SINGLE EVENT EFFECTS TEST REPORT ADRF5730-CSL

May 2026

Radiation Test Report	
Product:	ADRF5730-CSL
Effective LET:	≤ 68 MeV-cm^2/mg
Fluence:	1E7 Ions/cm^2
Facilities:	TAMU
Tested:	May 2026

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SEE Test Report for the ADRF5730-CSL – 6-Bit Attenuator – 100MHz to 40GHz

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Test Dates:
TAMU: May 29 and 31, 2026

I. Introduction

The purpose of this test is to determine the Single Event Effects (SEE) susceptibility of the ADRF5730-CSL, a silicon, 6-bit digital attenuator with 31.5 dB attenuation control range in 0.5 dB steps. This device operates from 100 MHz to 40 GHz with better than 4.8 dB of insertion loss and excellent attenuation accuracy. The ADRF5730-CSL has a radio frequency (RF) input power handling capability of 27 dBm average and 30 dBm peak for all states. The ADRF5730-CSL requires a dual supply voltage of +3.3 V and −3.3 V. The device features serial peripheral interface (SPI), parallel mode control, and complementary metal-oxide semiconductor (CMOS)-/low voltage transistor to transistor logic (LVTTL)- compatible controls. Single Event Latch-up (SEL) and Single Event Transients (SET) were verified on June 2026, at the TAMU heavy ion facility.

II. Device Under Test (DUT)

The ADRF5730-CSL is a 6-bit attenuator operating in the range of 100MHz to 40GHz. Four devices were tested.

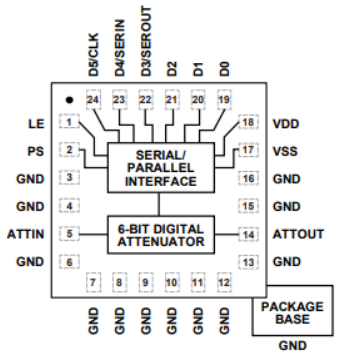


Figure 1: ADRF5730-CSL Block Diagram

Table 1

Part and test information.

Generic Part Number:	ADRF5730-CSL
Date of Test:	May 29 and 31, 2026
Manufacturer:	Analog Devices, Inc.
Die Rev:	ADRF5730_CS
Part Function:	6-bit attenuator operating in the range of 100MHz to 40GHz
Part Technology:	CMOS
Package Style:	24-Terminal LGA
Interconnect:	Flip Chip
Die Thickness:	Thinned to 50µm

III. Test Facilities

The heavy-ion beam testing was carried out at the Texas A&M University K500 (TAMU). The test setup was in an open-air environment.

Facility: TAMU
Cocktail: 24.8 MeV/nuc
Fluence: 1×10^7 cm^{-2} (per run)
Ions: Ag

Table 2
Heavy-ion species, effective linear energy transfer (LET), and location tested.

Ion	Effective LET (MeV·cm^2/mg)
Ag	58.0

IV. Test Method

A. Test Setup

The DUTs were de-processed to thin the die to a total thickness of 50µm. The ADRF5730-CSL was configured as shown in Figure 2. The power supply currents, power supply voltages and RF output were recorded. For SEL testing the power supply voltages were set to nominal plus ten percent as shown in Table 3 and the DUT was heated to high temperature (125°C). For SET testing the supply voltages were set to nominal values minus ten percent as shown in Table 3 at room temperature. The data from the spectrum analyzer, connected to the RF output was recorded in ~110ms - 130ms intervals. The plots show 4 data points around and including the fundamental at ~5MHz +/-151.5kHz as collected during the irradiation with captures before and after the beam was turned on/off. No SET were captured.

Table 3
Test Instrumentation

Name	Configured Values	Equipment
V_{DD}	3.6V (SEL); 3.0V (SET)	Keithley 2230
V_{SS}	-3.6V (SEL); -3.0V (SET)	Keithley 2230
RFIN	5GHz, -38dBm	HMC-T2240
RFOUT	Measured	Field Fox Spectrum Analyzer

Figure 2. ADRF5730-CSL test setup.

B. Irradiation procedure

SEL:

1. The device was powered on and brought up to ~125℃.
2. The software to monitor the supply voltages and currents was turned on.
3. The ion beam was turned on.
4. Once the 1e+07 fluence was reached, the beam was turned off and the software was terminated.

SET:

1. The device was powered on at room temperature
2. The software to monitor the Rf Output was turned on.
3. The ion beam was turned on
4. Once the 1e+07 fluence was reached, the beam was turned off and the software was terminated.

V. Results

SEL – No latch-up or destructive events were observed on the ADRF5730-CSL to the highest effective LET tested at 68 MeV·cm^2/mg. SEL plots are shown in the Appendix.

Table 4
SEL Test Runs

Run	Board Serial Number	Ion	Input Voltage (V_{DD},V_{SS})	Effective LET	Angle	Ave. Flux	Fluence	SEL
#			*V*	*MeV·cm^2/mg*	*degrees*	*#/cm^2/sec*	*total ions*	
48	**1**	**Ag**	**3.6, -3.6**	**58**	**0**	**7.930E+04**	**1.005E+07**	**0**
51	**2**	**Ag**	**3.6, -3.6**	**58**	**0**	**7.080E+04**	**9.966E+06**	**0**
52	**3**	**Ag**	**3.6, -3.6**	**58**	**0**	**8.046E+04**	**9.990E+06**	**0**
54	**4**	**Ag**	**3.6, -3.6**	**58**	**0**	**6.107E+04**	**1.001E+07**	**0**
57	**2**	**Ag**	**3.6, -3.6**	**68**	**30**	**8.573E+04**	**1.003E+07**	**0**
58	**1**	**Ag**	**3.6, -3.6**	**68**	**30**	**9.937E+04**	**9.990E+06**	**0**
60	**3**	**Ag**	**3.6, -3.6**	**68**	**30**	**1.021E+05**	**9.968E+06**	**0**
63	**4**	**Ag**	**3.6, -3.6**	**68**	**30**	**6.985E+04**	**9.988E+06**	**0**

SET – No transients were observed on the ADRF5730-CSL at 58.0 MeV·cm^2/mg. Four devices were tested. The Spectrum Analyzer data was not recorded at 68 MeV·cm^2/mg. We do not expect SET at 68.0 MeV·cm^2/mg but can not guarantee without providing data.

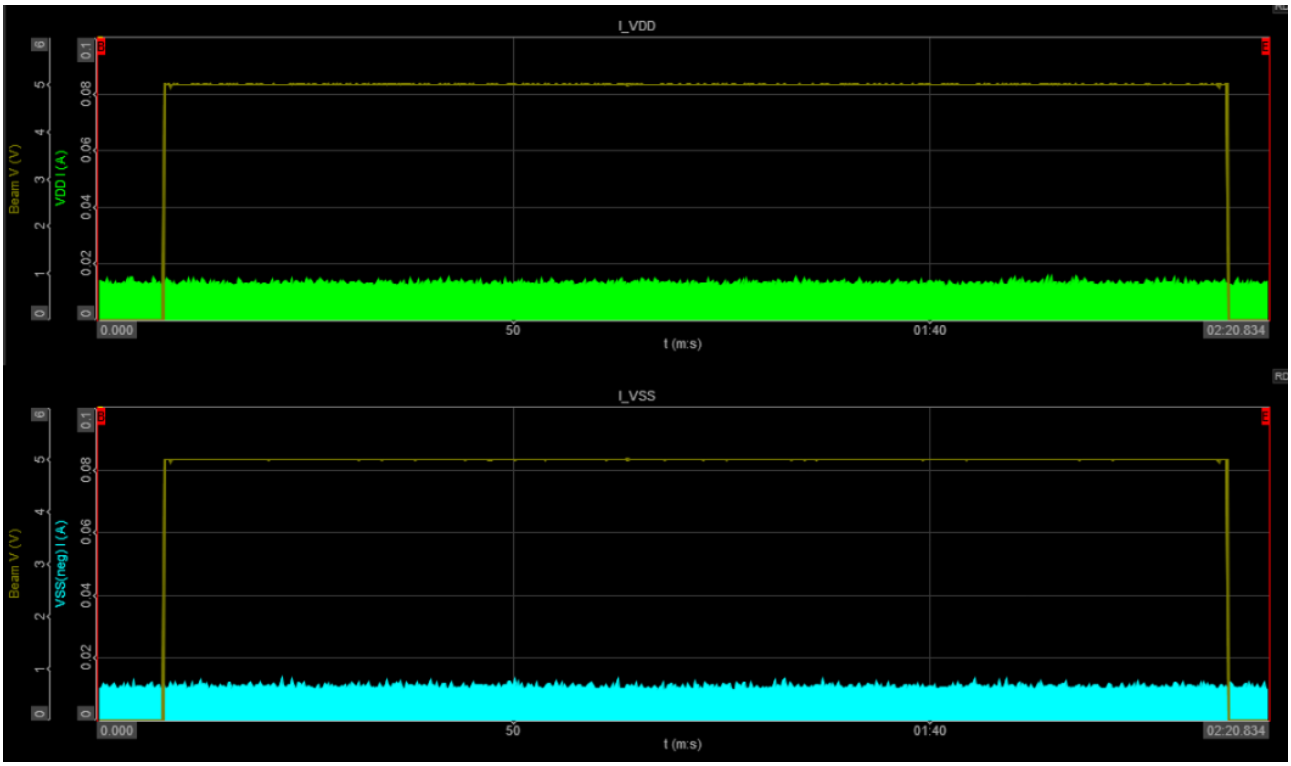
Table 5
SET Test Runs

Run	Board Serial Number	Ion	Input Voltage (V_{DD},V_{SS})	Effective LET	Angle	Ave. Flux	Fluence	SET
#			*V*	*MeV·cm^2/mg*	*degrees*	*#/cm^2/sec*	*total ions*	
44	1	Ag	3.0, -3.0	34.6	0	1.165E+05	1.005E+07	0
45	1	Ag	3.0, -3.0	50	0	9.282E+04	1.000E+07	0
46	1	Ag	3.0, -3.0	58	0	8.376E+04	9.977E+06	0
49	1	Ag	3.0, -3.0	58	0	7.525E+04	9.975E+06	0
50	2	Ag	3.0, -3.0	58	0	7.756E+04	1.002E+07	0
53	3	Ag	3.0, -3.0	58	0	6.934E+04	1.001E+07	0
55	4	Ag	3.0, -3.0	58	0	5.159E+04	1.002E+07	0
56	2	Ag	3.0, -3.0	68	30	7.917E+04	9.975E+06	0
59	1	Ag	3.0, -3.0	68	30	1.034E+05	1.000E+07	0*
61	3	Ag	3.0, -3.0	68	30	8.521E+04	9.970E+06	0*
62	3	Ag	3.0, -3.0	68	30	8.289E+04	1.003E+07	0*
64	4	Ag	3.0, -3.0	68	30	7.699E+04	1.002E+07	0*

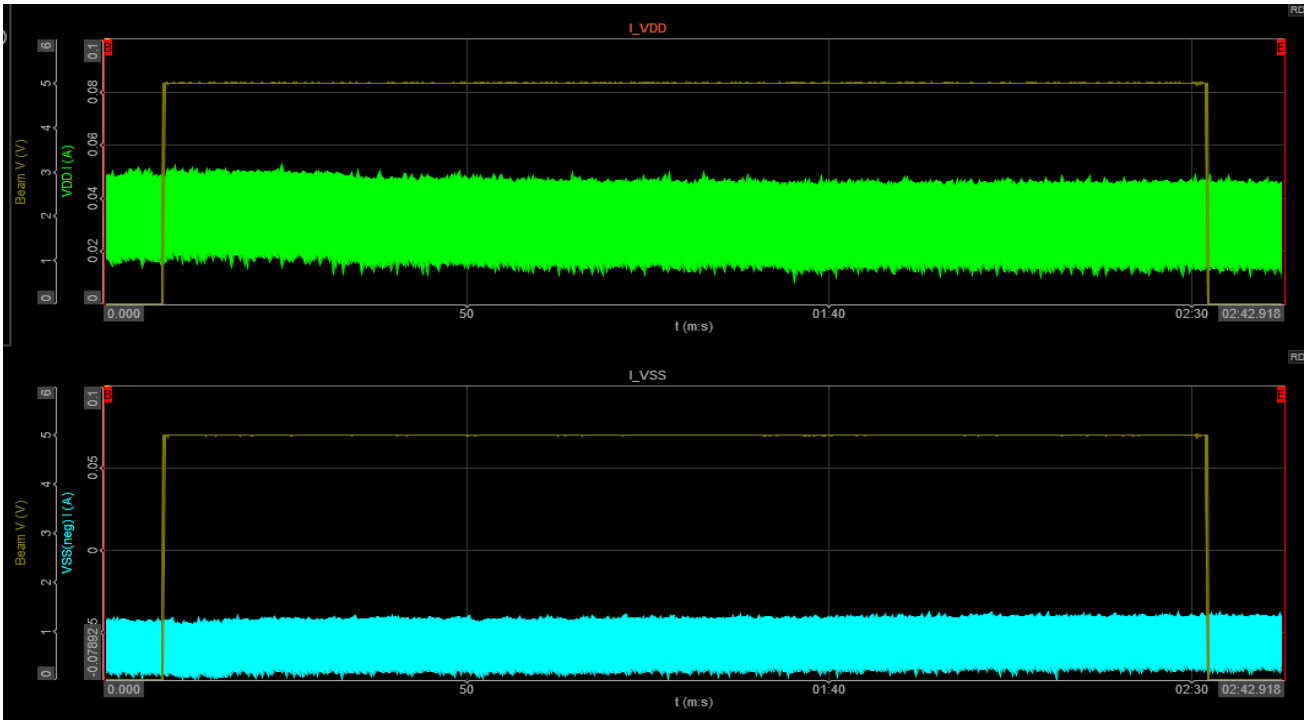
*Data capture was turned off so no data captured.

Appendix:

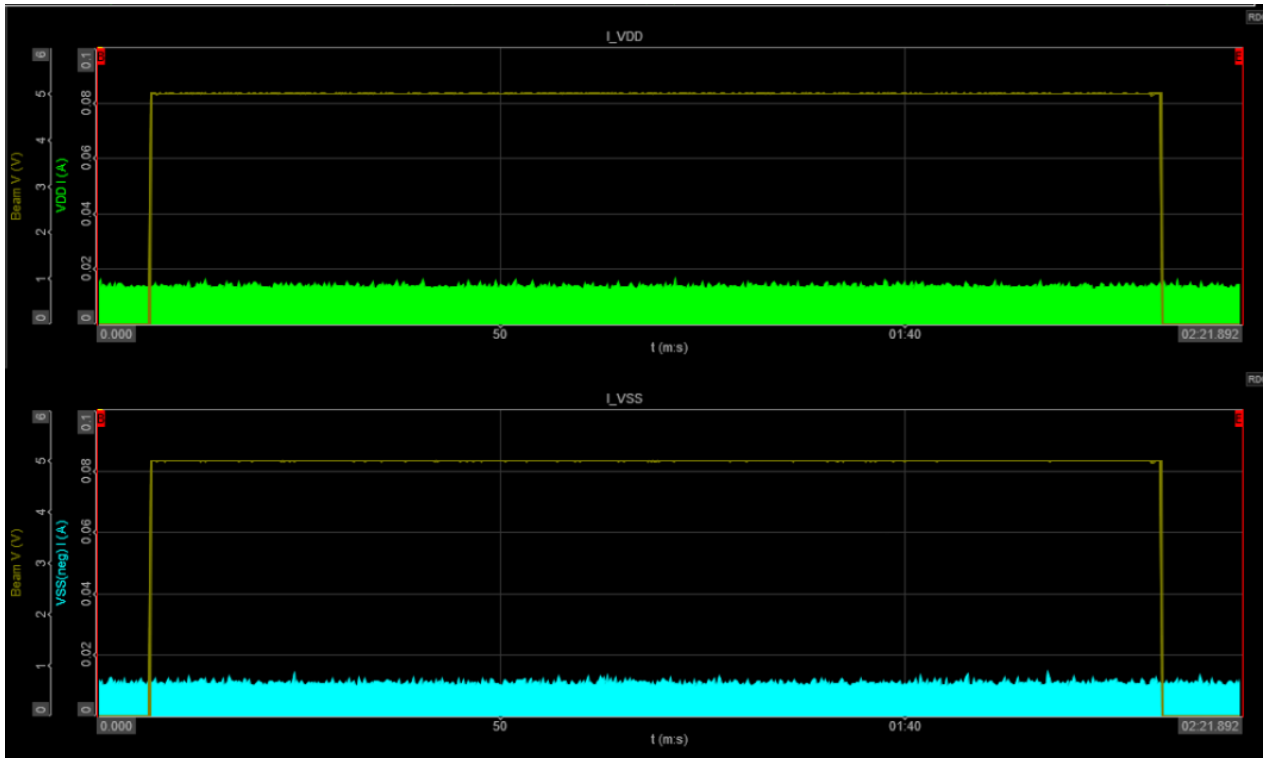
SEL



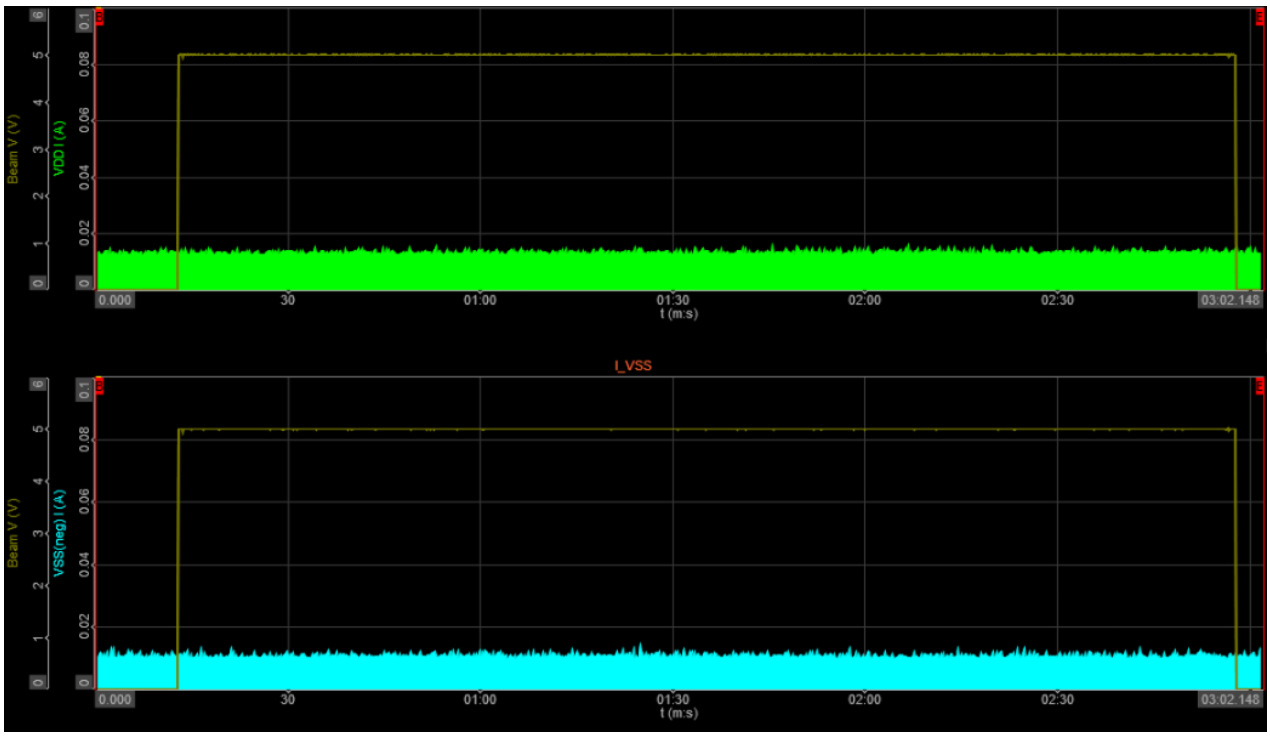
Run 48, Board 1, LET: 58.0 MeV·cm²/mg, RFin:



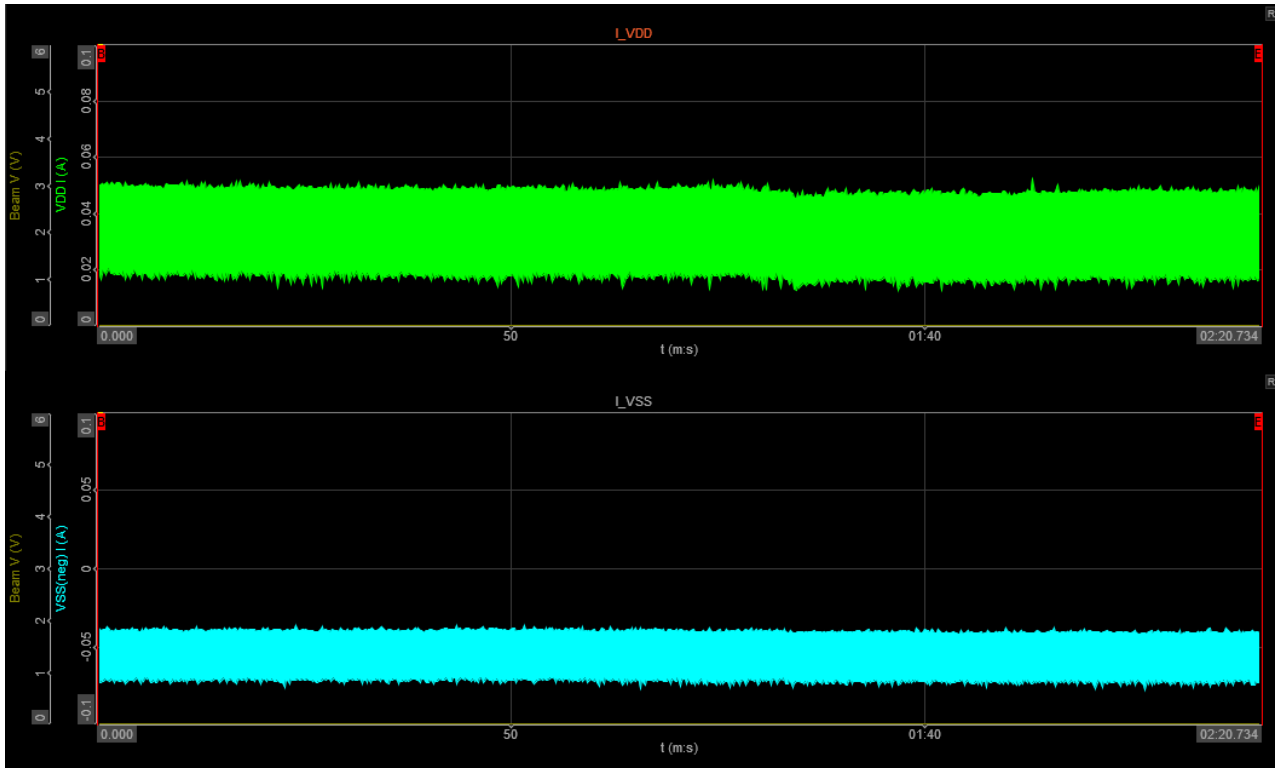
Run 51, Board 2, LET: 58.0 MeV·cm²/mg



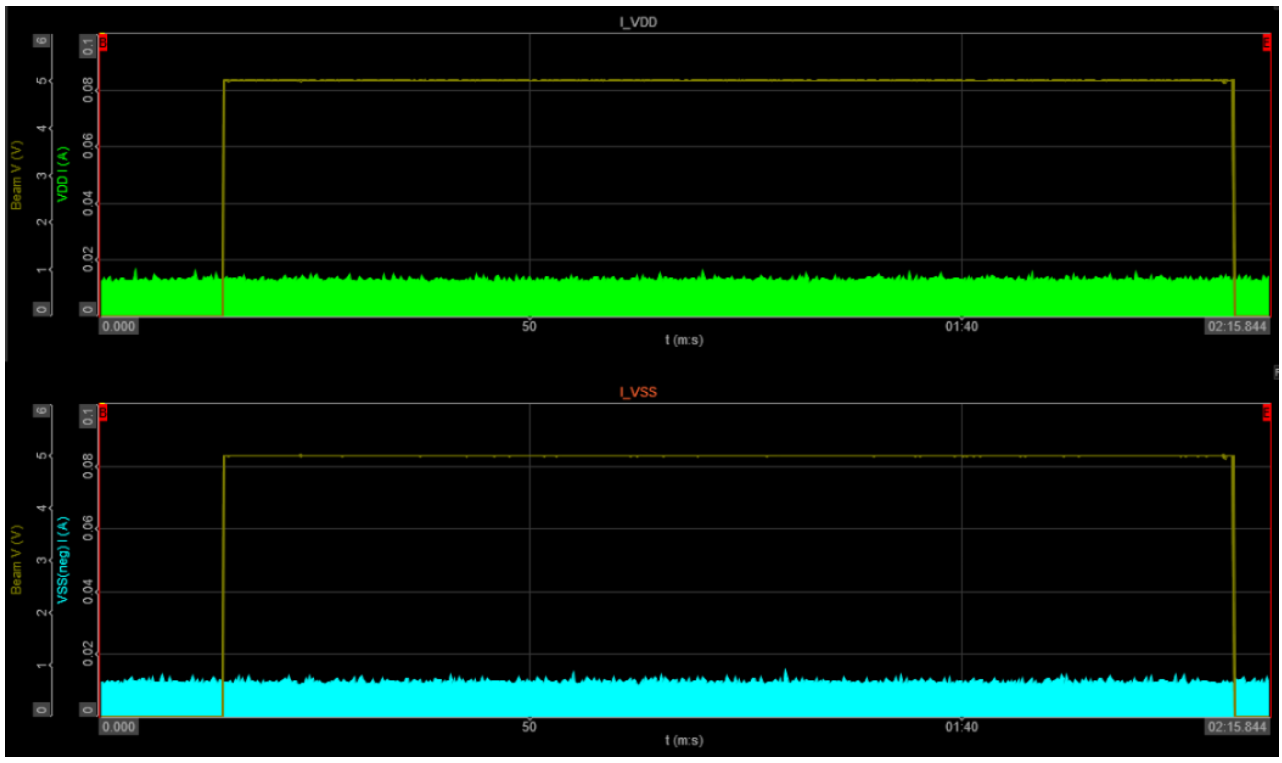
Run 52, Board 3, LET: 58.0 MeV·cm²/mg



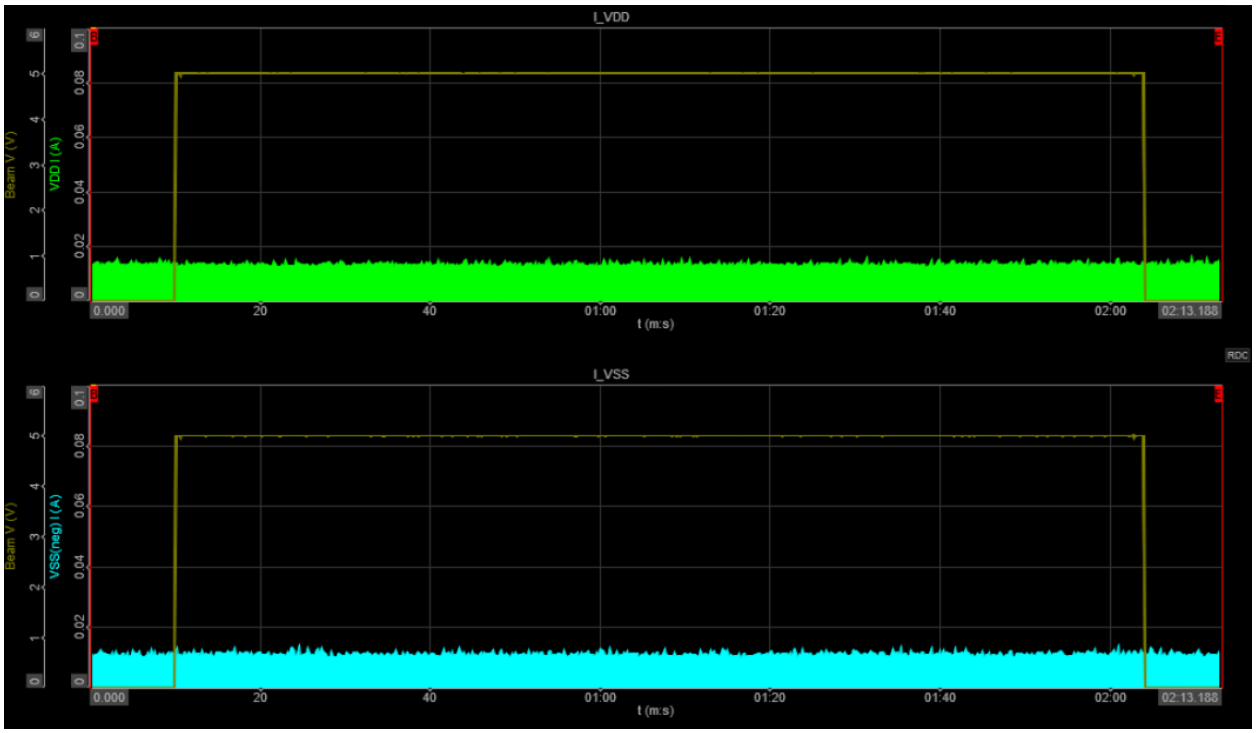
Run 54, Board 4, LET: 58.0 MeV·cm²/mg



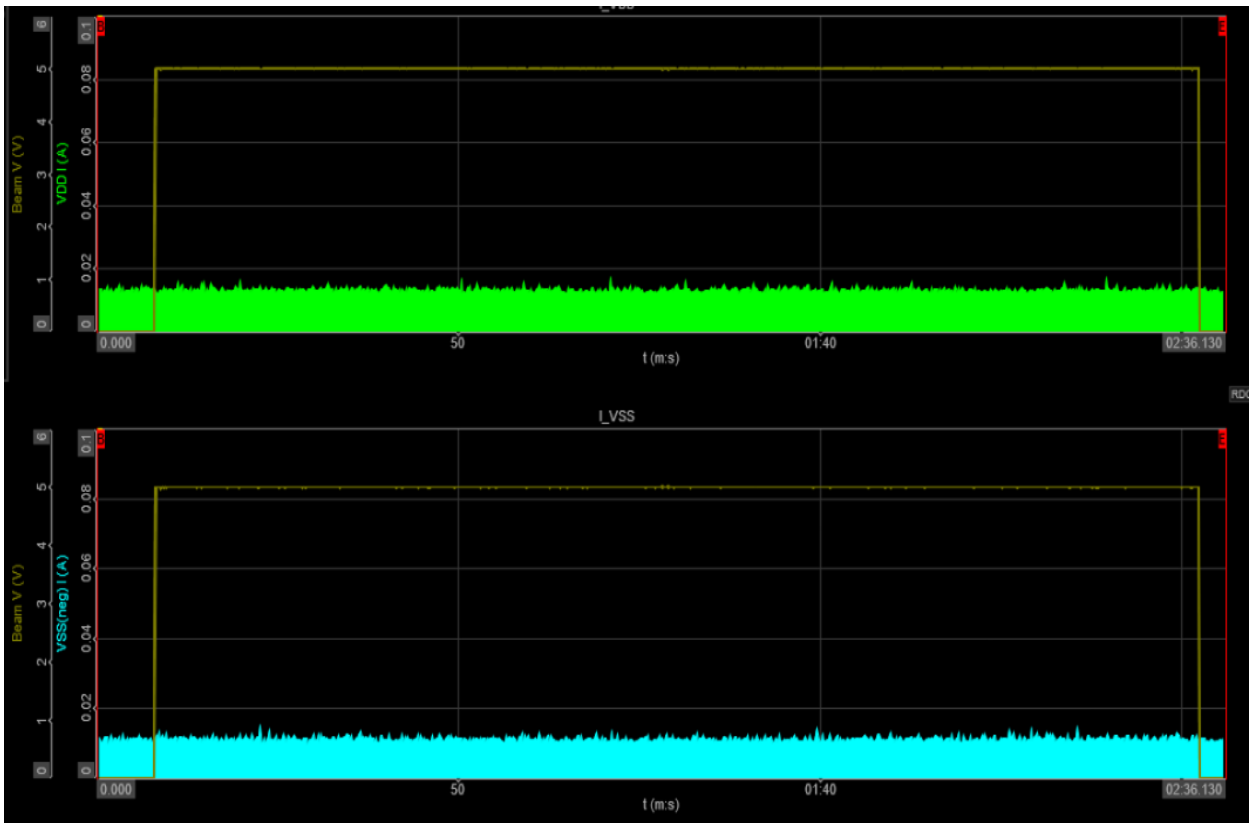
Run 57, Board 2, LET: 68.0 *MeV·cm²/mg*



Run 58, Board 1, LET: 68.0 *MeV·cm²/mg*

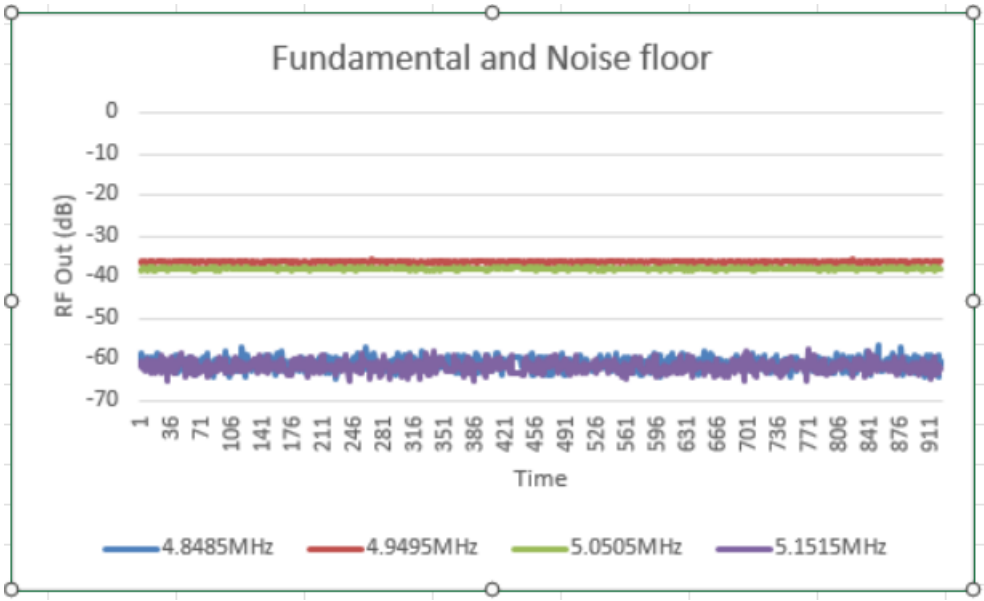


Run 60, Board 3, LET: 68.0 *MeV·cm²/mg*

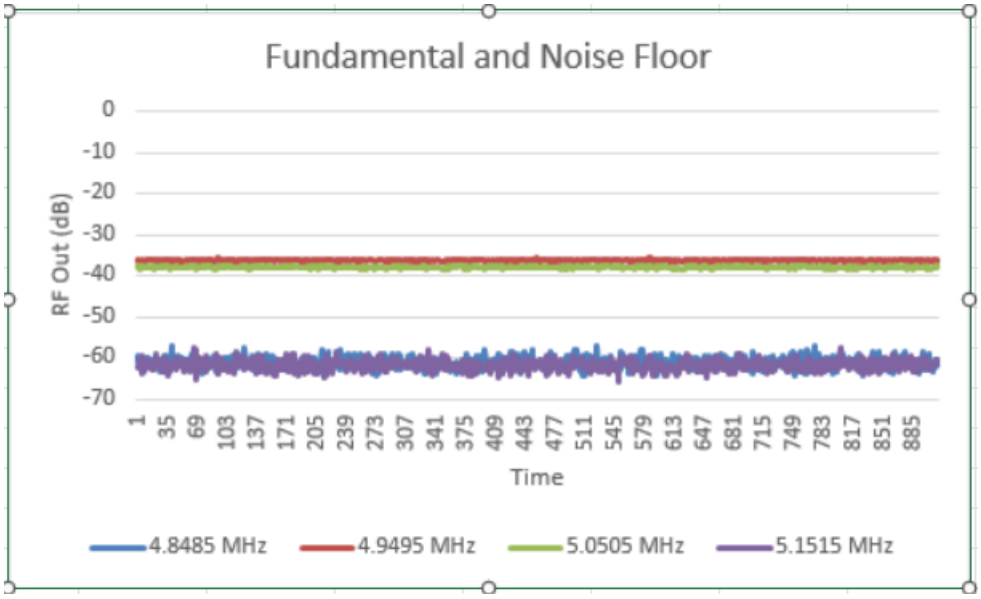


Run 63, Board 4, LET: 68.0 *MeV·cm²/mg*

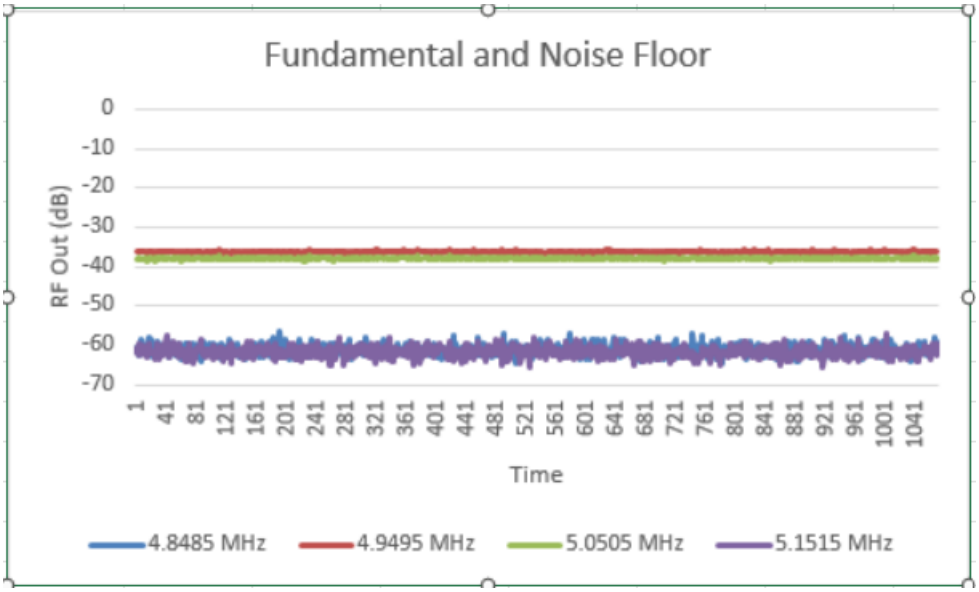
SET



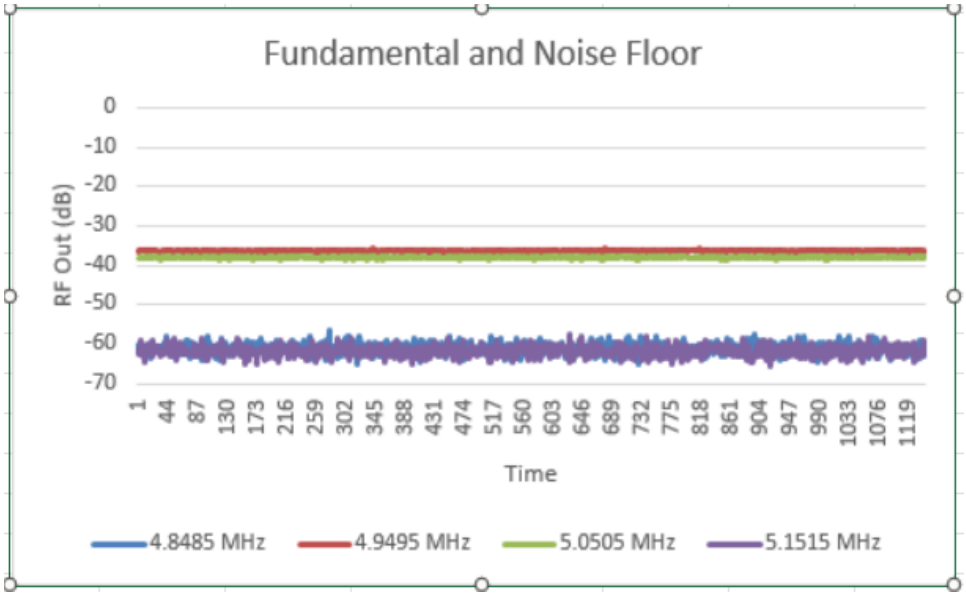
Run 44, Board 1, LET: 34.6 *MeV·cm^2/mg, RFin:5GHz*



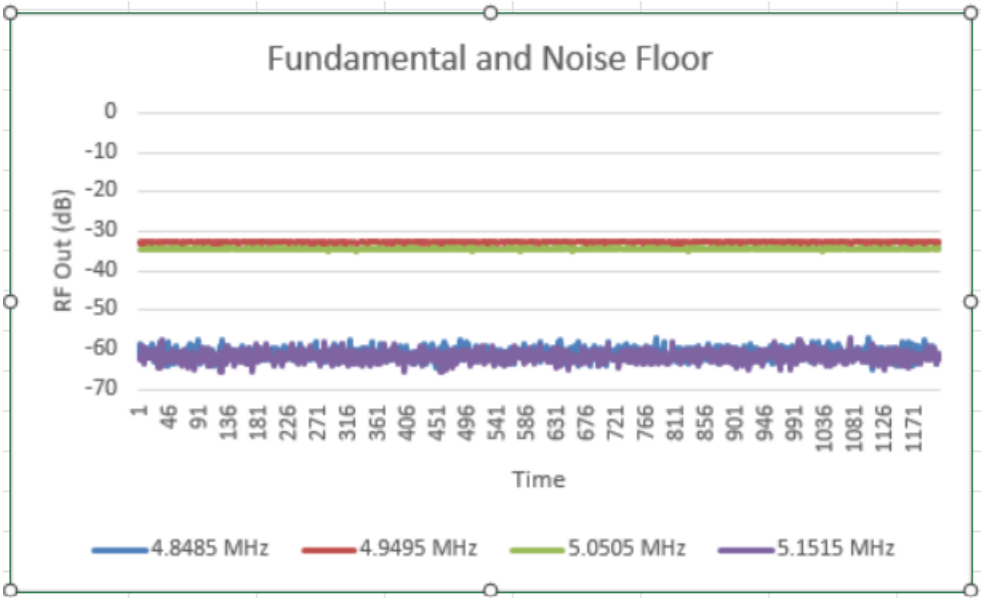
Run 45, Board 1, LET: 50.0 *MeV·cm^2/mg, RFin:5GHz*



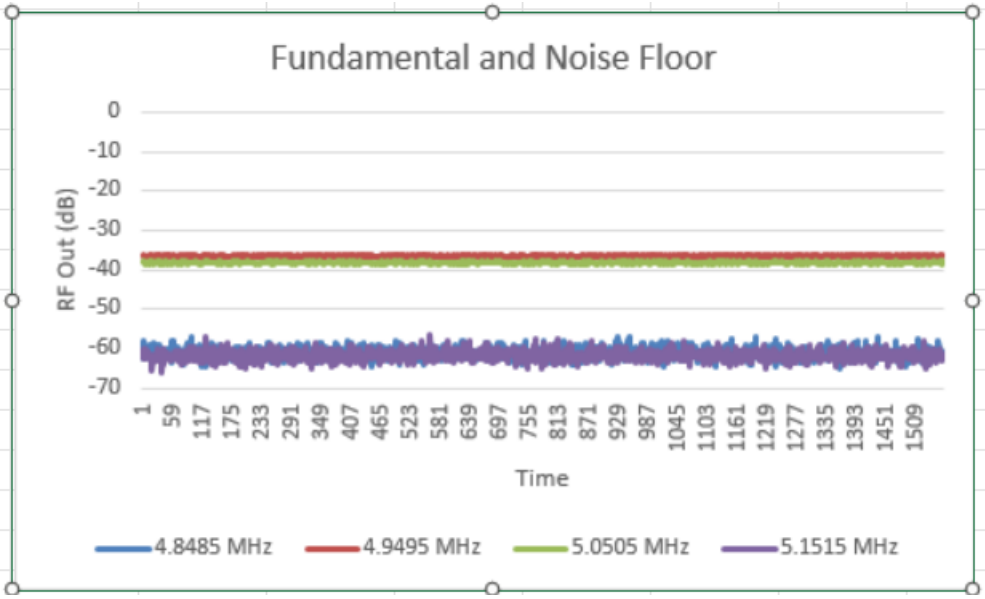
Run 46, Board 1, LET: 58 *MeV·cm²/mg, RFin:5GHz*



Run 50, Board 2, LET: 58 *MeV·cm²/mg, RFin:5GHz*



Run 53, Board 3, LET: 58 *MeV·cm²/mg, RFin:5GHz*



Run 55, Board 4, LET: 58 *MeV·cm²/mg, RFin:5GHz*