TEST REPORT

Report Number: 105146268MPK-001
Project Number: G105146268
Report Issue Date: October 29, 2022

Testing performed on
Lyxt Drivecam Event Recorder
Model Number: DC-7000-002

FCC ID: UO3-UN1CXC
IC: 6778A-UN1CXC

to

FCC Part 15 Subpart C (15.247)
ISED RSS-247 Issue 2

For

Lytx, INC.

Test Performed by:	**Test Authorized by:**
Intertek	Lyxt, Inc
1365 Adams Court	9785 Towne Centre Drive
Menlo Park, CA 94025 USA	San Diego, CA 92121 USA

Prepared by: _____ **Date:** October 29, 2022
Juan Alapizco Vega

Reviewed by: _____ **Date:** October 29, 2022
Minh Ly

Report No. 105146268MPK-001	
Equipment Under Test:	Drivecam Event Recorder
Model Number:	DC-7000-002
Applicant:	Lyxt, Inc.
Contact:	Stephanie Rydell
Address:	9785 Towne Centre Drive San Diego, CA 92121
Country:	USA
Tel. Number:	(858) 380-3012
Email:	Stephanie.rydell@lyxt.com
Applicable Regulation:	FCC Part 15 Subpart C (15.247) ISED RSS-247 Issue 2
Date of Test:	August 16, 2022 to October 11, 2022

We attest to the accuracy of this report:

Juan Alapizco Vega
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
Antenna Requirement	15.203	RSS-GEN	Complies (Internal Antenna)

EUT receive date: August 15, 2022

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: August 16, 2022

Test completion date: October 11, 2022

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

2.0 General Information

2.1 Product Description

Lyxt, Inc. supplied the following description of the EUT:

Dashcam device, with DVR recording and MV-AI triggering

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	Lyxt, Inc.
Model No.	DC-7000-002
FCC Identifier	UO3-UN1CXC
IC Identifier	6778A-UN1CXC
Type of transmission	Digital Transmission System (DTS)
Rated RF Output	5.02 dBm
Antenna(s) & Gain	Internal Antenna, Gain: 2.8 dBi
Frequency Range	2402 – 2480 MHz
Type of modulation/data rate	GFSK/1Mbit/s
Number of Channel(s)	40
Applicant Name & Address	Lyxt, Inc. 9785 Towne Centre Drive San Diego, CA 92121

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

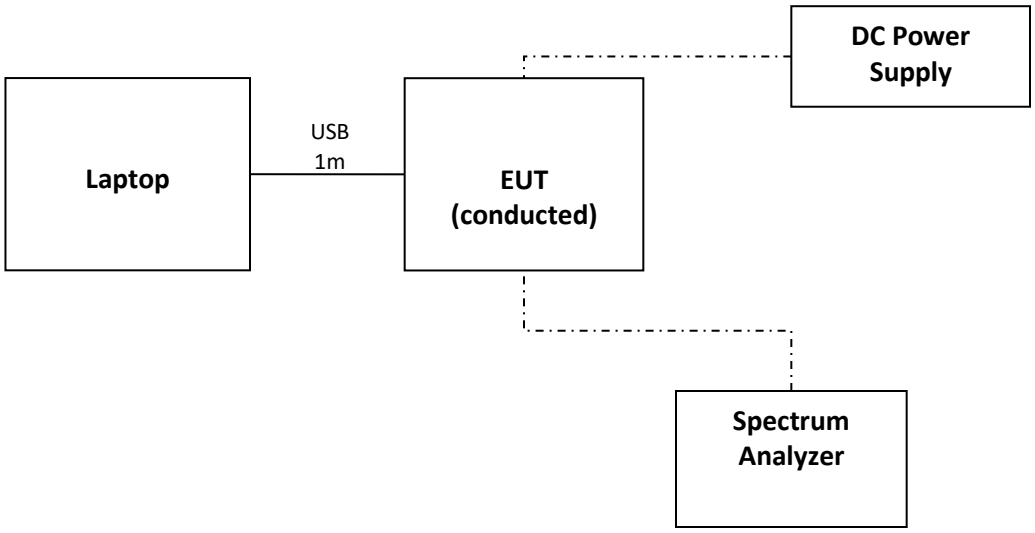
3.1 Support Equipment

Support Equipment		
Description	**Manufacturer**	**Model**
Laptop	Dell	Latitude 5590

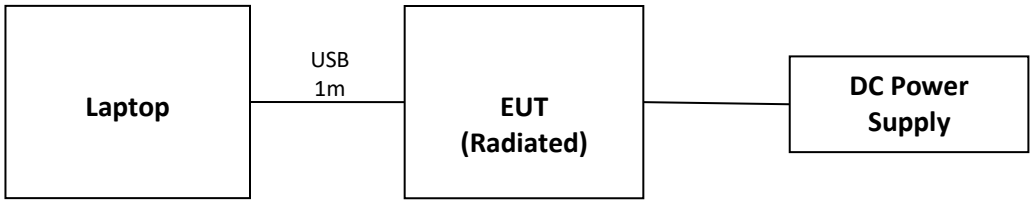
3.2 Block Diagram of Test Setup

Equipment Under Test			
Description	**Manufacturer**	**Model**	**Serial Number/ID**
Drivecam Event Recorder (radiated)	Lyxt, Inc.	DC-7000-002	QM40002328
Drivecam Event Recorder (conducted)	Lyxt, Inc.	DC-7000-002	QM40007220

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



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. The highest clock frequency used in the EUT is 5.825 GHz.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was provided by Lyxt, Inc.

3.5 Mode of Operation during Test

Mode of operation during testing, the distress button was preprogramed to switch between channels. During the transmitter tests, the transmitter was setup to transmit maximum communication and RF power levels.

EUT was placed into transmit mode at the lowest (2402MHz) middle (2442MHz), 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	739.3	--	1.1
	--	1.059	1.4
2442	714.3	--	1.2
	--	1.0599	1.5
2480	724.3	--	1.3
	--	1.053	1.6

Tested By	Test Date	Results
Juan Alapizco Vega	August 16- October 11, 2022	Complies

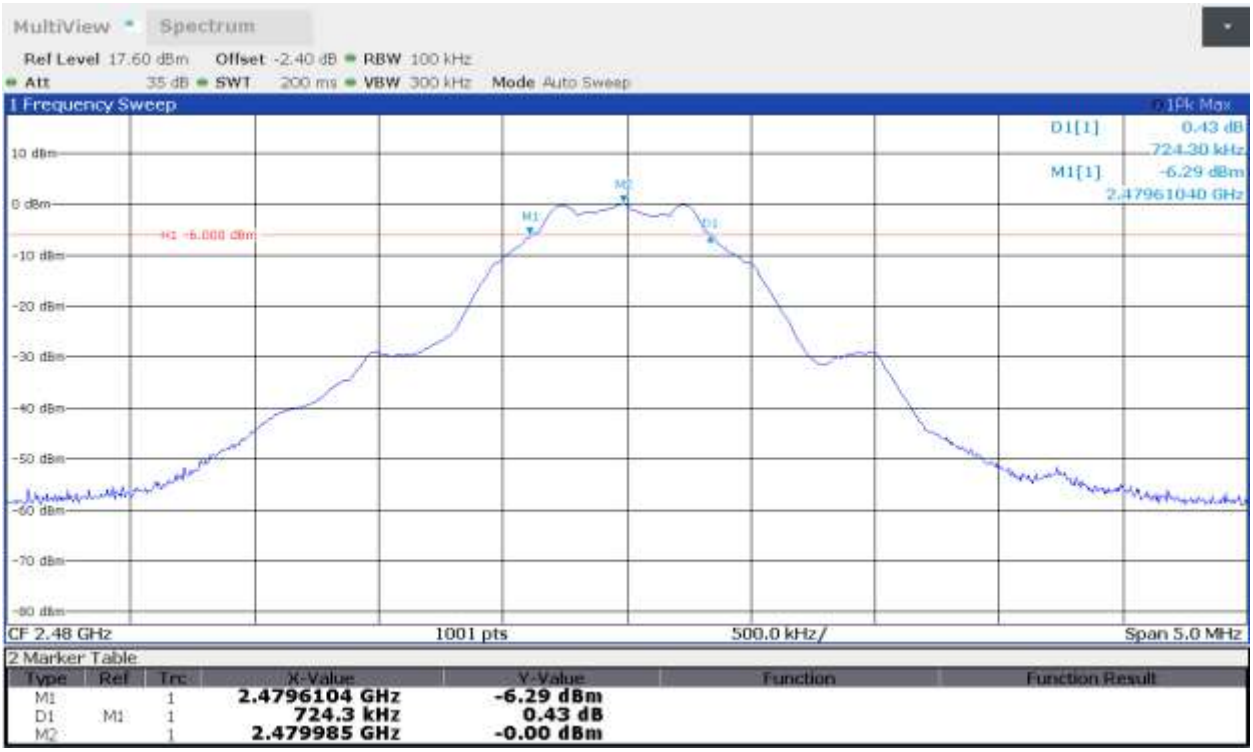
Plot 1. 1


MultiView
Spectrum
Ref Level 17.60 dBm Offset -2.40 dB RBW 100 kHz
Att 35 dB SWT 200 ms VBW 300 kHz Mode Auto Sweep
1 Frequency Sweep
1Pk Max
M1[1] -6.90 dBm
2.40162540 GHz
M2[1] -0.70 dBm
2.40200000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.402 GHz
1001 pts
500.0 kHz/
Span 5.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.4016254 GHz -6.90 dBm
D1 M1 1 739.3 kHz -0.34 dB
M2 1 2.402 GHz -0.70 dBm

Plot 1. 2


MultiView
Spectrum
Ref Level 17.60 dBm Offset -2.40 dB RBW 100 kHz
Att 35 dB SWT 200 ms VBW 300 kHz Mode Auto Sweep
1 Frequency Sweep
1Pk Max
D1[1] -0.18 dB
714.30 kHz
M1[1] -5.62 dBm
2.4416304 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M1
M2
D1
CF 2.442 GHz
1001 pts
500.0 kHz/
Span 5.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.4416304 GHz -5.62 dBm
D1 M1 1 714.3 kHz -0.18 dB
M2 1 2.44199 GHz 0.17 dBm

Plot 1. 3


MultiView
Spectrum
Ref Level 17.60 dBm Offset -2.40 dB RBW 100 kHz
Att 35 dB SWT 200 ms VBW 300 kHz Mode Auto Sweep
1 Frequency Sweep
1Pk Max
D1[1] 0.43 dB
724.30 kHz
M1[1] -6.29 dBm
2.47961040 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.48 GHz
1001 pts
500.0 kHz/
Span 5.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.4796104 GHz -6.29 dBm
D1 M1 1 724.3 kHz 0.43 dB
M2 1 2.479985 GHz -0.00 dBm

Plot 1. 4


MultiView
Spectrum
Ref Level 16.90 dBm Offset 1.90 dB RBW 30 kHz
Att 25 dB SWT 140 µs (~7.5 ms) VBW 100 kHz Mode Auto FFT
1 Occupied Bandwidth
1Pk Max
M1[1] -0.10 dBm
2.40200000 GHz
M2[1] -0.10 dBm
2.40200000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.402 GHz
1001 pts
1.0 MHz/
Span 10.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.402 GHz -0.10 dBm Occ Bw 1.059024891 MHz
T1 1 2.401473 GHz -14.42 dBm Occ Bw Centroid 2.402002524 GHz
T2 1 2.402532 GHz -12.42 dBm Occ Bw Freq Offset 2.52425068 kHz
D1 M1 1 0.0 Hz 0.00 dB
M2 1 2.402 GHz -0.10 dBm

Plot 1.5


MultiView
Spectrum
Ref Level 16.90 dBm Offset 1.90 dB RBW 30 kHz
Att 25 dB SWT 140 µs (~7.5 ms) VBW 100 kHz Mode Auto FFT
1 Occupied Bandwidth
1Pk Max
M1[1] -69.58 dBm
2.43700000 GHz
M2[1] -69.58 dBm
2.43700000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.442 GHz
1001 pts
1.0 MHz/
Span 10.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.437 GHz -69.58 dBm Occ Bw 1.059950943 MHz
T1 1 2.4414651 GHz -13.98 dBm Occ Bw Centroid 2.44199512 GHz
T2 1 2.4425251 GHz -12.98 dBm Occ Bw Freq Offset -4.879978534 kHz
D1 M1 1 0.0 Hz 0.00 dB
M2 1 2.437 GHz -69.58 dBm

Plot 1.6

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.

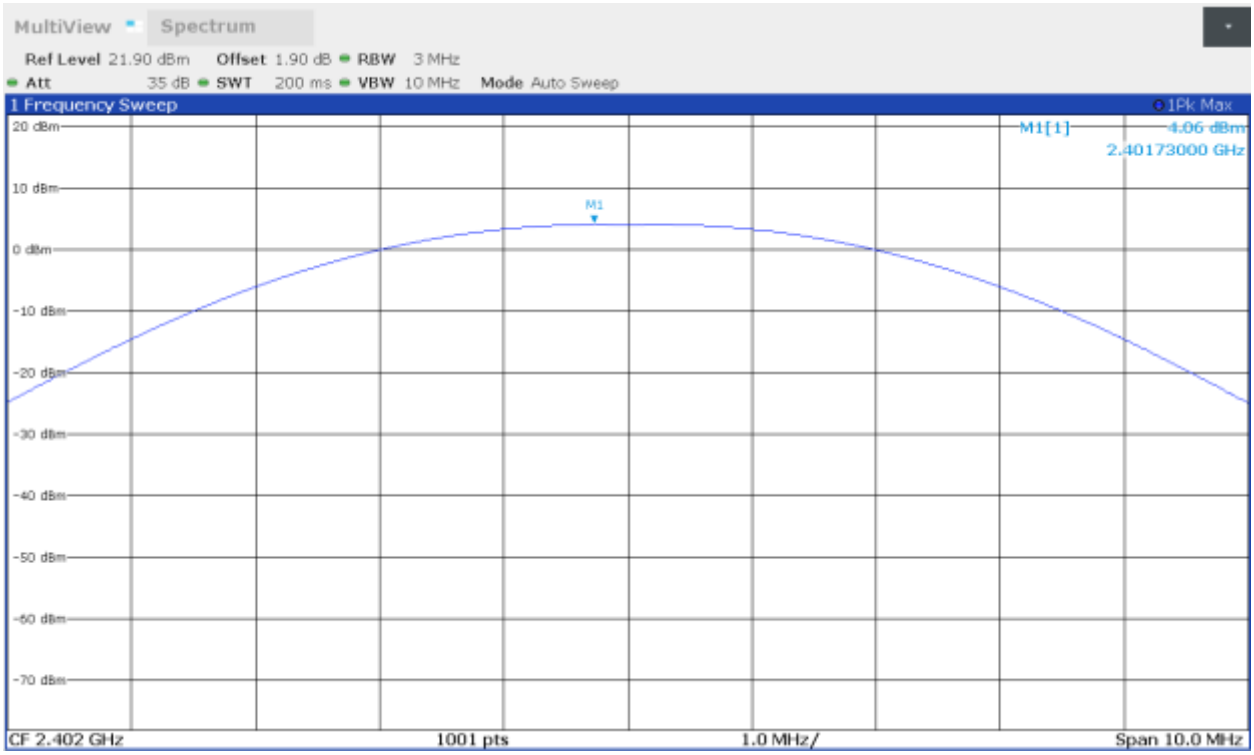
4.2.3 Test Result

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

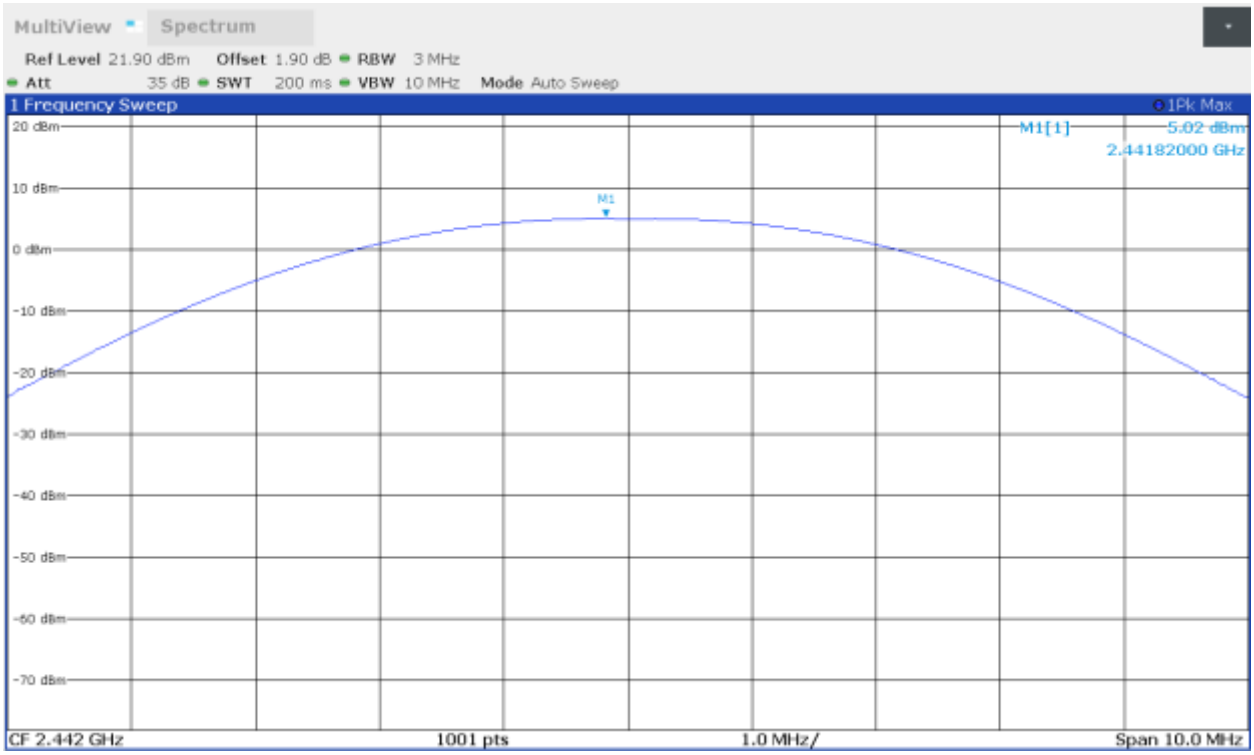
Frequency	Conducted Power (peak)		Plot
MHz	dBm	mW	
2402	4.06	2.546	2.1
2442	5.02	3.176	2.2
2480	4.90	3.090	2.3

Tested By	Test Date	Results
Juan Alapizco Vega	September 22, 2022	Complies

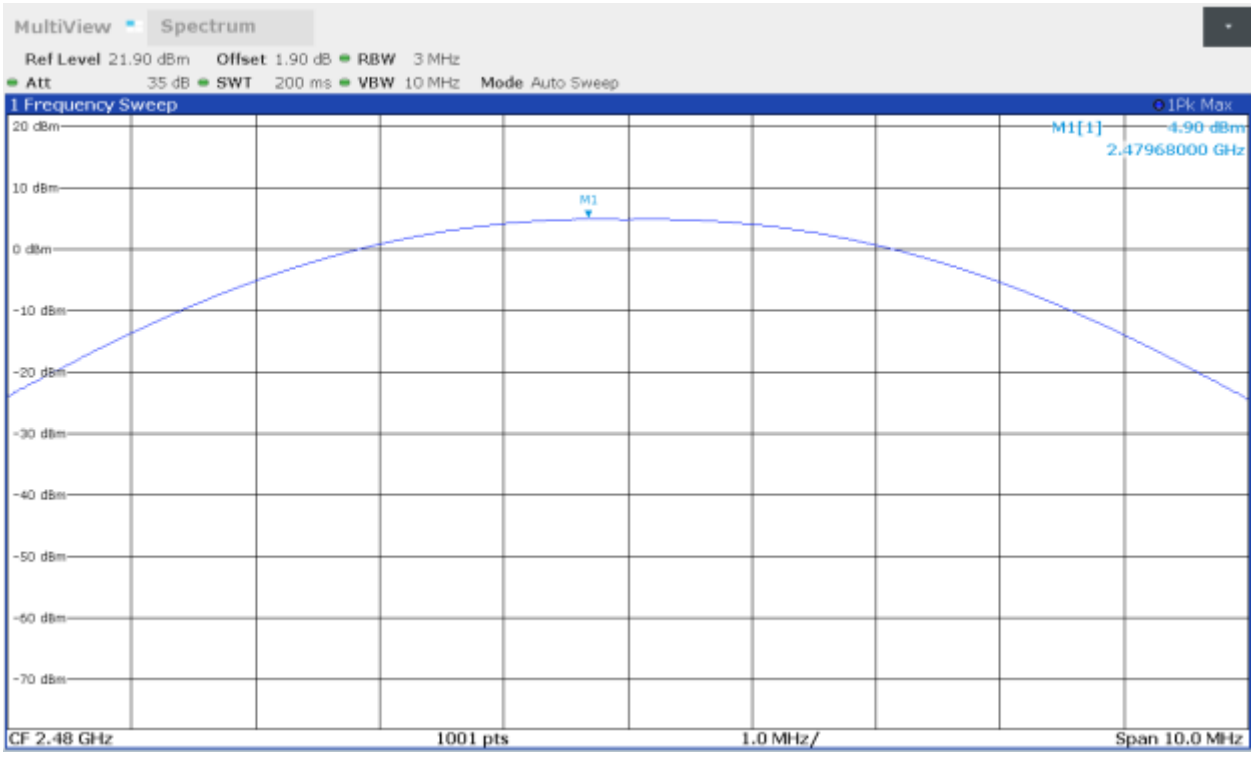
Plot 2. 1


MultiView
Spectrum
Ref Level 21.90 dBm Offset 1.90 dB RBW 3 MHz
Att 35 dB SWT 200 ms VBW 10 MHz Mode Auto Sweep
1 Frequency Sweep
1Pk Max
M1[1] 4.06 dBm
2.40173000 GHz
M1
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.402 GHz
1001 pts
1.0 MHz/
Span 10.0 MHz

Plot 2. 2


MultiView
Spectrum
Ref Level 21.90 dBm Offset 1.90 dB RBW 3 MHz
Att 35 dB SWT 200 ms VBW 10 MHz Mode Auto Sweep
1 Frequency Sweep
1Pk Max
M1[1] 5.02 dBm
2.44182000 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.442 GHz
1001 pts
1.0 MHz/
Span 10.0 MHz

Plot 2. 3



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.

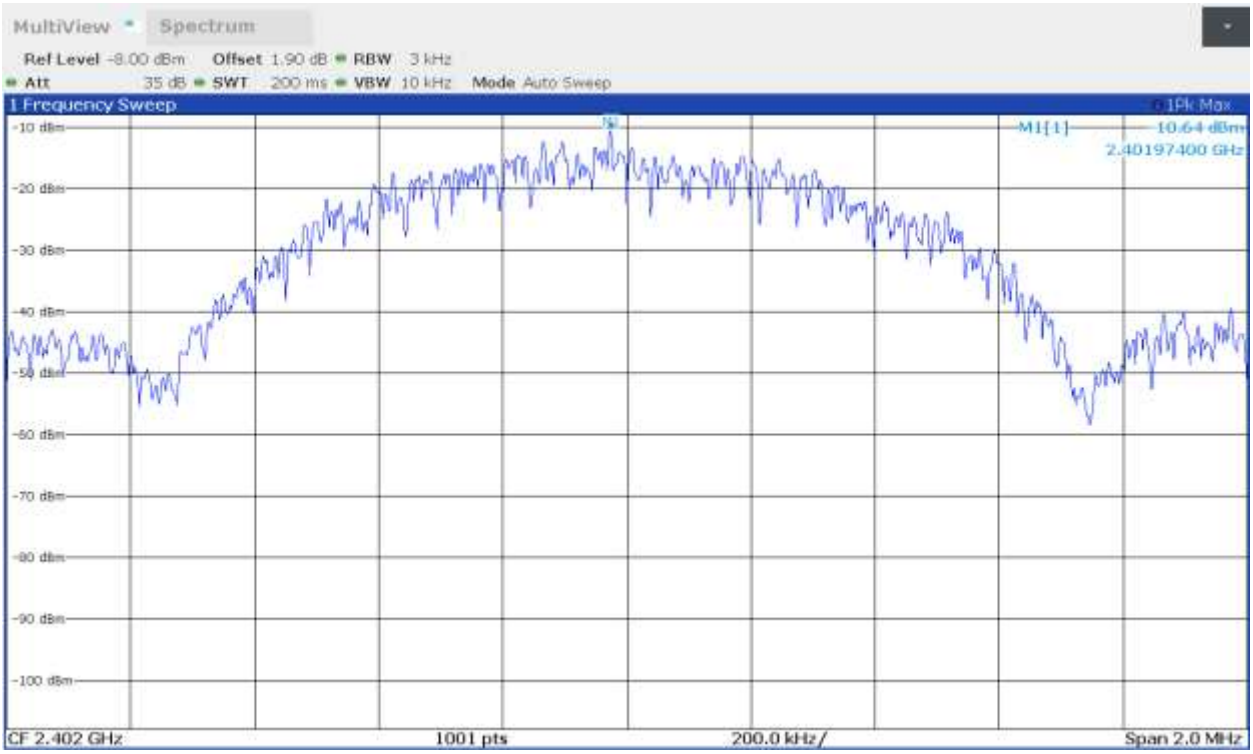
4.3.3 Test Result

Refer to the following plots for the test result

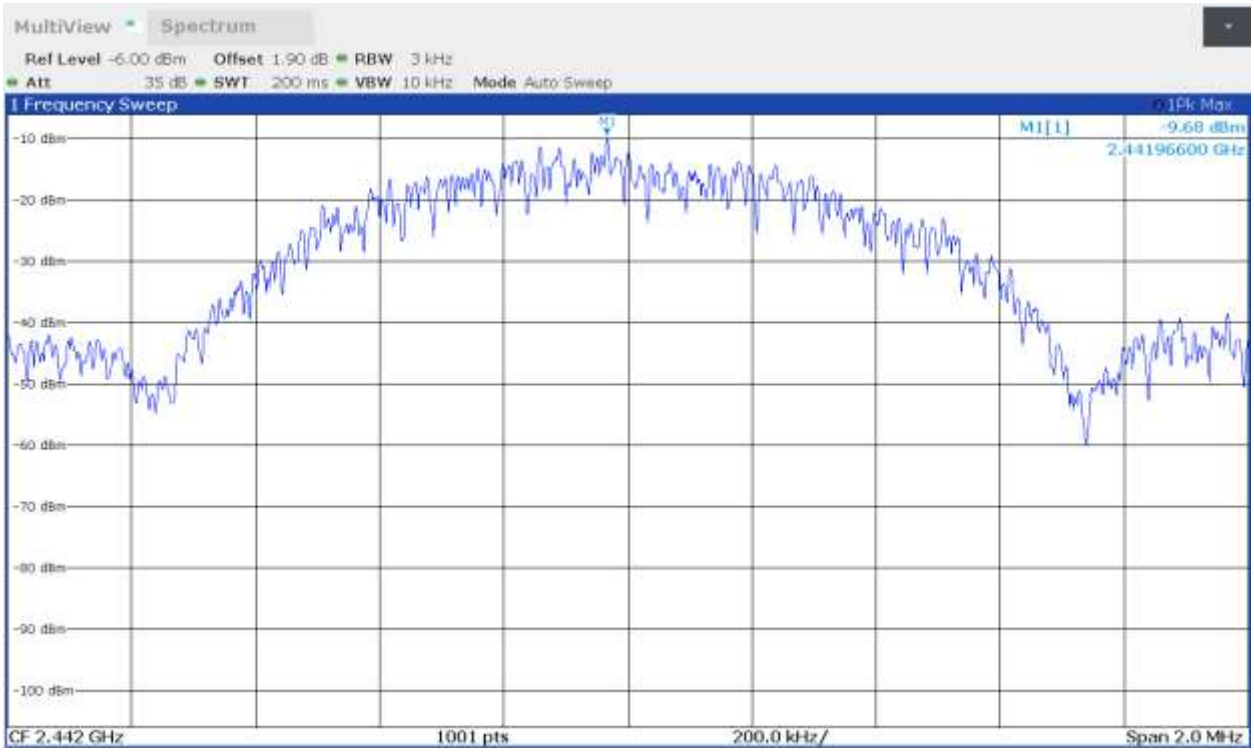
Frequency, MHz	Maximum Power Spectral Density, dBm	Maximum Power Spectral Density Limit, dBm	Margin, dB	Plot
2402	-10.64	8.0	-18.64	3.1
2440	-9.68	8.0	-17.68	3.2
2480	-9.74	8.0	-17.74	3.3

Tested By	Test Date	Results
Juan Alapizco Vega	September 12, 2022	Complies

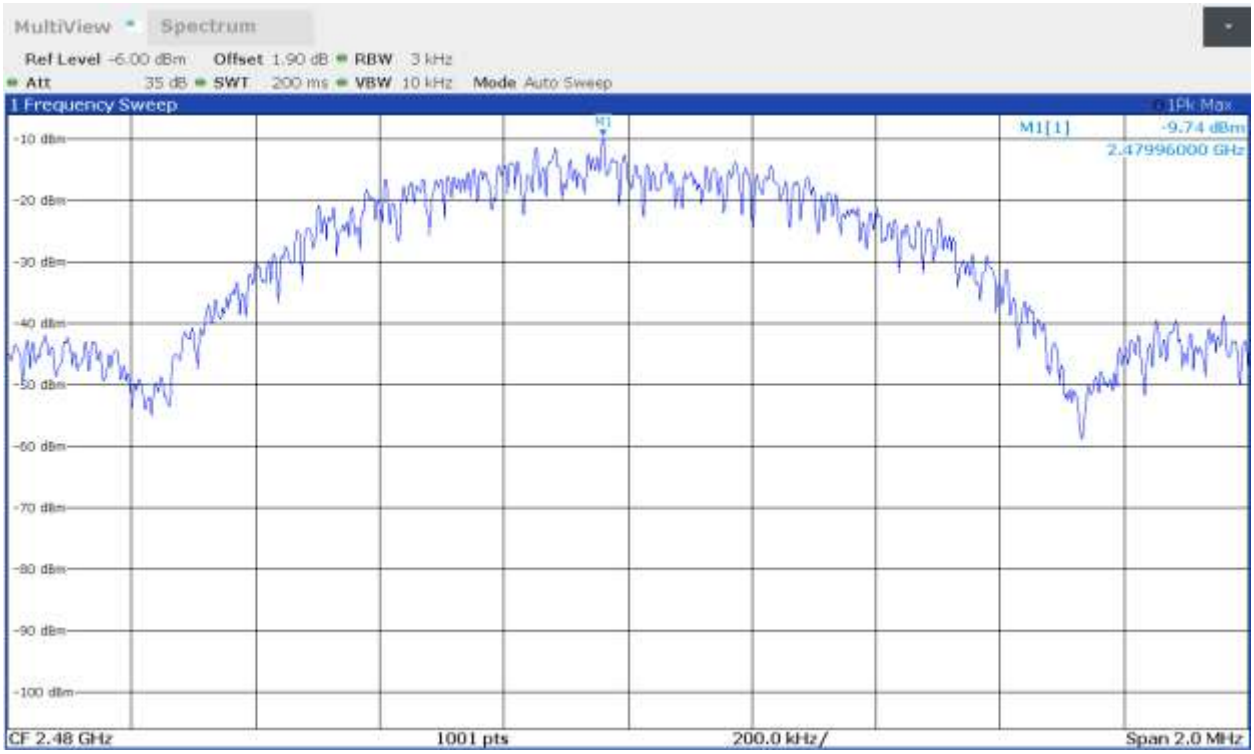
Plot 3. 1


MultiView
Spectrum
Ref Level -8.00 dBm Offset 1.90 dB RBW 3 kHz
Att 35 dB SWT 200 ms VBW 10 kHz Mode Auto Sweep
1 Frequency Sweep
1Pk Max
M1[1] 10.64 dBm
2.40197400 GHz
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
-100 dBm
CF 2.402 GHz
1001 pts
200.0 kHz/
Span 2.0 MHz

Plot 3. 2


MultiView
Spectrum
Ref Level -6.00 dBm Offset 1.90 dB RBW 3 kHz
Att 35 dB SWT 200 ms VBW 10 kHz Mode Auto Sweep
1 Frequency Sweep
1Pk Max
M1[1] -9.68 dBm
2.44196600 GHz
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
-100 dBm
CF 2.442 GHz
1001 pts
200.0 kHz/
Span 2.0 MHz

Plot 3. 3



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.

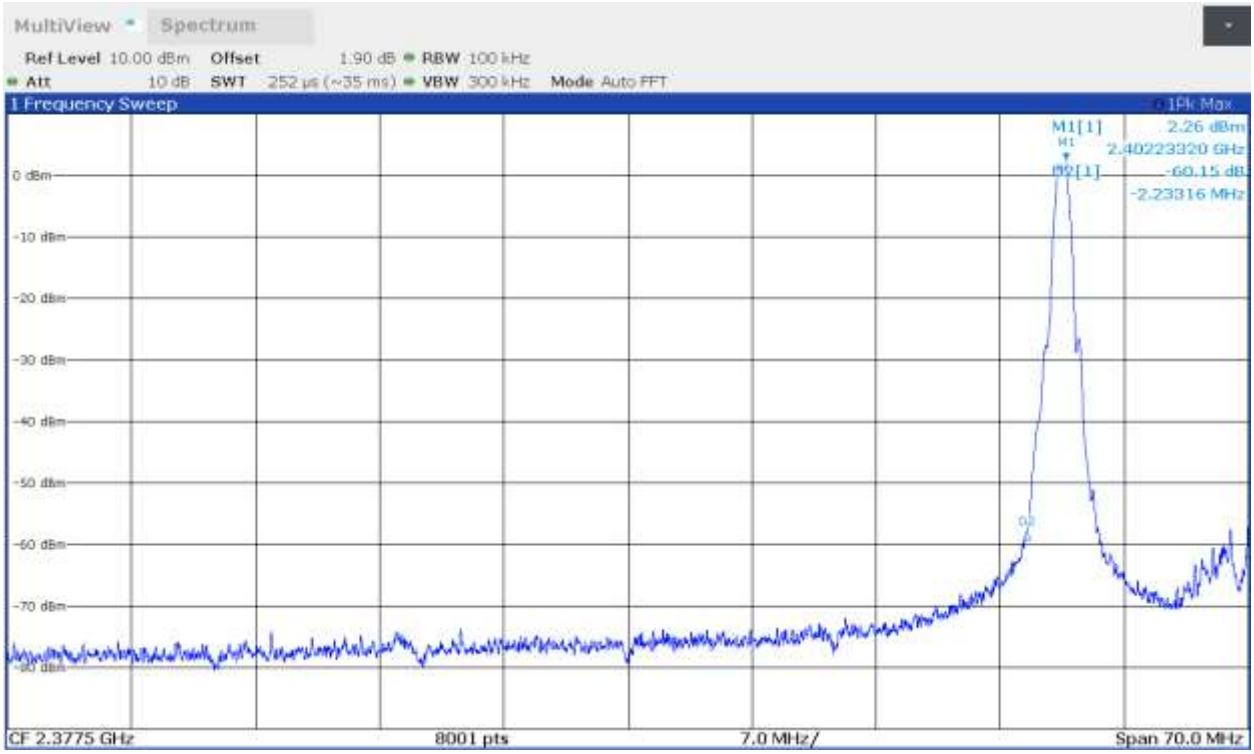
The unwanted emissions were measured from 30 MHz to 25 GHz. Plots below are corrected for cable loss and then compared to the limits.

4.4.3 Test Result

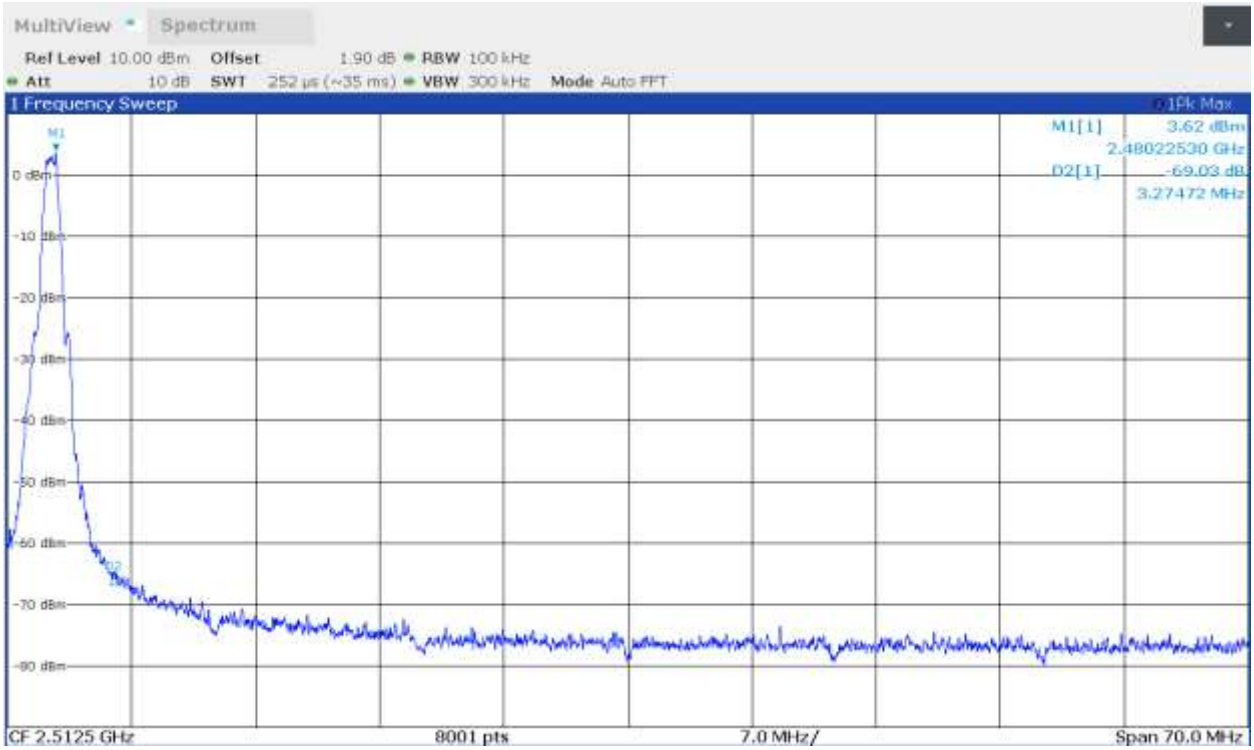
Refer to the following plots 4.1 – 4.5 for unwanted conducted emissions. The plot shows -20dB attenuation limit line.

Tested By	Test Date	Results
Juan Alapizco Vega	September 12, 2022	Complies

Tx @ Low Channel, 2402 MHz Band Edge
Plot 4.1

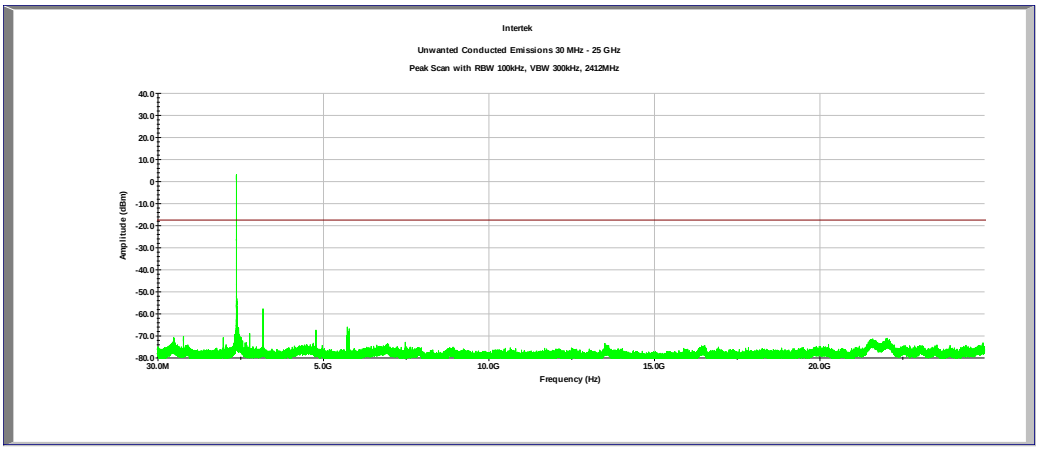


Tx @ High Channel, 2480 MHz Band Edge
Plot 4.2

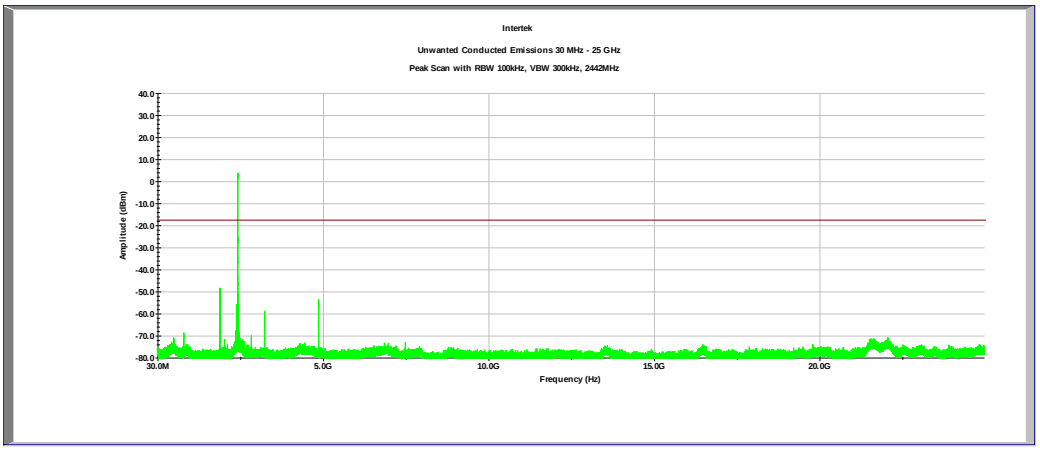


Results	Complies

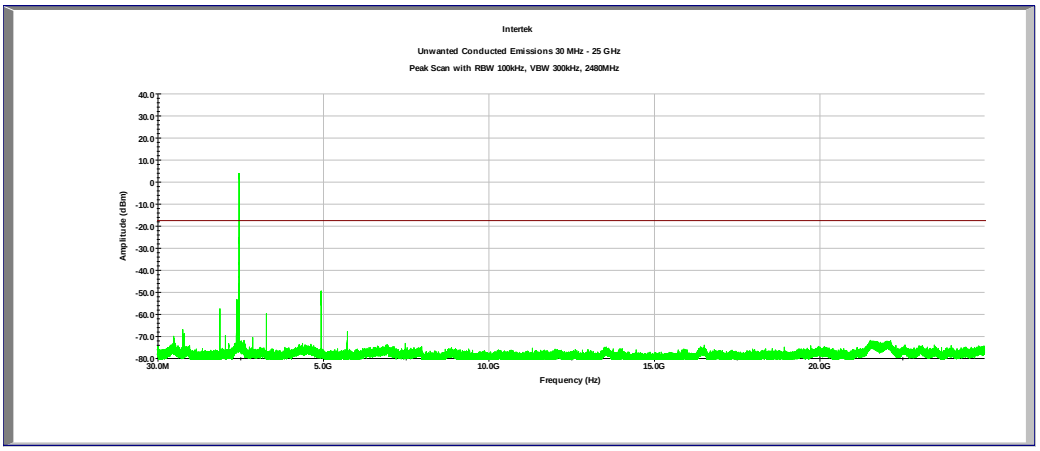
Tx @ Low Channel, 2402 MHz
30MHz -26GHz Conducted Spurious
Plot 4.3



Tx @ Mid Channel, 2442 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.

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.

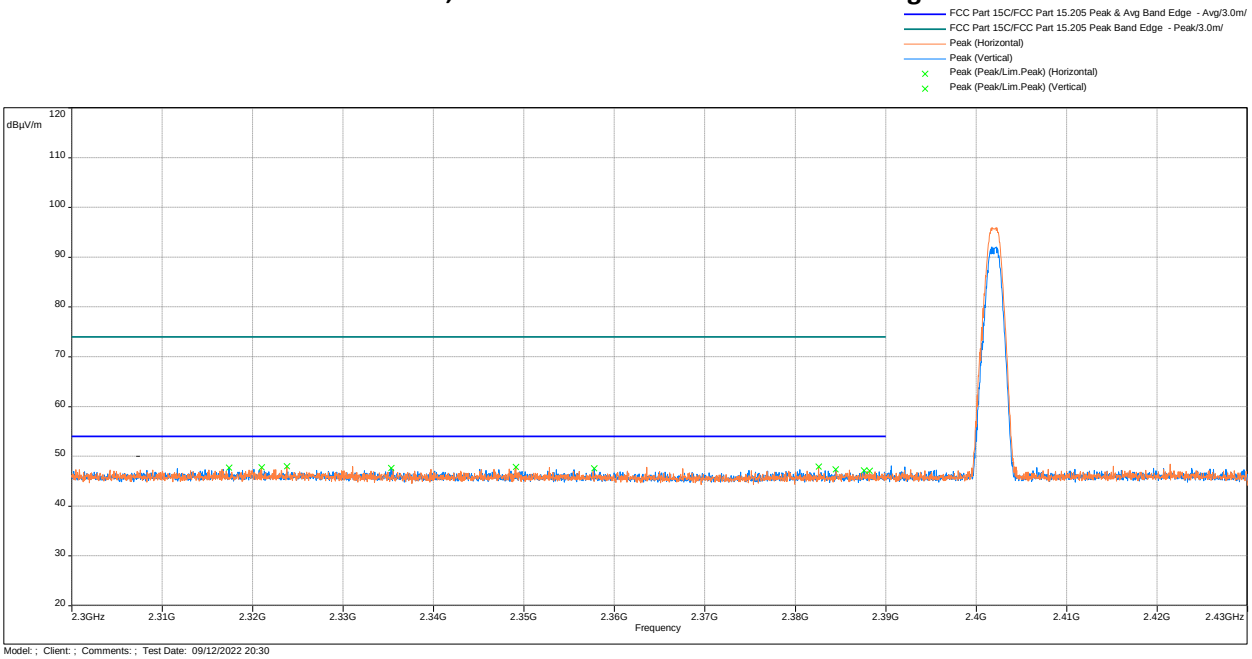
4.5.4 Test Results

All testing in this section were performed by radiated measurements.

Tested By	Test Date	Results
Juan Alapizco Vega	August 18, 2022 to October 11, 2022	Complies

Test Results: 15.209/15.205 Radiated Restricted Band Emissions

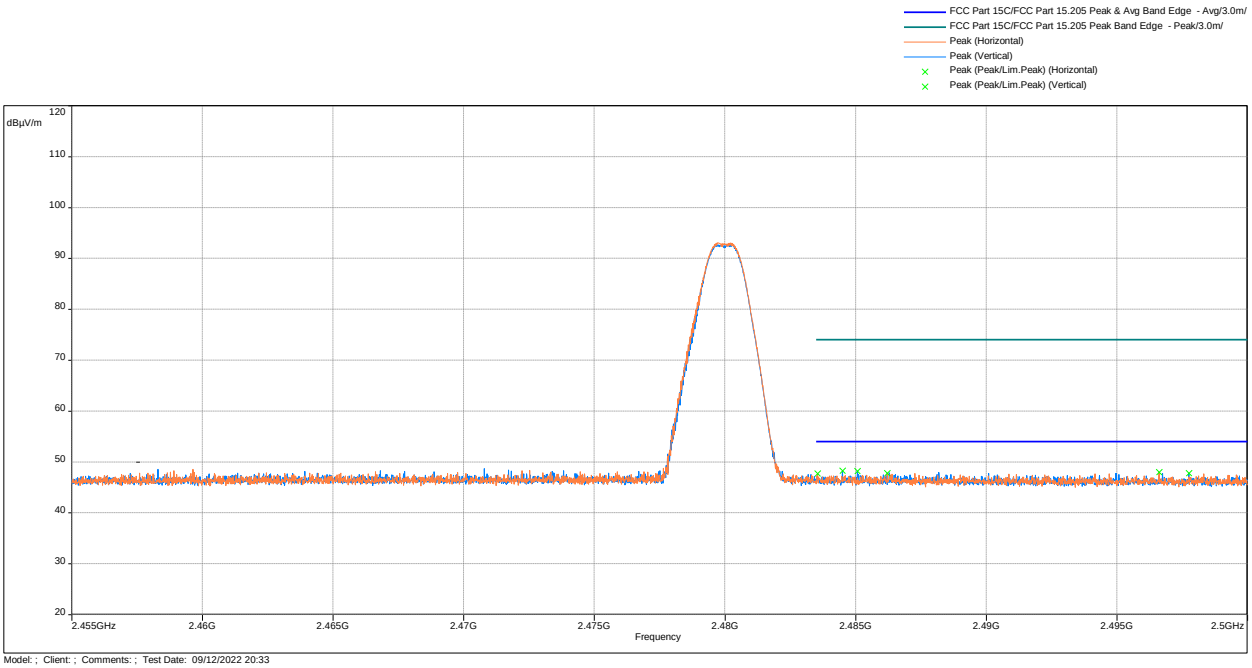
Out-of-Band Radiated spurious emissions at the Band-edge @3m distance
2310–2390 MHz, Peak Scan with Peak Limit and Average Limit



Freq. MHz	Peak@3m dB(uV/m)	Ave Limit dB(µV/m)	Margin dB	Height m	Azimuth deg	Polarity	Correction dB
2390.00	44.55	54	-9.45	1.33	298	Vertical	31.33

Note: Correction = AF + CF – Preap

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



Freq. MHz	Peak@3m dB(uV/m)	Ave Limit dB(µV/m)	Margin dB	Height m	Azimuth deg	Polarity	Correction dB
2483.50	45.67	54	-8.33	3.72	26175	Vertical	21.78

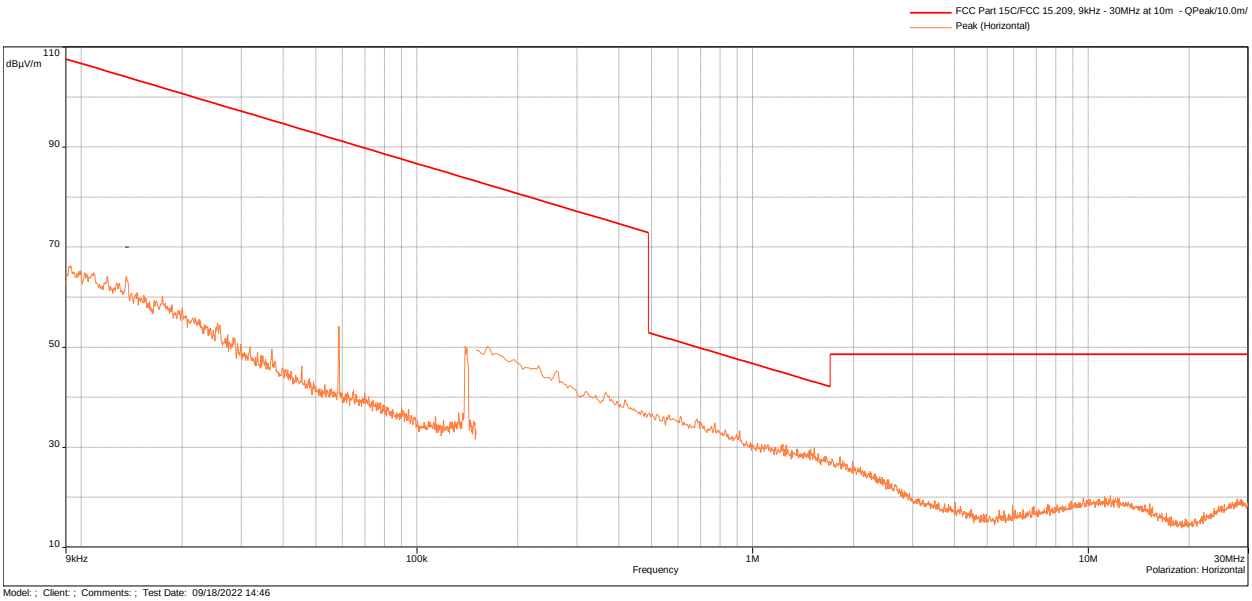
Note: Correction = AF + CF – Preamp+ DCF where DCF =2.1dB (see annex A)

Results	Complies

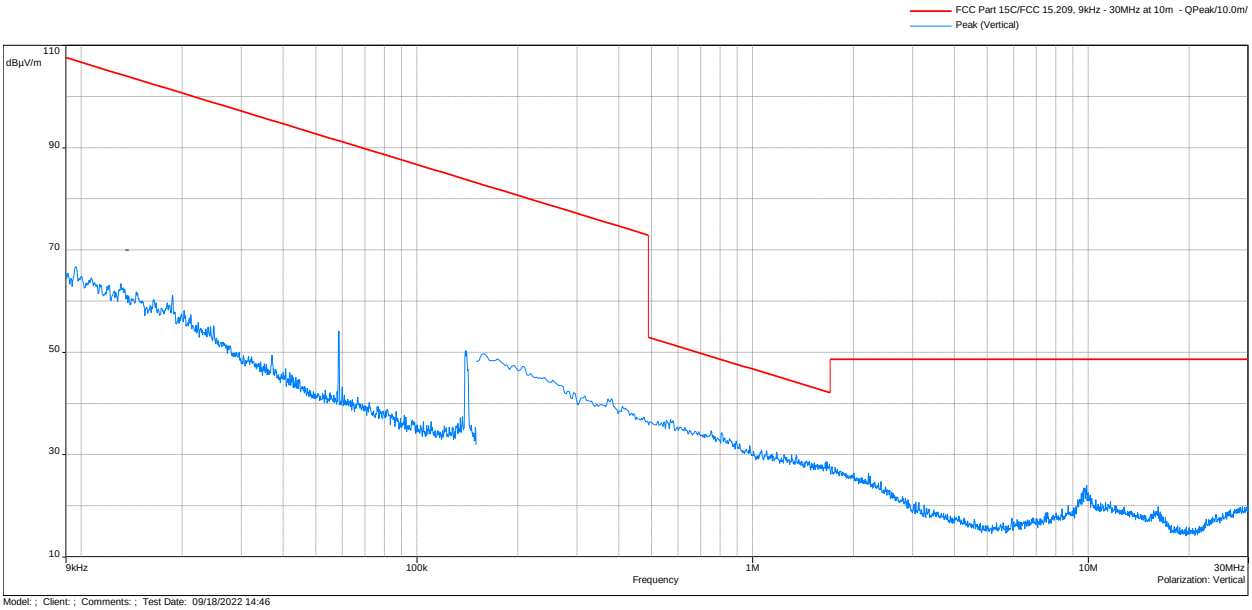
Out-of-Band Radiated Spurious Emissions

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

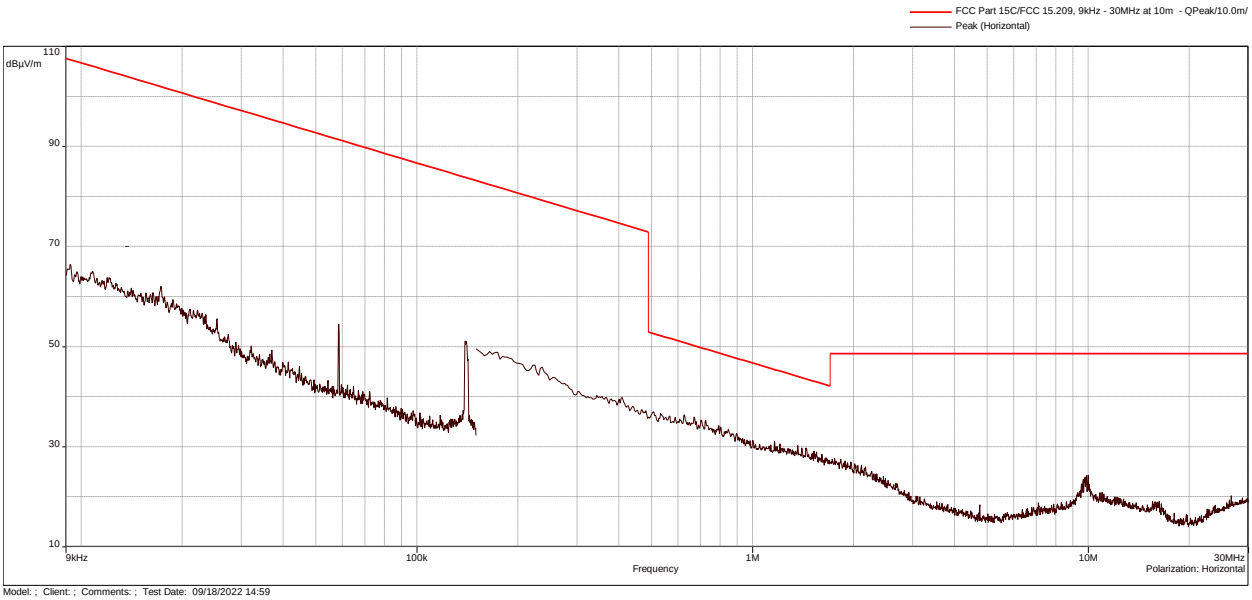
Radiated Spurious Emissions 9kHz - 30 MHz Parallel Antenna Polarization



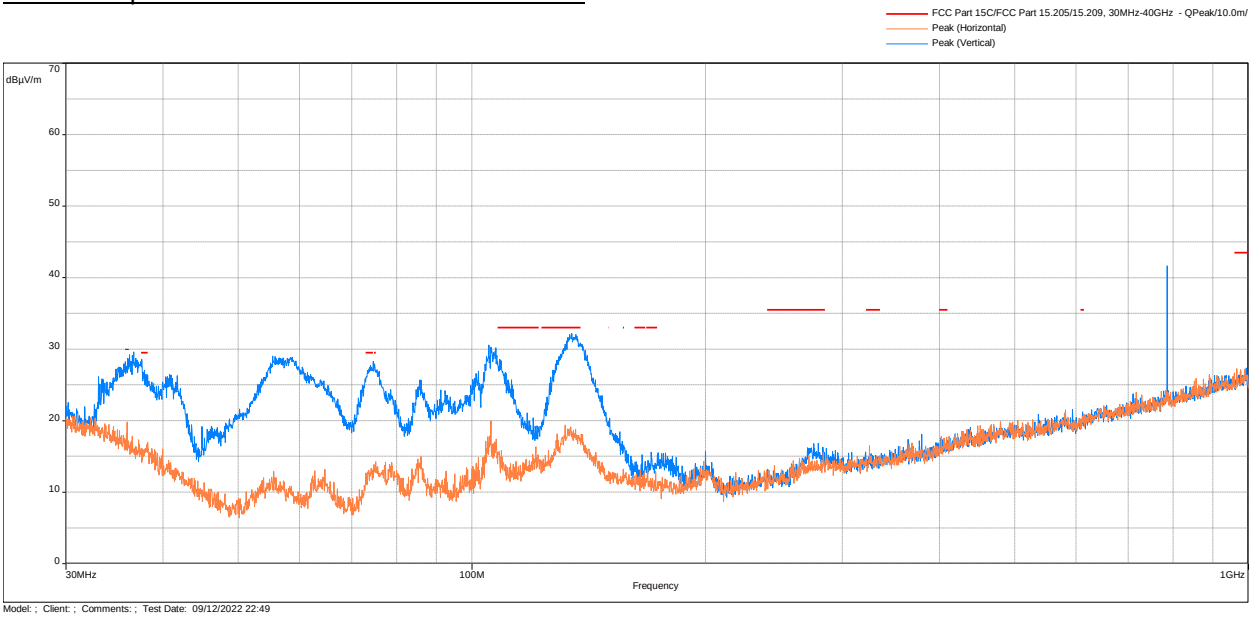
Radiated Spurious Emissions 9kHz - 30 MHz Perpendicular Antenna Polarization



Radiated Spurious Emissions 9kHz - 30 MHz Horizontal Antenna Polarization

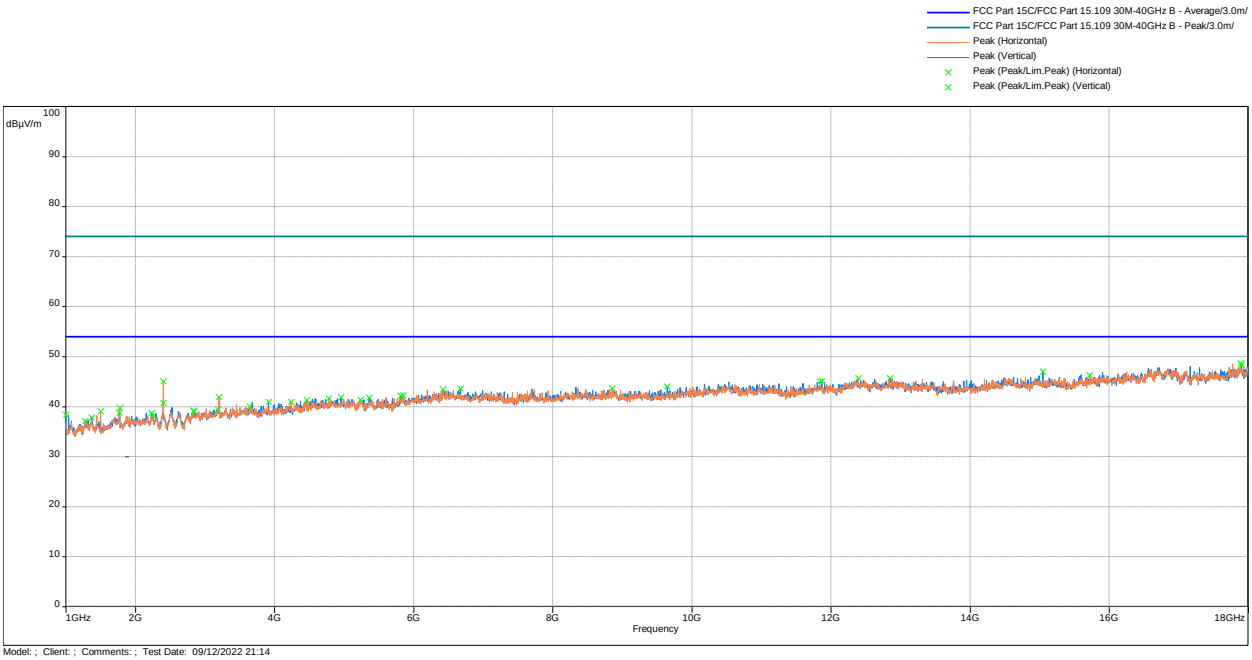


Radiated Spurious Emissions 30 MHz - 1000 MHz



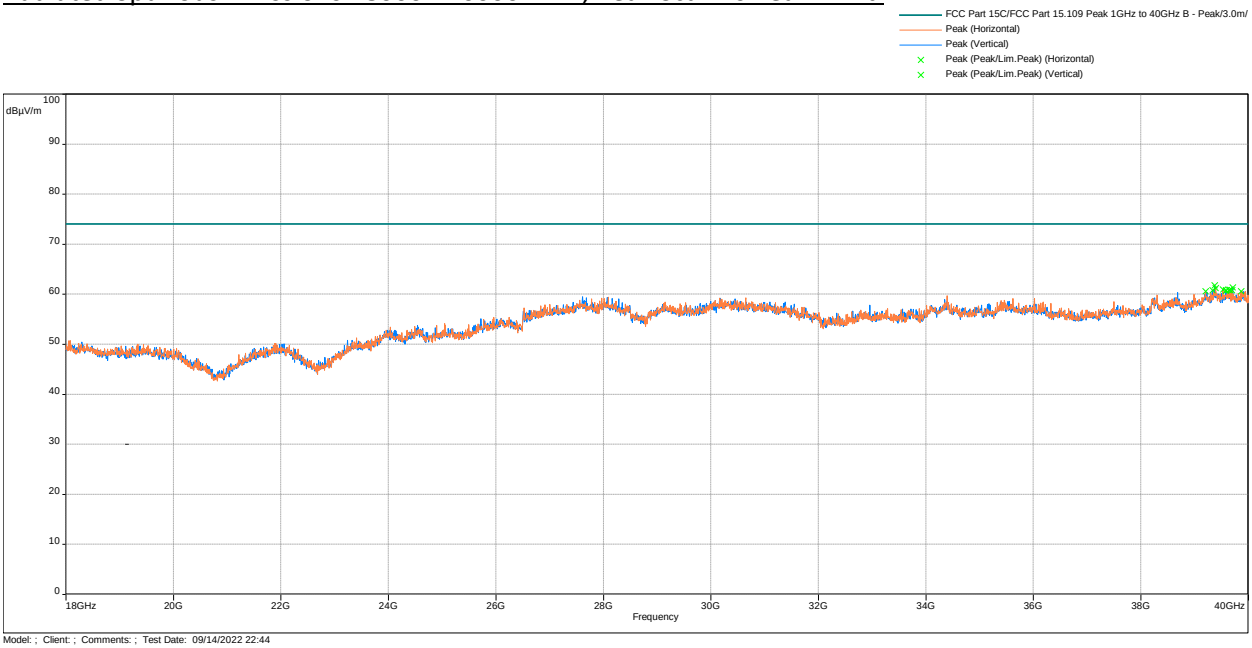
Note: The emissions close to the limit are those from the digital components of the EUT not the Radio.

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



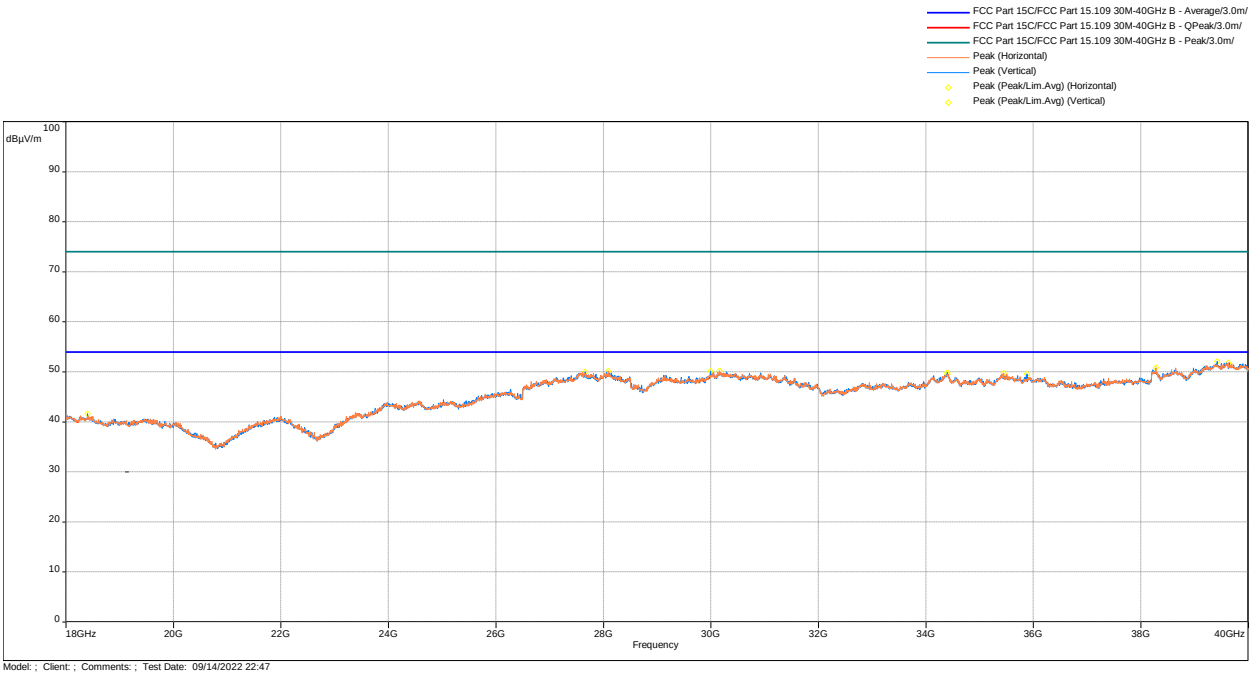
Model: ; Client: ; Comments: ; Test Date: 09/12/2022 21:14

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



Model: ; Client: ; Comments: ; Test Date: 09/14/2022 22:44

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



Model: ; Client: ; Comments: ; Test Date: 09/14/2022 22:47

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

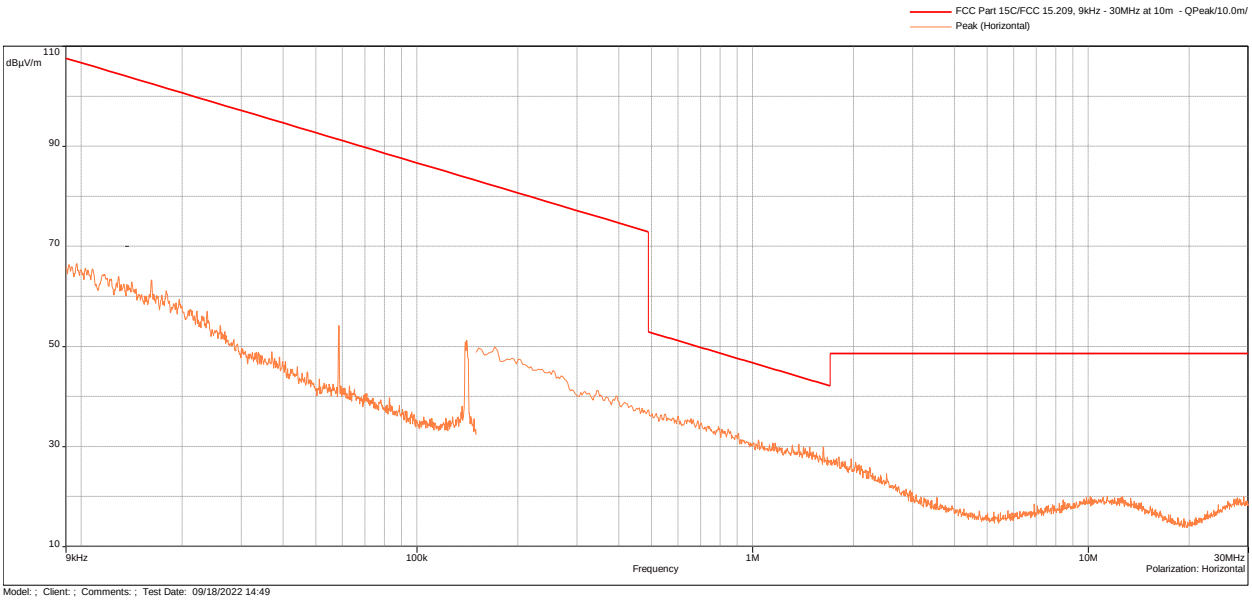
Frequency (MHz)	QPeak@ 10m (dBµV/m)	Lim. QPeak @10m (dBµV/m)	Margin (dB)	Height (m)	Angle (°)	Comment	Correction (dB)
37.11333	27.74	29.5	-1.76	1	249.5	Vertical	-11.2
55.38167	29	29.5	-0.5	1	294.5	Vertical	-20.01
74.65233	28.26	29.5	-1.24	2	2	Vertical	-18.74
105.175	30.59	33	-2.41	1	0	Vertical	-15.16
105.8863	30.26	33	-2.74	2	329.25	Vertical	-15.01
134.5013	32.19	33	-0.81	1	328.75	Vertical	-12.79

Note: Correction = AF + CF - Preamp

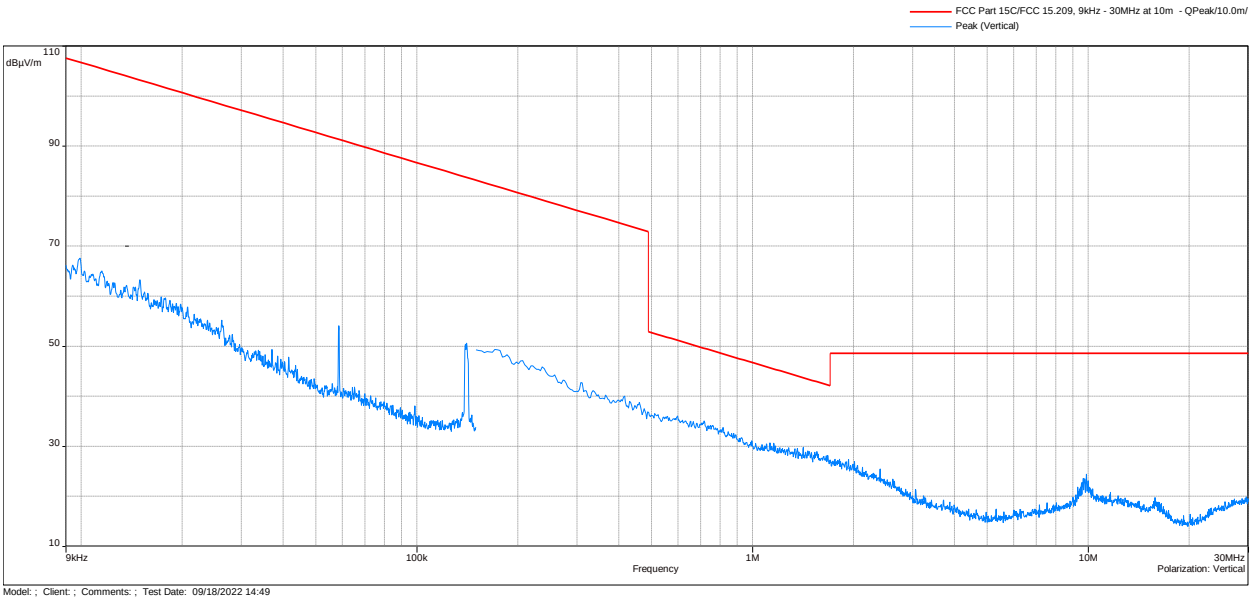
Results	Complies

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

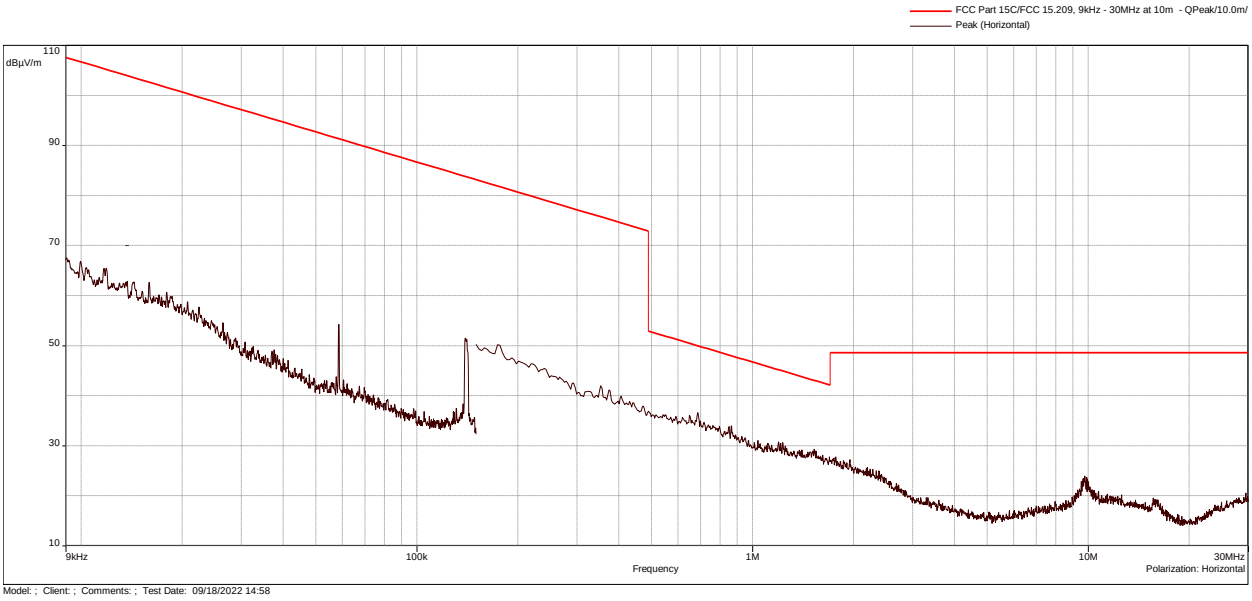
Radiated Spurious Emissions 9kHz - 30 MHz Parallel Antenna Polarization



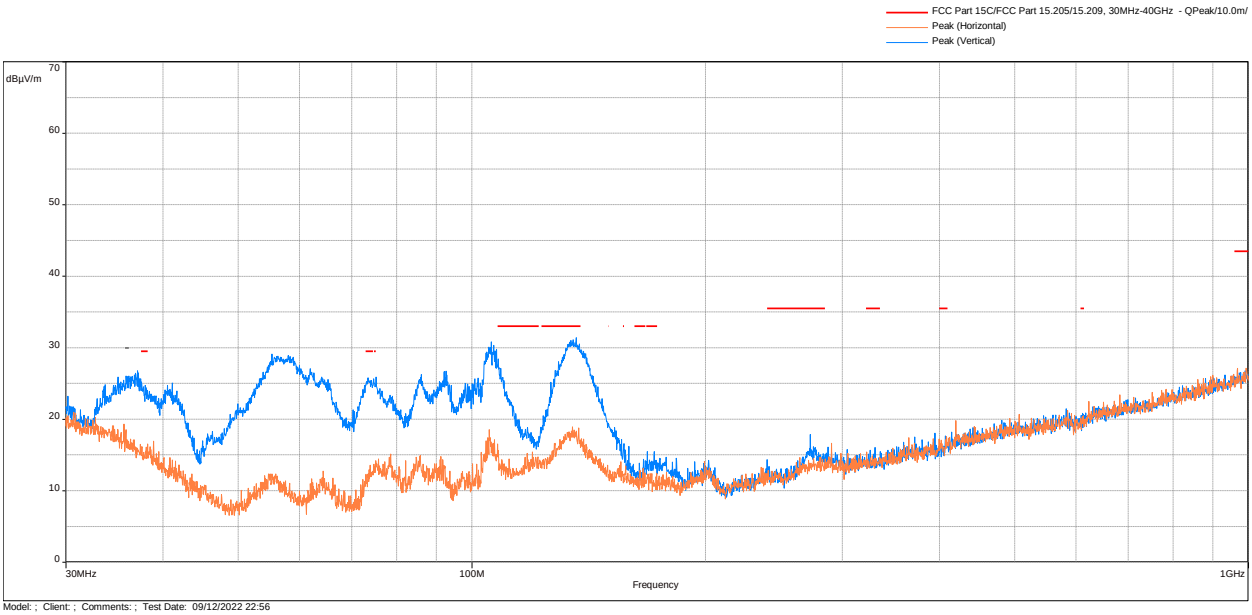
Radiated Spurious Emissions 9kHz - 30 MHz Perpendicular Antenna Polarization



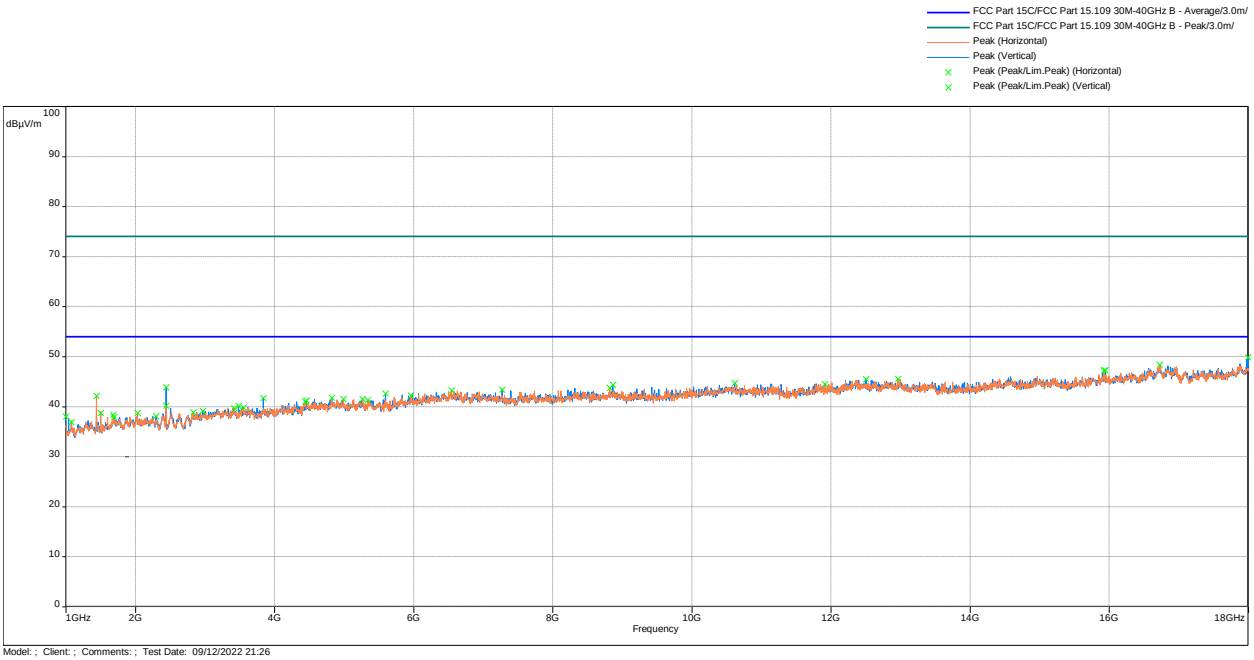
Radiated Spurious Emissions 9kHz - 30 MHz Horizontal Antenna Polarization



Radiated Spurious Emissions 30 MHz - 1000 MHz

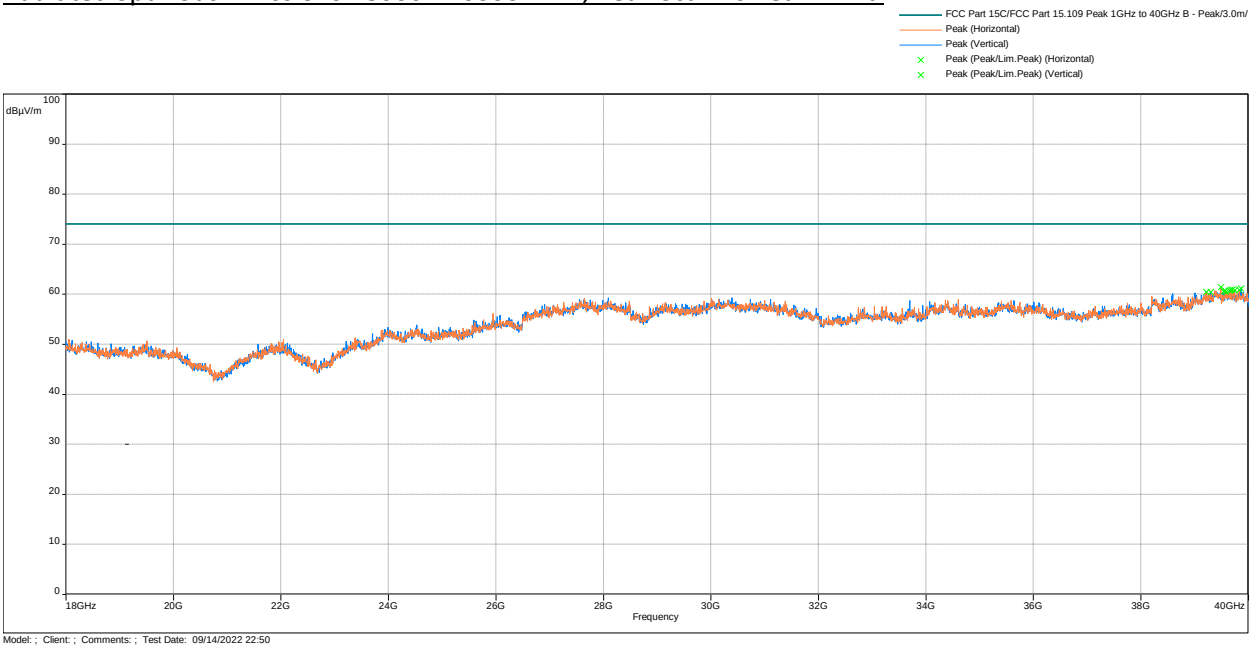


Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Peak Limit and Average Limit.



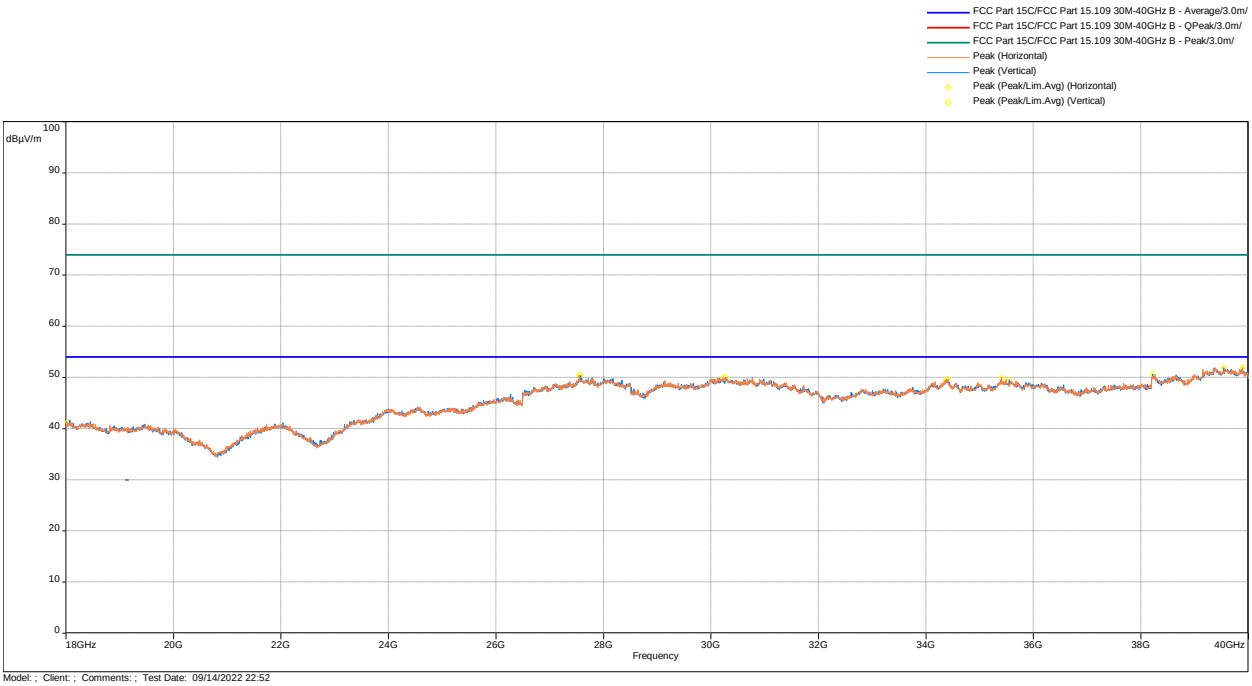
Model: ; Client: ; Comments: ; Test Date: 09/12/2022 21:26

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



Model: ; Client: ; Comments: ; Test Date: 09/14/2022 22:50

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



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

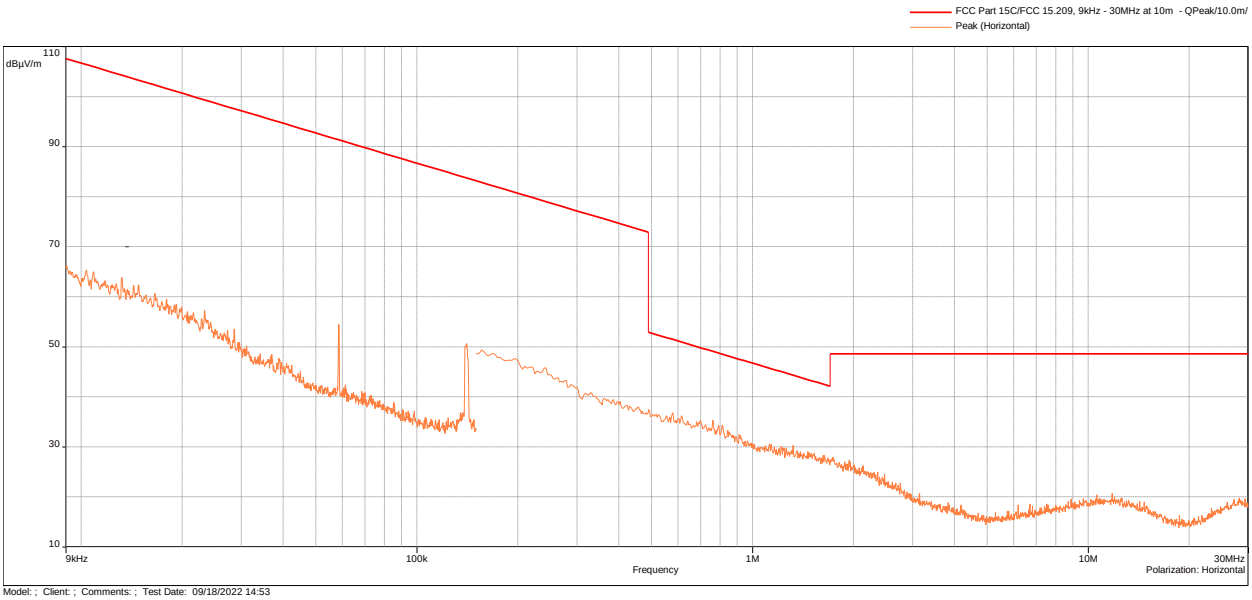
Frequency (MHz)	QPeak@ 10m (dBµV/m)	Lim. QPeak @10m (dBµV/m)	Margin (dB)	Height (m)	Angle (°)	Comment	Correction (dB)
37.11333	26.76	29.5	-2.74	1	249.5	Vertical	-11.2
55.28467	29.09	29.5	-0.41	4	58.5	Vertical	-20.01
105.2397	30.08	33	-2.92	1	232.75	Vertical	-15.15
105.951	30.79	33	-2.21	1	311	Vertical	-15
106.7593	30.32	33	-2.68	1	285.25	Vertical	-14.83
136.3443	31.41	33	-1.59	1	311	Vertical	-12.92

Note: Correction = AF + CF – Preamp

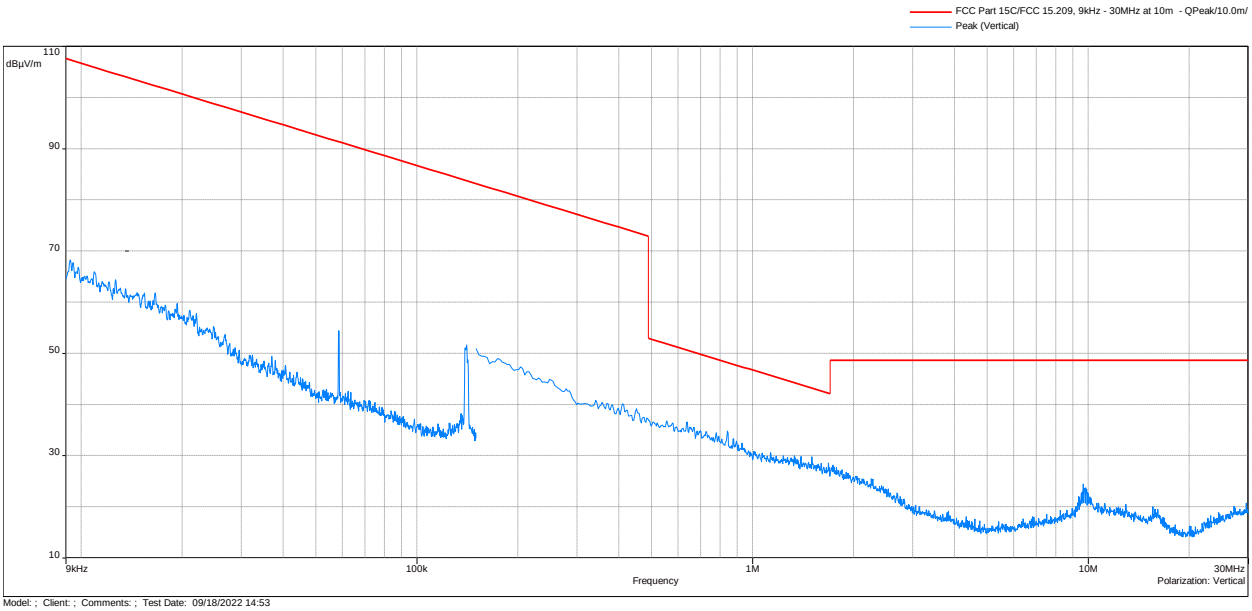
Results	Complies

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

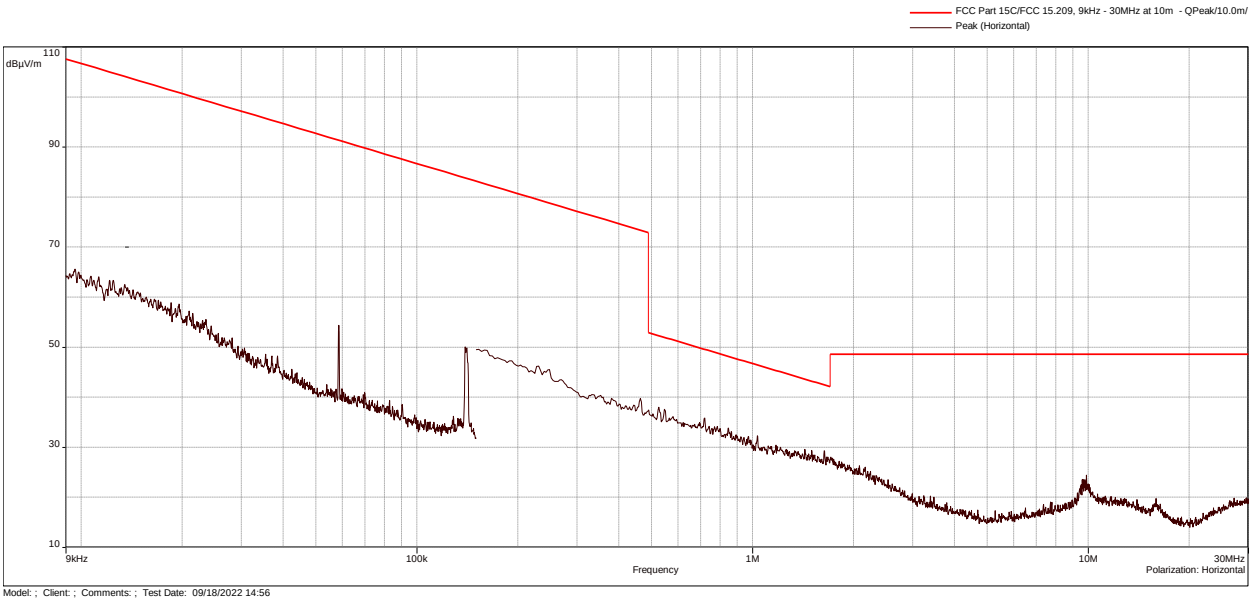
Radiated Spurious Emissions 9kHz - 30 MHz Parallel Antenna Polarization



Radiated Spurious Emissions 9kHz - 30 MHz Perpendicular Antenna Polarization

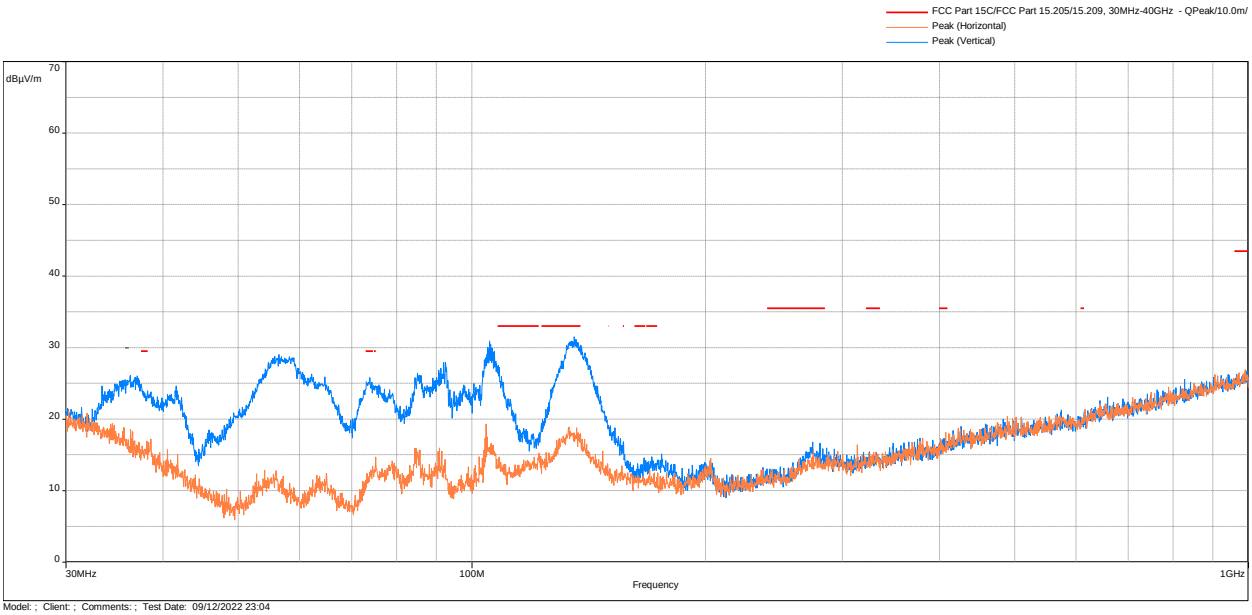


Radiated Spurious Emissions 9kHz - 30 MHz Horizontal Antenna Polarization



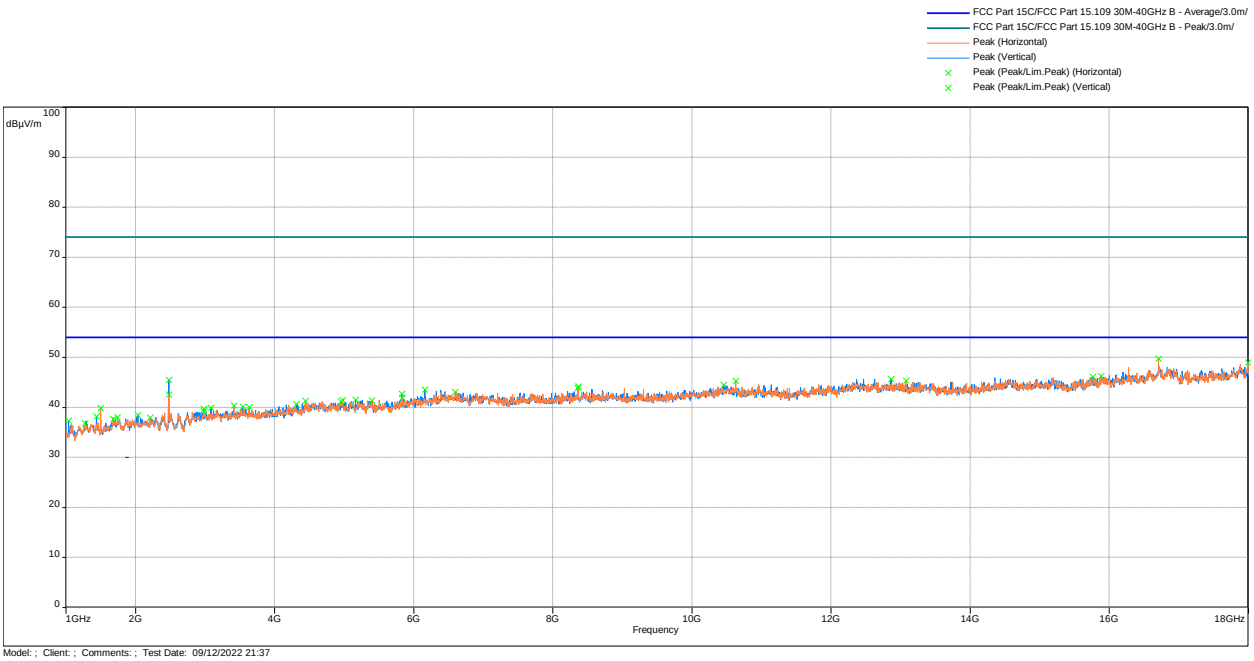
Model: ; Client: ; Comments: ; Test Date: 09/18/2022 14:56

Radiated Spurious Emissions 30 MHz - 1000 MHz



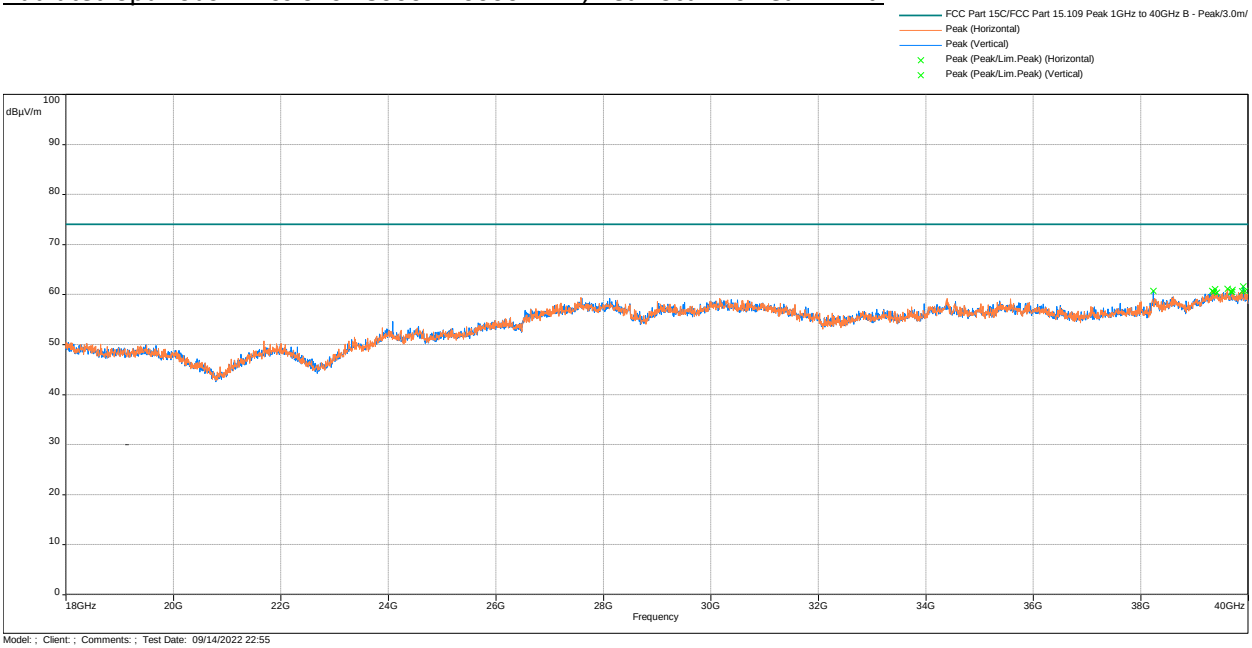
Model: ; Client: ; Comments: ; Test Date: 09/12/2022 23:04

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



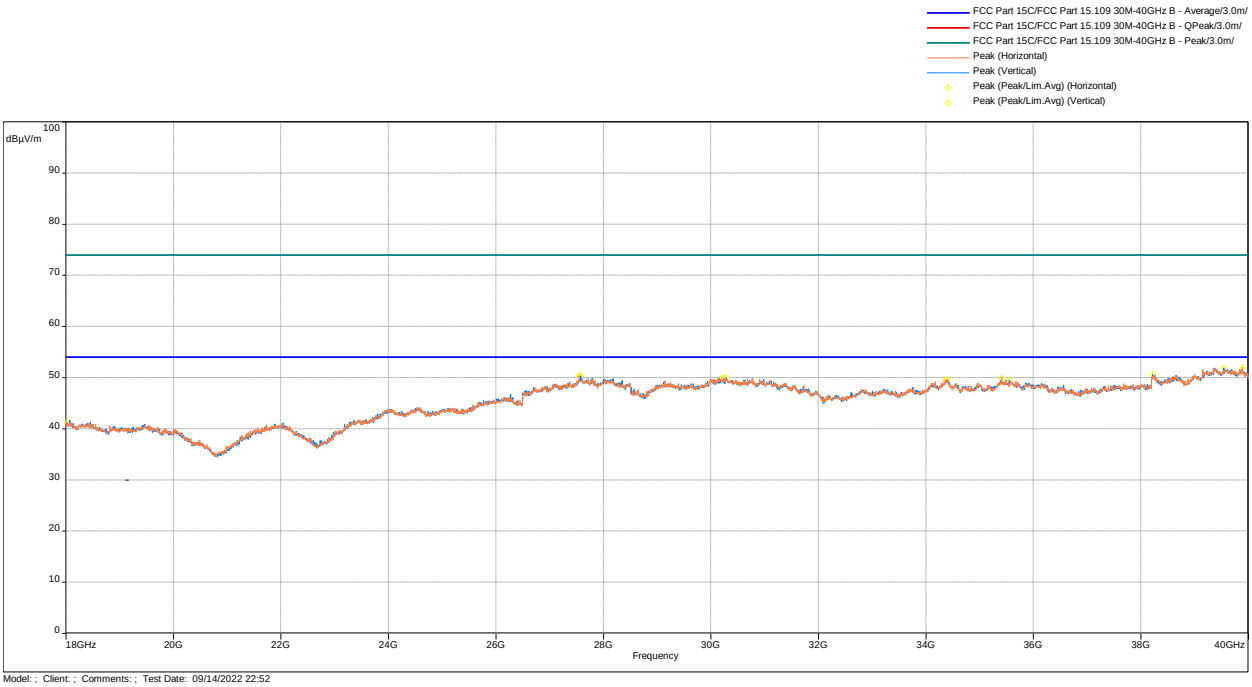
Model: ; Client: ; Comments: ; Test Date: 09/12/2022 21:37

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



Model: ; Client: ; Comments: ; Test Date: 09/14/2022 22:55

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



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

Frequency (MHz)	QPeak@ 10m (dBµV/m)	Lim. QPeak @10m (dBµV/m)	Margin (dB)	Height (m)	Angle (°)	Comment	Correction (dB)
56.44867	29.03	29.5	-0.47	4	128.75	Vertical	-20
85.16067	26.43	29.5	-3.07	2	312.5	Vertical	-19.46
104.8517	30.05	33	-2.95	2	277.25	Vertical	-15.24
105.4337	30.91	33	-2.09	0.99	294.25	Vertical	-15.11
105.6923	30.45	33	-2.55	0.99	352	Vertical	-15.05
106.1773	29.93	33	-3.07	0.99	294.25	Vertical	-14.95
135.439	31.52	33	-1.48	0.99	310.25	Vertical	-12.83

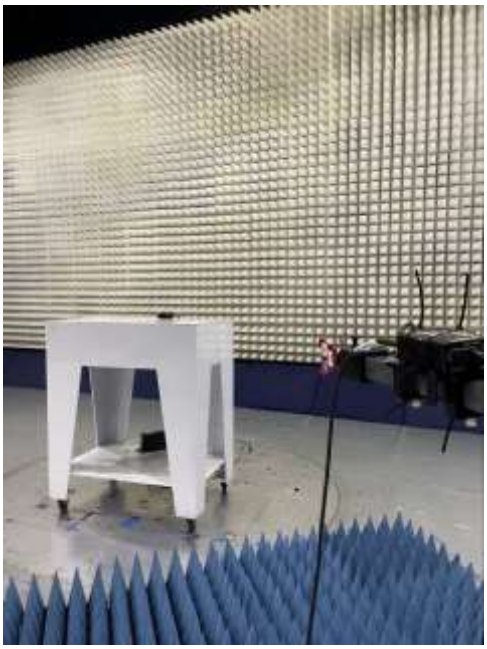
Note: Correction = AF + CF – Preamp

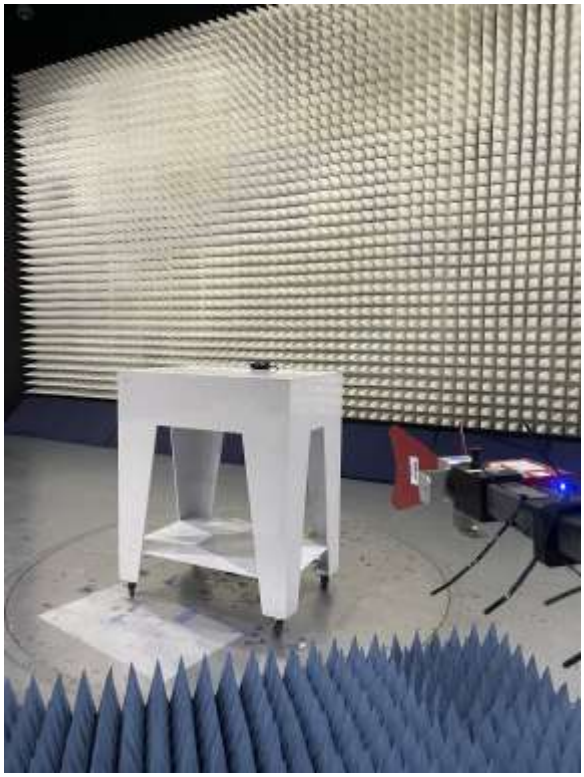
Results	Complies

4.5.5 Test Setup Configuration

The following photographs show the testing configurations used.

4.5.5 Test Setup Photographs (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.

4.6.3 Test Result

15.207: Conducted Emissions

Results	**Not applicable**

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
9kHz-30MHz Loop Antenna	ETS Lindgren	6512	01573	12	11/09/2022
30MHz-2GHz Bi-Log	SunAR RF Motion	JB1	01577	12	02/10/2023
1-18GHz 2 meter RF Cable	TRU Corp.	TRU Core 300	01330	12	08/25/2023
1-40GHz RF Cable (SMA	MEGAPHASE	EMC1-K1K1-20	01889	12	03/11/2023
1-40GHz DRG Horn (small)	ETS-Lindgren	3116	01894	12	06/20/2023
1-18GHz Horn Antenna	ETS Lindgren	3117-PA	01325	12	10/26/2022
9kHz-1GHz Pre-amplifier	Sonoma Instrument	310N	01713	12	02/17/2023
1-40GHz RF Cable	Mega PHASE	TM40-K1K1-59	01655	12	01/11/2023
1GHz to 40GHz RF Cable	MEGAPHASE	EMC1-K1K1-236	01484	12	06/27/2023
1-18GHz Horn Antenna	EMCO	3115	001595	12	#
18-40GHz Preamp	uComp Nordic	MCNS-50-18004000335p	01799	12	03/24/2023
EMI Test Receiver 40GHz	Rohde & Schwarz	ESU40	00961	12	03/10/2023
EMI Test Receiver	Rohde & Schwarz	ESR7	01607	12	11/19/2022
10m Chamber	Panashield	10 Meter Chamber	00984	12	#

= Calibration not required.

Software used for emission compliance testing utilized the following:

Name	Manufacturer	Version	Template/Profile
BAT-EMC	Nexio	3.20.0.14	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 / G105146268	JAV	ML	October 17, 2022	Original document

END OF REPORT