TEST REPORT

Report Number: 106028948MPK-001
Project Number: G106028948
Original Issue Date: December 26, 2024
Revised Date: February 04, 2025

Testing performed on
Vibration Pack
Model Number: MSP-09-2007

to

FCC Part 15 Subpart C (15.247)
ISED RSS-247 Issue 3

For

Bone Health Technologies Inc.

Test Performed by:	**Test Authorized by:**
Intertek	Bone Health Technologies Inc.
1365 Adams Court	101 Mississippi Street,
Menlo Park, CA 94025 USA	San Francisco, CA 94107 USA

Prepared by: Kenneth Tutor **Date:** December 26, 2024

Reviewed by: Minh Ly **Date:** December 26, 2024

Report No. 106028948MPK-001	
Equipment Under Test:	Vibration Pack
Model Number:	MSP-09-2007
Applicant:	Bone Health Technologies Inc.
Contact:	Derek Hillstrom
Address:	101 Mississippi Street, San Francisco, CA 94107
Country:	USA
Tel. Number:	+1 (415) 926-8616
Email:	dhillstrom@bonehealthtech.com
Applicable Regulation:	FCC Part 15 Subpart C (15.247) ISED RSS-247 Issue 3
Date of Test:	December 09 - 16, 2024

We attest to the accuracy of this report:

Kenneth Tutor
EMC Engineer

Minh LY
EMC Team Lead

TABLE OF CONTENTS

1.0 Summary of Tests

Test	Reference FCC	Reference Industry Canada	Result
RF Output Power	15.247(b)(3)	RSS-247, 5.4.d)	Complies
6 dB Bandwidth	15.247(a)(2)	RSS-247, 5.2.a)	Complies
Power Density	15.247(e)	RSS-247, 5.2.b)	Complies
Out of Band Antenna Conducted Emission	15.247(d)	RSS-247, 5.5	Complies
Transmitter Radiated Emissions	15.247(d), 15.209, 15.205	RSS-247, 5.5	Complies
AC Line Conducted Emission	15.207	RSS-GEN	Not Applicable[1]
Antenna Requirement	15.203	RSS-GEN	Complies (Internal Antenna)

[1] EUT is battery powered and the radio is disabled during charging mode.

EUT receive date: December 09, 2024

EUT receive condition: The pre-production version of the EUT was received in good condition with no apparent damage. As declared by the Applicant, it is identical to the production units.

Test start date: December 09, 2024

Test completion date: December 16, 2024

The test results in this report pertain only to the item tested.

2.0 General Information

2.1 Product Description

Bone Health Technologies Inc. supplied the following description of the EUT:

The EUT is the Vibration Pack used in the Osteoboost Vibration Belt.

For more information, see the user's manual provided by the manufacturer.

This test report covers only the 2.4GHz BLE radio.

Information about the BLE radio is presented below:

Applicant	Bone Health Technologies Inc.
Model No.	MSP-09-2007
Type of transmission	Digital Transmission System (DTS)
Rated RF Output	0.46dBm
Antenna(s) & Gain	Internal Antenna, Gain: +7.29dBi
Frequency Range	2402 – 2480 MHz
Type of modulation/data rate	GFSK/1Mbit/s
Number of Channel(s)	40
Applicant Name & Address	101 Mississippi Street, San Francisco, CA 94107 USA

*: Antenna gain was provided by Bone Health Technologies, Inc. Intertek takes no responsibility for the accuracy of the antenna gain.
*: This test report covers the BLE transmitter only.

2.2 Related Submittal(s) Grants

None.

2.3 Test Facility

The test site used to collect the radiated data is site 1 (3-m semi-anechoic chamber). This test facility and site measurement data have been fully placed on file with the FCC, IC and A2LA accredited.

2.4 Test Methodology

Antenna conducted measurements were performed according to the FCC documents "Guidance for Performing Compliance Measurement on Digital Transmission Systems (DTS) Operating under §15.247" (KDB 558074 D01 DTS Meas Guidance v05r02), and RSS-247 Issue 3, RSS-GEN Issue 5.

Radiated emissions and AC mains conducted emissions measurements were performed according to the procedures in ANSI C63.10: 2013. Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "Data Sheet" of this report.

2.5 Measurement Uncertainty

Compliance with the limits was based on the results of the measurements and doesn't take into account the measurement uncertainty.

Estimated Measurement Uncertainty

Measurement	Expanded Uncertainty (k=2)		
	0.15 MHz – 1 GHz	1 GHz – 2.5 GHz	> 2.5 GHz
RF Power and Power Density – antenna conducted	-	0.7 dB	-
Unwanted emissions – antenna conducted	1.1 dB	1.3 dB	1.9 dB
Bandwidth – antenna conducted	-	30 Hz	-

Measurement	Expanded Uncertainty (k=2)			
	0.15 MHz – 30MHz	30 – 200 MHz	200 MHz – 1 GHz	1 GHz – 18 GHz
Radiated emissions	-	4.7	4.6	5.1 dB
AC mains conducted emissions	2.1 dB	-	-	-

3.0 System Test Configuration

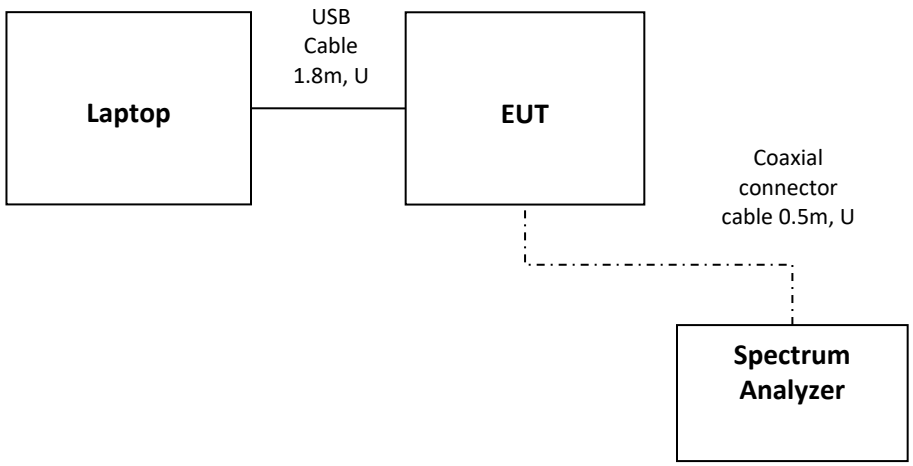
3.1 Support Equipment

Support Equipment		
Description	**Manufacturer**	**Model**
Laptop	Dell	Latitude 5420

3.2 Block Diagram of Test Setup

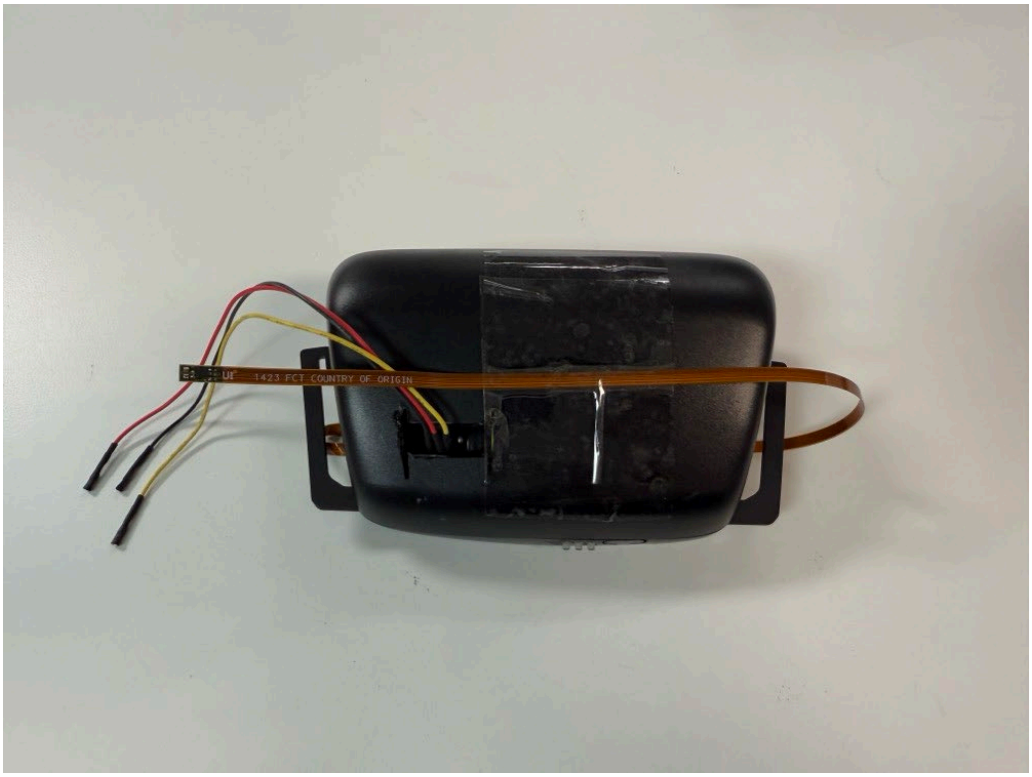
Equipment Under Test			
Description	**Manufacturer**	**Model**	**Serial Number/ID**
Vibration Pack	Bone Health Technologies Inc.	MSP-09-2007	MPK2412161344-001

Antenna was removed and co-axial connector was installed for Conducted Measurements.



S = Shielded **U** = Unshielded	**F** = With Ferrite **m** = Length in Meters

EUT Photos



3.3 Justification

For radiated emission measurements the EUT is placed on a non-conductive table. The EUT was configured to continuously transmit. Different orientations of the EUT were tested and only the worse-case emissions were reported. Per manufacturer, the BLE radio is disabled during charging mode.

The EUT was tested in 1 configuration:

A/ Normal mode: tested in battery mode

3.4 Software Exercise Program

The EUT exercise program used during radiated testing was provided by Bone Health Technologies Inc.

3.5 Mode of Operation during Test

During the transmitter tests, the transmitter was setup to transmit maximum communication and RF power levels. All testing was performed using radiated test method.

EUT was placed into transmit mode at the lowest (2402MHz) middle (2440MHz), and highest (2480MHz) channels.

3.6 Modifications Required for Compliance

No modifications were made by the manufacturer or Intertek to the EUT in order to bring the EUT into compliance.

3.7 Additions, Deviations and Exclusions from Standards

No additions, deviations or exclusions from the standard were made.

4.0 Measurement Results

4.1 6-dB Bandwidth and 99% Occupied Bandwidth
FCC Rule: 15.247(a)(2); RSS-247, 5.2.a) and RSS-GEN;

4.1.1 Requirement

The minimum 6-dB bandwidth shall be at least 500 kHz

4.1.2 Procedure

Radiated emission measurements were performed for Bandwidth measurements.

For FCC 6dB Channel Bandwidth the Procedure described in the FCC Publication KDB 558074 D01 Meas Guidance v05r02 was used to determine the DTS occupied bandwidth. Section 11.8.1 Option 1 of ANSI 63.10 was used.

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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 6 dB relative to the maximum level measured in the fundamental emission.

For 99% power bandwidth measurement, the bandwidth was determined by using the built-in 99% occupied bandwidth function of the spectrum analyzer. The resolution bandwidth is set to 1% of the selected span as is without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.

If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst-case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Bandwidth measurements are taken at 3 meters for frequencies 2402MHz, 2440MHz, and 2480MHz.

Field Strength Calculation

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

FS = RA + AF + CF – AG; if measurement is performed at a distance other than specified in the rule, a Distance Correction Factor (DCF) shall be added.

Where FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV); AF = Antenna Factor in dB(1/m)
CF = Cable Attenuation Factor in dB; AG = Amplifier Gain in dB

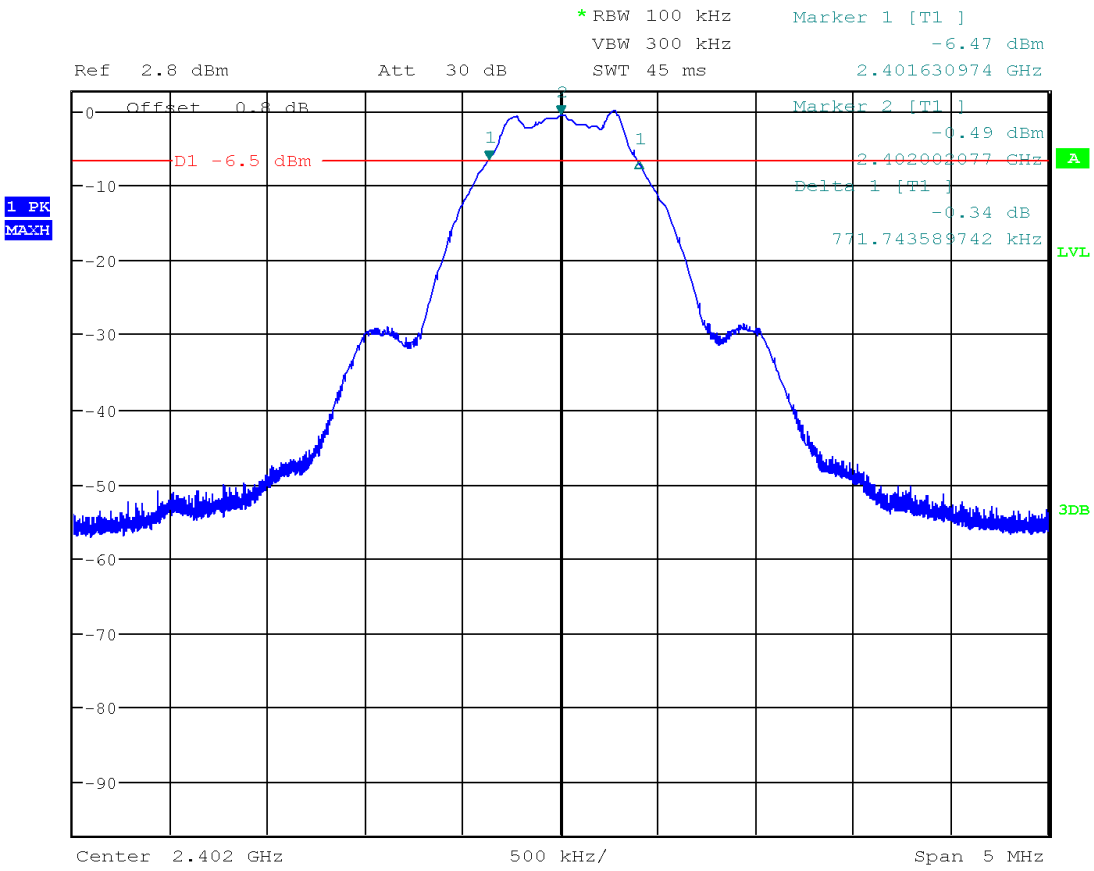
Assume a receiver reading of 52.0 dB(μV) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μV/m). This value in dB(μV/m) was converted to its corresponding level in μV/m.
RA = 52.0 dB(μV)
AF = 7.4 dB(1/m)
CF = 1.6 dB
AG = 29.0 dB
FS = 52.0+7.4+1.6-29.0 = 32 dB(μV/m).
Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m.

4.1.3 Test Result

Frequency (MHz)	6-dB bandwidth FCC 15.247 & RSS-GEN, kHz	Occupied bandwidth, RSS-GEN, MHz	Plot
2402	771.744	--	1.1
	--	1.0644	1.4
2440	786.141	--	1.2
	--	1.0698	1.5
2480	789.282	--	1.3
	--	1.0737	1.6

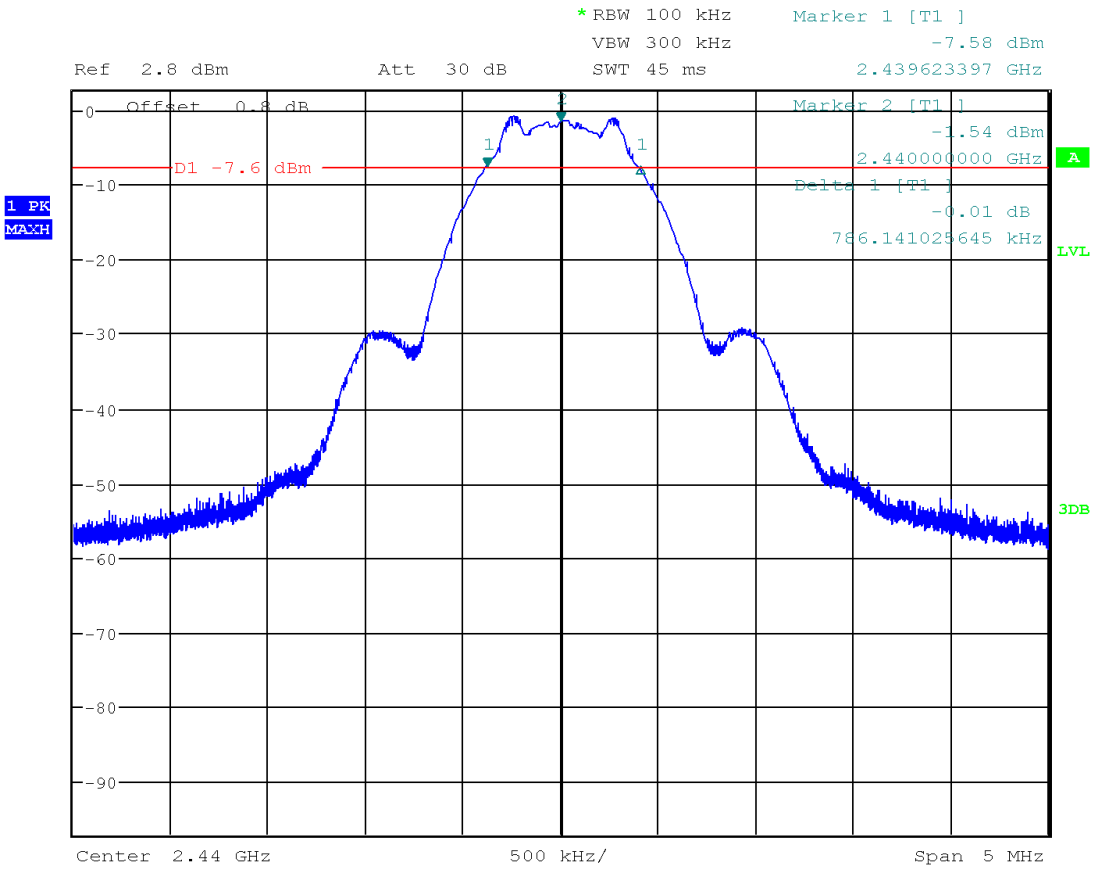
Tested By	Test Date	Results
Kenneth Tutor	December 09, 2024	Complies

Plot 1. 1



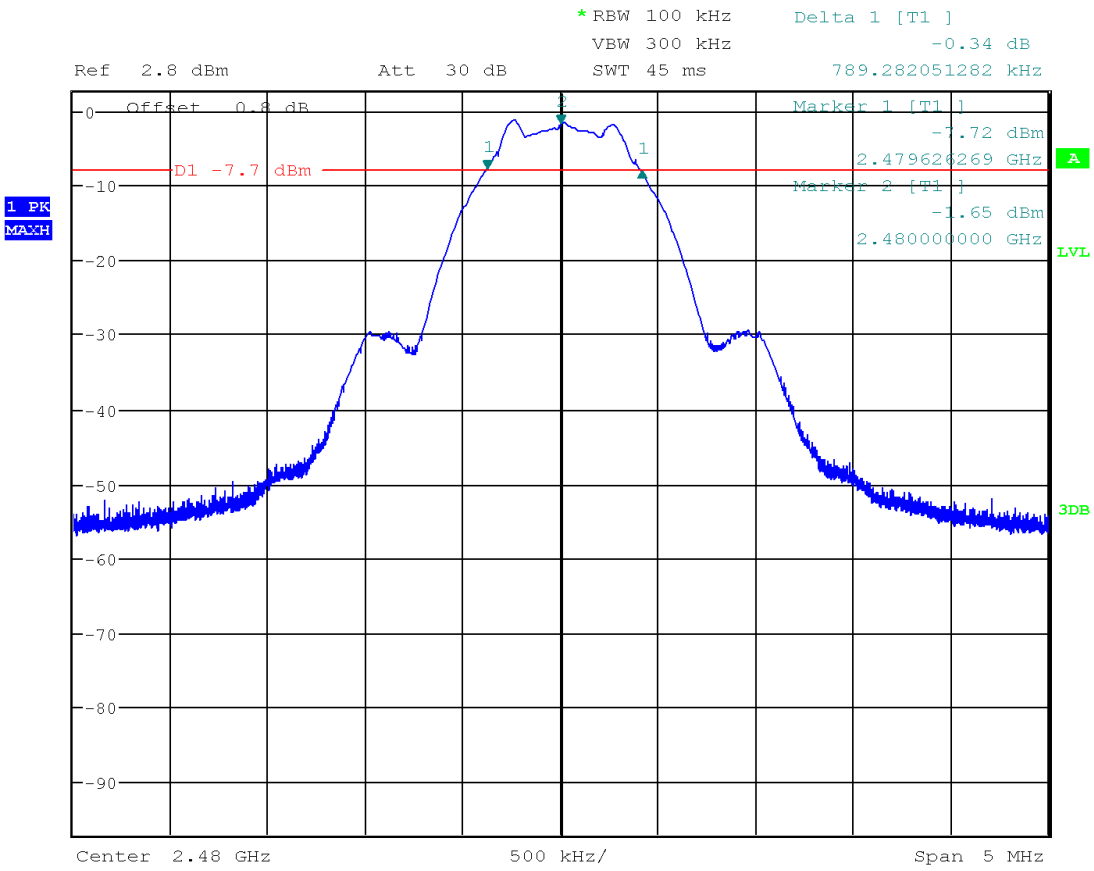
Date: 9.DEC.2024 21:43:31

Plot 1. 2



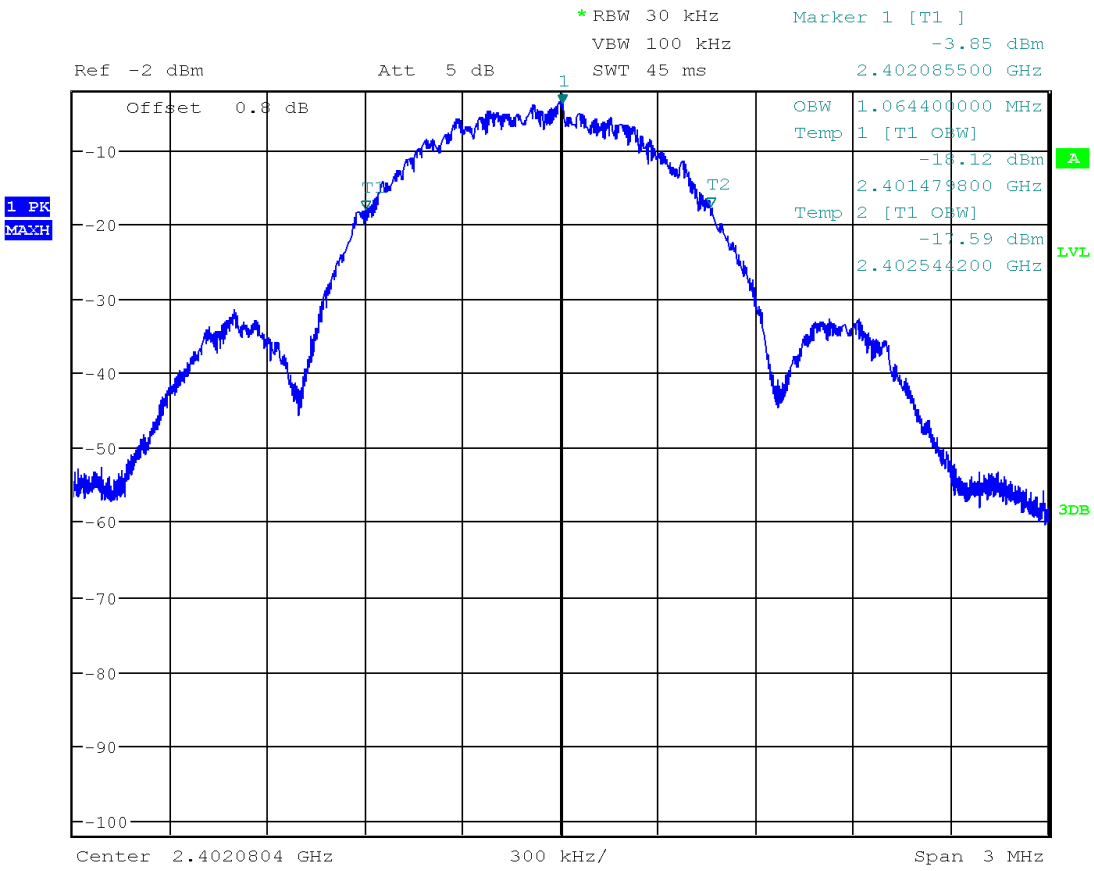
Date: 9.DEC.2024 22:25:40

Plot 1. 3



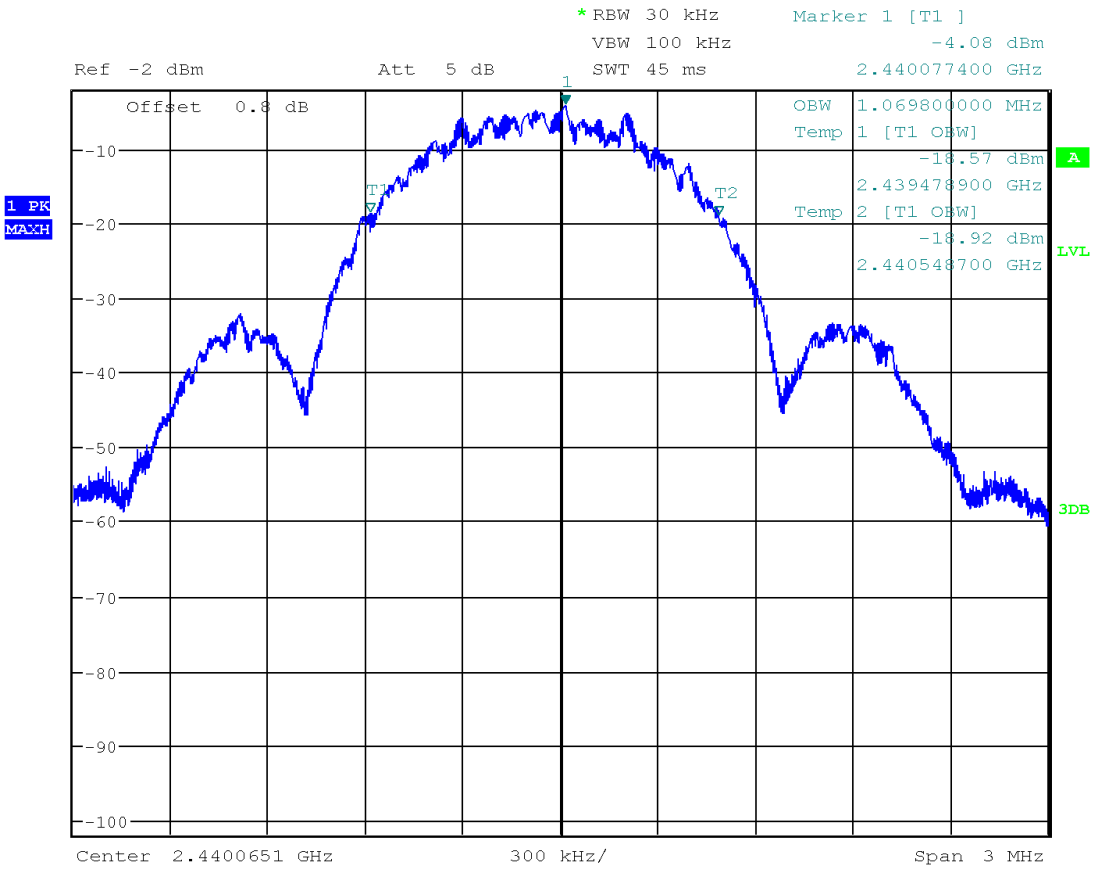
Date: 9.DEC.2024 22:04:45

Plot 1. 4



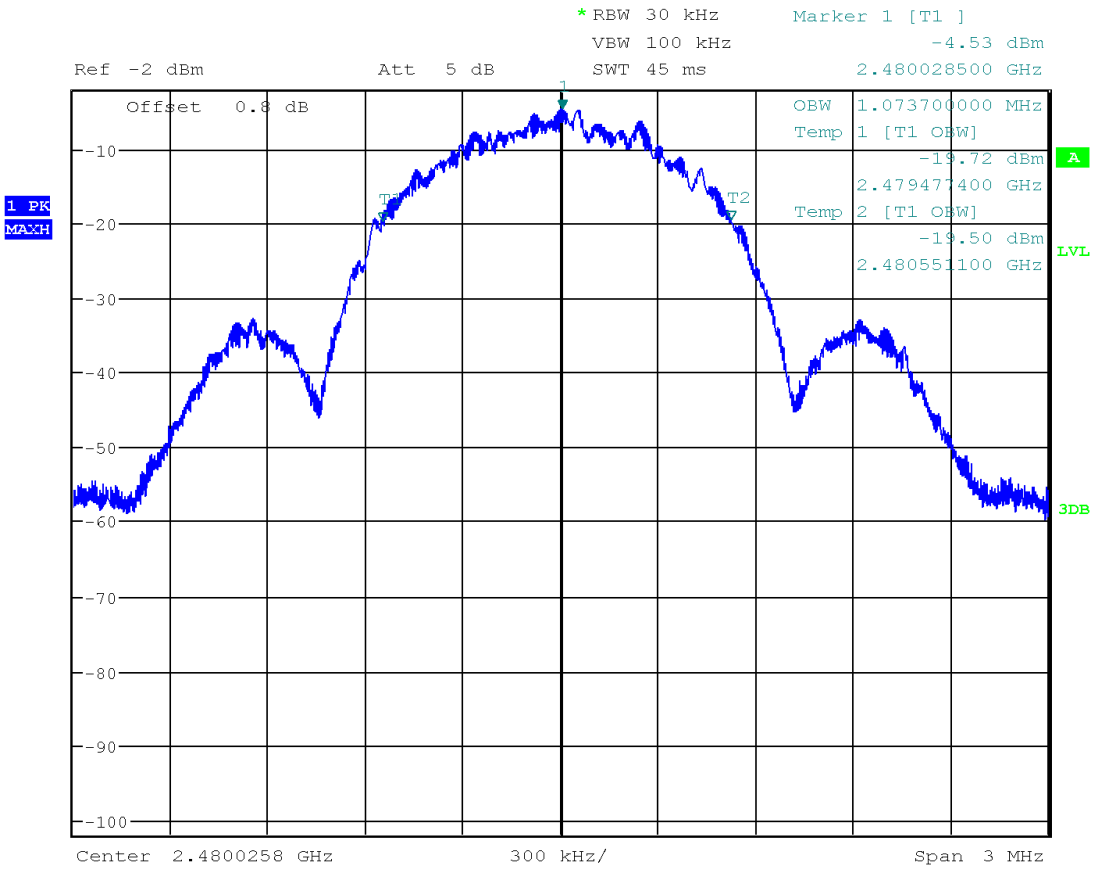
Date: 9.DEC.2024 23:27:58

Plot 1.5



Date: 9.DEC.2024 23:24:31

Plot 1.6



Date: 9.DEC.2024 23:30:37

Results	Complies

4.2 Maximum Peak Conducted Output Power at Antenna Terminals
FCC Rule: 15.247(b)(3); RSS-247 A8.4;

4.2.1 Requirement

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt or 30 dBm. For antennas with gains greater than 6 dBi, transmitter output level must be decreased appropriately, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.2.2 Procedure

The procedure described in FCC Publication KDB 558074 D01 Meas Guidance v05r02 was used. Specifically, section 11.9.1.1 RBW ≥ DTS bandwidth in ANSI 63.10.

1. Set the RBW ≥ DTS Bandwidth
2. Set the VBW ≥ 3 x RBW
3. Set the span ≥ 3 x RBW
4. Detector = Peak
5. Sweep time = Auto couple
6. Trace mode = Max Hold
7. Allow trace to fully stabilize
8. Use peak marker function to determine the peak amplitude level.

A spectrum analyzer was connected to the antenna port of the transmitter.

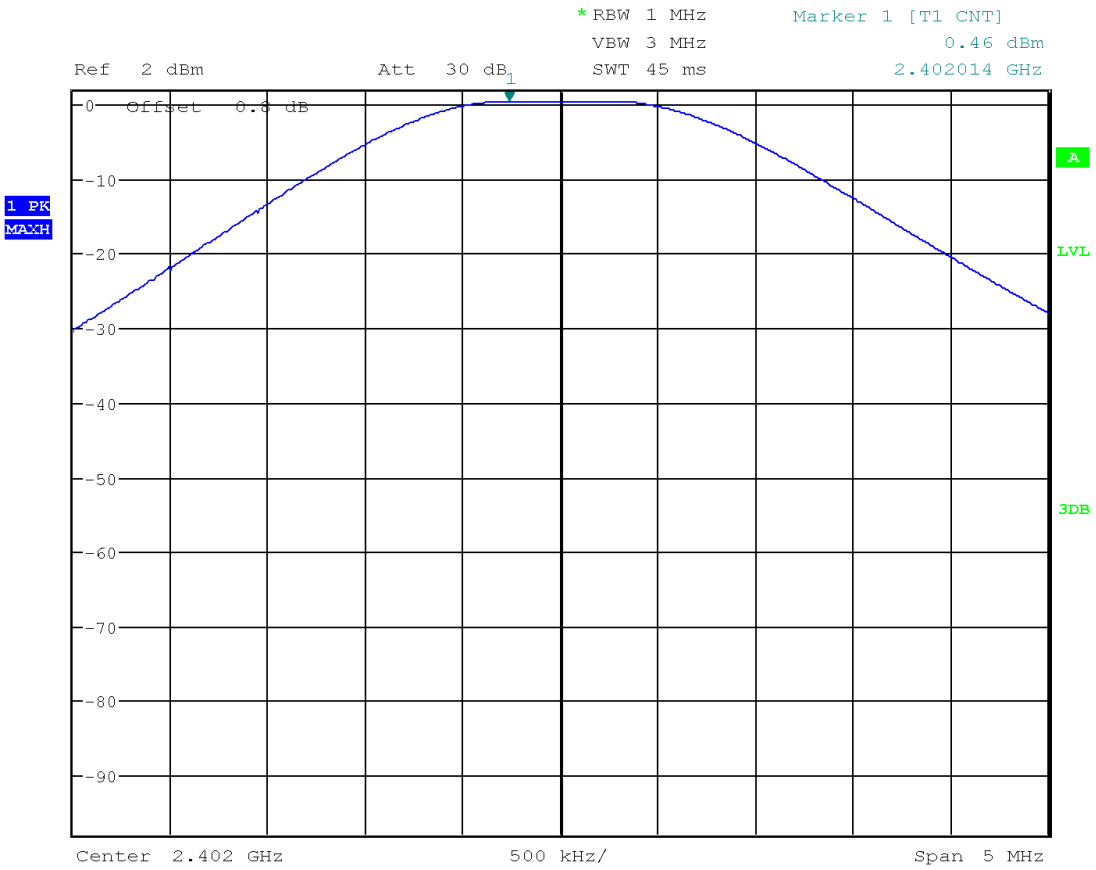
4.2.3 Test Result

Refer to the following plots 2.1 – 2.3 for the test details.

Frequency	Radiated Power (peak)		Plot
MHz	dBm	mW	
2402	0.46	1.112	2.1
2440	0.16	1.038	2.2
2480	-0.33	0.927	2.3

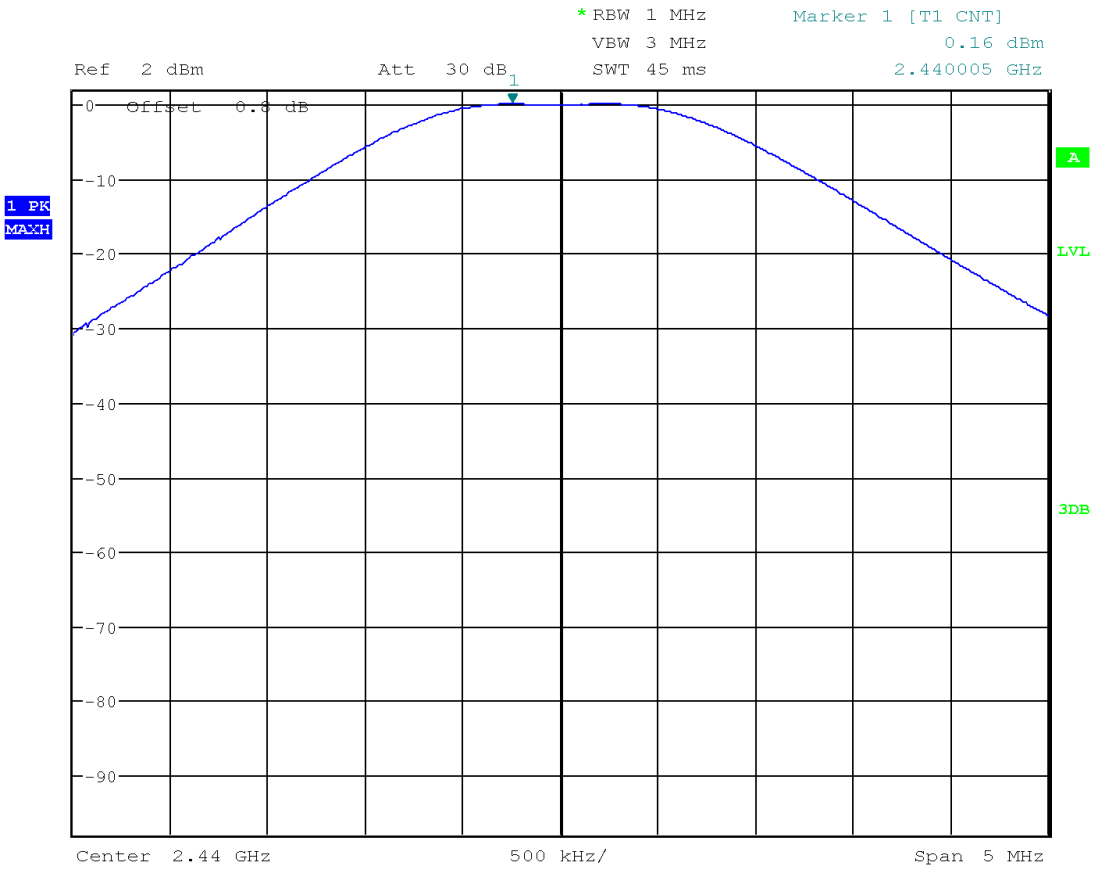
Tested By	Test Date	Results
Kenneth Tutor	December 09, 2024	Complies

Plot 2. 1



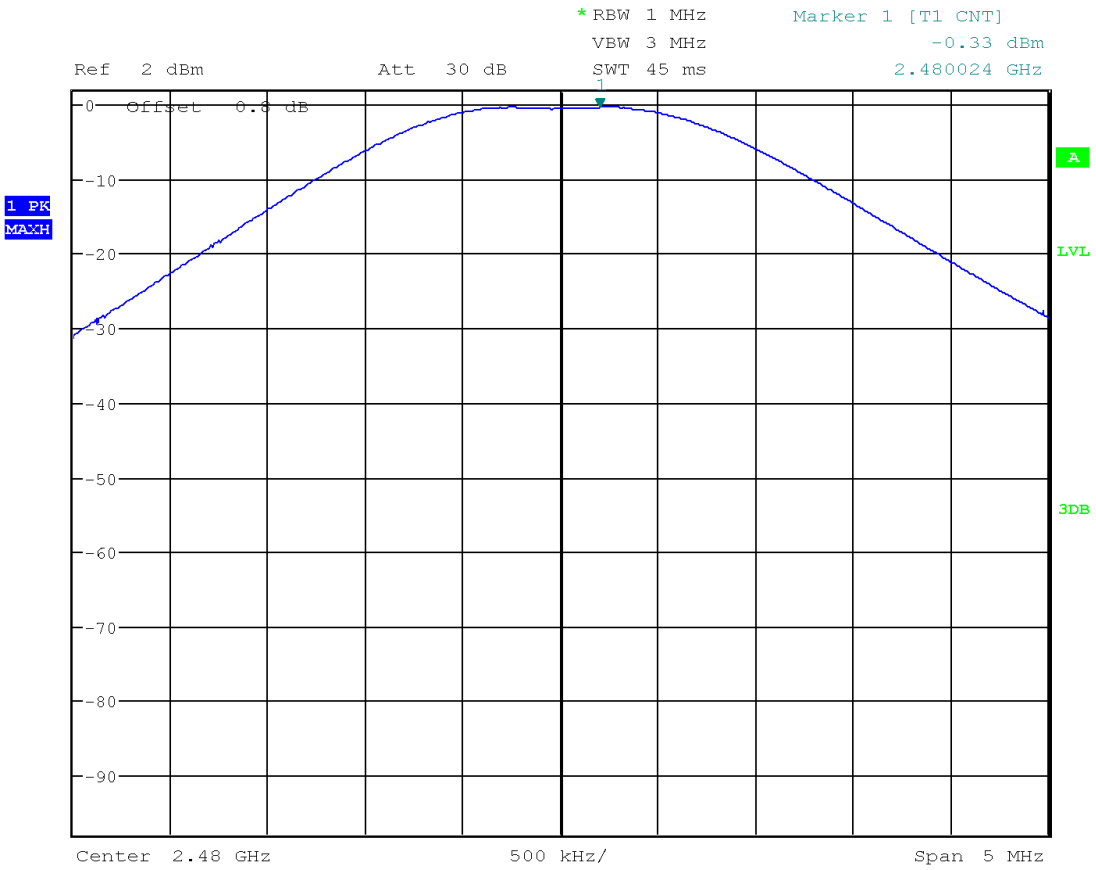
Date: 9.DEC.2024 21:02:26

Plot 2. 2



Date: 9.DEC.2024 21:00:34

Plot 2. 3



Date: 9.DEC.2024 21:16:17

Results	Complies

4.3 Maximum Power Spectral Density
FCC: 15.247 (e)

4.3.1 Requirement

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna should not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.3.2 Procedure

Radiated emission measurements were performed for Power Spectral Density.

The procedure described in FCC Publication KDB 558074 D01 Meas Guidance v05r02, specifically section 11.10.2 Method PKPSD (peak PSD) of ANSI 63.10.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the *DTS bandwidth*.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.

If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst-case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Power Spectral Density measurements are taken at 3 meters for frequencies 2402MHz, 2440MHz, and 2480MHz.

<u>Field Strength Calculation</u>

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

FS = RA + AF + CF – AG; if measurement is performed at a distance other than specified in the rule, a Distance Correction Factor (DCF) shall be added.

Where FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV); AF = Antenna Factor in dB(1/m)
CF = Cable Attenuation Factor in dB; AG = Amplifier Gain in dB

Assume a receiver reading of 52.0 dB(μV) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μV/m). This value in dB(μV/m) was converted to its corresponding level in μV/m.
RA = 52.0 dB(μV)
AF = 7.4 dB(1/m)
CF = 1.6 dB
AG = 29.0 dB
FS = 52.0+7.4+1.6-29.0 = 32 dB(μV/m).
Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m.

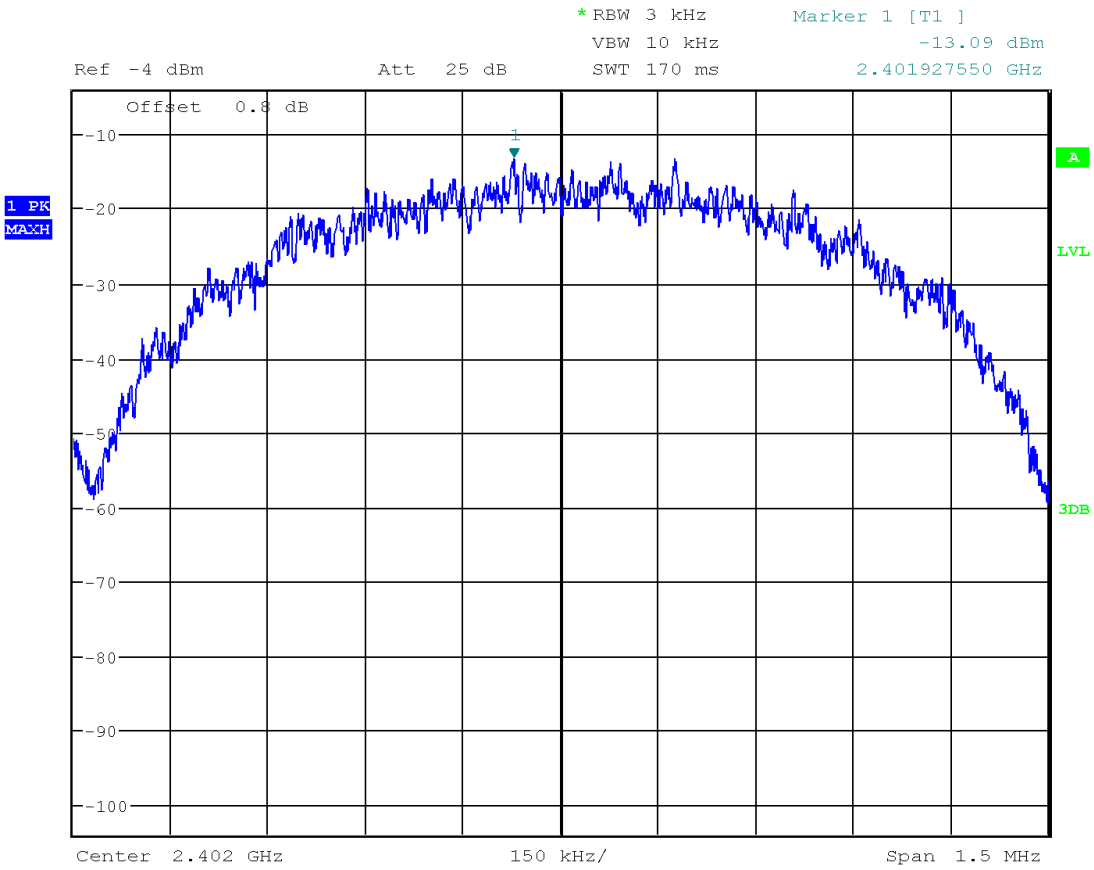
4.3.3 Test Result

Refer to the following plots for the test result

Frequency, MHz	Maximum Power Spectral Density, dBm	Maximum Power Spectral Density Limit, dBm	Margin, dB	Plot
2402	-13.09	8.0	-21.09	3.1
2440	-13.29	8.0	-21.29	3.2
2480	-15.23	8.0	-23.23	3.3

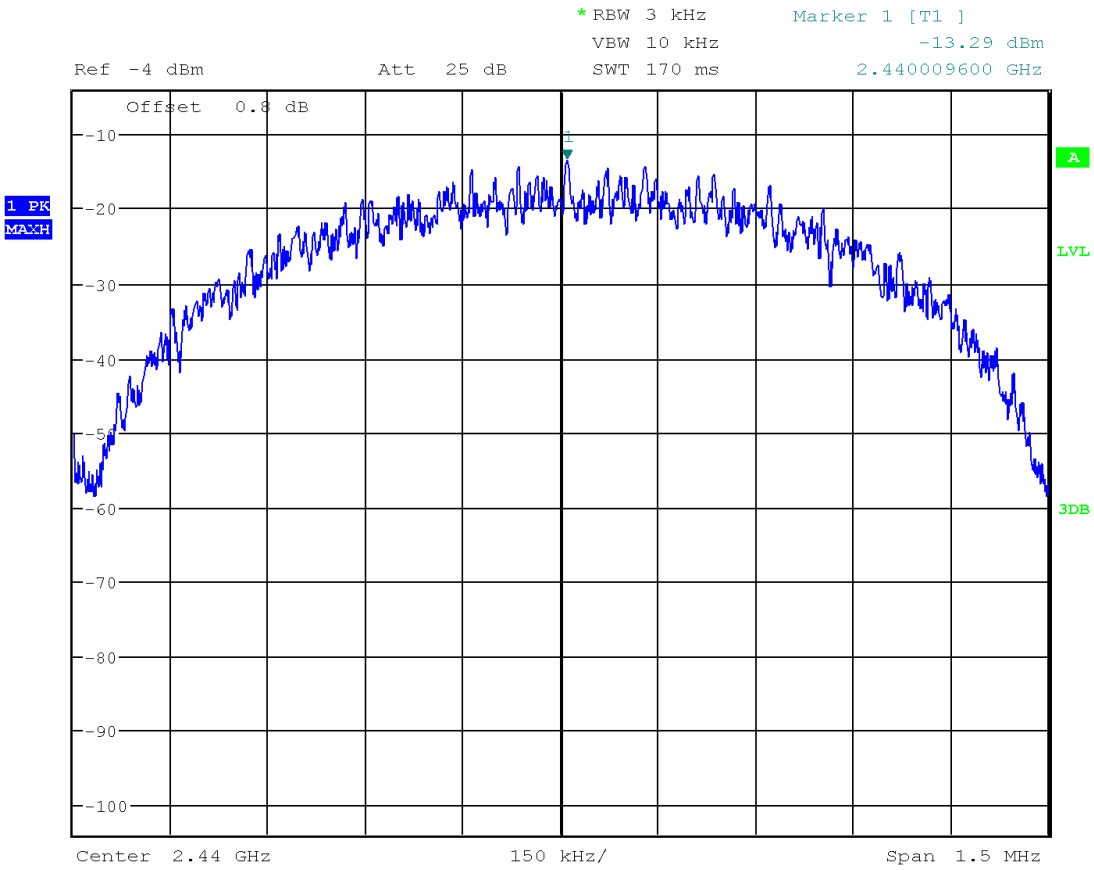
Tested By	Test Date	Results
Kenneth Tutor	December 09, 2024	Complies

Plot 3. 1



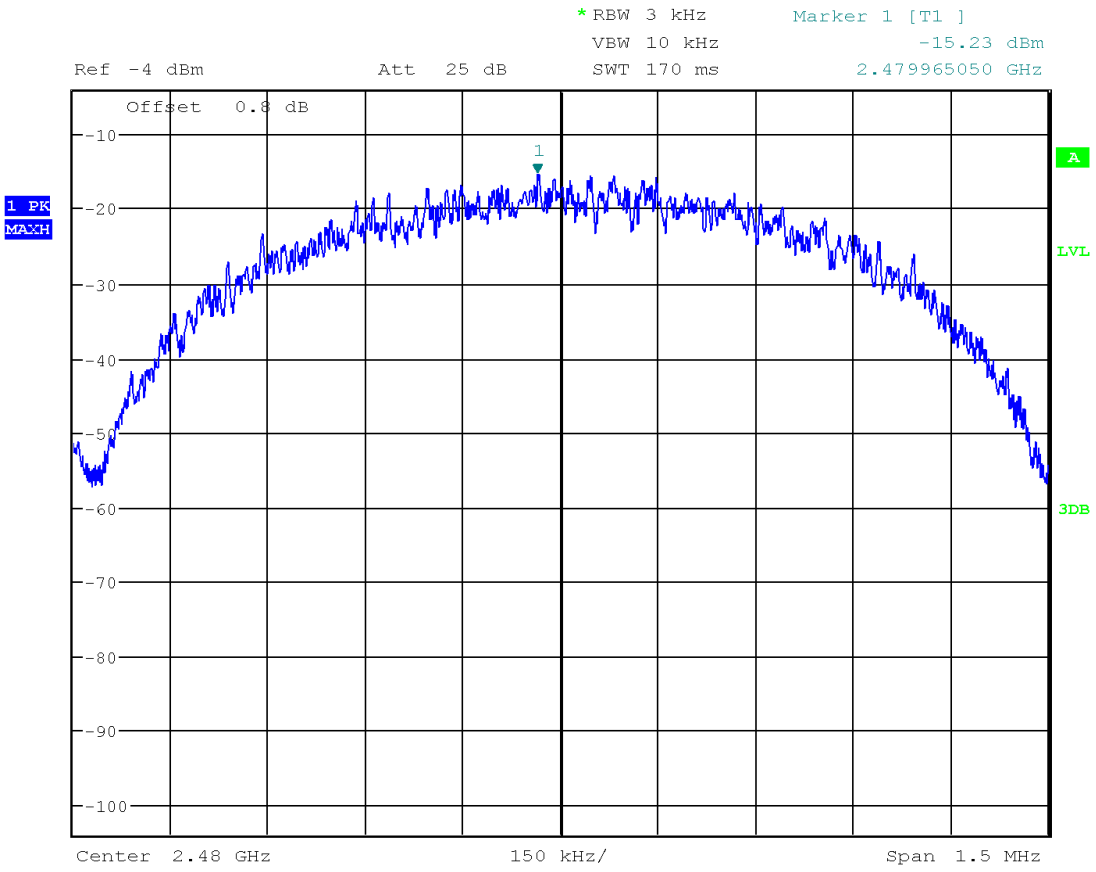
Date: 9.DEC.2024 23:46:24

Plot 3. 2



Date: 9.DEC.2024 23:48:54

Plot 3. 3



Date: 9.DEC.2024 23:43:44

Results	Complies

4.4 Out of Band Antenna Radiated Emission
FCC: 15.247(d)

4.4.1 Requirement

In any 100 kHz bandwidth outside the EUT pass-band, the RF power shall be below the maximum in-band 100 kHz emissions by at least 20 dB (if peak power of in-band emission is measured) or 30 dB (if average power of in-band emission is measured).

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)

4.4.2 Procedure

The procedure described in FCC Publication KDB 558074 D01 Meas Guidance v05r02, specifically section 11.11 DTS Emissions in non-restricted frequency bands of ANSI 63.10.

Radiated emission measurements were performed for Out of Band Antenna Emissions.

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 3 x RBW.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

The unwanted emissions were measured from 30 MHz to 25 GHz. Plots below are corrected for cable loss and then compared to the limits.

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.

If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst-case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Out of Band Emission measurements are taken at 3 meters for frequencies 2402MHz and 2480MHz.

Field Strength Calculation

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

FS = RA + AF + CF – AG; if measurement is performed at a distance other than specified in the rule, a Distance Correction Factor (DCF) shall be added.

Where FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV); AF = Antenna Factor in dB(1/m)
CF = Cable Attenuation Factor in dB; AG = Amplifier Gain in dB

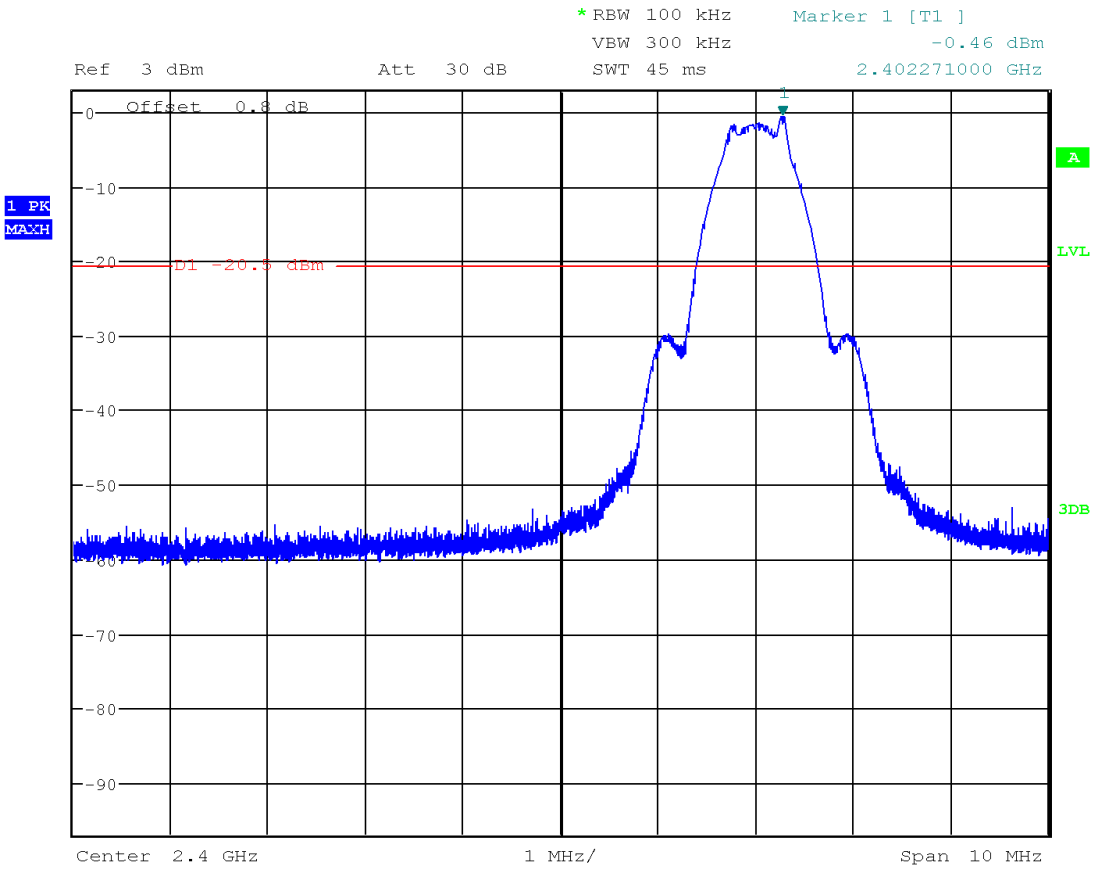
Assume a receiver reading of 52.0 dB(μV) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μV/m). This value in dB(μV/m) was converted to its corresponding level in μV/m.
RA = 52.0 dB(μV)
AF = 7.4 dB(1/m)
CF = 1.6 dB
AG = 29.0 dB
FS = 52.0+7.4+1.6-29.0 = 32 dB(μV/m).
Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m.

4.4.3 Test Result

Refer to the following plots 4.1 – 4.5 for unwanted conducted emissions. The plot shows -20dB attenuation limit line.

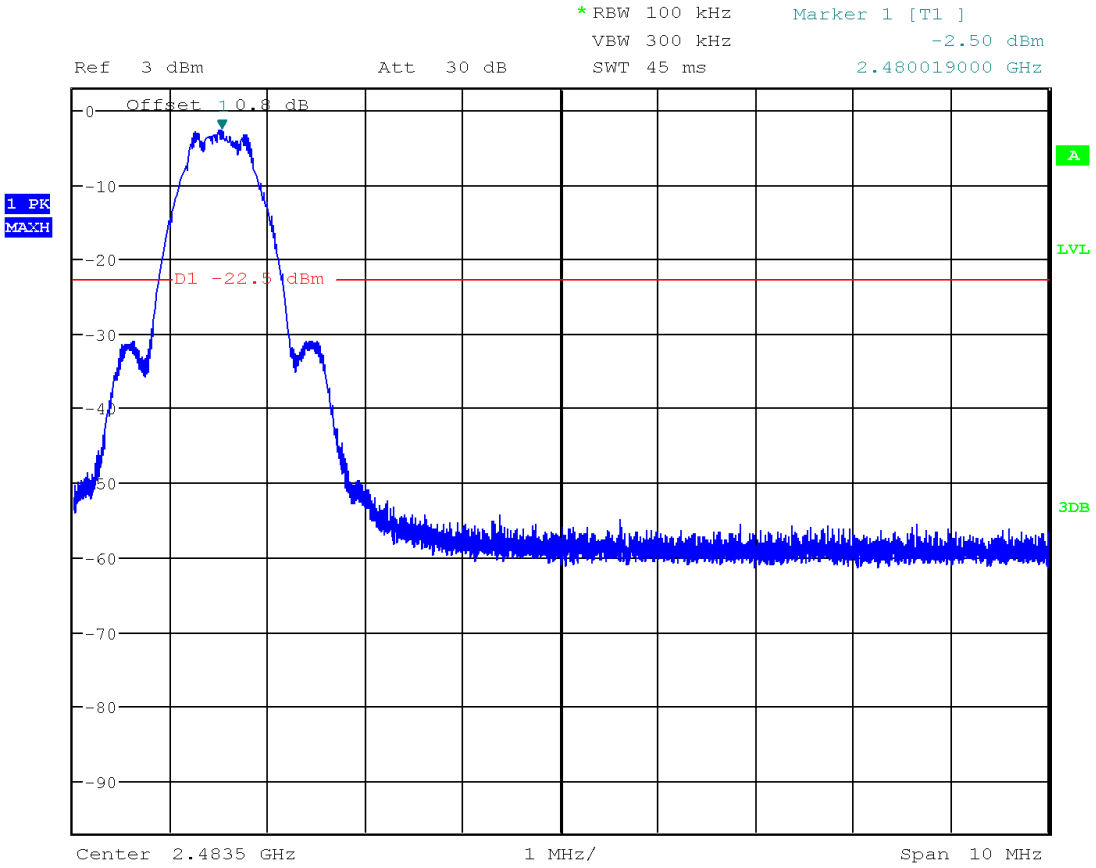
Tested By	Test Date	Results
Kenneth Tutor	December 09, 2024	Complies

Tx @ Low Channel, 2402 MHz Band Edge
Plot 4.1



Date: 10.DEC.2024 00:02:19

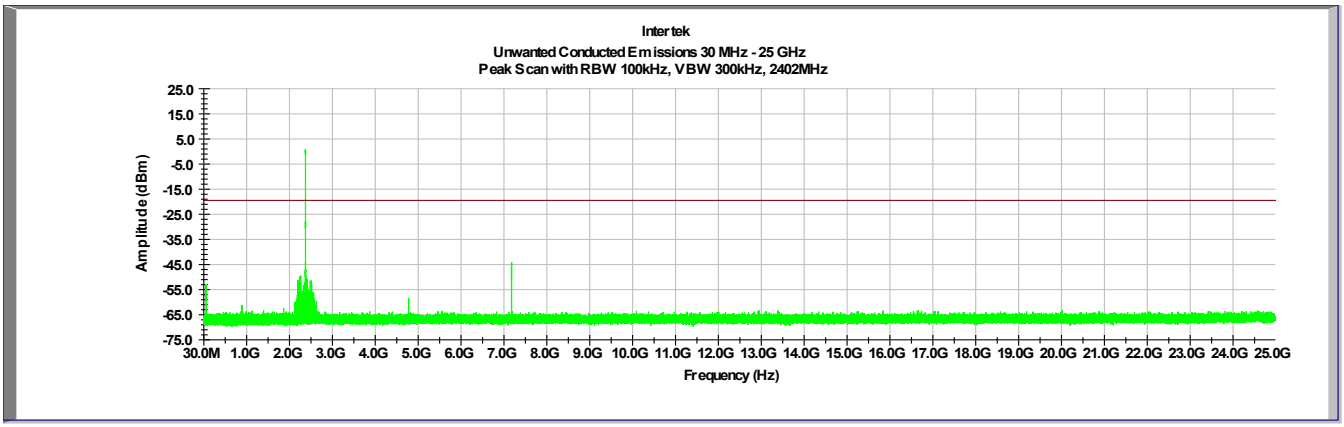
Tx @ High Channel, 2480 MHz Band Edge
Plot 4.2



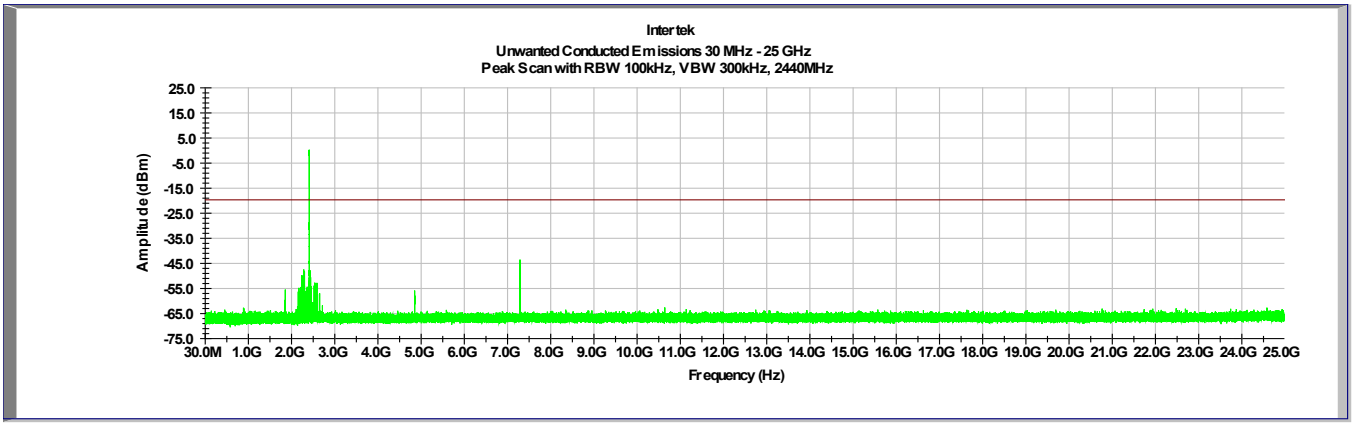
Date: 9.DEC.2024 23:59:08

Results	Complies

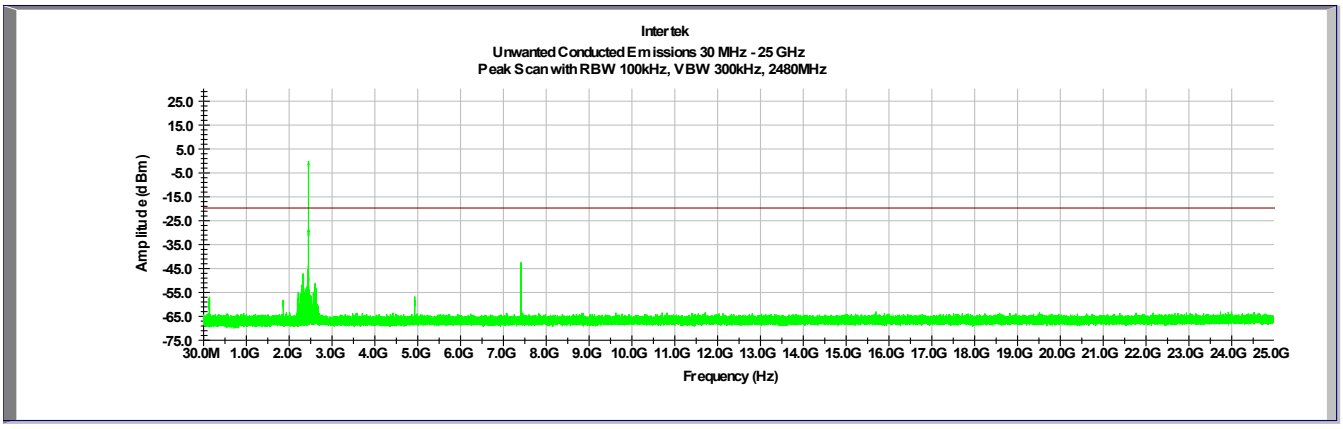
Tx @ Low Channel, 2402 MHz
30MHz -25GHz Conducted Spurious
Plot 4.3



Tx @ Mid Channel, 2440 MHz
30MHz -25GHz Conducted Spurious
Plot 4.4



Tx @ High Channel, 2480 MHz
30MHz -25GHz Conducted Spurious
Plot 4.5



Results	**Complies**

4.5 Transmitter Radiated Emissions
FCC Rules: 15.247(d), 15.209, 15.205; RSS-247, 5.5;

4.5.1 Requirement

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

For out of band radiated emissions (except for frequencies in restricted bands), in any 100 kHz bandwidths outside the EUT pass-band, the RF power shall be at least 20dB (peak) or 30 dB (average) below that of the maximum in-band 100 kHz emissions.

4.5.2 Procedure

Radiated emission measurements were performed from 9 kHz to 26.5 GHz according to the procedure described in ANSI C63.10: 2013. Spectrum Analyzer Resolution Bandwidth is 200Hz or greater for frequencies 9kHz to 30MHz, 100 kHz or greater for frequencies 30 MHz to 1000 MHz, 1 MHz for frequencies above 1000 MHz. Above 1000 MHz Peak and Average measurements were performed.

The EUT is placed on a plastic turntable that is 80 cm in height for below 1000MHz and 1.5m in height for above 1GHz. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst-case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at 3 meters for frequencies above 1 GHz and at 3 meters for frequencies below 1 GHz.

Measurements made from 1 GHz to 18GHz had a 2.4-2.5GHz notch filter in place. A preamp was used from 9kHz to 26.5GHz.

All measurements were made with a Peak Detector and compared to QP limits for 30MHz – 1GHz and Average limits for 1GHz – 26.5GHz.

Correlation measurements were performed below 30MHz between 10m ALSE and Open Field site according to FCC KDB 414788 D01 Radiated Test Site v01r01 section 2. All readings were within the acceptable tolerance.

EUT was test in X, Y, and Z positions. Data is included of the worst-case configuration (the configuration which resulted in the highest emission levels).

4.5.3 Field Strength Calculation

Field Strength Calculation

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

FS = RA + AF + CF – AG; if measurement is performed at a distance other than specified in the rule, a Distance Correction Factor (DCF) shall be added.

Where FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV); AF = Antenna Factor in dB(1/m)
CF = Cable Attenuation Factor in dB; AG = Amplifier Gain in dB

Assume a receiver reading of 52.0 dB(μV) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μV/m). This value in dB(μV/m) was converted to its corresponding level in μV/m.
RA = 52.0 dB(μV)
AF = 7.4 dB(1/m)
CF = 1.6 dB
AG = 29.0 dB
FS = 52.0+7.4+1.6-29.0 = 32 dB(μV/m).
Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m.

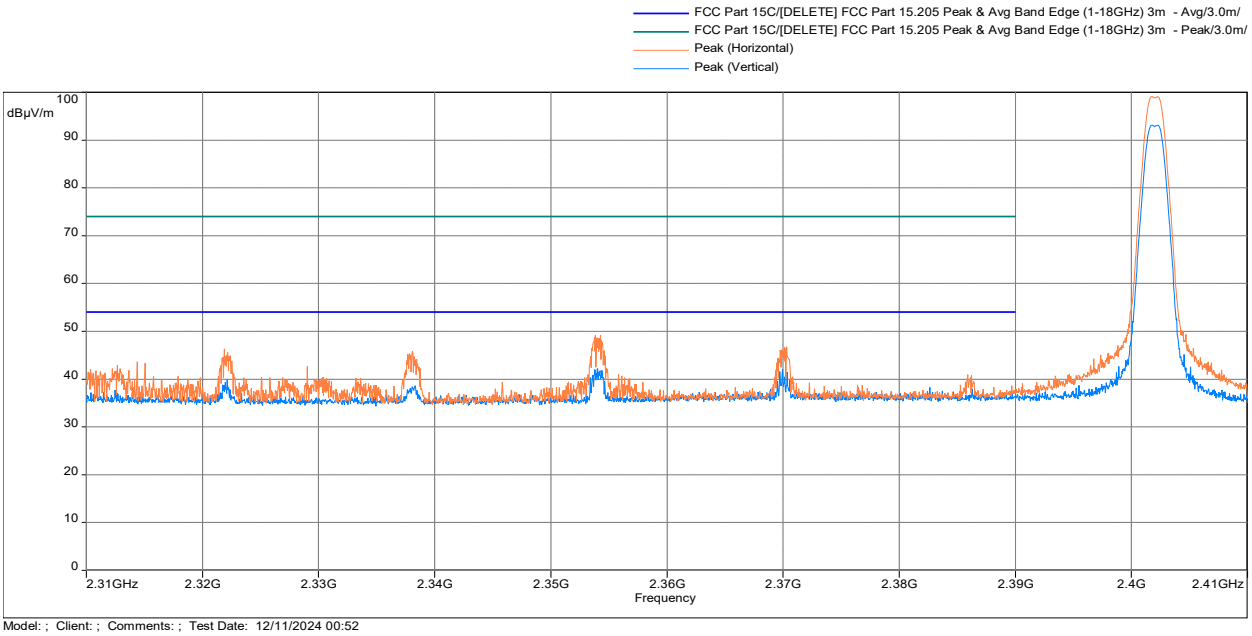
4.5.4 Test Results

All testing in this section were performed by radiated measurements.

Tested By	Test Date	Results
Kenneth Tutor	December 10-13, 2024	Complies

Test Results: 15.209/15.205 Radiated Restricted Band Emissions

Out-of-Band Radiated spurious emissions at the Band-edge @3m distance
2310–2390 MHz, Peak Scan with Peak Limit and Average Limit
Normal Mode

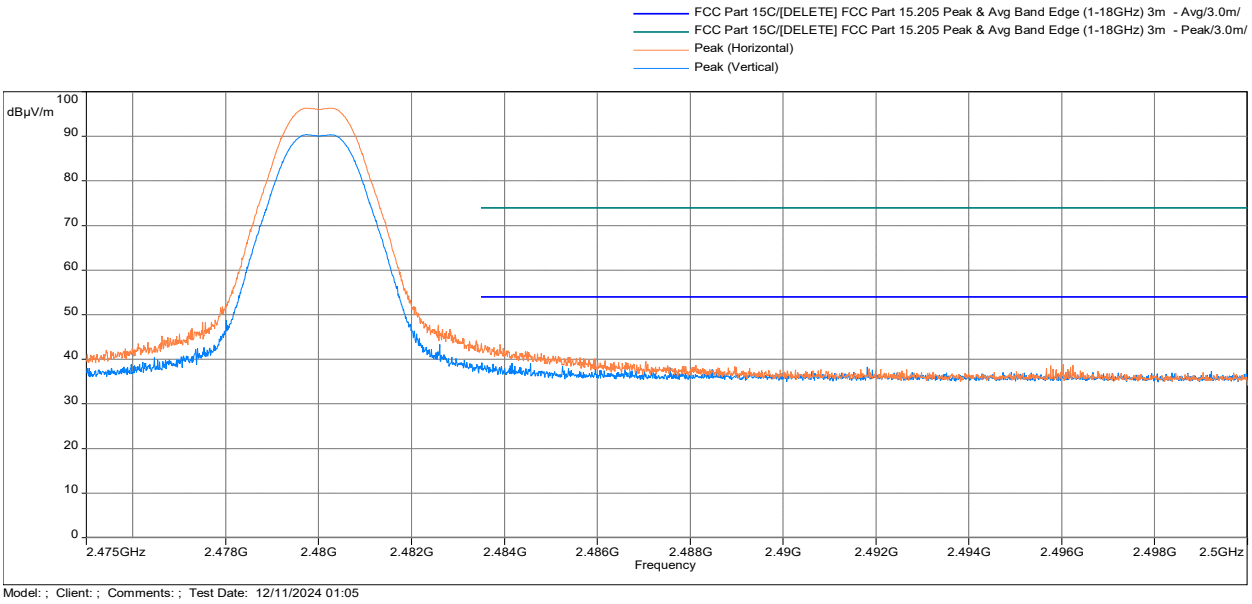


Model: ; Client: ; Comments: ; Test Date: 12/11/2024 00:52

Freq. MHz	Peak@3m dB(uV/m)	Ave Limit dB(µV/m)	Margin dB	Azimuth deg	Height m	Polarity	Correction dB
2353.840	49.23	54.0	-4.77	89.89	1.5	Horizontal	-6.21
2370.303	46.81	54.0	-7.19	54.47	1.5	Horizontal	-6.20
2321.900	46.33	54.0	-7.67	54.47	1.5	Horizontal	-6.22
2338.100	45.82	54.0	-8.18	89.89	1.5	Horizontal	-6.22
2390.000	35.85	54.0	-18.15	46.84	3.5	Vertical	-6.19
2390.000	36.06	54.0	-17.94	97.45	1.5	Horizontal	-6.19

Note: Correction = AF + CF + DCF – Preamp

Out-of-Band Radiated spurious emissions at the Band-edge @3m distance
2483.5–2500 MHz, Peak Scan with Peak Limit and Average Limit
Normal Mode



Model: ; Client: ; Comments: ; Test Date: 12/11/2024 01:05

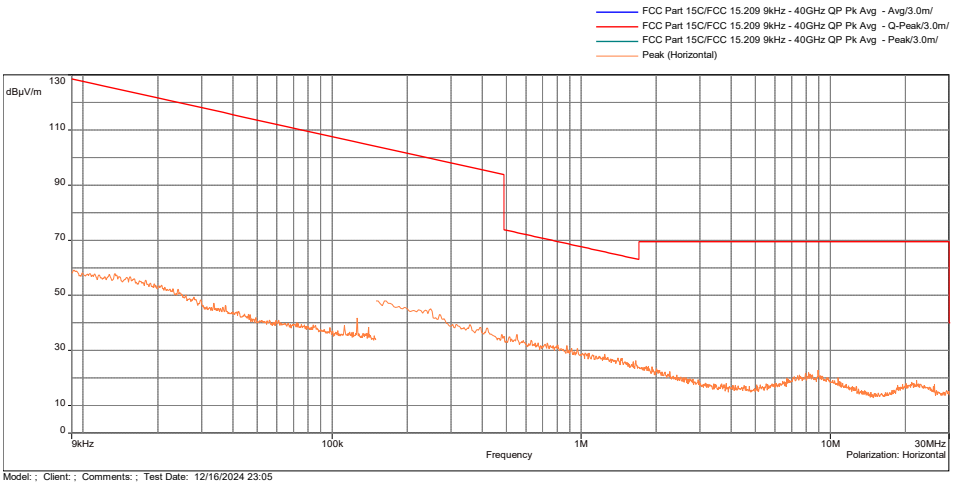
Freq. MHz	Ave@3m dB(uV/m)	Ave Limit dB(µV/m)	Margin dB	Azimuth deg	Height m	Polarity	Correction dB
2483.508	43.52	54.0	-10.48	54.47	1.5	Horizontal	-6.22
2483.513	39.23	54.0	-14.77	76.28	1.5	Vertical	-6.22

Note: Correction = AF + CF + DCF – Preamp

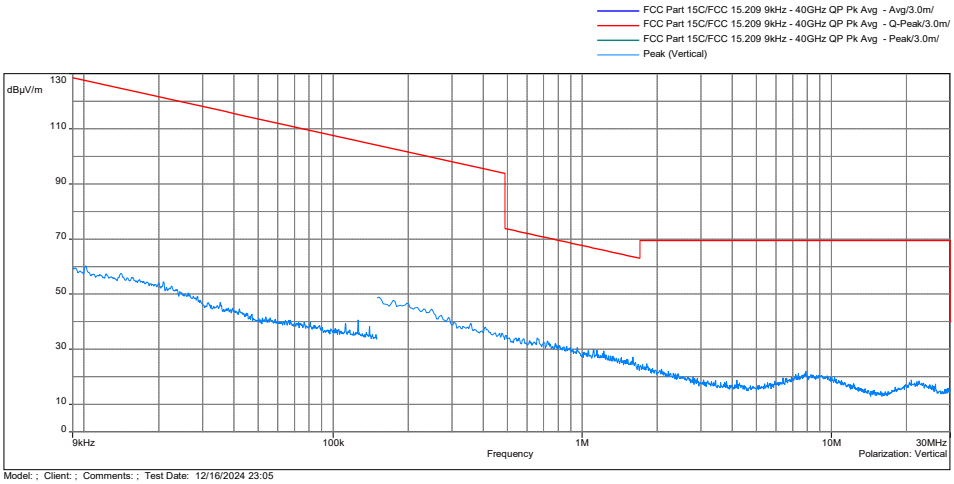
Results	Complies

Out-of-Band Radiated Spurious Emissions Low Channel, Tx at 2402MHz Normal Mode

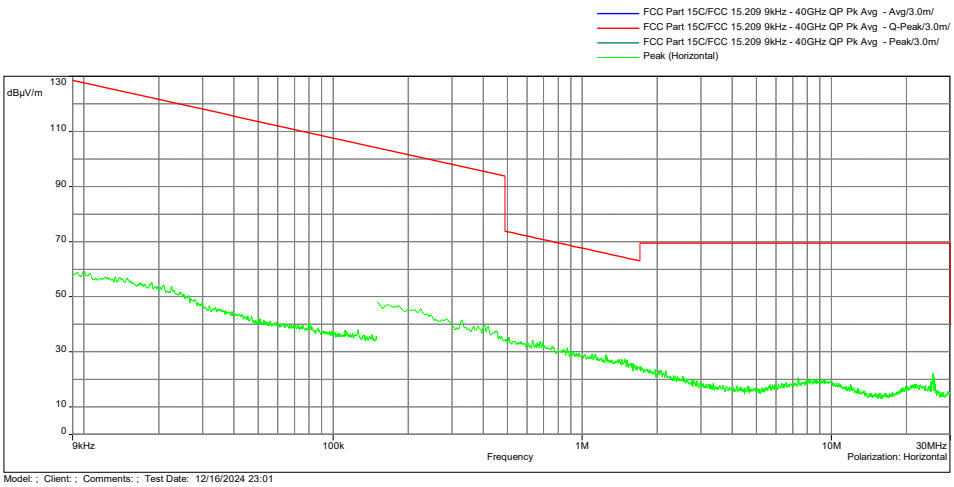
Antenna Position - Coaxial



Antenna Position - Coplanar

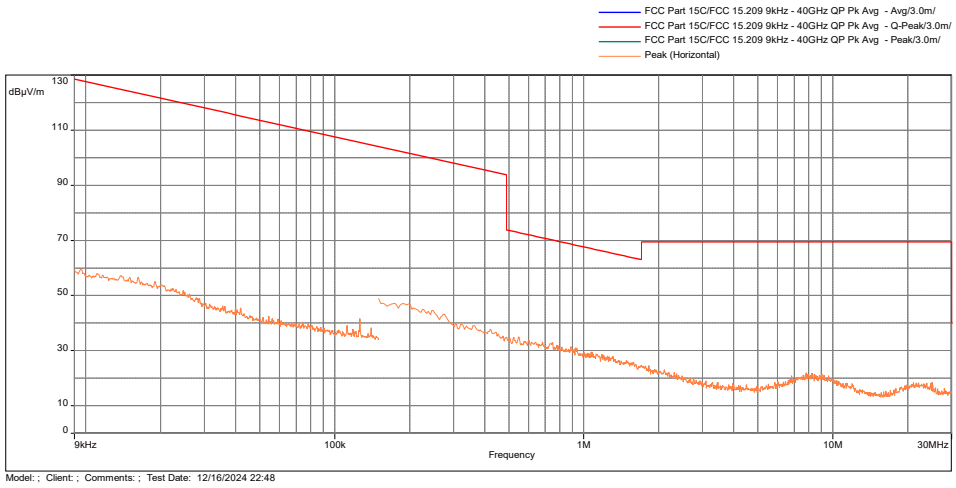


Antenna Position - Horizontal

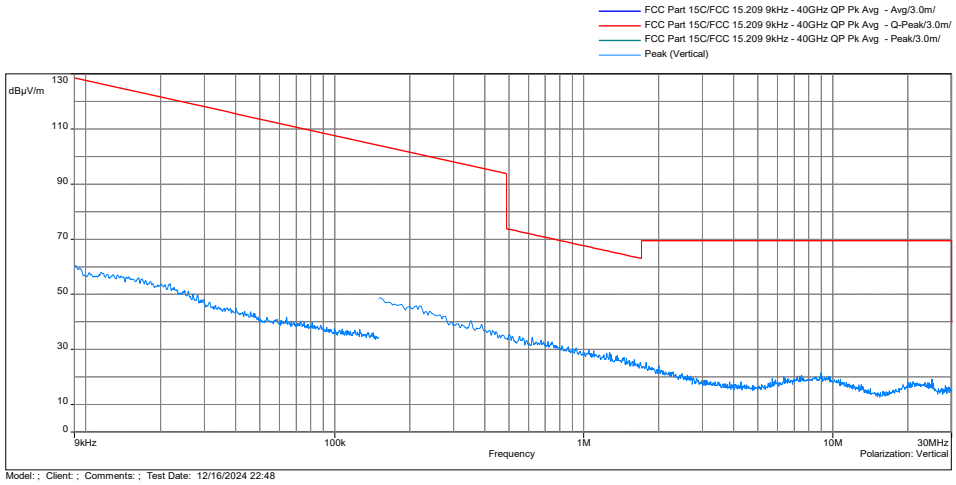


Out-of-Band Radiated Spurious Emissions Mid Channel, Tx at 2440MHz Normal Mode

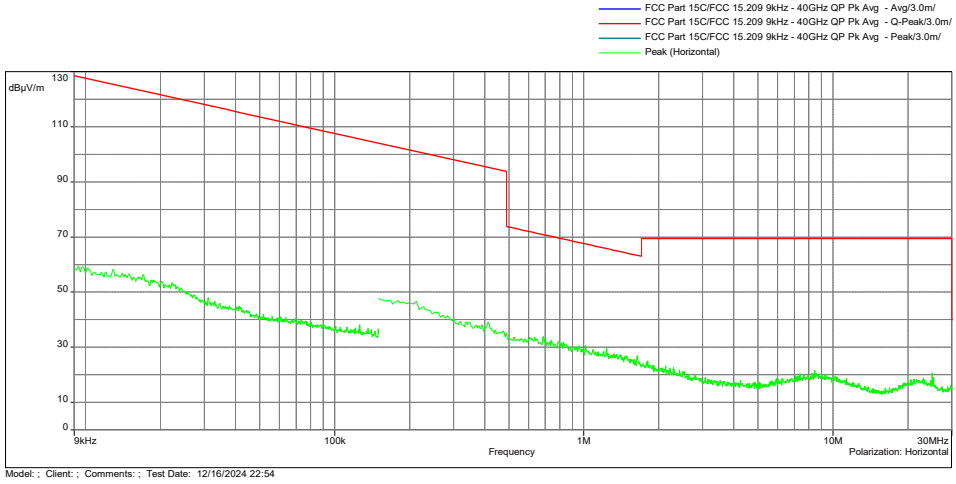
Antenna Position - Coaxial



Antenna Position - Coplanar

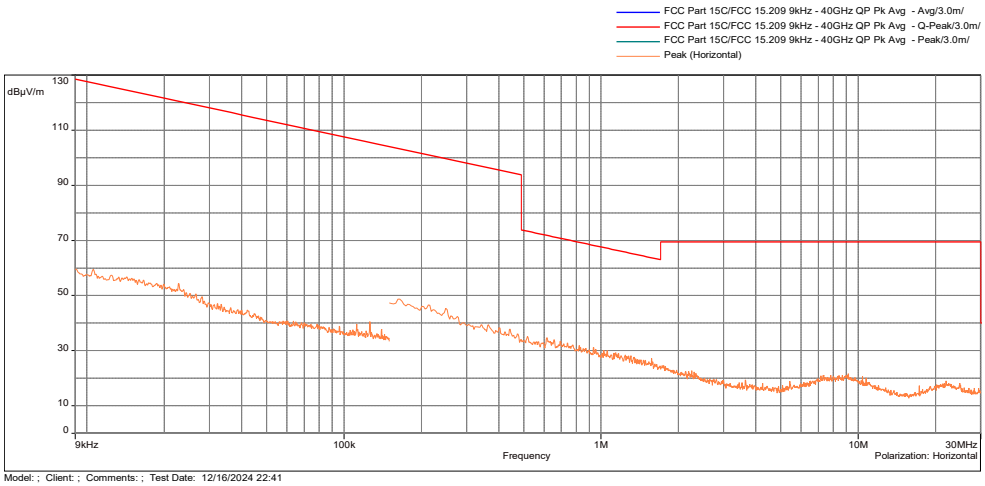


Antenna Position - Horizontal



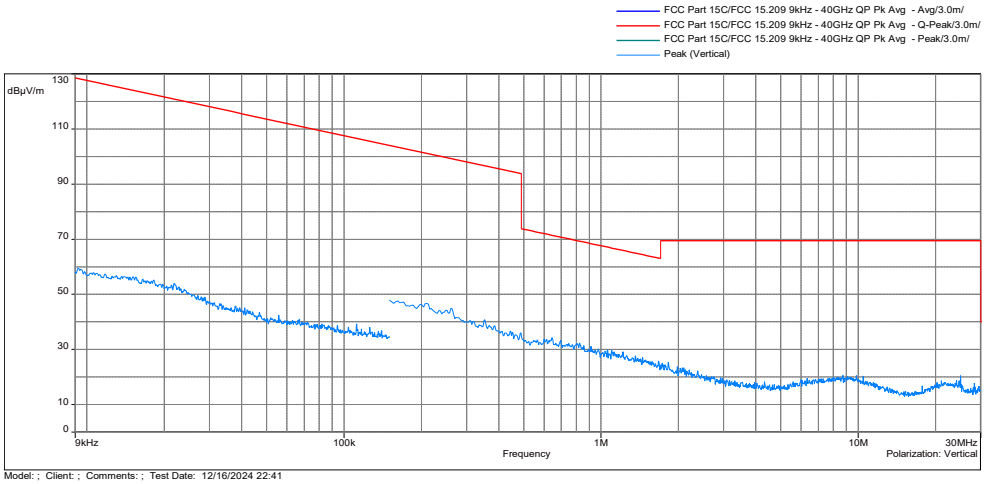
Out-of-Band Radiated Spurious Emissions High Channel, Tx at 2480MHz Normal Mode

Antenna Position - Coaxial



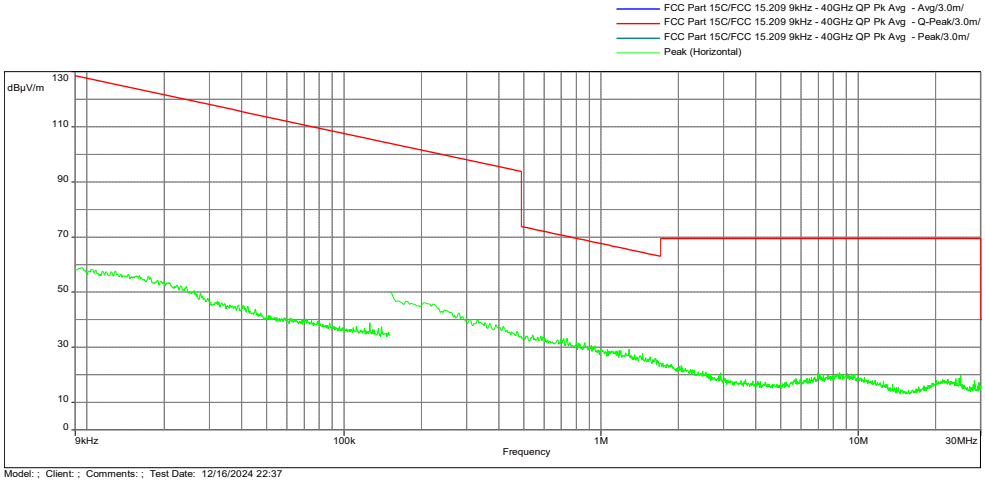
Model: ; Client: ; Comments: ; Test Date: 12/16/2024 22:41

Antenna Position - Coplanar



Model: ; Client: ; Comments: ; Test Date: 12/16/2024 22:41

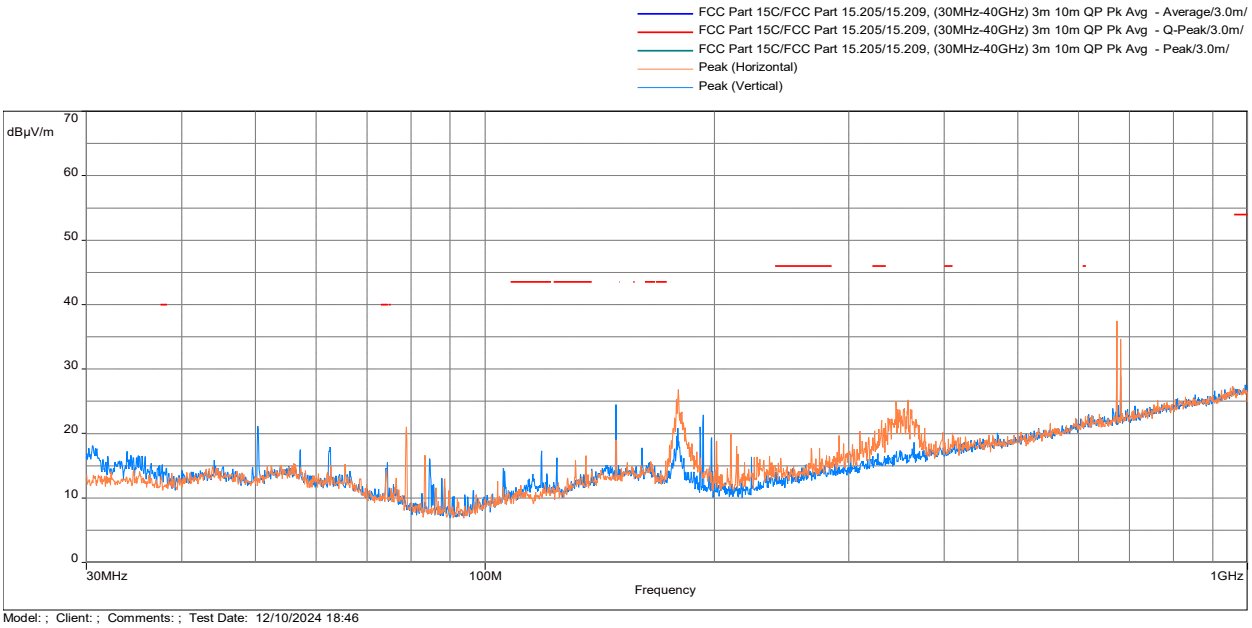
Antenna Position - Horizontal



Model: ; Client: ; Comments: ; Test Date: 12/16/2024 22:37

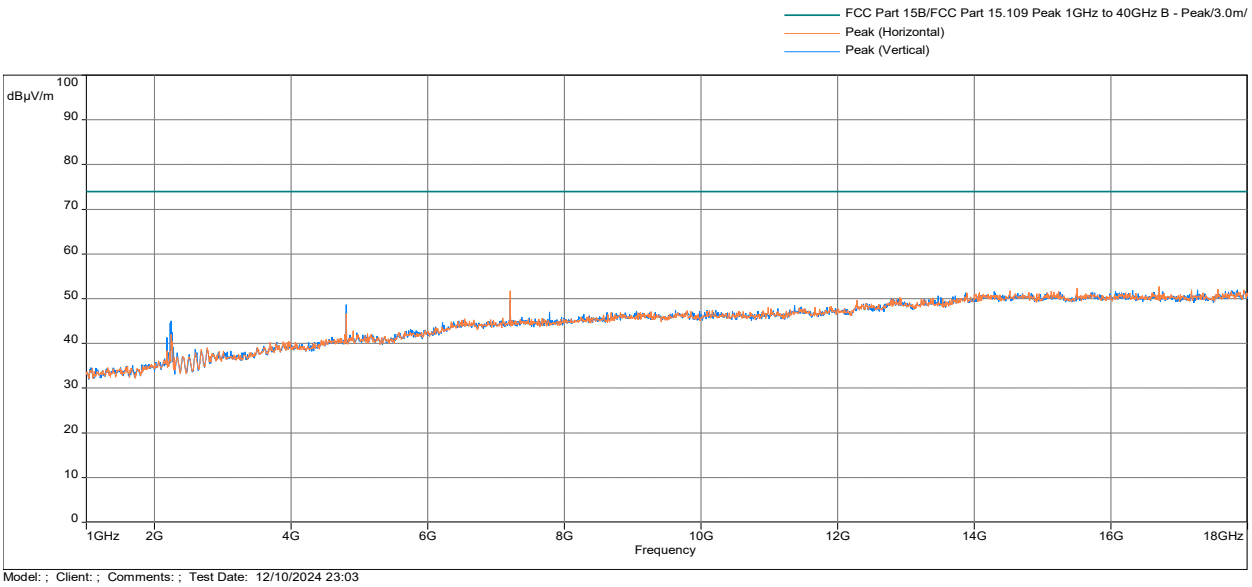
Test Results: 15.209 Radiated Spurious Emissions Low Channel, Tx at 2402MHz Normal Mode

Radiated Spurious Emissions 30 MHz - 1000 MHz



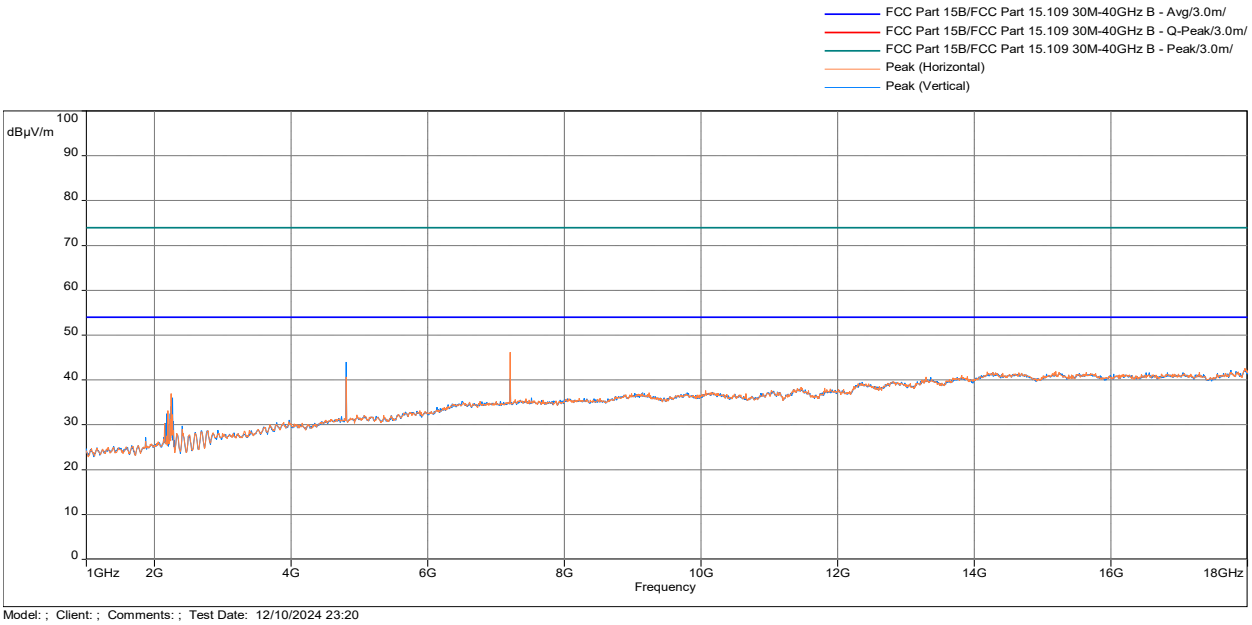
Model: ; Client: ; Comments: ; Test Date: 12/10/2024 18:46

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Peak Limit.



Model: ; Client: ; Comments: ; Test Date: 12/10/2024 23:03

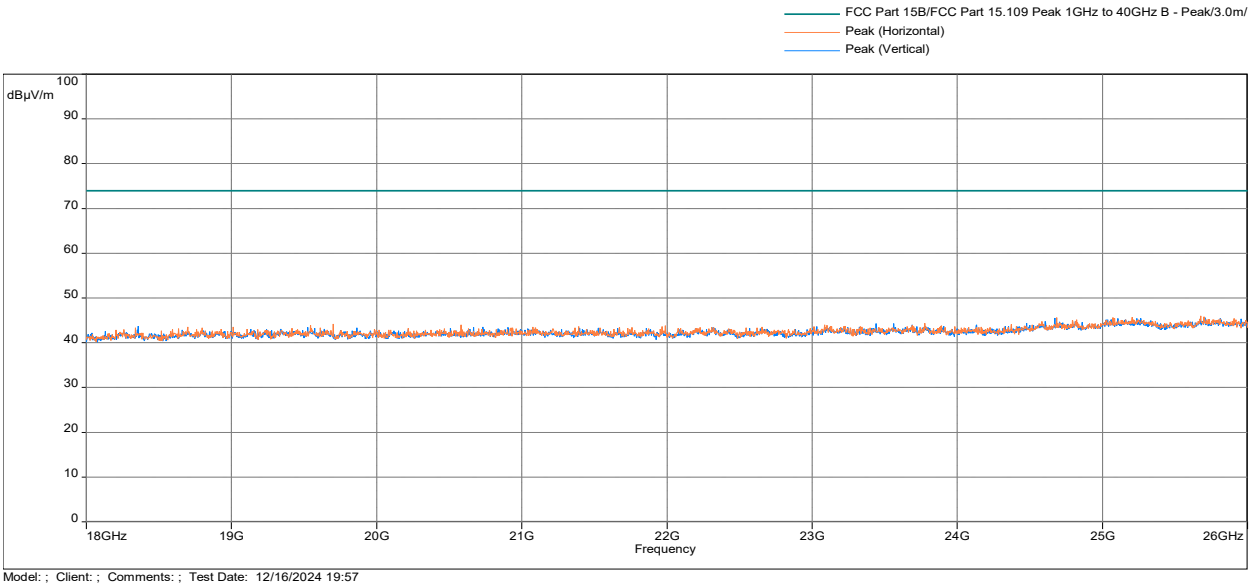
Radiated Spurious Emissions 1000 - 18000 MHz, Ave Scan vs Ave Limit.



Frequency (MHz)	Ave @3m (dBµV/m)	Lim. Ave @3m (dBµV/m)	Margin dB)	Height (m)	Angle (°)	Comment	Correction (dB)
7206.700	46.21	54.0	-7.79	2.5	102.1	Horizontal	4.60
4804.033	44.05	54.0	-9.95	1.5	286.0	Vertical	0.31
17957.500	42.55	54.0	-11.45	3.5	258.7	Horizontal	2.79
17951.833	42.23	54.0	-11.77	3.5	0.0	Vertical	2.78
4804.033	40.69	54.0	-13.31	2.5	11.1	Horizontal	0.31
7205.567	40.34	54.0	-13.66	2.5	119.6	Vertical	4.59

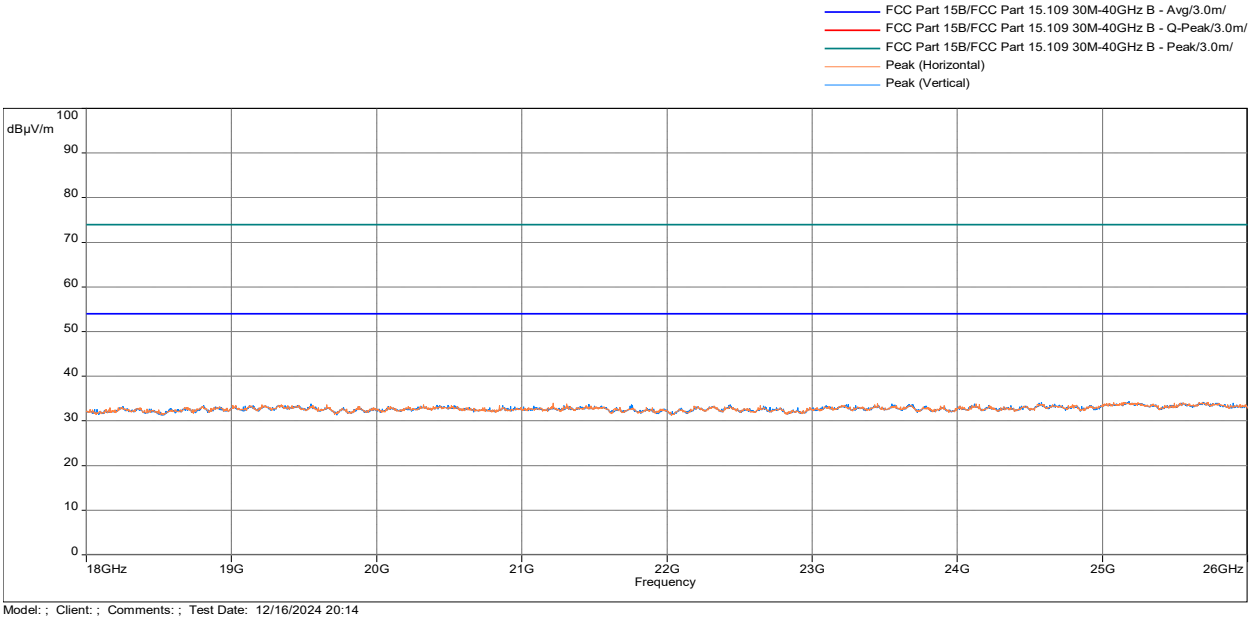
Note: Correction = AF + CF - Preamp

Radiated Spurious Emissions 18000 - 26000 MHz, Peak Scan vs Peak Limit.



Model: ; Client: ; Comments: ; Test Date: 12/16/2024 19:57

Radiated Spurious Emissions 18000 - 26000 MHz, Average Scan vs Average and Peak Limit.



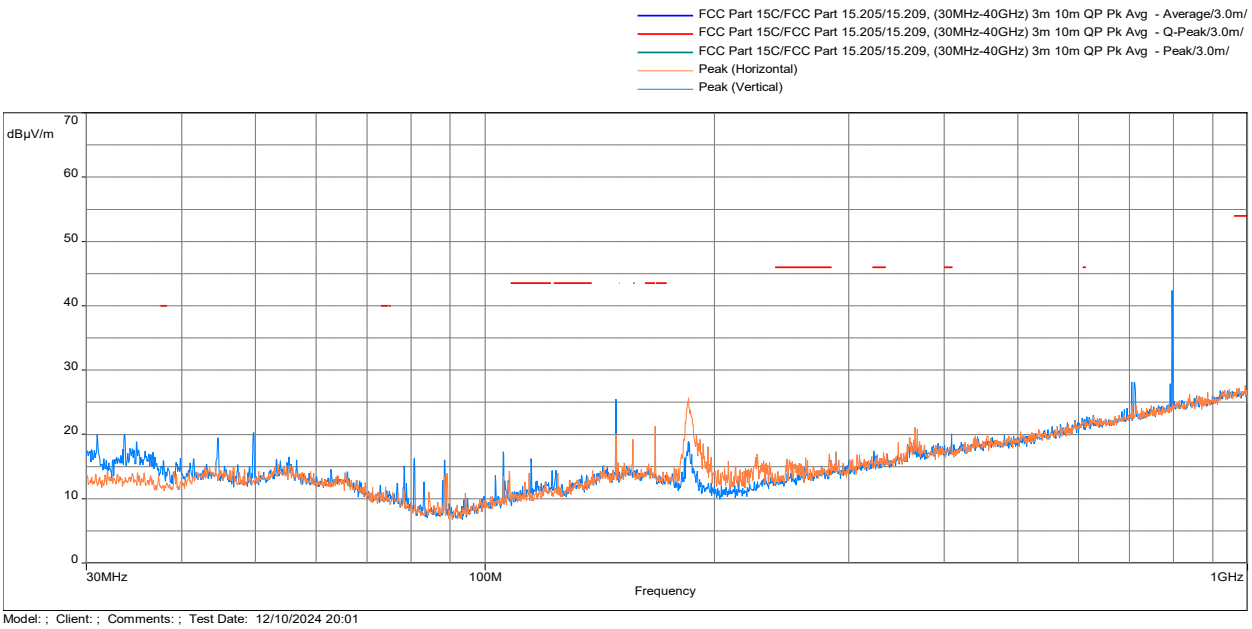
Model: ; Client: ; Comments: ; Test Date: 12/16/2024 20:14

Note: Correction = AF + CF - Preamp

Results	**Complies**

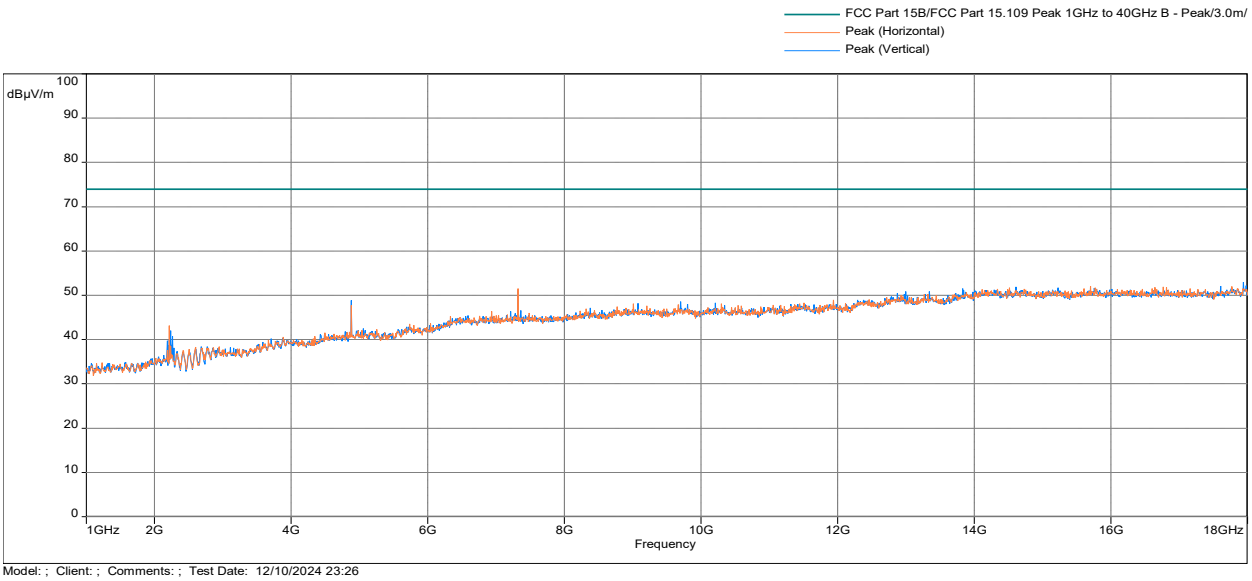
Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 2440 MHz Normal Mode

Radiated Spurious Emissions 30 MHz - 1000 MHz



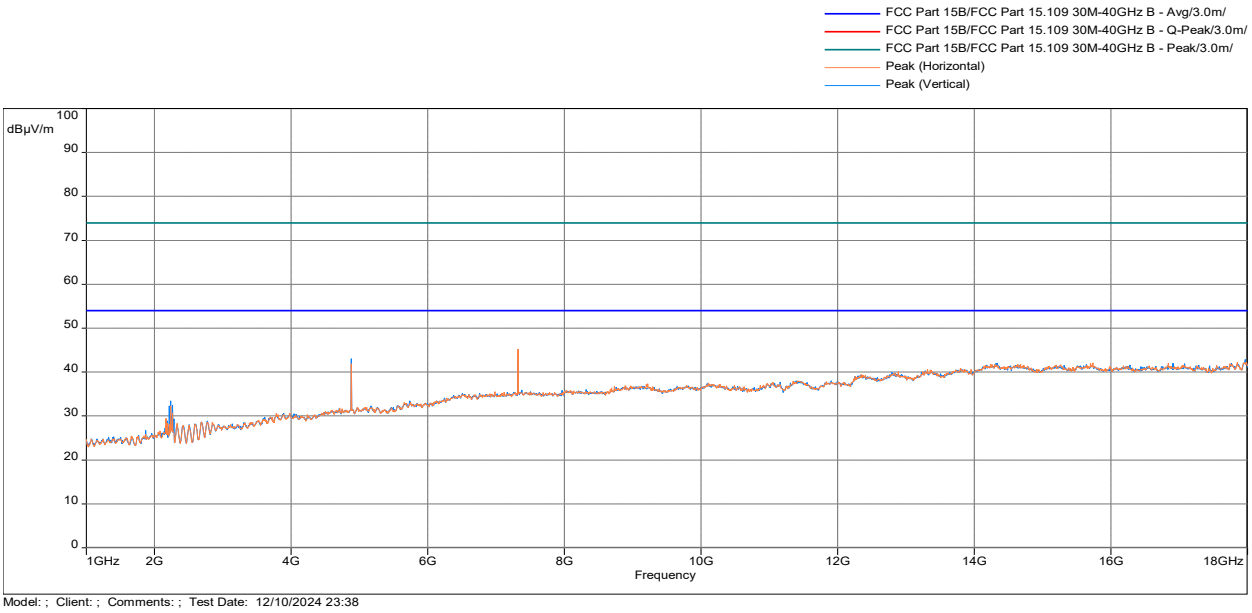
Model: ; Client: ; Comments: ; Test Date: 12/10/2024 20:01

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Peak Limit.



Model: ; Client: ; Comments: ; Test Date: 12/10/2024 23:26

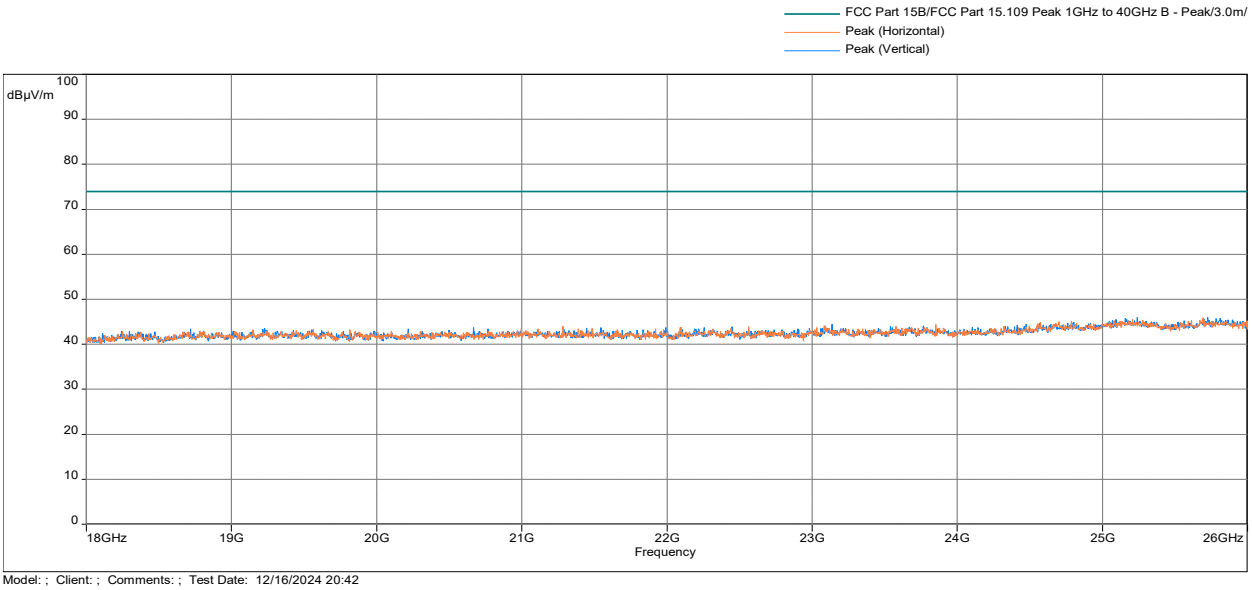
Radiated Spurious Emissions 1000 - 18000 MHz, Ave Scan vs Ave Limit.



Frequency (MHz)	Ave @3m (dBµV/m)	Lim. Ave @3m (dBµV/m)	Margin dB)	Height (m)	Angle (°)	Polarity	Correction (dB)
7320.600	45.30	54.0	-8.70	2.5	102.1	Horizontal	4.66
4879.967	43.09	54.0	-10.91	1.5	285.2	Vertical	0.49
7320.600	42.97	54.0	-11.03	2.5	27.6	Vertical	4.66
17963.733	42.89	54.0	-11.11	2.5	165.9	Vertical	2.79
17981.867	42.35	54.0	-11.65	3.5	0.0	Horizontal	2.80
15736.167	42.11	54.0	-11.89	2.5	102.1	Horizontal	3.58

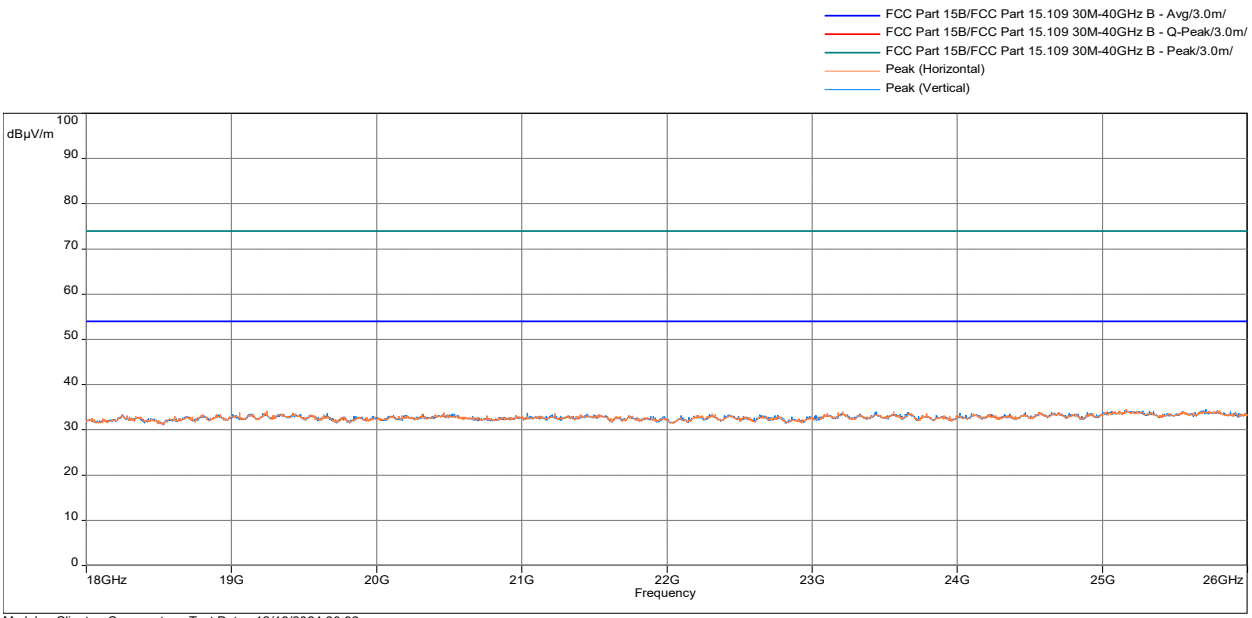
Note: Correction = AF + CF - Preamp

Radiated Spurious Emissions 18000 - 26000 MHz, Peak Scan vs Peak Limit.



Model: ; Client: ; Comments: ; Test Date: 12/16/2024 20:42

Radiated Spurious Emissions 18000 - 26000 MHz, Average Scan vs Average and Peak Limit.



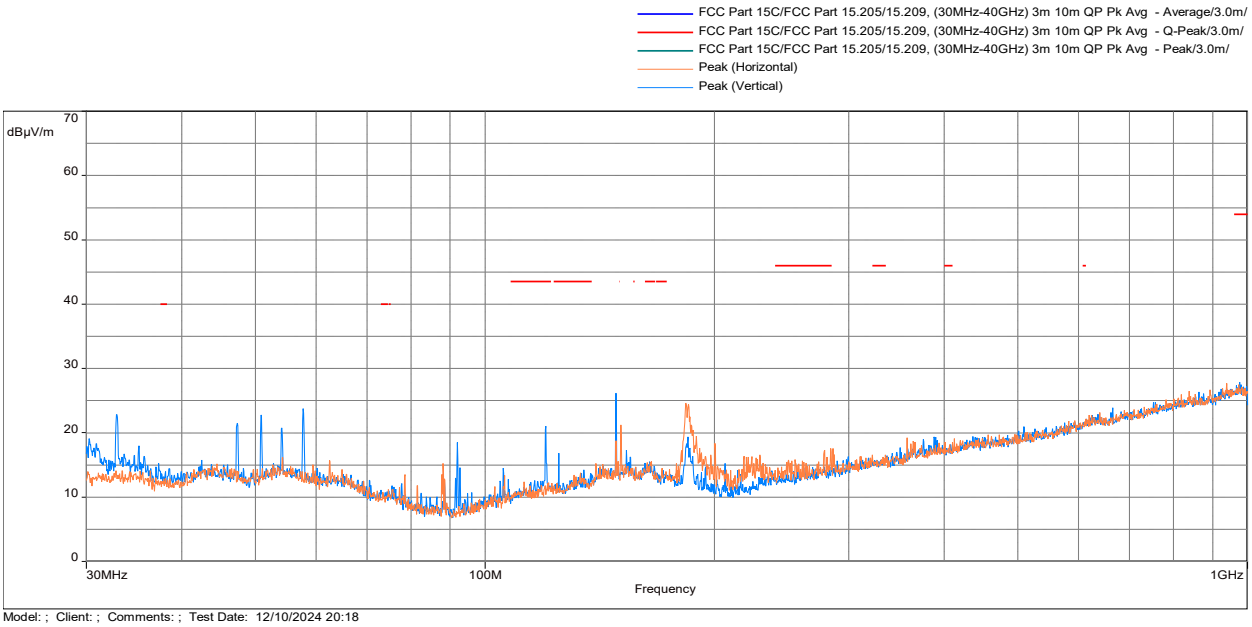
Model: ; Client: ; Comments: ; Test Date: 12/16/2024 20:32

Note: Correction = AF + CF - Preamp

Results	Complies

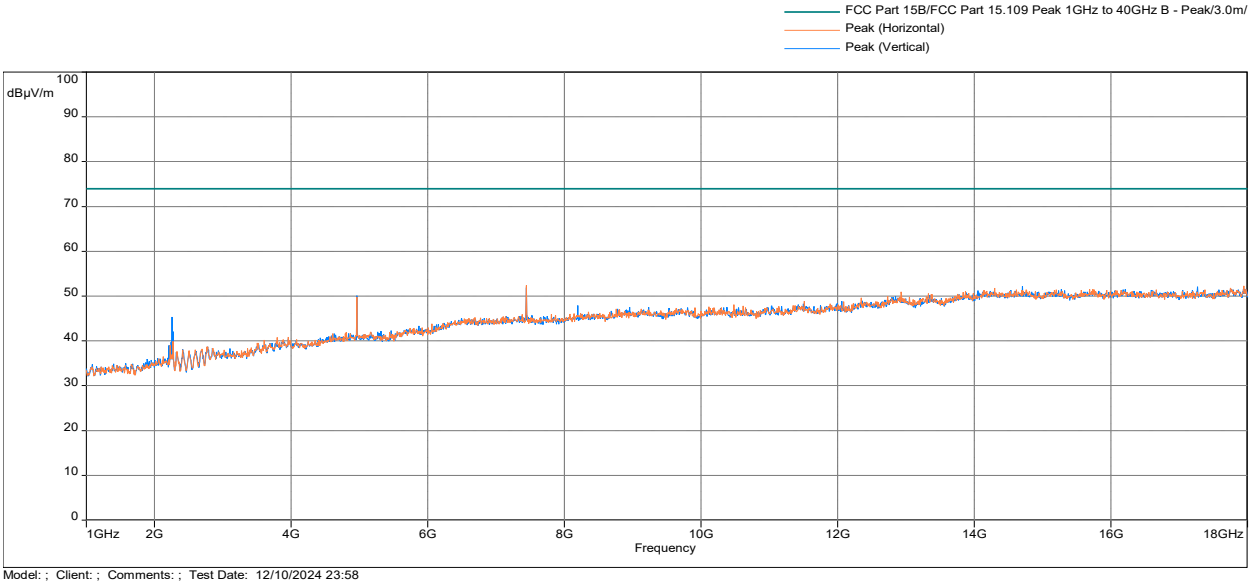
Test Results: 15.209 Radiated Spurious Emissions High Channel, Tx at 2480MHz Normal Mode

Radiated Spurious Emissions 30 MHz - 1000 MHz



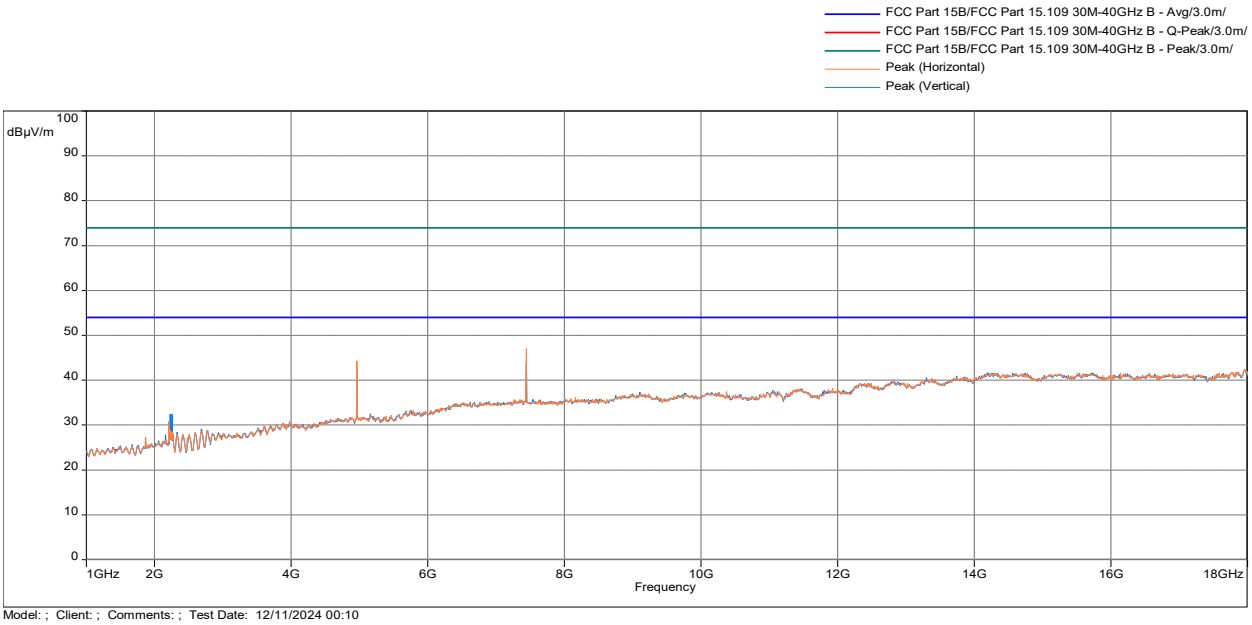
Model: ; Client: ; Comments: ; Test Date: 12/10/2024 20:18

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Peak Limit.



Model: ; Client: ; Comments: ; Test Date: 12/10/2024 23:58

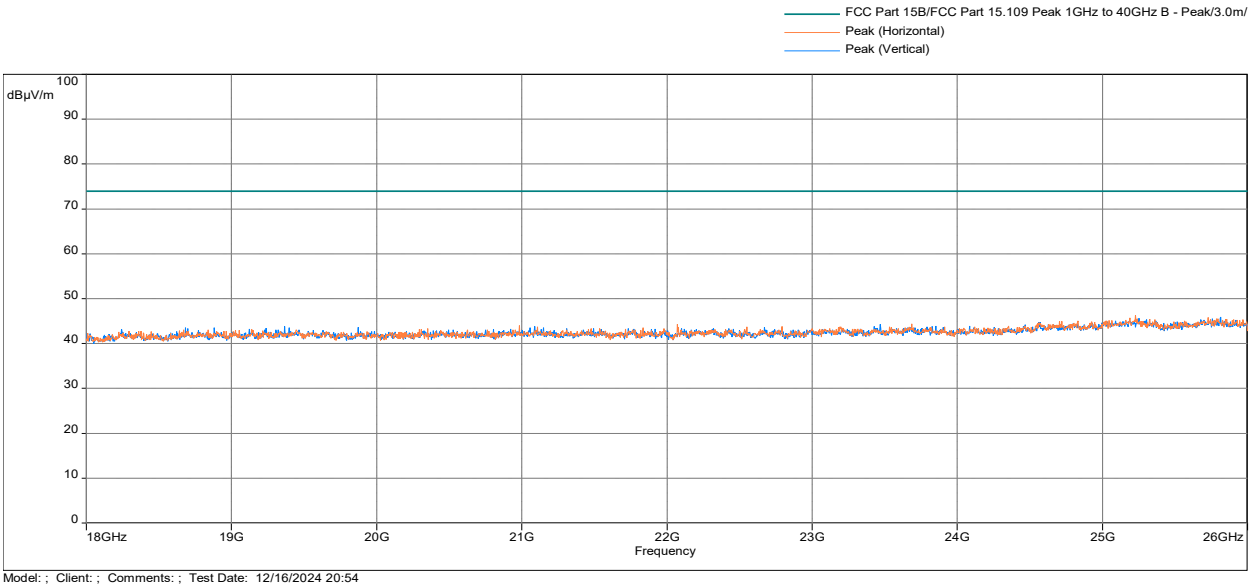
Radiated Spurious Emissions 1000 - 18000 MHz, Ave Scan vs Ave Limit.



Frequency (MHz)	Ave @3m (dBµV/m)	Lim. Ave @3m (dBµV/m)	Margin dB)	Height (m)	Angle (°)	Polarity	Correction (dB)
7439.033	47.04	54.0	-6.96	3.5	28.4	Horizontal	4.57
4959.867	44.31	54.0	-9.69	2.5	11.1	Horizontal	0.61
7439.033	43.84	54.0	-10.16	2.5	28.4	Vertical	4.57
4959.300	42.87	54.0	-11.13	2.5	348.9	Vertical	0.61
17960.900	42.41	54.0	-11.59	3.5	348.9	Horizontal	2.79
17959.200	42.29	54.0	-11.71	3.5	0.0	Vertical	2.79

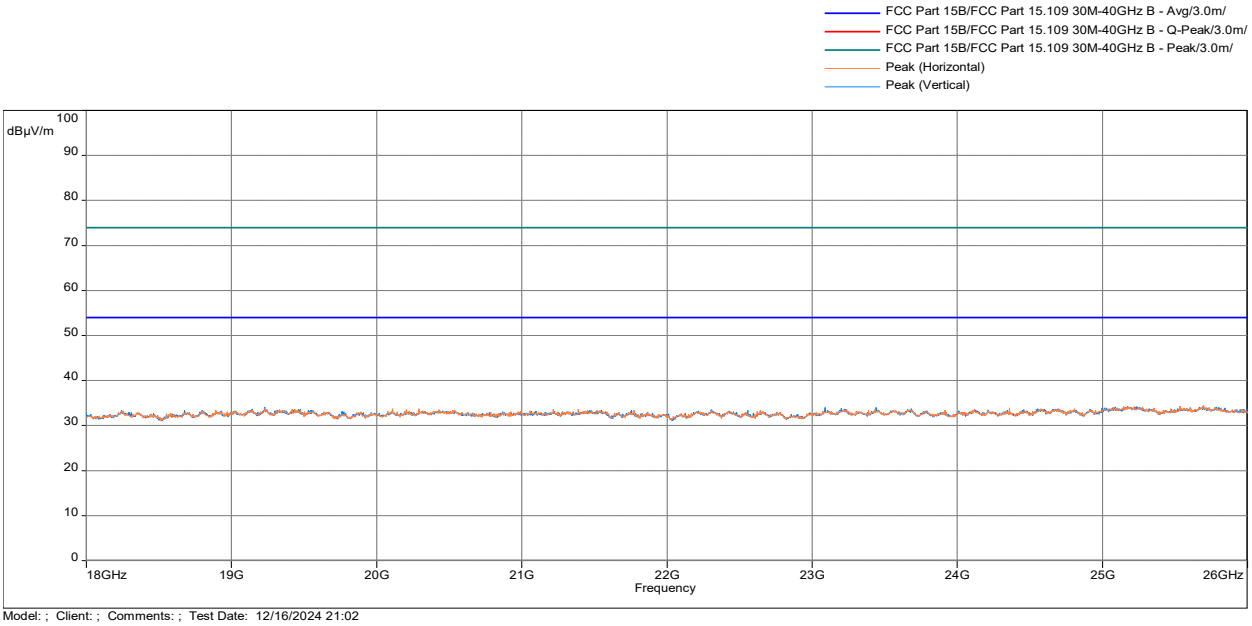
Note: Correction = AF + CF - Preamp

Radiated Spurious Emissions 18000 - 26000 MHz, Peak Scan vs Peak Limit.



Model: ; Client: ; Comments: ; Test Date: 12/16/2024 20:54

Radiated Spurious Emissions 18000 - 26000 MHz, Average Scan vs Average and Peak Limit.



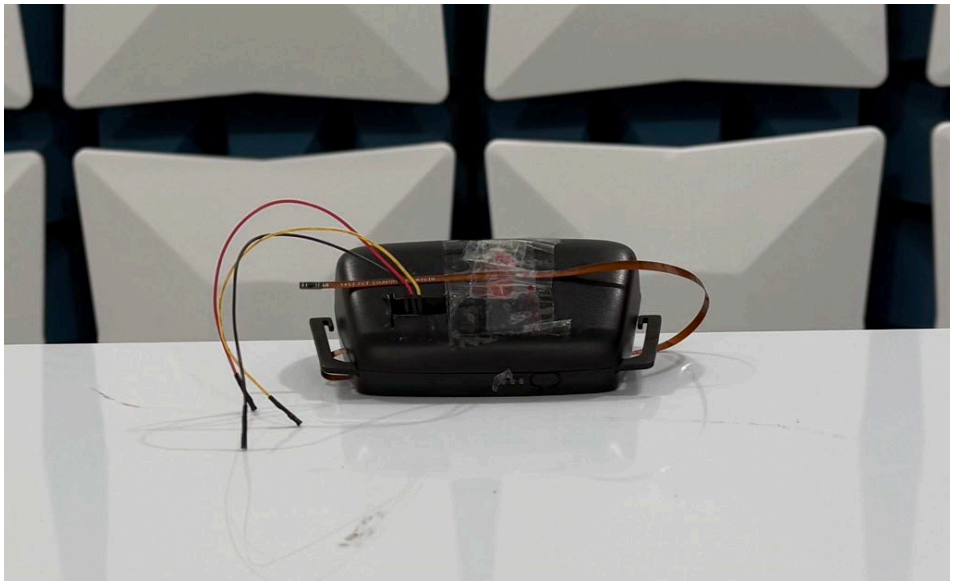
Model: ; Client: ; Comments: ; Test Date: 12/16/2024 21:02

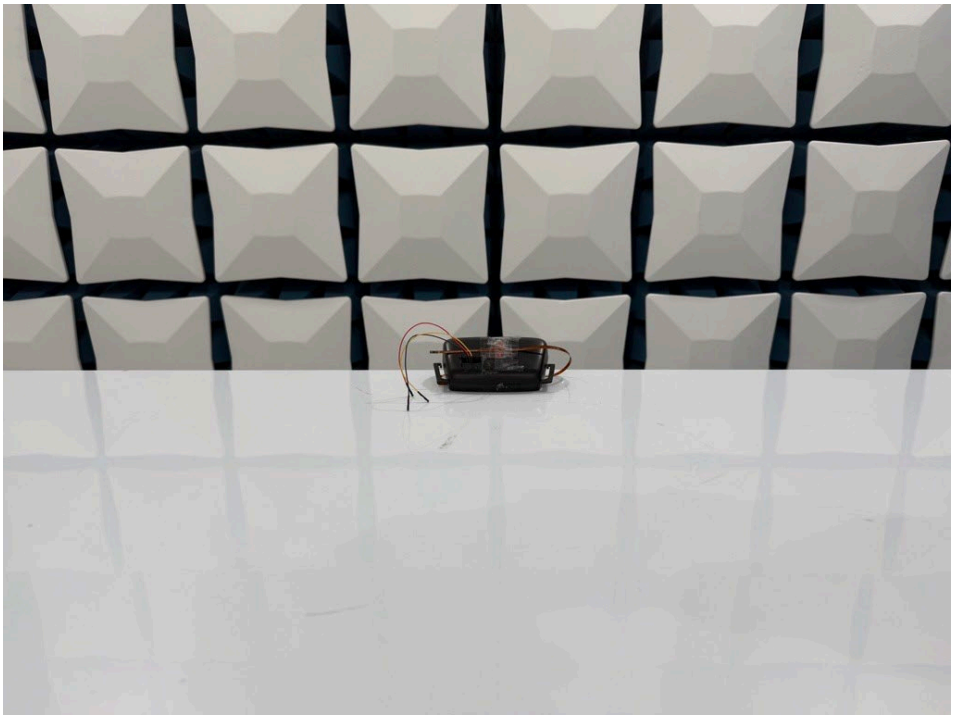
Note: Correction = AF + CF - Preamp

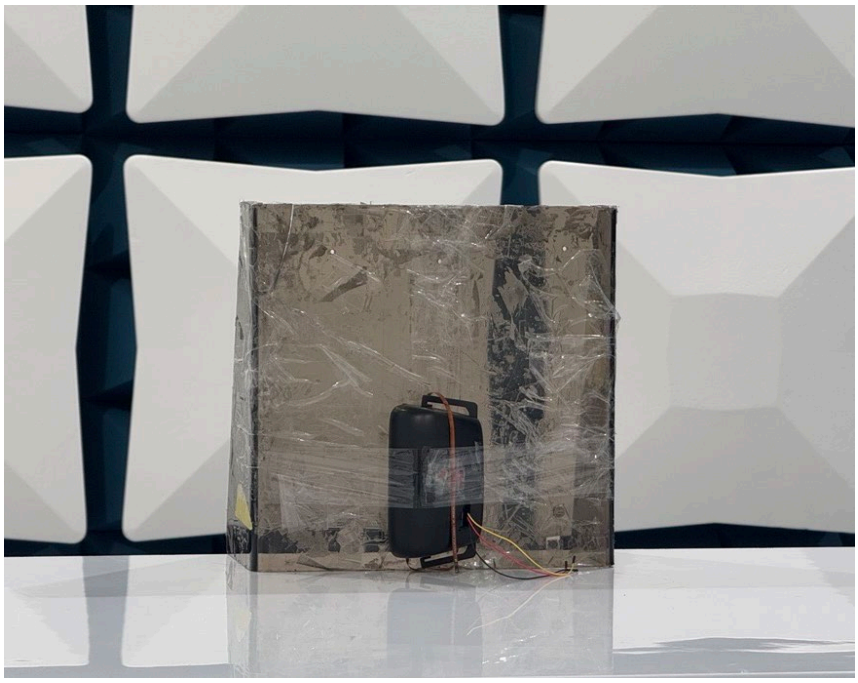
Results	**Complies**

4.5.5 Test Setup Configuration

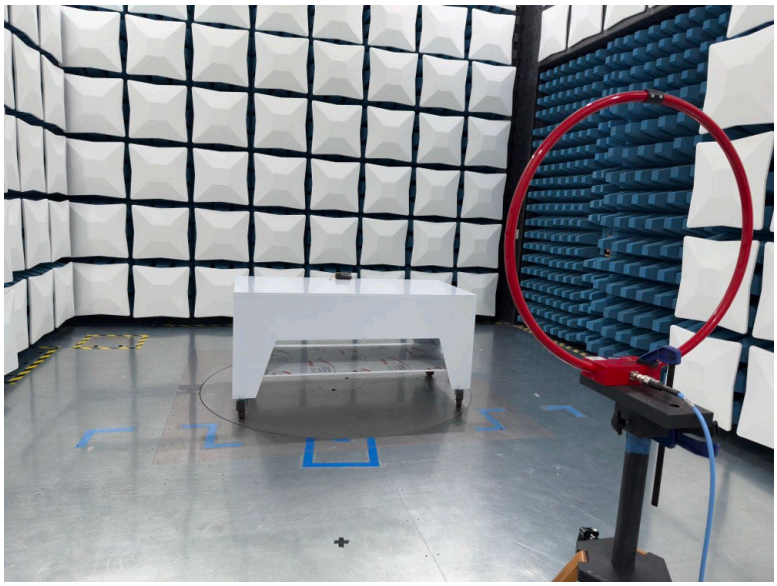
The following photographs show the testing configurations used.

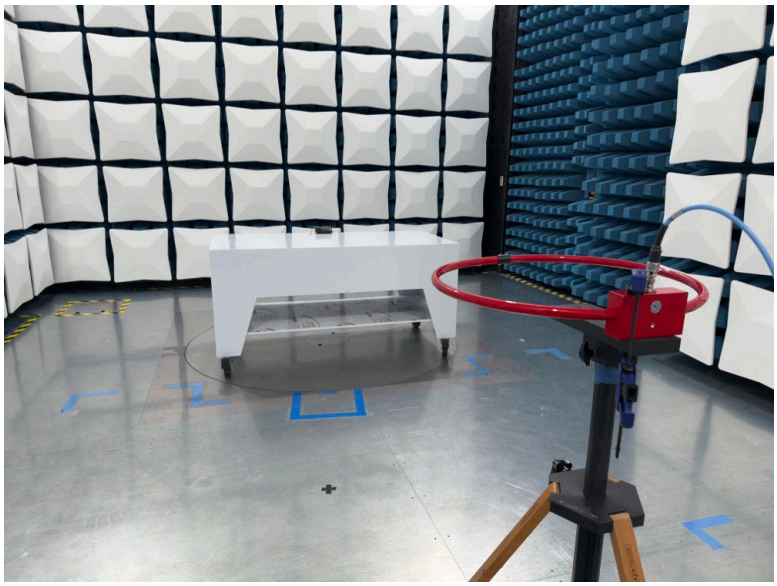




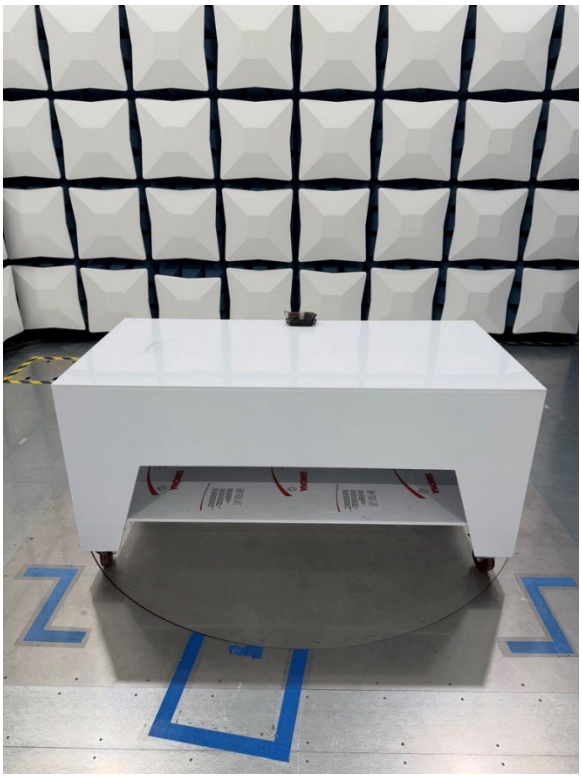


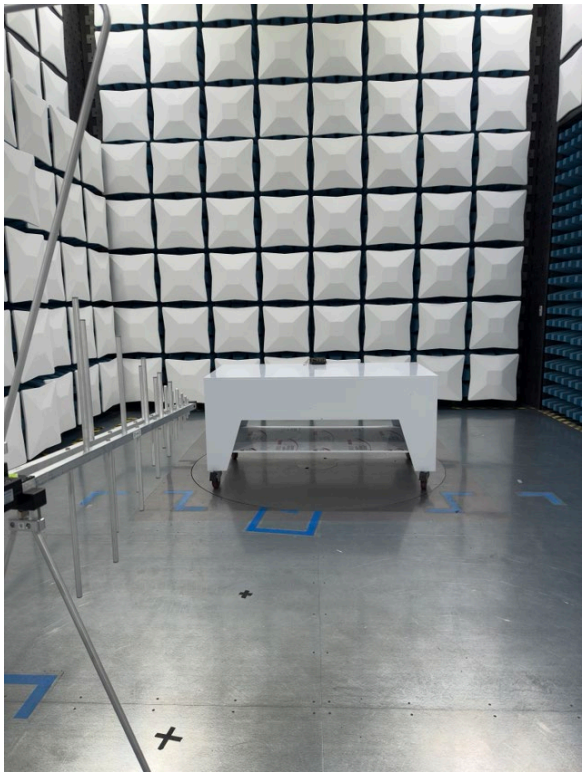
4.5.5 Test Setup Configuration (Continued)



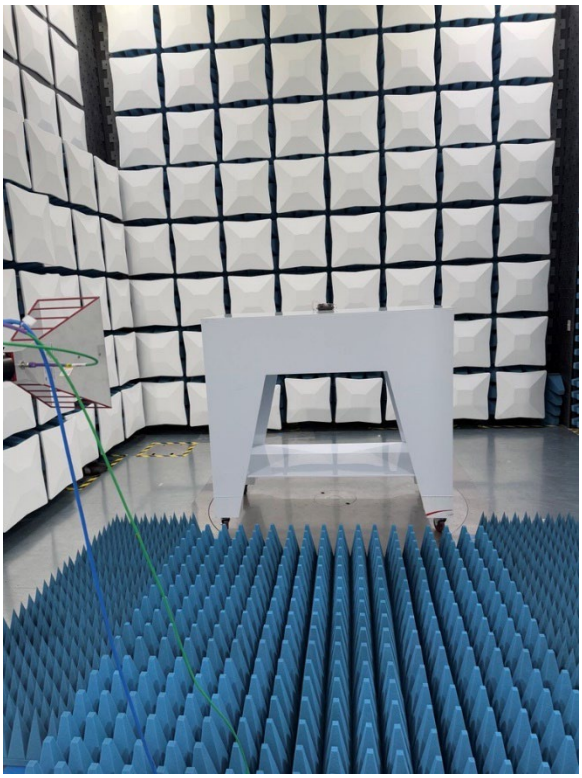


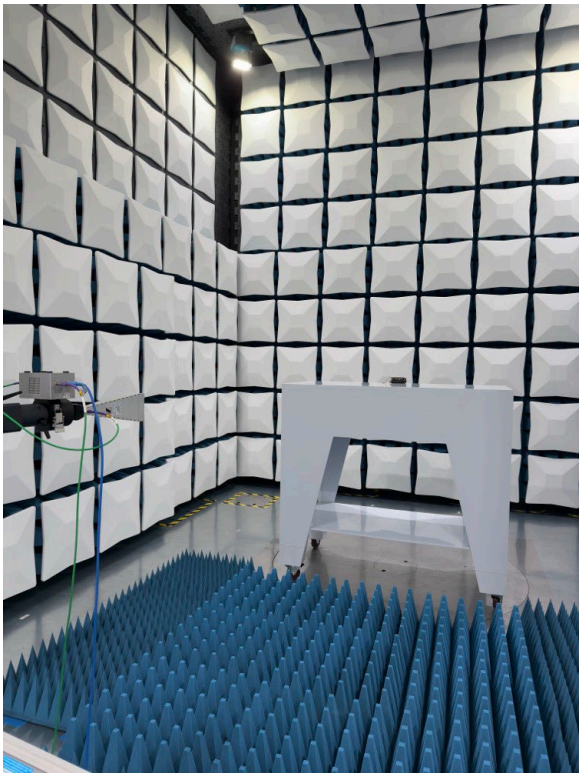
4.5.5 Test Setup Configuration (Continued)





4.5.5 Test Setup Configuration (Continued)





4.6 AC Line Conducted Emission
FCC: 15.207; RSS-GEN;

4.6.1 Requirement

Frequency Band MHz	Class B Limit dB(μV)		Class A Limit dB(μV)	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15-0.50	66 to 56 *	56 to 46 *	79	66
0.50-5.00	56	46	73	60
5.00-30.00	60	50	73	60

*Note: *Decreases linearly with the logarithm of the frequency. At the transition frequency the lower limit applies.*

4.6.2 Procedure

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide a defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN as defined in CISPR 16 shall be used.

The EUT is located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.

The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Floor standing EUT are placed on a horizontal metal ground plane and isolated from the ground plane by resting on an insulating material. The metal ground plane extends at least 0.5m beyond the boundaries of the EUT and has minimum dimensions of 2m by 2m.

Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.10-2013.

Results	**Not Applicable. EUT is battery operated.**

5.0 List of Test Equipment

Measurement equipment used for compliance testing utilized the equipment on the following list:

Equipment	Manufacturer	Model/Type	Asset #	Cal Int	Cal Due
EMI Receiver	Rohde and Schwarz	ESW44	ITS 02016	12	05/30/2025
9kHz-1GHz Preamplifier	Sonoma Instrument	310N	ITS 02129	12	10/02/2025
9kHz-30MHz Loop Antenna (Passive)	ETS Lindgren	6512	ITS 01573	12	12/02/2025
30-1000MHz Trilog Antenna	Schwarzbec	VULB 9168	ITS 02097	12	08/21/2025
1-18GHz Preamplifier	EMC Instruments	EMC118A45SE	ITS 02113	12	10/02/2025
1-18GHz Horn Antenna	RF Spin	DRH18-E	ITS 02114	12	10/02/2025
18-40GHz Preamplifier	EMC Instruments	EMC184045SE	ITS 02112	12	10/02/2025
18-40GHz Horn Antenna	RF Spin	DRH0844	ITS 02115	12	10/03/2025
Notch Filter	MICRO-TRONICS	BRM50702-01	ITS 02062	12	02/14/2025

Calibration not required.

Software used for emission compliance testing utilized the following:

Name	Manufacturer	Version	Template/Profile
BAT-EMC	Nexio	3.20.0.23	ESU and ESR Intertek Emissions Template
Tile	Quantum Change	3.4.K.22	Conducted Spurious_30M-26GHz
RS Commander	Rohde Schwarz	1.6.4	Not Applicable (Screen grabber)

6.0 Document History

Revision/ Job Number	Writer Initials	Reviewers Initials	Date	Change
1.0 / G106028948	KT	ML	December 26, 2024	Original document
2.0 / G106028948	KT	ML	February 04, 2025	Updated Section 4.2.2 for DTS device.

END OF REPORT