

## **COMPLIANCE WORLDWIDE INC. TEST REPORT 433-19**

**In Accordance with the Requirements of  
FCC PART 15.247, SUBPART C  
Class II Permissive Change  
Innovation, Science and Economic Development Canada  
RSS-247, Issue 2**

**Low Power License-Exempt Radio Communication Devices  
Intentional Radiators**

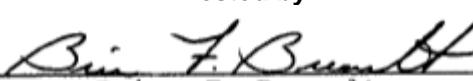
**Issued to  
iZotope, Inc.  
60 Hampshire Street  
Cambridge, MA 02139  
617-577-7799**

**for the  
iZotope Spire Studio (Tonos Product)  
Model: SP121  
802.11b/g/n Transmitter**

**FCC ID: 2AKPU1DX  
IC: 23446-PU1DX**

**Report Issued on November 22, 2019**

**Tested by**

  
\_\_\_\_\_  
Brian F. Breault

**Reviewed by**

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

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## 1. Scope

This test report certifies that the iZotope Spire Studio (Tonos Product) 802.11b/g/n Transmitter, as tested, meets the FCC Part 15, Subpart C and ISED Canada RSS-247, Issue 2 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.

## 2. Product Details

<b>2.1. Manufacturer:</b>	iZotope, Inc.
<b>2.2. Model Number:</b>	Spire Studio
<b>2.3. Serial Number:</b>	HA-389 (including HA-414 CPU, HA-426 UI, and HA-401 Audio)
<b>2.4. Description:</b>	"Spire Capture Pro": wireless internet enabled audio recording device.
<b>2.5. Power Source:</b>	DC 5 Volts @ 2 Amps. (Wall adapter)
<b>2.6. Hardware Revision:</b>	Tonos_Rev2
<b>2.7. Software Revision:</b>	Bare Modus 2.2.0.15384
<b>2.8. Modulation Type:</b>	OFDM
<b>2.9. Operating Frequency:</b>	2.4 GHz Nominal
<b>2.10. EMC Modifications:</b>	None

## 3. Product Configuration

### 3.1. Operational Characteristics & Software

First, make sure to plug the device in and let it charge for at least two hours. Turn the device on by pressing and holding the power button on the rear for at least two seconds. The LED panel will display a boot-up animation with white LEDs. After a few seconds, the device will enter testing mode and the LED panel will display one yellow and nine purple segments. The device will initially be in an idle, non-transmitting state.

For 802.11g testing, the device has four test modes:

Test Mode	Tx Mode	Channel	Data Rate
1	Idle	-	-
2	802.11g	1	6 Mbps
3	802.11g	6	6 Mbps
4	802.11g	11	6 Mbps

### 3.2. EUT Hardware

Manufacturer	Model/Part # / Options	Serial Number	Input Voltage	Freq (Hz)	Description/Function
iZotope, Inc.	Spire Studio	None	5	DC	

### 3.3. EUT Cables/Transducers

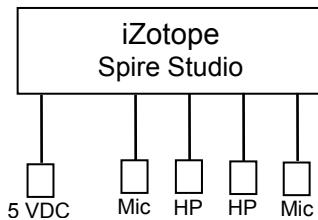
Cable Type	Length	Shield	From	To
Power	1 Meter	No	Power Adapter	Equipment under test
Mic/Line In 1	1 Meter	Yes	Unterminated	Equipment under test
Mic/Line In 2	1 Meter	Yes	Unterminated	Equipment under test
Headphones	1 Meter	Yes	Headphones	Equipment under test

### 3. Product Configuration (continued)

#### 3.4. Support Equipment

Device	Manufacturer	Model	Serial No.	Comment
None				

#### 3.5. Block Diagram Cables



### 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 <sup>1</sup>	Rohde & Schwarz	ESR7	101156	9/10/2020	2 Years
EMI Test Receiver, 10 Hz - 7GHz <sup>1</sup>	Rohde & Schwarz	ESR7	101770	10/3/2020	2 Years
Spectrum Analyzer, 2 Hz to 26.5 GHz <sup>2</sup>	Rohde & Schwarz	FSW26	102057	9/13/2020	2 Years
Spectrum Analyzer, 9 kHz to 40 GHz <sup>3</sup>	Rohde & Schwarz	FSV40	100899	9/10/2020	2 Years
EMI Receiver 9 kHz - 1 GHz	Hewlett Packard	8546A	3650A00360	9/11/2020	2 Years
Loop Antenna 9 kHz - 30 MHz	EMCO	6512	9309-1139	1/28/2022	3 Years
Biconilog Antenna, 30 MHz to 2 GHz	Sunol Sciences Corp	JB1	A050913	6/5/2022	2 Years
Horn Antenna, 960 MHz to 18 GHz	Electro-Metrics	EM-6961	6337	10/3/2020	2 Years
Horn Antenna, 18 GHz to 40 GHz	Com-Power	AH-840	03075	1/7/2021	2 Years
Preamplifier, 1 GHz to 26.5 GHz	Hewlett Packard	8449B	3008A01323	9/11/2020	2 Years
Digital Barometer	Control Company	4195	ID236	4/3/2020	2 Years
Temperature Chamber	Associated Environmental	SD-308	10782	CNR	

<sup>1</sup> ESR7 Firmware revision: V3.46 SP1, Date installed: 12/22/2018

Previous V3.36 SP2, installed 12/5/2018.

<sup>2</sup> FSW26 Firmware revision: V4.30 SP1, Date installed: 02/22/2019

Previous V3.36 SP2, installed 10/26/2018.

<sup>3</sup> FSV40 Firmware revision: V2.30 SP4, Date installed: 05/04/2016

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

#### 4.2. Measurement Software

Manufacturer	Software Description	Title or Model #	Rev.	Report Sections
Compliance Worldwide	Test Report Generation Software	Test Report Generator	1.0	7.10. Conducted Emissions

#### 4. Measurements Parameters

##### 4.3. Measurement & Equipment Setup

Test Dates:	November 6 <sup>th</sup> to November 15 <sup>th</sup>
Test Engineers:	Brian Breault
Normal Site Temperature (15 - 35°C):	21.7
Relative Humidity (20 -75%RH):	32%
Frequency Range:	30 kHz to 25 GHz
Measurement Distance:	3 Meters
EMI Receiver IF Bandwidth:	9 kHz – 150 kHz to 30 MHz 120 kHz – 30 MHz to 1 GHz 1 MHz – Above 1 GHz
EMI Receiver Avg Bandwidth:	30 kHz – 150 kHz to 30 MHz 300 kHz – 30 MHz to 1 GHz 3 MHz – Above 1 GHz
Detector Function:	Peak, QP - 150 kHz to 1 GHz Peak, Avg - Above 1 GHz Unless otherwise specified.

##### 4.4. Measurement Procedures

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

The measurement procedures in this report are in accordance with ANSI C63.10-2013: *American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices*. FCC OET Publication Number KDB 558074 D01 v05r02, *Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS), Frequency Hopping Spread Spectrum Systems, and Hybrid System Devices Operating Under §15.247*, dated April 2, 2019, was also referenced for the test procedures used to generate the data in this report. All references to these publications refer to this versions and dates detailed in this paragraph.

#### 4. Measurements Parameters (continued)

##### 4.5. Measurement Uncertainty

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

RF Frequency	$\pm 1 \times 10^{-8}$
Radiated Emission of Transmitter	$\pm 4.55$ dB
Radiated Emission of Receiver	$\pm 4.55$ dB
Temperature	$\pm 0.91^\circ C$
Humidity	$\pm 5\%$

#### 5. Choice of Equipment for Test Suits

##### 5.1 Choice of Model

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

##### 5.2 Presentation

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

##### 5.3 Choice of Operating Frequencies

The Izotope Spire Studio, as tested, operates on 11 channels, from channels 1 to 11 in the 2.4 GHz band.

In accordance with ANSI C63.10-2013, section 5.6, and FCC Part 15.31 (m), the choice of operating frequencies selected for the testing detailed in this report are outlined in the following table:

Channel	Frequency (MHz)	802.11g
1	2412	Tested
2	2417	Not Tested
3	2422	
4	2427	
5	2432	
6	2437	Tested
7	2442	Not Tested
8	2447	
9	2452	
10	2457	
11	2462	Tested

## 5. Choice of Equipment for Test Suits (continued)

### 5.4 Modes of Operation

802.11/g and a data rate of 6 Mbps was selected as worst case for testing the Izotope Spire Studio 802.11b/g/n transmitter because it provided the worst case combination of amplitude and bandwidth.

### 2.4 GHz Test Modes

Mode	Modulation	Data Rate
802.11g	OFDM	6 Mbps

## 6. Measurement Summary

Test Requirement	FCC Rule Reference	Test Report Section	Result
Antenna Requirement	15.203	7.1	Compliant
Minimum DTS Bandwidth	15.247 (a) (2)	7.2	Compliant
Occupied Bandwidth	15.247 (b) (1)	7.3	Compliant
Maximum Peak Conducted Output Power	15.247 (b) (1)	7.4	Compliant
Operation with directional antenna gains greater than 6 dBi	15.247 (b) (4)	7.5	Compliant
Transmitter Spurious Radiated Emissions	15.247 (d)	7.6	Compliant
Spurious Radiated Emissions (> GHz) - Harmonic Measurements	15.247 (d)		Compliant
Band Edge and Out of Band Measurements	15.247 (d)	7.7	Compliant
Emissions in Non-restricted Frequency Bands	15.247(e)	7.8	Compliant
Peak Power Spectral Density	15.247(e)	7.9	Compliant
Conducted Emissions	15.207	7.10	Compliant
Duty Cycle	15.207	7.11	Compliant
Public Exposure to Radio Frequency Energy Levels	1.1307 (b) (1)	7.12	Compliant



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## 7. Measurement Data

### 7.1. 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 with the provisions of this Section.

Conclusion: The Izotope Spire Studio utilizes an internal chip antenna which is not user accessible.

## 7.2. Minimum DTS Bandwidth

Requirement: (15.247 (a) (2))

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

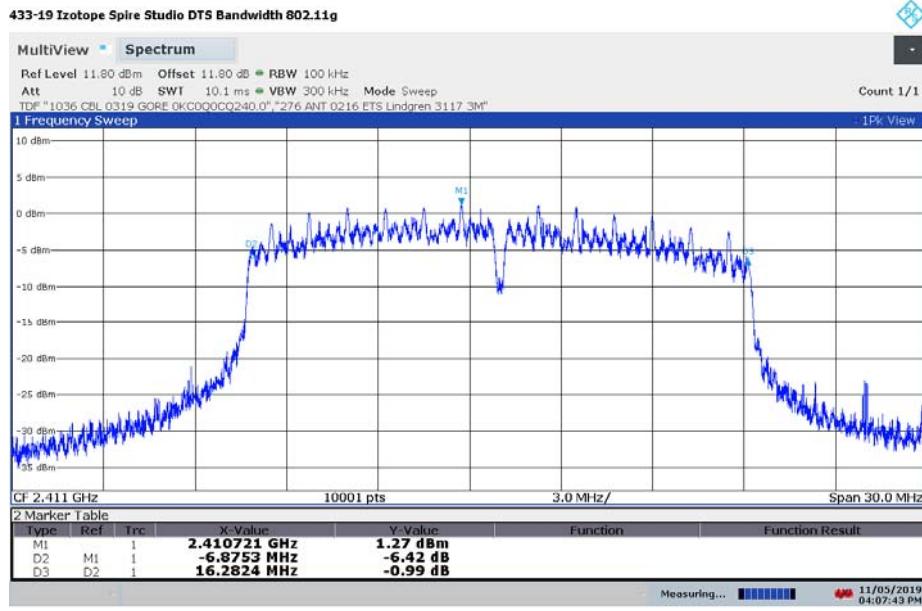
Procedure: This test was performed in accordance with the procedure detailed in Subclause 11.8 of ANSI C63.10, DTS Bandwidth.

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

### Measurement Results

802.11g Mode Channel	Frequency (MHz)	-6 dB Bandwidth (kHz)	Minimum -6 dB Bandwidth (kHz)	Result
Low	2412	16282.4	>500	Compliant
Middle	2437	16405.4	>500	Compliant
High	2462	16276.4	>500	Compliant

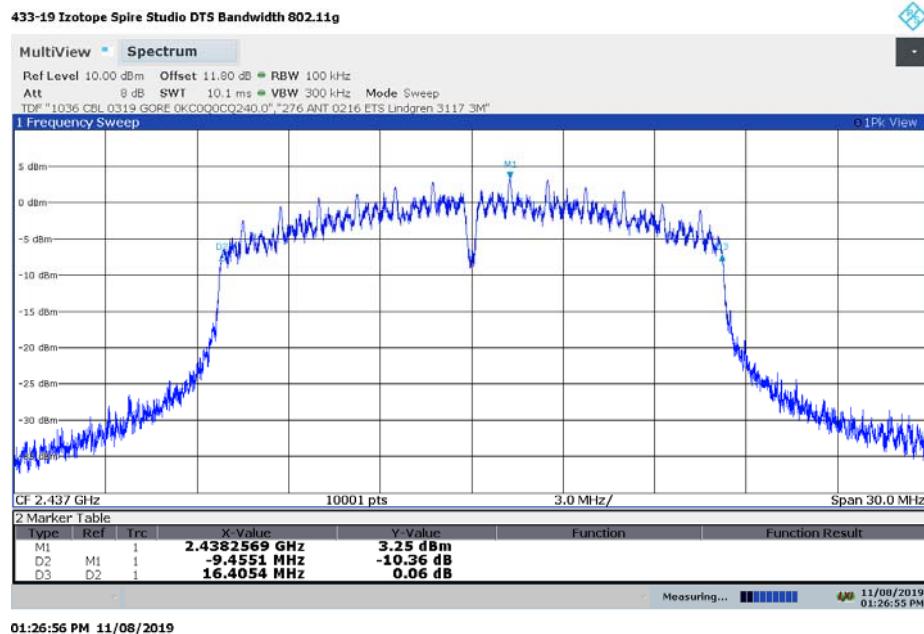
### 7.2.1. 802.11g: Low Channel – 1, 2412 MHz



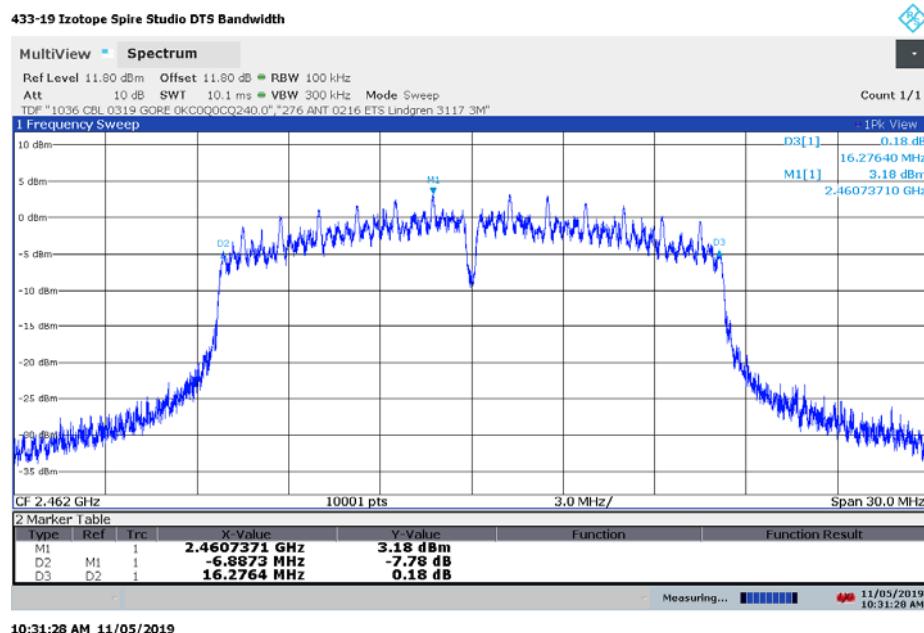
## 7. Measurement Data

### 7.2. Minimum DTS Bandwidth (15.247 (a) (2)) (continued)

#### 7.2.2. 802.11g Middle Channel – 6, 2437 MHz



#### 7.2.3. 802.11g: High Channel – 11, 2462 MHz



## 7. Measurement Data

### 7.3. Occupied Bandwidth (ISED RSS 210, RSS-GEN 4.6.1)

**Requirement:** The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

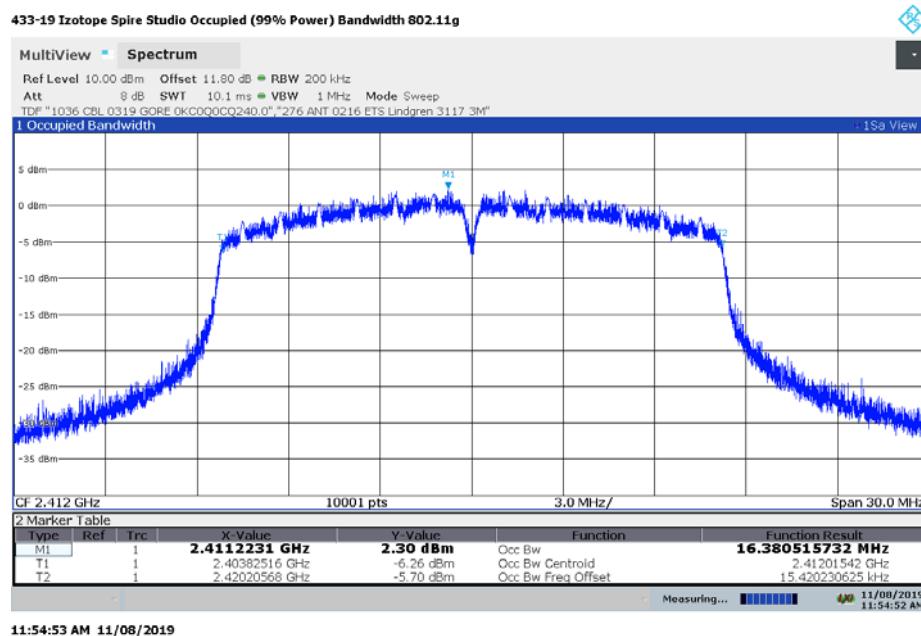
**Procedure:** This test was performed in accordance with the procedure detailed in Subclause 6.7 of ISED RSS-GEN.

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

#### Measurement Results

802.11g Mode Channel	Channel Frequency (MHz)	99% Power BW (MHz)
Low	2412	16.381
Middle	2437	16.358
High	2462	16.401

#### 7.2.1. 802.11g: Low Channel – 1, 2412 MHz

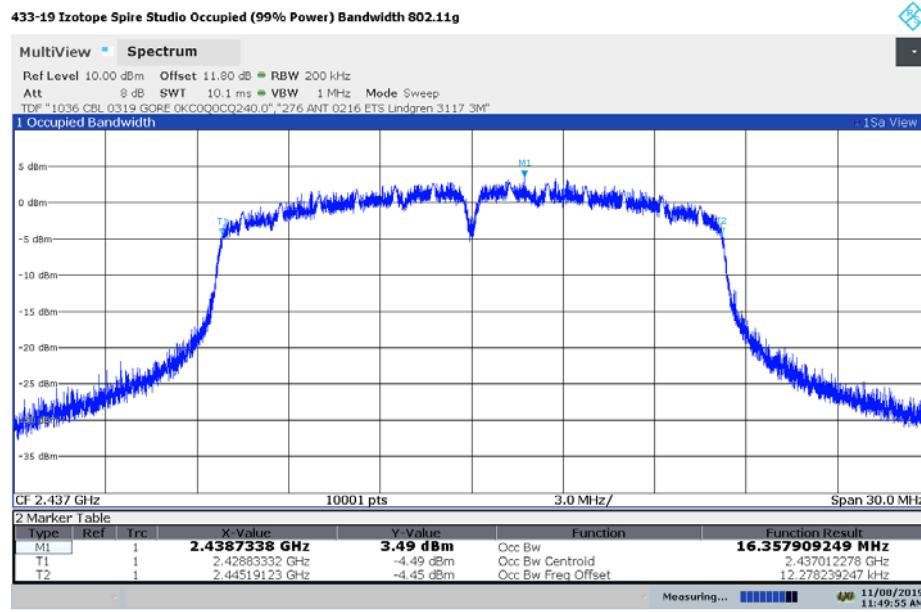


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## 7. Measurement Data

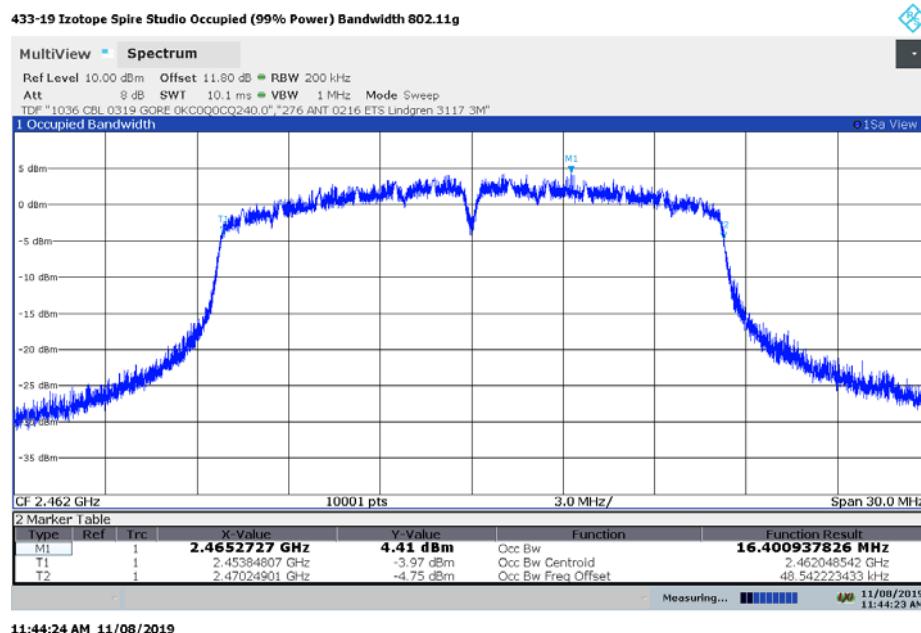
### 7.3. Occupied Bandwidth (ISED RSS 210, RSS-GEN 4.6.1)

#### 7.3.2. 802.11g Middle Channel – 6, 2437 MHz



11:49:55 AM 11/08/2019

#### 7.3.3. 802.11g: High Channel – 11, 2462 MHz



11:44:24 AM 11/08/2019

## 7. Measurement Data (continued)

### 7.4. Maximum Peak Conducted Output Power

Requirement: (15.247 (b) (3))

The maximum peak conducted output power of the intentional radiator shall not exceed the following: For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt (+30 dBm).

Procedure: The equipment under test did not have an RF connector to provide the capability of making a conducted mode measurement. The EIRP was calculated from the field strength measurement using the formula detailed in Annex G ANSI C63.10 and provided below.

$$\text{EIRP} = p_t \times g_t = (E \times d)^2 / 30 \quad (\text{G.1})$$

$p_t$  transmitter output power in watts

$g_t$  numeric gain of the transmitting antenna (dimensionless)

$E$  electric field strength in V/m

$D$  measurement distance in meters (m)

Conclusion: The device under test meets the required maximum peak conducted output power level of 1 Watt (+30 dBm).

#### Measurement Results

Channel	Frequency	Maximum Peak Field Strength	Effective Isotropically Radiated Power (EIRP)	Peak Limit	Margin	Result
	(MHz)	(dB $\mu$ V/m)	(dBm)	(dBm)	(dBm)	
Low	2412	113.50	18.27	30.00	-11.73	Compliant
Middle	2437	115.99	20.76	30.00	-9.24	Compliant
High	2462	116.04	20.81	30.00	-9.19	Compliant

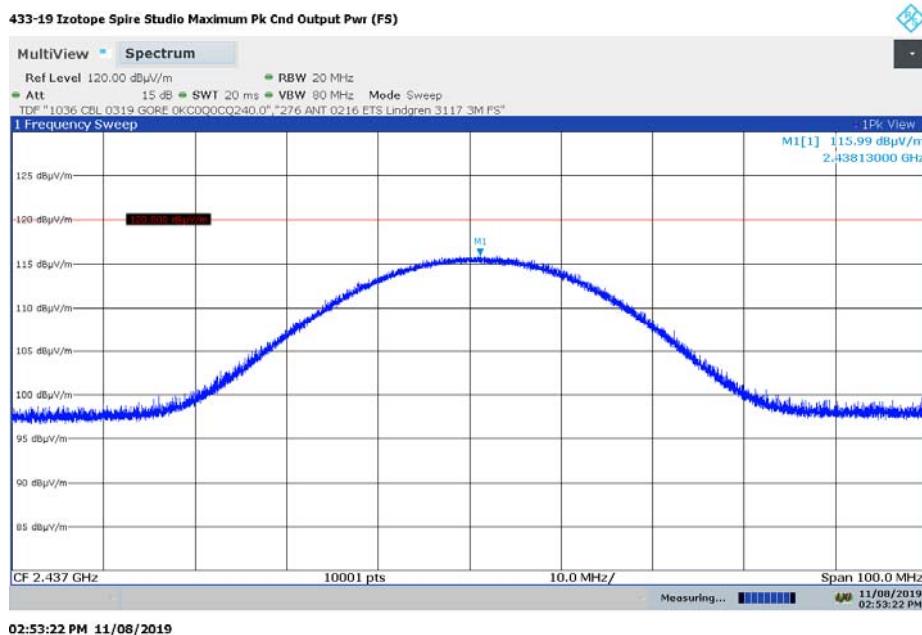
## 7. Measurement Data

### 7.3. Maximum Peak Conducted Output Power (continued)

#### 7.4.1. 802.11g: Low Channel – 1, 2412 MHz



#### 7.4.2. 802.11g: Middle Channel – 6, 2437 MHz



## 7. Measurement Data

### 7.3. Maximum Peak Conducted Output Power (continued)

#### 7.4.3. 802.11g: High Channel – 11, 2462 MHz





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## 7. Measurement Data (continued)

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

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

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

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Procedure: Not applicable for the device under test.

EUT Status: The EUT utilizes a Johanson Technology antenna, part number 2450AT18D0100, which provides 1.5 dBi peak gain from 2.4 GHz to 2.8 GHz and therefore is exempt from this requirement.

## 7. Measurement Data (continued)

### 7.6. Transmitter Spurious Radiated Emissions (30 kHz to 25 GHz)

#### 7.6.1 Transmitter Spurious Radiated Emissions

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

Frequency Range (MHz)	Distance (Meters)	Limit (dB $\mu$ V/m) <sup>1</sup>
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

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

Procedure: This test was performed in accordance with the procedure detailed in FCC OET publication number 558074, Section 12.0: Emissions in restricted frequency bands and FCC 47CFRPart 15.209: Radiated Emission Limits; General Requirements.

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.

Test Notes: Measurements were made from the lowest oscillator frequency stated by the manufacturer (32.768 kHz) to the 10<sup>th</sup> harmonic of the highest transmitter frequency or 40 MHz, whichever is lower.

Reference FCC Part 15.33(a) and FCC Part 15.33(a)(1).

Each of the test modes documented within the test report were evaluated and the worst case of each of the test modes is detailed in this section. A full set of measurement scans are presented in Appendix A of this test report.

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

Frequency Range	Worst-Case Measured Frequency (MHz)	Field Strength (dB $\mu$ V/m)	FCC Part 15.209 Limit (dB $\mu$ V/m)	Margin (dB)	Screen Plot Reference	Channel	Receive Antenna Polarity
						1/6/11	(H/V)
10 kHz - 150 kHz	0.0158	78.60	123.61	-45.01	A.1.1.3	1	Gnd Par
.150 kHz - 30 MHz	0.5595	56.53	72.65	-16.12	A.1.2.6	6	Gnd Par
30 MHz - 1000 MHz	954.57	38.74	46.00	-7.26	A.1.3.5	11	H
1000 MHz - 2400 MHz	1992.01	45.88	54.00	-8.12	A.1.4.6	11	V
2483.5 MHz - 7000 MHz	6909.00	43.89	54.00	-10.11	A.1.5.3	6	H
7000 MHz - 18000 MHz	17822.40	48.03	54.00	-6.24	A.1.6.1	1	H
18000 MHz - 25000 MHz	23911.26	44.60	54.00	-6.56	A.1.7.2	1	V

## 7. Measurement Data (continued)

### 7.6. Transmitter Spurious Radiated Emissions (150 kHz to 40 GHz)

#### 7.6.2. Transmitter Spurious Radiated Emissions (Harmonic Meas.) Test Results

Note: Worst case measurements of Harmonics that fall into the restricted bands.

##### 7.6.2.1. 2.4 GHz, 802.11g

802.11b Freq. (MHz)	Field Strength (dB $\mu$ V/m) <sup>1</sup>		Limit (dB $\mu$ V/m)		Margin (dB $\mu$ V/m)		Antenna Polarity (H/V)	Result
	Peak	Average	Peak	Average	Peak	Average		
4824	50.01	35.79	74	54	-23.99	-18.21	H	Compliant
4874	50.49	36.29	74	54	-23.51	-17.71	V	Compliant
4924	49.19	35.92	74	54	-24.81	-18.08	V	Compliant
7311	52.63	39.56	74	54	-21.37	-14.44	V	Compliant
7386	54.55	42.39	74	54	-19.45	-11.61	V	Compliant
12060	60.11	46.23	74	54	-13.89	-7.77	H	Compliant
12185	60.62	46.59	74	54	-13.38	-7.41	V	Compliant
12310	60.82	46.89	74	54	-13.18	-7.11	V	Compliant
14472	62.32	48.15	74	54	-11.68	-5.85	H	Compliant
19296	61.78	47.78	74	54	-12.22	-6.22	V	Compliant
19496	62.03	47.90	74	54	-11.97	-6.10	H	Compliant
19696	60.93	47.26	74	54	-13.07	-6.74	H	Compliant
22158	91.91	48.35	74	54	17.91	-5.65	H	Compliant

<sup>1</sup> All correction factors are stored in the spectrum analyzer and applied to this column entry.

## 7. Measurement Data (continued)

### 7.7. Band Edge and Out of Band Measurements

Requirement: 15.247(d) 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Procedure: For the lower band edge, this test was performed in accordance with the procedure detailed in ANSI C63.10, Section 6.10.4: Authorized-band band-edge measurements (relative method).

For the upper band edge, this test was performed in accordance with the procedure detailed in ANSI C63.10, Section 6.10.5: Restricted-band band-edge measurements.

Test Note: The radiated band edge and worst case out of band measurements in this report represent the measurements made with the worst case receive antenna polarity.

Conclusion: The EUT met the 20 dB requirement at the lower band edge and the Part 15.209 requirements at the upper band edge.

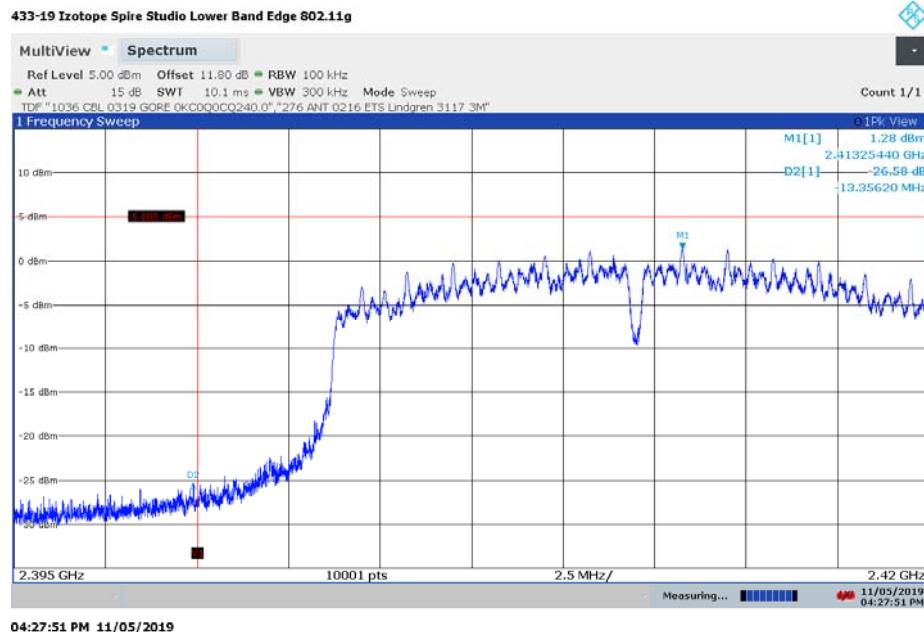
## 7. Measurement Data (continued)

### 7.7. Band Edge and Out of Band Measurements (continued)

#### 7.7.1. Lower Band Edge

Band Edge Frequency (MHz)	Mode of Operation	Lowest Transmitter Frequency (MHz)	Maximum PSD (100 kHz) (dBm)	Band Edge PSD (100 kHz) (dBm)	Offset	Minimum Required Offset	Result
2400	802.11g	2412	1.28	-25.3	-26.58	-20 dB	Compliant

#### 7.7.1.1. Lower Band Edge, 802.11g



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## 7. Measurement Data (continued)

### 7.7. Band Edge and Out of Band Measurements (continued)

#### 7.7.2. Upper Band Edge and Worst Case Out of Band

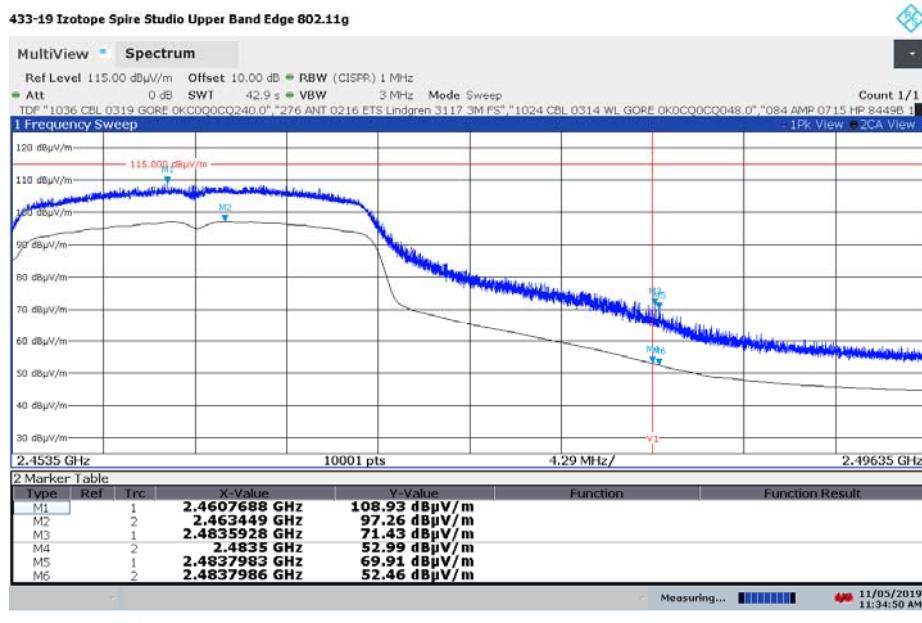
##### Upper Band Edge

Mode of Operation	Freq. (MHz)	Field Strength (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB $\mu$ V/m)		Result
		Peak	Average	Peak	Average	Peak	Average	
802.11g	2483.50	71.43	52.99	74	54	-2.57	-1.01	Compliant

##### Worst Case Out of Band

Mode of Operation	Freq. (MHz)	Field Strength (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB $\mu$ V/m)		Result
		Peak	Average	Peak	Average	Peak	Average	
802.11g	2483.798	69.91	52.46	74	54	-4.09	-1.54	Compliant

#### 7.7.2.1. Upper Band Edge & Worst Case Out of Band, 802.11g



**Test Number: 433-19**
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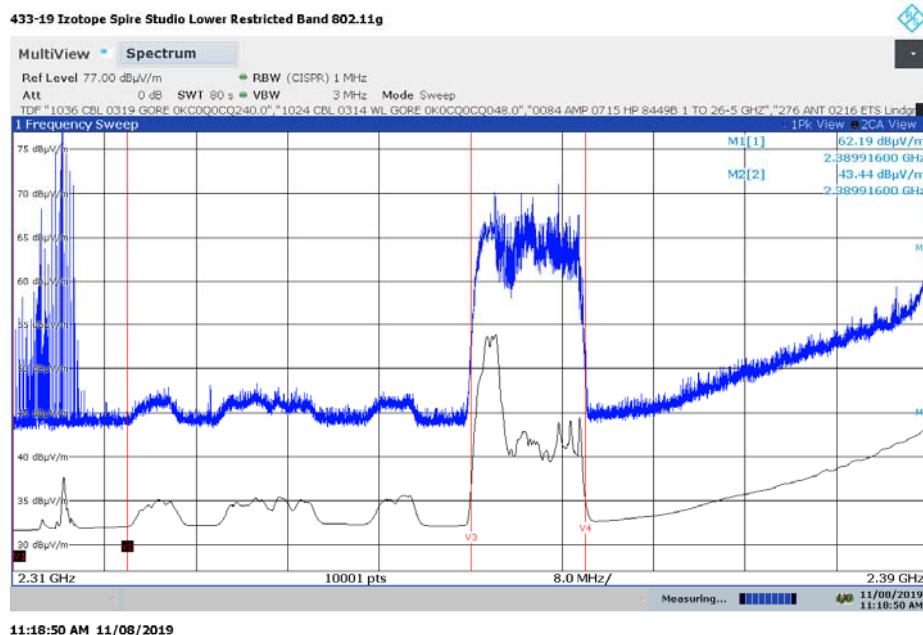
## 7. Measurement Data (continued)

### 7.7. Band Edge and Out of Band Measurements (continued)

#### 7.7.3. Lower Restricted Band, 2.310 MHz to 2390 MHz

Mode of Operation	Freq. (MHz)	Field Strength (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB $\mu$ V/m)		Result
		Peak	Average	Peak	Average	Peak	Average	
802.11g	2389.916	62.19	43.44	74	54	-11.81	-10.56	Compliant

#### 7.7.3.1. Lower Restricted Band, 802.11g



#### Note about the non-EUT transmissions in this band:

The emissions in the lower part of the Lower Restricted Band were due to transmissions in the Wireless Communications Service (WCS) B Block (2310 MHz to 2315 MHz). The emission near the center of the Lower Restricted Band was due to a transmission in the WCS A and B Blocks (2350 MHz to 2360 MHz). A real-time observation of the Lower Restricted Band confirmed that there were no emissions contributed by the EUT in either of these WCS Blocks during the absence of the ambient signals. However, due to the time requirements of the CISPR average detector, this could not be realized on the spectrum analyzer display. Markers 1 and 2 represent the peak and CISPR average values of the worst case emission contributed by the EUT.

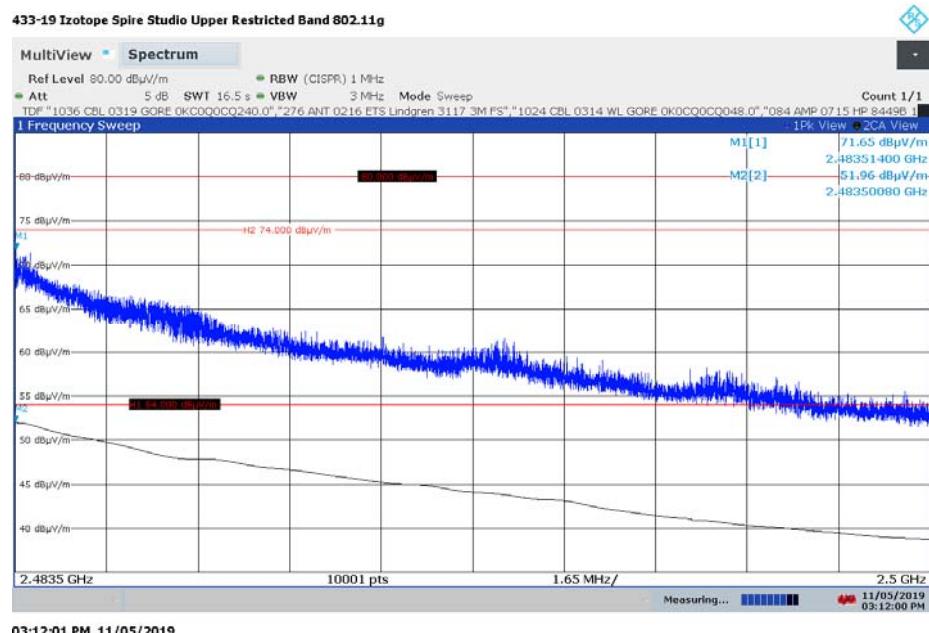
## 7. Measurement Data (continued)

### 7.7. Band Edge and Out of Band Measurements (continued)

#### 7.7.4. Upper Restricted Band, 2483.5 MHz to 2500 MHz

Mode of Operation	Freq. (MHz)	Field Strength (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB $\mu$ V/m)		Result
		Peak	Average	Peak	Average	Peak	Average	
802.11g	2483.510	71.65	51.96	74	54	-2.35	-2.04	Compliant

#### 7.7.4.1. Upper Restricted Band, 802.11g



## 7. Measurement Data (continued)

### 7.8. Emissions in Non-restricted Frequency Bands

Requirement: 15.247(d) 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.

**Test Notes:** The tabled measurements represent the measurement made with the worst case receive antenna polarity and turntable azimuth.

The peak measurement was taken at the time the DTS bandwidth measurement was made. This value was used as the reference level for the following measurement. Refer to section 7.2 of this report.

Screen captures for the emissions in the non-restricted frequency bands are located in Appendix B of this test report.

**Conclusion:** The DUT met the 20 dB requirement emission level delta requirement in the non restricted frequency bands.

#### Emissions in Non-restricted Frequency Bands

Mode of Operation	Maximum PSD (100 kHz) In-Band <sup>1</sup> (dBm)	Worst Case Out-of-Band Frequency (MHz)	Maximum PSD (100 kHz) Out-of-Band (dBm)	Delta to Maximum PSD (dB)	Minimum Required Delta	Margin	Result
<b>802.11g</b>	4.41	989.750	-29.56	-33.97	-20.00	-13.97	Compliant

<sup>1</sup>Taken from Section 7.2 - DTS Bandwidth

## 7. Measurement Data (continued)

### 7.9. Peak Power Spectral Density (15.247(e))

**Requirement:** For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of FCC Part 15.247. The same method of determining the conducted output power shall be used to determine the power spectral density.

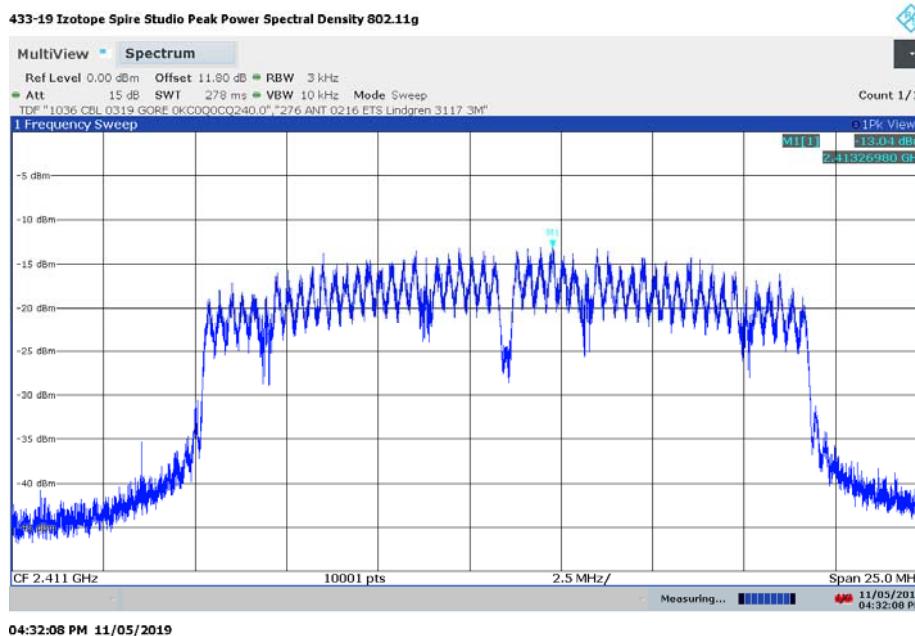
**Procedure:** ANSI C63.10, Section 11.10.2: Method PKPSD (peak PSD).

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

#### Measurement Results in 2400 MHz to 2483.5 MHz Band

802.11g Mode Channel	Frequency	Maximum PSD Frequency	Maximum Power Spectral Density	Limit	Margin	Result
	(MHz)	(MHz)	(dBm)			
Low	2412	2413.2698	-13.04	8.00	-21.04	Compliant
Middle	2437	2437.9299	-10.69	8.00	-18.69	Compliant
High	2462	2463.2799	-9.72	8.00	-17.72	Compliant

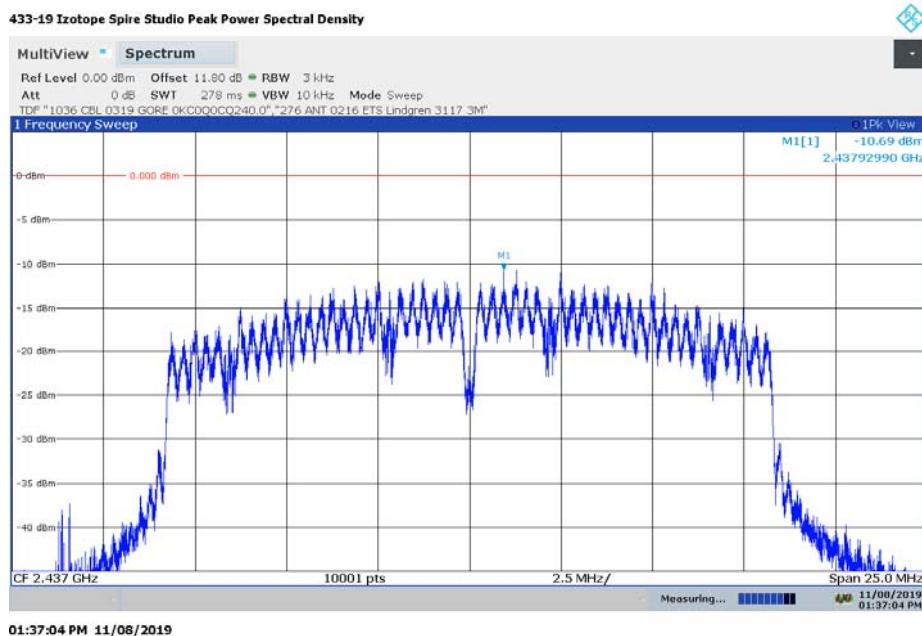
#### 7.9.1. 802.11g: Low Channel 1, 2412



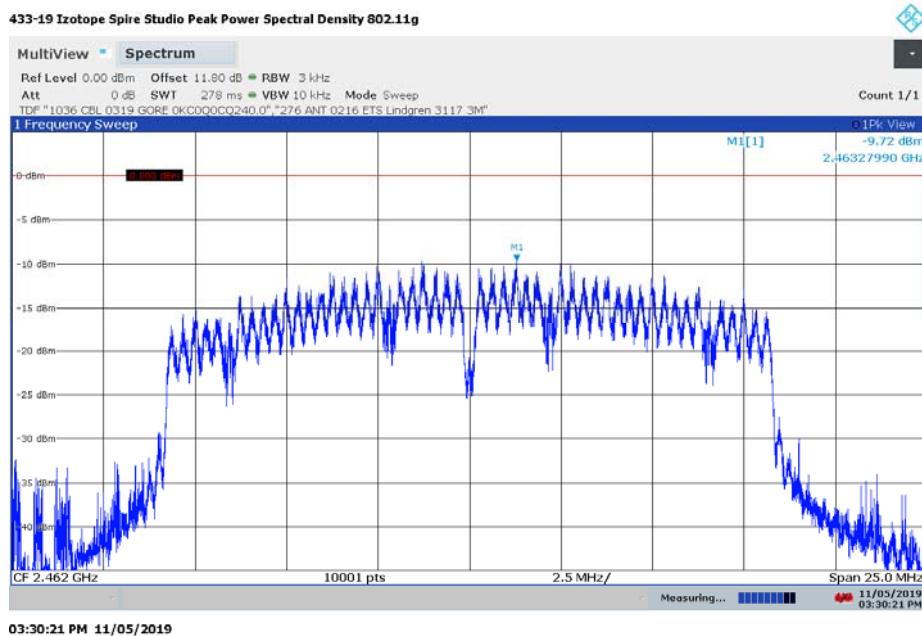
## 7. Measurement Data (continued)

### 7.9. Peak Power Spectral Density (15.247(e)) (continued)

#### 7.9.2. 802.11g: Middle Channel – 6, 2437 MHz



#### 7.9.3. 802.11g: High Channel – 11, 2462 MHz



## 7. Measurement Data (continued)

### 7.10. Conducted Emissions

Regulatory Limit: FCC Part 15.207

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.

### Measurement Equipment and Software Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due
LISN	EMCO	3825/2	9109-1860	9/10/2019
EMI Receiver	Hewlett Packard	8546A	3330A00115	9/12/2020
EMI Receiver	Rohde & Schwarz	ESR7	101156	9/10/2020

Manufacturer	Software Description	Title/Model #	Rev.
Compliance Worldwide	Test Report Generation Software	Test Report Generator	1.0

### Measurement & Equipment Setup

Test Date:	11/8/2019
Test Engineer:	Sean Defelice
Site Temperature (°C):	21
Relative Humidity (%RH):	37
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

### Test Procedure

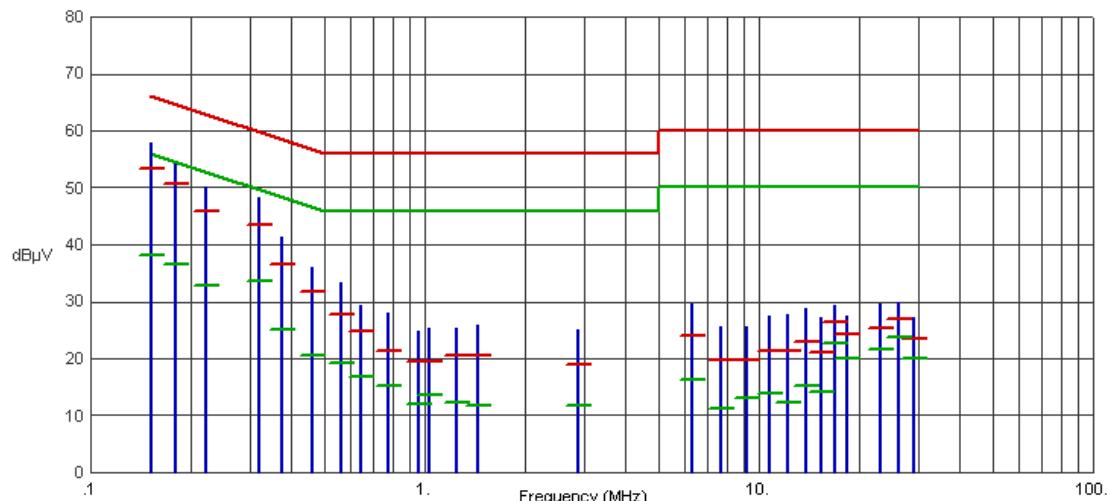
Test measurements were made in accordance with ANSI C63.10-2013, Section 6.2: Standard test method for ac power-line conducted emissions from unlicensed wireless devices

**Test Number: 433-19**
**Issue Date: 11/22/2016**

## 7. Measurement Data (continued)

### 7.10. Conducted Emissions

#### 7.10.1. 120 Volts, 60 Hz Phase

**Test No.: 433-19, 120 Volts, 60 Hz Phase**
**FCC Part 15.207**


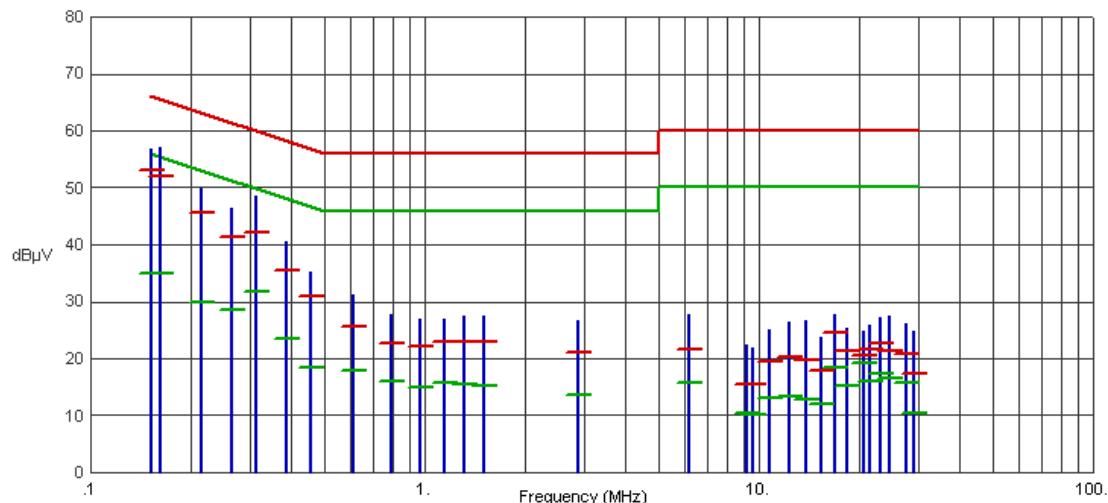
Frequency (MHz)	Pk Amp (dB $\mu$ V)	QP Amp (dB $\mu$ V)	QP Limit (dB $\mu$ V)	QP Margin (dB)	Avg Amp (dB $\mu$ V)	Avg Limit (dB $\mu$ V)	Avg Margin (dB)	Comments
.1523	57.95	53.29	65.87	-12.58	38.08	55.87	-17.79	
.1793	54.13	50.68	64.52	-13.84	36.61	54.52	-17.91	
.2220	50.04	45.93	62.74	-16.81	32.86	52.74	-19.88	
.3210	48.24	43.37	59.68	-16.31	33.71	49.68	-15.97	
.3750	41.42	36.49	58.39	-21.90	25.02	48.39	-23.37	
.4628	35.92	31.67	56.64	-24.97	20.56	46.64	-26.08	
.5595	33.32	27.65	56.00	-28.35	19.31	46.00	-26.69	
.6450	29.45	24.79	56.00	-31.21	16.78	46.00	-29.22	
.7800	27.96	21.42	56.00	-34.58	15.15	46.00	-30.85	
.9623	24.78	19.38	56.00	-36.62	11.94	46.00	-34.06	
1.0298	25.21	19.55	56.00	-36.45	13.49	46.00	-32.51	
1.2458	25.41	20.48	56.00	-35.52	12.36	46.00	-33.64	
1.4370	25.91	20.63	56.00	-35.37	11.65	46.00	-34.35	
2.8703	25.16	19.01	56.00	-36.99	11.64	46.00	-34.36	
6.2948	29.47	24.09	60.00	-35.91	16.32	50.00	-33.68	
7.6808	25.54	19.66	60.00	-40.34	11.07	50.00	-38.93	
9.2153	25.71	19.86	60.00	-40.14	13.03	50.00	-36.97	
10.7475	27.47	21.40	60.00	-38.60	13.76	50.00	-36.24	
12.2573	27.76	21.25	60.00	-38.75	12.40	50.00	-37.60	
13.8255	28.91	22.97	60.00	-37.03	15.26	50.00	-34.74	
15.3578	27.10	21.07	60.00	-38.93	14.09	50.00	-35.91	
16.8945	29.26	26.51	60.00	-33.49	22.67	50.00	-27.33	
18.4313	27.47	24.18	60.00	-35.82	20.09	50.00	-29.91	
23.0393	29.59	25.23	60.00	-34.77	21.49	50.00	-28.51	
26.1105	29.77	26.87	60.00	-33.13	23.74	50.00	-26.26	
29.0850	27.09	23.53	60.00	-36.47	20.12	50.00	-29.88	

**Test Number: 433-19**
**Issue Date: 11/22/2016**

## 7. Measurement Data (continued)

### 7.10. Conducted Emissions

#### 7.10.2. 120 Volts, 60 Hz Neutral

**Test No.: 433-19, 120 Volts, 60 Hz Neutral**
**FCC Part 15.207**


Frequency (MHz)	Pk Amp (dB $\mu$ V)	QP Amp (dB $\mu$ V)	QP Limit (dB $\mu$ V)	QP Margin (dB)	Avg Amp (dB $\mu$ V)	Avg Limit (dB $\mu$ V)	Avg Margin (dB)	Comments
.1523	56.76	52.98	65.87	-12.89	34.94	55.87	-20.93	
.1613	57.11	52.07	65.40	-13.33	34.84	55.40	-20.56	
.2153	49.82	45.61	63.00	-17.39	30.00	53.00	-23.00	
.2648	46.51	41.37	61.28	-19.91	28.43	51.28	-22.85	
.3120	48.60	42.22	59.92	-17.70	31.78	49.92	-18.14	
.3840	40.40	35.55	58.19	-22.64	23.51	48.19	-24.68	
.4538	35.20	30.89	56.81	-25.92	18.44	46.81	-28.37	
.6090	31.22	25.69	56.00	-30.31	17.90	46.00	-28.10	
.7913	27.70	22.64	56.00	-33.36	15.97	46.00	-30.03	
.9645	26.95	22.11	56.00	-33.89	14.88	46.00	-31.12	
1.1423	26.94	22.98	56.00	-33.02	15.80	46.00	-30.20	
1.3178	27.41	22.91	56.00	-33.09	15.56	46.00	-30.44	
1.5023	27.58	22.87	56.00	-33.13	15.16	46.00	-30.84	
2.8815	26.75	21.16	56.00	-34.84	13.72	46.00	-32.28	
6.1958	27.60	21.55	60.00	-38.45	15.62	50.00	-34.38	
9.2198	22.36	15.52	60.00	-44.48	10.47	50.00	-39.53	
9.5820	21.97	15.37	60.00	-44.63	10.16	50.00	-39.84	
10.7520	24.97	19.44	60.00	-40.56	13.16	50.00	-36.84	
12.2888	26.32	20.30	60.00	-39.70	13.38	50.00	-36.62	
13.8233	26.79	19.62	60.00	-40.38	12.75	50.00	-37.25	
15.3578	23.65	17.86	60.00	-42.14	11.99	50.00	-38.01	
16.8945	27.71	24.45	60.00	-35.55	18.35	50.00	-31.65	
18.4290	25.45	21.26	60.00	-38.74	15.16	50.00	-34.84	
20.6858	24.72	20.59	60.00	-39.41	19.30	50.00	-30.70	
21.5025	25.92	21.72	60.00	-38.28	16.12	50.00	-33.88	
23.0393	27.17	22.73	60.00	-37.27	17.27	50.00	-32.73	
24.5738	27.43	21.36	60.00	-38.64	16.64	50.00	-33.36	
27.6450	26.22	20.75	60.00	-39.25	15.64	50.00	-34.36	
29.1818	24.80	17.33	60.00	-42.67	10.48	50.00	-39.52	

## 7. Measurement Data (continued)

### 7.11. Duty Cycle

**Requirement:** Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%).

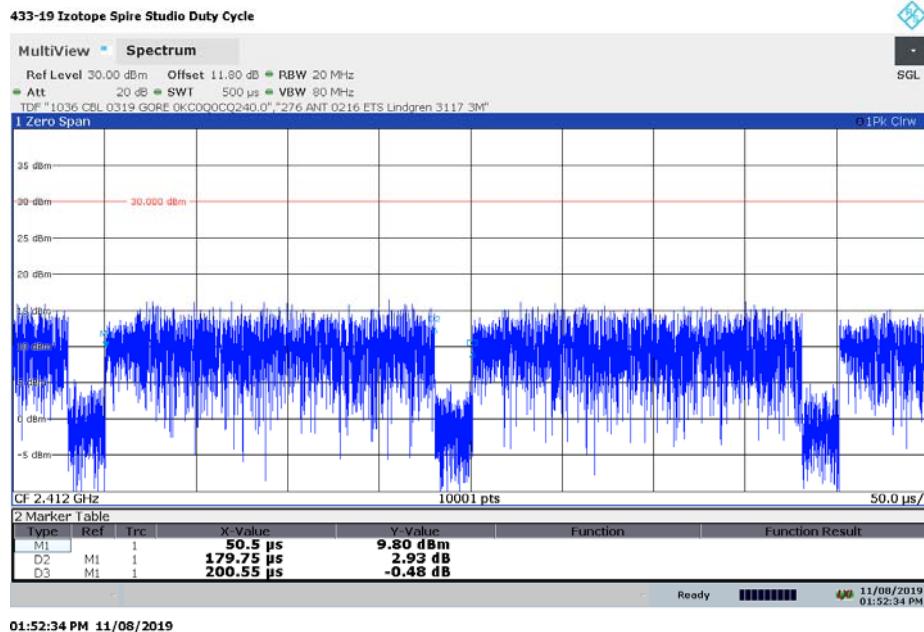
**Procedure:** Duty cycle measurements were made according to the procedure detailed ANSI C63.10-2013, Section 11.6(b)

**Results:** Duty cycle measurements are listed in the following table.

All power and power spectral density measurements for this report are peak mode measurements. Ample peak hold time was provided to ensure maximum peak measurements.

Frequency	T <sub>on</sub>	T <sub>total</sub>	Duty Cycle
(MHz)	(μS)	(μS)	(%)
2412	179.75	200.55	89.63%
2437	179.65	200.50	89.60%
2462	179.50	200.60	89.48%

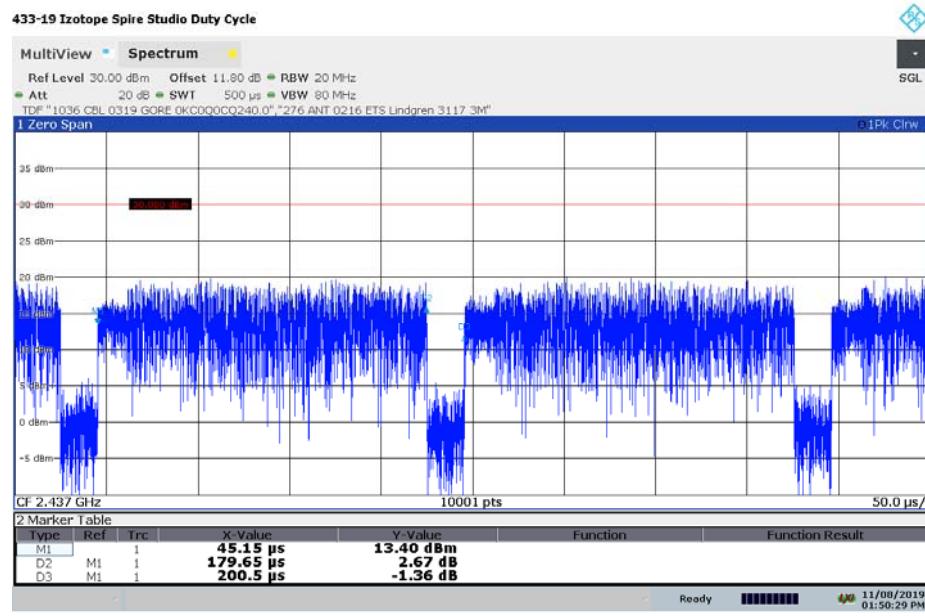
#### 7.11.1. 802.11g: Low Channel – 1, 2412 MHz



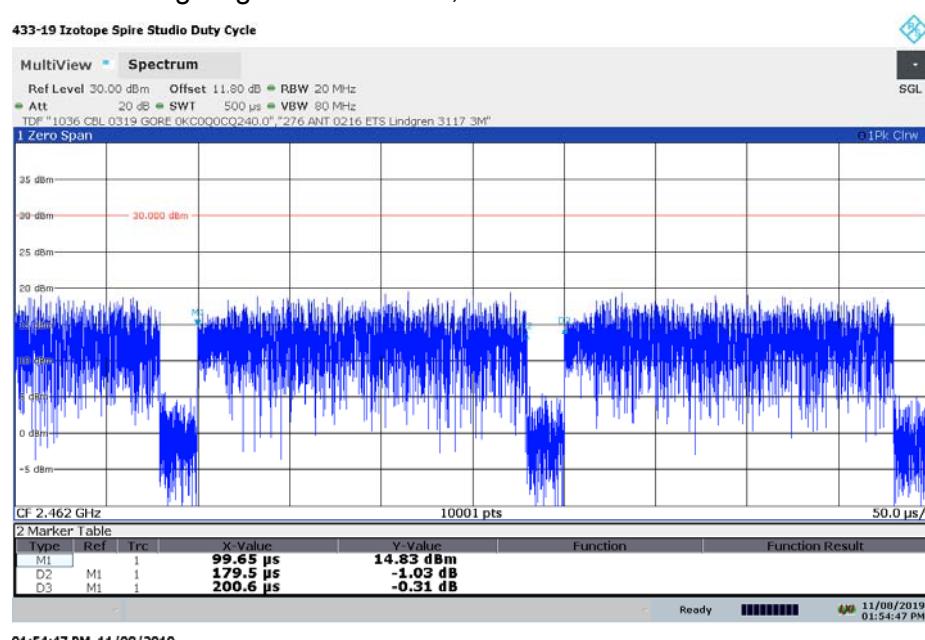
## 7. Measurement Data (continued)

### 7.11. Duty Cycle (continued)

#### 7.11.2. 802.11g: Middle Channel – 6, 2437 MHz



#### 7.11.3. 2.4 GHz 802.11g: High Channel – 11, 2462 MHz



## 7. Measurement Data (continued)

### 7.12. Public Exposure to Radio Frequency Energy Levels

Requirement: (FCC Part 15.247(i))

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

#### RSS 102, Section 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- At or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz.

Conclusion: (FCC Part 15.247(i))

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

#### RSS 102, Section 2.5.2

The device under test meets the radio frequency radiation exposure requirements specified in RSS 102, Section 2.5.2.

Measurement Results (Column references are on the following page)

Frequency (MHz)	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		FCC Limit (mW/cm <sup>2</sup> )	ISED Limit (W/m <sup>2</sup> )	Result
				(mW/cm <sup>2</sup> )	(W/m <sup>2</sup> )			
				(1)	(2)	(3)	(4)	(5)
2412	20	18.27	1.5	0.0133577	0.13357653	1.00	5.35	Compliant
2437	20	20.76	1.5	0.0236990	0.23699007	1.00	5.41	Compliant
2462	20	20.81	1.5	0.0239734	0.23973428	1.00	5.47	Compliant

## 7. Measurement Data (continued)

### 7.12. Public Exposure to Radio Frequency Energy Levels

1. Reference 47 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 installer. All other mobile and unlicensed transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in sections 1.1307(c) and 1.1307(d) of 47 CFR, Chapter 1.
2. Section 7.4 of this test report.
3. Antenna gain data supplied by the client and factored into the EUT peak output power.
4. Peak power density is calculated from peak EIRP:

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

PD = Power Density      W/m<sup>2</sup>  
OP = DUT Output Power      dBm  
AG = Antenna Gain      dBi  
d = MPE Distance      cm

5. Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.
6. Reference IC RSS-102 Section 4 Table 4 General Pulbic (Uncontrolled Environment) for equipment operating from 300 to 6000 MHz, the W/m<sup>2</sup> limit is determined by the formula  $0.02619 * F (\text{MHz})^{0.6834}$

## **8. Test Setup Photographs**

### **8.1. Radiated measurements 10 kHz to 1 GHz – Front**



## **8. Test Setup Photographs**

### **8.2. Radiated measurements 10 kHz to 30 MHz – Rear**



## **8. Test Setup Photographs**

### **8.3. Radiated measurements 30 MHz to 1 GHz - Rear**



## **8. Test Setup Photographs**

### **8.4. Radiated Emissions above 1 GHz – Front**



## **8. Test Setup Photographs**

### **8.5. Radiated Emissions 1 to 18 GHz – Rear**



## 8. Test Setup Photographs

### 8.6. Harmonic Radiated Emissions above 18 GHz– Rear



## 8. Test Setup Photographs

### 8.7. Power Line Conducted Emissions – Front



## **8. Test Setup Photographs**

### **8.8. Power Line Conducted Emissions – Rear**





Test Number: 433-19



Issue Date: 11/22/2016

## 9. Test Site Description

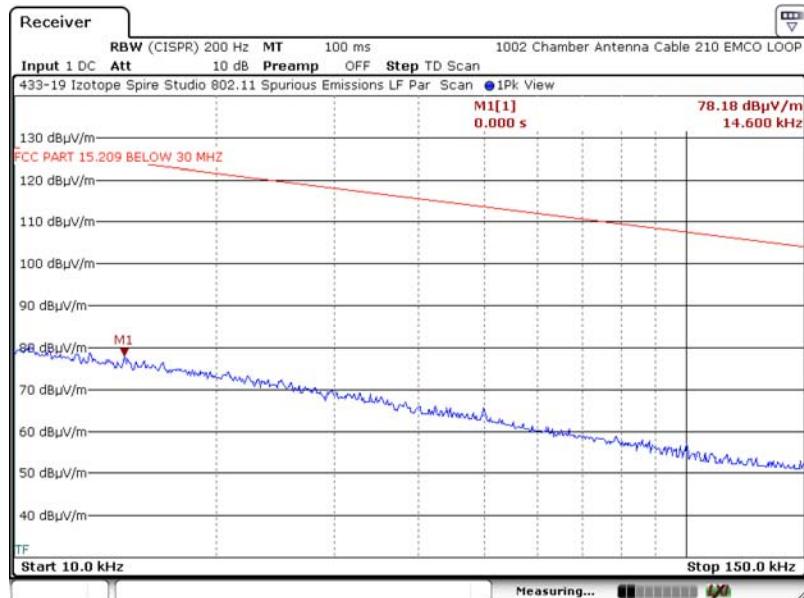
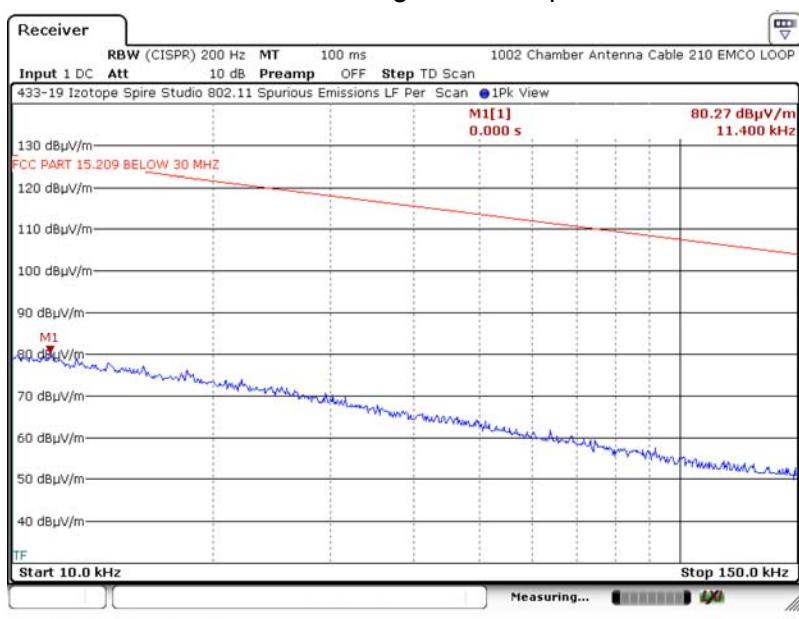
Compliance Worldwide is located at 357 Main Street in Sandown, New Hampshire. The test sites at Compliance Worldwide are used for conducted and radiated emissions testing in accordance with the Federal Communications Commission (FCC) and Industry Canada standards. Through our American Association for Laboratory Accreditation (A2LA) ISO Guide 17025 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-0274.

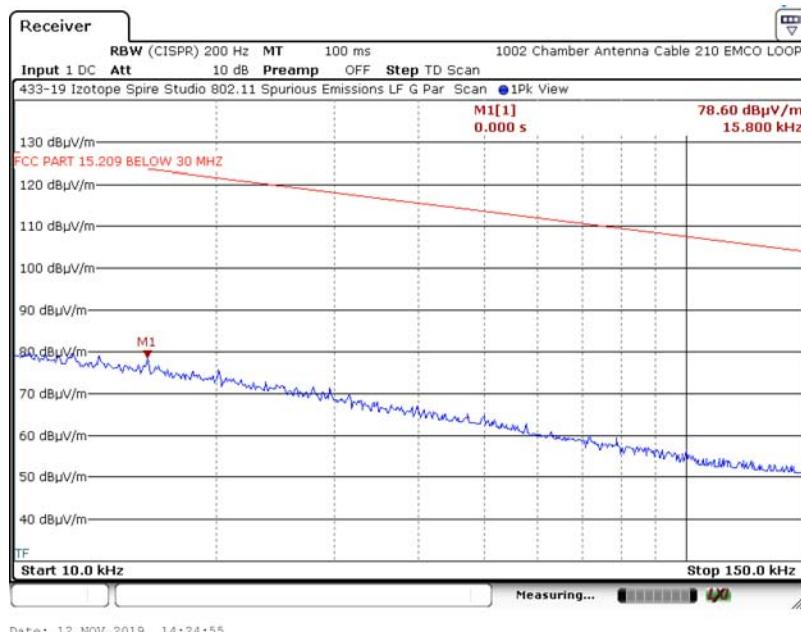
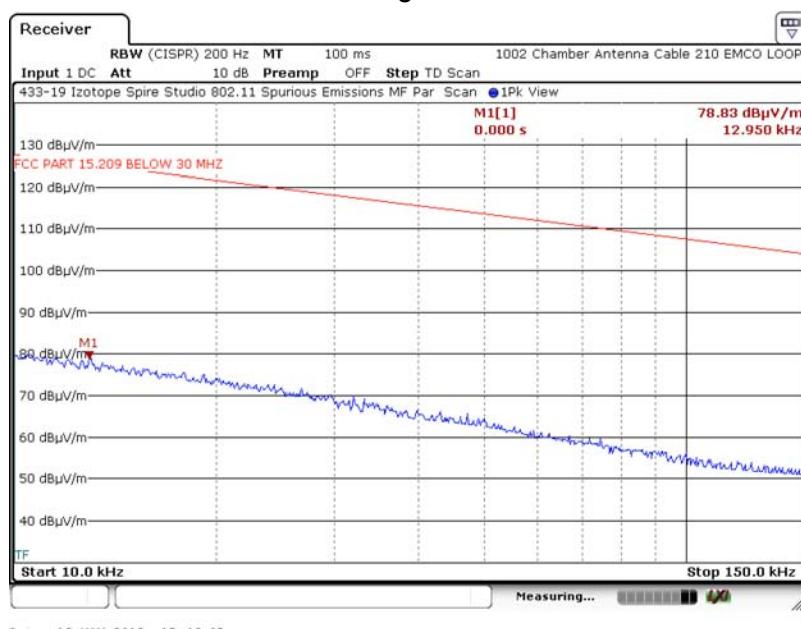
Compliance Worldwide is also designated as a Phase 1 CAB under APEC-MRA (US0132) for Australia/New Zealand AS/NZS CISPR 32, Chinese-Taipei (Taiwan) BSMI CNS 13438 and Korea (RRA) KN 11, KN 13, KN 14-1, KN 22, KN 32, KN 61000-6-3, KN 61000-6-4.

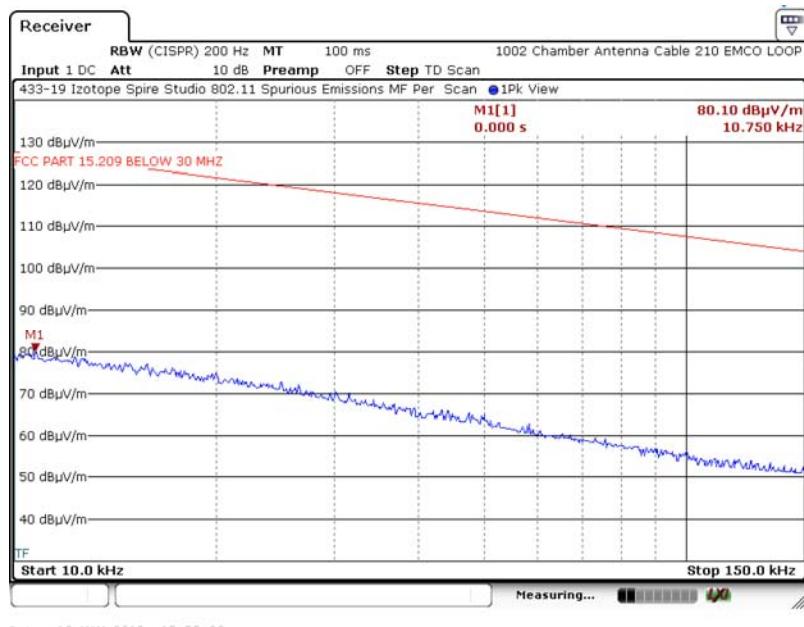
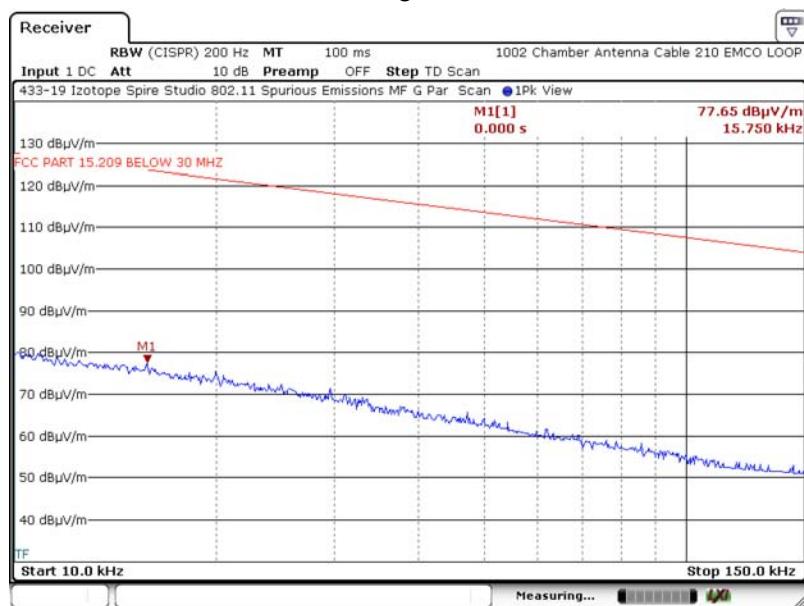
The radiated emissions test site is a 3 and 10 meter enclosed open area test site (OATS). Personnel, support equipment and test equipment are located in the basement beneath the OATS ground plane.

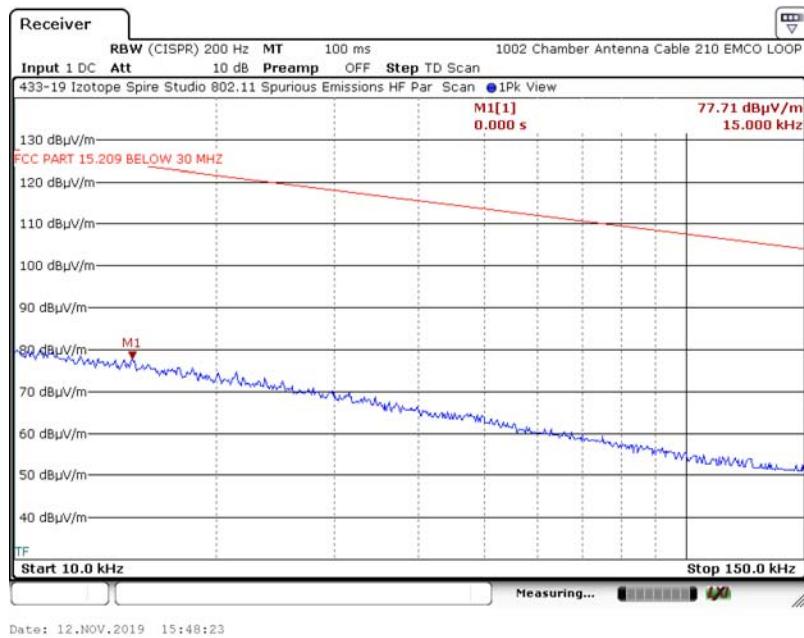
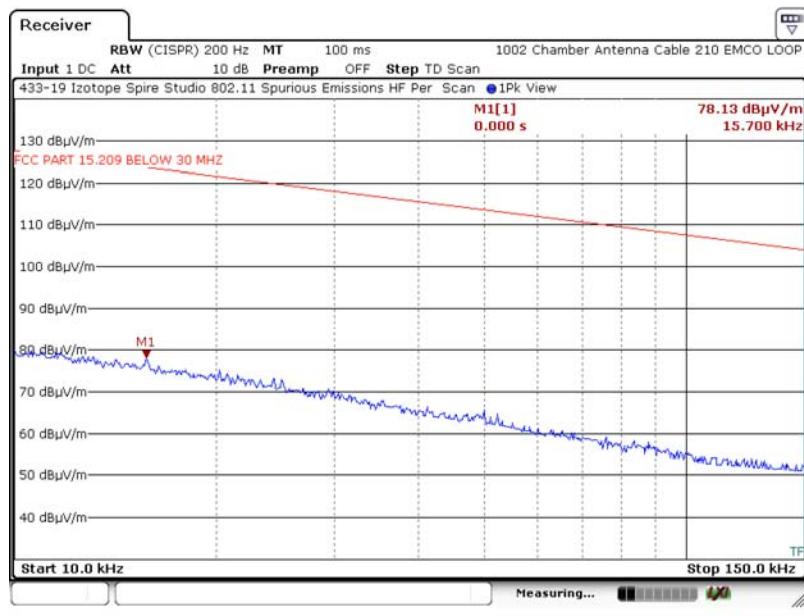
The conducted emissions site is part of a 16' x 20' x 12' ferrite tile chamber and uses one of the walls for the vertical ground plane. A second conducted emissions site is also located in the basement of the OATS site with a 2.3 x 2.5 meter ground plane and a 2.4 x 2.4 meter vertical wall.

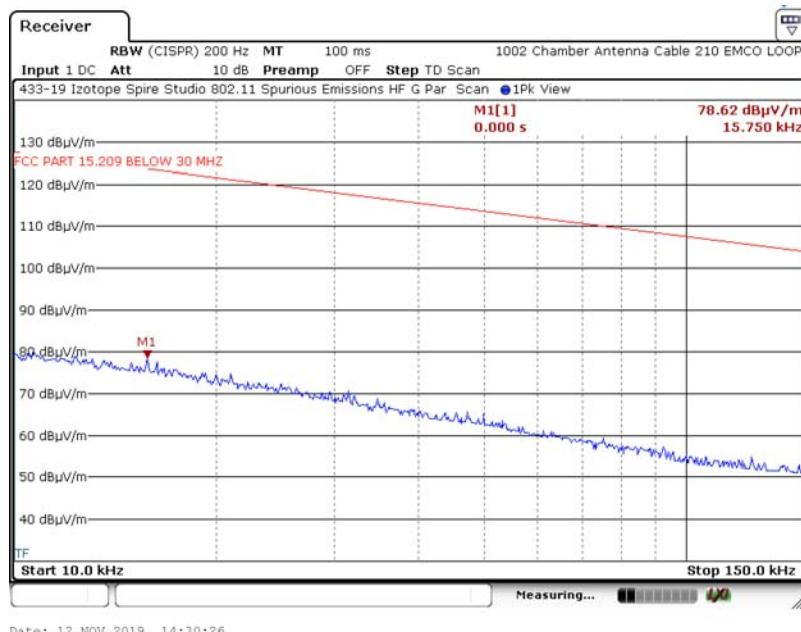
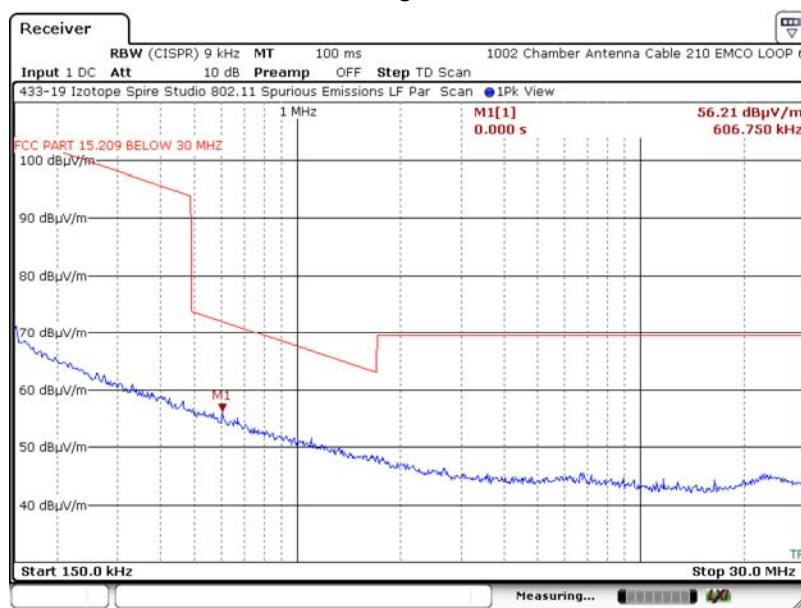
Both sites are designed to test products or systems 1.5 meters W x 1.5 meters L x 2.0 meters H, floor standing or table top.

**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz)**
**A1.1. Spurious Radiated Emissions (10 kHz – 150 kHz) Test Results**
**A1.1.1. Measurement Results: 802.11g, Ch 1, Parallel Antenna**

**A1.1.2. Measurement Results: 802.11g, Ch 1, Perpendicular Antenna**


**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.1. Spurious Radiated Emissions (10 kHz – 150 kHz) Test Results (continued)**
**A1.1.3. Measurement Results: 802.11g, Ch 1, Ground Parallel Antenna**

**A1.1.4. Measurement Results: 802.11g, Ch 6, Parallel Antenna**


**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz)**
**A1.1. Spurious Radiated Emissions (10 kHz – 150 kHz) Test Results (continued)**
**A1.1.5. Measurement Results: 802.11g, Ch 6, Perpendicular Antenna**

**A1.1.6. Measurement Results: 802.11g, Ch 6, Ground Parallel Antenna**


**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.1. Spurious Radiated Emissions (10 kHz – 150 kHz) Test Results (continued)**
**A1.1.7. Measurement Results: 802.11g, Ch 11, Parallel Antenna**

**A1.1.8. Measurement Results: 802.11g, Ch 11, Perpendicular Antenna**


**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.1. Spurious Radiated Emissions (10 kHz – 150 kHz) Test Results (continued)**
**A1.1.6. Measurement Results: 802.11g, Ch 1, Ground Parallel Antenna**

**A1.2. Spurious Radiated Emissions (150 kHz – 30 MHz) Test Results (continued)**
**A1.2.1. Measurement Results: 802.11g, Ch 1, Parallel Antenna**


**Test Number: 433-19**
**Issue Date: 11/22/2016**

## Appendix A

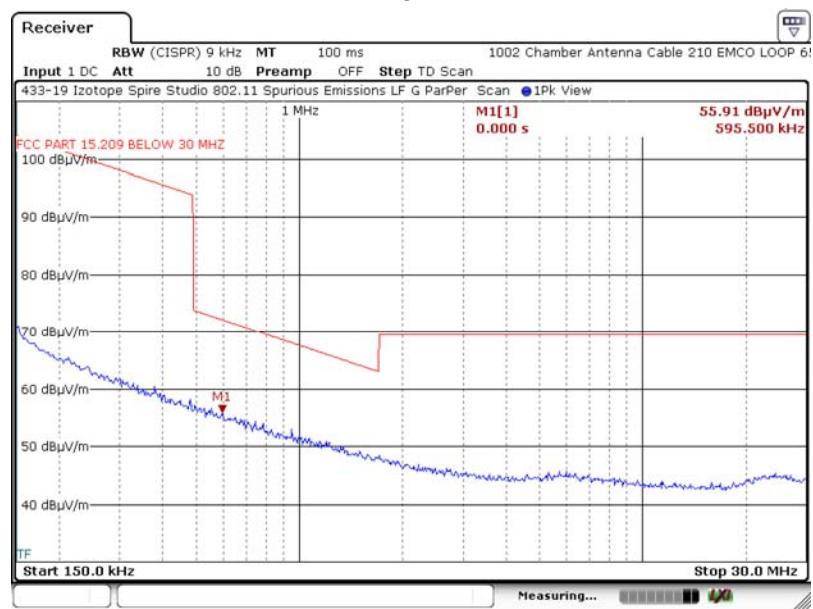
### A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)

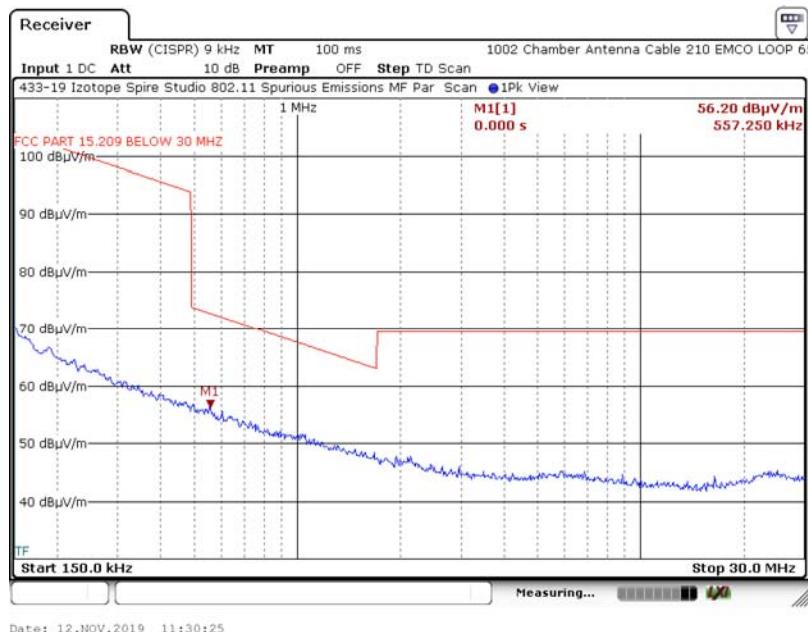
#### A1.2. Spurious Radiated Emissions (150 kHz – 30 MHz) Test Results

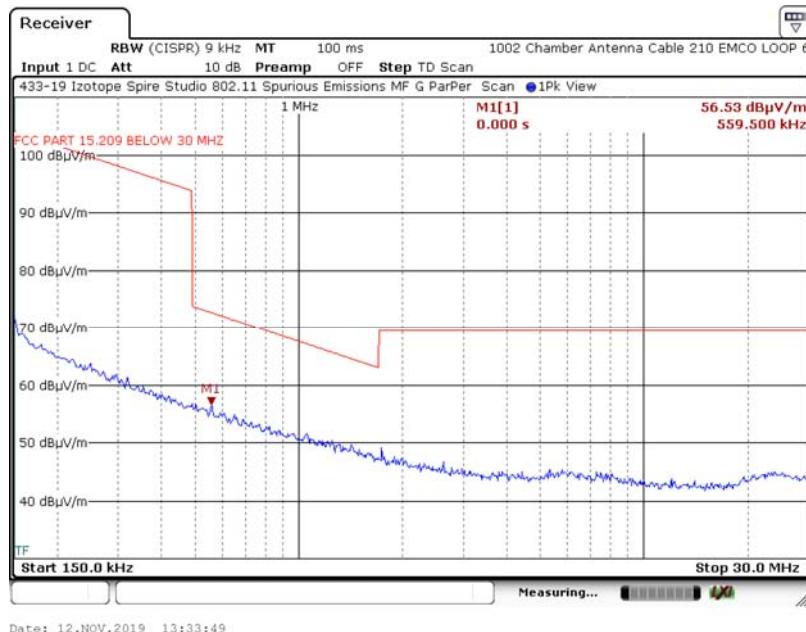
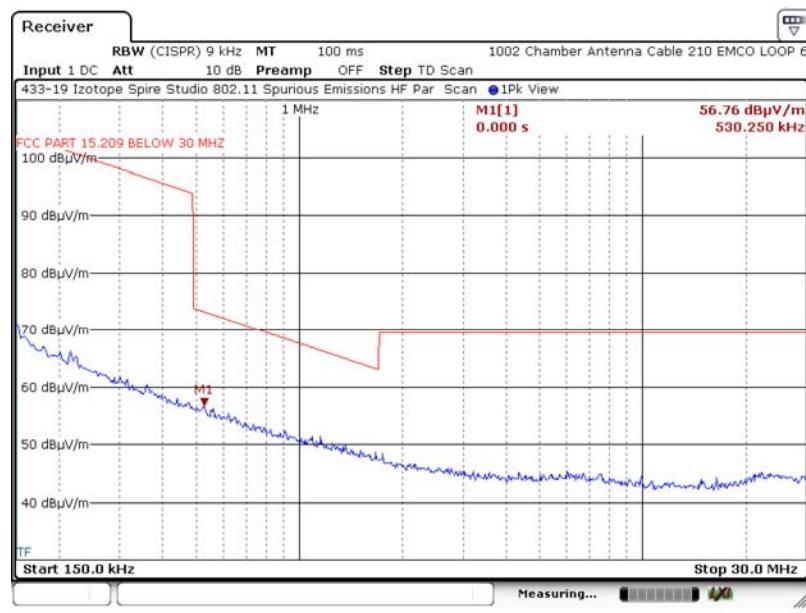
##### A1.2.2. Measurement Results: 802.11g, Ch 1, Perpendicular Antenna

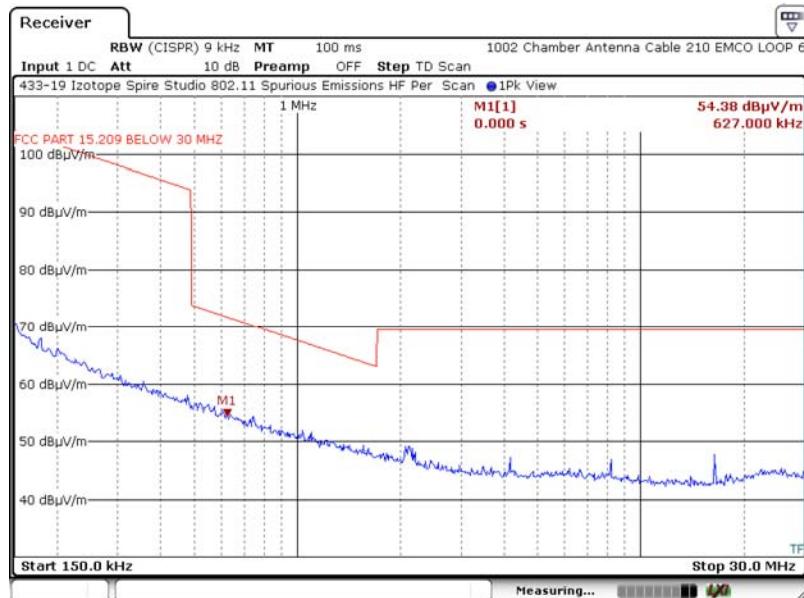


##### A1.2.3. Measurement Results: 802.11g, Ch 1, Ground Parallel Antenna

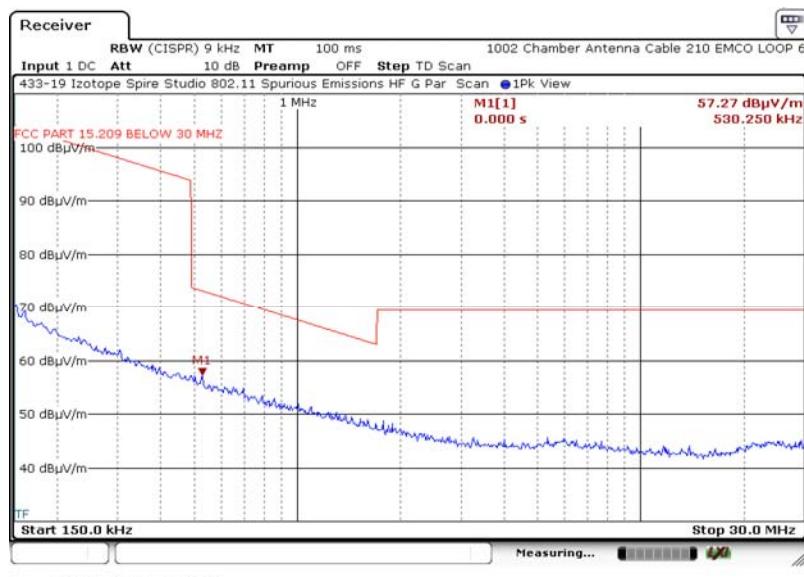


**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.2. Spurious Radiated Emissions (150 kHz – 30 MHz) Test Results (continued)**
**A1.2.4. Measurement Results: 802.11g, Ch 6, Parallel Antenna**

**A1.2.5. Measurement Results: 802.11g, Ch 6, Perpendicular**

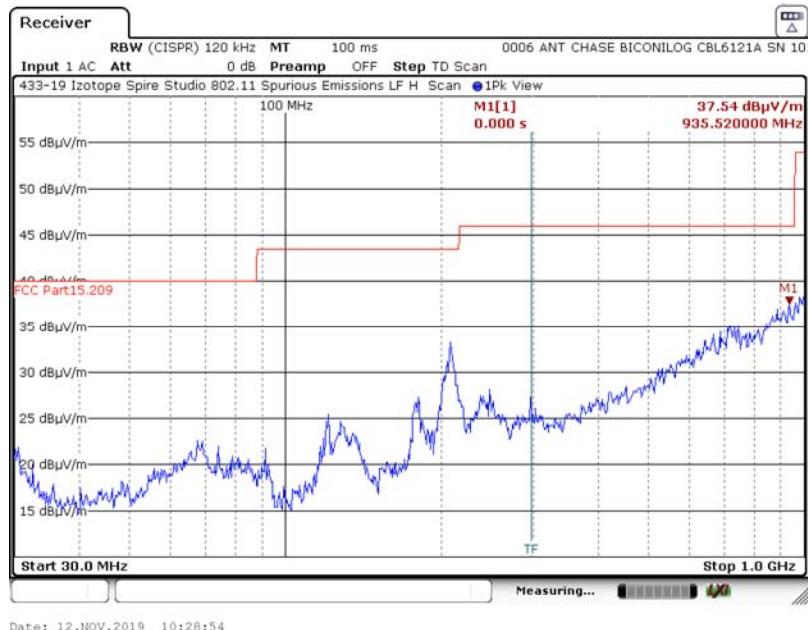
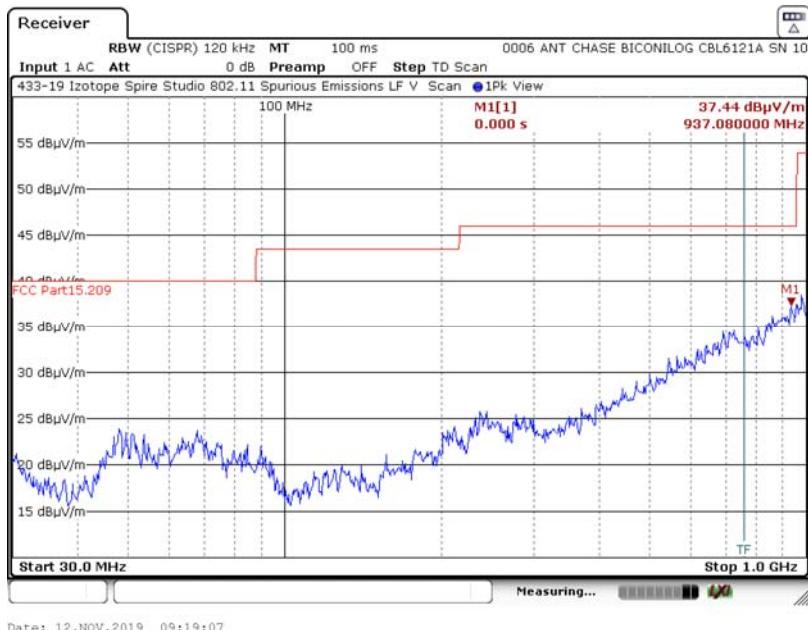

**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.2. Spurious Radiated Emissions (150 kHz – 30 MHz) Test Results (continued)**
**A1.2.6. Measurement Results: 802.11b, Ch 6, Ground Parallel Antenna**

**A1.2.7. Measurement Results: 802.11g, Ch 11, Parallel Antenna**


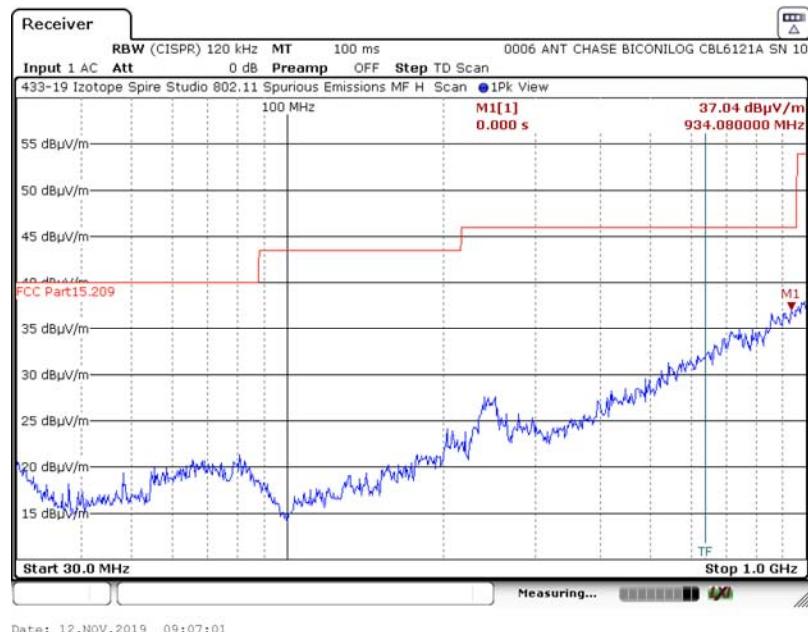
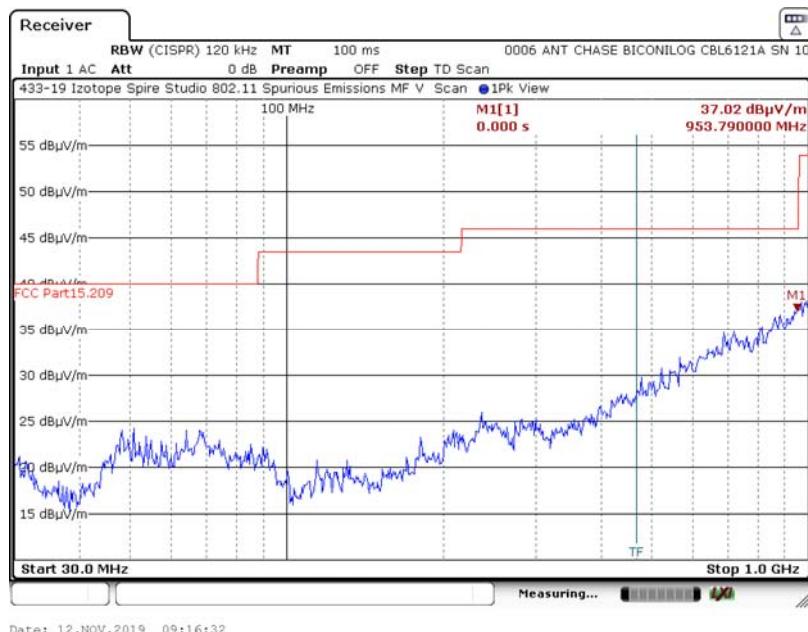
**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.2. Spurious Radiated Emissions (150 kHz – 30 MHz) Test Results (continued)**
**A1.2.8. Measurement Results: 802.11g, Ch 11, Perpendicular Antenna**


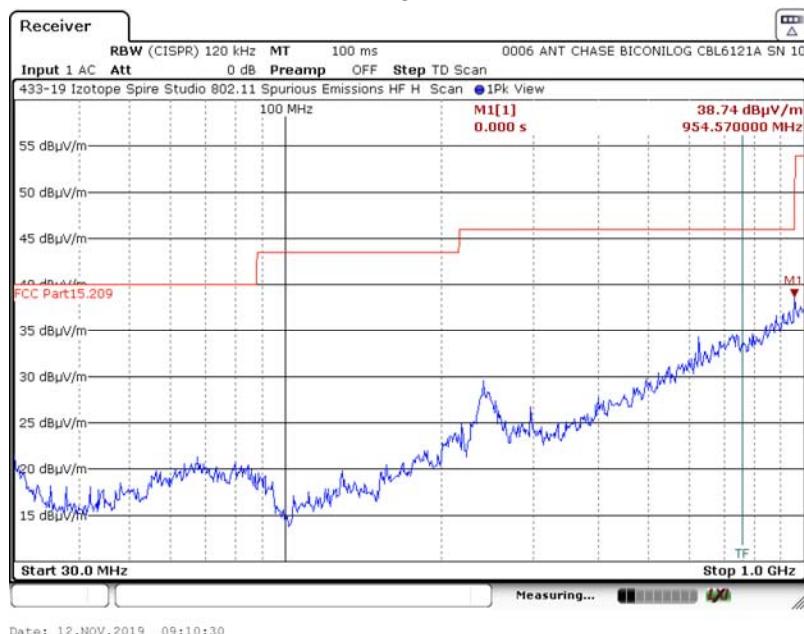
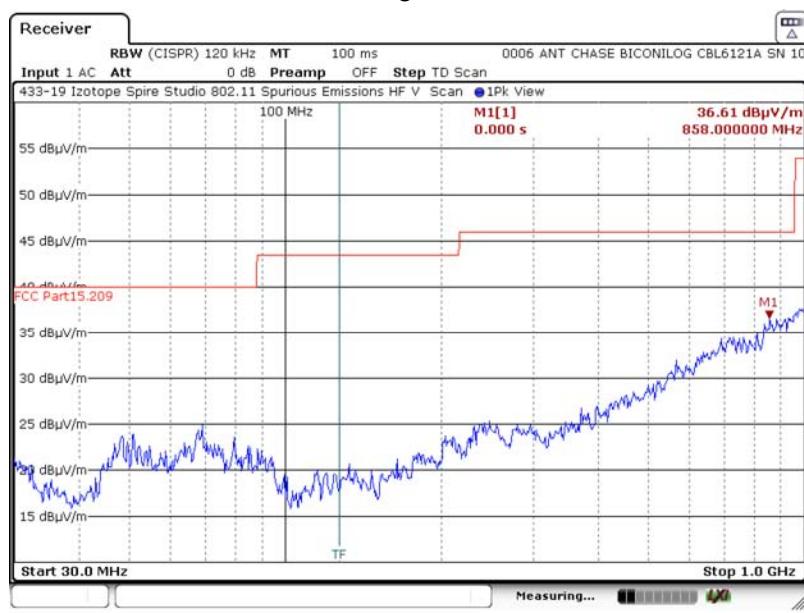
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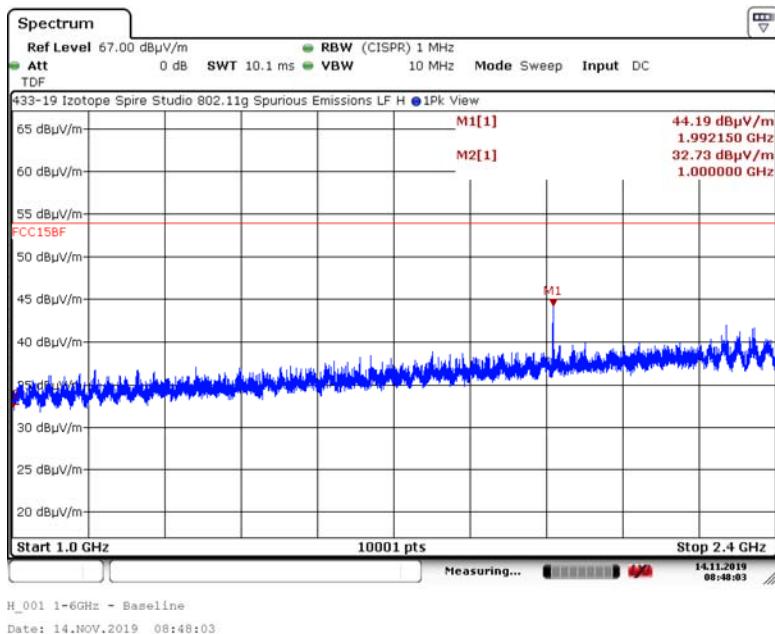
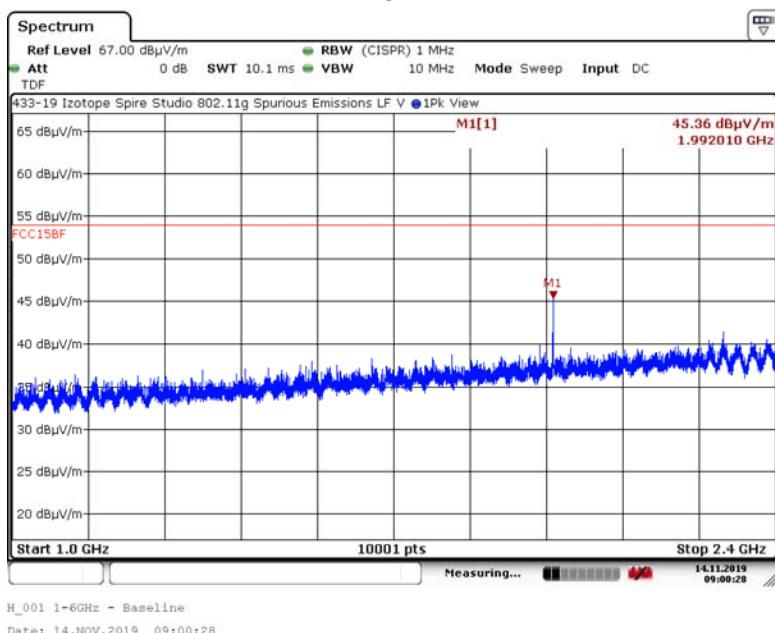
**A1.2.9. Measurement Results: 802.11g, Ch 11, Ground Parallel Antenna**


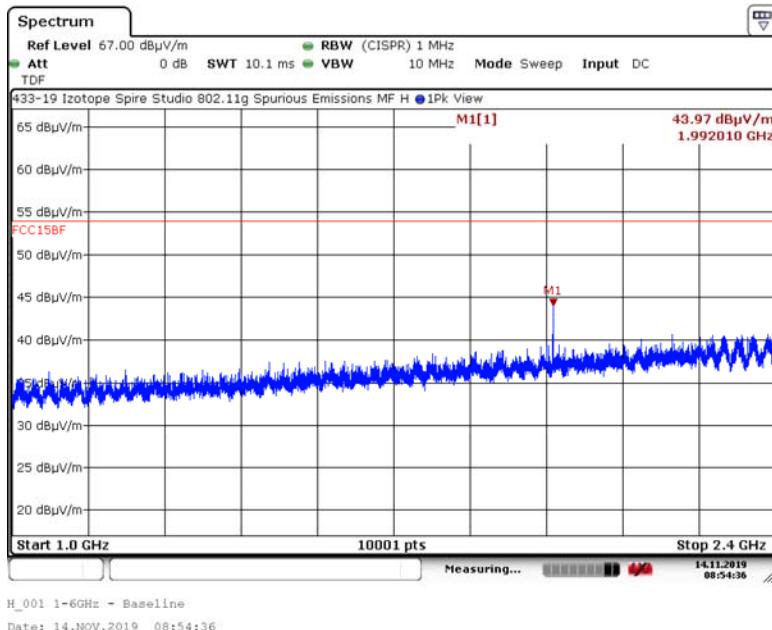
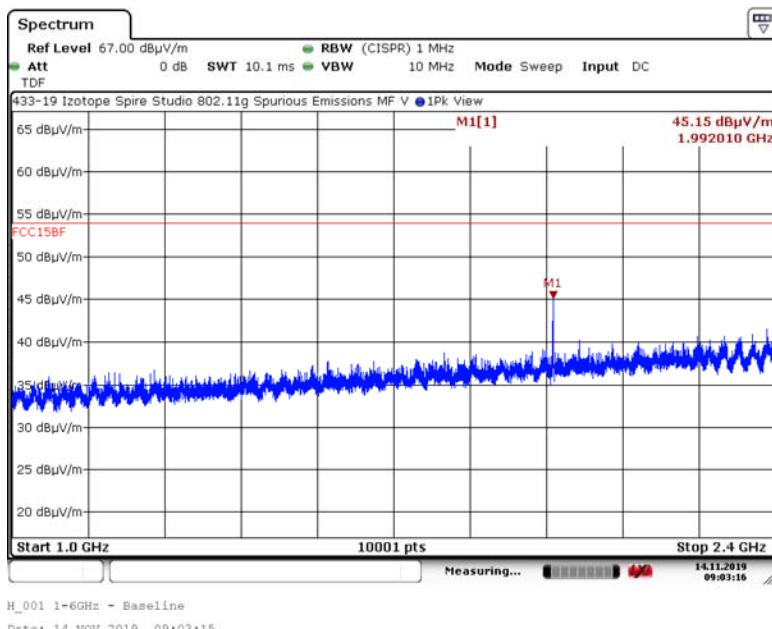
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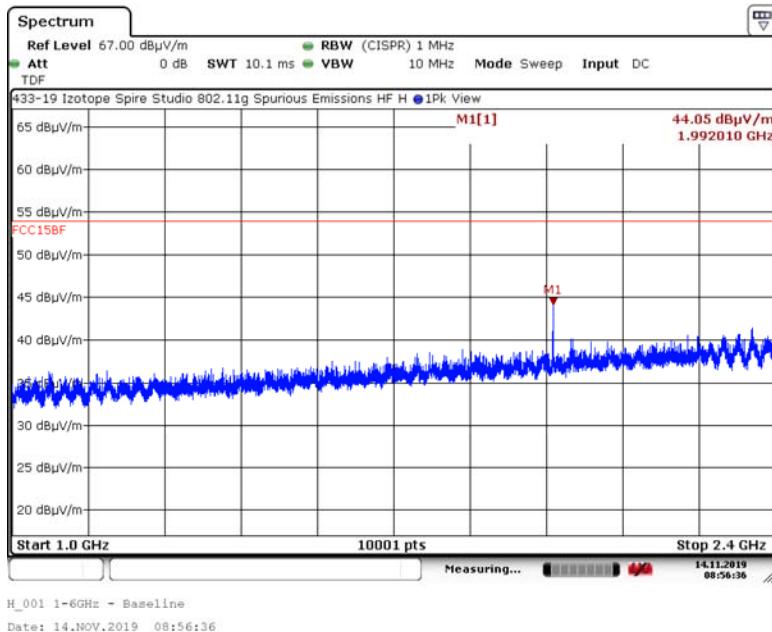
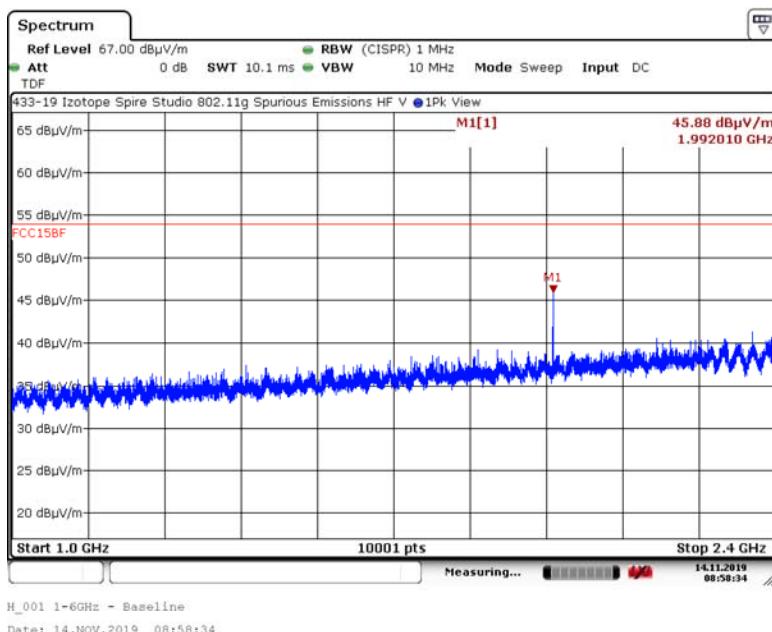
**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.3. Spurious Radiated Emissions (30 MHz – 1 GHz) Test Results**
**A1.3.1. Measurement Results: 802.11g, Ch 1, Horizontal Antenna**

**A1.3.2. Measurement Results: 802.11g, Ch 1, Vertical Antenna**


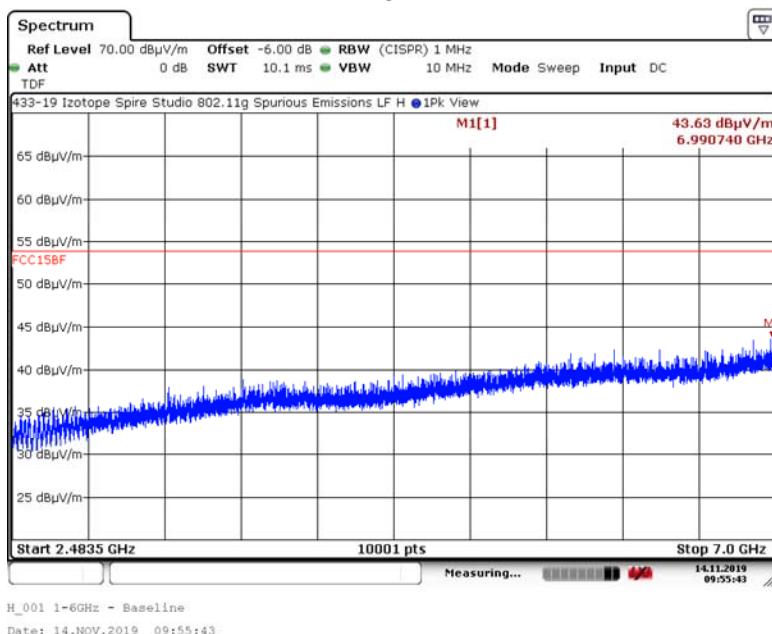
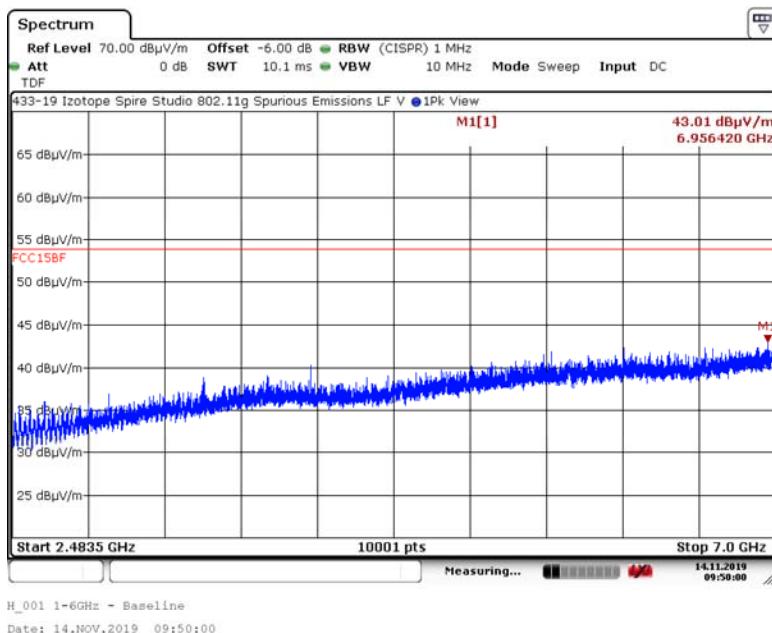
**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.3. Spurious Radiated Emissions (30 MHz – 1 GHz) Test Results (continued)**
**A1.3.3. Measurement Results: 802.11g, Ch 6, Horizontal Antenna**

**A1.3.4. Measurement Results: 802.11g, Ch 6, Vertical Antenna**


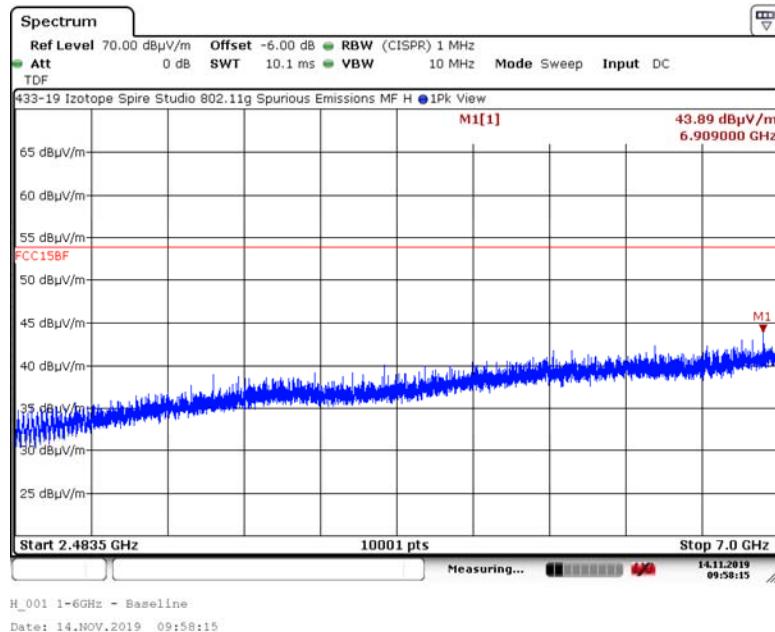
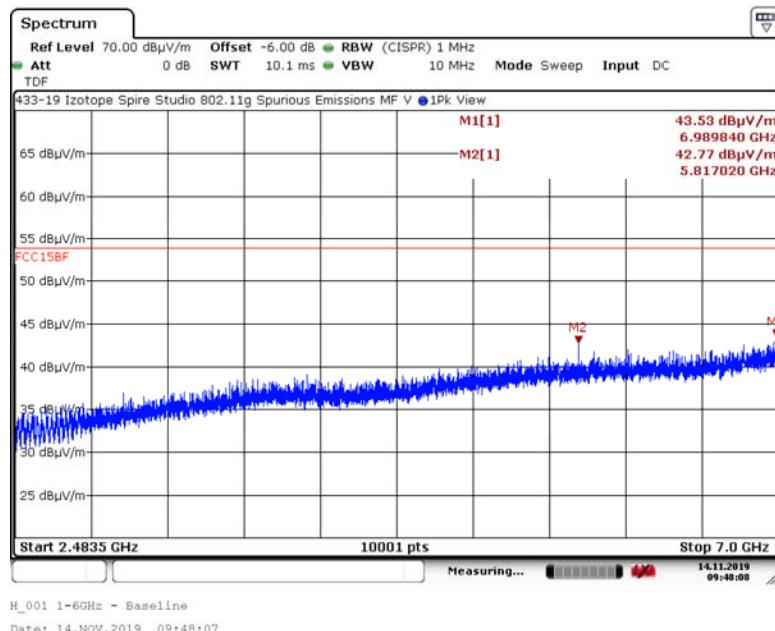
**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (30 kHz to 25 GHz) (continued)**
**A1.3. Spurious Radiated Emissions (30 MHz – 1 GHz) Test Results (continued)**
**A1.3.5. Measurement Results: 802.11g, Ch 11, Horizontal Antenna**

**A1.3.6. Measurement Results: 802.11g, Ch 11, Vertical Antenna**


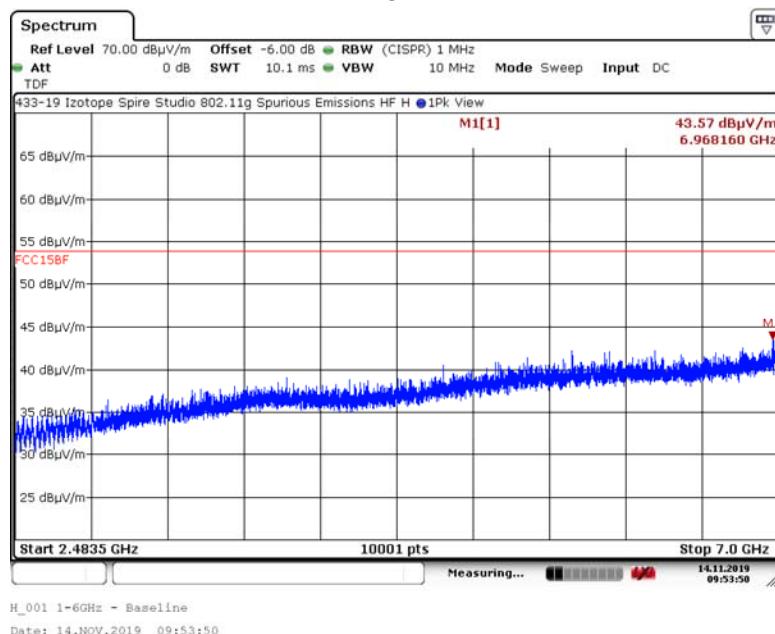
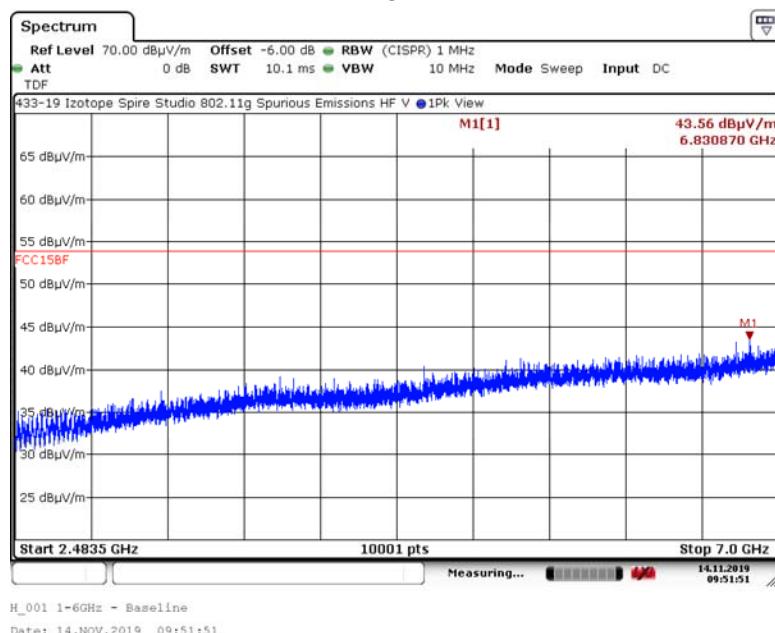
**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.4. Spurious Radiated Emissions (1 GHz – 2.4 GHz) Test Results**
**A1.4.1. Measurement Results: 802.11g, Ch 1, Horizontal Antenna**

**A1.4.2. Measurement Results: 802.11g, Ch 1, Vertical Antenna**


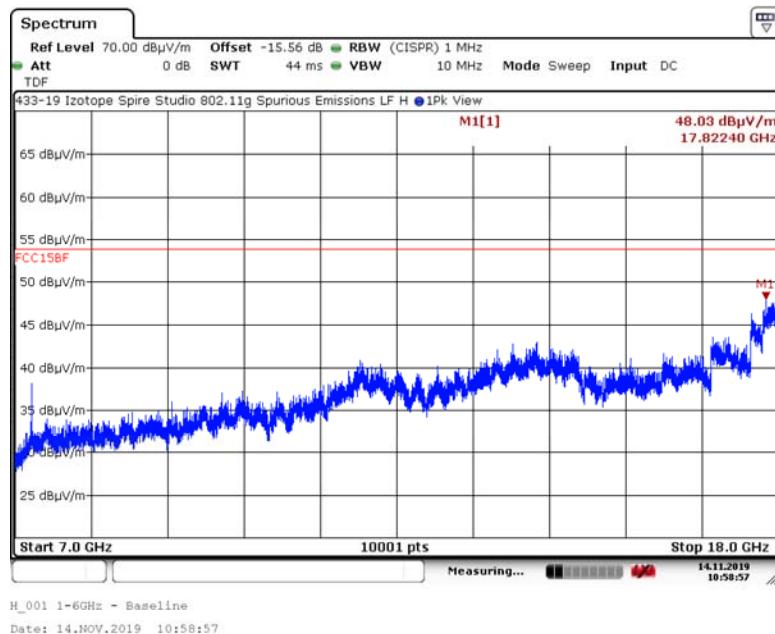
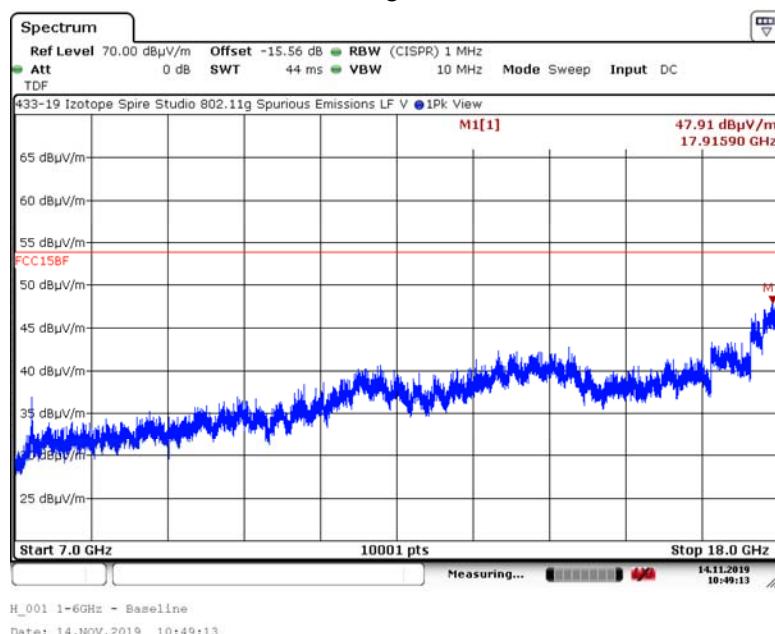
**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.4. Spurious Radiated Emissions (1 GHz – 2.4 GHz) Test Results (continued)**
**A1.4.3. Measurement Results: 802.11g, Ch 6, Horizontal Antenna**

**A1.4.4. Measurement Results: 802.11g, Ch 6, Vertical Antenna**


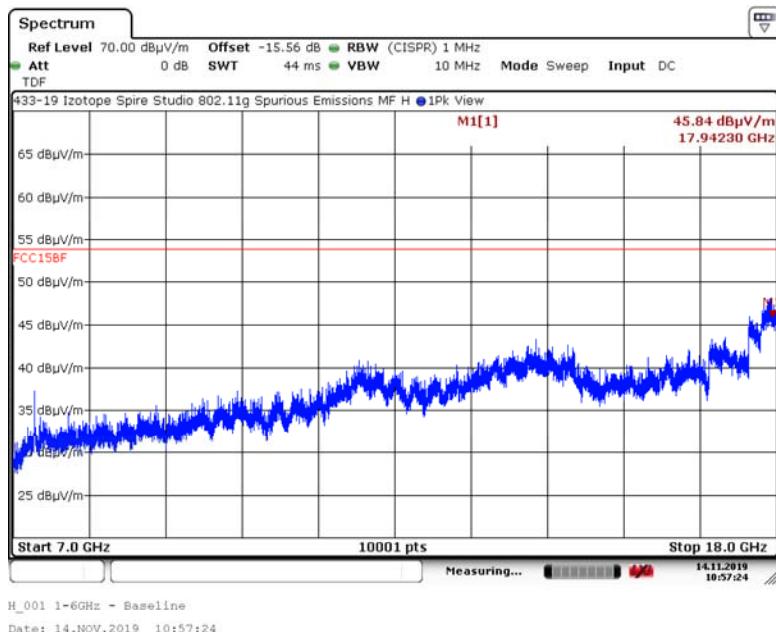
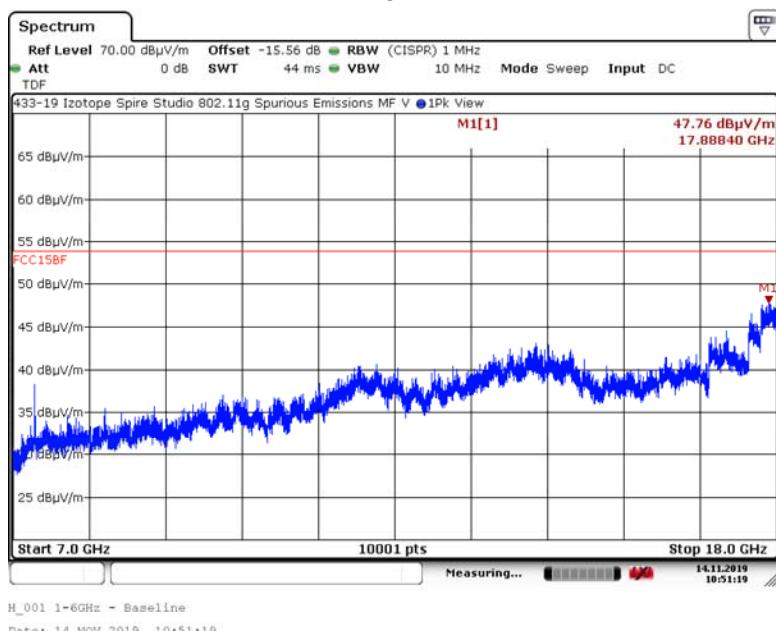
**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.4. Spurious Radiated Emissions (1 GHz – 2.4 GHz) Test Results (continued)**
**A1.4.5. Measurement Results: 802.11g, Ch 11, Horizontal Antenna**

**A1.4.6. Measurement Results: 802.11g, Ch 11, Vertical Antenna**


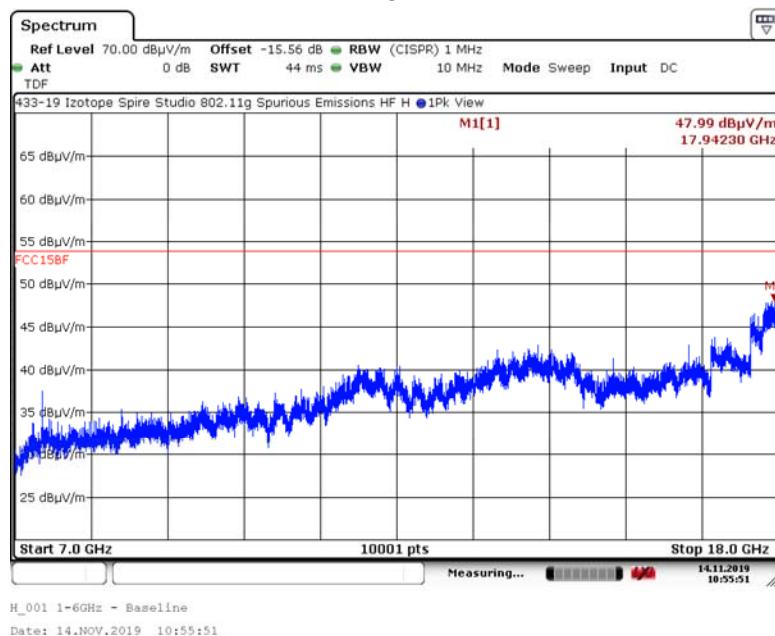
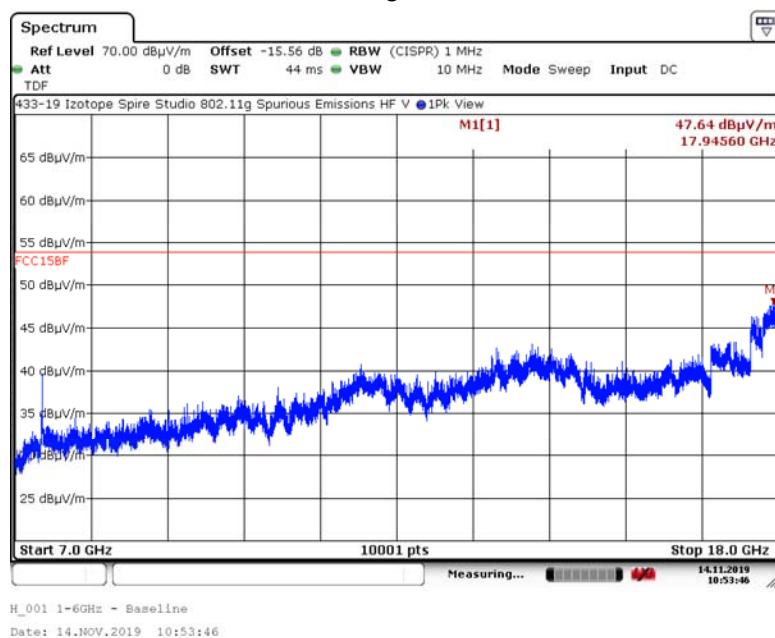
**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.5. Spurious Radiated Emissions (2483.5 GHz – 7 GHz) Test Results**
**A1.5.1. Measurement Results: 802.11g, Ch 1, Horizontal Antenna**

**A1.5.2. Measurement Results: 802.11g, Ch 1, Vertical Antenna**


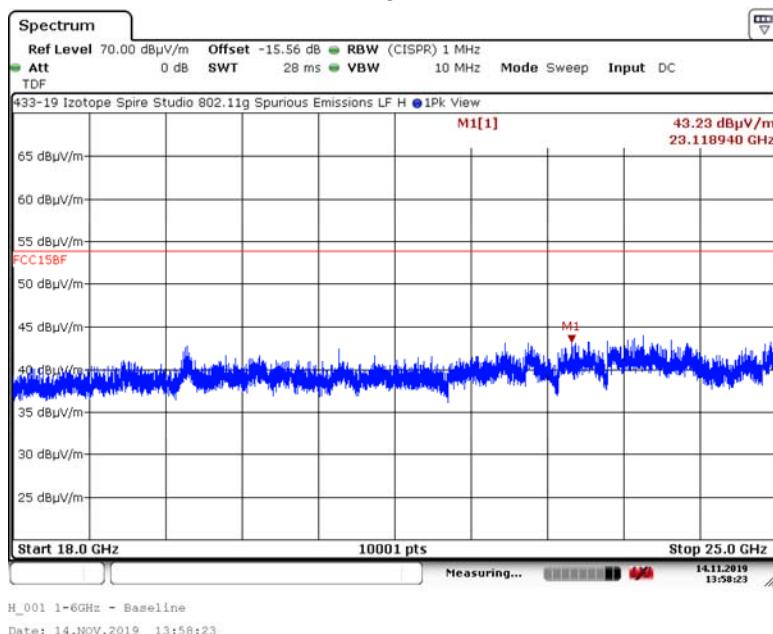
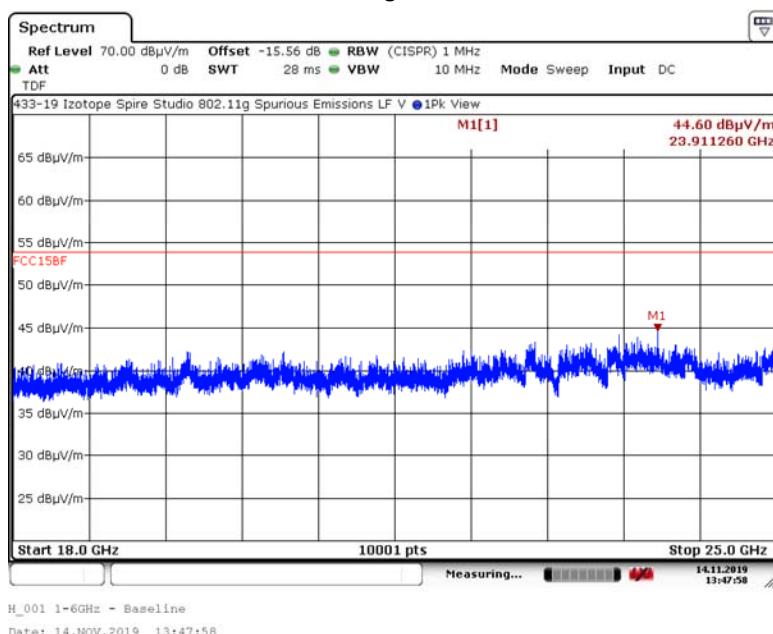
**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.5. Spurious Radiated Emissions (2483.5 GHz – 7 GHz) Test Results (continued)**
**A1.5.3. Measurement Results: 802.11g, Ch 6, Horizontal Antenna**

**A1.5.4. Measurement Results: 802.11g, Ch 6, Vertical Antenna**


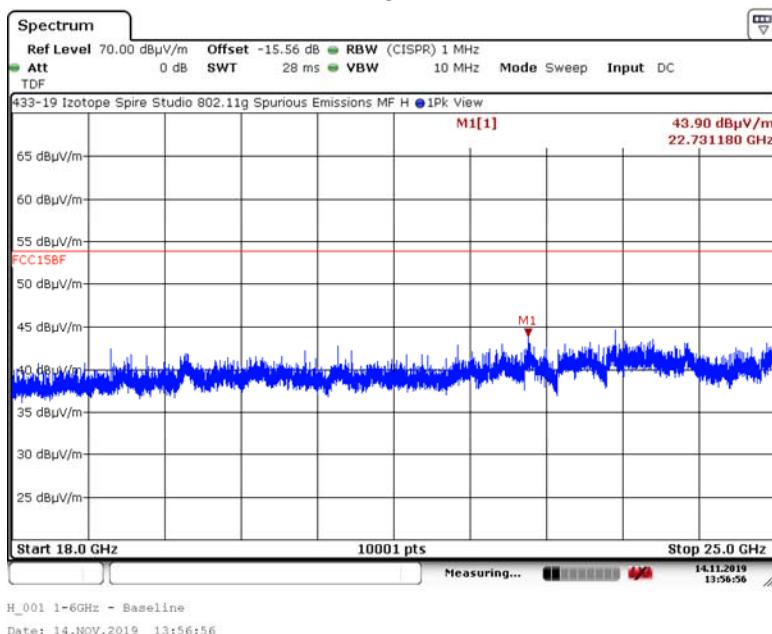
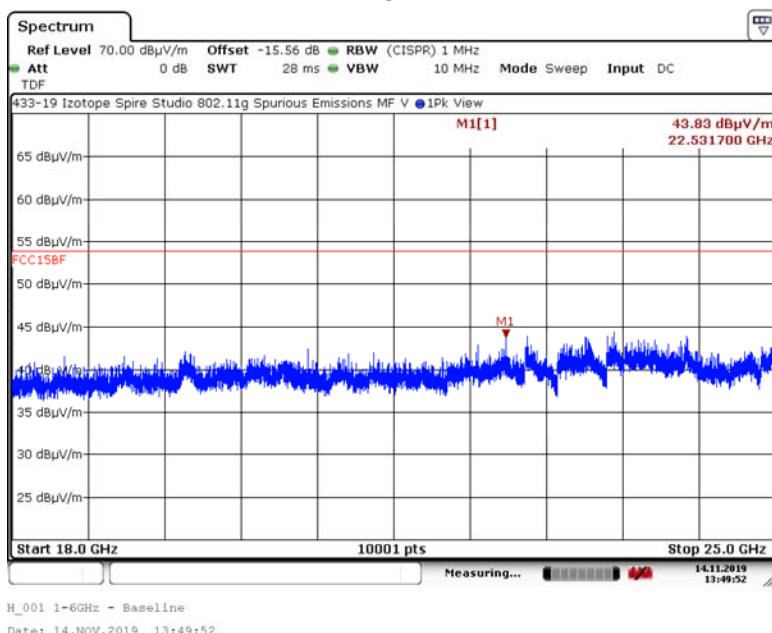
**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.5. Spurious Radiated Emissions (2483.5 GHz – 7 GHz) Test Results (continued)**
**A1.5.5. Measurement Results: 802.11g, Ch 11, Horizontal Antenna**

**A1.5.6. Measurement Results: 802.11g, Ch 11, Vertical Antenna**


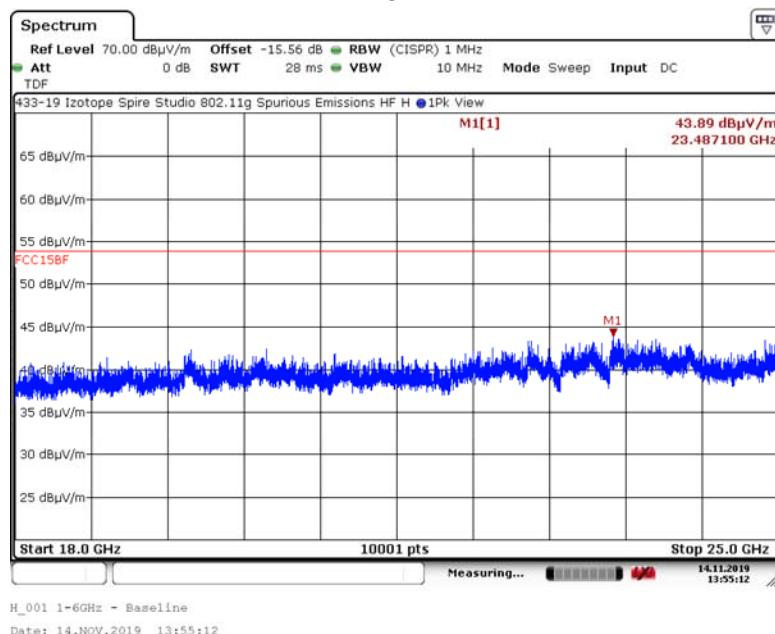
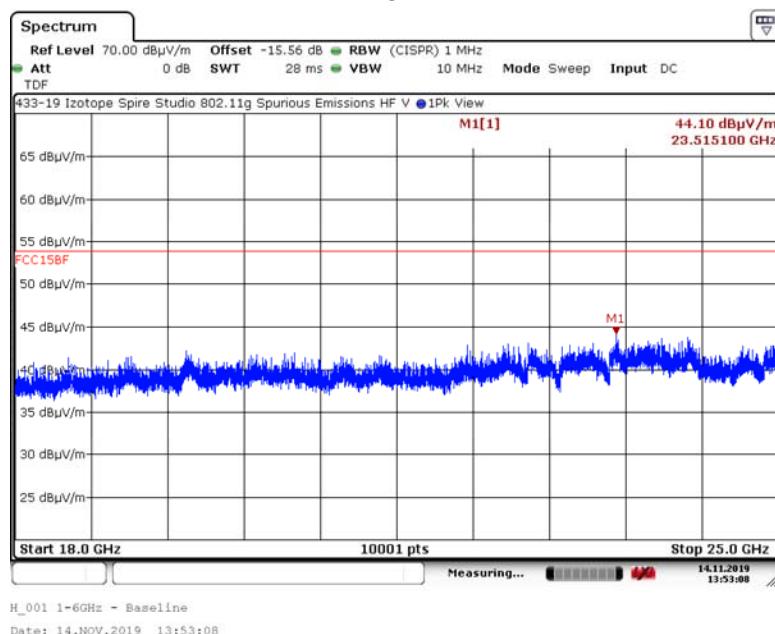
**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.6. Spurious Radiated Emissions (7 GHz – 18 GHz) Test Results**
**A1.6.1. Measurement Results: 802.11g, Ch 1, Horizontal Antenna**

**A1.6.2. Measurement Results: 802.11g, Ch 1, Vertical Antenna**


**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.6. Spurious Radiated Emissions (7 GHz – 18 GHz) Test Results (continued)**
**A1.6.3. Measurement Results: 802.11g, Ch 6, Horizontal Antenna**

**A1.6.4. Measurement Results: 802.11g, Ch 6, Vertical Antenna**


**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.6. Spurious Radiated Emissions (7 GHz – 18 GHz) Test Results (continued)**
**A1.6.5. Measurement Results: 802.11g, Ch 11, Horizontal Antenna**

**A1.6.6. Measurement Results: 802.11g, Ch 11, Vertical Antenna**


**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.7. Spurious Radiated Emissions (18 GHz – 25 GHz) Test Results**
**A1.7.1. Measurement Results: 802.11g, Ch 1, Horizontal Antenna**

**A1.7.2. Measurement Results: 802.11g, Ch 1, Vertical Antenna**


**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.7. Spurious Radiated Emissions (18 GHz – 25 GHz) Test Results (continued)**
**A1.7.3. Measurement Results: 802.11g, Ch 6, Horizontal Antenna**

**A1.7.4. Measurement Results: 802.11g, Ch 6, Vertical Antenna**


**Appendix A**
**A1. Transmitter Spurious Radiated Emissions (10 kHz to 25 GHz) (continued)**
**A1.7. Spurious Radiated Emissions (18 GHz – 25 GHz) Test Results (continued)**
**A1.7.5. Measurement Results: 802.11g, Ch 11, Horizontal Antenna**

**A1.7.6. Measurement Results: 802.11g, Ch 11, Vertical Antenna**


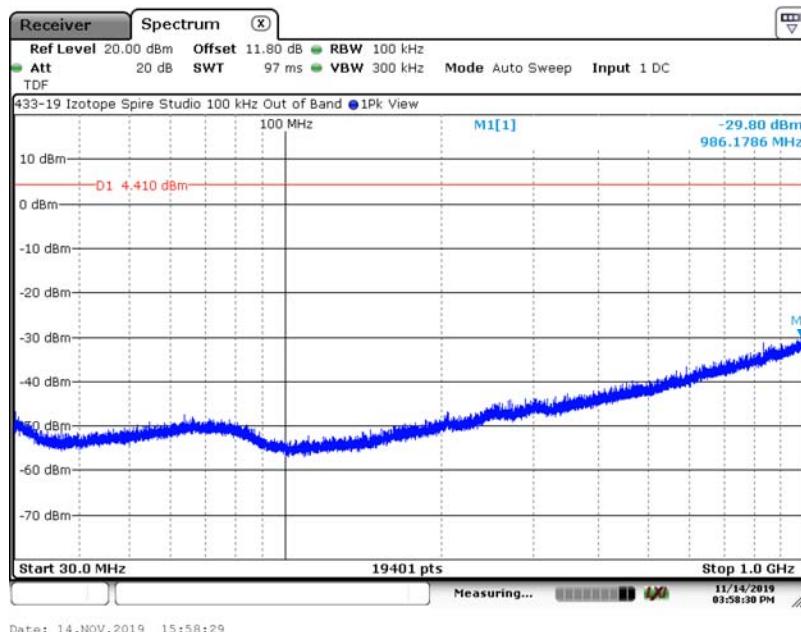
**Test Number: 433-19**
**Issue Date: 11/22/2016**

## Appendix B

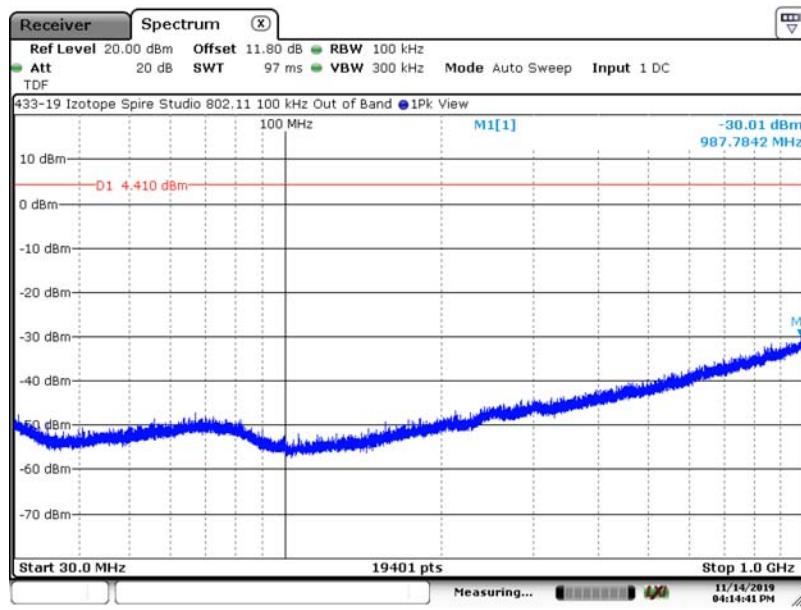
### B1. Emissions in Non-restricted Frequency Bands (30 MHz to 25 GHz)

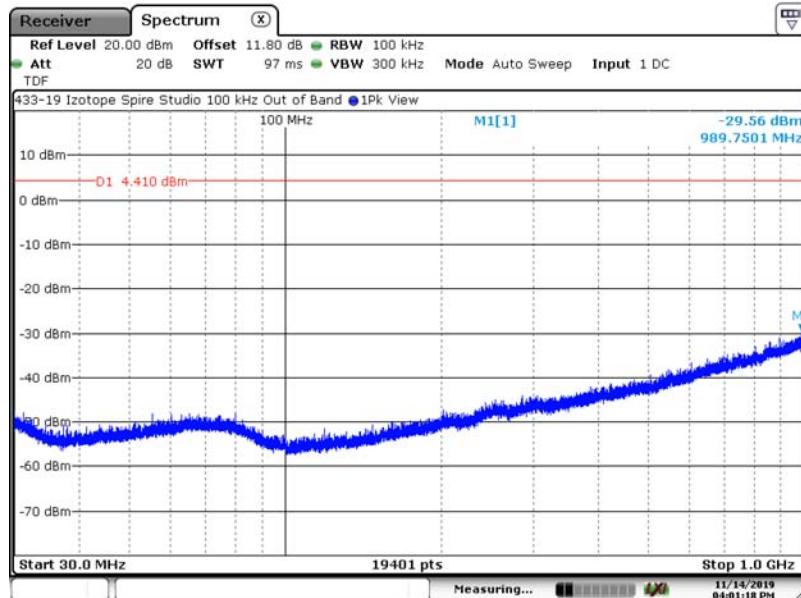
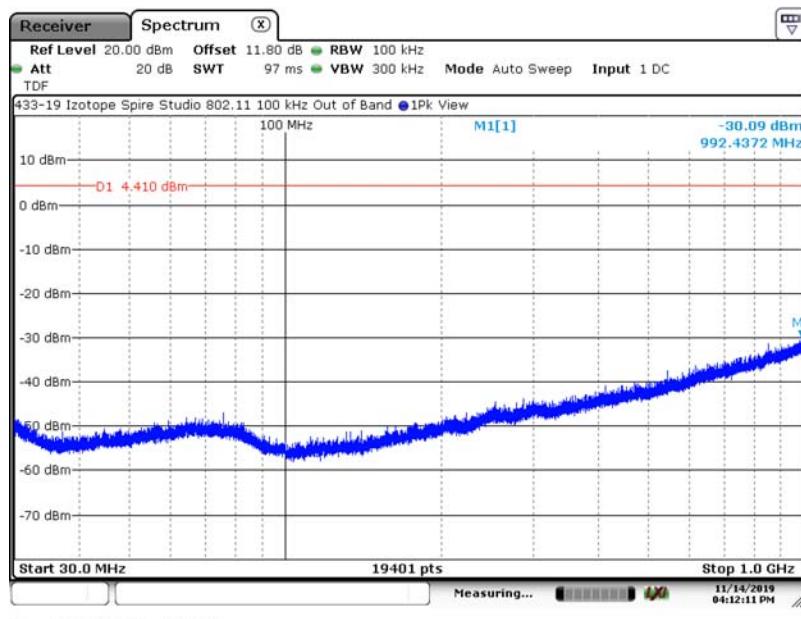
#### B1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 1 GHz) Test Results

##### B1.1.1. Measurement Results, LF: Horizontal Receive Antenna



##### B1.1.2. Measurement Results, LF: Vertical Receive Antenna



**Appendix B**
**B1. Emissions in Non-restricted Frequency Bands (30 MHz to 25 GHz) (continued)**
**B1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 1 GHz) Test Results**
**B1.1.3. Measurement Results, MF: Horizontal Receive Antenna**

**B1.1.4. Measurement Results, MF: Vertical Receive Antenna**


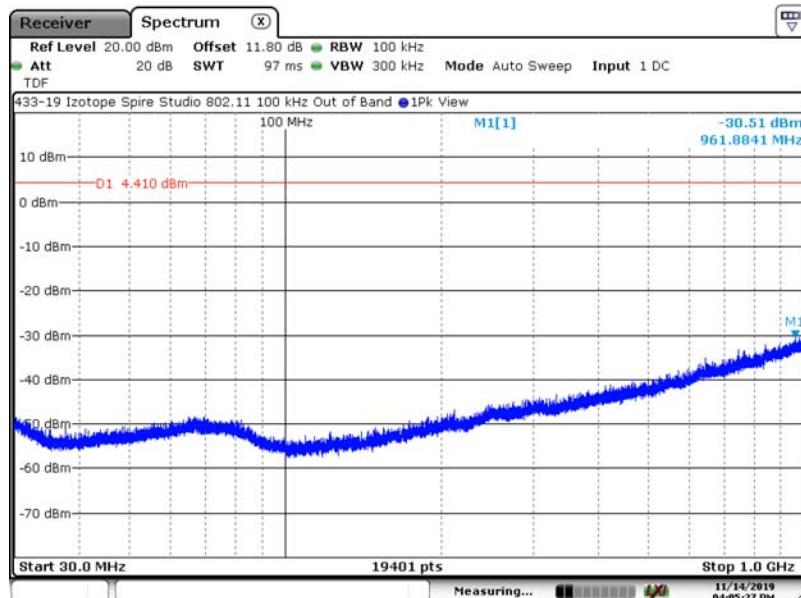
**Test Number: 433-19**
**Issue Date: 11/22/2016**

## Appendix B

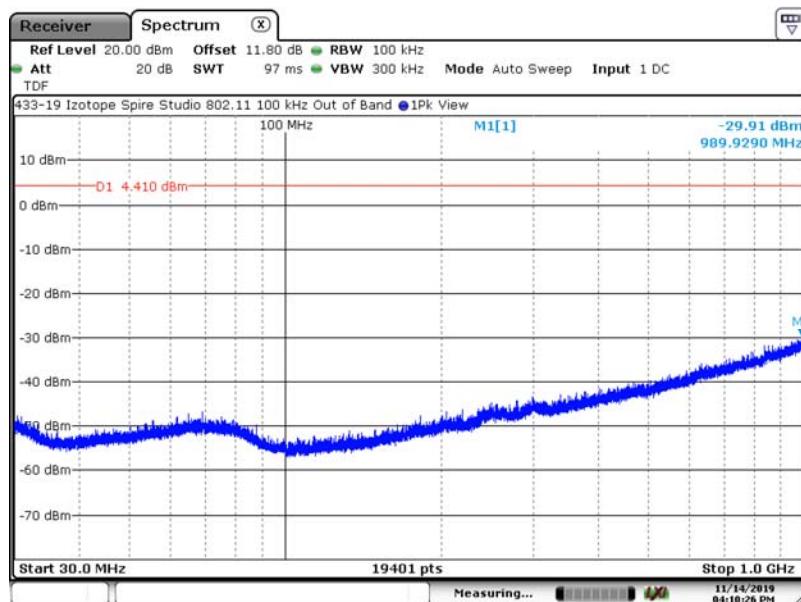
### B1. Emissions in Non-restricted Frequency Bands (30 MHz to 25 GHz) (continued)

#### B1.1. Emissions in Non-restricted Frequency Bands (30 MHz – 1 GHz) Test Results

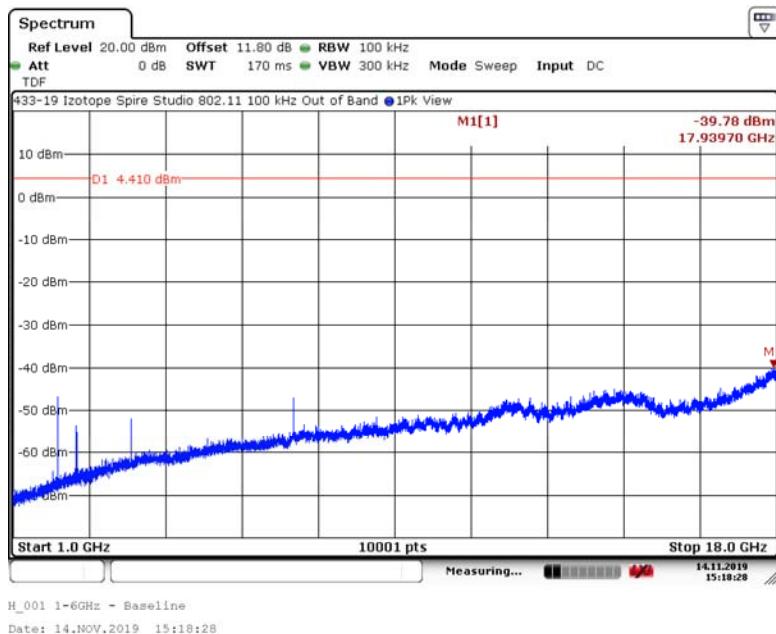
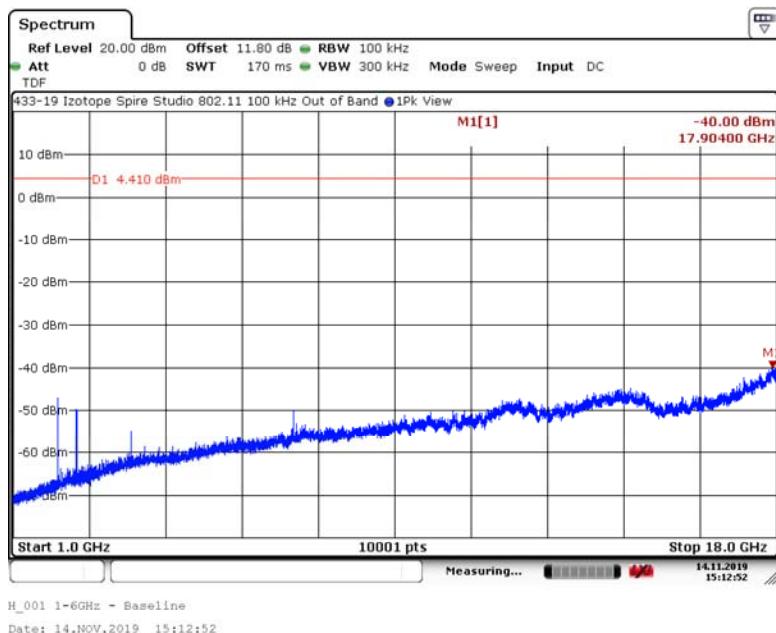
##### B1.1.5. Measurement Results, HF: Horizontal Receive Antenna

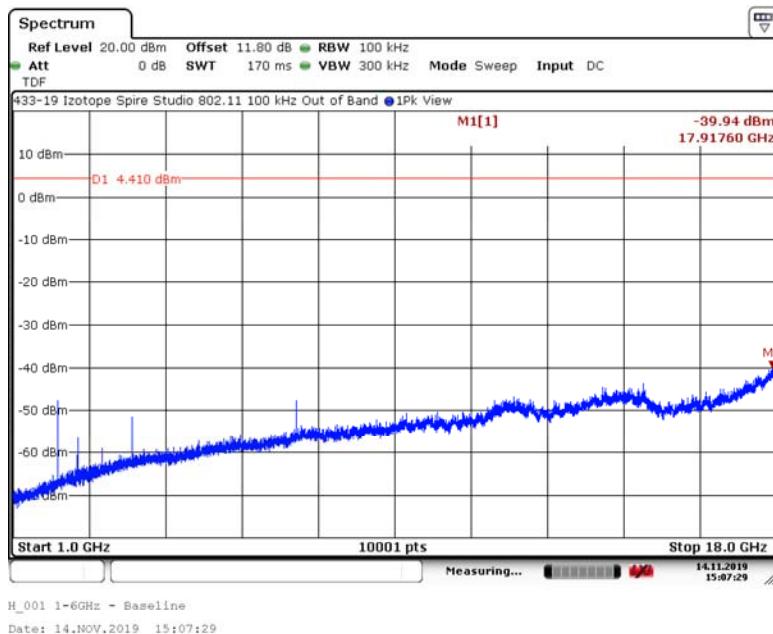
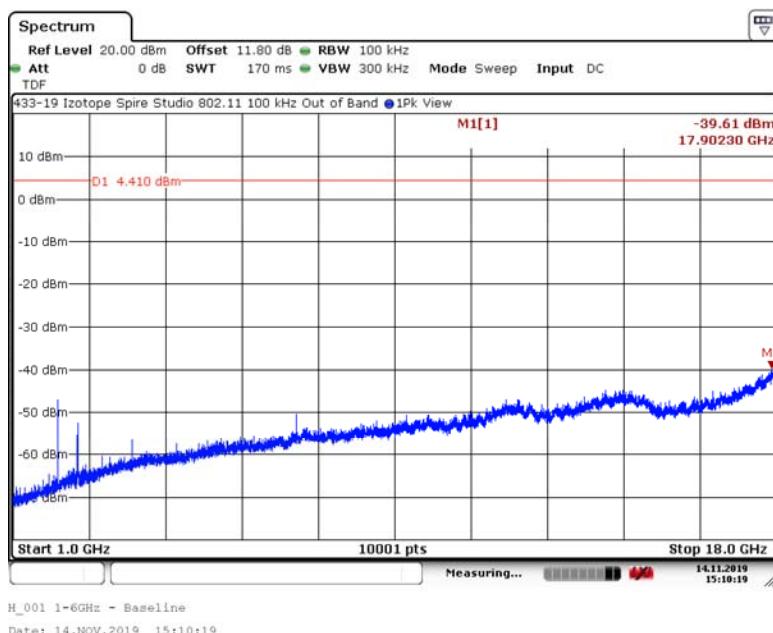


##### B1.1.6. Measurement Results, HF: Vertical Receive Antenna



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**Appendix B**
**B1. Emissions in Non-restricted Frequency Bands (30 MHz to 25 GHz) (continued)**
**B1.2. Emissions in Non-restricted Frequency Bands (1 GHz – 18 GHz) Test Results**
**B1.2.1. Measurement Results, LF: Horizontal Receive Antenna**

**B1.2.2. Measurement Results, LF: Vertical Receive Antenna**


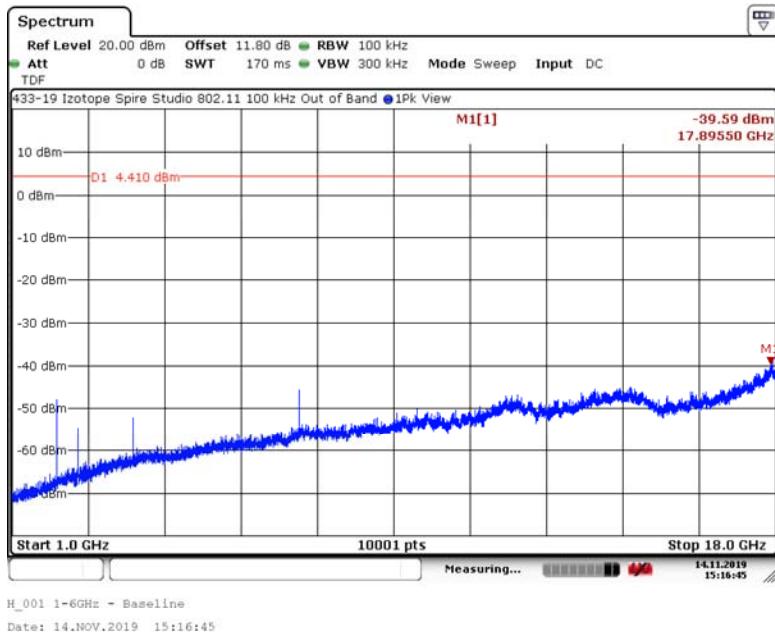
**Appendix B**
**B1. Emissions in Non-restricted Frequency Bands (30 MHz to 25 GHz) (continued)**
**B1.2. Emissions in Non-restricted Frequency Bands (1 GHz – 18 GHz) Test Results**
**B1.2.3. Measurement Results, MF: Horizontal Receive Antenna**

**B1.2.4. Measurement Results, MF: Vertical Receive Antenna**


## Appendix B

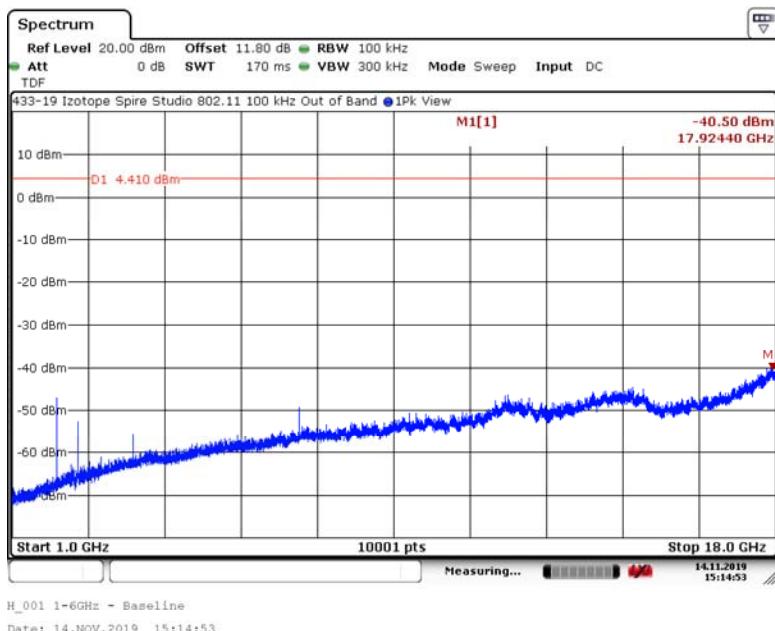
### B1. Emissions in Non-restricted Frequency Bands (30 MHz to 25 GHz) (continued)

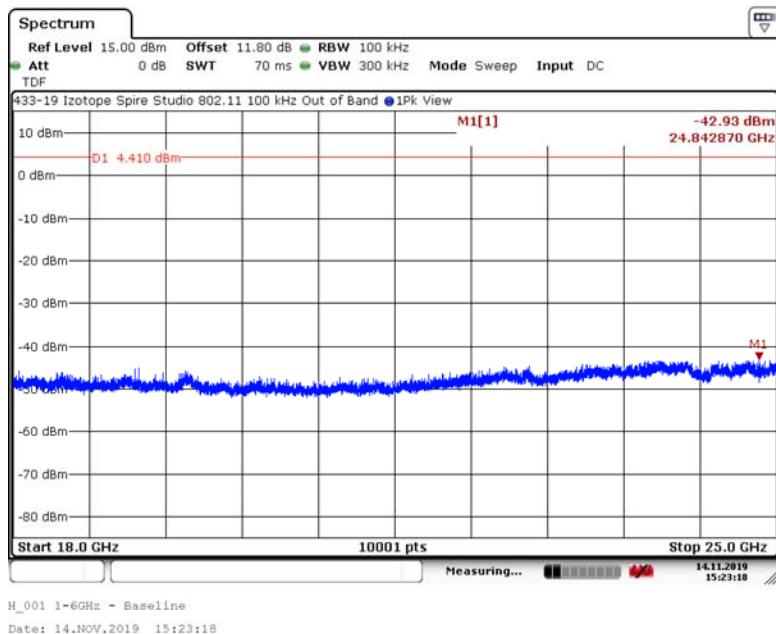
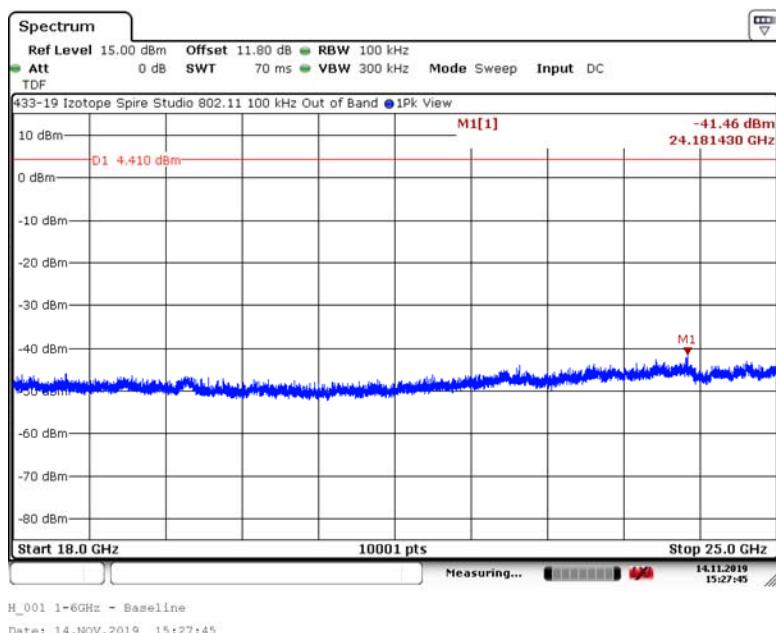
#### B1.2. Emissions in Non-restricted Frequency Bands (1 GHz – 18 GHz) Test Results

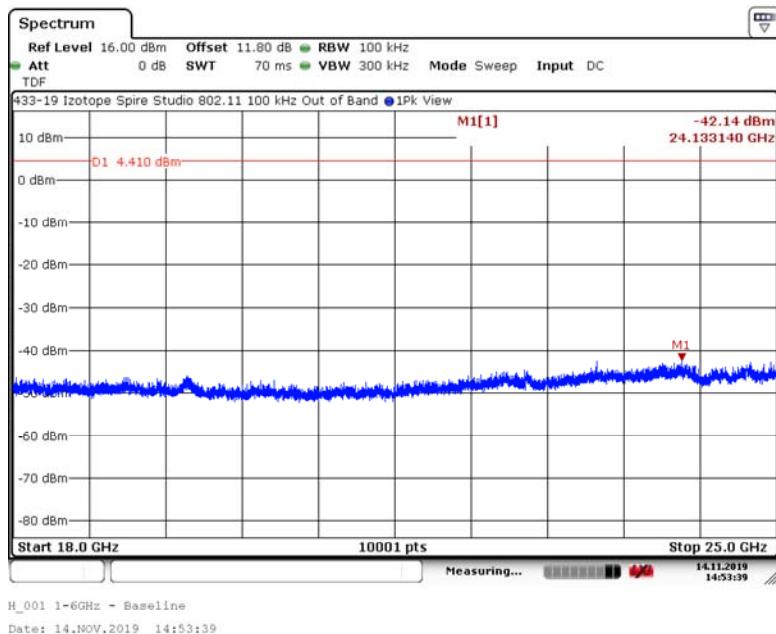
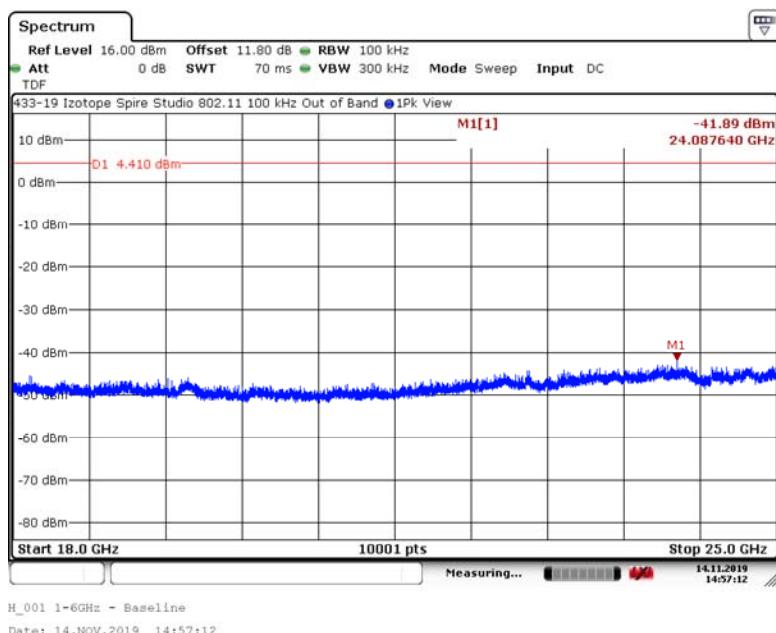
##### B1.2.5. Measurement Results, HF: Horizontal Receive Antenna

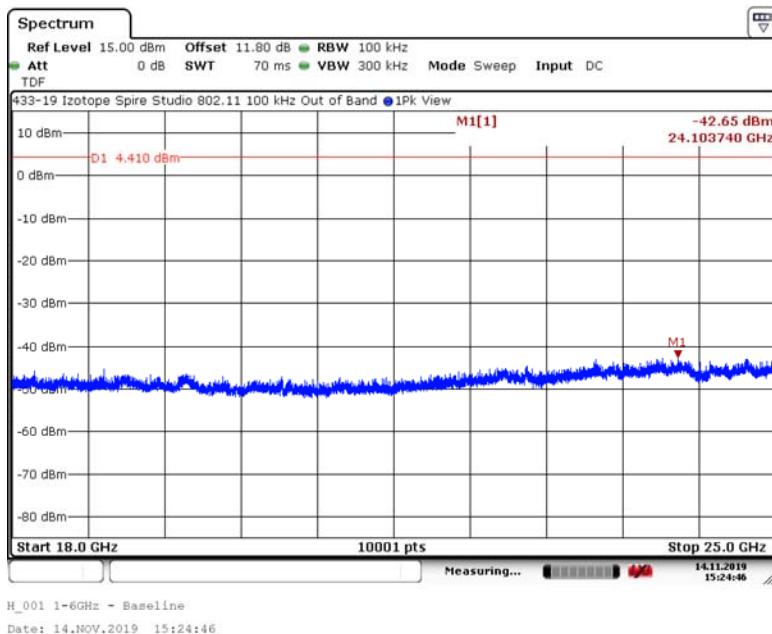


##### B1.2.6. Measurement Results, HF: Vertical Receive Antenna



**Appendix B**
**B1. Emissions in Non-restricted Frequency Bands (30 MHz to 25 GHz) (continued)**
**B1.3. Emissions in Non-restricted Frequency Bands (18 GHz – 25 GHz) Test Results**
**B1.3.1. Measurement Results, LF: Horizontal Receive Antenna**

**B1.3.2 Measurement Results, LF: Vertical Receive Antenna**


**Appendix B**
**B1. Emissions in Non-restricted Frequency Bands (30 MHz to 25 GHz) (continued)**
**B1.3. Emissions in Non-restricted Frequency Bands (18 GHz – 25 GHz) Test Results**
**B1.3.3. Measurement Results, MF: Horizontal Receive Antenna**

**B1.3.4 Measurement Results, MF: Vertical Receive Antenna**


**Appendix B**
**B1. Emissions in Non-restricted Frequency Bands (30 MHz to 25 GHz) (continued)**
**B1.3. Emissions in Non-restricted Frequency Bands (18 GHz – 25 GHz) Test Results**
**B1.3.5. Measurement Results, HF: Horizontal Receive Antenna**

**B1.3.6 Measurement Results, HF: Vertical Receive Antenna**
