

**COMPLIANCE WORLDWIDE INC.  
TEST REPORT 266-16FR2**

In Accordance with the Requirements of  
Federal Communications Commission 47 CFR Part 15.517, Subpart F  
Technical Requirements for Indoor UWB Systems

Issued to

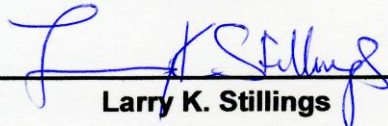
**Secure Care Products, LLC  
39 Chenell Drive  
Concord, NH 03301  
(603) 233 0745**

For the  
**ENVisionIT®  
Asset Tag / Staff Badge**


**FCC ID: KNK-TAG2**

Report Issued on September 16, 2016  
Revision R2 Issued on October 28, 2016

Tested By

  
\_\_\_\_\_  
**Larry K. Stillings**

Reviewed By

  
\_\_\_\_\_  
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### 1. Scope

This test report certifies that the Secure Care Patient ENVisionIT Asset Tag / Staff Badge 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 Changes the report from section 15.519 to 15.517. Revision R2 updates standards references in sections 6.4.3 to 6.4.9 and reorganizes the data for easier readability.

### 2. Product Details

- 2.1. **Manufacturer:** Secure Care Products, LLC
- 2.2. **Model Numbers:** A21450902 (Asset Tag) A21450912 (Staff Badge)
- 2.3. **Serial Numbers:** ID 006F-0111, A21450902 (Asset Tag), ID 00AA-0170 A21450912 (Staff Badge)
- 2.4. **Description:** ENVisionIT<sup>®</sup> RTLS Tag for Asset and Staff locations within a building.
- 2.5. **Power Source:** 3.0 VDC (Lithium) non-replaceable
- 2.6. **Hardware Revision:** N/A
- 2.7. **Software Revision:** N/A
- 2.8. **Modulation Type:** Pulse Modulation, Frequency Hopping
- 2.9. **Operating Frequency:** 3.993 GHz Center Frequency Nominal (Channel 2 – 500 MHz BW)
- 2.10. **EMC Modifications:** 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	A21450902	Pre production	3.0	DC	Asset Tag
Secure Care	A21450912	Pre production	3.0	DC	Staff Badge

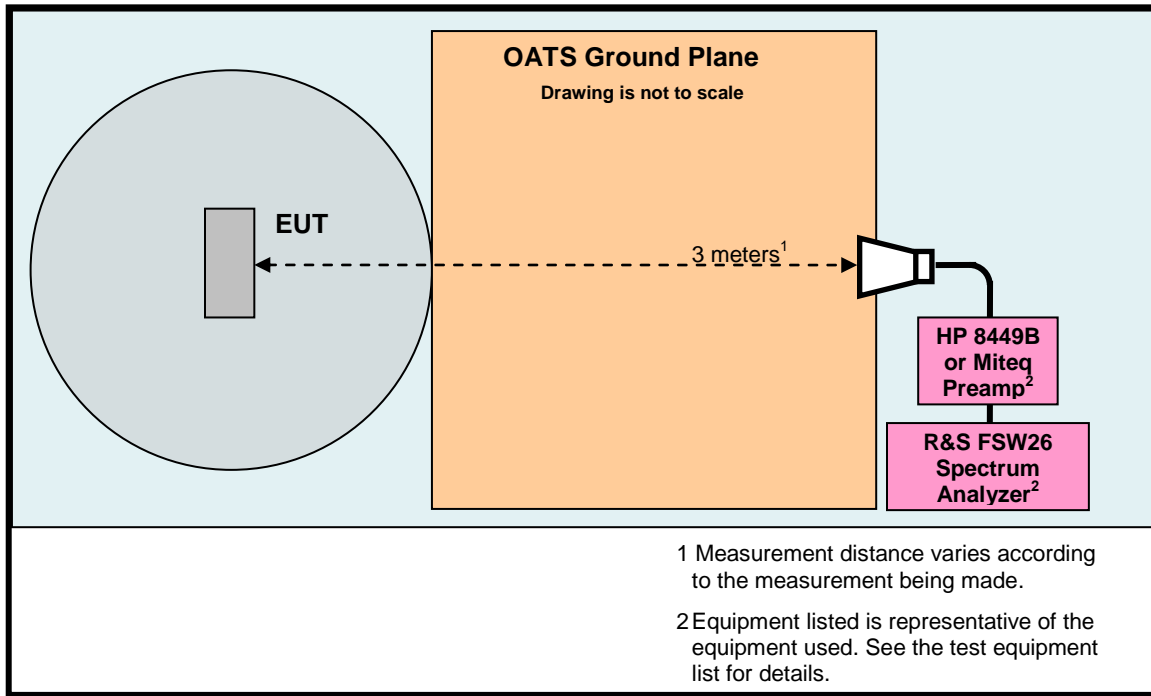
**Note:** The Asset Tag and Staff Badge contain identical PCBs, only the housing is different. Both units were evaluated and it was determined the Asset Tag was worst case.

#### 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.

**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°

**4. Measurements Parameters**

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

Device	Manufacturer	Model No.	Serial No.	Cal Due	Interval
EMI Receiver 9 kHz to 7 GHz	Rohde & Schwarz	ESR7	101156	7/23/2017	2 Years
Spectrum Analyzer 9 kHz to 40 GHz	Rohde & Schwarz	FSV40	100899	7/23/2017	2 Years
Spectrum Analyzer 10 Hz to 40 GHz	Rohde & Schwarz	FSVR40	100909	7/23/2017	2 Years
Spectrum Analyzer 3 Hz to 26.5 GHz	Rohde & Schwarz	FSW26	102057	3/2/2018	2 Years
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 Years
Preamplifier 100 MHz to 7 GHz	Miteq	AFS3-00100200-10-15P-4	988773	6/2/2017	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 Years
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 Years
Horn Antenna 18-40 GHz	Com Power	AH-840	101032	2/24/2018	2 Years
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 Years

<sup>1</sup> ESR7      Firmware revision: V2.28,SP1      Date installed: 9/2/2016      Previous V2.26, installed 8/15/2014.  
<sup>2</sup> FSV40      Firmware revision: V2.30 SP4,      Date installed: 5/4/2016      Previous V2.30 SP1, installed 10/22/2014.  
<sup>3</sup> FSVR40      Firmware revision: V2.23,      Date installed: 10/20/2014      Previous V1.63 SP1, installed 8/28/2013.  
<sup>4</sup> FSW26      Firmware revision: V2.50,      Date installed: 9/12/2016      Previous V2.40, installed 5/4/2016.

**4. Measurements Parameters (continued)**

**4.2. Measurement & Equipment Setup**

Test Dates:	5/12/2016, 5/13/2016, 8/19/2016, 9/13/2016, 9/14/2016, 10/28/2016
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
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, 15.517 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	$\pm 5\%$

**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	15.517 (a)	6.2	Compliant	
UWB Bandwidth	15.503 (a) (d) 15.517 (b)	6.3	Compliant	
Radiated Emissions below 960 MHz	15.517 (c) 15.209	6.4	Compliant	
Radiated Emissions above 960 MHz	15.517 (c) 15.521 (d)	6.5	Compliant	
Radiated Emissions in GPS Bands	15.517 (d)	6.6	Compliant	
RMS Emissions of UWB Transmission in a 1 MHz Bandwidth	15.517 (c) 15.521 (d)	6.7	Compliant	
Peak Emissions in a 50 MHz Bandwidth	15.517 (e) 15.521 (g)	6.8	Compliant	
Conducted Emissions	15.207	6.9	N/A	EUT is battery powered
Radio Frequency Exposure	FCC OET Bulletin 65	6.10	Compliant	

## 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 (15.517 (a))**

Requirement: (1) Indoor UWB devices, by the nature of their design, must be capable of operation only indoors. The necessity to operate with a fixed indoor infrastructure, e.g., a transmitter that must be connected to the AC power lines, may be considered sufficient to demonstrate this.

Result: Compliant, the EUT is an indoor tag designed to transmit location information to a wall or ceiling mounted node/receiver filed under a separate application. The statement required by Section 15.517(f) is located in the manual regarding the use of indoor equipment.

(2) The emissions from the equipment operated under this section shall not be intentional directed outside of the building in which the equipment is located, such as through a window or a doorway, to perform an outside function, such as the detection of persons about to enter a building.

Result: Not Applicable, Compliant.

(3) The use of outdoor mounted antennas, e.g. antennas mounted on the outside of a building or on a telephone pole, or any other outdoors infrastructure is prohibited.

Result: Not Applicable, Compliant.

(4) Field disturbance sensors installed inside of metal or underground storage tanks are considered to operate indoors provided the emissions are directed towards the ground.

Result: Not Applicable, Compliant.

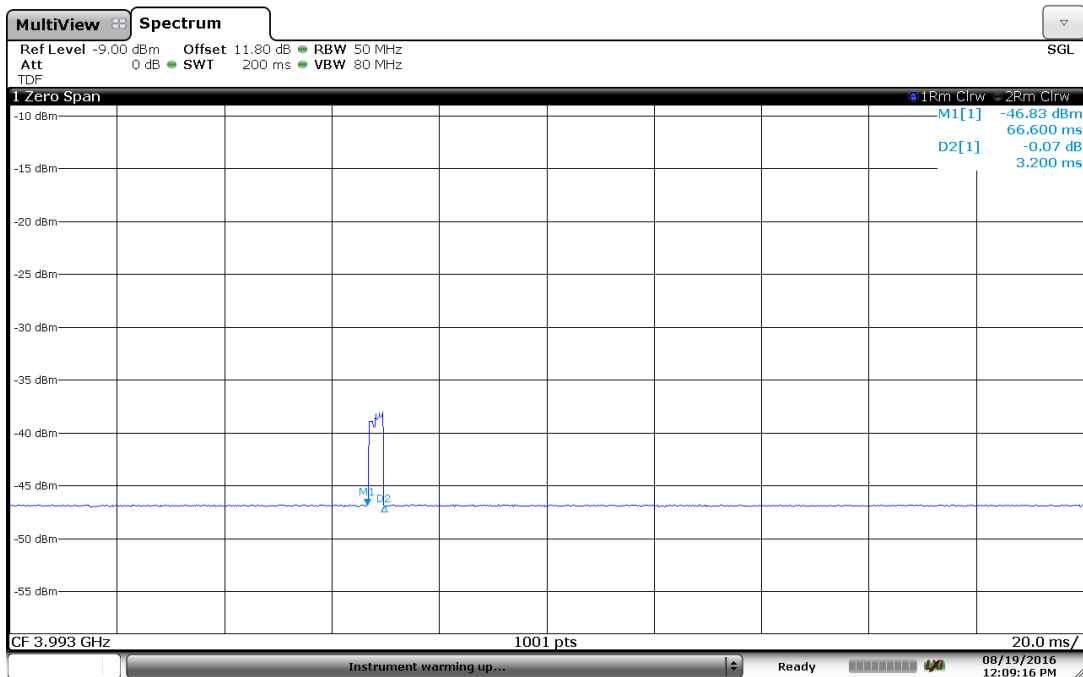
6. Measurement Data (continued)

6.2. Operational Requirements of the Device under Test (15.517 (a) continued)

(5) A communications system shall transmit only when the intentional radiator is sending information to an associated receiver.

Result: Compliant, the EUT transmits a 3.2 mS burst with time-stamp location information every 3 seconds to an associated receiver (nodes) located within the building.

6.2.1 Plot of Transmission



12:09:17 PM 08/19/2016

6. Measurement Data (continued)

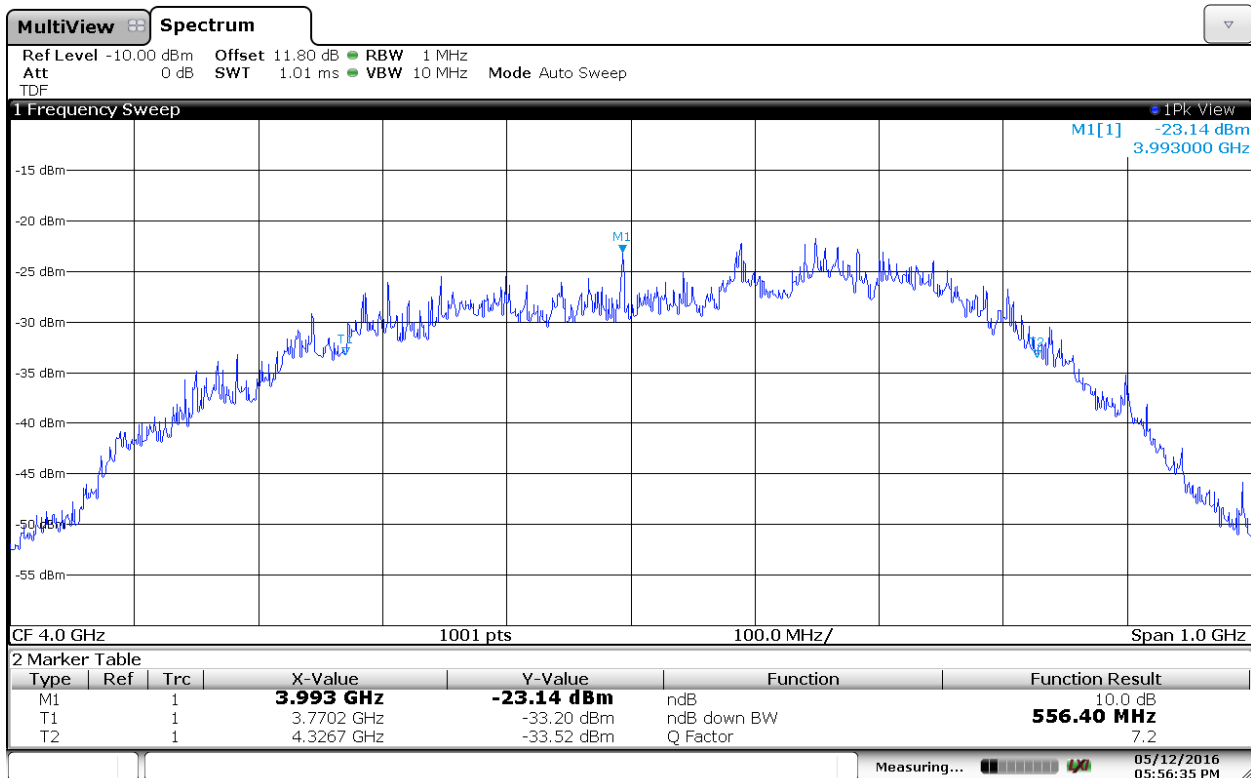
6.3. UWB Bandwidth (15.503 (a) (d), 15.517 (b))

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 – Model A219450912

$f_M$	The highest emission peak	3.9930
$f_L$	10 dB below the highest peak	3.7702
$f_H$	10 dB above the highest peak	4.3267
$f_C$	Calculated: $(f_H + f_L) / 2$	4.0485
Bandwidth	Calculated: $(f_H - f_L)$	0.5565
Fractional BW	Calculated: $2*(f_H - f_L) / (f_H + f_L)$	0.1375

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



05:56:35 PM 05/12/2016

**6. Measurement Data (continued)**

**6.4. Spurious Radiated Emissions below 960 MHz (15.517 (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.

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

Frequency (MHz)	Field Strength (dBµV/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.

Frequency Range:	10 kHz to 960 MHz
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 960 MHz
EMI Receiver Avg Bandwidth (minimum):	300 Hz – 30 kHz to 150 kHz 30 kHz – 150 kHz to 30 MHz 300 kHz - 30 MHz to 960 MHz
Detector Function:	Peak, Quasi-Peak & Average

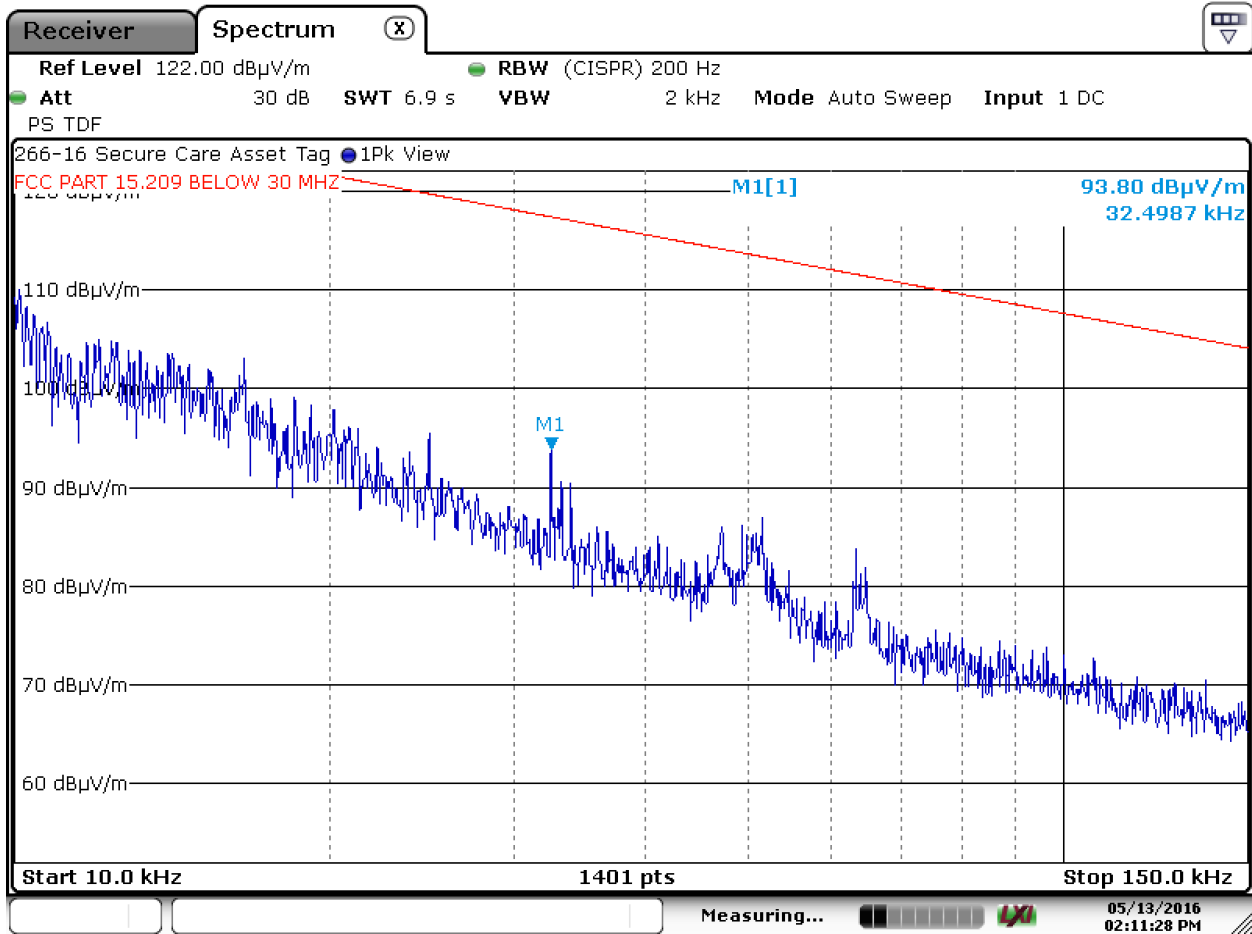
6. Measurement Data (continued)

6.4. Spurious Radiated Emissions (15.517 (c), 15.209 continued)

6.4.1. 10 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 – 10 to 150 kHz – X Axis



Date: 13.MAY.2016 14:11:28

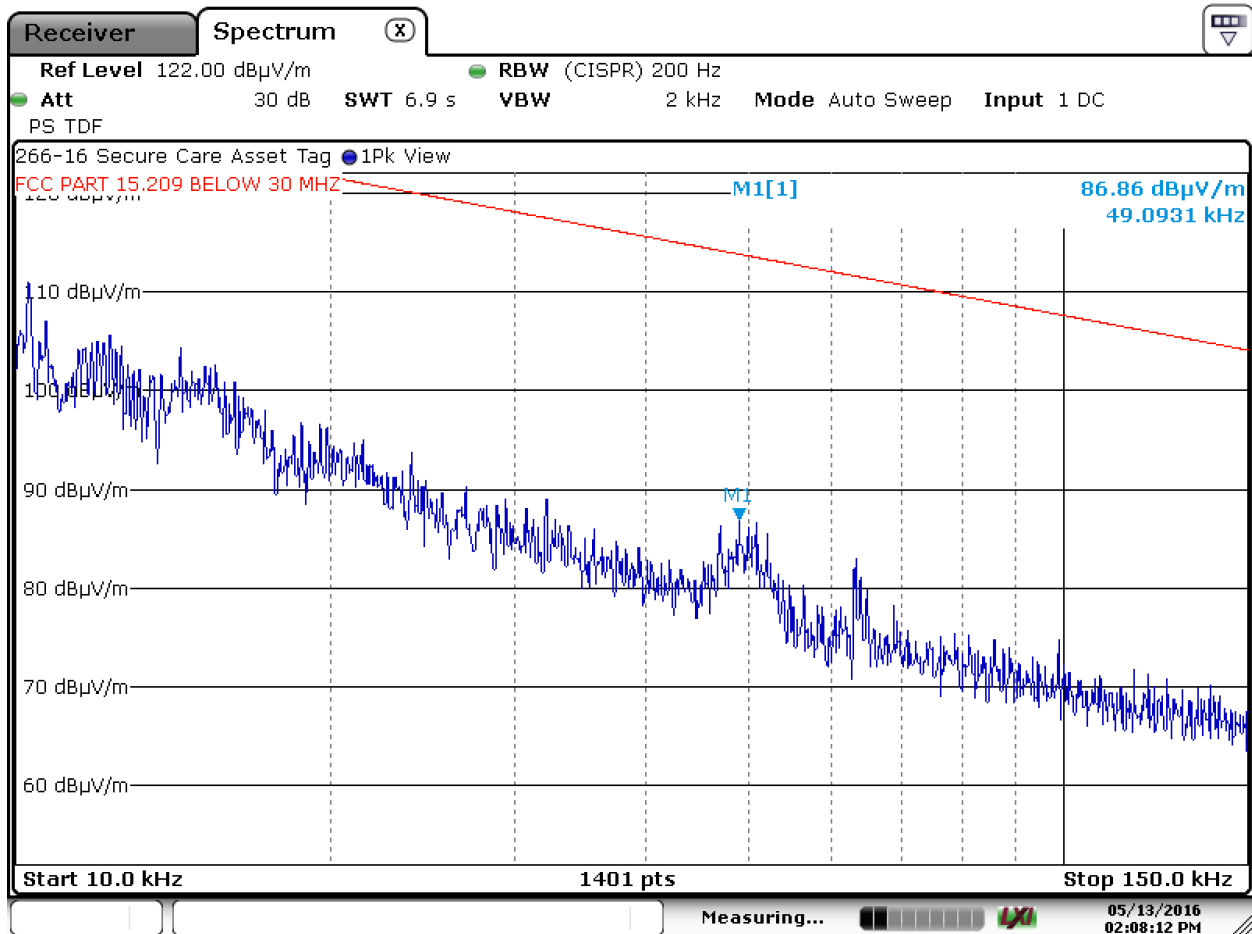
6. Measurement Data (continued)

6.4. Spurious Radiated Emissions (15.517 (c), 15.209 continued)

6.4.1. 10 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 – 10 to 150 kHz – X Axis



Date: 13.MAY.2016 14:08:12

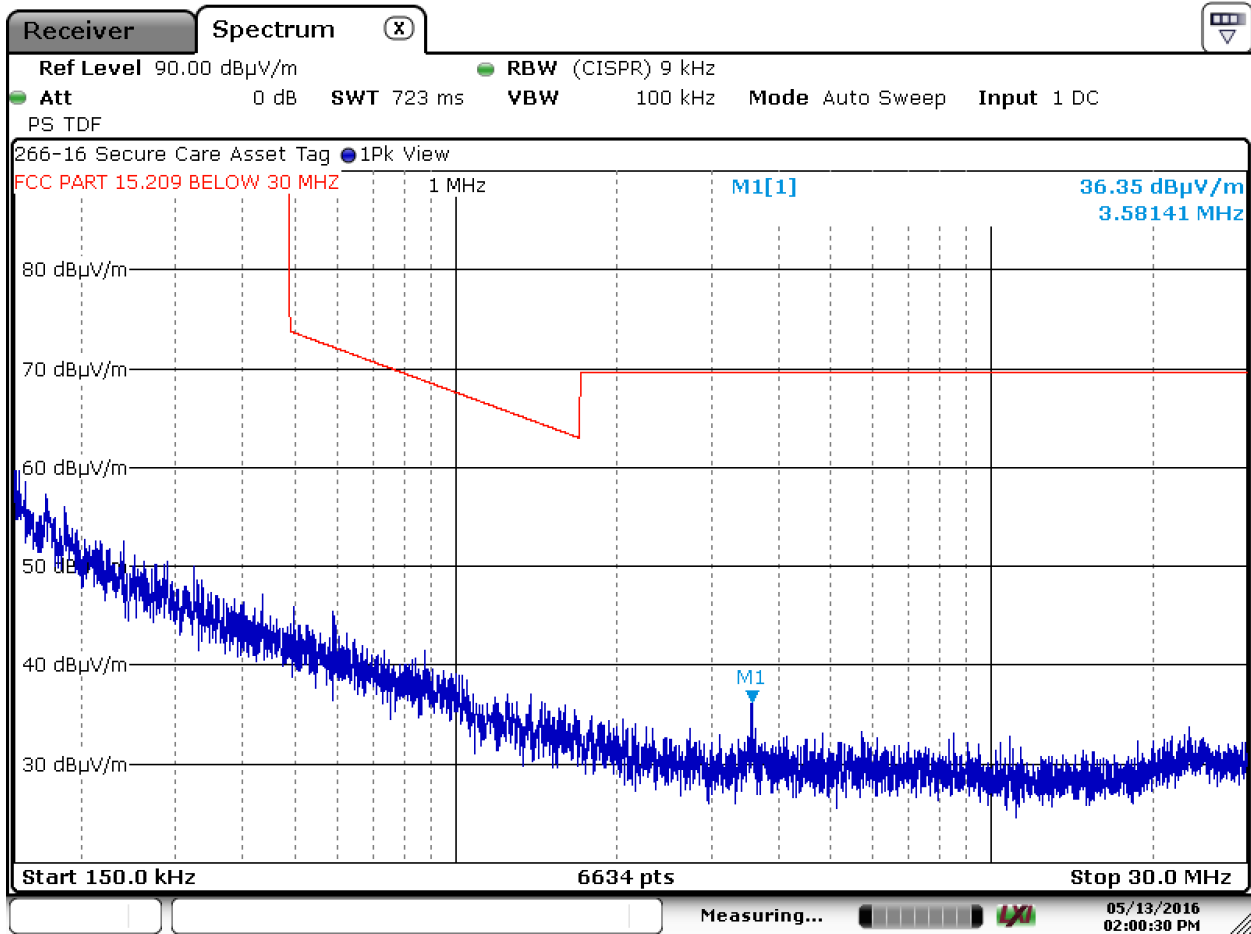
6. Measurement Data (continued)

6.4. Spurious Radiated Emissions (15.517 (c), 15.209 continued)

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



Date: 13.MAY.2016 14:00:30

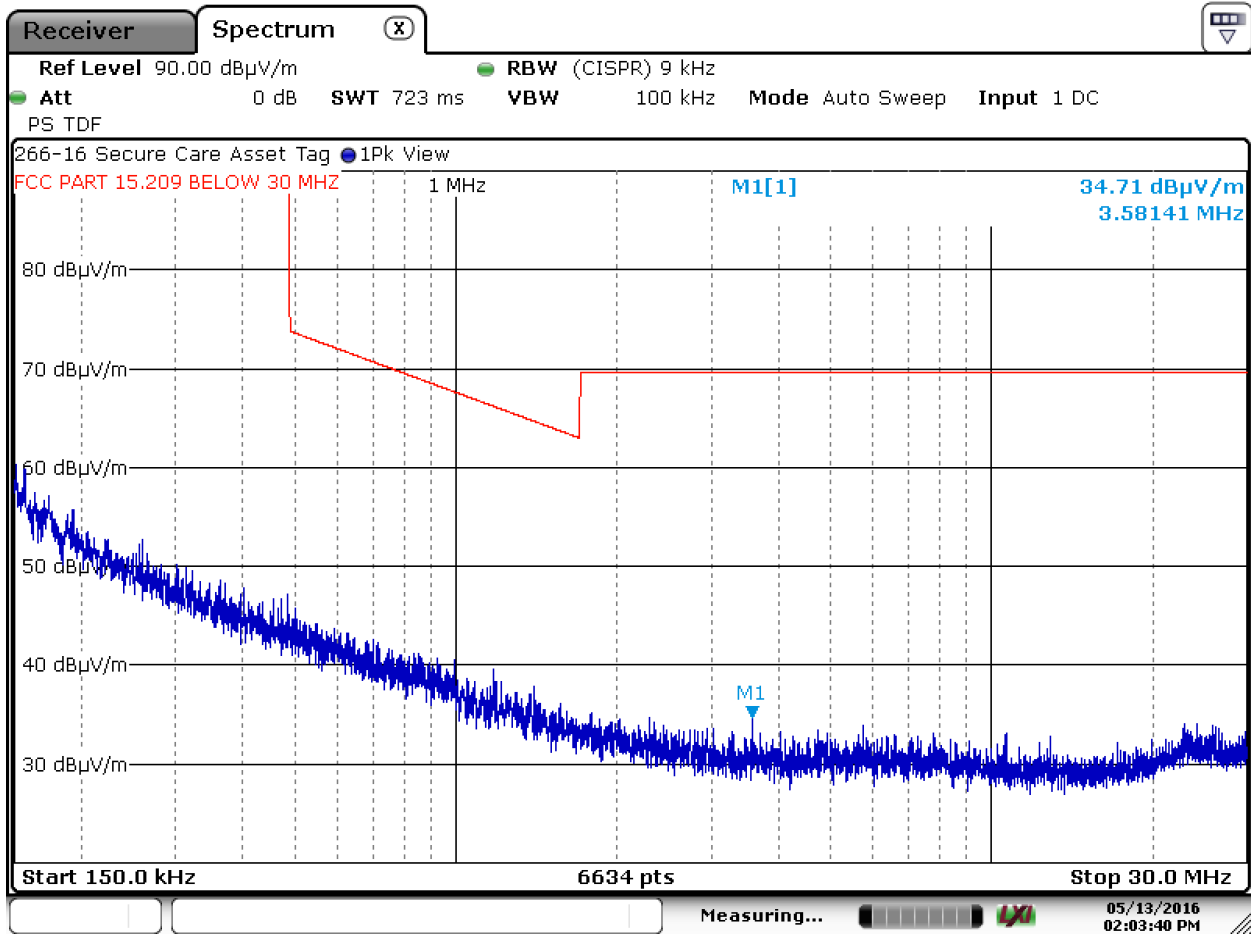
6. Measurement Data (continued)

6.4. Spurious Radiated Emissions (15.517 (c), 15.209 continued)

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



Date: 13.MAY.2016 14:03:40



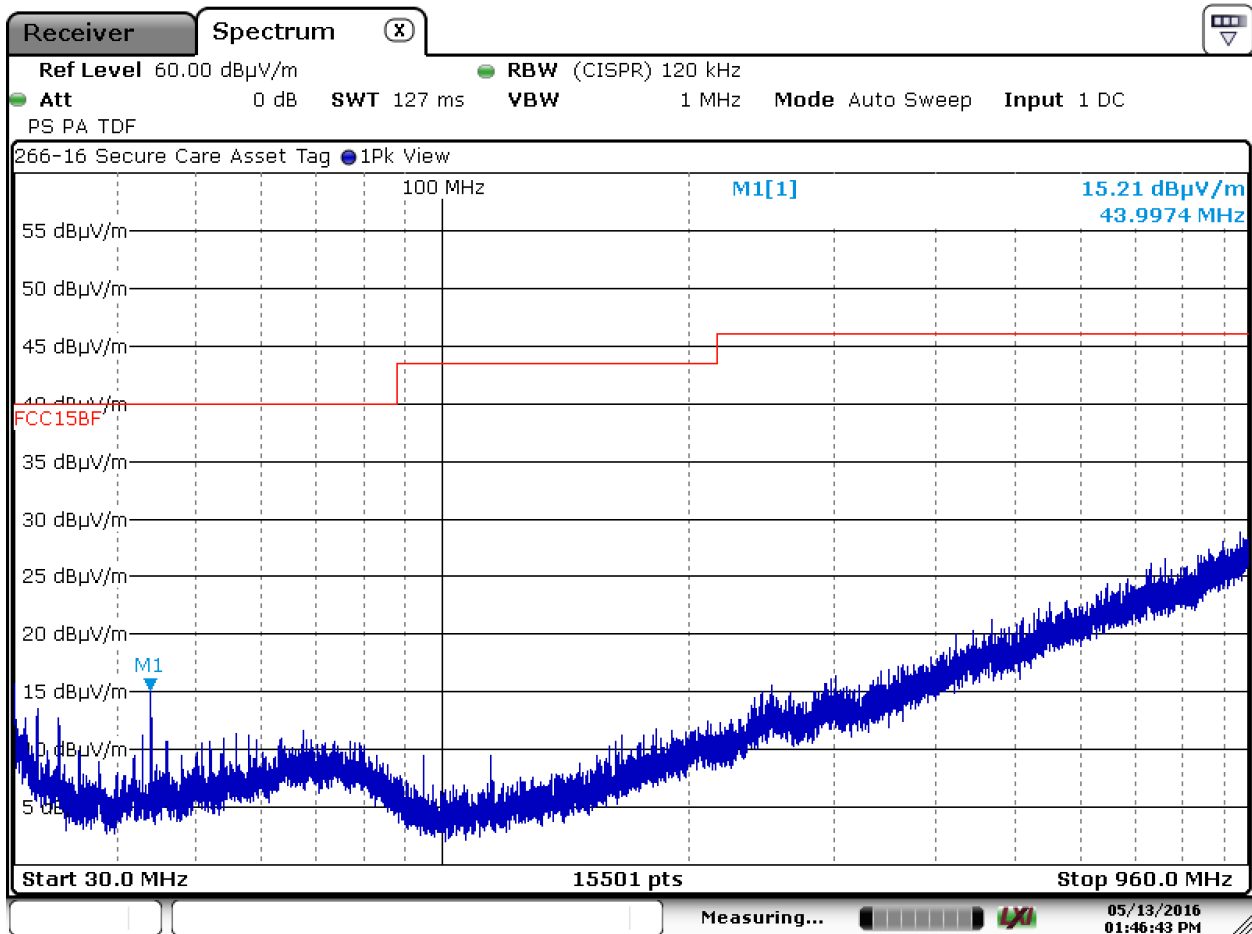
6. Measurement Data (continued)

6.4. Spurious Radiated Emissions (15.517 (c), 15.209 continued)

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



Date: 13.MAY.2016 13:46:43

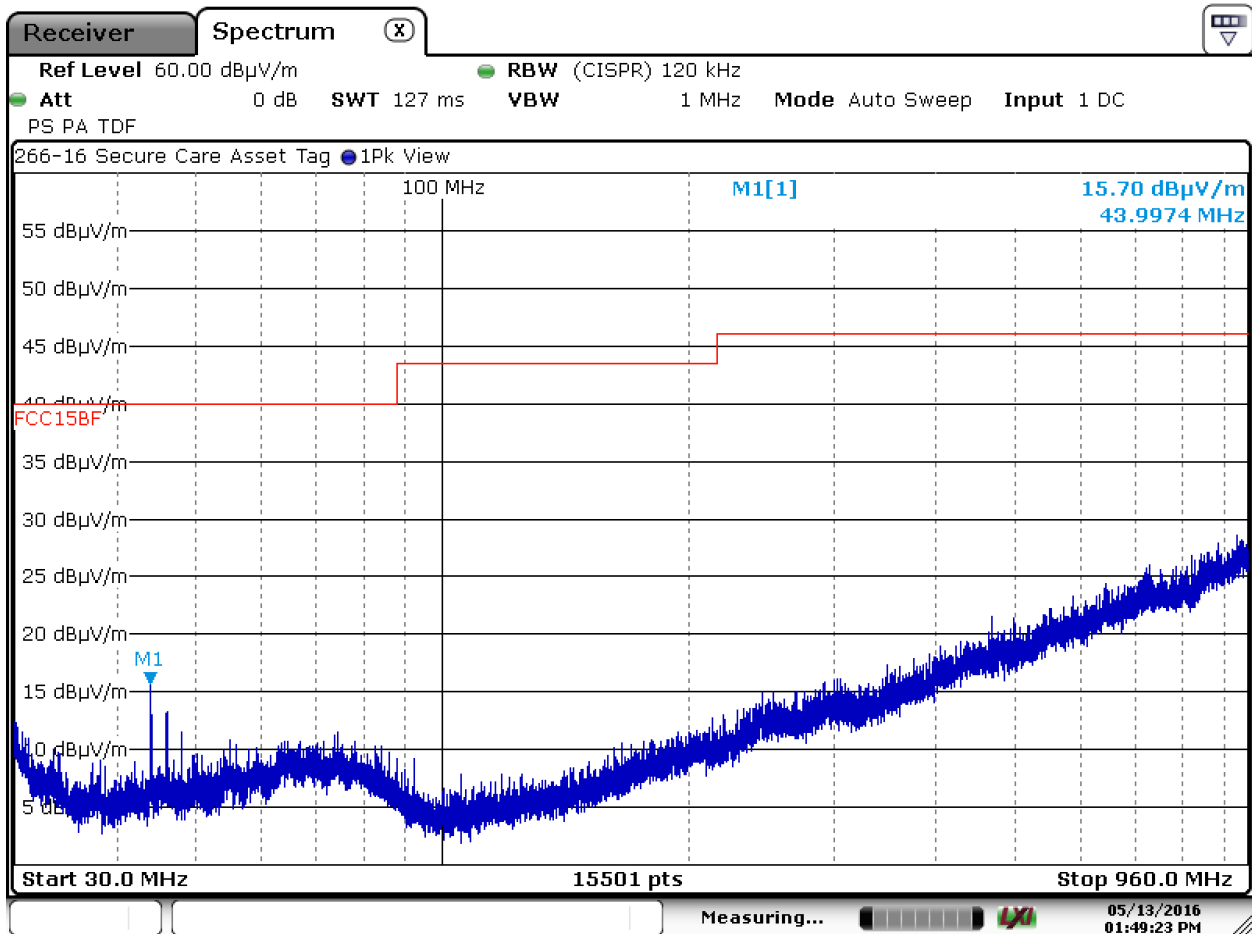
6. Measurement Data (continued)

6.4. Spurious Radiated Emissions (15.517 (c), 15.209 continued)

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 – X Axis



Date: 13.MAY.2016 13:49:23

**6. Measurement Data (continued)**

**6.5. Spurious Radiated Emissions above 960 MHz (15.517 (c), 15.521 (d))**

Requirement: 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:

The RMS average measurement is based on the use of a spectrum analyzer with a resolution bandwidth of 1 MHz, an RMS detector, and a 1 millisecond or less averaging time.

The EIRP in terms of dBm, can be converted to a field strength, in dBµV/m at 3 Meters by adding 95.2.

Frequency (MHz)	EIRP (dBm)	EIRP at 3 Meters (dBµV/m)
960 - 1610	-75.3	19.9
1610 - 1990	-53.3	41.9
1990 - 3100	-51.3	43.9
3100 - 10600	-41.3	53.9
Above 10600	-51.3	43.9

Frequency Range: 960 MHz to 40 GHz  
 Measurement Distance: 1 Meter and 0.3 Meter  
 EMI Receiver IF Bandwidth: 1 MHz  
 EMI Receiver Avg Bandwidth: 10 MHz  
 Detector Function: RMS 1 mS Average as defined in 15.521(d)

Notes: Measurements made from 960 MHz to 18 GHz were made in a semi-anechoic chamber at 1 Meter using a -9.54 dB distance offset was programmed into the spectrum analyzer.

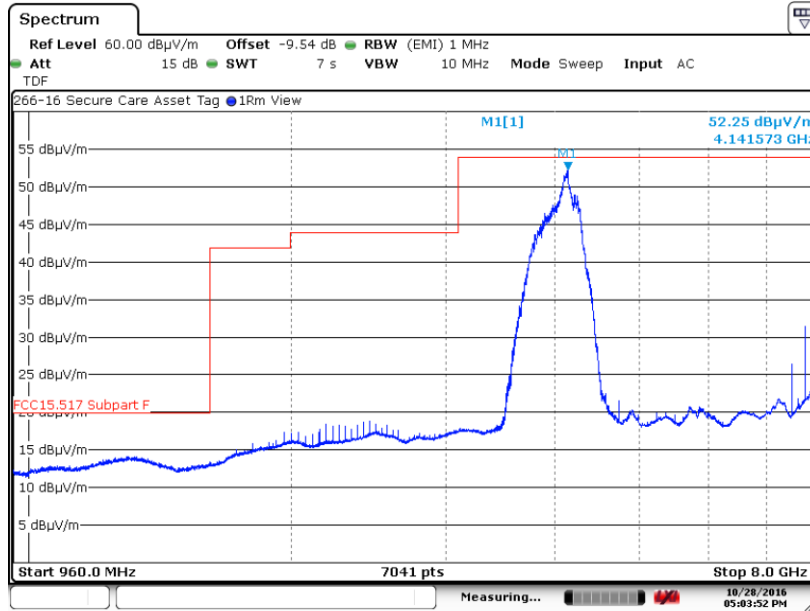
Measurements made from 8 to 18 GHz were done with the aid of a High Pass Filter before the low noise amplifier.

Measurements made from 18 to 40 GHz were done at 0.3 meters and a -20.00 dB distance offset was programmed into the spectrum analyzer.

6. Measurement Data (continued)

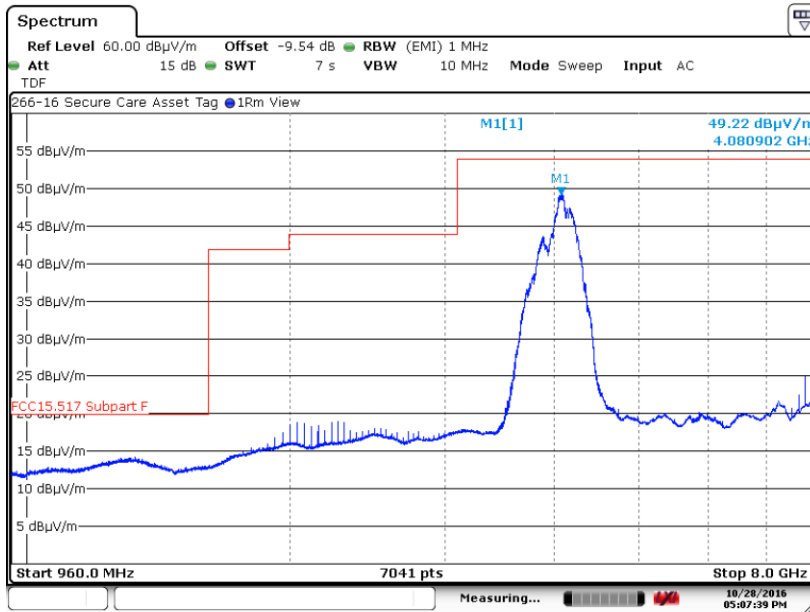
6.5. Spurious Radiated Emissions (15.517 (d) continued)

6.5.1. 960 MHz to 8 GHz Horizontal at 1 Meter, -9.54 dB offset entered in analyzer



Date: 28.OCT.2016 17:03:51

6.5.2. 960 MHz to 8 GHz Vertical at 1 Meter, -9.54 dB offset entered in analyzer

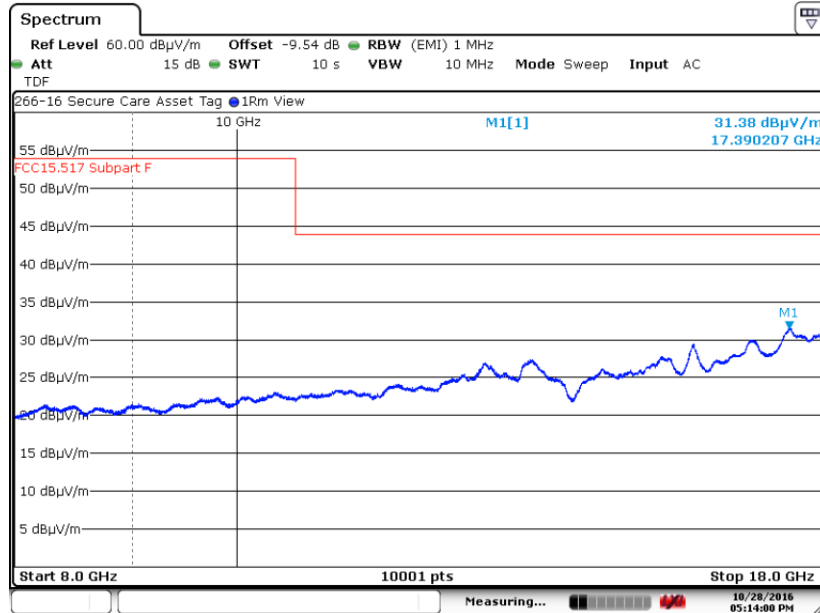


Date: 28.OCT.2016 17:07:37

6. Measurement Data (continued)

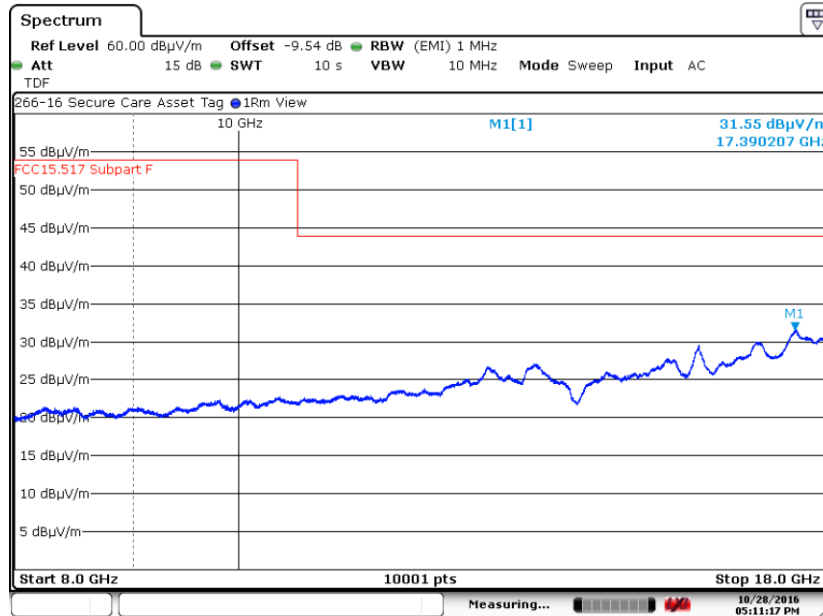
6.5. Spurious Radiated Emissions (15.517 (d) continued)

6.5.3. 8 to 18 GHz Horizontal at 1 Meter, -9.54 dB offset entered into analyzer



Date: 28.OCT.2016 17:13:59

6.5.4. 8 to 18 GHz Vertical at 1 Meter, -9.54 dB offset entered into analyzer

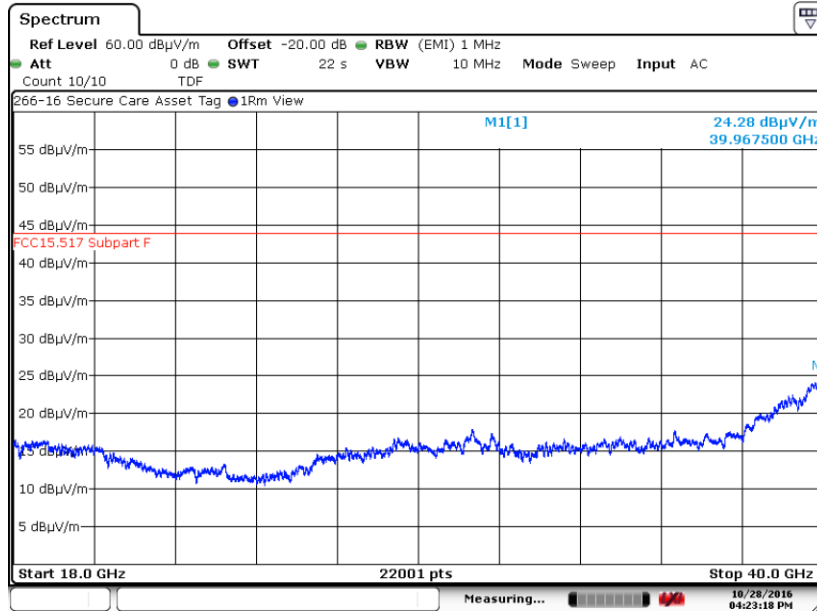


Date: 28.OCT.2016 17:11:16

6. Measurement Data (continued)

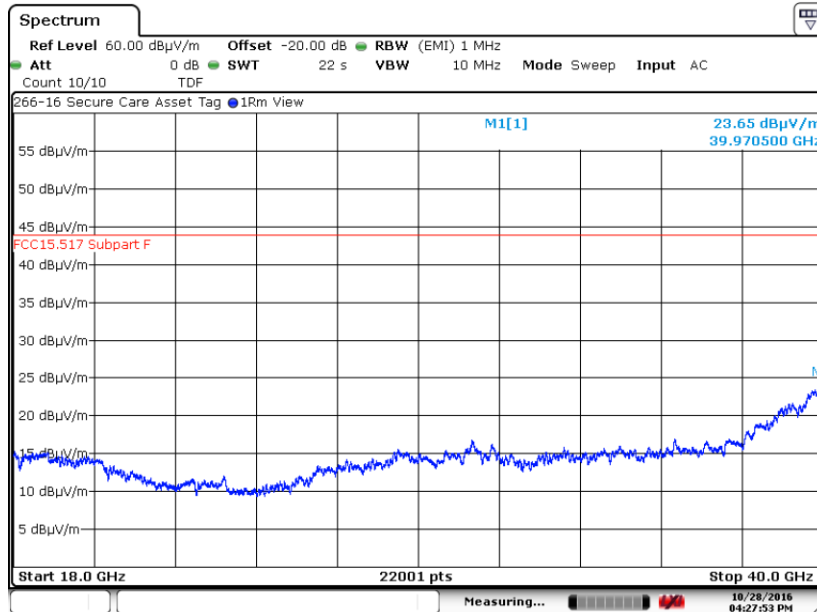
6.5. Spurious Radiated Emissions (15.517 (d) continued)

6.5.5. 18 to 40 GHz Horizontal at 0.3 Meter, -20.00 dB offset entered into analyzer



Date: 28.OCT.2016 16:23:17

6.5.6. 18 to 40 GHz Vertical at 0.3 Meter, -20.00 dB offset entered into analyzer



Date: 28.OCT.2016 16:27:52

**6. Measurement Data (continued)**

**6.6. Spurious Radiated Emissions in GPS Bands (15.517 (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 (dBμV/m)
1164 - 1240	-85.3	9.9
1559 - 1610	-85.3	9.9

**6.6.1. Measurement & Equipment Setup**

EMI Receiver IF Bandwidth: 1 kHz  
 EMI Receiver Avg Bandwidth: 10 kHz  
 Detector Functions: RMS Average

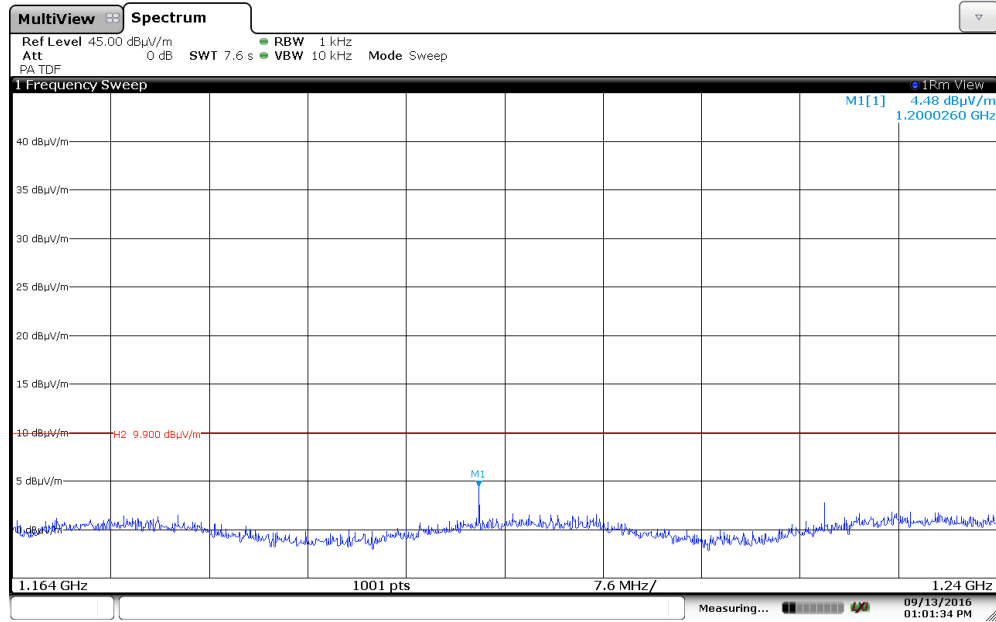
**6.6.2. 1164 to 1240 MHz & 1559 to 1610 MHz**

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 3 Meters and the -85.3 dBm limit was converted to a field strength limit of 9.9 dBuV/m using a factor of 95.2.

6. Measurement Data (continued)

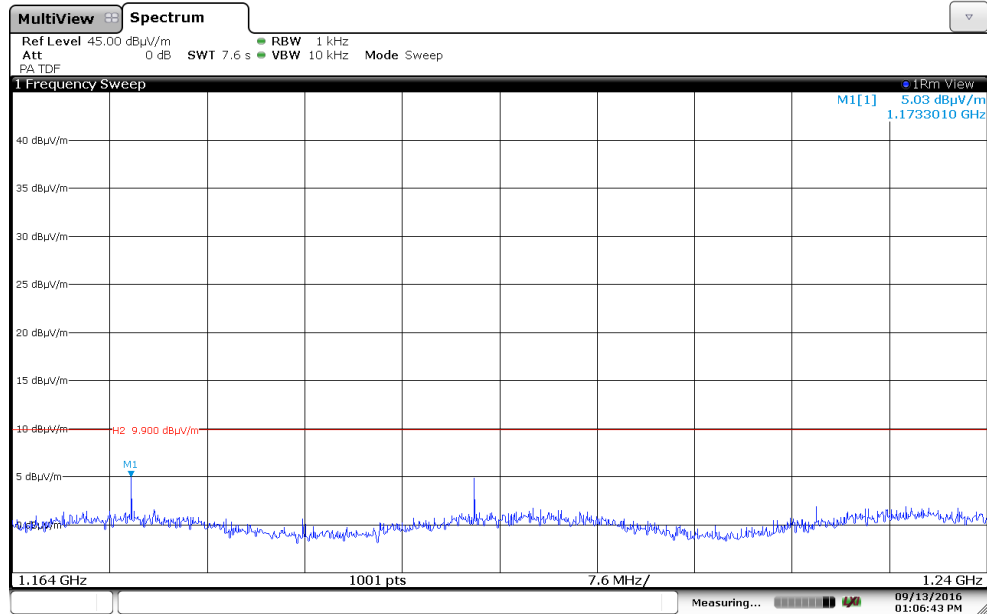
6.6. Spurious Radiated Emissions in GPS Bands (15.517 (d) continued)

6.6.3.1 Horizontal Measurement Polarity 1164 to 1240 MHz



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6.6.3.2 Vertical Measurement Polarity 1164 to 1240 MHz



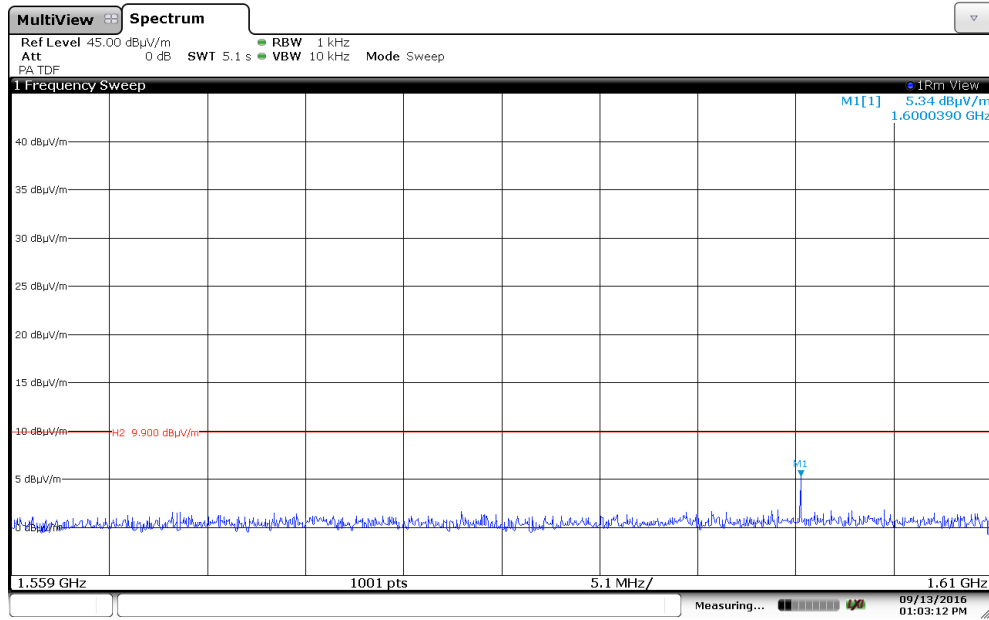
01:06:44 PM 09/13/2016



6. Measurement Data (continued)

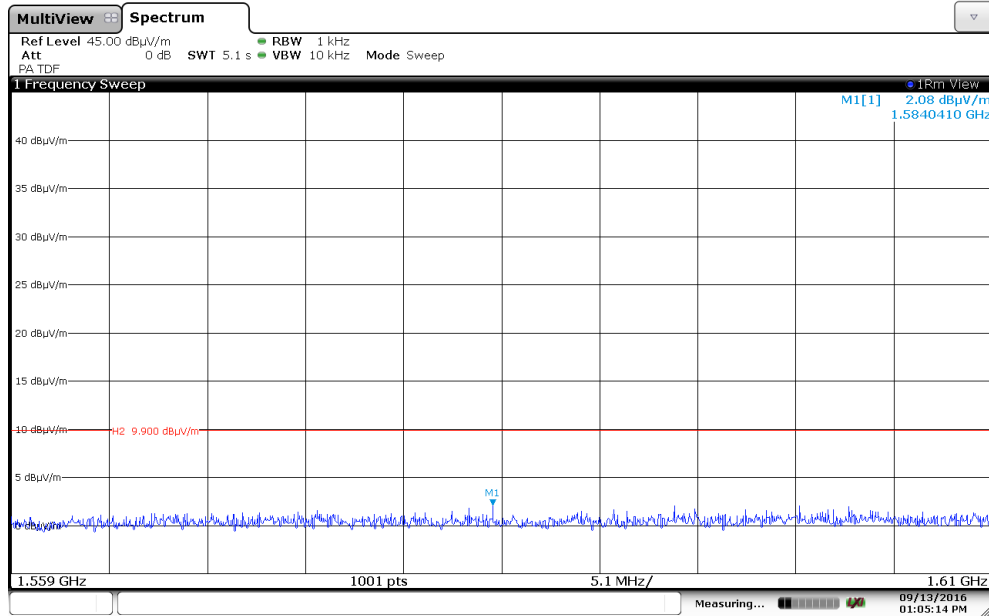
6.6. Spurious Radiated Emissions in GPS Bands (15.517 (d) continued)

6.6.3.3 Horizontal Measurement Polarity 1559 to 1610 MHz



01:03:13 PM 09/13/2016

6.6.3.4 Vertical Measurement Polarity 1559 to 1610 MHz



01:05:14 PM 09/13/2016

**6. Measurement Data (continued)**

**6.7. Radiated Emissions of UWB Transmission (15.517 (c), 15.521 (d))**

Requirement: 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:

The RMS average measurement is based on the use of a spectrum analyzer with a resolution bandwidth of 1 MHz, an RMS detector, and a 1 millisecond or less averaging time.

The EIRP in terms of dBm, can be converted to a field strength, in dBµV/m at 3 Meters by adding 95.2.

Frequency (MHz)	EIRP (dBm)	EIRP at 3 Meters (dBµV/m)
3100 - 10600	-41.3	53.9

Frequency Range: 3.5 to 4.5 GHz  
 Measurement Distance: 3 Meters  
 EMI Receiver IF Bandwidth: 1 MHz  
 EMI Receiver Avg Bandwidth: 10 MHz  
 Detector Function: RMS 1 mS Average as defined in 15.521(d)

6. Measurement Data (continued)

6.7. Spurious Radiated Emissions (15.517 (c), 15.521(d))

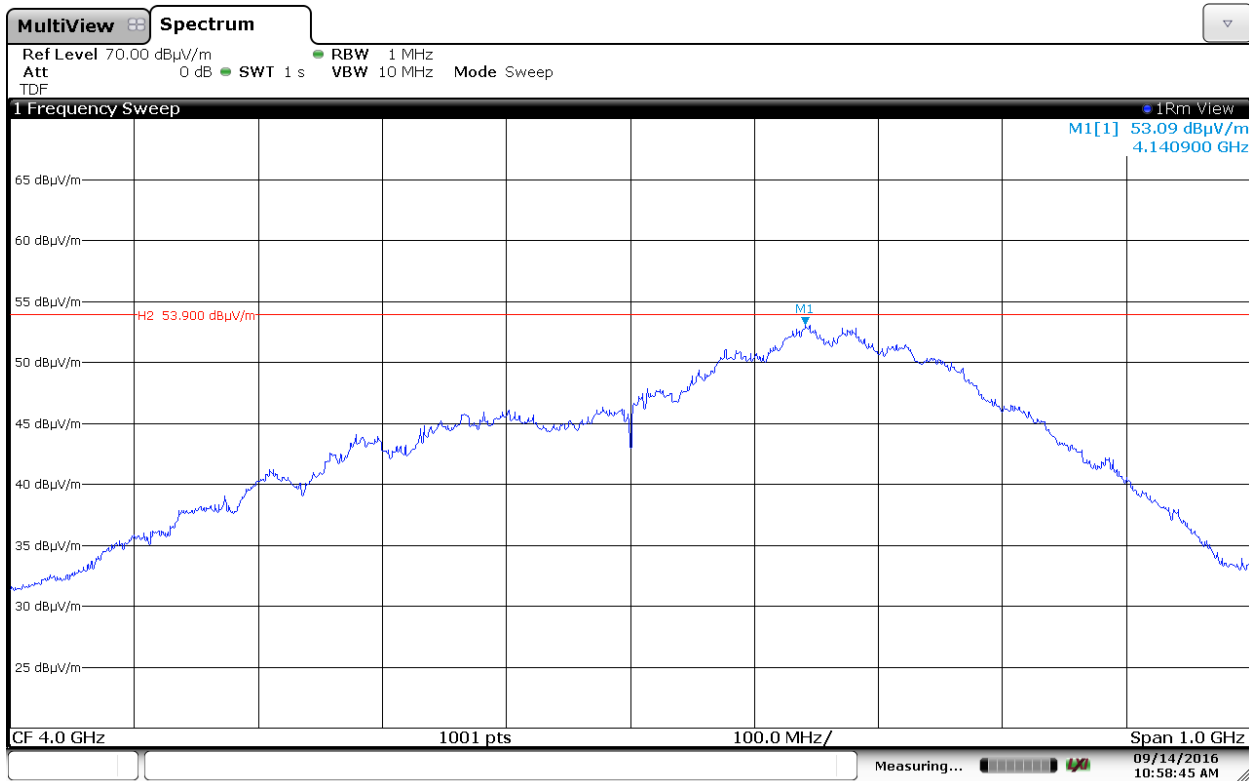
6.7.1. Plot of RMS Power at 3 Meters (Channel 2, 110 kbps, 64M PRF)

Frequency (GHz)	Amplitude <sup>1</sup>	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dBμV/m)	(dBμV/m)	(dB)	H/V	cm	Deg	
4.1409	53.09	53.90	-0.81	H	100	155	Compliant

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

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

Frequency (GHz)	Amplitude <sup>1</sup>	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dBm)	(dBm)	(dB)	H/V	cm	Deg	
4.1409	-42.11	-41.30	-0.81	H	100	155	Compliant



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**6. Measurement Data (continued)**

**6.8. Peak Emissions in a 50 MHz Bandwidth (15.517 (e), 15.521 (g))**

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.

The EIRP in terms of dBm, can be converted to a field strength, in dB $\mu$ V/m at 3 Meters by adding 95.2. As used in this subpart, EIRP refers to the highest signal strength measured in any direction and at any frequency from the UWB device.

Frequency (MHz)	EIRP (dBm)	EIRP at 3 Meters (dB $\mu$ V/m)
3100 - 10600	0	95.2

Frequency Range: 3.5 to 4.5 GHz  
 Measurement Distance: 3 Meters  
 EMI Receiver IF Bandwidth: 50 MHz  
 EMI Receiver Avg Bandwidth: 80 MHz  
 Detector Function: Peak, Max Held

6. Measurement Data (continued)

6.8. Peak Emissions in a 50 MHz Bandwidth (15.517 (e), 15.521 (g) continued)

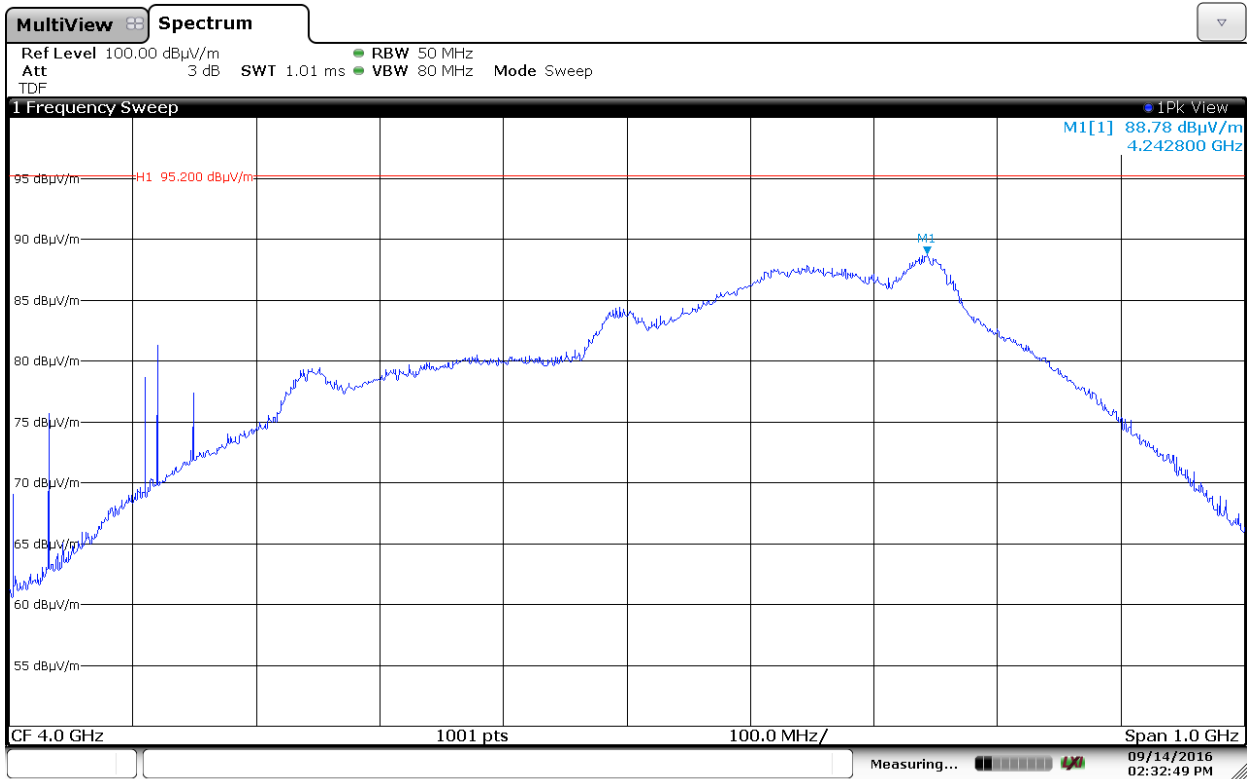
6.8.1 Plot of Peak Power at 3 Meters (Channel 2, 110 kbps, 64M PRF)

Frequency (GHz)	Amplitude <sup>1</sup>	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dBμV/m)	(dBμV/m)	(dB)	H/V	cm	Deg	
4.2428	88.78	95.20	-6.42	H	100	155	Compliant

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

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

Frequency (GHz)	Amplitude <sup>1</sup>	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dBm)	(dBm)	(dB)	H/V	cm	Deg	
4.2428	-6.42	0.00	-6.42	H	100	155	Compliant



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**6. Measurement Data (continued)**

**6.9 Conducted Emissions Test Setup**

**6.9.1. Regulatory Limit: FCC Part 15, Class B**

Frequency Range (MHz)	Limits (dBµV)	
	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.

**6.9.2 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

**6.9.3. 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

**6.9.4. 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.

**6. Measurement Data (continued)**

**6.10. Public Exposure to Radio Frequency Energy Levels (1.1307 (b)(1))**

**6.10.1. SAR Test Exclusion Calculation**

Requirement: Portable devices as defined in § 2.1093 of this chapter operating under Part 15 are subject to radio frequency radiation exposure requirements as specified in §§ 1.1307(b) and 2.1093 of this chapter. For a 1-g SAR, the test exclusion result must be ≤ 3.0.

Test Notes: The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by the following formula:

$$\text{SAR Test Exclusion} = \frac{P_{\text{MAX}}}{d_{\text{MIN}}} \times \sqrt{f_{\text{(GHz)}}} \quad (1)$$

- $P_{\text{MAX}}$  mW Maximum power of channel, including tune-up tolerance
- $d_{\text{MIN}}$  mm Minimum test separation distance, mm (≤ 50 mm)
- $f_{\text{(GHz)}}$  GHz  $f_{\text{(GHz)}}$  is the RF channel transmit frequency in GHz (>100 MHz and <6 GHz)

(1) FCC OET 447498 - Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

Result: The device under test meets the exclusion requirement detailed in FCC OET 447498.

<b>Channel 2</b>			
<b>Input:</b>	$P_{\text{MAX}}$	0.2265	mW
	$d_{\text{MIN}}$	5.00	mm
	$f_{\text{(GHz)}}$	4.243	GHz
	<b>Test Exclusion:</b>	<b>0.093</b>	
	<b>Limit Exemption:</b>	<b>3.000</b>	

<sup>1</sup> Taken from the peak data in Section 6.5 of this test report (converted to mW).

The device does not exceed the test limit exemption and therefore a routine SAR Evaluation is not required

## 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



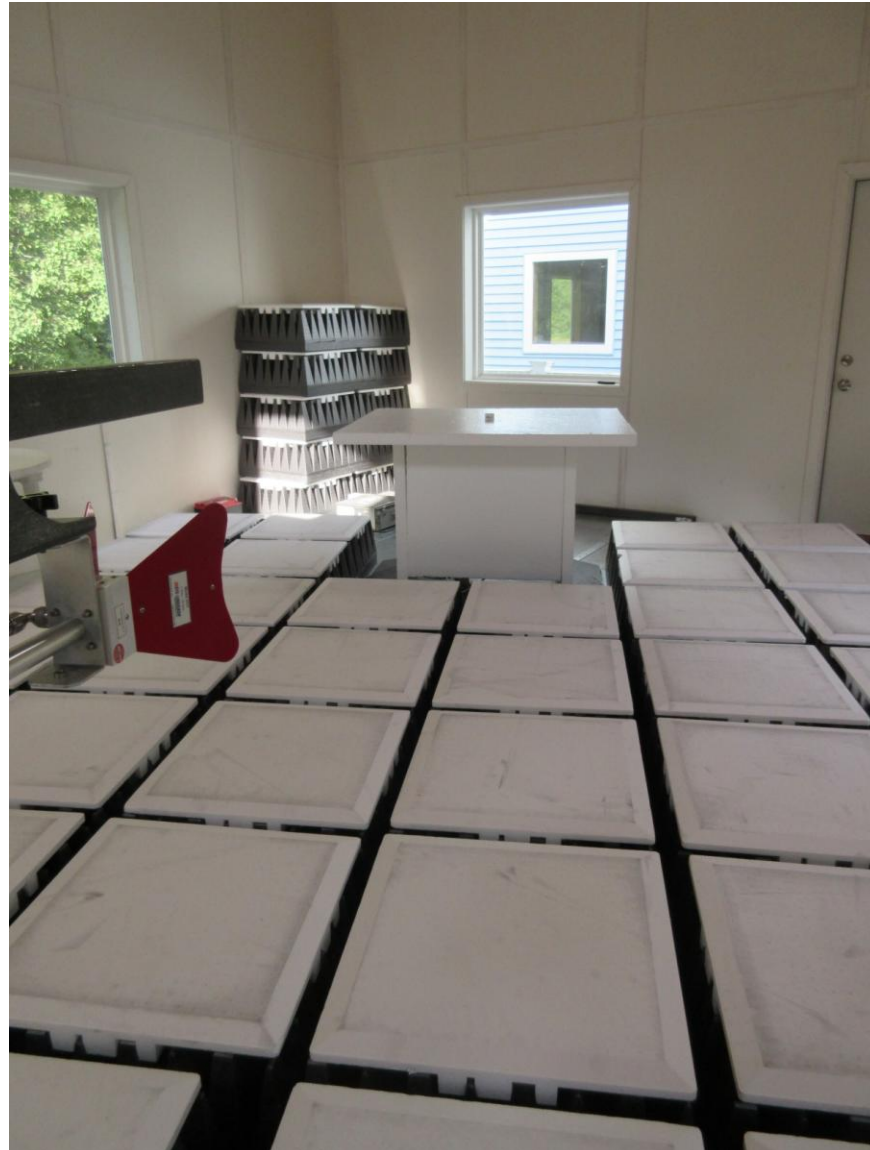
8. Test Images

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



**8. Test Images**

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





8. Test Images

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



**8. Test Images**

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

