TEST REPORT

Report Number: 102374971MPK-018
Project Number: G102374971
January 29, 2016

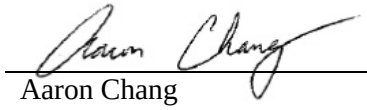
Testing performed on
Image Sensor Module
Model: QS-IS
FCC ID: 2AAJXQS-IS
IC: 11205A-QSIS
to

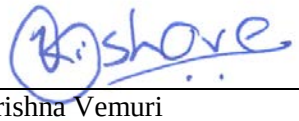
FCC Part 15 Subpart C (15.247)
Industry Canada RSS-247 Issue 1

For

Qolsys, Inc.

Test Performed by:	Test Authorized by:
Intertek	Qolsys, Inc.
1365 Adams Court	1900 The Alameda Ste 420
Menlo Park, CA 94025 USA	San Jose, CA 95126 USA

Prepared by:  **Date:** January 29, 2016
Aaron Chang

Reviewed by:  **Date:** January 29, 2016
Krishna Vemuri

Report No. 102374971MPK-018

Equipment Under Test:	Image Sensor Module
Trade Name:	Qolsys, Inc.
Model Number:	QS-IS
Serial Number:	EMC Proto1
Applicant:	Qolsys, Inc.
Contact:	Mark Skeen
Address:	Qolsys, Inc. 1900 The Alameda Ste 420 San Jose, CA 95126
Country	USA
Tel. Number:	408-709-2717
Email:	mark.skeen@qolsys.com
Applicable Regulation:	FCC Part 15 Subpart C (15.247) Industry Canada RSS-247 Issue 1
Date of Test:	January 7 – 27, 2016

We attest to the accuracy of this report:

Aaron Chang
Project Engineer

Krishna Vemuri
Engineering Team Lead

TABLE OF CONTENTS

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	Complies
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 & Unique connector)
RF Exposure	15.247(i), 2.1093(d)	RSS-102	Complies

EUT receive date: January 4, 2016
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: January 7, 2016
Test completion date: January 27, 2016
The test results in this report pertain only to the item tested.

2.0 General Information

2.1 Product Description

The Equipment Under Test (EUT) is the Image Sensor Module. It is Qolsys Gen2 Alarm Panel Radio Card for Alarm.com Image Sensor.

Information about the Zigbee radio is presented below:

Applicant	Qolsys, Inc.
Model No.	QS-IS
FCC Identifier	2AAJXQS-IS
IC Identifier	11205A-QSIS
Type of transmission	Digital Transmission System (DTS)
Rated RF Output	9.29 dBm (8.49 mW)
Antenna(s) & Gain	PCB antenna, Gain: < 2 dBi
Frequency Range	912 – 924 MHz
Type of modulation/data rate	BPSK / <200kbps
Number of Channel(s)	7
Applicant Name & Address	Qolsys, Inc. 1900 The Alameda Ste 420 San Jose, CA 95126 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 v03r03 June 9, 2016), and RSS-247, RSS-GEN.

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	-
Radiated emissions	4.2 dB	3.4 dB	4.4 dB
AC mains conducted emissions	2.4 dB	-	-

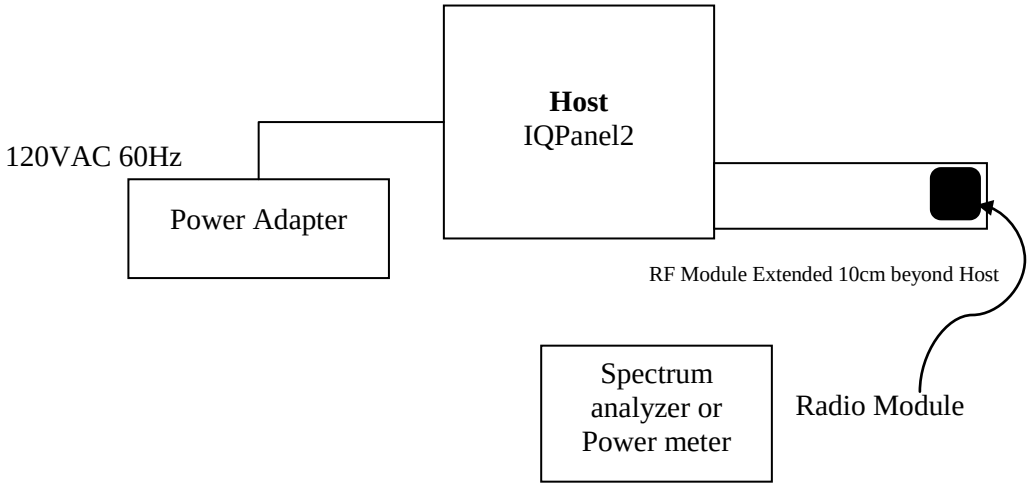
3.0 System Test Configuration

3.1 Support Equipment

Description	Manufacturer	Model No./ Part No.
IQPanel2	Qolsys, Inc.	QS9201-1230-840
Power Adapter	Sure Power	SW-050200A

3.2 Block Diagram of Test Setup

Antenna was removed and co-axial connector with a cable was installed for Conducted Measurements.
50Ohm Load 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 Qolsys, 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-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 DTS Meas Guidance v03r03 June 9, 2016 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.

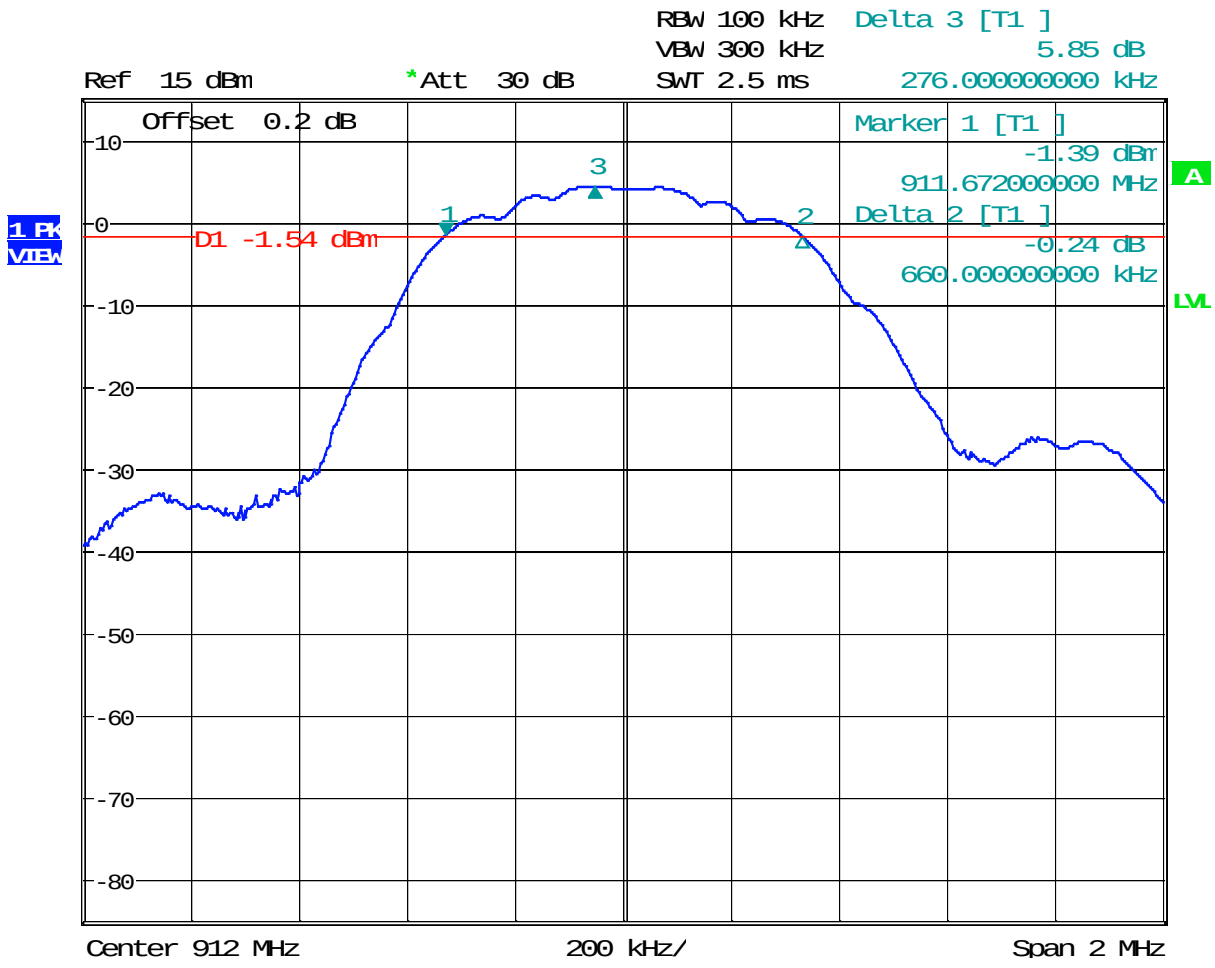
For 99% power bandwidth measurement, the bandwidth was determined by using the built-in 99% occupied bandwidth function of the spectrum analyzer. The resolution bandwidth is set to 1% of the selected span as is without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

4.1.3 Test Result

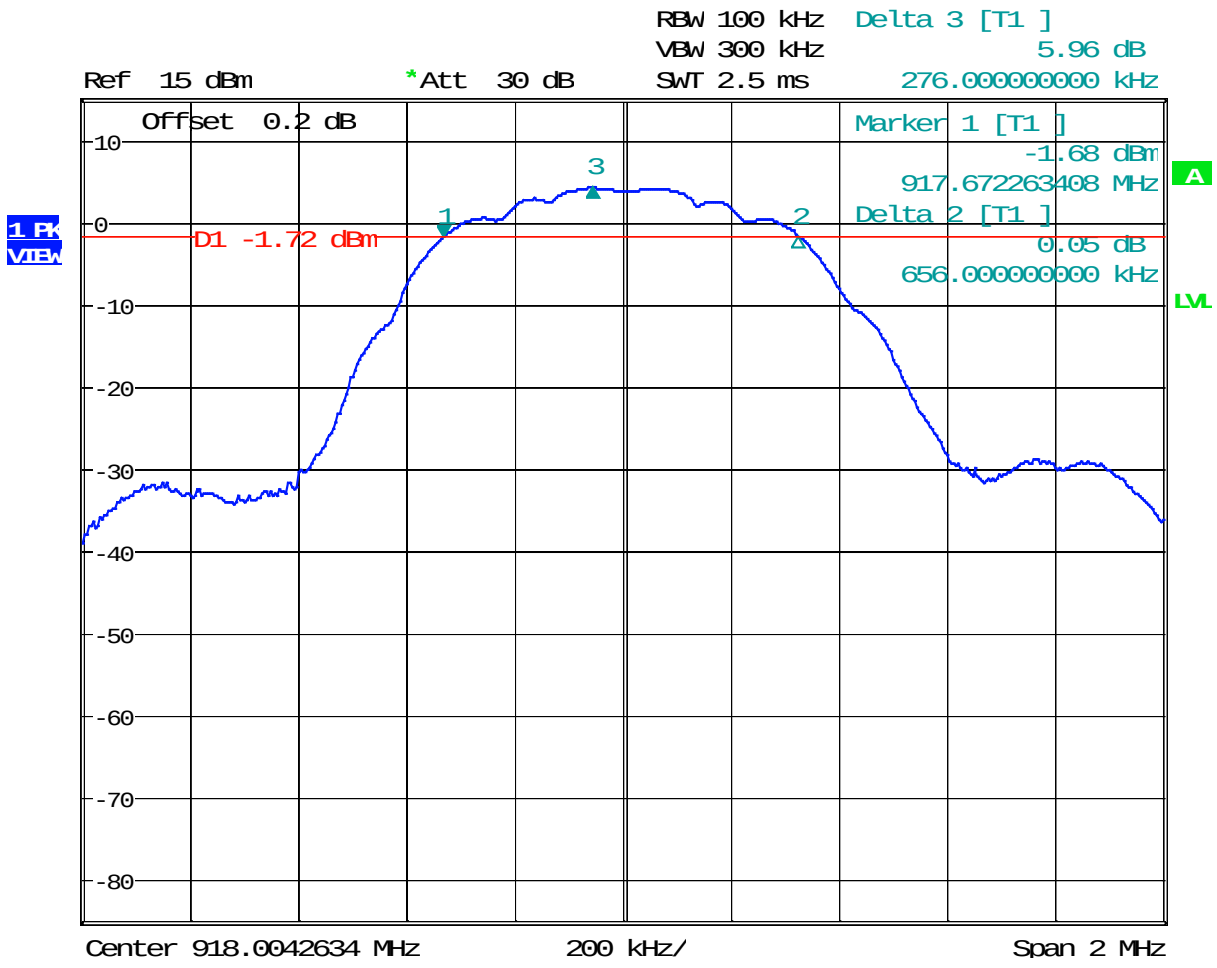
Frequency (MHz)	6-dB bandwidth FCC 15.247 & RSS-GEN, MHz	Occupied bandwidth, RSS-GEN, MHz	Plot
912	0.660	--	1.1
	--	0.912	1.4
918	0.656	--	1.2
	--	0.918	1.5
924	0.656	--	1.3
	--	0.924	1.6

Date of Test:	January 22, 2016
Results	**Complies**

Plot 1. 1

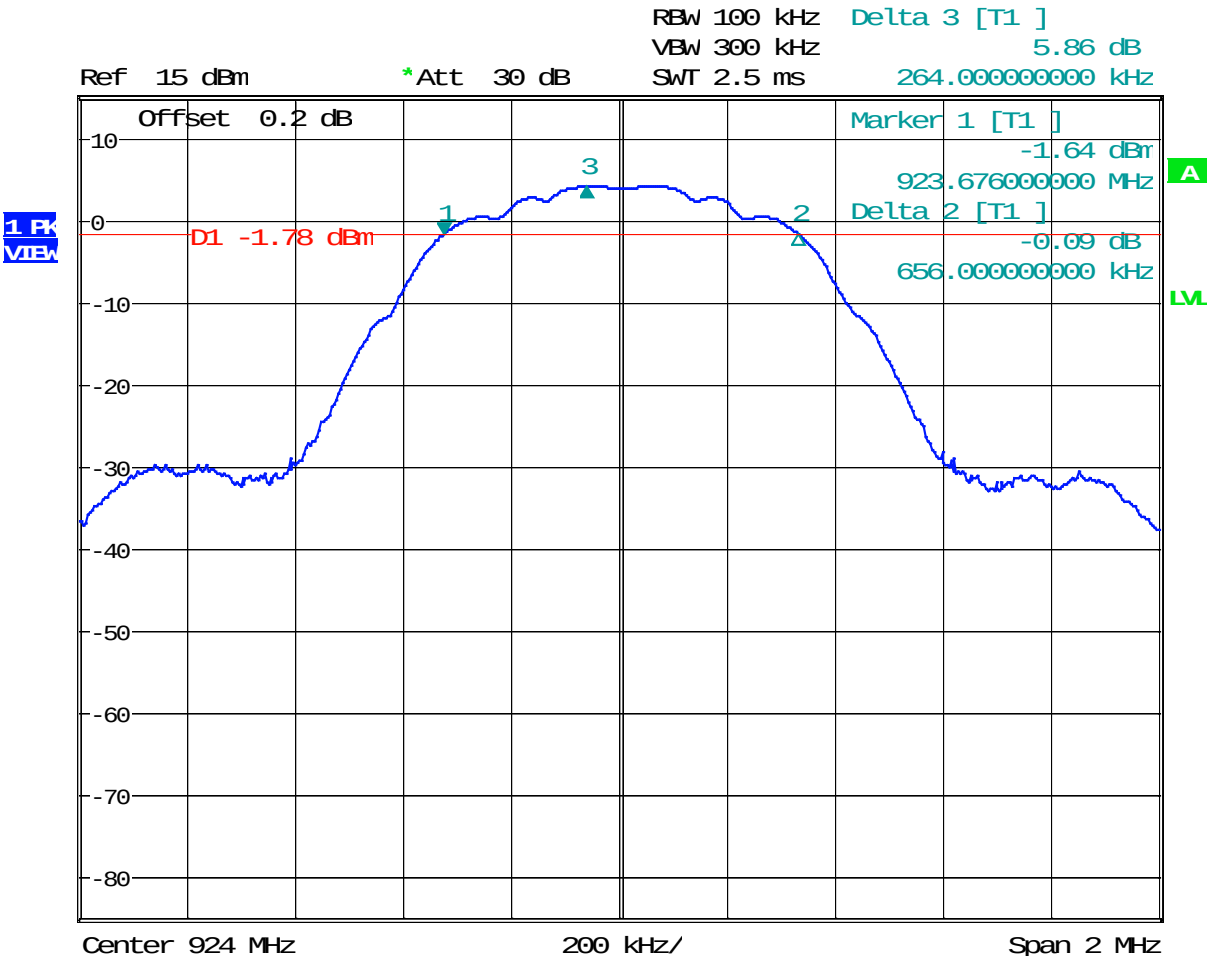

RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 3 [T1]
5.85 dB
276.000000000 kHz
Ref 15 dBm
*Att 30 dB
Offset 0.2 dB
Marker 1 [T1]
-1.39 dBm
911.672000000 MHz
Delta 2 [T1]
-0.24 dB
660.000000000 kHz
D1 -1.54 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 912 MHz
200 kHz/
Span 2 MHz
Date: 22.JAN.2016 17:55:20

Plot 1. 2



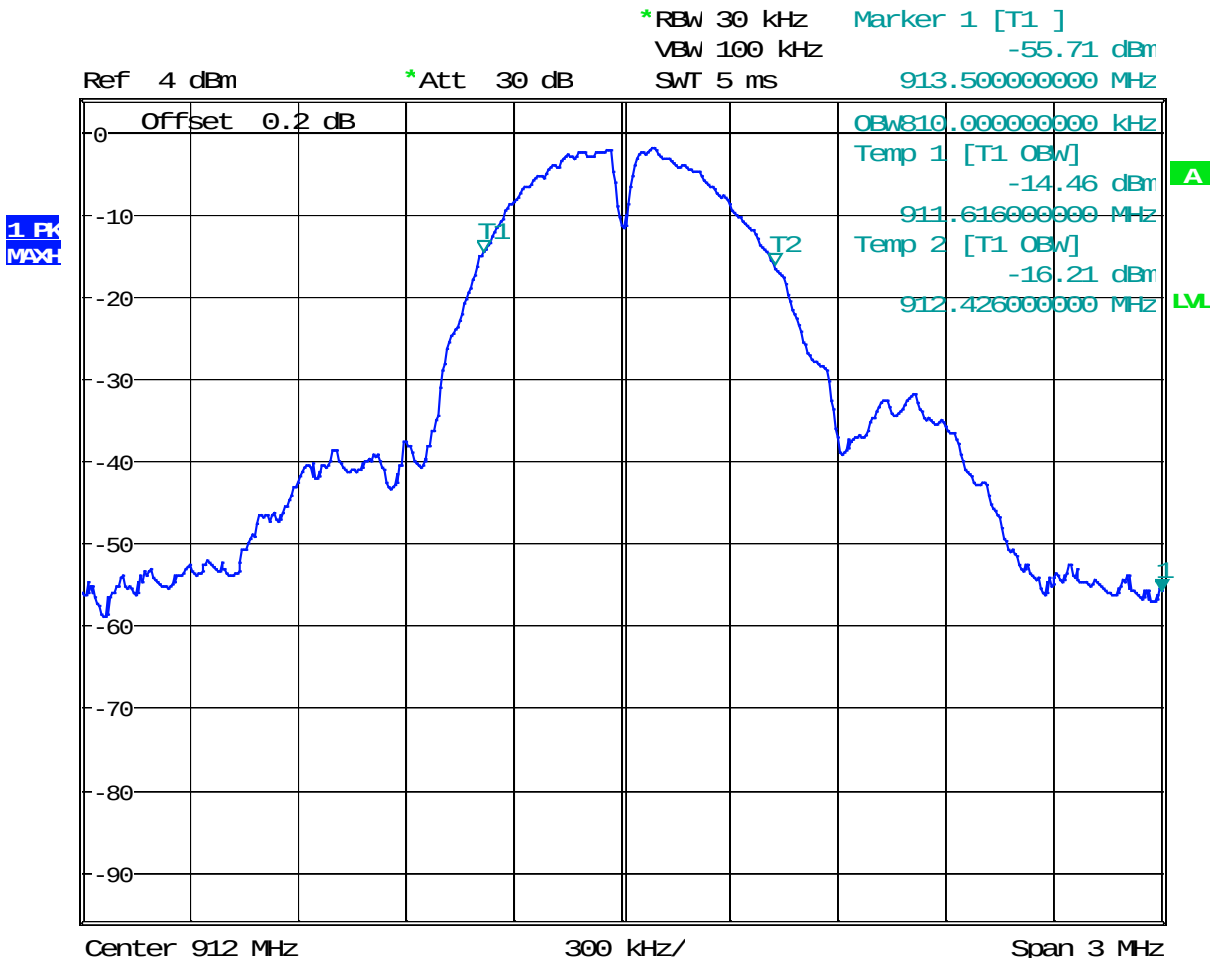
Date: 22.JAN.2016 17:52:58

Plot 1. 3



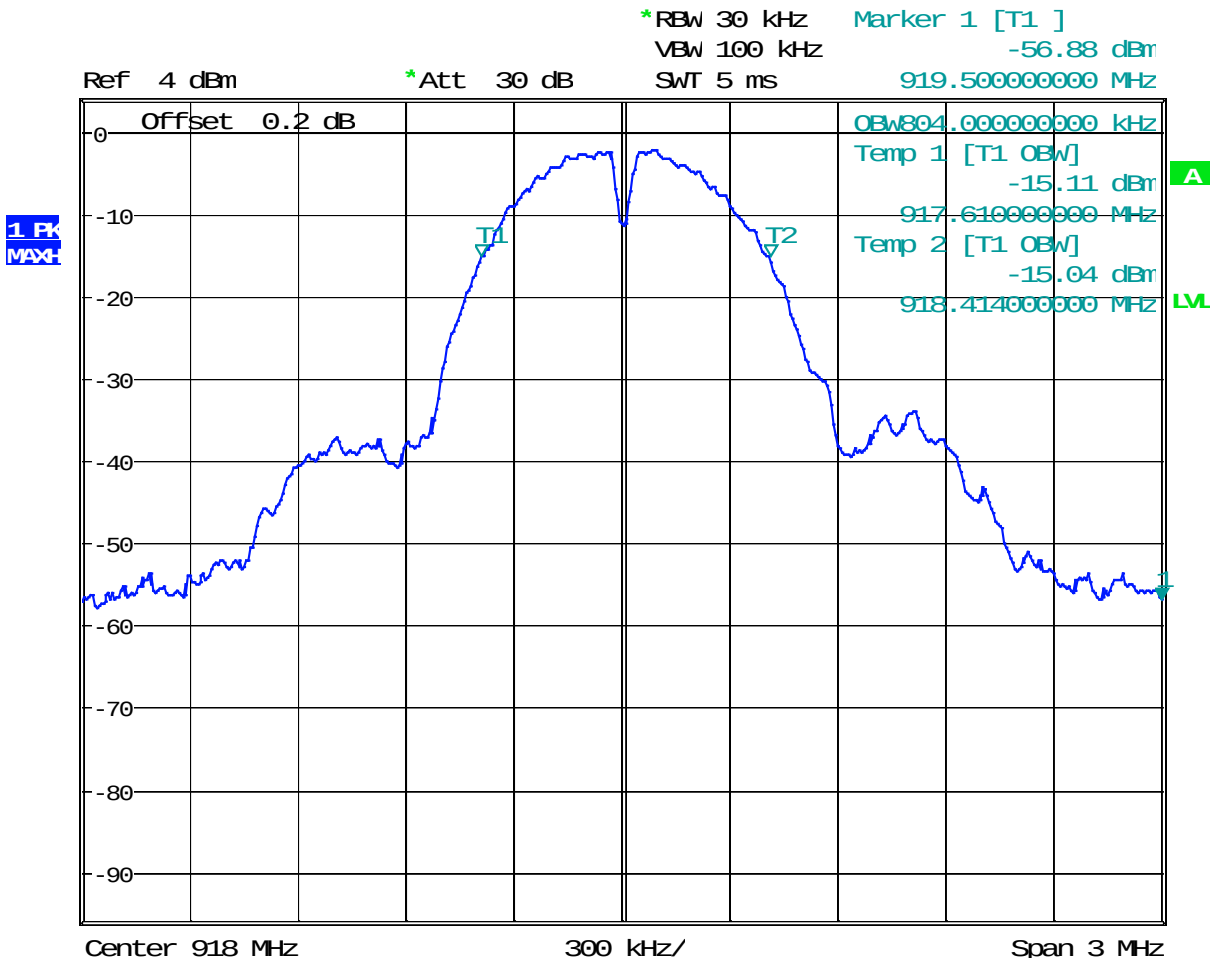
Date: 22.JAN.2016 17:57:03

Plot 1. 4



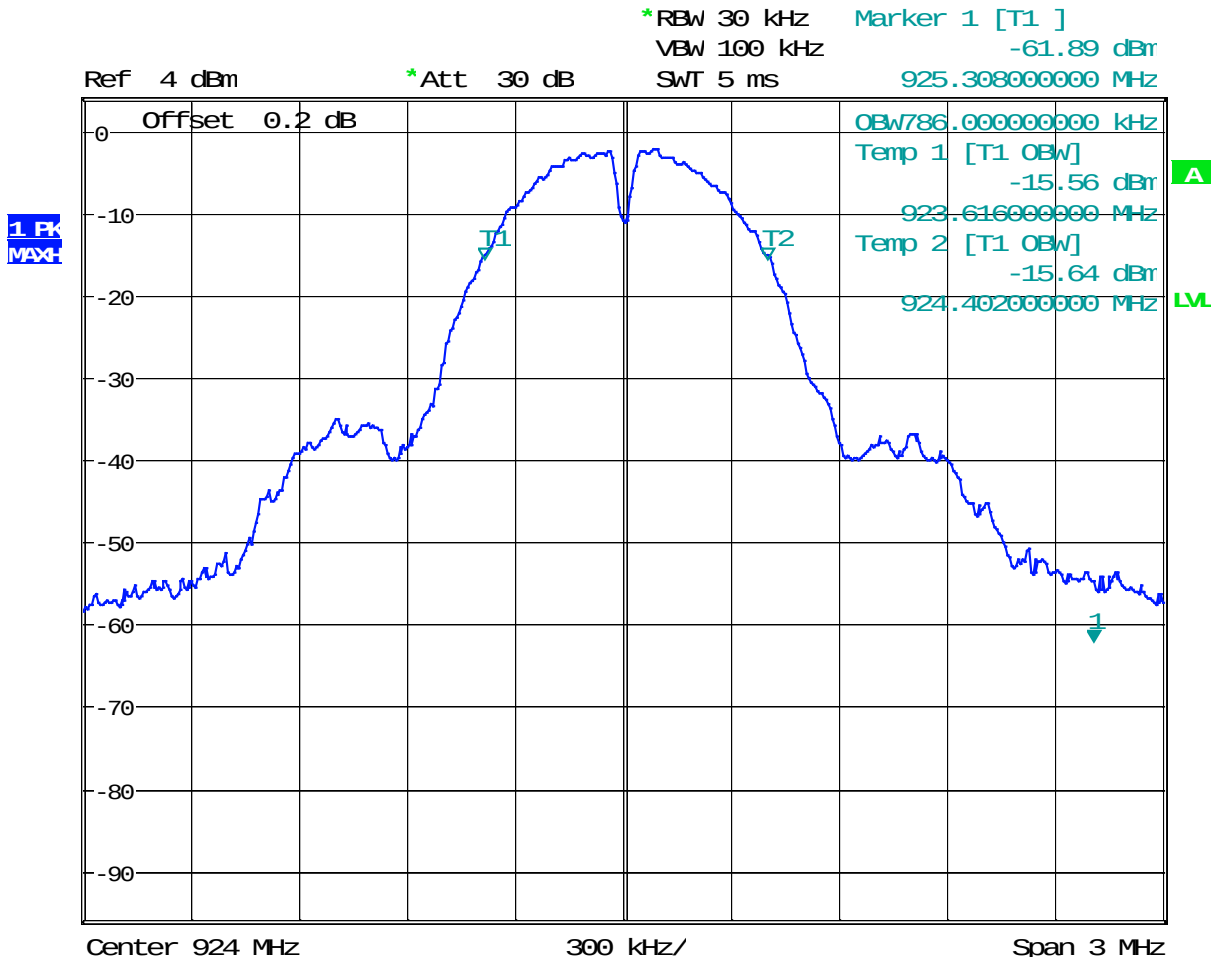
Date: 22.JAN.2016 18:03:43

Plot 1.5



Date: 22.JAN.2016 18:02:20

Plot 1.6



Date: 22.JAN.2016 17:59:15

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 DTS Meas Guidance v03r03 June 9, 2016 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.

A spectrum analyzer was connected to the antenna port of the transmitter.

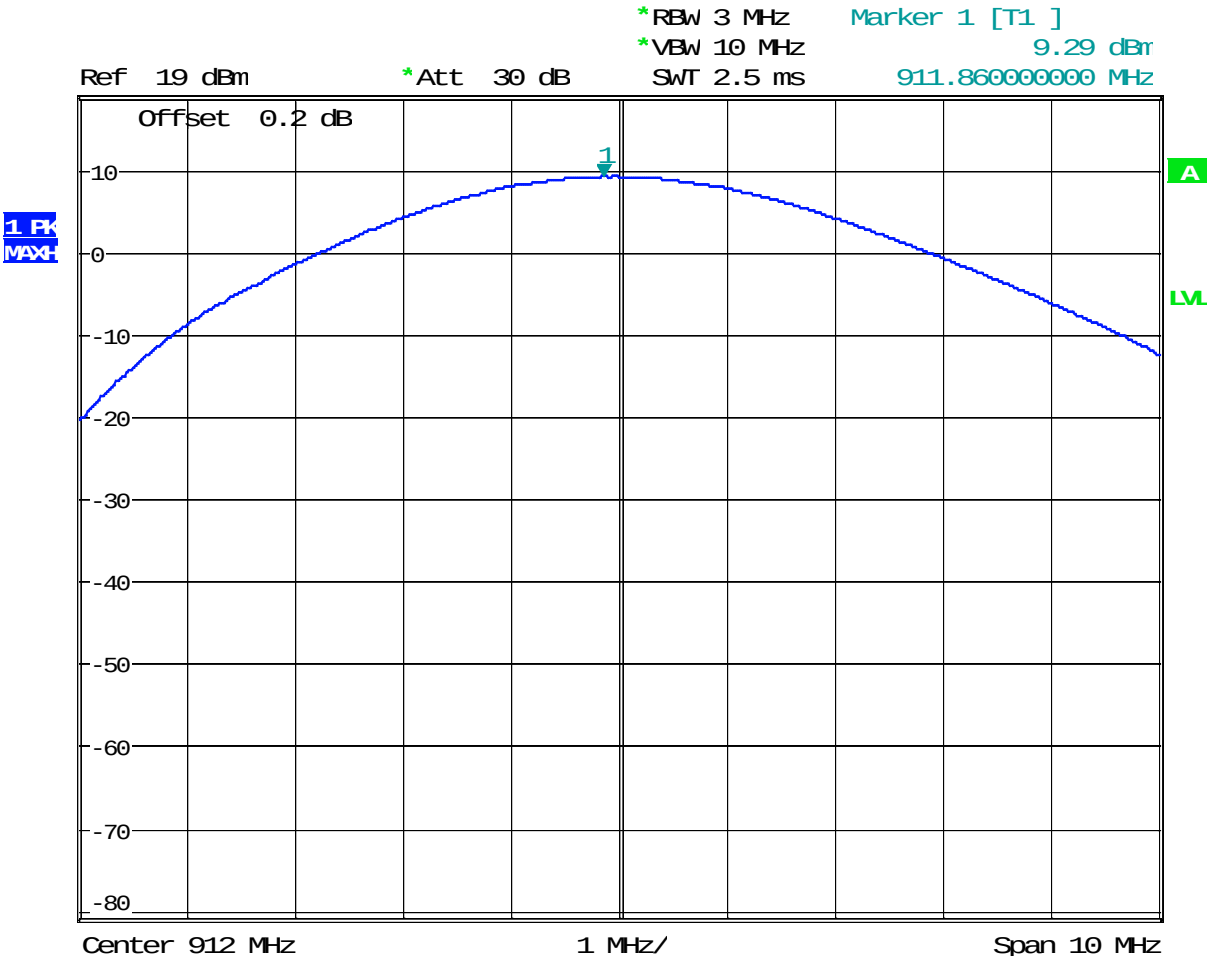
4.3.3 Test Result

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

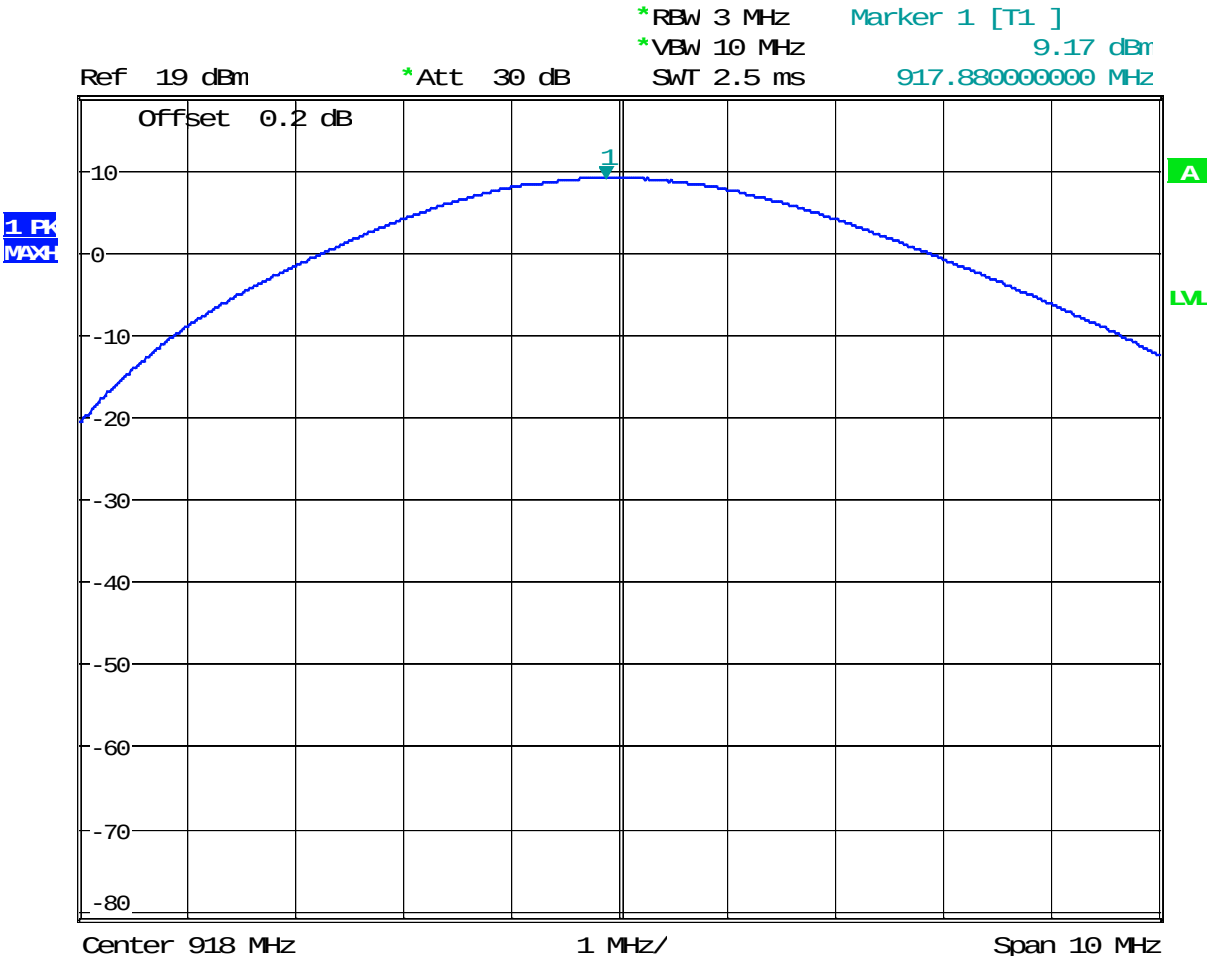
Frequency, MHz	Conducted Power (peak), dBm	Conducted Power (peak), mW	Plot
912	9.29	8.49	2.1
918	9.17	8.26	2.2
924	9.17	8.26	2.3

Date of Test:	January 22, 2016
Results	**Complies**

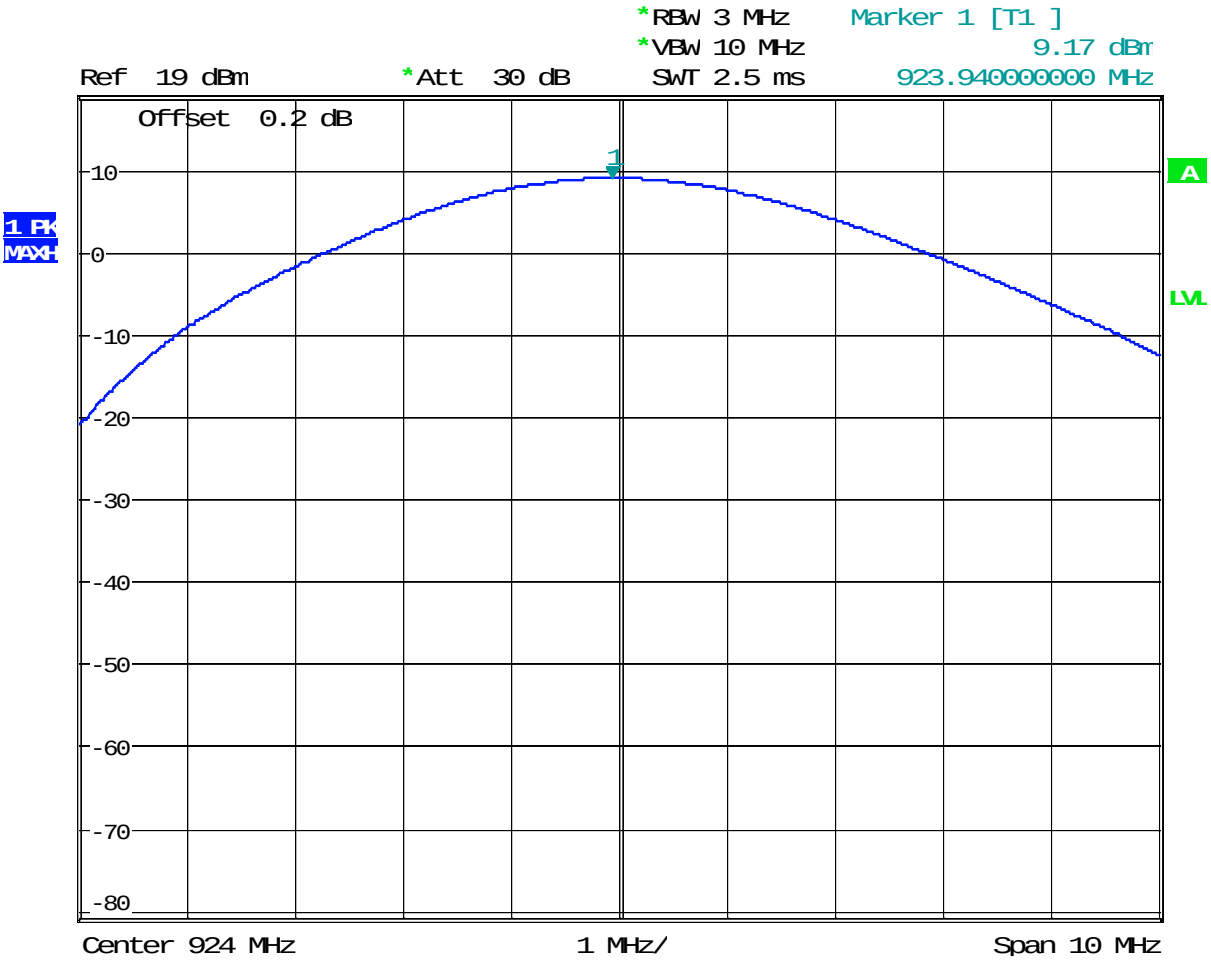
Plot 2. 1


*RBW 3 MHz
*VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
9.29 dBm
911.860000000 MHz
Ref 19 dBm
*Att 30 dB
Offset 0.2 dB
1 PK
MAXH
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 912 MHz
1 MHz/
Span 10 MHz
Date: 22.JAN.2016 18:14:16

Plot 2. 2


*RBW 3 MHz
*VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
9.17 dBm
917.880000000 MHz
Ref 19 dBm
*Att 30 dB
Offset 0.2 dB
1 PK
MAXH
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 918 MHz
1 MHz/
Span 10 MHz
Date: 22.JAN.2016 18:17:01

Plot 2. 3


*RBW 3 MHz
*VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
9.17 dBm
923.940000000 MHz
Ref 19 dBm
*Att 30 dB
Offset 0.2 dB
1 PK
MAXH
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 924 MHz
1 MHz/
Span 10 MHz
Date: 22.JAN.2016 18:18:04

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 DTS Meas Guidance v03r03 June 9, 2016, 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.

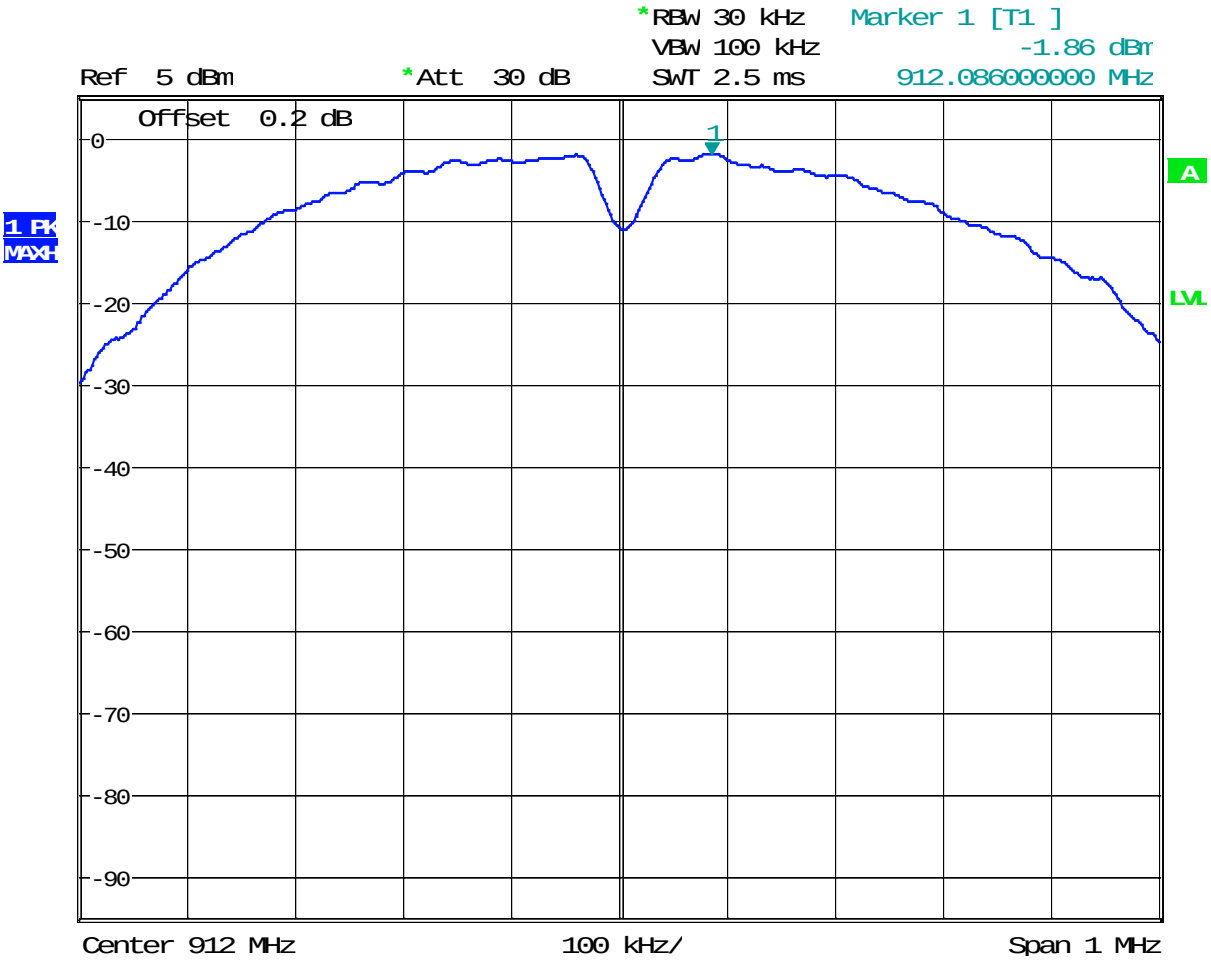
4.3.3 Test Result

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
912	-1.86	8.0	-9.86	3.1
918	-2.03	8.0	-10.03	3.2
924	-2.45	8.0	-10.45	3.3

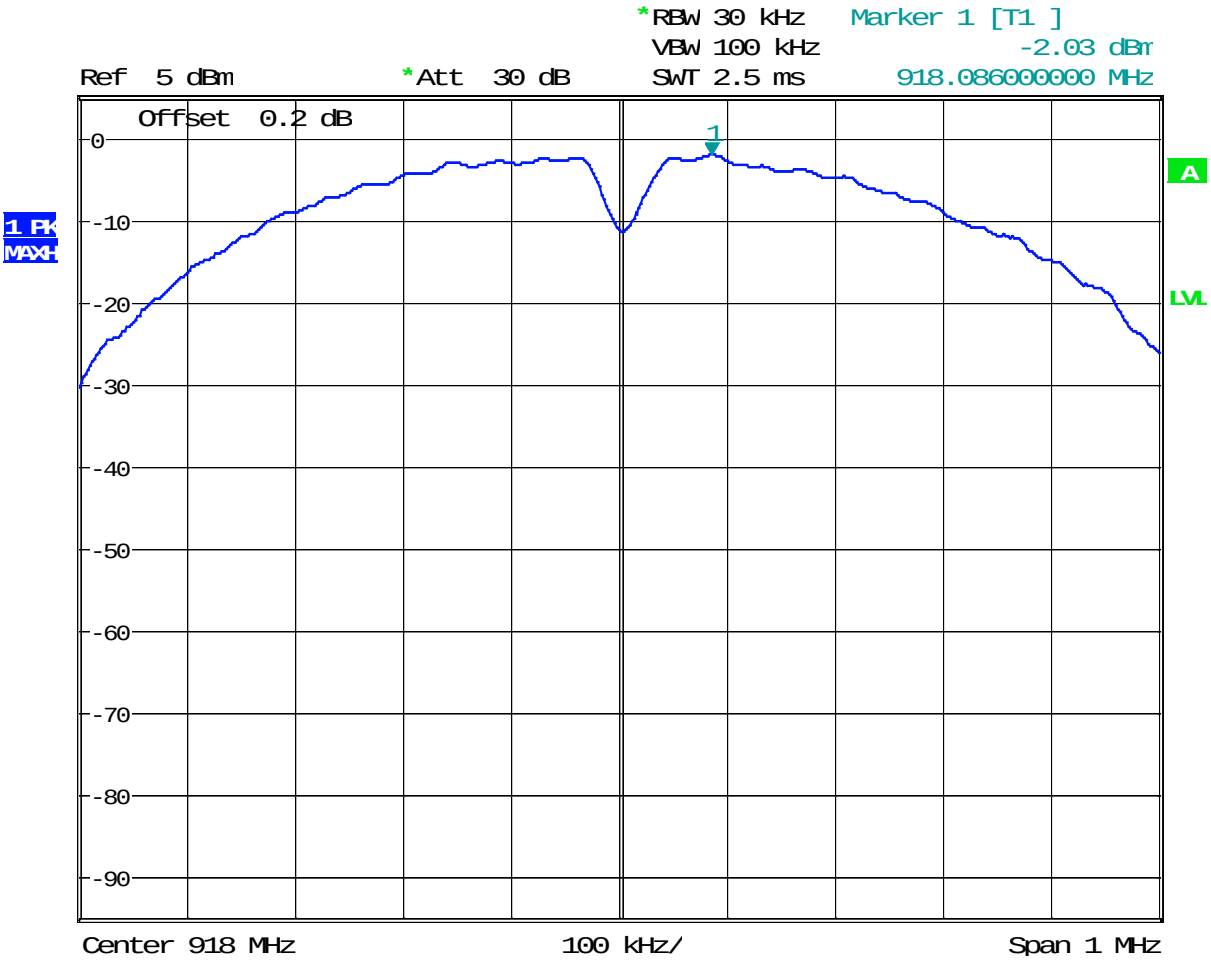
Date of Test:	January 22, 2016
Results	**Complies**

Plot 3. 1



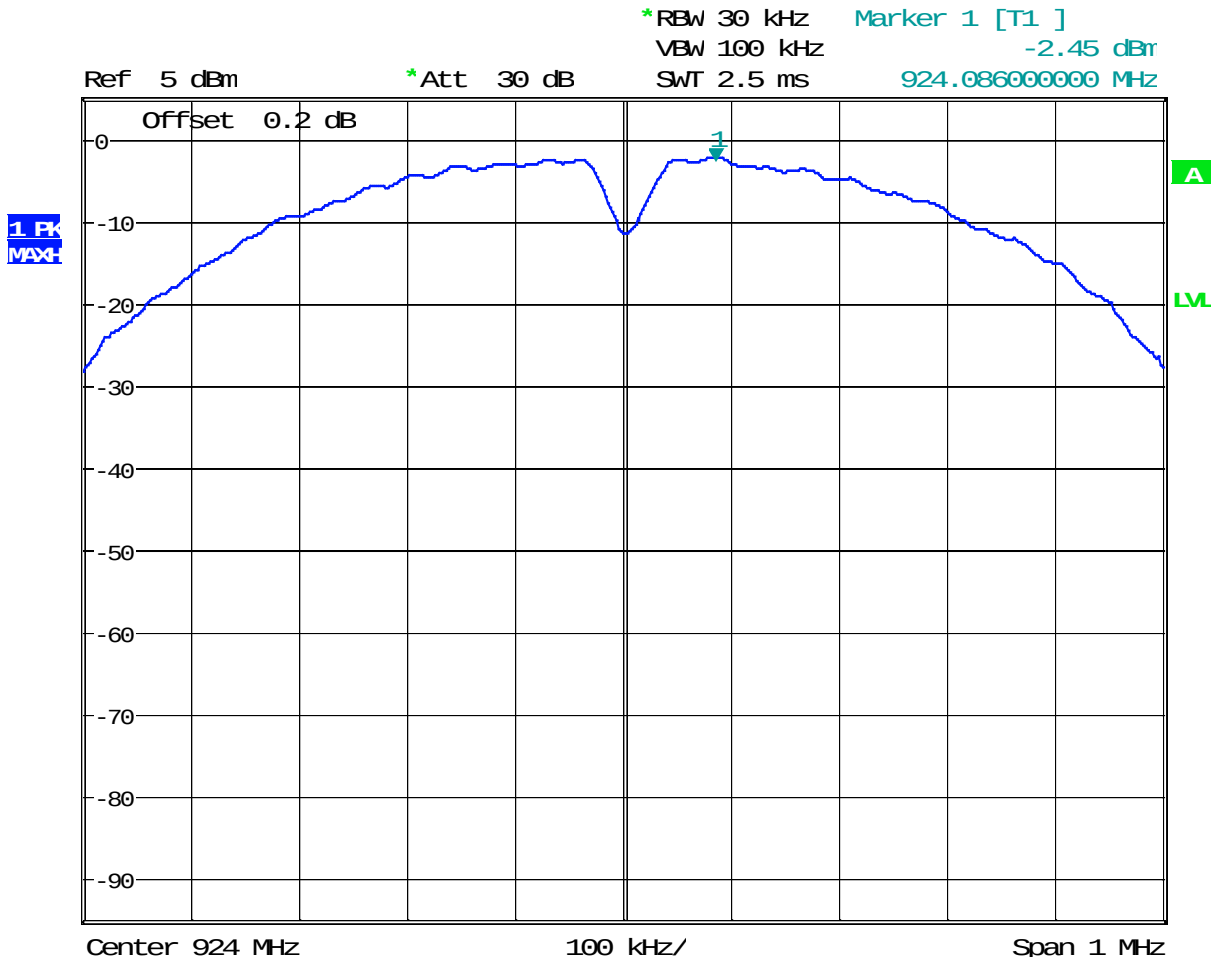
Date: 22.JAN.2016 18:27:15

Plot 3. 2



Date: 22.JAN.2016 18:26:45

Plot 3. 3



Date: 22.JAN.2016 18:25:58

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 DTS Meas Guidance v03r03 June 9, 2016, 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 $\geq$ 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.

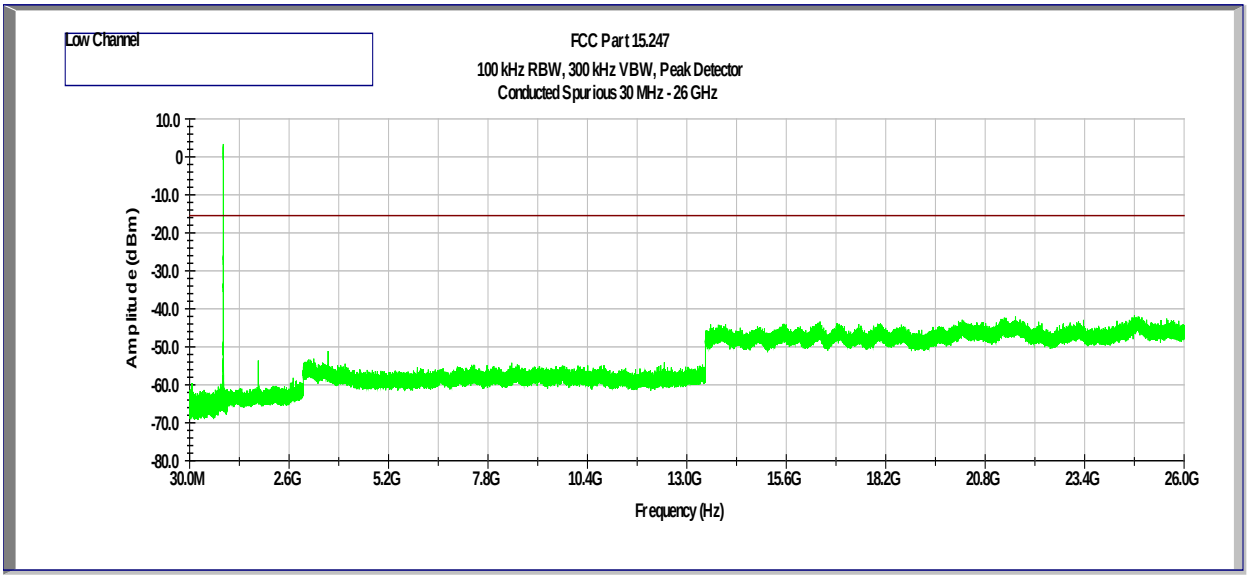
The unwanted emissions were measured from 30 MHz to 25 GHz. Plots below are corrected for cable loss and then compared to the limits.

4.4.3 Test Result

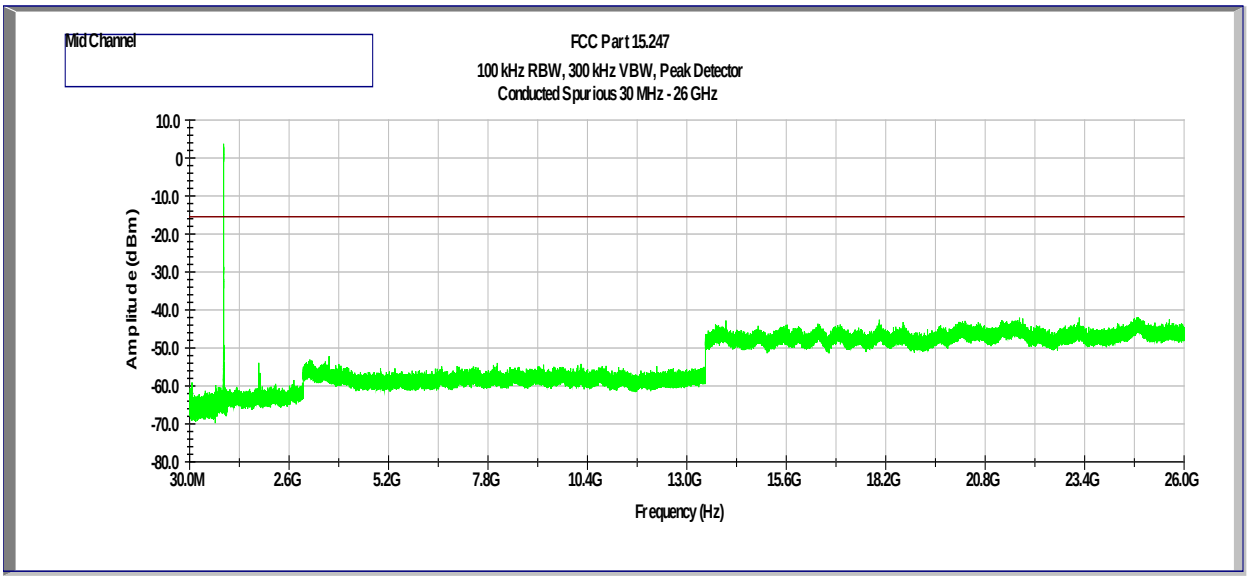
Refer to the following plots 4.1 – 4.5 for unwanted conducted emissions. The plot shows -20dB attenuation limit line.

Date of Test:	January 22, 2016
Results	**Complies**

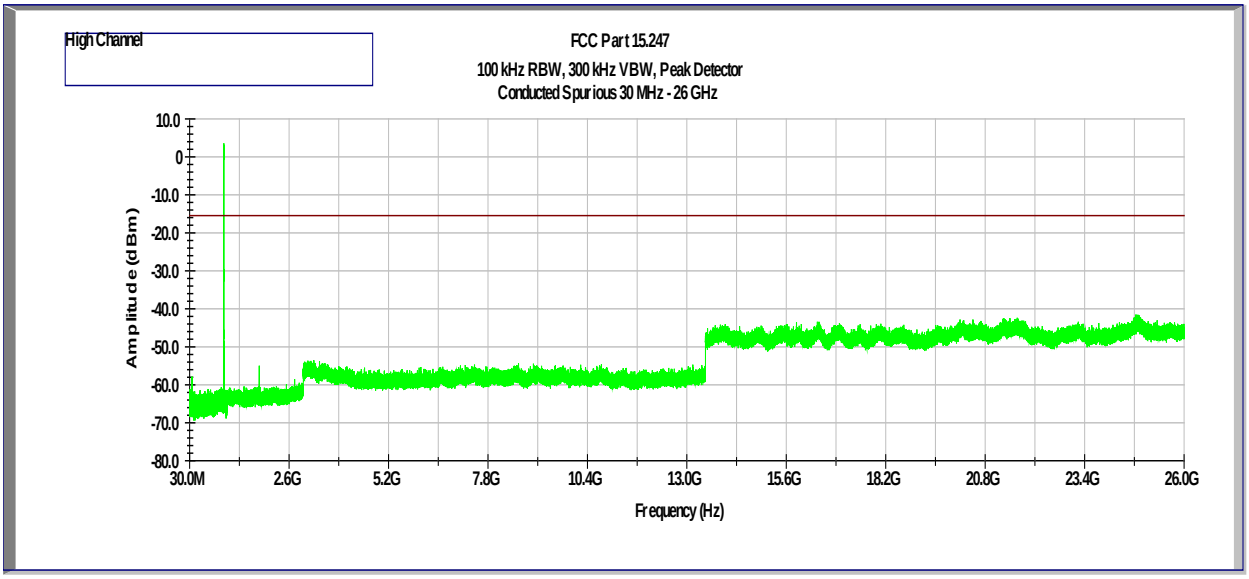
Tx @ Low Channel, 912 MHz
30MHz -26GHz Conducted Spurious
Plot 4.3



Tx @ Mid Channel, 918 MHz
30MHz -26GHz Conducted Spurious
Plot 4.5



Tx @ High Channel, 924 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 18 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 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 may 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:
$E = EIRP - 20\log D + 104.8$
where:
E = electric field strength in dBμV/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.
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 3dB of the limit.

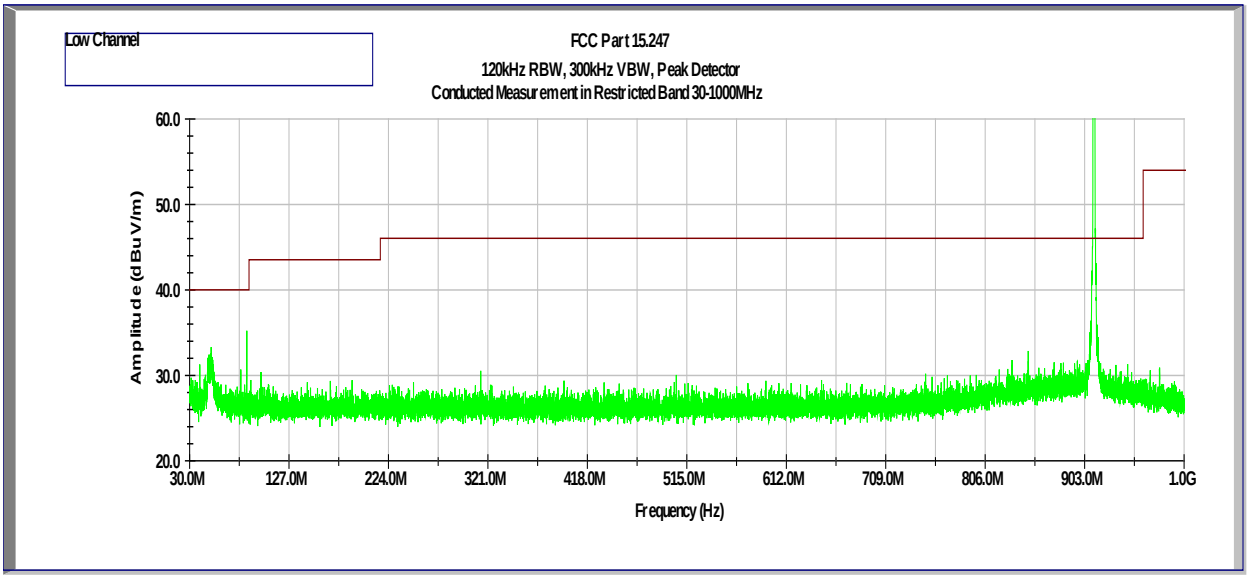
All conducted antenna port plots are corrected with the consideration of a -2.4dBi Antenna Gain.

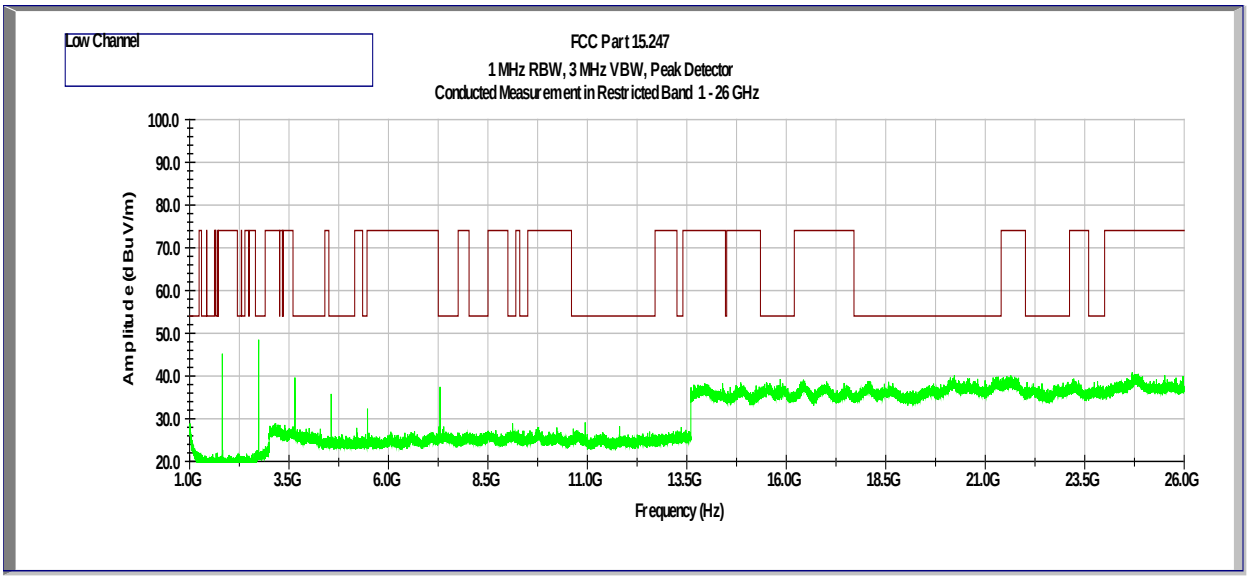
Radiated emission measurements were performed up to 18GHz.

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

Tx @ 912MHz

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

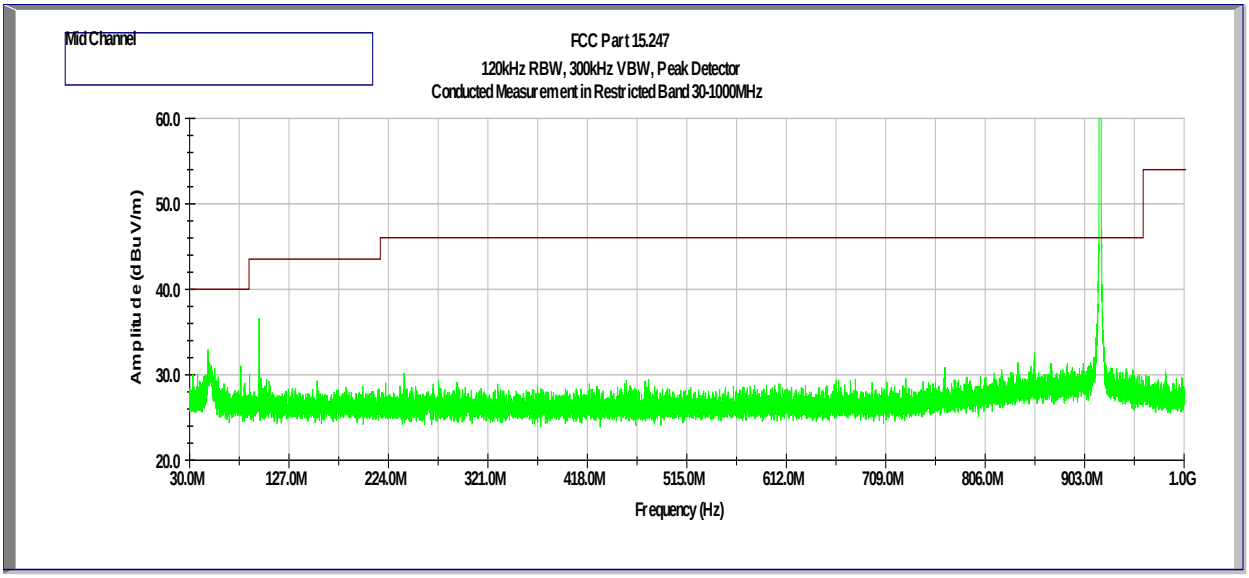


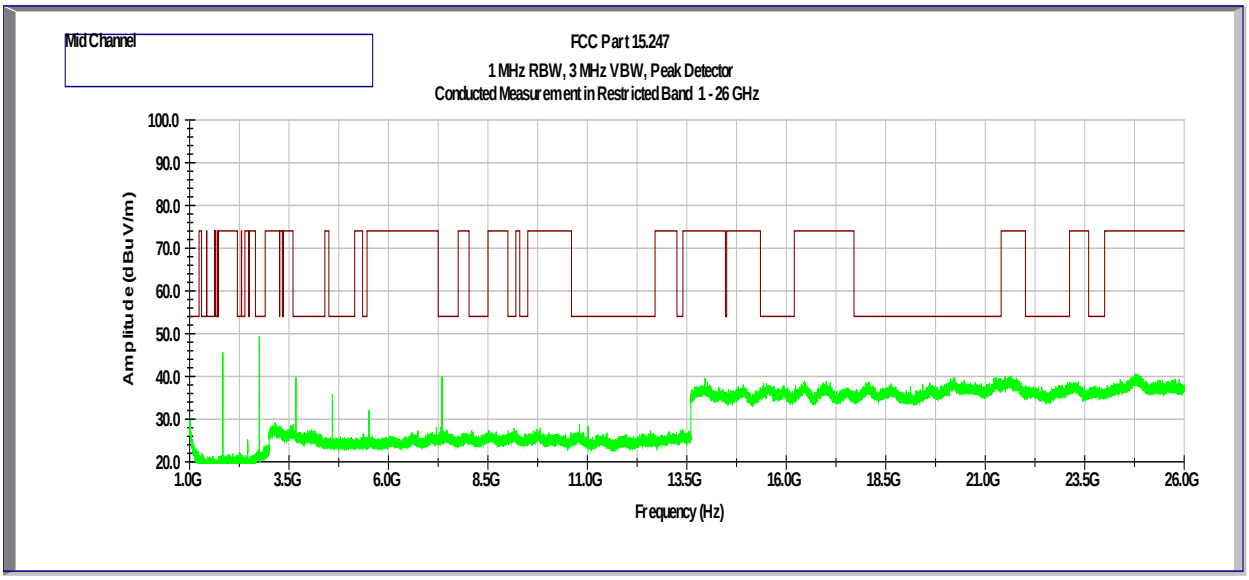


Out-of-Band Conducted Spurious Emissions (at Antenna Port)

Tx @ 918MHz

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

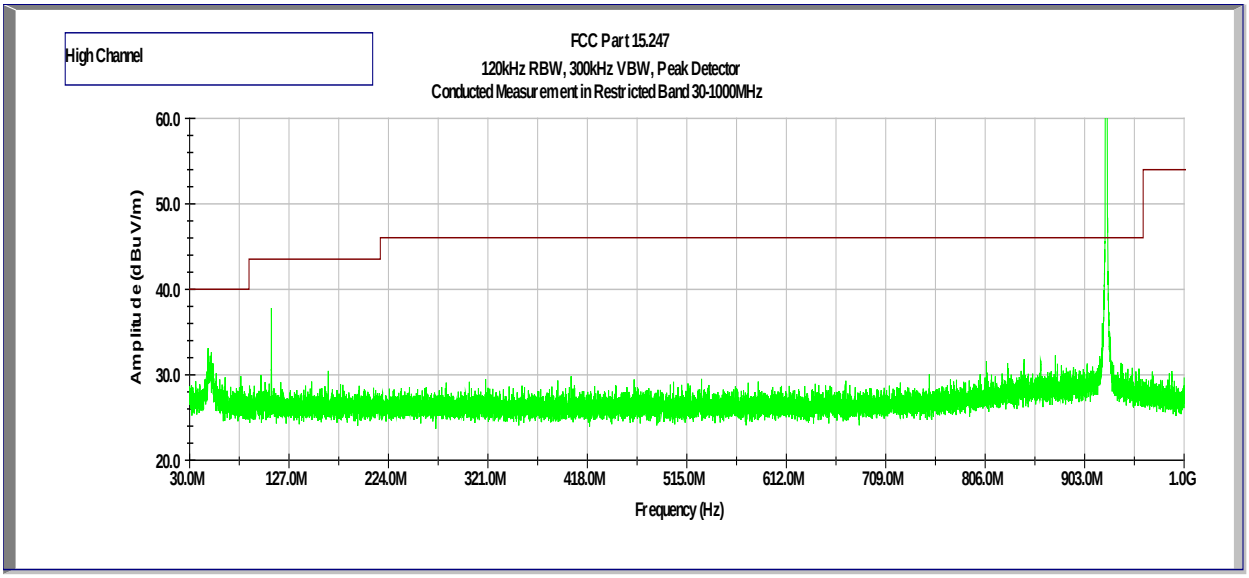


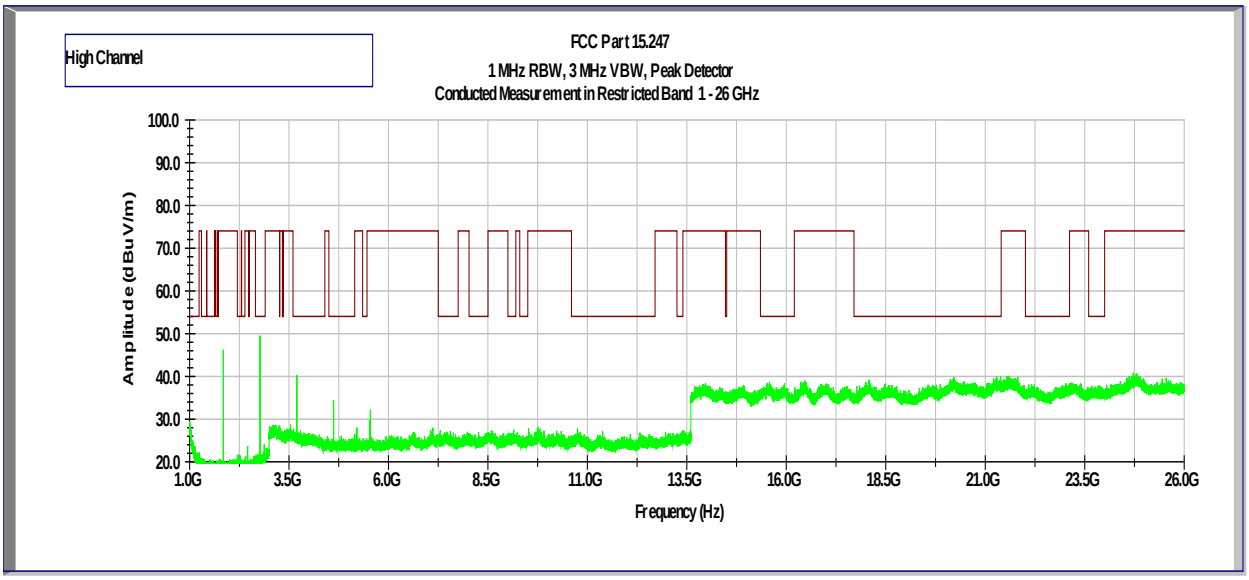


Out-of-Band Conducted Spurious Emissions (at Antenna Port)

Tx @ 924MHz

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

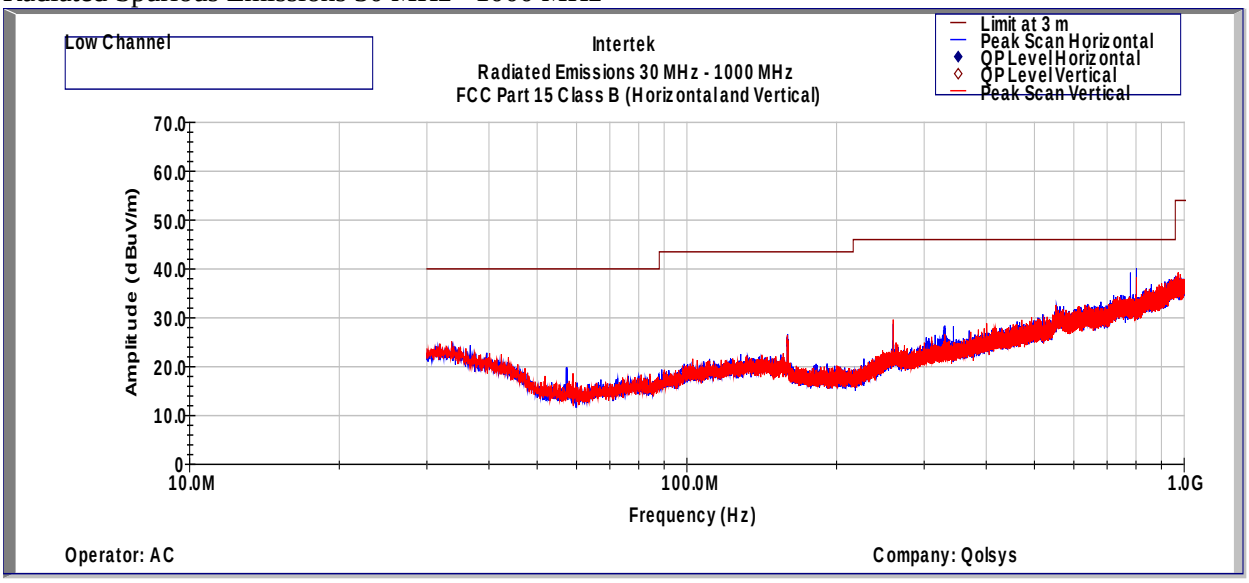




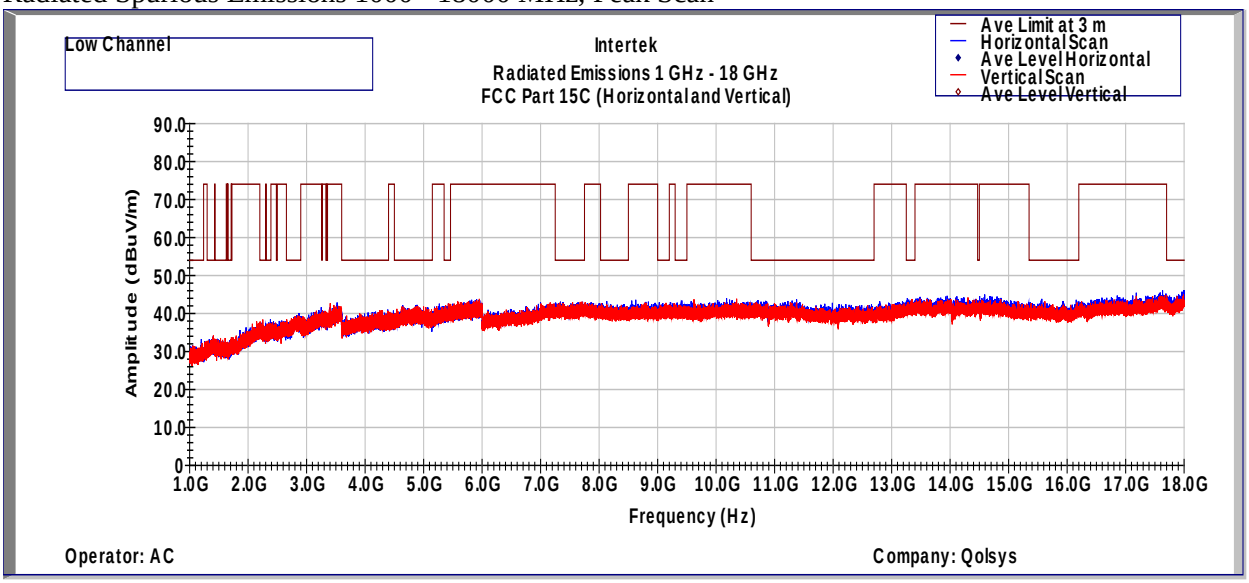
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation)

Test Results: 15.209 Radiated Spurious Emissions Low Channel, Tx at 912MHz

Radiated Spurious Emissions 30 MHz - 1000 MHz



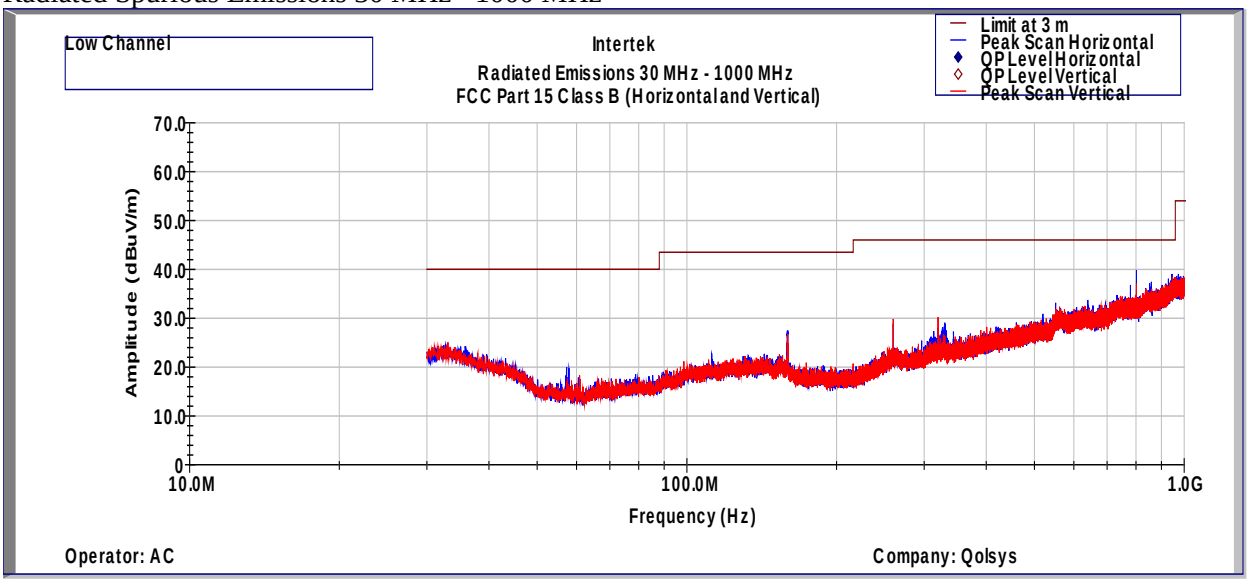
Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



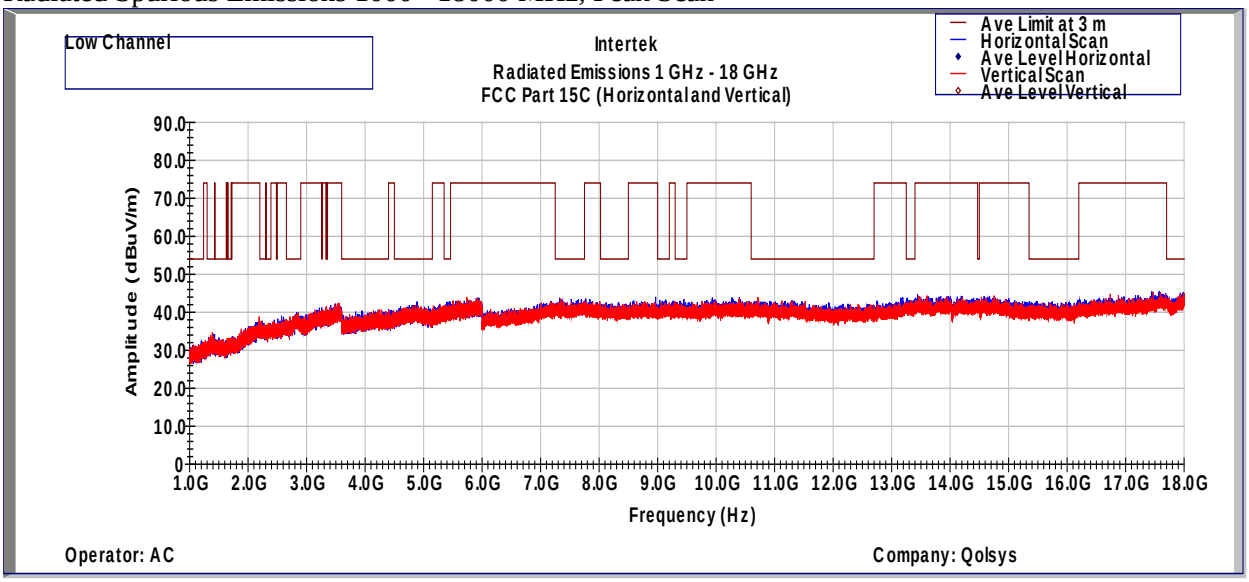
Note: FS@3m = RA + AF + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 918MHz

Radiated Spurious Emissions 30 MHz - 1000 MHz



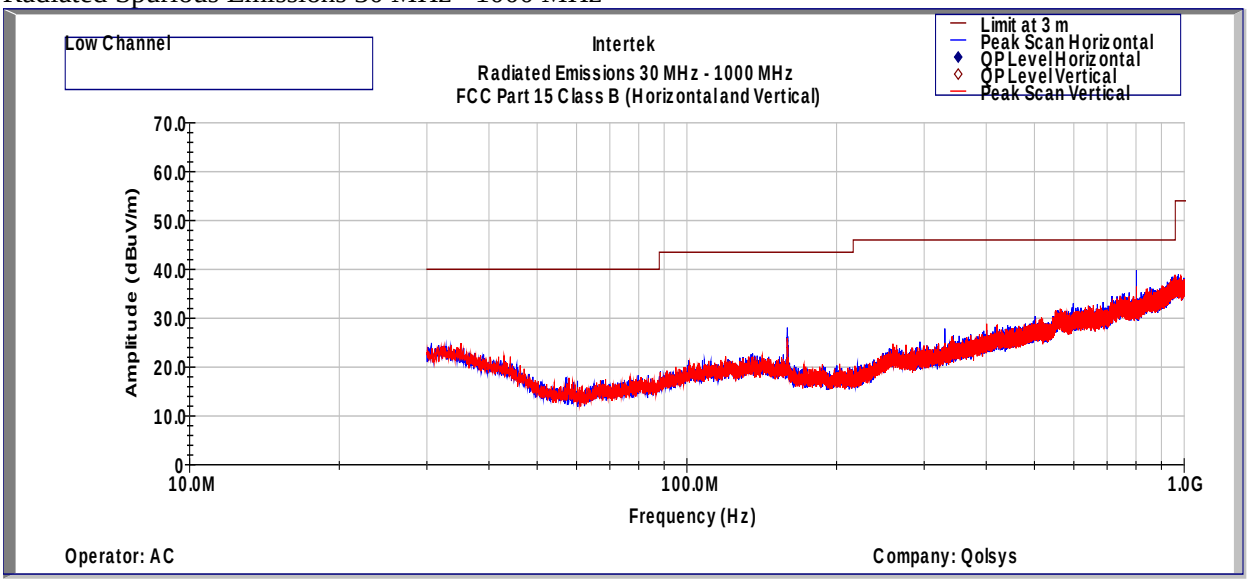
Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



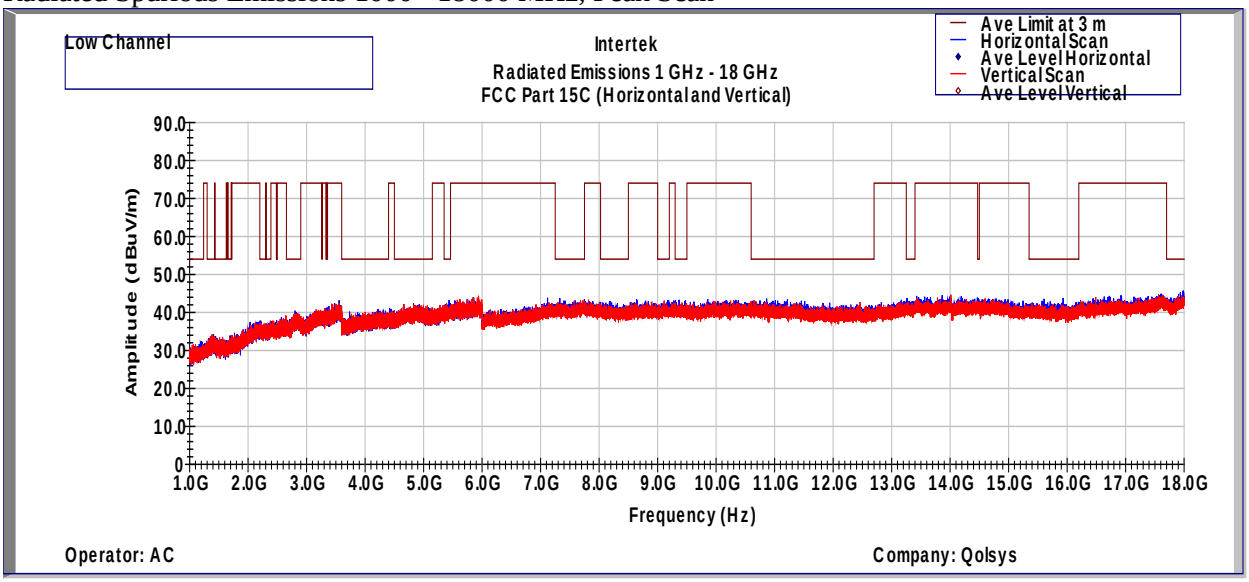
Note: FS@3m = RA + AF + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

Test Results: 15.209 Radiated Spurious Emissions High Channel, Tx at 924MHz

Radiated Spurious Emissions 30 MHz - 1000 MHz



Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan

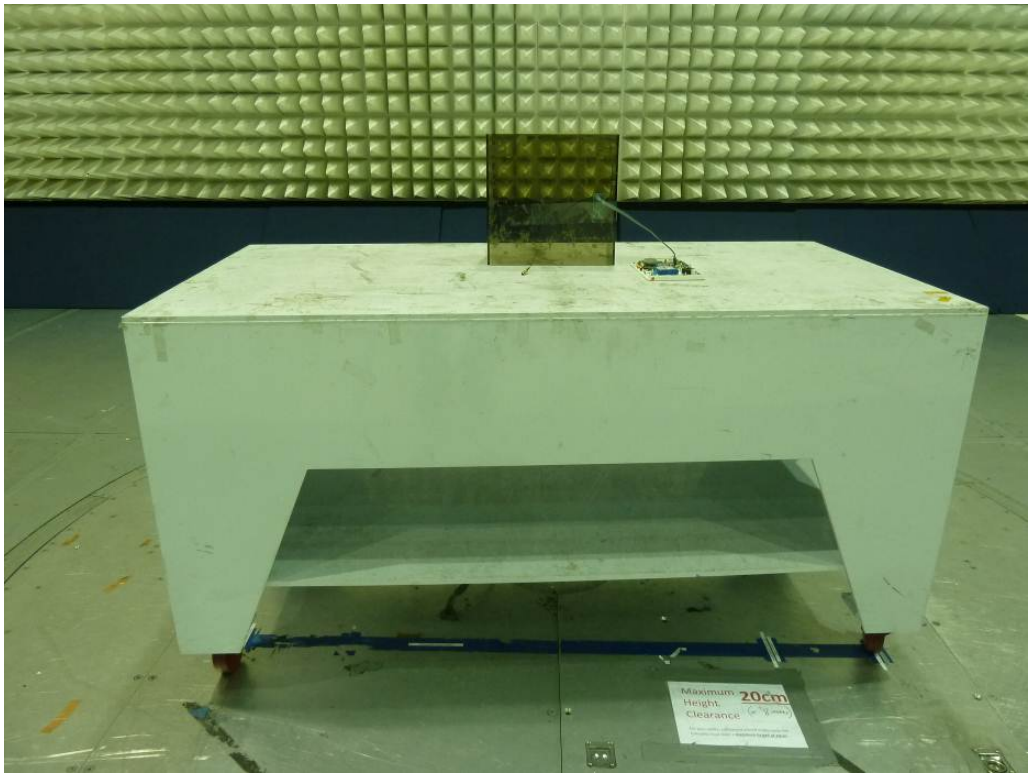


Note: FS@3m = RA + AF + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

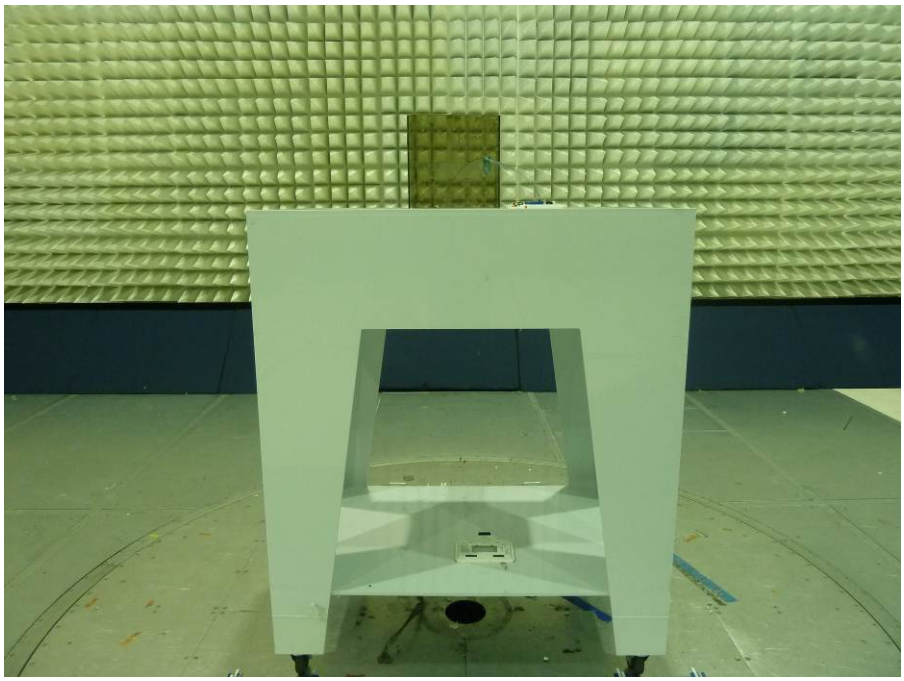
Results	**Complies**

4.5.8 Test setup photographs

The following photographs show the testing configurations used.



4.5.5 Test setup photographs (Continued)



4.6 Line Conducted Emissions
FCC Rules: 15.207; IC Rules: RSS-Gen
FCC Rules: 15.107; IC Rules: ICES 003

Requirements

Frequency Band MHz	Class B Limit dB(μV)	
	Quasi-Peak	Average
0.15-0.50	66 to 56 *	56 to 46 *
0.50-5.00	56	46
5.00-30.00	60	50

*Note: *Decreases linearly with the logarithm of the frequency*
At the transition frequency the lower limit applies.

Procedure

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide 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.

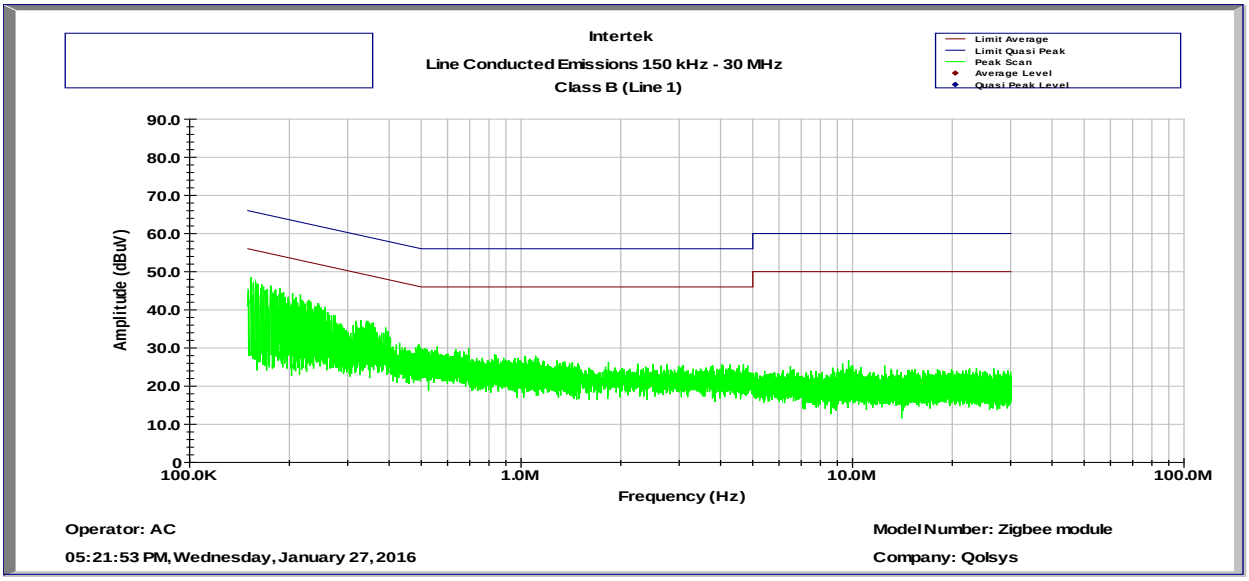
The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground 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.

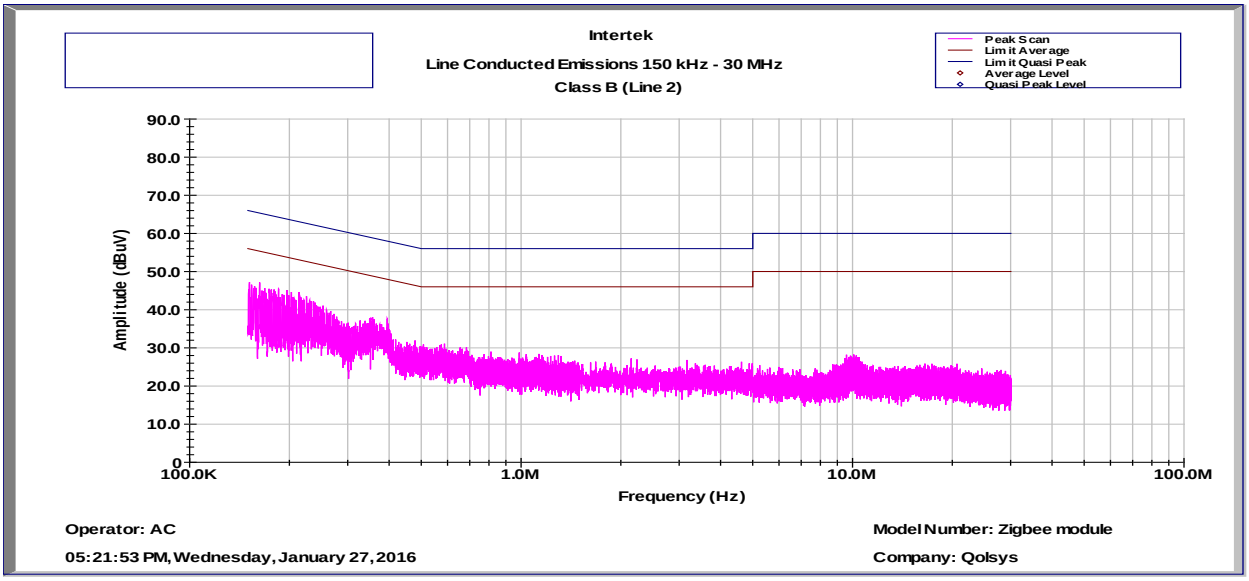
Floor standing EUT are placed on a horizontal metal ground plane and isolated from the ground plane by resting on an insulating material. The metal ground plane extends at least 0.5m beyond the boundaries of the EUT and has minimum dimensions of 2m by 2m.

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

Test Result

AC Line Conducted Emission Data, EUT in transmitting mode

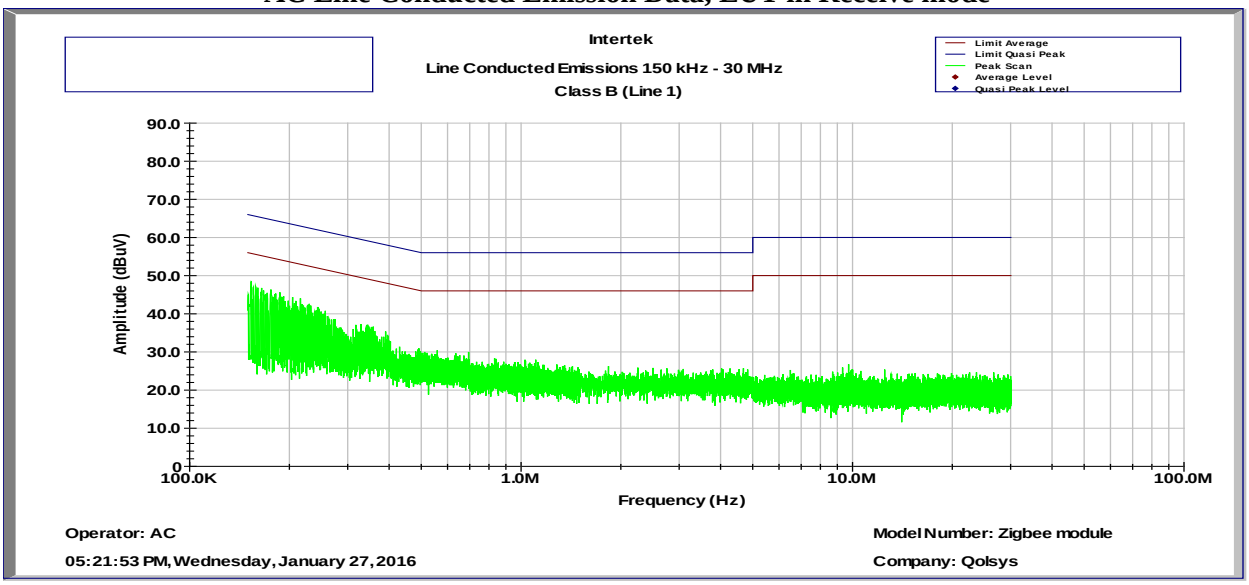


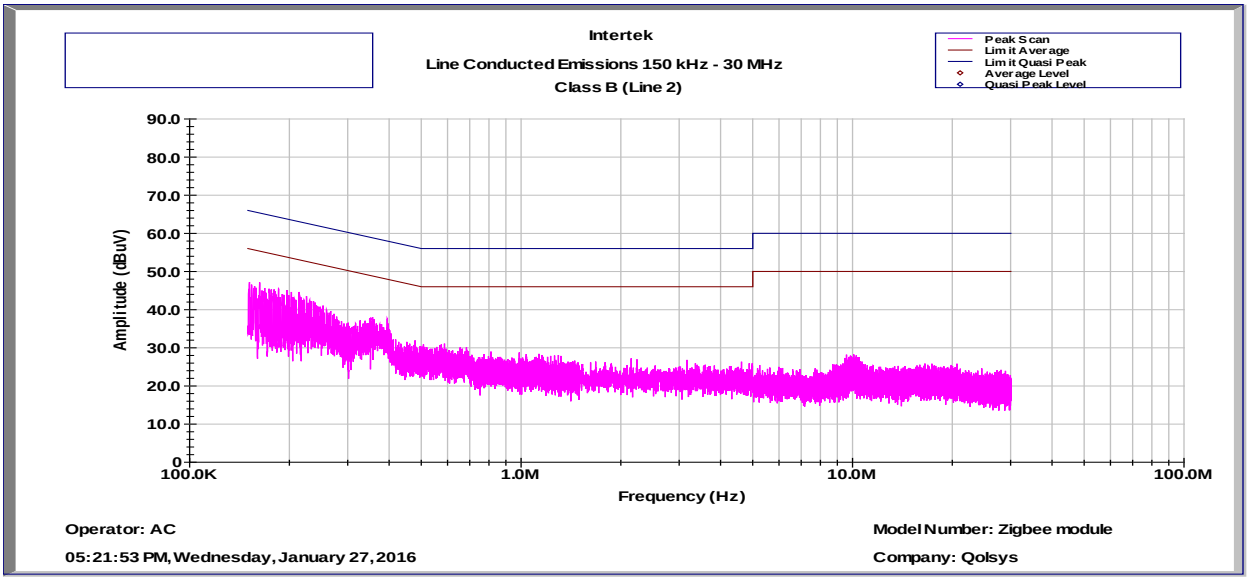


Frequency	Av Level	QP Level	Av Limit	QP Limit	Av Margin	QP Margin	Line
MHz	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
0.153	48.48	48.48	55.90	65.90	-7.42	-17.42	Line
0.165	46.76	46.76	55.57	65.57	-8.80	-18.80	Line
0.176	46.34	46.34	55.25	65.25	-8.91	-18.91	Line
0.152	47.20	47.20	55.95	65.95	-8.75	-18.75	Neutral
0.168	45.67	45.67	55.47	65.47	-9.80	-19.80	Neutral
0.197	45.10	45.10	54.66	64.66	-9.56	-19.56	Neutral

Results	**Complies** by 7.42dB

AC Line Conducted Emission Data, EUT in Receive mode



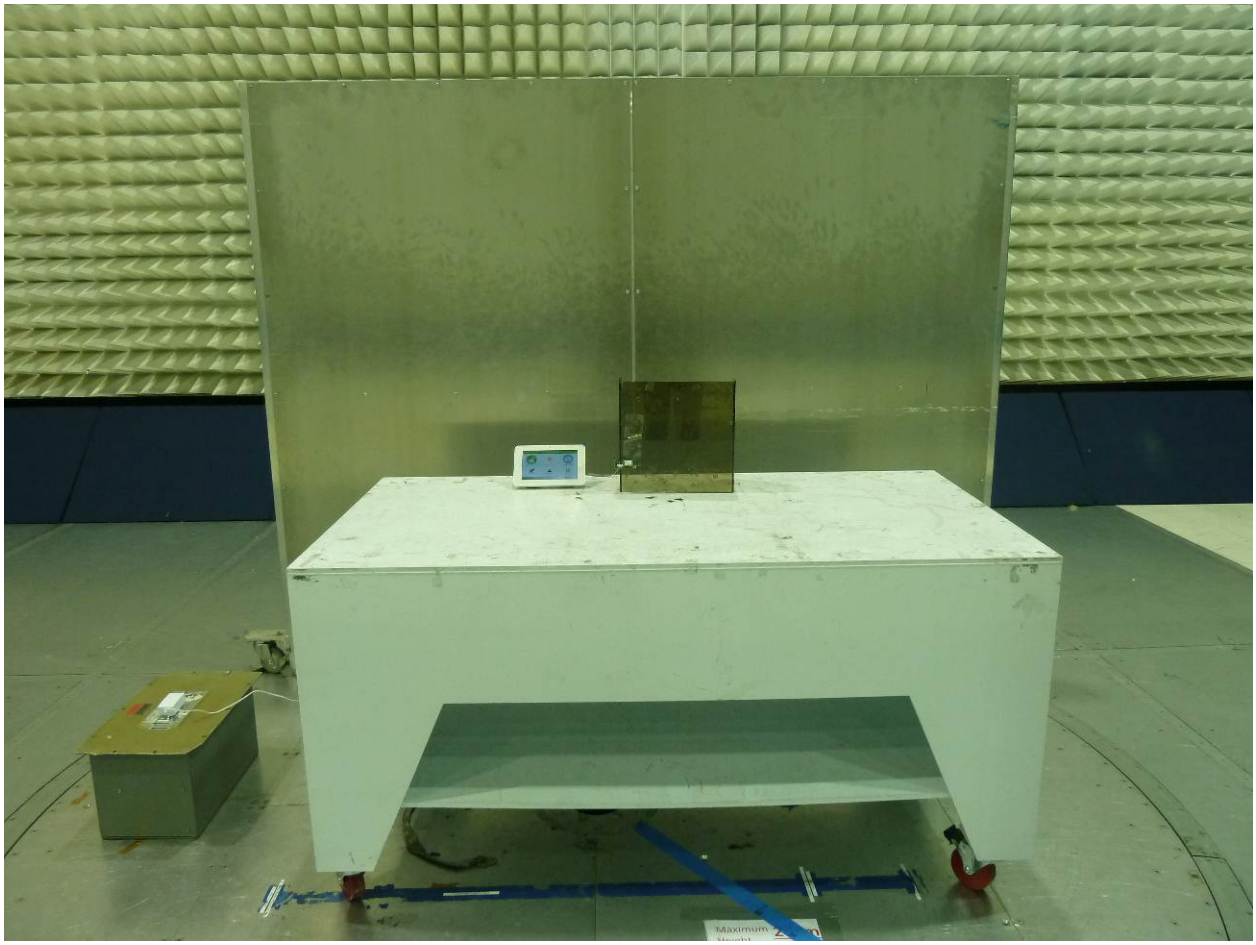


Frequency	Av Level	QP Level	Av Limit	QP Limit	Av Margin	QP Margin	Line
MHz	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
0.153	48.48	48.48	55.90	65.90	-7.42	-17.42	Line
0.165	46.76	46.76	55.57	65.57	-8.80	-18.80	Line
0.176	46.34	46.34	55.25	65.25	-8.91	-18.91	Line
0.152	47.20	47.20	55.95	65.95	-8.75	-18.75	Neutral
0.168	45.67	45.67	55.47	65.47	-9.80	-19.80	Neutral
0.197	45.10	45.10	54.66	64.66	-9.56	-19.56	Neutral

Results	**Complies** by 7.42dB

Test setup 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	ESU	ITS 00961	12	06/02/16
Spectrum Analyzer	Rohde and Schwarz	FSP	ITS 01200	12	02/09/16
BI-Log Antenna	Antenna Research	LPB 2513	ITS 00355	12	09/11/16
Pre-Amplifier	Sonoma Instrument	310N	ITS 00942	12	01/07/17
Pre-Amplifier (1-18GHz)	Miteq	AMF-4D-001180-24-10P	ITS 00526	12	10/06/16
Horn Antenna	ETS Lindgren	3115	ITS 00982	12	12/16/16
LISN	FCC	FCC-LISN-50-50-M-H	ITS 02011	12	06/02/16

No Calibration required

6.0 RF Exposure Evaluation

MPE Evaluation

The EUT is a wireless device used in a mobile application, at least 20 cm from any body part of the user or nearby persons.

The maximum Peak EIRP calculated is 11.29 dBm or 13.46 mW; therefore, to comply with RF Exposure Requirement, the MPE is calculated.

The Power Density can be calculated using the formula

$$S = EIRP/ 4\pi D^2$$

Where: S is Power Density in mW/cm^2
D is the distance from the antenna.

It is considered that 20 cm is the minimum distance that user can go closest to the EUT.

At 20 cm, S =0.02678 W/m^2, which is below the MPE Limit of 10 W/m^2

Date of Test:	January 22, 2016
Results	**Complies**

6.0 Document History

Revision/ Job Number	Writer Initials	Reviewers Initials	Date	Change
1.0 / G102374971	AC	KV	January 29, 2016	Original document