RF Test Report

Standard(s): FCC Part 15 Subpart 15.247,
RSS-247 Issue 3:2023
Unlicensed Intentional Radiators

Issued To: Quiet Inc.

253 Rosemont Street La Jolla, CA 92037 United States	3038 Hamilton Road Dorchester, ON, N0L1G5 Canada

Product Name: Quiet Phone
Model: QuietPhone12B
FCC ID: 2BMEA-QP12BUS25
IC: 33381-QP12BCA25

Report No. ML301873-RF01
Date of Issue: January 28, 2025

Report Prepared By:

Amir Emami, Project Engineer

Reviewed By:

Min Xie, Sr. Project Engineer

This report may not be reproduced, except in full, without prior written approval of Megalab Group Inc.

Table of Contents

1. Revision History 3
2. Summary of Test Results 4
   2.1 Test Verdict 4
   2.2 Test Standards 5
   2.3 Test Facility 6
3. General Information 9
   3.1 Client Information 9
   3.2 Device Under Test (DUT) 9
   3.3 Test Setup of DUT 10
   3.4 Modifications for Compliance 10
4. Test Results 11
   4.1 Emission Bandwidth 11
   4.2 Peak Conducted Output Power 15
   4.3 Spurious Out of Band Emissions (-20dBc) 18
   4.4 Transmitter Spurious Radiated Emissions 24
   4.5 Lower and Upper Band Edges 34
   4.6 Power Spectral Density 42
   4.7 Power Line Conducted Emissions 45

1. Revision History

Project No. & Revision	Report Date	Initials	Description
ML301873-RF00	January 13, 2025	AE	Initial Release
ML301873-RF01	January 28, 2025	AE	Corrections to client information

NOTE:

- Latest reports marked as a revision replace any previous report and/or report revision issued under the same project number.

2. Summary of Test Results

2.1 Test Verdict

Unless otherwise stated, the test data and results in this test report relate only to the sample(s) tested.

Requirement		Test Type	Result	Remark
FCC	ISED			
15.203 15.247(b)(4)	RSS-247 5.4(d)	Antenna Gain and Requirement	Pass	SMD Antenna with -0.75dBi Peak Gain
15.247(a)(2)	RSS-247 5.2(a)	Emission Bandwidth	Pass	6dB Bandwidth > 500kHz
15.247(b)(3)	RSS-247 5.4(d)	Peak Conducted Output Power	Pass	< 1 Watt
15.247(d)	RSS-247 5.5	Spurious Out of Band Emissions	Pass	< 20dBc
15.247(d) 15.209	RSS-GEN 8.9 (Table 5 & 6)	Transmitter Spurious Radiated Emissions	Pass	---
15.205 15.209	RSS-GEN 8.10 (Table 7)	Lower and Upper Band Edges	Pass	Transmitter spurious radiated emissions which fall in the restricted bands
15.247(e)	RSS-247 5.2(b)	Power Spectral Density	Pass	< 8 dBm in 3kHz BW
15.207	RSS-GEN (Table 4)	Power Line Conducted Emissions	Pass	This test is not applicable as the DUT does not connect directly to AC mains supply. Although this test is not applicable, compliance with FCC 15.207/RSS-GEN Table 4 is demonstrated in charging mode through the AC mains port of a laptop with the DUT connect to the laptop's USB port.

2.1.1 Test Verdict Notes and Justifications

The DUT was mounted in three orthogonal axes and worst-case results were obtained in the X-axis. Worst case results are presented. See the Test Setup Photos for axis details.

Antenna details obtained from Antenna Manufacturer's Test Report. As per FCC 15.203, the antenna is permanently installed and has less than 6dBi gain.

2.2 Test Standards

Standard	Description
47 CFR FCC Part 15 Subpart C	Code of Federal Regulations – Radio Frequency Devices, Intentional Radiators
FCC KDB 558074:2019	Digital Transmission Systems, measurements and procedures
RSS-247 Issue 3:2023	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-GEN Issue 5:2021	General Requirements for Compliance of Radio Apparatus
ANSI C63.4:2014	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10:2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
ISO 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories

2.3 Test Facility

All tests were performed at Megalab Group Inc., located at 150 Addison Hall Circle, Aurora, ON, L4G 3X8, Canada.
The 10-meter semi-anechoic chamber for radiated emission and radiated immunity is designed to handle weights of up to 10,000lb and has power capability of over 100A. The turntable is capable of supporting test devices or systems either floor standing or table top of up to 4 meters wide and 3m tall. Conducted emissions, unless otherwise specified, are performed on a 2.44m x 2.48m ground plane and using a 2.44m x 2.48m vertical ground plane if applicable.

2.3.1 Accreditations

This report does not indicate any product endorsement by any government, accreditation agency, or Megalab Group Inc. Megalab Group Inc. shall have no liability for any deductions, interpretations or generalizations drawn by the client or others from the issued reports. If any opinions or interpretations are expressed in this report, they are outside Megalab Group Inc.'s scope of accreditation and do not necessarily reflect the opinions of Megalab Group Inc., unless otherwise specified.

A2LA (Certificate #5179.02)
Megalab Group Inc. is accredited to ISO/IEC 17025:2017 by the American Association for Laboratory Accreditation (A2LA) with Testing Certificate #5179.02. The laboratories current scope of accreditation can be found as listed on A2LA's website.

ISED
Megalab Group Inc. is registered with and recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.
Company Number: 28697

FCC
Megalab Group Inc. is registered with and recognized by the Federal Communications Commission (FCC) as an accredited testing laboratory.
Registration No. 200040

VCCI
The Semi-anechoic chamber of Megalab Group Inc. is registered with the Regulations for Voluntary Control Council for Interference (VCCI). Registration No.: R-20173, G-20174, C-20132, T-20133.

2.3.2 Measurement Uncertainty

As per ISO/IEC 17025 requirements, an evaluation of the measurement uncertainties associated with the emission test results should be included in the test report.

Where relevant, the following measurement uncertainty levels have been estimated for the tests performed on the DUT as specified in CISPR 16-4-2. The measurement uncertainties given below are based on a coverage factor k = 2 which yields approximately a 95% level of confidence for the near-normal distribution typical of most measurement results.

Measurement	Frequency Range	Uncertainty
Conducted Emissions at AC Mains Power Port	150kHz to 30MHz	2.27 dB
Radiated Emissions	30MHz to 1GHz	5.22 dB
	1GHz to 18GHz	4.76 dB

2.3.3 Sample Calculations

Conducted Emissions

Emission Level (dBµV) =	Read Level (dBµV)	+	LISN Factor (dB)	+	Attenuation Factor (dB)	+	Cable Loss (dB)
=	34.8	+	0.1	+	10.0	+	0.2
=	45.1						

Margin (dB) =	Limit (dBµV)	-	Emission Level (dBµV)
=	60.0	-	45.1
=	14.9		

Radiated Emissions

Emission Level (dBµV/m) =	Read Level (dBµV)	+	Antenna Factor (dB/m)	+	Cable Loss (dB)	-	Pre-Amp Gain (dB)
=	52.4	+	9.4	+	1.3	-	29.2
=	33.9						

Margin (dB) =	Limit (dBµV/m)	-	Emission Level (dBµV/m)
=	50.0	-	33.9
=	16.1		

2.3.4 Terms, Definitions and Abbreviations

AE	Auxiliary Equipment
DUT	Device Under Test
DTS	Digital Transmission System
EMC	Electro-Magnetic Compatibility
FHSS	Frequency Hopping Spread Spectrum
ISM	Industrial, Scientific and Medical
LISN	Line Impedance Stabilization Network
N/A	Not Applicable
NCR	No Calibration Required
RF	Radio Frequency
RBW	Resolution Bandwidth
VBW	Video Bandwidth

Auxiliary Equipment/Support Equipment
Equipment needed to exercise and/or monitor the operation of the DUT.

Artificial Mains Network
Network that provides a defined impedance to the DUT at radio frequencies, couples the disturbance voltage to the measuring receiver and decouples the test circuit from the supply mains.

Class A Equipment
Equipment suitable for use in all locations other than those allocated in residential environments and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

Class B Equipment
Equipment suitable for use in all locations, including in residential environments and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

Device Under Test
Device or system being evaluated for compliance with the requirements of the Test Standards listed in this report.

Electro-Magnetic Compatibility
Ability of equipment or system to function satisfactorily in its EM environment without introducing intolerable electromagnetic disturbances to anything in that environment.

Electromagnetic Disturbance
Any electromagnetic phenomenon which may degrade the performance of a device, equipment or system.

3. General Information

3.1 Client Information

Company	Quiet Inc.
Address (USA)	253 Rosemont Street La Jolla, CA 92037 United States
Address (Canada)	3038 Hamilton Road Dorchester, ON, N0L1G5 Canada
Contact	Scott Moser
Email	scott@quiet-inc.com
Phone	(858) 699-8954

3.2 Device Under Test (DUT)

3.2.1 DUT Information

DUT Name	Quiet Phone
DUT Model(s)	QuietPhone12B
Serial Number	Prototype
Power Source (AC / DC / Battery)	Rechargeable Battery
Input Voltage (V) or Range	5VDC
Frequency (Hz) or Range	N/A
Rated Current (A)	<1
Mode(s) of Operation	Charging, Standby, Calling
Connectors Available on DUT	USB-C
DUT Dimensions (L x W x H)	22cm x 11.5cm x 6cm
Transmitter Information	
FCC ID	2BMEA-QP12BUS25
IC	33381-QP12BCA25
Technology Used	BLE
Operating Frequency	2402MHz to 2480MHz
Modulation Type	GFSK
Number of Channels	40
Data Rate	1Mbps PHY radio
Antenna Manufacturer	Taoglas
Antenna Model	WLA.01.A
Antenna Type	SMD Antenna
Antenna Gain	-0.75dBi Peak

Note: Above antenna information is provided in the custom test report by Taoglas for this DUT.

3.2.2 DUT Description

The Quiet Phone is a communication device which pairs to a cellphone via Bluetooth Low Energy. It is engineered for environments where noise control and minimal disruption are critical, such as aircraft cabins, train systems, public spaces, factories, and similar shared spaces. Its design allows telecommunication without disturbing nearby individuals, in public or loud environments.

3.3 Test Setup of DUT

3.3.1 Configuration

The DUT was configured in a direct test mode using BlueTest3 software with the following parameters under the Continuous Tx test commands setting:

- Power: 4
- Channels:
  - 0 (Low, 2402MHz),
  - 19 (Mid, 2440MHz),
  - 39 (High, 2480MHz)
- Type: LE1M PR15
- Pattern Bits: 32
- Pattern (Hex): 00000001

- For all the tests, the DUT was set to transmit continuously with 100% duty cycle
- For the conducted DUT test sample, the antenna was disconnected and a SMA connector was placed by the client before the matching network to the antenna.

During all radiated emission measurements, the DUT was mounted in three orthogonal axes. See Test Setup Photos for axis details.

Power line conducted emissions was evaluated on the laptop into which the DUT was connected via USB for charging and continuously transmitting.

Description of I/O Cables			
Cable Function	**Length of Cable (m)**	**Shielded (Y/N)**	**Outdoor Use (Y/N)**
USB-C, Charging	<3m	Y	N

3.3.2 Support Equipment

Device	Manufacturer	Model	S/N
Laptop	Lenovo	T480s	---

3.4 Modifications for Compliance

No modifications were made to the device under test to comply with the testing requirements.

4. Test Results

4.1 Emission Bandwidth

Test Date:	January 7, 2025	Initials:	AE
Temperature (°C)	20.2		
Relative Humidity (%)	8.3		
Barometric Pressure (kPa)	98.1		

4.1.1 Limits

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

4.1.2 Test Procedure

Tested according to ANSI C63.10 Section 11.8 and 6.9.3.

For the 6dB (DTS) Bandwidth:

a) Set RBW = 100kHz and VBW ≥ [3 × RBW].
b) Detector = Peak and Trace Mode = Max Hold.
c) Sweep = Auto Couple.
d) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

For the 99% Bandwidth:

a) Set RBW in the range of 1% to 5% of the actual occupied bandwidth.
b) Set VBW ≥ [3 × RBW].
c) Span set to 1.5 to 5 times the occupied bandwidth.
d) Use the 99% power bandwidth function of the instrument to measure bandwidth.

4.1.3 Test Results

6dB (DTS) Bandwidth				
Channel	**Frequency (MHz)**	**6dB Bandwidth (MHz)**	**Limit (MHz)**	**Test Result**
Low	2402	0.728	> 0.50	Pass
Mid	2440	0.731	> 0.50	Pass
High	2480	0.725	> 0.50	Pass

99% Bandwidth					
Channel	**Frequency (MHz)**	**F_{LOW} (MHz)**	**F_{HIGH} (MHz)**	**Occupied Bandwidth (MHz)**	**Test Result**
Low	2402	2401.621	2402.673	1.05	Pass
Mid	2440	2439.623	2440.676	1.05	Pass
High	2480	2479.623	2480.678	1.06	Pass

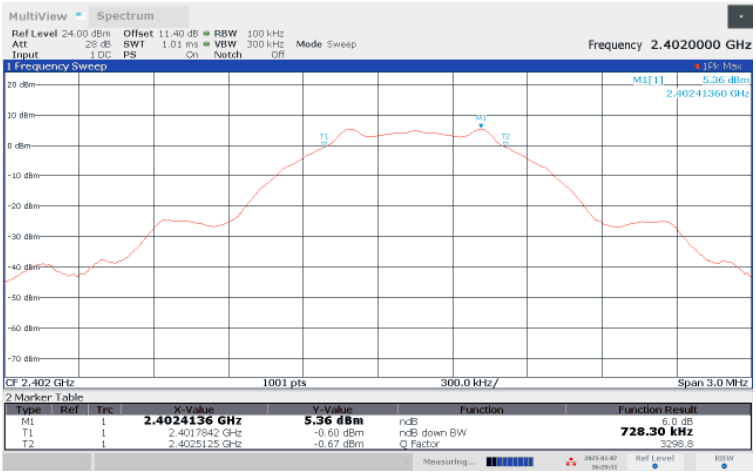


Figure 1 – 6dB Bandwidth - Low Channel

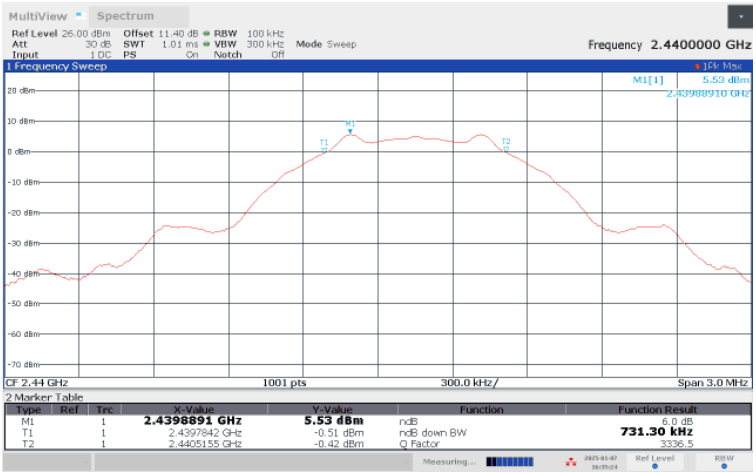


Figure 2 – 6dB Bandwidth - Mid Channel

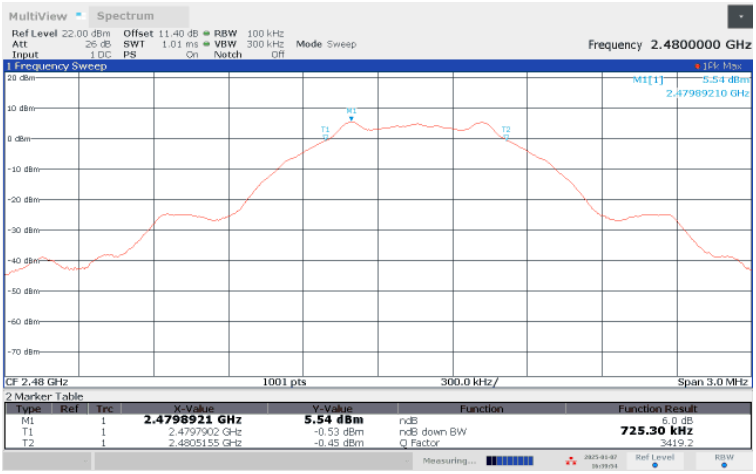


Figure 3 – 6dB Bandwidth - High Channel

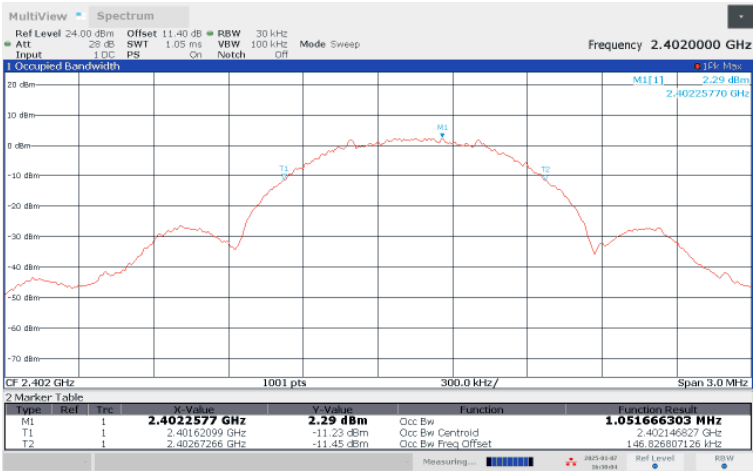


Figure 4 – 99% Bandwidth - Low Channel

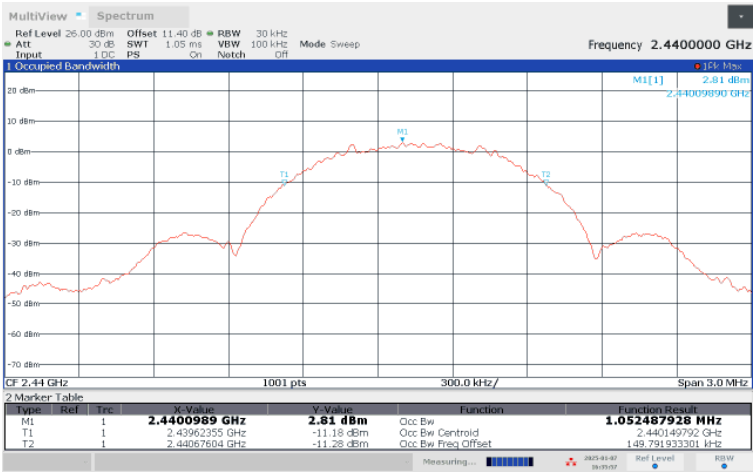


Figure 5 – 99% Bandwidth - Mid Channel

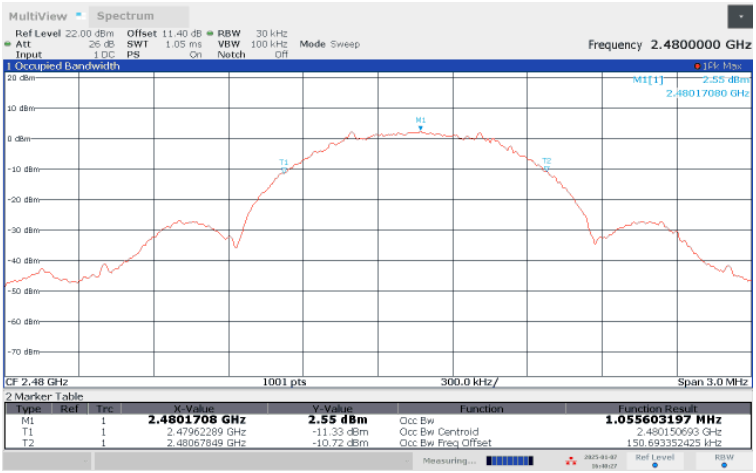


Figure 6 – 99% Bandwidth - High Channel

4.1.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration/ *(Verification)* Date	Calibration/ *(Verification)* Due
EQ_EMC_58	EMI Receiver	Rohde & Schwarz	ESW 44	Mar 1, 2024	Mar 1, 2026
EQ_EMC_115	10dB Attenuator	Fairview Microwave	SA18E-10	*(Apr 10, 2024)*	*(Apr 10, 2025)*

4.2 Peak Conducted Output Power

Test Date:	January 7, 2025	Initials:	AE
Temperature (°C)	20.2		
Relative Humidity (%)	8.3		
Barometric Pressure (kPa)	98.1		

4.2.1 Limits

The maximum peak conducted output power of the intentional radiator shall not exceed 1 Watt (+30dBm) for systems using digital modulation in the 902–928MHz, 2400–2483.5MHz, and 5725–5850MHz bands. The maximum conducted output power is the highest total transmit power occurring in any mode.

4.2.2 Test Procedure

Tested according to ANSI C63.10 Section 11.9.1.

The test was performed using a spectrum analyzer with a resolution bandwidth greater than the DTS bandwidth.

The RF output of the DUT was connected to the spectrum analyzer with sufficient attenuation in front and the total path loss was set as reference offset to correct the final reading.

4.2.3 Test Results

Channel	Frequency (MHz)	Peak Power (dBm)	Peak Power (mW)	Limit (dBm)	Test Result
Low	2402	5.49	3.54	30	Pass
Mid	2440	5.58	3.61	30	Pass
High	2480	5.60	3.63	30	Pass

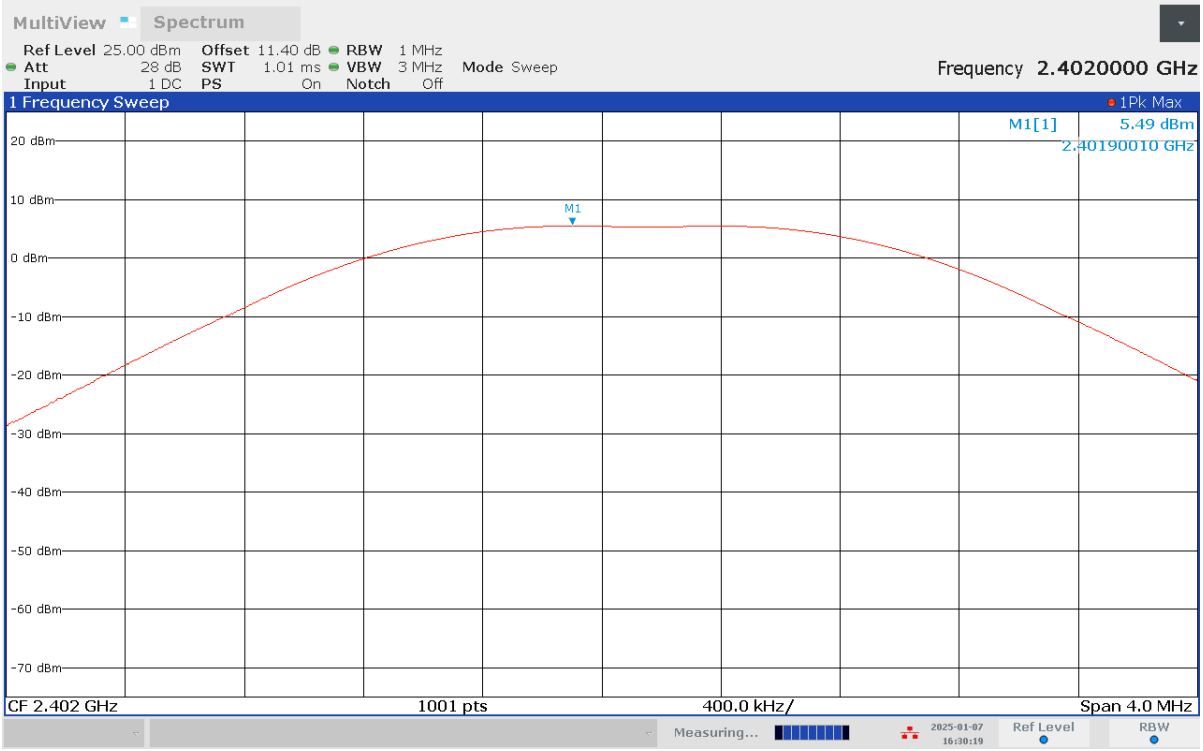


Figure 7 – Peak Power - Low Channel

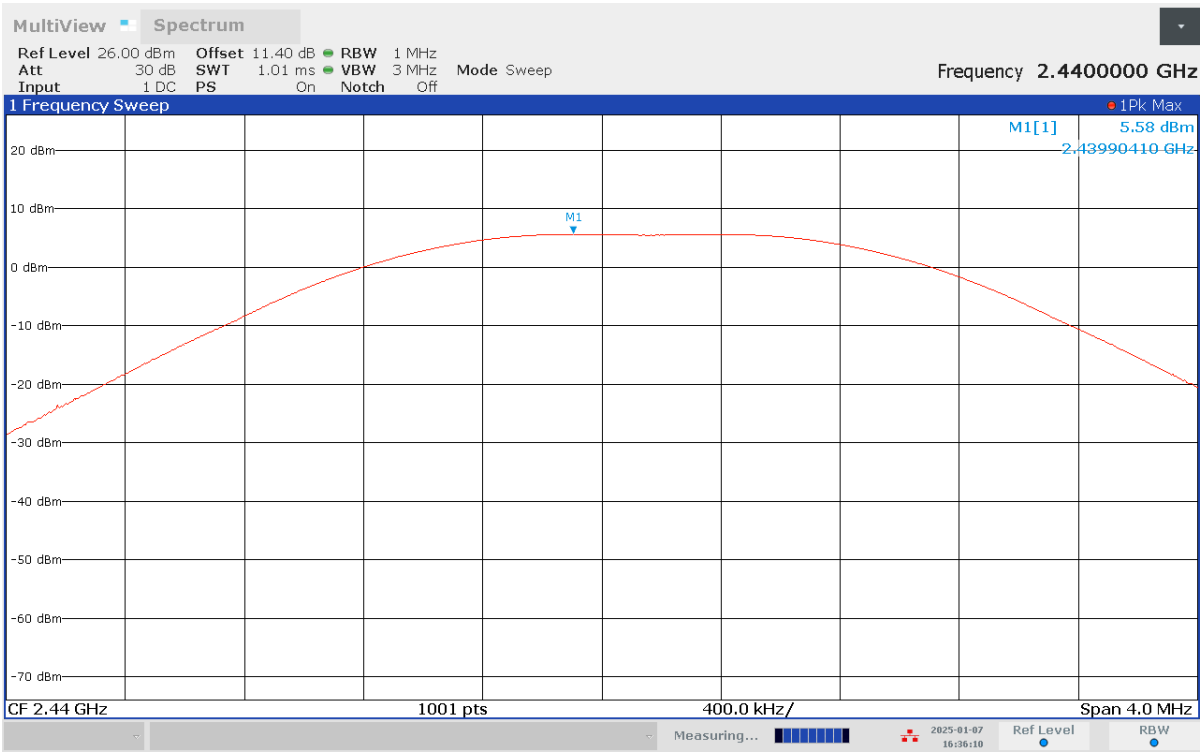


Figure 8 – Peak Power - Mid Channel

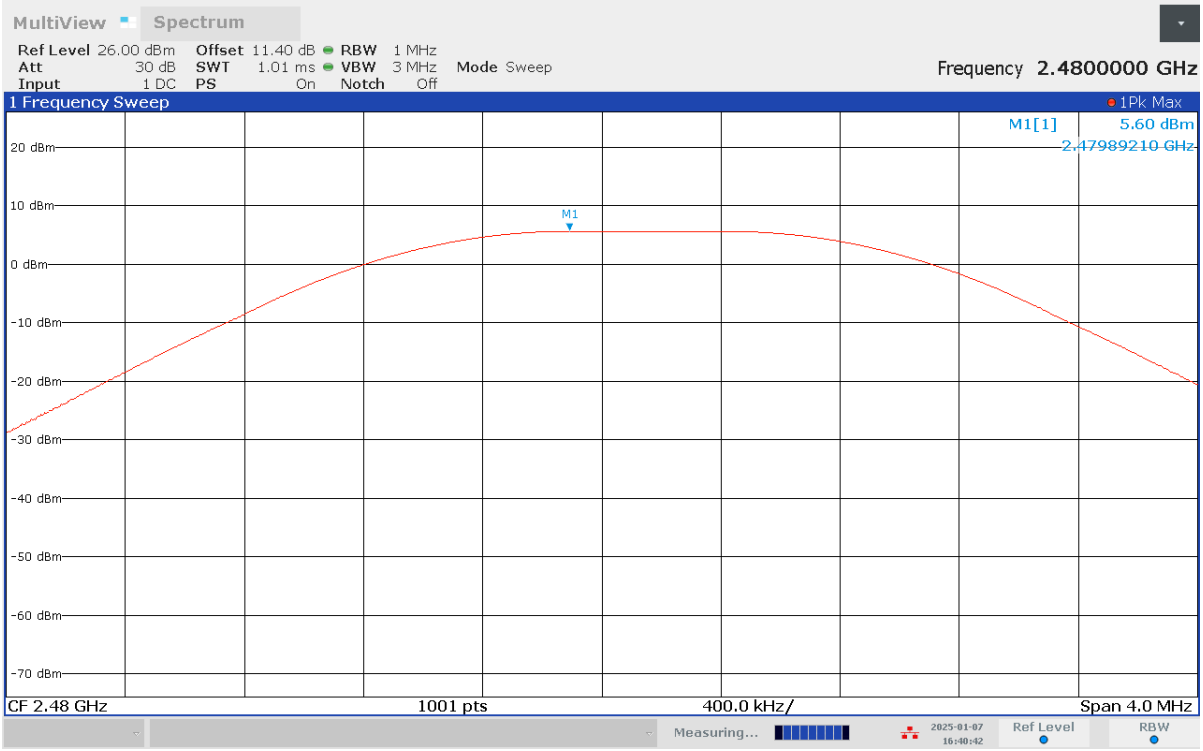


Figure 9 – Peak Power - High Channel

4.2.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration/ *(Verification)* Date	Calibration/ *(Verification)* Due
EQ_EMC_58	EMI Receiver	Rohde & Schwarz	ESW 44	Mar 1, 2024	Mar 1, 2026
EQ_EMC_115	10dB Attenuator	Fairview Microwave	SA18E-10	*(Apr 10, 2024)*	*(Apr 10, 2025)*

4.3 Spurious Out of Band Emissions (-20dBc)

Test Date:	January 7, 2025	Initials:	AE
Temperature (°C)	20.2		
Relative Humidity (%)	8.3		
Barometric Pressure (kPa)	98.1		

4.3.1 Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30dB instead of 20dB.

4.3.2 Test Procedure

Tested according to ANSI C63.10 Section 11.11

For the reference level measurement:

a) Set RBW = 100kHz and VBW ≥ [3 × RBW].
b) Detector = Peak and Trace Mode = Max Hold.
c) Sweep = Auto Couple.
d) Span set to ≥1.5 DTS bandwidth.
e) Use the peak marker function to determine the maximum level.

For the out of band emission measurement

a) Set the start and stop frequency to encompass the frequency range to be measured.
b) Set RBW = 100kHz and VBW ≥ [3 × RBW].
c) Detector = Peak and Trace Mode = Max Hold.
d) Sweep = Auto Couple.
e) Use the peak marker function to determine the maximum level.

The RF output of the DUT was connected to the spectrum analyzer with sufficient attenuation in front and the total path loss was set as reference offset to correct the final reading.

4.3.3 Test Results

The DUT met the 20dB below carrier requirement for out of band emissions.

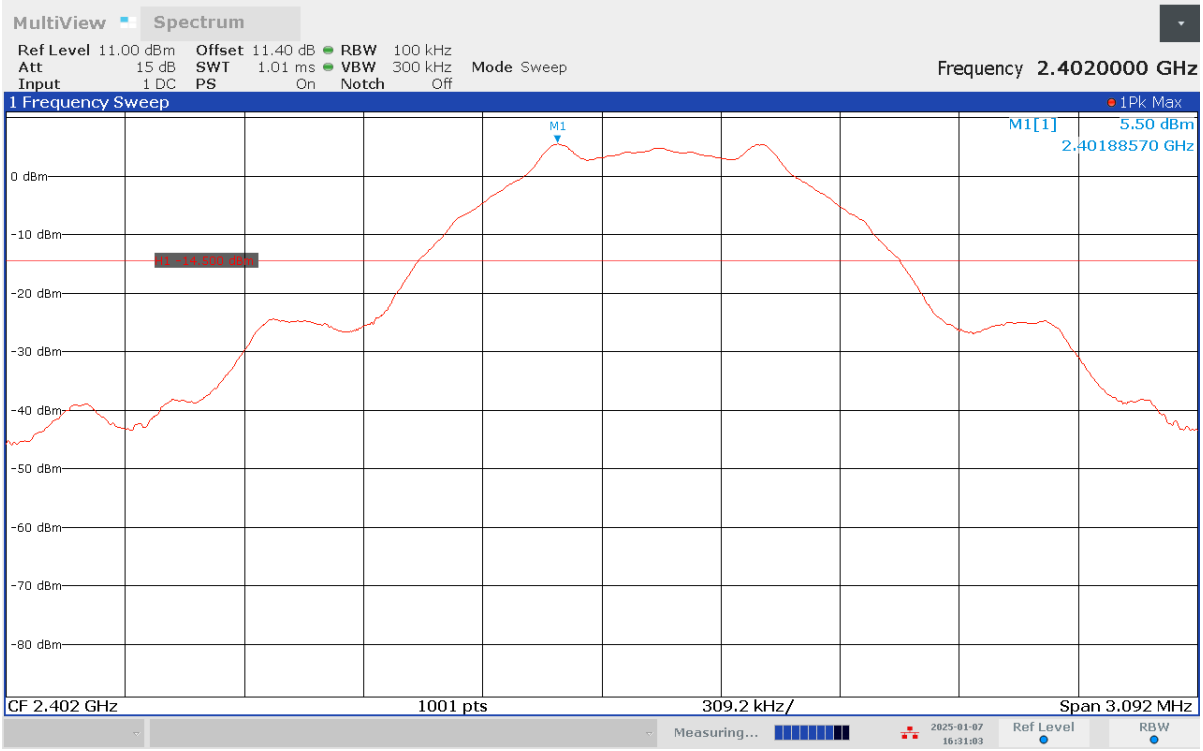


Figure 10 – -20dBc Reference Level - Low Channel

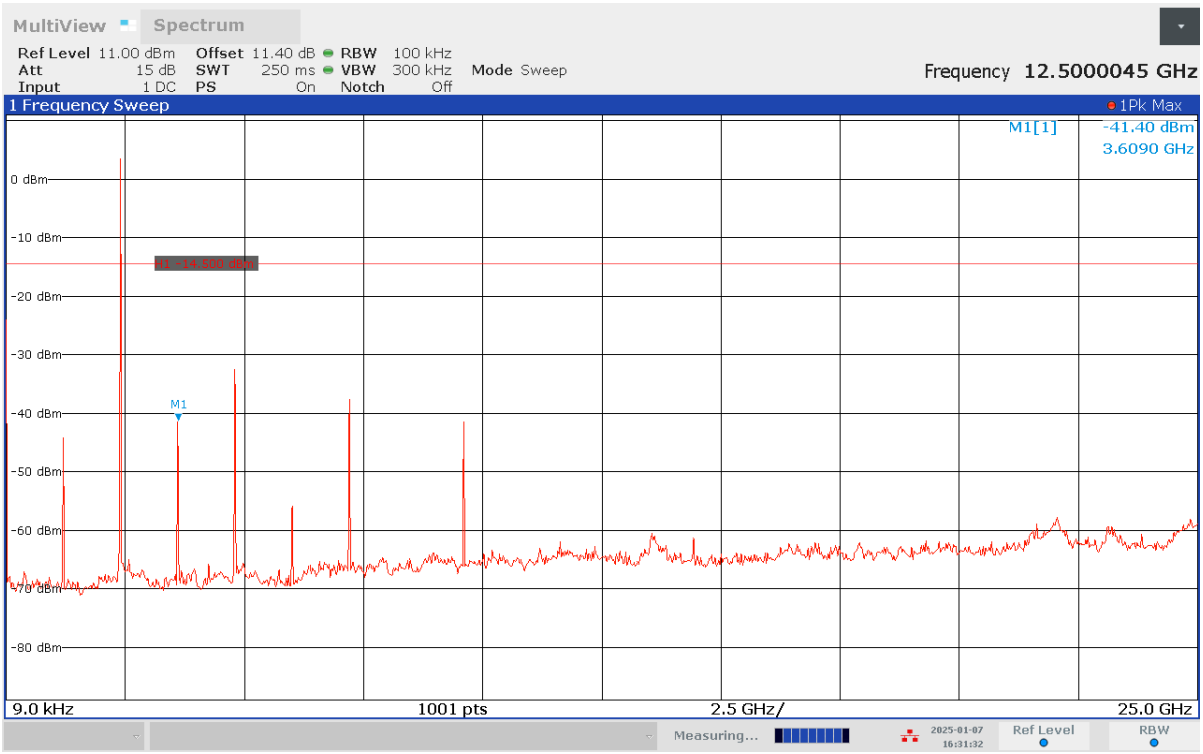


Figure 11 – -20dBc - Low Channel

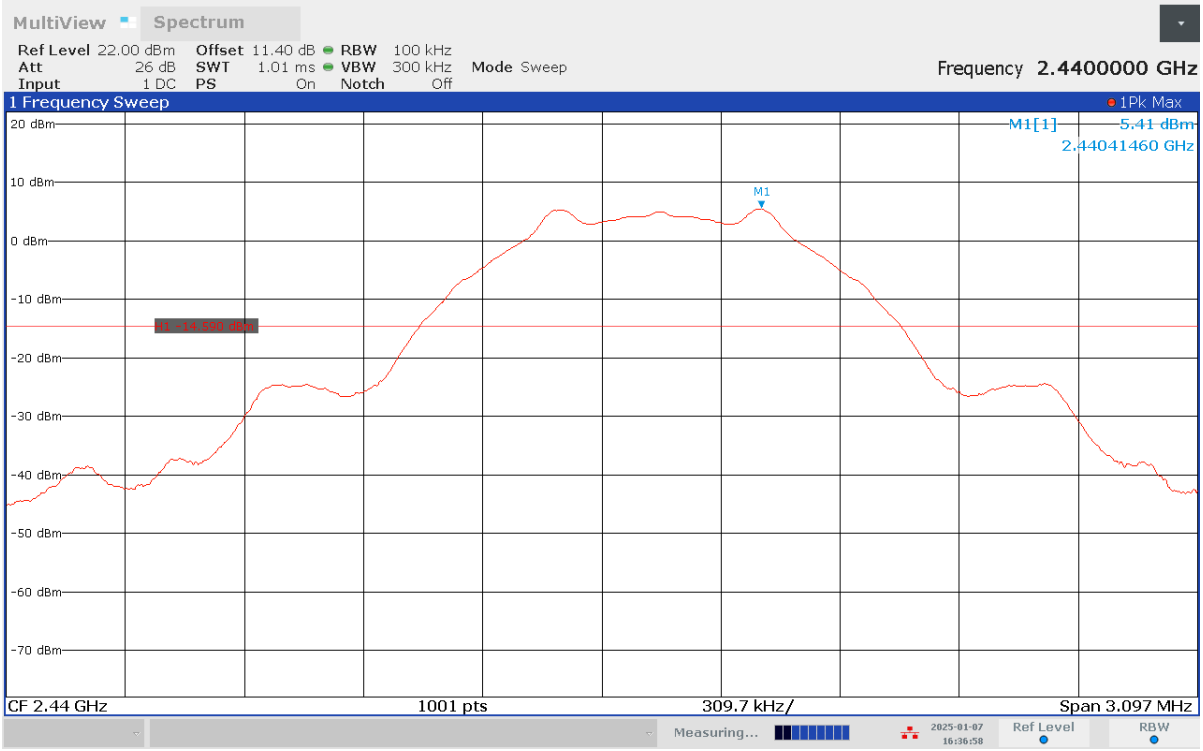


Figure 12 – -20dBc Reference Level - Mid Channel

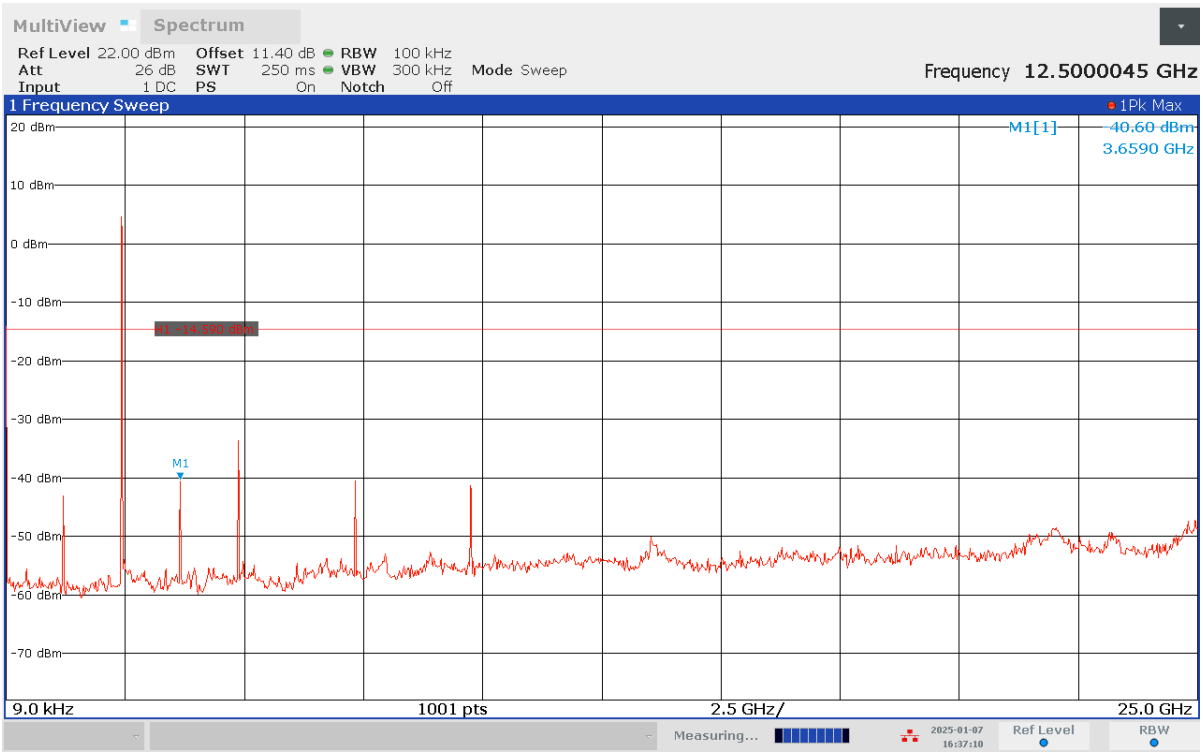


Figure 13 – -20dBc - Mid Channel

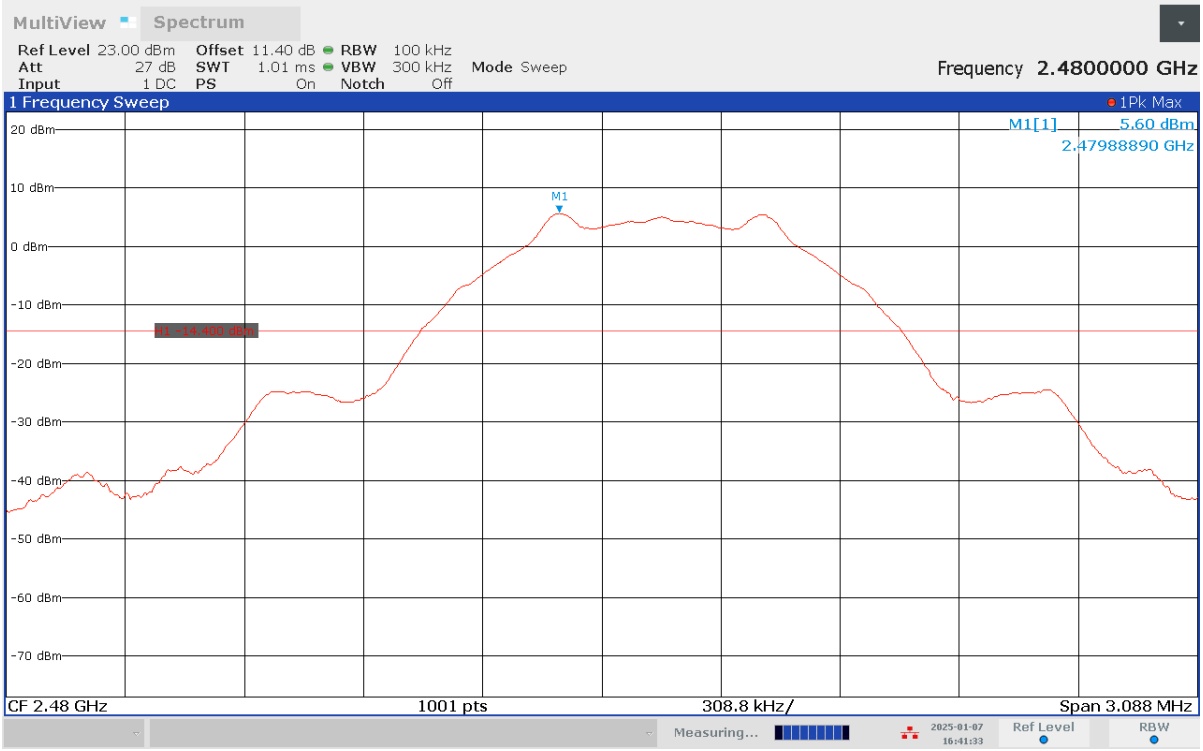


Figure 14 – -20dBc Reference Level - High Channel

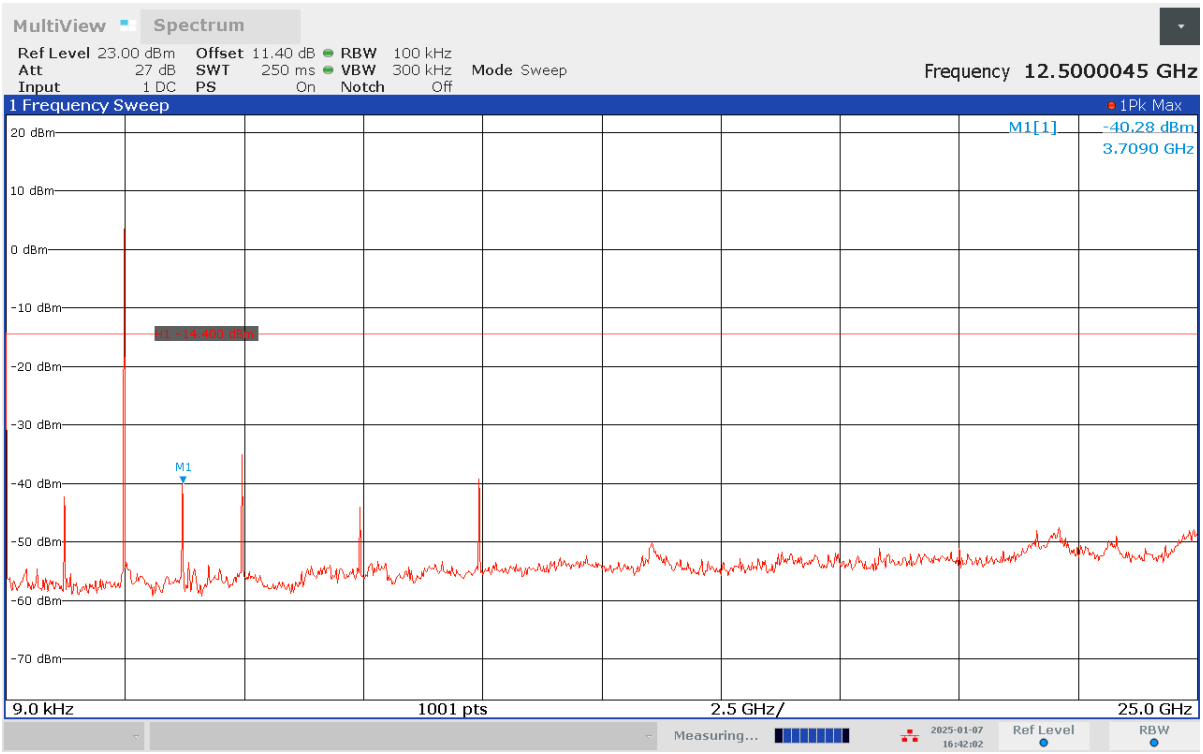


Figure 15 – -20dBc - High Channel

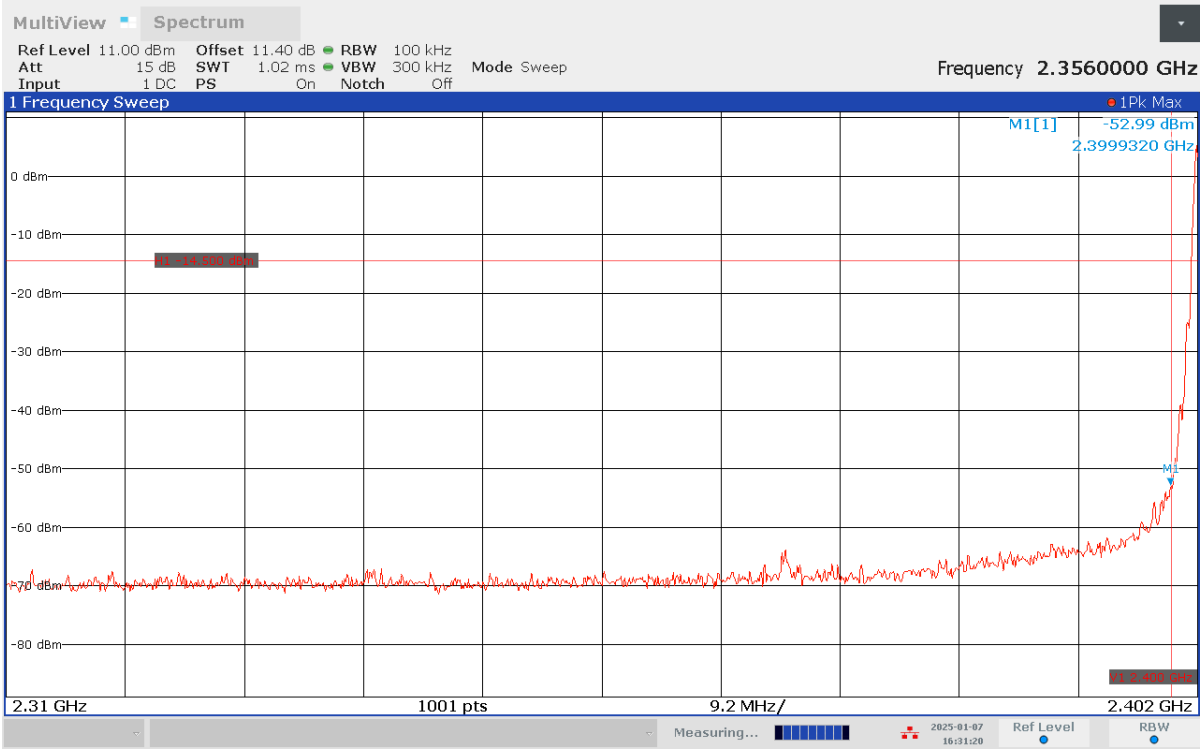


Figure 16 – -20dBc Band Edge - Low Channel

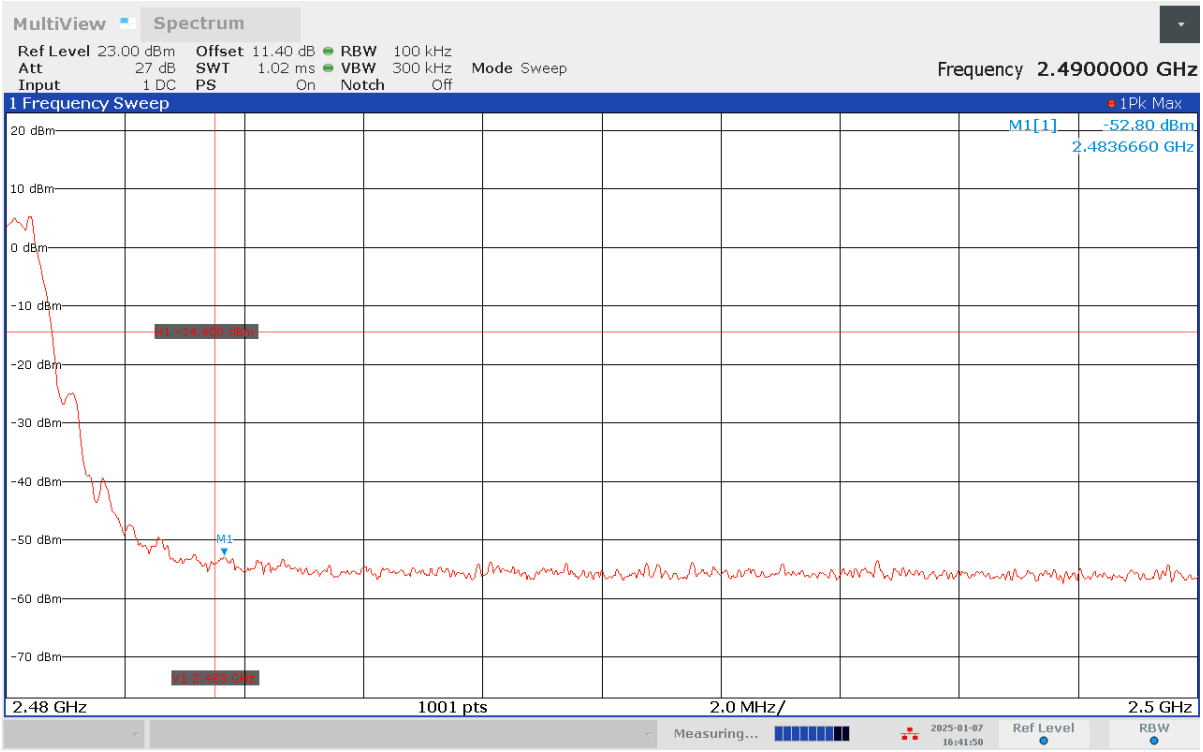


Figure 17 – -20dBc Band Edge - High Channel

4.3.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration/ *(Verification)* Date	Calibration/ *(Verification)* Due
EQ_EMC_58	EMI Receiver	Rohde & Schwarz	ESW 44	Mar 1, 2024	Mar 1, 2026
EQ_EMC_115	10dB Attenuator	Fairview Microwave	SA18E-10	*(Apr 10, 2024)*	*(Apr 10, 2025)*

4.4 Transmitter Spurious Radiated Emissions

Test Date:	January 7, 2025	Initials:	AE
Temperature (°C)	20.2		
Relative Humidity (%)	8.3		
Barometric Pressure (kPa)	98.1		

4.4.1 Limits

Any radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the general radiated emission limits specified in FCC 15.209(a). Other emissions shall be at least 20dB below the highest level of the intentional transmitter.

Base Standard(s): FCC Subpart C 15.209 and RSS-Gen Section 8.9.

Frequency Range (MHz)	Field Strength Limit		Field Strength at 3m (dBµV/m)	Detector Type / Measurement Bandwidth
	µV/m	Distance		
0.009 – 0.150	2400/F(kHz)	300	128.5 – 104.1	Quasi-Peak‡ / 200Hz
0.150 – 0.490	2400/F(kHz)	300	104.1 – 93.8	Quasi-Peak‡ / 9kHz
0.490 – 1.705	24000/F(kHz)	30	73.8 – 63.0	Quasi-Peak / 9kHz
1.705 – 30	30	30	69.5	Quasi-Peak / 9kHz
30 – 88	100	3	40.0	Quasi-Peak / 120kHz
88 – 216	150	3	43.5	Quasi-Peak / 120kHz
216 – 960	200	3	46.0	Quasi-Peak / 120kHz
960 – 1000	500	3	54.0	Quasi-Peak / 120kHz
Above 1000	500	3	54.0	Average / 1MHz
Above 1000	5000	3	74.0	Peak / 1MHz

‡The emission limits below 1GHz shown in the above table are based on measurements employing a CISPR Quasi-Peak detector except for the frequency bands 9-90 kHz and 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

As per ANSI C63.4 Section 4.2, if the Peak detector measurements do not exceed the Quasi-Peak limits, or Average limits where defined, then the DUT is considered to have passed the requirements.

4.4.2 Test Procedure

Tested according to ANSI C63.10 Section 6.3.

The device under test was setup inside a semi-anechoic chamber with remotely controlled turntable and antenna positioner at a 3m test distance. The DUT was placed on top of a 0.8m high non-conductive table above the reference ground plane for frequencies below 1GHz and 1.5m high for frequencies above 1GHz.

To determine the emission characteristics of the DUT, exploratory radiated emission scans were made while rotating the turntable 0° to 360° and using the applicable detector. The results were recorded in graphical form.

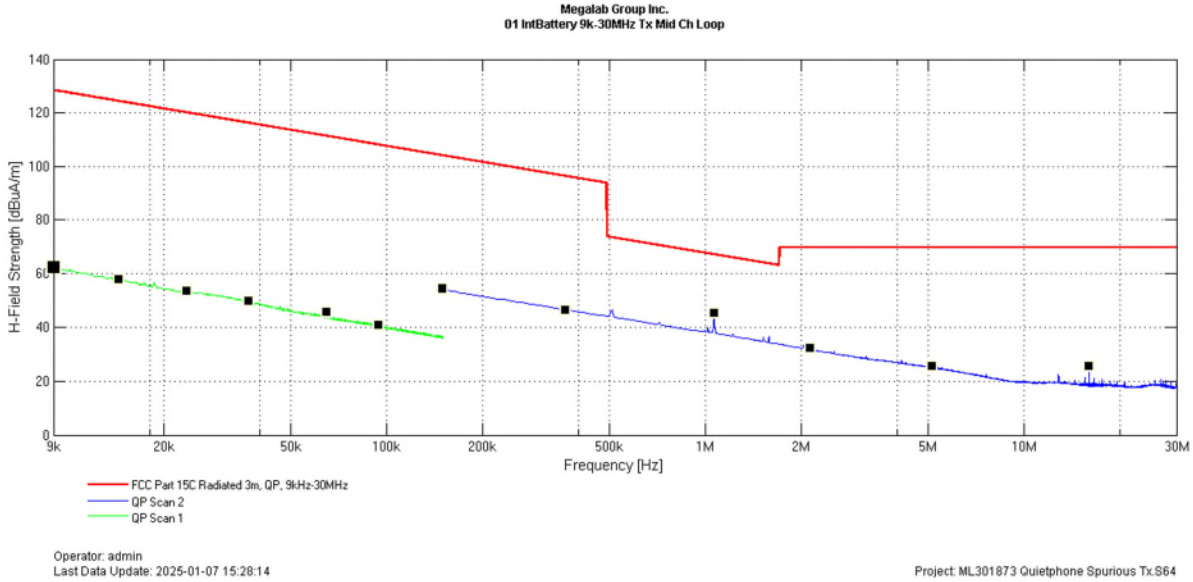
For each suspected emission, final measurements of the DUT radiated emissions with the Quasi-Peak, Average or Peak detector, as defined in the limit tables above, were made with the turntable azimuth rotated 0° to 360° and antenna height varied from 1m to 4m. The antenna was positioned to receive emissions in the vertical and horizontal polarizations such that the maximum radiated emission levels were detected.

As per FCC Part 15.33(a), the DUT was scanned to the 10th harmonic of the highest fundamental frequency.

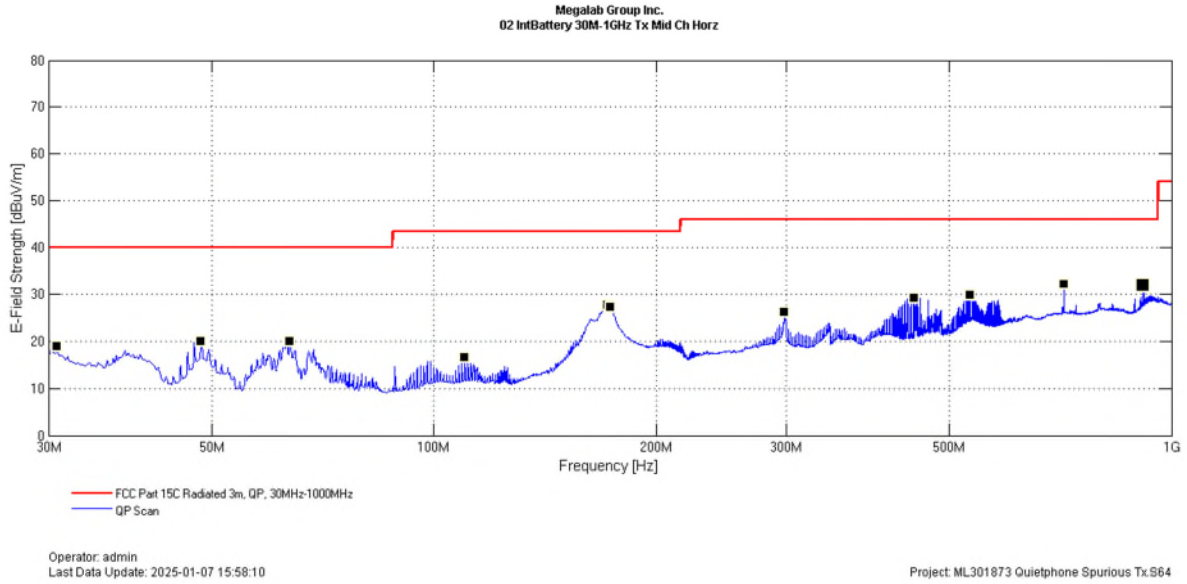
Peak output power for low, mid and high channels, each in three orthogonal axes, were verified. The worst case was used for the spurious emissions which was on the mid channel and in the X-axis.

4.4.3 Test Results

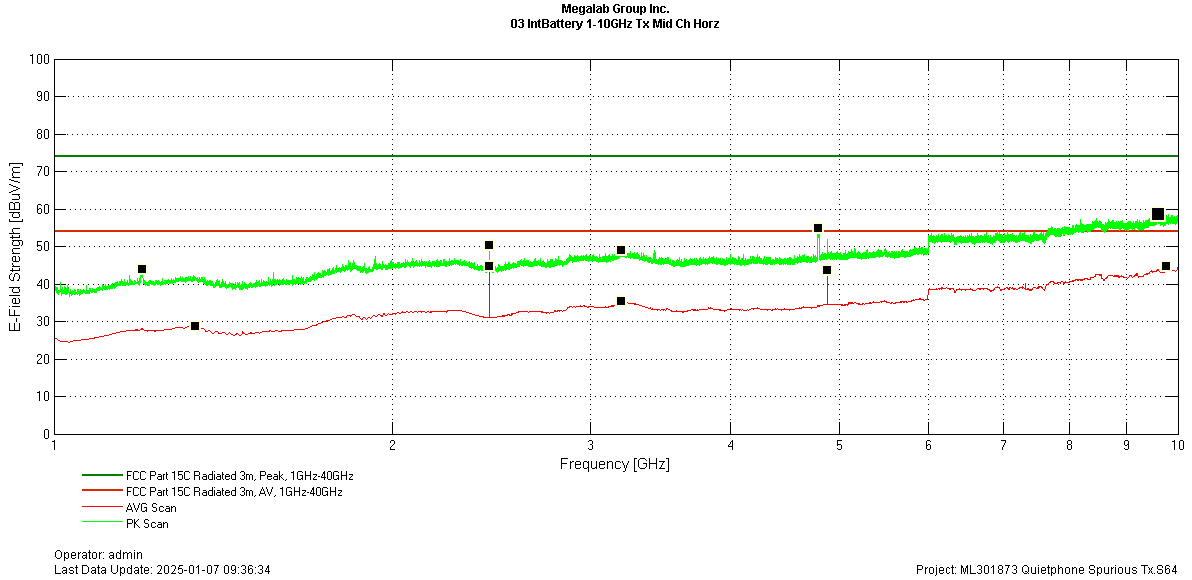
Range:	9kHz to 30MHz	**Tx Frequency**	2440MHz
Test Voltage:	Internal Battery	**Antenna Polarization**	N/A



Range:	30MHz to 1GHz	**Tx Frequency**	2440MHz
Test Voltage:	Internal Battery	**Antenna Polarization**	Horizontal

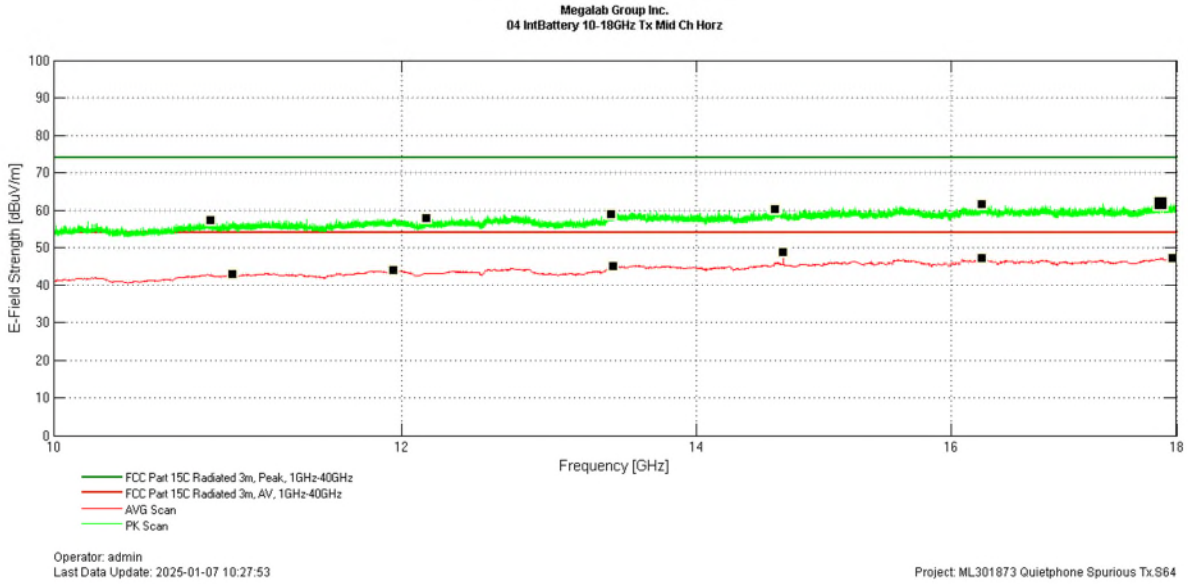


Range:	1GHz to 10GHz	**Tx Frequency**	2440MHz
Test Voltage:	Internal Battery	**Antenna Polarization**	Horizontal



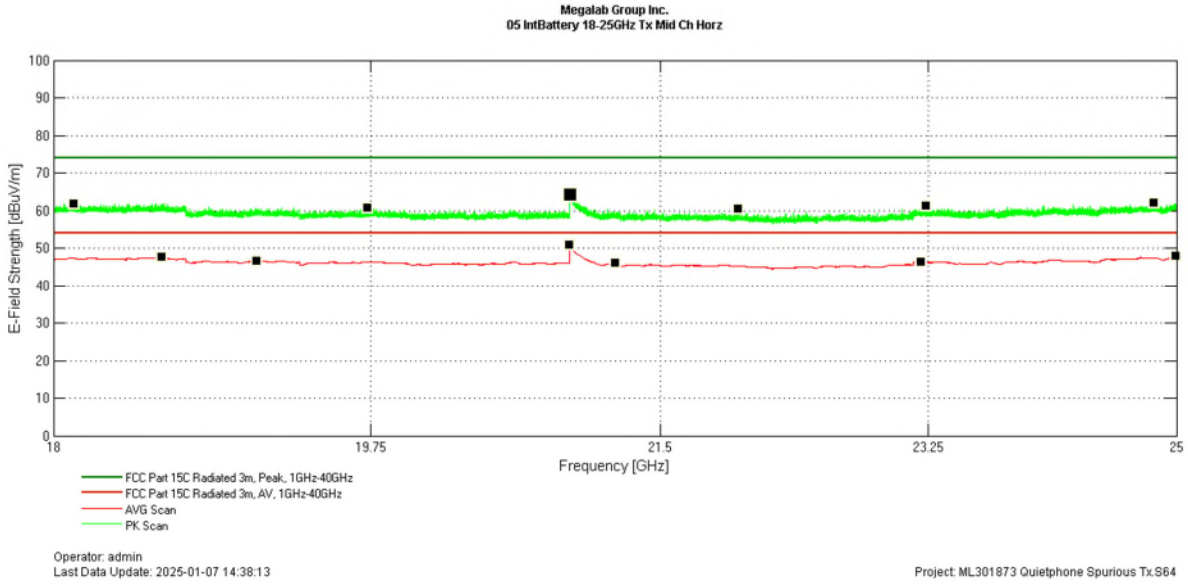
Remark: A notch filter was used to filter out the fundamental

Range:	10GHz to 18GHz	**Tx Frequency**	2440MHz
Test Voltage:	Internal Battery	**Antenna Polarization**	Horizontal



Remark: A notch filter was used to filter out the fundamental

Range:	18GHz to 25GHz	**Tx Frequency**	2440MHz
Test Voltage:	Internal Battery	**Antenna Polarization**	Horizontal



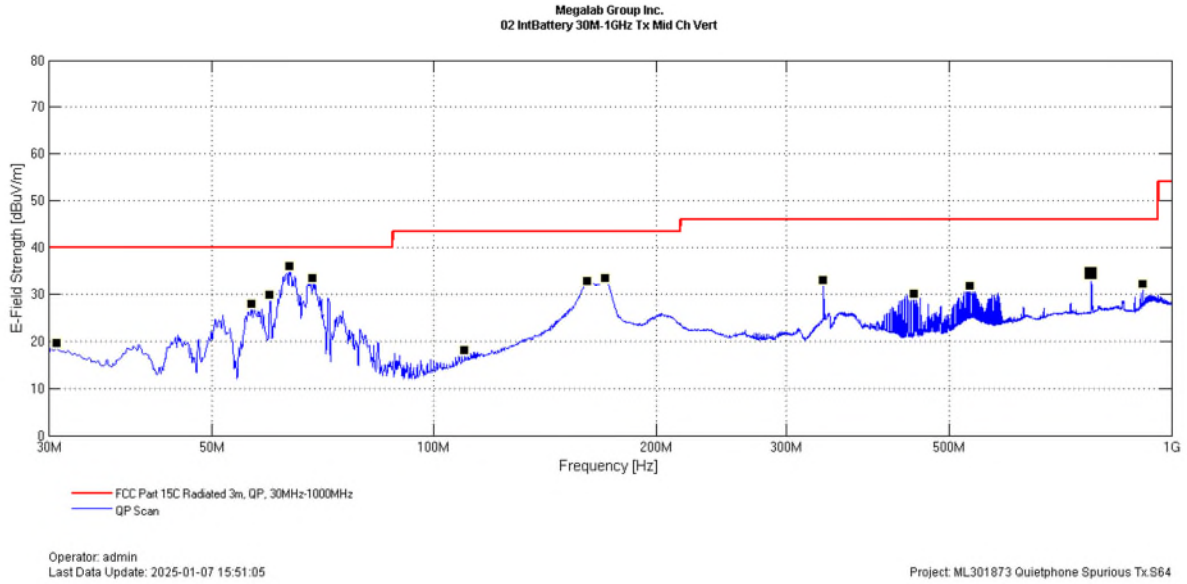
Horizontal Antenna Polarization							
Frequency (MHz)	Detector	Reading (dBµV)	Correction Factor (dB)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Test Result
714.15	QP	41.9	-9.7	32.2	46.0	13.8	Pass
913.85	QP	39.9	-8.0	31.9	46.0	14.1	Pass
172.05	QP	52.0	-24.3	27.7	43.5	15.8	Pass
534.05	QP	41.7	-11.9	29.8	46.0	16.3	Pass
447.95	QP	45.2	-16.0	29.2	46.0	16.8	Pass
298.85	QP	47.1	-21.0	26.2	46.0	19.9	Pass
9599.00	PEAK	49.9	8.7	58.6	74.0	15.4	Pass
4792.00	PEAK	54.5	0.4	54.9	74.0	19.1	Pass
3201.00	PEAK	49.0	0.1	49.1	74.0	25.0	Pass
1198.00	PEAK	49.6	-5.7	43.9	74.0	30.1	Pass
9762.00	AVG	35.8	8.9	44.7	54.0	9.4	Pass
3198.00	AVG	35.2	0.1	35.3	54.0	18.7	Pass
1336.00	AVG	33.9	-5.2	28.7	54.0	25.3	Pass
17854.00	PEAK	42.2	19.4	61.7	74.0	12.3	Pass
16256.00	PEAK	43.7	17.7	61.4	74.0	12.6	Pass
17969.00	AVG	27.4	19.7	47.2	54.0	6.9	Pass
16256.00	AVG	29.3	17.7	47.0	54.0	7.0	Pass

Worst case position: Angle: 0 Deg
Height: 150 cm

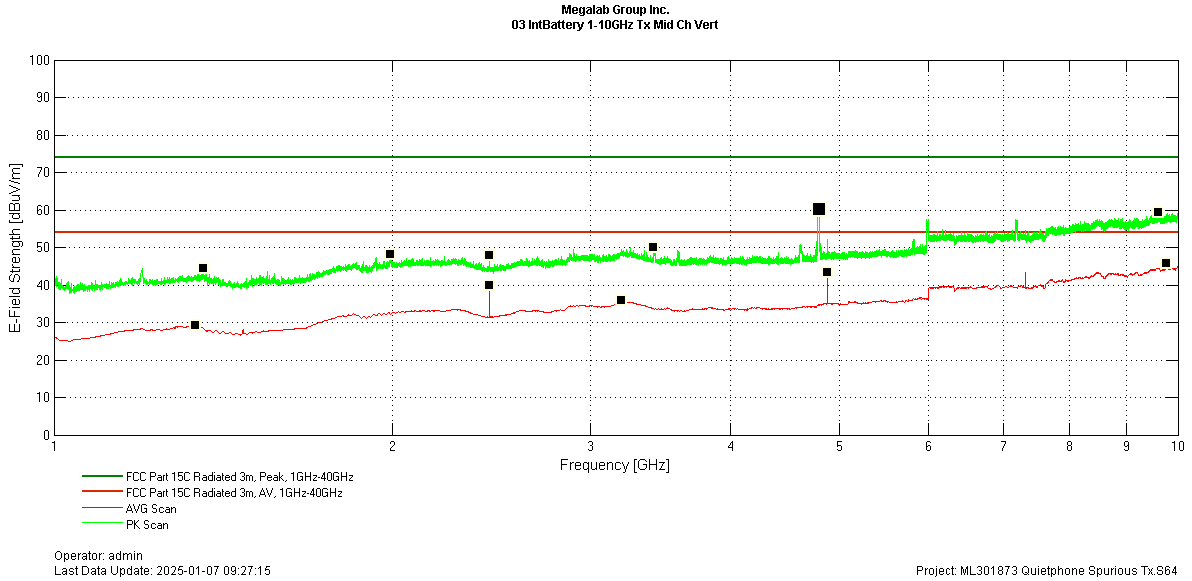
Harmonics Measurements

Frequency (MHz)	Detector	Antenna Polarity	Reading (dBµV)	Correction Factor (dB)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Test Result
X-Axis								
4880.0	PEAK	Horz	50.3	1.0	51.3	74.0	22.7	Pass
4880.0	AVG	Horz	42.7	1.0	43.7	54.0	10.3	Pass
7320.0	PEAK	Horz	46.4	4.4	50.8	74.0	23.2	Pass
7320.0	AVG	Horz	31.7	4.4	36.1	54.0	17.9	Pass
9760.0	PEAK	Horz	39.8	8.9	48.7	74.0	25.3	Pass
9760.0	AVG	Horz	31.5	8.9	40.4	54.0	13.6	Pass
12200.0	PEAK	Horz	43.3	13.2	56.5	74.0	17.5	Pass
12200.0	AVG	Horz	29.5	13.2	42.7	54.0	11.3	Pass
14640.0	PEAK	Horz	42.9	16.5	59.4	74.0	14.6	Pass
14640.0	AVG	Horz	29.6	16.5	46.1	54.0	7.9	Pass

Range:	30MHz to 1GHz	**Tx Frequency**	2440MHz
Test Voltage:	Internal Battery	**Antenna Polarization**	Vertical

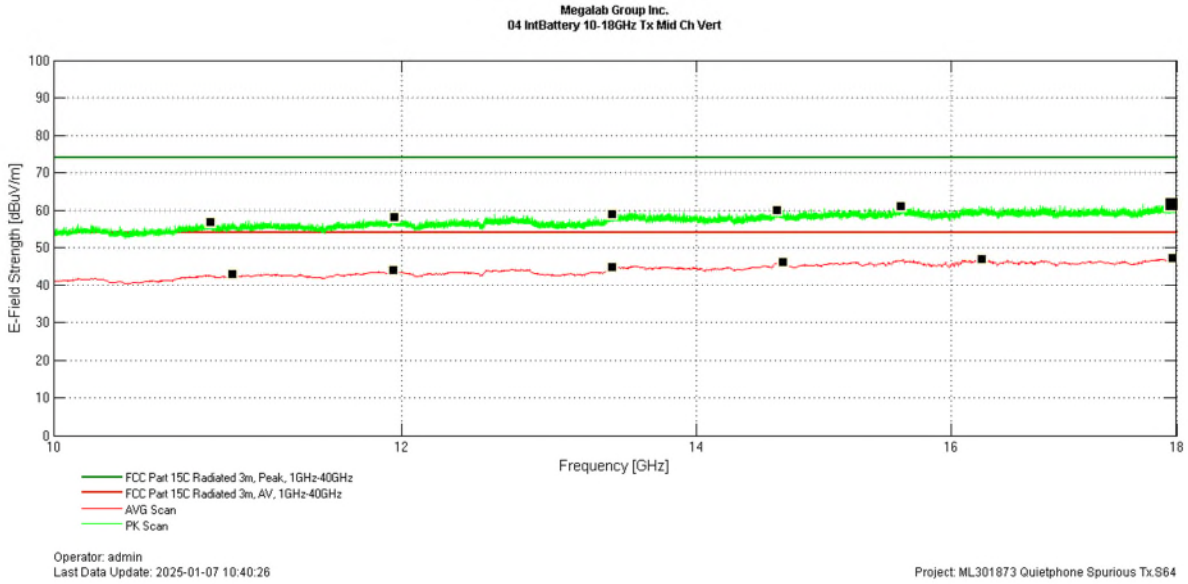


Range:	1GHz to 10GHz	**Tx Frequency**	2440MHz
Test Voltage:	Internal Battery	**Antenna Polarization**	Vertical



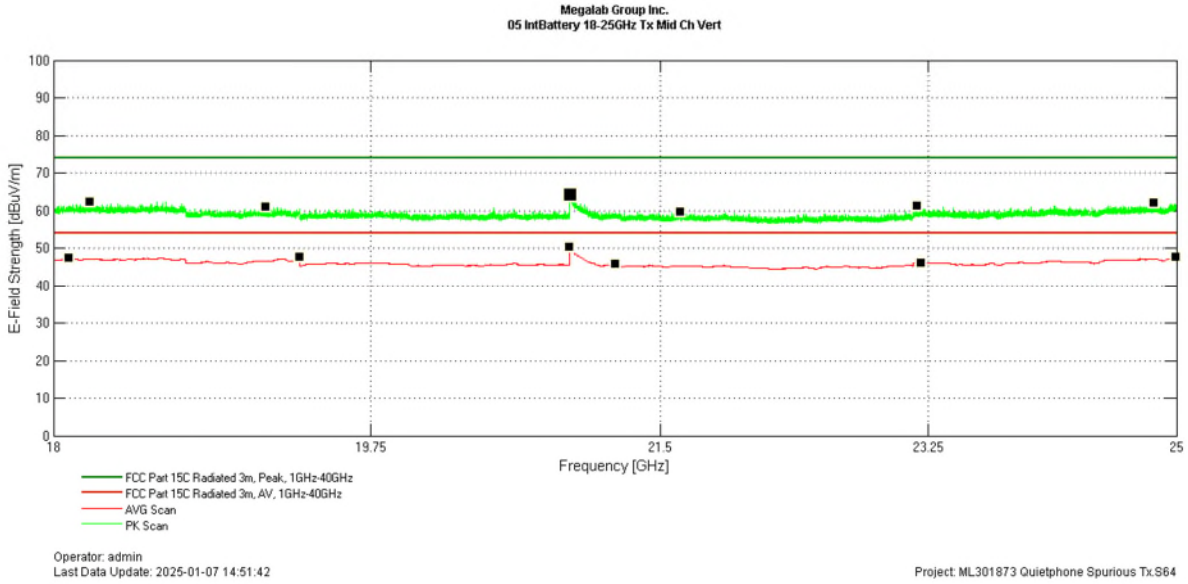
Remark: A notch filter was used to filter out the fundamental

Range:	10GHz to 18GHz	**Tx Frequency**	2440MHz
Test Voltage:	Internal Battery	**Antenna Polarization**	Vertical



Remark: A notch filter was used to filter out the fundamental

Range:	18GHz to 25GHz	**Tx Frequency**	2440MHz
Test Voltage:	Internal Battery	**Antenna Polarization**	Vertical



Vertical Antenna Polarization							
Frequency (MHz)	Detector	Reading (dBµV)	Correction Factor (dB)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Test Result
63.65	QP	63.0	-27.1	35.9	40.0	4.1	Pass
68.50	QP	60.2	-26.9	33.3	40.0	6.7	Pass
170.55	QP	57.6	-24.3	33.4	43.5	10.2	Pass
59.95	QP	57.2	-27.4	29.8	40.0	10.2	Pass
161.60	QP	56.4	-23.7	32.7	43.5	10.8	Pass
777.95	QP	44.0	-9.5	34.5	46.0	11.6	Pass
4794.00	PEAK	59.6	0.5	60.0	74.0	14.0	Pass
9609.00	PEAK	50.7	8.7	59.4	74.0	14.6	Pass
3415.00	PEAK	51.3	-1.2	50.1	74.0	23.9	Pass
1993.00	PEAK	50.2	-2.1	48.1	74.0	25.9	Pass
1357.00	PEAK	50.2	-5.8	44.4	74.0	29.6	Pass
9762.00	AVG	36.8	8.9	45.7	54.0	8.3	Pass
3196.00	AVG	35.7	0.1	35.8	54.0	18.3	Pass
1335.00	AVG	34.4	-5.2	29.2	54.0	24.8	Pass
17956.00	PEAK	41.9	19.7	61.6	74.0	12.4	Pass
15587.00	PEAK	44.1	16.8	60.9	74.0	13.1	Pass
17968.00	AVG	27.3	19.7	47.0	54.0	7.0	Pass
16257.00	AVG	29.2	17.7	46.9	54.0	7.2	Pass

Worst case position: Angle: 160 Deg
Height: 100 cm

Harmonics Measurements

Frequency (MHz)	Detector	Antenna Polarity	Reading (dBµV)	Correction Factor (dB)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Test Result
X-Axis								
4880.0	PEAK	Vert	49.9	1.0	50.9	74.0	23.1	Pass
4880.0	AVG	Vert	42.5	1.0	43.5	54.0	10.5	Pass
7320.0	PEAK	Vert	47.1	4.4	51.5	74.0	22.5	Pass
7320.0	AVG	Vert	35.0	4.4	39.4	54.0	14.6	Pass
9760.0	PEAK	Vert	45.4	8.9	54.3	74.0	19.7	Pass
9760.0	AVG	Vert	32.7	8.9	41.6	54.0	12.4	Pass
12200.0	PEAK	Vert	42.6	13.2	55.8	74.0	18.2	Pass
12200.0	AVG	Vert	29.7	13.2	42.9	54.0	11.1	Pass
14640.0	PEAK	Vert	43.2	16.5	59.7	74.0	14.3	Pass
14640.0	AVG	Vert	32.0	16.5	48.5	54.0	5.5	Pass

4.4.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration/ *(Verification)* Date	Calibration/ *(Verification)* Due
EQ_EMC_132	EMI Receiver	Gauss Instruments	TDEMI X40	Nov 29, 2023	Nov 29, 2025
EQ_EMC_48	Loop Antenna 9kHz – 30MHz	Com-Power	AL-130R	Apr 9, 2024	Apr 9, 2026
EQ_EMC_59	BiLog Antenna 30MHz – 1GHz	ETS Lindgren	3142E	Apr 19, 2024	Apr 19, 2026
EQ_EMC_68	6dB Attenuator	Fairview Microwave	SA3NS-06	Apr 19, 2024	Apr 19, 2026
EQ_EMC_60	Horn Antenna 1GHz – 18GHz	ETS Lindgren	3117	April 9, 2024	April 9, 2026
EQ_EMC_56	Horn Antenna 18GHz – 40GHz	A.H Systems	SAS-574	April 8, 2024	April 8, 2026
EQ_EMC_85	RF Cable <1GHz	Times Microwave	LMR-400	*(Apr 10, 2024)*	*(Apr 10, 2025)*
EQ_EMC_75	RF Cable >1GHz	MegaPhase	EMC2	*(Apr 10, 2024)*	*(Apr 10, 2025)*
EQ_EMC_123	Preamplifier 30MHz – 9GHz	RF Bay	EPA-250T	Jan 23, 2024	Jan 23, 2026
EQ_EMC_42	Preamplifier 1GHz – 18GHz	Com-Power	PAM-118A	Jan 17, 2024	Jan 17, 2026
EQ_EMC_43	Preamplifier 18GHz – 40GHz	Com-Power	PAM-840A	Jan 31, 2024	Jan 31, 2026
EQ_EMC_108	2.4 – 2.5GHz Notch Filter	Micro-Tronics	BRM50702	*(Apr 10, 2024)*	*(Apr 10, 2025)*
EQ_EMC_149	Emissions Software	Gauss Instruments	EMI64k v6.31.2	NCR	NCR

4.5 Lower and Upper Band Edges

Test Date:	January 6, 2025	Initials:	AE
Temperature (°C)	21.0		
Relative Humidity (%)	7.5		
Barometric Pressure (kPa)	97.5		

4.5.1 Limits

Any radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the general radiated emission limits specified in FCC 15.209(a).

4.5.2 Test Procedure

Tested according to ANSI C63.10 Section 11.12

The device under test was setup inside a semi-anechoic chamber with remotely controlled turntable and antenna positioner at a 3m test distance. The DUT was placed on top of a 0.8m high non-conductive table above the reference ground plane for frequencies below 1GHz and 1.5m high for frequencies above 1GHz.

For both the lower and upper radiated band edges, the radiated emission was first maximized on the center frequency of the low and high channels with the turntable azimuth rotated 0° to 360° and antenna height varied from 1m to 4m. Once maximized, the start and stop frequency were adjusted to capture that channel's lower and upper band edges inside the restricted bands.

The antenna was positioned to receive emissions in the vertical and horizontal polarizations such that the maximum radiated emission levels were detected.

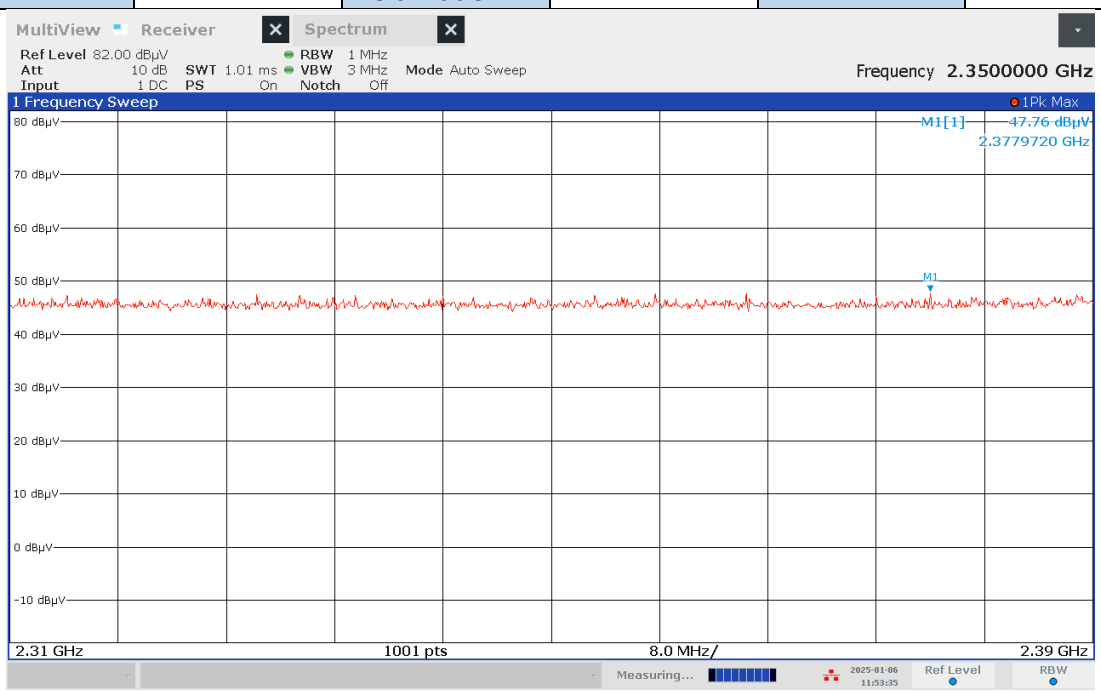
The radiated band edge measurements were made with the DUT in each of the three orthogonal axes.

4.5.3 Test Results

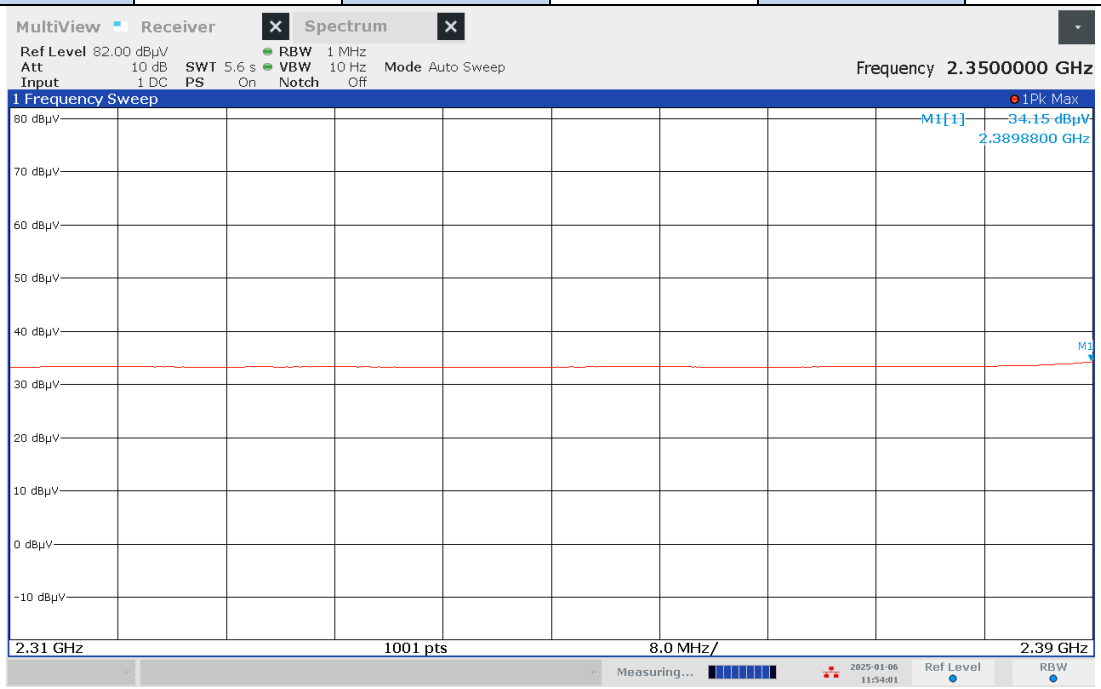
The DUT met the band edge requirements. Peak output power for low, mid and high channels, each in three orthogonal axes, were measured and the Plots Section below contains the maximum radiated emission levels captured on the spectrum analyzer at the band edges for the worst-case position which was in the X-axis. The Final Measurements Section contains the final results with the correction factors added in.

4.5.3.1. Plots

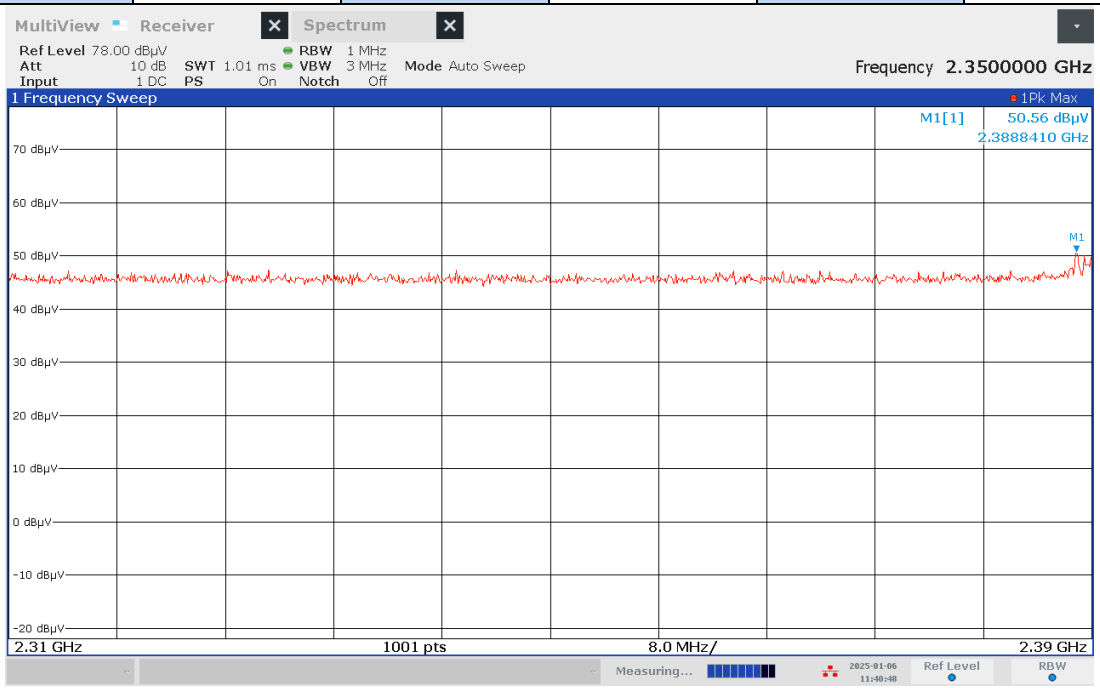
Tx Frequency	Low Channel	**Antenna Polarization**	Horizontal	**Emission**	Peak



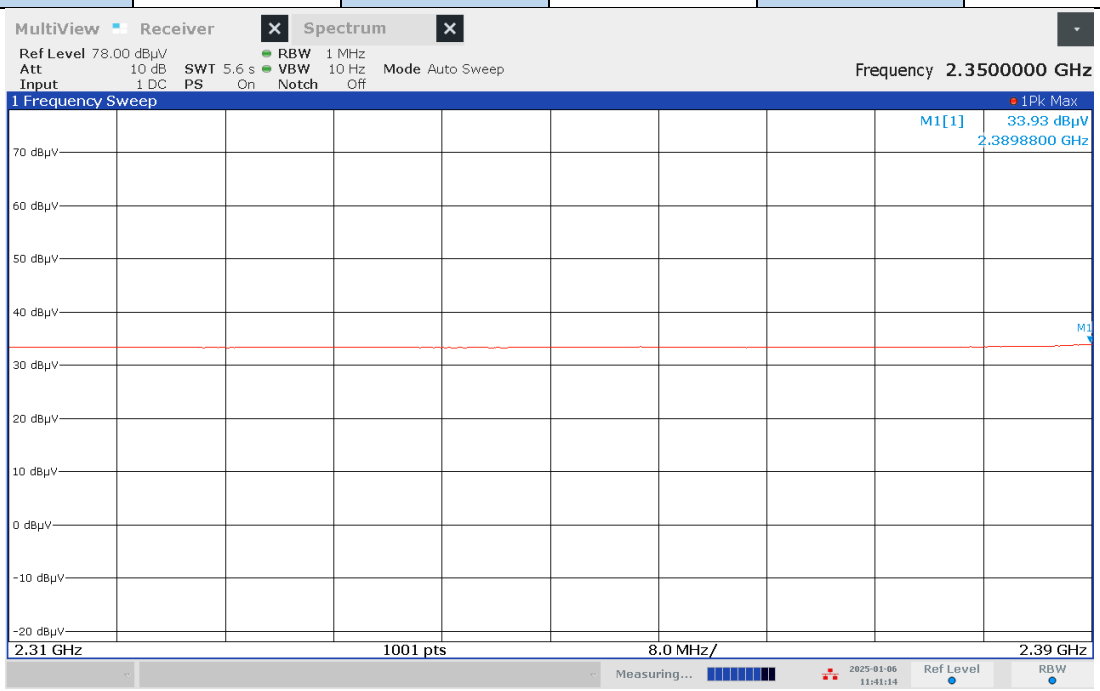
Tx Frequency	Low Channel	**Antenna Polarization**	Horizontal	**Emission**	Average



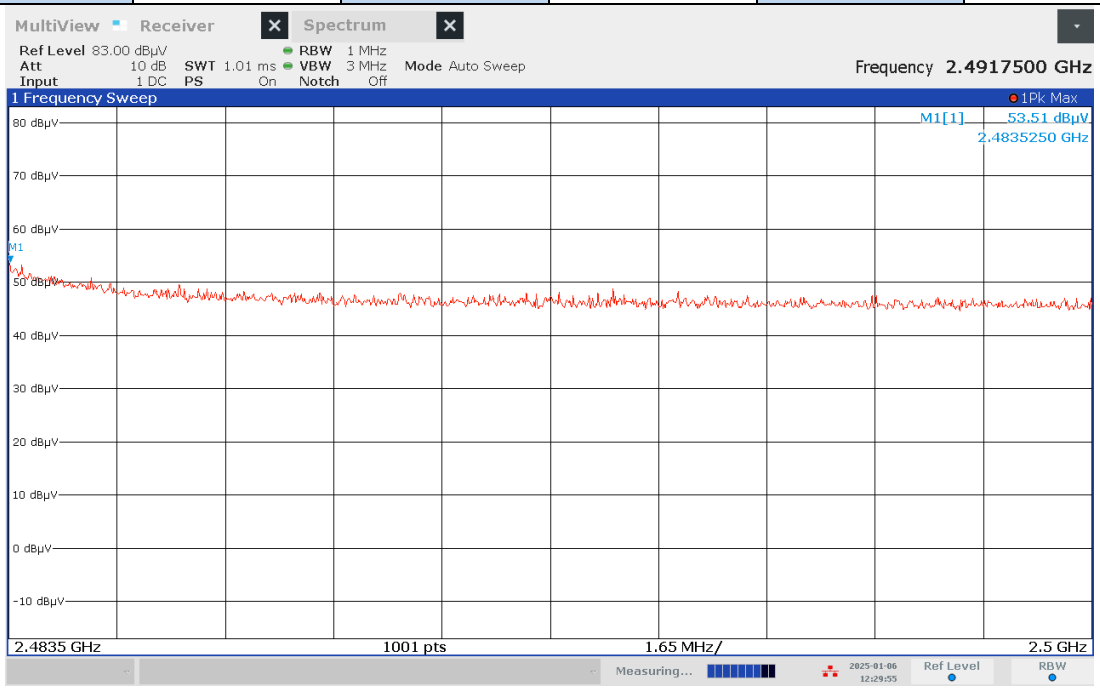
Tx Frequency	Low Channel	**Antenna Polarization**	Vertical	**Emission**	Peak



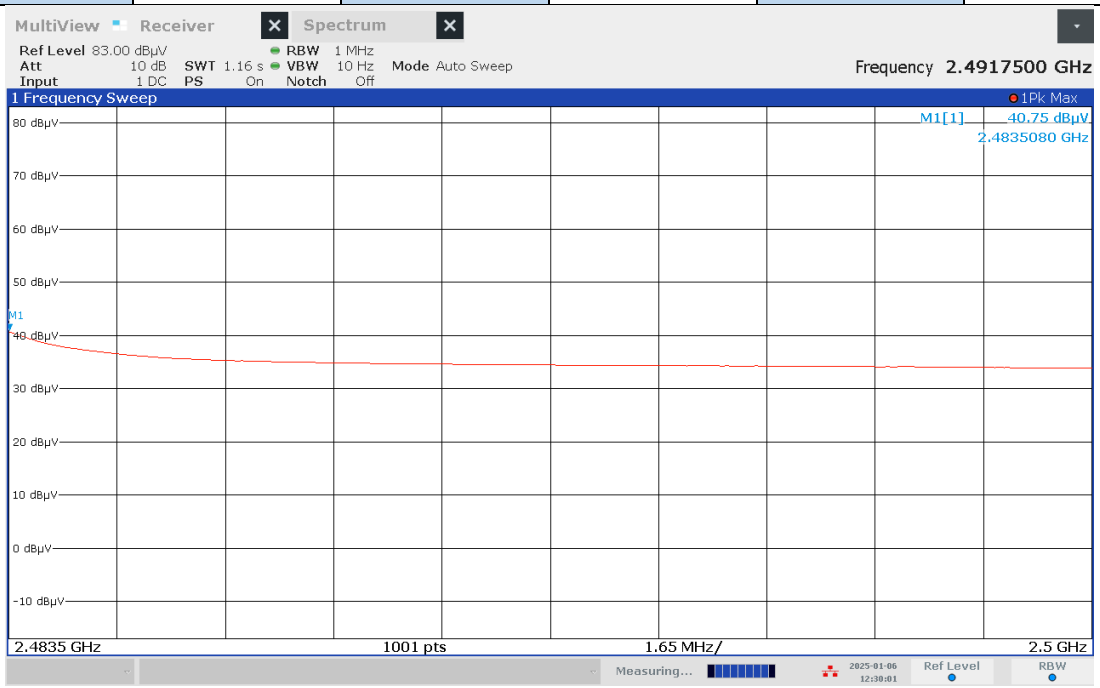
Tx Frequency	Low Channel	**Antenna Polarization**	Vertical	**Emission**	Average



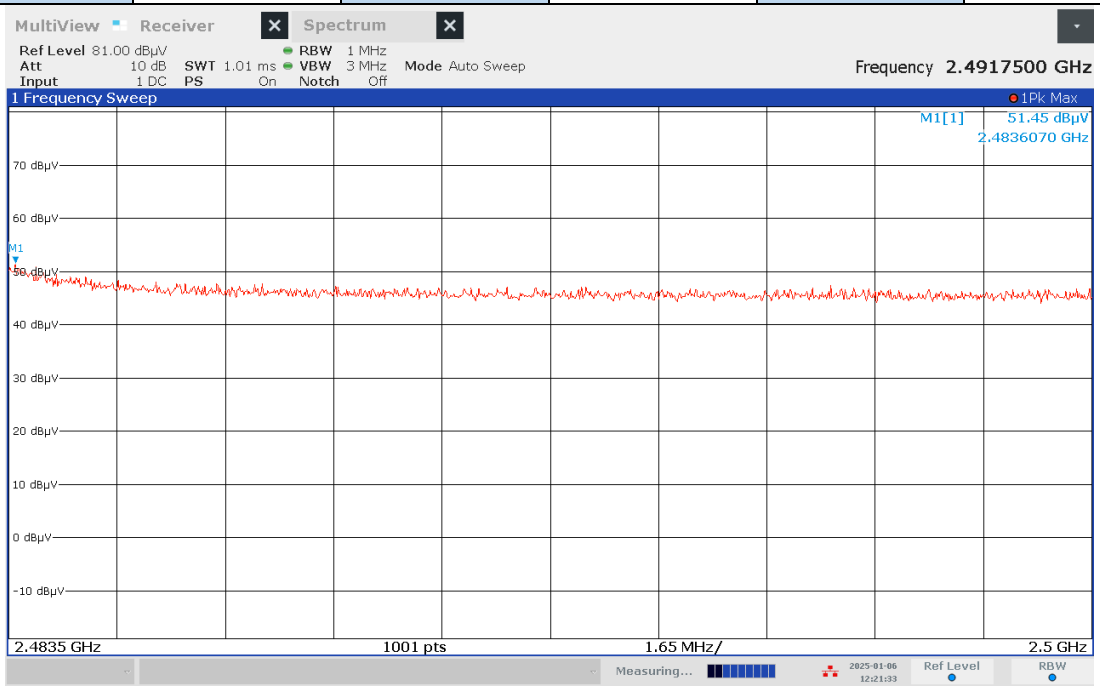
Tx Frequency	High Channel	**Antenna Polarization**	Horizontal	**Emission**	Peak



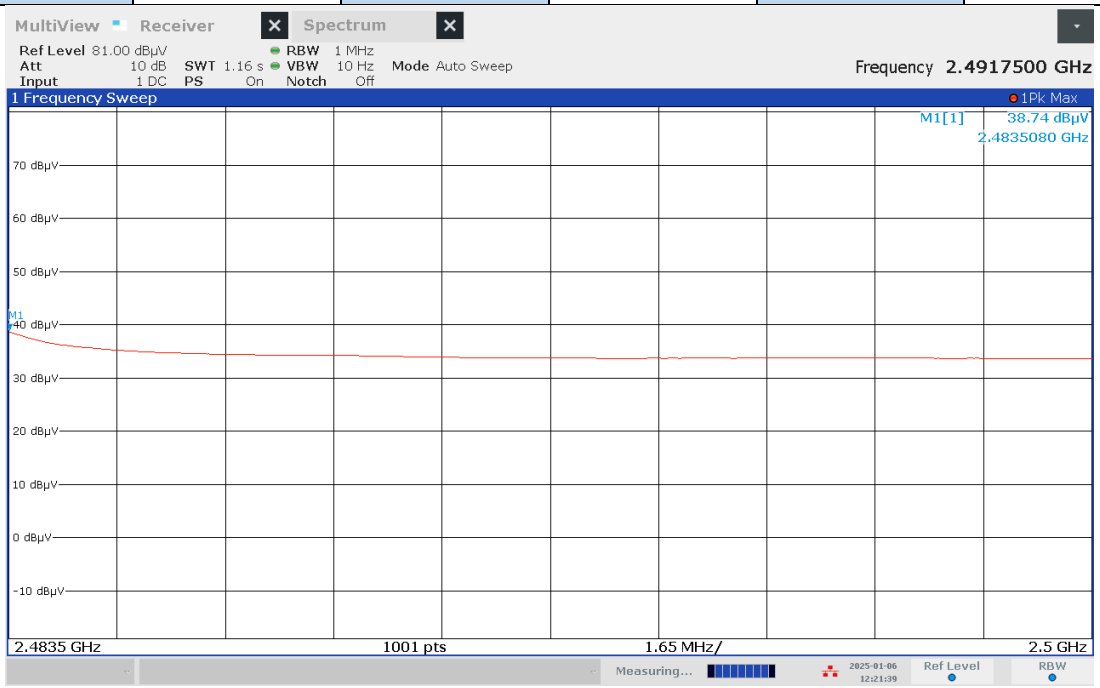
Tx Frequency	High Channel	**Antenna Polarization**	Horizontal	**Emission**	Average



Tx Frequency	High Channel	**Antenna Polarization**	Vertical	**Emission**	Peak



Tx Frequency	High Channel	**Antenna Polarization**	Vertical	**Emission**	Average



4.5.3.2. Final Measurements

Low Channel

Frequency (MHz)	Detector	Antenna Polarity	Reading (dBµV)	Correction Factor (dB)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Test Result
Z-Axis								
2375.6	PEAK	Horz	47.4	-2.8	44.6	74.0	29.4	Pass
2389.7	AVG	Horz	33.5	-2.7	30.8	54.0	23.2	Pass
2389.0	PEAK	Vert	49.4	-2.7	46.7	74.0	27.3	Pass
2390.0	AVG	Vert	33.6	-2.7	30.9	54.0	23.1	Pass
2497.2	PEAK	Horz	48.3	-2.5	45.8	74.0	28.2	Pass
2483.7	AVG	Horz	33.5	-2.4	31.0	54.0	23.0	Pass
2487.7	PEAK	Vert	47.4	-2.5	45.0	74.0	29.0	Pass
2484.4	AVG	Vert	33.5	-2.4	31.1	54.0	22.9	Pass
X-Axis								
2378.0	PEAK	Horz	47.8	-2.8	45.0	74.0	29.0	Pass
2389.9	AVG	Horz	34.2	-2.7	31.4	54.0	22.6	Pass
2388.8	PEAK	Vert	50.6	-2.7	47.8	74.0	26.2	Pass
2389.9	AVG	Vert	33.9	-2.7	31.2	54.0	22.8	Pass
2499.5	PEAK	Horz	47.2	-2.5	44.6	74.0	29.4	Pass
2497.3	AVG	Horz	33.5	-2.5	31.0	54.0	23.0	Pass
2492.7	PEAK	Vert	47.8	-2.5	45.3	74.0	28.7	Pass
2484.1	AVG	Vert	33.6	-2.4	31.1	54.0	22.9	Pass
Y-Axis								
2333.5	PEAK	Horz	47.3	-2.9	44.3	74.0	29.7	Pass
2389.9	AVG	Horz	33.5	-2.7	30.8	54.0	23.2	Pass
2326.3	PEAK	Vert	47.3	-2.9	44.4	74.0	29.6	Pass
2389.9	AVG	Vert	33.7	-2.7	31.0	54.0	23.0	Pass
2489.2	PEAK	Horz	47.5	-2.5	45.1	74.0	28.9	Pass
2484.7	AVG	Horz	33.5	-2.4	31.0	54.0	23.0	Pass
2484.0	PEAK	Vert	46.8	-2.4	44.4	74.0	29.6	Pass
2483.7	AVG	Vert	33.5	-2.4	31.1	54.0	22.9	Pass

High Channel

Frequency (MHz)	Detector	Antenna Polarity	Reading (dBµV)	Correction Factor (dB)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Test Result
Z-Axis								
2370.6	PEAK	Horz	47.6	-2.8	44.8	74.0	29.2	Pass
2333.3	AVG	Horz	33.2	-2.9	30.3	54.0	23.7	Pass
2369.6	PEAK	Vert	47.7	-2.8	44.9	74.0	29.1	Pass
2356.0	AVG	Vert	33.3	-2.9	30.4	54.0	23.6	Pass
2483.7	PEAK	Horz	51.5	-2.4	49.1	74.0	24.9	Pass
2483.5	AVG	Horz	39.7	-2.4	37.2	54.0	16.8	Pass
2483.5	PEAK	Vert	49.7	-2.4	47.2	74.0	26.8	Pass
2483.5	AVG	Vert	36.9	-2.4	34.5	54.0	19.5	Pass
X-Axis								
2380.7	PEAK	Horz	47.4	-2.7	44.6	74.0	29.4	Pass
2358.1	AVG	Horz	33.2	-2.9	30.3	54.0	23.7	Pass
2389.1	PEAK	Vert	48.0	-2.7	45.3	74.0	28.7	Pass
2357.0	AVG	Vert	33.3	-2.9	30.3	54.0	23.7	Pass
2483.5	PEAK	Horz	53.5	-2.4	51.1	74.0	22.9	Pass
2483.5	AVG	Horz	40.8	-2.4	38.3	54.0	15.7	Pass
2483.6	PEAK	Vert	51.5	-2.4	49.0	74.0	25.0	Pass
2483.5	AVG	Vert	38.7	-2.4	36.3	54.0	17.7	Pass
Y-Axis								
2332.2	PEAK	Horz	47.6	-2.9	44.7	74.0	29.3	Pass
2357.2	AVG	Horz	33.3	-2.9	30.4	54.0	23.6	Pass
2319.6	PEAK	Vert	47.5	-2.9	44.6	74.0	29.4	Pass
2357.2	AVG	Vert	33.2	-2.9	30.3	54.0	23.7	Pass
2484.4	PEAK	Horz	50.9	-2.4	48.5	74.0	25.5	Pass
2483.5	AVG	Horz	38.6	-2.4	36.2	54.0	17.8	Pass
2483.5	PEAK	Vert	51.9	-2.4	49.5	74.0	24.5	Pass
2483.5	AVG	Vert	40.0	-2.4	37.6	54.0	16.4	Pass

4.5.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration/ *(Verification)* Date	Calibration/ *(Verification)* Due
EQ_EMC_58	EMI Receiver	Rohde & Schwarz	ESW 44	Mar 1, 2024	Mar 1, 2026
EQ_EMC_60	Horn Antenna 1GHz – 18GHz	ETS Lindgren	3117	April 9, 2024	April 9, 2026
EQ_EMC_42	Preamplifier 1GHz – 18GHz	Com-Power	PAM-118A	Jan 17, 2024	Jan 17, 2026
EQ_EMC_75	RF Cable >1GHz	MegaPhase	EMC2	*(Apr 10, 2024)*	*(Apr 10, 2025)*

4.6 Power Spectral Density

Test Date:	January 7, 2025	Initials:	AE
Temperature (°C)	20.2		
Relative Humidity (%)	8.3		
Barometric Pressure (kPa)	98.1		

4.6.1 Limits

For digitally modulated systems, the power spectral density (PSD) 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.

4.6.2 Test Procedure

Tested according to ANSI C63.10 Section 11.10

a) Set RBW = 3kHz and VBW ≥ [3 × RBW].
b) Set Span to 1.5 times the DTS Bandwidth.
c) Detector = Peak and Trace Mode = Max Hold.
d) Sweep = Auto Couple.
e) Use the peak marker function to determine the maximum level.

The RF output of the DUT was connected to the spectrum analyzer with sufficient attenuation in front and the total path loss was set as reference offset to correct the final reading.

4.6.3 Test Results

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Test Result
Low	2402	-6.21	8	Pass
Mid	2440	-6.25	8	Pass
High	2480	-5.81	8	Pass

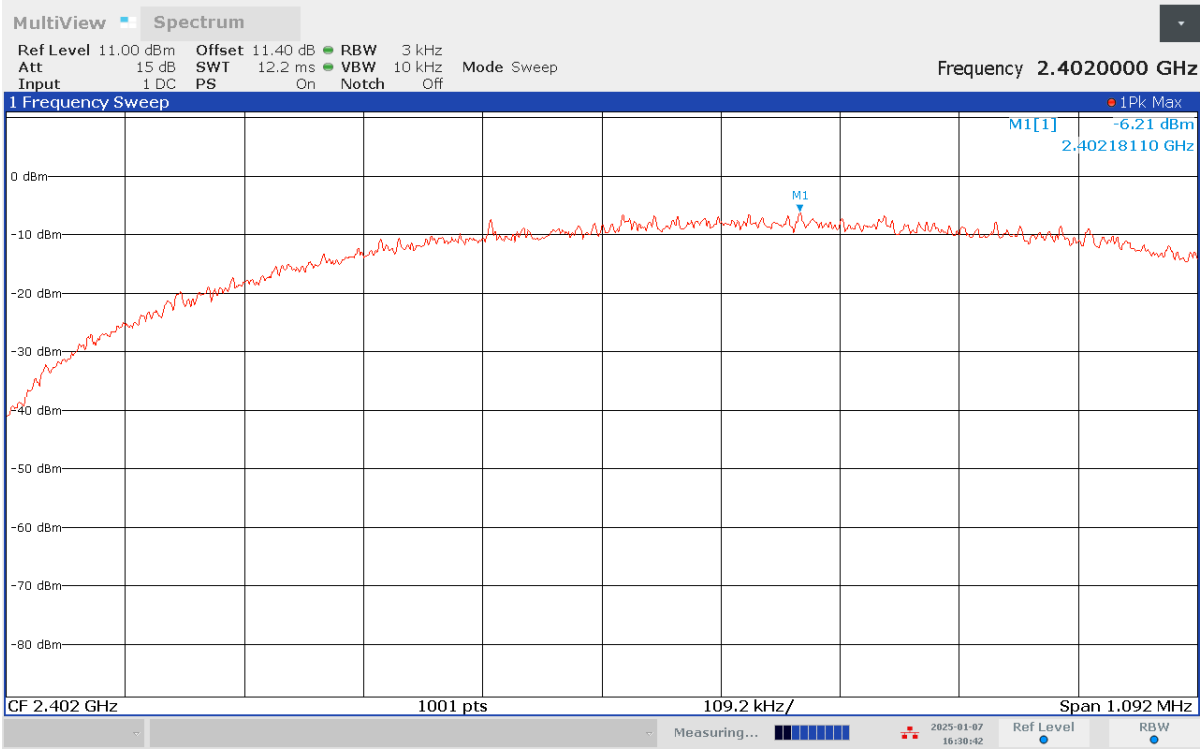


Figure 18 – PSD - Low Channel

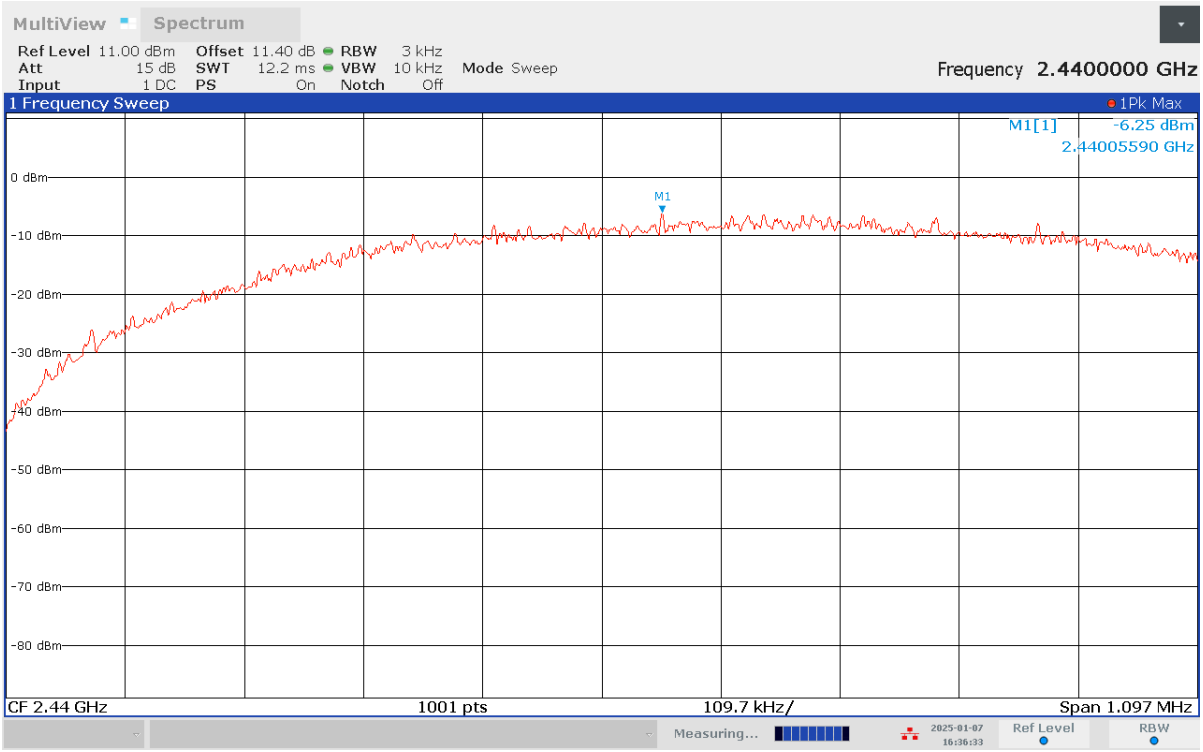


Figure 19 – PSD - Mid Channel

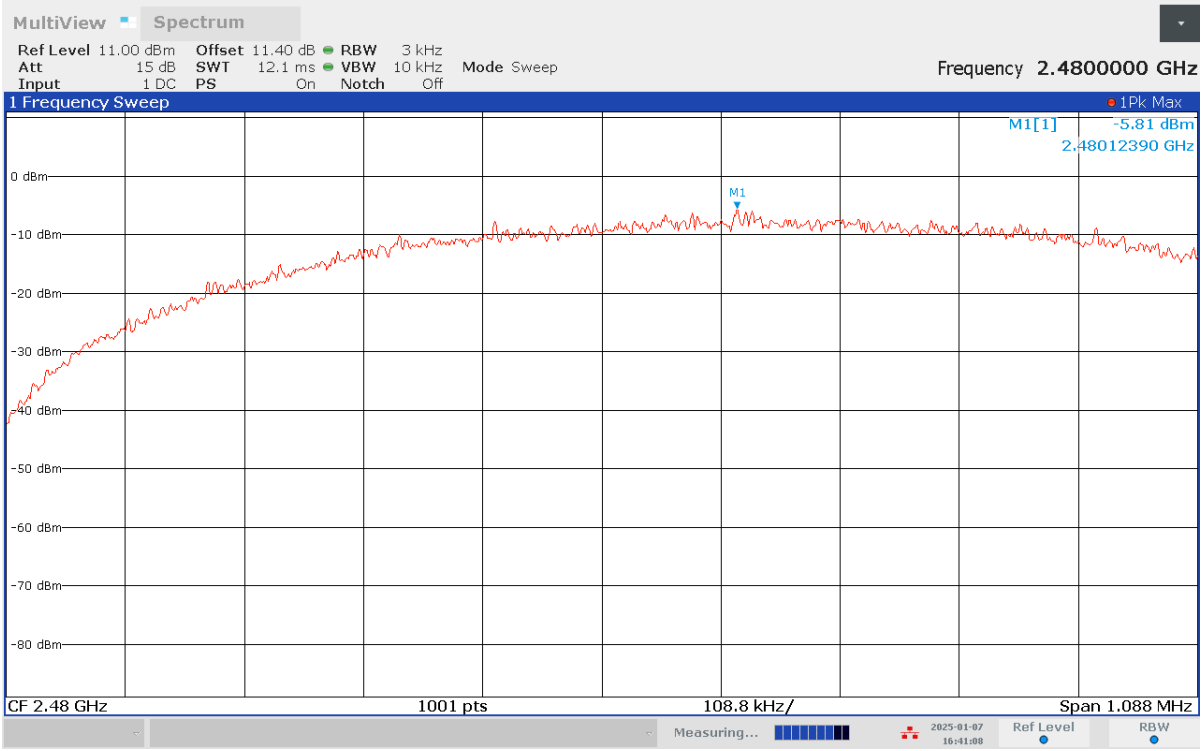


Figure 20 – PSD - High Channel

4.6.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration/ *(Verification)* Date	Calibration/ *(Verification)* Due
EQ_EMC_58	EMI Receiver	Rohde & Schwarz	ESW 44	Mar 1, 2024	Mar 1, 2026
EQ_EMC_115	10dB Attenuator	Fairview Microwave	SA18E-10	*(Apr 10, 2024)*	*(Apr 10, 2025)*

4.7 Power Line Conducted Emissions

Test Date:	January 10, 2025	Initials:	AE
Temperature (°C)	20.6		
Relative Humidity (%)	5.6		
Barometric Pressure (kPa)	98.6		

The conducted emission test is to measure radio-frequency (RF) signals and noise emitted from electrical and electronic devices in the frequency range of 150kHz to 30MHz.

4.7.1 Limits

Base Standard(s): FCC Subpart B 15.207 and RSS-GEN Section 8.8.

Frequency Range (MHz)	Coupling Device	Detector Type / Bandwidth	Limit (dBµV)
0.15 to 0.50	LISN	Quasi-Peak / 9kHz	66 to 56*
0.50 to 5			56
5 to 30			60
0.15 to 0.50	LISN	Average / 9kHz	56 to 46*
0.50 to 5			46
5 to 30			50

* Decreases linearly with the logarithm of the frequency

As per ANSI C63.4 Section 4.2, if the Peak or Quasi-Peak detector measurements do not exceed the Average limits, then the DUT is considered to have passed the requirements.

4.7.2 Test Procedure

Tested according to ANSI C63.10 Section 6.2.

Conducted emissions were measured on the DUT's power port via an Artificial Mains Network (AMN), also known as Line Impedance Stabilization Network (LISN), and maximum conducted emissions are checked on all the DUT's AC lines in the frequency range of 150kHz to 30MHz. The LISNs provide 50Ω/50µH of coupling impedance for the measuring receiver.

To determine the emission characteristics of the DUT, the conducted emission scans were made using the applicable detector and the results were recorded in graphical form.

For each suspected emission, final measurements of the DUT conducted emissions were made with the Quasi-Peak or Average detector as defined in the limits table above.

For Table-Top Equipment, the device under test is configured on a 0.8m high non-conductive table above the reference ground plane and 0.4m away from the vertical reference ground plane.

4.7.3 Setup Diagram

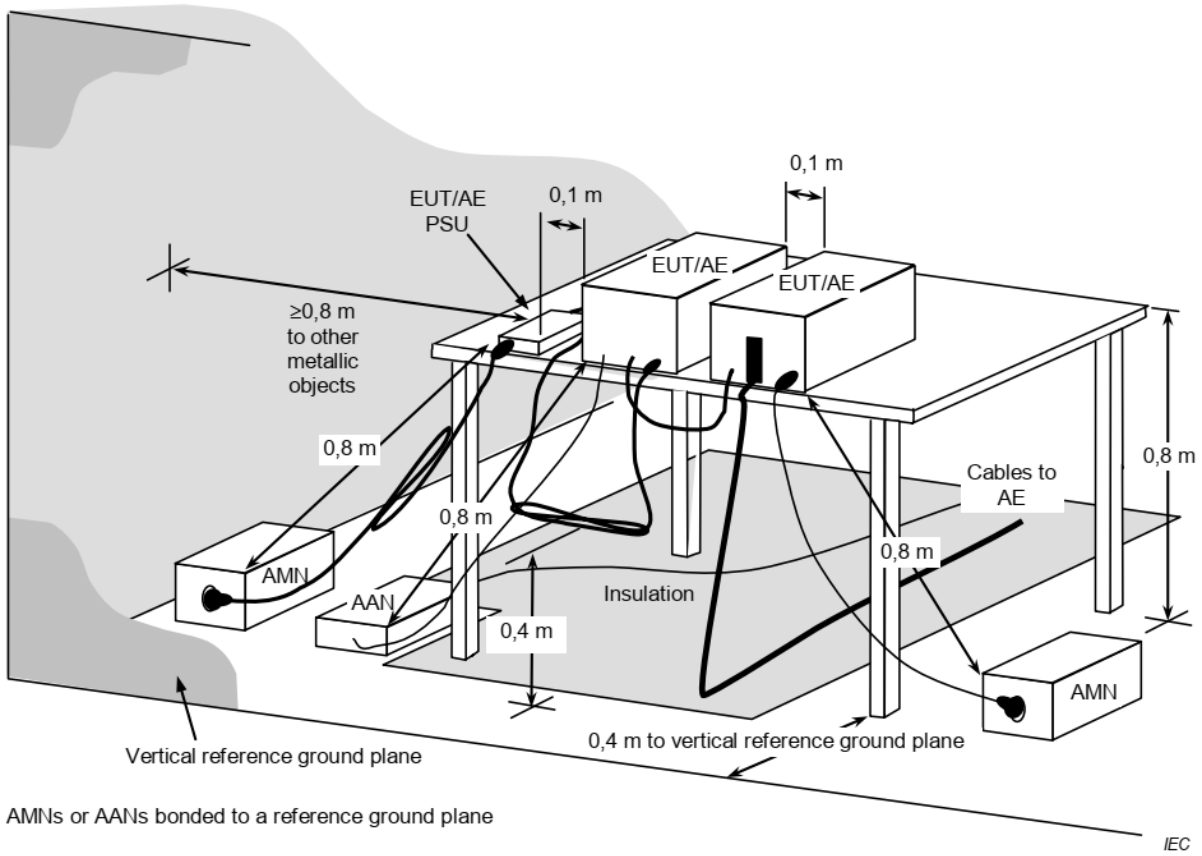
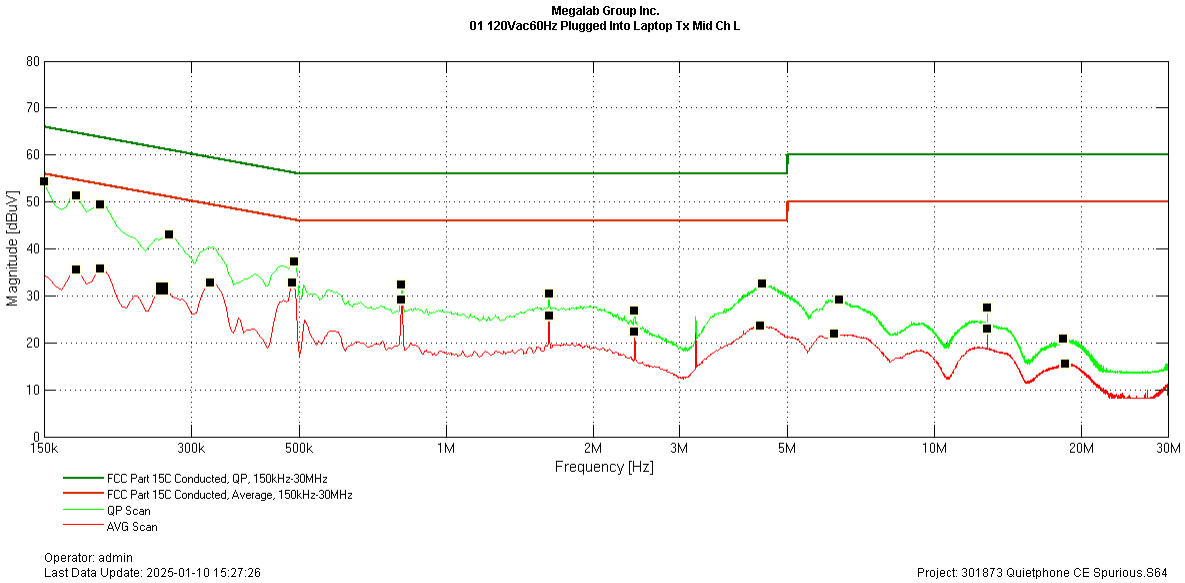


Figure 21 – Sample Measurement Arrangement for DUT

4.7.4 Test Results

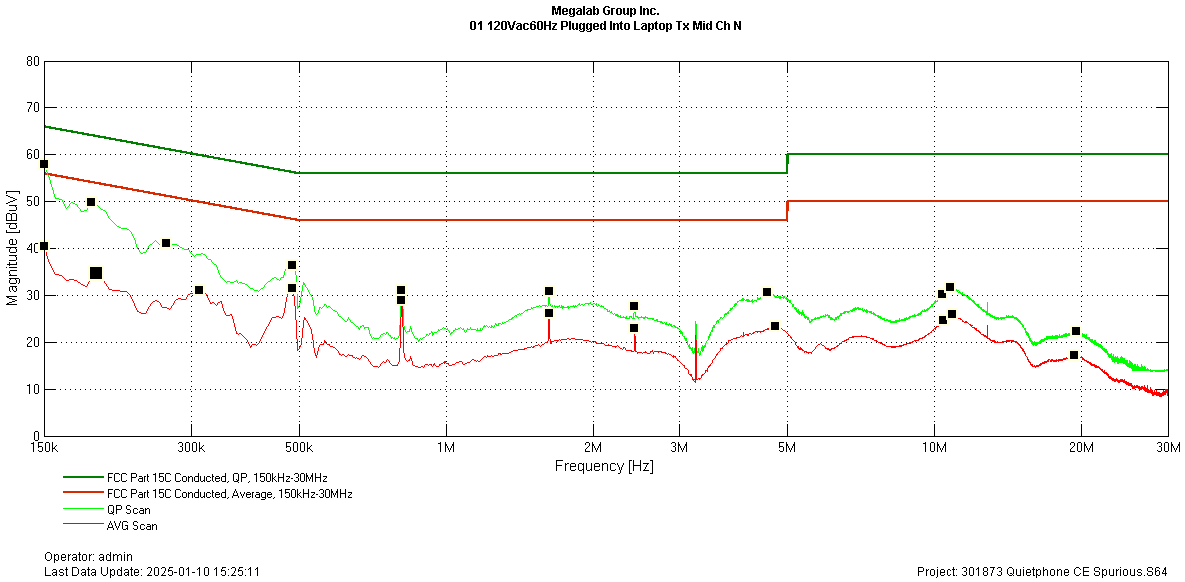
Power line conducted emissions was evaluated on the laptop into which the DUT was connected via USB for charging and was also continuously transmitting on Middle Channel.

Range:	150kHz to 30MHz	**DUT**	QuietPhone12B
Test Voltage:	120Vac 60Hz	**Phase**	Line



Line										
Frequency (MHz)	**QP Reading (dBµV)**	**AVG Reading (dBµV)**	**Corr Factor (dB)**	**QP Emission Level (dBµV)**	**AVG Emission Level (dBµV)**	**QP Limit (dBµV)**	**QP Margin (dB)**	**AVG Limit (dBµV)**	**AVG Margin (dB)**	**Test Result**
0.150	44.4	--	10.0	54.4	--	66.0	11.7	--	--	Pass
0.175	41.3	25.5	10.0	51.2	35.5	64.7	13.5	54.7	19.2	Pass
0.196	39.3	25.8	10.0	49.3	35.7	63.8	14.5	53.8	18.1	Pass
0.271	33.0	--	9.9	42.9	--	61.1	18.2	--	--	Pass
0.488	27.3	--	9.9	37.3	--	56.2	19.0	--	--	Pass
4.443	22.4	--	10.0	32.5	--	56.0	23.6	--	--	Pass
0.809	22.4	19.1	9.9	32.4	29.0	56.0	23.6	46.0	17.0	Pass
0.329	--	22.8	9.9	--	32.7	--	--	49.5	16.8	Pass
2.432	16.9	12.2	10.0	26.8	22.2	56.0	29.2	46.0	23.8	Pass
0.484	--	22.9	9.9	--	32.8	--	--	46.3	13.4	Pass

Range:	150kHz to 30MHz	**DUT**	QuietPhone12B
Test Voltage:	120Vac 60Hz	**Phase**	Neutral



Neutral										
Frequency (MHz)	**QP Reading (dBµV)**	**AVG Reading (dBµV)**	**Corr Factor (dB)**	**QP Emission Level (dBµV)**	**AVG Emission Level (dBµV)**	**QP Limit (dBµV)**	**QP Margin (dB)**	**AVG Limit (dBµV)**	**AVG Margin (dB)**	**Test Result**
0.150	47.9	30.5	10.0	57.9	40.4	66.0	8.1	56.0	15.6	Pass
0.188	39.8	--	10.0	49.8	--	64.1	14.3	--	--	Pass
0.484	26.4	21.6	9.9	36.4	31.5	56.3	19.9	46.3	14.8	Pass
0.267	31.2	--	9.9	41.1	--	61.2	20.1	--	--	Pass
0.809	21.0	18.9	9.9	30.9	28.9	56.0	25.1	46.0	17.1	Pass
1.623	20.8	16.1	10.0	30.7	26.0	56.0	25.3	46.0	20.0	Pass
0.313	--	21.2	9.9	--	31.1	--	--	49.9	18.8	Pass
0.192	--	24.7	10.0	--	34.6	--	--	54.0	19.3	Pass

4.7.5 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration/ *(Verification)* Date	Calibration/ *(Verification)* Due
EQ_EMC_132	EMI Receiver	Gauss Instruments	TDEMI X40	Nov 29, 2023	Nov 29, 2025
EQ_EMC_61	LISN	FCC	50/250-16-2-01	Jan 16, 2024	Jan 16, 2026
EQ_EMC_44	Transient Limiter (10dB)	Com-Power	LIT-930A	*(Apr 10, 2024)*	*(Apr 10, 2025)*
EQ_EMC_84	RF Cable	Times Microwave	LMR-400	*(Apr 10, 2024)*	*(Apr 10, 2025)*
EQ_EMC_149	Emissions Software	Gauss Instruments	EMI64k v6.31.2	NCR	NCR

---------- End of Test Report ----------