TEST REPORT

Report Number: 105683076MPK-002
Project Number: G105683076
Original Issue Date: March 29, 2024
Revised: May 16, 2024

Testing performed on
Model X Controller
Model Number: T14399

to

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

For

Traeger Pellet Grills LLC

Test Performed by:	**Test Authorized by:**
Intertek	Traeger INC.
1365 Adams Court	533 South 400 West,
Menlo Park, CA 94025 USA	Salt Lake City, UT, 84101, USA

Prepared by: _____ **Date:** March 29, 2024
Gilberto Gallegos Rangel

Reviewed by: _____ **Date:** March 29, 2024
Minh Ly

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Report No. 105683076MPK-002	
Equipment Under Test:	Model X Controller
Model Number:	T14399
Applicant:	Traeger Pellet Grills LLC
Contact:	Chuck Benson
Address:	Traeger Pellet Grills LLC 533 South 400 West, Salt Lake City, UT, 84101, USA
Country:	USA
Tel. Number:	(503)-780-9527
Email:	cbenson@traegergrills.com
Applicable Regulation:	FCC Part 15 Subpart C (15.247) ISED RSS-247 Issue 3
Date of Test:	January 22-30, 2024

We attest to the accuracy of this report:

Gilberto Gallegos Rangel
EMC Engineer

Minh Ly
EMC Team Lead

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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	Complies
Antenna Requirement	15.203	RSS-GEN	Complies (Internal Antenna)

EUT receive date: January 22, 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: January 22, 2024

Test completion date: January 30, 2024

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

2.0 General Information

2.1 Product Description

Traeger Pellet Grills LLC supplied the following description of the EUT:

The Model X controller is a controller installed into a grill to control and monitor its setting and attached peripherals.

For more information, see 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	Traeger Pellet Grills LLC
Model No.	Model X Controller
Type of transmission	Digital Transmission System (DTS)
Rated RF Output	13.92 dBm
Antenna(s) & Gain	Internal Antenna, Gain: 4.01dBi
Frequency Range	2402 – 2480 MHz
Type of modulation/data rate	GFSK/1Mbit/s
Number of Channel(s)	40
Applicant Name & Address	Traeger Pellet Grills LLC 533 South 400 West, Salt Lake City, UT, 84101, USA

2.2 Related Submittal(s) Grants

None.

2.3 Test Facility

The test site used to collect the radiated data is site 1 (10-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 2, 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

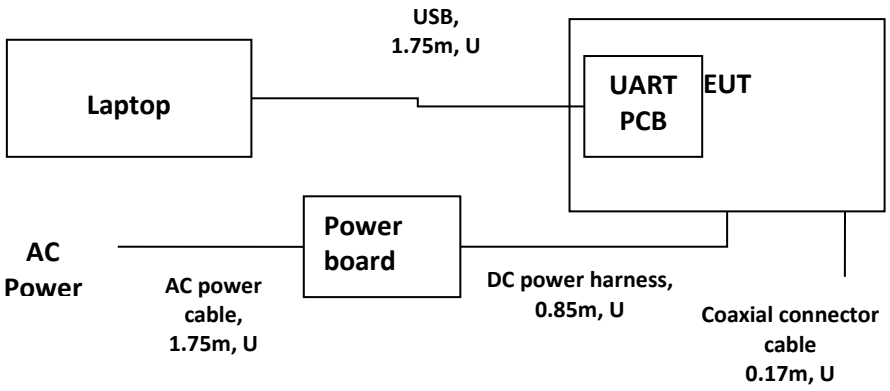
3.1 Equipment Under Test (EUT) & Support Equipment

Equipment Under Test			
Description	**Manufacturer**	**Model**	**Serial Number/ID**
Model X Controller– Conducted Unit	Traeger Pellets Grills LLC	T14038 v.C1	U2C123520120E
Model X Controller – Radiated Unit	Traeger Pellets Grills LLC	T14038 v.C1	U2C123520152D

Support Equipment		
Description	**Manufacturer**	**Model**
Programming Board	Traeger Pellet Grills	763-1-1608
Power Board	Traeger Pellet Grills	T14707
Fan	Guangdong Fangzhan Motor Co.	FZ-BLDC12038
Auger	Guangdong Fangzhan Motor Co.	FZ6020C-614
Ignitor	Yandi	T14588
RTD Temperature Sensor Cavity	Yandi	T14665
Meat Probe Temperature Sensor	Yandi	BAC289/BAC329
Pellet Sensor	Traeger Pellet Grills	T00261

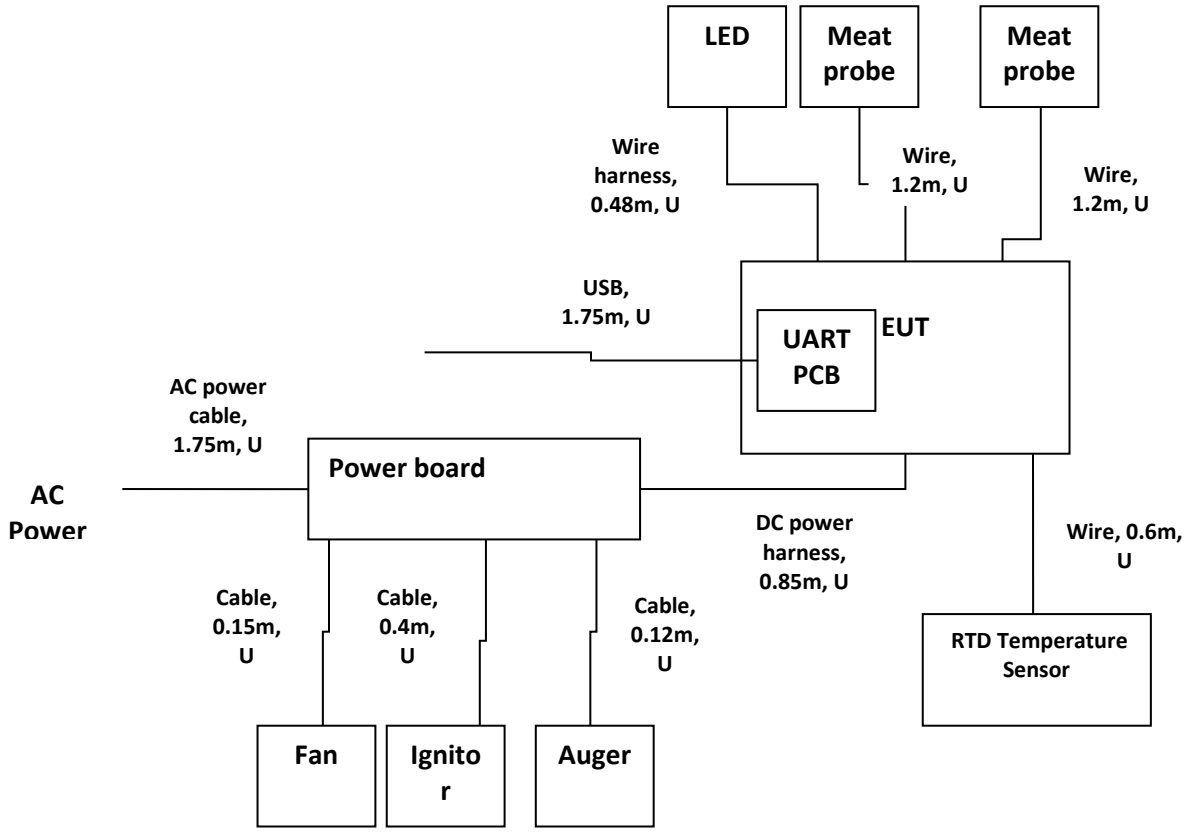
3.2 Block Diagram of Test Setup

Conducted setup



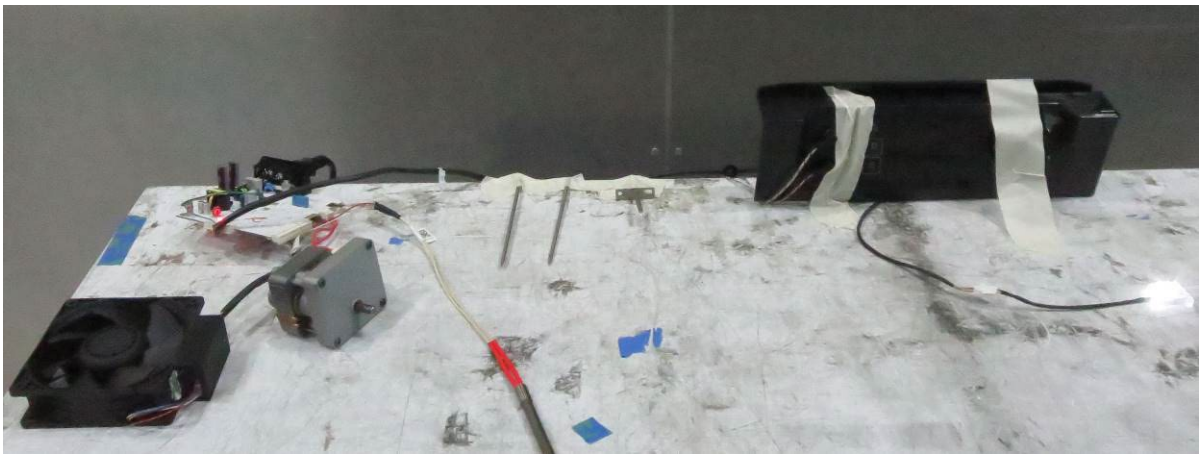
S = Shielded **U** = Unshielded	**F** = With Ferrite **m** = Meter

Radiated setup



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 orientation of the EUT were tested and only the worse-case emissions were reported.

The EUT was tested in 1 configuration with EUT in horizontal and upright positions and in AC mode.

The EUT was set to continuous transmit mode with the duty cycle >98%.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was provided by Traeger Pellet Grills LLC.

3.5 Mode of Operation during Test

During the transmitter tests, the transmitter was setup to transmit maximum communication and RF power levels with the duty cycle >98%.

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

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

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.

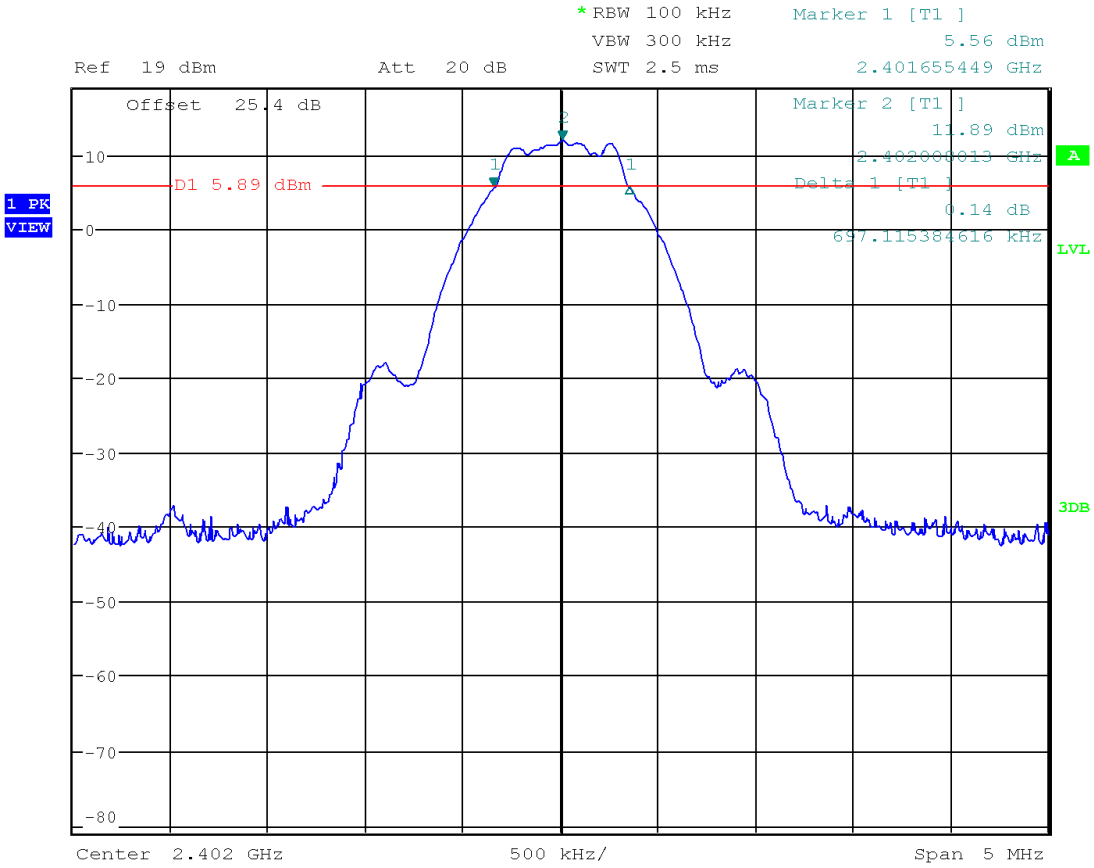
For 99% power bandwidth measurement, the bandwidth was determined by using the built-in 99% occupied bandwidth function of the spectrum analyzer. The resolution bandwidth is set to 1% of the selected span as is without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

4.1.3 Test Result

Frequency (MHz)	6-dB bandwidth FCC 15.247 & RSS-GEN, kHz	Occupied bandwidth, RSS-GEN, MHz	Plot
2402	697.115		1.1
		1.0336	1.4
2440	697.115		1.2
		1.0384	1.5
2480	700.32		1.3
		1.0432	1.6

Tested By	Test Date	Results
Gilberto Gallegos Rangel	January 30, 2024	Complies

Plot 1. 1



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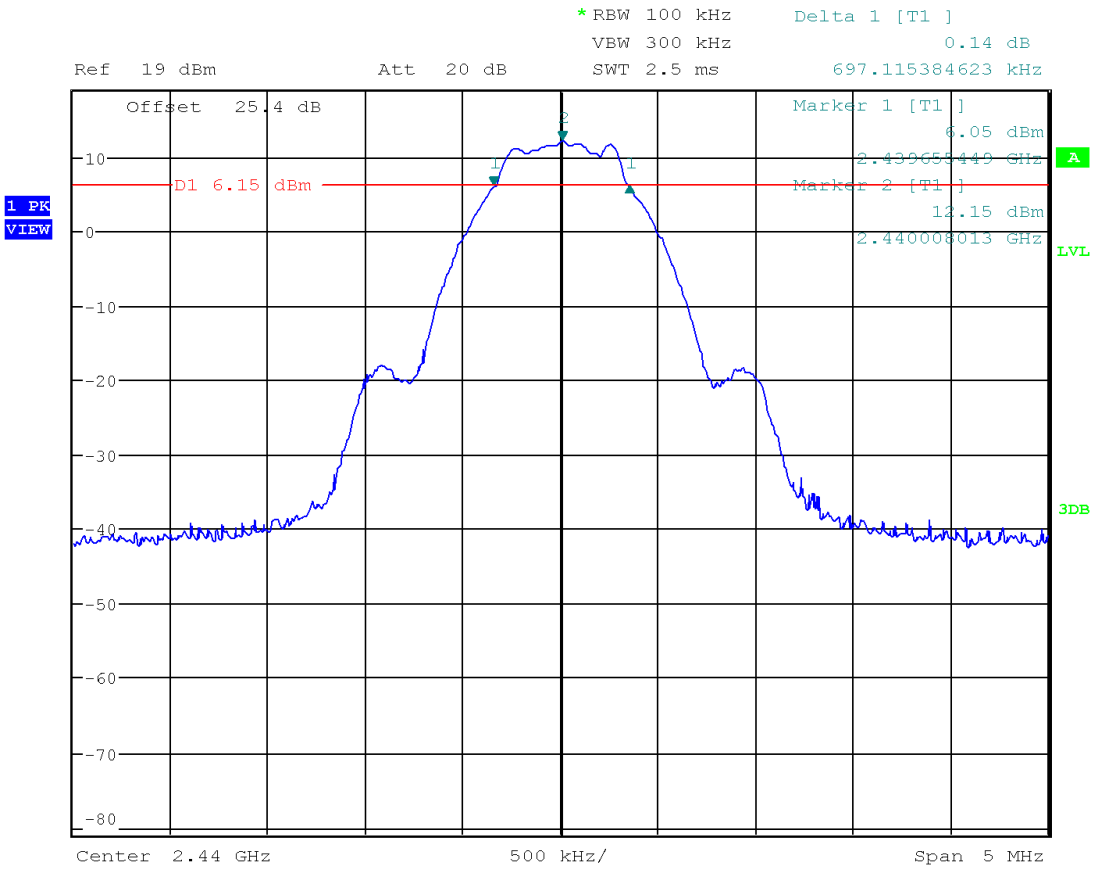
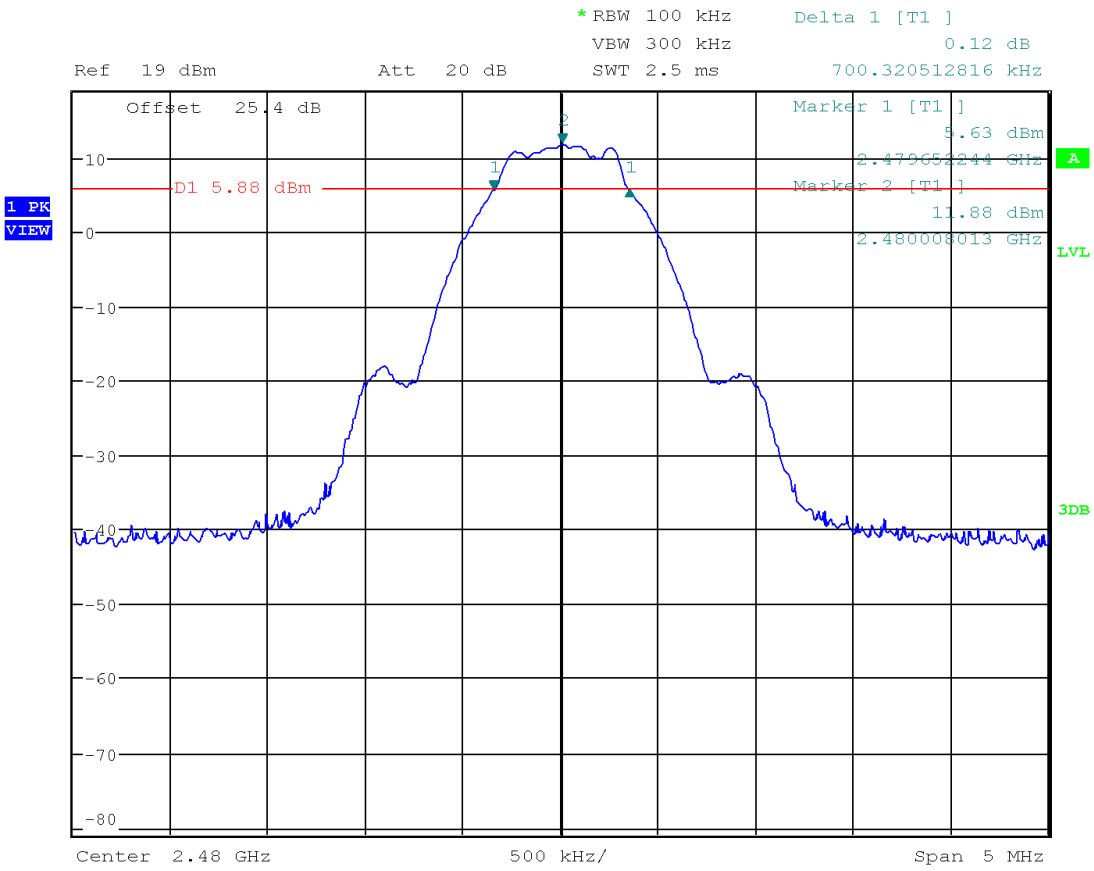
Plot 1. 2



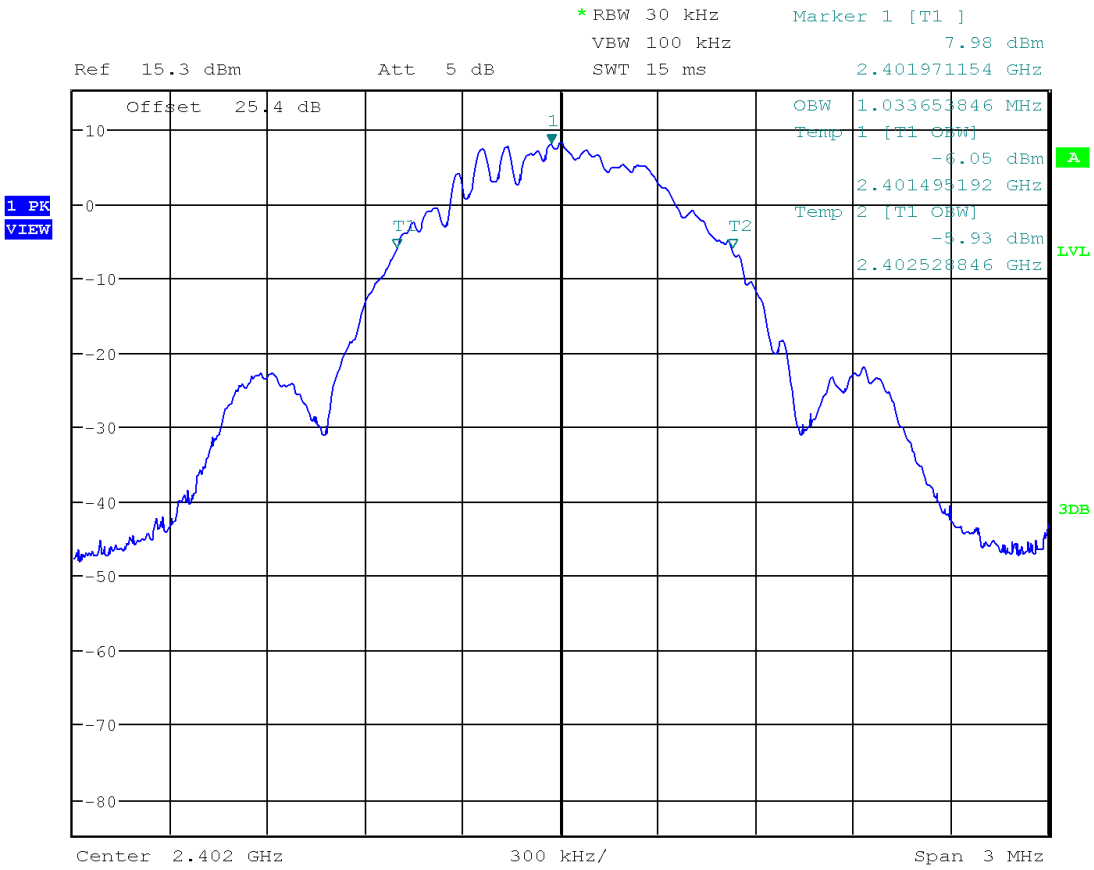
Date: 30.JAN.2024 20:44:51

Plot 1. 3



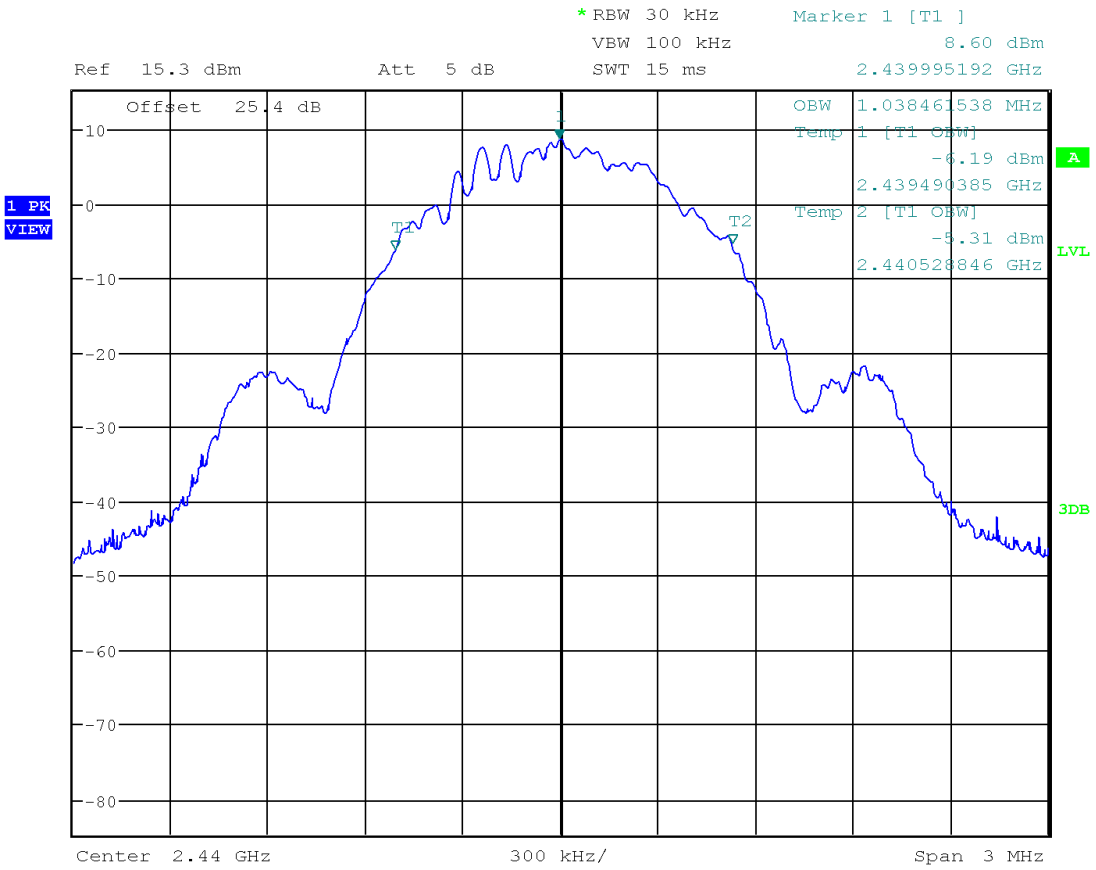
Date: 30.JAN.2024 20:42:04

Plot 1. 4



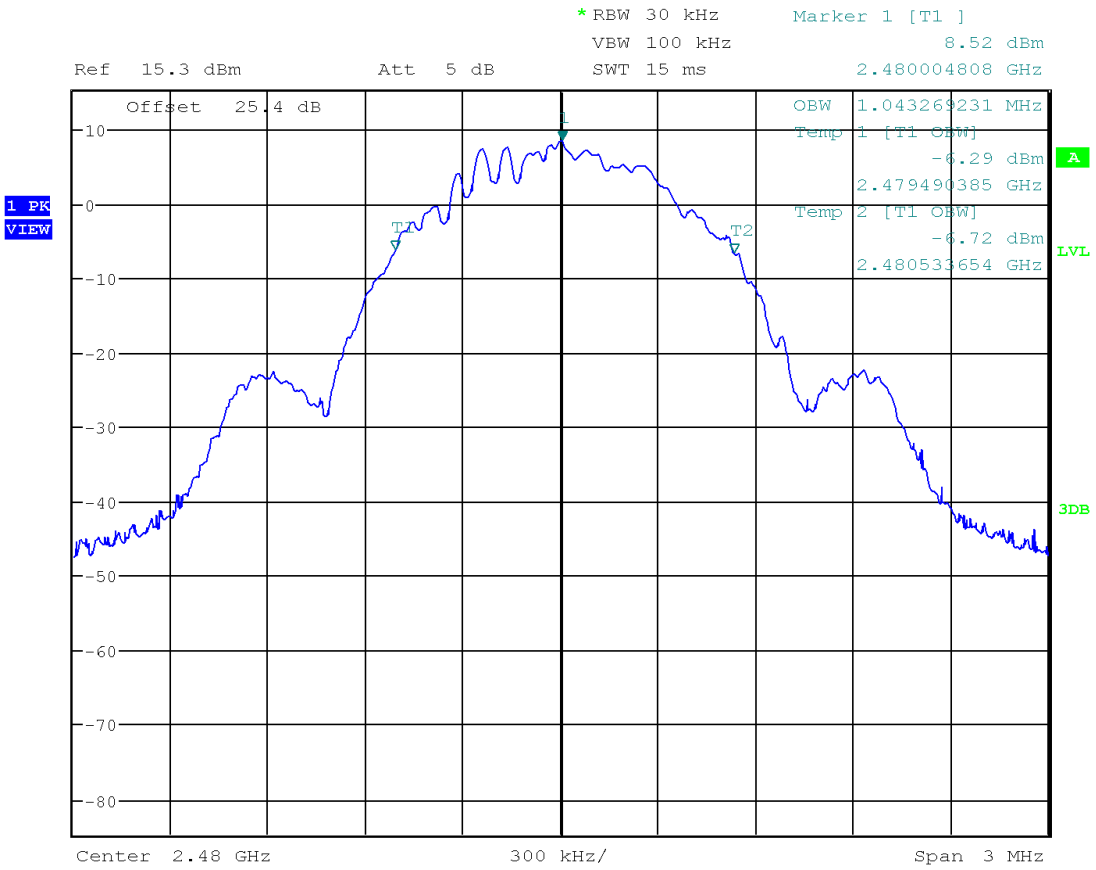
Date: 30.JAN.2024 20:34:39

Plot 1.5



Date: 30.JAN.2024 20:37:00

Plot 1.6



Date: 30.JAN.2024 20:39:03

Results	Complies

4.2 Maximum Peak Conducted Output Power at Antenna Terminals
FCC Rule: 15.247(b)(3); RSS-247, 5.4.d);

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.

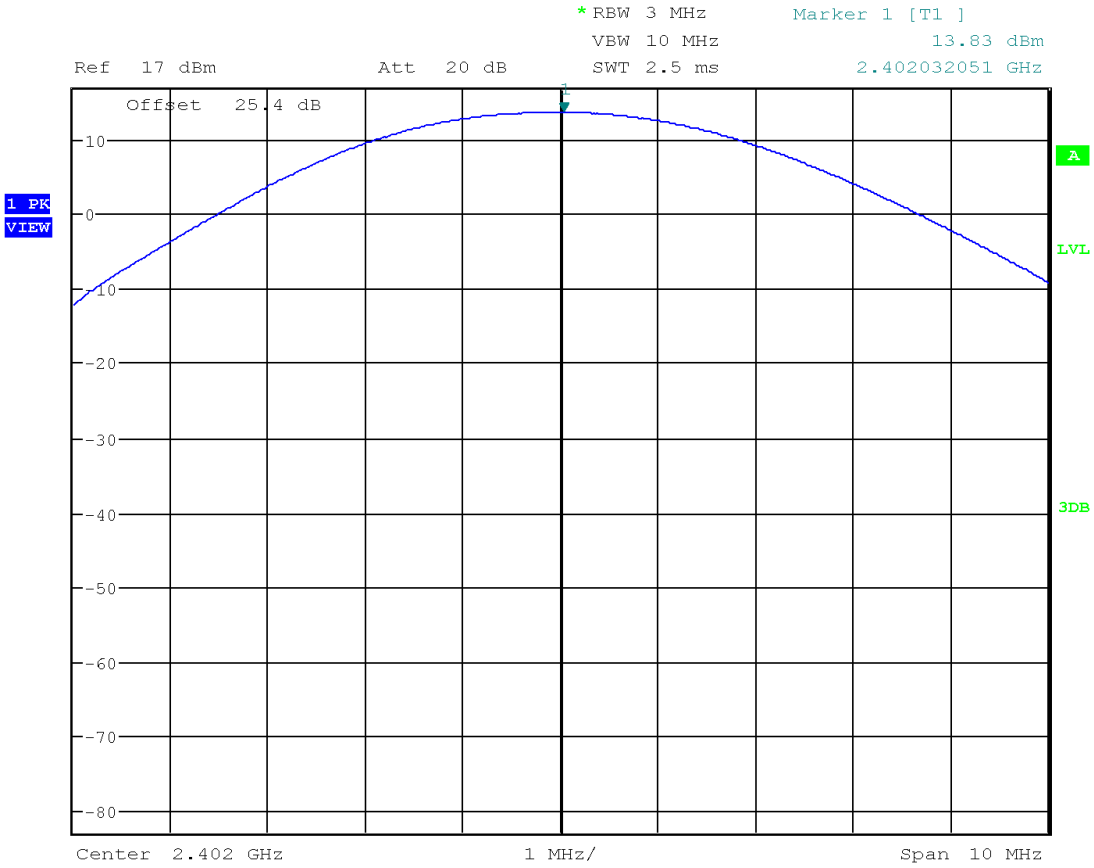
4.2.3 Test Result

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

Frequency	Conducted Power (peak)		Plot
MHz	dBm	mW	
2402	13.83	24.1546	2.1
2440	13.92	24.6603	2.2
2480	13.65	23.1739	2.3

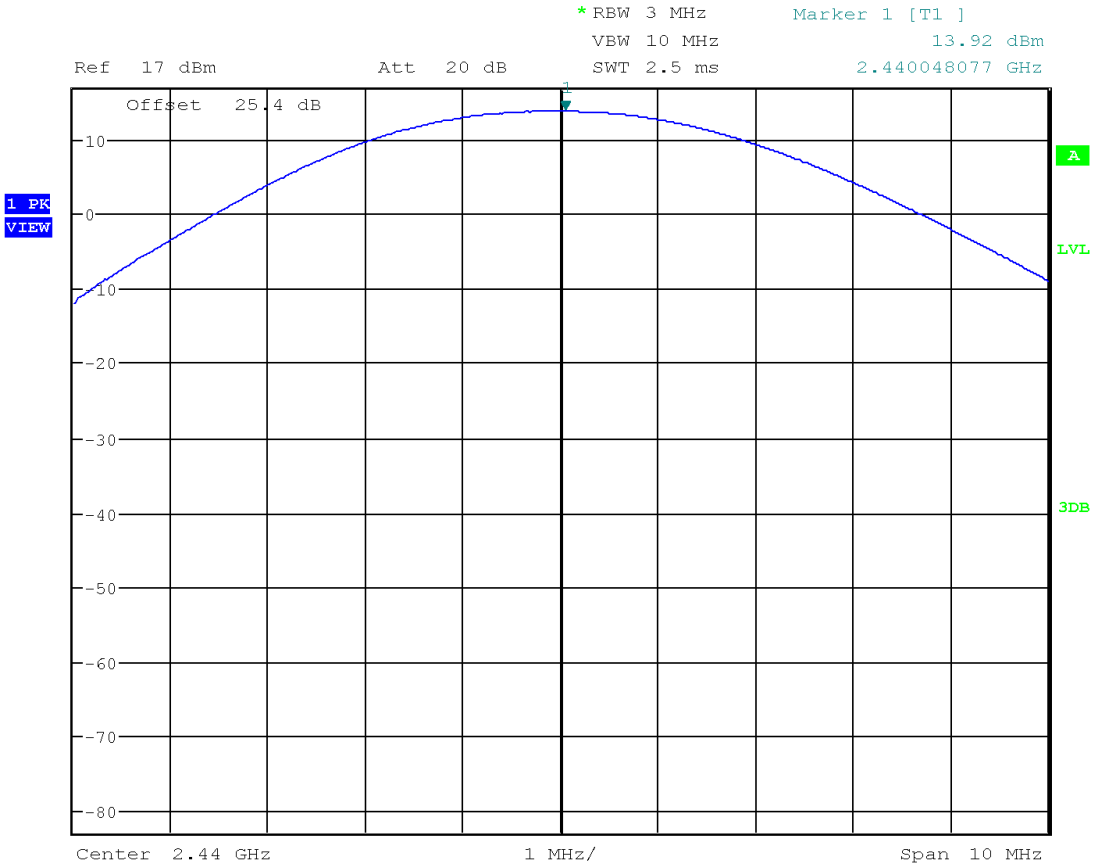
Tested By	Test Date	Results
Gilberto Gallegos Rangel	January 30, 2024	Complies

Plot 2. 1



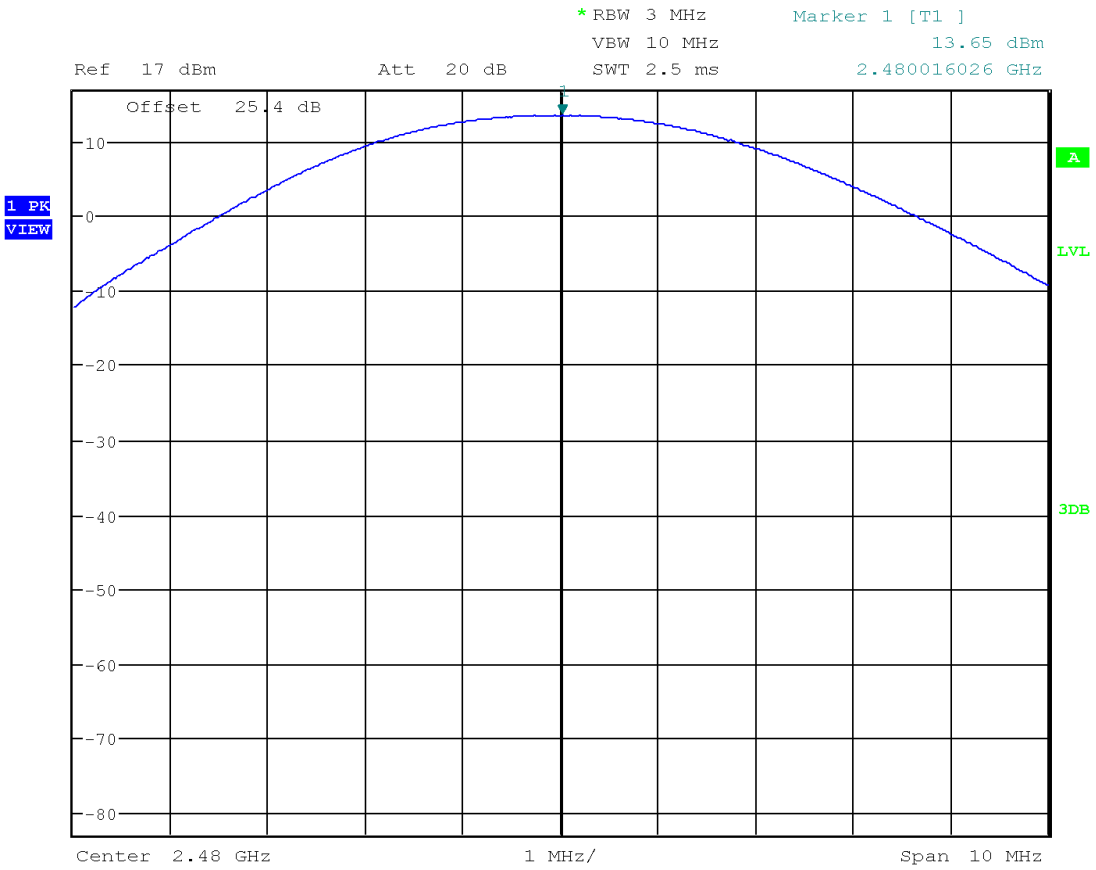
Date: 30.JAN.2024 21:04:28

Plot 2. 2



Date: 30.JAN.2024 21:06:21

Plot 2. 3



Date: 30.JAN.2024 21:09:11

Results	Complies

4.3 Maximum Power Spectral Density
FCC: 15.247 (e); RSS-247, 5.2.b);

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

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

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.

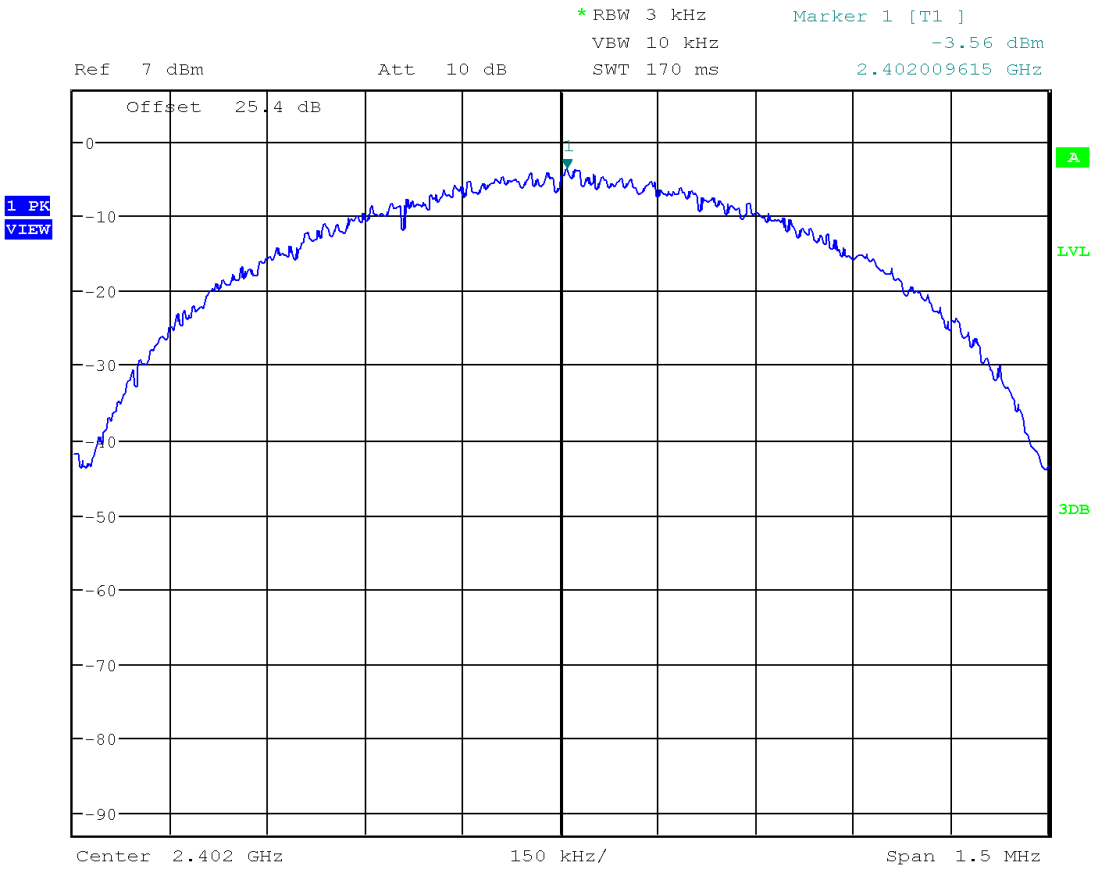
4.3.3 Test Result

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	-3.56	8.0	-11.56	3.1
2440	-2.00	8.0	-10	3.2
2480	-2.29	8.0	-10.29	3.3

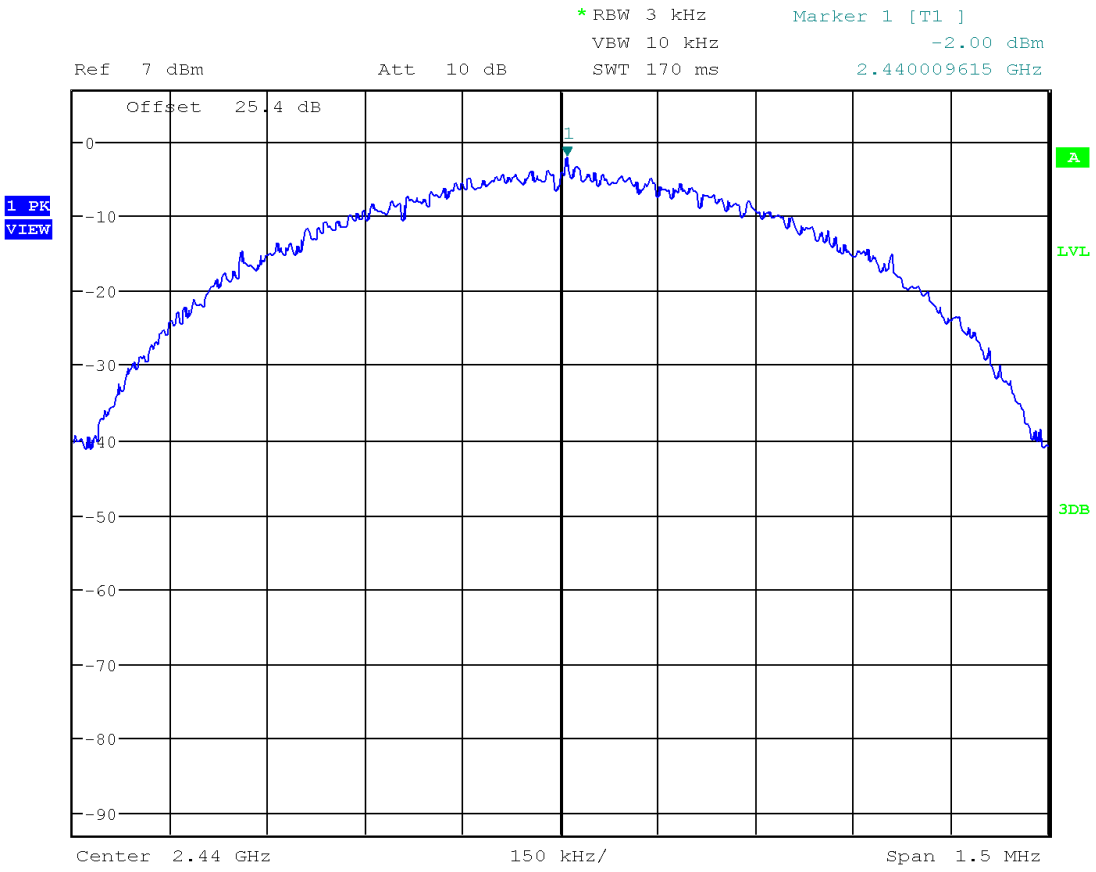
Tested By	Test Date	Results
Gilberto Gallegos Rangel	January 30, 2024	Complies

Plot 3. 1



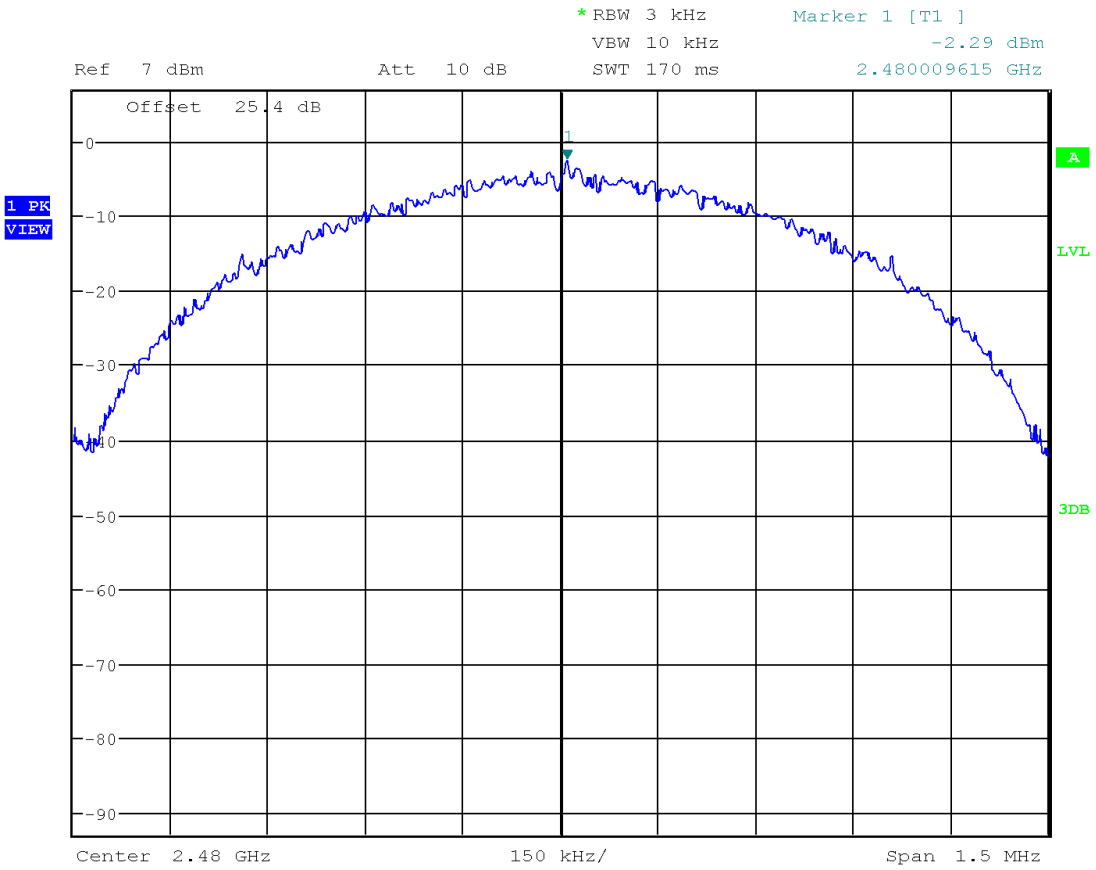
Date: 30.JAN.2024 21:19:55

Plot 3. 2



Date: 30.JAN.2024 21:13:39

Plot 3. 3



Date: 30.JAN.2024 21:11:29

Results	Complies

4.4 Out of Band Antenna Conducted Emission
FCC: 15.247(d); RSS-247, 5.5;

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.

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

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.

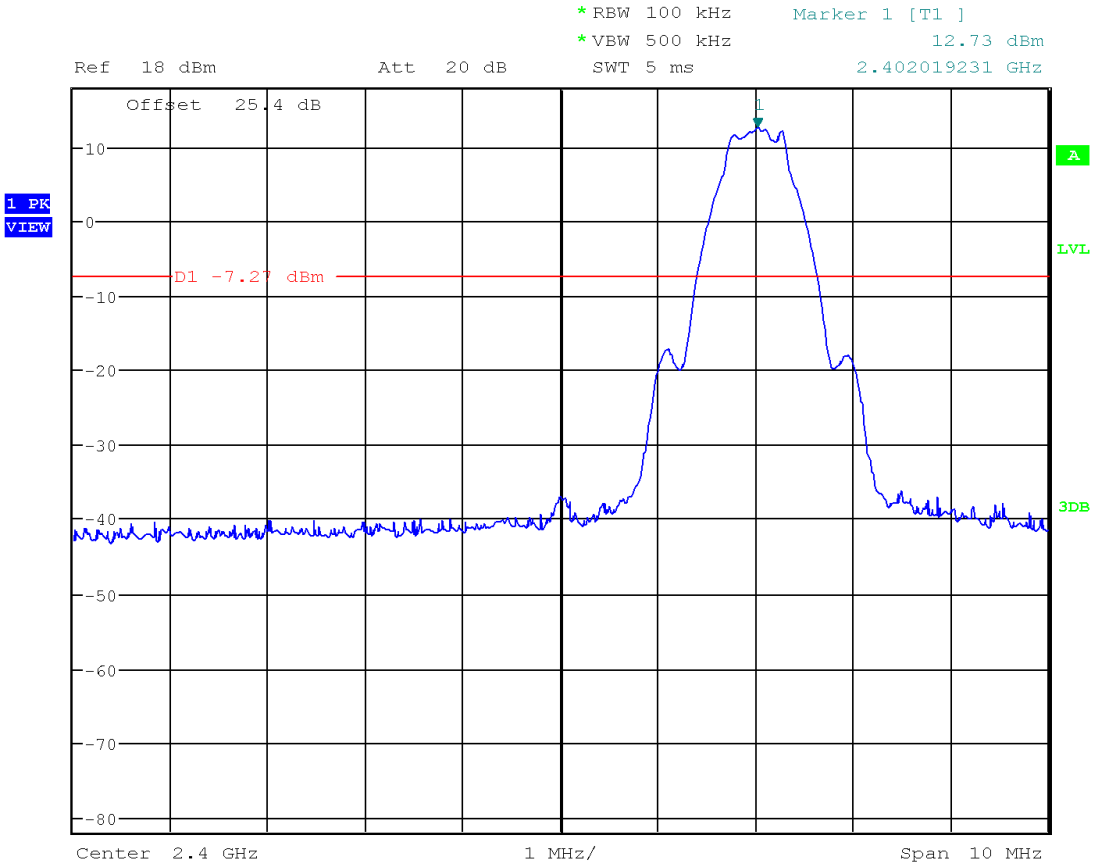
The unwanted emissions were measured from 30 MHz to 25 GHz. Plots below are corrected for cable loss and then compared to the limits.

4.4.3 Test Result

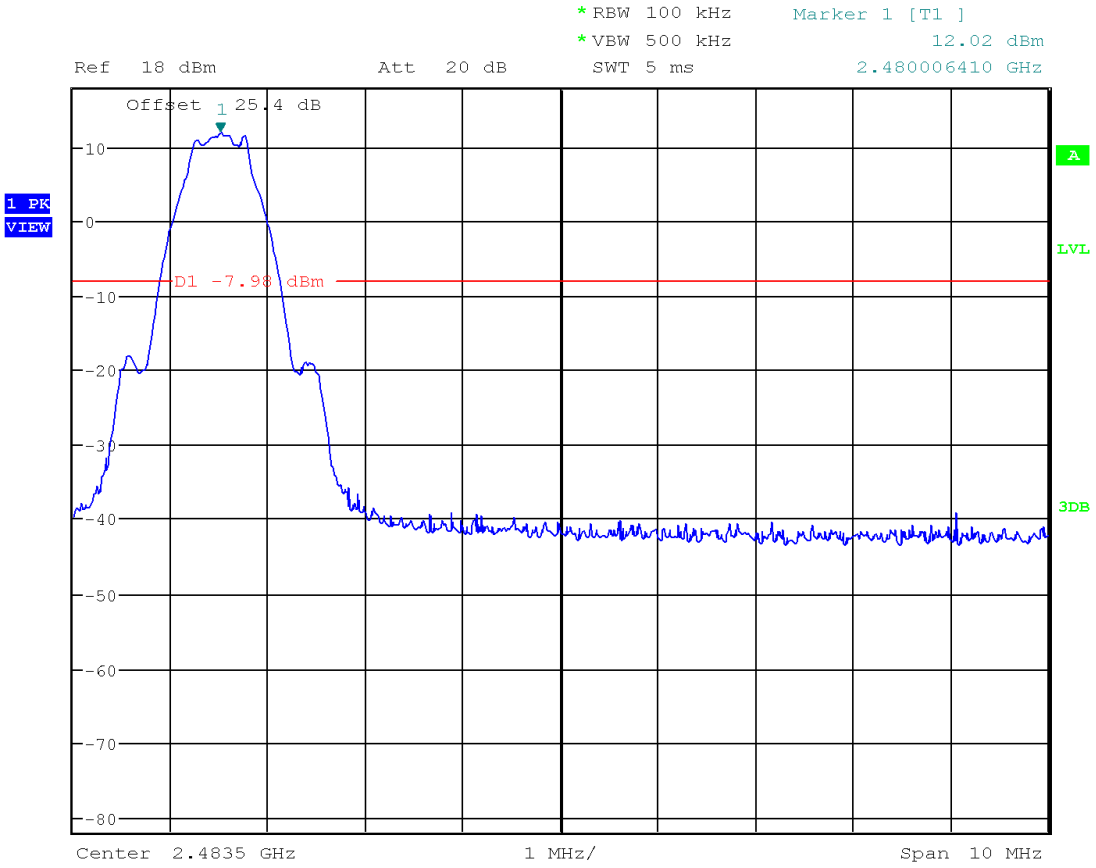
Refer to the following plots 4.1 – 4.5 for unwanted conducted emissions. The plot shows -20dB attenuation limit line.

Tested By	Test Date	Results
Gilberto Gallegos Rangel	January 30, 2024	Complies

Tx @ Low Channel, 2402 MHz Band Edge
Plot 4.1



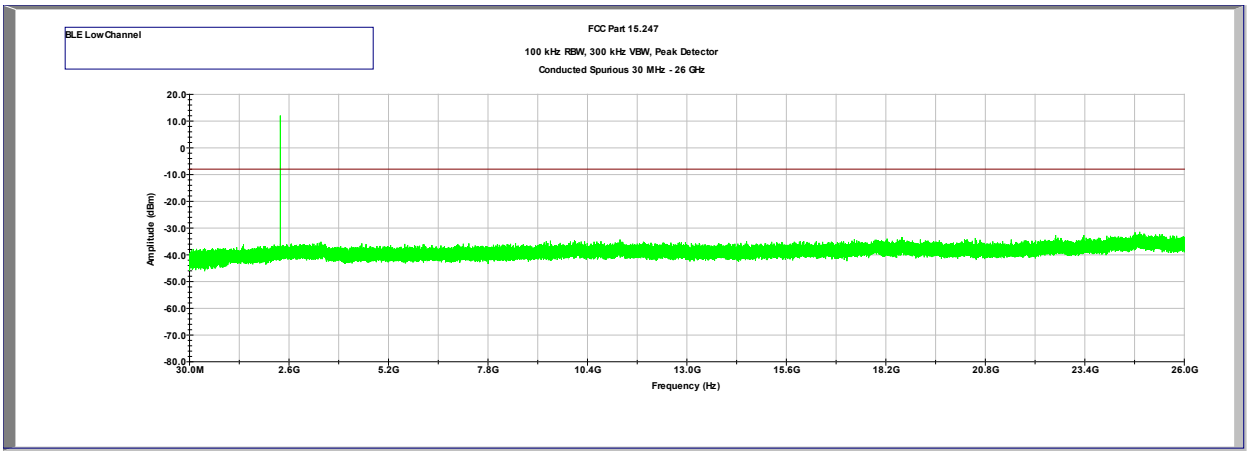
Tx @ High Channel, 2480 MHz Band Edge
Plot 4.2



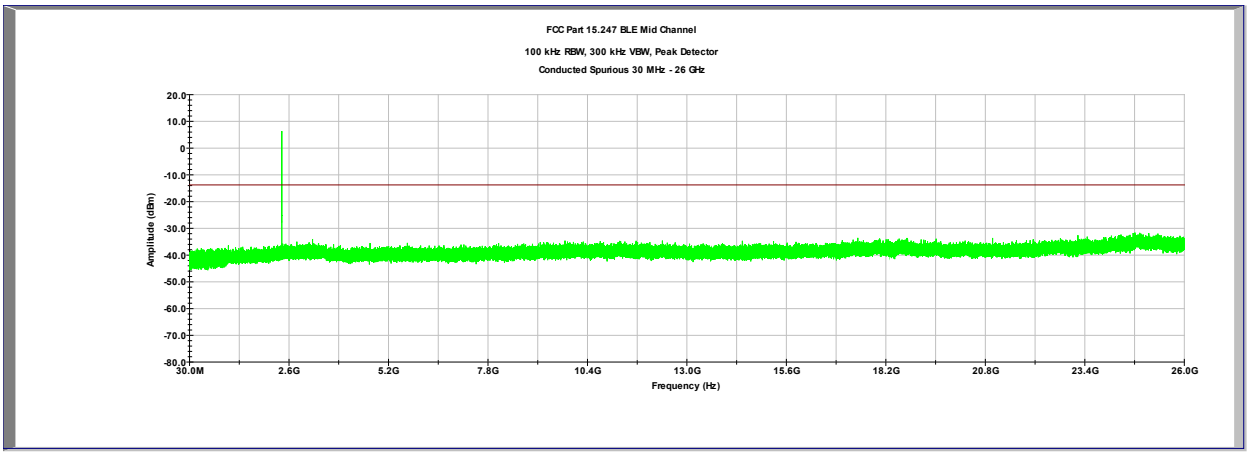
Results	Complies

Note: The emission values were at least 30 dB below the peak emission as measured with a 100 kHz BW

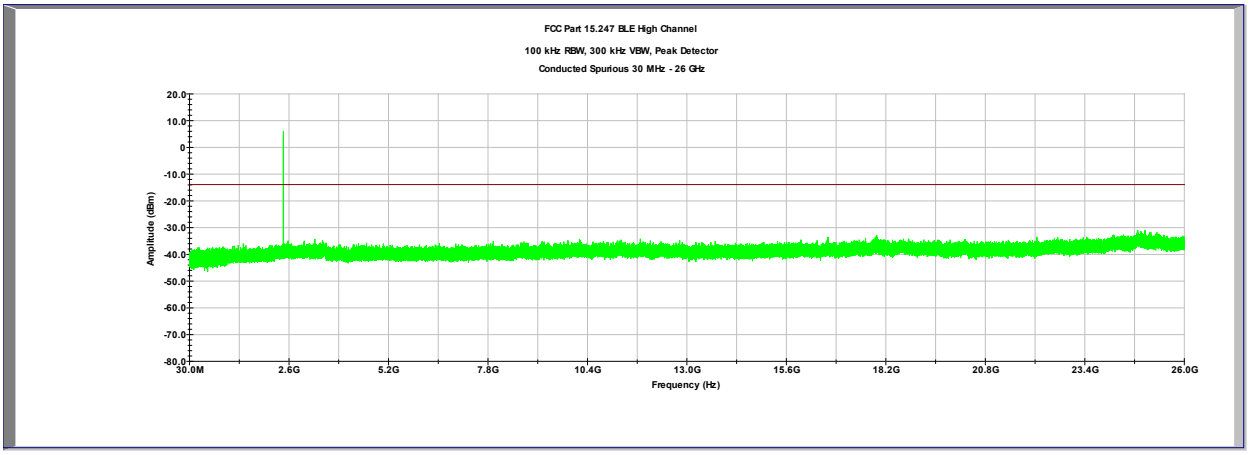
Tx @ Low Channel, 2402 MHz
30MHz -26GHz Conducted Spurious
Plot 4.3



Tx @ Mid Channel, 2440 MHz
30MHz -26GHz Conducted Spurious
Plot 4.4



Tx @ High Channel, 2480 MHz
30MHz -26GHz 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 10 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 tested in both horizontal and upright position. 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.

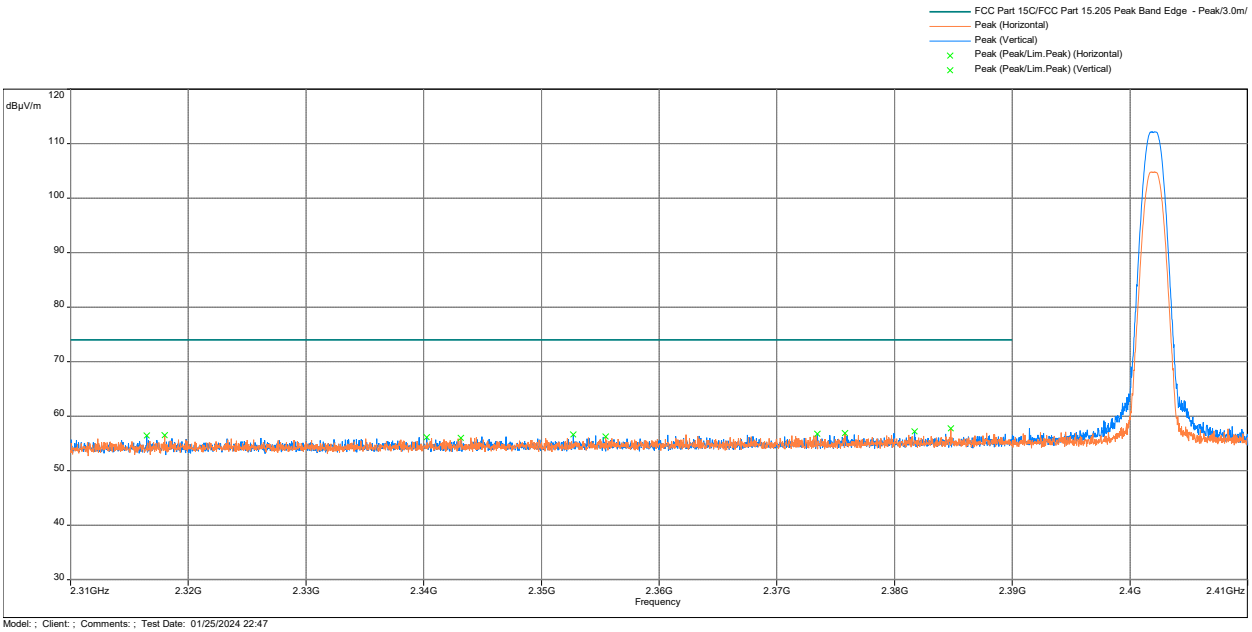
4.5.4 Test Results

All testing in this section were performed by radiated measurements.

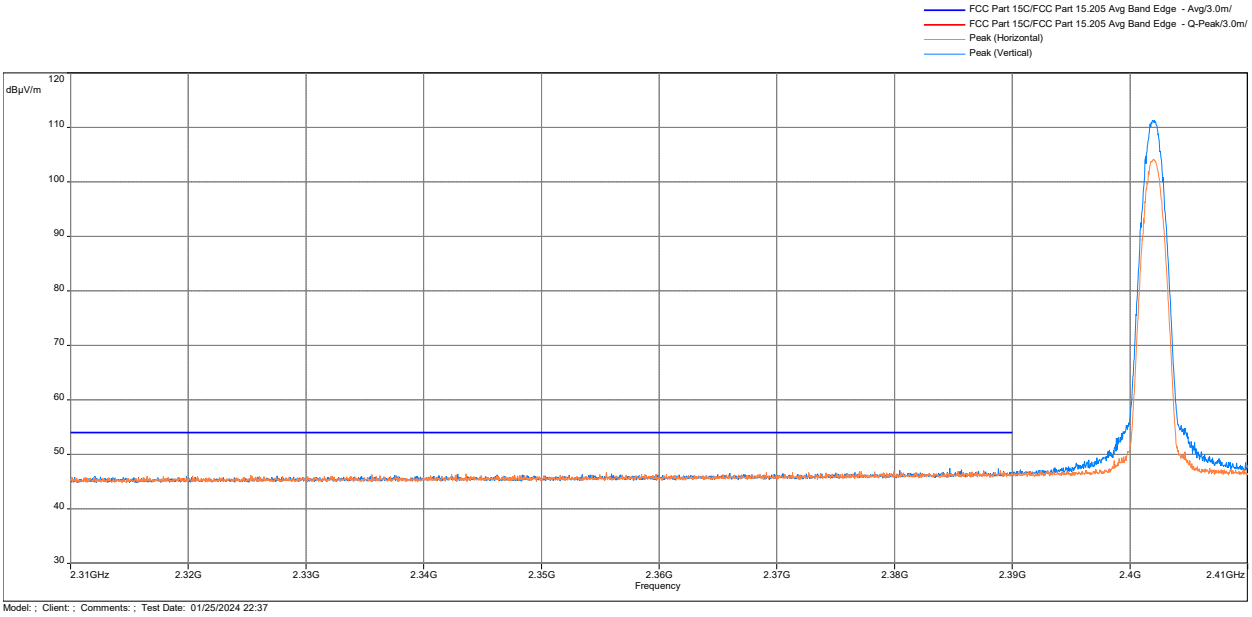
Tested By	Test Date	Results
Gilberto Gallegos Rangel	January 22-30, 2024	Complies

Test Results: 15.209/15.205 Radiated Restricted Band Emissions

Out-of-Band Radiated spurious emissions at the Band-edge @1m distance
2310–2390 MHz, Peak Scan with Peak Limit



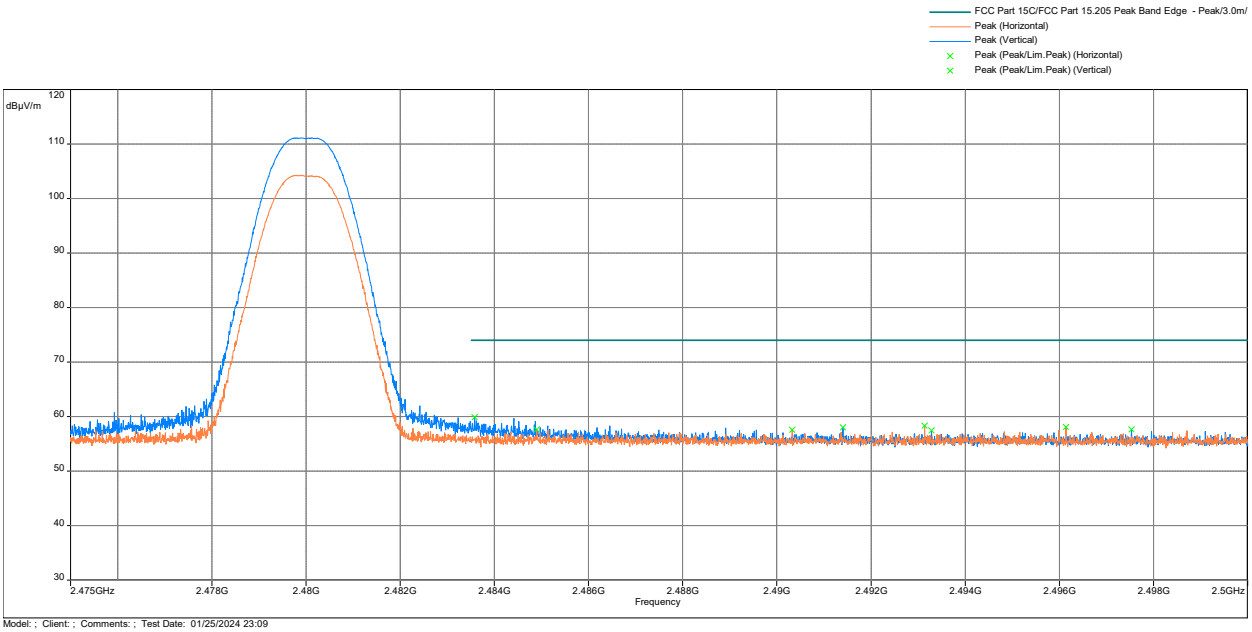
Out-of-Band Radiated spurious emissions at the Band-edge @1m distance
2310–2390 MHz, Average Scan with Average Limit



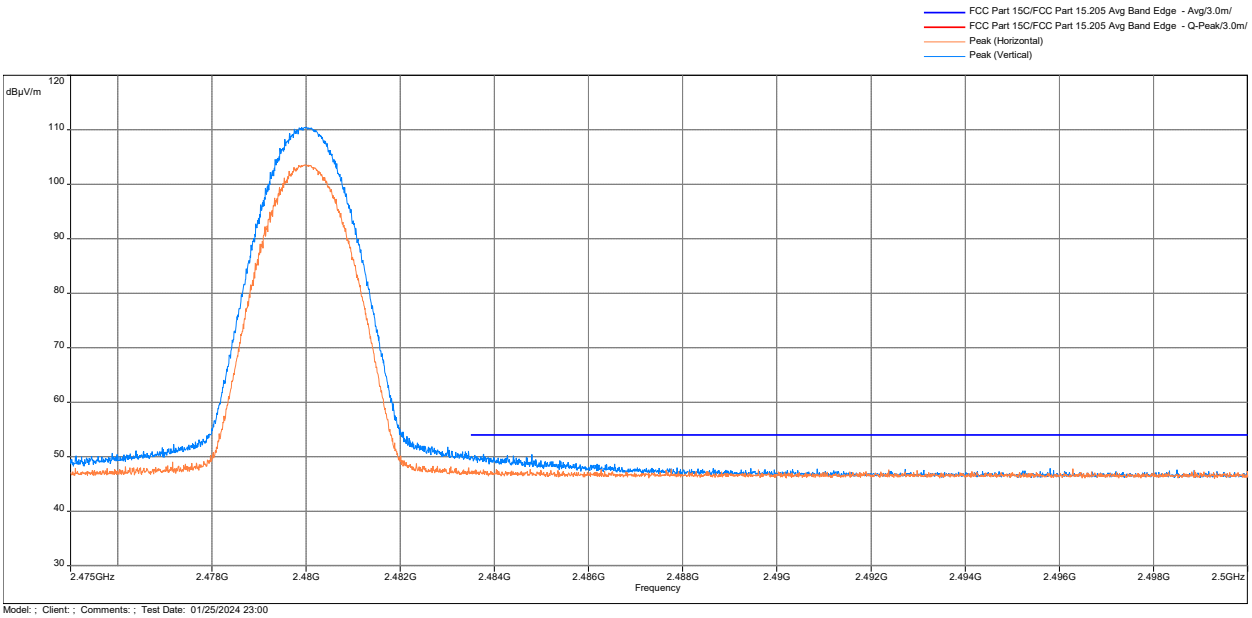
Freq. MHz	Ave dB(uV/m)	Ave Limit dB(µV/m)	Margin dB	Height m	Azimuth deg	Polarity	Correction dB
2389.933	46.59	54	-7.41	1.51	337.25	Vertical	27.32

Note: Correction = AF + CF + DCF – Preamp

Out-of-Band Radiated spurious emissions at the Band-edge @1m distance
2483.5–2500 MHz, Peak Scan with Peak Limit



Out-of-Band Radiated spurious emissions at the Band-edge @1m distance
2483.5–2500 MHz, Average Scan with Average Limit



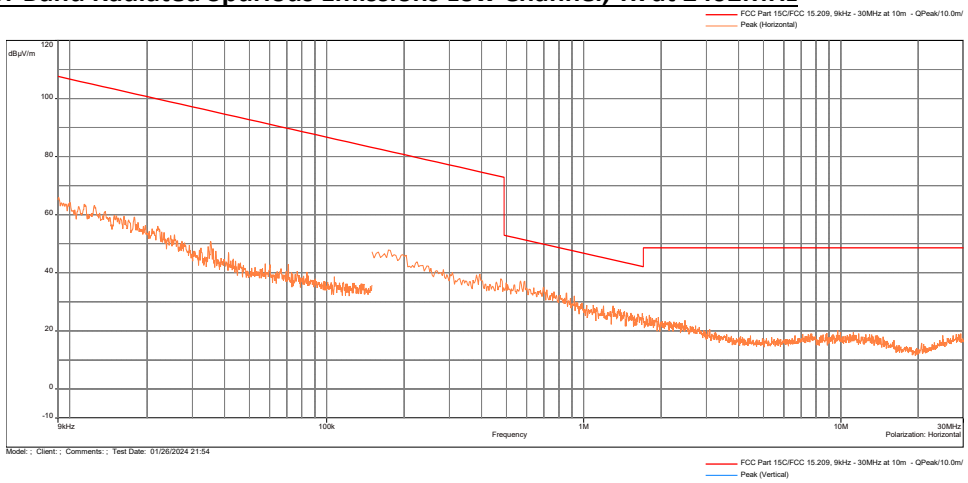
Freq. MHz	Peak@3m dB(uV/m)	Ave Limit dB(µV/m)	Margin dB	Height m	Azimuth deg	Polarity	Correction dB
2483.5	49.27	54	-4.73	1.51	87.25	Vertical	27.35

Note: Correction = AF + CF + DCF – Preamp

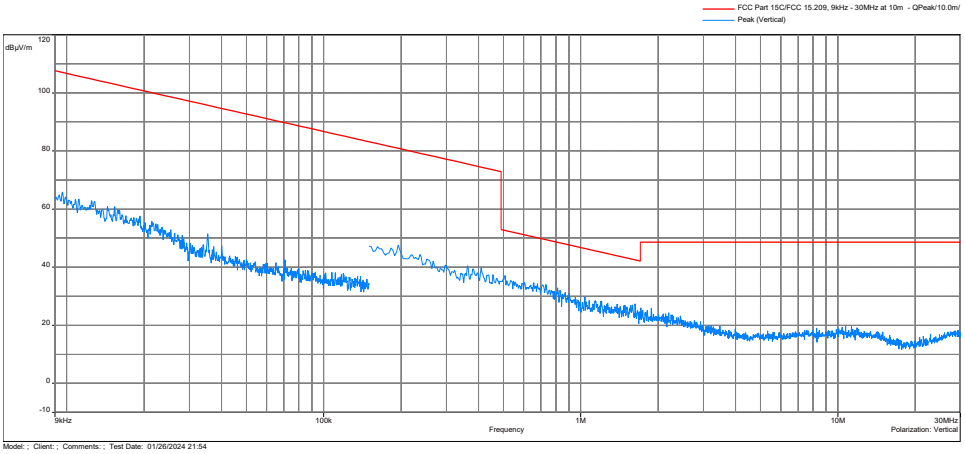
Results	Complies

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

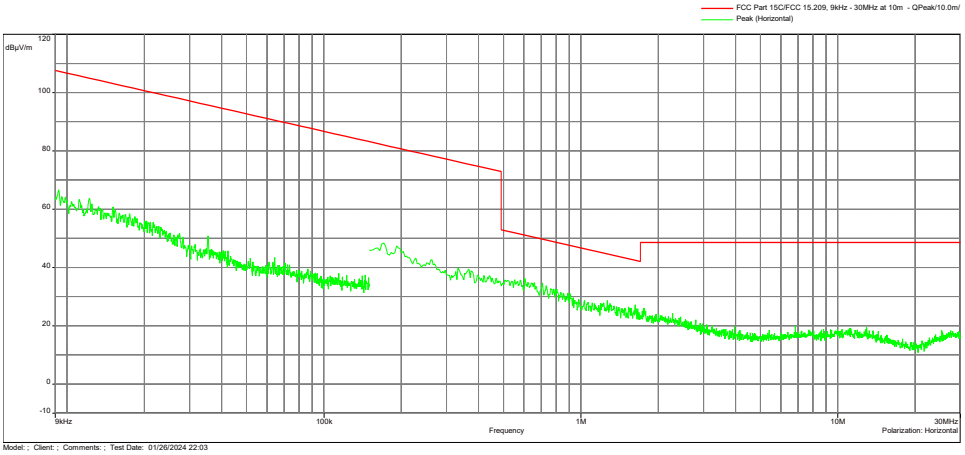
Antenna Position - Coaxial



Antenna Position - Coplanar

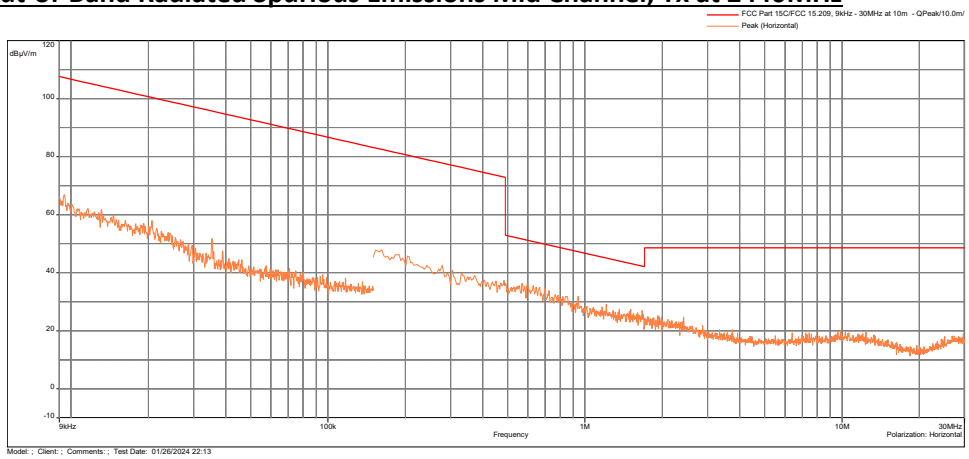


Antenna Position - Horizontal

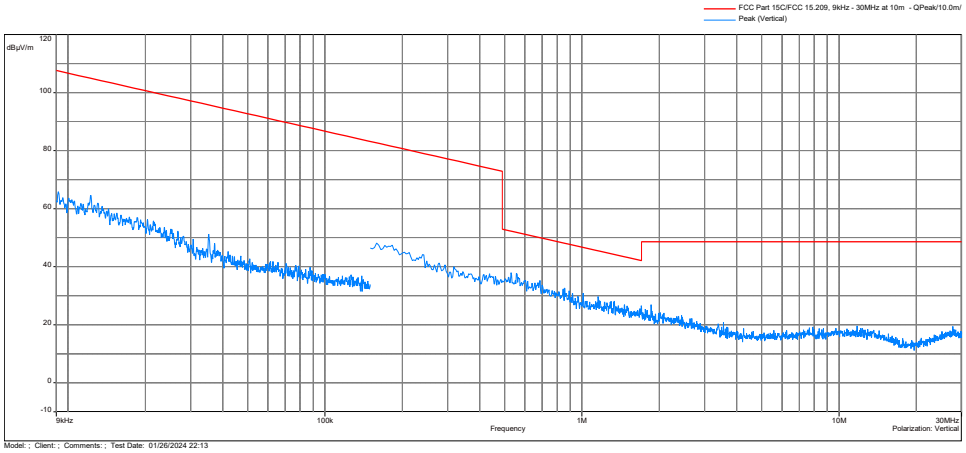


Out-of-Band Radiated Spurious Emissions Mid Channel, Tx at 2440MHz

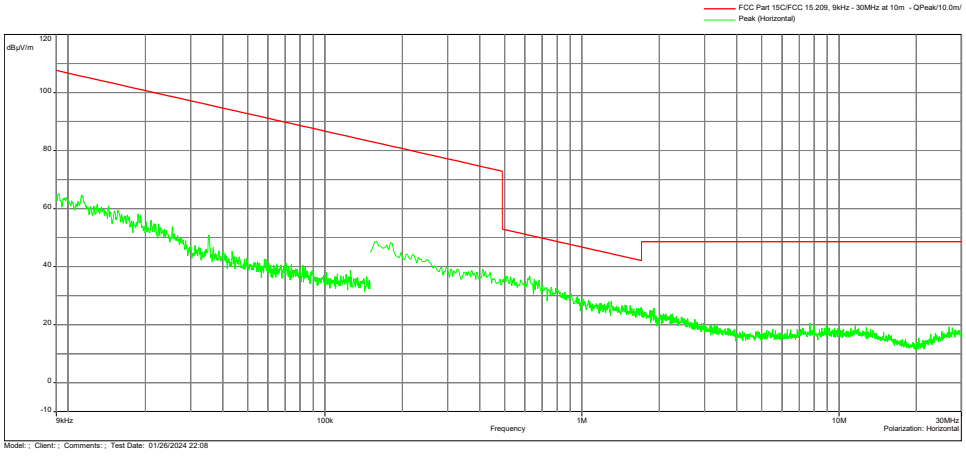
Antenna Position - Coaxial



Antenna Position - Coplanar

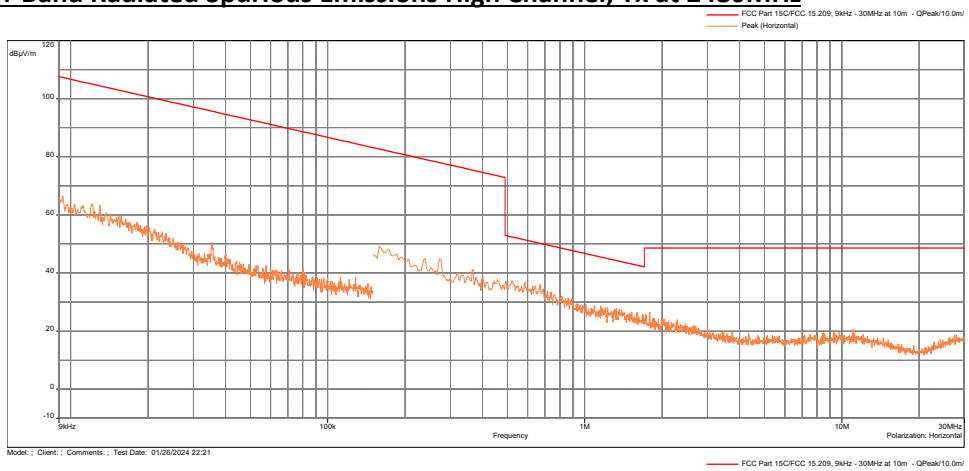


Antenna Position - Horizontal

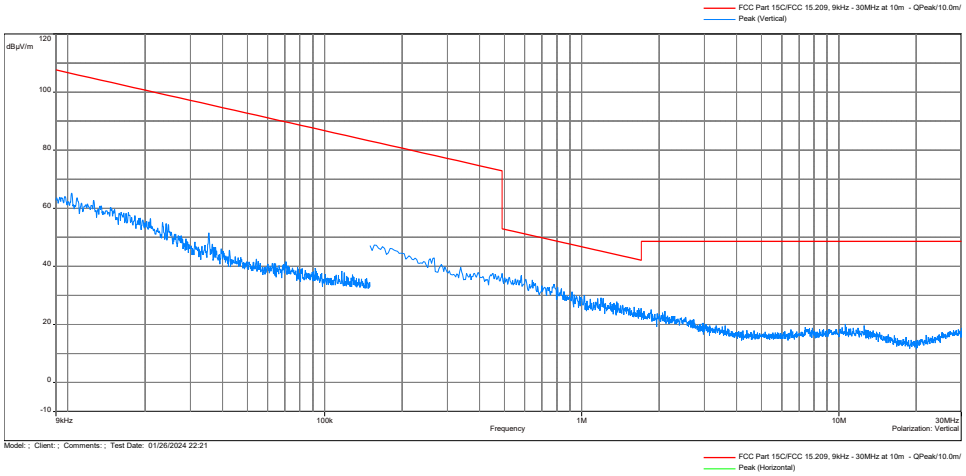


Out-of-Band Radiated Spurious Emissions High Channel, Tx at 2480MHz

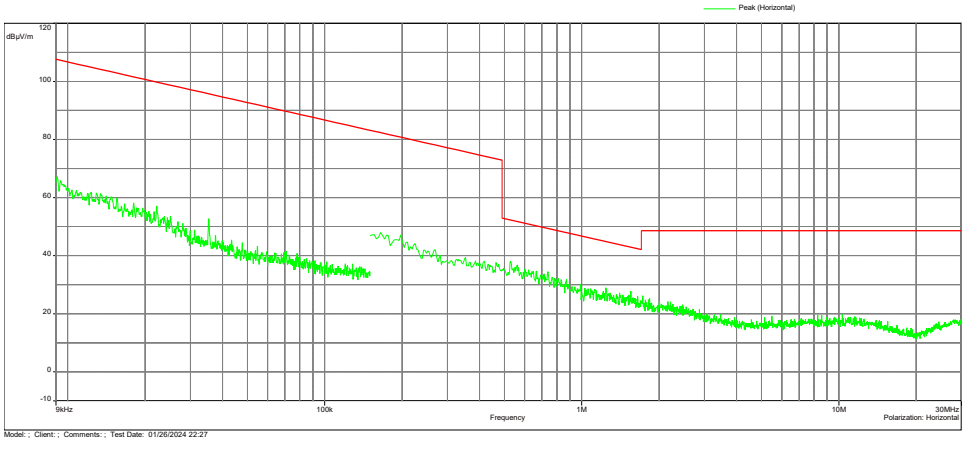
Antenna Position - Coaxial



Antenna Position - Coplanar

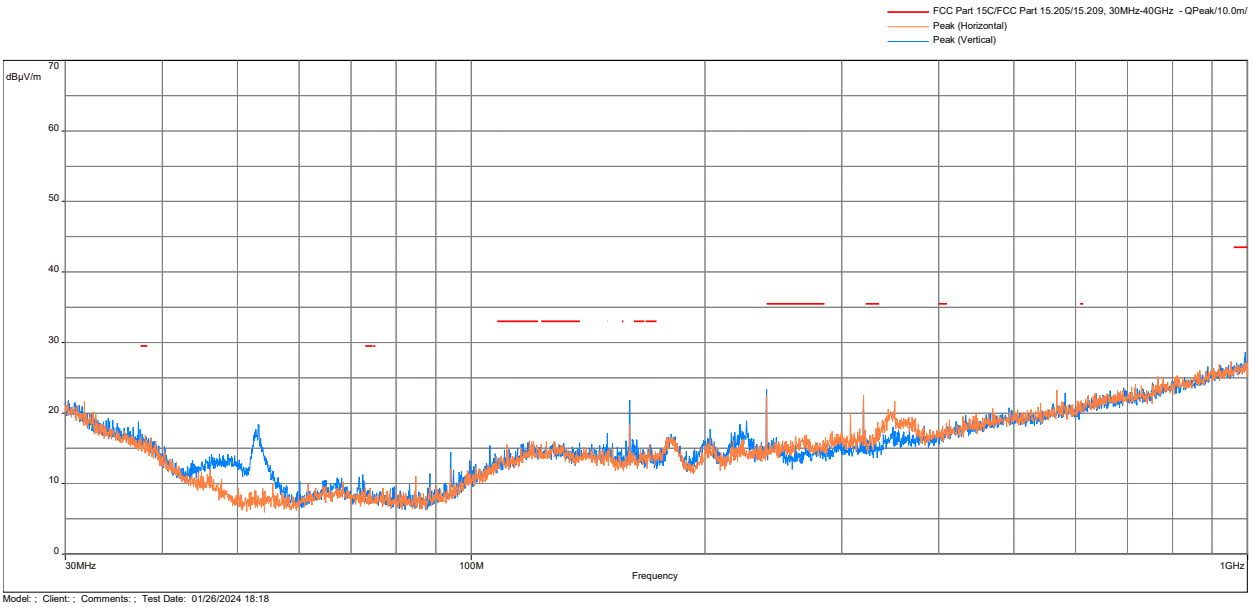


Antenna Position - Horizontal

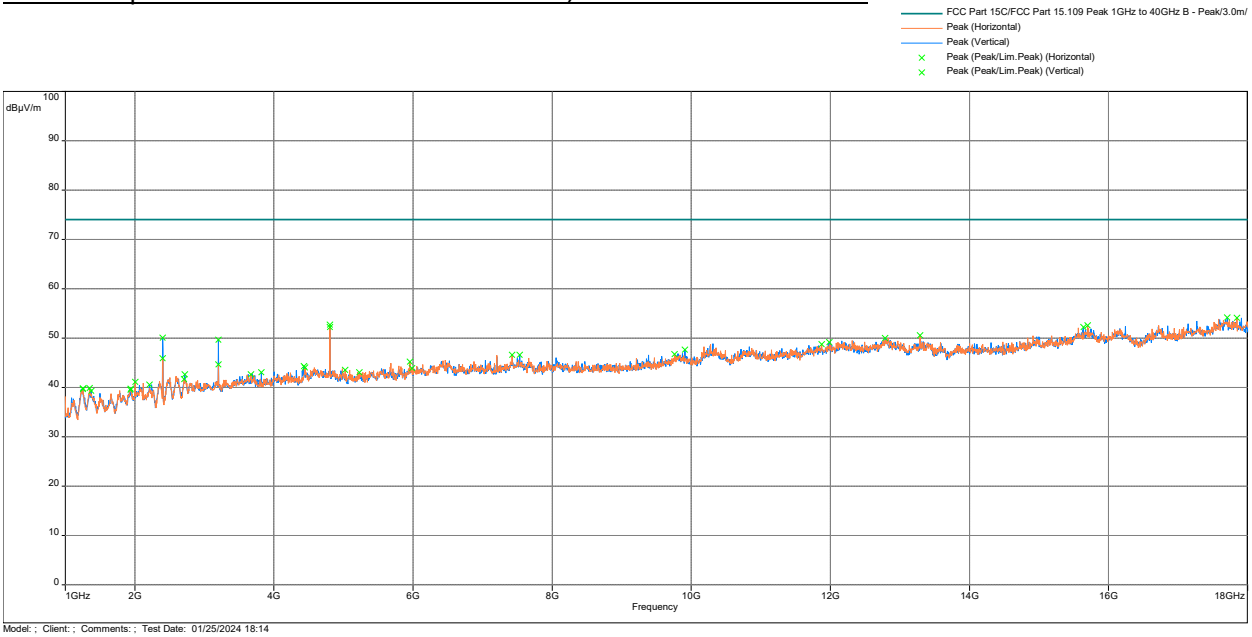


Test Results: 15.209 Radiated Spurious Emissions Low Channel, Tx at 2402MHz Normal Mode

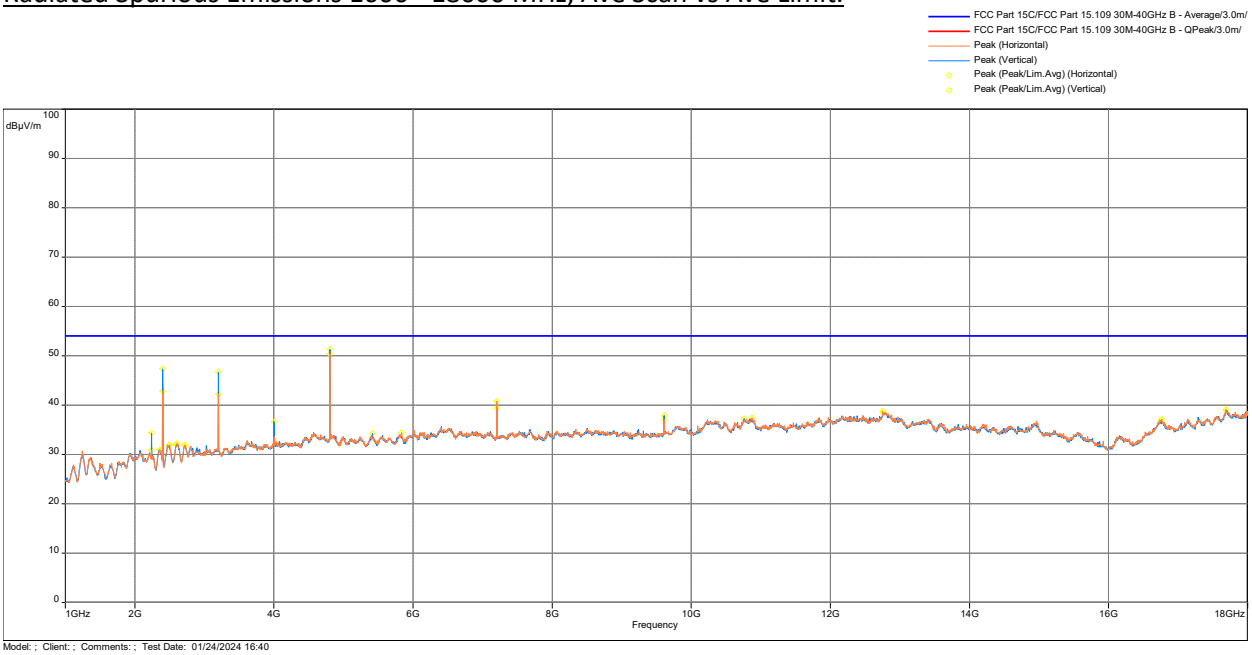
Radiated Spurious Emissions 30 MHz - 1000 MHz



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



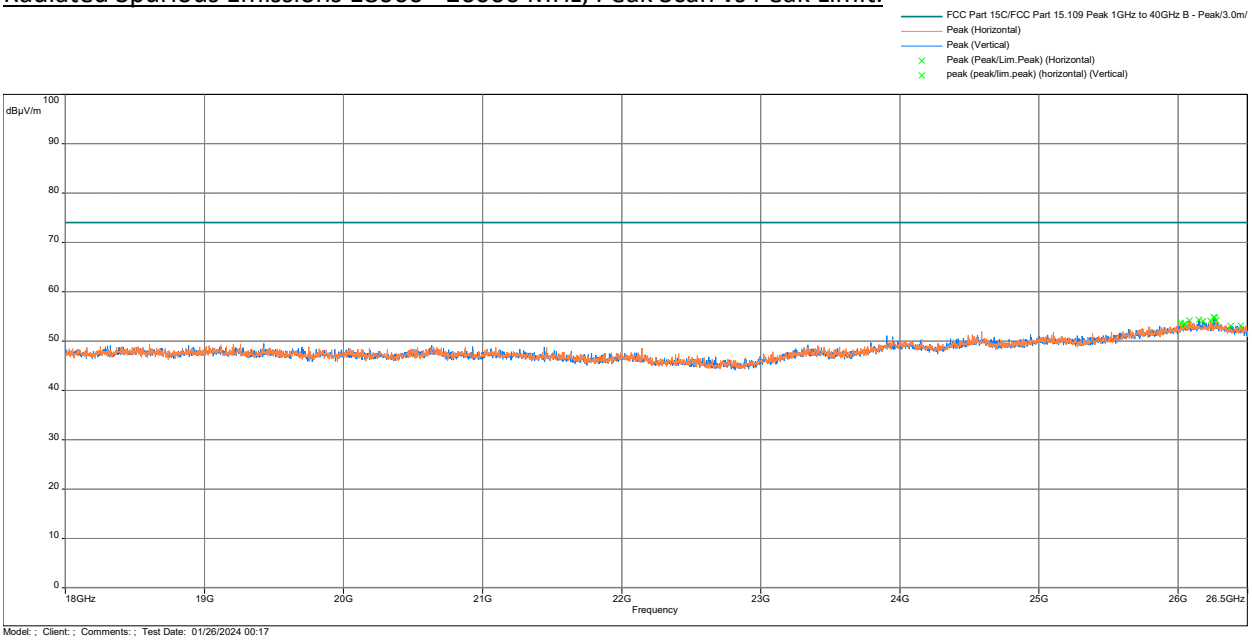
Radiated Spurious Emissions 1000 - 18000 MHz, Ave Scan vs Ave Limit.



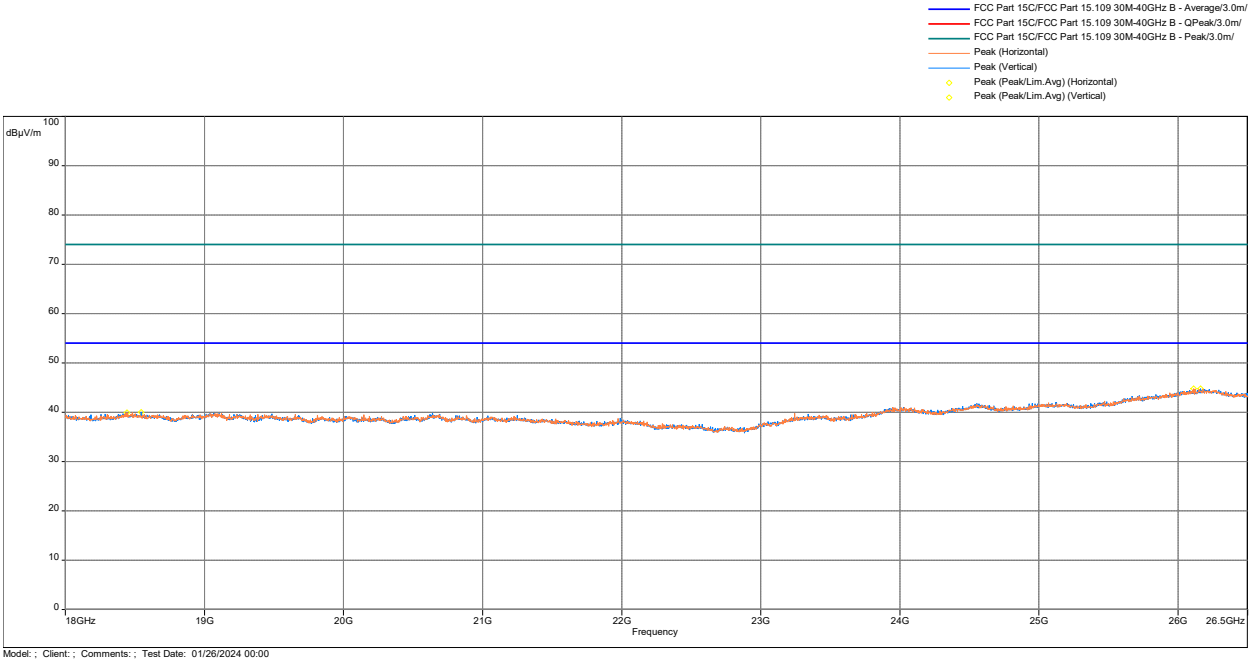
Frequency (MHz)	Ave @3m (dBµV/m)	Lim. Ave @3m (dBµV/m)	Margin dB)	Height (m)	Angle (°)	Comment	Correction (dB)
4804.033	51.33	54	-2.67	3.49	189.25	Vertical	-5.18
4804.033	50.45	54	-3.55	3.49	256.25	Horizontal	-5.18
2401.933	47.37	54	-6.63	1.5	0.75	Vertical	-10.91
3202.633	46.77	54	-7.23	2.49	278	Vertical	-8.87
2401.933	42.85	54	-11.15	1.51	277.75	Horizontal	-10.91
3202.633	42.22	54	-11.78	2.51	253.75	Horizontal	-8.87

Note: Correction = AF + CF - Preamp

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



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

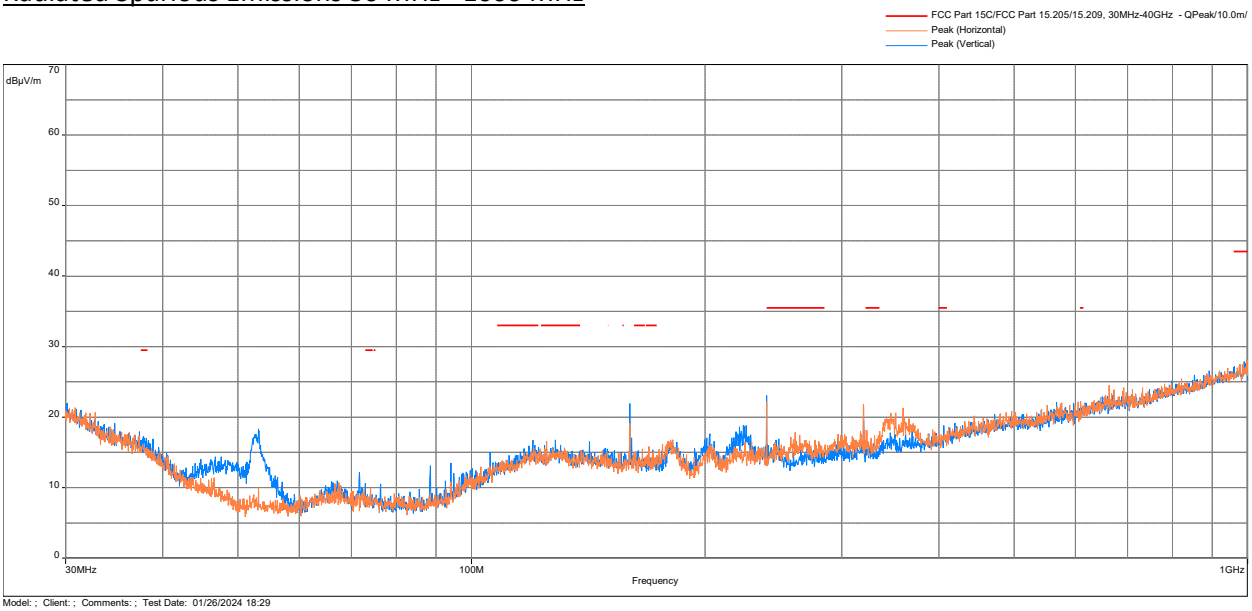


Note: Correction = AF + CF - Preamp

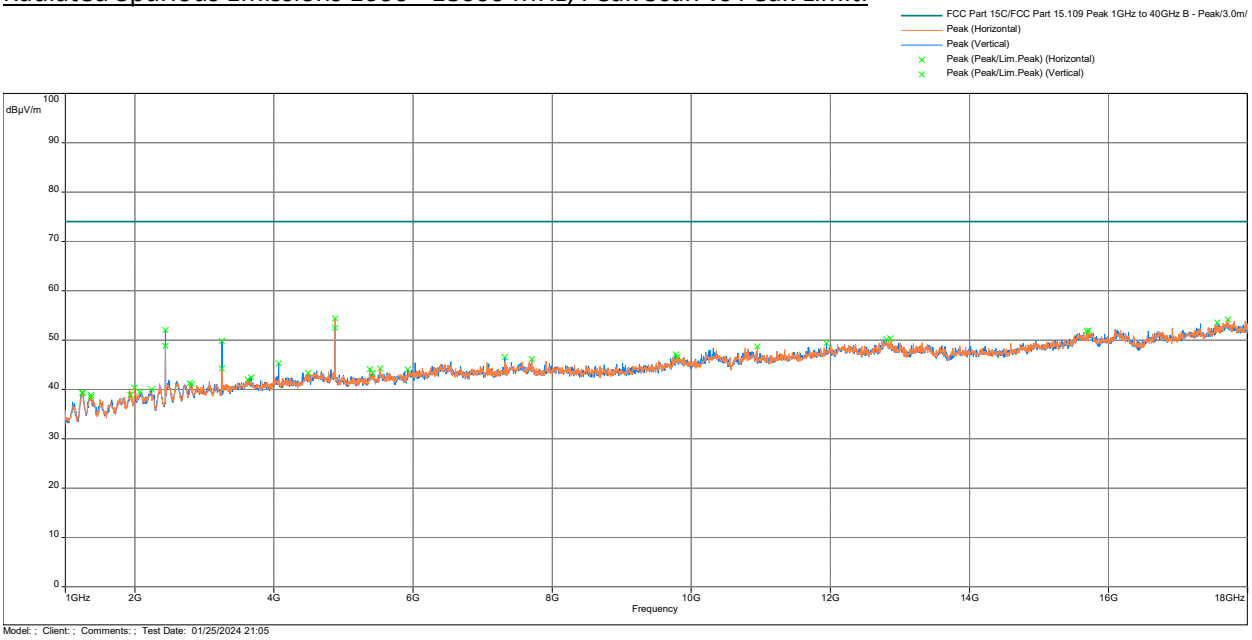
Results	**Complies**

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

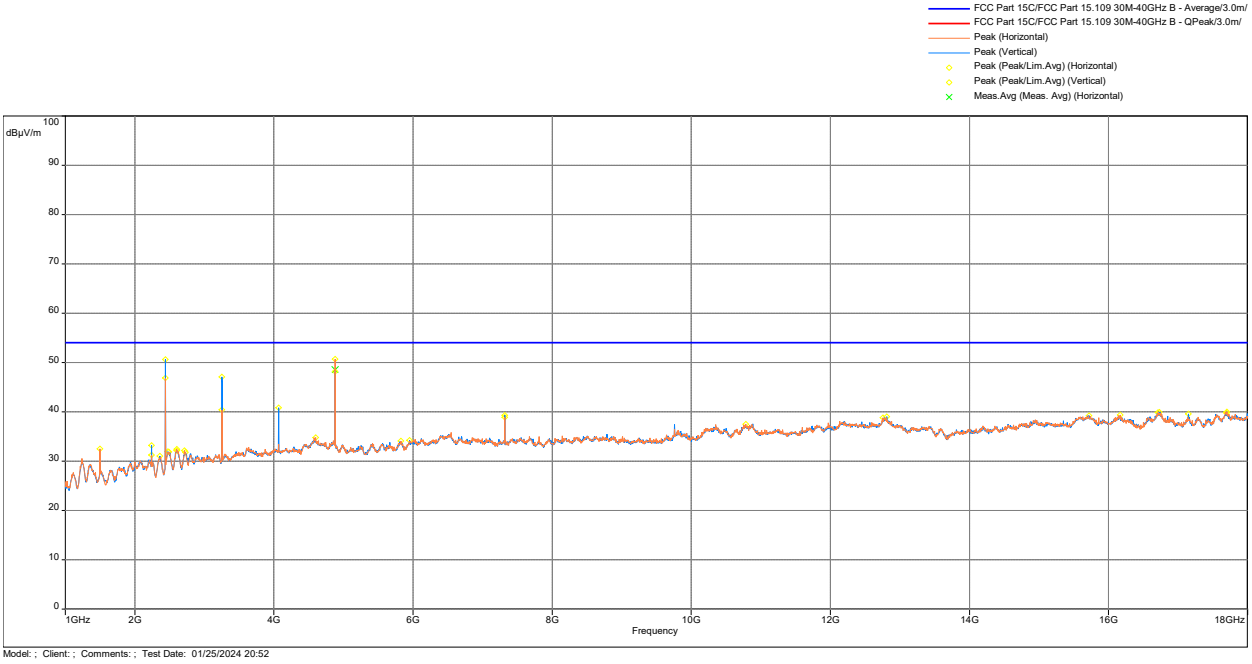
Radiated Spurious Emissions 30 MHz - 1000 MHz



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



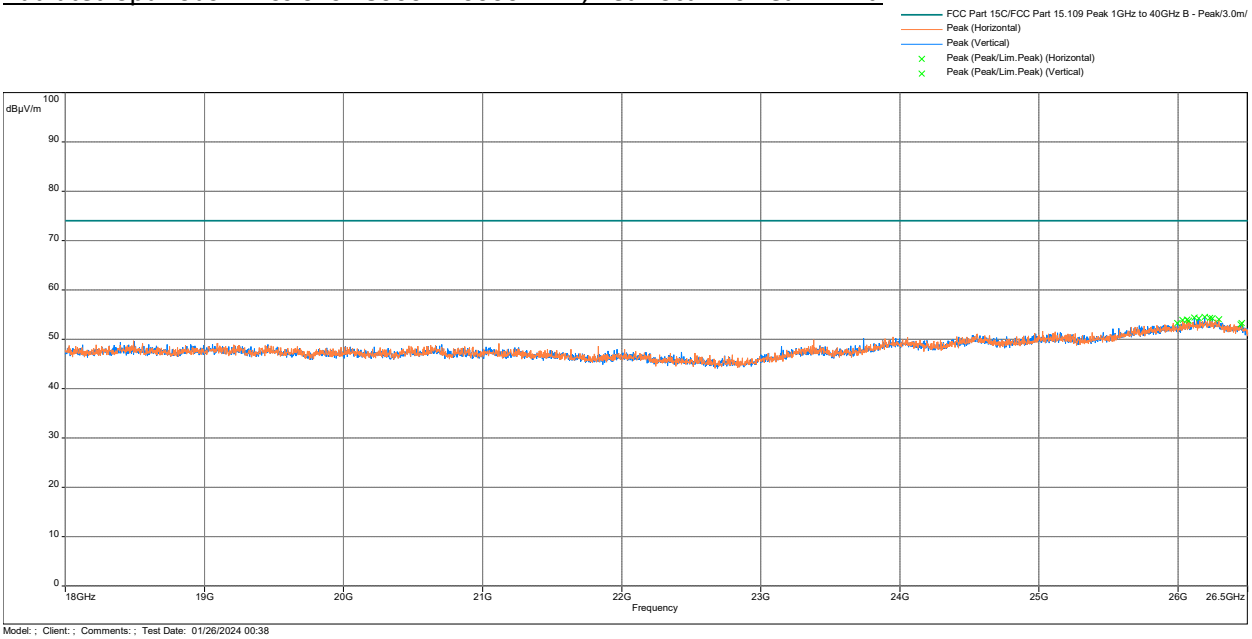
Radiated Spurious Emissions 1000 - 18000 MHz, Average Scan vs Average Limit.



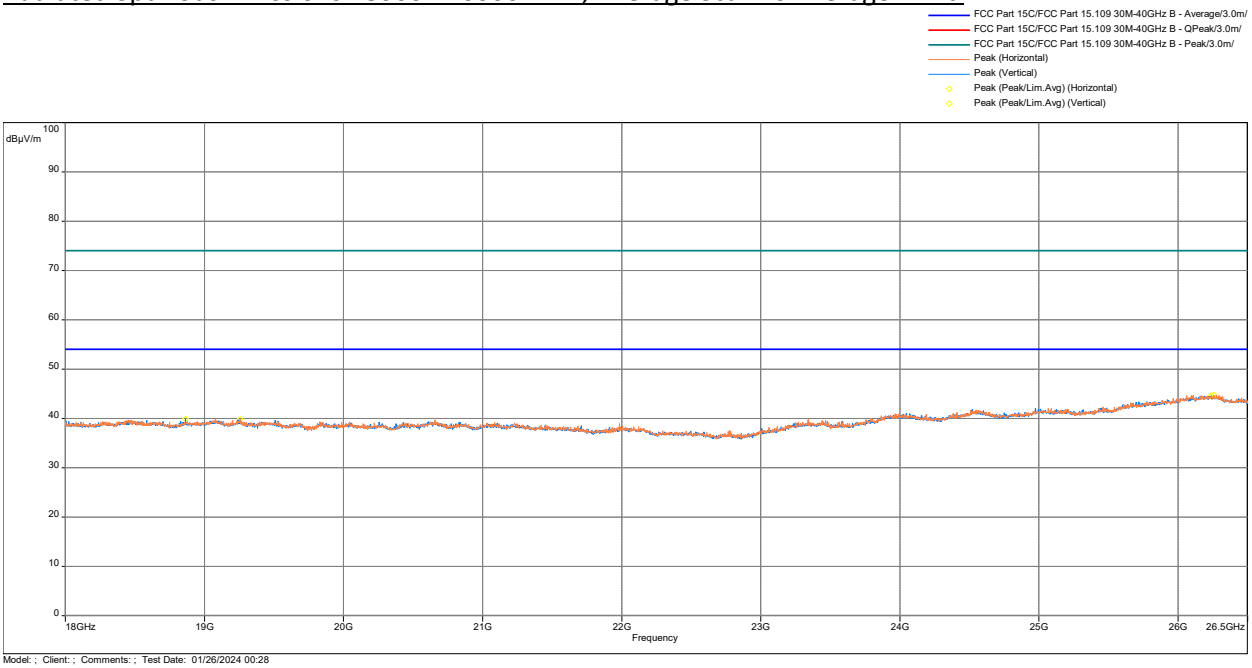
Frequency (MHz)	Peak @3m (dBµV/m)	Lim. Ave @3m (dBµV/m)	Margin dB)	Height (m)	Angle (°)	Comment	Correction (dB)
4879.51	48.53	54	-5.47	3.49	257	Horizontal	-5.25
2439.9	50.6	54	-3.4	2.51	297.5	Vertical	-10.52
4879.967	48.17	54	-5.83	1.51	189.25	Vertical	-5.25
3253.067	47.09	54	-6.91	1.51	103.25	Vertical	-8.77
2439.9	46.88	54	-7.12	3.49	1.5	Horizontal	-10.52
4066.233	40.85	54	-13.15	2.51	255	Vertical	-6.85

Note: Correction = AF + CF - Preamp

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



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

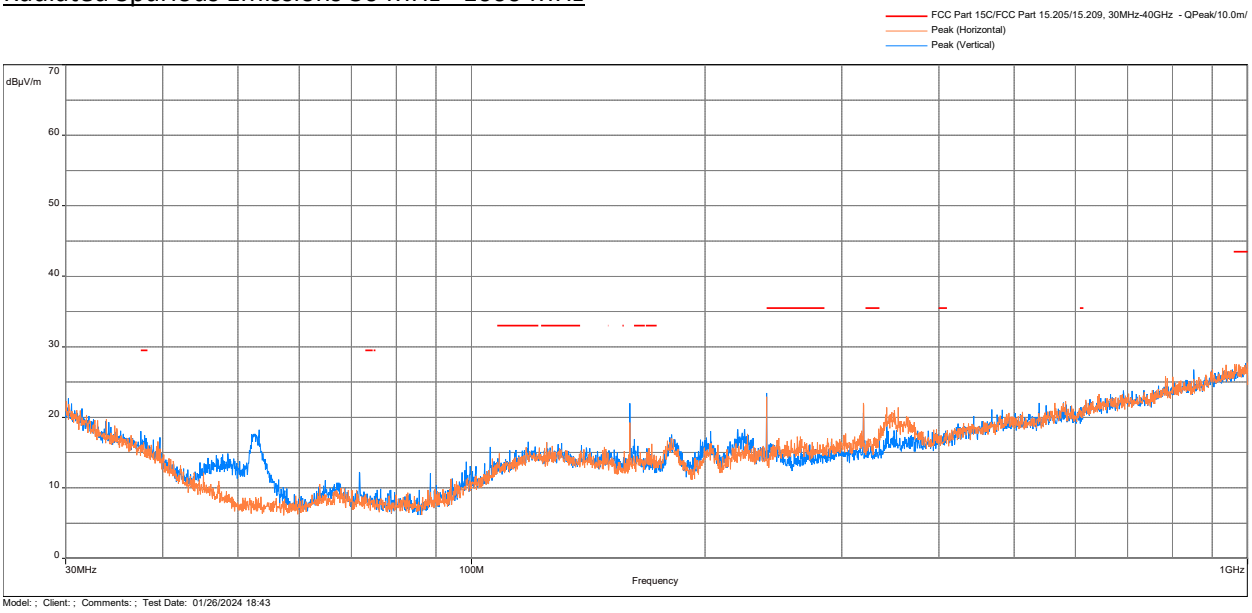


Note: Correction = AF + CF - Preamp

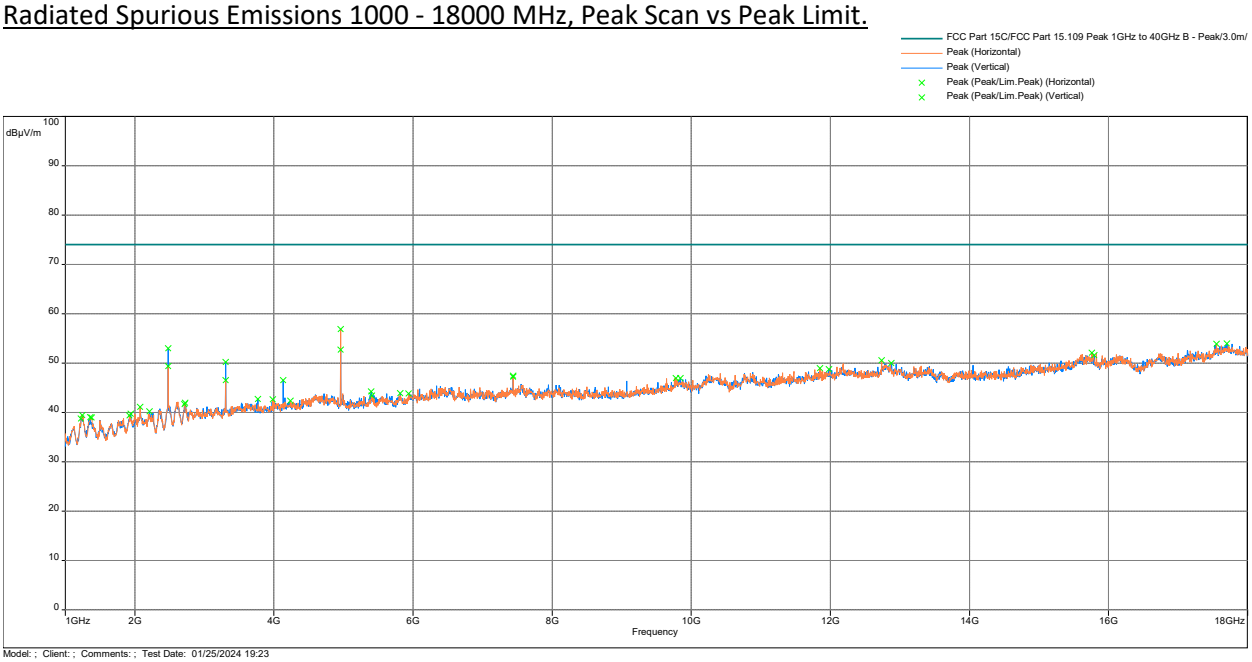
Results	Complies

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

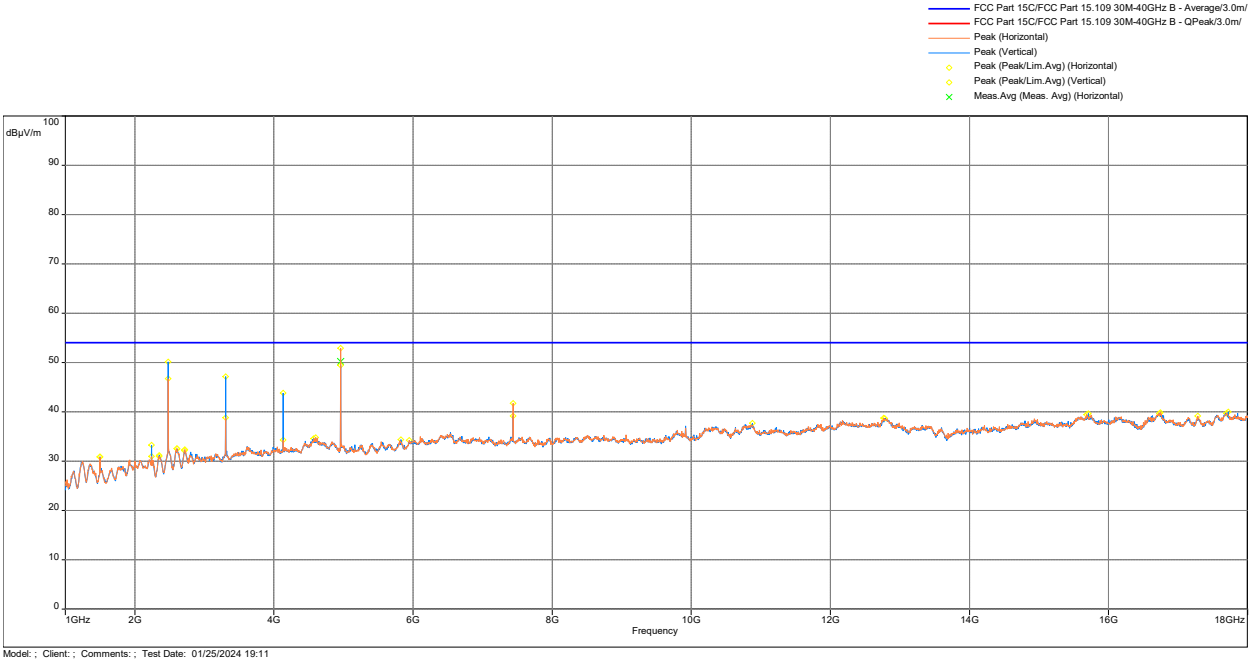
Radiated Spurious Emissions 30 MHz - 1000 MHz



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



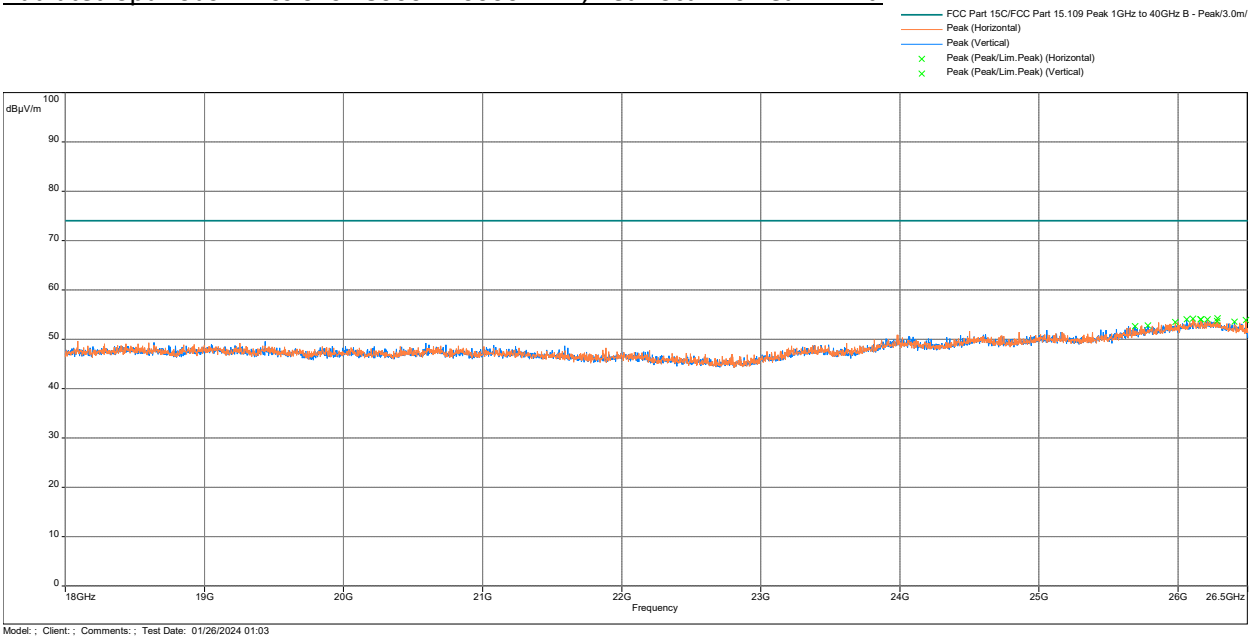
Radiated Spurious Emissions 1000 - 18000 MHz, Average Scan vs Average Limit.



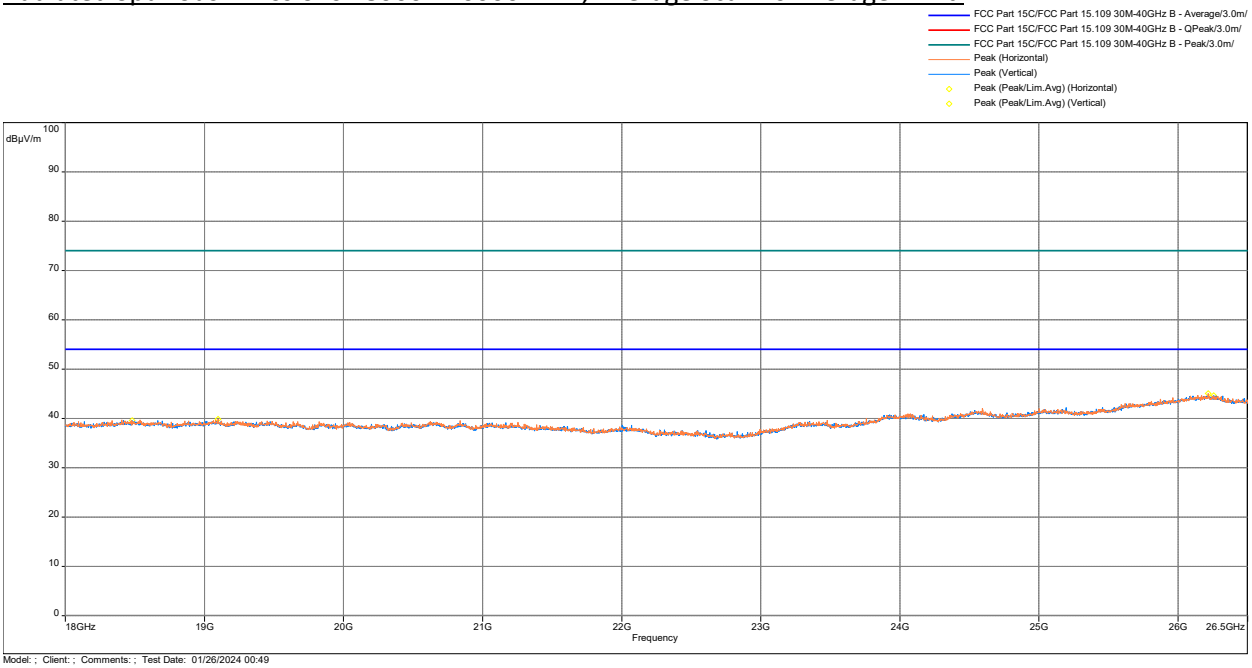
Frequency (MHz)	Peak @3m (dBµV/m)	Lim. Ave @3m (dBµV/m)	Margin dB)	Height (m)	Angle (°)	Comment	Correction (dB)
4959.514	50.18	54	-3.82	3.48	272.5	Horizontal	-5.41
2480.133	52.52	54.0	-1.48	3.49	147.25	Vertical	-3.12
4959.3	51.72	54.0	-2.28	1.51	2	Vertical	8.4
3306.333	51.23	54.0	-2.77	3.49	136.75	Horizontal	9.18
2479.567	50.16	54.0	-3.84	2.51	112.25	Horizontal	-14.05
4133.1	48.05	54.0	-5.95	1.51	99.25	Vertical	-6.66

Note: Correction = AF + CF - Preamp

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



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

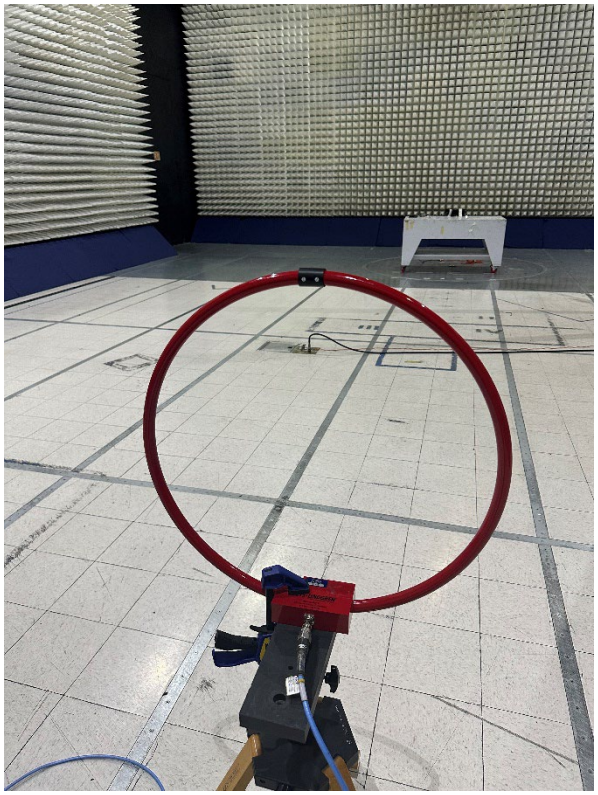


Note: Correction = AF + CF - Preamp

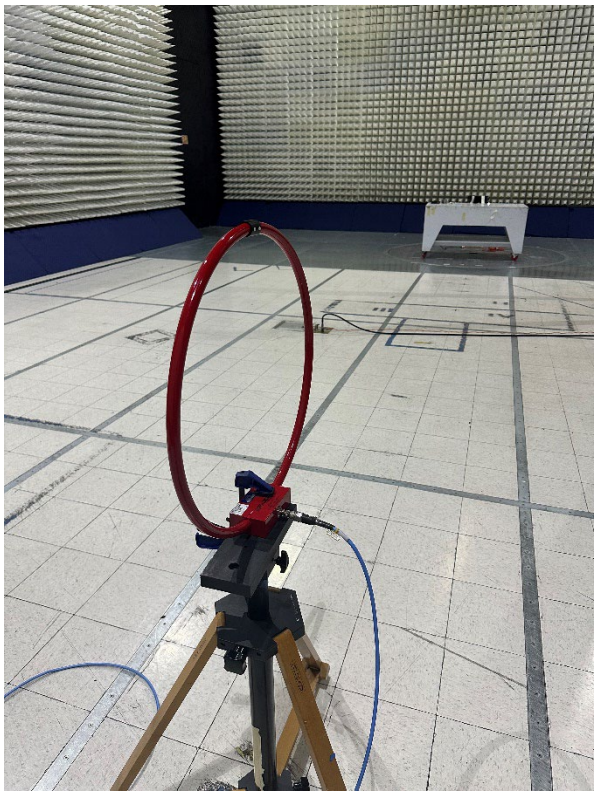
Results	Complies

4.5.5 Test Setup Configuration

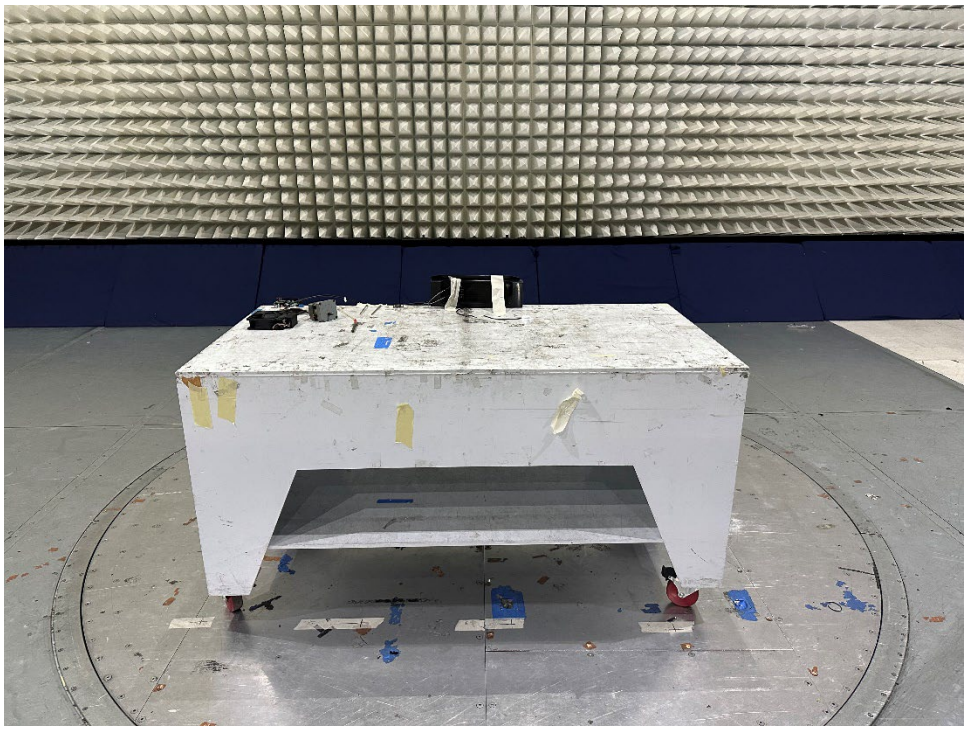
The following photographs show the testing configurations used.

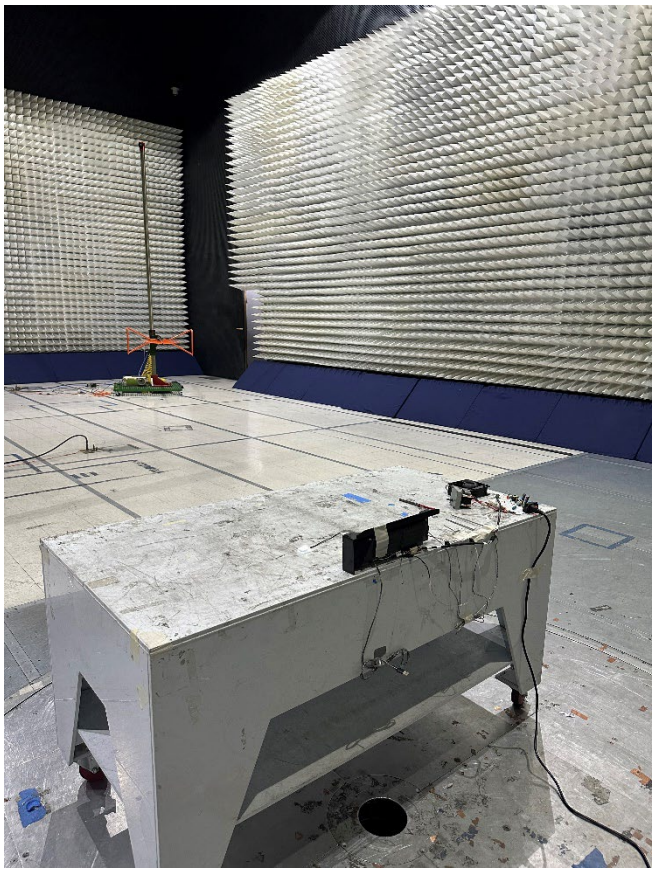


4.5.5 Test Setup Configuration (Continued)

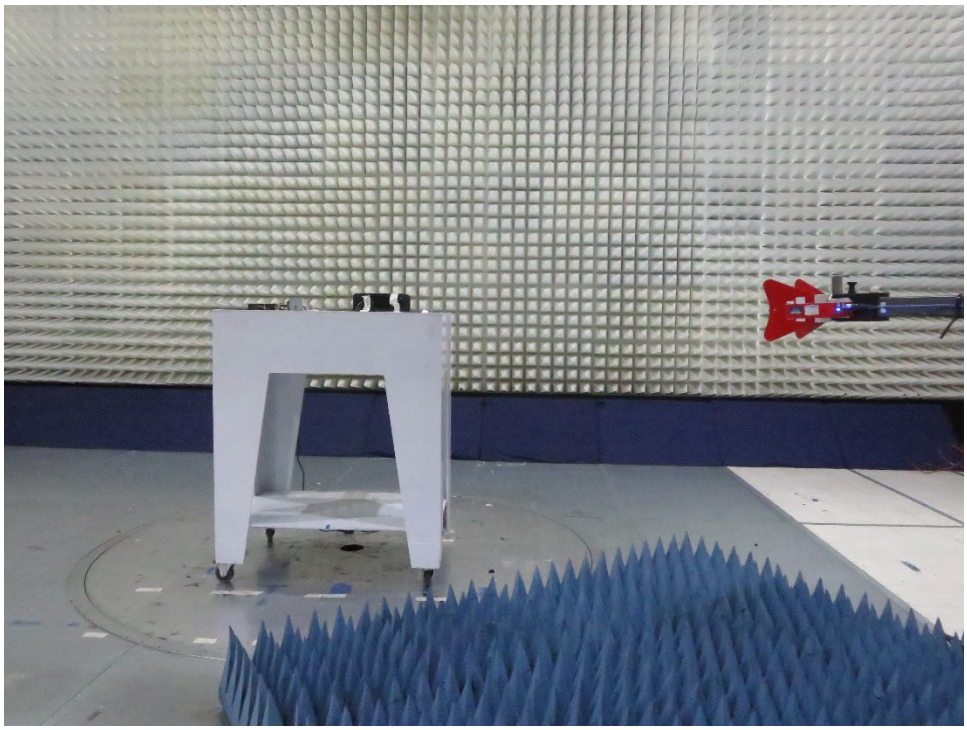


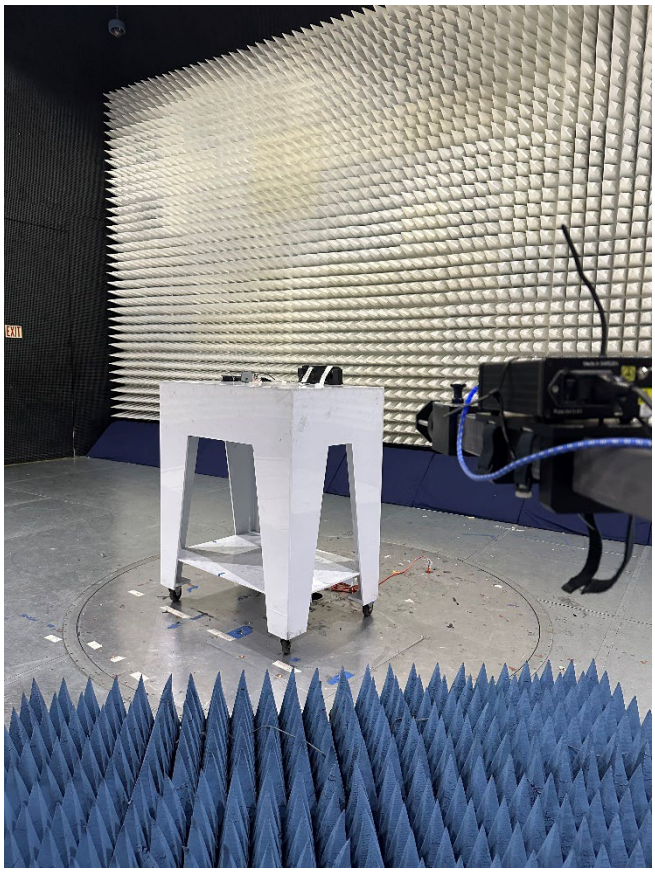
4.5.5 Test Setup Configuration (Continued)





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.

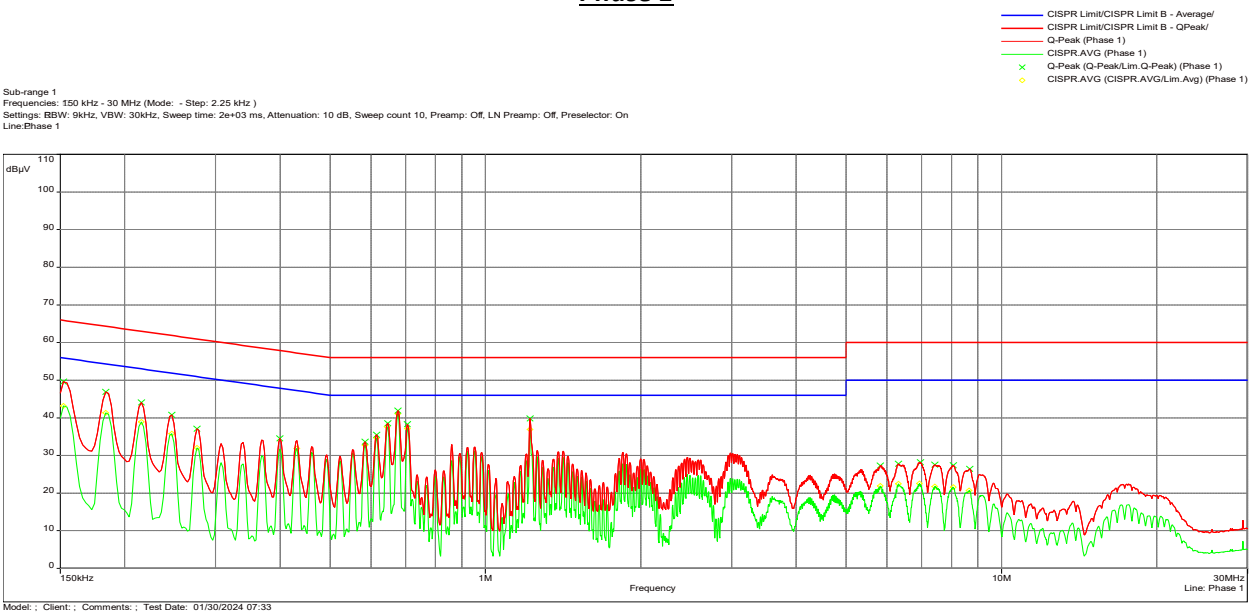
Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.10-2013.

Tested By	Test Date	Results
Erica Chan	January 30, 2024	Complies

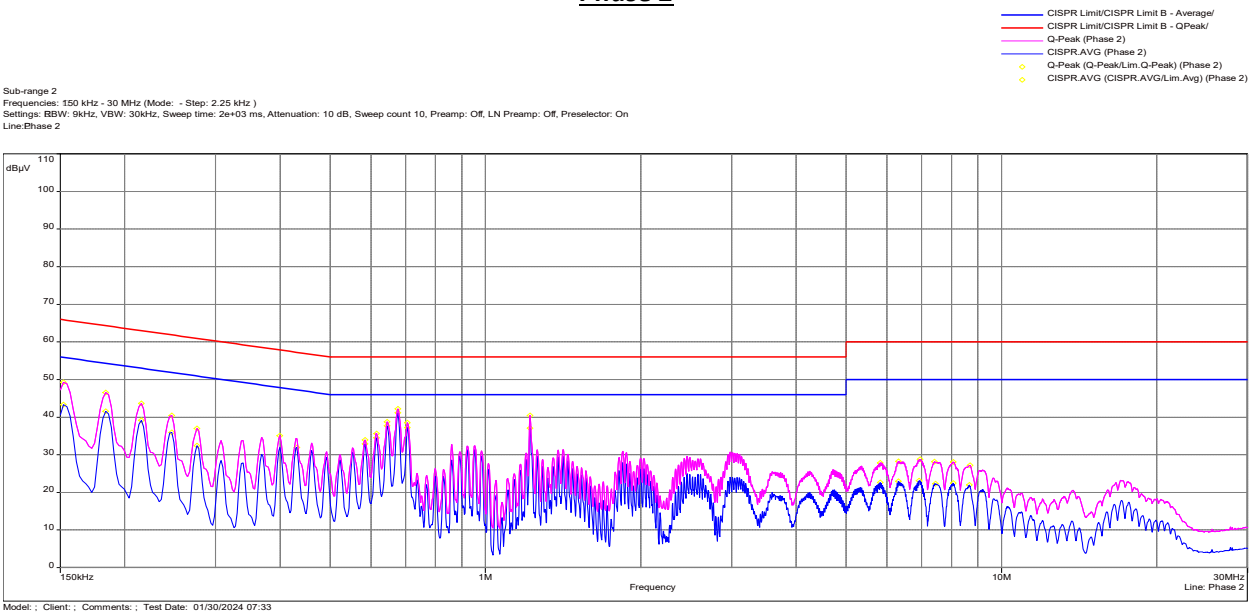
4.6.3 Test Result

15.207: Conducted Emissions 120VAC 60Hz

Phase 1



Phase 2



4.6.3 Test Results (Continued)

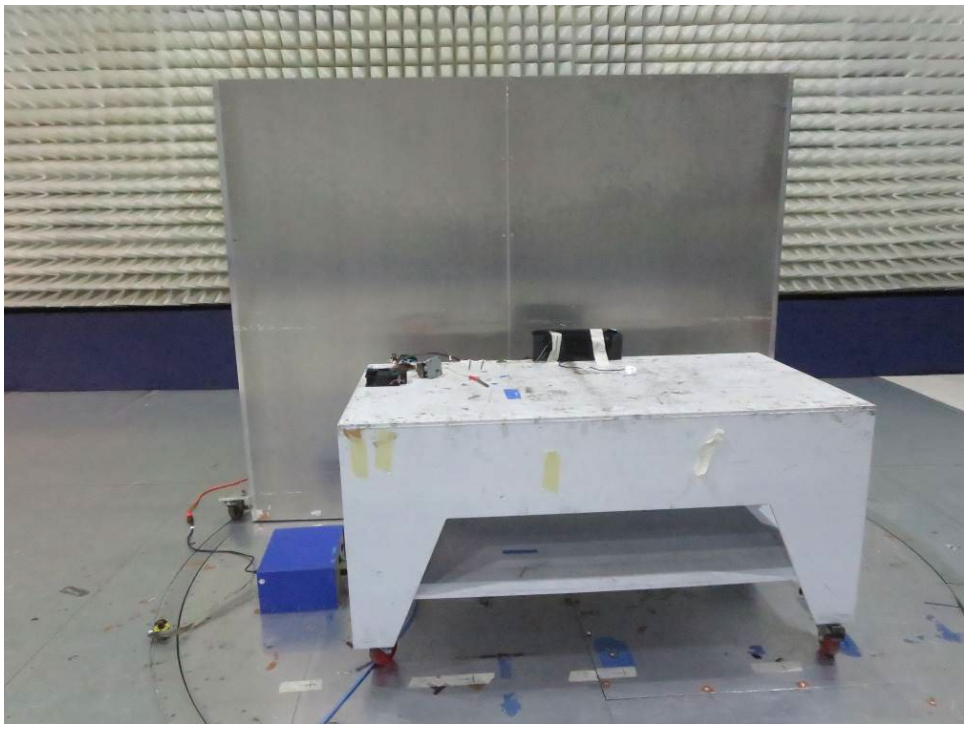
Frequency (MHz)	Q-Peak (dBµV)	Limit Q-Peak (dBµV)	Margin Q-Peak (dB)	Line	Correction (dB)
0.6765	42.18	56	-13.82	Phase 2	10.83
0.6765	41.85	56	-14.15	Phase 1	10.83
1.221	40.45	56	-15.55	Phase 2	10.84
1.221	39.83	56	-16.17	Phase 1	10.83
0.15225	49.59	65.88	-16.29	Phase 1	11.26
0.15225	49.31	65.88	-16.57	Phase 2	11.25
0.645	38.73	56	-17.27	Phase 2	10.83
0.18375	46.84	64.31	-17.47	Phase 1	11.15

Frequency (MHz)	CISPR AVG (dBµV)	Limit Avg (dBµV)	Margin Avg (dB)	Line	Correction (dB)
0.6765	41.18	46	-4.82	Phase 2	10.83
0.6765	41.12	46	-4.88	Phase 1	10.83
0.645	37.75	46	-8.25	Phase 2	10.83
0.645	37.6	46	-8.4	Phase 1	10.83
0.70575	37.2	46	-8.8	Phase 2	10.83
0.70575	37.14	46	-8.86	Phase 1	10.83
1.221	37.1	46	-8.9	Phase 2	10.84
1.221	36.94	46	-9.06	Phase 1	10.83

Results	**Complies** by 4.82 dB

4.6.4 Test Setup Photographs

The following photographs show the testing configurations used.



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 Test Receiver 40GHz	Rohde & Schwarz	ESU40	ITS 00961	12	03/14/2024
9kHz-1GHzPre-Amplifier	Sonoma Instruments	310N	ITS 00415	12	05/17/2024
30MHz-2GHz Bi-Log Antenna	SunAR RF Motion	JB1	ITS 01577	12	02/20/2024
1-18GHz Horn Antenna Red	ETS Lindgren	3117-PA	ITS 01636	12	03/19/2024
1-18GHz Small Horn Antenna with Preamp	ETS Lindgren	3117-PA	ITS 01365	12	05/20/2024
150kHz to 30MHz LISN	COM-POWER	LIN-115A	ITS 01607	12	07/31/2024
EMI Test Receiver	Rohde & Schwarz	ESR7	ITS 01607	12	10/18/2024
18-40GHz Preamp	uComp Nordic	MCNS-50-18004000335P	ITS 01799	12	03/15/2024
18 - 26.5GHz Horn Antenna	EMCO	3160-09	ITS 00571	#	#
Spectrum Analyzer 20hz-26.5ghz	Rohde & Schwarz	FSU	ITS 00913	12	06/16/2024

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 / G105683076	GGR	ML	March 29, 2024	Original document
1.1 / G105683076	EC	ML	May 16, 2024	Section 3.3: Added statement that duty cycle is >98%. Section 4.4:3: Added a statements regarding band edge margins

END OF REPORT