TEST REPORT

Report Number: 102241369MPK-015
Project Number: G102241369
January 25, 2016

Testing performed on
WiFi/BT Module Card
Model: 576253
FCC ID: 2AHLA-576253
IC: 4811A-576253
to

FCC Part 15 Subpart C (15.247)
Industry Canada RSS-247 Issue 1
FCC Part 15, Subpart B
Industry Canada ICES-003

For

Bosch Automotive Service Solutions LLC

Test Performed by:	Test Authorized by:
Intertek	Bosch Automotive Service Solutions LLC
1365 Adams Court	655 Eisenhower Dr.
Menlo Park, CA 94025 USA	Owatonna, MN 55060 USA

Prepared by: _____ **Date:** January 25, 2016
Anderson Soungpanya

Reviewed by: _____ **Date:** January 25, 2016
Krishna K Vemuri

Report No. 102241369MPK-015

Equipment Under Test:	WiFi/BT Module Card
Trade Name:	WiFi/BT Module Card
Model Number:	576253
Serial Number:	MPK1511100953-001
Applicant:	Bosch Automotive Service Solutions LLC
Contact:	Eric Vande Zande
Address:	Bosch Automotive Service Solutions LLC 655 Eisenhower Dr. Owatonna, MN 55060
Country	USA
Tel. Number:	(507) 455-4437
Email:	eric.vandezande@us.bosch.com
Applicable Regulation:	FCC Part 15 Subpart C (15.247) Industry Canada RSS-247 Issue 1 FCC Part 15, Subpart B Industry Canada ICES-003
Date of Test:	November 30 – December 23, 2015

We attest to the accuracy of this report:

Anderson Soungpanya
Project Engineer

Krishna K Vemuri
EMC Senior Staff Engineer

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: October 19, 2015
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: November 30, 2015
Test completion date: December 23, 2015
The test results in this report pertain only to the item tested.

2.0 General Information

2.1 Product Description

The Mid Range Scan Tool (MRST) is to be used in an automotive service shop environment in global markets. The MRST is usable as a standalone instrument by connecting to the vehicle diagnostic connector. Vehicle diagnostic connectivity is also added for certain Multi-Media equipped vehicles via USB, Bluetooth, and audio cable.

Information about the 2.4 GHz radio is presented below:

Applicant	Bosch Automotive Service Solutions LLC
Model No.	576253
FCC ID	2AHLA-576253
IC	4811A-576253
Type of transmission	Digital Transmission System (DTS)
Rated RF Output	5.93 dBm (3.917 mW)
Antenna(s) & Gain	YAGEO - ANTX150P111B24553; Internal Antenna, 3.2 dBi peak gain Taoglas Antenna Solution - FXP.840.07.0055B; Internal Antenna, 2.0 dBi peak gain
EIRP	5.93 dBm + 3.2 dBi = 9.13 dBm (8.19 mW)
Frequency Range	2402 – 2480 MHz
Type of modulation/data rate	GFSK 1MB
Number of Channel(s)	40, Channels 0-39
Applicant Name & Address	Bosch Automotive Service Solutions LLC 655 Eisenhower Dr. Owatonna, MN 55060 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, 2015), 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 – 6 GHz	> 6 GHz
RF Power and Power Density – antenna conducted	1.1 dB	1.5 dB	–
Unwanted emissions - antenna conducted	1.2 dB	1.7 dB	2.0 dB
Bandwidth – antenna conducted	50 Hz	100 Hz	–
Radiated emissions	4.2 dB	5.4 dB	
AC mains conducted emissions	2.4 dB	-	-

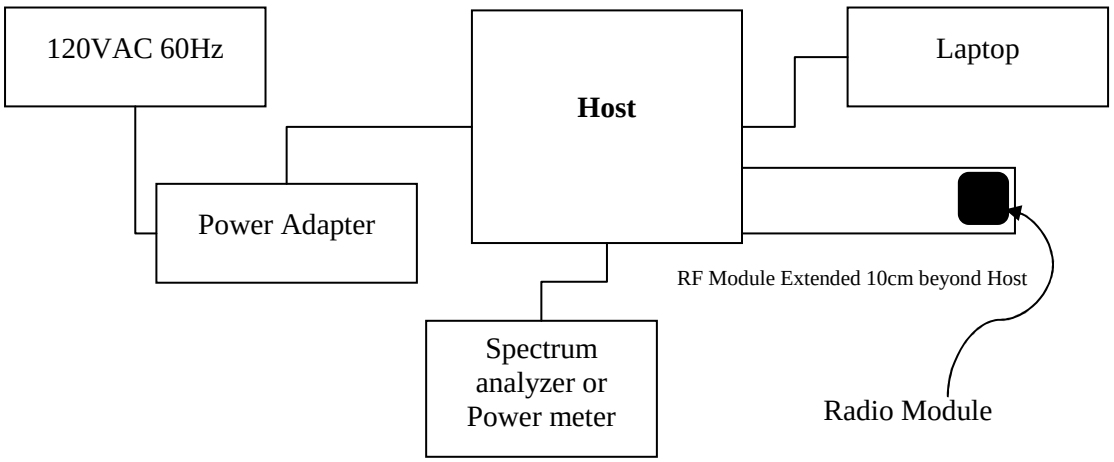
3.0 System Test Configuration

3.1 Support Equipment

Description	Manufacturer	Model No./ Part No.
Power Adapter	I.T.E Power Supply	PW172KB1500B02
Laptop	Acer	Aspire E1-571-6811

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 Bosch Automotive Service Solutions LLC

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.

3.6 Modifications Required for Compliance

Intertek installed no modifications during compliance testing in order to bring the product into compliance.

3.7 Additions, Deviations and Exclusions from Standards

No additions, deviations or exclusions from the standard were made.

4.0 Measurement Results

4.1 6-dB Bandwidth and 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, 2015 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.

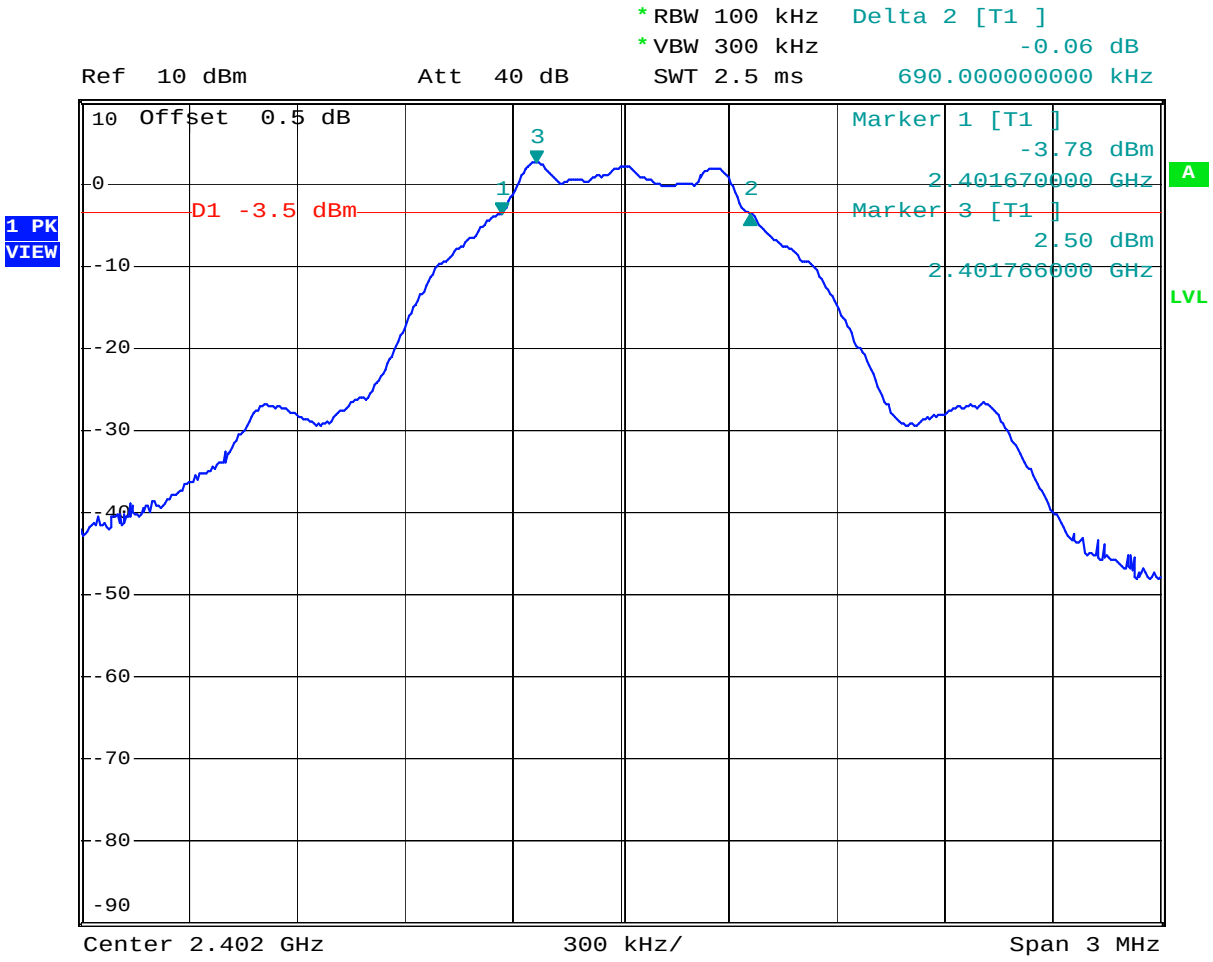
For 99% power bandwidth measurement, the bandwidth was determined by using the built-in 99% occupied bandwidth function of the spectrum analyzer. The resolution bandwidth is set to 1% of the selected span as is without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

4.1.3 Test Result

Frequency (MHz)	6-dB bandwidth FCC 15.247 & RSS-GEN, MHz	Occupied bandwidth, RSS-GEN, MHz	Plot
2402	0.690	--	1.1
	--	1.064	1.4
2442	0.690	--	1.2
	--	1.060	1.5
2480	0.690	--	1.3
	--	1.069	1.6

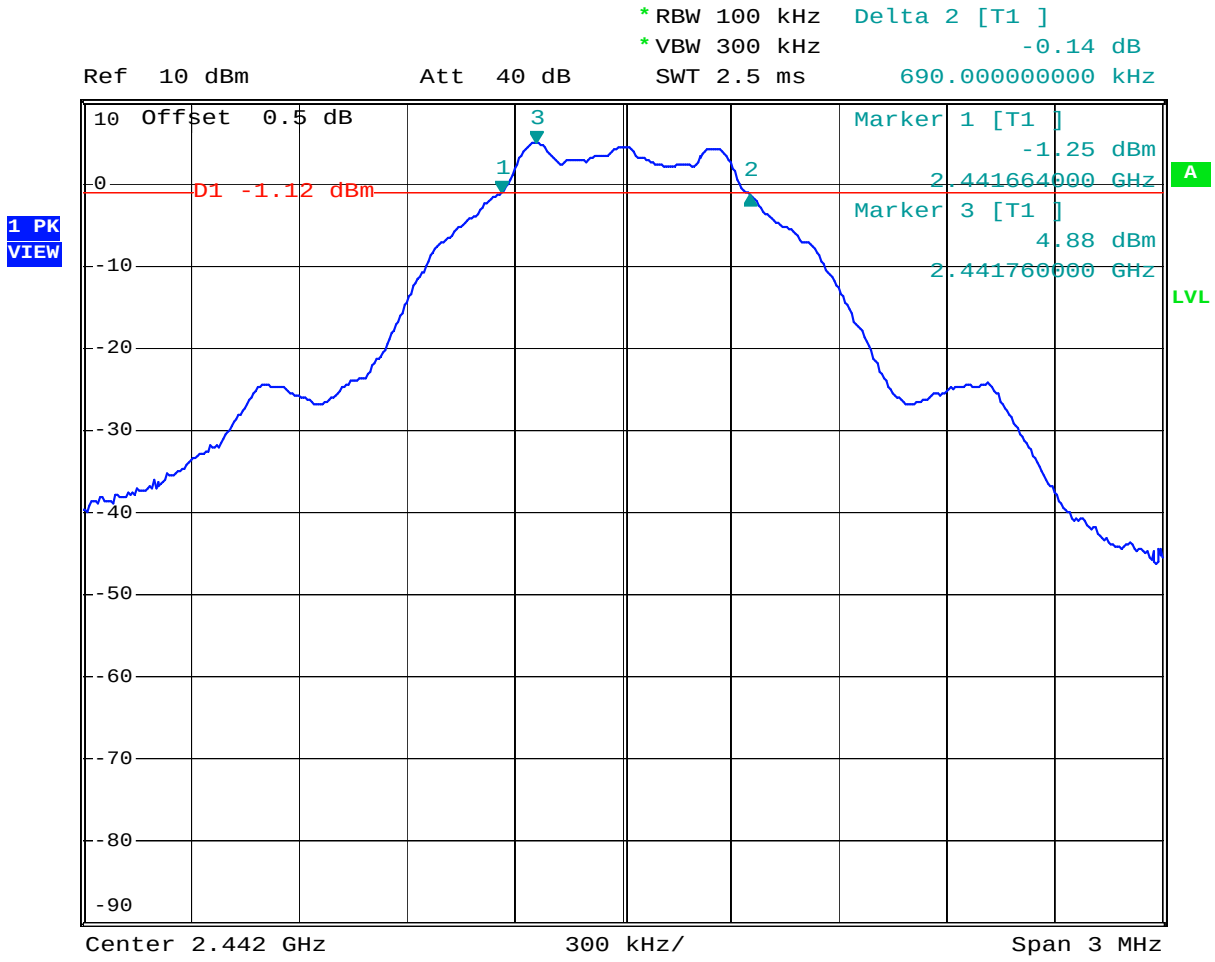
Results	Complies

Plot 1. 1



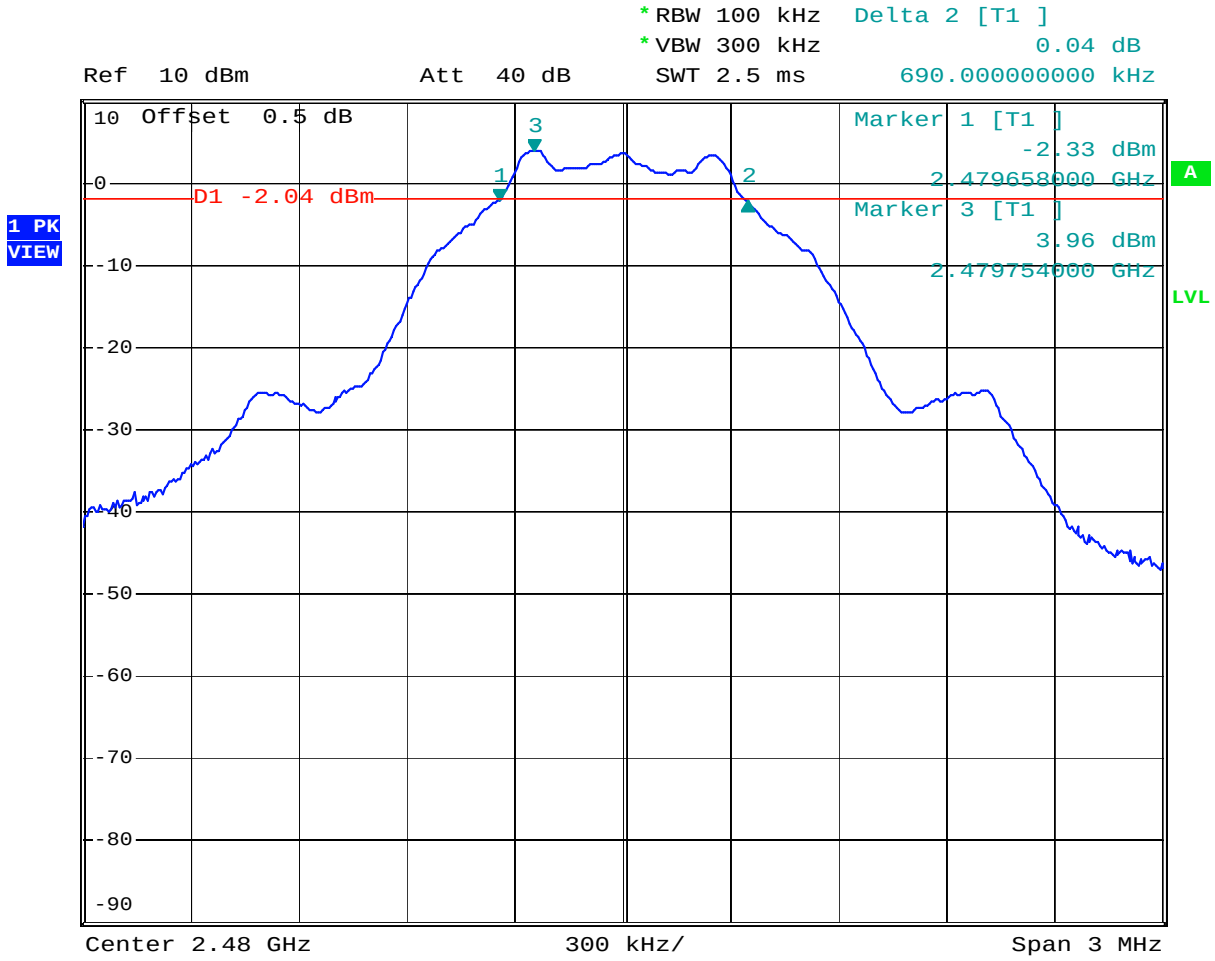
Date: 30.NOV.2015 14:31:35

Plot 1. 2

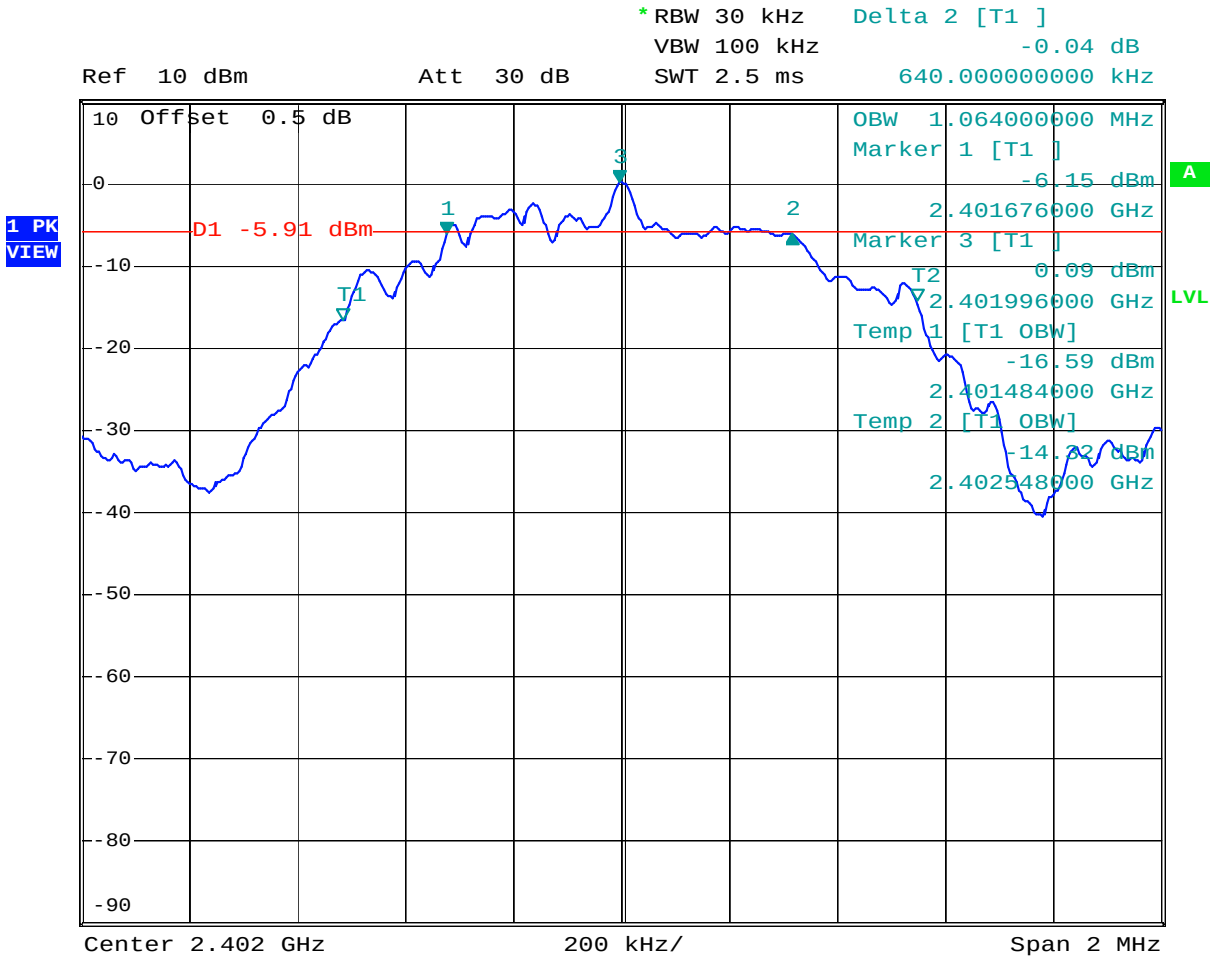


Date: 30.NOV.2015 14:34:09

Plot 1. 3


*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 2 [T1]
0.04 dB
690.000000000 kHz
Ref 10 dBm
Att 40 dB
10 Offset 0.5 dB
Marker 1 [T1]
-2.33 dBm
2.479658000 GHz
Marker 3 [T1]
3.96 dBm
2.479754000 GHz
D1 -2.04 dBm
1 PK
VIEW
A
LVL
Center 2.48 GHz
300 kHz/
Span 3 MHz
Date: 30.NOV.2015 14:36:05

Plot 1. 4



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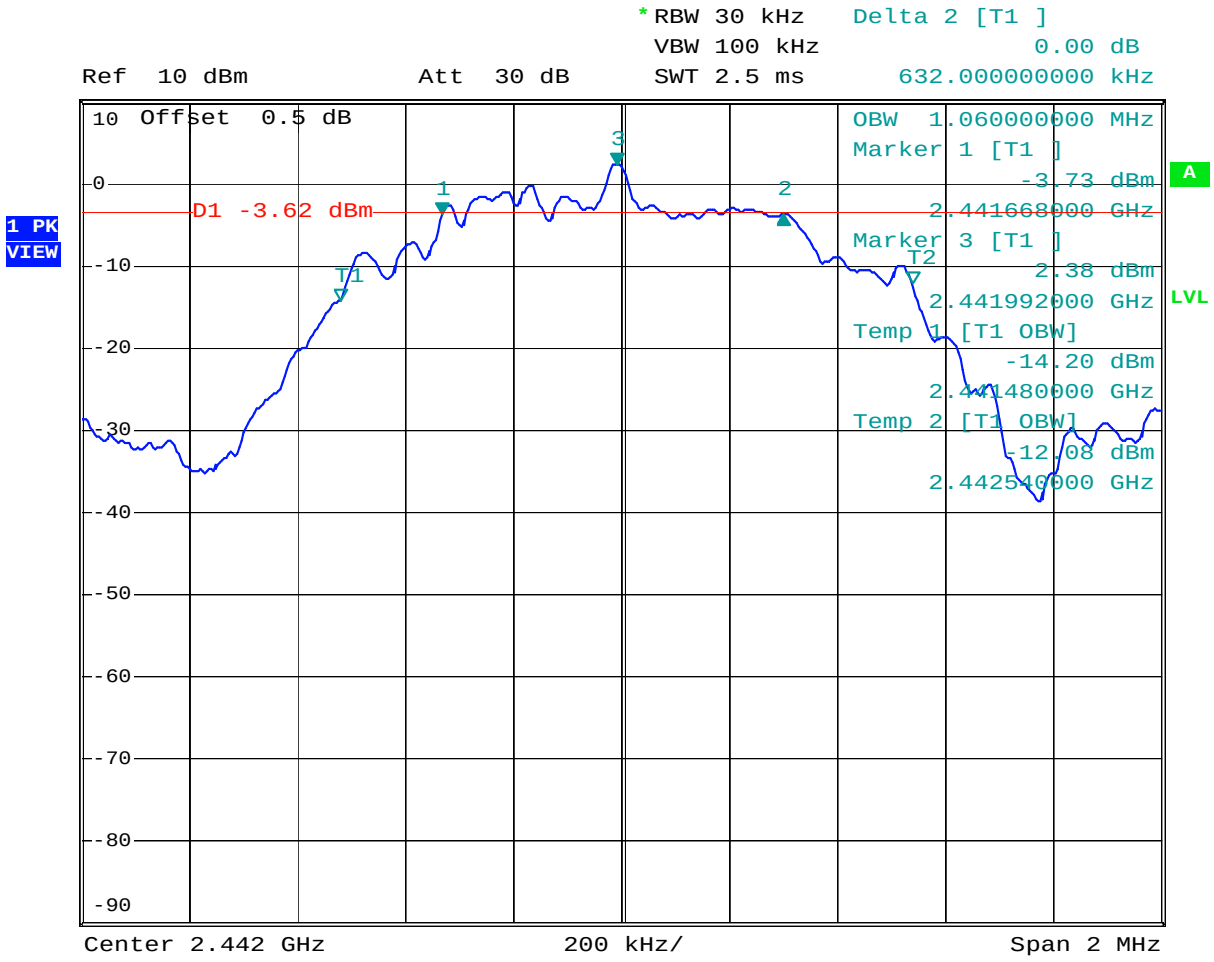
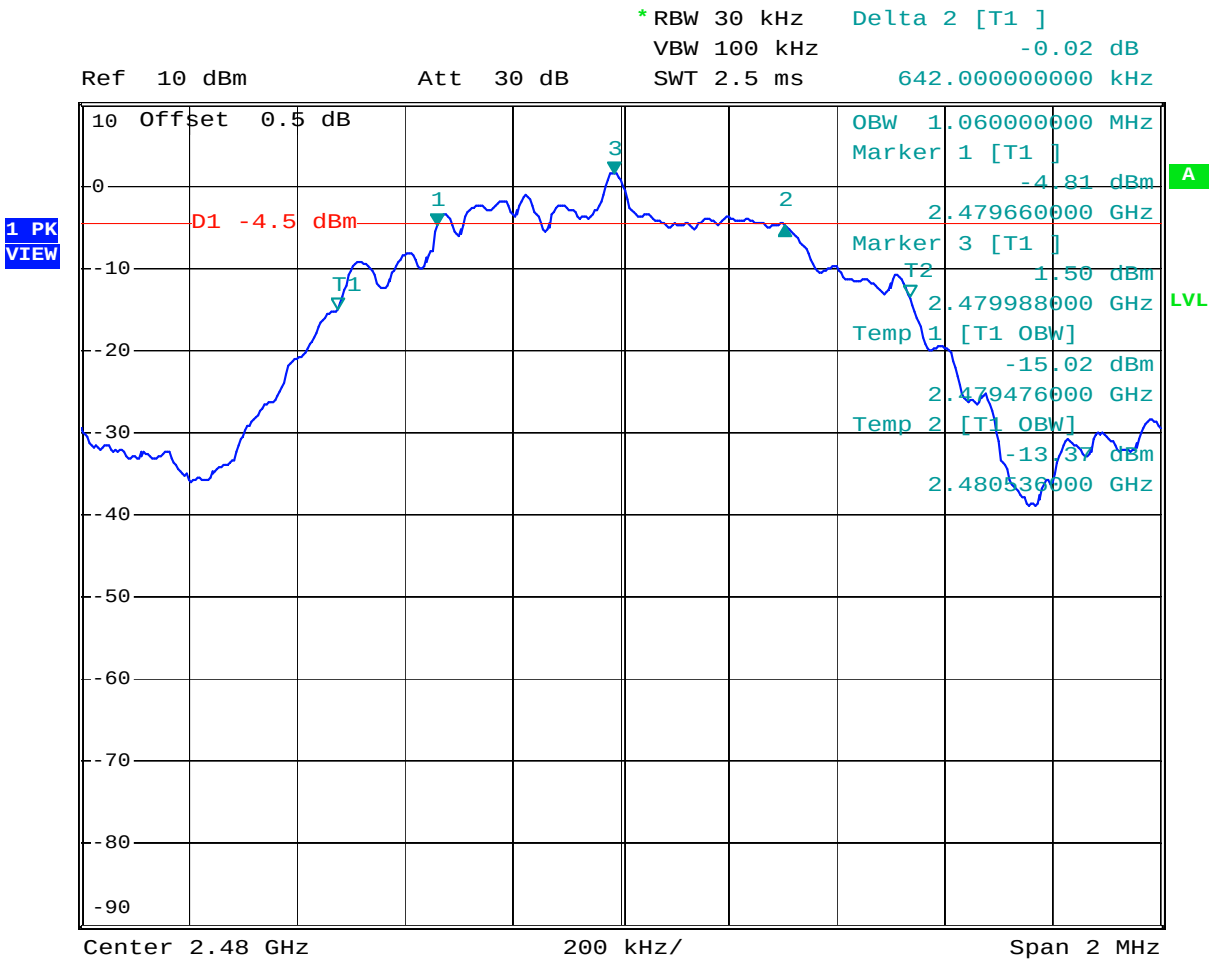
Plot 1.5



Date: 30.NOV.2015 14:48:59

Plot 1.6



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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, 2015 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.

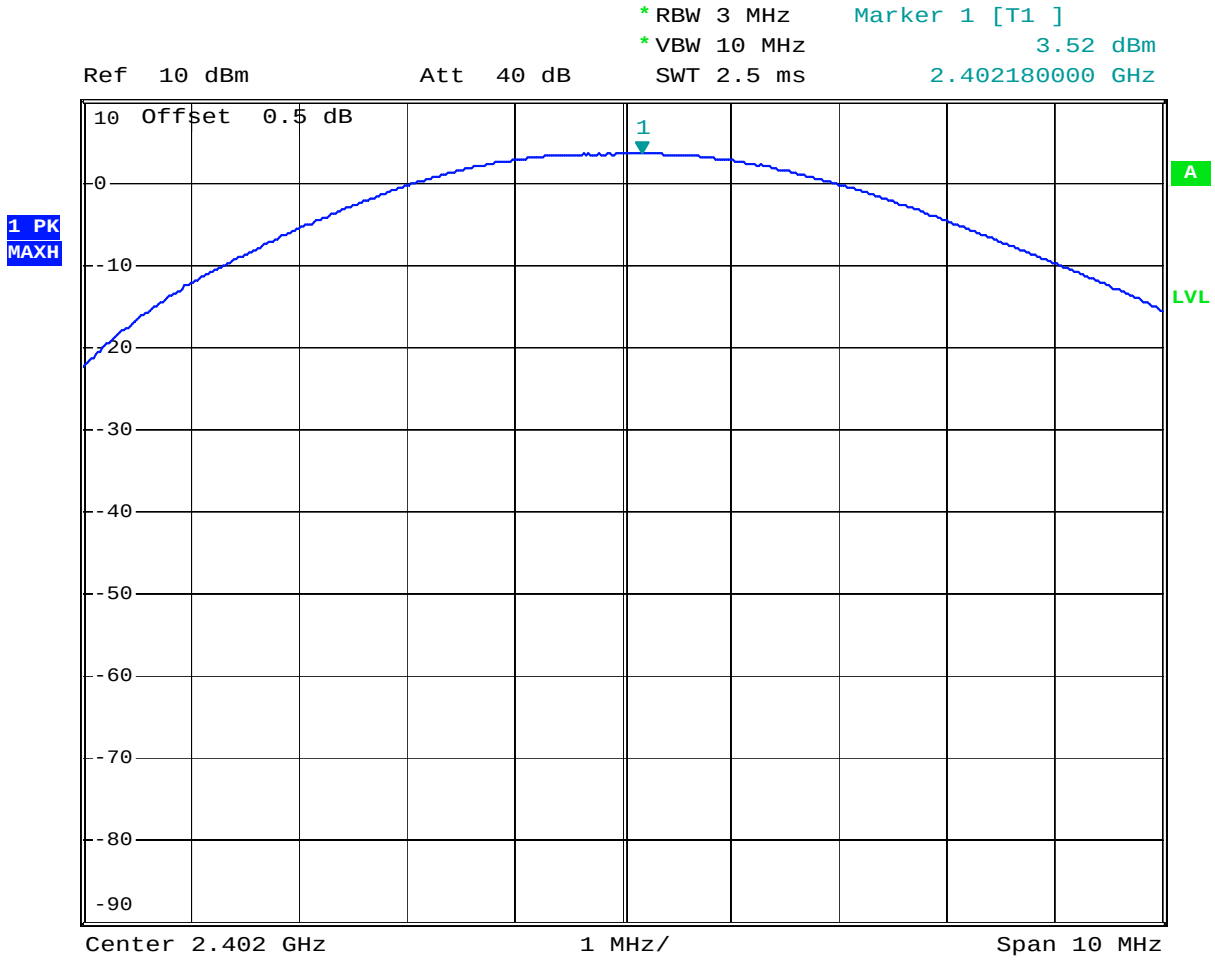
4.3.3 Test Result

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

Frequency, MHz	Conducted Power (peak), dBm	Conducted Power (peak), mW	Plot
2402	3.52	2.249	2.1
2442	5.93	3.917	2.2
2480	4.96	3.133	2.3

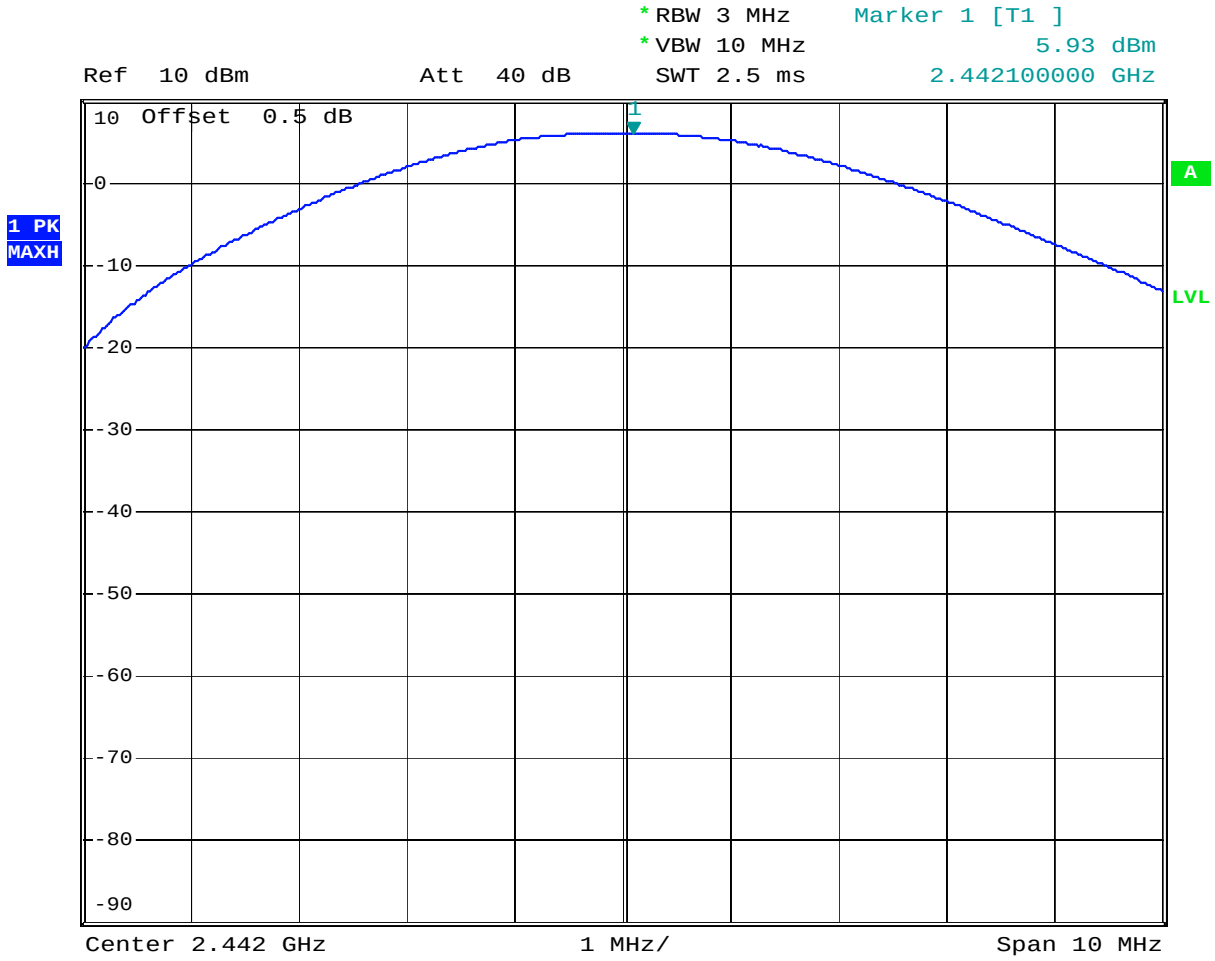
Results	Complies

Plot 2. 1



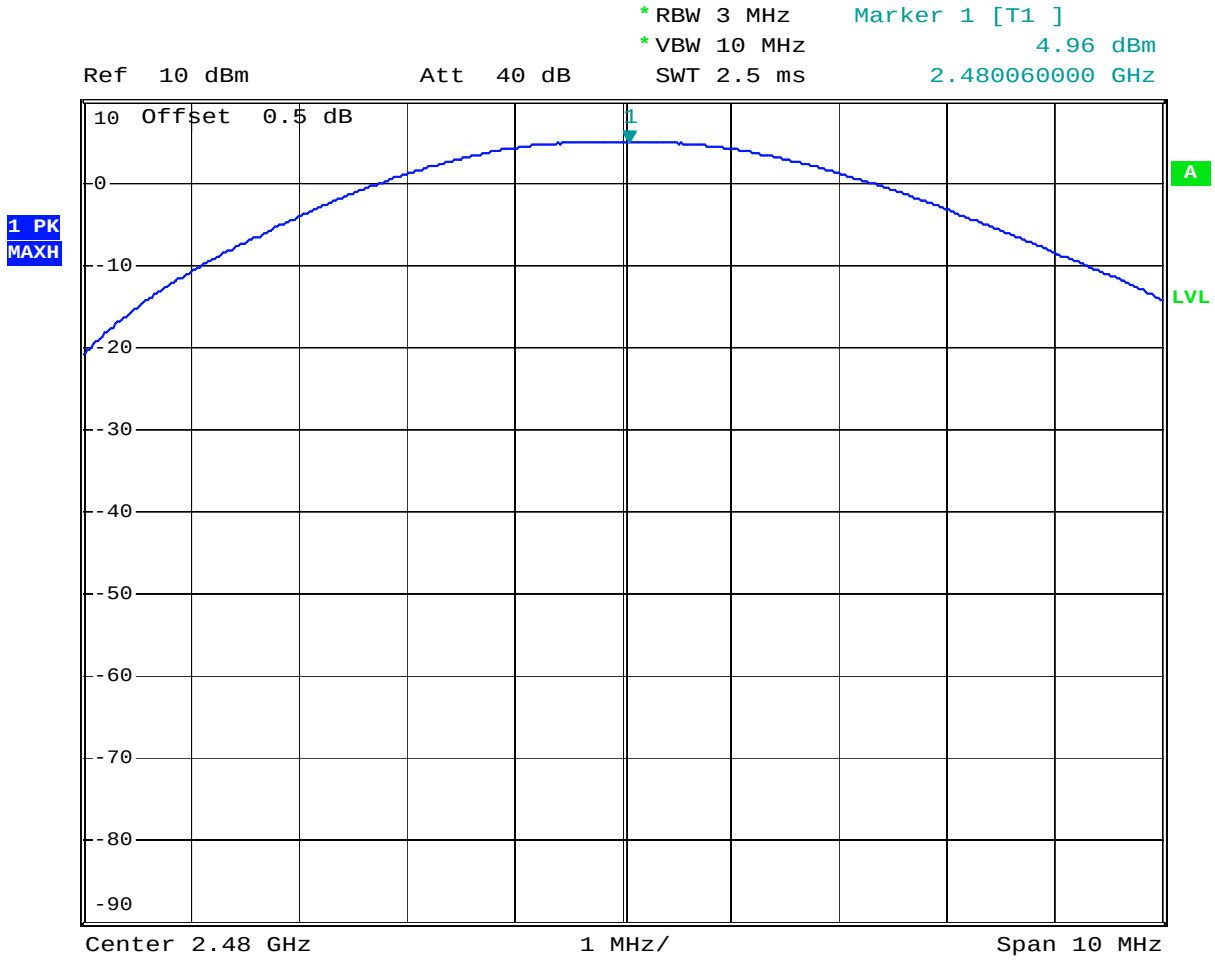
Date: 30.NOV.2015 14:22:54

Plot 2. 2



Date: 30.NOV.2015 14:25:07

Plot 2. 3



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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, 2015, 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

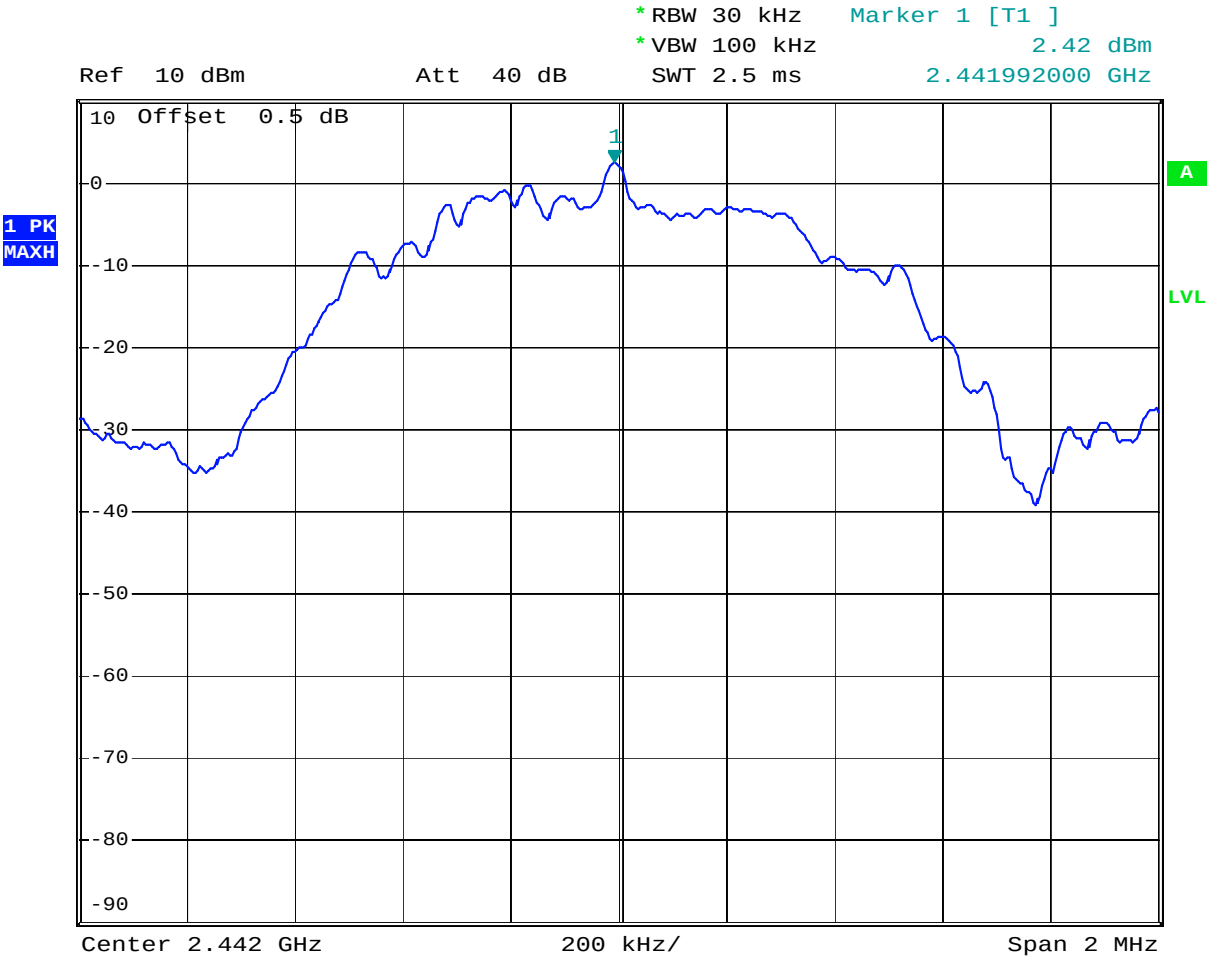
Frequency, MHz	Maximum Power Spectral Density, dBm	Maximum Power Spectral Density Limit, dBm	Margin, dB	Plot
2402	-0.01	8.0	-8.01	3.1
2442	2.42	8.0	-5.58	3.2
2480	1.43	8.0	-6.57	3.3

Results	Complies

Plot 3. 1

Date: 30.NOV.2015 14:28:59

Plot 3. 2



Date: 30.NOV.2015 14:28:13

Plot 3. 3

Date: 30.NOV.2015 14:27:32

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, 2015, 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.

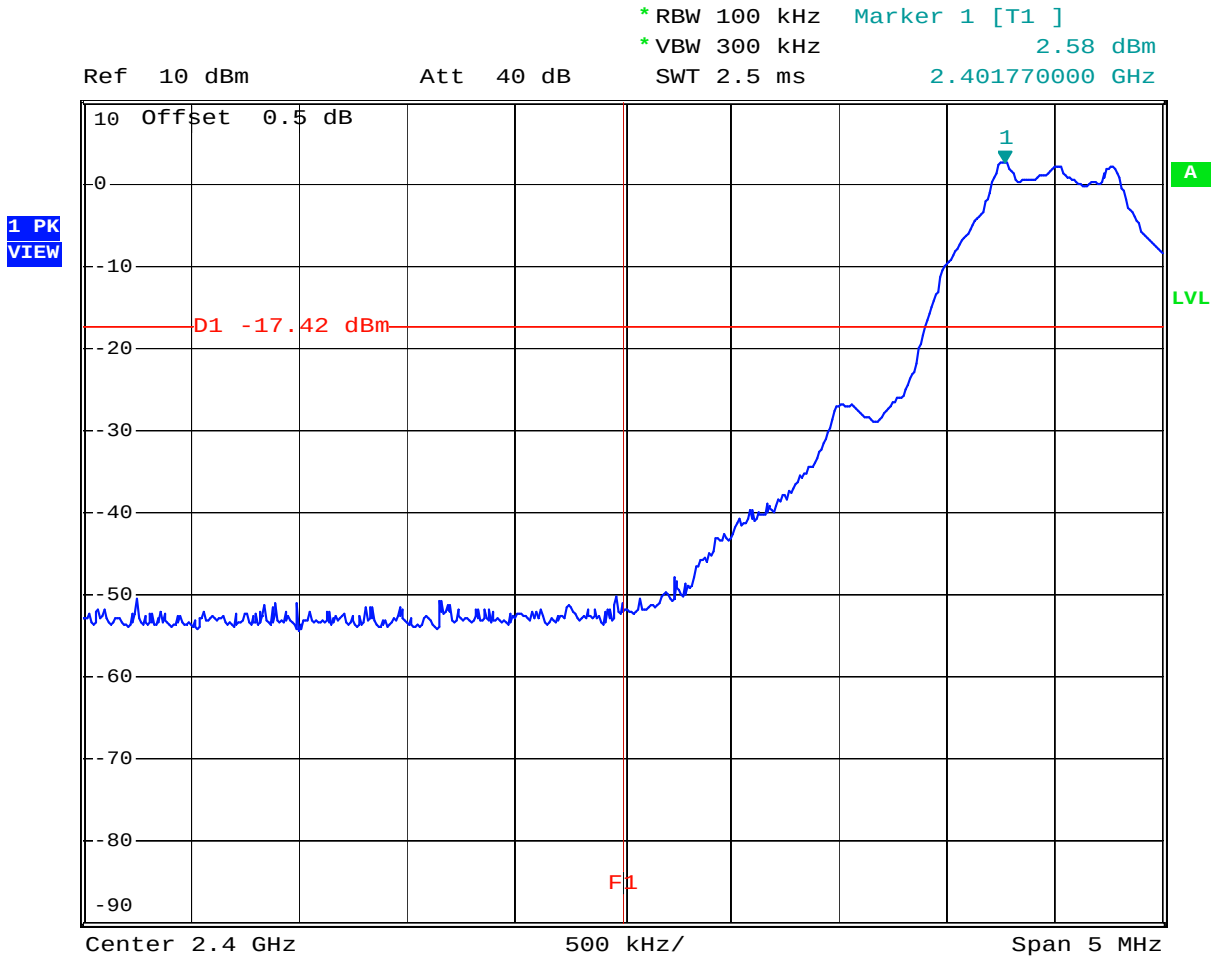
The unwanted emissions were measured from 30 MHz to 25 GHz. Plots below are corrected for cable loss and then compared to the limits.

4.4.3 Test Result

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

Results	**Complies**

Tx @ Low Channel, 2400 MHz Band Edge
Plot 4.1



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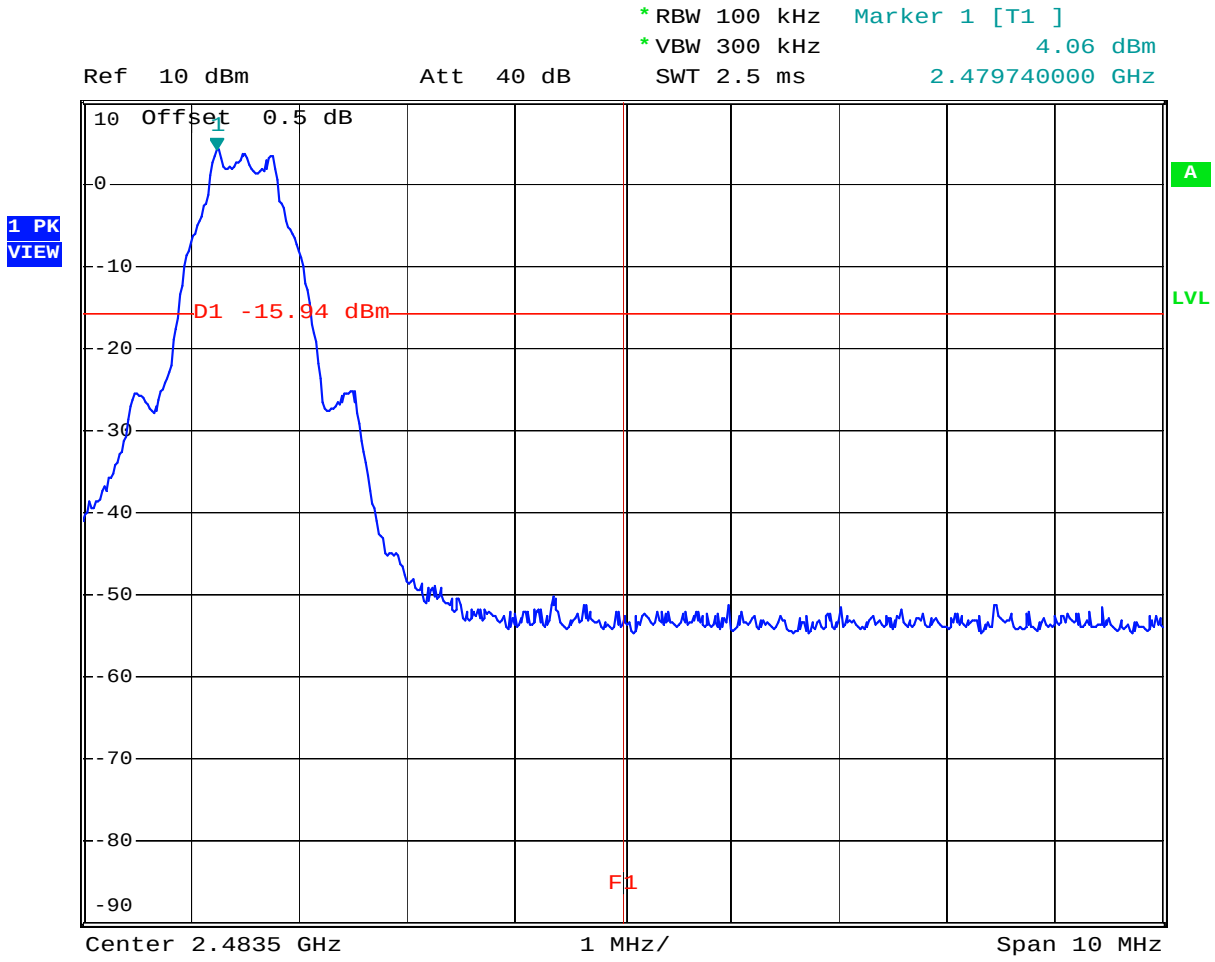
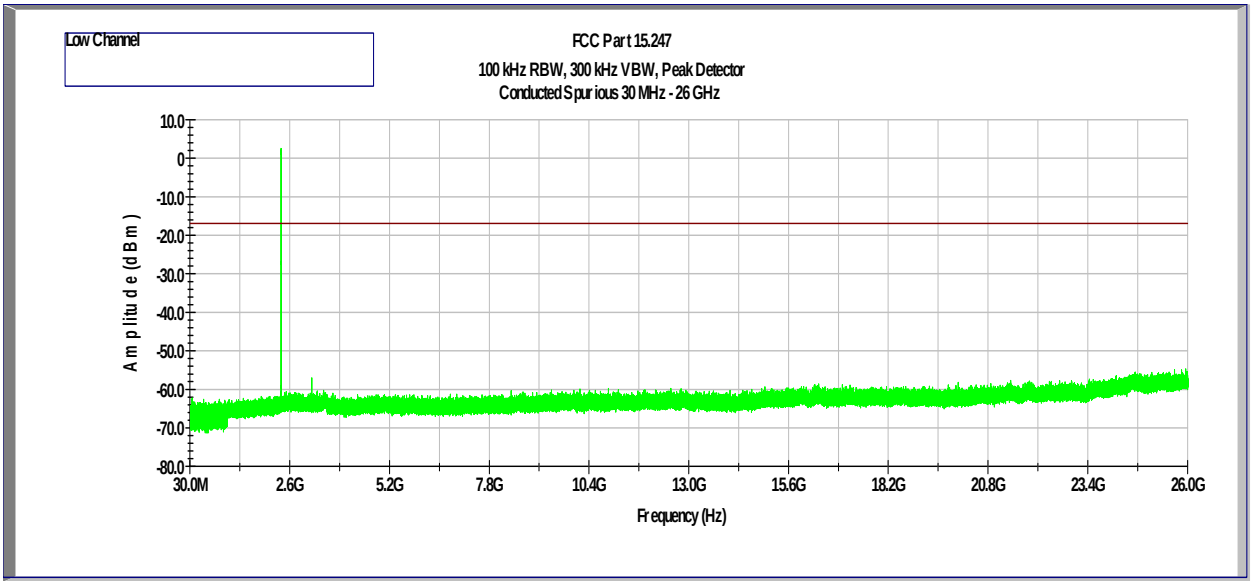
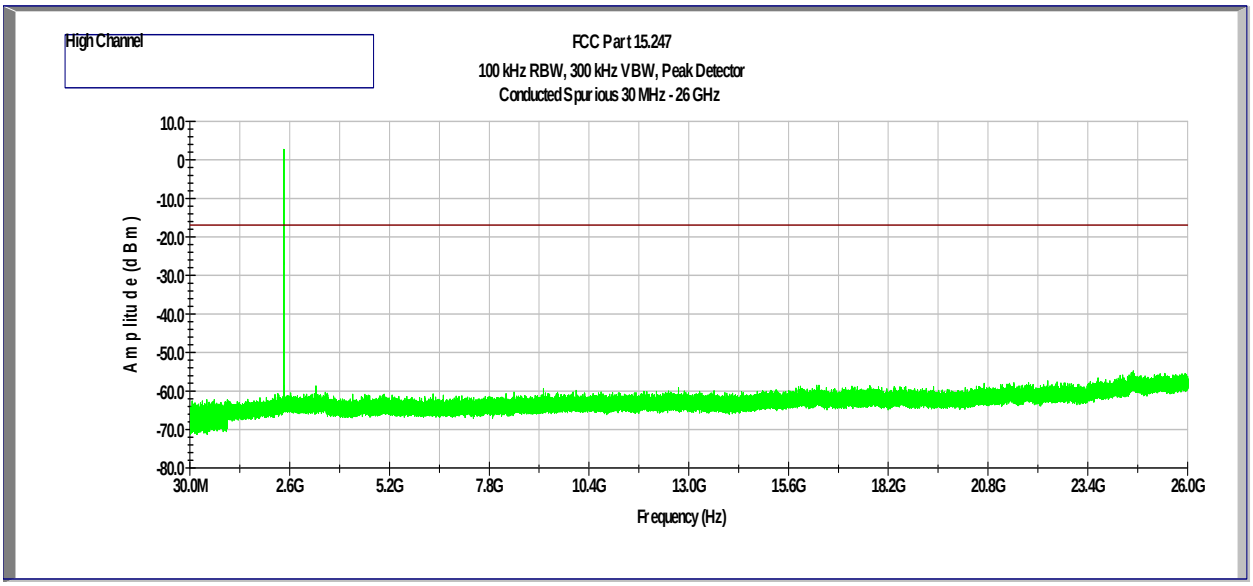
Tx @ Low Channel, 2483.5 MHz Band Edge
Plot 4.2



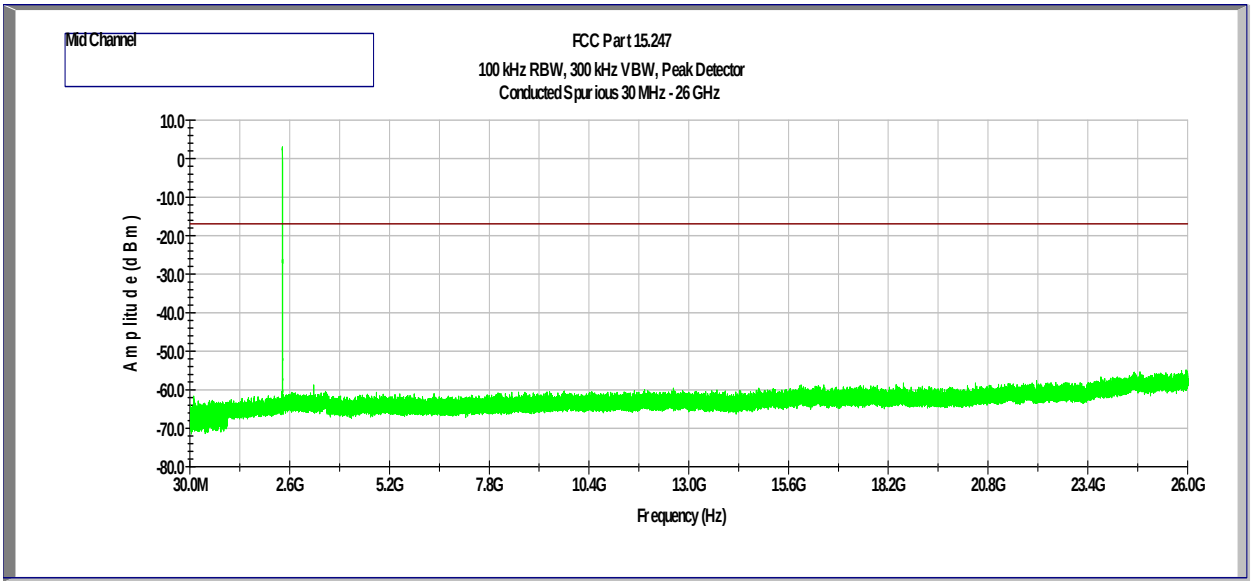
Tx @ Low Channel, 2402 MHz
30MHz -26GHz Conducted Spurious
Plot 4.3



Tx @ Mid Channel, 2442 MHz
30MHz -26GHz Conducted Spurious
Plot 4.5



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 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.

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).

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.

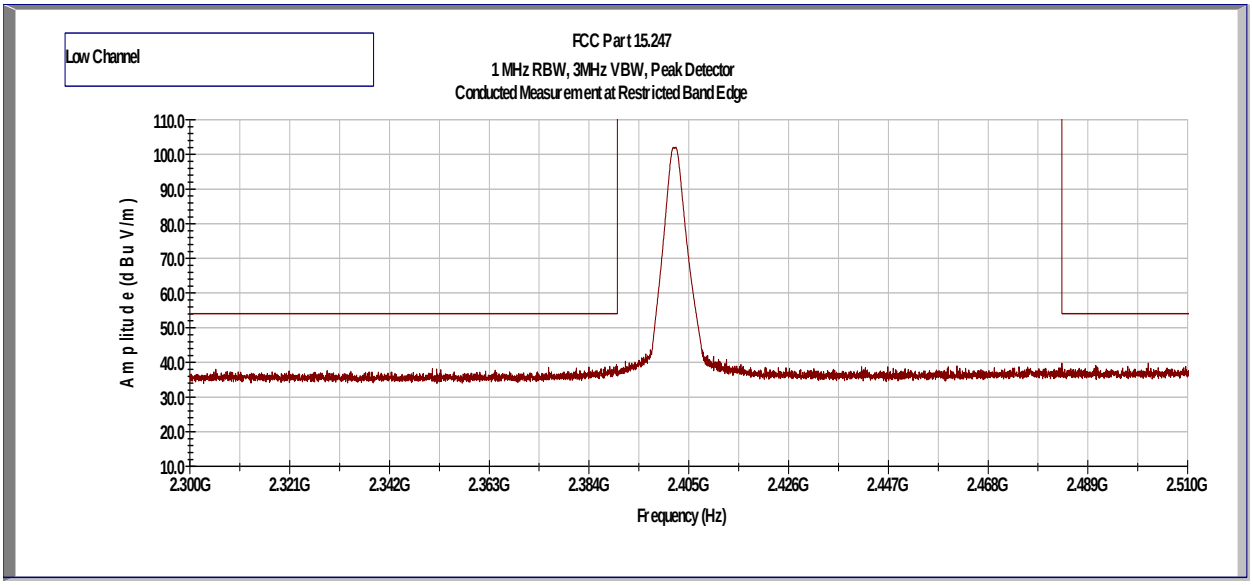
All conducted antenna port plots are corrected with the consideration of a 3.6dBi Antenna Gain.

Radiated emission measurements were performed up to 26GHz. No Emissions were identified when scanned from 18-25 GHz.

Date of Test:	November 30, 2015 to December 23, 2015

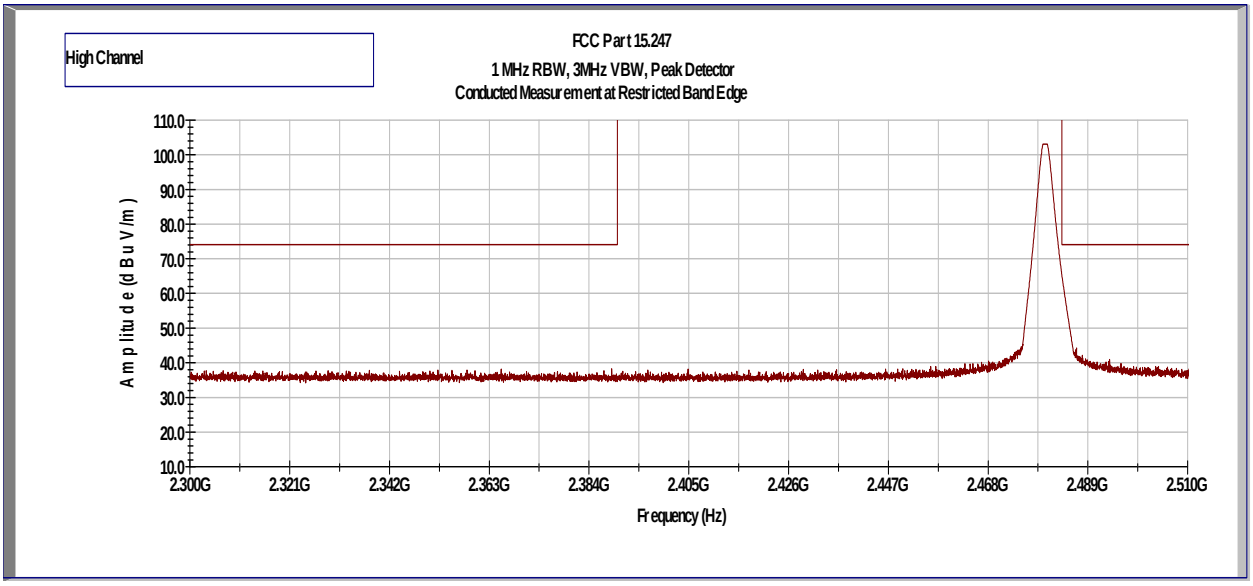
Test Results: 15.209/15.205 Restricted Band Emissions at Antenna Port

Out-of-Band Spurious Emissions at the Band Edge – Tx @ 2402 MHz



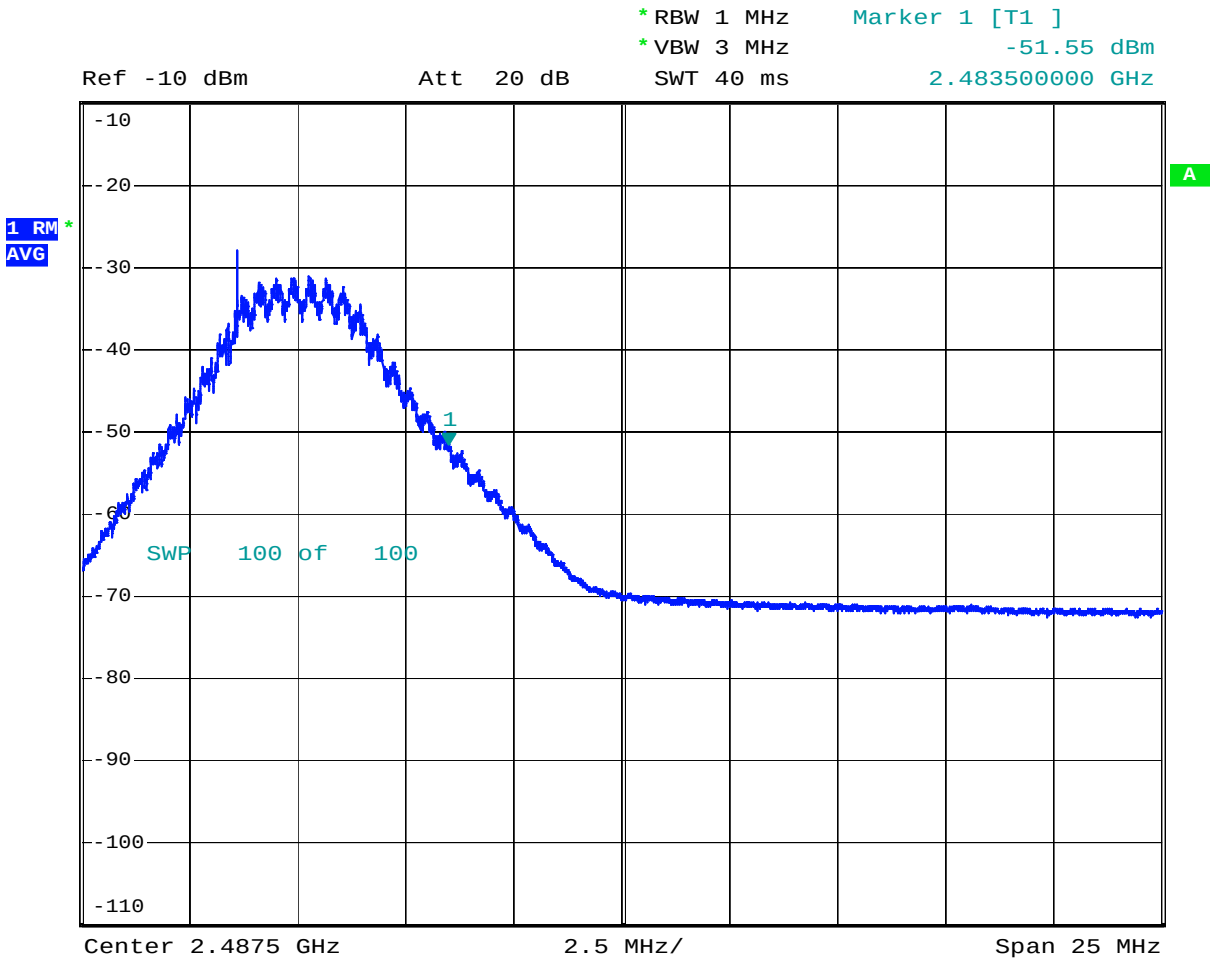
Frequency	Corrected Amplitude	Avg Limit	Margin	Detector	Results
GHz	dBµV/m	dBµV/m	dB		
2.386	39.9	54	14.1	Peak	Pass

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



Frequency	Corrected Amplitude	Peak Limit	Margin	Detector	Results
GHz	dBµV/m	dBµV/m	dB		
2.4835	65.6	74	8.4	Peak	Pass

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



Frequency	Detector	Corrected Amplitude	Raw Amplitude	Antenna Factor	Cable Loss	EIRP	δ(dB)*	Corr. Factor at 3 m	Average Limit	Margin
MHz	Peak / Avg	dB(uV)	dBm	dBi	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB
2483.5	Avg	50.0	-51.6	3.2	0.5	-47.9	2.6	9.5	54	-4.0

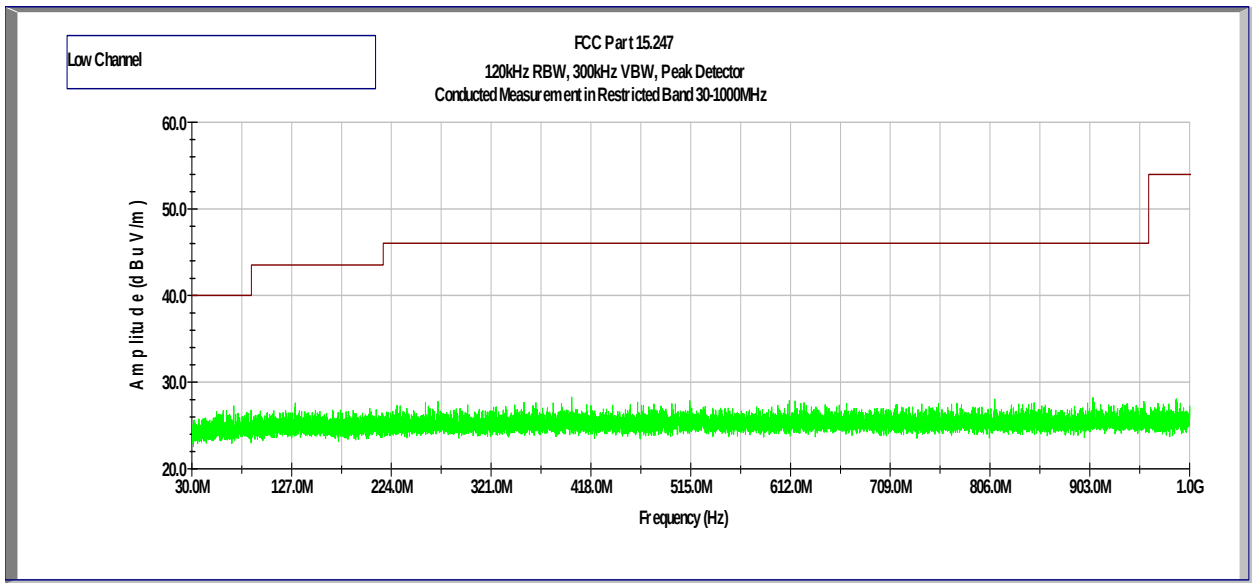
* **δ(dB) -** Duty Cycle Correction Factor. See Appendix A for Duty Cycle measurement and calculation. Duty cycle Correction Factor was applied for Average Field Strength (FS).

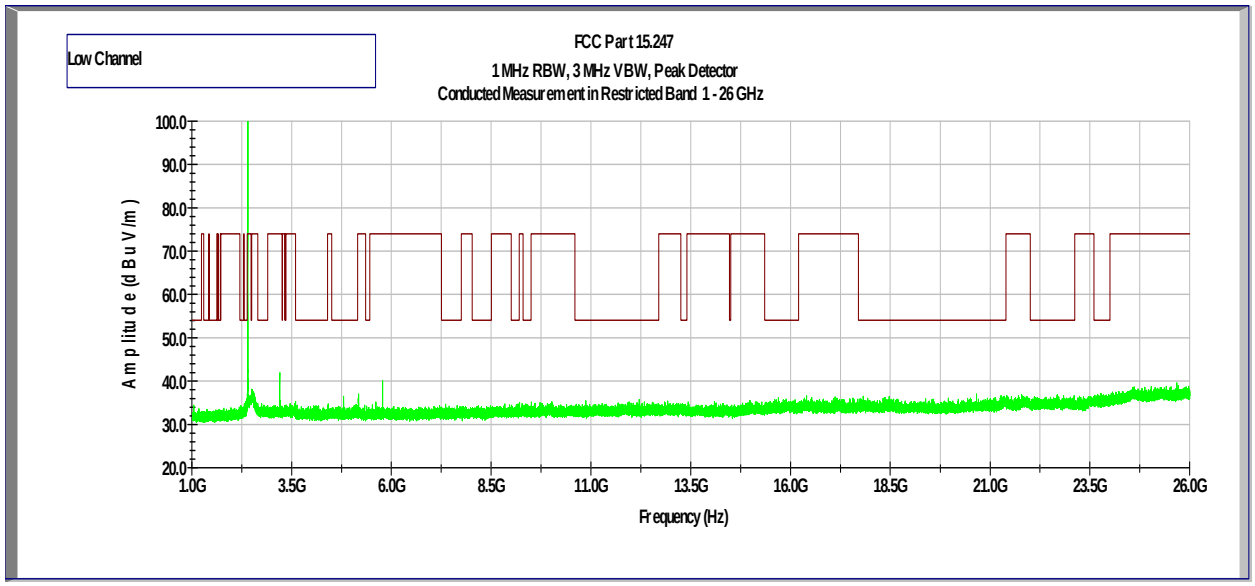
Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:
E = EIRP + δ(dB) – 20log D + 104.8
where:
E = electric field strength in dBμV/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.

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

Tx @ 2402MHz

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

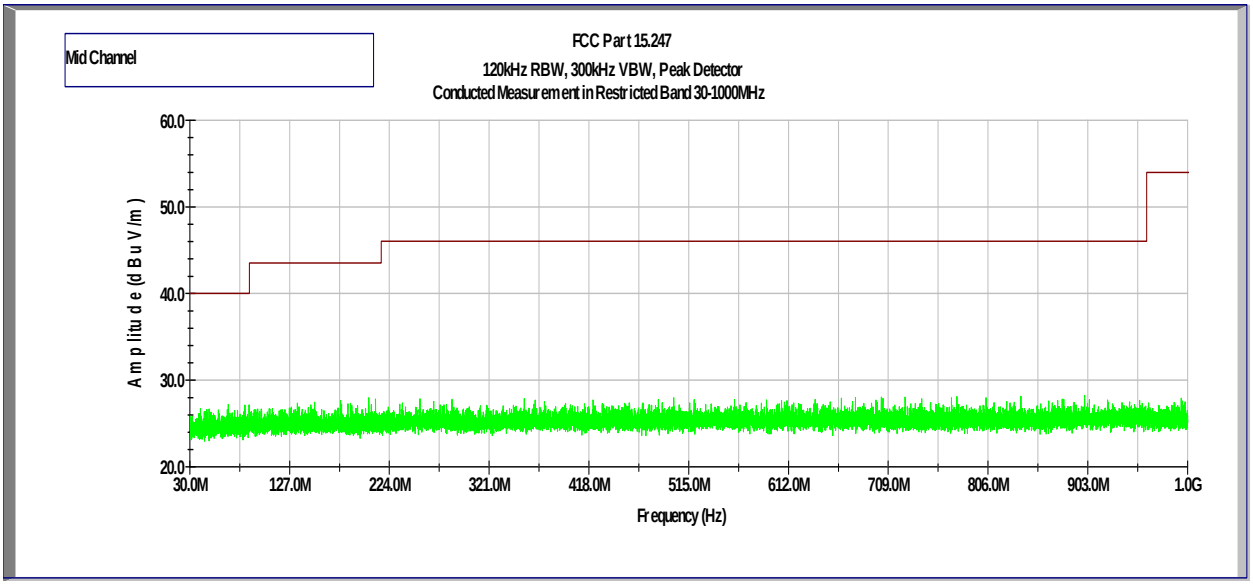


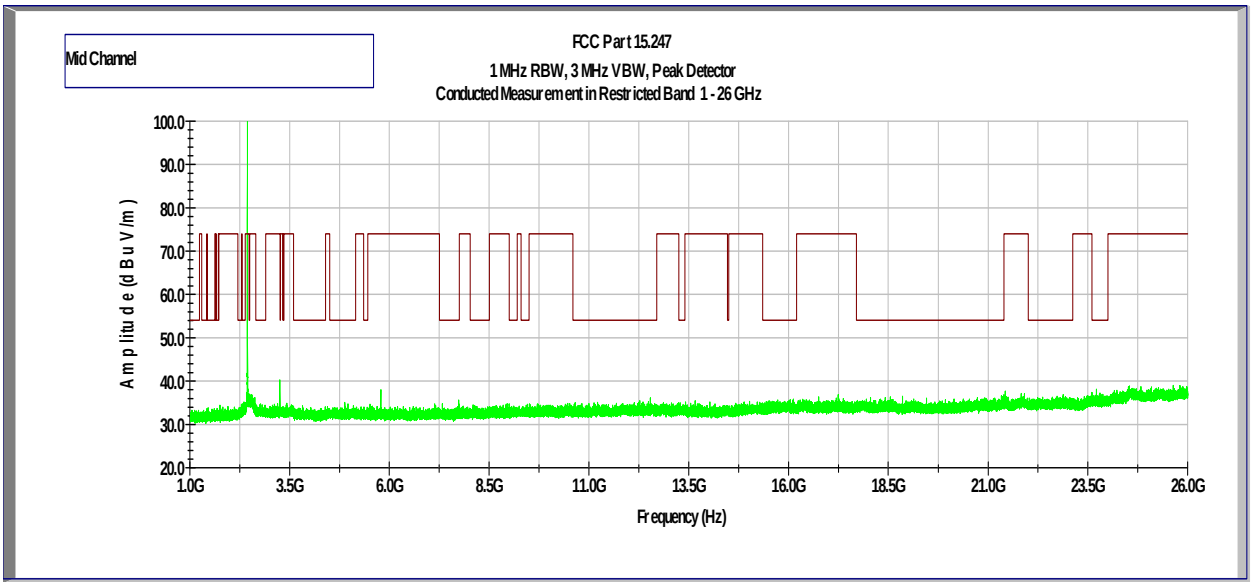


Out-of-Band Conducted Spurious Emissions (at Antenna Port)

Tx @ 2442MHz

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

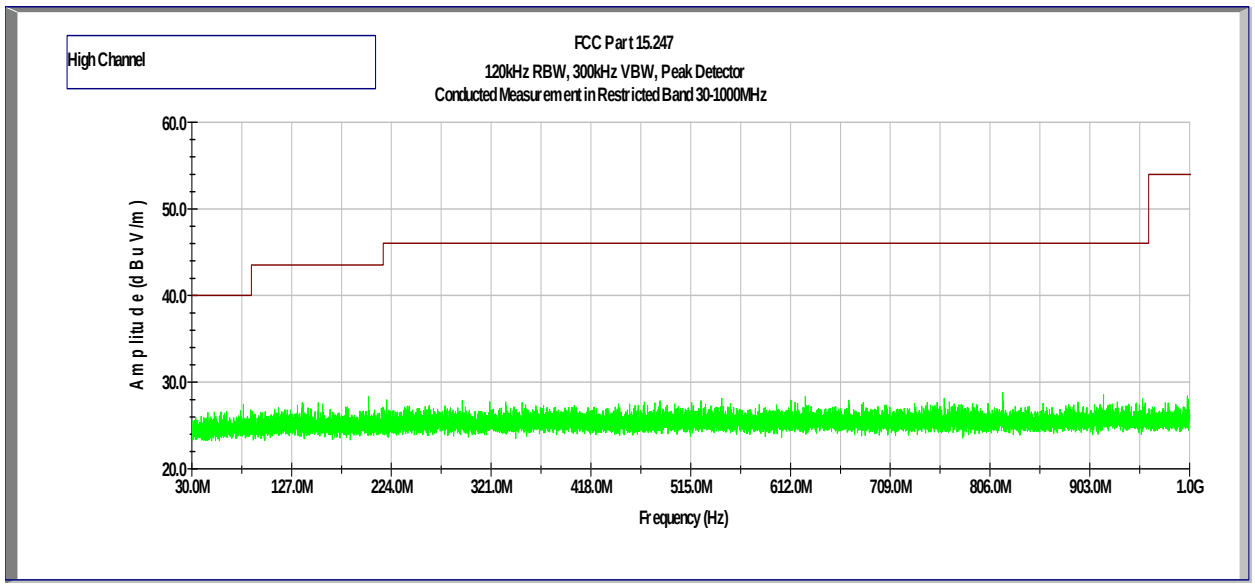


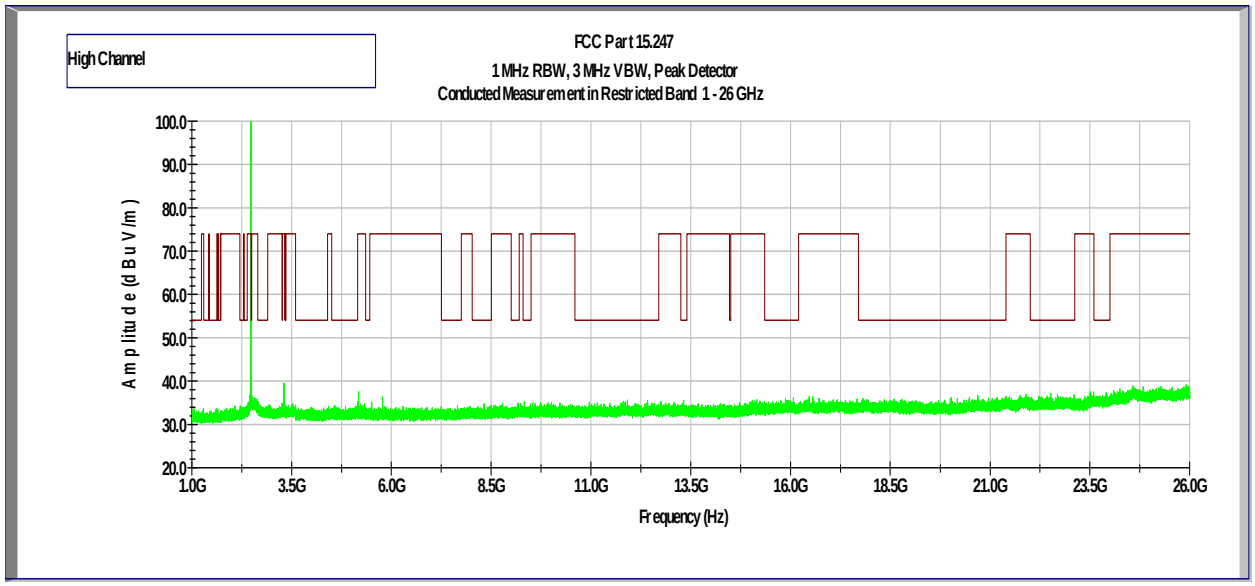


Out-of-Band Conducted Spurious Emissions (at Antenna Port)

Tx @ 2480MHz

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





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

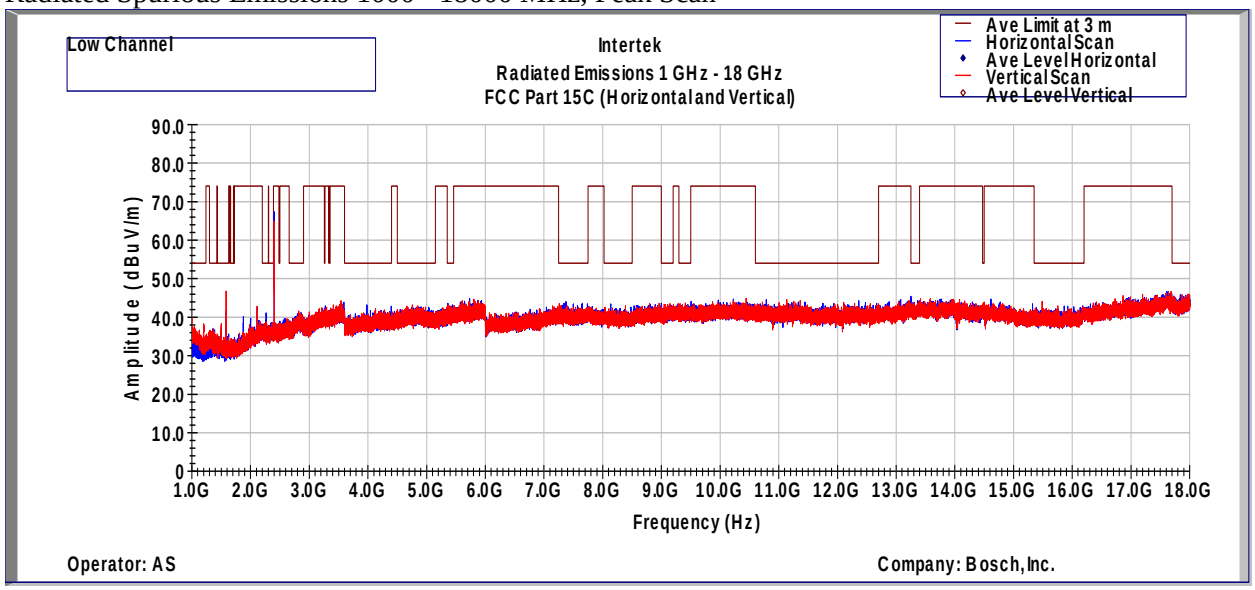
Test Results: 15.209 Radiated Spurious Emissions Low Channel, Tx at 2402MHz
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
171.717	35.8	43.5	-7.7	46.5	1.4	32.0	10.5	9.4
192.022	36.2	43.5	-7.3	46.7	1.5	32.0	10.5	9.5
193.930	34.7	43.5	-8.8	45.2	1.5	32.0	10.5	9.5
203.080	34.2	43.5	-9.3	44.4	1.6	32.0	10.5	9.7
206.896	34.5	43.5	-9.0	44.4	1.6	32.0	10.5	10.0
215.981	38.4	43.5	-5.1	47.7	1.7	32.0	10.5	10.6
240.005	34.7	46.0	-11.3	42.2	1.9	32.0	10.5	12.0
300.016	36.5	46.0	-9.5	42.3	2.3	32.0	10.5	13.3
312.011	38.2	46.0	-7.8	43.7	2.3	32.0	10.5	13.6
323.263	36.6	46.0	-9.4	41.8	2.4	32.0	10.5	13.9
338.007	34.2	46.0	-11.8	38.9	2.4	32.0	10.5	14.4
389.999	34.5	46.0	-11.5	38.0	2.5	32.0	10.5	15.5
420.005	35.8	46.0	-10.2	38.3	2.6	32.0	10.5	16.5
479.983	36.8	46.0	-9.2	38.6	2.8	32.1	10.5	16.9
494.016	34.4	46.0	-11.6	35.9	2.9	32.1	10.5	17.2
527.998	40.1	46.0	-5.9	40.8	3.0	32.1	10.5	18.0
540.026	38.3	46.0	-7.7	39.1	3.0	32.1	10.5	17.8
550.017	36.6	46.0	-9.4	37.5	3.0	32.1	10.5	17.7
551.989	42.6	46.0	-3.4	43.5	3.0	32.1	10.5	17.8
575.981	34.7	46.0	-11.3	34.7	3.0	32.2	10.5	18.6
600.004	39.6	46.0	-6.4	39.9	3.1	32.2	10.5	18.3
606.018	34.2	46.0	-11.8	34.4	3.1	32.2	10.5	18.4
644.042	36.5	46.0	-9.5	35.6	3.3	32.2	10.5	19.3
648.019	36.2	46.0	-9.8	35.4	3.3	32.3	10.5	19.3
660.015	35.1	46.0	-10.9	34.2	3.4	32.3	10.5	19.3
711.199	38.6	46.0	-7.4	36.7	3.6	32.3	10.5	20.1
719.993	35.6	46.0	-10.4	33.5	3.6	32.3	10.5	20.2
731.019	36.0	46.0	-10.0	33.8	3.7	32.2	10.5	20.2
769.011	36.8	46.0	-9.2	34.4	3.8	32.2	10.5	20.3
775.833	40.0	46.0	-6.0	37.5	3.8	32.2	10.5	20.4
801.926	35.6	46.0	-10.4	32.2	3.8	32.1	10.5	21.1
839.497	35.8	46.0	-10.2	32.3	3.9	31.9	10.5	21.0
1000.000	41.3	54.0	-12.7	34.6	4.2	30.8	10.5	22.8

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
(MHz)	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
92.145	34.8	43.5	-8.7	46.7	1.0	32.1	10.5	8.7
124.995	37.0	43.5	-6.5	45.5	1.2	32.0	10.5	11.8
129.328	36.5	43.5	-7.0	45.1	1.2	32.0	10.5	11.6
170.585	36.5	43.5	-7.0	47.2	1.4	32.0	10.5	9.4
185.200	38.2	43.5	-5.3	48.9	1.5	32.0	10.5	9.3
192.022	37.6	43.5	-5.9	48.1	1.5	32.0	10.5	9.5
193.962	36.1	43.5	-7.4	46.6	1.5	32.0	10.5	9.5
204.341	35.1	43.5	-8.4	45.2	1.6	32.0	10.5	9.8
205.699	34.5	43.5	-9.0	44.5	1.6	32.0	10.5	9.9
206.863	36.5	43.5	-7.0	46.4	1.6	32.0	10.5	10.0
209.450	34.8	43.5	-8.7	44.5	1.6	32.0	10.5	10.1
210.743	34.7	43.5	-8.8	44.3	1.7	32.0	10.5	10.2
211.972	35.2	43.5	-8.3	44.7	1.7	32.0	10.5	10.3
213.233	35.7	43.5	-7.8	45.1	1.7	32.0	10.5	10.4
214.526	35.7	43.5	-7.8	45.1	1.7	32.0	10.5	10.5
217.210	35.3	46.0	-10.7	44.5	1.7	32.0	10.5	10.7
219.732	34.5	46.0	-11.5	43.5	1.7	32.0	10.5	10.8
222.254	35.1	46.0	-10.9	43.7	1.7	32.0	10.5	11.1
223.483	34.5	46.0	-11.5	43.1	1.7	32.0	10.5	11.2
224.679	35.4	46.0	-10.6	43.8	1.8	32.0	10.5	11.3
226.005	34.5	46.0	-11.5	42.8	1.8	32.0	10.5	11.4
227.330	34.5	46.0	-11.5	42.6	1.8	32.0	10.5	11.6
231.081	34.3	46.0	-11.7	42.1	1.8	32.0	10.5	11.9
240.005	40.7	46.0	-5.3	48.3	1.9	32.0	10.5	12.0
250.352	34.4	46.0	-11.6	42.1	1.9	32.0	10.5	11.9
255.363	34.9	46.0	-11.1	42.0	2.0	32.0	10.5	12.3
374.997	41.7	46.0	-4.3	45.4	2.5	32.0	10.5	15.3
499.997	35.8	46.0	-10.2	37.1	2.9	32.1	10.5	17.3
527.998	36.1	46.0	-9.9	36.8	3.0	32.1	10.5	18.0
539.994	34.2	46.0	-11.8	35.0	3.0	32.1	10.5	17.9
552.022	35.5	46.0	-10.5	36.4	3.0	32.1	10.5	17.8
625.030	38.8	46.0	-7.2	38.4	3.2	32.2	10.5	18.9
749.999	39.9	46.0	-6.1	38.1	3.7	32.2	10.5	19.8
801.958	37.4	46.0	-8.6	34.1	3.8	32.1	10.5	21.1
874.967	40.4	46.0	-5.6	36.2	3.9	31.7	10.5	21.6
939.149	37.5	46.0	-8.5	31.7	4.0	31.3	10.5	22.6
992.790	38.1	54.0	-15.9	31.5	4.1	30.9	10.5	22.9

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



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

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

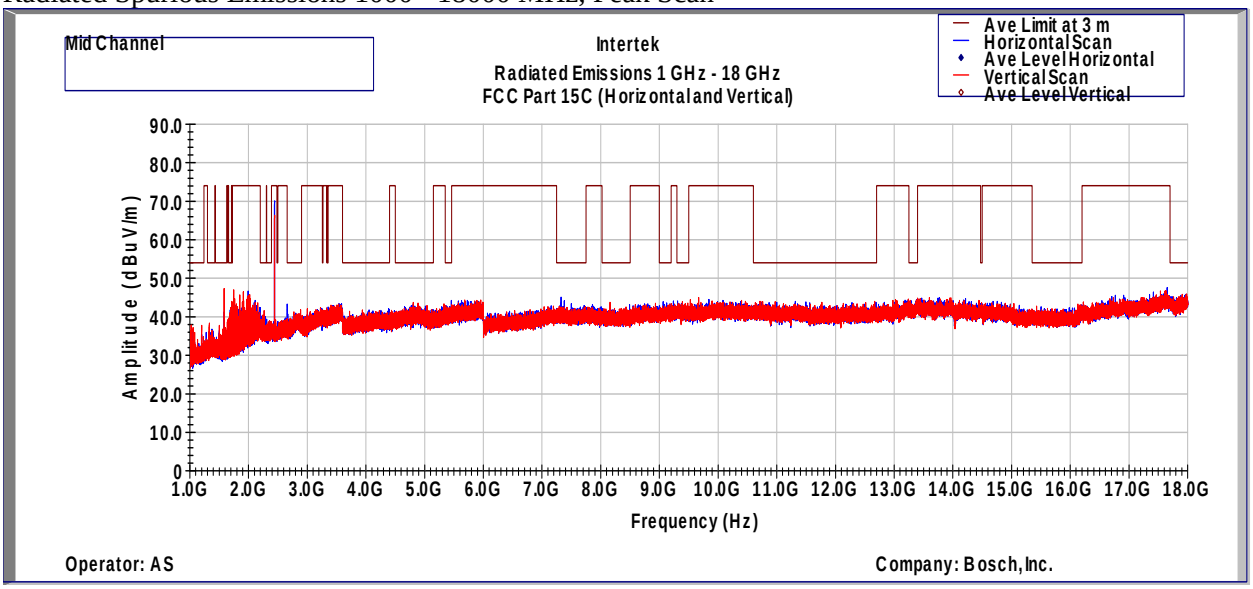
Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 2442MHz
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
185.232	36.0	43.5	-7.5	46.7	1.5	32.0	10.5	9.3
189.015	34.7	43.5	-8.8	45.2	1.5	32.0	10.5	9.4
191.990	35.9	43.5	-7.6	46.4	1.5	32.0	10.5	9.5
193.962	35.2	43.5	-8.3	45.7	1.5	32.0	10.5	9.5
216.014	38.4	46.0	-7.6	47.7	1.7	32.0	10.5	10.6
300.016	35.9	46.0	-10.1	41.7	2.3	32.0	10.5	13.3
312.011	38.1	46.0	-7.9	43.7	2.3	32.0	10.5	13.6
323.263	36.3	46.0	-9.7	41.4	2.4	32.0	10.5	13.9
387.930	34.8	46.0	-11.2	38.2	2.5	32.0	10.5	15.5
389.999	34.6	46.0	-11.4	38.1	2.5	32.0	10.5	15.5
420.005	35.9	46.0	-10.1	38.3	2.6	32.0	10.5	16.5
452.597	34.9	46.0	-11.1	36.7	2.7	32.0	10.5	17.0
479.983	37.0	46.0	-9.0	38.7	2.8	32.1	10.5	16.9
527.998	39.7	46.0	-6.3	40.3	3.0	32.1	10.5	18.0
539.994	39.1	46.0	-6.9	39.9	3.0	32.1	10.5	17.9
550.017	36.2	46.0	-9.8	37.1	3.0	32.1	10.5	17.7
600.004	39.8	46.0	-6.2	40.1	3.1	32.2	10.5	18.3
623.996	34.8	46.0	-11.2	34.5	3.2	32.2	10.5	18.9
644.010	39.4	46.0	-6.6	38.6	3.3	32.2	10.5	19.3
648.019	36.1	46.0	-9.9	35.3	3.3	32.3	10.5	19.3
711.166	38.2	46.0	-7.8	36.3	3.6	32.3	10.5	20.1
719.961	34.7	46.0	-11.3	32.6	3.6	32.3	10.5	20.2
730.987	37.7	46.0	-8.3	35.6	3.7	32.2	10.5	20.2
768.978	36.6	46.0	-9.4	34.2	3.8	32.2	10.5	20.3
775.833	39.2	46.0	-6.8	36.7	3.8	32.2	10.5	20.4
780.036	34.9	46.0	-11.1	32.3	3.8	32.1	10.5	20.5
801.958	36.1	46.0	-9.9	32.7	3.8	32.1	10.5	21.1
834.033	35.9	46.0	-10.1	32.4	3.9	31.9	10.5	21.1
914.737	37.6	46.0	-8.4	32.3	4.0	31.5	10.5	22.3
953.537	38.5	46.0	-7.5	32.8	4.1	31.2	10.5	22.4
980.988	38.3	54.0	-15.7	31.8	4.1	31.0	10.5	22.8
1000.000	39.9	54.0	-14.1	33.2	4.2	30.8	10.5	22.8

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
(MHz)	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
122.829	34.4	43.5	-9.1	42.8	1.2	32.0	10.5	11.9
124.995	37.3	43.5	-6.2	45.9	1.2	32.0	10.5	11.8
129.328	34.8	43.5	-8.7	43.5	1.2	32.0	10.5	11.6
166.673	35.3	43.5	-8.2	46.4	1.4	32.0	10.5	9.0
168.645	36.0	43.5	-7.5	46.8	1.4	32.0	10.5	9.3
169.680	36.5	43.5	-7.0	47.2	1.4	32.0	10.5	9.4
185.232	38.3	43.5	-5.2	49.0	1.5	32.0	10.5	9.3
191.990	38.4	43.5	-5.1	48.9	1.5	32.0	10.5	9.5
193.962	36.7	43.5	-6.8	47.2	1.5	32.0	10.5	9.5
204.374	34.5	43.5	-9.0	44.6	1.6	32.0	10.5	9.8
205.699	35.5	43.5	-8.0	45.5	1.6	32.0	10.5	9.9
206.993	35.0	43.5	-8.5	44.9	1.6	32.0	10.5	10.0
208.221	35.2	43.5	-8.3	45.0	1.6	32.0	10.5	10.1
210.679	34.9	43.5	-8.6	44.5	1.7	32.0	10.5	10.2
212.069	35.1	43.5	-8.4	44.6	1.7	32.0	10.5	10.3
213.362	35.3	43.5	-8.2	44.7	1.7	32.0	10.5	10.4
214.559	35.0	43.5	-8.5	44.3	1.7	32.0	10.5	10.5
217.145	34.9	46.0	-11.1	44.0	1.7	32.0	10.5	10.6
219.700	34.3	46.0	-11.7	43.3	1.7	32.0	10.5	10.8
222.319	34.6	46.0	-11.4	43.3	1.7	32.0	10.5	11.1
224.776	35.5	46.0	-10.5	44.0	1.8	32.0	10.5	11.3
227.427	34.5	46.0	-11.5	42.6	1.8	32.0	10.5	11.6
228.656	34.4	46.0	-11.6	42.4	1.8	32.0	10.5	11.7
229.982	34.9	46.0	-11.1	42.8	1.8	32.0	10.5	11.8
237.709	34.6	46.0	-11.4	42.2	1.8	32.0	10.5	12.0
240.005	39.8	46.0	-6.2	47.4	1.9	32.0	10.5	12.0
255.525	34.4	46.0	-11.6	41.6	2.0	32.0	10.5	12.4
374.997	41.5	46.0	-4.5	45.2	2.5	32	10.5	15.3
500.03	36.3	46.0	-9.7	37.6	2.9	32.1	10.5	17.3
527.998	35.4	46.0	-10.6	36.1	3.0	32.1	10.5	18
552.022	35.3	46.0	-10.7	36.1	3.0	32.1	10.5	17.8
625.03	39.8	46.0	-6.2	39.4	3.2	32.2	10.5	18.9
749.999	38.4	46.0	-7.6	36.6	3.7	32.2	10.5	19.8
801.926	37.6	46.0	-8.4	34.3	3.8	32.1	10.5	21.1
874.967	41.0	46.0	-5.0	36.7	3.9	31.7	10.5	21.6

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



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

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 2480MHz

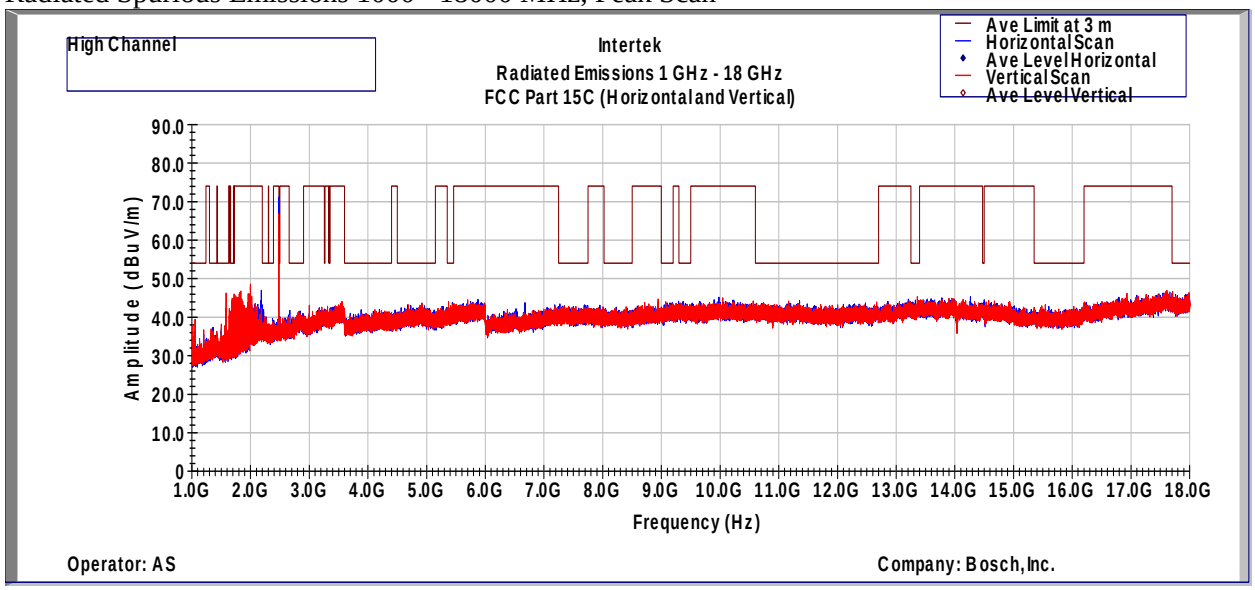
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
164.798	33.7	43.5	-9.8	45.0	1.4	32.0	10.5	8.7
170.585	36.1	43.5	-7.4	46.7	1.4	32.0	10.5	9.4
191.990	36.7	43.5	-6.8	47.2	1.5	32.0	10.5	9.5
193.962	35.3	43.5	-8.2	45.8	1.5	32.0	10.5	9.5
216.014	38.6	46.0	-7.4	47.9	1.7	32.0	10.5	10.6
300.016	35.9	46.0	-10.1	41.8	2.3	32.0	10.5	13.3
312.011	36.8	46.0	-9.2	42.3	2.3	32.0	10.5	13.6
323.296	37.7	46.0	-8.3	42.8	2.4	32.0	10.5	13.9
387.898	34.6	46.0	-11.4	38.1	2.5	32.0	10.5	15.5
389.967	35.5	46.0	-10.5	38.9	2.5	32.0	10.5	15.5
419.972	36.3	46.0	-9.7	38.7	2.6	32.0	10.5	16.5
452.564	34.9	46.0	-11.1	36.7	2.7	32.0	10.5	17.0
480.015	36.6	46.0	-9.4	38.4	2.8	32.1	10.5	16.9
517.231	33.9	46.0	-12.1	34.8	2.9	32.1	10.5	17.8
527.998	40.5	46.0	-5.5	41.2	3.0	32.1	10.5	18.0
539.994	38.3	46.0	-7.7	39.1	3.0	32.1	10.5	17.9
550.017	36.3	46.0	-9.7	37.2	3.0	32.1	10.5	17.7
551.989	42.6	46.0	-3.4	43.5	3.0	32.1	10.5	17.8
600.037	39.7	46.0	-6.3	40.1	3.1	32.2	10.5	18.3
606.018	34.6	46.0	-11.4	34.8	3.1	32.2	10.5	18.4
644.010	35.7	46.0	-10.3	34.8	3.3	32.2	10.5	19.3
648.019	35.3	46.0	-10.7	34.4	3.3	32.3	10.5	19.3
660.015	34.1	46.0	-11.9	33.2	3.4	32.3	10.5	19.3
672.043	34.7	46.0	-11.3	33.9	3.4	32.3	10.5	19.2
711.166	37.6	46.0	-8.4	35.7	3.6	32.3	10.5	20.1
719.993	34.6	46.0	-11.4	32.5	3.6	32.3	10.5	20.2
730.987	36.2	46.0	-9.8	34.1	3.7	32.2	10.5	20.2
743.952	34.6	46.0	-11.4	32.5	3.7	32.2	10.5	20.1
768.978	36.8	46.0	-9.2	34.4	3.8	32.2	10.5	20.3
775.833	39.9	46.0	-6.1	37.3	3.8	32.2	10.5	20.4
801.958	35.4	46.0	-10.6	32.1	3.8	32.1	10.5	21.1
1000.000	40.6	54.0	-13.4	33.9	4.2	30.8	10.5	22.8

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
(MHz)	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
124.995	37.0	43.5	-6.5	45.5	1.2	32.0	10.5	11.8
125.836	34.6	43.5	-8.9	43.2	1.2	32.0	10.5	11.8
126.774	34.8	43.5	-8.7	43.4	1.2	32.0	10.5	11.7
164.798	35.2	43.5	-8.3	46.5	1.4	32.0	10.5	8.7
169.648	37.0	43.5	-6.5	47.7	1.4	32.0	10.5	9.4
186.073	38.4	43.5	-5.1	49.1	1.5	32.0	10.5	9.3
192.022	37.8	43.5	-5.7	48.3	1.5	32.0	10.5	9.5
193.962	36.6	43.5	-6.9	47.1	1.5	32.0	10.5	9.5
204.503	34.5	43.5	-9.0	44.7	1.6	32.0	10.5	9.8
206.928	35.8	43.5	-7.7	45.8	1.6	32.0	10.5	10.0
208.157	34.3	43.5	-9.2	44.2	1.6	32.0	10.5	10.0
209.547	34.3	43.5	-9.2	44.0	1.6	32.0	10.5	10.2
210.743	35.5	43.5	-8.0	45.1	1.7	32.0	10.5	10.2
212.037	35.7	43.5	-7.8	45.2	1.7	32.0	10.5	10.3
213.395	34.9	43.5	-8.6	44.3	1.7	32.0	10.5	10.4
214.656	35.5	43.5	-8.0	44.8	1.7	32.0	10.5	10.5
217.210	34.9	46.0	-11.1	44.1	1.7	32.0	10.5	10.7
218.439	36.0	46.0	-10.0	45.1	1.7	32.0	10.5	10.7
221.025	35.1	46.0	-10.9	43.9	1.7	32.0	10.5	10.9
222.286	35.1	46.0	-10.9	43.8	1.7	32.0	10.5	11.1
224.873	36.1	46.0	-9.9	44.5	1.8	32.0	10.5	11.3
227.395	34.3	46.0	-11.7	42.4	1.8	32.0	10.5	11.6
229.949	34.8	46.0	-11.2	42.7	1.8	32.0	10.5	11.8
235.090	34.8	46.0	-11.2	42.6	1.8	32.0	10.5	11.9
240.037	40.1	46.0	-5.9	47.7	1.9	32.0	10.5	12.0
242.786	34.4	46.0	-11.6	42	1.9	32	10.5	12
247.862	34.1	46.0	-11.9	41.8	1.9	32	10.5	11.9
374.997	41.6	46.0	-4.4	45.2	2.5	32	10.5	15.3
499.997	36.6	46.0	-9.4	38	2.9	32.1	10.5	17.3
527.998	36.5	46.0	-9.5	37.2	3	32.1	10.5	18
552.022	35.5	46.0	-10.5	36.4	3	32.1	10.5	17.8
624.998	38.4	46.0	-7.6	38	3.2	32.2	10.5	18.9
749.999	38.1	46.0	-7.9	36.3	3.7	32.2	10.5	19.8
801.926	37.1	46.0	-8.9	33.8	3.8	32.1	10.5	21.1
875.032	41.3	46.0	-4.7	37	3.9	31.7	10.5	21.6
904.617	37.4	46.0	-8.6	32.4	4	31.6	10.5	22.1

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



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

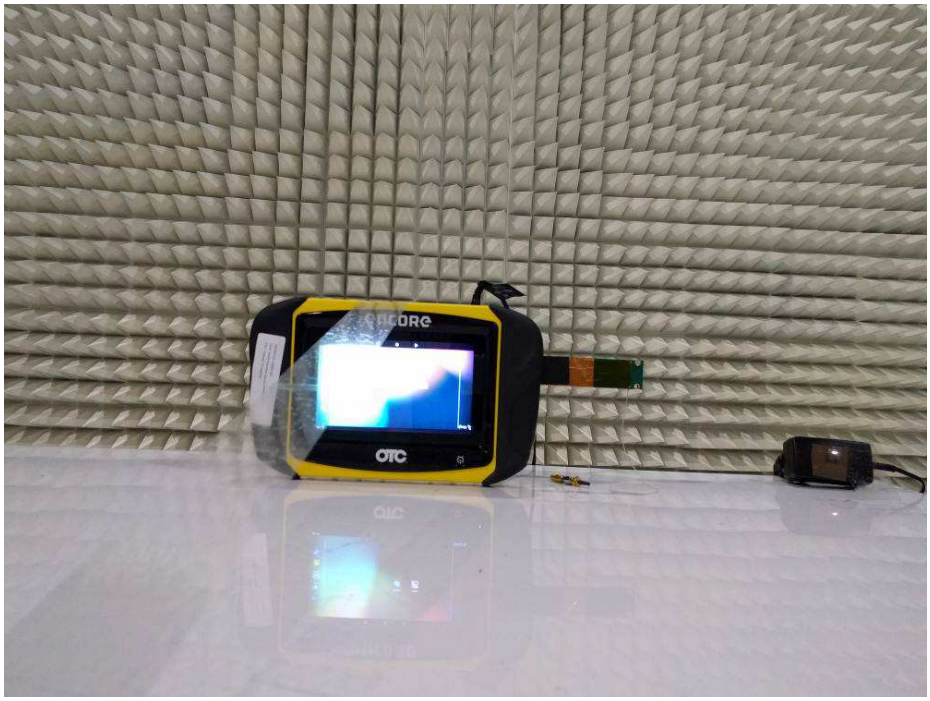
Note: FS@3m = RA + AF + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

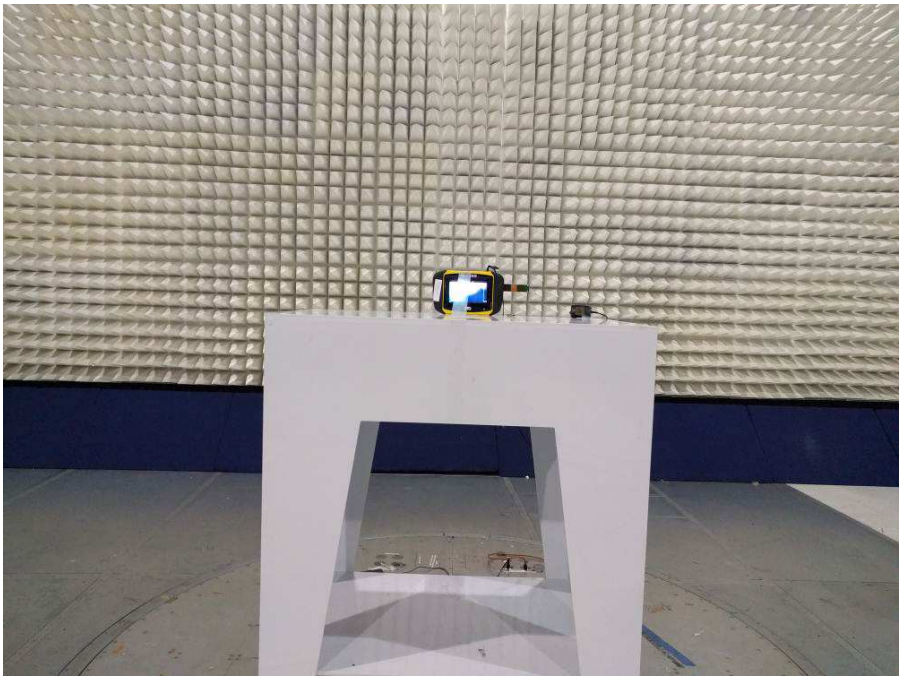
Results	**Complies**

4.5.4 Test Configuration Photographs

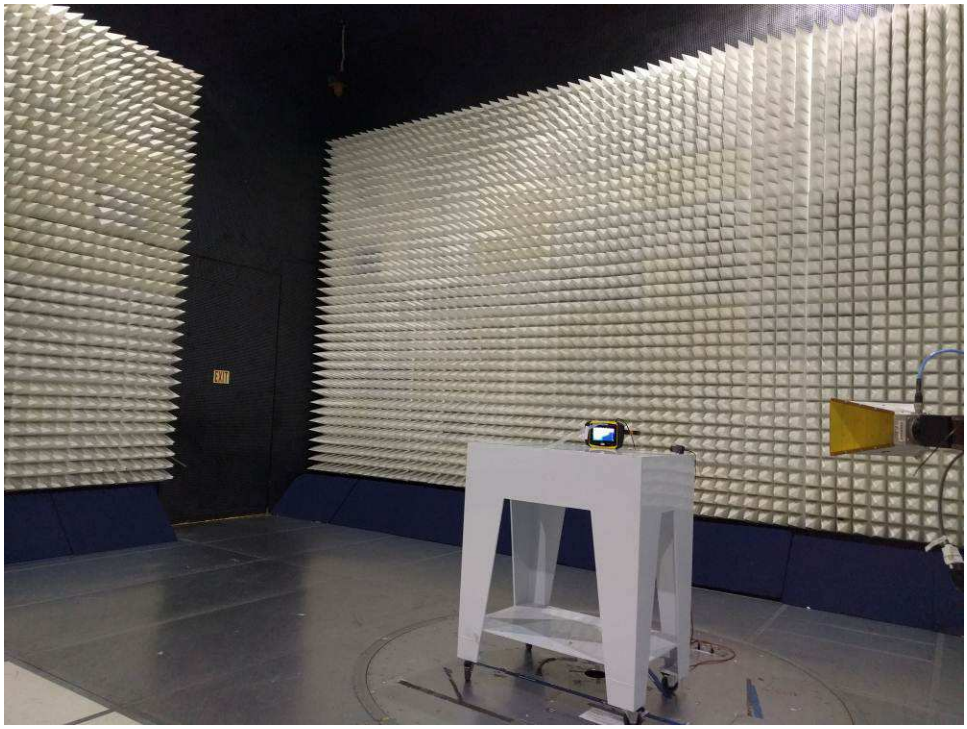
The following photographs show the testing configurations used.

4.6.4 Test Setup Photographs





4.6.4 Test Setup Photographs



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 72 MHz; therefor 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.

Date of Test:	**December 23, 2015**
Results	**Complies**

Test Results: Radiated Emissions 30 MHz – 1000 MHz
Test Results: 15.109 Radiated Spurious Emissions Class B

Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
191.990	38.4	43.5	-5.1	48.9	1.5	32.0	10.5	9.5
193.995	37.9	43.5	-5.6	48.4	1.5	32.0	10.5	9.5
216.014	40.6	46.0	-5.4	49.8	1.7	32.0	10.5	10.6
240.005	38.0	46.0	-8.0	45.5	1.9	32.0	10.5	12.0
264.029	38.4	46.0	-7.6	45.0	2.0	32.0	10.5	12.8
420.005	36.0	46.0	-10.0	38.4	2.6	32.0	10.5	16.5
452.564	36.1	46.0	-9.9	37.9	2.7	32.0	10.5	17.0
479.983	40.5	46.0	-5.5	42.3	2.8	32.1	10.5	16.9
519.009	35.8	46.0	-10.2	36.6	2.9	32.1	10.5	17.8
537.148	36.6	46.0	-9.4	37.4	3.0	32.1	10.5	17.9
539.994	41.9	46.0	-4.1	42.7	3.0	32.1	10.5	17.9
550.017	37.0	46.0	-9.0	37.9	3.0	32.1	10.5	17.7
552.022	42.5	46.0	-3.5	43.4	3.0	32.1	10.5	17.8
552.280	36.4	46.0	-9.6	37.2	3.0	32.1	10.5	17.8
576.013	38.1	46.0	-7.9	38.1	3.0	32.2	10.5	18.6
600.004	40.3	46.0	-5.7	40.6	3.1	32.2	10.5	18.3
606.018	38.2	46.0	-7.8	38.4	3.1	32.2	10.5	18.4
648.019	37.9	46.0	-8.1	37	3.3	32.3	10.5	19.3
660.015	37.9	46.0	-8.1	37	3.4	32.3	10.5	19.3
675.018	41.5	46.0	-4.5	40.7	3.5	32.3	10.5	19.1
711.166	40.2	46.0	-5.8	38.3	3.6	32.3	10.5	20.1
719.993	36.6	46.0	-9.4	34.5	3.6	32.3	10.5	20.2
725.005	37.7	46.0	-8.3	35.5	3.6	32.3	10.5	20.2
743.985	37.6	46.0	-8.4	35.6	3.7	32.2	10.5	20.1
768.978	39.1	46.0	-6.9	36.7	3.8	32.2	10.5	20.3
775.833	40.5	46.0	-5.5	37.9	3.8	32.2	10.5	20.4
792.000	38.2	46.0	-7.8	35.1	3.8	32.1	10.5	20.9
792.388	39	46.0	-7.0	35.9	3.8	32.1	10.5	20.9
899.961	36.9	46.0	-9.1	32.1	4	31.6	10.5	21.9
960.036	39.1	54.0	-14.9	33.3	4.1	31.1	10.5	22.4
1000	39.6	54.0	-14.4	32.9	4.2	30.8	10.5	22.8

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
(MHz)	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
30.000	37.0	40.0	-3.0	40.8	0.6	32.1	10.5	17.2
112.903	39.8	43.5	-3.7	49.2	1.1	32.1	10.5	11.0
116.621	37.8	43.5	-5.7	46.6	1.2	32.1	10.5	11.6
117.656	36.9	43.5	-6.6	45.6	1.2	32.0	10.5	11.7
157.587	38.2	43.5	-5.3	50.3	1.4	32.0	10.5	8.0
193.962	39.3	43.5	-4.2	49.8	1.5	32.0	10.5	9.5
214.462	37.0	43.5	-6.5	46.3	1.7	32.0	10.5	10.5
218.212	38.6	46.0	-7.4	47.7	1.7	32.0	10.5	10.7
219.538	37.5	46.0	-8.5	46.4	1.7	32.0	10.5	10.8
220.831	37.8	46.0	-8.2	46.6	1.7	32.0	10.5	10.9
222.092	37.2	46.0	-8.8	45.9	1.7	32.0	10.5	11.0
223.418	37.0	46.0	-9.0	45.6	1.7	32.0	10.5	11.2
228.494	37.4	46.0	-8.6	45.4	1.8	32.0	10.5	11.7
264.029	36.8	46.0	-9.2	43.4	2.0	32.0	10.5	12.8
276.994	36.7	46.0	-9.3	43.3	2.1	32.0	10.5	12.7
289.734	37.0	46.0	-9.0	43.4	2.2	32.0	10.5	12.9
299.983	38.0	46.0	-8.0	43.8	2.3	32.0	10.5	13.3
452.564	37.2	46.0	-8.8	39.0	2.7	32.0	10.5	17.0
475.004	37.6	46.0	-8.4	39.3	2.8	32.1	10.5	17.0
499.997	37.9	46.0	-8.1	39.3	2.9	32.1	10.5	17.3
527.998	42.1	46.0	-3.9	42.8	3.0	32.1	10.5	18.0
539.994	36.9	46.0	-9.1	37.7	3.0	32.1	10.5	17.9
674.985	37.0	46.0	-9.0	36.2	3.4	32.3	10.5	19.1
711.134	36.8	46.0	-9.2	34.9	3.6	32.3	10.5	20.1
725.005	37.1	46.0	-8.9	35.0	3.6	32.3	10.5	20.2
801.894	37.5	46.0	-8.5	34.2	3.8	32.1	10.5	21.1
902.903	37.7	46.0	-8.3	32.8	4.0	31.6	10.5	22.0
960.036	38.1	54.0	-15.9	32.3	4.1	31.1	10.5	22.4
1000.000	39.3	54.0	-14.7	32.6	4.2	30.8	10.5	22.8

4.6.4 Test Configuration Photographs

The following photographs show the testing configurations used.

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.

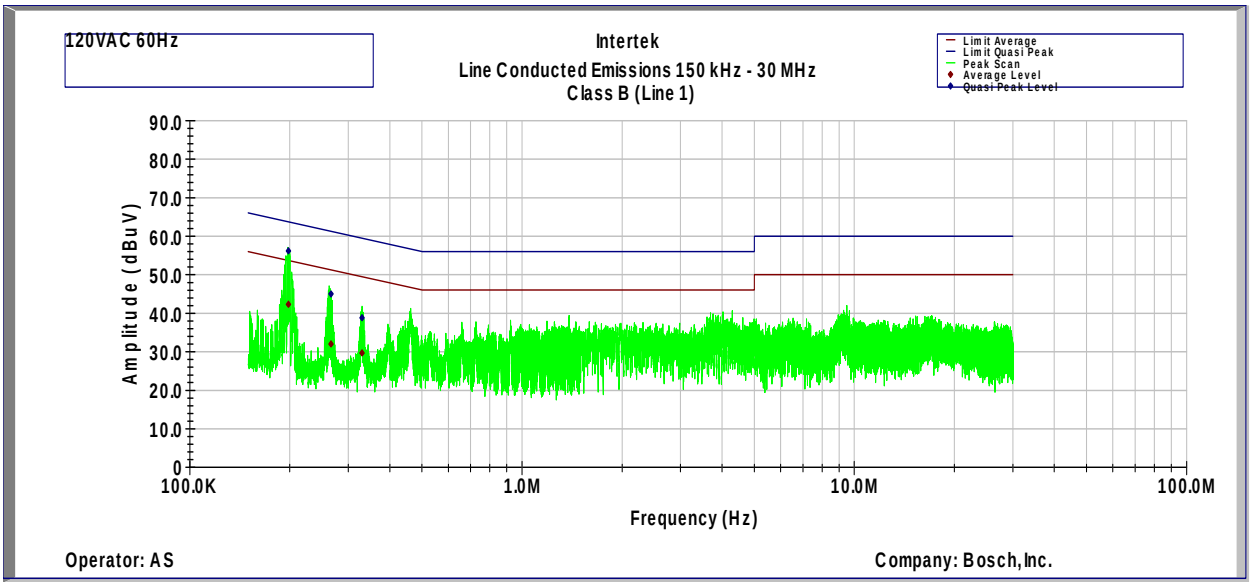
Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.4.

Testing for 15.207 was performed with Bluetooth, 2.4GHz WLAN and 5GHz WLAN transmission. There were no significant changes in emissions and worst case data is submitted below.

Date of Test:	December 23, 2015
Results	**Complies**

4.7.3 Test Result

AC Line Conducted Emission Data, EUT in transmitting mode



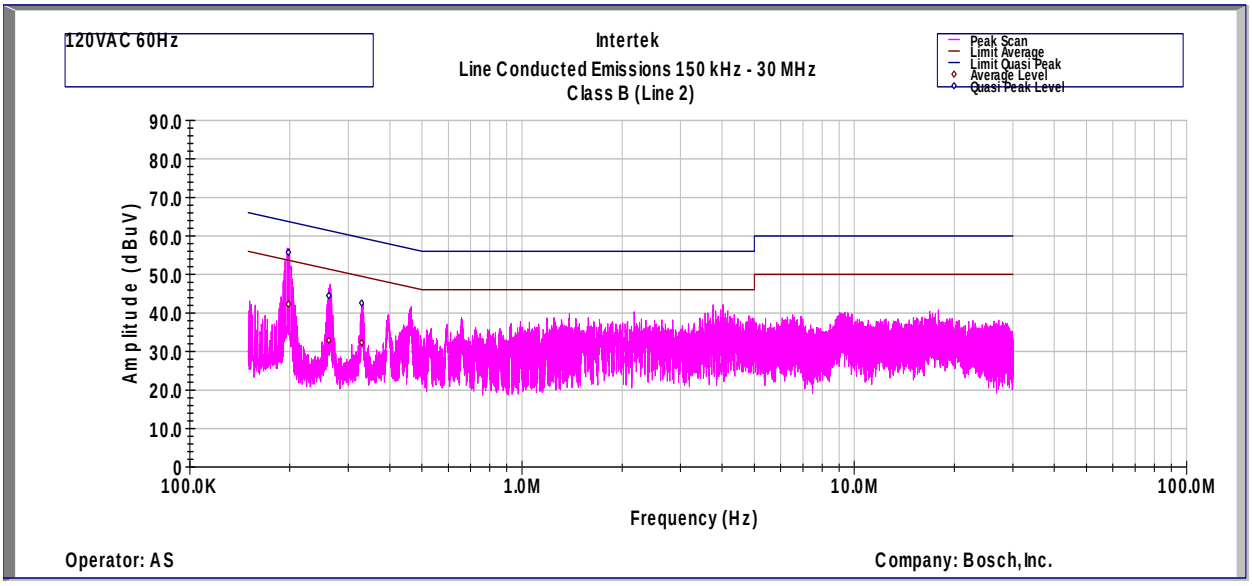
Intertek Testing Services
Line Conducted Emissions 150 kHz - 30 MHz
FCC Class B (Line 1)
Operator: AS

Model Number: WiFi/BT Module Card
Company: Bosch Automotive Service Solutions

Frequency	Av Level	QP Level	Av Limit	QP Limit	Av Margin	QP Margin
MHz	dBuV	dBuV	dBuV	dBuV	dB	dB
0.198	42.3	56.2	54.6	64.6	-12.3	-8.4
0.266	32.0	45.0	52.7	62.7	-20.7	-17.7
0.330	29.7	38.8	50.9	60.9	-21.2	-22.1

Test Mode: Transmitter On
Temp.: 23C
Humidity: 51.6%

AC Line Conducted Emission Data, EUT in transmitting mode



Intertek Testing Services
Line Conducted Emissions 150 kHz - 30 MHz
FCC Class B (Line 2)
Operator: AS

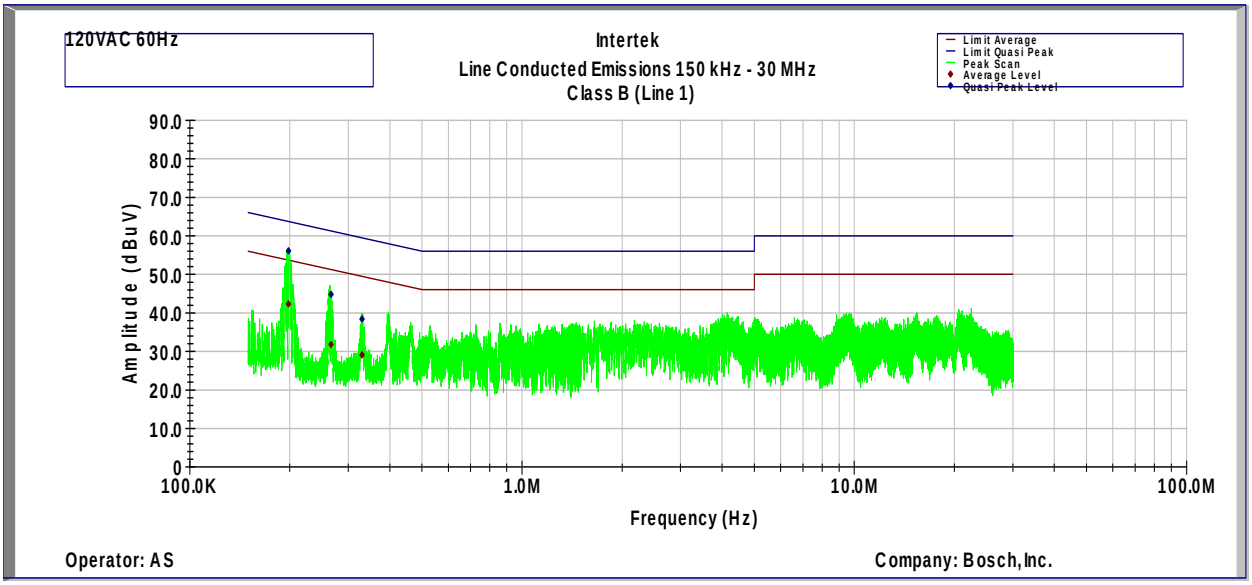
Model Number: WiFi/BT Module Card
Company: Bosch Automotive Service Solutions

Frequency	Av Level	QP Level	Av Limit	QP Limit	Av Margin	QP Margin
MHz	dBuV	dBuV	dBuV	dBuV	dB	dB
0.198	42.3	55.7	54.6	64.6	-12.3	-8.9
0.262	32.9	44.5	52.8	62.8	-19.9	-18.3
0.329	32.3	42.6	50.9	60.9	-18.6	-18.3

Test Mode: Transmitter On
Temp.: 23C
Humidity: 51.6%

Results	**Complies** by 8.4 dB

AC Line Conducted Emission Data, EUT in Receive mode



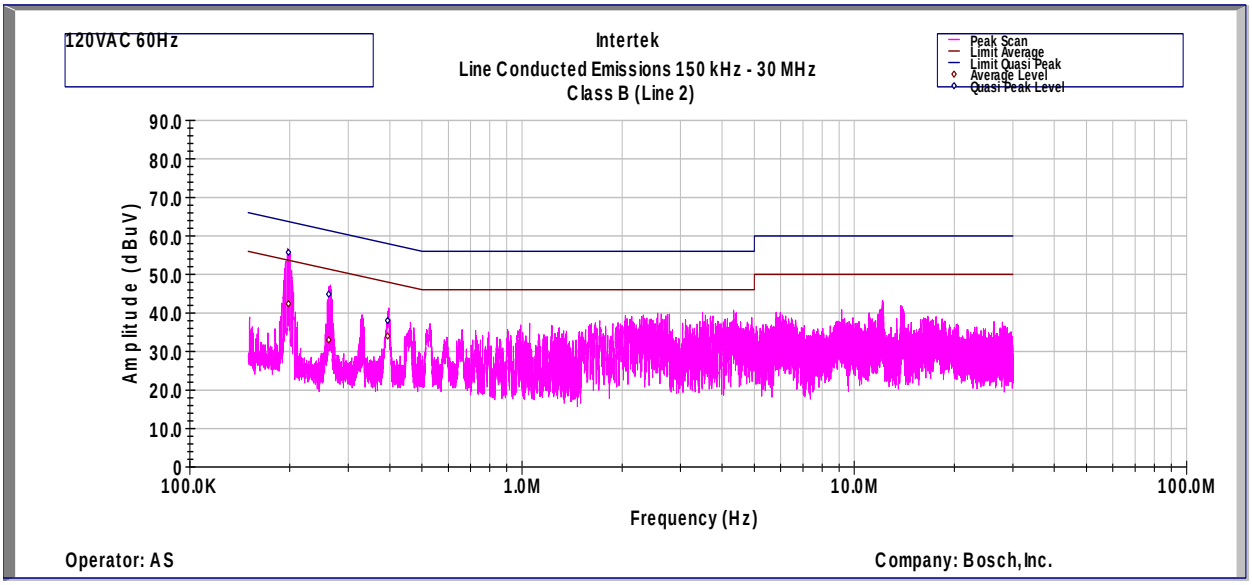
Intertek Testing Services
Line Conducted Emissions 150 kHz - 30 MHz
FCC Class B (Line 1)
Operator: AS

Model Number: WiFi/BT Module Card
Company: Bosch Automotive Service Solutions

Frequency	Av Level	QP Level	Av Limit	QP Limit	Av Margin	QP Margin
MHz	dBuV	dBuV	dBuV	dBuV	dB	dB
0.198	42.3	56.1	54.6	64.6	-12.3	-8.5
0.266	31.8	44.8	52.7	62.7	-20.9	-17.9
0.330	29.1	38.4	50.9	60.9	-21.8	-22.5

Test Mode: Receive Mode
Temp.: 23C
Humidity: 51.6%

AC Line Conducted Emission Data, EUT in Receive mode



Intertek Testing Services
Line Conducted Emissions 150 kHz - 30 MHz
FCC Class B (Line 2)
Operator: AS

Model Number: WiFi/BT Module Card
Company: Bosch Automotive Service Solutions LLC

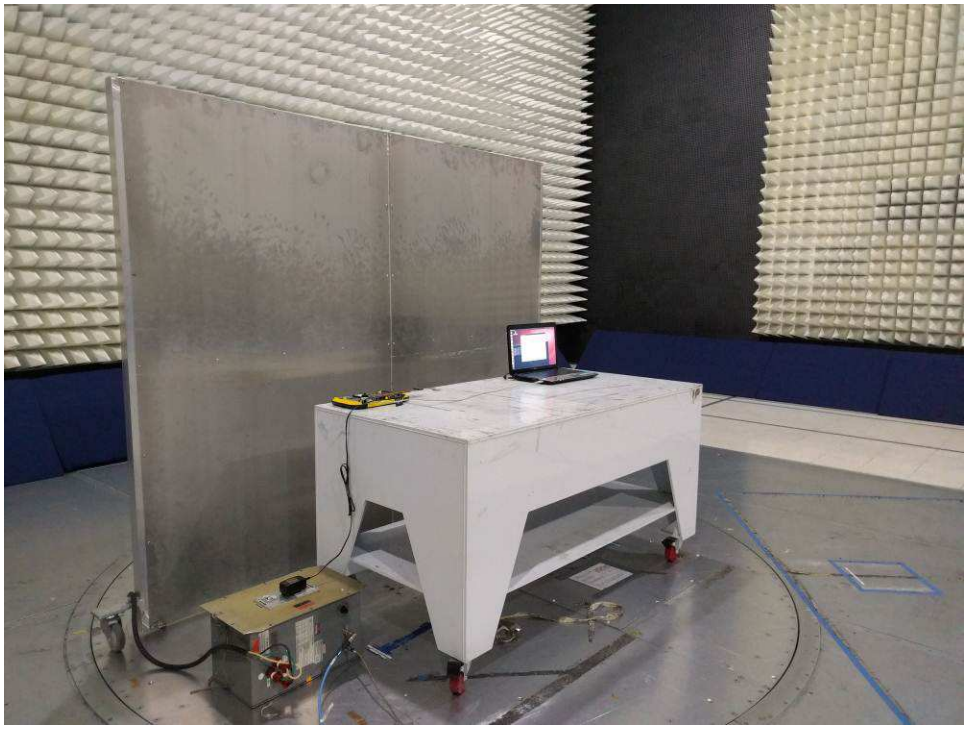
Frequency	Av Level	QP Level	Av Limit	QP Limit	Av Margin	QP Margin
MHz	dBuV	dBuV	dBuV	dBuV	dB	dB
0.198	42.4	55.7	54.6	64.6	-12.2	-8.9
0.262	33.0	44.9	52.8	62.8	-19.8	-17.9
0.394	34.0	38.0	49.0	59.0	-15.0	-21.0

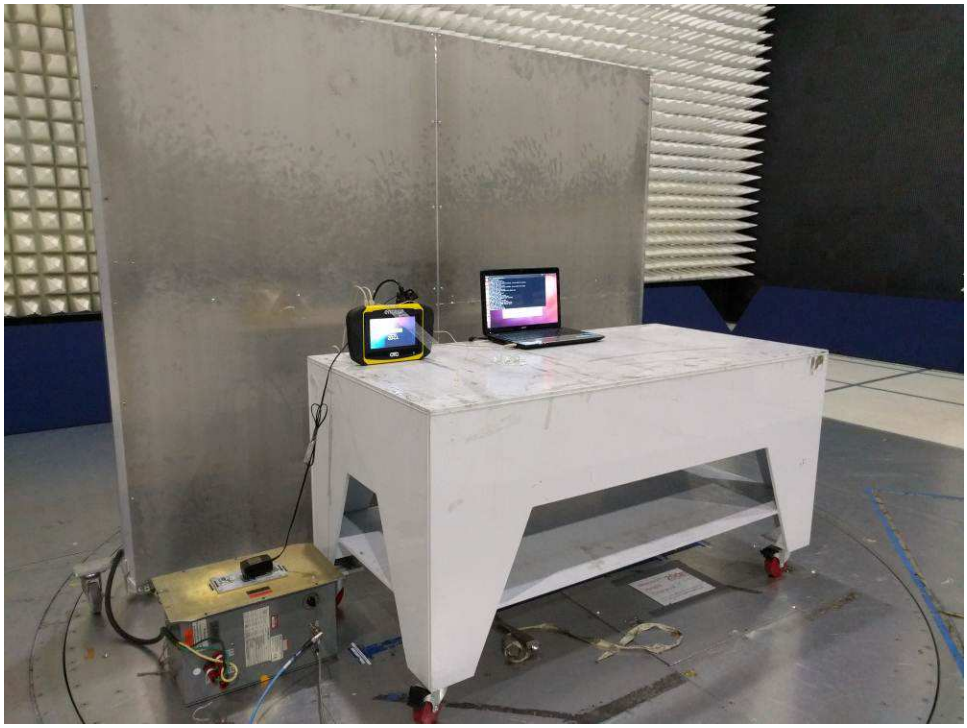
Test Mode: Receive Mode
Temp.: 23C
Humidity: 51.6%

Results	**Complies** by 8.5 dB

4.7.4 Test Configuration Photographs

The following photographs show the testing configurations used.





5.0 List of Test Equipment

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

Equipment	Manufacturer	Model/Type	Asset #	Cal Int	Cal Due
EMI Receiver	Rohde and Schwarz	ESU	ITS 00961	12	06/02/16
Spectrum Analyzer	Rohde and Schwarz	FSP	ITS 01200	12	2/09/16
BI-Log Antenna	Antenna Research	LPB-2513	ITS 00355	12	08/11/16
Pyramidal Horn Antenna	EMCO	3160-09	ITS 00571	#	#
Pre-Amplifier	Sonoma Instrument	310	ITS 00942	12	01/15/16
Pre-Amplifier (1-18GHz)	Miteq	AMF-4D-001180-24-10P	ITS 00526	12	10/06/16
Pre-Amplifier (18-40GHz)	Miteq	JSD44-18004000-305P	ITS 00921	12	06/18/16
Horn Antenna	EMCO	3115	ITS 01595	12	1/14/16
LISN	FCC	FCC-LISN-50-50-M-H	ITS 00551	12	06/02/16

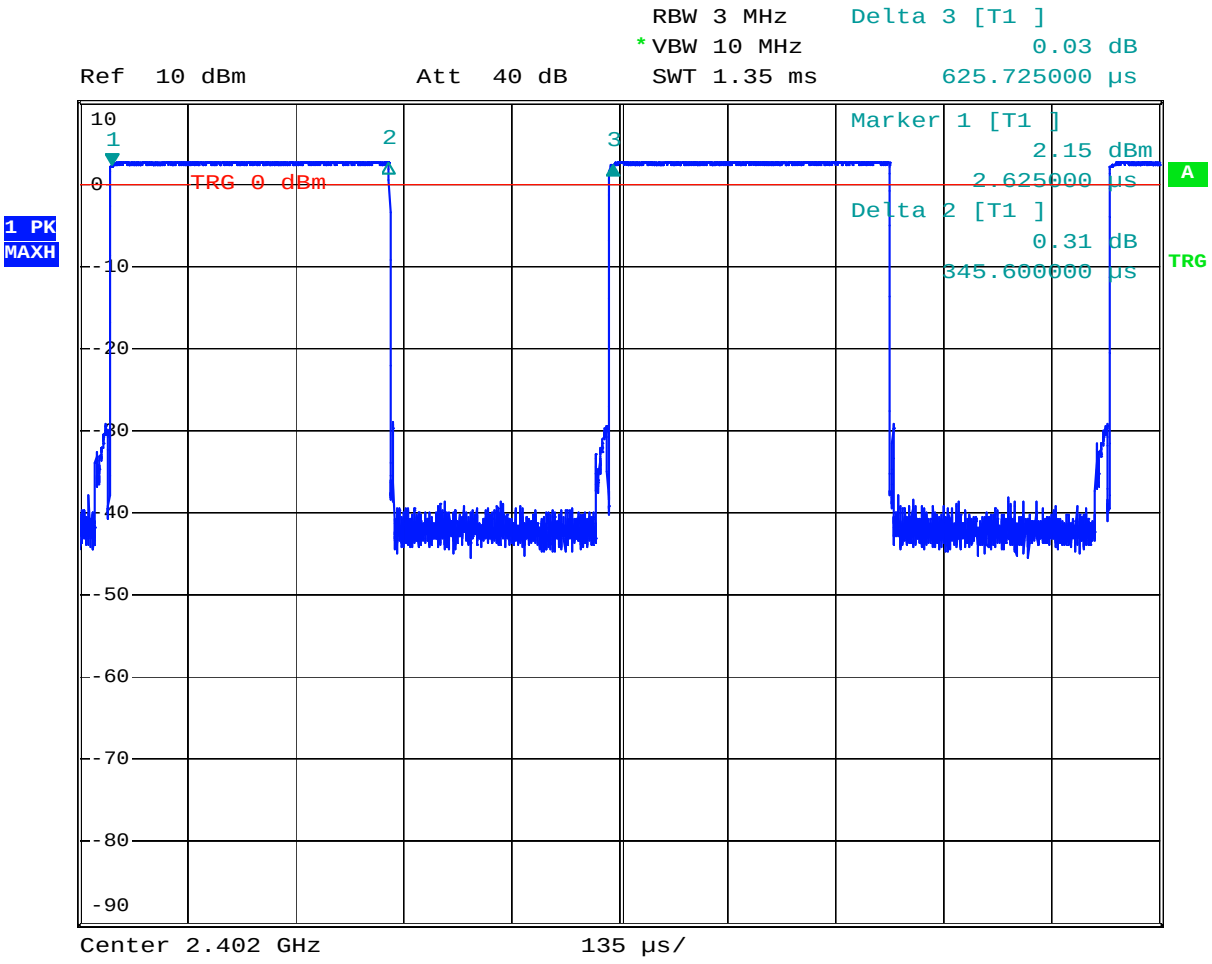
No Calibration required

6.0 Document History

Revision/ Job Number	Writer Initials	Reviewers Initials	Date	Change
1.0 / G102241369	AS	KV	January 25, 2016	Original document

Annex A - Duty Cycle Measurement

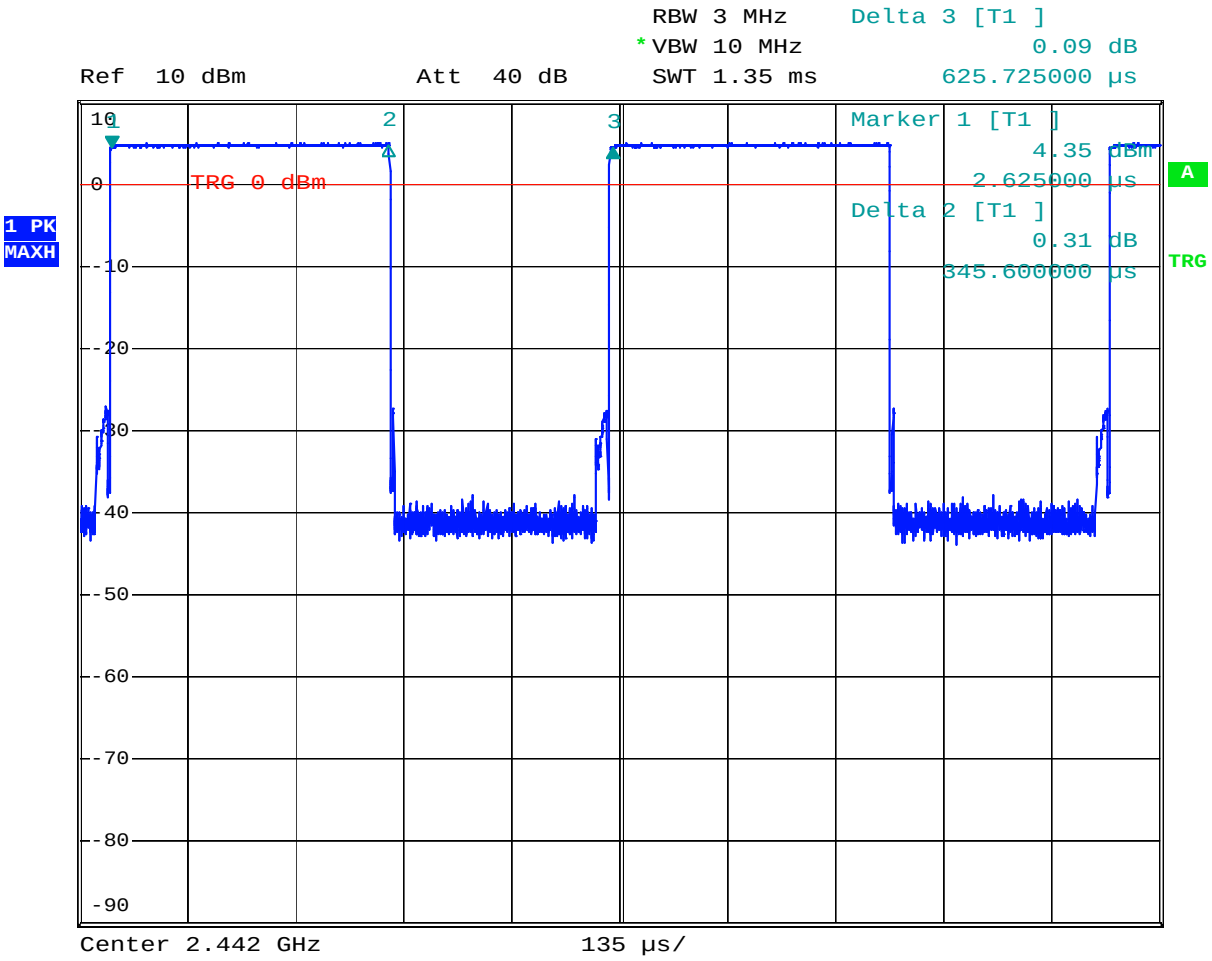
Low Channel @ 2402 MHz



Date: 1.DEC.2015 09:57:52

Duty Cycle: DC = 345.6 / 625.7 = 0.552 or 55.2%
Duty Cycle Correction Factor **δ (dB)** = 10 log (345.6 / 625.7) = 2.6dB

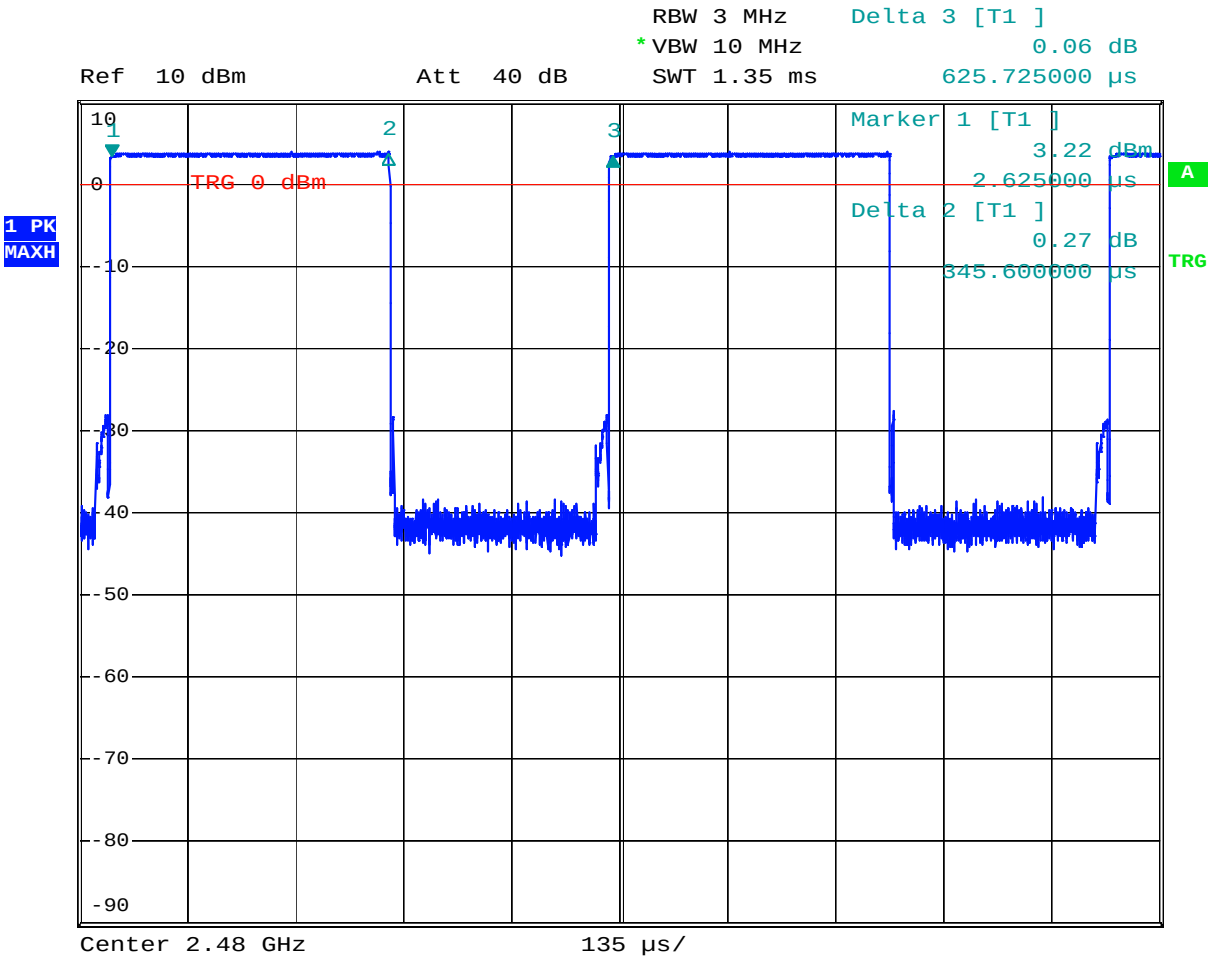
Mid Channel @ 2442 MHz



Date: 1.DEC.2015 09:56:21

Duty Cycle: DC = 345.6 / 625.7 = 0.552 or 55.2%
Duty Cycle Correction Factor **δ (dB)** = 10 log (345.6 / 625.7) = 2.6dB

High Channel @ 2480 MHz



Date: 1.DEC.2015 09:57:12

Duty Cycle: DC = 345.6 / 625.7 = 0.552 or 55.2%
Duty Cycle Correction Factor **δ (dB)** = 10 log (345.6 / 625.7) = 2.6dB