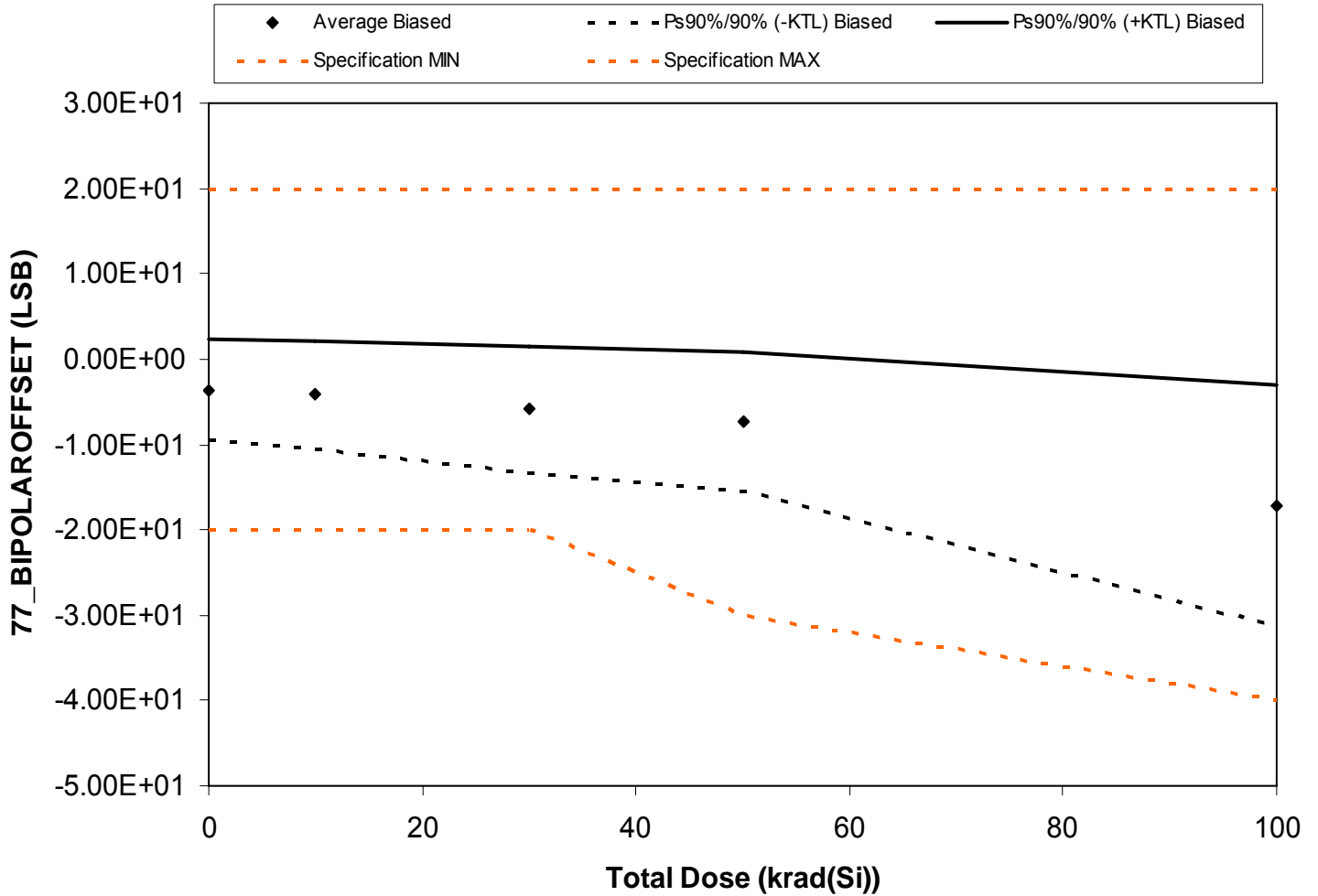


Figure 5.75. Plot of 77\_BIPOLAROFFSET (LSB) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.75. Raw data for 77\_BIPOLAROFFSET (LSB) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

77_BIPOLAROFFSET (LSB)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	-2.34E+00	-3.03E+00	-4.34E+00	-5.87E+00	-1.47E+01
32	-5.04E+00	-5.20E+00	-6.72E+00	-7.93E+00	-1.84E+01
34	-7.05E-01	-8.25E-01	-1.96E+00	-2.96E+00	-9.48E+00
35	-6.11E+00	-6.83E+00	-8.75E+00	-1.02E+01	-2.13E+01
36	-4.05E+00	-5.09E+00	-7.55E+00	-9.68E+00	-2.19E+01
1	-2.69E+00	-2.58E+00	-2.07E+00	-3.22E+00	-2.52E+00
2	-7.02E+00	-7.05E+00	-6.58E+00	-7.34E+00	-6.45E+00
<b>Biased Statistics</b>					
Average Biased	-3.65E+00	-4.19E+00	-5.87E+00	-7.34E+00	-1.72E+01
Std Dev Biased	2.15E+00	2.32E+00	2.71E+00	2.98E+00	5.14E+00
Ps90%/90% (+KTL) Biased	2.25E+00	2.16E+00	1.57E+00	8.47E-01	-3.07E+00
Ps90%/90% (-KTL) Biased	-9.55E+00	-1.05E+01	-1.33E+01	-1.55E+01	-3.13E+01
<b>Specification MIN</b>	<b>-2.00E+01</b>	<b>-2.00E+01</b>	<b>-2.00E+01</b>	<b>-3.00E+01</b>	<b>-4.00E+01</b>
Status	PASS	PASS	PASS	PASS	PASS
<b>Specification MAX</b>	<b>2.00E+01</b>	<b>2.00E+01</b>	<b>2.00E+01</b>	<b>2.00E+01</b>	<b>2.00E+01</b>
Status	PASS	PASS	PASS	PASS	PASS

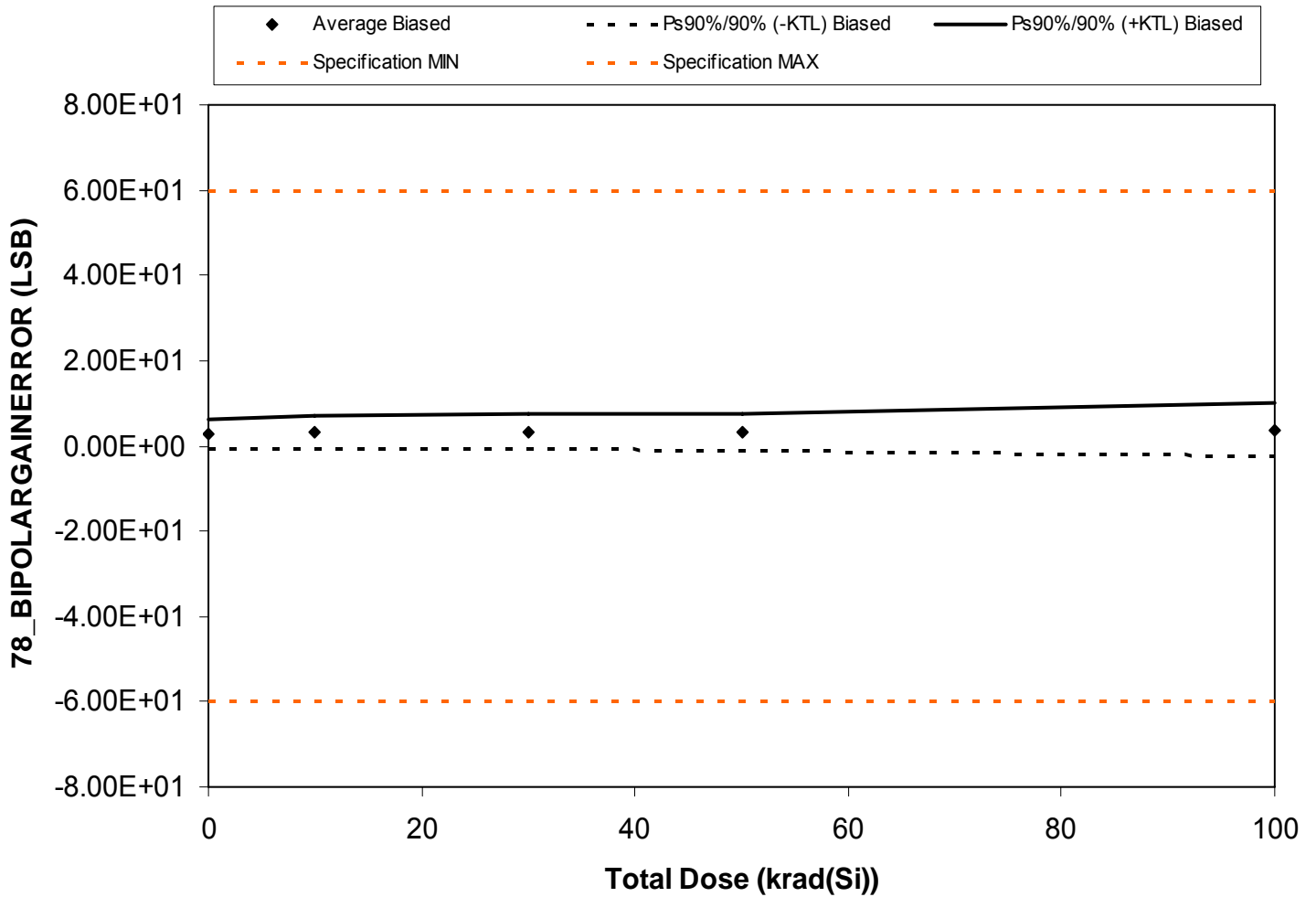


Figure 5.76. Plot of 78\_BIPOLARGAINERROR (LSB) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.76. Raw data for 78\_BIPOLARGAINERROR (LSB) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

78_BIPOLARGAINERROR (LSB)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	1.33E+00	1.49E+00	2.13E+00	2.11E+00	1.87E+00
32	3.91E+00	4.20E+00	4.05E+00	3.99E+00	4.47E+00
34	2.46E+00	2.43E+00	2.75E+00	2.68E+00	2.77E+00
35	2.20E+00	2.72E+00	2.13E+00	1.95E+00	2.52E+00
36	4.46E+00	4.92E+00	5.52E+00	5.61E+00	7.54E+00
1	3.93E+00	2.95E+00	2.61E+00	3.64E+00	3.05E+00
2	4.41E+00	4.29E+00	3.77E+00	4.14E+00	3.83E+00
<b>Biased Statistics</b>					
Average Biased	2.87E+00	3.15E+00	3.32E+00	3.27E+00	3.83E+00
Std Dev Biased	1.29E+00	1.39E+00	1.46E+00	1.54E+00	2.28E+00
Ps90%/90% (+KTL) Biased	6.40E+00	6.95E+00	7.32E+00	7.48E+00	1.01E+01
Ps90%/90% (-KTL) Biased	-6.56E-01	-6.53E-01	-6.84E-01	-9.43E-01	-2.42E+00
<b>Specification MIN</b>	<b>-6.00E+01</b>	<b>-6.00E+01</b>	<b>-6.00E+01</b>	<b>-6.00E+01</b>	<b>-6.00E+01</b>
Status	PASS	PASS	PASS	PASS	PASS
<b>Specification MAX</b>	<b>6.00E+01</b>	<b>6.00E+01</b>	<b>6.00E+01</b>	<b>6.00E+01</b>	<b>6.00E+01</b>
Status	PASS	PASS	PASS	PASS	PASS

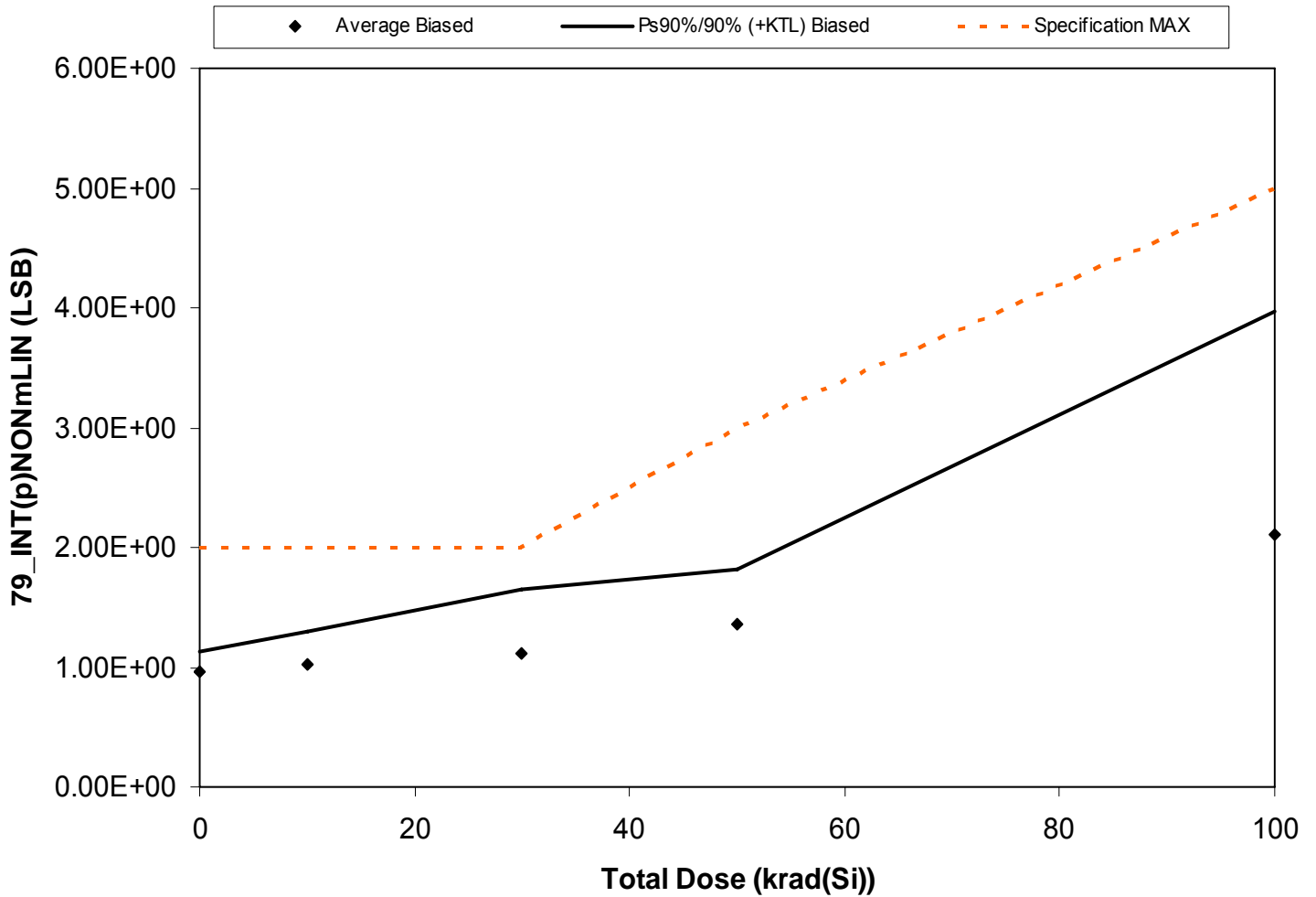


Figure 5.77. Plot of  $79\_INT(p)NONmLIN$  (LSB) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.77. Raw data for 79\_INT(p)NONmLIN (LSB) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

79_INT(p)NONmLIN (LSB)		Total Dose (krad(Si))				
		0	10	30	50	100
Device						
	31	9.58E-01	1.10E+00	1.28E+00	1.39E+00	1.78E+00
	32	1.07E+00	1.03E+00	1.10E+00	1.31E+00	1.95E+00
	34	9.23E-01	8.87E-01	9.23E-01	1.21E+00	1.85E+00
	35	9.59E-01	9.95E-01	9.24E-01	1.28E+00	1.67E+00
	36	9.23E-01	1.14E+00	1.35E+00	1.63E+00	3.31E+00
	1	9.93E-01	9.22E-01	8.16E-01	9.24E-01	1.03E+00
	2	7.80E-01	7.44E-01	7.45E-01	7.81E-01	9.21E-01
<b>Biased Statistics</b>						
	Average Biased	9.66E-01	1.03E+00	1.11E+00	1.36E+00	2.11E+00
	Std Dev Biased	5.83E-02	9.75E-02	1.97E-01	1.64E-01	6.76E-01
	Ps90%/90% (+KTL) Biased	1.13E+00	1.30E+00	1.65E+00	1.81E+00	3.96E+00
	Ps90%/90% (-KTL) Biased	8.06E-01	7.62E-01	5.75E-01	9.13E-01	2.57E-01
	<b>Specification MAX</b>	<b>2.00E+00</b>	<b>2.00E+00</b>	<b>2.00E+00</b>	<b>3.00E+00</b>	<b>5.00E+00</b>
	Status	PASS	PASS	PASS	PASS	PASS

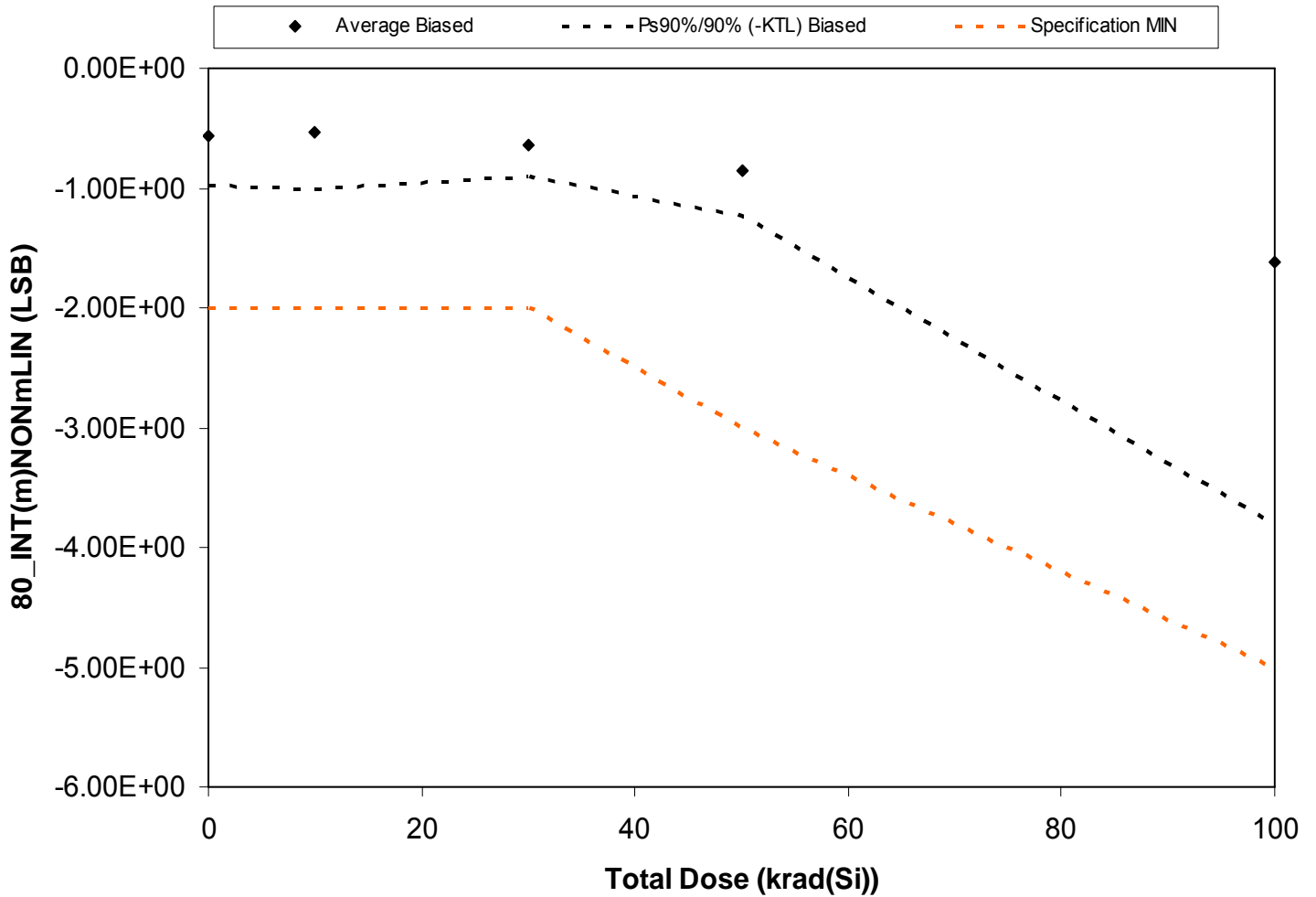


Figure 5.78. Plot of 80\_INT(m)NONmLIN (LSB) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.78. Raw data for 80\_INT(m)NONmLIN (LSB) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

80_INT(m)NONmLIN (LSB)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	-7.81E-01	-6.74E-01	-7.45E-01	-1.03E+00	-1.07E+00
32	-5.68E-01	-3.90E-01	-5.32E-01	-7.81E-01	-1.28E+00
34	-3.90E-01	-3.19E-01	-5.68E-01	-6.75E-01	-1.53E+00
35	-6.04E-01	-6.39E-01	-6.75E-01	-9.23E-01	-1.21E+00
36	-4.62E-01	-6.75E-01	-7.10E-01	-8.88E-01	-3.02E+00
1	-7.09E-01	-8.51E-01	-9.23E-01	-6.04E-01	-6.38E-01
2	-3.90E-01	-4.61E-01	-4.26E-01	-2.49E-01	-4.25E-01
<b>Biased Statistics</b>					
Average Biased	-5.61E-01	-5.39E-01	-6.46E-01	-8.59E-01	-1.62E+00
Std Dev Biased	1.49E-01	1.71E-01	9.19E-02	1.36E-01	8.01E-01
Ps90%/90% (+KTL) Biased	-1.51E-01	-6.98E-02	-3.94E-01	-4.86E-01	5.75E-01
Ps90%/90% (-KTL) Biased	-9.71E-01	-1.01E+00	-8.98E-01	-1.23E+00	-3.82E+00
<b>Specification MIN</b>	<b>-2.00E+00</b>	<b>-2.00E+00</b>	<b>-2.00E+00</b>	<b>-3.00E+00</b>	<b>-5.00E+00</b>
Status	PASS	PASS	PASS	PASS	PASS

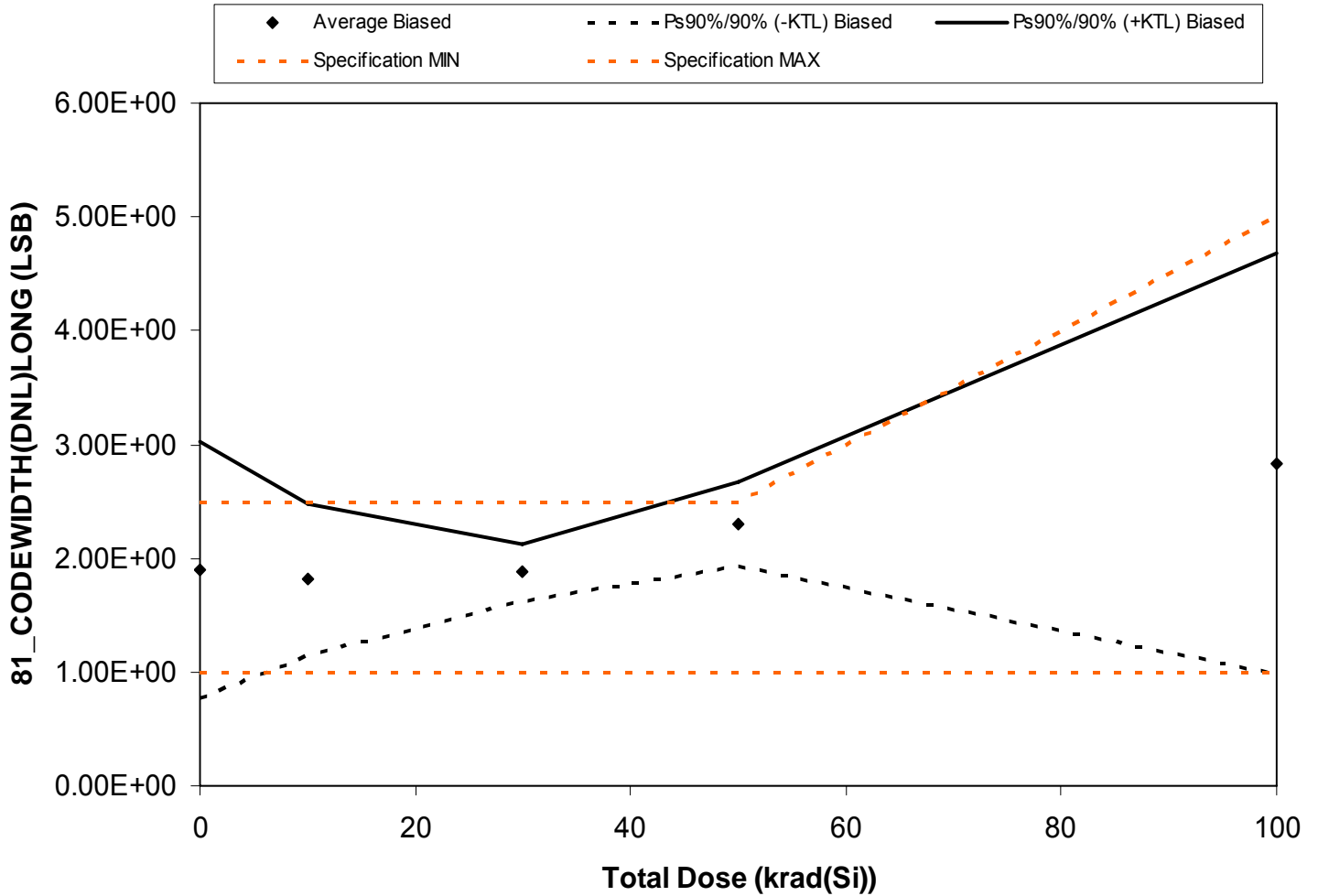


Figure 5.79. Plot of 81\_CODEWIDTH(DNL)LONG (LSB) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.79. Raw data for 81\_CODEWIDTH(DNL)LONG (LSB) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

81_CODEWIDTH(DNL)LONG (LSB)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	2.24E+00	2.17E+00	1.81E+00	2.10E+00	2.38E+00
32	1.60E+00	1.56E+00	1.81E+00	2.41E+00	2.63E+00
34	1.56E+00	1.67E+00	1.92E+00	2.24E+00	2.45E+00
35	1.67E+00	1.71E+00	1.85E+00	2.34E+00	2.67E+00
36	2.45E+00	1.95E+00	2.02E+00	2.42E+00	4.02E+00
1	2.24E+00	2.34E+00	2.38E+00	2.38E+00	2.23E+00
2	1.63E+00	1.63E+00	1.60E+00	1.63E+00	1.52E+00
<b>Biased Statistics</b>					
Average Biased	1.90E+00	1.81E+00	1.88E+00	2.30E+00	2.83E+00
Std Dev Biased	4.11E-01	2.45E-01	9.09E-02	1.36E-01	6.74E-01
Ps90%/90% (+KTL) Biased	3.03E+00	2.48E+00	2.13E+00	2.67E+00	4.68E+00
Ps90%/90% (-KTL) Biased	7.77E-01	1.14E+00	1.63E+00	1.93E+00	9.80E-01
<b>Specification MIN</b>	<b>1.00E+00</b>	<b>1.00E+00</b>	<b>1.00E+00</b>	<b>1.00E+00</b>	<b>1.00E+00</b>
Status	PASS	PASS	PASS	PASS	PASS
<b>Specification MAX</b>	<b>2.50E+00</b>	<b>2.50E+00</b>	<b>2.50E+00</b>	<b>2.50E+00</b>	<b>5.00E+00</b>
Status	PASS	PASS	PASS	PASS	PASS

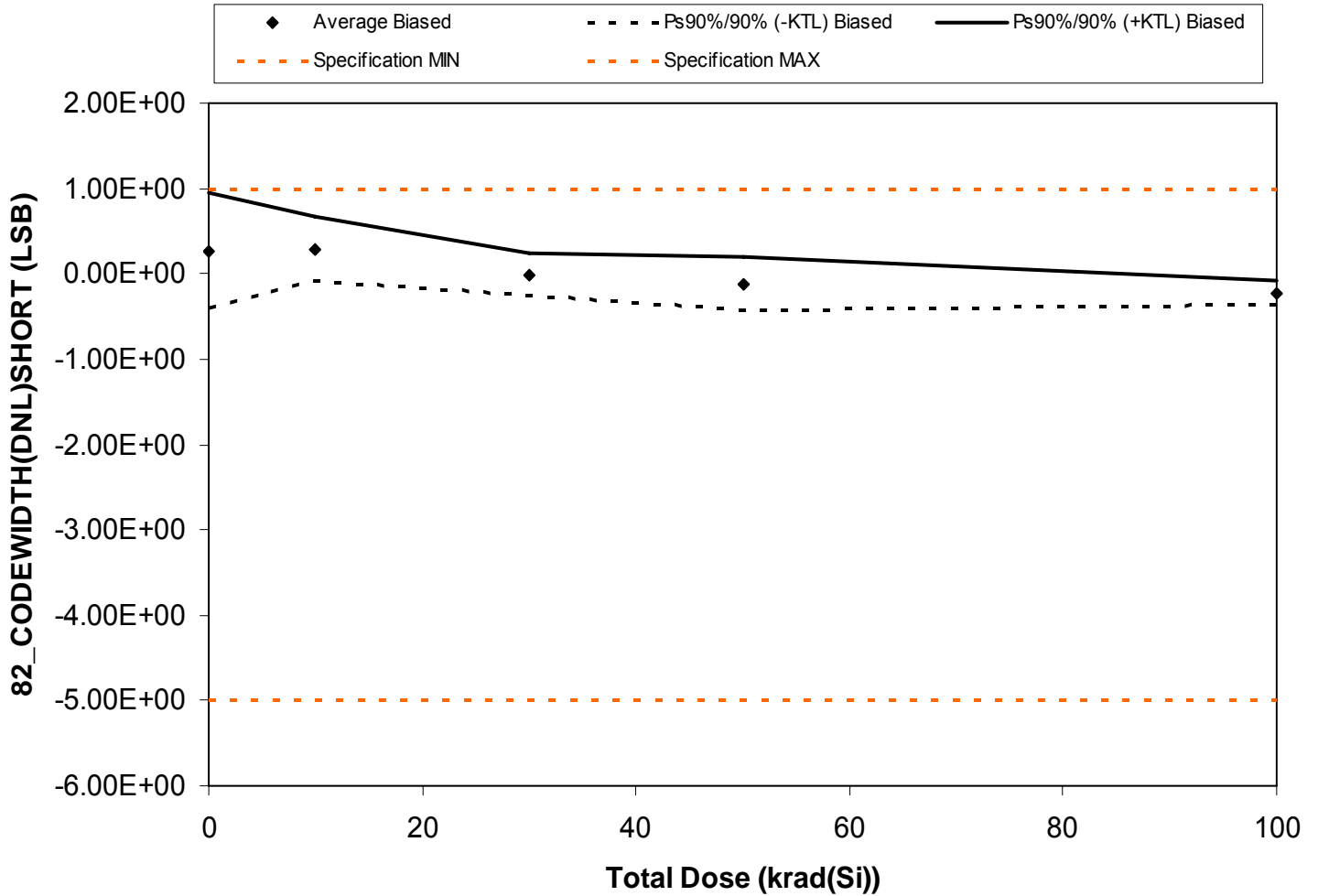


Figure 5.80. Plot of 82\_CODEWIDTH(DNL)SHORT (LSB) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.80. Raw data for 82\_CODEWIDTH(DNL)SHORT (LSB) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

82_CODEWIDTH(DNL)SHORT (LSB)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	-3.50E-02	1.42E-01	1.42E-01	7.10E-02	-1.42E-01
32	4.61E-01	3.90E-01	-7.10E-02	-1.42E-01	-2.13E-01
34	4.26E-01	4.26E-01	-7.10E-02	-1.78E-01	-2.13E-01
35	4.62E-01	3.55E-01	-3.60E-02	-2.13E-01	-2.49E-01
36	3.60E-02	1.42E-01	0.00E+00	-1.07E-01	-2.84E-01
1	1.06E-01	0.00E+00	-3.50E-02	-7.10E-02	-7.10E-02
2	4.25E-01	3.54E-01	3.19E-01	4.62E-01	3.90E-01
<b>Biased Statistics</b>					
Average Biased	2.70E-01	2.91E-01	-7.20E-03	-1.14E-01	-2.20E-01
Std Dev Biased	2.48E-01	1.38E-01	8.84E-02	1.11E-01	5.27E-02
Ps90%/90% (+KTL) Biased	9.49E-01	6.70E-01	2.35E-01	1.90E-01	-7.56E-02
Ps90%/90% (-KTL) Biased	-4.09E-01	-8.83E-02	-2.50E-01	-4.17E-01	-3.65E-01
<b>Specification MIN</b>	<b>-5.00E+00</b>	<b>-5.00E+00</b>	<b>-5.00E+00</b>	<b>-5.00E+00</b>	<b>-5.00E+00</b>
Status	PASS	PASS	PASS	PASS	PASS
<b>Specification MAX</b>	<b>1.00E+00</b>	<b>1.00E+00</b>	<b>1.00E+00</b>	<b>1.00E+00</b>	<b>1.00E+00</b>
Status	PASS	PASS	PASS	PASS	PASS

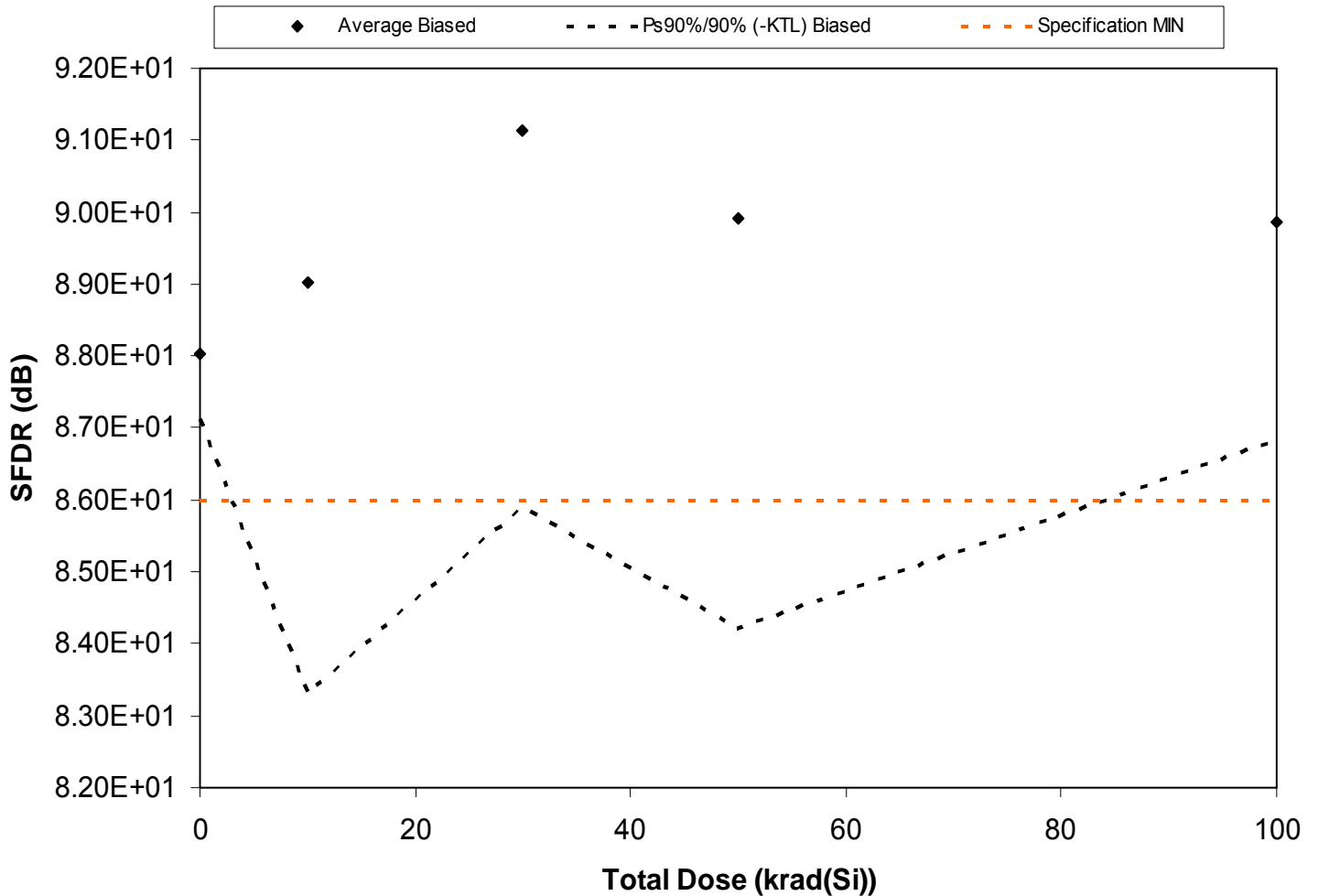


Figure 5.81. Plot of SFDR (dB) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.81. Raw data for SFDR (dB) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

SFDR (dB)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	8.78E+01	8.85E+01	8.77E+01	8.78E+01	9.08E+01
32	8.78E+01	8.81E+01	9.23E+01	9.10E+01	8.98E+01
34	8.78E+01	8.78E+01	9.17E+01	9.18E+01	9.06E+01
35	8.82E+01	9.27E+01	9.19E+01	9.14E+01	9.02E+01
36	8.85E+01	8.80E+01	9.21E+01	8.76E+01	8.80E+01
1	9.18E+01	8.78E+01	8.82E+01	8.73E+01	9.24E+01
2	8.89E+01	8.79E+01	8.83E+01	8.82E+01	8.81E+01
<b>Biased Statistics</b>					
Average Biased	8.80E+01	8.90E+01	9.11E+01	8.99E+01	8.99E+01
Std Dev Biased	3.28E-01	2.09E+00	1.91E+00	2.07E+00	1.11E+00
Ps90%/90% (+KTL) Biased	8.89E+01	9.48E+01	9.64E+01	9.56E+01	9.29E+01
Ps90%/90% (-KTL) Biased	8.71E+01	8.33E+01	8.59E+01	8.42E+01	8.68E+01
<b>Specification MIN</b>	<b>8.60E+01</b>	<b>8.60E+01</b>	<b>8.60E+01</b>	<b>8.60E+01</b>	<b>8.60E+01</b>
Status	PASS	PASS	PASS	PASS	PASS

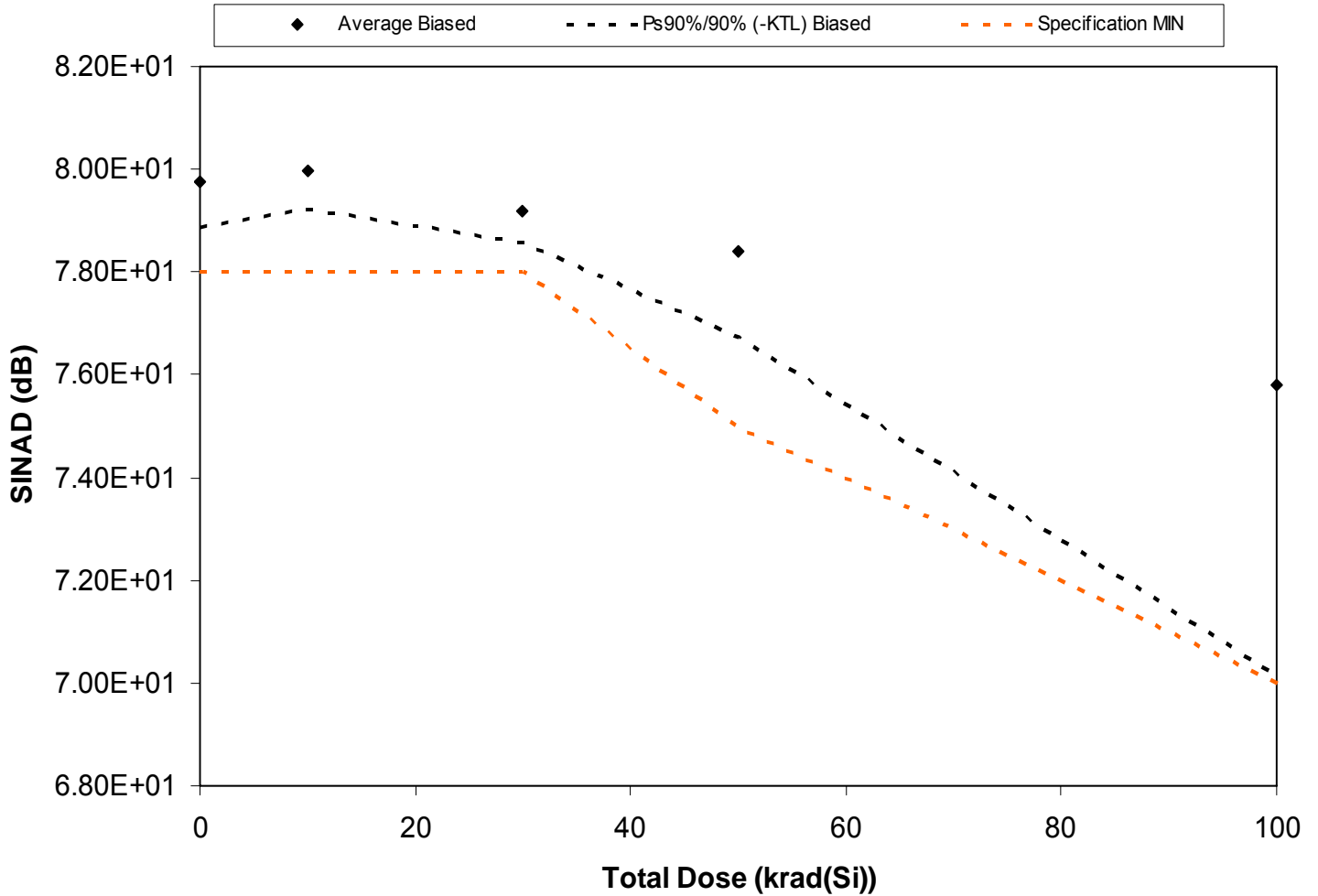


Figure 5.82. Plot of SINAD (dB) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.82. Raw data for SINAD (dB) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

SINAD (dB)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	7.96E+01	7.97E+01	7.91E+01	7.88E+01	7.70E+01
32	7.96E+01	8.03E+01	7.94E+01	7.85E+01	7.66E+01
34	8.03E+01	8.02E+01	7.93E+01	7.86E+01	7.63E+01
35	7.98E+01	8.01E+01	7.94E+01	7.87E+01	7.70E+01
36	7.95E+01	7.96E+01	7.89E+01	7.73E+01	7.21E+01
1	7.95E+01	7.96E+01	7.94E+01	7.95E+01	7.96E+01
2	8.03E+01	8.04E+01	8.03E+01	8.03E+01	8.02E+01
<b>Biased Statistics</b>					
Average Biased	7.98E+01	8.00E+01	7.92E+01	7.84E+01	7.58E+01
Std Dev Biased	3.24E-01	2.81E-01	2.28E-01	6.05E-01	2.06E+00
Ps90%/90% (+KTL) Biased	8.06E+01	8.07E+01	7.98E+01	8.01E+01	8.14E+01
Ps90%/90% (-KTL) Biased	7.89E+01	7.92E+01	7.86E+01	7.67E+01	7.01E+01
<b>Specification MIN</b>	<b>7.80E+01</b>	<b>7.80E+01</b>	<b>7.80E+01</b>	<b>7.50E+01</b>	<b>7.00E+01</b>
Status	PASS	PASS	PASS	PASS	PASS

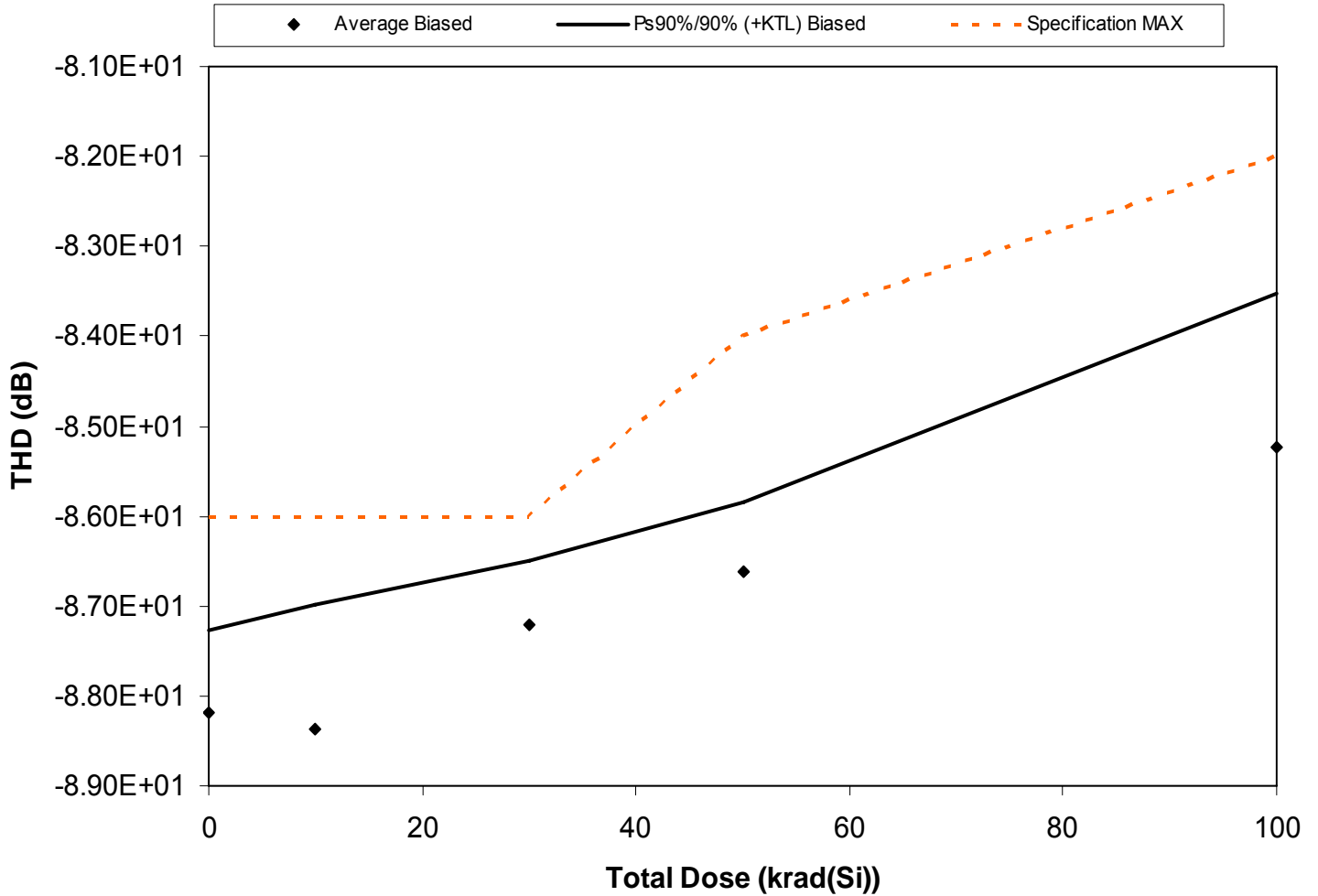


Figure 5.83. Plot of THD (dB) versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias and the black lines (solid and/or dashed) are the average of the data points after application of the KTL statistics on the samples irradiated under electrical bias. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



Table 5.83. Raw data for THD (dB) versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

THD (dB)	Total Dose (krad(Si))				
	0	10	30	50	100
Device					
31	-8.83E+01	-8.88E+01	-8.76E+01	-8.70E+01	-8.53E+01
32	-8.84E+01	-8.85E+01	-8.73E+01	-8.68E+01	-8.56E+01
34	-8.84E+01	-8.82E+01	-8.73E+01	-8.67E+01	-8.53E+01
35	-8.76E+01	-8.76E+01	-8.70E+01	-8.63E+01	-8.58E+01
36	-8.83E+01	-8.88E+01	-8.70E+01	-8.64E+01	-8.42E+01
1	-8.75E+01	-8.84E+01	-8.81E+01	-8.83E+01	-8.80E+01
2	-8.84E+01	-8.88E+01	-8.82E+01	-8.88E+01	-8.79E+01
<b>Biased Statistics</b>					
Average Biased	-8.82E+01	-8.84E+01	-8.72E+01	-8.66E+01	-8.52E+01
Std Dev Biased	3.33E-01	5.05E-01	2.58E-01	2.82E-01	6.17E-01
Ps90%/90% (+KTL) Biased	-8.73E+01	-8.70E+01	-8.65E+01	-8.59E+01	-8.35E+01
Ps90%/90% (-KTL) Biased	-8.91E+01	-8.98E+01	-8.79E+01	-8.74E+01	-8.69E+01
<b>Specification MAX</b>	<b>-8.60E+01</b>	<b>-8.60E+01</b>	<b>-8.60E+01</b>	<b>-8.40E+01</b>	<b>-8.20E+01</b>
Status	PASS	PASS	PASS	PASS	PASS



## **6.0. Summary / Conclusions**

The total ionizing dose testing described in this final report was performed using the facilities at Radiation Assured Devices' Longmire Laboratories in Colorado Springs, CO. The high dose rate total ionizing dose (TID) source is a JLSA 84-21 irradiator modified to provide a panoramic exposure. The Co-60 rods are held in the base of the irradiator heavily shielded by lead, during the radiation exposures the rod is raised by an electronic timer/controller and the exposure is performed in air. The dose rate for this irradiator in this configuration ranges from  $<1\text{rad(Si)/s}$  to a maximum of approximately  $120\text{rad(Si)/s}$ , determined by the distance from the source.

The parametric data was obtained as read and record and all the raw data plus an attributes summary are contained in this report as well as in a separate Excel file. The attributes data contains the average, standard deviation and the average with the KTL values applied. The KTL value used in this work is 2.742 per MIL-HDBK-814 using one sided tolerance limits of 90/90 and a 5-piece sample size. The 90/90 KTL values were selected to match the statistical levels specified in the MIL-PRF-38535 sampling plan for the qualification of a radiation hardness assured (RHA) component. Note that the following criterion must be met for a device to pass the RLAT: following the radiation exposure each of the 5 pieces irradiated under electrical bias shall pass the specification value. The KTL statistics are included in this report for reference only. If any of the 5 pieces irradiated under electrical bias exceed the datasheet specifications, then the lot could be logged as a failure.

Based on the criterion established above, the units-under-test (from the lot date code / traceability information provided on the first page of this report) PASSED to the maximum tested total dose of  $100\text{krad(Si)}$  with the all of the units-under-test remaining within their post-irradiation datasheet limits.



**Appendix A: Photograph of Sample Unit-Under-Test to Show Device Traceability**





## Appendix B: TID Bias Connections

### Biased Samples:

FUNCTION	PIN NUMBER	BIAS CONNECTIONS DURING IRRADIATION
+A <sub>IN</sub>	1	+2.5V, 1000pF Ceramic to -A <sub>IN</sub>
-A <sub>IN</sub>	2	GND
V <sub>REF</sub>	3	10μF Ceramic to GND
REFCOMP	4	10μF Ceramic to GND
AGND	5	GND
D13 (MSB)	6	Open
D12	7	Open
D11	8	Open
D10	9	Open
D9	10	Open
D8	11	Open
D7	12	Open
D6	13	Open
DGND	14	GND
D5	15	Open
D4	16	Open
D3	17	Open
D2	18	Open
D1	19	Open
D0	20	Open
SHDN/	21	+5.5 V ± 0.15 V
RD/	22	GND
CONVST/	23	500 kHz Square Wave @ 5 % Duty Cycle
CS/	24	GND
BUSY/	25	Open
V <sub>SS</sub>	26	-5.5 V ± 0.15 V, 10μF Ceramic to GND
DV <sub>DD</sub>	27	Pin 28
AV <sub>DD</sub>	28	+5.5 V ± 0.15 V, 10μF Ceramic to GND



## 28-Pin Flat Pack (F)

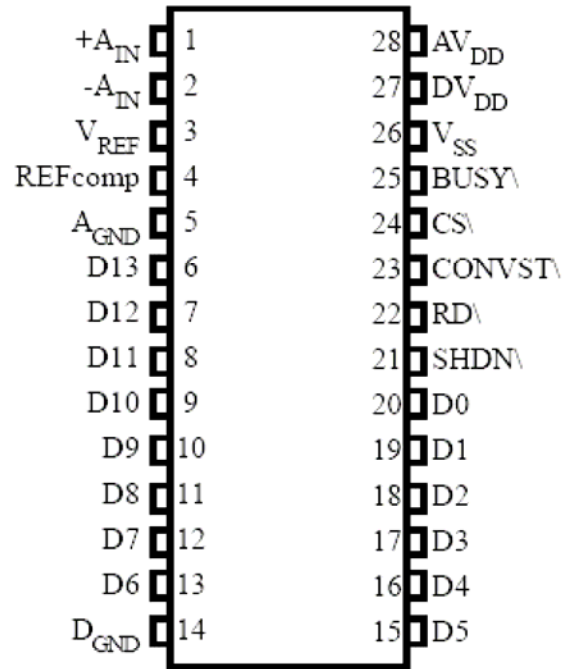


Figure B.1. RAD1419 28-Pin Flat pack package drawing (for reference only).



## **Appendix C: Electrical Test Parameters and Conditions**

All electrical tests for this device are performed on one of Radiation Assured Device's LTS2020 Test Systems. The LTS2020 Test System is a programmable parametric tester that provides parameter measurements for a variety of digital, analog and mixed signal products including voltage regulators, voltage comparators, D to A and A to D converters. The LTS2020 Test System achieves accuracy and sensitivity through the use of software self-calibration and an internal relay matrix with separate family boards and custom personality adapter boards. The tester uses this relay matrix to connect the required test circuits, select the appropriate voltage / current sources and establish the needed measurement loops for all the tests performed. The measured parameters and test conditions are shown in Table C.1.

A listing of the measurement precision/resolution for each parameter is shown in Table C.2. The precision/resolution values were obtained either from test data or from the DAC resolution of the LTS-2020. To generate the precision/resolution shown in Table C.2, one of the units-under-test was tested repetitively (a total of 10-times with re-insertion between tests) to obtain the average test value and standard deviation. Using this test data MIL-HDBK-814 90/90 KTL statistics were applied to the measured standard deviation to generate the final measurement range. This value encompasses the precision/resolution of all aspects of the test system, including the LTS2020 mainframe, family board, socket assembly and DUT board as well as insertion error. In some cases, the measurement resolution is limited by the internal DACs, which results in a measured standard deviation of zero. In these instances the precision/resolution will be reported back as the LSB of the DAC.



Table C.1. Measured parameters and test conditions for the RAD1419.

<b>Parameter</b>	<b>Test Condition</b>
Power Supply Current	SHDN=V <sub>CC</sub> , CS=0
Power Supply Current, Nap Mode	SHDN=0 CS=0
Power Supply Current, Sleep Mode	SHDN=0 CS=1
Power Supply Current	SHDN=1 CS=0
Power Supply Current, Nap Mode	SHDN=0 CS=0
Power Supply Current, Sleep Mode	SHDN=0 CS=1
VREF	IOUT = 0
VOL D0-D13	IOUT = 1.6mA
VOH D0-D13	IOUT = -200μA
VOH0p2MA_BUSY	IOUT = -200μA
IOZH D0-D13	VOUT=5V, CS/ = High
IOZLVO D0-13	VOUT=0V, CS/ = High
IIL CS	VIN=0V
IIL RD	VIN=0V
IIL SHDN	VIN=0V
IIL CONVST	VIN=0V
IIH CS	VIN=5V
IIH RD	VIN=5V
IIH SHDN	VIN=5V
IIH CONVST	VIN=5V
+Analog Input Leakage Current	VIN=2.5V
-Analog Input Leakage Current	VIN=-2.5V
Bipolar Offset	VDD = 5V, VSS = - 5V
Bipolar Gain (Full Scale) Error	VDD = 5V, VSS = - 5V
Integral Linearity Error-Positive	VDD = 5V, VSS = - 5V
Integral Linearity Error-Negative	VDD = 5V, VSS = - 5V
Differential Linearity Error-Long	VDD = 5V, VSS = - 5V
Differential Linearity Error-Short	VDD = 5V, VSS = - 5V
SFDR	100kHz Input Signal
THD	100kHz Input Signal, First 5 Harmonics
SINAD	100kHz Input Signal



Table C.2. Measured parameters, pre-irradiation specifications and measurement resolution/precision for the RAD1419.

Parameter	Spec Min	Spec Max	Precision (stdev*2.065)
ICCSHDN=1CS=0		2.00E-02	±6.14E-05
ICCSHDN=0CS=0		3.00E-03	±8.71E-06
ICCSHDN=0CS=1		3.00E-03	±1.07E-05
IEESHDN=1CS=0	-3.00E-02		±5.40E-05
IEESHDN=0CS=0	-5.00E-04		±8.26E-06
IEESHDN=0CS=1	-1.00E-04		±1.81E-07
VREF	2.48E+00	2.52E+00	±9.67E-16
VOL1p6MA_D0		4.00E-01	±1.63E-03
VOL1p6MA_D1		4.00E-01	±1.46E-03
VOL1p6MA_D2		4.00E-01	±1.75E-03
VOL1p6MA_D3		4.00E-01	±1.63E-03
VOL1p6MA_D4		4.00E-01	±1.17E-03
VOL1p6MA_D5		4.00E-01	±1.63E-03
VOL1p6MA_D6		4.00E-01	±1.39E-03
VOL1p6MA_D7		4.00E-01	±1.52E-03
VOL1p6MA_D8		4.00E-01	±1.17E-03
VOL1p6MA_D9		4.00E-01	±1.52E-03
VOL1p6MA_D10		4.00E-01	±1.52E-03
VOL1p6MA_D11		4.00E-01	±1.31E-03
VOL1p6MA_D12		4.00E-01	±1.17E-03
VOL1p6MA_D13		4.00E-01	±1.52E-03
VOH0p2MA_D0	4.00E+00		±4.27E-03
VOH0p2MA_D1	4.00E+00		±3.99E-03
VOH0p2MA_D2	4.00E+00		±4.35E-03
VOH0p2MA_D3	4.00E+00		±3.99E-03
VOH0p2MA_D4	4.00E+00		±3.99E-03
VOH0p2MA_D5	4.00E+00		±3.48E-03
VOH0p2MA_D6	4.00E+00		±4.27E-03
VOH0p2MA_D7	4.00E+00		±3.48E-03
VOH0p2MA_D8	4.00E+00		±3.48E-03
VOH0p2MA_D9	4.00E+00		±4.27E-03
VOH0p2MA_D10	4.00E+00		±2.61E-03
VOH0p2MA_D11	4.00E+00		±1.00E-03
VOH0p2MA_D12	4.00E+00		±1.00E-03
VOH0p2MA_BUSY	4.00E+00		±1.00E-03



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VOH0p2MA_D13	4.00E+00		±3.48E-03
IOZHVO=5V_D0	-1.00E-05	1.00E-05	±2.95E-09
IOZHVO=5V_D1	-1.00E-05	1.00E-05	±5.22E-09
IOZHVO=5V_D2	-1.00E-05	1.00E-05	±3.54E-09
IOZHVO=5V_D3	-1.00E-05	1.00E-05	±3.52E-09
IOZHVO=5V_D4	-1.00E-05	1.00E-05	±3.92E-09
IOZHVO=5V_D5	-1.00E-05	1.00E-05	±4.89E-09
IOZHVO=5V_D6	-1.00E-05	1.00E-05	±4.87E-09
IOZHVO=5V_D7	-1.00E-05	1.00E-05	±5.08E-09
IOZHVO=5V_D8	-1.00E-05	1.00E-05	±6.06E-09
IOZHVO=5V_D9	-1.00E-05	1.00E-05	±5.78E-09
IOZHVO=5V_D10	-1.00E-05	1.00E-05	±3.65E-09
IOZHVO=5V_D11	-1.00E-05	1.00E-05	±5.06E-09
IOZHVO=5V_D12	-1.00E-05	1.00E-05	±4.27E-09
IOZHVO=5V_D13	-1.00E-05	1.00E-05	±4.91E-09
IOZLVO=0V_D0	-1.00E-05	1.00E-05	±3.48E-09
IOZLVO=0V_D1	-1.00E-05	1.00E-05	±4.89E-09
IOZLVO=0V_D2	-1.00E-05	1.00E-05	±3.89E-09
IOZLVO=0V_D3	-1.00E-05	1.00E-05	±3.43E-09
IOZLVO=0V_D4	-1.00E-05	1.00E-05	±4.27E-09
IOZLVO=0V_D5	-1.00E-05	1.00E-05	±3.26E-09
IOZLVO=0V_D6	-1.00E-05	1.00E-05	±3.57E-09
IOZLVO=0V_D7	-1.00E-05	1.00E-05	±2.27E-09
IOZLVO=0V_D8	-1.00E-05	1.00E-05	±2.58E-09
IOZLVO=0V_D9	-1.00E-05	1.00E-05	±3.43E-09
IOZLVO=0V_D10	-1.00E-05	1.00E-05	±3.40E-09
IOZLVO=0V_D11	-1.00E-05	1.00E-05	±2.39E-09
IOZLVO=0V_D12	-1.00E-05	1.00E-05	±2.83E-09
IOZLVO=0V_D13	-1.00E-05	1.00E-05	±3.65E-09
III0V_CS	-1.00E-05	1.00E-05	±3.48E-09
III0V_RD	-1.00E-05	1.00E-05	±2.76E-09
III0V_SHDN	-1.00E-05	1.00E-05	±3.38E-09
III0V_CONVST	-1.00E-05	1.00E-05	±1.63E-09
IIH5V_CS	-1.00E-05	1.00E-05	±1.63E-09
IIH5V_RD	-1.00E-05	1.00E-05	±2.93E-09
IIH5V_SHDN	-1.00E-05	1.00E-05	±1.44E-09
IIH5V_CONVST	-1.00E-05	1.00E-05	±3.62E-09
IINp2p5VAIN	-1.00E-06	1.00E-06	±4.65E-08
IINm2p5VAIN	-1.00E-06	1.00E-06	±4.15E-08
BIPOLAROFFSET	-2.00E+01	2.00E+01	±1.65E-01
BIPOLARGAINERROR	-6.00E+01	6.00E+01	±2.43E-01
INT(p)NONmLIN		2.00E+00	±1.79E-01
INT(m)NONmLIN	-2.00E+00		±1.34E-01

**An ISO 9001:2008 and DSCC Certified Company**



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CODEWIDTH(DNL)LONG	1.00E+00	2.50E+00	±2.04E-01
CODEWIDTH(DNL)SHORT	-5.00E+00	1.00E+00	±9.99E-02
SFDR	8.60E+01		±3.96E+00
THD		-8.60E+01	±4.10E-01
SINAD	7.80E+01		±1.14E-01

**An ISO 9001:2008 and DSCC Certified Company**



## Appendix D: List of Figures used in Section 5: Total Ionizing Dose Test Results

- 5.1 1\_ICCSDN=1CS=0 (A)
- 5.2 2\_ICCSDN=0CS=0 (A)
- 5.3 3\_ICCSDN=0CS=1 (A)
- 5.4 4\_IEESHDN=1CS=0 (A)
- 5.5 5\_IEESHDN=0CS=0 (A)
- 5.6 6\_IEESHDN=0CS=1 (A)
- 5.7 7\_VREF (V)
- 5.8 8\_CONVERTTTOmFS
- 5.9 9\_VOL1p6MA\_D0 (V)
- 5.10 10\_VOL1p6MA\_D1 (V)
- 5.11 11\_VOL1p6MA\_D2 (V)
- 5.12 12\_VOL1p6MA\_D3 (V)
- 5.13 13\_VOL1p6MA\_D4 (V)
- 5.14 14\_VOL1p6MA\_D5 (V)
- 5.15 15\_VOL1p6MA\_D6 (V)
- 5.16 16\_VOL1p6MA\_D7 (V)
- 5.17 17\_VOL1p6MA\_D8 (V)
- 5.18 18\_VOL1p6MA\_D9 (V)
- 5.19 19\_VOL1p6MA\_D10 (V)
- 5.20 20\_VOL1p6MA\_D11 (V)
- 5.21 21\_VOL1p6MA\_D12 (V)
- 5.22 22\_VOL1p6MA\_D13 (V)
- 5.23 23\_CONVERTTTOpFS
- 5.24 24\_VOH0p2MA\_D0 (V)
- 5.25 25\_VOH0p2MA\_D1 (V)
- 5.26 26\_VOH0p2MA\_D2 (V)
- 5.27 27\_VOH0p2MA\_D3 (V)
- 5.28 28\_VOH0p2MA\_D4 (V)
- 5.29 29\_VOH0p2MA\_D5 (V)
- 5.30 30\_VOH0p2MA\_D6 (V)
- 5.31 31\_VOH0p2MA\_D7 (V)
- 5.32 32\_VOH0p2MA\_D8 (V)
- 5.33 33\_VOH0p2MA\_D9 (V)
- 5.34 34\_VOH0p2MA\_D10 (V)
- 5.35 35\_VOH0p2MA\_D11 (V)
- 5.36 36\_VOH0p2MA\_D12 (V)
- 5.37 37\_VOH0p2MA\_BUSY (V)
- 5.38 38\_VOH0p2MA\_D13 (V)
- 5.39 39\_IOZHVO=5V\_D0 (A)



- 5.40 40\_IOZHVO=5V\_D1 (A)
- 5.41 41\_IOZHVO=5V\_D2 (A)
- 5.42 42\_IOZHVO=5V\_D3 (A)
- 5.43 43\_IOZHVO=5V\_D4 (A)
- 5.44 44\_IOZHVO=5V\_D5 (A)
- 5.45 45\_IOZHVO=5V\_D6 (A)
- 5.46 46\_IOZHVO=5V\_D7 (A)
- 5.47 47\_IOZHVO=5V\_D8 (A)
- 5.48 48\_IOZHVO=5V\_D9 (A)
- 5.49 49\_IOZHVO=5V\_D10 (A)
- 5.50 50\_IOZHVO=5V\_D11 (A)
- 5.51 51\_IOZHVO=5V\_D12 (A)
- 5.52 52\_IOZHVO=5V\_D13 (A)
- 5.53 53\_IOZLVO=0V\_D0 (A)
- 5.54 54\_IOZLVO=0V\_D1 (A)
- 5.55 55\_IOZLVO=0V\_D2 (A)
- 5.56 56\_IOZLVO=0V\_D3 (A)
- 5.57 57\_IOZLVO=0V\_D4 (A)
- 5.1 1\_ICCSDN=1CS=0 (A)
- 5.2 2\_ICCSDN=0CS=0 (A)
- 5.3 3\_ICCSDN=0CS=1 (A)
- 5.4 4\_IEESHDN=1CS=0 (A)
- 5.5 5\_IEESHDN=0CS=0 (A)
- 5.6 6\_IEESHDN=0CS=1 (A)
- 5.7 7\_VREF (V)
- 5.8 9\_VOL1p6MA\_D0 (V)
- 5.9 10\_VOL1p6MA\_D1 (V)
- 5.10 11\_VOL1p6MA\_D2 (V)
- 5.11 12\_VOL1p6MA\_D3 (V)
- 5.12 13\_VOL1p6MA\_D4 (V)
- 5.13 14\_VOL1p6MA\_D5 (V)
- 5.14 15\_VOL1p6MA\_D6 (V)
- 5.15 16\_VOL1p6MA\_D7 (V)
- 5.16 17\_VOL1p6MA\_D8 (V)
- 5.17 18\_VOL1p6MA\_D9 (V)
- 5.18 19\_VOL1p6MA\_D10 (V)
- 5.19 20\_VOL1p6MA\_D11 (V)
- 5.20 21\_VOL1p6MA\_D12 (V)
- 5.21 22\_VOL1p6MA\_D13 (V)
- 5.22 24\_VOH0p2MA\_D0 (V)
- 5.23 25\_VOH0p2MA\_D1 (V)



5.24 26\_VOH0p2MA\_D2 (V)  
5.25 27\_VOH0p2MA\_D3 (V)  
5.26 28\_VOH0p2MA\_D4 (V)  
5.27 29\_VOH0p2MA\_D5 (V)  
5.28 30\_VOH0p2MA\_D6 (V)  
5.29 31\_VOH0p2MA\_D7 (V)  
5.30 32\_VOH0p2MA\_D8 (V)  
5.31 33\_VOH0p2MA\_D9 (V)  
5.32 34\_VOH0p2MA\_D10 (V)  
5.33 35\_VOH0p2MA\_D11 (V)  
5.34 36\_VOH0p2MA\_D12 (V)  
5.35 37\_VOH0p2MA\_BUSY (V)  
5.36 38\_VOH0p2MA\_D13 (V)  
5.37 39\_IOZHVO=5V\_D0 (A)  
5.38 40\_IOZHVO=5V\_D1 (A)  
5.39 41\_IOZHVO=5V\_D2 (A)  
5.40 42\_IOZHVO=5V\_D3 (A)  
5.41 43\_IOZHVO=5V\_D4 (A)  
5.42 44\_IOZHVO=5V\_D5 (A)  
5.43 45\_IOZHVO=5V\_D6 (A)  
5.44 46\_IOZHVO=5V\_D7 (A)  
5.45 47\_IOZHVO=5V\_D8 (A)  
5.46 48\_IOZHVO=5V\_D9 (A)  
5.47 49\_IOZHVO=5V\_D10 (A)  
5.48 50\_IOZHVO=5V\_D11 (A)  
5.49 51\_IOZHVO=5V\_D12 (A)  
5.50 52\_IOZHVO=5V\_D13 (A)  
5.51 53\_IOZLVO=0V\_D0 (A)  
5.52 54\_IOZLVO=0V\_D1 (A)  
5.53 55\_IOZLVO=0V\_D2 (A)  
5.54 56\_IOZLVO=0V\_D3 (A)  
5.55 57\_IOZLVO=0V\_D4 (A)  
5.56 58\_IOZLVO=0V\_D5 (A)  
5.57 59\_IOZLVO=0V\_D6 (A)  
5.58 60\_IOZLVO=0V\_D7 (A)  
5.59 61\_IOZLVO=0V\_D8 (A)  
5.60 62\_IOZLVO=0V\_D9 (A)  
5.61 63\_IOZLVO=0V\_D10 (A)  
5.62 64\_IOZLVO=0V\_D11 (A)  
5.63 65\_IOZLVO=0V\_D12 (A)  
5.64 66\_IOZLVO=0V\_D13 (A)



- 5.65 67\_IIL0V\_CS (A)
- 5.66 68\_IIL0V\_RD (A)
- 5.67 69\_IIL0V\_SHDN (A)
- 5.68 70\_IIL0V\_CONVST (A)
- 5.69 71\_IIH5V\_CS (A)
- 5.70 72\_IIH5V\_RD (A)
- 5.71 73\_IIH5V\_SHDN (A)
- 5.72 74\_IIH5V\_CONVST (A)
- 5.73 75\_IINp2p5VAIN (A)
- 5.74 76\_IINm2p5VAIN (A)
- 5.75 77\_BIPOLAROFFSET (LSB)
- 5.76 78\_BIPOLARGAINERROR (LSB)
- 5.77 79\_INT(p)NONmLIN (LSB)
- 5.78 80\_INT(m)NONmLIN (LSB)
- 5.79 81\_CODEWIDTH(DNL)LONG (LSB)
- 5.80 82\_CODEWIDTH(DNL)SHORT (LSB)
- 5.81 SFDR (dB)
- 5.82 SINAD (dB)
- 5.83 THD (dB)