FCC Part 15.247 Test Report

Test Lab:	Applicant:
Rhein Tech Laboratories, Inc. Tel: 703-689-0368 360 Herndon Parkway www.rheintech.com Suite 1400 Herndon, VA 20170	Innovative Wireless Technologies, Inc. (IWT) 1100 Main Street Tel: 434-316-5230 Lynchburg, VA 24504

FCC ID	SP8-FAP2213-011	**Test Report Date**	April 28, 2025
Platform	N/A	**RTL Work Order Number**	2024115
Models	SENTINEL Gateway Node SENTINEL Fixed Mesh Node	**RTL Quote Number**	QRTL24-115A
American National Standard Institute	ANSI C63.10-2020: American National Standard for Testing Unlicensed Wireless Devices		
FCC Classification	DTS – Part 15 Digital Transmission System		
FCC Rule Part(s)	FCC Rules Part 15.247: Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System (10-01-21)		

Frequency Range (MHz)	Output Power (W)	Frequency Tolerance	Emission Designator
902 – 928	0.061	N/A	880KFXD

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. Furthermore, there was no deviation from, additions to, or exclusions from, the applicable parts of FCC Part 2, FCC Part 15.247 and ANSI C63.10.

Signature: _____ Date: April 28, 2025

Typed/Printed Name: Desmond A. Fraser Position: President

This report may not be reproduced, except in full, without the written approval of Rhein Tech Laboratories, Inc. and Innovative Wireless Technologies, Inc. (IWT). The test results relate only to the item(s) tested. This report replaces Report 2024115 Report R3.0.

These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by ANSI-ASQ National Accreditation Board/ACLASS. Refer to certificate and scope of accreditation AT-1445.

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1 General Information

1.1 Scope

Applicable Standard:

- FCC Rules 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.

1.2 Description of EUT

Equipment Under Test	SENTINEL™ Gateway Node (IWT P/N FAP2213-011); SENTINEL™ Fixed Mesh Node (IWT P/N FAP4213-025)
Power Supply	19V AC adapter
Modulation Type	2-FSK
Frequency Range	902 – 928 MHz
Antenna Connector Type	N
Antenna Type & Gain	Yagi (11 dBi); Omni (6 dBi); Sector (17 dBi)

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.

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 certification for Innovative Wireless Technologies, Inc., Models: SENTINEL™ Gateway Node, P/N: FAP2213-011 and SENTINEL™ Fixed Mesh Node, P/N: FAP4213-025, both under FCC ID: SP8-FAP2213-011.

The Gateway Node (GWN) and the Fixed Mesh Node (FMN) are electrically and mechanically identical except the GWN has an Ethernet port that provides a gateway to a wired network for system management.

The GWN was fully tested; the FMN was properly investigated and found to be compliant as was the GWN.

1.6 Modifications

No modifications were made during testing.

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	903.0
Mid	915.0
High	927.0

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 and power/frequency/channel control (Software: FCC Control v1.0). 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.

Each node incorporates two digital transceivers that share a single PA and antenna. One transceiver is dedicated to voice packets while the other is dedicated to non-voice data, referenced in the report as Transmitter 0 and Transmitter 1, respectively.

2.3 Test Result Summary

Table 2-2: Test Summary – FCC Part 15, Subpart C (Sections 15.207/15.209/15.247)

FCC Reference	C63.10 Procedure	Test	Pass/Fail or N/A
FCC 15.207	6.2	AC Power Conducted Emissions	Pass
FCC 15.209	11.11, 11.12	Radiated Emissions	Pass
FCC 15.247(b)(3)	11.9	Maximum Peak Power Output	Pass
FCC 15.247(d)	11.11	Antenna Conducted Spurious Emissions	Pass
FCC 15.247(d)	11.12	Band Edge	Pass
FCC 15.247(a)(2)	11.8	6 dB & 99% Bandwidth	Pass
FCC 15.247(e)	11.10	Power Spectral Density	Pass

Test data is provided for the Gateway Node, referenced as GWN, and as required, for the Fixed Mesh Node, referenced as FMN.

2.4 Test System Details

The test samples were received on August 26, 2024. The FCC identifiers for all applicable equipment, plus descriptions of all cables used in the tested systems are identified in the following tables.

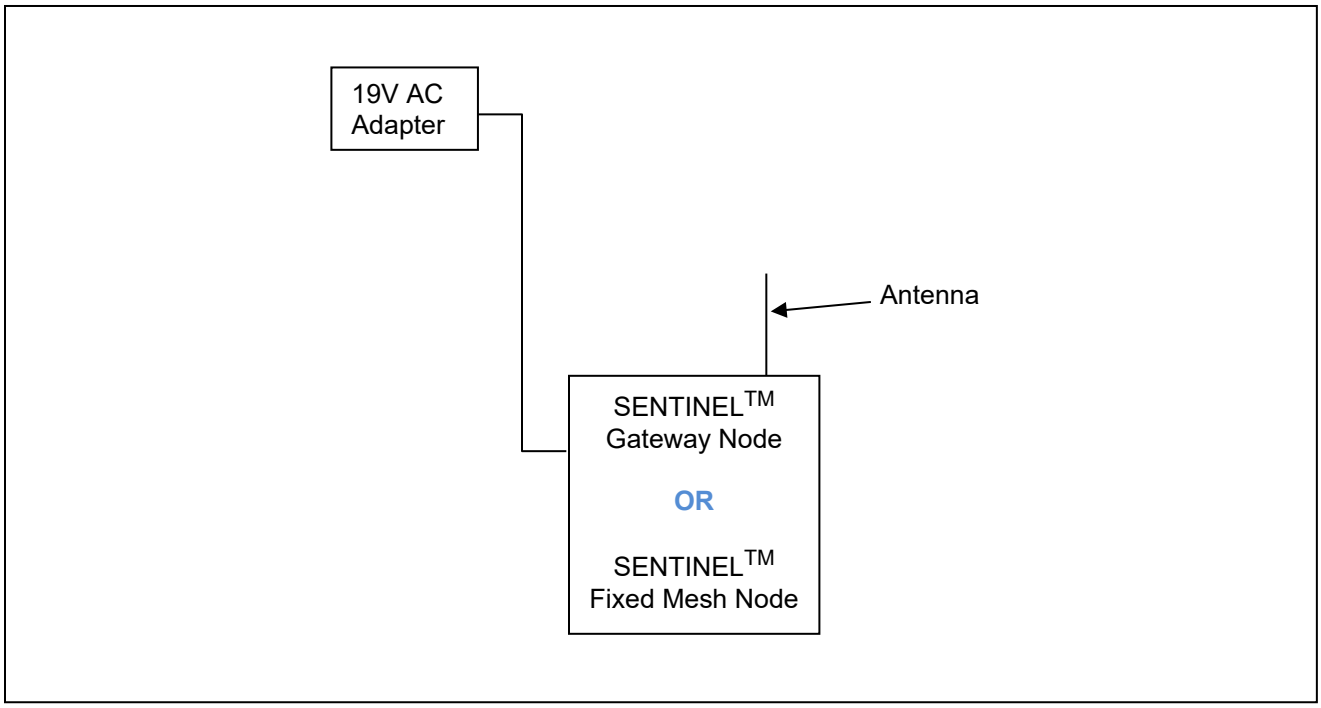
Table 2-3: Equipment Under Test

Part	Manufacturer	Model #	Serial Number	FCC ID	RTL Bar Code
SENTINEL™ Gateway Node	Innovative Wireless Technologies, Inc.	FAP2213-011	G24140011	SP8-FAP2213-011	24416
SENTINEL™ Gateway Node	Innovative Wireless Technologies, Inc.	FAP2213-011	G24140029	SP8-FAP2213-011	24417
SENTINEL™ Fixed Mesh Node	Innovative Wireless Technologies, Inc.	FAP4213-025	F11510112	SP8-FAP2213-011	24447
Yagi Antenna 11 dBi	ZDA Communications LLC	ZDADJ928-11YG	N/A	N/A	24420
Omni Antenna 6 dBi	Hana Wireless	HW-OD9-5-NF	N/A	N/A	24419
Sector Antenna 17 dBi	Ventev / TerraWave Solutions	T09170P1000690	N/A	N/A	24418
AC Adapter	FSP Group Inc.	FSP150-ABAN1	H00000012	N/A	24421
AC Adapter	FSP Group Inc.	FSP150-ABAN1	H00000012	N/A	24422

Table 2-4: Accessory Equipment

Part	Manufacturer	Model #	Serial Number	FCC ID	RTL Bar Code
Software	Innovative Wireless Technologies, Inc.	FCC Control v 1.0	N/A	N/A	N/A

2.5 Configuration of Tested System



3 Output Power – FCC §15.247(b)(3)

3.1 Power Output Test Procedure

A conducted power measurement of the EUT was taken using a Rohde & Schwarz Analyzer.

Procedure: C63.10-2020 11.9.2.2.2 Method AVGSA-1

Limit: FCC 15.247(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(3) For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

Table 3-1: Power Output Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW50	Analyzer	101021	05/30/2027
901338	Weinschel Corp.	46-40-34	Attenuator (DC-18GHz, 40 dB, 25W)	BM0556	02/07/2027
901524	MA/COM	2082-6174-20	20 dB Attenuator (2W, DC-4GHz)	N/A	10/14/2025
901791	Shireen	UF1-2.92	40 GHz 24” Cable	N/A	08/02/2025

3.2 Average Power Output Test Data

Table 3-2: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Air Pressure (kPa)
December 18, 2024	23.5	23	100.7
December 19, 2024	23.7	20	101.5

Table 3-3: Average Power Output Test Data – GWN - Transmitter 0

Frequency (MHz)	Average Conducted Power (dBm)	Average Conducted Power (W)
903.0	17.30	0.054
915.0	17.71	0.059
927.0	17.84	0.061

Table 3-4: Average Power Output Test Data – GWN - Transmitter 1

Frequency (MHz)	Average Conducted Power (dBm)	Average Conducted Power (W)
903.0	17.19	0.052
915.0	17.61	0.058
927.0	17.79	0.060

Table 3-5: Average Power Output Test Data – FMN - Transmitter 0

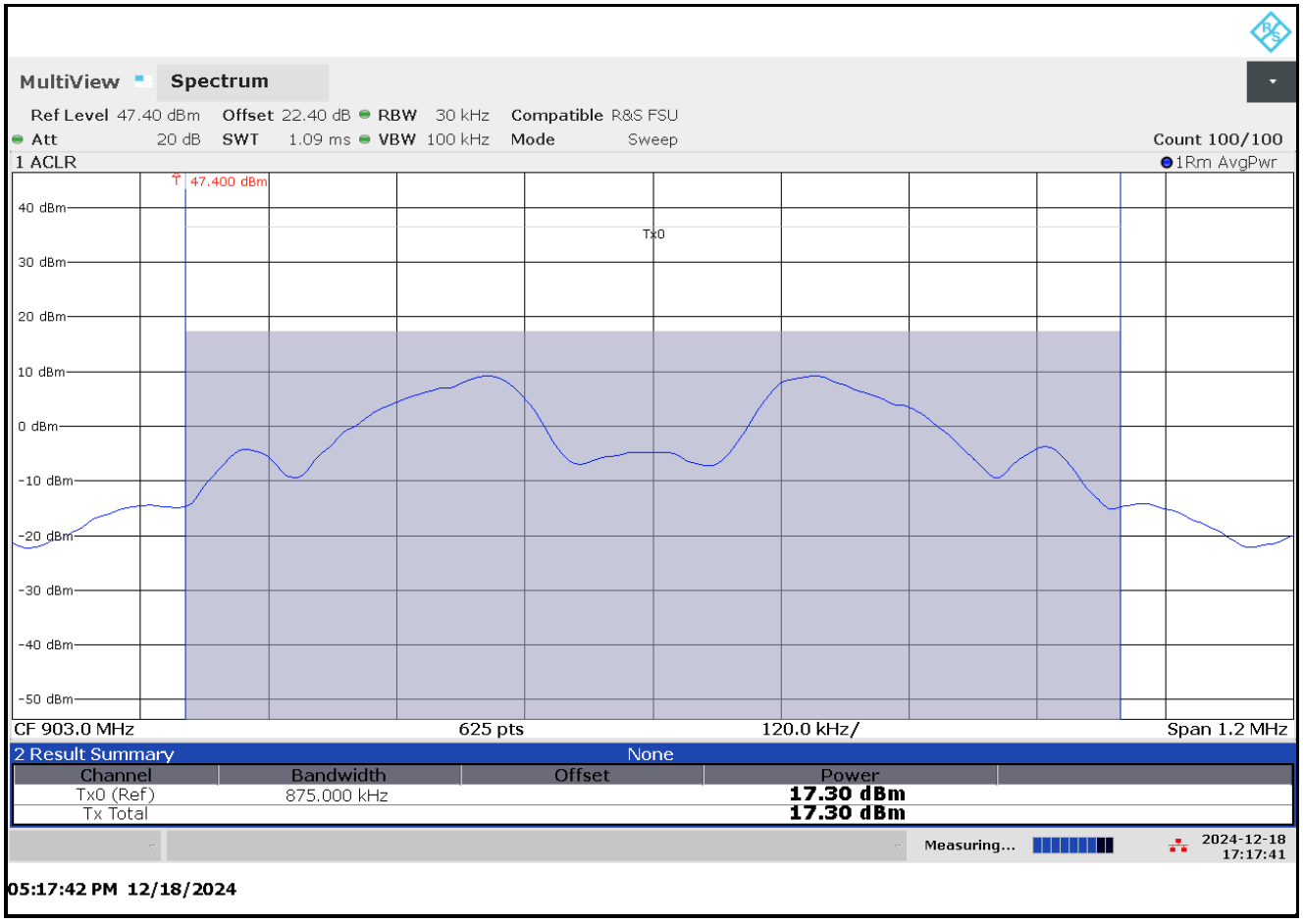
Frequency (MHz)	Average Conducted Power (dBm)	Average Conducted Power (W)
903.0	16.35	0.043
915.0	17.05	0.051
927.0	17.57	0.057

Table 3-6: Average Power Output Test Data – FMN - Transmitter 1

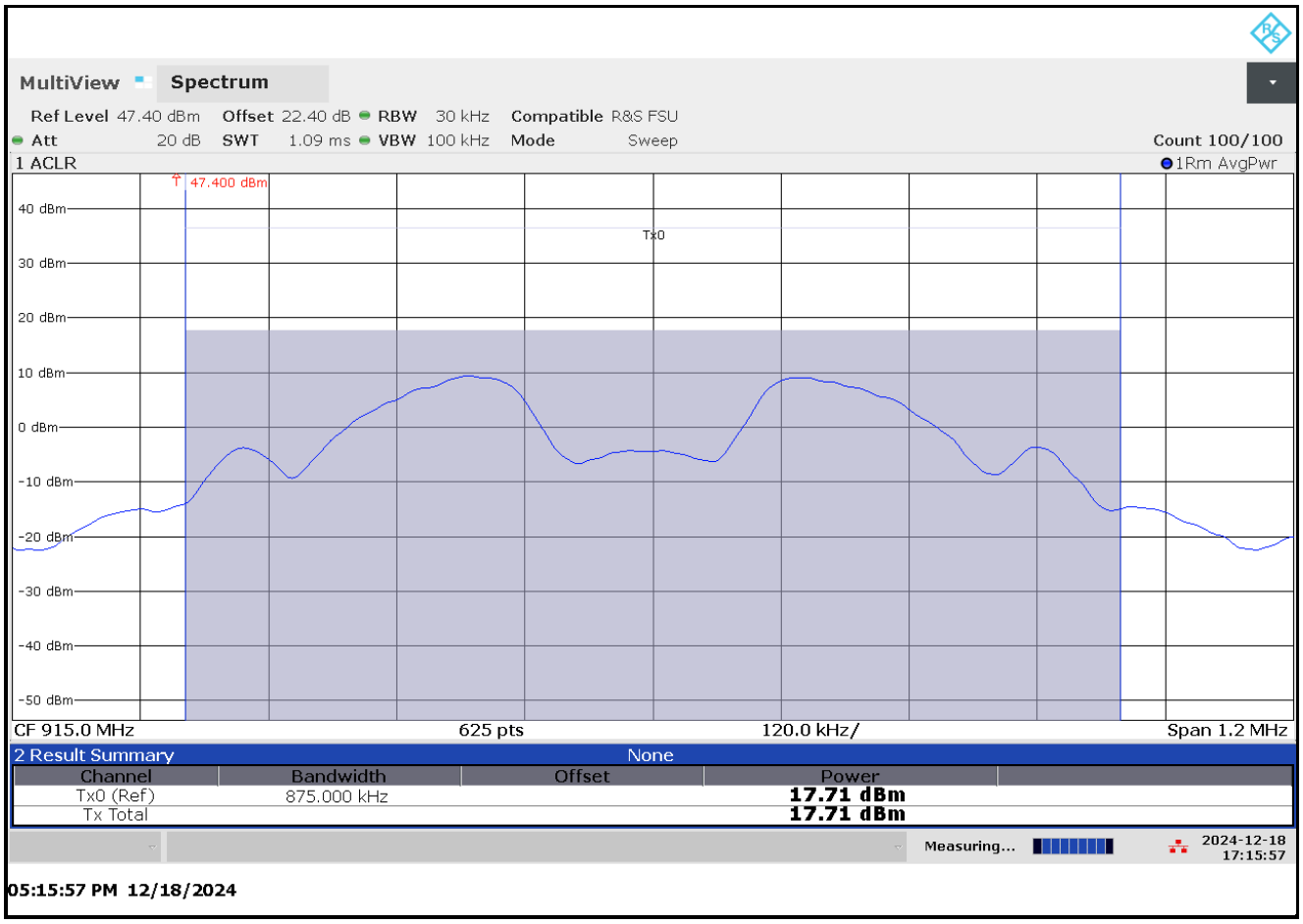
Frequency (MHz)	Average Conducted Power (dBm)	Average Conducted Power (W)
903.0	16.25	0.042
915.0	17.00	0.050
927.0	17.86	0.061

3.2.1 Output Power – Gateway Node (GWN) Transmitter 0

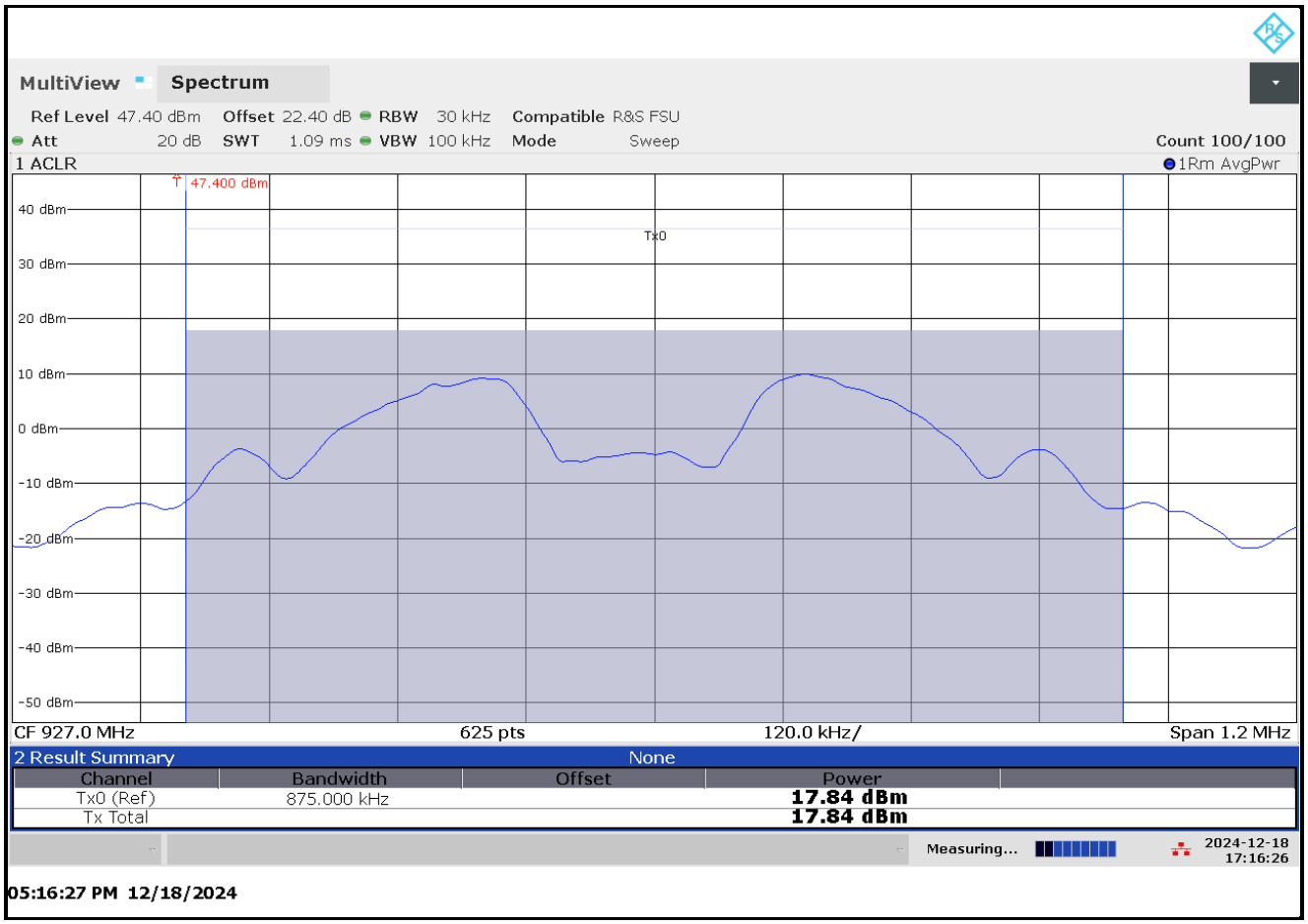
Plot 3-1: Output Power (903.0 MHz Carrier) – Transmitter 0 – GWN



Plot 3-2: Output Power (915.0 MHz Carrier) – Transmitter 0 – GWN

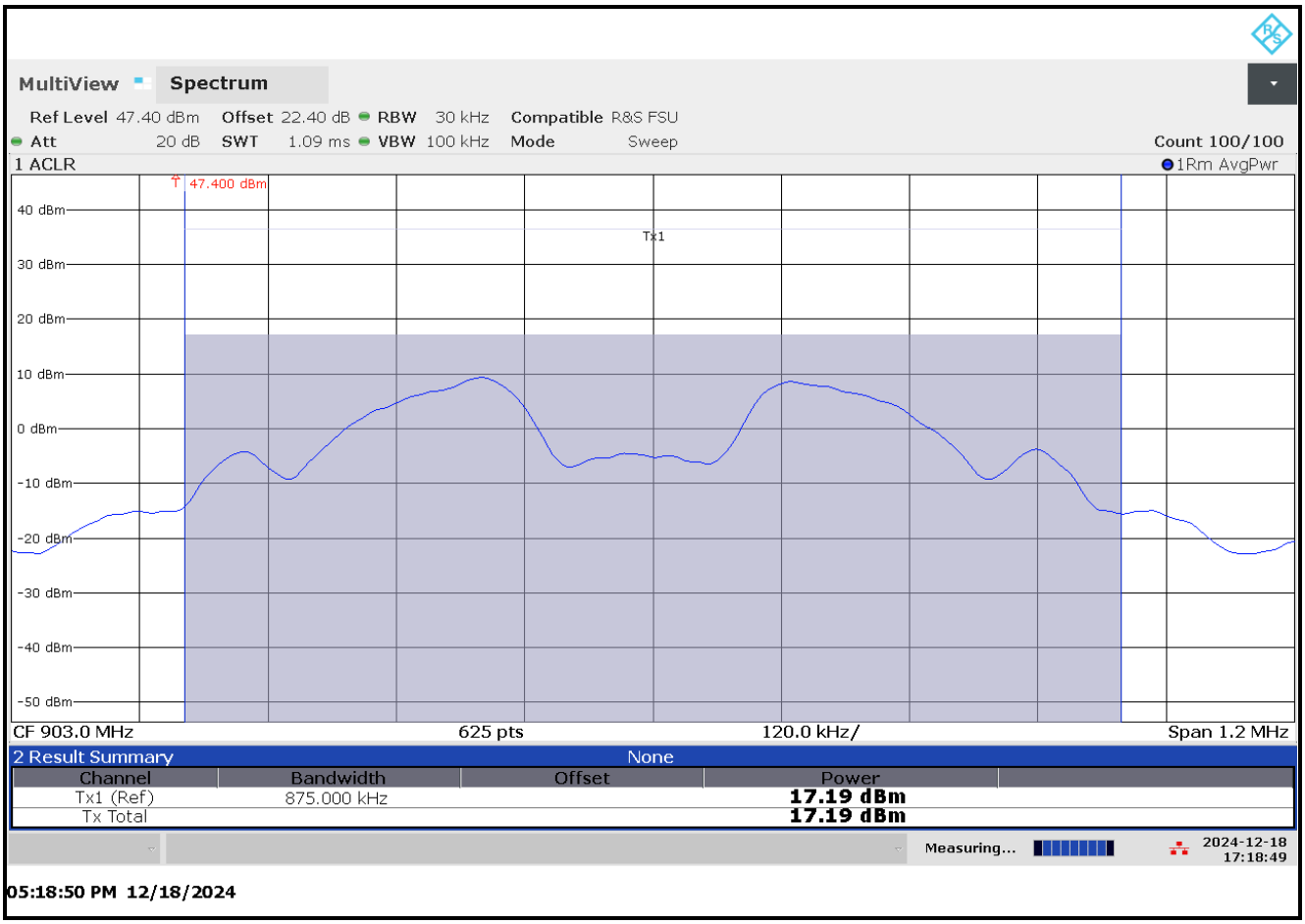


Plot 3-3: Output Power (927.0 MHz Carrier) – Transmitter 0 – GWN

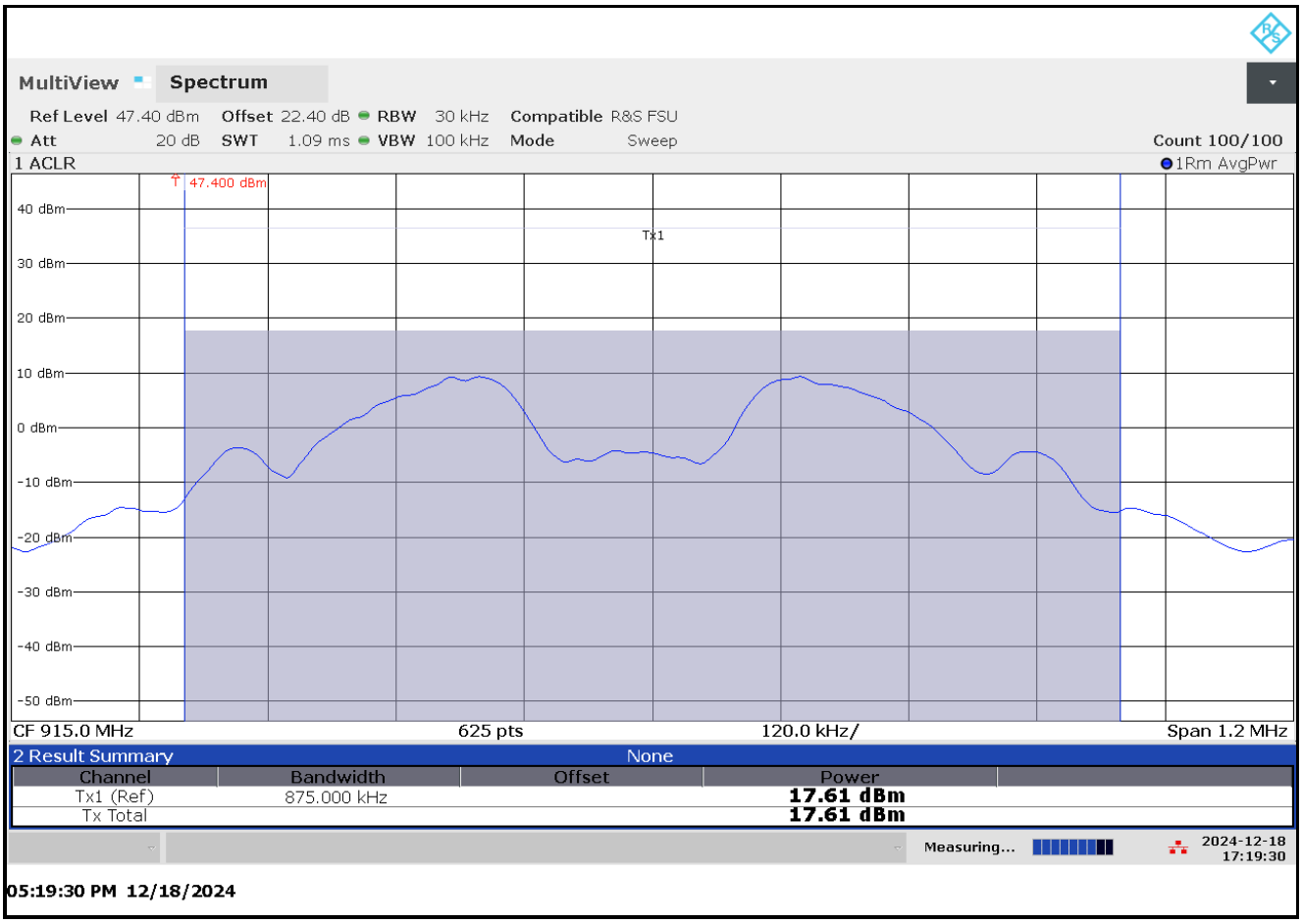


3.2.2 Output Power – Gateway Node (GWN) Transmitter 1

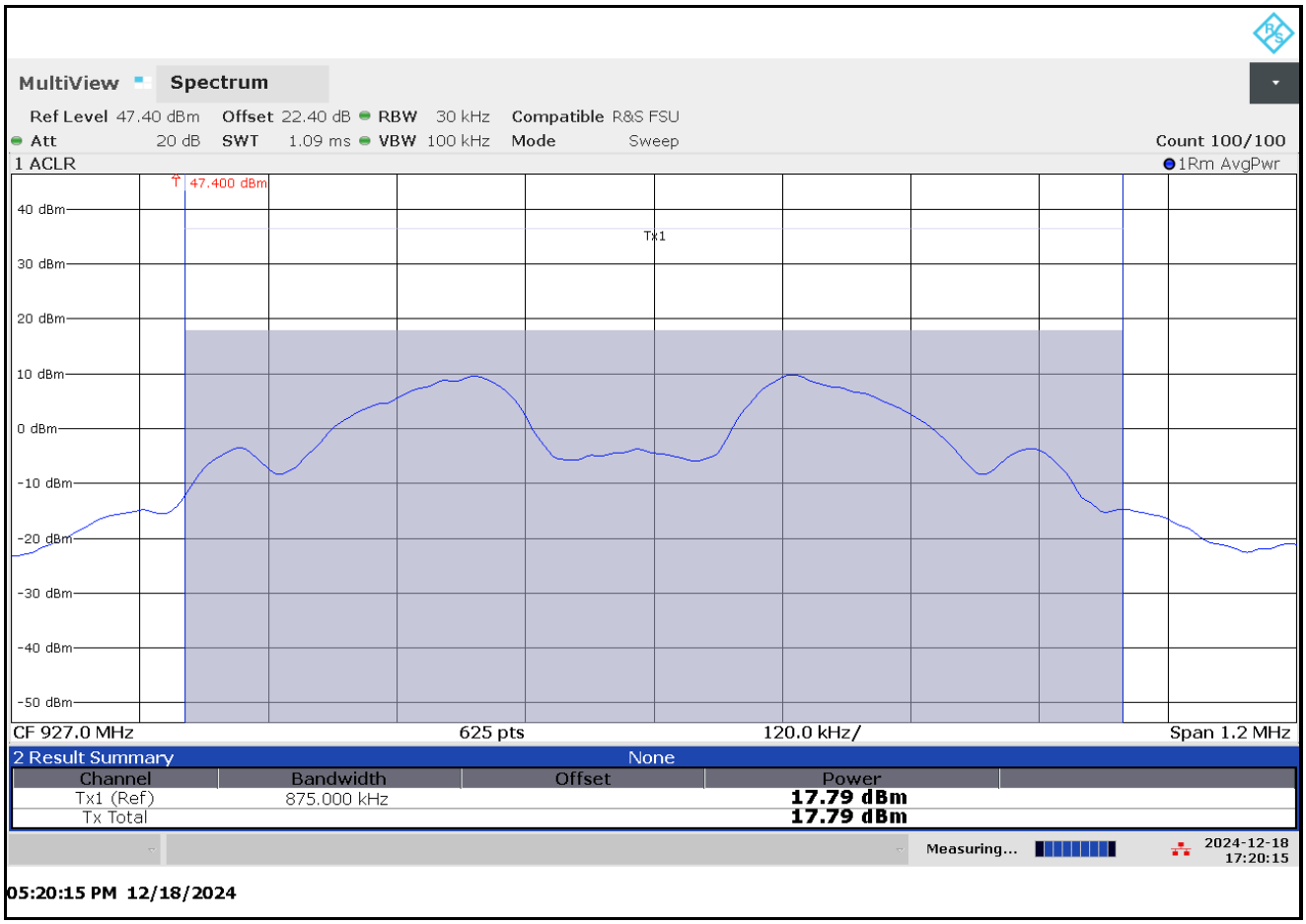
Plot 3-4: Output Power (903.0 MHz Carrier) – Transmitter 1 – GWN



Plot 3-5: Output Power (915.0 MHz Carrier) – Transmitter 1 – GWN

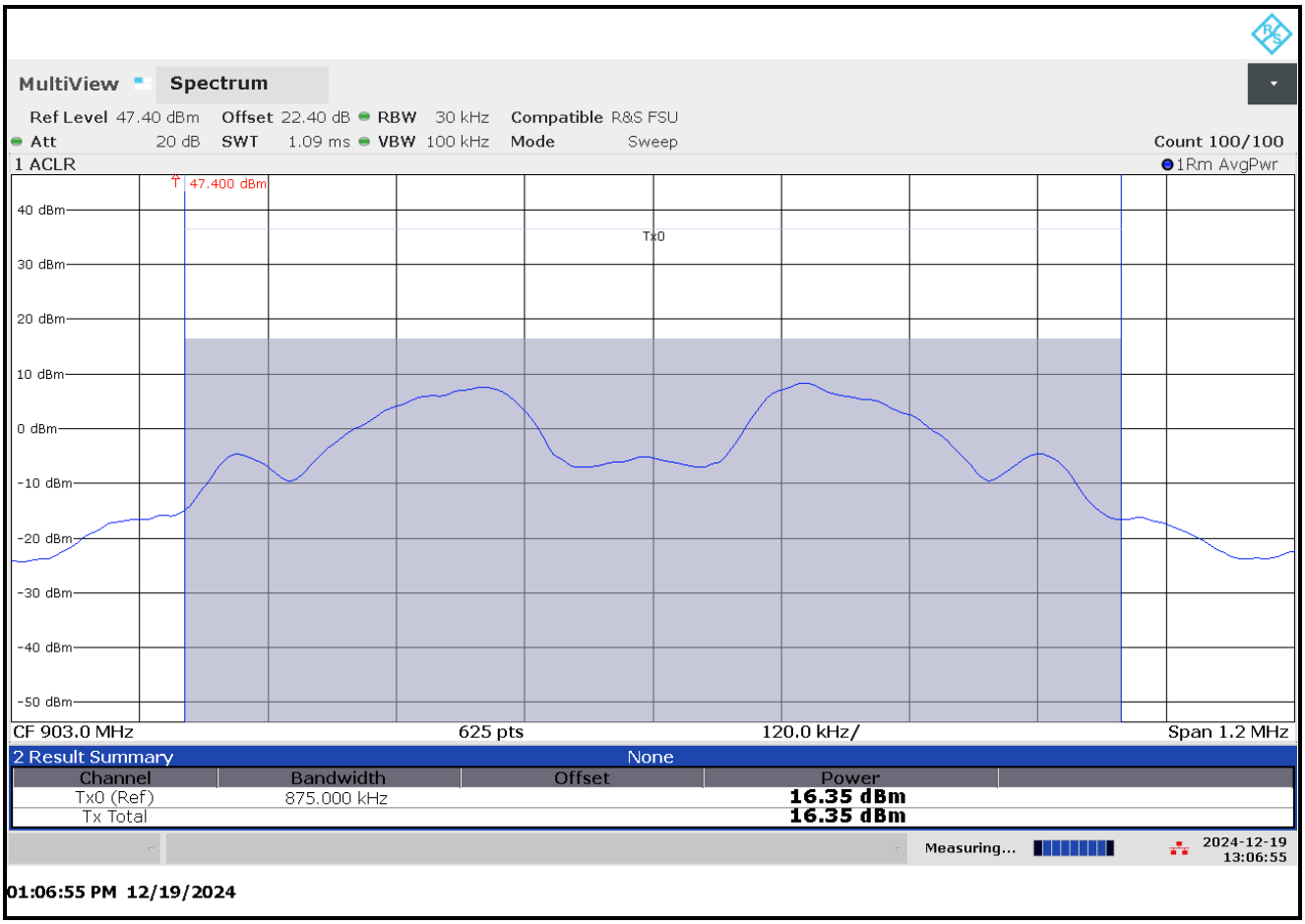


Plot 3-6: Output Power (927.0 MHz Carrier) – Transmitter 1 – GWN

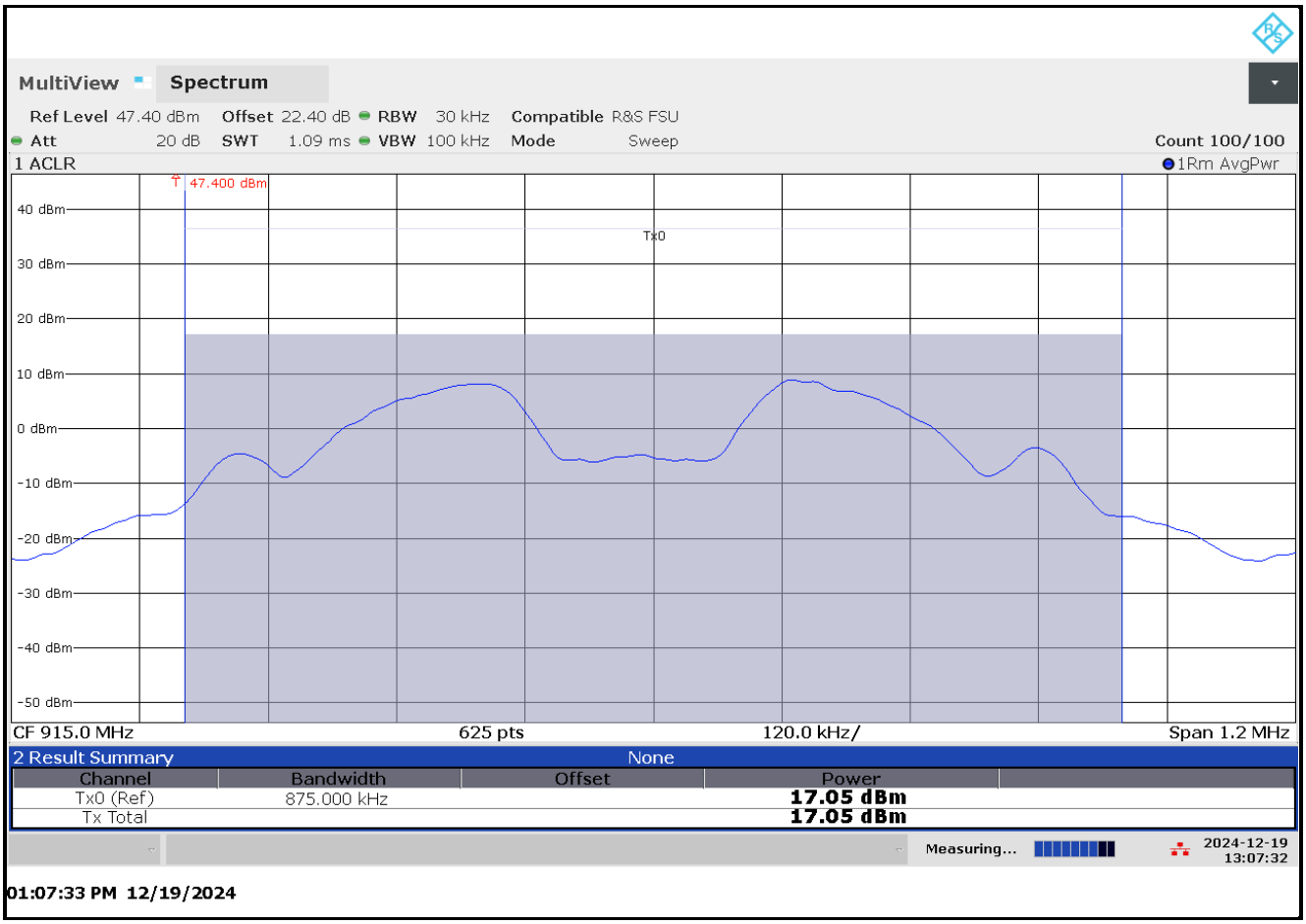


3.2.3 Output Power – Fixed Mesh Node (FMN) Transmitter 0

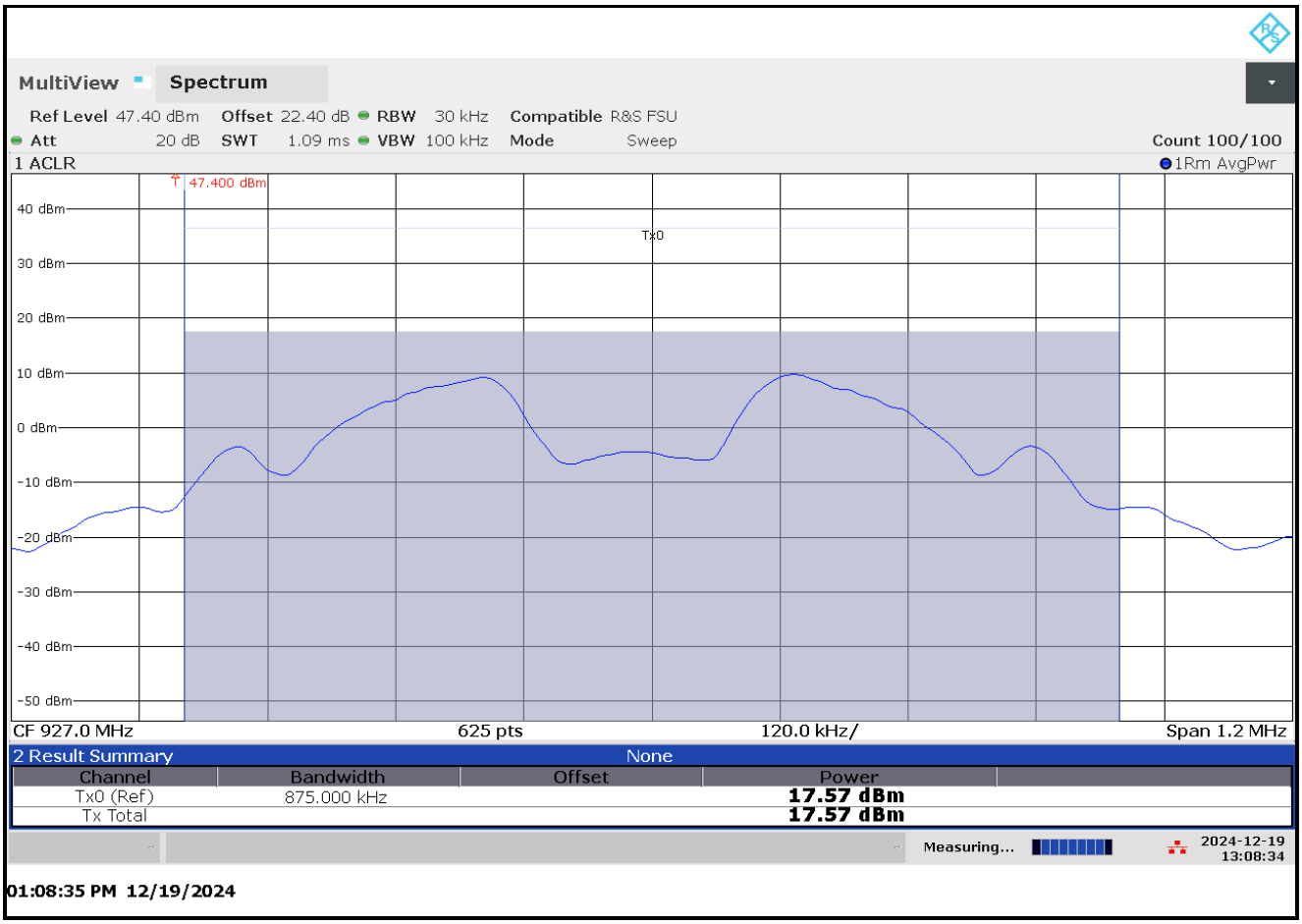
Plot 3-7: Output Power (903.0 MHz Carrier) – Transmitter 0 – FMN



Plot 3-8: Output Power (915.0 MHz Carrier) – Transmitter 0 – FMN

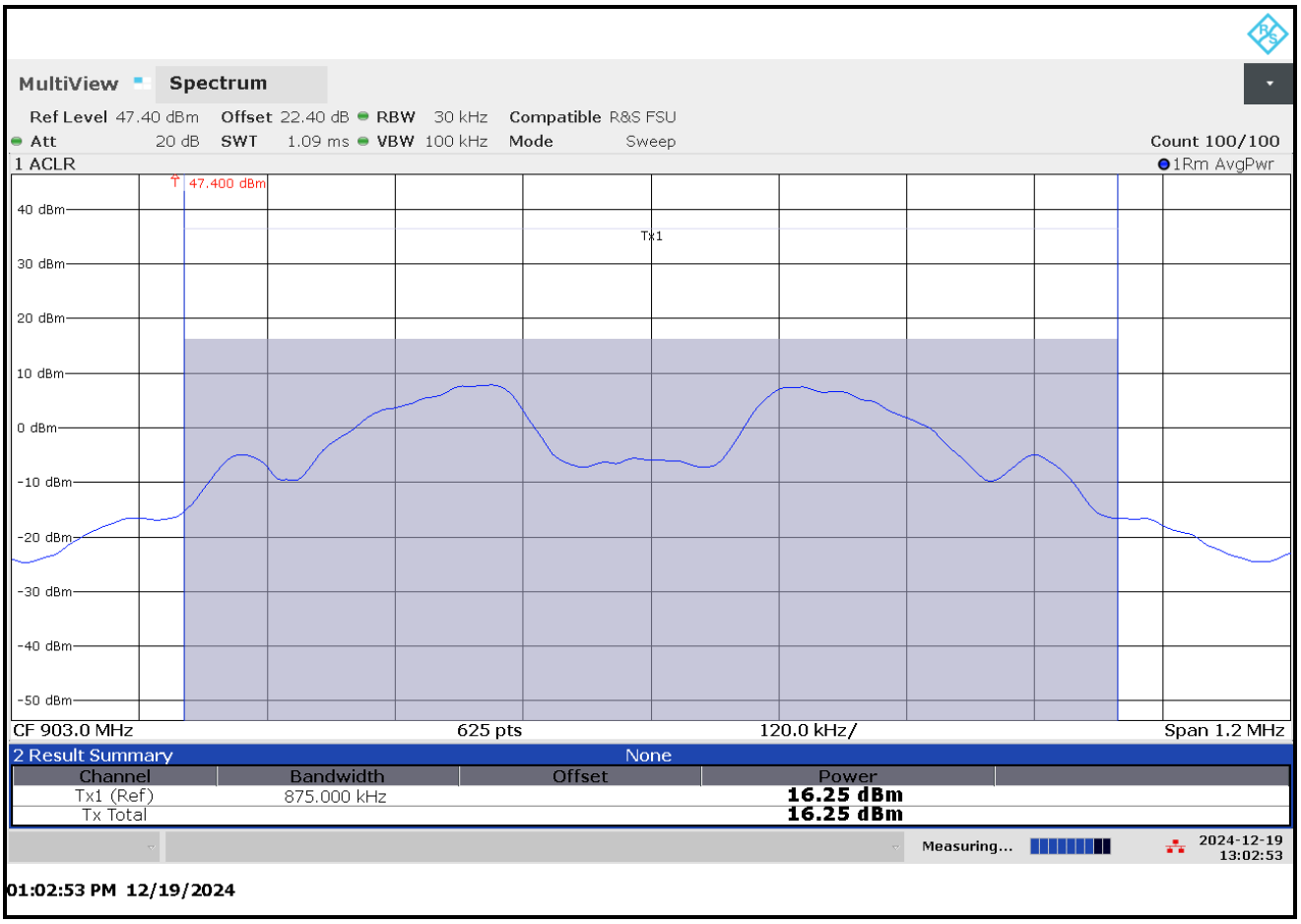


Plot 3-9: Output Power (927.0 MHz Carrier) – Transmitter 0 – FMN

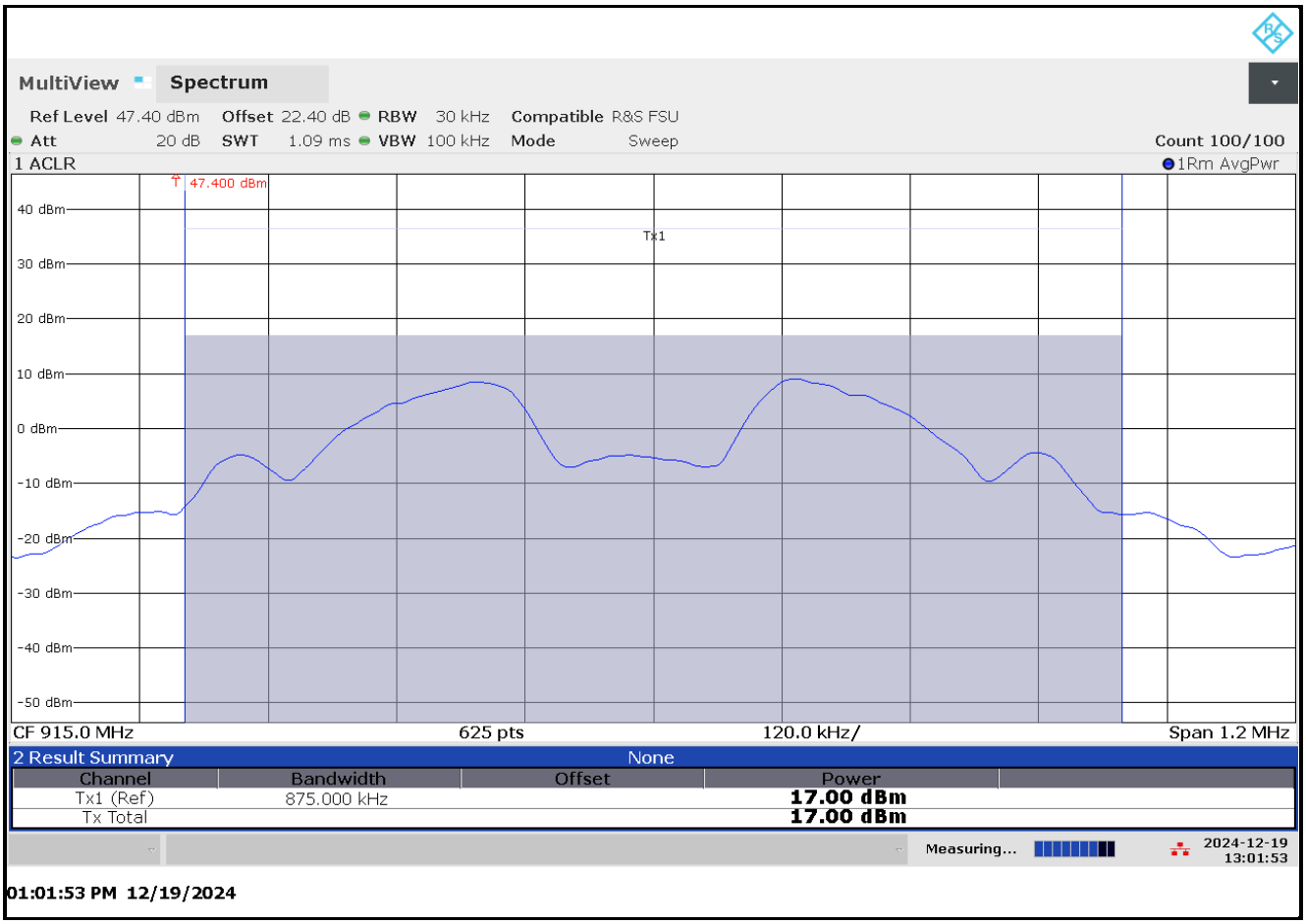


3.2.4 Output Power – Fixed Mesh Node (FMN) Transmitter 1

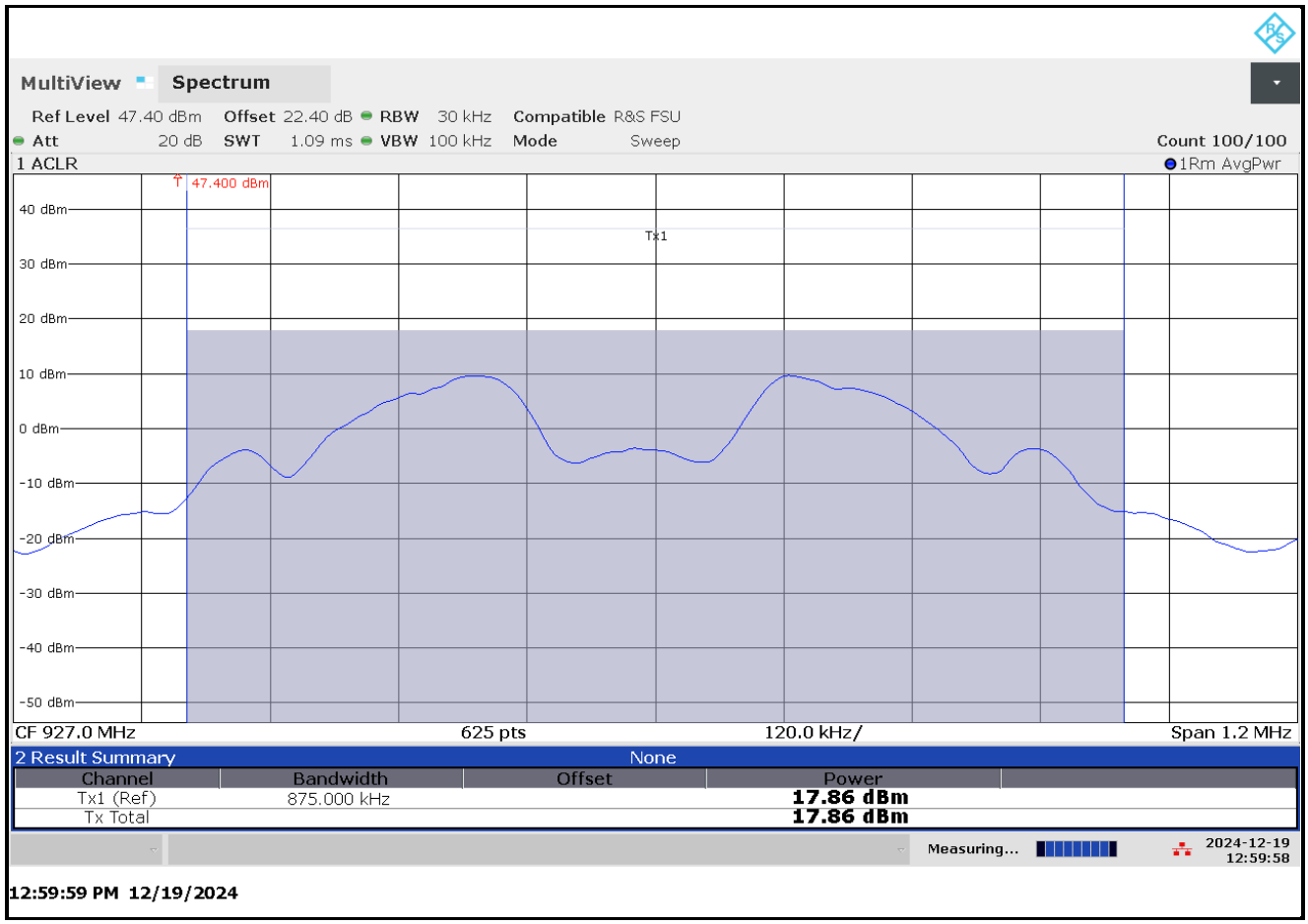
Plot 3-10: Output Power (903.0 MHz Carrier) – Transmitter 1 – FMN



Plot 3-11: Output Power (915.0 MHz Carrier) – Transmitter 1 – FMN



Plot 3-12: Output Power (927.0 MHz Carrier) – Transmitter 1 – FMN



Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ±0.8 dB

Result: Pass

Test Personnel:

Daniel W. Baltzell	Signature	December 18-19, 2024
EMC Test Engineer		Dates of Test

3.3 Peak Average Power Bonded Pair Channels Test Data

The bonded channels, namely 903 MHz, 915 MHz and 915, 927 MHz in GWN Transmitter 0 and Transmitter 1 and FMN Transmitter 0 and Transmitter 1 are spaced 12 MHz apart due to the low and middle channels configured during testing. The bonded pair channel signals transmit simultaneously and are incoherent in nature. Therefore, their peak average power could add constructively or destructively. If they add constructively, their peak average power increase is approximately only 3 dB.

The (903, 927) MHz channel pairing is an artifact of the FCC testing methodology and does not represent the actual operating condition of the device. Its inclusion in this report is for completeness, ensuring a thorough evaluation of emissions based on the test channels used, rather than reflecting real-world operation.

The total peak average power, $\mathbf{P_{total\ peak\ average}}$, is calculated where $P^{peak\ average\ 1}$ and $P^{peak\ average\ 2}$ represents the peak average bonded pair channels respectively.

$$\mathbf{P_{total\ peak\ average}\ (dBm)} = 10\log_{10}(10^{P^{peak\ average\ 1}/10} + 10^{P^{peak\ average\ 2}/10})$$

The total peak average power resulting from the bonded pair incoherent channel signals spaced 12 MHz apart are summed in the following tables.

Table 3-7: Bonded Pair Channels Peak Average Power Output Test Data – GWN - Transmitter 0

Bonded Pair Channels Frequency (MHz)	Bonded Pair Channels Peak Average Conducted Power (dBm)	Bonded Pair Channels Total Peak Average Conducted Power (dBm)	Bonded Pair Channels Total Peak Average Conducted Power (W)
903.0, 915.0	17.30, 17.71	20.52	0.1127
915.0, 927.0	17.71, 17.84	20.78	0.1198

Table 3-8: Bonded Pair Channels Peak Average Power Output Test Data – GWN - Transmitter 1

Bonded Pair Channels Frequency (MHz)	Bonded Pair Channels Peak Average Conducted Power (dBm)	Bonded Pair Channels Total Peak Average Conducted Power (dBm)	Bonded Pair Channels Total Peak Average Conducted Power (W)
903.0, 915.0	17.19, 17.61	20.41	0.1100
915.0, 927.0	17.61, 17.79	20.71	0.1178

Table 3-9: Bonded Pair Channels Peak Average Power Output Test Data – FMN - Transmitter 0

Bonded Pair Channels Frequency (MHz)	Bonded Pair Channels Peak Average Conducted Power (dBm)	Bonded Pair Channels Total Peak Average Conducted Power (dBm)	Bonded Pair Channels Total Peak Average Conducted Power (W)
903.0, 915.0	16.35, 17.05	19.73	0.0939
915.0, 927.0	17.05, 17.57	20.33	0.1078

Table 3-10: Bonded Pair Channels Peak Average Power Output Test Data – FMN - Transmitter 1

Bonded Pair Channels Frequency (MHz)	Bonded Pair Channels Peak Average Conducted Power (dBm)	Bonded Pair Channels Total Peak Average Conducted Power (dBm)	Bonded Pair Channels Total Peak Average Conducted Power (W)
903.0, 915.0	16.25, 17.00	19.65	0.0923
915.0, 927.0	17.00, 17.86	20.46	0.1112

4 Power Spectral Density - FCC §15.247(e)

4.1 Power Output Test Procedure

A conducted power measurement of the EUT was taken using a Rohde & Schwarz Analyzer.

Procedure: C63.10-2020 11.9

Limit: 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Table 4-1: Power Output Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW50	Analyzer	101021	05/30/2027
901338	Weinschel Corp.	46-40-34	Attenuator (DC-18GHz, 40 dB, 25W)	BM0556	02/07/2027

4.2 Average Power Spectral Density Test Data – Gateway Node

Table 4-2: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Air Pressure (kPa)
August 31, 2024	24.5	34	101.8

Table 4-3: Power Spectral Density Test Data - Transmitter 0

Frequency (MHz)	Average Spectral Power Density (dBm)	Limit (dBm)
903.0	0.89	8.0
915.0	1.22	8.0
927.0	1.61	8.0

Table 4-4: Power Spectral Density Test Data - Transmitter 1

Frequency (MHz)	Average Spectral Power Density (dBm))	Limit (dBm)
903.0	0.95	8.0
915.0	0.85	8.0
927.0	1.32	8.0

4.3 Power Spectral Density Bonded Pair Channels Test Data – Gateway Node (GWN)

The bonded channels, namely 903 MHz, 915 MHz and 915 MHz, 927 MHz in GWN Transmitter 0 and Transmitter 1, and FMN Transmitter 0 and Transmitter 1 are spaced 12 MHz apart due to the low, middle channels configured during testing. The bonded pair channel signals transmit simultaneously and are incoherent in nature. Therefore, their power spectral density could add constructively or destructively. If they add constructively, their power spectral density increase is approximately only 3 dB.

The (903, 927) MHz channel pairing is an artifact of the FCC testing methodology and does not represent the actual operating condition of the device. Its inclusion in this report is for completeness, ensuring a thorough evaluation of emissions based on the test channels used, rather than reflecting real-world operation.

The total power spectral density, $P_{Total\ PSD}$, is calculated where $P^{PSD\ 1}$ and $P^{PSD\ 2}$ represent the power spectral density of the bonded pair channels respectively.

$$\mathbf{P_{Total\ PSD}\ (dBm)} = 10\log_{10}(10^{PSD\ 1/10} + 10^{PSD\ 2/10})$$

The total power spectral density resulting from the bonded pair incoherent channel signals spaced 12 MHz apart are summed in the tables below.

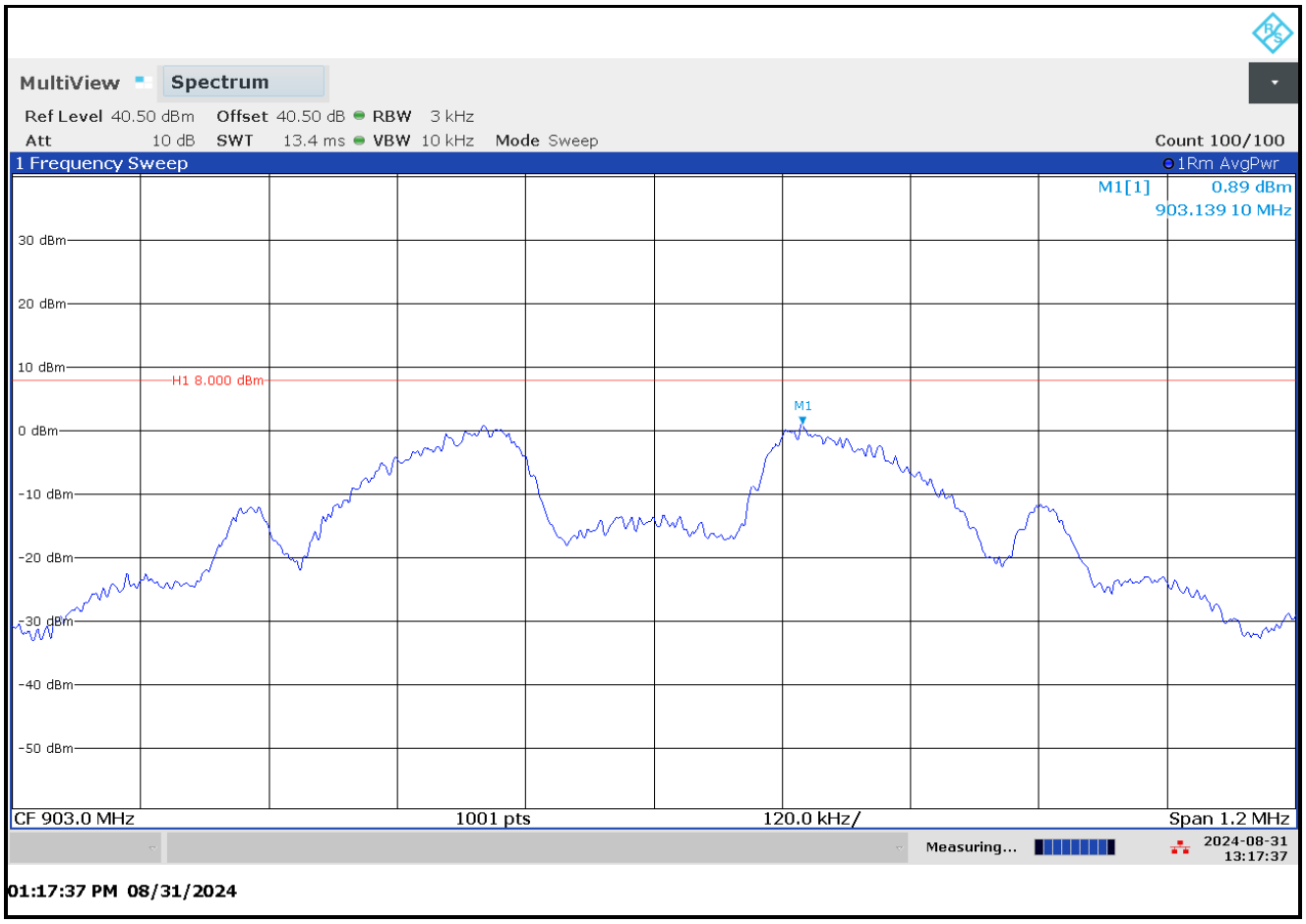
Table 4-5: Peak Power Spectral Density Bonded Pair Channels Test Data - Transmitter 0

Frequency (MHz)	Average Bonded Pair Channels Power Spectral Density (dBm)	Total Average Bonded Pair Channels Power Spectral Density (dBm)	Limit (dBm)
903.0, 915	0.89, 1.22	4.07	8.0
915.0, 927	1.22, 1.61	4.43	8.0

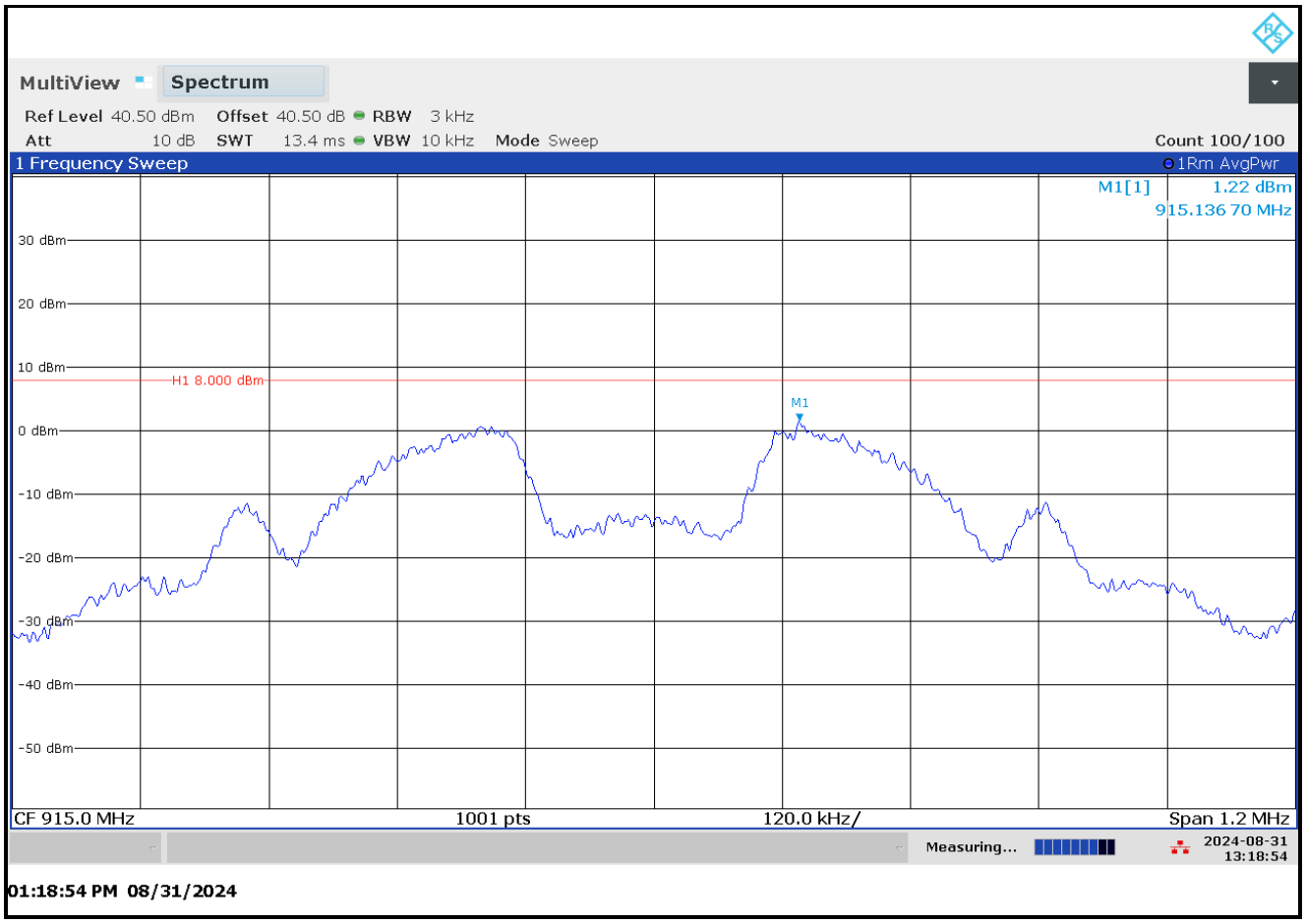
Table 4-6: Power Spectral Density Bonded Pair Channels Test Data - Transmitter 1

Frequency (MHz)	Average Spectral Power Density (dBm))	Total Average Bonded Pair Channels Power Spectral Density (dBm)	Limit (dBm)
903.0, 915	0.95, 0.85	3.91	8.0
915.0, 927	0.85, 1.32	4.10	8.0

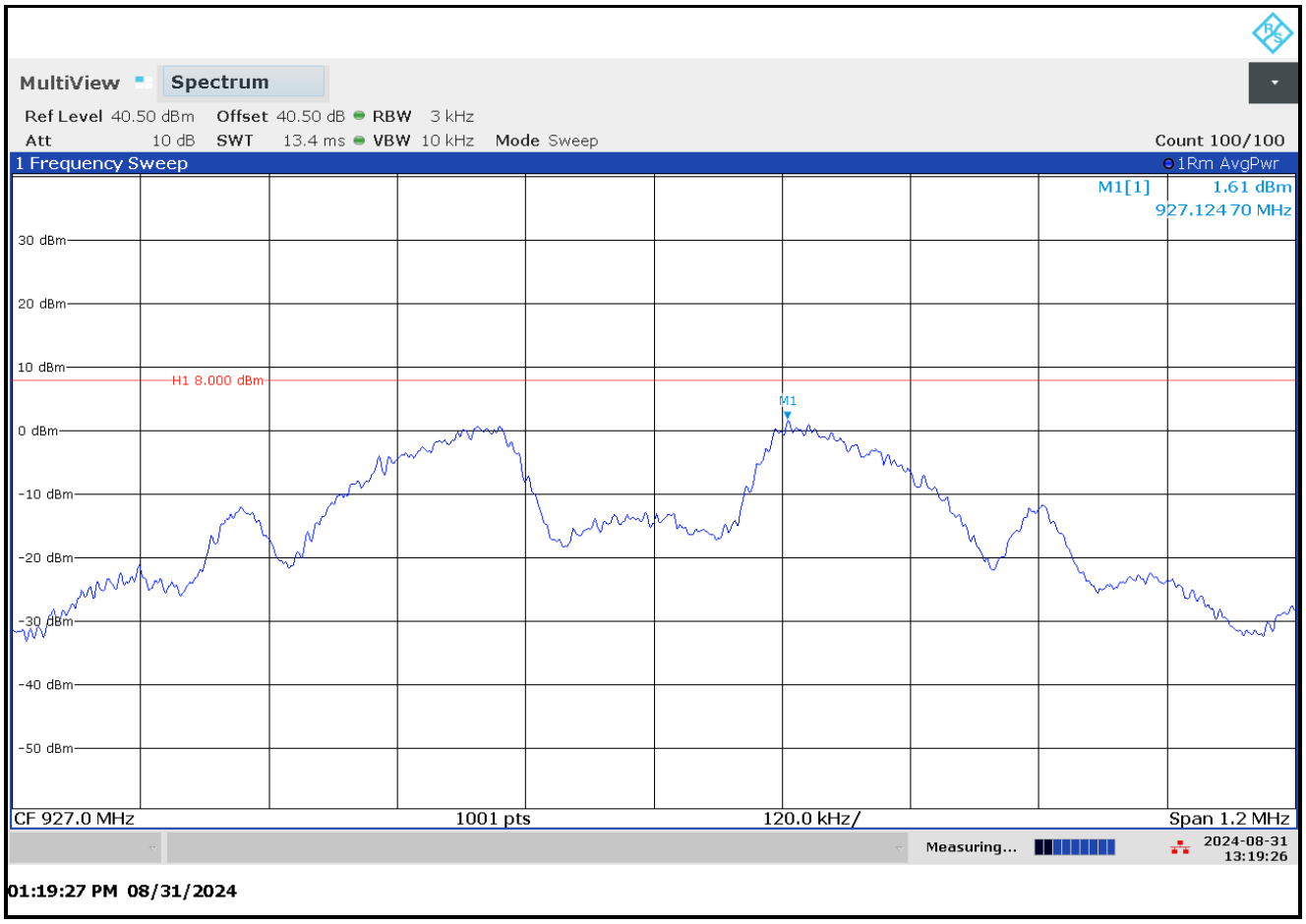
Plot 4-1: Power Spectral Density (903 MHz Carrier) – Transmitter 0



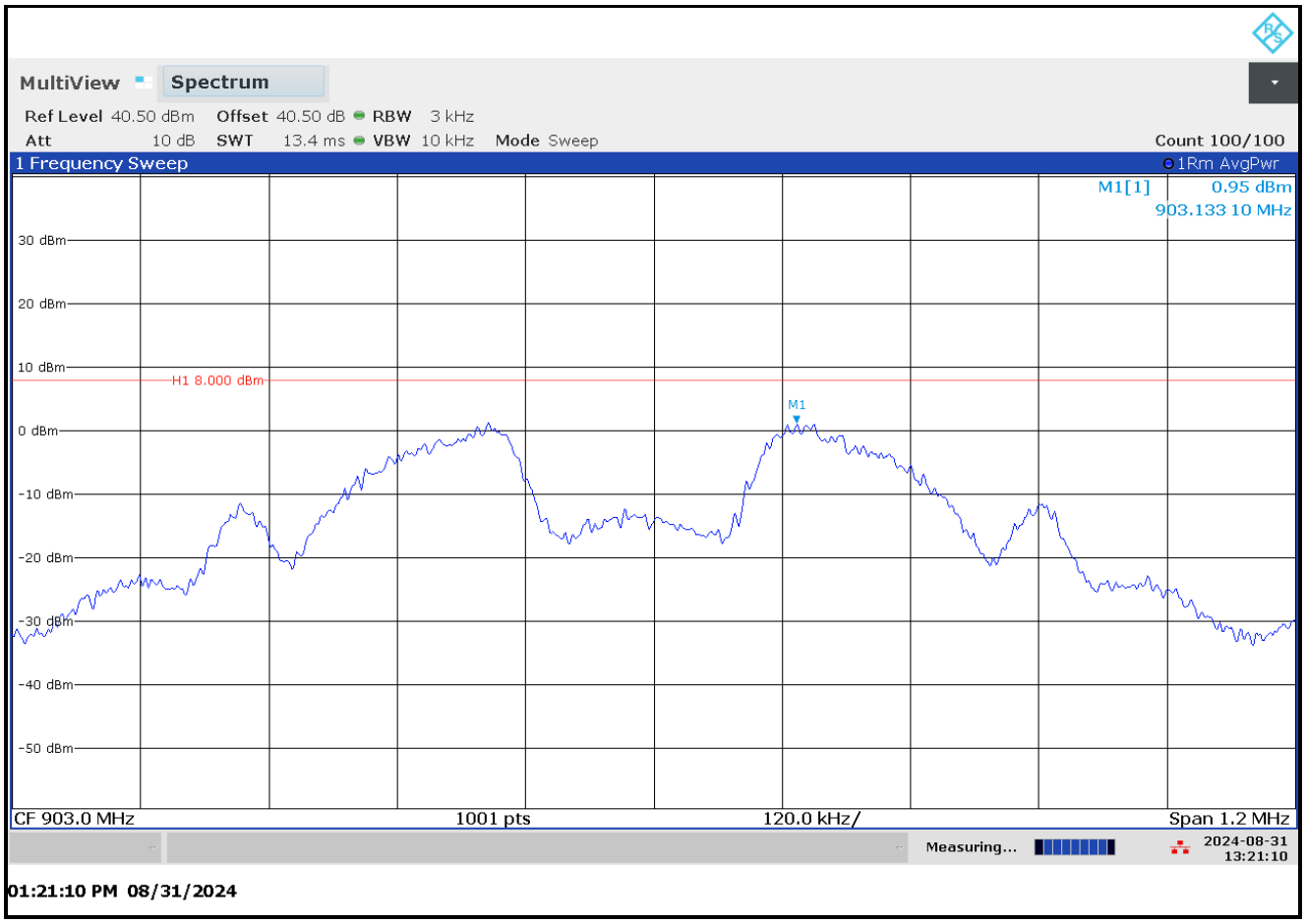
Plot 4-2: Power Spectral Density (915 MHz Carrier) – Transmitter 0



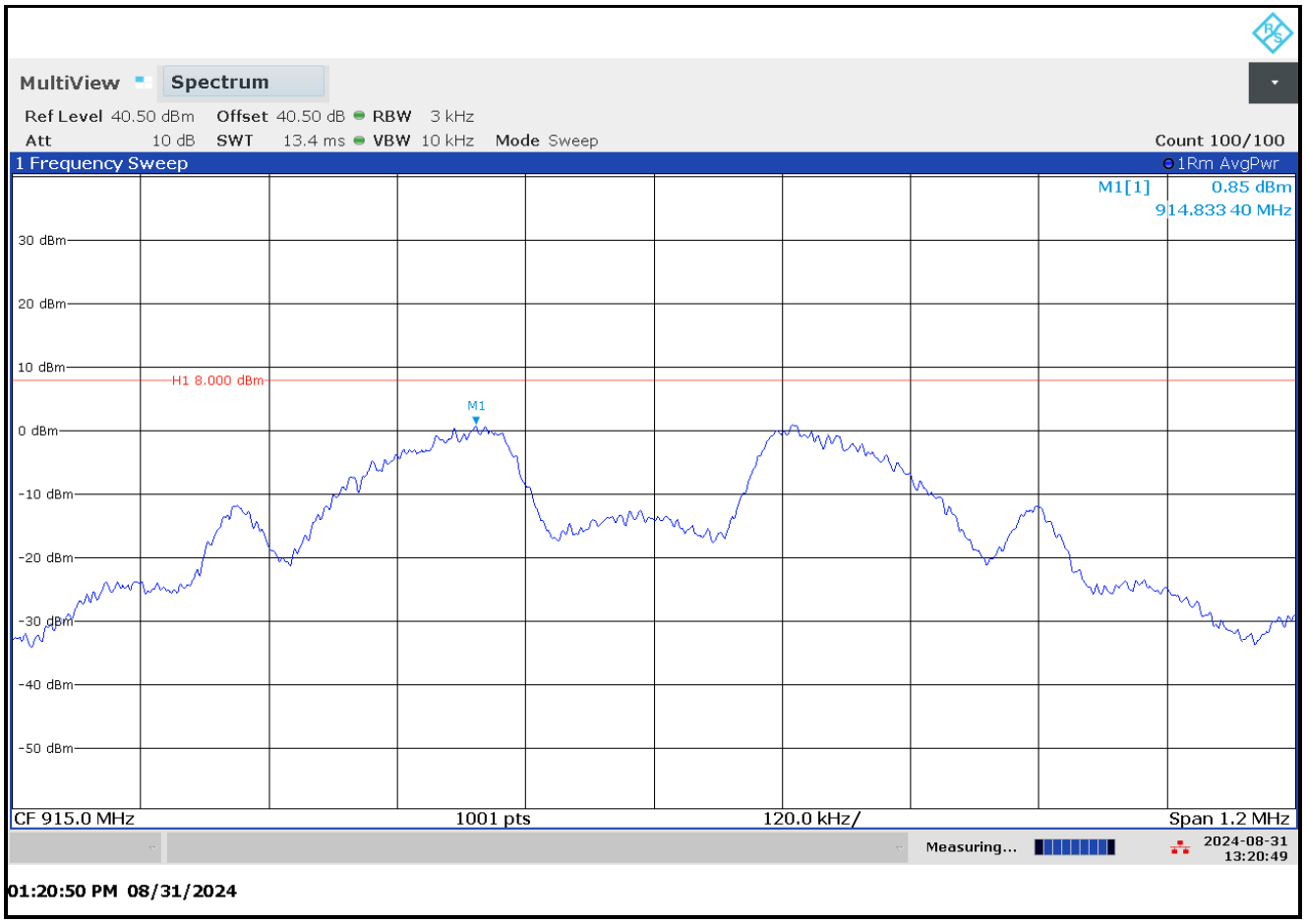
Plot 4-3: Power Spectral Density (927 MHz Carrier) – Transmitter 0



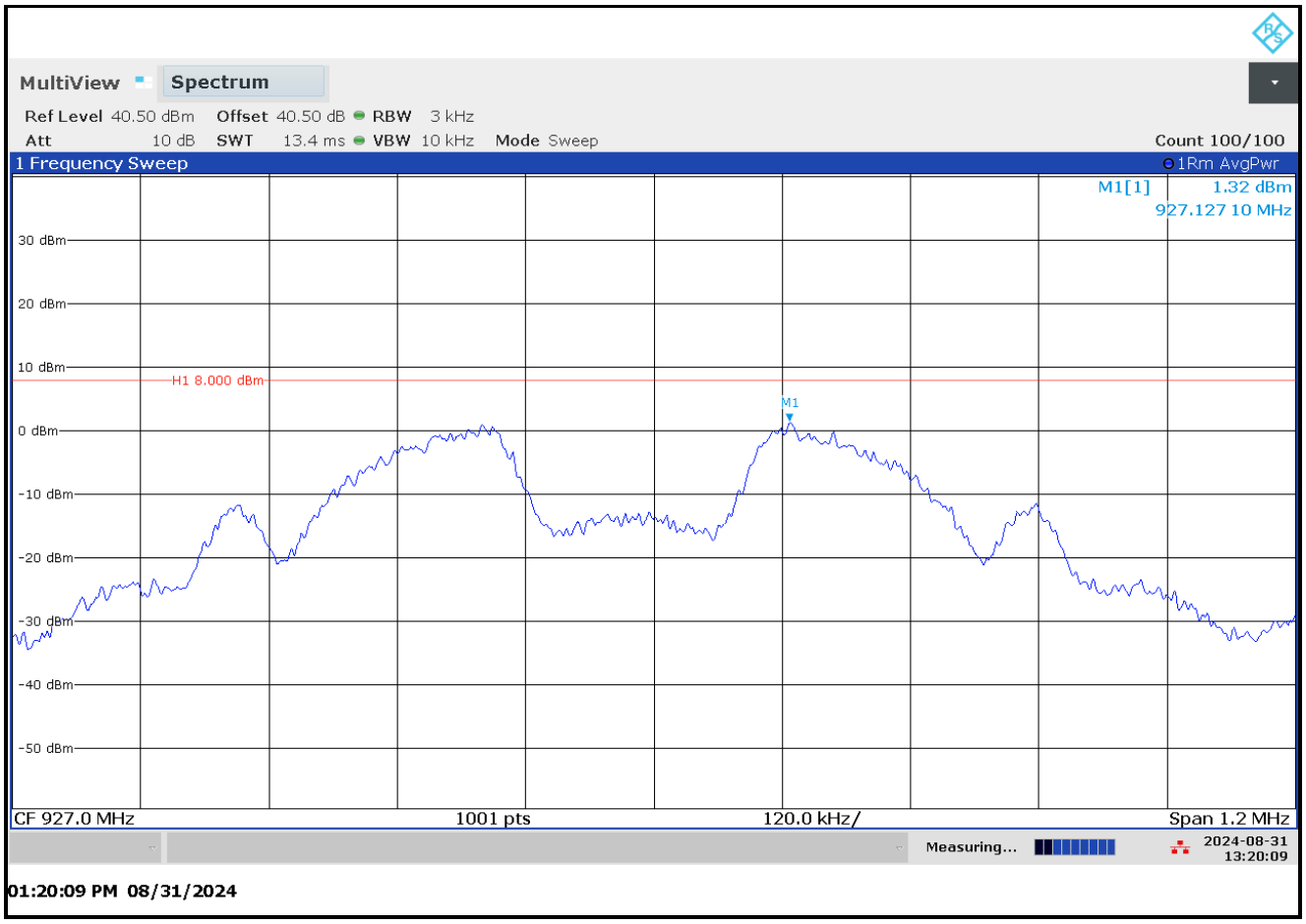
Plot 4-4: Power Spectral Density (903 MHz Carrier) – Transmitter 1



Plot 4-5: Power Spectral Density (915 MHz Carrier) – Transmitter 1



Plot 4-6: Power Spectral Density (927 MHz Carrier) – Transmitter 1



Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ±0.8 dB

Result: Pass

Test Personnel:

Daniel W. Baltzell		August 31, 2024
EMC Test Engineer	Signature	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 11.12

The EUT was connected to the spectrum analyzer through suitable attenuation. The span was set 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 which fall outside of the authorized band of operation. The spectrum analyzer was set to the following:

RBW = 100 kHz
VBW > = RBW
Sweep = auto
Detector function = peak
Trace = max hold

The trace was allowed to stabilize. The marker was set on the emission at the band edge and peak. The difference can be used to show the delta between the maximum in-band emission and the emission at the band edge and compared to the 6 dBc requirement of 15.247(d) (when using peak emissions).

Table 5-1: Band Edge Test Equipment

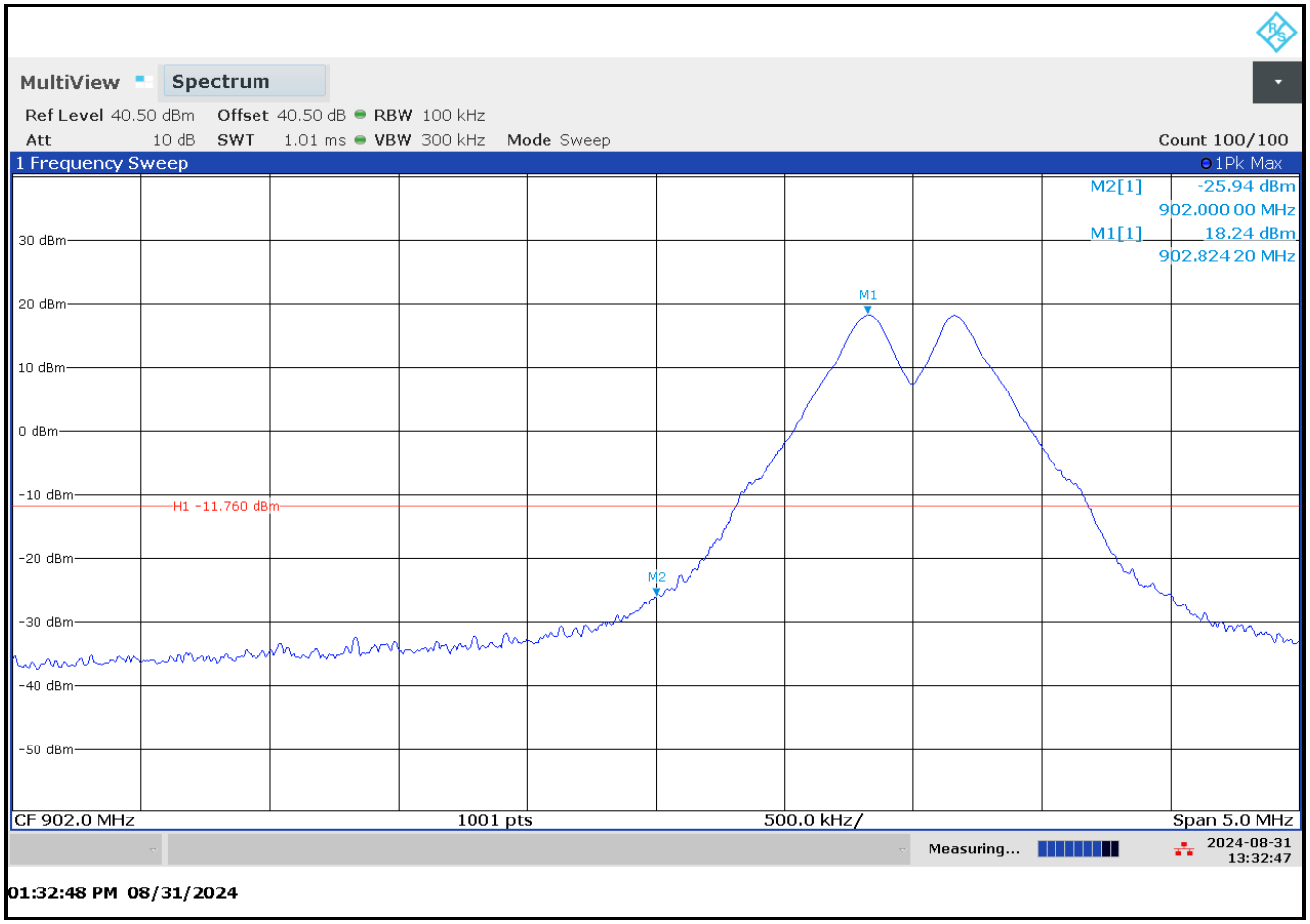
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW50	Analyzer	101021	05/30/2027
901338	Weinschel Corp.	46-40-34	Attenuator (DC-18GHz, 40 dB, 25W)	BM0556	02/07/2027

5.2 Band Edge Test Data – Gateway Node

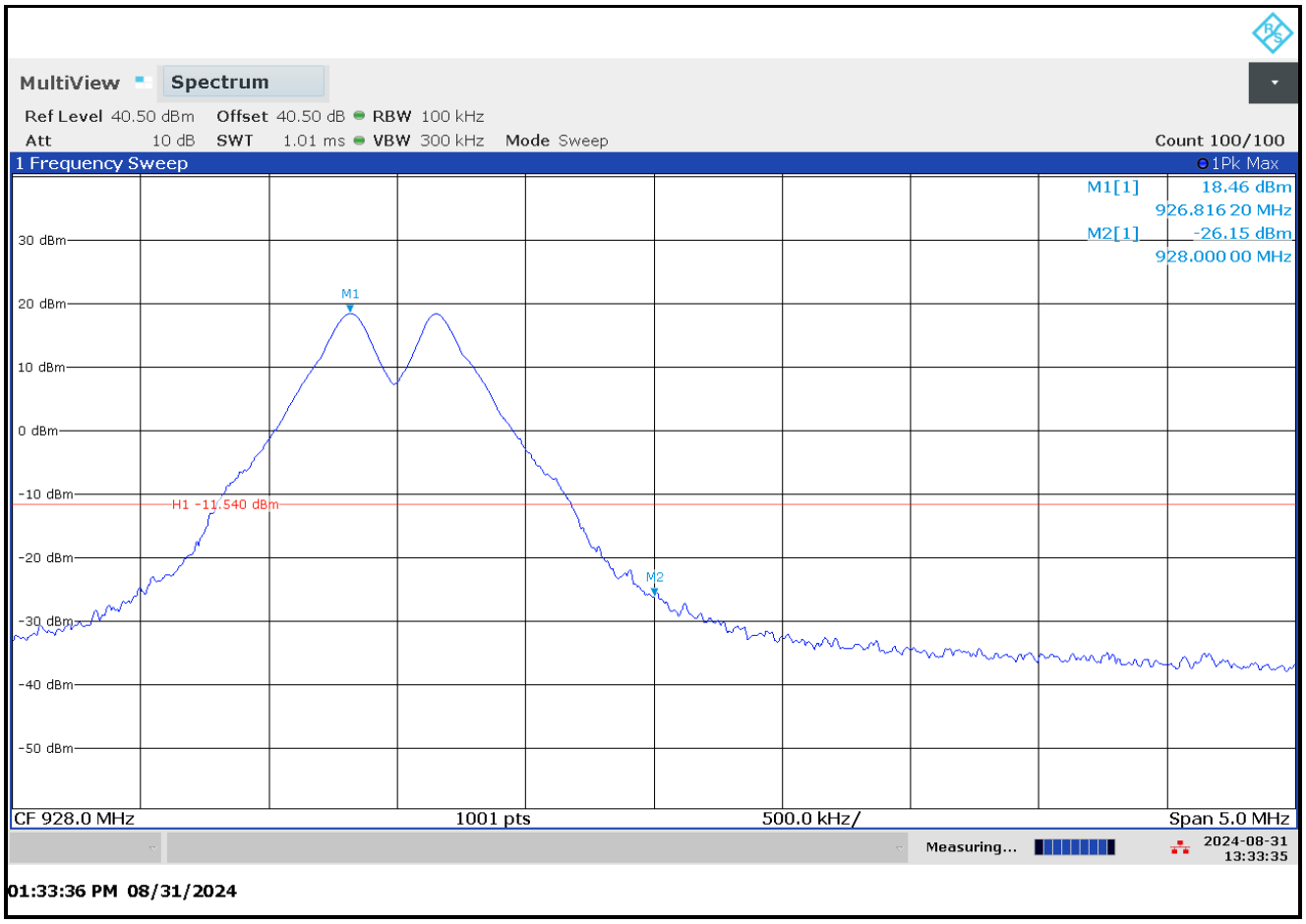
Table 5-2: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Air Pressure (kPa)
August 31, 2025	24.5	34	101.8

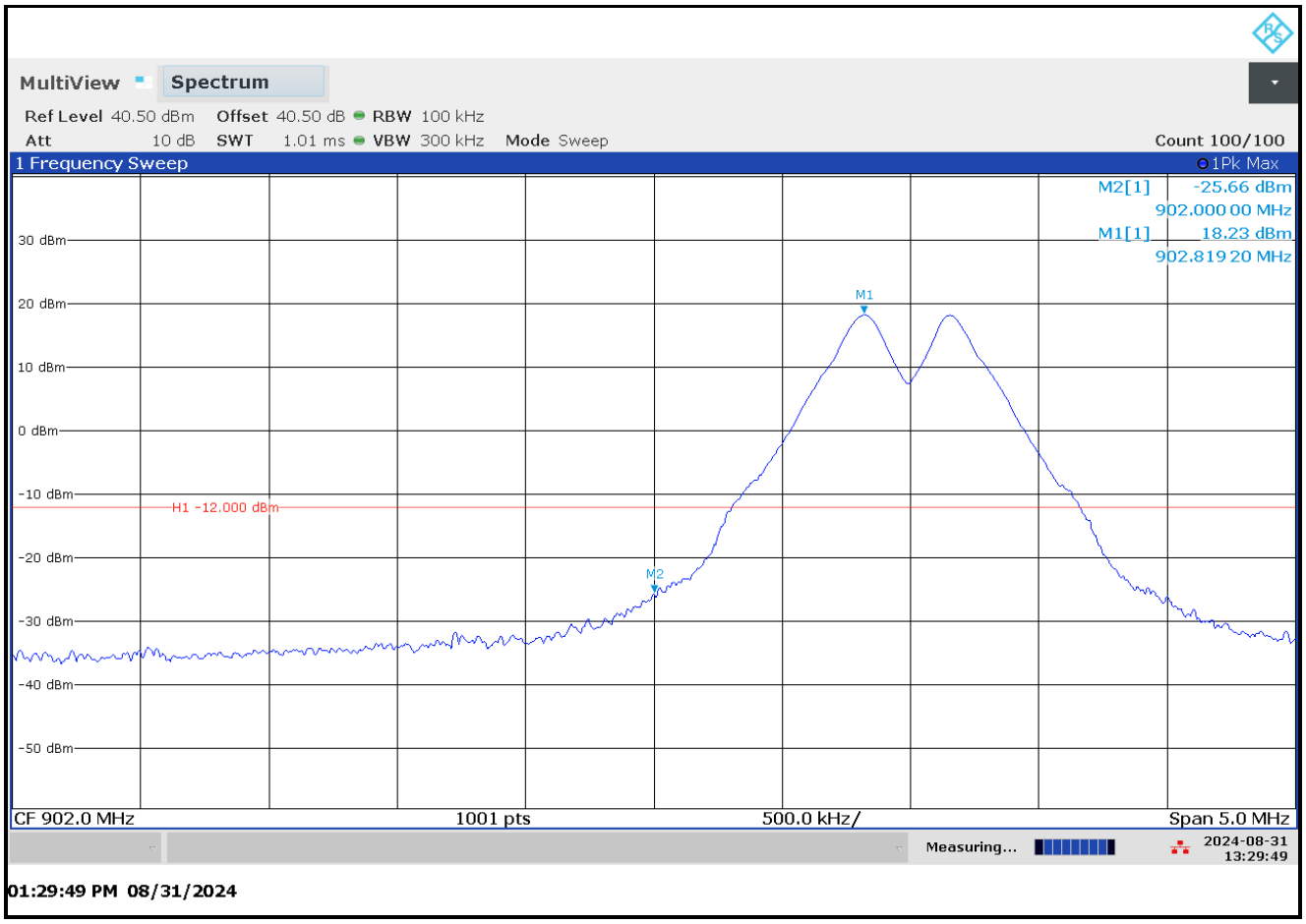
Plot 5-1: Lower Band Edge (902 MHz Band Edge, 903.0 MHz Carrier) - Transmitter 0



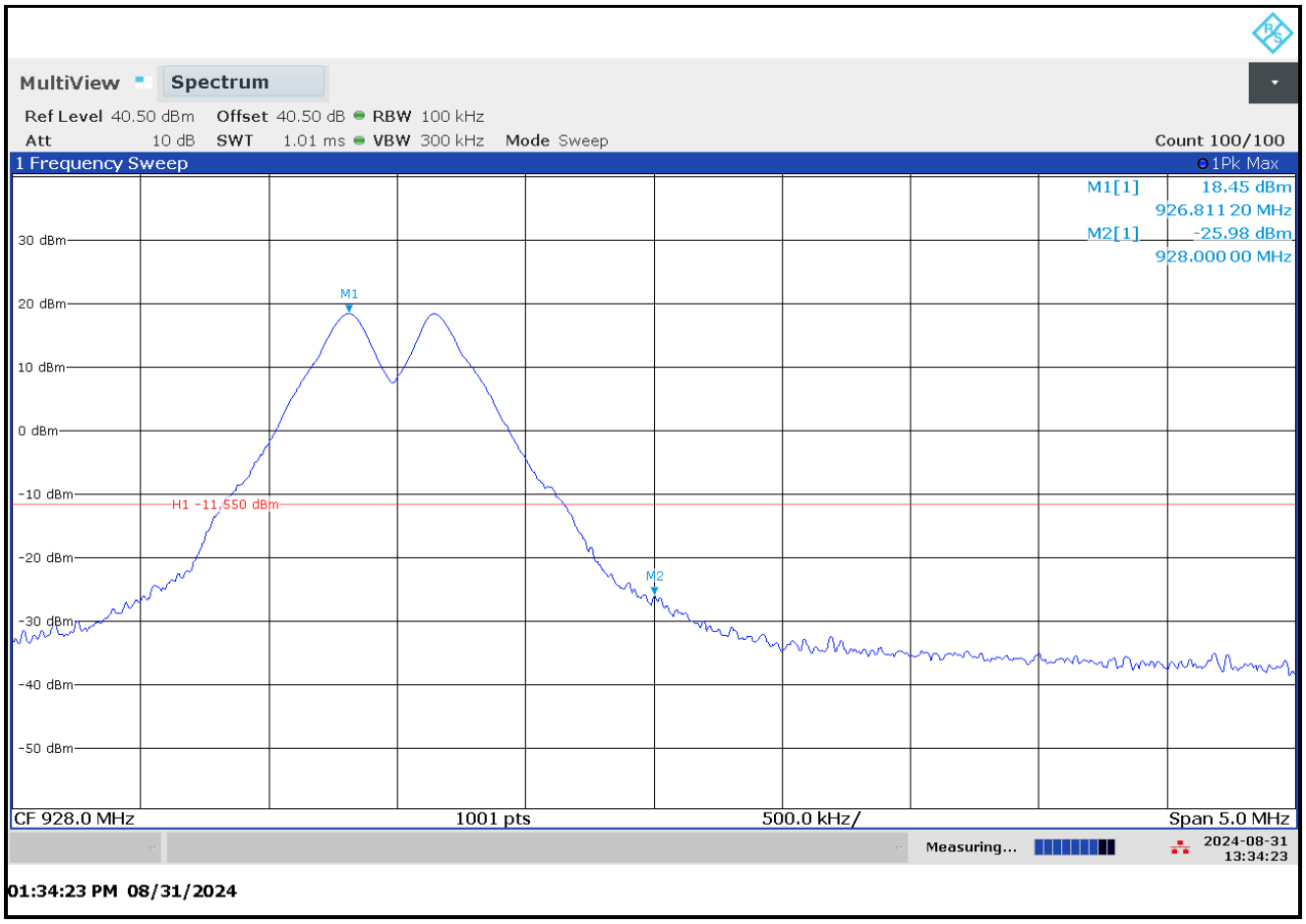
Plot 5-2: Upper Band Edge (928 MHz Band Edge, 927.0 MHz Carrier) - Transmitter 0



Plot 5-3: Lower Band Edge (902 MHz Band Edge, 903.0 MHz Carrier) - Transmitter 1



Plot 5-4: Upper Band Edge (928 MHz Band Edge, 927.0 MHz Carrier) - Transmitter 1



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 Hz; ±0.8 dB

Result: Pass

Test Personnel:

Daniel W. Baltzell	Daniel W. Baltzell	August 31, 2024
EMC Test Engineer	Signature	Date of Test

6 Antenna Conducted Spurious Emissions – FCC §15.247(d)

6.1 Antenna Conducted Spurious Emissions Test Procedures

Procedure: C63.10-2020 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 100 kHz, and the video bandwidth set at 100 kHz. The modulated carrier was identified at the following frequencies: 903.0 MHz, 915.0 MHz and 927.0 MHz. The carrier to the 10th harmonic of the carrier frequency was investigated.

6.2 Antenna Conducted Spurious Emissions Test Results

Table 6-1: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Air Pressure (kPa)
August 31, 2025	24.5	34	101.8

All spurious emissions were greater than 30 dB below the limit (note that we are reporting power as average). Per FCC 15.31(o), no data is being reported.

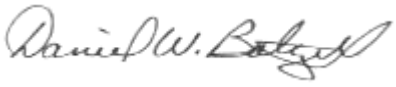
Table 6-2: Antenna Conducted Spurious Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW50	Analyzer	101021	05/30/2027
901338	Weinschel Corp.	46-40-34	Attenuator (DC-18GHz, 40 dB, 25W)	BM0556	02/07/2027

Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ±0.8 dB

Result: Pass

Test Personnel:



Daniel W. Baltzell		August 31, 2024
EMC Test Engineer	Signature	Date of Test

7 6 dB and 99% Bandwidths – FCC §15.247(a)(2)

7.1 Bandwidth Test Procedure

Procedure: C63.10-2020 11.8

RBW = 1% to 5% of the OBW
VBW = at least three times RBW

The peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level.
Set detection mode to peak and trace mode to max-hold.

The analyzer 6 dB and 99% power function was used to determine the bandwidths.

The minimum 6 dB bandwidths 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 minimum 6 dB bandwidth shall be at least 500 kHz.

Table 7-1: Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW50	Analyzer	101021	05/30/2027
901338	Weinschel Corp.	46-40-34	Attenuator (DC-18GHz, 40 dB, 25W)	BM0556	02/07/2027

7.2 Bandwidth Test Data – Gateway Node

Table 7-2: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Air Pressure (kPa)
August 31, 2024	24.5	34	101.8

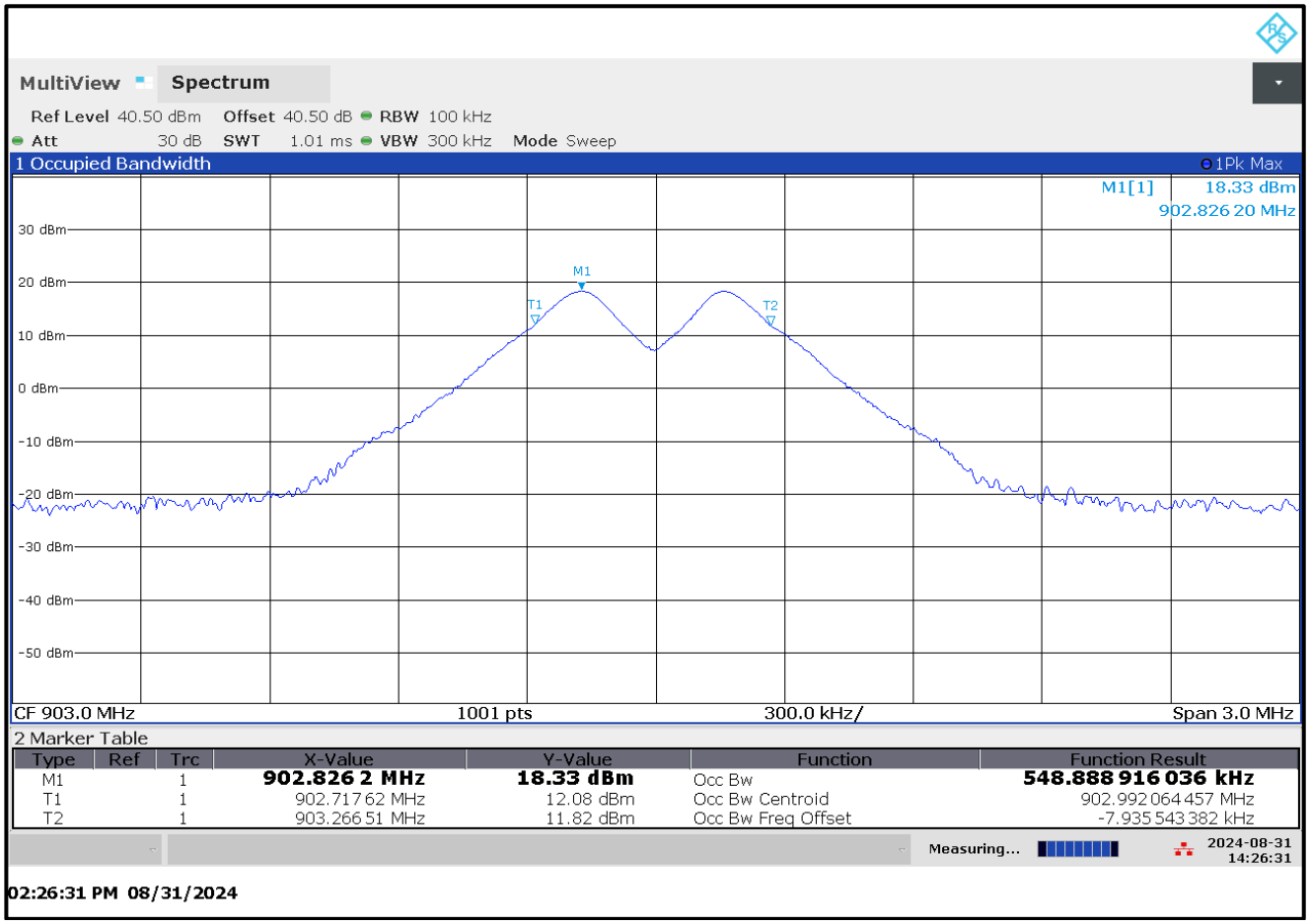
Table 7-3: 6 dB Modulated Bandwidth Test Data – Transmitter 0

Frequency (MHz)	6 dB Bandwidth (kHz)	Min. Limit (kHz)	Pass/Fail
903.0	549	500	Pass
915.0	546	500	Pass
927.0	544	500	Pass

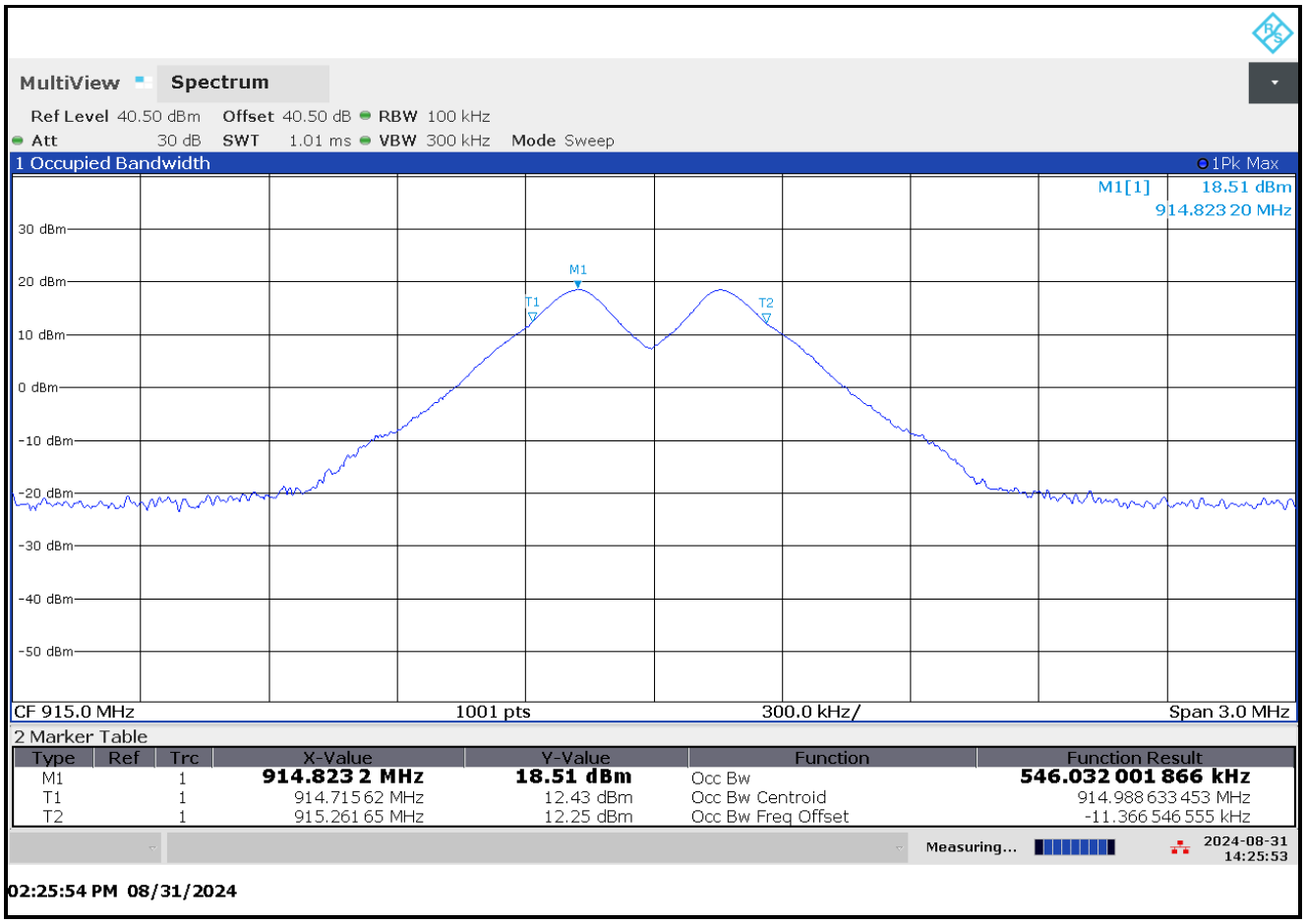
Table 7-4: 6 dB Modulated Bandwidth Test Data – Transmitter 1

Frequency (MHz)	6 dB Bandwidth (kHz)	Min. Limit (kHz)	Pass/Fail
903.0	545	500	Pass
915.0	545	500	Pass
927.0	546	500	Pass

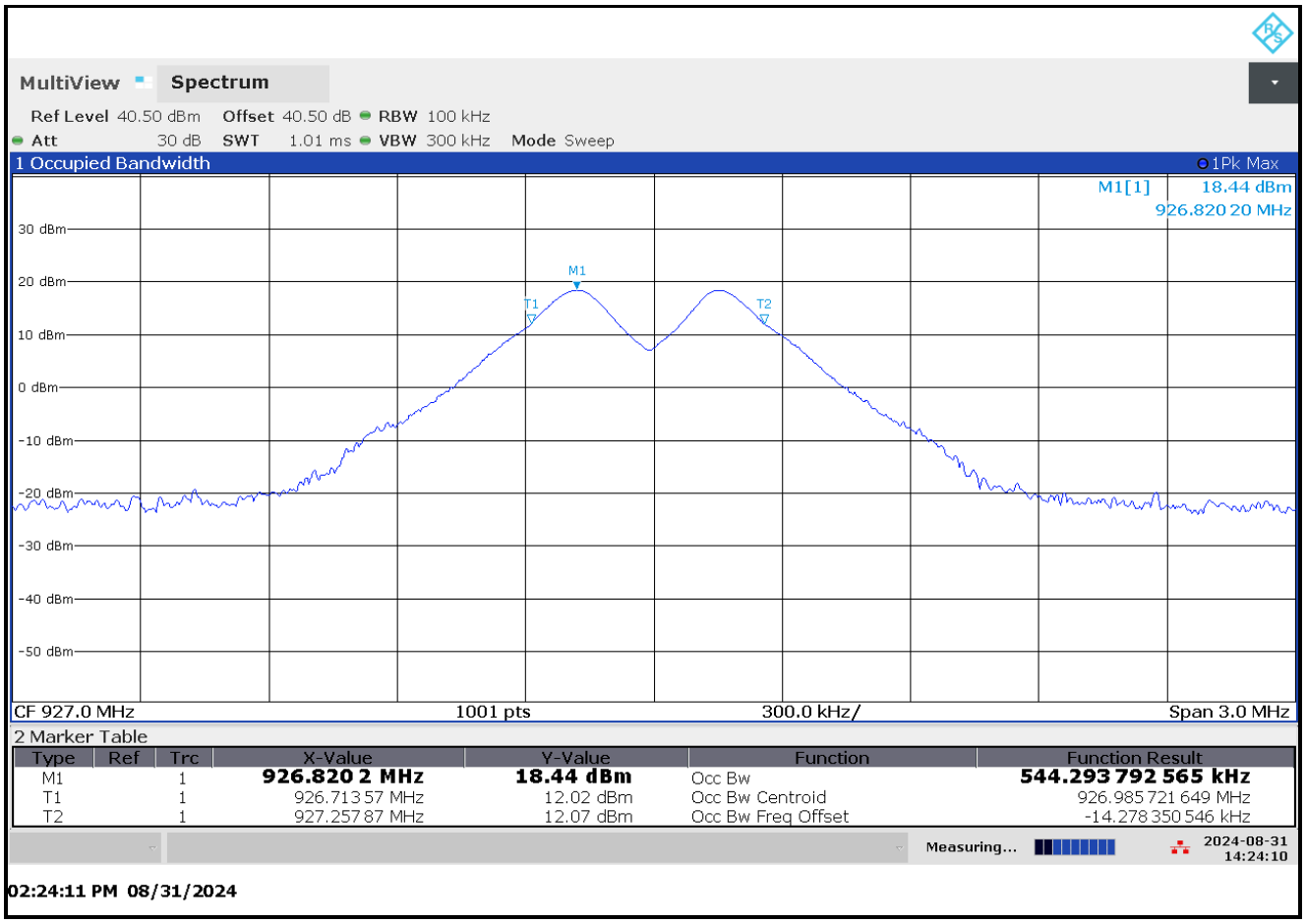
Plot 7-1: 6 dB Bandwidth; 903.0 MHz – Transmitter 0



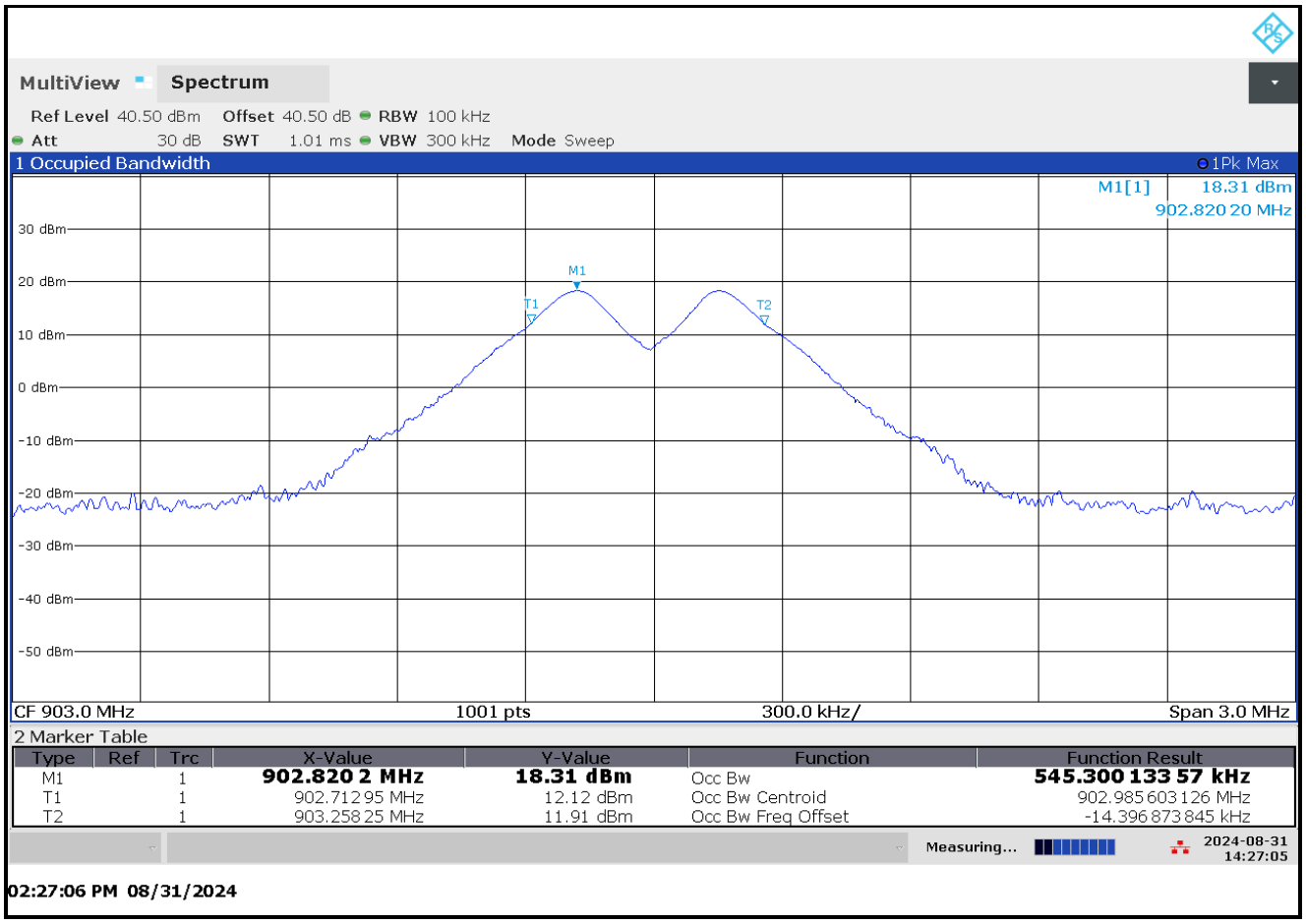
Plot 7-2: 6 dB Bandwidth; 915.0 MHz – Transmitter 0



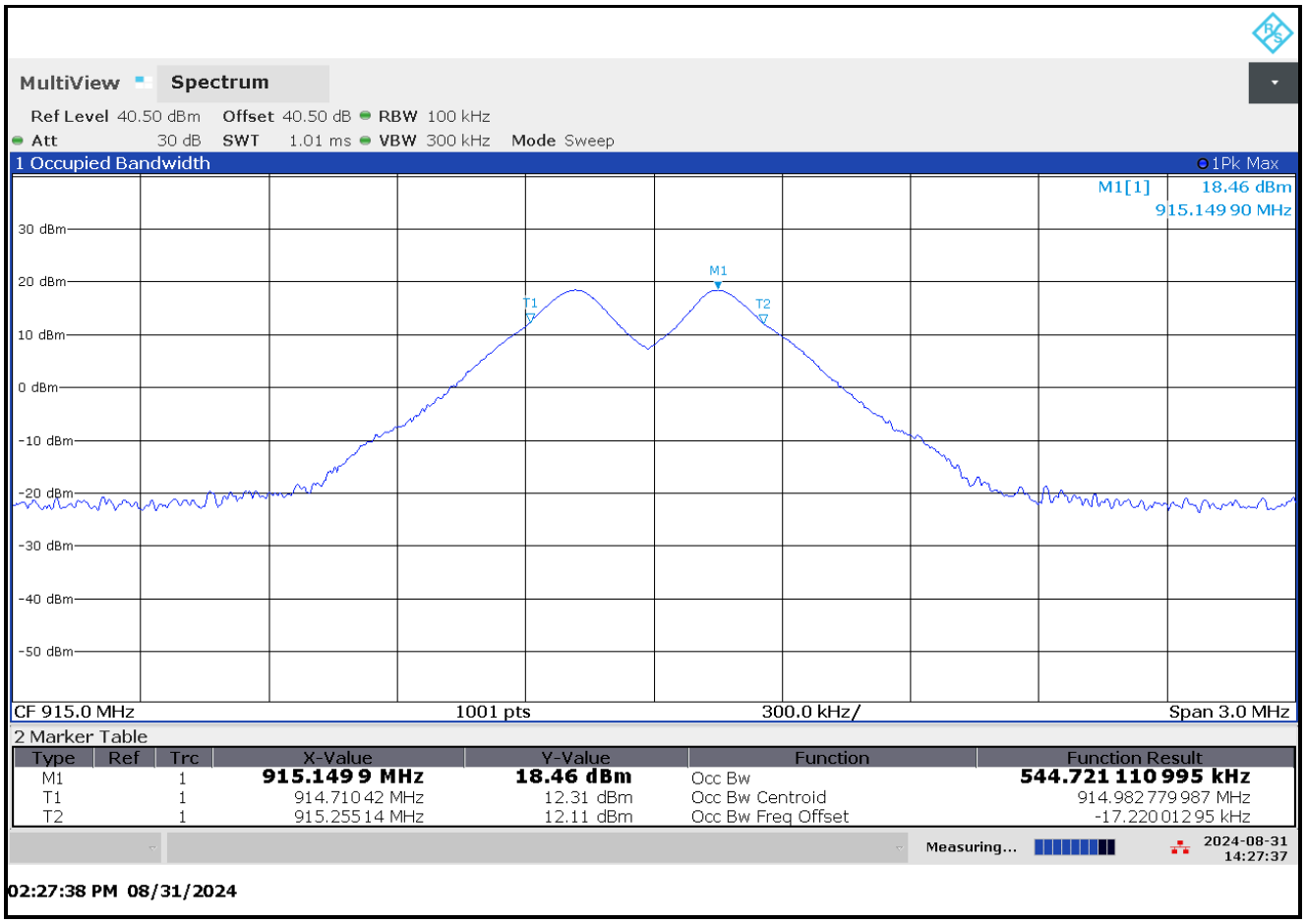
Plot 7-3: 6 dB Bandwidth; 927.0 MHz – Transmitter 0



Plot 7-4: 6 dB Bandwidth; 903.0 MHz – Transmitter 1



Plot 7-5: 6 dB Bandwidth; 915.0 MHz – Transmitter 1



Plot 7-6: 6 dB Bandwidth; 927.0 MHz – Transmitter 1

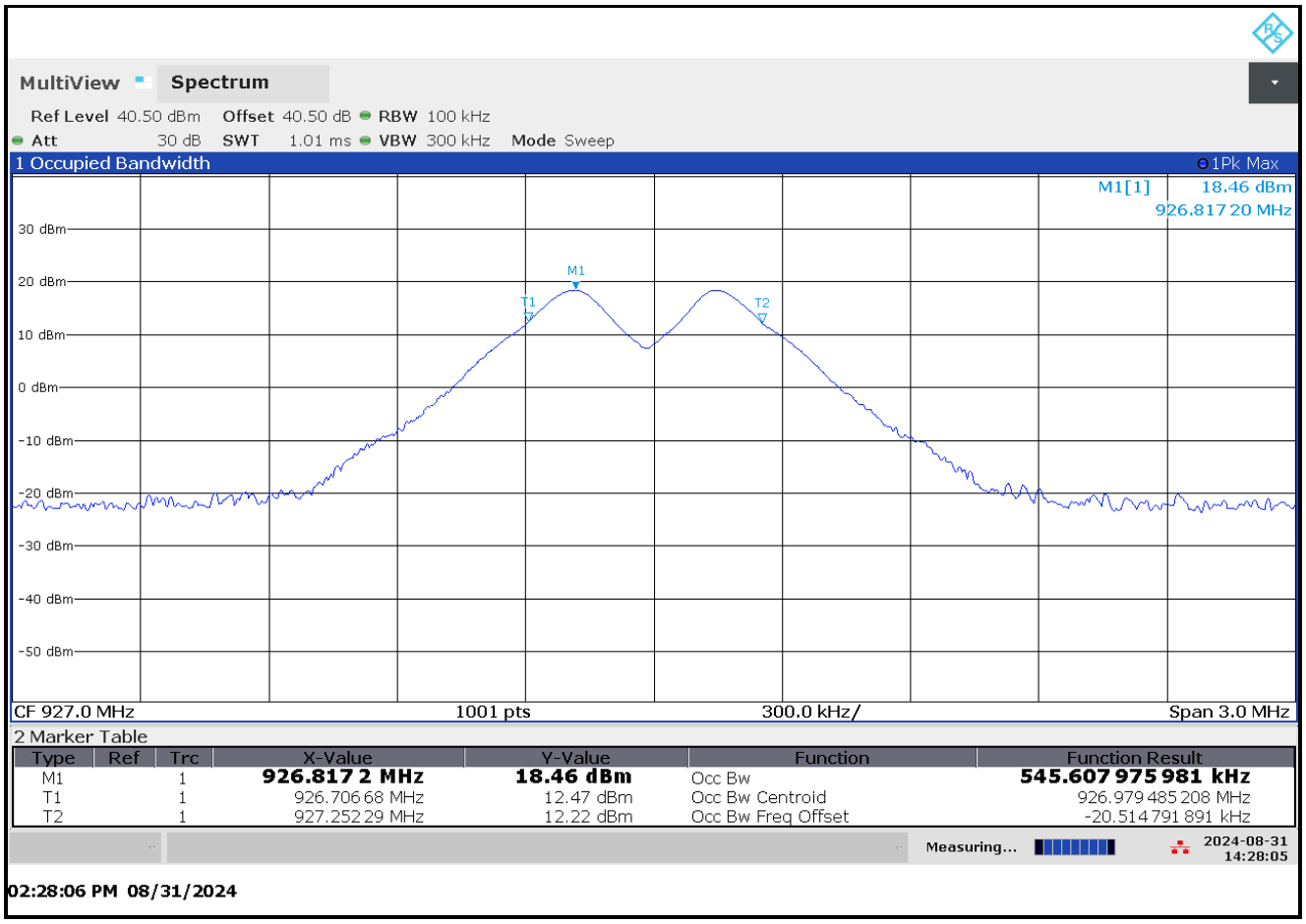


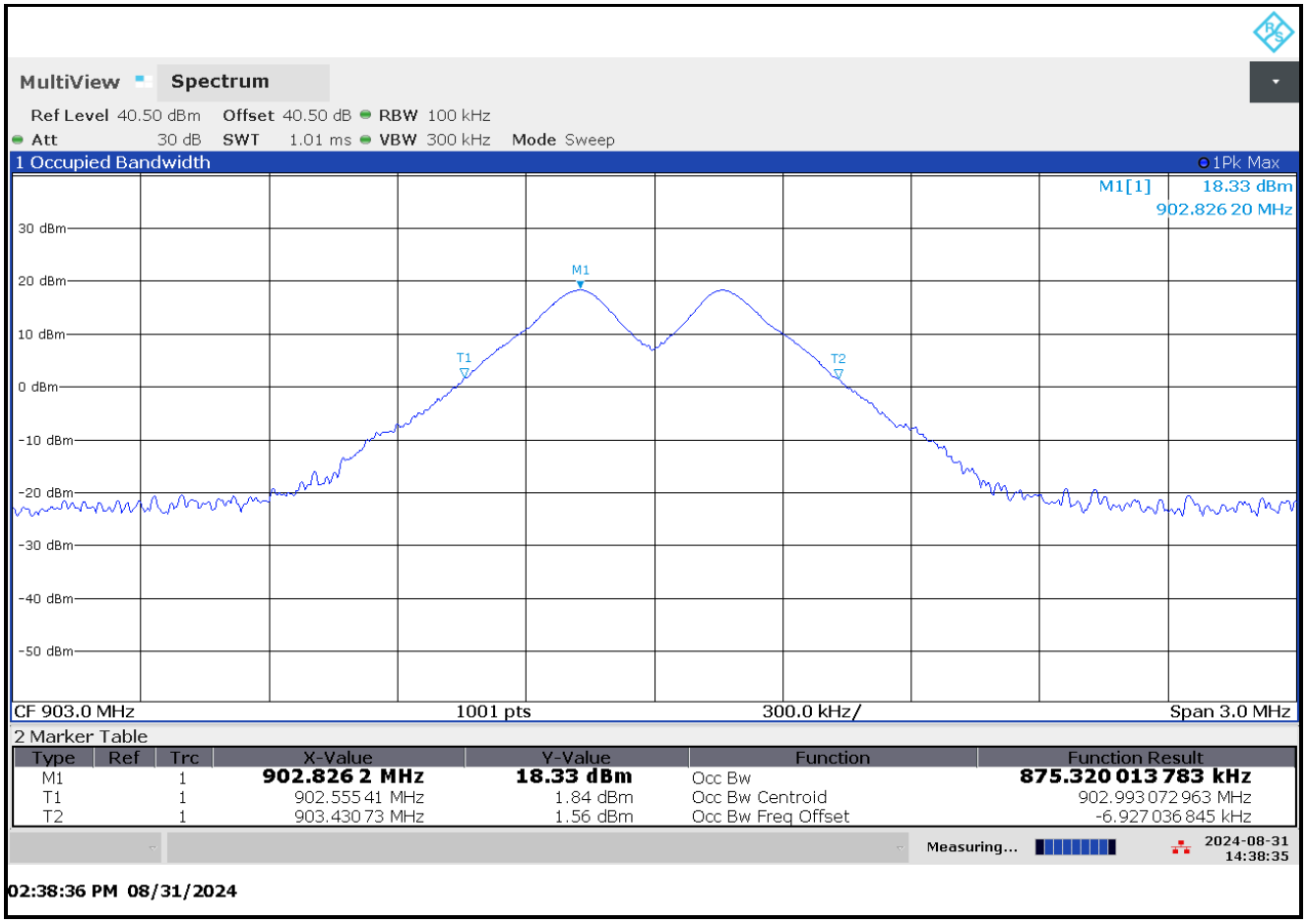
Table 7-5: 99 % Modulated Bandwidth Test Data – Transmitter 0

Frequency (MHz)	99% Bandwidth (kHz)
903.0	875
915.0	851
927.0	880

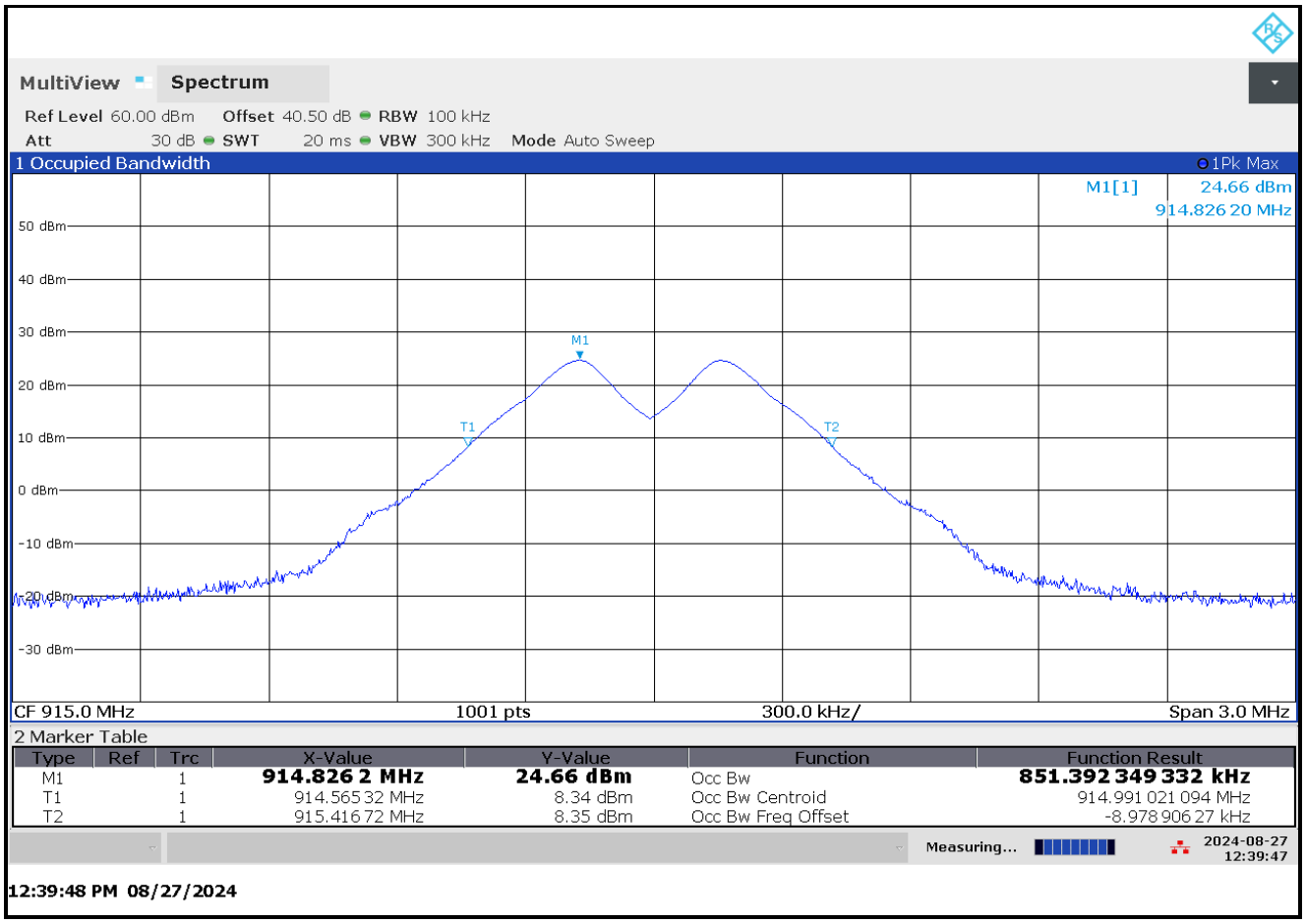
Table 7-6: 99 % Modulated Bandwidth Test Data – Transmitter 1

Frequency (MHz)	99% Bandwidth (kHz)
903.0	860
915.0	857
927.0	855

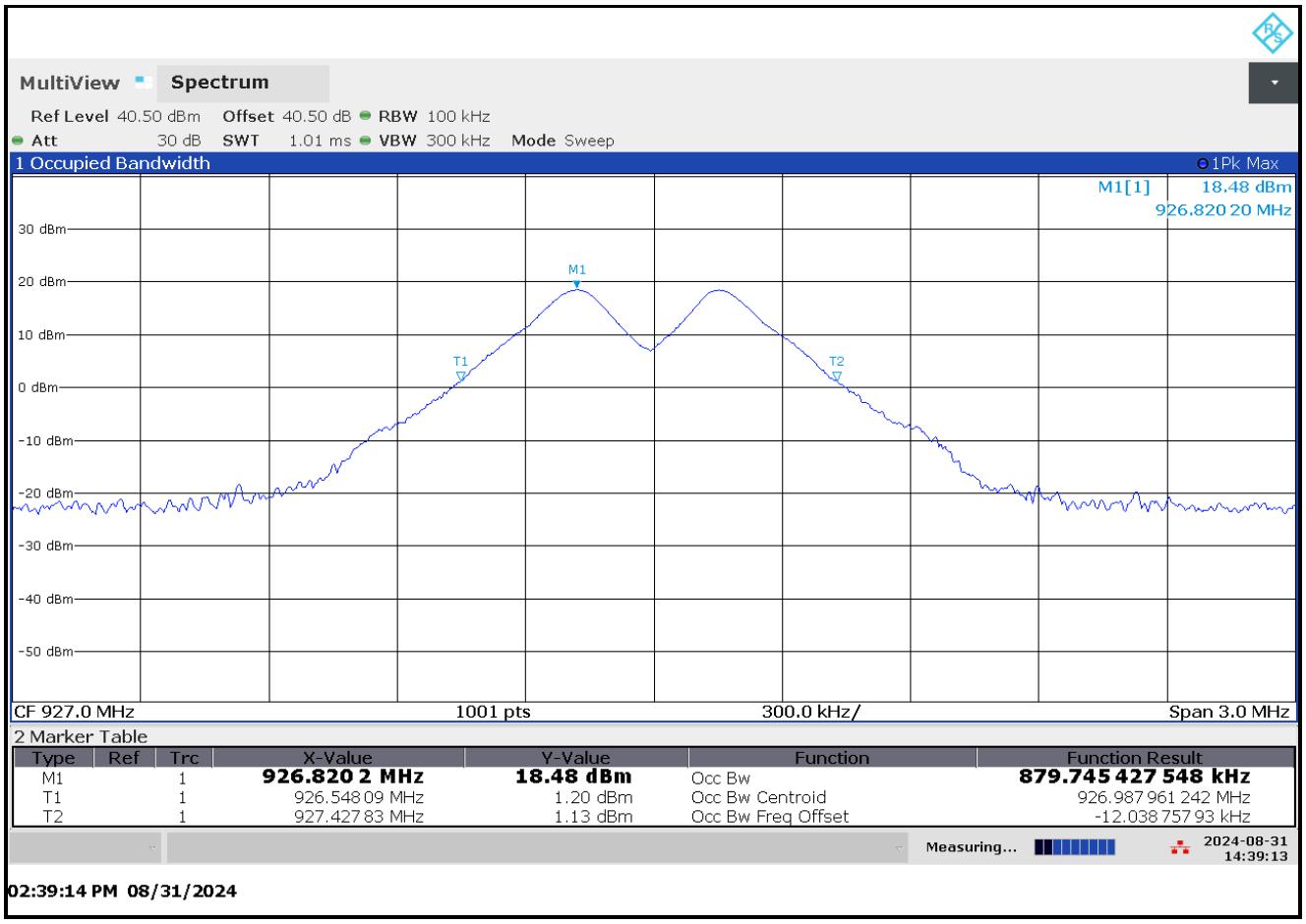
Plot 7-7: 99% Bandwidth; 903.0 MHz – Transmitter 0



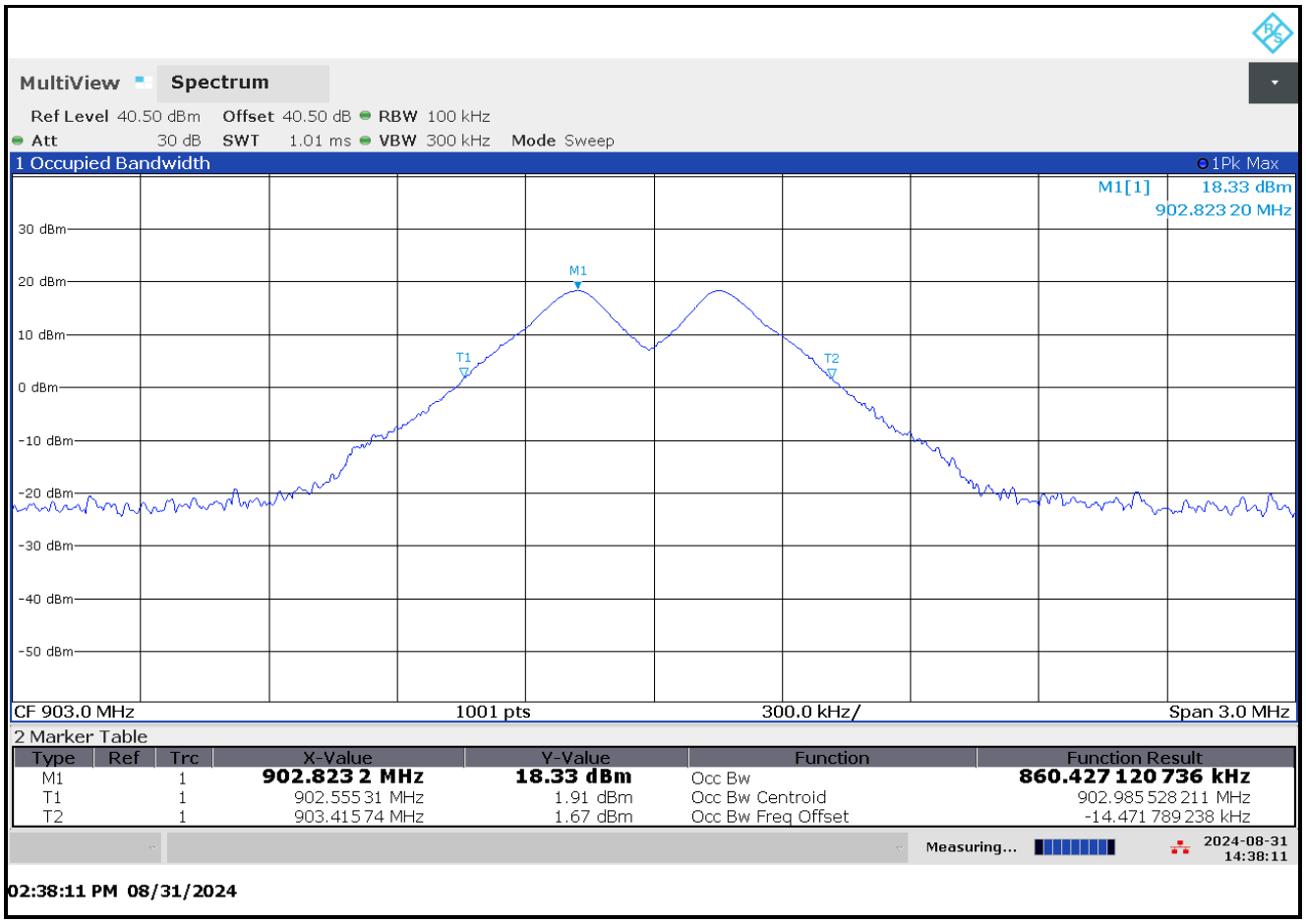
Plot 7-8: 99% Bandwidth; 915.0 MHz – Transmitter 0



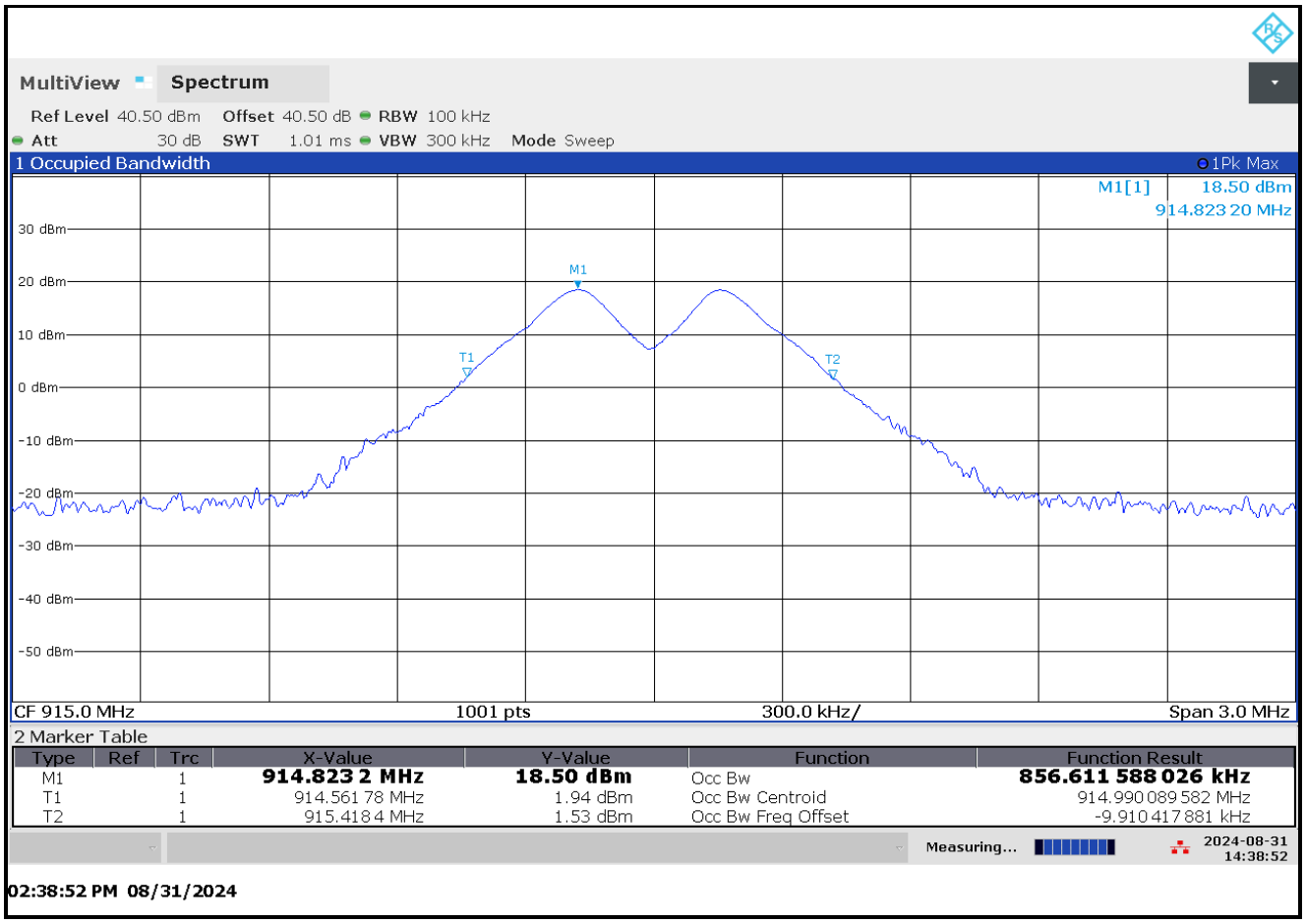
Plot 7-9: 99% Bandwidth; 927.0 MHz – Transmitter 0



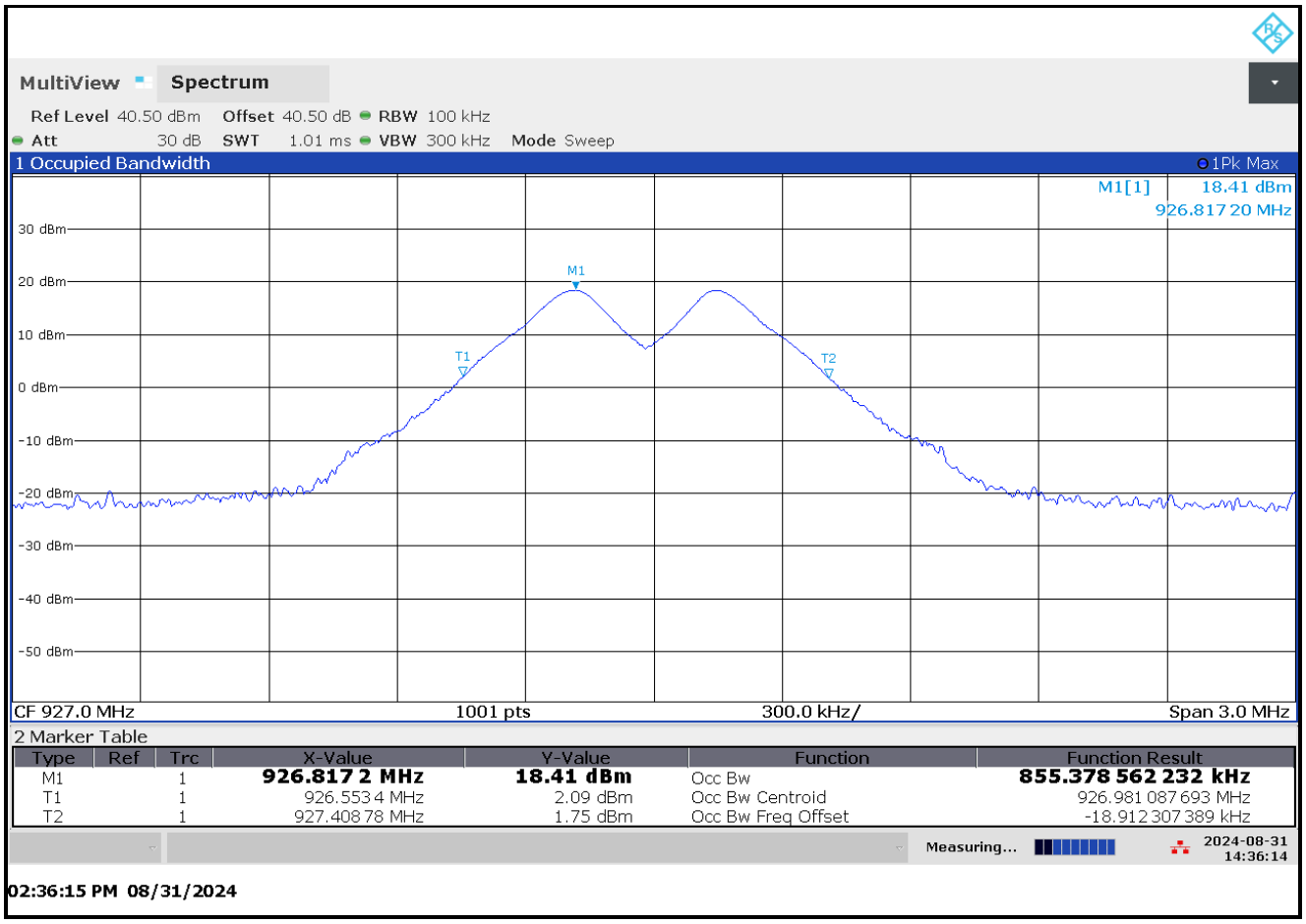
Plot 7-10: 99% Bandwidth; 903.0 MHz – Transmitter 1



Plot 7-11: 99% Bandwidth; 915.0 MHz – Transmitter 1



Plot 7-12: 99% Bandwidth; 927.0 MHz – Transmitter 1



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 Hz; ±0.8 dB

Result: Pass

Test Personnel:

Daniel W. Baltzell		August 31, 2024
EMC Test Engineer	Signature	Date of Test

8 Conducted Emissions Measurement Limits – FCC §15.207

8.1 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

8.2 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 8-1: Conducted Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW50	Analyzer	101021	05/30/2027
901083	AFJ International	LS16	16A LISN (110 V)	16010020080	08/20/2027
N/A	Rhein Tech Laboratories, Inc.	Automated Emission Tester	Emissions testing software Version. 7.1.3.20	N/A	N/A

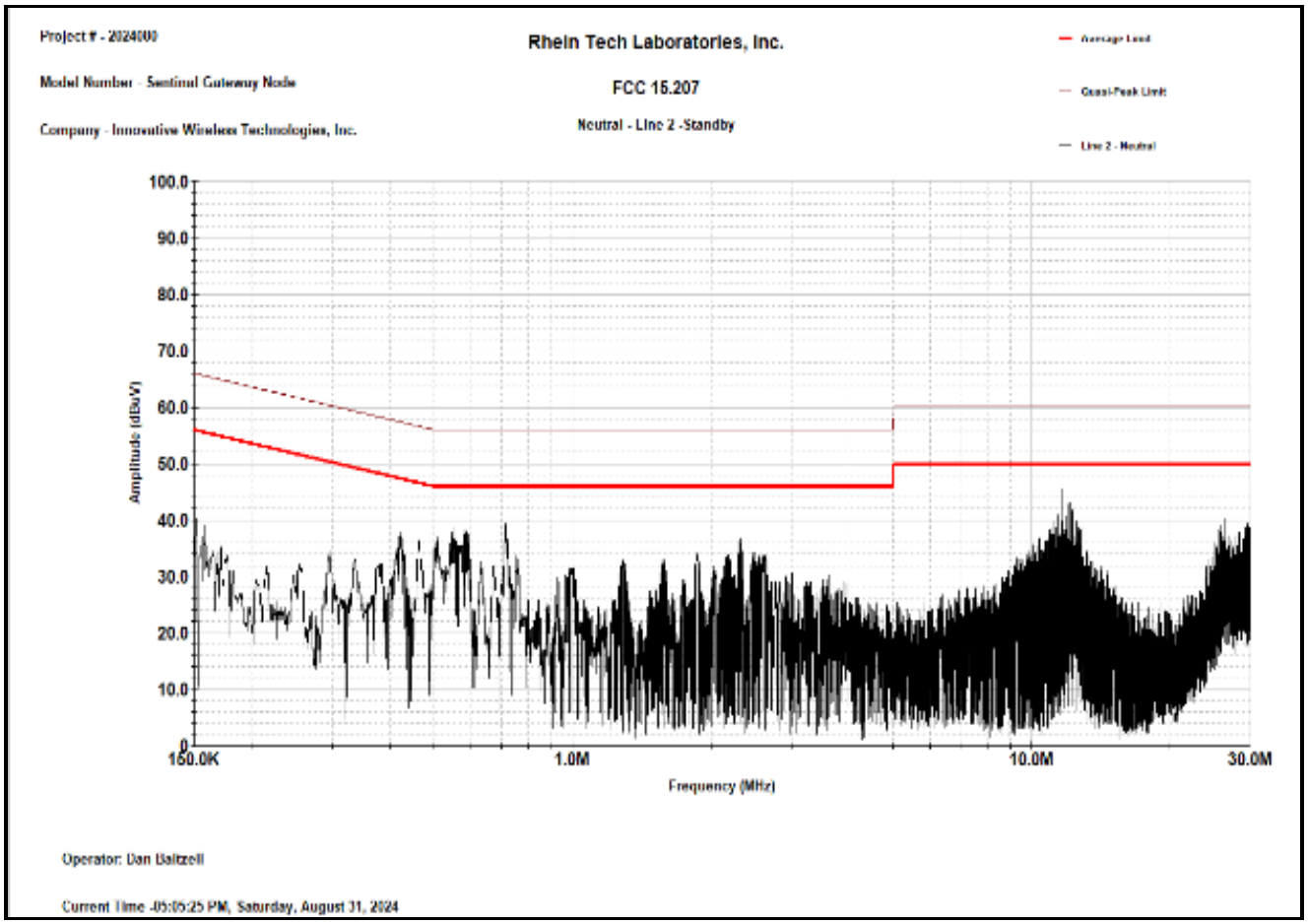
8.3 Conducted Line Emissions Test Data

Table 8-2: Environmental Conditions

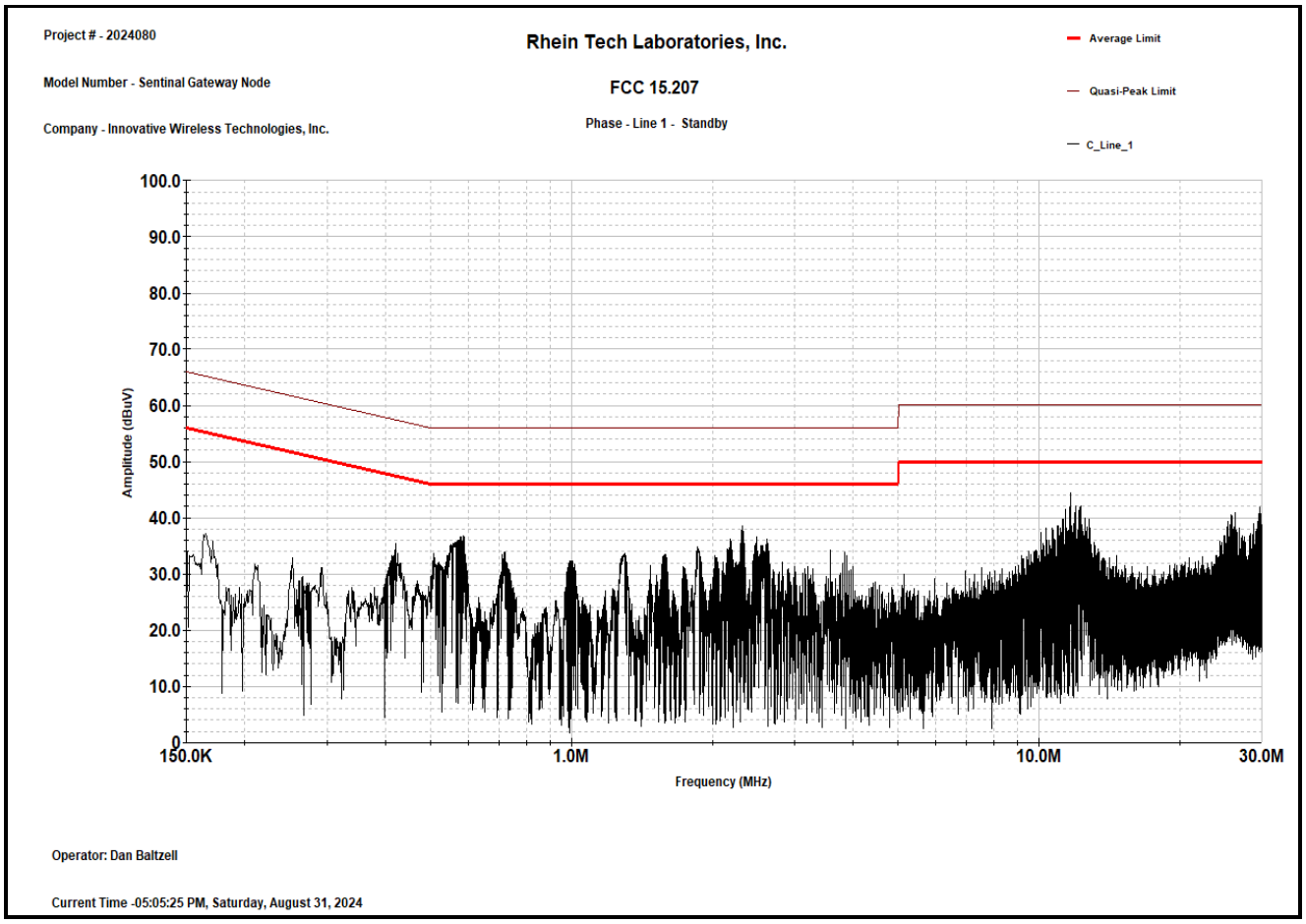
Date	Temperature (°C)	Humidity (%)	Air Pressure (kPa)
August 31, 2024	24.4	34	101.4
October 21, 2024	23.6	30	101.4

8.3.1 Gateway Node (GWN)

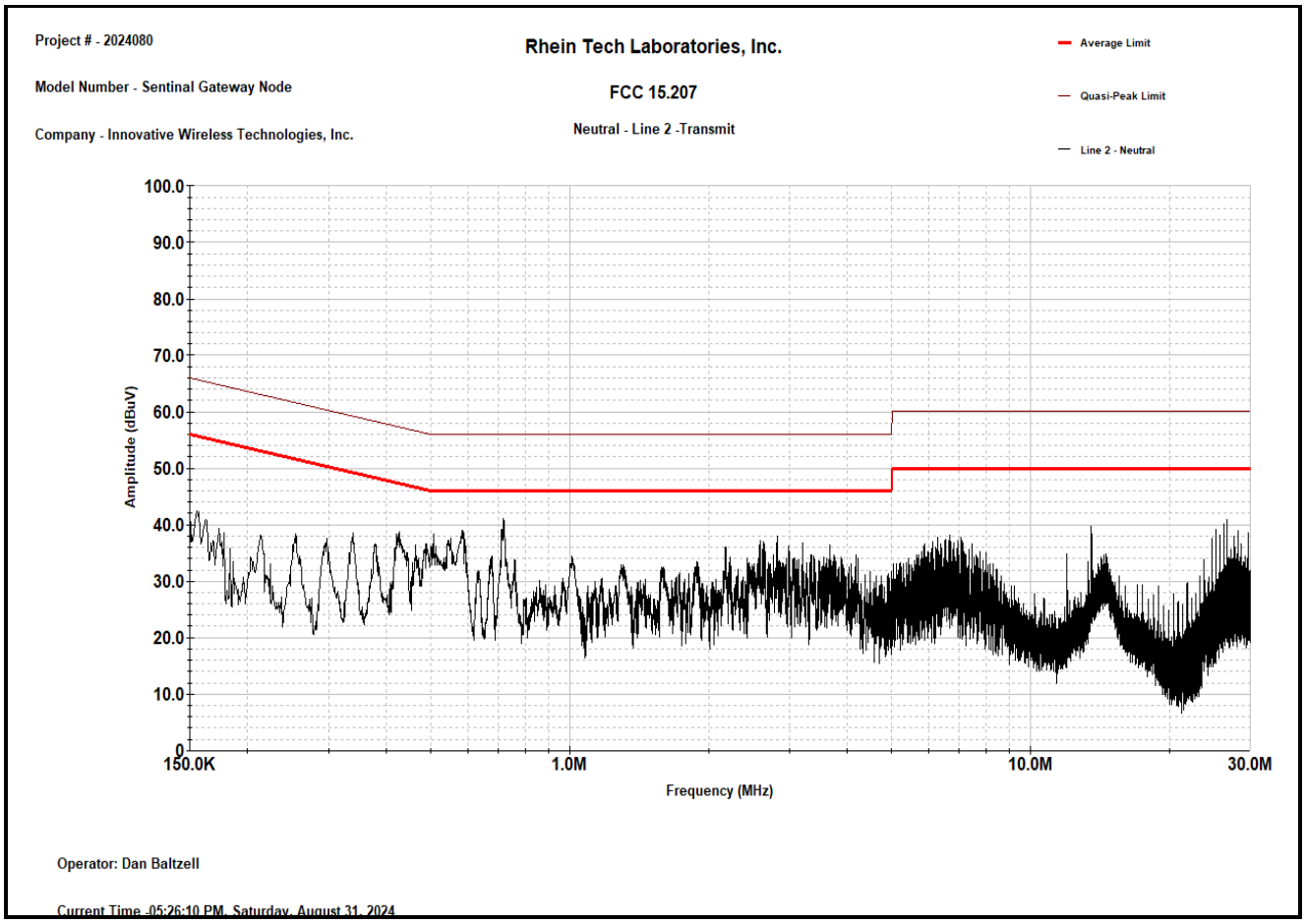
Plot 8-1: Conducted Emissions Receive - Neutral – GWN



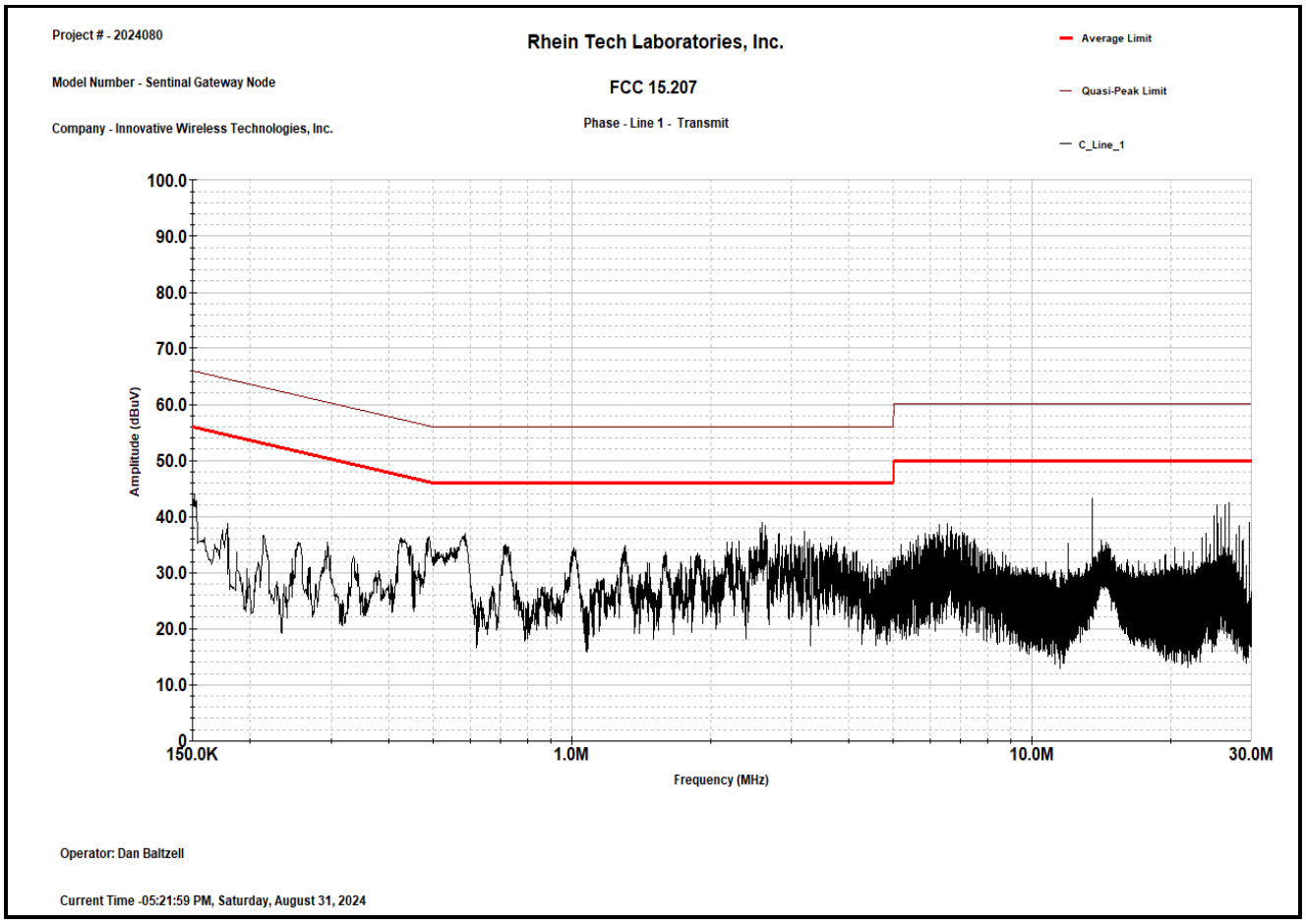
Plot 8-2: Conducted Emissions Receive - Phase – GWN



Plot 8-3: Conducted Emissions Transmit – Neutral – GWN

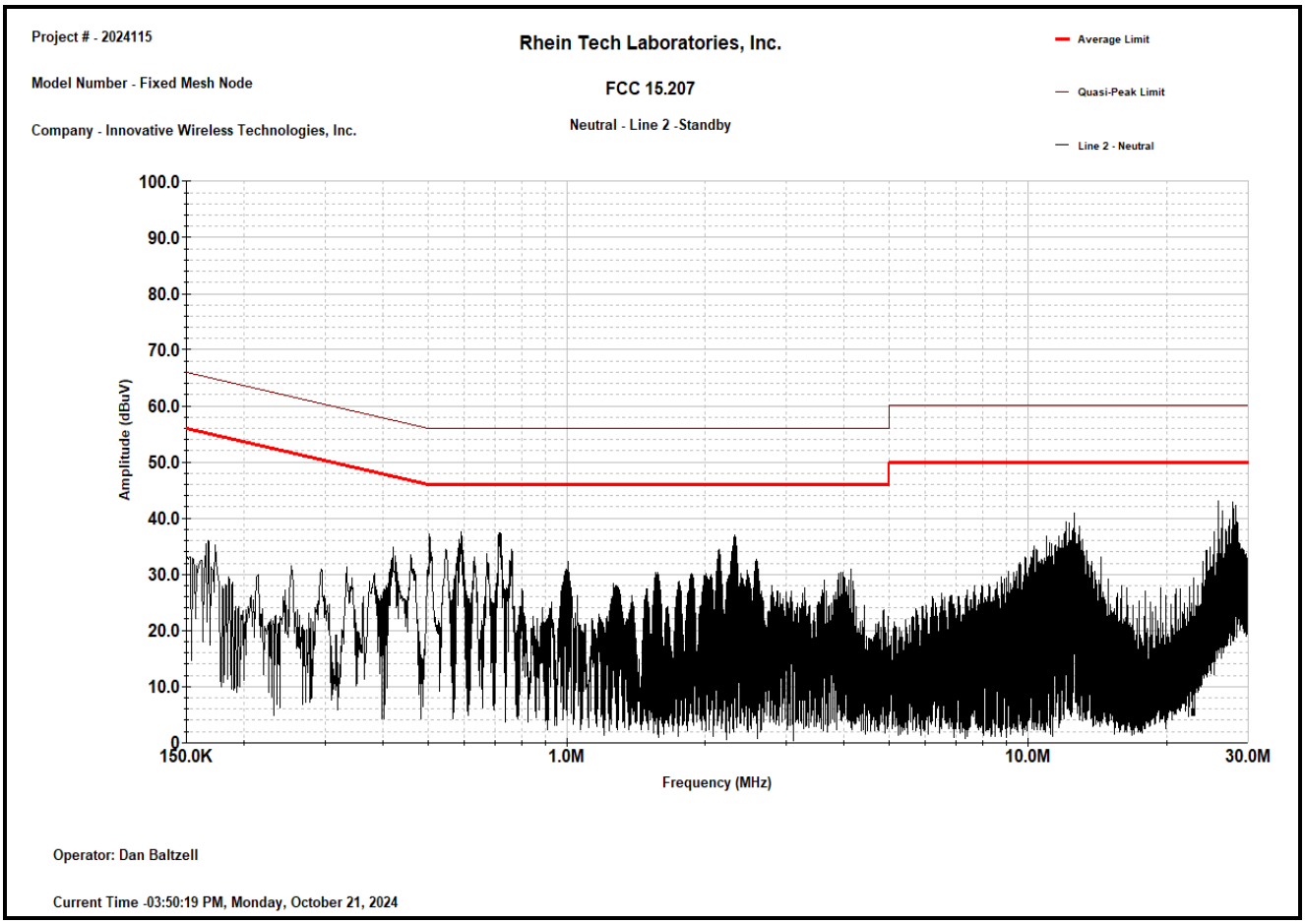


Plot 8-4: Conducted Emissions Transmit - Phase – GWN

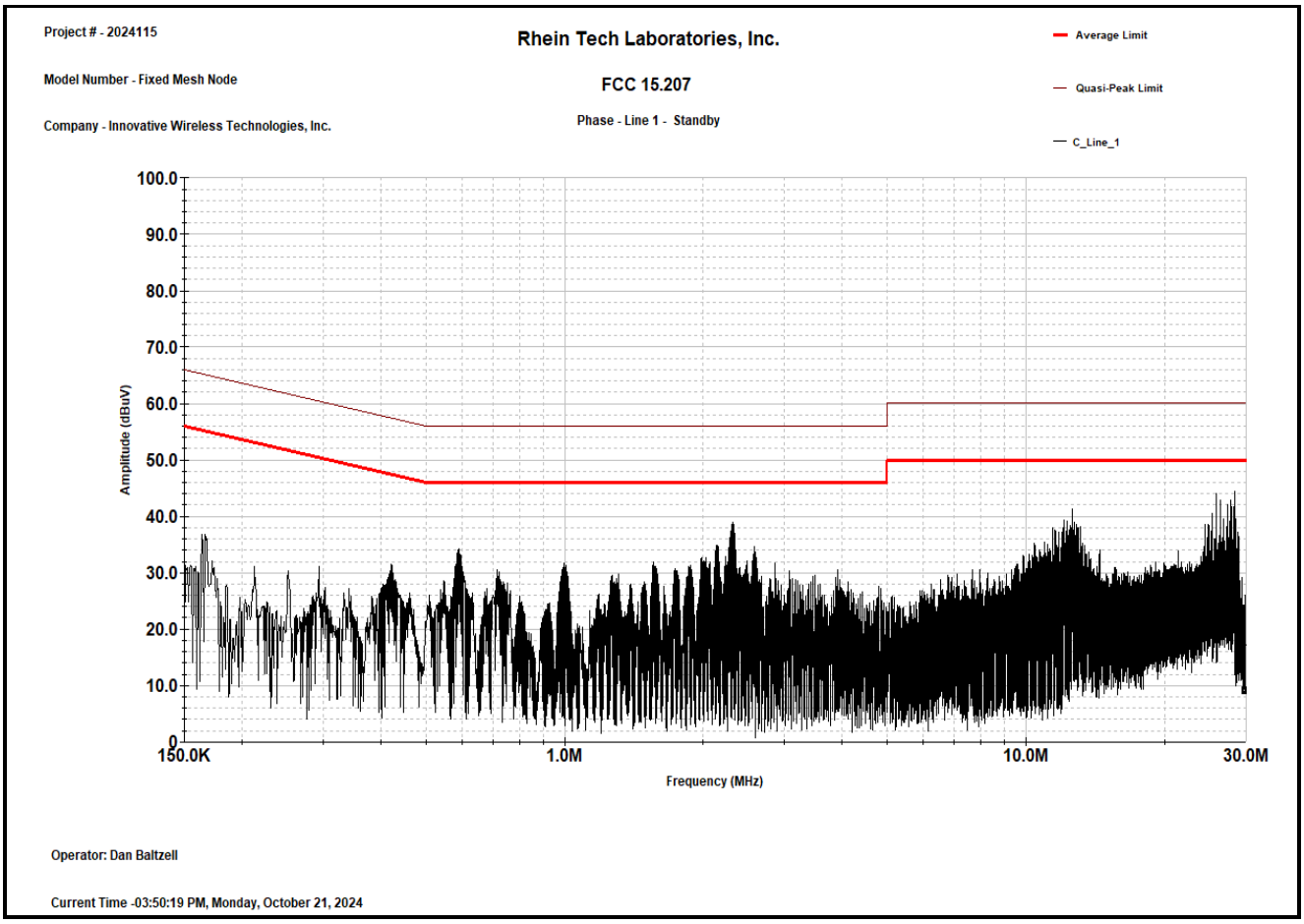


8.3.2 Fixed Mesh Node (FMN)

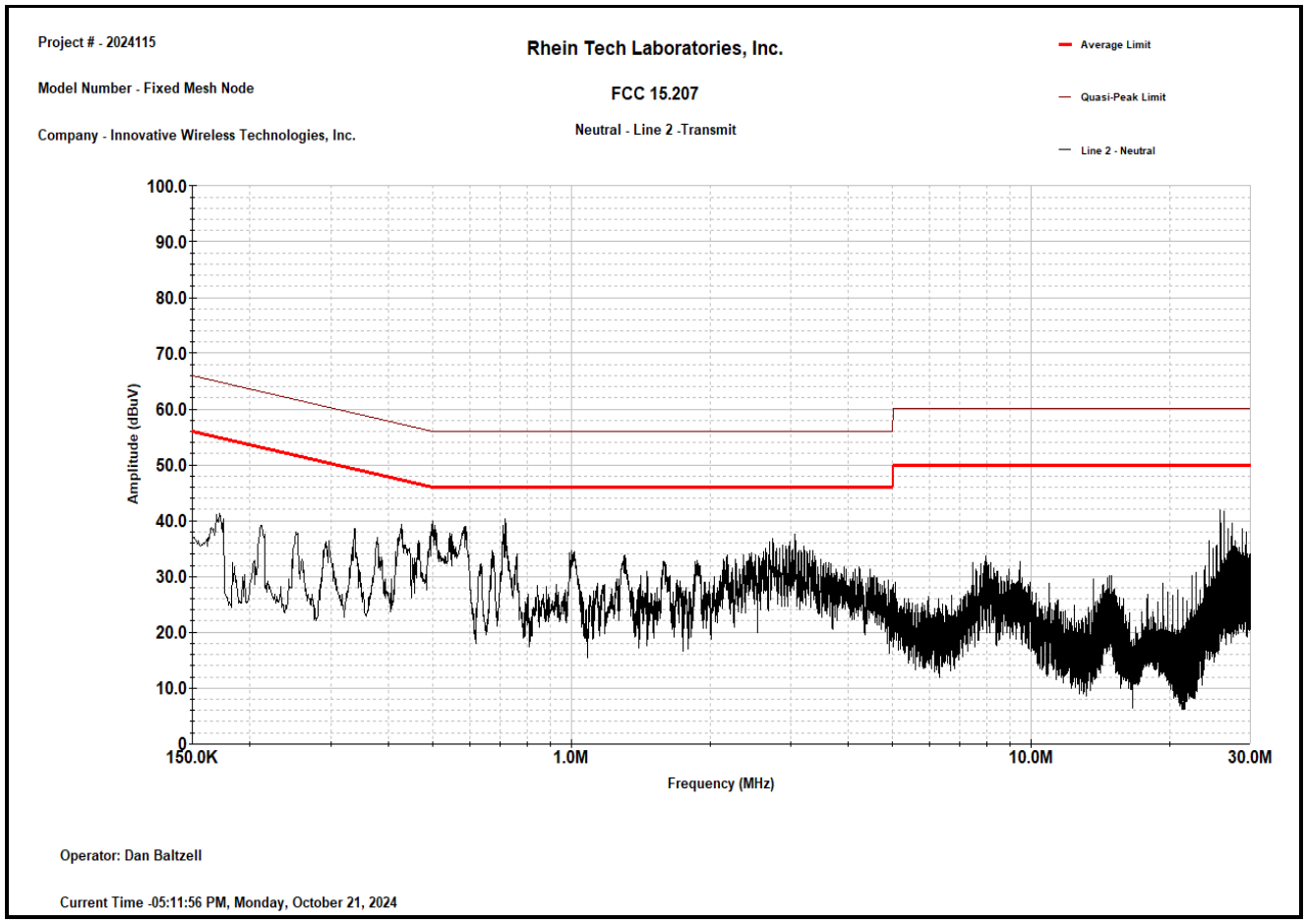
Plot 8-5: Conducted Emissions Receive - Neutral – FMN



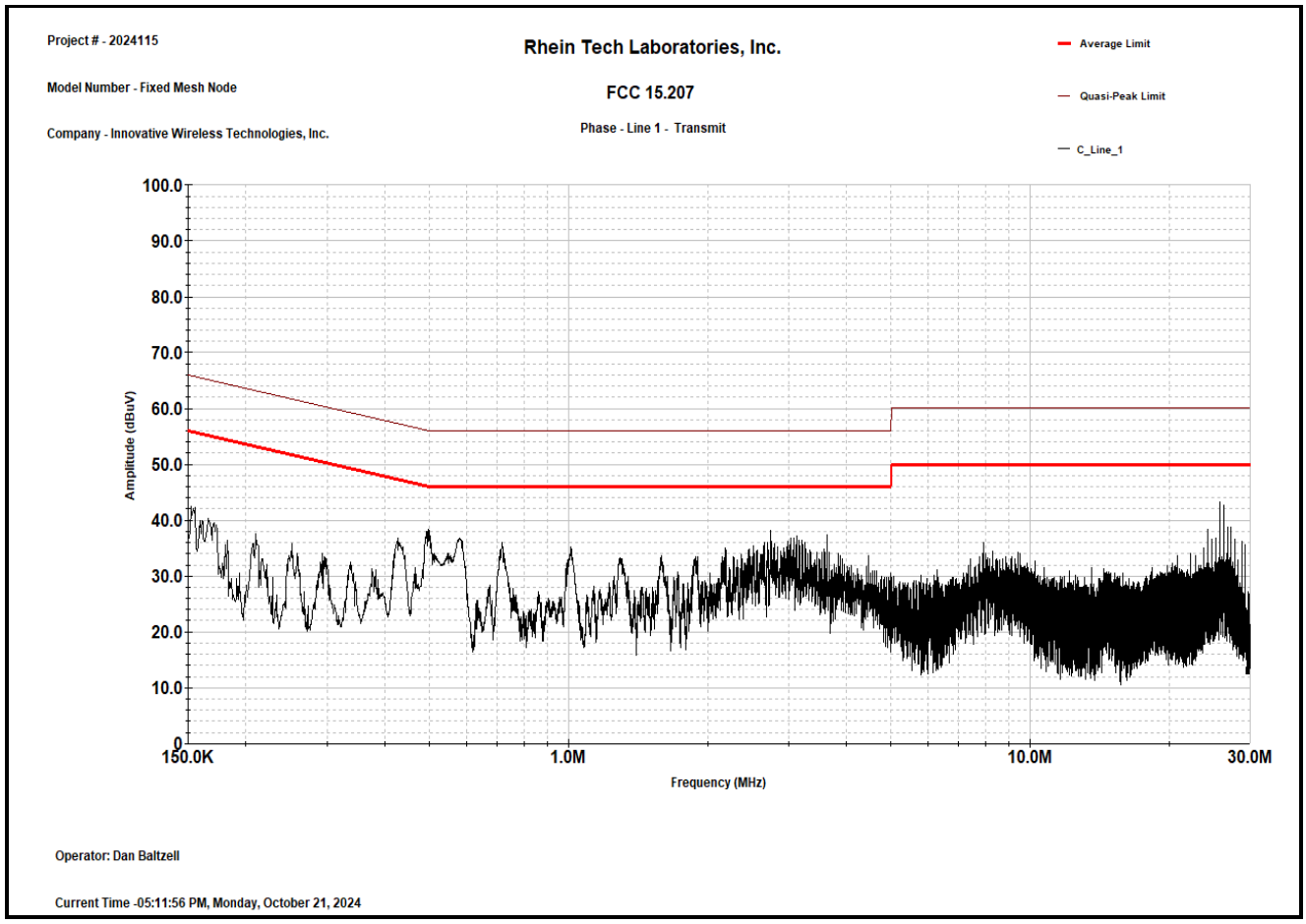
Plot 8-6: Conducted Emissions Receive - Phase – FMN



Plot 8-7: Conducted Emissions Transmit – Neutral – FMN



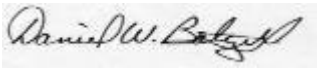
Plot 8-8: Conducted Emissions Transmit - Phase – FMN



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		August 31 and October 21, 2024
Test Engineer	Signature	Dates of Test

9 Radiated Emissions – FCC §15.209

9.1 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	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 average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 6 dB under any circumstances of modulation.

9.2 Radiated Emissions Measurement Test Procedure

Procedure: C63.10-2020 6.5, 6.6

Before final radiated emissions measurements were made on the open-field three/ten meter range, the EUT was scanned indoors at one and three meter distances. This was done to determine its emissions spectrum signature. The test system's physical arrangement and associated cabling varied 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, 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.

At each frequency, the EUT was rotated 360°, 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 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.

The following power levels were explicitly configured for the following antennas:

- ZDA Communications LLC Model ZDADJ928-11YG (Yagi, 11 dBi)
  Maximum Power: **10 dBm**
- Ventev T09170P1000690 (Sector, 17 dBi)
  Maximum Power: **9 dBm**
- Hana Wireless Model HW-OD9-5-NF (Omni, 6 dBi)
  Maximum Power: **9 dBm**

The transmit power levels for the Yagi, Omni, and Sector antennas were selected based on their maximum permissible gains and configured to ensure compliance with the radiated spurious emissions limits of both the Federal Communications Commission (FCC) and Innovation, Science and Economic Development Canada (ISED). Radiated emissions testing was performed solely with these specific antenna and power level combinations. Pursuant to FCC rules, any modification that impacts a device's RF characteristics, including using different antennas or antenna gains, requires submission of a Class II Permissive Change (C2PC) along with updated emissions testing. Similarly, ISED regulations mandate that all antennas used with a transmitter be explicitly tested and documented, and any changes require reassessment of compliance.

Accordingly, if alternative antenna types are implemented, new power levels for the antenna types must be established, radiated emissions must be retested, and Class II Permissive Change (C2PC) applications must be submitted to both the FCC and ISED to maintain authorization and ensure continued compliance.

Table 9-1: Radiated Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900878	Rhein Tech Laboratories	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901729	Insulated Wire Inc.	KPS-1503-3150-KPR	SMK RF Cables 20'	NA	12/29/2027
901242	Rhein Tech Laboratories	WRT-000-0003	Wood rotating table	N/A	Not Required
900772	EMCO	3161-02	Horn Antenna (2-4 GHz)	9804-1044	08/05/2027
900321	EMCO	3161-03	Horn Antennas (4–8.2 GHz)	9508-1020	08/05/2027
900323	EMCO	3160-7	Horn Antennas (8.2–12.4 GHz)	9605-1054	08/05/2027
901477	Micro-Coax	UFA210A-0-0360-300300	RF cable. 0.04-18 GHz	212349-002	09/01/2025

9.3 Radiated Emissions Harmonics/Spurious Test Data

Table 9-2: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Air Pressure (kPa)
April 25, 2025	16.9	64	101.8
April 26, 2025	18.1	52	101.3
April 27, 2025	14.4	28	102.2

9.3.1 Gateway Node (GWN)

Table 9-3: Radiated Emissions Harmonics/Spurious – Yagi, 903.0 MHz (Peak) – Transmitter 0 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2707.248	17.1	28.3	45.4	74	-28.6
3609.664	13.3	29.4	42.7	74	-31.3
4512.080	11.2	36.4	47.6	74	-26.4
5414.496	10.1	37.3	47.4	74	-26.6
8121.744	3.9	39.7	43.6	74	-30.4
9024.160	2.8	45.5	48.3	74	-25.7

Table 9-4: Radiated Emissions Harmonics/Spurious – Yagi, 903.0 MHz (Avg.) – Transmitter 0 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2707.248	8.7	28.3	37	54	-17.0
3609.664	5.5	29.4	34.9	54	-19.1
4512.080	1	36.4	37.4	54	-16.6

Table 9-5: Radiated Emissions Harmonics/Spurious – Yagi, 915.0 MHz (Peak) –Transmitter 0 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2744.784	15	28.4	43.4	74	-30.6
3659.712	12.1	29.5	41.6	74	-32.4
4574.640	13.7	36.4	50.1	74	-23.9
7319.424	5.1	39	44.1	74	-29.9
8234.352	4.6	44.9	49.5	74	-24.5
9149.280	4.5	45.6	50.1	74	-23.9

Table 9-6: Radiated Emissions Harmonics/Spurious – Yagi, 915.0 MHz (Avg.) – Transmitter 0 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2744.784	7.7	28.4	36.1	54	-17.9
3659.712	4	29.5	33.5	54	-20.5
4574.640	3.7	36.4	40.1	54	-13.9

Table 9-7: Radiated Emissions Harmonics/Spurious – Yagi, 927.0 MHz (Peak) – Transmitter 0 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2780.376	21.3	28.4	49.7	74	-24.3
3707.168	10	29.5	39.5	74	-34.5
4633.960	12	36.5	48.5	74	-25.5
7414.336	4.1	39.1	43.2	74	-30.8
8341.128	1.7	45	46.7	74	-27.3

Table 9-8: Radiated Emissions Harmonics/Spurious – Yagi, 927.0 MHz (Avg.) – Transmitter 0 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2780.376	15	28.4	43.4	54	-10.6
3707.168	4.2	29.5	33.7	54	-20.3
4633.960	1.9	36.5	38.4	54	-15.6

Table 9-9: Radiated Emissions Harmonics/Spurious – Omni, 903.0 MHz (Peak) – Transmitter 0 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2707.248	18	28.3	46.3	74	-27.7
3609.664	13	29.4	42.4	74	-31.6
4512.080	11.4	36.4	47.8	74	-26.2
5414.496	9.2	37.3	46.5	74	-27.5
8121.744	3.5	39.7	43.2	74	-30.8
9024.160	4.4	45.5	49.9	74	-24.1

Table 9-10: Radiated Emissions Harmonics/Spurious – Omni, 903.0 MHz (Avg.) – Transmitter 0 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2707.248	9.8	28.3	38.1	54	-15.9
3609.664	2.1	29.4	31.5	54	-22.5
4512.080	0.6	36.4	37	54	-17

Table 9-11: Radiated Emissions Harmonics/Spurious – Omni, 915.0 MHz (Peak) – Transmitter 0 -GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2744.784	14	28.4	42.4	74	-31.6
3659.712	10.1	29.5	39.6	74	-34.4
4574.640	11.8	36.4	48.2	74	-25.8
7319.424	2.3	39	41.3	74	-32.7
8234.352	3.6	44.9	48.5	74	-25.5
9149.280	3.3	45.6	48.9	74	-25.1

Table 9-12: Radiated Emissions Harmonics/Spurious – Omni, 915.0 MHz (Avg.) – Transmitter 0 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2744.784	6.9	28.4	35.3	54	-18.7
3659.712	2.1	29.5	31.6	54	-22.4
4574.640	1.5	36.4	37.9	54	-16.1

Table 9-13: Radiated Emissions Harmonics/Spurious – Omni, 927.0 MHz (Peak) – Transmitter 0 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2780.376	16.1	28.4	44.5	74	-29.5
3707.168	9	29.5	38.5	74	-35.5
4633.960	8.5	36.5	45	74	-29
7414.336	4.3	39.1	43.4	74	-30.6
8341.128	4.4	45	49.4	74	-24.6

Table 9-14: Radiated Emissions Harmonics/Spurious – Omni, 927.0 MHz (Avg.) – Transmitter 0 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2780.376	8	28.4	36.4	54	-17.6
3707.168	3.3	29.5	32.8	54	-21.2

Table 9-15: Radiated Emissions Harmonics/Spurious – Sector, 903.0 MHz (Peak) – Transmitter 0 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2707.248	9	28.3	37.3	74	-36.7
3609.664	3.6	29.4	33	74	-41
4512.080	0.3	36.4	36.7	74	-37.3
5414.496	0.6	37.3	37.9	74	-36.1

Table 9-16: Radiated Emissions Harmonics/Spurious – Sector, 903.0 MHz (Avg.) – Transmitter 0 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2707.248	12.4	28.3	40.7	54	-13.3
3609.664	3.1	29.4	32.5	54	-21.5

Table 9-17: Radiated Emissions Harmonics/Spurious – Sector, 915.0 MHz (Peak) – Transmitter 0 - GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2744.784	17.3	28.4	45.7	74	-28.3
3659.712	12.3	29.5	41.8	74	-32.2
4574.640	11	36.4	47.4	74	-26.6
7319.424	3.5	39	42.5	74	-31.5
8234.352	3.7	44.9	48.6	74	-25.4
9149.280	3.3	45.6	48.9	74	-25.1

Table 9-18: Radiated Emissions Harmonics/Spurious – Sector, 915.0 MHz (Avg.) - Transmitter 0 - GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2744.784	9.3	28.4	37.7	54	-16.3
3659.712	1	29.5	30.5	54	-23.5
4574.640	2.8	36.4	39.2	54	-14.8

Table 9-19: Radiated Emissions Harmonics/Spurious – Sector, 927.0 MHz (Peak) – Transmitter 0 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2780.376	22.1	28.4	50.5	74	-23.5
3707.168	10.7	29.5	40.2	74	-33.8
4633.960	9.7	36.5	46.2	74	-27.8
7414.336	4.8	39.1	43.9	74	-30.1
8341.128	3	45	48	74	-26

Table 9-20: Radiated Emissions Harmonics/Spurious – Sector, 927.0 MHz (Avg.) – Transmitter 0 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2780.376	14.6	28.4	43	54	-11
3707.168	0.4	29.5	29.9	54	-24.1

Table 9-21: Radiated Emissions Harmonics/Spurious – Yagi, 903.0 MHz (Peak) – Transmitter 1 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2707.248	16.9	28.3	45.2	74	-28.8
3609.664	12	29.4	41.4	74	-32.6
4512.080	10.1	36.4	46.5	74	-27.5
5414.496	10.7	37.3	48	74	-26
8121.744	3	39.7	42.7	74	-31.3
9024.160	5	45.5	50.5	74	-23.5

Table 9-22: Radiated Emissions Harmonics/Spurious – Yagi, 903.0 MHz (Avg.) – Transmitter 1 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2707.248	10.3	28.3	38.6	54	-15.4
3609.664	4.7	29.4	34.1	54	-19.9
4512.080	2.1	36.4	38.5	54	-15.5

Table 9-23: Radiated Emissions Harmonics/Spurious – Yagi, 915.0 MHz (Peak) – Transmitter 1 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2744.784	17.3	28.4	45.7	74	-28.3
3659.712	12.6	29.5	42.1	74	-31.9
4574.640	12.9	36.4	49.3	74	-24.7
7319.424	6.4	39	45.4	74	-28.6
8234.352	2.9	44.9	47.8	74	-26.2
9149.280	4.8	45.6	50.4	74	-23.6

Table 9-24: Radiated Emissions Harmonics/Spurious – Yagi, 915.0 MHz (Avg.) – Transmitter 1 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2744.784	10.3	28.4	38.7	54	-15.3
3659.712	2.7	29.5	32.2	54	-21.8
4574.640	3.8	36.4	40.2	54	-13.8

Table 9-25: Radiated Emissions Harmonics/Spurious – Yagi, 927.0 MHz (Peak) – Transmitter 1 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2780.376	16.8	28.4	45.2	74	-28.8
3707.168	8.7	29.5	38.2	74	-35.8
4633.960	11.5	36.5	48	74	-26
7414.336	5.3	39.1	44.4	74	-29.6
8341.128	4.3	45	49.3	74	-24.7

Table 9-26: Radiated Emissions Harmonics/Spurious – Yagi, 927.0 MHz (Avg.) – Transmitter 1 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2780.376	15.3	28.4	43.7	54	-10.3
3707.168	3.1	29.5	32.6	54	-21.4
4633.960	3.6	36.5	40.1	54	-13.9

Table 9-27: Radiated Emissions Harmonics/Spurious – Omni, 903.0 MHz (Peak) – Transmitter 1 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2707.248	18.5	28.3	46.8	74	-27.2
3609.664	15.1	29.4	44.5	74	-29.5
4512.080	13.7	36.4	50.1	74	-23.9
5414.496	10.9	37.3	48.2	74	-25.8
8121.744	2.9	39.7	42.6	74	-31.4
9024.160	4.1	45.5	49.6	74	-24.4

Table 9-28: Radiated Emissions Harmonics/Spurious – Omni, 903.0 MHz (Avg.) – Transmitter 1 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2707.248	12.6	28.3	40.9	54	-13.1
3609.664	7.1	29.4	36.5	54	-17.5
4512.080	3.3	36.4	39.7	54	-14.3

Table 9-29: Radiated Emissions Harmonics/Spurious – Omni, 915.0 MHz (Peak) – Transmitter 1 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2744.784	17.9	38.4	56.3	74	-17.7
3659.712	12.7	29.5	42.2	74	-31.8
4574.640	13.2	36.4	49.6	74	-24.4
7319.424	4.3	39	43.3	74	-30.7
8234.352	4.7	44.9	49.6	74	-24.4
9149.280	4.2	45.6	49.8	74	-24.2

Table 9-30: Radiated Emissions Harmonics/Spurious – Omni, 915.0 MHz (Avg.) – Transmitter 1 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2744.784	12.3	28.4	40.7	54	-13.3
3659.712	4.1	29.5	33.6	54	-20.4
4574.640	3.7	36.4	40.1	54	-13.9

Table 9-31: Radiated Emissions Harmonics/Spurious – Omni, 927.0 MHz (Peak) – Transmitter 1 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2780.376	17.1	28.4	45.5	74	-28.5
3707.168	11.2	29.5	40.7	74	-33.3
4633.960	9.6	36.5	46.1	74	-27.9
7414.336	3.2	39.1	42.3	74	-31.7
8341.128	1.9	45	46.9	74	-27.1

Table 9-32: Radiated Emissions Harmonics/Spurious – Omni, 927.0 MHz (Avg.) – Transmitter 1 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2780.376	13.1	28.4	41.5	54	-12.5
3707.168	3.1	29.5	32.6	54	-21.4
4633.960	1.9	36.5	38.4	54	-15.6

Table 9-33: Radiated Emissions Harmonics/Spurious – Sector, 903.0 MHz (Peak) – Transmitter 1 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2707.248	19.1	28.3	47.4	74	-26.6
3609.664	11.7	29.4	41.1	74	-32.9
4512.080	11.1	36.4	47.5	74	-26.5
5414.496	10.9	37.3	48.2	74	-25.8
8121.744	4.4	39.7	44.1	74	-29.9
9024.160	4.7	45.5	50.2	74	-23.8

Table 9-34: Radiated Emissions Harmonics/Spurious – Sector, 903.0 MHz (Avg.) – Transmitter 1 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2707.248	21.3	28.3	49.6	54	-4.4
3609.664	11.2	29.4	40.6	54	-13.4
4512.080	10.3	36.4	46.7	54	-7.3

Table 9-35: Radiated Emissions Harmonics/Spurious – Sector, 915.0 MHz (Peak) – Transmitter 1 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2744.784	18.1	28.4	46.5	74	-27.5
3659.712	11.8	29.5	41.3	74	-32.7
4574.640	14.1	36.4	50.5	74	-23.5
7319.424	6.1	39	45.1	74	-28.9
8234.352	3.1	44.9	48	74	-26
9149.280	4.4	45.6	50	74	-24

Table 9-36: Radiated Emissions Harmonics/Spurious – Sector, 915.0 MHz (Avg.) – Transmitter 1 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2744.784	18.3	28.4	46.7	54	-7.3
3659.712	11.3	29.5	40.8	54	-13.2
4574.640	11.9	36.4	48.3	54	-5.7

Table 9-37: Radiated Emissions Harmonics/Spurious – Sector, 927.0 MHz (Peak) – Transmitter 1 – GWN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Corrected Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2780.376	22.3	28.4	50.7	74	-23.3
3707.168	11.3	29.5	40.8	74	-33.2
4633.960	12.3	36.5	48.8	74	-25.2
7414.336	7.5	39.1	46.6	74	-27.4
8341.128	5.1	45	50.1	74	-23.9

Table 9-38: Radiated Emissions Harmonics/Spurious – Sector, 927.0 MHz (Avg.) – Transmitter 1 – GWN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2780.376	15.1	28.4	43.5	54	-10.5
3707.168	2.1	29.5	31.6	54	-22.4
4633.960	1.9	36.5	38.4	54	-15.6

9.3.2 Fixed Mesh Node (FMN)

Table 9-39: Radiated Emissions Harmonics/Spurious – Sector, 903.0 MHz (Peak) – Transmitter 0 – FMN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2709.384	9.6	28.3	37.9	74	-36.1
3612.600	7.2	29.4	36.6	74	-37.4
4512.080	7.8	36.4	44.2	74	-29.8
5418.904	7.7	37.3	45	74	-29
8130.786	7.1	39.7	46.8	74	-27.2
9031.413	7.2	45.5	52.7	74	-21.3

Table 9-40: Radiated Emissions Harmonics/Spurious – Sector, 903.0 MHz (Avg.) – Transmitter 0 – FMN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2709.384	11.7	28.3	43.8	54	-10.2
3612.600	1.9	29.4	35.6	54	-18.4
4512.080	1.1	36.4	43.2	54	-10.8

Table 9-41: Radiated Emissions Harmonics/Spurious – Sector, 915.0 MHz (Peak) – Transmitter 0 – FMN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2745.442	13.4	28.4	41.8	74	-32.2
3660.589	11.5	29.5	41	74	-33
4575.736	12.4	36.4	48.8	74	-25.2
7321.178	8.1	39	47.1	74	-26.9
8236.325	7.8	44.9	52.7	74	-21.3
9151.472	7.9	45.6	53.5	74	-20.5

Table 9-42: Radiated Emissions Harmonics/Spurious – Sector, 915.0 MHz (Avg.) – Transmitter 0 – FMN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2745.442	11.2	28.4	39.6	54	-14.4
3660.589	6.7	29.5	36.2	54	-17.8
4575.736	7.6	36.4	44	54	-10

Table 9-43: Radiated Emissions Harmonics/Spurious – Sector, 927.0 MHz (Peak) – Transmitter 0 – FMN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2780.376	11.8	28.4	40.2	74	-33.8
3707.168	9.1	29.5	38.6	74	-35.4
4633.960	11.2	36.5	47.7	74	-26.3
7414.336	7.8	39.1	46.9	74	-27.1
8341.128	5.9	45	50.9	74	-23.1

Table 9-44: Radiated Emissions Harmonics/Spurious – Sector, 927.0 MHz (Avg.) – Transmitter 0 – FMN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2780.376	5.9	28.4	34.3	54	-22.5
3707.168	7.1	29.5	36.6	54	-22.4
4633.960	4.3	36.5	40.8	54	-32.2

Table 9-45: Radiated Emissions Harmonics/Spurious – Sector, 903.0 MHz (Peak) – Transmitter 1 – FMN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2709.455	10.3	28.3	38.6	74	-35.4
3612.606	9.7	29.4	39.1	74	-34.9
4515.757	7.4	36.4	43.8	74	-30.2
5418.910	7.7	37.3	45	74	-29
8128.364	7.8	39.7	47.5	74	-26.5
9031.516	7.9	45.5	53.4	74	-20.6

Table 9-46: Radiated Emissions Harmonics/Spurious – Sector, 903.0 MHz (Avg.) – Transmitter 1 – FMN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2709.455	2.1	28.3	30.4	54	-23.6
3612.606	0.5	29.4	29.9	54	-24.1
4515.757	0.2	36.4	36.6	54	-17.4

Table 9-47: Radiated Emissions Harmonics/Spurious – Sector, 915.0 MHz (Peak) – Transmitter 1 – FMN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2744.784	12.2	28.4	40.6	74	-33.4
3659.712	9.5	29.5	39	74	-35
4574.640	10.1	36.4	46.5	74	-27.5
7319.424	8.1	39	47.1	74	-26.9
8234.352	7.3	44.9	52.2	74	-21.8
9149.280	8.6	45.6	54.2	74	-19.8

Table 9-48: Radiated Emissions Harmonics/Spurious – Sector, 915.0 MHz (Avg.) – Transmitter 1 – FMN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2744.784	5.7	28.4	34.1	54	-19.9
3659.712	2.3	29.5	31.8	54	-22.2

Table 9-49: Radiated Emissions Harmonics/Spurious – Sector, 927.0 MHz (Peak) – Transmitter 1 – FMN

Emission Frequency (MHz)	Peak Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2780.376	10.2	28.4	38.6	74	-35.4
3707.168	4.2	29.5	33.7	74	-40.3
4633.960	11.8	36.5	48.3	74	-25.7
7414.336	9.3	39.1	48.4	74	-25.6
8341.128	6.3	45	51.3	74	-22.7

Table 9-50: Radiated Emissions Harmonics/Spurious – Sector, 927.0 MHz (Avg.) – Transmitter 1 – FMN

Emission Frequency (MHz)	Average Level Measured (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
2780.376	0.8	28.4	29.2	54	-24.8
3707.168	0.6	29.5	30.1	54	-23.9

Measurement uncertainty 30 MHz – 6 GHz = ±4.8 dB and from 6 GHz and above = ±5.2 dB:
This measurement uncertainty is expanded for a 95% confidence level received with a coverage factor k=2 for the entire frequency range.

Results: Pass

Test Personnel:

Daniel W. Baltzell		April 25th – 27th, 2025
EMC Test Engineer	Signature	Dates of Test

10 Conclusion

The data in this measurement report shows that the Innovative Wireless Technologies, Inc. (IWT) SENTINEL™ Gateway Node and the SENTINEL™ Fixed Mesh Node, FCC ID: SP8-FAP2213-011, comply with the applicable requirements of the FCC Rules and Regulations Parts 2 and 15.