COMPLIANCE WORLDWIDE INC.
TEST REPORT 172-13R3

In Accordance with the Requirements of

FCC PART 15.247, SUBPART C
INDUSTRY CANADA RSS 210, ISSUE 8

Low Power License-Exempt Radio Communication Devices
Intentional Radiators

Issued to

CIMCON Lighting, Inc.
234 Littleton Road
Westford, MA 01886

for the

CIMCON Transmitter Module
CIMX1PRO

FCC ID: S3Z-CIM35X1

Report Issued on February 28, 2013

Tested by

Brian F. Breault

Reviewed by

Larry K. Stillings

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1. Scope

This test report certifies that the CIMCON 2.4 GHz Zigbee Transmitter Module, as tested, meets the FCC Part 15.247**,** and Industry Canada RSS 210, Issue 8 requirements. The scope of this test report is limited to the test sample provided by the client, only in as much as that sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required.
Revision R2 – Added Unwanted Emissions into Non-Restricted Bands.
Revision R3 – § 7.11, Added a note to clarify the worst case duty cycle under normal operations.

2. Product Details

2.1. Manufacturer: CIMCON Lighting Inc.

2.2. Model Number: CIMX1PRO

2.3. Serial Number: N/A

2.4. Description: CIMCON Zigbee Pro Transmitter Module

2.5. Power Source: 3.4 VDC Power Supply (120 VAC, 60 Hz)

2.6. EMC Modifications: None

3. Product Configuration

3.1. Operational Characteristics & Software

Operating Instructions for Test

- Connect the CIMX1PRO to the laptop using a null modem serial cable.
- Open a terminal emulator on the laptop.
  - Configure the terminal emulator for 115200, 8, N, 1.
- Power on the test module and then press Enter.
- Wait for scrolling text. Once you see the “>” prompt, enter the following:
  - settxpowmode 0 1 <Enter>
  - Response will be
    ”Tx power mode set to NORMAL level with EXTERNAL PA.”.
  - Use the setchannel command to set the desired channel in the form of setchannel X (X = hexadecimal channel number 11 – 25 (hex b – 19).
  - settxpower P (set the channel power)
    - UFL Antenna Unit
      - Channel 11: P = -5 [dBm]
      - Channel 18: P = -5 [dBm]
      - Channel 25: P = -7 [dBm]
    - Fixed Antenna Unit
      - Channel 11: P = -3 [dBm]
      - Channel 18: P = -3 [dBm]
      - Channel 25: P = -3 [dBm]
  - txstream (initiate the transmission)
  - To terminate the transmission, type “e”

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3. Product Configuration

3.2. EUT Hardware

Manufacturer	Model/Part # / Options	Serial Number	Input Voltage	Frq (Hz)	Description/Function
CIMCON	CIMX1PRO Transmitter Module	N/A	3.4	DC	CIMCON Zigbee Pro Transmitter Module, Surface Mount or Through Hole (TH) Variants
Digi International (Maxstream)	A24-HASM-525 or A24-HASM-450	N/A	N/A	N/A	152mm 2.4 GHz RP-SMA swivel, tilt (Right Angle) whip antenna, 2.1 dBi gain. Used on the UFL version.

3.3. EUT CONNECTED Hardware

Manufacturer	Model	Serial Number	Description
None	N/A	N/A	All connected equipment for this configuration is support equipment.

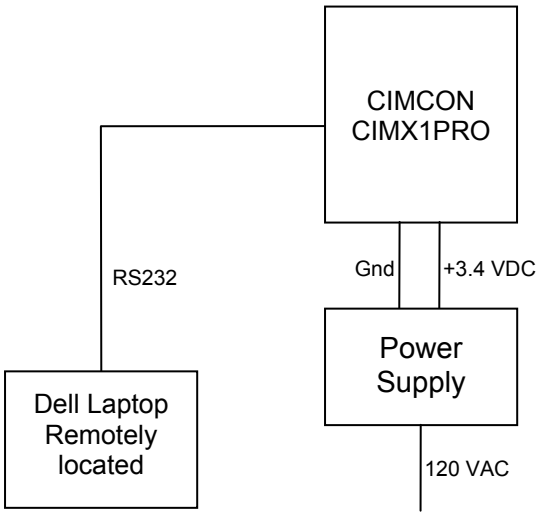
3.4. EUT Cables/Transducers

Manufacturer	Model/Part #	Len. (m)	Shield Y/N	Description/Function
Taoglas	IPEX MHFI to SMA Bulkhead Connector with 200mm 1.13 cable	0.2	Y	Cable connecting antenna to CIMX1PRO

3.5. Support Equipment

Manufacturer	Model/Part # Options	Input Voltage	Input Freq	Description/Function
DELL	Latitude C400 Laptop	120	60	Support laptop for controlling the EUT
CIMCON	Power Supply PCB	120	60	3.4 volt DC power supply for testing the DUT
Generic	9-Pin Null Modem Serial Cable	N/A	N/A	For configuring the DUT. Not connected when the DUT is transmitting and being tested.

3.6. Block Diagram



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4. Measurements Parameters

4.1. Measurement Equipment Used to Perform Tests

Device	Manufacturer	Model No.	Serial No.	Cal Due
Spectrum Analyzer	Rohde & Schwarz	FSV40	100899	5/26/2013
Spectrum Analyzer	Agilent	E7405A	MY45115430	5/11/2013
EMI Receiver	Hewlett Packard	8546A	3650A00360	6/13/2014
Microwave Preamp	Hewlett Packard	83050A	3331A00404	6/6/2013
Loop Antenna	EMCO	6512	9309-1139	8/28/2014
Bilog Antenna	Com-Power	AC-220	25509	8/20/2013
Horn Antenna	ETS-Lindgren	3117	00143292	1/14/2015
Horn Antenna	Com-Power	AH-840	03075	8/27/2014
RF Signal Generator	Rohde & Schwarz	SMB 100A	175352	5/14/2014
2.4 GHz BP Filter	Micro-Tronics	BRM50702	14	2/27/2013
RF Power Meter	Boonton	4220A	323203AC	6/13/2014
Power Sensor	Boonton	51081	29412	6/13/2014
Digital Barometer	Extech Instruments	SD700	Q590483	5/1/2013

4.2. Measurement & Equipment Setup

Test Dates:	February 12th to 26th, 28th, 2013
Test Engineer:	Brian Breault
Normal Site Temperature (15 - 35°C):	21.7
Relative Humidity (20 -75%RH):	33%
Frequency Range:	10 kHz to 26.5 GHz
Measurement Distance:	3 Meters
EMI Receiver IF Bandwidth:	9 kHz – 150 kHz to 30 MHz 120 kHz – 30 MHz to 1 GHz 1 MHz – Above 1 GHz
EMI Receiver Avg Bandwidth:	30 kHz – 150 kHz to 30 MHz 300 kHz – 30 MHz to 1 GHz 3 MHz – Above 1 GHz
Detector Function:	Peak, QP - 150 kHz to 1 GHz Peak, Avg - Above 1 GHz Unless otherwise specified.

4.3. Measurement Procedures

Test measurements were made in accordance FCC Part 15.247, IC RSS-210 Annex II: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5850 MHz, and 24.0 - 24.25 GHz.

The test procedures used to perform the measurements for this report are detailed in the FCC Office of Engineering and Technology (OET) publication 558074 D01, DTS Measurement Guidance v02, dated 10/04/2012. Upper band edge measurements were made using the guidelines detailed in OET KDB 913591.

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4. Measurements Parameters

4.3. Measurement Procedures (continued)

The test methods used to generate the data in this test report is in accordance with ANSI C63.4:2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

4.4. Duty Cycle

The device under test was configured to run continuously at a duty cycle greater than 98%. The average actual duty cycle measured during normal operation was 11.48%. Based on this difference, a duty cycle correction factor was added to the measured values in accordance with FCC Part 15.35.

4.5. Measurement Uncertainty

The following uncertainties are expressed for an expansion/coverage factor of K=2.

RF Frequency	$\pm$ 1x10^{-8}
Radiated Emission of Transmitter	$\pm$ 4.55 dB
Radiated Emission of Receiver	$\pm$ 4.55 dB
Temperature	$\pm$ 0.91^{o} C
Humidity	$\pm$ 5%

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5. Choice of Equipment for Test Suits

5.1 Choice of Model

This test report is based on the test samples supplied by the manufacturer and are reported by the manufacturer to be equivalent to the production units.

5.2 Presentation

This test sample was tested complete with all required ancillary equipment. Refer to Section 3 of this report for product equipment configuration.

5.3 Choice of Operating Frequencies

The CIMCON CIMX1PRO, as tested, utilizes fifteen 802.15.4 (Zigbee) channels, from channel 11 (2405 MHz) to channel 25 (2475 MHz).

In accordance with ANSI C63.4-2009, section 13.2.1, three operating frequencies were selected for testing and are detailed in the following table:

Channel	Frequency (MHz)	Status
11	**2405**	**Tested**
12	2410	Not Tested
13	2415	Not Tested
14	2420	Not Tested
15	2425	Not Tested
16	2430	Not Tested
17	2435	Not Tested
18	**2440**	**Tested**
19	2445	Not Tested
20	2450	Not Tested
21	2455	Not Tested
22	2460	Not Tested
23	2465	Not Tested
24	2470	Not Tested
25	**2475**	**Tested**
26	2480	Not Used

5.4 Modes of Operation

The CIMCON CIMX1PRO transmitter module was configured for a single mode of operation only. This test mode configures the transmitter to operate at a duty cycle greater than 98%. Individual channel RF power output for the device under test is adjustable and was configured as follows:

- Fixed, non-removable antenna version:
  - All channels set for -3 dBm.
- Removable UFL antenna version:
  - Channel 11 set for -5 dBm
  - Channel 18 set for -5 dBm
  - Channel 25 set for -7 dBm

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6. Measurement Summary

Test Requirement	FCC Rule Reference	IC Rule Reference	Test Report Section	Result
Antenna Requirement	15.203	RSS-GEN 7.1.2	7.1	Compliant
Minimum 6 dB Bandwidth	15.247 (a) (2)	RSS-210 A8.2	7.2	Compliant
99% Bandwidth	N/A	RSS-GEN 4.6.1	7.3	Compliant
Maximum Peak Conducted Output Power	15.247 (b) (1)	RSS-210 A8.4 (4)	7.4	Compliant
Operation with directional antenna gains greater than 6 dBi	15.247 (b) (4)	RSS-GEN 7.1.2	7.5	Compliant
Spurious Radiated Emissions	15.247 (d)	RSS-GEN 4.9	7.6	Compliant
Unwanted Emissions into Non-Restricted Bands	15.247 (d)	RSS-210 A8.5	7.7	Compliant
Spurious Radiated Emissions (> GHz) - Harmonic Measurements	15.247 (d)	RSS-210 A8.9	7.8	Compliant
Lower and Upper Band Edge	15.247 (d)	RSS-210 A8.5	7.9	Compliant
Maximum Power Spectral Density	15.247(e)		7.10	Compliant
Duty Cycle			7.11	N/A
Conducted Emissions	15.207	RSS-GEN	7.12	Compliant
Public Exposure to Radio Frequency Energy Levels	1.1307 (b) (1)	RSS-GEN 5.5 RSS-102	7.13	Compliant

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7. Measurement Data

7.1. Antenna Requirement (15.203, RSS GEN 7.1.2)

Requirement: 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.

Conclusion: The fixed antenna version utilizes a single wire, soldered in place antenna.

The UFL version utilizes a Digi A24-HASM-525 2.4 GHz, half wave dipole antenna. This antenna employs a reverse polarity SMA male connector.

These antennas are not user replaceable in a normal configuration.

7.2. Minimum 6 dB Bandwidth

Requirement: (15.247 (a) (2), RSS 210 A8.2(a))
Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Procedure: This test was performed in accordance with the procedure detailed in FCC OET publication number 558074, Section 7.0: DTS (6 dB Channel Bandwidth.

Conclusion: The device under test meets the minimum 500 kHz 6 dB bandwidth requirement.

Measurement Results

Channel	Frequency (MHz)	-6 dB Bandwidth (MHz)	Minimum -6 dB Bandwidth (kHz)	Result
Low	2405	1.595	> 500	Compliant
Middle	2440	1.580	> 500	Compliant
High	2475	1.590	> 500	Compliant

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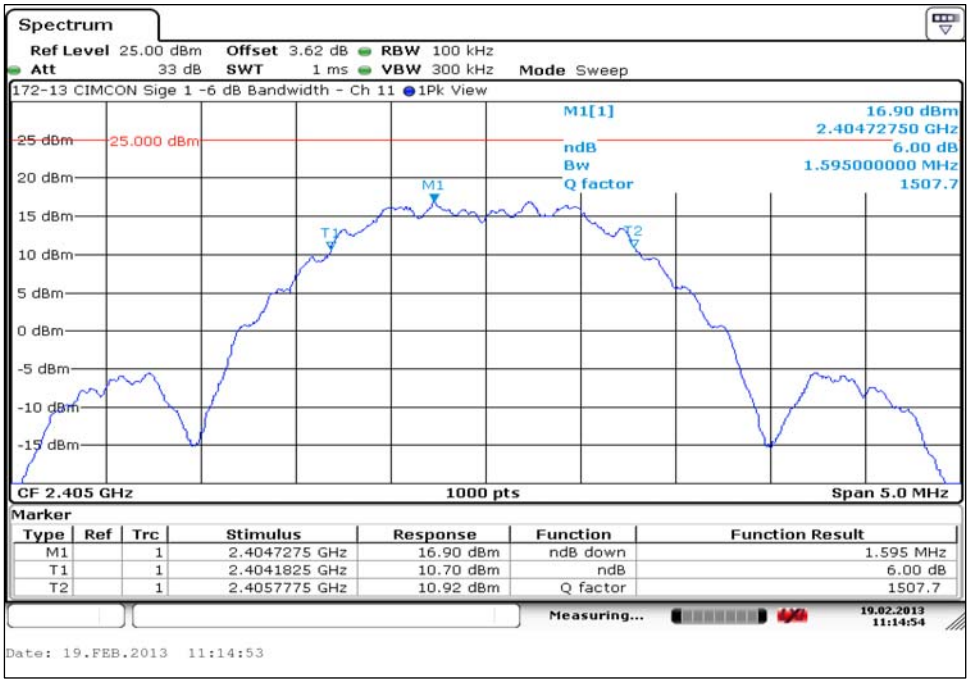
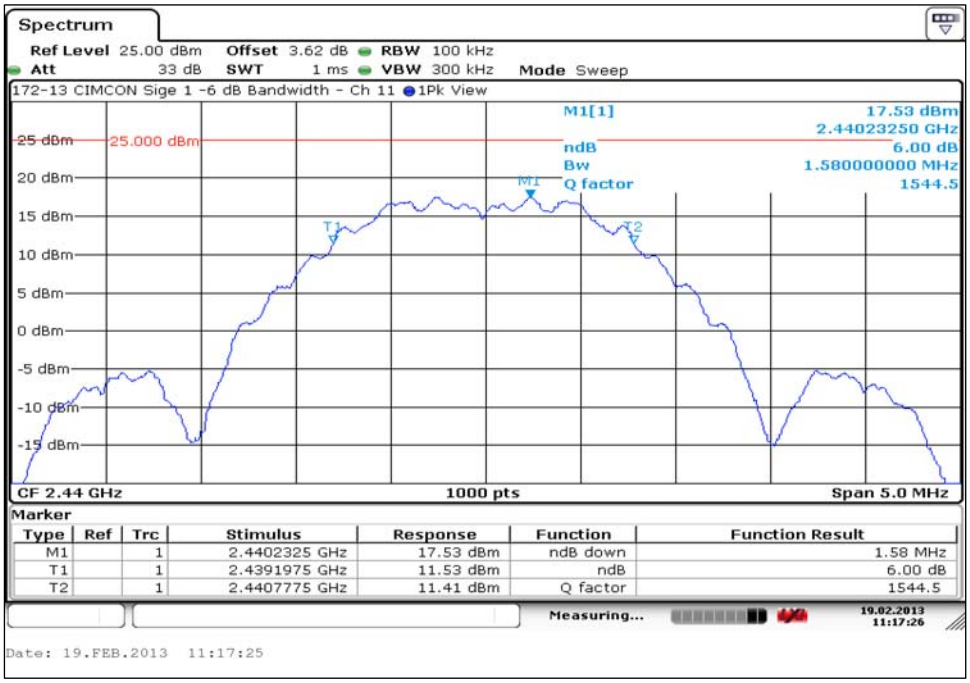
7. Measurement Data (continued)

7.2. Minimum 6 dB Bandwidth (continued)

7.2.1. Low Channel, 11



7.2.2. Middle Channel, 18



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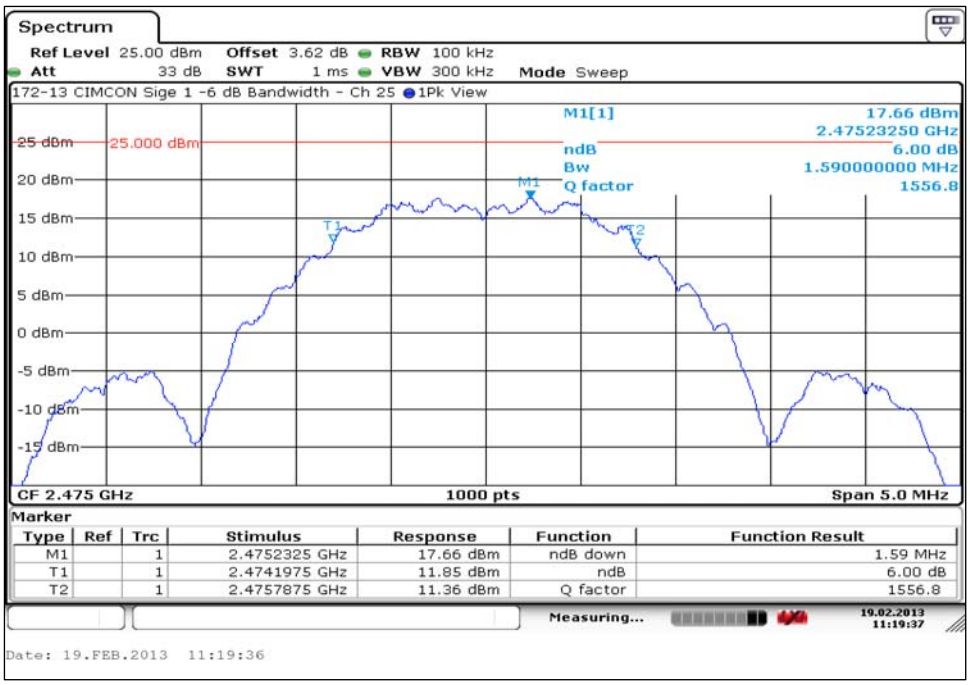
7. Measurement Data

7.2. Minimum 6 dB Bandwidth (15.247 (a) (2)) (continued)

7.2.3. High Channel, 25



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7. Measurement Data (continued)

7.3. 99% Bandwidth (RSS 210)

Requirement: When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.
The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

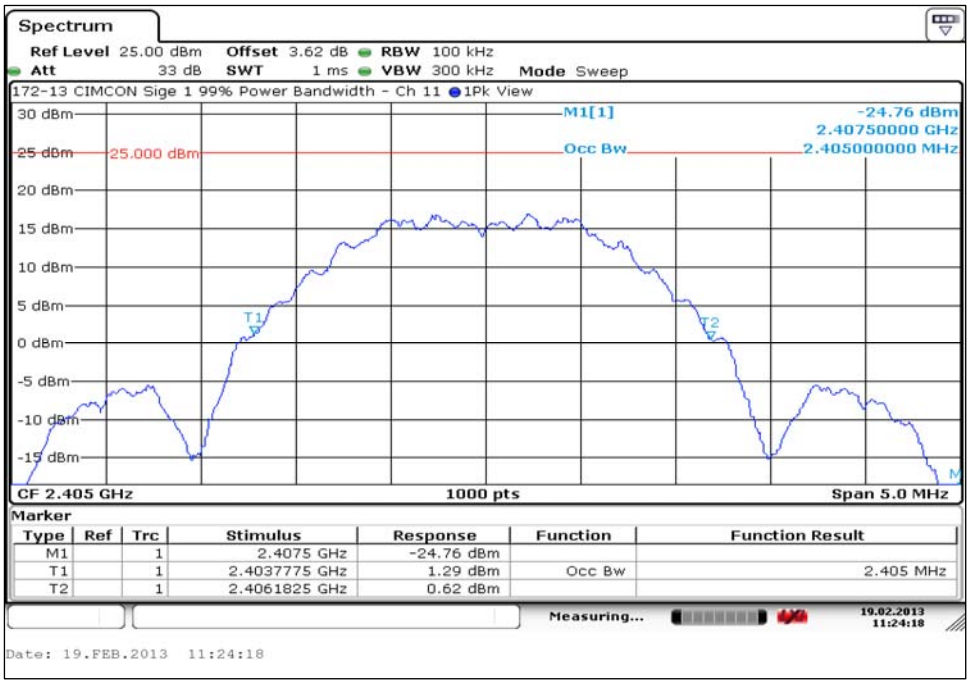
Procedure: This test was performed utilizing the automated 99% bandwidth function of the spectrum analyzer.

Conclusion: Compliant, for informational purposes only.

Measured results

Channel	Channel Frequency (MHz)	99% Power Bandwidth (MHz)
Low	2405	2.405
Middle	2440	2.380
High	2480	2.395

7.3.1. Low Channel, 11



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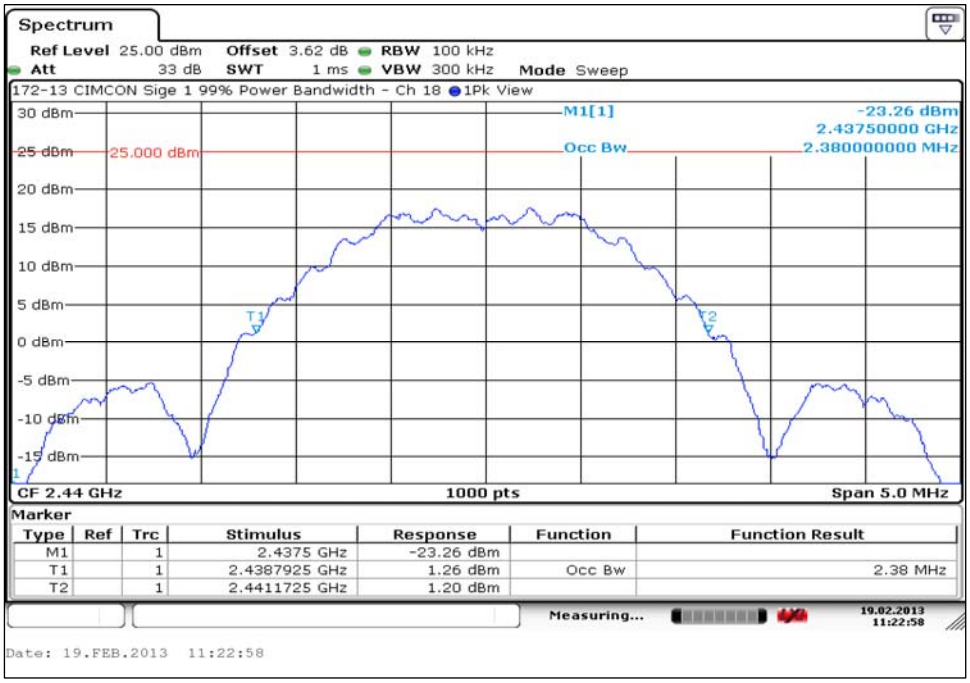
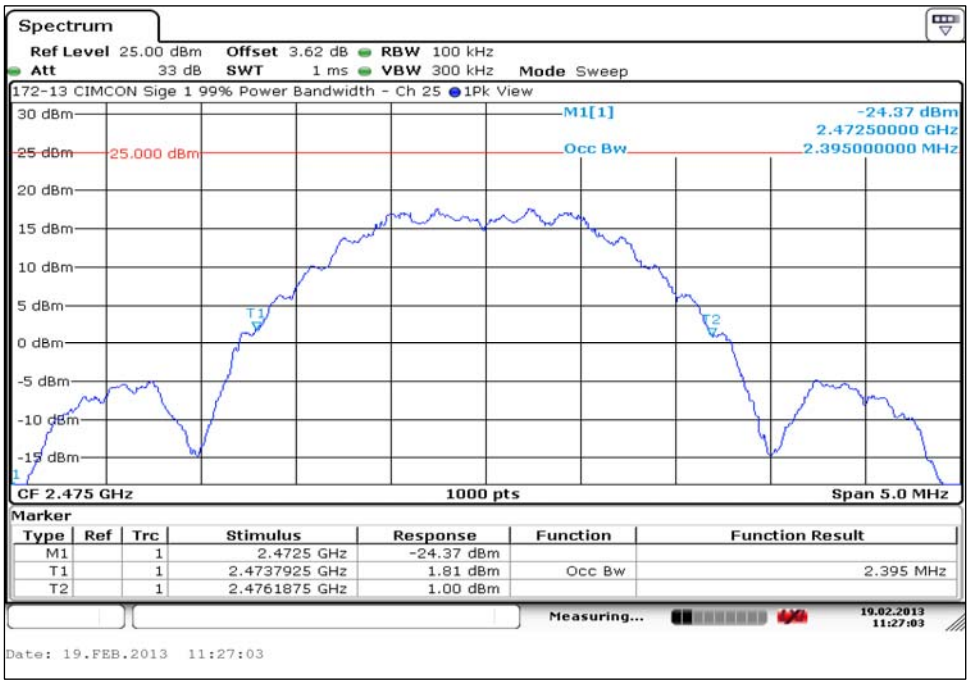
7. Measurement Data (continued)

7.3. 99% Bandwidth (RSS 210) (continued)

7.3.2. Middle Channel, 18



7.3.3. High Channel, 25



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7. Measurement Data (continued)

7.4. Maximum Peak Conducted Output Power

Requirement: (15.247 (b) (3))
The maximum peak conducted output power of the intentional radiator shall not exceed the following: For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

Procedure: This test was performed in accordance with the procedure detailed in FCC OET publication number 558074, Section 8.1.2 Option 2 (channel integration method).

Using the Rohde & Schwarz FSV40 band power function the integrated peak power was measured. The band power function span is determined by using the 6 dB Emission Bandwidth (EBW) measured in Section 7.2 of this report.

Test Notes:
1. All corrections have been factored into the measurement results.
2. Two sets of measurements were made to include the two antenna configurations:
    1. Fixed antenna version:
        - The DUT power output on all tested channels was set for -3 dBm.
    2. UFL antenna version:
        - The DUT power output was set as follows:
            a. Channel 11: -5 dBm
            b. Channel 18: -5 dBm
            c. Channel 25: -7 dBm

Conclusion: The device under test meets the required maximum peak conducted output power level of 1 Watt.

7.4.1. Measurement Results for the Fixed Antenna Version

Channel	Frequency	DUT Channel Power Output Setting	Peak Conducted Output Power	Output Power Limit	Result
	(MHz)	(dBm)	(dBm)	(dBm)	
Low	2405	-3	22.04	30	Compliant
Middle	2440	-3	22.59	30	Compliant
High	2475	-3	22.75	30	Compliant

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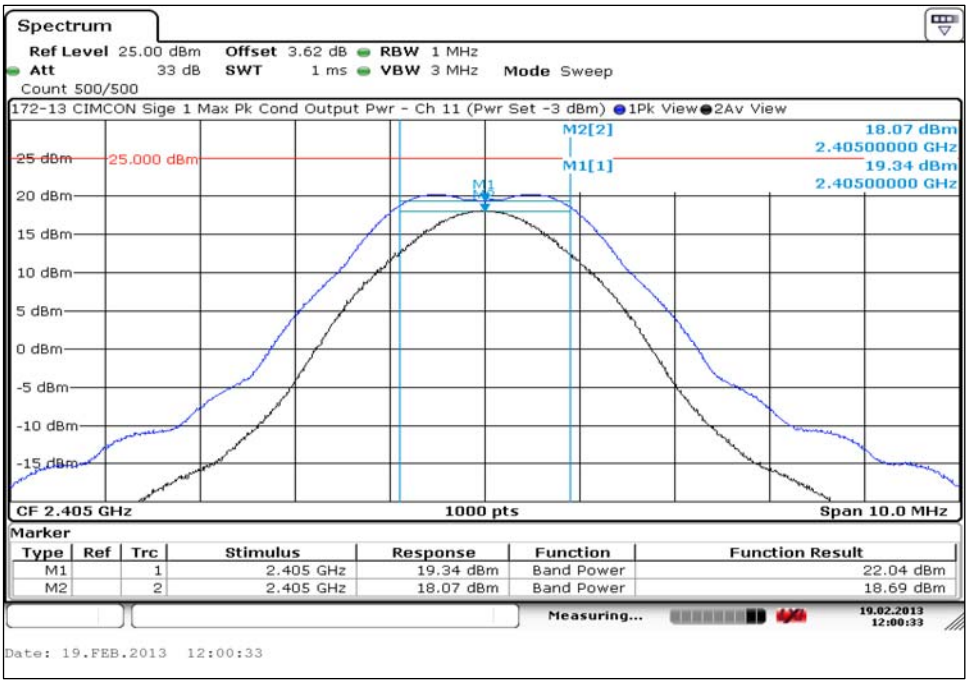
7. Measurement Data (continued)

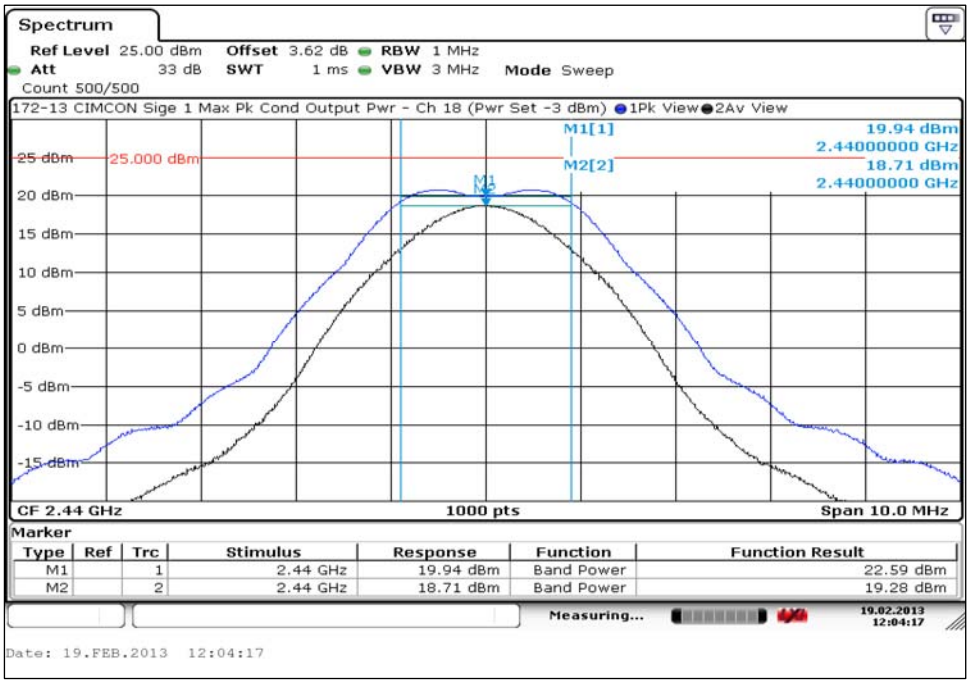
7.4. Maximum Peak Conducted Output Power (continued)

7.4.1. Fixed Antenna Version

7.4.1.1. Low Channel, 11



7.4.1.2. Middle Channel, 18



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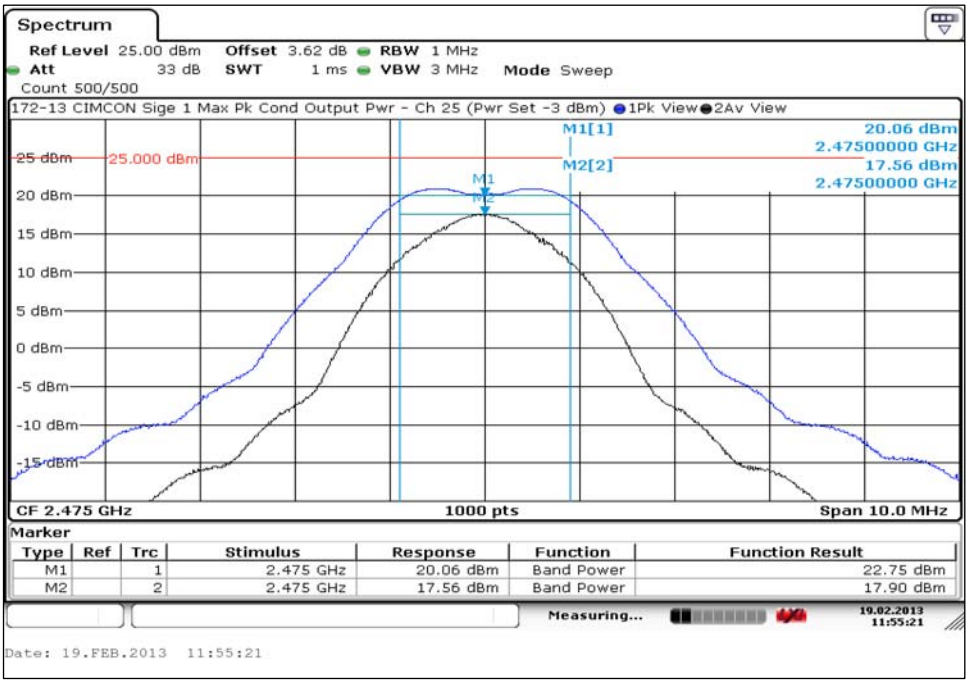
7. Measurement Data (continued)

7.4. Maximum Peak Conducted Output Power (15.247 (b) (1)) (continued)

7.4.1. Fixed Antenna Version

7.4.1.3. High Channel, 25



7.4.2. Measurement Results for the UFL Antenna Version

Channel	Frequency	DUT Channel Power Output Setting	Peak Conducted Output Power	Output Power Limit	Result
	(MHz)	(dBm)	(dBm)	(dBm)	
Low	2405	-5	19.88	30	Compliant
Middle	2440	-5	21.02	30	Compliant
High	2475	-7	20.33	30	Compliant

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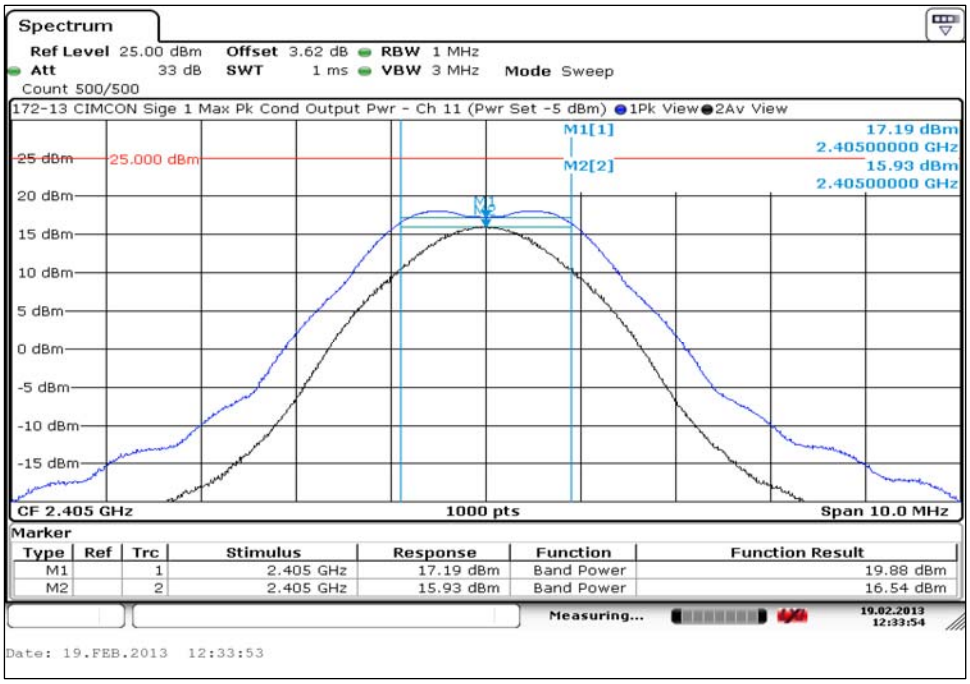
7. Measurement Data (continued)

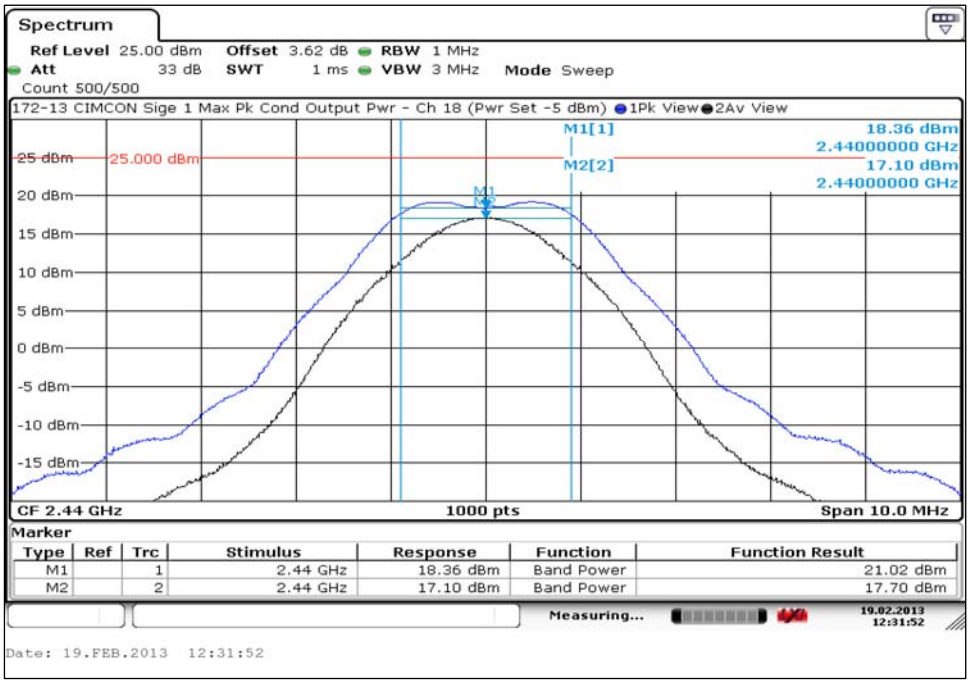
7.4. Maximum Peak Conducted Output Power (continued)

7.4.2. UFL Antenna Version

7.4.2.1. Low Channel, 11



7.4.2.2. Middle Channel, 18



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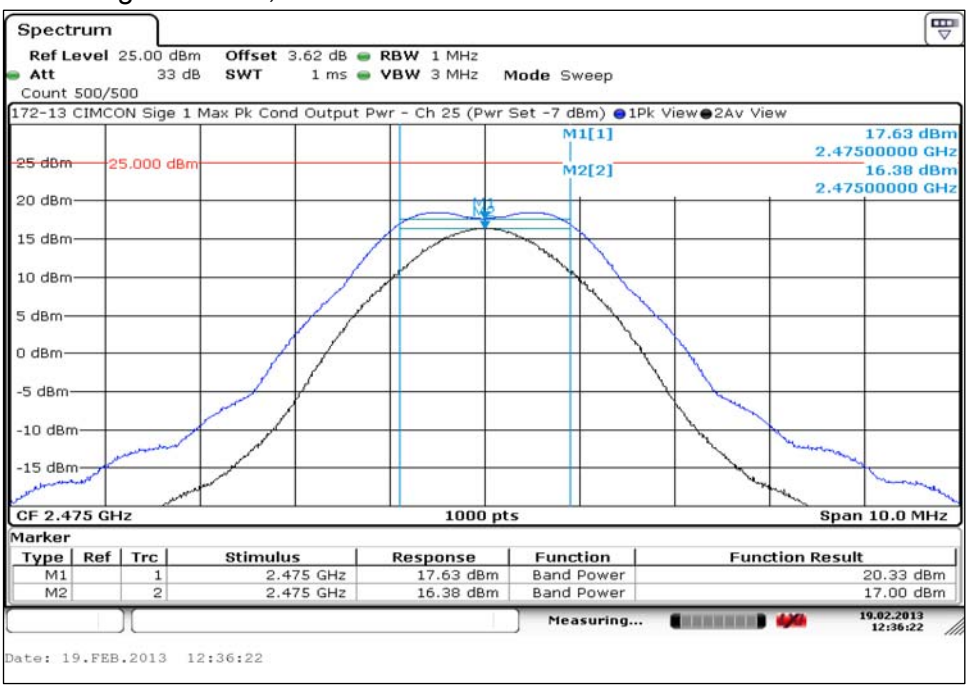
7. Measurement Data (continued)

7.4. Maximum Peak Conducted Output Power (15.247 (b) (1)) (continued)

7.4.2. UFL Antenna Version

7.4.2.3. High Channel, 25



7.5. Operation with directional antenna gains greater than 6 dBi (15.247 (b)(4))

Requirement: If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of FCC Part 15.247, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400 – 2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Conclusion: The tested fixed antenna has a gain of 1.5 dBi and the tested Digi A24-HASM-525 2.4 GHz, half wave dipole antenna has a gain of 2.1 dBi. An adjustment in the peak power output of the DUT related to antenna gain was not necessary.

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7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

Requirement: (15.209) The Emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency Range (MHz)	Distance (Meters)	Limit (dBµV/m)[1]
0.009 to 0.490	3	128.5 to 93.8
0.490 to 1.705	3	73.8 to 63.0
1.705 to 30	3	69.5
30 to 88	3	40.0
88 to 216	3	43.5
216 to 960	3	46.0
>960	3	54.0

[1] Measurements in the 9 to 90 kHz, 110 to 490 kHz and above 1000 MHz ranges employ an average detector. Otherwise a quasi-peak detector is used.

Procedure: This test was performed in accordance with the procedure detailed in FCC OET publication number 558074, Section 10.0: Maximum Unwanted Emissions Levels and FCC 47 CFR Part 15.209: Radiated Emission Limits; General Requirements.

Test measurements were made in accordance with ANSI C63.4-2009, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

Conclusion: The Emissions from the DUT did not exceed the field strength levels specified in the above table.

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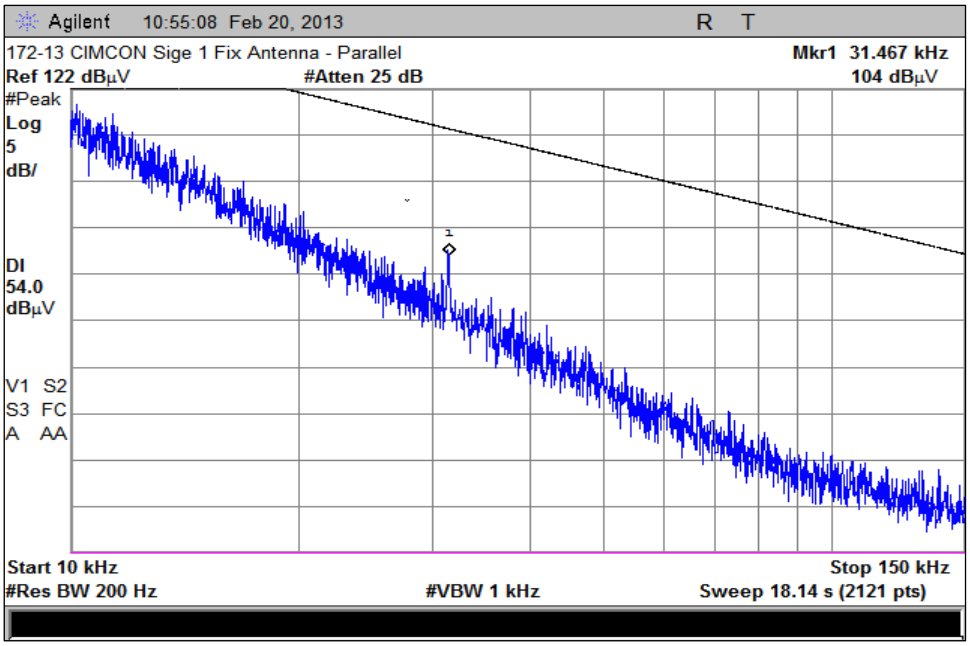
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

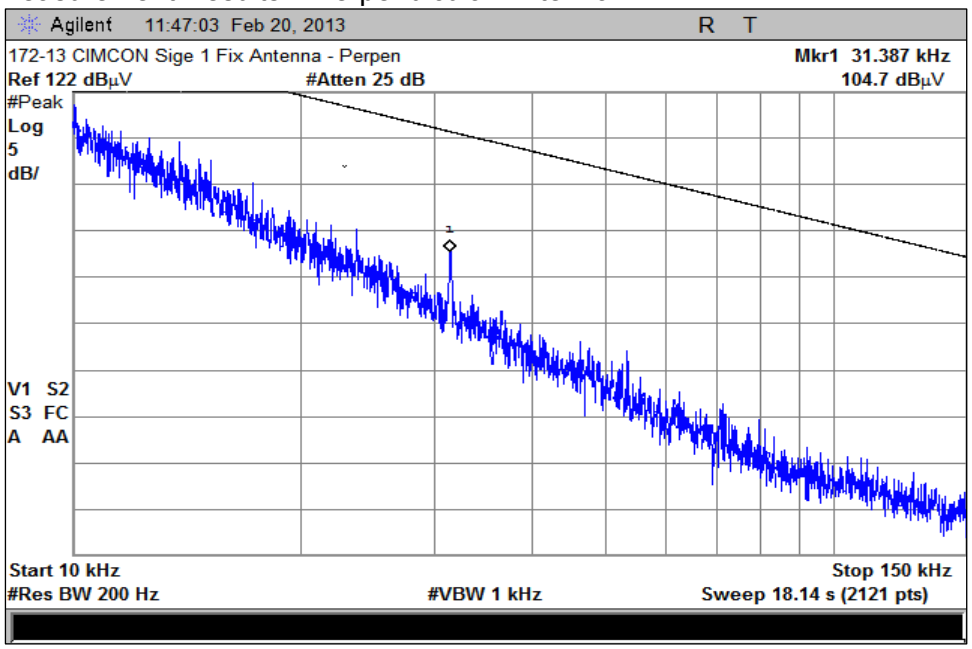
7.6.1. Measurement Results - Fixed Antenna Version (continued)

7.6.1.1. Spurious Radiated Emissions (10 kHz – 150 kHz) Test Results

Measurement Results – Parallel Antenna



Measurement Results – Perpendicular Antenna



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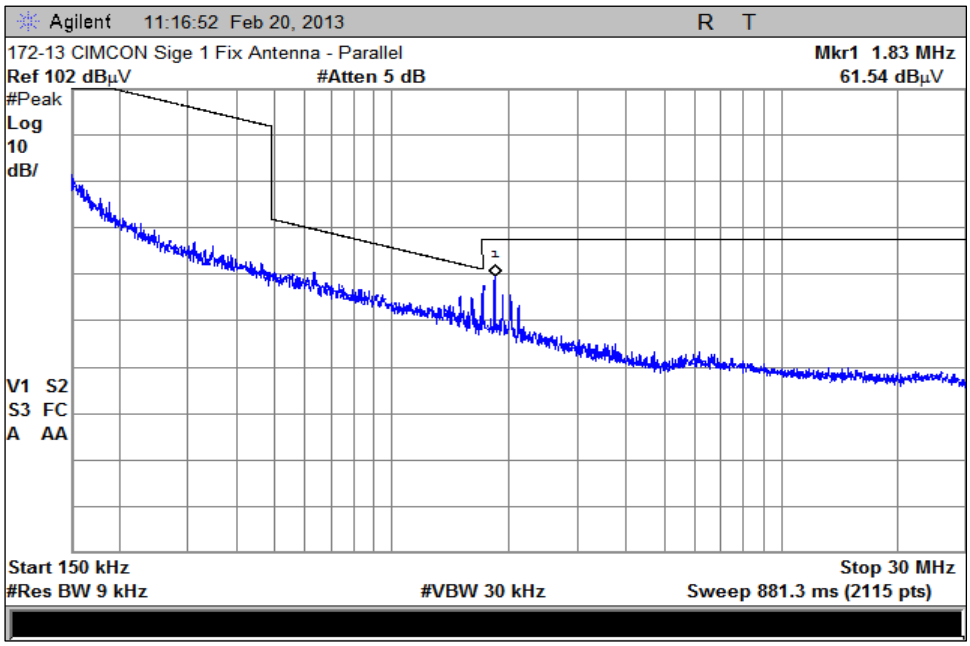
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

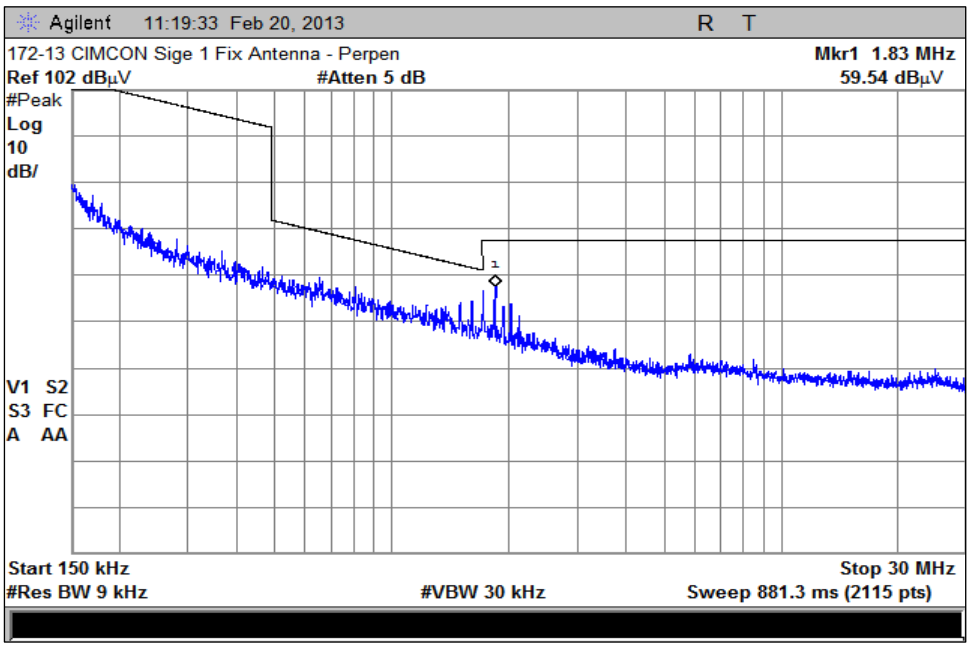
7.6.1. Measurement Results - Fixed Antenna Version (continued)

7.6.1.2. Spurious Radiated Emissions (150 kHz – 30 MHz) Test Results

Measurement Results – Parallel Antenna



Measurement Results – Perpendicular Antenna



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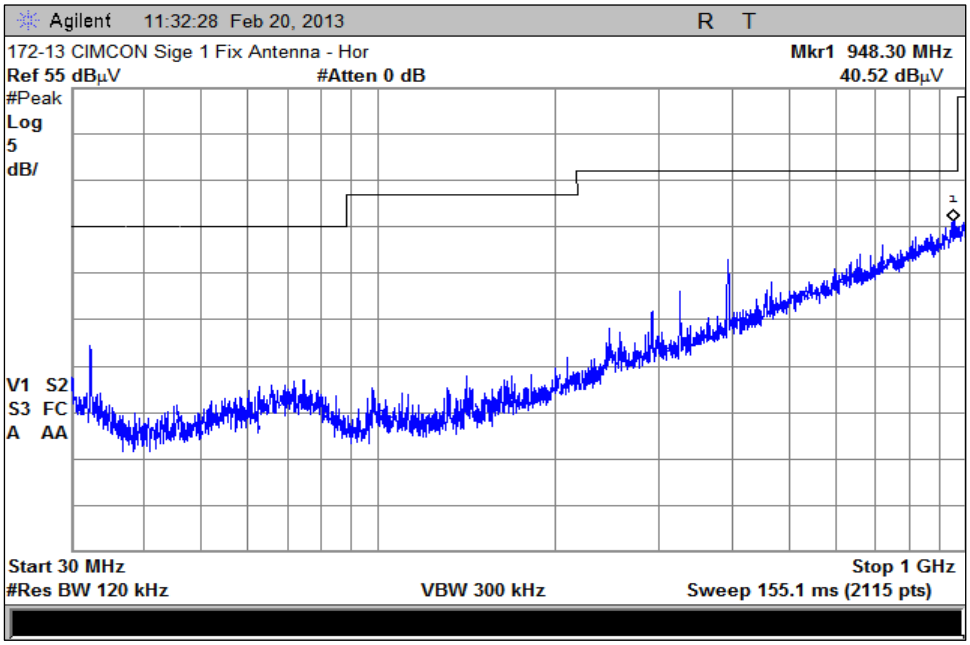
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

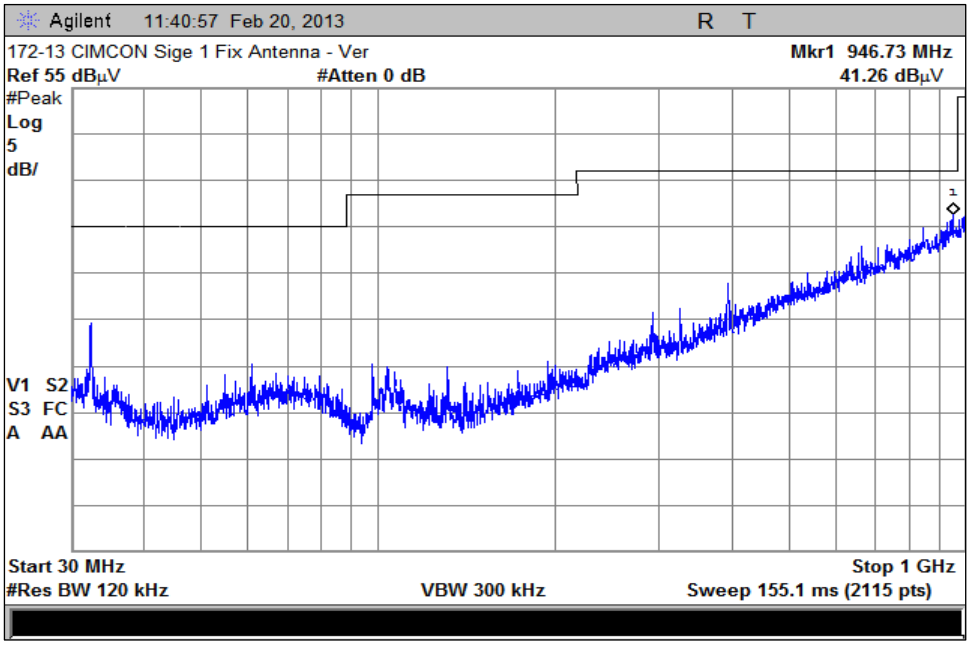
7.6.1. Measurement Results - Fixed Antenna Version (continued)

7.6.1.3. Spurious Radiated Emissions (30 MHz – 1 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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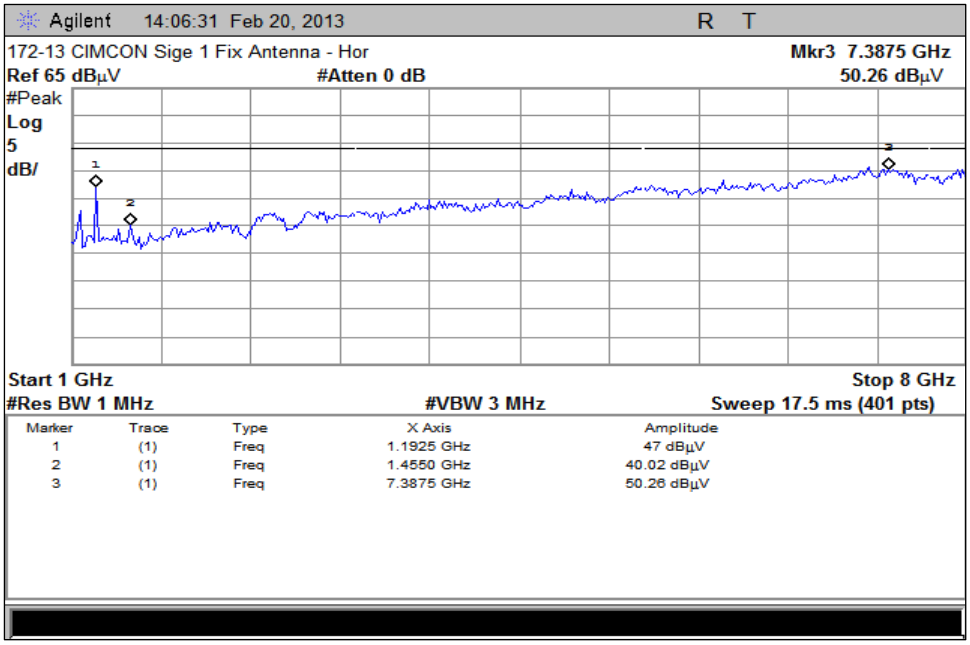
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

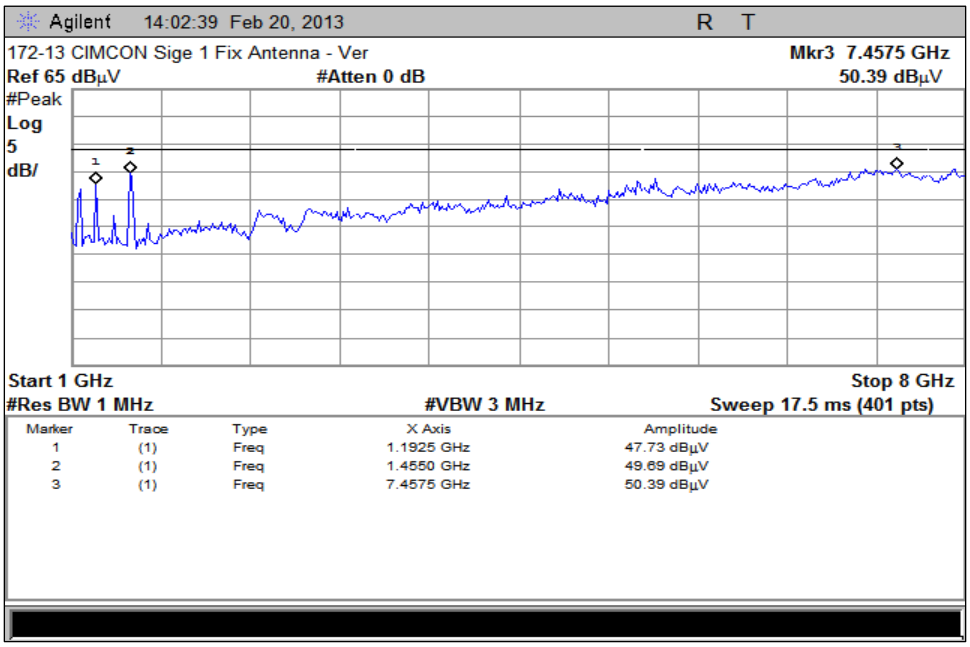
7.6.1. Measurement Results - Fixed Antenna Version (continued)

7.6.1.4. Spurious Radiated Emissions (1 GHz – 8 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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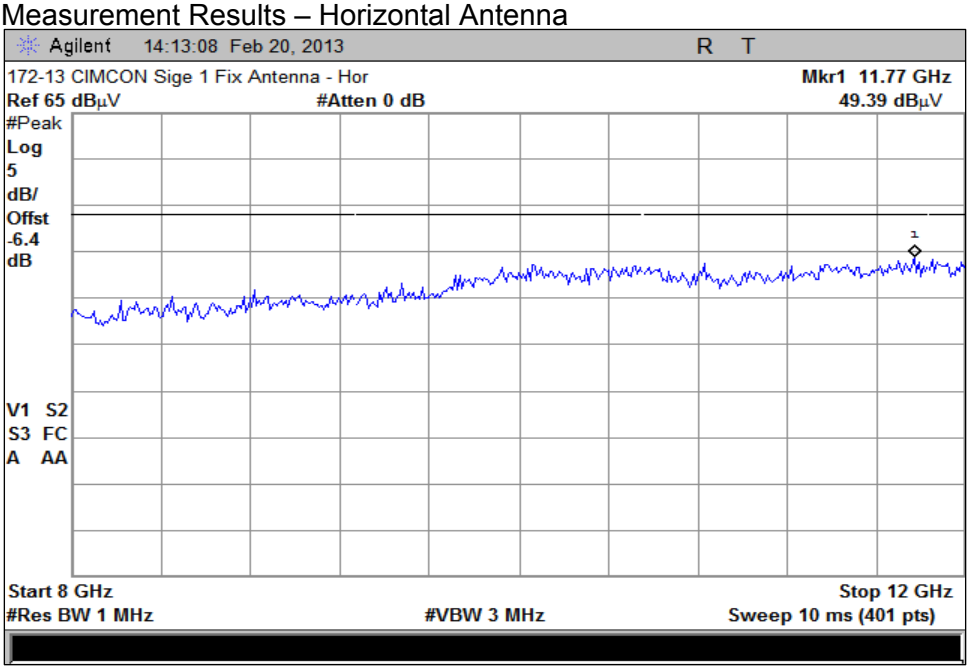
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

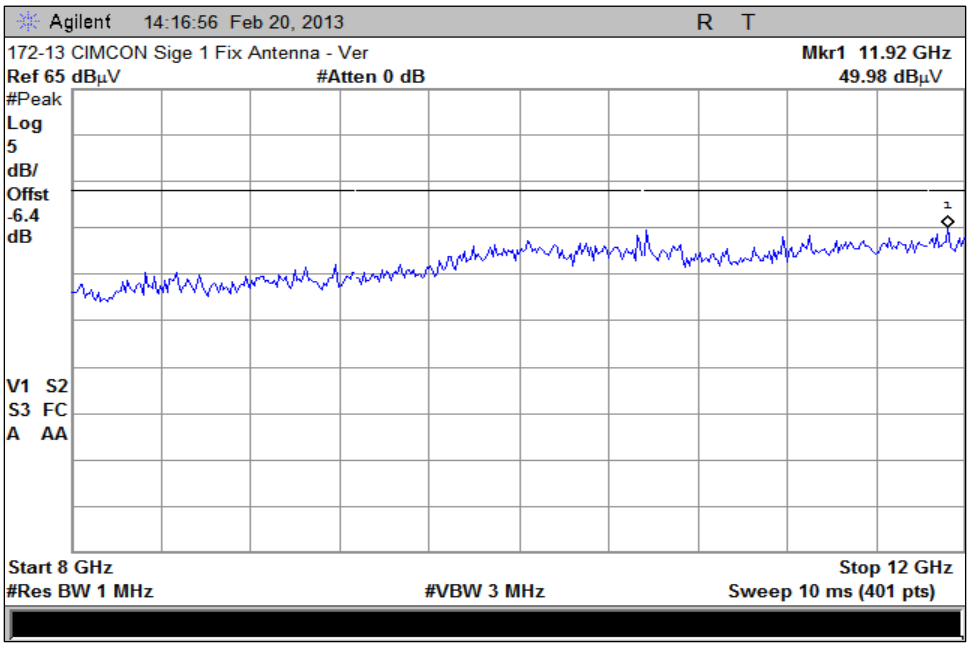
7.6.1. Measurement Results - Fixed Antenna Version (continued)

7.6.1.5. Spurious Radiated Emissions (8 GHz – 12 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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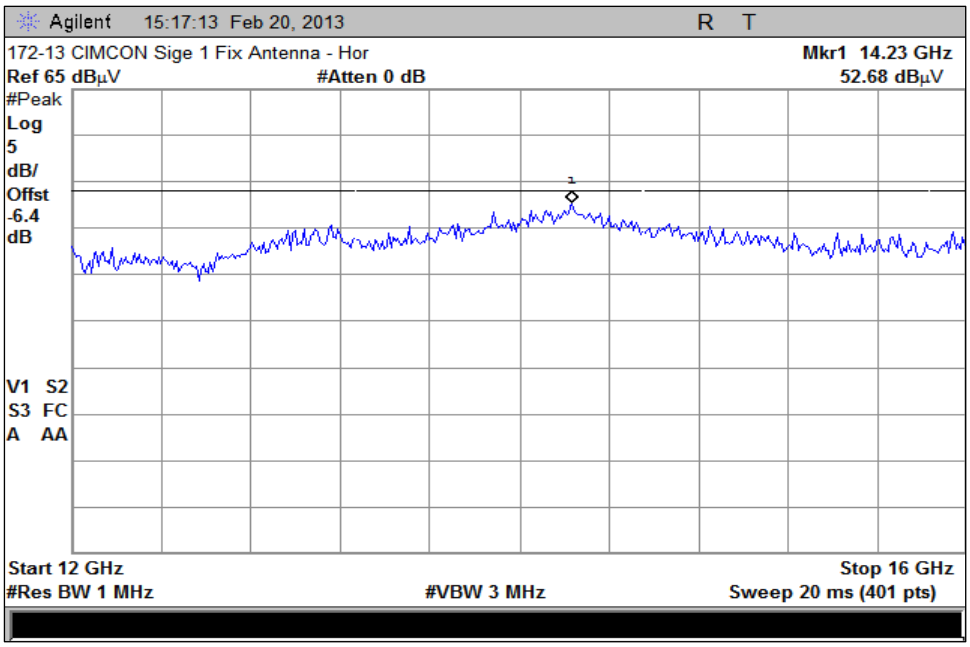
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

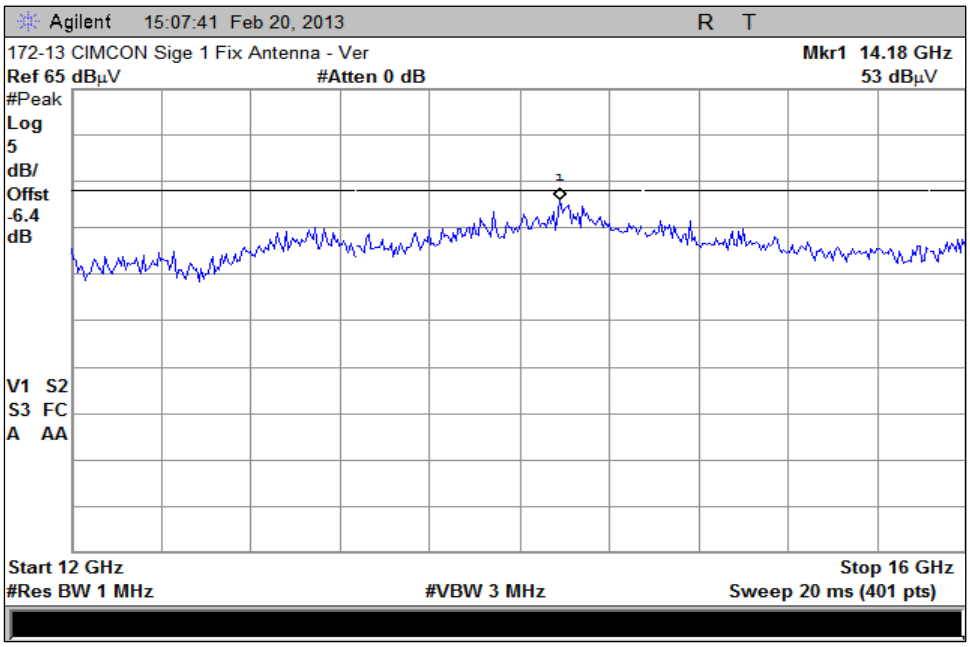
7.6.1. Measurement Results - Fixed Antenna Version (continued)

7.6.1.6. Spurious Radiated Emissions (12 GHz – 16 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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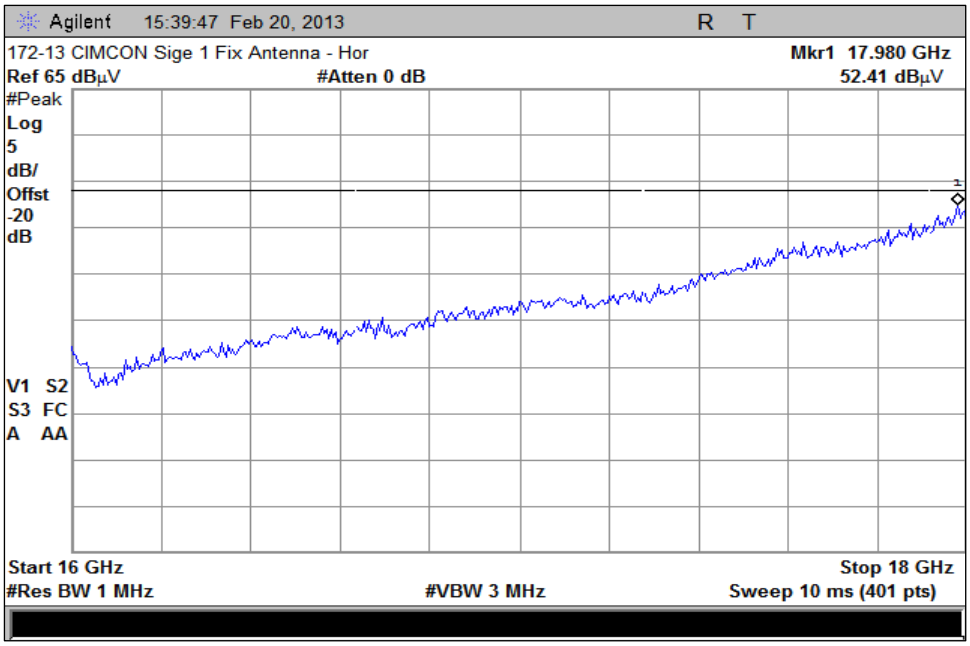
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

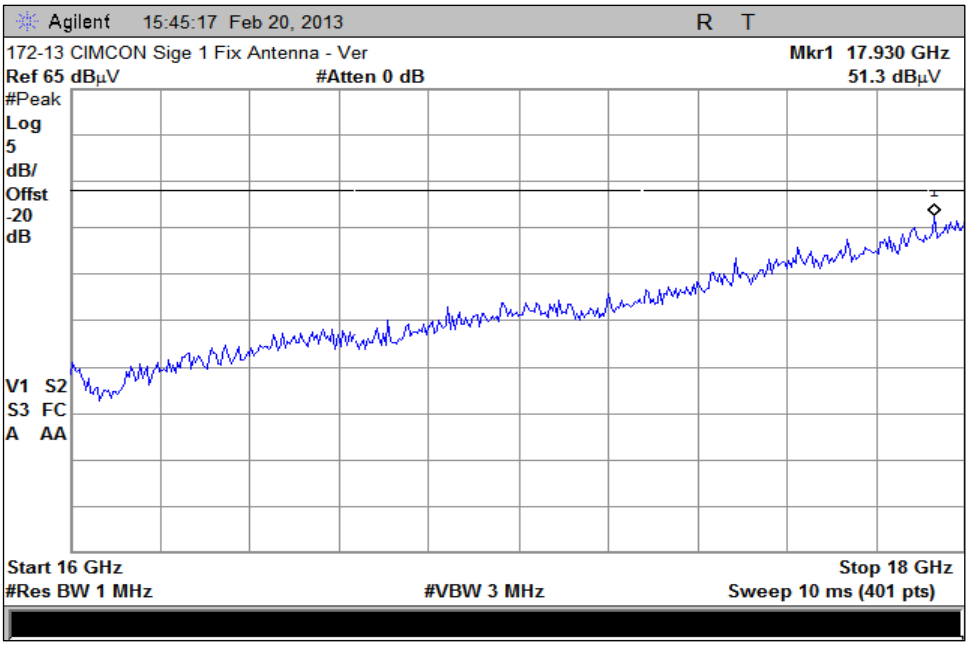
7.6.1. Measurement Results - Fixed Antenna Version (continued)

7.6.1.7. Spurious Radiated Emissions (16 GHz – 18 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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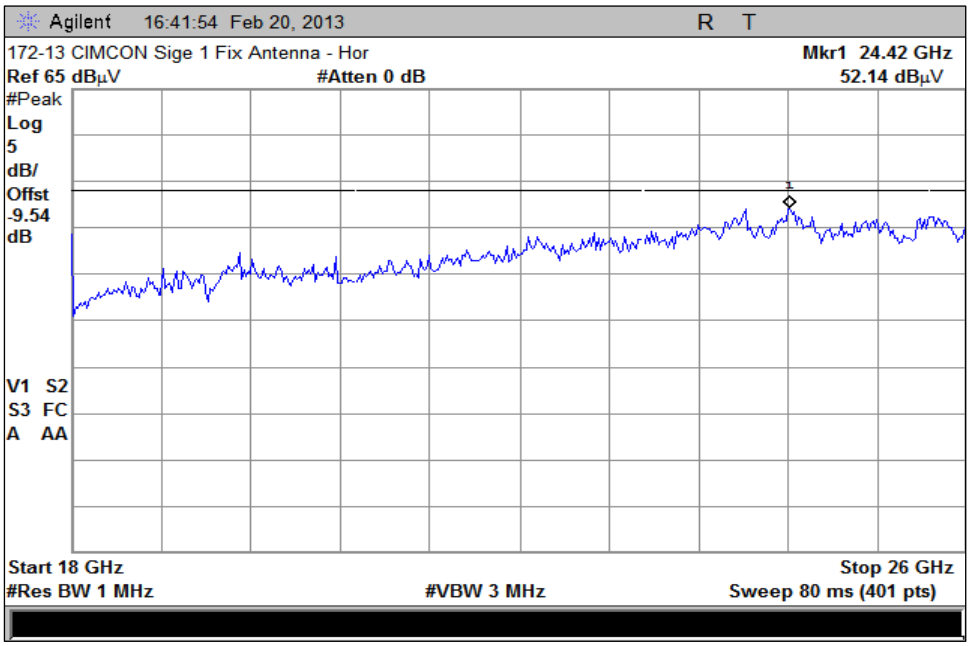
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

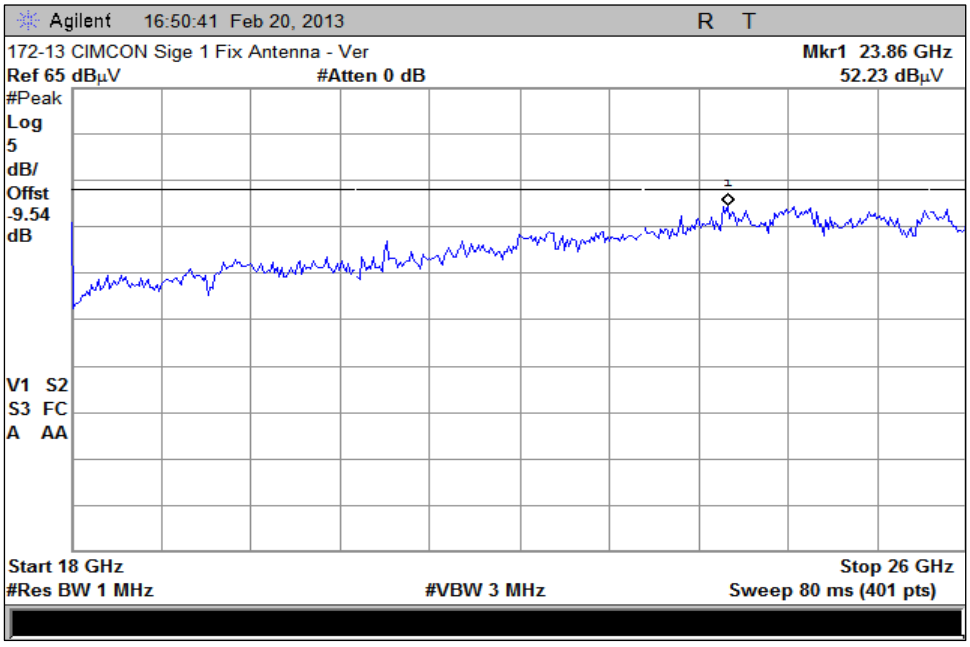
7.6.1. Measurement Results - Fixed Antenna Version (continued)

7.6.1.8. Spurious Radiated Emissions (18 GHz – 26 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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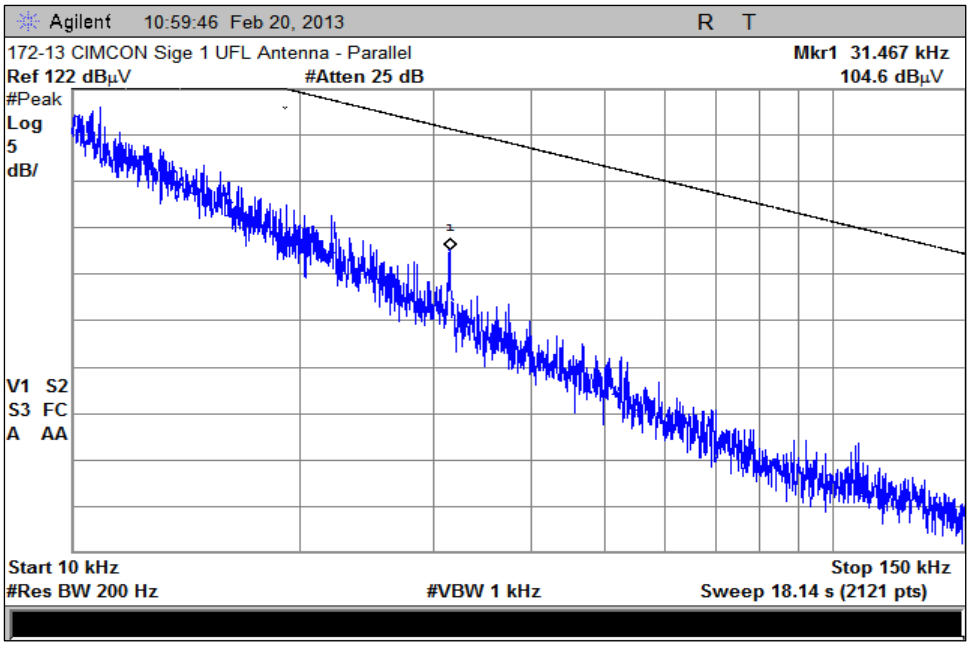
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

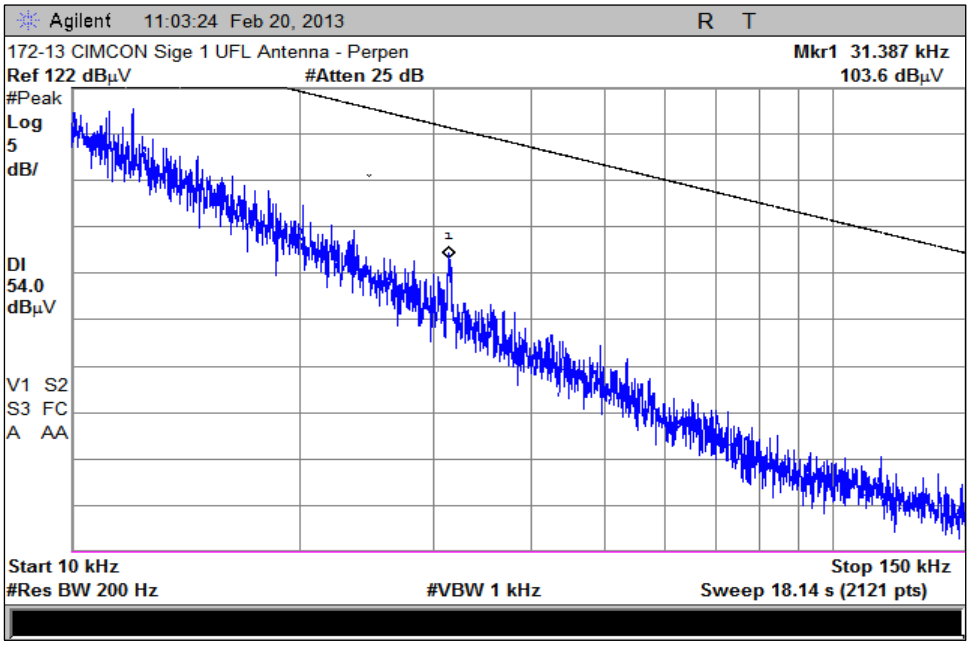
7.6.2. Measurement Results - UFL Antenna Version (continued)

7.6.2.1. Spurious Radiated Emissions (10 kHz – 150 Hz) Test Results

Measurement Results – Parallel Antenna



Measurement Results – Perpendicular Antenna



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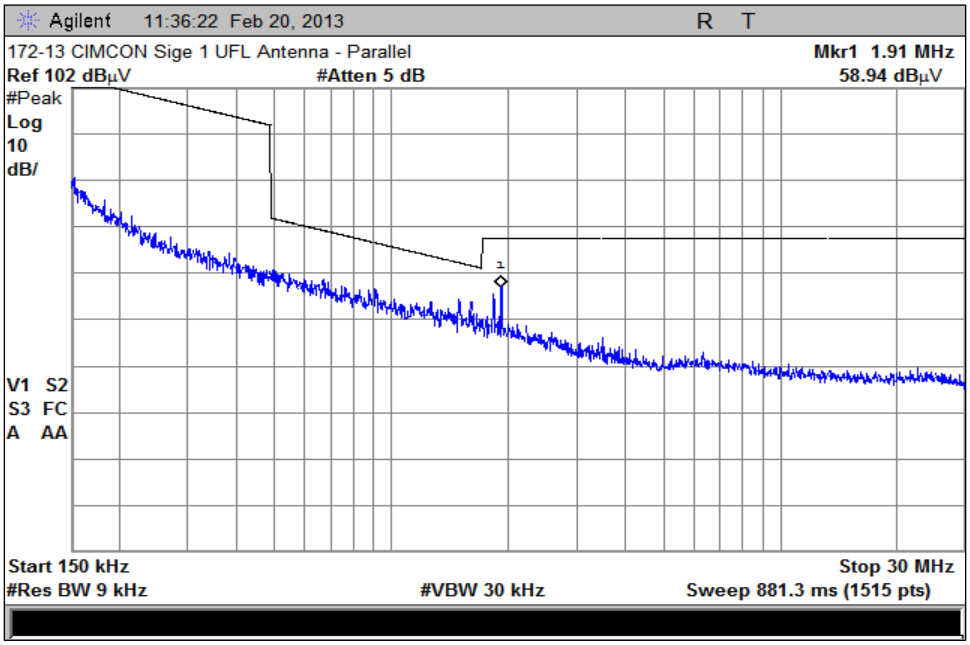
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

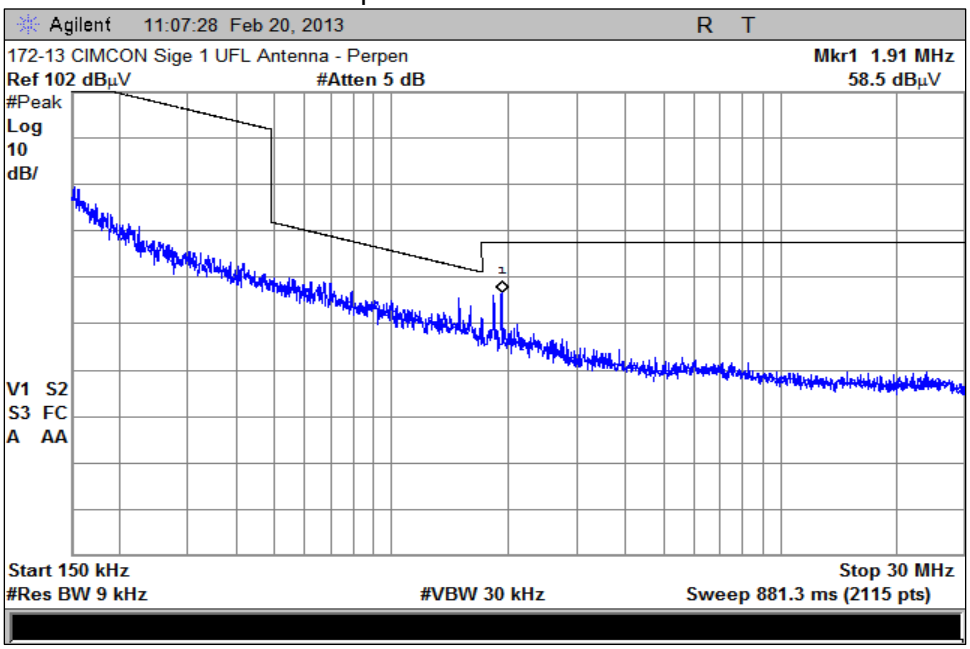
7.6.2. Measurement Results - UFL Antenna Version (continued)

7.6.2.2. Spurious Radiated Emissions (150 kHz – 30 MHz) Test Results

Measurement Results – Parallel Antenna



Measurement Results – Perpendicular Antenna



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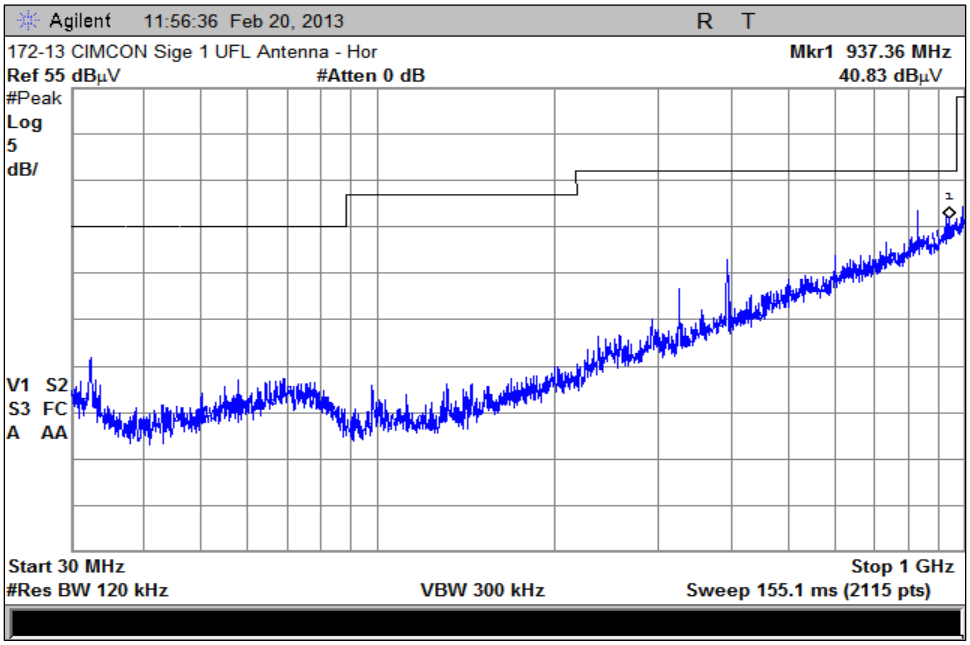
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

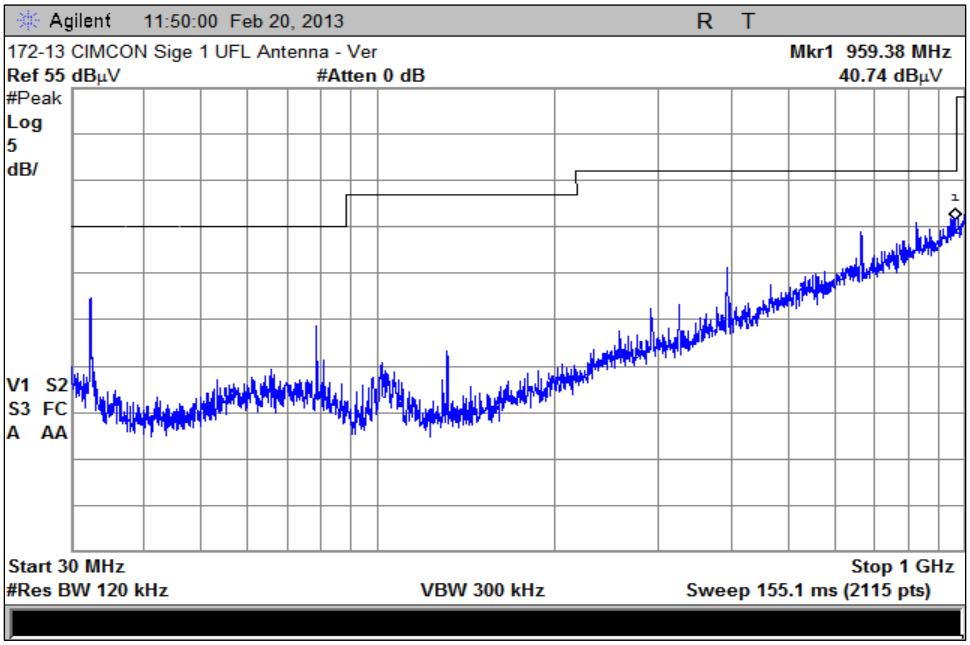
7.6.2. Measurement Results - UFL Antenna Version (continued)

7.6.2.3. Spurious Radiated Emissions (30 MHz – 1 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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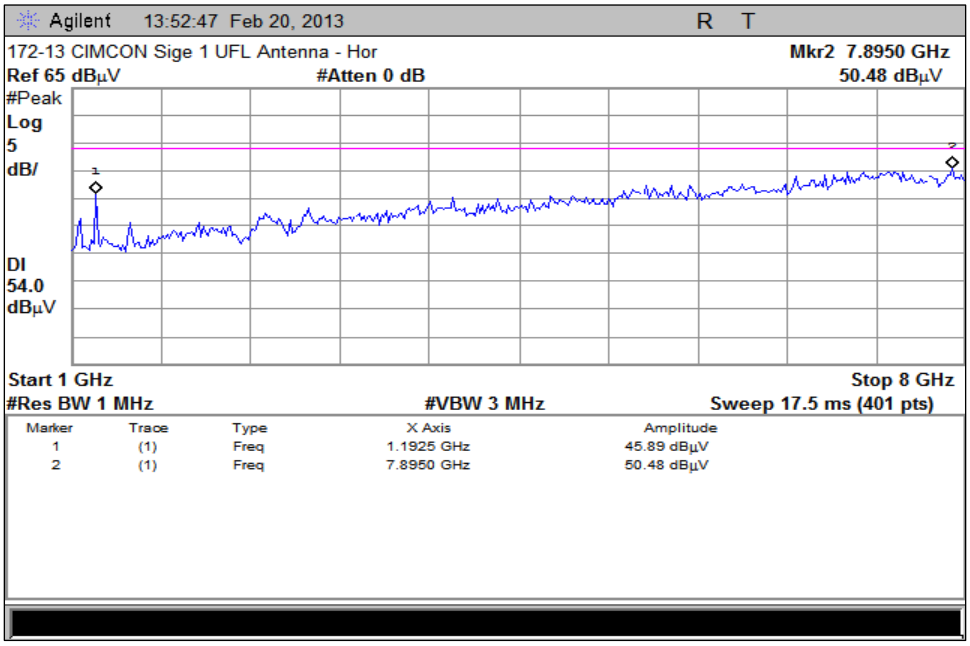
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

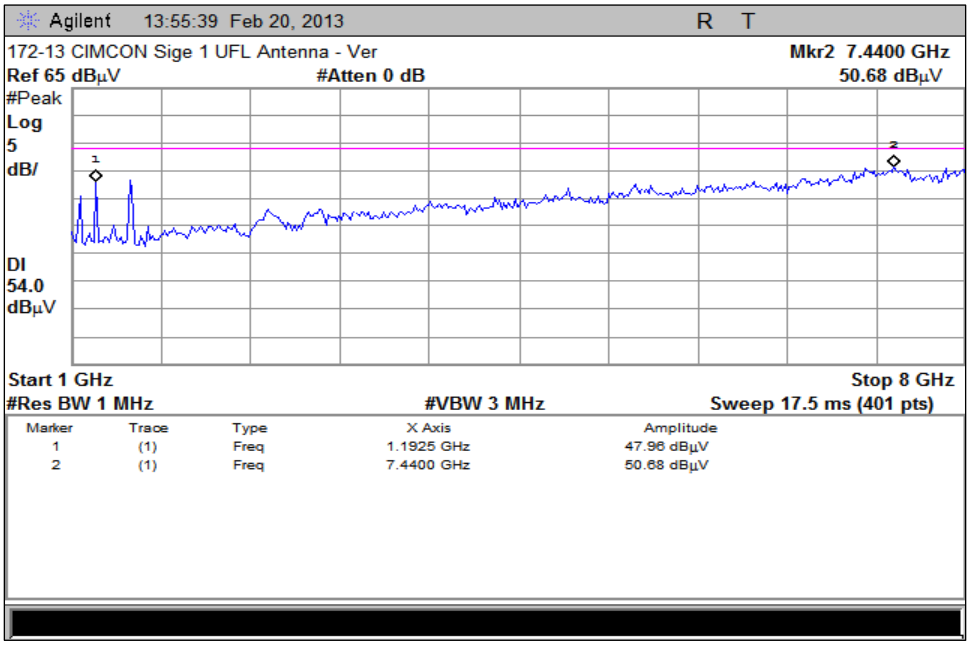
7.6.2. Measurement Results - UFL Antenna Version (continued)

7.6.2.4. Spurious Radiated Emissions (1 GHz – 8 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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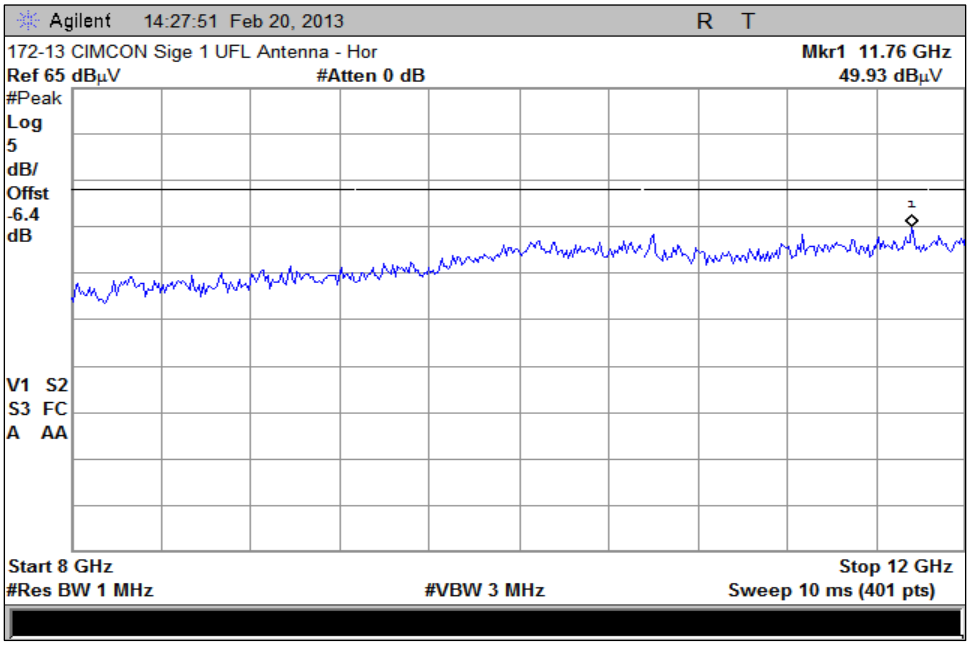
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

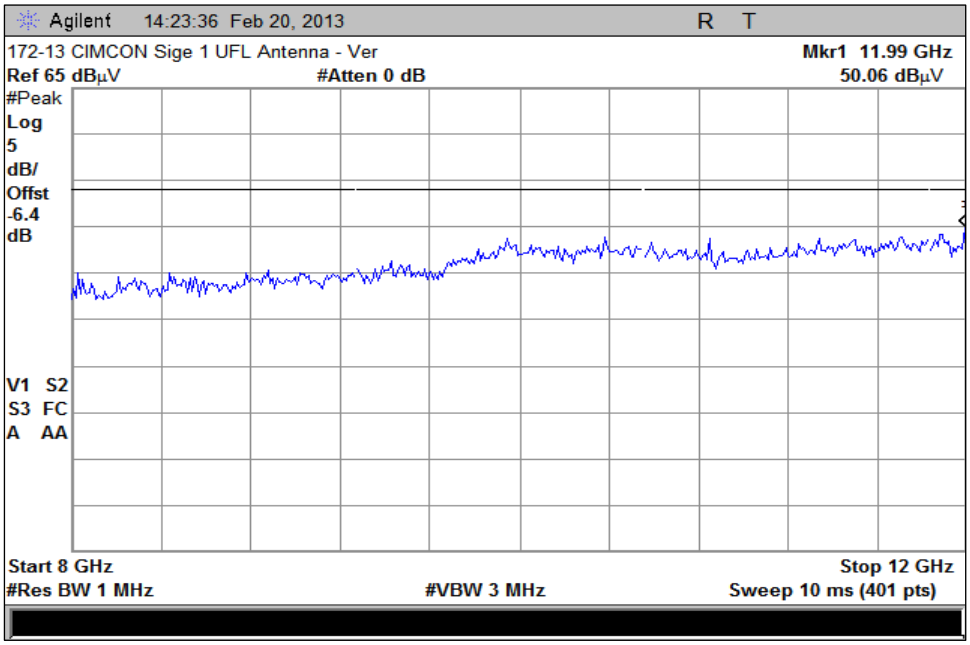
7.6.2. Measurement Results - UFL Antenna Version (continued)

7.6.2.5. Spurious Radiated Emissions (8 GHz – 12 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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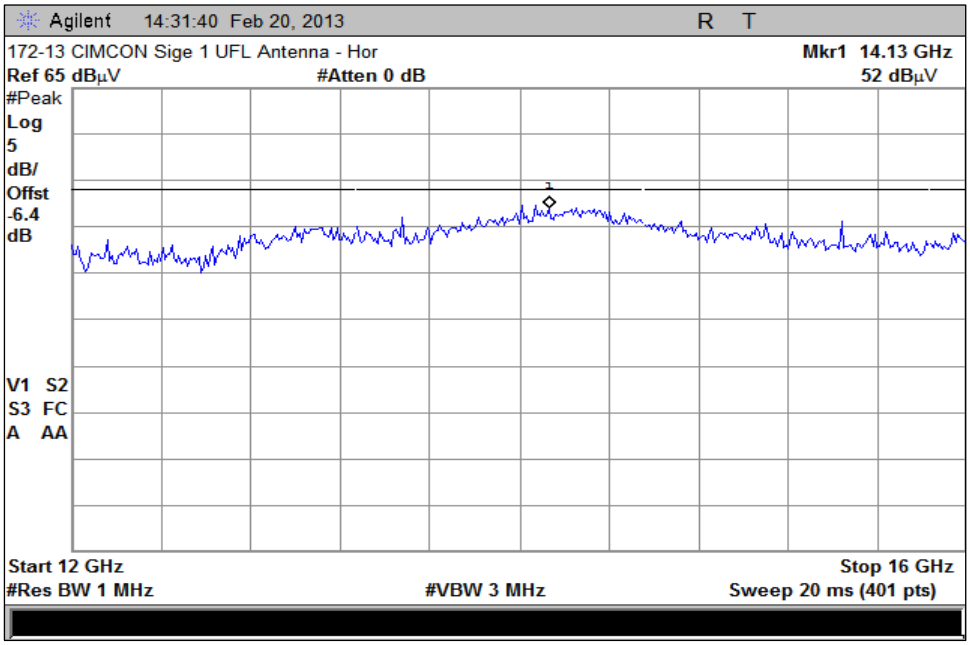
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

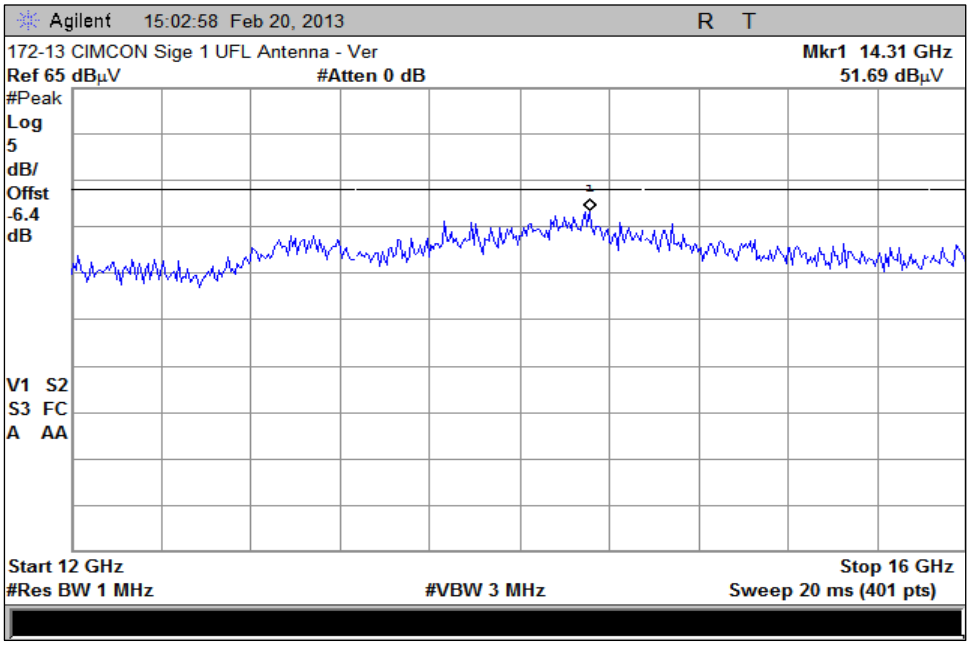
7.6.2. Measurement Results - UFL Antenna Version (continued)

7.6.2.6. Spurious Radiated Emissions (12 GHz – 16 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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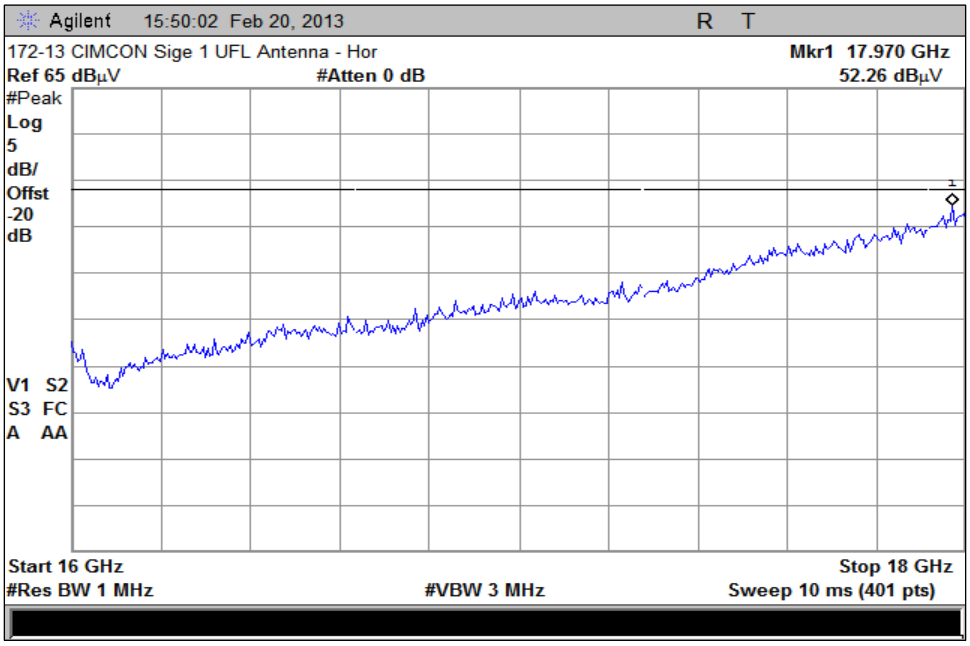
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

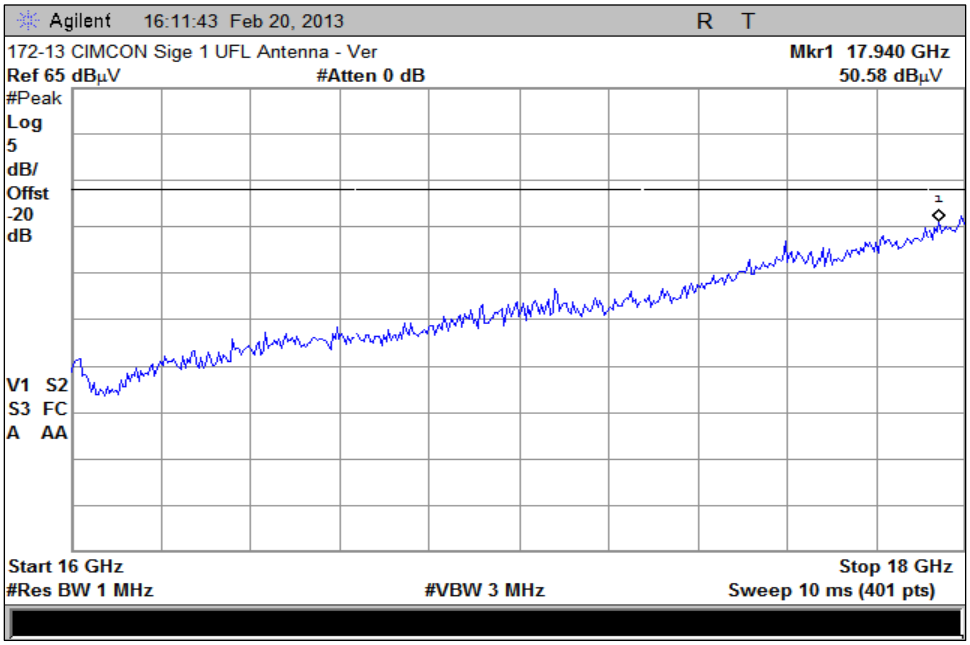
7.6.2. Measurement Results - UFL Antenna Version (continued)

7.6.2.7. Spurious Radiated Emissions (16 GHz – 18 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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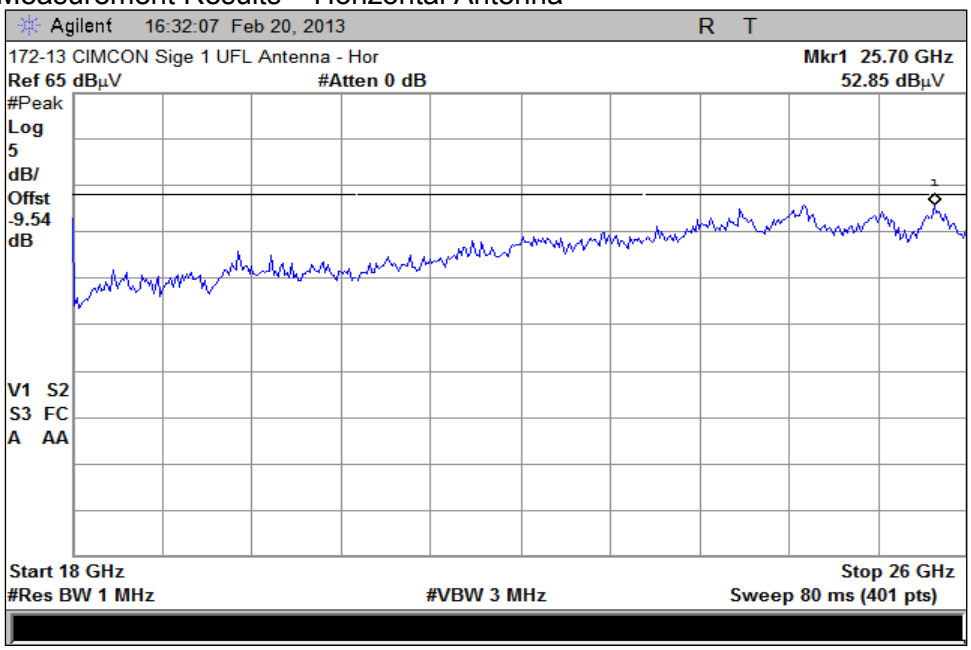
7. Measurement Data (continued)

7.6. Transmitter Spurious Radiated Emissions (150 kHz to 26 GHz)

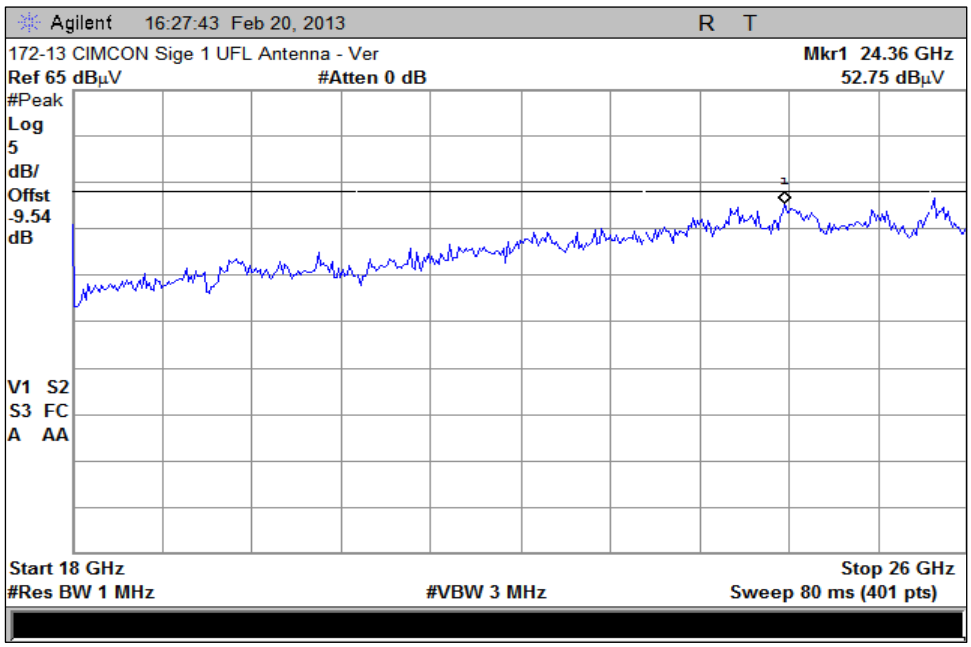
7.6.2. Measurement Results - UFL Antenna Version (continued)

7.6.2.8. Spurious Radiated Emissions (18 GHz – 26 GHz) Test Results

Measurement Results – Horizontal Antenna



Measurement Results – Vertical Antenna



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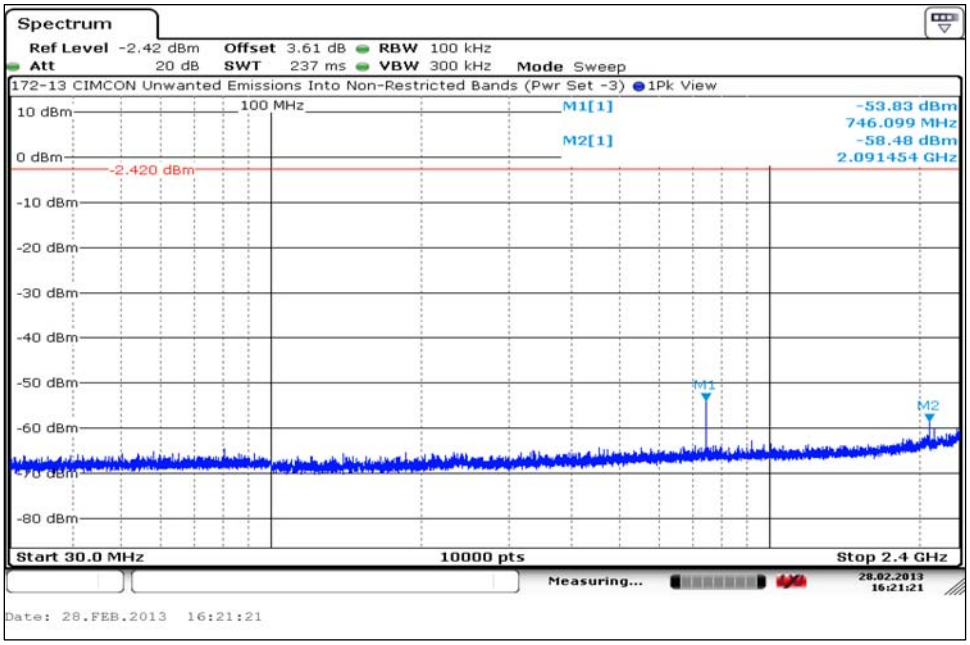
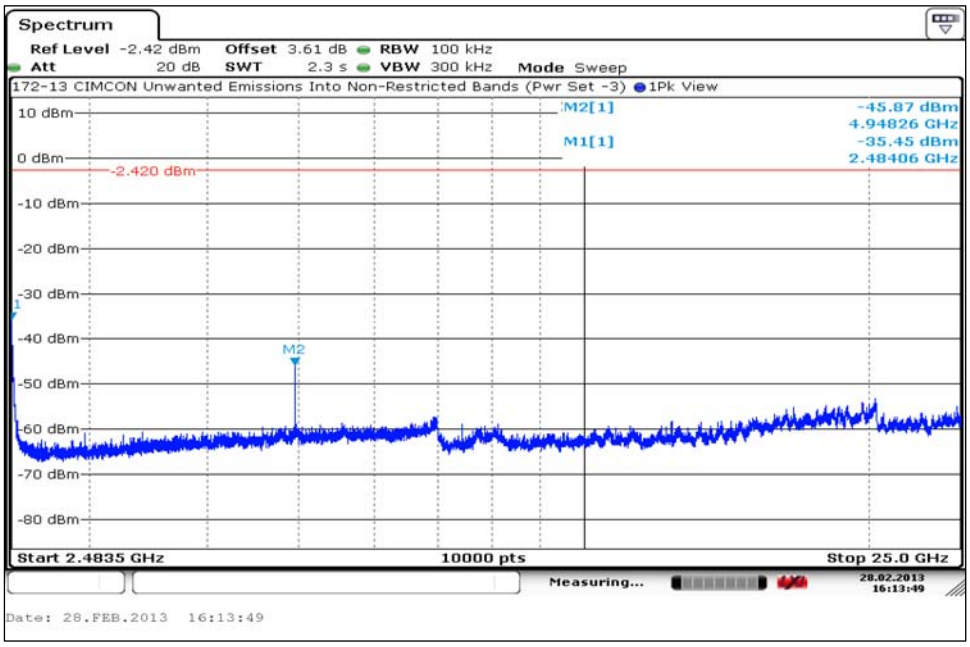
7. Measurement Data (continued)

7.7. Unwanted Emissions into Non-Restricted Bands

7.7.1. 30 MHz to Lower Band Edge (Antenna Port Conducted)



7.7.1. Upper Band Edge to 10th Harmonic (Antenna Port Conducted)



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7. Measurement Data (continued)

7.8. Harmonic Emissions in the Restricted Bands of Operation

7.8.1. Measurement Results - Fixed Antenna Version

Freq. (MHz)	Measured Field Strength (dBµV/m)		Duty Cycle CF (dB)	Adjusted Average Field Strength (dBµV/m)[1]	Limit (dBµV/m)		Margin (dBµV/m)[2]		Antenna Polarity (H/V)	Result
	Peak	Average			Peak	Average	Peak	Average		
4810	58.36	50.42	-18.82	39.54	74.00	54.00	-15.64	-14.46	H	Compliant
4880	60.07	52.67	-18.59	41.48	74.00	54.00	-13.93	-12.52	V	Compliant
4950	62.59	55.00	-19.00	43.59	74.00	54.00	-11.41	-10.41	V	Compliant
7320	64.68	56.98	-18.59	46.09	74.00	54.00	-9.32	-7.91	H	Compliant
7425	71.61	64.79	-19.00	52.61	74.00	54.00	-2.39	-1.39	H	Compliant
12025	58.56	46.62	-18.82	39.74	74.00	54.00	-15.44	-14.26	H	Compliant
12200	59.04	47.00	-18.59	40.45	74.00	54.00	-14.96	-13.55	V	Compliant
12375	59.85	48.34	-19.00	40.85	74.00	54.00	-14.15	-13.15	V	Compliant
19240	55.34	43.32	-18.82	36.52	74.00	54.00	-18.66	-17.48	V	Compliant
19520	56.95	44.11	-18.59	38.36	74.00	54.00	-17.05	-15.64	V	Compliant
19800	57.02	43.01	-19.00	38.02	74.00	54.00	-16.98	-15.98	V	Compliant
22275	58.49	45.68	-19.00	39.49	74.00	54.00	-15.51	-14.51	H	Compliant

[1] Duty cycle correction factors applied to peak field strength measurements.
[2] Average margin was factored from the adjusted average field strength.

7.8.2. Measurement Results - UFL Antenna Version

Freq. (MHz)	Measured Field Strength (dBµV/m)		Duty Cycle CF (dB)	Adjusted Average Field Strength (dBµV/m)[1]	Limit (dBµV/m)		Margin (dBµV/m)[2]		Antenna Polarity (H/V)	Result
	Peak	Average			Peak	Average	Peak	Average		
4810	55.86	47.51	-18.82	37.04	74.00	54.00	-18.14	-16.96	H	Compliant
4880	58.92	51.64	-18.59	40.33	74.00	54.00	-15.08	-13.67	H	Compliant
4950	58.11	50.32	-19.00	39.11	74.00	54.00	-15.89	-14.89	H	Compliant
7320	63.53	55.94	-18.59	44.94	74.00	54.00	-10.47	-9.06	V	Compliant
7425	70.08	62.79	-19.00	51.08	74.00	54.00	-3.92	-2.92	H	Compliant
12025	61.01	51.53	-18.82	42.19	74.00	54.00	-12.99	-11.81	V	Compliant
12200	62.67	54.18	-18.59	44.08	74.00	54.00	-11.33	-9.92	V	Compliant
12375	62.58	53.11	-19.00	43.58	74.00	54.00	-11.42	-10.42	V	Compliant
19240	57.22	43.12	-18.82	38.40	74.00	54.00	-16.78	-15.60	V	Compliant
19520	56.64	43.15	-18.59	38.05	74.00	54.00	-17.36	-15.95	H	Compliant
19800	57.04	43.45	-19.00	38.04	74.00	54.00	-16.96	-15.96	V	Compliant
22275	60.03	46.05	-19.00	41.03	74.00	54.00	-13.97	-12.97	V	Compliant

[1] Duty cycle correction factors applied to peak field strength measurements.
[2] Average margin was factored from the adjusted average field strength.

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7. Measurement Data (continued)

7.9. Band Edge Measurements (15.247 d))

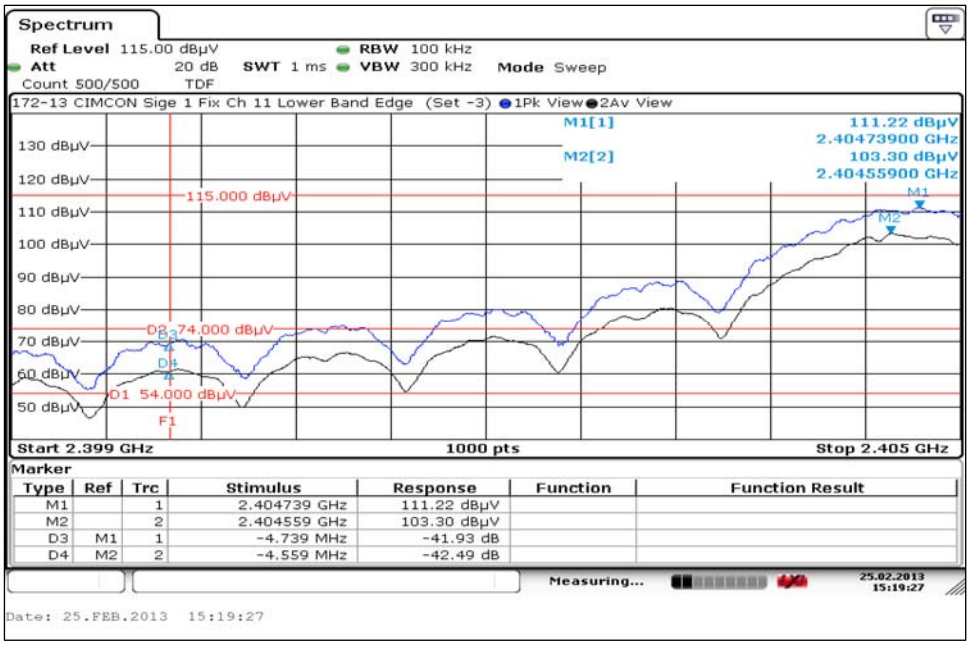
Requirement: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that 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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Procedure: For the lower band edge, this test was performed in accordance with the procedure detailed in FCC OET publication number 558074, Section 10.2.5 Band-Edge Measurements and KDB 913591, band edge measurements of a Part 15 intentional radiator.

7.9.1. Measurement Results - Fixed Antenna Version

7.9.1.1. Measurement Results – Lower Band Edge

Lowest Channel	Reference Level (dBµV/m)		Band Edge Frequency	Field Strength (dBµV/m)	Required Attenuation	Actual Attenuation	Result
(MHz)	Freq.	Peak	(MHz)	Peak			
2405	2404.739	111.22	2400	69.29	≥20 dB	41.93	Compliant



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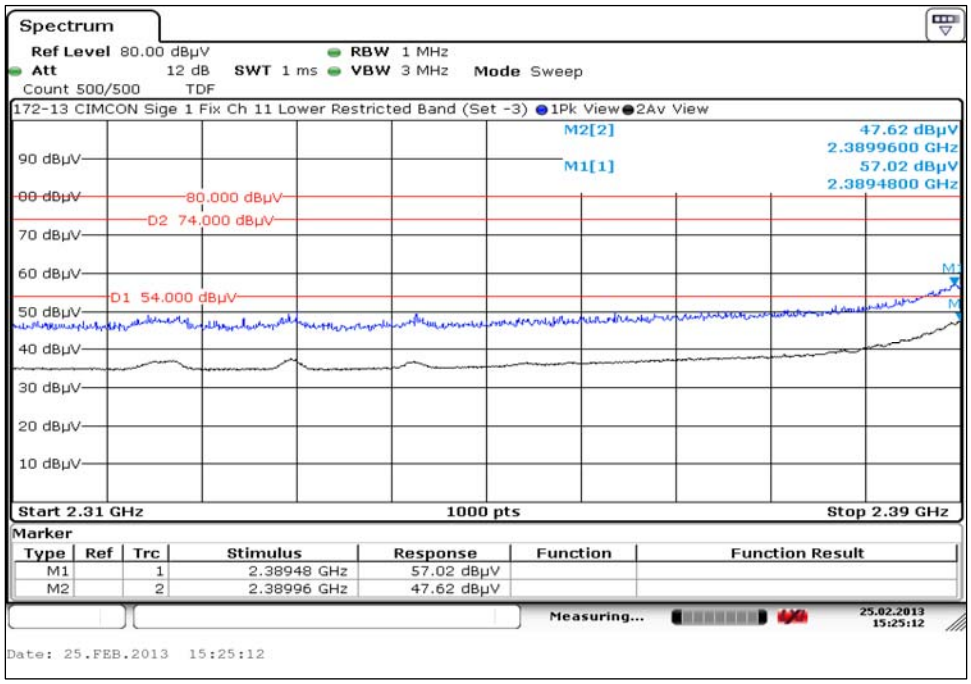
7. Measurement Data (continued)

7.9. Band Edge Measurements (continued)

7.9.1. Fixed Antenna Version

7.9.1.2. Measurement Results – Lower Restricted Band 2310 to 2390 MHz

Freq. (MHz)	Field Strength (dBµV/m)		Limit (dBµV/m)		Margin (dBµV/m)		Result
	Peak	Average	Peak	Average	Peak	Average	
2389.48	57.02	47.62	74	54	-16.98	-6.38	Compliant



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7. Measurement Data (continued)

7.9. Band Edge Measurements (continued)

7.9.1. Fixed Antenna Version

7.9.1.3. Upper Band Edge and Worst Case Out of Band

Marker Delta Calculator

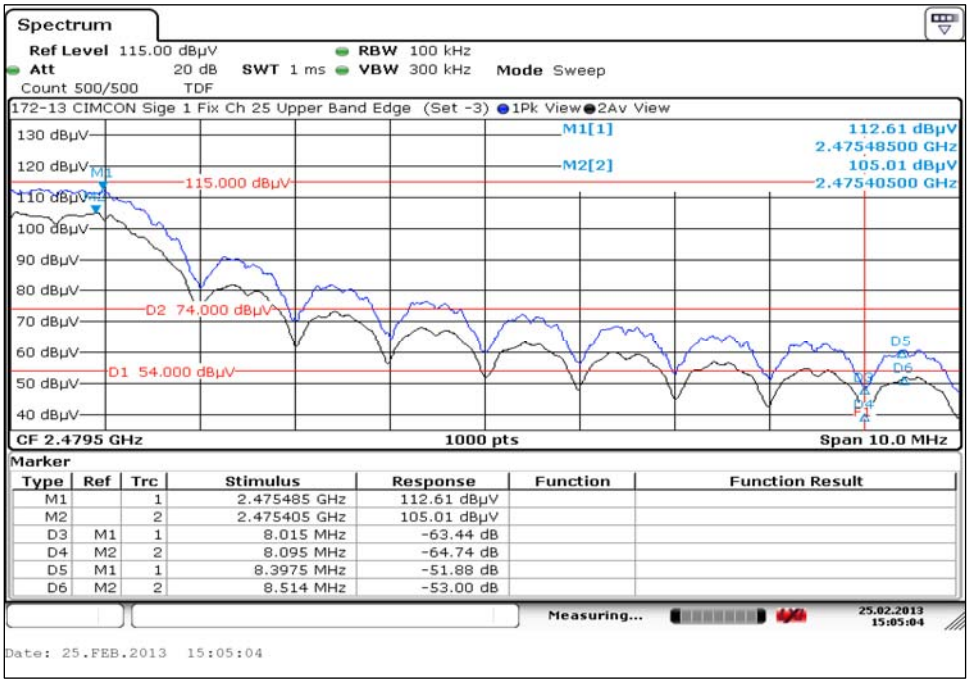
Highest Channel Frequency	Band Edge & Worst Case Out of Band	
	Freq. (MHz)	Peak Marker Delta
(MHz)		
2475.000	2483.500	-63.44
	2483.860	-51.88

Upper Band Edge and Worst Case Out of Band

Highest Channel Frequency	Fundamental Field Strength		Band Edge & Worst Case Out of Band[1]			Limit		Result
	(dBµV/m)		Freq. (MHz)	Amplitude (dBµV/m)		(dBµV/m)		
(MHz)	Peak	Average		Peak	Average	Peak	Average	
2475.000	116.59	114.38	2483.500	53.15	50.94	74	54	Compliant
			2483.860	64.71	43.50	74	54	Compliant

[1] In addition to the peak marker delta offset, the duty cycle correction factor was applied to the worst case out of band field strength.

Marker Delta Measurement



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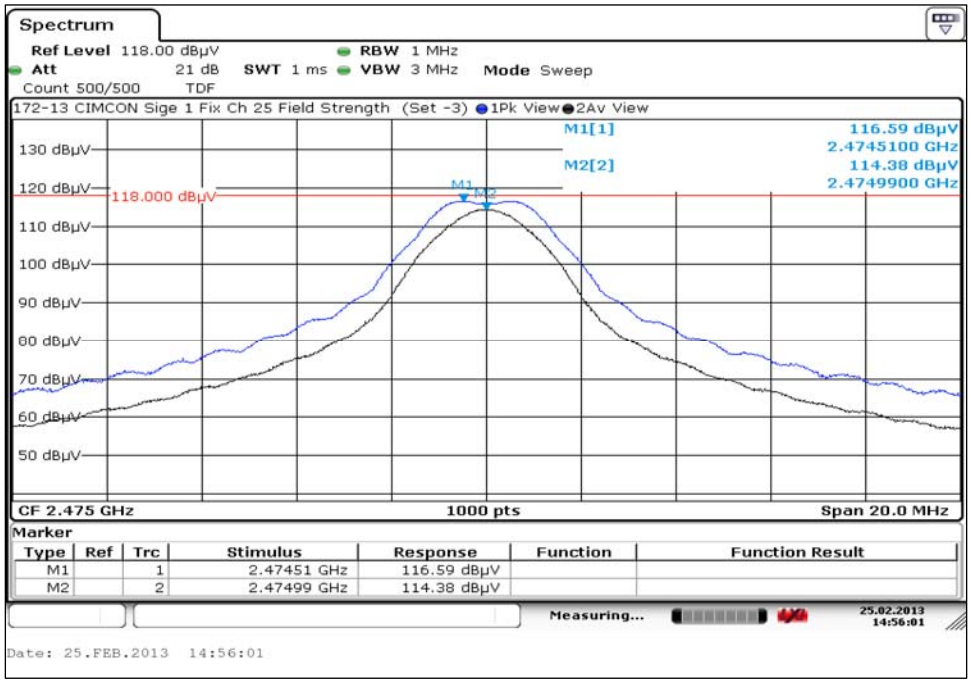
7. Measurement Data (continued)

7.9. Band Edge Measurements (continued)

7.9.1. Fixed Antenna Version

7.9.1.3. Upper Band Edge and Worst Case Out of Band (continued)

Channel 25 Field Strength



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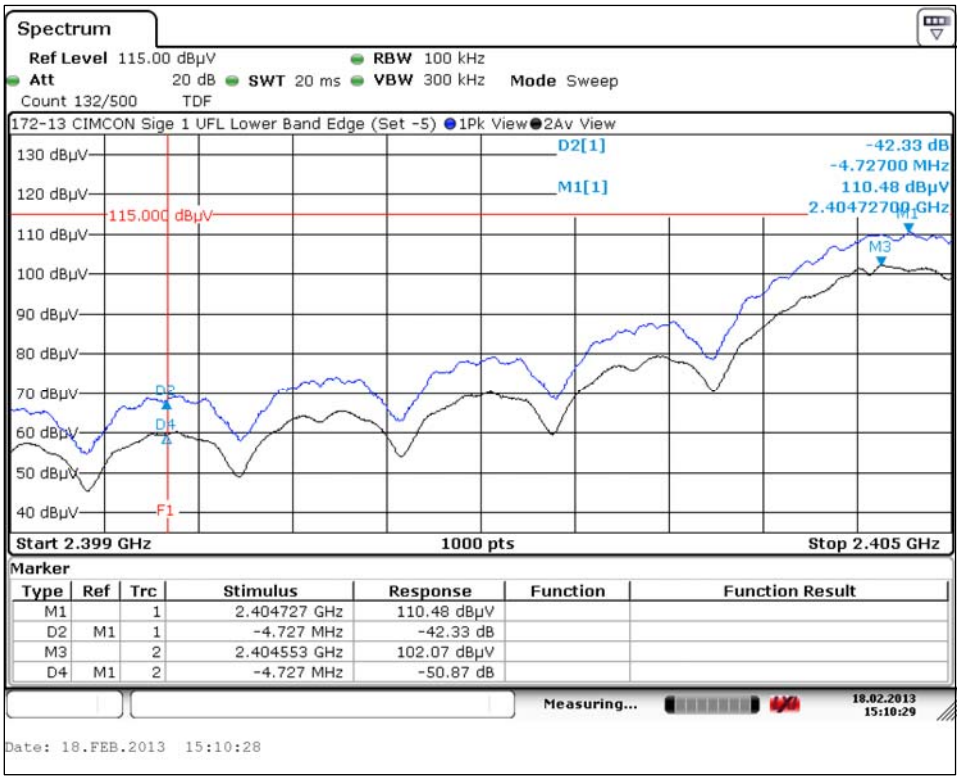
7. Measurement Data (continued)

7.9. Band Edge Measurements (15.247 d))

7.9.2. Measurement Results - UFL Antenna Version

7.9.2.1. Measurement Results – Lower Band Edge

Lowest Channel	Reference Level (dBµV/m)		Band Edge Frequency	Field Strength (dBµV/m)	Required Attenuation	Actual Attenuation	Result
(MHz)	Freq.	Peak	(MHz)	Peak			
2405	2404.727	110.48	2400	68.15	≥20 dB	42.33	Compliant



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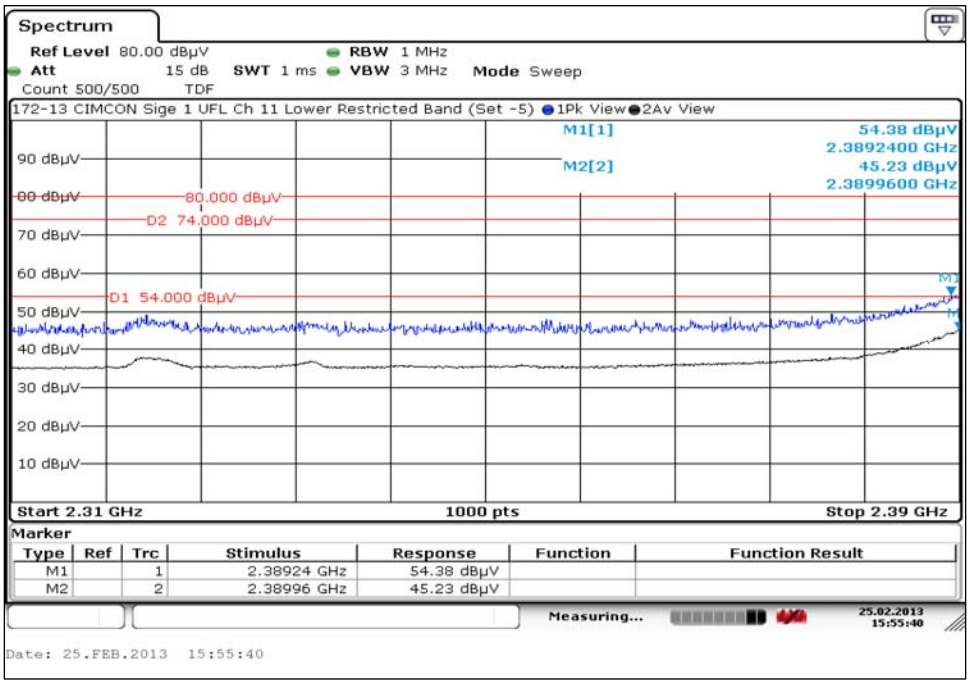
7. Measurement Data (continued)

7.9. Band Edge Measurements (continued)

7.9.2. UFL Antenna Version (continued)

7.9.1.2. Measurement Results – Lower Restricted Band 2310 to 2390 MHz

Freq. (MHz)	Field Strength (dBµV/m)		Limit (dBµV/m)		Margin (dBµV/m)		Result
	Peak	Average	Peak	Average	Peak	Average	
2389.240	54.38	45.23	74	54	-19.62	-8.77	Compliant



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7. Measurement Data (continued)

7.9. Band Edge Measurements (continued)

7.9.2. UFL Antenna Version (continued)

7.9.2.3. Upper Band Edge and Worst Case Out of Band

Marker Delta Calculator

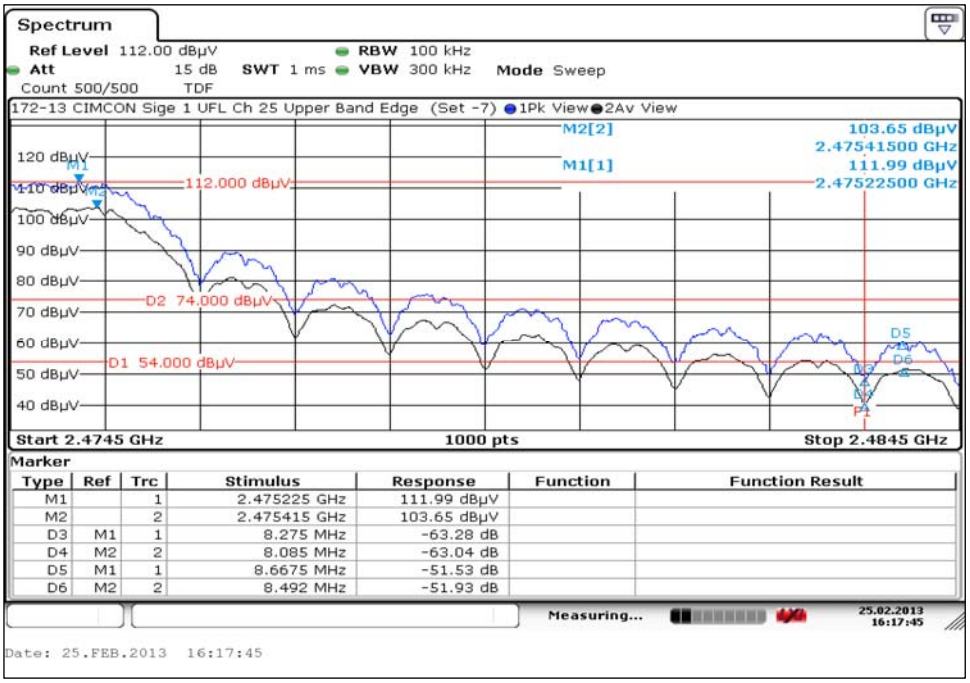
Highest Channel Frequency	Band Edge & Worst Case Out of Band	
	Freq. (MHz)	Peak Marker Delta
(MHz)		
2475.000	2483.500	-63.28
	2483.893	-51.53

Upper Band Edge and Worst Case Out of Band

Highest Channel Frequency	Fundamental Field Strength		Band Edge & Worst Case Out of Band[1]			Limit		Result
	(dBµV/m)		Freq. (MHz)	Amplitude (dBµV/m)		(dBµV/m)		
(MHz)	Peak	Average		Peak	Average	Peak	Average	
2475.000	115.44	113.39	2483.500	53.15	50.94	74	54	Compliant
			2483.893	63.91	42.86	74	54	Compliant

[1] In addition to the peak marker delta offset, the duty cycle correction factor was applied to the worst case out of band field strength.

Marker Delta Measurement



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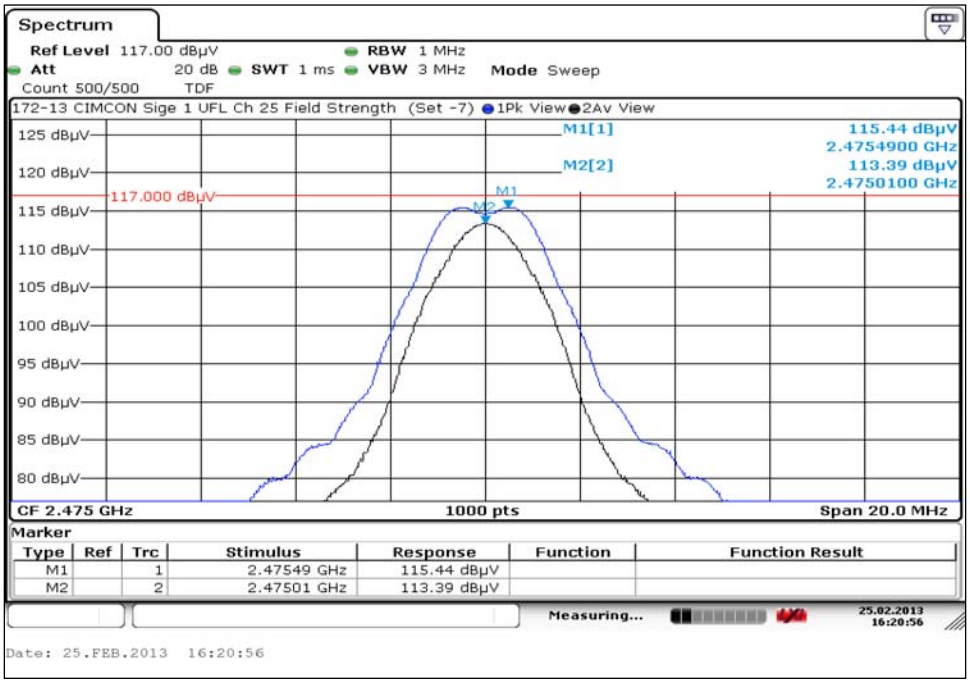
7. Measurement Data (continued)

7.9. Band Edge Measurements (continued)

7.9.2. UFL Antenna Version (continued)

7.9.2.3. Upper Band Edge and Worst Case Out of Band

Channel 25 Field Strength



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7. Measurement Data (continued)

7.10. Maximum Power Spectral Density (15.247(e))

Requirement: For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

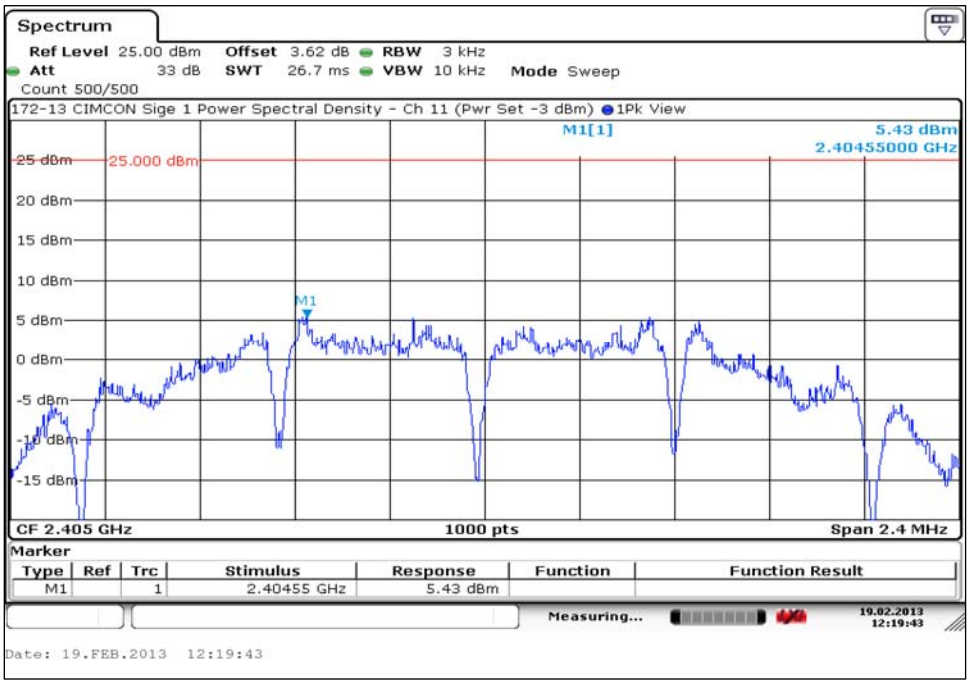
Procedure: FCC OET publication number 558074, Section 9.0: Maximum Power Spectral Density Level in the Fundamental Emission, Option 9.1 Opt. 1.

Conclusion: The DUT meets the required power spectral density limit at the tested frequencies.

7.10.1. Measurement Results for the Fixed Antenna Version

Channel	Channel Frequency (MHz)	DUT Channel Output Power Setting	Measured Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)	Result
Low	2405	-3	2404.5500	5.43	8	-2.57	Compliant
Middle	2440	-3	2439.5428	5.53	8	-2.47	Compliant
High	2480	-3	2475.5400	5.95	8	-2.05	Compliant

7.10.1.1. Low Channel, 11



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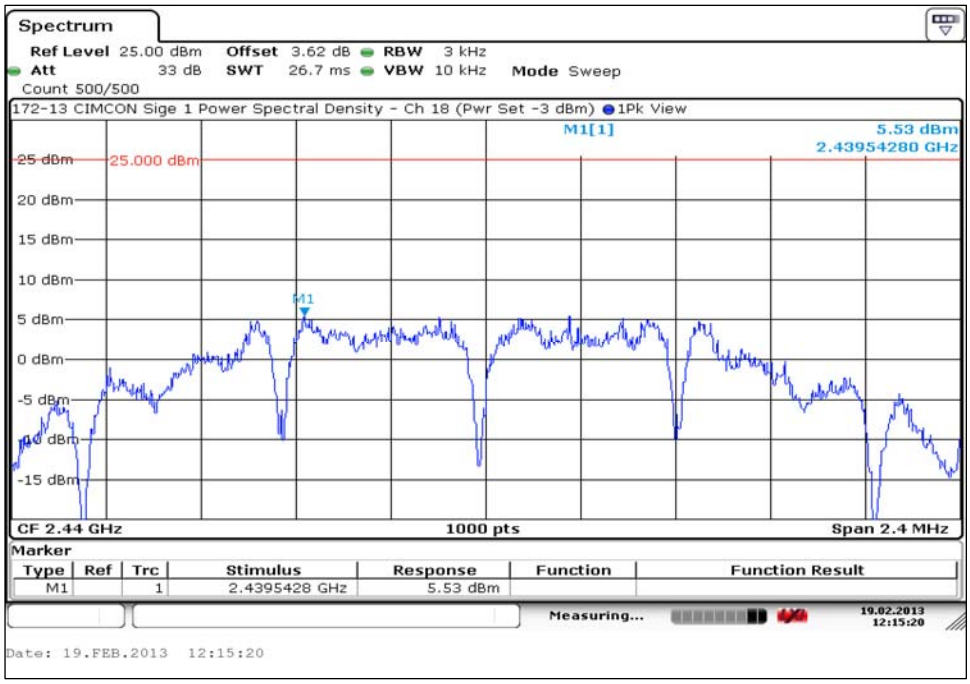
7. Measurement Data (continued)

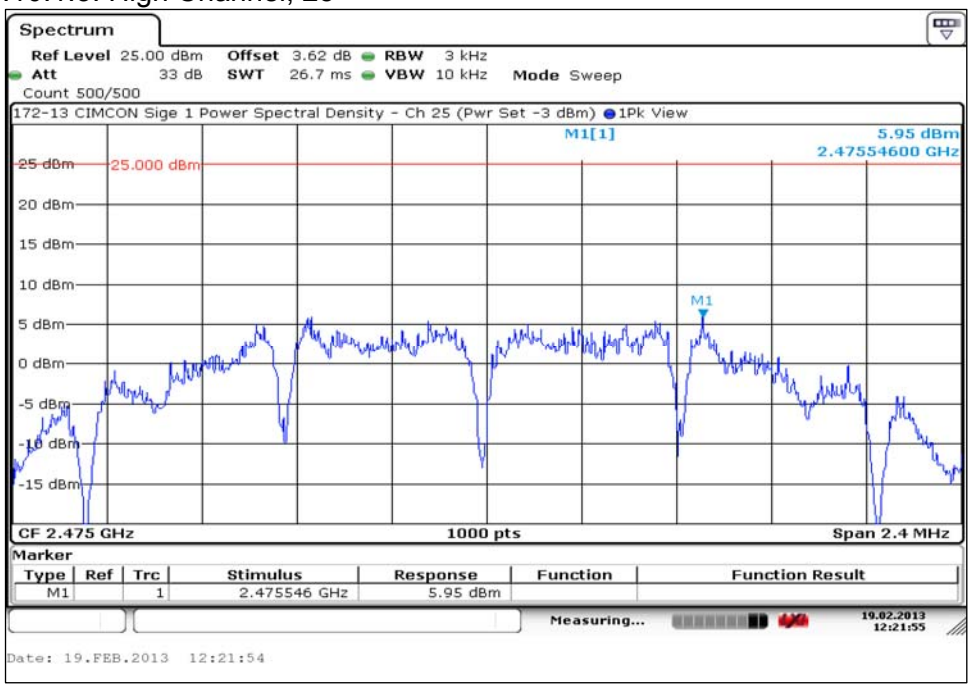
7.10. Power Spectral Density (15.247(e)) (continued)

7.10.1. Fixed Antenna Version

7.10.1.2. Middle Channel, 18



7.10.1.3. High Channel, 25



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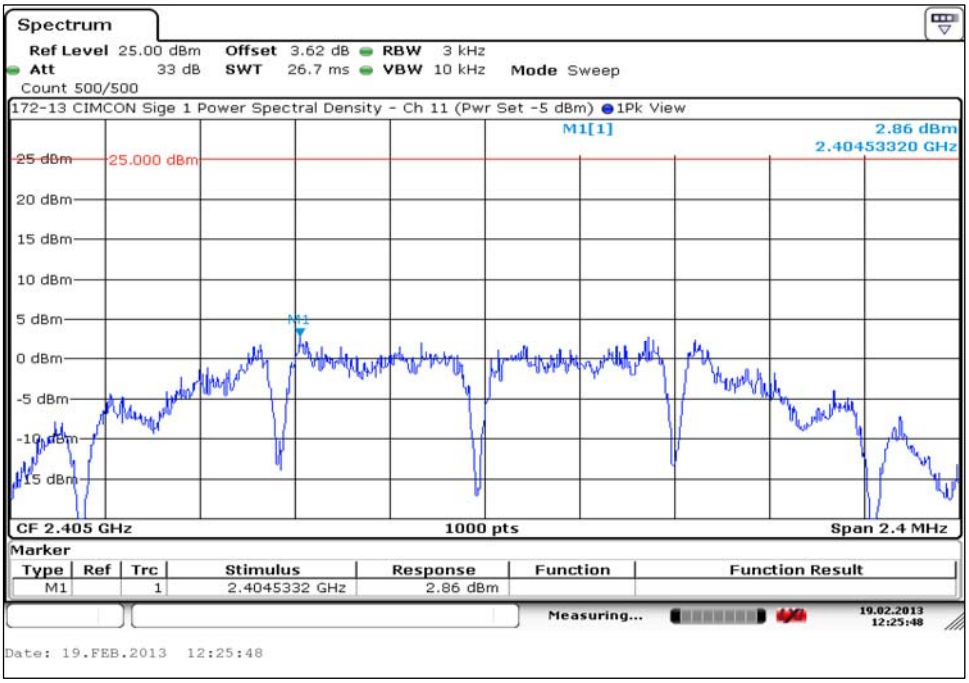
7. Measurement Data (continued)

7.10. Maximum Power Spectral Density (15.247(e))

7.10.2. Measurement Results for the UFL Antenna Version

Channel	Channel Frequency (MHz)	DUT Channel Output Power Setting	Measured Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)	Result
Low	2405	-5	2405.5332	2.86	8	-5.14	Compliant
Middle	2440	-5	2439.8620	3.63	8	-4.37	Compliant
High	2480	-7	2475.4040	3.43	8	-4.57	Compliant

7.10.2.1. Low Channel, 11



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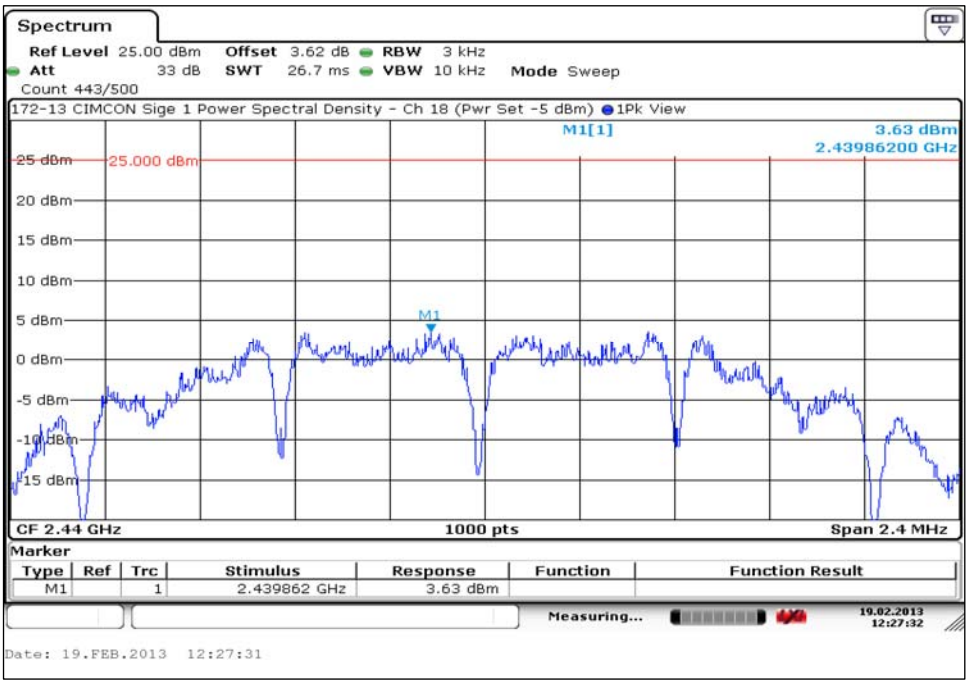
7. Measurement Data (continued)

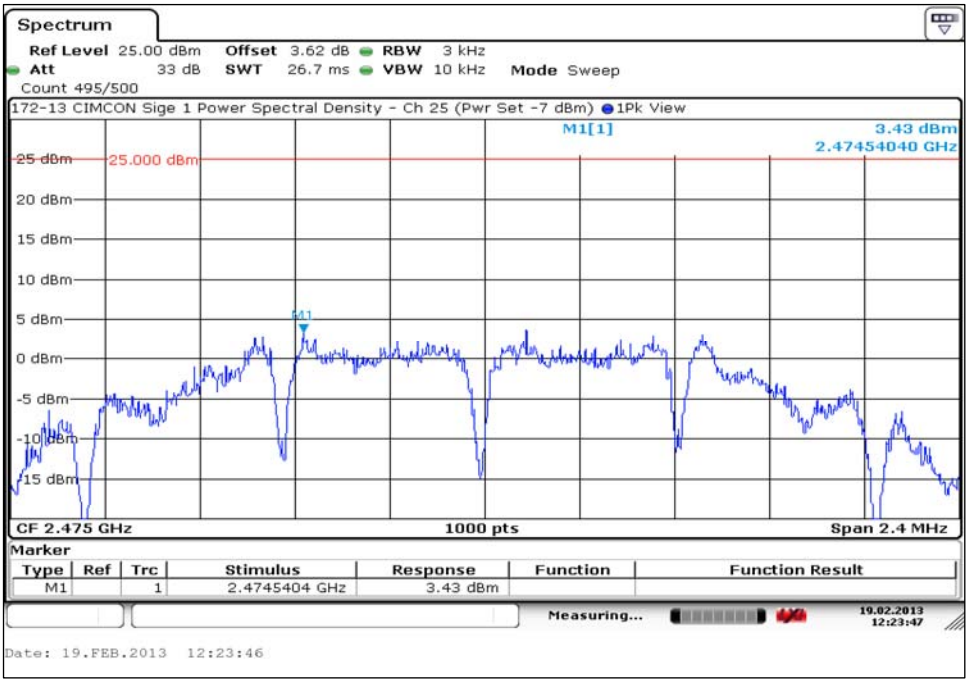
7.10. Maximum Power Spectral Density (15.247(e))

7.10.2. UFL Antenna Version

7.10.2.2. Middle Channel, 18



7.10.2.2. Middle Channel, 18



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7. Measurement Data (continued)

7.11. Duty Cycle Calculations (ANSI C63.10-2009, Section 7.5)

Requirement: When the average value of the pulsed emissions from an EUT must be determined, the average can be found by measuring the peak pulse amplitude and determining the duty cycle correction factor of the pulse modulation. The duty cycle correction factor δ may be expressed in dB as in the following equation:

$$\delta\ (dB) = 20_{\log dB}\ (\delta)$$

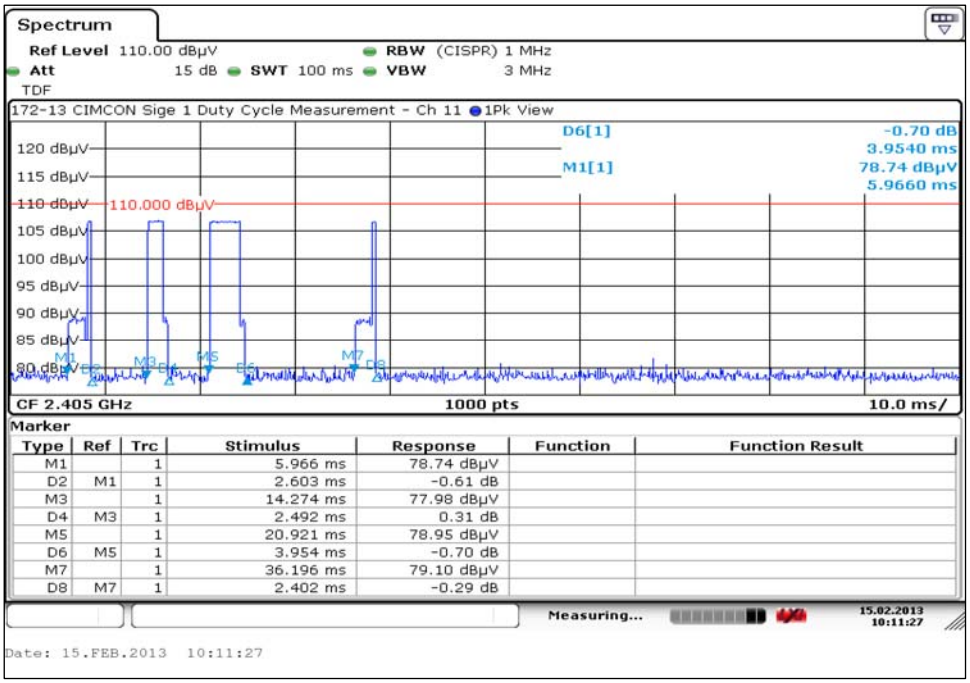
This correction factor can then be applied to the peak pulse amplitude to find the average emission. This correction is applied for all emissions including the fundamental and harmonics.

Note: The DUT was operated at its maximum transmission rate under normal operations to produce the following duty cycle.

7.11.1 Worst Case Duty Cycle for a Normally Operating Device

Channel	Channel Frequency (MHz)	Total Time On per 100 ms Period (ms)	Percentage of Time On per 100 ms Period (Fraction)	Duty Cycle Correction Factor (dB)	Maximum Allowed Duty Cycle Correction Factor (dB)	Applied Duty Cycle
Low	2405	11.451	0.11451	-18.823	-20	-18.823
Middle	2440	11.762	0.11762	-18.590	-20	-18.590
High	2475	11.221	0.11221	-18.999	-20	-18.999

Low Channel, 11



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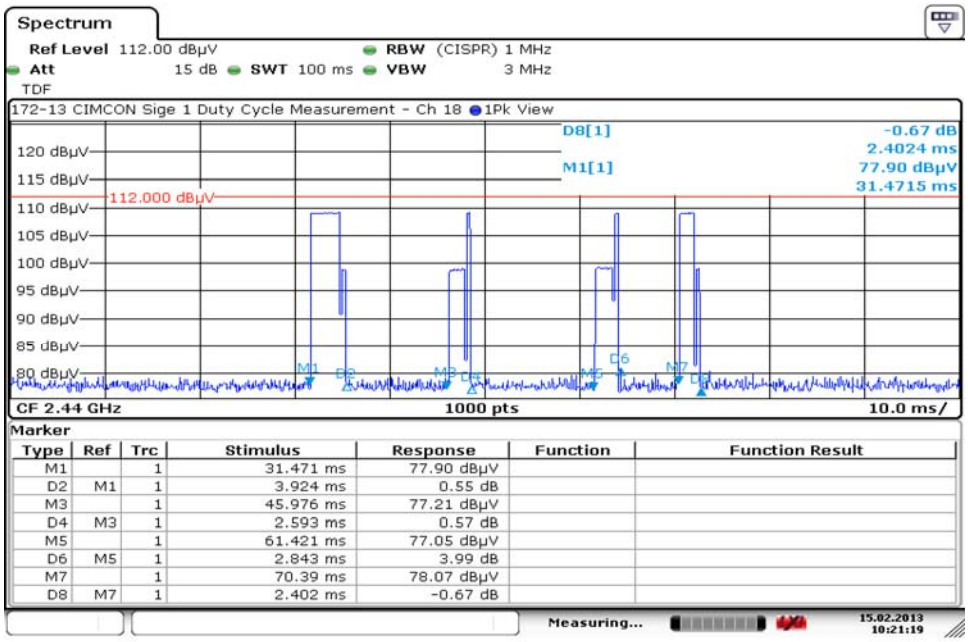
7. Measurement Data (continued)

7.11. Duty Cycle Calculations (ANSI C63.10-2009, Section 7.5) (continue)

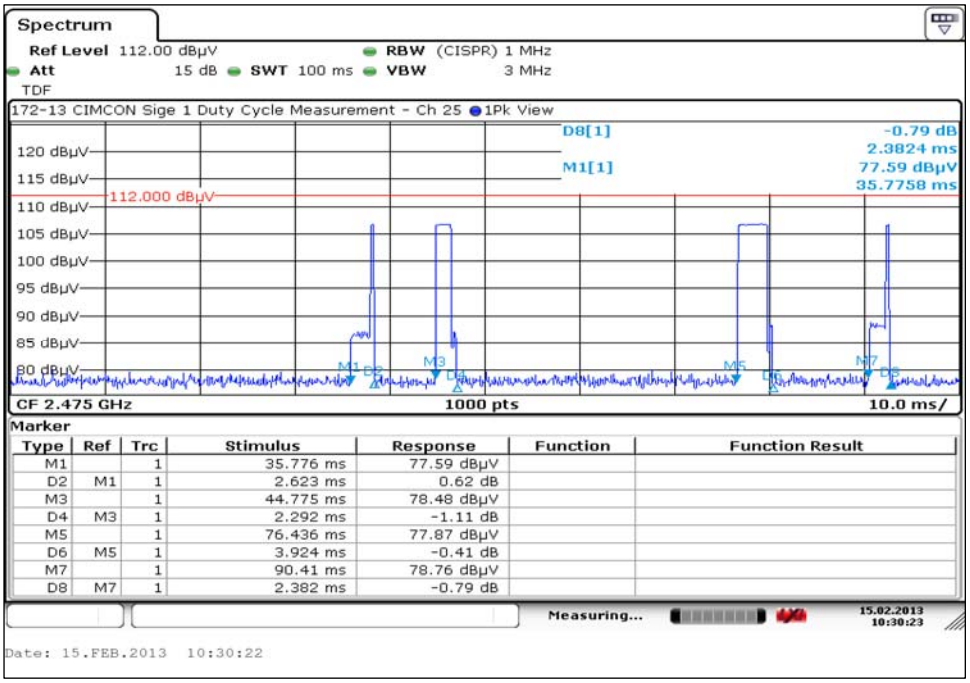
Middle Channel, 18



Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	31.471 ms	77.90 dBµV		
D2	M1	1	3.924 ms	0.55 dB		
M3		1	45.976 ms	77.21 dBµV		
D4	M3	1	2.593 ms	0.57 dB		
M5		1	61.421 ms	77.05 dBµV		
D6	M5	1	2.843 ms	3.99 dB		
M7		1	70.39 ms	78.07 dBµV		
D8	M7	1	2.402 ms	-0.67 dB		

High Channel, 25



Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	35.776 ms	77.59 dBµV		
D2	M1	1	2.623 ms	0.62 dB		
M3		1	44.775 ms	78.48 dBµV		
D4	M3	1	2.292 ms	-1.11 dB		
M5		1	76.436 ms	77.87 dBµV		
D6	M5	1	3.924 ms	-0.41 dB		
M7		1	90.41 ms	78.76 dBµV		
D8	M7	1	2.382 ms	-0.79 dB		

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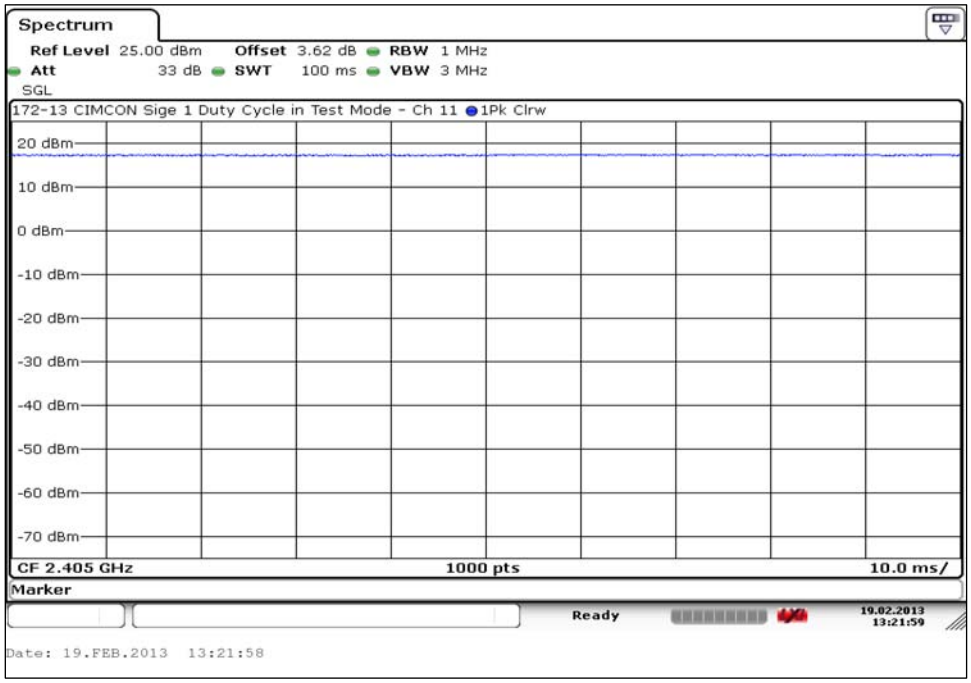
7. Measurement Data (continued)

7.11. Duty Cycle Calculations (ANSI C63.10-2009, Section 7.5)

7.11.2. Duty Cycle for the Device as Tested

Channel	Channel Frequency (MHz)	Total Time On per 100 ms Period (ms)	Percentage of Time On per 100 ms Period (Fraction)	Duty Cycle Correction Factor (dB)
Low	2405	>98.0	>0.98	N/A
Middle	2440	>98.0	>0.98	N/A
High	2475	>98.0	>0.98	N/A

Low Channel, 11



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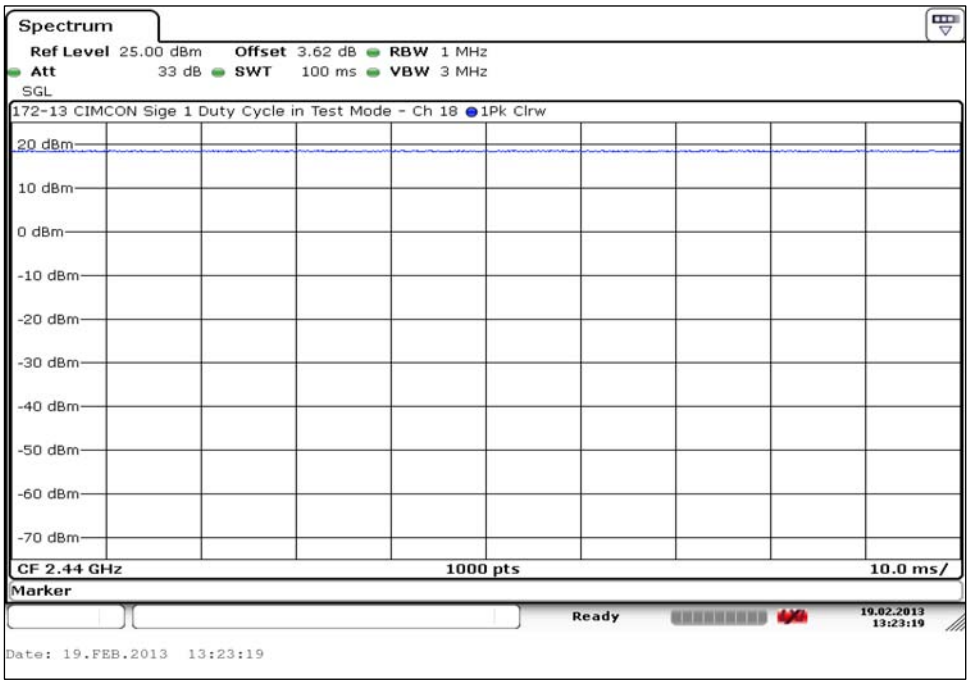
7. Measurement Data (continued)

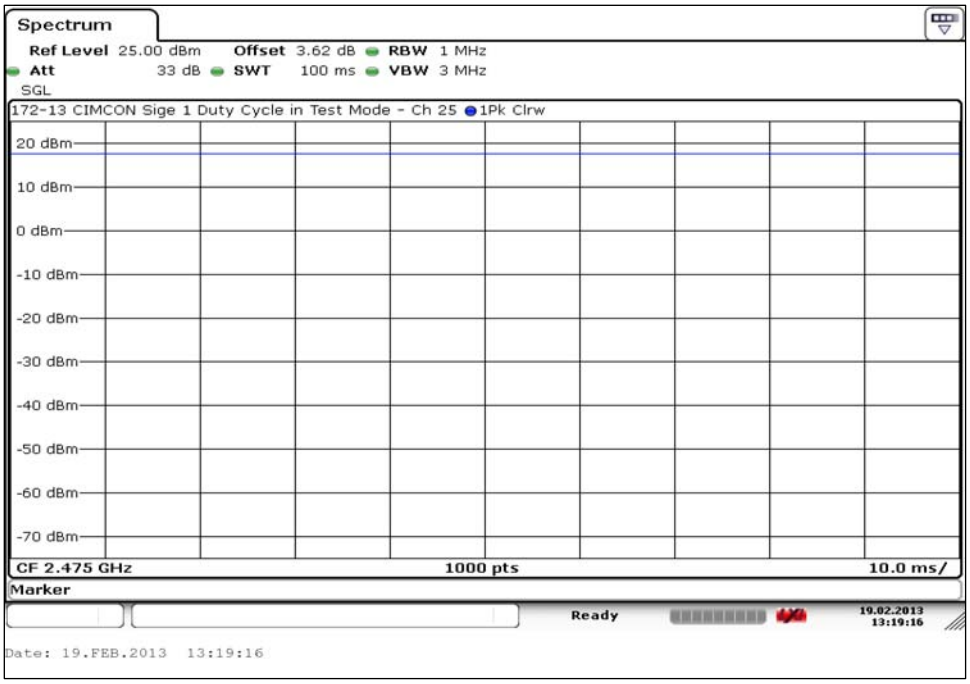
7.11. Duty Cycle Calculations (ANSI C63.10-2009, Section 7.5)

7.11.2. Duty Cycle for the Device as Tested

Middle Channel, 18



High Channel, 25



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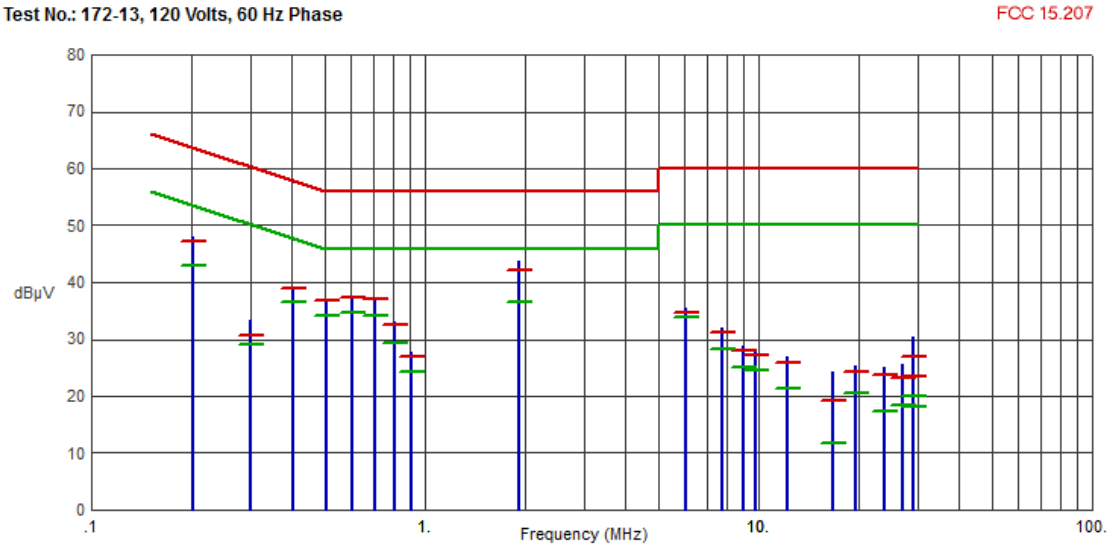
7. Measurement Data (continued)

7.12. Conducted Emissions

7.12.1. 120 Volts, 60 Hz Phase



Frequency (MHz)	Pk Amp (dBµV)	QP Amp (dBµV)	QP Limit (dBµV)	QP Margin (dB)	Avg Amp (dBµV)	Avg Limit (dBµV)	Avg Margin (dB)	Comments
.2016	47.97	47.31	63.54	-16.23	42.94	53.54	-10.60	
.3009	33.28	30.68	60.22	-29.54	29.11	50.22	-21.11	
.4041	39.19	38.89	57.77	-18.88	36.59	47.77	-11.18	
.5054	37.13	36.76	56.00	-19.24	34.01	46.00	-11.99	
.6063	37.67	37.34	56.00	-18.66	34.71	46.00	-11.29	
.7074	37.31	36.97	56.00	-19.03	34.16	46.00	-11.84	
.8084	33.11	32.61	56.00	-23.39	29.30	46.00	-16.70	
.9102	27.66	27.04	56.00	-28.96	24.28	46.00	-21.72	
1.9217	43.64	42.19	56.00	-13.81	36.57	46.00	-9.43	
6.0683	35.35	34.78	60.00	-25.22	33.77	50.00	-16.23	
7.7875	31.88	31.19	60.00	-28.81	28.30	50.00	-21.70	
9.0018	28.74	27.90	60.00	-32.10	25.12	50.00	-24.88	
9.8130	27.96	27.22	60.00	-32.78	24.48	50.00	-25.52	
12.2403	26.88	25.84	60.00	-34.16	21.45	50.00	-28.55	
16.7866	24.28	19.08	60.00	-40.92	11.86	50.00	-38.14	
19.5257	25.45	24.14	60.00	-35.86	20.59	50.00	-29.41	
23.7699	25.19	23.85	60.00	-36.15	17.30	50.00	-32.70	
27.1568	25.49	23.16	60.00	-36.84	18.29	50.00	-31.71	
29.1130	26.46	23.35	60.00	-36.65	18.26	50.00	-31.74	
29.2341	30.50	26.85	60.00	-33.15	20.07	50.00	-29.93	

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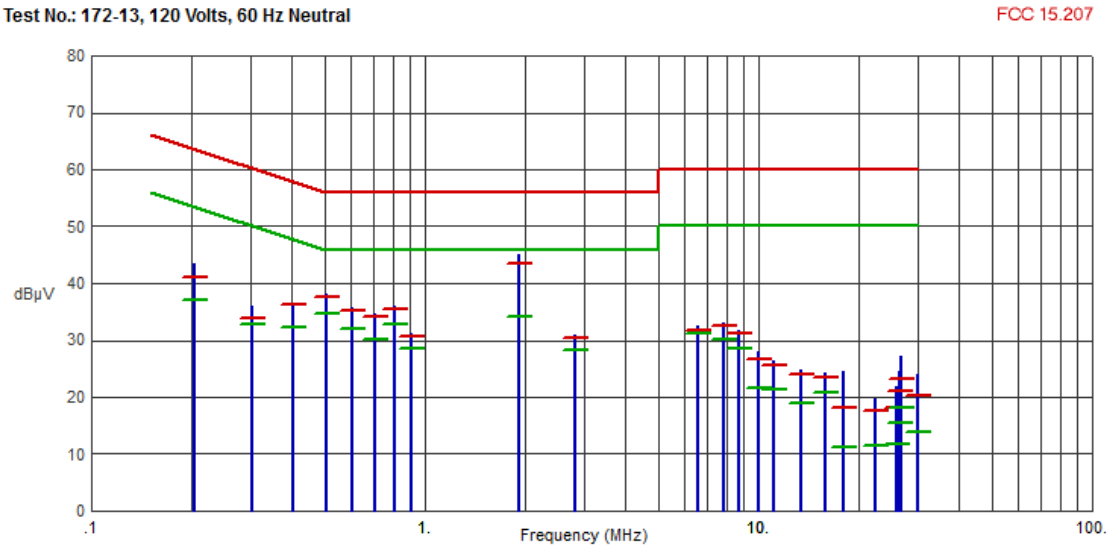
7. Measurement Data (continued)

7.12. Conducted Emissions (continued)

7.12.2. 120 Volts, 60 Hz Neutral



Frequency (MHz)	Pk Amp (dBµV)	QP Amp (dBµV)	QP Limit (dBµV)	QP Margin (dB)	Avg Amp (dBµV)	Avg Limit (dBµV)	Avg Margin (dB)	Comments
.2032	43.46	41.05	63.48	-22.43	37.07	53.48	-16.41	
.3020	35.93	33.75	60.19	-26.44	32.76	50.19	-17.43	
.4043	36.59	36.23	57.76	-21.53	32.33	47.76	-15.43	
.5059	38.05	37.70	56.00	-18.30	34.76	46.00	-11.24	
.6067	35.66	35.29	56.00	-20.71	31.90	46.00	-14.10	
.7077	34.57	34.14	56.00	-21.86	30.07	46.00	-15.93	
.8088	35.88	35.47	56.00	-20.53	32.88	46.00	-13.12	
.9099	31.25	30.79	56.00	-25.21	28.41	46.00	-17.59	
1.9228	45.03	43.37	56.00	-12.63	34.18	46.00	-11.82	
2.8328	31.02	30.46	56.00	-25.54	28.32	46.00	-17.68	
6.5768	32.42	31.80	60.00	-28.20	31.14	50.00	-18.86	
7.8917	33.02	32.40	60.00	-27.60	30.19	50.00	-19.81	
8.7013	31.65	31.11	60.00	-28.89	28.62	50.00	-21.38	
10.0138	27.98	26.55	60.00	-33.45	21.57	50.00	-28.43	
11.1322	26.45	25.57	60.00	-34.43	21.40	50.00	-28.60	
13.3576	24.90	23.88	60.00	-36.12	18.83	50.00	-31.17	
15.8863	24.39	23.39	60.00	-36.61	20.92	50.00	-29.08	
18.0153	24.41	18.20	60.00	-41.80	11.16	50.00	-38.84	
22.3595	19.74	17.51	60.00	-42.49	11.52	50.00	-38.48	
25.8747	21.87	18.26	60.00	-41.74	11.61	50.00	-38.39	
26.5485	24.58	21.14	60.00	-38.86	15.55	50.00	-34.45	
26.6097	27.15	23.31	60.00	-36.69	18.04	50.00	-31.96	
29.9058	23.98	20.32	60.00	-39.68	13.92	50.00	-36.08	

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7. Measurement Data (continued)

7.13. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102

Requirement: (15.247(i))

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. Devices are subject to the radio frequency radiation exposure requirements specified in 47CFR 1.1307(b), FCC 47 CFR 2.1091 and 47 CFR 2.1093, as appropriate. All equipment shall be considered to operate in a ''general population/uncontrolled'' environment.

Procedure: The power density is calculated from the maximum peak output power of the device under test.

Conclusion: The device under test is meets radio frequency radiation exposure requirements specified in 47CFR 1.1307(b), § 2.1091 and § 2.1093.

Fixed Antenna Version

Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
	(1)	(2)	(3)	(4)		(5)	
2405	20.0	22.04	1.5	0.0449500	0.4495005	1	Compliant
2440	20.0	22.59	1.5	0.0510188	0.5101879	1	Compliant
2480	20.0	22.75	1.5	0.0529334	0.5293344	1	Compliant

UFL Antenna Version

Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
	(1)	(2)	(3)	(4)		(5)	
2405	20.0	19.88	2.1	0.0313856	0.3138558	1	Compliant
2440	20.0	21.02	2.1	0.0408066	0.4080657	1	Compliant
2480	20.0	20.33	2.1	0.0348121	0.3481209	1	Compliant

1. Reference CFR 2.1093(b): For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.
2. Section 7.4 of this test report.
3. Data supplied by the client. Antenna specification data of worst case antenna used by the DUT.
4. Power density is calculated from the maximum peak output power of the device under test.
5. Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.

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8. Test Setup Photographs

8.1. Radiated Emissions - Front:

8.1.1. Fixed Antenna Version

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8. Test Setup Photographs

8.1. Radiated Emissions - Front

8.1.2. UFL Antenna Version

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8. Test Setup Photographs

8.2. Radiated Emissions Rear - Below 30 MHz

8.2.1. Fixed Antenna Version

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8. Test Setup Photographs

8.2. Radiated Emissions Rear - Below 30 MHz

8.2.2. UFL Antenna Version

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8. Test Setup Photographs

8.3. Radiated Emissions Rear – 30 MHz to 1 GHz

8.3.1. Fixed Antenna Version

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8. Test Setup Photographs

8.3. Radiated Emissions Rear – 30 MHz to 1 GHz

8.3.2. UFL Antenna Version

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8. Test Setup Photographs

8.4. Radiated Emissions Rear - Above 1 GHz

8.4.1. Fixed Antenna Version

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8. Test Setup Photographs

8.4. Radiated Emissions Rear - Above 1 GHz

8.4.2. UFL Antenna Version

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8. Test Setup Photographs

8.5. Conducted Emissions Front

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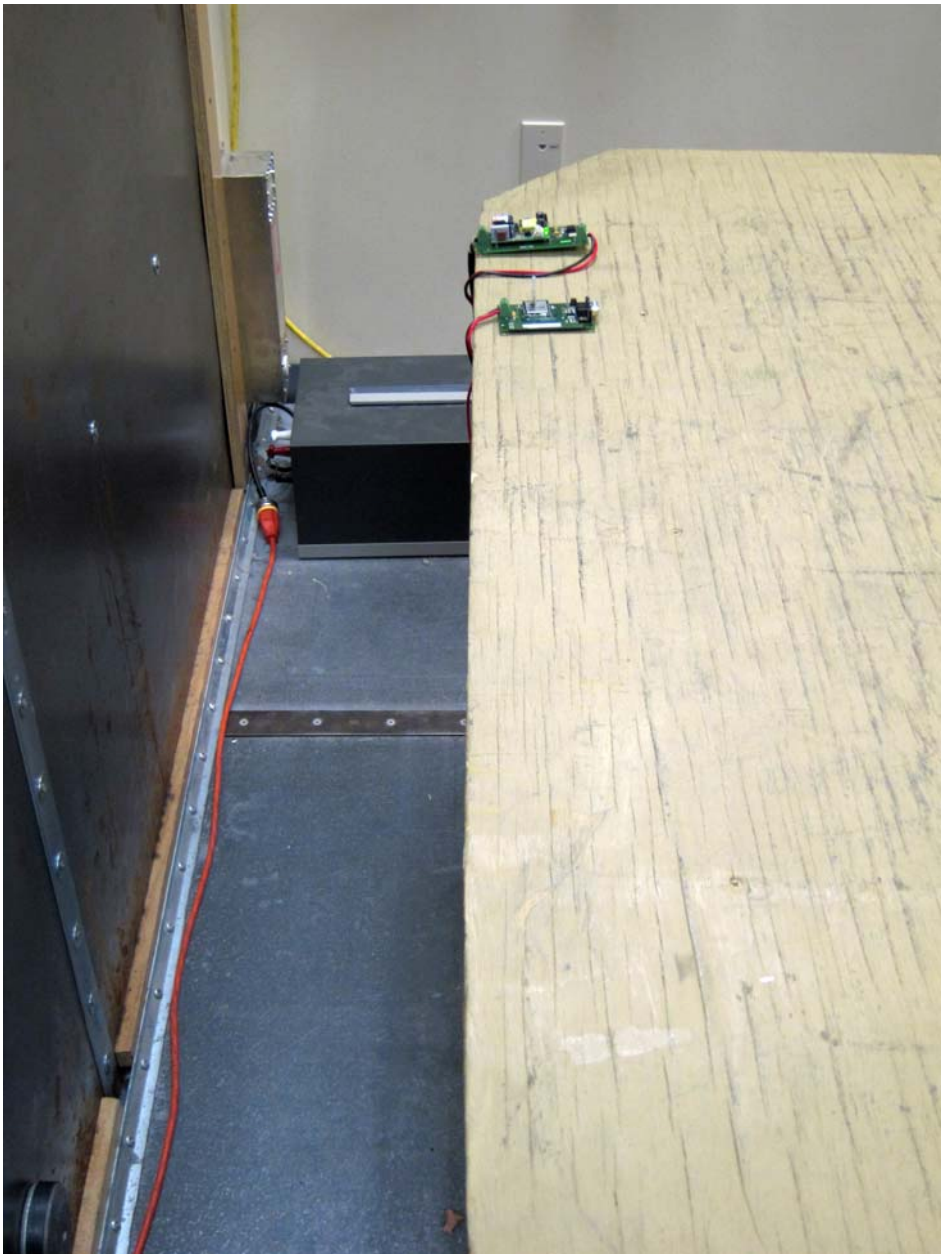
8. Test Setup Photographs

8.6. Conducted Emissions Rear



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9. Test Site Description

Compliance Worldwide is located at 357 Main Street in Sandown, New Hampshire. The test sites at Compliance Worldwide are used for conducted and radiated emissions testing in accordance with Federal Communications Commission (FCC), Industry Canada, and Voluntary Control Council Interference (VCCI) standards. A description of the test sites is on file with the FCC (registration number 96392), Industry Canada (file number IC 3023A-1), and VCCI (Member number 3168), Registration numbers C-3673, G-167, R-3305 & T-1809.

Compliance Worldwide is also designated as a Phase 1 CAB under APEC-MRA (US0132) for Australia/New Zealand AS/NZS CISPR 22, Chinese-Taipei (Taiwan) BSMI CNS 13438 and Korea (RRA) KN 22.

The radiated emissions test site is a 3 and 10 meter enclosed open area test site (OATS). Personnel, support equipment and test equipment are located in the basement beneath the OATS ground plane.

The conducted emissions site is part of a 16' x 20' x 12' ferrite tile chamber and uses one of the walls for the vertical ground plane required by EN 55022.

Both sites are designed to test products or systems 1.5 meters W x 1.5 meters L x 2.0 meters H, floor standing or table top.

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