

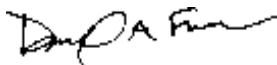


Engineering Solutions & Electromagnetic Compatibility Services

**Certification Application Report
FCC Part 15.247 & ISED RSS-247**

Test Lab: Rhein Tech Laboratories, Inc. Phone: 703-689 0368 360 Herndon Parkway www.rheintech.com Suite 1400 Herndon, VA 20160 E-Mail: atcbinfo@rheintech.com		Applicant: L3Harris Technologies 221 Jefferson Ridge Parkway Lynchburg, VA 24501 USA	
FCC ID IC	OWDTR-0177-E 3636B-0177	Test Report Date	April 9, 2025
Platform	N/A	RTL Work Order #	2024073
Model HVIN	XL-85M UHF-L XLM-85M-UHF-L	RTL Quote Number	QRTL24-073B
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 (Wi-Fi)		
FCC Rule Part(s)	FCC Rules Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz (10-01-21)		
ISED Standards	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) Peak Conducted	Frequency Tolerance	Emission Designator
2412 – 2462	0.141	N/A	17M5GXD
2422 – 2452	0.076	N/A	36M1FXD

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, ANSI C63.10, and ISED RSS-247 and RSS-Gen.

Signature: 

Date: April 9, 2025

Typed/Printed Name: Desmond A. Fraser

Position: President

*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. This report replaces Report R1.0.*

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1 General Information

1.1 Scope

Applicable Standards

- FCC Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
- ISSED RSS-247: Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
- ISSED RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus

1.2 Description of EUT

Equipment Under Test	Mobile Radio
Model / HVIN	XL-85M UHF-L / XLM-85M-UHF-L
Power Supply	13.8 VDC
Frequency Range	2412–2462 MHz

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.

CAB ID: US0079

1.4 Related Submittal(s)/Grant(s)

This is an original certification application for L3Harris Technologies Model XL-85M UHF-L Land Mobile Radio, FCC ID: OWDTR-0177-E, IC: 3636B-0177.

1.5 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: Channels Tested for Wi-Fi – 802.11b (11 Mbps); 802.11g (54 Mbps); 802.11n (6.5 Mbps)

Channel (#)	Frequency (MHz)
1	2412
6	2437
11	2462

2.2 Exercising the EUT

The EUT was tested in all three orthogonal planes in order to determine worst-case emissions. The EUT was provided with software to continuously transmit during testing. The carrier was also checked to verify that information was being transmitted, and all modes were investigated and the worst-case mode was used for final testing. 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 Summary – FCC Part 15, Subpart C (Section 15.247); ISSED RSS-247, RSS-Gen

FCC	ISSED	Test	Result
FCC 15.207	RSS-Gen 8.8	AC Conducted Emissions	N/A
FCC 15.209	RSS-247 5.5; RSS-Gen 8.9, 8.10	Radiated Emissions	Pass
FCC 15.247(a)(2)	RSS-247 5.2(a)	6 dB Bandwidth	Pass
FCC 15.247(b)(1)	RSS-247 5.4(b); RSS-Gen 6.12	Maximum Peak Power Output	Pass
FCC 15.247(d)	RSS-247 5.5; RSS-Gen 6.13	Antenna Conducted Spurious Emissions	Pass
FCC 15.247(d)	RSS-247 5.5	Band Edge Measurement	Pass
FCC 15.247(e)	RSS-247 5.2(b)	Power Spectral Density	Pass
N/A	RSS-Gen 6.7	99% Bandwidth	Pass

2.4 Tested System Details

The test sample was received on December 27, 2024. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable.

The device was programmed for multiple modes of operation and modulation types.

Table 2-3: Equipment Under Test (EUT)

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Mobile Radio	L3Harris Technologies	XL-85M UHF-L	FCC UNIT 2	OWDTR-0177-E	24455
Mobile Radio	L3Harris Technologies	XL-85M UHF-L	N/A	OWDTR-0177-E	24456
Control Head/Keyboard	L3Harris Technologies	XL-CH2	A4031A000186	OWDTR-0171-E	24454
Wi-Fi/BT Antenna	JRC Mobility	MTD302248	MTD302248	N/A	N/A
Handset/Mic/Speaker	L3Harris Technologies	N/A	14050-6010-01	N/A	24462

2.5 Configuration of Tested System

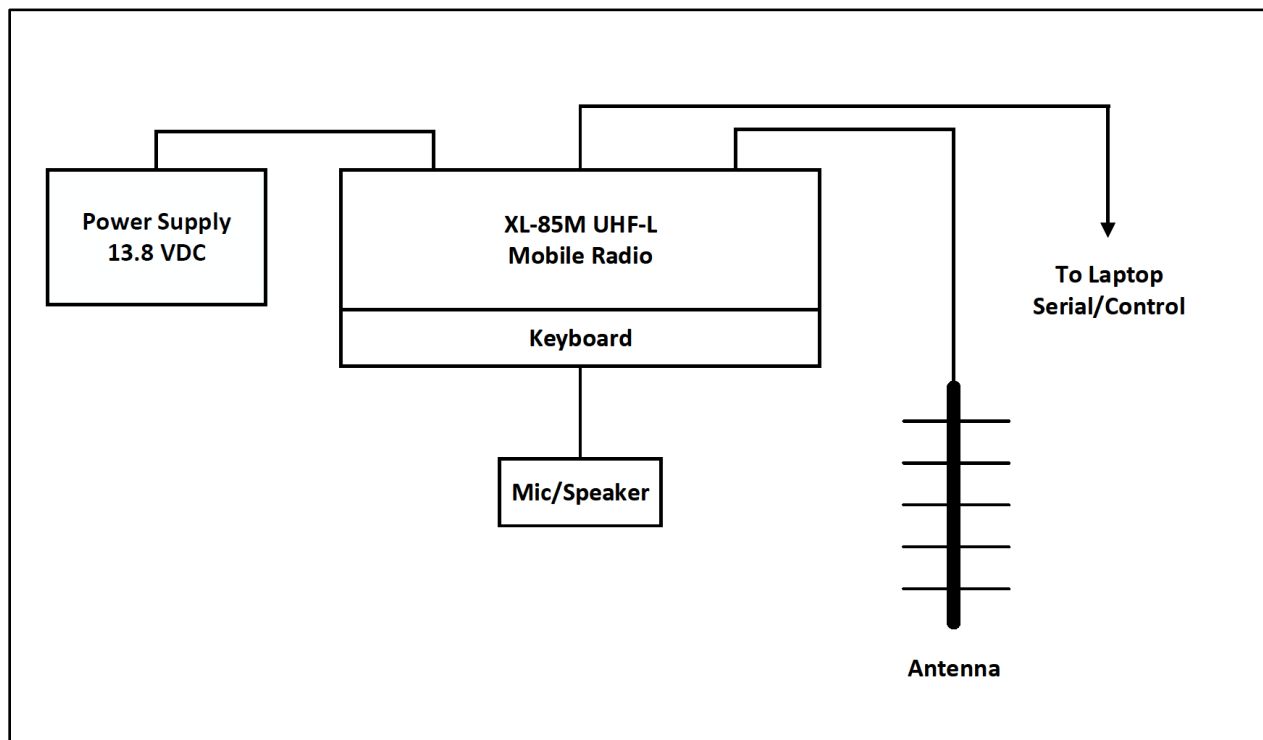


Figure 2-1: Configuration of Tested System

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

3.1 Power Output Test Procedure

A conducted power measurement of the EUT was taken with an analyzer. The following settings were used:

- 1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel (5 MHz used)
- 2) RBW >20 dB bandwidth of the emission being measured (2 MHz used)
- 3) VBW ≥RBW (3 MHz used)
- 4) Sweep: Auto
- 5) Detector function: Peak
- 6) Trace: Max hold. The trace was allowed to stabilize, and the marker-to-peak function was used to set the marker to the peak of the emission.

Table 3-1: Power Output Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW	Spectrum Analyzer	101021	02/02/2027

3.2 Power Output Test Results

Table 3-2: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Pressure (kPa)
December 27, 2024	22.1	38	101.3

Table 3-3: Power Output Test Data – 802.11b

Channel (#)	Frequency (MHz)	Conducted Peak Power (dBm)	Limit (dBm)	Margin (dB)
1	2412	21.5	30.0	-8.5
6	2437	19.3	30.0	-10.7
11	2462	18.1	30.0	-11.9

Table 3-4: Power Output Test Data – 802.11g

Channel (#)	Frequency (MHz)	Conducted Peak Power (dBm)	Limit (dBm)	Margin (dB)
1	2412	18.8	30.0	-11.2
6	2437	18.7	30.0	-11.3
11	2462	18.0	30.0	-12.0

Table 3-5: Power Output Test Data – 802.11n

Channel (#)	Frequency (MHz)	Conducted Peak Power (dBm)	Limit (dBm)	Margin (dB)
1	2422	16.4	30.0	-13.6
6	2437	18.8	30.0	-11.2
11	2452	16.5	30.0	-13.5

Rhein Tech Laboratories, Inc.
360 Herndon Parkway
Suite 1400
Herndon, VA 20170
<http://www.rheintech.com>

Client: L3Harris Technologies
Model: XL-85M UHF-L
Standards: FCC 15.247 & ISSED RSS-247
ID's: FCC ID: OWDTR-0177-E/IC: 3636B-0177
Report #: 2024073DTS

Highest conducted peak power measured: 21.5 dBm $\approx$ 141 mW; $P(\text{Watts}) = 10^{(\text{dBm} / 10)} / 1000$

Measurement uncertainty: ± 0.5 dB. This measurement uncertainty is an expanded uncertainty for a 95% confidence level received with a coverage factor $k=2$.

Results: Pass

Test Personnel:

Daniel W. Baltzell		December 27, 2024
Test Engineer	Signature	Date of Test

4 Compliance with the Band Edge – FCC 15.247(d); RSS-247 5.5

4.1 Band Edge Test Procedure

The transmitter output was connected to its appropriate antenna. 1 MHz integrated peak (100 kHz RBW/ 300 kHz VBW) and 1 MHz integrated average (100 MHz RBW/300 kHz VBW) corrected measurements were taken within the restricted band to show compliance.

Table 4-1: Band Edge Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW	Spectrum Analyzer	101021	02/02/2027

4.2 Restricted Band Edge Test Results

Table 4-2: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Pressure (kPa)
December 28, 2024	22.1	38	101.3
December 29, 2024	22.7	26	100.6

EUT was programmed to TX with 11.0 Mbps rate, 20 MHz bandwidth, and 20 dBm power level, and 54.0 Mbps rate for 802.11g; 802.11n used 40 MHz and 20 dBm for all test frequencies.

Conversion of dBm to dBµV/m at 3 m:

$$\text{dB}\mu\text{V/m} = \text{dBm} + 104.7 - (20 * \text{LOG}(3\text{m})) = \text{dBm} + 95.2$$

4.3 Band Edge Plots

Plot 4-1: Lower Band Edge – Average – 802.11b

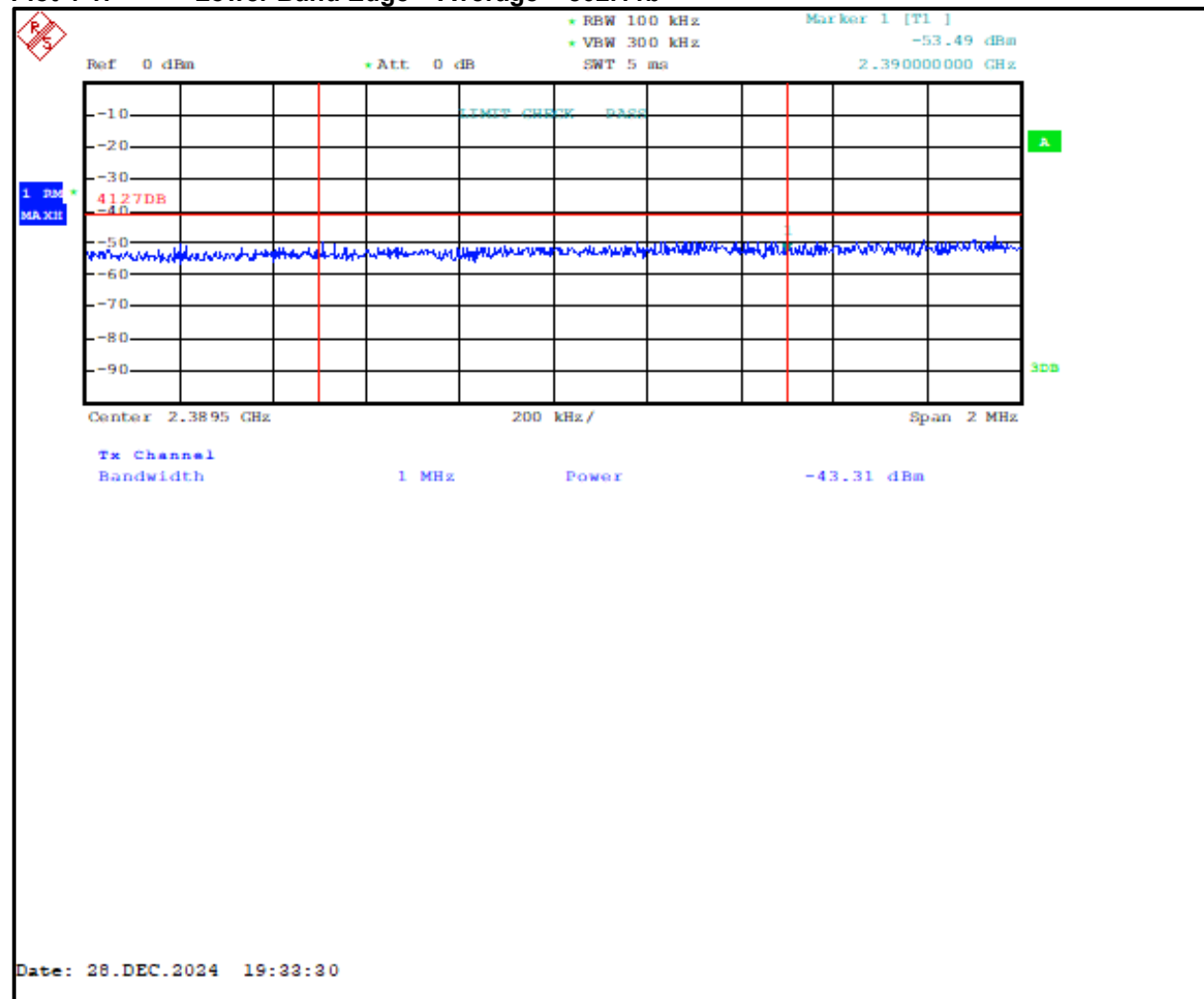


Table 4-3: Lower Band Edge - Average – 802.11b

Frequency (MHz)	Measured Average Level (dBm)	Field Strength Conversion (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)
2385.0	-43.3	51.9	54.0	-2.1

Plot 4-2: Lower Band Edge – Peak – 802.11b

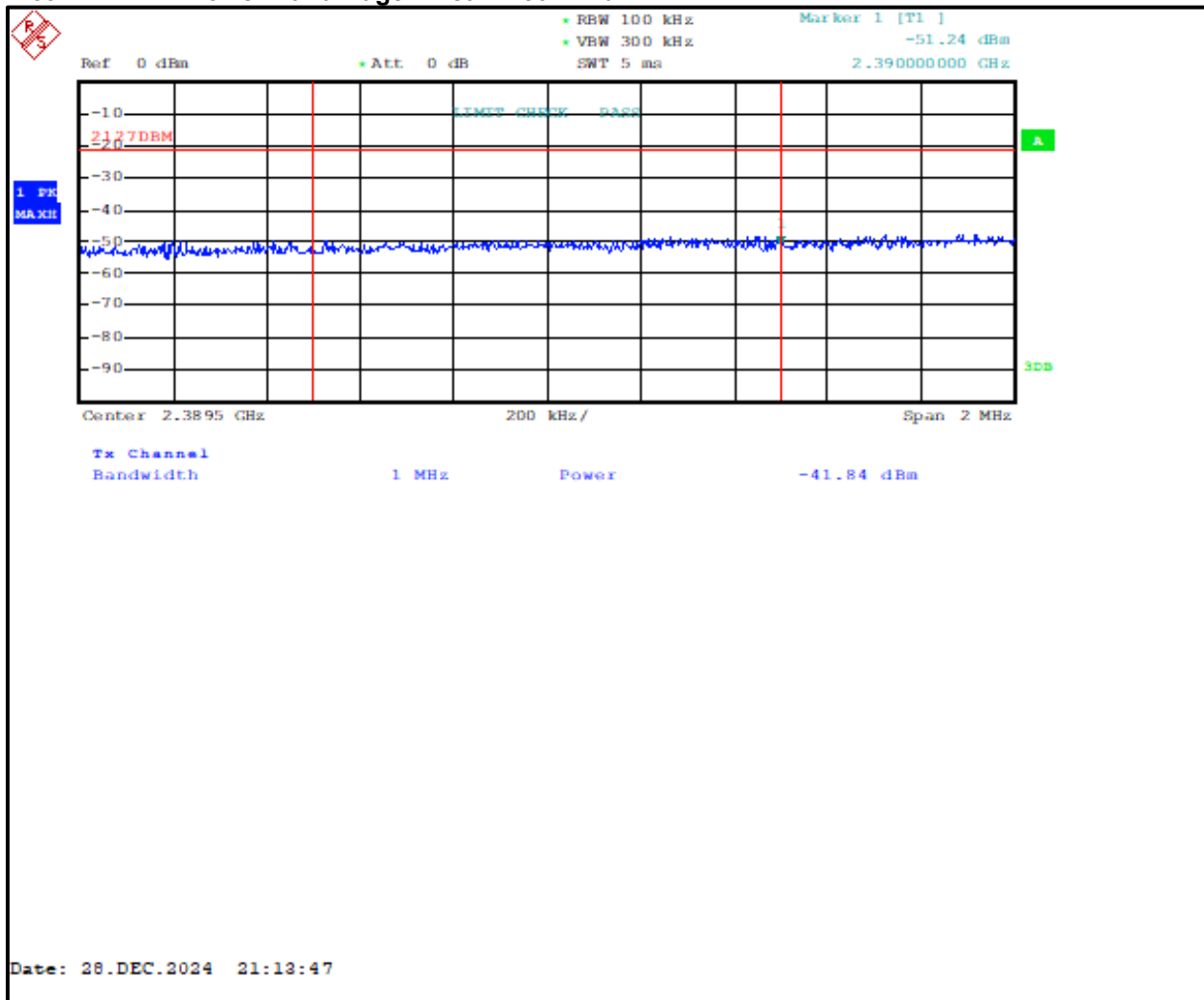


Table 4-4: Lower Band Edge - Peak – 802.11b

Frequency (MHz)	Measured Peak Level (dBm)	Field Strength Conversion (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)
2385.0	-41.8	53.4	74.0	-20.6

Plot 4-3: Upper Band Edge – Average – 802.11b

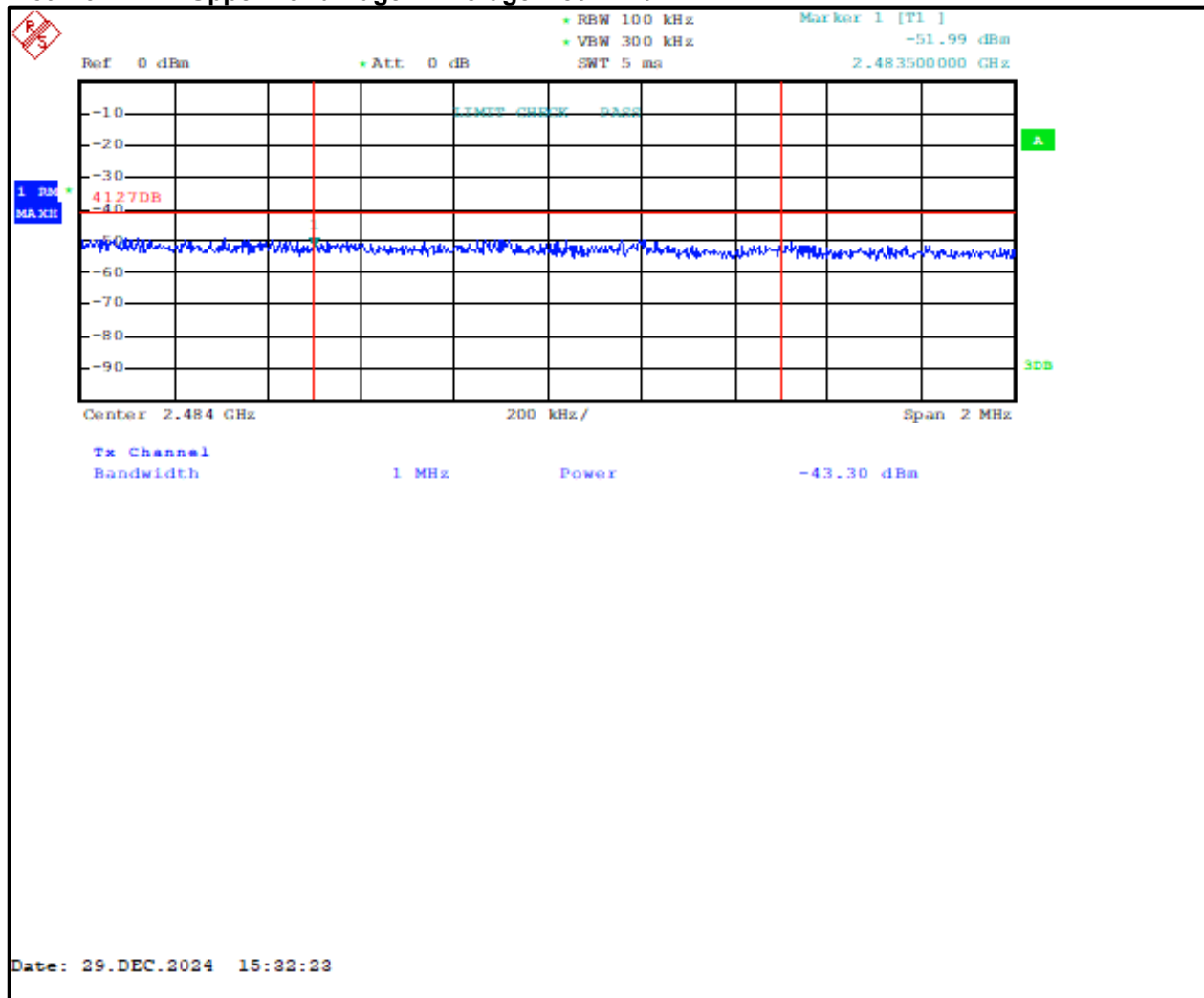


Table 4-5: Upper Band Edge - Average – 802.11b

Frequency (MHz)	Measured Average Level (dBm)	Field Strength Conversion (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)
2484.0	-43.3	51.9	54.0	-2.1

Plot 4-4: Upper Band Edge – Peak – 802.11b

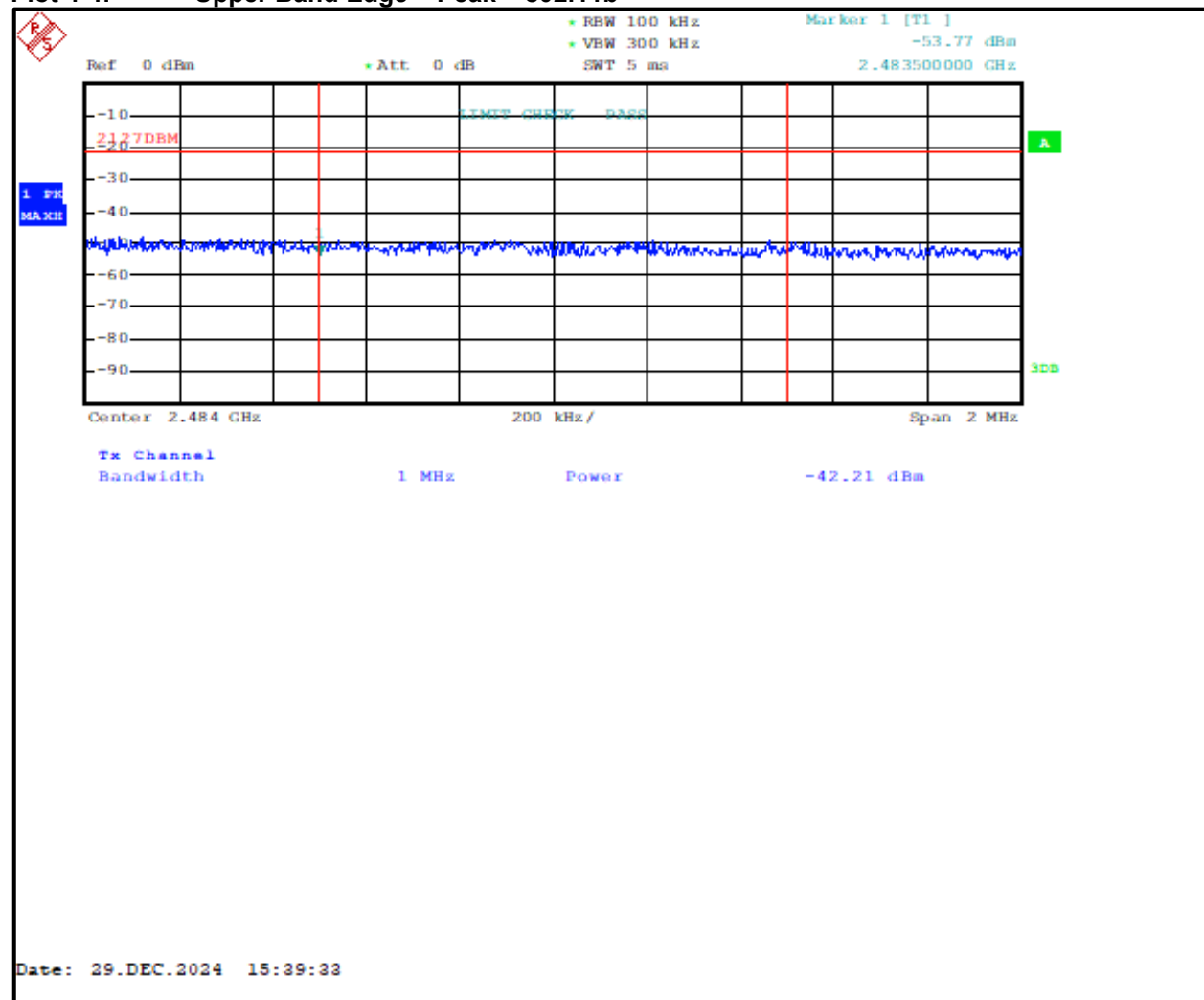


Table 4-6: Upper Band Edge - Peak – 802.11b (11.0 Mbps)

Frequency (MHz)	Measured Peak Level (dBm)	Field Strength Conversion (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)
2484.0	-42.2	53.0	74.0	-21.0

Plot 4-5: Lower Band Edge – Average – 802.11g



Table 4-7: Lower Band Edge - Average – 802.11g

Frequency (MHz)	Measured Level (dBm)	Field Strength Conversion (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2389.5	-50.7	44.5	54.0	-9.5

Plot 4-6: Lower Band Edge – Peak – 802.11g

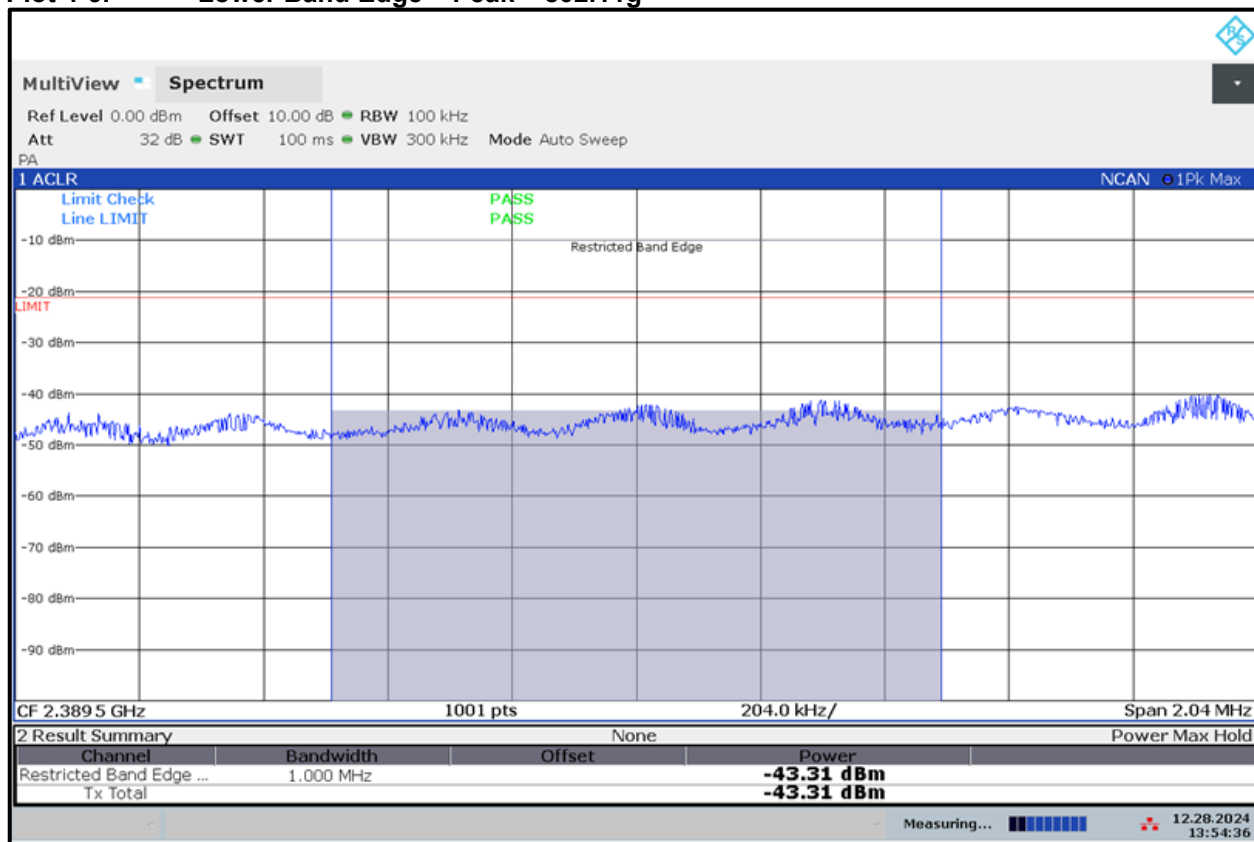


Table 4-8: Lower Band Edge - Peak – 802.11g

Frequency (MHz)	Measured Peak Level (dBm)	Field Strength Conversion (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)
2389.5	-43.3	51.9	74.0	-22.1

Plot 4-7: Upper Band Edge – Average – 802.11g

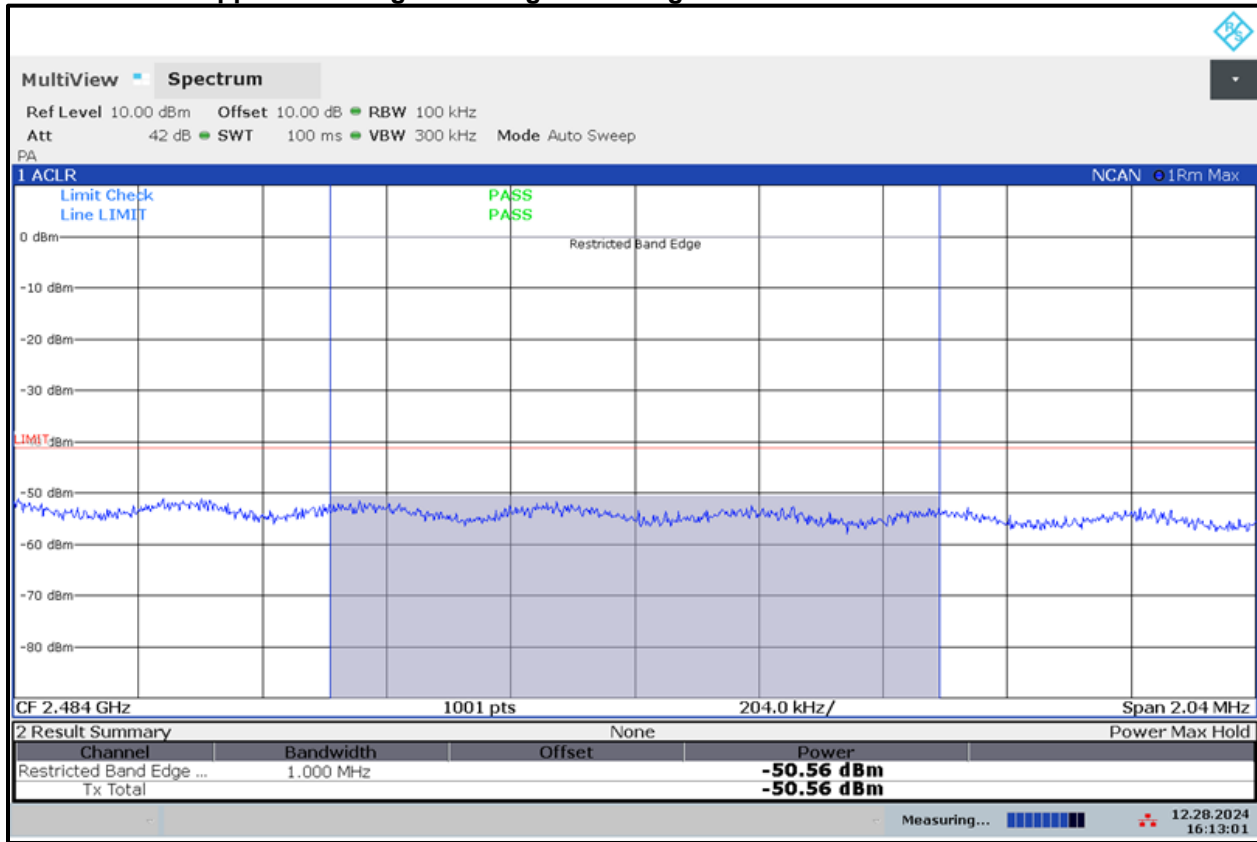


Table 4-9: Upper Band Edge – Average – 802.11g

Frequency (MHz)	Measured Level (dBm)	Field Strength Conversion (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2484.0	-50.6	44.6	54.0	-9.4

Plot 4-8: Upper Band Edge – Peak – 802.11g

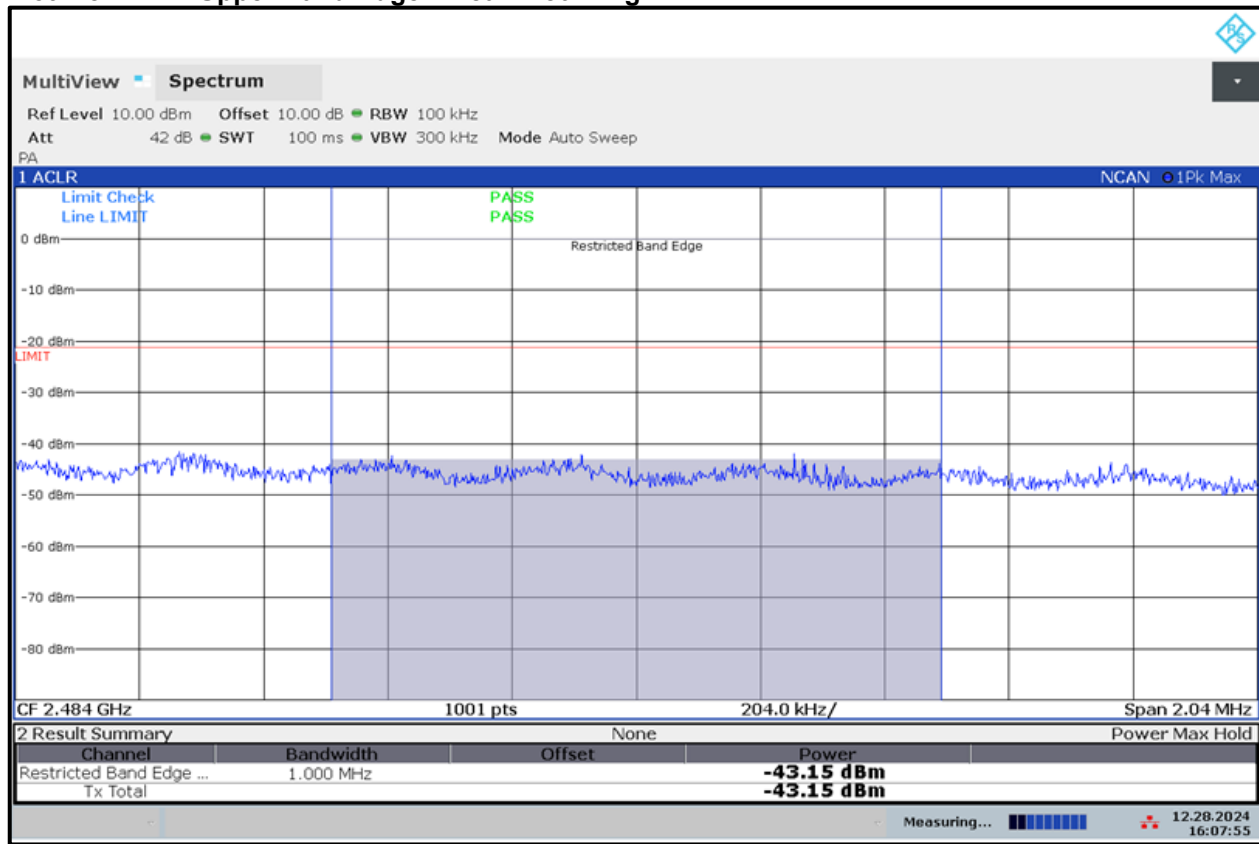


Table 4-10: Upper Band Edge - Peak – 802.11g

Frequency (MHz)	Measured Peak Level (dBm)	Field Strength Conversion (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)
2484.0	-43.2	-52.0	74.0	-22.0

Plot 4-9: Lower Band Edge – Average – 802.11n

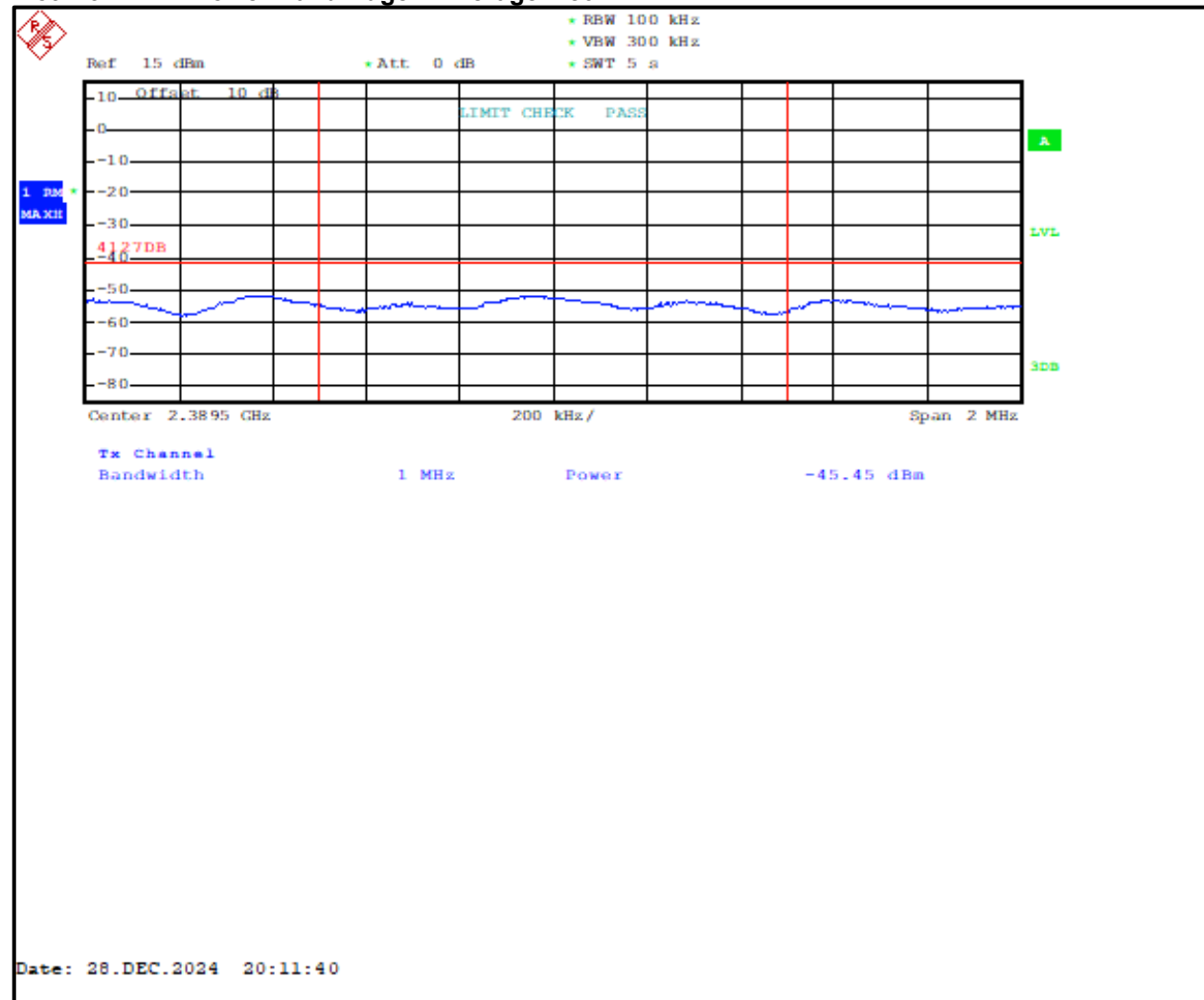


Table 4-11: Lower Band Edge - Average – 802.11n

Frequency (MHz)	Measured Average Level (dBm)	Field Strength Conversion (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)
2385.0	-45.5	49.7	54.0	-4.3

Plot 4-10: Lower Band Edge – Peak – 802.11n

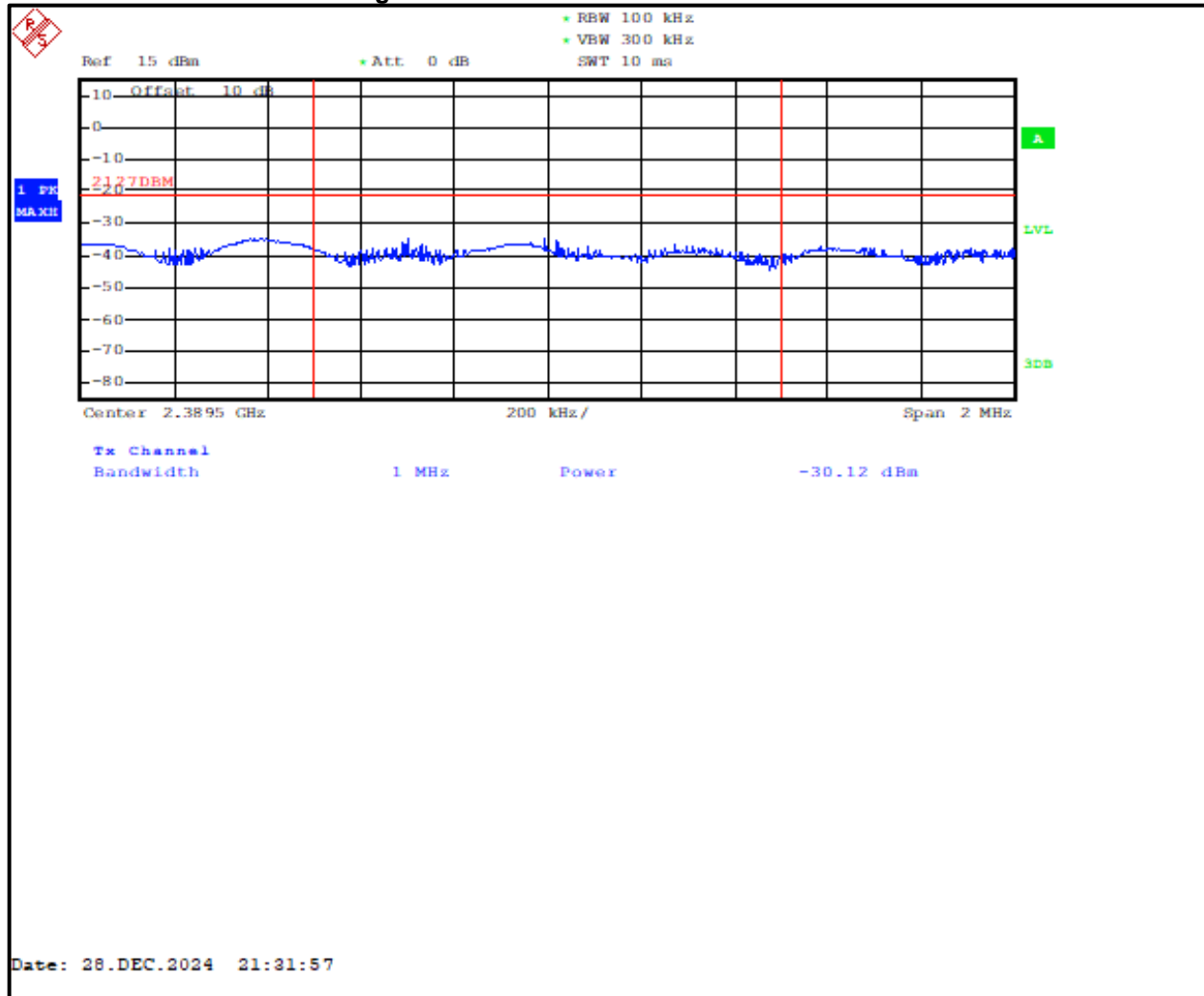


Table 4-12: Lower Band Edge - Peak – 802.11n

Frequency (MHz)	Measured Peak Level (dBm)	Field Strength Conversion (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)
2385.0	-30.1	65.1	74.0	-8.9

Plot 4-11: Upper Band Edge – Average – 802.11n

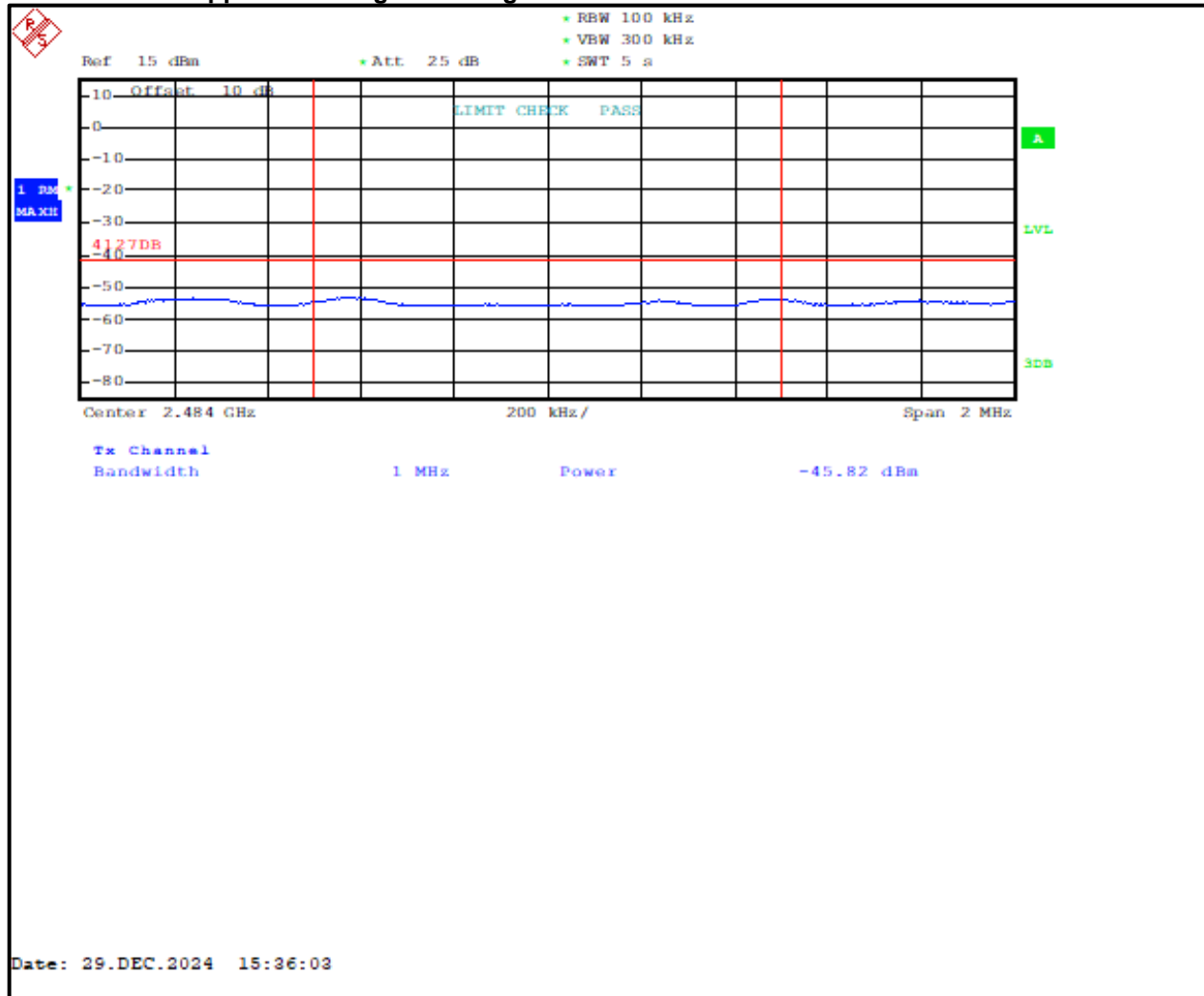


Table 4-13: Upper Band Edge - Average – 802.11n

Frequency (MHz)	Measured Average Level (dBm)	Field Strength Conversion (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)
2484.0	-45.8	49.4	54.0	-4.6

Plot 4-12: Upper Band Edge – Peak – 802.11n

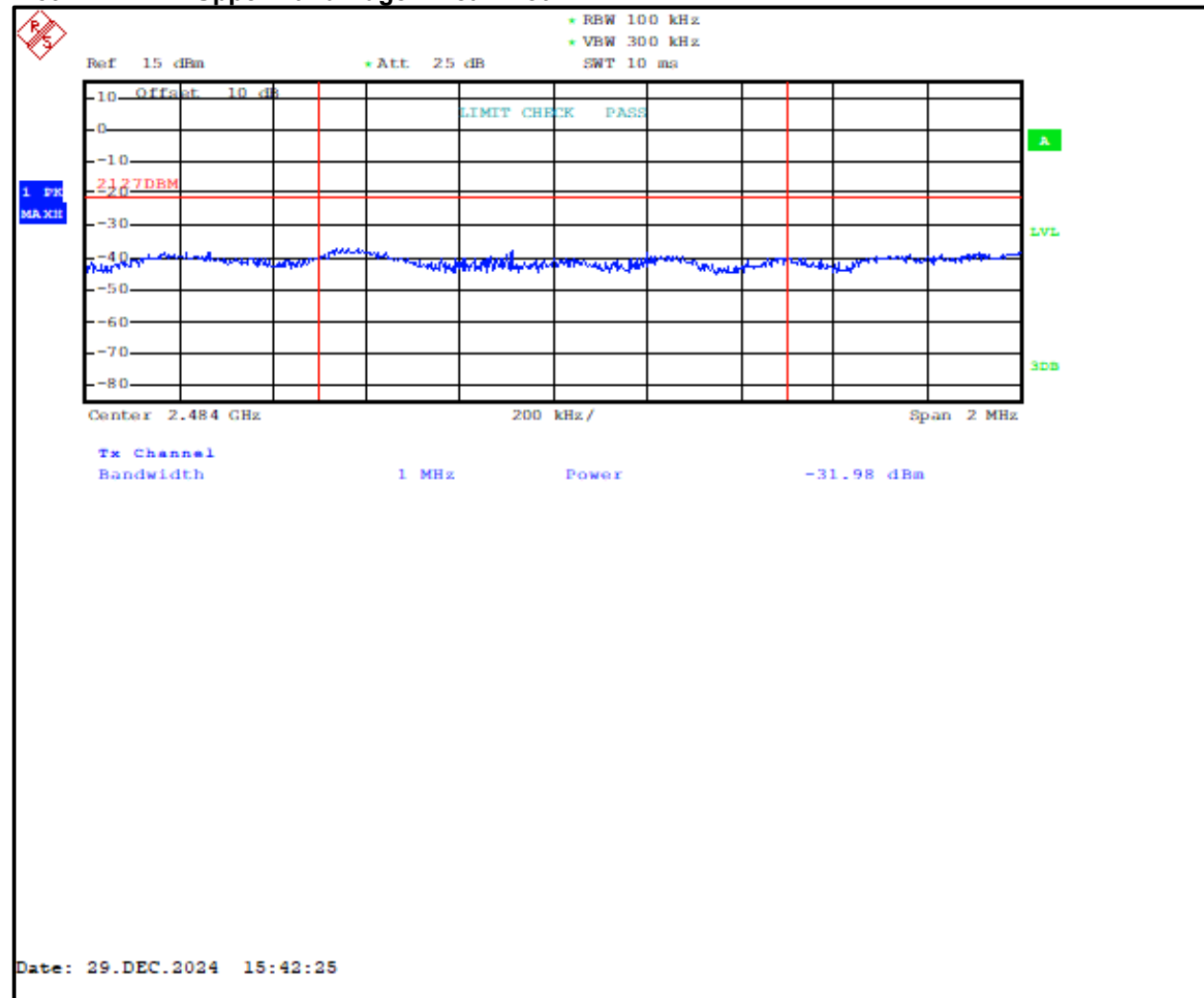


Table 4-14: Upper Band Edge - Peak – 802.11n

Frequency (MHz)	Measured Peak Level (dBm)	Field Strength Conversion (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)
2484.0	-32.0	63.2	74.0	-10.8

Measurement uncertainty: ± 0.5 dB. This measurement uncertainty is an expanded uncertainty for a 95% confidence level received with a coverage factor $k=2$.

Results: Pass

Test Personnel:

Daniel W. Baltzell
Test Engineer

Daniel W. Baltzell

Signature

December 28-29, 2024
Dates of Test

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

5.1 Antenna Conducted Spurious Emissions Test Procedures

Antenna spurious emissions per FCC 15.247(d) were measured from the EUT antenna port using a A 50-ohm spectrum analyzer with a resolution bandwidth of 100 kHz and a video bandwidth of 100 kHz. The modulated carrier was identified at the following frequencies: 2,412 MHz, 2,437 MHz, and 2,462 MHz.

Table 5-1: Antenna Conducted Spurious Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	12/01/27

5.2 Antenna Conducted Spurious Emissions Test Results

Table 5-2: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Pressure (kPa)
December 30, 2024	22	41	101.2

Note: EUT was programmed to TX with 11.0 Mbps rate, 20 MHz bandwidth, and 10 dBm power level for all three test frequencies.

No harmonics or spurs were found within 20 dB (note that we are reporting power as peak) of the carrier level from the carrier to the 10th harmonic of the carrier frequency.

Measurement uncertainty: ± 0.5 dB. This measurement uncertainty represents an expanded uncertainty for a 95% confidence level, obtained with a coverage factor $k = 2$.

Results: Pass

Test Personnel:

Daniel W. Baltzell
Test Engineer



Signature

December 30, 2024
Date of Test

6 Bandwidths – FCC 15.247(a)(1); RSS-247 5.2(a); RSS-Gen 6.7

6.1 Bandwidth Test Procedure

The minimum 6 dB and 99% bandwidths, as specified in FCC 15.247(a)(1), RSS-247 5.2(a), and RSS-Gen 6.7, were measured using a 50-ohm spectrum analyzer with the resolution bandwidth set at 100 kHz and the video bandwidth set at ≥ 3 times the resolution bandwidth (RBW). The device was modulated; the VBW shall not be smaller than three times the RBW value. Video averaging is not permitted.

The maximum bandwidth shall be 6 dB, with a value of 500 kHz.

Table 6-1: Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW	Spectrum Analyzer	101021	02/02/2027

6.2 Modulated Bandwidth Test Results

Table 6-2: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Pressure (kPa)
December 29, 2024	22.7	38	101.3

Table 6-3: Modulated Bandwidth Test Data – 802.11b

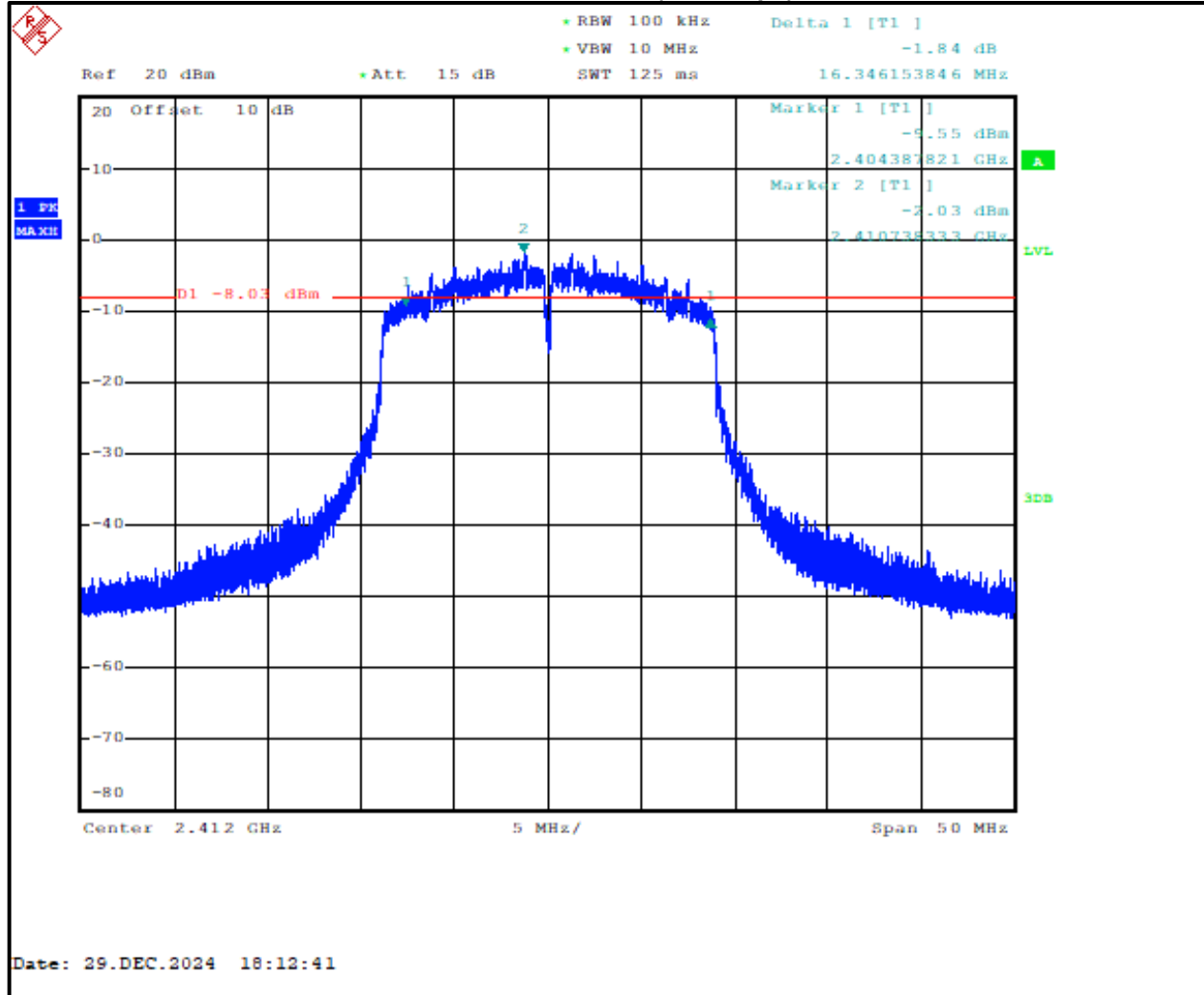
Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)
2412	16.4	17.4
2437	15.4	17.5
2462	16.7	17.5

Table 6-4: Modulated Bandwidth Test Data – 802.11n

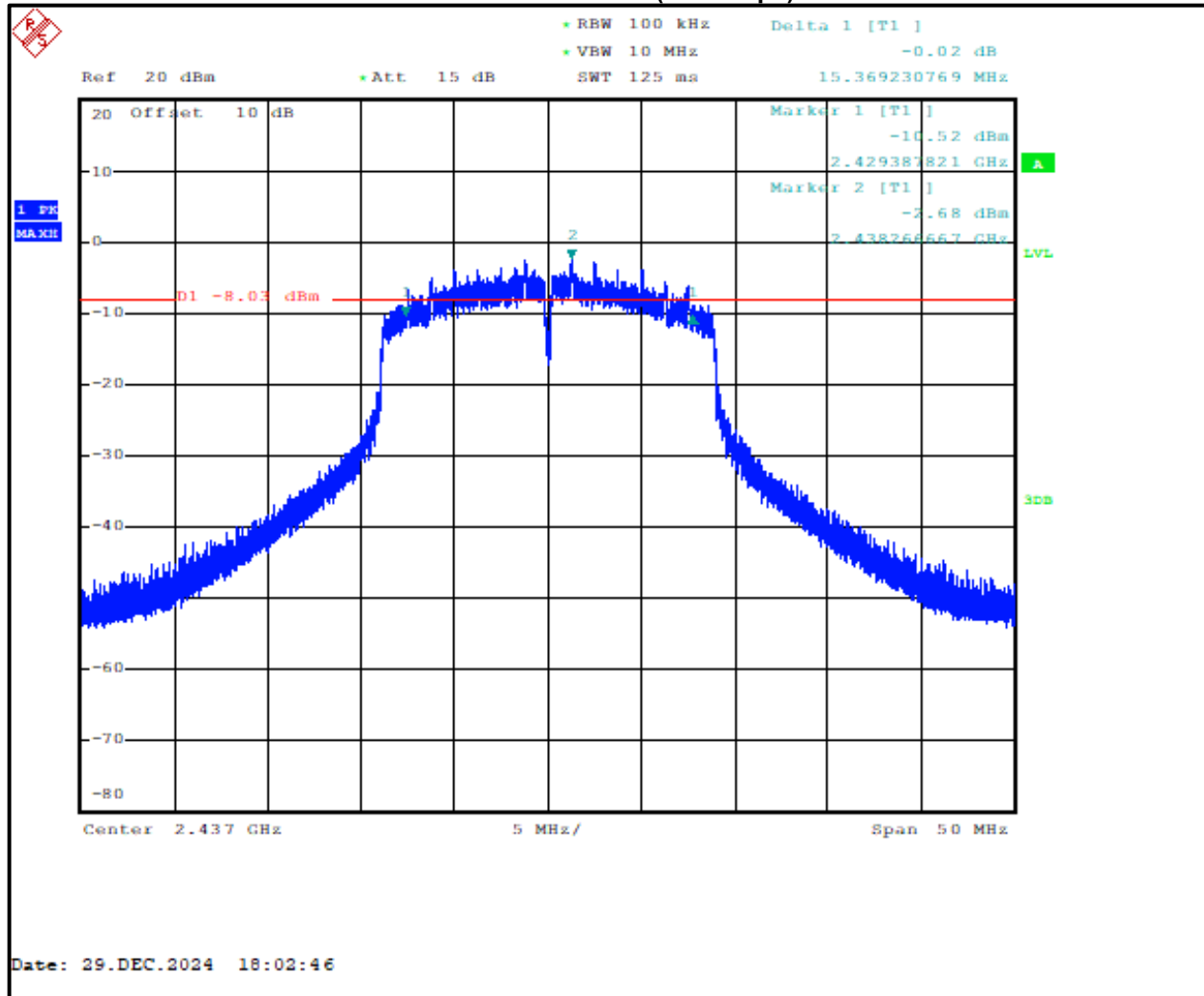
Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)
2422	35.6	35.9
2437	35.7	36.1
2452	35.1	35.9

6.3 Bandwidth Plots

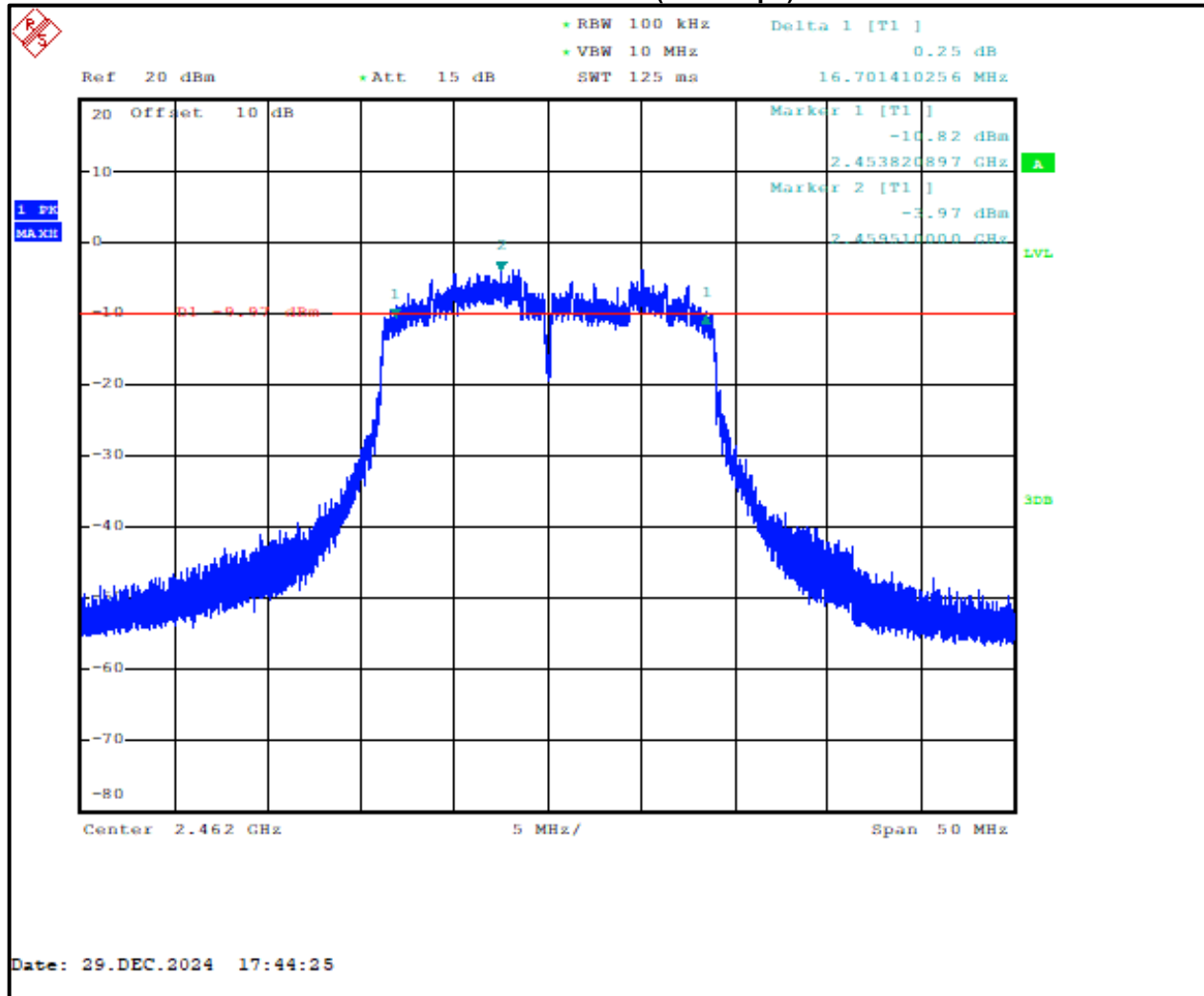
Plot 6-1: 6 dB Bandwidth – 2412 MHz – 802.11b (11.0 Mbps)



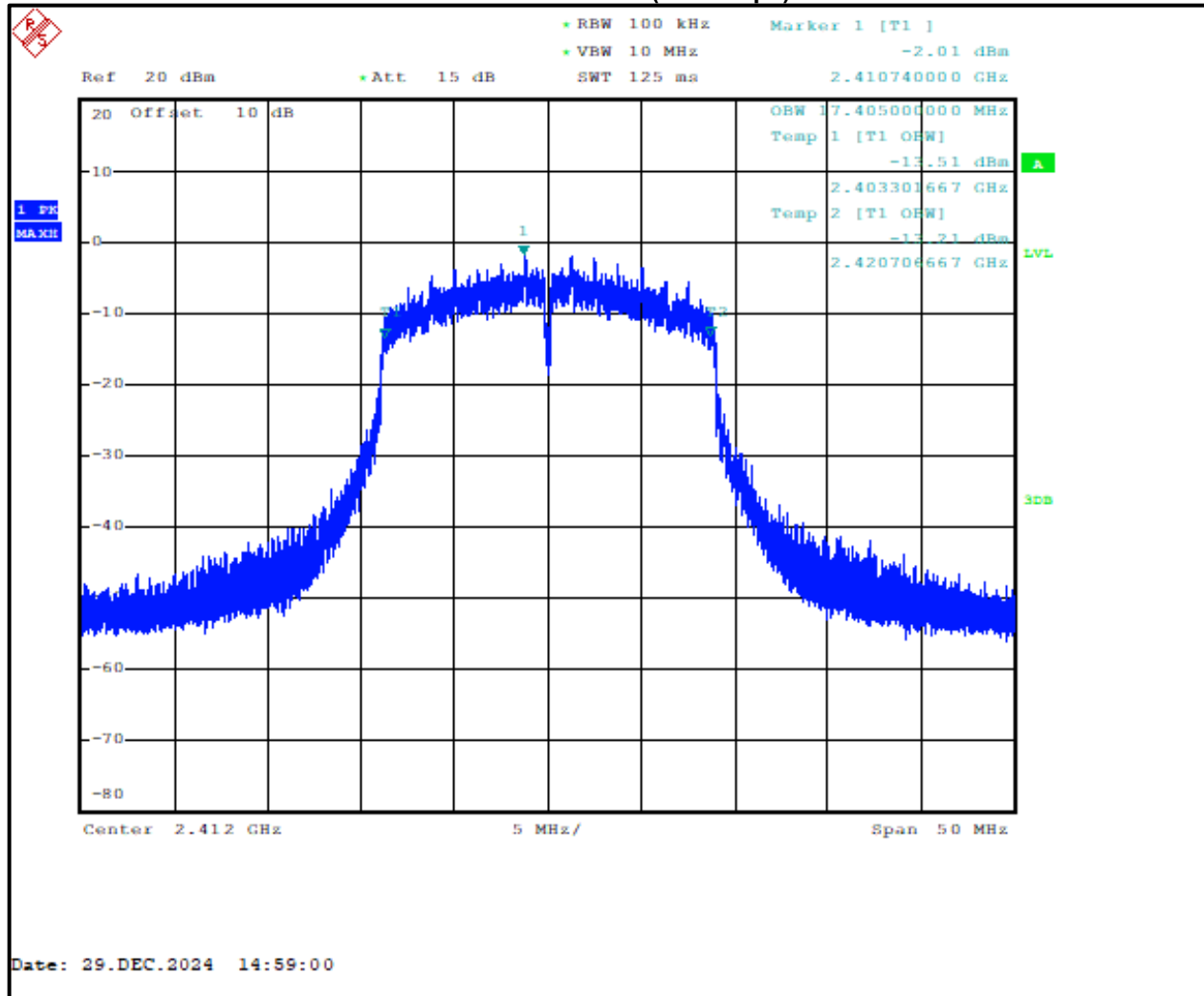
Plot 6-2: 6 dB Bandwidth – 2437 MHz – 802.11b (11.0 Mbps)



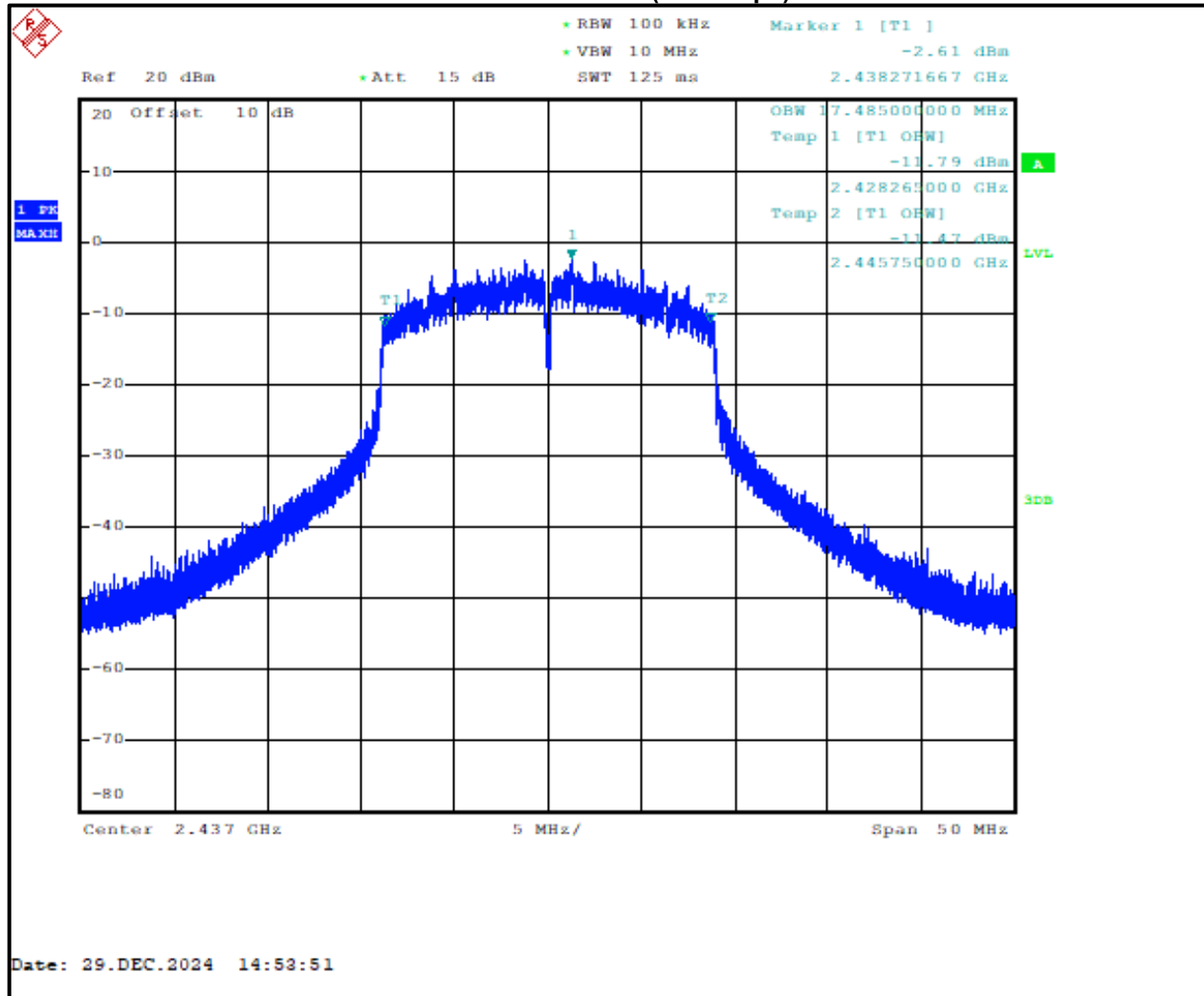
Plot 6-3: 6 dB Bandwidth – 2462 MHz – 802.11b (11.0 Mbps)



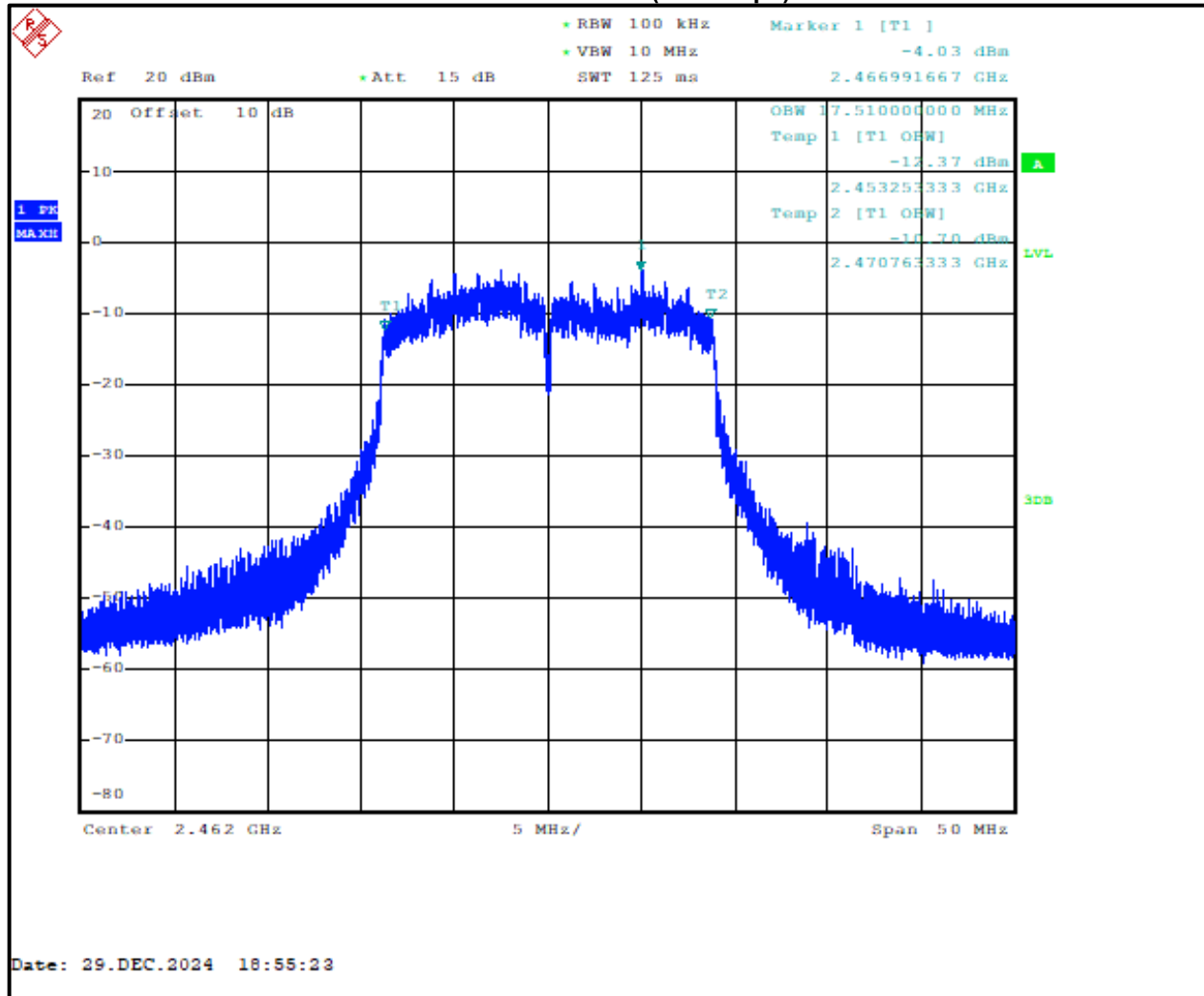
Plot 6-4: 99% Bandwidth – 2412 MHz – 802.11b (11.0 Mbps)



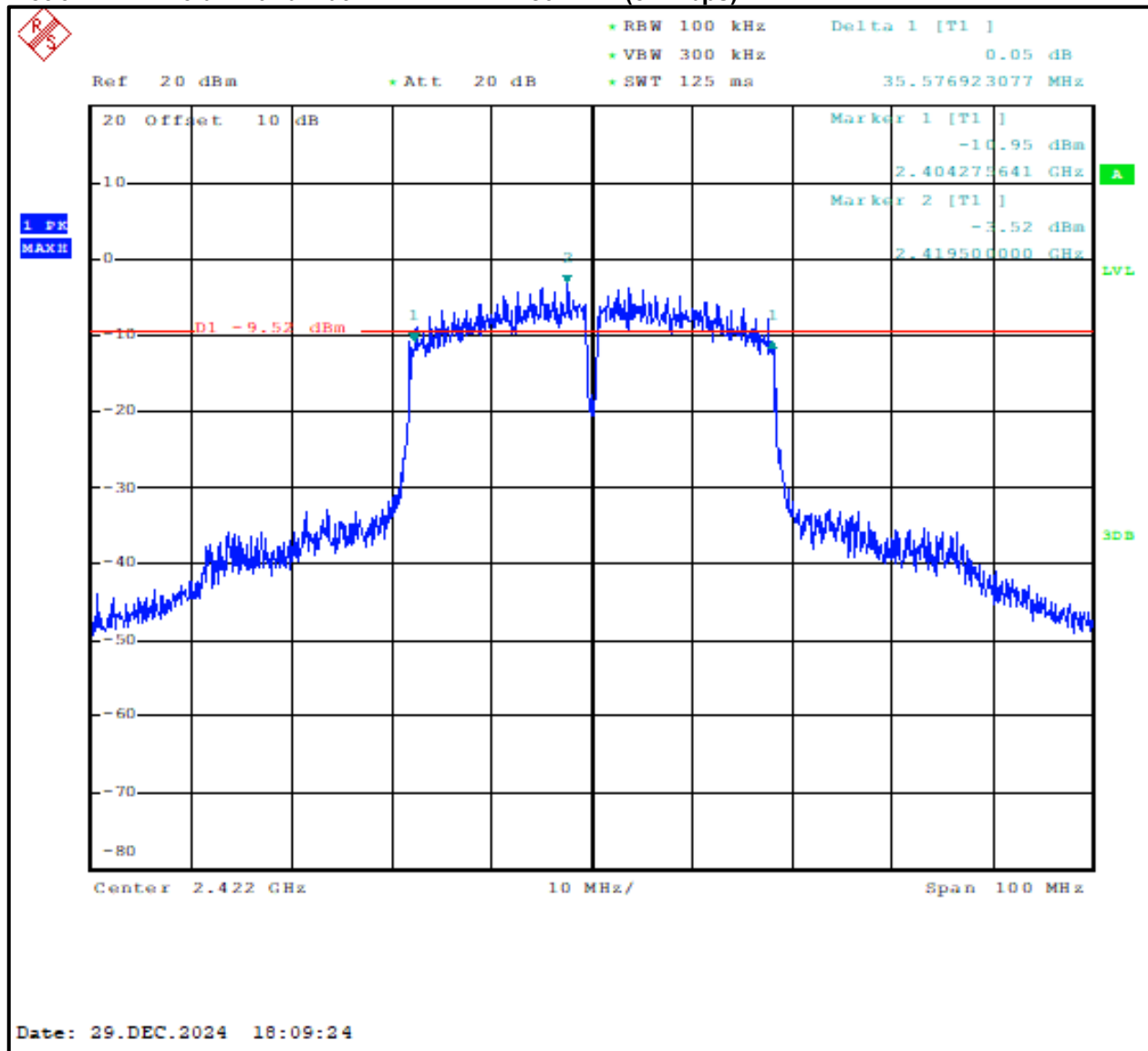
Plot 6-5: 99% Bandwidth – 2437 MHz – 802.11b (11.0 Mbps)



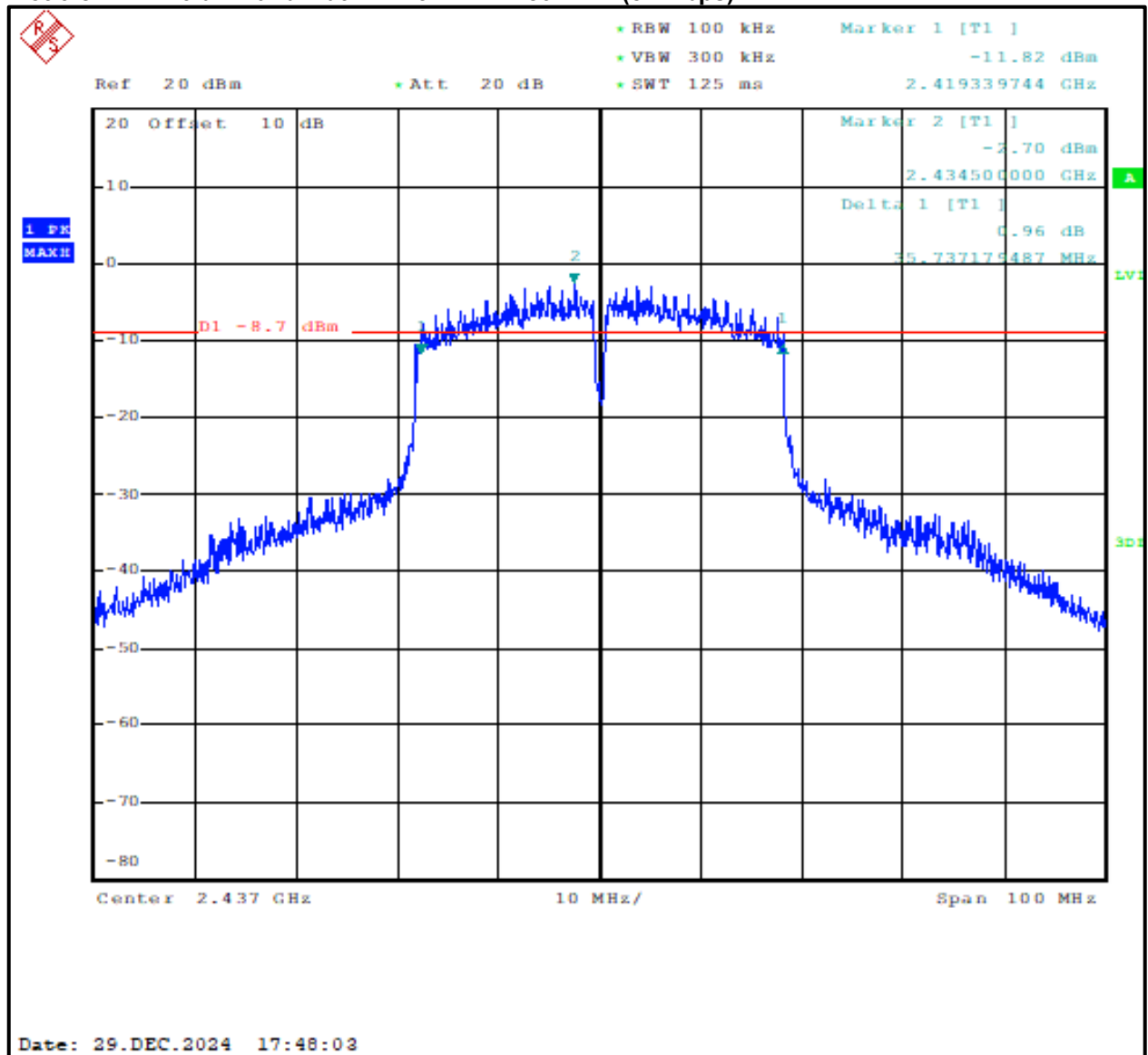
Plot 6-6: 99% Bandwidth – 2462 MHz – 802.11b (11.0 Mbps)



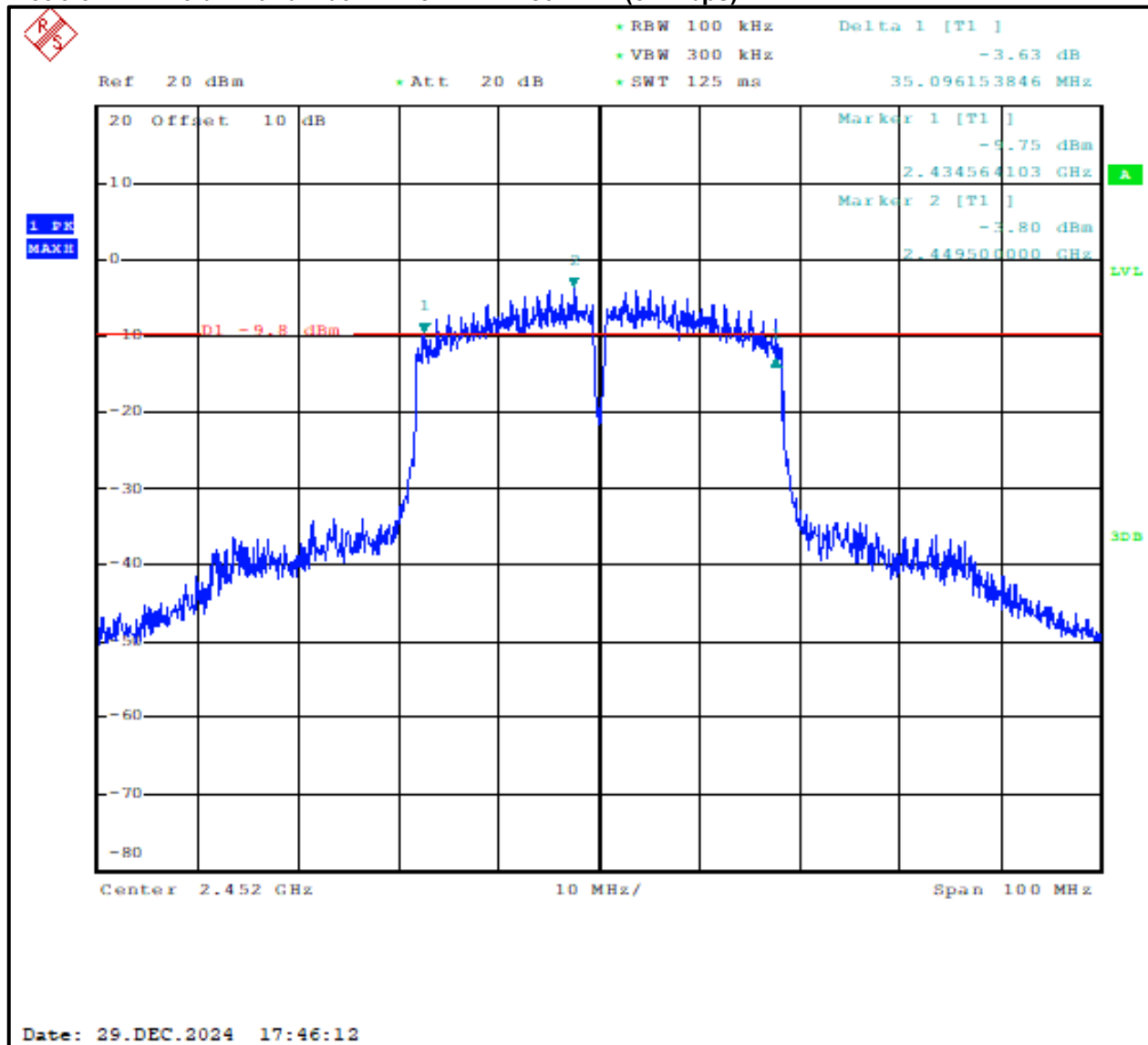
Plot 6-7: 6 dB Bandwidth – 2422 MHz – 802.11n (54 Mbps)



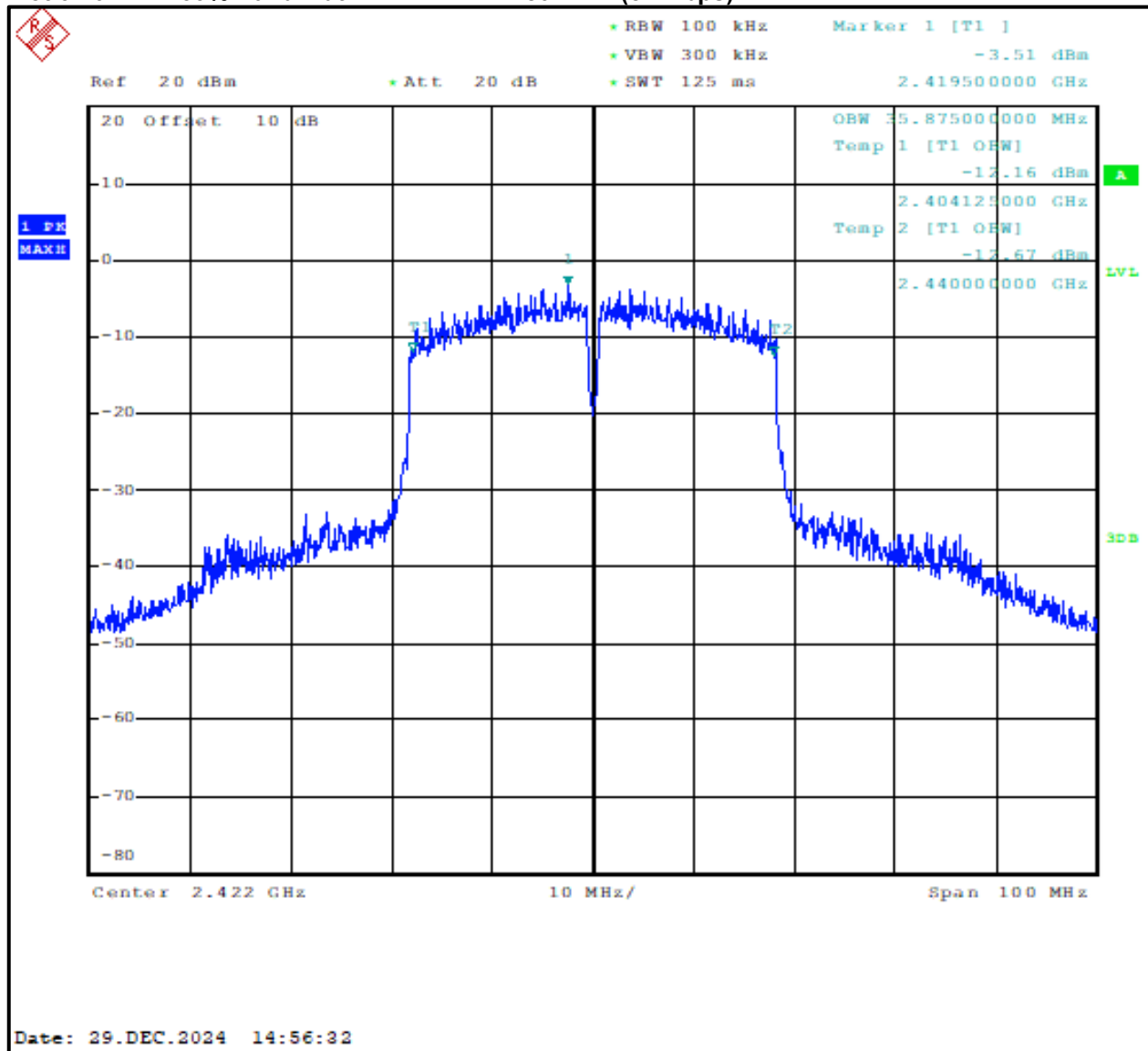
Plot 6-8: 6 dB Bandwidth – 2437 MHz – 802.11n (54 Mbps)



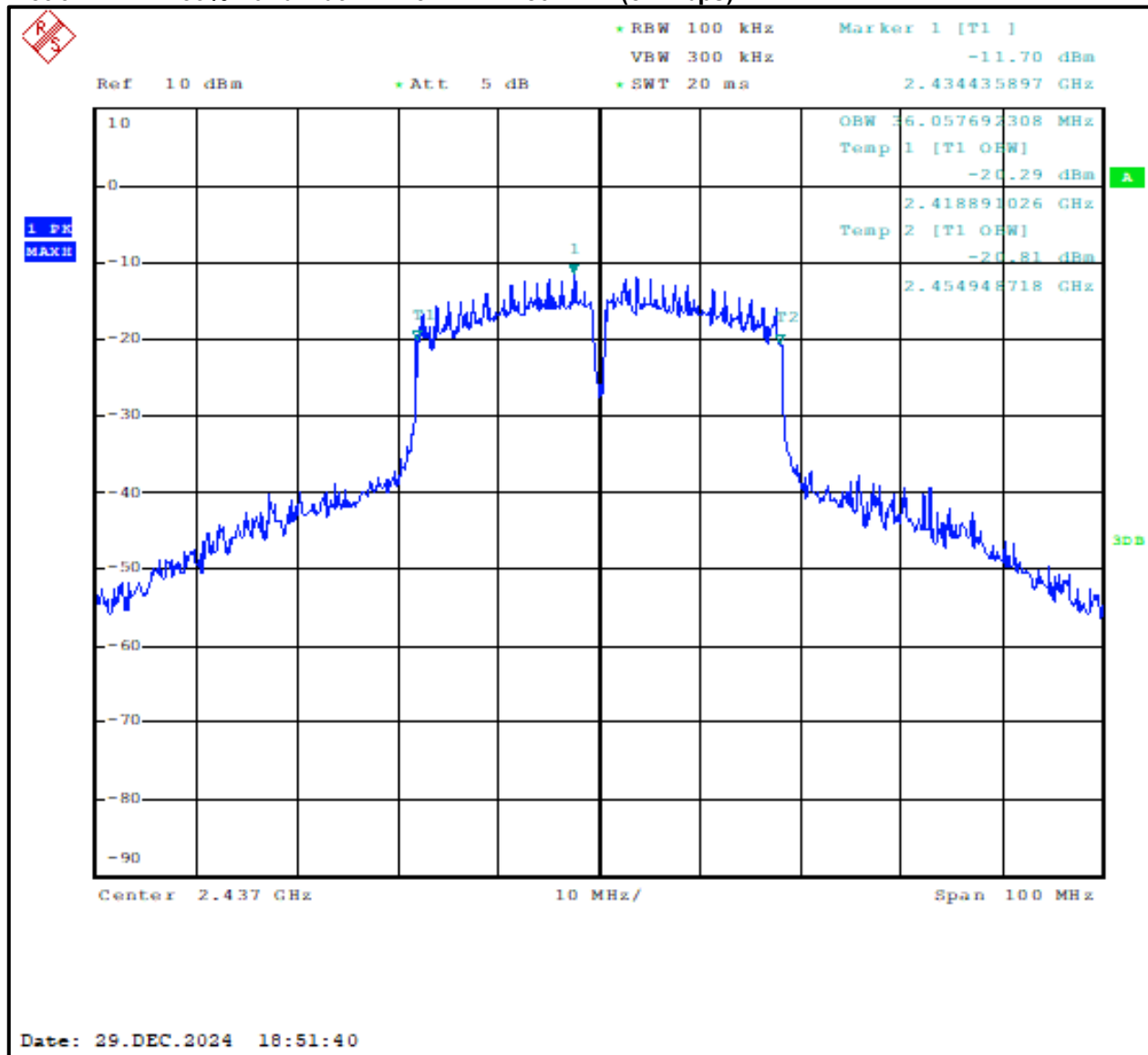
Plot 6-9: 6 dB Bandwidth – 2452 MHz – 802.11n (54 Mbps)



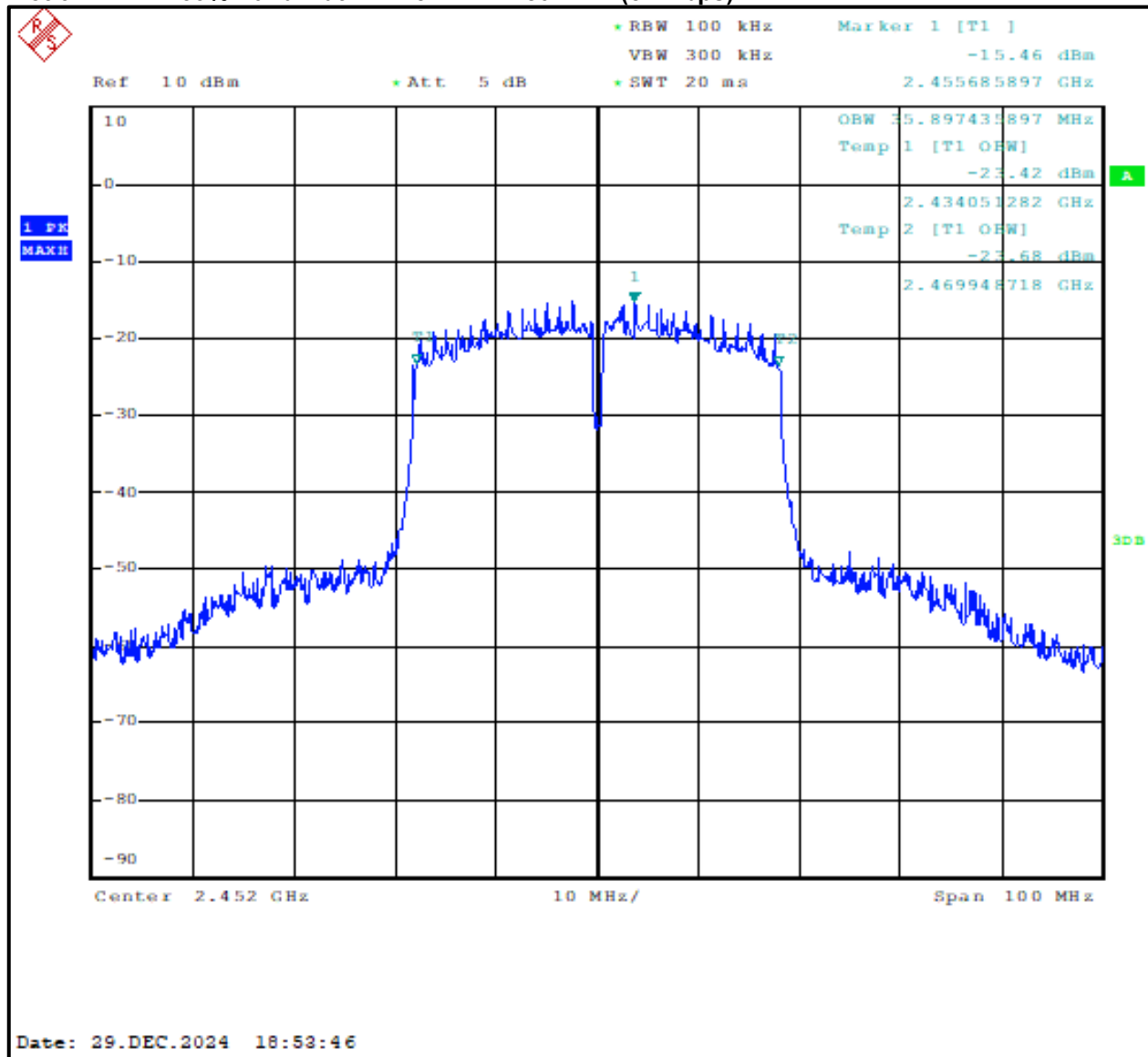
Plot 6-10: 99% Bandwidth – 2422 MHz – 802.11n (54 Mbps)



Plot 6-11: 99% Bandwidth – 2437 MHz – 802.11n (54 Mbps)



Plot 6-12: 99% Bandwidth – 2452 MHz – 802.11n (54 Mbps)



Measurement uncertainty: $\pm 1 \times 10^{-6}$ Hz. 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

Daniel W. Baltzell

Signature

December 29, 2024
 Date of Test

7 Power Spectral Density – FCC 15.247(e); RSS-247 5.2(b)

7.1 Power Spectral Density Test Procedure

The power spectral density, as per FCC 15.247(e), was measured using a 50-ohm spectrum analyzer with the following settings: a resolution bandwidth of 3 kHz, a video bandwidth of 30 kHz, and an auto-sweep time. The spectral lines were resolved for the modulated carriers at 2412 MHz, 2437 MHz, and 2462 MHz for Wi-Fi. These levels are below the +8 dBm limit.

Table 7-1: Power Spectral Density Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW	Spectrum Analyzer	101021	02/02/2027

7.2 Power Spectral Density Test Results

Table 7-2: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Pressure (kPa)
December 28, 2024	21.1	41	101.2

Note: The EUT was programmed to transmit at rates of 11.0 Mbps (802.11b), 54 Mbps (802.11g), with a 20 MHz bandwidth, and 40 MHz (802.11n), using the highest power setting.

Table 7-3: Power Spectral Density Test Data – 802.11b

Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)	Result (Pass / Fail)
2412	-17.8	8.0	-25.8	Pass
2437	-17.7	8.0	-25.7	Pass
2462	-18.2	8.0	-26.2	Pass

Table 7-4: Power Spectral Density Test Data – 802.11g

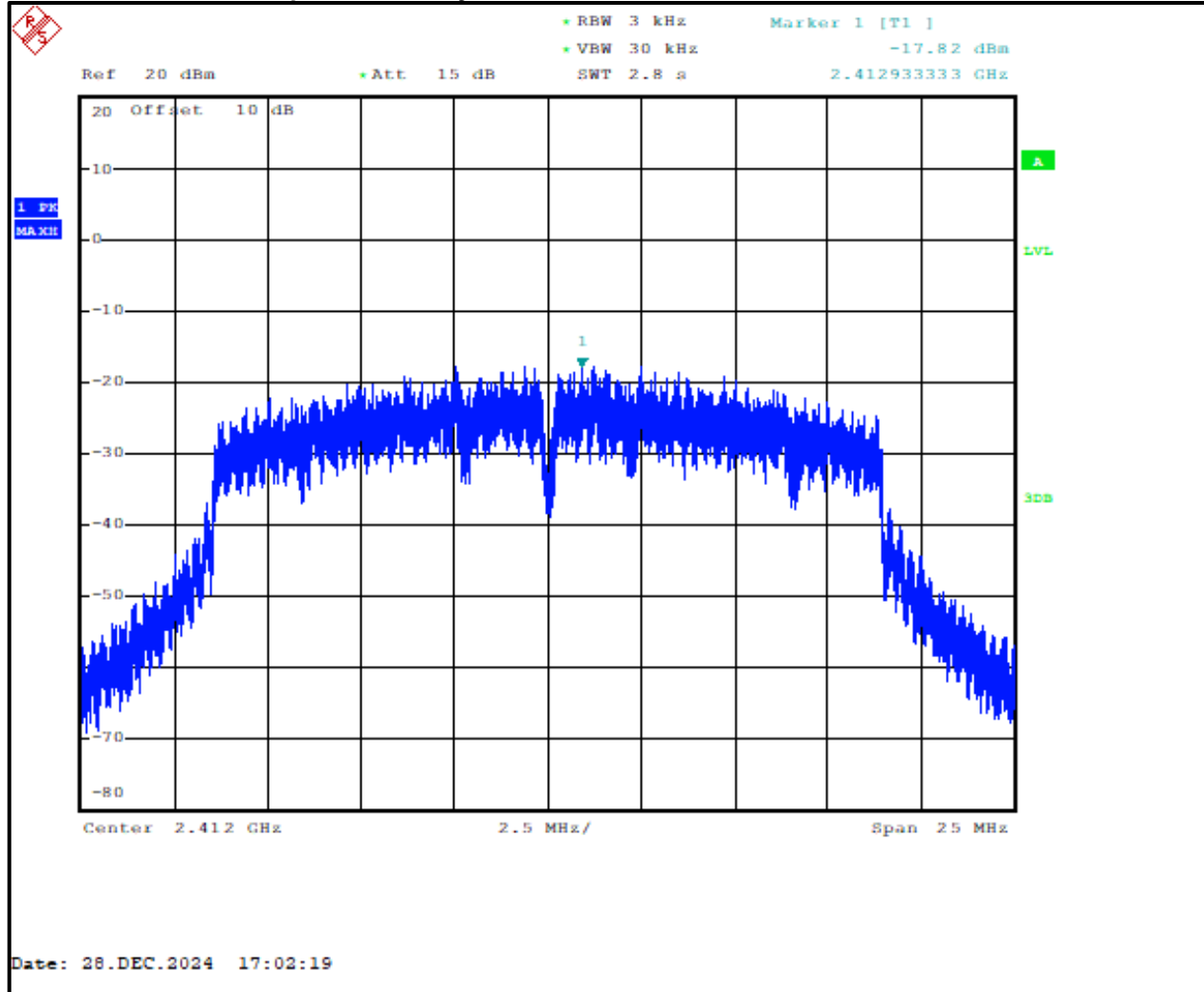
Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)	Result (Pass / Fail)
2412	-12.7	8.0	-20.7	Pass
2437	-12.6	8.0	-20.6	Pass
2462	-12.9	8.0	-20.9	Pass

Table 7-5: Power Spectral Density Test Data – 802.11n

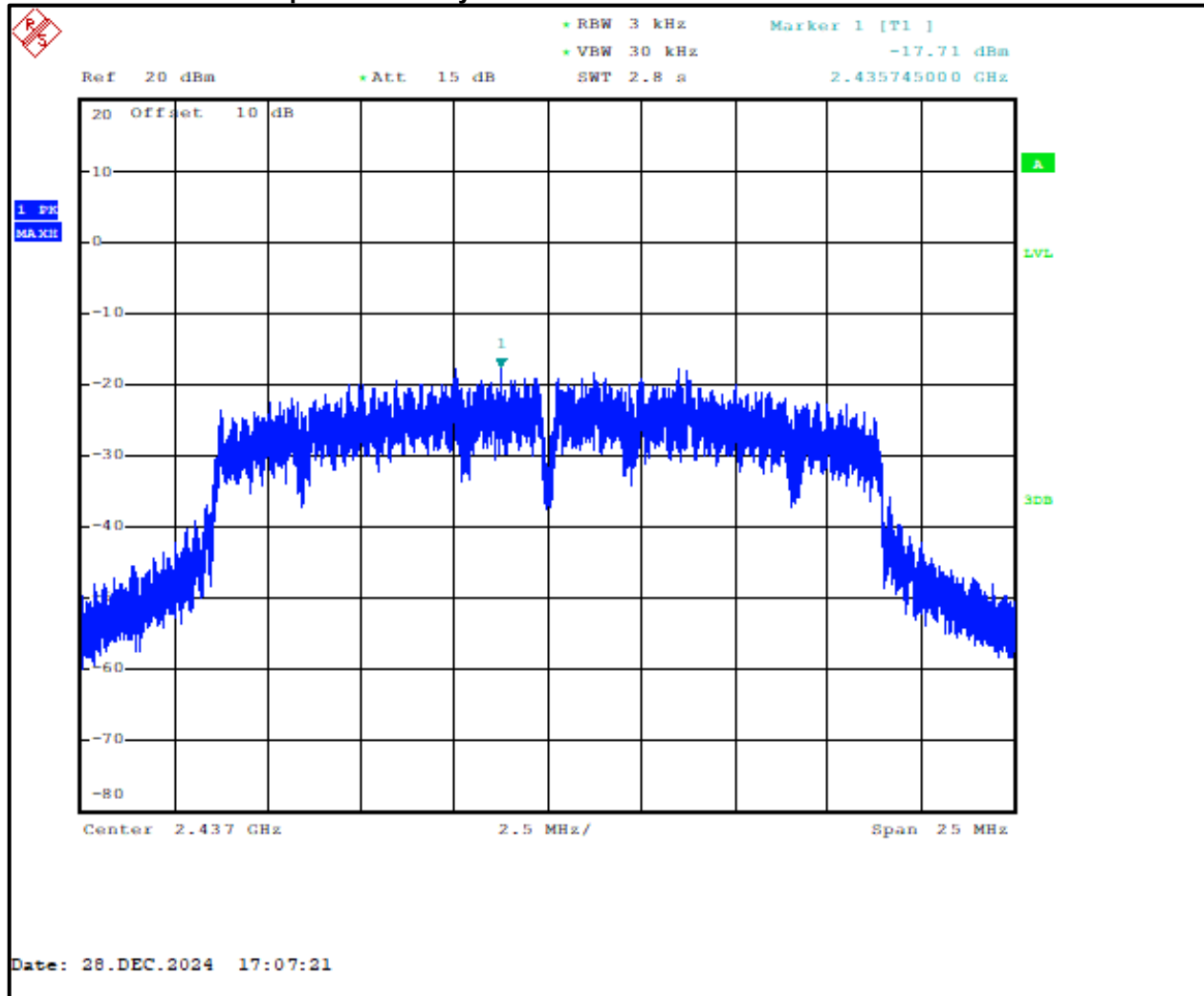
Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)	Result (Pass / Fail)
2422	-23.3	8.0	-31.3	Pass
2437	-20.4	8.0	-28.4	Pass
2452	-23.6	8.0	-31.6	Pass

7.3 Power Spectral Density Plots

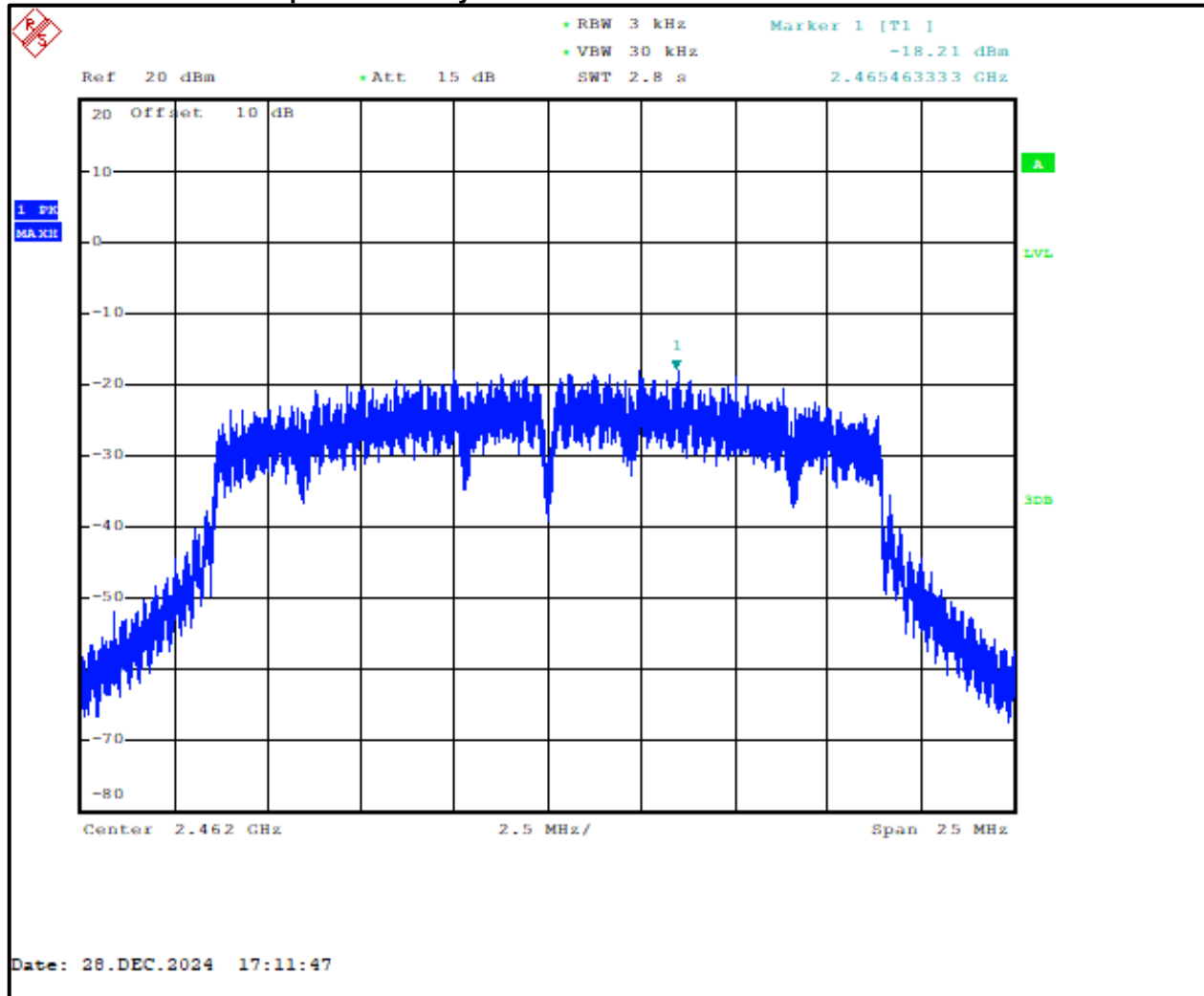
Plot 7-1: Power Spectral Density – 2412 MHz – 802.11b



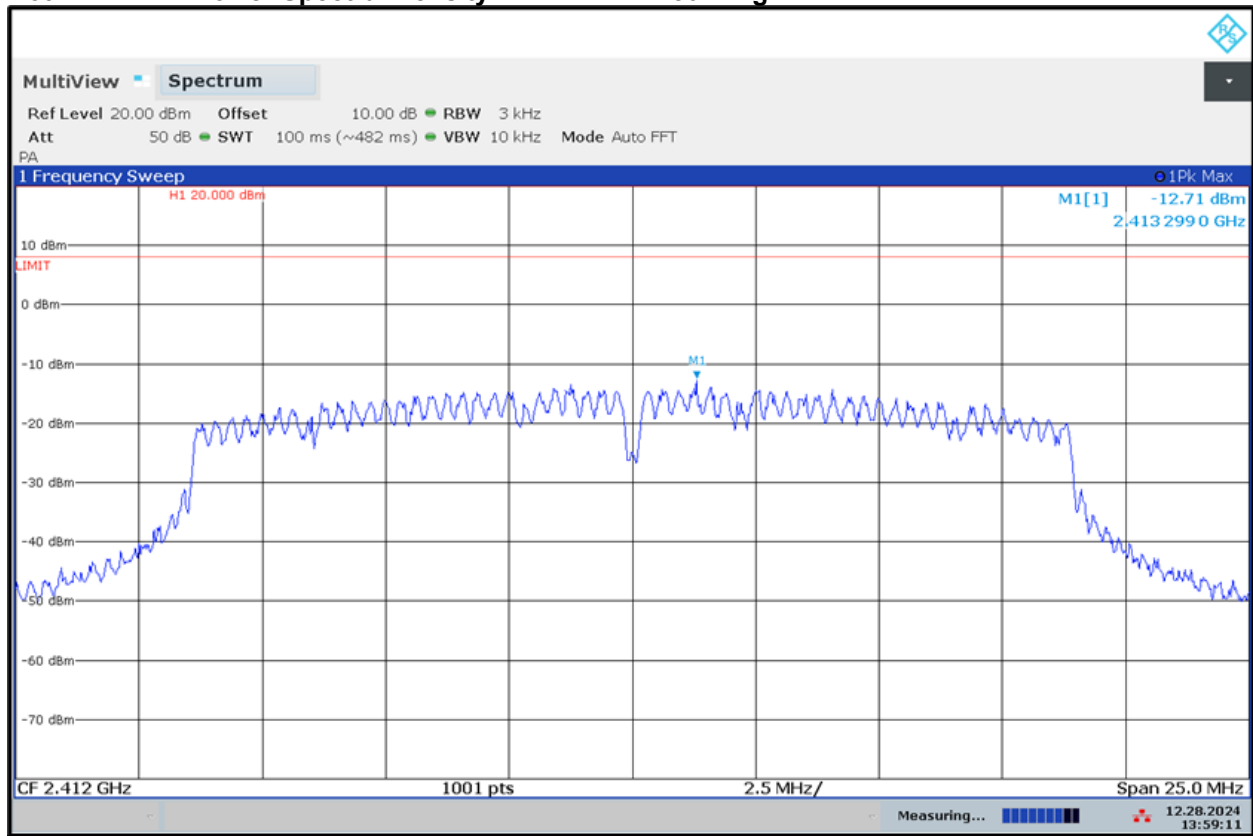
Plot 7-2: Power Spectral Density – 2437 MHz – 802.11b



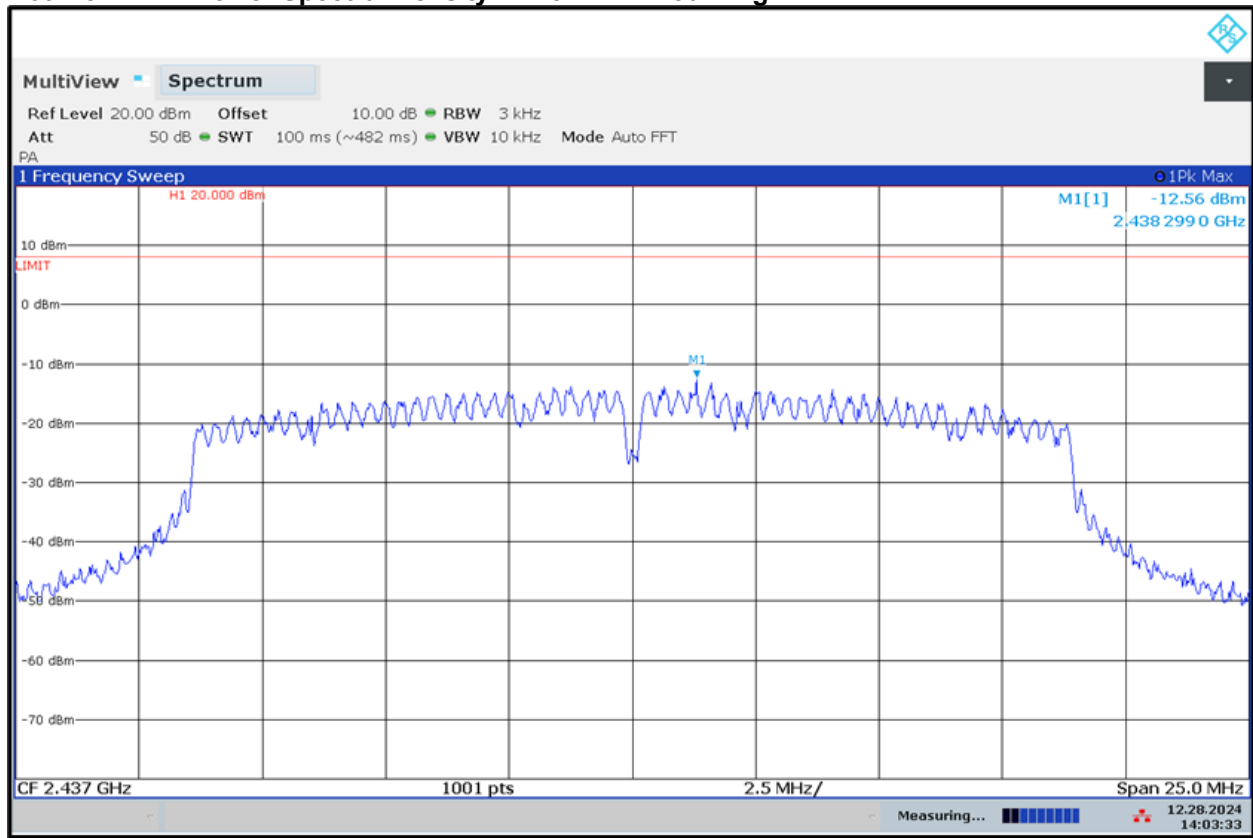
Plot 7-3: Power Spectral Density – 2462 MHz - 802.11b



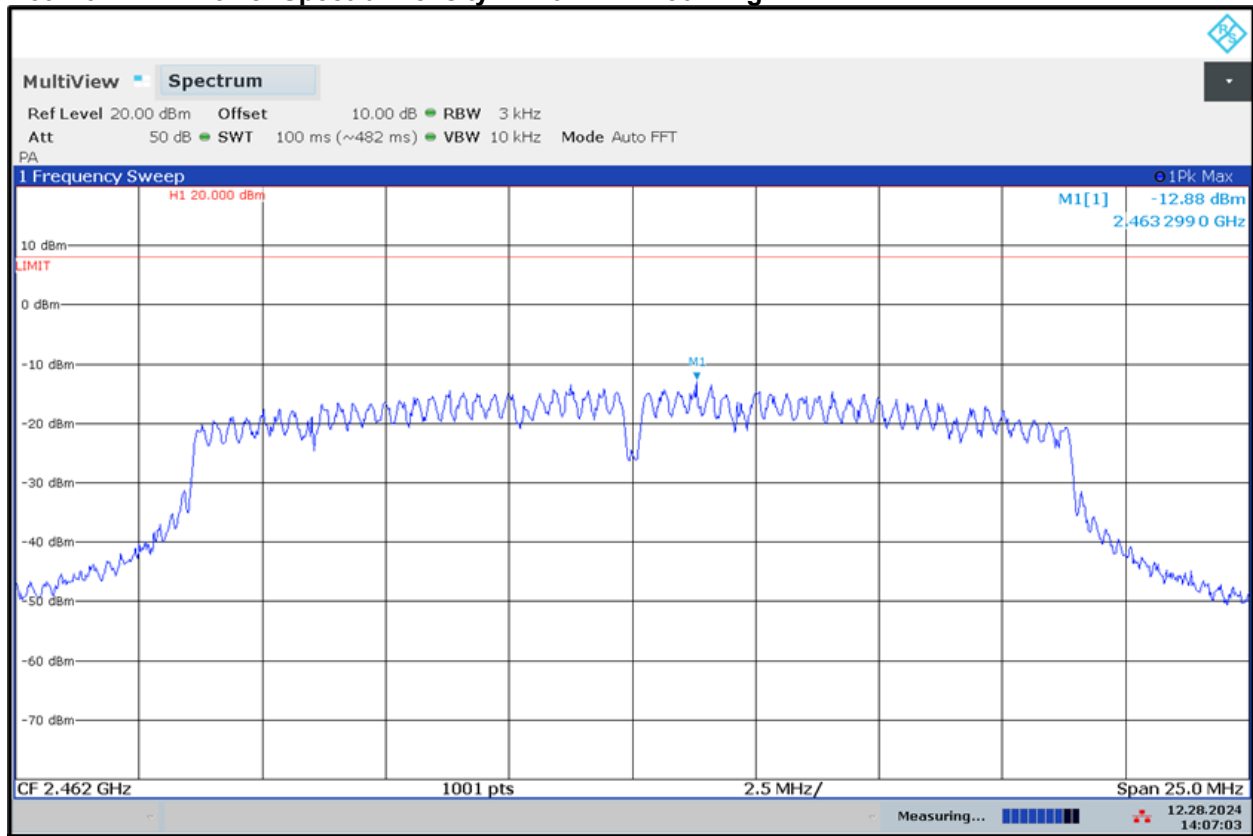
Plot 7-4: Power Spectral Density – 2412 MHz – 802.11g



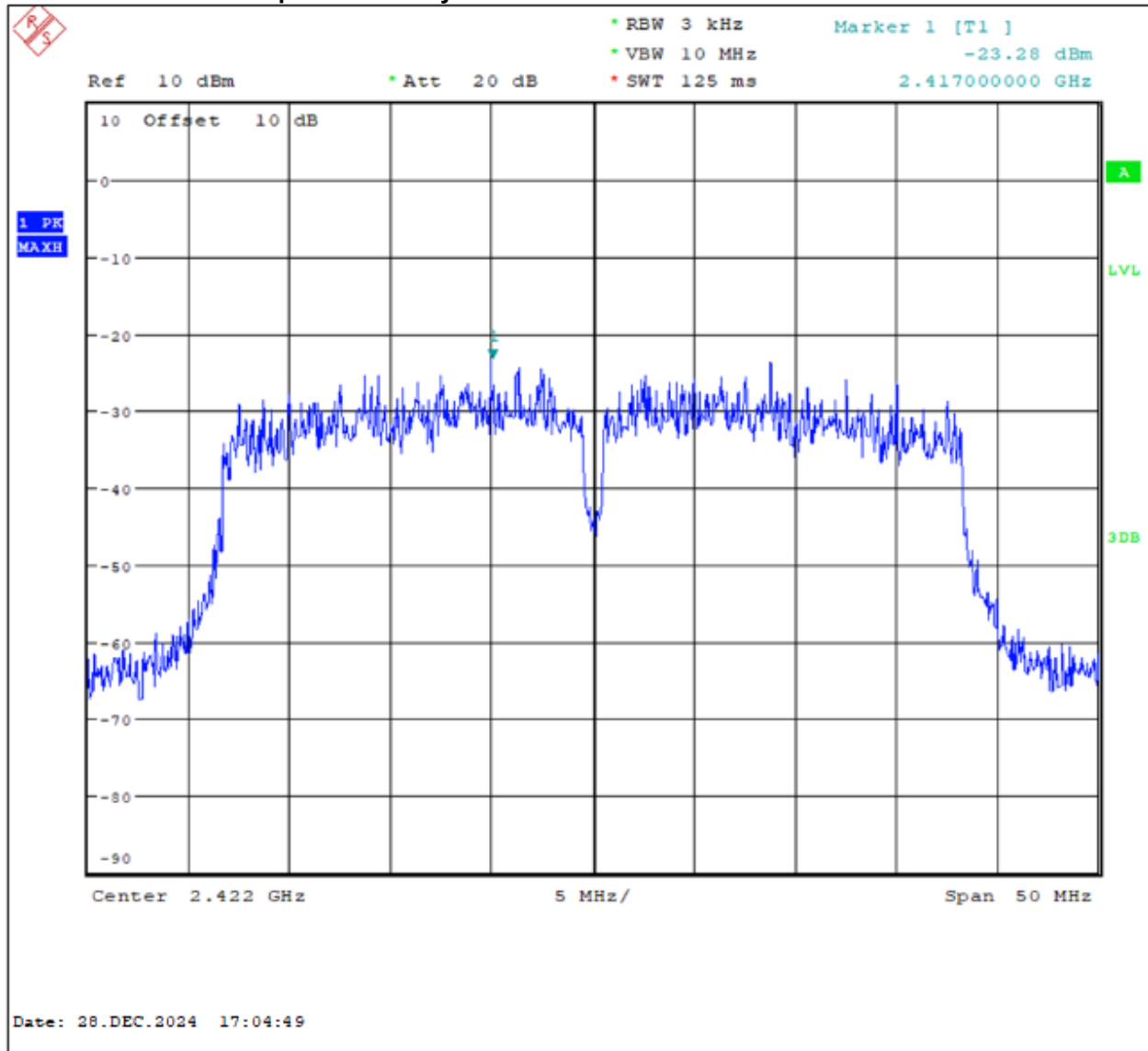
Plot 7-5: Power Spectral Density – 2437 MHz – 802.11g



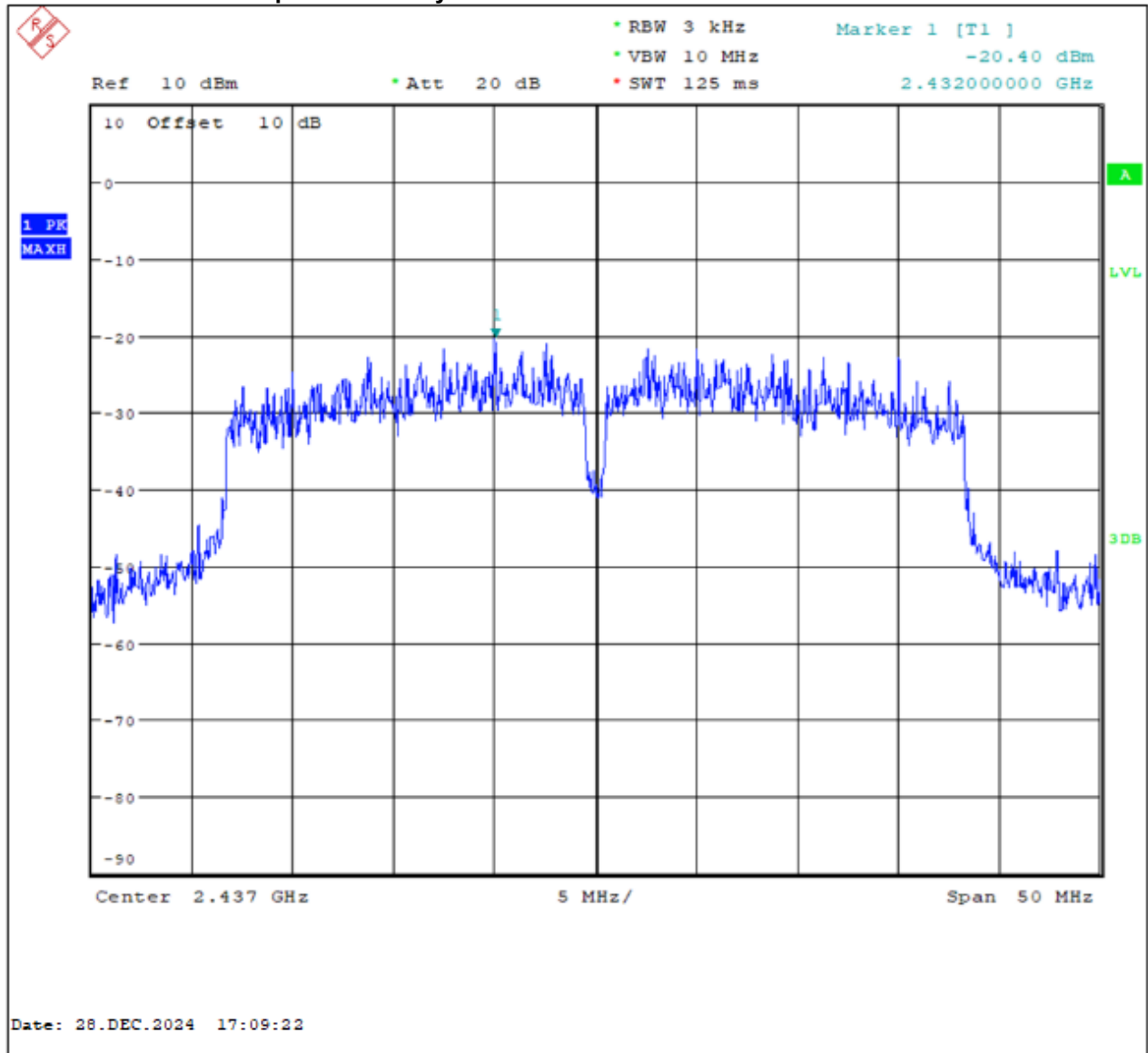
Plot 7-6: Power Spectral Density – 2462 MHz - 802.11g



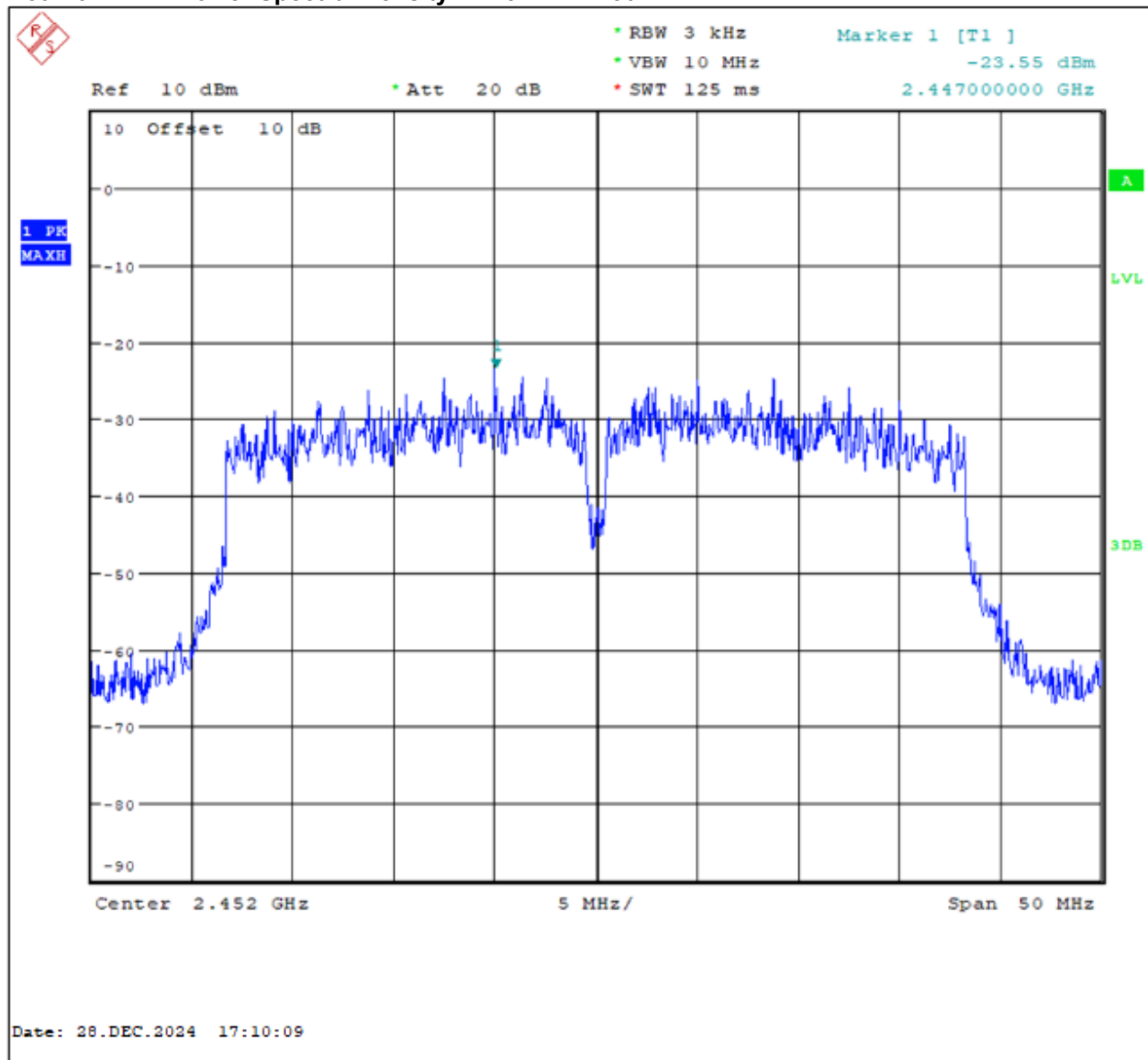
Plot 7-7: Power Spectral Density – 2422 MHz - 802.11n



Plot 7-8: Power Spectral Density – 2437 MHz - 802.11n



Plot 7-9: Power Spectral Density – 2452 MHz - 802.11n



Measurement uncertainty: ± 0.5 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

Daniel W. Baltzell
 Signature

December 28, 2024
 Date of Test

8 AC Conducted Emissions – FCC 15.207; RSS-Gen 8.8

The device is a mobile 13.8 VDC equipment. AC line conducted emissions measurements are not required.

9 Radiated Emissions – FCC 15.209; RSS-247 5.5; RSS-Gen 8.9, 8.10

9.1 Limits of Radiated Emissions Measurement

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009-0.490	2400/f (kHz)	300
0.490-1.705	2400/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 the 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.

9.2 Radiated Emissions Measurement Test Procedure

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

Final radiated emissions measurements were taken on the three- and ten-meter open-field test sites. 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 (24.8 GHz).

At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from 1 to 4 meters 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 1000 MHz, emissions are measured using the average detector function with a minimum resolution bandwidth of 1 MHz. No video filter with a bandwidth less than 10 times the resolution was used. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

9.3 Field Strength Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$\begin{aligned} \text{FI (dB}\mu\text{V/m)} &= \text{SAR (dB}\mu\text{V)} + \text{SCF (dB/m)} \\ \text{FI} &= \text{Field Intensity} \\ \text{SAR} &= \text{Spectrum Analyzer Reading} \\ \text{SCF} &= \text{Site Correction Factor} \end{aligned}$$

The Site Correction Factor (SCF) used in the above equation is determined empirically and is expressed in the following equation:

$$\text{SCF (dB/m)} = -\text{PG (dB)} + \text{AF (dB/m)} + \text{CL (dB)}$$

$$\begin{aligned} \text{SCF} &= \text{Site Correction Factor} \\ \text{PG} &= \text{Pre-amplifier Gain} \\ \text{AF} &= \text{Antenna Factor} \\ \text{CL} &= \text{Cable Loss} \end{aligned}$$

The field intensity in microvolts per meter can then be determined according to the following equation:

$$\text{FI (}\mu\text{V/m)} = 10^{\text{FI (dB}\mu\text{V/m)}/20}$$

For example, assume a signal at a frequency of 125 MHz has a received level measured as 49.3 dB μ V. The total Site Correction Factor (antenna factor plus cable loss minus preamplifier gain) for 125 MHz is -11.5 dB/m. The actual radiated field strength is calculated as follows:

$$\begin{aligned} 49.3 \text{ dB}\mu\text{V} - 11.5 \text{ dB} &= 37.8 \text{ dB}\mu\text{V/m} \\ 10^{37.8/20} &= 10^{1.89} = 77.6 \mu\text{V/m} \end{aligned}$$

Table 9-1: Radiated Emissions Test Equipment

RTL Asset Number	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900772	EMCO	3161-02	Horn Antenna (2.0–4.0 GHz)	9804-1044	08/05/2027
900321	EMCO	3161-03	Horn Antennas (4.0–8.2 GHz)	9508-1020	08/05/2027
900323	EMCO	3160-7	Horn Antennas (8.2–12.4 GHz)	9605-1054	08/05/2027
900356	EMCO	3160-08	Horn Antenna (12.4–18.0 GHz)	9607-1044	08/05/2027
901218	EMCO	3160-09	Horn Antenna (18.0–26.5 GHz)	960281-003	08/05/2027
901669	ETS-Lindgren	3142E	Biconilog Antenna (30 MHz–6000 MHz)	00166065	07/11/2027
900932	Hewlett Packard	8449B OPT H02	Preamplifier 1-26.5 GHz	3008A00505	01/30/2027
901729	Insulated Wire Inc.	KPS-1503-3150-KPR	SMK RF Cables 20'	NA	12/29/2027
901477	Micro-Coax	UFA210A-0-0360-300300	RF cable 0.04-18 GHz	212349-002	09/01/2027
900905	Rhein Tech Laboratories	PR-1040	OATS 1 Preamplifier 40dB (30 MHz–2 GHz)	1006	09/30/2027
901672	Rohde & Schwarz	FSEM30	Spectrum Analyzer	FSEM30	04/25/2027

9.4 Radiated Emissions Test Results

Table 9-2: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Pressure (kPa)
January 7, 2025	2	50	101.3

Table 9-3: Radiated Emissions Harmonics/Spurious – 2412 MHz, Peak Detector; 802.11b

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4824.0	53.9	0.5	54.4	74.0	-19.6
12060.0	45.1	10.0	55.1	74.0	-18.9
14472.0	44.4	14.9	59.3	74.0	-14.7
19296.0	36.1	19.9	56.0	74.0	-18.0

Table 9-4: Radiated Emissions Harmonics/Spurious – 2412 MHz, Average Detector; 802.11b

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4824.0	42.1	0.5	42.6	54.0	-11.4
12060.0	28.2	10.0	38.2	54.0	-15.8
14472.0	26.9	14.9	41.8	54.0	-12.2
19296.0	28.3	19.9	48.2	54.0	-5.8

Table 9-5: Radiated Emissions Harmonics/Spurious – 2437 MHz, Peak Detector; 802.11b

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4874.0	39.0	0.5	39.5	74.0	-34.5
7311.0	34.9	2.5	37.4	74.0	-36.6
12185.0	36.1	10.1	46.2	74.0	-27.8
19496.0	36.6	20.0	56.6	74.0	-17.4

Table 9-6: Radiated Emissions Harmonics/Spurious – 2437 MHz, Average Detector; 802.11b

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4874.0	20.8	0.5	21.4	54.0	-32.6
7311.0	21.0	2.5	23.5	54.0	-30.5
12185.0	21.8	10.1	31.9	54.0	-22.1
19496.0	22.6	20.0	42.6	54.0	-11.4

Table 9-7: Radiated Emissions Harmonics/Spurious – 2462 MHz, Peak Detector; 802.11b

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4924.0	34.8	0.5	35.3	74.0	-38.7
7386.0	34.9	2.6	37.5	74.0	-36.5
12310.0	24.0	10.1	34.1	74.0	-39.9
19696.0	25.8	20.3	46.1	74.0	-27.9
22158.0	25.8	22.1	47.9	74.0	-26.1

Table 9-8: Radiated Emissions Harmonics/Spurious – 2462 MHz, Average Detector; 802.11b

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4924.0	26.1	0.5	26.6	54.0	-27.4
7386.0	21.0	2.6	23.6	54.0	-30.4
12310.0	21.0	10.1	31.1	54.0	-22.9
19696.0	23.7	20.3	44.0	54.0	-10.0
22158.0	23.2	22.1	45.3	54.0	-8.7

Table 9-9: Radiated Emissions Harmonics/Spurious – 2412 MHz, Peak Detector; 802.11g

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4824.0	39.6	0.5	40.1	74.0	-33.9
12060.0	23.1	10.0	33.1	74.0	-40.9
14472.0	24.3	14.9	39.2	74.0	-34.8
19296.0	26.3	19.9	46.2	74.0	-27.8

Table 9-10: Radiated Emissions Harmonics/Spurious – 2412 MHz, Average Detector; 802.11g

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4824.0	33.7	0.5	34.2	54.0	-19.8
12060.0	22.2	10.0	32.2	54.0	-21.8
14472.0	21.8	14.9	36.7	54.0	-17.3
19296.0	22.7	19.9	42.6	54.0	-11.4

Table 9-11: Radiated Emissions Harmonics/Spurious – 2437 MHz, Peak Detector; 802.11g

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4874.0	38.1	0.5	38.6	74.0	-35.4
7311.0	23.1	2.5	25.6	74.0	-48.4
12185.0	24.1	10.1	34.2	74.0	-39.8
19496.0	22.9	20.0	43.0	74.0	-31.0

Table 9-12: Radiated Emissions Harmonics/Spurious – 2437 MHz, Average Detector; 802.11g

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4874.0	32.4	0.5	32.9	54.0	-21.1
7311.0	21.5	2.5	24.0	54.0	-30.0
12185.0	22.9	10.1	33.0	54.0	-21.0
19496.0	22.7	20.0	42.7	54.0	-11.3

Table 9-13: Radiated Emissions Harmonics/Spurious – 2462 MHz, Peak Detector; 802.11g

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4924.0	34.2	0.5	34.7	74.0	-39.3
7386.0	23.8	2.6	26.4	74.0	-47.6
12310.0	24.3	10.1	34.4	74.0	-39.6
19696.0	25.7	20.3	46.0	74.0	-28.0
22158.0	25.7	22.1	47.8	74.0	-26.2

Table 9-14: Radiated Emissions Harmonics/Spurious – 2462 MHz, Average Detector; 802.11g

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4924.0	26.3	0.5	26.8	54.0	-27.2
7386.0	22.0	2.6	24.6	54.0	-29.4
12310.0	21.2	10.1	31.3	54.0	-22.7
19696.0	23.0	20.3	43.3	54.0	-10.7
22158.0	23.9	22.1	46.0	54.0	-8.0

Table 9-15: Radiated Emissions Harmonics/Spurious – 2412 MHz, Peak Detector; 802.11n

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4824.0	39.0	0.5	39.5	74.0	-34.5
12060.0	24.4	10.0	34.4	74.0	-39.6
14472.0	22.1	14.9	37.1	74.0	-36.9
19296.0	24.8	19.9	44.7	74.0	-29.3

Table 9-16: Radiated Emissions Harmonics/Spurious – 2412 MHz, Average Detector; 802.11n

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4824.0	32.8	0.5	33.3	54.0	-20.7
12060.0	22.2	10.0	32.2	54.0	-21.8
14472.0	21.7	14.9	36.7	54.0	-17.3
19296.0	22.2	19.9	42.1	54.0	-11.9

Table 9-17: Radiated Emissions Harmonics/Spurious – 2437 MHz, Peak Detector; 802.11n

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4874.0	37.2	0.5	37.7	74.0	-36.3
7311.0	23.1	2.5	25.6	74.0	-48.4
12185.0	23.8	10.1	33.9	74.0	-40.1
19496.0	25.8	20.0	45.8	74.0	-28.2

Table 9-18: Radiated Emissions Harmonics/Spurious – 2437 MHz, Average Detector; 802.11n

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4874.0	31.1	0.5	31.6	54.0	-22.4
7311.0	21.8	2.5	24.3	54.0	-29.7
12185.0	21.1	10.1	31.1	54.0	-22.9
19496.0	22.3	20.0	42.3	54.0	-11.7

Table 9-19: Radiated Emissions Harmonics/Spurious – 2462 MHz, Peak Detector; 802.11n

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4924.0	36.2	0.5	36.7	74.0	-37.3
7386.0	24.1	2.6	26.7	74.0	-47.3
12310.0	24.8	10.1	34.9	74.0	-39.1
19696.0	26.5	20.3	46.8	74.0	-27.2
22158.0	26.1	22.1	48.2	74.0	-25.8

Table 9-20: Radiated Emissions Harmonics/Spurious – 2462 MHz, Average Detector; 802.11n

Frequency (MHz)	Average Analyzer (dBμV/m)	Site Correction Factor (dB/m)	Average Corrected (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)
4924.0	29.8	0.5	30.3	54.0	-23.7
7386.0	20.7	2.6	23.3	54.0	-30.7
12310.0	22.2	10.1	32.4	54.0	-21.6
19696.0	23.2	20.3	43.5	54.0	-10.5
22158.0	23.3	22.1	45.4	54.0	-8.6

Table 9-21: Unintentional Emissions Test Data

Temperature: 36°F Humidity: 50% Barometric Pressure: 30.16"Hg										
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (°)	Antenna Height (m)	Analyzer Reading (dBμV)	Site Correction Factor (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pass/Fail
30.400	QP	V	260	1.0	47.4	-19.4	28	40	-12	Pass
32.886	QP	H	40	1.0	46.2	-15.2	31	40	-9	Pass
35.411	QP	V	220	1.0	44.4	-16.6	27.8	40	-12.2	Pass
37.996	QP	V	80	1.0	48.8	-18	30.8	40	-9.2	Pass
50.024	QP	V	190	1.0	51	-22.8	28.2	40	-11.8	Pass
81.062	QP	H	120	1.5	45.6	-28.5	17.1	40	-22.9	Pass
144.483	QP	V	230	1.0	51.9	-26.3	25.6	43.5	-17.9	Pass
147.000	QP	V	140	1.0	50	-26	24	43.5	-19.5	Pass
149.543	QP	V	30	1.0	44.5	-25.5	19	43.5	-24.5	Pass
240.053	QP	H	70	1.4	57.1	-20.1	37	46	-9	Pass
250.013	QP	V	80	1.0	55.8	-19.5	36.3	46	-9.7	Pass
400.000	QP	H	125	1.5	50.1	-17.4	32.7	46	-13.3	Pass
681.200	QP	H	320	1.4	36.5	-11.4	25.1	46	-20.9	Pass
994.000	QP	V	325	1.0	32.5	-8	24.5	54	-29.5	Pass
1042.084	AV	H	90	1.5	42.7	-7.3	35.4	54	-18.6	Pass
1050.013	AV	H	330	1.1	35.2	-7	28.2	54	-25.8	Pass
1114.228	AV	H	339	1.0	34.8	-7.2	27.6	54	-26.4	Pass

Measurement uncertainty: ±4.7 dB. This measurement uncertainty represents an expanded uncertainty for a 95% confidence level, obtained with a coverage factor k = 2.

Results: Pass

Test Personnel:

Daniel W. Baltzell
Test Engineer



Signature

January 7, 2025
Date of Test

Rhein Tech Laboratories, Inc.
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<http://www.rheintech.com>

Client: L3Harris Technologies
Model: XL-85M UHF-L
Standards: FCC 15.247 & ISED RSS-247
ID's: FCC ID: OWDTR-0177-E/IC: 3636B-0177
Report #: 2024073DTS

10 Conclusion

The data in this DTS measurement report shows that the EUT as tested, L3Harris Technologies XL-85M UHF-L MHz Land Mobile Radio, FCC ID: OWDTR-0177-E, IC: 3636B-0177, complies with the applicable requirements of FCC Parts 2 and 15 and ISED RSS-247 and RSS-Gen.