TEST REPORT

Report Number: 101867573MPK-002
Project Number: G101867573
January 09, 2015

Testing performed on
Tile
Model: T1002
FCC ID: 2ABXLT1002
IC: 11858A-T1002
to

FCC Part 15 Subpart C (15.247)
Industry Canada RSS-210 Issue 8, Annex 8
FCC Part 15, Subpart B
Industry Canada ICES-003

For

Tile, Inc.

Test Performed by:	Test Authorized by:
Intertek	Tile, Inc.
1365 Adams Court	2121 S. El Camino Real, Suite C-100
Menlo Park, CA 94025 USA	San Mateo, CA 94403, USA

Prepared by: ______________________ **Date:** January 09, 2015
Anderson Soungpanya

Reviewed by: ______________________ **Date:** January 09, 2015
Krishna K Vemuri

Report No. 101867573MPK-002

Equipment Under Test:	Tile
Trade Name:	Tile, Inc.
Model Number:	T1002
Serial Numbers:	MPK1501051234-001 (Radiated Sample) MPK1501051234-002 (Conducted Sample)
Applicant:	Tile, Inc.
Contact:	Mike Farley
Address:	Tile, Inc. 2121 S. El Camino Real, Suite C-100 San Mateo, CA 94403
Country	USA
Tel. Number:	(831) 320-4211
Email:	mike@thetileapp.com
Applicable Regulation:	FCC Part 15 Subpart C (15.247) Industry Canada RSS-210 Issue 8, Annex 8 FCC Part 15, Subpart B Industry Canada ICES-003
Date of Test:	December 08 to 31, 2014

We attest to the accuracy of this report:

Anderson Soungpanya
Project Engineer

Krishna K Vemuri
EMC Senior Staff Engineer

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1.0 Summary of Tests

Test	Reference FCC	Reference Industry Canada	Result
Radiated Emissions	15.109	ICES-003	Complies
AC Line Conducted Emission	15.107	ICES-003	Not applicable[1]
RF Output Power	15.247(b)(3)	RSS-210, A8.4	Complies
6 dB Bandwidth	15.247(a)(2)	RSS-210, A8.2	Complies
Power Density	15.247(e)	RSS-210, A8.2b	Complies
Out of Band Antenna Conducted Emission	15.247(d)	RSS-210, A8.5	Complies
Transmitter Radiated Emissions	15.247(d), 15.209, 15.205	RSS-210, A8.5	Complies
AC Line Conducted Emission	15.207	RSS-GEN	Not applicable[1]
Antenna Requirement	15.203	RSS-GEN	Complies (Internal Antenna)
RF Exposure	15.247(i), 2.1093(d)	RSS-102	Complies *

[1] EUT is battery powered only & not rechargeable.

* Compliance with the SAR requirements is considered without testing because the RF power of channel is below SAR Test Exclusion Threshold. The SAR Test Exclusion Threshold (TET in mW) was calculated according to the KDB 447498, sec 4.3.1.1) using formula:

$$TET = 3 \times d / \sqrt{f_{(GHz)}}$$

where d = 5 mm – is the minimum test separation distance. At f = 2.45 GHz, TET = 9.6 mW (10 mW if rounded).

EUT receive date: December 08, 2014

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: December 08, 2014

Test completion date: December 31, 2014

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

2.0 General Information

2.1 Product Description

Equipment under Test (EUT) is the Tile, Model T1002. As described by the manufacturer, Tile is intended to be used on a variety of items in order to track them using a smartphone enabled with Bluetooth Low Energy technology. Description of product as it is marketed as “Tile Bluetooth Location Finder -The World's Largest Lost & Found”.

Information about the 2.4GHz radio is presented below:

Applicant	Tile, Inc.
Model No.	T1002
FCC Identifier	2ABXLT1002
IC Identifier	11858A-T1002
IEEE Reference standard	802.15.1 Bluetooth Low Energy (LE)
Type of transmission	Direct Sequence Spread Spectrum (DSSS)
Modes	Single mode (Classic Bluetooth mode is not supported)
Rated RF Output	-3.22 dBm (0.476 mW)
Frequency Range	2402 – 2480 MHz
Type of modulation/data rate	GFSK / 1Mbps
Number of Channel(s)	40 (from 0 to 39)
Duty Cycle (during testing)	>98%
Antenna(s) & Gain	Meandering inverted F PCB antenna, Gain: 0 dBi
Manufacturer Name & Address	Tile, Inc. 2121 S. El Camino Real, Suite C-100 San Mateo, CA 94403, 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), and RSS-210, RSS-GEN, and

Radiated emissions and AC mains conducted emissions measurements were performed according to the procedures in ANSI C63.10. 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	-
Radiated emissions	4.2 dB	3.4 dB	4.4 dB
AC mains conducted emissions	2.4 dB	-	-

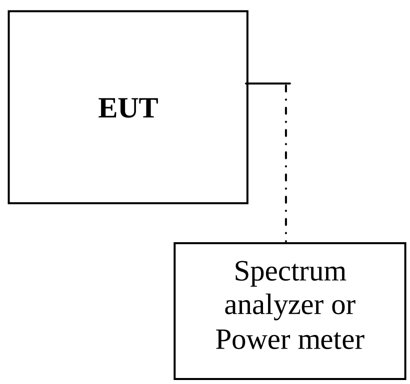
3.0 System Test Configuration

3.1 Support Equipment

EUT was tested as a standalone device. No Support equipment is used in test setup.

3.2 Block Diagram of Test Setup

Antenna was removed and co-axial connector with a
cable was installed for Conducted Measurements.
Internal antenna was used for Radiated 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. The EUT is programmed to transmit full power.

3.4 Software Exercise Program

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

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

Intertek installed no modifications during compliance testing in order to bring the product 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 Occupied Bandwidth
FCC Rule: 15.247(a)(2); RSS-210 A8.2 and RSS-GEN;

4.1.1 Requirement

The minimum 6-dB bandwidth shall be at least 500 kHz

4.1.2 Procedure

For FCC 6dB Channel Bandwidth the Procedure described in the FCC Publication 558074 D01 DTS Meas Guidance v03r02 June 5, 2014 was used to determine the DTS occupied bandwidth. Section 8.1 Option 1 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.

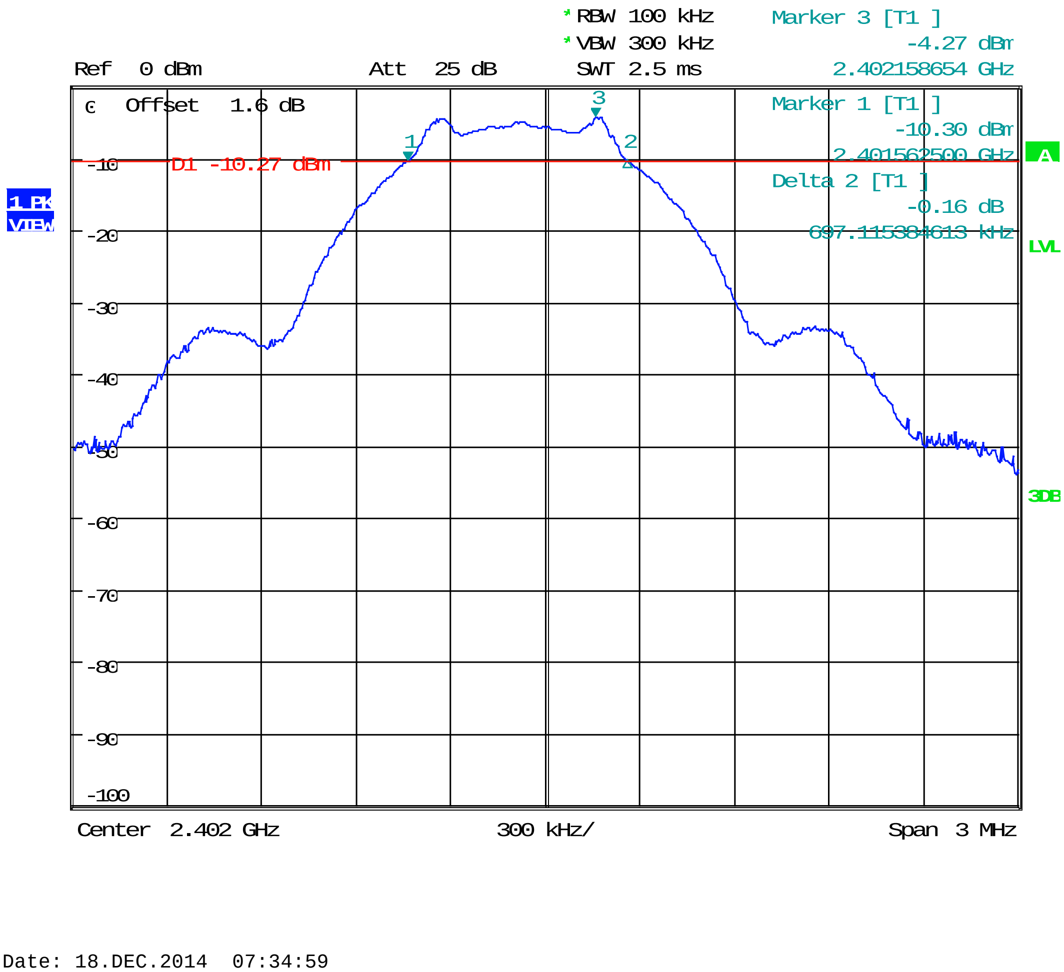
For 99% power bandwidth measurement, the bandwidth was determined by using the built-in 99% occupied bandwidth function of the spectrum analyzer. The resolution bandwidth is set to 1% of the selected span as is without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

4.1.3 Test Result

Frequency (MHz)	6-dB bandwidth FCC 15.247 & RSS-GEN, kHz	Occupied bandwidth, RSS-GEN, MHz	Plot
2402	697.1	--	1.1
	--	1.058	1.4
2434	711.5	--	1.2
	--	1.067	1.5
2480	726.0	--	1.3
	--	1.072	1.6

Results	**Complies**

Plot 1. 1

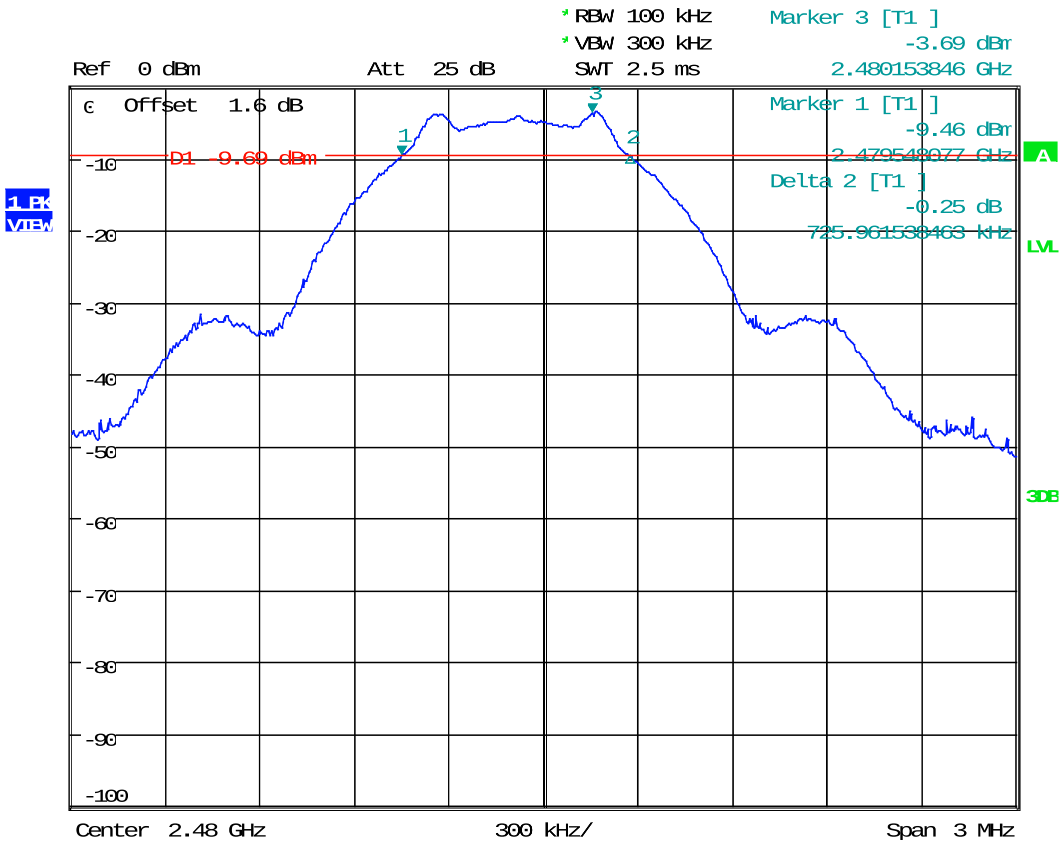


*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Ref 0 dBm
Att 25 dB
Marker 3 [T1]
-4.27 dBm
2.402158654 GHz
Offset 1.6 dB
Marker 1 [T1]
-10.30 dBm
2.401562500 GHz
Delta 2 [T1]
-0.16 dB
697.115384613 kHz
D1 -10.27 dBm
1 PK
VIEW
A
LVL
3DB
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1
2
3
Center 2.402 GHz
300 kHz/
Span 3 MHz
Date: 18.DEC.2014 07:34:59

Plot 1. 2

*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Ref 0 dBm
Att 25 dB
Marker 3 [T1]
-4.21 dBm
2.433658654 GHz
Marker 1 [T1]
-10.36 dBm
2.433548077 GHz
Delta 2 [T1]
0.06 dB
711.538461536 kHz
Offset 1.6 dB
D1 -10.21 dBm
1 PK
VIEW
A
LVL
3DB
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 2.434 GHz
300 kHz/
Span 3 MHz
Date: 18.DEC.2014 07:37:02

Plot 1. 3



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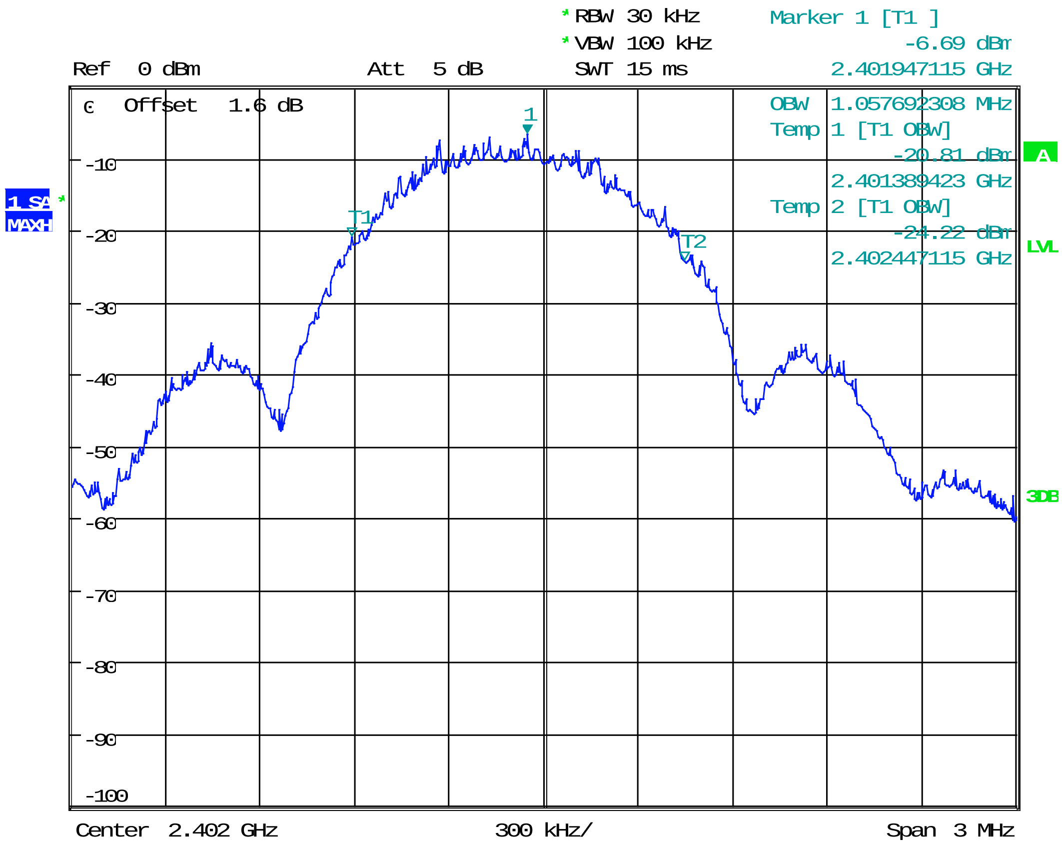
Plot 1. 4



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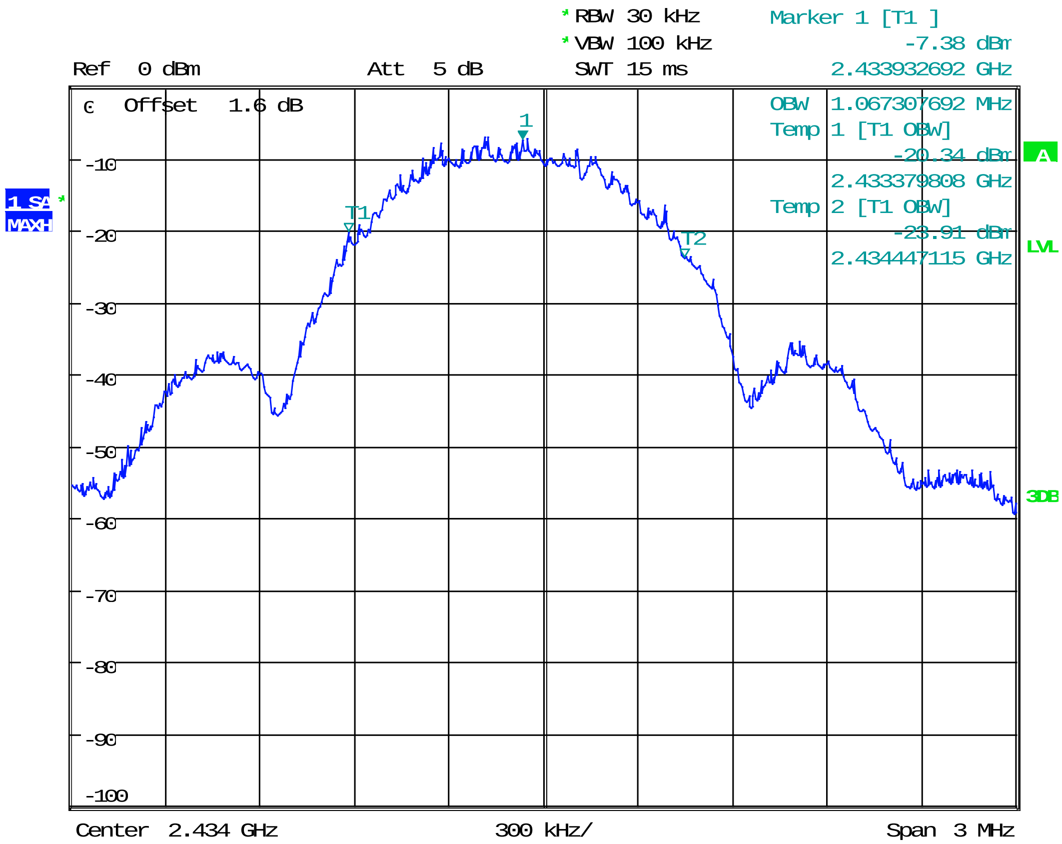
Plot 1.5



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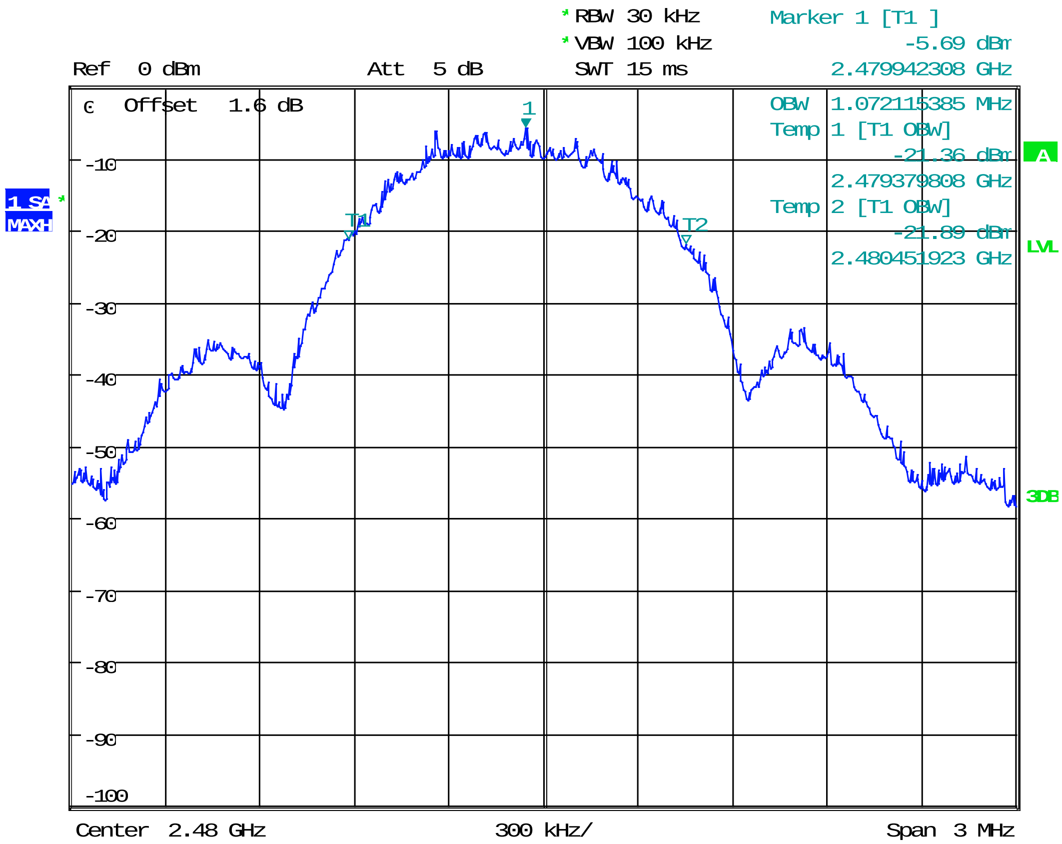
Plot 1.6



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4.2 Maximum Peak Conducted Output Power at Antenna Terminals
FCC Rule: 15.247(b)(3); RSS-210 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 DTS Meas Guidance v03r02 June 5, 2014 was used. Specifically, section 9.1.1 RBW ≥ DTS Bandwidth 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.

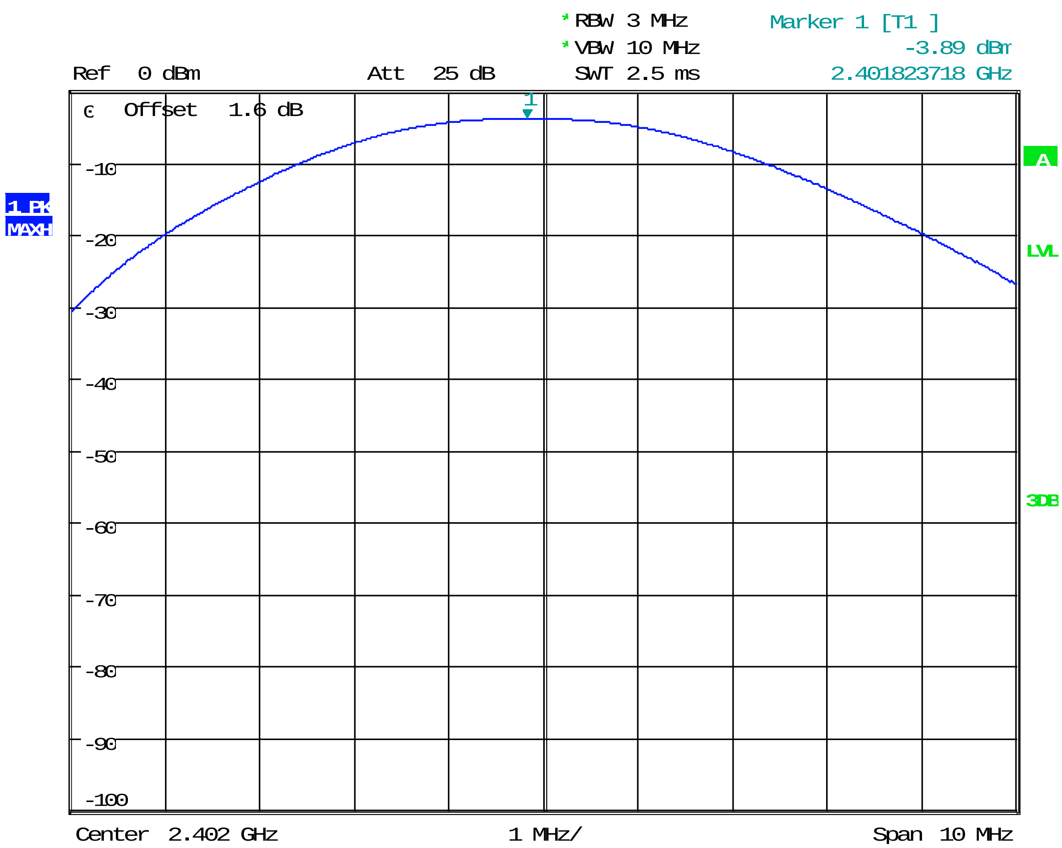
4.3.3 Test Result

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

Frequency, MHz	**Conducted Power (peak), dBm**	**Conducted Power (peak), mW**	**Plot**
2402	-3.89	0.408	2.1
2434	-3.78	0.419	2.2
2480	-3.22	0.476	2.3

Results	**Complies**

Plot 2. 1



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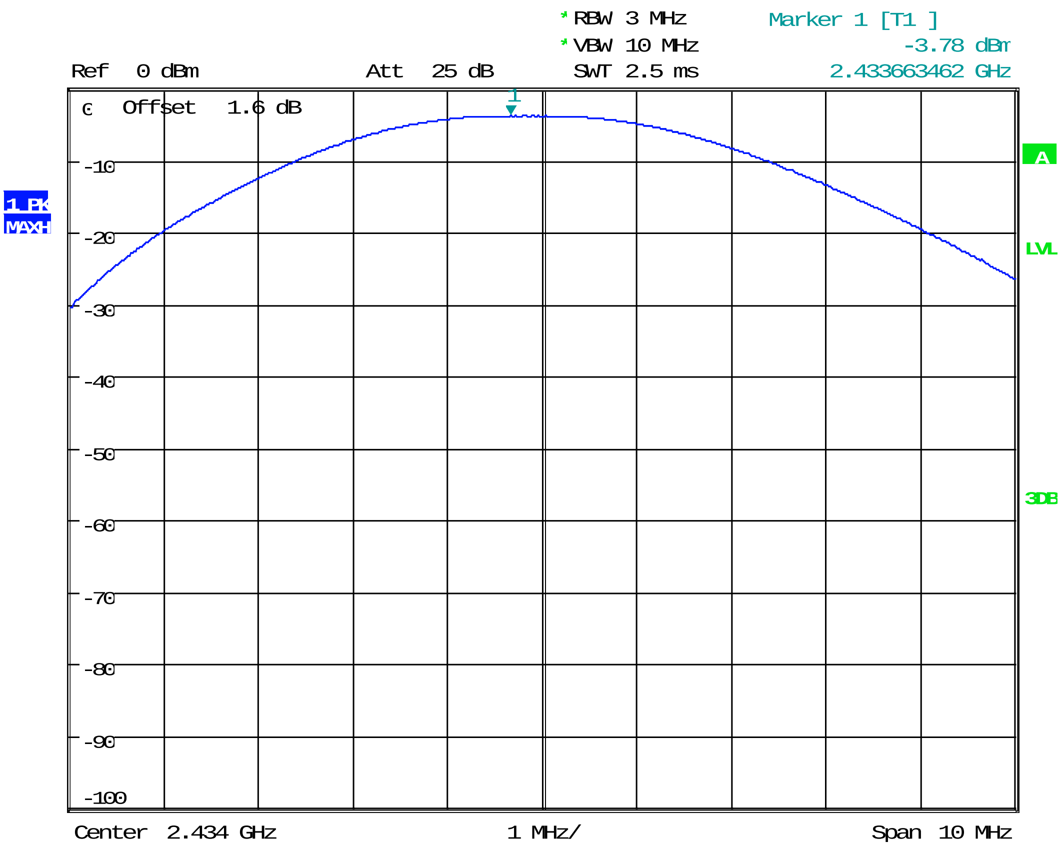
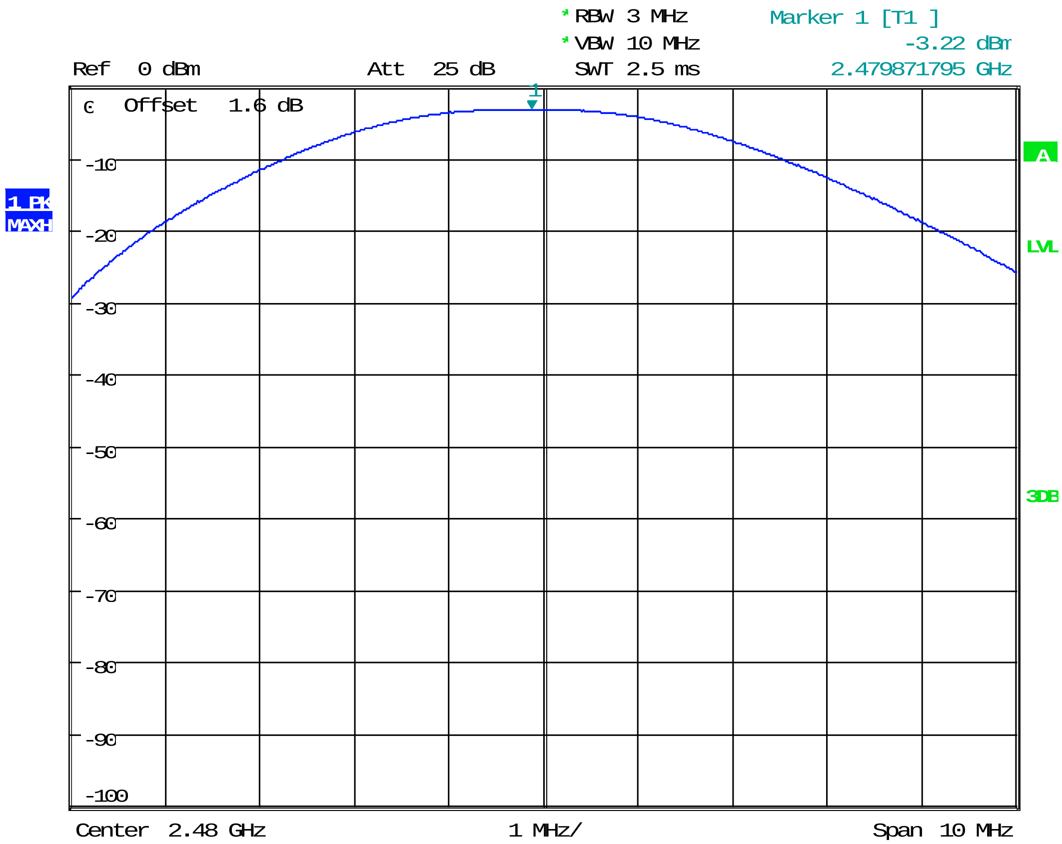
Plot 2. 2



Date: 18.DEC.2014 07:30:14

Plot 2. 3



Date: 18.DEC.2014 07:31:02

4.3 Maximum Power Spectral Density
FCC: 15.247 (e); RSS-210 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

The procedure described in FCC Publication 558074 D01 DTS Meas Guidance v03r02 June 5, 2014, specifically section 10.2 Method PKPSD (peak PSD).

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.

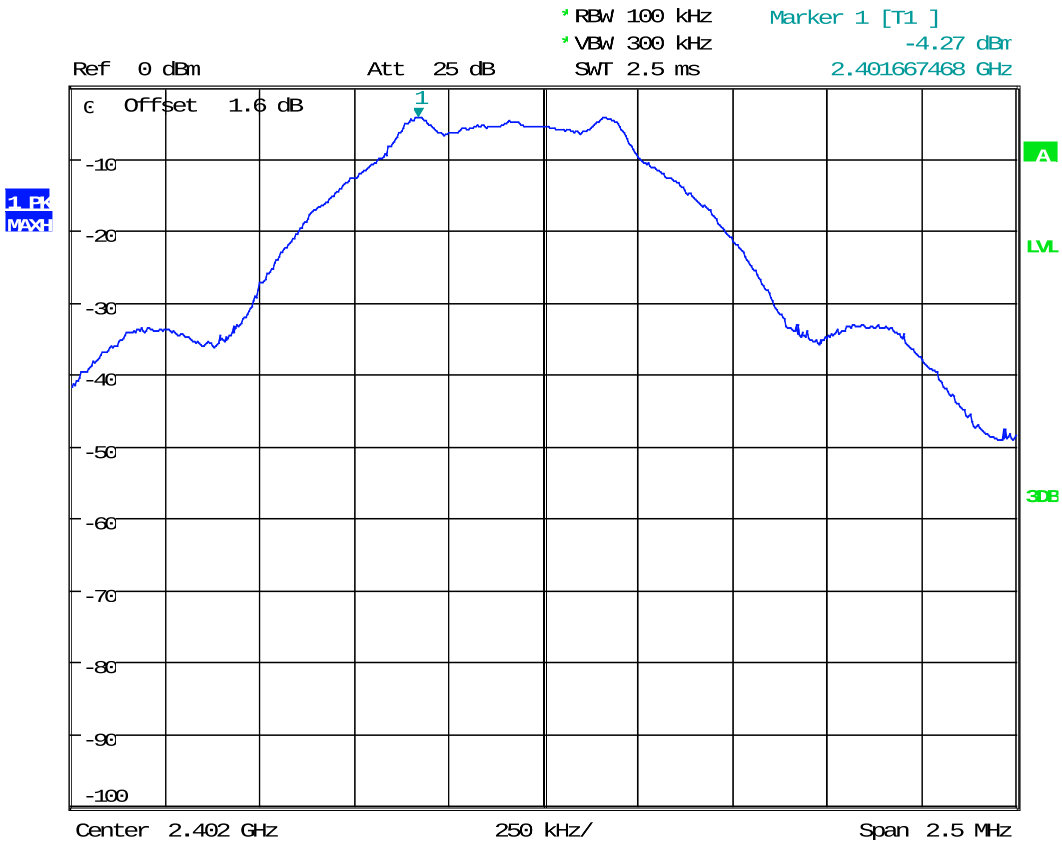
4.3.3 Test Result

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	-4.27	8.0	-12.27	3.1
2434	-4.10	8.0	-12.10	3.2
2480	-3.58	8.0	-11.58	3.3

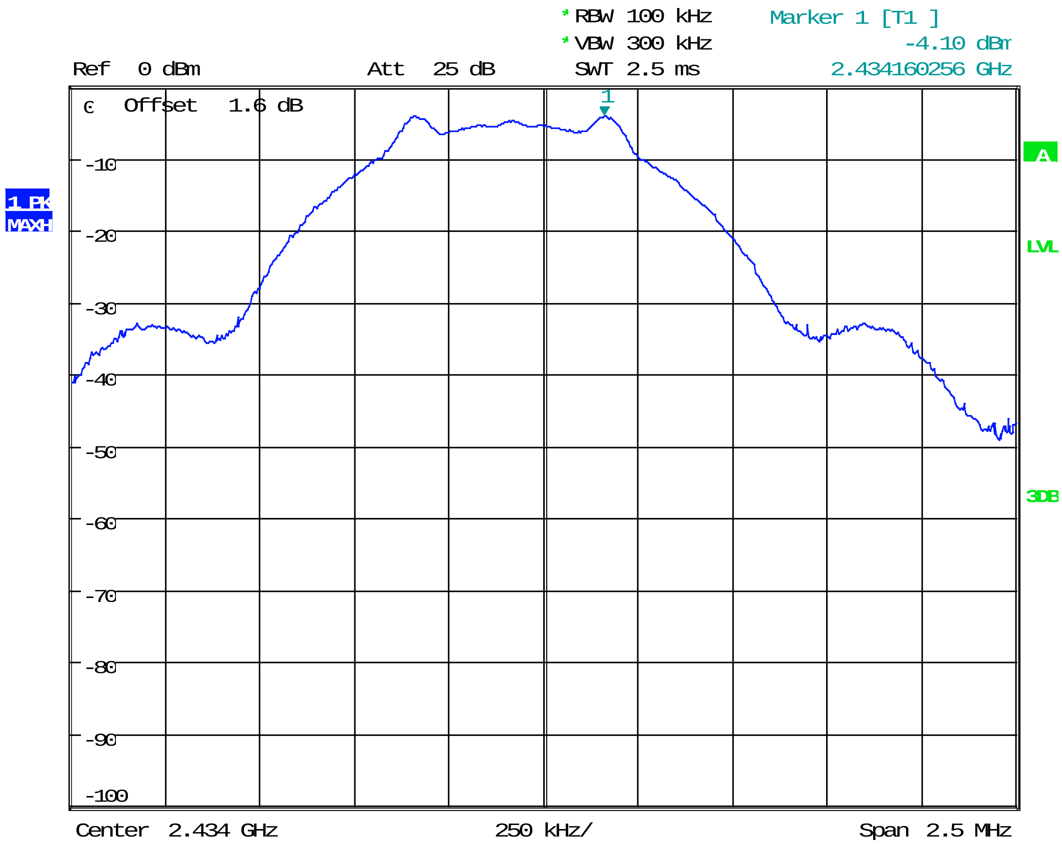
Results	**Complies**

Plot 3. 1



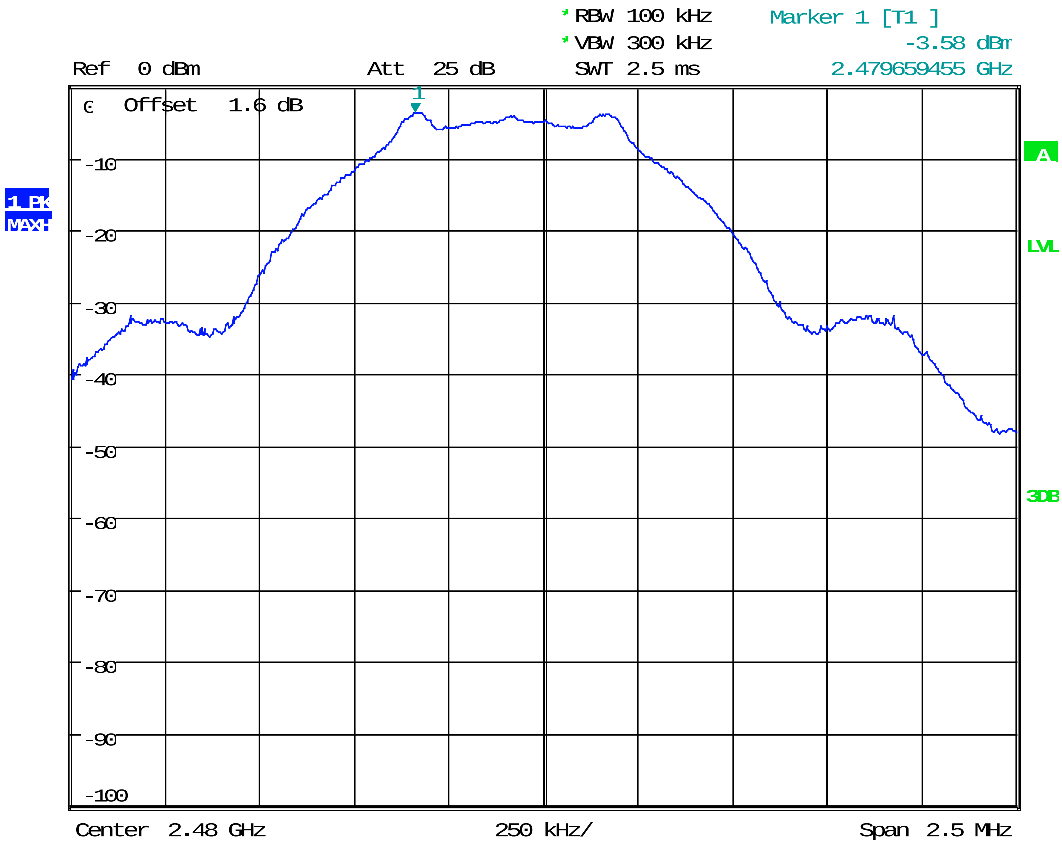
Date: 18.DEC.2014 07:59:13

Plot 3. 2



Date: 18.DEC.2014 08:00:48

Plot 3. 3



Date: 18.DEC.2014 07:57:57

4.4 Unwanted Conducted Emissions
FCC: 15.247(d); RSS-210 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 DTS Meas Guidance v03r02 June 5, 2014, specifically section 11.0 Emissions in non-restricted frequency bands.

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.

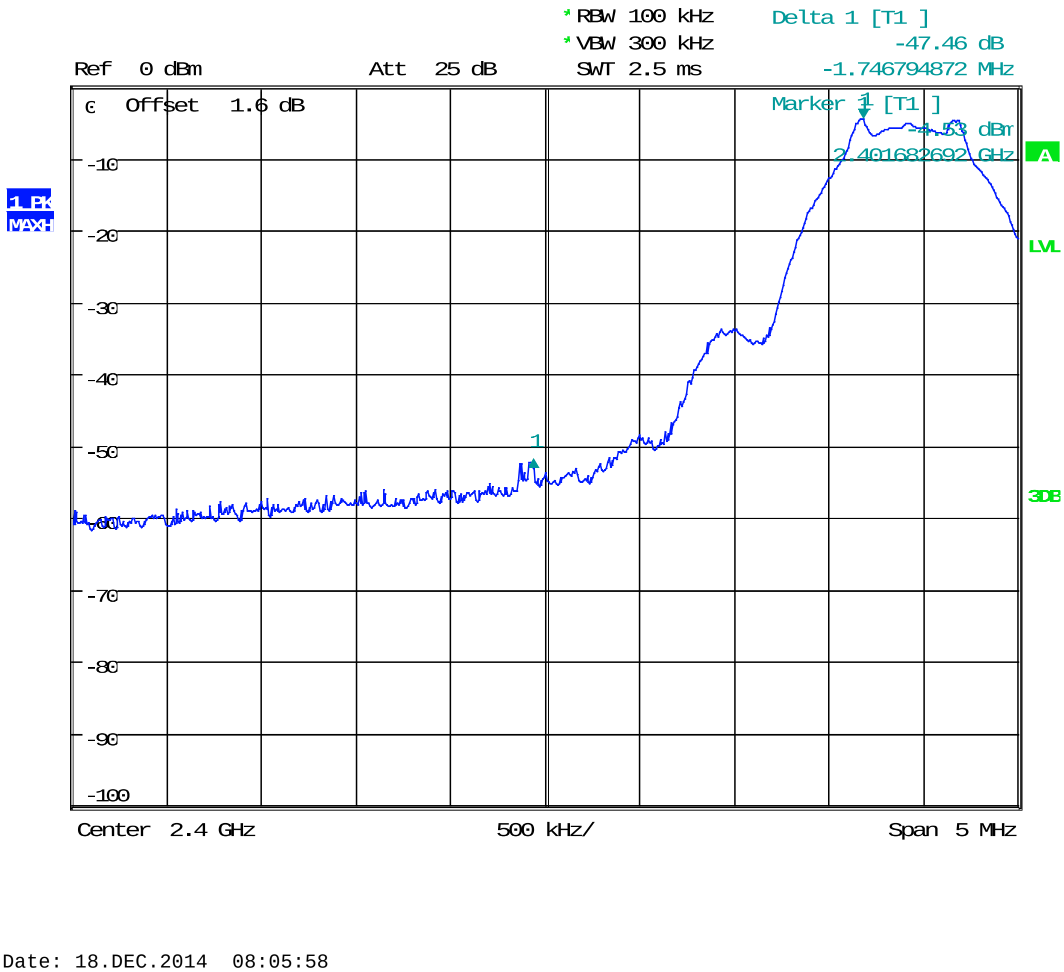
The unwanted emissions were measured from 30 MHz to 25 GHz. Plots below are corrected for cable loss and then compared to the limits.

4.4.3 Test Result

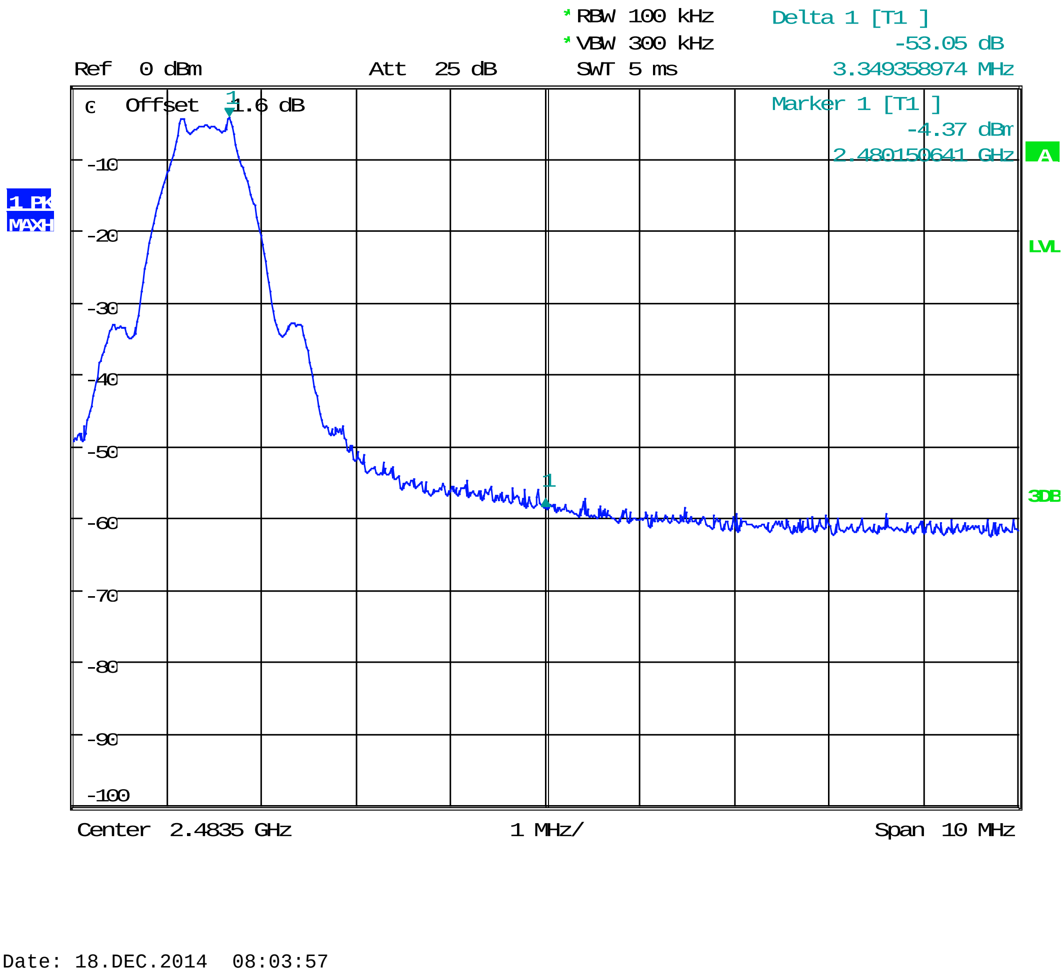
Results	**Complies**

See plots below for details.

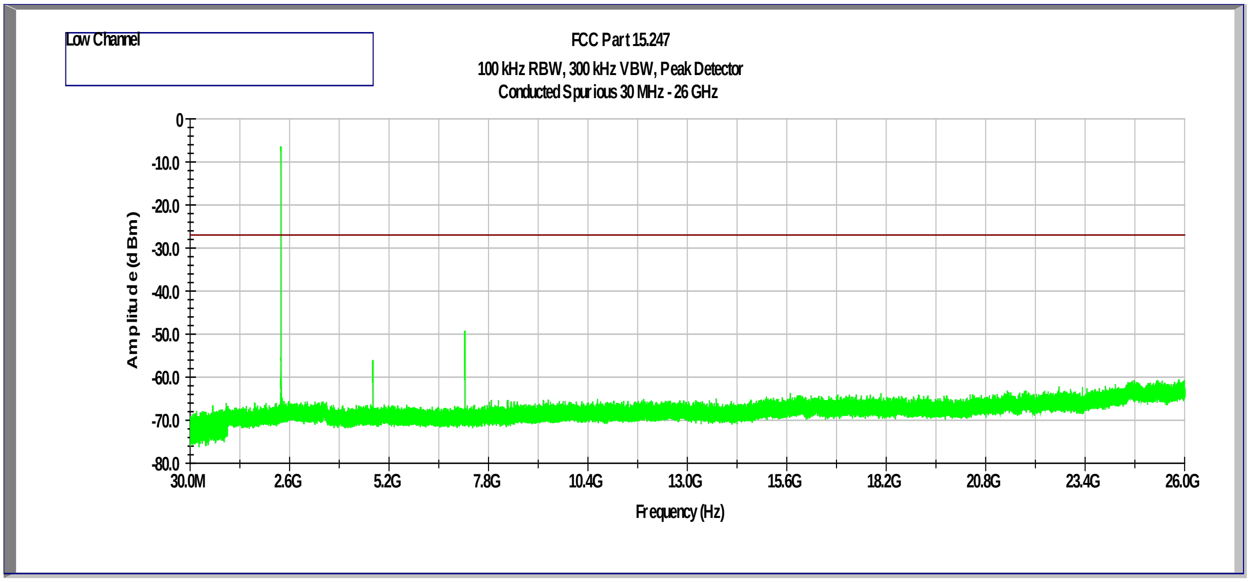
Tx @ Low Channel, 2400 MHz Band Edge



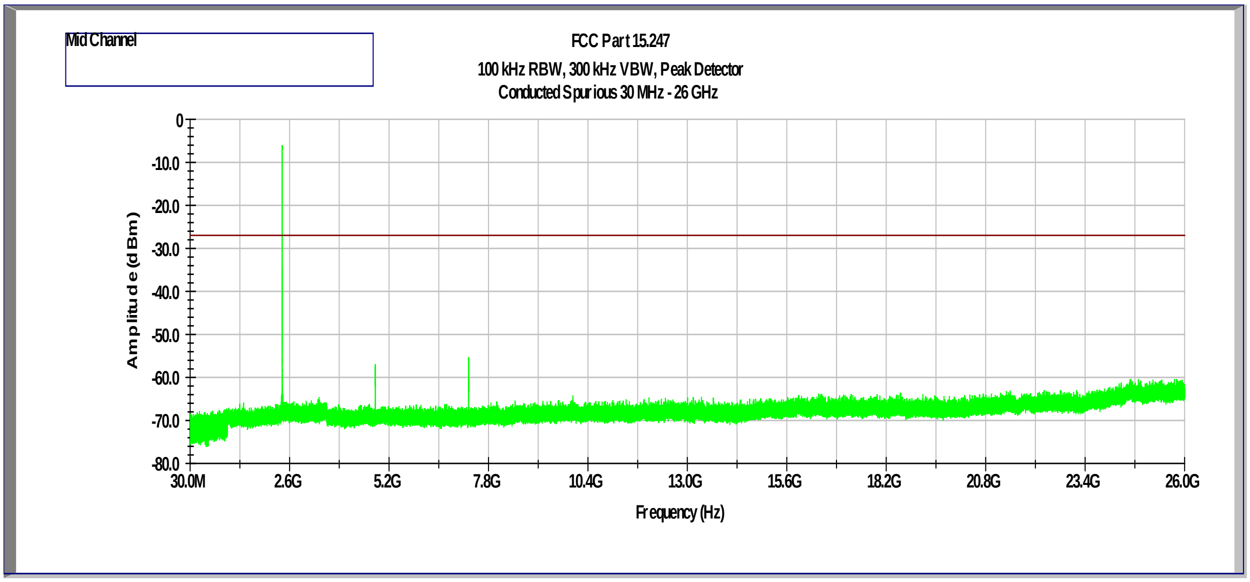
Tx @ Low Channel, 2483.5 MHz Band Edge



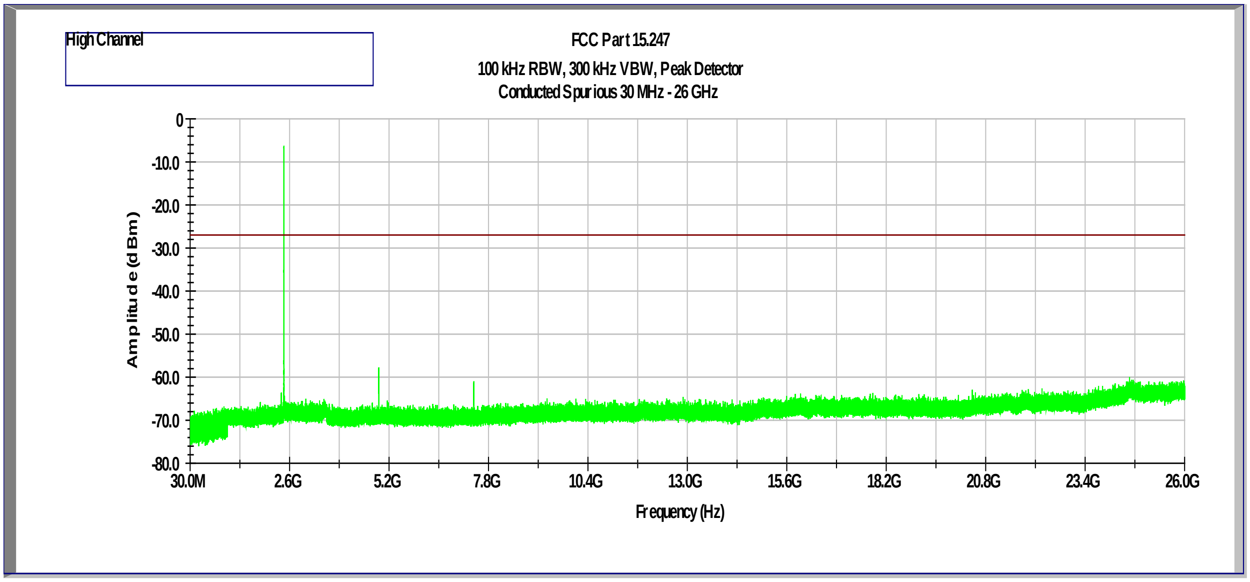
Conducted Spurious Emissions, Tx @ Low Channel, 2402 MHz



Conducted Spurious Emissions, Tx @ Middle Channel, 2434 MHz



Conducted Spurious Emissions, Tx @ High Channel, 2480 MHz



4.5 Transmitter Radiated Emissions
FCC Rules: 15.247(d), 15.209, 15.205; RSS-210;

4.5.1 Requirement

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

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).

4.5.2 Procedure

Radiated emission measurements were performed from 30 MHz to 25 GHz according to the procedure described in ANSI C64.10. 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. 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 10 meters for frequencies below 1 GHz and at 3 meters for frequencies above 1 GHz, and 1 meter for radiated band edge testing.

Data included is representative of the worst-case configuration (the configuration which resulted in the highest emission levels). Plots below are corrected for distance, cables, preamp, filters and antenna factors then compared to the limits.

4.5.3 Field Strength Calculation

<u>Field Strength Calculation</u>

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

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

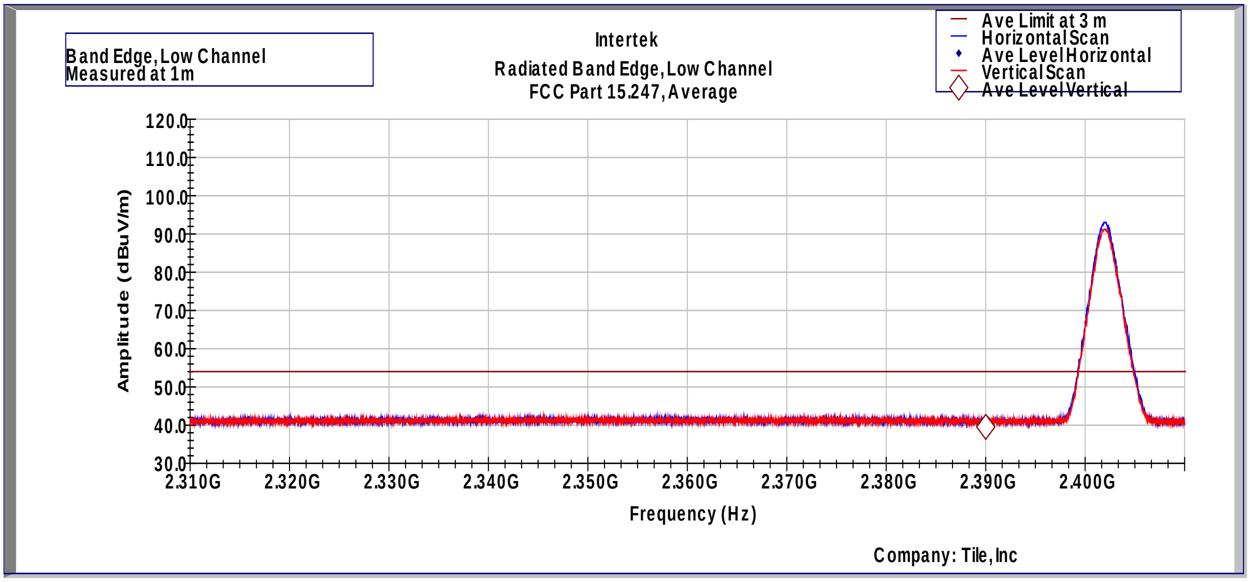
Radiated emission measurements were performed up to 25GHz. Peak emissions that were identified were measured to be greater than 20dB below 74dBμV peak limits. No Emissions were identified when scanned from 18-25 GHz.

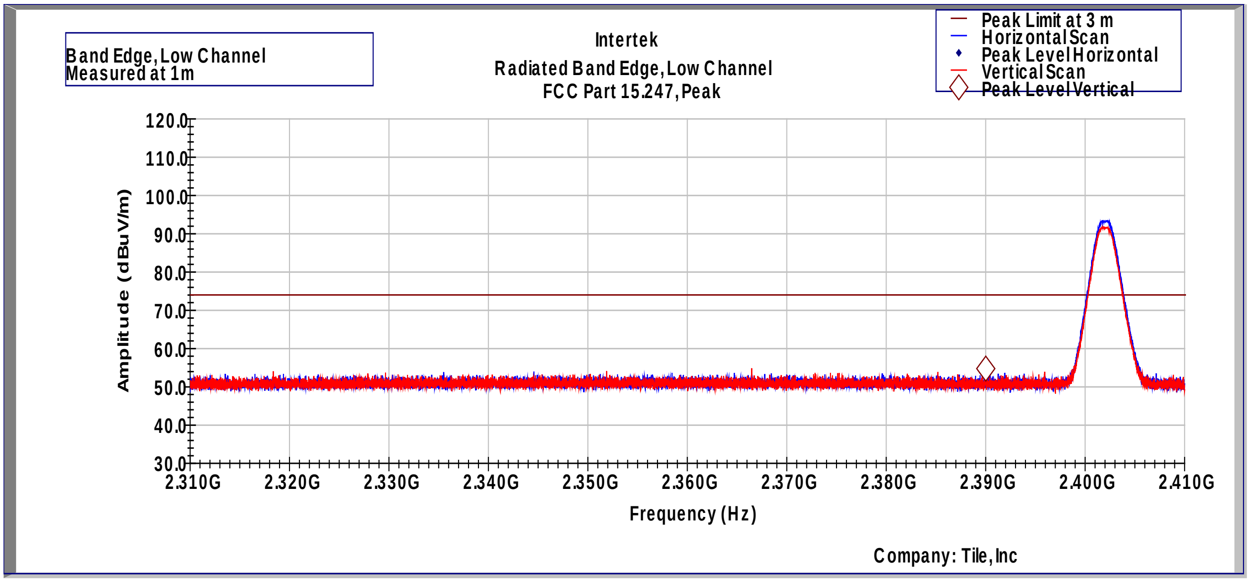
Results	**Complies** by 4.2dB

See plots below for details.

Test Results: 15.209/15.205 Restricted Band Emissions

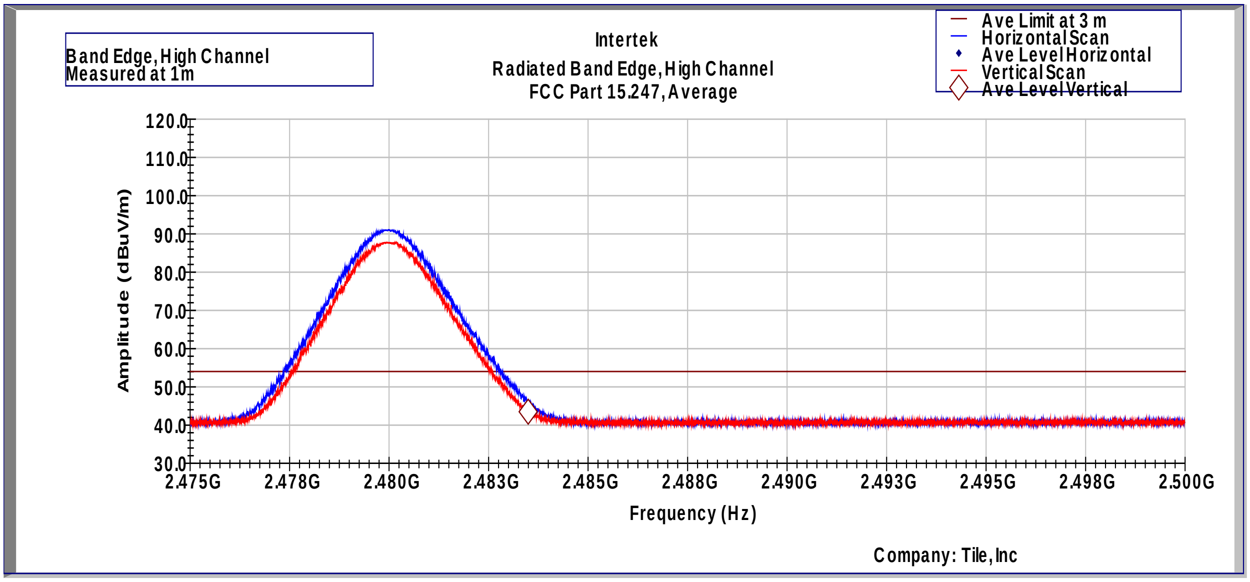
Out-of-Band Radiated spurious emissions at the Band-edge
2310–2390 MHz

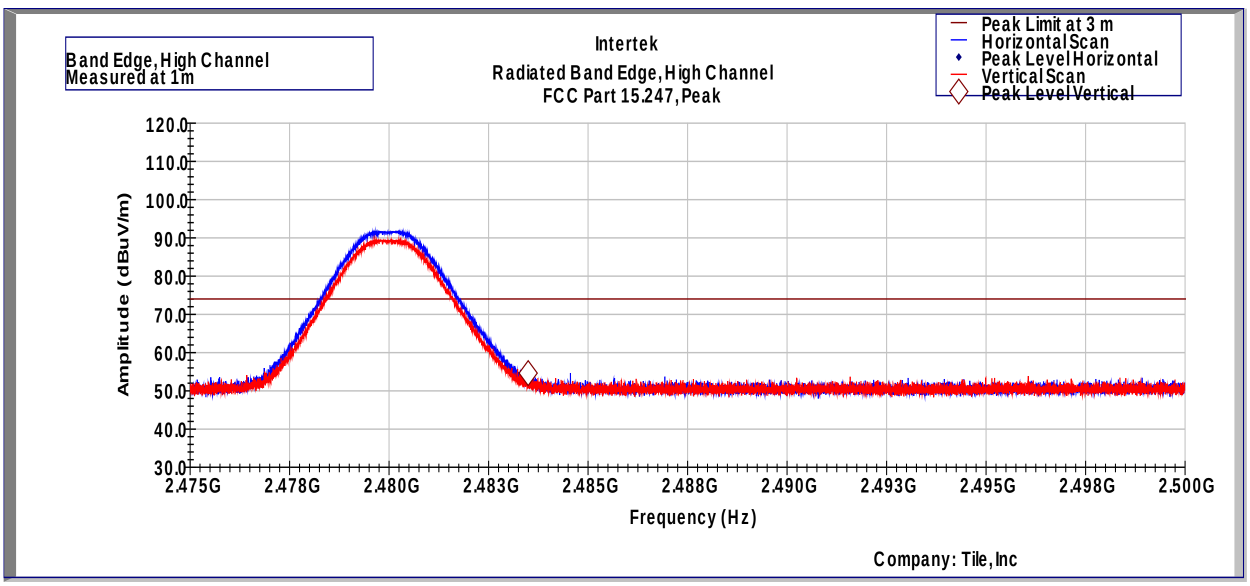




Results	Complies

Out-of-Band Radiated spurious emissions at the Band-edge
2483.5–2500 MHz

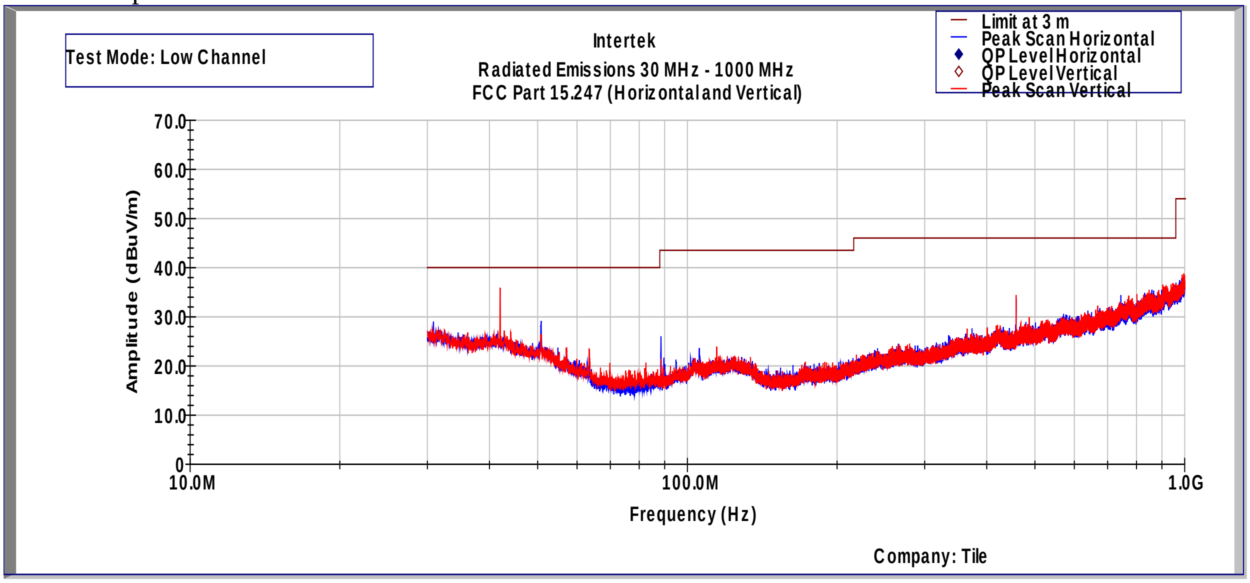




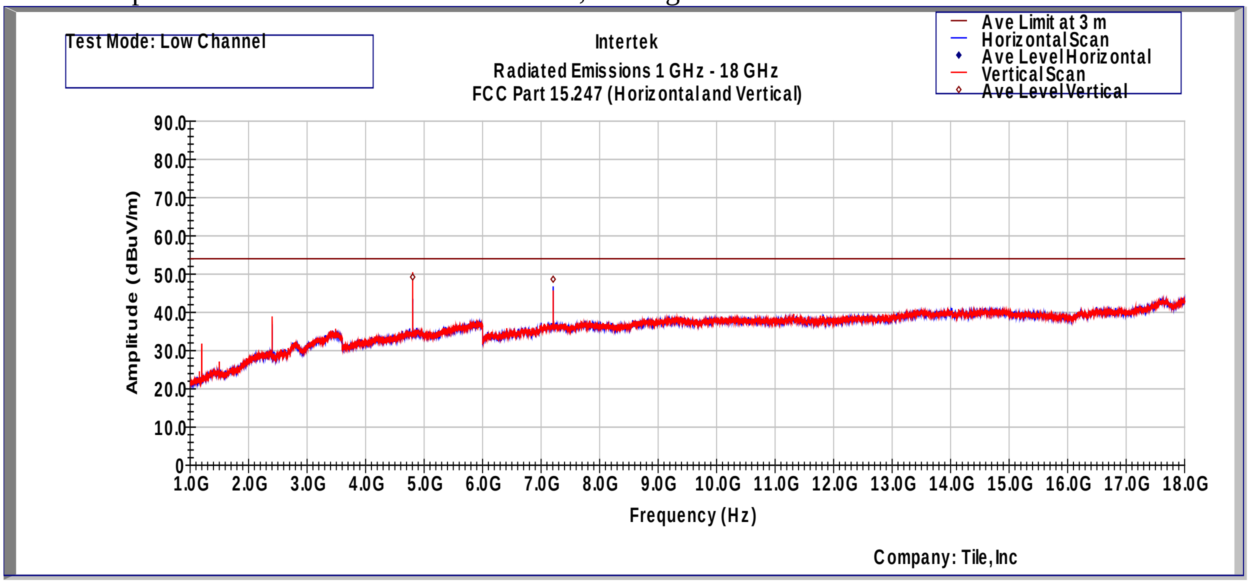
Results	**Complies**

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, Average Scan

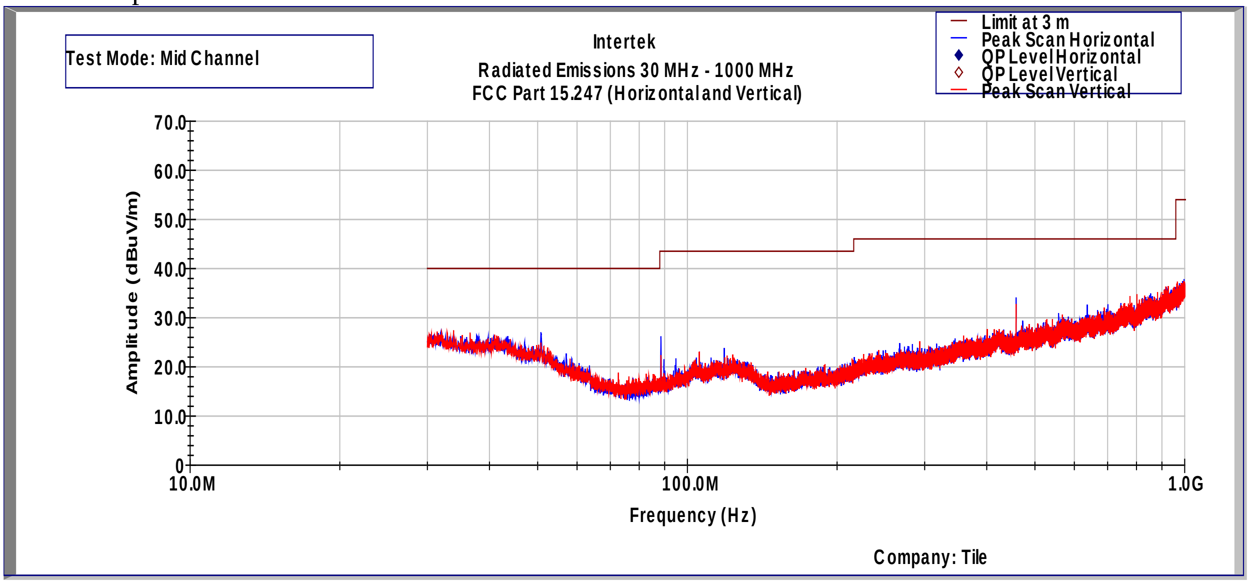


Frequency	Ave Level	Ave Limit@3m	Margin	Raw	Cable	Preamp	AF
MHz	**(dBuV/m)**	**(dBuV/m)**	**(dB)**	**(dBuV)**	**(dB)**	**(dB)**	**dB(1/m)**
4804	49.2	54	-4.8	45.1	6.0	34.4	32.5
7206	48.6	54	-5.4	37.4	7.6	33	36.7

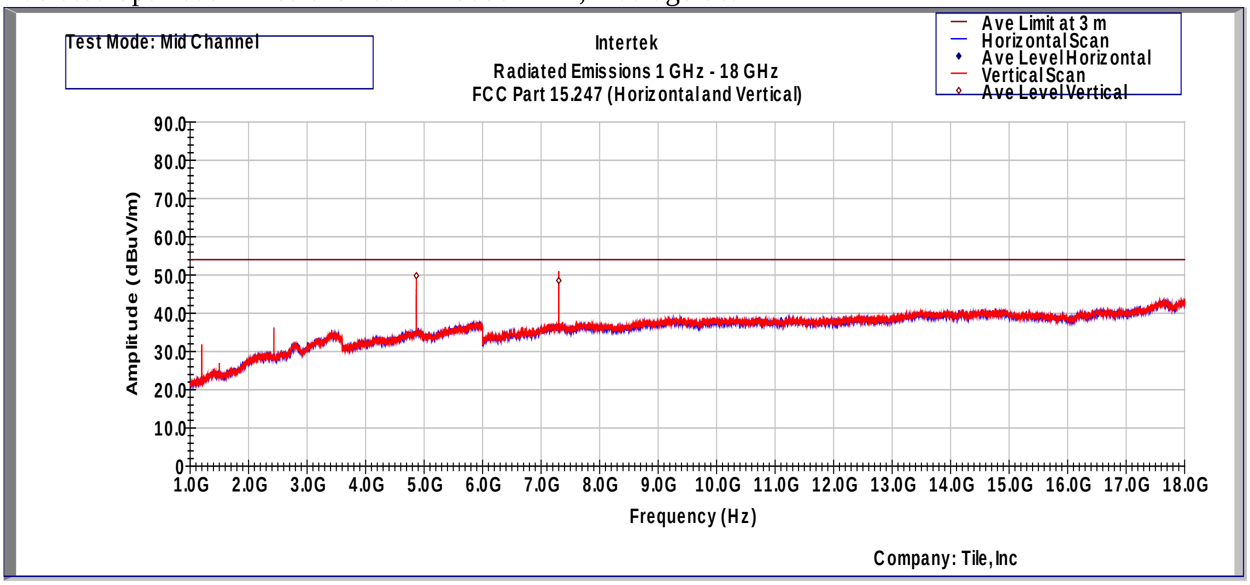
Results	**Complies**

Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 2434MHz

Radiated Spurious Emissions 30 MHz - 1000 MHz



Radiated Spurious Emissions 1000 - 18000 MHz, Average Scan

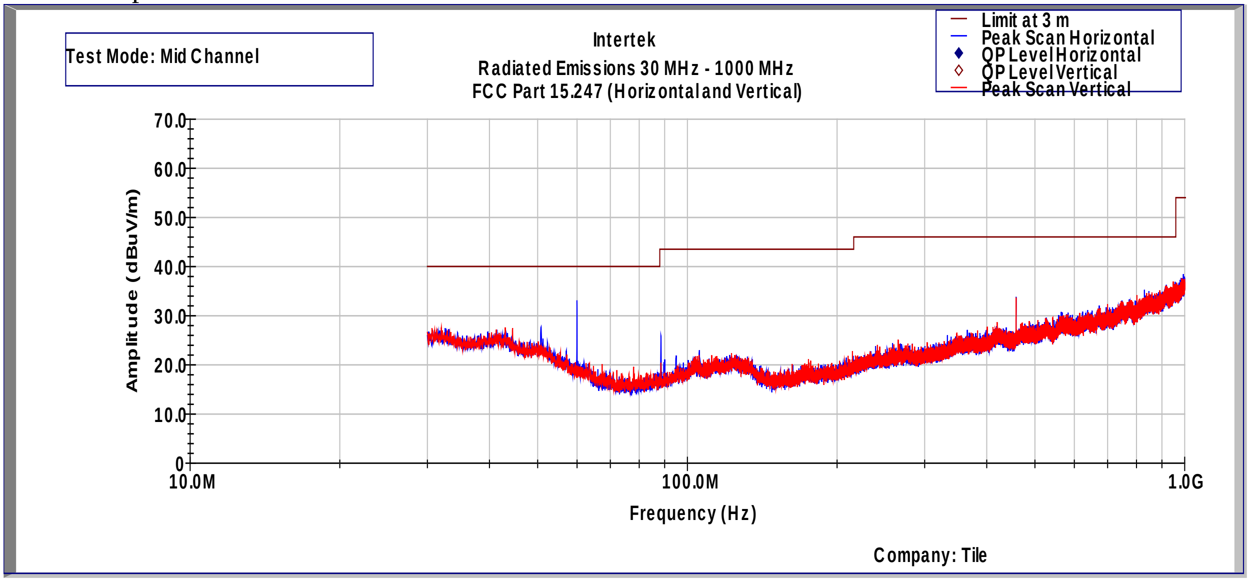


Frequency	Ave Level	Ave Limit@3m	Margin	Raw	Cable	Preamp	AF
MHz	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(dB)	(dB)	dB(1/m)
4868	49.8	54	-4.2	45.2	6.1	34.4	32.9
7302	48.5	54	-5.5	37	7.6	33	36.9

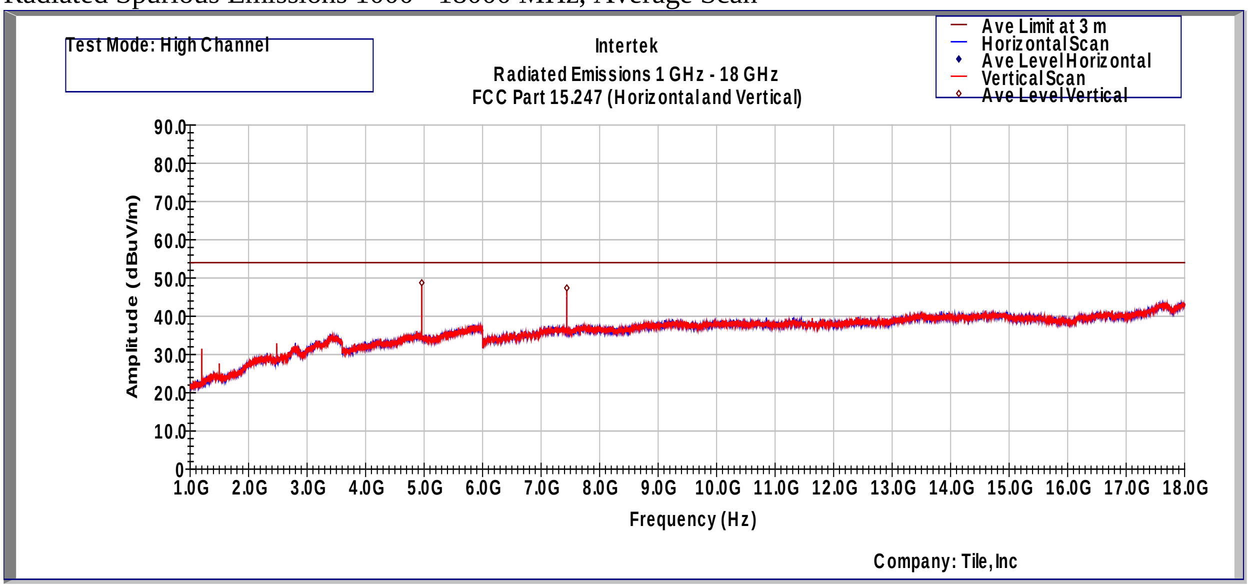
Results	Complies

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, Average Scan

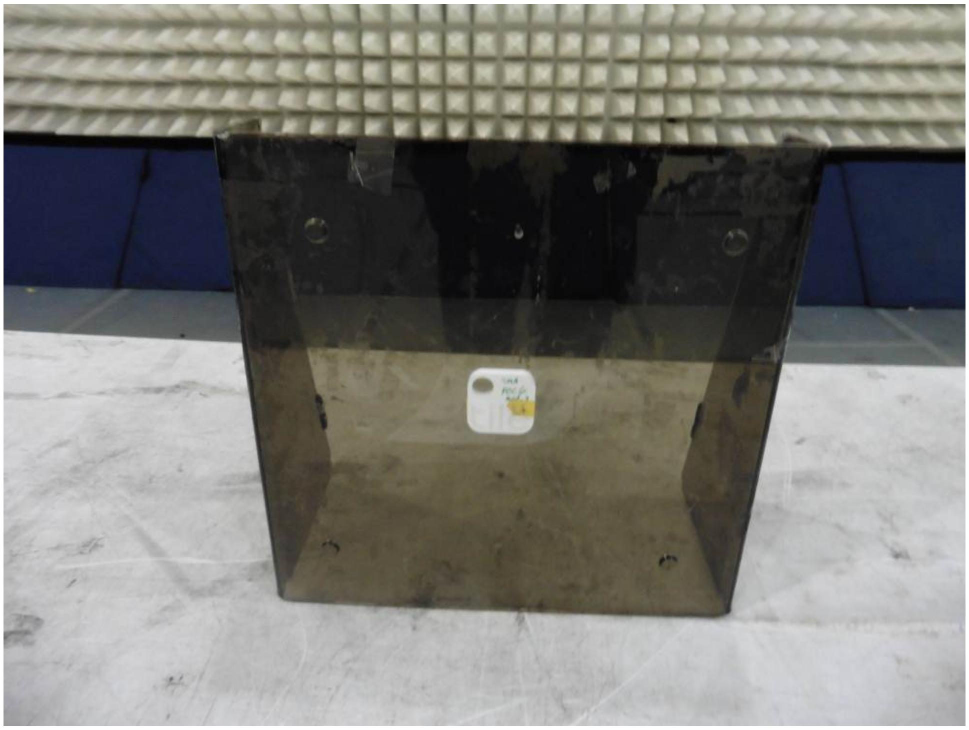


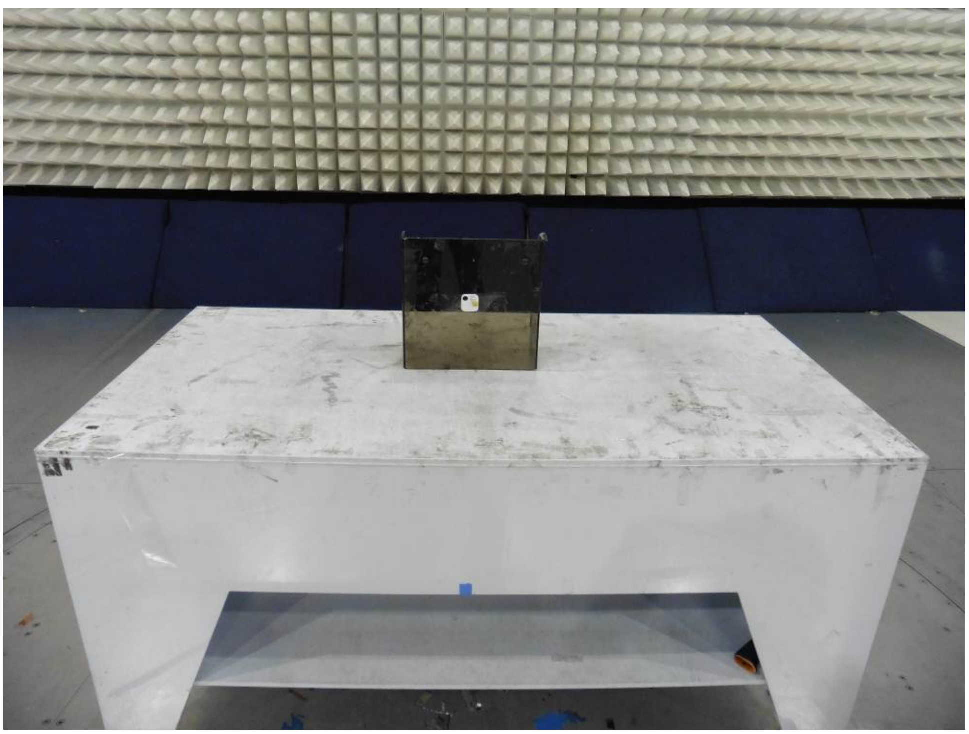
Frequency	Ave Level	Ave Limit@3m	Margin	Raw	Cable	Preamp	AF
MHz	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(dB)	(dB)	dB(1/m)
4960	48.7	54	-5.3	44.2	6.1	34.4	32.8
7440	47.4	54	-6.6	35.8	7.7	32.9	36.8

Results	**Complies**

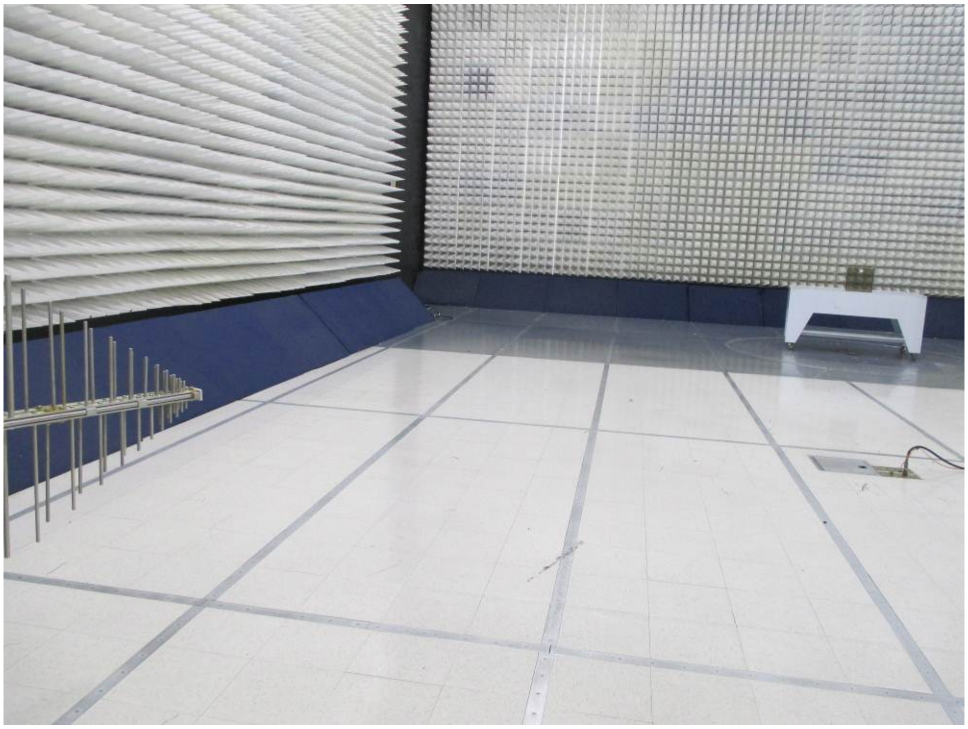
4.5.4 Test setup photographs

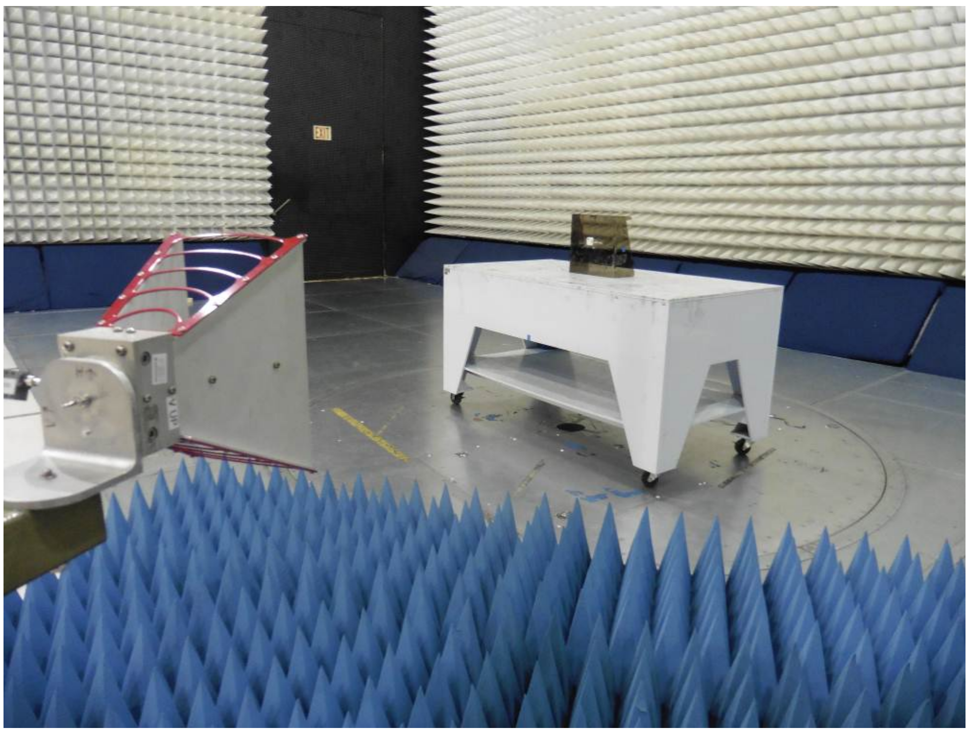
The following photographs show the testing configurations used.





4.5.4 Test setup photographs (Continued)





4.6 Radiated Emissions

FCC Ref: 15.109, ICES 003

4.6.1 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

4.6.2 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.

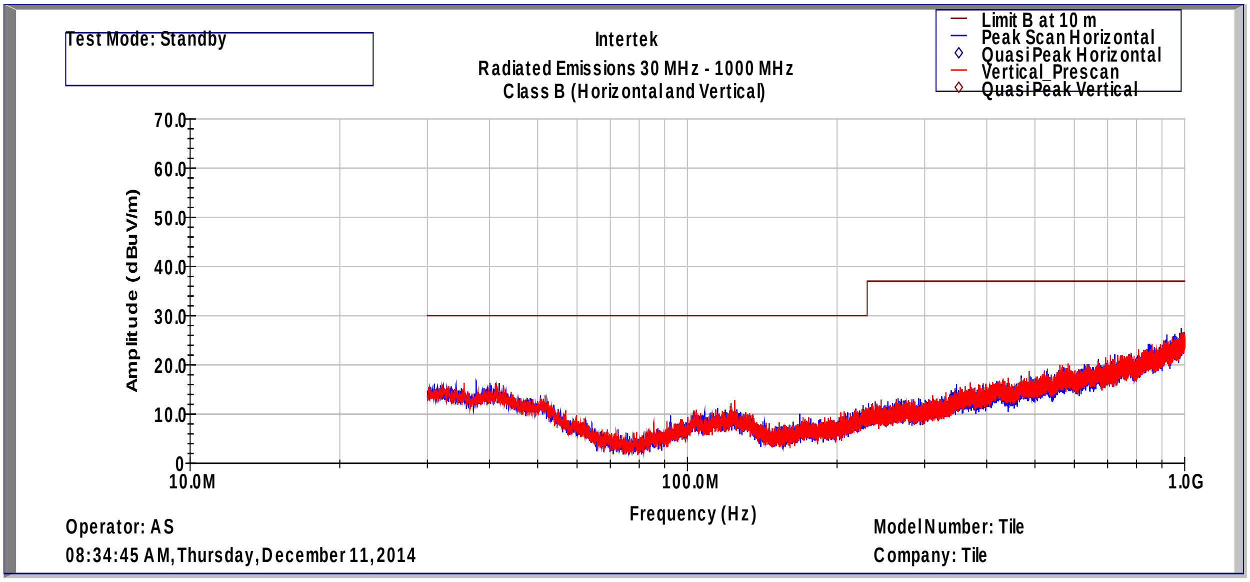
Floor standing EUT are placed on a horizontal metal ground plane and isolated from the ground plane by resting on an insulating material.

Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4 and EN 55022.

4.6.3 Test Results

The highest clock frequency used in the EUT is 16 MHz; therefore testing for Radiated Emissions need be tested up to 1 GHz for FCC 15B. Radiated emission measurements were performed from 30 MHz to 1000 MHz. The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Test Results: Radiated Emissions 30 MHz – 1000 MHz



Radiated Emissions 30 MHz - 1000 MHz
EN55022 Class B
Company: Tile, Inc. Model Number: Tile

CISPR Class B (Vertical)

Frequency	Peak FS	Limit@10m	Margin	RA	CF	AG	AF	Azimuth	Height
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)	deg	cm
41.122	16.3	30	-13.7	30.5	0.7	32	17.1	341	100
709.194	21.9	37	-15.1	31.9	3.1	32.5	19.4	349	100
997.672	26.7	37	-10.3	29.8	3.7	30.2	23.4	349	100

CISPR Class B (Horizontal)

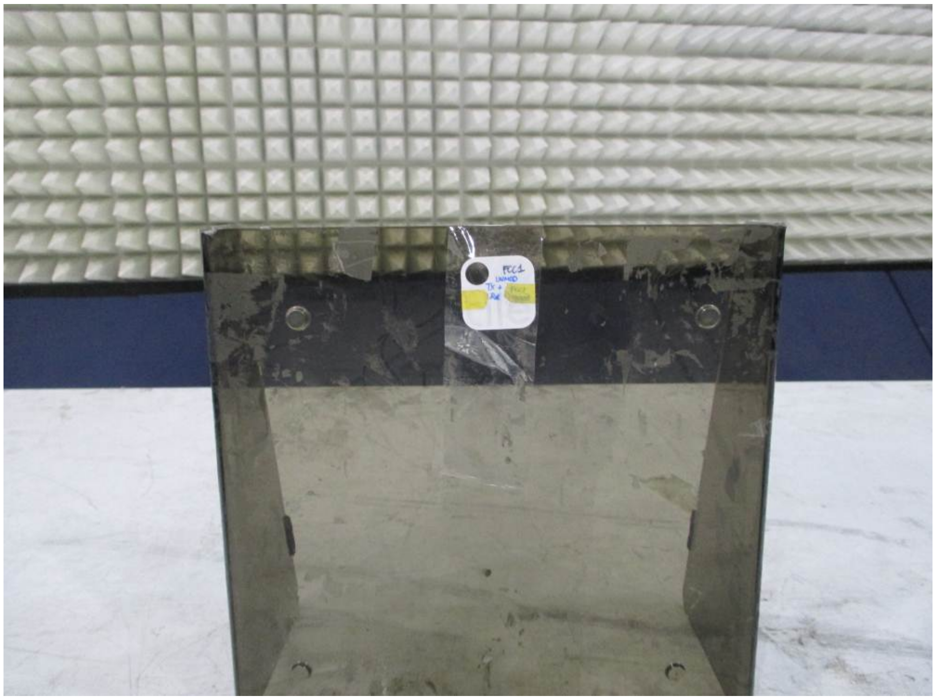
Frequency	Peak FS	Limit@10m	Margin	RA	AG	AF	CF	Azimuth	Height
MHz	dB(uV)	dB(uV/m)	dB	dB(uV)	dB	dB(1/m)	dB	deg	cm
37.598	16.8	30	-13.2	30.6	32	17.5	0.7	28	100
850.426	24.3	37	-12.7	31.1	31.7	21.5	3.4	17	100
921.171	26.1	37	-10.9	31.3	31	22.3	3.6	17	100
984.836	27.5	37	-9.5	31.3	30.4	22.8	3.7	17	100

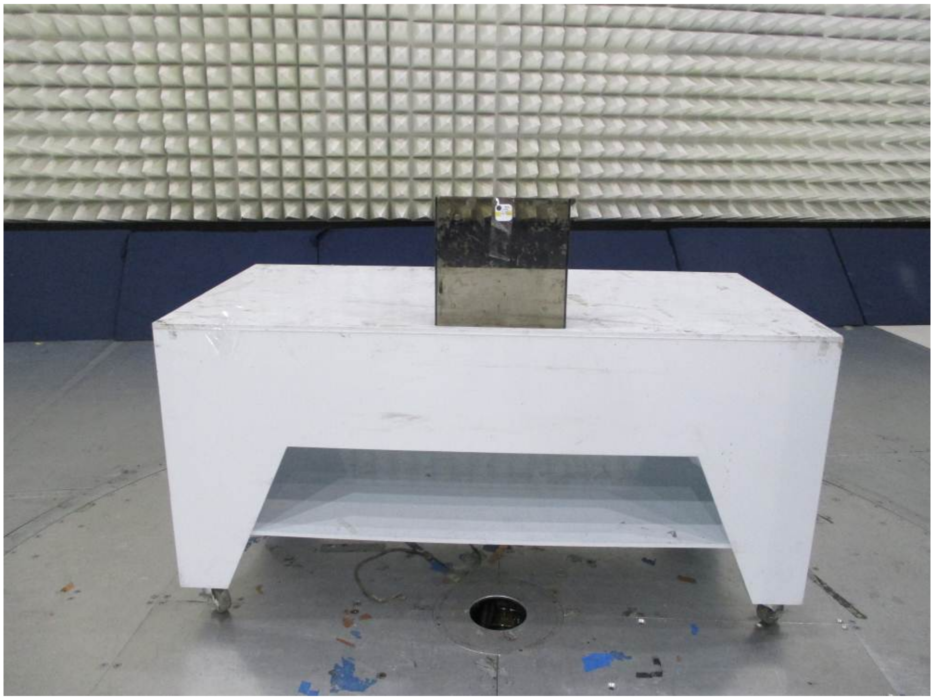
Temp: 22C
Humidity: 43%

Results:	**Complies** by 9.5 dB.

4.6.4 Test Configuration Photographs

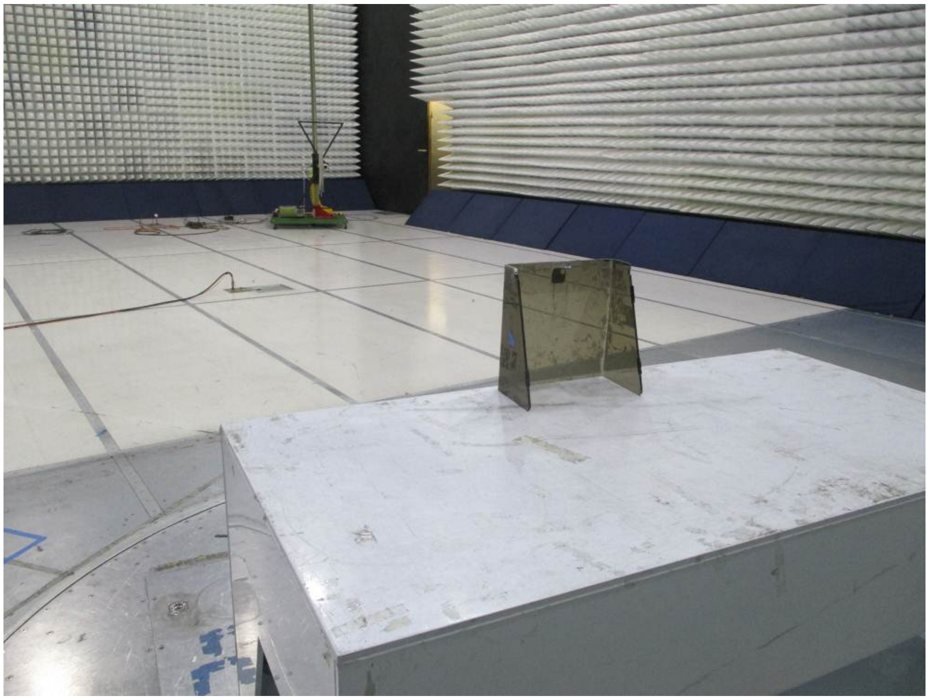
The following photographs show the testing configurations used.

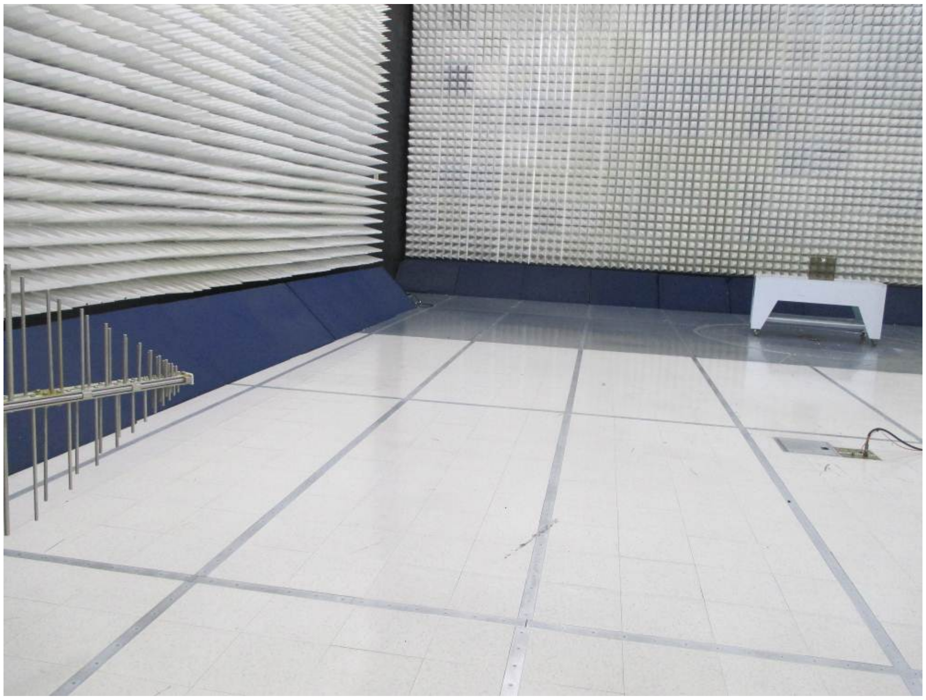




Electromagnetic Radiated Disturbance Setup Photograph

4.6.4 Test Configuration Photographs (Continued)





Electromagnetic Radiated Disturbance Setup Photograph

4.7 AC Line Conducted Emission
FCC: 15.207, 15.107; RSS-GEN;

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.

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

Results	**Not Applicable. 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:

Equipment	Manufacturer	Model/Type	Asset #	Cal Int	Cal Due
Pyramidal Horn Antenna	EMCO	3160-09	ITS 00571	#	#
Pre-Amplifier	Miteq	JSD44-18004000-305P	ITS 00921	12	06/09/15
BI-Log Antenna	Antenna Research	LPB-2513/A	ITS 00355	12	08/21/15
Pre-Amplifier	Sonoma Instrument	310	ITS 00942	12	11/26/15
Hygro Thermometer	Control Co.	4085	ITS 00322	12	11/14/15
Pre-Amplifier	Miteq	AMF-4D-001180-24-10P	ITS 00526	12	10/01/15
Spectrum Analyzer	Rohde & Schwarz	FSU	ITS 00913	12	12/16/15
EMI Receiver	Rohde & Schwarz	ESU	ITS 00961	12	11/10/15
Horn Antenna	ETS-Lindgren	3115	ITS 00982	12	11/21/15
Signal Generator	Rohde & Schwarz	SMR40	ITS 00981	12	11/17/15

No Calibration required

6.0 Document History

Revision/ Job Number	Writer Initials	Reviewers Initials	Date	Change
1.0 / G101867573	AS	KK	January 09, 2015	Original document