

TEST REPORT

Report Number: 104729499MPK-007

Project Number: G104729499

Report Issue Date: September 08, 2021

**Testing performed on
Optejet® Dispenser
Model Number: Microdose Dispenser 1.0**

FCC ID: 2A2VJ-EYENOVIAGEN1

to

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

For

Eyenovia, Inc.

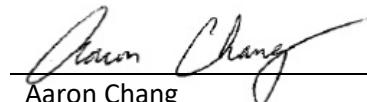
Test Performed by:

Intertek
1365 Adams Court
Menlo Park, CA 94025 USA

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Prepared by:


Aaron Chang

Date: September 08, 2021

Reviewed by:


Krishna K Vemuri

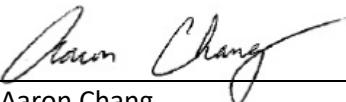
Date: September 08, 2021

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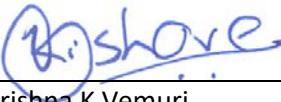
Report No. 104729499MPK-007

Equipment Under Test:	Optejet® Dispenser
Model Number:	Microdose Dispenser 1.0
Applicant:	Eyenovia, Inc.
Contact:	Kris Rodgers
Address:	Eyenovia, Inc. 8748 Technology Way Reno, NV 89521
Country:	USA
Email:	krodrgers@eyenovia.com
Applicable Regulation:	FCC Part 15 Subpart C (15.247) ISED RSS-247 Issue 2
Date of Test:	July 26, 2021 to July 28, 2021 & September 1-8, 2021

We attest to the accuracy of this report:



Aaron Chang
Senior Project Engineer



Krishna K Vemuri
EMC Manager

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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: July 25, 2021**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:** July 26, 2021**Test completion date:** September 7, 2021

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

2.0 General Information

2.1 Product Description

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

Eyenovia's Optejet® dispenser with MAP™ technology (Microdose Array Print) is a horizontal topical delivery system for the eye and works similar to an inkjet printer. Medication is administered as a directional mist in a micro droplet array, coating the corneal surface of the eye like pixels. Contact happens at low velocity minimizing ocular impact. Unlike a traditional eyedropper that uses gravity, the Optejet® dispenses medication horizontally. The Optejet® is designed to administer every dose reliably and accurately to someone who could be seated or standing.

For more information, refer to the following product specification, declared by the manufacturer.

Information about the 2.4 GHz radio is presented below:

Applicant	Eyenovia, Inc.
Model No.	Microdose Dispenser 1.0
FCC Identifier	2A2VJ-EYENOVIAGEN1
Type of transmission	Digital Transmission System (DTS)
Rated RF Output	-1.03 dBm
Antenna(s) & Gain	Internal Antenna, Gain: 0.5 dBi
Frequency Range	2402 – 2480 MHz
Type of modulation/data rate	GFSK / 1Mbit/s
Number of Channel(s)	40
Applicant Name & Address	Eyenovia, Inc. 8748 Technology Way Reno, NV 89521 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

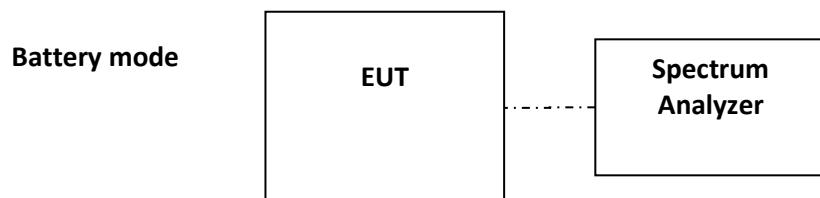
3.1 Support Equipment

No support equipment was used.

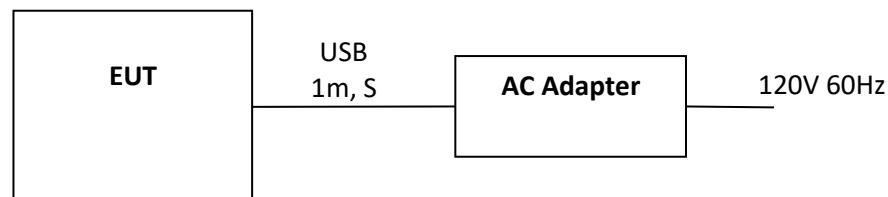
3.2 Block Diagram of Test Setup

Equipment Under Test			
Description	Manufacturer	Model	Serial Number
Radiated Sample	Eyenovia, Inc.	Microdose Dispenser 1.0	I0B4J_0857
Conducted Sample	Eyenovia, Inc.	Microdose Dispenser 1.0	I0F8Q_0208
AC Adapter	HOMESPORT	2005AYU0500100	N/A

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



Charging mode



= Shielded

U = Unshielded

F = With Ferrite

m = Length in Meters

EUT Photo



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 2.48 GHz.

3.4 Software Exercise Program

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

3.5 Mode of Operation during Test

Mode of operation during the tests was setup using a laptop which allows controlling the radio by test software. 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 (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) $\geq 3 \times$ 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.

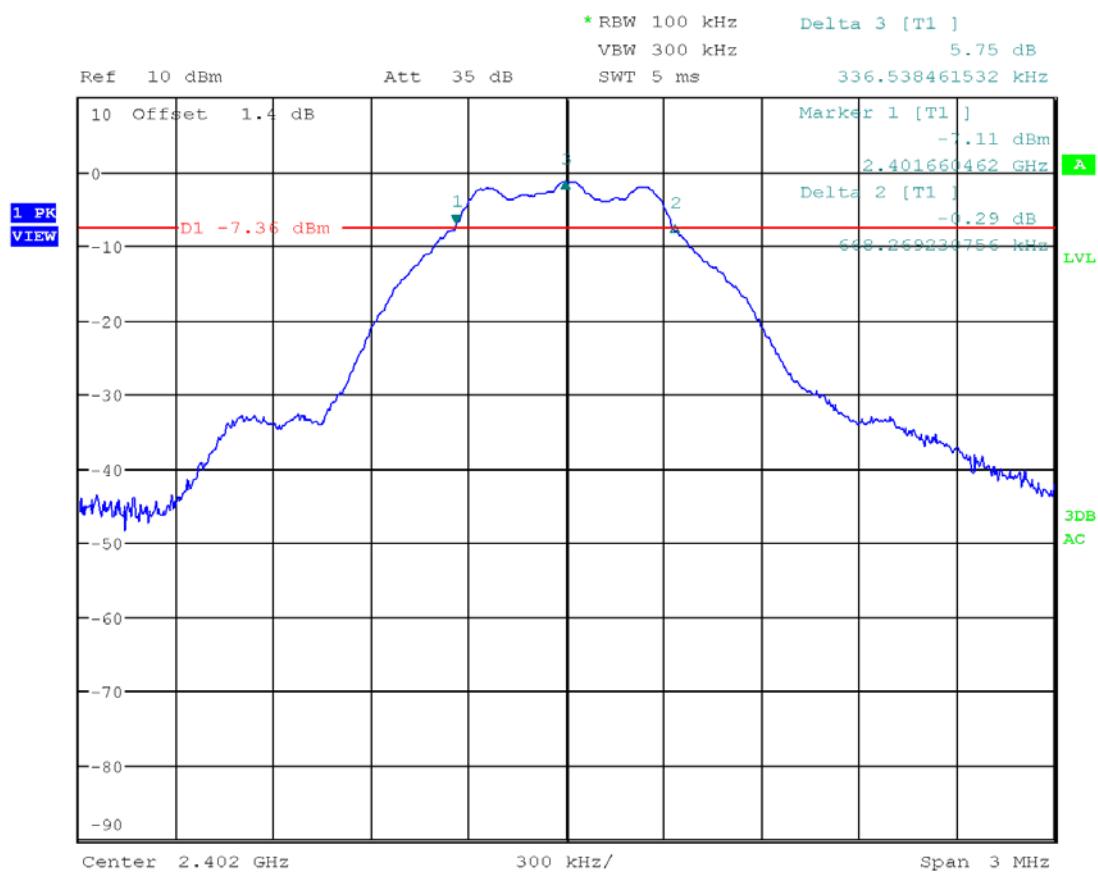
For 99% power bandwidth measurement, the bandwidth was determined by using the built-in 99% occupied bandwidth function of the spectrum analyzer. The resolution bandwidth is set to 1% of the selected span as is without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

4.1.3 Test Result

Frequency (MHz)	6-dB bandwidth FCC 15.247 kHz	Occupied bandwidth, RSS-GEN, MHz	Plot
2402	668.269	--	1.1
	--	1.011	1.4
2440	668.269	--	1.2
	--	1.008	1.5
2480	677.885	--	1.3
	--	1.017	1.6

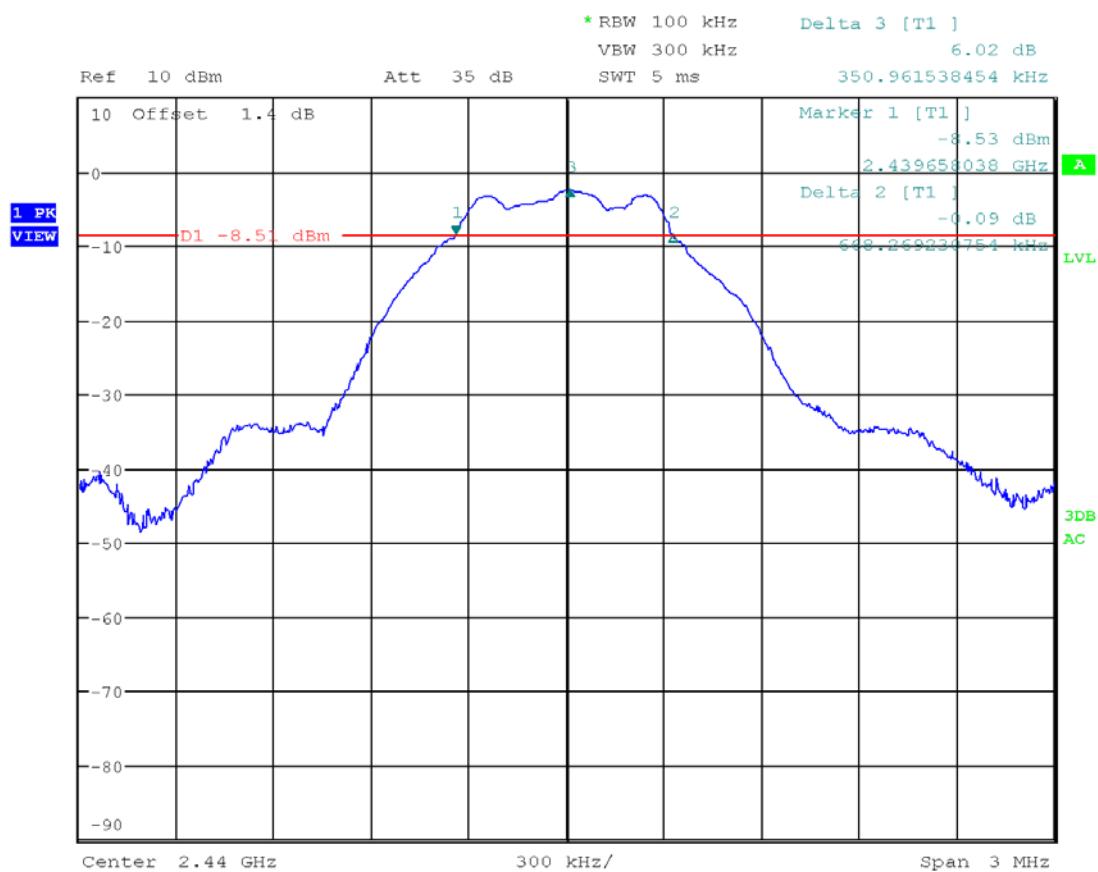
Tested By	Test Date	Results
Aaron Chang	July 26, 2021	Complies

Plot 1.1



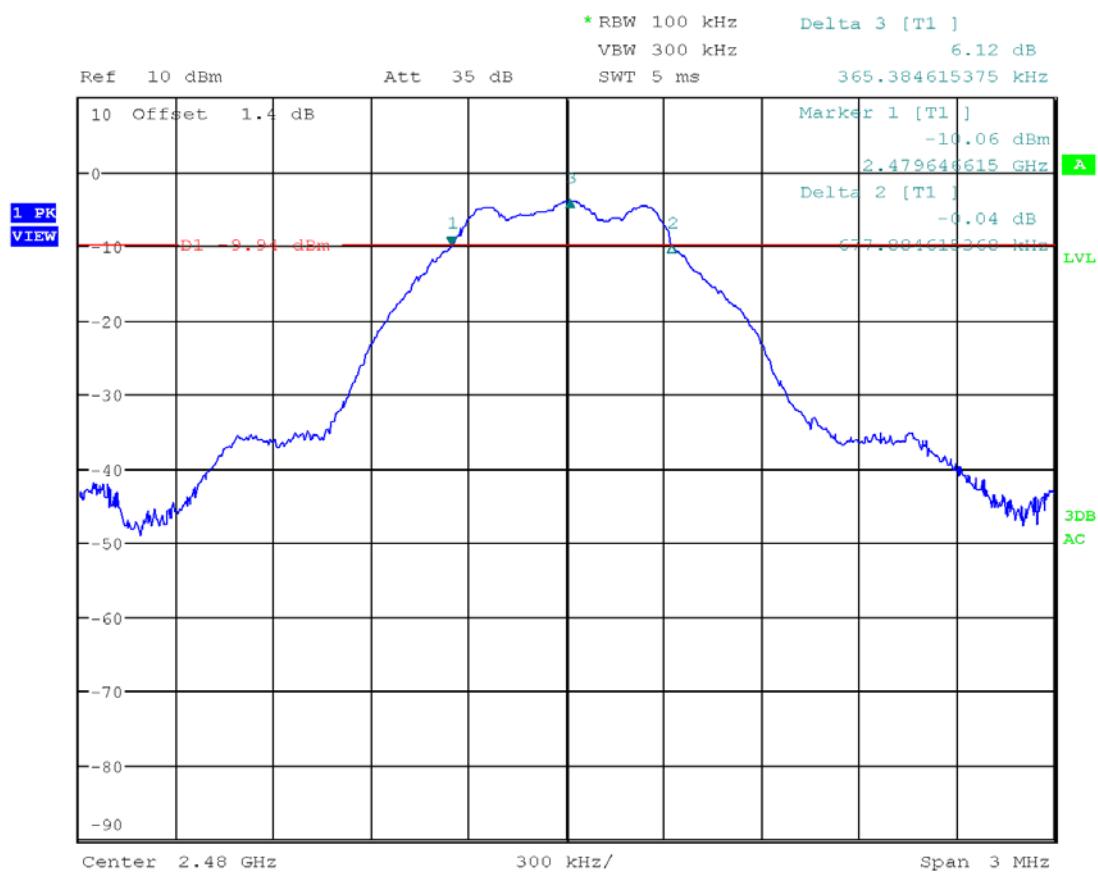
Date: 26.JUL.2021 23:20:05

Plot 1.2



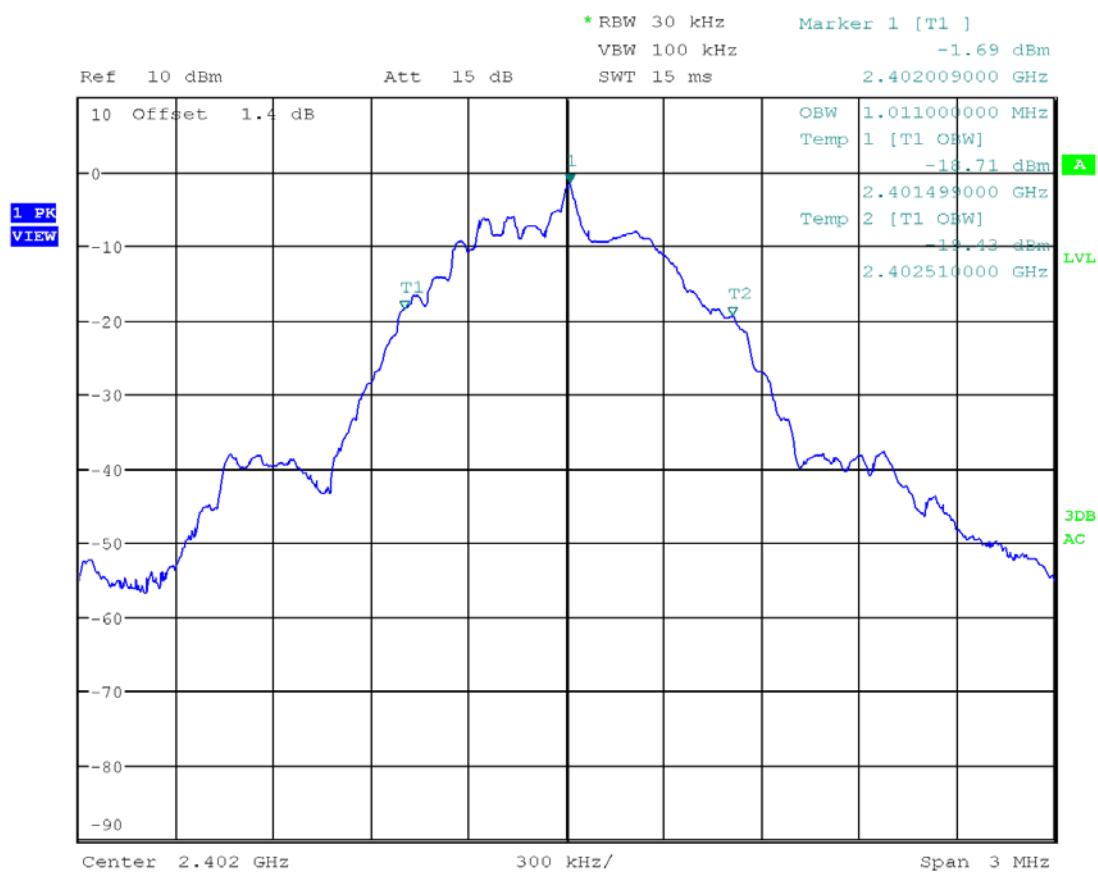
Date: 26.JUL.2021 23:18:15

Plot 1.3



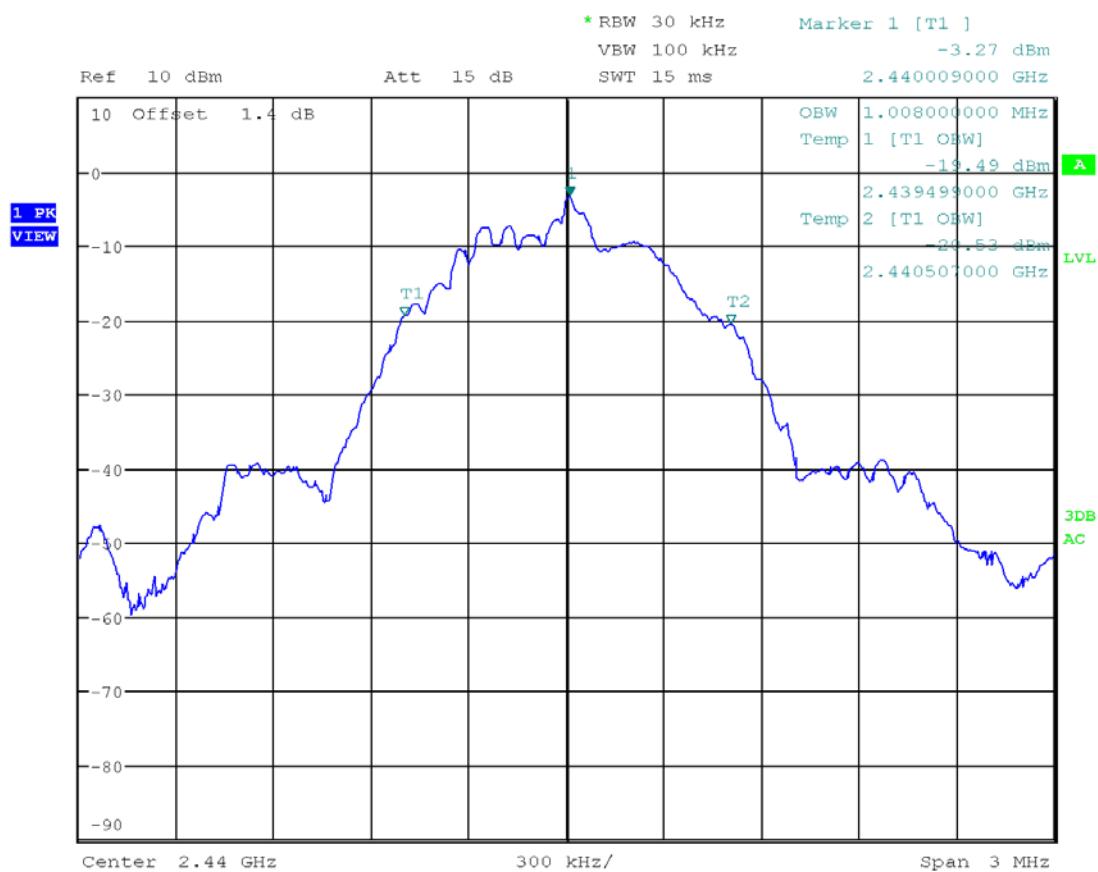
Date: 26.JUL.2021 23:16:28

Plot 1.4



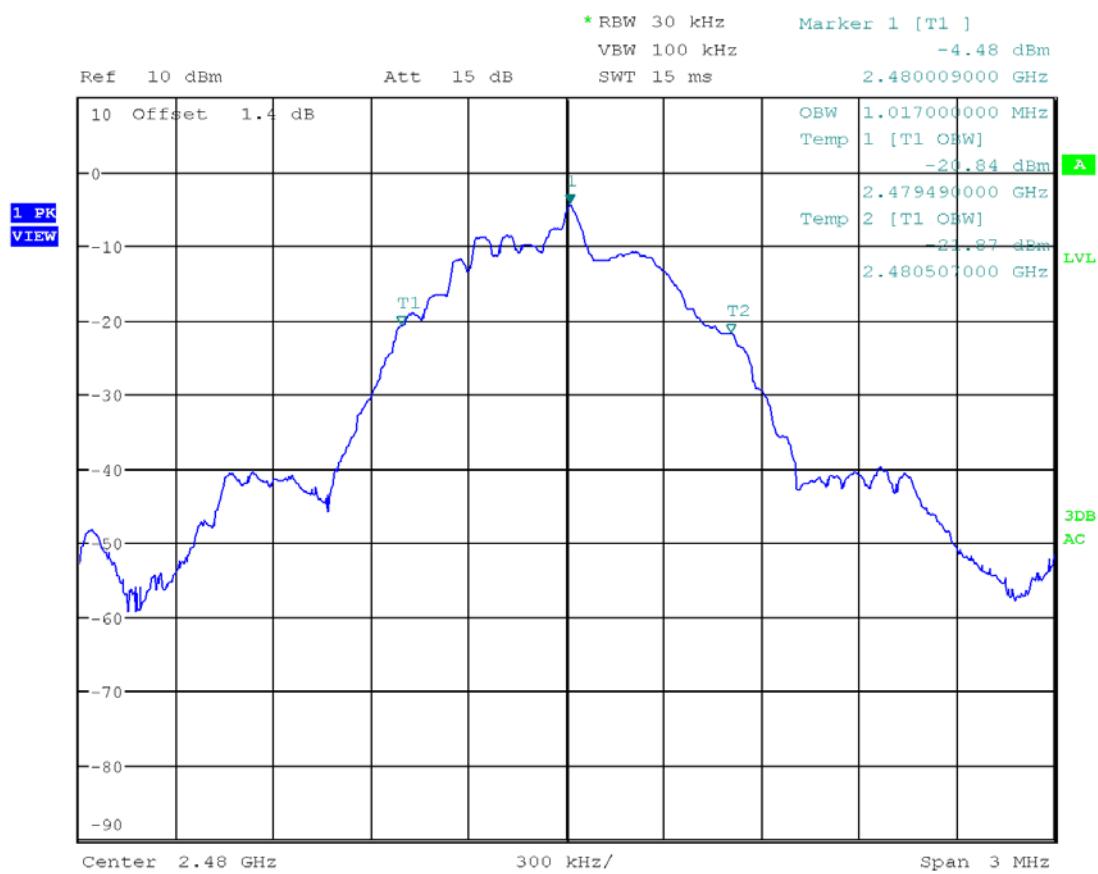
Date: 26.JUL.2021 23:21:43

Plot 1.5



Date: 26.JUL.2021 23:22:31

Plot 1.6



Date: 26.JUL.2021 23:23:27

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 $\text{RBW} \geq \text{DTS}$ bandwidth in ANSI 63.10.

1. Set the $\text{RBW} \geq \text{DTS}$ Bandwidth
2. Set the $\text{VBW} \geq 3 \times \text{RBW}$
3. Set the span $\geq 3 \times \text{RBW}$
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.

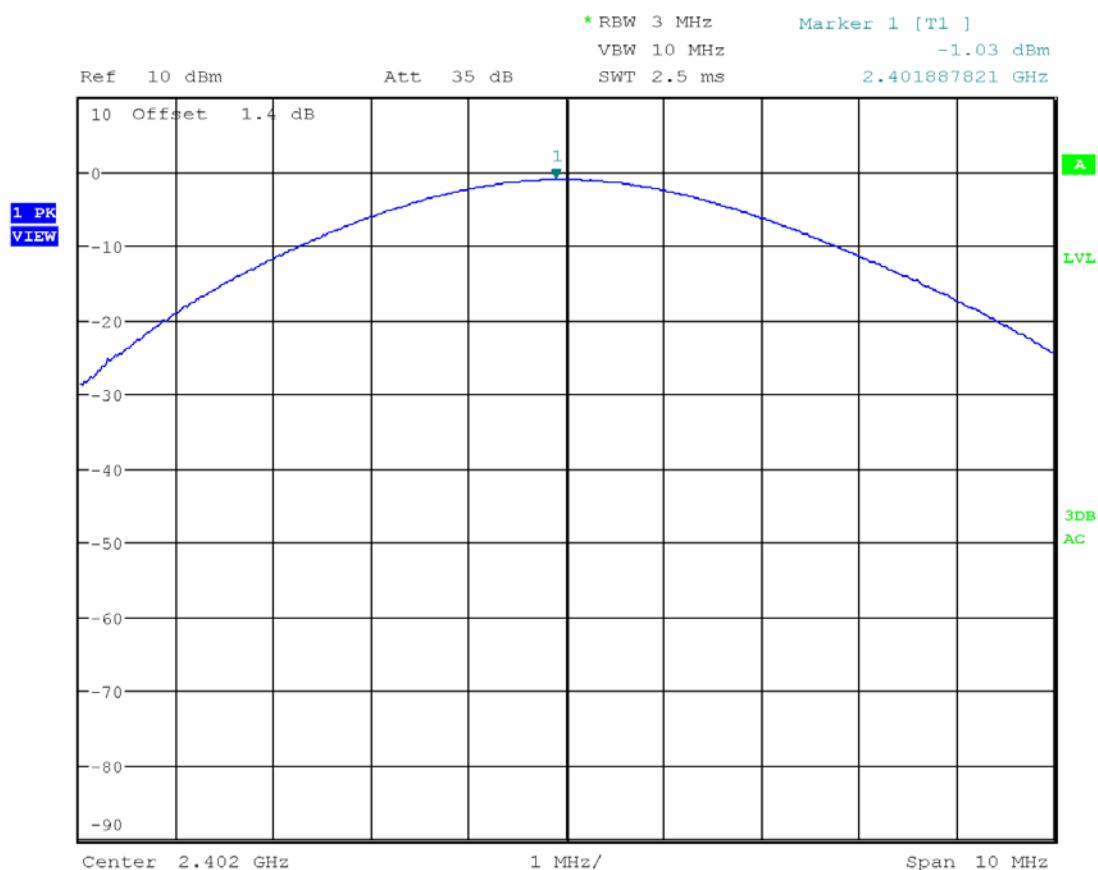
4.2.3 Test Result

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

Frequency	Conducted Power (peak)		Plot	
	MHz	dBm		
2402		-1.03	0.789	2.1
2442		-2.09	0.618	2.2
2480		-3.50	0.447	2.3

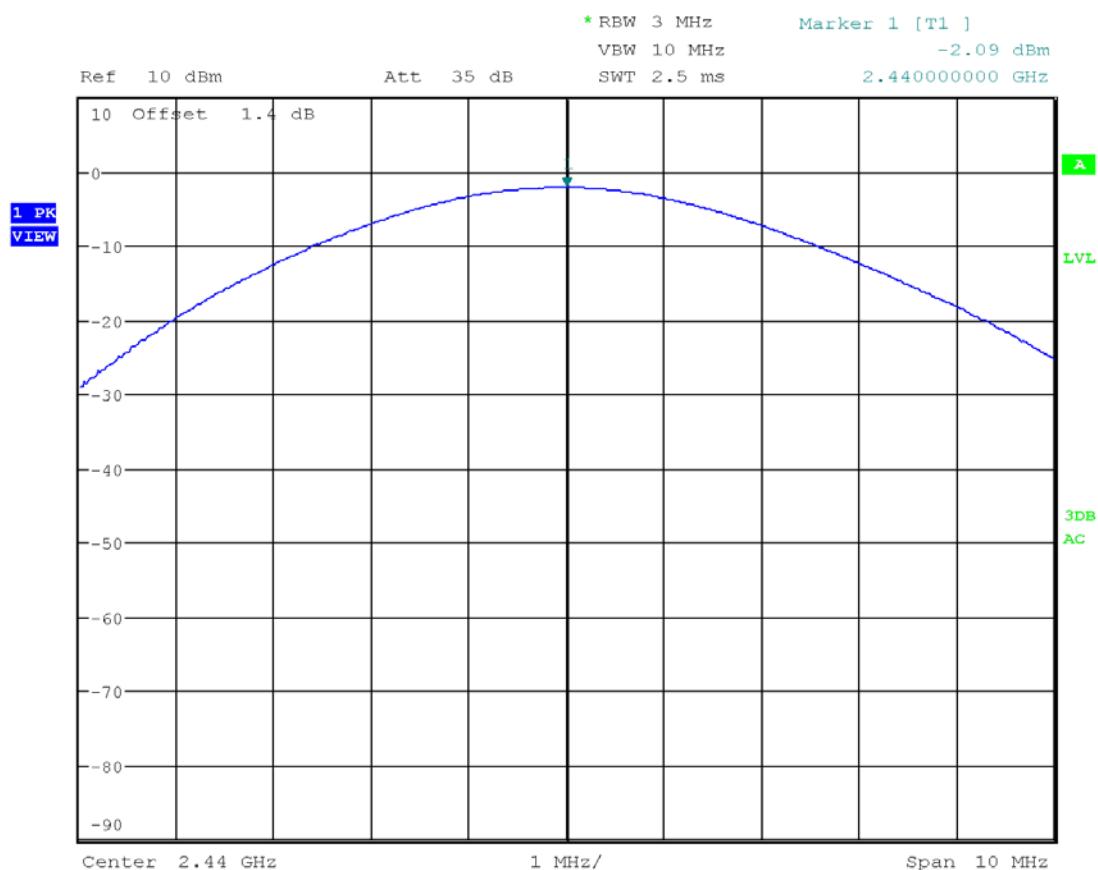
Tested By	Test Date	Results
Aaron Chang	July 26, 2021	Complies

Plot 2. 1



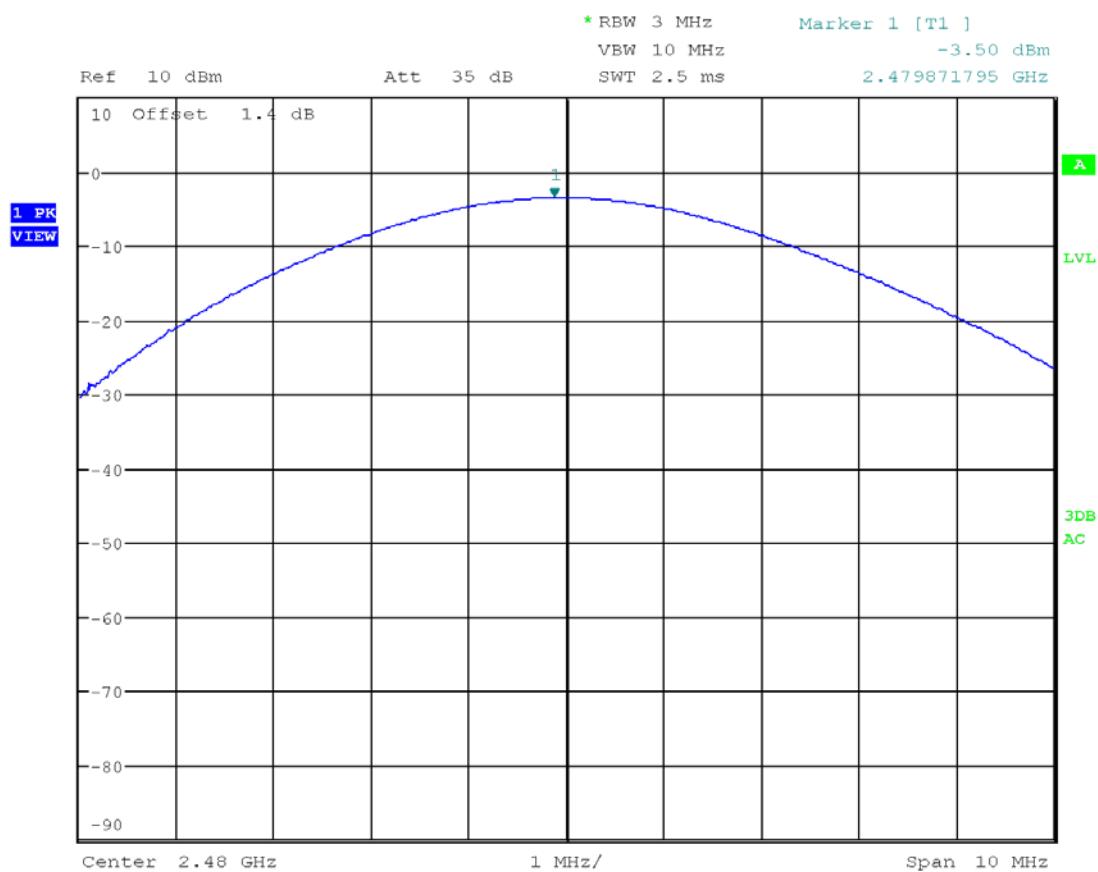
Date: 26.JUL.2021 22:46:20

Plot 2. 2



Date: 26.JUL.2021 22:48:05

Plot 2.3



Date: 26.JUL.2021 23:00:20

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: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
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.

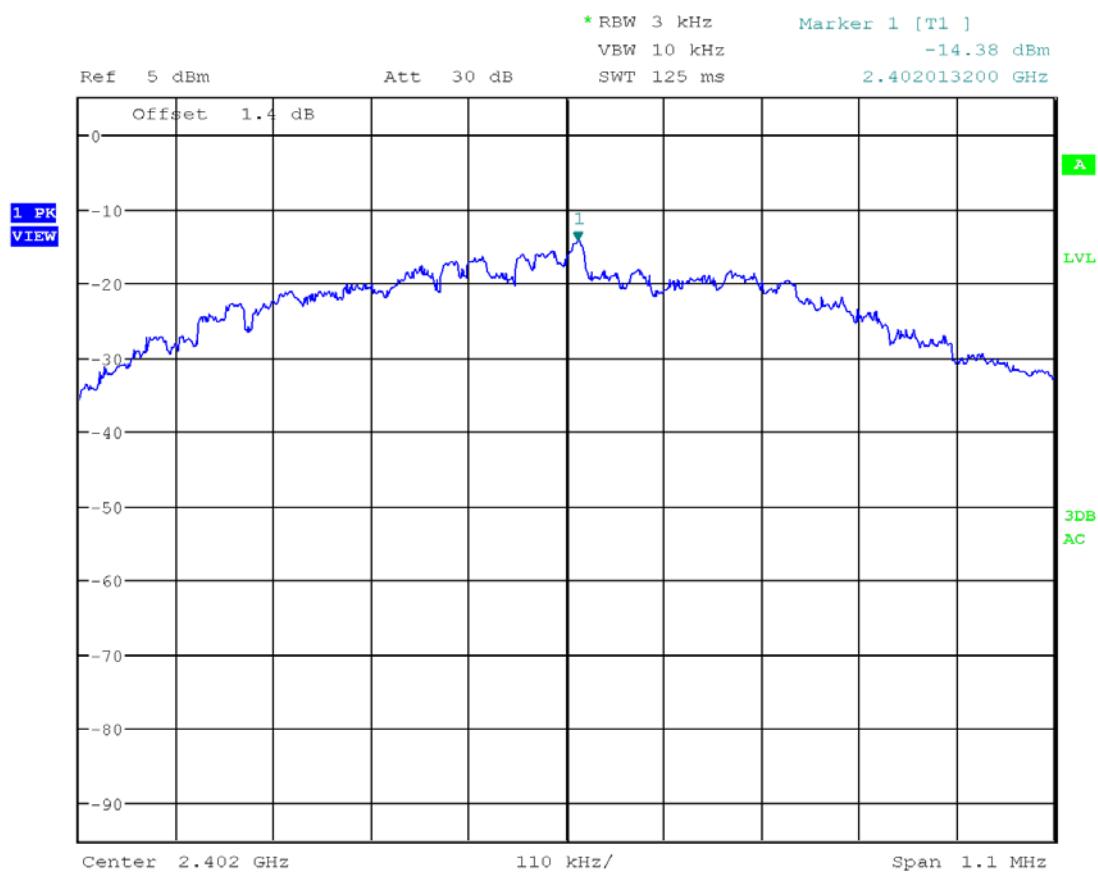
4.3.3 Test Result

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	-14.38	8.0	-22.38	3.1
2440	-16.64	8.0	-24.64	3.2
2480	-16.83	8.0	-24.83	3.3

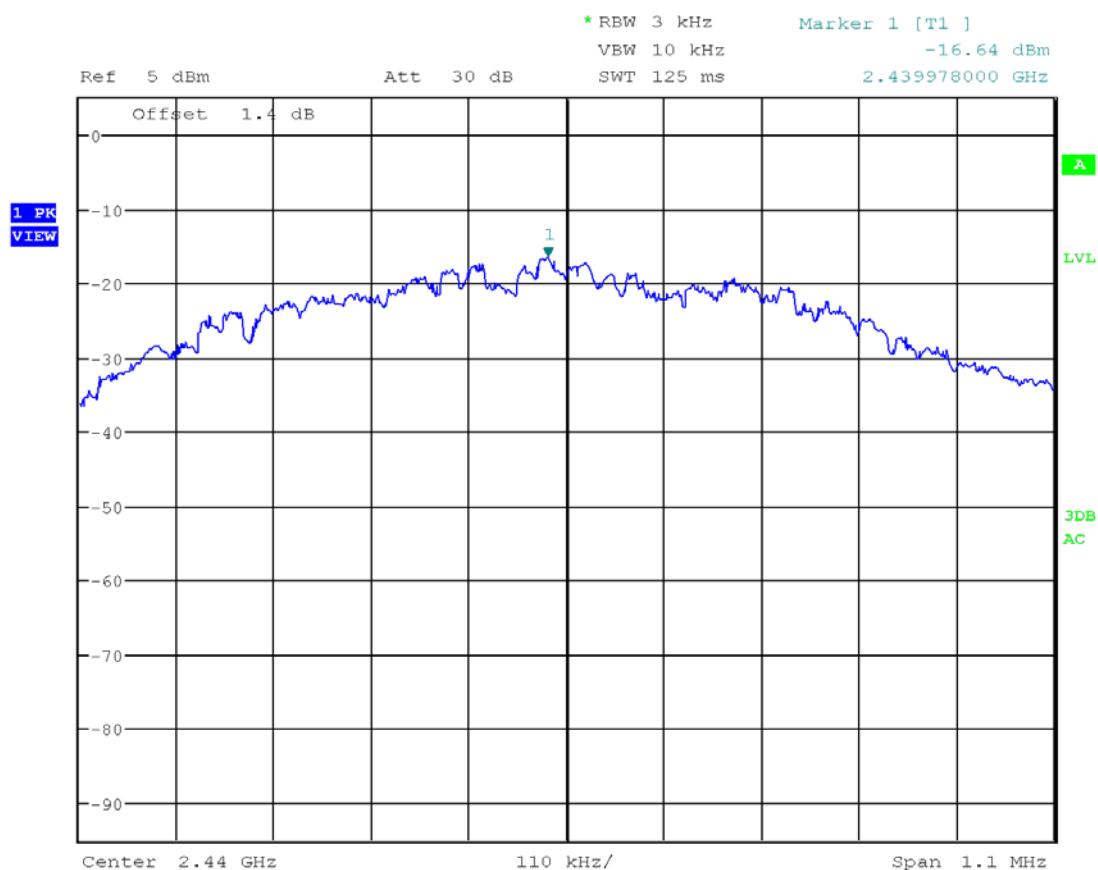
Tested By	Test Date	Results
Aaron Chang	July 26, 2021	Complies

Plot 3.1



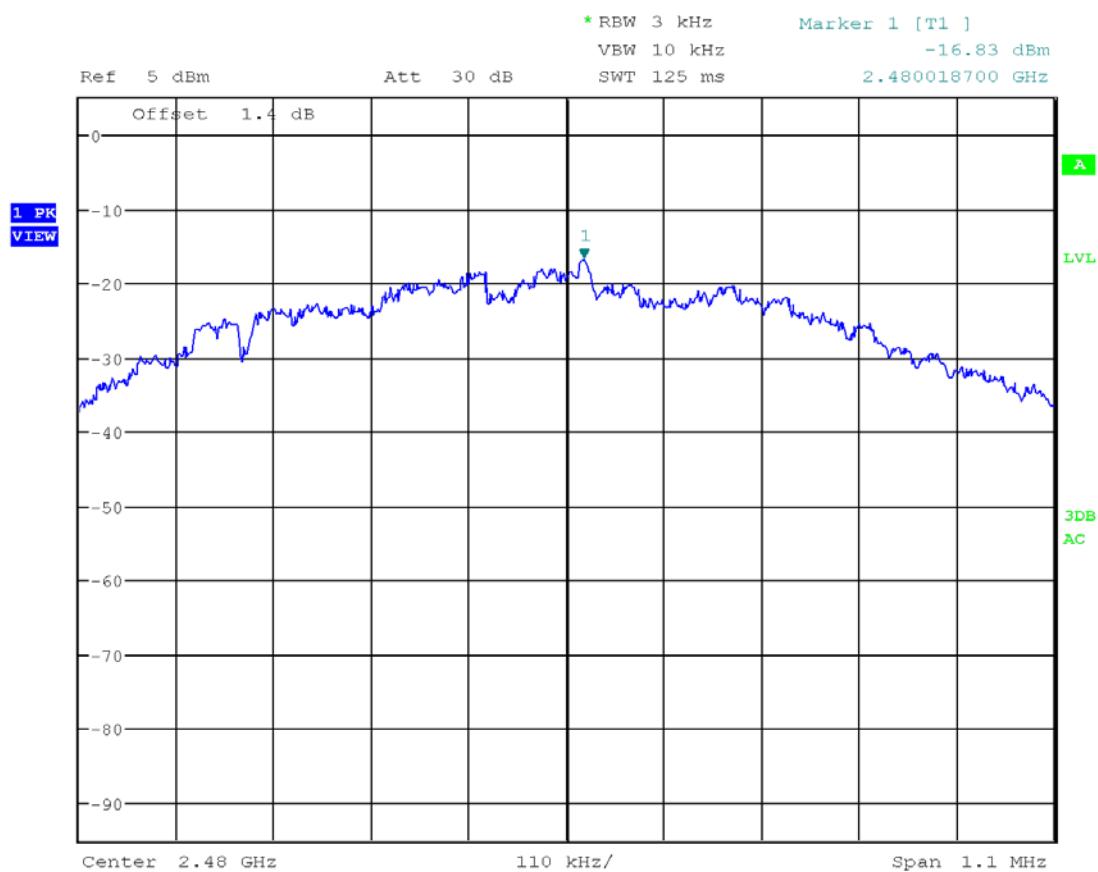
Date: 26.JUL.2021 23:26:15

Plot 3.2



Date: 26.JUL.2021 23:27:21

Plot 3.3



Date: 26.JUL.2021 23:28:22

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.

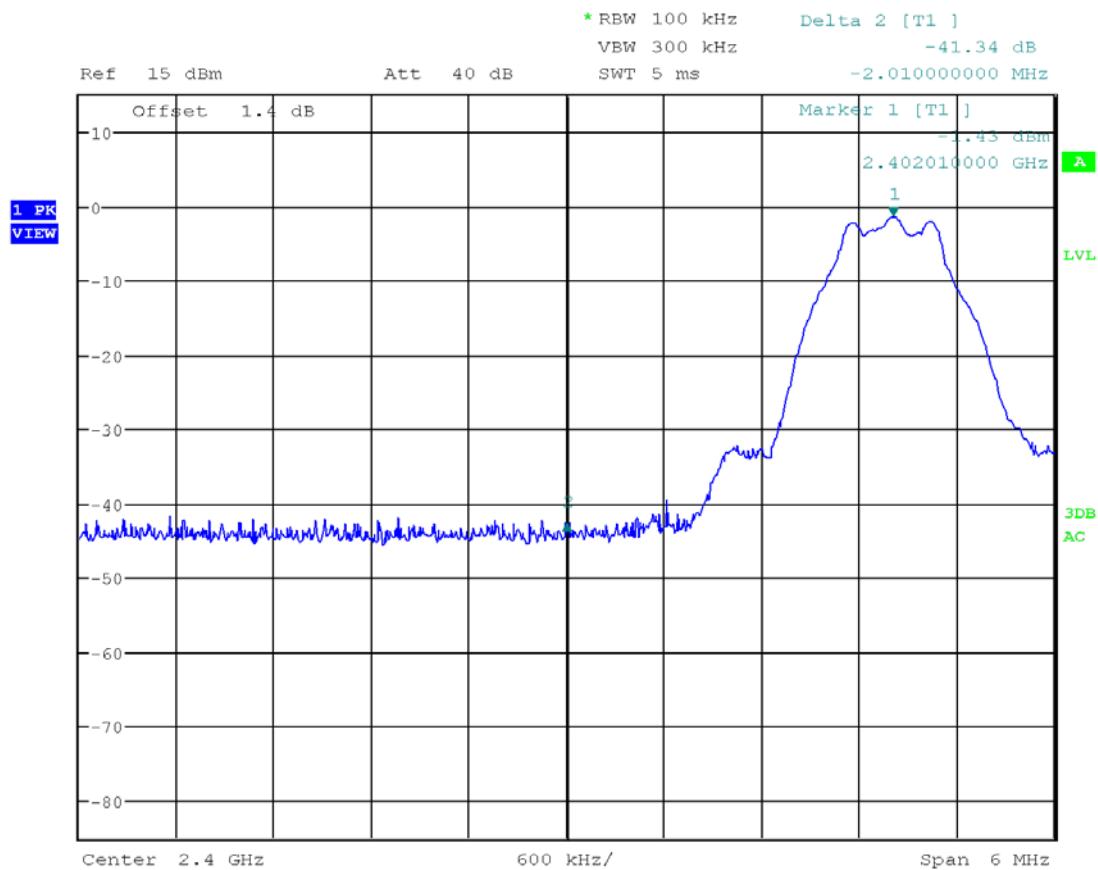
1. Set the RBW = 100 kHz.
2. Set the VBW $\geq 3 \times$ RBW.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

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

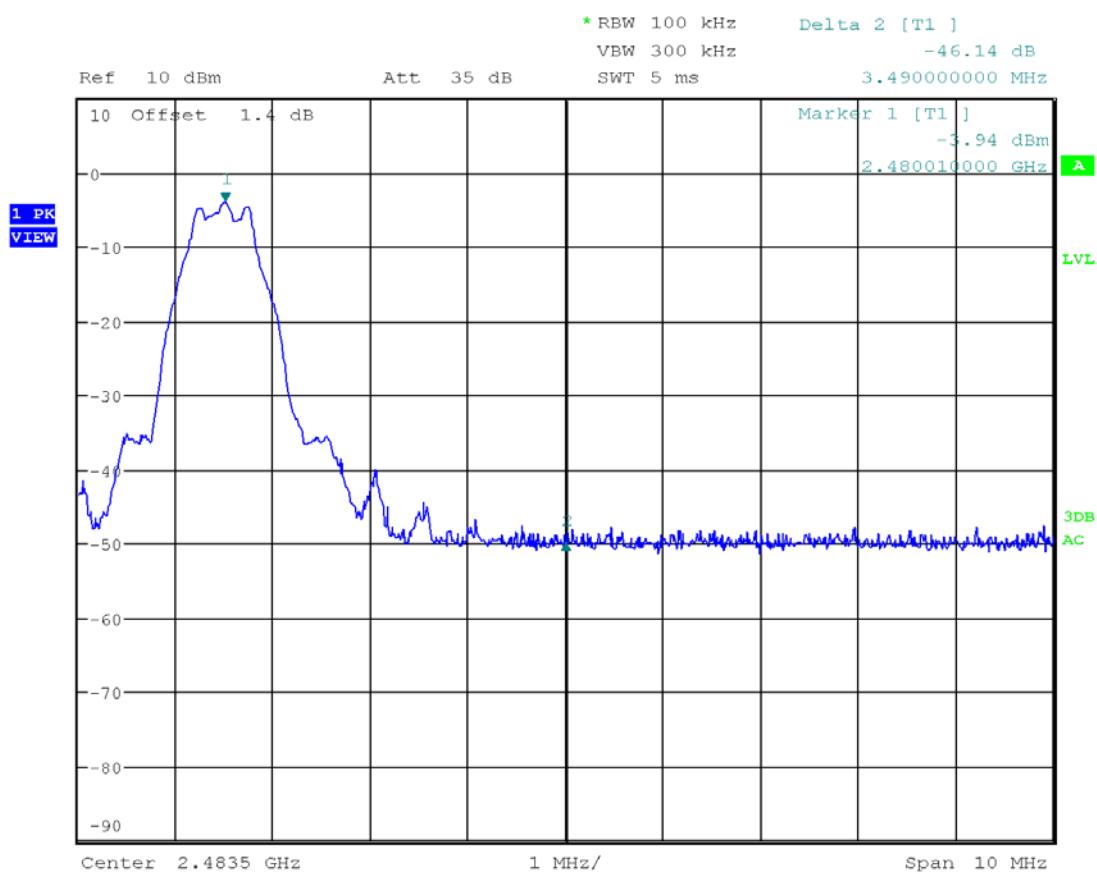
Refer to the following plots 4.1 – 4.5 for unwanted conducted emissions. The plot shows -20dB attenuation limit line.

Tested By	Test Date	Results
Aaron Chang	July 26, 2021	Complies

Tx @ Low Channel, 2402 MHz Band Edge
 Plot 4.1


Date: 26.JUL.2021 23:33:05

Tx @ High Channel, 2480 MHz Band Edge
Plot 4.2

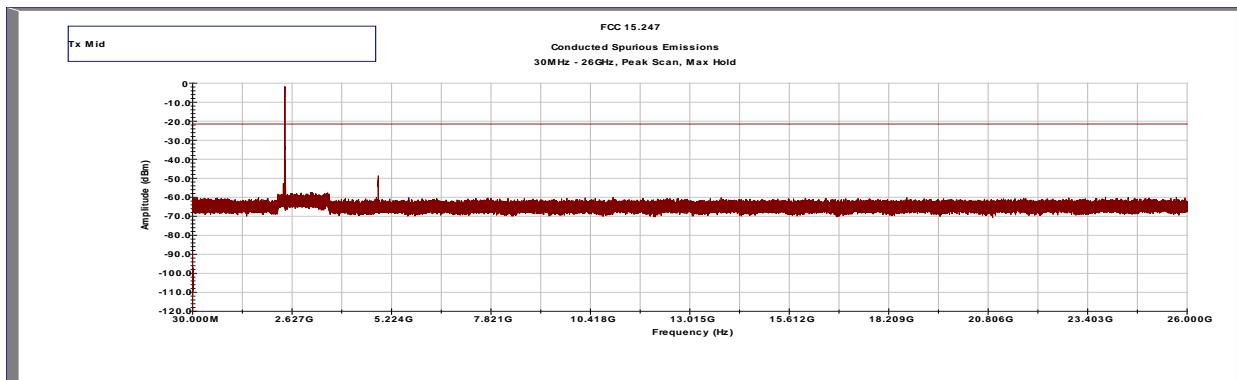


Date: 26.JUL.2021 23:31:05

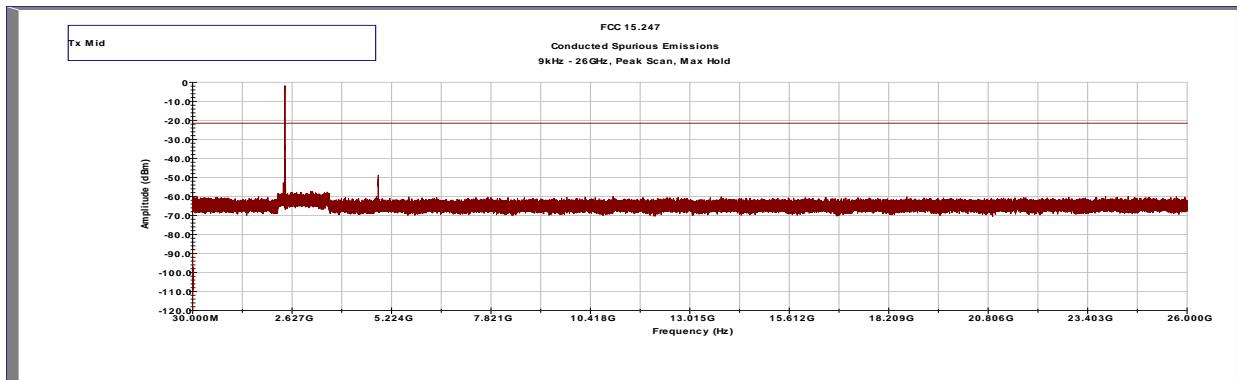
Results

Complies

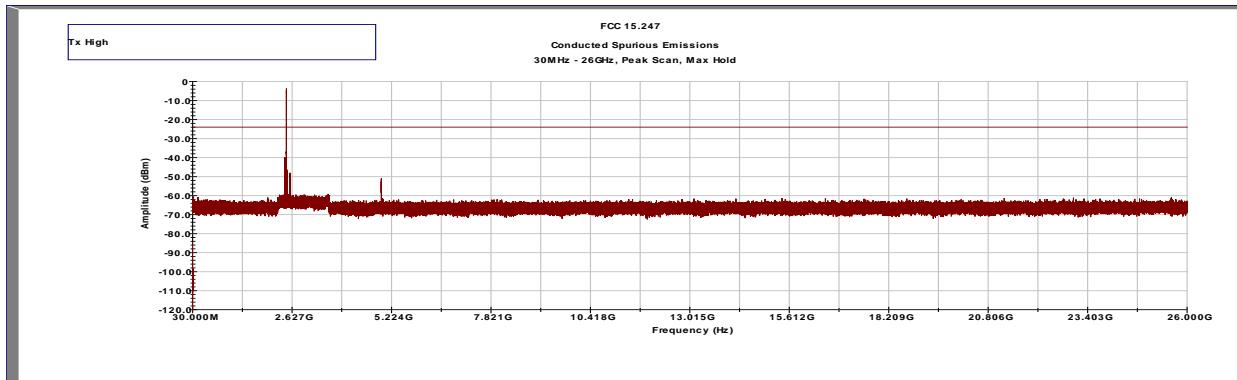
Tx @ Low Channel, 2402 MHz
30MHz -26GHz Conducted Spurious
Plot 4.3



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.

Radiated measurements were performed on the X, Y and Z orientation of the EUT. Data is presented with 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(μ V/m)

RA = Receiver Amplitude (including preamplifier) in dB(μ V); 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(μ V) 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(μ V/m). This value in dB(μ V/m) was converted to its corresponding level in μ V/m.

RA = 52.0 dB(μ V)

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(μ V/m).

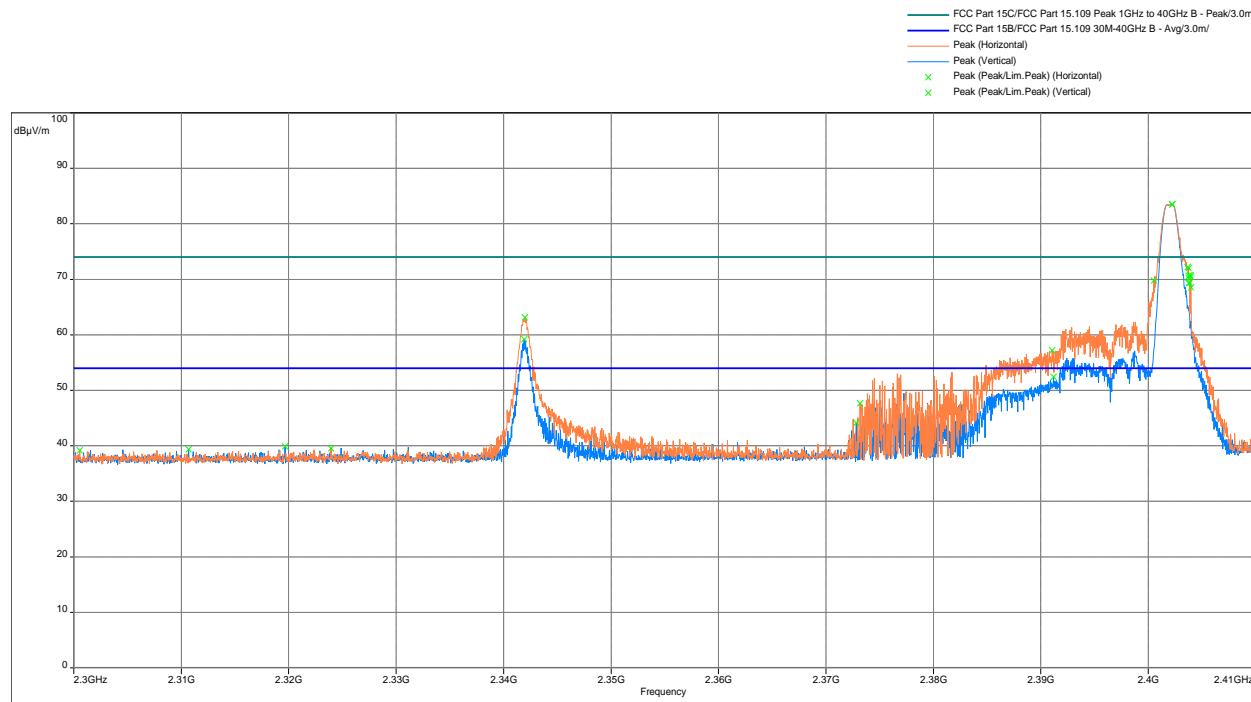
Level in μ V/m = Common Antilogarithm [(32 dB μ V/m)/20] = 39.8 μ V/m.

4.5.4 Test Results

All testing in this section were performed by radiated measurements.

Tested By	Test Date	Results
Aaron Chang	February 23, 2021 September 1-2, 2021	Complies

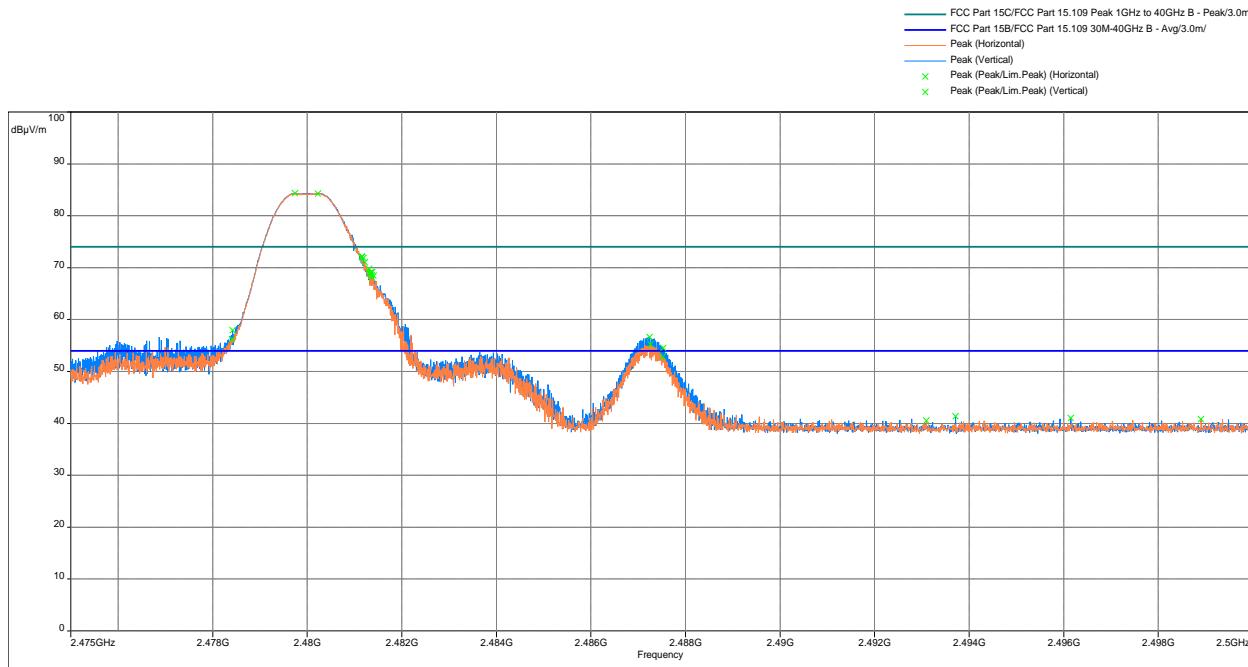
Test Results: 15.209/15.205 Radiated Restricted Band Emissions

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


Model: ; Client: ; Comments: ; Test Date: 07/29/2021 01:28

Freq. MHz	Peak@3m dB(uV/m)	Peak Limit dB(uV/m)	Avg@3m dB(uV/m)	Avg Limit dB(μV/m)	Peak Margin dB	Avg Margin dB	Height m	Azimuth deg	Polarity	Correction dB
2341.921	59.21	74	45.88	54	-14.79	-8.12	2.99	143.25	Vertical	-12.18
2341.969	63.12	74	49.4	54	-10.88	-4.6	1.01	348.25	Horizontal	-12.18
2374.488	52.15	74	35.98	54	-21.85	-18.02	1.01	341.25	Horizontal	-11.86
2376.648	52.99	74	38.23	54	-21.01	-15.77	1.01	0	Horizontal	-11.83
2376.978	52.82	74	38.42	54	-21.18	-15.58	1.01	0	Horizontal	-11.83
2380.065	52.54	74	38.82	54	-21.46	-15.18	1.01	355	Horizontal	-11.8
2381.726	53.3	74	39.7	54	-20.7	-14.3	1.01	355	Horizontal	-11.78
2390.000	51.07	74	35.94	54	-22.93	-18.06	3.99	81.75	Vertical	-11.69
2390.000	56.72	74	40.29	54	-17.28	-13.71	1.01	348.25	Horizontal	-11.69

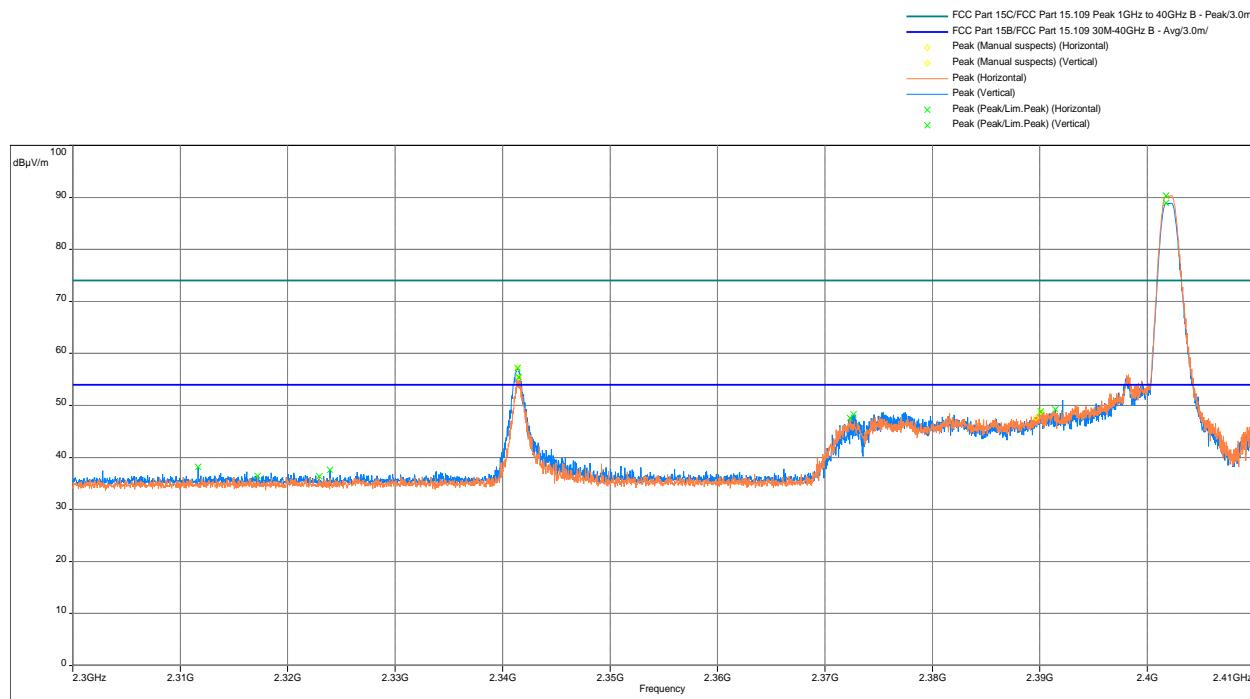
**Out-of-Band Radiated spurious emissions at the Band-edge @3m distance
2483.5–2500 MHz, Peak Scan with Peak Limit and Average Limit
Battery Mode**



Model: ; Client: ; Comments: ; Test Date: 07/29/2021 01:09

Freq. MHz	Peak@3m dB(uV/m)	Peak Limit dB(uV/m)	Avg@3m dB(uV/m)	Avg Limit dB(μV/m)	Peak Margin dB	Avg Margin dB	Height m	Azimuth deg	Polarity	Correction dB
2483.500	53.77	74	34.88	54	-20.23	-19.12	1.01	268.25	Vertical	-10.62
2483.500	53.89	74	36.12	54	-20.11	-17.88	1.01	324.5	Horizontal	-10.62
2483.926	52.51	74	34.04	54	-21.49	-19.96	1.01	269	Horizontal	-10.62
2484.208	51.78	74	31.21	54	-22.22	-5.82	1.01	269	Horizontal	-10.62
2483.653	53.77	74	34.98	54	-5.82	-5.82	1.99	324.5	Vertical	-10.62
2483.935	53.66	74	34.97	54	-5.82	-19.03	2.99	309.75	Vertical	-10.62
2484.250	52.42	74	34.04	54	-21.58	-19.96	1.99	324.5	Vertical	-10.62
2484.448	49.66	74	31.76	54	-24.34	-22.24	1.99	317.75	Vertical	-10.62
2487.266	55.25	74	50.03	54	-18.75	-3.97	1.99	326	Vertical	-10.61
2487.529	54.52	74	48.18	54	-19.48	-5.82	1.01	268.25	Horizontal	-10.61

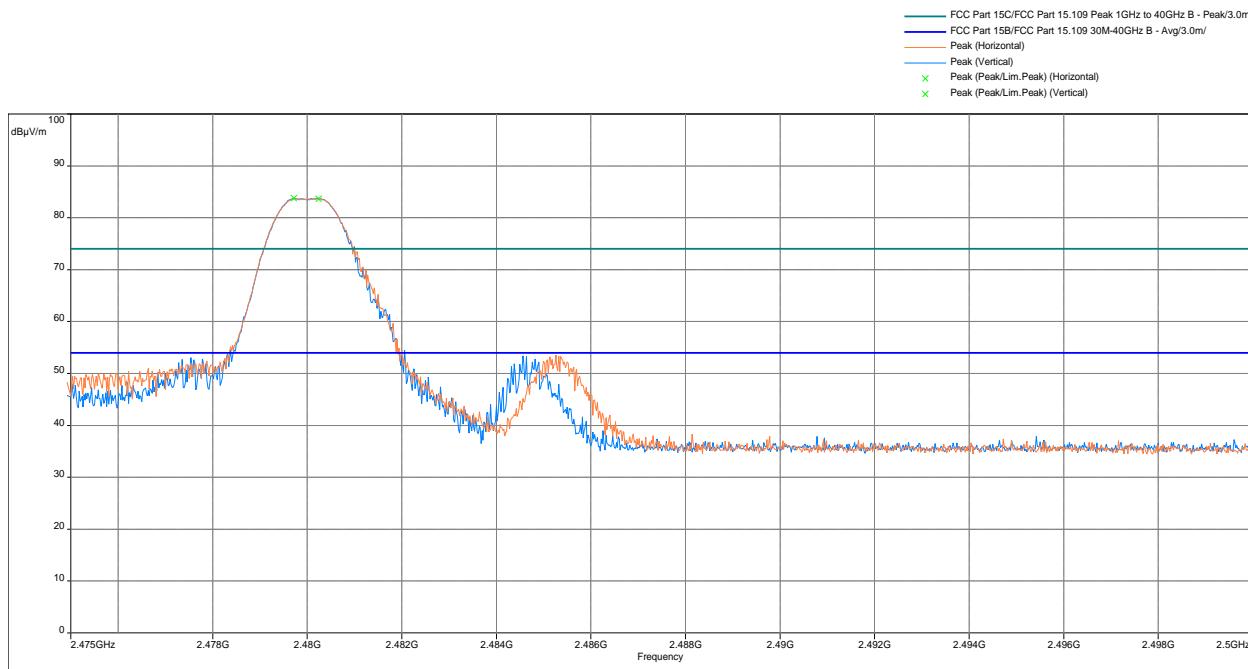
**Out-of-Band Radiated spurious emissions at the Band-edge @3m distance
2310–2390 MHz, Peak Scan with Peak Limit and Average Limit
Charging Mode**



Model: , Client: , Comments: , Test Date: 09/03/2021 00:27

Freq. MHz	Peak@3m dB(μV/m)	Peak Limit dB(μV/m)	Avg@3m dB(μV/m)	Avg Limit dB(μV/m)	Peak Margin dB	Avg Margin dB	Height m	Azimuth deg	Polarity	Correction dB
2341.481	55.4	74	44.93	54	-18.6	-9.07	2.01	98.5	Horizontal	-12.5
2390	48.85	74	43.07	54	-25.15	-10.93	2.01	10.5	Horizontal	-12.05
2341.382	57.21	74	35.61	54	-16.79	-18.39	1.04	355.25	Vertical	-12.51
2390	47.66	74	33.13	54	-26.34	-20.87	1.04	355.25	Vertical	-12.05

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



Model: ; Client: ; Comments: ; Test Date: 09/02/2021 23:50

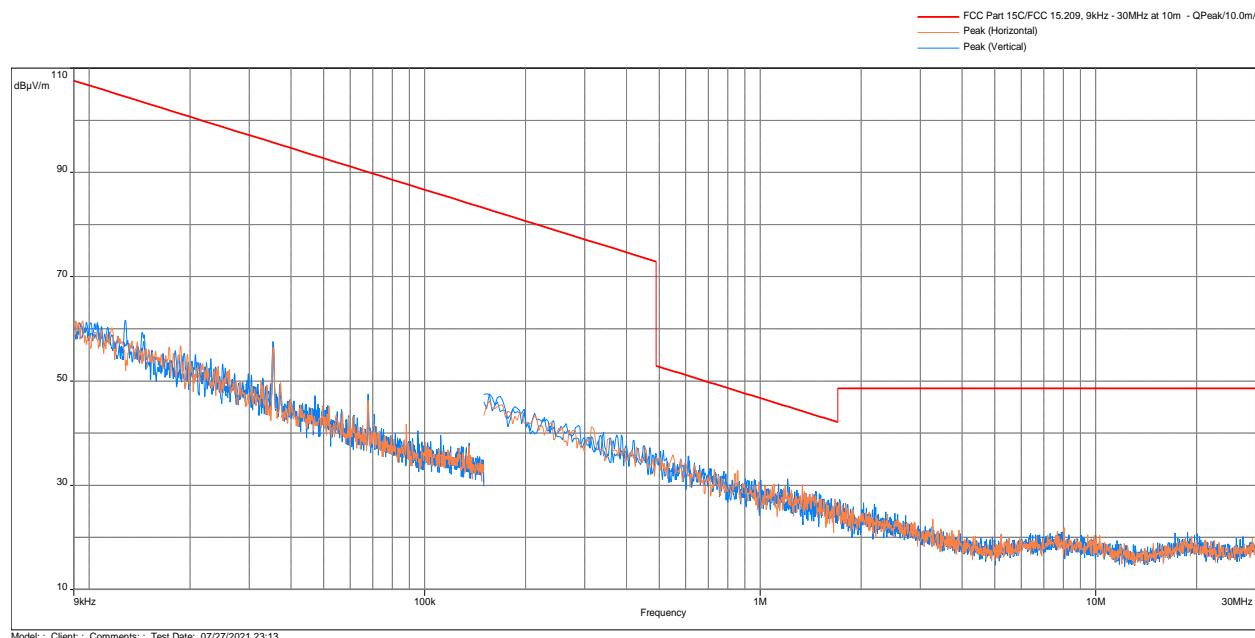
Freq. MHz	Peak@3m dB(uV/m)	Peak Limit dB(uV/m)	Avg@3m dB(uV/m)	Avg Limit dB(μV/m)	Peak Margin dB	Avg Margin dB	Height m	Azimuth deg	Polarity	Correction dB
2485.26	53.59	74	46.4	54	-20.41	-7.6	3.01	167	Horizontal	-10.96
2484.56	53.45	74	46.02	54	-20.55	-7.98	1.04	13.75	Vertical	-10.96

Results
Complies

Out-of-Band Radiated Spurious Emissions

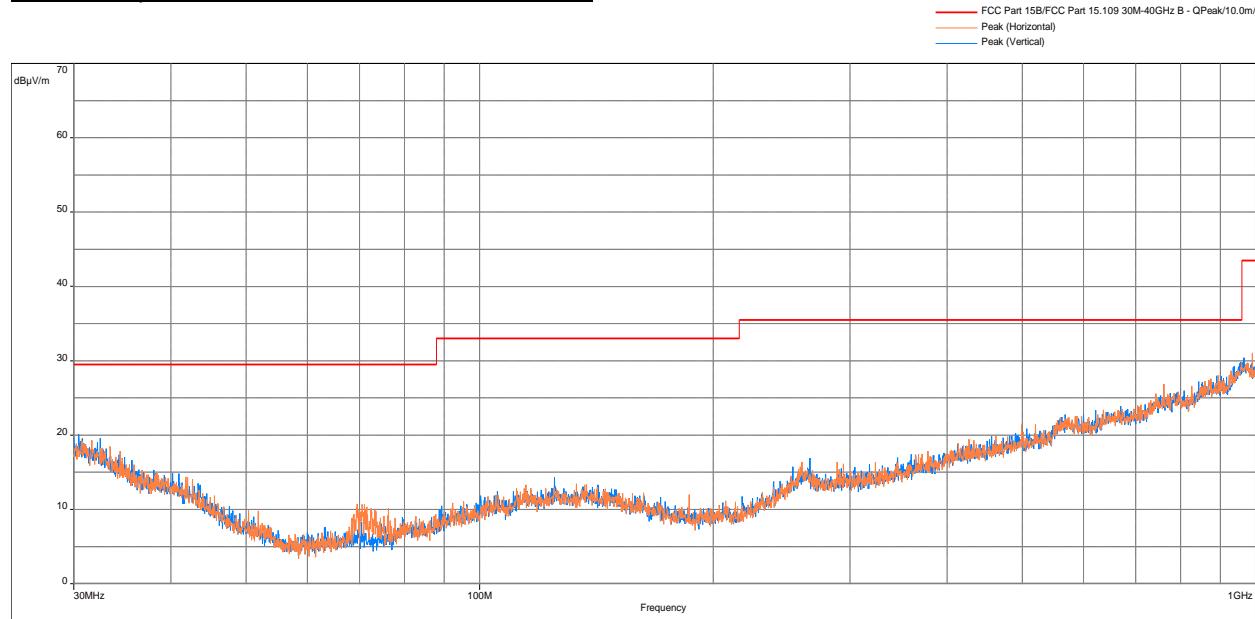
Test Results: 15.209 Radiated Spurious Emissions Low Channel, Tx at 2402MHz
Battery Mode

Radiated Spurious Emissions 9kHz - 30 MHz Parallel, Perpendicular & Horizontal Antenna Polarization



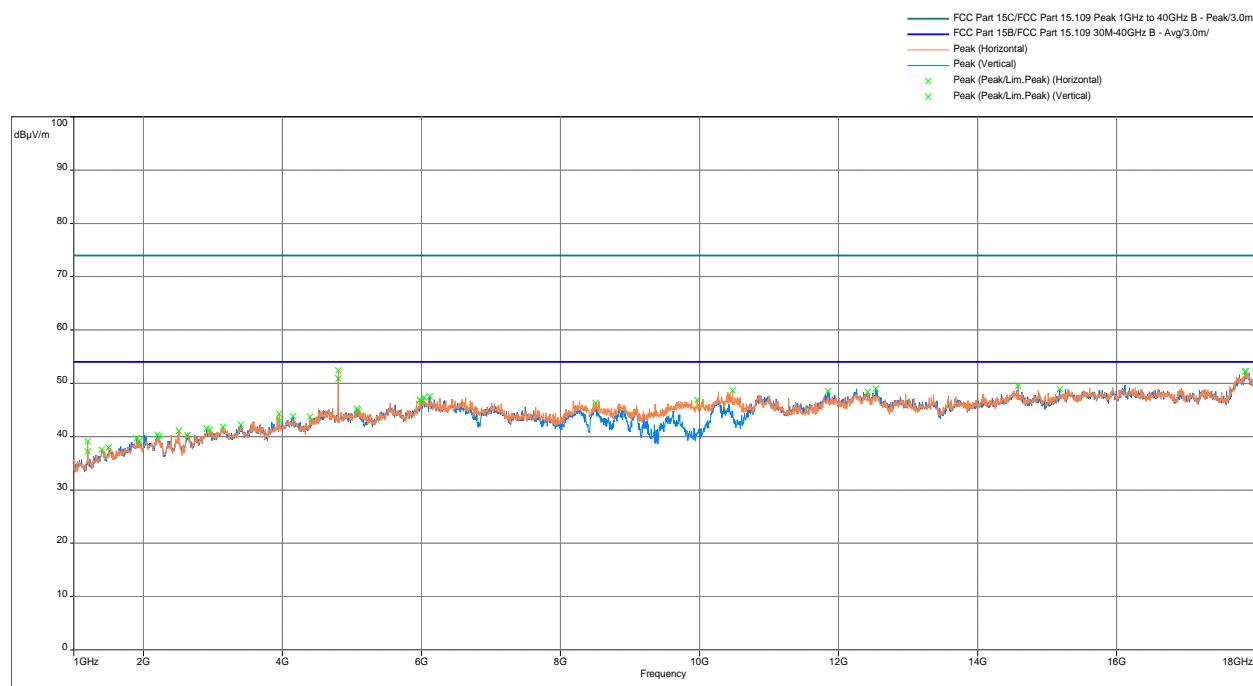
Model: ; Client: ; Comments: ; Test Date: 07/27/2021 23:13

Radiated Spurious Emissions 30 MHz - 1000 MHz

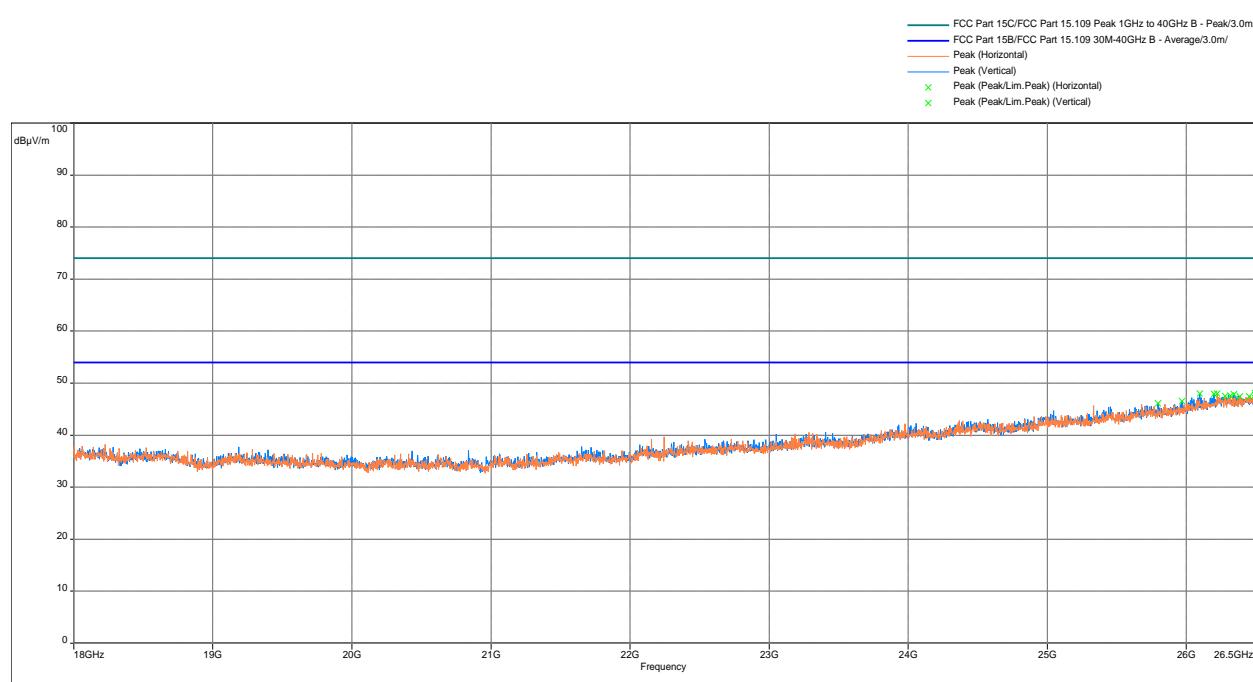


Model: ; Client: ; Comments: ; Test Date: 07/27/2021 22:07

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



Radiated Spurious Emissions 18 – 26.5 GHz, Peak Scan vs Peak & Average Limit



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

Frequency (MHz)	QPeak@ 10m (dB μ V/m)	Lim. QPeak @10m (dB μ V/m)	Margin (dB)	Height (m)	Angle (°)	Comment	Correction (dB)
956.544	29.84	35.5	-5.66	2.5	162.75	Vertical	3.89
953.731	29.66	35.5	-5.84	4.0	354	Vertical	3.78
959.0013	29.65	35.5	-5.85	4.0	60	Horizontal	4.07
959.6803	29.37	35.5	-6.13	4.0	32.5	Horizontal	4.08
957.902	29.32	35.5	-6.18	2.5	0	Horizontal	3.96
938.2433	29.29	35.5	-6.21	1.0	327.25	Vertical	2.78

Note: Correction = AF + CF - Preamp

Frequency (MHz)	Peak @3m (dB μ V/m)	Lim. Peak @3m (dB μ V/m)	Margin dB	Height (m)	Angle (°)	Comment	Correction (dB)
4803.467	52.42	74	-21.58	3.01	13.25	Horizontal	-5.29
4804.033	50.91	74	-23.09	1.99	304.5	Vertical	-5.29

Note: Correction = AF + CF - Preamp

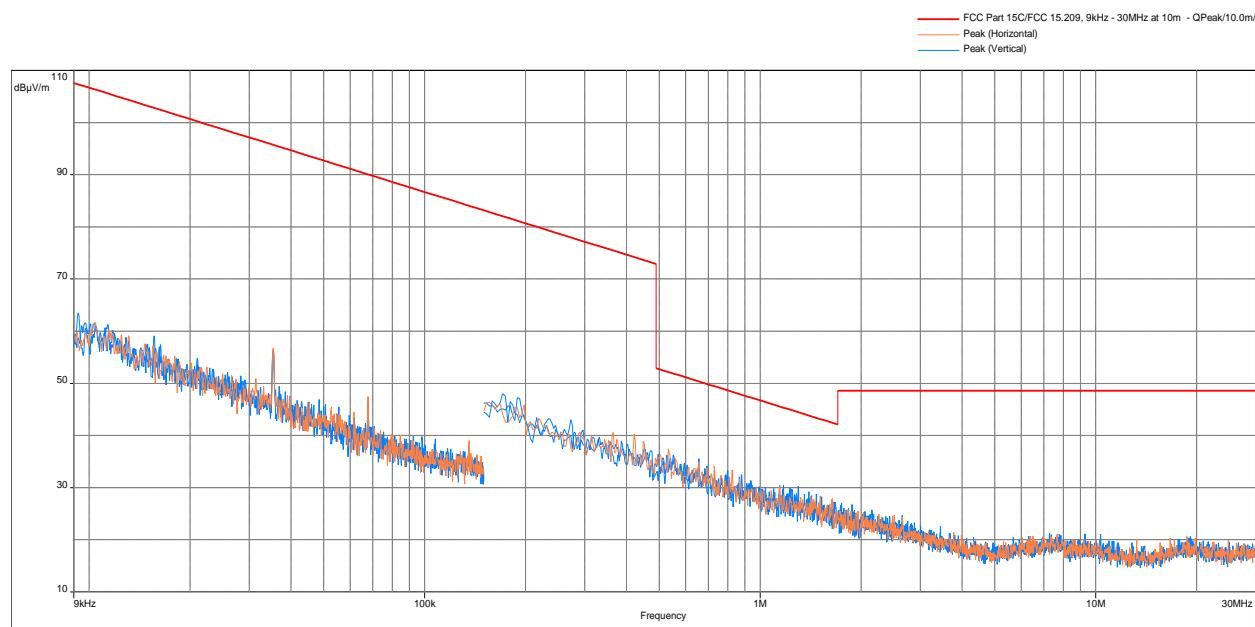
Frequency (MHz)	Ave @3m (dB μ V/m)	Lim. Ave @3m (dB μ V/m)	Margin dB	Height (m)	Angle (°)	Comment	Correction (dB)
4803.467	45.06	54	-8.94	3.01	0	Horizontal	-5.29
4804.033	47.07	54	-6.93	1.99	228.75	Vertical	-5.29

Note: Correction = AF + CF - Preamp

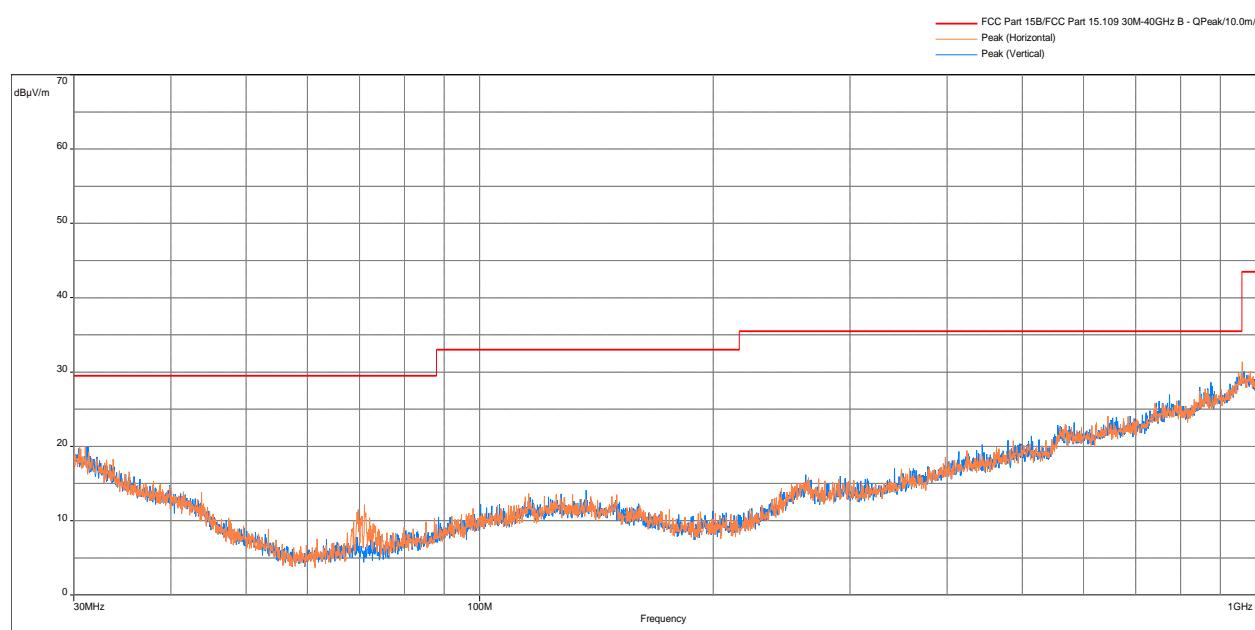
Results	Complies
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Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 2440 MHz
Battery Mode

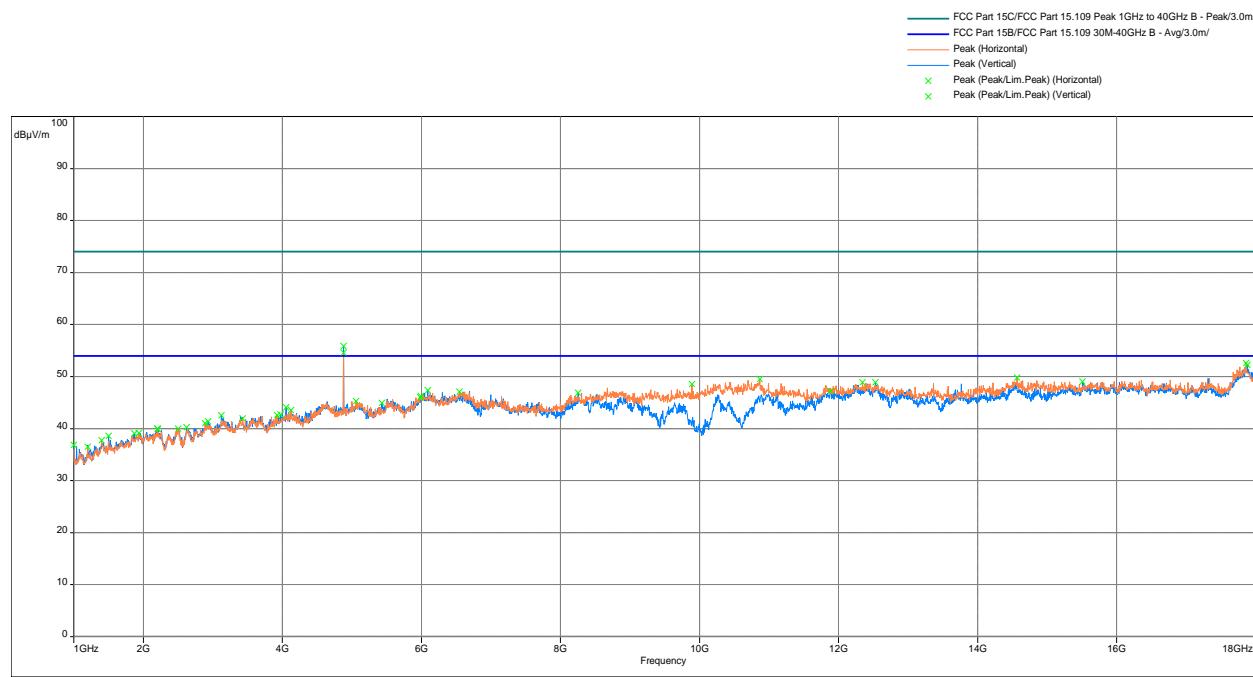
Radiated Spurious Emissions 9kHz - 30 MHz Parallel, Perpendicular & Horizontal Antenna Polarization



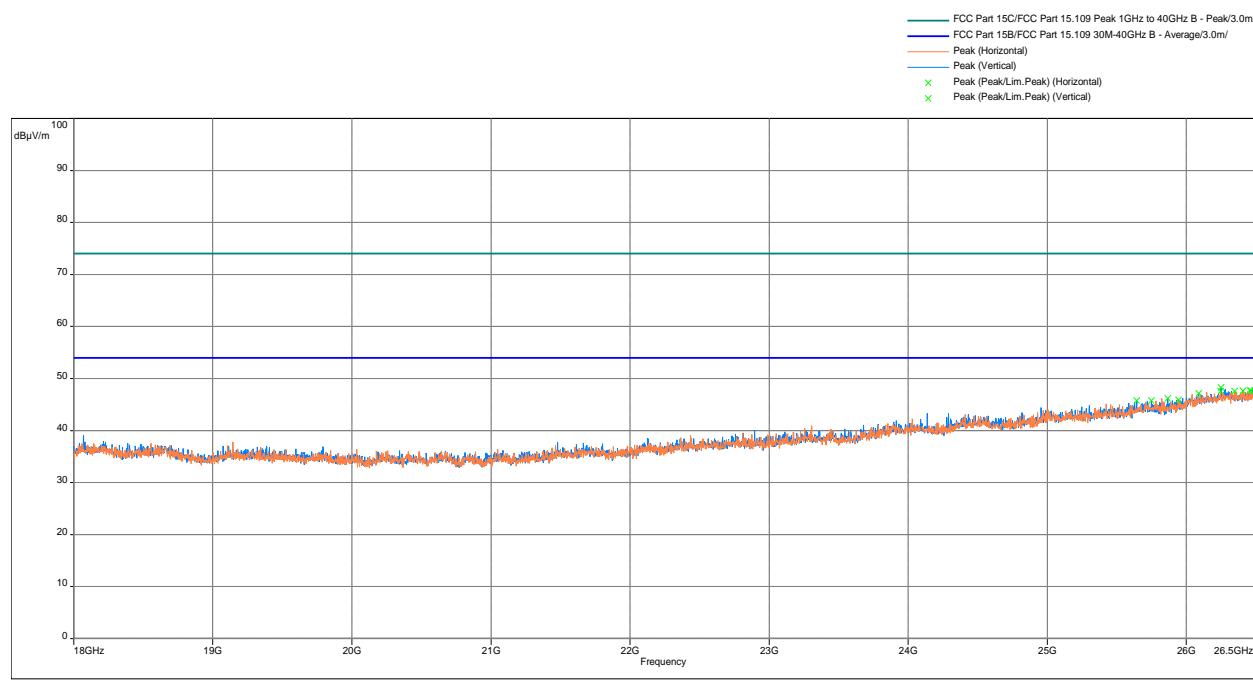
Radiated Spurious Emissions 30 MHz - 1000 MHz



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



Radiated Spurious Emissions 18 – 26.5 GHz, Peak Scan vs Peak & Average Limit



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

Frequency (MHz)	QPeak@ 10m (dB μ V/m)	Lim. QPeak @10m (dB μ V/m)	Margin (dB)	Height (m)	Angle (°)	Comment	Correction (dB)
950.336	29.85	35.5	-5.65	2.49	217	Horizontal	3.57
957.514	29.83	35.5	-5.67	0.99	97.75	Horizontal	3.95
951.985	29.45	35.5	-6.05	4	0	Vertical	3.68
945.777	29.35	35.5	-6.15	2.5	0	Vertical	3.22
949.2043	29.32	35.5	-6.18	1	172.5	Vertical	3.55
959.9713	29.28	35.5	-6.22	1	0	Vertical	4.09

Note: Correction = AF + CF – Preamp

Frequency (MHz)	Peak @3m (dB μ V/m)	Lim. Peak @3m (dB μ V/m)	Margin dB	Height (m)	Angle (°)	Comment	Correction (dB)
4879.967	55.84	74	-18.16	1.01	245	Vertical	-4.97
4879.967	54.58	74	-19.42	3.01	275.25	Horizontal	-4.97

Note: Correction = AF + CF - Preamp

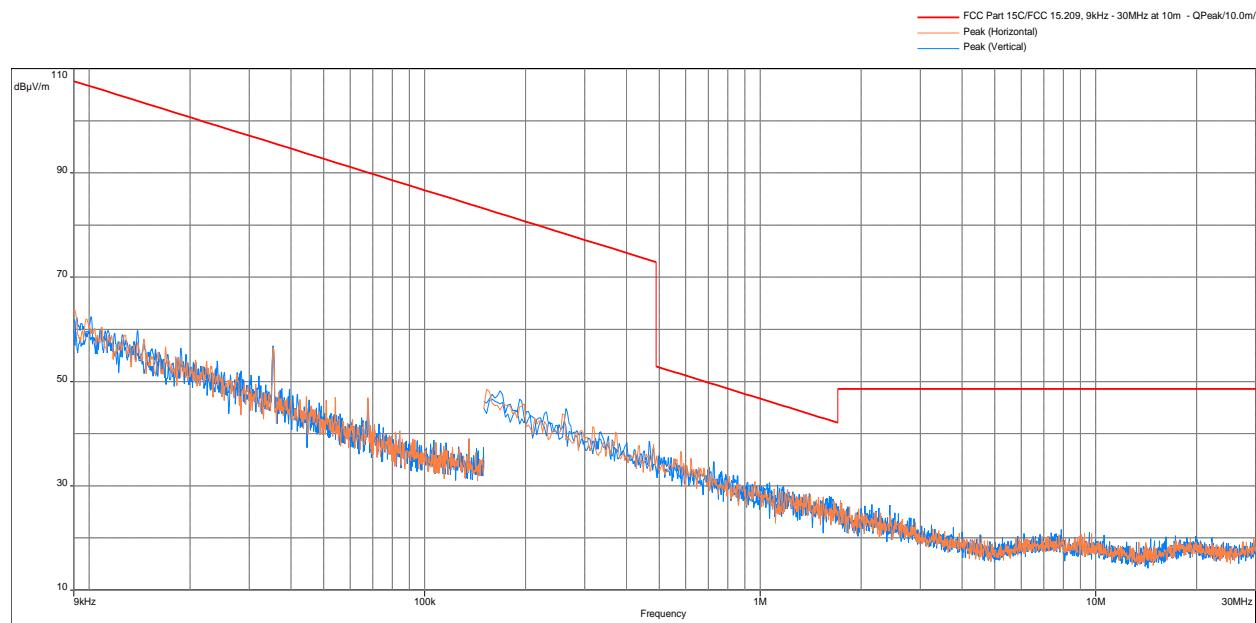
Frequency (MHz)	Ave @3m (dB μ V/m)	Lim. Ave @3m (dB μ V/m)	Margin dB	Height (m)	Angle (°)	Comment	Correction (dB)
4879.967	50.43	54	-3.57	2.99	260.5	Vertical	-4.97
4879.967	48.57	54	-5.43	3.01	251.5	Horizontal	-4.97

Note: Correction = AF + CF - Preamp

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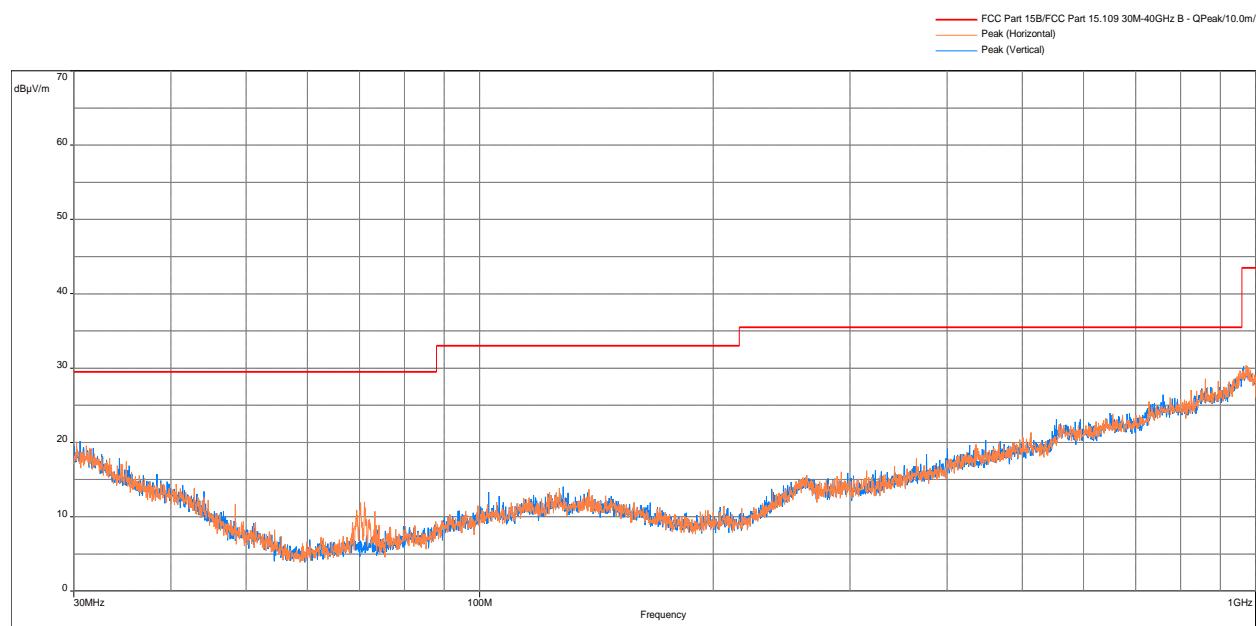
Test Results: 15.209 Radiated Spurious Emissions High Channel, Tx at 2480MHz
Battery Mode

Radiated Spurious Emissions 9kHz - 30 MHz Parallel, Perpendicular & Horizontal Antenna Polarization



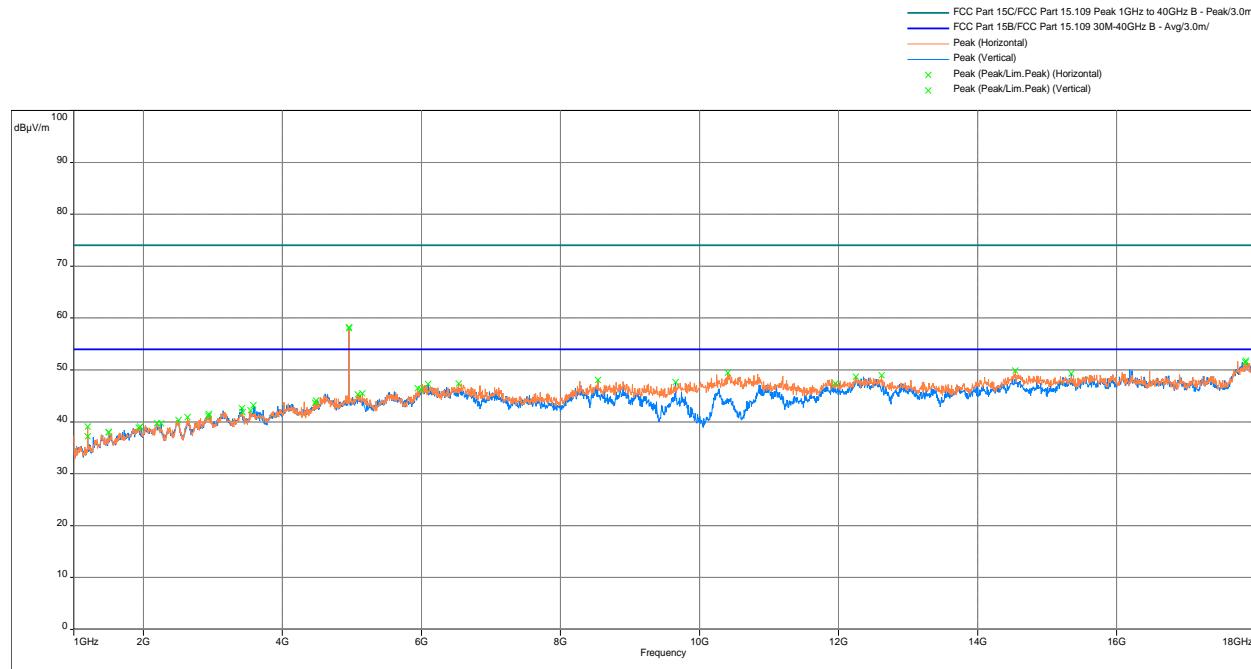
Model: ; Client: ; Comments: ; Test Date: 07/27/2021 23:21

Radiated Spurious Emissions 30 MHz - 1000 MHz

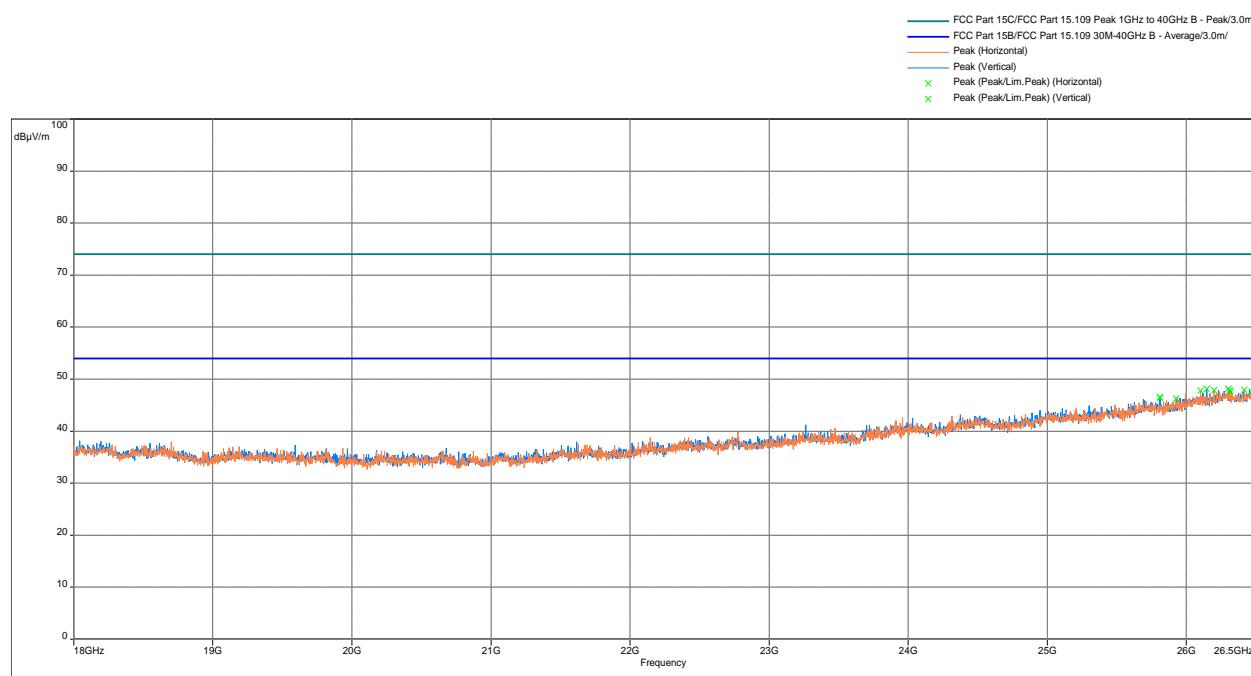


Model: ; Client: ; Comments: ; Test Date: 07/27/2021 22:18

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



Radiated Spurious Emissions 18 - 26 GHz, Peak Scan vs Peak & Average Limit



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

Frequency (MHz)	QPeak@ 10m (dB μ V/m)	Lim. QPeak @10m (dB μ V/m)	Margin (dB)	Height (m)	Angle (°)	Comment	Correction (dB)
954.636	29.62	35.5	-5.88	4	298.75	Horizontal	3.82
953.925	29.57	35.5	-5.93	4	0	Horizontal	3.8
949.592	29.25	35.5	-6.25	4	252.75	Horizontal	3.56
955.962	29.17	35.5	-6.33	2.49	9	Horizontal	3.83
946.132	28.88	35.5	-6.62	4	0	Horizontal	3.23
957.837	28.84	35.5	-6.66	2.49	225.5	Horizontal	3.96

Note: Correction = AF + CF – Preamp

Frequency (MHz)	Peak @3m (dB μ V/m)	Lim. Peak @3m (dB μ V/m)	Margin dB	Height (m)	Angle (°)	Comment	Correction (dB)
4960.433	58.22	74	-15.78	1.01	260.25	Vertical	-4.58
4960.433	58.05	74	-15.95	3.01	50.75	Horizontal	-4.58

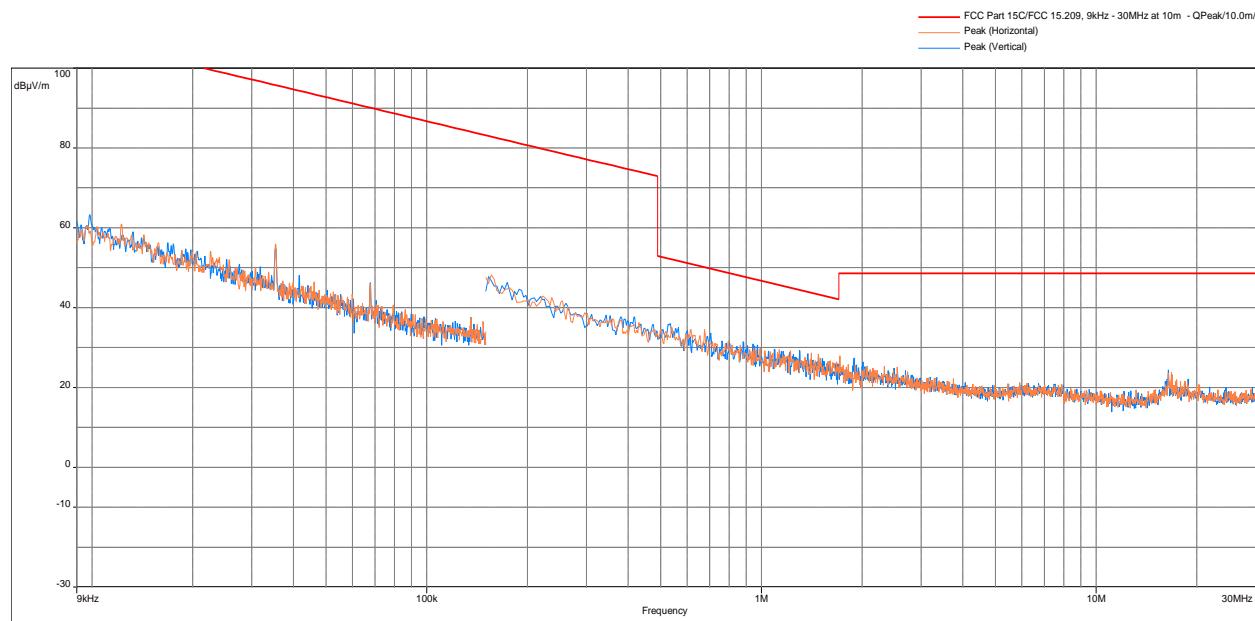
Note: Correction = AF + CF - Preamp

Frequency (MHz)	Ave @3m (dB μ V/m)	Lim. Ave @3m (dB μ V/m)	Margin dB	Height (m)	Angle (°)	Comment	Correction (dB)
4960.433	52.26	54	-1.74	3.01	272.75	Horizontal	-4.58
4960.433	52.14	54	-1.86	1.01	348	Vertical	-4.58

Note: Correction = AF + CF - Preamp

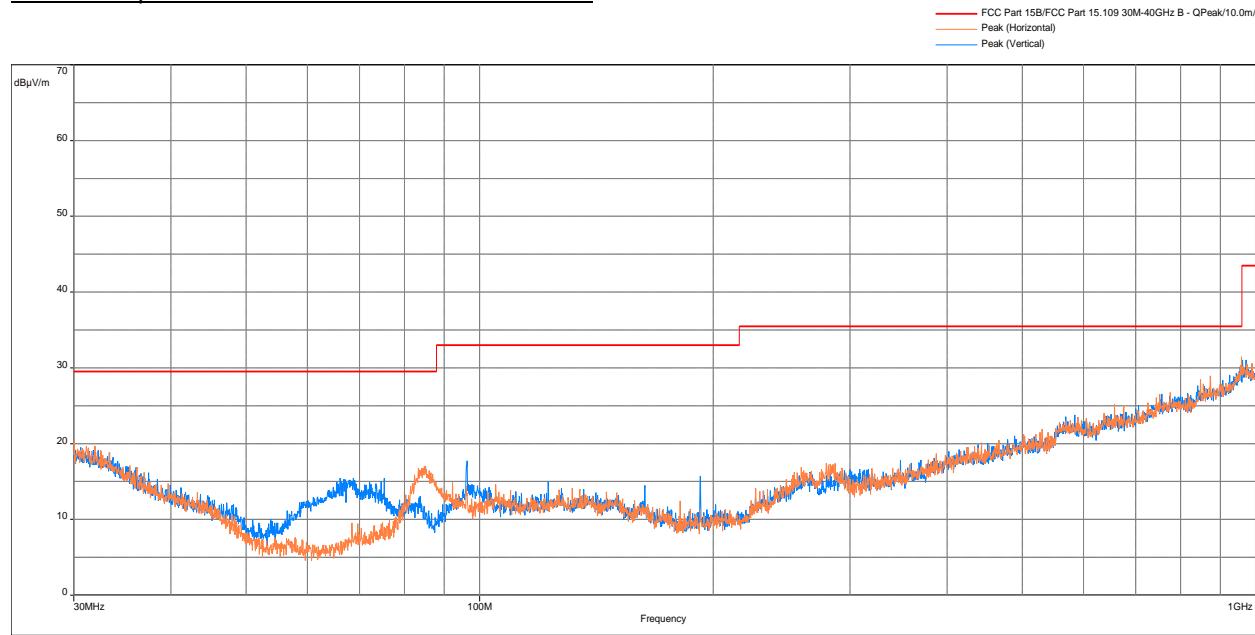
Test Results: 15.209 Radiated Spurious Emissions Low Channel, Tx at 2402MHz
Charging Mode

Radiated Spurious Emissions 9kHz - 30 MHz Parallel, Perpendicular & Horizontal Antenna Polarization



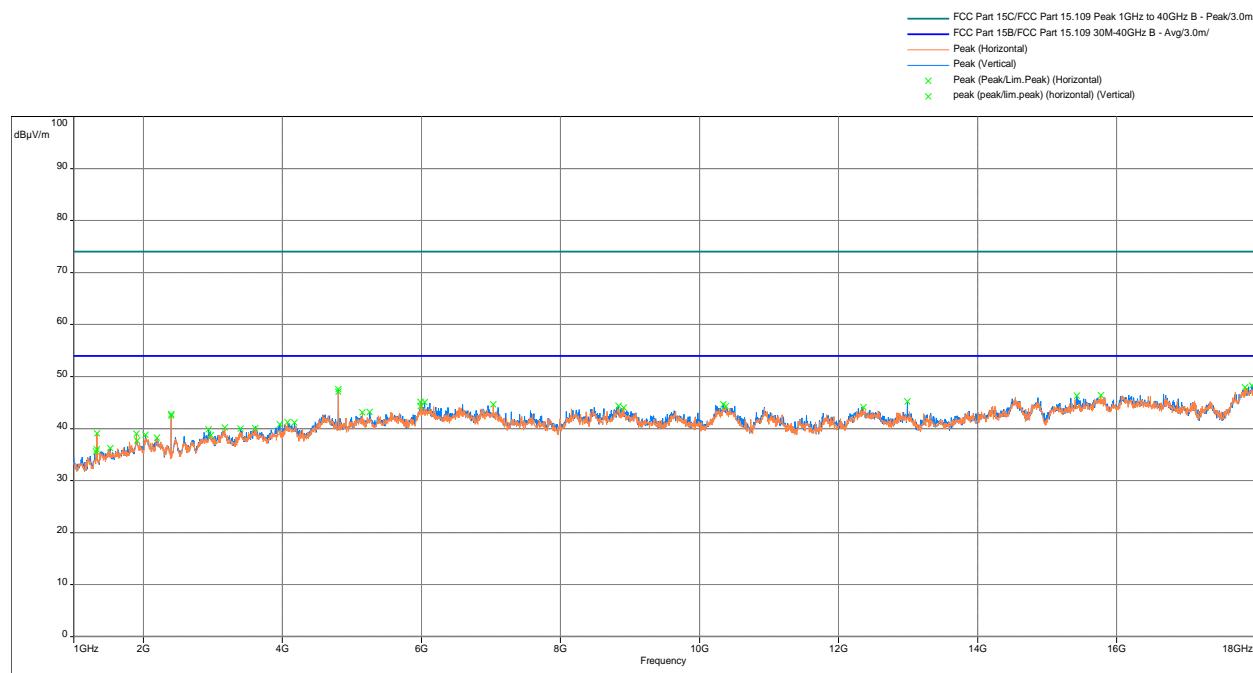
Model: Client: ; Comments: ; Test Date: 09/01/2021 00:38

Radiated Spurious Emissions 30 MHz - 1000 MHz

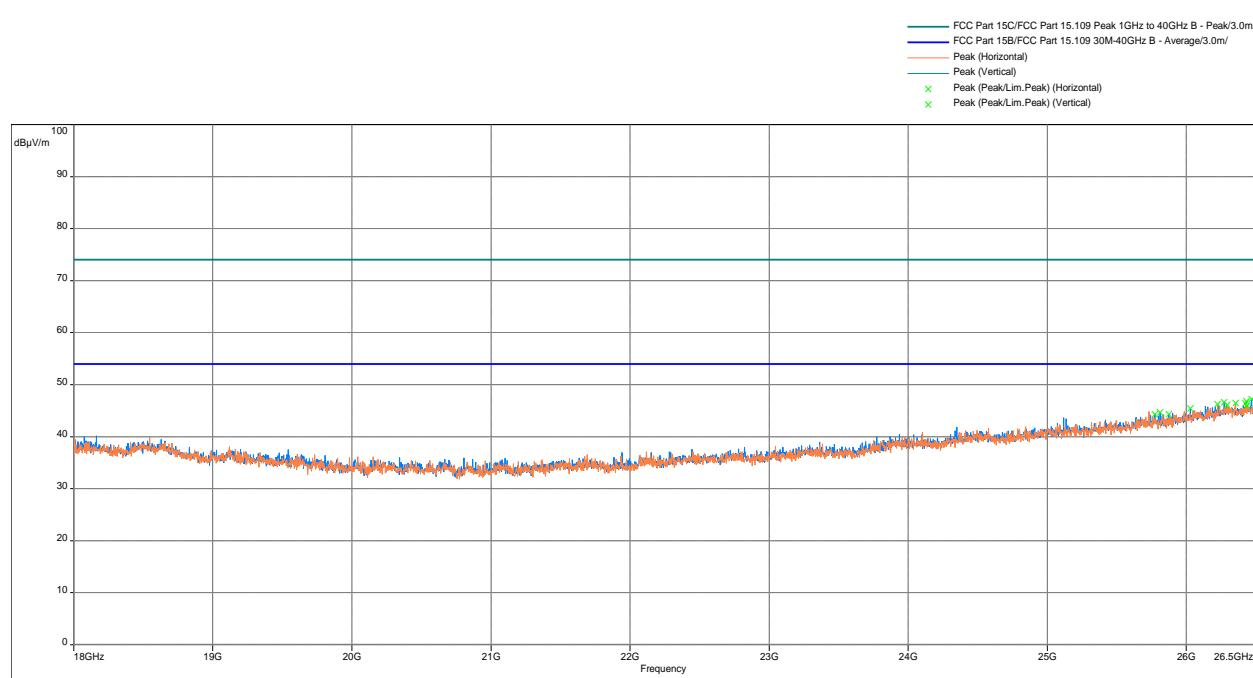


Model: Client: ; Comments: ; Test Date: 08/31/2021 23:48

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



Radiated Spurious Emissions 18 – 26.5 GHz, Peak Scan vs Peak & Average Limit



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

Frequency (MHz)	QPeak@ 10m (dB μ V/m)	Lim. QPeak @10m (dB μ V/m)	Margin (dB)	Height (m)	Angle (°)	Comment	Correction (dB)
85.128	17.02	29.5	-12.48	4	34	Horizontal	-18.63
96.316	17.75	33	-15.25	1	145.25	Vertical	-17.01
163.246	14.51	33	-18.49	4	164.25	Vertical	-15.69
192.410	15.74	33	-17.26	1	353	Vertical	-17.07
657.849	25.19	35.5	-10.31	3	9.75	Horizontal	-3.29
958.646	22.598	35.5	-12.90	2.84	350.5	Horizontal	4.03

Note: Correction = AF + CF - Preamp

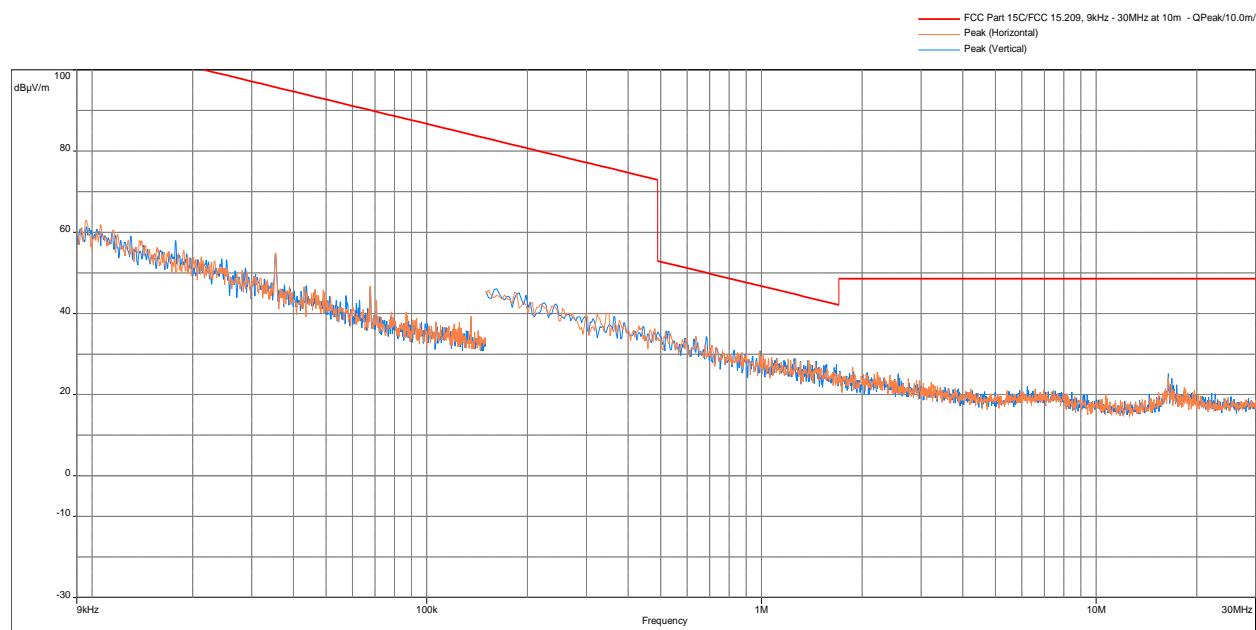
Frequency (MHz)	Peak @3m (dB μ V/m)	Lim. Avg @3m (dB μ V/m)	Margin dB	Height (m)	Angle (°)	Comment	Correction (dB)
4804.6	47.58	54	-6.42	2.04	312.25	Vertical	-5.9
4804.033	47.09	54	-6.91	3.99	240	Horizontal	-5.9

Note: Correction = AF + CF - Preamp

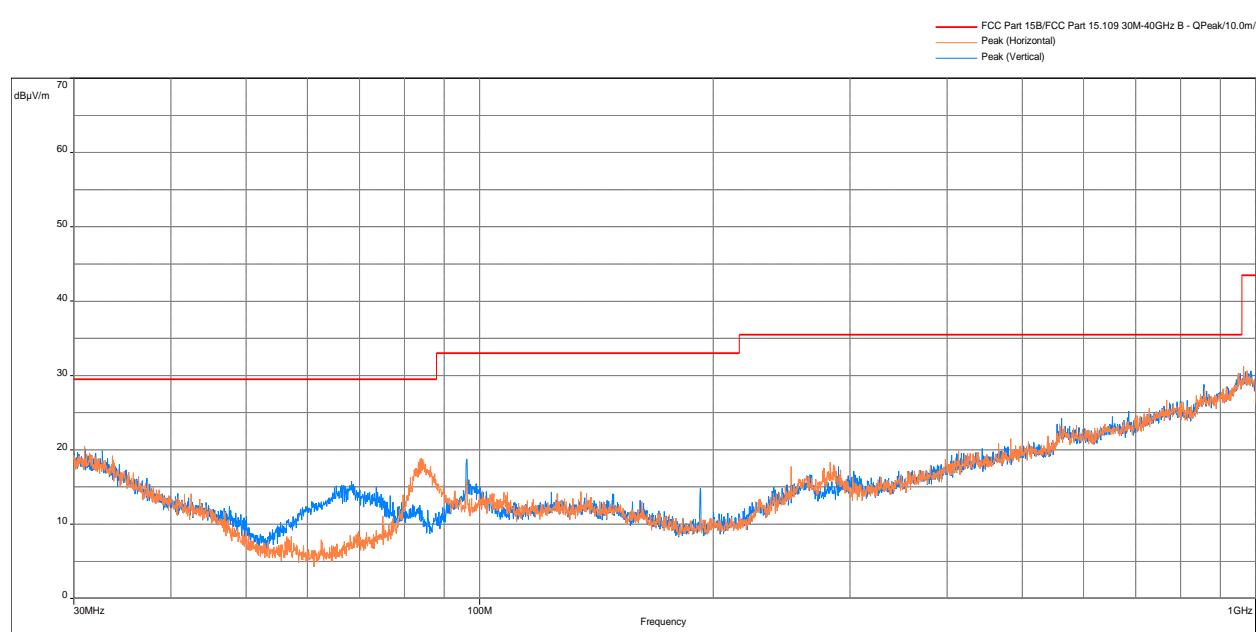
Results	Complies
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Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 2440 MHz
Charging Mode

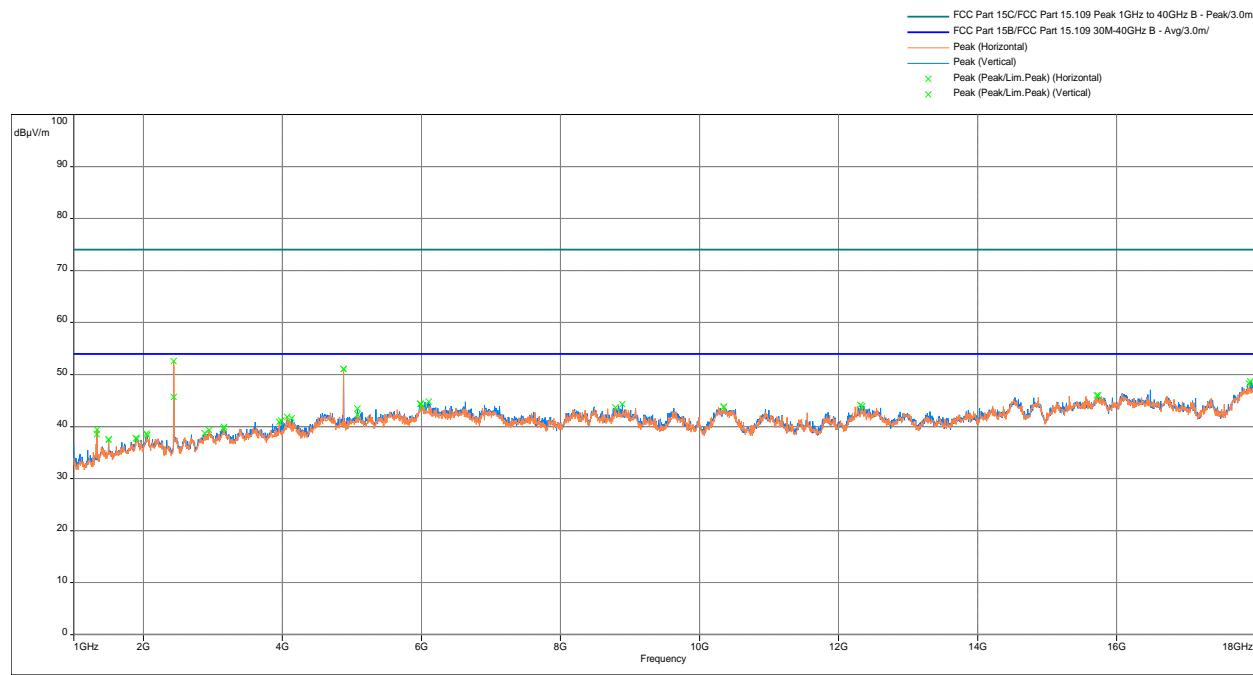
Radiated Spurious Emissions 9kHz - 30 MHz Parallel, Perpendicular & Horizontal Antenna Polarization



Radiated Spurious Emissions 30 MHz - 1000 MHz

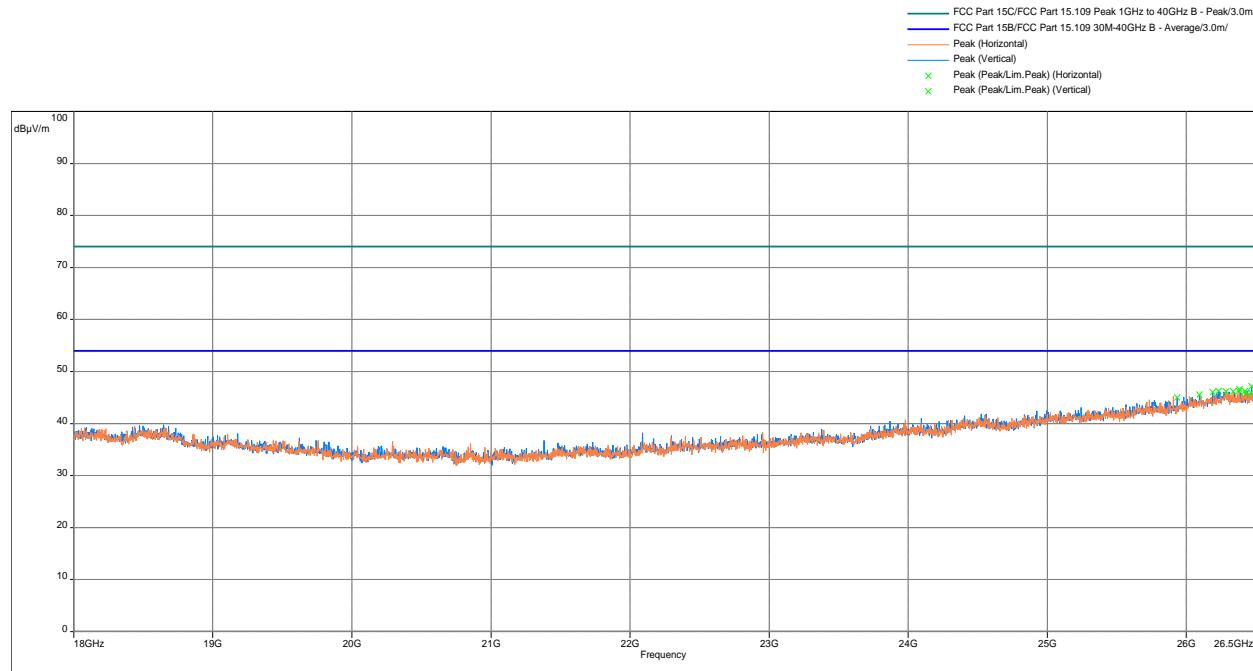


Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Peak and Avg Limit



Model: ; Client: ; Comments: ; Test Date: 09/02/2021 22:09

Radiated Spurious Emissions 18 – 26.5 GHz, Peak Scan vs Peak & Average Limit



Model: ; Client: ; Comments: ; Test Date: 09/02/2021 23:31

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

Frequency (MHz)	QPeak@ 10m (dB μ V/m)	Lim. QPeak @10m (dB μ V/m)	Margin (dB)	Height (m)	Angle (°)	Comment	Correction (dB)
84.094	18.85	29.5	-10.65	4	188	Horizontal	-18.83
96.251	18.75	33	-14.25	1	95	Vertical	-17.01
192.507	14.84	33	-18.16	1	0	Vertical	-17.07
251.871	17.75	35.5	-17.75	4	55.5	Horizontal	-12.75
289.895	17.75	35.5	-17.75	2	164.5	Vertical	-12.32
857.798	28.8	35.5	-6.7	4	234.5	Vertical	0.94

Note: Correction = AF + CF – Preamp

Frequency (MHz)	Peak @3m (dB μ V/m)	Lim. Peak @3m (dB μ V/m)	Margin dB	Height (m)	Angle (°)	Comment	Correction (dB)
4879.483	51.08	74	-22.92	3.01	13.75	Horizontal	-5.57
4879.483	51.03	74	-22.97	1.06	0.25	Vertical	-5.56

Note: Correction = AF + CF - Preamp

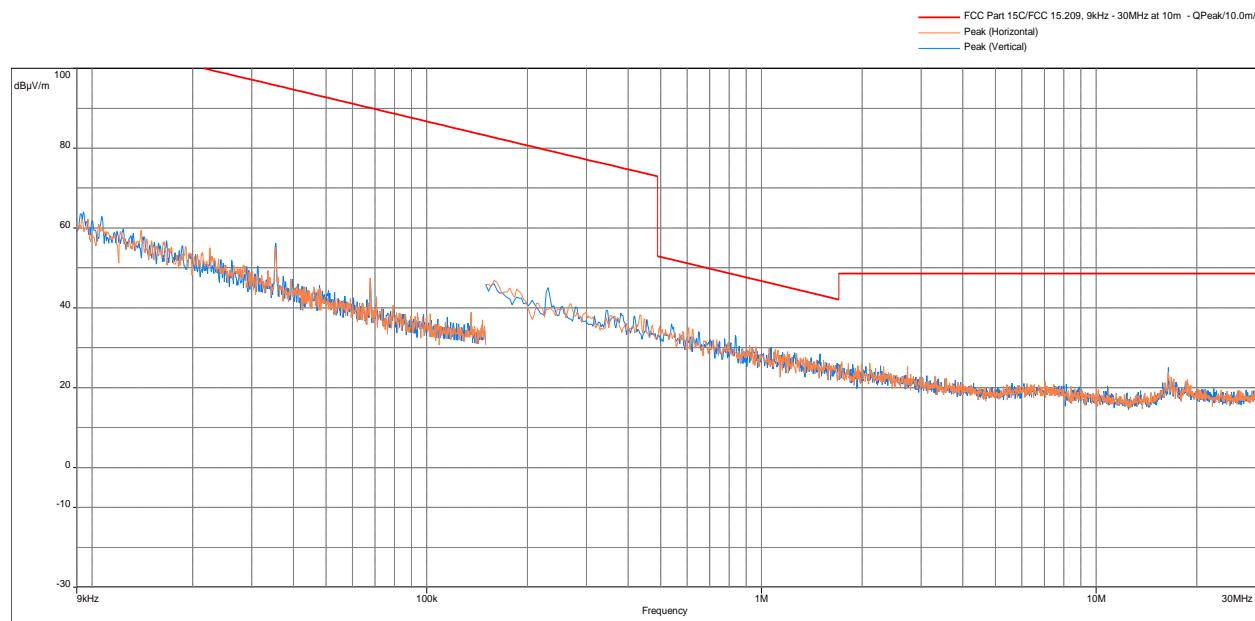
Frequency (MHz)	Ave @3m (dB μ V/m)	Lim. Ave @3m (dB μ V/m)	Margin dB	Height (m)	Angle (°)	Comment	Correction (dB)
4879.483	44.16	54	-9.84	1.33	286	Horizontal	-5.57
4879.483	44.1	54	-9.9	1.33	286	Vertical	-5.57

Note: Correction = AF + CF - Preamp

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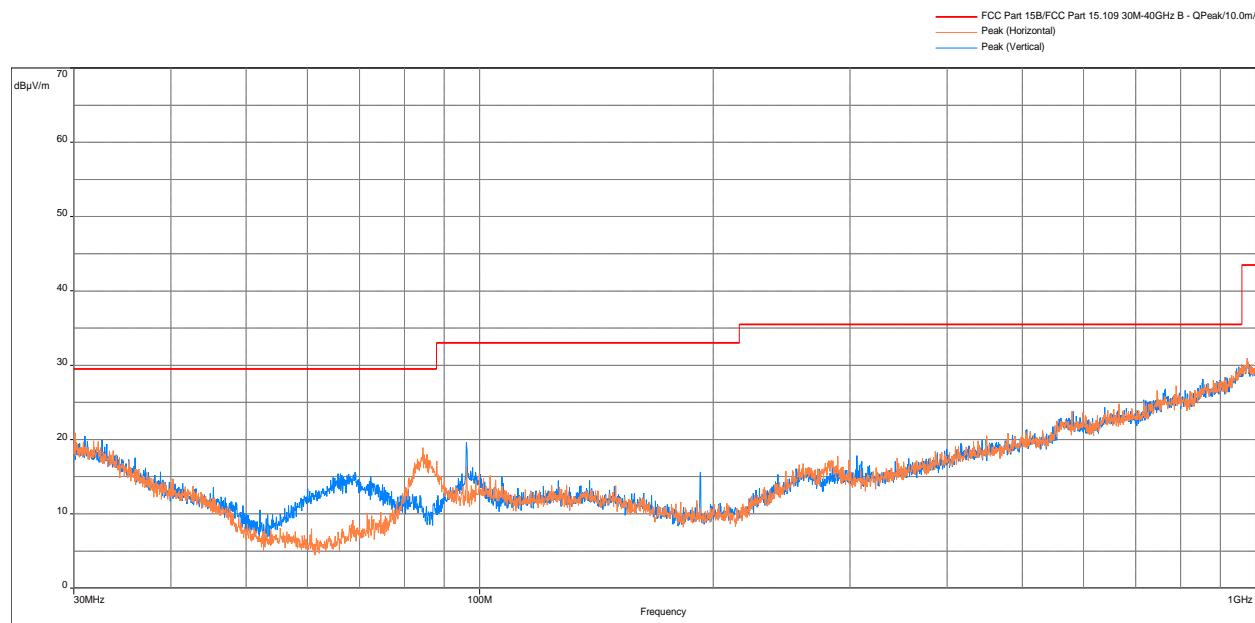
Test Results: 15.209 Radiated Spurious Emissions High Channel, Tx at 2480MHz
Charging Mode

Radiated Spurious Emissions 9kHz - 30 MHz Parallel, Perpendicular & Horizontal Antenna Polarization



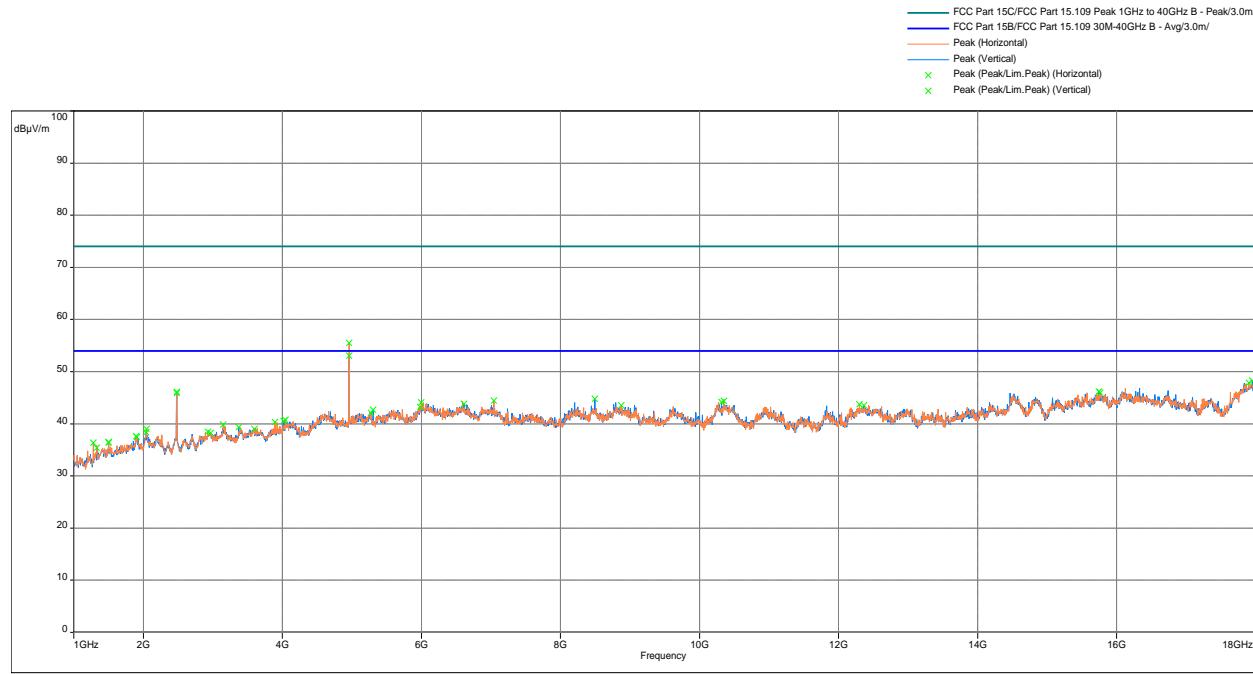
Model: ; Client: ; Comments: ; Test Date: 09/01/2021 00:31

Radiated Spurious Emissions 30 MHz - 1000 MHz

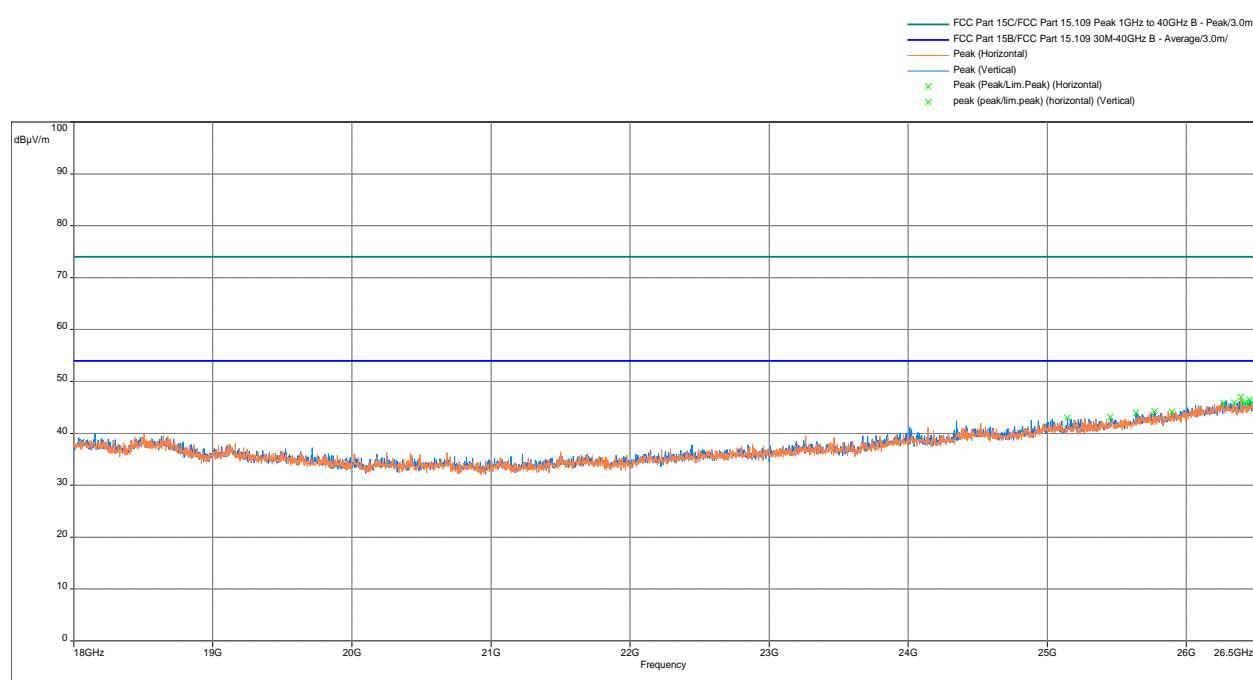


Model: ; Client: ; Comments: ; Test Date: 09/01/2021 00:19

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



Radiated Spurious Emissions 18 - 26 GHz, Peak Scan vs Peak & Average Limit



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

Frequency (MHz)	QPeak@ 10m (dB μ V/m)	Lim. QPeak @10m (dB μ V/m)	Margin (dB)	Height (m)	Angle (°)	Comment	Correction (dB)
84.514	18.93	29.5	-10.57	4	187.75	Horizontal	-18.74
96.154	16.33	33	-16.67	4	38.25	Horizontal	-17.03
96.186	19.6	33	-13.4	1.01	134.5	Vertical	-17.02
192.507	15.58	33	-17.42	1.01	29.5	Vertical	-17.07
746.248	26.63	35.5	-8.87	3	173.5	Horizontal	-1.3
789.607	27.26	35.5	-8.24	4	267.25	Horizontal	-0.58

Note: Correction = AF + CF – Preamp

Frequency (MHz)	Peak @3m (dB μ V/m)	Lim. Peak @3m (dB μ V/m)	Margin dB	Height (m)	Angle (°)	Comment	Correction (dB)
4960.433	55.52	74	-18.48	3.01	116.25	Horizontal	-5.05
4960.433	53.08	74	-20.92	3.99	309	Vertical	-5.05

Note: Correction = AF + CF - Preamp

Frequency (MHz)	Ave @3m (dB μ V/m)	Lim. Ave @3m (dB μ V/m)	Margin dB	Height (m)	Angle (°)	Comment	Correction (dB)
4960.478	45.42	54	-8.58	1.12	291.75	Vertical	-5.05
4960.485	47.41	54	-6.59	1.24	287.25	Horizontal	-5.05

Note: Correction = AF + CF - Preamp

Results	Complies
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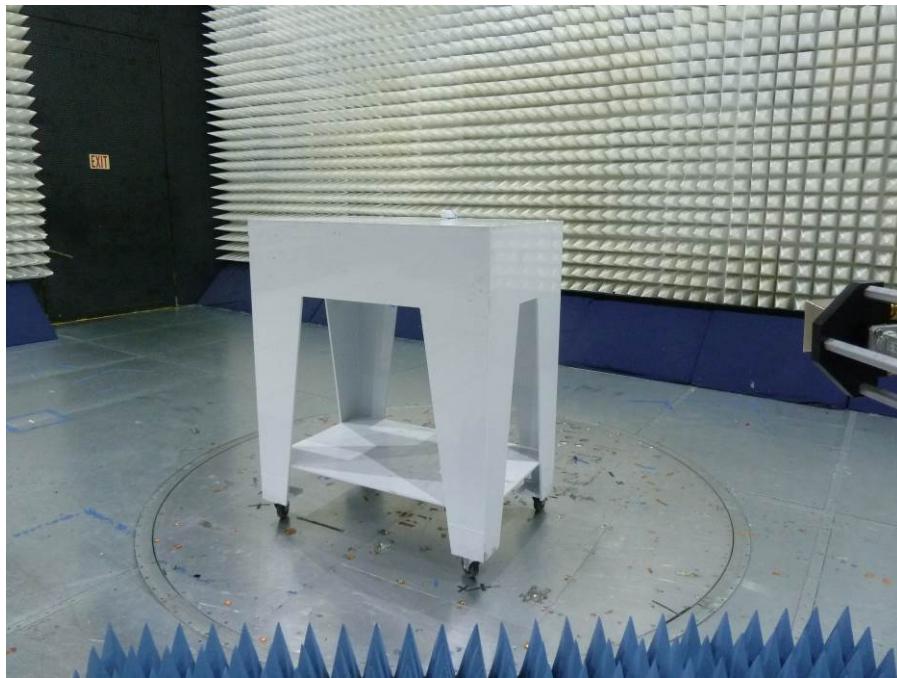
4.5.5 Test Setup Configuration

The following photographs show the testing configurations used.

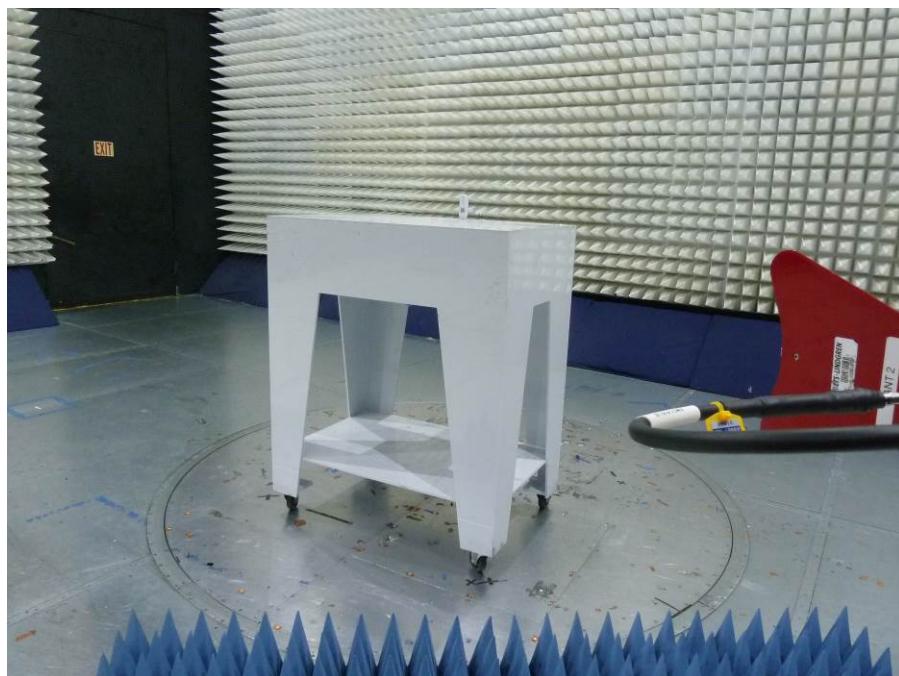
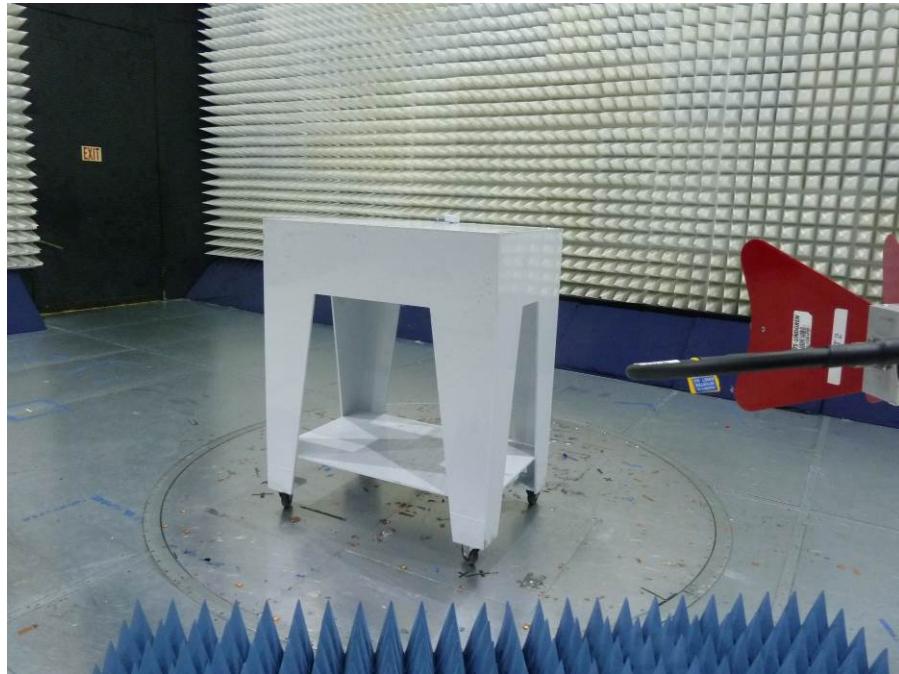


4.5.5 Test Setup Configuration (Continued)

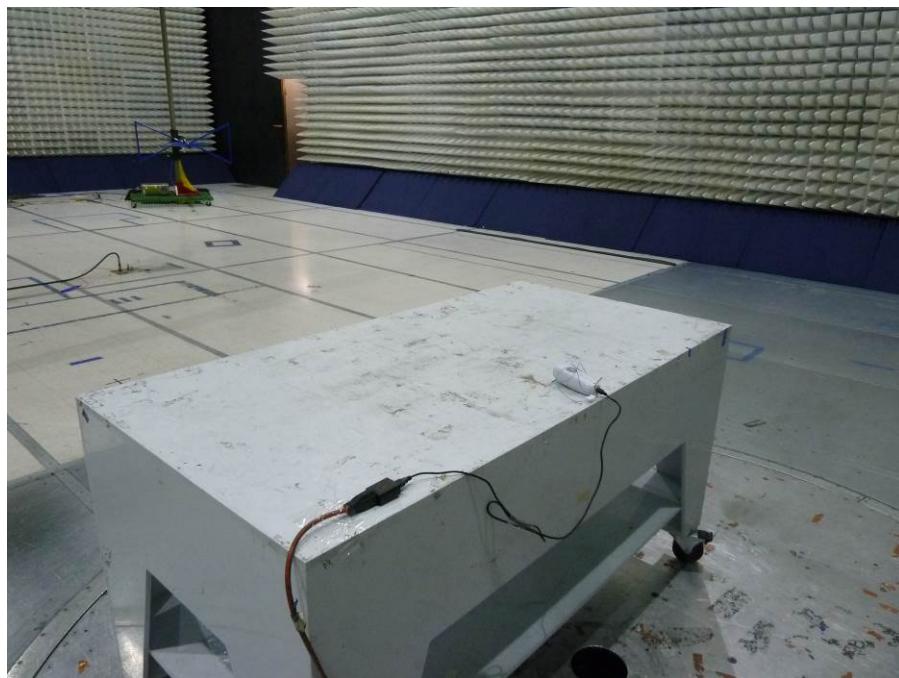
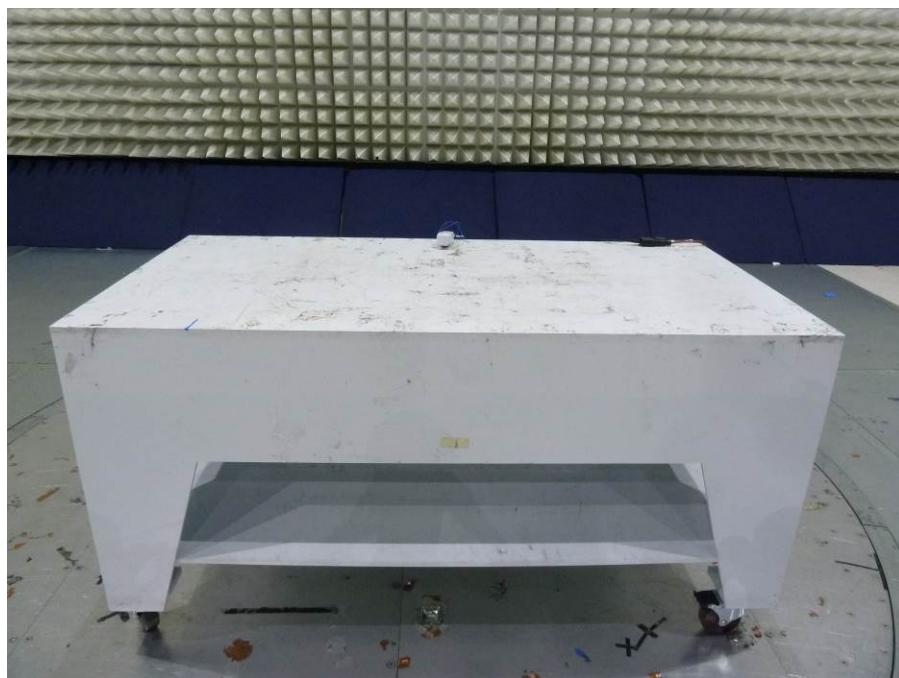




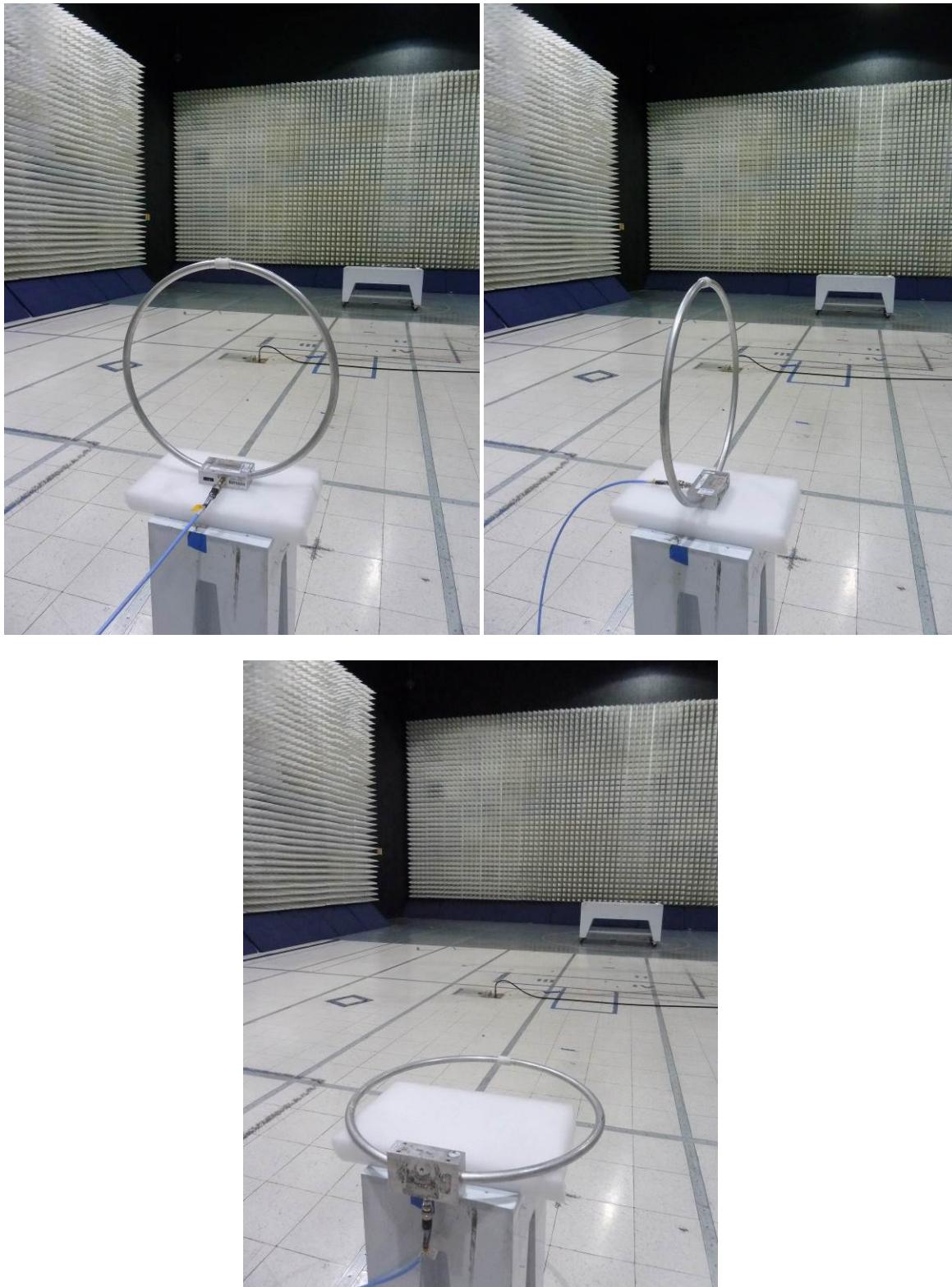
4.5.5 Test Setup Configuration (Continued)



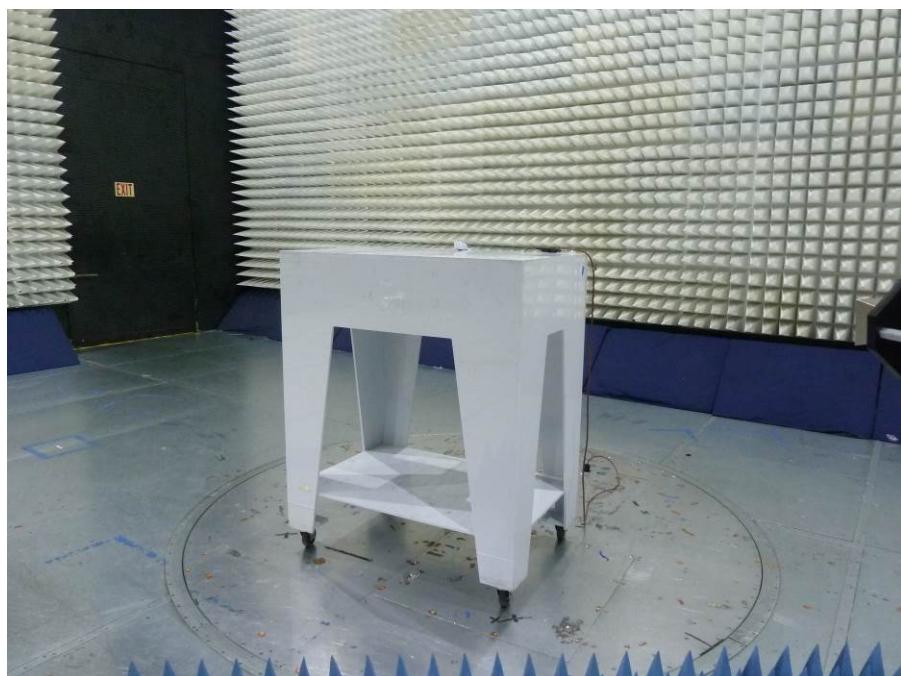
4.5.5 Test Setup Configuration (Continued)



4.5.5 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.

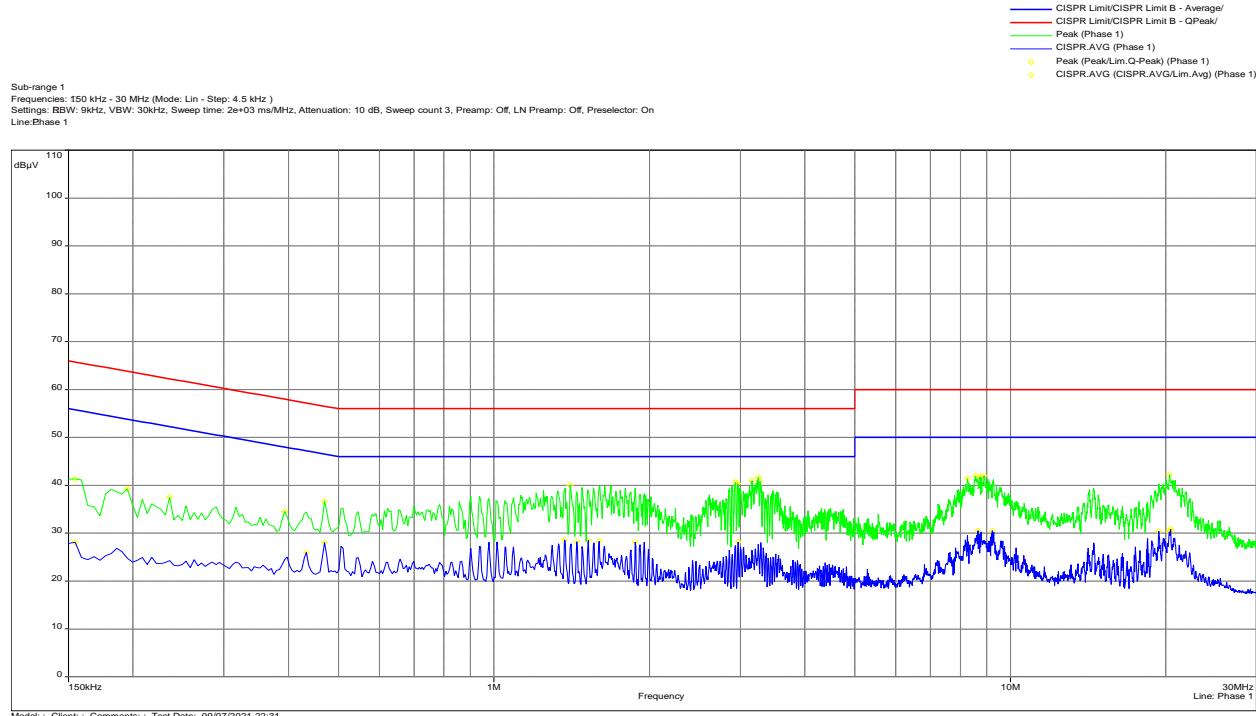
Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.10-2013.

Tested By	Test Date
Aaron Chang	September 7, 2021

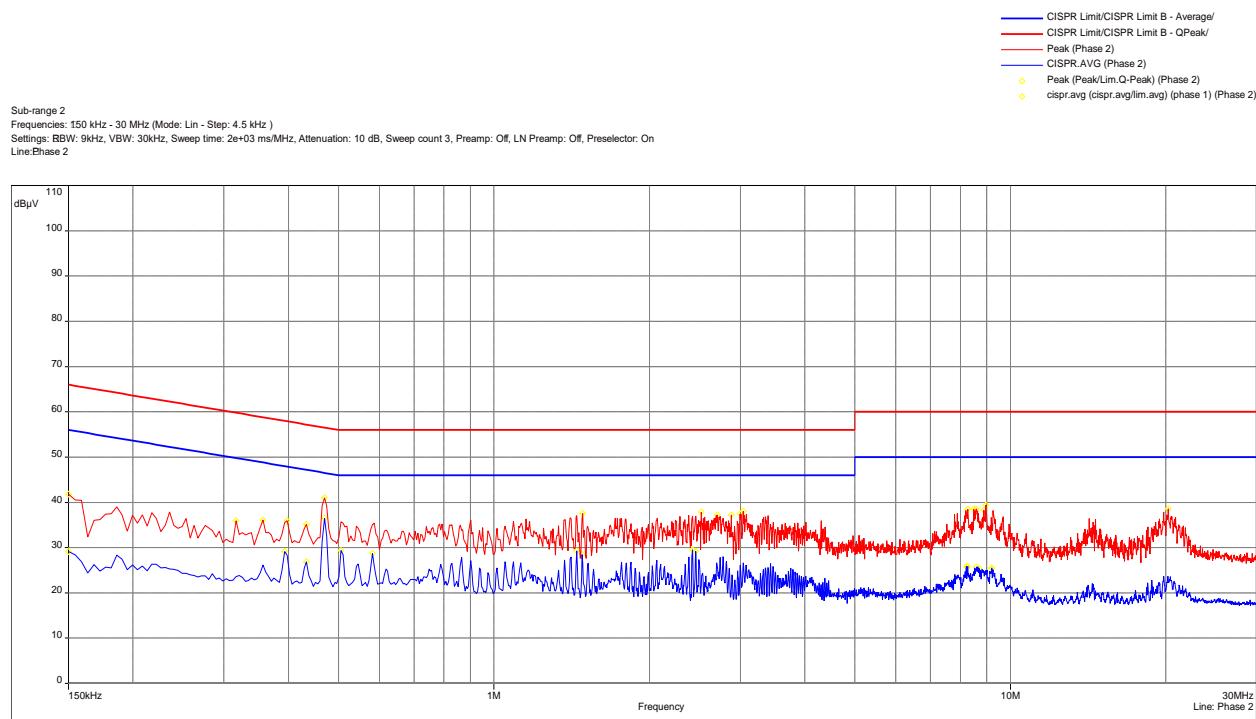
4.6.3 Test Result

15.207: Conducted Emissions 120VAC 60Hz

Phase 1



Phase 2



4.6.3 Test Results (Continued)

Frequency (MHz)	CISPR Avg (dB μ V)	Q-Peak (dB μ V)	Limit Avg (dB μ V)	Limit Q-Peak (dB μ V)	Margin Avg (dB)	Margin Q-Peak (dB)	Line	Correction (dB)
0.469	36.49	38.91	46.52	56.52	-10.03	-17.61	Phase 2	20.96
0.507	29.5	31.98	46	56	-16.5	-24.02	Phase 2	20.96
0.582	27.63	31.06	46	56	-18.37	-24.94	Phase 2	20.97
1.443	28.19	34.13	46	56	-17.81	-21.87	Phase 2	21.03
2.422	28.29	34.06	46	56	-17.71	-21.94	Phase 2	21.08
2.454	27.5	33.74	46	56	-18.5	-22.26	Phase 2	21.09

Results: Complies by 10.03 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 Receiver	Rohde and Schwarz	ESU40	ITS 00961	12	03/09/22
LISN	FCC	FCC-LISN-50-50	ITS 00551	12	11/16/21
Horn Antenna	ETS Lindgren	3117PA	ITS 01636	12	12/17/21
18-40GHz Preamp	uComp Nordic	MCNS-50-18004000335P	ITS 01799	12	03/19/22
Pyramidal Horn Antenna	EMCO	3160-09	ITS 00571	#	#
Loop Antenna	EMCO	6512	ITS 001598	12	11/03/21
BI-Log Antenna	Teseq	CBL 6111D	ITS 01505	12	03/22/22
Pre-Amplifier	Sonoma Instrument	310N	ITS 00942	12	04/19/22
RF Cable	TRU Corporation	TRU CORE 300	ITS 01462	12	09/01/21
RF Cable	TRU Corporation	TRU CORE 300	ITS 01465	12	09/01/21
RF Cable	TRU Corporation	TRU CORE 300	ITS 01470	12	09/01/21
RF Cable	TRU Corporation	TRU CORE 300	ITS 01342	12	09/01/21
Notch Filter	MICRO-TRONICS	BRM50702	ITS 01166	12	06/29/22
RF Cable	Mega Phase	EMC1-K1K1-236	ITS 01484	12	06/29/22
10m Semi-anechoic chamber	Panashield	10m Chamber	ITS 00984	36	07/29/23

No Calibration required

Software used for emission compliance testing utilized the following:

Name	Manufacturer	Version	Template/Profile
BAT-EMC	Nexio	3.19.1.19	Eyenovia.bpp
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 / G104729499	AC	KV	September 08, 2021	Original document

END OF REPORT