

TEST REPORT

Report Number: 104449578MPK-001
Project Numbers: G104449578, G104274802
Report Issue Date: October 27, 2020

Testing performed on
MOBILE-READY CONTACTLESS SMARTCARD READER
Model Number: CSB 3500

FCC ID: T8I-CONEKT5
IC: 6504A-CONEKT5
to

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

For

Farpointe Data, Inc.

Test Performed by:
Intertek
1365 Adams Court
Menlo Park, CA 94025 USA

Test Authorized by:
Farpointe Data, Inc.
2195 Zanker Road
San Jose, CA 95131 USA

Prepared by:



Anderson Soungpanya

Date: October 27, 2020

Reviewed by:



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Date: October 27, 2020

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Report No. 104449578MPK-001	
Equipment Under Test:	MOBILE-READY CONTACTLESS SMARTCARD READER
Model Number:	CSB 3500
Applicant:	Farpointe Data, Inc.
Contact:	Kirk Bierach
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Country:	USA
Tel. Number:	(408) 731-8700
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Applicable Regulation:	FCC Part 15 Subpart C (15.247) Industry Canada RSS-247 Issue 2
Date of Test:	September 11, 2018, May 7, 2020 & October 5 – 23, 2020

We attest to the accuracy of this report:



Anderson Soungpanya
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: March 15, 2020

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: March 15, 2020

Test completion date: October 23, 2020

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

2.0 General Information

2.1 Product Description

Farpointe Data, Inc. supplied the following description of the EUT:

CONTACTLESS PROXIMITY CARD READER.

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

Information about the 2.4 GHz radio is presented below:

Applicant	Farpointe Data, Inc.
Model No.	CSB 3500
FCC Identifier	T8I-CONEKT5
IC Identifier	6504A-CONEKT5
Type of transmission	Digital Transmission System (DTS)
Rated RF Output	1.97 dBm
Antenna(s) & Gain	Internal Antenna, Gain: 2.1 dBi
Frequency Range	2402 – 2480 MHz
Type of modulation/data rate	GFSK / 1Mbit/s
Number of Channel(s)	40
Applicant Name & Address	Farpointe Data, Inc. 2195 Zanker Road San Jose, CA 95131 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

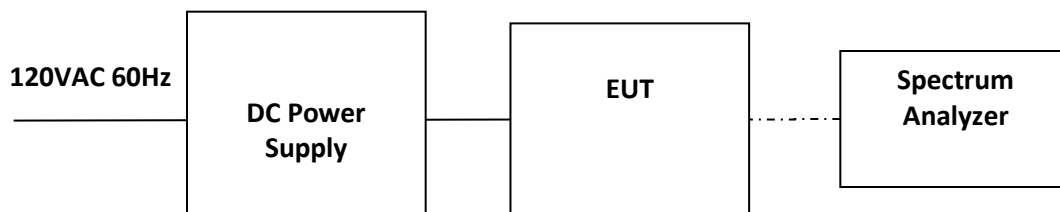
3.1 Support Equipment

Support Equipment		
Description	Manufacturer	Model
DC Power Supply	Exetech	D30030012

3.2 Block Diagram of Test Setup

Equipment Under Test			
Description	Manufacturer	Model	Serial Number
Radiated Sample of MOBILE-READY CONTACTLESS SMARTCARD READERS	Farpointe Data, Inc.	CSB 3500	24010013

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



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

EUT Photo



3.3 Justification

For radiated emission measurements the EUT is placed on a non-conductive table.

BLE transmitter is identical to certification, FCC ID: T8I-CONEKT3 and IC: 6504A-CONEKT3. Antenna port Conducted Test data in section 4.1, 4.3, 4.4 were borrowed from original report, 104274802MPK-001. Radiated Emissions were remeasured to show compliance.

3.4 Software Exercise Program

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

3.5 Mode of Operation during Test

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.

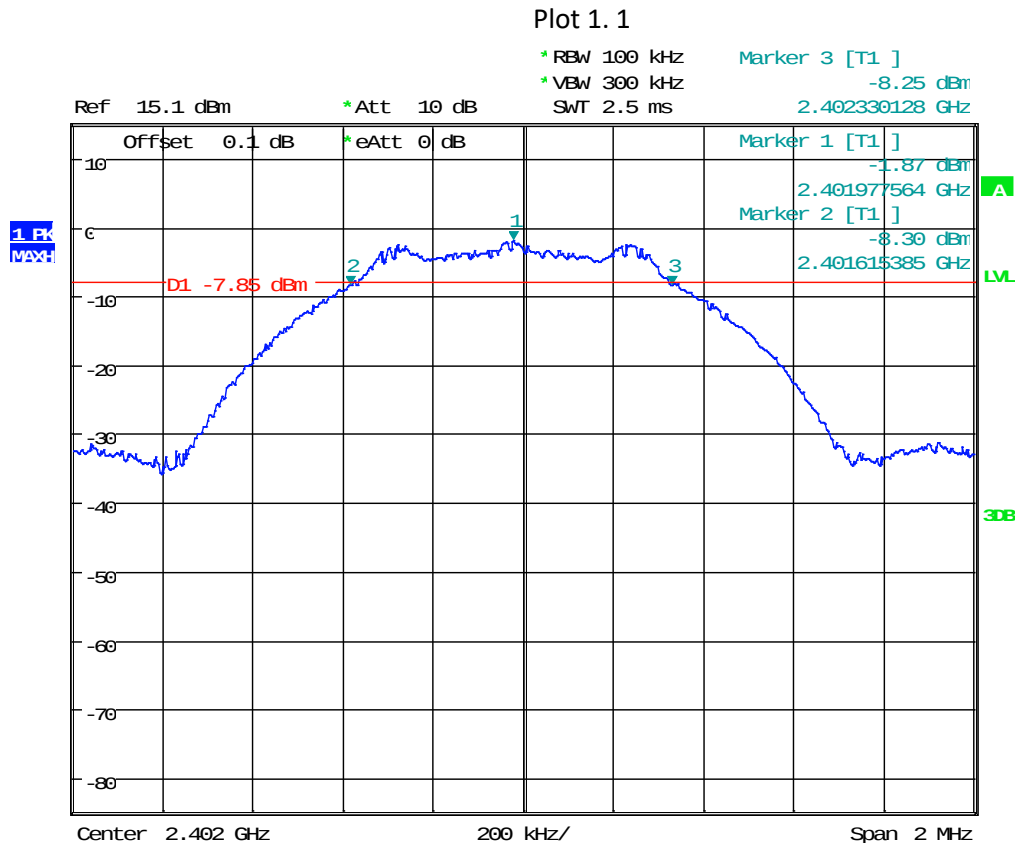
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude 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.

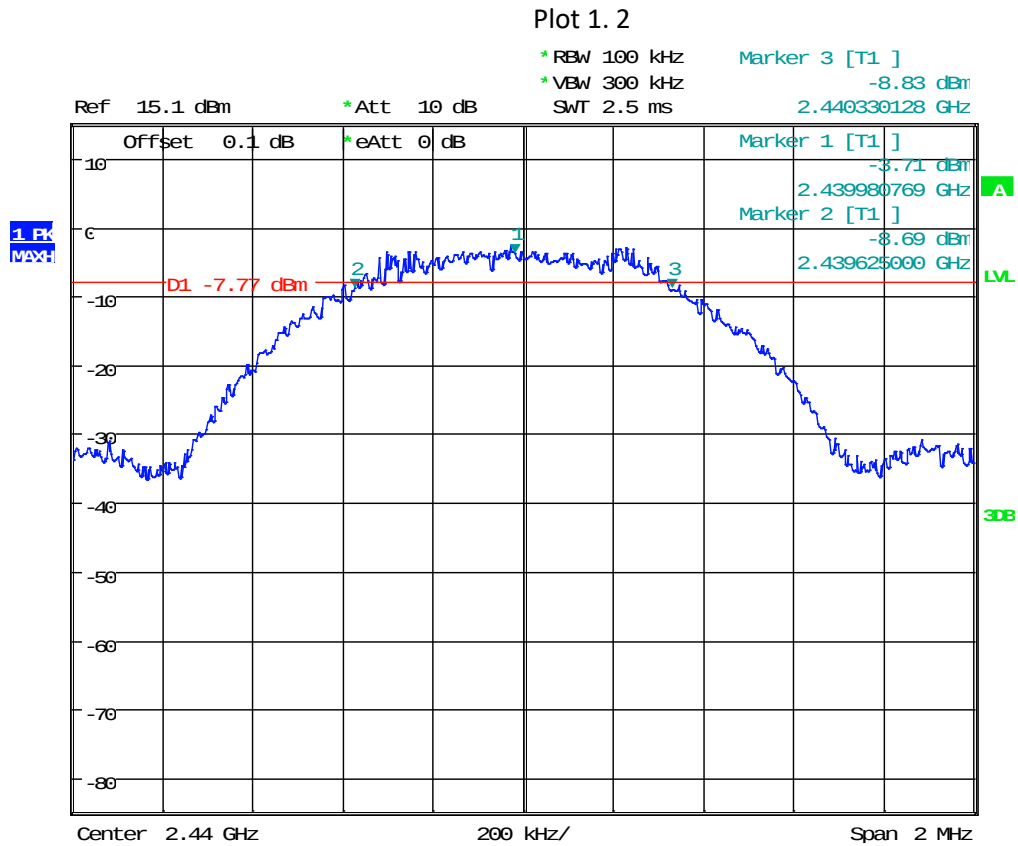
4.1.3 Test Result

Frequency (MHz)	6-dB bandwidth FCC 15.247 & RSS-GEN, kHz	Occupied bandwidth, RSS-GEN, MHz	Plot
2402	714.743	--	1.1
	--	1.069	1.4
2440	705.128	--	1.2
	--	1.054	1.5
2480	714.743	--	1.3
	--	1.737	1.6

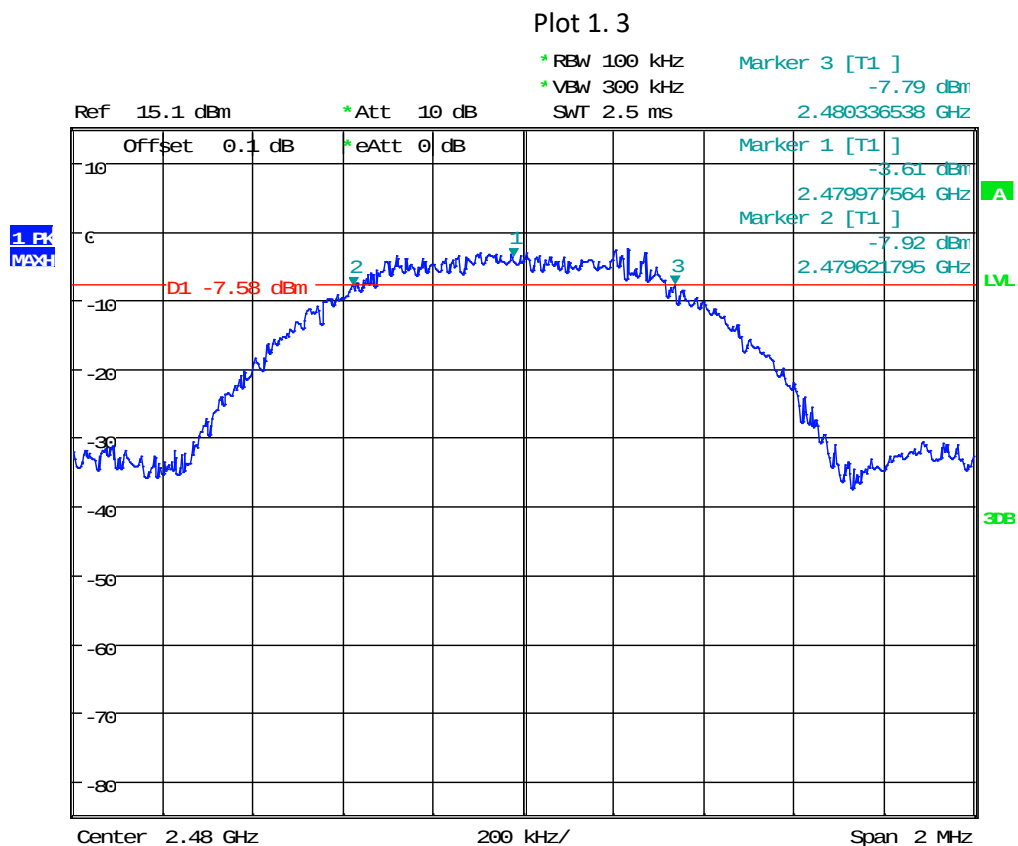
Tested By	Test Date	Results
Aaron Chang	September 11, 2018	Complies



Date: 11.SEP.2018 11:18:32

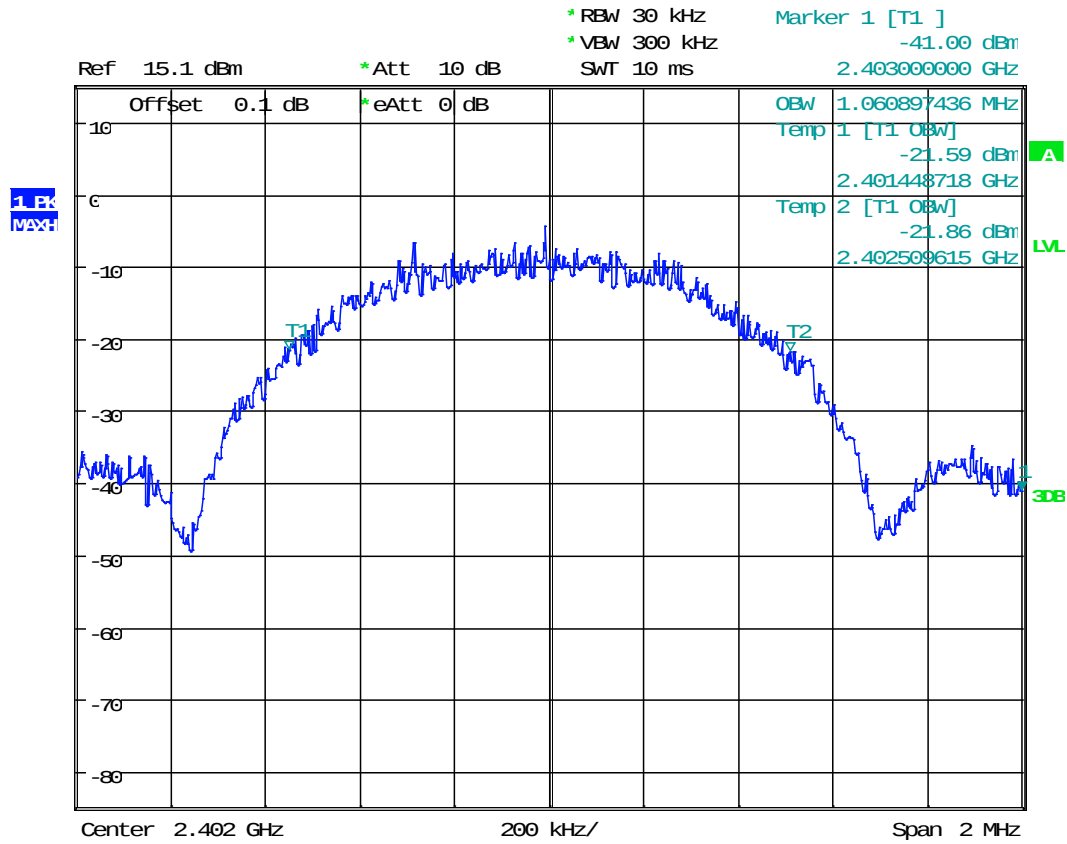


Date: 11.SEP.2018 11:23:11



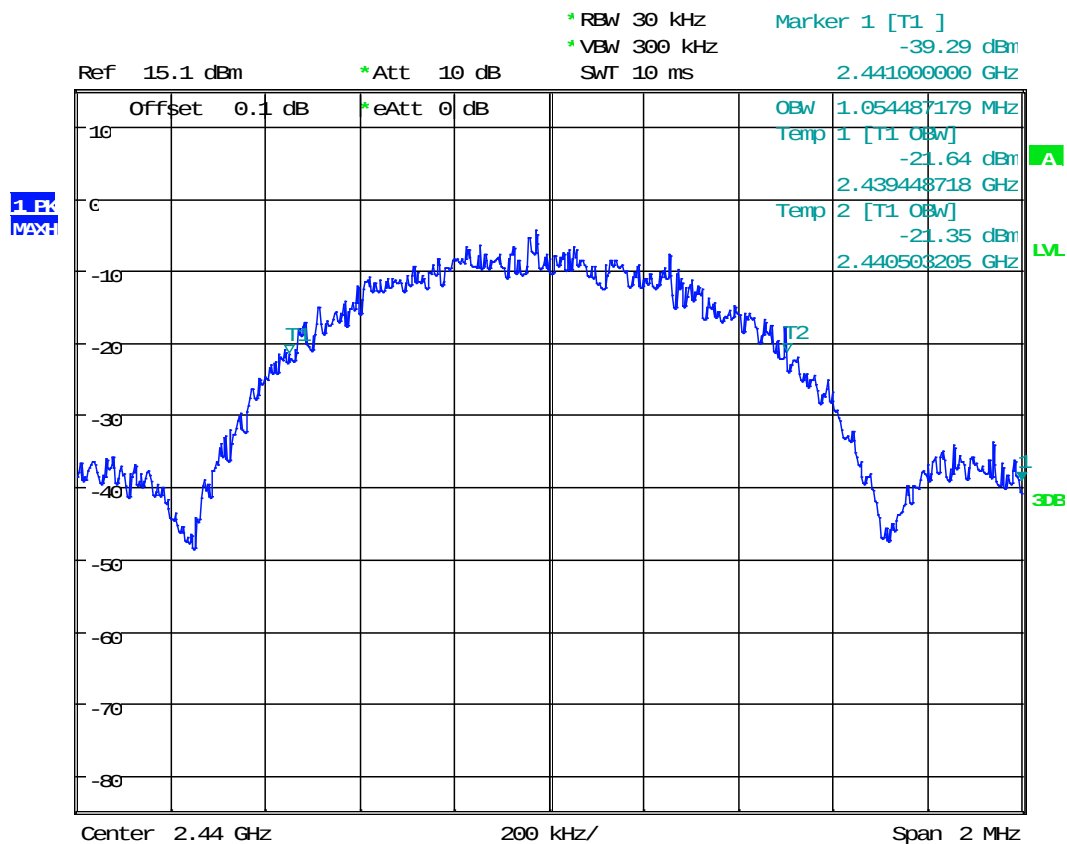
Date: 11.SEP.2018 11:25:58

Plot 1. 4



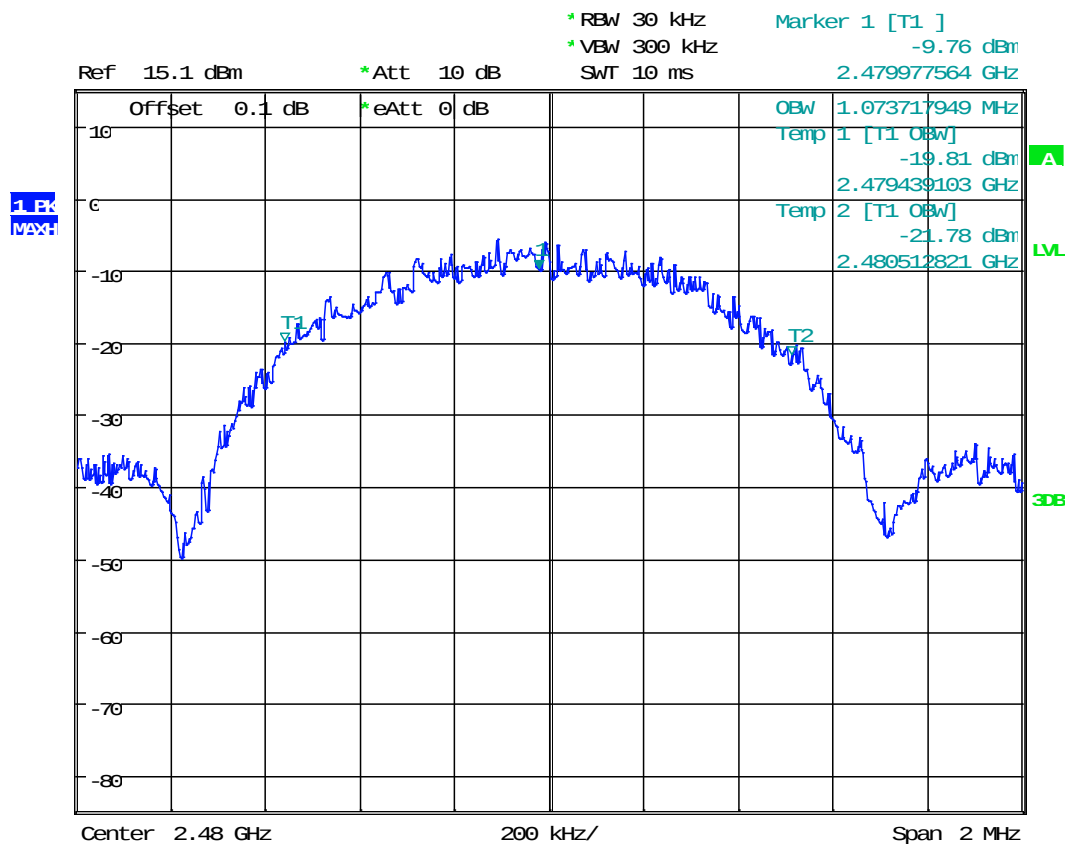
Date: 11.SEP.2018 11:34:26

Plot 1.5



Date: 11.SEP.2018 11:33:18

Plot 1.6



Date: 11.SEP.2018 11:31:24

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 $RBW \geq DTS$ bandwidth in ANSI 63.10.

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

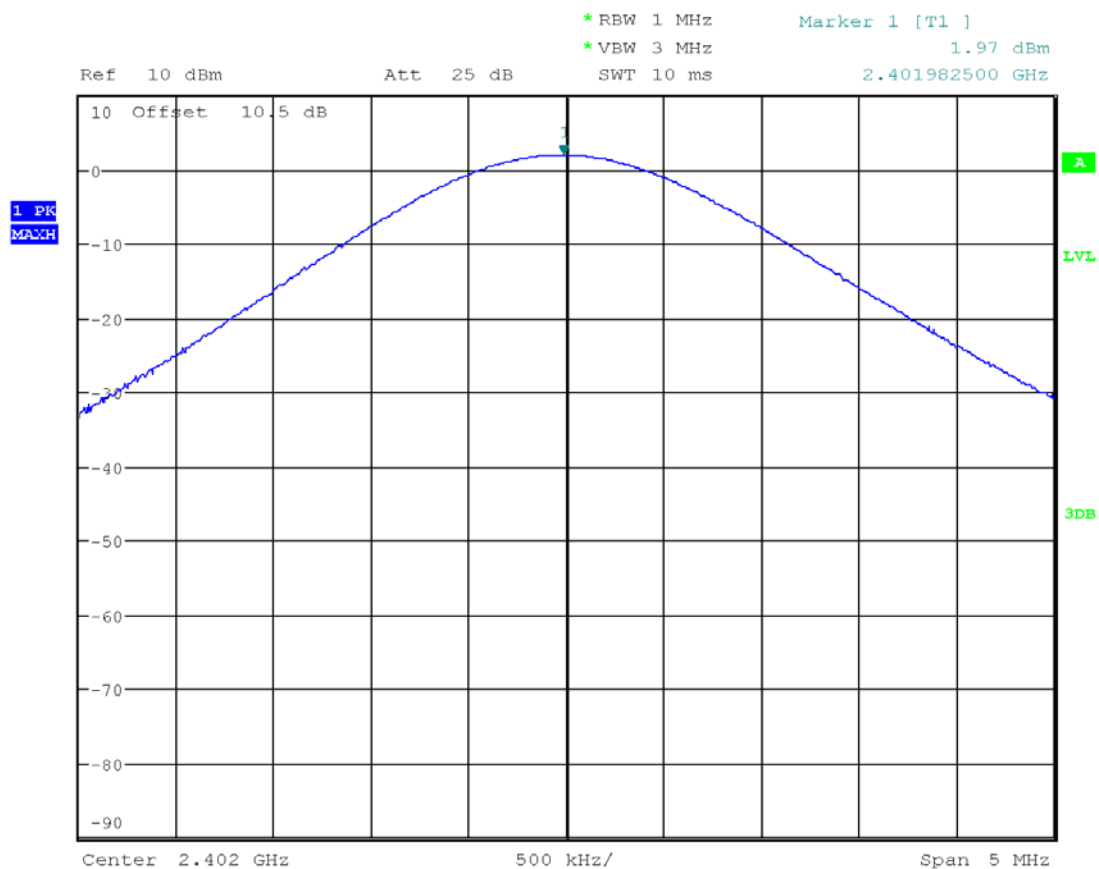
4.2.3 Test Result

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

Frequency	Conducted Power (peak)		Plot
	dBm	mW	
2402	1.97	1.574	2.1
2442	1.88	1.542	2.2
2480	1.75	1.496	2.3

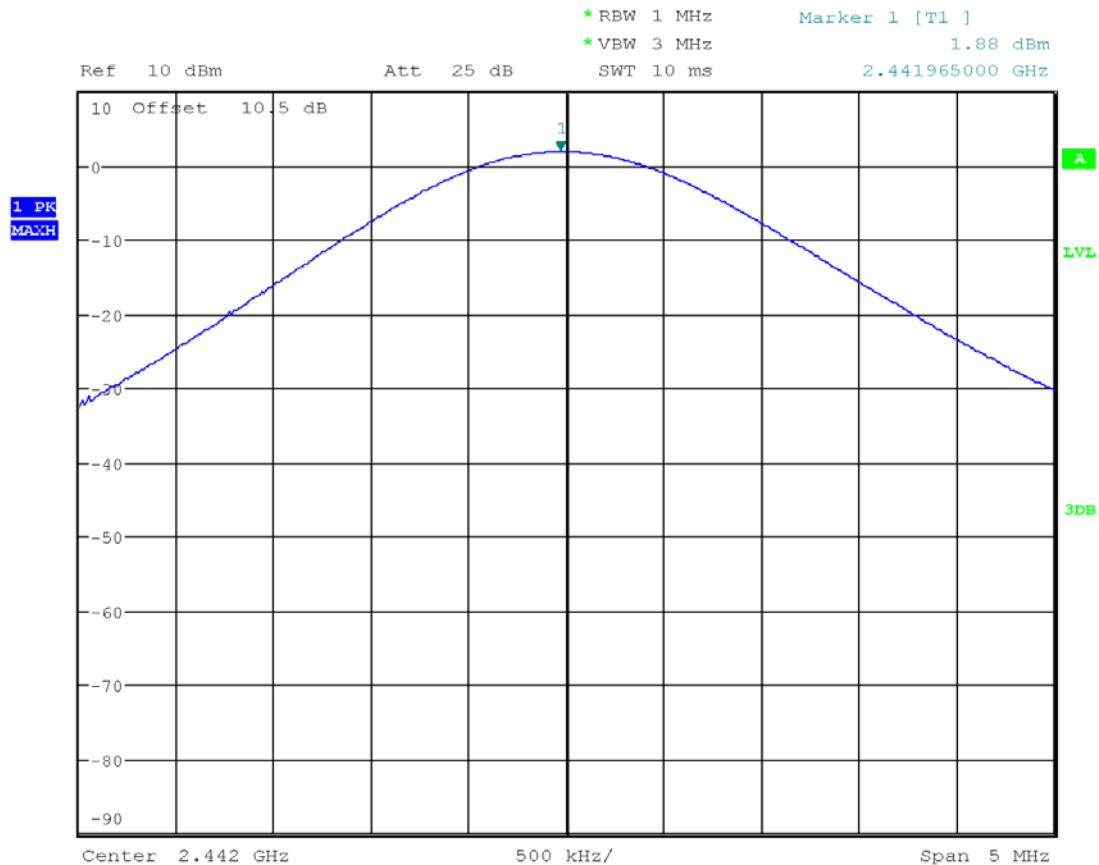
Tested By	Test Date	Results
Anderson Soungpanya	October 23, 2020	Complies

Plot 2.1



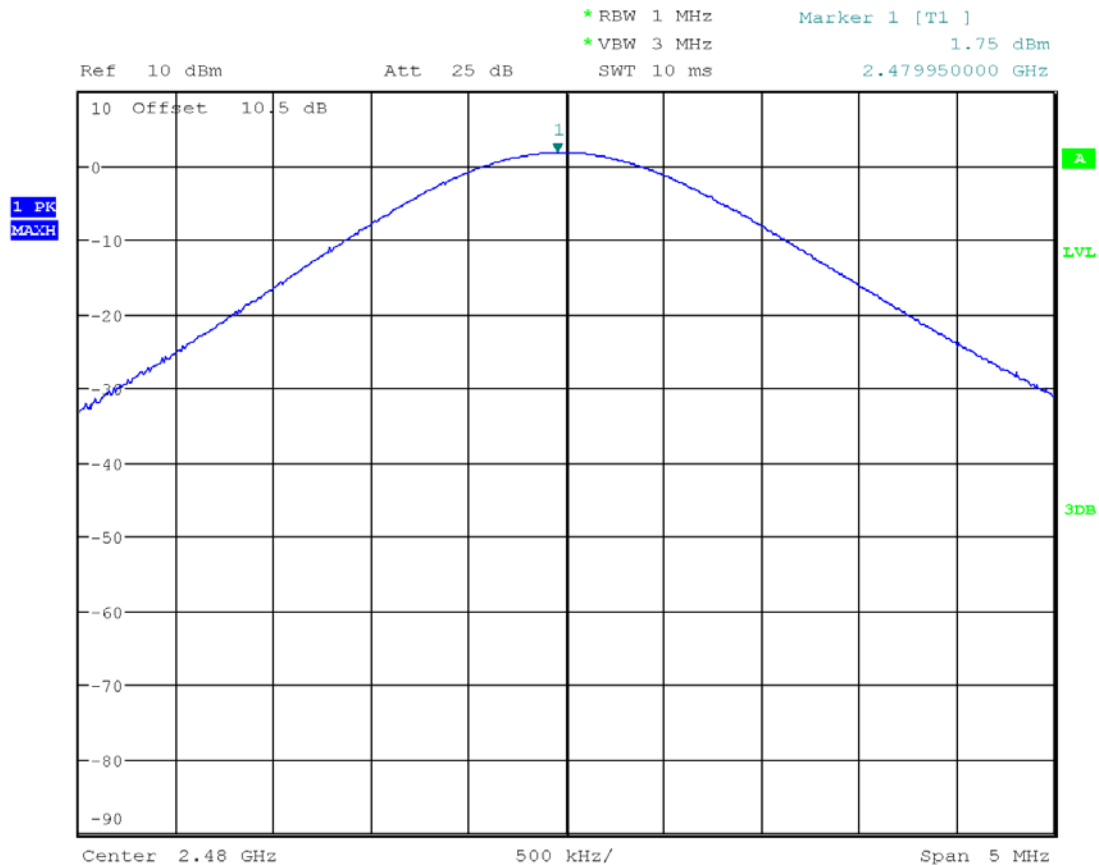
Date: 23.OCT.2020 08:58:40

Plot 2. 2



Date: 23.OCT.2020 08:57:50

Plot 2.3



Date: 23.OCT.2020 08:59:17

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.

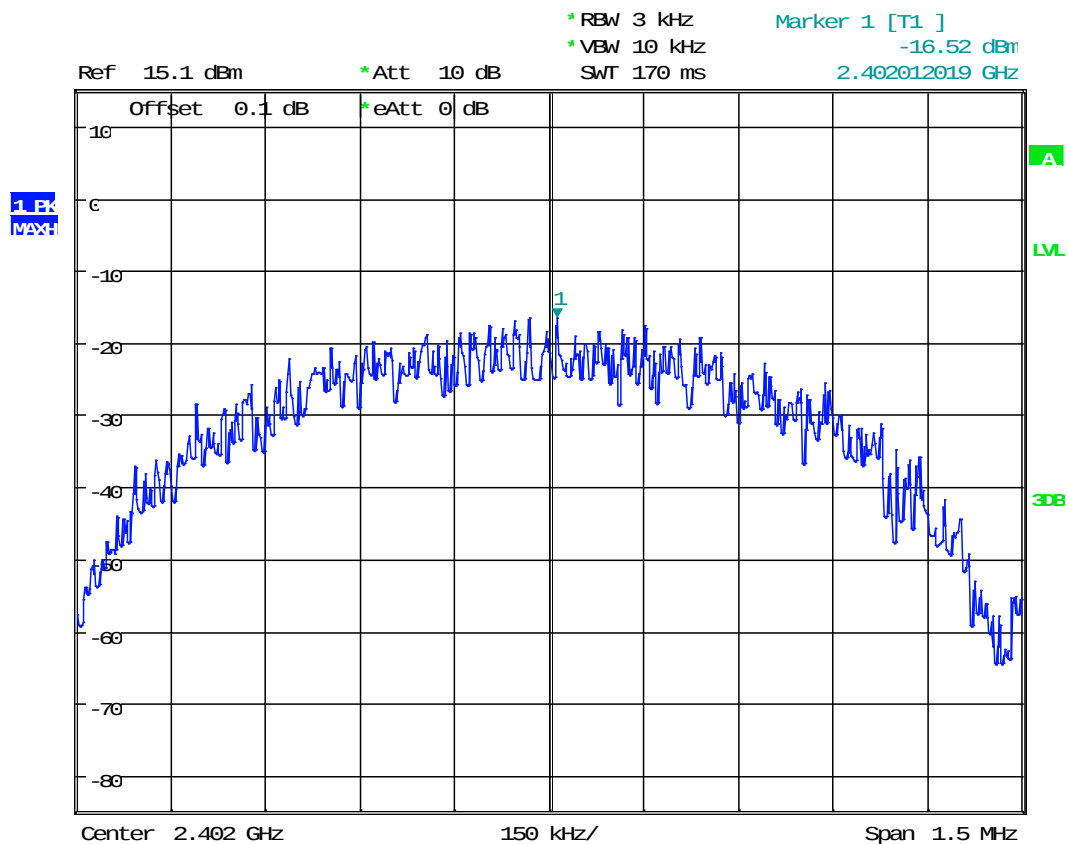
4.3.3 Test Result

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	-16.52	8.0	-24.52	3.1
2440	-14.95	8.0	-22.95	3.2
2480	-14.94	8.0	-22.94	3.3

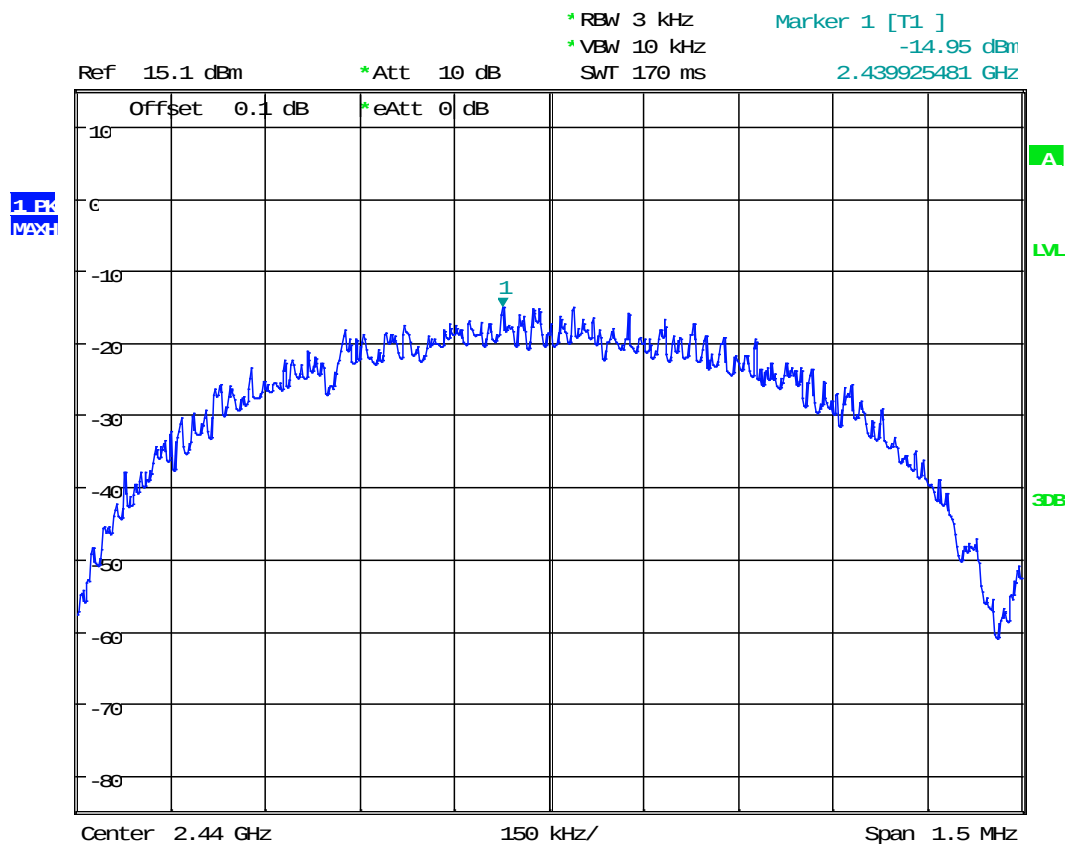
Tested By	Test Date	Results
Aaron Chang	September 11, 2018	Complies

Plot 3.1



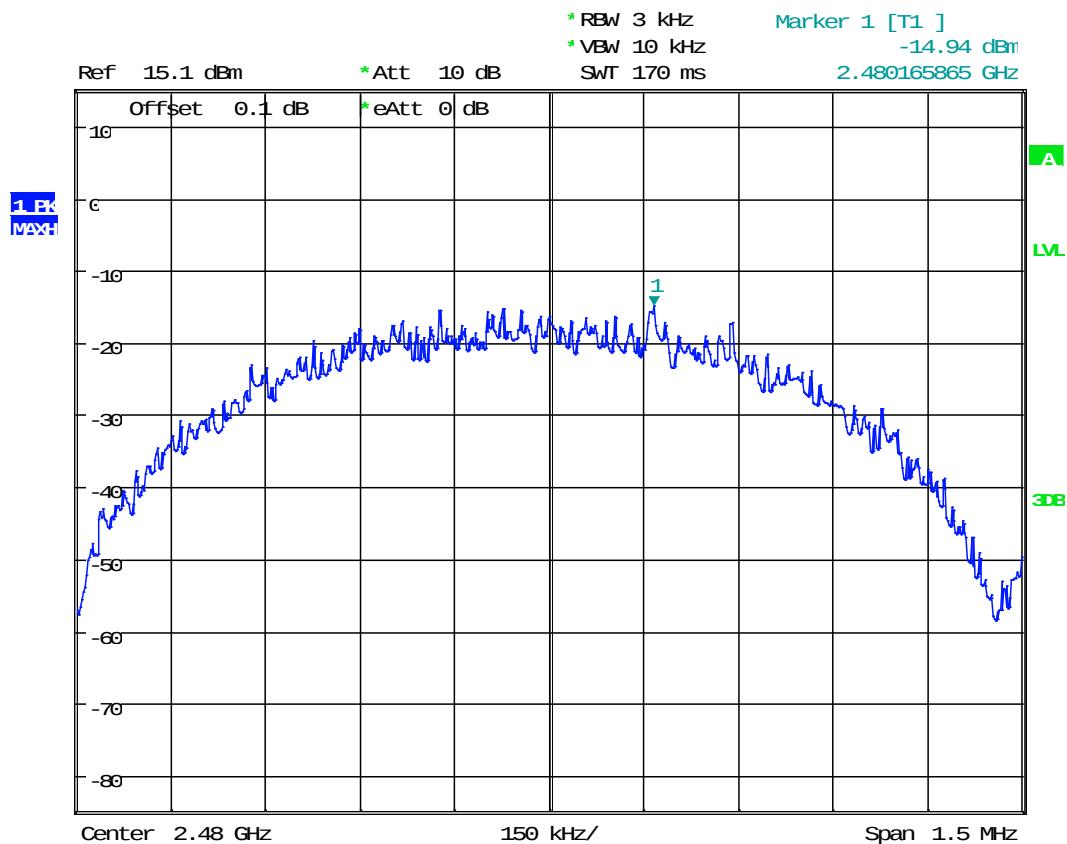
Date: 11.SEP.2018 11:39:49

Plot 3.2



Date: 11.SEP.2018 11:44:51

Plot 3.3



Date: 11.SEP.2018 11:43:38

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.

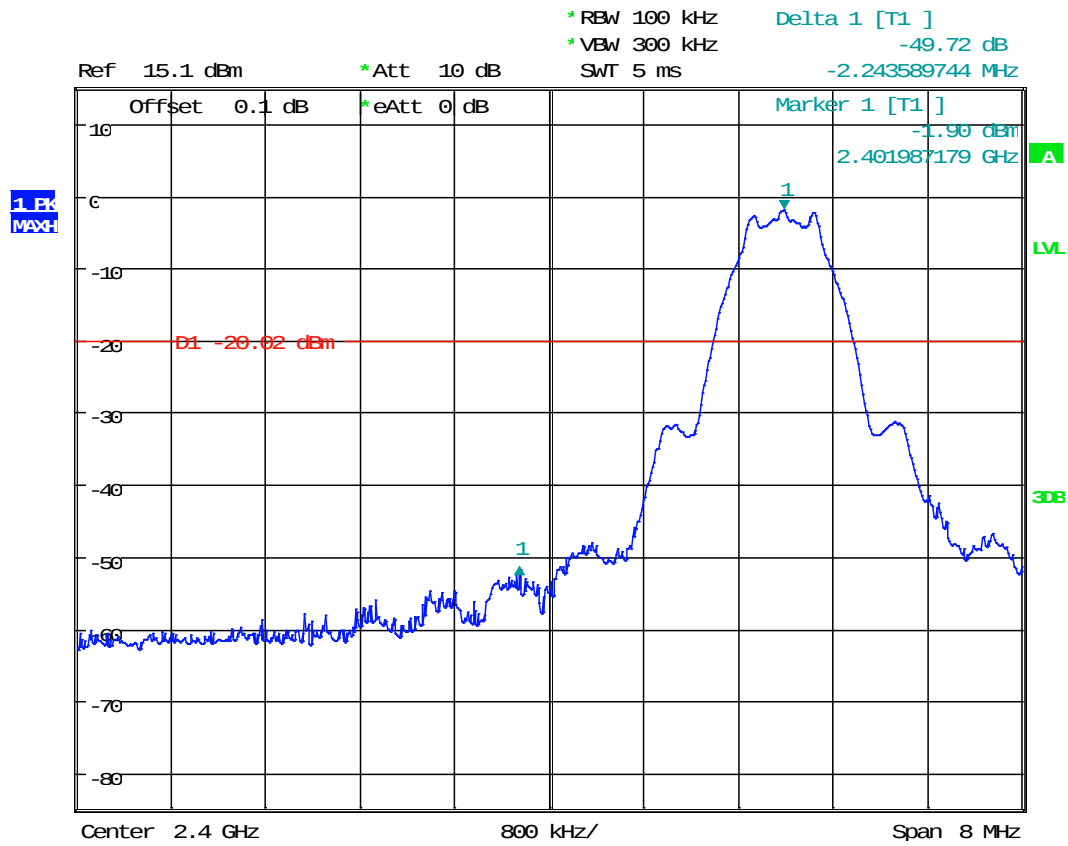
The unwanted emissions were measured from 30 MHz to 25 GHz. Plots below are corrected for cable loss and then compared to the limits.

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.

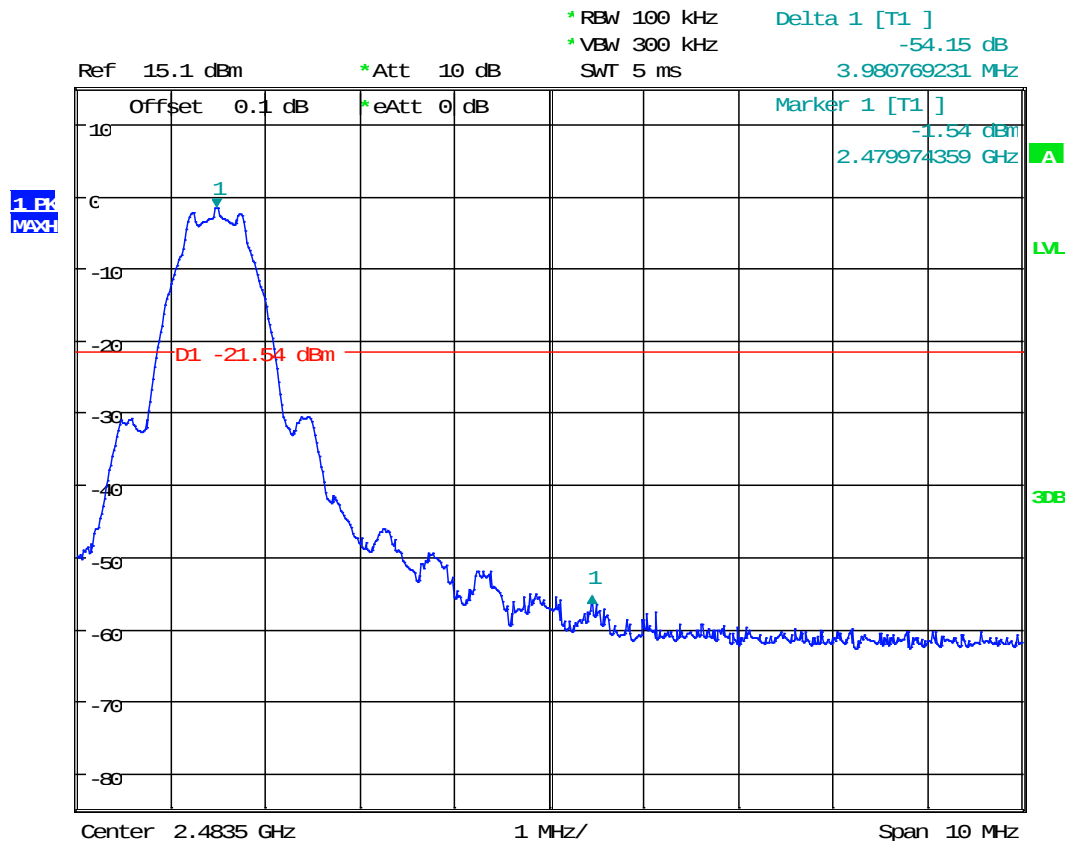
Tested By	Test Date	Results
Aaron Chang	September 11, 2018	Complies

Tx @ Low Channel, 2400 MHz Band Edge
Plot 4.1



Date: 11.SEP.2018 12:03:42

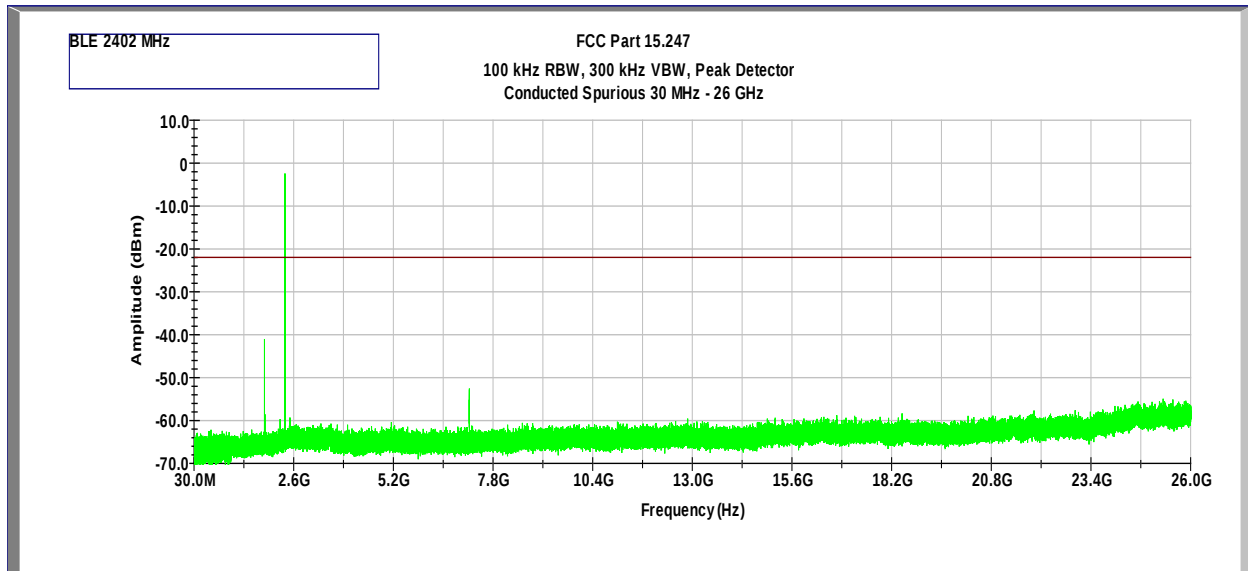
Tx @ High Channel, 2483.5 MHz Band Edge
Plot 4.2



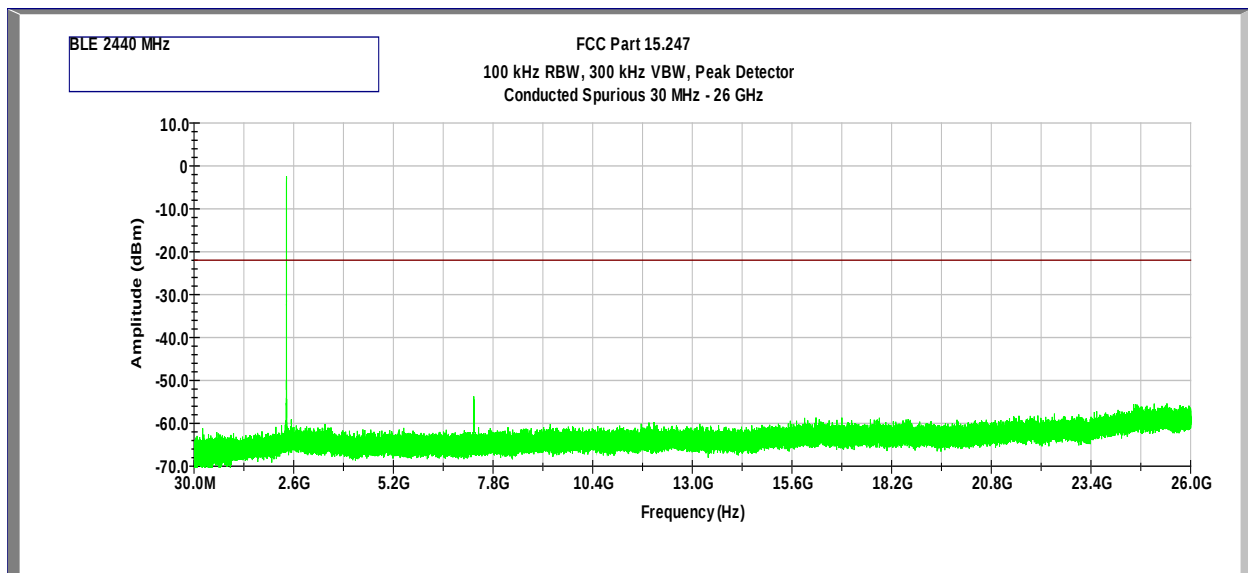
Date: 11.SEP.2018 12:06:10

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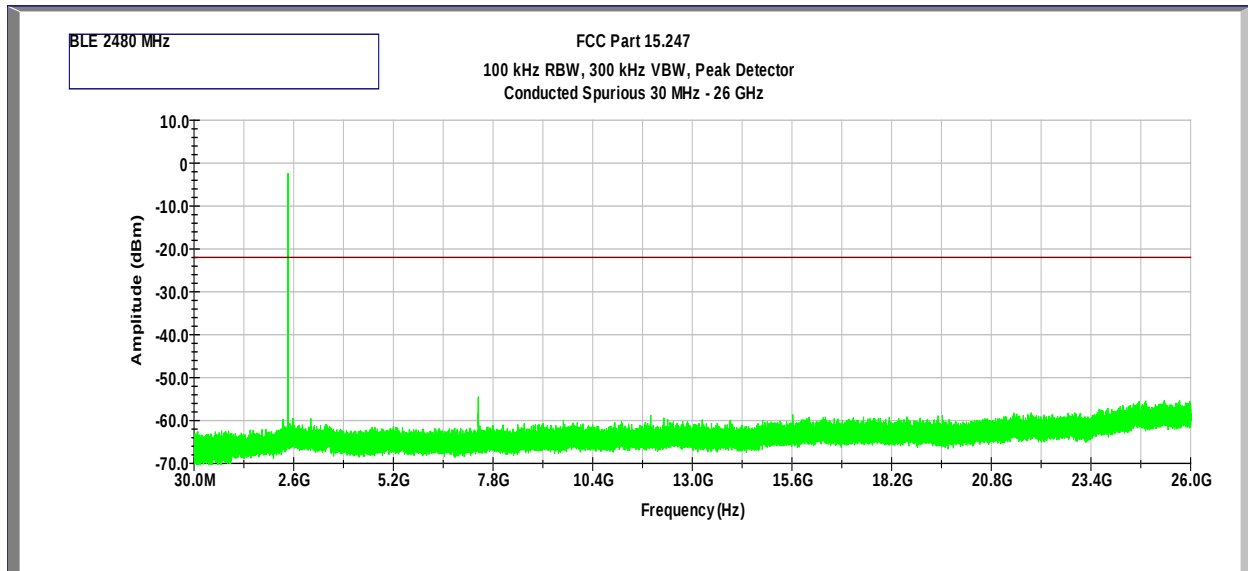
Tx @ Low Channel, 2402 MHz
30MHz -26GHz Conducted Spurious
Plot 4.3



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 30 MHz to 25 GHz according to the procedure described in ANSI C63.10: 2013. Spectrum Analyzer Resolution Bandwidth is 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 30MHz to 26GHz.

All measurements were made with a Peak Detector and compared to QP limits for 30MHz – 1GHz and Average limits for 1GHz – 26GHz.

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.

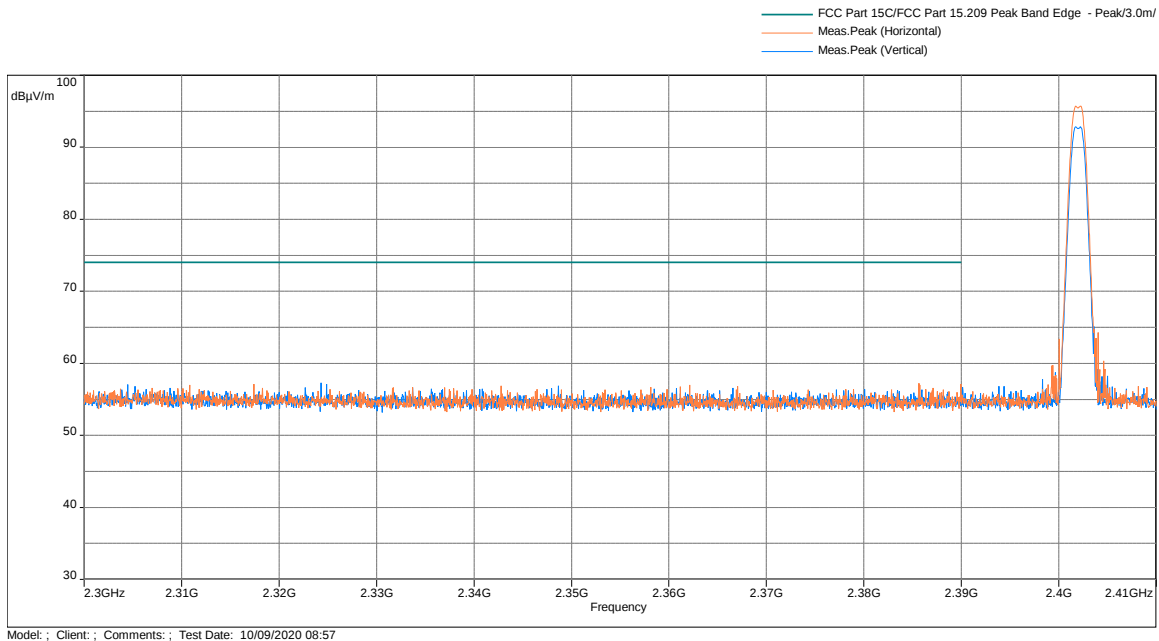
4.5.4 Test Results

All testing in this section were performed by radiated measurements.

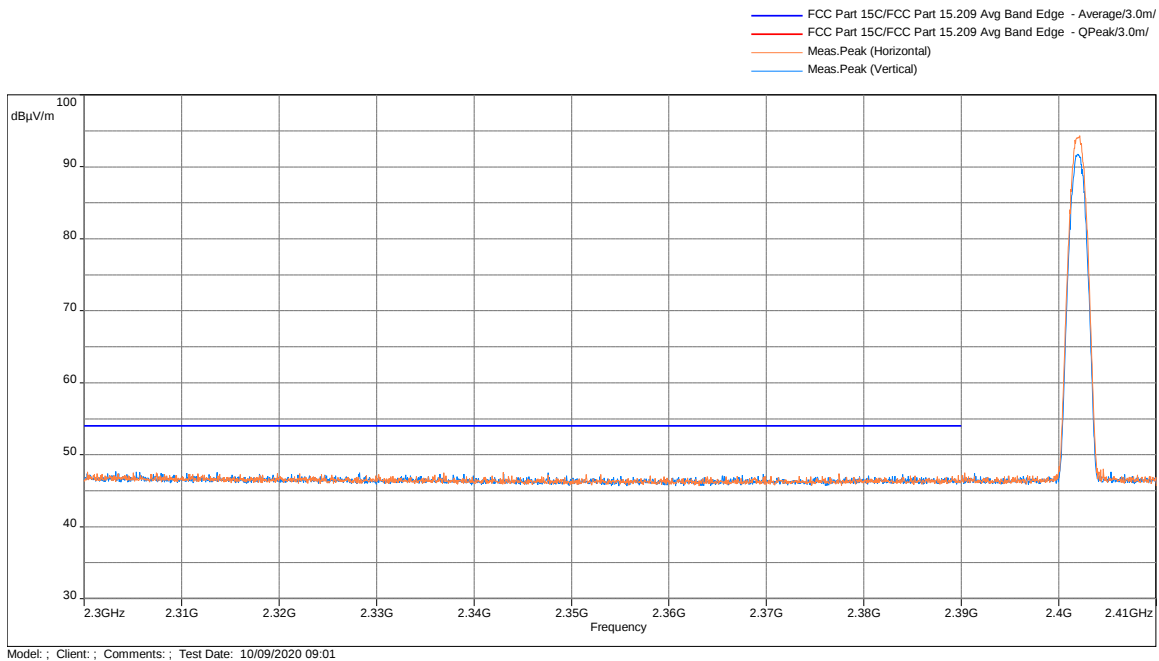
Tested By	Test Date	Results
Anderson Soungpanya	October 6 – 9, 2020	Complies

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**

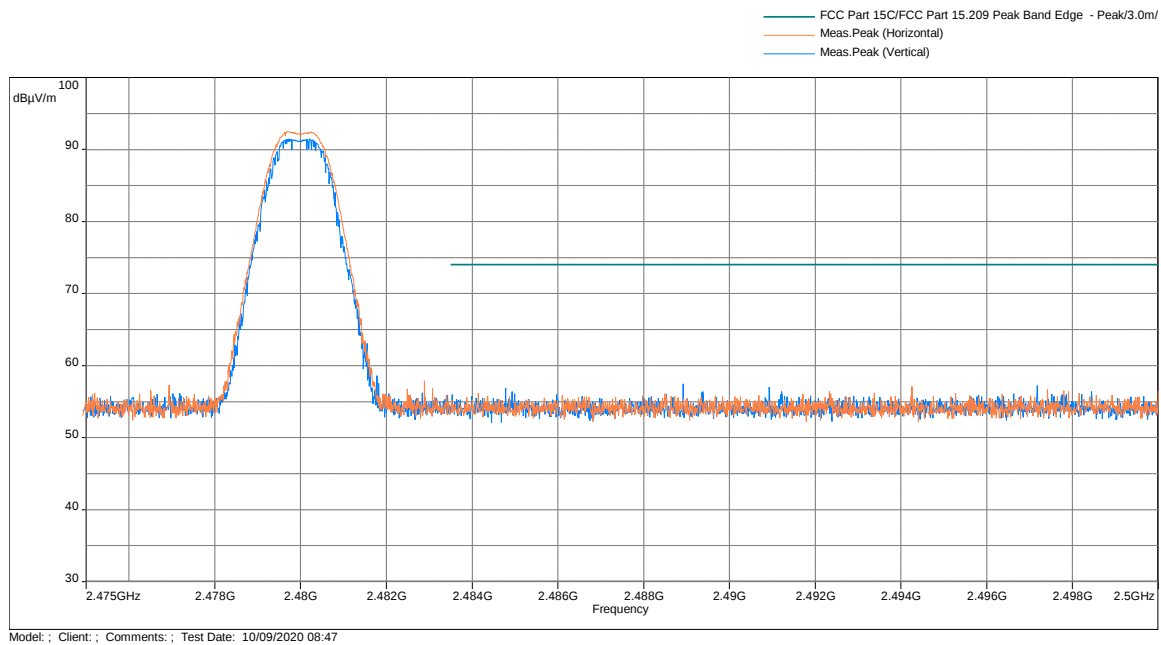


**Out-of-Band Radiated spurious emissions at the Band-edge @3m distance
2310–2390 MHz, Average Scan with Average Limit**

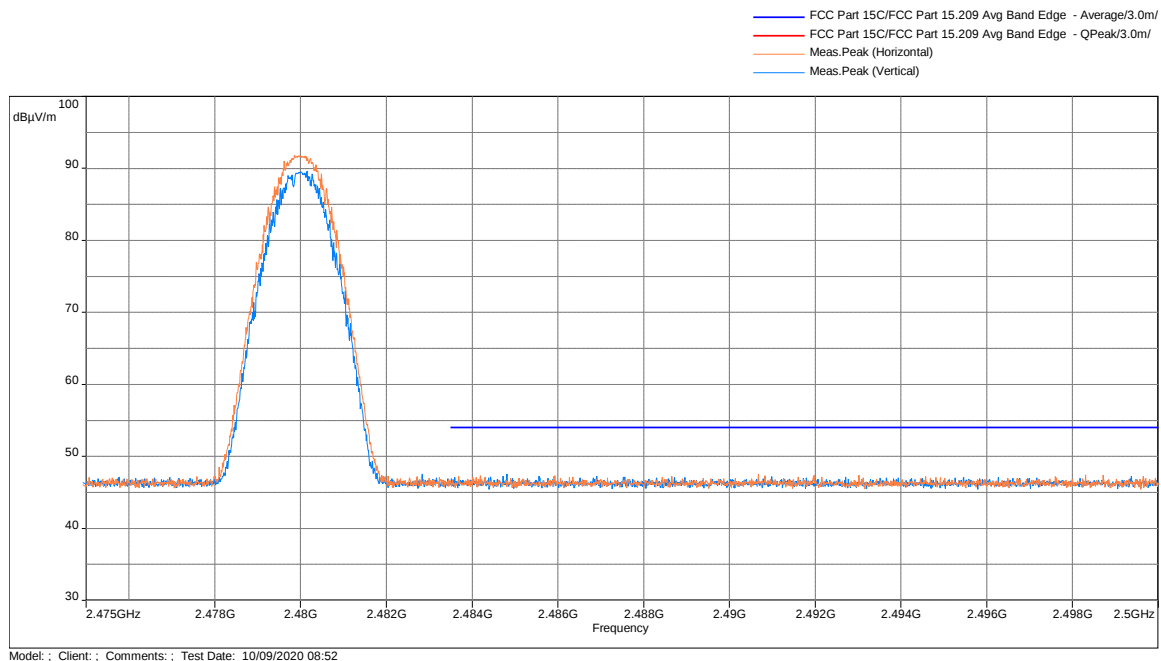


Results	Complies
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**Out-of-Band Radiated spurious emissions at the Band-edge, @3m distance
2483.5–2500 MHz, Peak Scan with Peak Limit**



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



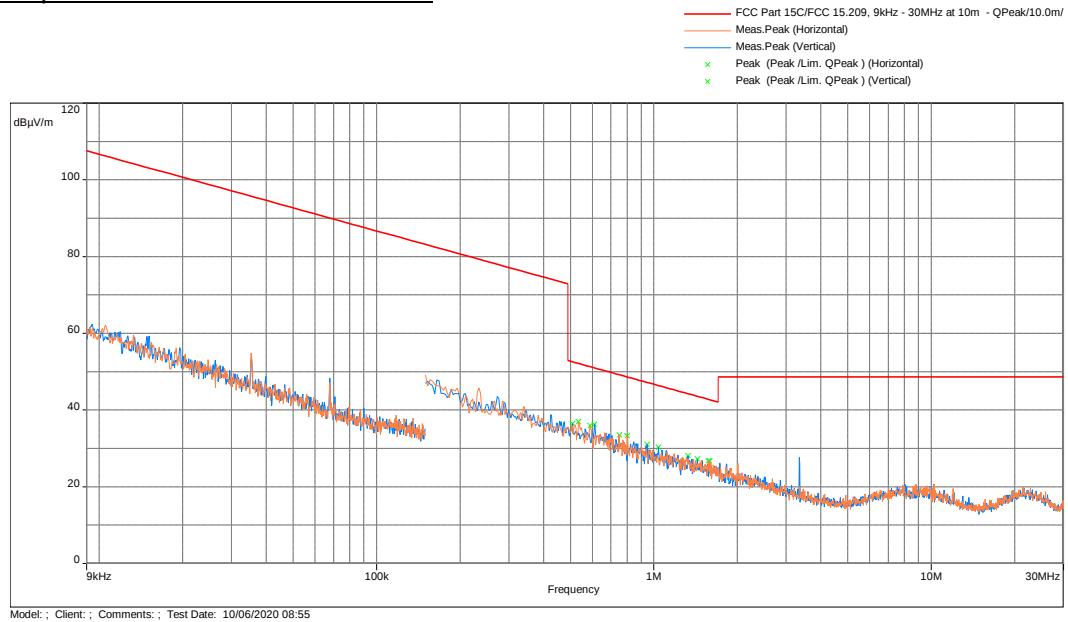
Results

Complies

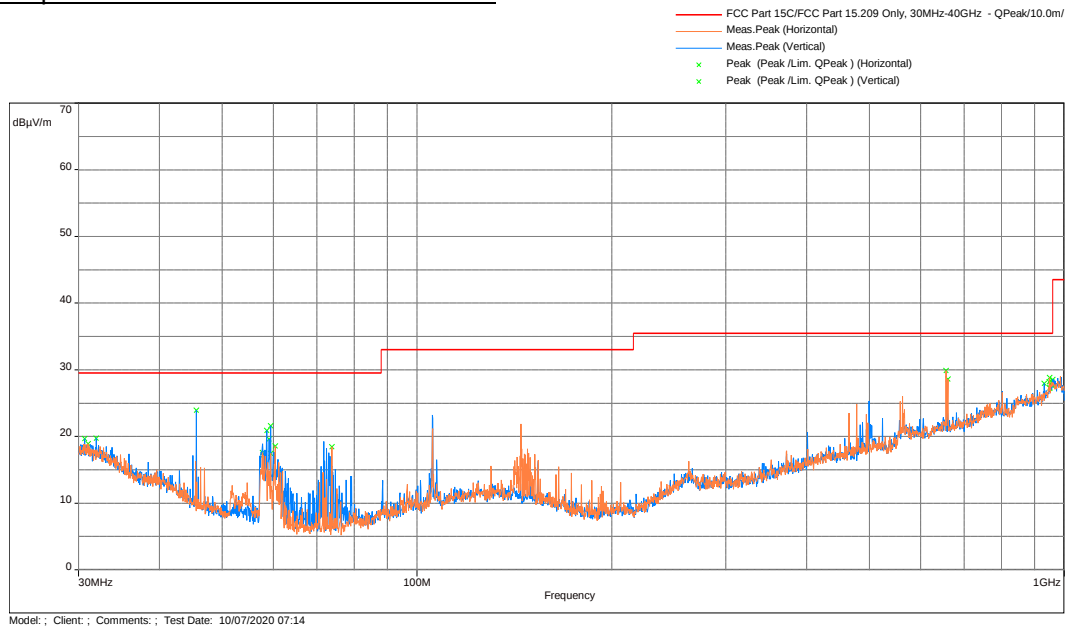
Out-of-Band Radiated Spurious Emissions

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

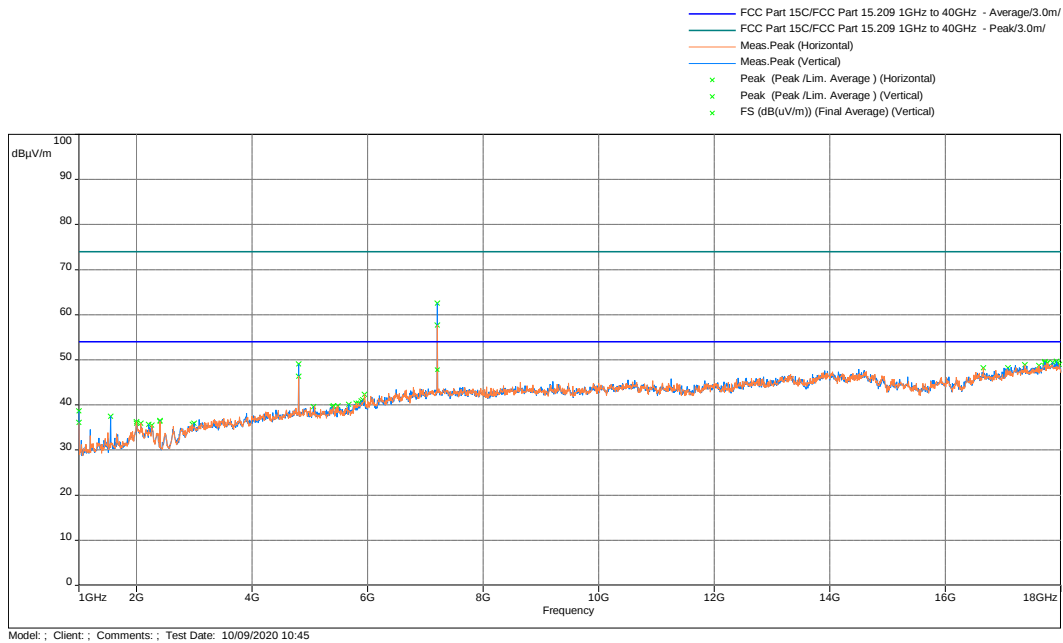
Radiated Spurious Emissions 9kHz - 30 MHz



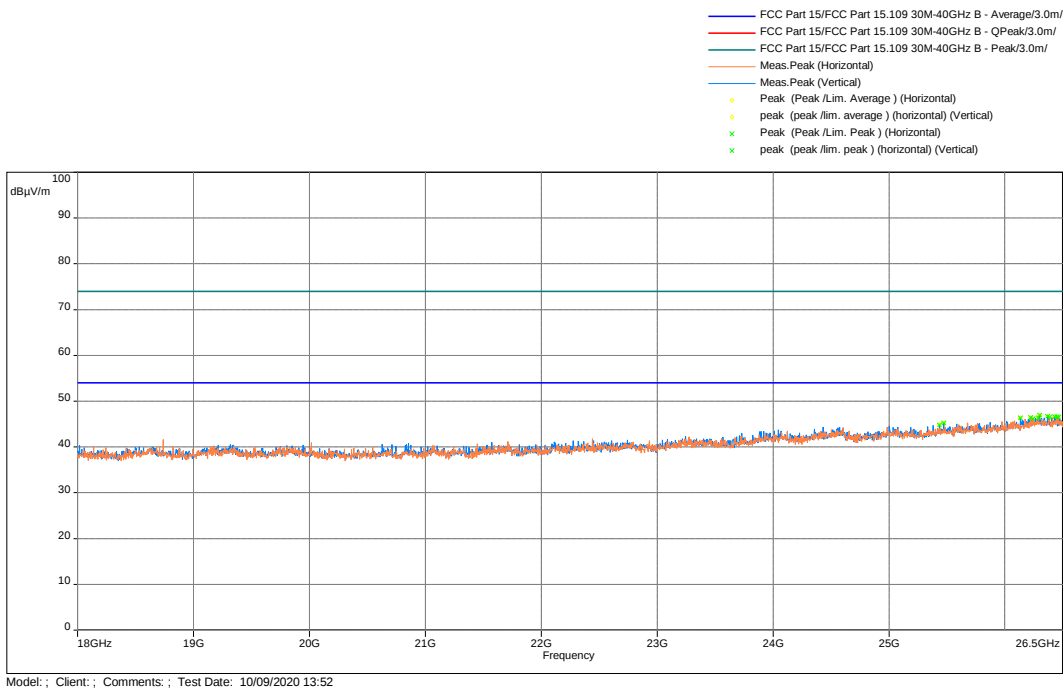
Radiated Spurious Emissions 30 MHz - 1000 MHz



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



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



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

Freq. MHz	Peak FS@10m dB(μV/m)	Limit@10m dB(μV/m)	Margin dB	Height m	Azimuth deg	Polarity	Correction dB
45.649	23.93	29.5	-5.57	3.98	246	Vertical	-16.96
59.455	21.56	29.5	-7.94	3.98	200	Vertical	-21.90
656.426	29.85	35.5	-5.65	1.02	135	Horizontal	-4.91
660.791	28.58	35.5	-6.92	1.02	135	Horizontal	-4.89

Freq. MHz	Avg FS@3m dBμV/m	Avg Limit@3m dBμV/m	Margin dB	Angle deg	Height m	Polarity	Correction
7205.234	49.78	54	-4.22	124.5	1.67	Vertical	-0.3
7205.234	48.94	54	-5.06	151	2.41	Horizontal	-0.3

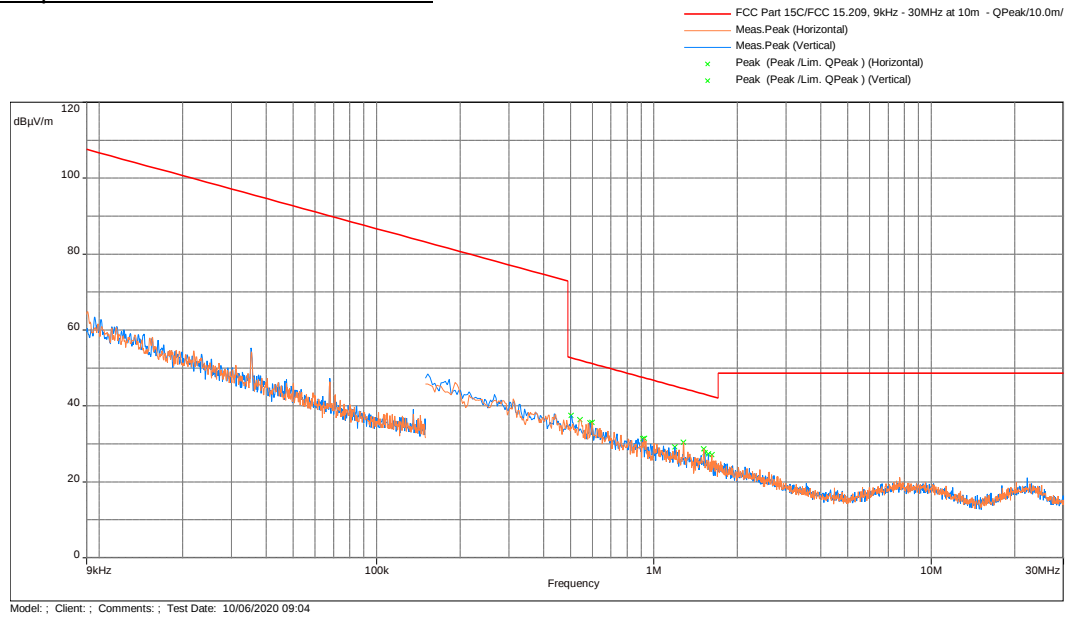
Note: FS = RA + Correction

Correction = AF + CF – Preamp

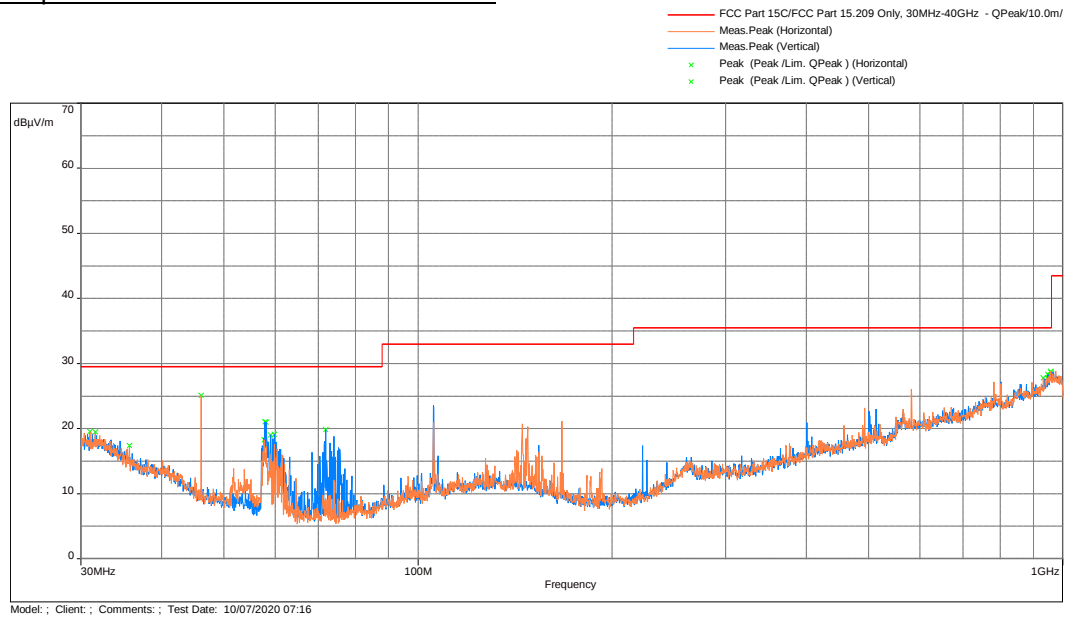
Results	Complies
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Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 2442 MHz

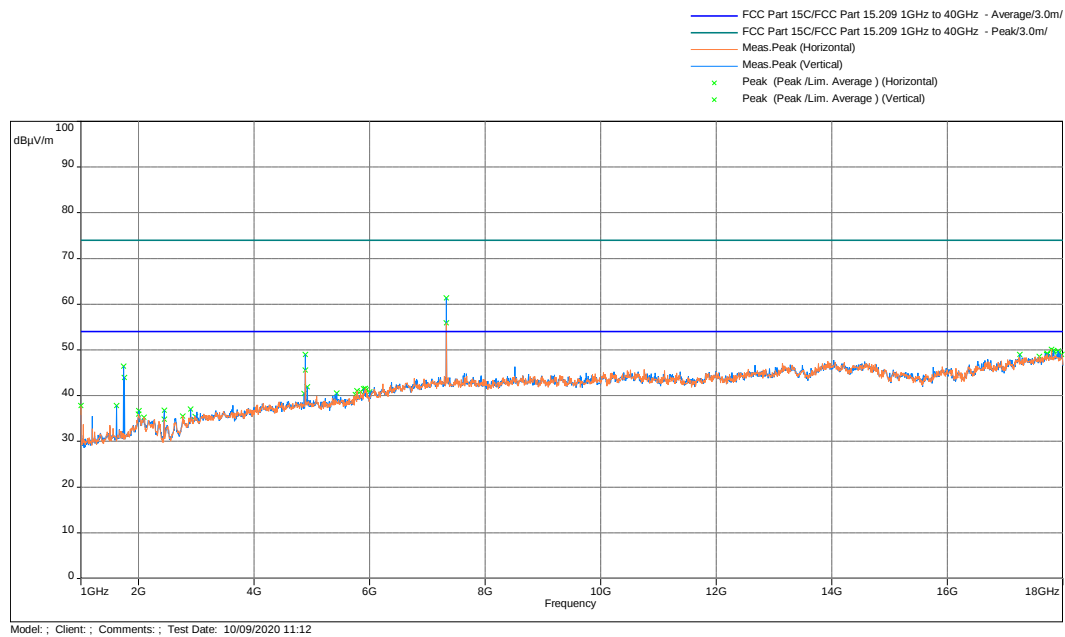
Radiated Spurious Emissions 9kHz - 30 MHz



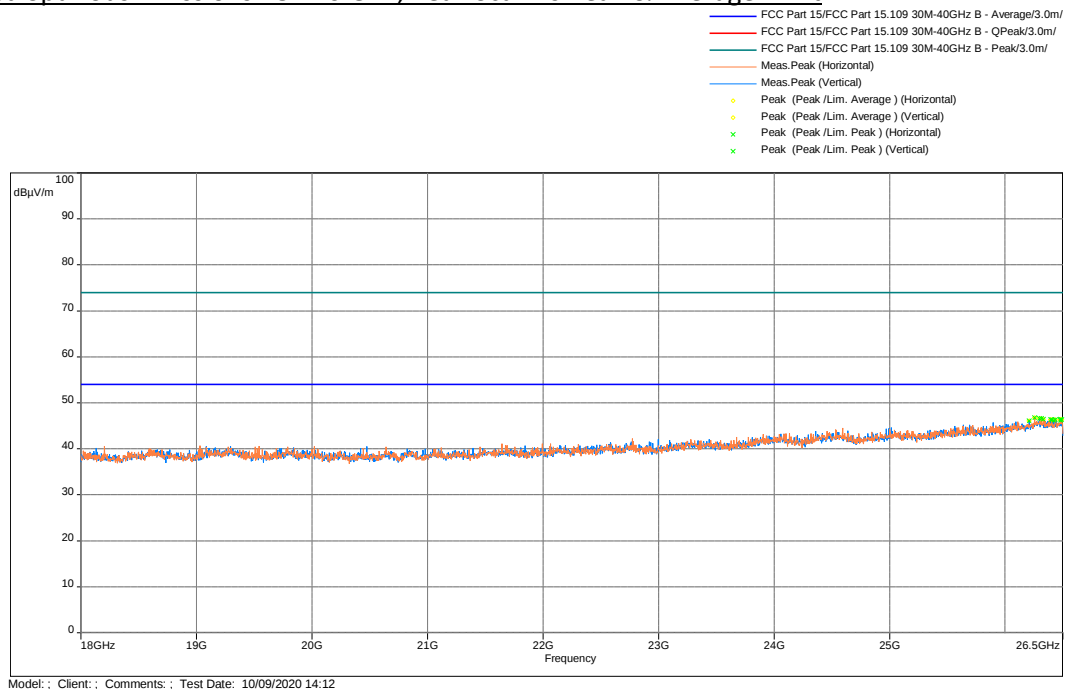
Radiated Spurious Emissions 30 MHz - 1000 MHz



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



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



Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 2442 MHz

Freq. MHz	Peak FS@10m dB(μV/m)	Limit @10m dB(μV/m)	Margin dB	Height m	Azimuth deg	Polarity	Correction dB
46.069	25.06	29.5	-4.44	2.02	215	Horizontal	-17.2
31.584	19.48	29.5	-10.02	2.98	176	Vertical	-9.50
57.903	21.04	29.5	-8.46	3.98	195	Vertical	-21.76
71.904	19.82	29.5	-9.68	2.98	291	Vertical	-20.77

Freq. MHz	Avg FS@3m dBμV/m	Avg Limit@3m dBμV/m	Margin dB	Angle deg	Height m	Polarity	Correction
7325.133	52.18	54	-1.82	175	1.97	Vertical	0.04
7325.133	50.77	54	-3.23	259	2.24	Horizontal	0.04

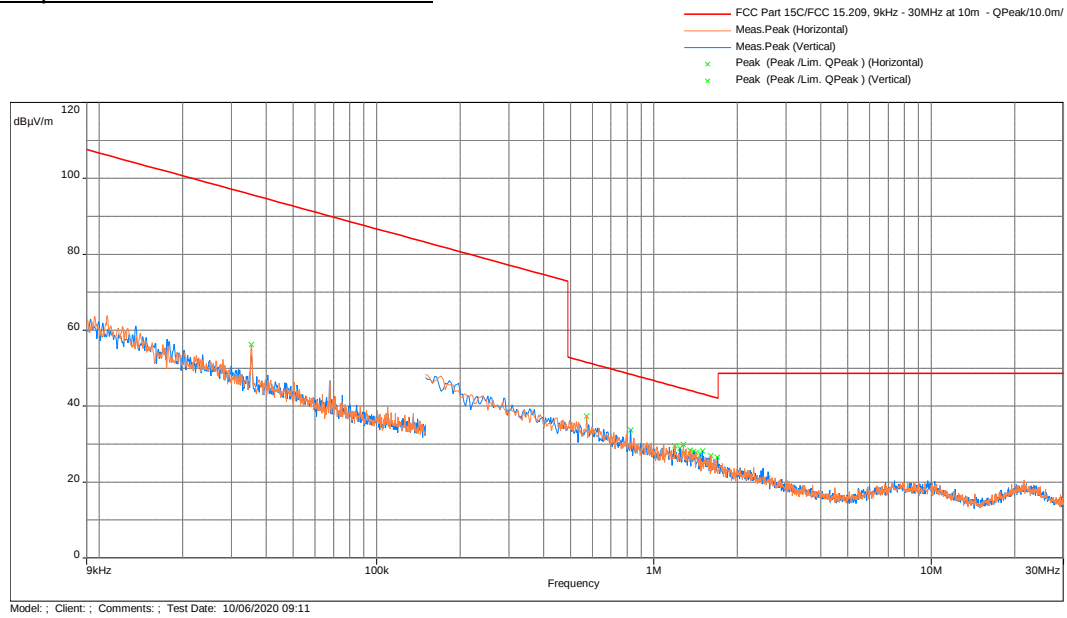
Note: FS = RA + Correction

Correction = AF + CF – Preamp

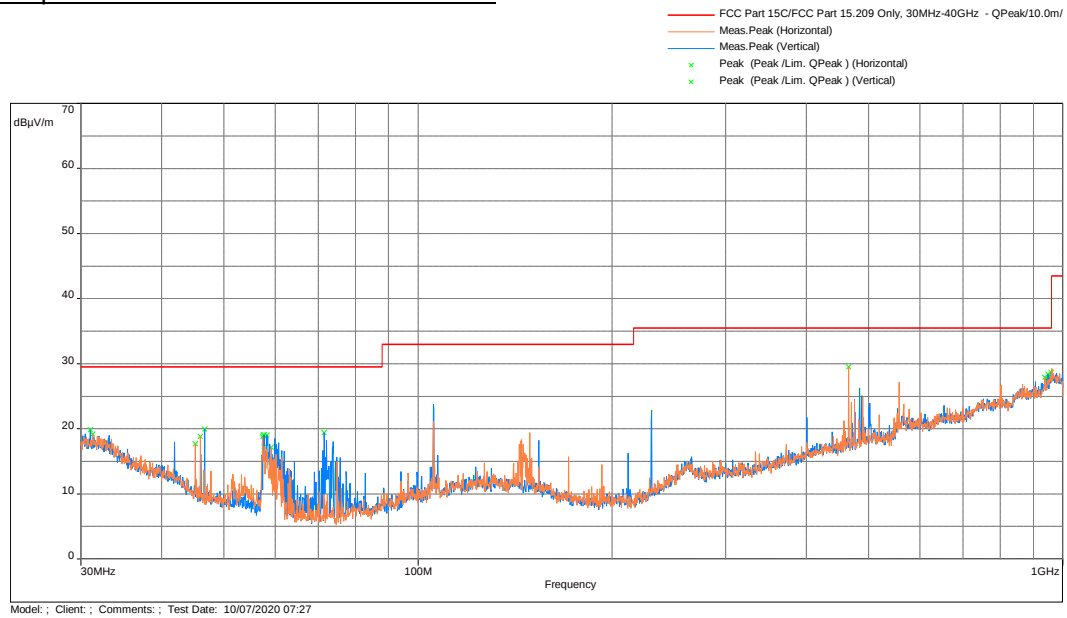
Results	Complies
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Test Results: 15.209 Radiated Spurious Emissions High Channel, Tx at 2480MHz

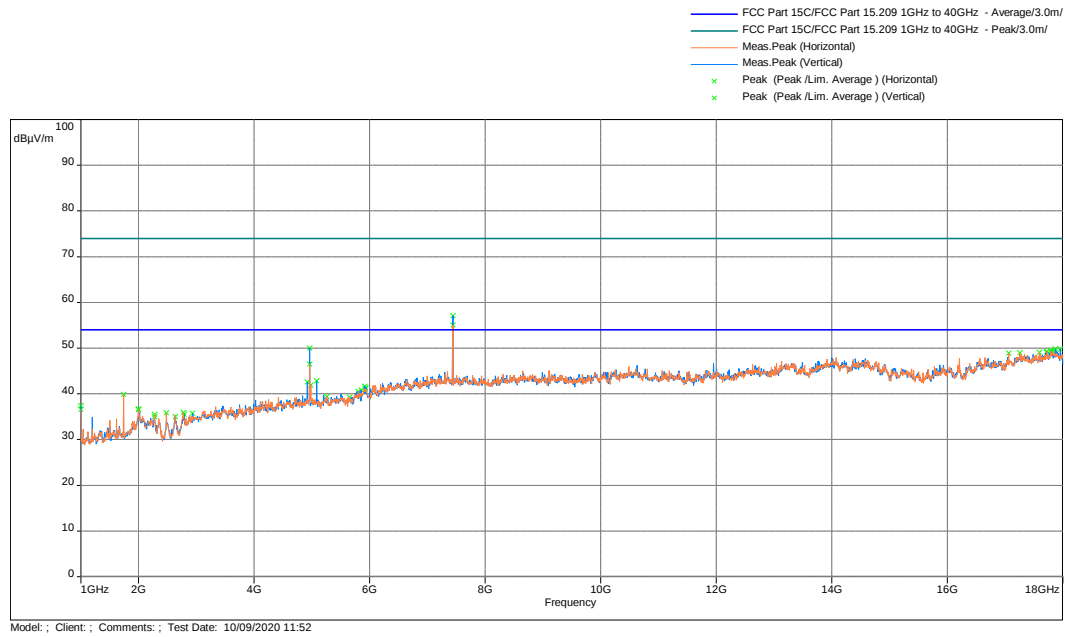
Radiated Spurious Emissions 9kHz - 30 MHz



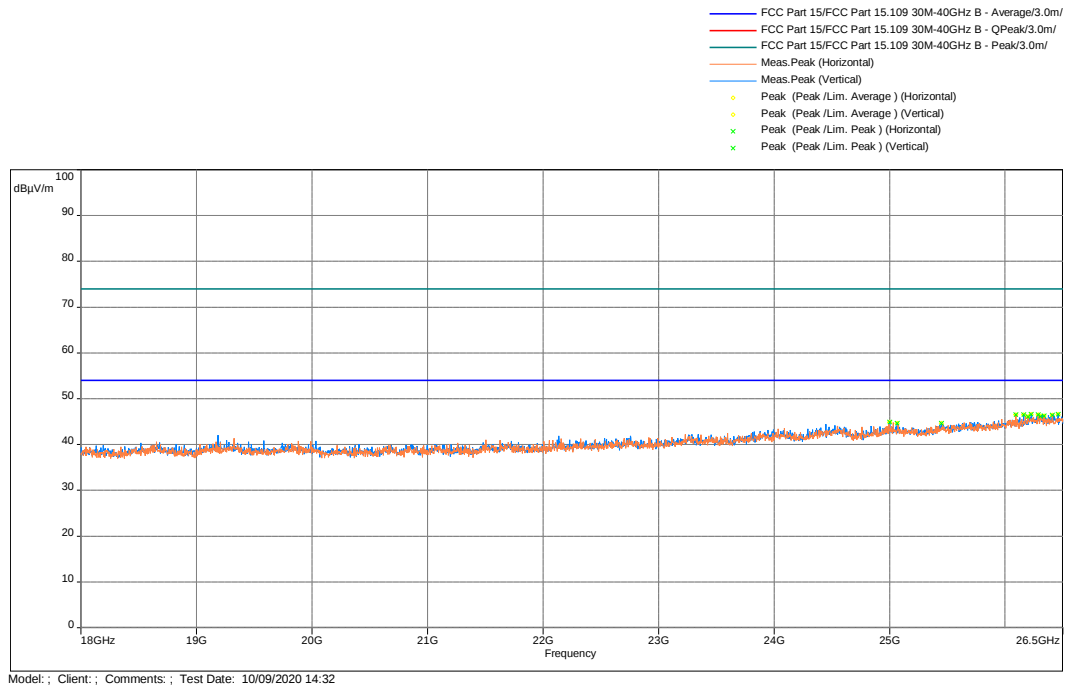
Radiated Spurious Emissions 30 MHz - 1000 MHz



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



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



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

Freq. MHz	QP FS@10m dB(μV/m)	Limit @10m dB(μV/m)	Margin dB	Height m	Azimuth deg	Polarity	Correction dB
31.034	19.82	29.5	-9.68	2.98	105	Vertical	-9.24
46.651	19.97	29.5	-9.53	3.98	0.5	Vertical	-17.49
57.548	18.98	29.5	-10.52	3.98	293	Vertical	-21.73
465.433	29.53	35.5	-5.97	3.02	323	Horizontal	-8.73

Freq.	Avg FS@3m	Avg Limit@3m	Margin	Angle	Height	Polarity	Correction
MHz	dBμV/m	dBμV/m	dB	deg	m		
7439.033	50.73	54	-3.27	154	1.94	Vertical	0.07
7439.033	49.65	54	-4.35	42	2.64	Horizontal	0.07

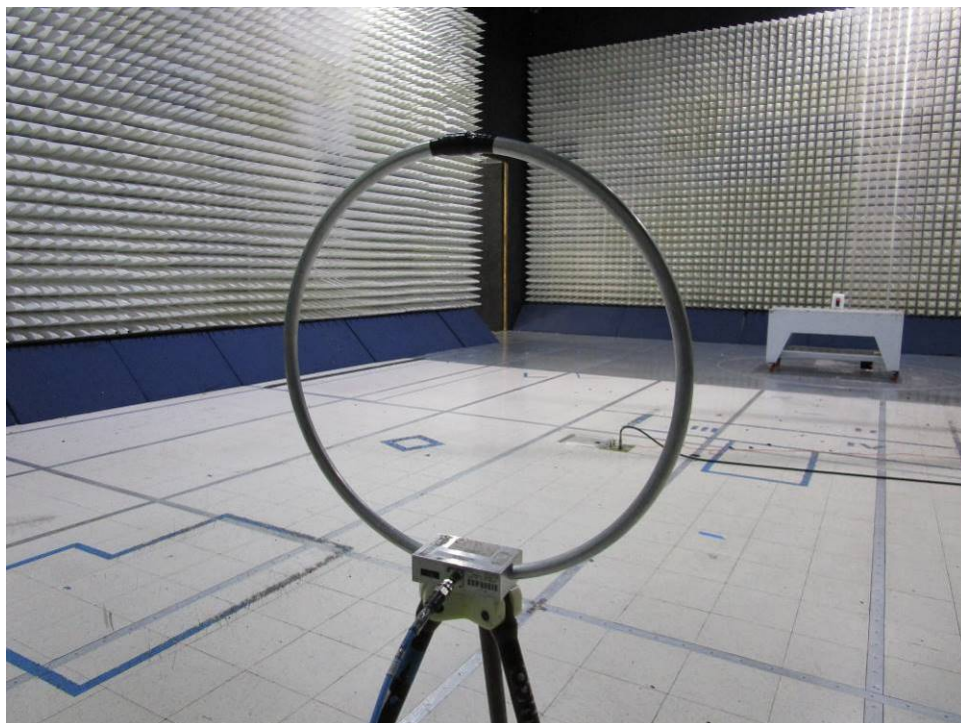
Note: FS = RA + Correction

Correction = AF + CF – Preamp

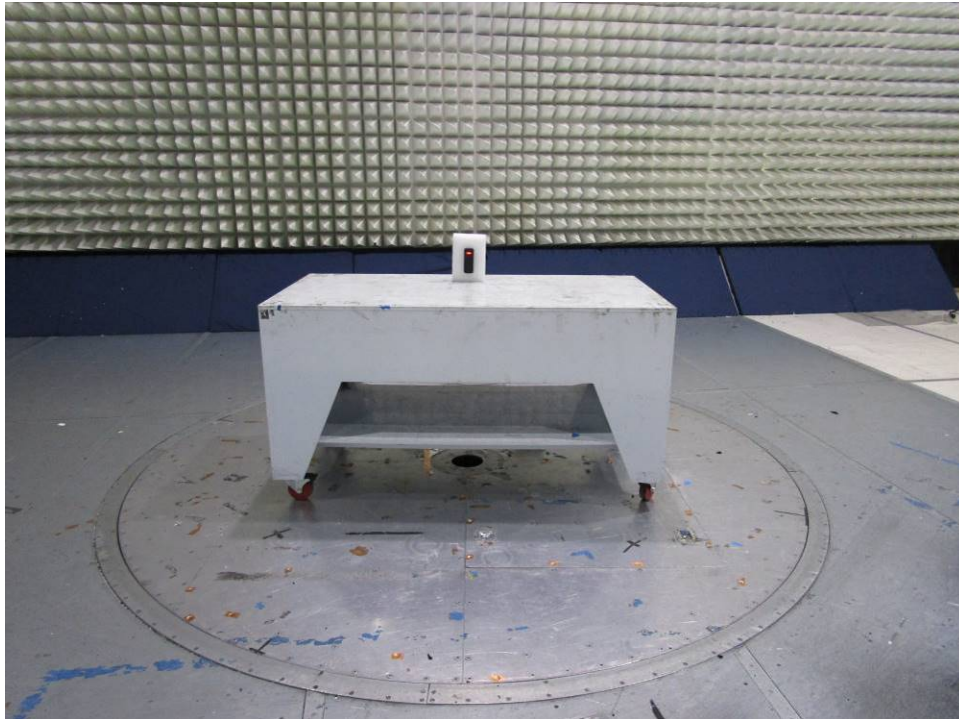
Results	Complies
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4.2.5 Test Setup Configuration

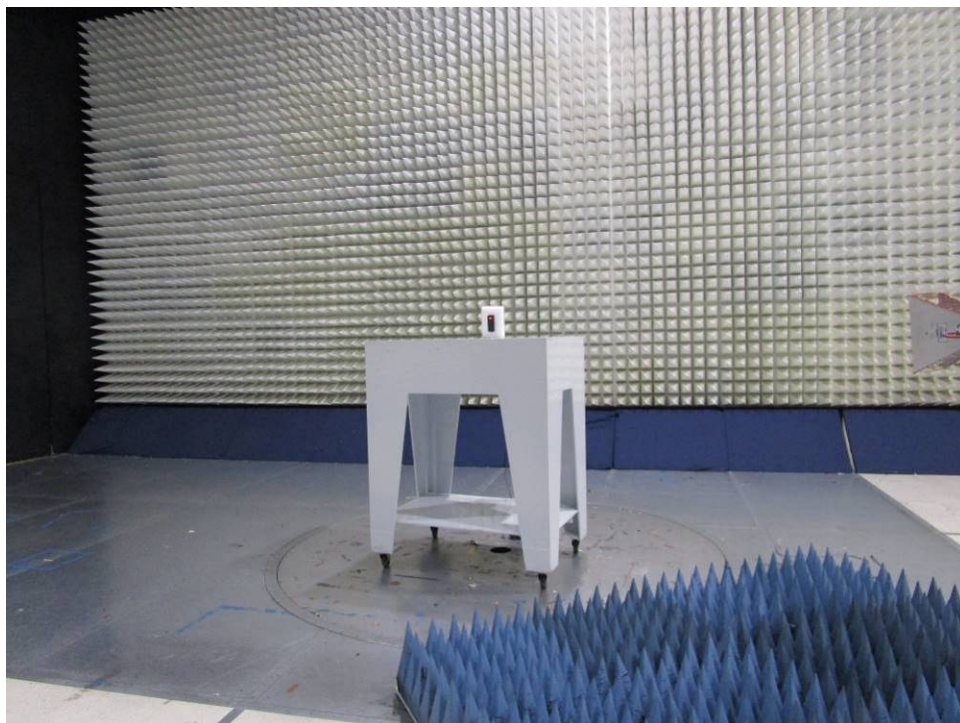
The following photographs show the testing configurations used.



4.5.8 Test Setup Configuration (Continued)



4.5.8 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(μ V)		Class A Limit dB(μ V)	
	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.

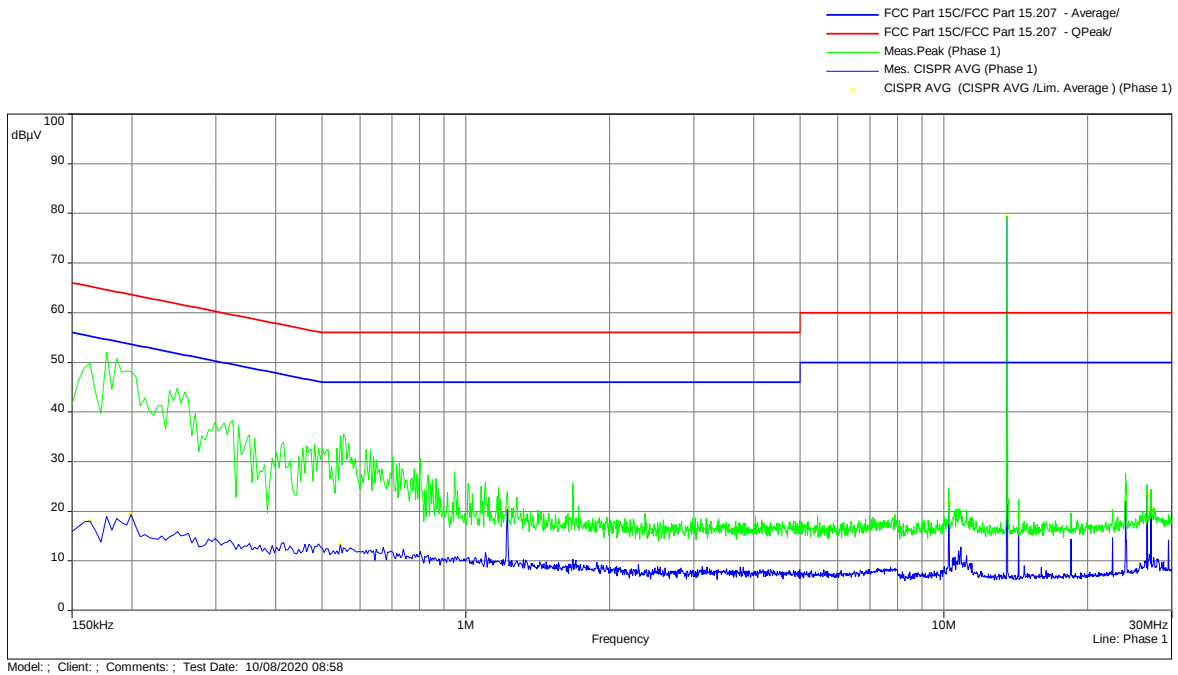
Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.10-2013.

Tested By	Test Date	Results
Anderson Sounghpanya	October 8, 2020	Complies

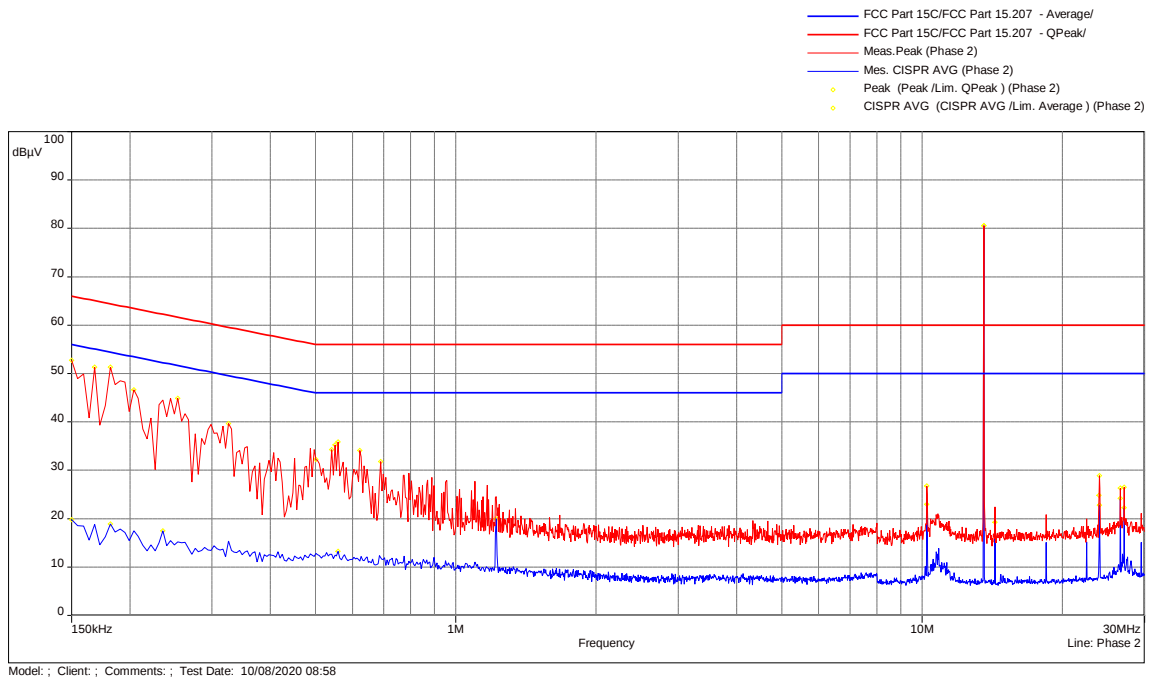
4.6.3 Test Result

15.207, 120VAC 60Hz with BLE Transmitter On & 13.56 MHz Transmitter On

Phase 1



Phase 2



Quasi Peak Table

Frequency (MHz)	Peak (dBμV)	Lim. QPeak (dBμV)	Peak-Lim (dB)	Comment	Correction (dB)
0.150	52.75	66.00	-13.25	Phase 2	20.98
0.164	49.75	65.28	-15.53	Phase 1	20.97
0.168	51.29	65.06	-13.77	Phase 2	20.98
0.177	51.96	64.63	-12.66	Phase 1	20.97
0.182	51.34	64.42	-13.07	Phase 2	20.98
0.186	50.72	64.21	-13.50	Phase 1	20.97
0.204	46.62	63.45	-16.82	Phase 2	20.98
0.249	44.89	61.79	-16.90	Phase 1	20.97
0.254	44.92	61.64	-16.72	Phase 2	20.97
0.272	39.76	61.07	-21.31	Phase 1	20.97
0.326	39.63	59.57	-19.94	Phase 2	20.97
0.326	38.33	59.57	-21.23	Phase 1	20.98
0.501	32.87	56.00	-23.13	Phase 1	20.98
0.501	32.21	56.00	-23.79	Phase 2	20.97
0.537	32.71	56.00	-23.29	Phase 1	20.99
0.542	34.32	56.00	-21.68	Phase 2	20.99
0.546	35.35	56.00	-20.65	Phase 1	21.00
0.551	35.23	56.00	-20.77	Phase 2	20.99
0.555	35.63	56.00	-20.37	Phase 1	21.00
0.560	35.85	56.00	-20.15	Phase 2	20.99
0.618	32.49	56.00	-23.51	Phase 1	21.01
0.623	34.15	56.00	-21.85	Phase 2	21.01
0.632	32.48	56.00	-23.52	Phase 1	21.02
0.690	31.82	56.00	-24.18	Phase 2	21.03
10.239	24.74	60.00	-35.26	Phase 1	21.18
10.239	26.74	60.00	-33.26	Phase 2	21.18
23.955	24.81	60.00	-35.19	Phase 2	21.66
23.991	28.85	60.00	-31.15	Phase 2	21.66
24.000	27.61	60.00	-32.39	Phase 1	21.67
24.081	25.87	60.00	-34.13	Phase 1	21.68
26.624	25.41	60.00	-34.59	Phase 1	21.83
26.624	26.37	60.00	-33.63	Phase 2	21.81
27.119	26.47	60.00	-33.53	Phase 2	21.83
27.119	24.42	60.00	-35.58	Phase 1	21.84

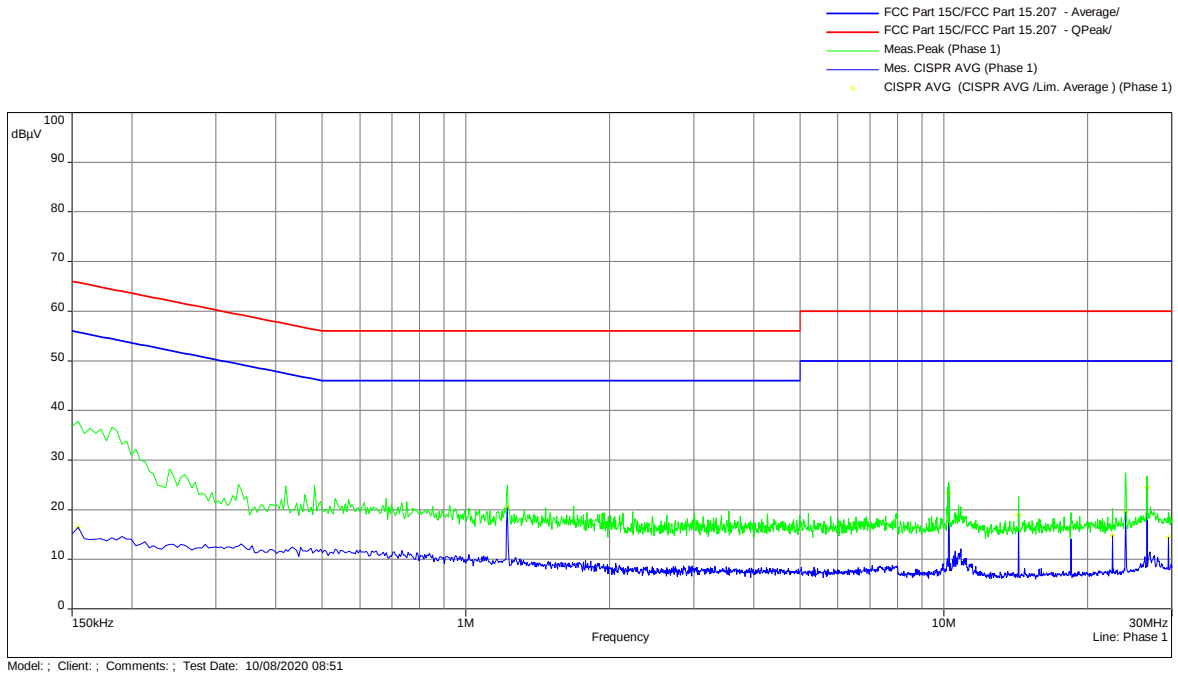
Average Table

Frequency (MHz)	CISPR AVG (dBμV)	Lim. Average (dBμV)	CISPR AVG-Lim (dB)	Comment	Correction (dB)
0.150	19.83	56.00	-36.17	Phase 2	20.98
0.164	18.05	55.28	-37.24	Phase 1	20.97
0.182	18.89	54.42	-35.52	Phase 2	20.98
0.200	19.32	53.63	-34.32	Phase 1	20.97
0.236	17.52	52.25	-34.73	Phase 2	20.97
0.546	13.31	46.00	-32.69	Phase 1	21.00
0.560	13.22	46.00	-32.78	Phase 2	20.99
1.221	20.52	46.00	-25.48	Phase 1	21.00
1.221	19.95	46.00	-26.05	Phase 2	21.00
10.239	21.81	50.00	-28.19	Phase 1	21.18
10.239	22.98	50.00	-27.02	Phase 2	21.18
14.334	19.20	50.00	-30.80	Phase 1	21.26
14.334	19.23	50.00	-30.77	Phase 2	21.26
24.000	21.98	50.00	-28.02	Phase 1	21.67
24.000	22.80	50.00	-27.20	Phase 2	21.66
26.624	23.20	50.00	-26.80	Phase 1	21.83
26.624	24.17	50.00	-25.83	Phase 2	21.81
27.119	22.29	50.00	-27.71	Phase 2	21.83
27.119	20.54	50.00	-29.46	Phase 1	21.84

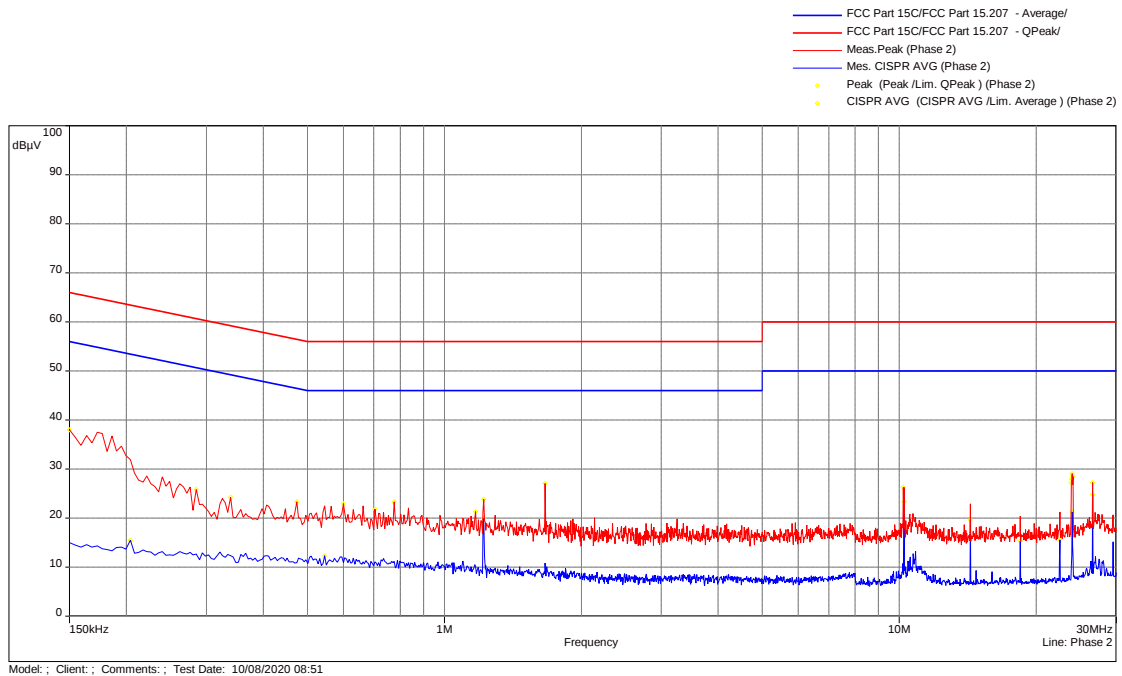
Results	Complies
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15.207, 120VAC 60Hz with BLE Transmitter On & 13.56 MHz Transmitter Off

Phase 1



Phase 2



Quasi Peak Table

Frequency (MHz)	Peak (dBμV)	Lim. QPeak (dBμV)	Peak-Lim (dB)	Comment	Correction (dB)
0.150	38.02	66.00	-27.98	Phase 2	20.98
0.155	37.83	65.75	-27.93	Phase 1	20.97
0.285	25.87	60.67	-34.80	Phase 2	20.97
0.335	25.17	59.34	-34.17	Phase 1	20.98
0.339	24.22	59.23	-35.01	Phase 2	20.97
0.420	24.83	57.45	-32.61	Phase 1	20.98
0.461	23.03	56.68	-33.66	Phase 1	20.98
0.474	23.35	56.44	-33.10	Phase 2	20.97
0.483	24.87	56.29	-31.41	Phase 1	20.98
0.600	22.90	56.00	-33.10	Phase 2	21.00
0.681	22.38	56.00	-33.62	Phase 1	21.03
0.704	21.84	56.00	-34.16	Phase 2	21.03
0.776	23.35	56.00	-32.65	Phase 2	21.01
1.172	21.32	56.00	-34.68	Phase 2	21.00
1.221	24.98	56.00	-31.02	Phase 1	21.00
1.221	23.87	56.00	-32.13	Phase 2	21.00
1.469	20.44	56.00	-35.56	Phase 1	21.00
1.667	27.09	56.00	-28.91	Phase 2	20.99
1.680	20.75	56.00	-35.25	Phase 1	21.00
2.234	19.64	56.00	-36.36	Phase 1	21.01
3.548	19.72	56.00	-36.28	Phase 1	21.11
10.181	24.66	60.00	-35.34	Phase 1	21.18
10.203	26.29	60.00	-33.71	Phase 2	21.18
10.239	25.51	60.00	-34.49	Phase 1	21.18
14.339	22.73	60.00	-37.27	Phase 1	21.26
23.919	27.14	60.00	-32.86	Phase 2	21.66
23.955	25.55	60.00	-34.45	Phase 1	21.67
23.960	27.94	60.00	-32.06	Phase 2	21.66
24.005	27.46	60.00	-32.54	Phase 1	21.67
24.005	29.07	60.00	-30.93	Phase 2	21.66
24.081	28.49	60.00	-31.51	Phase 2	21.66
26.624	26.85	60.00	-33.15	Phase 1	21.83
26.624	27.23	60.00	-32.77	Phase 2	21.81
0.150	38.02	66.00	-27.98	Phase 2	20.98

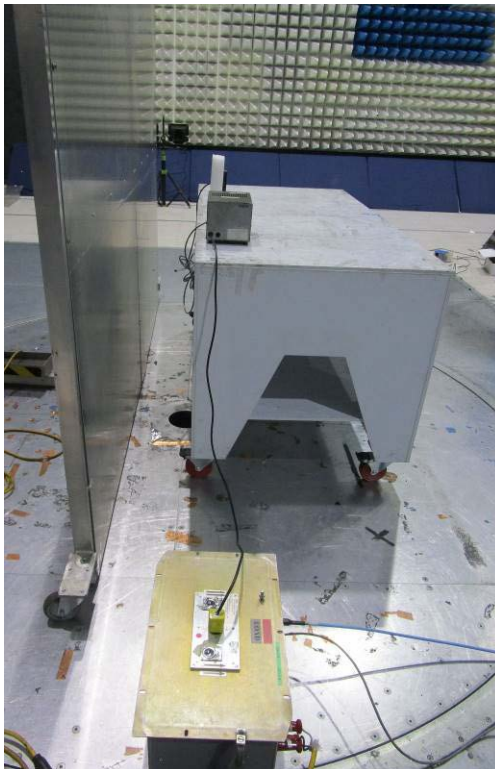
Average Table

Frequency (MHz)	CISPR AVG (dBμV)	Lim. Average (dBμV)	CISPR AVG-Lim (dB)	Comment	Correction (dB)
0.155	16.47	55.75	-39.29	Phase 1	20.97
0.204	15.49	53.45	-37.96	Phase 2	20.98
0.546	12.37	46.00	-33.63	Phase 2	20.99
1.221	19.94	46.00	-26.06	Phase 2	21.00
1.221	20.39	46.00	-25.61	Phase 1	21.00
10.239	23.27	50.00	-26.73	Phase 1	21.18
10.239	23.34	50.00	-26.66	Phase 2	21.18
14.334	19.68	50.00	-30.32	Phase 2	21.26
14.334	18.94	50.00	-31.06	Phase 1	21.26
18.434	15.36	50.00	-34.64	Phase 2	21.46
22.529	15.63	50.00	-34.37	Phase 2	21.59
22.529	14.78	50.00	-35.22	Phase 1	21.60
24.000	21.23	50.00	-28.77	Phase 2	21.66
24.005	19.57	50.00	-30.43	Phase 1	21.67
26.624	24.82	50.00	-25.18	Phase 2	21.81
26.624	24.50	50.00	-25.50	Phase 1	21.83
29.490	14.39	50.00	-35.61	Phase 1	21.86

Results	Complies
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4.6.4 Test Configuration 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	ESR7	ITS 01607	12	10/23/20
EMI Receiver	Rohde and Schwarz	ESU40	ITS 00961	12	11/07/20
Pre-Amplifier (18-40GHz)	Miteq	TTA1840-35-S-M	ITS 01393	12	03/02/21
1-18GHz Preamplifier	uComp Nordic	MCN-40-001018002510P	ITS 01817	12	04/16/21
Horn Antenna	ETS-Lindgren	3115	ITS 00982	12	04/21/21
Pyramidal Horn Antenna	EMCO	3160-09	ITS 00571	#	#
Loop Antenna	EMCO	6512	ITS 01598	12	10/22/20
BI-Log Antenna	Teseq	CBL611D	ITS 01058	12	10/19/20
Pre-Amplifier	Sonoma Instrument	310N	ITS 01493	12	02/07/21
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	06/11/21
RF Cable	Mega Phase	EMC1-K1K1-236	ITS 01537	12	04/17/21
RF Cable	Mega Phase	TM40-K1K1-19	ITS 01155	12	04/17/21

No Calibration required

Software used for emission compliance testing utilized the following:

Name	Manufacturer	Version	Template/Profile
BAT-EMC	Nexio	3.19.1.19	Farpointe_G104449578.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 / G104449578	AS	KV	October 27, 2020	Original document

END OF REPORT