



# RADIO TEST REPORT

For

MODEL NO. 1703  
FCC ID: C3K1703  
IC ID: 3048A-1703

Test Report No. R-TR190-FCCIC-BTLE-1  
Issue Date: 09/14/2015

FCC CFR47 Part 15 Subpart C  
Industry Canada RSS-247 Issue 1

*Prepared by*  
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## 1 Record of Revisions

Revision	Date	Section	Page(s)	Summary of Changes	Author/Revised By:
1.0	09/14/2015	All	All	First Version	Daniel Salinas

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# Test Report Attestation

**Microsoft Corporation**

**Model:** 1703

**FCC ID:** C3K1703

**IC ID:** 3048A-1703

## Applicable Standards

Specification	Test Result
FCC CFR47 Rule Parts 15.207, 15.209, 15.247	Pass
Industry Canada RSS-247 Issue 1	Pass

Microsoft EMC Laboratory attests that the product model identified in this report has been tested to and meets the requirements identified in the above standards. The test results in this report solely pertains to the specific sample tested, under the conditions and operating modes as provided by the customer.

This report shall not be used to claim product certification, approval, or endorsement by A2LA or any agency of any Government. Reproduction, duplication or publication of extracts from this test report is prohibited and requires prior written approval of Microsoft EMC Laboratory.



Written By: Daniel Salinas  
Radio Test Engineer



Reviewed/ Issued By: Sajay Jose  
EMC/RF Compliance Lab Manager

## 2 Deviations from Standards

None.

## 3 Facilities and Accreditations

### 3.1 Test Facility

All test facilities used to collect the test data are located at Microsoft EMC Laboratory,  
17760 NE 67<sup>th</sup> Ct,  
Redmond WA, 98052, USA

### 3.2 Accreditations

The lab is established and follows procedures as outlined in IEC/ISO 17025 and A2LA accreditation requirements.

A2LA Accredited Testing Certificate Number: 3472.01

FCC Registration Number: US1141

IC Site Registration Numbers: 3048A-1, 3048A-2, 3048A-3, 3048A-4

### 3.3 Test Equipment

The site and related equipment are constructed in conformance with the requirements of ANSI C63.4 2014, CISPR 16-1-1 and other equivalent applicable standards. Test site requirements for measurements above 1 GHz are in accordance with ANSI C63.4 2009. ANSI C63.10 2013 and the appropriate KDB test methods were followed.

The calibrations of the measuring instruments, including any accessories that may affect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the user manual for the measuring equipment.

## 4 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the product, as specified in CISPR 16-4-2. This represents an expanded uncertainty expressed at 95% confidence level using a coverage factor  $k=2$ . These levels are for reference only and not included to determine product compliance.

Expanded uncertainty calculations are available upon request.

Test item	Value (dB)
Radiated disturbance (30 MHz to 1 GHz)	6.01
Radiated disturbance (1 GHz to 18 GHz)	4.80
Conducted Disturbance at Mains Port	3.30

## 5 Product Description

Company Name:	Microsoft Corporation
Address:	One Microsoft Way
City, State, Zip:	Redmond, WA 98052-6399
Customer Contact:	Sahithi Kandula
Functional Description of the EUT:	Portable Computing device with 2x2 802.11 a/b/g/n/ac WLAN and BT 4.0 Radios
Model:	1703
FCC ID:	C3K1703
IC ID:	3048A-1703
Radio Description:	BT LE (2402- 2480 MHz)
Modulation:	GFSK
Antenna Type and Gain:	Internal 4 dBi
EUT Classification:	DTS
Equipment Design State:	EV3B
Equipment Condition:	Good
Test Sample Details:	SN(s): 000187552375, 000133752157 - Conducted SN(s): 000132152157, 000181452357 - Radiated

### 5.1 Test Configurations

Test software “WiFi Tool” (V2.7.4) provided by the customer and “Lab Tool” (V2.0.0.77) from the module vendor was used to program the EUT continuously in GFSK mode. Channel numbers 0, 19 and 39 are used as the Low/Mid/High channels of test.

When in Low energy mode operation, the Bluetooth transmitter hops pseudo-randomly between 40 channels, three of which are “advertising channels”. Operation on the advertising channels does not qualify the EUT as a FHSS, and so the EUT is certified as a DTS device. The data shown in this report reflects the device when it transmits on its advertising channels.

### 5.2 Environmental Conditions

Ambient air temperature of the test site was within the range of 10 °C to 40 °C (50 °F to 104 °F) unless the EUT specified testing over a different temperature range. Humidity levels were in the range of 10% to 90% relative humidity. Testing conditions were within tolerance and any deviations required from the EUT are reported.

### 5.3 Antenna Requirements

The antennas are permanently attached and there are no provisions for connection to an external antenna.

#### 5.4 Equipment Modifications

No modifications were made during testing.

#### 5.5 Dates of Testing

Testing was performed on July 8<sup>th</sup>-9<sup>th</sup>, July 21<sup>st</sup>, July 23<sup>rd</sup>-24<sup>th</sup>, and August 21<sup>st</sup> 2015.



## 6 Test Results Summary

Test Description	FCC CFR 47/ IC Rule Part	Limit	Test Result
6dB Bandwidth	15.247 (a)(2) RSS-247 [5.2]	> 500kHz	Pass
Output Power	15.247 (b)(3) RSS-247 [5.4]	< 1 Watt	Pass
Power Spectral Density	15.247 (e) RSS-247 [5.2]	< 8dBm/3kHz	Pass
Conducted Band Edge/Spurious Emissions	15.247 (d) RSS-247 [5.5]	< 20dBc	Pass
Radiated Spurious Emissions/ Restricted Band Emissions	15.205, 15.209 RSS-247 [5.5], RSS-Gen [8.9]	FCC CFR 47 15.209 limits RSS-Gen [8.9]	Pass
AC Power line Conducted Emissions	15.207 RSS-Gen [8.8]	FCC CFR 47 15.207 limits RSS-Gen [8.8]	Pass

## 7 Test Equipment List

The site and related equipment are in conformance with the requirements of ANSI C63.4, CISPR 16-1-1, and other equivalent applicable standards.

Equipment used for Radiated and Conducted Measurements				
Manufacturer	Description	Model #	Asset #	Calibration Due
Rohde & Schwarz	EMI Test Receiver	ESU40	RF-192	4/14/2016
Rohde & Schwarz	EMI Test Receiver	ESU40	RF-012	4/12/2016
Agilent	Spectrum Analyzer	N9030A	EMC-607	6/16/2016
Rohde & Schwarz	Signal Analyzer	FSV40	RF-195	4/10/2016
Rohde & Schwarz	Signal Analyzer	FSV40	RF-245	4/10/2016
Sunol Sciences	Antenna - Broadband	JB6	EMC-008	3/4/2016
ETS-Lindgren	Antenna	3117	RF-139	4/9/2016
ETS-Lindgren	Antenna	3117	RF-138	5/13/2016
ETS-Lindgren	Antenna - Standard Gain	3160-09	RF-179	4/30/2016
ETS-Lindgren	Antenna - Standard Gain	3160-10	RF-038	4/30/2016
Rohde & Schwarz	Custom Filter Bank+PreAmp	SFUNIT RX	RF-323	3/21/2016
Rohde & Schwarz	Custom Filter Bank	SFUNIT RX	RF-324	3/21/2016
Rohde & Schwarz	Pre-Amp	TS-PR26	RF-042	1/6/2016
Rohde & Schwarz	Pre-Amp	TS-PR40	RF-200	1/6/2016
Rohde & Schwarz	Switch and Control Unit	OSP130	RF-249	1/9/2016
Rohde & Schwarz	Switch and Control Unit	OSP150	RF-250	1/9/2016
Rohde & Schwarz	Switch and Control Unit	OSP130	RF-018	12/18/2015
Rohde & Schwarz	Switch and Control Unit	OSP150	RF-019	12/18/2015

Maturo	Antenna Tower Controller	NCD	RF-002	N/A
Maturo	Device Positioner	TD1.5	RF-003	N/A
Maturo	System Controller	NCD-120	RF-327	N/A
Sunol Sciences	System Controller	SC110V	RF-001	N/A
Madge Tech	THP Monitor	PRH Temp 2000	EMC-681	11/5/2015
Madge Tech	THP Monitor	PRH Temp 2000	EMC-171	N/A
Fluke	Multimeter	87V	EMC-193	4/9/2016
Rohde & Schwarz	Software	EMC-32 V9.15	N/A	N/A
Huber Suhner	RF Cable	102A	RF-272	1/6/2016
Huber Suhner	RF Cable	Sucoflex 102A	RF-269	3/21/2016

<b>Equipment used for Line Conducted Emissions Measurement</b>				
<b>Manufacturer</b>	<b>Description</b>	<b>Model #</b>	<b>Asset #</b>	<b>Calibration Due</b>
Rohde & Schwarz	EMI Test Receiver	ESR 3	EMC-669	11/3/2015
Teseq	LISN	NNB 51	EMC-187	10/11/2015
Teseq	LISN	NNB 51	EMC-642	10/11/2015
Micro-Coax	RF Cable	UFA210A-1-1800-50U50U	EMC-367	8/6/2016
Madge Tech	THP Monitor	PRHTemp2000	EMC-837	6/23/2016
ETS	TILE SW	Ver 7.0	N/A	N/A

\*Note: List of equipment that fall under the category of cables, pre-amplifiers or switching panels with Calibration due date of "n/a" have regular in house verification.

## 8 Test Site Description

### 8.1 Radiated Emissions Test Site

Radiated measurements are performed in a 3m semi-anechoic chamber, which meets NSA requirements for the frequency range of 30MHz to 1000MHz. For measurements above 1 GHz, absorbers with a 2.4m X 2.4m configuration are laid out on the ground plane between the Receiving antenna and the EUT in accordance with the requirements of ANSI C63.4:2009.

#### 8.1.1 Radiated Measurements in 30M- 1000 MHz

The EUT is positioned on a Turntable at a height of 80cm using a non-conducting table. A Linearly polarized broadband antenna is positioned at 3m from the EUT periphery. The turntable is rotated 360 degrees and the antenna height varied from 1m to 4m to determine the highest emissions. This is repeated for both Horizontal and Vertical Polarizations of the Measurement Antenna. The EUT is also rotated about its three orthogonal orientations to investigate emissions.

#### 8.1.2 Radiated Measurements above 1GHz

The EUT is positioned on a Turntable at a height of 150cm using a device positioner. A Linearly polarized antenna is positioned at 3m from the EUT periphery. Guidelines in ANSI C63.10 2013 were followed with respect to maximizing the emissions. The turntable is rotated 360 degrees, the antenna height maintained at 150cm and the device positioner rotated about it's horizontal axis to determine the highest emissions. This is repeated for both Horizontal and Vertical Polarizations of the Measurement Antenna. Measurements above 18GHz were performed at a distance of 1m.

### 8.2 Antenna port conducted measurements

All antenna port conducted measurements were performed on a bench-top setup consisting of a spectrum analyzer, power meter (as necessary), splitters/combiners (as necessary), attenuators, and pre-characterized RF cables.

The correction factors between the EUT and the Spectrum Analyzer is added internally in the Analyzer settings. The plots displayed accounts for these correction factors.

### 8.3 Test Setup Diagrams

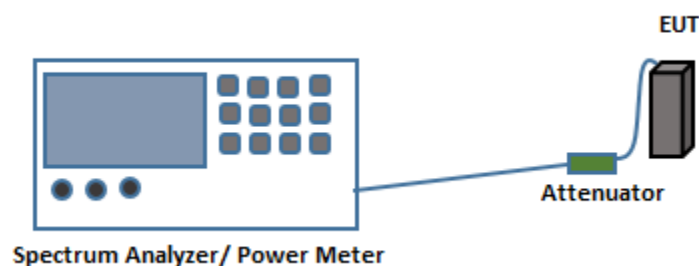


Fig.1. Test Setup for Antenna port conducted measurements

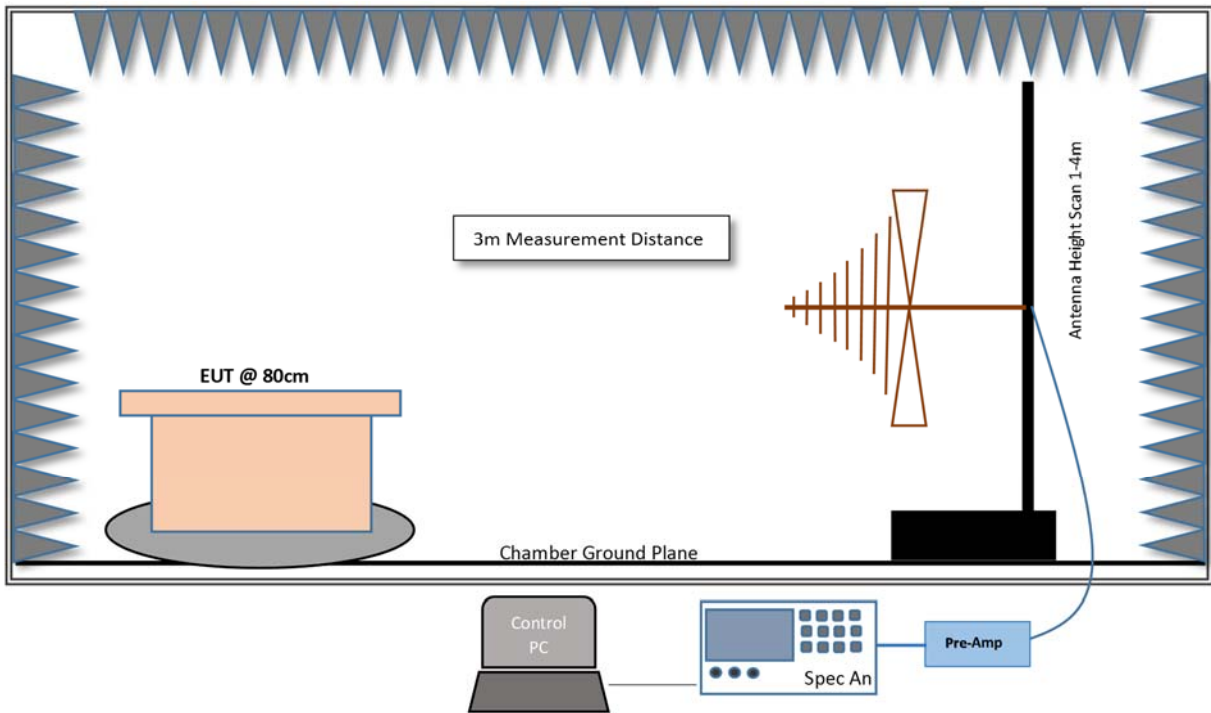


Fig.2. Test Setup for Radiated measurements in 30MHz- 1GHz Range

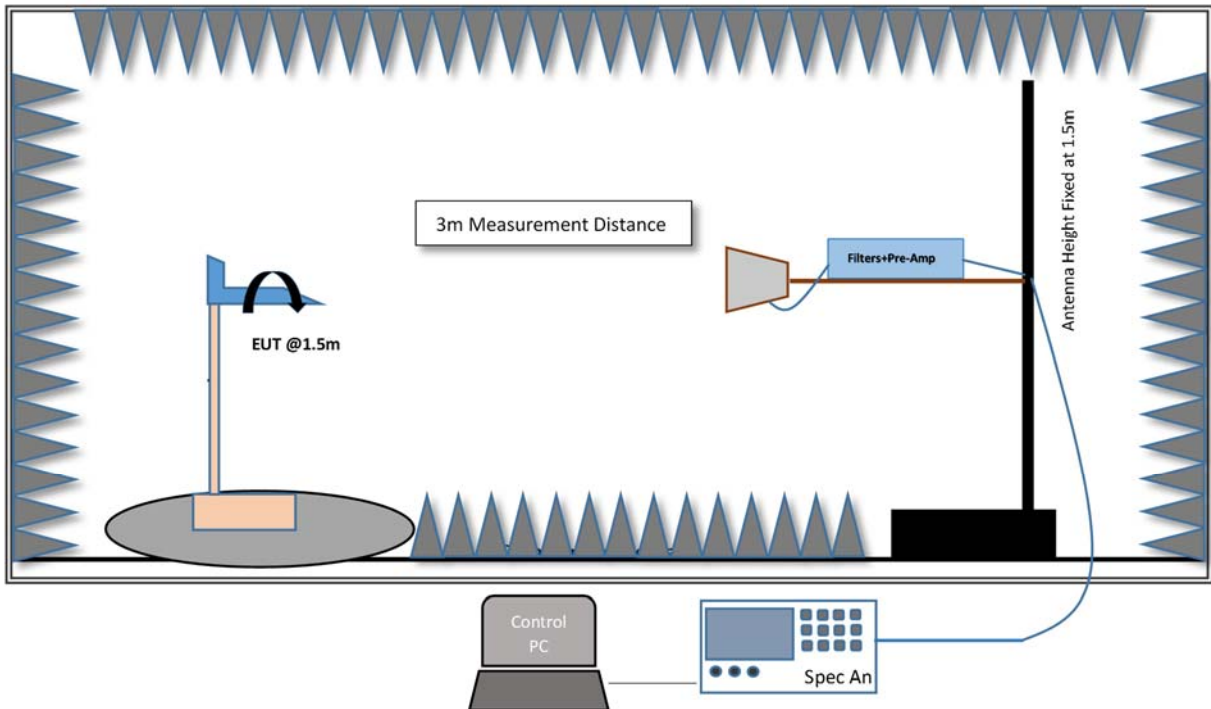


Fig.3. Test Setup for Radiated measurements in 1GHz- 18GHz Range

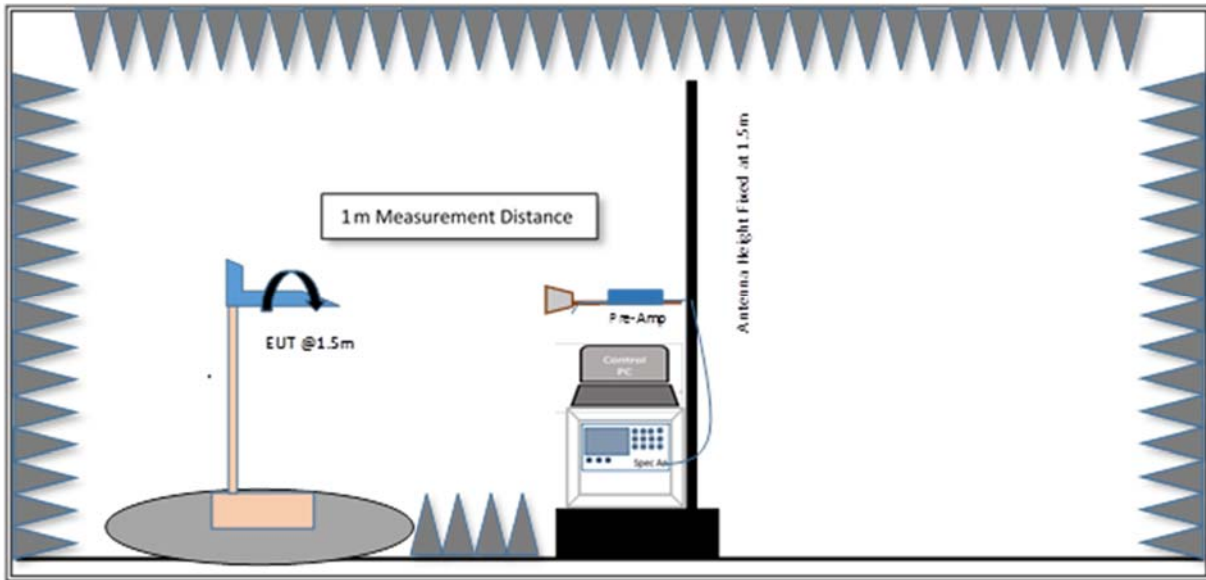


Fig.4. Test Setup for Radiated measurements >18GHz

## 9 Test Results- Conducted

### 9.1 6-dB Bandwidth

#### 9.1.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (a)(2)

Industry Canada RSS-247 [5.2]

#### 9.1.2 Test Method:

Measurements were performed according to the procedure defined in KDB 558074- Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 V03R03 and ANSI C63.10 2013.

#### Spectrum Analyzer settings:

RBW= 100 kHz

VBW= 300 kHz

Trace Mode= Peak Detector (Max Hold)

Sweep time= Auto

The in-built functionality of the Spectrum Analyzer is used to measure the 6-dB bandwidth.

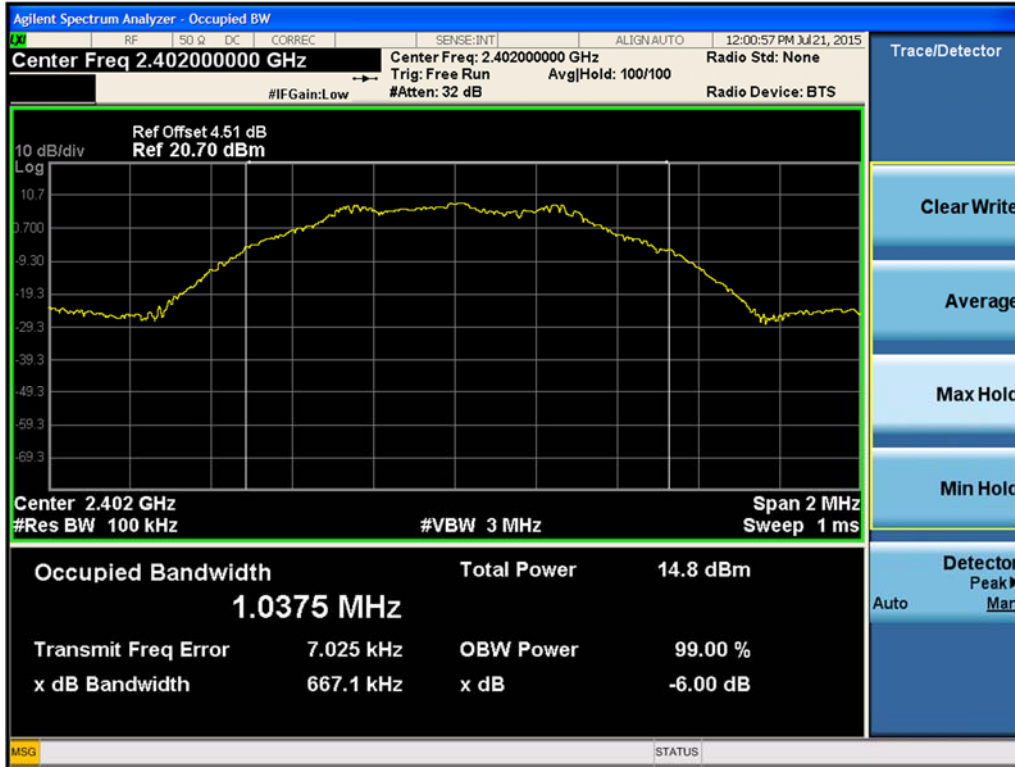
#### 9.1.3 Limits:

The 6-dB bandwidth shall be at least 500 kHz

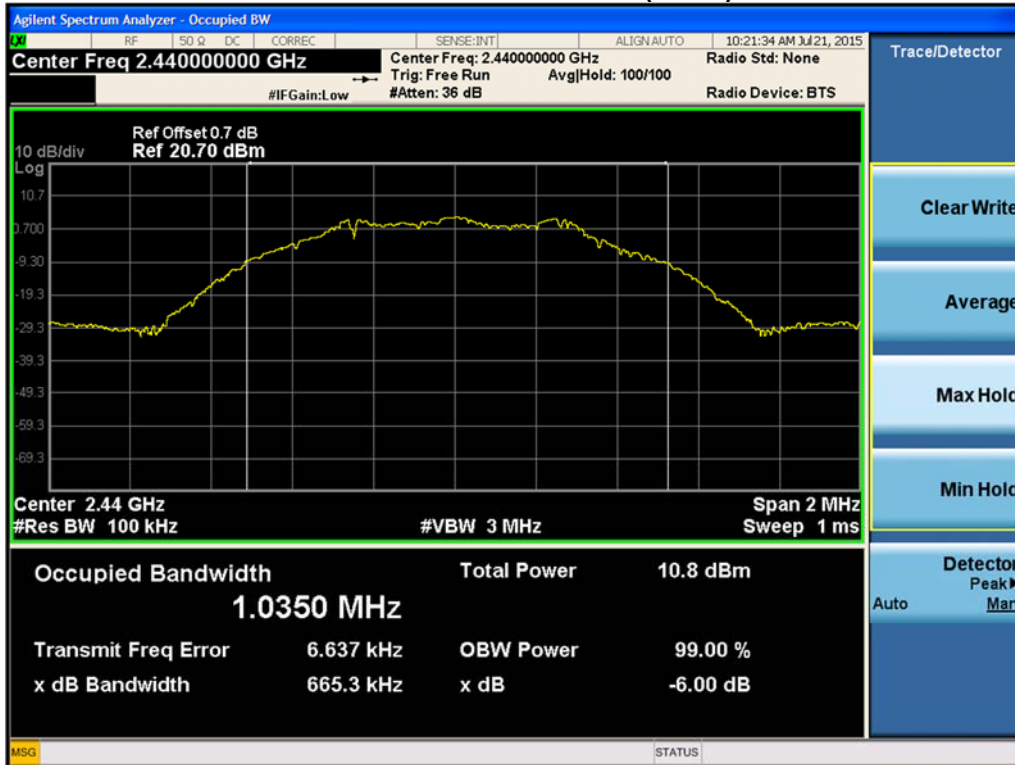
#### 9.1.4 Test Results:

Frequency (MHz)	Test Mode	Channel No.	6dB Bandwidth (kHz)	Limit (kHz)	Result
2402	BT LE	0	667.1	>500	PASS
2440	BT LE	19	665.3	>500	PASS
2480	BT LE	39	674.1	>500	PASS

### 9.1.5 Test Data:



Plot 9-1. 6dB Bandwidth (Ch. 0)



Plot 9-2. 6dB Bandwidth (Ch. 19)





Plot 9-3. 6dB Bandwidth (Ch. 39)

## 9.2 Output Power

### 9.2.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (b)(3)

Industry Canada RSS-247 [5.4]

### 9.2.2 Test Method:

Measurements were performed according to the procedure defined in KDB 558074- Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 V03R03 and ANSI C63.10 2013.

#### Spectrum Analyzer settings:

##### **Peak Power:**

RBW= 1 MHz

VBW= 3 MHz

Trace Mode= Peak Detector (Max Hold)

Sweep time= Auto

Span= 3 MHz

### 9.2.3 Limits:

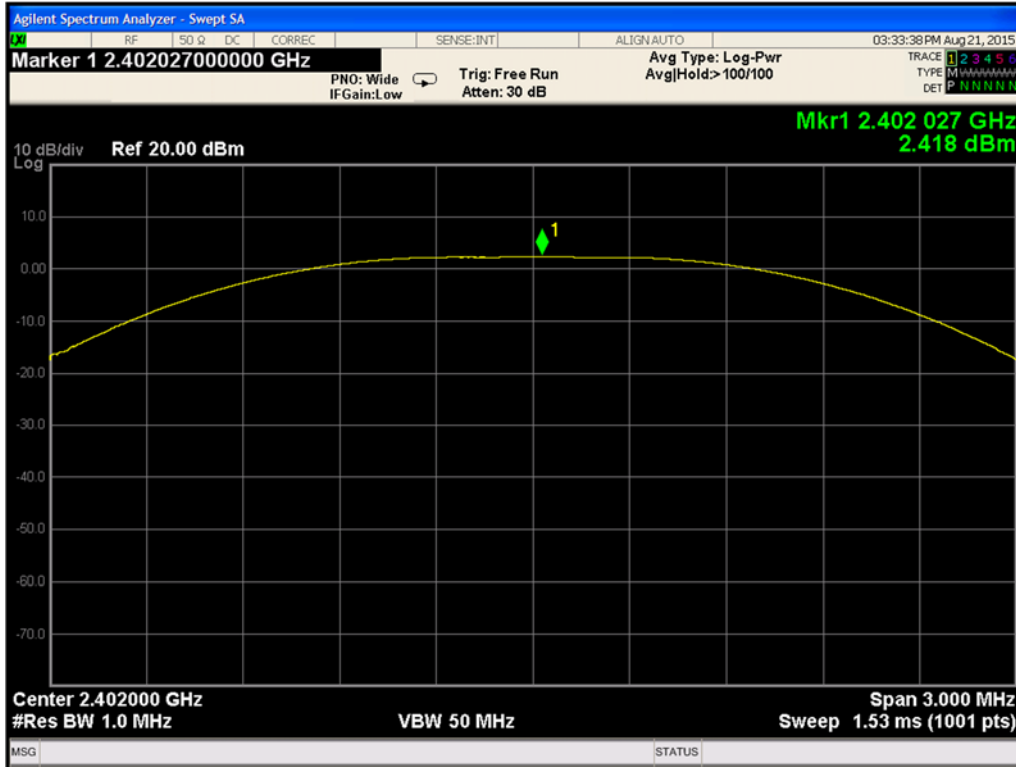
15.247: The maximum permissible peak output power is 30 dBm (1 W)

RSS-247: The maximum peak conducted output power shall not exceed 30dBm (1 W) and the maximum radiated output power shall not exceed 36dBm (4 W) EIRP.

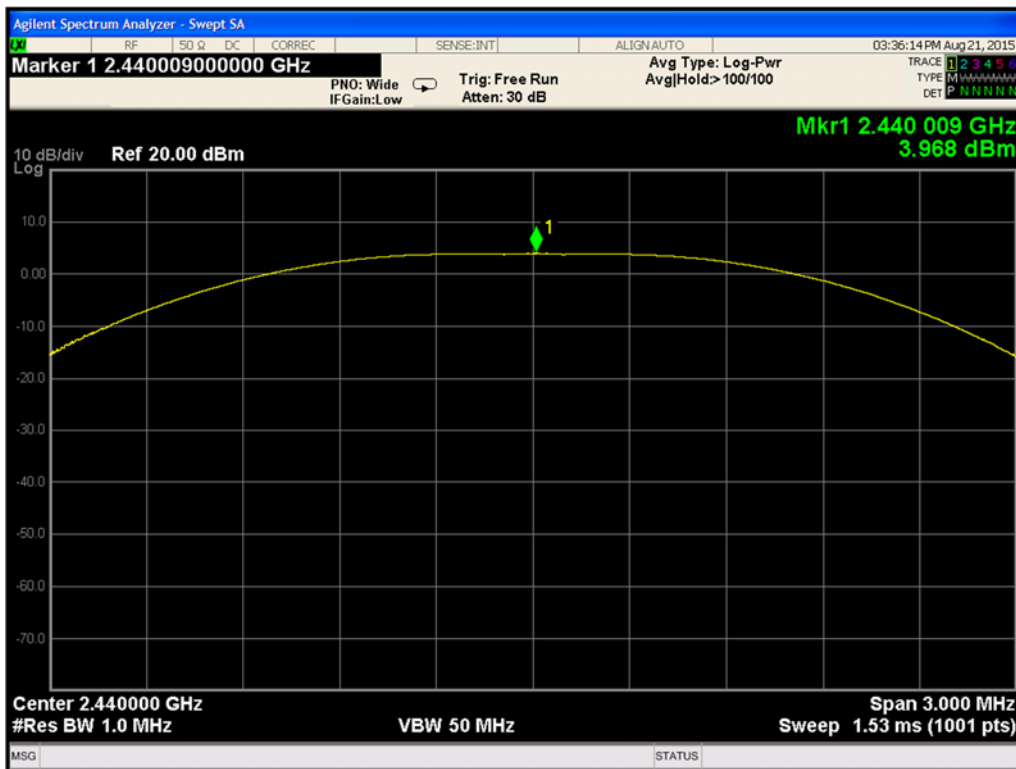
### 9.2.4 Test Results:

Frequency (MHz)	Test Mode	Channel No.	Peak Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Peak Power (W)	Result
2402	BT LE	0	2.418	4.0	6.418	0.0018	PASS
2440	BT LE	19	3.968	4.0	7.968	0.0025	PASS
2480	BT LE	39	3.801	4.0	7.801	0.0024	PASS

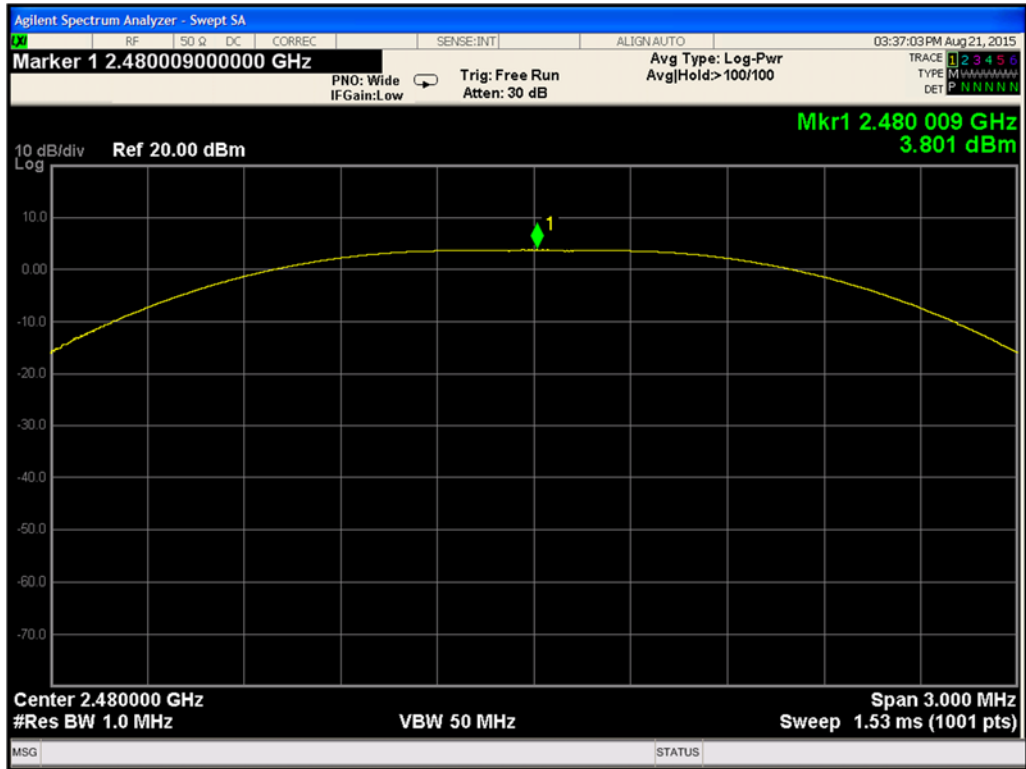
9.2.5 Test Data:



Plot 9-4. Peak Power (Ch. 0)



Plot 9-5. Peak Power (Ch. 19)



Plot 9-6. Peak Power (Ch. 39)

## 9.3 Peak Power Density

### 9.3.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (e)

Industry Canada RSS-247 [5.2]

### 9.3.2 Test Method:

Measurements were performed according to the procedure defined in KDB 558074- Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 V03R03 and ANSI C63.10 2013.

#### Spectrum Analyzer settings:

RBW= 100 kHz

VBW= 300 kHz

Trace Mode= Peak Detector (Max Hold)

Sweep time= Auto

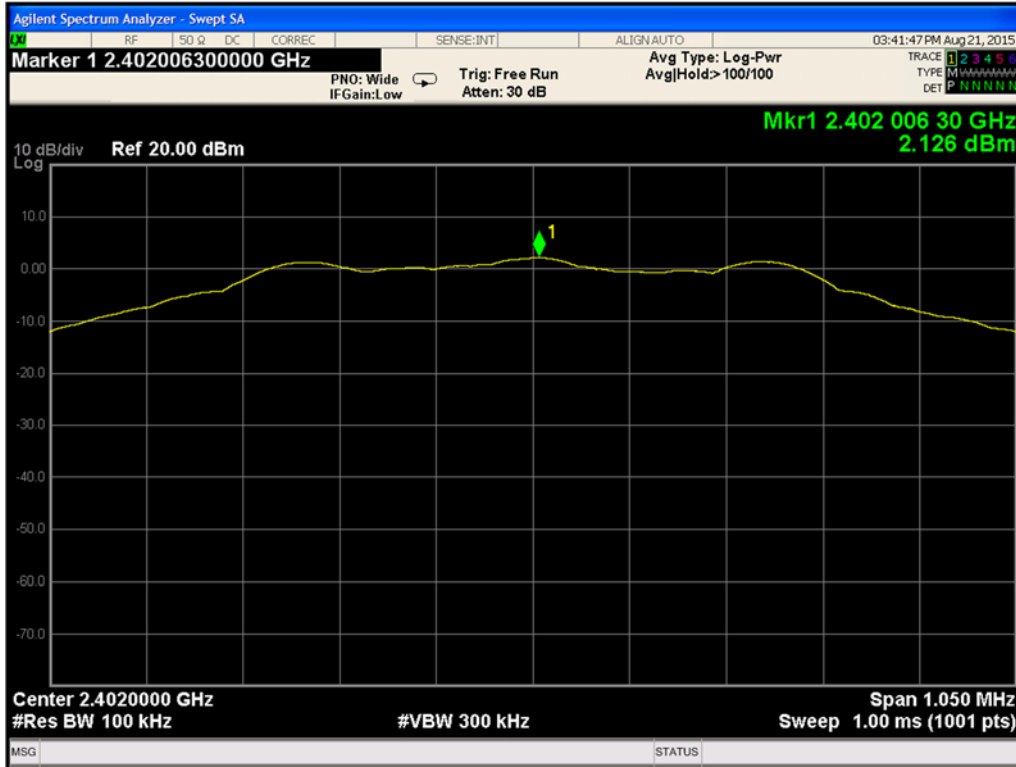
### 9.3.3 Limits:

The maximum permissible power density is 8 dBm/3kHz.

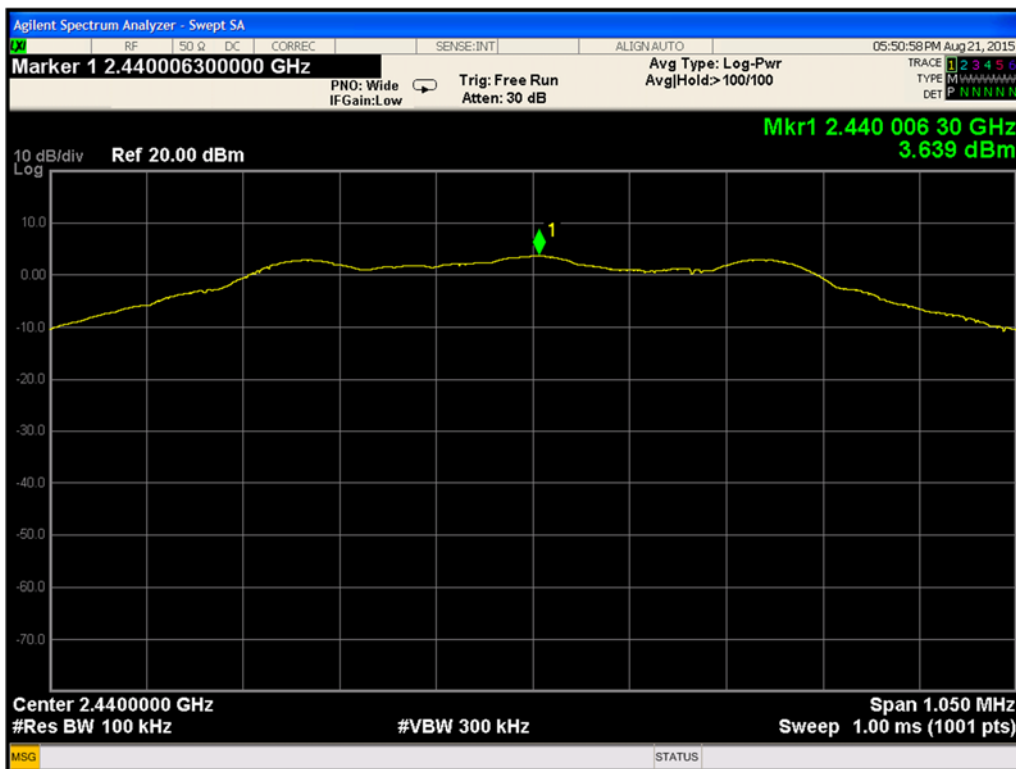
### 9.3.4 Test Results:

Frequency (MHz)	Test Mode	Channel No.	Power Spectral Density (dBm/100kHz)	Limit (dBm/3kHz)	Result
2402	BT LE	0	2.126	8	PASS
2440	BT LE	19	3.639	8	PASS
2480	BT LE	39	3.476	8	PASS

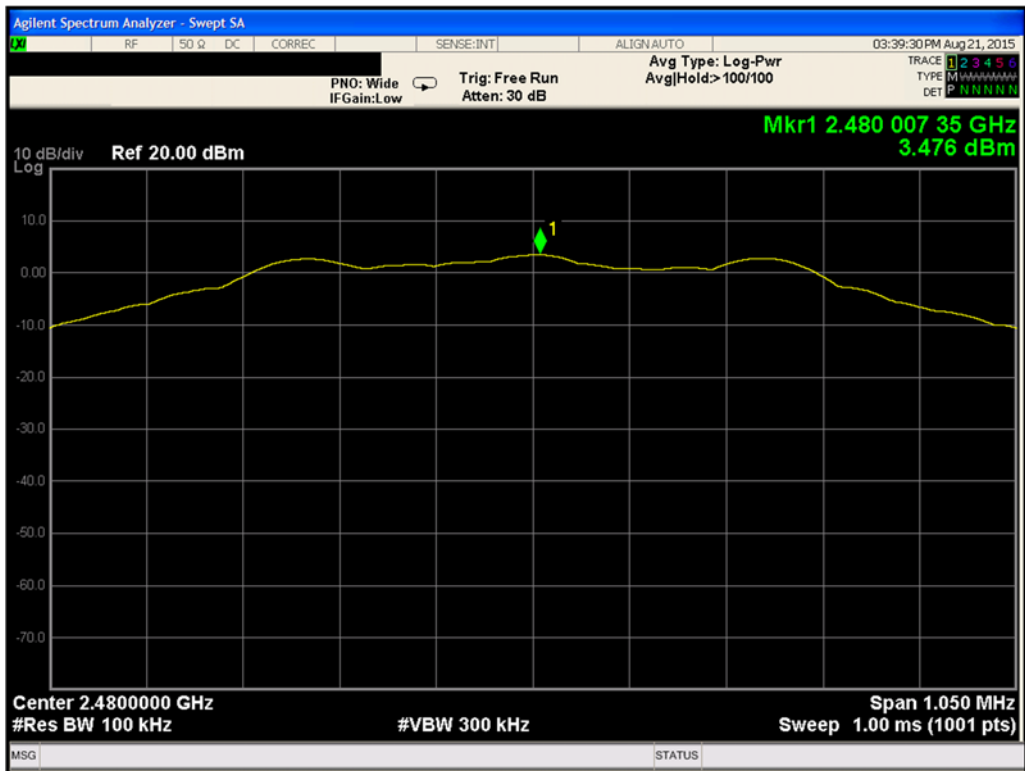
9.3.5 Test Data:



Plot 9-7. Power Spectral Density (Ch. 0)



Plot 9-8. Power Spectral Density (Ch. 19)



Plot 9-9. Power Spectral Density (Ch. 39)

## 9.4 Conducted Spurious Emissions

### 9.4.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (d)

Industry Canada RSS-247 [5.5]

### 9.4.2 Test Method:

Measurements were performed according to the procedure defined in KDB 558074- Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 V03R03 and ANSI C63.10 2013.

#### **Spectrum Analyzer settings:**

##### ***Identification of Reference Level:***

RBW= 100 kHz

VBW  $\geq$  3 x RBW

Trace Mode= Peak Detector (Max Hold)

Sweep time= Auto

Span= 3 MHz

Peak Marker function to determine the max PSD level.

##### ***Conducted Spurious Emissions:***

RBW= 1MHz

VBW  $\geq$  3 x RBW

Trace Mode= Peak Detector (Max Hold)

Sweep time= Auto

Span= 30 MHz- 12 GHz; 12 GHz – 25 GHz

Sweep Points= 30000

### 9.4.3 Limits:

The maximum spurious emission shall be at least 20dBc.

### 9.4.4 Test Result:

Pass.



#### 9.4.5 Test Data:

Channel	Carrier Frequency (MHz)	Emission Frequency (MHz)	Emissions Amplitude (dBm/100 kHz)	Limit (dBm/100 kHz)	Result
0	2402	4804.6	-41.393	-17.87	Pass
0	2402	22865.8	-27.209	-17.87	Pass
39	2441	3777.9	-41.855	-16.36	Pass
39	2441	22813.3	-27.785	-16.36	Pass
78	2480	3740.0	-41.642	-16.52	Pass
78	2480	22503.5	-28.403	-16.52	Pass

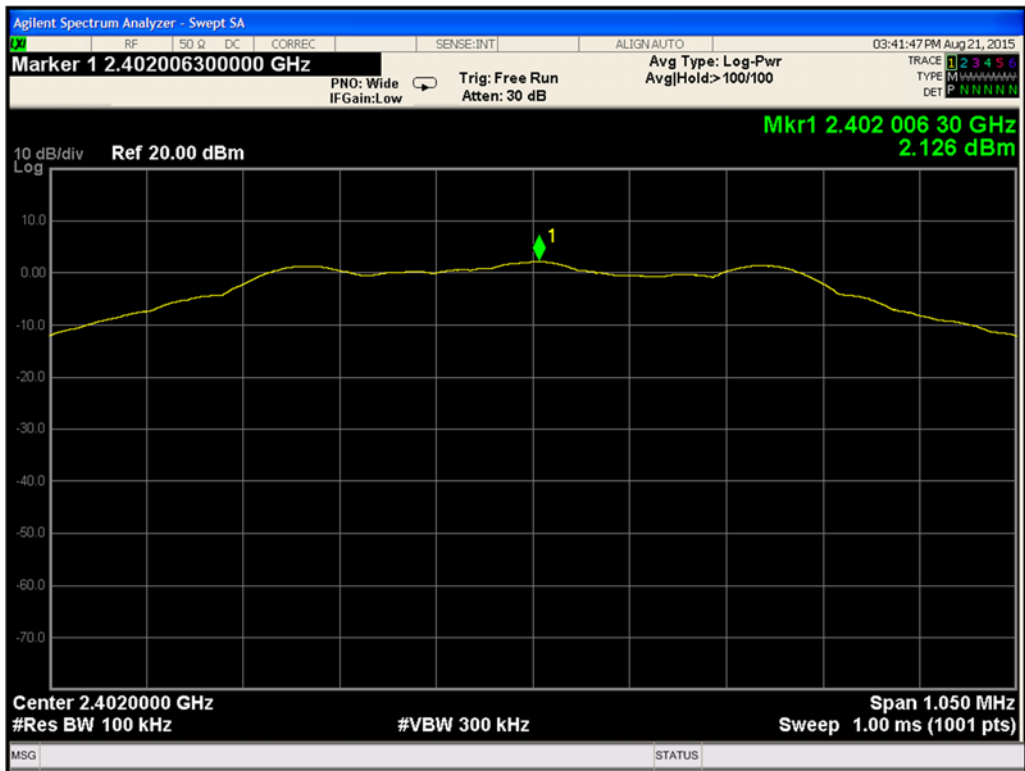
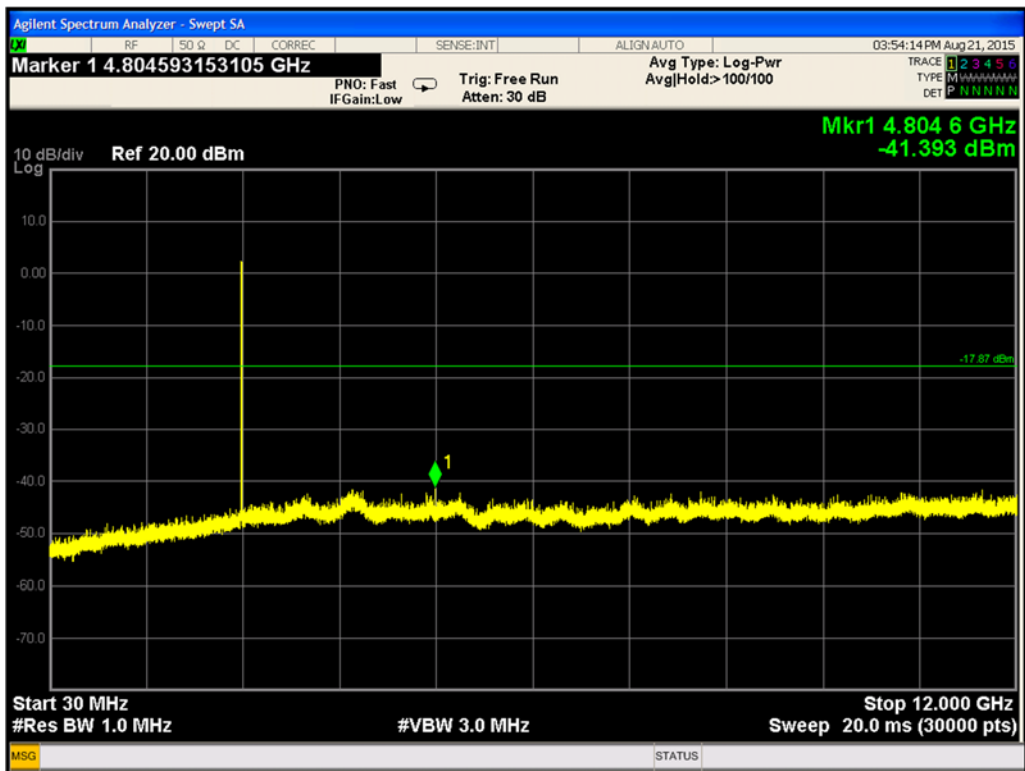


Figure 9-10. Reference Level Measurement (Ch.0)



Plot 9-11. Conducted Spurious Emissions 30-1000 MHz (Ch. 0)

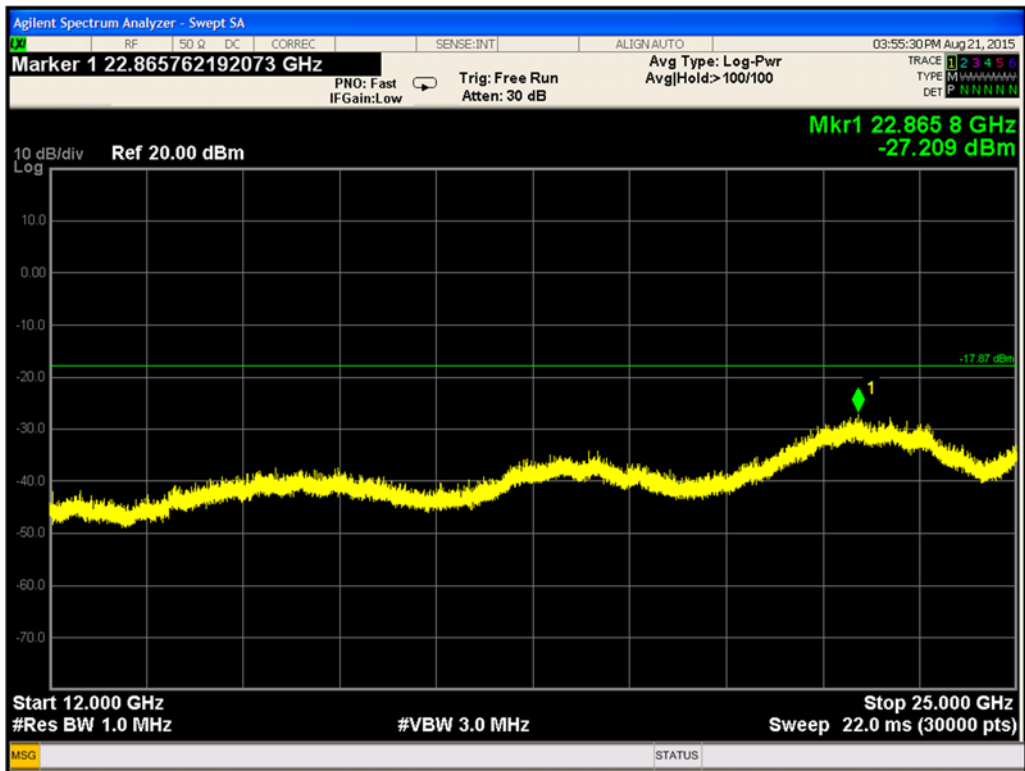


Figure 9-12. Conducted Spurious Emissions 1-25 GHz (ch.0)

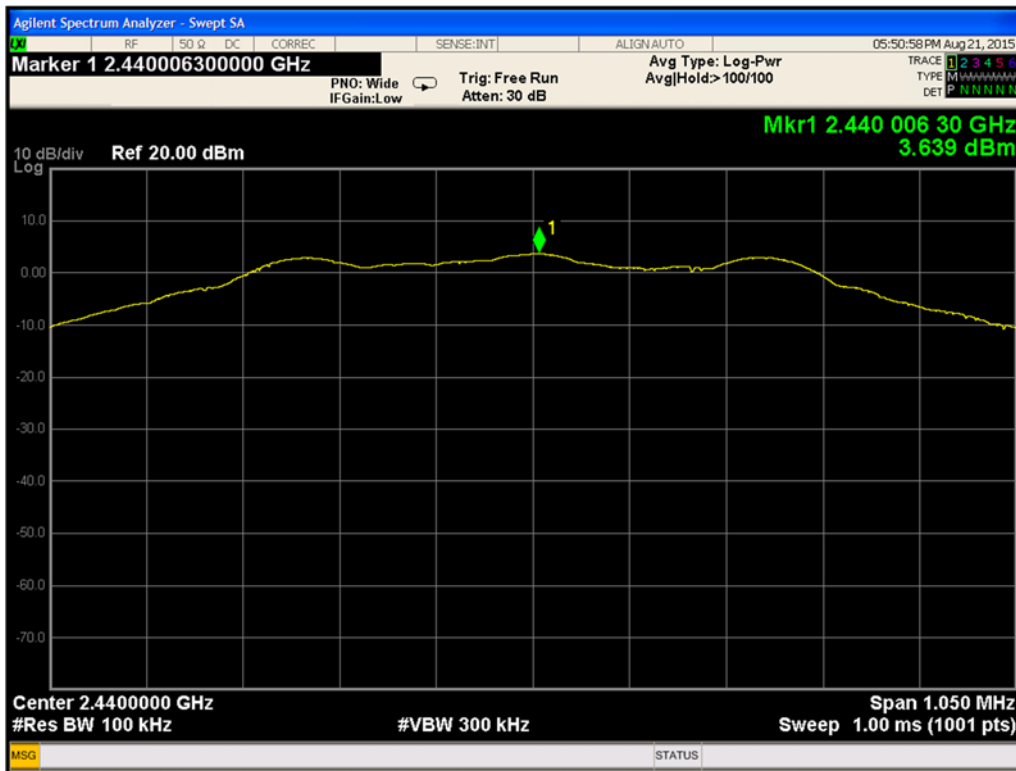
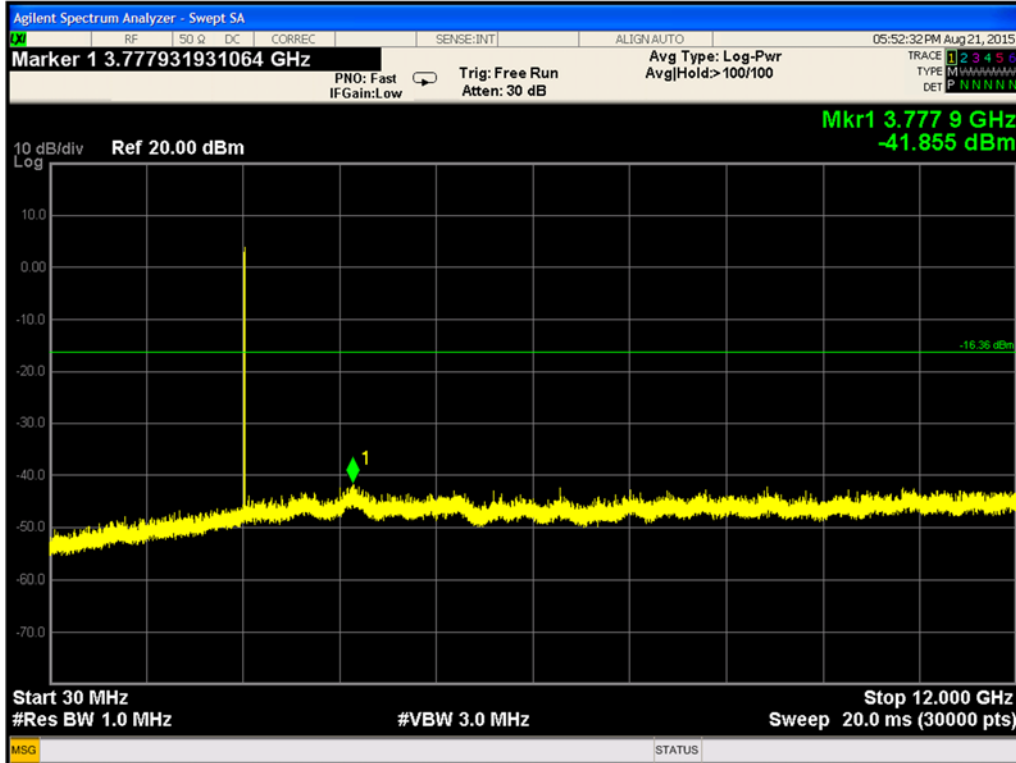
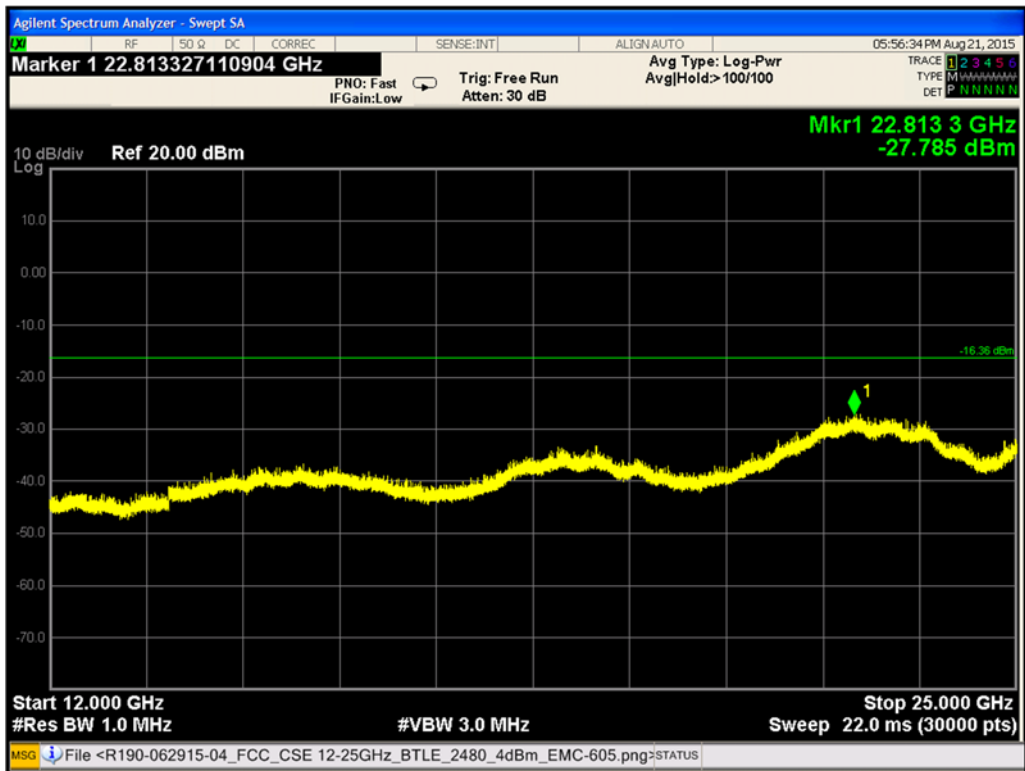


Figure 9-13. Reference Level Measurement (ch.19)



Plot 9-14. Conducted Spurious Emissions 30-1000 MHz (Ch. 19)



Plot 9-15. Conducted Spurious Emissions 1-25 GHz (Ch. 19)

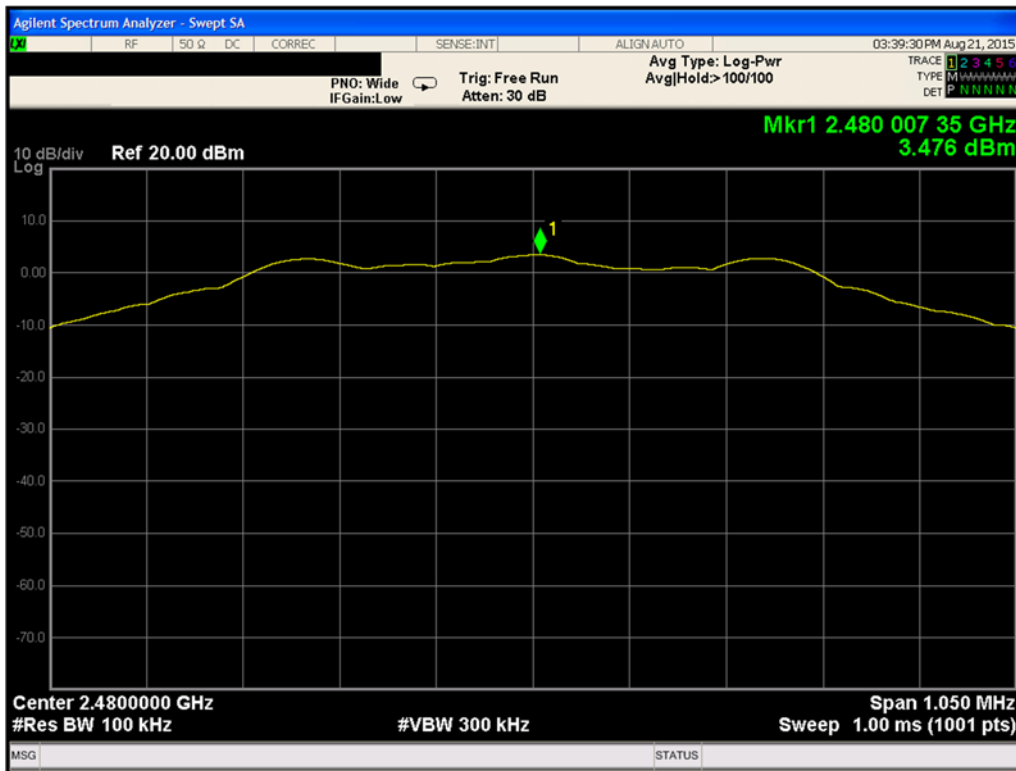


Figure 9-16. Reference Level Measurement (ch.39)

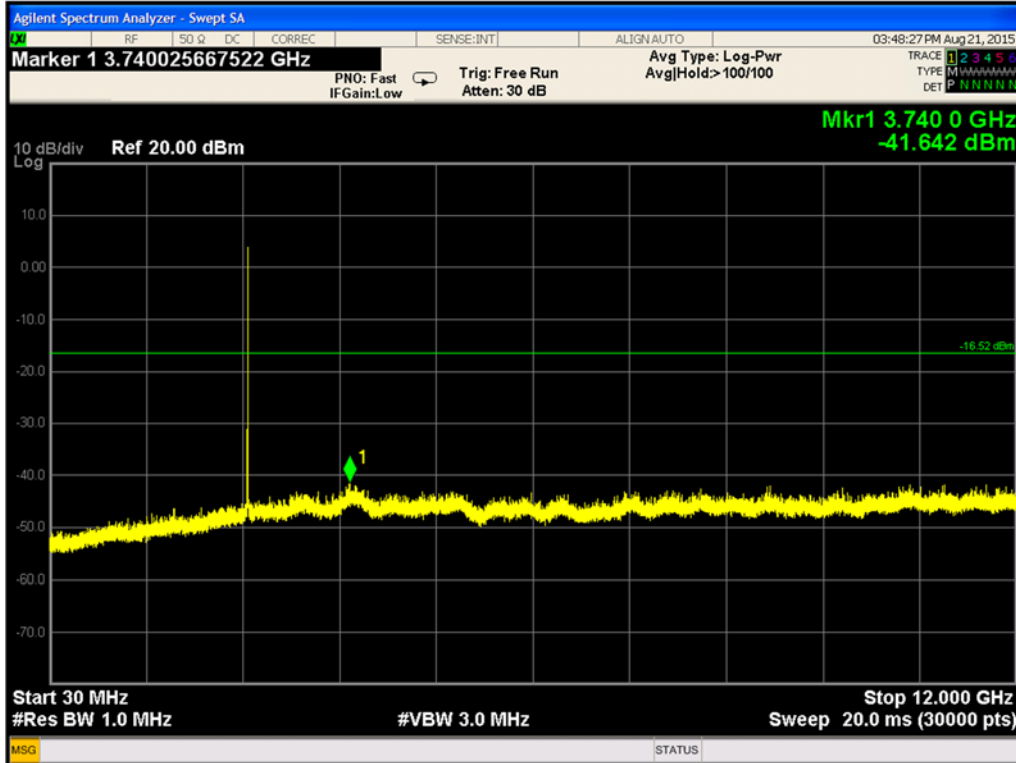


Figure 9-17. Conducted Spurious Emissions 30-1000 MHz (ch.39)

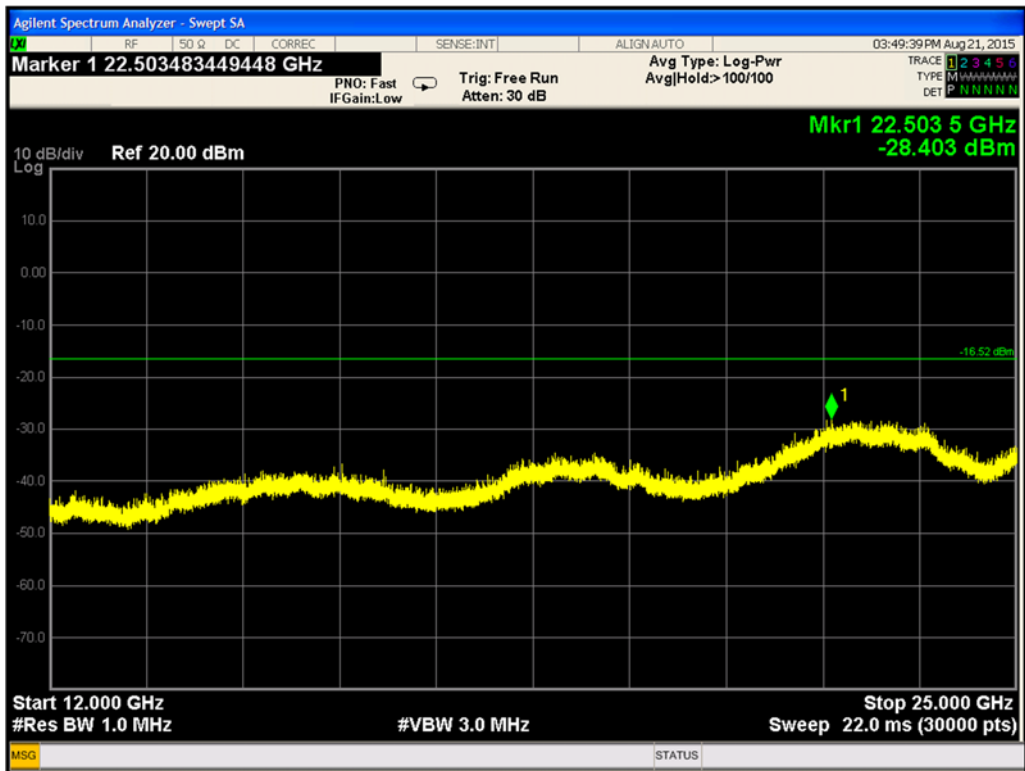


Figure 9-18. Conducted Spurious Emissions 1-25GHz (ch.39)

## 9.5 Conducted Band Edge Emissions

### 9.5.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (d)

Industry Canada RSS-247 [5.5]

### 9.5.2 Test Method:

Measurements were performed according to the procedure defined in KDB 558074- Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 V03R03 and ANSI C63.10 2013.

#### **Spectrum Analyzer settings:**

##### ***Band Edge Emissions:***

RBW= 100 kHz

VBW  $\geq 3 \times$  RBW

Detector= Peak

Sweep time= Auto

Span = 10MHz

### 9.5.3 Limits:

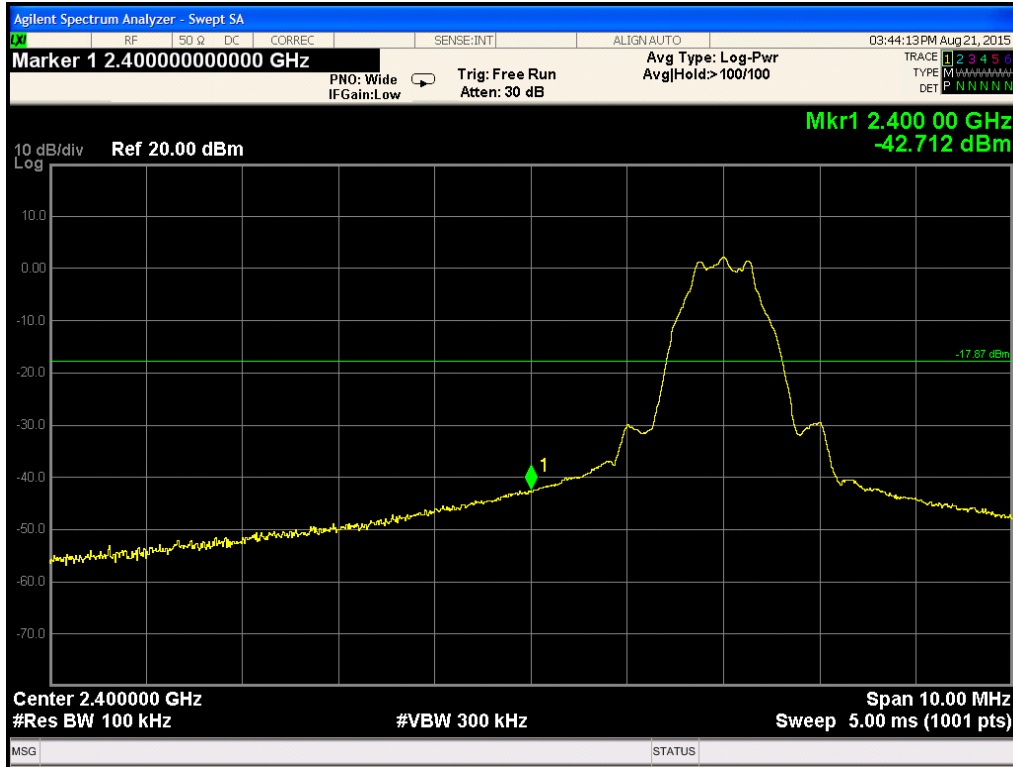
The maximum spurious emission shall be at least 20dBc.

### 9.5.4 Test Result:

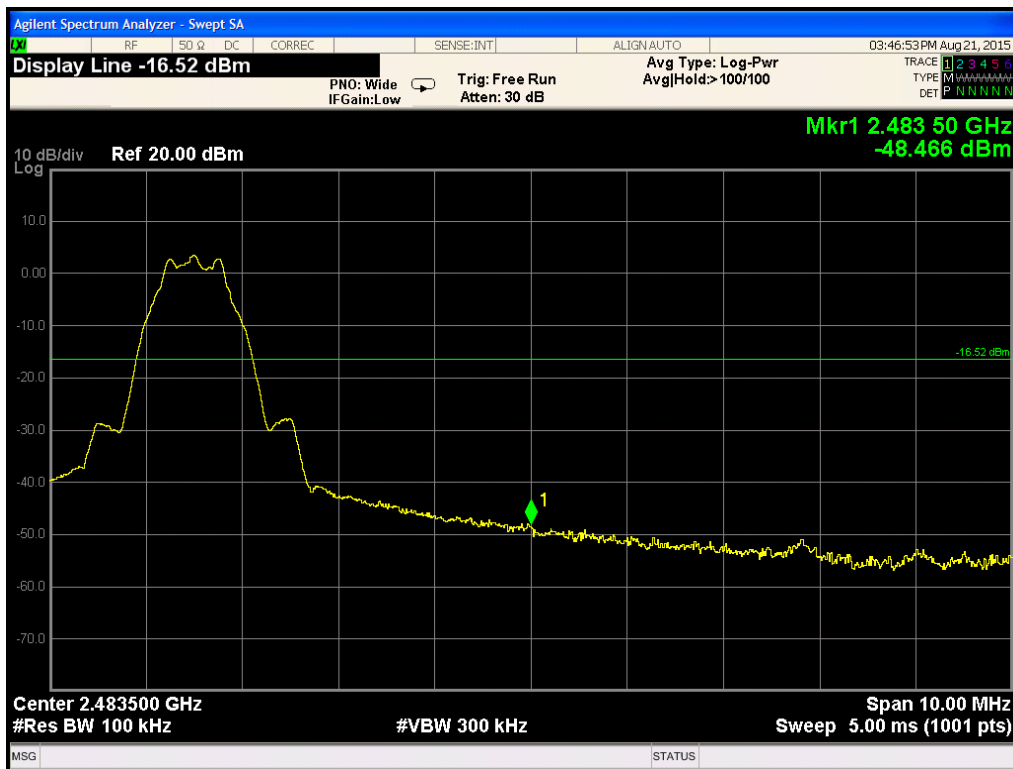
Pass.



9.5.5 Test Data:



Plot 9-19. Conducted-Low Band Edge (Ch. 0)



Plot 9-20. Conducted- High Band Edge (Ch. 39)

## 9.6 Radiated Spurious and Band Edge Emissions

### 9.6.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (d)

Industry Canada RSS-247 [5.5] and RSS GEN [8.9]

### 9.6.2 Test Method:

Measurements were performed according to the procedure defined in KDB 558074- Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 V03R03 and ANSI C63.10 2013.

Radiated spurious measurements are made from 30MHz to the 10th harmonic of the fundamental frequency of the transmitter. The limit for radiated spurious emissions is per 15.209 and RSS-247 [5.5]. Additionally, emissions found in the restricted bands as listed in 15.205 were tested for compliance per limits in 15.209 and RSS-Gen.

The EUT was tested near the low, middle and high channels of operation in each sub band. Guidelines in ANSI C63.10 2013 were followed with respect to maximizing the emissions. Emissions below 1 GHz were maximized by continuously scanning the unit in three orthogonal orientations. Measurements above 1 GHz were maximized by rotating the EUT about its vertical and horizontal axis. The horizontal axis was varied in 30 degree increments up to 150 degrees in accordance with ANSI C 63.10 2013. Both Horizontal and vertical polarizations were investigated. Worst case maximized data is shown in this test report. The EUT's maximum emissions for measurements below 1GHz were observed to be with the unit placed flat on the table.

A pre-amp and a high pass filter were required for this test, in order to provide the measuring system with sufficient sensitivity. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength.

### **Radiated Spurious Emissions**

#### **Spectrum Analyzer Settings:**

##### **30 MHz- 1 GHz:**

RBW= 120 kHz

VBW  $\geq$  3 X RBW

Trace Mode: Peak Detector (Max Hold). Final measurements performed using QP Detector.

Span= 30 MHz- 1 GHz

Sweep time= Auto

##### **Above 1 GHz:**

RBW= 1 MHz

VBW= 3 MHz

Trace Mode: Peak Detector (Max Hold) and RMS Average Detector (Max Hold)

Span= 1- 18 GHz and 18- 26.5 GHz.

Sweep time= Auto

**Restricted Band-Edge Emissions**

**Spectrum Analyzer Settings:**

RBW= 1 MHz

VBW= 3 MHz

Trace Mode: Peak Detector (Max Hold) and RMS Average Detector (Max Hold)

Span= 2310 – 2500 MHz

Sweep Points = 801

Sweep Time = Peak: Auto; Average: 100 s

**Sample Calculation:**

Field Strength Level: Amplitude (Analyzer level) + AFCL (Antenna Factor and Cable losses) – Amplifier Gain = 50 dBμV + 33 dB – 25 dB = 78dBμV/m

**9.6.3 Limits:**

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (meters)	Corrected Field Strength for 3m measurement distance (dBμV/m)
0.009-0.490	2400/F (kHz)	300	48.5- 13.8
0.490-1.705	24000/F (kHz)	30	33.8- 23.0
1.705-30	30	30	29.5
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
960-1000	500	3	54
Above 1000	500	3	54 (Average) 74 (Peak)

**9.6.4 Test Result:**

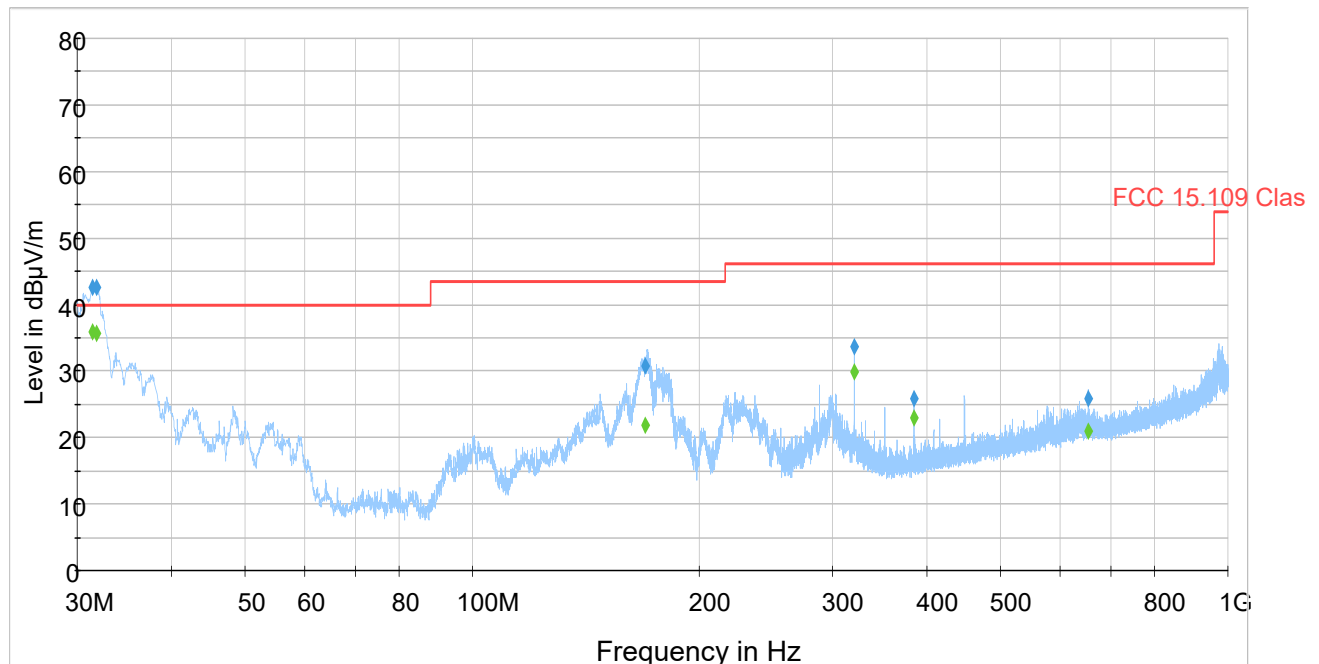
Pass.

## 9.6.5 Test Data:

### 9.6.5.1 Emissions in 30 MHz- 1 GHz range

Worst case emissions in mid channel of operation shown here.

RSE 30-1000 MHz					
Frequency (MHz)	Raw Quasi-Peak Amplitude (dBμV/m)	Correction Factor (dB)	Corrected Peak Field Strength (dBμV/m)	Quasi-Peak Limit (dBμV/m)	Quasi-Peak Margin (dB)
31.417	45.30	-9.4	35.90	40	-4.10
31.815	45.38	-9.7	35.68	40	-4.32
169.57	39.12	-17.2	21.92	43.52	-12.87
320.04	43.66	-13.7	29.96	46.02	-16.06
384.05	34.71	-11.8	22.91	46.02	-23.11
653.25	26.72	-5.8	20.92	46.02	-25.10

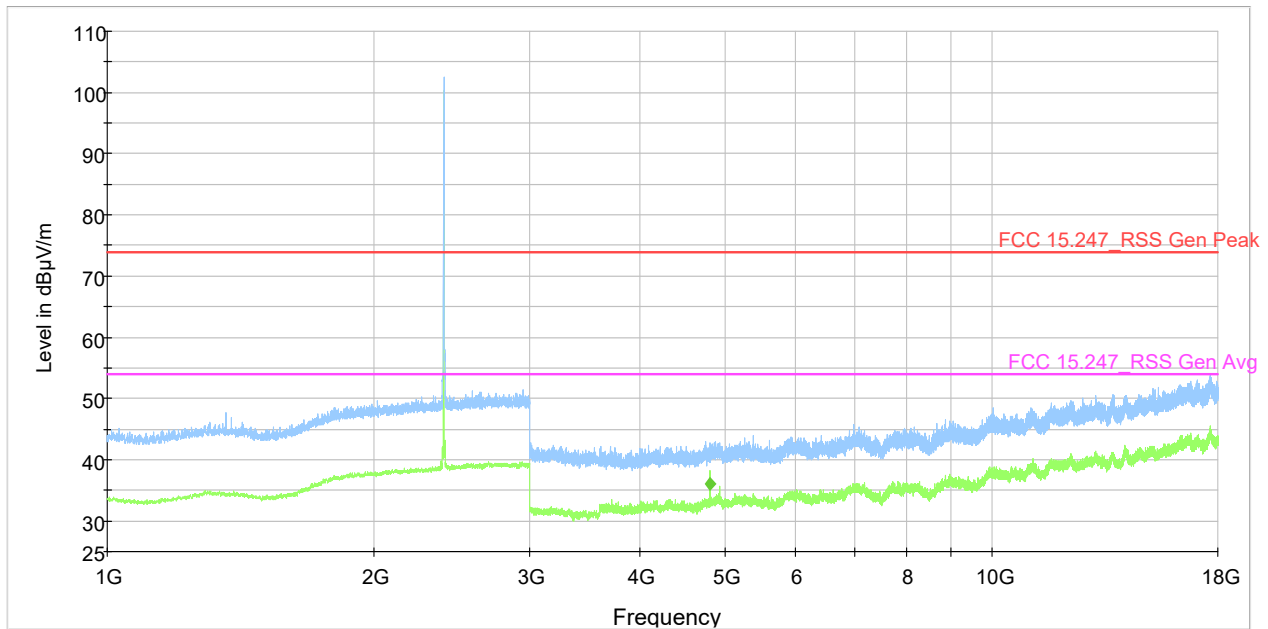


— Preview Result 1-PK+ [Preview Result 1-PK+] [Final Result PK+] [Final Result QPK] [Final Result QPK]

**Plot 9-21. Radiated Spurious Emissions (Ch. 19) (30MHz - 1GHz)**

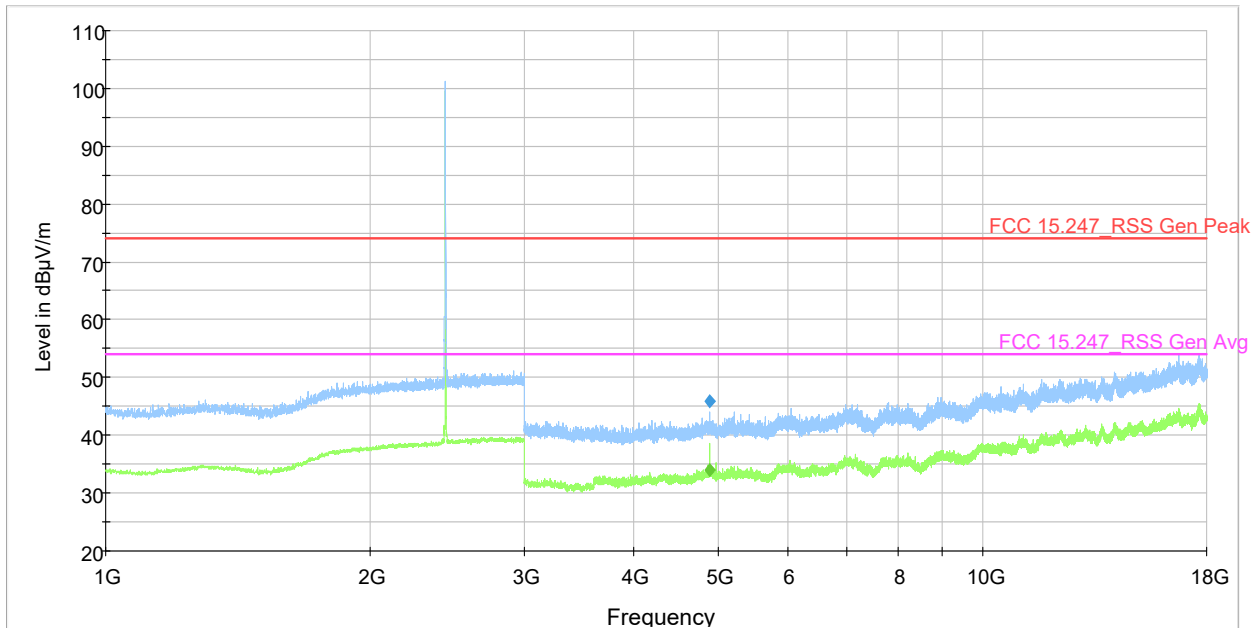
### 9.6.5.2 Emissions in 1-18 GHz range

RSE - 18GHz Average Data						
Carrier Frequency (MHz)	Frequency (MHz)	Raw Avg. Amplitude (dB $\mu$ V)	Correction Factor (dB)	Corrected Avg. Field Strength (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Margin (dB)
2402	4804.10	27.88	8.1	35.98	54	-18.02
2440	4879.70	26.02	7.9	33.92	54	-20.08
2480	4959.70	31.74	8.0	39.74	54	-14.26
RSE - 18GHz Peak Data						
Carrier Frequency (MHz)	Frequency (MHz)	Raw Peak Amplitude (dB $\mu$ V)	Correction Factor (dB)	Corrected Peak Field Strength (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin (dB)
2402	No Emissions observed above the noise floor					
2440	4879.7	37.95	7.9	45.85	74	-28.15
2480	4960.5	40.00	8.0	48.00	74	-26.00



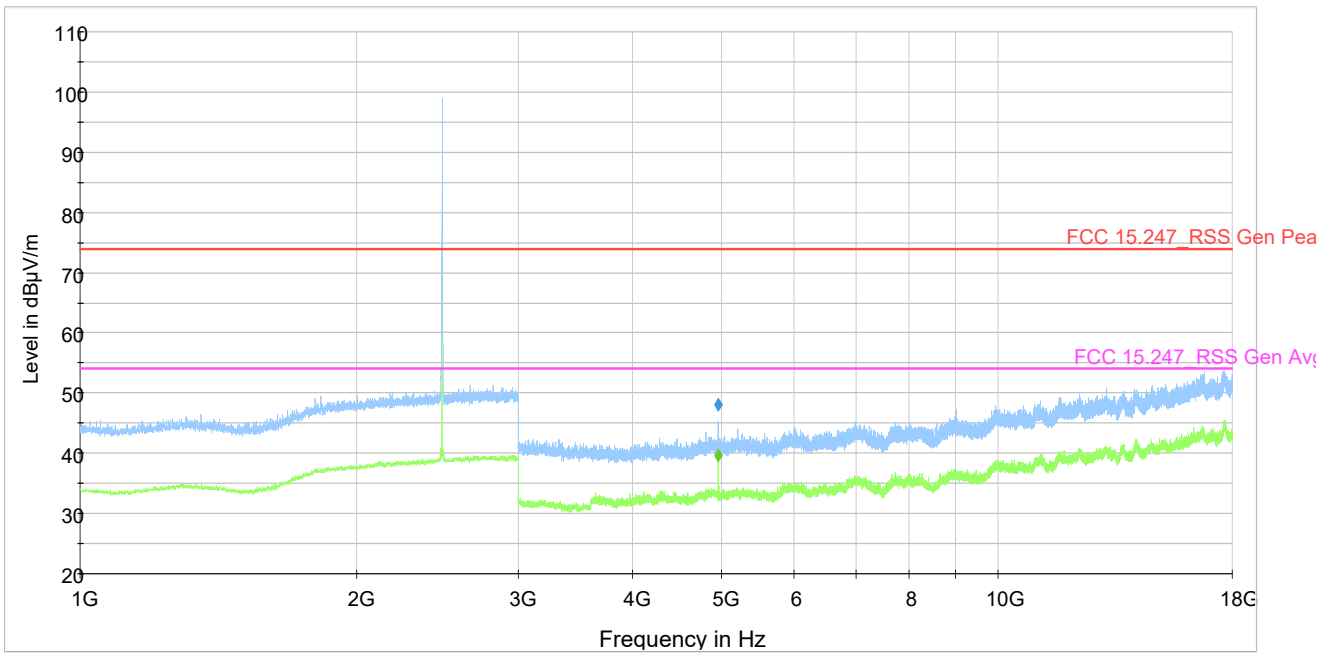
— Preview Result 2-RMS [Preview Result 2.Result:4]     — Preview Result 1-PK+ [Preview Result 1.Result:2]  
— FCC 15.247\_RSS Gen Peak [..]     — FCC 15.247\_RSS Gen Avg [..]  
◆ Final\_Result PK+ [Final\_Result.Result:4]     ◆ Final\_Result RMS [Final\_Result.Result:5]

**Plot 9-22. Radiated Spurious Emissions 1-18 GHz (Ch. 0)**



— Preview Result 2-RMS [Preview Result 2.Result:4] 
 — Preview Result 1-PK+ [Preview Result 1.Result:2] 
 — FCC 15.247\_RSS Gen Peak [..] 
 — FCC 15.247\_RSS Gen Avg [..] 
 ◆ Final\_Result PK+ [Final\_Result.Result:4] 
 ◆ Final\_Result RMS [Final\_Result.Result:5]

**Plot 9-23. Radiated Spurious Emissions 1-18 GHz (Ch. 19)**

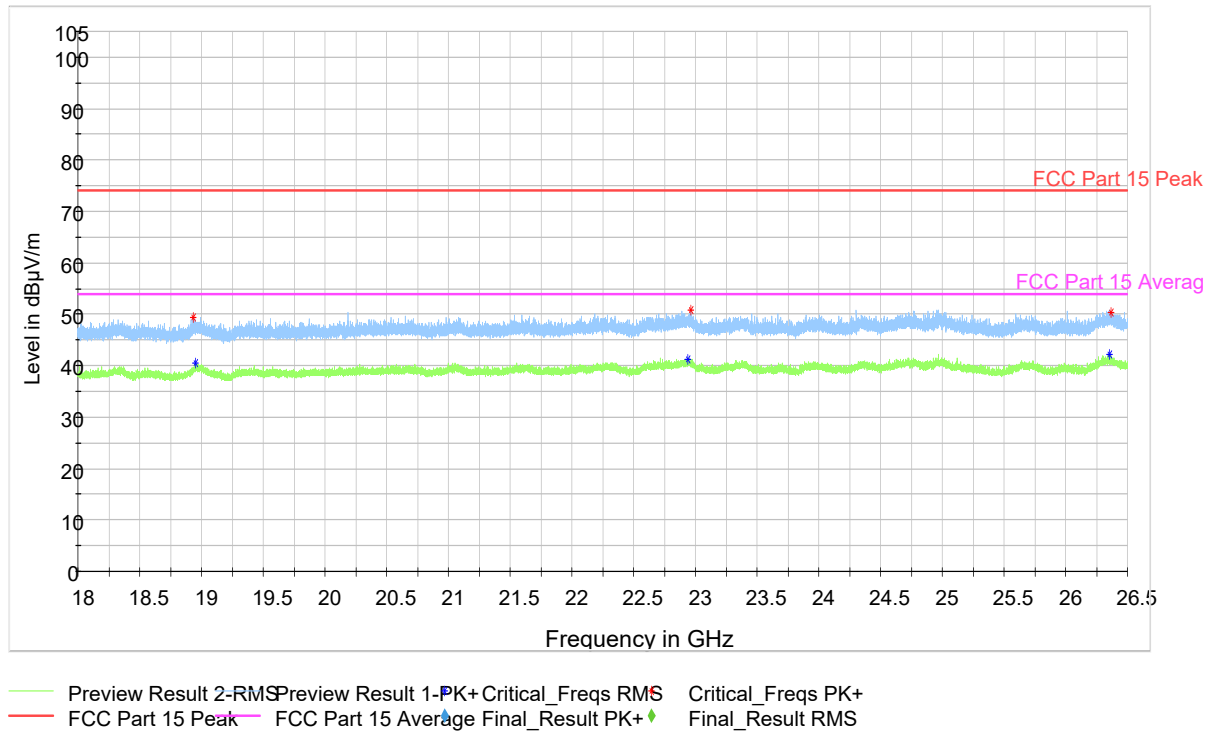


— Preview Result 2-RMS [Preview Result 2.Result:4] 
 — Preview Result 1-PK+ [Preview Result 1.Result:2] 
 — FCC 15.247\_RSS Gen Peak [..] 
 — FCC 15.247\_RSS Gen Avg [..] 
 ◆ Final\_Result PK+ [Final\_Result.Result:4] 
 ◆ Final\_Result RMS [Final\_Result.Result:5]

**Plot 9-24. Radiated Spurious Emissions 1-18 GHz (Ch. 39)**

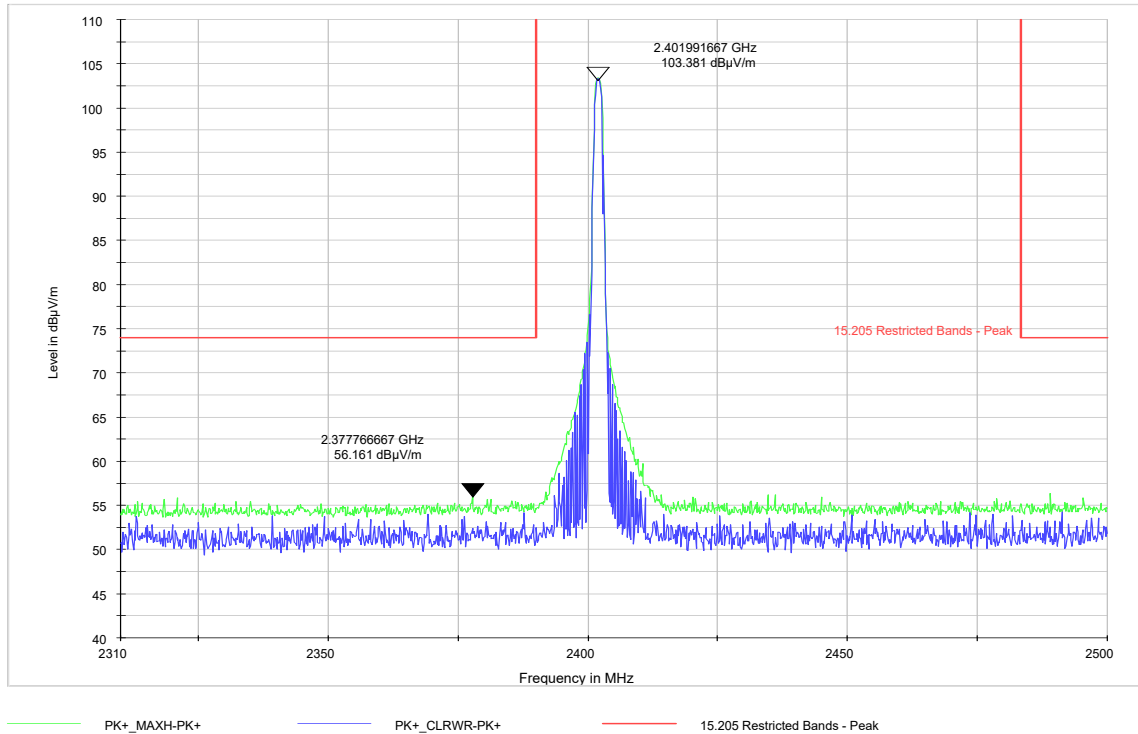
### 9.6.5.3 Emissions in 18-26.5 GHz range

No significant emissions to report above noise floor.

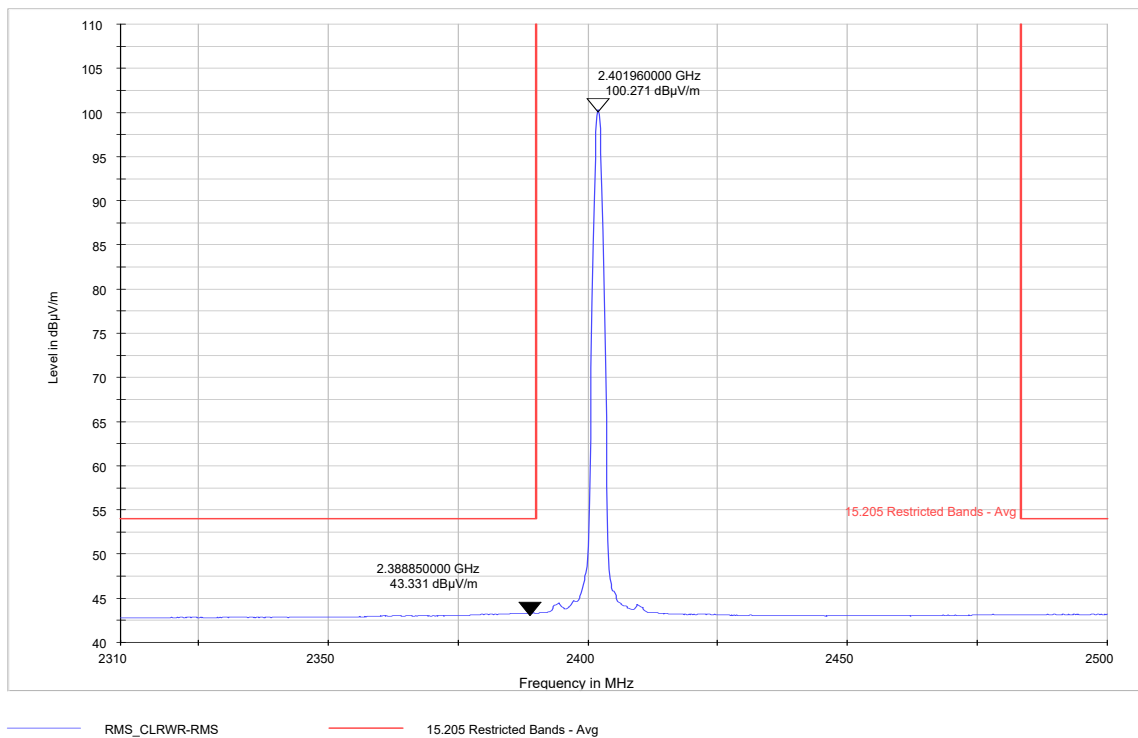


**Plot 9-24. Radiated Spurious Emissions (Ch. 0) (18 – 26.5 GHz)**

### 9.6.5.4 Radiated restricted Band-edge emissions

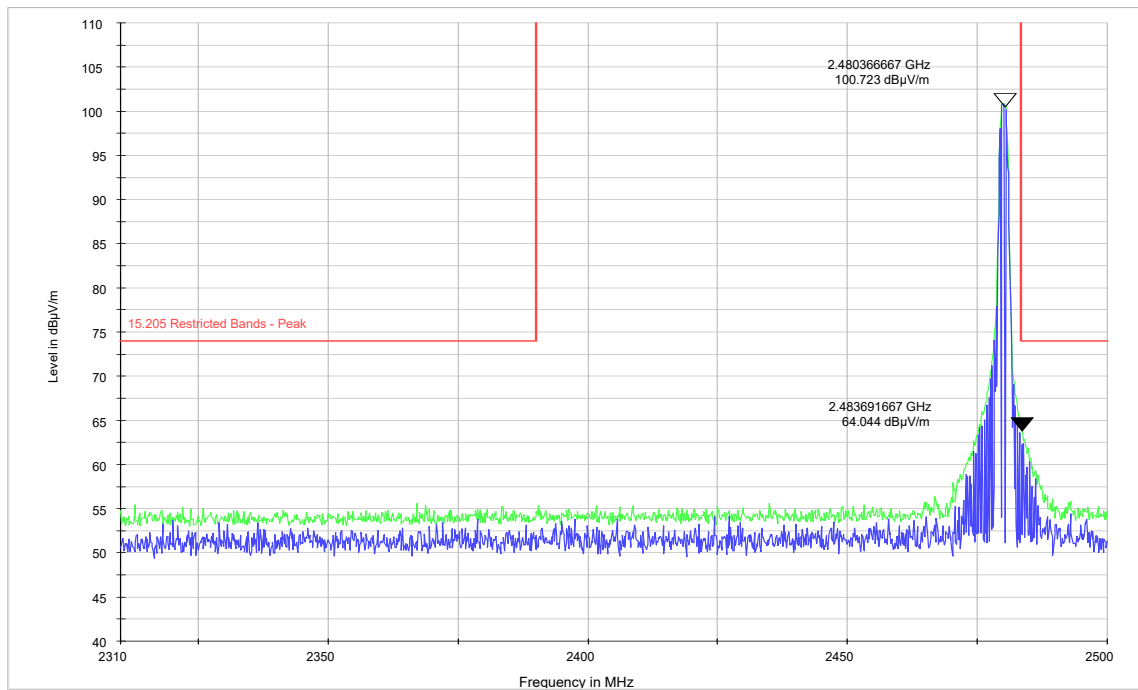


**Plot 9-25. Radiated Restricted Band Edge (Ch. 0) Peak**



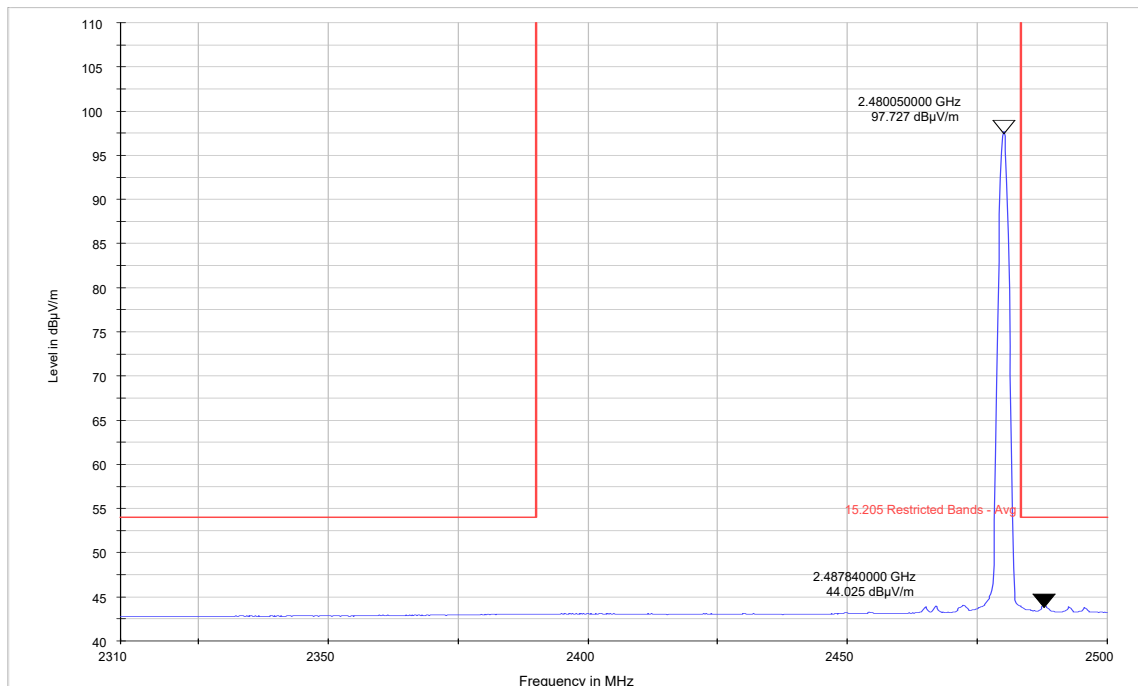
**Plot 9-26. Radiated Restricted Band Edge (Ch. 0) Average**





PK+\_MAXH-PK+      PK+\_CLRWR-PK+      15.205 Restricted Bands - Peak

**Plot 9-27. Radiated Restricted Band Edge (Ch. 39) Peak**



RMS\_CLRWR-RMS      15.205 Restricted Bands - Avg

**Plot 9-28. Radiated Restricted Band Edge (Ch. 39) Average**

## 9.7 AC Line Conducted Emissions

### 9.7.1 Test Requirements

FCC CFR 47 Rule Part 15.207 (a)

Industry Canada RSS Gen [8.8]

### 9.7.2 Test Method

Conducted power line measurements were made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment was tested with the power cords that were used under normal operating conditions. The following measurements were made using a LISN (Line Impedance Stabilization Network). AC powered peripherals were attached to a second LISN with the 50 ohm measuring port terminated by a 50 ohm resistive load.

#### EMI Receiver Settings:

**150 kHz – 30 MHz:**

RBW= 9 kHz

VBW  $\geq$  3 X RBW

Trace Mode: Peak Detector (Max Hold).

Final measurements were performed using Quasi-Peak and Average Detectors.

Span= 150 kHz – 30 MHz

Sweep time= Auto

### 9.7.3 Limit

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

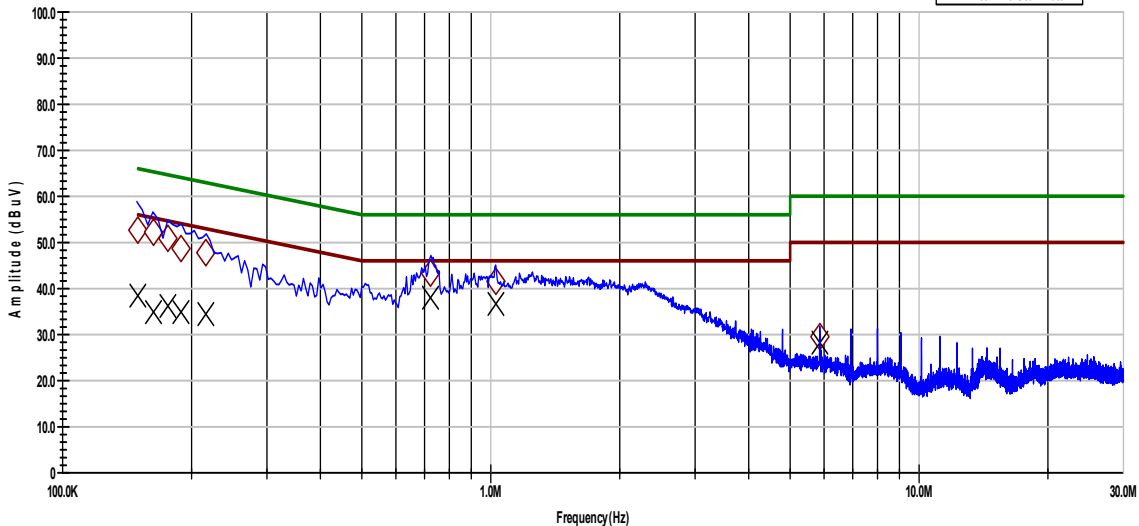
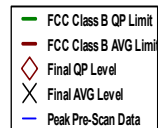
### 9.7.4 Test Result:

Pass

### 9.7.5 Test Data:

Frequency (MHz)	QP Net Reading (dB $\mu$ V)	AVG Net Reading (dB $\mu$ V)	Quasi-Peak Limit (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Line Tested (L or N)	Quasi-Peak Margin (dB)	Average Margin (dB)
0.15	52.5	38.65	66	56	L	-13.5	-17.35
0.16	52.25	34.98	65.64	55.64	L	-13.39	-20.66
0.18	51.05	36.28	65.26	55.26	L	-14.21	-18.98
0.19	48.71	34.74	64.87	54.87	L	-16.16	-20.13
0.22	47.83	34.57	64.1	54.1	L	-16.27	-19.53
0.72	43.37	37.86	56	46	L	-12.63	-8.14
1.03	41.73	36.58	56	46	L	-14.27	-9.42
5.86	29.4	28.19	60	50	L	-30.6	-21.81
0.15	51.07	37.59	66	56	N	-14.93	-18.41
0.17	49.54	32.34	65.39	55.39	N	-15.84	-23.04
0.19	50	35.44	65	55	N	-15	-19.56
0.73	43.59	37.5	56	46	N	-12.41	-8.5
1.03	41.61	36.51	56	46	N	-14.39	-9.49
6.93	29.69	28.18	60	50	N	-30.31	-21.82

Microsoft EMC Laboratory  
 Redmond 17760  
 Final Line Measurements



Operator: Daniel Salinas

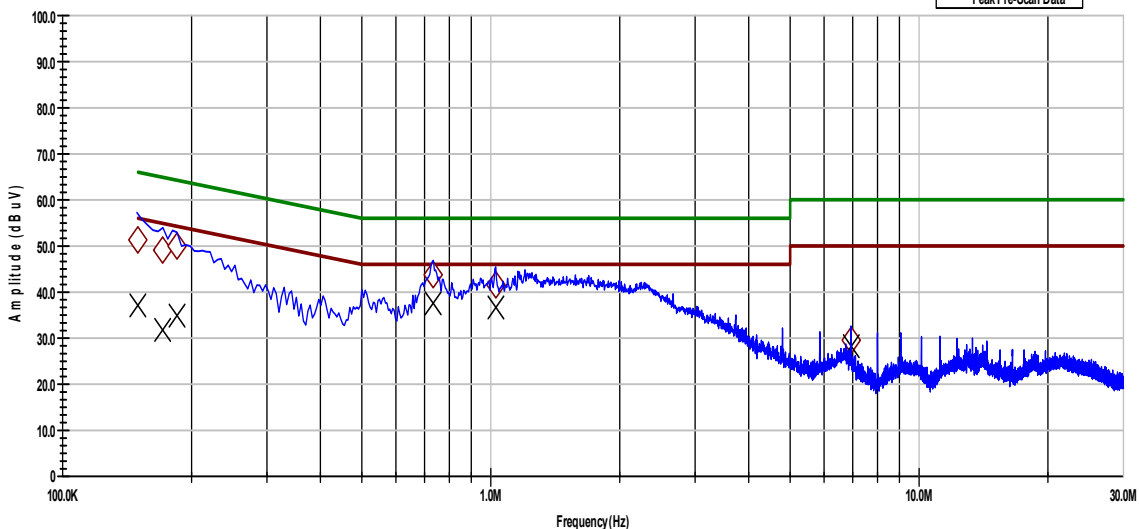
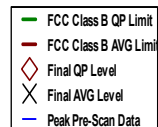
Precheck (Yes/No): Yes

Current Time -04:18:43 PM, Thursday August 13, 2015

TILE Profile: CE Rev 1.7

**Plot 9-29. AC Line Conducted Emissions- Line (150 kHz- 30 MHz)**

Microsoft EMC Laboratory  
 Redmond 17760  
 Final Neutral Measurements



Operator: Daniel Salinas

Precheck (Yes/No): Yes

Current Time -04:23:46 PM, Thursday August 13, 2015

TILE Profile: CE Rev 1.7

**Plot 9-30. AC Line Conducted Emissions- Neutral (150 kHz- 30 MHz)**

# End of Report