COMPLIANCE WORLDWIDE INC.
TEST REPORT 287-13R1

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

David Clark Company
360 Franklin Street
Worcester, MA 01604

for the

DC Pro X
Hybrid Electronic Noise-Cancelling Aviation Headset
2.4 GHz Bluetooth Interface

FCC ID: Y3J-DCXBT
IC: 9409A-DCXBT

Report Issued on May 17, 2013
Report Revision R1 Issued on July 19, 2013

Tested by

Brian F. Breault

Reviewed by

Larry K. Stillings

Table of Contents

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

1. Scope

This test report certifies that the David Clark Company DC Pro-X Hybrid Electronic Noise-Cancelling Aviation Headset 2.4 GHz Bluetooth Interface, 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 R1: Added reference to FCC Public Notice DA-00 in section 4.3. Revised the 99% power bandwidth measurements in Section 6.8. Proper DUT operating mode and measurement span to RBW ratios were followed.

2. Product Details

2.1. Manufacturer: David Clark Company

2.2. Model Number: DC Pro-X

2.3. Serial Number: None

2.4. Description: Headphone Bluetooth Interface

2.5. Power Source: 2 AA Batteries

2.6. EMC Modifications: None

3. Product Configuration

3.1. Operational Characteristics & Software

CSR BlueTest3 was used as the control software for the Bluetooth transmitter.
Once the software and driver were installed, the transmitter could be configured to function in a number of ways.

Notes: The default transmitter power settings set by the client were maintained throughout the testing.

To facilitate setting the required transmitter test modes, the following device hardware setup was used: A parallel cable from the laptop containing the test software was attached to the custom headphone test module. A second custom built cable ran from the test module to the headphone Inline Pack which contains the Bluetooth transmitter. During the test, the headphone Inline Pack was rotated through three orthogonal axes as required by ANSI C63.4-2003, section 13.4.1, c) for a hand held or body worn device.

The following test modes were utilized to perform the testing:

TXSTART – The transmitter transmits a single carrier on a selected frequency from channel 0 to 78.

TXDATA 1 – Initiates a modulated output on the selected transmitter channel.

TXDATA 2 – Initiates the hopping sequence defined by the CFG HOPPING SEQ section.

CFG HOPPING SEQ – Selects the channel(s) to be included in a hopping sequence.

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

3. Product Configuration (continued)

3.1. Operational Characteristics & Software (continued)

General Setup Parameters:

RF Test Mode:	CFG FREQ
TX/RX INT (µs):	6250
Loopback (µs):	1875
Report Int (s):	1
RF Test Mode:	CFG PKT
Packet Type:	30
Packet Size:	679
RF Test Mode:	CFG BIT ERR
Bit Count:	16000000
Reset:	FALSE
LO Freq (MHz):	2402.000 (e.g.)
Hi-Side:	FALSE
RX Atten:	0

3.2. EUT Hardware

Device	Manufacturer	Model	Serial No.	Comment
Headset	David Clark Co.	DC Pro-X	N/A	

3.3. Support Equipment

Device	Manufacturer	Model	Serial No.	Comment
Headset Test Module	David Clark Co.	43001G-12	N/A	Bluetooth to LPT1 converter
Laptop	Dell	Inspiron E1505	07898349890528	
Power Supply	Hewlett Packard	6296A	7M0599	Used in place of the two AA batteries in the Inline Pack.

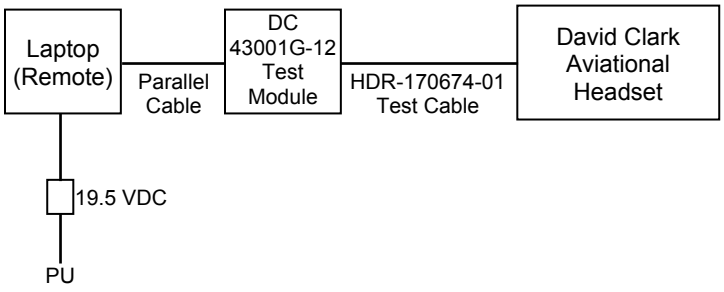
3.4. Cables

Part #	Shielded Y or N	Length	Function / Description
N/A	Y	1 m	Standard 25 Pin Parallel Cable
HDR-170674-01	N	0.5 m	Custom 20 pin interface cable.

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

3. Product Configuration (continued)

3.5. Block Diagram



4. Measurements Parameters

4.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due
Spectrum Analyzer	Rohde & Schwarz	FSV40	100899	5/26/2013
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	ComPower	AH-840	03075	8/27/2014
DMM / Temperature	Fluke	187	79690058	2/22/2014
RF Signal Generator	Rohde & Schwarz	SMB 100A	175352	5/14/2014
2.4 GHz BP Filter	Micro-Tronics	BRM50702	14	5/12/2014
RF Power Meter	Boonton	4220A	323203AC	6/13/2014
Power Sensor	Boonton	51081	29412	6/13/2014
Digital Barometer	Control Company	4195	ID236	2/25/2015

4.2. Measurement & Equipment Setup

Test Dates:	May. 6th 2011 – May. 14th, 2013
Test Engineer:	Brian Breault
Normal Site Temperature (15 - 35°C):	21.6
Relative Humidity (20 -75%RH):	35
Frequency Range:	30 MHz to 26 GHz
Measurement Distance:	3 Meters
EMI Receiver IF/Resolution Bandwidth:	100 kHz - 30 MHz to 1 GHz
	1 MHz - Above 1 GHz
EMI Receiver Average/Video Bandwidth:	300 kHz - 30 MHz to 1 GHz
	3 MHz - Above 1 GHz
Detector Function:	Peak, Quasi-Peak & Average

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

4. Measurements Parameters

4.3. Measurement Procedure

Testing was performed in accordance with the requirements detailed in FCC Public Notice DA 00-705 “Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.”

Test measurements were made in accordance with FCC Part 15.247 and IC RSS-210 Annex II: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

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

In accordance with ANSI C63.4-2009, section 13.4.1, c), the device under test was rotated through three orthogonal axes to determine which attitude produced the highest emission relative to the limit. The positions tested were the following:

- X axis - Inline Pack on left side, front toward 180º
- Y axis - Inline Pack front facing toward 180º, top up
- Z axis - Inline Pack front facing down, bottom toward 0º

All measurements detailed in this test report represent the attitude that produced the highest emission relative to a given limit.

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

5. Measurements Summary

Test Requirement	FCC Rule Requirement	IC Rule Requirement	Report Section	Result
Antenna requirement	15.203	RSS-GEN 7.1.2	6.1	Compliant
Number of hopping channels	15.247 (a) (1) (iii)	RSS-210 A8.1 (d)	6.2	Compliant
Minimum 20 dB bandwidth	15.247 (a) (1) (iii)	RSS-210 A8.1 (b)	6.3	Compliant
Hopping channel carrier frequency separation	15.247 (a) (1)	RSS-210 A8.1 (b)	6.4	Compliant
Average time of occupancy	15.247 (a) (1) (iii)	RSS-210 A8.1 (d)	6.5	Compliant
Maximum peak conducted output power	15.247 (b) (1)	RSS-210 A8.1 (b)	6.6	Compliant
Band edge	15.247 (d)	RSS-210 A8.5	6.7	Compliant
99% (occupied) bandwidth	N/A	RSS-GEN 4.6.1	6.8	Compliant
Spurious harmonic radiated emissions	ANSI C63.4 10.2.8.2	RSS-210 A8.9	6.9	Compliant
Spurious radiated emissions	15.209	RSS-GEN	6.10	Compliant
Power line conducted emissions	15.207	RSS-GEN	N/A	DC Only
Public exposure to radio frequency energy levels	15.247 (1) 1.1307 (b)(1)	RSS-GEN 5.5 RSS-102	6.11	Compliant

6. Measurement Data

6.1. 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.

Status: The device under test utilized a Johanson Technology 2450AT45A100 internal chip antenna, inaccessible to the user.

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

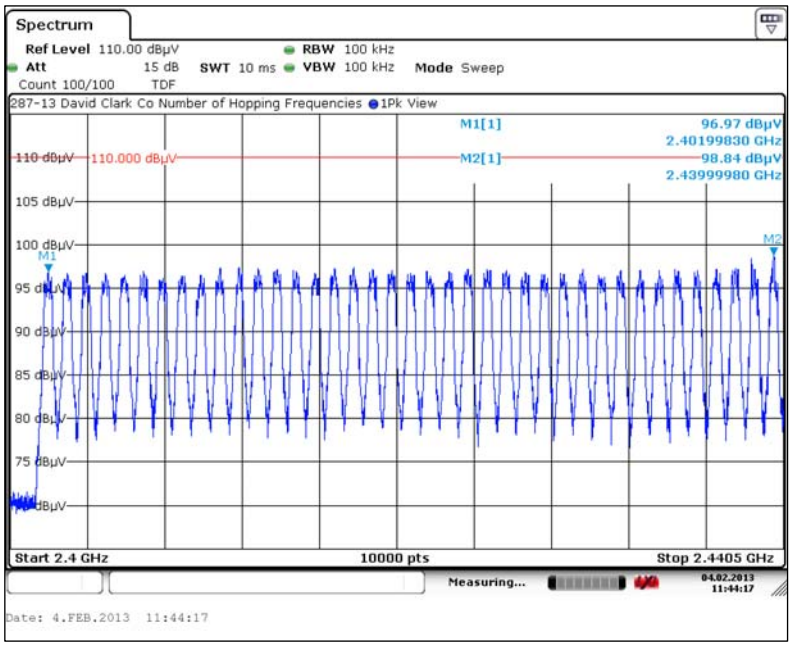
6.2. Number of Hopping Channels (15.247 (a) (1) (iii), RSS-210 A8.1 (d))

Requirement: Systems Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

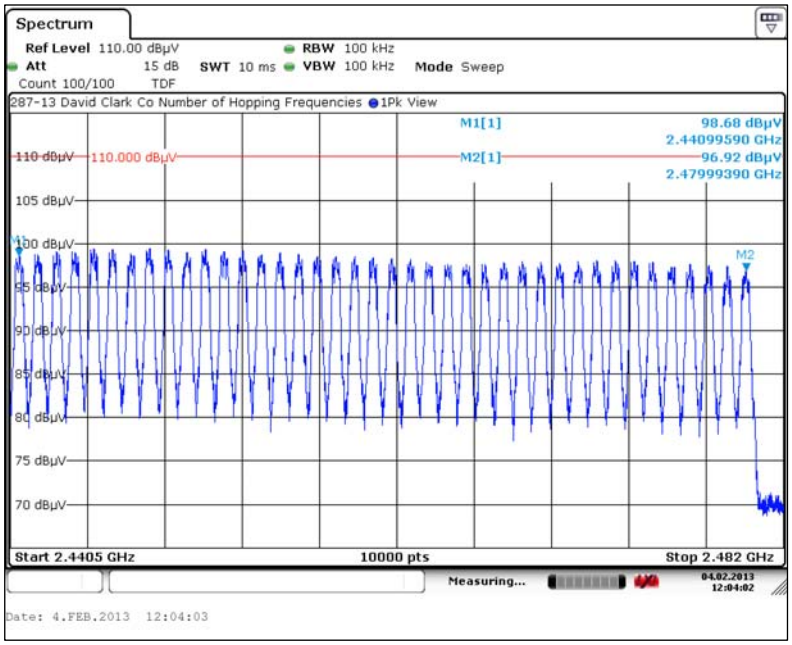
Status: The device under test utilizes 79 hopping channels from 2402 MHz to 2480 MHz.

Result: Compliant

Lower Channels:



Upper Channels:



Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data

6.3. Minimum 20 dB Bandwidth (15.247 (a) (1), RSS-210 A8.1 (b))

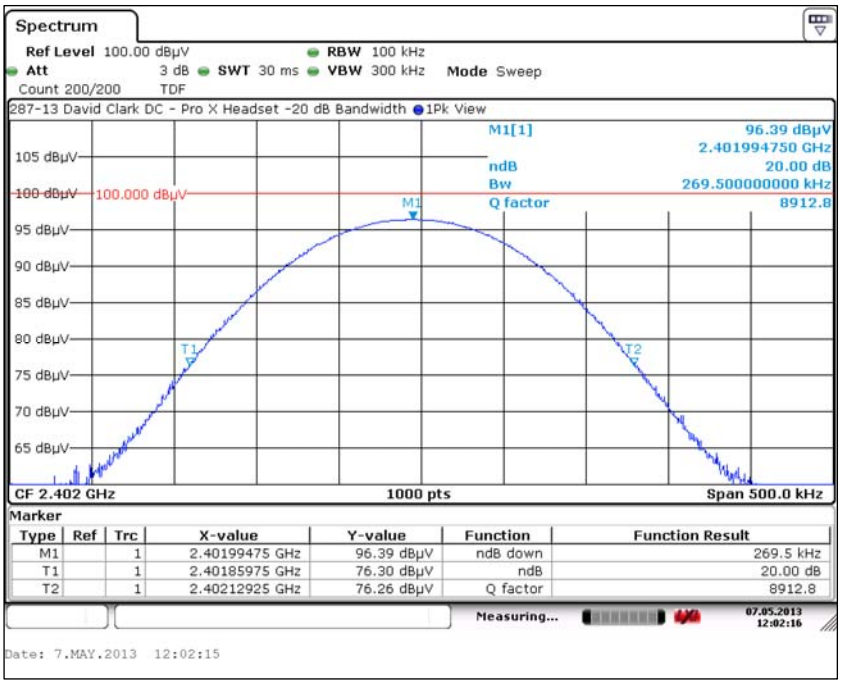
Requirement: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies 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.

Test Note: The 20 dB bandwidth of the hopping channel is the greater of the values.

Resolution Bandwidth : 100 kHz
Video Bandwidth : 300 kHz

Channel	Frequency (MHz)	-20 dB Bandwidth (kHz)
Low	2402	269.5
Middle	2441	273.0
High	2480	273.5

6.3.1. 20 dB Bandwidth – Low Frequency (2402 MHz)

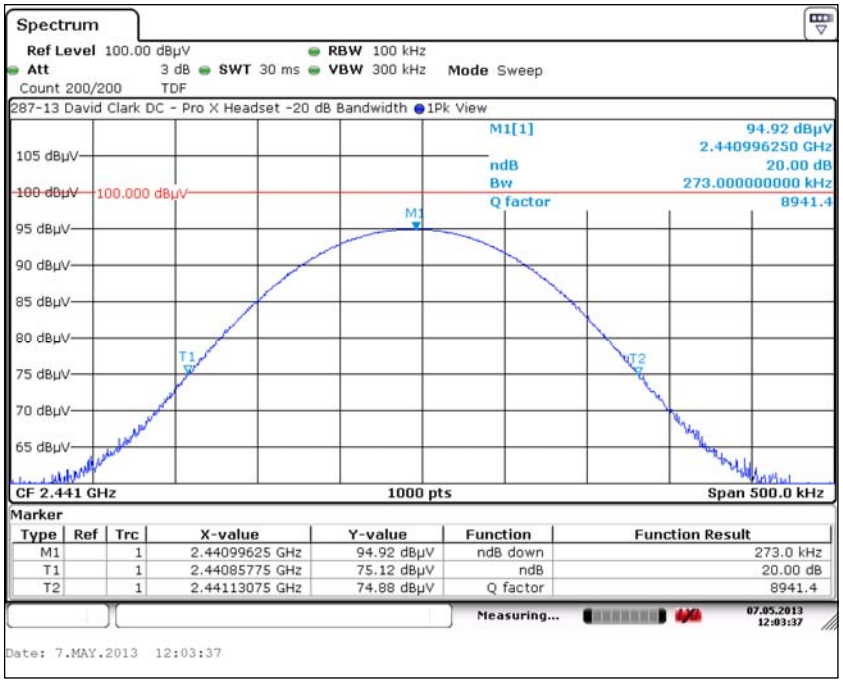


Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

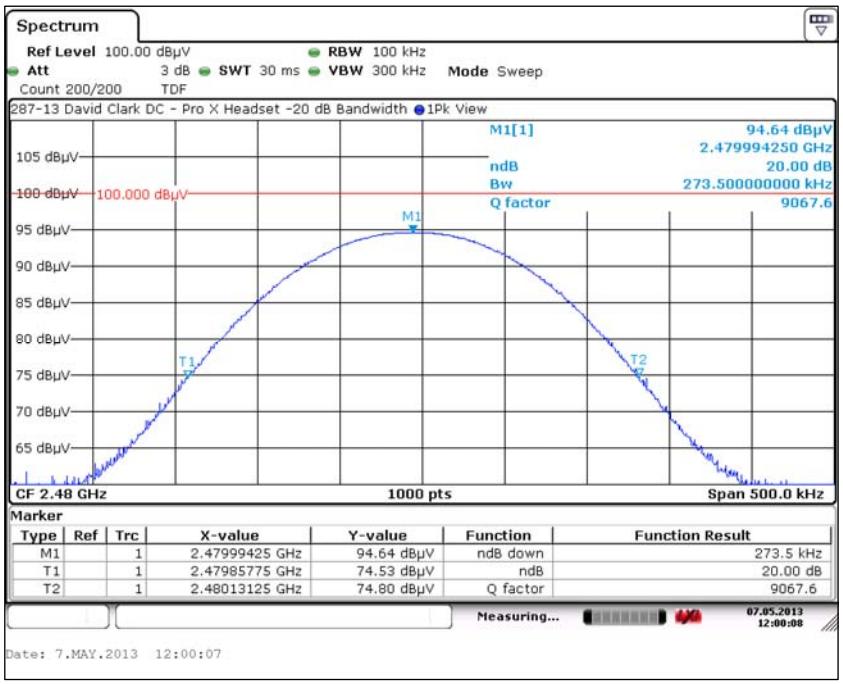
6. Measurement Data

6.3. Minimum 20 dB Bandwidth (15.247 (a) (1), RSS-210 A8.1 (b))

6.3.2. 20 dB Bandwidth – Middle Frequency (2441 MHz)



6.3.3. 20 dB Bandwidth – High Frequency (2480 MHz)



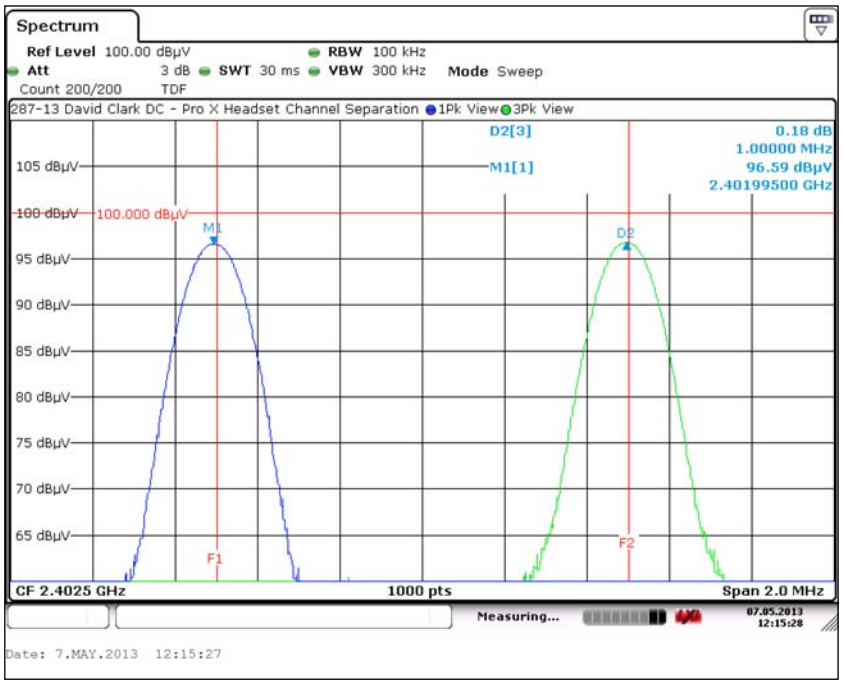
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data

6.4. Frequency Hopping Channel Separation (15.247 (a) (1), RSS-210 A8.1 (b))

Channel Pair	Channel Pair	Channel Separation (kHz)	Required Channel Separation (kHz)	Result
Low	2402	1000	>269.5 kHz	Compliant
	2403			
Middle	2440	1000	>273.0 kHz	Compliant
	2441			
High	2479	1000	>273.5 kHz	Compliant
	2480			

6.4.1. Channel Separation – Low Frequency (2402/2403 MHz)

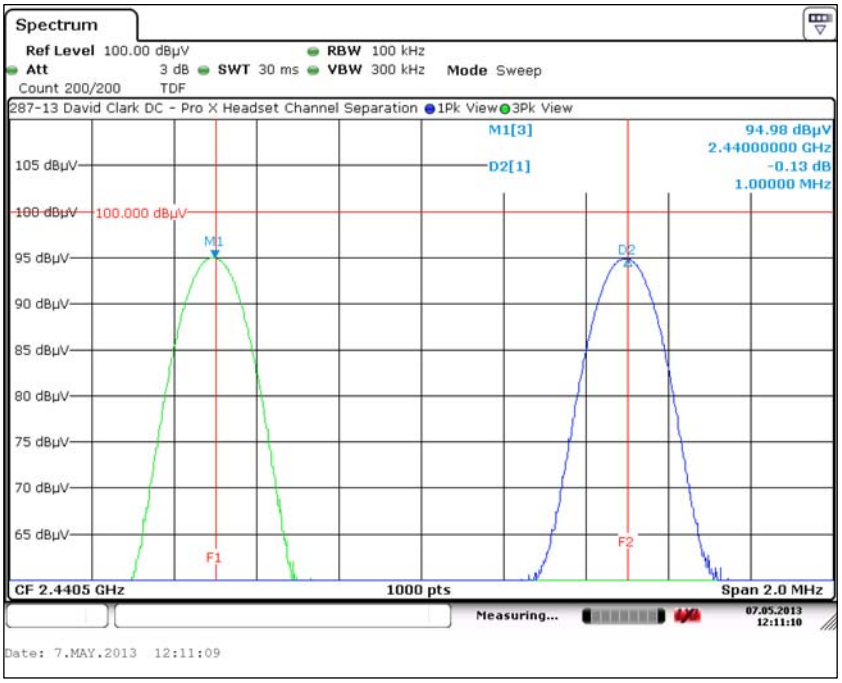


Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

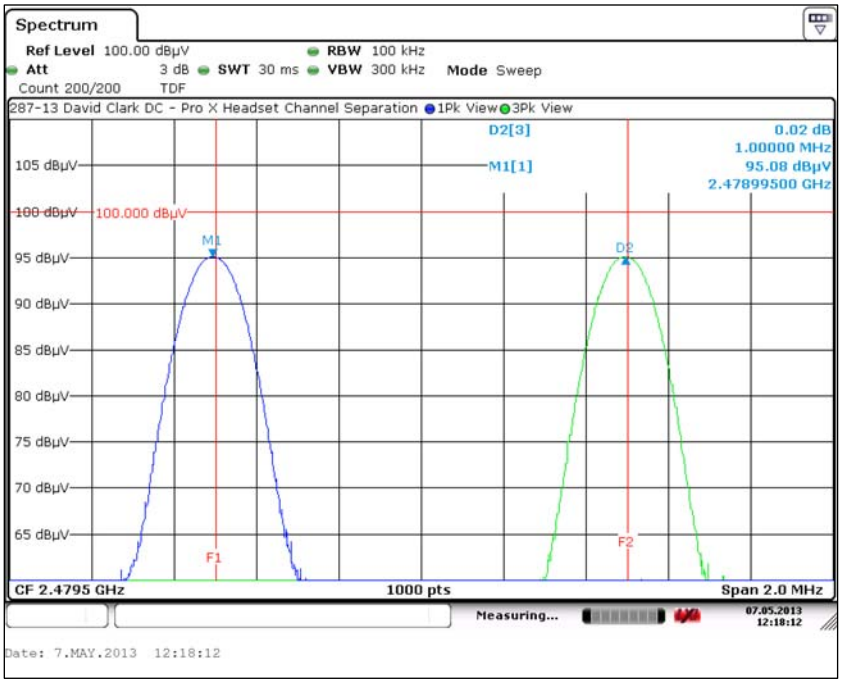
6. Measurement Data

6.4. Frequency Hopping Channel Separation (15.247 (a) (1), RSS-210 A8.1 (b))

6.4.2. Channel Separation – Middle Frequency (2441/2442 MHz)



6.4.3. Channel Separation – High Frequency (2479/2480 MHz)



Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data

6.5. Average Time of Occupancy (15.247 (a) (1) (iii), RSS-210 A8.1 (d))

Requirement: 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.

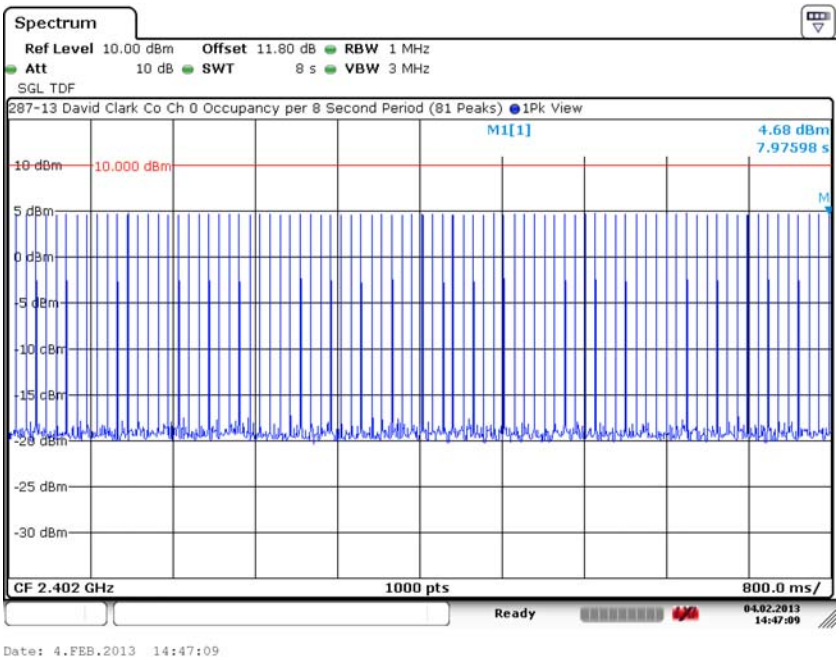
Test Note: A sweep time of 8 seconds was used to facilitate counting the pulses on a given frequency. This number was multiplied by 4 to determine the number of pulses in a 32 second interval.

79 Channels x 0.4 Seconds = 32 Seconds

Channel	Frequency (MHz)	Number of Pulses per 8s Period	Number of Pulses per 32s Period	Pulse Width (µS)	Dwell Time per Period (32 Seconds)	Allowable Dwell Time per Period	Result
Low	2402	81	324	837.8	0.2714	0.4	Compliant
Middle	2441	81	324	847.8	0.2747	0.4	Compliant
High	2480	81	324	849.8	0.2753	0.4	Compliant

6.5.1. Pulses per 8 Second Period

6.5.1.1. Pulses per 8 Second Period – Low Frequency (2402 MHz)



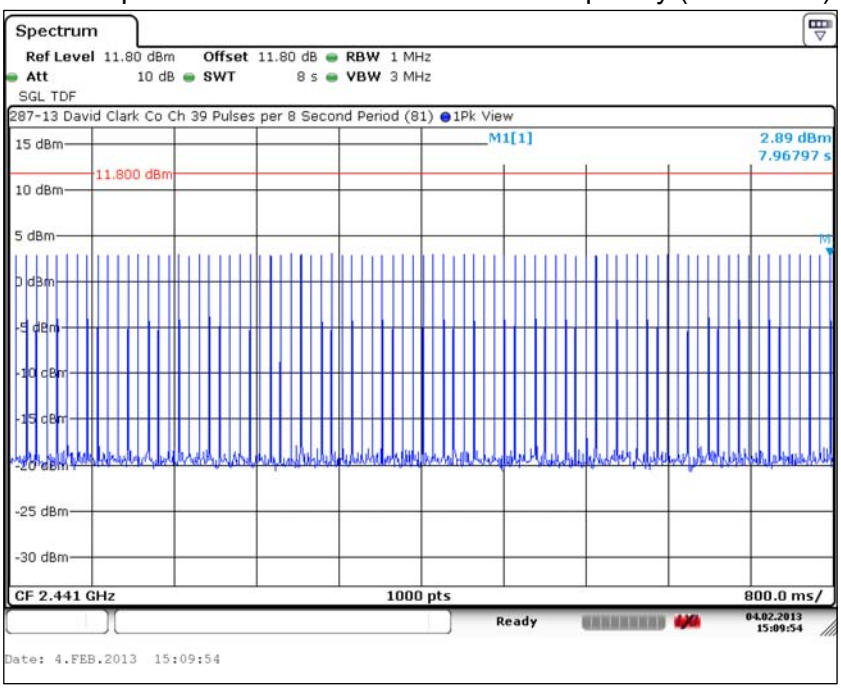
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data

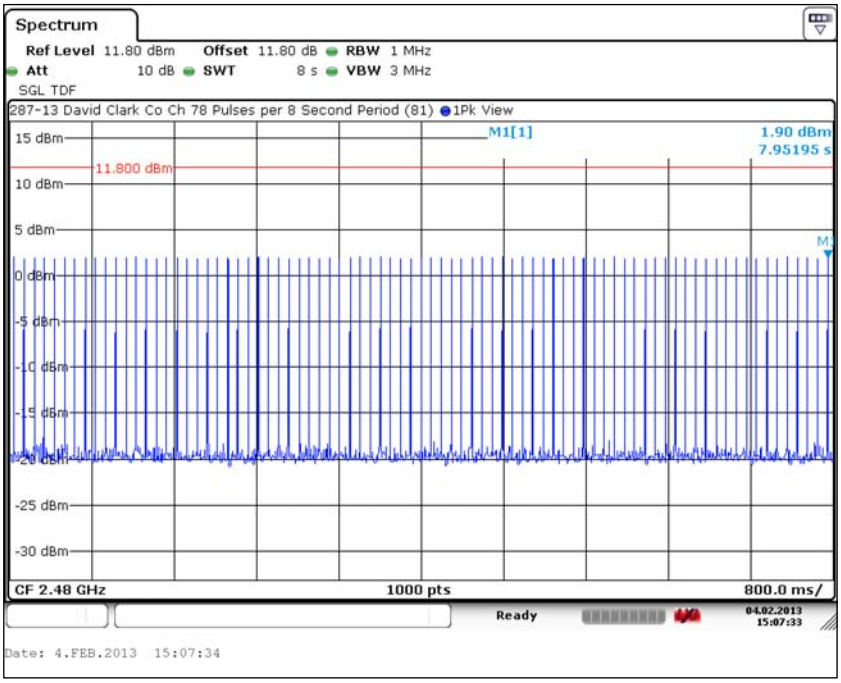
6.5. Average Time of Occupancy (15.247 (a) (1) (iii), RSS-210 A8.1 (d))

6.5.1. Pulses per 10 Second Period (continued)

6.5.1.2. Pulses per 10 Second Period – Middle Frequency (2441 MHz)



6.5.1.3. Pulses per 10 Second Period – High Frequency (2480 MHz)



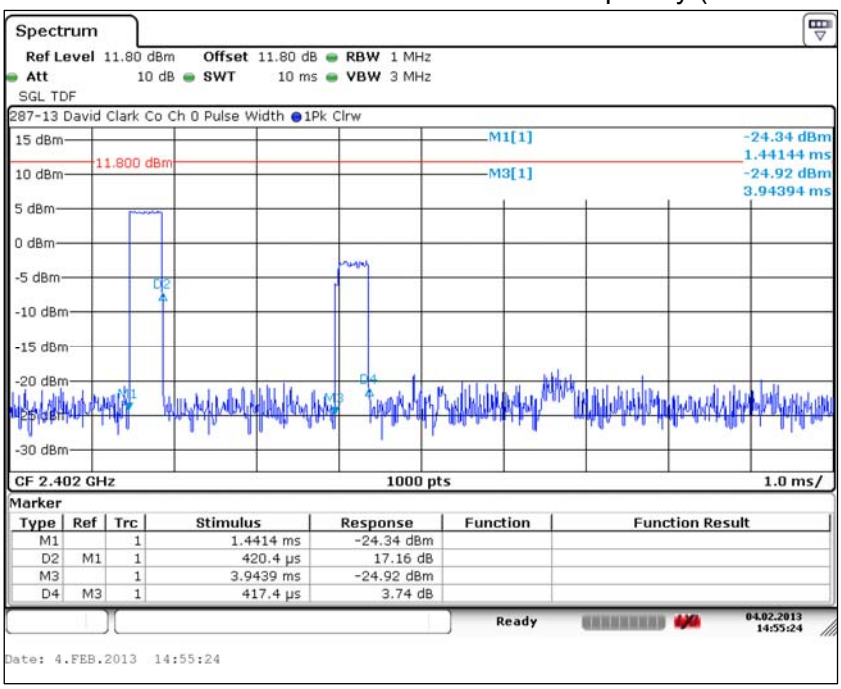
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data

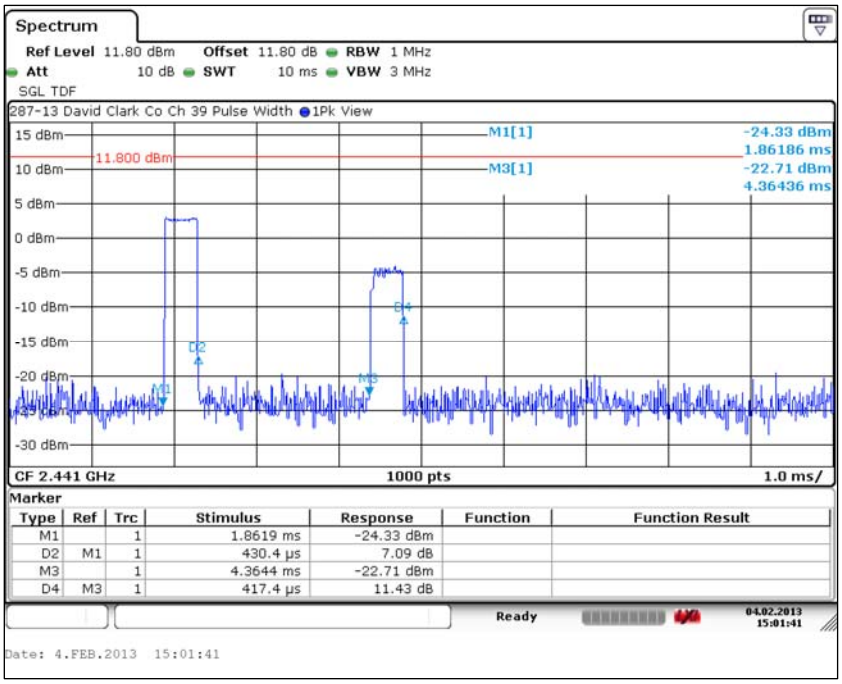
6.5. Average Time of Occupancy (15.247 (a) (1) (iii), RSS-210 A8.1 (d))

6.5.2. Transmitter Individual Pulse Width

6.5.2.1. Transmitter Individual Pulse Width – Low Frequency (2402 MHz)



6.5.2.2. Transmitter Individual Pulse Width – Middle Frequency (2441 MHz)



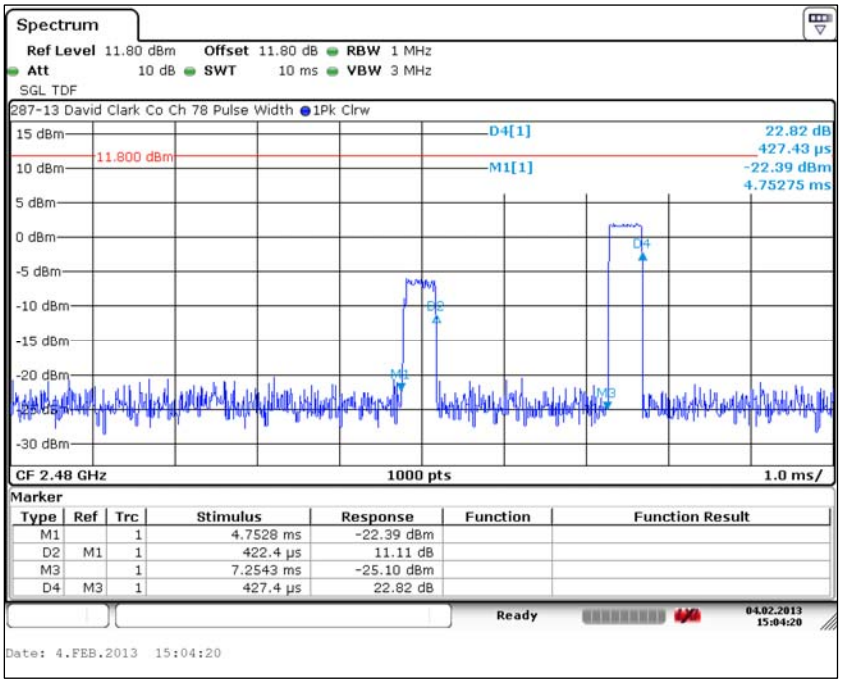
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data

6.5. Average Time of Occupancy (15.247 (a) (1) (iii), RSS-210 A8.1 (d))

6.5.2. Transmitter Individual Pulse Width (continued)

6.5.2.3. Transmitter Individual Pulse Width – High Frequency (2480 MHz)



Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data

6.6. Maximum Peak Conducted Output Power (15.247 (b) (1), RSS-210 A8.1 (b))

Requirement: The maximum peak conducted output power of the intentional radiator shall not exceed 1 watt for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels.

Test Note[1]: The device under test does not facilitate conducted power measurements. Radiated field strength measurements were made and converted to units of power using the following formula:

$$P = \frac{(E \times d)^2}{(30 \times G)}$$

P = the power in Watts (power has been converted to milliwatts in the table).
E = the measured maximum field in V/m
G = the numeric gain of the transmitting antenna over an isotropic radiator.
d = the distance in meters of the field strength measurement.

[1] Reference FCC OET 412172: Determining ERP and EIRP

Channel	Freq.	Peak Field Strength	Distance	Antenna Gain[1]		Measured Output Power	Output Power Limit	Result
	(MHz)	(dBµV/m)	(m)	(dBi)	(numeric)	(mW)	(mW)	
Low	2402	97.06	3.0	1.00	1.259	1.21	1000	Compliant
Middle	2441	95.02	3.0	1.00	1.259	0.76	1000	Compliant
High	2480	94.87	3.0	1.00	1.259	0.73	1000	Compliant

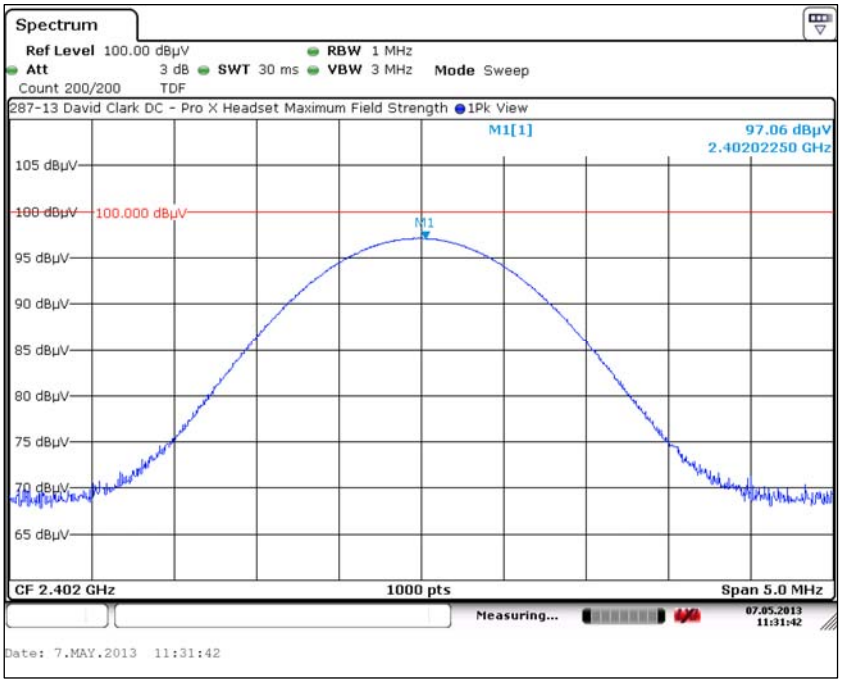
[1] Taken from the antenna manufacture's data guide.

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

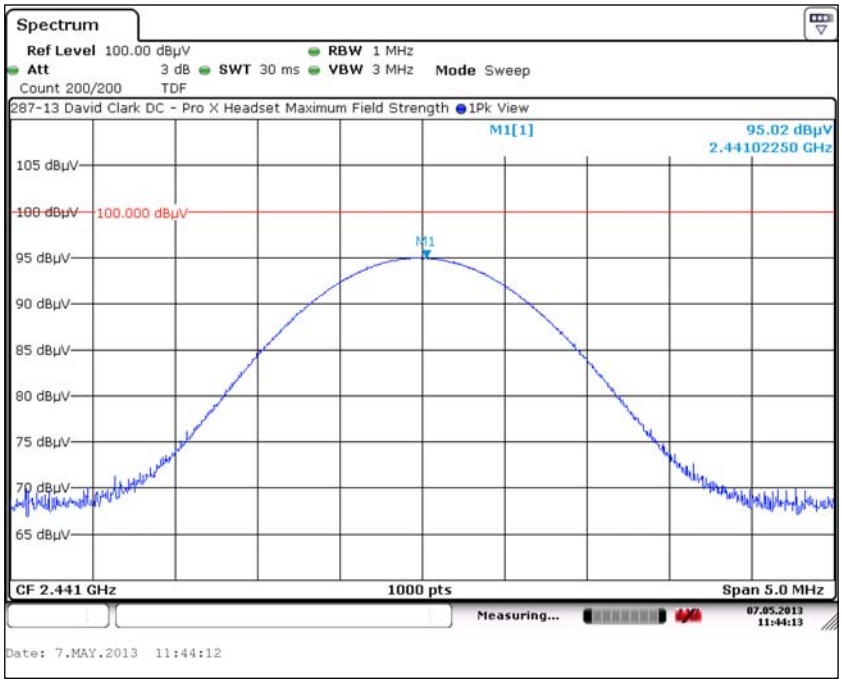
6. Measurement Data

6.6. Maximum Peak Conducted Output Power (15.247 (b) (1), RSS-210 A8.1

6.6.1. Field Strength – Low Frequency (2402 MHz)



6.6.2. Field Strength – Middle Frequency (2441 MHz)

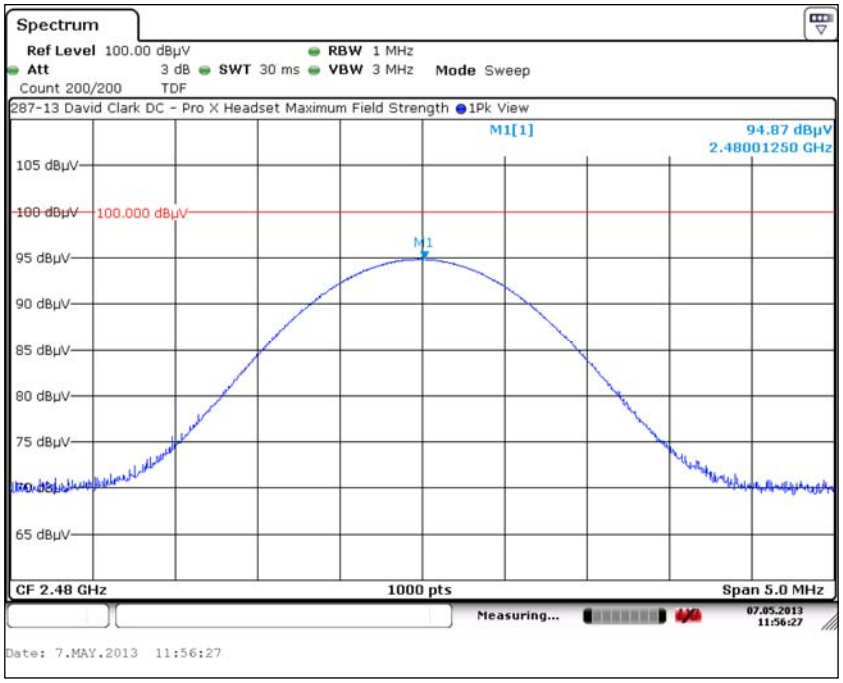


Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data

6.6. Maximum Peak Conducted Output Power (15.247 (b) (1), RSS-210 A8.1 (b))

6.6.3. Field Strength – High Frequency (2480 MHz)



Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data

6.7. Band Edge (15.247 (d), RSS-210 A8.5)

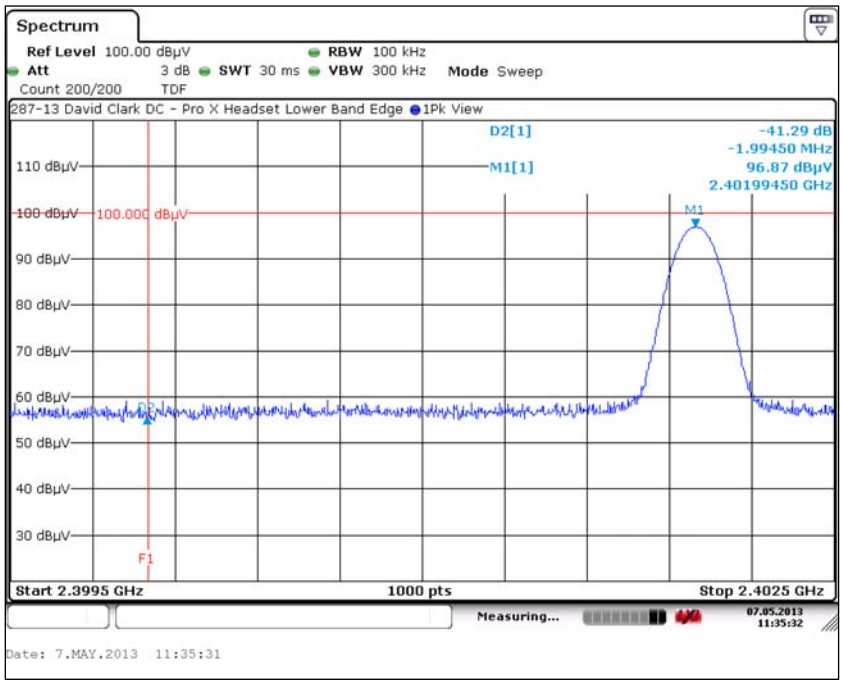
Requirement: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that 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.

Resolution Bandwidth : 100 kHz
Video Bandwidth : 300 kHz

6.7.1. Lower Band Edge

6.7.1.1. Unmodulated Carrier

Lowest Channel	Field Strength (dBµV/m)		Band Edge Frequency	Field Strength (dBµV/m)		Required Offset (dB)	Actual Offset (dB)	Result
(MHz)	Peak	Average	(MHz)	Peak	Average			
2402.	99.23	---	2400	55.58	---	>20 dB	41.29	Compliant



Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

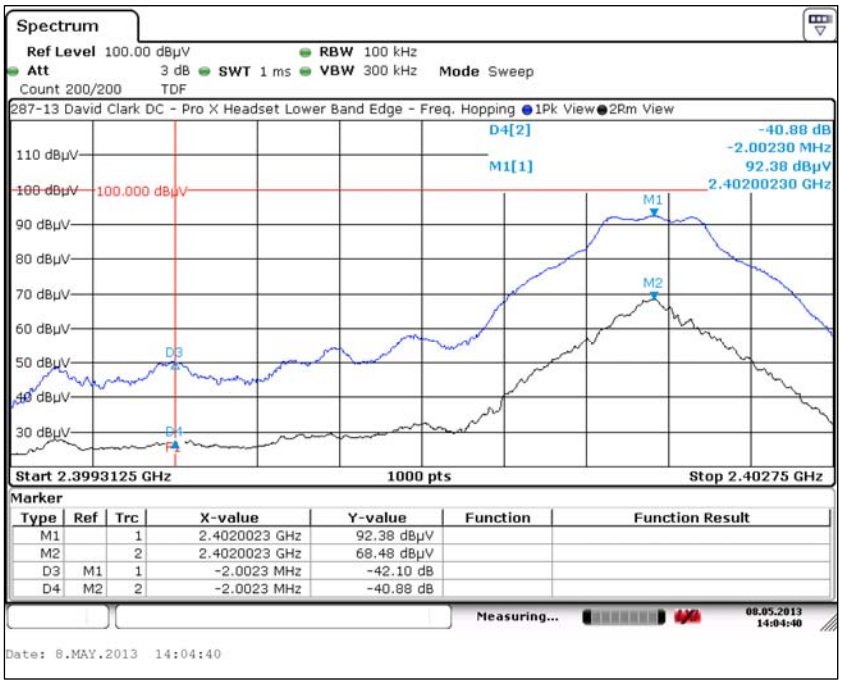
6. Measurement Data (continued)

6.7. Band Edge (15.247 (d), RSS-210 A8.5)

6.7.1. Lower Band Edge

6.7.1.2. Frequency Hopping

Lowest Channel	Field Strength (dBm)		Band Edge Frequency	Field Strength (dBm)		Required Offset (dB)	Actual Offset (dB)	Result
(MHz)	Peak	Average	(MHz)	Peak	Average			
2402.	92.38	---	2400	50.28	---	>20 dB	42.10	Compliant



Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data

6.7. Band Edge (15.247 (d), RSS-210 A8.5)

6.7.2. Upper Band Edge

6.7.2.1. Unmodulated Carrier

Band Edge

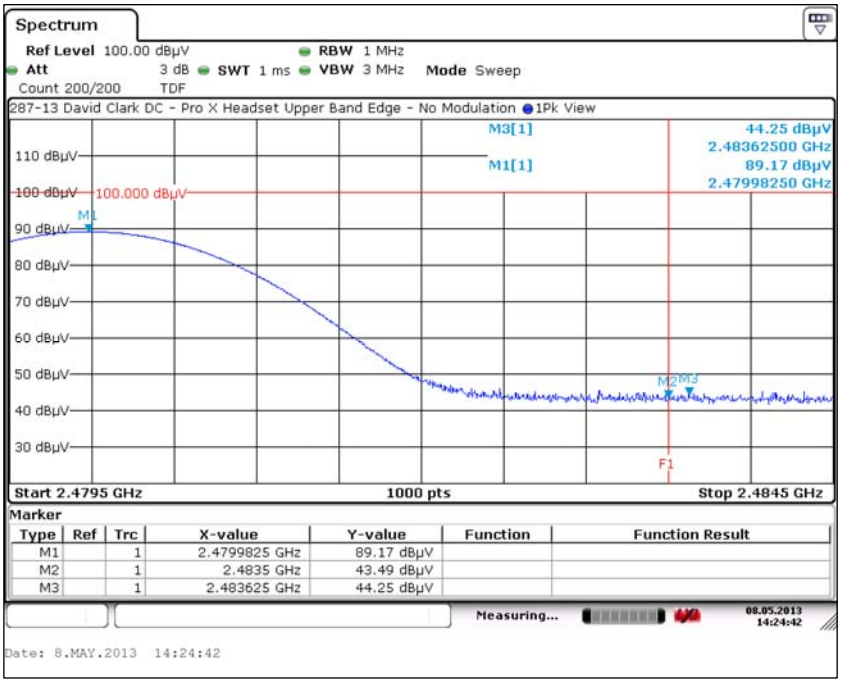
Highest Channel	Field Strength (dBµV/m)		Band Edge Frequency	Field Strength (dBµV/m)		15.209 Limit (dB)	Margin (dB)	Result
(MHz)	Peak	Average	(MHz)	Peak	Average[1]	Average		
2480	93.95	-	2483.5	43.49	-	54	-10.51	Compliant

[1] The Peak measurement meets the average limit.

Worst-case Out of Band

Frequency	Field Strength (dBµV/m)		15.209 Limit (dB)	Margin (dB)	Result
(MHz)	Peak	Average[1]	Average[1]	Average	
2483.625	44.25	-	54	-9.75	Compliant

[1] The Peak measurement meets the average limit.



Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data

6.7. Band Edge (15.247 (d), RSS-210 A8.5)

6.7.2. Upper Band Edge

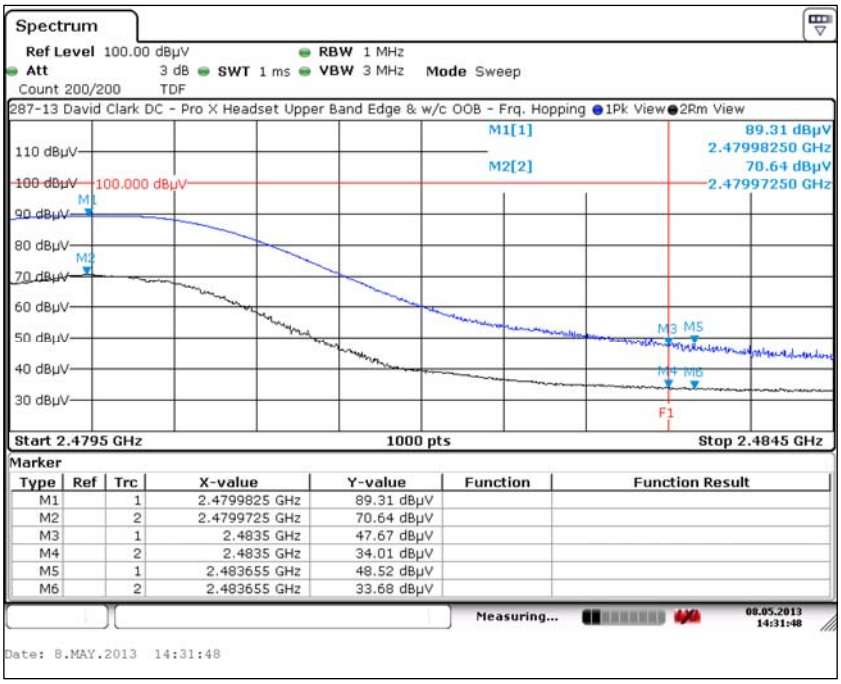
6.7.2.2. Modulated Carrier

Band Edge

Highest Channel	Field Strength (dBµV/m)		Upper Band Edge	Field Strength (dBµV/m)		Limit (dBµV/m)		Margin (dB)		Result
(MHz)	Peak	Average	(MHz)	Peak	Average	Peak	Average	Peak	Average	
2480	89.31	70.64	2483.5	47.67	34.01	74	54	-26.33	-19.99	Compliant

Worst-case Out of Band

Freq. (MHz)	Field Strength (dBµV/m)		15.209 Limit (dBµV/m)		Margin (dB)		Result
	Peak	Average	Peak	Average	Peak	Average	
2483.655	48.52	33.68	74	54	-25.48	-20.32	Compliant

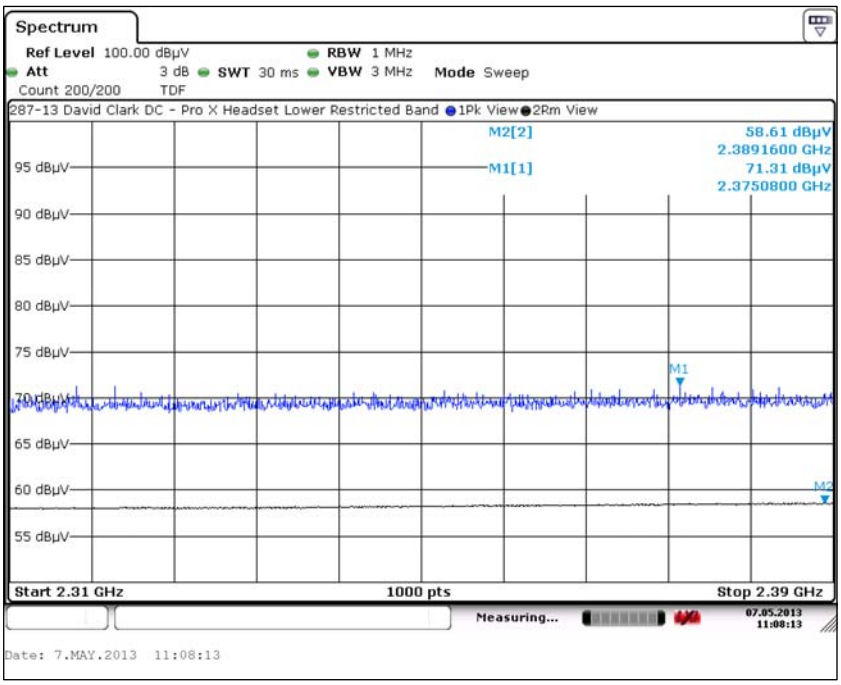


Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

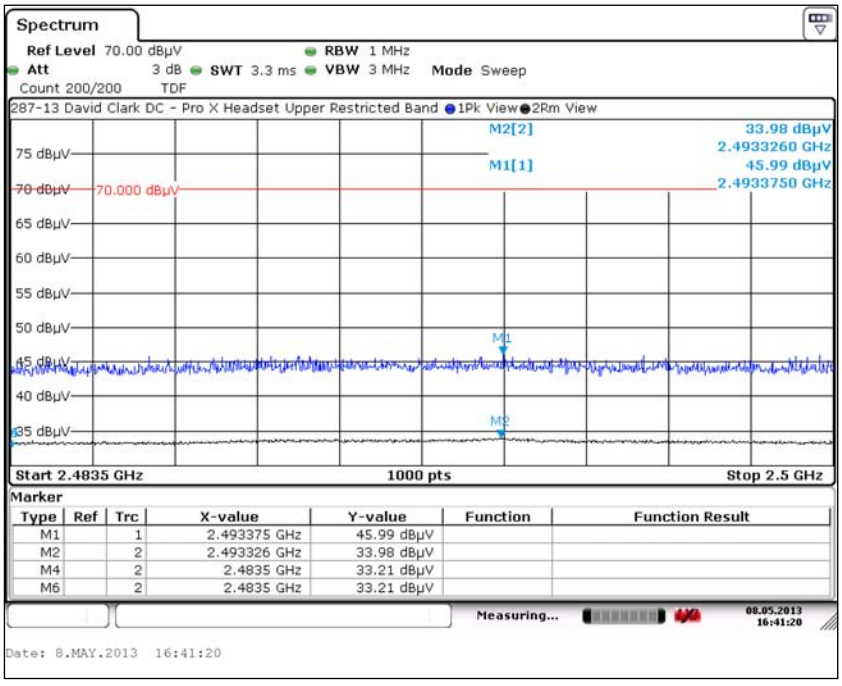
6. Measurement Data

6.7. Band Edge (15.247 (d), RSS-210 A8.5)

6.7.3. Lower Restricted Band (2310 MHz to 2390 MHz)



6.7.4. Upper Restricted Band (2483.5 MHz to 2500 MHz)



Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

6.8. 99% (Occupied) Bandwidth (RSS-GEN 4.6.1)

Requirement: For devices operating above 900 MHz, the 99% bandwidth shall be no wider than 0.5% of the center frequency.

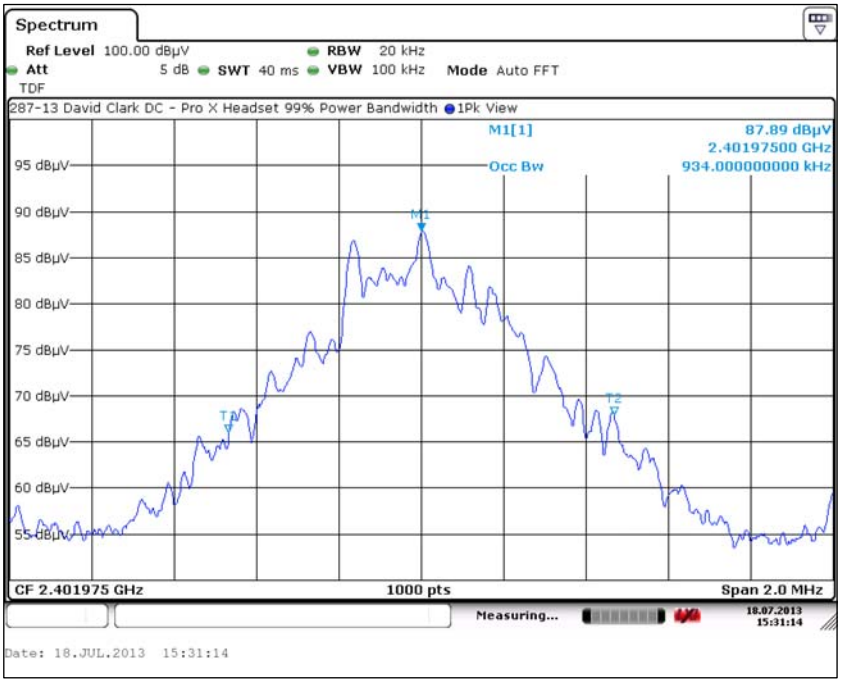
The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

Resolution Bandwidth : 100 kHz
Video Bandwidth : 300 kHz

6.8.1. Measurement Results

Channel	Channel Frequency (MHz)	99% Power Bandwidth (MHz)
Low	2402	.934
Middle	2441	.916
High	2480	.982

6.8.1.1. 99% Power Bandwidth – Low Frequency (2402 MHz)

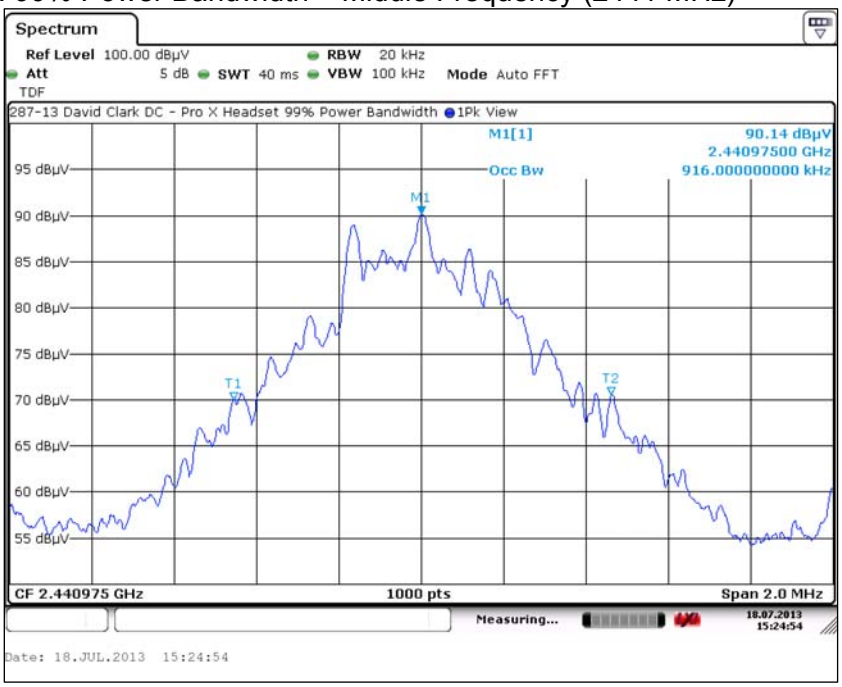


Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

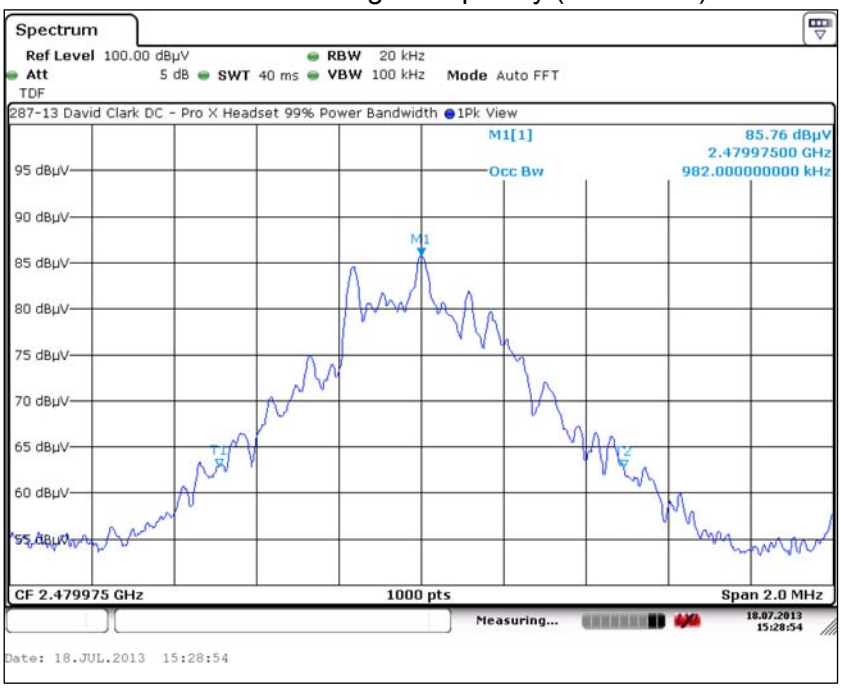
6. Measurement Data (continued)

6.8. 99% Bandwidth (RSS 210)

6.8.1.2. 99% Power Bandwidth – Middle Frequency (2441 MHz)



6.8.1.3. 99% Power Bandwidth – High Frequency (2480 MHz)



Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

6.9. Combined Spurious Harmonic Radiated Emissions (ANSI C63.4 Section 10.2.8.2, RSS-210 A8.9)

Test Note: The following table represents the worst case measurement of each harmonic emission, taking into account the ANSI C63.4.1 requirement of rotating the DUT through three orthogonal axes.

Resolution Bandwidth : 1 MHz
Video Bandwidth : 3 MHz

Frequency (MHz)	Field Strength (dBµV/m)[1]		Limit (dBµV/m)		Margin (dB)		Pol (H/V)	Results
	Peak	Avg	Peak	Avg	Peak	Avg		
4804	56.45	44.14	74.00	54.00	-17.55	-9.86	V	Compliant
4882	54.08	40.29	74.00	54.00	-19.92	-13.71	H	Compliant
4960	55.18	37.36	74.00	54.00	-18.82	-16.64	V	Compliant
7323	51.30	39.85	74.00	54.00	-22.70	-14.15	H	Compliant
7440	50.69	38.52	74.00	54.00	-23.31	-15.48	V	Compliant
12010	55.35	43.86	74.00	54.00	-18.65	-10.14	H	Compliant
12205	56.23	44.17	74.00	54.00	-17.77	-9.83	H	Compliant
12400	57.38	44.95	74.00	54.00	-16.62	-9.05	H	Compliant
19216	56.45	45.04	74.00	54.00	-17.55	-8.96	H	Compliant
19528	56.60	44.90	74.00	54.00	-17.40	-9.10	H	Compliant
19840	56.78	44.33	74.00	54.00	-17.22	-9.67	H	Compliant
22320	58.73	46.56	74.00	54.00	-15.27	-7.44	H	Compliant

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

Regulatory Limit: FCC Part 15.209

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.

Test Procedure

Test measurements were made in accordance with ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

Test Notes:

The host PC that was required to control the DUT had to be co-located with the DUT during spurious radiated emissions testing. To determine if the device under test was the source of any observed emissions, at the end of each test the host PC was observed with the DUT disconnected.

The frequency span that includes the Bluetooth transmitters was omitted from the spurious emissions scan.

Conclusion:

The device under test met the spurious emissions requirements.

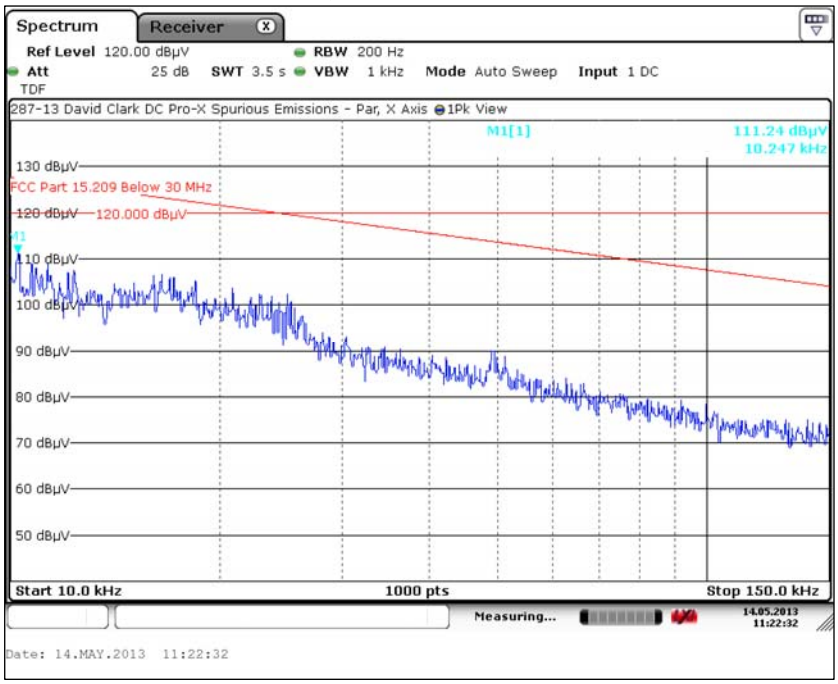
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

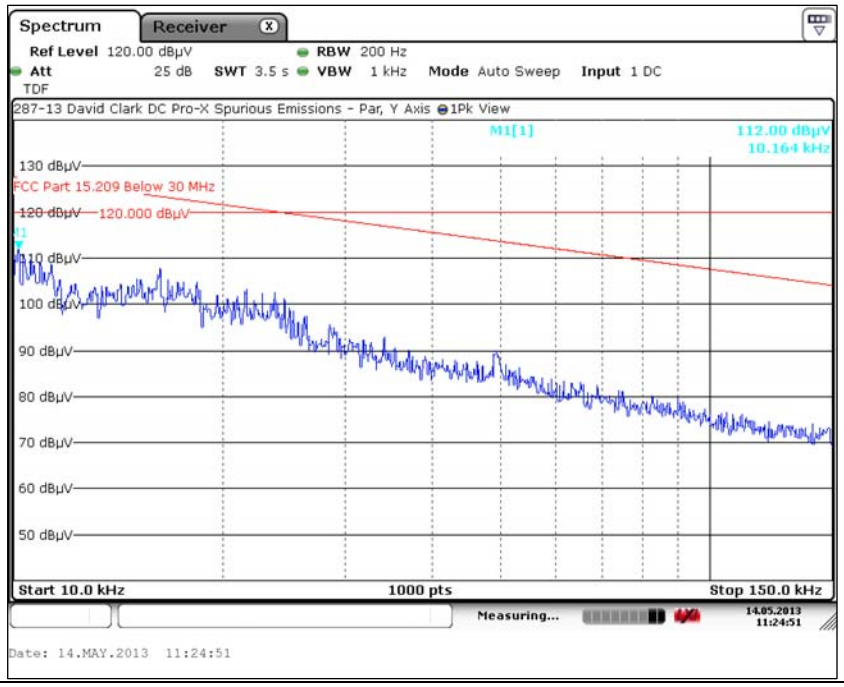
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.1. Measurement Results – 10 kHz to 150 kHz

6.10.1.1. Parallel Antenna, X-Axis



6.10.1.2. Parallel Antenna, Y-Axis



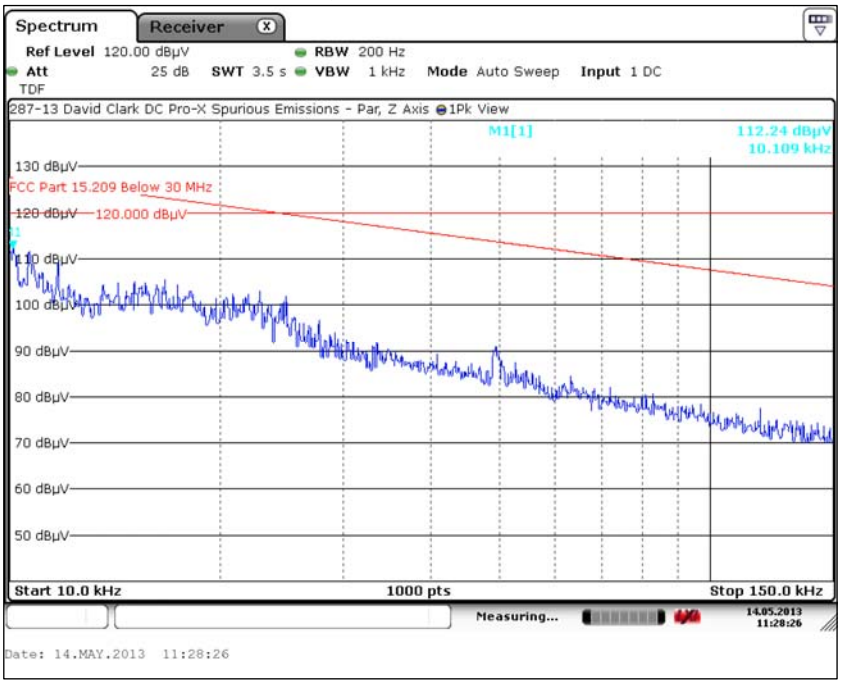
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

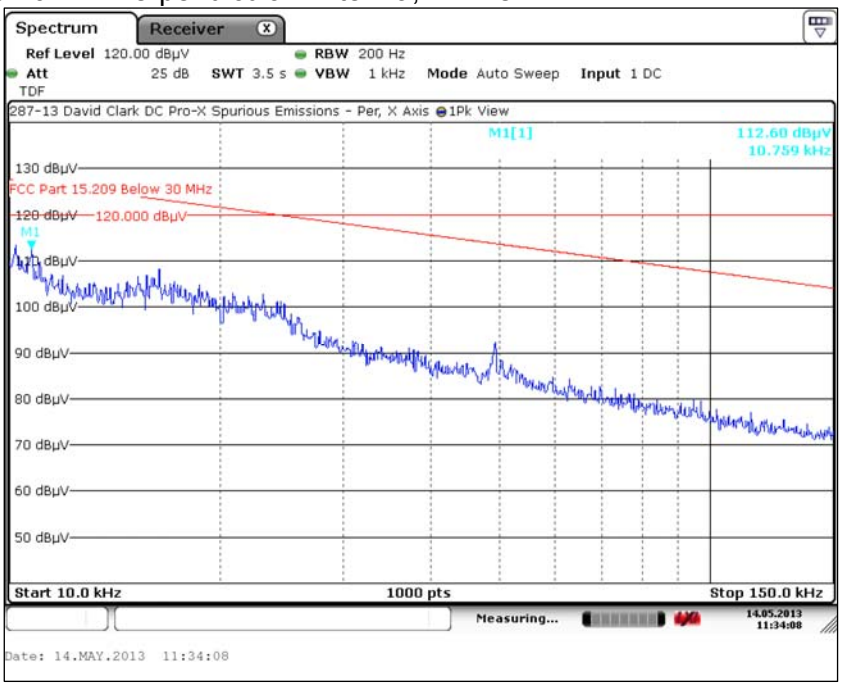
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.1. Measurement Results – 10 kHz to 150 kHz

6.10.1.3. Parallel Antenna, Z-Axis



6.10.1.4. Perpendicular Antenna, X-Axis



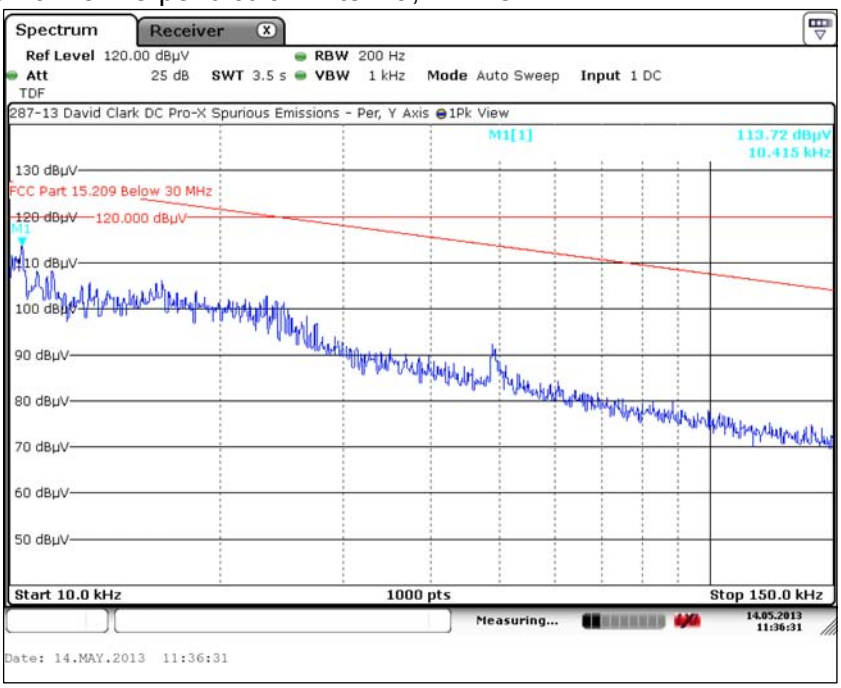
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

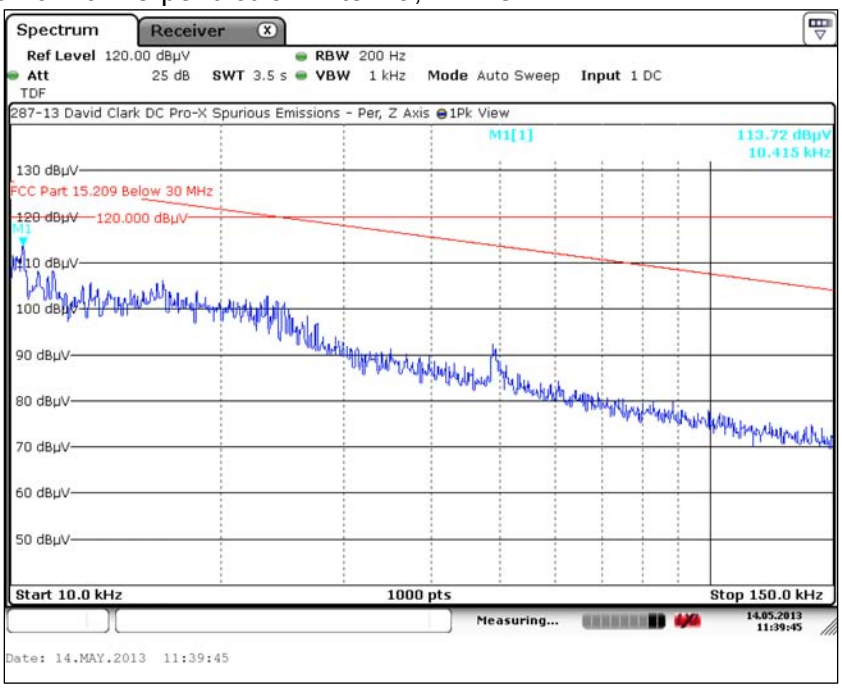
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.1. Measurement Results – 10 kHz to 150 kHz

6.10.1.5. Perpendicular Antenna, Y-Axis



6.10.1.6. Perpendicular Antenna, Z-Axis



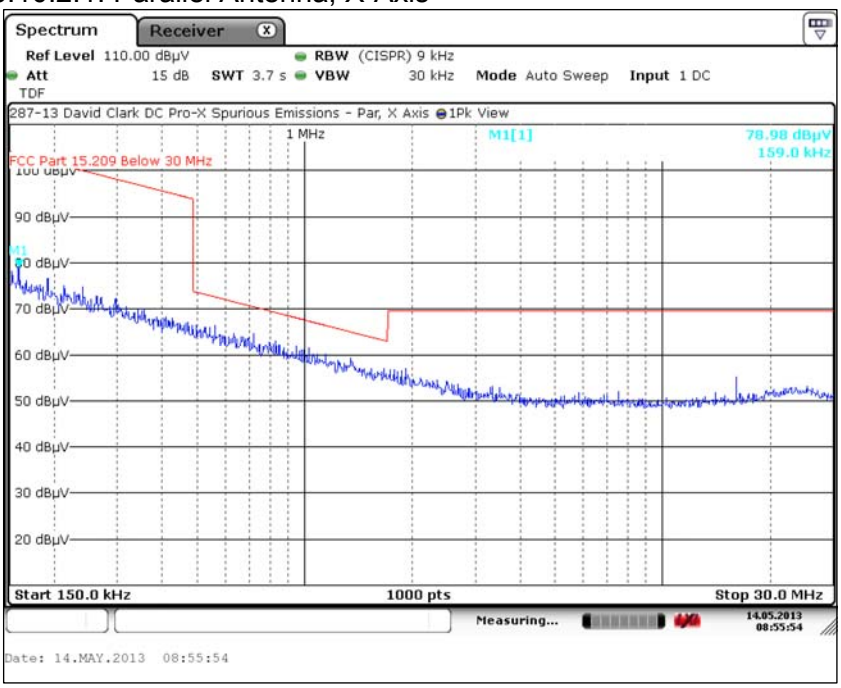
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

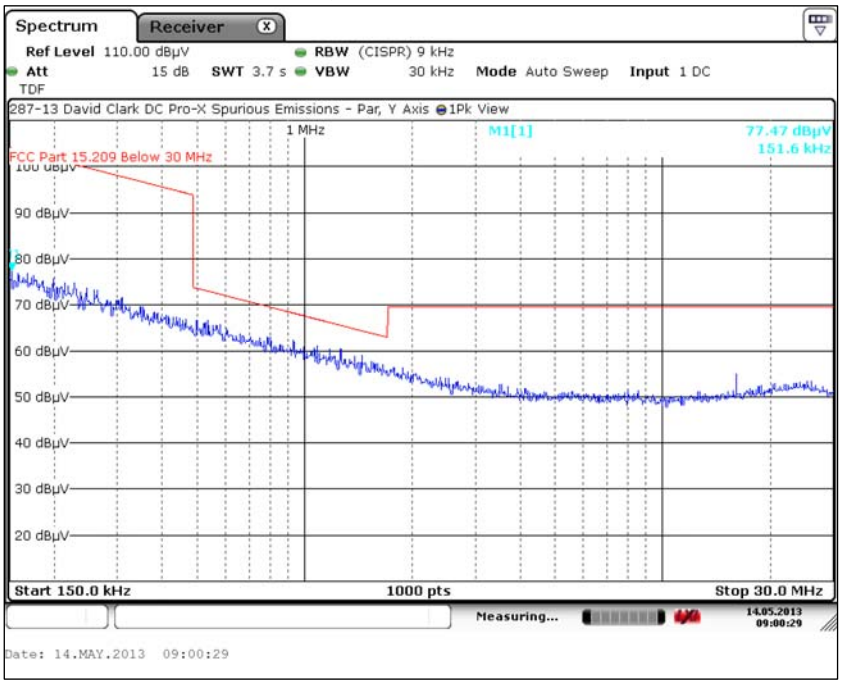
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.2. Measurement Results – 150 kHz to 30 MHz

6.10.2.1. Parallel Antenna, X-Axis



6.10.2.2. Parallel Antenna, Y-Axis



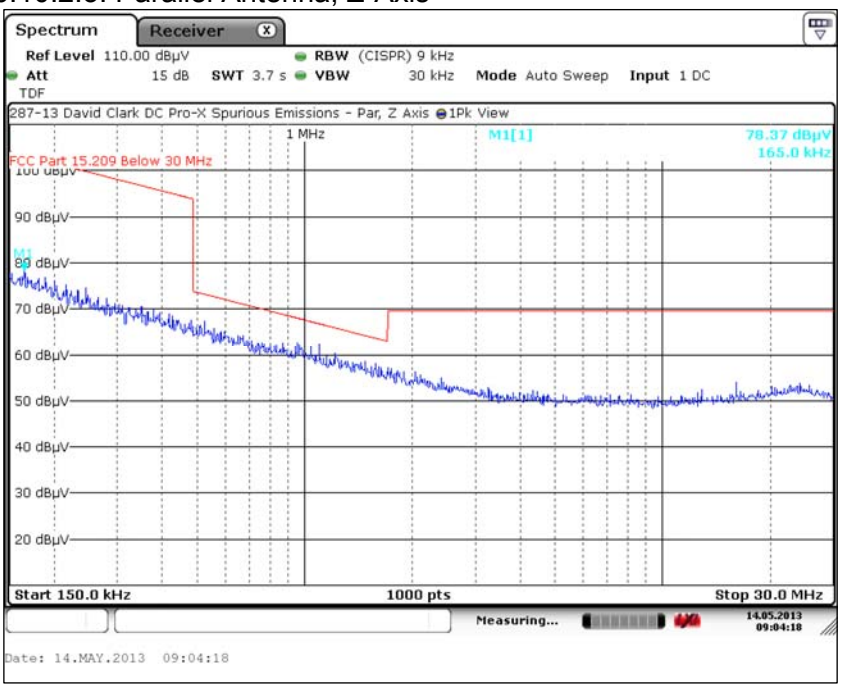
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

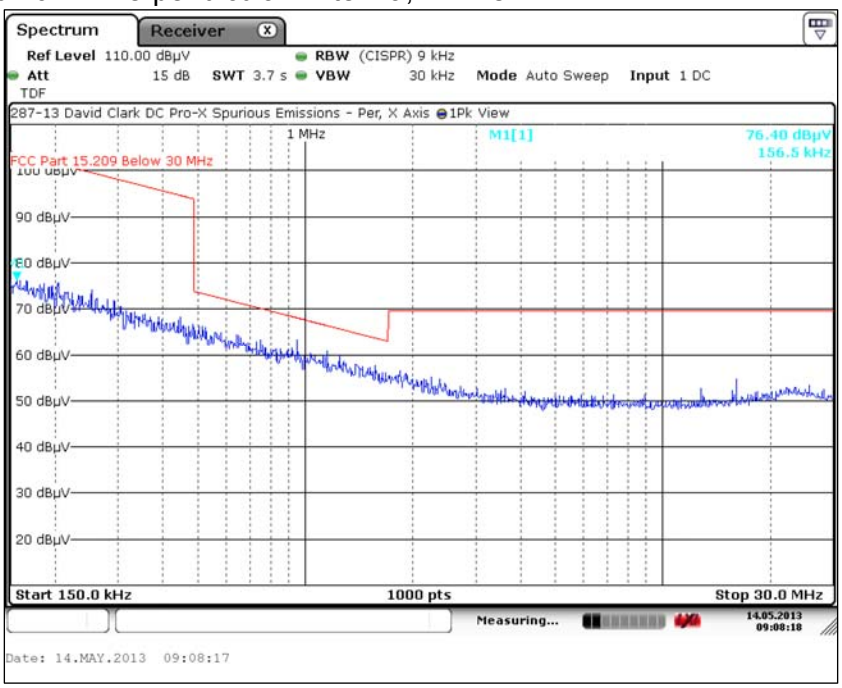
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.2. Measurement Results – 150 kHz to 30 MHz

6.10.2.3. Parallel Antenna, Z-Axis



6.10.2.4 Perpendicular Antenna, X-Axis



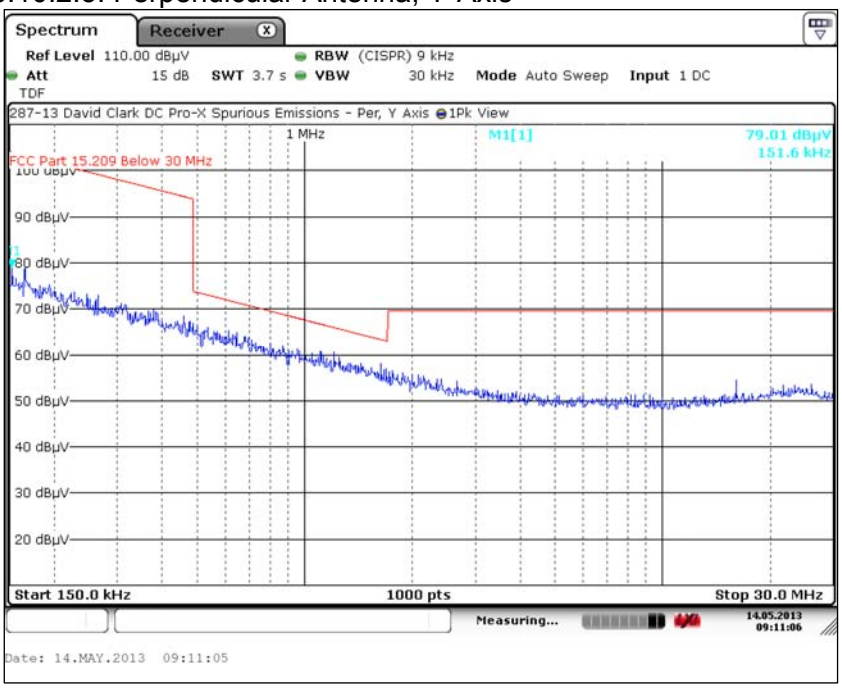
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

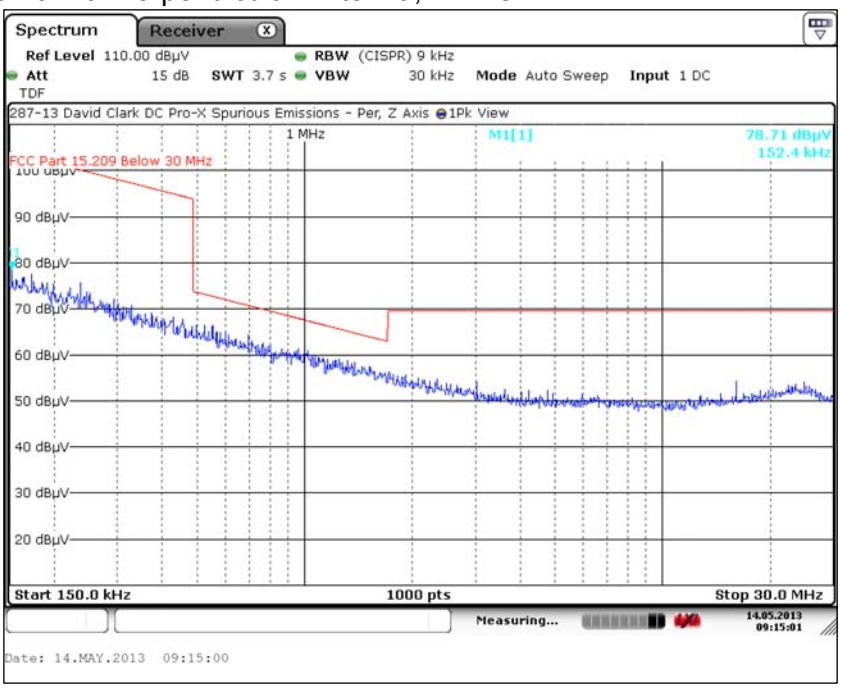
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.2. Measurement Results – 150 kHz to 30 MHz

6.10.2.5. Perpendicular Antenna, Y-Axis



6.10.2.6. Perpendicular Antenna, Z-Axis



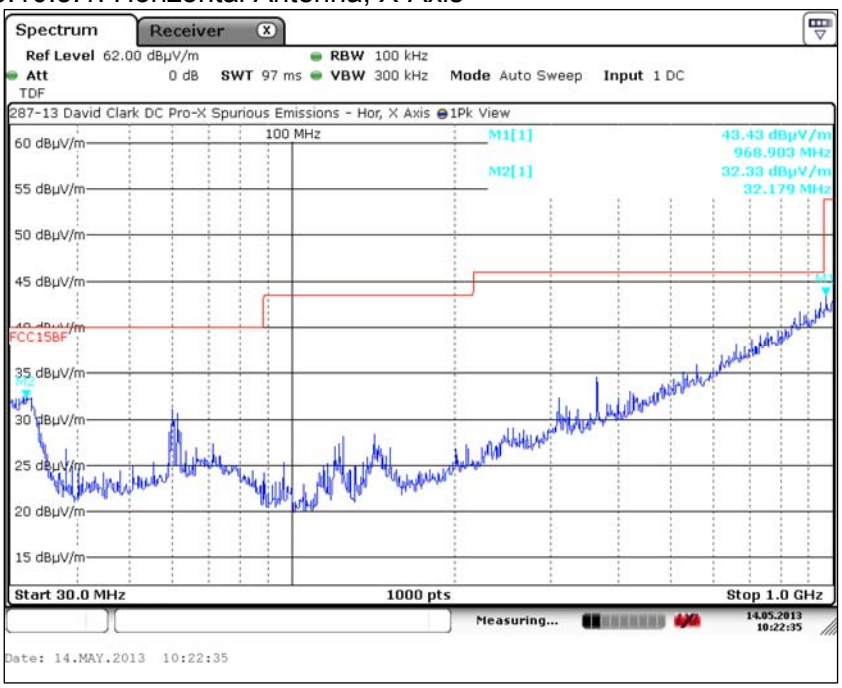
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

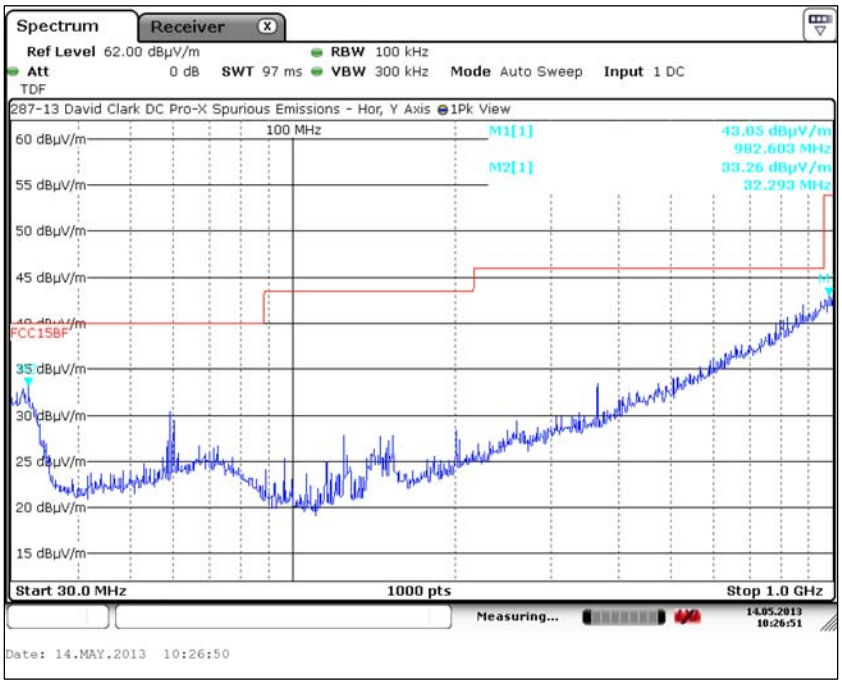
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.3. Measurement Results – 30 MHz to 1 GHz

6.10.3.1. Horizontal Antenna, X-Axis



6.10.3.2. Horizontal Antenna, Y-Axis



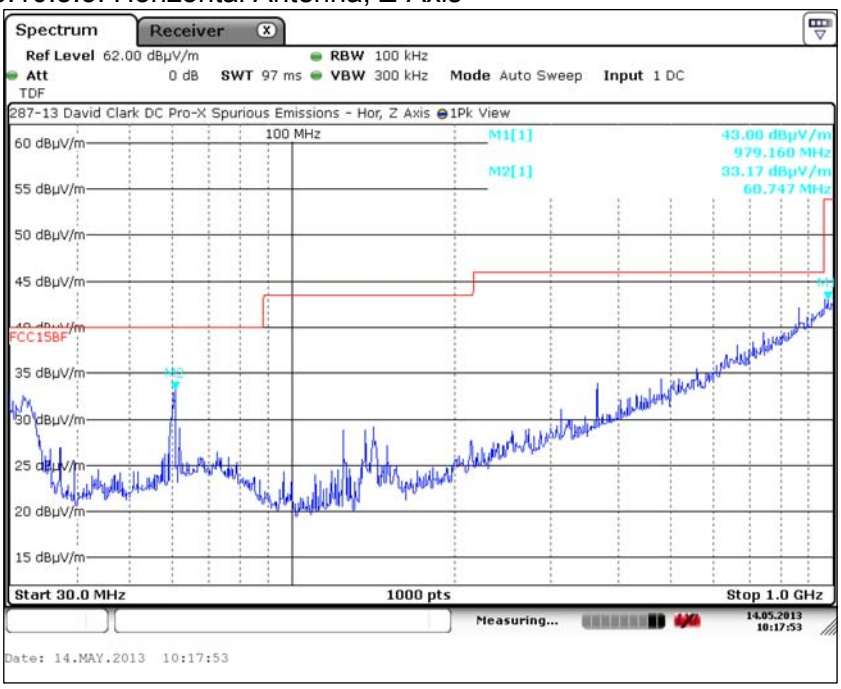
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

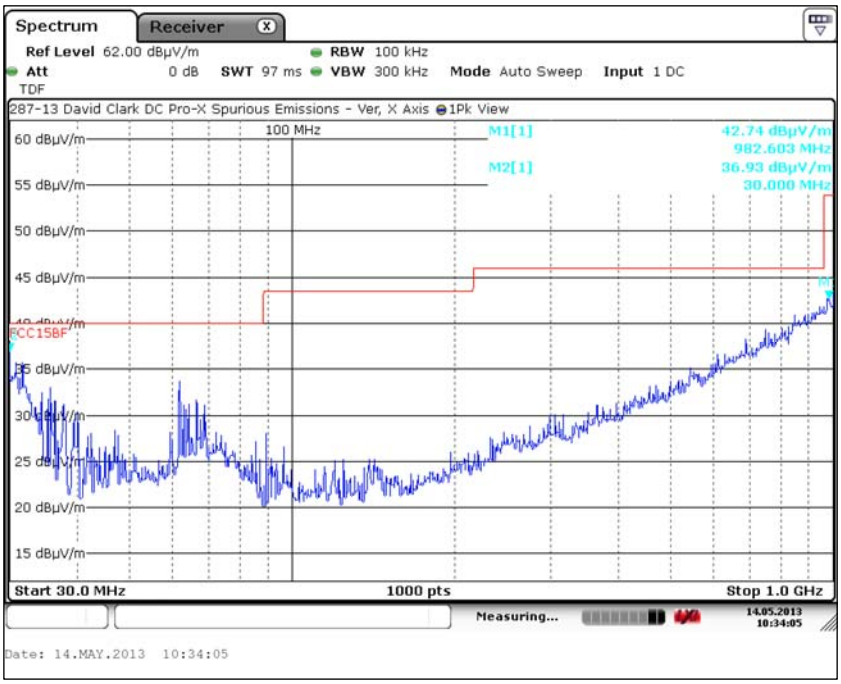
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.3. Measurement Results – 30 MHz to 1 GHz

6.10.3.3. Horizontal Antenna, Z-Axis



6.10.3.4. Vertical Antenna, X-Axis



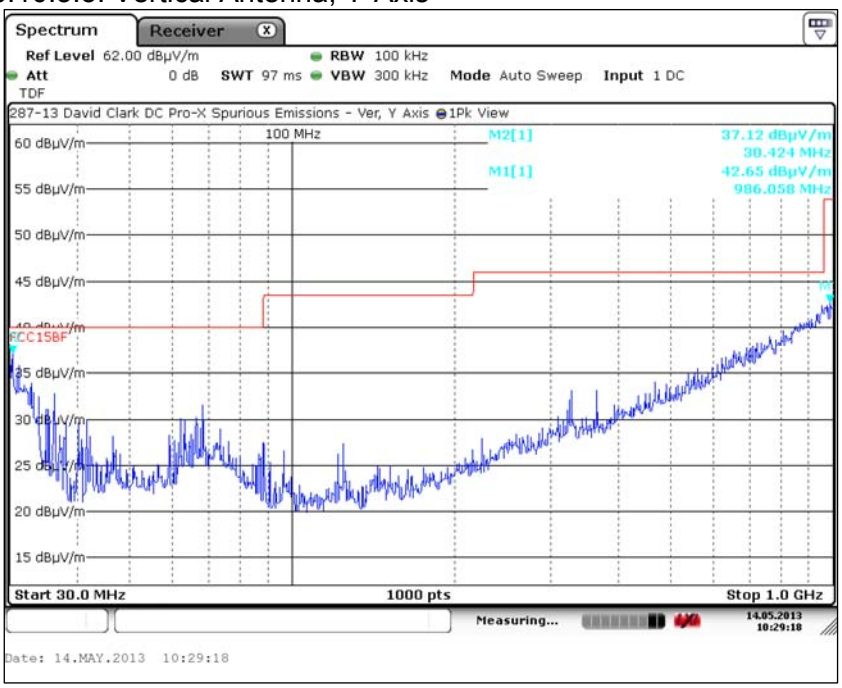
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

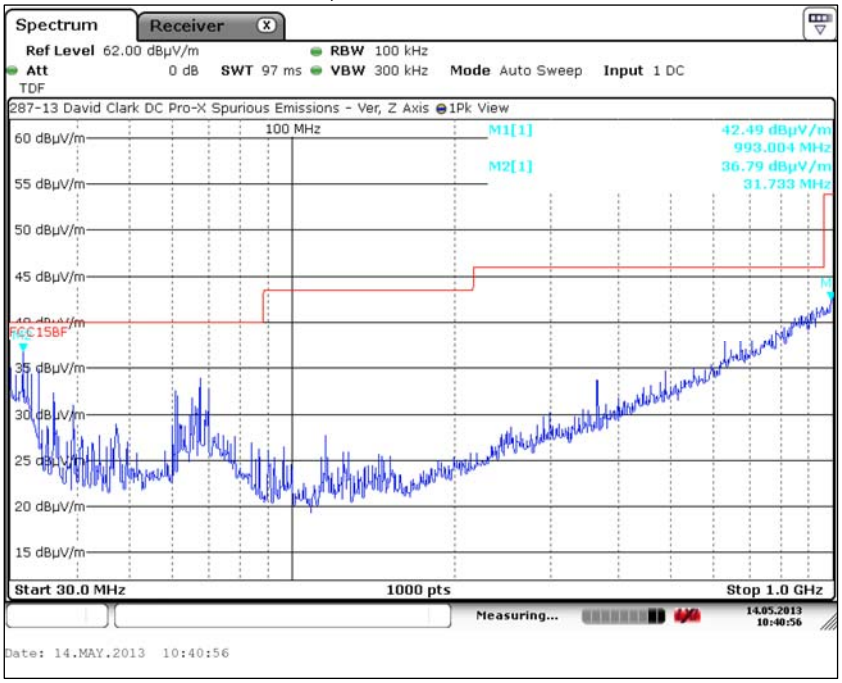
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.3. Measurement Results – 30 MHz to 1 GHz

6.10.3.5. Vertical Antenna, Y-Axis



6.10.3.3. Vertical Antenna, Z-Axis



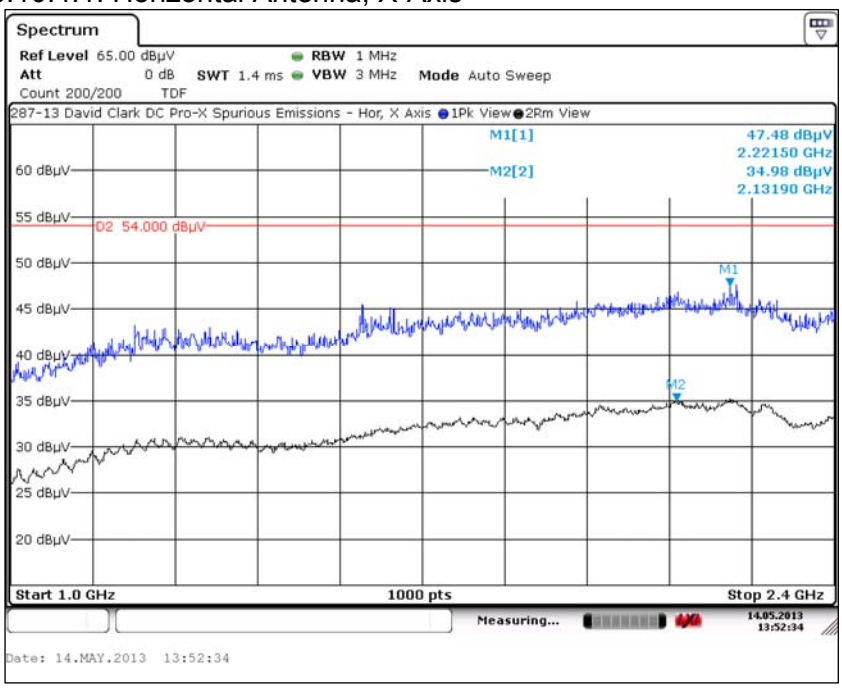
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

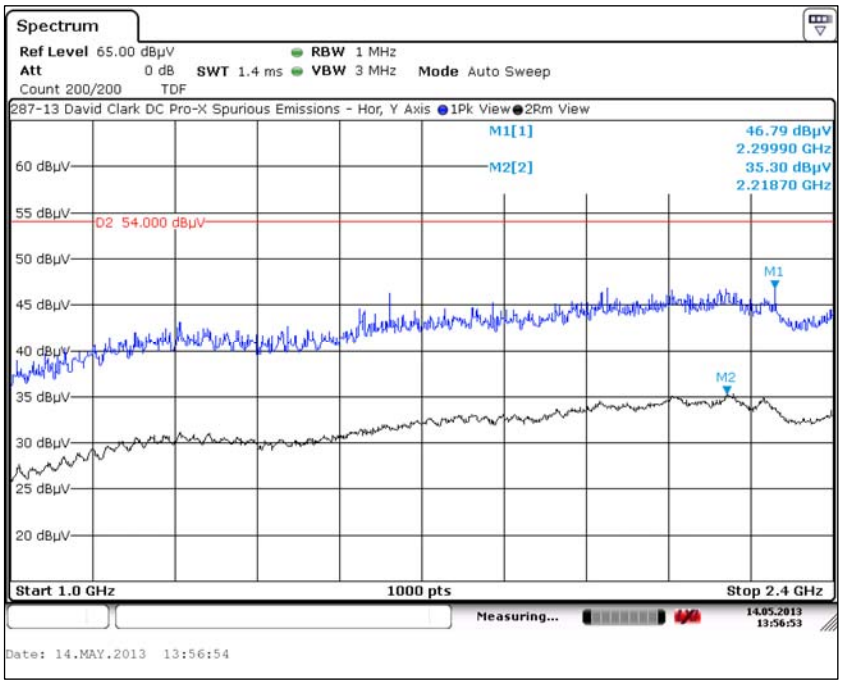
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.4. Measurement Results – 1 GHz to 2.4 GHz

6.10.4.1. Horizontal Antenna, X-Axis



6.10.4.2. Horizontal Antenna, Y-Axis



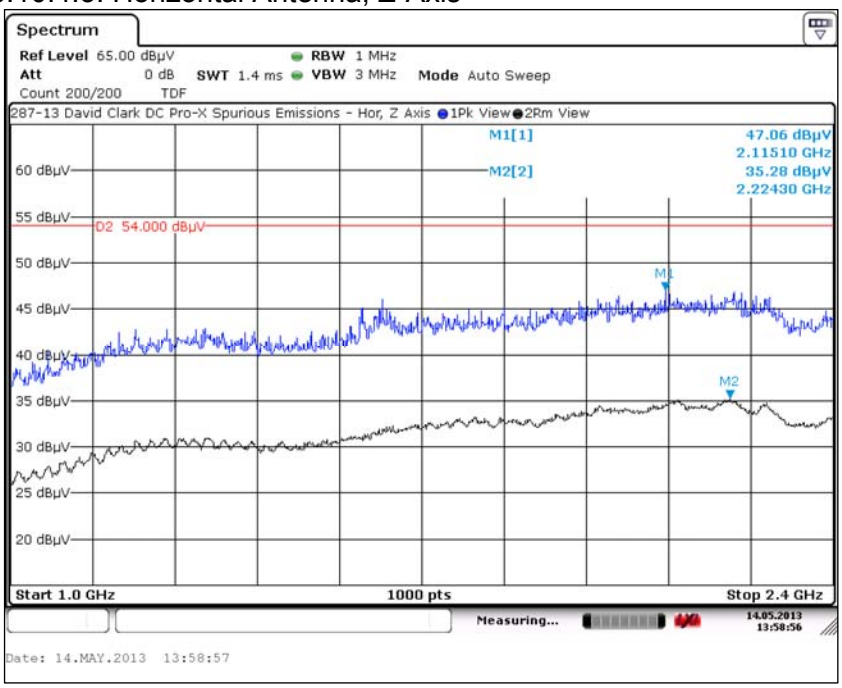
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

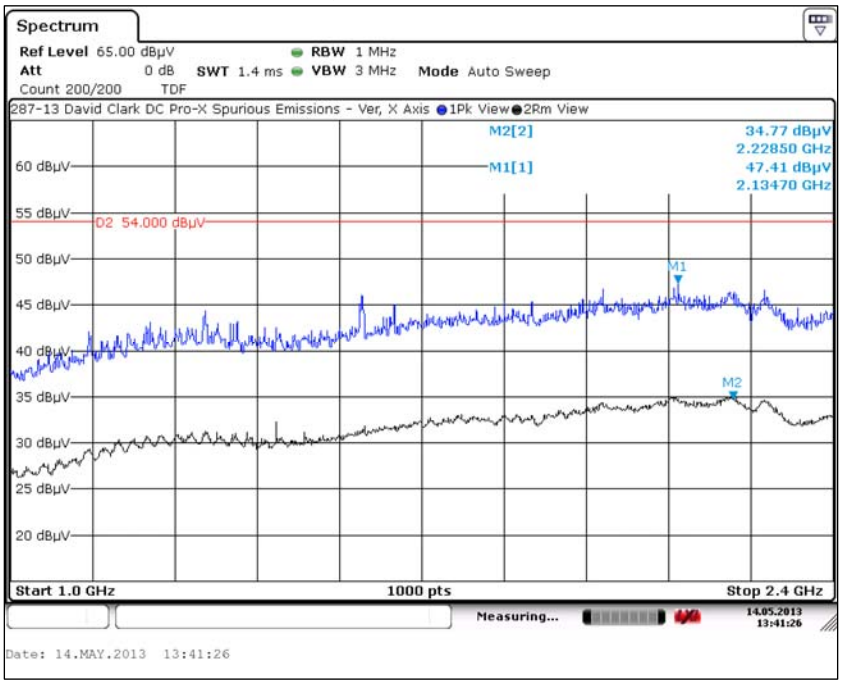
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.4. Measurement Results – 1 GHz to 2.4 GHz

6.10.4.3. Horizontal Antenna, Z-Axis



6.10.4.4. Vertical Antenna, X-Axis



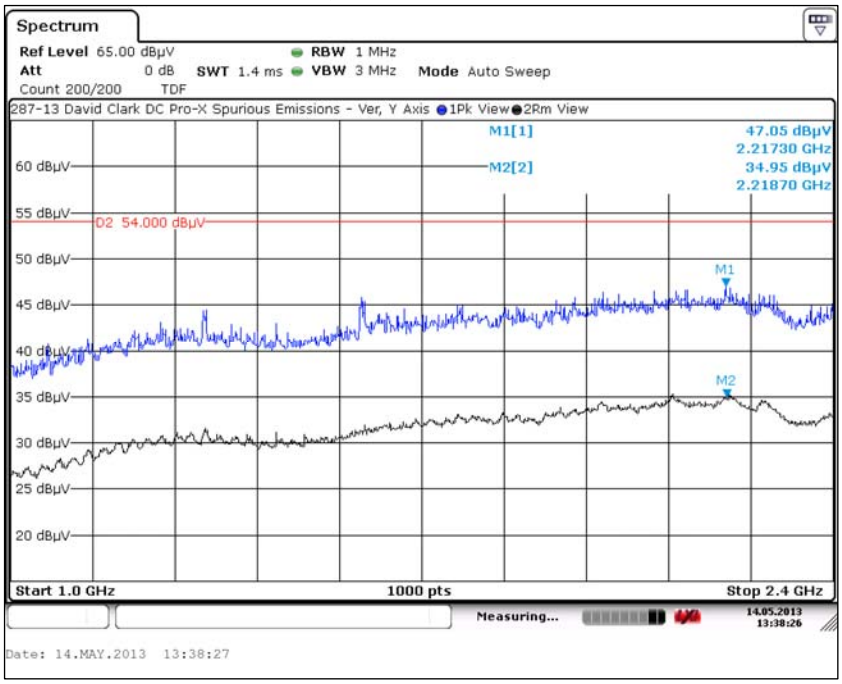
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

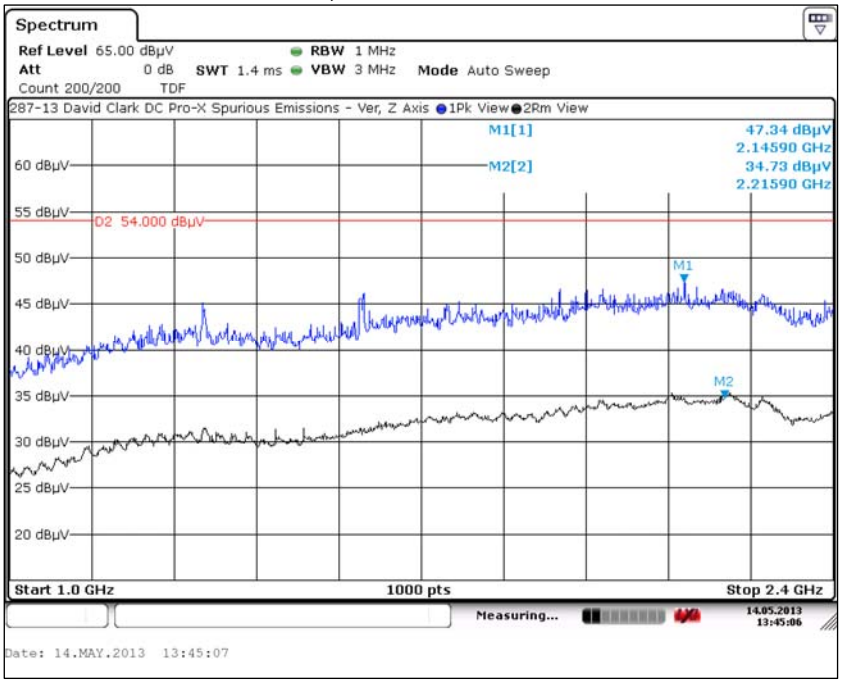
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.4. Measurement Results – 1 GHz to 2.4 GHz

6.10.4.5. Vertical Antenna, Y-Axis



6.10.4.6. Vertical Antenna, Z-Axis



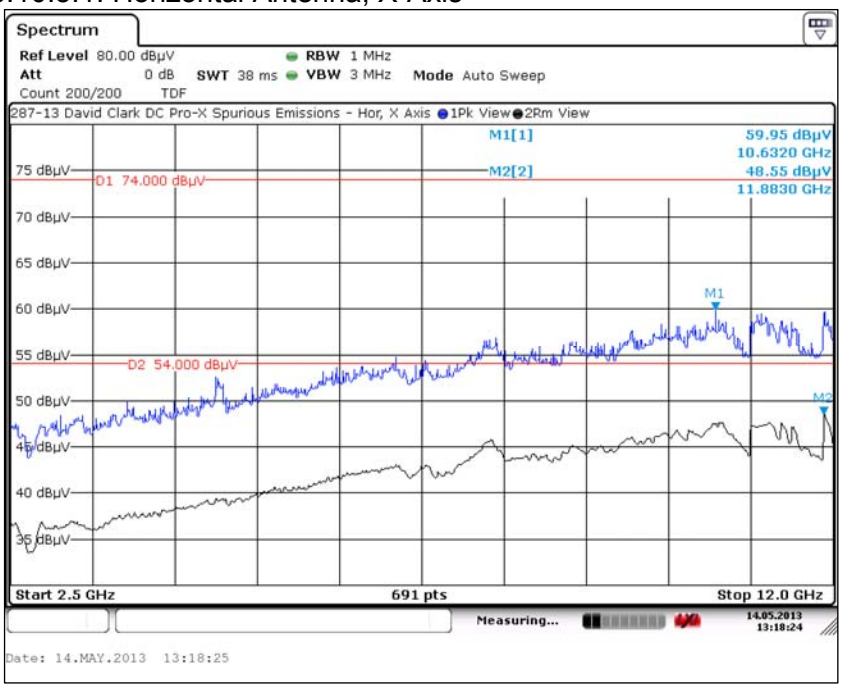
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

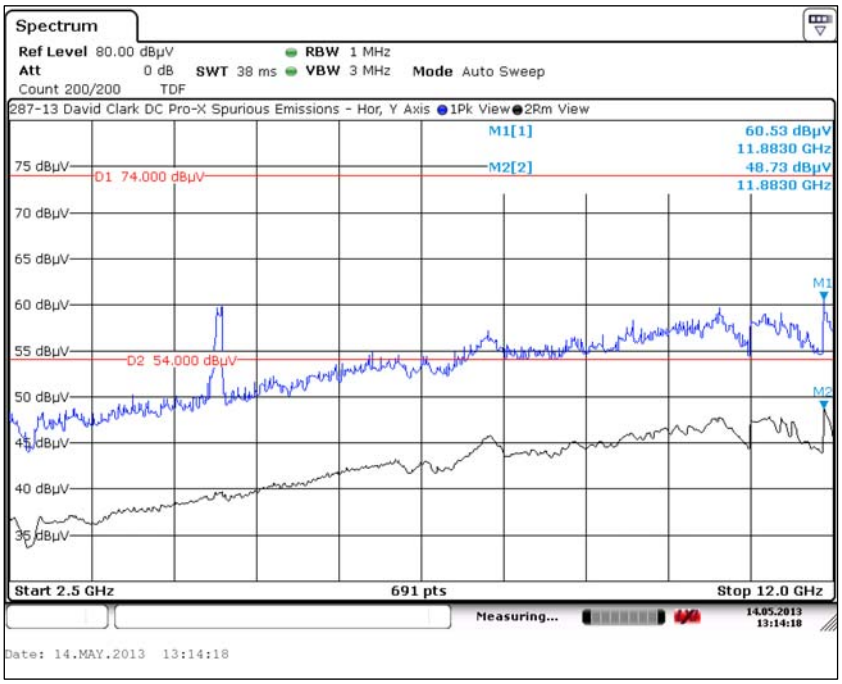
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.5. Measurement Results – 2.5 GHz to 12 GHz

6.10.5.1. Horizontal Antenna, X-Axis



6.10.5.2. Horizontal Antenna, Y-Axis



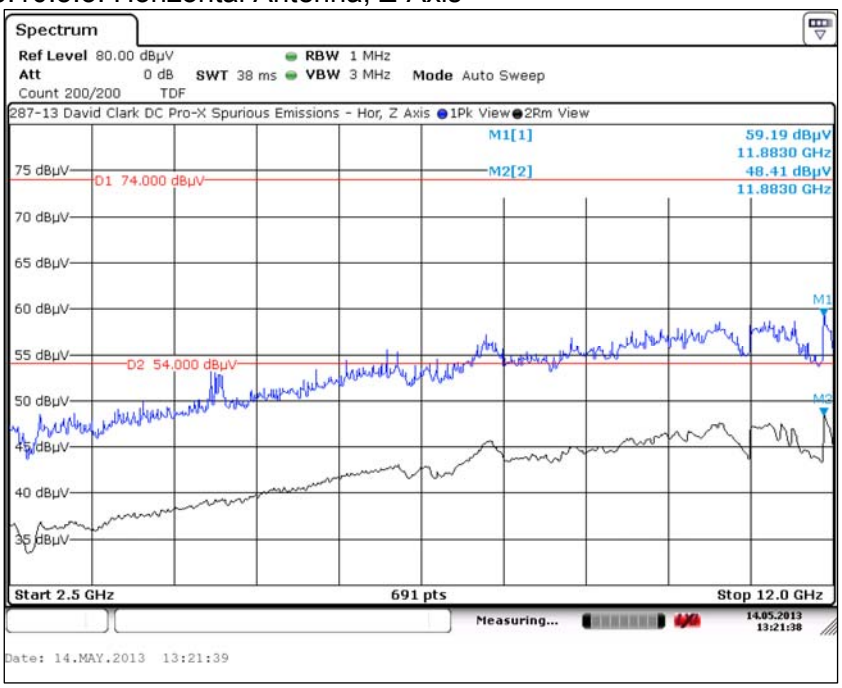
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

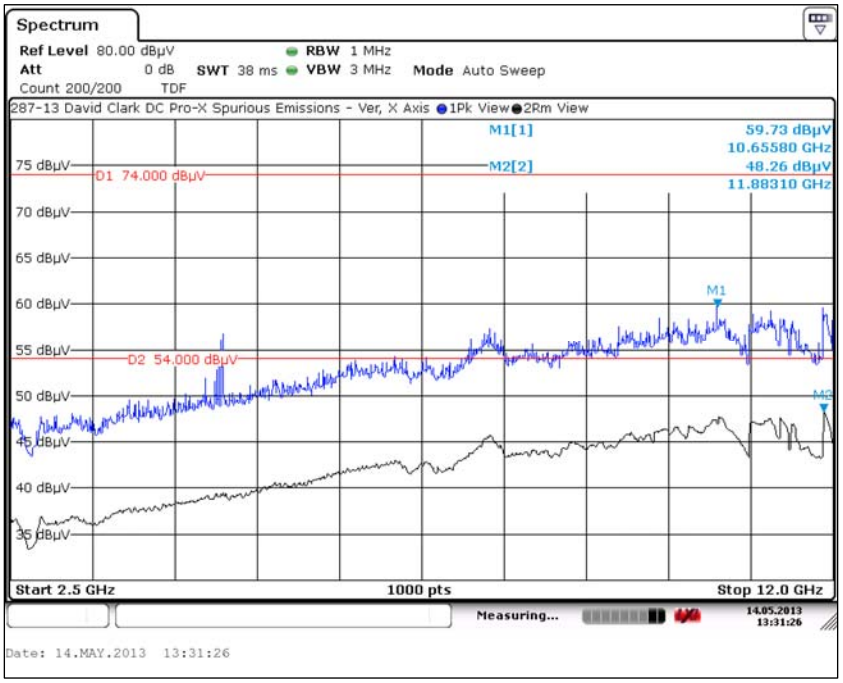
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.5. Measurement Results – 2.5 GHz to 12 GHz

6.10.5.3. Horizontal Antenna, Z-Axis



6.10.5.4. Vertical Antenna, X-Axis



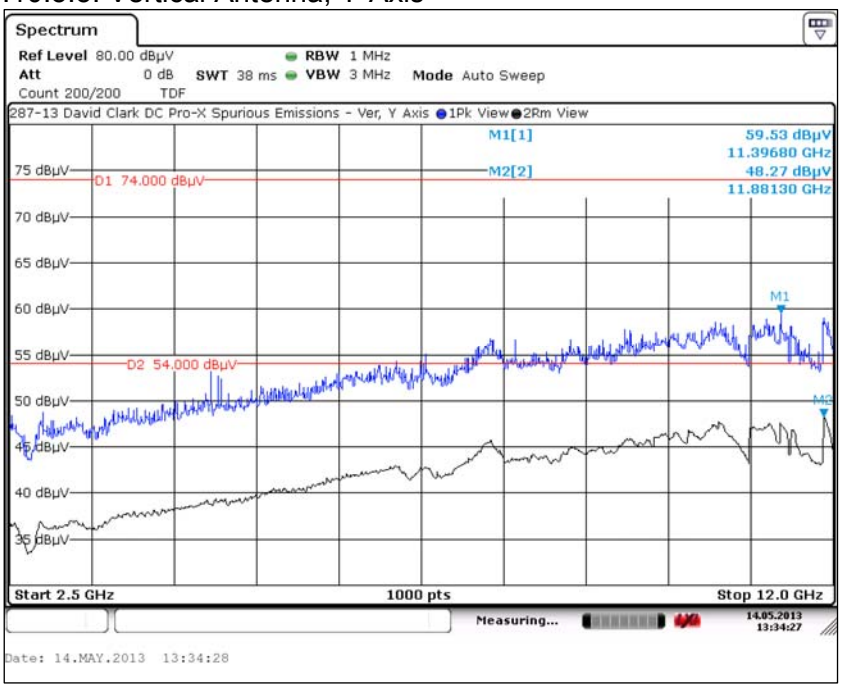
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

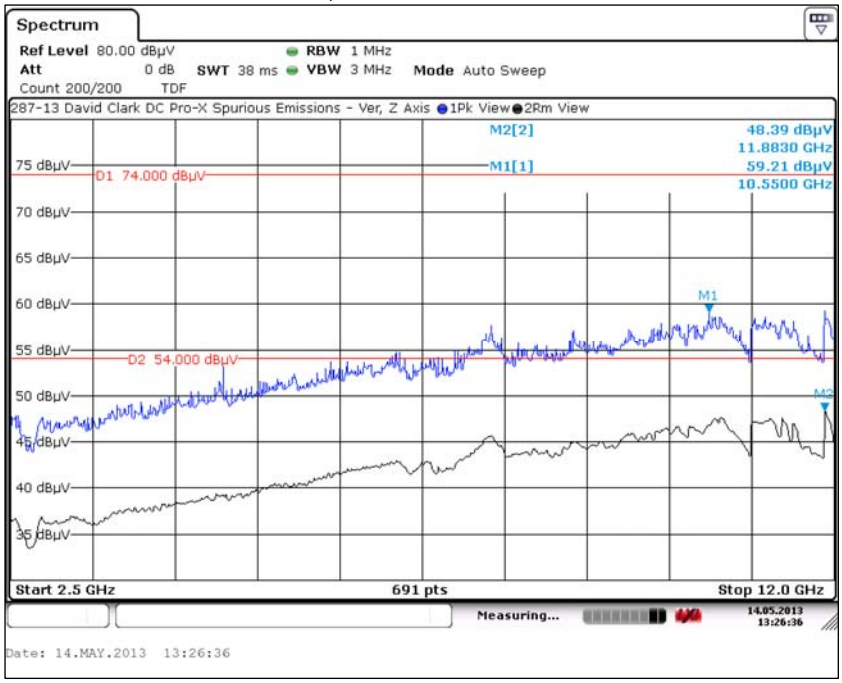
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.5. Measurement Results – 2.5 GHz to 12 GHz

6.10.5.5. Vertical Antenna, Y-Axis



6.10.5.6. Vertical Antenna, Z-Axis



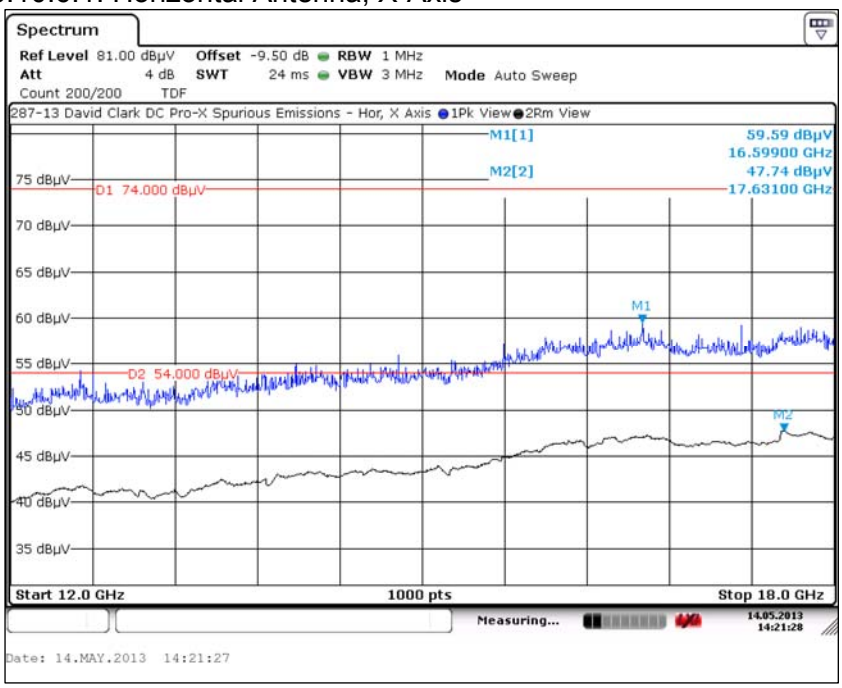
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

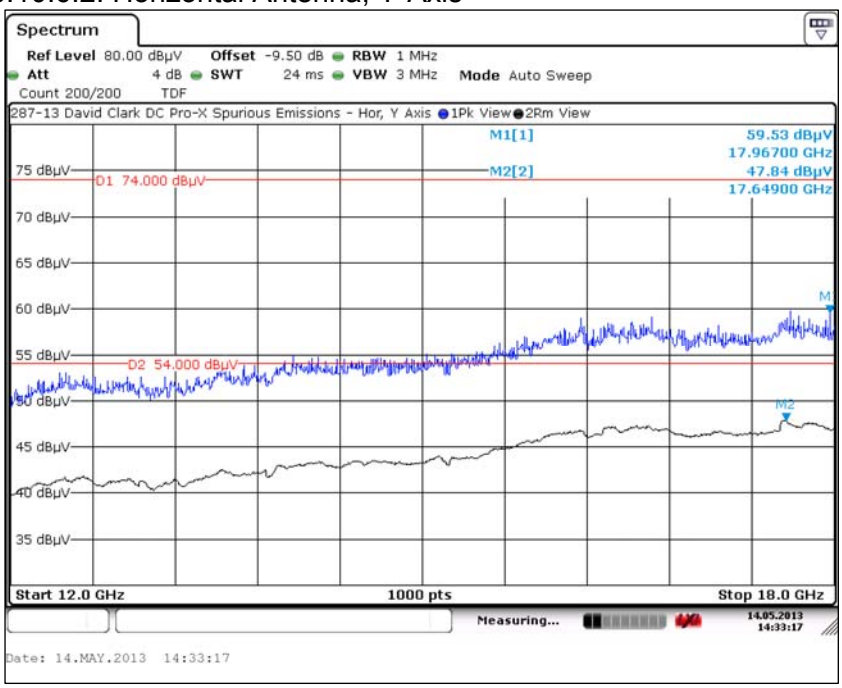
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.6. Measurement Results – 12 GHz to 18 GHz

6.10.6.1. Horizontal Antenna, X-Axis



6.10.6.2. Horizontal Antenna, Y-Axis



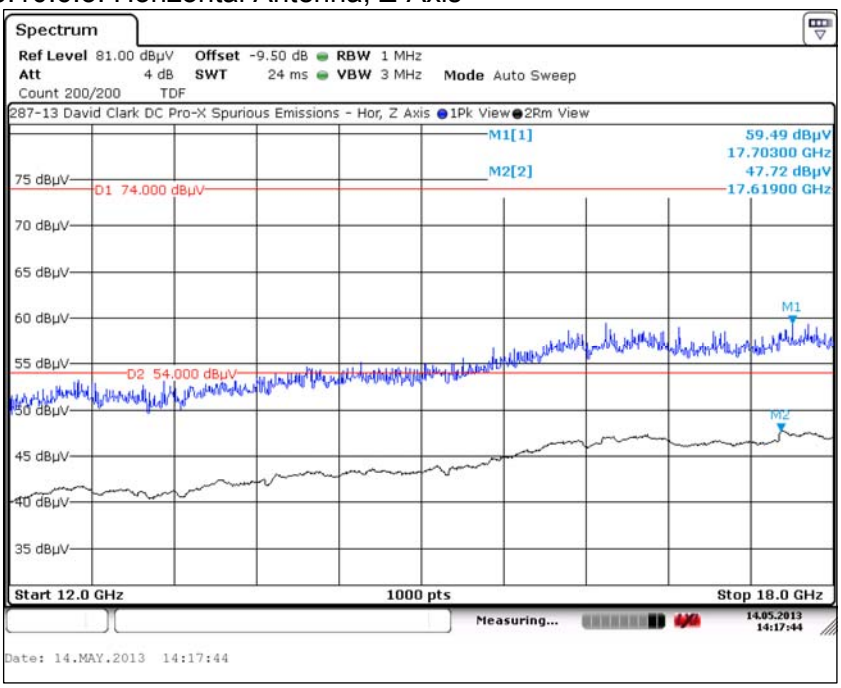
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

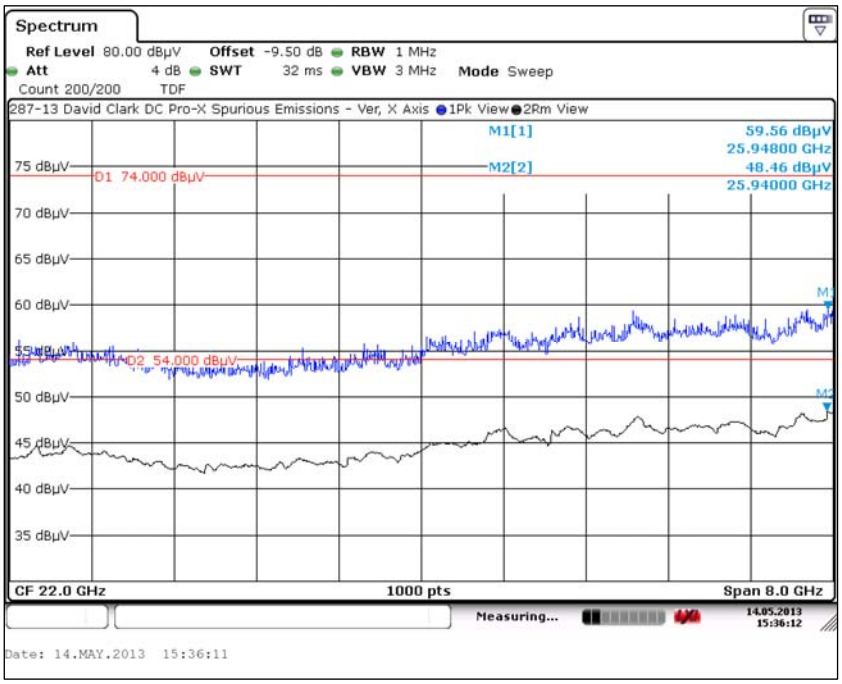
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.6. Measurement Results – 12 GHz to 18 GHz

6.10.6.3. Horizontal Antenna, Z-Axis



6.10.6.4. Vertical Antenna, X-Axis



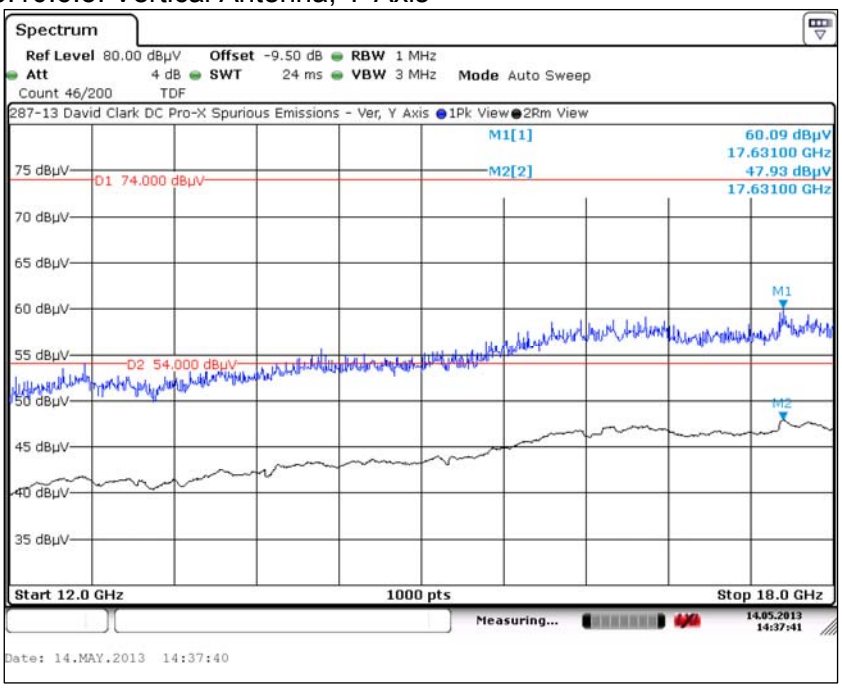
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

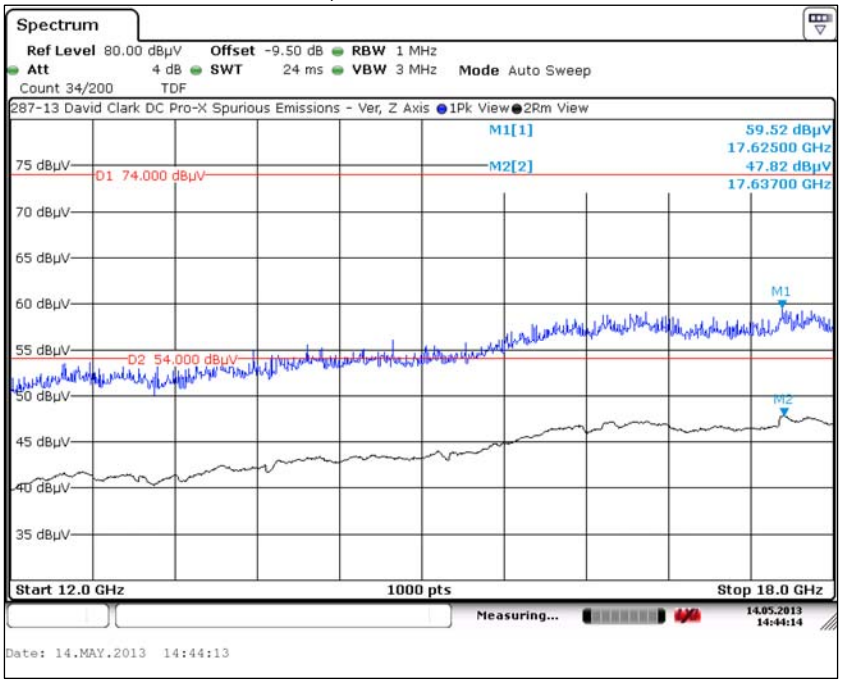
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.6. Measurement Results – 12 GHz to 18 GHz

6.10.6.5. Vertical Antenna, Y-Axis



6.10.6.6. Vertical Antenna, Z-Axis



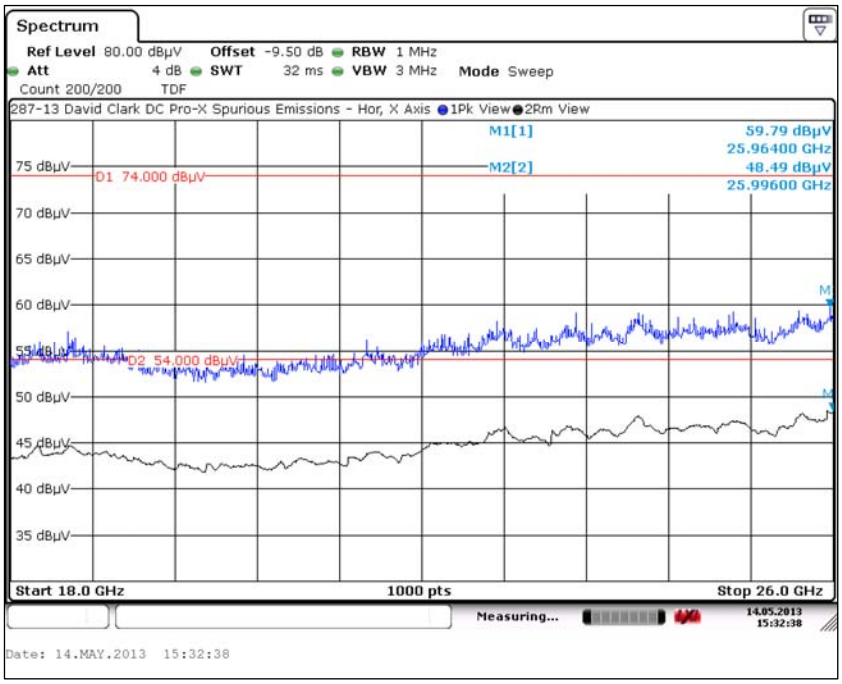
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

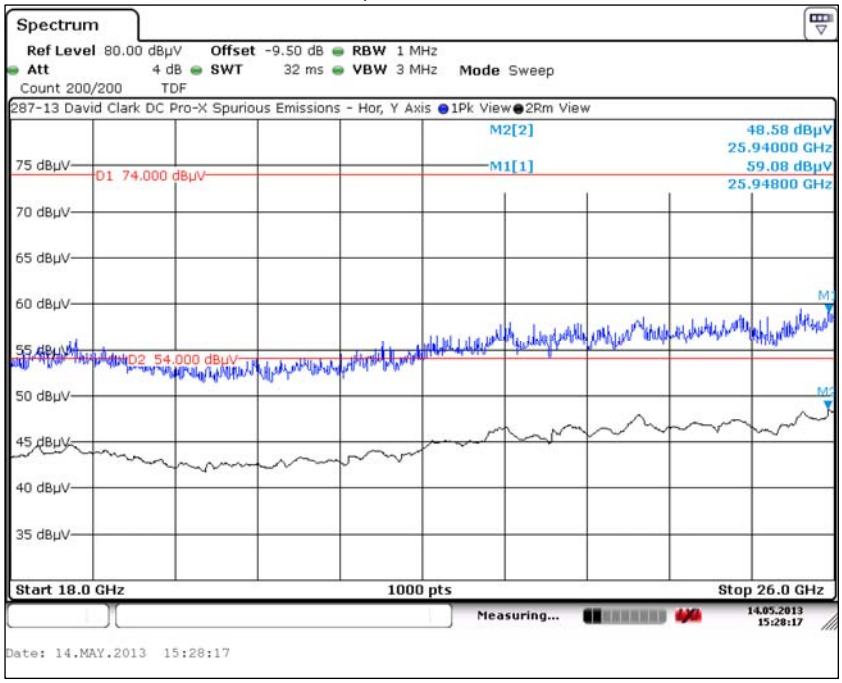
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.7. Measurement Results – 18 GHz to 26 GHz

6.10.7.1. Horizontal Antenna, X-Axis



6.10.7.2. Horizontal Antenna, Y-Axis



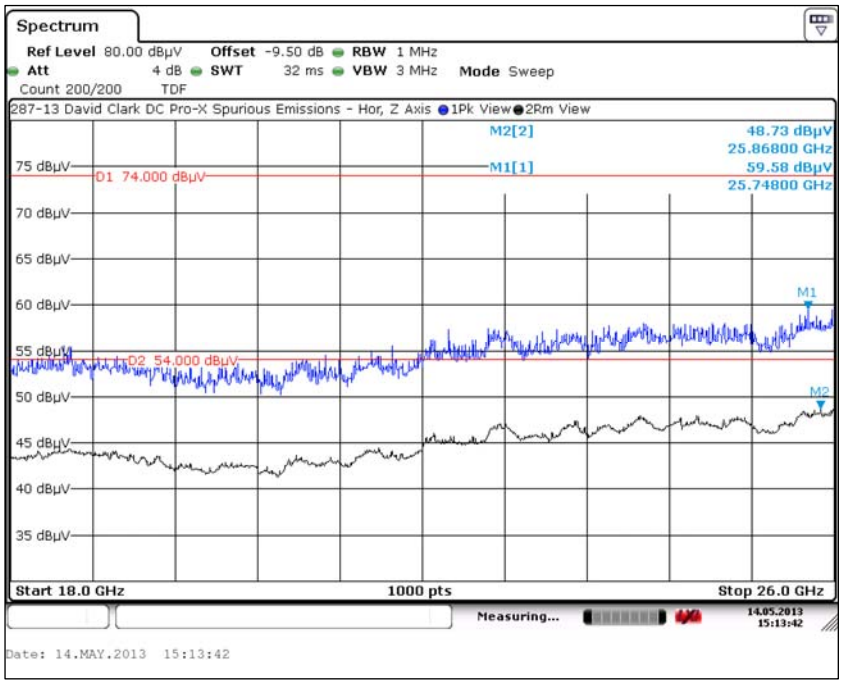
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

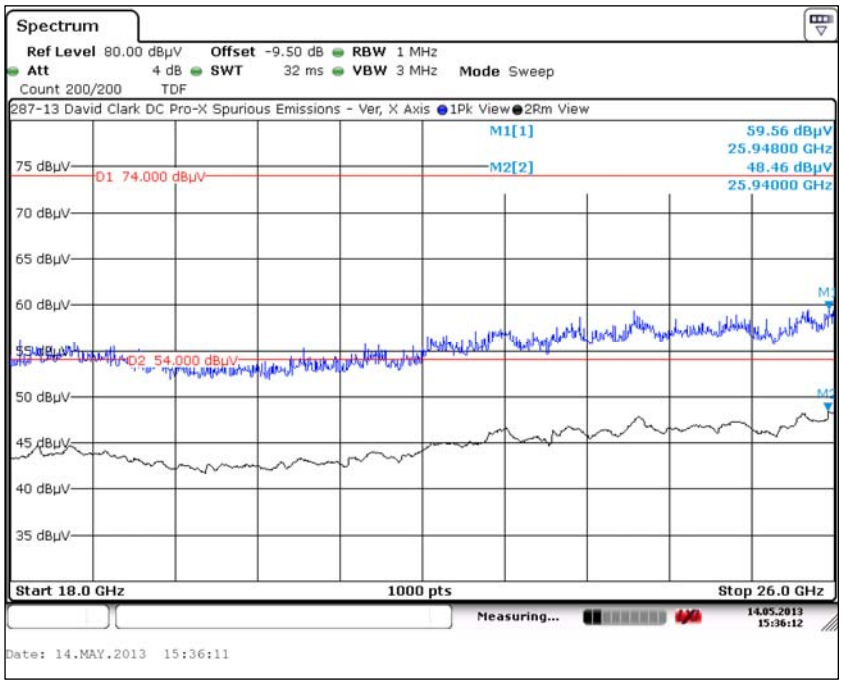
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.7. Measurement Results – 18 GHz to 26 GHz

6.10.7.3. Horizontal Antenna, Z-Axis



6.10.7.4. Vertical Antenna, X-Axis



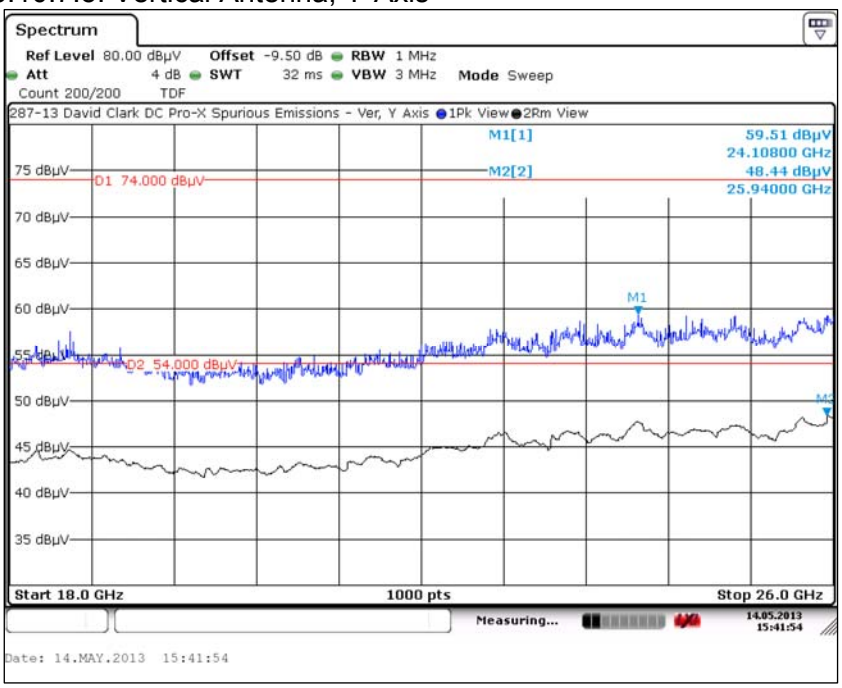
Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

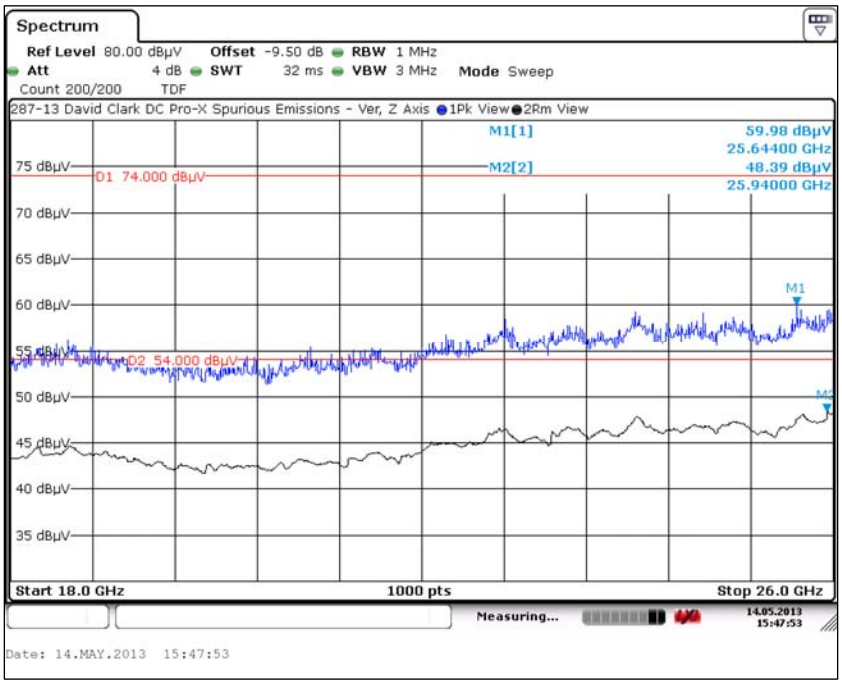
6.10. Spurious Radiated Emissions Test Results (15.209), IC RSS-GEN

6.10.7. Measurement Results – 18 GHz to 26 GHz

6.10.7.5. Vertical Antenna, Y-Axis



6.10.7.6. Vertical Antenna, Z-Axis



Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

6. Measurement Data (continued)

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

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)	
2402	2.5	4.83	1.0	0.0487564	0.4875637	1	Compliant
2441	2.5	2.79	1.0	0.0304812	0.3048115	1	Compliant
2480	2.5	2.64	1.0	0.0294463	0.2944634	1	Compliant

$$PD = \frac{OP + AG}{(4 \times \pi \times d^2)}$$

- **PD = Power Density (mW/cm^2)**
- **OP = DUT Output Power (dBm)**
- **AG = DUT Antenna Gain (dBi)**
- **d = MPE Distance (cm)**

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 6.6 of this test report.
3. Antenna gain value for this product was reported by the client.
4. Power density is calculated from power measurement and antenna gain.
5. Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

7. 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.

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com