TEST REPORT

Report Number: 103607712MPK-010
Project Numbers: G103607712, G103848751

Original Issue Date: September 05, 2018
Revision Issue Date: March 19, 2019

Testing performed on
Inductive Sound Processor
Model: AS00721 (Rev1.0) and AS00790(Rev1.1)

FCC ID: 2AGDU-EL2PIN

to
FCC Part 15 Subpart C (15.247)
Industry Canada RSS-247 Issue 2
FCC Part 15 Subpart B
Industry Canada ICES-003

For

Earlens Corporation

Test Performed by:	Test Authorized by:
Intertek	Earlens Corporation
1365 Adams Court	4045 A Campbell
Menlo Park, CA 94025 USA	Menlo Park, CA 94025 USA

Prepared by: _____ **Date:** September 05, 2018
Aaron Chang

Reviewed by: _____ **Date:** September 05, 2018
Krishna K Vemuri

Report No. 103607712MPK-010

Equipment Under Test:	Inductive Sound Processor
Trade Name:	Inductive Sound Processor
Model Number:	AS00721 (Rev1.0) AS00790 (Rev1.1)
Applicant:	Earlens Corporation
Contact:	Larry Arne
Address:	Earlens Corporation 4045 A Campbell Menlo Park, CA 94025
Country	USA
Email:	Larry.Arne@Earlens.com
Applicable Regulation:	FCC Part 15 Subpart C (15.247) Industry Canada RSS-247 Issue 2 FCC Part 15 Subpart B Industry Canada ICES-003 Issue 6
Date of Test:	August 10, 21 to 31, 2018 (Rev 1.0) September 04, 2018 (Rev 1.0) March 6 to 18, 2019 (Rev 1.1)

We attest to the accuracy of this report: (Original Issue Rev 1.0)

Aaron Chang
Project Engineer

Krishna K Vemuri
Engineering Team Lead

We attest to the accuracy of this report: (Rev 1.1)

Hung Huynh
Engineer

Krishna K Vemuri
Engineering Team Lead

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1.0 Summary of Tests

Test	Reference FCC	Reference Industry Canada	Result
RF Output Power	15.247(b)(3)	RSS-247, 5.4.4	Complies
6 dB Bandwidth	15.247(a)(2)	RSS-247, 5.2.1	Complies
Power Density	15.247(e)	RSS-247, 5.2.2	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)
RF Exposure	15.247(i), 2.1093(d)	RSS-102	Complies
Radiated Emissions	15.109	ICES-003	Complies
AC Line Conducted Emissions	15.107	ICES-003	Not Applicable[1]

[1] EUT is battery powered only.

EUT receive date: August 10, 2018 (Rev 1.0)
March 06, 2019 (Rev 1.1)

EUT receive condition: The pre-production version of the EUT was received in good condition with no apparent damage. As declared by the Applicant, it is identical to the production units.

Test start date: August 10, 2018 (Rev 1.0)
March 06, 2019 (Rev 1.1)

Test completion date: September 04, 2018 (Rev 1.0)
March 18, 2019 (Rev 1.1)

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

2.0 General Information

2.1 Product Description

Earlens Corporationsupplied the following description of the EUT:

Equipment under Test (EUT) is the Inductive Sound Processor, Model AS00721 (Rev1.0) and AS00790 (Rev1.1). As described by the manufacturer, the Inductive Sound Processor is a hearing aid device.

Information about the Bluetooth 4.0 (BLE) radio is presented below:

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

Information about the 2.4 GHz radio is presented below:

Applicant	Earlens Corporation
Model No.	AS00721 (Rev1.0) and AS00790 (Rev1.1)
FCC Identifier	2AGDU-EL2PIN
IC Identifier	20825-EL2PIN
Type of transmission	Digital Transmission System (DTS)
Rated RF Output	-0.93 dBm
Antenna(s) & Gain	Internal Antenna, Gain: -1.2 dBi
Frequency Range	2402 – 2480 MHz
Type of modulation/data rate	GFSK / 1Mbit/s
Number of Channel(s)	40
Applicant Name & Address	Earlens Corporation 4045 A Campbell Menlo Park, CA 94025 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, Frequency Hopping Spread Spectrum System, and Hybrid System devices Operating under §15.247" (KDB 558074 D01 Meas Guidance v05), RSS-247 Issue 2, ANSI C63.10: 2013 and RSS-GEN Issue 5.

Radiated emissions and AC mains conducted emissions measurements were performed according to the procedures in ANSI C63.10: 2013 & ANSI C63.4-2014. 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

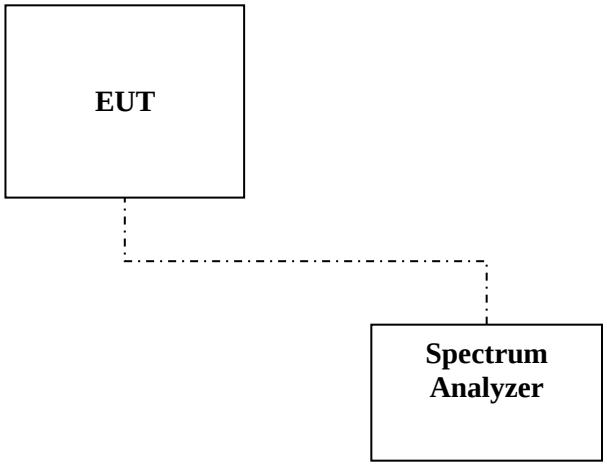
3.1 Support Equipment

None. No support equipment was used for testing.

3.2 Block Diagram of Test Setup

Equipment Under Test			
Description	**Manufacturer**	**Model Number**	**Serial Numbers**
Rev 1.0			
Inductive Sound Processor	Earlens Corporation	AS00721	18080019 (Low) 18080020 (Mid) 18080022 (High)
Rev 1.1			
Inductive Sound Processor	Earlens Corporation	AS00790	19020032 (Low) 19020028 (Mid) 19020025 (High)

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

3.3 Justification

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

Revision 1.1
As declared by Earlens Corporation, design updates were only made to in-ear inductive link (new drive circuitry, new clock and new switching regulators) and the Bluetooth chip / antenna has stayed the same. Therefore, the model number AS00721 was changed to AS00790 as requested by manufacturer.

To continued compliance on the Inductive Sound Processor, the following tests were performed: Duty Cycle Measurement, Maximum Peak Conducted Output Power at Antenna Terminals, Transmitter Radiated Emissions, and Radiated Emissions on Digital Parts. See Annex B for test plan, test data and setup pictures.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was provided by Earlens Corporation

3.5 Mode of Operation during Test

During transmitter testing, the transmitter was setup to transmit at maximum RF power on low, middle and high frequencies/channels.

3.5 Modifications Required for Compliance

No modifications were made by the manufacturer or Intertek to the EUT in order to bring the EUT into compliance.

3.6 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 A8.2 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 558074 D01 Meas Guidance v05 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.

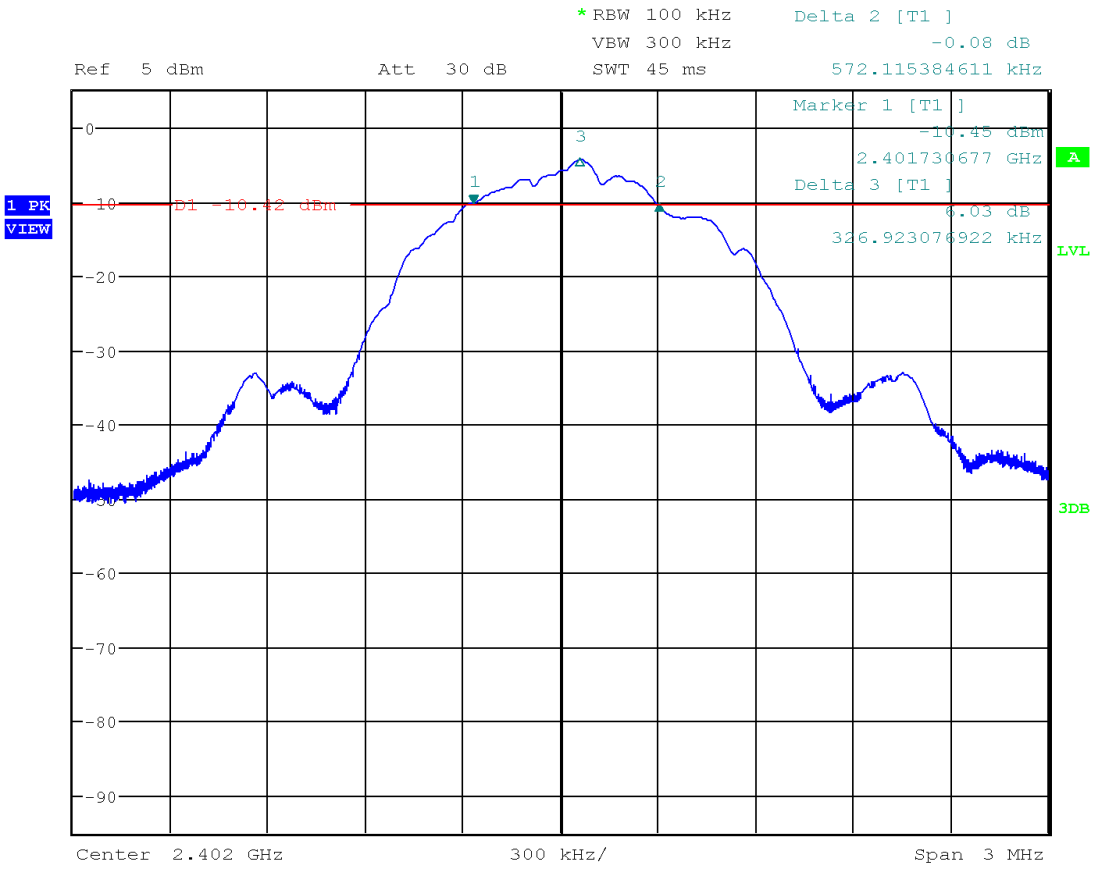
For 99% power bandwidth measurement, the bandwidth was determined by using the built-in 99% occupied bandwidth function of the spectrum analyzer. The resolution bandwidth is set to 1% of the selected span as is without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

4.1.3 Test Result

Frequency (MHz)	6-dB bandwidth FCC 15.247 & RSS-GEN (kHz)	Occupied bandwidth, RSS-GEN (kHz)	Plot
2402	572.115	--	1.1
	--	1.068	1.4
2426	581.731	--	1.2
	--	1.045	1.5
2480	581.731	--	1.3
	--	1.068	1.6

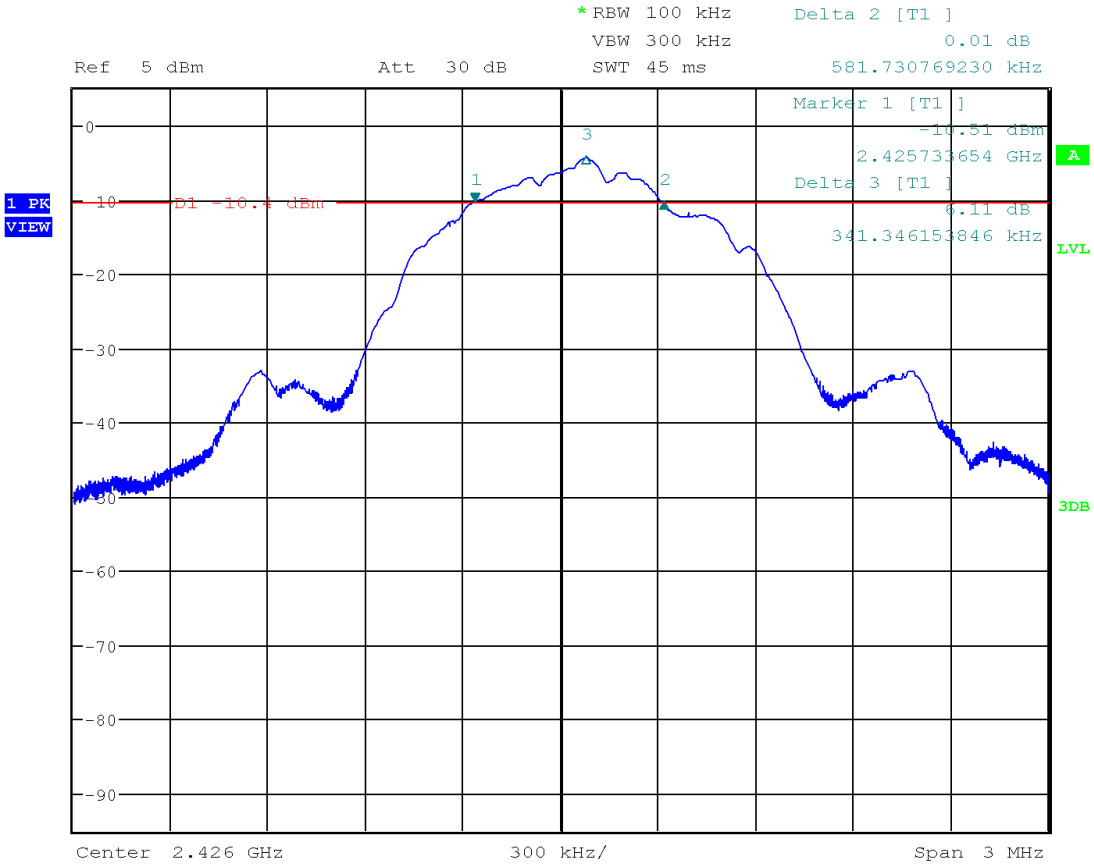
Date of Test:	August 21, 2018
Results	**Complies**

Plot 1. 1



Date: 21.AUG.2018 08:25:26

Plot 1. 2



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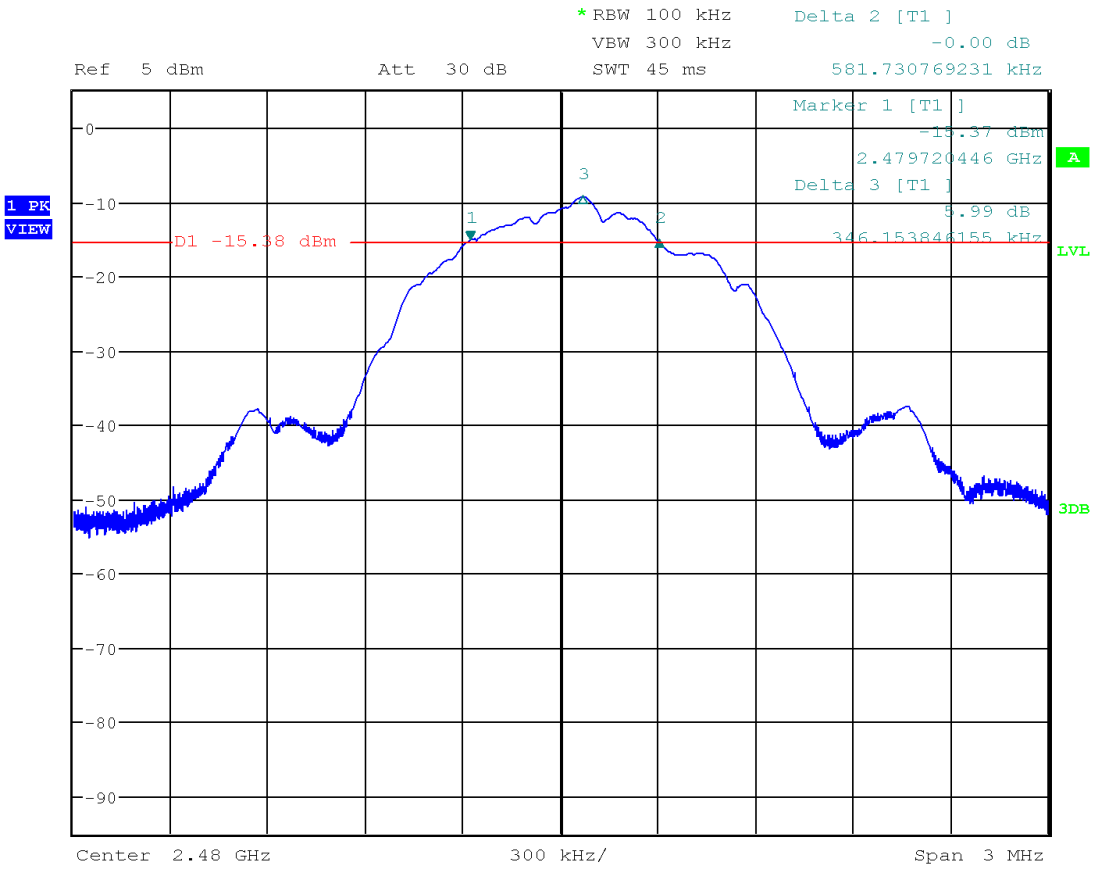
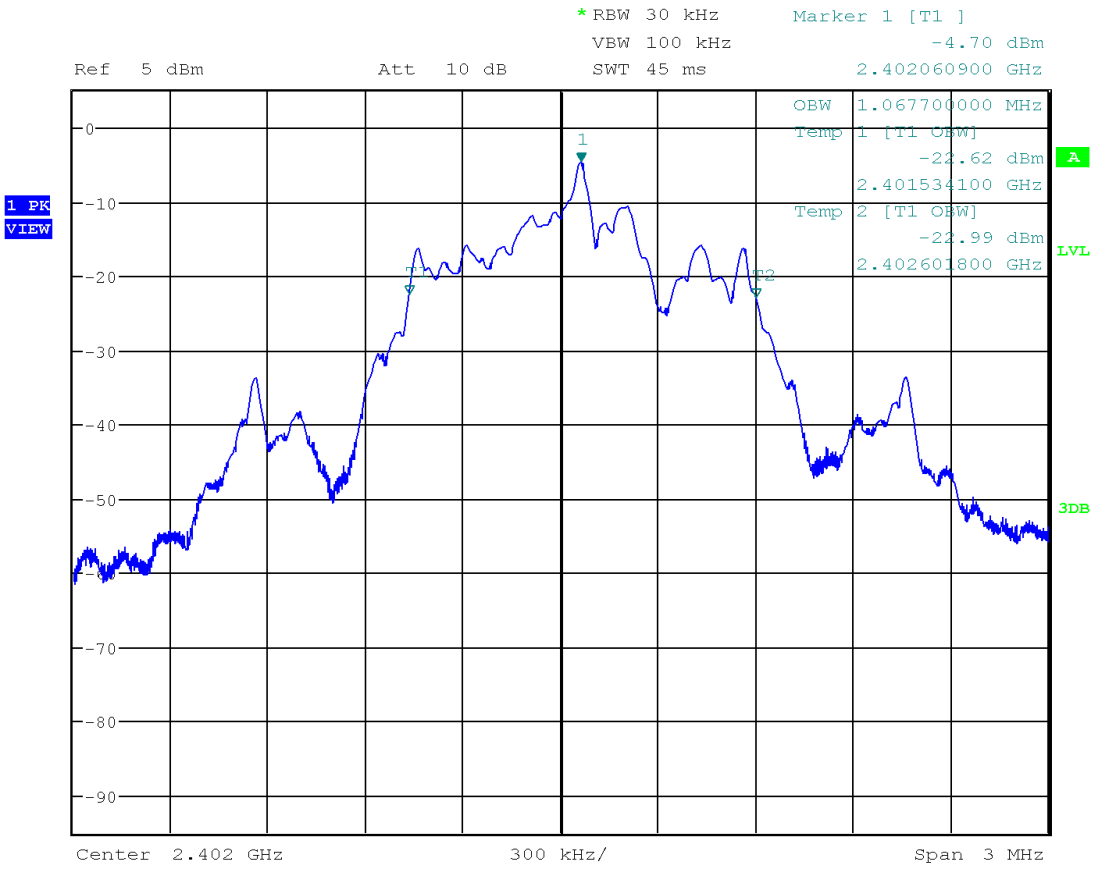
Plot 1. 3



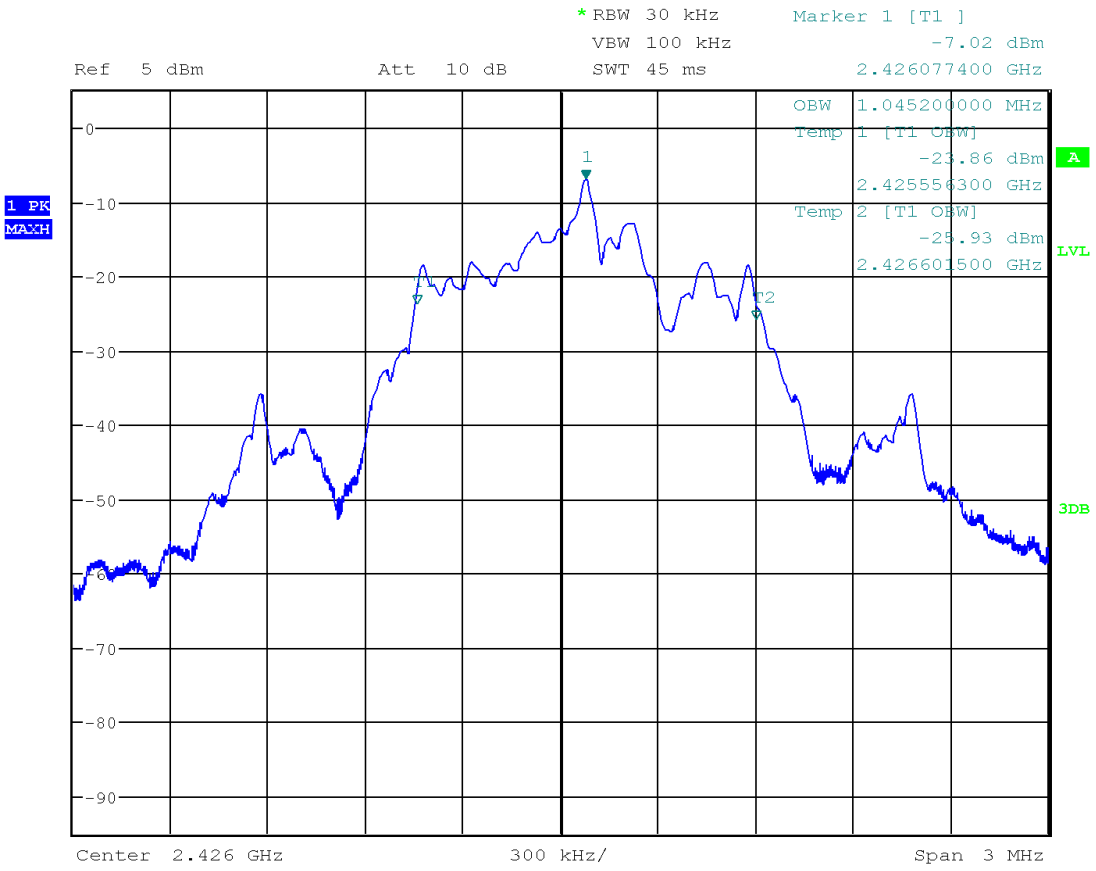
Date: 21.AUG.2018 09:56:00

Plot 1. 4



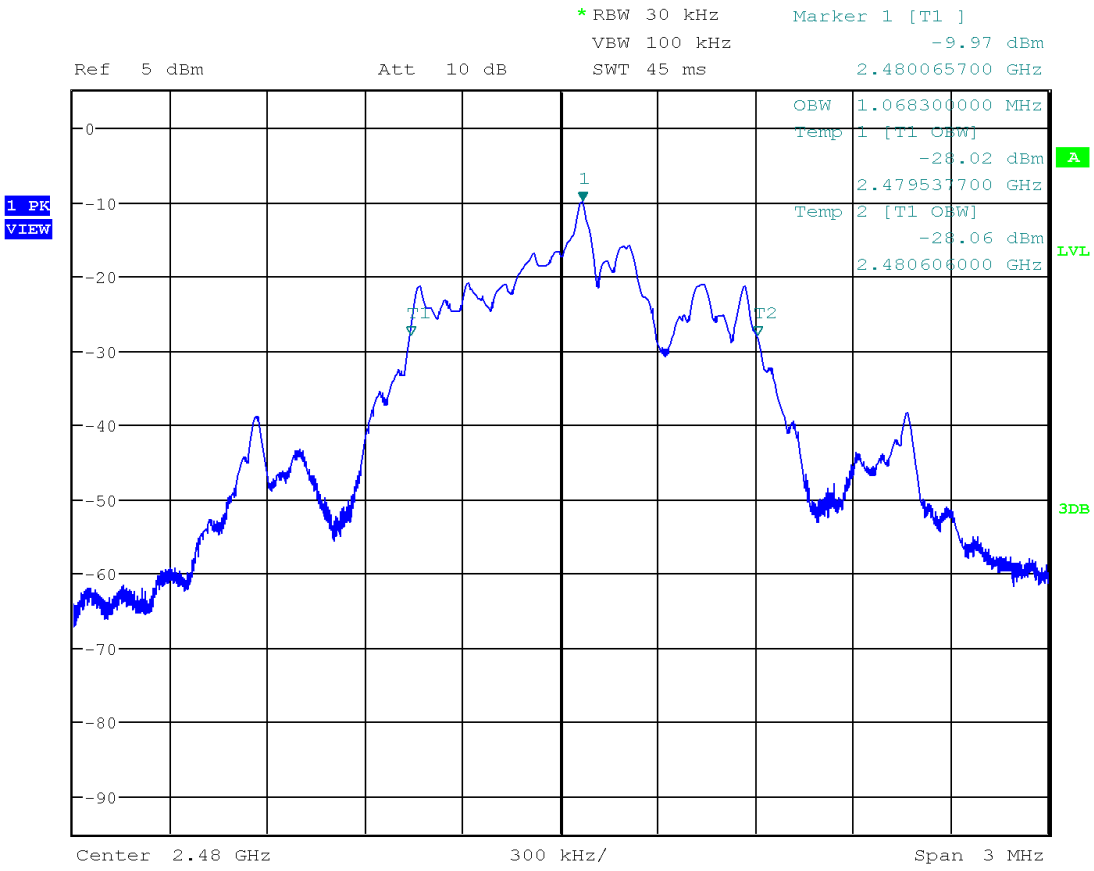
Date: 21.AUG.2018 08:30:34

Plot 1.5



Date: 21.AUG.2018 08:43:24

Plot 1.6



Date: 21.AUG.2018 09:58:35

4.2 Maximum Peak Conducted Output Power at Antenna Terminals
FCC Rule: 15.247(b)(3); RSS-247 A8.4;

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 558074 D01 Meas Guidance v05 was used. Specifically, section 11.9.1.1 RBW ≥ DTS Bandwidth of ANSI 63.10 was utilized as the spectrum analyzer's resolution bandwidth was greater than the DTS bandwidth.

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.

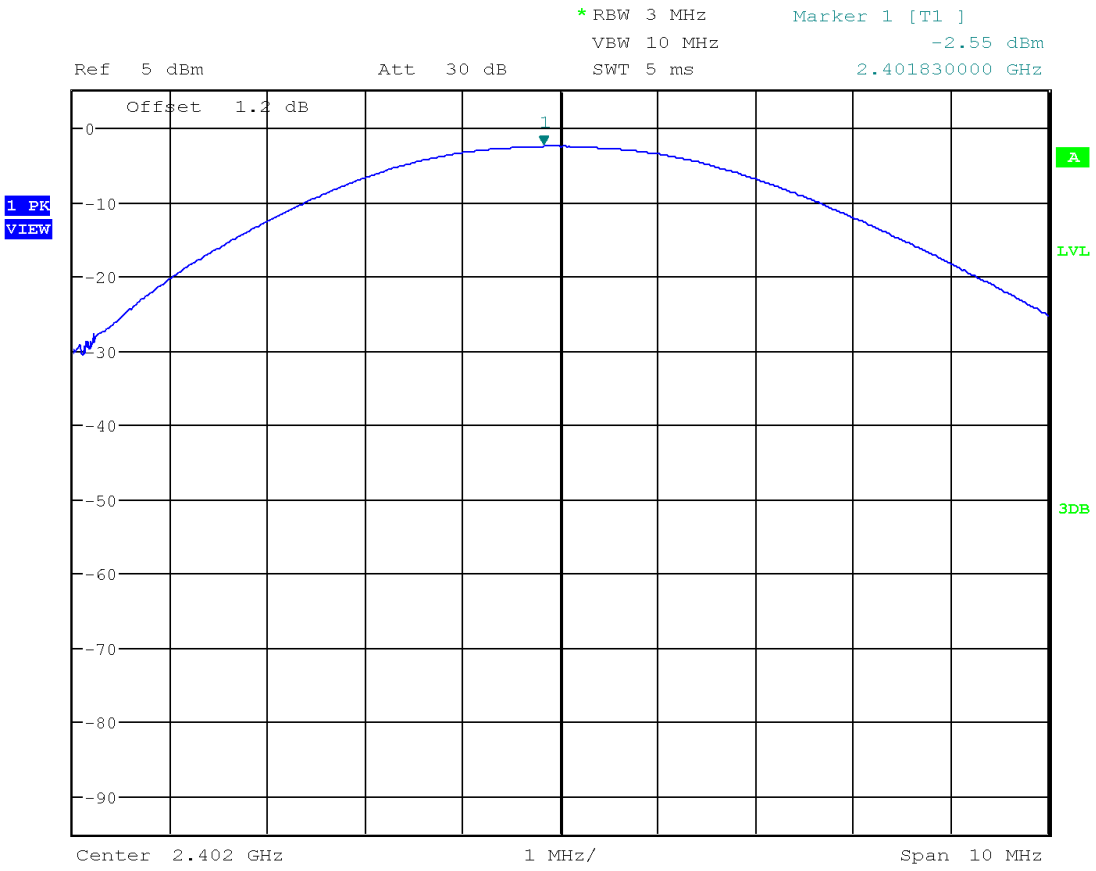
4.3.3 Test Result

Refer to the following plots 2.1 – 2.6 for the test details.

Frequency, MHz	Conducted Power (peak), dBm	Conducted Power (peak), mW	Plot
2402	-2.55	0.556	2.1
2426	-0.93	0.807	2.2
2480	-1.00	0.794	2.3

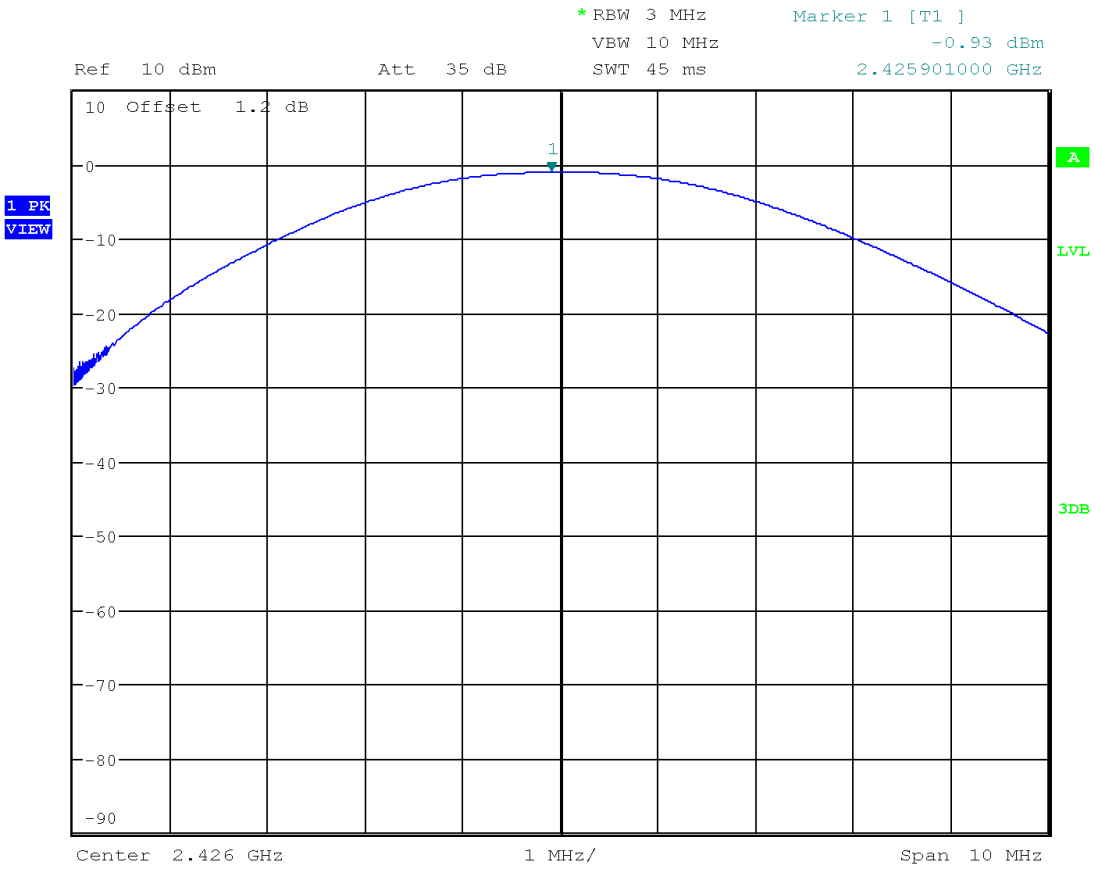
Date of Test:	August 22 to 31, 2018
Results	**Complies**

Plot 2. 1



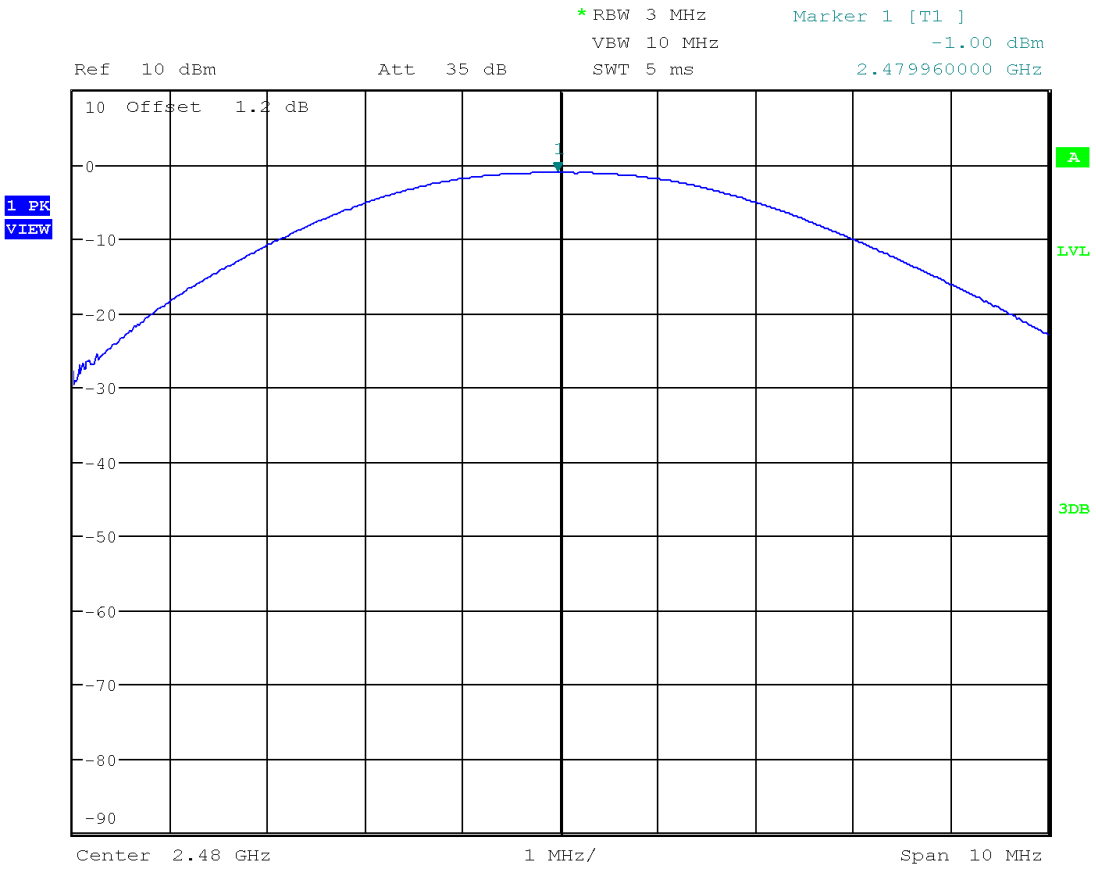
Date: 22.AUG.2018 09:42:22

Plot 2. 2



Date: 30.AUG.2018 07:35:28

Plot 2. 3



Date: 31.AUG.2018 12:33:14

4.3 Maximum Power Spectral Density
FCC: 15.247 (e); RSS-247 A8.2b;

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 558074 D01 Meas Guidance v05, specifically section 11.10.2 Method PKPSD (peak PSD) of ANSI 63.10.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the *DTS bandwidth*.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

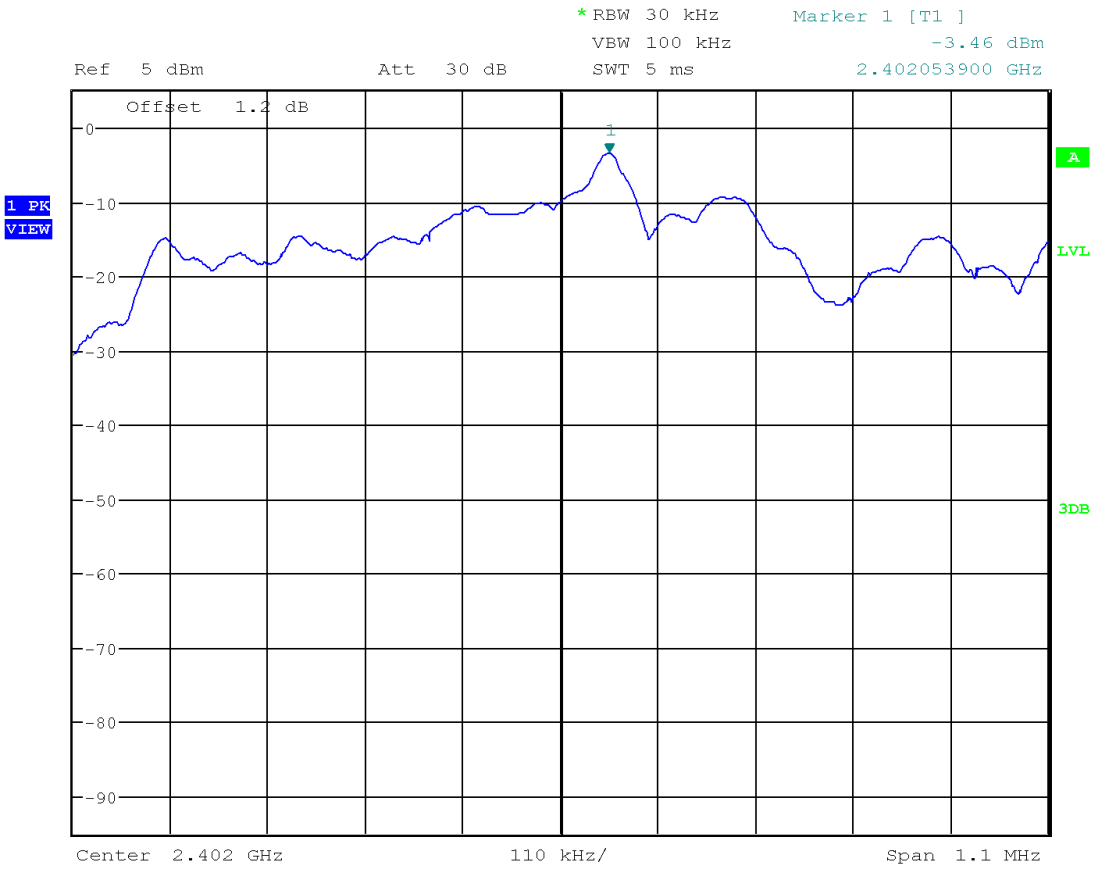
4.3.3 Test Result

Refer to the following plots for the test result

Frequency, MHz	Maximum Power Spectral Density, dBm	Maximum Power Spectral Density Limit, dBm	Margin, dB	Plot
2402	-3.46	8.0	-11.46	3.1
2426	-1.97	8.0	-9.97	3.2
2480	-6.98	8.0	-14.98	3.3

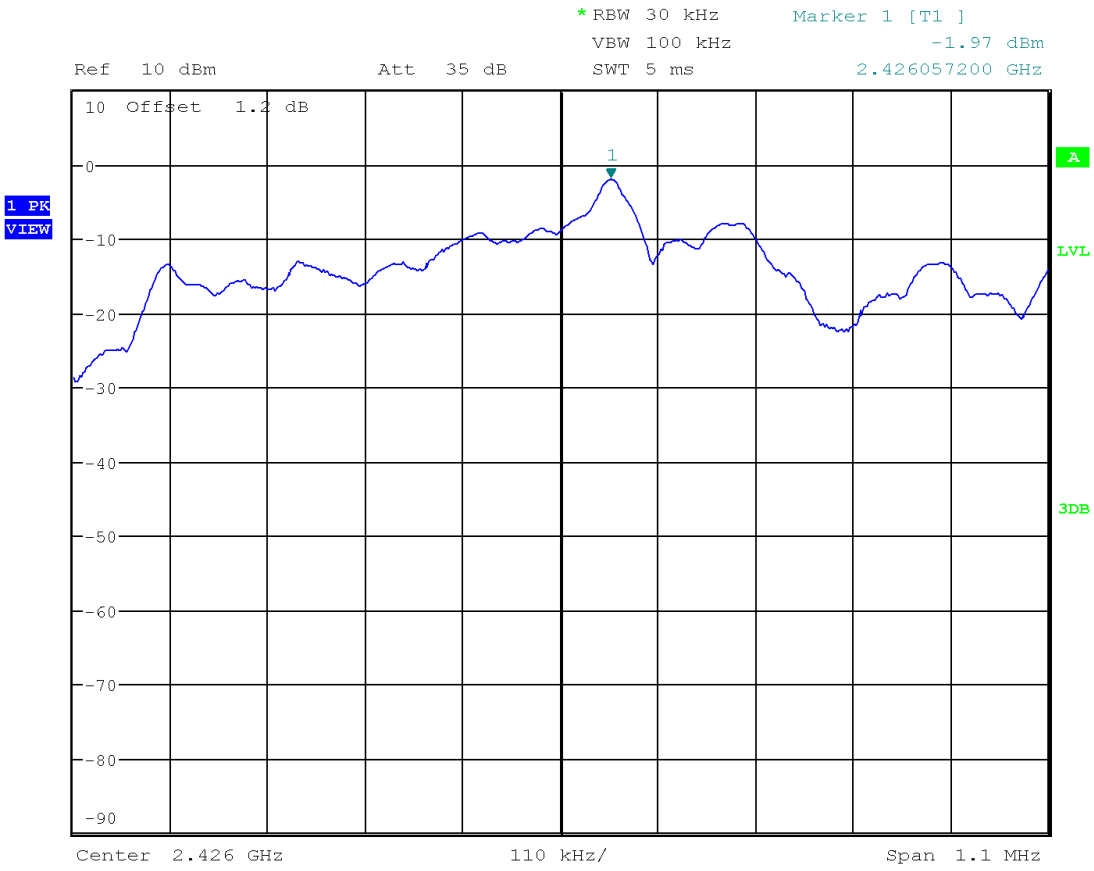
Date of Test:	August 22 & 30, 2018
Results	**Complies**

Plot 3. 1



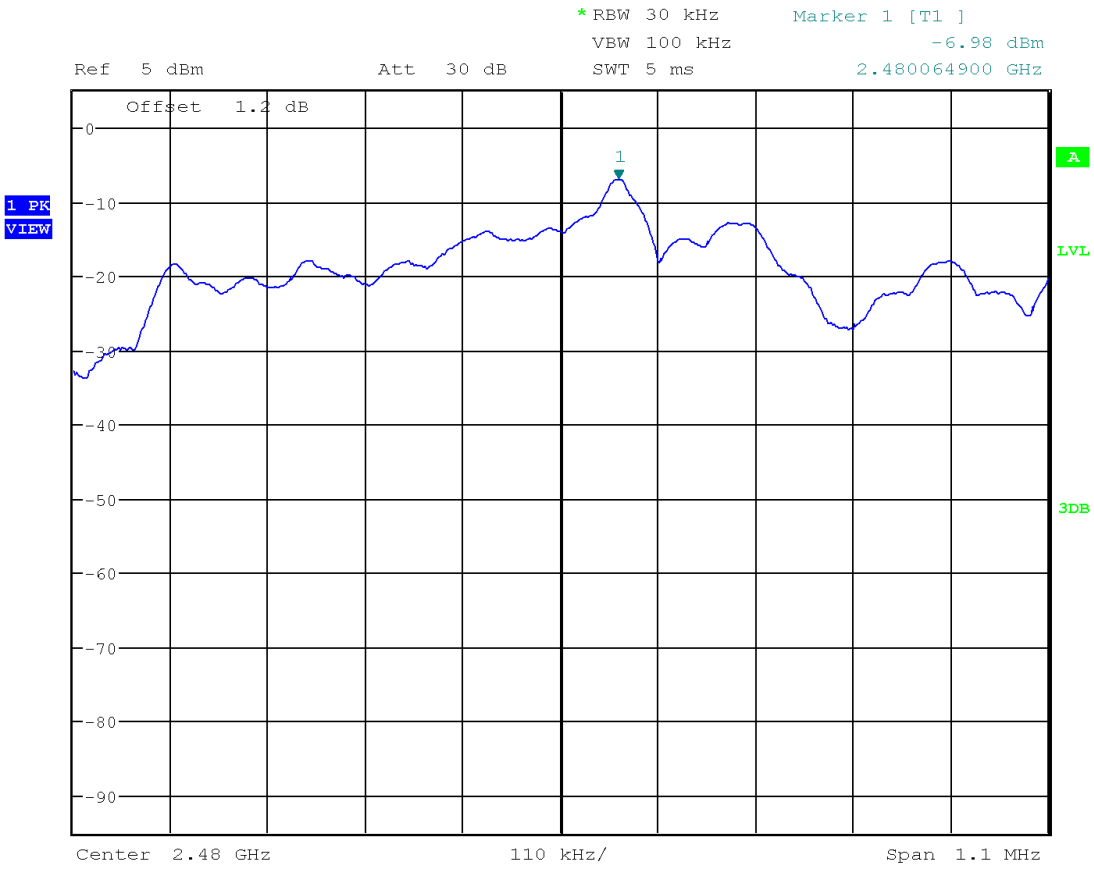
Date: 22.AUG.2018 09:43:24

Plot 3. 2



Date: 30.AUG.2018 07:36:37

Plot 3. 3



Date: 22.AUG.2018 10:30:49

4.4 Unwanted Conducted Emissions
FCC: 15.247(d); RSS-247 A8.5;

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 558074 D01 Meas Guidance v05, 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.

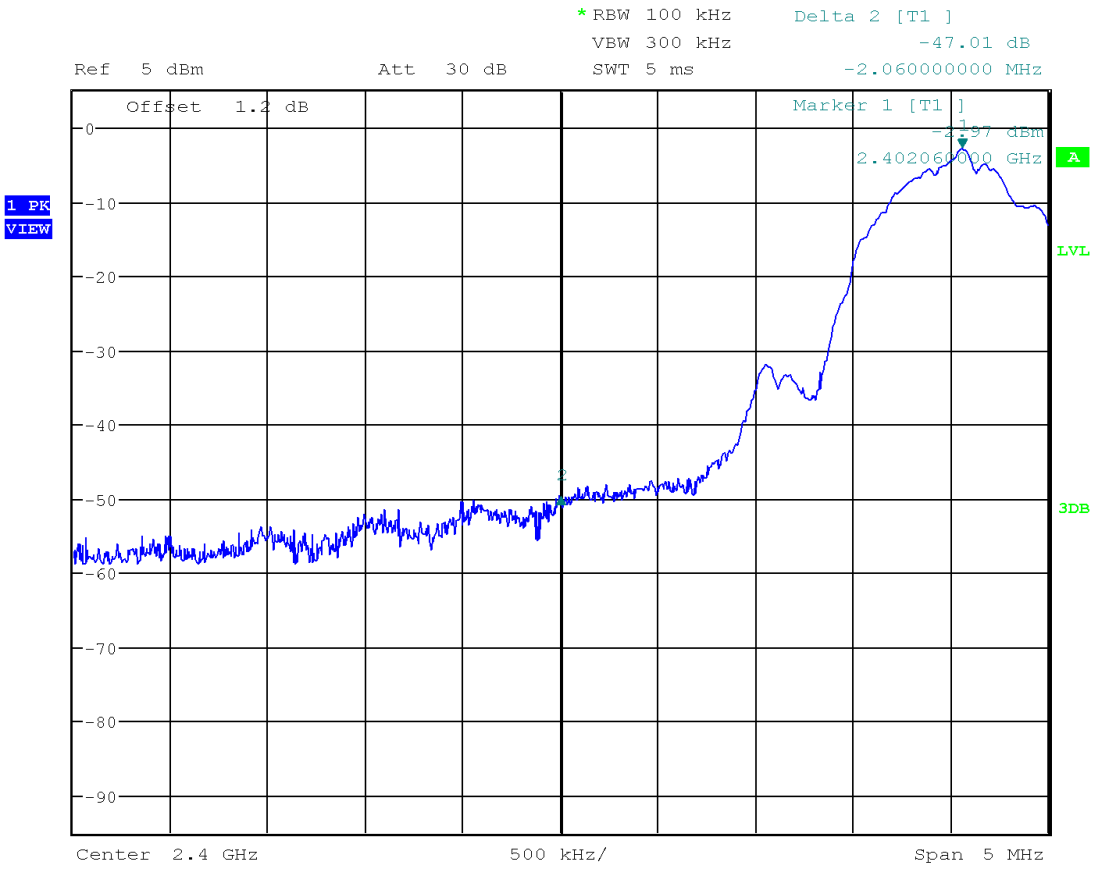
The unwanted emissions were measured from 30 MHz to 25 GHz. Plots below are corrected for cable loss and then compared to the limits.

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.

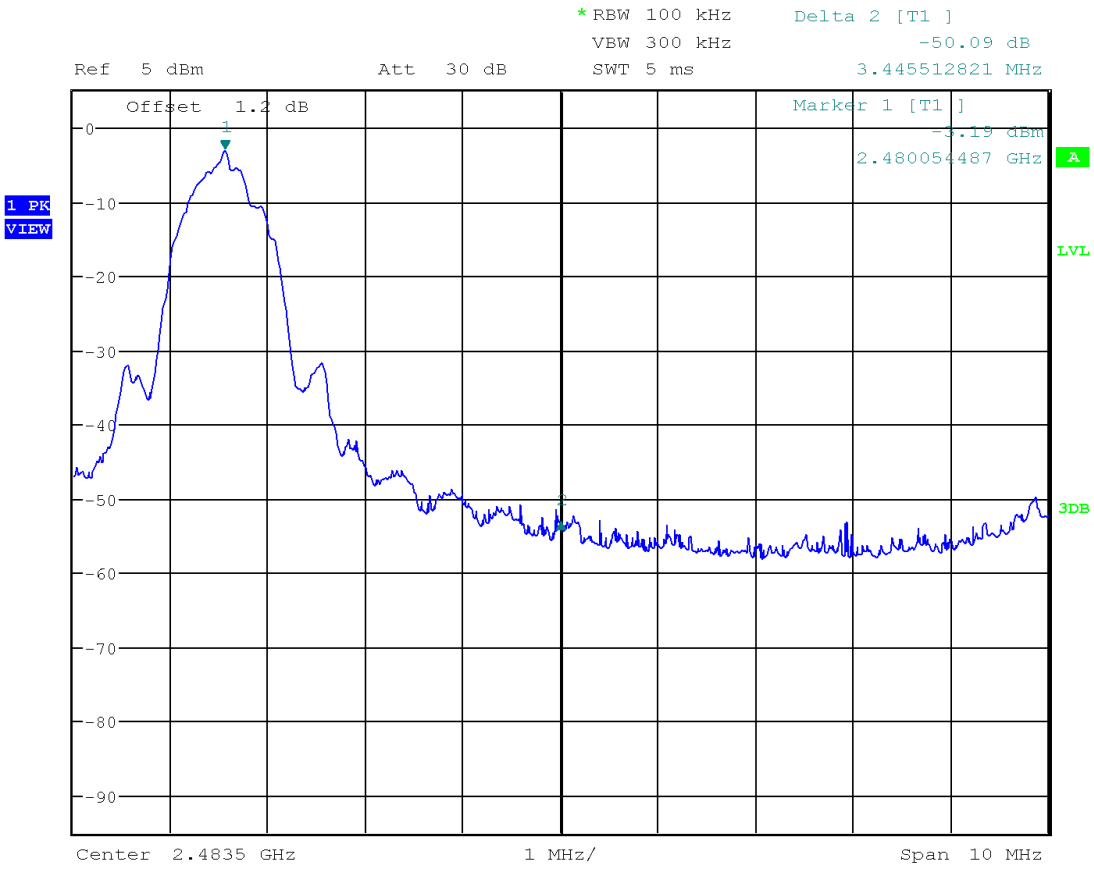
Date of Test:	August 22 & 30,2018 & September 4, 2018
Results	**Complies**

Tx @ Low Channel, 2400 MHz Band Edge
Plot 4.1



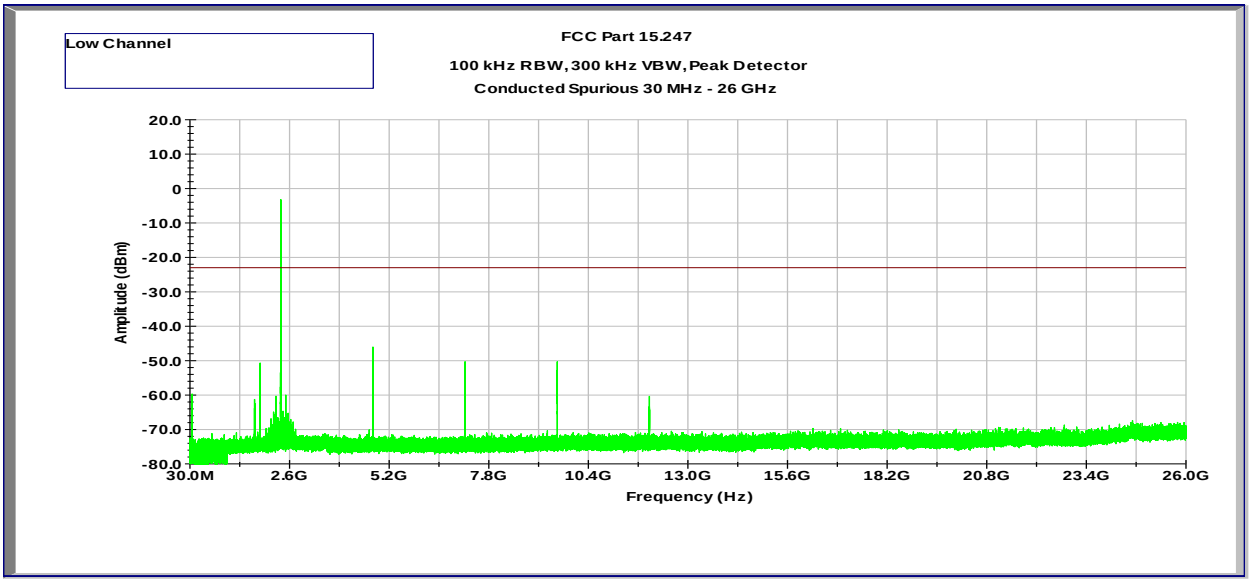
Date: 22.AUG.2018 09:44:38

Tx @ High Channel, 2483.5 MHz Band Edge
Plot 4.2

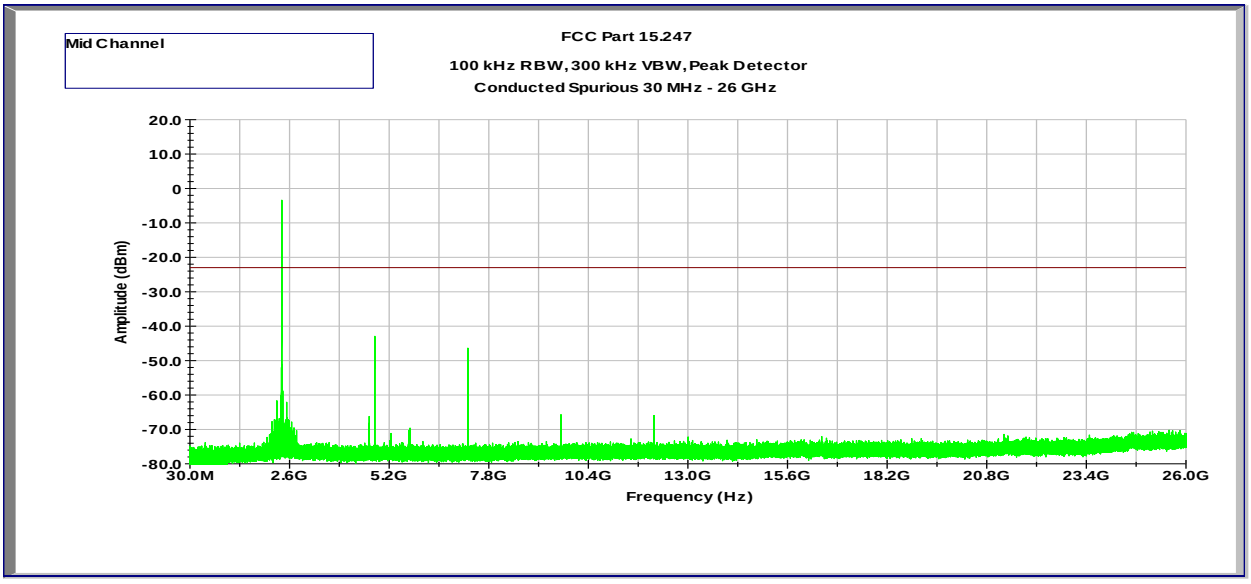


Date: 4.SEP.2018 11:34:15

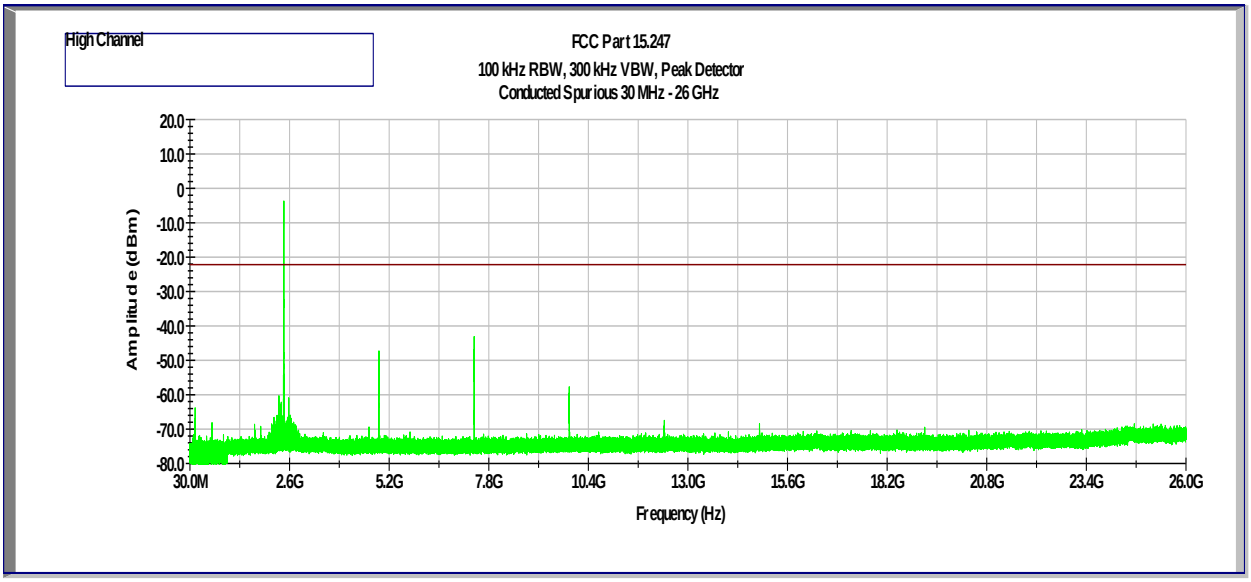
Tx @ Low Channel, 2402 MHz
30MHz -26GHz Conducted Spurious
Plot 4.3



Tx @ Mid Channel, 2426 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;

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.

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 included of the worst-case configuration (the configuration which resulted in the highest emission levels).

4.5.3 Field Strength Calculation

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF – AG; if measurement is performed at a distance other than specified in the rule, a Distance Correction Factor (DCF) shall be added.

Where FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV); AF = Antenna Factor in dB(1/m)
CF = Cable Attenuation Factor in dB; AG = Amplifier Gain in dB

Assume a receiver reading of 52.0 dB(μV) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μV/m). This value in dB(μV/m) was converted to its corresponding level in μV/m.
RA = 52.0 dB(μV)
AF = 7.4 dB(1/m)
CF = 1.6 dB
AG = 29.0 dB
FS = 52.0+7.4+1.6-29.0 = 32 dB(μV/m).
Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m.

4.5.4 Antenna-port conducted measurements

Antenna-port conducted measurements August also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

4.5.6 General Procedure for conducted measurements in restricted bands

a) Measure the conducted output power (in dBm) using the detector specified for determining quasi-peak, peak, and average conducted output power, respectively.

b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)

c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).

d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (*e.g.*, Watts, mW).

e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:
E = EIRP – 20log D + 104.8+DCF (DCF for Average measurements)
where:
E = electric field strength in dBμV/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.
DCF = Duty Cycle Correction Factor
f) Compare the resultant electric field strength level to the applicable limit.
g) Perform radiated spurious emission test

4.5.7 Test Results

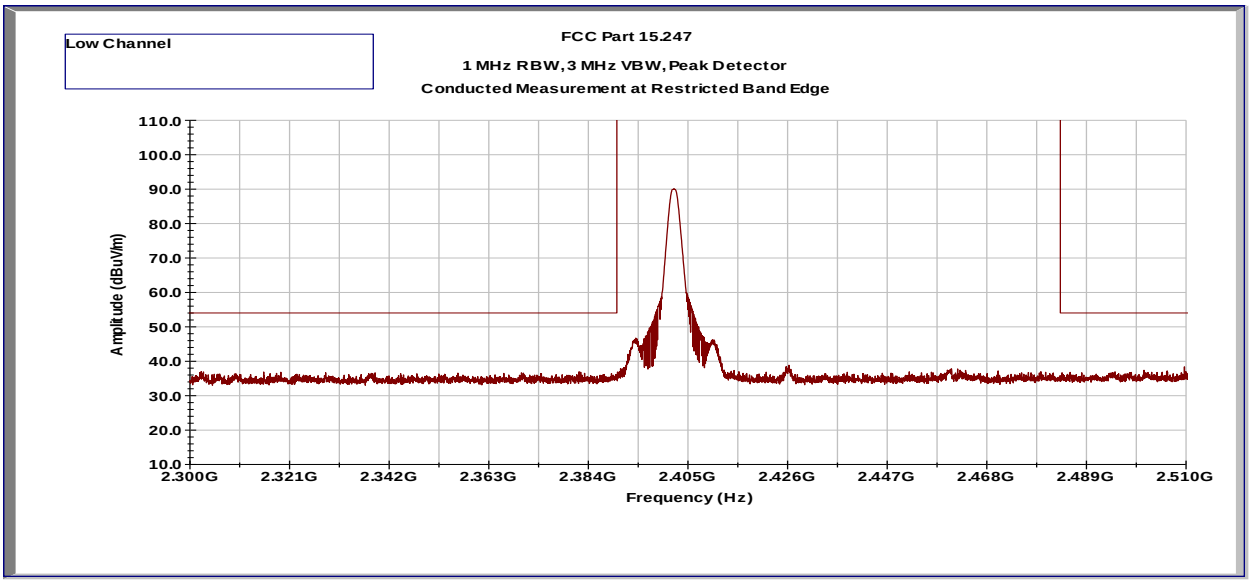
The data on the following pages list the significant emission frequencies, the limit and the margin of compliance where emissions are within 0.5dB of the limit.

All conducted antenna port plots are corrected with the consideration of a 2 dBi Antenna Gain.

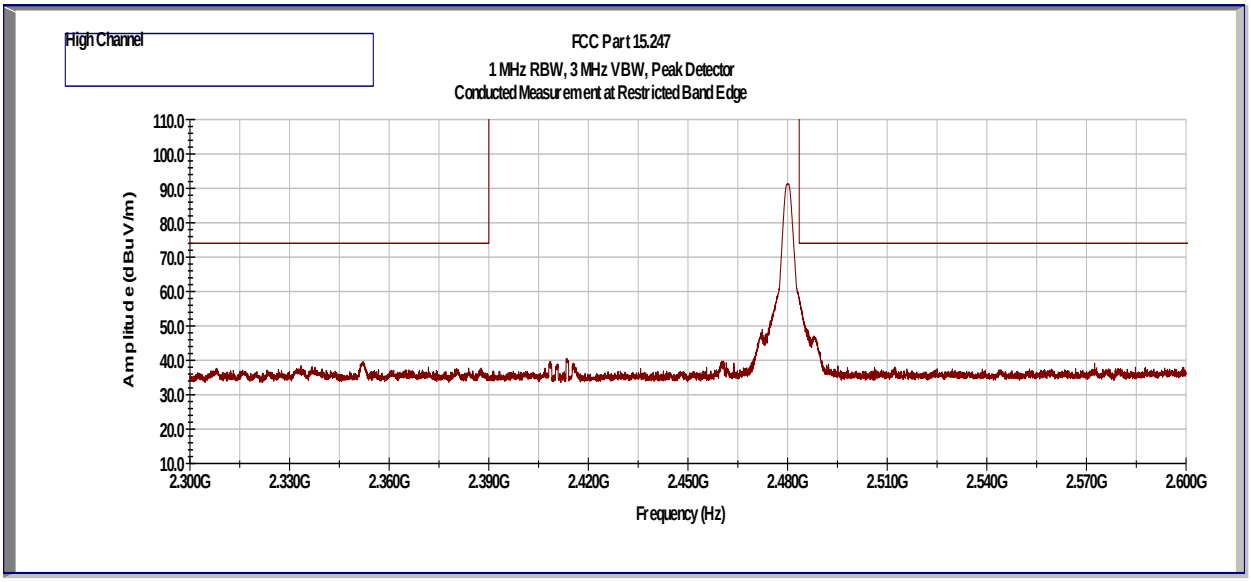
Date of Test:	August 22 & 30, 2018 & September 4, 2018
Results	**Complies**

Test Results: 15.209/15.205 Restricted Band Emissions at Antenna Port

Out-of-Band Spurious Emissions at the Band Edge – Tx @ 2402 MHz
Peak detector vs Average limits

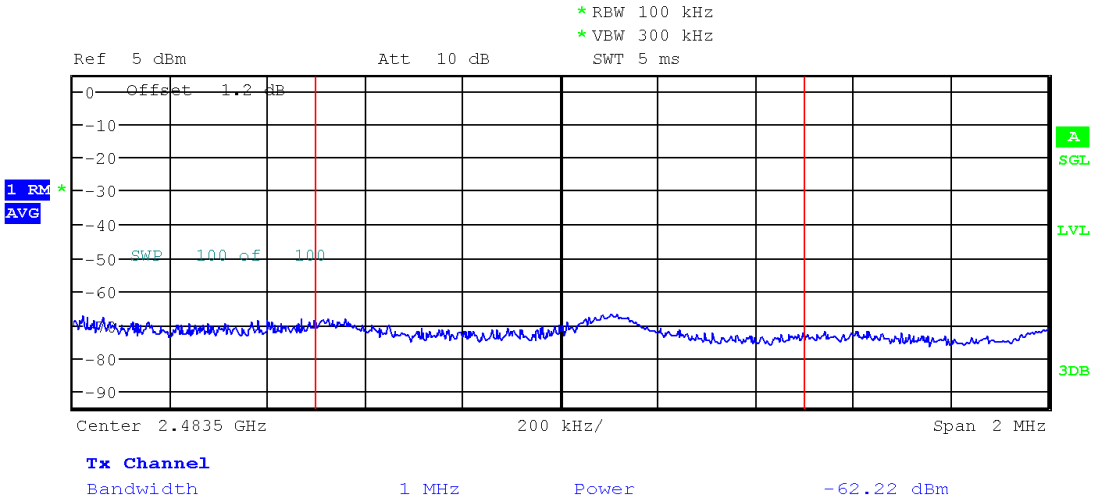


Out-of-Band Spurious Emissions at the Band Edge – Tx @ 2480 MHz
Peak detector vs Peak limits



Frequency	Corrected Amplitude	Peak Limit	Margin	Detector	Results
GHz	dBµV/m	dBµV/m	dB		
2.4835	54.2	74	-19.8	Peak	Pass

Out-of-Band Spurious Emissions at the Band Edge – Tx @ 2480 MHz



Date: 4.SEP.2018 11:37:03

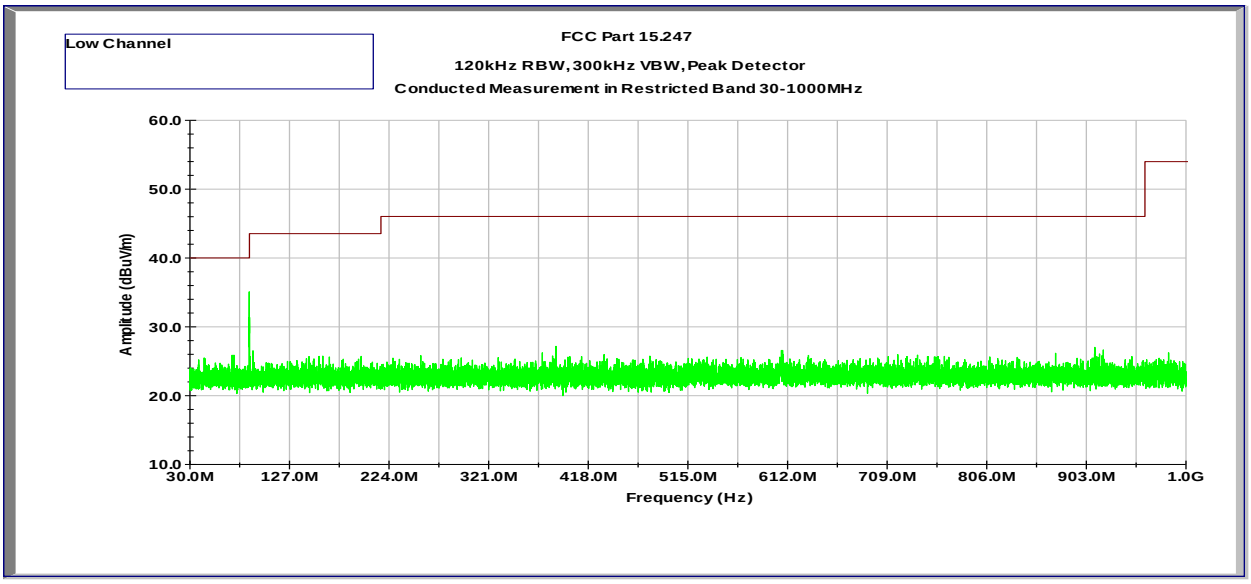
Frequency	Corrected Amplitude (E)	Avg Limit	Margin	Detector	Results
GHz	dBµV/m	dBµV/m	dB		
2.4835	33.8	54	-20.2	RMS	Pass

E = EIRP – 20log D + 104.8 + δ
EIRP = -62.22 + (-)1.2
D = 3 (meters)
Section 11.13.3.4 “Trace averaging across on- and off-times of the EUT transmissions followed by duty cycle correction” of ANSI 63.10 was utilized per KDB 558074 D01 DTS Meas Guidance v05.

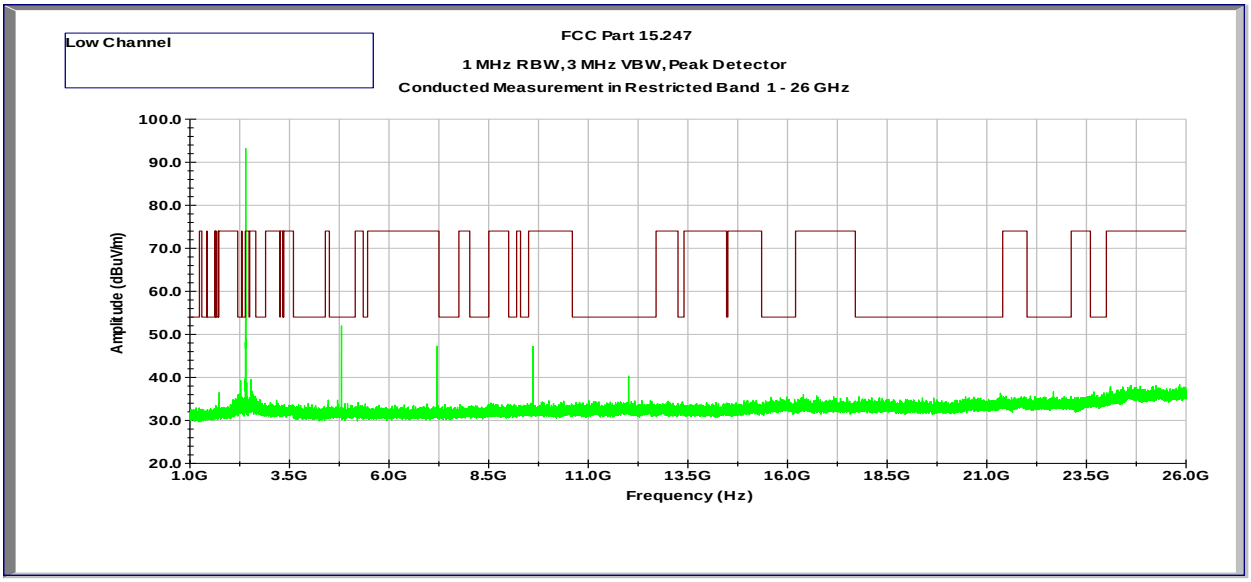
Out-of-Band Conducted Spurious Emissions (at Antenna Port)

Tx @ 2402MHz

Out-of-Band Spurious Emissions at Antenna Port - 30 MHz to 1 GHz



Out-of-Band Spurious Emissions at Antenna Port – 1 - 26 GHz Peak Detector vs Avg Limit

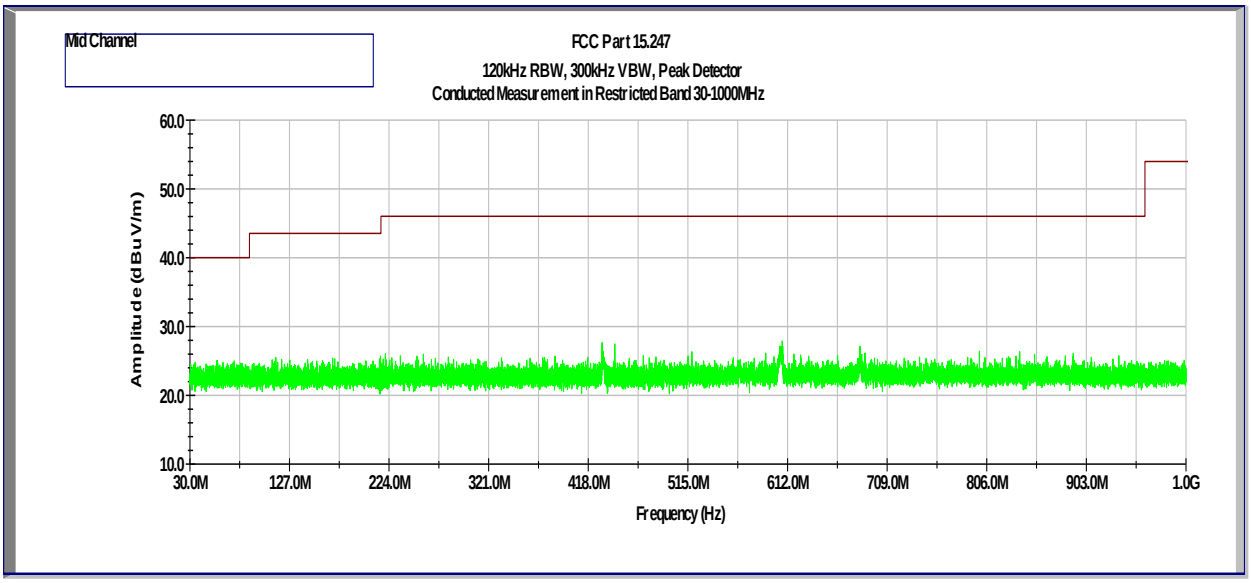


Frequency	Corrected Amplitude	Avg Limit	Margin	Detector	Results
GHz	dBµV/m	dBµV/m	dB		
4.804	51.9	54	-2.1	Peak	Pass

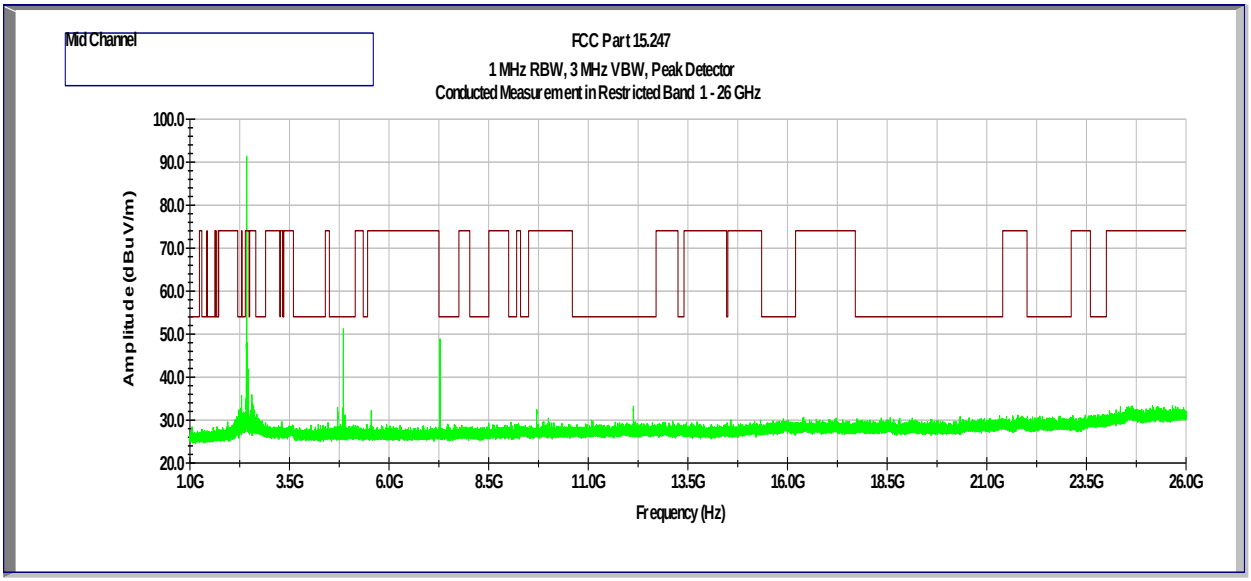
Out-of-Band Conducted Spurious Emissions (at Antenna Port)

Tx @ 2426MHz

Out-of-Band Spurious Emissions at Antenna Port - 30 MHz to 1 GHz



Out-of-Band Spurious Emissions at Antenna Port – 1 - 26 GHz Peak Detector vs Avg Limit

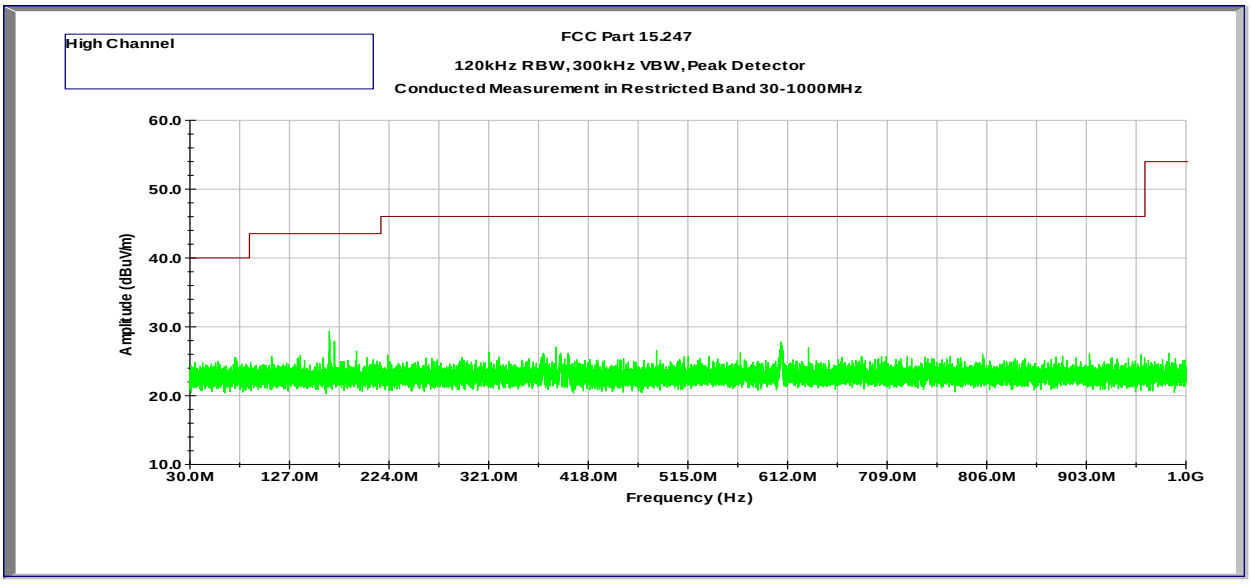


Frequency	Corrected Amplitude	Avg Limit	Margin	Detector	Results
GHz	dBµV/m	dBµV/m	dB		
4.852	51.2	54	-2.8	Peak	Pass

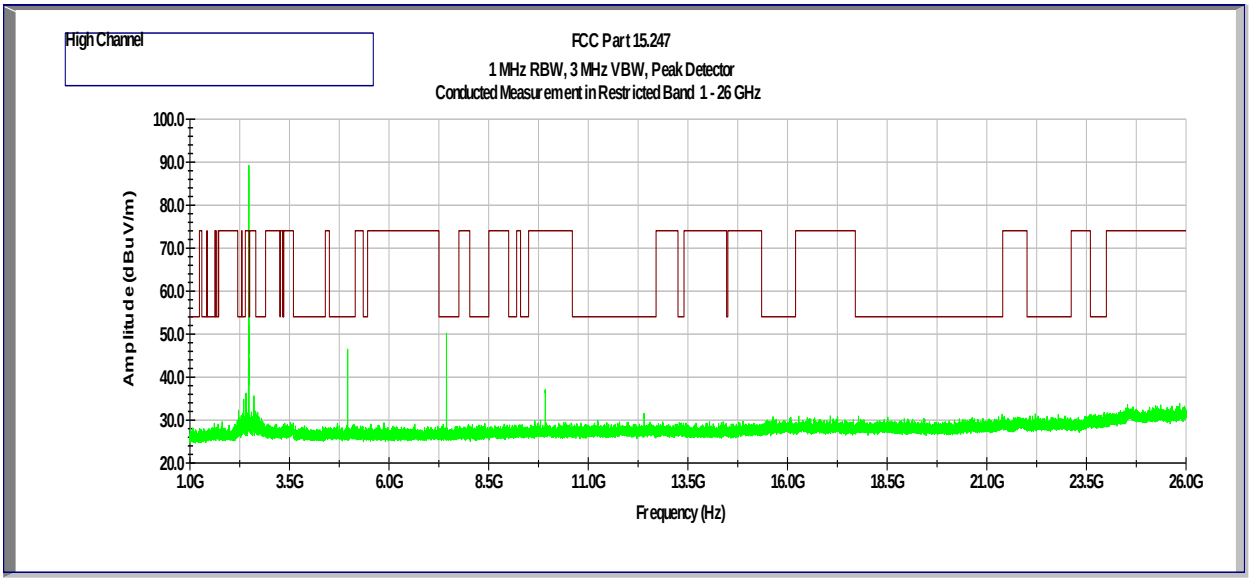
Out-of-Band Conducted Spurious Emissions (at Antenna Port)

Tx @ 2480MHz

Out-of-Band Spurious Emissions at Antenna Port - 30 MHz to 1 GHz



Out-of-Band Spurious Emissions at Antenna Port – 1 - 26 GHz Peak Detector vs Avg Limit



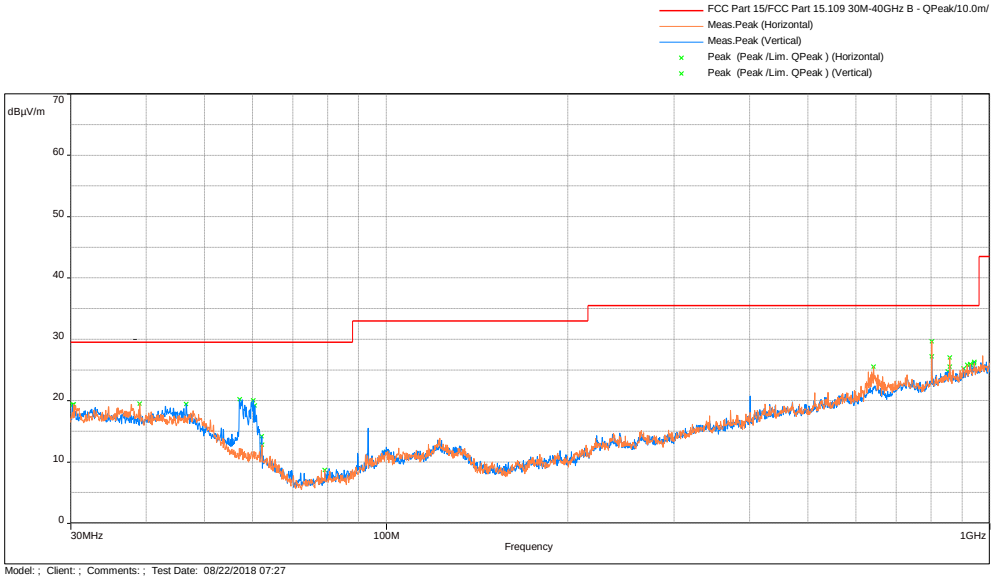
Frequency	Corrected Amplitude	Avg Limit	Margin	Detector	Results
GHz	dBµV/m	dBµV/m	dB		
7.440	50	54	-4	Peak	Pass

Out-of-Band Radiated Spurious Emissions (Cabinet Radiation)

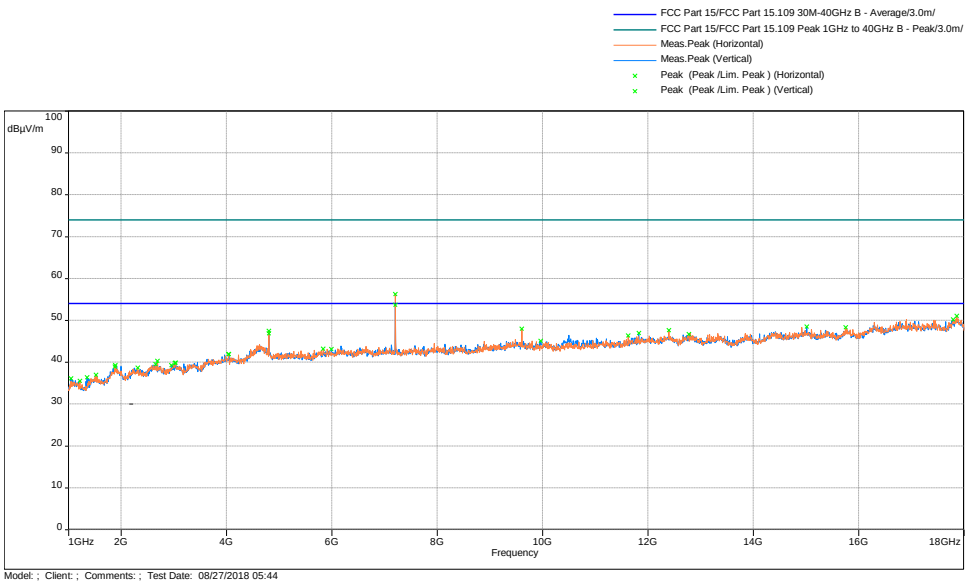
Test Results: 15.209 Radiated Spurious Emissions Low Channel

Tx at 2402MHz

Radiated Spurious Emissions 30 MHz - 1000 MHz



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



Frequency	Avg@3m	Lim.@3m	Margin	Height	Angle	Comment	RA	Correction
MHz	dBµV/m	dBµV/m	dB	m	°		dBµV	dB
7206.7	53.2	54	-0.8	2.48	314.75	Horizontal	58.3	-5.07

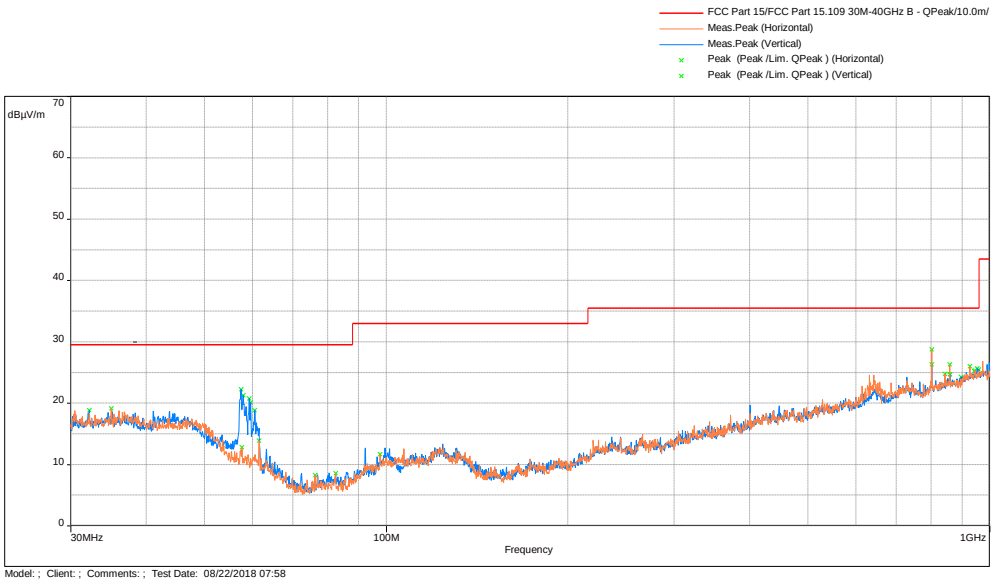
Note: Measurements were performed in X, Y, Z planes of the EUT and worst cast data was presented. Final average measurements were performed using section 11.12.2.5.2 “Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction” of ANSI 63.10 was utilized; except when using 11.12.2.5.2, set Trace mode = Max Hold and the measurement correction factor in 11.12.2.5.2 i) is not added.

Results	**Complies**

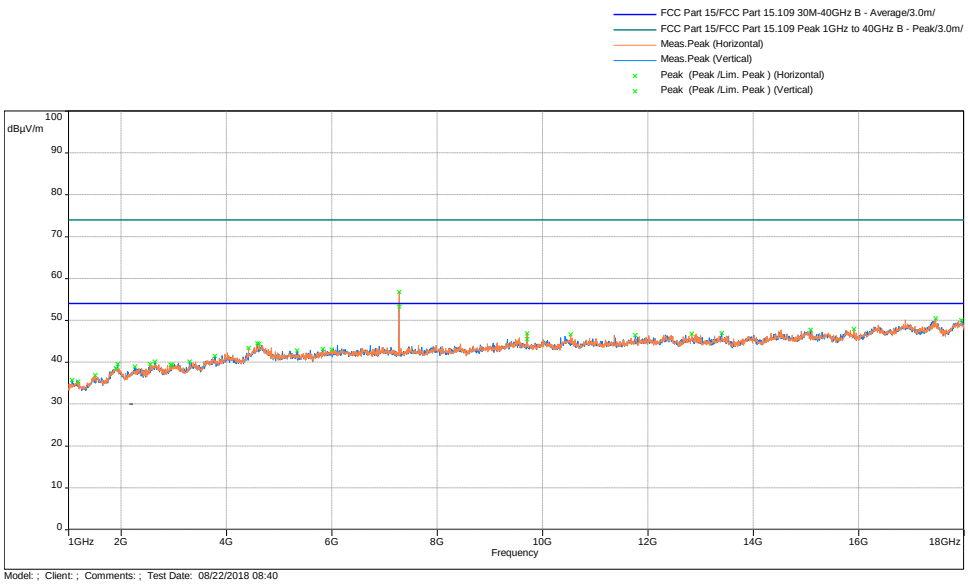
Note: Radiated emission measurements were performed up to 25GHz. No emissions were identified when scanned from 18-25 GHz.

Test Results: 15.209 Radiated Spurious Emissions Mid Channel
Tx at 2426MHz

Radiated Spurious Emissions 30 MHz - 1000 MHz



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



Frequency	Avg@3m	Lim.@3m	Margin	Height	Angle	Comment	RA	Correction
MHz	dBµV/m	dBµV/m	dB	m	°		dBµV	dB
7278.1	53.5	54	-0.5	1.14	69.25	Horizontal	58.6	-5.1

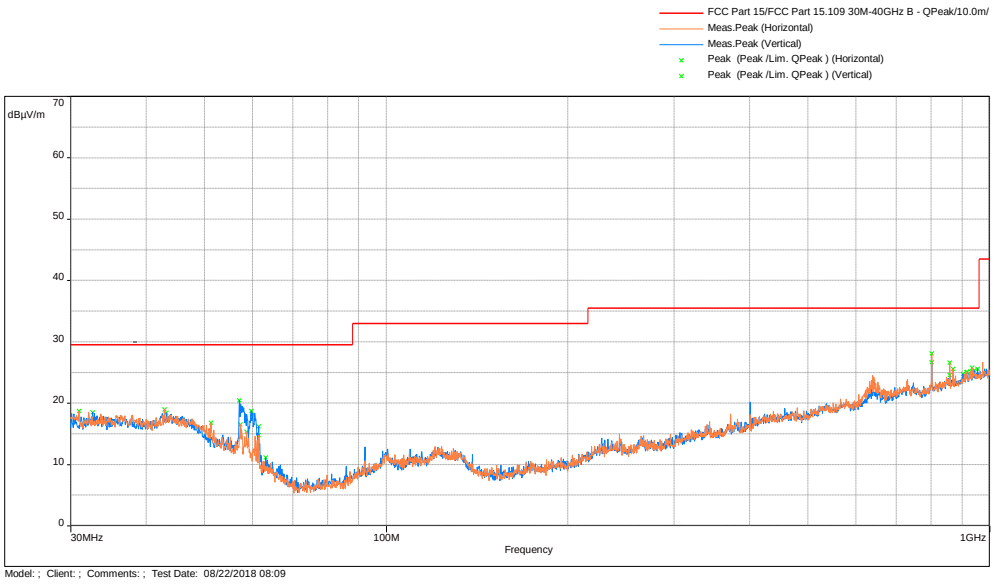
Note: Measurements were performed in X, Y, Z planes of the EUT and worst cast data was presented. Final average measurements were performed using section 11.12.2.5.2 “Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction” of ANSI 63.10 was utilized; except when using 11.12.2.5.2, set Trace mode = Max Hold and the measurement correction factor in 11.12.2.5.2 i) is not added.

Results	**Complies**

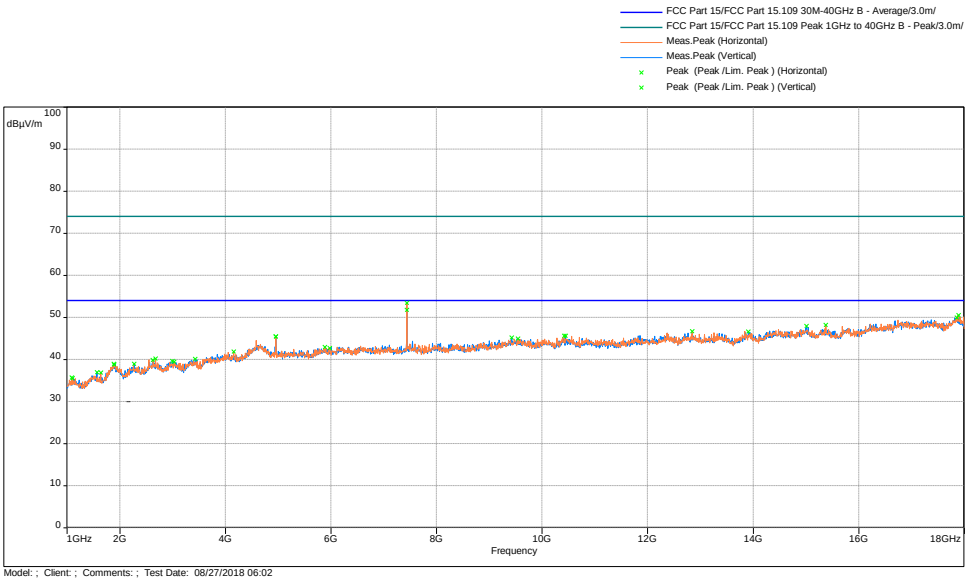
Note: Radiated emission measurements were performed up to 25GHz. No emissions were identified when scanned from 18-25 GHz.

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

Radiated Spurious Emissions 30 MHz - 1000 MHz



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



Frequency	Avg@3m	Lim.@3m	Margin	Height	Angle	Comment	RA	Correction
MHz	dBµV/m	dBµV/m	dB	m	°		dBµV	dB
7439.6	52.3	54	-1.7	2.15	182.75	Horizontal	57.1	-4.79

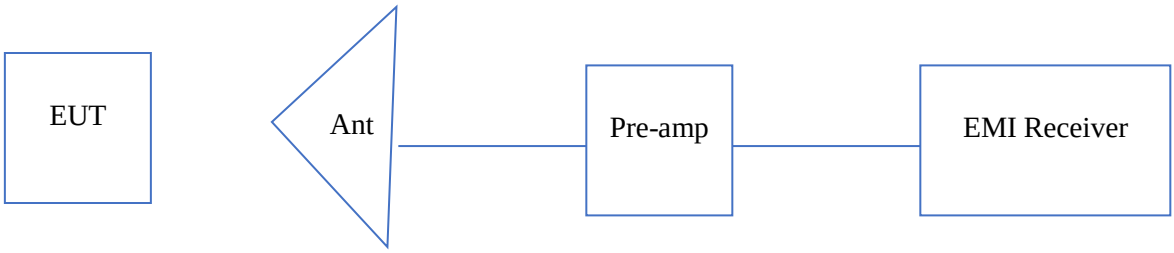
Note: Measurements were performed in X, Y, Z planes of the EUT and worst cast data was presented. Final average measurements were performed using section 11.12.2.5.2 “Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction” of ANSI 63.10 was utilized; except when using 11.12.2.5.2, set Trace mode = Max Hold and the measurement correction factor in 11.12.2.5.2 i) is not added.

Results	**Complies**

Note: Radiated emission measurements were performed up to 25GHz. No emissions were identified when scanned from 18-25 GHz.

4.5.8 Test setup photographs

The following photographs show the testing configurations used.



4.6 Radiated Emissions on Digital Parts
FCC Ref: 15.109, ICES 003, RSS Gen

4.6.1 Test Limit

Limits for Electromagnetic Radiated Emissions FCC Section 15.109(b), ICES 003*, RSS GEN

Frequency (MHz)	**Class A at 10m dB(μV/m)**	**Class B at 3m dB(μV/m)**
30-88	39	40.0
88-216	43.5	43.5
216-960	46.4	46.0
Above 960	49.5	54.0

* According to FCC Part 15.109(g) an alternative to the radiated emission limits shown above, digital devices may be shown to comply with the limit of CISPR Pub. 22

4.6.2 Procedure

Radiated measurements were taken. 120 kHz resolution bandwidth was used from 30 MHz - 1 GHz. 1 MHz resolution bandwidth was used for measurements done above 1 GHz. All plots are corrected for cable loss, antenna factor, and preamp.

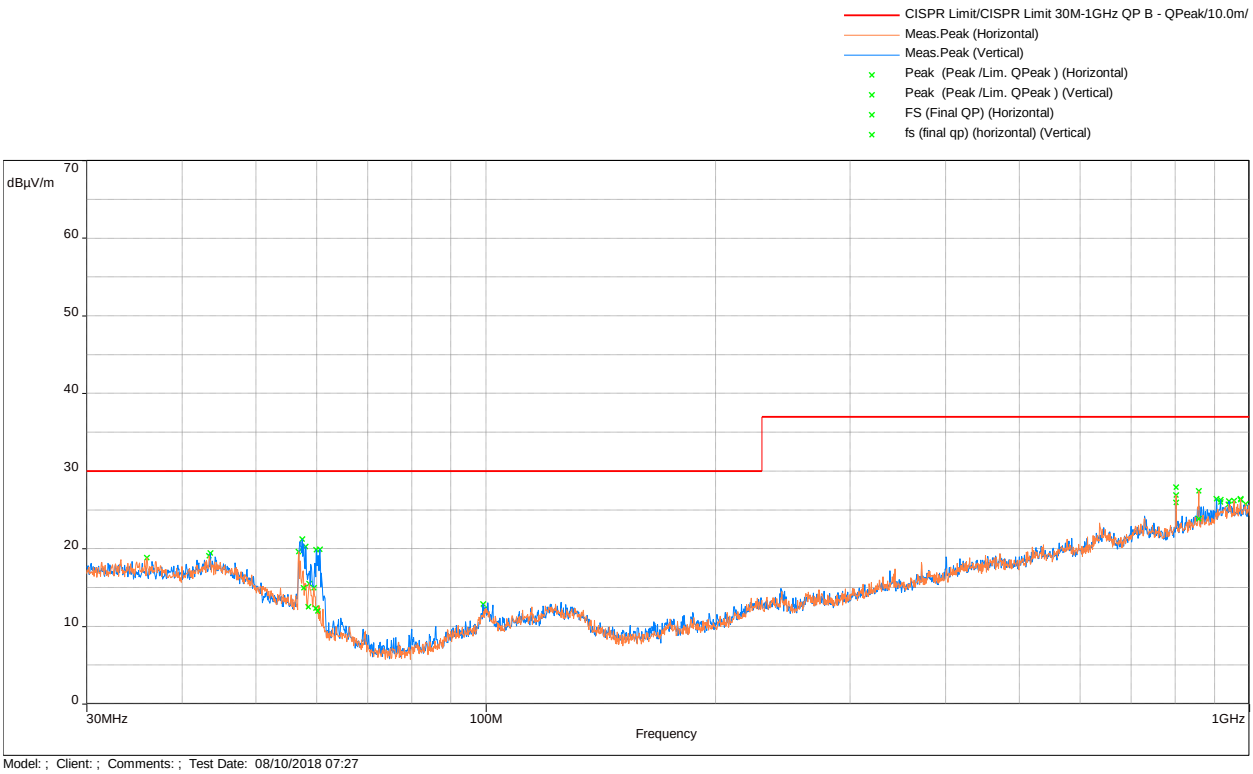
Radiated emission measurements were performed from 30 MHz to 18000 MHz. The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Measurements recorded in this section were made with the Transmitter in standby mode (RF Off).

4.6.3 Test Results

The EUT met the radiated disturbance requirements of FCC Part 15, Subpart B and ICES-003 Industry Canada for a Class B device.

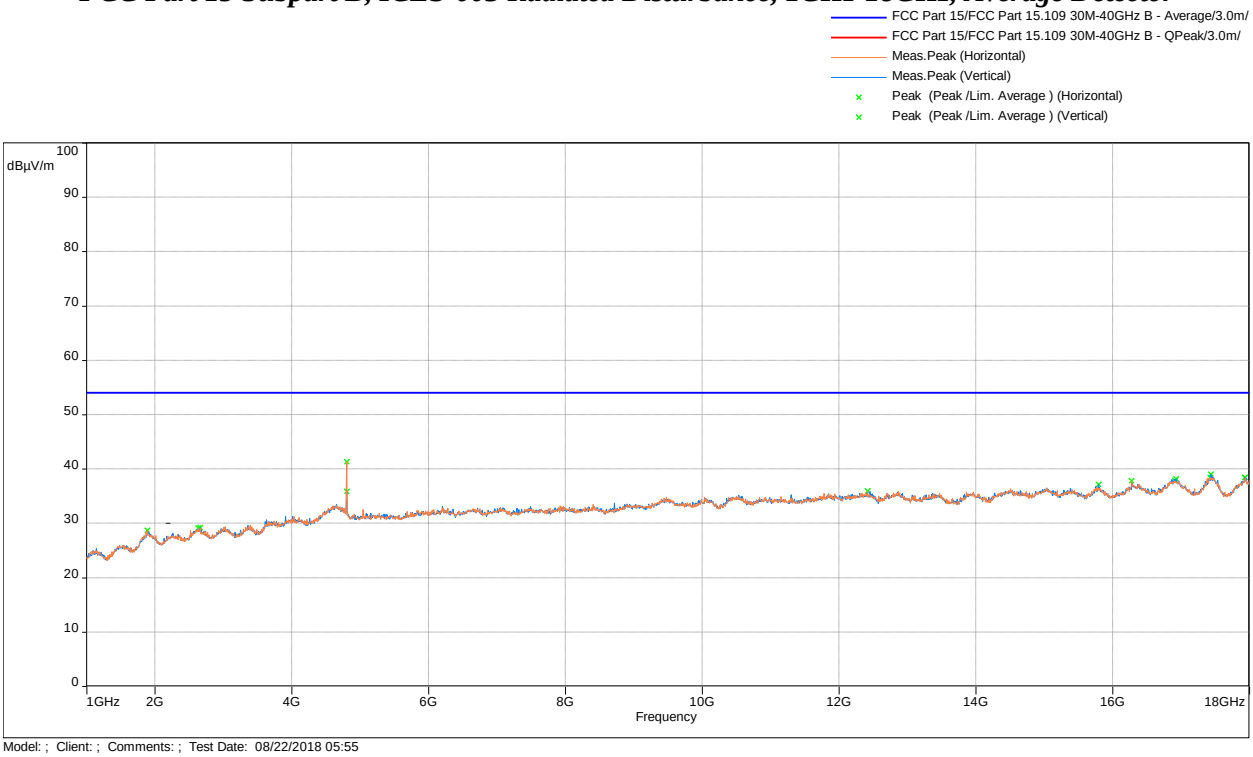
FCC Part 15 Subpart B, ICES-003 Radiated Disturbance, 30MHz-1GHz



Frequency (MHz)	FS @10m (dBµV/m)	Limit @10m (dBµV/m)	Margin (dB)	Azimuth (deg)	Height (m)	Polarity	RA (dBuV)	Correction (dB)
57.783	14.96	30	-15.04	85	4	Vertical	30.4	-15.56
58.519	12.5	30	-17.5	224.75	3.64	Vertical	28.18	-15.8
59.896	12.33	30	-17.67	255.75	3.72	Vertical	28.55	-16.2
60.218	11.94	30	-18.06	61	3.83	Vertical	28.46	-16.33
801.811	27.88	37	-9.12	49.25	1.2	Horizontal	31.37	-3.49
859.078	23.87	37	-13.13	11	1.52	Horizontal	26.45	-2.58

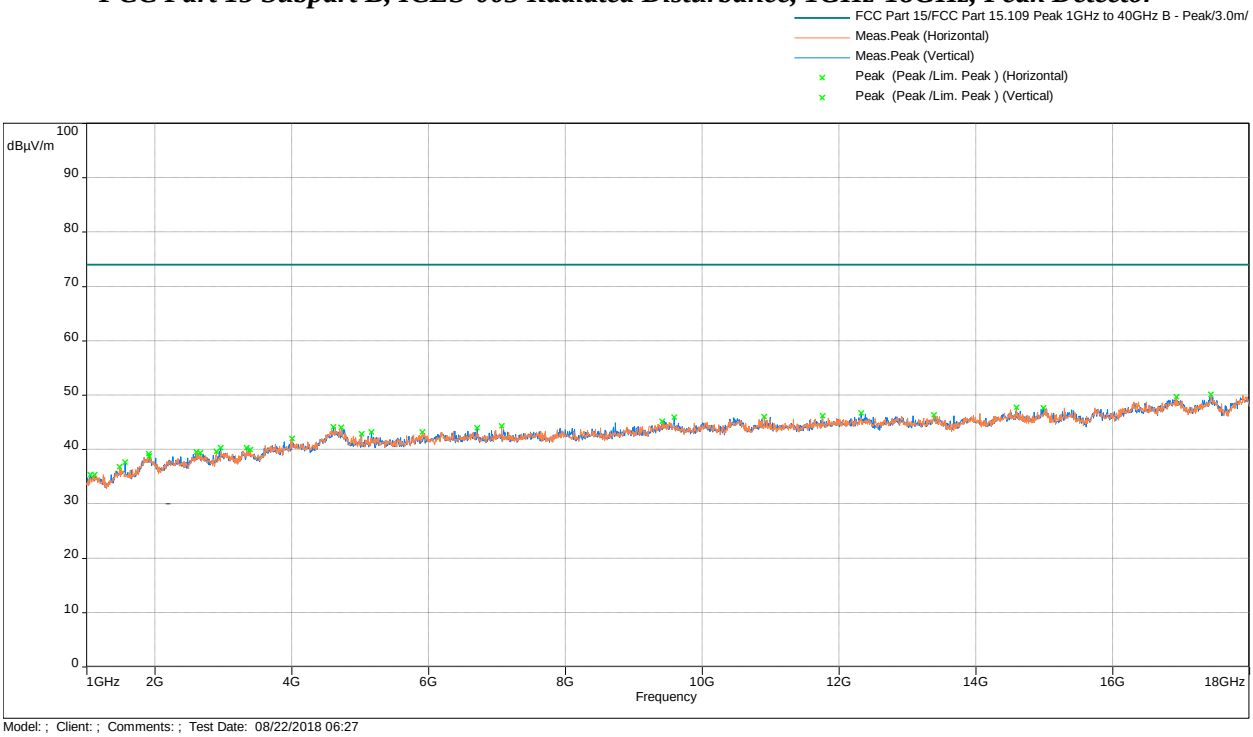
4.6.3 Test Results (Continued)

FCC Part 15 Subpart B, ICES-003 Radiated Disturbance, 1GHz-18GHz, Average Detector



Model: ; Client: ; Comments: ; Test Date: 08/22/2018 05:55

FCC Part 15 Subpart B, ICES-003 Radiated Disturbance, 1GHz-18GHz, Peak Detector

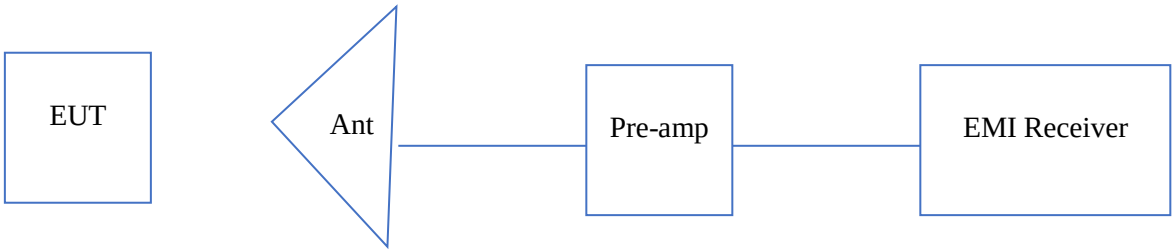


Model: ; Client: ; Comments: ; Test Date: 08/22/2018 06:27

Result:	**Complies** by 9.12 dB for FCC Part 15 Subpart B and ICES-003

4.6.4 Setup Photographs:

The following photographs show the testing configurations used.



4.7 AC Line Conducted Emission
FCC Rule 15.207, FCC 15.107

4.7.1 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.*

4.7.2 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.

EUT was placed in transmission mode then tested for conducted emissions per 15.207 to ensure the device complies with 15.207. After, the EUT RF was powered off and was measured to show compliance with the 15.107 limits.

4.7.3 Test Results

Not applicable. The EUT is battery powered only.

5.0 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

Rev 1.0

Equipment	Manufacturer	Model/Type	Asset #	Cal Int	Cal Due
Spectrum Analyzer	Rohde and Schwarz	FSU	ITS 00913	12	01/24/19
Horn Antenna	ETS-Lindgren	3117-PA	ITS 01636	12	01/11/19
Notch Filter	Micro-Tronics	BRM50702	ITS 01166	12	03/10/19
EMI Receiver	Rohde and Schwarz	ESR	ITS 01607	12	10/09/18
BI-Log Antenna	Antenna Research	LPB-2513	ITS 00355	12	02/21/19
Pre-Amplifier	Sonoma Instrument	310	ITS 01493	12	10/20/18
RF Cable	TRU Corporation	TRU CORE 300	ITS 01462	12	08/19/19
RF Cable	TRU Corporation	TRU CORE 300	ITS 01465	12	08/19/19
RF Cable	TRU Corporation	TRU CORE 300	ITS 01470	12	08/19/19
RF Cable	TRU Corporation	TRU CORE 300	ITS 01330	12	11/29/18

Rev 1.1

Equipment	Manufacturer	Model/Type	Asset #	Cal Int	Cal Due
Spectrum Analyzer	Rohde and Schwarz	ESU40	ITS 00961	12	10/26/19
Horn Antenna	ETS-Lindgren	3117-PA	ITS 01636	12	01/17/20
Notch Filter	Micro-Tronics	BRM50702	ITS 01166	12	03/10/19
EMI Receiver	Rohde and Schwarz	ESR	ITS 01607	12	10/23/19
BI-Log Antenna	Teseq	CBL 6111D	ITS 01058	12	09/20/19
Pre-Amplifier	Sonoma Instrument	310N	ITS 01493	12	02/27/20
RF Cable	TRU Corporation	TRU CORE 300	ITS 01462	12	08/19/19
RF Cable	TRU Corporation	TRU CORE 300	ITS 01465	12	08/19/19
RF Cable	TRU Corporation	TRU CORE 300	ITS 01470	12	08/19/19

Software used for emission compliance testing utilized the following:

Rev 1.0

Name	Manufacturer	Version	Template/Profile
Tile	Quantum Change	3.4.K.22	Conducted Restricted Band Edge_Avg Conducted Restricted Band Edge_Peak Conducted Restricted Band_1-26GHz Conducted Restricted Band_30M-1GHz Conducted Spurious_30M-26GHz
BAT-EMC	Nexio	3.16.0.64	Earlens 8-10-2018.bpp Earlens FCC 8-21-2018
RS Commander	Rohde Schwarz	1.6.4	Not Applicable (Screen grabber)

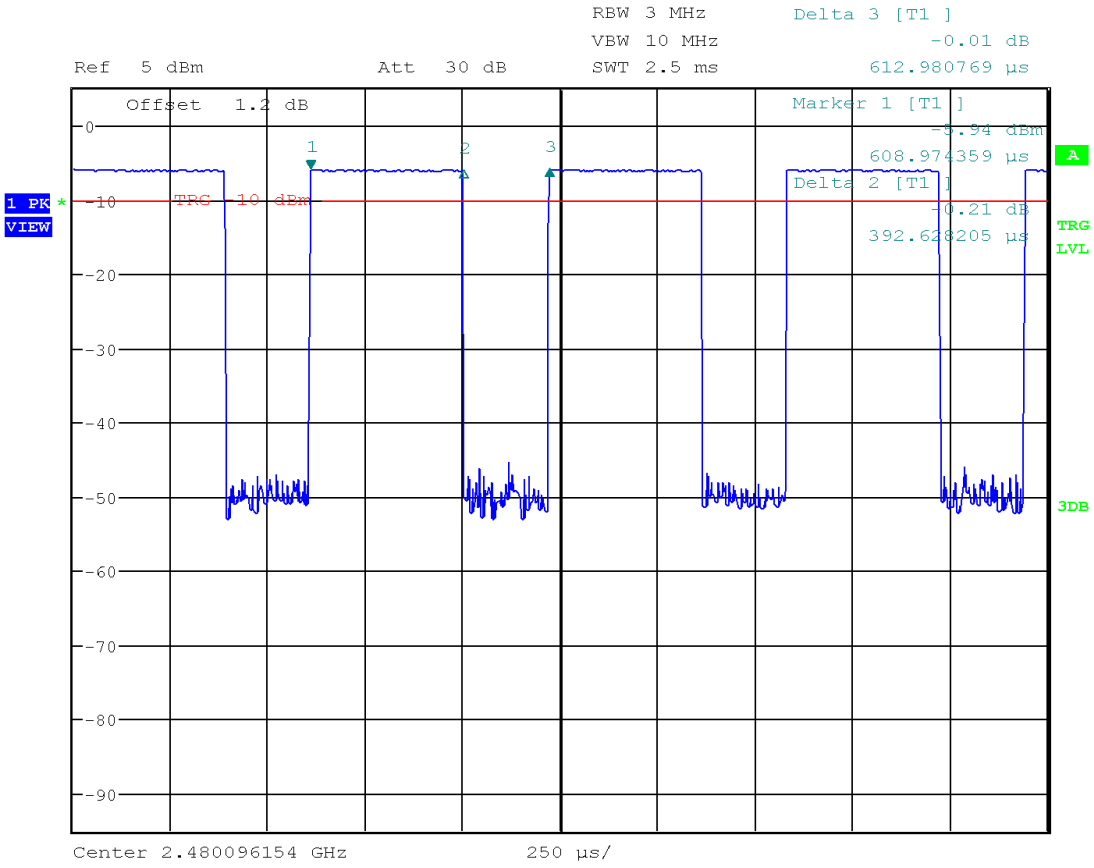
Rev 1.1

Name	Manufacturer	Version	Template/Profile
BAT-EMC	Nexio	3.17.0.10	Earlens 3-6-2019.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 / G103607712	AC	KV	September 05, 2018	Original document
1.1 / G103848751	HH	KV	March 19, 2019	Limited evaluation for spurious emissions on Bluetooth radio and digital parts. The model number AS00721 was changed to AS00790 as requested by manufacturer. See section 3.3 for details.

Annex A – Duty Cycle Measurement



Date: 27.AUG.2018 10:15:07

Duty Cycle:
DC = 392.6 / 613.0 = 0.64 or 64%

Duty Cycle Correction Factor δ (dB) for power averaging:
δ = 10 log (1/DC) = 1.94 dB (power average/RMS)
δ = 20 log (1/DC) = 3.87 dB (linear voltage averaging)

Annex B – Addendum to Original Report (Revision 1.1)

B1.0 Summary of Tests

Test	Reference FCC	Reference Industry Canada	Result
RF Output Power	15.247(b)(3)	RSS-247, 5.4.4	Complies
Transmitter Radiated Emissions	15.247(d), 15.209, 15.205	RSS-247, 5.5	Complies
Radiated Emissions	15.109	ICES-003	Complies

B1.1 Maximum Peak Conducted Output Power at Antenna Terminals
FCC Rule: 15.247(b)(3); RSS-247 A8.4;

B1.2.1 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.

B1.1.2 Procedure

The procedure described in FCC Publication 558074 D01 Meas Guidance v05 was used. Specifically, section 11.9.1.1 RBW ≥ DTS Bandwidth of ANSI 63.10 was utilized as the spectrum analyzer's resolution bandwidth was greater than the DTS bandwidth.

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.

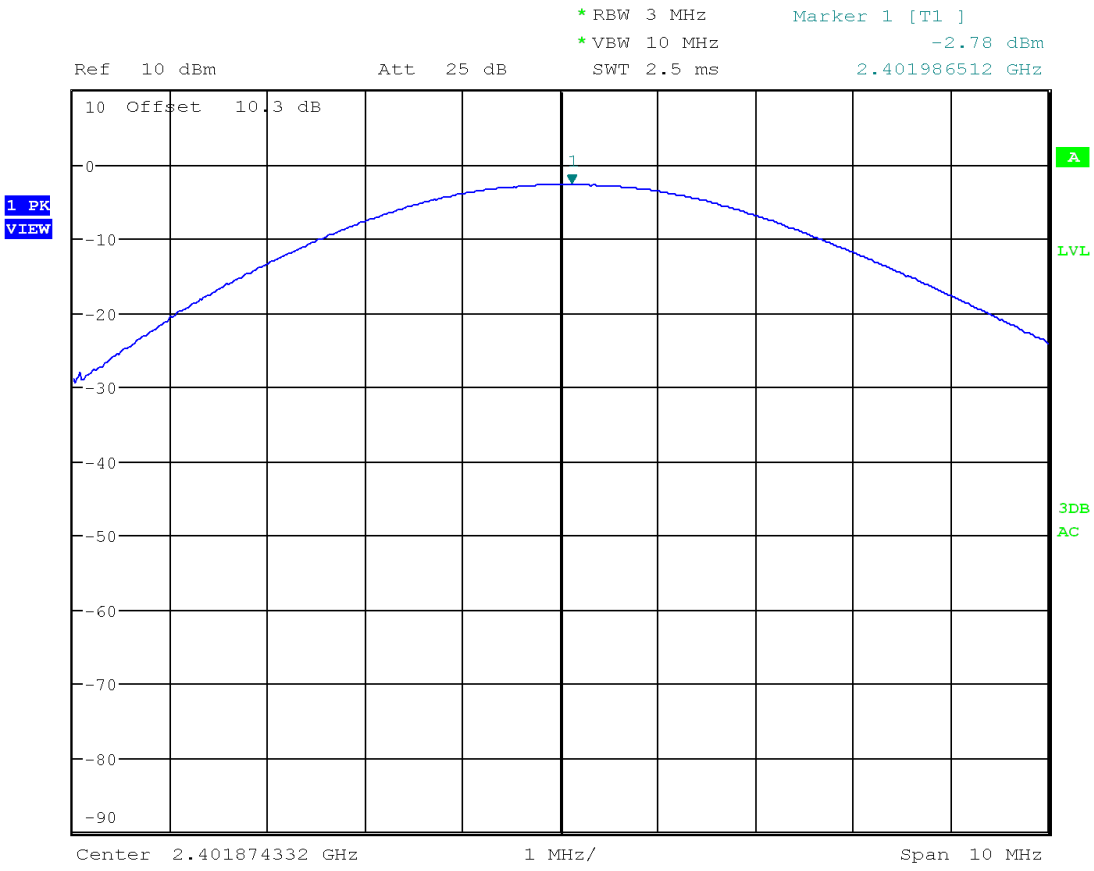
B1.1.3 Test Result

Refer to the following plots 2.1 – 2.6 for the test details.

Frequency, MHz	Conducted Power (peak), dBm	Conducted Power (peak), mW	Plot
2402	-2.78	0.527	2.1
2426	-1.54	0.701	2.2
2480	-3.51	0.445	2.3

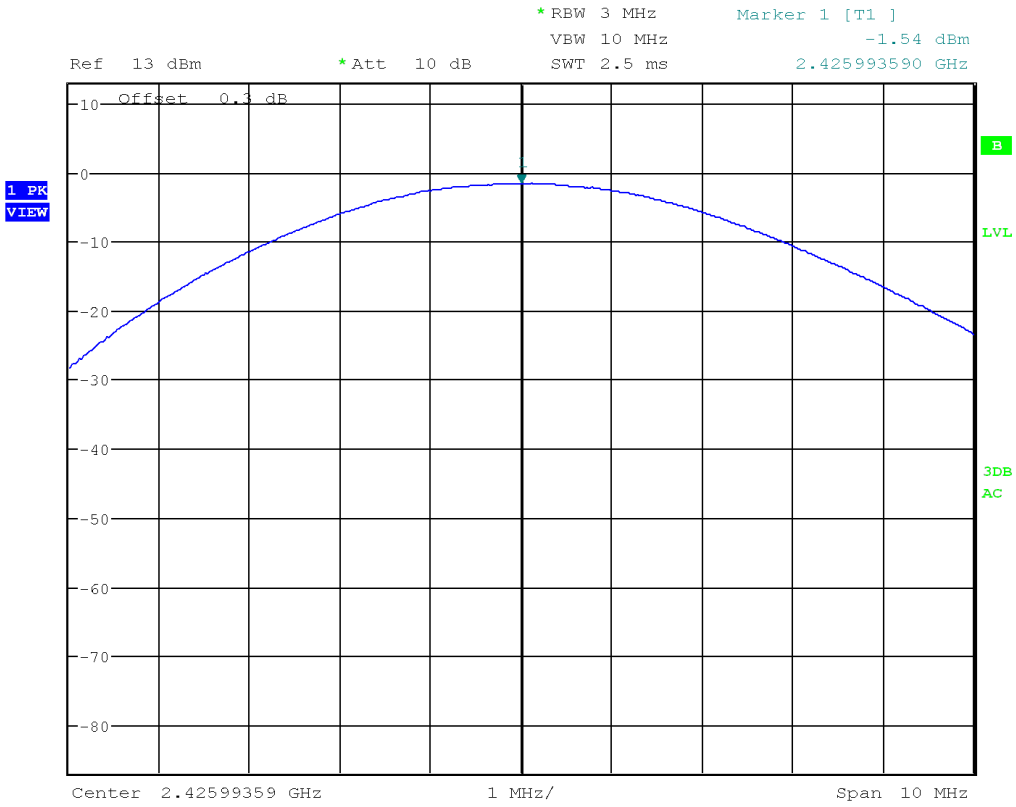
Date of Test:	March 11 -14, 2019
Results	**Complies**

Plot 2. 4



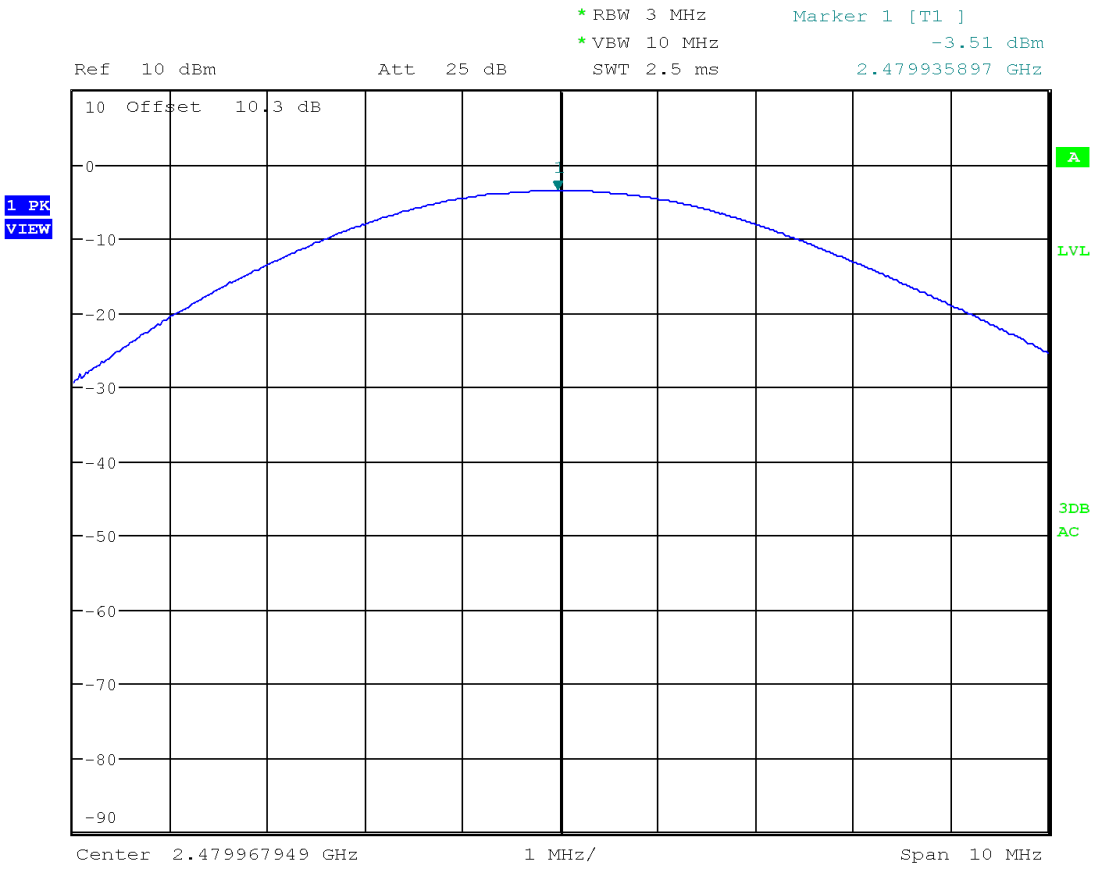
Date: 11.MAR.2019 15:58:25

Plot 2. 5



Date: 14.MAR.2019 18:28:01

Plot 2. 6



Date: 11.MAR.2019 15:41:45

B1.2 Transmitter Radiated Emissions
FCC Rules: 15.247(d), 15.209, 15.205; RSS-247;

B1.2.1 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.

B1.2.2 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 included of the worst-case configuration (the configuration which resulted in the highest emission levels).

B1.2.3 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

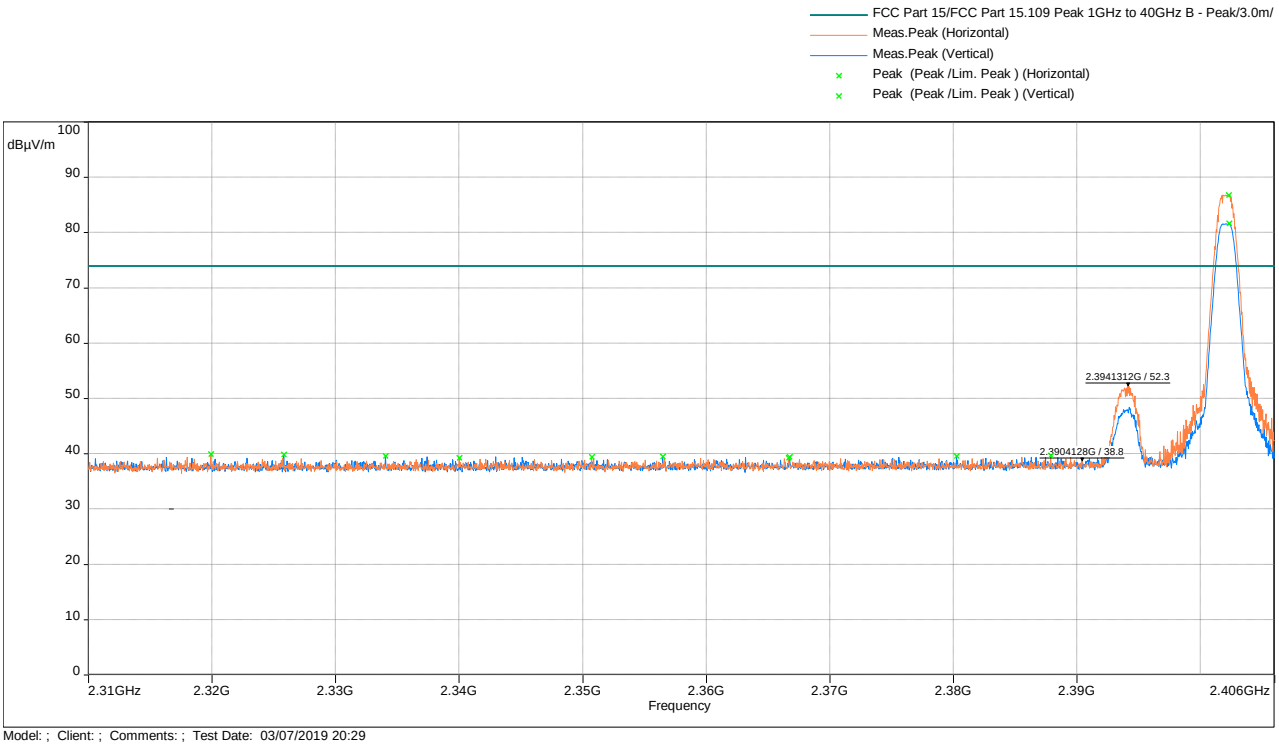
Assume a receiver reading of 52.0 dB(μV) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μV/m). This value in dB(μV/m) was converted to its corresponding level in μV/m.
RA = 52.0 dB(μV)
AF = 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.

B1.2.4 Test Results

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Date of Test:	March 07-10, 2019
Results	**Complies**

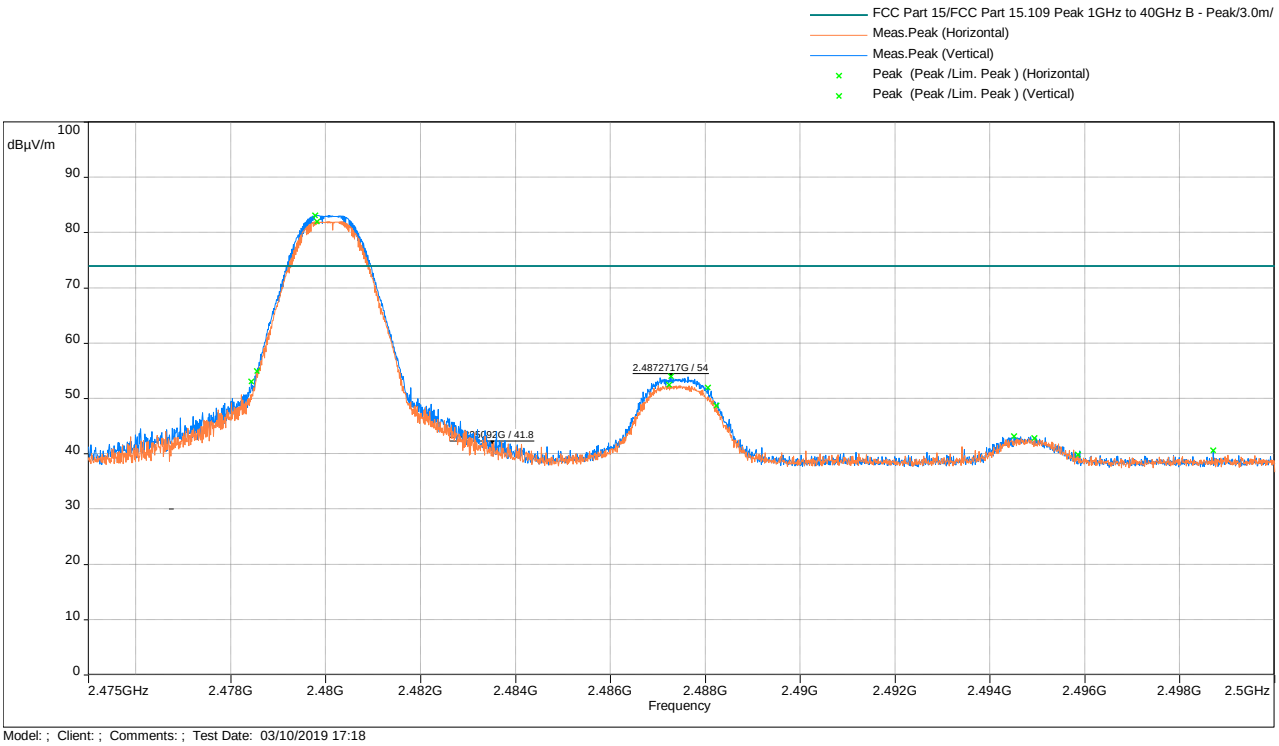
Out-of-Band Radiated spurious emissions at the Band-edge @3m distance
2310–2390 MHz, Peak Scan with Peak Limit



Frequency (MHz)	Peak @3m dB(µV/m)	Ave Limit @3m dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw @3m (dBuV)	Correction (dB)
2390.0	38.8	54.0	-15.2	238	1.5	Vertical	54.2	-15.4

Note: Measurements were performed in X, Y, Z planes of the EUT and worst cast data was presented.

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



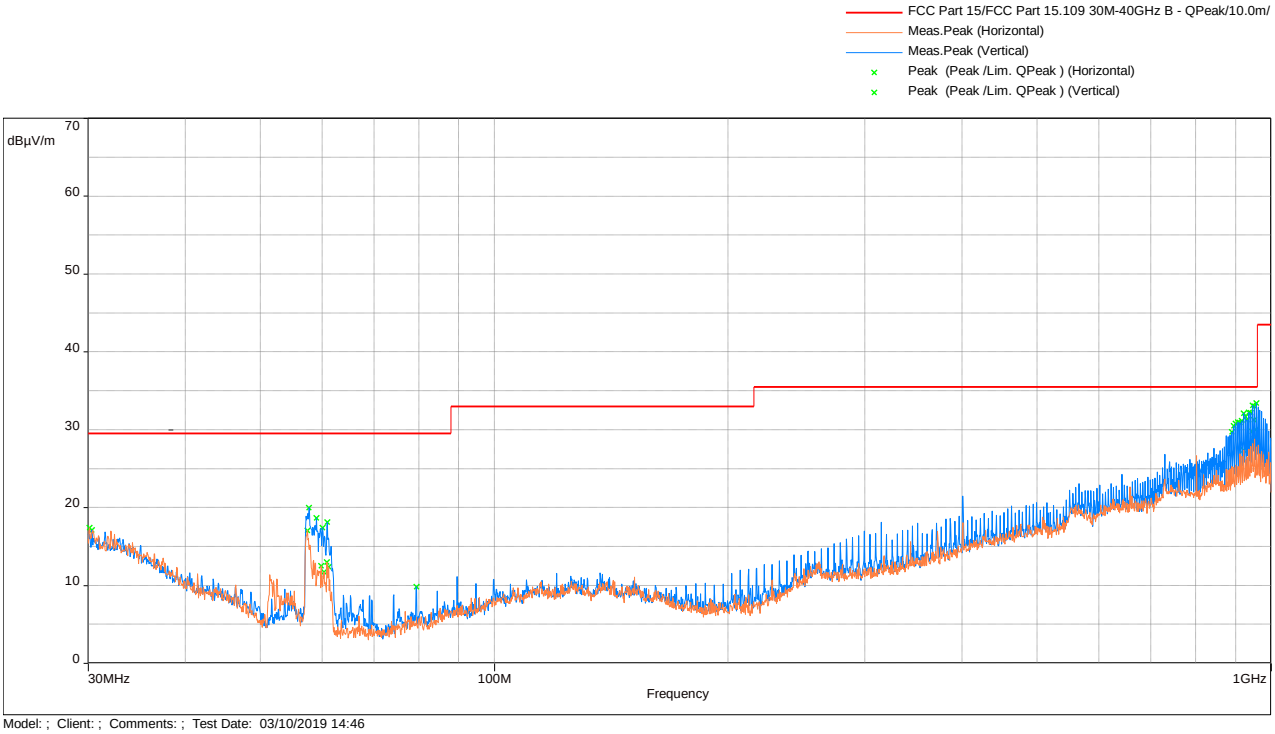
Frequency (MHz)	Peak @3m dB(µV/m)	Ave Limit @3m dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw @3m (dBuV)	Correction (dB)
2483.5	41.80	54.00	-12.2	244.3	2.5	Vertical	56.85	-15.05

Frequency (MHz)	Ave @3m dB(µV/m)	Ave Limit @3m dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw @3m (dBuV)	Correction (dB)
2487.2	51.73	54.00	-2.27	315.0	2.48	Horizontal	64.84	-13.11

Note: Measurements were performed in X, Y, Z planes of the EUT and worst cast data was presented. Final average measurements were performed using section 11.13.3.4 “Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction” of ANSI 63.10 was utilized per KDB 558074 D01 DTS Meas Guidance v05.

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

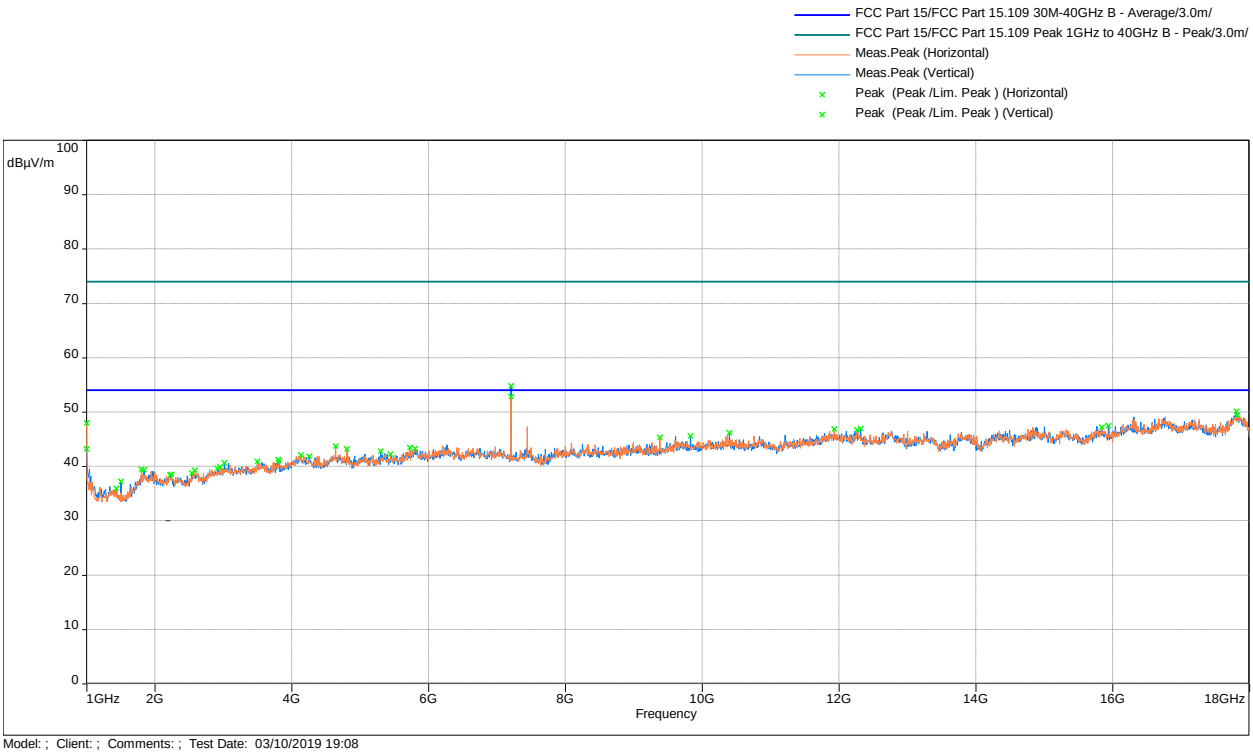
Radiated Spurious Emissions 30 MHz - 1000 MHz



Model: ; Client: ; Comments: ; Test Date: 03/10/2019 14:46

Frequency (MHz)	Q-Peak dB(µV/m)	Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
947.1946	33.77	35.5	-1.73	338.5	1.69	Vertical	34.23	-0.46

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



Frequency (MHz)	FS@3m dB(µV/m)	Average Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
7206.7	53.5	54	-0.5	49.2	1.51	Horizontal	59.14	-5.64

Note: Measurements were performed in X, Y, Z planes of the EUT and worst cast data was presented. Final average measurements were performed using section 11.12.2.5.2 “Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction” of ANSI 63.10 was utilized; except when using 11.12.2.5.2, set Trace mode = Max Hold and the measurement correction factor in 11.12.2.5.2 i) is not added.

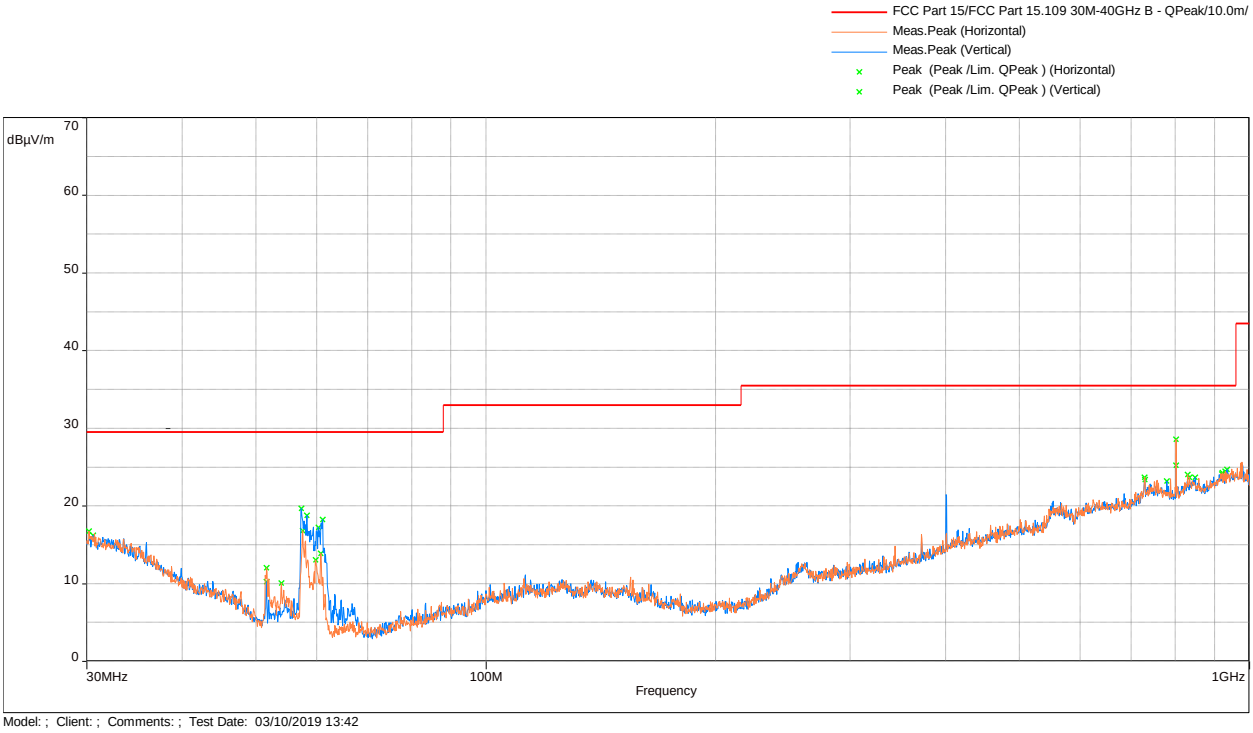
Note: FS@3m = RA + Correction
Correction = AF + CF - Preamp

Results	**Complies**

Note: Radiated emission measurements were performed up to 25GHz. No emissions were identified when scanned from 18-25 GHz.

Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 2426MHz

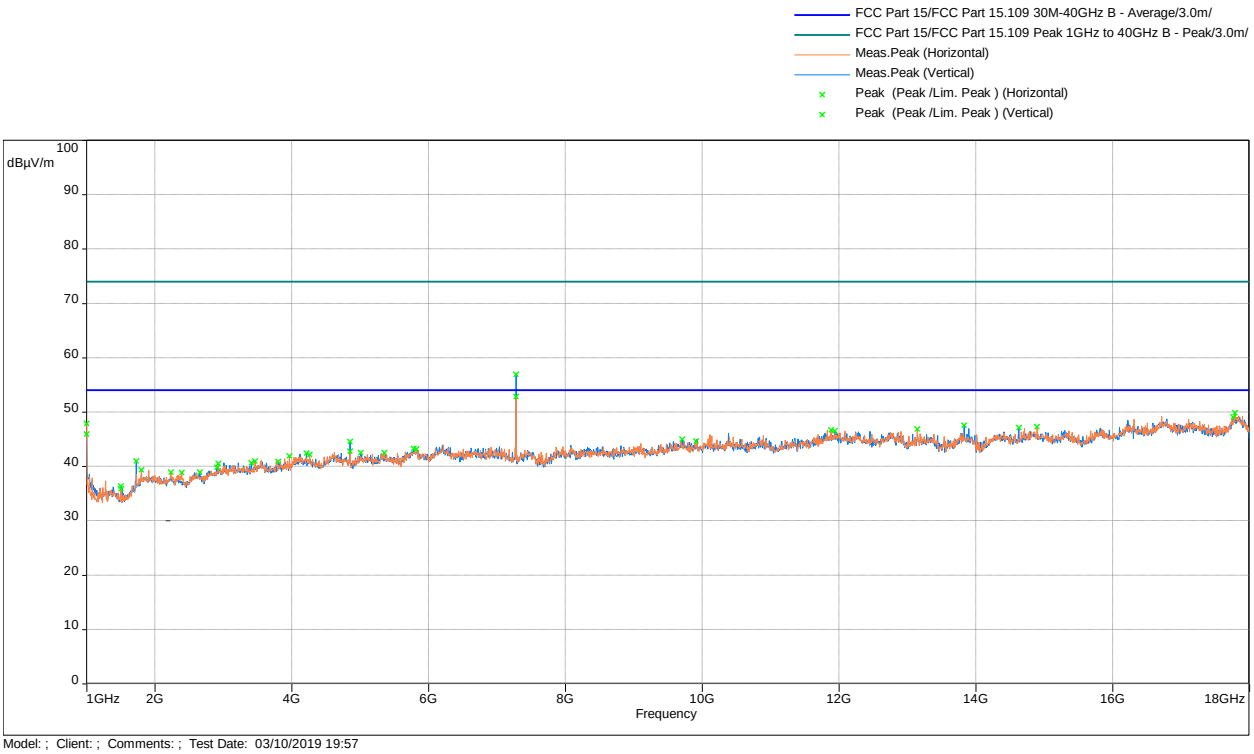
Radiated Spurious Emissions 30 MHz - 1000 MHz



Model: ; Client: ; Comments: ; Test Date: 03/10/2019 13:42

Frequency (MHz)	Q-Peak dB(µV/m)	Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
801.829	28.53	35.5	-6.97	267.5	1.02	Horizontal	32.17	-3.64

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



Frequency (MHz)	FS@3m dB(µV/m)	Average Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
7279.2	53.6	54	-0.4	44.25	1.51	Vertical	59.37	-5.77

Note: Measurements were performed in X, Y, Z planes of the EUT and worst cast data was presented. Final average measurements were performed using section 11.12.2.5.2 "Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction" of ANSI 63.10 was utilized; except when using 11.12.2.5.2, set Trace mode = Max Hold and the measurement correction factor in 11.12.2.5.2 i) is not added.

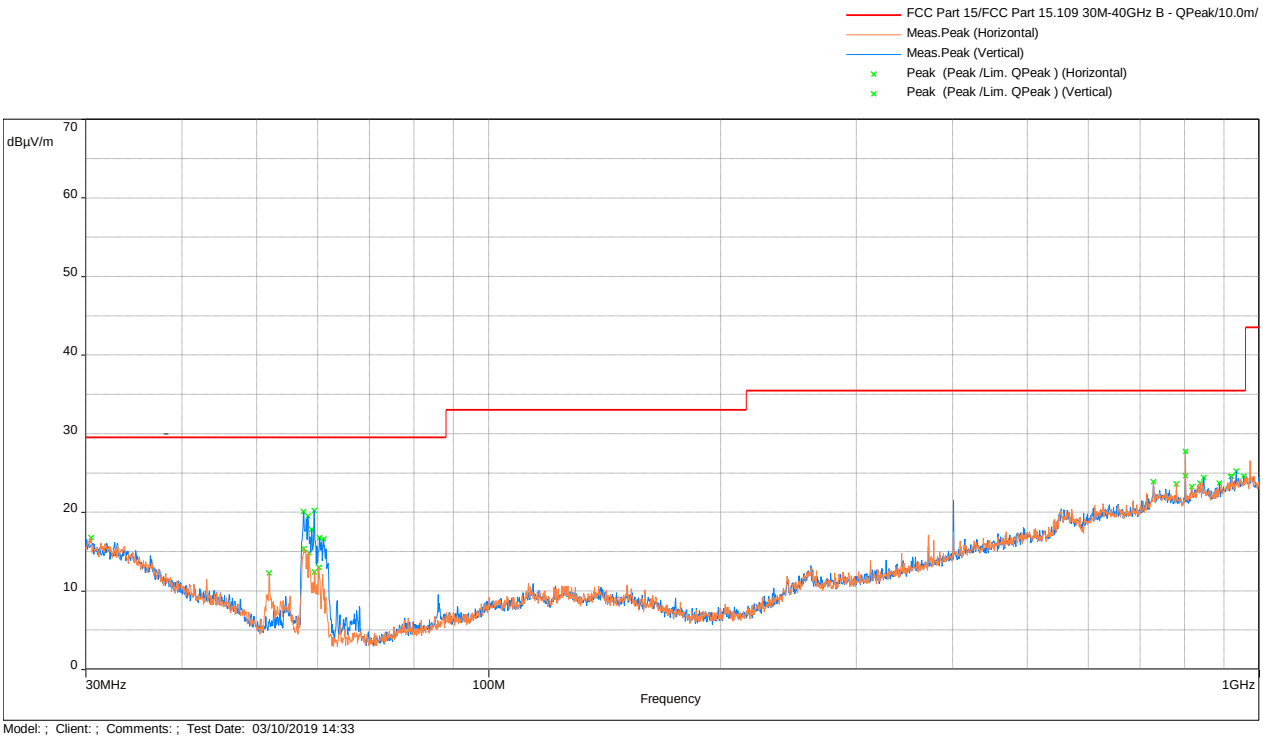
Note: FS@3m = RA + Correction
Correction = AF + CF - Preamp

Results	**Complies**

Note: Radiated emission measurements were performed up to 25GHz. No emissions were identified when scanned from 18-25 GHz.

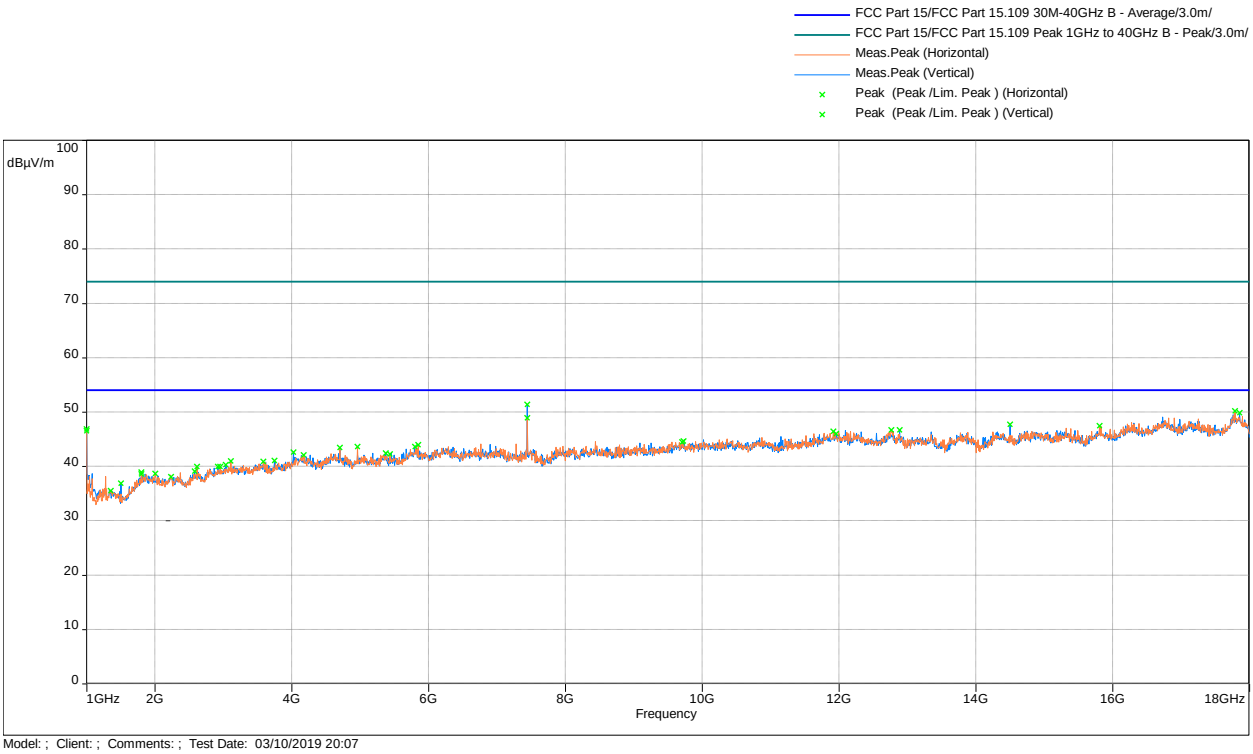
Test Results: 15.209 Radiated Spurious Emissions High Channel, Tx at 2480MHz

Radiated Spurious Emissions 30 MHz - 1000 MHz



Frequency (MHz)	Q-Peak dB(µV/m)	Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
801.829	27.69	35.5	-7.81	69.25	1.02	Horizontal	27.69	-3.64

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



Frequency (MHz)	FS@3m dB(µV/m)	Average Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
7440.167	48.87	54	-5.13	9.50	1.52	Horizontal	54.15	-5.28

Note: Measurements were performed in X, Y, Z planes of the EUT and worst cast data was presented. Final average measurements were performed using section 11.12.2.5.2 "Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction" of ANSI 63.10 was utilized; except when using 11.12.2.5.2, set Trace mode = Max Hold and the measurement correction factor in 11.12.2.5.2 i) is not added.

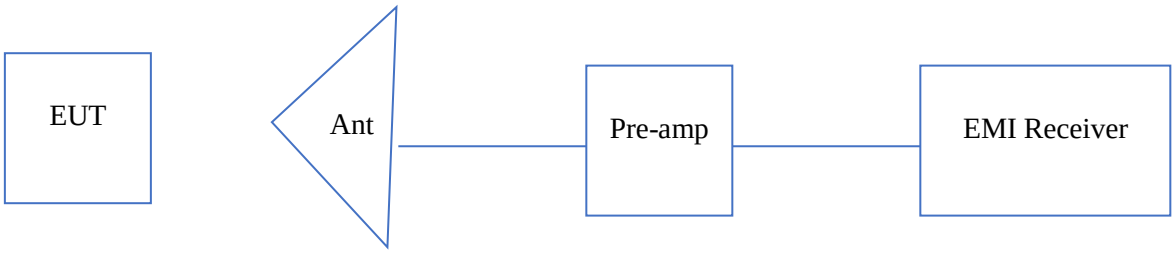
Note: FS@3m = RA + Correction
Correction = AF + CF - Preamp

Results	**Complies**

Note: Radiated emission measurements were performed up to 25GHz. No emissions were identified when scanned from 18-25 GHz.

B1.2.5 Test setup photographs

The following photographs show the testing configurations used.



B1.3 Radiated Emissions on Digital Parts

FCC Ref: 15.109, ICES 003

B1.3.1 Requirement

Limits for Electromagnetic Radiated Emissions FCC Section 15.109(b), ICES 003*, RSS GEN

Frequency (MHz)	**Class A at 10m dB(µV/m)**	**Class B at 3m dB(µV/m)**
30-88	39	40.0
88-216	43.5	43.5
216-960	46.4	46.0
Above 960	49.5	54.0

* According to FCC Part 15.109(g) an alternative to the radiated emission limits shown above, digital devices may be shown to comply with the limit of CISPR Pub. 22

B1.3.2 Procedures

Measurements are conducted with a quasi-peak detector instrument in the frequency range of 30 MHz to 1000 MHz and with the average detector instrument in the frequency range above 1000 MHz. The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole.

Measurements of the radiated field are made with the antenna located at a distance of 10 meters from the EUT. If the field-strength measurements at 10m cannot be made because of high ambient noise level or for other reasons, measurements of Class B equipment may be made at a closer distance, for example 3m. An inverse proportionality factor of 20 dB per decade should be used to normalize the measured data to the specified distance for determining compliance.

The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for a 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.

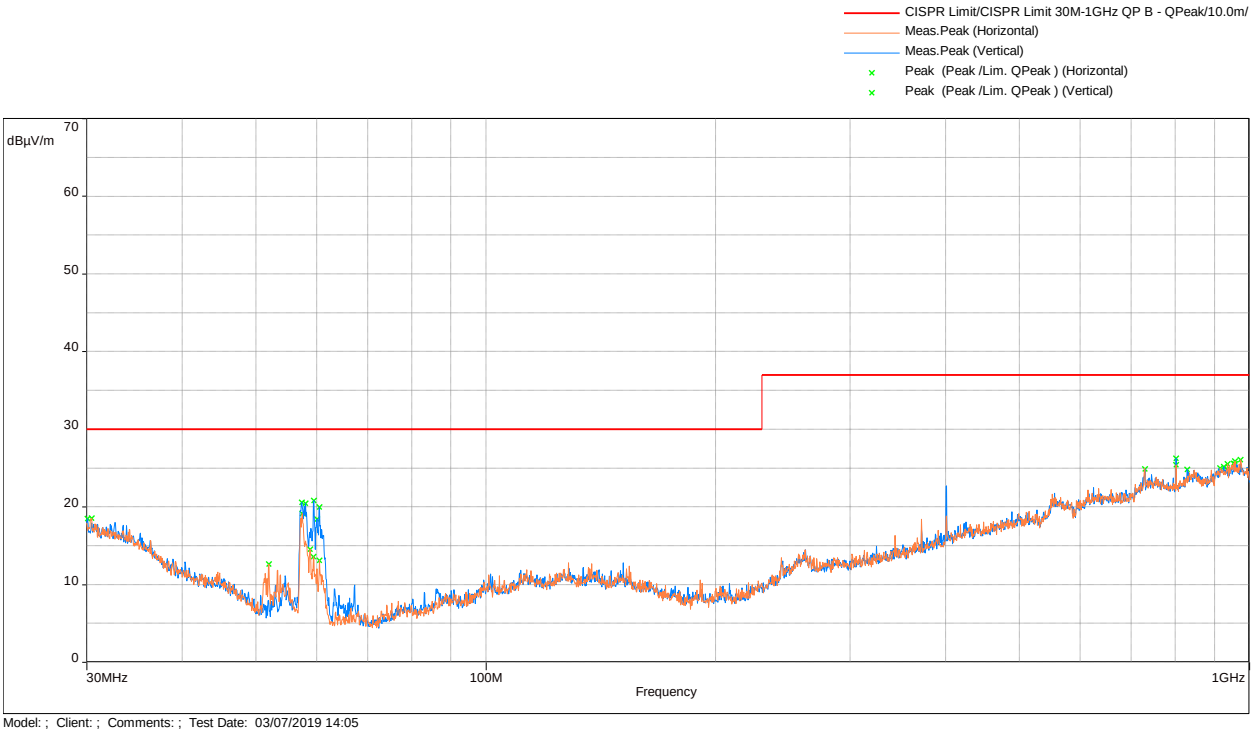
Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.

Measurements recorded in this section were made with the Transmitter in standby mode (Tx Off).

B1.3.3 Test Results

Date of Test:	March 7, 2019
Results	**Complies**

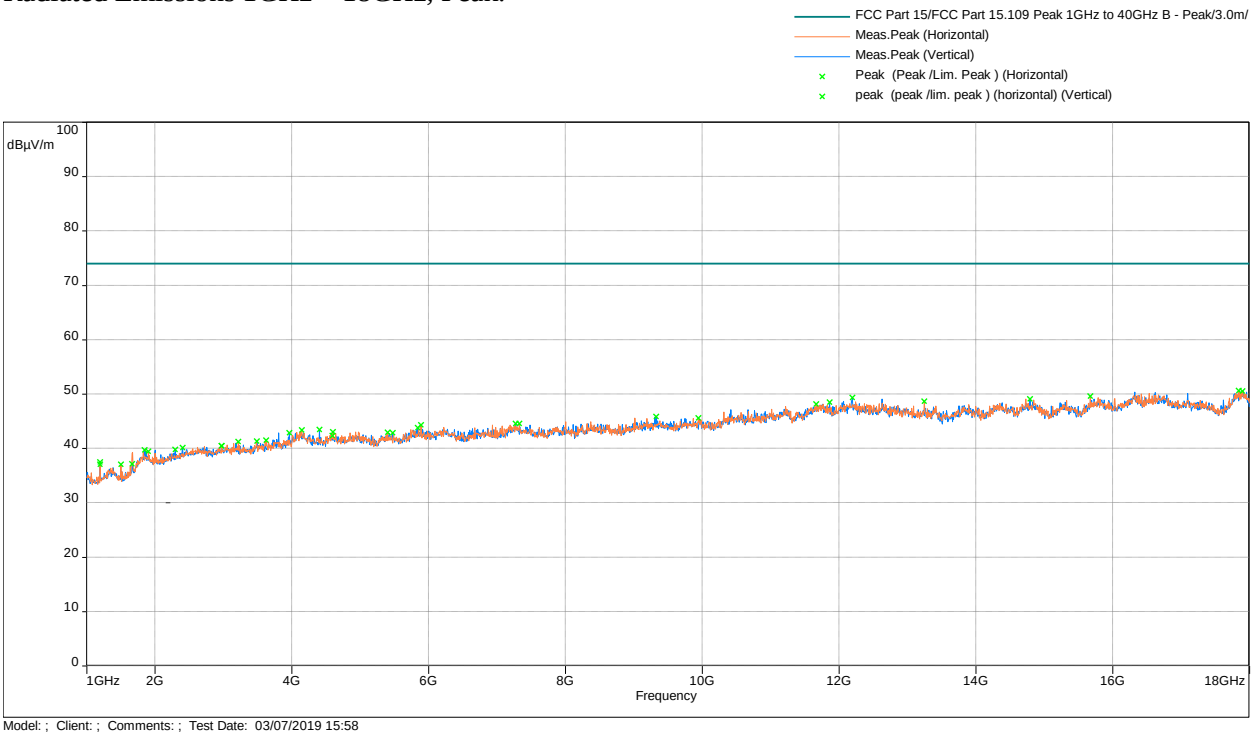
Test Results: Radiated Emissions 30 MHz – 1000 MHz



Frequency	Quasi Pk FS	Limit	Margin	Azimuth	Height	Polarity	Raw	Correction
MHz	dB(uV/m)	dB(uV/m)	dB	deg	cm		dB(uV/m)	dB
30.097	18.44	30	-11.56	144.25	2.02	Vertical	27.48	-9.04
59.52033	20.78	30	-9.22	242.25	3.99	Vertical	43.03	-22.25
57.38633	20.57	30	-9.43	262.75	3.99	Vertical	42.64	-22.07
57.48333	19.14	30	-10.86	104.25	3.98	Horizontal	41.22	-22.08
973.6807	26.03	37	-10.97	38.5	1.98	Horizontal	26.12	-0.09
801.829	26.25	37	-10.75	62.75	2.02	Vertical	29.89	-3.64

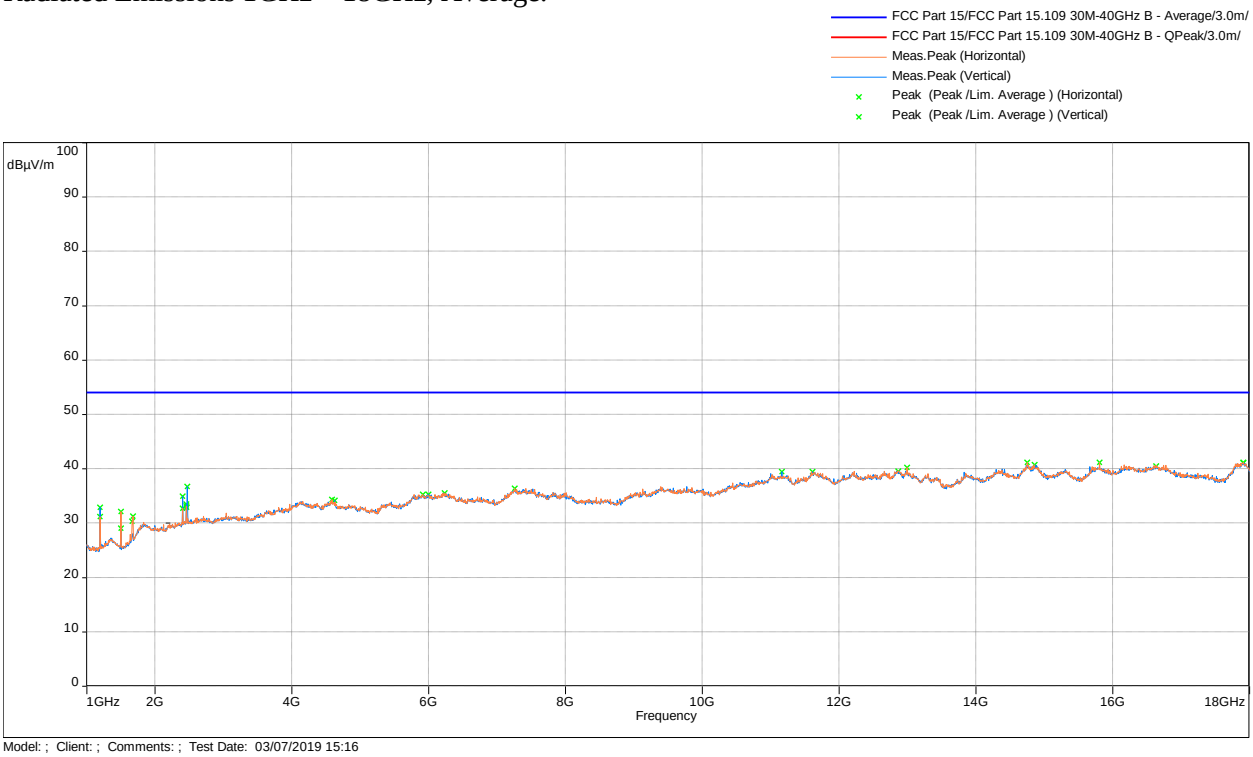
B1.4.3 Test Results (Continued)

Radiated Emissions 1GHz – 18GHz, Peak.



Model: ; Client: ; Comments: ; Test Date: 03/07/2019 15:58

Radiated Emissions 1GHz – 18GHz, Average.

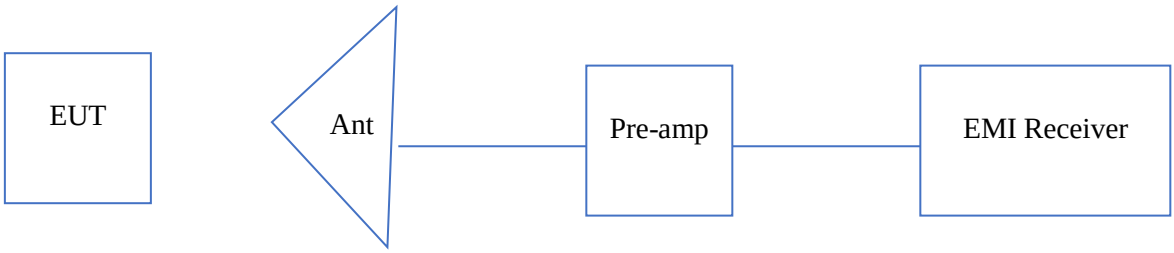


Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz.

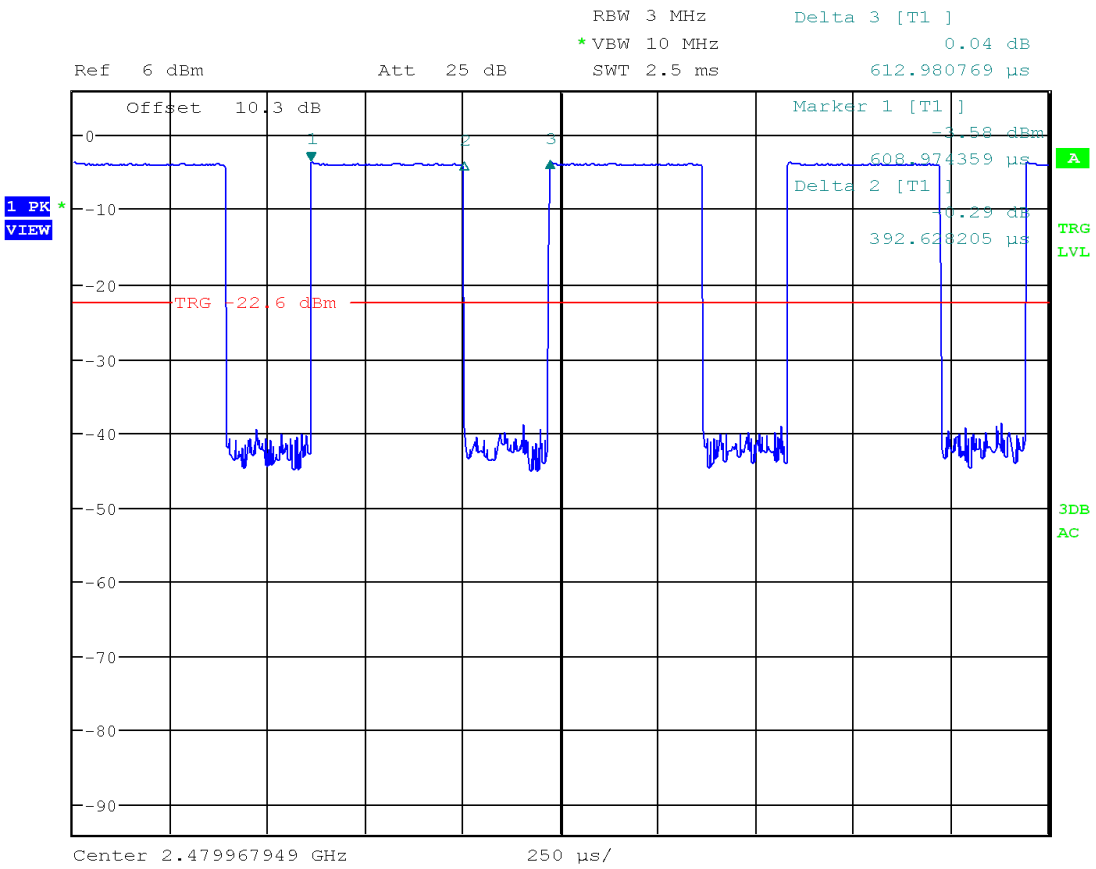
Result:	**Complies** by 9.22 dB

B1.3.4 Test Configuration Photographs

The following photographs show the testing configurations used.



B1.4 Duty Cycle Measurement



Date: 11.MAR.2019 15:30:09

Duty Cycle:
DC = 392.6 / 613.0 = 0.64 or 64%

Duty Cycle Correction Factor δ (dB) for power averaging:
δ = 10 log (1/DC) = 1.94 dB (power average/RMS)
δ = 20 log (1/DC) = 3.87 dB (linear voltage averaging)

END OF REPORT