TEST REPORT

Report Number: 104274811MPK-002
Project Number: G104274811
Original Report Issue Date: May 18, 2020
Revision Report Issue Date: July 29, 2020

Testing performed on
CONEKT® Reader
Model: CSR-6.4

FCC ID: T8I-CONEKT2
IC: 6504A-CONEKT2
to

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

For

Farpointe Data, Inc.

Test Performed by:	Test Authorized by:
Intertek	Farpointe Data, Inc.
1365 Adams Court	2195 Zanker Road
Menlo Park, CA 94025 USA	San Jose, CA 95131 USA

Prepared by: _____ **Date:** May 18, 2020
Aaron Chang

Reviewed by: _____ **Date:** May 18, 2020
Krishna K Vemuri

Report No. 104274811MPK-002	
Equipment Under Test:	CONEKT® Reader
Model Number:	CSR-6.4
Applicant:	Farpointe Data, Inc.
Contact:	Kirk Bierach
Address:	Farpointe Data, Inc. 2195 Zanker Road San Jose, CA 95131
Country:	USA
Tel. Number:	(408) 731-8700
Email:	kirk.bierach@farpointedata.com
Applicable Regulation:	FCC Part 15 Subpart C (15.247) Industry Canada RSS-247 Issue 2
Date of Test:	September 11, 2018 & March 15 – May 7, 2020

We attest to the accuracy of this report:

Aaron Chang
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: May 7, 2020

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

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2.0 General Information

2.1 Product Description

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

CONEKT® MOBILE-READY CONTACTLESS SMARTCARD READER AND KEYPAD

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.	CSR-6.4
FCC Identifier	T8I-CONEKT2
IC Identifier	6504A-CONEKT2
Type of transmission	Digital Transmission System (DTS)
Rated RF Output	1.74 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

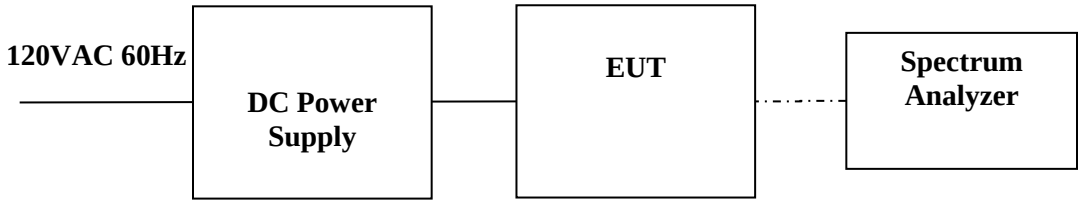
3.1 Support Equipment

Support Equipment			
Description	**Manufacturer**	**Model**	**Serial Number**
DC Power Supply	Keysight	E3631A	MY67156007

3.2 Block Diagram of Test Setup

Equipment Under Test			
Description	**Manufacturer**		**Serial Number**
Radiated Sample of CONEKT® Readers	Farpointe Data, Inc.	CSR-6.4	SN1
Conducted Sample of CONEKT® Readers	Farpointe Data, Inc.	CSR-6.4	SN2

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



S = 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.

BLE circuitry is identical to original certification, FCC ID: T8I-CONEKT. Antenna port Conducted Test data in section 4.1, 4.3, 4.4 were borrowed from original report, 103506678MPK-002. Output Power and Radiated Emissions were remeasured to check for 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) ≥ 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.

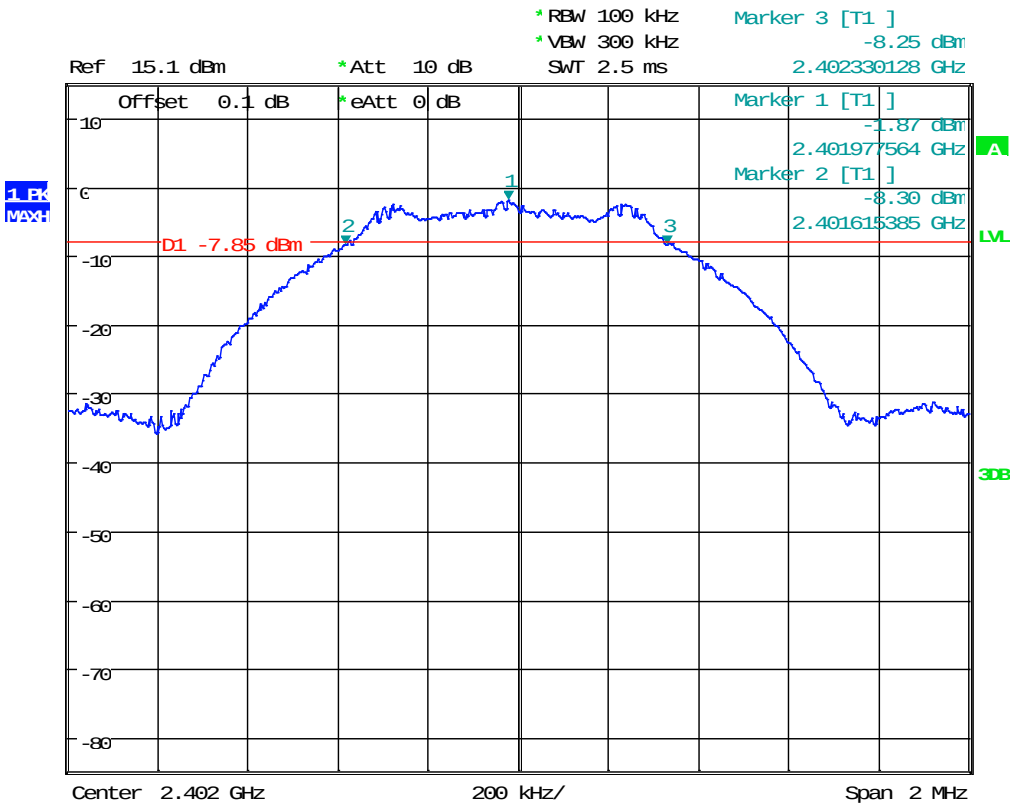
For 99% power bandwidth measurement, the bandwidth was determined by using the built-in 99% occupied bandwidth function of the spectrum analyzer. The resolution bandwidth is set to 1% of the selected span as is without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

4.1.3 Test Result

Frequency (MHz)	6-dB bandwidth FCC 15.247 & RSS-GEN, kHz	Occupied bandwidth, RSS-GEN, MHz	Plot
2402	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

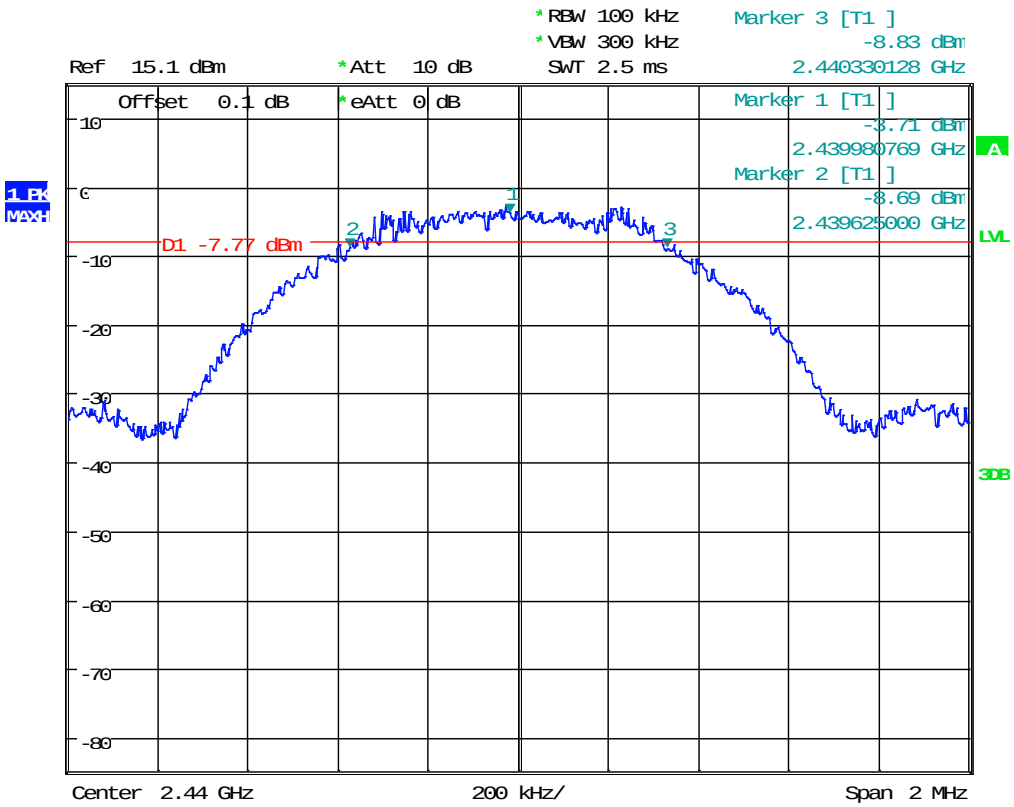
Date of Test:	September 11, 2018
Results	**Complies**

Plot 1. 1



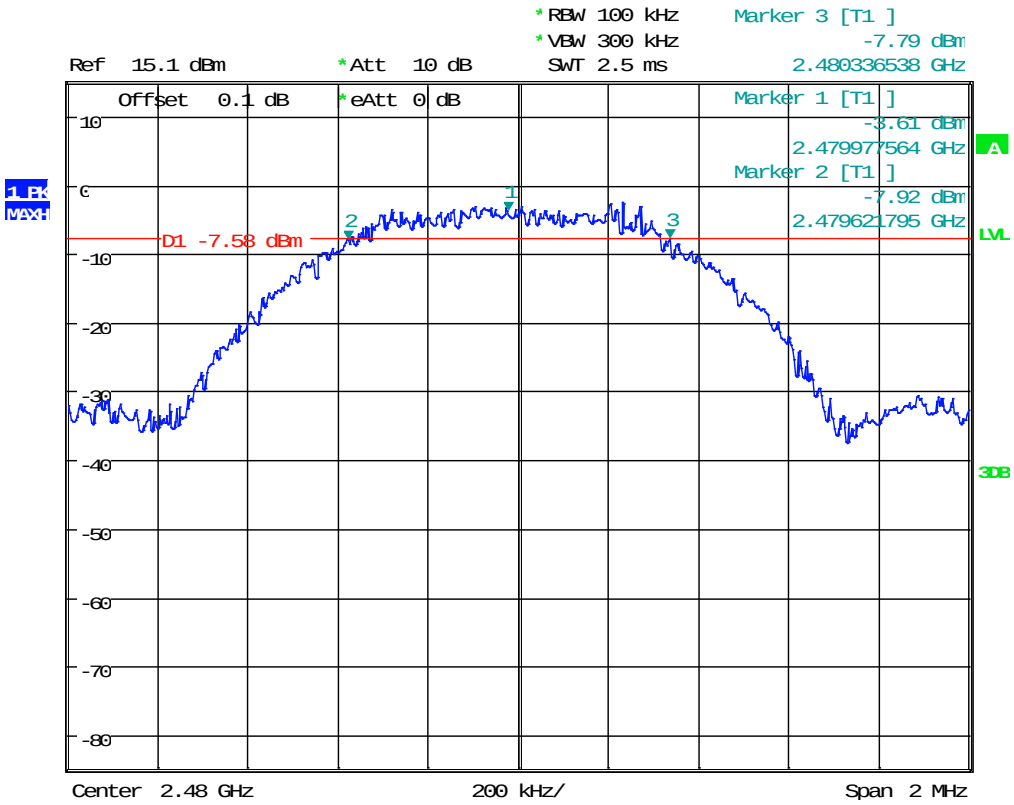
Date: 11.SEP.2018 11:18:32

Plot 1. 2



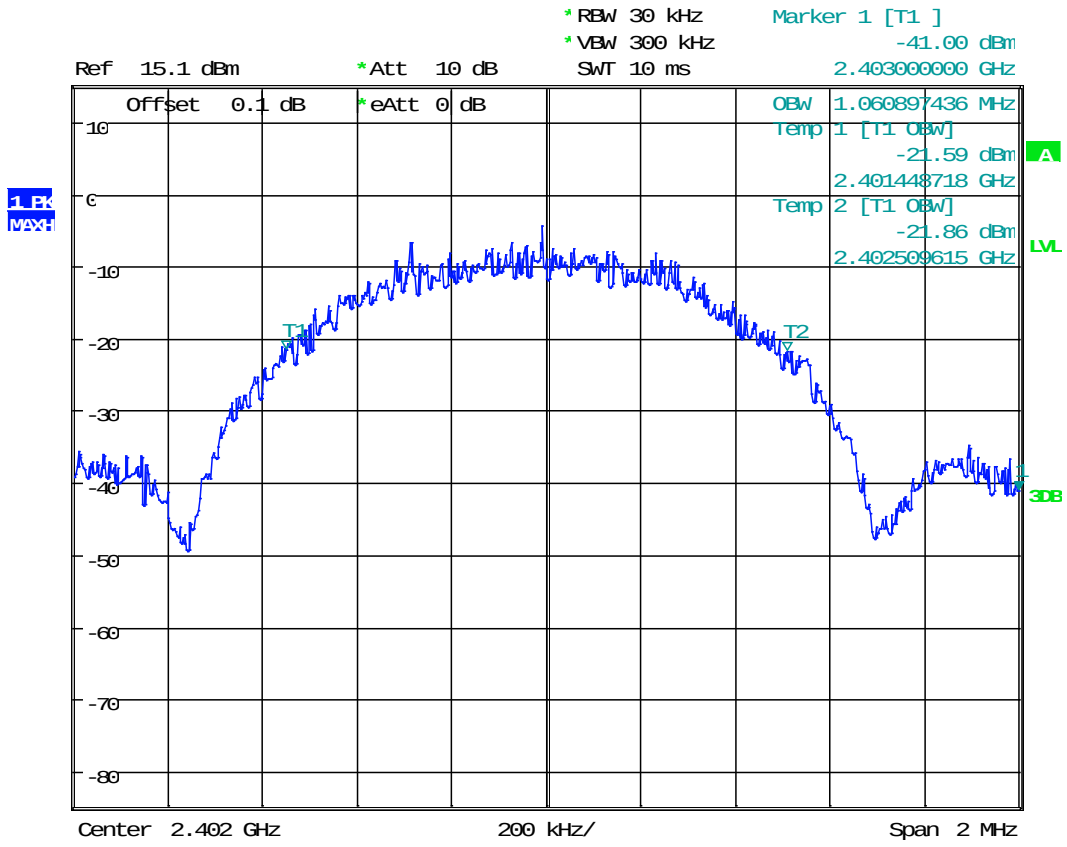
Date: 11.SEP.2018 11:23:11

Plot 1. 3



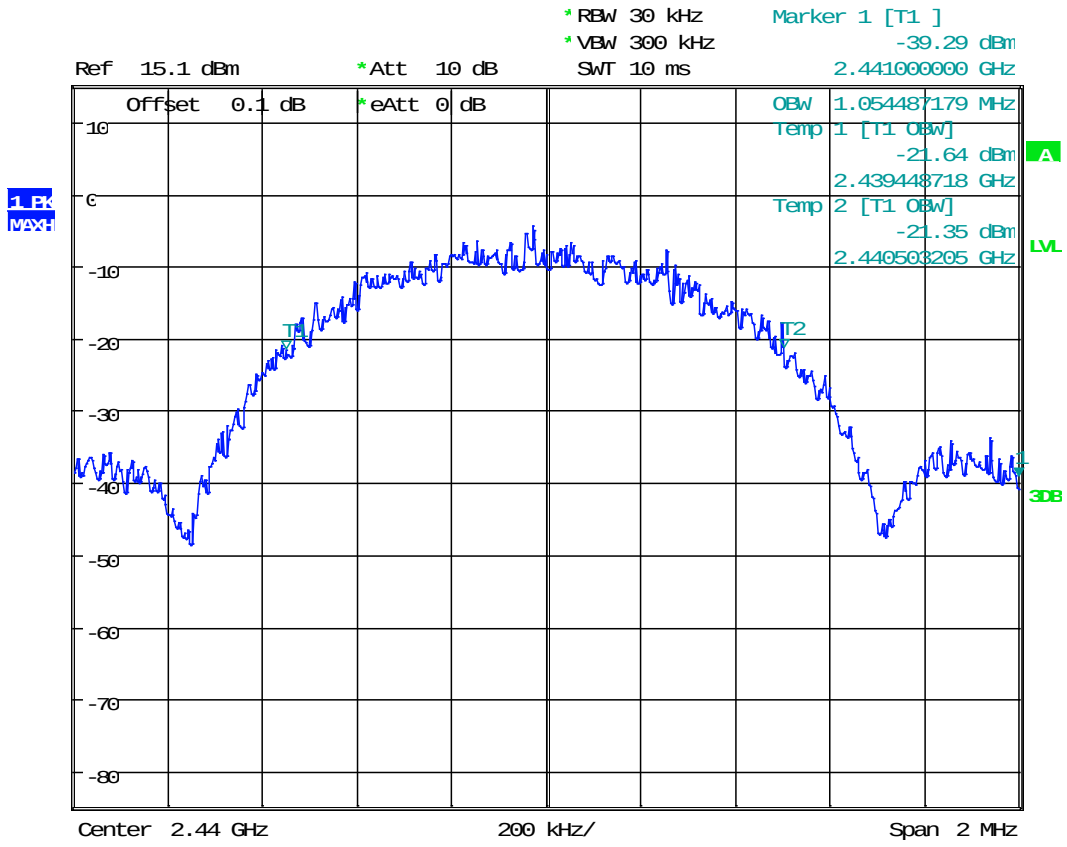
Date: 11.SEP.2018 11:25:58

Plot 1. 4



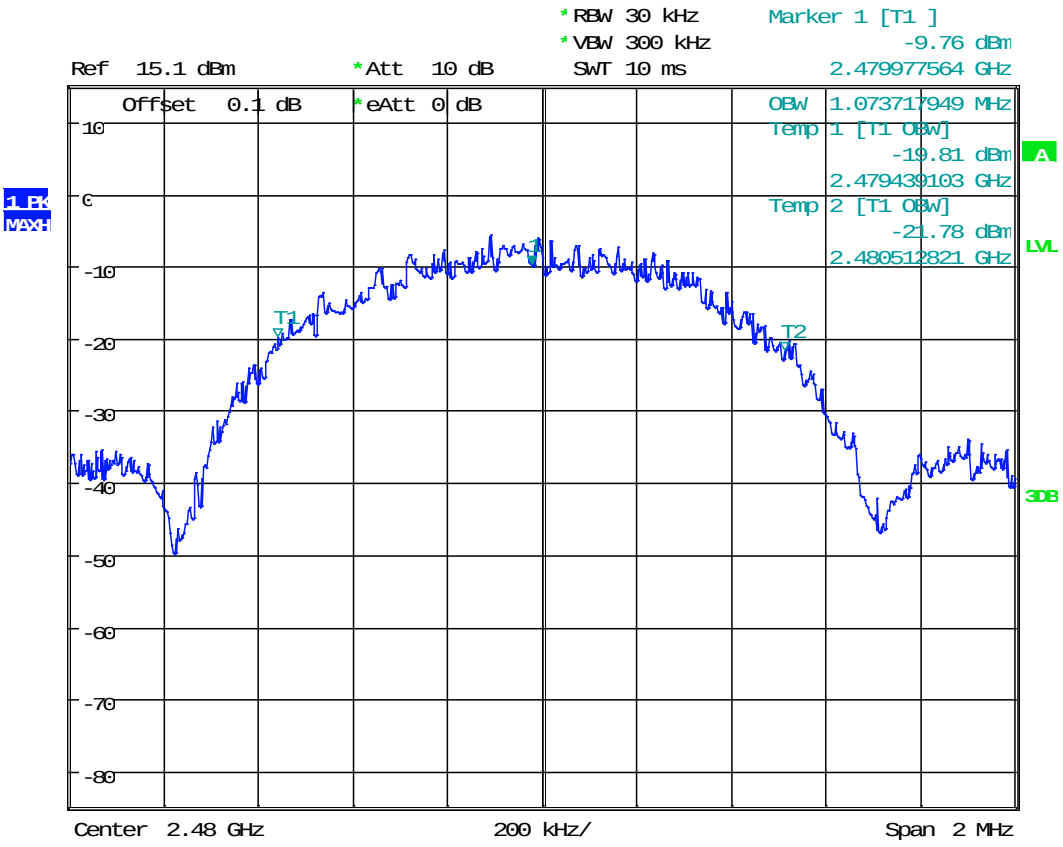
Date: 11.SEP.2018 11:34:26

Plot 1.5



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

Plot 1.6



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

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.

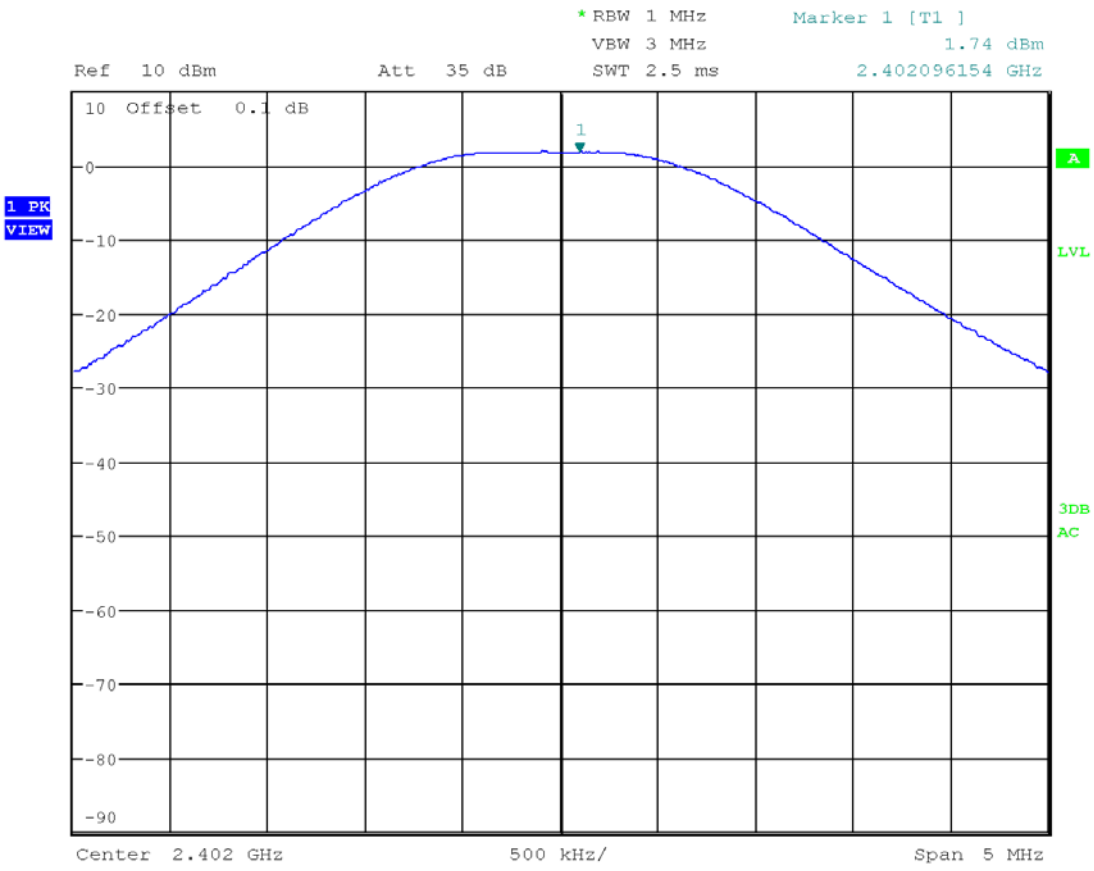
4.2.3 Test Result

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

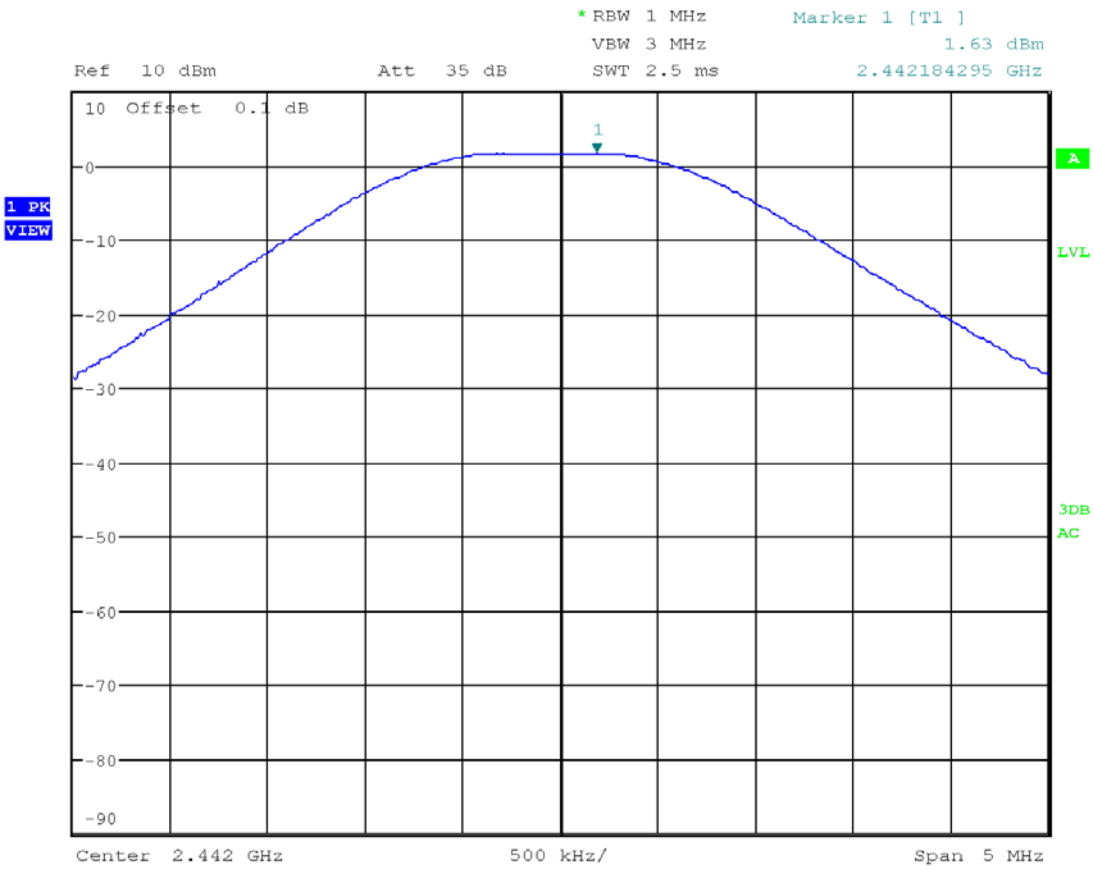
Frequency	**Conducted Power (peak)**		**Plot**
MHz	dBm	mW	
2402	1.74	1.493	2.1
2442	1.63	1.455	2.2
2480	1.65	1.462	2.3

Tested By	**Test Date**
Aaron Chang	May 7, 2020

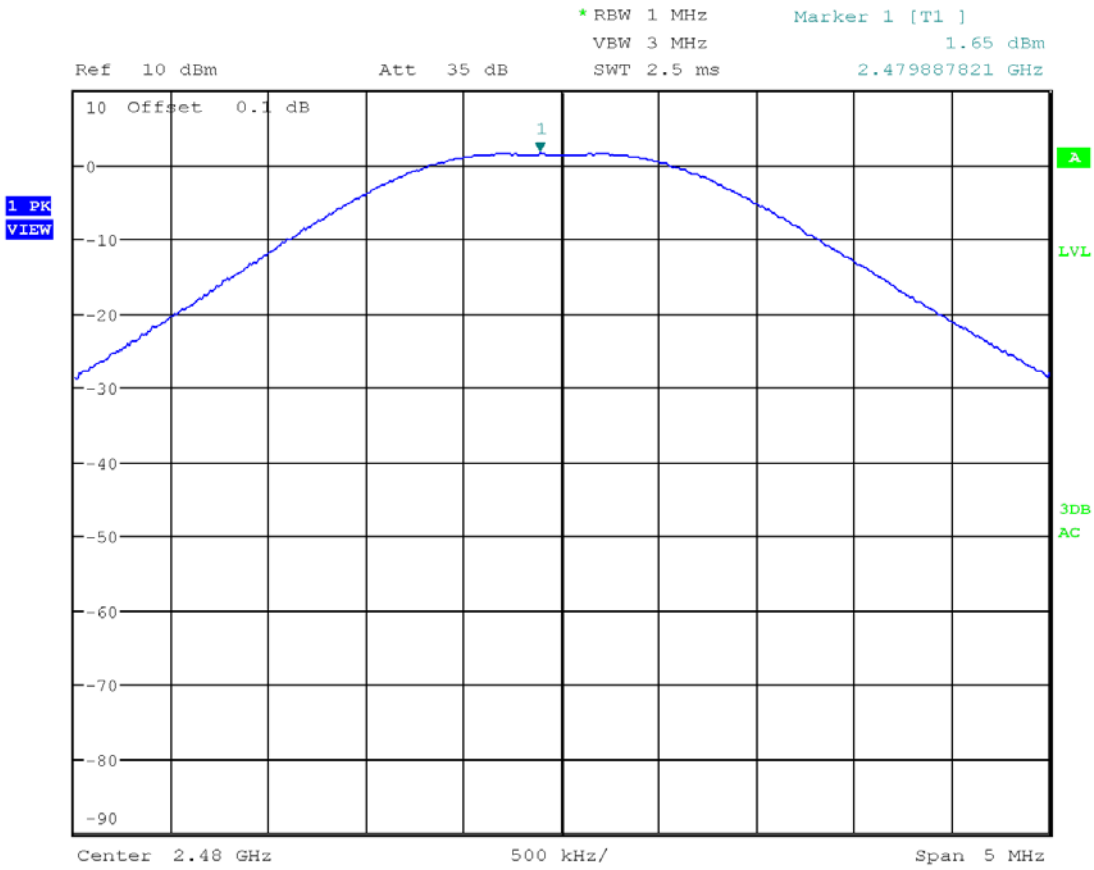
Plot 2. 1


* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
1.74 dBm
2.402096154 GHz
Ref 10 dBm
Att 35 dB
10 Offset 0.1 dB
1 PK
VIEW
A
LVL
3DB
AC
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.402 GHz
500 kHz/
Span 5 MHz

Plot 2. 2


* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
1.63 dBm
2.442184295 GHz
Ref 10 dBm
Att 35 dB
10 Offset 0.1 dB
1 PK
VIEW
A
LVL
3DB
AC
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.442 GHz
500 kHz/
Span 5 MHz

Plot 2. 3


* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
1.65 dBm
2.479887821 GHz
Ref 10 dBm
Att 35 dB
10 Offset 0.1 dB
1 PK
VIEW
A
LVL
3DB
AC
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.48 GHz
500 kHz/
Span 5 MHz

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.

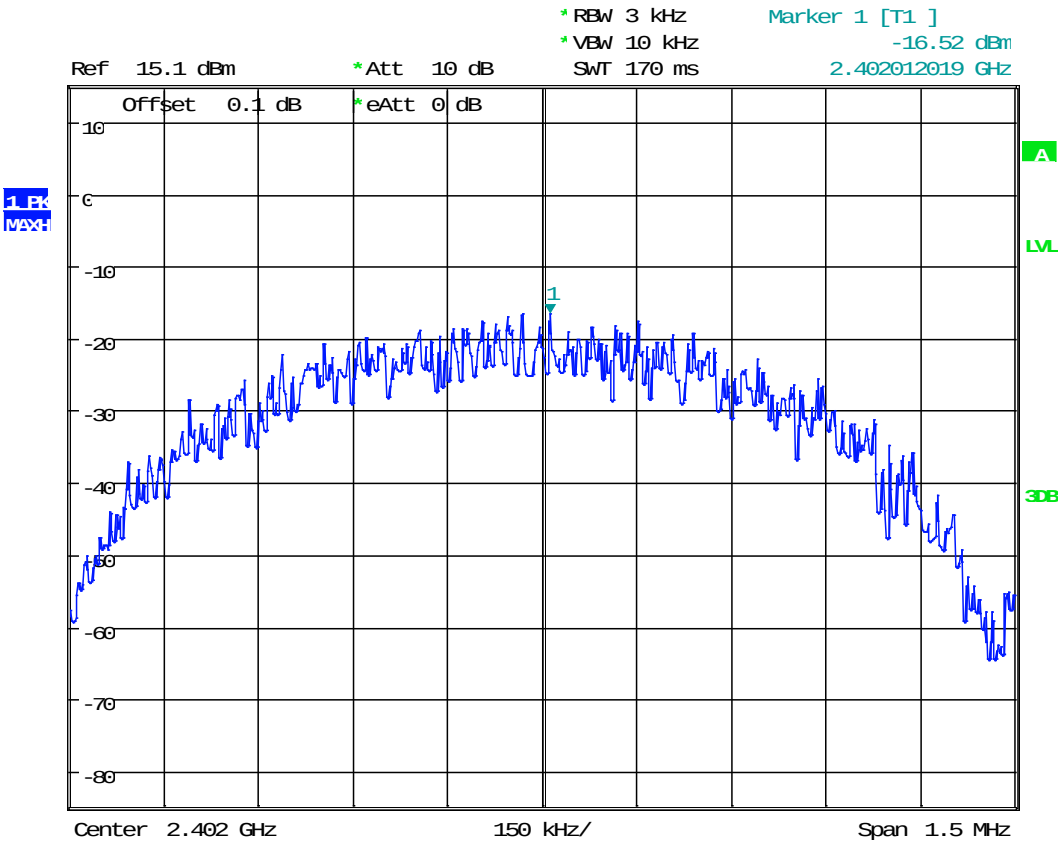
4.3.3 Test Result

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	-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

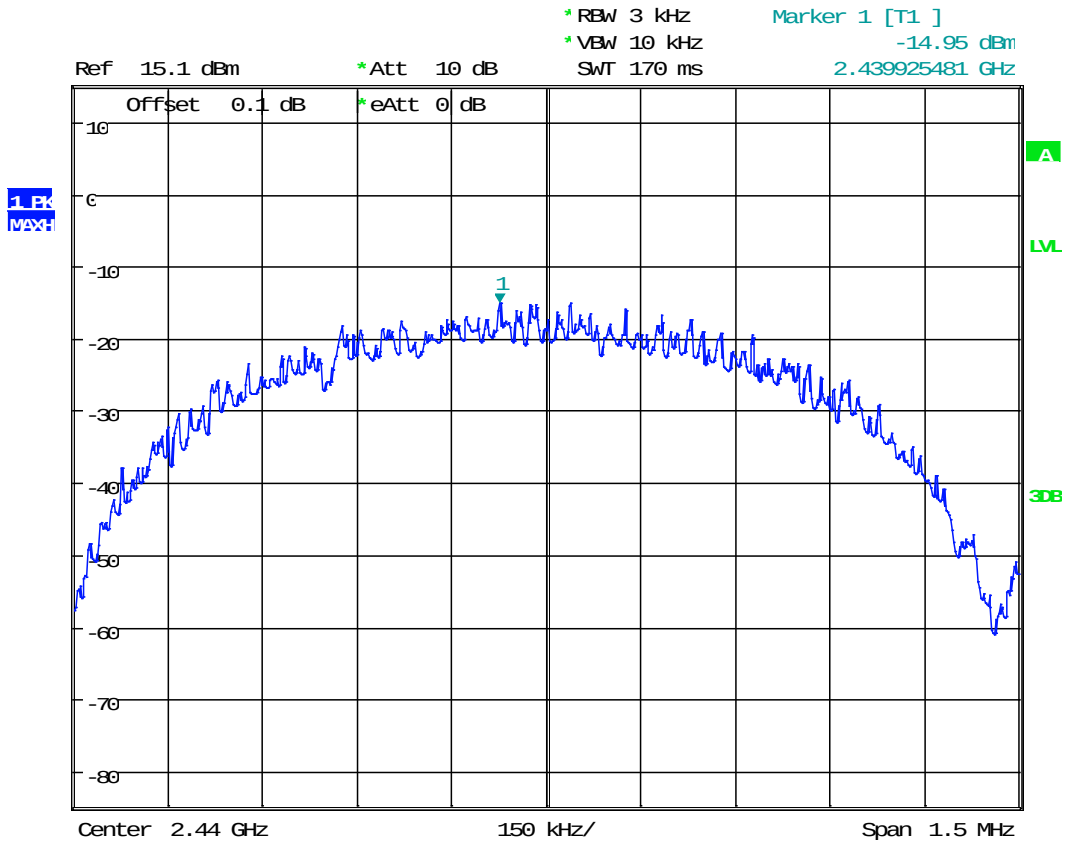
Date of Test:	September 11, 2018
Results:	**Complies**

Plot 3. 1



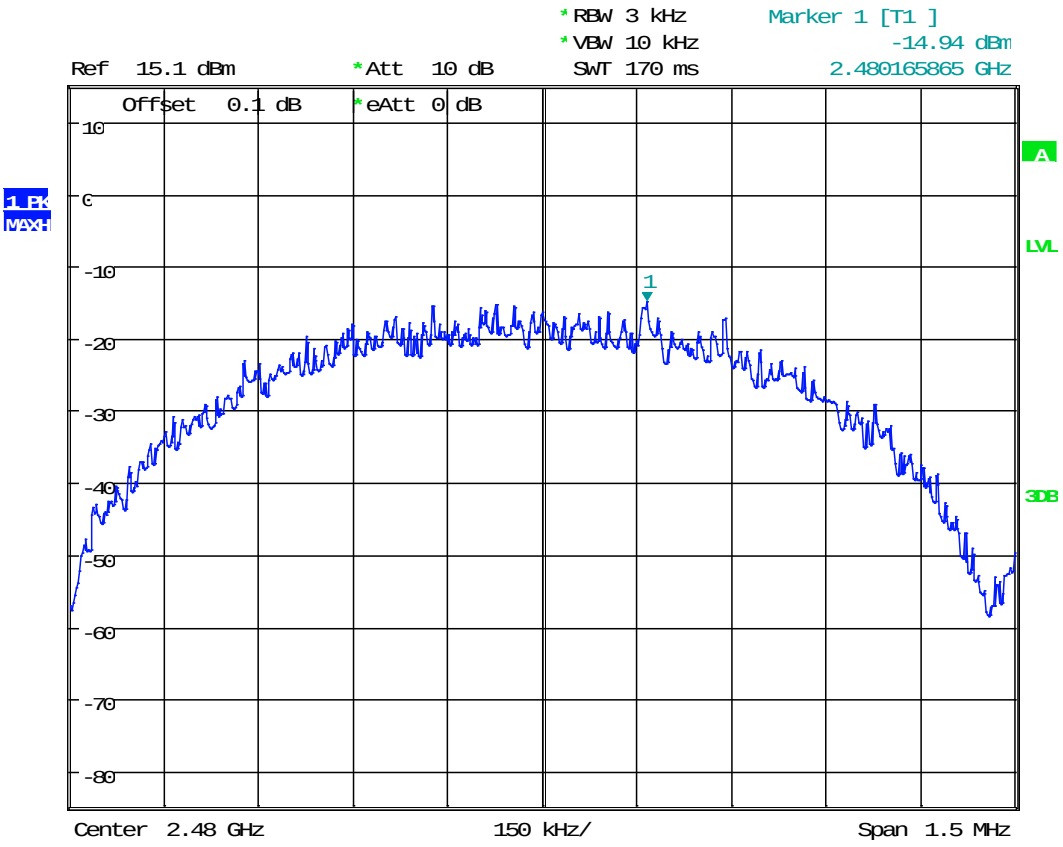
Date: 11.SEP.2018 11:39:49

Plot 3. 2



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

Plot 3. 3



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

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.

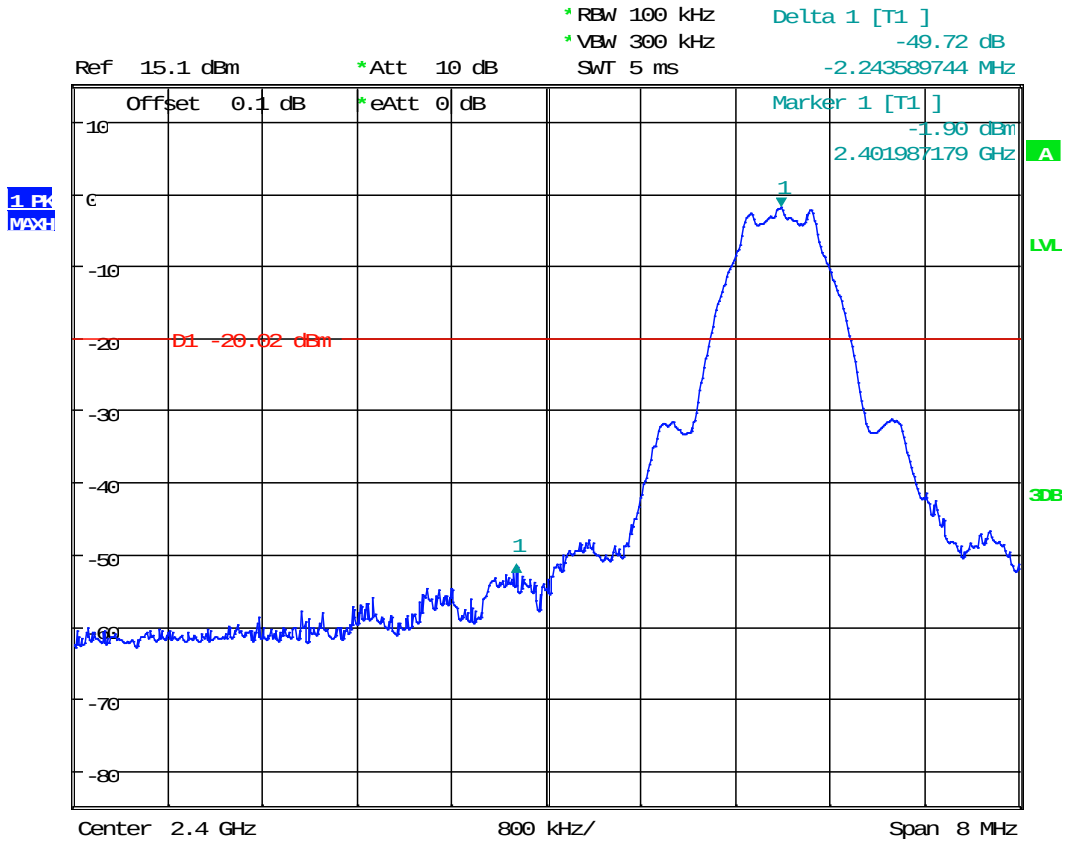
1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 3 x RBW.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

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

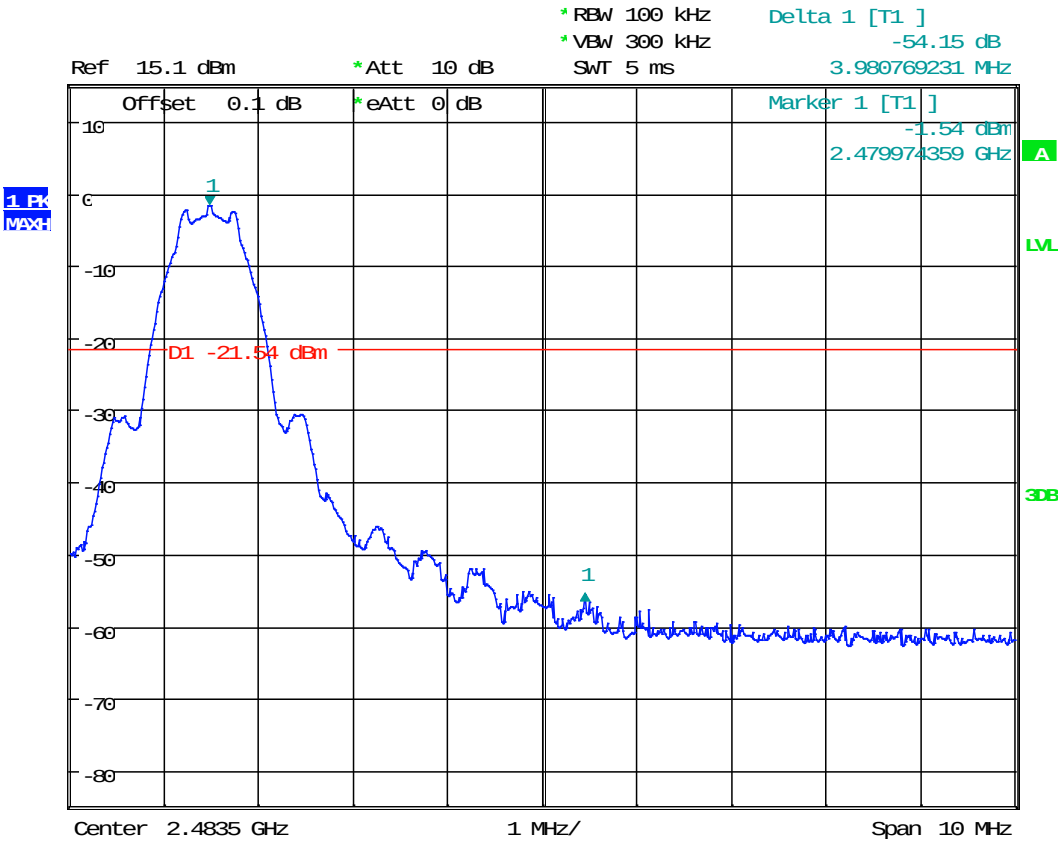
Refer to the following plots 4.1 – 4.5 for unwanted conducted emissions. The plot shows -20dB attenuation limit line.

Date of Test:	September 11, 2018
Results	**Complies**



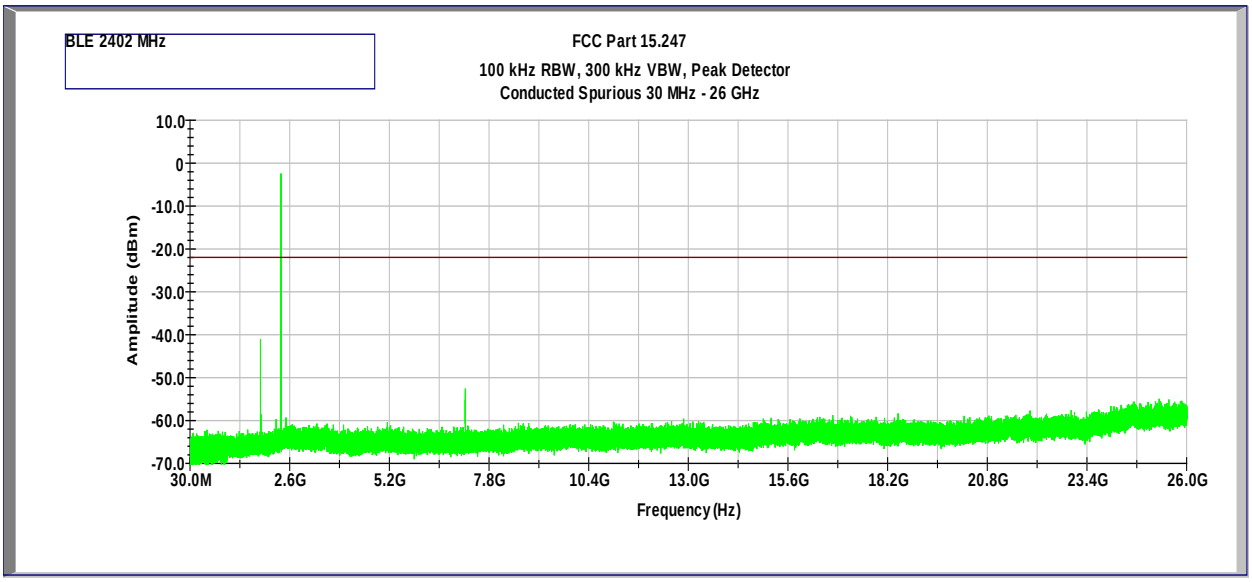
Date: 11.SEP.2018 12:03:42

Tx @ High Channel, 2483.5 MHz Band Edge
Plot 4.2

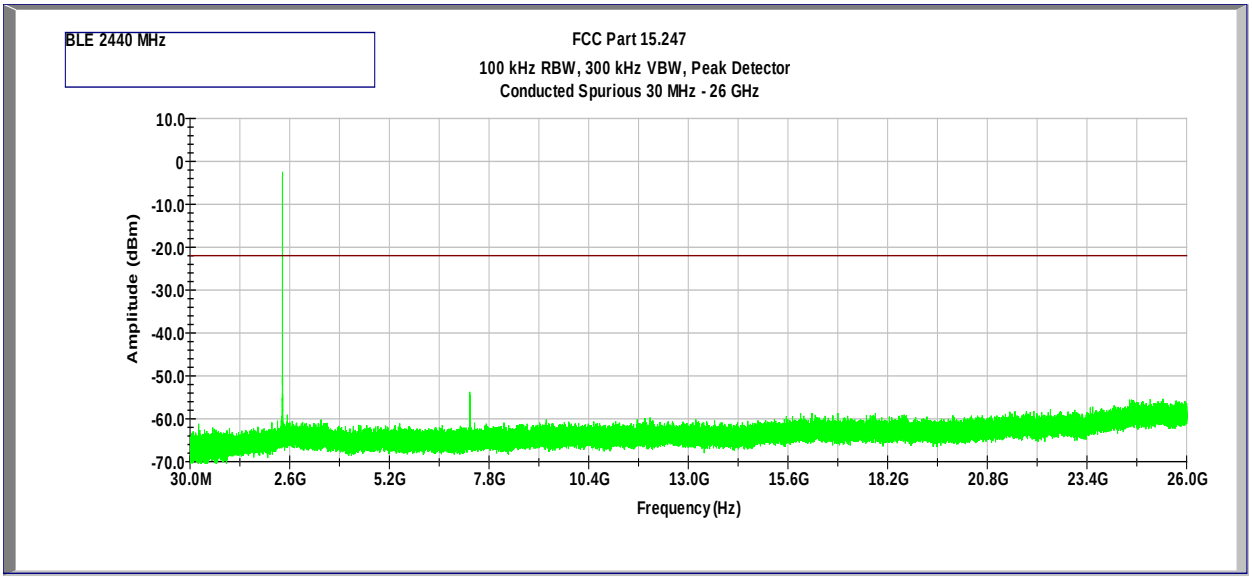


Date: 11.SEP.2018 12:06:10

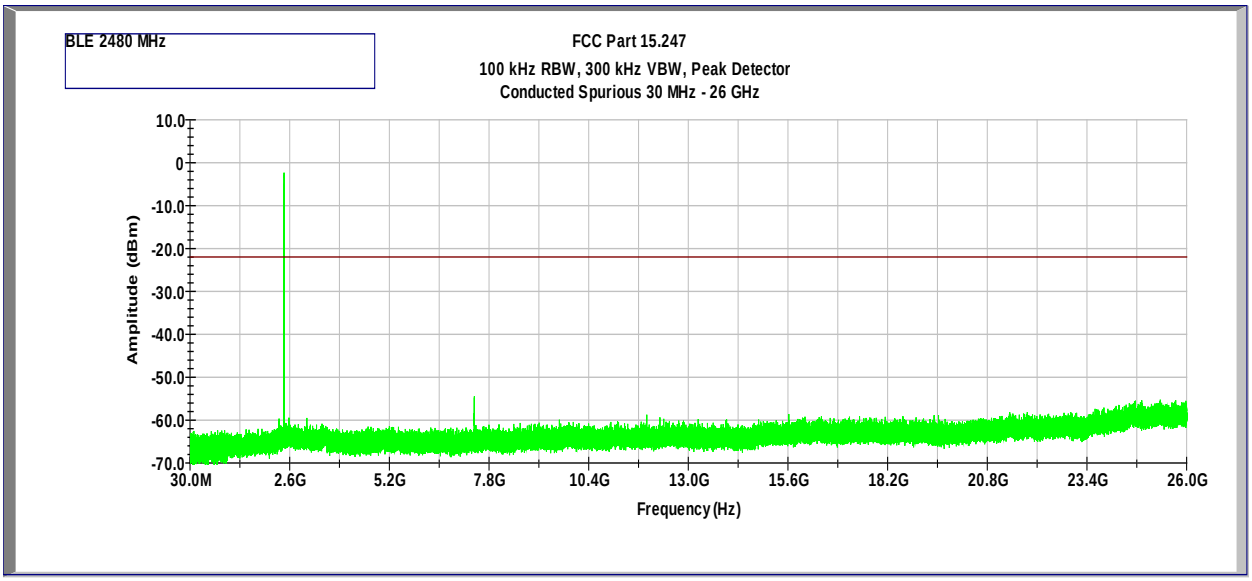
Tx @ Low Channel, 2402 MHz
30MHz -26GHz Conducted Spurious
Plot 4.3



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



Tx @ High Channel, 2480 MHz
30MHz -26GHz Conducted Spurious
Plot 4.5



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(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.

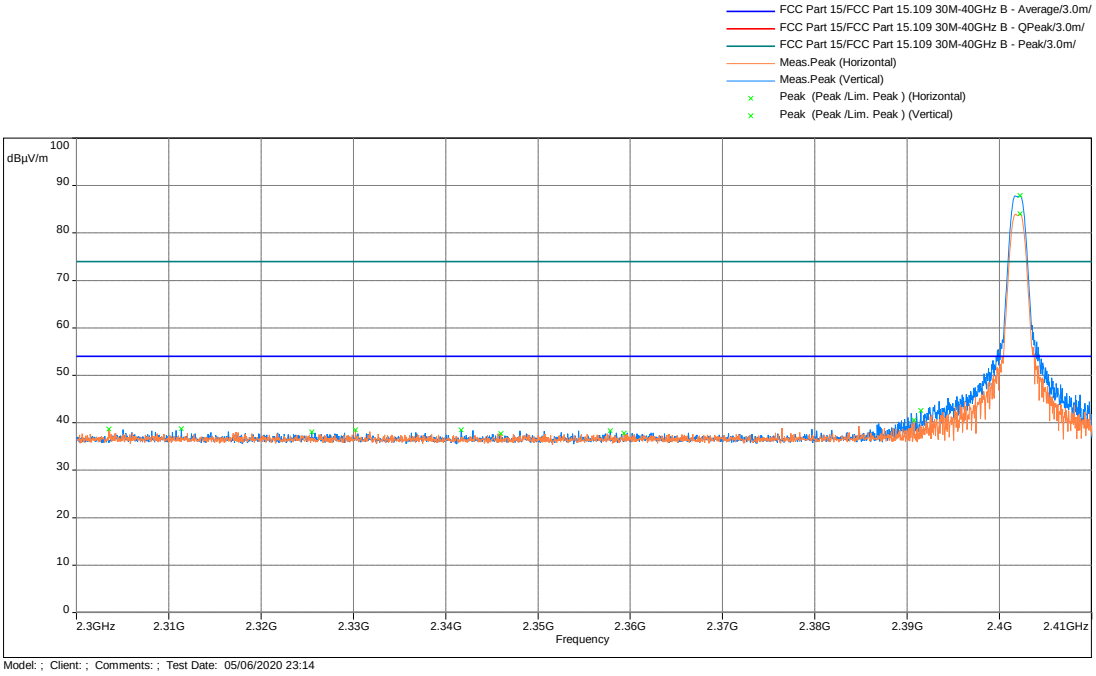
4.5.4 Test Results

All testing in this section were performed by radiated measurements.

Tested By	Test Date
Aaron Chang	March 17 & May 6-7, 2020

Test Results: 15.209/15.205 Radiated Restricted Band Emissions

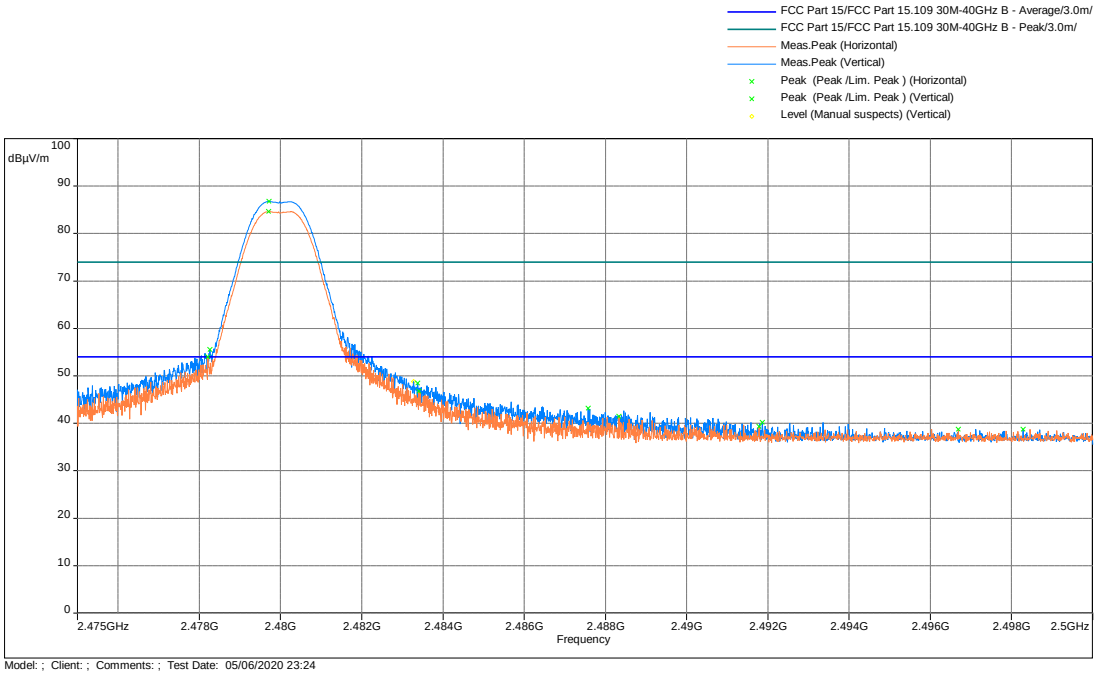
Out-of-Band Radiated spurious emissions at the Band-edge @3m distance
2310–2390 MHz, Peak Scan with Peak and Average Limit



Frequency	Corrected Amplitude	Peak Limit	Margin	Height	Angle	Detector	Polarity	Correction
GHz	dBµV/m	dBµV/m	dB	m	deg			
2390.097	41.1	74	-32.9	1.01	128.75	Peak	Vertical	5.1

Frequency	Corrected Amplitude	Average Limit	Margin	Height	Angle	Detector	Polarity	Correction
GHz	dBµV/m	dBµV/m	dB	m	deg			
2390.097	41.1	54	-12.9	1.01	128.75	Peak	Vertical	5.1

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



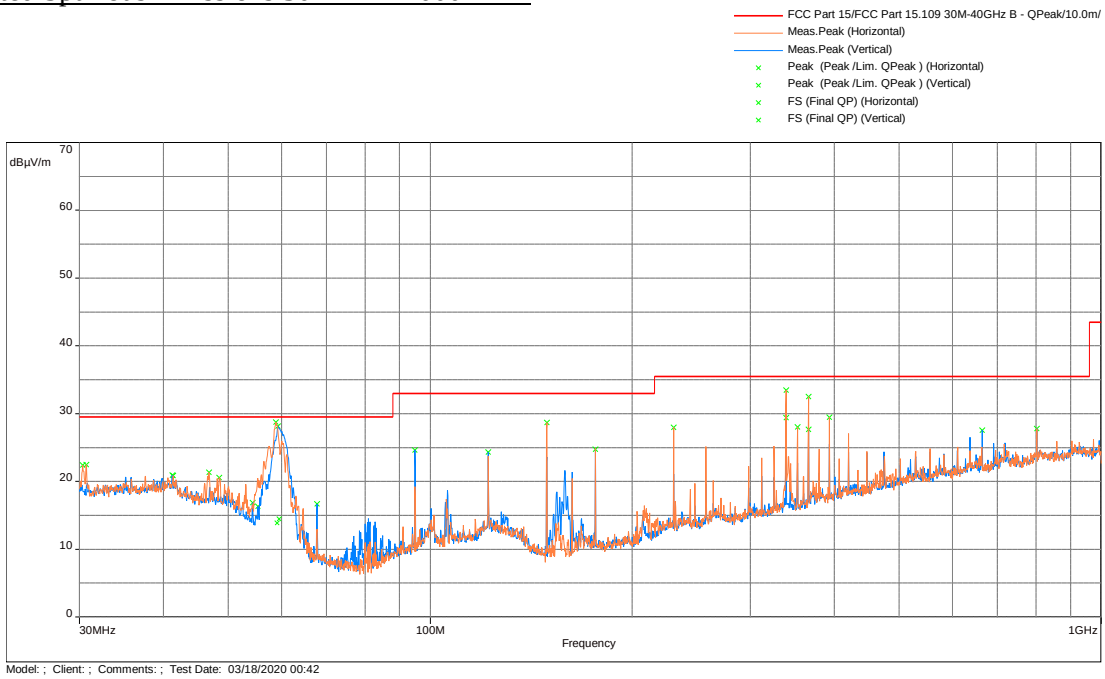
Frequency	Corrected Amplitude	Peak Limit	Margin	Height	Angle	Detector	Polarity	Correction
GHz	dBµV/m	dBµV/m	dB	m	deg			
2483.28	48.83	74	-25.17	1	132.75	Peak	Vertical	5.2

Frequency	Corrected Amplitude	Average Limit	Margin	Height	Angle	Detector	Polarity	Correction
GHz	dBµV/m	dBµV/m	dB	m	deg			
2483.28	48.83	54	-5.17	1	132.75	Peak	Vertical	5.2

Out-of-Band Radiated Spurious Emissions

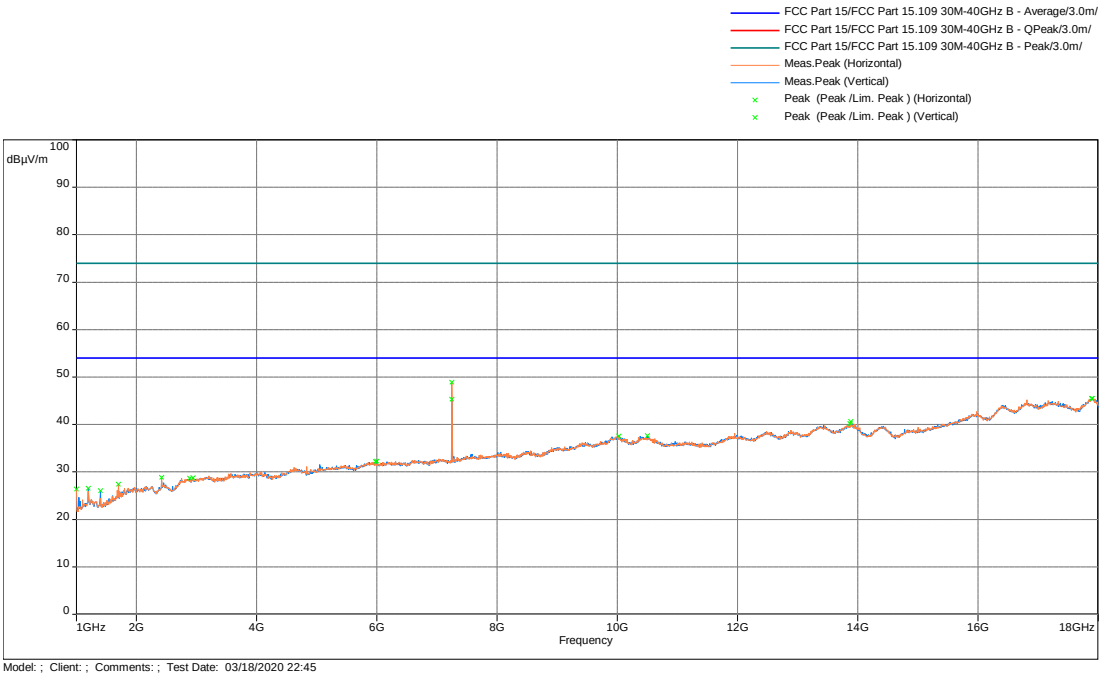
Test Results: 15.209 Radiated Spurious Emissions Low Channel, Tx at 2402MHz

Radiated Spurious Emissions 30 MHz - 1000 MHz



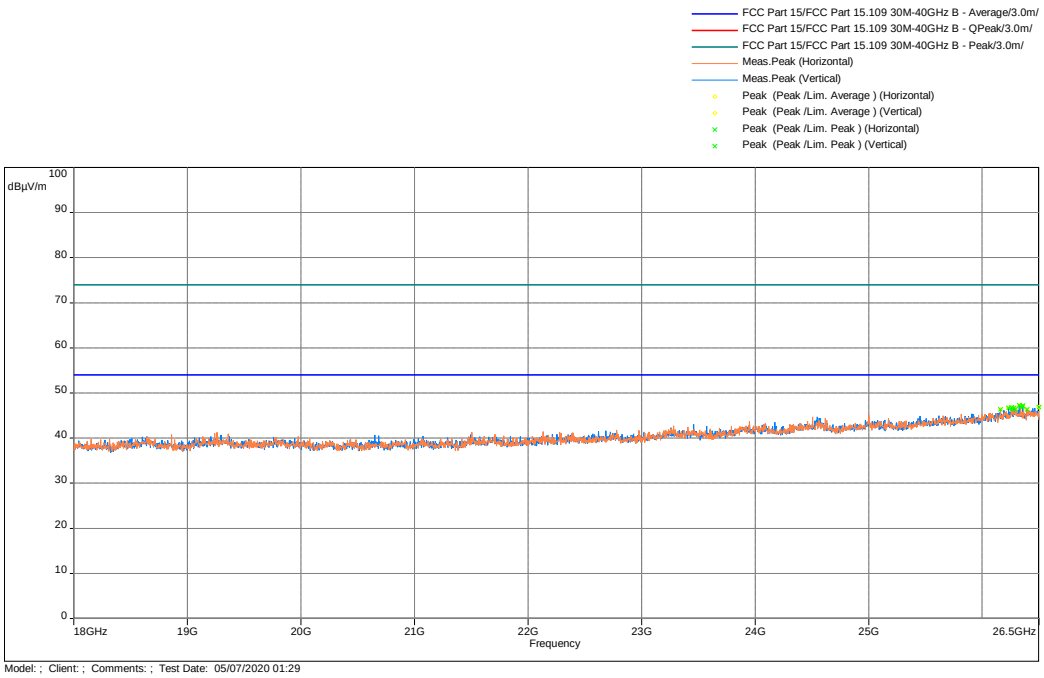
Model: ; Client: ; Comments: ; Test Date: 03/18/2020 00:42

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



Model: ; Client: ; Comments: ; Test Date: 03/18/2020 22:45

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



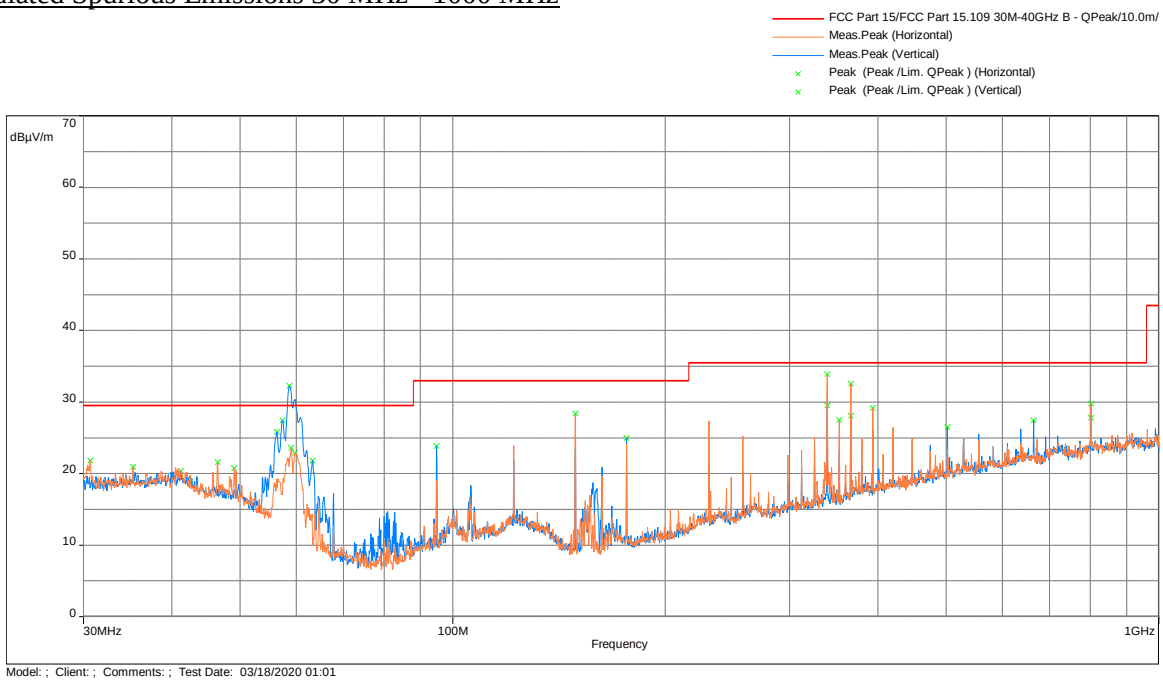
Freq. MHz	QP FS@10m dB(uV/m)	Limit dB(µV/m)	Margin dB	Height m	Azimuth deg	Polarity	Correction dB
59.106	13.87	29.5	-15.63	1.32	143.25	Vertical	-14.95
59.527	14.46	29.5	-15.04	3.81	287.5	Horizontal	-15.07
149.148	28.68	33	-4.32	3.98	359.25	Horizontal	-16.04
339.010	33.47	35.5	-2.03	2.48	150.5	Horizontal	-8.55
366.105	32.49	35.5	-3.01	2.48	150.5	Horizontal	-7.84

Frequency	FS@3m	Limit	Margin	Height	Angle	Detector	Polarity	Correction
GHz	dBµV/m	dBµV/m	dB	m	deg			
7248.633	48.93	74	-25.07	1	0	Peak	Horizontal	12.7
7248.633	48.93	54	-5.07	1	0	Peak	Horizontal	12.7

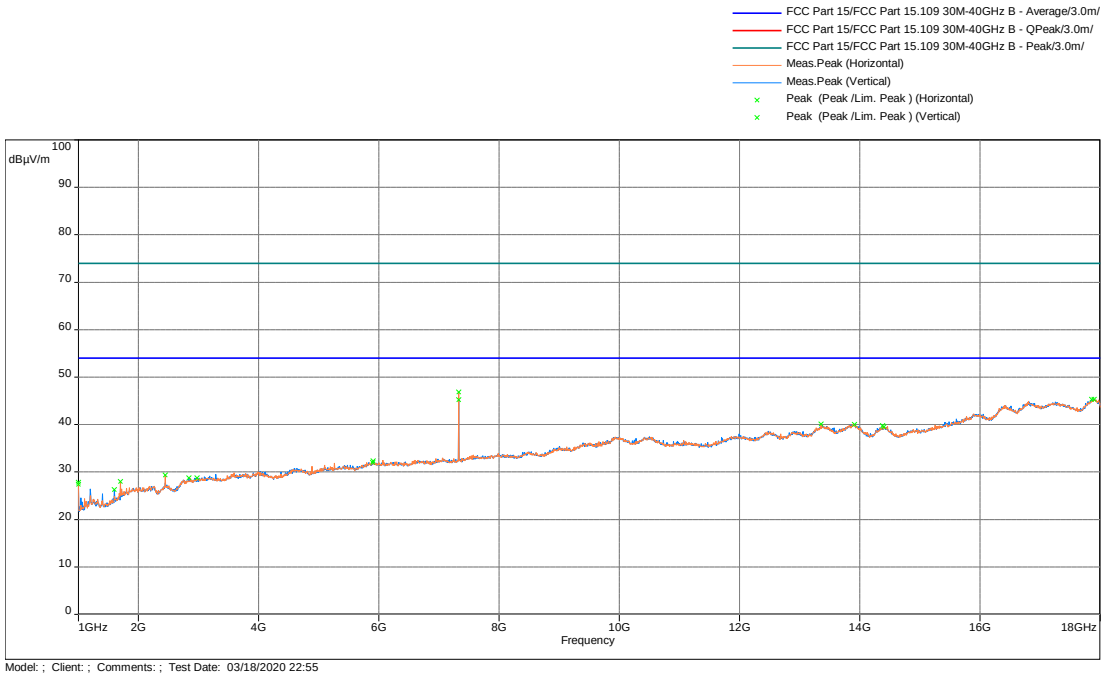
Note: FS = RA + Correction
Correction = AF + CF – Preamp

Results	Complies

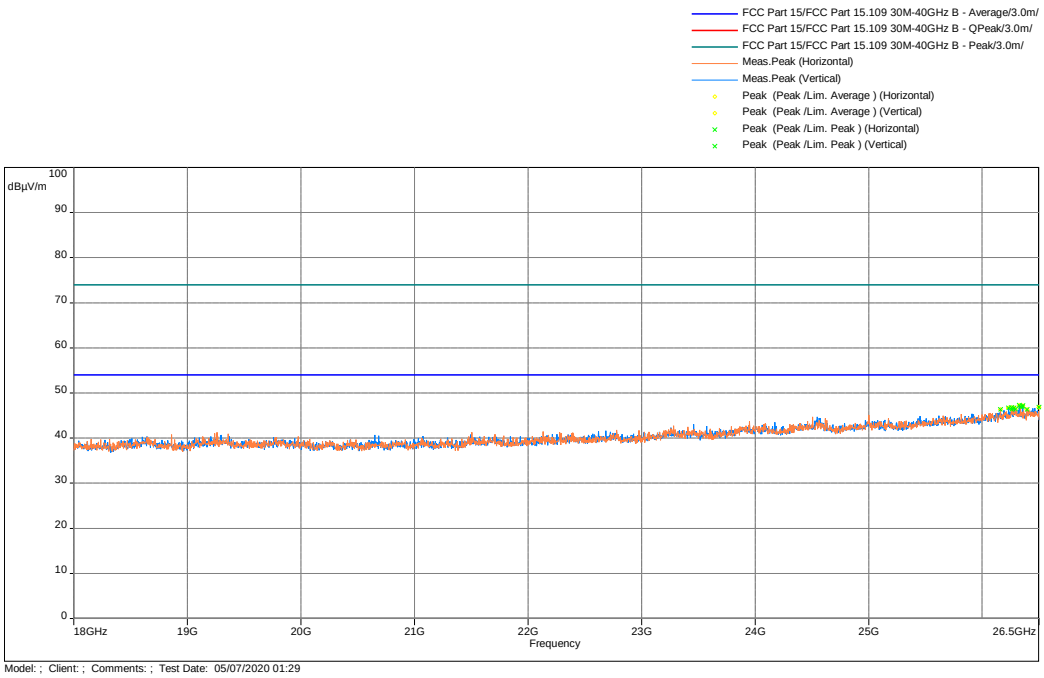
Radiated Spurious Emissions 30 MHz - 1000 MHz



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



Freq. MHz	QP FS@10m dB(uV/m)	Limit dB(µV/m)	Margin dB	Height m	Azimuth deg	Polarity	Correction dB
56.352	25.8	29.5	-3.7	4	316.25	Vertical	-13.46
57.386	27.4	29.5	-2.1	4	316.25	Vertical	-14.06
58.712	17.25	29.5	-12.25	3.85	316.25	Vertical	-14.77
149.148	28.37	33	-4.63	3.98	0	Horizontal	-16.04
339.010	33.86	35.5	-1.64	2.48	153.5	Horizontal	-8.55

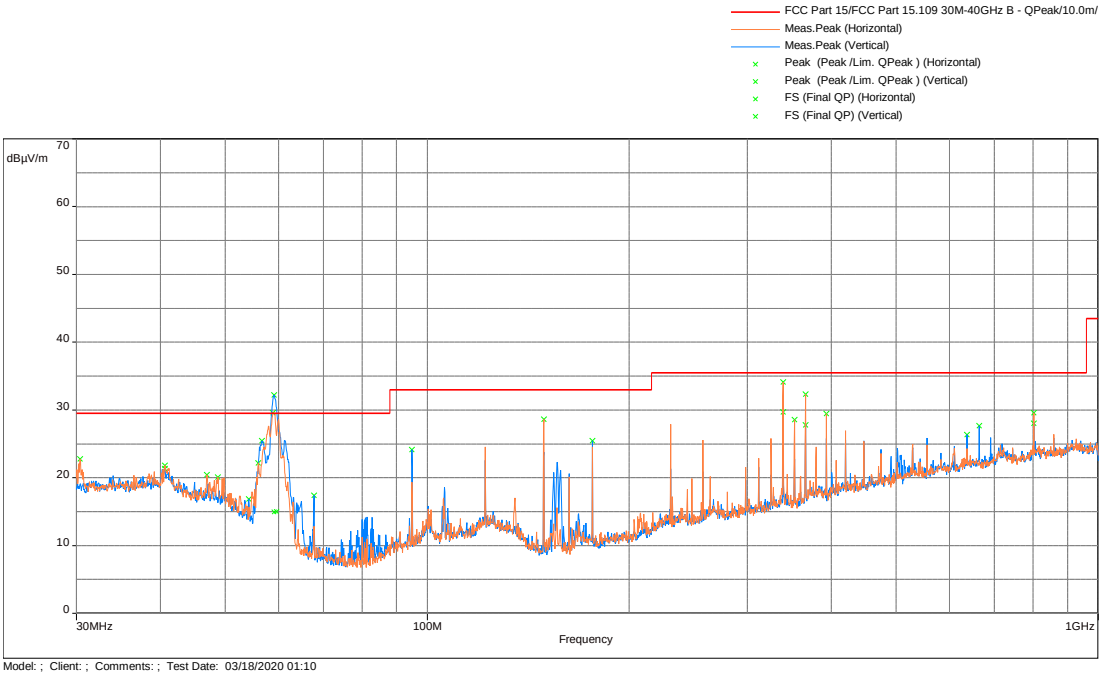
Frequency GHz	FS@3m dBµV/m	Limit dBµV/m	Margin dB	Height m	Angle deg	Detector	Polarity	Correction
7326.267	46.81	74	-27.19	1.99	15	Peak	Horizontal	12.89
7326.267	46.81	54	-7.19	1.99	15	Peak	Horizontal	12.89

Note: FS = RA + Correction
Correction = AF + CF – Preamp

Results	Complies

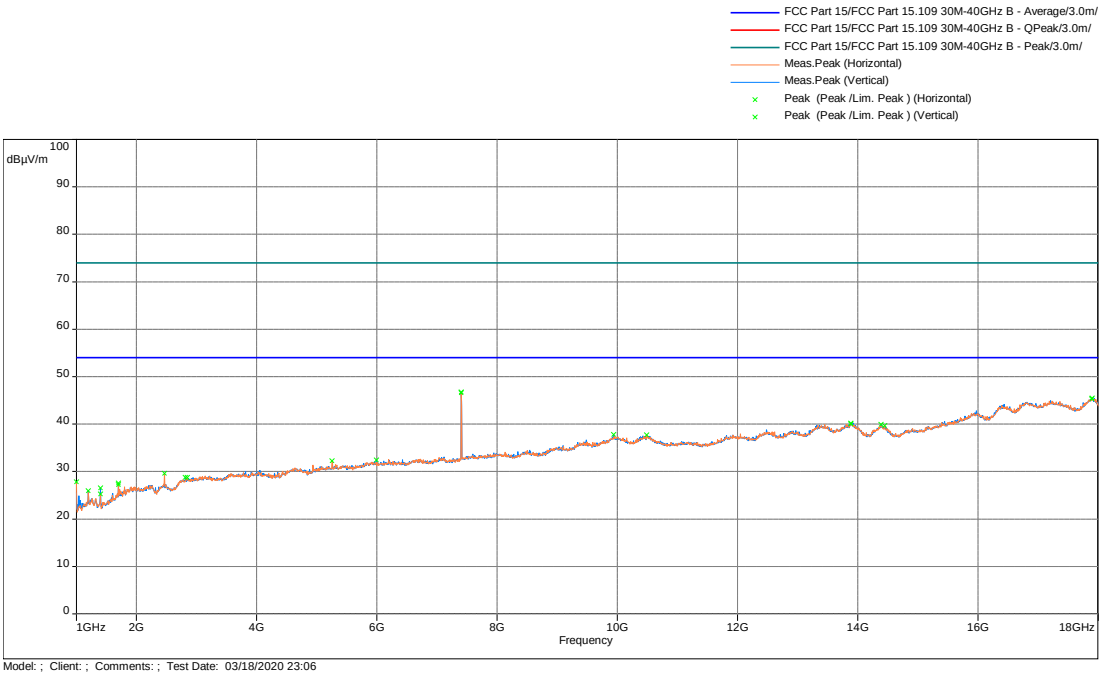
Test Results: 15.209 Radiated Spurious Emissions High Channel, Tx at 2480MHz

Radiated Spurious Emissions 30 MHz - 1000 MHz



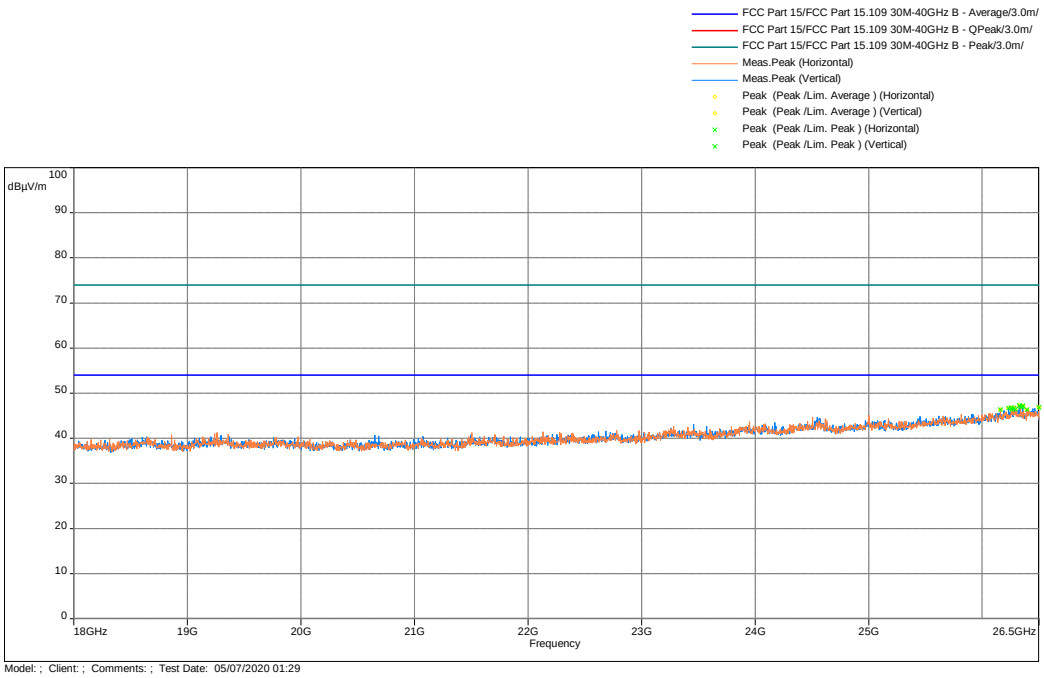
Model: ; Client: ; Comments: ; Test Date: 03/18/2020 01:10

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



Model: ; Client: ; Comments: ; Test Date: 03/18/2020 23:06

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



Freq. MHz	QP FS@10m dB(uV/m)	Limit dB(µV/m)	Margin dB	Height m	Azimuth deg	Polarity	Correction dB
56.675	25.46	29.5	-4.04	4	234	Vertical	-13.65
59.154	14.92	29.5	-14.58	3.07	267.75	Vertical	-14.96
59.602	15.02	29.5	-14.48	1.98	59.25	Horizontal	-15.09
149.148	28.64	33	-4.36	4	3	Horizontal	-16.04

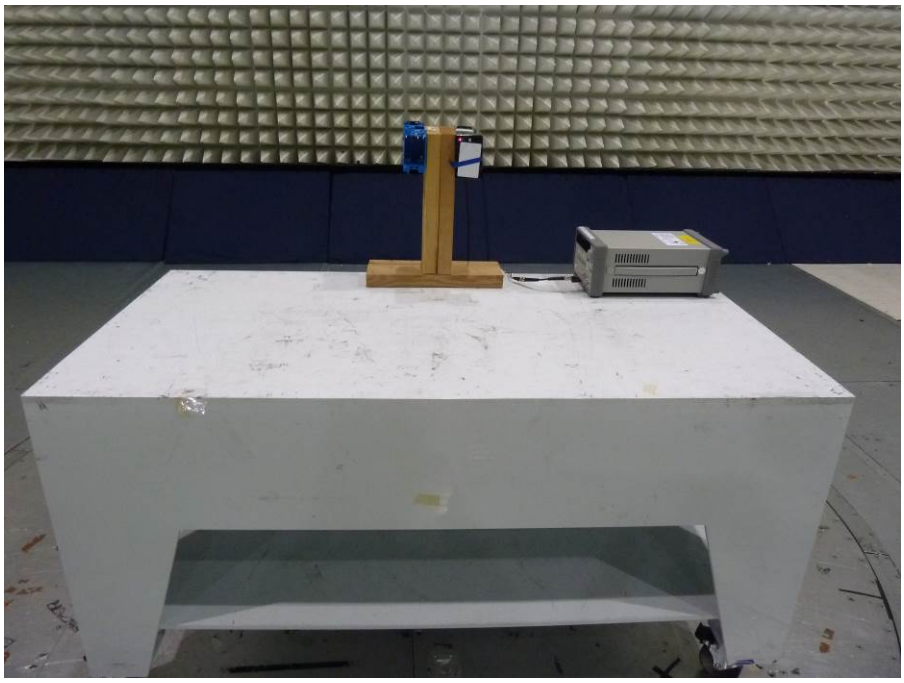
Frequency	FS@3m	Limit	Margin	Height	Angle	Detector	Polarity	Correction
GHz	dBµV/m	dBµV/m	dB	m	deg			
7403.333	46.8	74	-27.2	1.49	300.75	Peak	Vertical	13.18
7403.333	46.8	54	-7.2	1.49	300.75	Peak	Vertical	13.18

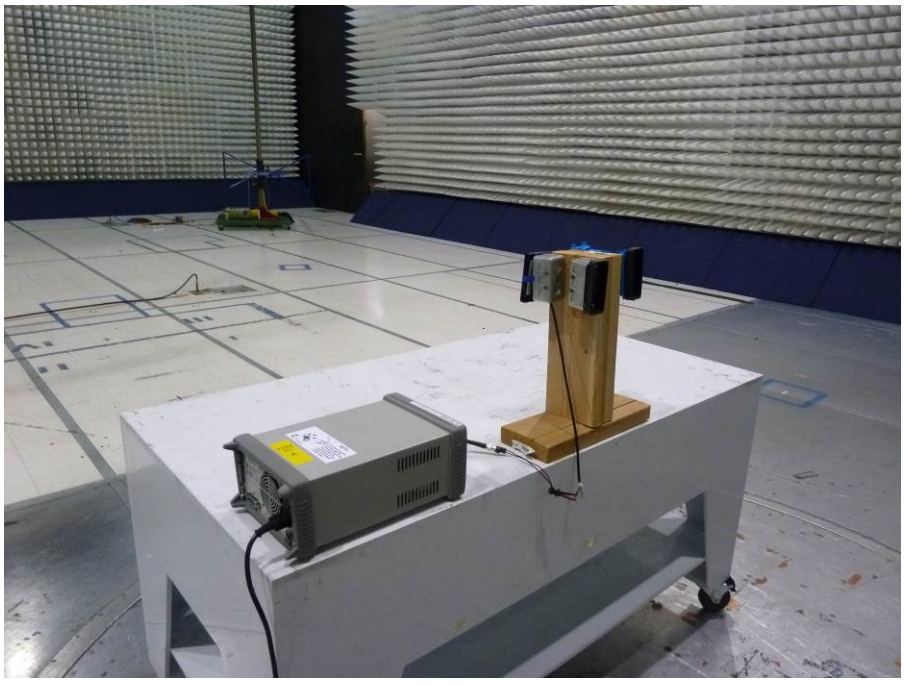
Note: FS = RA + Correction
Correction = AF + CF – Preamp

Results	Complies

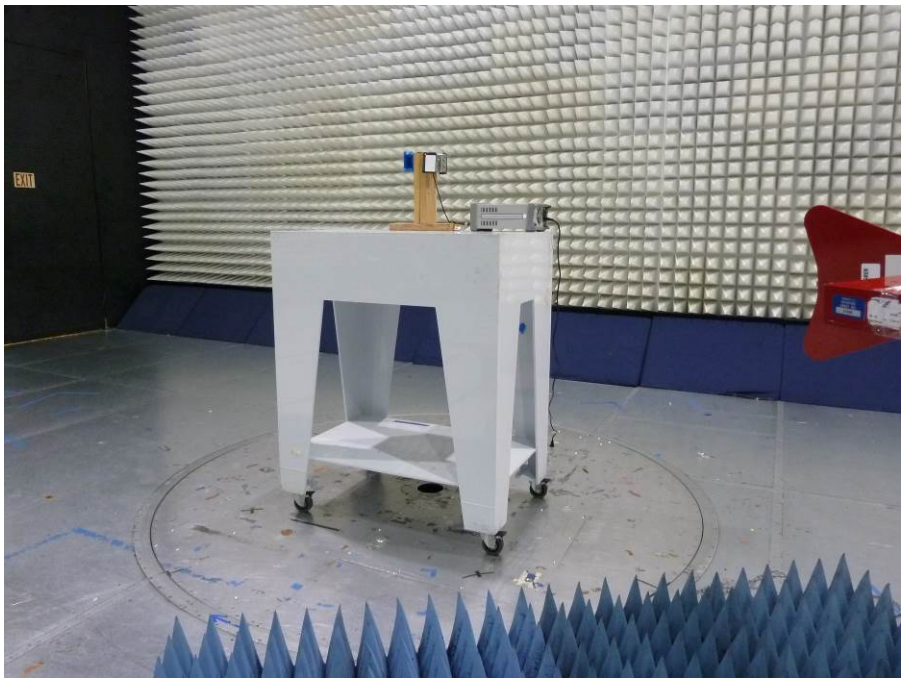
4.2.5 Test Setup Configuration

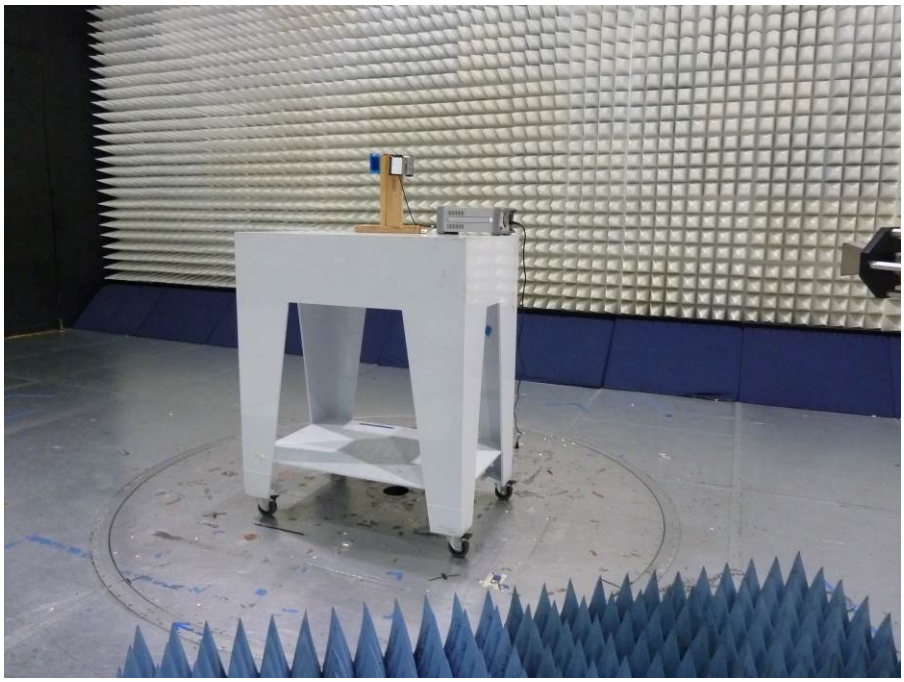
The following photographs show the testing configurations used.





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(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.

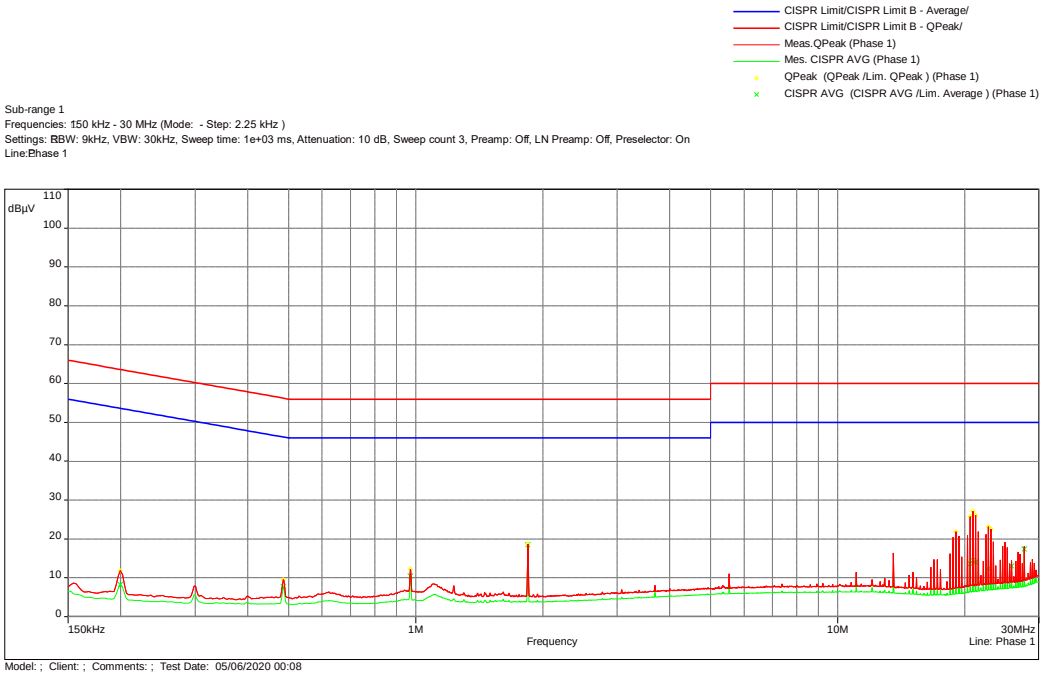
Floor standing EUT are placed on a horizontal metal ground plane and isolated from the ground plane by resting on an insulating material. The metal ground plane extends at least 0.5m beyond the boundaries of the EUT and has minimum dimensions of 2m by 2m.

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

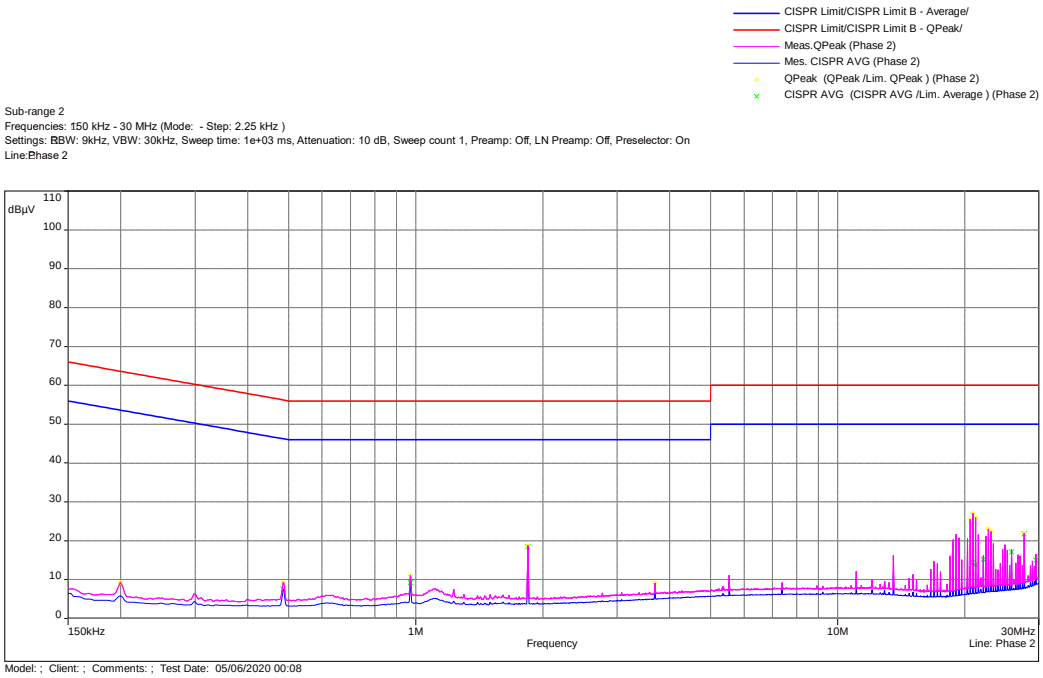
4.6.3 Test Result

15.207, 120VAC 60Hz with BLE Transmitter On

Phase 1



Phase 2

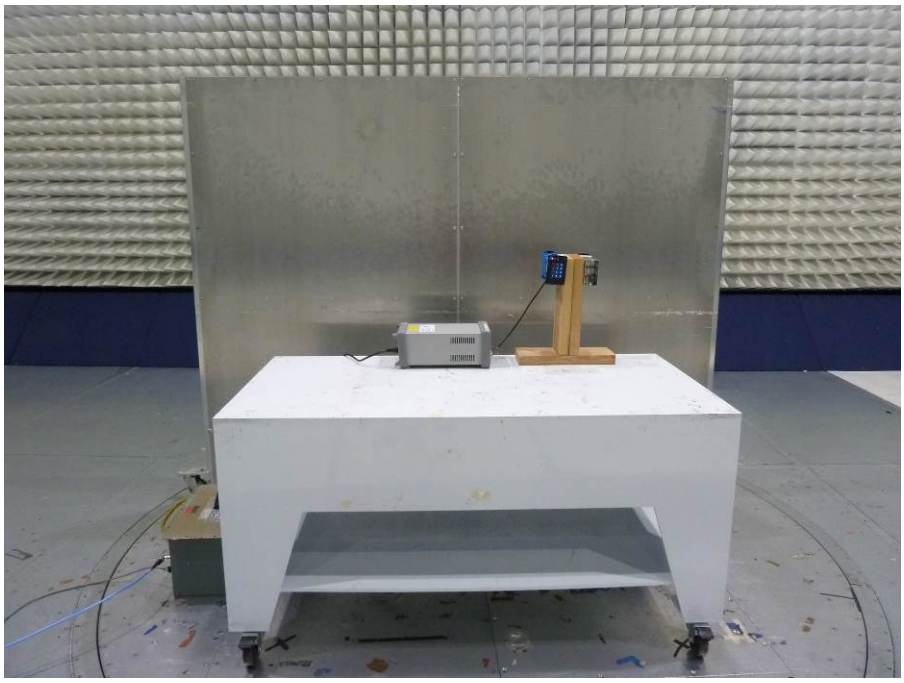


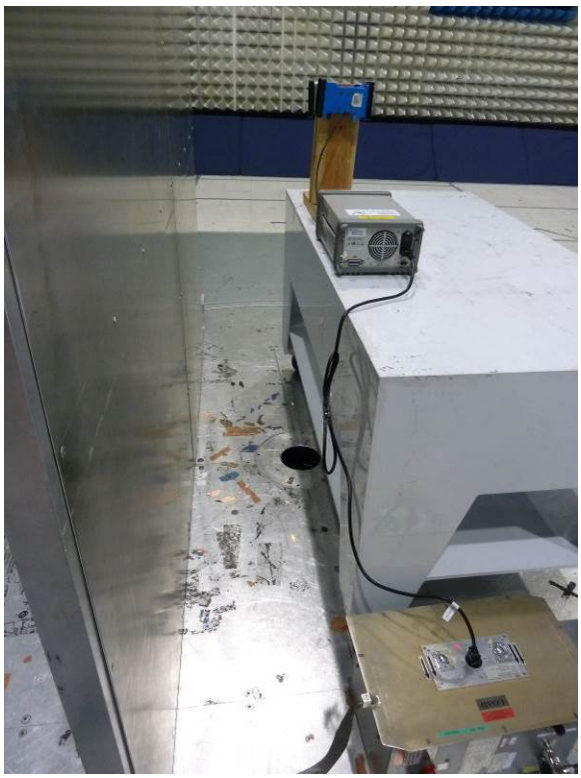
Frequency (MHz)	CISPR AVG (dBµV)	QPeak (dBµV)	Lim. Average (dBµV)	Lim. QPeak (dBµV)	CISPR AVG-Lim (dB)	QPeak-Lim (dB)	Comment	Correction (dB)
0.200	8.22	11.79	53.63	63.63	-45.41	-51.84	Phase 1	10.16
0.485	7.78	9.52	46.25	56.25	-38.47	-46.73	Phase 1	10.12
0.971	10.44	12.24	46	56	-35.56	-43.76	Phase 1	10.14
1.844	18.46	18.72	46	56	-27.54	-37.28	Phase 1	10.19
20.616	13.57	25.77	50	60	-36.43	-34.23	Phase 1	10.87
20.922	14.49	27.13	50	60	-35.51	-32.87	Phase 1	10.89
21.230	13.98	26.15	50	60	-36.02	-33.85	Phase 1	10.89
22.769	12.31	23.16	50	60	-37.69	-36.84	Phase 1	10.94
0.485	7.59	9.31	46.25	56.25	-38.66	-46.94	Phase 2	10.12
0.971	9.24	11.15	46	56	-36.76	-44.85	Phase 2	10.14
1.844	18.54	18.74	46	56	-27.46	-37.26	Phase 2	10.19
20.922	14.41	27	50	60	-35.59	-33	Phase 2	10.89
21.230	13.84	25.92	50	60	-36.16	-34.08	Phase 2	10.89
27.670	21.78	21.97	50	60	-28.22	-38.03	Phase 2	11.07

Result	**Complies** by 28.22 dB

4.6.4 Test Configuration Photographs

The following photographs show the testing configurations used.





5.0 List of Test Equipment

Measurement equipment used for emission 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-	ITS 01393	12	03/02/21
Active Horn Antenna	ETS-Lindgren	3117-PA	ITS 01365	12	07/08/20
Pyramidal Horn Antenna	EMCO	3160-09	ITS 00571	#	#
BI-Log Antenna	Teseq	CBL611D	ITS 01650	12	07/23/20
Pre-Amplifier	Sonoma Instrument	310N	ITS 01493	12	02/07/21
RF Cable	TRU Corporation	TRU CORE 300	ITS 01462	12	08/27/20
RF Cable	TRU Corporation	TRU CORE 300	ITS 01465	12	08/27/20
RF Cable	TRU Corporation	TRU CORE 300	ITS 01470	12	08/27/20
RF Cable	TRU Corporation	TRU CORE 300	ITS 01342	12	10/07/20
Notch Filter	MICRO-TRONICS	BRM50702	ITS 01166	12	05/14/20
RF Cable	Mega Phase	EMC1-K1K1-236	ITS 01537	12	04/17/21

No Calibration required

Software used for emission compliance testing utilized the following:

Name	Manufacturer	Version	Template/Profile
BAT-EMC	Nexio	3.17.0.10	Farpointe_3-17-2020.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 / G104274811	AC	KV	May 18, 2020	Original document
2.0 / G104274811	AC	KV	July 29, 2020	Updated the report section 3 with model numbers information