



Engineering Solutions & Electromagnetic Compatibility Services

FCC Part 15.247 & ISED RSS-247 Certification Report

Test Lab: Rhein Tech Laboratories, Inc. Phone: 703-689-0368 360 Herndon Parkway Fax: 703-689-2056 Suite 1400 www.rheintech.com Herndon, VA 20170		Applicant: Smart Tools Plus, LLC 20636 Castlemaine Circle Strongsville, OH 44149 (USA)	
FCC ID IC	2BFLWSC40 32981-SC40	Test Report Date	August 14, 2025
Platform	SmartCuffs® 4.0	RTL Work Order Number	2023093
Model / HVIN	SmartCuffs 4.0	RTL Quote Number	QRTL23-093
American National Standard Institute	ANSI C63.10-2020: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
FCC Classification	DTS – Part 15 Digital Transmission System		
FCC Rule Part(s)	FCC Rules Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz (2024)		
ISED Rule Part(s)	RSS-247 Issue 3: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus		
Frequency Range (MHz)	Output Power (W)*	Frequency Tolerance	Emission Designator
2402-2480	0.0061	N/A	N/A

*Power is EIRP

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards. Furthermore, there was no deviation from, additions to, or exclusions from, the applicable parts of FCC Part 2, FCC Part 15, ISED RSS-247, ISED RSS-Gen and ANSI C63.10.

Signature: 

Date: August 14, 2025

Typed/Printed Name: Desmond A. Fraser

Position: President

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Replaces Report R1.3.*

*These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by ANAB.
Refer to certificate and scope of accreditation AT-1445.*

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1 General Information

1.1 Scope

Applicable Standards:

FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz;

ISED RSS-247 Issue 3: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network LE-LAN) Devices

RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus

1.2 Description of EUT

Equipment Under Test	Blood Flow Restriction Cuff with Bluetooth LE
Model #	SmartCuffs@ 4.0
Power Supply	3.7VDC Internal rechargeable Li-Ion battery
Modulation Type	BLE
Frequency Range	2402 - 2480 MHz
Antenna Type	Chip

1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.10-2020).

CAB ID: US0079

1.4 Measurement Uncertainty

The measurement uncertainty complies with CISPR 16-4-2 limits and is not used to adjust measurements for compliance determination. Expanded uncertainty (U) for each scope, calculated per ANSI/NCSL Z540-2-1997 (R2002) with a type B evaluation, is provided in this RTL report. While this demonstrates RTL's commitment to transparency, compliance decisions are based solely on comparing measured values directly to the relevant standards' limits.

1.5 Related Submittal(s)/Grant(s)

This is an original application for FCC and ISED Canada certification for Smart Tools Plus, LLC Model/HVIN: SmartCuffs@ 4.0; FCC ID: 2BFLWSC40, IC: 32981-SC40.

1.6 Modifications

No modifications were required for compliance.

2 Test Information

2.1 Description of Test Modes

In accordance with FCC 15.31(m), and because the EUT utilizes an operating band greater than 10 MHz, the following frequencies were tested:

Table 2-1: Frequencies Tested

Channel	Frequency
Low	2402
Mid	2440
High	2480

2.2 Exercising the EUT

The EUT was tested in all three orthogonal planes to determine worst-case emissions. The EUT was provided with EspRFTestTool Version 3.6 software to transmit during testing. The carrier was also checked to verify that information was being transmitted. There were no deviations from the test standard(s) and/or methods. The test results reported relate only to the item tested.

2.3 Test Result Summary

Table 2-2: Test Result Summary – FCC Part 15, Subpart C (Section 15.247); ISED RSS-247, RSS-Gen

Test	FCC Reference	ISED Reference	Result
AC Power Conducted Emissions	15.207	RSS-Gen 8.8	Not Tested
Radiated Emissions	15.209	RSS-247 5.5; RSS-Gen 8.9, 8.10	Pass
Maximum Peak Power Output	15.247(b)(1)	RSS-247 5.4(b), RSS-Gen 6.12	Pass
Antenna Conducted Spurious Emissions	15.247(d)	RSS-247 5.5, RSS-Gen 6.13	Pass
Power Spectral Density	15.247(e)	ISED RSS-247 5.2(b)	Pass
6 dB Bandwidth	15.247(a)(2)	RSS-247 5.2(a)	Pass
99% Bandwidth	N/A	RSS-Gen 6.7/ TRC-43	N/A

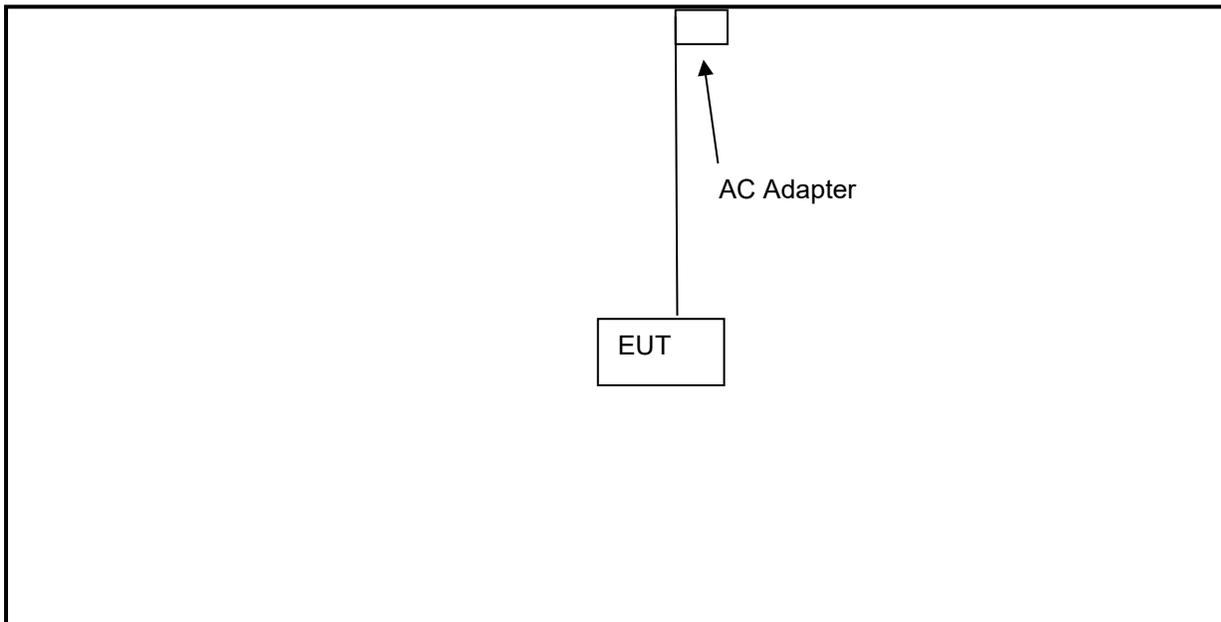
2.4 Test System Details

The test samples were received on January 16, 2024. The FCC identifiers for all applicable equipment, plus descriptions of all cables used in the tested system are identified in the following tables.

Table 2-3: Equipment Under Test

Part	Manufacturer	Model	Serial Number	FCC ID	RTL Bar Code
Compression Cuff	Smart Tools Plus, LLC	SmartCuffs 4.0	N/A	2BFLWSC40	24304
Compression Cuff	Smart Tools Plus, LLC	SmartCuffs 4.0	N/A	2BFLWSC40	24307
Compression Cuff	Smart Tools Plus, LLC	SmartCuffs 4.0	N/A	2BFLWSC40	24308
Compression Cuff	Smart Tools Plus, LLC	SmartCuffs 4.0	N/A	2BFLWSC40	24309
AC Adapter	OEM	XY-1304-2USB	N/A	N/A	24310
AC Adapter	OEM	XY-1304-2USB	N/A	N/A	24311

2.5 Configuration of Tested System



3 Peak Output Power – FCC 15.247(b)(1); ISED RSS-247 5.4(b), RSS-Gen 6.12

3.1 Power Output Test Procedure

A conducted power measurement of the EUT was taken using a Rhode & Schwarz spectrum analyzer.

Procedure: C63.10-2020 9.8 Maximum peak conducted output power.

Table 3-1: Power Output Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	12/01/2024

3.2 Power Output Test Data

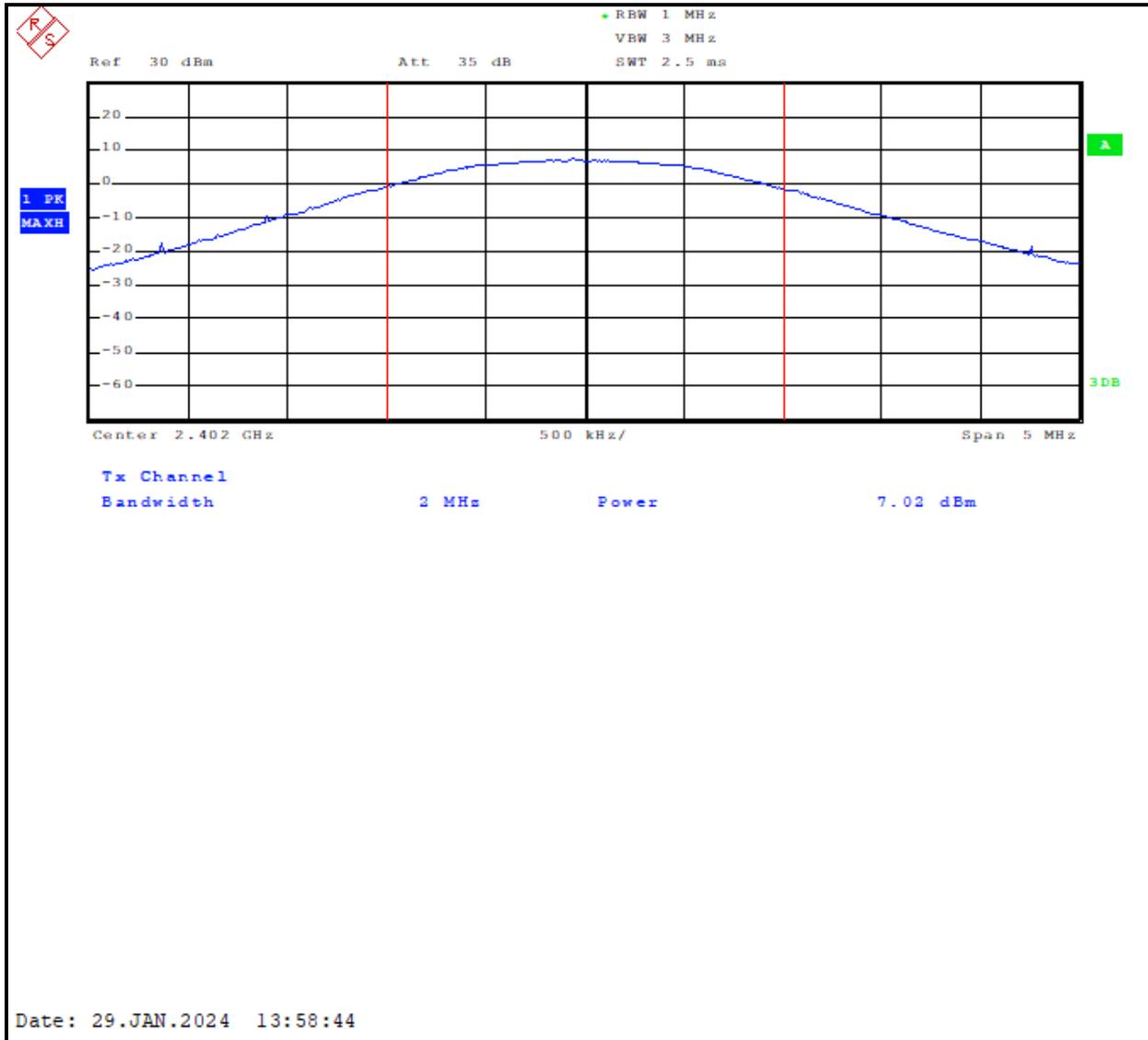
Table 3-2: Power Output – Environmental Factors

Date	Temperature (°C)	Humidity (%)	Atmospheric Pressure (kPa)
01/29/2024	22.5	24	100.3

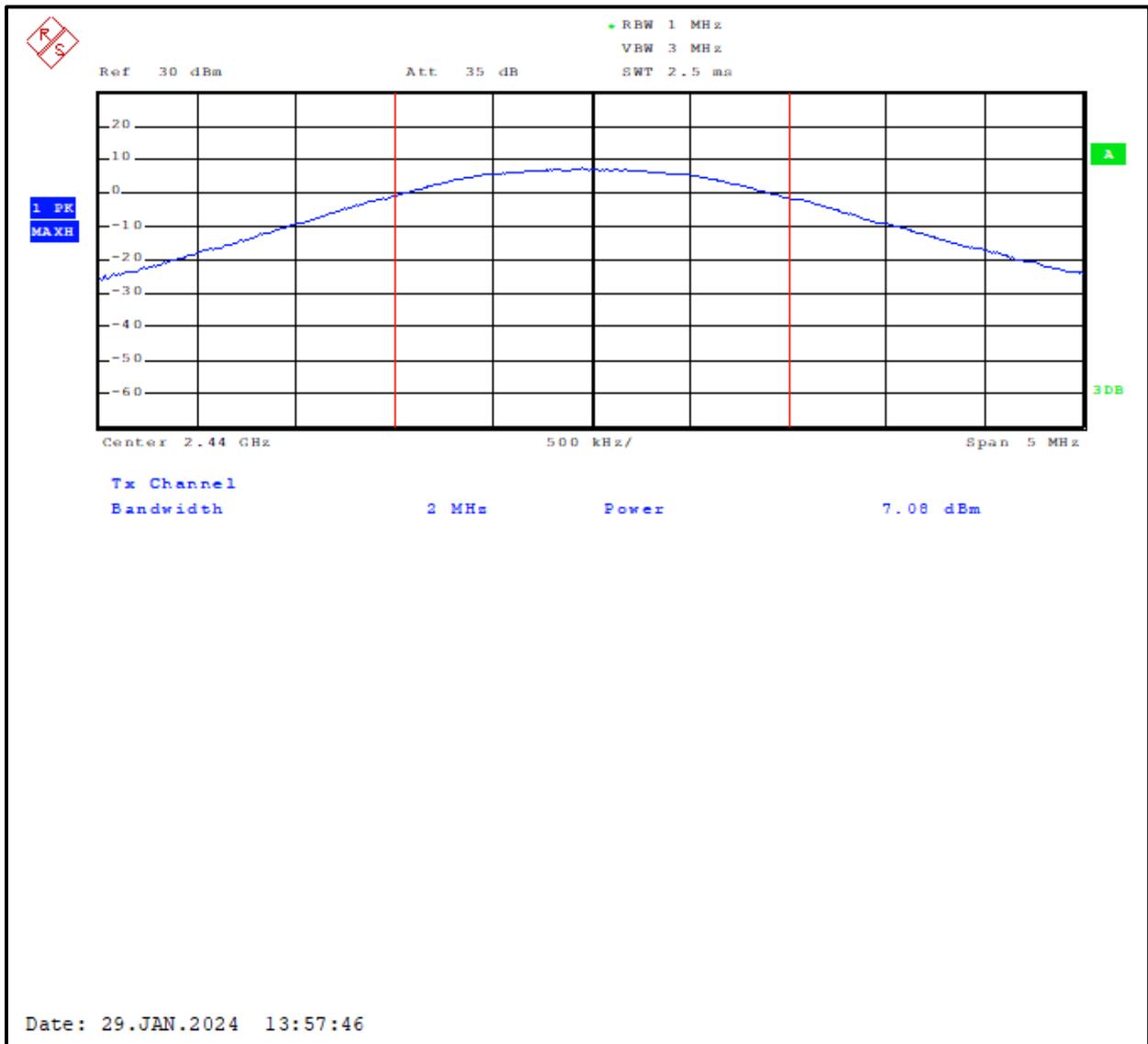
Table 3-3: Power Output Test Data

Frequency (MHz)	Level Measured (dBm)
2402	7.0
2440	7.1
2480	7.9

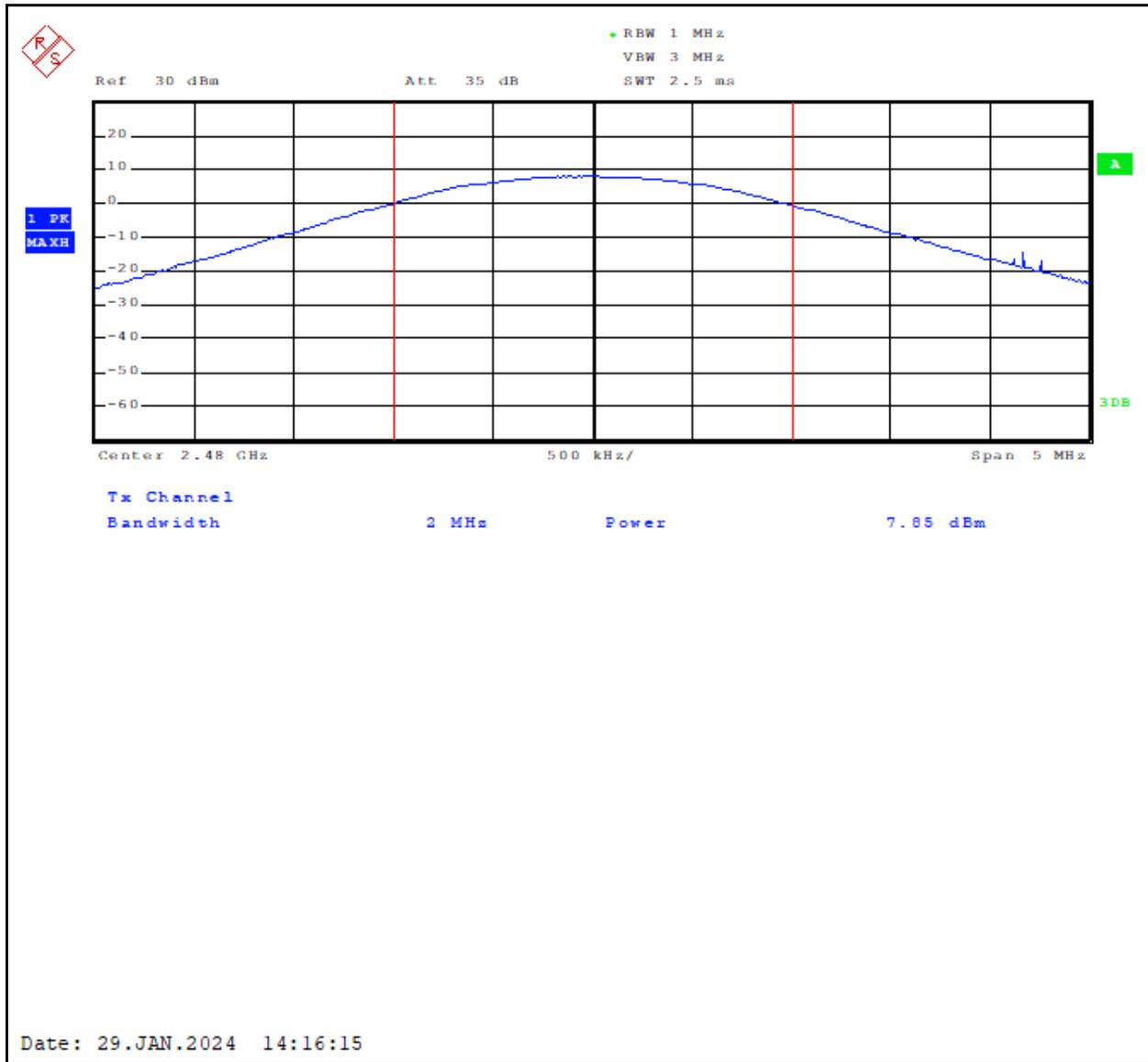
Plot 3-1: Maximum Conducted Output Power (2402 MHz)



Plot 3-2: Maximum Conducted Output Power (2440 MHz)



Plot 3-3: Maximum Conducted Output Power (2480 MHz)



Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ± 0.5 dB

Results: Pass

Test Personnel:

Daniel W. Baltzell
Test Engineer

Signature

January 29, 2024
Date of Test

4 Peak Power Spectral Density – FCC 15.247(e); ISED RSS-247 5.2(b)

4.1 Peak Spectral Density Test Procedure

Procedure: ANSI C63.10-2020, 11.10.2 Digitally modulated systems shall have conducted peak power spectral density of 8 dBm in any 3 kHz band during any time interval of continuous transmission. A conducted measurement was taken. A resolution bandwidth 3 kHz was used. A video bandwidth of 10 kHz and max hold was used with the marker on the peak. The measured level was compared to the 8 dBm limit.

Table 4-1: Power Spectral Density Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW50	Analyzer	101021	05/30/2027

4.2 Peak Spectral Density Test Data

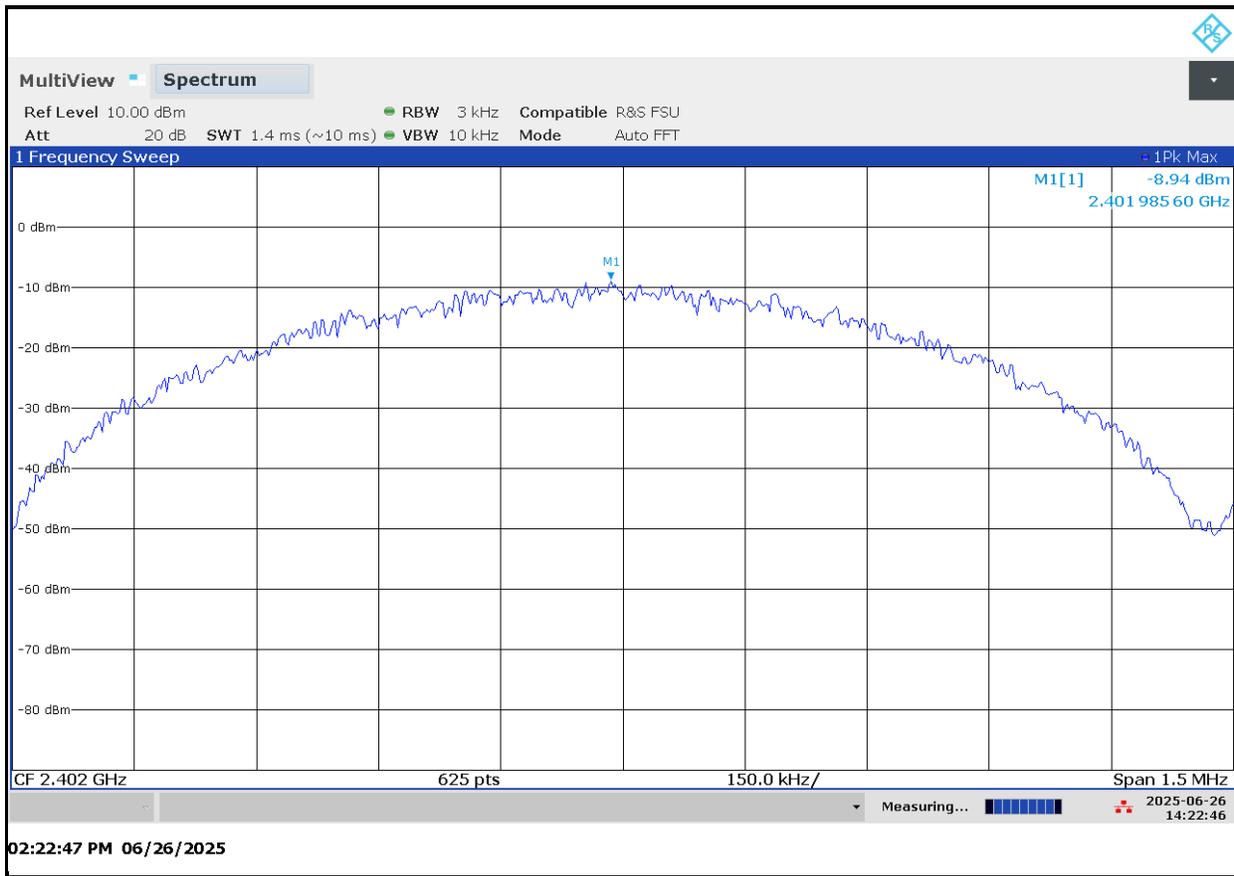
Table 4-2: Power Spectral Density - Environmental Factors

Date	Temperature (°C)	Humidity (%)	Pressure (kPa)
June 26, 2025	27.3	37	101.5

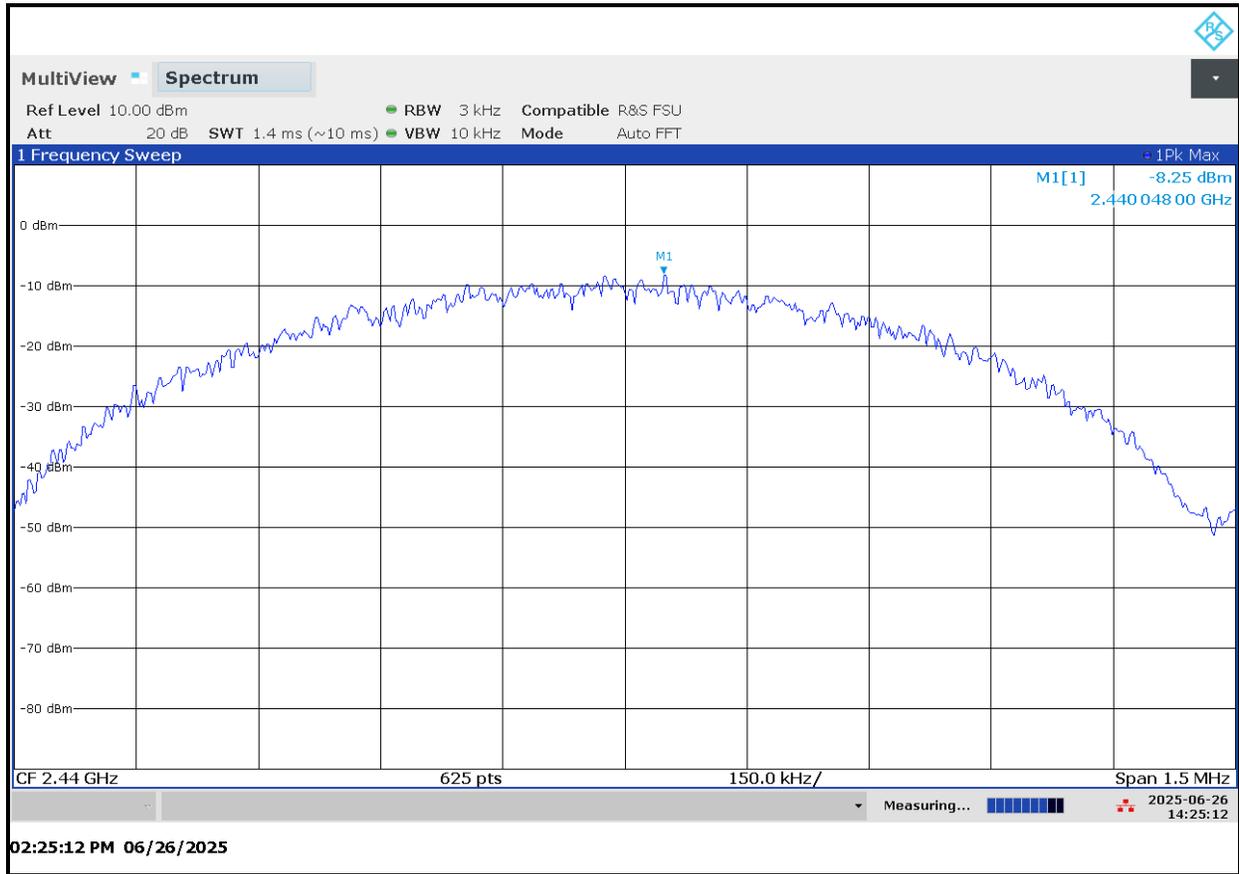
Table 4-3: Peak Spectral Density Test Data

Channels	Frequency (MHz)	Measured Power (dBm)	Limit (dBm)	Margin (dB)	Pass/Fail
Low	2402	-8.9	8.0	-16.9	Pass
Mid	2440	-8.3	8.0	-16.3	Pass
High	2480	-8.2	8.0	-16.2	Pass

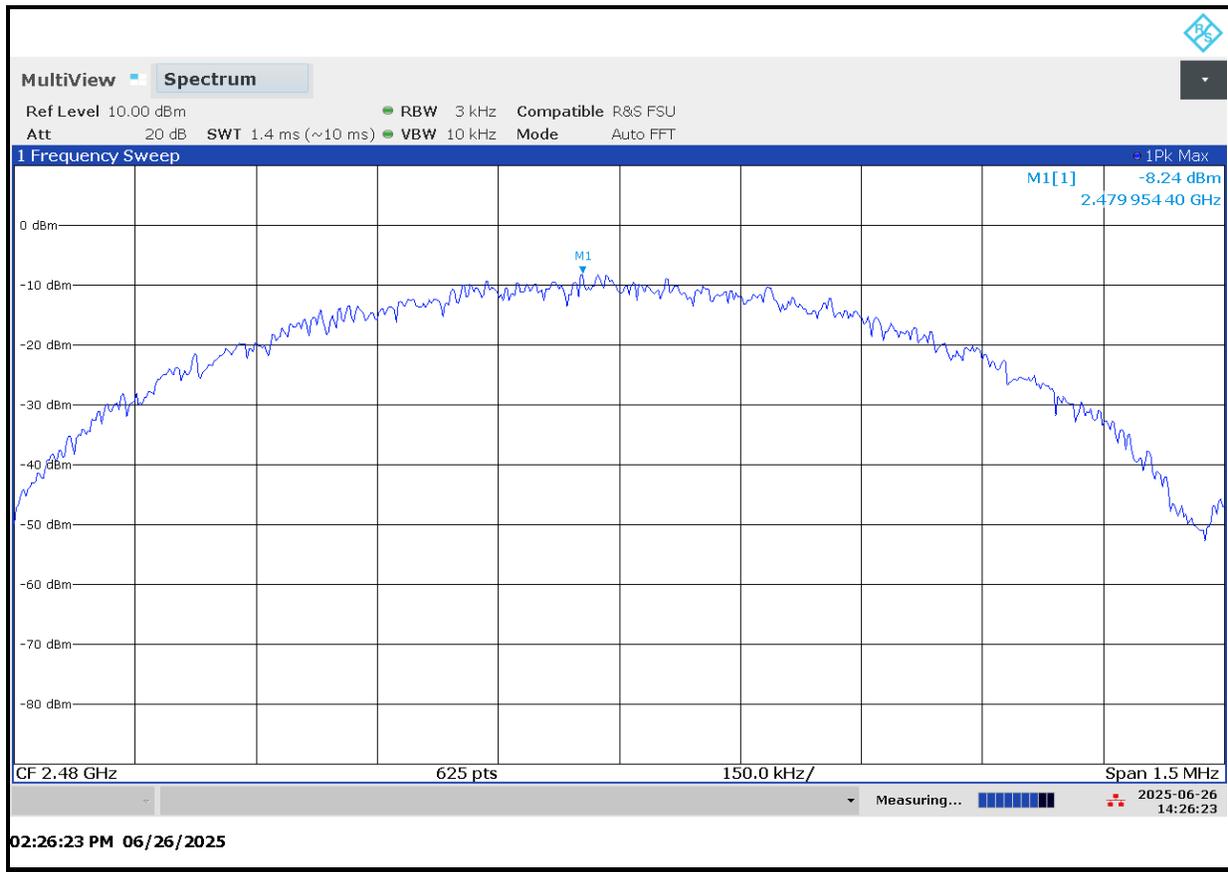
Plot 4-1: Power Spectral Density (2402 MHz)



Plot 4-2: Power Spectral Density (2440 MHz)



Plot 4-3: Power Spectral Density (2480 MHz)



Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ± 0.5 dB

Results: Pass

Test Personnel:

Daniel W. Baltzell
 Test Engineer

Signature

June 26, 2025
 Date of Test

5 Band Edge Compliance of RF Conducted Emissions – FCC 15.247(d)

5.1 Band Edge Test Procedure

Procedure: C63.10-2020 6.10.5 Restricted Band Edge

The following test methodology shall be used for the restricted-band band-edge measurements:

- a) For frequency hopping systems, the hopping shall be turned OFF during this test.
- b) Configure the spectrum analyzer settings as described in step e) (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).
- c) Set the unlicensed wireless device to the lowest frequency channel.
- d) Set the unlicensed wireless device to operate at maximum output power and 100% duty cycle, or equivalent “normal mode of operation” as specified in 6.10.3.
- e) Perform the test as follows:
 - 1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products that fall outside of the authorized band of operation.
 - 2) Reference level offset: Adjusted for gains and losses of measurement antenna factor, preamp gain and cable loss, so as to indicate field strength, in units of dBµV/m at 3 m, directly on the instrument display. Alternatively, the reference level offset may be set to zero and calculations shall be provided showing the conversion of raw measured data to the field strength in dBµV/m at 3 m.
 - 3) Reference level: As required to keep the signal from exceeding the maximum spectrum analyzer input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.6.2.
 - 4) Attenuation: Auto (at least 10 dB preferred).
 - 5) Sweep time: No faster than coupled (auto) time.
 - 6) Resolution bandwidth:
 - i) Below 150 kHz: 300 Hz or CISPR 200 Hz (CISPR 200 Hz required if using QP detector)
 - ii) 150 kHz to 30 MHz: 10 kHz or CISPR 9 kHz, (CISPR 9 kHz required if using QP detector)
 - iii) 30 MHz to 1000 MHz: 100 kHz or CISPR 120 kHz, (CISPR 120 kHz required if using QP detector)
 - iv) Above 1 GHz: 1 MHz
 - 7) Video bandwidth:
 - i) VBW for Peak, Quasi-peak, or Average Detector Function: 3 × RBW
 - ii) VBW for alternative average measurements using peak detector function; refer to 4.1.5.2.3
 - 8) Detector (unless specified otherwise):
 - i) QP below 1 GHz (however, peak detector measurements may be used to determine compliance with QP requirements).
 - ii) Peak and average above 1 GHz
 - 9) Trace: Max-hold for final measurement; a combination of two traces, clear-write and maxhold, is recommended for maximizing the emission.
- f) Using the applicable procedure(s) of 6.4, 6.5, or 6.6 orient the EUT and measurement antenna positions to produce the highest emission level.
- g) Set the marker on the emission at the restricted band-edge, or on the highest modulation product within the restricted-band, if this level is greater than that at the band-edge.
- h) Repeat step d) through step g) for every applicable modulation.
- i) Repeat step d) through step h) for the highest gain of each type of antenna to be used with the EUT.
- j) Set the EUT to the highest frequency channel and repeat step d) through step i).
- k) The band-edge measurement shall be reported by providing spectral plot(s) of the measuring instrument display; the axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Table 5-1: Band Edge Test Equipment

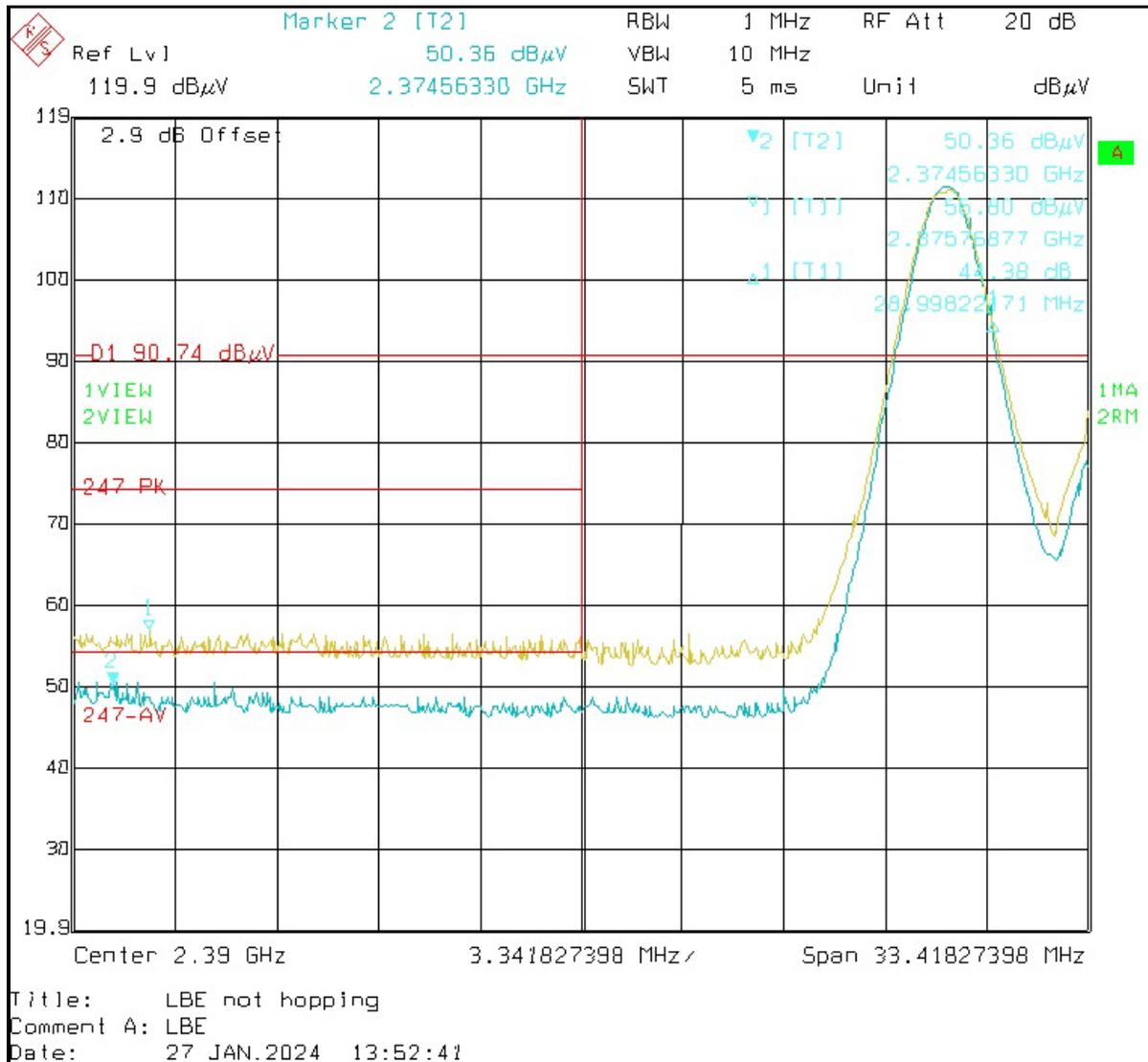
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901672	Rohde & Schwarz	FSEM30	Spectrum Analyzer	833063/13	04/25/27

5.2 Band Edge Test Results

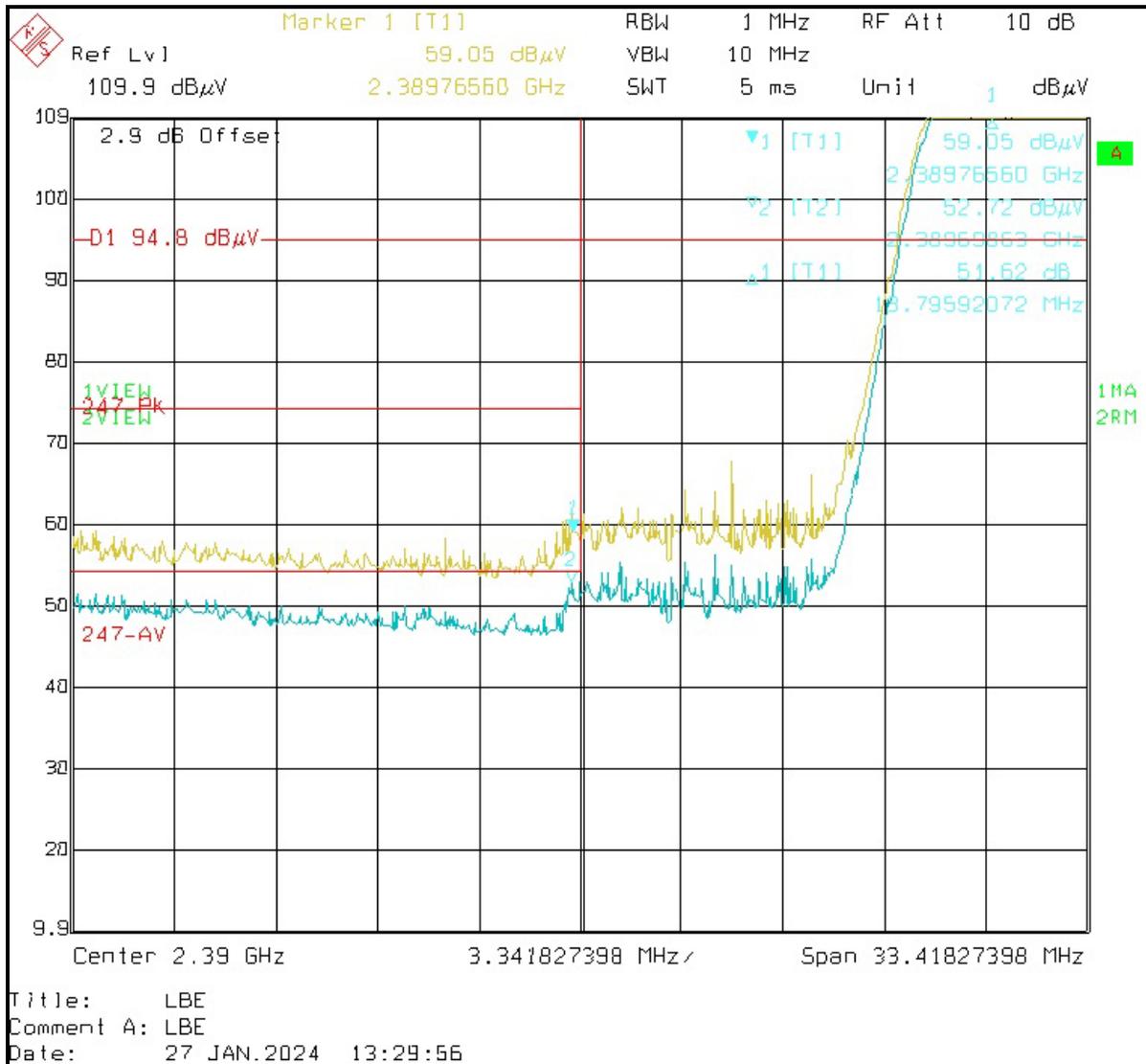
Table 5-2: Band Edge – Environmental Factors

Date	Temperature (°C)	Humidity (%)	Atmospheric Pressure (kPa)
01/27/2024	15	60	101

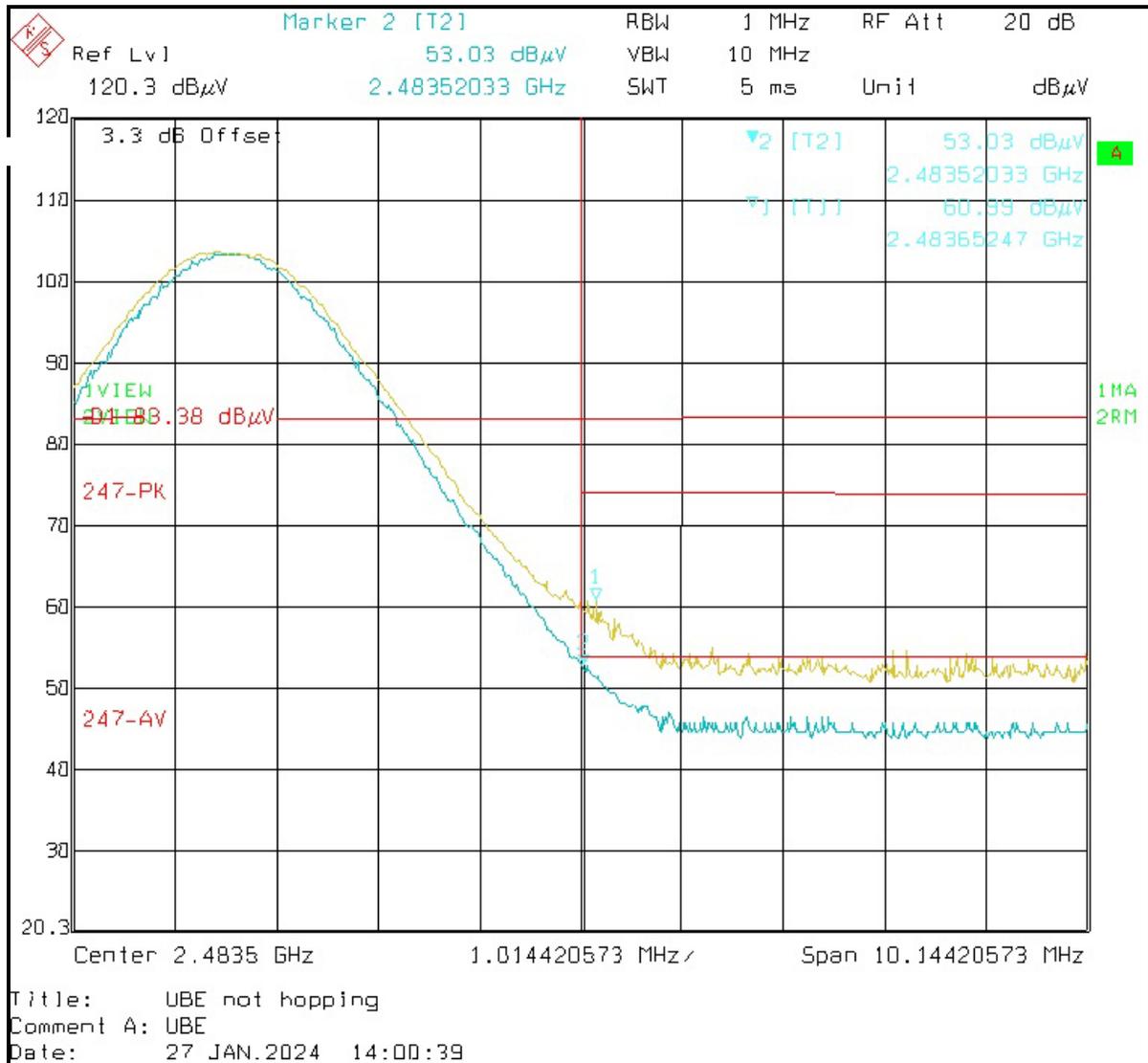
Plot 5-1: Lower Band Edge (Peak-Average, 2402 MHz Carrier)



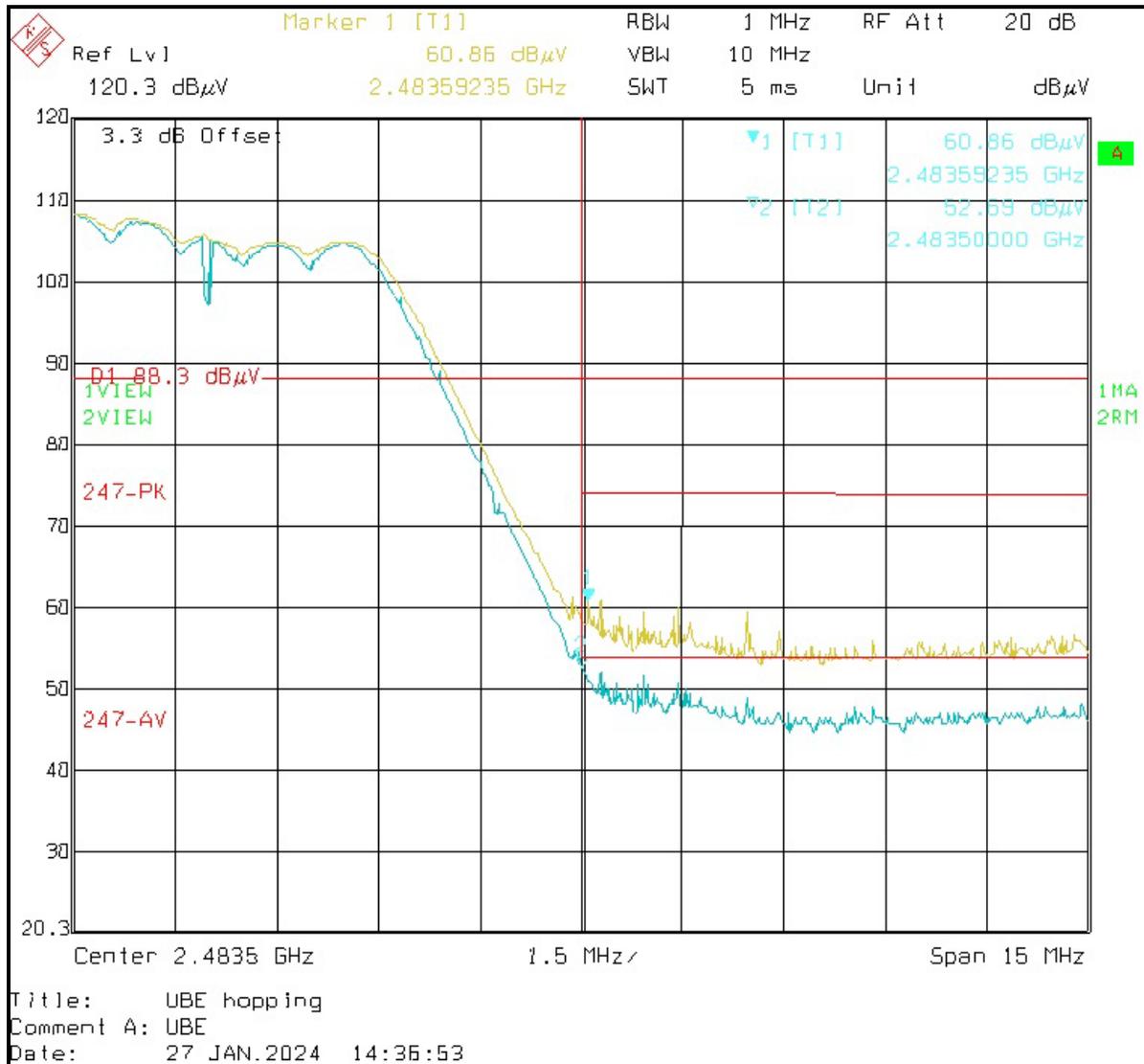
Plot 5-2: Lower Band Edge (Peak-Average Hopping, 2402 MHz Carrier)



Plot 5-3: Upper Band Edge (Peak-Average, 2480 MHz Carrier)



Plot 5-4: Upper Band Edge (Peak-Average Hopping, 2480 MHz Carrier)



Measurement uncertainty: ± 4.6 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor $k=2$

Results: Pass

Test Personnel:

Daniel W. Baltzell
 Test Engineer

Signature

January 27, 2024
 Date of Test

6 Antenna Conducted Spurious Emissions – FCC 15.247(d); ISED RSS-247 5.5, RSS-Gen 6.13

6.1 Antenna Conducted Spurious Emissions Test Procedures

Procedure: C63.10-2013 6.7

Antenna spurious emissions per FCC 15.247(d) were measured from the EUT antenna port using a 50-ohm spectrum analyzer with the resolution bandwidth set at 1 MHz, and the video bandwidth set at 3 MHz. The modulated carrier was identified at the following frequencies: 2402 MHz, 2440 MHz and 2480 MHz. The carrier to the 10th harmonic of the carrier frequency was investigated.

Table 6-1: Antenna Conducted Spurious Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	12/01/2025

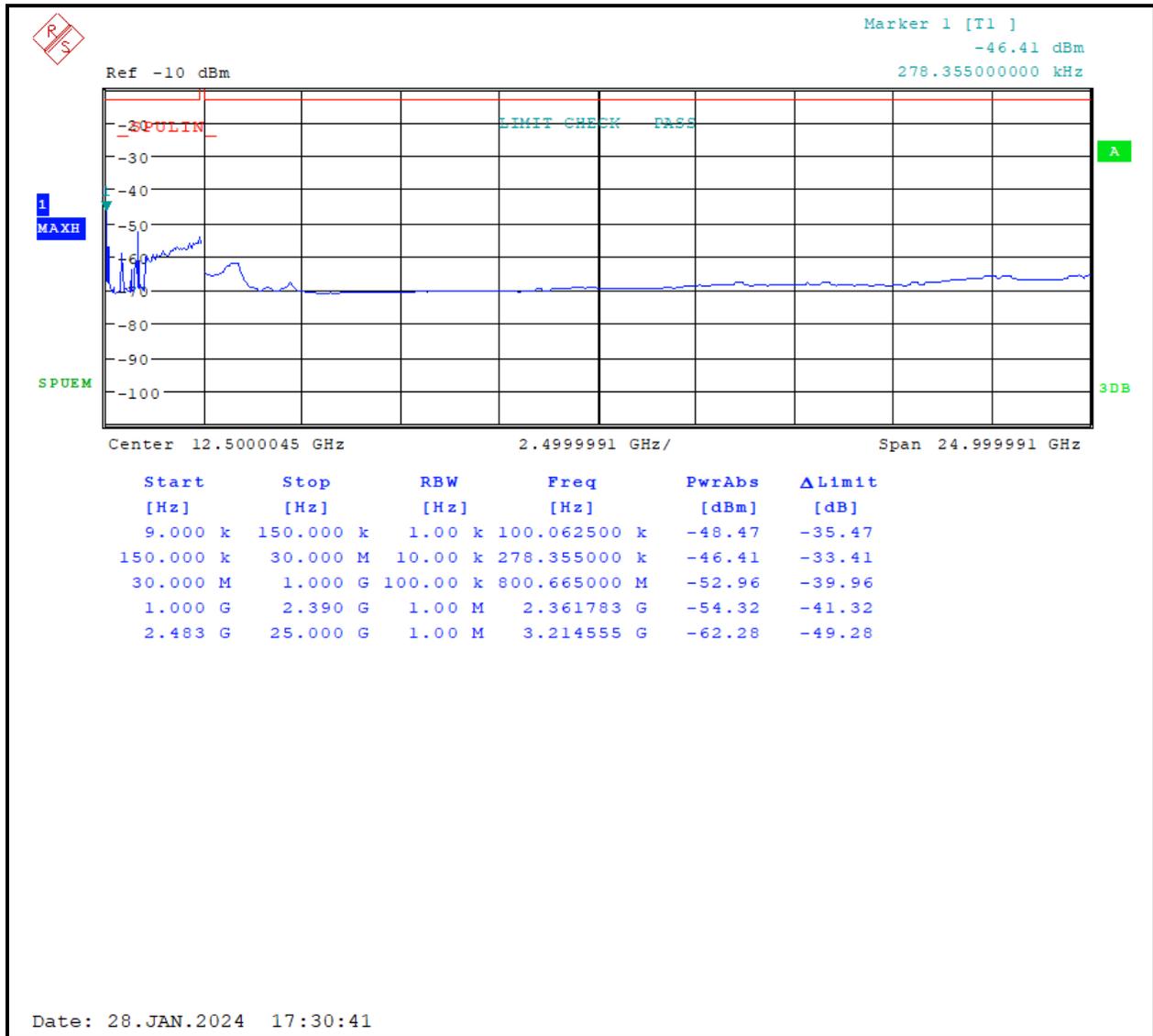
6.2 Antenna Conducted Spurious Emissions Test Results

Table 6-2: Antenna Conducted Spurious Emissions – Environmental Factors

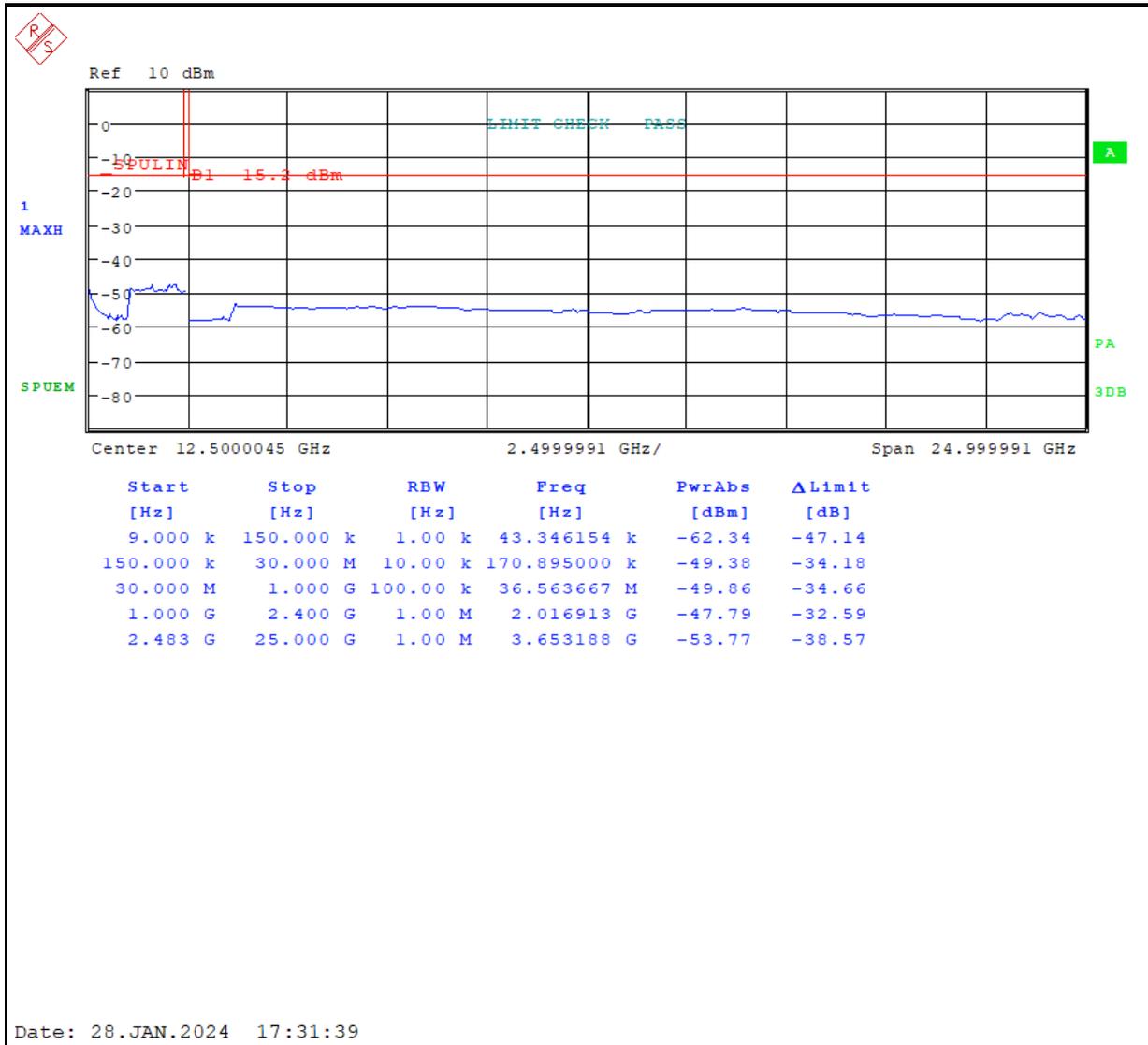
Date	Temperature (°C)	Humidity (%)	Atmospheric Pressure (kPa)
01/28/2024	23	46	101

All spurious emissions were greater than 20 dB below the limit.

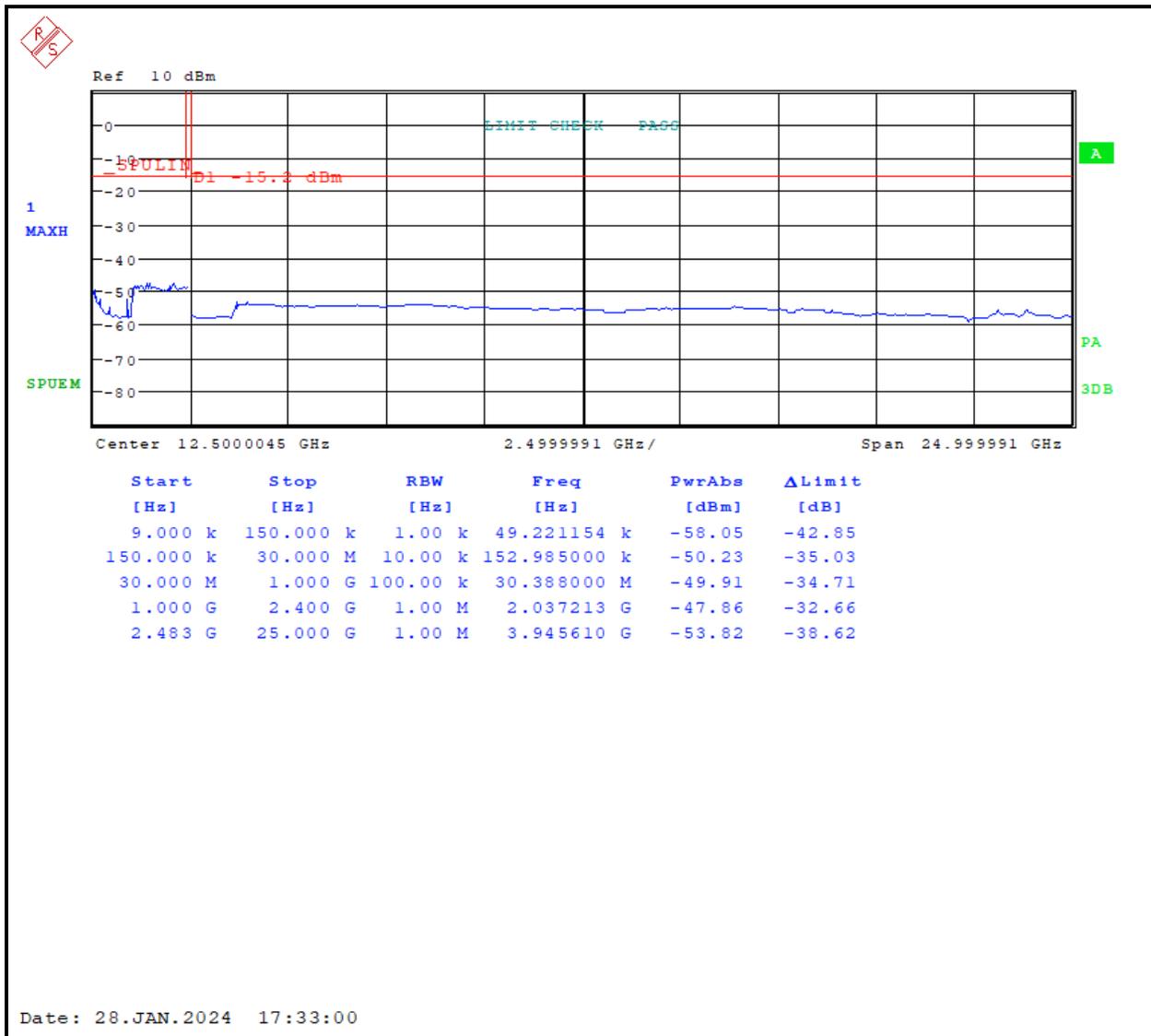
Plot 6-1: Antenna Conducted Spurious Emissions (2402 MHz)



Plot 6-2: Antenna Conducted Spurious Emissions (2440 MHz)



Plot 6-3: Antenna Conducted Spurious Emissions (2480 MHz)



Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ±0.5 dB

Results: Pass

Test Personnel:

Daniel W. Baltzell
 Test Engineer

Signature

January 28, 2024
 Date of Test

7 6 dB Bandwidth – FCC 15.247(a)(2); ISED RSS-247 5.2(a)

7.1 Bandwidth Test Procedure

Procedure: C63.10-2013 6.9.2

The minimum 6 dB bandwidths per FCC 15.247 were measured using a 50-ohm spectrum analyzer. The carrier was adjusted on the analyzer so that it was displayed entirely on the spectrum analyzer. The sweep time was set to auto and allowed through several sweeps with the max hold function used in peak detector mode. The resolution bandwidth was set to 100 kHz, and the video bandwidth set at 300 kHz. The minimum 6 dB bandwidths were measured using the spectrum analyzer delta marker set 6 dB down from the peak of the carrier.

Table 7-1: 6 dB Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW	Spectrum Analyzer	101021	05/30/2027

7.2 Bandwidth Test Results

Table 7-2: 6 dB Bandwidth – Environmental Factors

Date	Temperature (°C)	Humidity (%)	Atmospheric Pressure (kPa)
06/26/2025	27.3	37	101.5

Table 7-3: 6 dB Bandwidth Test Data

Frequency (MHz)	Bandwidth (kHz)	Minimum Limit (kHz)	Pass/Fail
2402	656	500	Pass
2440	648	500	Pass
2480	648	500	Pass

Plot 7-1: 6 dB Bandwidth – 2402 MHz



Plot 7-2: 6 dB Bandwidth – 2440 MHz



Plot 7-3: 6 dB Bandwidth – 2480 MHz



Measurement uncertainties shown for these tests are expanded uncertainty expressed at 95% confidence level using a coverage factor k=2. Measurement uncertainty $\pm 1.0 * 10^{-6}$ Hz

Results: Pass

Test Personnel:

Daniel W. Baltzell
 Test Engineer

Signature

June 26, 2025
 Date of Test

8 Occupied Bandwidth – ISED RSS-Gen 6.7

8.1 99% Bandwidth Test Procedure

ANSI C63.10 Section 9.4

The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g., on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

Table 8-1: 99% Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	12/01/2025

8.2 99% Bandwidth Test Results

Table 8-2: 99% Bandwidth – Environmental Factors

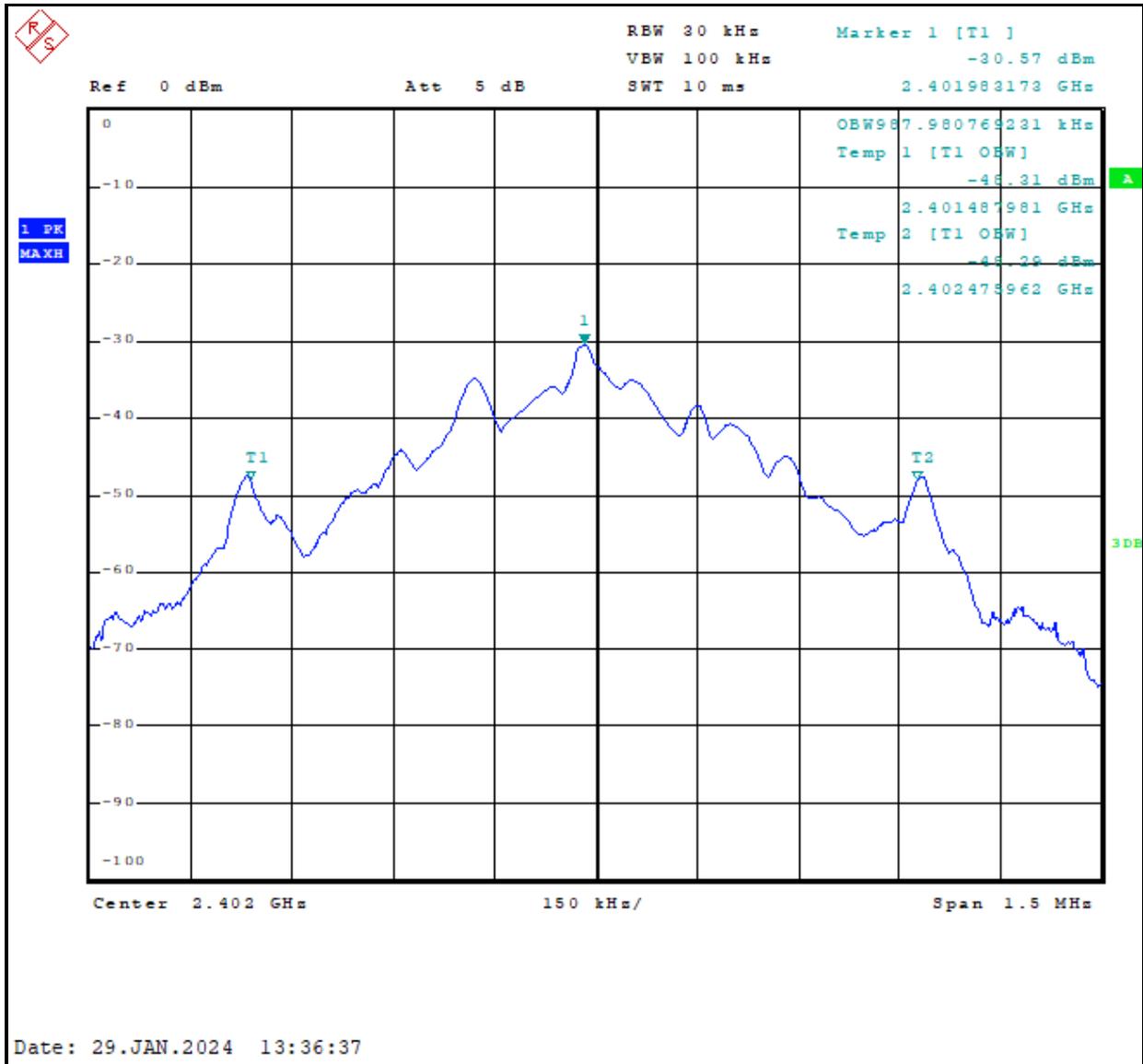
Date	Temperature (°C)	Humidity (%)	Atmospheric Pressure (kPa)
01/29/2024	24.3	34	100.1

Table 8-3: 99% Bandwidth Test Data

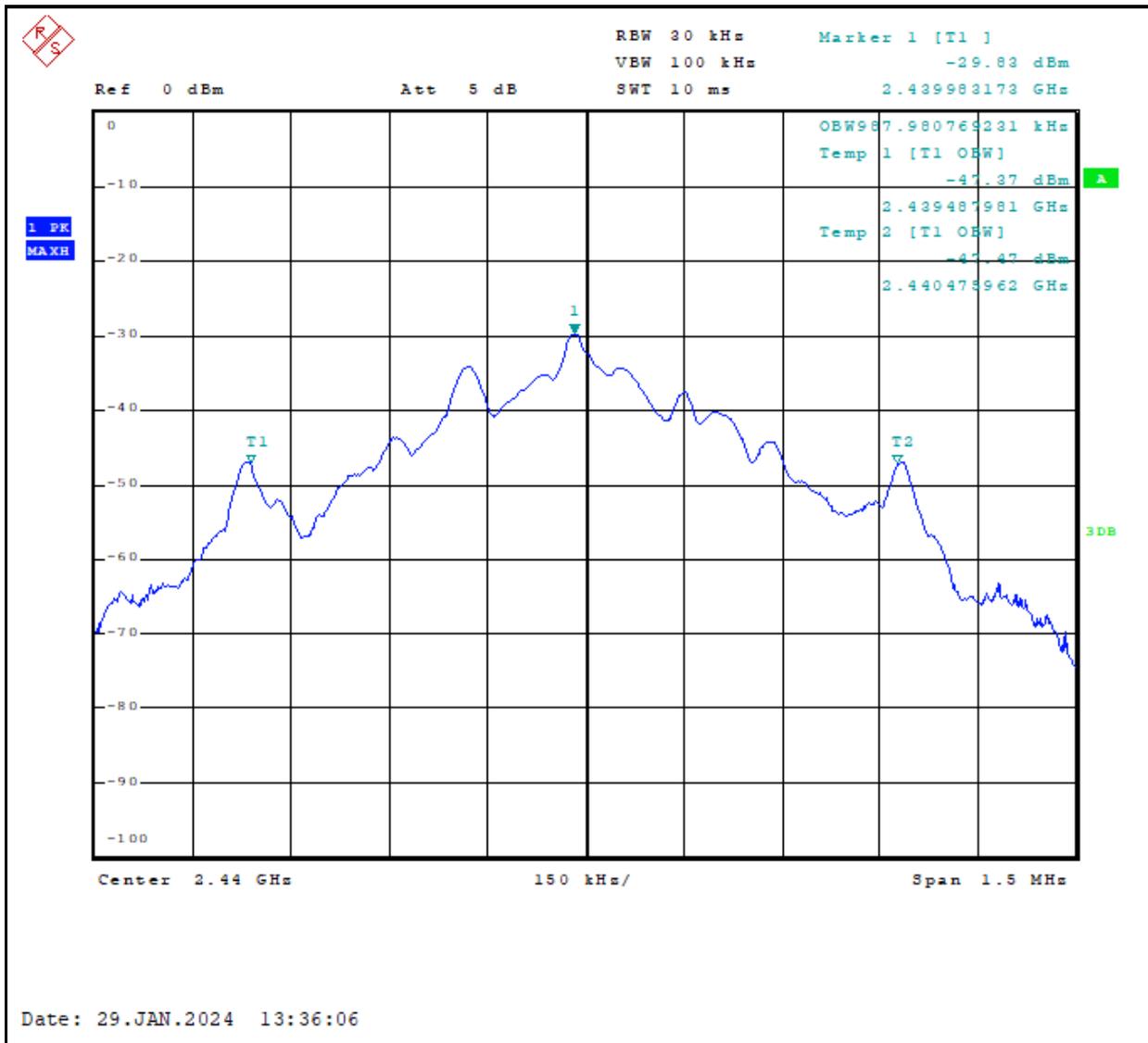
Frequency (MHz)	99% Bandwidth (kHz)
2402	988
2440	988
2480	990

8.3 99% Bandwidth Plots

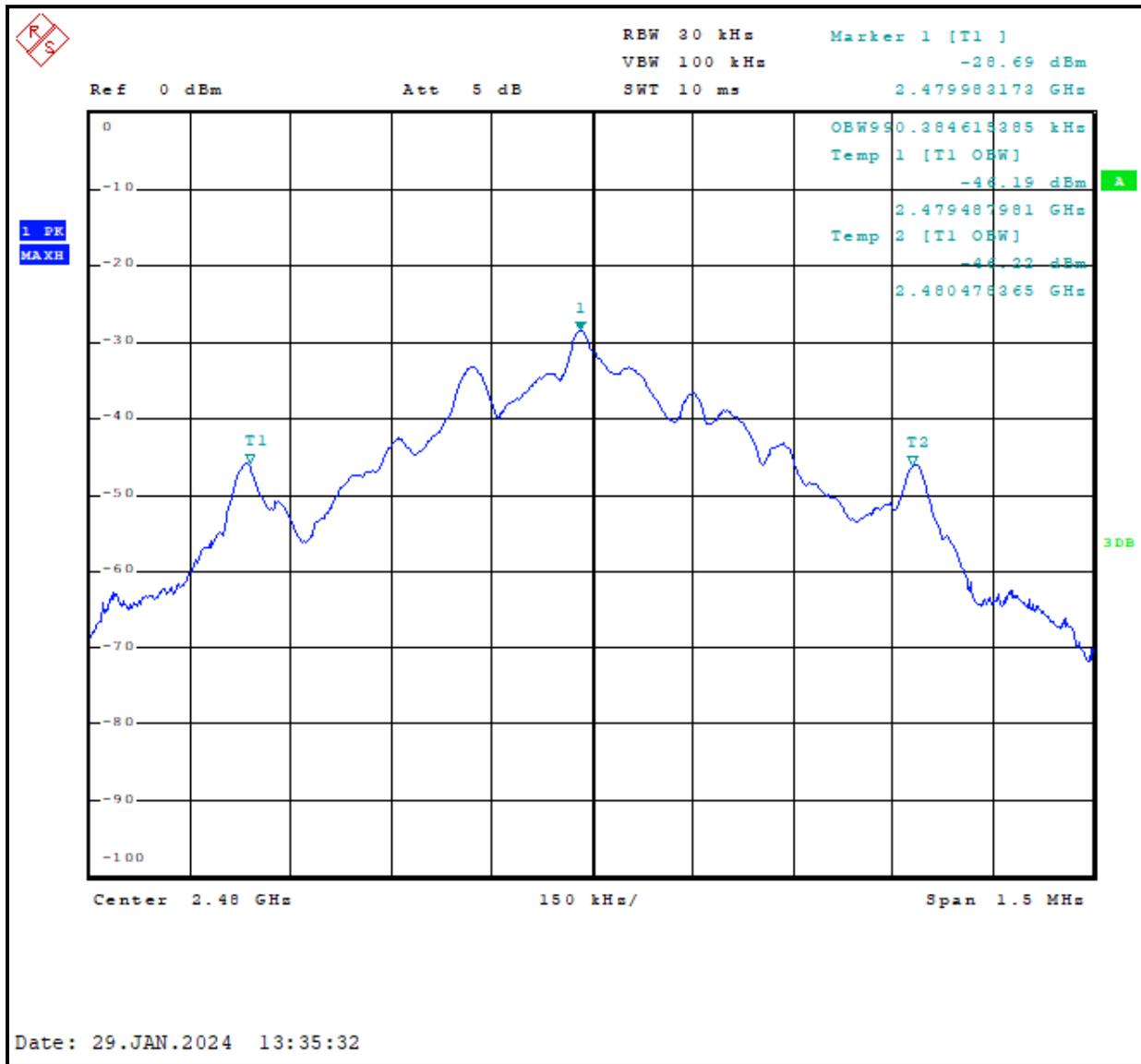
Plot 8-1: 99% Bandwidth - 2402 MHz



Plot 8-2: 99% Bandwidth - 2440 MHz



Plot 8-3: 99% Bandwidth - 2480 MHz



Measurement uncertainty: Measurement uncertainties shown for these tests are expanded uncertainties expressed at 95% confidence level using a coverage factor $k = 2$. Measurement uncertainty = ± 2 dB.

Results: Pass

Test Personnel:

Daniel W. Baltzell
 Test Engineer

Signature

January 29, 2024
 Date of Test

9 Duty Cycle

ANSI C63.10 Section 7.5

The EUT was set to hopping mode for normal use operation. The spectrum analyzer gate function was used to determine the pulse width using the gate start and stop times, with a zero span to capture a pulse from the device under test. The sweep was then set to single sweep for 100 ms.

The Duty Cycle in the above period (100 ms) is equal to the number of pulses multiplied by the dwell time, then divided by 100 ms.

Table 9-1: Duty Cycle Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901672	Rohde & Schwarz	FSEM30	Spectrum Analyzer	833063/13	04/25/2027

9.1 Duty Cycle Test Results

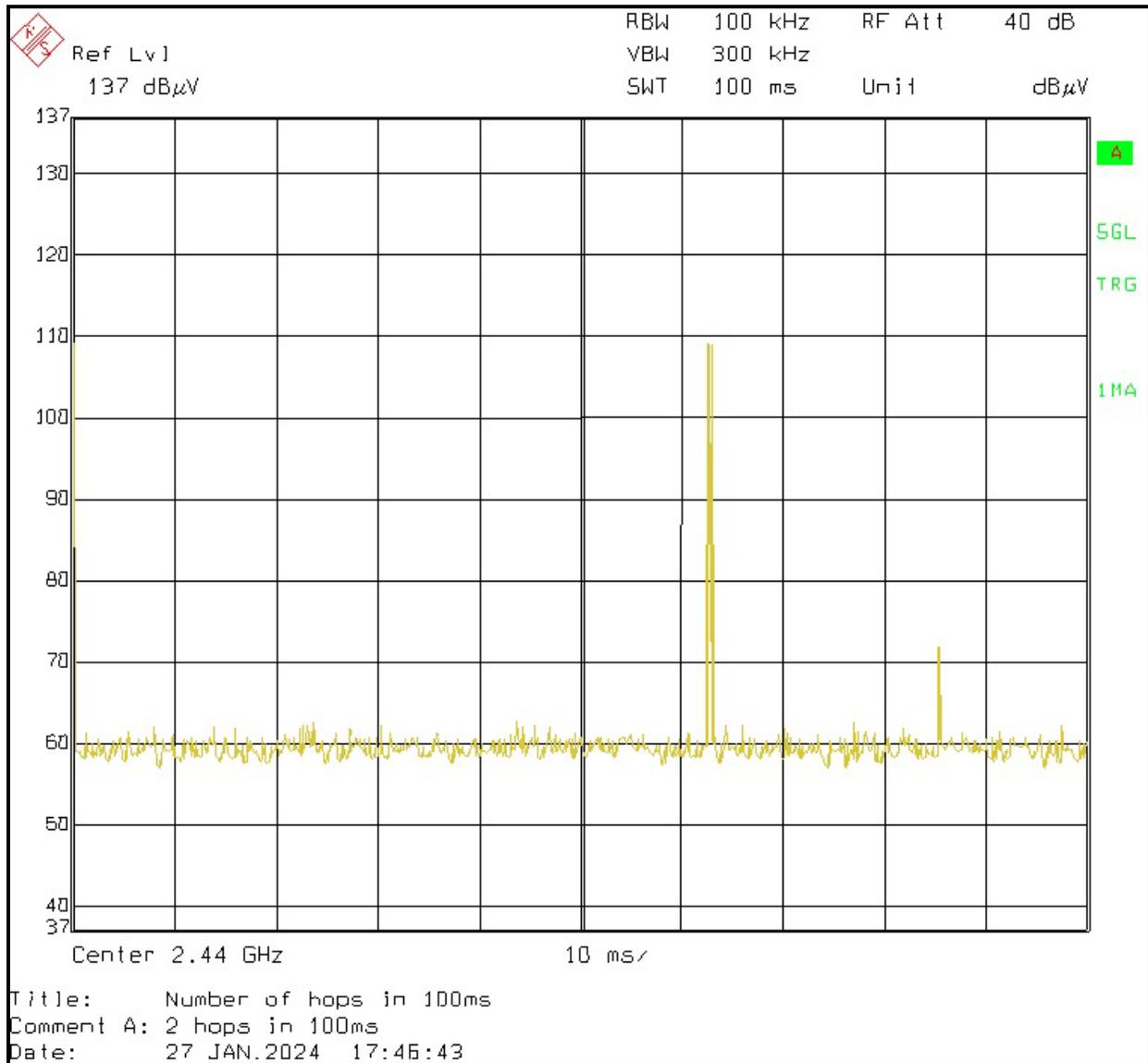
Table 9-2: Duty Cycle – Environmental Factors

Date	Temperature (°C)	Humidity (%)	Atmospheric Pressure (kPa)
01/27/2024	15	60	101

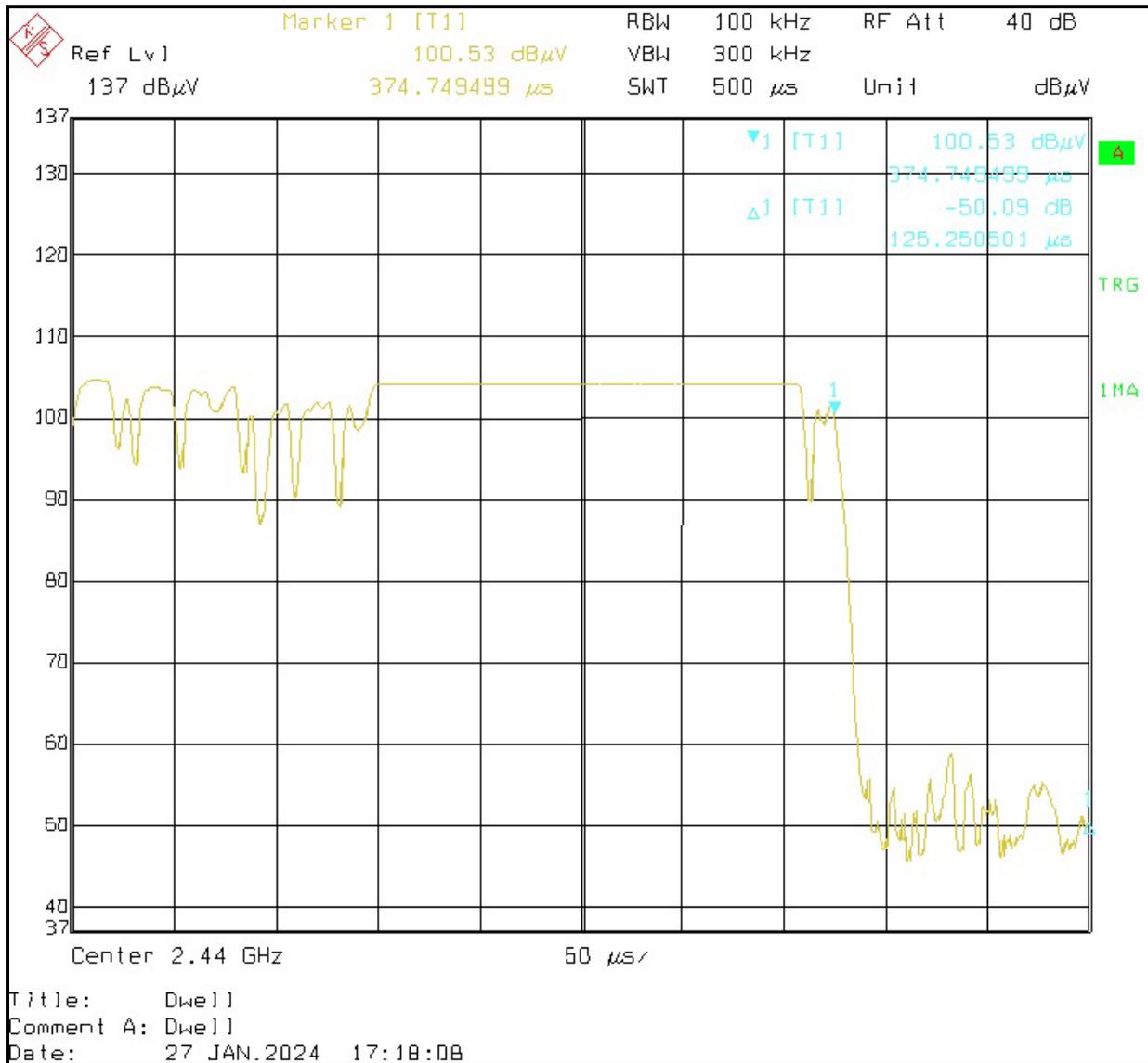
Table 9-3: Duty Cycle Test Data

Frequency (MHz)	Duty Cycle (%)
2440	0.75

Plot 9-1: Duty Cycle, Hopping, 2440 MHz



Plot 9-2: Dwell Time, 2440 MHz (375 μs)



Number of Pulse = 2

DC (%) = $(0.375 \text{ ms} * 2) / 100 \text{ ms} = 0.75 \%$

= $20\text{Log}(0.0075) = -42.5 \text{ dB}$

Results: Pass

Test Personnel:

Daniel W. Baltzell
 Test Engineer

Signature

January 27, 2024
 Date of Test

10 AC Conducted Emissions – FCC 15.207; ISED RSS-Gen 8.8

10.1 Limits of Conducted Emissions Measurement

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

10.2 Conducted Emissions Measurement Test Procedure

Procedure: C63.10-2020 6.2

The power line conducted emission measurements were performed in a Series 81 type shielded enclosure manufactured by Rayproof. The EUT was assembled on a wooden table 80 centimeters high. Power was fed to the EUT through a 50-ohm / 50 micro Henry Line Impedance Stabilization Network (EUT LISN). The EUT LISN was fed power through an A.C. filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT test peripherals. This peripheral LISN was also fed A.C. power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers the EUT host peripherals.

The spectrum analyzer was connected to the A.C. line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. No video filter less than 10 times the resolution bandwidth was used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by increasing the sweep time in order to obtain a calibrated measurement. The emission spectrum was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in this report.

Table 10-1: Conducted Emissions Test Equipment

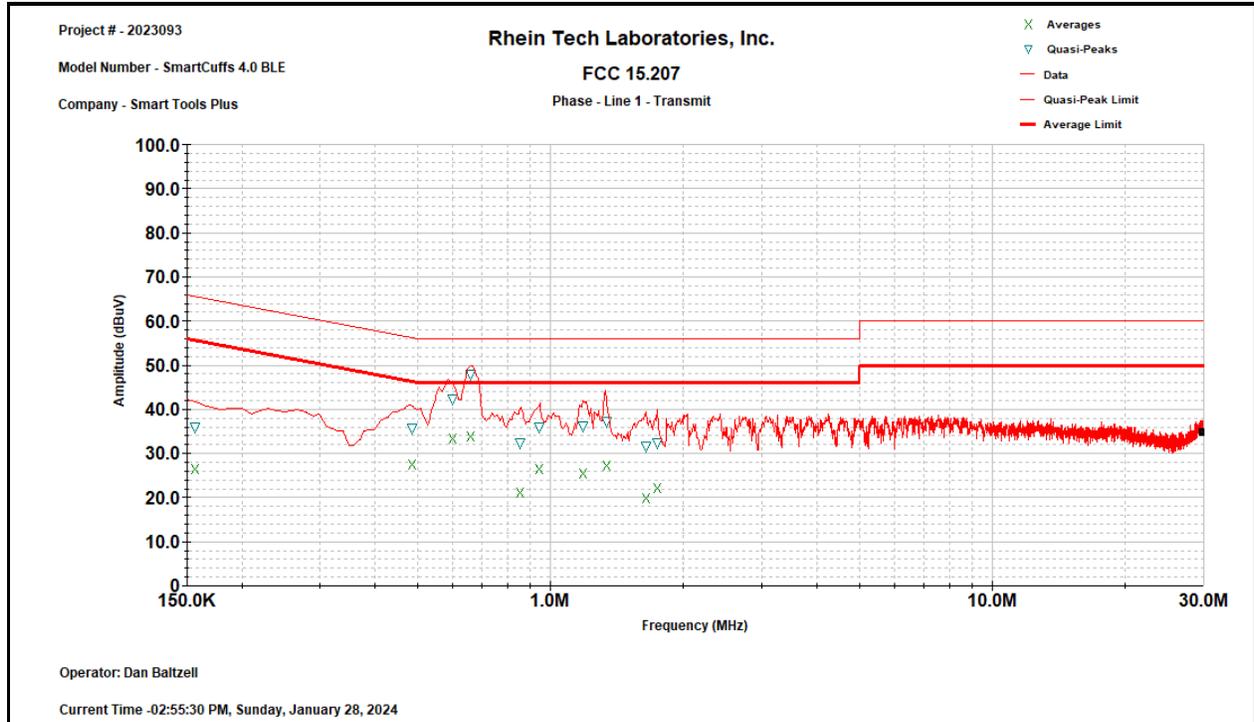
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901083	AFJ International	LS16	16A LISN (110 V)	16010020080	02/16/2025
900339	Hewlett Packard	85650A	Quasi-Peak Adapter (30 Hz - 1 GHz)	2521A00743	09/16/2025
900930	Hewlett Packard	85662A	Spectrum Analyzer Display Section	3144A20839	02/26/2025
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	9009303138A07771	02/26/2025
900728	Solar	8130	Filter	947305	05/08/2026

10.3 Conducted Emissions Test Data

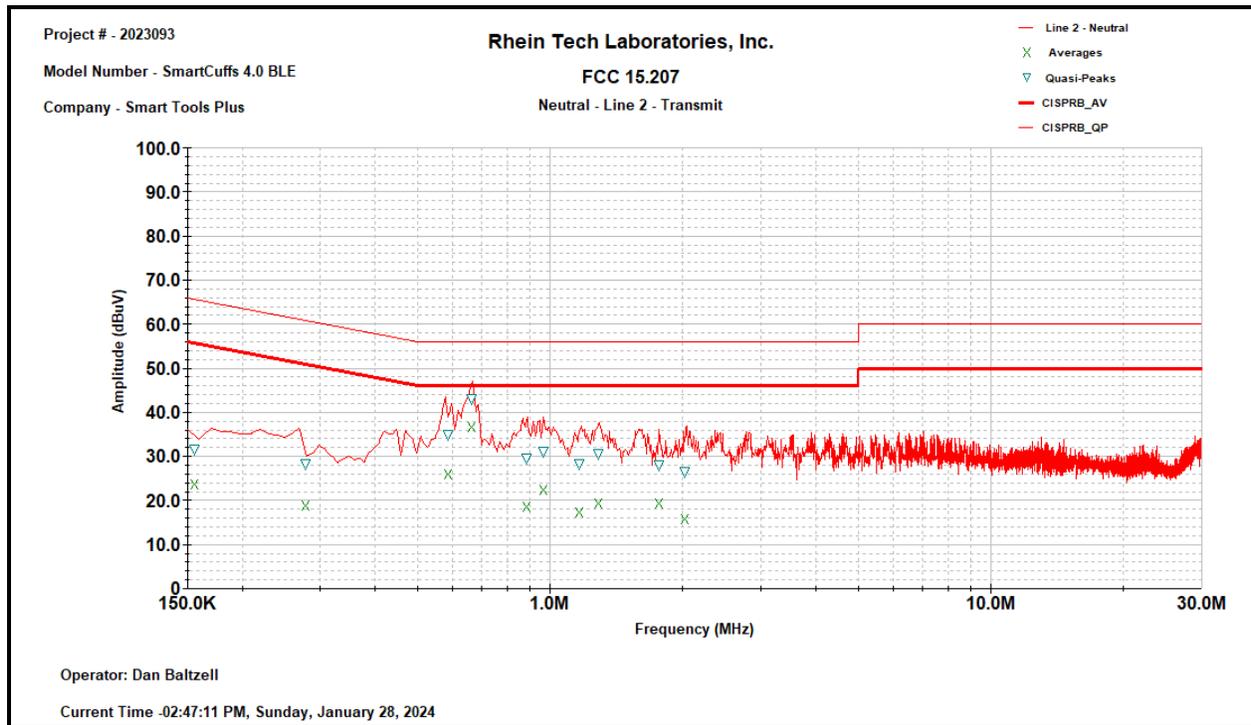
Table 10-2: Conducted Emissions – Environmental Factors

Date	Temperature (°C)	Humidity (%)	Atmospheric Pressure (kPa)
01/28/2024	22.1	26	99.4

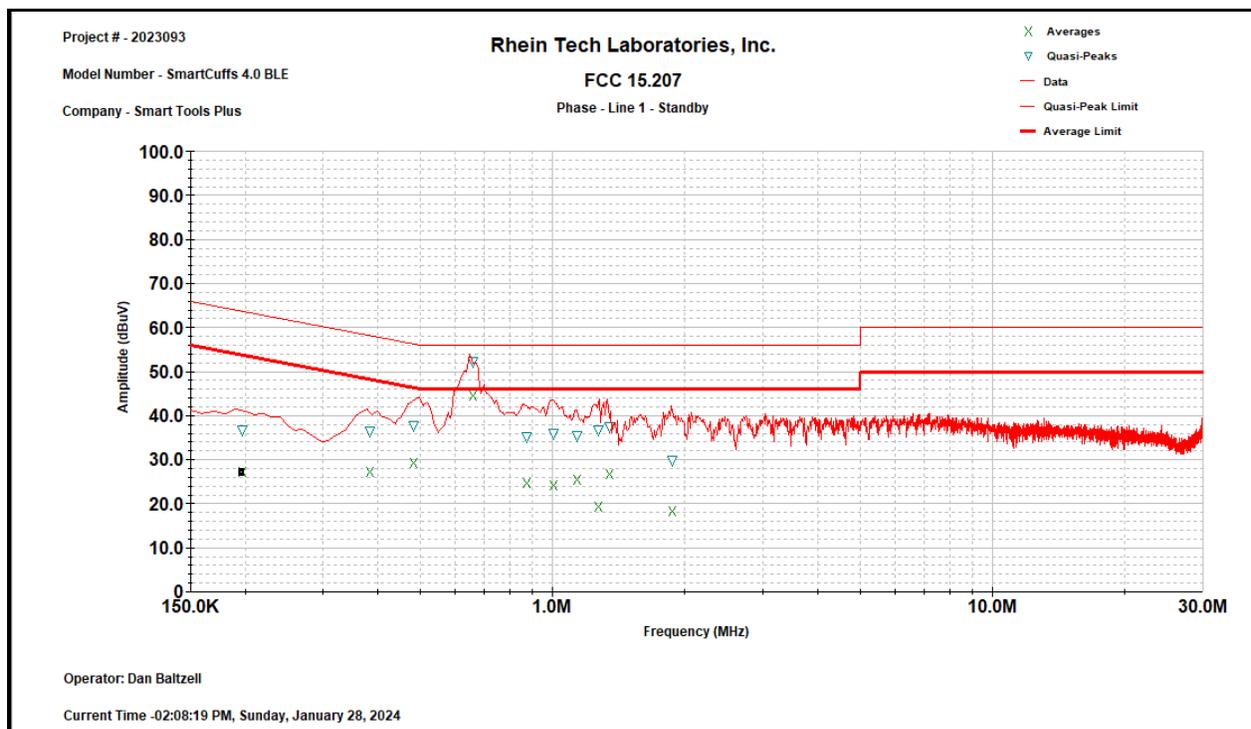
Plot 10-1: Conducted Line Emissions – Phase - Transmit



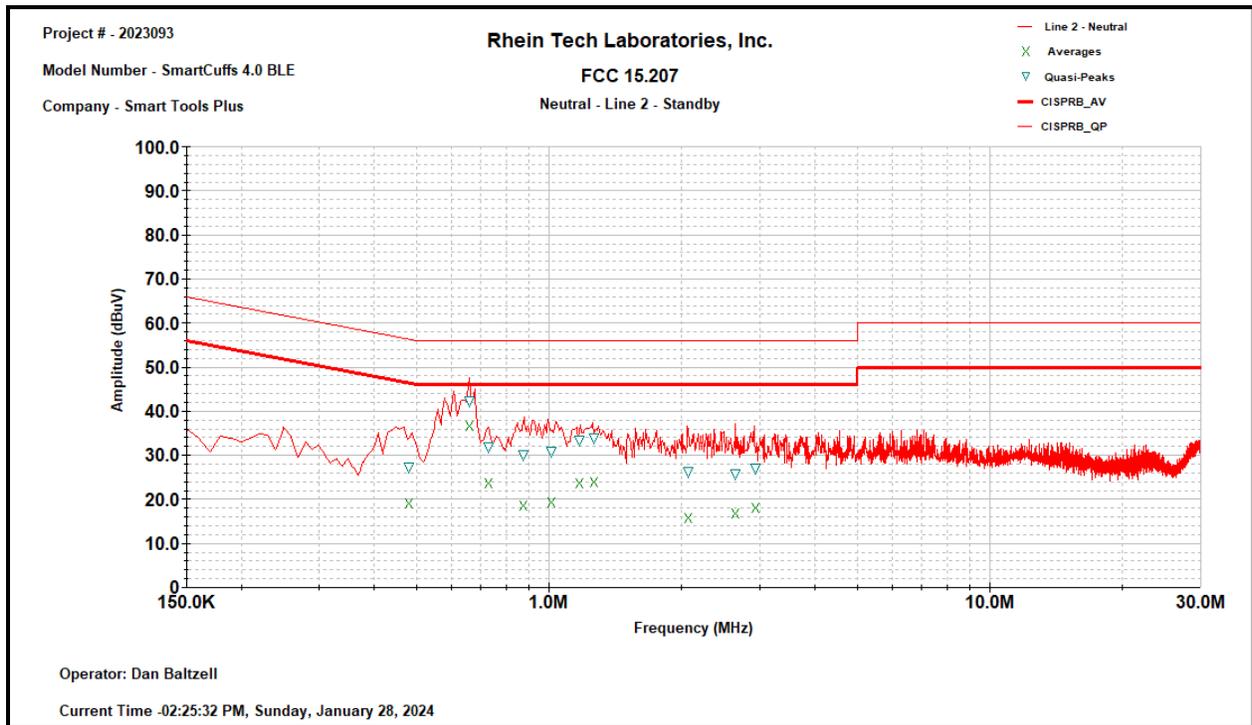
Plot 10-2: Conducted Line Emissions – Neutral - Transmit



Plot 10-3: Conducted Line Emissions – Phase - Receive



Plot 10-4: Conducted Line Emissions – Neutral – Receive



Measurement uncertainties shown for these tests are expanded uncertainties expressed at 95% confidence level using a coverage factor $k = 2$. Conducted Emissions: ± 3.6 dB

Results: Pass

Test Personnel:

Daniel W. Baltzell EMC Test Engineer	 Signature	January 28, 2024 Date of Test
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11 Radiated Emissions – FCC 15.209; ISED RSS-247 5.5; RSS-Gen 8.9, 8.10

11.1 Limits of Radiated Emissions Measurement

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009-0.490	2400/f (kHz)	300
0.490-1.705	24000/f (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any circumstances of modulation.

11.2 Radiated Emissions Measurement Test Procedure

Procedure: C63.10-2020 17.8.8

Before final measurements of radiated emissions were made on the open-field three/ten meter range, the EUT was scanned indoors at one and three meter distances. This was done in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three/ten-meter, open-field test site. The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The spectrum was examined from 9 kHz to the 10th harmonic of the highest fundamental transmitter frequency (9 GHz).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations. For frequencies between 30 and 1000 MHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1,000 MHz, emissions are measured using the average detector function with a minimum resolution bandwidth of 1 MHz. No video filter less than 10 times the resolution bandwidth was used. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Table 11-1: Radiated Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900878	Rhein Tech Laboratories, Inc.	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	N/A
901729	Insulated Wire Inc.	KPS-1503-3150-KPR	SMK RF Cables 20'	NA	12/29/2025
901242	Rhein Tech Laboratories, Inc.	WRT-000-0003	Wood rotating table	N/A	N/A
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	08/25/2025
900321	EMCO	3161-03	Horn Antennas (4 – 8.2 GHz)	9508-1020	08/25/2025
900323	EMCO	3160-7	Horn Antennas (8.2 – 12.4 GHz)	9605-1054	08/25/2025
900356	EMCO	3160-08	Horn Antenna (12.4 – 18.0 GHz)	9607-1044	08/25/2025
901218	EMCO	3160-09	Horn Antenna (18.0 – 26.5 GHz)	960281-003	08/25/2025
901672	Rohde & Schwarz	FSEM30	Spectrum Analyzer	833063/13	04/25/2027
901669	ETS-Lindgren	3142E	Biconilog Antenna (30 MHz – 6000 MHz)	00166065	07/11/2025
900905	Rhein Tech Labs	PR-1040	OATS 1 Preamplifier 40dB (30 MHz – 2 GHz)	1006	01/30/2025
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	01/30/2025
901727	Insulated Wire Inc.	KPS-1503-360-KPR	SMK RF Cables 36"	NA	11/30/2025

11.3 Radiated Emissions Test Results

Table 11-2: Radiated Emissions – Environmental Factors

Date	Temperature (°C)	Humidity (%)	Atmospheric Pressure (kPa)
01/27/2024	15	60	101

11.3.1 Radiated Emissions Unintentional

Table 11-3: Radiated Emissions Unintentional Test Data

Emission Frequency (MHz)	Detector Level (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
160.000	45.5	-24.3	21.2	43.5	-22.3
240.000	45.9	-19.8	26.1	46.0	-19.9
320.000	31.0	-19.8	11.2	46.0	-34.8
400.000	38.1	-16.9	21.2	46.0	-24.8
800.000	30.2	-8.7	21.5	46.0	-24.5
1200.000	28.6	-3.4	25.2	54.0	-28.8

NOTE: 120 kHz RBW/500 kHz VBW Quasi-Peak below 1 GHz; 1 MHz RBW/3 MHz VBW RMS detector above 1 GHz

11.3.2 Radiated Emissions Harmonics/Spurious

Table 11-4: Peak Radiated Emissions Harmonics/Spurious TX Frequency; 2402 MHz

Emission Frequency (MHz)	Peak Detector Level (dBuV) (1 MHz RBW/ 3 MHz VBW)	Site Correction Factor (dB/m)	Peak Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)
4804.0	48.8	8.9	57.7	74.0	-16.3
12010.0	32.3	17.7	50.0	74.0	-24.0
19216.0	34.7	22.9	57.6	74.0	-16.4

Table 11-5: Average Radiated Emissions Harmonics/Spurious TX Frequency; 2402 MHz

Emission Frequency (MHz)	Average Detector Level (dBuV) (1 MHz RBW/ 3 MHz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4804.0	6.3	8.9	15.2	54.0	-38.8
12010.0	-10.2	17.7	7.5	54.0	-46.5
19216.0	-7.8	22.9	15.1	54.0	-38.9

Table 11-6: Peak Radiated Emissions Harmonics/Spurious TX Frequency; 2440 MHz

Emission Frequency (MHz)	Peak Detector Level (dBuV) (1 MHz RBW/ 3 MHz VBW)	Site Correction Factor (dB/m)	Peak Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)
4880.0	48.5	9.1	57.6	74.0	-16.4
7320.0	53.5	12.5	66.0	74.0	-8.0
12200.0	35.5	17.8	53.3	74.0	-20.7
19520.0	35.9	23.2	59.1	74.0	-14.9

Table 11-7: Average Radiated Emissions Harmonics/Spurious TX Frequency; 2440 MHz

Emission Frequency (MHz)	Average Detector Level (dBuV) (1 MHz RBW/ 3 MHz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4880.0	6.0	9.1	15.1	54.0	-38.9
7320.0	11.0	12.5	23.5	54.0	-30.5
12200.0	-7.0	17.8	10.8	54.0	-43.2
19520.0	-6.6	23.2	16.6	54.0	-37.4

Table 11-8: Peak Radiated Emissions Harmonics/Spurious TX Frequency; 2480 MHz

Emission Frequency (MHz)	Peak Detector Level (dBuV) (1 MHz RBW/ 3 MHz VBW)	Site Correction Factor (dB/m)	Peak Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)
4960.0	44.8	9.3	54.1	74.0	-19.9
7440.0	37.1	12.4	49.5	74.0	-24.5
12400.0	36.0	18.3	54.3	74.0	-19.7
19840.0	35.9	23.3	59.2	74.0	-14.8
22320.0	37.1	25.2	62.3	74.0	-11.7

Table 11-9: Average Radiated Emissions Harmonics/Spurious TX Frequency; 2480 MHz

Emission Frequency (MHz)	Average Detector Level (dBuV) (1 MHz RBW/ 3 MHz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4960.0	2.3	9.3	11.6	54.0	-42.4
7440.0	-5.4	12.4	7.0	54.0	-47.0
12400.0	-6.5	18.3	11.8	54.0	-42.2
19840.0	-6.6	23.3	16.7	54.0	-37.3
22320.0	-5.4	25.2	19.8	54.0	-34.2

Measurements interpolated from 1m distance.

Note*: Average calculations were used to obtain Average levels at:

$$\text{Average (dB}\mu\text{V/m)} = \text{Peak (dB}\mu\text{V/m)} + 20 * \text{LOG(Duty Cycle)}$$

Please refer to Section 10 for the Duty Cycle.

Measurement uncertainty: ±4.6 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2

Results: Pass

Test Personnel:

Daniel W. Baltzell EMC Test Engineer	 Signature	January 27, 2024 Date of Test
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12 Conclusion

The data in this measurement report shows the Smart Tools Plus, LLC Model SmartCuffs® 4.0, FCC ID: 2BFLWSC40, IC: 32981-SC40, complies with the applicable requirements of FCC Parts 2 and 15 and ISED RSS-247 and RSS-Gen.