SINGLE EVENT EFFECTS TEST REPORT ADL8140-CSL

November 2025

Radiation Test Report	
Product:	ADL8140-CSL
Effective LET:	83.2 MeV-cm^2/mg
Fluence:	1E7 Ions/cm^2
Facilities:	TAMU
Tested:	Nov. 3, 2025

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SEE Test Report for the ADL8140-CSL – 10GHz to 18GHz LNA

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Test Date:
November 3, 2025

I. Introduction

The purpose of this test is to determine the heavy ion-induced Single-Event Effects (SEE) susceptibility of the ADL8140-CSL, a 10GHz – 18GHz LNA.

Single Event Latch-up was evaluated with high supply voltage and high temperature with no latch-up or other destructive SEE events observed to the highest LET tested (83.2 MeV-cm^2/mg). The device was evaluated at 125°C using the TAMU heating system (forced air).

II. Device Under Test

The ADL8140-CSL is a low noise amplifier (LNA) that operates from 10GHz to 18 GHz. Typical gain and noise figure are 27.5 dB and 1 dB, respectively, from 12GHz to 15 GHz. Figure 1 shows a functional block diagram of the device. Table 1 shows the basic part and test details. Detailed device parameters and functional descriptions can be found in the datasheet.

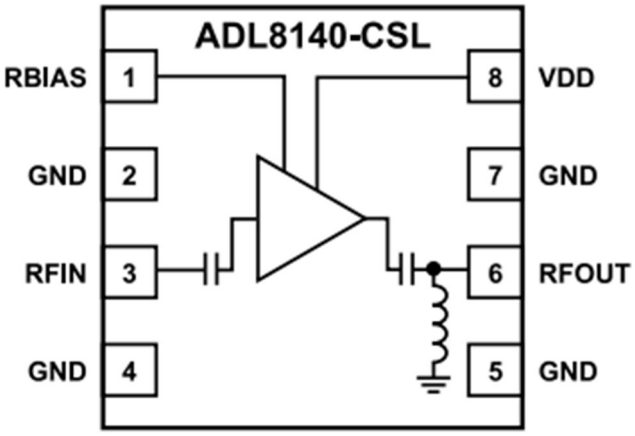

Figure 1. Functional block diagram.

Table 1
Part and test information.

Generic Part Number:	ADL8140
Date of Test:	Nov 3, 2025
Manufacturer:	Analog Devices
Die Revision:	ADL8140
Part Function:	10GHz to 18GHz LNA
Part Technology:	GaAs
Package Style:	8-Ld LFCSP
Interconnect:	Wire-Bonded

III. Test Facilities

The heavy-ion beam testing was carried out at the Texas A&M University Cyclotron Facility. The facility utilizes the K500 cyclotron with a superconducting magnet which generates the magnetic field used to accelerate the ions. The test setup was in an air environment.

Facility: Texas A&M University Cyclotron Facility
Beam: 24.7 A MeV
Flux: up to 1×10^5 $cm^{-2} \cdot s^{-1}$
Fluence: up to 1×10^7 cm^{-2} (perrun)
Ions: Ag

IV. Test Method

A. Test Setup

The device under test (DUT) was chemically de-processed to expose the wire-bonded die. The RF input was set to 14 GHz @ -5dBm using a Hittite HMC-T2240 RF Generator. The power supply to the DUT was set to 1.65V with ~33 mA supply current for SEL and 1.35V with ~29mA supply current for SET. The output was monitored using a Keysight Field Fox Spectrum Analyzer. The power supply current was monitored using Python scripts. The TAMU temp forcing system was used to get the device to 125°C. The test configuration is shown in Figure 2.

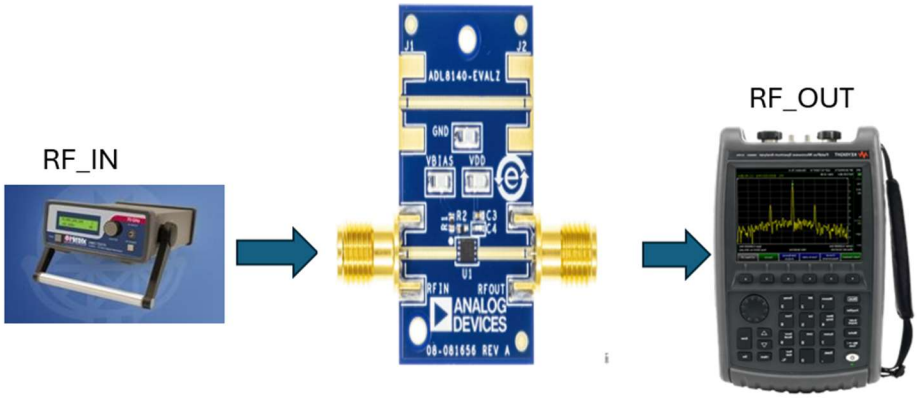

Figure 2: ADL8140 Test Setup

B. Irradiation procedure

1) Turn on power to DUT
2) SEL: Set the temperature of the DUT to 125°C
   SET: Set the temperature of the DUT to room temperature
3) Start power supply current and spectrum analyzer monitoring script
4) Start Beam
5) Stop beam at 1E7 total ions

Test Conditions

Temperature:	**SEL:** 125°C
	SET: 25°C
RF Input Frequency:	14 GHz
Power Supply(s):	**SEL:** 1.65V
	SET: 1.35V
Parameters:	Supply Current
	RF Output
Samples:	4

V. Results

SEL – The ADL8140 did not exhibit SEL at ≤ 83.2 MeV-cm^2/mg out to 1.0E7 ions/cm^2 while heated to 125°C. The test runs are shown below in Table 2. Plots are shown below in Figures 3-6.

Table 2: SEL Test Runs

Run	Dut	ion	LET (MeVcm^2/mg)	Range(um)	Angle(^{o})	TID(Rads)	Flux (ions/cm^{2}s)	Fluence (Ions/cm^2)	SEL
Run 9	1	Xe	83.2	70.5	40	13.3k	7.6e4	9.99e6	0
Run 12	2	Xe	83.2	70.5	40	13.3k	7.04e4	9.97e6	0
Run 14	3	Xe	83.2	70.5	40	13.35k	6.36e4	1.00e7	0
Run 16	4	Xe	83.2	70.5	40	13.38k	8.32e4	9.96e6	0

SET – The ADL8140 did not exhibit SET at ≤ 83.2 MeV-cm^2/mg out to 1.0E7 ions/cm^2 while at 25°C. The test runs are shown below in Table 3. Plots are shown below in Figures 7-10.

Table 3: SET Test Runs

Run	Dut	ion	LET (MeVcm^2/mg)	Range(um)	Angle(^{o})	TID(Rads)	Flux (ions/cm^{2}s)	Fluence (Ions/cm^2)	SET
Run 11	1	Xe	83.2	70.5	40	13.3k	7.6e4	9.99e6	0
Run 13	2	Xe	83.2	70.5	40	13.4k	9.5e4	1.002e7	0
Run 15	3	Xe	83.2	70.5	40	13.38k	9.51e4	1.003e7	0
Run 17	4	Xe	83.2	70.5	40	13.41k	9.06e4	1.005e7	0

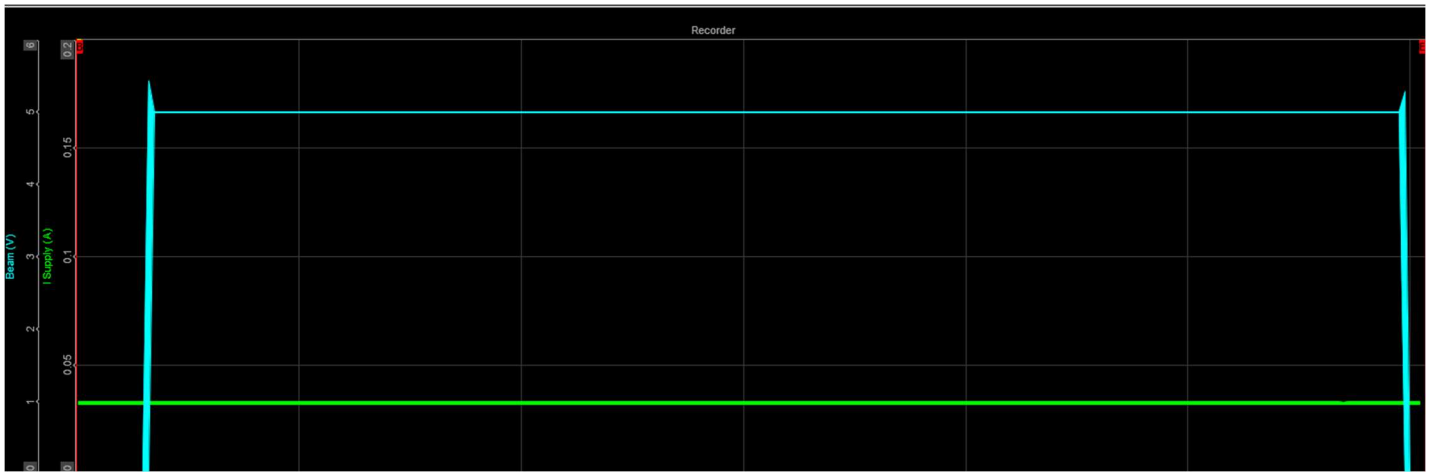

Figure 3: ADL8140 Run 9 Power Supply Current Bd 1

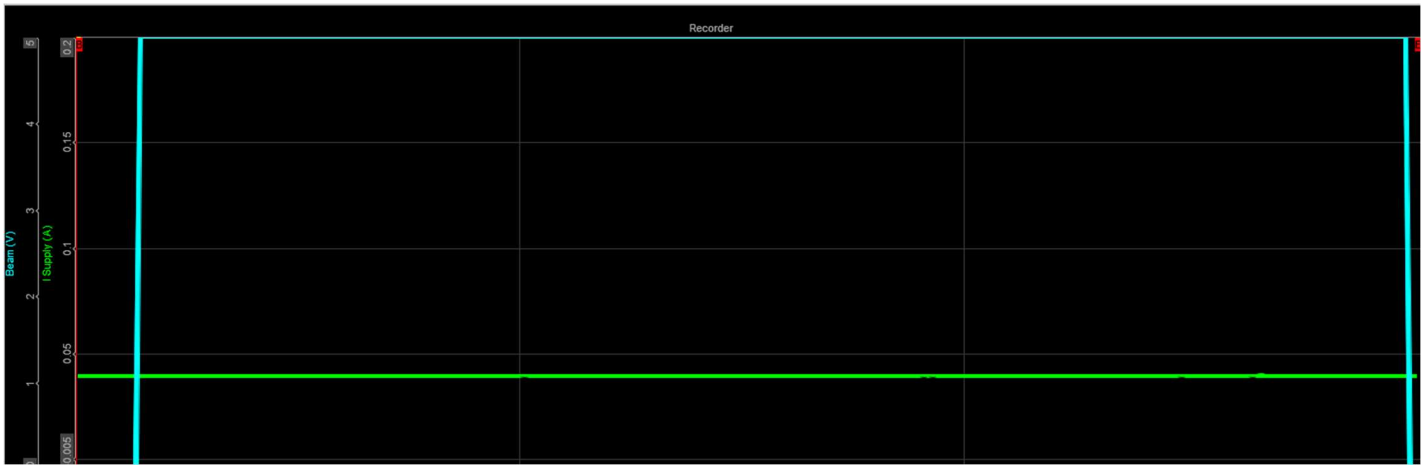

Figure 4: ADL8140 Run 12 Power Supply Current Bd 2

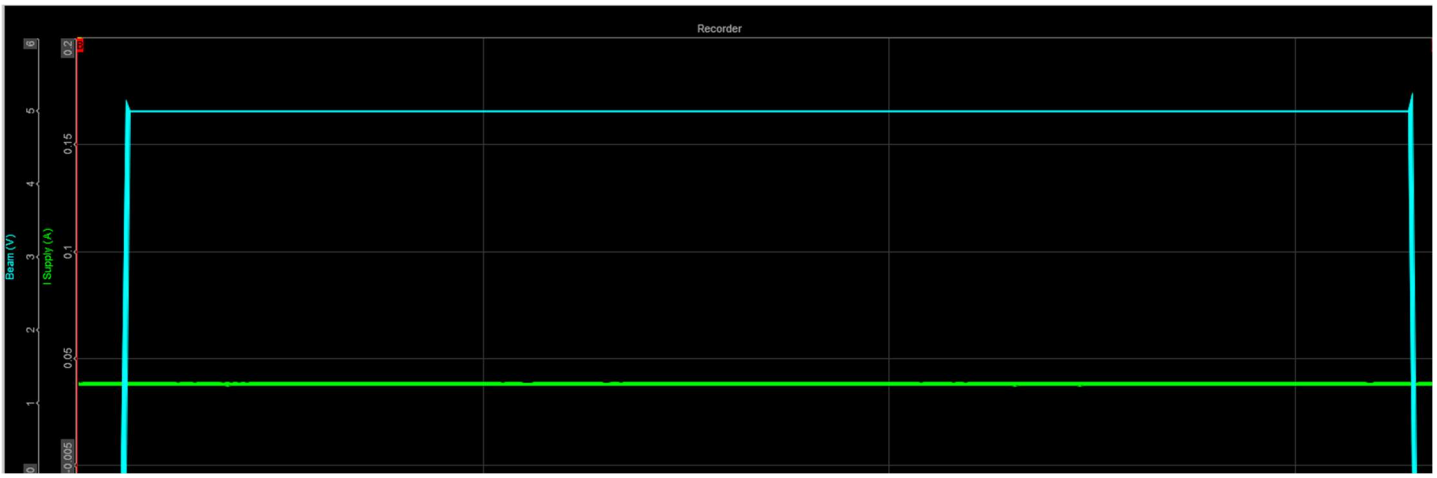

Figure 5: ADL8140 Run 14 Power Supply Current Bd 3

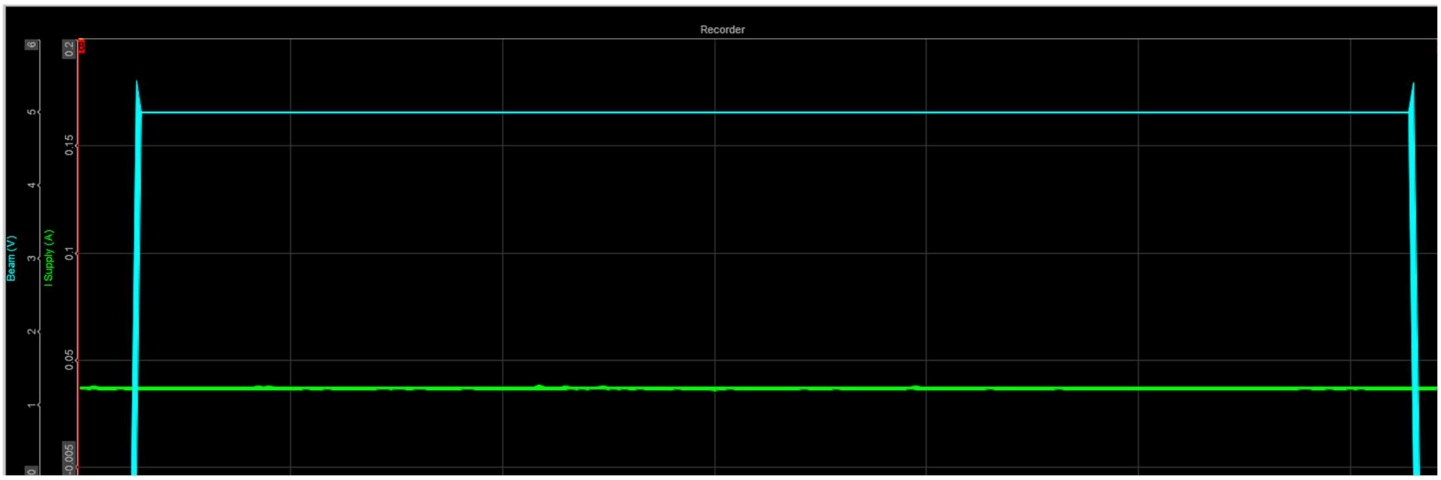

Figure 6: ADL8140 Run 16 Power Supply Current Bd 4

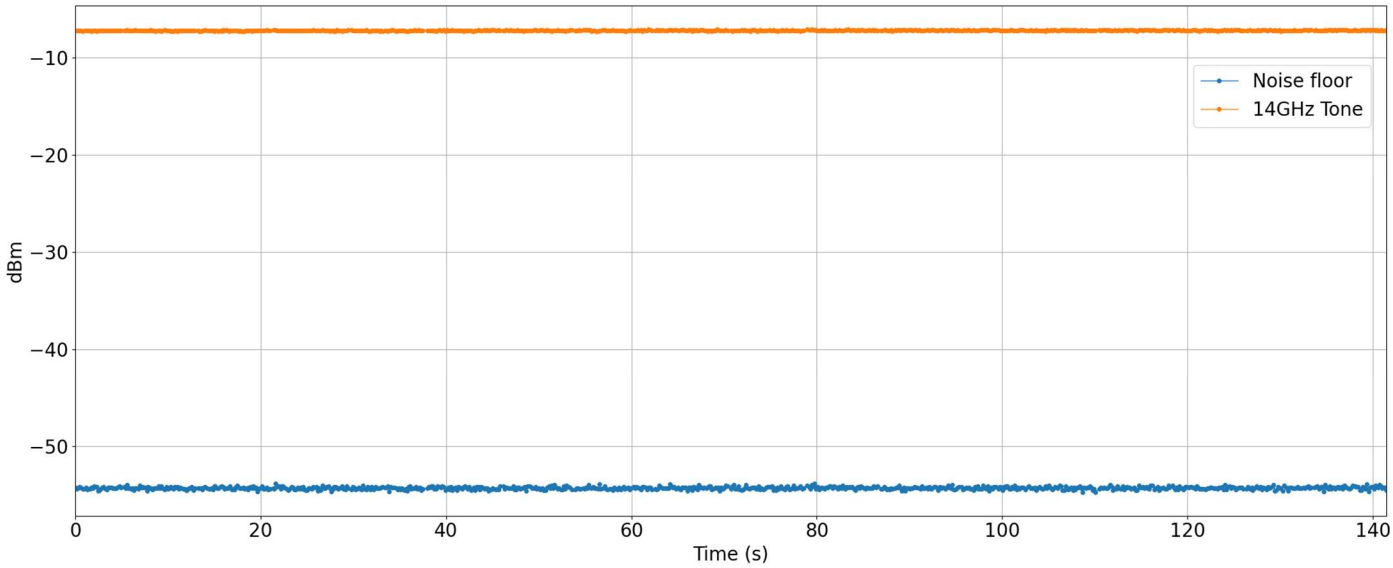

Figure 7: SET Run 11, Bd 1

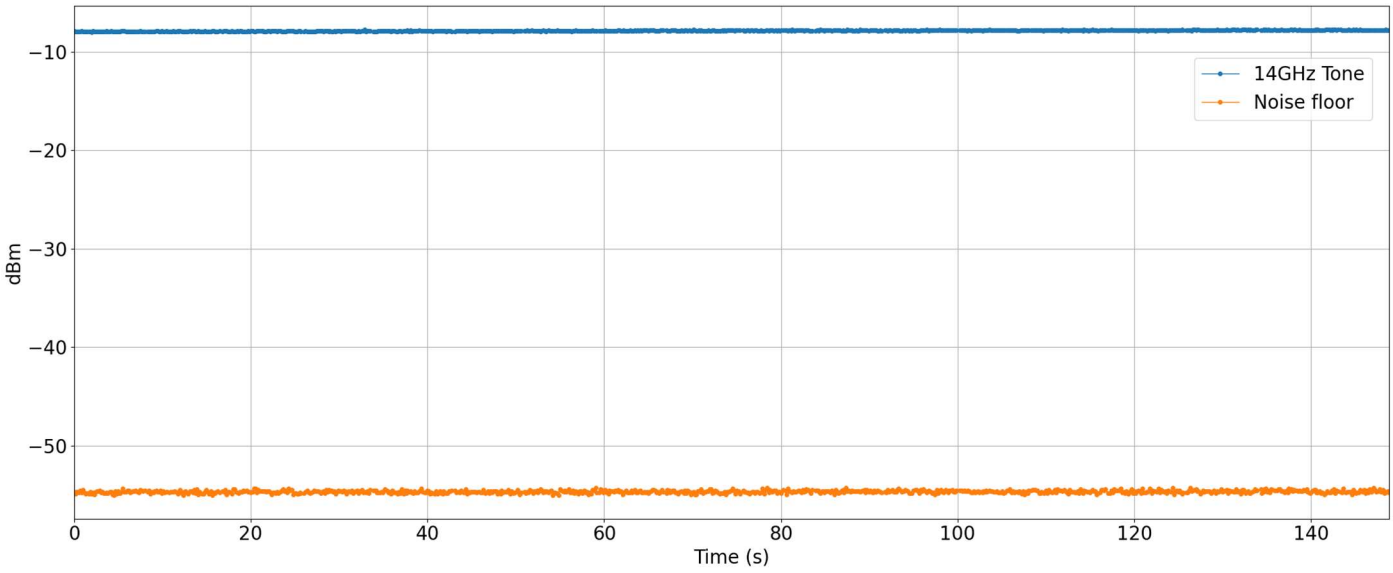

Figure 8: SET Run 13, Bd 2

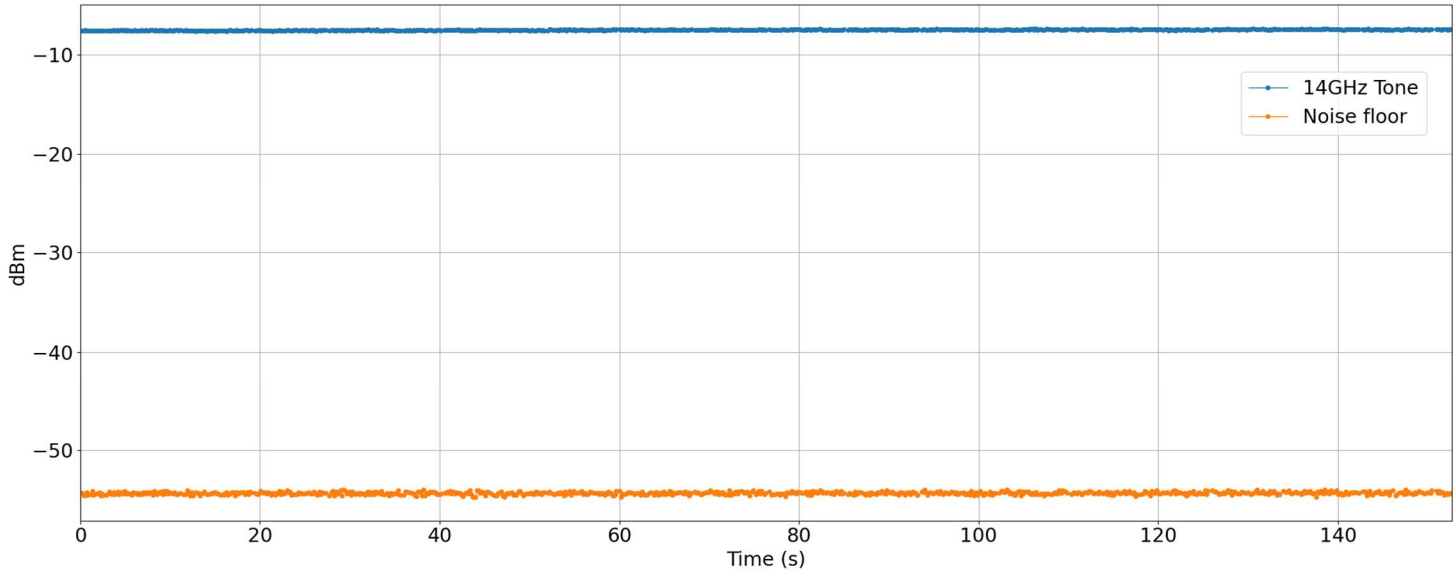

Figure 9: SET Run 15, Bd 3

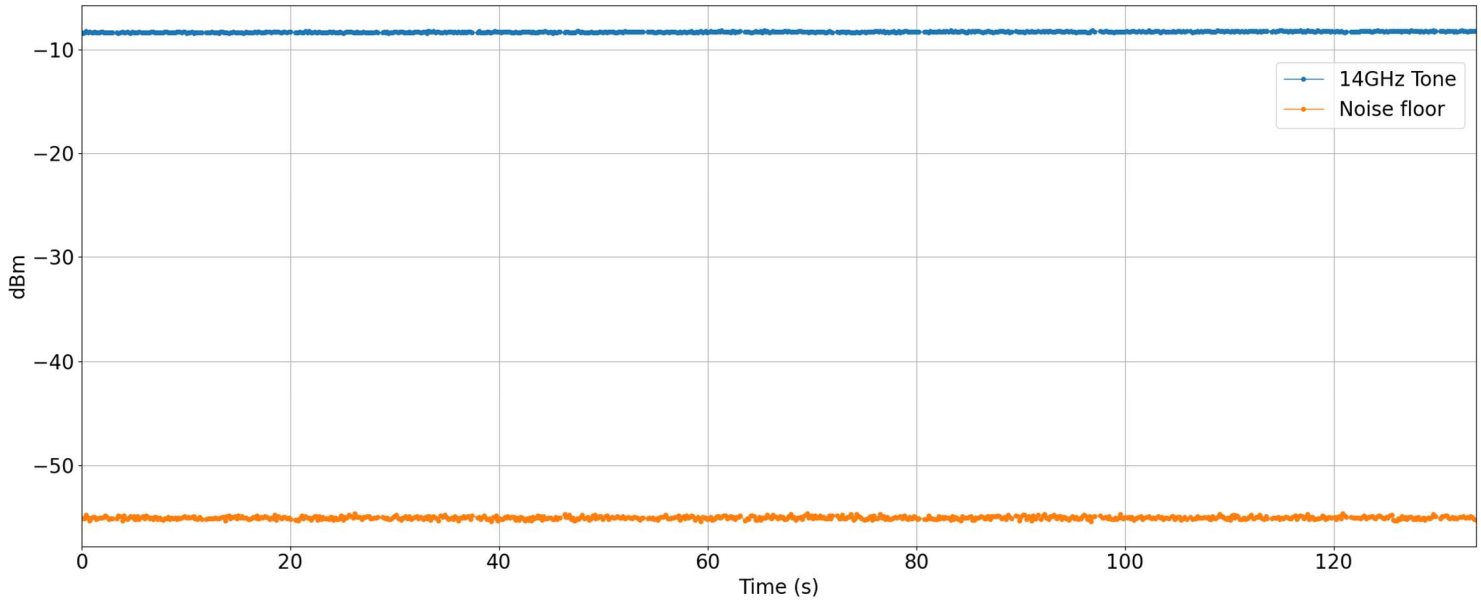

Figure 10: SET Run 17, Bd 4

VI. Conclusion:

The ADL8140 does not exhibit SEL ≤83.2 MeV-cm^2/mg. SET were not detected at the same level.

Table 4: Equipment used and Calibration:

Equipment	Calibration
Keithley 2300G-30-6	SN# 802901012766910023 Calibration due 2/28/26
HMC-T2240	SN#002023 No Cal required – verified using Field Fox
Keysight Field Fox N9552B	SN#MY62151444 Calibration due 9/24/26