



## COMPLIANCE WORLDWIDE INC. TEST REPORT 266-16AR3

In Accordance with the Requirements of  
**Federal Communications Commission 47 CFR Part 15.519, Subpart F**  
**Technical Requirements for Hand Held UWB Systems**

Issued to

**Secure Care Products, LLC**  
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Concord, NH 03301  
(603) 233 0745

For the  
**ENVisionIT®**  
**RTLS Non-Cutband Transmitters**  
**40.68 MHz Door Management Radio**

**FCC ID: KNK-4068-2**

**Report Issued on June 30, 2016**  
**Revision R3 Issued on September 9, 2016**

Tested By

  
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## 1. Scope

This test report certifies that the Secure Care Patient ENVisionIT RTLS Non-Cutband Tag as tested, meets the FCC Part 15, Subpart F 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 adds 15.519(a)(1) information to the test report, corrects references to 15.515, and removes RF Exposure from the report. Revision R2 clarifies the RMS and Peak Power EIRP Measurements on pages 23 & 24. Revision R3 updates the RMS and Peak Power EIRP measurement plots to dB $\mu$ V/m on pages 23 and 24.

## 2. Product Details

<b>2.1. Manufacturer:</b>	Secure Care Products, LLC
<b>2.2. Model Number:</b>	A20440952
<b>2.3. Serial Number:</b>	ID 009F-0159, A20440952
<b>2.4. Description:</b>	40.68 MHz door management radio. ENVisionIT® RTLS Non-Cutband Tag patient protection transmitter for infant security, wandering patient, & resident protection products.
<b>2.5. Power Source:</b>	3.0 VDC (Lithium) non-replaceable
<b>2.6. Hardware Revision:</b>	N/A
<b>2.7. Software Revision:</b>	N/A
<b>2.8. Modulation Type:</b>	Pulse Modulation, Frequency Hopping
<b>2.9. Operating Frequency:</b>	3.993 GHz Center Frequency Nominal (Channel 2 – 500 MHz BW)
<b>2.10. EMC Modifications:</b>	None

## 3. Product Configuration

### 3.1 Operational Characteristics & Software

#### Hardware Setup:

Holding the button slide on the power switch. Wait for the LED to blink twice and release the button.

The tags are pre-configured to transmit on Channel 2 using a 64M PRF with a data rate of 110 kbps.

### 3.2. EUT Hardware

Manufacturer	Model/Part # / Options	Serial Number	Input Volts	Freq (Hz)	Description/Function
Secure Care	A20440952	Pre production	3.0	DC	Patient Wearable Tag

### 3.3. Support Equipment

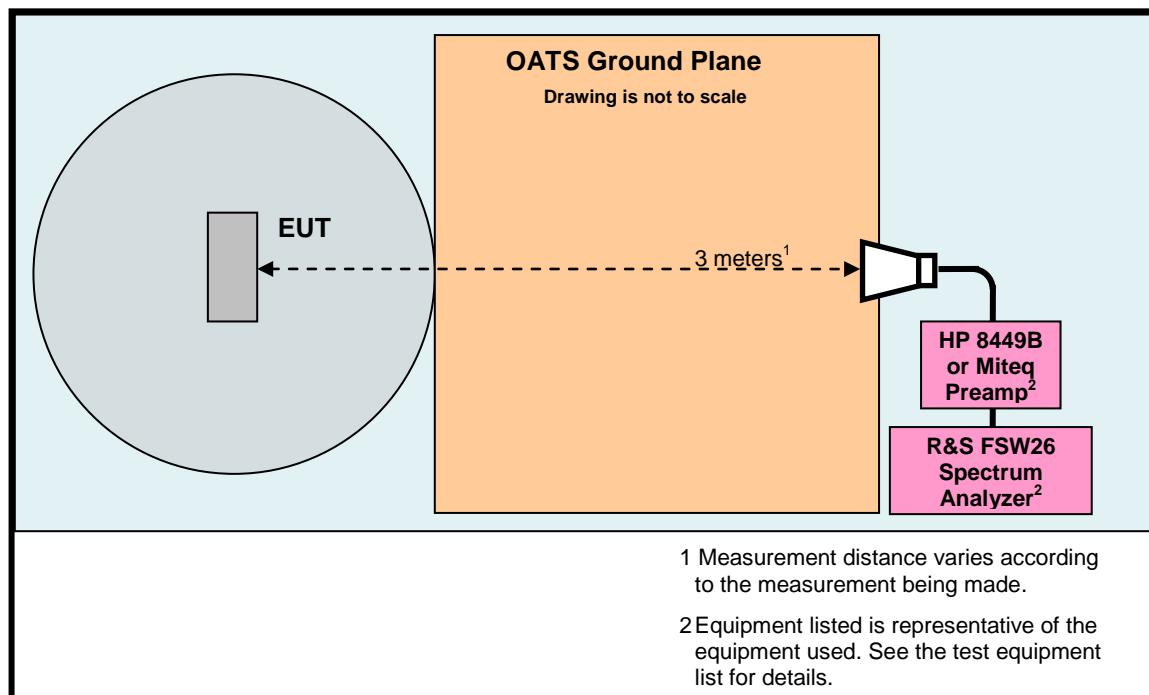
Manufacturer	Model/Part # / Options	Serial Number	Input Voltage	Freq (Hz)	Description/Function
Secure Care Products, LLC.	A07390940	0021600087	N/A	-	For setting up the DUT operation. Not used during testing.

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### 3. Product Configuration (cont.)

#### 3.4. Test Setup Diagram



#### 3.5. EUT Orientation Diagram

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



Y-Axis



Z-Axis

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

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°

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#### 4. Measurements Parameters

##### 4.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due	Interval
Spectrum Analyzer 10 Hz to 40 GHz	Rohde & Schwarz	FSVR40	100909	7/23/2017	2 Year
Spectrum Analyzer 9 kHz to 40 GHz	Rohde & Schwarz	FSV40	100899	7/23/2017	2 Year
EMI Receiver 9 kHz to 7 GHz	Rohde & Schwarz	ESR7	101156	7/23/2017	2 Year
Spectrum Analyzer 3 Hz to 26.5 GHz	Rohde & Schwarz	FSW26	102044	6/1/2016	1 Year
Combilog Antenna, 30 MHz to 2 GHz	Com-Power	AC-220	25509	5/12/2018	2 Years
Loop Antenna 9 kHz to 30 MHz	EMCO	6512	9309-1139	9/23/2016	2 Year
Preamplifier 100 MHz to 7 GHz	Miteq	AFS3-00100200-10-15P-4	988773	4/3/2016	1 Year
Preamplifier 100 MHz to 18 GHz	Miteq	AMF-7D-00101800-30-10P	1953081	10/15/2016	1 Year
Preamplifier 1 to 26.5 GHz	Hewlett Packard	8449B	3008A01323	7/22/2017	2 Year
Preamplifier 18 to 40 GHz	Avantek	AWT-40039	FM22038832	11/25/2016	1 Year
Horn Antenna 1 to 18 GHz	ETS-Lindgren	3117	00143292	2/22/2019	3 Year
Horn Antenna 700 MHz to 18 GHz	Electro-Metrics	RGA 50/60	2813	7/15/2016	2 Year
Horn Antenna 18-40 GHz	Com Power	AH-840	03075	9/24/2016	2 Year
High Pass Filter 8 to 18 GHz	Micro-Tronics	HPM50107	G036	5/15/2017	1 Year
Barometer	Control Company	4195	Cal ID# 236	10/8/2017	2 Year

<sup>1</sup> ESR7 Firmware revision: V2.26, Date installed: 08/15/2014 Previous V2.17, installed 6/11/2014.  
<sup>2</sup> FSV40 Firmware revision: V2.30 SP4, Date installed: 05/04/2016 Previous V2.30 SP1, installed 10/22/2014.  
<sup>3</sup> FSV40 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:	5/9/2016, 5/12/2016 5/13/2016, 5/14/2016, 5/25/2016, 5/27/2016, 8/19/2016, 9/9/2016
Test Engineers:	Brian Breault, Larry Stillings
Normal Site Temperature (15 - 35°C):	21.6
Relative Humidity (20 -75%RH):	35
Frequency Range:	30 kHz to 40 GHz
Measurement Distance:	3 Meters
EMI Receiver IF Bandwidth:	200 Hz – 30 kHz to 150 kHz 9 kHz – 150 kHz to 30 MHz 120 kHz - 30 MHz to 1 GHz 1 MHz - Above 1 GHz 300 Hz – 30 kHz to 150 kHz 30 kHz – 150 kHz to 30 MHz 300 kHz - 30 MHz to 1 GHz 3 MHz - Above 1 GHz
EMI Receiver Avg Bandwidth:	300 Hz – 30 kHz to 150 kHz 30 kHz – 150 kHz to 30 MHz 300 kHz - 30 MHz to 1 GHz 3 MHz - Above 1 GHz
Detector Function:	Peak, Quasi-Peak & Average

##### 4.3. Measurement Procedure

Test measurements were made in accordance FCC Parts 15.209, 15.519 Subpart F.

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

##### 4.4. Measurement Uncertainty

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

RF Frequency (out of band)	$\pm 1 \times 10^{-8}$
Radiated Emission of Transmitter to 100 GHz	$\pm 4.55$ dB
Radiated Emission of Receiver	$\pm 4.55$ dB
Temperature	$\pm 0.91^\circ$ C
Humidity	$\pm 5\%$

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## 5. Measurements Summary

Test Requirement	FCC Rule Requirement	Test Report Section	Result	Comment
Antenna Requirement	15.203	6.1	Compliant	The antenna is a surface mounted.
Operational Requirements	15.519 (a) 15.519 (a)(1)	6.2	Compliant	
UWB Bandwidth	15.503 (a) (d) 15.519 (b)	6.3	Compliant	
Spurious Radiated Emissions	15.519 (c) 15.209	6.4	Compliant	
Radiated Emissions in GPS Bands	15.519 (d) 15.209			
Peak Emissions in a 50 MHz Bandwidth	15.519 (e)	6.5	Compliant	
Conducted Emissions	15.207	6.6	N/A	EUT is battery powered

## 6. Measurement Data

### 6.1. Antenna Requirement (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

Result: The antenna utilized by the device under test is a pcb surface mount type.

## 6. Measurement Data (continued)

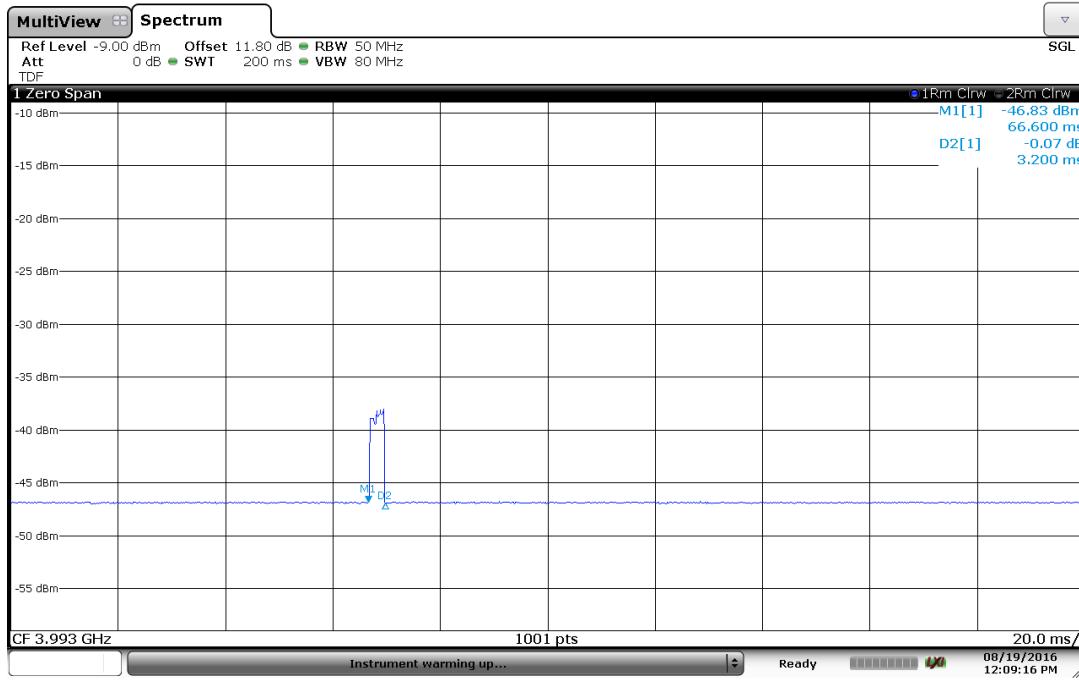
### 6.2. Operational Requirements of the Device under Test (15.519 (a) (a)(1))

Requirement: UWB device operating under the provisions of this section must be hand held, i.e., they are relatively small device that are primarily hand held while being operated and do not employ a fixed infrastructure. UWB devices operating under the provisions of this section may operate indoors or outdoors.

A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.

**Result:** Compliant, the EUT transmits a 3.2 mS burst of location information every 3 seconds to an associated receiver.

#### 6.2.1 Plot of Transmission



12:09:17 PM 08/19/2016

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## 6. Measurement Data (continued)

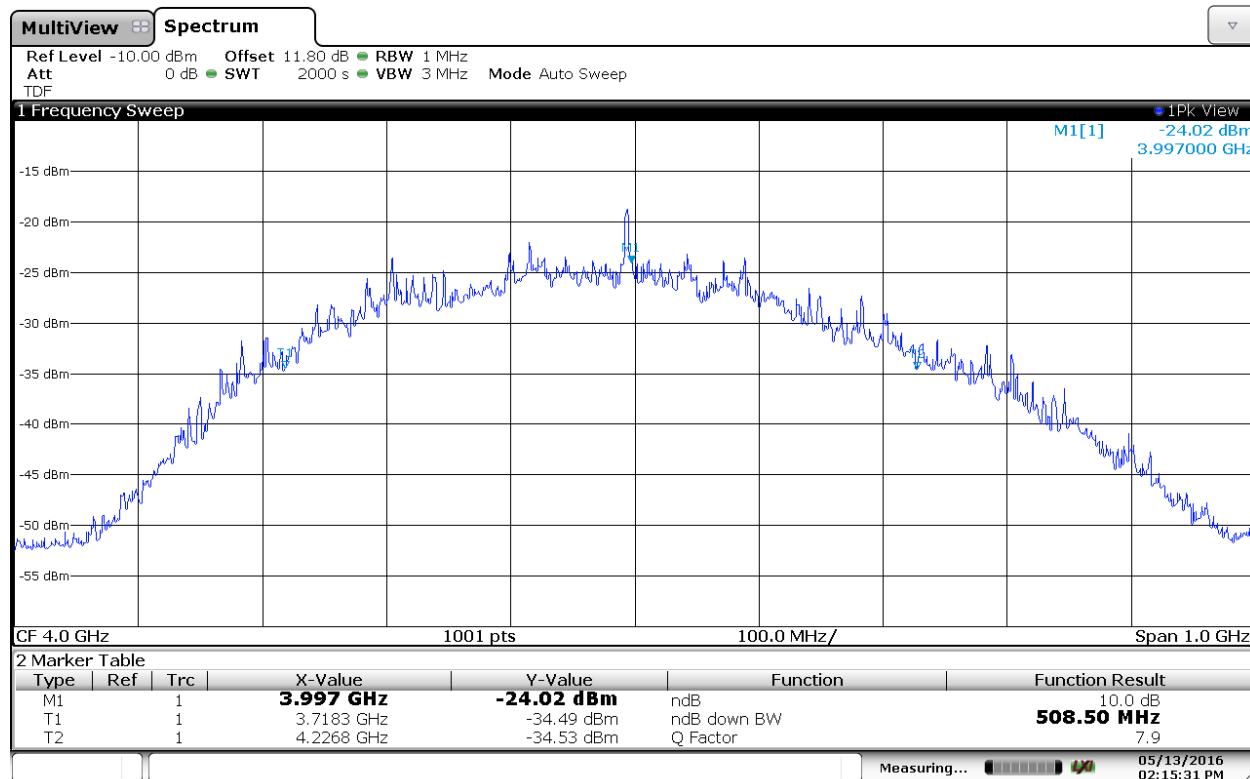
### 6.3. UWB Bandwidth (15.503 (a) (d), 15.519 (b))

Requirement: The UWB bandwidth of a device operating under the provisions of this section shall be contained between 3,100 MHz and 10,600 MHz and at any point in time, and has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

#### 6.3.1. Measurement Data – Values in GHz

$f_M$	The highest emission peak	3.9970
$f_L$	10 dB below the highest peak	3.7183
$f_H$	10 dB above the highest peak	4.2268
$f_C$	Calculated: $(f_H + f_L) / 2$	3.9726
Bandwidth	Calculated: $(f_H - f_L)$	0.5085
Fractional BW	Calculated: $2*(f_H - f_L) / (f_H + f_L)$	0.1280

#### 6.3.2. Measurement Plot of 10 dB frequencies (Channel 2, 110 kbps, 64M PRF)


**02:15:31 PM 05/13/2016**

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## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions (15.519 (c), 15.209)

Requirement: The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in Section 15.209. The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

Frequency (MHz)	EIRP (dBm)	EIRP at 3 Meters (dB $\mu$ V/m)
960 - 1610	-75.3	19.9
1610 - 1990	-63.3	31.9
1990 - 3100	-61.3	33.9
3100 - 10600	-41.3	53.9
Above 10600	-61.3	33.9

### Spurious Radiated Emissions in GPS Bands (15.519 (d))

Requirement: In addition to the radiated emission limits specified in the table in paragraph (d) of this section, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:

Frequency (MHz)	EIRP (dBm)	EIRP at 3 Meters (dB $\mu$ V/m)
1164 - 1240	-85.3	9.9
1559 - 1610	-85.3	9.9

### Radiated Emissions Field Strength Limits at 3 Meters (Section 15.209)

Frequency (MHz)	Field Strength (dB $\mu$ V/m)
0.009 to 0.490	128.5 to 93.8
0.490 to 1.705	73.8 to 63
1.705 - 30	69.5
30 - 88	40
88 - 216	43.5
216 - 960	46
960 - 40,000	54

Test Notes: Refer to Section 4.1 for the test equipment used.

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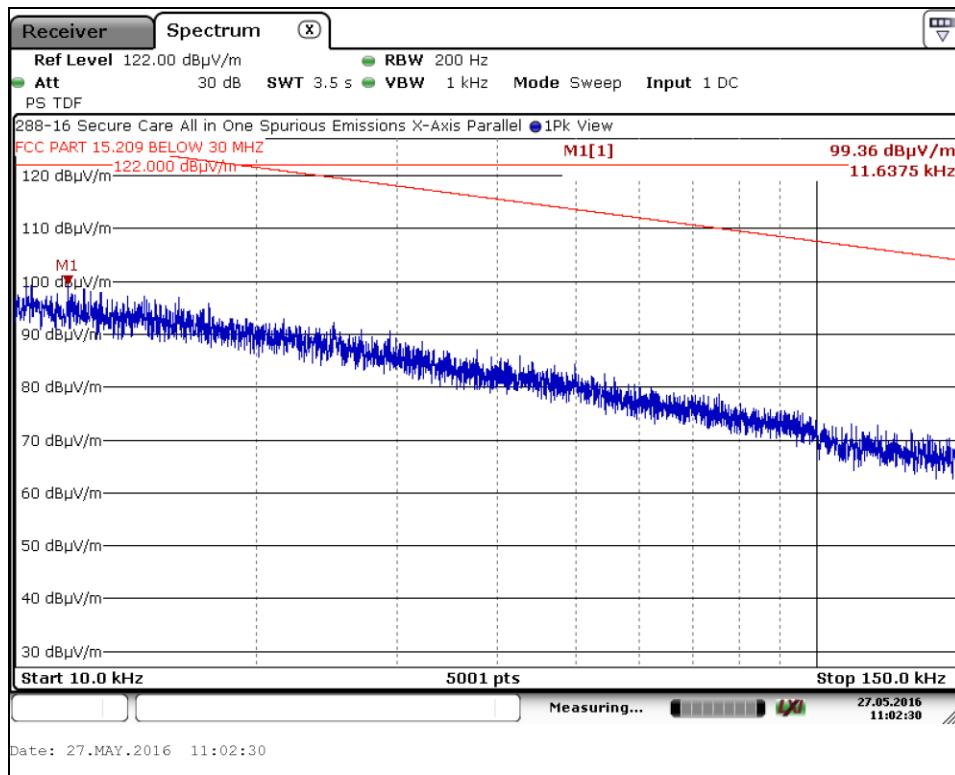
## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions (15.519 (c), 15.209)

#### 6.4.1. 32 kHz to 960 MHz, measured at 3 Meters

The device was prescreened in our 3 Meter Semi-Anechoic Chamber. There were no measurable emissions below 960 MHz on our 3 Meter OATS.

##### 6.4.1.1 Parallel Measurement Antenna – 32 to 150 kHz – X Axis



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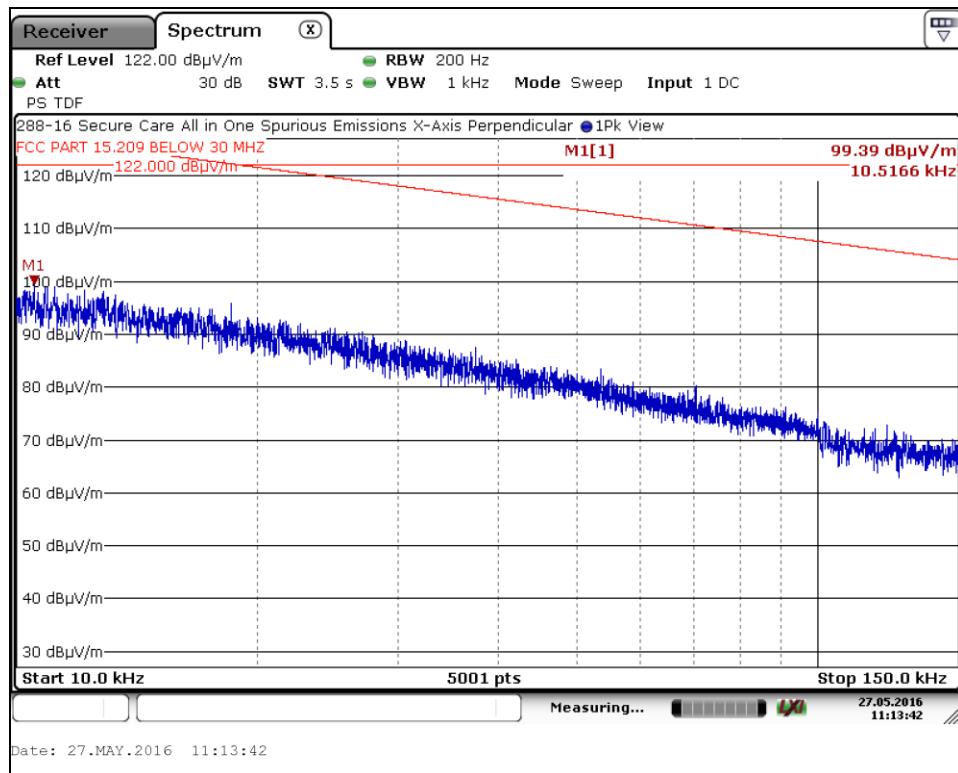
## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions (15.519 (c), 15.209)

#### 6.4.1. 32 kHz to 960 MHz, measured at 3 Meters

The device was prescreened in our 3 Meter Semi-Anechoic Chamber. There were no measurable emissions below 960 MHz on our 3 Meter OATS.

#### 6.4.1.2 Perpendicular Measurement Antenna – 30 to 150 kHz – X Axis



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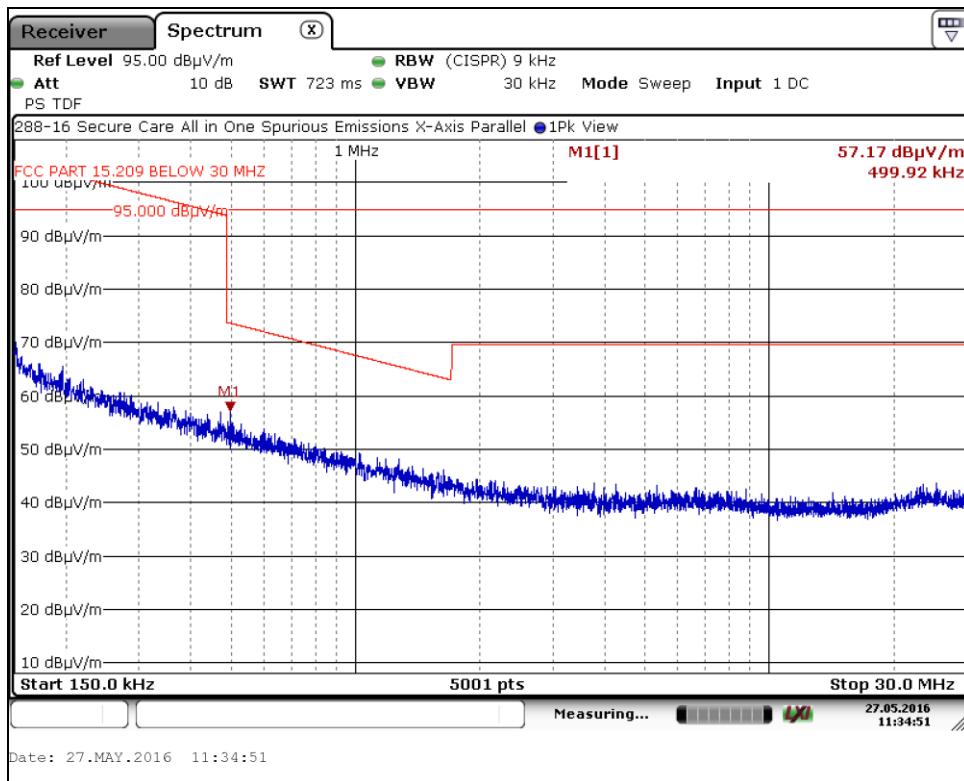
## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions (15.519 (c), 15.209)

#### 6.4.1. 32 kHz to 960 MHz, measured at 3 Meters

The device was prescreened in our 3 Meter Semi-Anechoic Chamber. There were no measurable emissions below 960 MHz on our 3 Meter OATS.

#### 6.4.1.3 Parallel Measurement Antenna – 150 kHz to 30 MHz – X Axis



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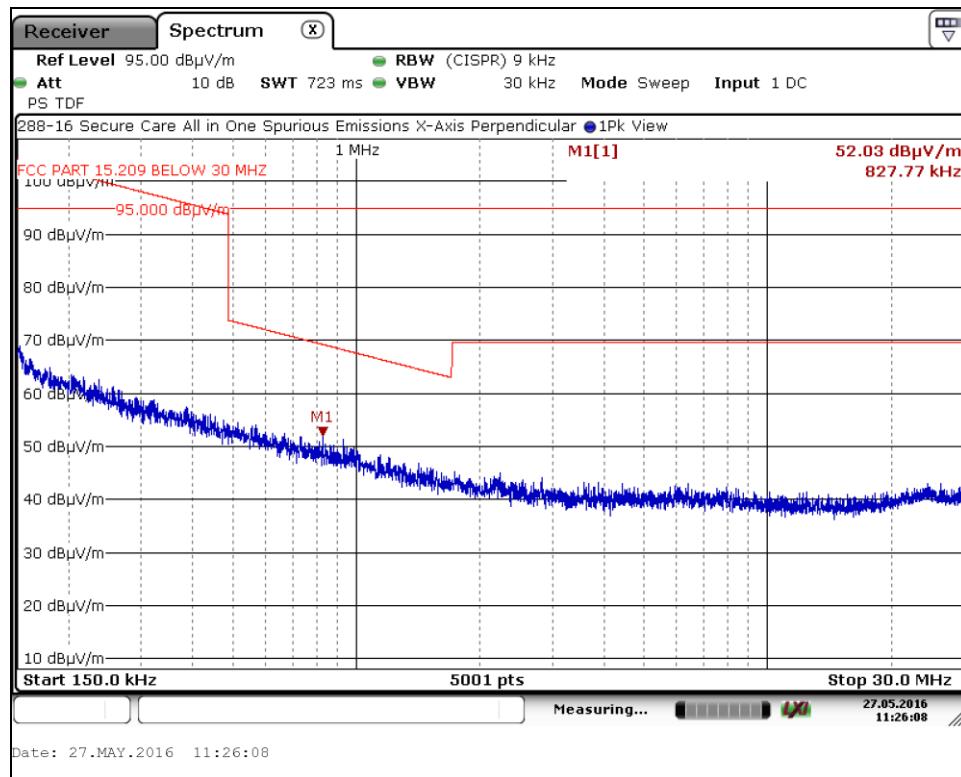
## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions (15.519 (c), 15.209)

#### 6.4.1. 32 kHz to 960 MHz, measured at 3 Meters

The device was prescreened in our 3 Meter Semi-Anechoic Chamber. There were no measurable emissions below 960 MHz on our 3 Meter OATS.

#### 6.4.1.4 Perpendicular Measurement Antenna – 150 kHz to 30 MHz – X Axis



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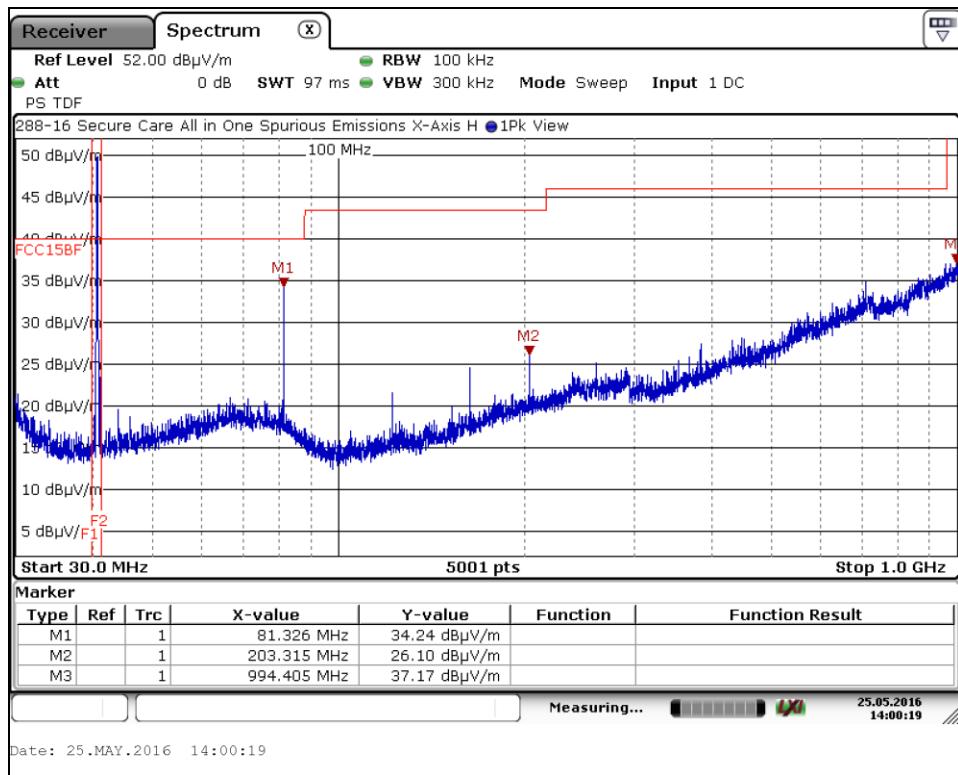
## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions (15.519 (c), 15.209)

#### 6.4.1. 32 kHz to 960 MHz, measured at 3 Meters

The device was prescreened in our 3 Meter Semi-Anechoic Chamber. There were no measurable emissions below 960 MHz on our 3 Meter OATS.

#### 6.4.1.5 Horizontal Polarity – 30 to 960 MHz – X Axis



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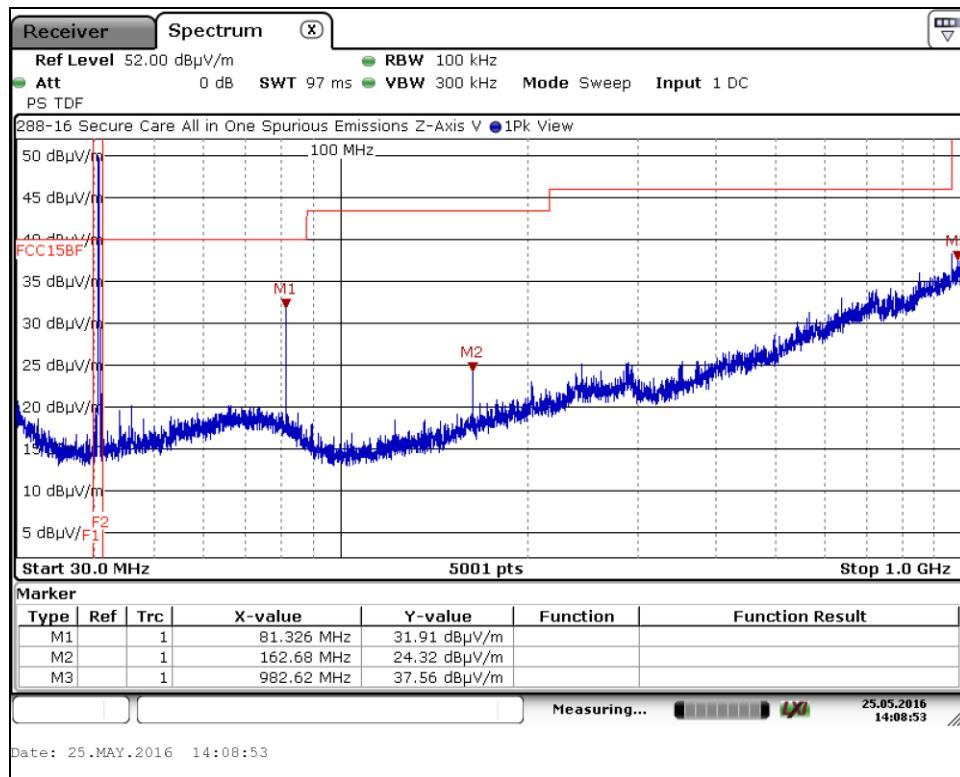
## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions (15.519 (c), 15.209)

#### 6.4.1. 32 kHz to 960 MHz, measured at 3 Meters

The device was prescreened in our 3 Meter Semi-Anechoic Chamber. There were no measurable emissions below 960 MHz on our 3 Meter OATS.

##### 6.4.1.6 Vertical Polarity – 30 to 960 MHz – Z Axis



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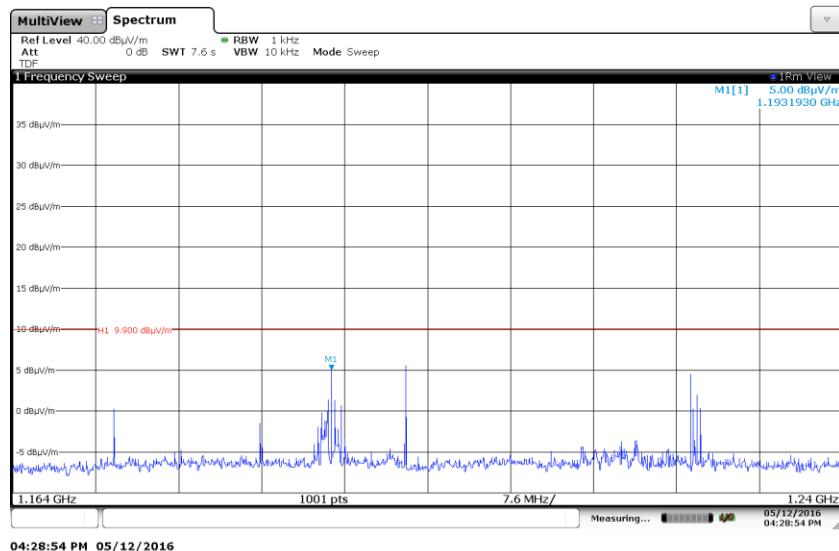
## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions in GPS Bands (15.519 (d), 15.209)

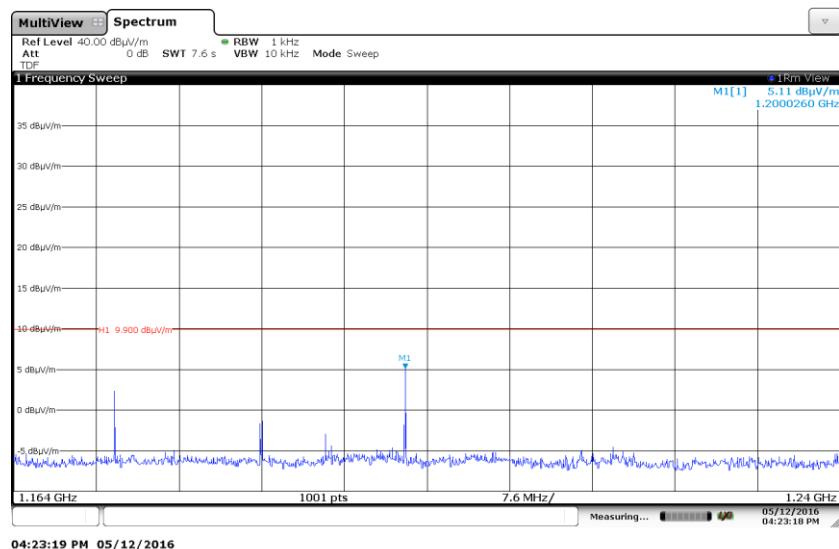
#### 6.4.2 1164 to 1240 MHz & 1559 to 1610 MHz

There were no broadband emissions related to the UWB transmitter. Measured signals were narrowband and related to the microprocessor / clocks and do not fall under the requirements of this section. Measurements were made at 1 Meters using a 9.54 dB distance offset and the -85.3 dBm limit was converted to a field strength limit of 9.9 dB $\mu$ V/m.

##### 6.4.2.1 Horizontal Measurement Polarity 1164 to 1240 MHz



##### 6.4.2.2 Vertical Measurement Polarity 1164 to 1240 MHz

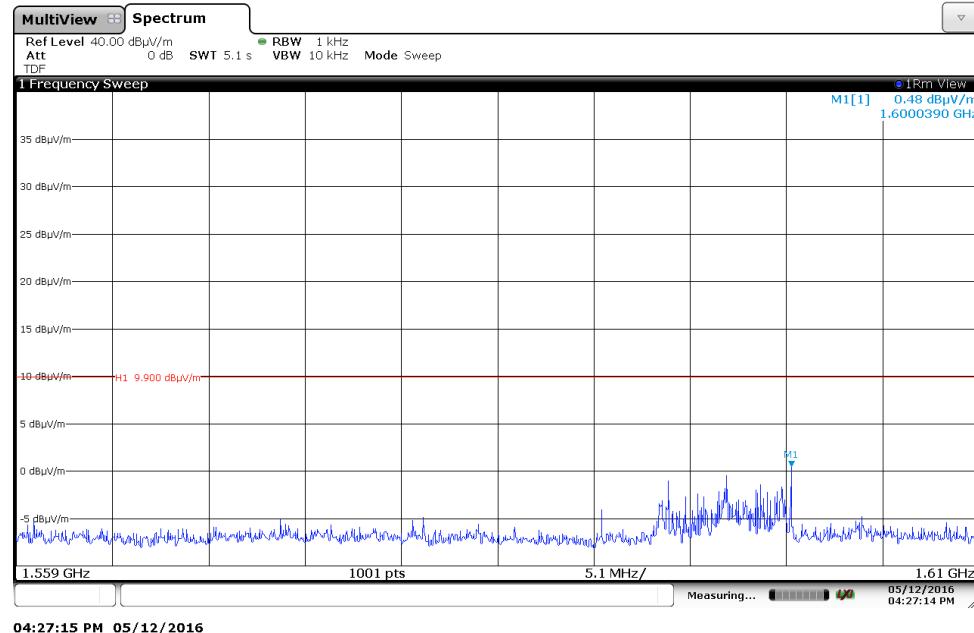


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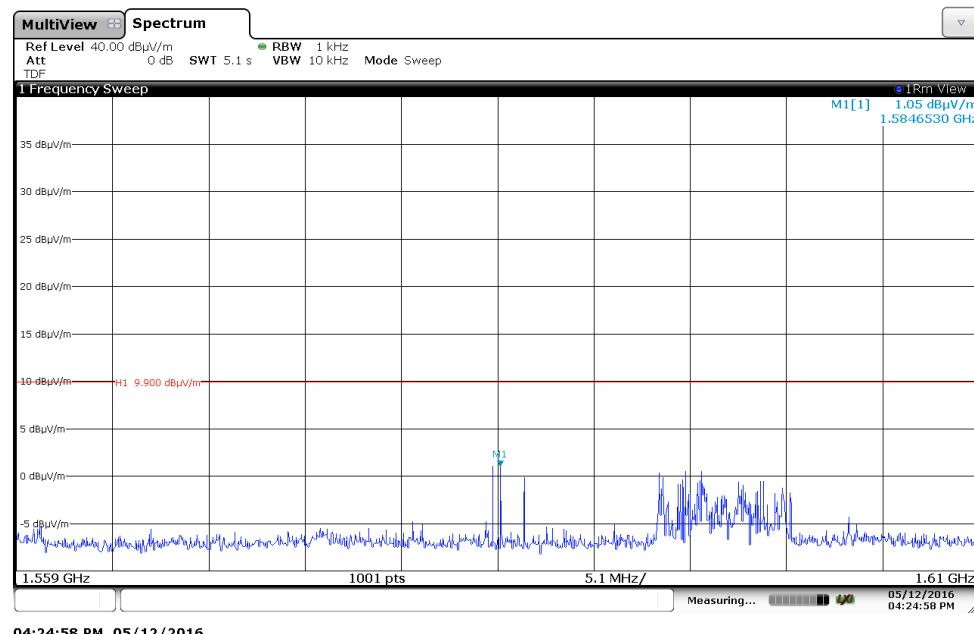
## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions in GPS Bands (15.519 (d), 15.209)

#### 6.4.2.3 Horizontal Measurement Polarity 1559 to 1610 MHz



#### 6.4.2.4 Vertical Measurement Polarity 1559 to 1610 MHz



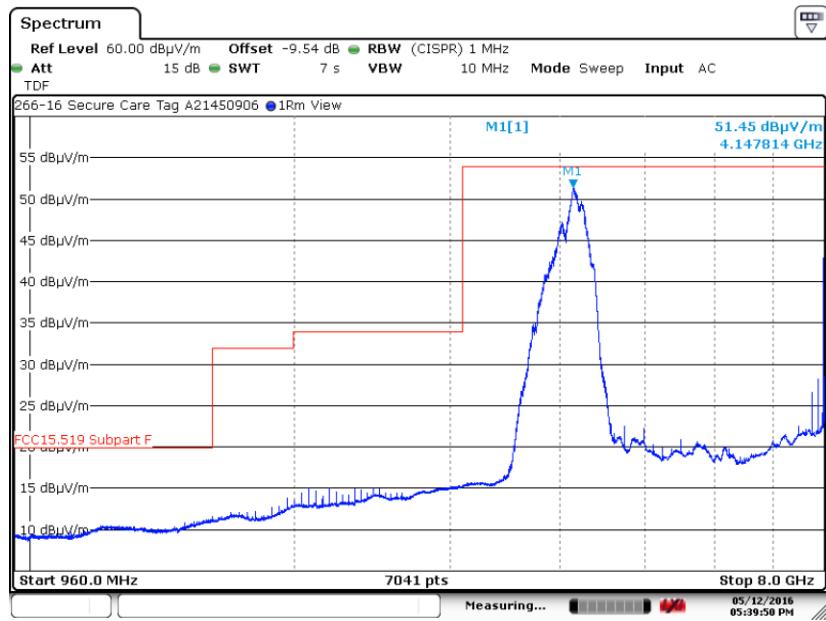
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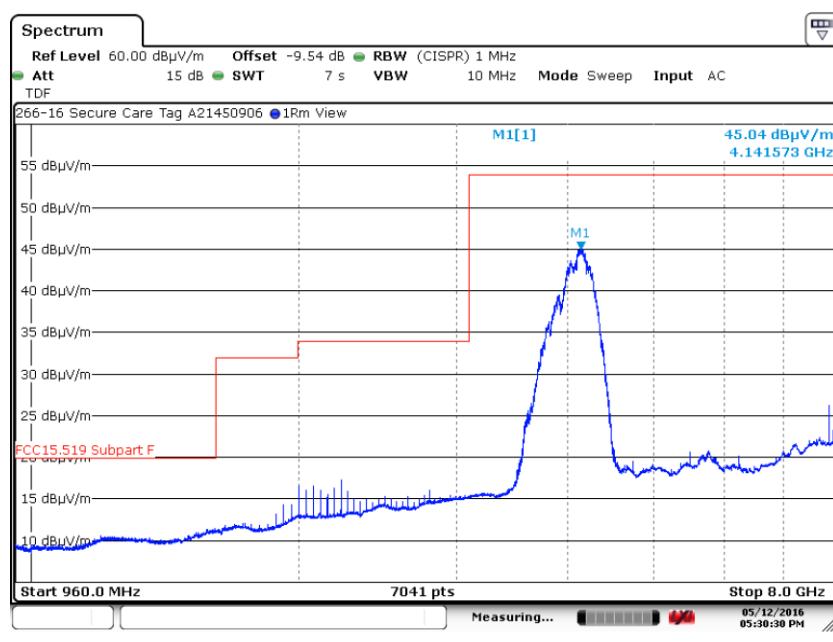
## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions (15.519 (d), 15.209)

#### 6.4.3. 960 MHz to 8 GHz Horizontal at 1 Meter



#### 6.4.4. 960 MHz to 8 GHz Vertical at 1 Meter



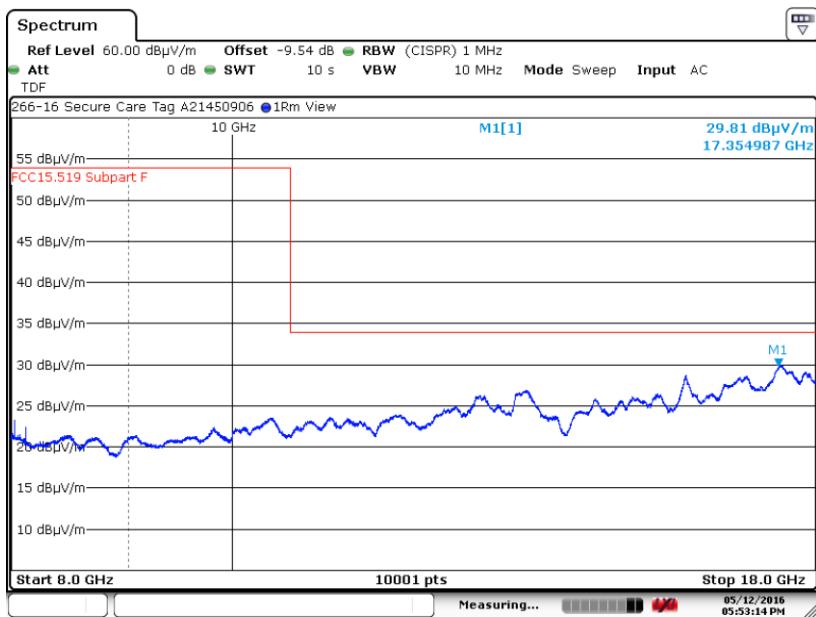
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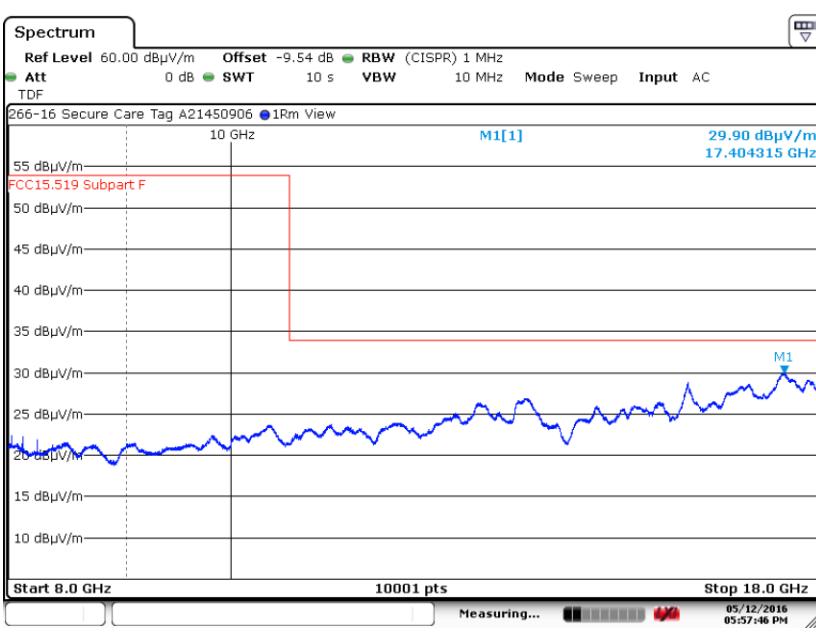
## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions (15.519 (d), 15.209)

#### 6.4.5. 8 to 18 GHz Horizontal at 1 Meter



#### 6.4.6. 8 to 18 GHz Vertical at 1 Meter



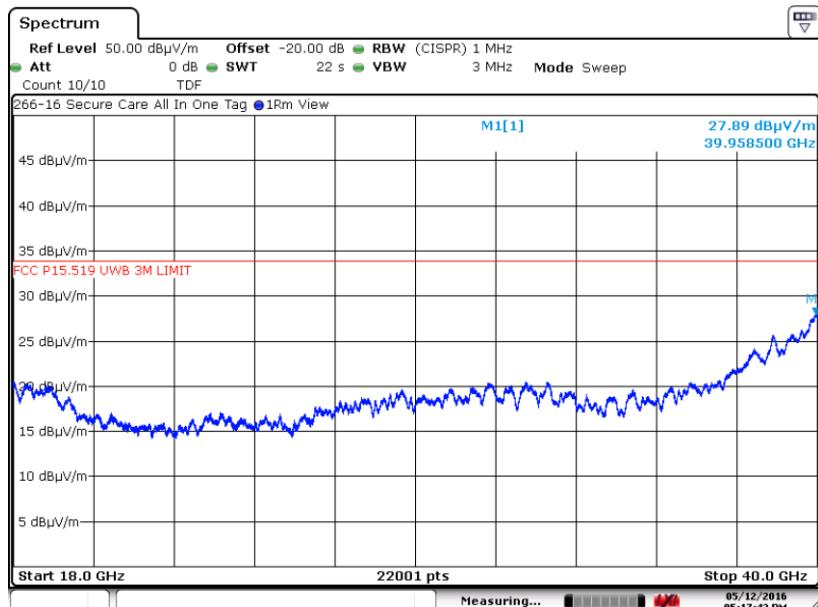
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## 6. Measurement Data (continued)

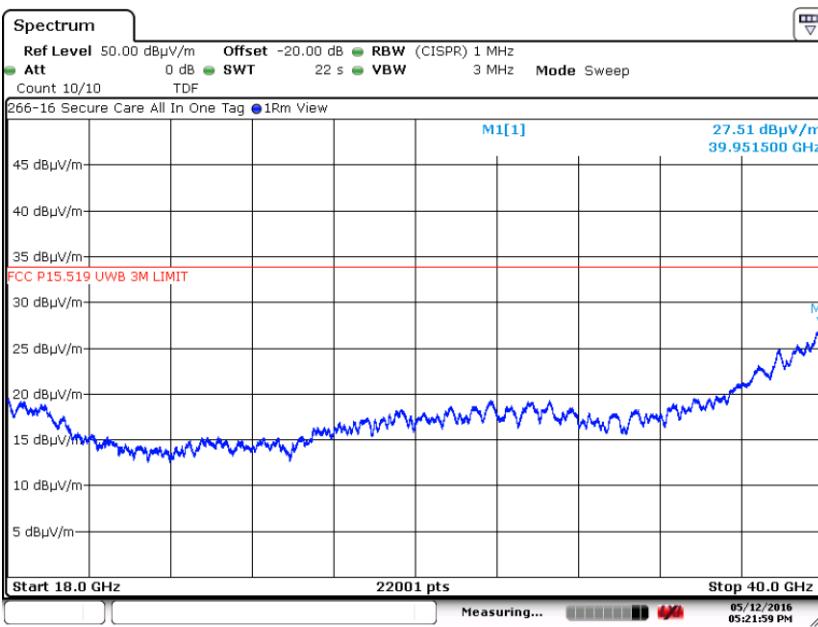
### 6.4. Spurious Radiated Emissions (15.519 (d), 15.209)

#### 6.4.7. 18 to 40 GHz Horizontal at 0.3 Meter



Date: 12.MAY.2016 17:17:42

#### 6.4.8. 18 to 40 GHz Vertical at 0.3 Meter



Date: 12.MAY.2016 17:21:59

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## 6. Measurement Data (continued)

### 6.4. Spurious Radiated Emissions (15.519 (d), 15.209)

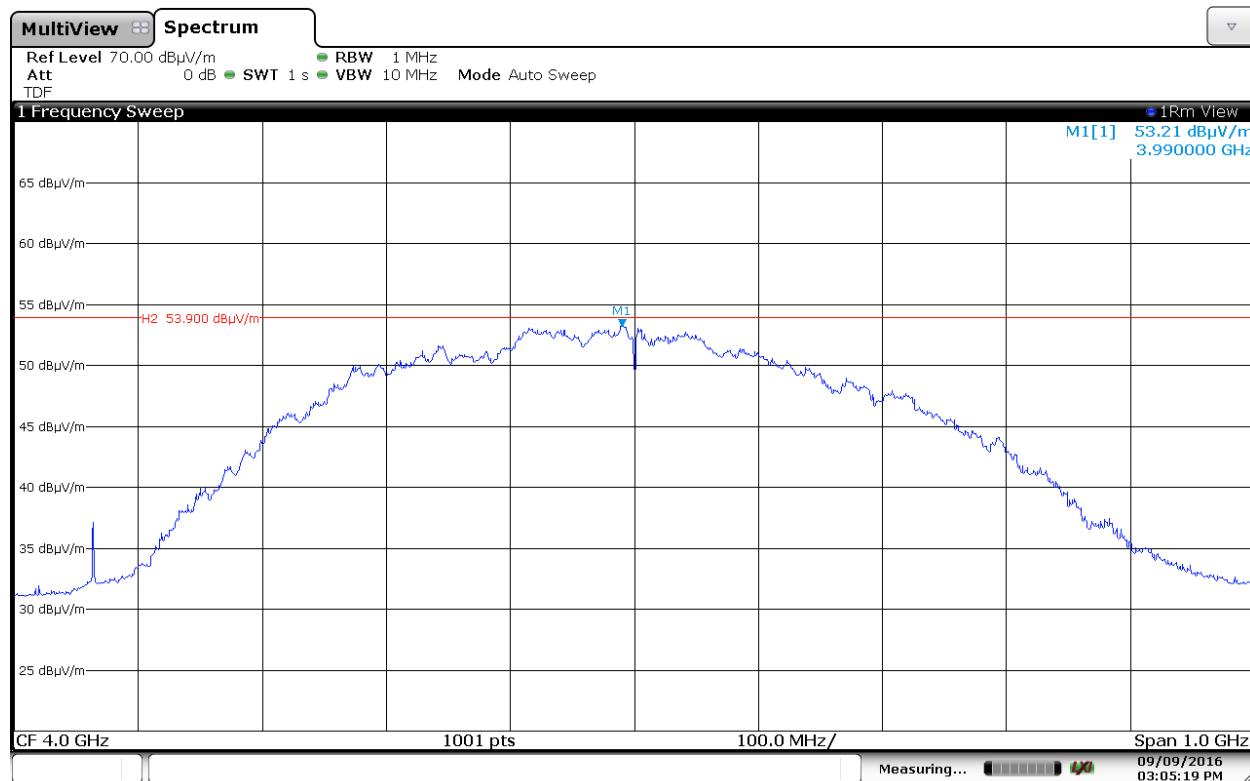
6.4.9. Plot of RMS Power at 3 Meters (Channel 2, 110 kbps, 64M PRF)

Frequency (GHz)	Amplitude <sup>1</sup>	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	H/V	cm	Deg	
3.990	53.21	53.90	-0.69	H	100	0	Compliant

Notes: <sup>1</sup> Antenna Factor (AF), Cable Factor (CF) and External Preamplifier Gain (PAG) have been entered into the analyzer as transducer factors.

Equation (22) from ANSI C63.10-2013,  $EIRP = E_{meas} + 20 \log (d_{meas}) - 104.7$ ;  $d_{meas} = 3$   
 $EIRP (\text{dBm}) = E_{meas} (\text{dB}\mu\text{V/m}) - 95.2$

Frequency (GHz)	Amplitude <sup>1</sup>	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dBm)	(dBm)	(dB)	H/V	cm	Deg	
3.990	-41.99	-41.30	-0.69	H	100	0	Compliant



03:05:19 PM 09/09/2016

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## 6. Measurement Data (continued)

### 6.5. Peak Emissions in a 50 MHz Bandwidth (15.519 (e))

Requirement: There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs,  $f_M$ . That limit is 0 dBm EIRP.

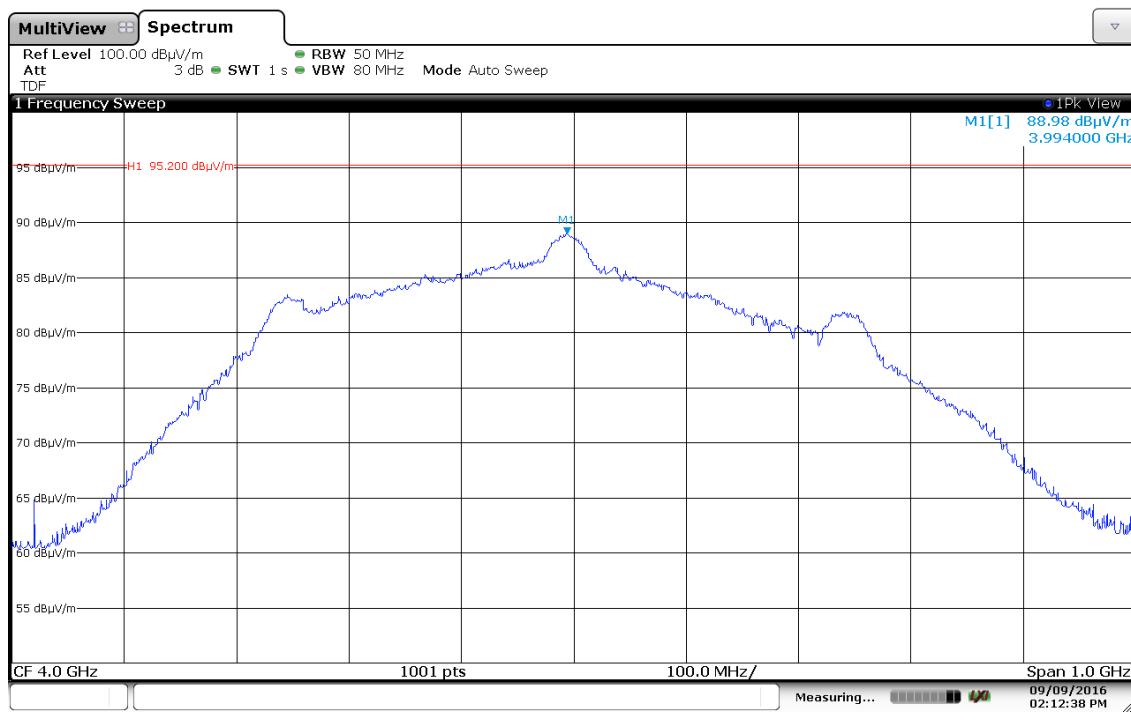
Frequency (GHz)	Amplitude <sup>1</sup>	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	H/V	cm	Deg	
3.994	88.98	95.20	-6.22	H	100	0	Compliant

Notes: <sup>1</sup> Antenna Factor (AF), Cable Factor (CF) and External Preamplifier Gain (PAG) have been entered into the analyzer as transducer factors.

Equation (22) from ANSI C63.10-2013,  $EIRP = E_{meas} + 20 \log (d_{meas}) - 104.7$ ;  $d_{meas} = 3$   
 $EIRP (\text{dBm}) = E_{meas} (\text{dB}\mu\text{V/m}) - 95.2$

Frequency (GHz)	Amplitude <sup>1</sup>	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dBm)	(dBm)	(dB)	H/V	cm	Deg	
3.994	-6.22	0.00	-6.22	H	100	0	Compliant

#### 6.5.1 Plot of Peak Power at 3 Meters (Channel 2, 110 kbps, 64M PRF)



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## 6. Measurement Data (continued)

### 6.6 Conducted Emissions Test Setup

#### 6.6.1. Regulatory Limit: FCC Part 15, Class B

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-Peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5.0	56	46
5.0 to 30.0	60	50

\* Decreases with the logarithm of the frequency.

#### 6.6.2 Measurement Equipment and Software Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due
EMI Receiver	Hewlett Packard	8546A	3330A00115	6/2/2016
RF Filter Section	Hewlett Packard	85460A	3325A00121	6/2/2016
LISN	EMCO	3825/2	9109-1860	7/21/2016
Manufacturer	Software Description	Title/Model #	Rev.	
Compliance Worldwide	Test Report Generation Software	Test Report Generator	1.0	

#### 6.6.3. Measurement & Equipment Setup

Test Date:	N/A
Test Engineer:	N/A
Site Temperature (°C):	22
Relative Humidity (%RH):	35
Frequency Range:	0.15 MHz to 30 MHz
EMI Receiver IF Bandwidth:	9 kHz
EMI Receiver Avg Bandwidth:	30 kHz
Detector Functions:	Peak, Quasi-Peak. & Average

#### 6.6.4. Test Procedure

Test measurements were made in accordance with ANSI C63.4-2014, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

## 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 the 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.

## 8. Test Images

### 8.1. Spurious and Harmonic Emissions – 30 kHz to 1 GHz Front



**8. Test Images****8.2. Spurious and Harmonic Emissions – 30 kHz to 30 MHz Rear**

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## 8. Test Images

### 8.3. Spurious and Harmonic Emissions – 30 MHz to 1 GHz Rear

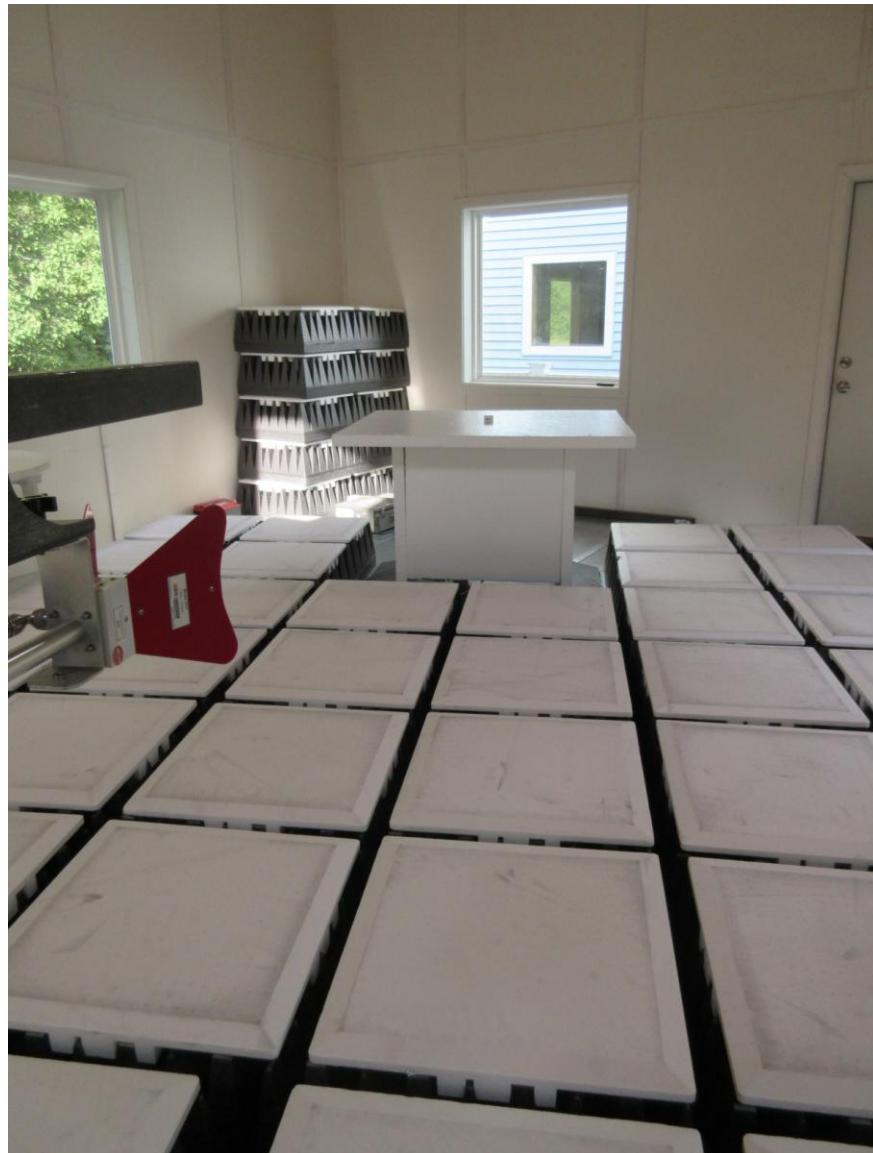


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## 8. Test Images

### 8.4. Spurious and Harmonic Emissions – Above 1 GHz Front



Test Number: 266-16AR3

Issue Date: 9/9/2016

## 8. Test Images

### 8.5. Spurious and Harmonic Emissions – 1 to 18 GHz Rear



Test Number: 266-16AR3

Issue Date: 9/9/2016

## 8. Test Images

### 8.6. Spurious and Harmonic Emissions – 18 to 40 GHz Rear

