

COMPLIANCE WORLDWIDE INC. TEST REPORT 290-16

In Accordance with the Requirements of

Industry Canada RSS 210, Issue 8

Federal Communications Commission CFR Title 47 Part 15.223

Low Power License-Exempt Radio Communication Devices
Intentional Radiators

Issued to

Secure Care Products, LLC
39 Chenell Drive
Concord, NH 03301
603-223-0745

for the

ENVisionIT®
RTLS Non-Cutband Transmitters
6.78 MHz Door Management Radio

FCC ID: KNK-678-2

Report Issued on May 31, 2016

Testing performed by



Brian F. Breault
EMC Test Engineer

Reviewed By



Larry K. Stillings

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1. Scope

This test report certifies that the Secure Care Products, LLC. ENVisionIT® model A20440932 All in One 6.78 MHz door management radio, as tested, meets the Subpart C, FCC Part 15.209 requirements and the RSS 210 Annex II Rules. In addition, the FCC Part 15.223 requirements have also been met. 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.

2. Product Details

2.1. Manufacturer: Secure Care Products, LLC.

2.2. Model Number: Model A20440932 tested. Unit A20450932 contains an identical transmitter.

2.3. Serial Number: ID 008B-0139

2.4. Description: 6.78 MHz door management radio. ENVisionIT® All in One Tag patient protection transmitter for infant security, wandering patient, & resident protection products.

2.5. Power Source: 3.0 VDC (Lithium) non-replaceable

2.6. EMC Modifications: None

3. Product Configuration

3.1. Operational Characteristics & Software

Operating Instructions for Test

Use the tester to enable continuous wave features. With the transmitter at the top of the tester, push the “4” key to enable continuous wave output on the low frequency radio. This will output a continuous wave for one minute and then revert back to normal operation.

The “#” key will put the transmitter in sleep mode

The “7” key will enable a quick wakeup of the transmitter.

3.2. EUT Hardware

Manufacturer	Model/Part # / Options	Serial Number	Volts	Frq (Hz)	Description/Function
Secure Care Products, LLC.	A20440932	008B-0139	3.0	DC	ENVisionIT® patient protection transmitter for infant security, wandering patient, & resident protection products.

3.3. Support Equipment

Manufacturer	Model/Part # / Options	Serial Number	Input Voltage	Frq (Hz)	Description/Function
Secure Care Products, LLC.	A07390900	0081300002	N/A	-	For setting up the DUT operation. Not used during testing.



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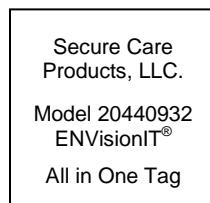
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3. Product Configuration (continued)

3.4. Support Equipment Cables

Cable Type	Length	Shield	From	To
None				

3.5. Block Diagram



4. Measurements Parameters

4.1 Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due	Interval
EMI Test Receiver, 9kHz - 7GHz ¹	Rohde & Schwarz	ESR7	101156	7/23/2017	2 Years
Spectrum Analyzer 20 Hz – 40 GHz ²	Rohde & Schwarz	FSV40	100899	7/23/2017	2 Years
Spectrum Analyzer, 9 kHz to 40 GHz ³	Rohde & Schwarz	FSVR40	100909	7/23/2017	2 Years
EMI Receiver	Hewlett Packard	8546A	3650A00360	6/4/2016	2 Years
Loop Antenna	EMCO	6512	9309-1139	9/23/2016	2 Years
CombiLog Antenna, 30 MHz to 2 GHz	Com-Power	AC-220	25509	5/12/2018	2 Years
LISN 50 Ω 50 µH, 9 kHz to 30 MHz	EMCO	3825/2	9109-1860	7/23/2016	1 Year
Power Supply	Hewlett Packard	6296A	7M0599	8/26/2016	2 Years
Digital Barometer	Control Company	4195	ID236	10/8/2017	2 Years
Temperature Chamber	Associated Research	E-0029	N/A	N/A	---

¹ ESR7 Firmware revision: V2.26,

Date installed: 08/15/2014

Previous V2.17, installed 6/11/2014.

² FSV40 Firmware revision: V2.30 SP4,

Date installed: 05/04/2016

Previous V2.30 SP1, installed 10/22/2014.

³ FSVR40 Firmware revision: V2.23,

Date installed: 10/20/2014

Previous V1.63 SP1, installed 8/28/2013.

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4. Measurements Parameters (continued)

4.2 Measurement & Equipment Setup

Test Dates:	5/5/2016 to 5/27/2016
Test Engineers:	Brian Breault
Site Temperature (°C):	21.4
Relative Humidity (%RH):	32
Frequency Range:	30 kHz to 2.0 GHz
Measurement Distance:	3 Meters
EMI Receiver IF Bandwidth:	120 kHz (30 MHz – 1 GHz) 1 MHz (>1 GHz)
EMI Receiver Avg Bandwidth:	300 kHz (30 MHz – 1 GHz) 3 MHz (>1 GHz)
Detector Functions:	Peak, Quasi-Peak and Average

4.3 Test Procedure

The manufacturer stated that two units, numbers A20440932 and A20450932, contained identical transmitters and by certifying one of the devices the other should be covered.

The two units, numbers A20440932 and A20450932, were rotated through three orthogonal positions and measured for peak field strength. The unit that yielded the highest field strength measurement was used as the test sample for this test report. The three orthogonal positions are defined further on in this section.

The results of the preliminary measurements are as follows:

A20440932	Parallel			Perpendicular		
	Field Strength	Elevation	TT Position	Field Strength	Elevation	TT Position
X-Axis	59.00	100	254	53.42	100	154
Y-Axis	48.88	100	208	37.29	100	0
Z-Axis	57.98	100	58	53.19	100	338

A20450932	Parallel			Perpendicular		
	Field Strength	Elevation	TT Position	Field Strength	Elevation	TT Position
X-Axis	47.12	100	248	37.11	100	0
Y-Axis	58.27	100	264	52.48	100	0
Z-Axis	58.20	100	0	52.79	100	250

The test methods used to generate the data in this test report are in accordance with ANSI C63.10: 2013, American National Standard for Methods for Unlicensed Wireless Devices

4. Measurements Parameters (continued)

4.3 Test Procedure (continued)

In addition, the measurements were performed with the device in three orthogonal positions in accordance with ANSI C63.10-2013, sections 5.10.1, 6.4.6 and Annex H. The three orthogonal axes were defined as follows:



X-Axis

X Axis Upright (Label forward)
Y Axis Horizontal on left edge
Z Axis Label Up



Y-Axis

Front of unit is facing the antenna at 0°
Front of unit is facing the antenna at 0°
Bottom edge of the unit is facing the antenna at 0°



Z-Axis

4.4. Choice of Equipment for Test Suits

4.4.1. 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.

4.4.2. Presentation

The test sample was tested complete with all required ancillary equipment. Refer 4.4

4.4.3. Choice of Operating Frequencies

The transmitter in the unit under test utilizes a single operating frequency at approximately 6.78 MHz

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5. Measurement Summary

Test Requirement	FCC Requirement	IC Requirement	Test Report Section	Result	Comment
Antenna Requirement	15.203	RSS210 A1.1	6.1	Compliant	The antenna is enclosed within the device under test.
Emission Bandwidth	15.223	RSS-210 §2.3	6.2	Compliant	
Radiated Field Strength of Fundamental	15.223 (a)	RSS-Gen Tbl 6	6.3	Compliant	
Duty Cycle Correction Factor	15.35 (c)	RSS-Gen Tbl 6	6.4	Compliant	
Spurious Radiated Emissions	15.223 (b), 15.209	A13.1.2 (2)	6.5	Compliant	
Frequency Stability	15.229 (d)	Not Required	---	Not Required	
Conducted Emissions	15.207	---	---	Not Required	Unit operates on an internal battery.
Public Exposure to Radio Frequency Energy Levels.	15.247(i) 1.1307 (b)(1)	RSS-GEN 5.5, RSS 102	---	Not Required	Intentional emission frequency is below 100 MHz.



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6. Measurement Data

6.1. Antenna Requirement (Section 15.203)

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: Compliant - The antenna utilized by the device under test is contained inside a sealed plastic enclosure.

6. Measurement Data

6.2. Emission Bandwidth (FCC Sections 15.223, 15.209, IC RSS-210 Section A2.3)

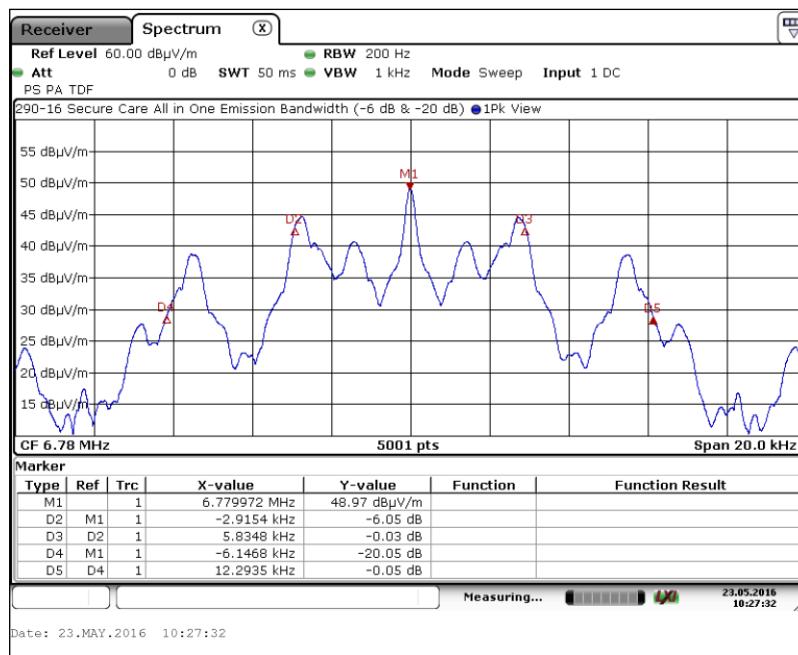
Requirement: For FCC Part 15.223 and IC RSS-210, the field strength of any emission within the band 1.705–10.0 MHz shall not exceed 100 microvolts/meter at a distance of 30 meters. However, if the bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level. For the purposes of this section, the bandwidth is determined at the points 6 dB down from the modulated carrier.

For FCC Part 15.209, the bandwidth requirement is not specified. The 20 dB bandwidth has been included as part of this test report.

Test Note: Reference ANSI C63.10-2013, Section 6.9.1. for the bandwidth measurement method.

Conclusion: Compliant - The -6 dB bandwidth is less than 10% of the intentional emission center frequency. Therefore, the emission field strength cannot exceed the default field strength of 15 μ V/meter (23.52 dB μ V/m) at 30 meters.

Fundamental Frequency (MHz)	-6 dB Bandwidth (kHz)	-20 dB Bandwidth (kHz)	Result
6.78	5.835	12.294	N/A



6. Measurement Data (continued)

6.3. Radiated Field Strength of Fundamental (15.223, Section (a), Rss-Gen Tbl 6)

Requirement: The field strength of any emission within the band 1.705–10.0 MHz shall not exceed 100 microvolts/meter at a distance of 30 meters. However, if the bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level. For the purposes of this section, bandwidth is determined at the points 6 dB down from the modulated carrier. The emission limits in this paragraph are based on measurement instrumentation employing an average detector.

Test Note: Reference ANSI C63.10-2013 sections 5.3.2 and 6.4.4.2. The following formula was used to extrapolate the measurement distance to the limit distance:

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log\left(\frac{d_{\text{near field}}}{d_{\text{measure}}}\right) - 20 \log\left(\frac{d_{\text{limit}}}{d_{\text{near field}}}\right) \quad \text{Equation 1}$$

FS_{limit} is the calculation of field strength at the limit distance (dB μ V/m) 31.59

FS_{max} is the measured field strength, expressed in (dB μ V/m) 59.00

$d_{\text{near field}}$ is the $\lambda/2\pi$ distance (Meters) 7.04

d_{measure} is the distance of the measurement point from the EUT (Meters) 3.00

d_{limit} is the reference limit distance (Meters) 30.00

Conclusion: Compliant - The fundamental frequency radiated field strength of the device under test complies with the requirements detailed in FCC Part 15.223, Section (a) and Part 15.209, Section (a).

6.3.1. Worst Case Radiated Field Strength of Fundamental

Freq. (MHz)	Amplitude ¹ (dB μ V/m)	Duty Cycle Correction	Corr. Ampl. ² (dB μ V/m)	FCC 15.223 Limit (dB μ V/m)	Margin (dB)	Ant Polarity	Ant Height	Turntable Azimuth	Result
	Peak	dB	Average			Par/Per	cm	Deg	
6.78	31.59	-29.76	1.83	23.52	-21.69	Par	100	254	Compliant

¹ Measurement has been extrapolated from 3 meters to 30 meters using Equation 1 on this page.

² The average field strength was determined by applying a duty cycle correction factor to the peak field strength. Refer to Section 4 for the duty cycle calculation.

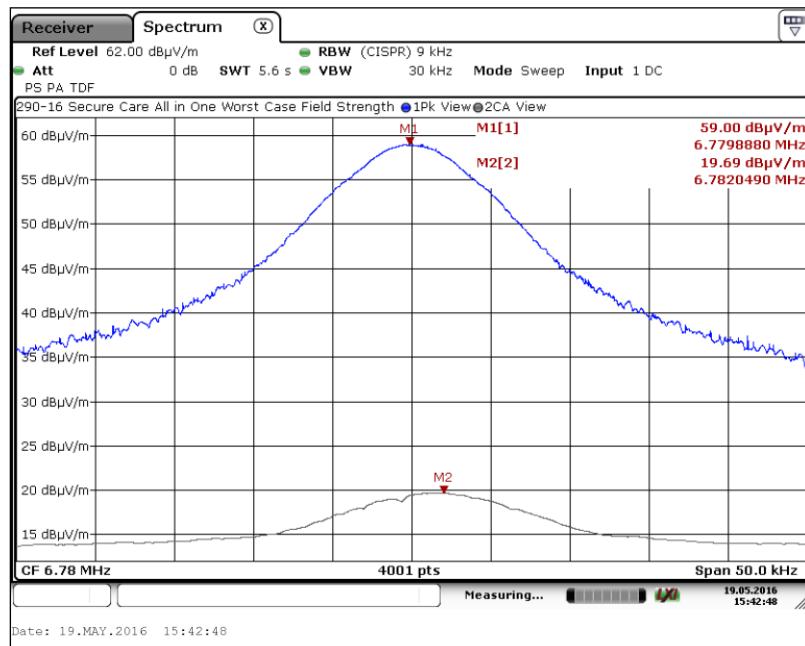
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6. Measurement Data (continued)

6.3. Radiated Field Strength of Fundamental (15.209, Section (a), Rss-GEN Tbl 6)

6.3.2. Worst Case Radiated Field Strength of Fundamental



Note: The CISPR average trace on this plot is for informational purposes only. The average value was determined by applying a duty cycle correction factor to the peak field strength measurement.

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6. Measurement Data (continued)

6.4. Duty Cycle Correction Factor (FCC Part 15.35(c), ANSI C63.10, Section 7.5)

Requirement: Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 s (100 ms). In cases where the pulse train exceeds 0.1 s, the measured field strength shall be determined during a 0.1 s interval. To determine the duty cycle, the following equation is used:

$$\delta(\text{dB}) = 20\log[\sum(nt_1 + mt_2 + \dots + \xi t_x)/T]$$

n is the number of pulses of duration t_1

m is the number of pulses of duration t_2

ξ is the number of pulses of duration t_x

T is the period of the pulse train

If $T > 100$ ms then $T = 100$ ms

Applied: $nt_1 = .286 \text{ ms} \times 4 \text{ pulses} = 1.144 \text{ ms}$ Plot 6.5.1

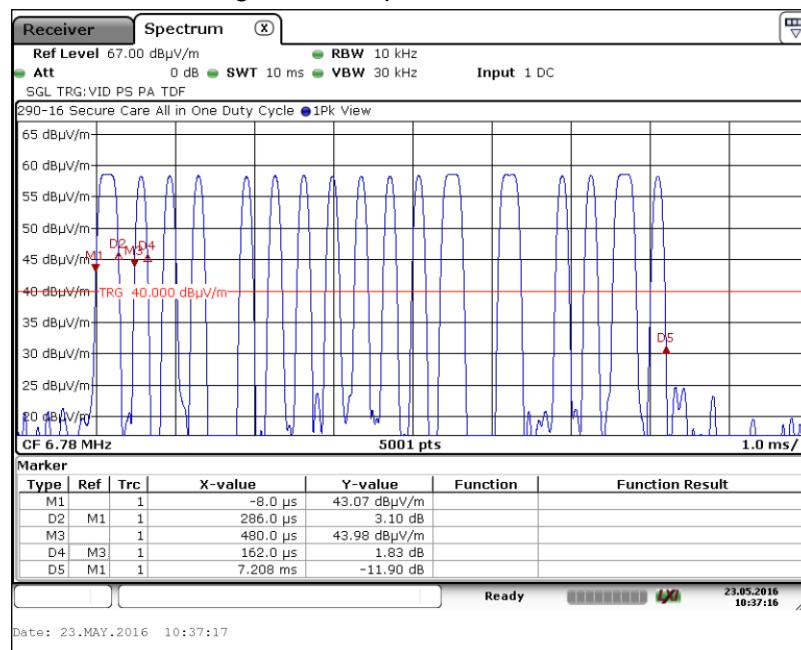
$mt_2 = .162 \text{ ms} \times 13 \text{ pulses} = 2.106 \text{ ms}$ Plot 6.5.1

$T = 100 \text{ ms}$ (maximum allowable period) Plot 6.5.2

Duty Cycle Correction Factor = $20\log((1.144 + 2.106)/100)$

Duty Cycle Correction Factor = -29.76

6.4.1. DUT Pulse Train during Normal Operation



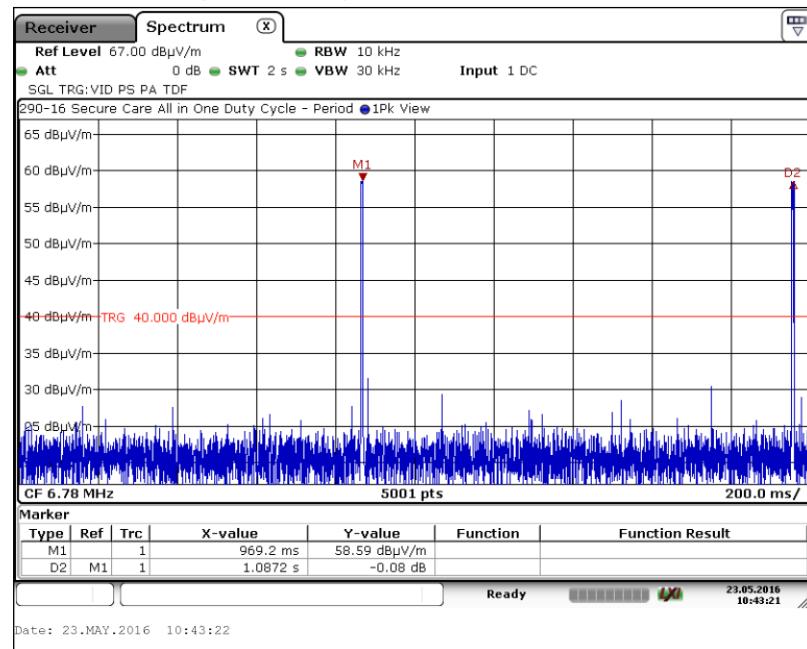
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6. Measurement Data (continued)

6.4. Duty Cycle Correction Factor (FCC Part 15.35(c), ANSI C63.10, § 7.5) (Continued)

6.4.2. Time of One Period (1087.2 ms)



6. Measurement Data (continued)

6.5. Spurious Radiated Emissions, 30 MHz to 2.0 GHz (15.223 Section (b), 15.209)

Requirement: The spurious radiated emissions requirements for intentional radiators shall demonstrate compliance with the field strength limits detailed in Part 15.223, Section (b): The field strength of any emissions appearing outside of this band shall not exceed the general radiated emissions limits in Section 15.209. FCC Part 15.33 requires that, due to the highest frequency used in the device being between 108 MHz and 500 MHz (433.92 MHz), the upper frequency of measurement will be 2 GHz.

FCC Part 15.209 Spurious Emissions Limits:

Frequency (MHz)	Field Strength (μ V/m)	Meas. Distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100	3
88–216	150	3
216–960	200	3
Above 960	500	3

Procedure: This test was performed in accordance with the information provided in ANSI C63.10-2013, Section 6.5.

Test Notes: Screen captures test notes:

- Section 6.5.2: The emission marked by the pair of vertical cursors is the DUT intentional emissions frequency covered by this test report.
- Section 6.5.3: The emission marked by the pair of vertical cursors is another DUT intentional emissions frequency and is covered by a separate test report.

Conclusion: Compliant. The Emissions from the DUT did not exceed the field strength levels specified in FCC Part 15.209.

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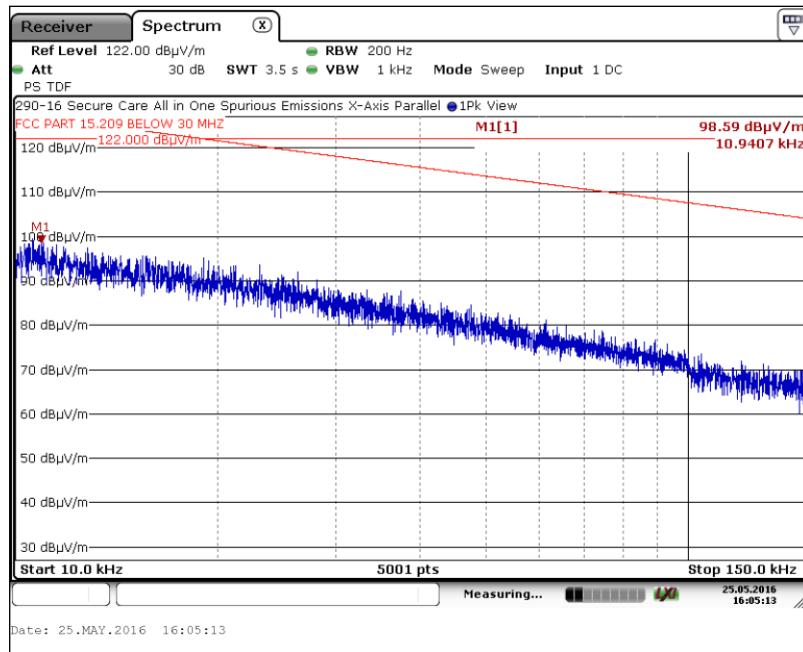
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6. Measurement Data (continued)

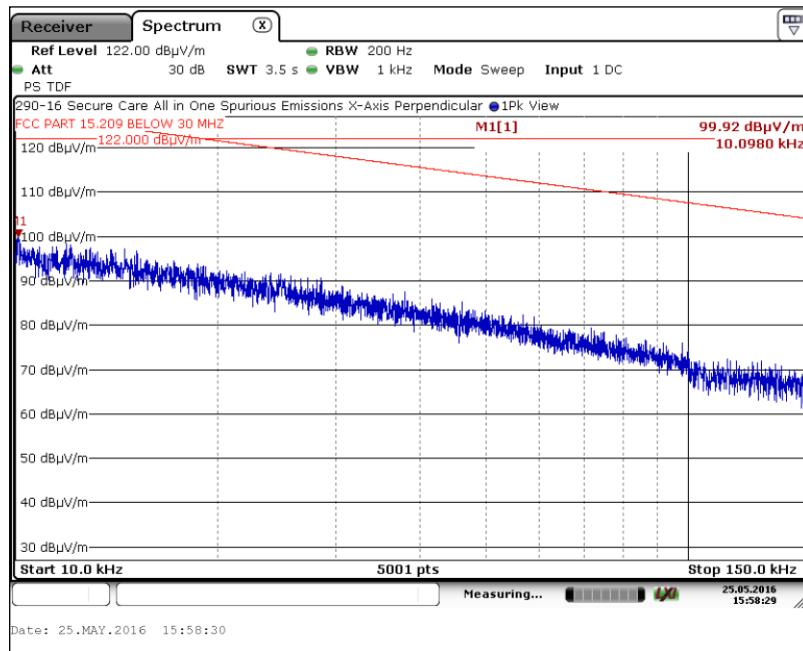
6.5. Spurious Radiated Emissions, 10 kHz to 1.0 GHz (15.229, § (c), 15.209) (cont'd)

6.5.1. Spurious Radiated Emissions, 10 kHz to 150 kHz Test Results

6.5.1.1. X-Axis, Parallel Antenna



6.5.1.2. X-Axis, Perpendicular Antenna



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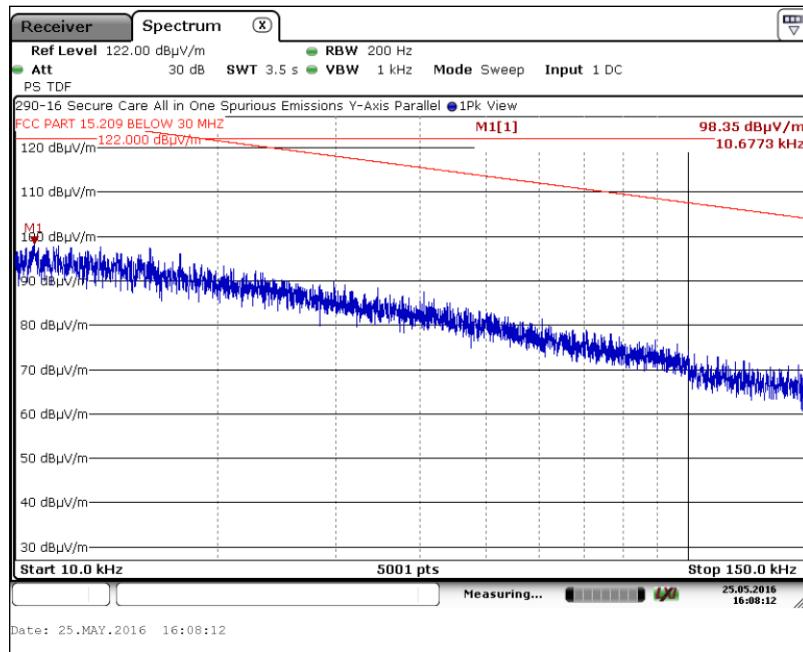
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6. Measurement Data (continued)

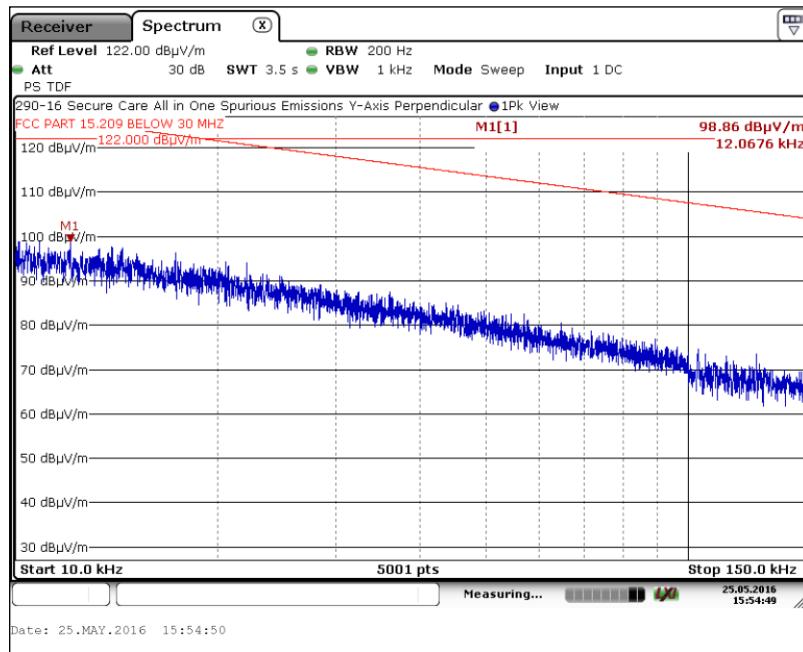
6.5. Spurious Radiated Emissions, 10 kHz to 1.0 GHz (15.229, § (c), 15.209) (cont'd)

6.5.1. Spurious Radiated Emissions, 10 kHz to 150 kHz Test Results

6.5.1.3. Y-Axis, Parallel Antenna



6.5.1.4. Y-Axis, Perpendicular Antenna



Test Number: 290-16

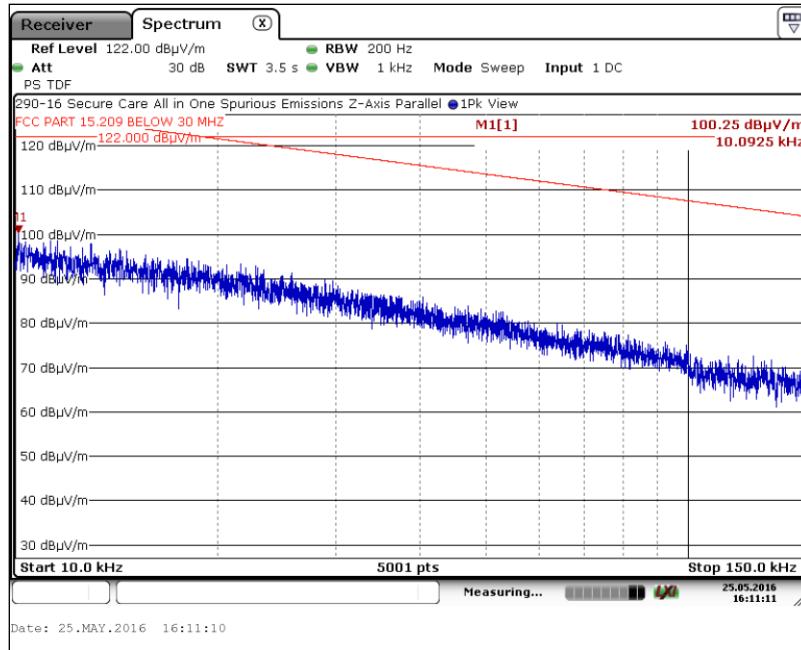
Issue Date: 5/27/2016

6. Measurement Data (continued)

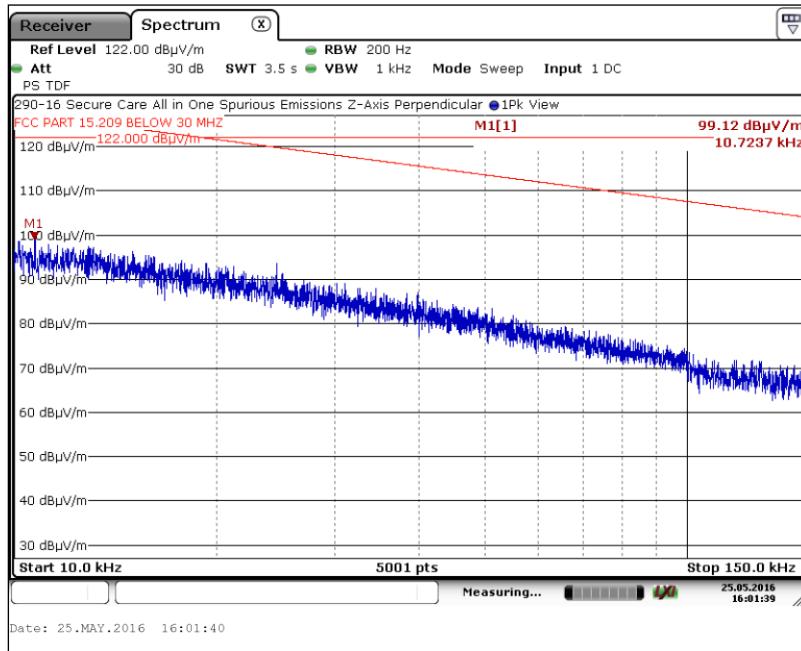
6.5. Spurious Radiated Emissions, 10 kHz to 1.0 GHz (15.229, § (c), 15.209) (cont'd)

6.5.1. Spurious Radiated Emissions, 10 kHz to 150 kHz Test Results

6.5.1.5. Z-Axis, Parallel Antenna



6.5.1.6. Z-Axis, Perpendicular Antenna



Test Number: 290-16

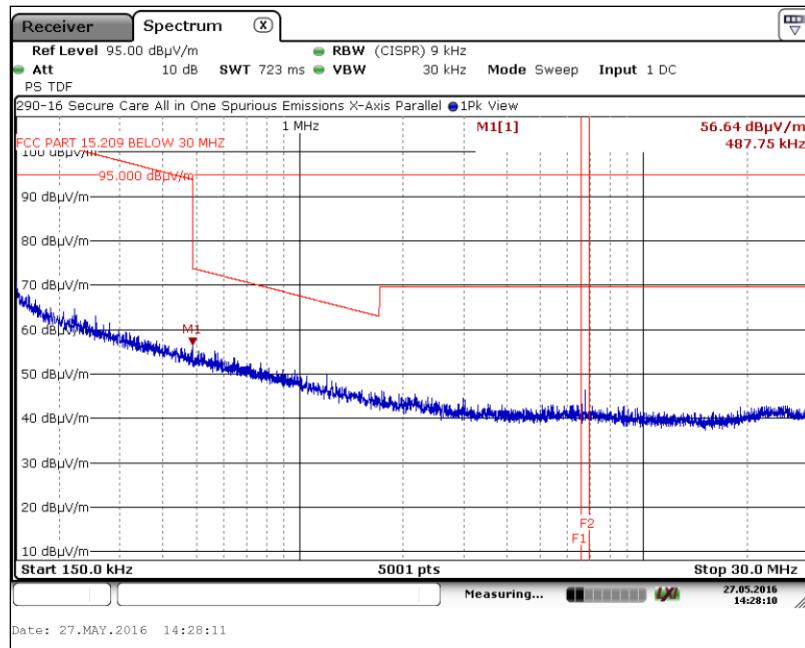
Issue Date: 5/27/2016

6. Measurement Data (continued)

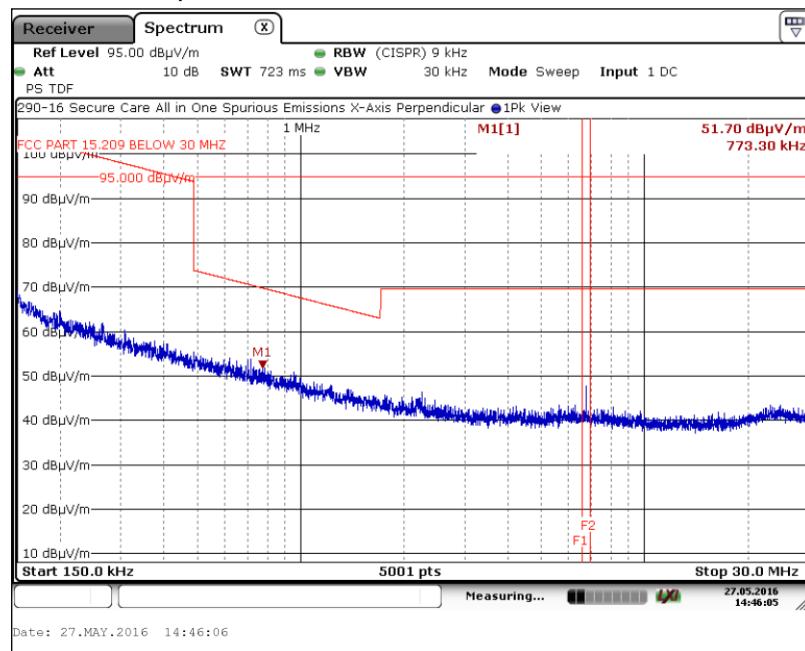
6.5. Spurious Radiated Emissions, 10 kHz to 1.0 GHz (15.229, § (c), 15.209) (cont'd)

6.5.2. Spurious Radiated Emissions, 150 kHz to 30 MHz Test Results

6.5.2.1. X-Axis, Parallel Antenna



6.5.2.2. X-Axis, Perpendicular Antenna



Test Number: 290-16

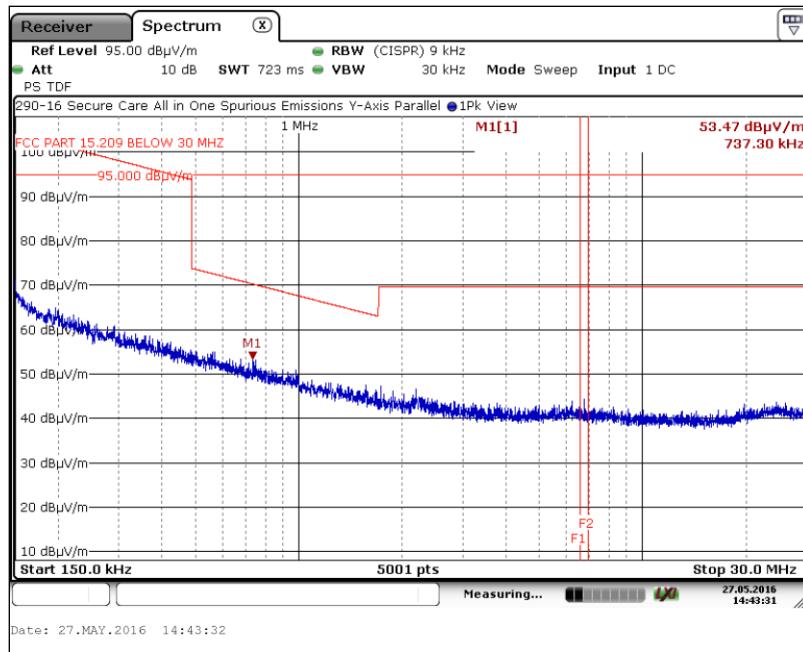
Issue Date: 5/27/2016

6. Measurement Data (continued)

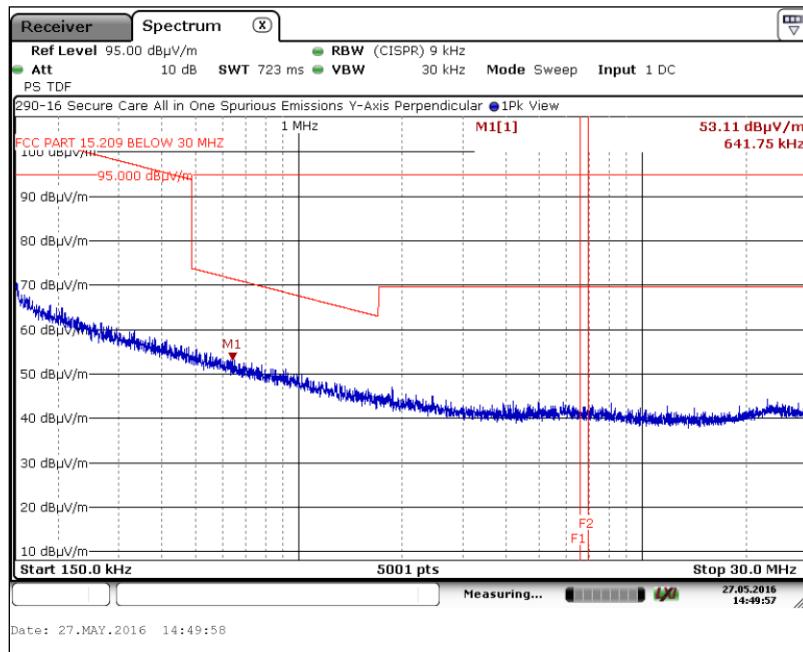
6.5. Spurious Radiated Emissions, 30 kHz to 2.0 GHz (15.229, § (c), 15.209) (cont'd)

6.5.2. Spurious Radiated Emissions, 150 kHz to 30 MHz Test Results

6.5.2.3. Y-Axis, Parallel Antenna



6.5.2.4. Y-Axis, Perpendicular Antenna



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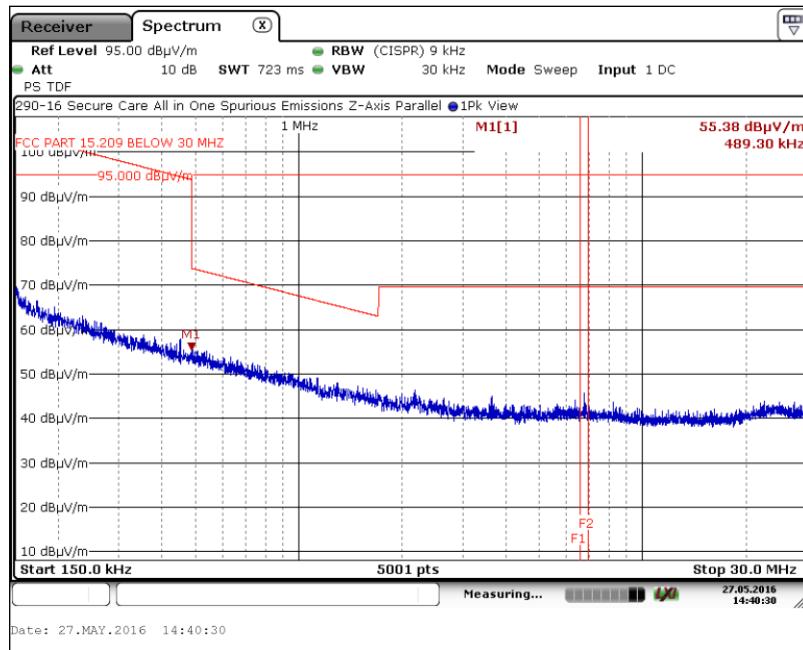
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6. Measurement Data (continued)

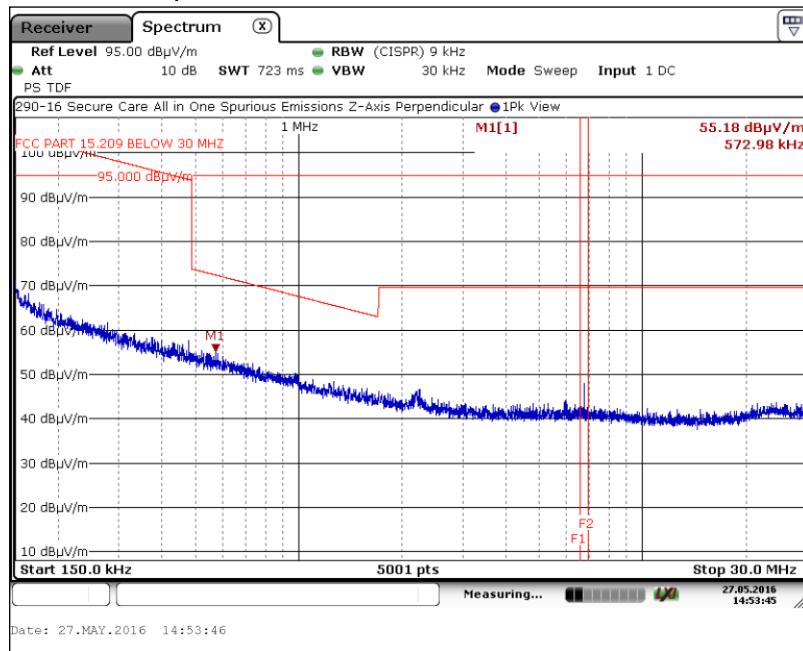
6.5. Spurious Radiated Emissions, 10 kHz to 1.0 GHz (15.229, § (c), 15.209) (cont'd)

6.5.2. Spurious Radiated Emissions, 150 kHz to 30 MHz Test Results

6.5.2.5. Z-Axis, Parallel Antenna



6.5.2.6. Z-Axis, Perpendicular Antenna



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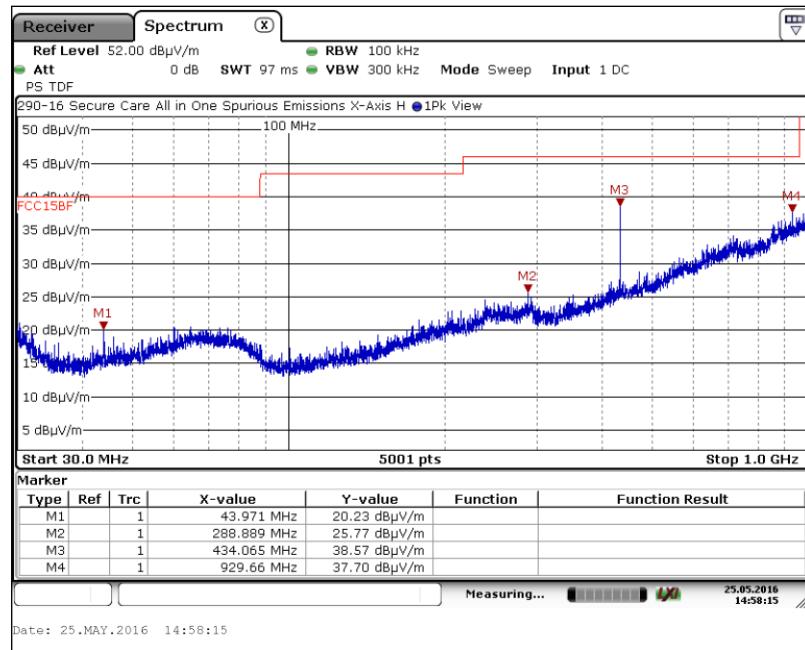
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6. Measurement Data (continued)

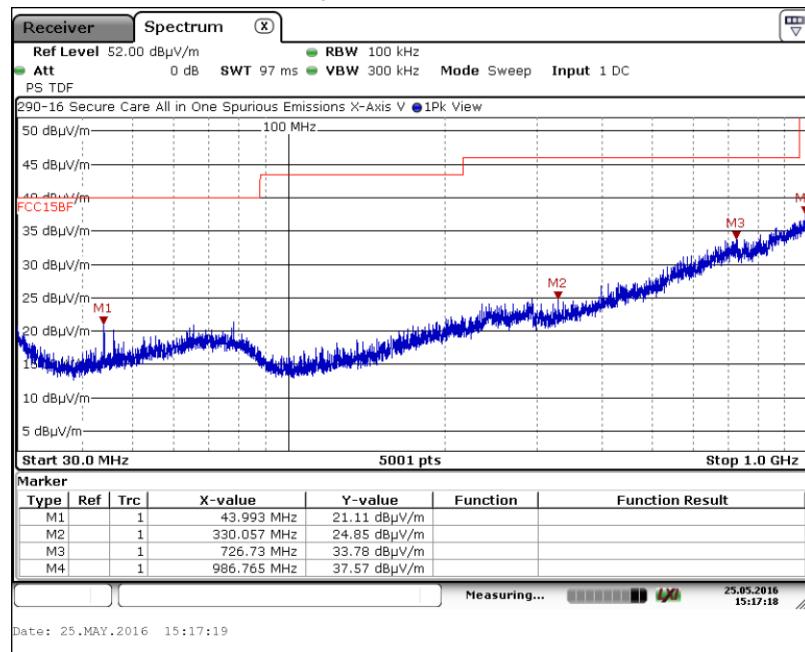
6.5. Spurious Radiated Emissions, 10 kHz to 1.0 GHz (15.229, § (c), 15.209) (cont'd)

6.5.3. Spurious Radiated Emissions, 30 MHz to 1 GHz Test Results

6.5.3.1. X-Axis, Horizontal Polarity



6.5.3.2. X-Axis, Vertical Polarity



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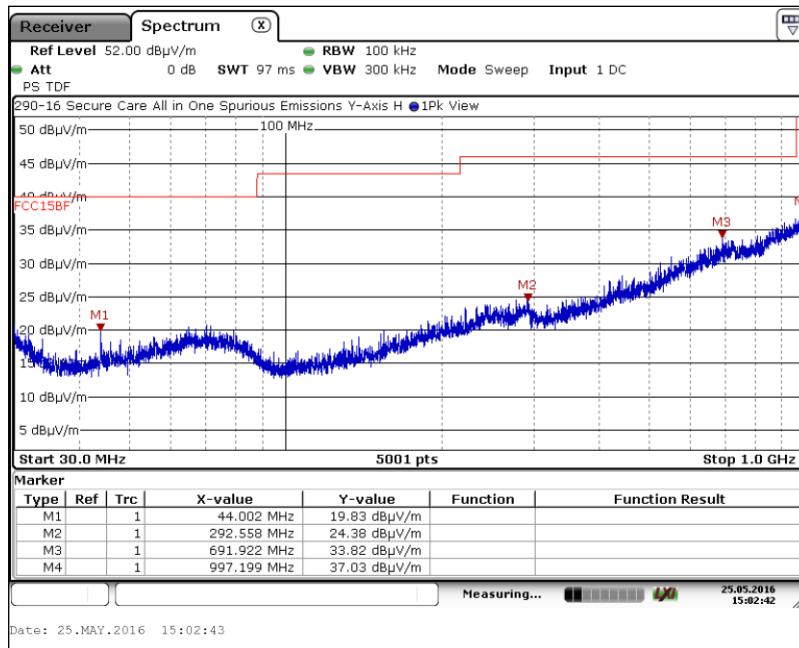
Issue Date: 5/27/2016

6. Measurement Data (continued)

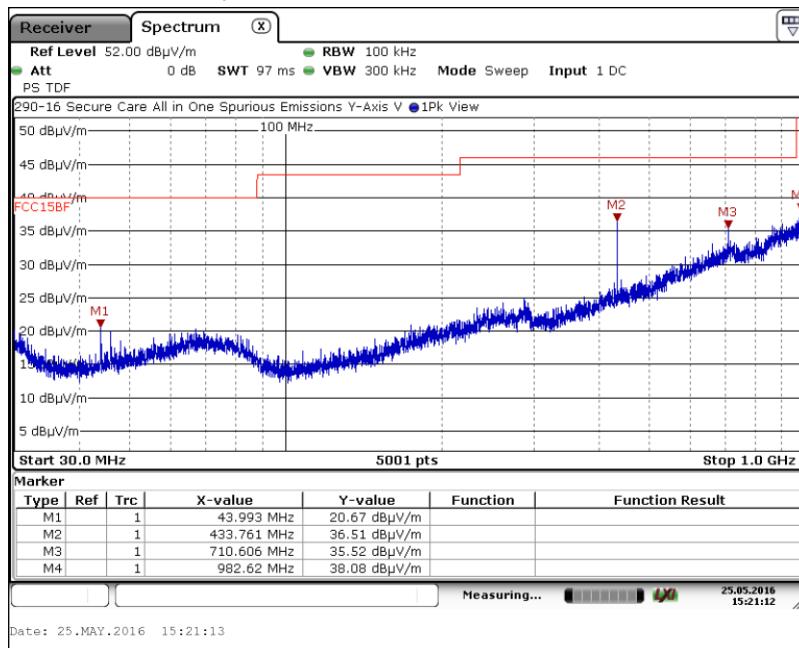
6.5. Spurious Radiated Emissions, 10 kHz to 1.0 GHz (15.229, § (c), 15.209) (cont'd)

6.5.3. Spurious Radiated Emissions, 30 MHz to 1 GHz Test Results

6.5.3.3. Y-Axis, Horizontal Polarity



6.5.3.4. Y-Axis, Vertical Polarity



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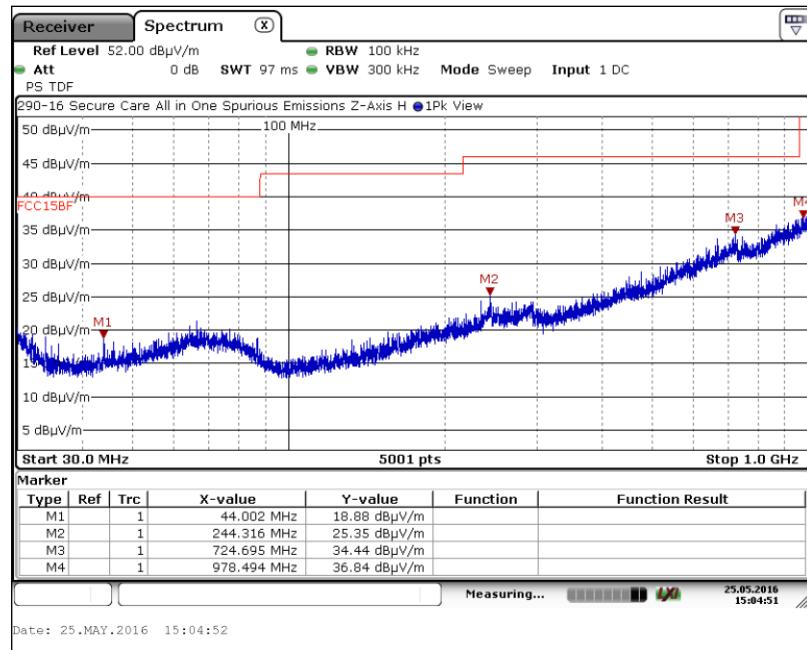
Issue Date: 5/27/2016

6. Measurement Data (continued)

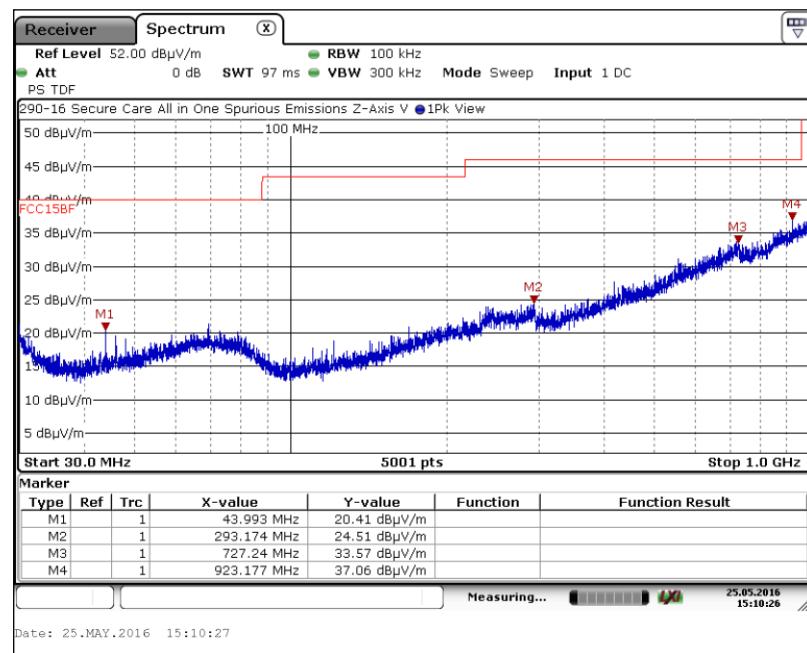
6.5. Spurious Radiated Emissions, 10 kHz to 1.0 GHz (15.229, § (c), 15.209) (cont'd)

6.5.3. Spurious Radiated Emissions, 30 MHz to 1 GHz Test Results

6.5.3.5. Z-Axis, Horizontal Polarity



6.5.3.6. Z-Axis, Vertical Polarity



7. Test Setup Photographs

7.1. Radiated Emissions Front View



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7. Test Setup Photographs

7.2. Radiated Emissions Rear View < 30 MHz



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7. Test Setup Photographs

7.4. Radiated Emissions Rear View 30 MHz – 1 GHz





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8. 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) and Industry Canada standards. Through our American Association for Laboratory Accreditation (A2LA) ISO Guide 17025:2005 Accreditation our test sites are designated with the FCC (designation number **US1091**), Industry Canada (file number **IC 3023A-1**) and VCCI (Member number 3168) under registration number A-0208.

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 11, KN 13, KN 14-1, KN 22, KN 32, KN 61000-6-3, KN 61000-6-4.

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. A second conducted emissions site is also located in the basement of the OATS site with a 2.3 x 2.5 meter ground plane and a 2.4 x 2.4 meter vertical wall.

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.