



# FCC TEST REPORT

**Application No:** ZR/2020/50046  
**Applicant:** Xiaomi Communications Co., Ltd.  
**Address of Applicant:** #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085  
**Manufacturer:** Xiaomi Communications Co., Ltd.  
**Address of Manufacturer:** #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085  
**EUT Description:** Mobile Phone  
**Model No.:** M2006C3MNG  
**Trade Mark:** Redmi  
**FCC ID:** 2AFZZC3MNG  
**Standards:** 47 CFR FCC Part 2, Subpart J  
 47 CFR Part 15, Subpart C  
**Test Method:** KDB558074 D01 15.247 Meas Guidance v05r02  
 ANSI C63.10 (2013)  
**Date of Receipt:** 2020/6/10  
**Date of Test:** 2020/6/10to 2020/6/24  
**Date of Issue:** 2020/7/4

<b>Test Result:</b>	<b>PASS *</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Derek Yang  
Wireless Laboratory Manager



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# 1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2020/7/4		Original

<b>Authorized for issue by:</b>			
<b>Tested By</b>		 <hr/> (Mike Hu) /Project Engineer	
<b>Checked By</b>		 <hr/> (David Chen) /Reviewer	



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## 2 Test Summary

Test Item	Test Requirement	Test method	Test Result	Result
<b>AC Power Line Conducted Emission</b>	15.207	ANSI C63.10 2013	Clause 4.2	PASS
<b>Duty Cycle</b>	--	--	Clause 4.3	PASS
<b>Conducted Output Power</b>	15.247 (b)(3)	ANSI C63.10 2013	Clause 4.4	PASS
<b>DTS (6 dB) Bandwidth &amp; 99% Occupied Bandwidth</b>	15.247 (a)(2)	ANSI C63.10 2013	Clause 4.5	PASS
<b>Power Spectral Density</b>	15.247 (e)	ANSI C63.10 2013	Clause 4.6	PASS
<b>Band-edge for RF Conducted Emissions</b>	15.247(d)	ANSI C63.10 2013	Clause 4.7	PASS
<b>RF Conducted Spurious Emissions</b>	15.247(d)	ANSI C63.10 2013	Clause 4.8	PASS
<b>Radiated Spurious Emissions</b>	15.247(d);15.205/15.209	ANSI C63.10 2013	Clause 4.9	PASS
<b>Restricted bands around fundamental frequency (Radiated Emission)</b>	15.247(d);15.205/15.209	ANSI C63.10 2013	Clause 4.10	PASS



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### 3 General Information

#### 3.1 Client Information

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Address of Applicant:	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Manufacturer:	Xiaomi Communications Co., Ltd.
Address of Manufacturer:	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

#### 3.2 Test Location

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Address:	No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
Post code:	518057
Telephone:	+86 (0) 755 2601 2053
Fax:	+86 (0) 755 2671 0594
E-mail:	ee.shenzhen@sgs.com

#### 3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.



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### 3.4 General Description of EUT

EUT Description::	Mobile Phone
Model No.:	M2006C3MNG
Trade Mark:	Redmi
Hardware Version:	P2
Software Version:	MIUI 12
IEEE 802.11 WLAN Mode Supported	<input checked="" type="checkbox"/> 802.11B (20 MHz channel bandwidth), <input checked="" type="checkbox"/> 802.11G (20 MHz channel bandwidth) <input checked="" type="checkbox"/> 802.11N (20 MHz channel bandwidth), <input checked="" type="checkbox"/> 802.11N (40 MHz channel bandwidth)
Operation Frequency:	2400 MHz -2483.5MHz fc = 2407 MHz + N * 5 MHz, where: -fc = "Operating Frequency" in MHz, -N = "Channel Number" with the range from 1 to 11 for the 20 MHz channel bandwidth, or 3 to 9 for the 40 MHz channel bandwidth.
Type of Modulation:	IEEE for 802.11B: DSSS IEEE for 802.11G : OFDM IEEE for 802.11N(HT20) : OFDM IEEE for 802.11N(HT40) : OFDM
Sample Type:	<input checked="" type="checkbox"/> Portable Device, <input type="checkbox"/> Module
Antenna Type:	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated
Antenna Ports	<input checked="" type="checkbox"/> Ant 1, <input type="checkbox"/> Ant 2, <input type="checkbox"/> Ant 3
Smart System	<input checked="" type="checkbox"/> SISO (for 802.11B/G/N), <input type="checkbox"/> MIMO (for 802.11N): 2 Tx & 2 Rx, <input type="checkbox"/> Diversity (for 802.11B/G) : Tx & Rx
Antenna Gain:	1.0dBi
Power Supply	<input checked="" type="checkbox"/> AC/DC Adapter; <input checked="" type="checkbox"/> Battery <input type="checkbox"/> PoE;; <input type="checkbox"/> Other:
Accessories	AC Adapter 1:Model :MDY-09-EQ; Input:100-240V,0.35A;Output:5V,2A AC Adapter 2:Model :MDY-09-EQ; Input:100-240V,0.35A;Output:5V,2A Li-ion Battery: Model :BN56;3.85V,4900mAh USB: Model :H52210; 0.8 meter, shielded cable, with-out ferrite core

Operation Frequency of each channel (802.11B/G/N HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		
Operation Frequency of each channel (802.11N HT40)							
Channel	Frequency	Channel	Frequency	Channel	Frequency		
3	2422MHz	6	2437MHz	9	2452MHz		
4	2427MHz	7	2442MHz				



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5	2432MHz	8	2447MHz
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Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency for 802.11B/G/N (HT20)	Frequency for 802.11N (HT40)
The Lowest channel	2412MHz	2422MHz
The Middle channel	2437MHz	2437MHz
The Highest channel	2462MHz	2452MHz

### 3.5 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	50 % RH
Atmospheric Pressure:	101.30 KPa
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

### 3.6 Description of Support Units

The EUT has been tested independent unit.



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## 4 Test results and Measurement Data

### 4.1 Antenna Requirement

<b>Standard requirement:</b>	47 CFR Part 15C Section 15.203 /247(c)
<p>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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, 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 this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p>	
<p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.0dBi.</p>	



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## 4.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2013		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	* Decreases with the logarithm of the frequency.		
Test Procedure:	<ol style="list-style-type: none"> <li>1) The mains terminal disturbance voltage test was conducted in a shielded room.</li> <li>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</li> <li>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,</li> <li>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.</li> <li>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</li> </ol>		



<p>Test Setup:</p>	
<p>Exploratory Test Mode:</p>	<p>Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. Charge + Transmitting mode.</p>
<p>Final Test Mode:</p>	<p>Through Pre-scan, find the 1Mbps of rate of 802.11B at lowest channel is the worst case. Charge + Transmitting mode. Only the worst case is recorded in the report.</p>
<p>Instruments Used:</p>	<p>Refer to section 5.10 for details</p>
<p>Test Results:</p>	<p>Pass</p>



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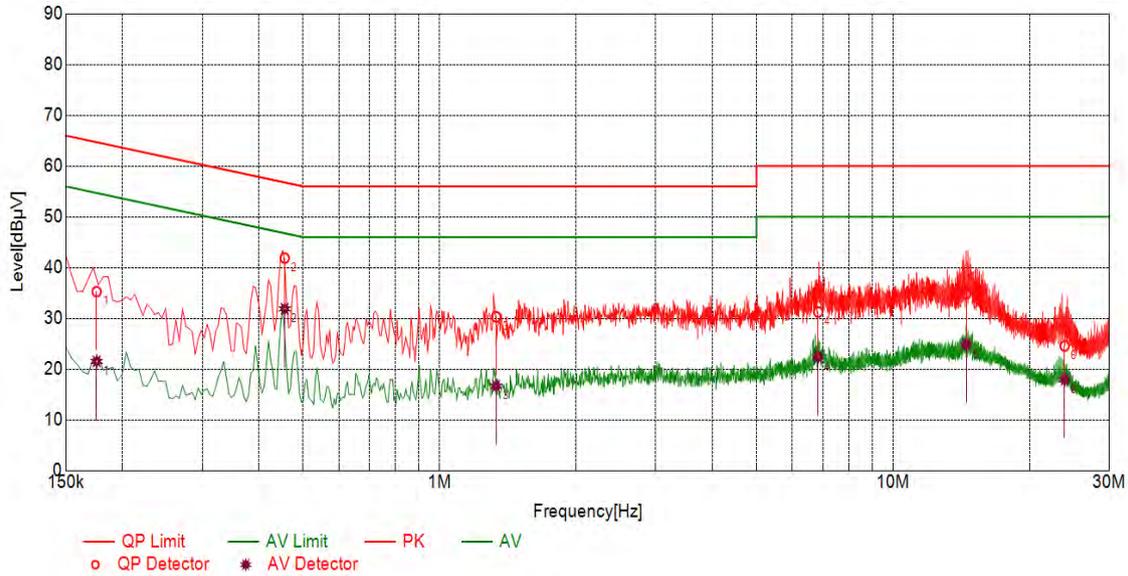
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**Measurement Data**

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

**Live Line:**



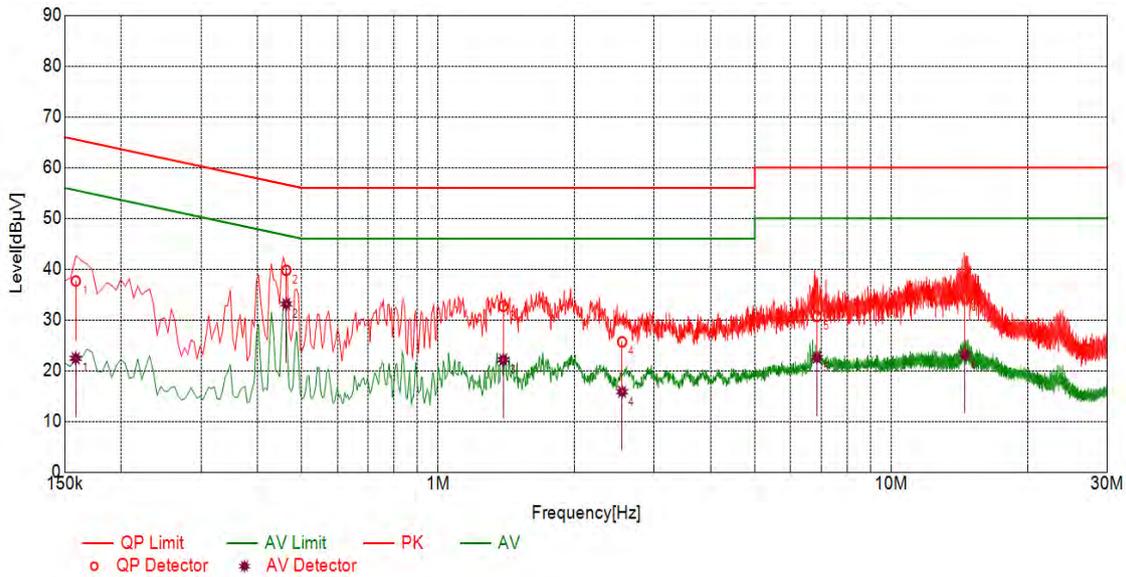
**Test Graph**

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value	QP Limit	QP Margin	AV Value	AV Limit	AV Margin	Type
1	0.1755	10.10	35.26	64.70	29.44	21.52	54.70	33.18	L
2	0.4559	10.10	41.87	56.77	14.90	31.86	46.77	14.91	L
3	1.3335	10.10	30.31	56.00	25.69	16.65	46.00	29.35	L
4	6.8421	10.10	31.24	60.00	28.76	22.37	50.00	27.63	L
5	14.5050	10.11	34.83	60.00	25.17	24.87	50.00	25.13	L
6	23.9012	10.11	24.56	60.00	35.44	17.90	50.00	32.10	L

**Neutral Line:**



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**Test Graph**

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value	QP Limit	QP Margin	AV Value	AV Limit	AV Margin	Type
1	0.1587	10.10	37.66	65.53	27.87	22.42	55.53	33.11	N
2	0.4626	10.10	39.76	56.65	16.89	33.12	46.65	13.53	N
3	1.3930	10.10	32.68	56.00	23.32	22.15	46.00	23.85	N
4	2.5480	10.10	25.67	56.00	30.33	15.83	46.00	30.17	N
5	6.8564	10.10	30.69	60.00	29.31	22.55	50.00	27.45	N
6	14.5561	10.11	34.40	60.00	25.60	23.11	50.00	26.89	N

**Remarks:**

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.



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### 4.3 Duty Cycle

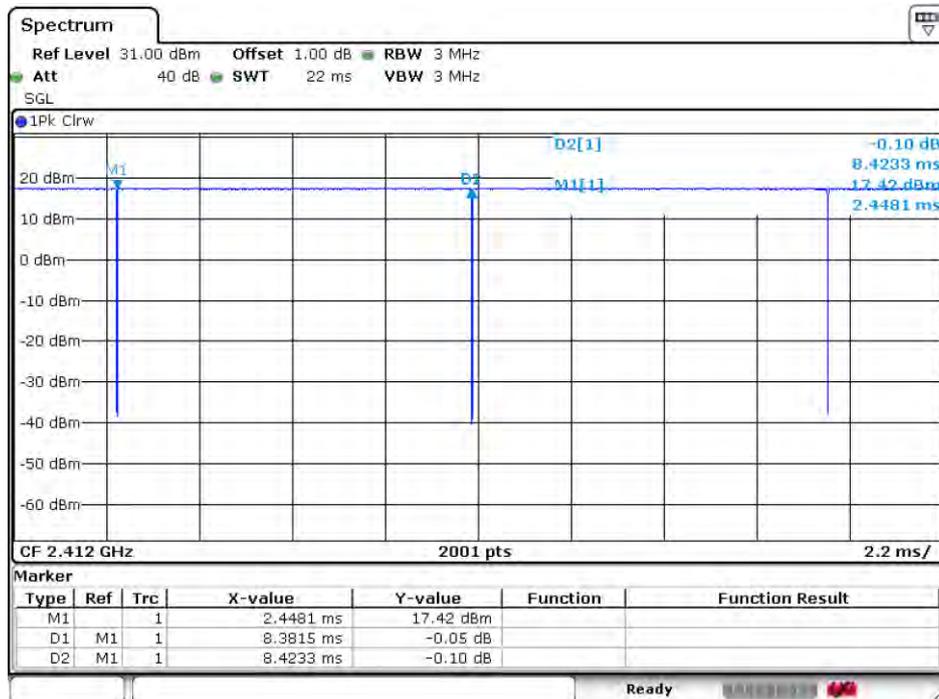
#### 4.3.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11B	Ant 1: CH1,CH6,CH11	99.50
11G	Ant 1: CH1,CH6,CH11	95.60
11N20	Ant 1: CH1,CH6,CH11	95.68
11N40	Ant 1: CH3,CH6,CH9	93.32

#### 4.3.1 Test Plots

##### 4.3.1.1 ANT1

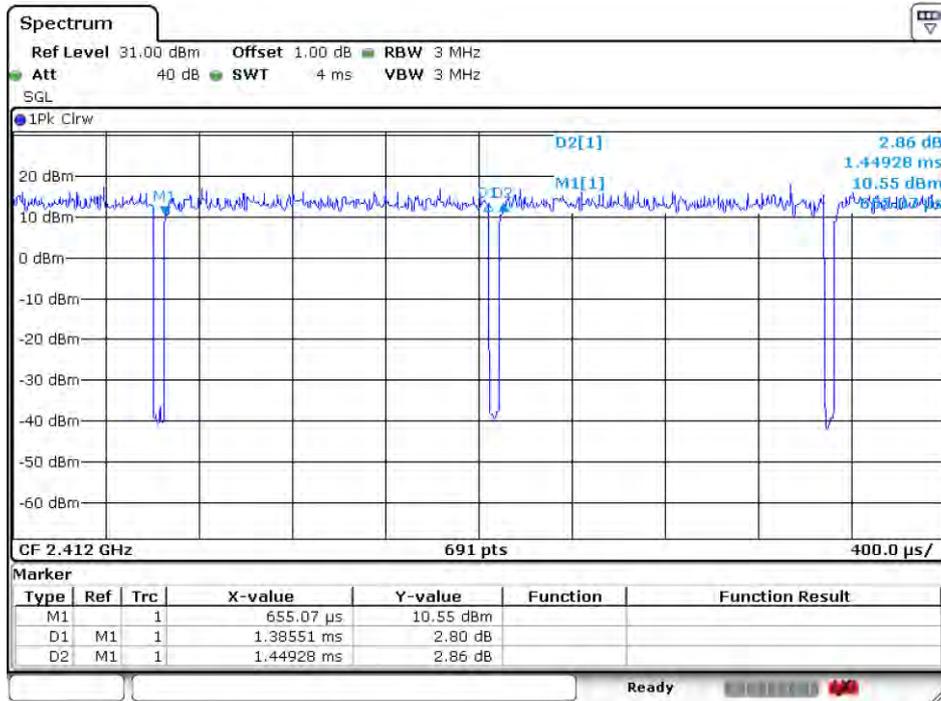
##### 4.3.1.1.1 11B



Date: 12 JUN. 2020 10:11:19

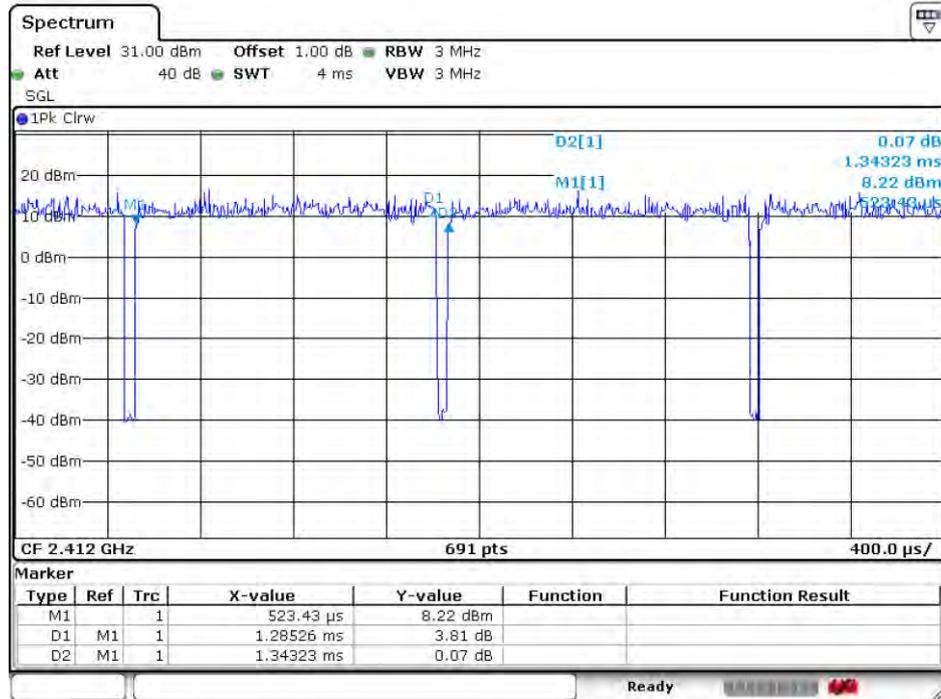


**4.3.1.1.2 11G**



Date: 12 JUN 2020 10:10:23

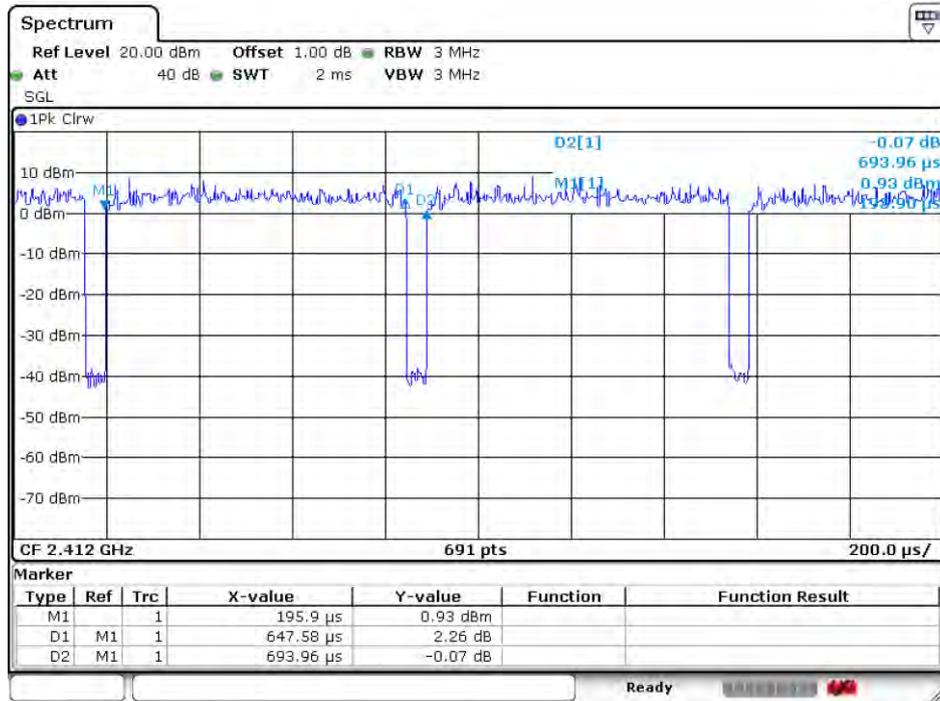
**4.3.1.1.3 11N20**



Date: 12 JUN 2020 10:12:01



**4.3.1.1.4 11N40**



Date: 12 JUN.2020 10:12:48



#### 4.4 Conducted Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10 :2013 Section 11.9.1.3
Test Setup:	
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40).
Limit:	30dBm
Test Results:	Pass



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**4.4.1 Test Results**

**Measurement Data of Average Power:**

Mode	Test Channel	Average Output Power (dBm) [Duty Cycle Considered]	Result
802.11B	Lowest	16.70	Report purpose only
	Middle	16.79	Report purpose only
	Highest	17.41	Report purpose only
802.11G	Lowest	13.78	Report purpose only
	Middle	13.98	Report purpose only
	Highest	14.36	Report purpose only
802.11N20	Lowest	11.81	Report purpose only
	Middle	11.98	Report purpose only
	Highest	12.42	Report purpose only
802.11N40	Lowest	11.45	Report purpose only
	Middle	11.87	Report purpose only
	Highest	12.78	Report purpose only

**Measurement Data of Peak Power:**

Mode	Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result
802.11B	Lowest	16.90	30.00	Pass
	Middle	16.95	30.00	Pass
	Highest	17.59	30.00	Pass
802.11G	Lowest	14.22	30.00	Pass
	Middle	14.20	30.00	Pass
	Highest	14.67	30.00	Pass
802.11N20	Lowest	12.34	30.00	Pass
	Middle	12.28	30.00	Pass
	Highest	12.84	30.00	Pass
802.11N40	Lowest	11.95	30.00	Pass
	Middle	12.05	30.00	Pass
	Highest	12.98	30.00	Pass



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### 4.5 DTS (6 dB) Bandwidth & 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10: 2013 Section 11.8.1 Option 1
Test Setup:	
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40).
Limit:	≥ 500 kHz
Test Results:	Pass

#### 4.5.1 Test Results

Mode	Test Channel	Occupied Bandwidth (MHz)	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
802.11B	Lowest	12.81	8.55	≥500	Pass
	Middle	13.11	8.55	≥500	Pass
	Highest	13.24	9.03	≥500	Pass
802.11G	Lowest	20.06	16.32	≥500	Pass
	Middle	16.85	15.72	≥500	Pass
	Highest	17.19	16.32	≥500	Pass
802.11N20	Lowest	20.01	17.57	≥500	Pass
	Middle	17.80	16.32	≥500	Pass
	Highest	17.93	17.54	≥500	Pass
802.11N40	Lowest	35.77	35.02	≥500	Pass
	Middle	35.95	35.10	≥500	Pass
	Highest	36.64	36.34	≥500	Pass



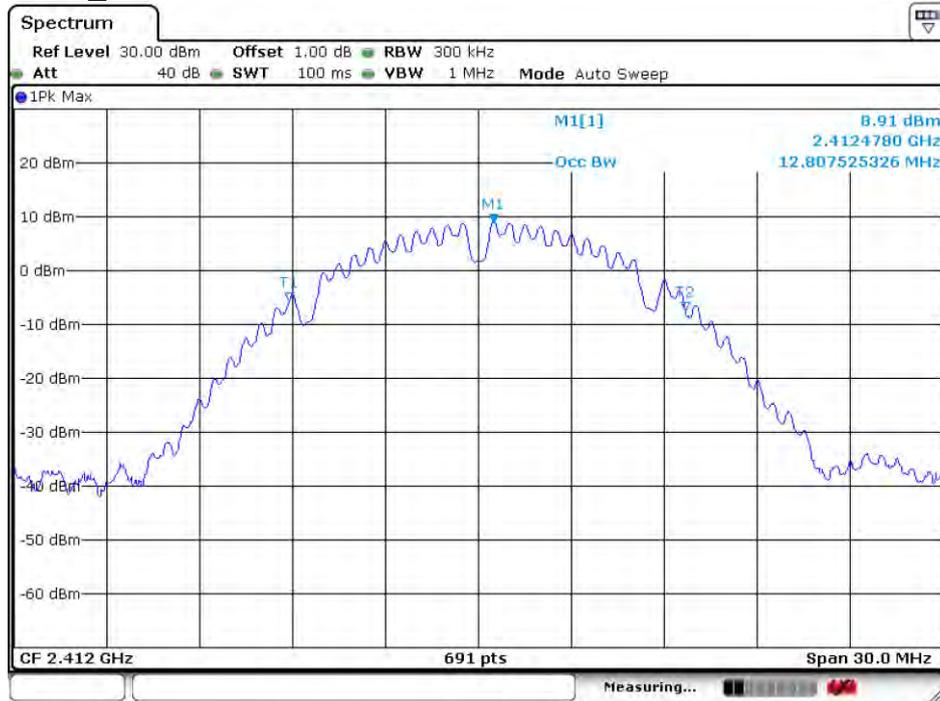
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## 4.5.2 Test plots

### 4.5.2.1 ANT1

#### 4.5.2.1.1 802.11B\_Lowest Channel

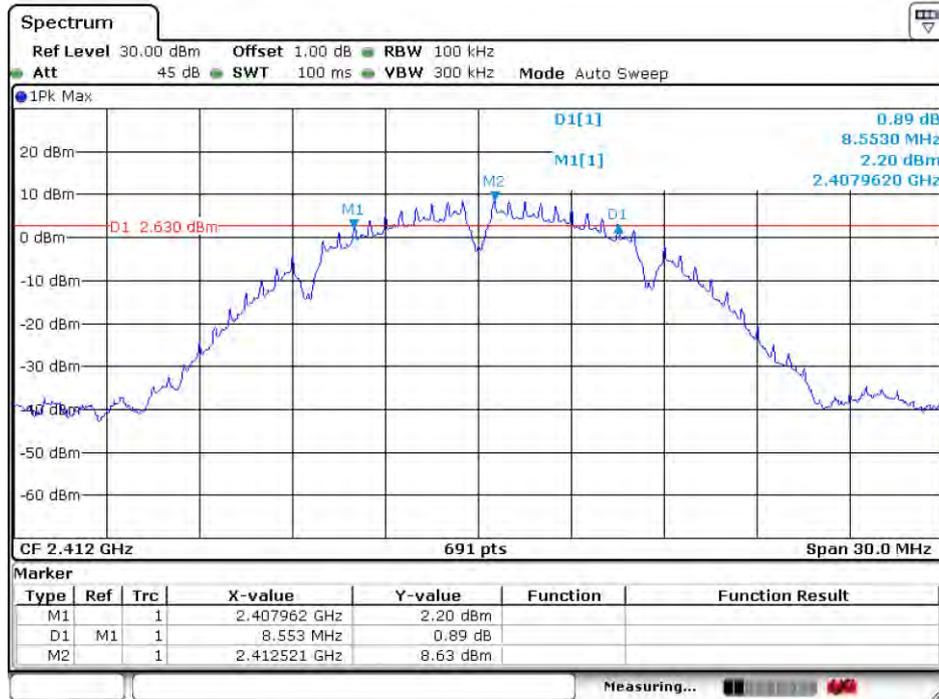


Date: 12 JUN 2020 08:29:50



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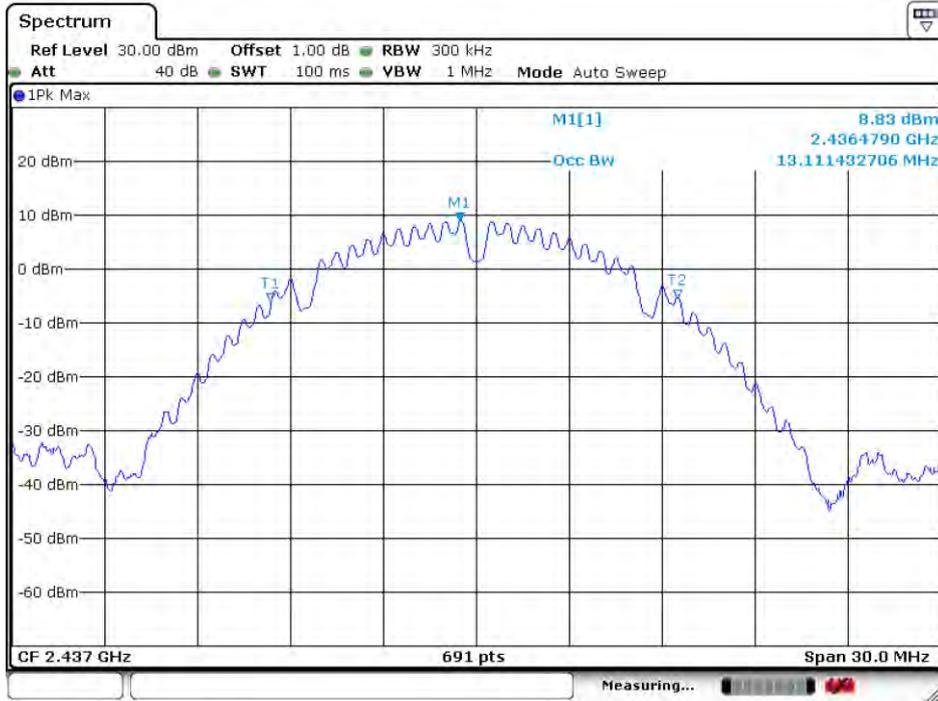
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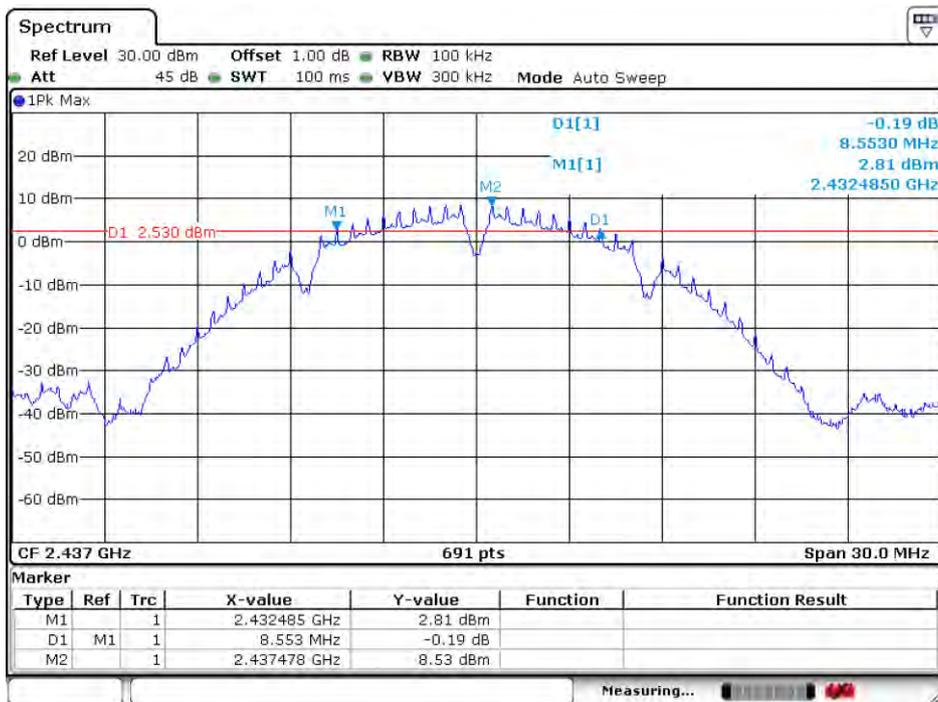
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**4.5.2.1.2 802.11B\_ Middle Channel**



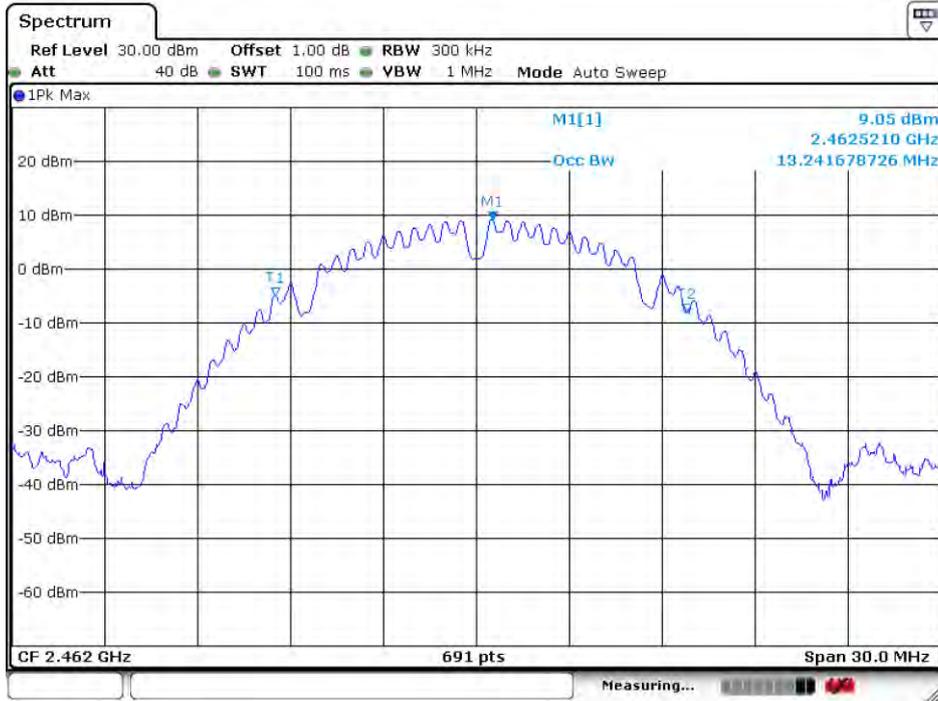
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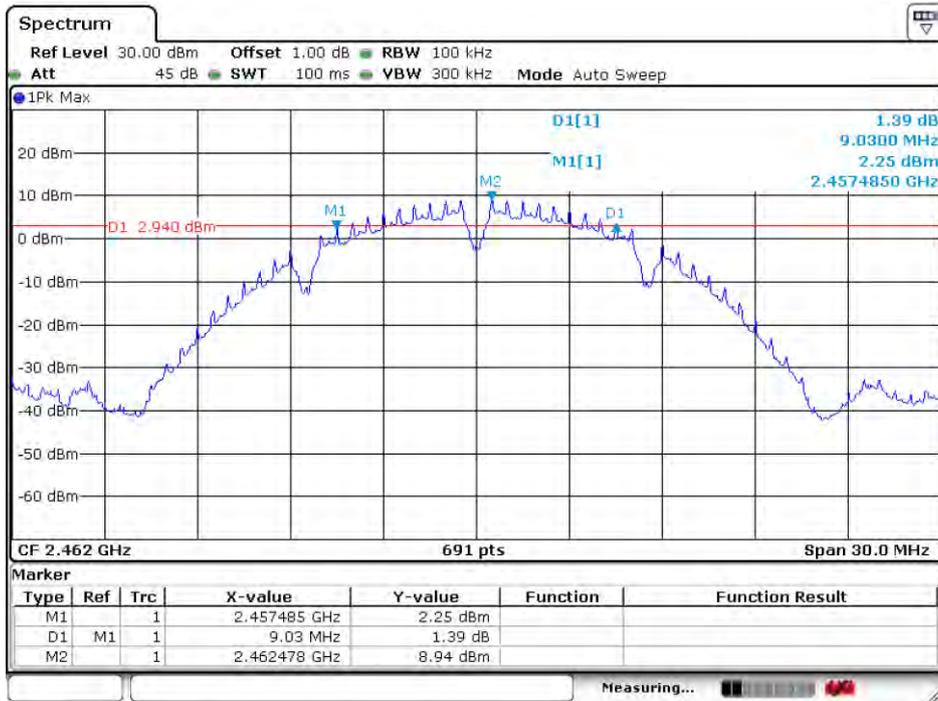
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**4.5.2.1.3 802.11B\_ Highest Channel**



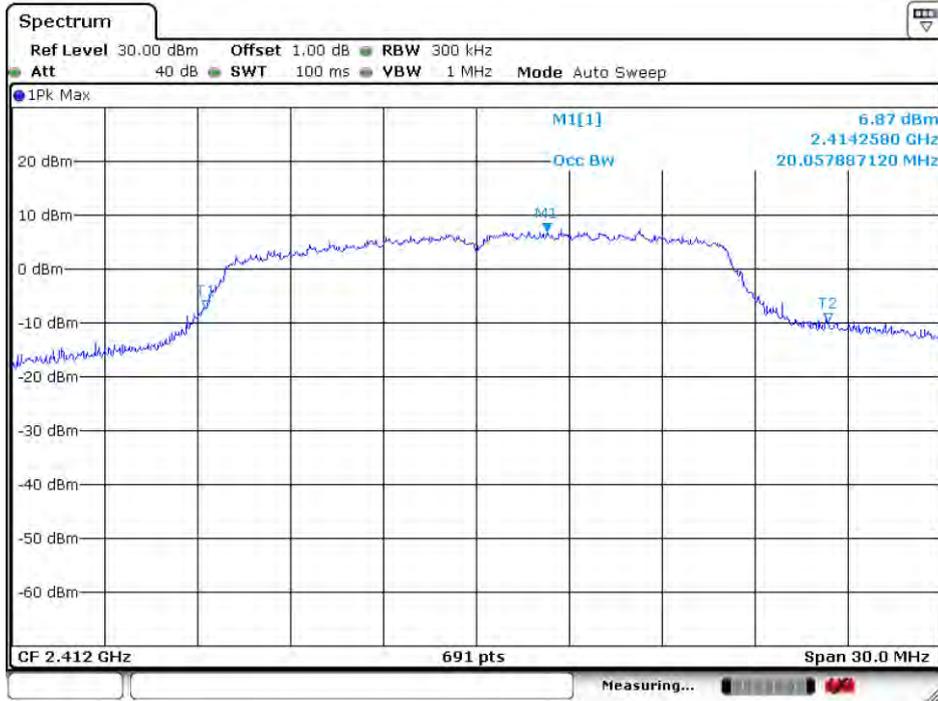
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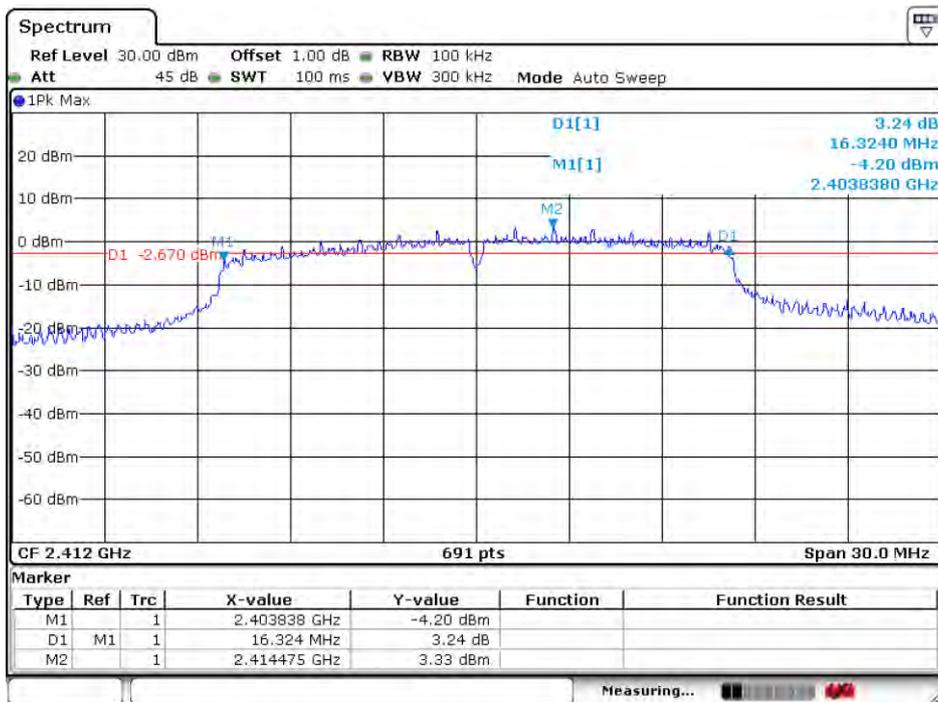
Date: 12 JUN.2020 08:09:51



**4.5.2.1.4 802.11G\_Lowest Channel**



Date: 12 JUN.2020 08:29:23



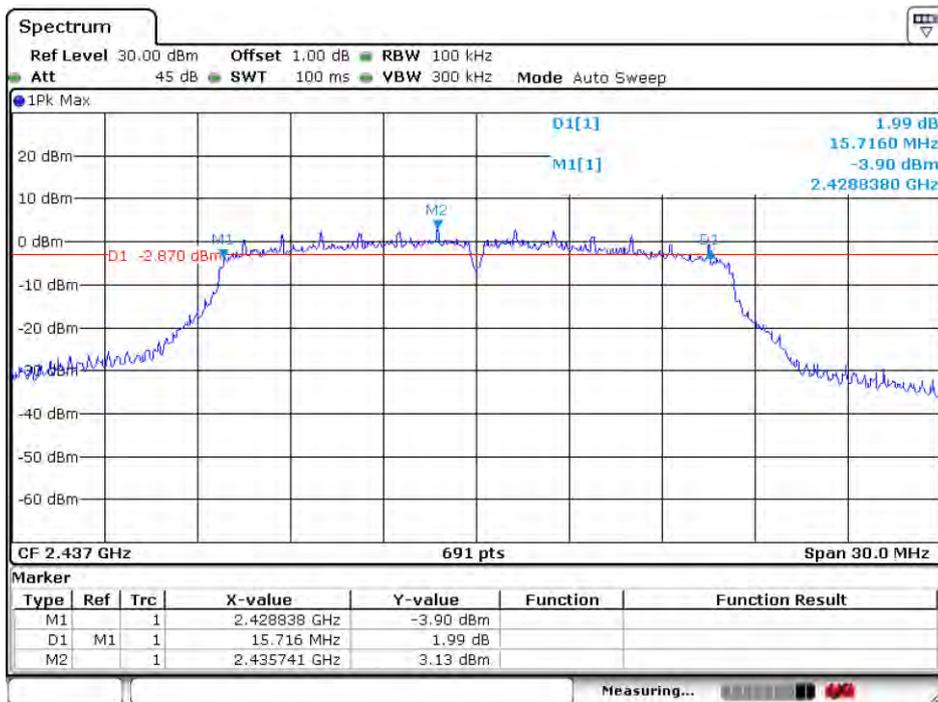
Date: 12 JUN.2020 08:13:30



**4.5.2.1.5 802.11G\_ Middle Channel**



Date: 12 JUN.2020 08:25:09



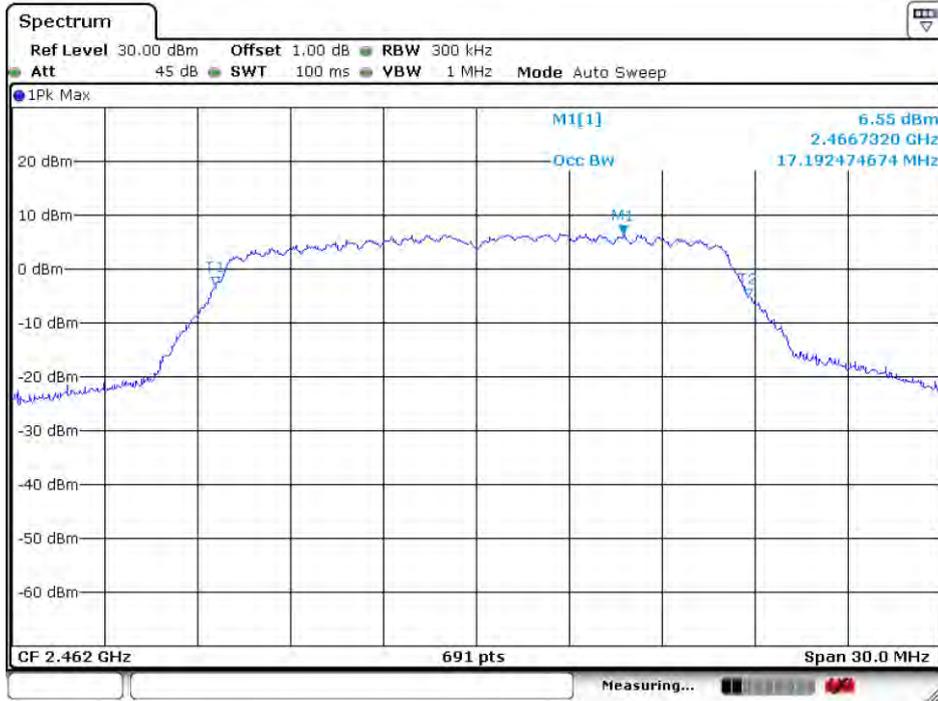
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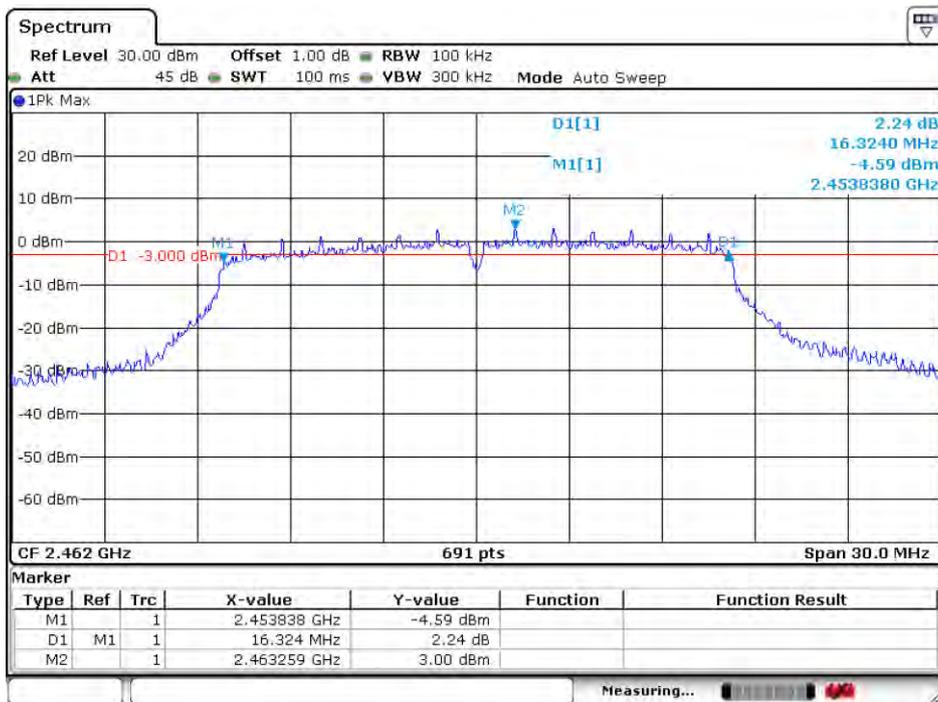
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**4.5.2.1.6 802.11G\_Highest Channel**



Date: 12 JUN.2020 08:24:30



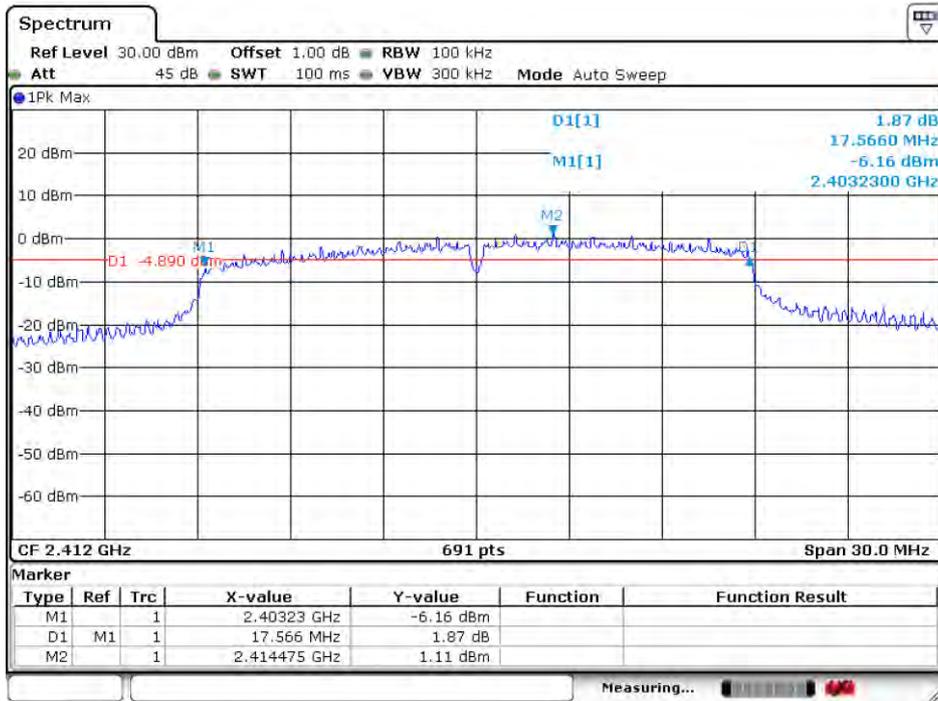
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**4.5.2.1.7 802.11N20\_Lowest Channel**



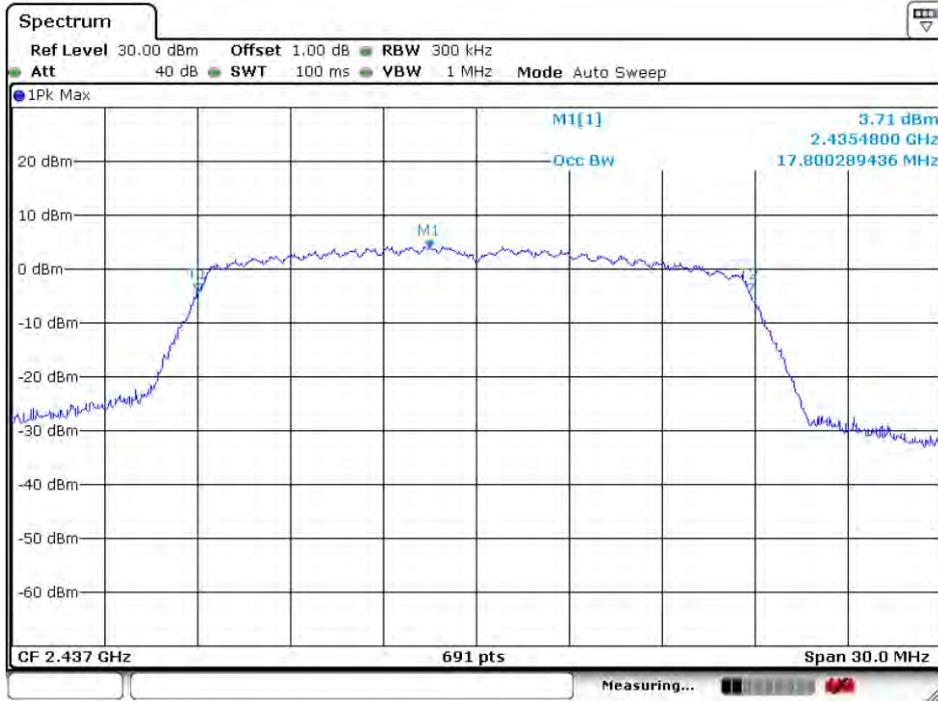
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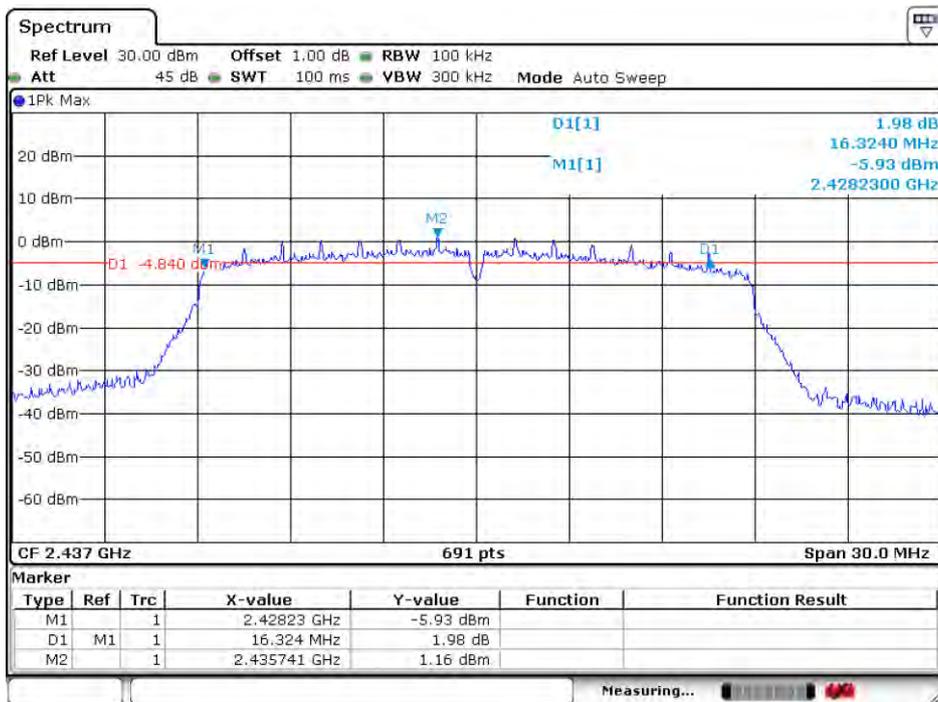
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**4.5.2.1.8 802.11 N20\_ Middle Channel**



Date: 12 JUN.2020 08:35:34



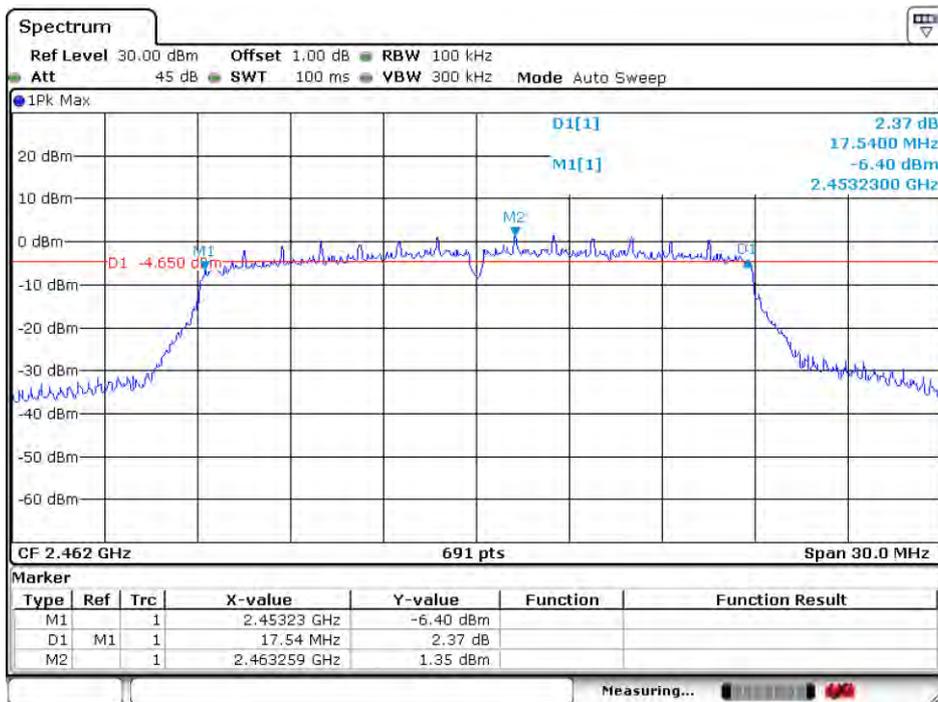
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**4.5.2.1.9 802.11 N20\_ Highest Channel**



Date: 12 JUN.2020 08:33:38



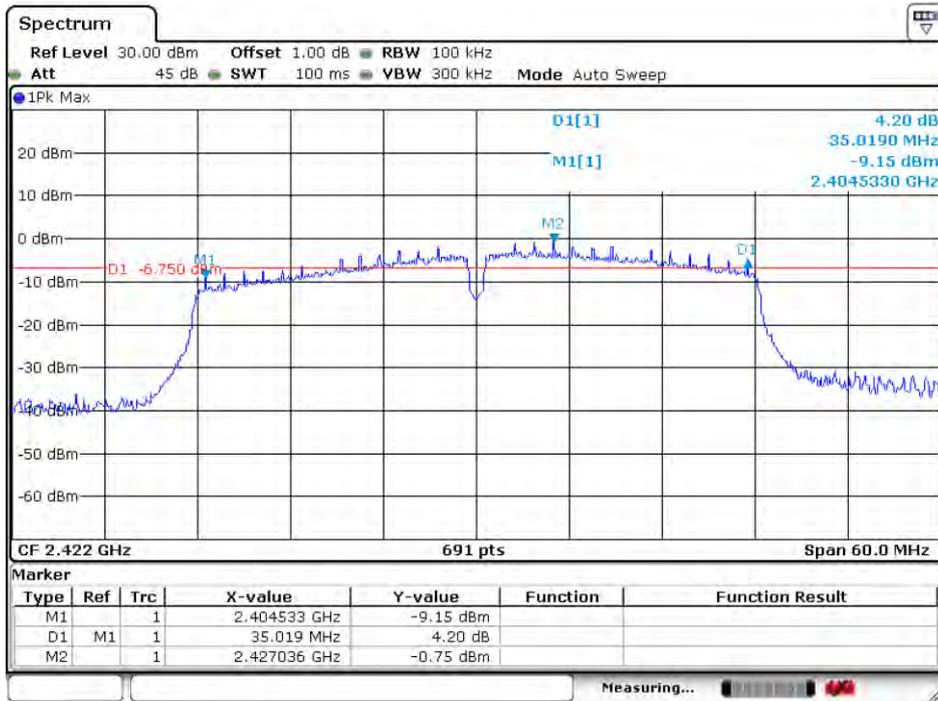
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**4.5.2.1.10 802.11N40\_Lowest Channel**



Date: 12 JUN.2020 08:36:45



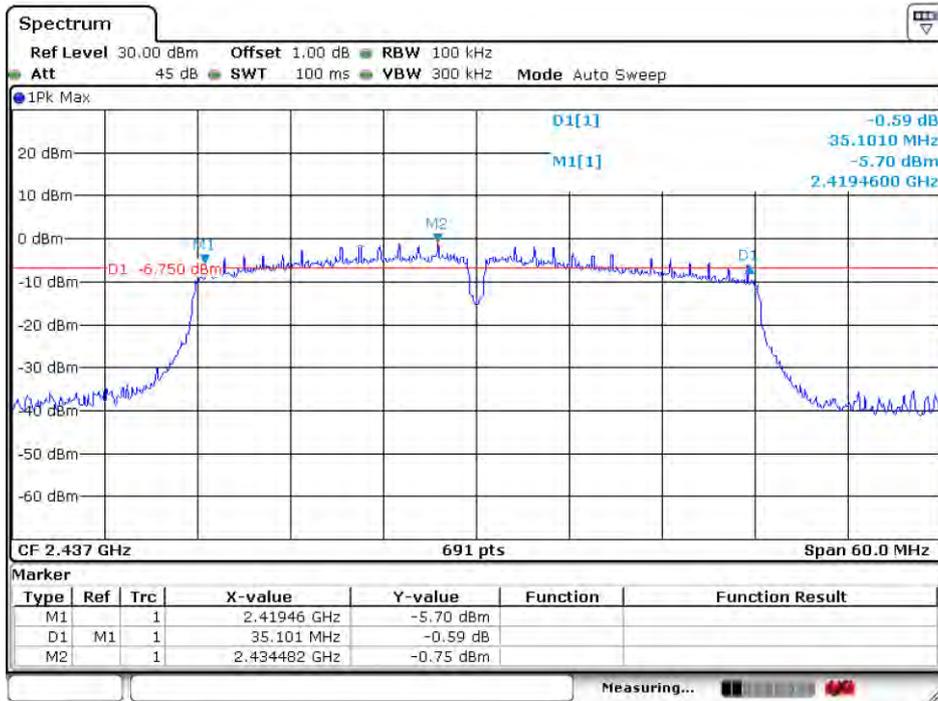
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**4.5.2.1.11 802.11 N40\_ Middle Channel**



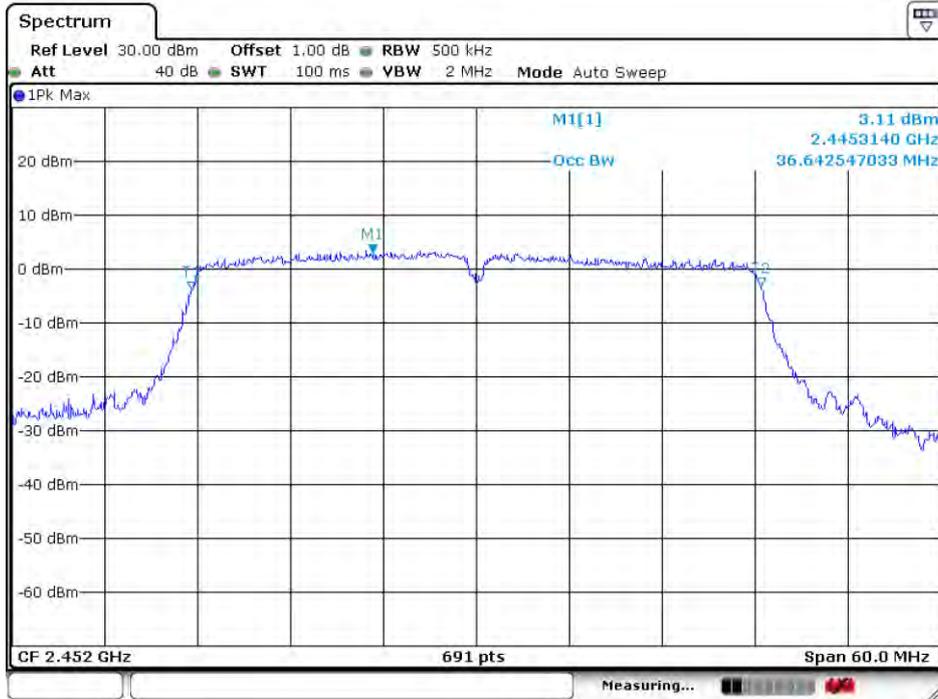
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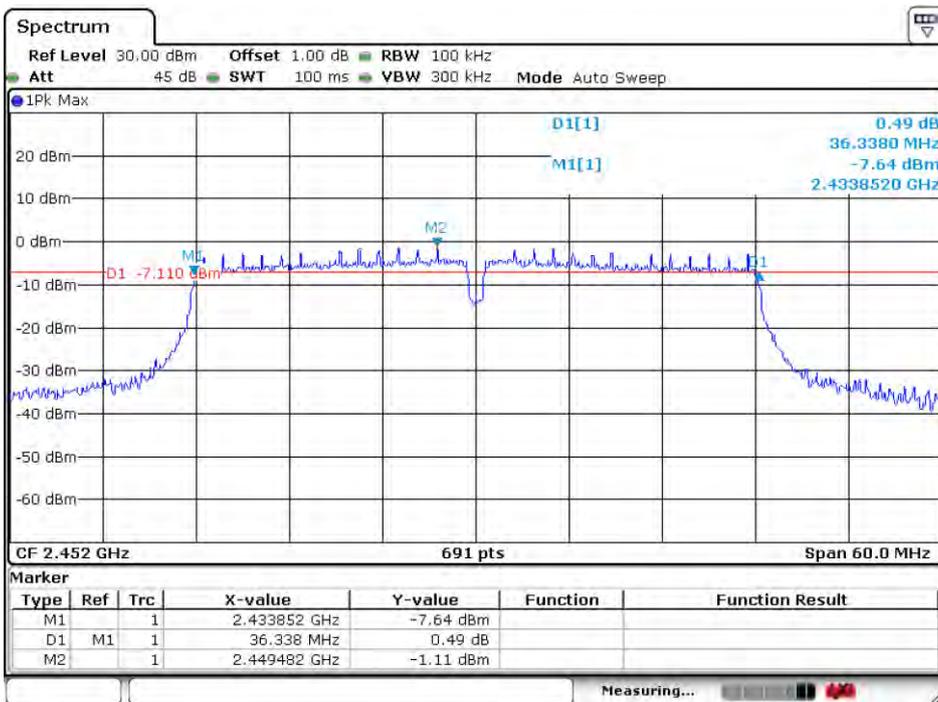
Date: 12 JUN.2020 07:08:11



**4.5.2.1.12 802.11 N40\_ Highest Channel**



Date: 12 JUN.2020 08:37:27



Date: 12 JUN 2020 07:09:59



### 4.6 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10 :2013 Section 11.10.2
Test Setup:	
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40).
Limit:	≤8.00dBm/3kHz
Test Results:	Pass

#### 4.6.1 Test Results

Mode	Test Channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11B	Lowest	-4.18	≤8.00	Pass
	Middle	-4.00	≤8.00	Pass
	Highest	-3.67	≤8.00	Pass
802.11G	Lowest	-8.46	≤8.00	Pass
	Middle	-8.56	≤8.00	Pass
	Highest	-8.57	≤8.00	Pass
802.11N20	Lowest	-10.24	≤8.00	Pass
	Middle	-11.59	≤8.00	Pass
	Highest	-10.10	≤8.00	Pass
802.11N40	Lowest	-13.24	≤8.00	Pass
	Middle	-14.03	≤8.00	Pass
	Highest	-14.05	≤8.00	Pass



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## 4.6.2 Test plots

### 4.6.2.1 ANT1

#### 4.6.2.1.1 802.11B\_Lowest Channel



Date: 12 JUN.2020 09:48:39



**4.6.2.1.2 802.11B\_ Middle Channel**



Date: 12 JUN.2020 09:46:57

**4.6.2.1.3 802.11B\_ Highest Channel**



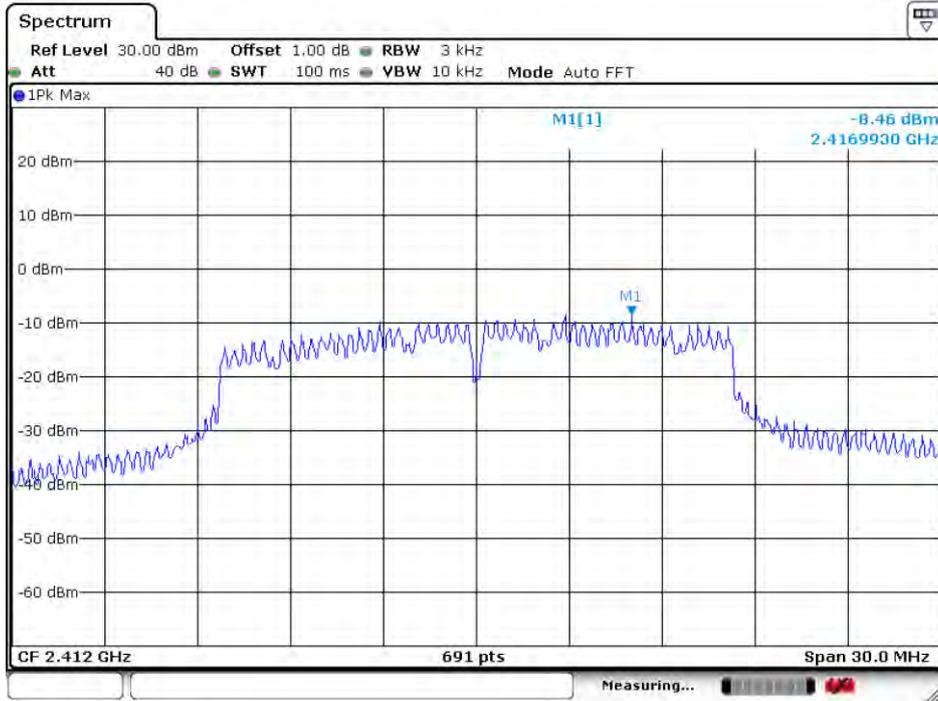
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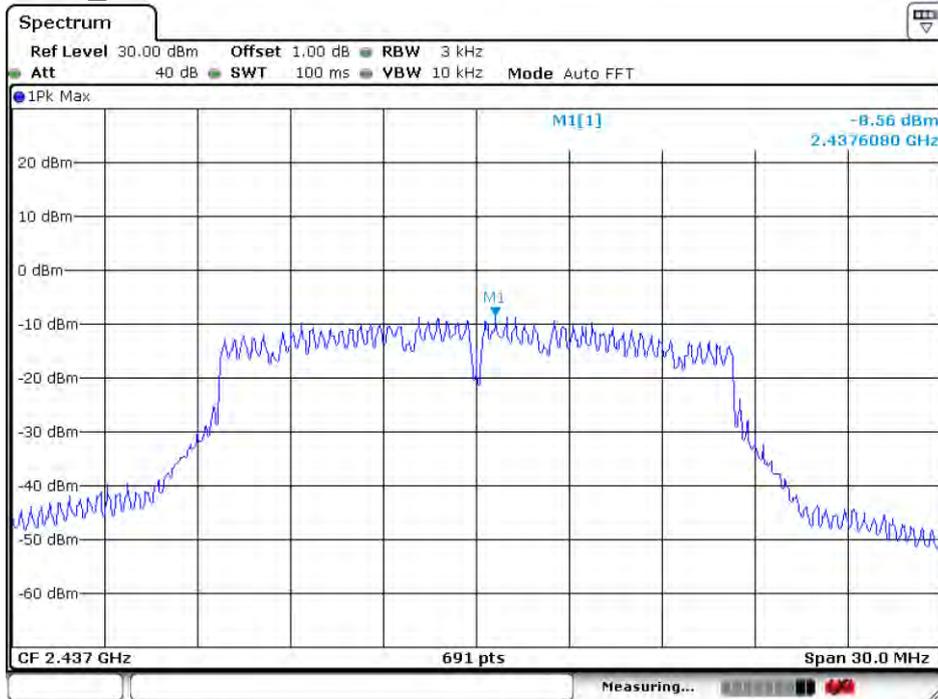
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**4.6.2.1.4 802.11G\_Lowest Channel**



Date: 12 JUN.2020 09:48:01

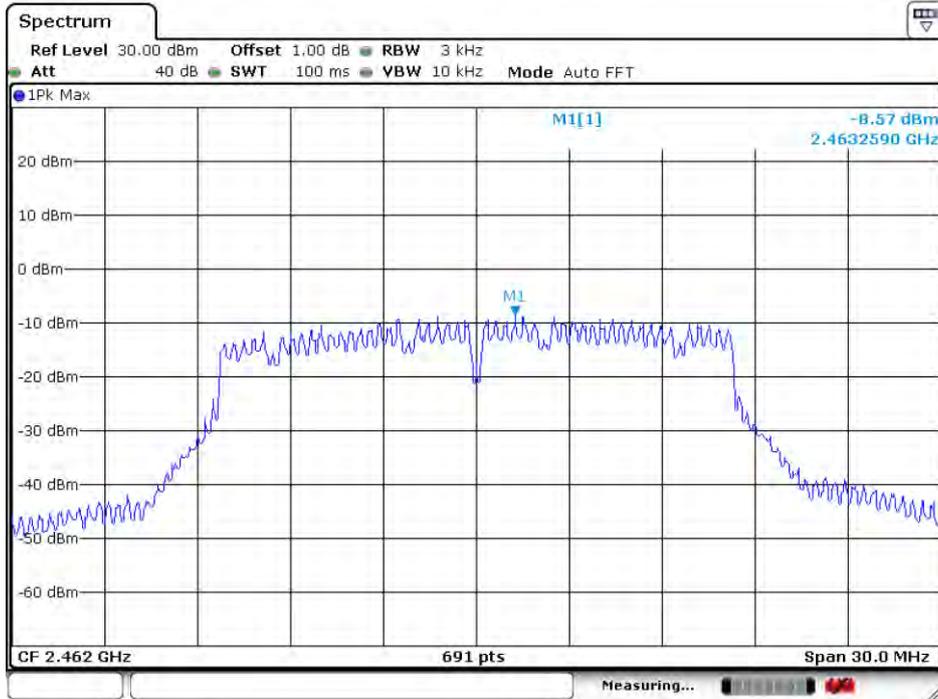
**4.6.2.1.5 802.11G\_Middle Channel**



Date: 12 JUN.2020 09:45:45

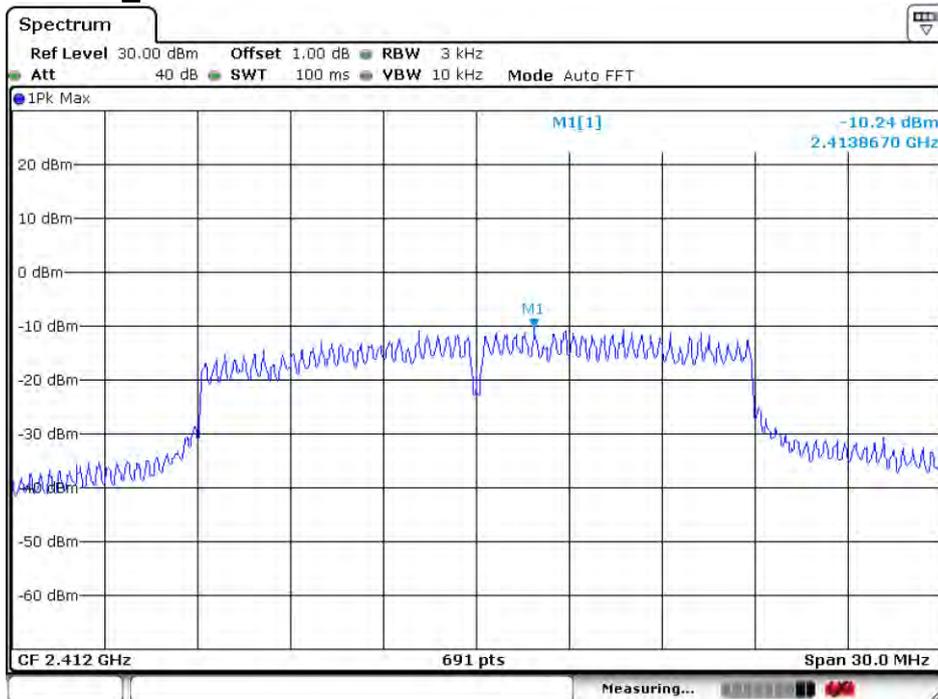


**4.6.2.1.6 802.11G\_Highest Channel**



Date: 12 JUN.2020 09:45:08

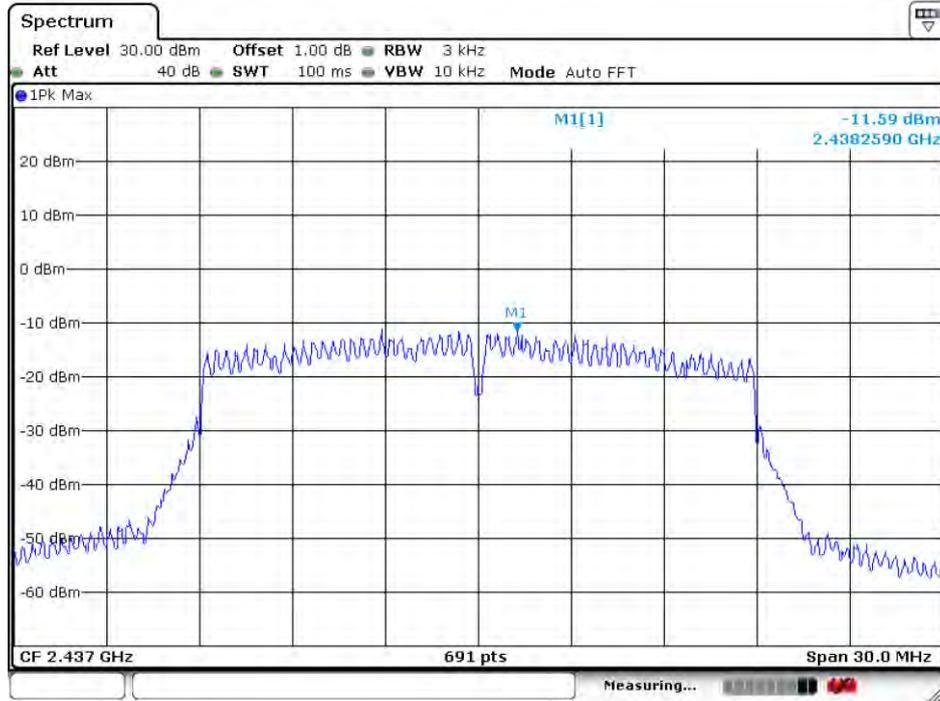
**4.6.2.1.7 802.11N20\_Lowest Channel**



Date: 12 JUN.2020 09:50:52

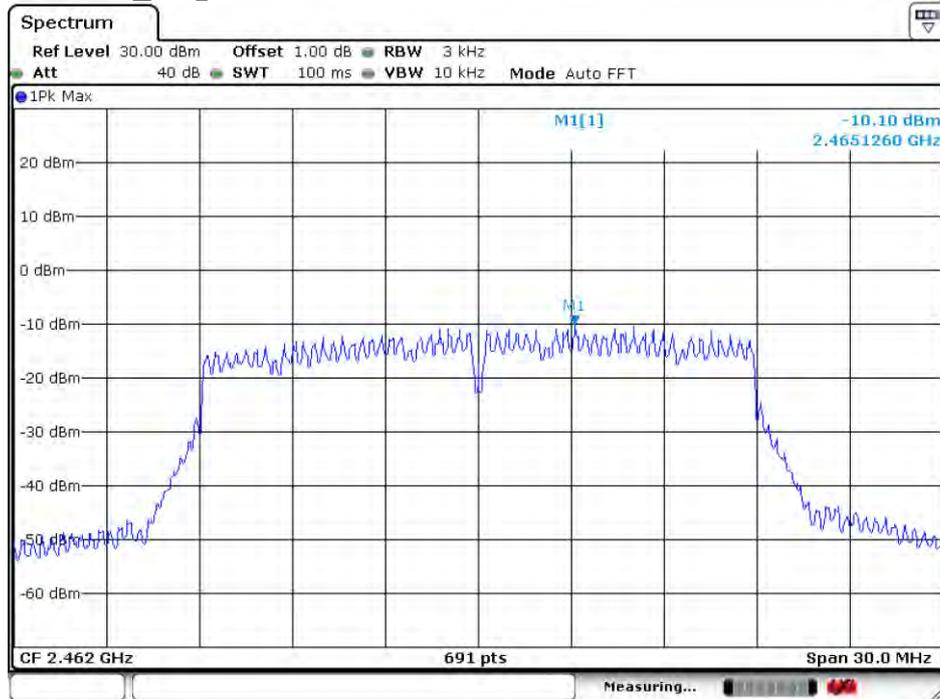


**4.6.2.1.8 802.11 N20\_ Middle Channel**



Date: 12 JUN.2020 09:50:32

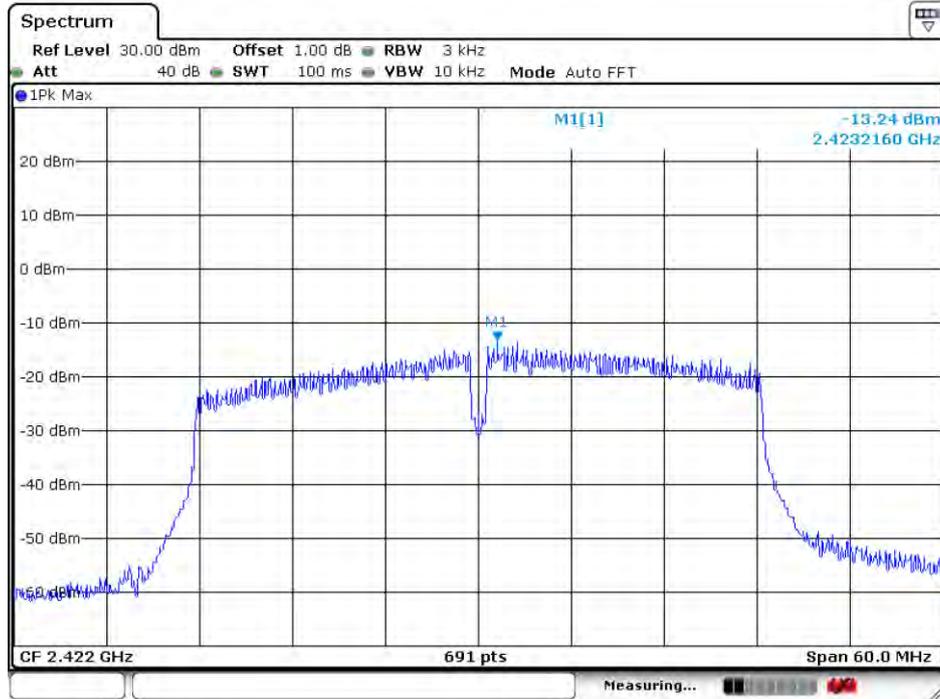
**4.6.2.1.9 802.11 N20\_ Highest Channel**



Date: 12 JUN.2020 09:50:06

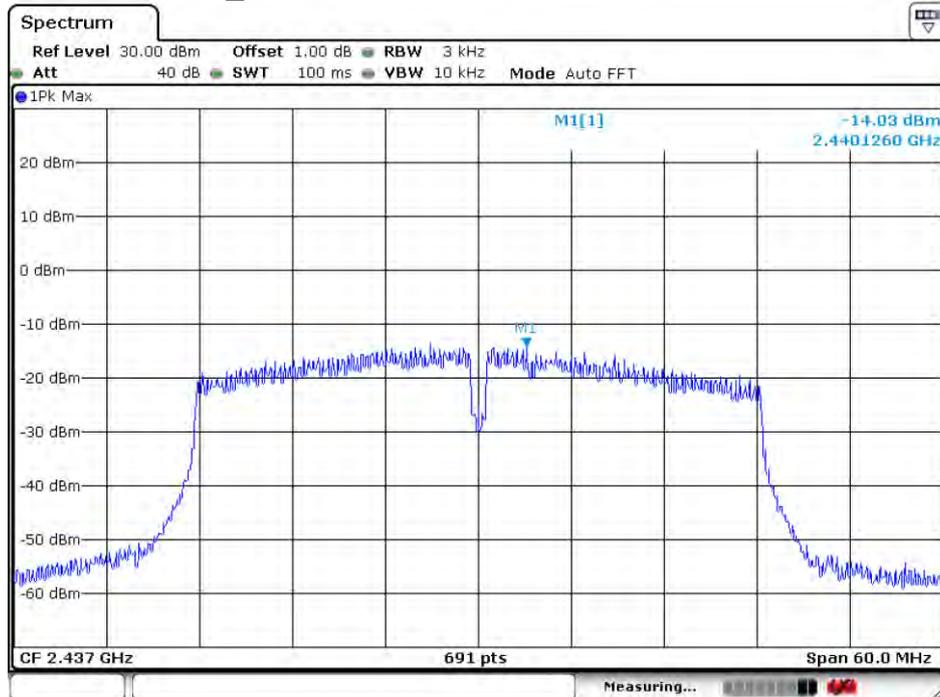


**4.6.2.1.10 802.11N40\_Lowest Channel**



Date: 12 JUN.2020 09:51:11

**4.6.2.1.11 802.11 N40\_ Middle Channel**



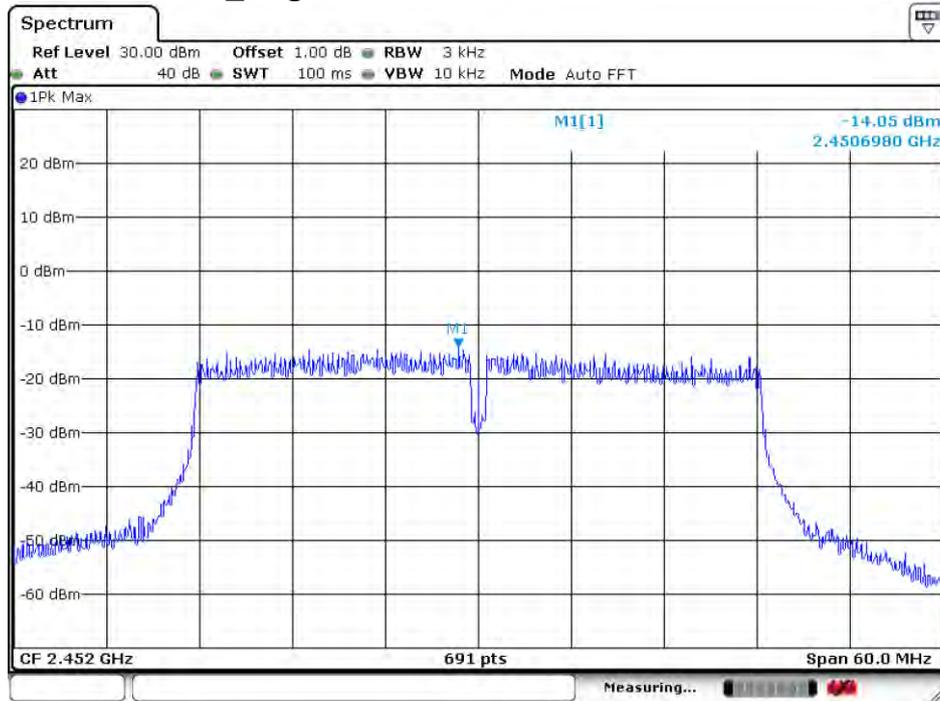
Date: 12 JUN.2020 09:51:33



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**4.6.2.1.12 802.11 N40\_ Highest Channel**



Date: 12 JUN.2020 09:51:53



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### 4.7 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.13
Test Setup:	<p>The diagram shows a Spectrum Analyzer on the left, connected by a red cable to an E.U.T. (Equipment Under Test) on the right. Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20) ; 13.5Mbps of rate is the worst case of 802.11N(HT40).
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



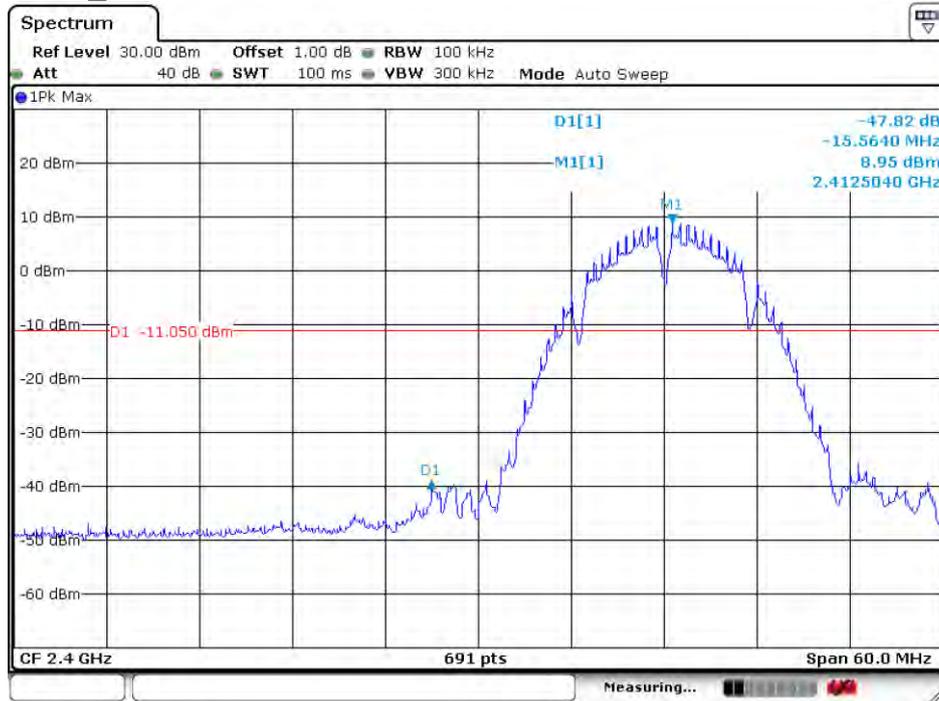
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### 4.7.1 Test plots

#### 4.7.1.1 ANT1

##### 4.7.1.1.1 802.11B\_Lowest Channel

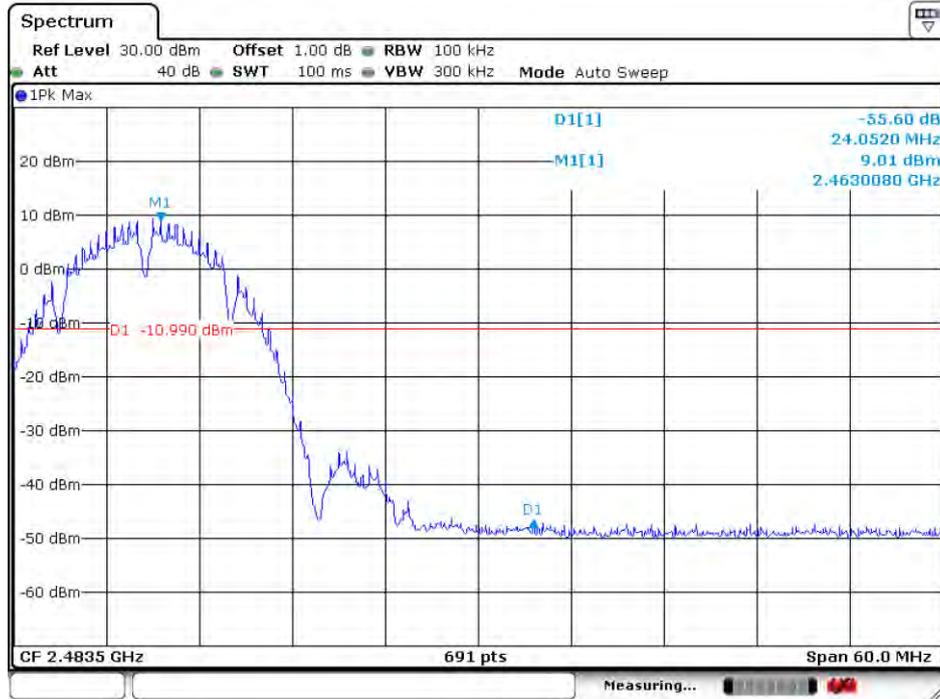


Date: 12 JUN.2020 09:41:48



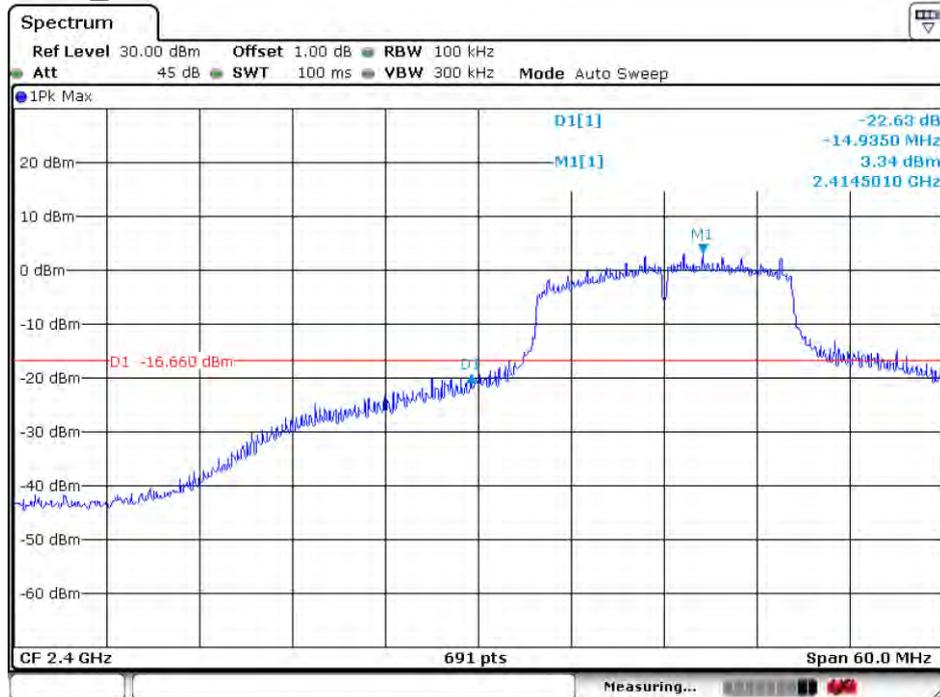
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**4.7.1.1.2 802.11B\_Highest Channel**



Date: 12 JUN.2020 09:42:36

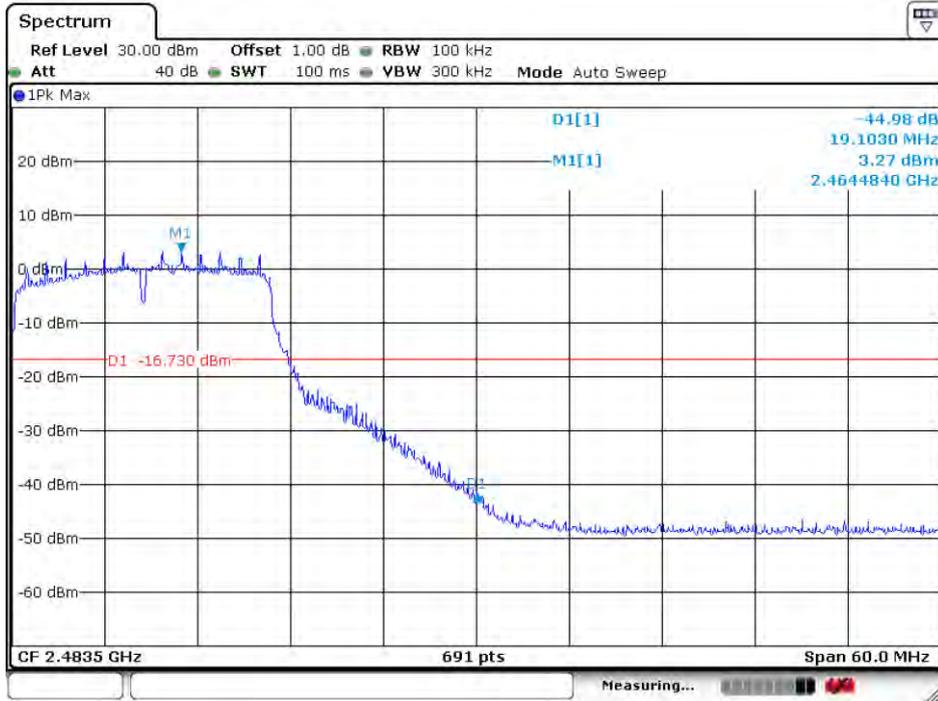
**4.7.1.1.3 802.11G\_Lowest Channel**



Date: 12 JUN.2020 08:26:28

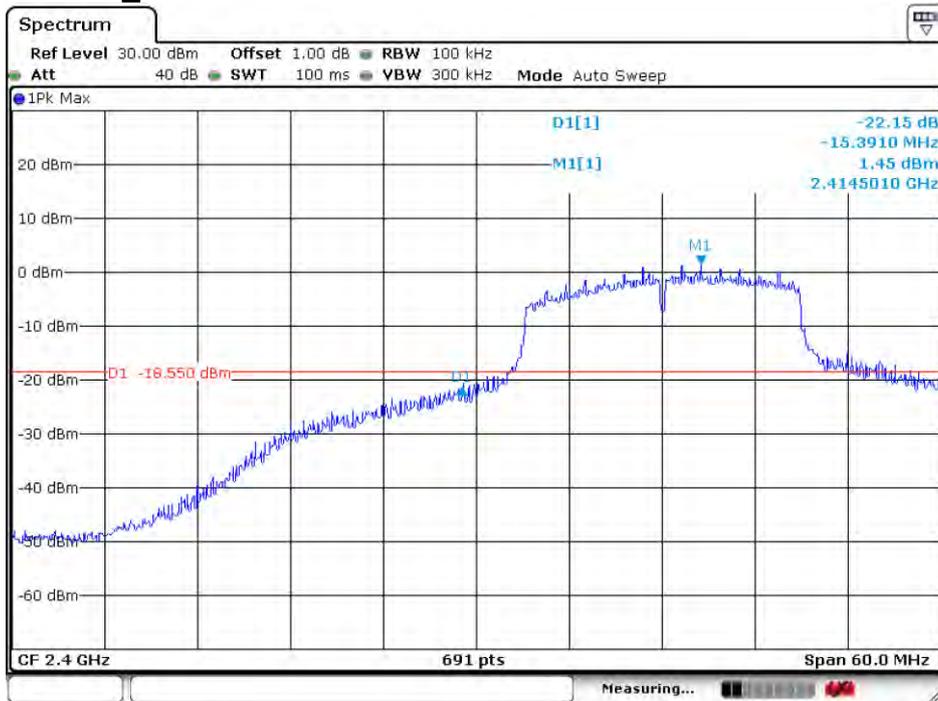


**4.7.1.1.4 802.11G\_Highest Channel**



Date: 12 JUN.2020 09:44:22

**4.7.1.1.5 802.11N20\_Lowest Channel**



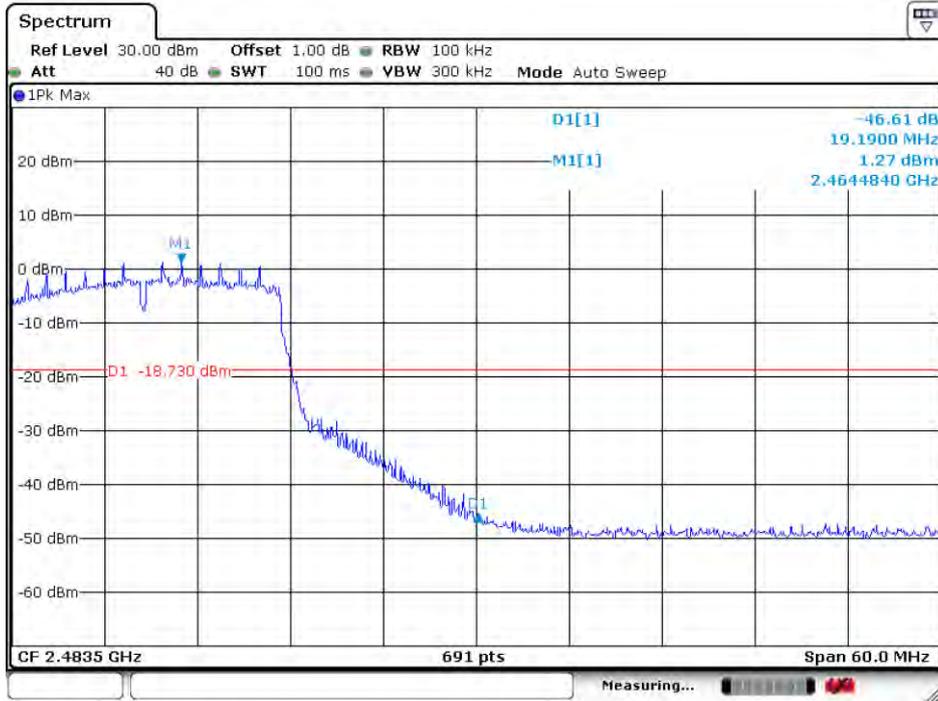
Date: 12 JUN.2020 09:40:48



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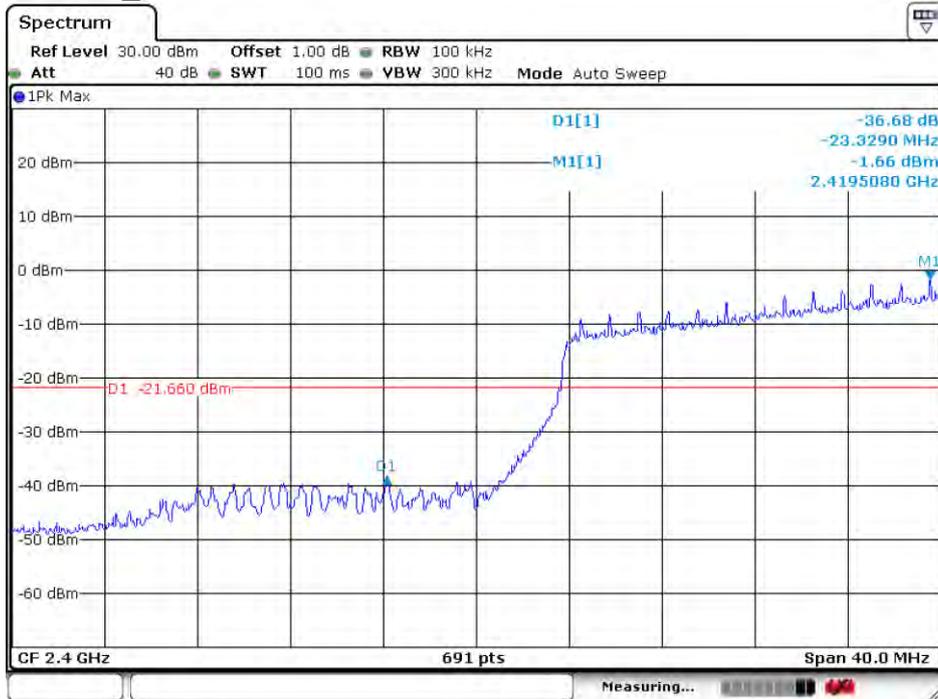
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**4.7.1.1.6 802.11 N20\_ Highest Channel**



Date: 12 JUN.2020 09:39:35

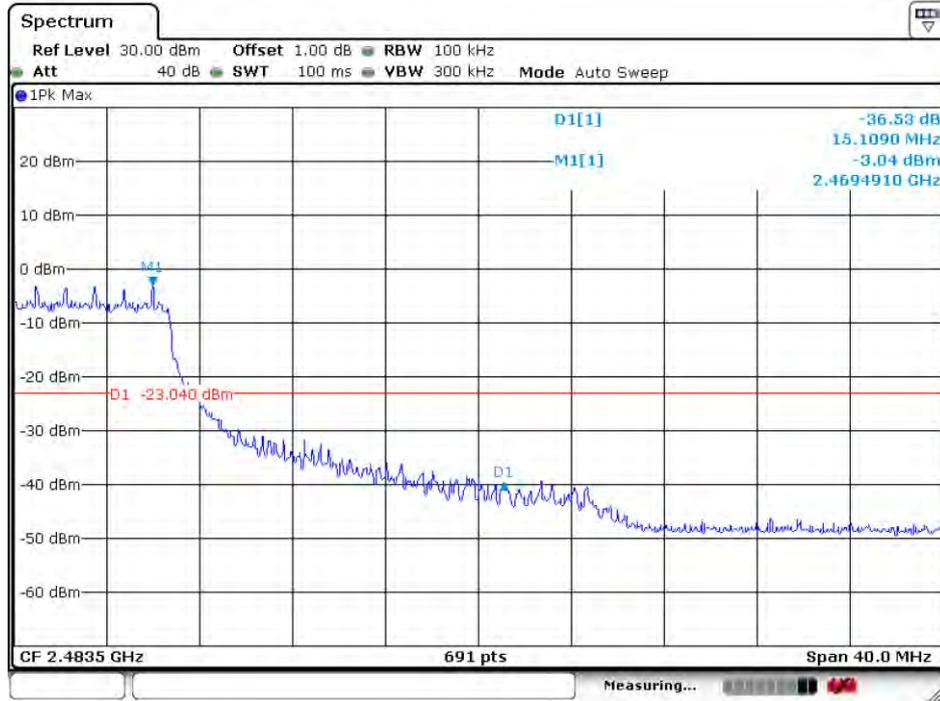
**4.7.1.1.7 802.11N40\_ Lowest Channel**



Date: 12 JUN.2020 09:14:38



**4.7.1.1.8 802.11 N40\_ Highest Channel**



Date: 12 JUN.2020 09:12:28



### 4.8 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.11
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40).
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

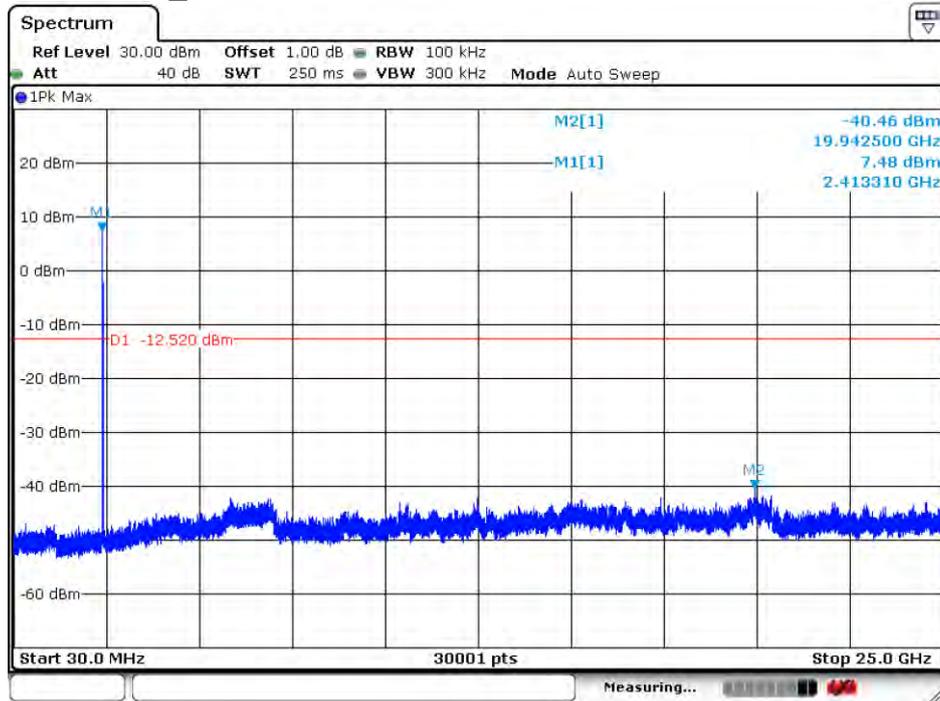


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**4.8.1 Test plots**

**4.8.1.1 ANT1**

**4.8.1.1.1 802.11B\_Lowest Channel**



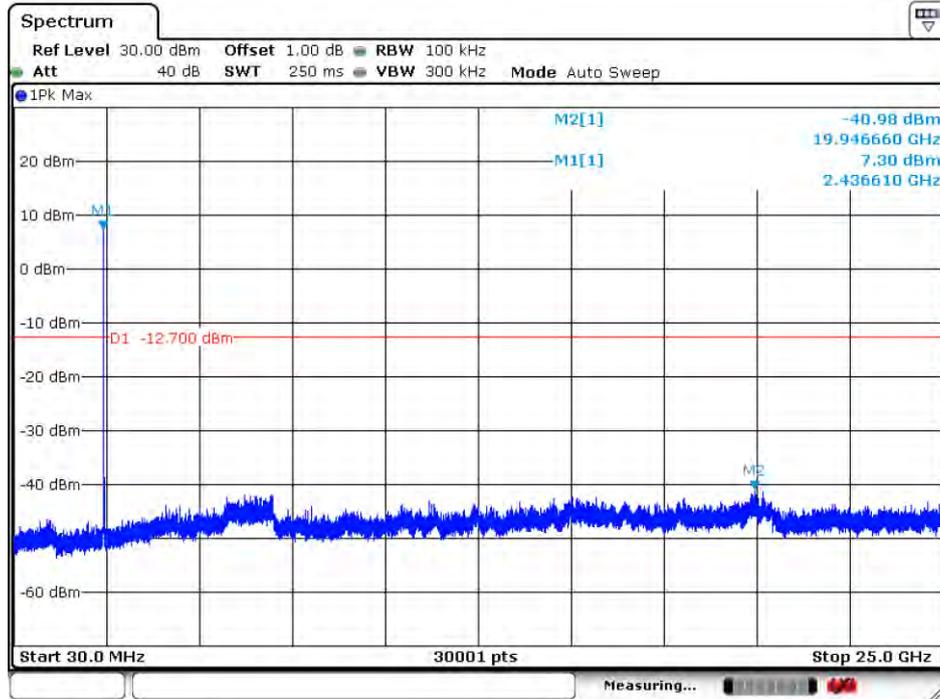
Date: 12 JUN 2020 10:05:40



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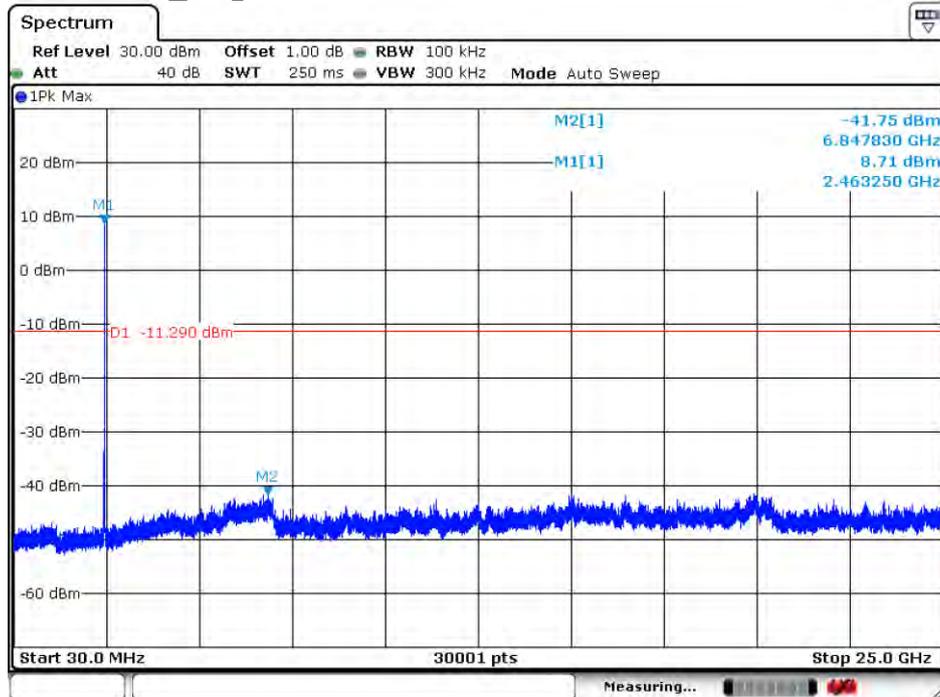
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**4.8.1.1.2 802.11B\_ Middle Channel**



Date: 12 JUN. 2020 10:05:05

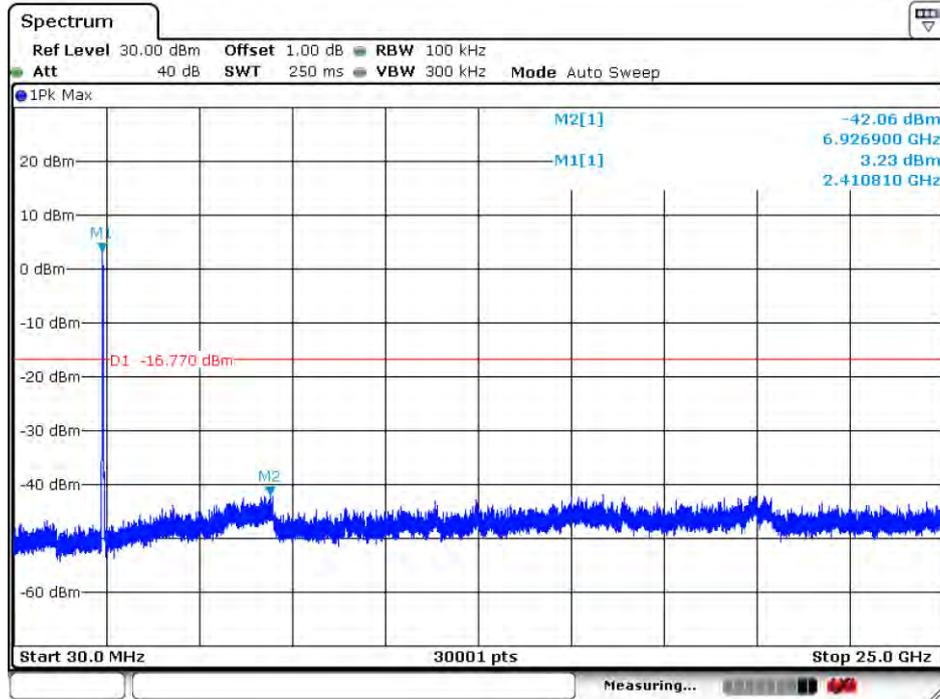
**4.8.1.1.3 802.11B\_ Highest Channel**



Date: 12 JUN. 2020 10:04:15

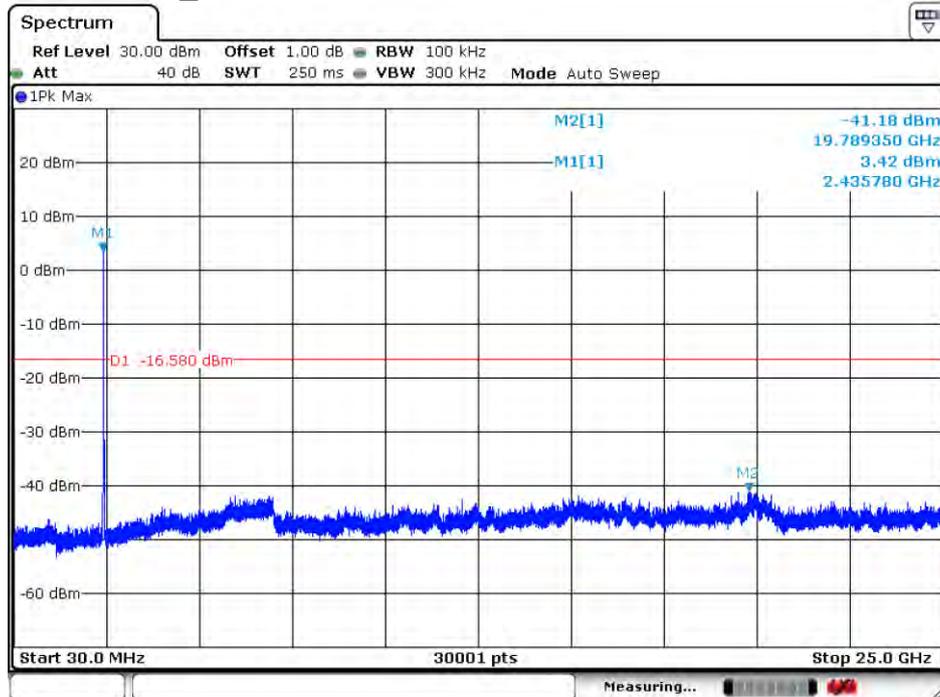


**4.8.1.1.4 802.11G\_Lowest Channel**



Date: 12 JUN. 2020 10:06:24

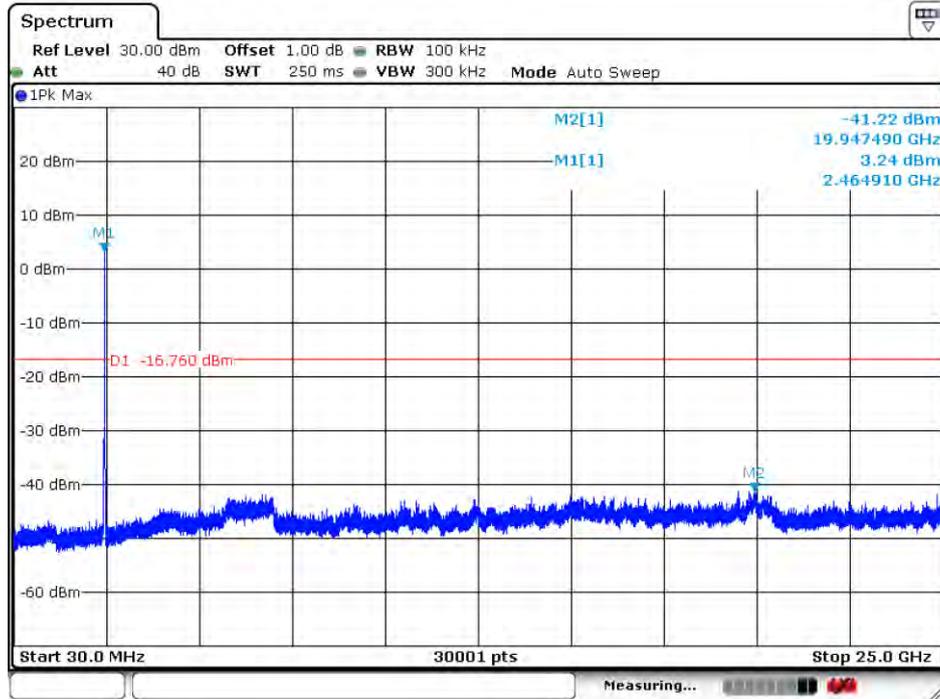
**4.8.1.1.5 802.11G\_Middle Channel**



Date: 12 JUN. 2020 10:07:52

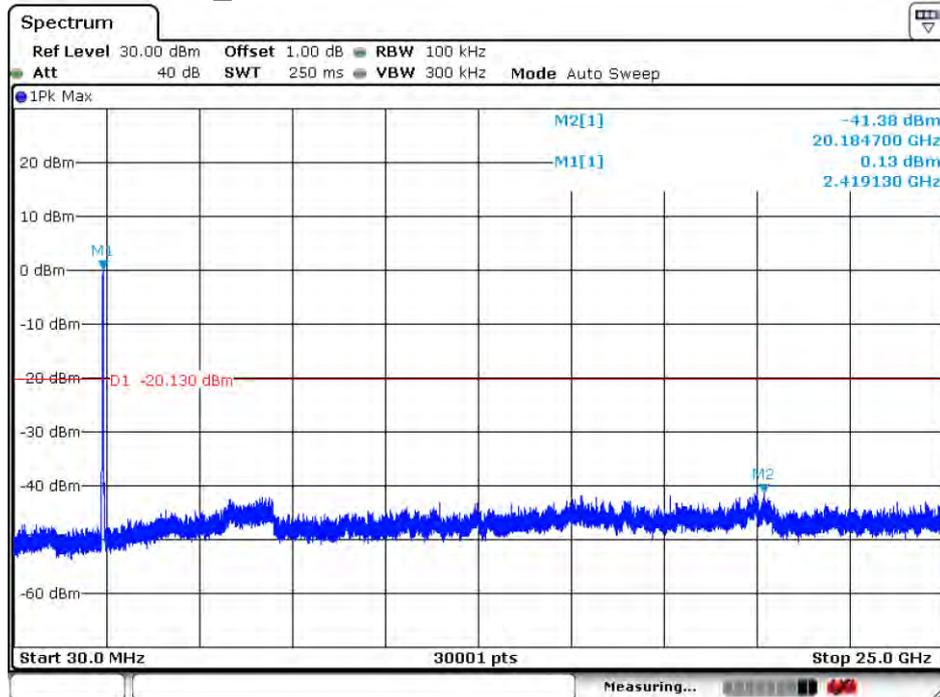


**4.8.1.1.6 802.11G\_Highest Channel**



Date: 12 JUN. 2020 10:09:09

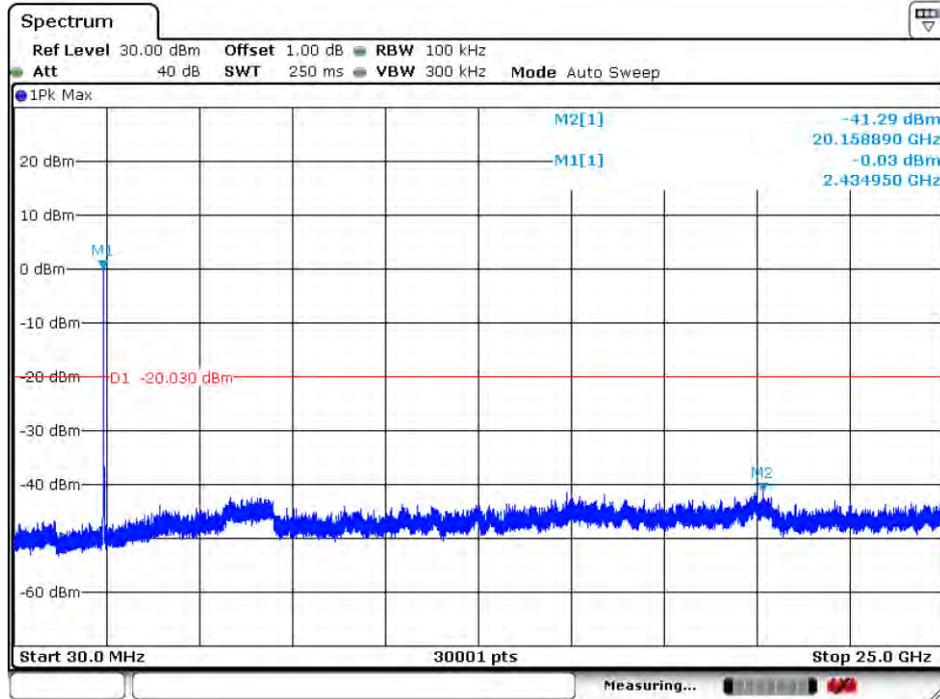
**4.8.1.1.7 802.11N20\_Lowest Channel**



Date: 12 JUN. 2020 10:00:50

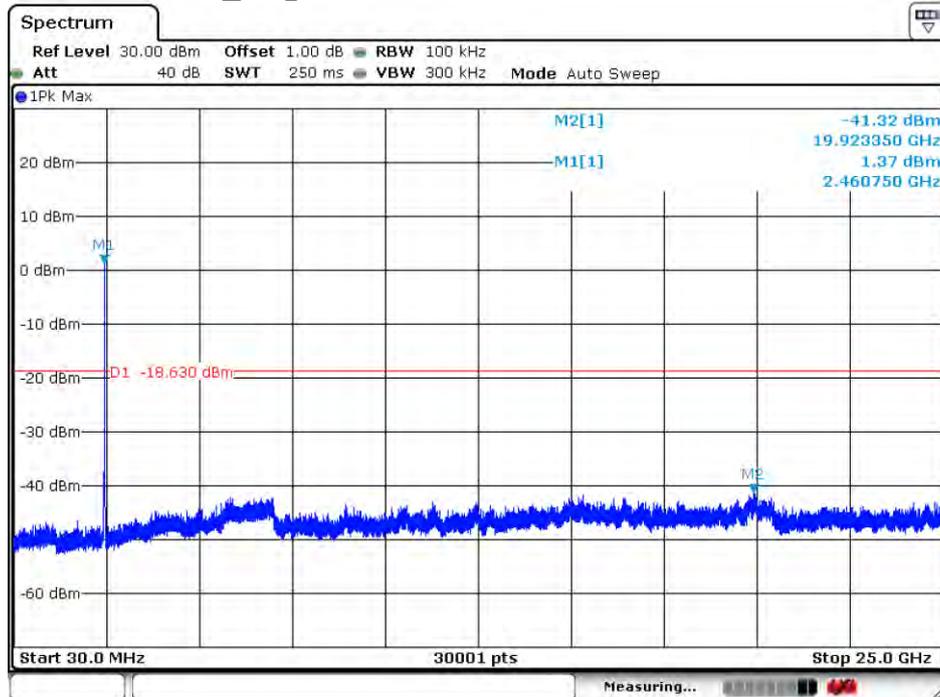


**4.8.1.1.8 802.11 N20\_ Middle Channel**



Date: 12 JUN.2020 10:01:43

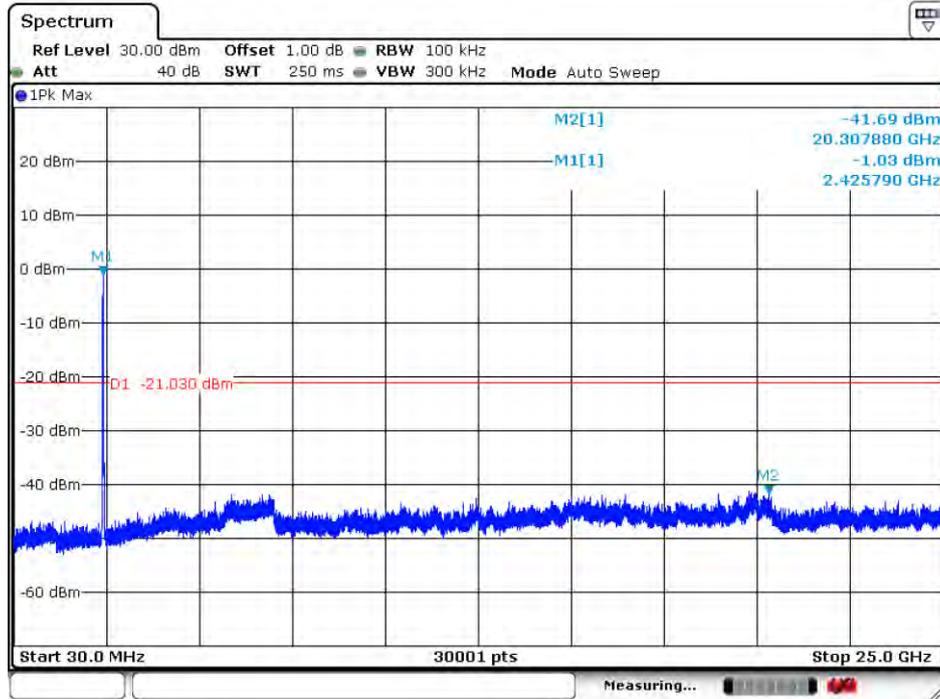
**4.8.1.1.9 802.11 N20\_ Highest Channel**



Date: 12 JUN.2020 10:02:45

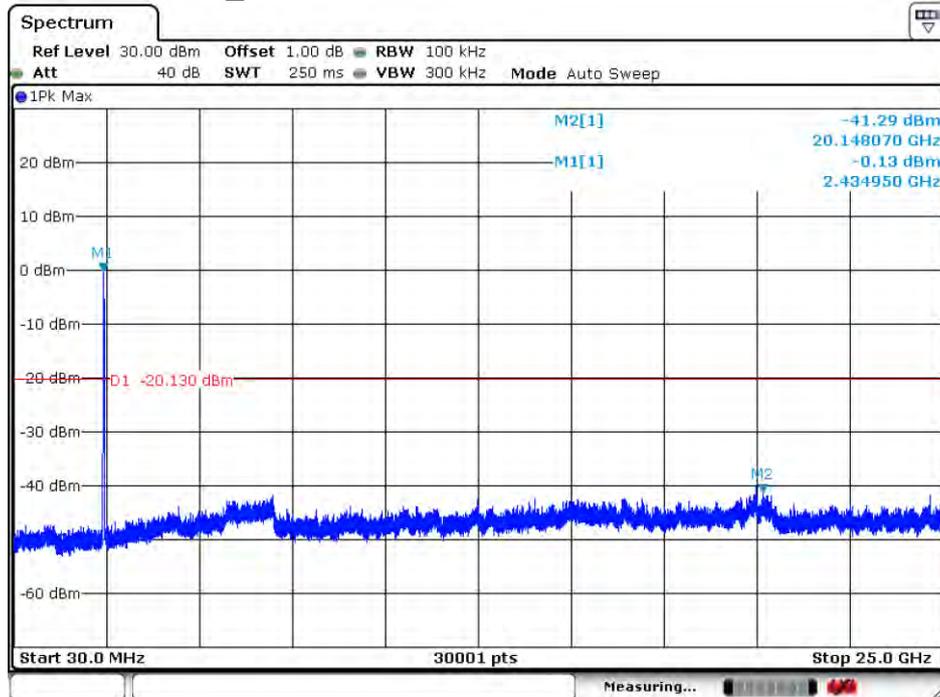


**4.8.1.1.10 802.11N40\_Lowest Channel**



Date: 12 JUN 2020 10:00:08

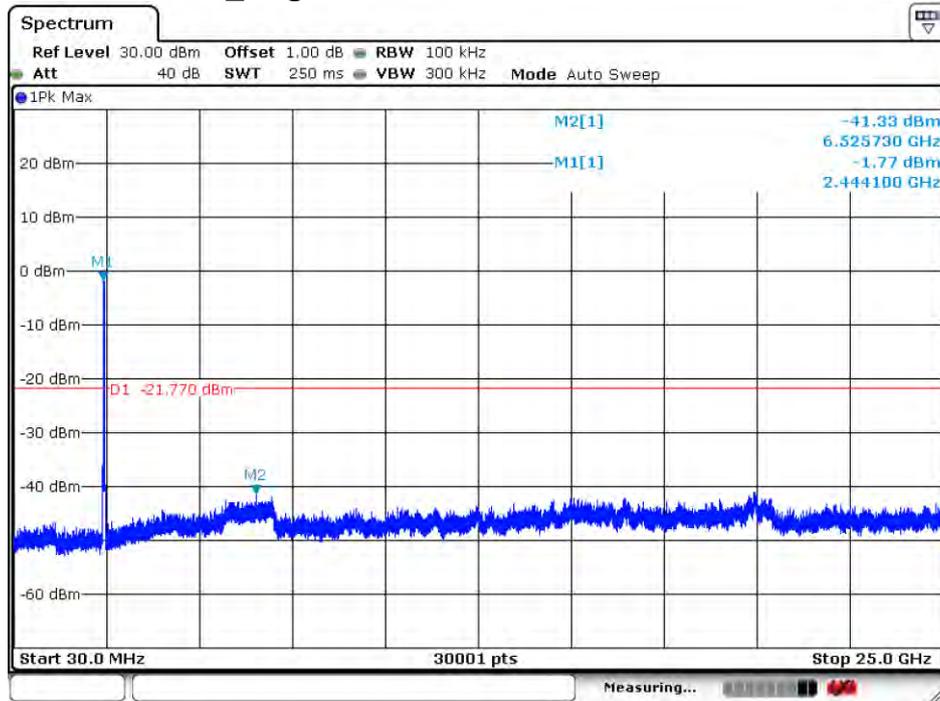
**4.8.1.1.11 802.11 N40\_ Middle Channel**



Date: 12 JUN 2020 09:54:01



**4.8.1.1.12 802.11 N40\_ Highest Channel**



Date: 12 JUN. 2020 09:53:10

**Remark:**

Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.



### 4.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10 :2013 Section 11.12				
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
Peak		1MHz	10Hz	Average	
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
Remark: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.					

Test Setup:	
-------------	--



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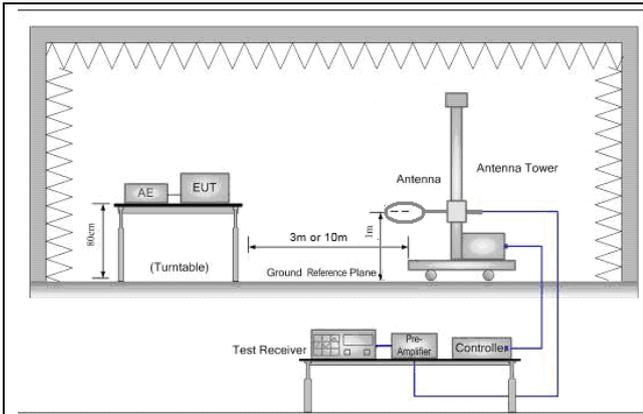


Figure 1. Below 30MHz

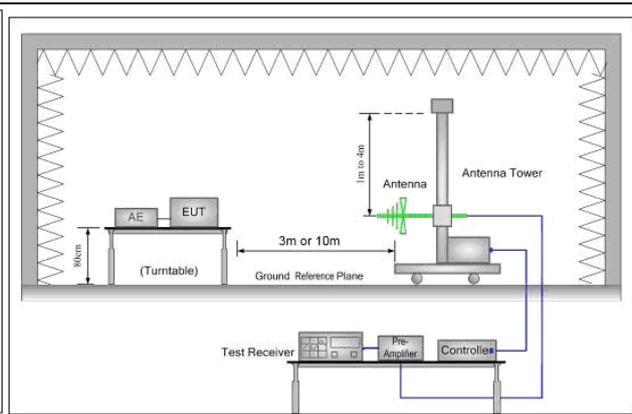


Figure 2. 30MHz to 1GHz

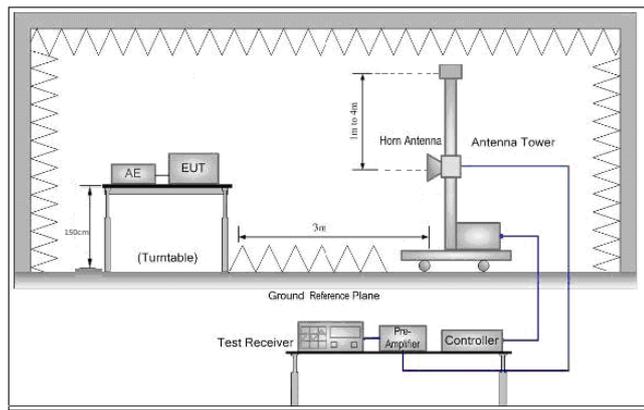


Figure 3. Above 1 GHz

**Test Procedure:**

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation
- c. The EUT was set 3 or 10 meters from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz, RBW=1MHz for  $f > 1$ GHz ; VBW  $\geq$  RBW; Sweep = auto;  
Detector function = peak; Trace = max hold for peak
  - (3) For average measurement: use duty cycle correction factor method per 15.35(c).  
Duty cycle = On time/100 milliseconds

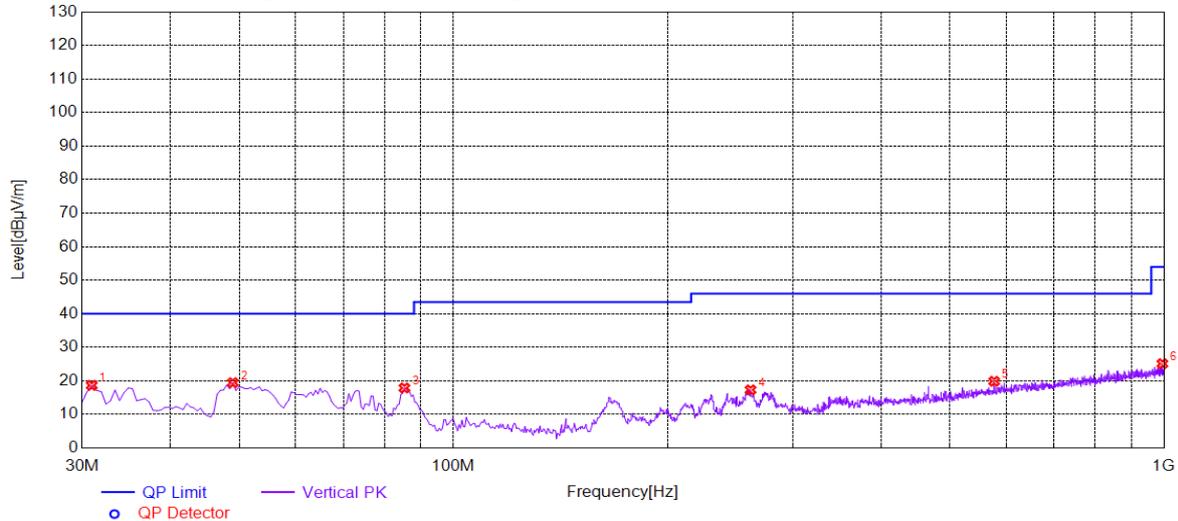


	<p>On time = <math>N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n</math>            Where <math>N_1</math> is number of type 1 pulses, <math>L_1</math> is length of type 1 pulses, etc.            Average Emission Level = Peak Emission Level + <math>20 * \log(\text{Duty cycl}</math></p> <p>f. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>g. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>h. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>i. Test the EUT in the lowest channel, the middle channel, the Highest channel</p> <p>j. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.</p> <p>k. Repeat above procedures until all frequencies measured was complete.</p>
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Charge + Transmitting mode.
Final Test Mode:	Pretest the EUT at Charge + Transmitting mode. Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40) For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11B at lowest channel is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



### 4.9.1 Radiated emission below 1GHz

#### 4.9.1.1 Charge + Transmitting, Vertical



#### Suspected List

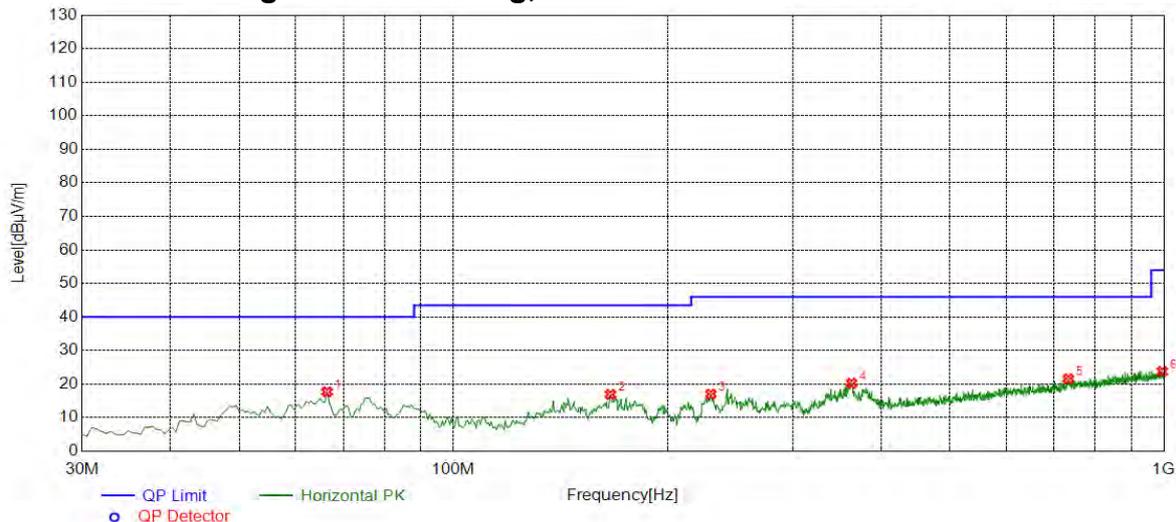
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.9705	18.68	-32.82	40.00	21.32	150	257	Vertical
2	48.9245	19.48	-30.19	40.00	20.52	150	344	Vertical
3	85.3177	17.91	-34.55	40.00	22.09	150	82	Vertical
4	261.9460	17.34	-28.90	46.00	28.66	150	0	Vertical
5	576.8684	19.90	-20.71	46.00	26.10	150	91	Vertical
6	995.1476	25.16	-13.93	54.00	28.84	150	57	Vertical



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**4.9.1.2 Charge + Transmitting, Horizontal**



**Suspected List**

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	66.3932	17.73	-33.27	40.00	22.27	150	175	Horizontal
2	166.3532	16.93	-33.86	43.50	26.57	150	53	Horizontal
3	230.4052	17.06	-29.95	46.00	28.94	150	234	Horizontal
4	363.3617	20.27	-25.92	46.00	25.73	150	250	Horizontal
5	733.6018	21.60	-17.88	46.00	24.40	150	228	Horizontal
6	994.6623	23.79	-13.93	54.00	30.21	150	316	Horizontal



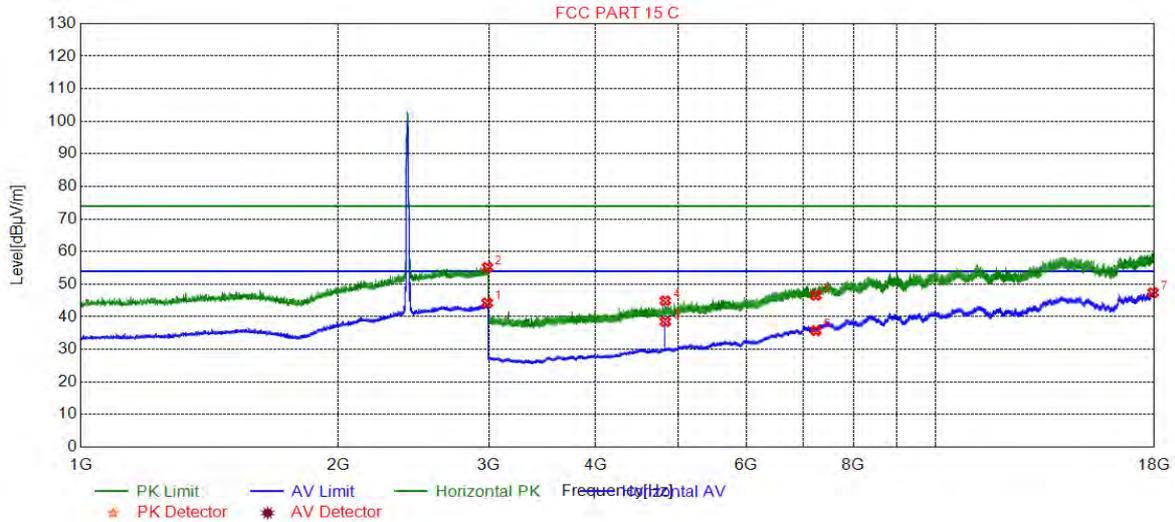
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### 4.9.2 Transmitter emission above 1GHz

#### 4.9.2.1 ANT1

#### 4.9.2.1.1 802.11B\_Lowest Channel\_Horizontal



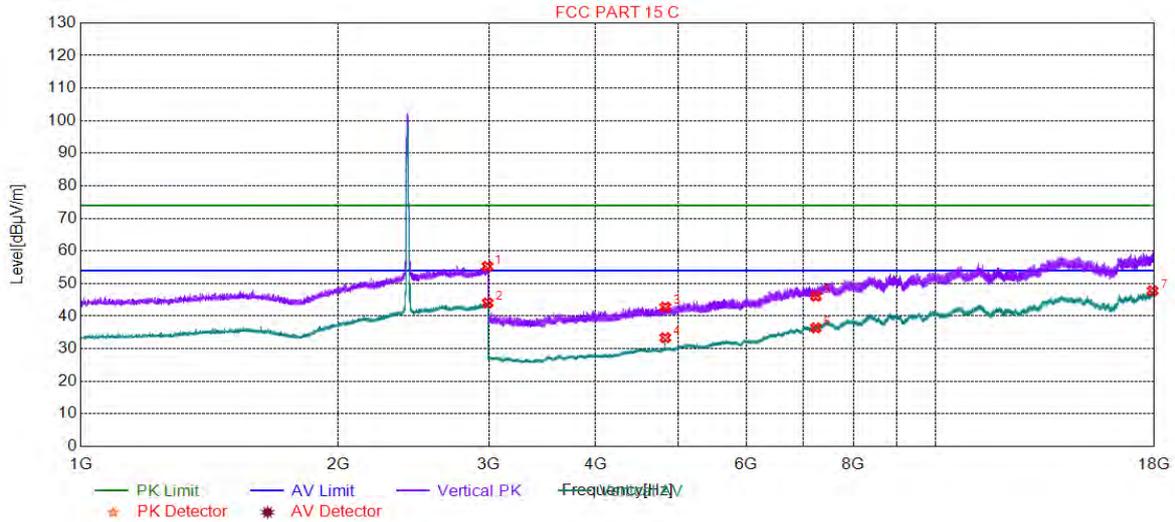
#### Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2986.496	44.29	9.51	54.00	9.71	150	32	Horizontal
2	2988.997	55.21	9.50	74.00	18.79	150	73	Horizontal
3	4824.000	38.51	-18.21	54.00	15.49	150	237	Horizontal
4	4824.000	44.94	-18.21	74.00	29.06	150	348	Horizontal
5	7236.000	46.57	-9.99	74.00	27.43	150	0	Horizontal
6	7236.000	35.75	-9.99	54.00	18.25	150	0	Horizontal
7	17932.34	47.45	0.70	54.00	6.55	150	191	Horizontal



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**4.9.2.1.2 802.11B\_Lowest Channel\_Vertical**



**Suspected List**

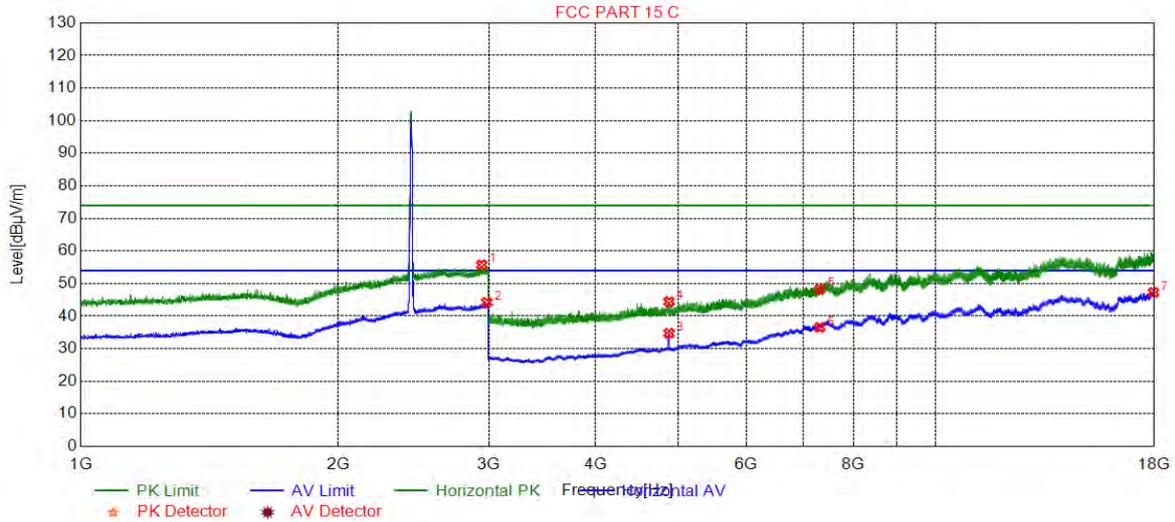
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2988.997	55.28	9.50	74.00	18.72	150	135	Vertical
2	2990.997	44.06	9.49	54.00	9.94	150	2	Vertical
3	4824.000	42.81	-18.21	74.00	31.19	150	18	Vertical
4	4824.000	33.39	-18.21	54.00	20.61	150	264	Vertical
5	7236.000	46.08	-9.99	74.00	27.92	150	292	Vertical
6	7236.000	36.43	-9.99	54.00	17.57	150	292	Vertical
7	17914.74	47.78	0.69	54.00	6.22	150	142	Vertical



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**4.9.2.1.3 802.11B\_ Middle Channel\_ Horizontal**



**Suspected List**

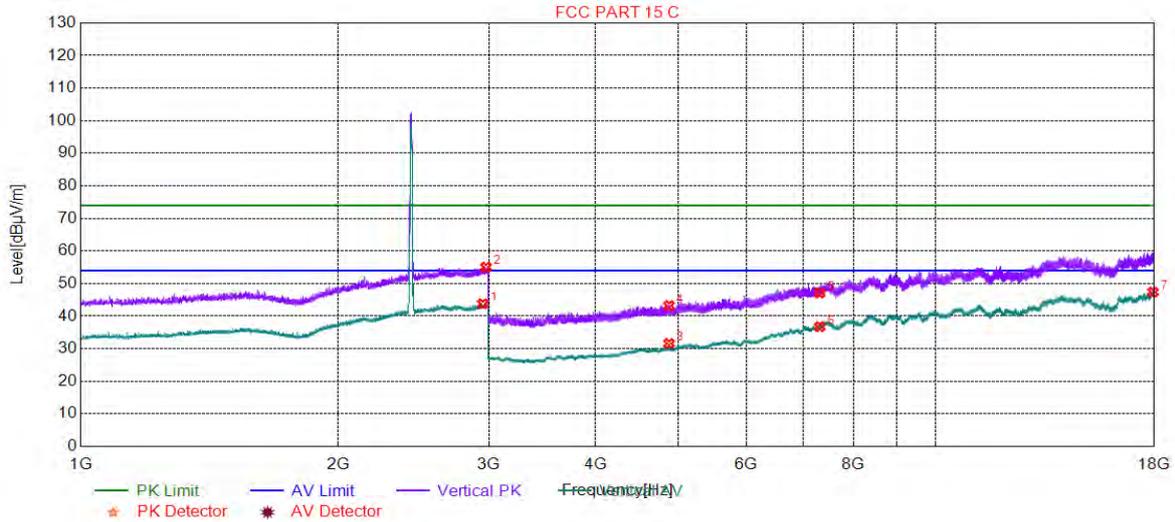
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2942.985	55.76	9.60	74.00	18.24	150	32	Horizontal
2	2983.996	44.26	9.52	54.00	9.74	150	72	Horizontal
3	4874.000	34.74	-17.99	54.00	19.26	150	264	Horizontal
4	4874.000	44.45	-17.99	74.00	29.55	150	264	Horizontal
5	7311.000	48.21	-9.74	74.00	25.79	150	241	Horizontal
6	7311.000	36.55	-9.74	54.00	17.45	150	241	Horizontal
7	17954.34	47.25	0.71	54.00	6.75	150	291	Horizontal



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**4.9.2.1.4 802.11B\_ Middle Channel\_ Vertical**



**Suspected List**

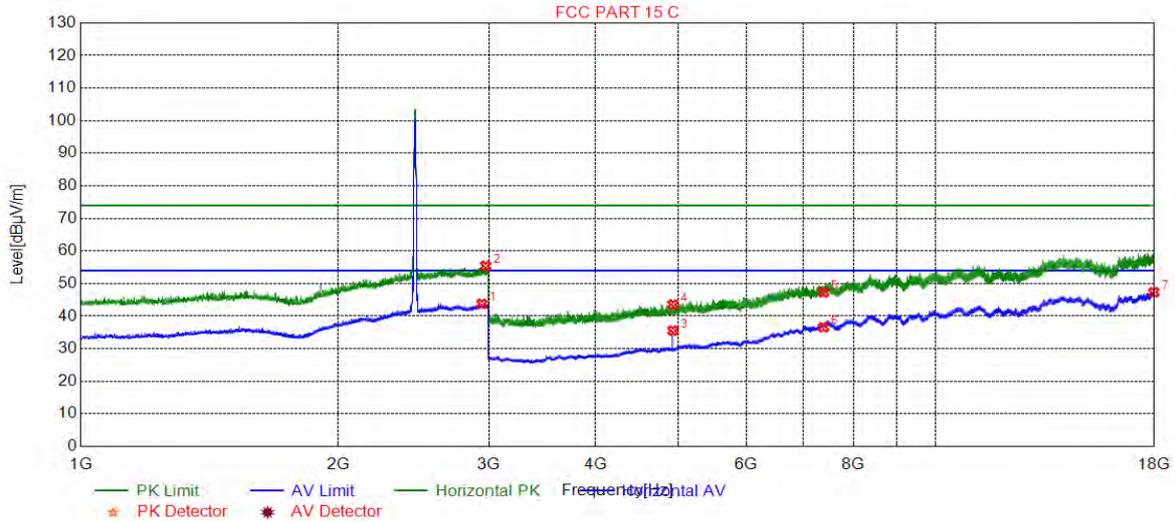
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2951.487	43.82	9.67	54.00	10.18	150	328	Vertical
2	2977.494	55.06	9.55	74.00	18.94	150	302	Vertical
3	4874.000	31.61	-17.99	54.00	22.39	150	264	Vertical
4	4874.000	43.26	-17.99	74.00	30.74	150	290	Vertical
5	7311.000	47.13	-9.74	74.00	26.87	150	0	Vertical
6	7311.000	36.75	-9.74	54.00	17.25	150	190	Vertical
7	17932.34	47.42	0.70	54.00	6.58	150	140	Vertical



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**4.9.2.1.5 802.11B\_ Highest Channel\_ Horizontal**



**Suspected List**

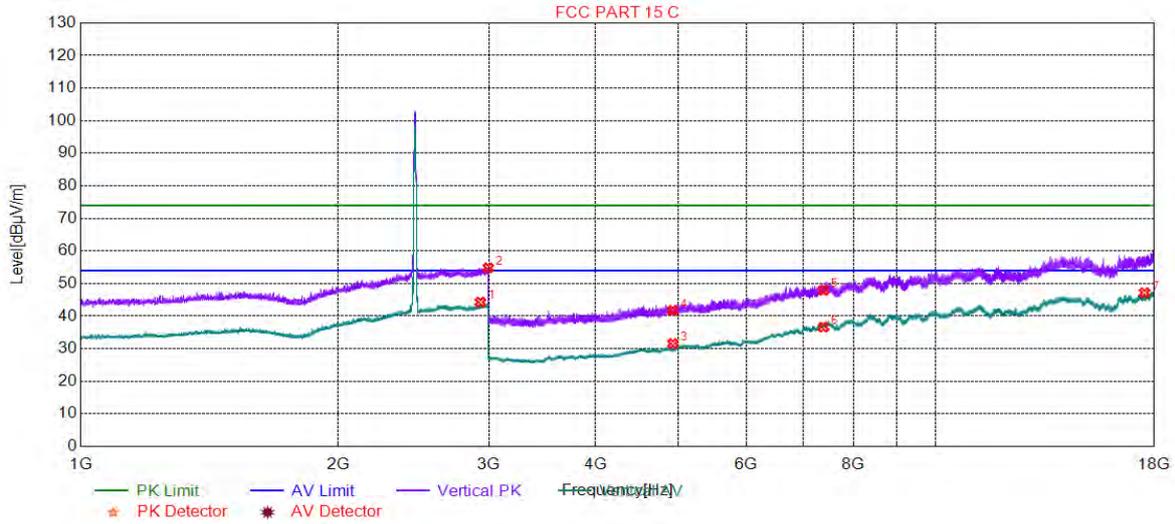
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2944.486	43.80	9.62	54.00	10.20	150	128	Horizontal
2	2973.493	55.43	9.57	74.00	18.57	150	358	Horizontal
3	4924.000	35.57	-17.72	54.00	18.43	150	293	Horizontal
4	4924.000	43.57	-17.72	74.00	30.43	150	348	Horizontal
5	7386.000	47.31	-9.55	74.00	26.69	150	191	Horizontal
6	7386.000	36.59	-9.55	54.00	17.41	150	90	Horizontal
7	17971.94	47.33	0.71	54.00	6.67	150	90	Horizontal



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**4.9.2.1.6 802.11B\_ Highest Channel\_ Vertical**



**Suspected List**

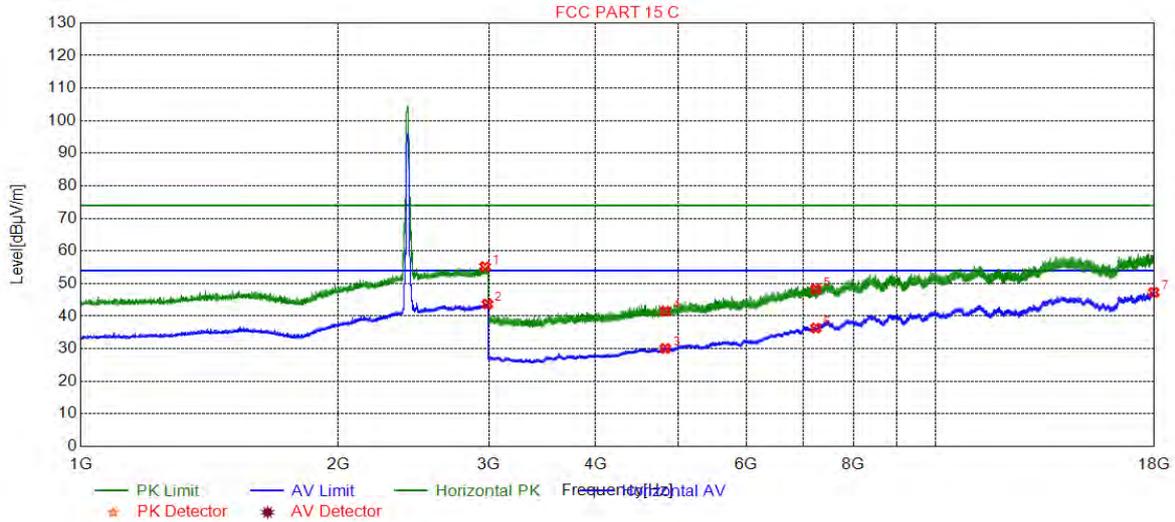
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2932.483	44.31	9.49	54.00	9.69	150	328	Vertical
2	2995.498	54.82	9.47	74.00	19.18	150	28	Vertical
3	4924.000	31.59	-17.72	54.00	22.41	150	237	Vertical
4	4924.000	41.77	-17.72	74.00	32.23	150	18	Vertical
5	7386.000	47.89	-9.55	74.00	26.11	150	42	Vertical
6	7386.000	36.63	-9.55	54.00	17.37	150	291	Vertical
7	17526.97	47.16	1.03	54.00	6.84	150	342	Vertical



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**4.9.2.1.7 802.11G\_Lowest Channel\_Horizontal**



**Suspected List**

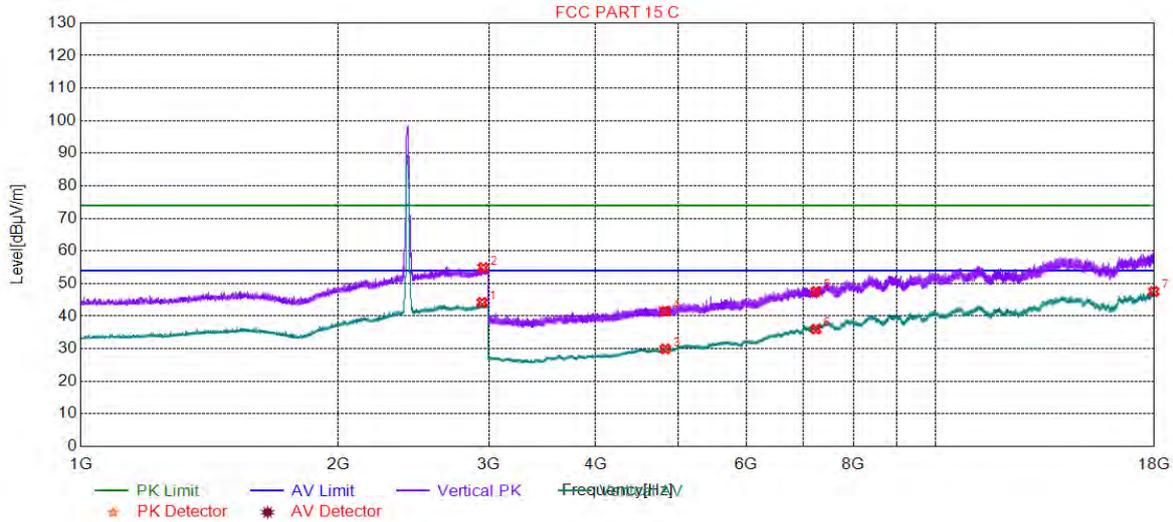
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2969.492	55.17	9.59	74.00	18.83	150	59	Horizontal
2	2988.997	43.72	9.50	54.00	10.28	150	297	Horizontal
3	4824.000	30.08	-18.21	54.00	23.92	150	292	Horizontal
4	4824.000	41.53	-18.21	74.00	32.47	150	209	Horizontal
5	7236.000	48.29	-9.99	74.00	25.71	150	0	Horizontal
6	7236.000	36.33	-9.99	54.00	17.67	150	291	Horizontal
7	17969.74	47.28	0.71	54.00	6.72	150	39	Horizontal



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**4.9.2.1.8 802.11G\_Lowest Channel\_Vertical**



**Suspected List**

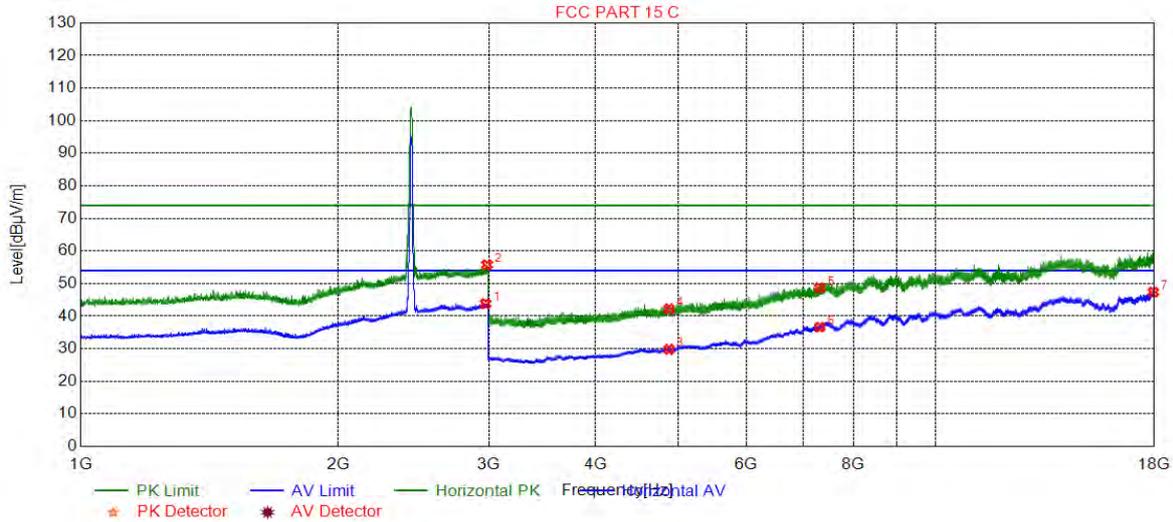
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2946.486	44.21	9.64	54.00	9.79	150	54	Vertical
2	2954.988	54.88	9.66	74.00	19.12	150	273	Vertical
3	4824.000	29.93	-18.21	54.00	24.07	150	182	Vertical
4	4824.000	41.55	-18.21	74.00	32.45	150	182	Vertical
5	7236.000	47.56	-9.99	74.00	26.44	150	342	Vertical
6	7236.000	36.01	-9.99	54.00	17.99	150	342	Vertical
7	17965.89	47.56	0.71	54.00	6.44	150	42	Vertical



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**4.9.2.1.9 802.11G\_ Middle Channel\_ Horizontal**



**Suspected List**

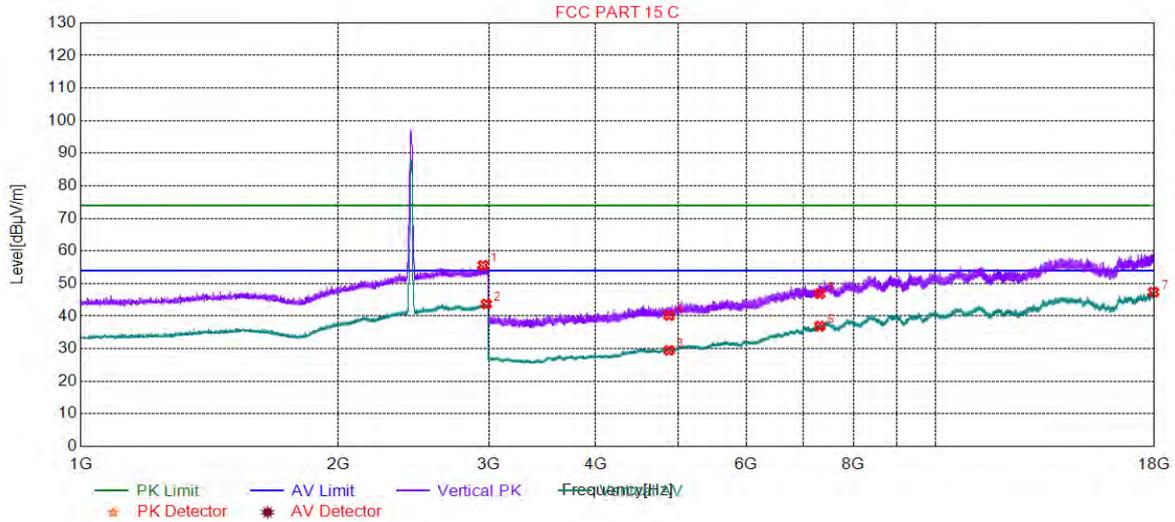
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2973.993	43.86	9.57	54.00	10.14	150	18	Horizontal
2	2985.996	55.77	9.51	74.00	18.23	150	224	Horizontal
3	4874.000	29.80	-17.99	54.00	24.20	150	266	Horizontal
4	4874.000	42.26	-17.99	74.00	31.74	150	348	Horizontal
5	7311.000	48.70	-9.74	74.00	25.30	150	191	Horizontal
6	7311.000	36.62	-9.74	54.00	17.38	150	140	Horizontal
7	17945.54	47.38	0.70	54.00	6.62	150	90	Horizontal



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**4.9.2.1.10 802.11G\_ Middle Channel\_ Vertical**



**Suspected List**

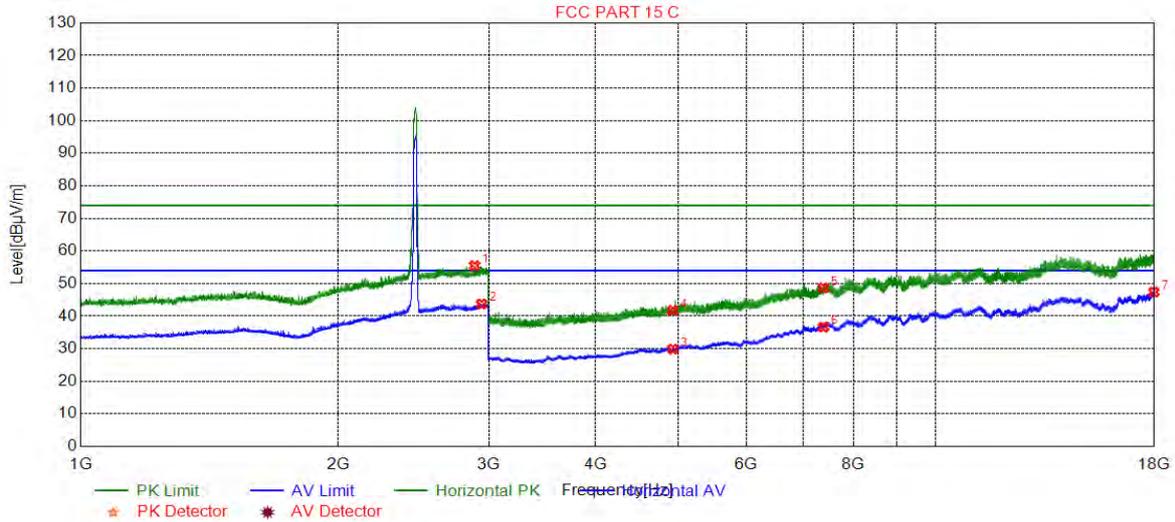
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2954.988	55.62	9.66	74.00	18.38	150	69	Vertical
2	2979.995	43.74	9.54	54.00	10.26	150	206	Vertical
3	4874.000	29.50	-17.99	54.00	24.50	150	237	Vertical
4	4874.000	40.22	-17.99	74.00	33.78	150	100	Vertical
5	7311.000	46.90	-9.74	74.00	27.10	150	40	Vertical
6	7311.000	36.93	-9.74	54.00	17.07	150	140	Vertical
7	17954.89	47.43	0.71	54.00	6.57	150	241	Vertical



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**4.9.2.1.11 802.11G\_ Highest Channel\_ Horizontal**



**Suspected List**

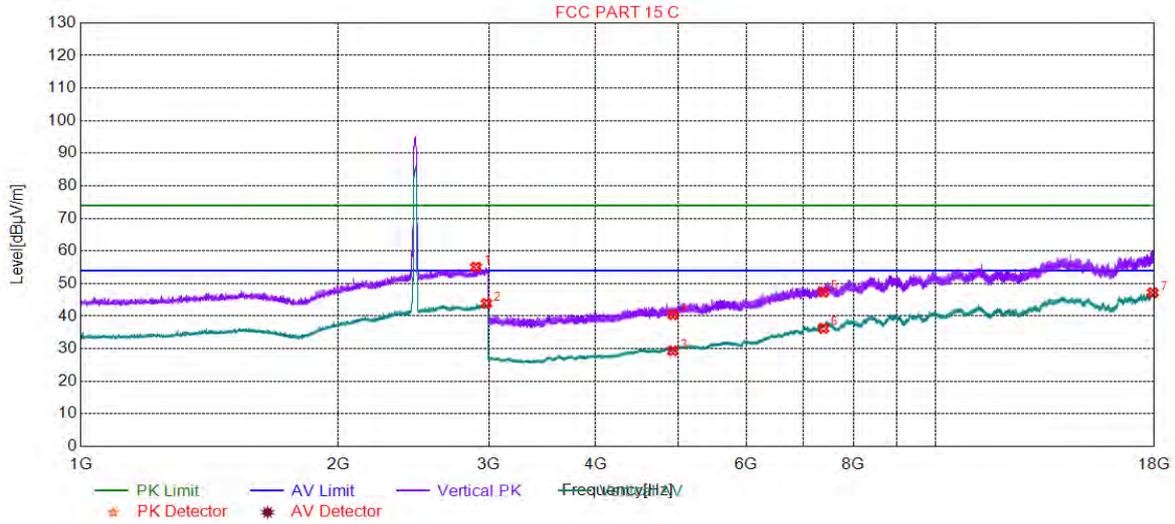
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2887.471	55.49	9.17	74.00	18.51	150	154	Horizontal
2	2942.485	43.75	9.60	54.00	10.25	150	112	Horizontal
3	4924.000	29.90	-17.72	54.00	24.10	150	100	Horizontal
4	4924.000	41.77	-17.72	74.00	32.23	150	209	Horizontal
5	7386.000	48.68	-9.55	74.00	25.32	150	191	Horizontal
6	7386.000	36.64	-9.55	54.00	17.36	150	241	Horizontal
7	17973.59	47.43	0.71	54.00	6.57	150	40	Horizontal



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**4.9.2.1.12 802.11G\_ Highest Channel\_ Vertical**



**Suspected List**

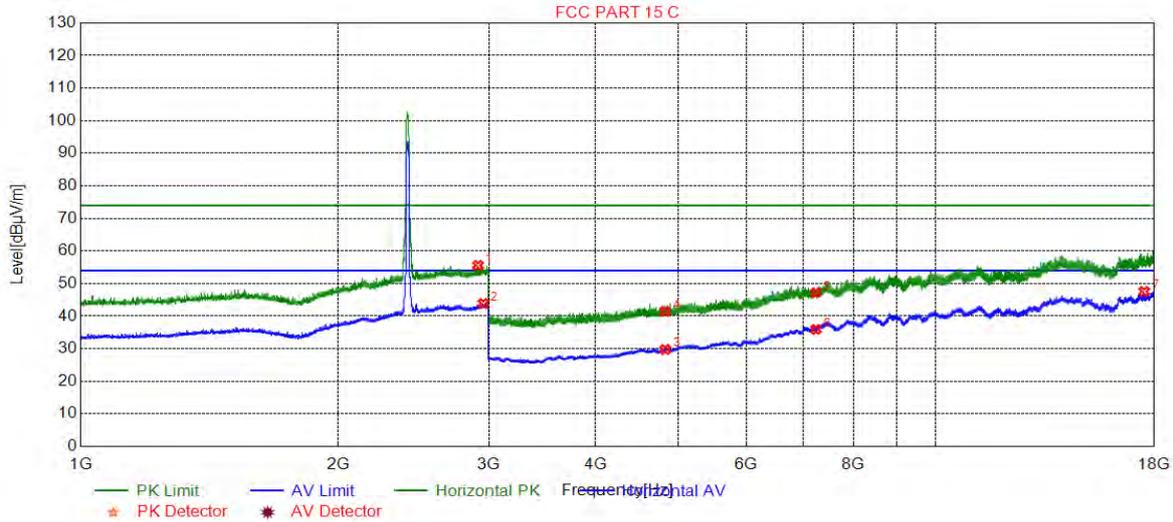
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2898.474	55.05	9.14	74.00	18.95	150	54	Vertical
2	2980.995	43.93	9.54	54.00	10.07	150	164	Vertical
3	4924.000	29.38	-17.72	54.00	24.62	150	346	Vertical
4	4924.000	40.44	-17.72	74.00	33.56	150	291	Vertical
5	7386.000	47.36	-9.55	74.00	26.64	150	41	Vertical
6	7386.000	36.28	-9.55	54.00	17.72	150	342	Vertical
7	17924.09	47.19	0.70	54.00	6.81	150	191	Vertical



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**4.9.2.1.13 802.11N20\_Lowest Channel\_Horizontal**



**Suspected List**

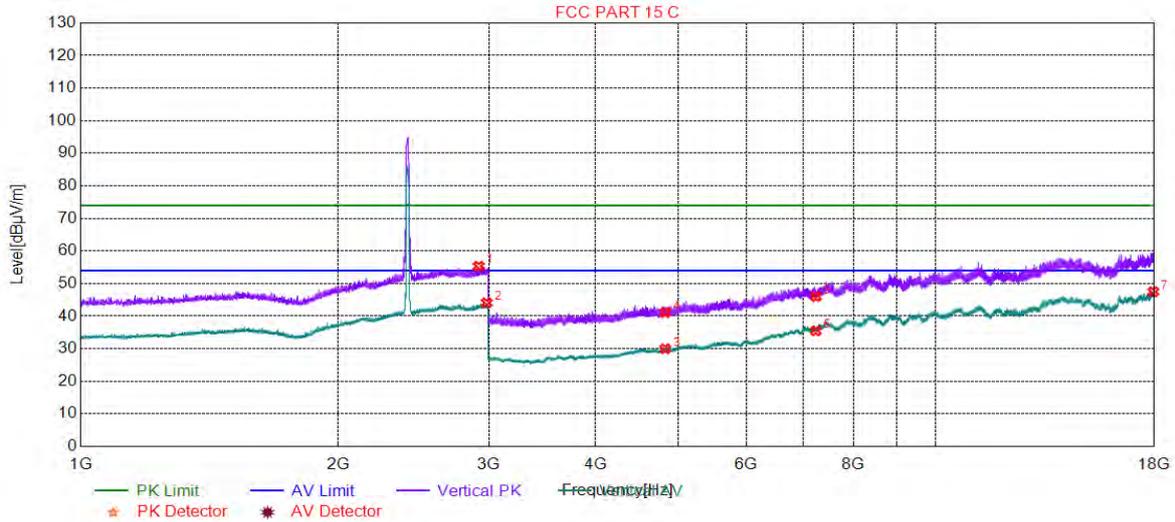
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2913.978	55.58	9.29	74.00	18.42	150	248	Horizontal
2	2955.488	43.89	9.65	54.00	10.11	150	59	Horizontal
3	4824.000	29.76	-18.21	54.00	24.24	150	291	Horizontal
4	4824.000	41.48	-18.21	74.00	32.52	150	360	Horizontal
5	7236.000	47.22	-9.99	74.00	26.78	150	140	Horizontal
6	7236.000	35.94	-9.99	54.00	18.06	150	342	Horizontal
7	17510.47	47.57	0.96	54.00	6.43	150	190	Horizontal



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**4.9.2.1.14 802.11N20\_Lowest Channel\_Vertical**



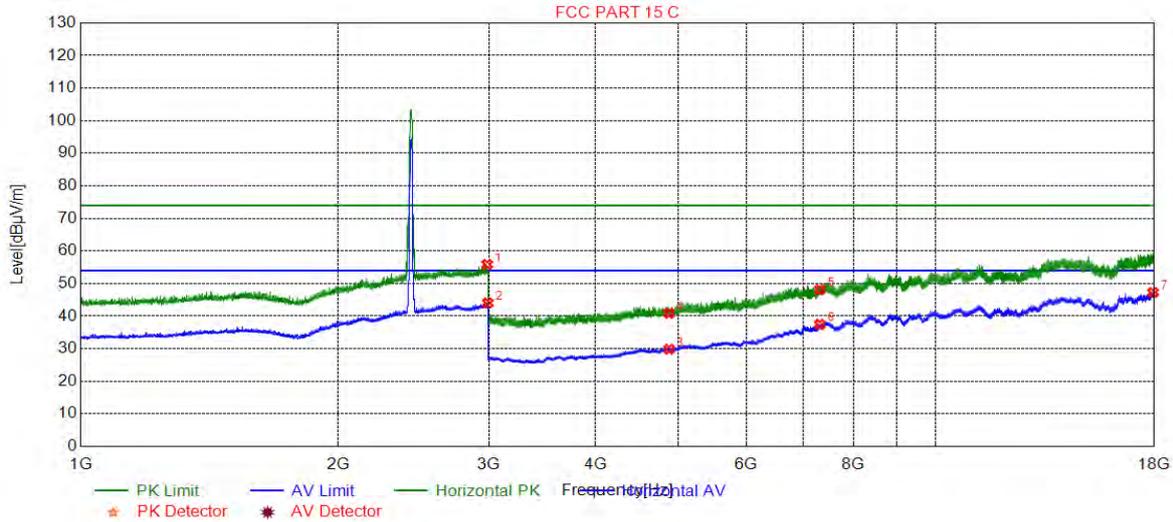
**Suspected List**

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2918.479	55.32	9.34	74.00	18.68	150	288	Vertical
2	2983.495	44.09	9.53	54.00	9.91	150	15	Vertical
3	4824.000	29.99	-18.21	54.00	24.01	150	360	Vertical
4	4824.000	41.11	-18.21	74.00	32.89	150	154	Vertical
5	7236.000	46.01	-9.99	74.00	27.99	150	292	Vertical
6	7236.000	35.47	-9.99	54.00	18.53	150	0	Vertical
7	17947.74	47.50	0.70	54.00	6.50	150	89	Vertical



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**4.9.2.1.15 802.11N20\_ Middle Channel\_ Horizontal**



**Suspected List**

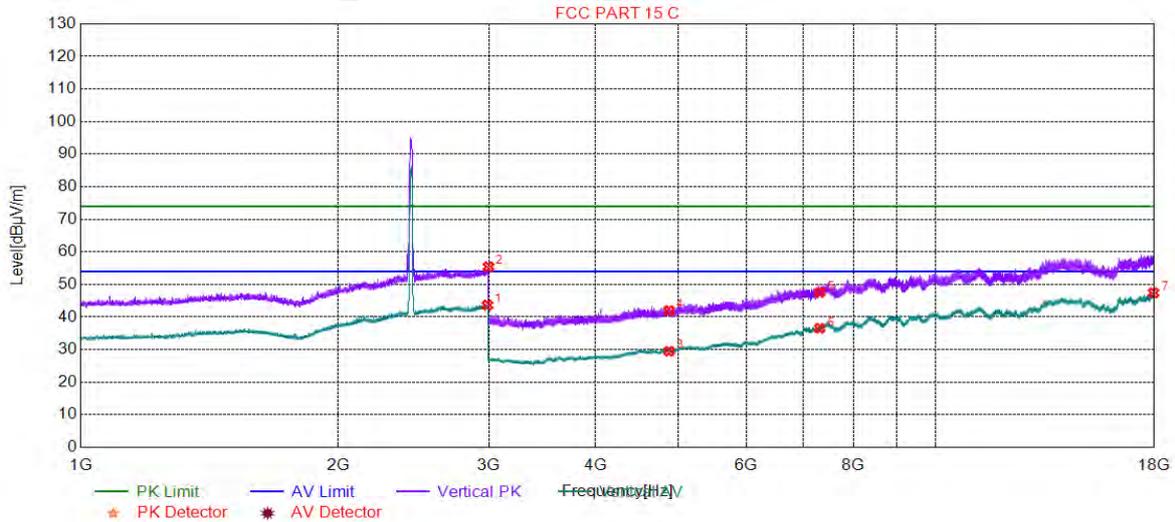
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2986.496	55.88	9.51	74.00	18.12	150	210	Horizontal
2	2991.497	44.06	9.49	54.00	9.94	150	72	Horizontal
3	4874.000	29.86	-17.99	54.00	24.14	150	154	Horizontal
4	4874.000	40.90	-17.99	74.00	33.10	150	126	Horizontal
5	7311.000	48.16	-9.74	74.00	25.84	150	90	Horizontal
6	7311.000	37.49	-9.74	54.00	16.51	150	0	Horizontal
7	17932.34	47.28	0.70	54.00	6.72	150	190	Horizontal



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**4.9.2.1.16 802.11N20\_Middle Channel\_Vertical**

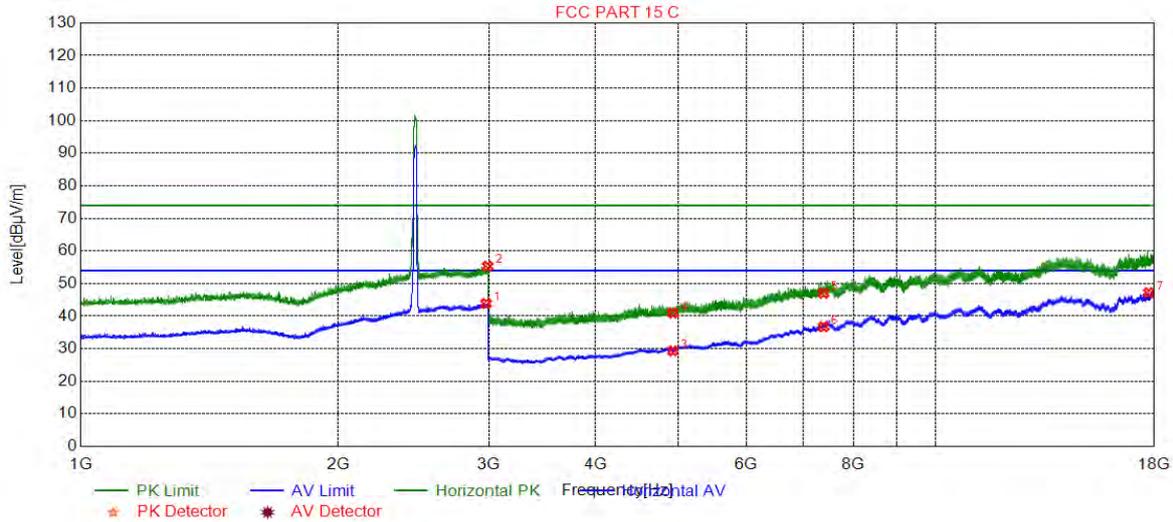


**Suspected List**

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2988.997	43.66	9.50	54.00	10.34	150	315	Vertical
2	2997.499	55.44	9.46	74.00	18.56	150	205	Vertical
3	4874.000	29.50	-17.99	54.00	24.50	150	209	Vertical
4	4874.000	42.01	-17.99	74.00	31.99	150	45	Vertical
5	7311.000	47.54	-9.74	74.00	26.46	150	40	Vertical
6	7311.000	36.55	-9.74	54.00	17.45	150	342	Vertical
7	17954.89	47.47	0.71	54.00	6.53	150	0	Vertical



**4.9.2.1.17 802.11N20\_ Highest Channel\_ Horizontal**



**Suspected List**

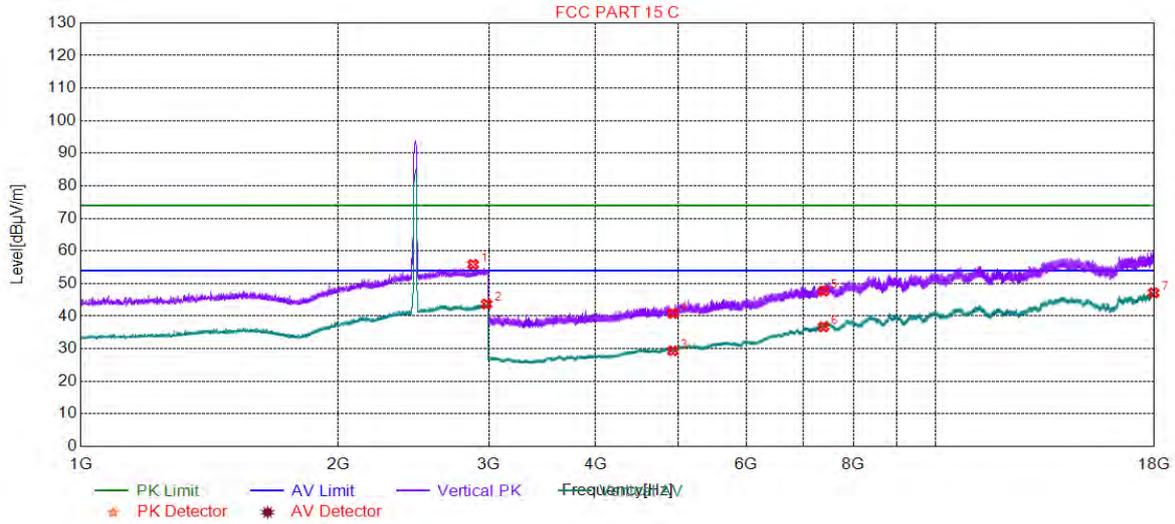
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2977.994	43.90	9.55	54.00	10.10	150	265	Horizontal
2	2990.497	55.32	9.49	74.00	18.68	150	18	Horizontal
3	4924.000	29.35	-17.72	54.00	24.65	150	128	Horizontal
4	4924.000	40.96	-17.72	74.00	33.04	150	18	Horizontal
5	7386.000	47.04	-9.55	74.00	26.96	150	90	Horizontal
6	7386.000	36.74	-9.55	54.00	17.26	150	191	Horizontal
7	17727.18	47.22	0.82	54.00	6.78	150	191	Horizontal



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**4.9.2.1.18 802.11N20\_ Highest Channel\_ Vertical**



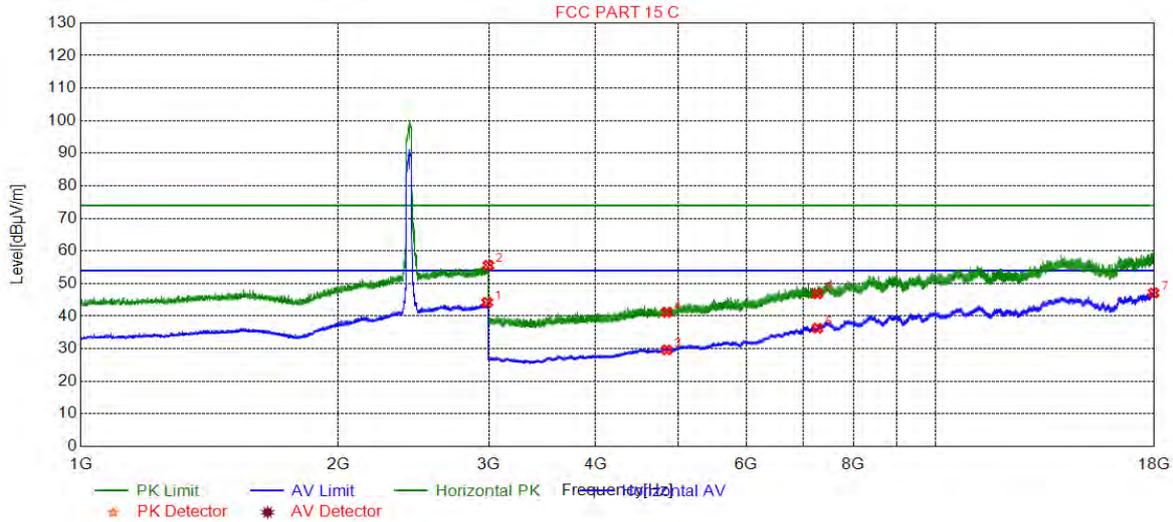
**Suspected List**

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2874.968	55.87	9.19	74.00	18.13	150	301	Vertical
2	2981.995	43.72	9.53	54.00	10.28	150	12	Vertical
3	4924.000	29.36	-17.72	54.00	24.64	150	99	Vertical
4	4924.000	40.82	-17.72	74.00	33.18	150	127	Vertical
5	7386.000	47.67	-9.55	74.00	26.33	150	142	Vertical
6	7386.000	36.72	-9.55	54.00	17.28	150	142	Vertical
7	17963.14	47.15	0.71	54.00	6.85	150	292	Vertical



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**4.9.2.1.19 802.11N40\_Lowest Channel\_Horizontal**



**Suspected List**

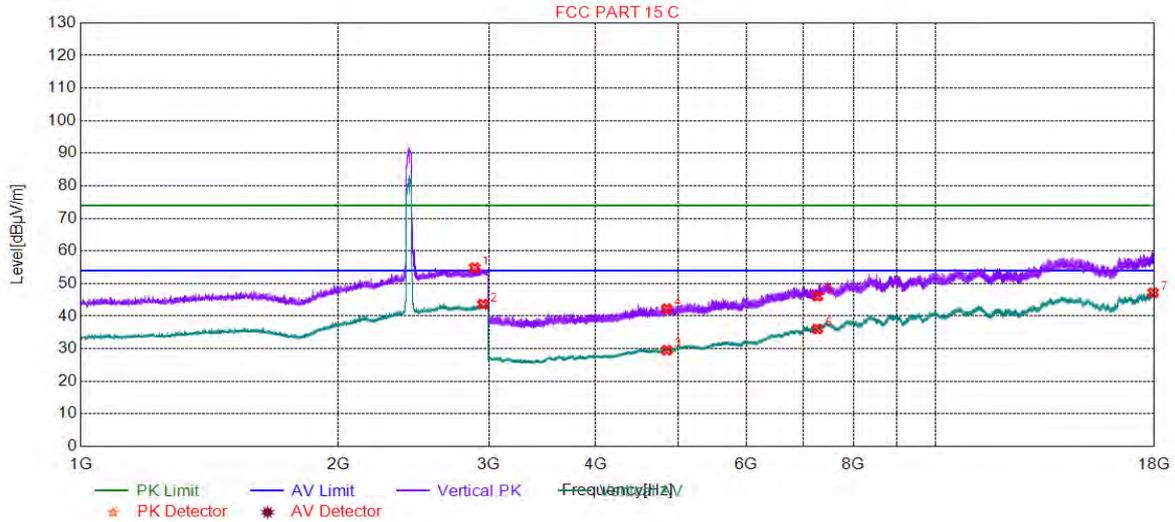
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2986.996	44.23	9.51	54.00	9.77	150	197	Horizontal
2	2995.999	55.60	9.47	74.00	18.40	150	358	Horizontal
3	4844.000	29.66	-18.13	54.00	24.34	150	155	Horizontal
4	4844.000	41.16	-18.13	74.00	32.84	150	155	Horizontal
5	7266.000	46.88	-9.88	74.00	27.12	150	91	Horizontal
6	7266.000	36.30	-9.88	54.00	17.70	150	0	Horizontal
7	17957.09	47.15	0.71	54.00	6.85	150	141	Horizontal



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**4.9.2.1.20 802.11N40\_Lowest Channel\_Vertical**



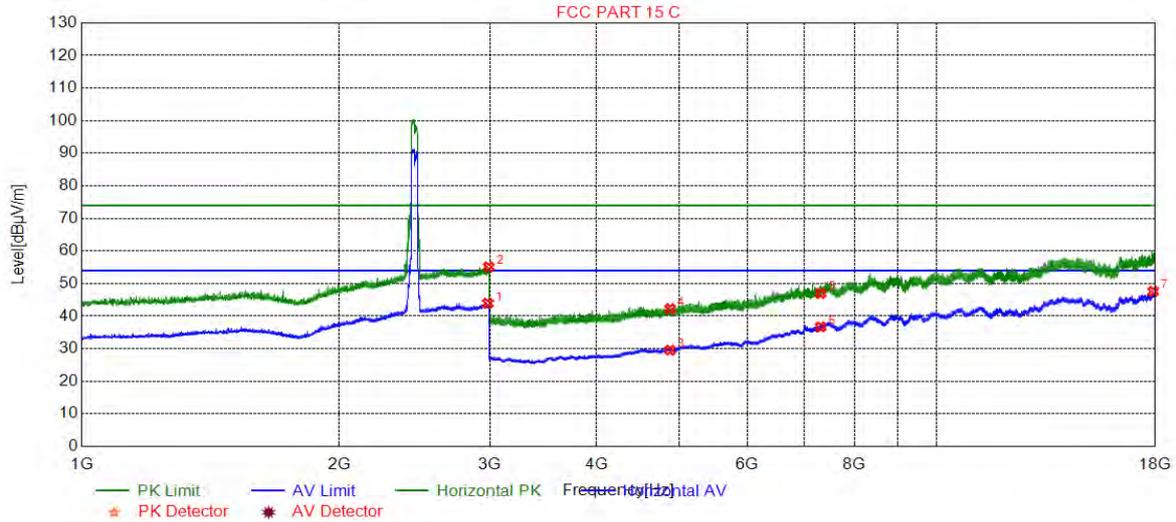
**Suspected List**

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2887.972	54.81	9.16	74.00	19.19	150	2	Vertical
2	2953.988	43.64	9.66	54.00	10.36	150	124	Vertical
3	4844.000	29.55	-18.13	54.00	24.45	150	262	Vertical
4	4844.000	42.23	-18.13	74.00	31.77	150	208	Vertical
5	7266.000	46.09	-9.88	74.00	27.91	150	239	Vertical
6	7266.000	36.07	-9.88	54.00	17.93	150	137	Vertical
7	17938.39	47.18	0.70	54.00	6.82	150	38	Vertical



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**4.9.2.1.21 802.11N40\_ Middle Channel\_ Horizontal**



**Suspected List**

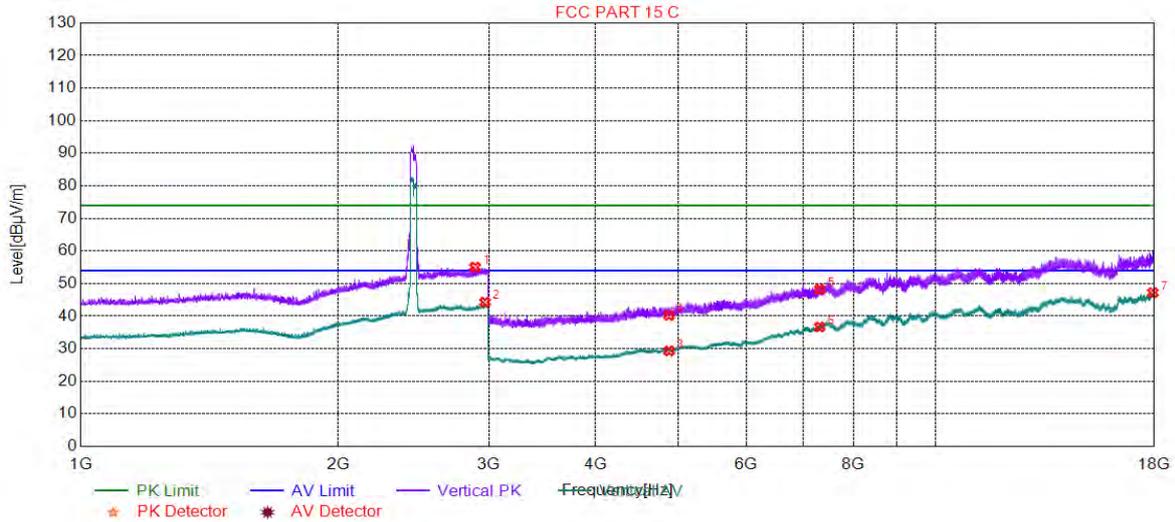
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2983.996	43.95	9.52	54.00	10.05	150	223	Horizontal
2	2990.997	55.14	9.49	74.00	18.86	150	251	Horizontal
3	4874.000	29.57	-17.99	54.00	24.43	150	182	Horizontal
4	4874.000	42.27	-17.99	74.00	31.73	150	210	Horizontal
5	7311.000	46.98	-9.74	74.00	27.02	150	0	Horizontal
6	7311.000	36.70	-9.74	54.00	17.30	150	241	Horizontal
7	17891.64	47.61	0.58	54.00	6.39	150	241	Horizontal



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**4.9.2.1.22 802.11N40\_ Middle Channel\_ Vertical**



**Suspected List**

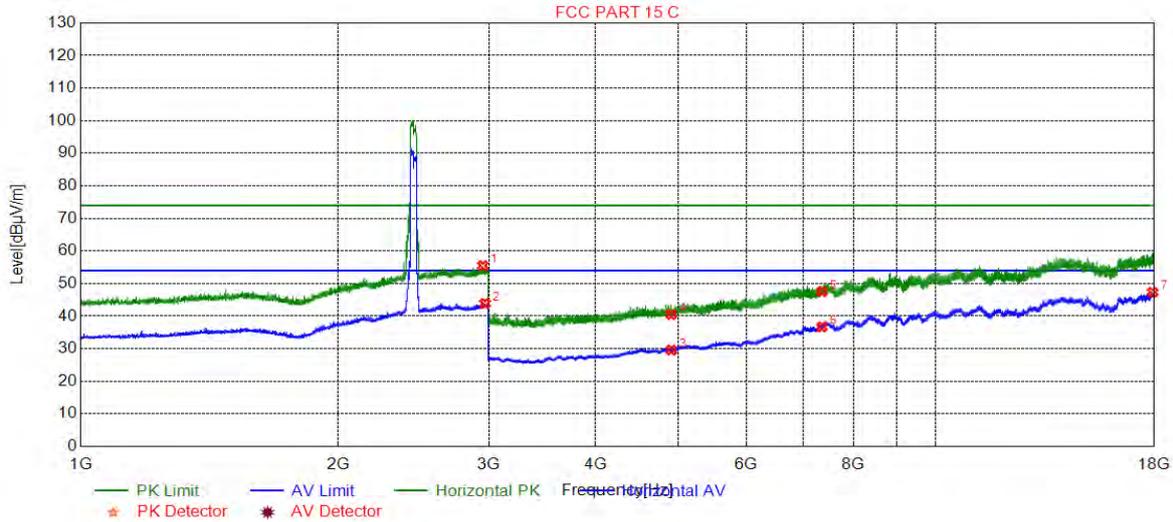
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2890.972	55.05	9.16	74.00	18.95	150	96	Vertical
2	2969.492	44.30	9.59	54.00	9.70	150	288	Vertical
3	4874.000	29.34	-17.99	54.00	24.66	150	295	Vertical
4	4874.000	40.23	-17.99	74.00	33.77	150	18	Vertical
5	7311.000	48.23	-9.74	74.00	25.77	150	342	Vertical
6	7311.000	36.68	-9.74	54.00	17.32	150	190	Vertical
7	17926.84	47.21	0.70	54.00	6.79	150	190	Vertical



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**4.9.2.1.23 802.11N40\_ Highest Channel\_ Horizontal**



**Suspected List**

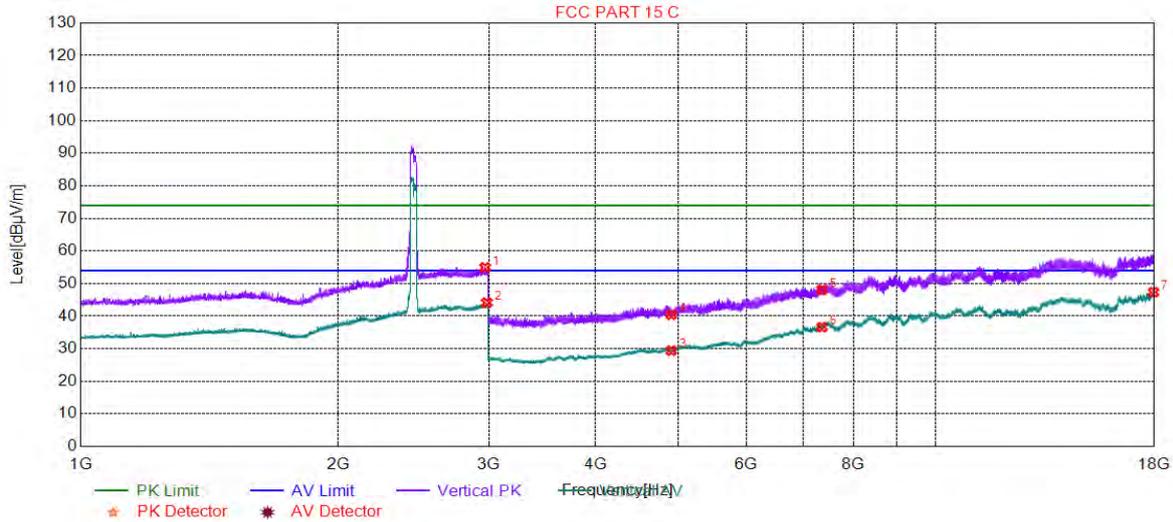
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2951.988	55.49	9.67	74.00	18.51	150	155	Horizontal
2	2968.992	43.90	9.59	54.00	10.10	150	18	Horizontal
3	4904.000	29.62	-17.85	54.00	24.38	150	72	Horizontal
4	4904.000	40.49	-17.85	74.00	33.51	150	240	Horizontal
5	7356.000	47.55	-9.62	74.00	26.45	150	292	Horizontal
6	7356.000	36.70	-9.62	54.00	17.30	150	191	Horizontal
7	17913.09	47.34	0.69	54.00	6.66	150	242	Horizontal



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**4.9.2.1.24 802.11N40\_ Highest Channel\_ Vertical**



**Suspected List**

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2969.992	54.94	9.59	74.00	19.06	150	123	Vertical
2	2984.496	44.12	9.52	54.00	9.88	150	69	Vertical
3	4904.000	29.44	-17.85	54.00	24.56	150	18	Vertical
4	4904.000	40.45	-17.85	74.00	33.55	150	237	Vertical
5	7356.000	48.09	-9.62	74.00	25.91	150	142	Vertical
6	7356.000	36.62	-9.62	54.00	17.38	150	142	Vertical
7	17953.79	47.35	0.71	54.00	6.65	150	41	Vertical

**Remark:**

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 2) Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz and 18GHz to 25GHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.
- 4) All Modes have been tested, but only the worst case data displayed in this report.



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### 4.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205		
Test Method:	ANSI C63.10: 2013 Section 11.12		
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m @3m)	Remark
	30MHz-88MHz	40.0	Quasi-peak Value
	88MHz-216MHz	43.5	Quasi-peak Value
	216MHz-960MHz	46.0	Quasi-peak Value
	960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz		54.0	Average Value
		74.0	Peak Value
Test Setup:			

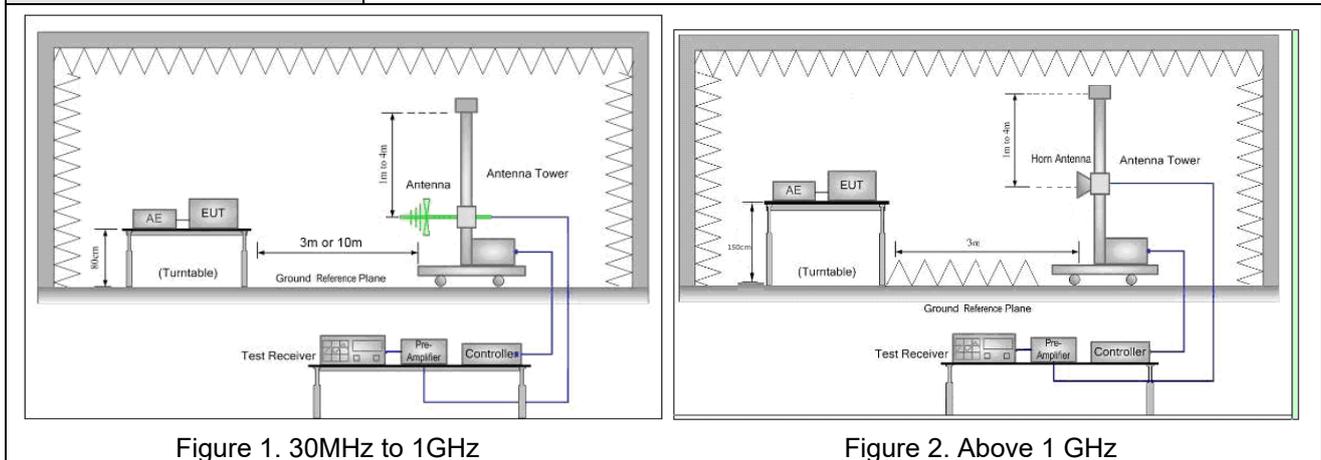


Figure 1. 30MHz to 1GHz

Figure 2. Above 1 GHz



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<p>Test Procedure:</p>	<ol style="list-style-type: none"> <li>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel</li> <li>h. Test the EUT in the lowest channel , the Highest channel</li> <li>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.</li> <li>j. Repeat above procedures until all frequencies measured was complete.</li> </ol>
<p>Exploratory Test Mode:</p>	<p>Transmitting with all kind of modulations, data rates. Charge + Transmitting mode.</p>
<p>Final Test Mode:</p>	<p>Pretest the EUT at Charge +Transmitting mode. Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40). Only the worst case is recorded in the report.</p>
<p>Instruments Used:</p>	<p>Refer to section 5.10 for details</p>
<p>Test Results:</p>	<p>Pass</p>



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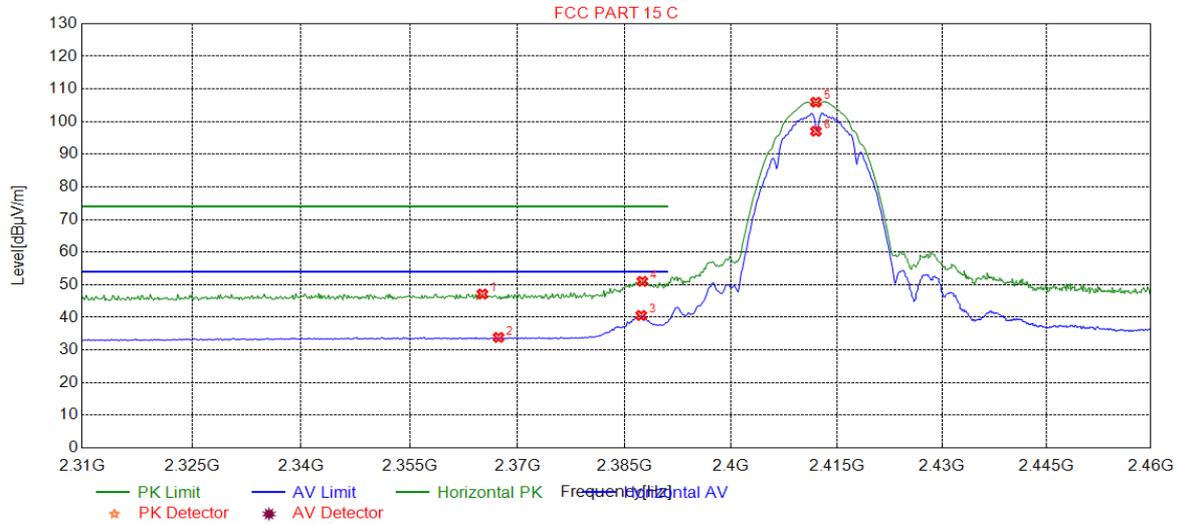
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Test plot as follows:

**4.10.1 ANT1**

**4.10.1.1 802.11B\_Lowest Channel\_Horizontal**



**Suspected List**

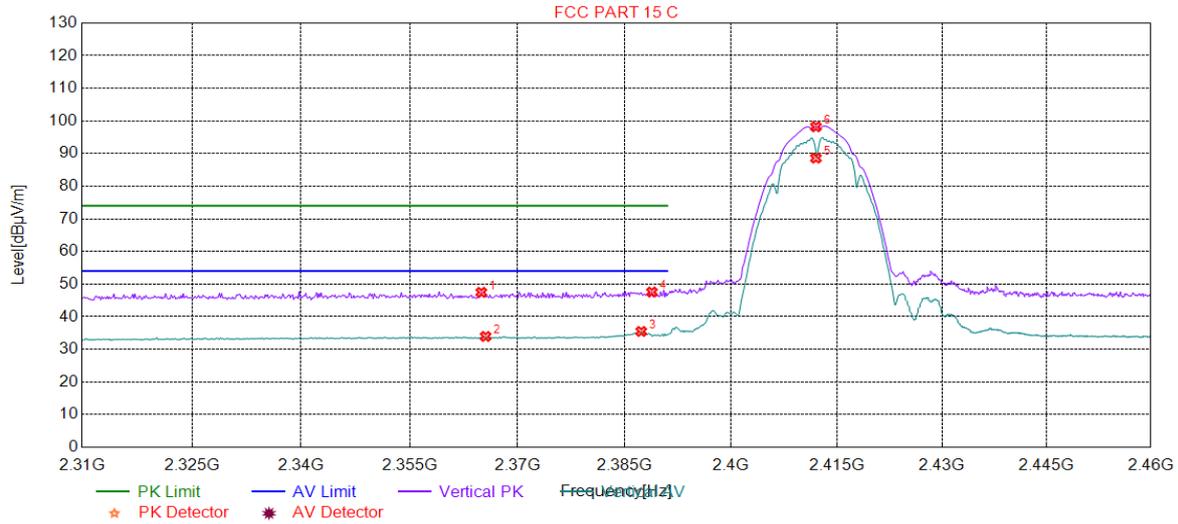
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2365.105	47.17	7.79	74.00	26.83	150	80	Horizontal
2	2367.357	33.87	7.79	54.00	20.13	150	38	Horizontal
3	2387.327	40.59	7.77	54.00	13.41	150	212	Horizontal
4	2387.477	51.06	7.77	74.00	22.94	150	216	Horizontal
5	2412.000	105.93	7.81	0.00	-105.93	150	208	Horizontal
6	2412.000	97.04	7.81	0.00	-97.04	150	208	Horizontal



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**4.10.1.2 802.11B\_Lowest Channel\_Vertical**



**Suspected List**

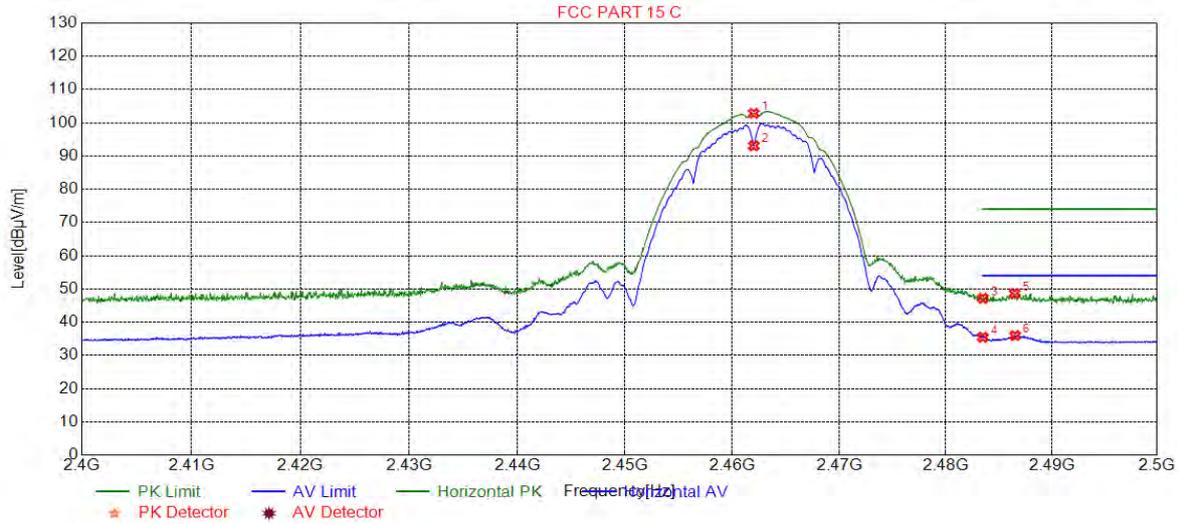
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2364.955	47.49	7.80	74.00	26.51	150	2	Vertical
2	2365.555	33.97	7.79	54.00	20.03	150	273	Vertical
3	2387.327	35.51	7.77	54.00	18.49	150	18	Vertical
4	2388.828	47.58	7.77	74.00	26.42	150	108	Vertical
5	2412.000	88.61	7.81	0.00	-88.61	150	55	Vertical
6	2412.000	98.21	7.81	0.00	-98.21	150	55	Vertical



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**4.10.1.3 802.11B\_ Highest Channel\_ Horizontal**



**Suspected List**

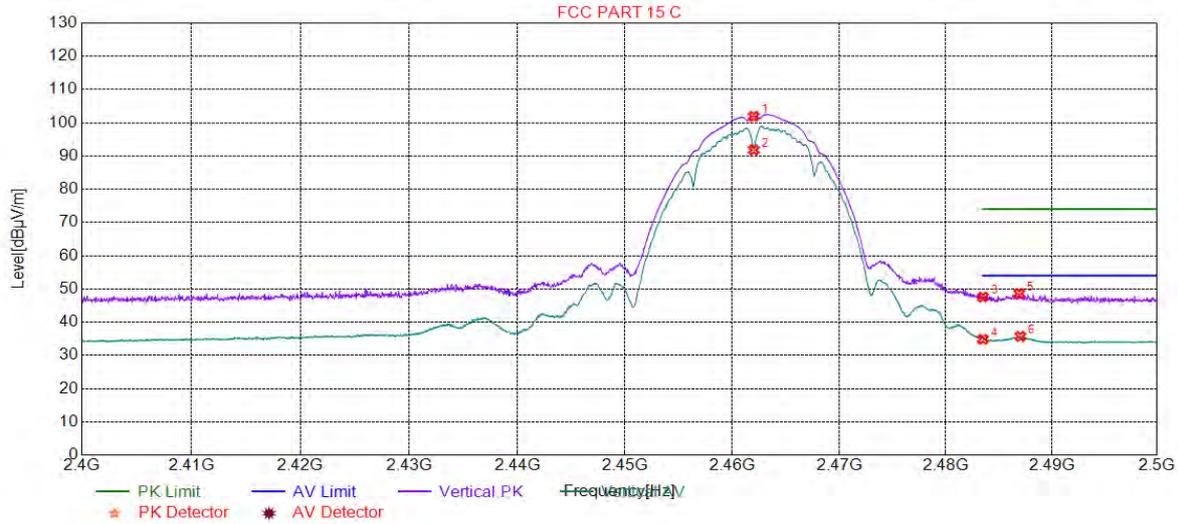
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	102.83	7.98	0.00	-102.83	150	215	Horizontal
2	2462.000	93.07	7.98	0.00	-93.07	150	215	Horizontal
3	2483.500	47.21	8.01	74.00	26.79	150	248	Horizontal
4	2483.500	35.49	8.01	54.00	18.51	150	215	Horizontal
5	2486.493	48.64	8.01	74.00	25.36	150	204	Horizontal
6	2486.543	35.99	8.01	54.00	18.01	150	204	Horizontal



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**4.10.1.4 802.11B\_ Highest Channel\_ Vertical**



**Suspected List**

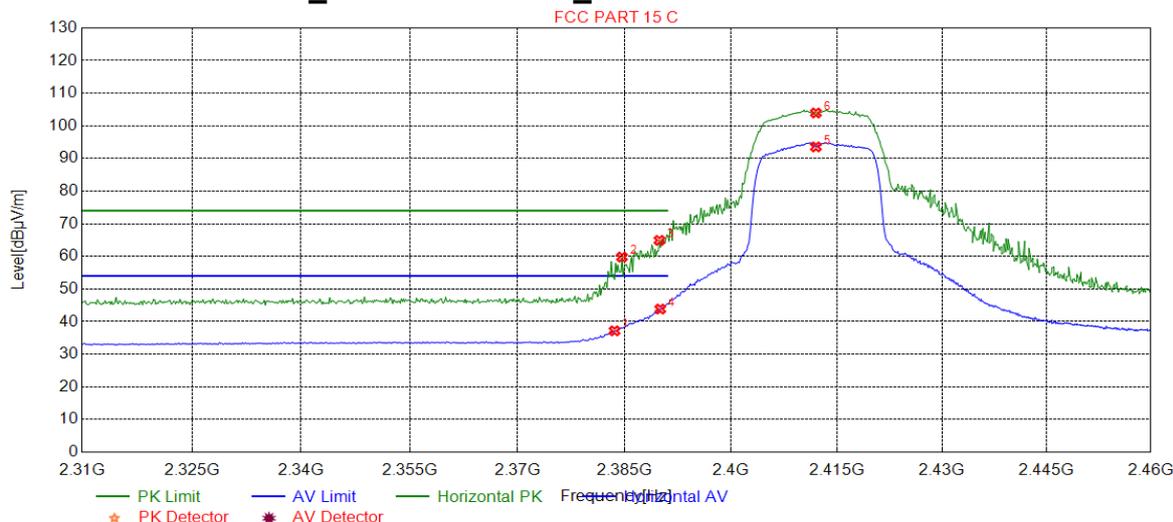
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	101.95	7.98	0.00	-101.95	150	215	Vertical
2	2462.000	91.82	7.98	0.00	-91.82	150	215	Vertical
3	2483.500	47.58	8.01	74.00	26.42	150	188	Vertical
4	2483.500	34.86	8.01	54.00	19.14	150	346	Vertical
5	2486.943	48.63	8.01	74.00	25.37	150	204	Vertical
6	2487.043	35.75	8.01	54.00	18.25	150	215	Vertical



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**4.10.1.5 802.11G\_Lowest Channel\_Horizontal**



**Suspected List**

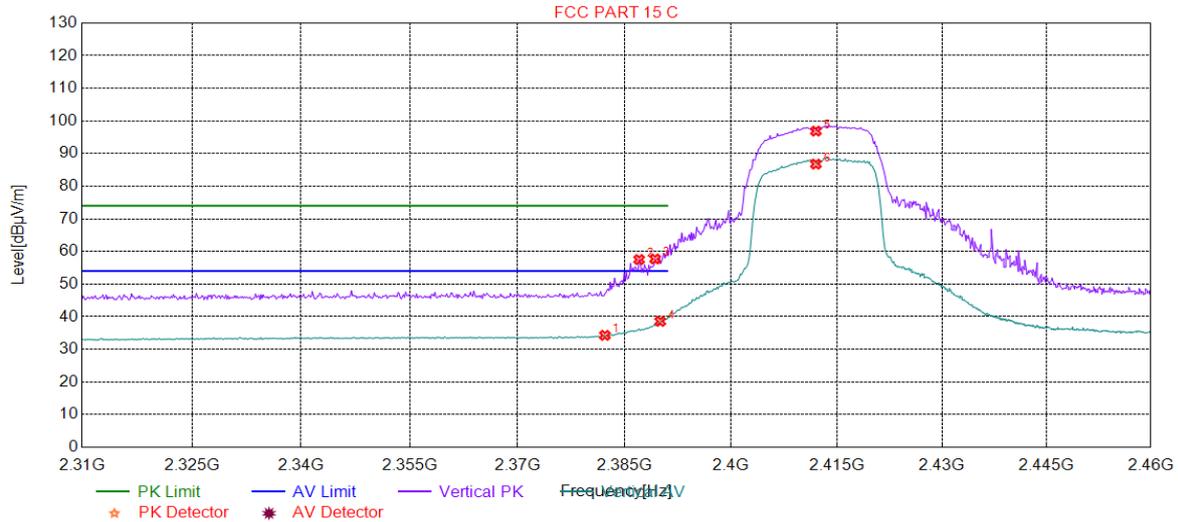
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2383.573	37.19	7.78	54.00	16.81	150	223	Horizontal
2	2384.624	59.80	7.78	74.00	14.20	150	261	Horizontal
3	2389.879	64.91	7.77	74.00	9.09	150	228	Horizontal
4	2390.000	43.87	7.77	54.00	10.13	150	220	Horizontal
5	2412.000	93.55	7.81	0.00	-93.55	150	220	Horizontal
6	2412.000	103.95	7.81	0.00	-103.95	150	220	Horizontal



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**4.10.1.6 802.11G\_Lowest Channel\_Vertical**



**Suspected List**

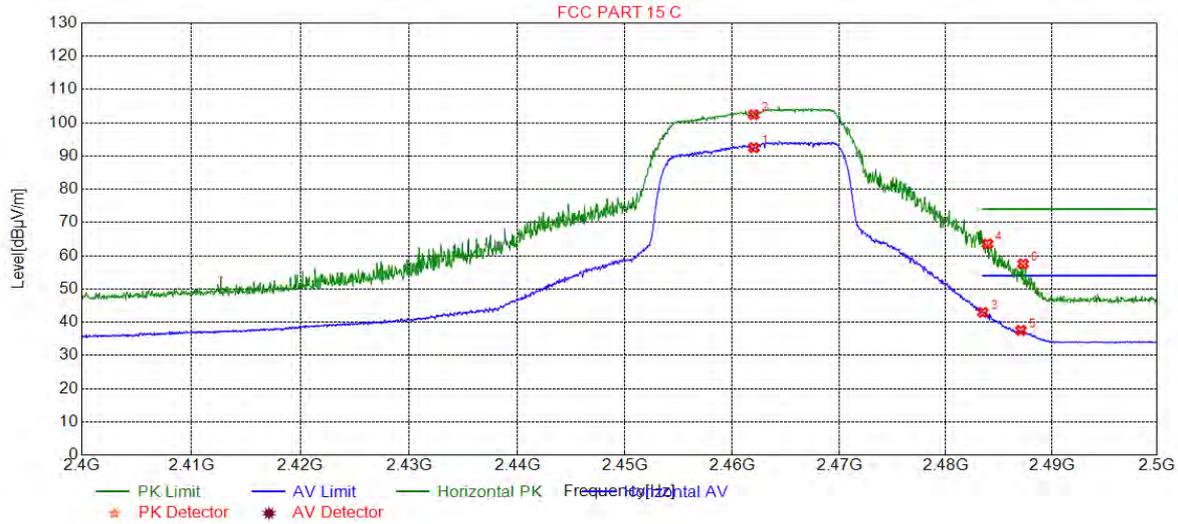
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2382.222	34.31	7.78	54.00	19.69	150	326	Vertical
2	2387.027	57.53	7.77	74.00	16.47	150	215	Vertical
3	2389.279	57.72	7.77	74.00	16.28	150	219	Vertical
4	2390.000	38.58	7.77	54.00	15.42	150	248	Vertical
5	2412.000	96.88	7.81	0.00	-96.88	150	243	Vertical
6	2412.000	86.78	7.81	0.00	-86.78	150	223	Vertical



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**4.10.1.7 802.11G\_ Highest Channel\_ Horizontal**



**Suspected List**

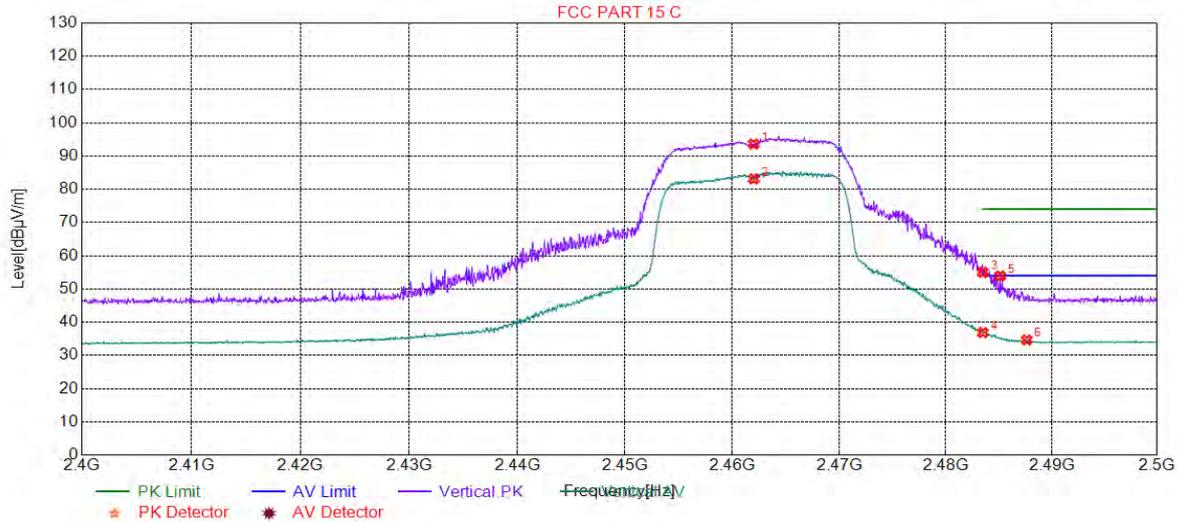
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	92.50	7.98	0.00	-92.50	150	218	Horizontal
2	2462.000	102.44	7.98	0.00	-102.44	150	218	Horizontal
3	2483.500	42.92	8.01	54.00	11.08	150	212	Horizontal
4	2483.942	63.58	8.01	74.00	10.42	150	212	Horizontal
5	2487.093	37.53	8.01	54.00	16.47	150	218	Horizontal
6	2487.293	57.55	8.01	74.00	16.45	150	224	Horizontal



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**4.10.1.8 802.11G\_ Highest Channel\_ Vertical**



**Suspected List**

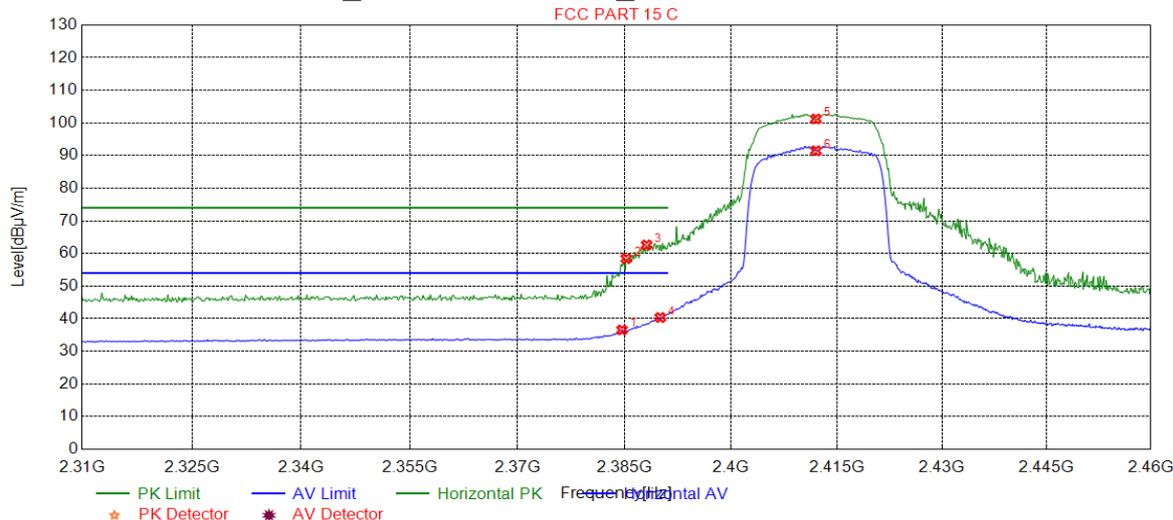
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	93.60	7.98	0.00	-93.60	150	73	Vertical
2	2462.000	83.13	7.98	0.00	-83.13	150	73	Vertical
3	2483.500	55.00	8.01	74.00	19.00	150	51	Vertical
4	2483.500	36.92	8.01	54.00	17.08	150	51	Vertical
5	2485.142	53.92	8.01	74.00	20.08	150	51	Vertical
6	2487.643	34.69	8.02	54.00	19.31	150	57	Vertical



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**4.10.1.9 802.11N20\_ Lowest Channel\_ Horizontal**



**Suspected List**

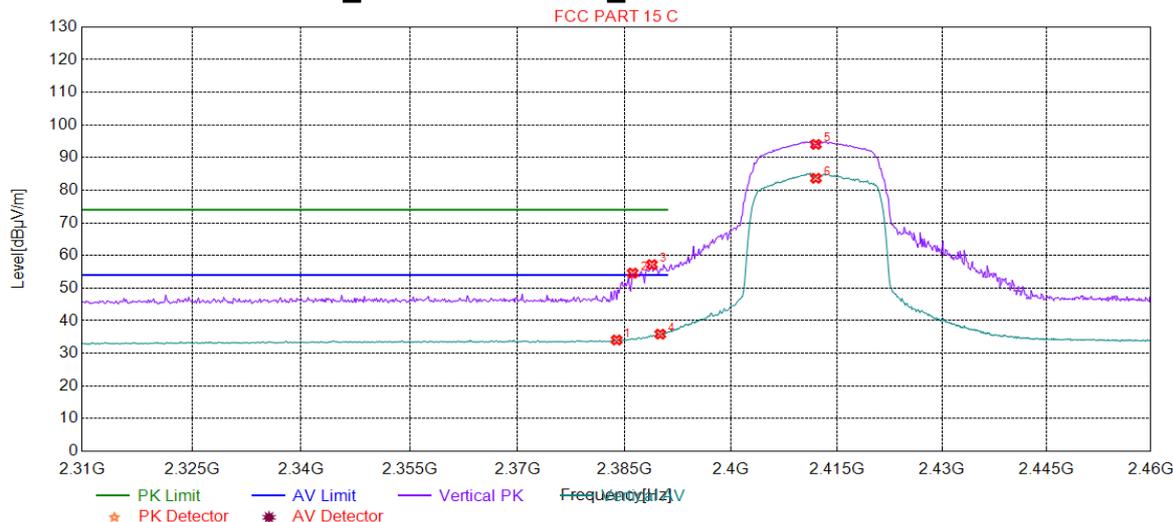
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2384.624	36.57	7.78	54.00	17.43	150	231	Horizontal
2	2385.225	58.45	7.77	74.00	15.55	150	231	Horizontal
3	2388.078	62.62	7.77	74.00	11.38	150	222	Horizontal
4	2390.000	40.37	7.77	54.00	13.63	150	231	Horizontal
5	2412.000	101.23	7.81	0.00	-101.23	150	231	Horizontal
6	2412.000	91.48	7.81	0.00	-91.48	150	227	Horizontal



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**4.10.1.10 802.11N20\_Lowest Channel\_Vertical**



**Suspected List**

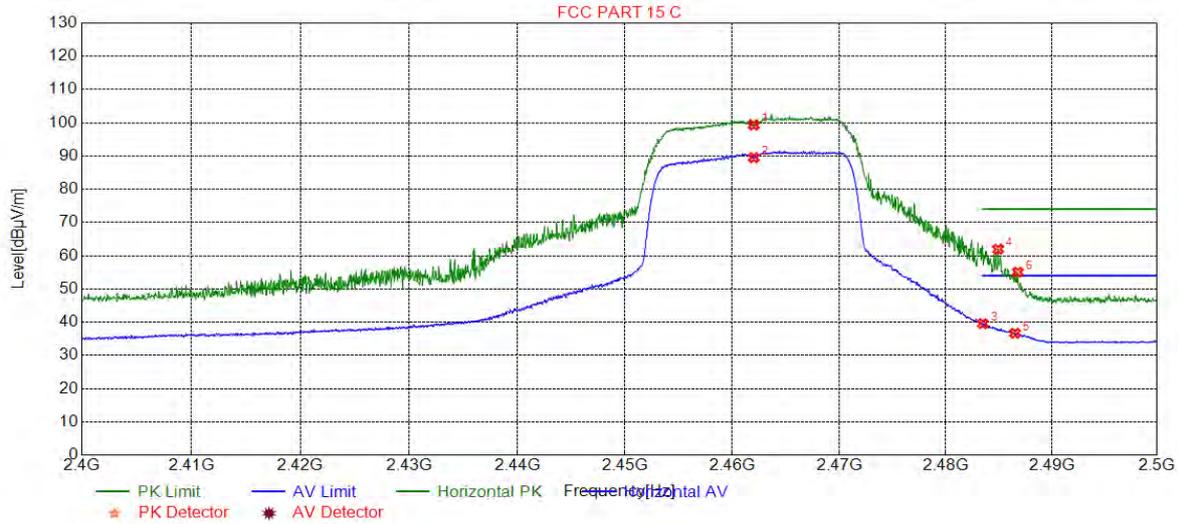
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2383.873	34.11	7.78	54.00	19.89	150	36	Vertical
2	2386.126	54.62	7.77	74.00	19.38	150	40	Vertical
3	2388.828	57.22	7.77	74.00	16.78	150	36	Vertical
4	2390.000	35.90	7.77	54.00	18.10	150	244	Vertical
5	2412.000	94.04	7.81	0.00	-94.04	150	32	Vertical
6	2412.000	83.67	7.81	0.00	-83.67	150	40	Vertical



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**4.10.1.11 802.11N20\_ Highest Channel\_ Horizontal**



**Suspected List**

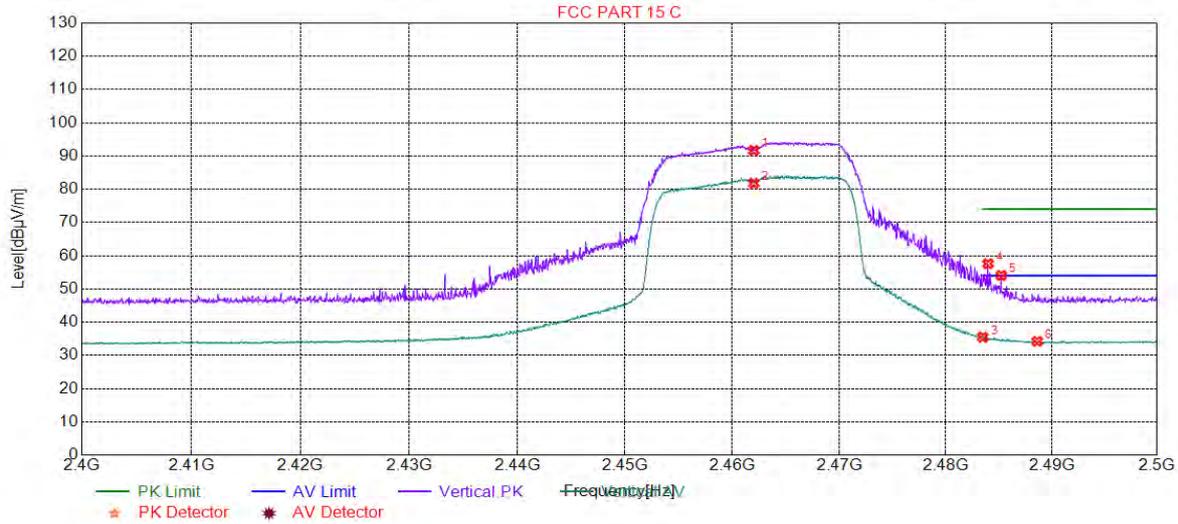
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	99.31	7.98	0.00	-99.31	150	224	Horizontal
2	2462.000	89.51	7.98	0.00	-89.51	150	201	Horizontal
3	2483.500	39.57	8.01	54.00	14.43	150	224	Horizontal
4	2484.942	61.96	8.01	74.00	12.04	150	201	Horizontal
5	2486.543	36.69	8.01	54.00	17.31	150	201	Horizontal
6	2486.793	55.08	8.01	74.00	18.92	150	201	Horizontal



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**4.10.1.12 802.11N20\_ Highest Channel\_ Vertical**



**Suspected List**

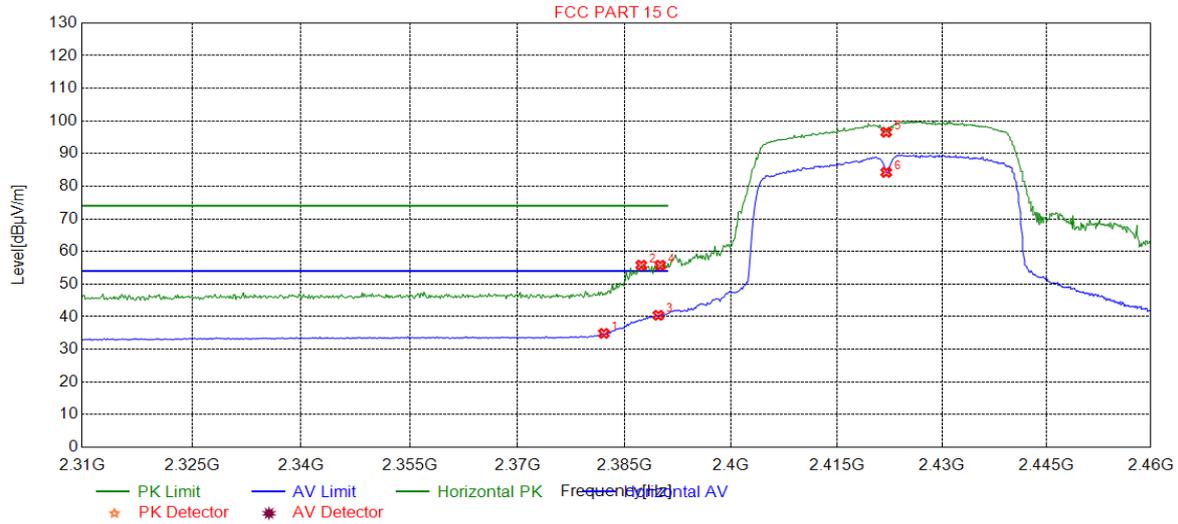
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	91.69	7.98	0.00	-91.69	150	104	Vertical
2	2462.000	81.82	7.98	0.00	-81.82	150	109	Vertical
3	2483.500	35.52	8.01	54.00	18.48	150	104	Vertical
4	2483.992	57.61	8.01	74.00	16.39	150	241	Vertical
5	2485.242	54.07	8.01	74.00	19.93	150	241	Vertical
6	2488.644	34.26	8.02	54.00	19.74	150	10	Vertical



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**4.10.1.13 802.11N40\_Lowest Channel\_Horizontal**



**Suspected List**

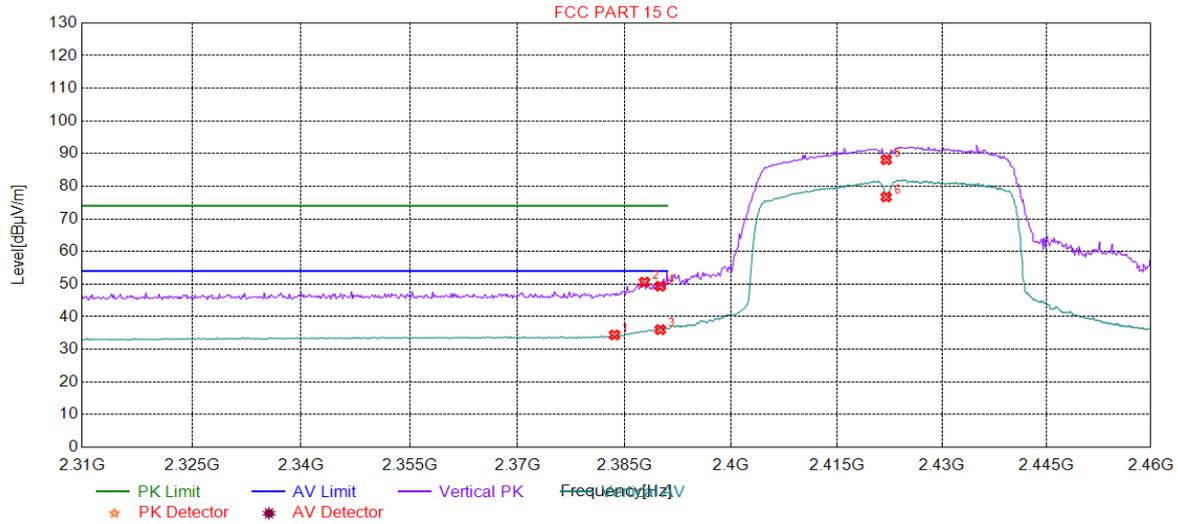
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2382.072	34.89	7.78	54.00	19.11	150	227	Horizontal
2	2387.327	55.81	7.77	74.00	18.19	150	206	Horizontal
3	2389.729	40.45	7.77	54.00	13.55	150	231	Horizontal
4	2390.000	55.80	7.77	74.00	18.20	150	231	Horizontal
5	2422.000	96.55	7.85	0.00	-96.55	150	227	Horizontal
6	2422.000	84.25	7.85	0.00	-84.25	150	227	Horizontal



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**4.10.1.14 802.11N40\_Lowest Channel\_Vertical**



**Suspected List**

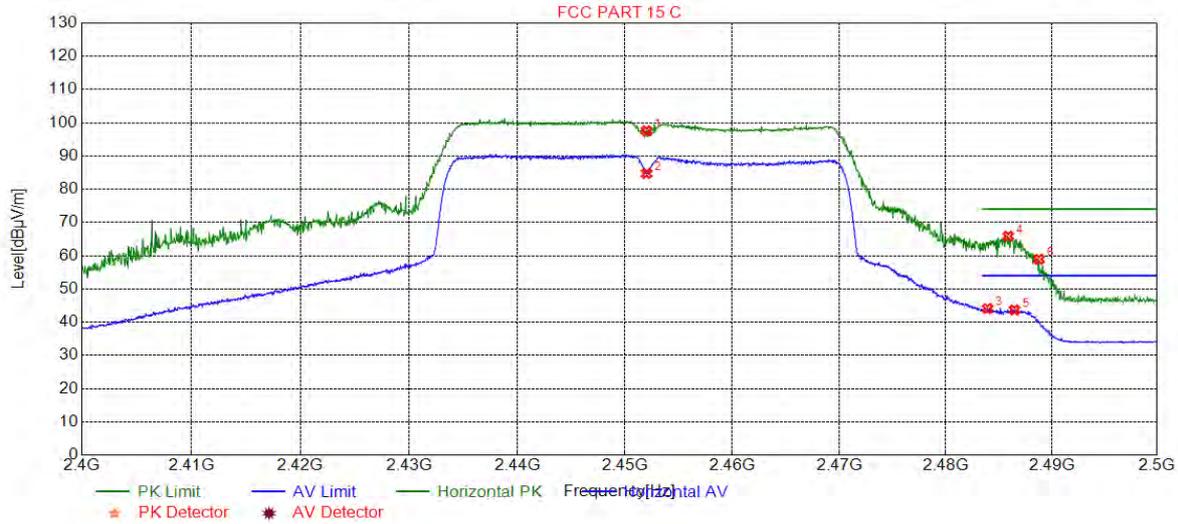
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2383.573	34.44	7.78	54.00	19.56	150	245	Vertical
2	2387.777	50.61	7.77	74.00	23.39	150	35	Vertical
3	2390.000	36.07	7.77	54.00	17.93	150	249	Vertical
4	2390.000	49.38	7.77	74.00	24.62	150	56	Vertical
5	2422.000	88.11	7.85	0.00	-88.11	150	56	Vertical
6	2422.000	76.71	7.85	0.00	-76.71	150	319	Vertical



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**4.10.1.15 802.11N40\_ Highest Channel\_ Horizontal**



**Suspected List**

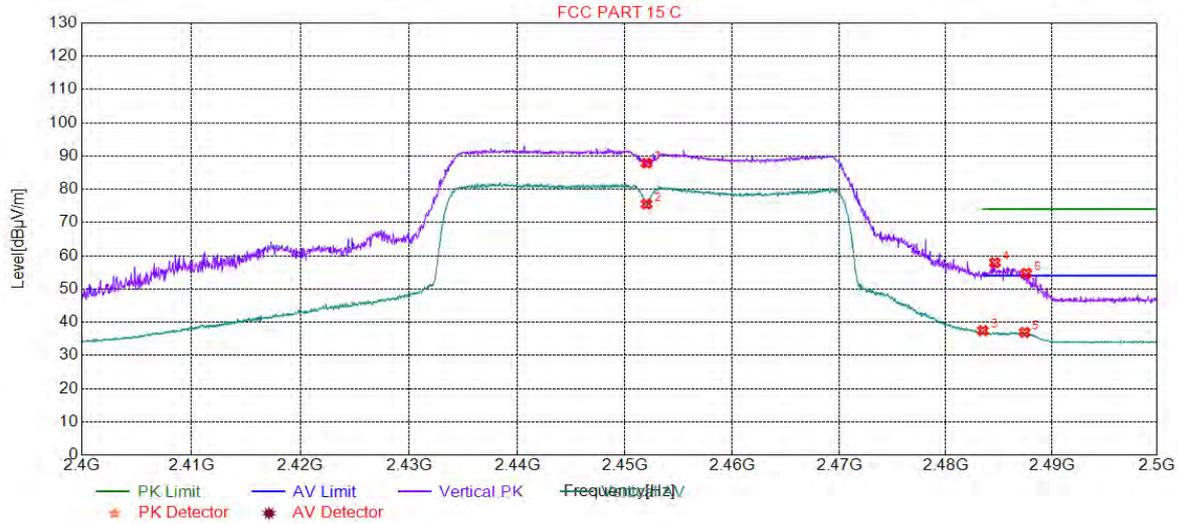
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.000	97.59	7.97	0.00	-97.59	150	211	Horizontal
2	2452.000	84.74	7.97	0.00	-84.74	150	222	Horizontal
3	2483.942	44.14	8.01	54.00	9.86	150	222	Horizontal
4	2485.892	65.90	8.01	74.00	8.10	150	222	Horizontal
5	2486.493	43.71	8.01	54.00	10.29	150	222	Horizontal
6	2488.794	58.95	8.02	74.00	15.05	150	211	Horizontal



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**4.10.1.16 802.11N40\_ Highest Channel\_ Vertical**



**Suspected List**

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.000	87.86	7.97	0.00	-87.86	150	203	Vertical
2	2452.000	75.54	7.97	0.00	-75.54	150	226	Vertical
3	2483.500	37.47	8.01	54.00	16.53	150	77	Vertical
4	2484.642	57.90	8.01	74.00	16.10	150	248	Vertical
5	2487.443	36.96	8.01	54.00	17.04	150	336	Vertical
6	2487.593	54.75	8.02	74.00	19.25	150	38	Vertical

**Remark:**

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

**Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor**

All Modes have been tested, but only the worst case data displayed in this report.



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## 5 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.75dB
2	RF power density, conducted	±2.84dB
3	Spurious emissions, conducted	±0.75dB
4	Radiated Spurious emission test	±4.5dB (30MHz-1GHz)
		±4.8dB (1GHz-25GHz)
5	Conduct emission test	±3.12 dB (9KHz- 30MHz)
6	Temperature test	±1°C
7	Humidity test	±3%
8	DC and low frequency voltages	±0.5%



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## 6 Equipment List

Conducted Emission					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2020/5/10	2023/5/9
LISN	Rohde & Schwarz	ENV216	SEM007-01	2019/7/14	2020/7/14
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2012/0/4/1	2021/3/31
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2020/6/12	2021/6/11
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2020/2/11	2021/2/10
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2020/3/2	2021/3/1

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
DC Power Supply	Agilent Technologies Inc	66311B	W009-09	2019/7/15	2020/7/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2020/1/3	2021/1/2
Coaxial Cable	SGS	N/A	SEM031-01	2020/6/12	2021/6/11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019/7/14	2020/7/14
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2019/10/27	2020/10/27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019/7/14	2020/7/14



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RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018/3/13	2021/3/12
Measurement Software	AUDIX	e3V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020/6/12	2021/6/11
EXA Signal Analyzer (10Hz-26.5GHz)	Agilent Technologies Inc	N9010A	SEM004-09	2020/3/12	2021/3/11
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2020/6/27	2023/6/26
Horn Antenna (0.8-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018/4/13	2021/4/12
Pre-amplifier(0.1-1.3GHz)	HP	8447D	SEM005-02	2019/7/14	2020/7/14
Low Noise Amplifier(100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2019/9/3	2020/9/2
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017/10/17	2020/10/16
Pre-amplifier(18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2020/3/2	2021/3/1
Band filter	N/A	N/A	SEM023-01	N/A	N/A
RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017/8/5	2020/8/4
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2020/6/12	2021/6/11
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2019/7/14	2020/7/14
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2020/6/27	2023/6/26
Pre-amplifier (0.1-1.3GHz)	Agilent Technologies	8447D	SEM005-01	2020/3/2	2021/3/1



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RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018/3/31	2021/3/30
EMI Test Receiver (9k-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2020/3/2	2021/3/1
Trilog-Broadband Antenna(25M-2GHz)	Schwarzbeck	VULB9168	SEM003-18	2020/3/15	2022/3/14
Pre-amplifier (9k-1GHz)	Sonoma	310N	SEM005-03	2020/3/12	2021/3/11
Loop Antenna (9kHz-30MHz)	ETS-Lindgren	6502	SEM003-08	2017/8/22	2020/8/21
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2020/6/12	2021/6/11

## 7 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of Set-Up for ZR/2020/50046.

The End



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