



**MET Laboratories, Inc.** *Safety Certification - EMI - Telecom Environmental Simulation*

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August 11, 2014

Nielsen Audio  
9705 Patuxent Woods Drive  
Columbia, MD 21046

Dear Allen Zimmerman,

Enclosed is the EMC Wireless test report for compliance testing of the Nielsen Audio, PPM 360 Meter as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Part 15, Subpart B and ICES-003, Issue 5 August 2012 for a Class B Digital Device, and FCC Part 15 Subpart C and RSS-210, Issue 8, Dec. 2010 for Intentional Radiators.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,  
MET LABORATORIES, INC.

Jennifer Warnell  
Documentation Department

Reference: (\\Nielsen Audio\\EMC40578B-FCC247 Rev. 1)

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## **Electromagnetic Compatibility Criteria Test Report**

for the

**Nielsen Audio  
PPM 360 Meter**

**Tested under**  
the FCC Certification Rules  
contained in  
Title 47 of the CFR, Parts 15 Subpart B & ICES-003  
for Class B Digital Devices  
&  
15.247 Subpart C & RSS-210, Issue 8, Dec. 2010  
for Intentional Radiators

**MET Report: EMC40578B-FCC247 Rev. 1**

August 11, 2014

**Prepared For:**

**Nielsen Audio  
9705 Patuxent Woods Drive  
Columbia, MD 21046**

**Prepared By:**  
**MET Laboratories, Inc.**  
914 W. Patapsco Ave.  
Baltimore, MD 21230

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15.247 Subpart C & RSS-210, Issue 8, Dec. 2010  
for Intentional Radiators



Benjamin Taylor, Project Engineer  
Electromagnetic Compatibility Lab



Jennifer Warnell  
Documentation Department

**Engineering Statement:** The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules Parts 15B, 15.247 and Industry Canada standards ICES-003, Issue 5 August 2012, RSS-210, Issue 8, Dec. 2010 under normal use and maintenance.



Asad Bajwa,  
Director, Electromagnetic Compatibility Lab

## Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	July 29, 2014	Initial Issue.
1	August 11, 2014	Editorial corrections.

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## List of Terms and Abbreviations

<b>AC</b>	<b>Alternating Current</b>
<b>ACF</b>	<b>Antenna Correction Factor</b>
<b>Cal</b>	<b>Calibration</b>
<b><i>d</i></b>	<b>Measurement Distance</b>
<b>dB</b>	<b>Decibels</b>
<b>dB<sub>μ</sub>A</b>	<b>Decibels above one microamp</b>
<b>dB<sub>μ</sub>V</b>	<b>Decibels above one microvolt</b>
<b>dB<sub>μ</sub>A/m</b>	<b>Decibels above one microamp per meter</b>
<b>dB<sub>μ</sub>V/m</b>	<b>Decibels above one microvolt per meter</b>
<b>DC</b>	<b>Direct Current</b>
<b>E</b>	<b>Electric Field</b>
<b>DSL</b>	<b>Digital Subscriber Line</b>
<b>ESD</b>	<b>Electrostatic Discharge</b>
<b>EUT</b>	<b>Equipment Under Test</b>
<b><i>f</i></b>	<b>Frequency</b>
<b>FCC</b>	<b>Federal Communications Commission</b>
<b>GRP</b>	<b>Ground Reference Plane</b>
<b>H</b>	<b>Magnetic Field</b>
<b>HCP</b>	<b>Horizontal Coupling Plane</b>
<b>Hz</b>	<b>Hertz</b>
<b>IEC</b>	<b>International Electrotechnical Commission</b>
<b>kHz</b>	<b>kilohertz</b>
<b>kPa</b>	<b>kilopascal</b>
<b>kV</b>	<b>kilovolt</b>
<b>LISN</b>	<b>Line Impedance Stabilization Network</b>
<b>MHz</b>	<b>Megahertz</b>
<b>μH</b>	<b>microhenry</b>
<b>μ</b>	<b>microfarad</b>
<b>μs</b>	<b>microseconds</b>
<b>NEBS</b>	<b>Network Equipment-Building System</b>
<b>PRF</b>	<b>Pulse Repetition Frequency</b>
<b>RF</b>	<b>Radio Frequency</b>
<b>RMS</b>	<b>Root-Mean-Square</b>
<b>TWT</b>	<b>Traveling Wave Tube</b>
<b>V/m</b>	<b>Volts per meter</b>
<b>VCP</b>	<b>Vertical Coupling Plane</b>



# **I. Executive Summary**

## A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Nielsen Audio PPM 360 Meter, with the requirements of Part 15, §15.247. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the PPM 360 Meter. Nielsen Audio should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the PPM 360 Meter, has been **permanently** discontinued.

## B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, §15.247, in accordance with Nielsen Audio, purchase order number TF20131002. All tests were conducted using measurement procedure ANSI C63.4-2003.

FCC Reference 47 CFR Part 15.247:2005	IC Reference RSS-210 Issue 8: 2010; RSS-GEN Issues 3: 2010	Description	Compliance
47 CFR Part 15.107 (a)	ICES-003 Issue 5 August 2012	Conducted Emission Limits for a Class B Digital Device	Compliant
47 CFR Part 15.109 (a)	ICES-003 Issue 5 August 2012	Radiated Emission Limits for a Class B Digital Device	Compliant
Title 47 of the CFR, Part 15 §15.203	N/A	Antenna Requirement	Compliant
Title 47 of the CFR, Part 15 §15.207(a)	RSS-GEN (7.2.4)	Conducted Emission Limits	Compliant
Title 47 of the CFR, Part 15 §15.247(a)(1)	RSS-Gen(4.6)	20 dB Occupied Bandwidth	Compliant
		99% Occupied Bandwidth	Compliant
Title 47 of the CFR, Part 15 §15.247(a)(1)	RSS-210(A8.1)	Average Time of Occupancy (Dwell Time)	Compliant
Title 47 of the CFR, Part 15 §15.247(a)(1)	RSS-210(A8.1)	Number of RF Channels	Compliant
Title 47 of the CFR, Part 15 §15.247(a)(1)	RSS-210(A8.1)	RF Channel Separation	Compliant
Title 47 of the CFR, Part 15 §15.247(b)	RSS-210(A8.4)	Peak Power Output	Compliant
Title 47 of the CFR, Part 15 §15.247(d); §15.209; §15.205	RSS-210(A8.5)	Radiated Spurious Emissions	Compliant
Title 47 of the CFR, Part 15 §15.247(d)	RSS-210(A8.5)	Spurious Conducted Emissions	Compliant
Title 47 of the CFR, Part 15 §15.247(g) & (h)	RSS-210(A8.1)	Declaration Statements for FHSS	Compliant

**Table 1. Executive Summary of EMC Part 15.247 Compliance Testing**

## II. Equipment Configuration

## A. Overview

MET Laboratories, Inc. was contracted by Nielsen Audio to perform testing on the PPM 360 Meter, under Nielsen Audio's purchase order number TF20131002.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Nielsen Audio, PPM 360 Meter.

The results obtained relate only to the item(s) tested.

<b>Model(s) Tested:</b>	PPM 360 Meter	
<b>Model(s) Covered:</b>	PPM 360 Meter	
<b>EUT Specifications:</b>	Primary Power: 3.7 V Li-ion Battery	
	Secondary Power: 120 VAC, 60 Hz (external charger)	
	FCC ID: IKGDA120	
	IC: 4213A-DA120	
	Type of Modulations:	FHSS
<b>Environmental Test Conditions:</b>	Equipment Code:	DSS
	Peak RF Output Power:	7.02dBm
	EUT Frequency Ranges:	2402-2480MHz
<b>Analysis:</b>	The results obtained relate only to the item(s) tested.	
<b>Environmental Test Conditions:</b>	Temperature: 15-35° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
<b>Evaluated by:</b>	Benjamin Taylor	
<b>Report Date(s):</b>	August 11, 2014	

**Table 2. EUT Summary Table**

## B. References

<b>CFR 47, Part 15, Subpart C</b>	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: General Rules and Regulations, Allocation, Assignment, and Use of Radio Frequencies
<b>CFR 47, Part 15, Subpart B</b>	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
<b>RSS-210, Issue 8, Dec. 2010</b>	Low-power Licence-exempt Radiocommunications Devices (All Frequency Bands): Category I Equipment
<b>RSS-GEN, Issue 3, Dec. 2010</b>	General Requirements and Information for the Certification of Radio Apparatus
<b>ICES-003, Issue 5 August 2012</b>	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
<b>ANSI C63.4:2003</b>	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
<b>ISO/IEC 17025:2005</b>	General Requirements for the Competence of Testing and Calibration Laboratories
<b>ANSI C63.10-2009</b>	American National Standard for Testing Unlicensed Wireless Devices

**Table 3. References**

## C. Test Site

All testing was performed at MET Laboratories, Inc., 914 W. Patapsco Ave., Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

## D. Description of Test Sample

The Nielsen Audio PPM 360 Meter, Equipment Under Test (EUT), is carried by panelists and detects the media codes embedded into program material that panelists are exposed to throughout the day. The meter logs this information along with a time stamp when the media codes are detected. At predetermined times the PPM G2V2 Meter connects to the collection servers. After establishing this connection the PPM G2V2 Meter then transmits the panelist data logs to the collection servers. After the data logs are transmitted the PPM G2V2 Meter then disconnects from the collection servers until the next programmed time.



Photograph 1. Nielsen Audio PPM 360 Meter

## **E. Mode of Operation**

The PPM G2V2 Meter uses the same wireless provider that one may use with a standard cell phone. Three important differences exist between the PPM G2V2 Meter and a cell phone. The PPM G2V2 Meter does not have GPS location detection; the PPM G2V2 Meter does not have SMS messaging capability; and the PPM G2V2 Meter does not have voice capability.

## **F. Method of Monitoring EUT Operation**

1. Messages formerly displayed on the base/recharger of the first generation PPM G2V2 Meter are now displayed on the PPM G2V2 Meter's LCD.
2. The green motion LED on the PPM G2V2 Meter operates on the same principles as the generation 1 meter. The LED is included for compliance purposes and has 3 unique states (on, flash/warn, and off).

## **G. Modifications**

- a) **Modifications to EUT**  
No modifications were made to the EUT.
- b) **Modifications to Test Standard**  
No modifications were made to the test standard.

## **H. Disposition of EUT**

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Nielsen Audio upon completion of testing.

### **III. Electromagnetic Compatibility Criteria for Unintentional Radiators**



## Electromagnetic Compatibility Criteria

### § 15.107 Conducted Emissions Limits

**Test Requirement(s):** **15.107 (a)** Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 4. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

**15.107 (b)** For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 4. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges.

**15.207(a)**, Except as shown in paragraphs (b) and (c) of this section\*, charging, AC adapters or battery eliminators the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the Table 4, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency range (MHz)	Class A Conducted Limits (dB $\mu$ V)		*Class B Conducted Limits (dB $\mu$ V)	
	Quasi-Peak	Average	Quasi-Peak	Average
* 0.15- 0.45	79	66	66 - 56	56 - 46
0.45 - 0.5	79	66	56	46
0.5 - 30	73	60	60	50
Note 1 — The lower limit shall apply at the transition frequencies. Note 2 — The limit decreases linearly with the logarithm if the frequency in the range 0.15 MHz to 0.5 MHz. * -- Limits per Subsection 15.207(a).				

**Table 4. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Subsections 15.107(a) (b) and 15.207(a)**

**Test Procedures:** The EUT was placed on a non-metallic table, 80 cm above the ground plane and 40cm from a vertical ground plane. The method of testing, test conditions, and test procedures of ANSI C63.4 were used. The EUT was powered through a 50 $\Omega$ /50 $\mu$ H LISN. An EMI receiver, connected to the measurement port of the LISN, scanned the frequency range from 150 kHz to 30 MHz in order to find the peak conducted emissions. All peak emissions within 6 dB of the limit were re-measured using a quasi-peak and/or average detector as appropriate.

**Test Results:** The EUT was compliant with the Class B requirement(s) of this section. Measured emissions were below applicable limits.

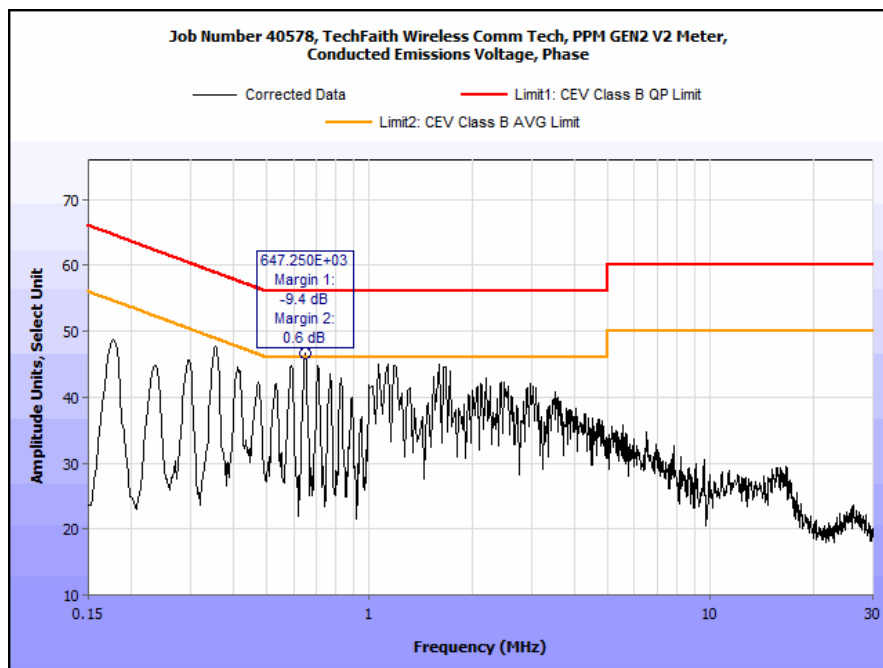
**Test Engineer(s):** Surinder Singh

**Test Date(s):** 05/20/14

## Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

Frequency (MHz)	Uncorrected Meter Reading (dBμV) QP	Cable Loss (dB)	Corrected Measurement (dBμV) QP	Limit (dBμV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBμV) Avg.	Cable Loss (dB)	Corrected Measurement (dBμV) AVG	Limit (dBμV) AVG	Margin (dB) AVG
0.237	48.18	0	48.18	62.2	-14.02	36.9	0	36.9	52.2	-15.3
0.592	39.48	0	39.48	56	-16.52	30.11	0	30.11	46	-15.89
1.79	28.92	0	28.92	56	-27.08	16.94	0	16.94	46	-29.06
7.44	24.94	0	24.94	60	-35.06	15.48	0	15.48	50	-34.52
15.68	21.33	0	21.33	60	-38.67	12.19	0	12.19	50	-37.81
24.89	15.39	0	15.39	60	-44.61	10.03	0	10.03	50	-39.97

Table 5. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

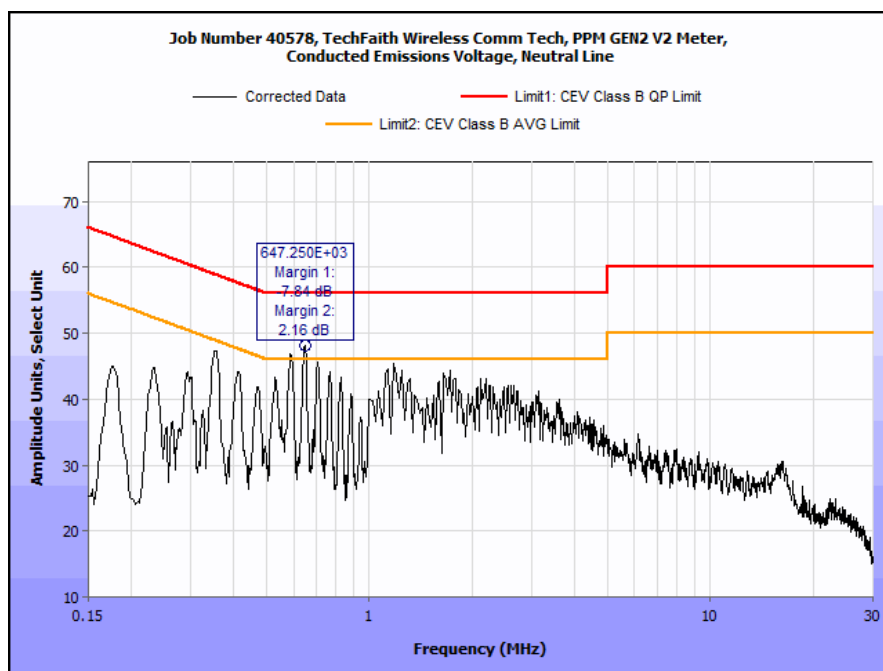


Plot 1. Conducted Emissions, Phase Line

## Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

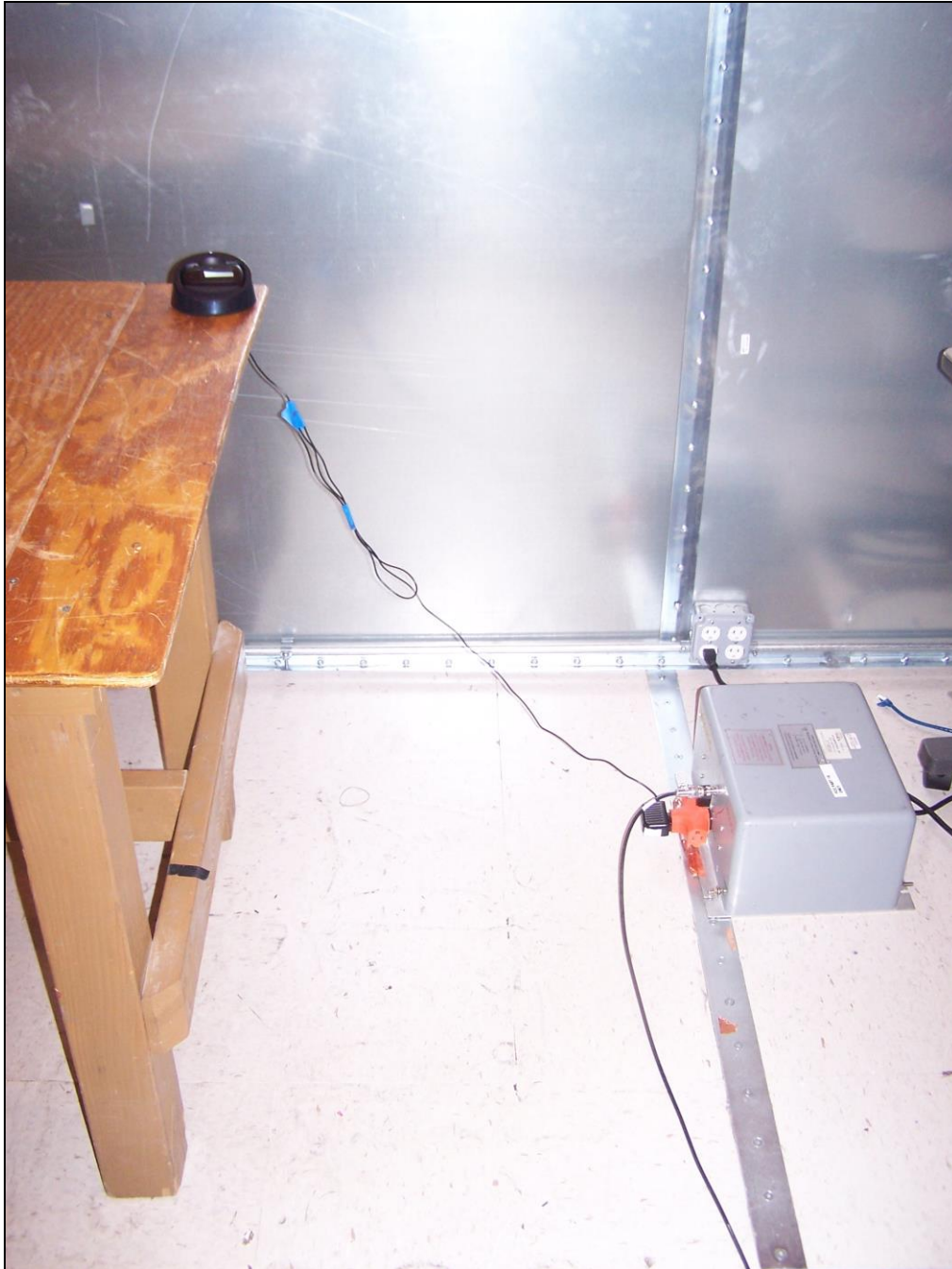
Frequency (MHz)	Uncorrected Meter Reading (dBμV) QP	Cable Loss (dB)	Corrected Measurement (dBμV) QP	Limit (dBμV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBμV) Avg.	Cable Loss (dB)	Corrected Measurement (dBμV) AVG	Limit (dBμV) AVG	Margin (dB) AVG
0.292	47.46	0	47.46	60.47	-13.01	38.01	0	38.01	50.47	-12.46
0.711	42.11	0	42.11	56	-13.89	32.61	0	32.61	46	-13.39
1.35	33.73	0	33.73	56	-22.27	23.8	0	23.8	46	-22.2
6.35	23.99	0	23.99	60	-36.01	13.82	0	13.82	50	-36.18
16.34	20.65	0	20.65	60	-39.35	10.37	0	10.37	50	-39.63
20.7	14.23	0	14.23	60	-45.77	9.43	0	9.43	50	-40.57

Table 6. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)



Plot 2. Conducted Emissions, Neutral Line

## Conducted Emission Limits Test Setup



**Photograph 2. Conducted Emissions, Test Setup**

## Radiated Emission Limits

### § 15.109 Radiated Emissions Limits

**Test Requirement(s):** **15.109 (a)** Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the Class B limits expressed in Table 7.

**15.109 (b)** The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the Class A limits expressed in Table 7.

Frequency (MHz)	Field Strength (dB $\mu$ V/m)	
	§15.109 (b), Class A Limit (dB $\mu$ V) @ 10m	§15.109 (a), Class B Limit (dB $\mu$ V) @ 3m
30 - 88	39.00	40.00
88 - 216	43.50	43.50
216 - 960	46.40	46.00
Above 960	49.50	54.00

**Table 7. Radiated Emissions Limits calculated from FCC Part 15, §15.109 (a) (b)**

**Test Procedures:** The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4 were used. An antenna was located 3 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

**Test Results:** The EUT was compliant with the Class B requirement(s) of this section. Measured emissions were below applicable limits.

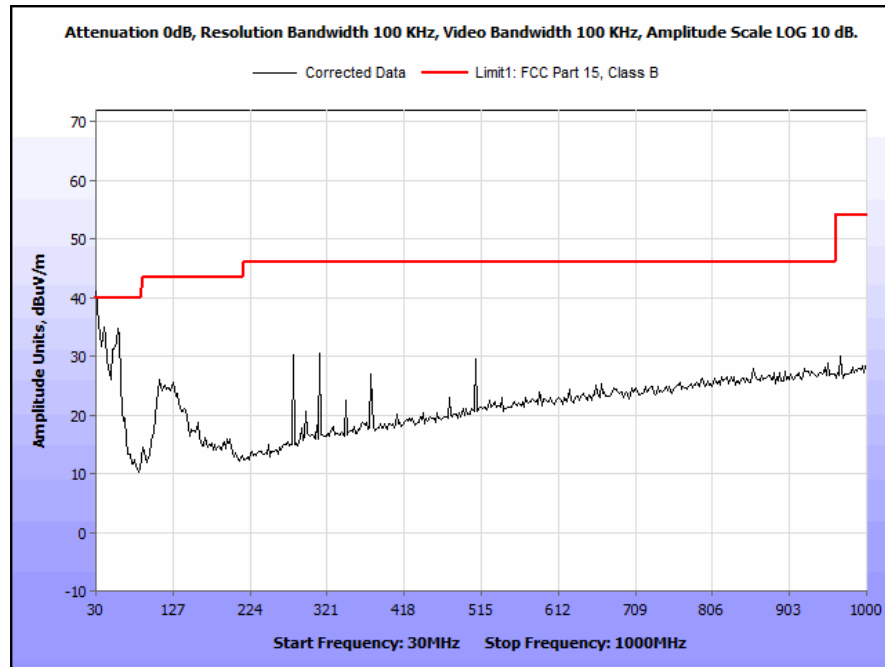
**Test Engineer(s):** Benjamin Taylor

**Test Date(s):** 04/26/14

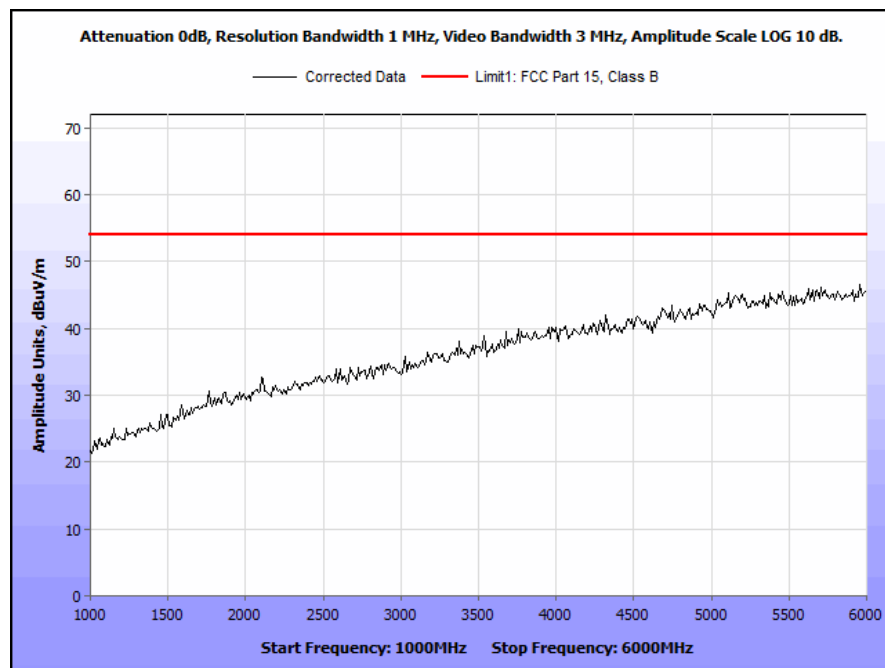
## Radiated Emissions Limits Test Results, Class B

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dB $\mu$ V)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
57.655311	10	H	1.39	5.80	7.43	0.52	0.00	13.75	40.00	-26.25
57.655311	4	V	1.42	21.11	7.43	0.52	0.00	29.06	40.00	-10.94
112.82565	0	H	1.37	5.72	13.37	0.83	0.00	19.92	43.50	-23.58
112.82565	10	V	1.39	7.23	13.37	0.83	0.00	21.43	43.50	-22.07
248.25651	5	H	1.39	4.69	12.13	1.23	0.00	18.05	46.00	-27.95
248.25651	2	V	1.37	4.48	12.13	1.23	0.00	17.84	46.00	-28.16
344.04559	12	H	1.40	7.48	14.98	1.37	0.00	23.83	46.00	-22.17
344.04559	15	V	1.39	6.85	14.98	1.37	0.00	23.20	46.00	-22.80
507.87747	19	H	1.42	7.96	18.16	1.88	0.00	28.00	46.00	-18.00
507.87747	7	V	1.37	11.12	18.16	1.88	0.00	31.16	46.00	-14.84
976.51303	11	H	1.32	5.95	23.53	2.87	0.00	32.35	54.00	-21.65
976.51303	9	V	1.35	6.02	23.53	2.87	0.00	32.42	54.00	-21.58

**Table 8. Radiated Emissions Limits, Test Results**



**Plot 3. Radiated Emissions, 30 MHz – 1 GHz**



**Plot 4. Radiated Emissions, 1 GHz – 6 GHz**



## Radiated Emission Limits Test Setup



**Photograph 3. Radiated Emissions, Test Setup**



## **IV. Electromagnetic Compatibility Criteria for Intentional Radiators**

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.203 Antenna Requirement

**Test Requirement:**

**§ 15.203:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

- a.) Antenna must be permanently attached to the unit.
- b.) Antenna must use a unique type of connector to attach to the EUT.
- c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

**Results:**

The EUT as tested is compliant the criteria of §15.203. The transmitter employs an integrated antenna.

**Test Engineer(s):**

Benjamin Taylor

**Test Date(s):**

05/05/14

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.207(a) Conducted Emissions Limits

**Test Requirement(s):** § 15.207 (a): For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50  $\Sigma$  line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency range (MHz)	§ 15.207(a), Conducted Limit (dB $\mu$ V)	
	Quasi-Peak	Average
* 0.15- 0.45	66 - 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

**Table 9. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)**

**Test Procedure:** The EUT was placed on a 0.8 m-high wooden table inside a screen room. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50  $\Omega$ /50  $\mu$ H Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with ANSI C63.4-2003 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz". The measurements were performed over the frequency range of 0.15 MHz to 30 MHz using a 50  $\Omega$ /50  $\mu$ H LISN as the input transducer to an EMC/field intensity meter. For the purpose of this testing, the transmitter was turned on. Scans were performed with the transmitter on.

**Test Results:** The EUT was compliant with this requirement. Measured emissions were below applicable limits.

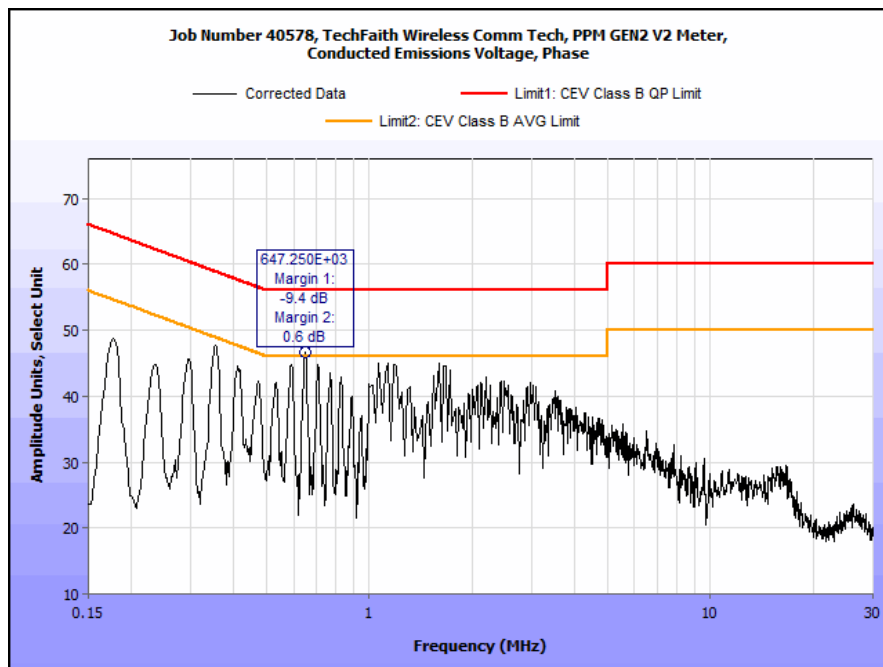
**Test Engineer(s):** Surinder Singh

**Test Date(s):** 05/20/14

## 15.207(a) Conducted Emissions Test Results

Frequency (MHz)	Uncorrected Meter Reading (dBμV) QP	Cable Loss (dB)	Corrected Measurement (dBμV) QP	Limit (dBμV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBμV) Avg.	Cable Loss (dB)	Corrected Measurement (dBμV) AVG	Limit (dBμV) AVG	Margin (dB) AVG
0.237	48.18	0	48.18	62.2	-14.02	36.9	0	36.9	52.2	-15.3
0.592	39.48	0	39.48	56	-16.52	30.11	0	30.11	46	-15.89
1.79	28.92	0	28.92	56	-27.08	16.94	0	16.94	46	-29.06
7.44	24.94	0	24.94	60	-35.06	15.48	0	15.48	50	-34.52
15.68	21.33	0	21.33	60	-38.67	12.19	0	12.19	50	-37.81
24.89	15.39	0	15.39	60	-44.61	10.03	0	10.03	50	-39.97

Table 10. Conducted Emissions, 15.207(a), Phase Line, Test Results

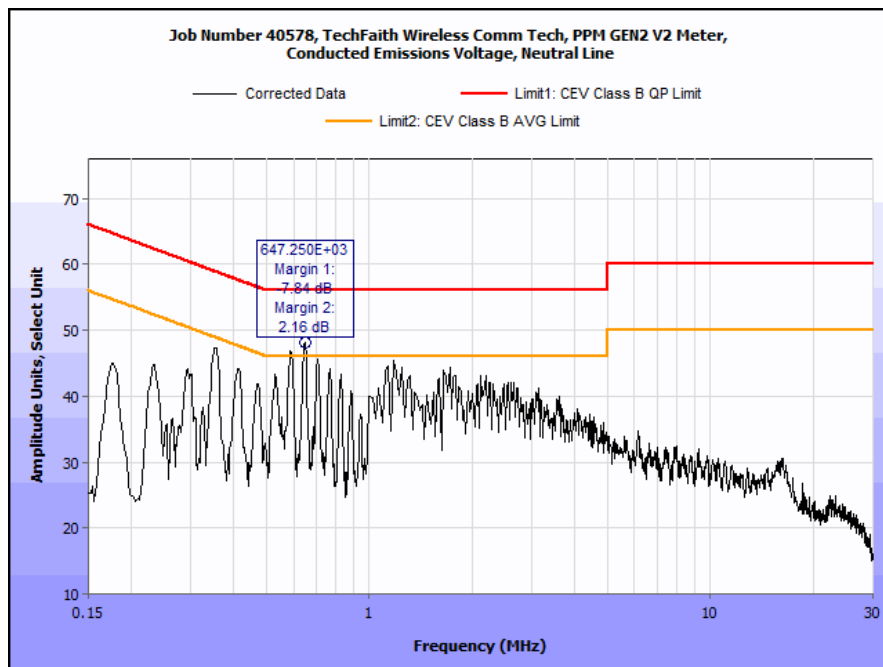


Plot 5. Conducted Emissions, 15.207(a), Phase Line

## 15.207(a) Conducted Emissions Test Results

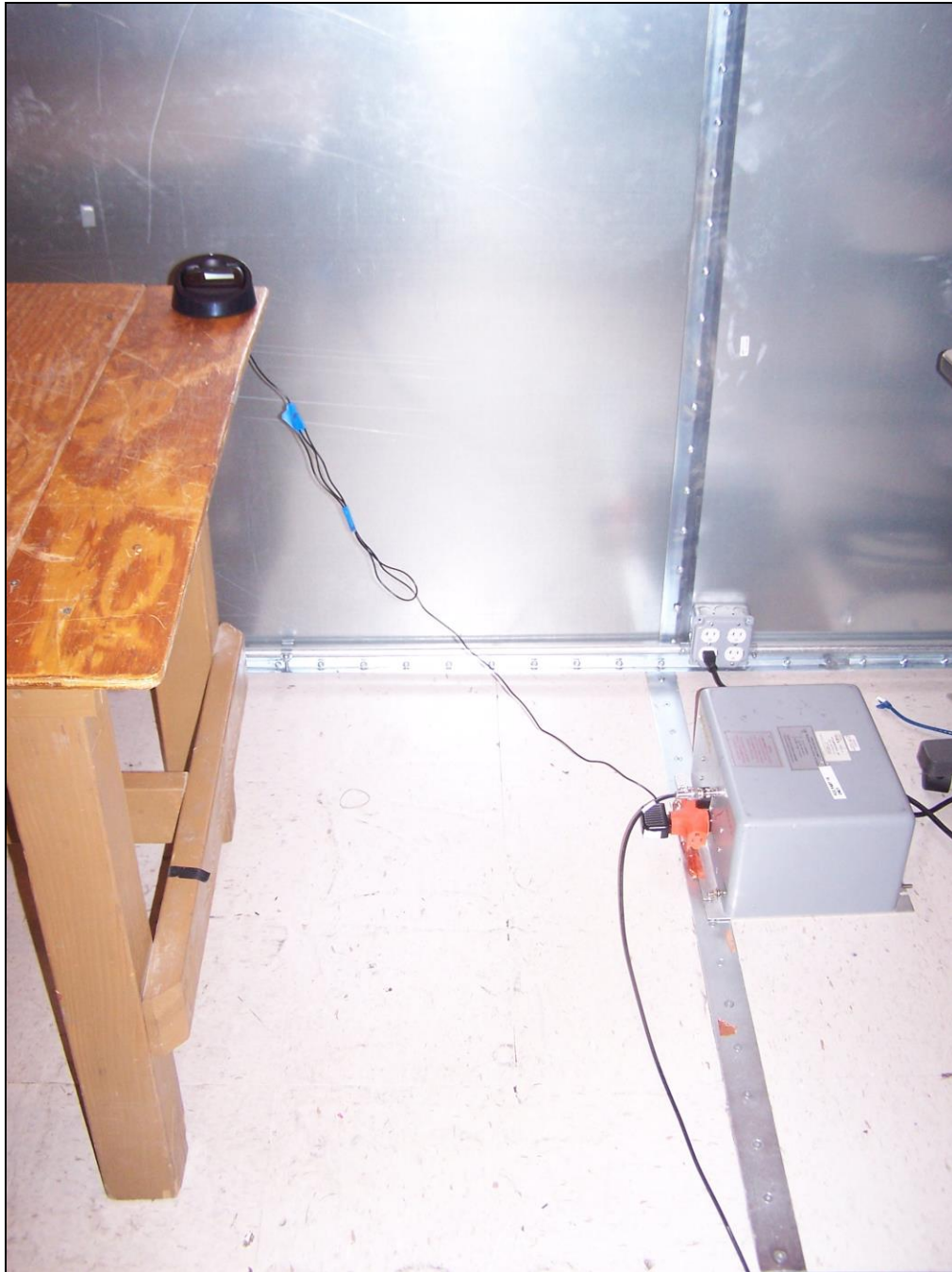
Frequency (MHz)	Uncorrected Meter Reading (dBμV) QP	Cable Loss (dB)	Corrected Measurement (dBμV) QP	Limit (dBμV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBμV) Avg.	Cable Loss (dB)	Corrected Measurement (dBμV) AVG	Limit (dBμV) AVG	Margin (dB) AVG
0.292	47.46	0	47.46	60.47	-13.01	38.01	0	38.01	50.47	-12.46
0.711	42.11	0	42.11	56	-13.89	32.61	0	32.61	46	-13.39
1.35	33.73	0	33.73	56	-22.27	23.8	0	23.8	46	-22.2
6.35	23.99	0	23.99	60	-36.01	13.82	0	13.82	50	-36.18
16.34	20.65	0	20.65	60	-39.35	10.37	0	10.37	50	-39.63
20.7	14.23	0	14.23	60	-45.77	9.43	0	9.43	50	-40.57

Table 11. Conducted Emissions, 15.207(a), Neutral Line, Test Results



Plot 6. Conducted Emissions, 15.207(a), Neutral Line

## 15.207(a) Conducted Emissions Test Setup



**Photograph 4. Conducted Emissions, 15.207(a), Test Setup**

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.247(a)(1) 20 dB Occupied Bandwidth

**Test Requirements:** § 15.247(a): Operation under the provisions of this section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

For systems using digital modulation techniques, the EUT may operate in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands. For DTS, the minimum 6 dB bandwidth shall be at least 500 kHz. For frequency hopping systems, the EUT shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

**Test Procedure:** The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately equal to 1% of the total emission bandwidth. The 20 dB bandwidth was measured and recorded.

**Test Results** The EUT was compliant with § 15.247 (a)(2).

**Test Engineer(s):** Benjamin Taylor

**Test Date(s):** 05/05/14

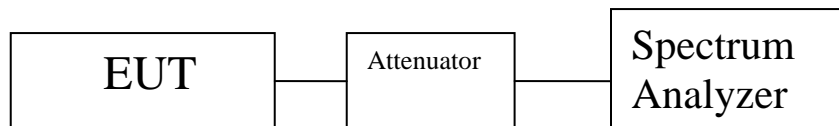
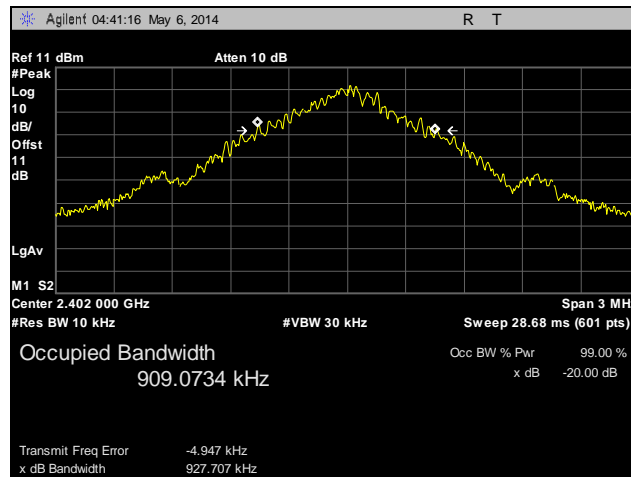


Figure 1. Block Diagram, Occupied Bandwidth Test Setup

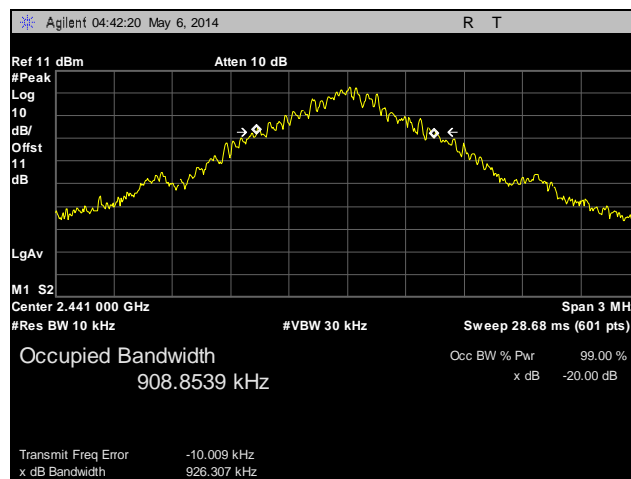
Occupied Bandwidth		
Carrier Channel	Frequency (MHz)	Measured -20dB Occupied Bandwidth (kHz)
Low	2402	927.7
Mid	2441	926.3
High	2480	931.03

Table 12. Occupied Bandwidth, Recorded Results

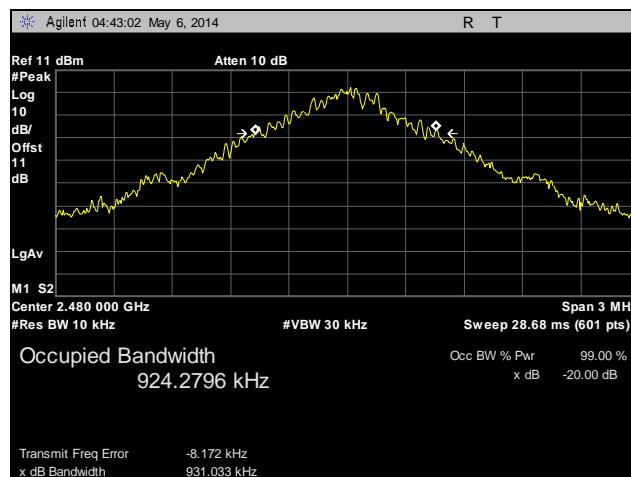
## 20 dB Occupied Bandwidth Test Results



Plot 7. 20 dB Occupied Bandwidth, Low Channel



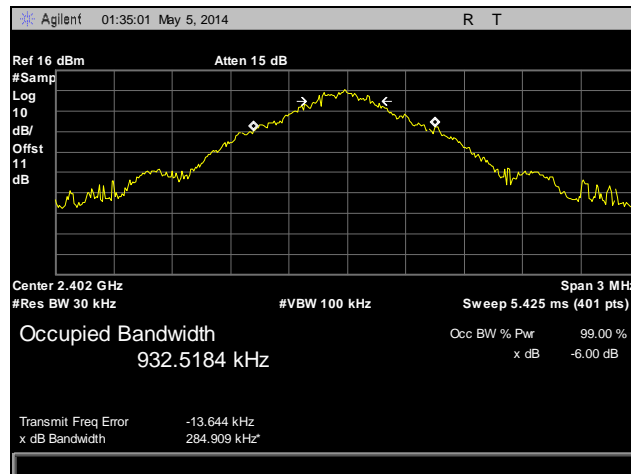
Plot 8. 20 dB Occupied Bandwidth, Mid Channel



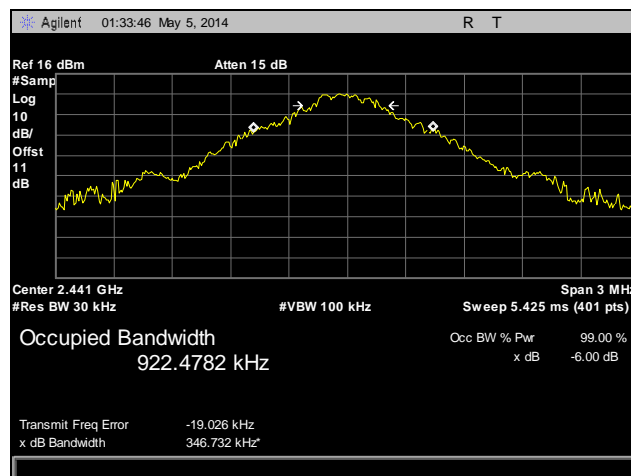
Plot 9. 20 dB Occupied Bandwidth, High Channel



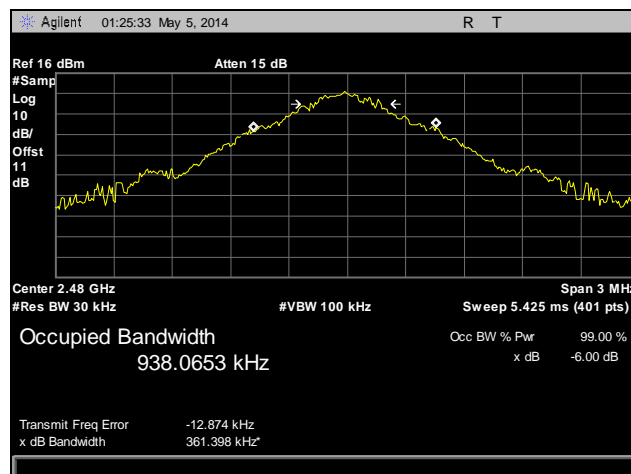
## 99% Occupied Bandwidth Test Results



Plot 10. 99% Occupied Bandwidth, Low Channel



Plot 11. 99% Occupied Bandwidth, Mid Channel



Plot 12. 99% Occupied Bandwidth, High Channel

## Electromagnetic Compatibility Criteria for Intentional Radiators

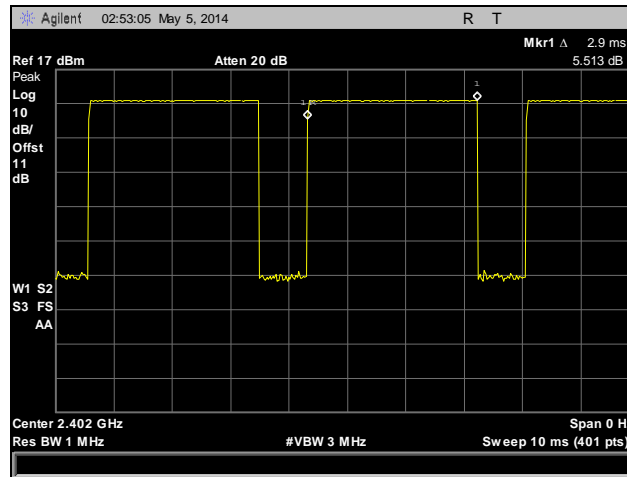
### § 15.247(a)(1) Average Time of Occupancy (Dwell Time)

**Remarks:**

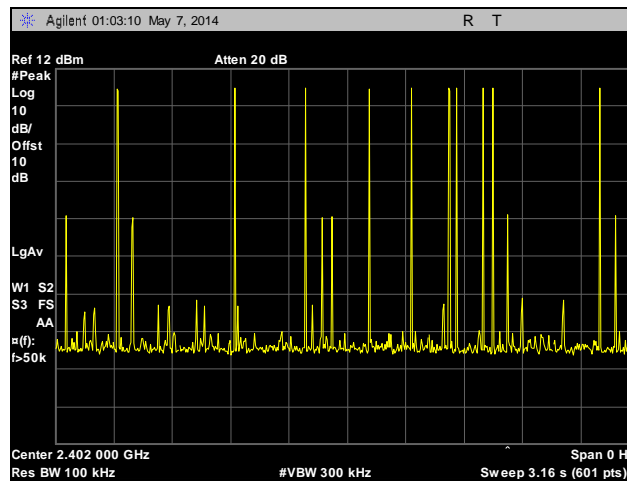
(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Total hopping channels is 79 channels. The EUT meets the specifications of Section 15.247(a)(1) (iii) for Number of Hopping Channels and dwell time.

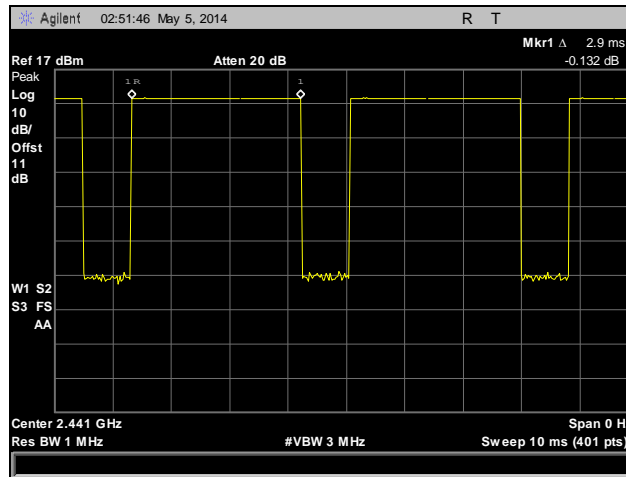
Channel	On Time (ms)	# of times channel appears in a 31.6 s period)	Dwell Time (ms)	Limit (ms)
Low	2.9	100	290	400
Mid	2.9	100	290	400
High	2.9	70	203	400



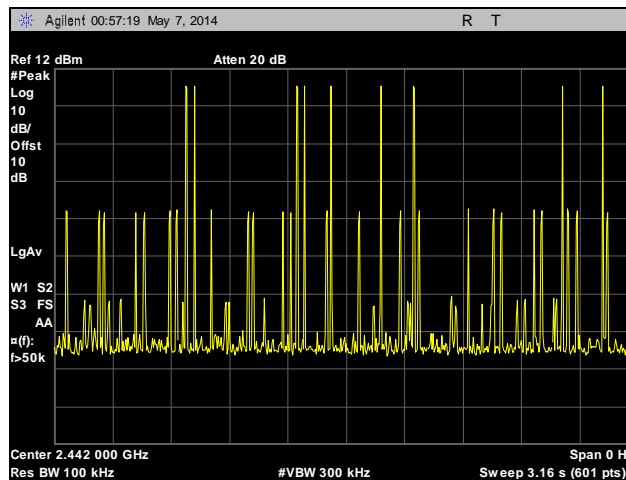
Plot 13. Low Channel, On Time



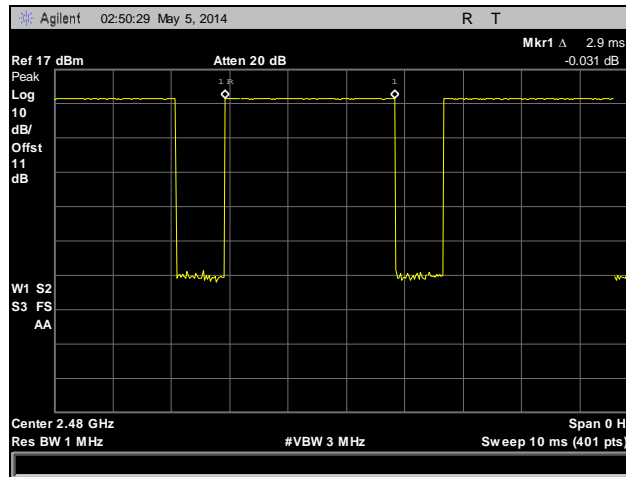
Plot 14. Dwell Time, 3.16s window, Low Channel



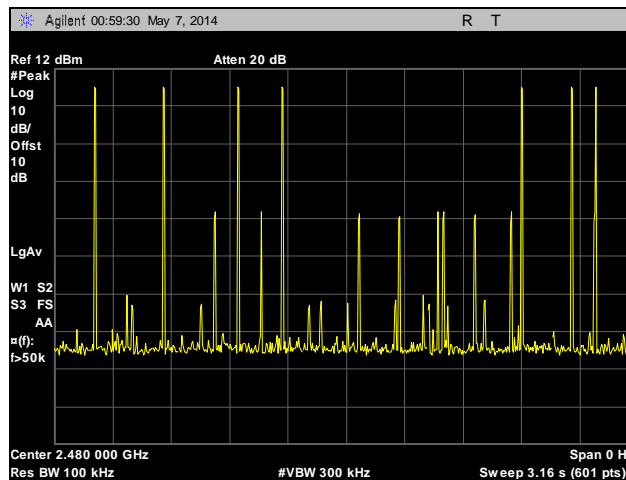
Plot 15. Mid Channel, On Time



Plot 16. Dwell Time, 3.16s window, Mid Channel



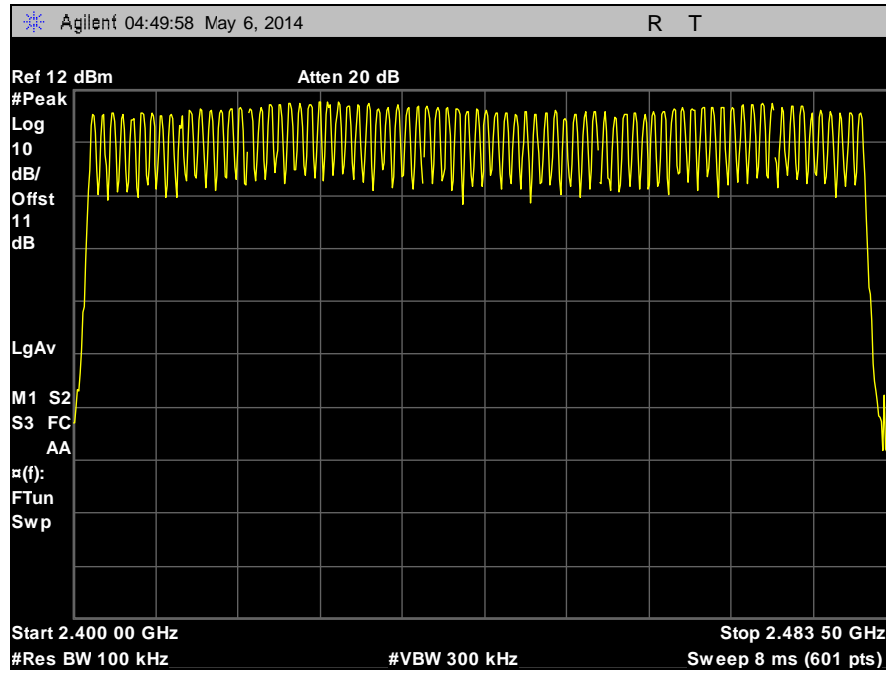
**Plot 17. High Channel, On Time**



**Plot 18. Dwell Time, 3.16s window, High Channel**

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.247(a)(1) Number of RF Channels



Plot 19. Number of Channels

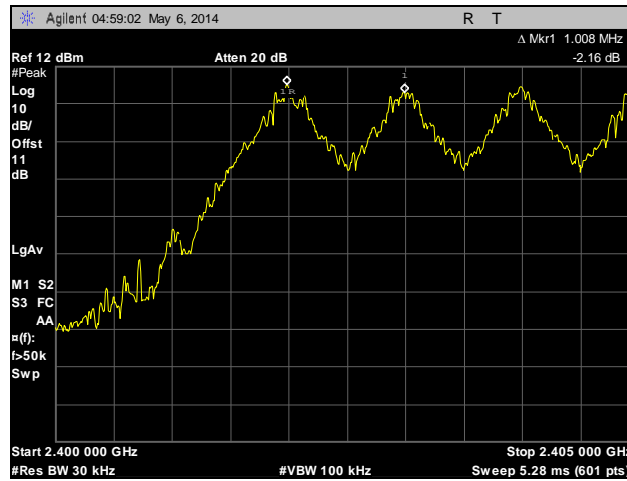
## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.247(a)(1) RF Channel Separation

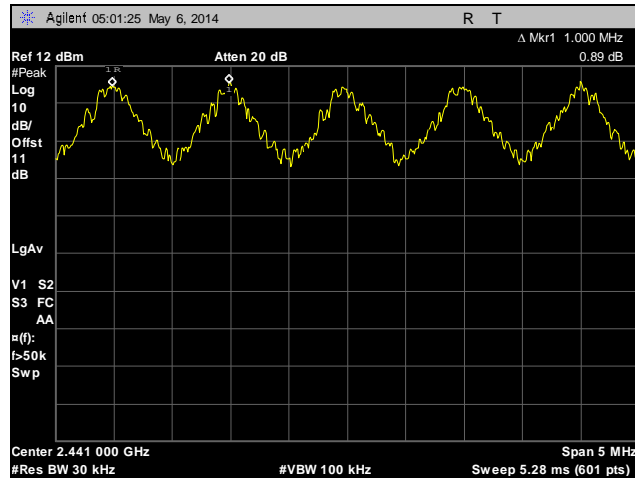
**Requirement:** Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

**Remarks:** EUT operates below 125mW (20dBm). Channels are separated by more than two thirds of the -20dB Bandwidth.

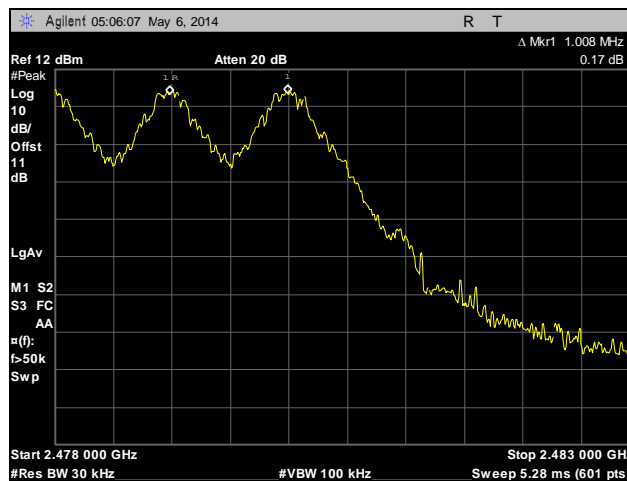
EDR –  $\frac{2}{3} * 0.9263 \text{ MHz (20dB Bandwidth)} = 611 \text{ kHz Minimum Separation Distance}$



Plot 20. Channel Separation, Low Channel



Plot 21. Channel Separation, Mid Channel



Plot 22. Channel Separation, High Channel



## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.247(b) Peak Power Output

**Test Requirements:** §15.247(b)(1): The maximum peak output power of the intentional radiator shall not exceed 0.125 Watts for frequency hopping systems operating in the 2400-2483.5 MHz band. .

§15.247(c): if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Test Procedure:** The transmitter was connected to a calibrated spectrum analyzer. The EUT was measured at the low, mid and high channels of each band.

**Test Results:** The EUT was compliant with the Peak Power Output limits of §15.247(b).

**Test Engineer(s):** Benjamin Taylor

**Test Date(s):** 05/05/14

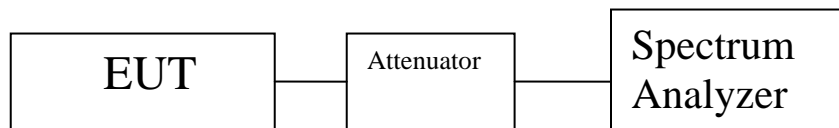


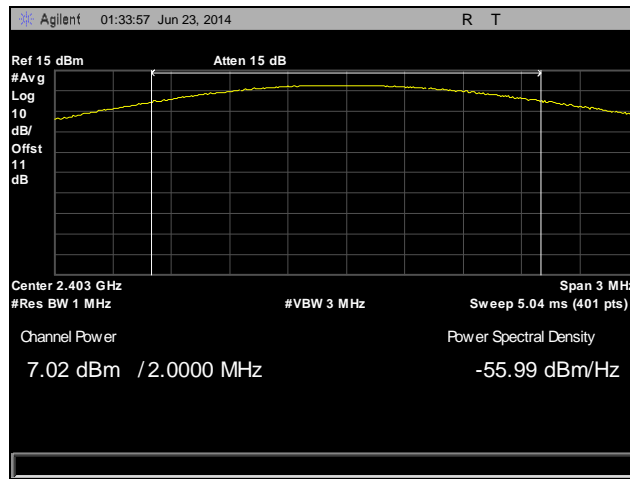
Figure 2. Peak Power Output Test Setup

## Peak Power Output Test Results

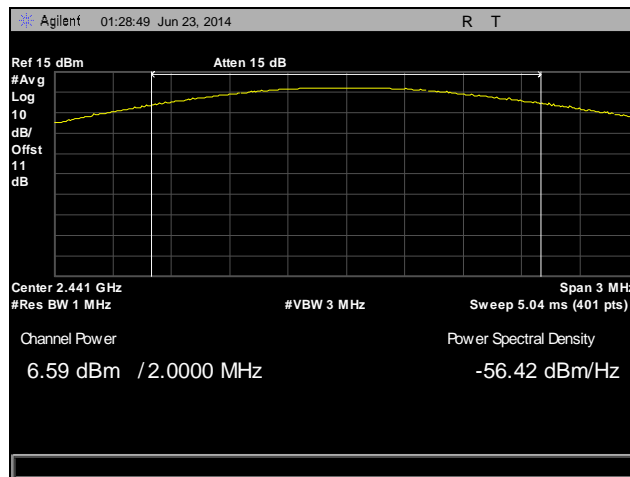
Peak Conducted Output Power		
Carrier Channel	Frequency (MHz)	Measured Peak Output Power dBm
Low	2403	7.02
Mid	2441	6.59
High	2480	5.27

**Table 13. Peak Power Output, Test Results**

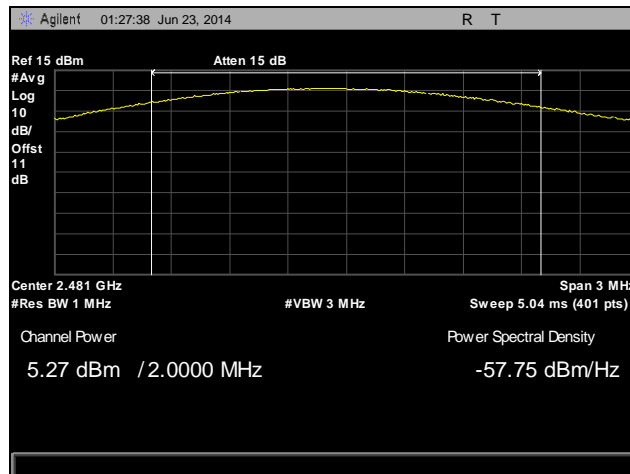
## Peak Power Output Test Results



**Plot 23. Peak Power Output, Low Channel**



**Plot 24. Peak Power Output, Mid Channel**



**Plot 25. Peak Power Output, High Channel**

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.247(d) Radiated Spurious Emissions Requirements and Band Edge

**Test Requirements:** §15.247(d); §15.205: Emissions outside the frequency band.

**§15.247(d):** In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. 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).

**§15.205(a):** Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090–0.110-----	16.42–16.423	399.9–410	4.5–5.15
<sup>1</sup> 0.495–0.505-----	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905-----	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128-----	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775-----	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775-----	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218-----	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825-----	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225-----	123–138	2200–2300	14.47–14.5
8.291–8.294-----	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366-----	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675-----	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475-----	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293-----	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025-----	240–285	3345.8–3358 36.	43–36.5
12.57675–12.57725-----	322–335.4	3600–4400	( <sup>2</sup> )

**Table 14. Restricted Bands of Operation**

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490 – 0.510 MHz.

<sup>2</sup> Above 38.6

**Test Requirement(s):** § 15.209 (a): Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 15.

Frequency (MHz)	§ 15.209(a), Radiated Emission Limits (dBμV) @ 3m
30 - 88	40.00
88 - 216	43.50
216 - 960	46.00
Above 960	54.00

**Table 15. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)**

**Test Procedure:** The transmitter was set to the low, mid, and channel at the highest output power and placed on a 0.8 m high wooden table inside in a semi-anechoic chamber. Measurements were performed with the EUT rotated 360 degrees and varying the adjustable antenna mast with 1 m to 4 m height to determine worst case orientation for maximum emissions. Measurement were repeated the measurement at the low and highest channels.

For frequencies from 30 MHz to 1 GHz, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

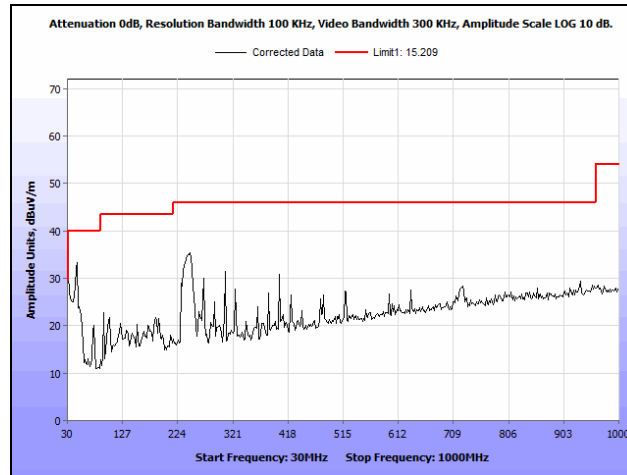
EUT Field Strength Final Amplitude = Raw Amplitude – Preamp gain + Antenna Factor + Cable Loss – Distance Correction Factor

**Test Results:** The EUT was compliant with the Radiated Spurious Emission limits of §15.247(d) and § 15.209 (a). Only noise floor was observed above 18GHz.

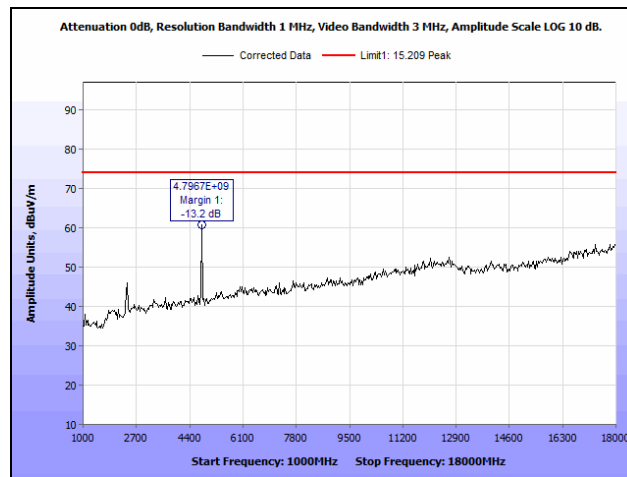
**Test Engineer(s):** Benjamin Taylor

**Test Date(s):** 06/18/14

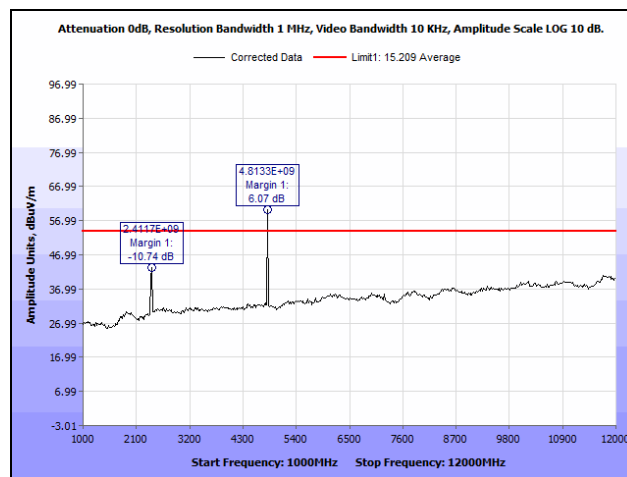
## Radiated Spurious Emissions Test Results



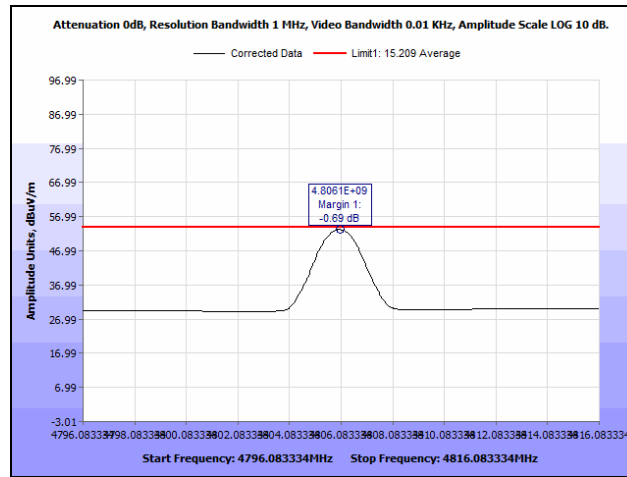
Plot 26. Radiated Spurious Emissions, Low Channel, 30 MHz – 1 GHz



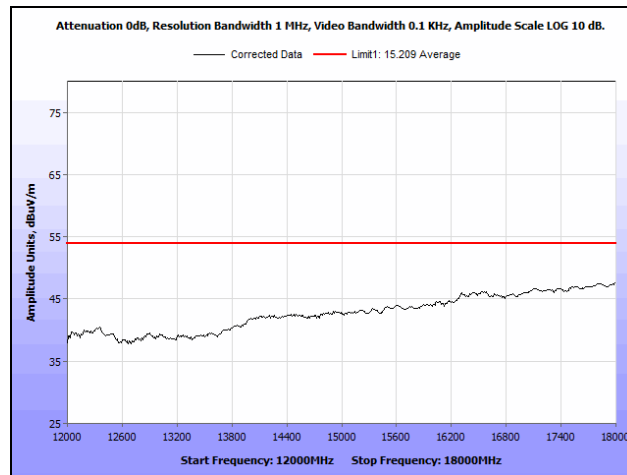
Plot 27. Radiated Spurious Emissions, Low Channel, 1 GHz – 18 GHz, Peak



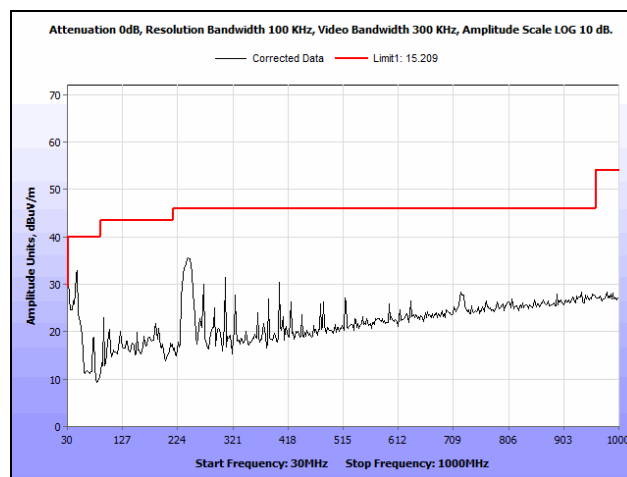
Plot 28. Radiated Spurious Emissions, Low Channel, 1 GHz – 12 GHz, Average



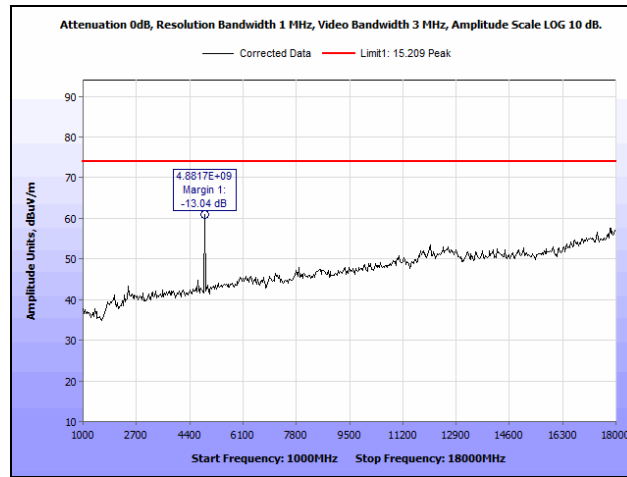
**Plot 29. Radiated Spurious Emissions, Low Channel, 4806 MHz, Average**



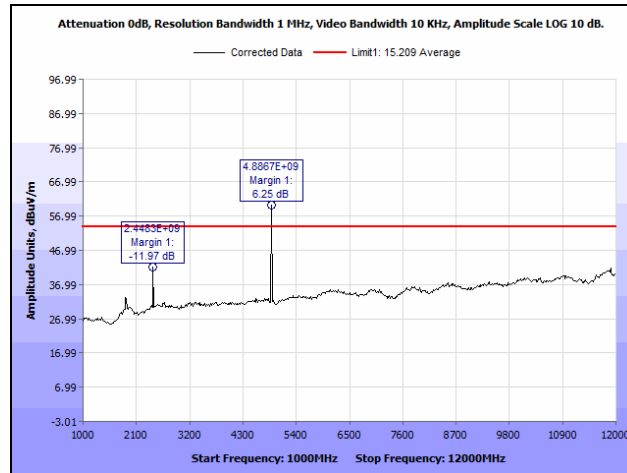
**Plot 30. Radiated Spurious Emissions, Low Channel, 12 GHz – 18 GHz, Average**



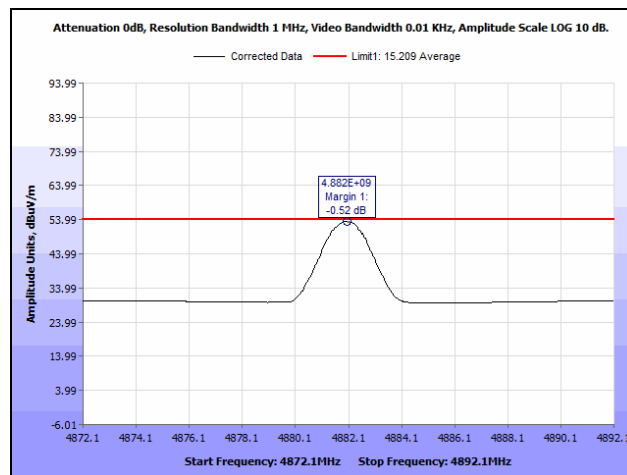
**Plot 31. Radiated Spurious Emissions, Mid Channel, 30 MHz – 1 GHz**



**Plot 32. Radiated Spurious Emissions, Mid Channel, 1 GHz – 18 GHz, Peak**

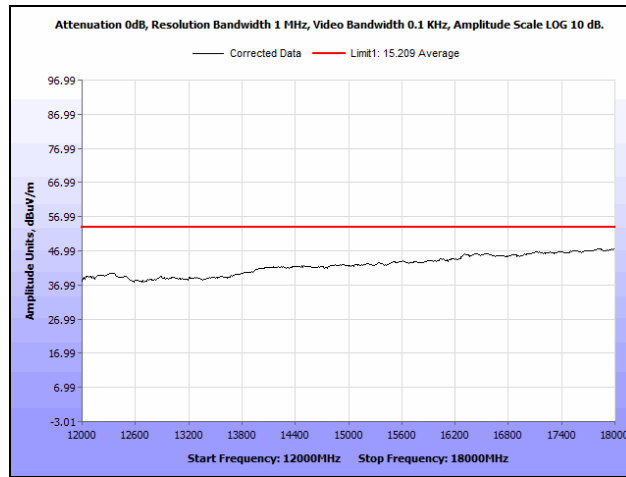


**Plot 33. Radiated Spurious Emissions, Mid Channel, 1 GHz – 12 GHz, Average**

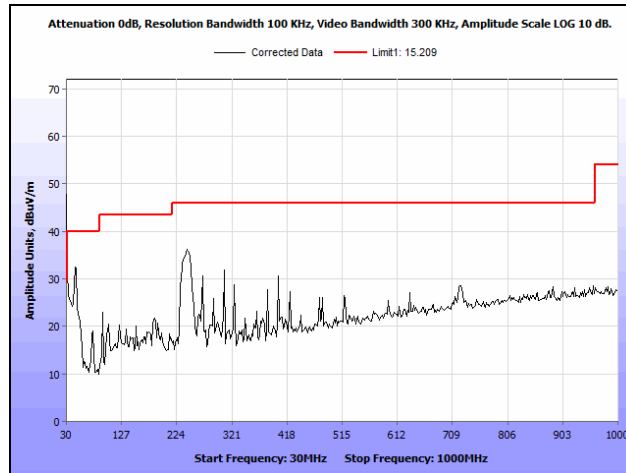


**Plot 34. Radiated Spurious Emissions, Mid Channel, 4882 MHz, Average**

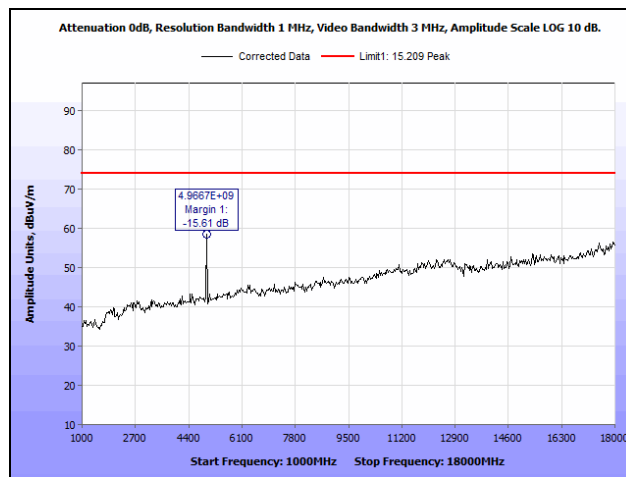




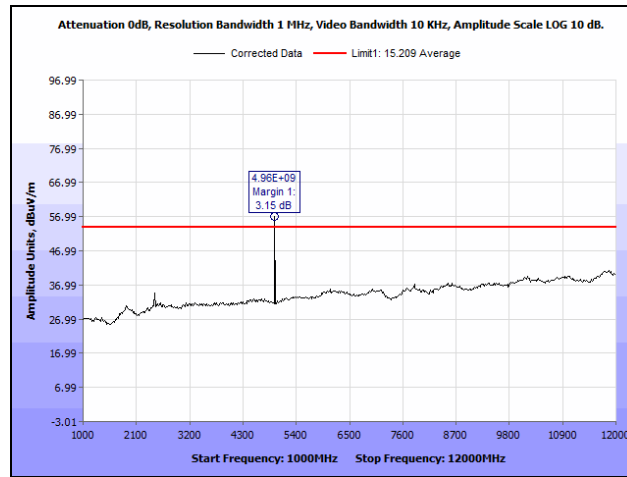
**Plot 35. Radiated Spurious Emissions, Mid Channel, 12 GHz – 18 GHz, Average**



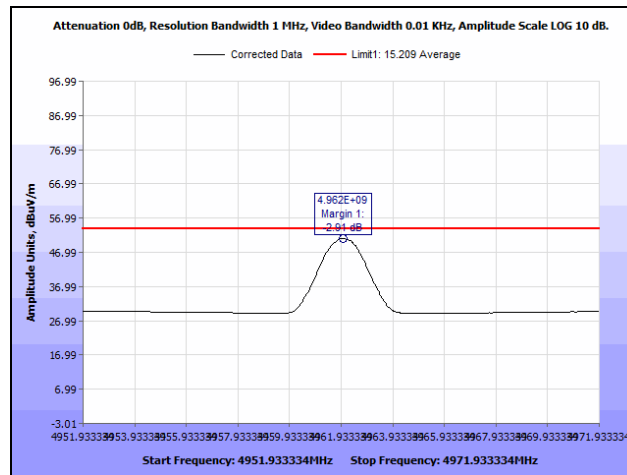
**Plot 36. Radiated Spurious Emissions, High Channel, 30 MHz – 1 GHz**



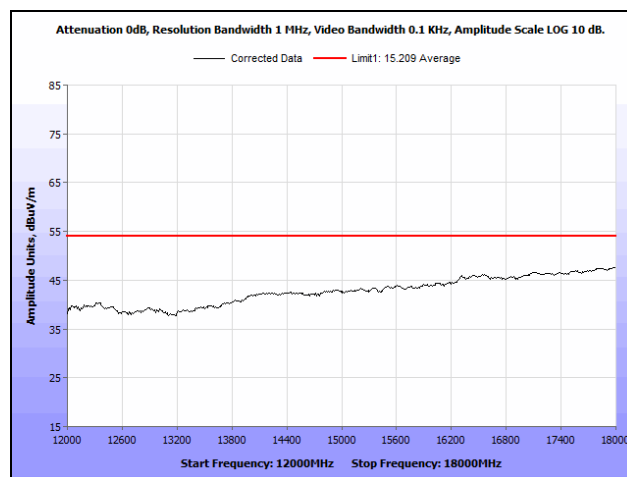
**Plot 37. Radiated Spurious Emissions, High Channel, 1 GHz – 18 GHz, Peak**



**Plot 38. Radiated Spurious Emissions, High Channel, 1 GHz – 12 GHz, Average**



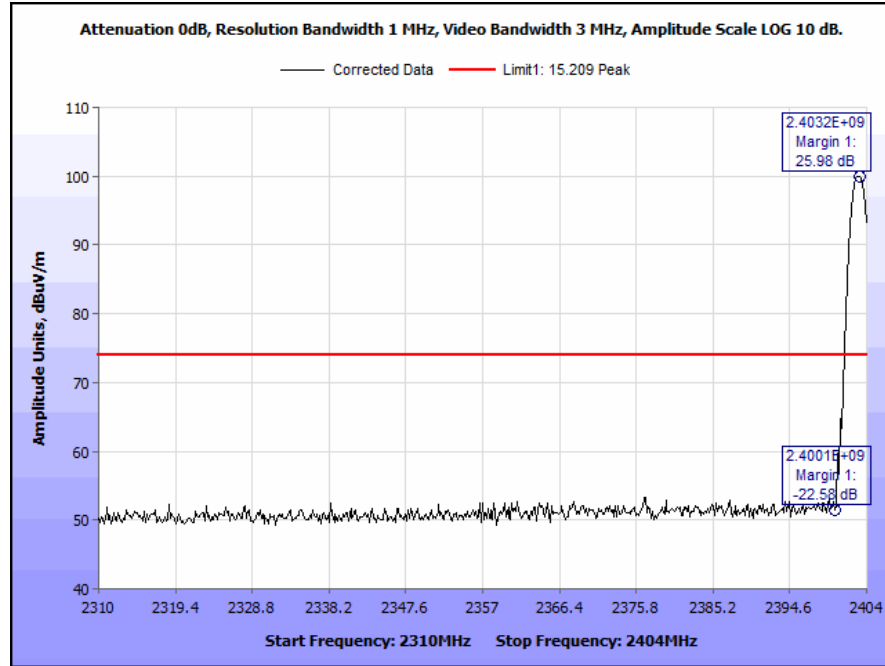
**Plot 39. Radiated Spurious Emissions, High Channel, 4962 MHz, Average**



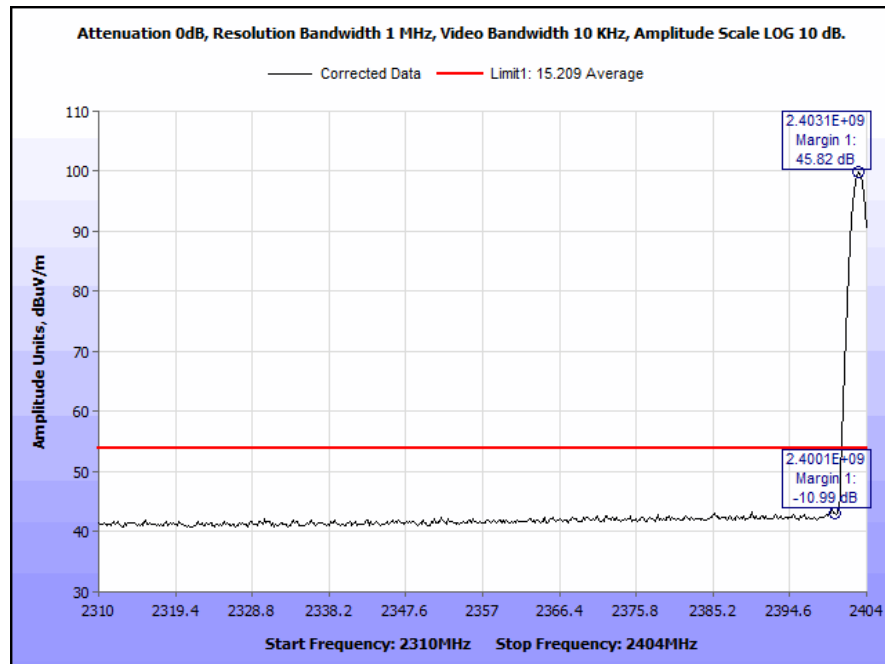
**Plot 40. Radiated Spurious Emissions, High Channel, 12 GHz – 18 GHz, Average**

## Radiated Band Edge Measurements

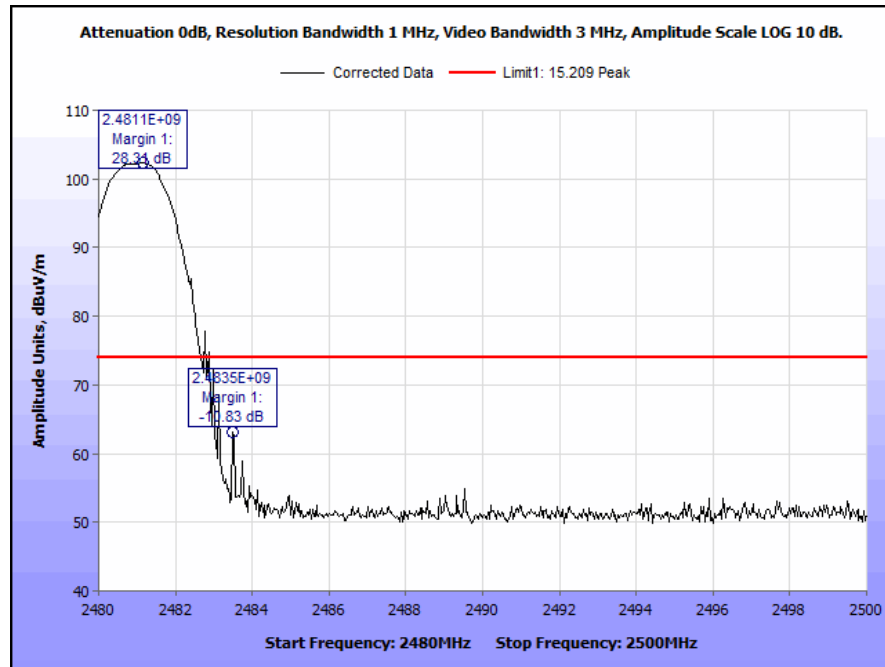
**Test Procedures:** The transmitter was turned. Measurements were performed of the low and high channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance.



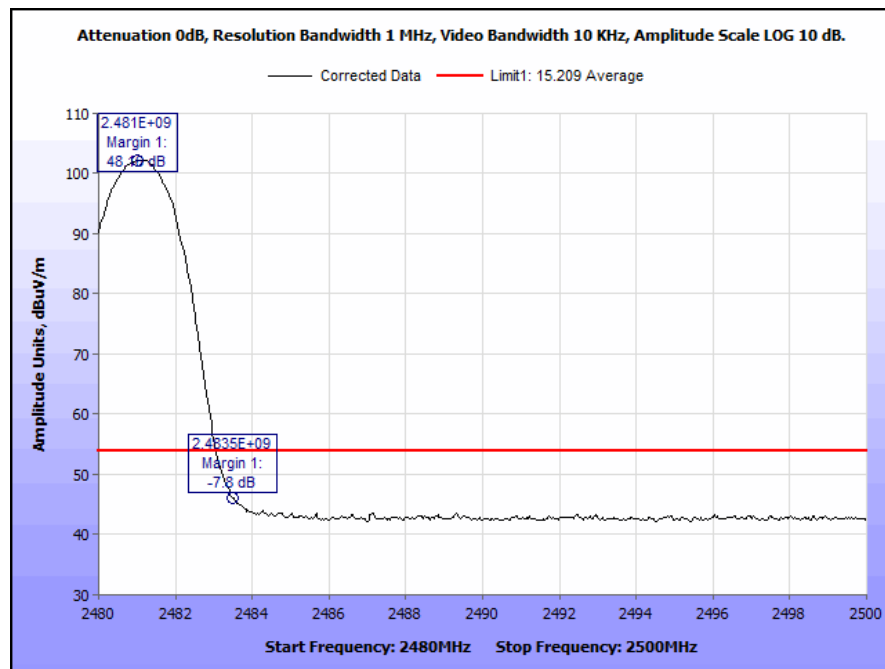
**Plot 41. Radiated Restricted Band Edge, Low Channel, Peak**



**Plot 42. Radiated Restricted Band Edge, Low Channel, Average**

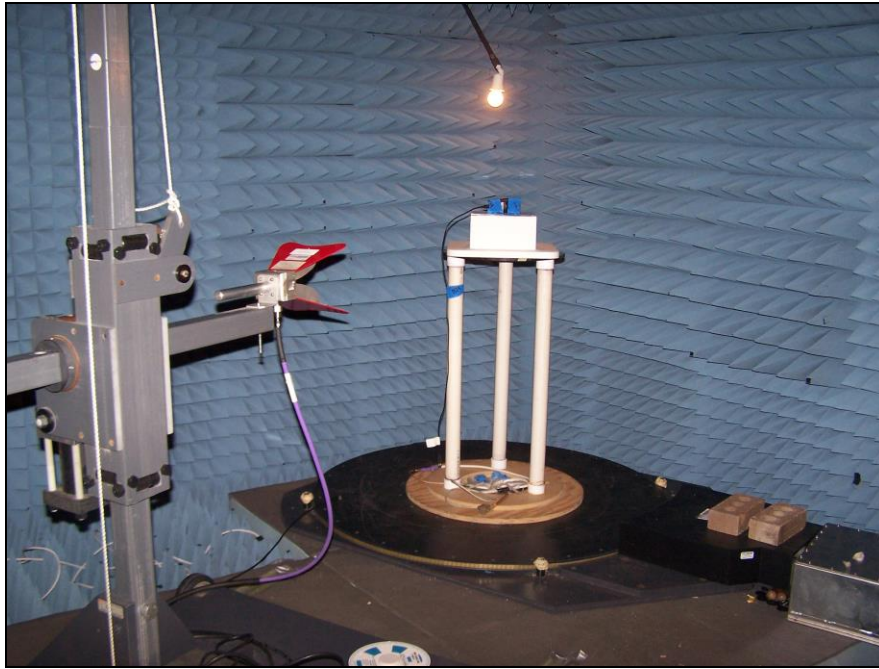


**Plot 43. Radiated Restricted Band Edge, High Channel, Peak**

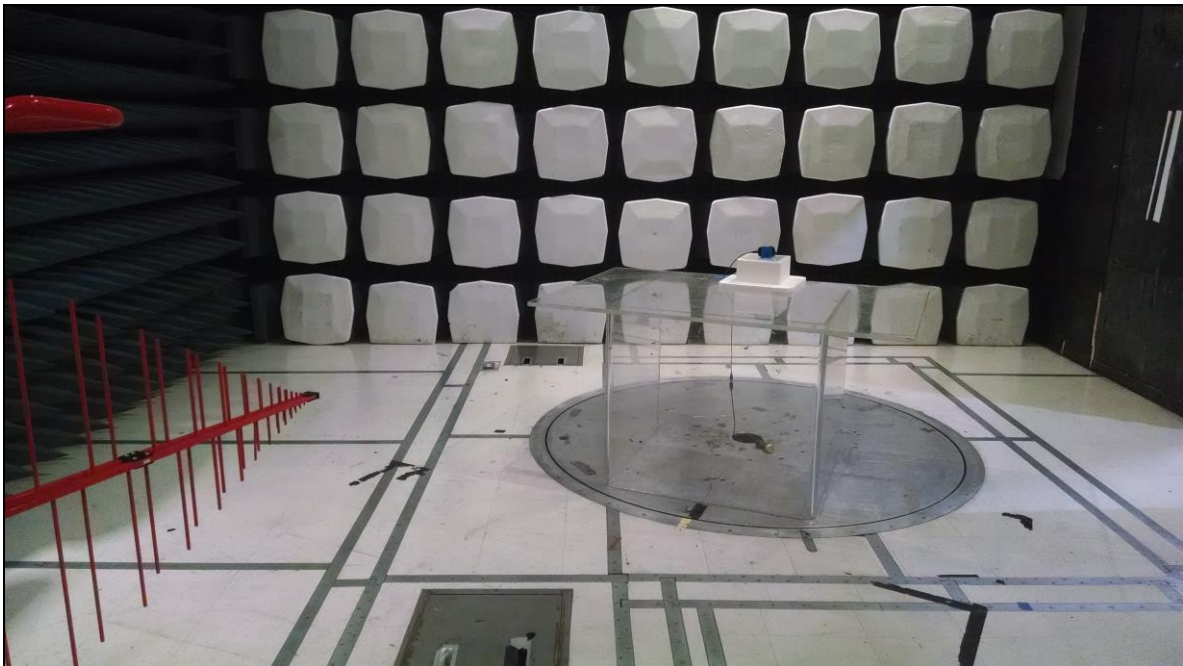


**Plot 44. Radiated Restricted Band Edge, High Channel, Average**

## Radiated Spurious Emissions Test Setup



**Photograph 5. Radiated Spurious Emissions above 1GHz Test Setup**



**Photograph 6. Radiated Spurious Emissions below 1GHz**

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.247(d) RF Conducted Spurious Emissions Requirements and Band Edge

**Test Requirement:** **15.247(d)** In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

**Test Procedure:** For intentional radiators with a digital device portion which operates below 10 GHz, the spectrum was investigated as per §15.33(a)(1) and §15.33(a)(4); i.e., the lowest RF signal generated or used in the device up to the 10<sup>th</sup> harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

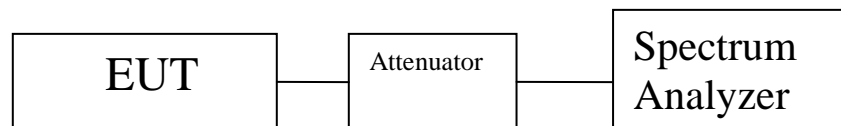
The EUT was connected directly to a spectrum analyzer through a suitable attenuator, and measurements were recorded in a 100 kHz RBW.

See following pages for detailed test results with RF Conducted Spurious Emissions.

**Test Results:** The EUT was compliant with the Conducted Spurious Emission limits of **§15.247(d)**.

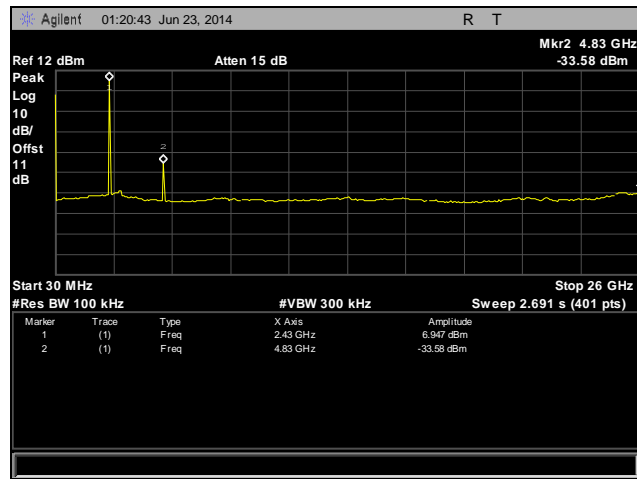
**Test Engineer(s):** Benjamin Taylor

**Test Date(s):** 05/05/14

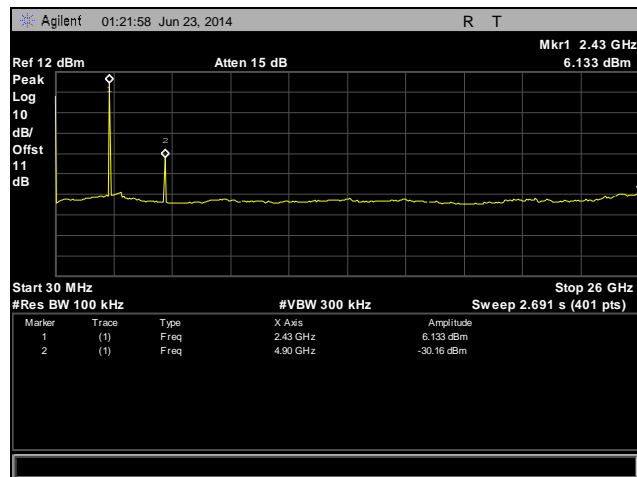


**Figure 3. Block Diagram, Conducted Spurious Emissions Test Setup**

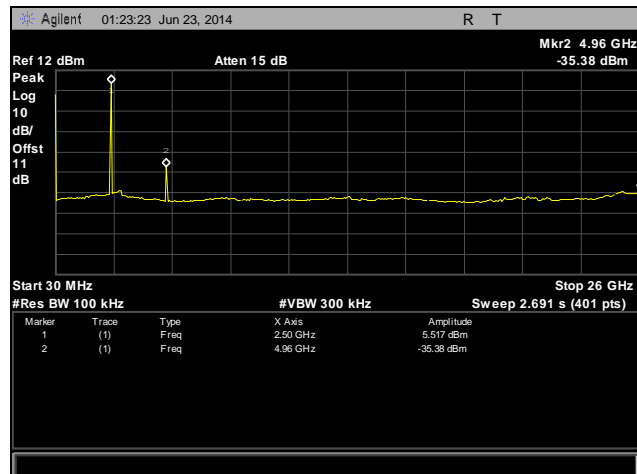
## Conducted Spurious Emissions Test Results



Plot 45. Conducted Spurious Emissions, Low Channel, 30 MHz – 26 GHz

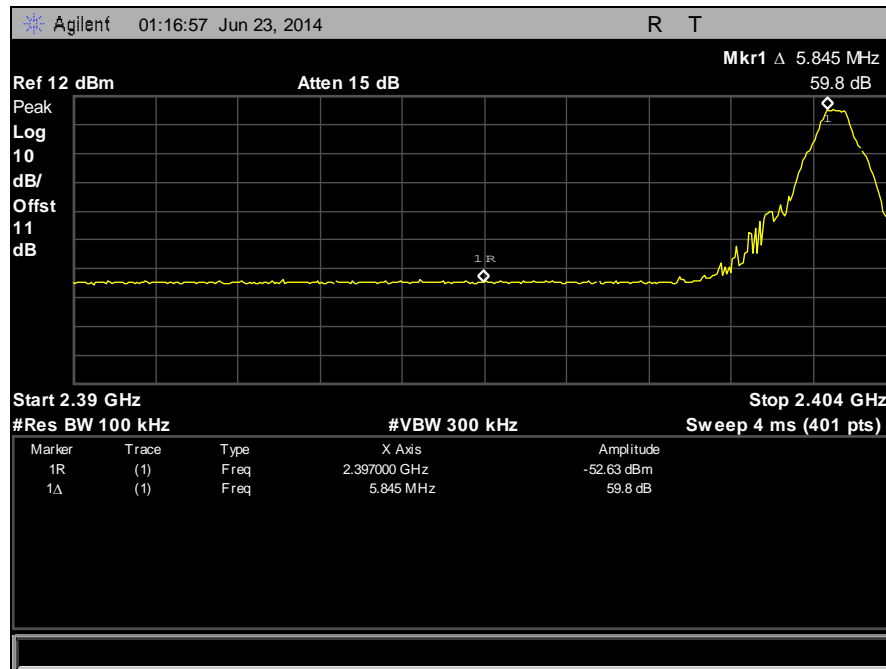


Plot 46. Conducted Spurious Emissions, Mid Channel, 30 MHz – 26 GHz

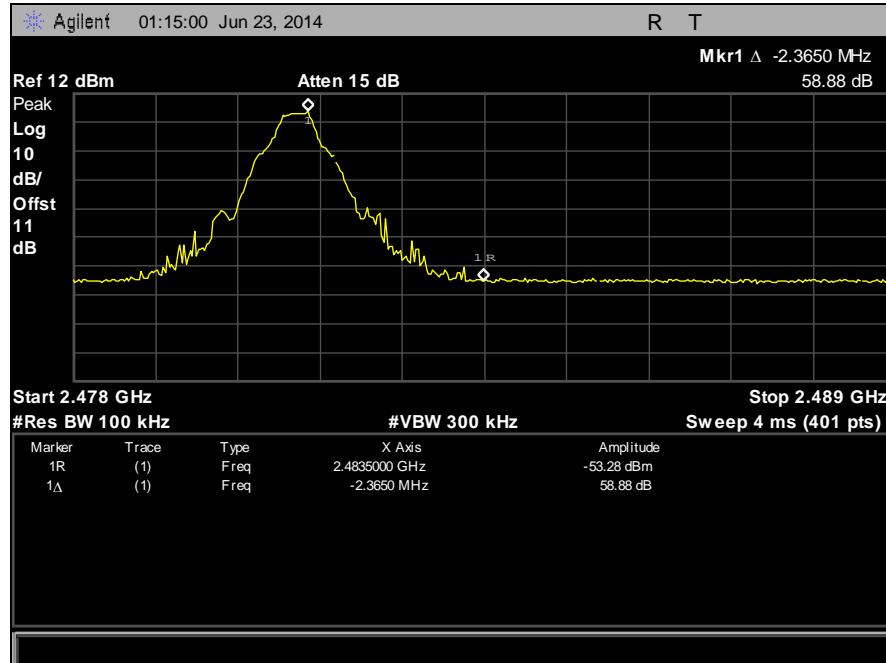


Plot 47. Conducted Spurious Emissions, High Channel, 30 MHz – 26 GHz

## Conducted Band Edge Test Results

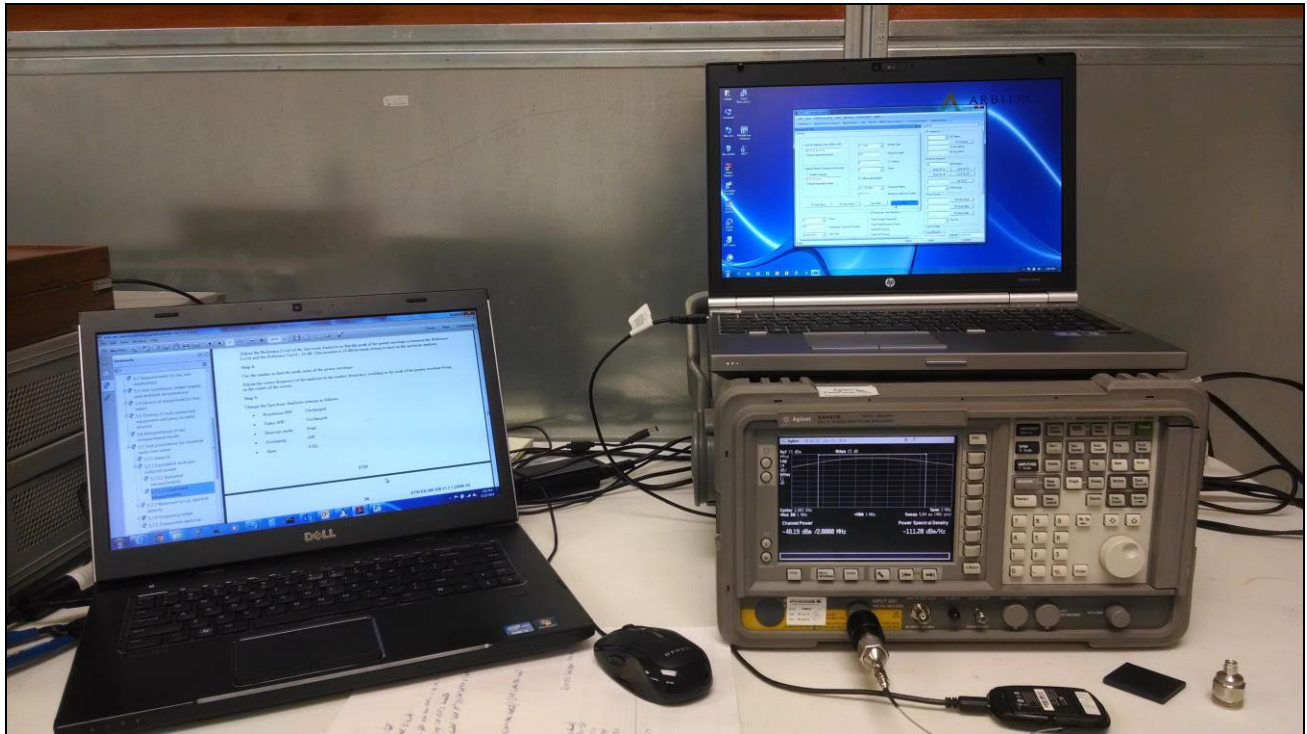


Plot 48. Conducted Band Edge, Low Channel



Plot 49. Conducted Band Edge, High Channel





**Photograph 7. Conducted Spurious Emissions, Test Setup**

## IV. Test Equipment

## Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1T4300	SEMI-ANECHOIC CHAMBER # 1 (NSA)	EMC TEST SYSTEMS	NONE	07/24/2012	07/24/2015
1T4818	COMB GENERATOR	COM-POWER	CGO-520	SEE NOTE	
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	07/16/2012	07/16/2014
1T4751	ANTENNA - BILOG	SUNOL SCIENCES	JB6	01/08/2013	07/08/2014
1T4771	PSA SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4446A	02/15/2013	08/15/2014
1T4483	ANTENNA; HORN	ETS-LINDGREN	3117	02/28/2014	08/28/2015
1T4505	TEMPERATURE CHAMBER	TEST EQUITY	115	01/05/2014	01/05/2015
1T4612	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4407B	07/30/2013	07/30/2014
1T4149	HIGH-FREQUENCY ANECHOIC CHAMBER	RAY-PROOF	81	NOT REQUIRED	
1T4442	PRE-AMPLIFIER, MICROWAVE	MITEQ	AFS42-01001800-30-10P	SEE NOTE	
1T4858	DIGITAL BAROMETER, HYGROMETER, THERMOMETER	CONTROL COMPANY	15-078-198, FB70423, 245CD	12/19/2013	12/19/2015

**Table 16. Test Equipment List**

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

## **V. Certification & User's Manual Information**

## Certification & User's Manual Information

### A. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

#### § 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

- (a) The various types of radio communication transmitting devices described throughout this chapter.
- (b) *The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.*
- (c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.
- (d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

#### § 2.803 Marketing of radio frequency devices prior to equipment authorization.

- (a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:
  - (1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or
  - (2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.
- (d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

- (e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:
- (i) *Compliance testing;*
  - (ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;
  - (iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;
  - (iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or
  - (v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.
- (e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.
- (f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

## Certification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

### § 2.901 Basis and Purpose

- (a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.<sup>1</sup> *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.*
- (b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

### § 2.907 Certification.

- (a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.
- (b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

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<sup>1</sup> In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

## Certification & User's Manual Information

### § 2.948 Description of measurement facilities.

- (a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.
  - (1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.
    - (i) *If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.*
    - (ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.
  - (2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.



## Certification & User's Manual Information

### 1. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

#### § 15.19 Labeling requirements.

(a) *In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:*

- (1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

- (2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

- (3) All other devices shall bear the following statement in a conspicuous location on the device:

*This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

- (4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

- (5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

#### § 15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

### § 15.105 Information to the user.

- (a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

- (b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## ICES-003 Procedural & Labeling Requirements

The manufacturer, importer or supplier shall meet the labelling requirements set out in this section for every ITE unit:

- (i) Prior to marketing in Canada, for ITE manufactured in Canada, and;
- (ii) Prior to importation into Canada, for imported ITE.

The presence of the label on the ITE represents the manufacturer's or importer's Self-Declaration of Compliance (SDoC) to Industry Canada ICES-003. Each unit of an ITE model shall bear a label indicating the model's compliance with ICES-003.

The label shall be permanently affixed to the ITE or displayed electronically and its text must be clearly legible. When the dimension of the device is too small or it is otherwise not practical to place the label on the ITE, the label shall be placed in a prominent location in the user manual supplied with the ITE. The user manual may be in an electronic format and must be readily available.

### Labeling Requirements:

#### Industry Canada ICES-003 Compliance Label:

*CAN ICES-3 (\*)/NMB-3(\*)*

\* Insert either "A" or "B" but not both to identify the applicable Class of ITE

# End of Report