



# FCC TEST REPORT

**Application No:** ZR/2019/20008  
**Applicant:** TCL Communication Ltd.  
**Address of Applicant:** 7/F, Block F4, TCL Communication Technology Building, TCL International E City, Zhong Shan Yuan Road, Nanshan District, Shenzhen, Guangdong, P.R. China 518052  
**Manufacturer:** TCL Communication Ltd.  
**Address of Manufacturer:** 7/F, Block F4, TCL Communication Technology Building, TCL International E City, Zhong Shan Yuan Road, Nanshan District, Shenzhen, Guangdong, P.R. China 518052  
**EUT Description:** LTE/WCDMA/GSM mobile phone  
**Model No.:** 5053A  
**Trade Mark:** alcatel  
**FCC ID:** 2ACCJH105  
**Standards:** 47 CFR FCC Part 2, Subpart J  
 47 CFR Part 15, Subpart C  
**Test Method:** KDB558074 D01 15.247 Meas Guidance v05  
 ANSI C63.10 (2013)  
**Date of Receipt:** 2019/2/20  
**Date of Test:** 2019/2/22 to 2019/3/15  
**Date of Issue:** 2019/3/15

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

*Derek yang*

Derek Yang

Wireless Laboratory Manager



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# 1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2019/3/15		Original

<b>Authorized for issue by:</b>			
<b>Tested By</b>		2019/3/15	
	<hr/>	<hr/>	
	<b>(Mike Hu) /Project Engineer</b>	<b>Date</b>	
<b>Checked By</b>		2019/3/15	
	<hr/>	<hr/>	
	<b>(David Chen) /Reviewer</b>	<b>Date</b>	



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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

Applicant:	TCL Communication Ltd.
Address of Applicant:	7/F, Block F4, TCL Communication Technology Building, TCL International E City, Zhong Shan Yuan Road, Nanshan District, Shenzhen, Guangdong, P.R. China 518052
Manufacturer:	TCL Communication Ltd.
Address of Manufacturer:	7/F, Block F4, TCL Communication Technology Building, TCL International E City, Zhong Shan Yuan Road, Nanshan District, Shenzhen, Guangdong, P.R. China 518052

#### 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::	LTE/WCDMA/GSM mobile phone
Model No.:	5053A
Trade Mark:	alcatel
Hardware Version:	PIO
Software Version:	v3FT8
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 and HT20) : OFDM IEEE for 802.11N(HT20 and 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:	-0.83dBi
Power Supply	<input checked="" type="checkbox"/> AC/DC Adapter; <input type="checkbox"/> Battery <input type="checkbox"/> PoE;; <input type="checkbox"/> Other:

#### 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		
5	2432MHz	8	2447MHz		

Remark:



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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 -0.83dBi.</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>



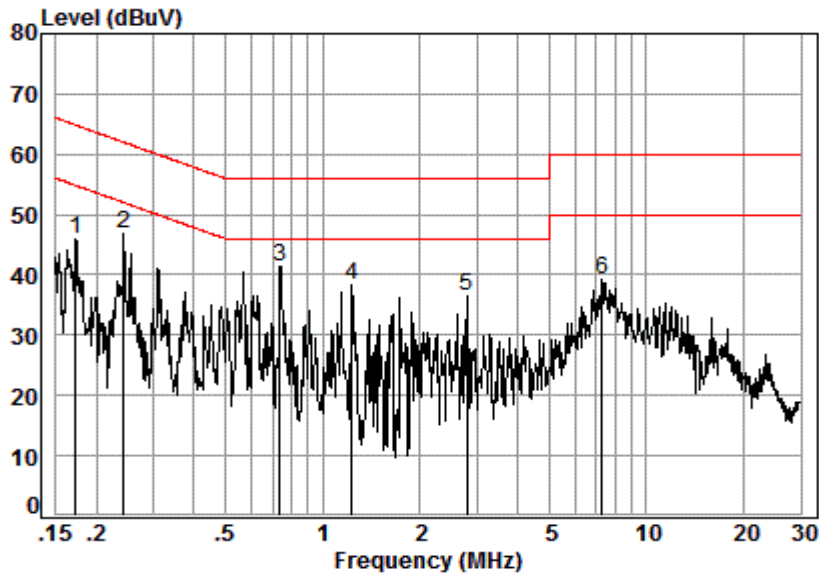
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Measurement Data

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:



Site : Shielding Room  
 Condition: Line  
 Job No. : 11311CR  
 Test mode:

	Freq	Cable Loss	LISN Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.17	0.02	9.66	36.31	45.99	54.81	-8.82	Peak
2	0.24	0.03	9.67	37.20	46.90	52.00	-5.10	Peak
3	0.74	0.08	9.70	31.74	41.52	46.00	-4.48	Peak
4	1.23	0.11	9.73	28.42	38.26	46.00	-7.74	Peak
5	2.79	0.16	9.71	26.62	36.49	46.00	-9.51	Peak
6	7.29	0.17	9.79	29.35	39.31	50.00	-10.69	Peak

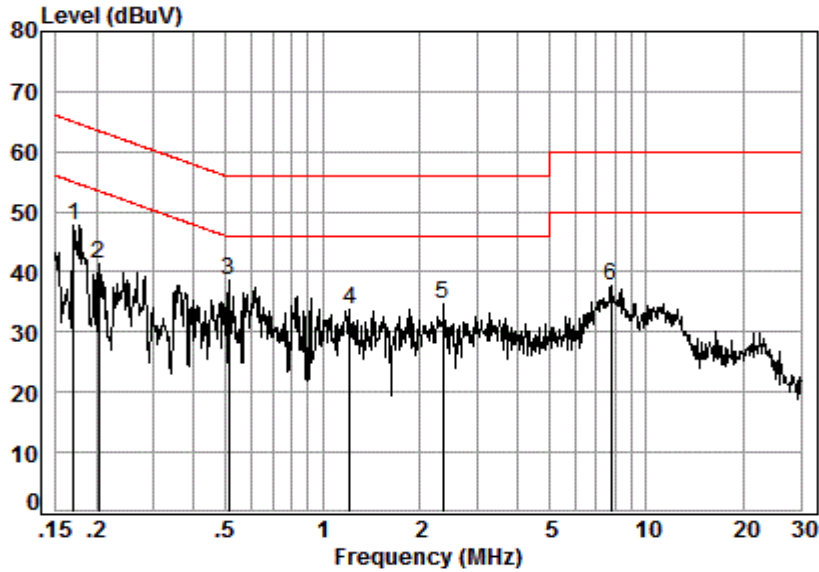


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Neutral Line:



Site : Shielding Room  
 Condition: Neutral  
 Job No. : 11311CR  
 Test mode:

	Freq	Cable Loss	LISN Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.17	0.02	9.64	38.13	47.79	54.94	-7.15	Peak
2	0.20	0.02	9.64	31.84	41.50	53.49	-11.99	Peak
3	0.51	0.06	9.64	28.80	38.50	46.00	-7.50	Peak
4	1.22	0.11	9.70	24.10	33.91	46.00	-12.09	Peak
5	2.36	0.16	9.68	24.78	34.62	46.00	-11.38	Peak
6	7.77	0.17	9.78	27.65	37.60	50.00	-12.40	Peak

Remarks:

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



### 4.3 Duty Cycle

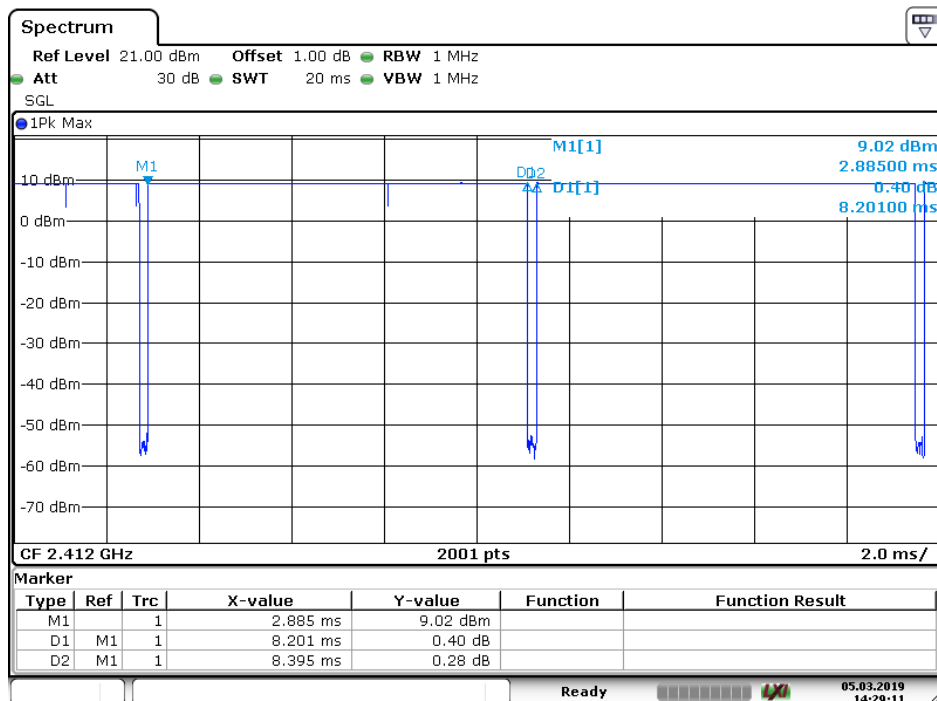
#### 4.3.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11B	Ant 1: CH1,CH6,CH11	97.69
11G	Ant 1: CH1,CH6,CH11	86.84
11N20	Ant 1: CH1,CH6,CH11	86.05
11N40	Ant 1: CH3,CH6,CH9	71.98

#### 4.3.1 Test Plots

##### 4.3.1.1 ANT1

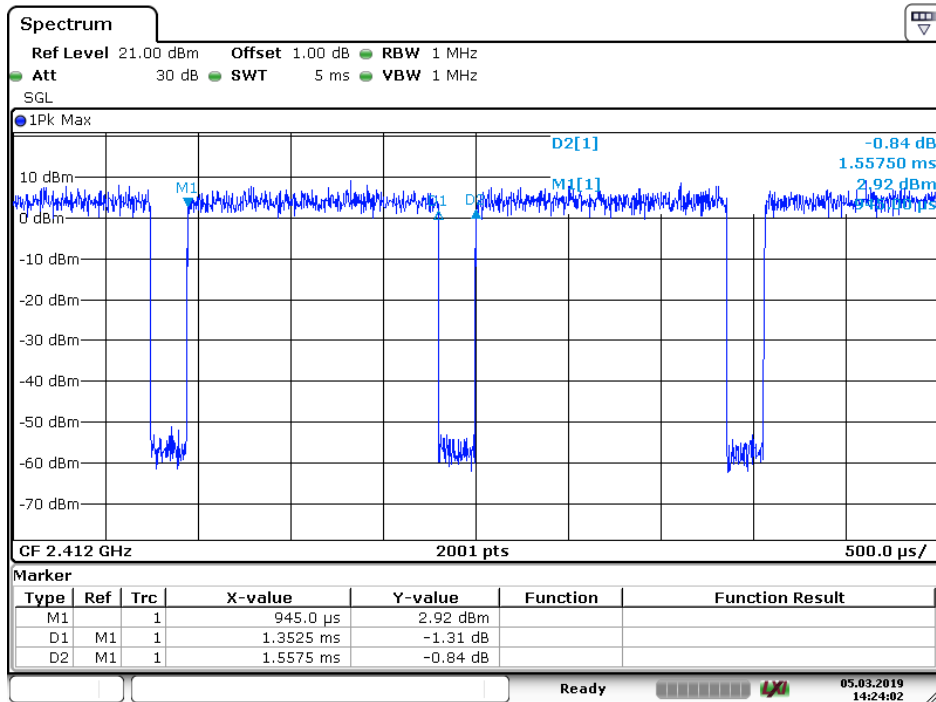
##### 4.3.1.1.1 11B



Date: 5 MAR. 2019 14:29:11

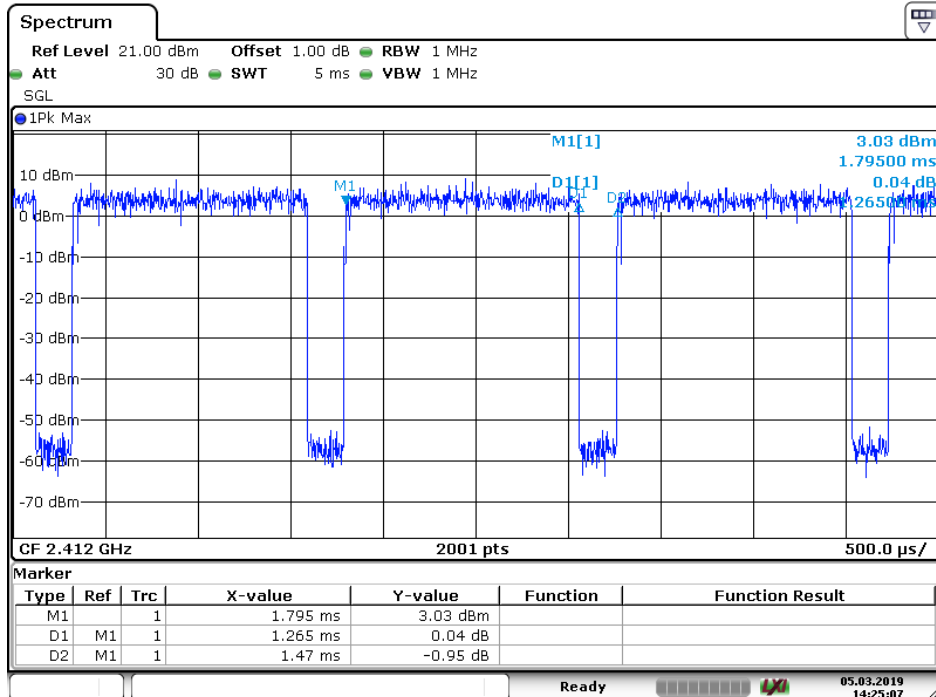


**4.3.1.1.2 11G**



Date: 5 MAR .2019 14:24:02

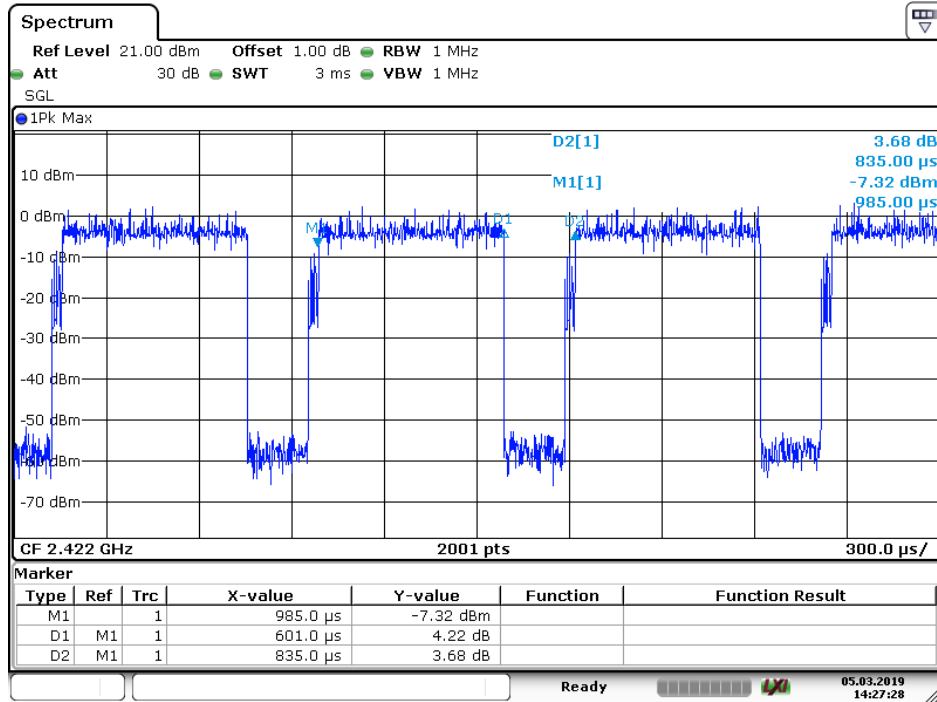
**4.3.1.1.3 11N20**



Date: 5 MAR .2019 14:25:07



**4.3.1.1.4 11N40**



Date: 5 M AR .2019 14:27:28



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#### 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)	Result
802.11B	Lowest	15.18	Report purpose only
	Middle	15.33	Report purpose only
	Highest	15.78	Report purpose only
802.11G	Lowest	13.90	Report purpose only
	Middle	14.22	Report purpose only
	Highest	14.57	Report purpose only
802.11N20	Lowest	13.99	Report purpose only
	Middle	14.26	Report purpose only
	Highest	14.68	Report purpose only
802.11N40	Lowest	14.24	Report purpose only
	Middle	14.11	Report purpose only
	Highest	14.10	Report purpose only

**Measurement Data of Peak Power:**

Mode	Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result
802.11B	Lowest	18.86	30.00	Pass
	Middle	19.13	30.00	Pass
	Highest	19.44	30.00	Pass
802.11G	Lowest	21.64	30.00	Pass
	Middle	22.29	30.00	Pass
	Highest	22.13	30.00	Pass
802.11N20	Lowest	21.51	30.00	Pass
	Middle	21.81	30.00	Pass
	Highest	22.13	30.00	Pass
802.11N40	Lowest	21.85	30.00	Pass
	Middle	21.78	30.00	Pass
	Highest	21.89	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	12.85	8.09	≥500	Pass
	Middle	12.86	8.57	≥500	Pass
	Highest	12.92	8.57	≥500	Pass
802.11G	Lowest	17.26	16.18	≥500	Pass
	Middle	17.35	16.36	≥500	Pass
	Highest	17.44	16.42	≥500	Pass
802.11N20	Lowest	18.22	17.41	≥500	Pass
	Middle	18.22	17.59	≥500	Pass
	Highest	18.19	17.62	≥500	Pass
802.11N40	Lowest	36.26	34.95	≥500	Pass
	Middle	36.44	35.01	≥500	Pass
	Highest	36.50	35.14	≥500	Pass



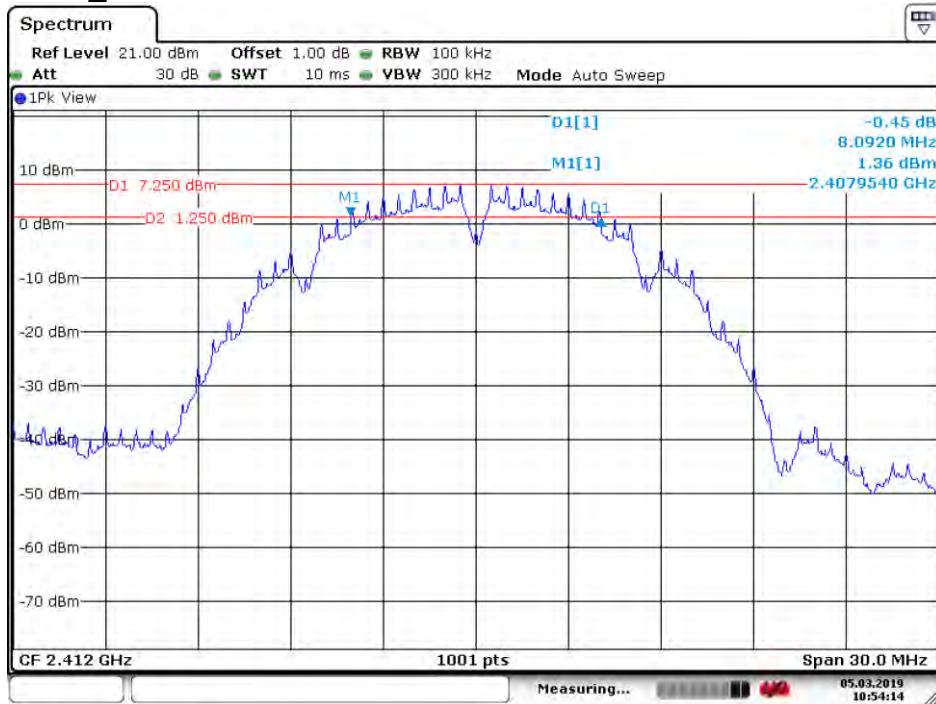
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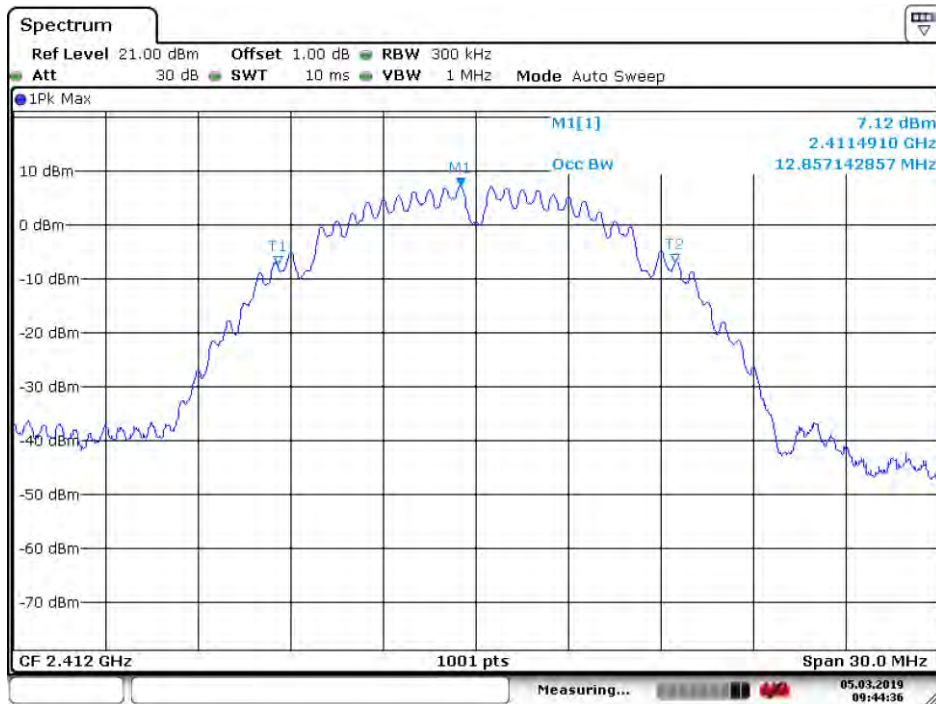
### 4.5.2 Test plots

#### 4.5.2.1 ANT1

##### 4.5.2.1.1 802.11B\_Lowest Channel



Date: 5.MAR.2019 10:54:15



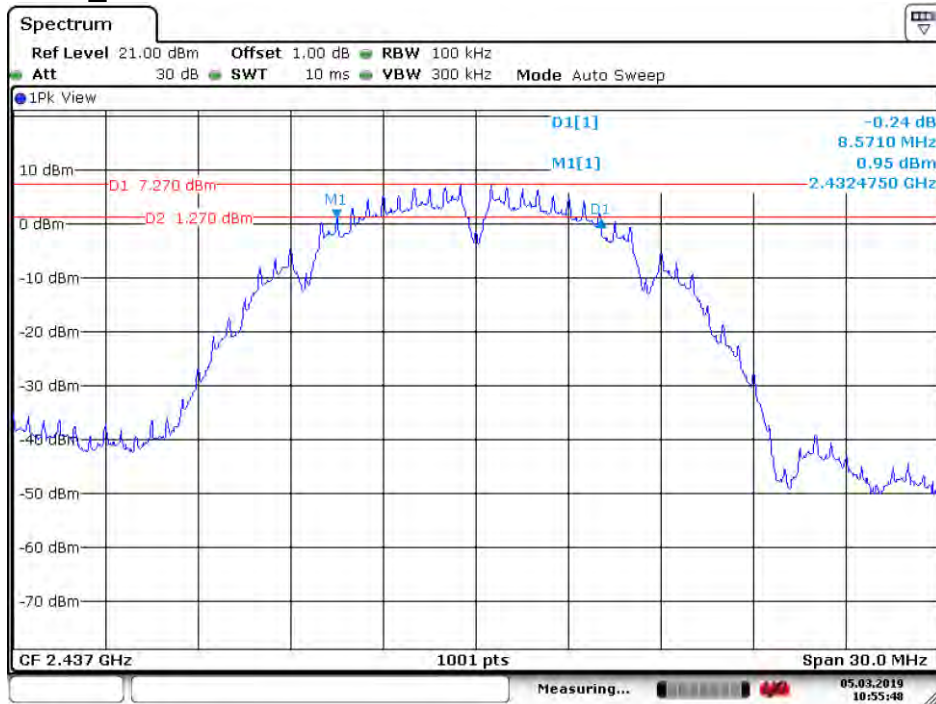
Date: 5.MAR.2019 09:44:36



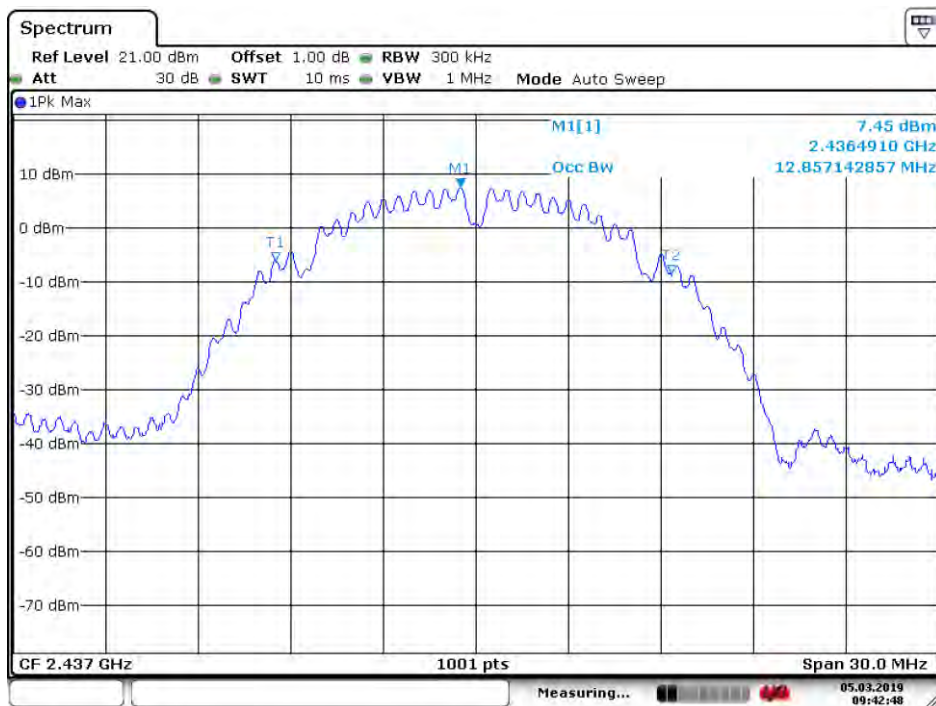
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**4.5.2.1.2 802.11B\_ Middle Channel**



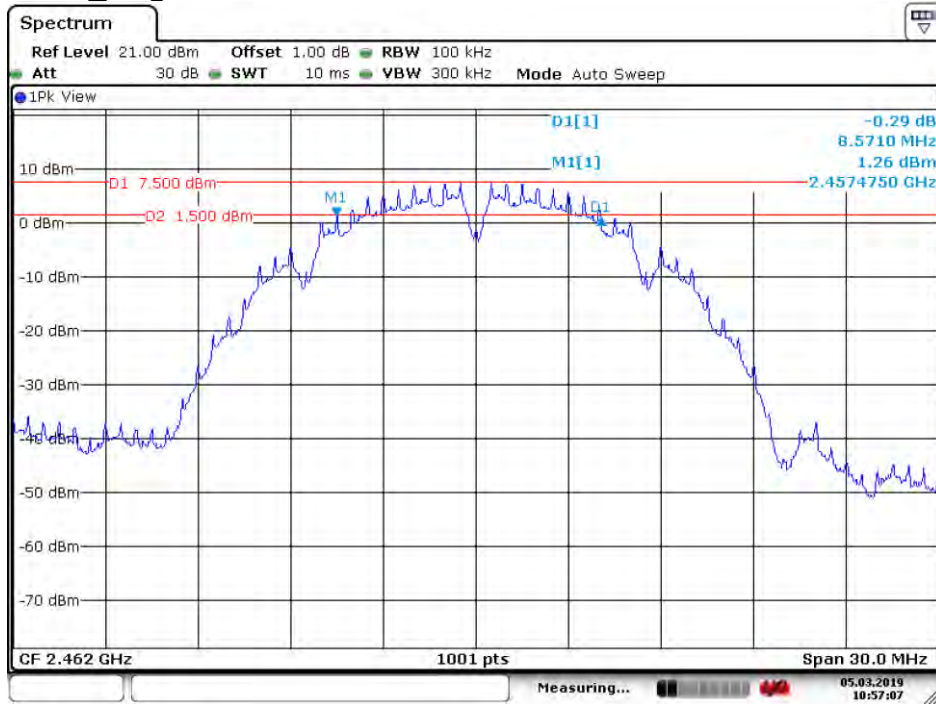
Date: 5.MAR.2019 10:55:48



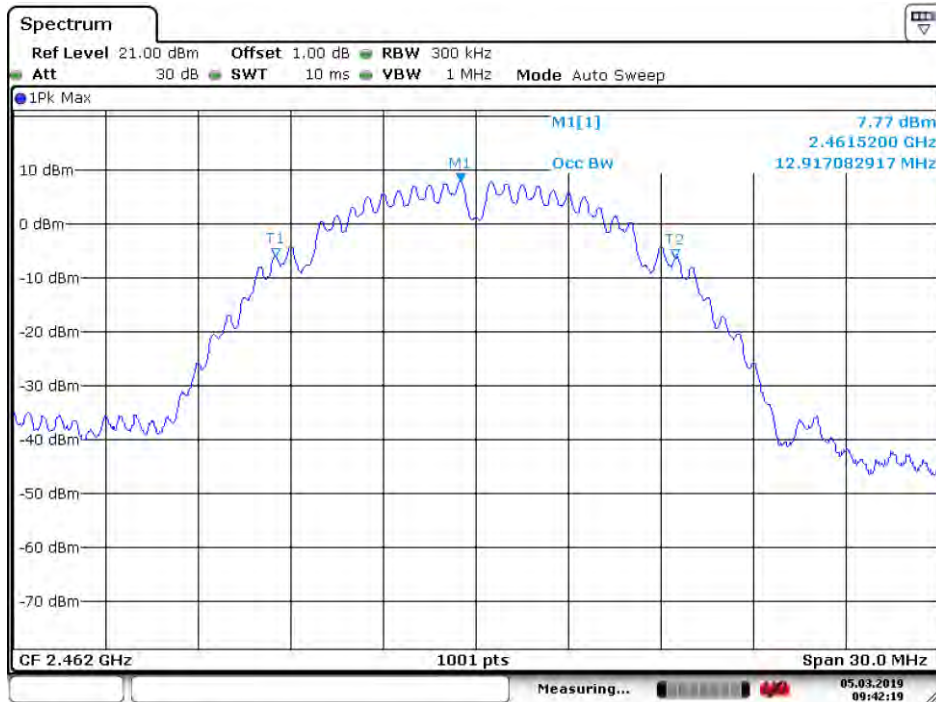
Date: 5.MAR.2019 09:42:49



**4.5.2.1.3 802.11B\_Highest Channel**



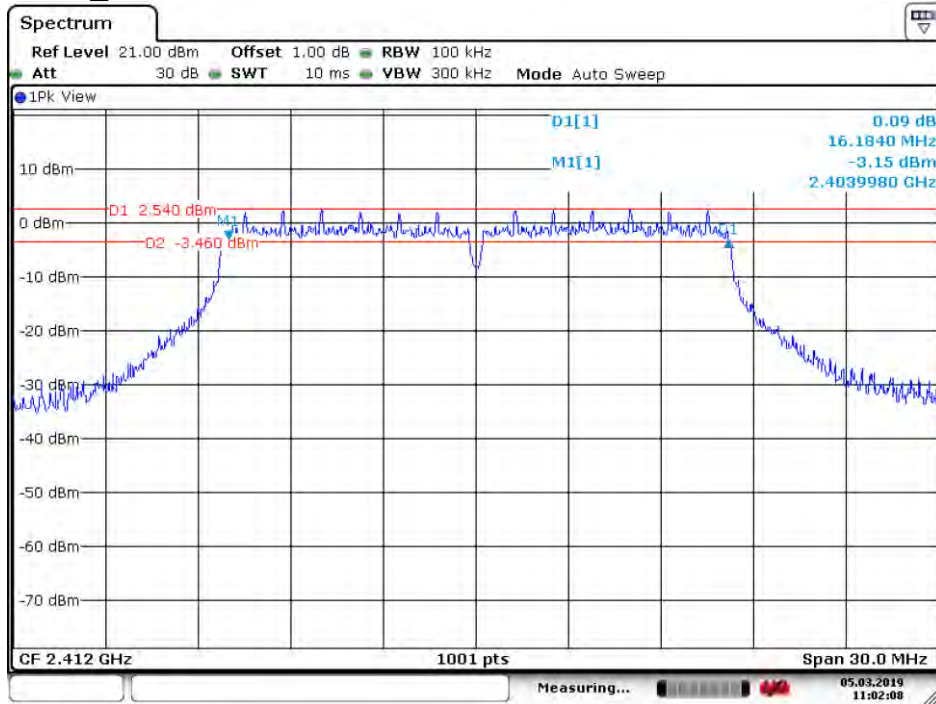
Date: 5.MAR.2019 10:57:07



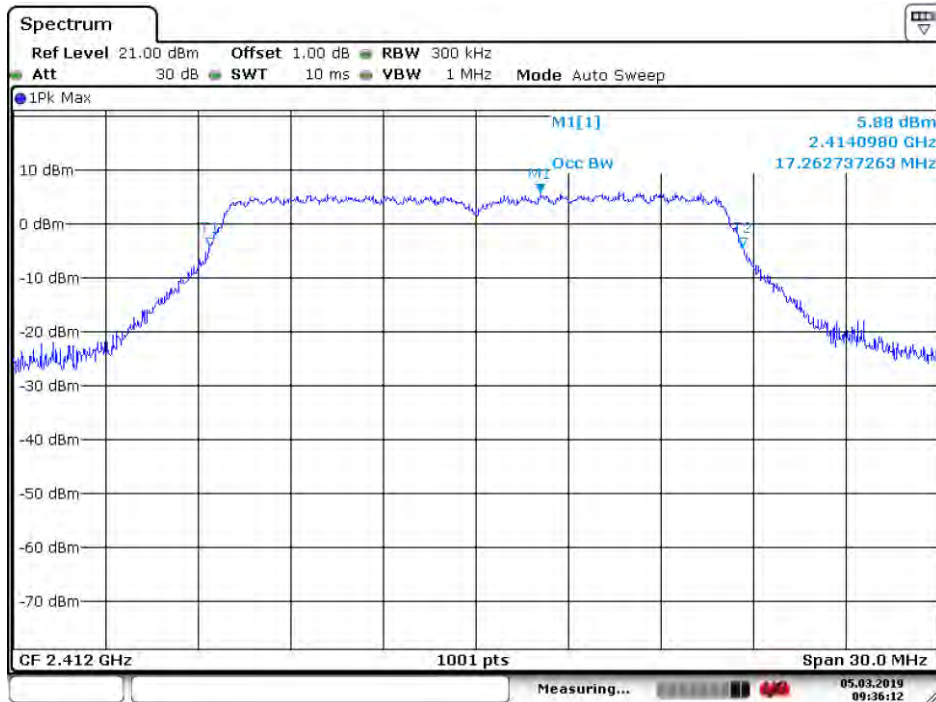
Date: 5.MAR.2019 09:42:19



**4.5.2.1.4 802.11G\_Lowest Channel**



Date: 5.MAR.2019 11:02:08

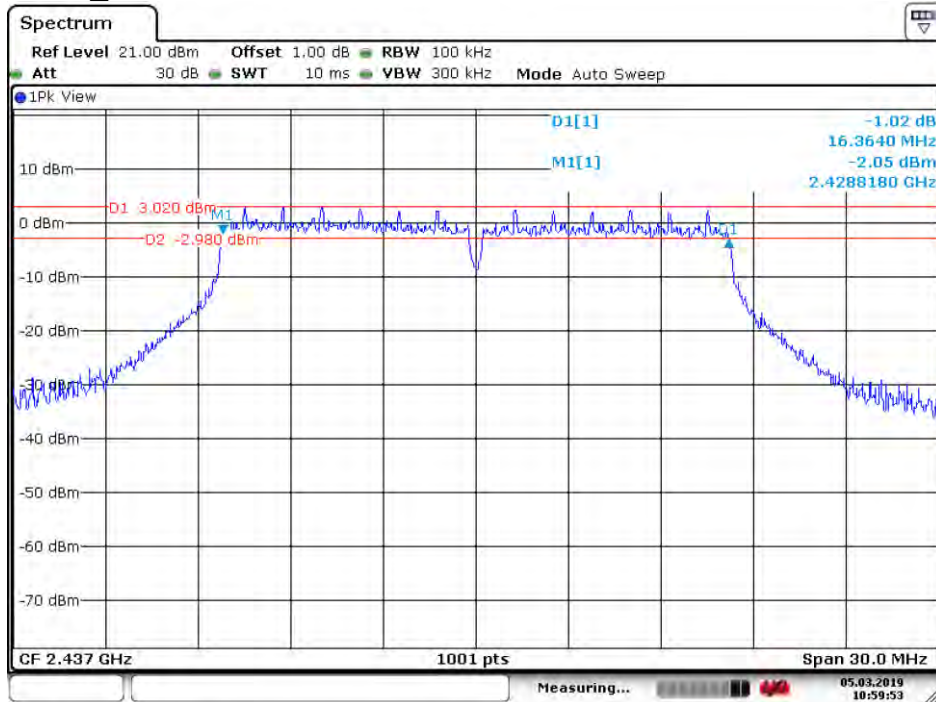


Date: 5.MAR.2019 09:36:13

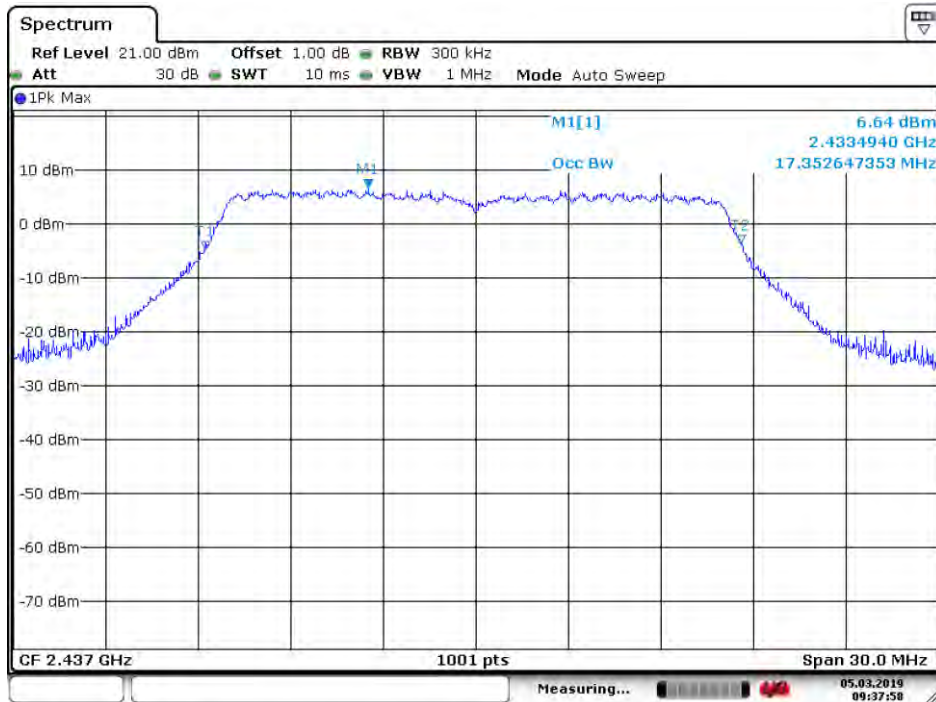


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### 4.5.2.1.5 802.11G\_Middle Channel



Date: 5.MAR.2019 10:59:54

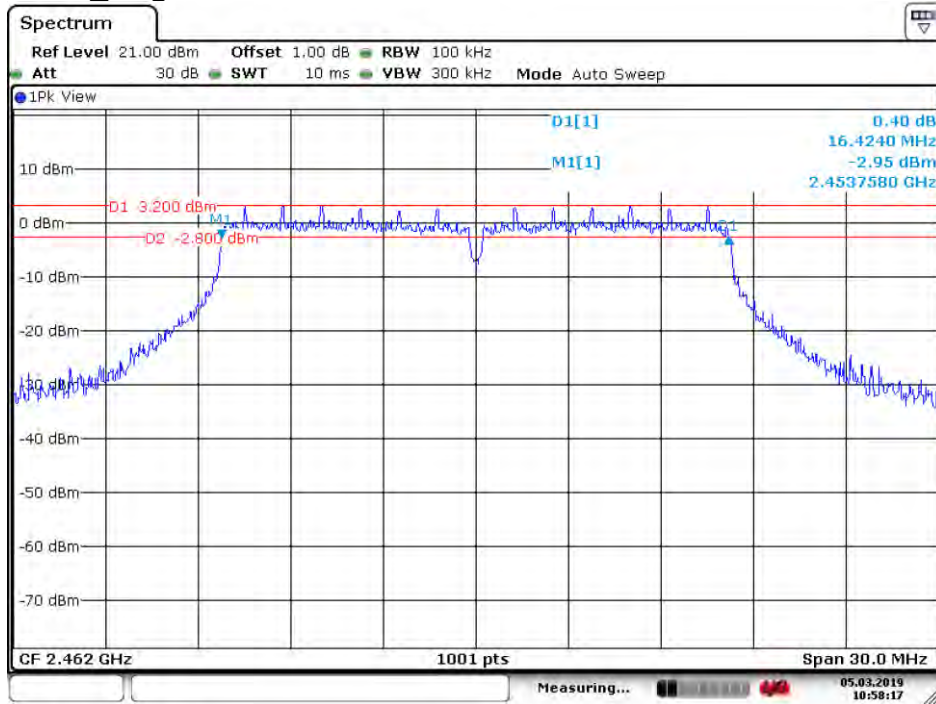


Date: 5.MAR.2019 09:37:58



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**4.5.2.1.6 802.11G\_Highest Channel**



Date: 5.MAR.2019 10:58:17



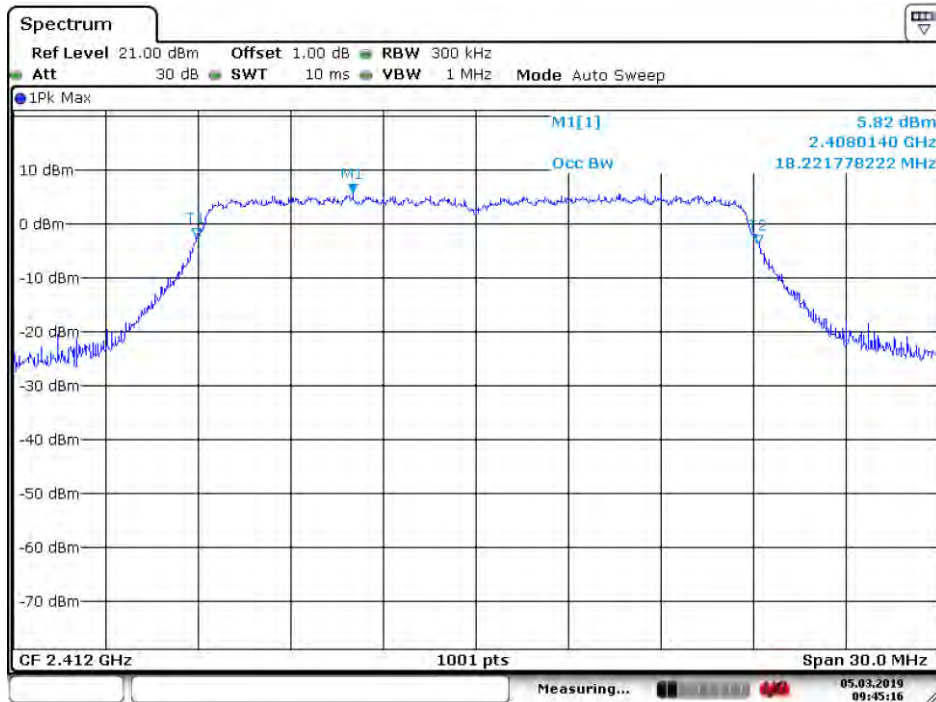
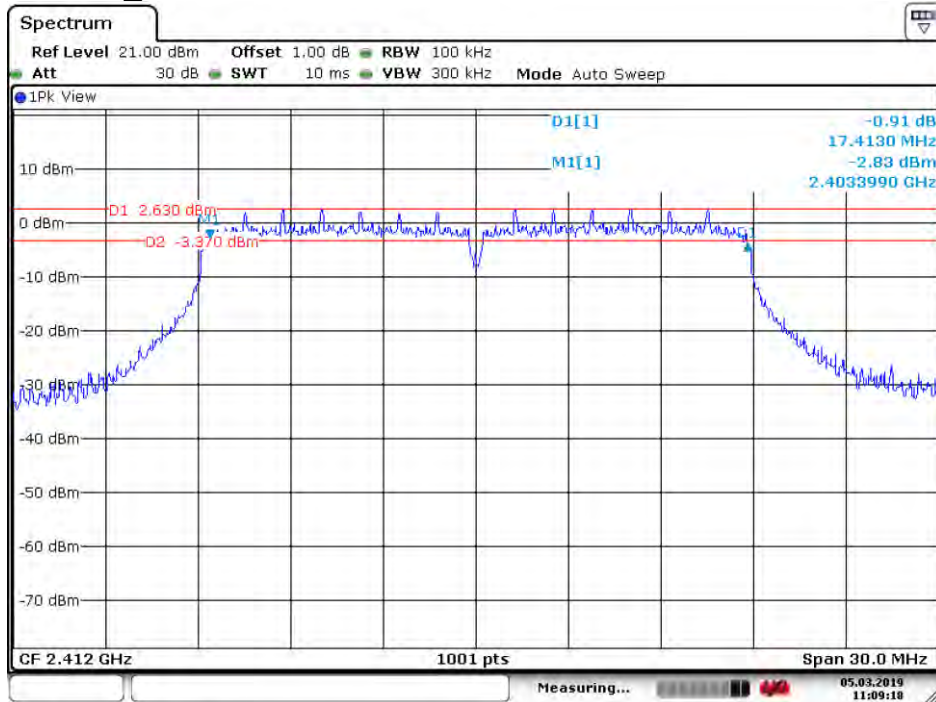
Date: 5.MAR.2019 09:40:01



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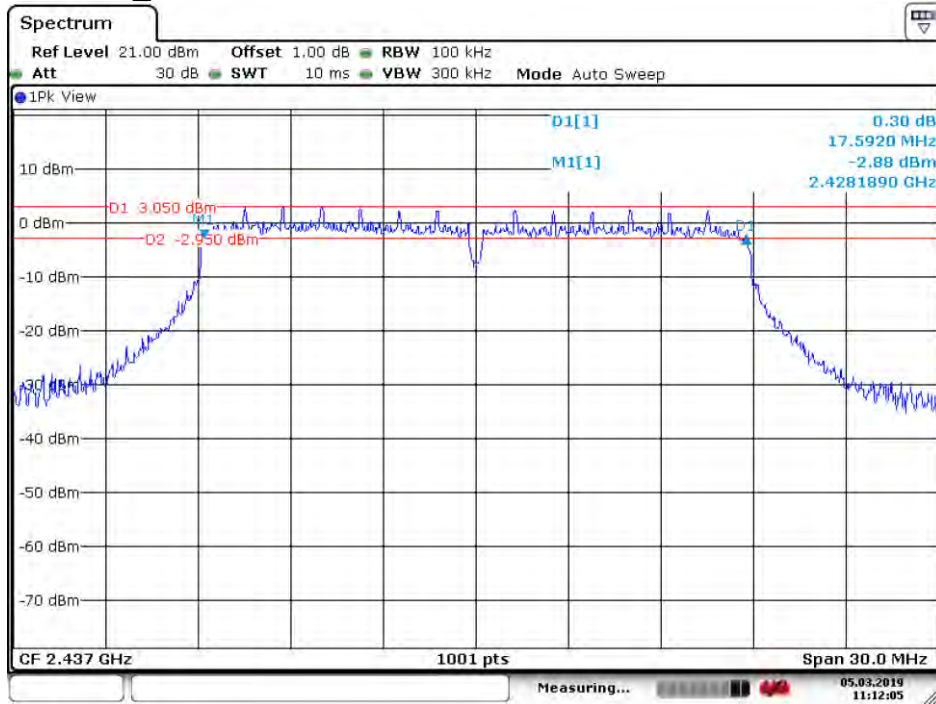


**4.5.2.1.7 802.11N20\_Lowest Channel**

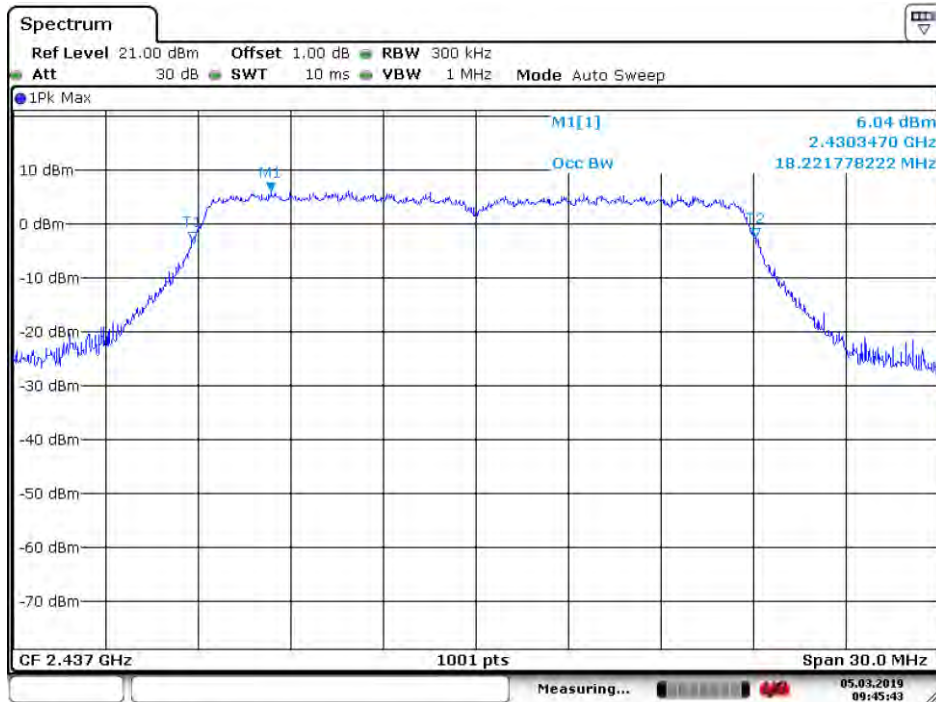


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**4.5.2.1.8 802.11 N20\_ Middle Channel**



Date: 5.MAR.2019 11:12:05

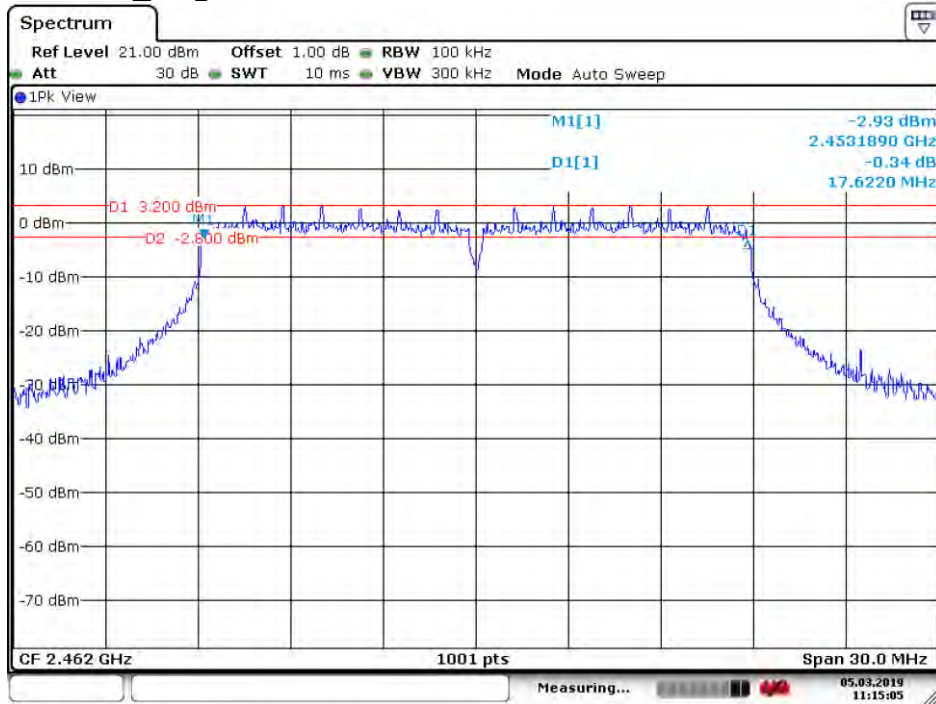


Date: 5.MAR.2019 09:45:43

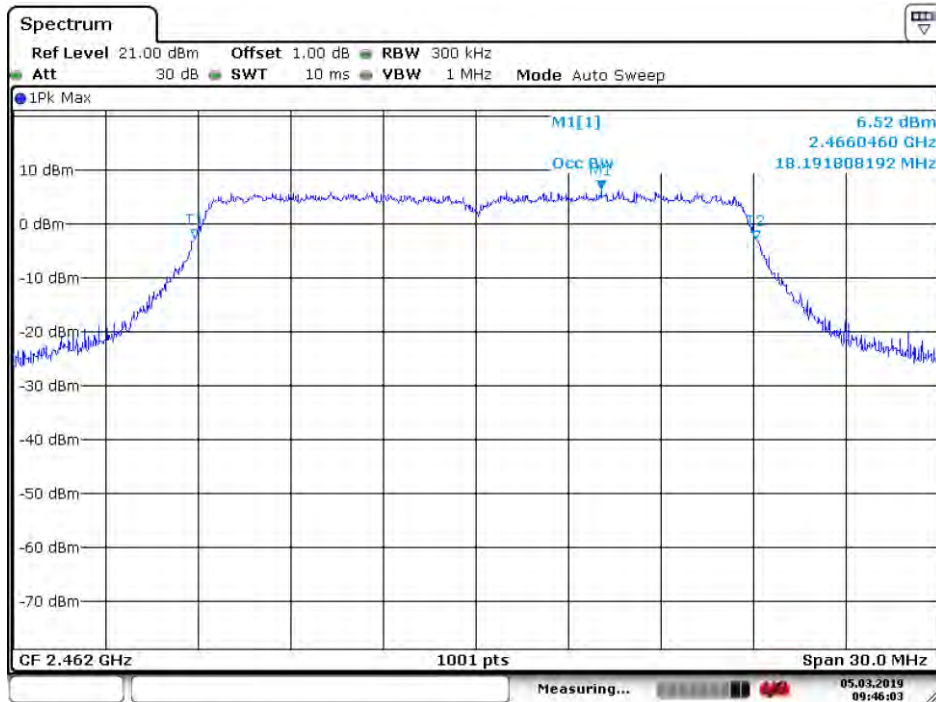


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**4.5.2.1.9 802.11 N20\_ Highest Channel**



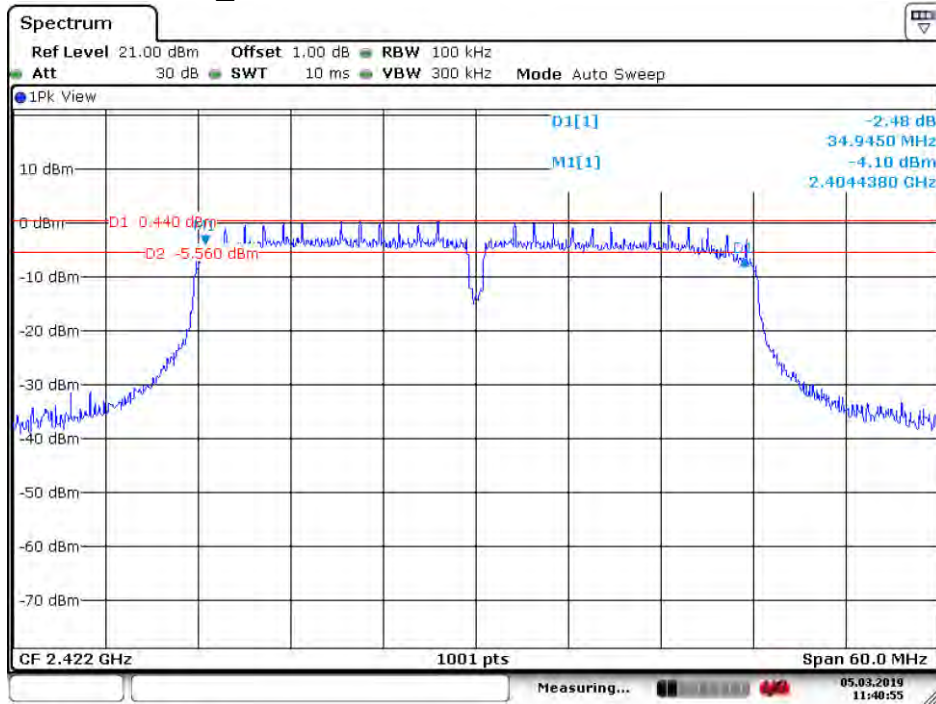
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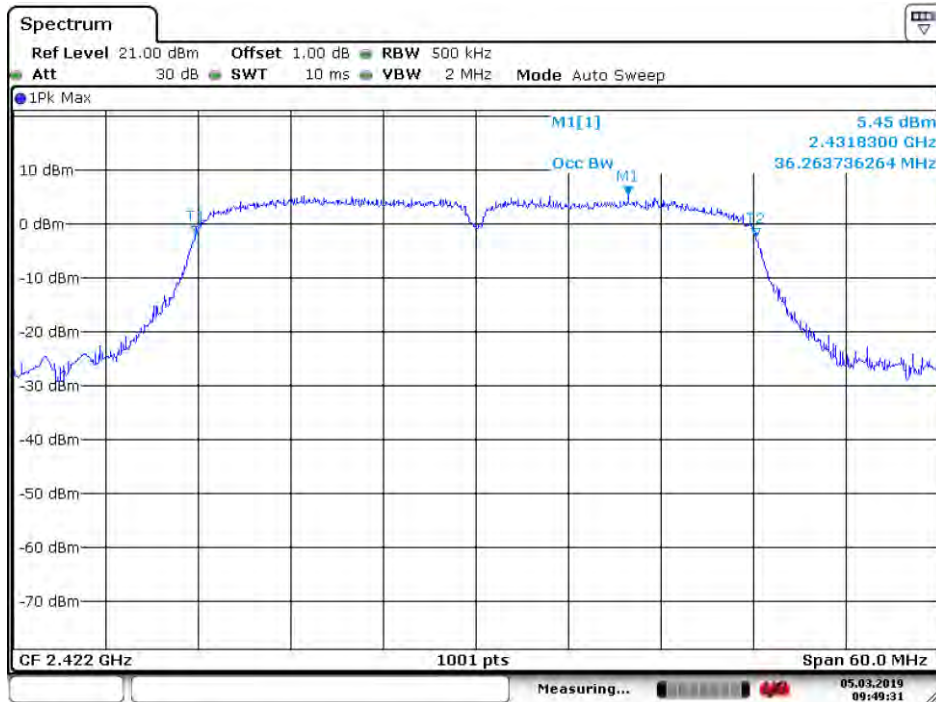
Date: 5.MAR.2019 09:46:03



**4.5.2.1.10 802.11N40\_Lowest Channel**



Date: 5.MAR.2019 11:40:55

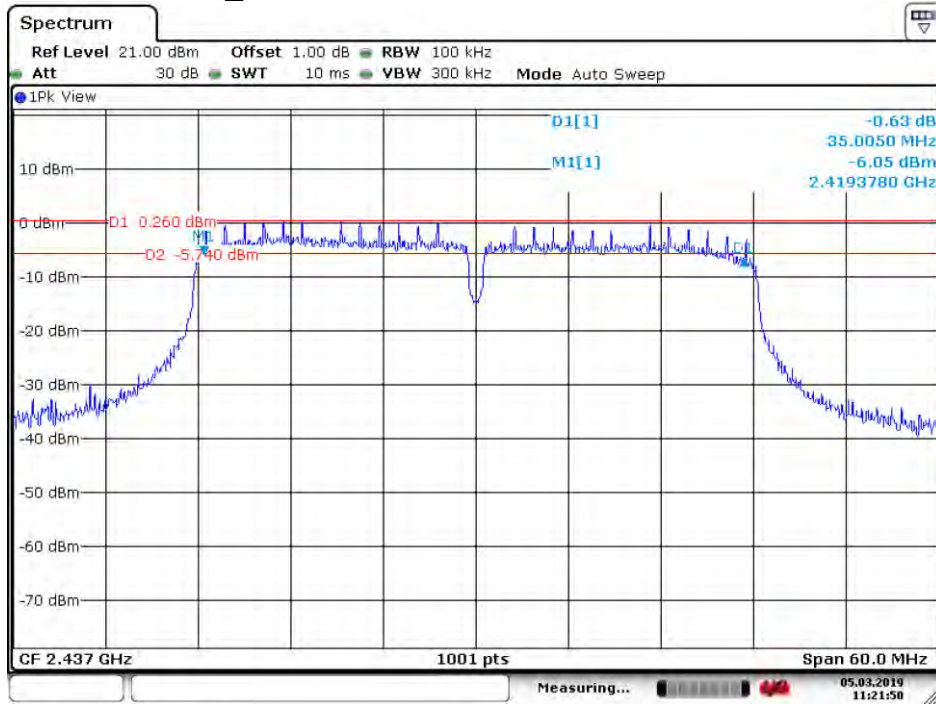


Date: 5.MAR.2019 09:49:32

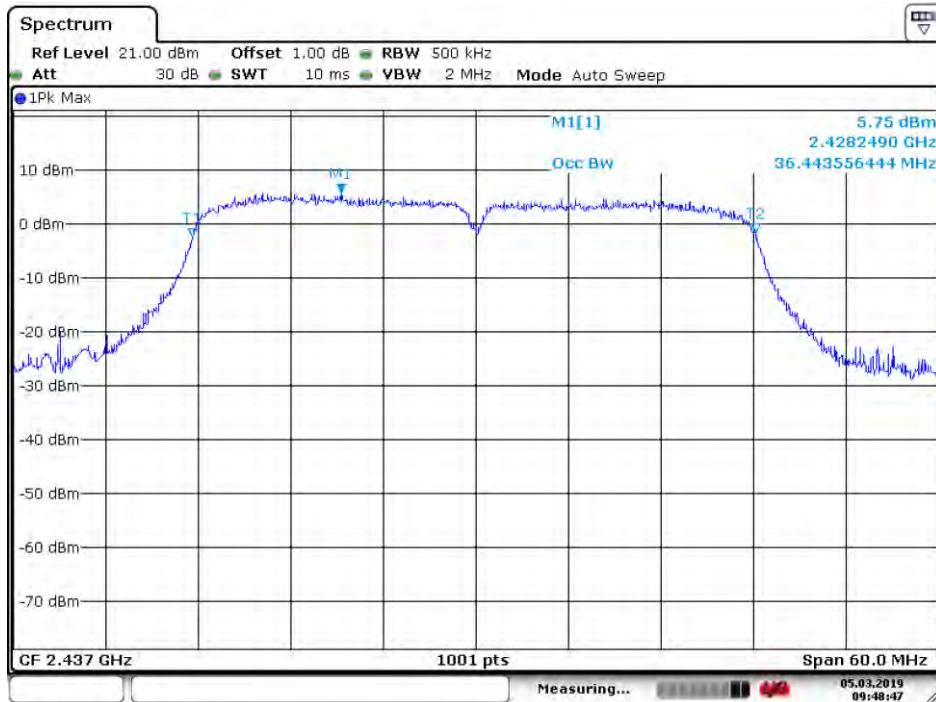


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**4.5.2.1.11 802.11 N40\_ Middle Channel**



Date: 5.MAR.2019 11:21:51

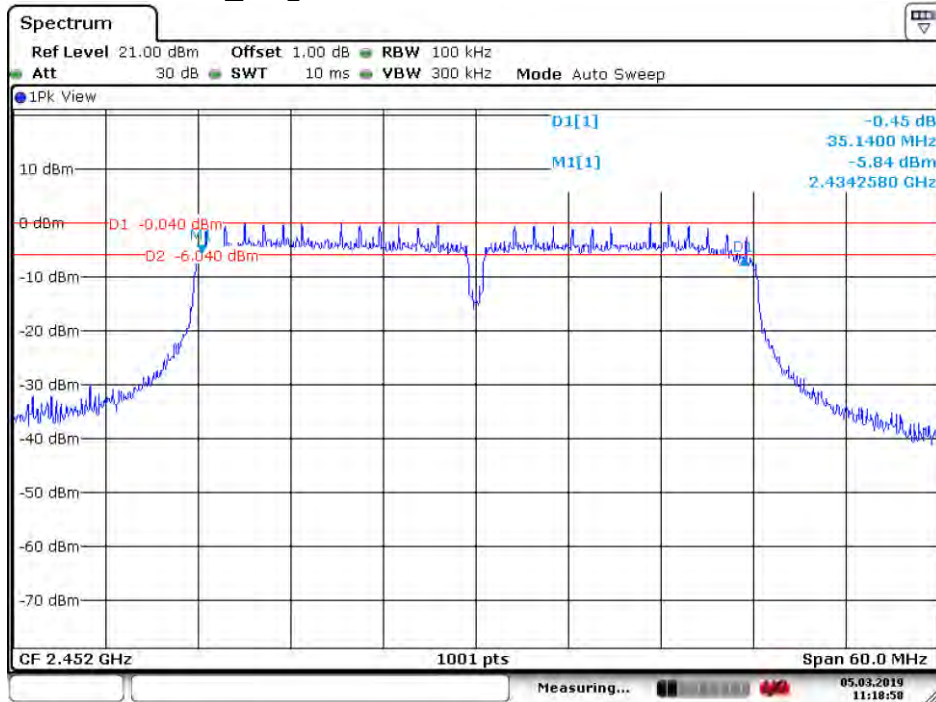


Date: 5.MAR.2019 09:48:47

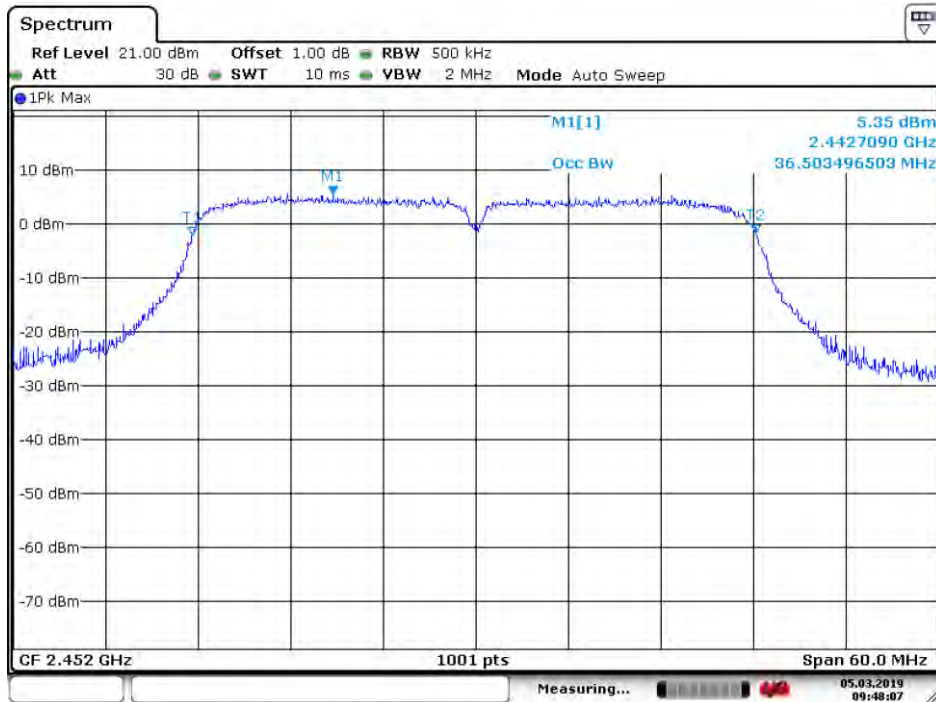


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**4.5.2.1.12 802.11 N40\_ Highest Channel**



Date: 5.MAR.2019 11:18:59



Date: 5.MAR.2019 09:48:07



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## 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	-5.83	≤8.00	Pass
	Middle	-5.12	≤8.00	Pass
	Highest	-4.35	≤8.00	Pass
802.11G	Lowest	-8.22	≤8.00	Pass
	Middle	-9.06	≤8.00	Pass
	Highest	-8.41	≤8.00	Pass
802.11N20	Lowest	-9.94	≤8.00	Pass
	Middle	-8.63	≤8.00	Pass
	Highest	-8.94	≤8.00	Pass
802.11N40	Lowest	-13.17	≤8.00	Pass
	Middle	-12.91	≤8.00	Pass
	Highest	-12.53	≤8.00	Pass



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### 4.6.2 Test plots

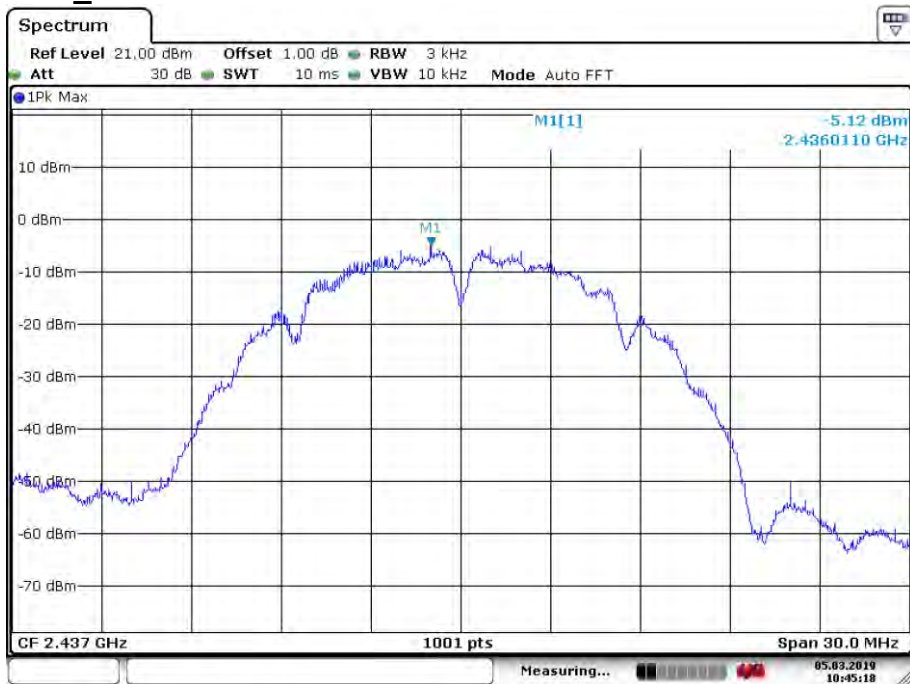
#### 4.6.2.1 ANT1

##### 4.6.2.1.1 802.11B\_Lowest Channel



Date: 5.MAR.2019 10:45:45

##### 4.6.2.1.2 802.11B\_Middle Channel



Date: 5.MAR.2019 10:45:18



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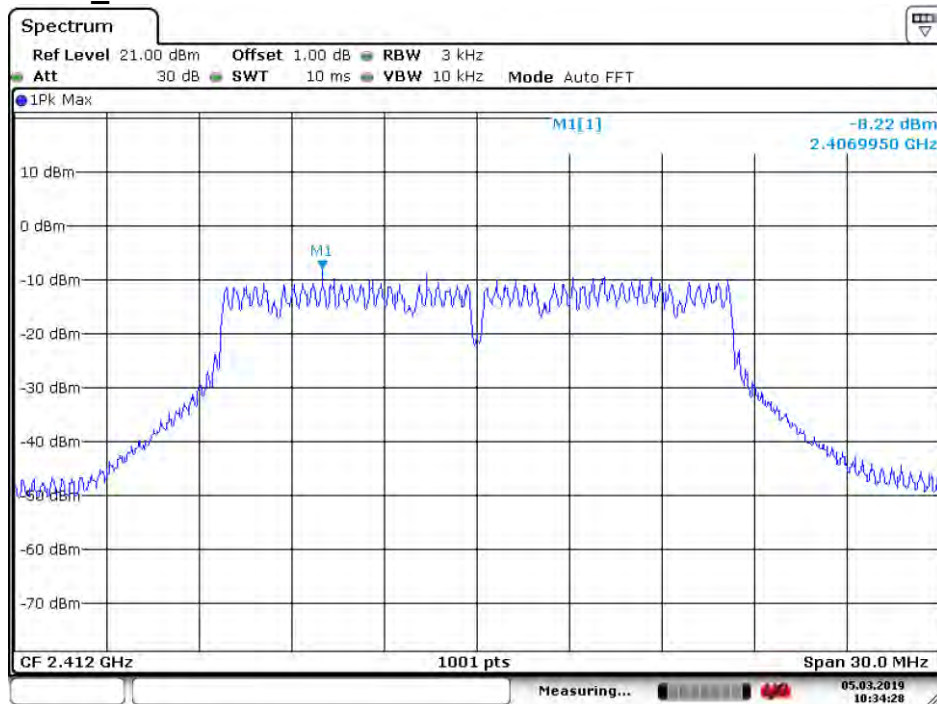


**4.6.2.1.3 802.11B\_Highest Channel**



Date: 5.MAR.2019 10:44:55

**4.6.2.1.4 802.11G\_Lowest Channel**

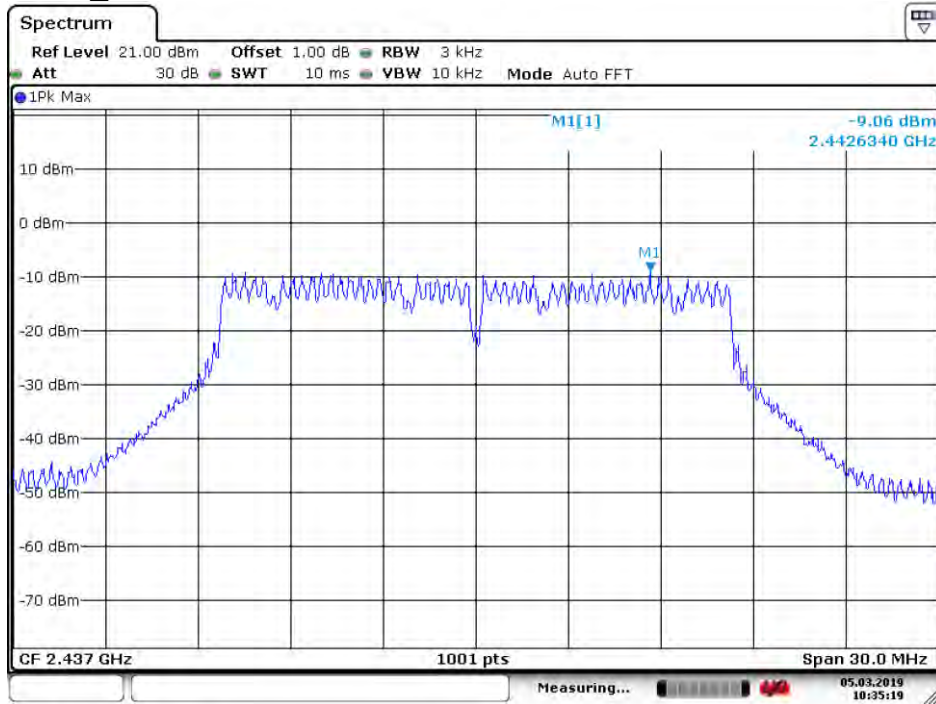


Date: 5.MAR.2019 10:34:29



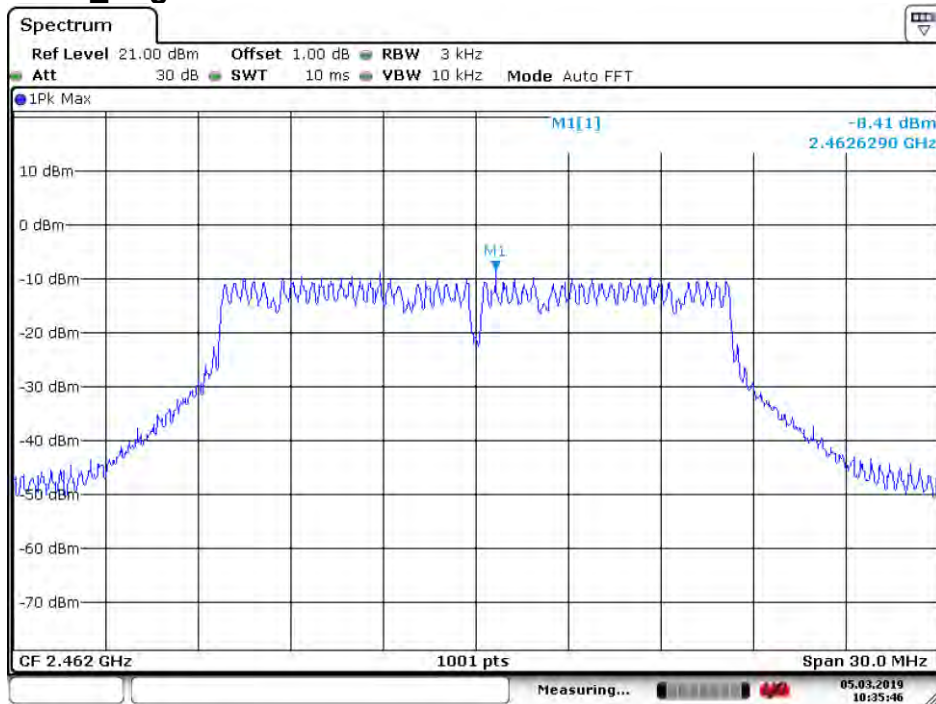
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### 4.6.2.1.5 802.11G\_Middle Channel



Date: 5.MAR.2019 10:35:19

### 4.6.2.1.6 802.11G\_Highest Channel



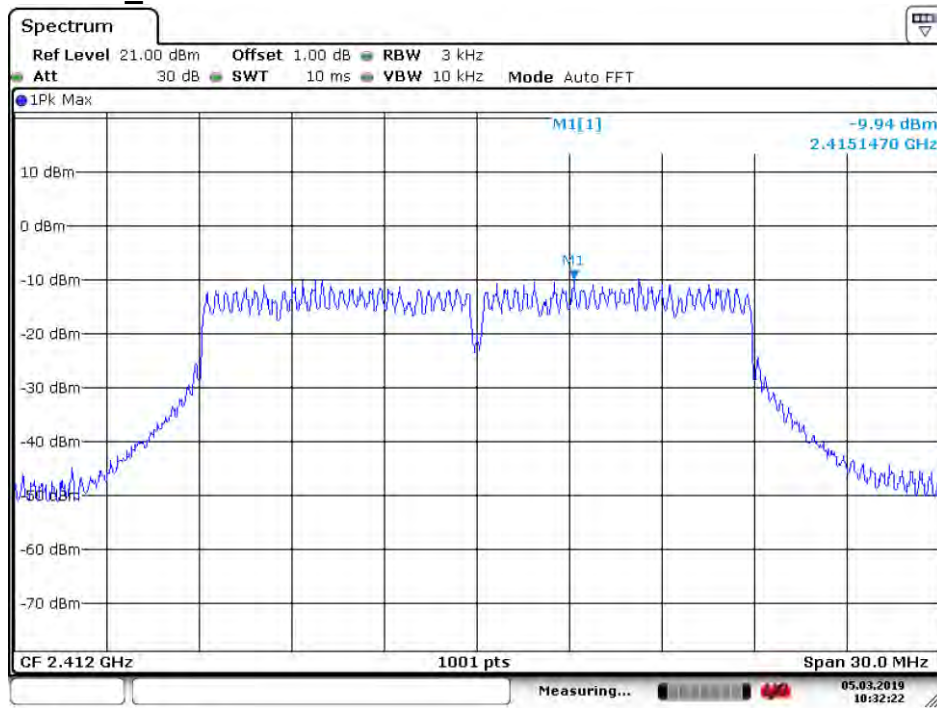
Date: 5.MAR.2019 10:35:46



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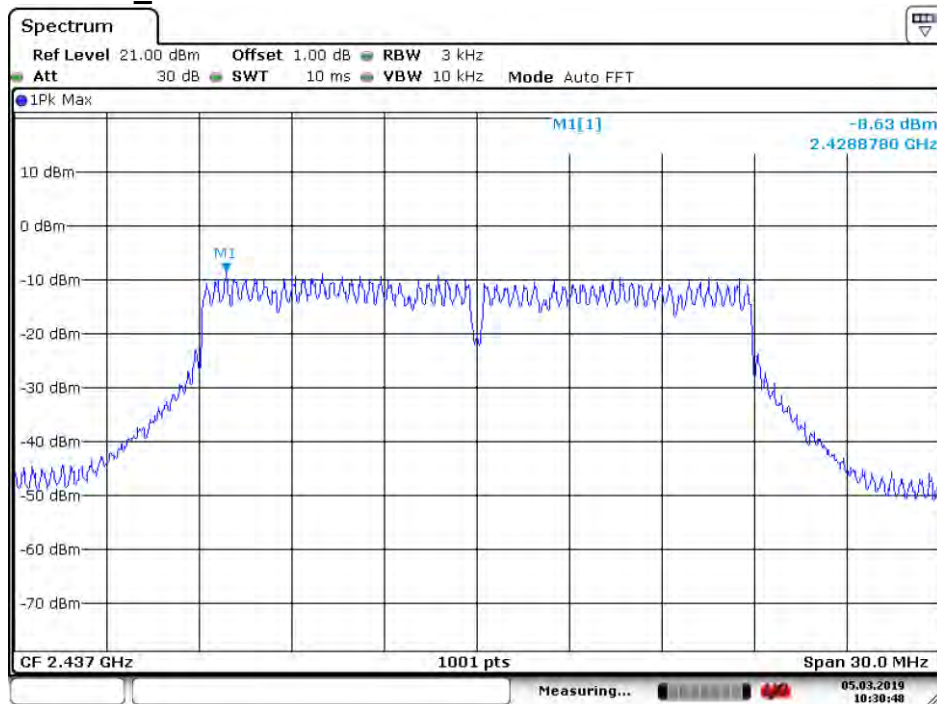
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### 4.6.2.1.7 802.11N20\_Lowest Channel



Date: 5.MAR.2019 10:32:23

### 4.6.2.1.8 802.11 N20\_Middle Channel



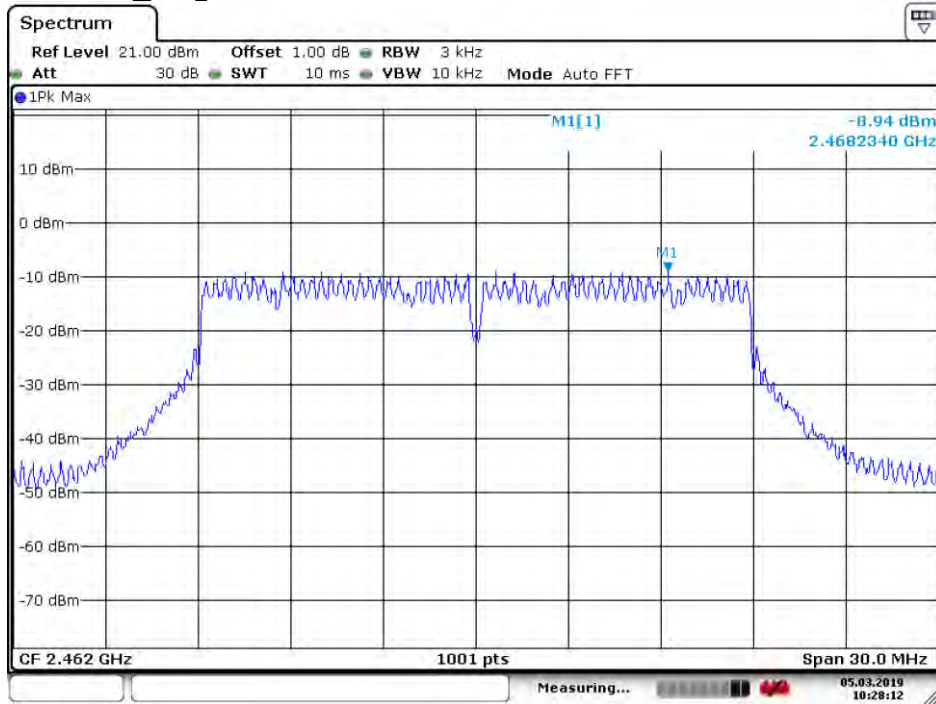
Date: 5.MAR.2019 10:30:49



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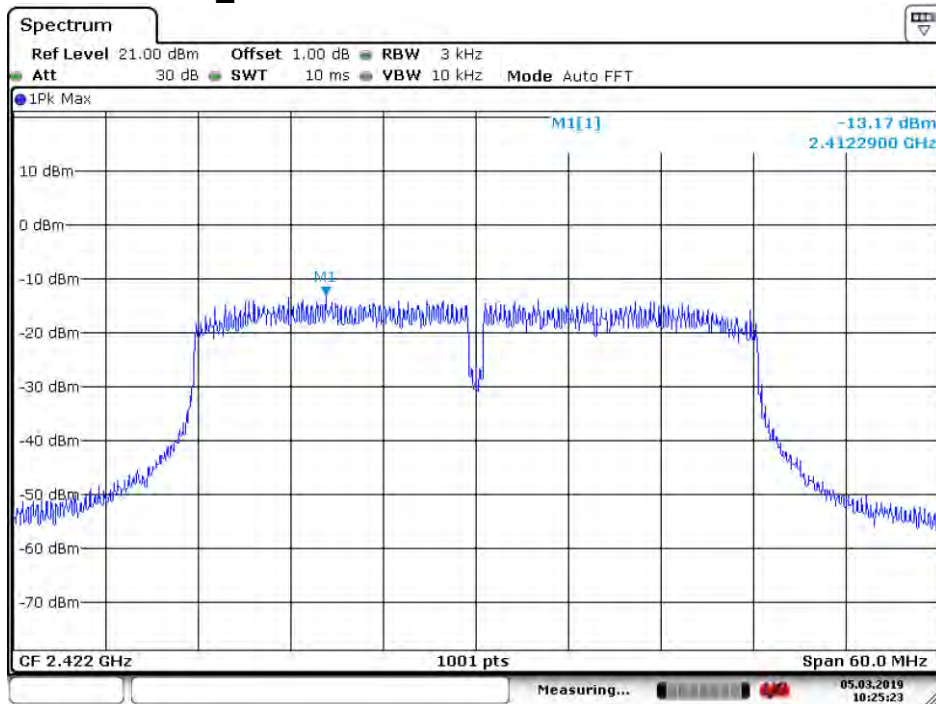
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**4.6.2.1.9 802.11 N20\_ Highest Channel**



Date: 5.MAR.2019 10:28:13

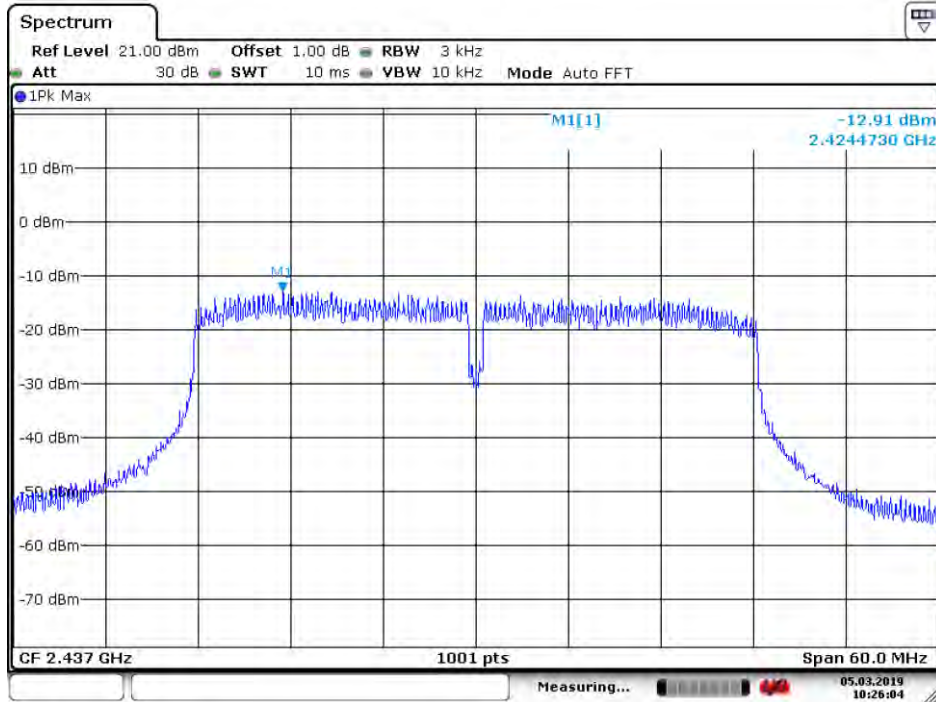
**4.6.2.1.10 802.11N40\_ Lowest Channel**



Date: 5.MAR.2019 10:25:24

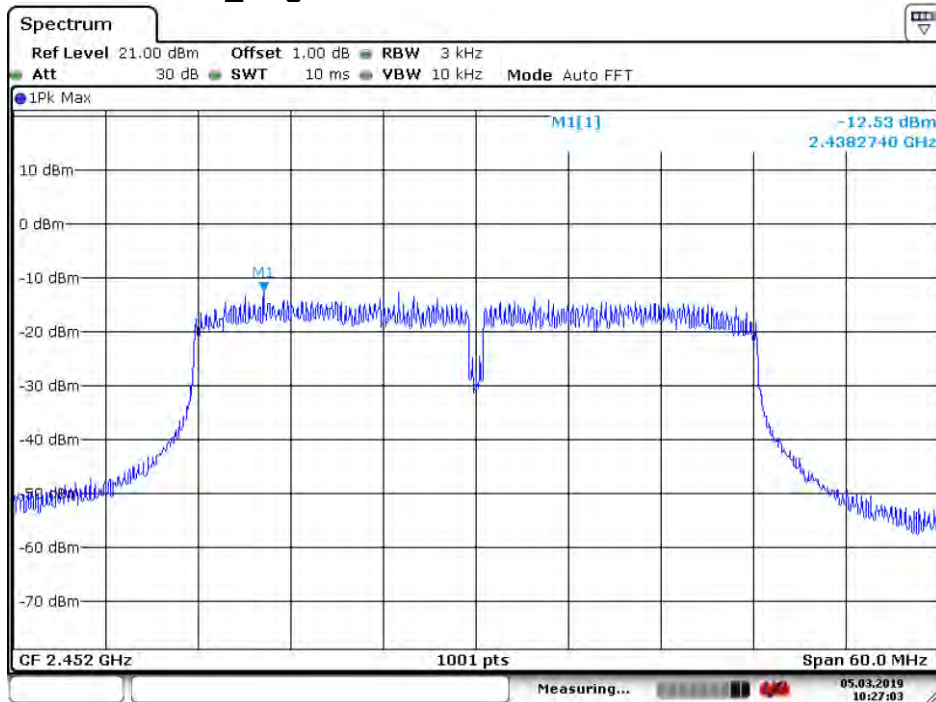


**4.6.2.1.11 802.11 N40\_ Middle Channel**



Date: 5.MAR.2019 10:26:04

**4.6.2.1.12 802.11 N40\_ Highest Channel**



Date: 5.MAR.2019 10:27:03



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### 4.7 Band-edge for RF Conducted Emissions

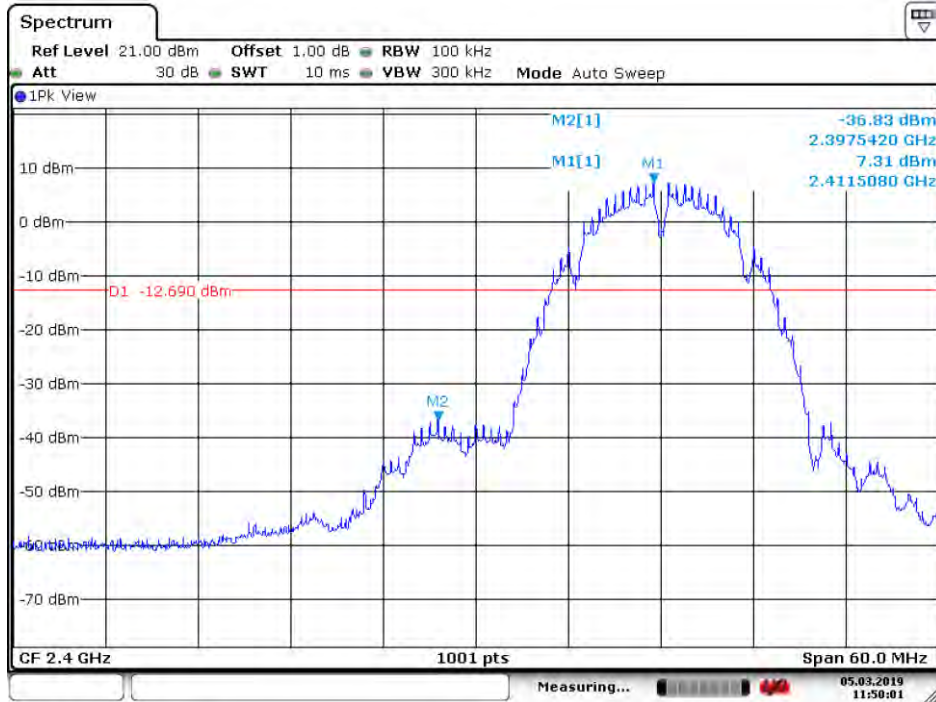
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.13
Test Setup:	<p>The diagram shows a Spectrum Analyzer on the left, connected by a red cable to an E.U.T. (Equipment Under Test) on the right. Both are placed on a Non-Conducted Table. Below the table is a 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



### 4.7.1 Test plots

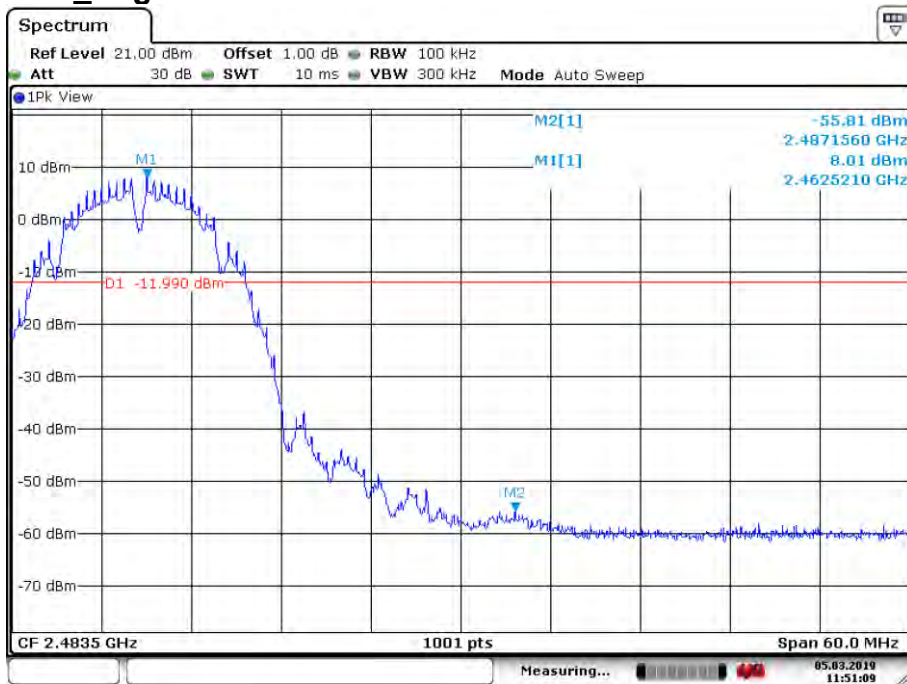
#### 4.7.1.1 ANT1

##### 4.7.1.1.1 802.11B\_Lowest Channel



Date: 5.MAR.2019 11:50:01

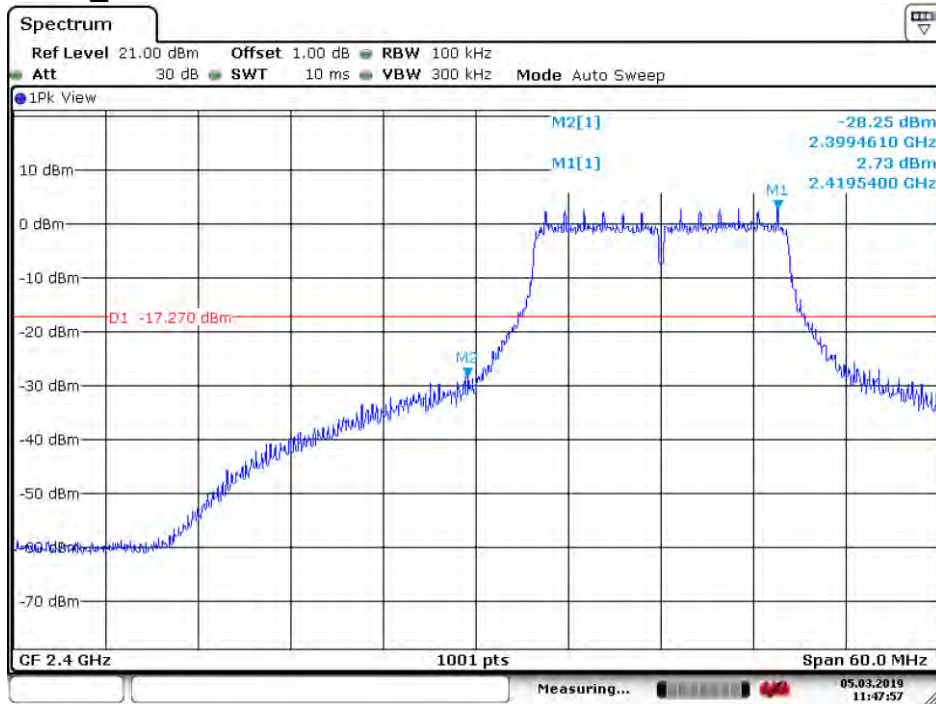
##### 4.7.1.1.2 802.11B\_Highest Channel



Date: 5.MAR.2019 11:51:08

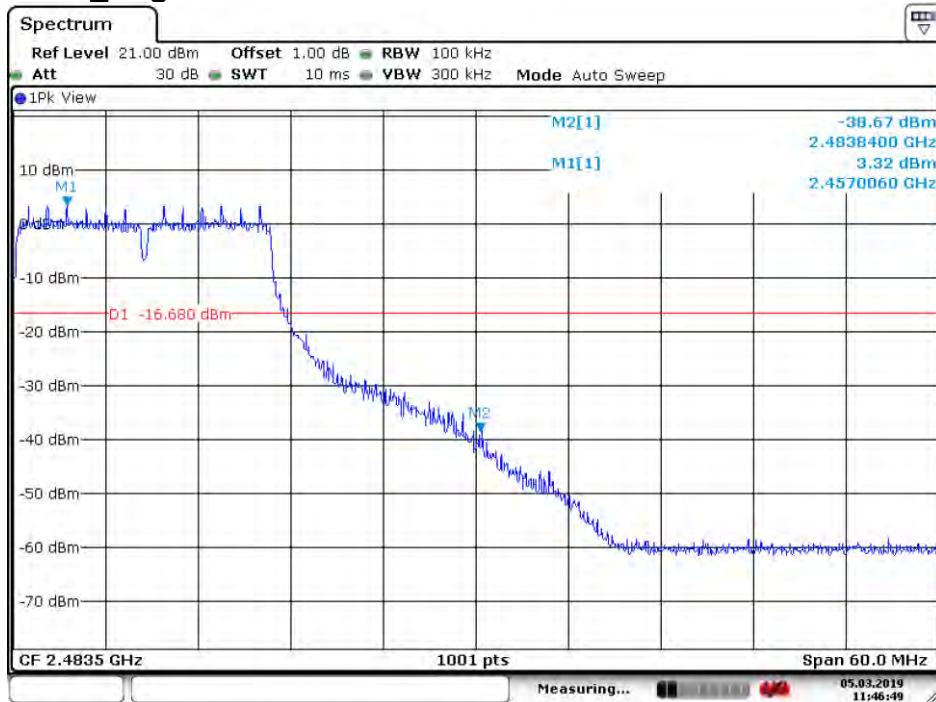


**4.7.1.1.3 802.11G\_Lowest Channel**



Date: 5.MAR.2019 11:47:57

**4.7.1.1.4 802.11G\_Highest Channel**



Date: 5.MAR.2019 11:46:49

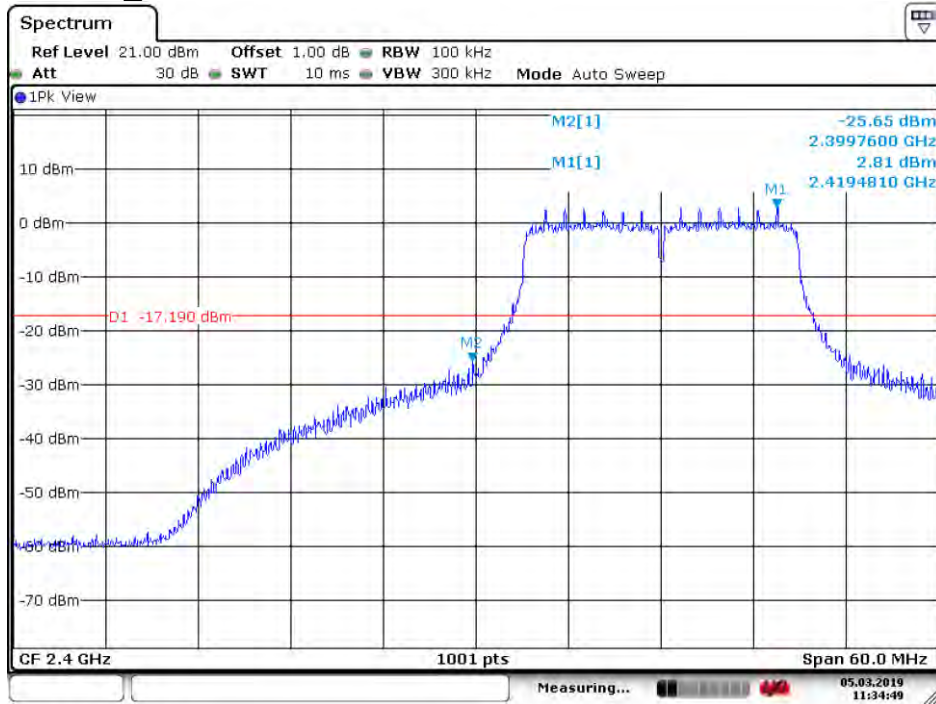


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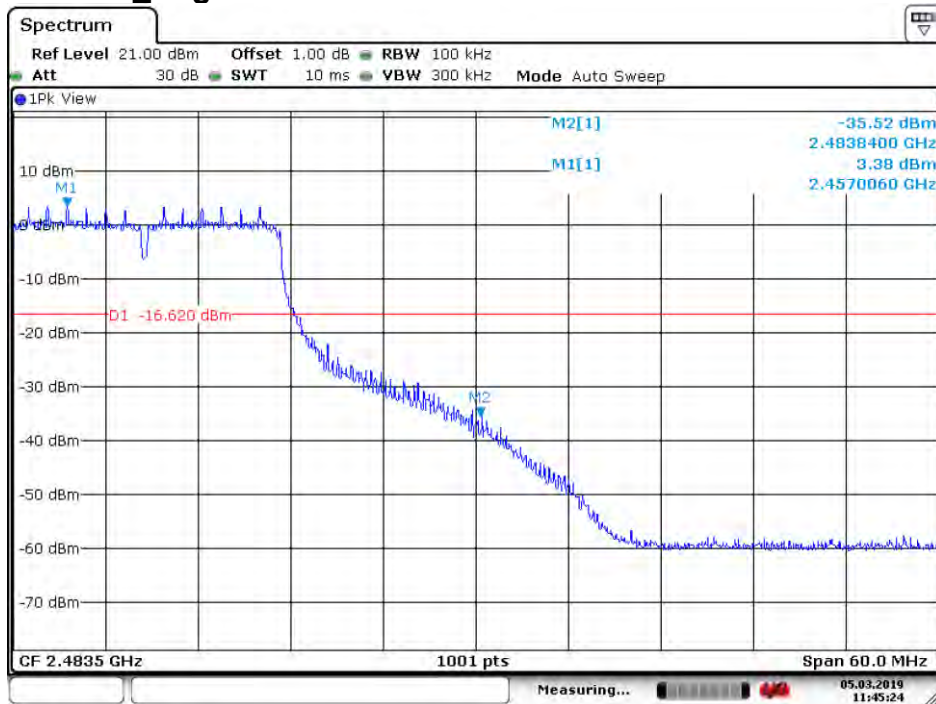


**4.7.1.1.5 802.11N20\_ Lowest Channel**



Date: 5.MAR.2019 11:34:49

**4.7.1.1.6 802.11 N20\_ Highest Channel**



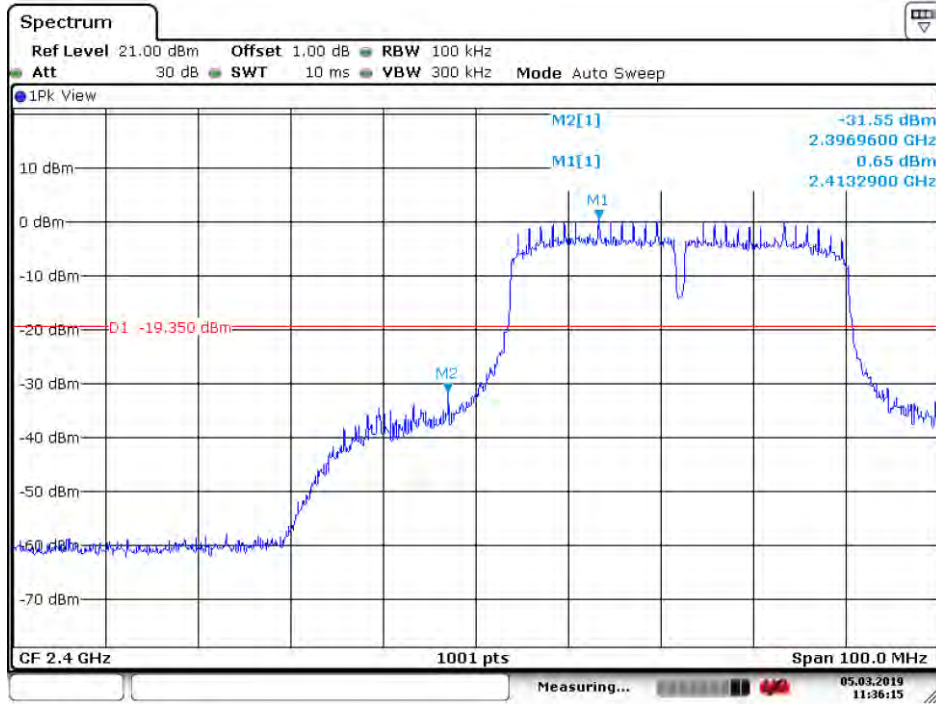
Date: 5.MAR.2019 11:45:24



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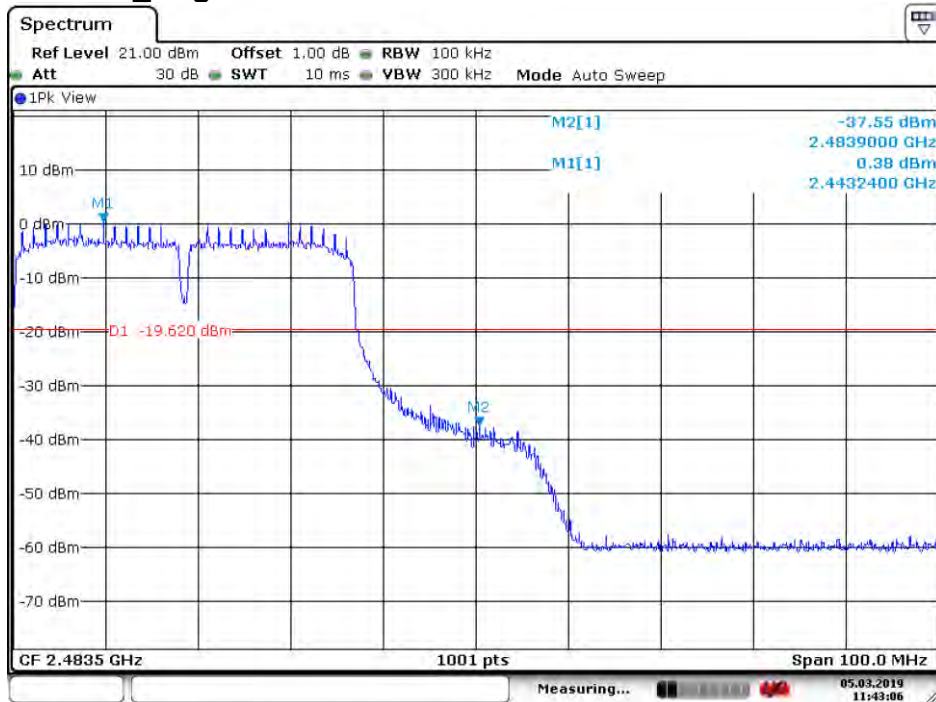
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**4.7.1.1.7 802.11N40\_Lowest Channel**



Date: 5.MAR.2019 11:36:16

**4.7.1.1.8 802.11 N40\_Highest Channel**



Date: 5.MAR.2019 11:43:06



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### 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



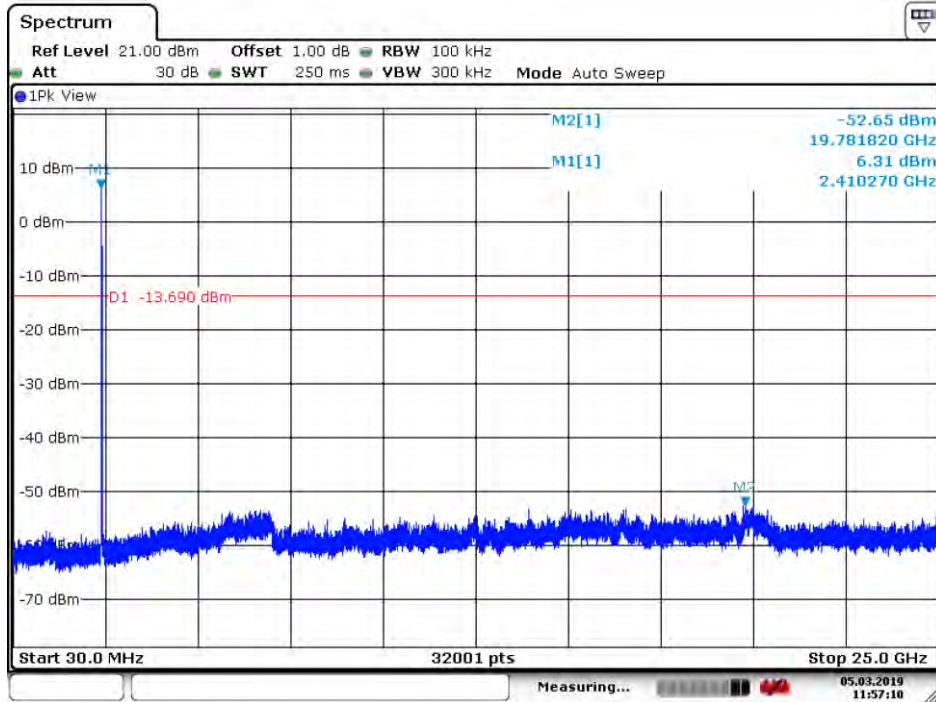
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### 4.8.1 Test plots

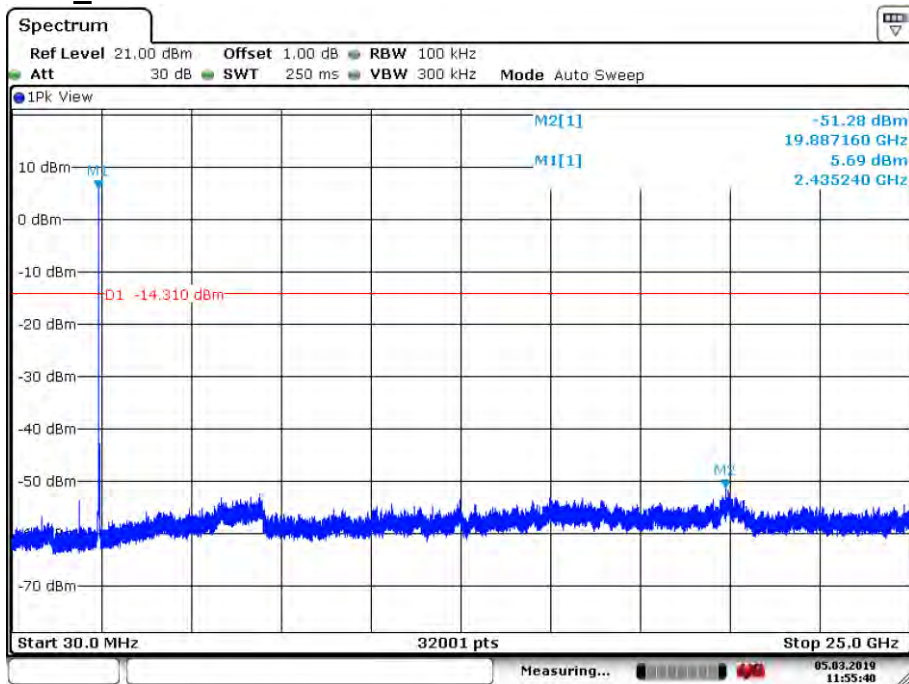
#### 4.8.1.1 ANT1

##### 4.8.1.1.1 802.11B\_Lowest Channel



Date: 5.MAR.2019 11:57:10

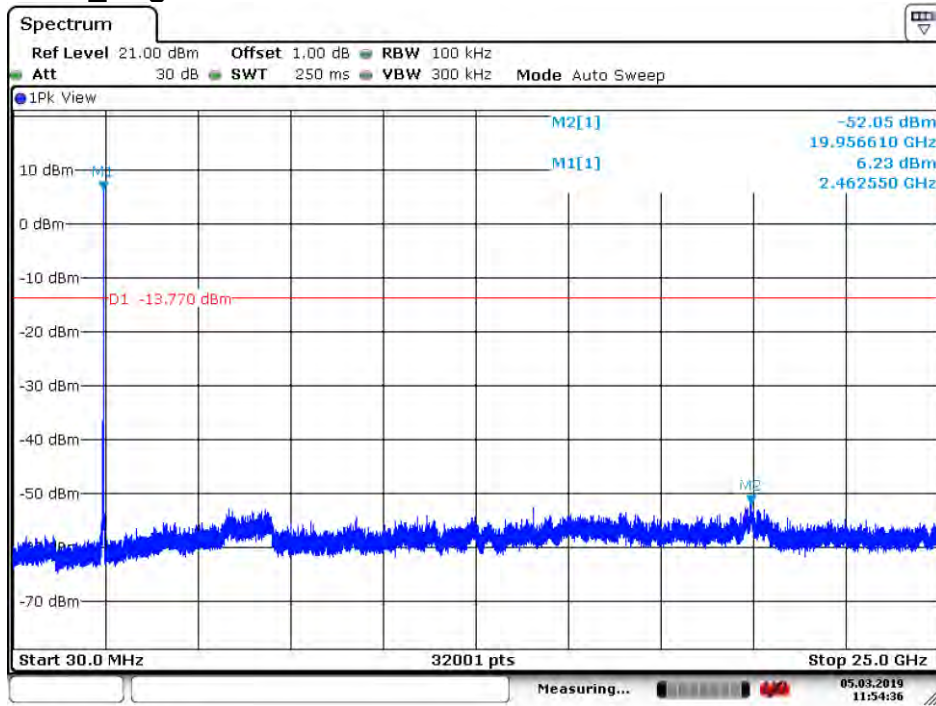
##### 4.8.1.1.2 802.11B\_Middle Channel



Date: 5.MAR.2019 11:55:41

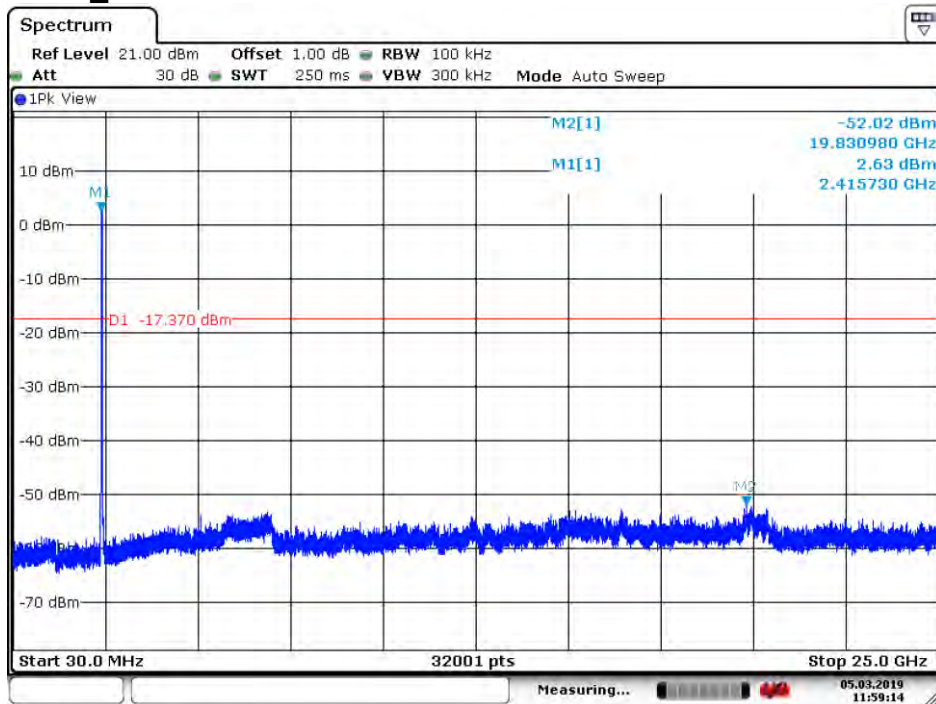


### 4.8.1.1.3 802.11B\_Highest Channel



Date: 5.MAR.2019 11:54:37

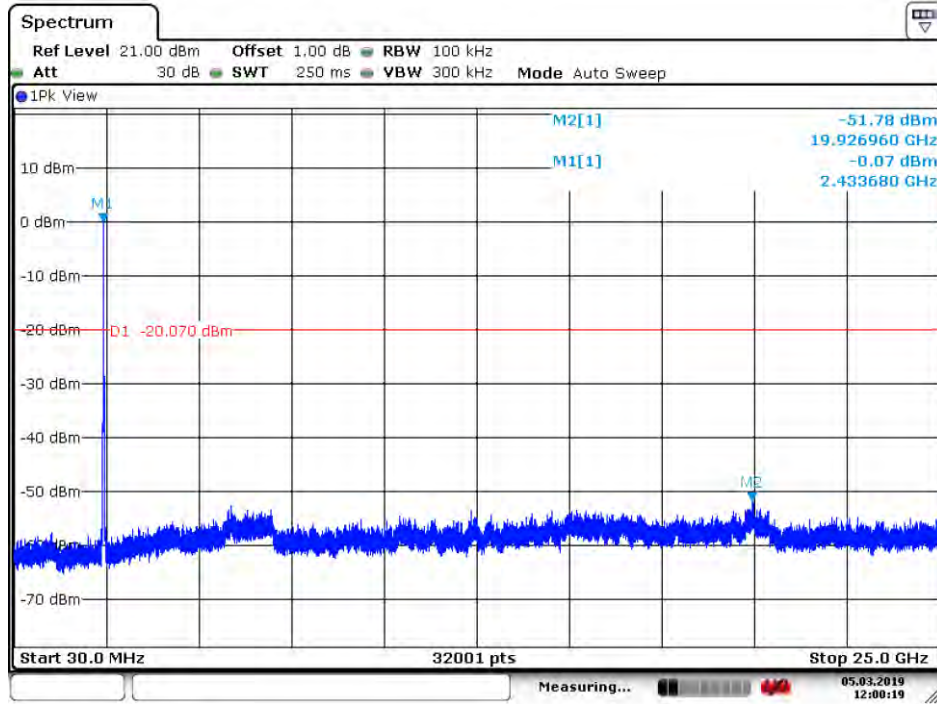
### 4.8.1.1.4 802.11G\_Lowest Channel



Date: 5.MAR.2019 11:59:14

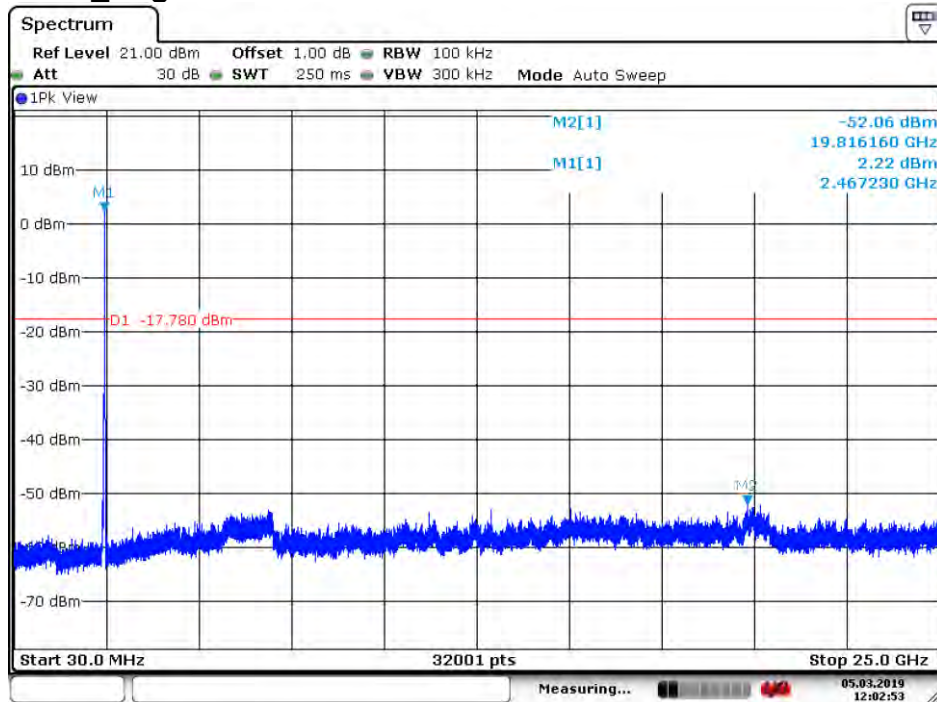


**4.8.1.1.5 802.11G\_ Middle Channel**



Date: 5. MAR.2019 12:00:19

**4.8.1.1.6 802.11G\_ Highest Channel**



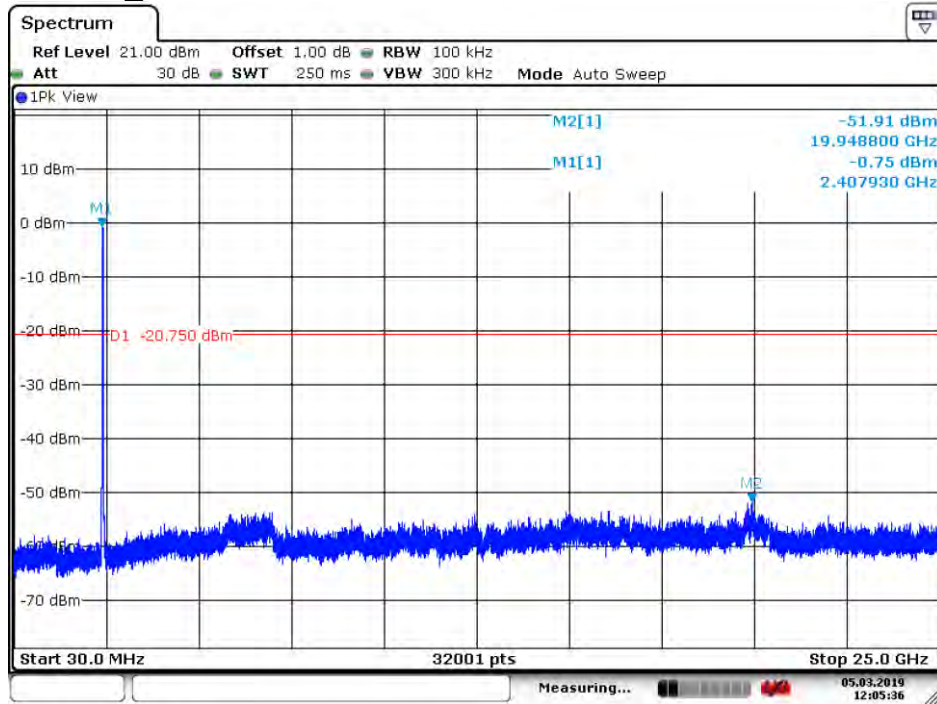
Date: 5. MAR.2019 12:02:53



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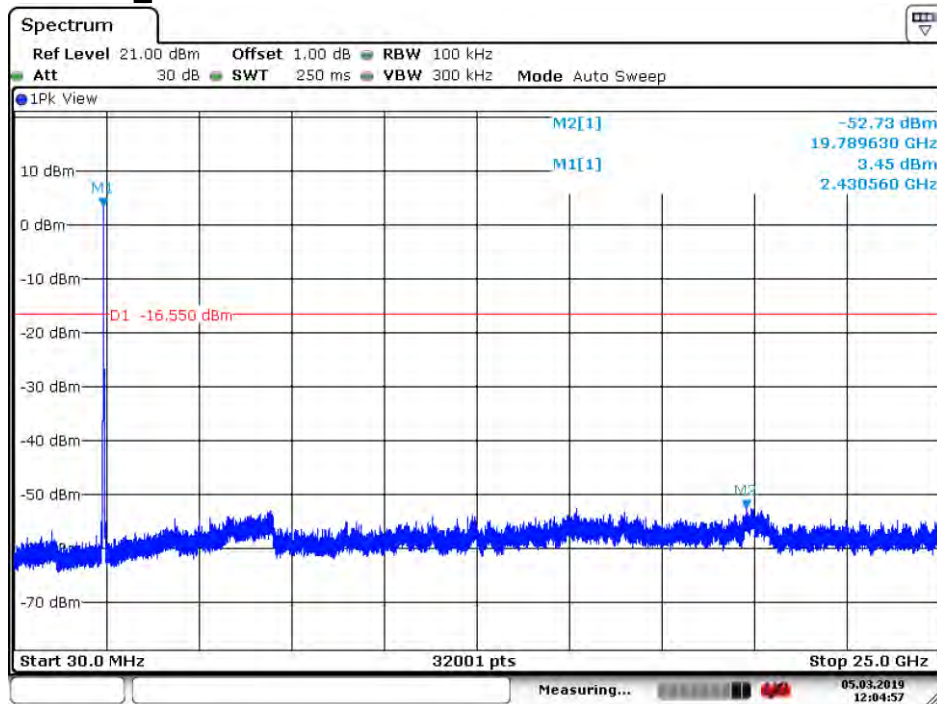
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**4.8.1.1.7 802.11N20\_ Lowest Channel**



Date: 5.MAR.2019 12:05:36

**4.8.1.1.8 802.11 N20\_ Middle Channel**

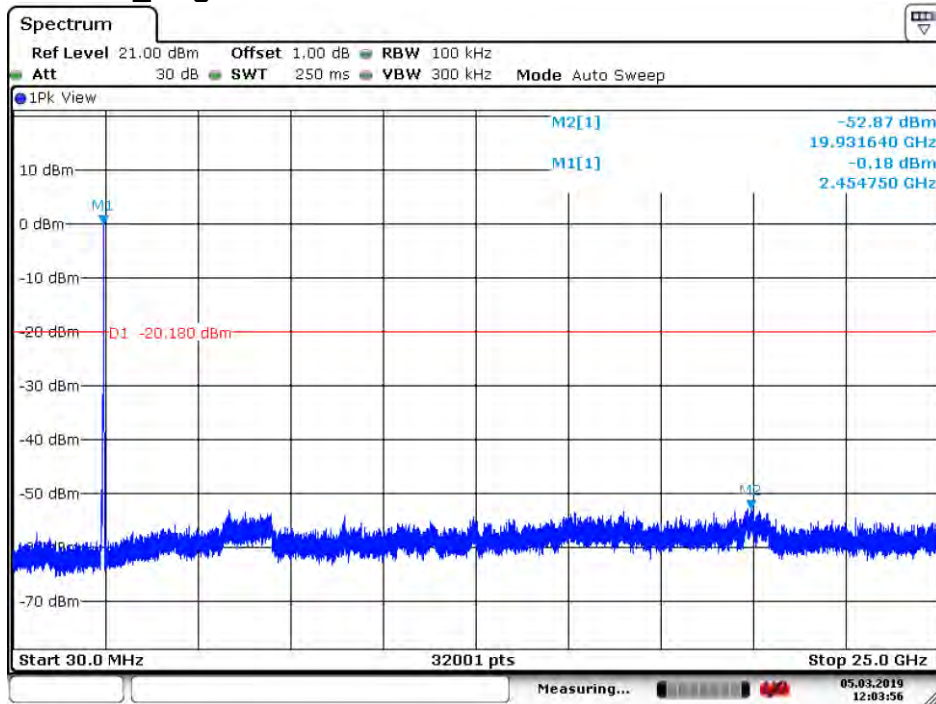


Date: 5.MAR.2019 12:04:58



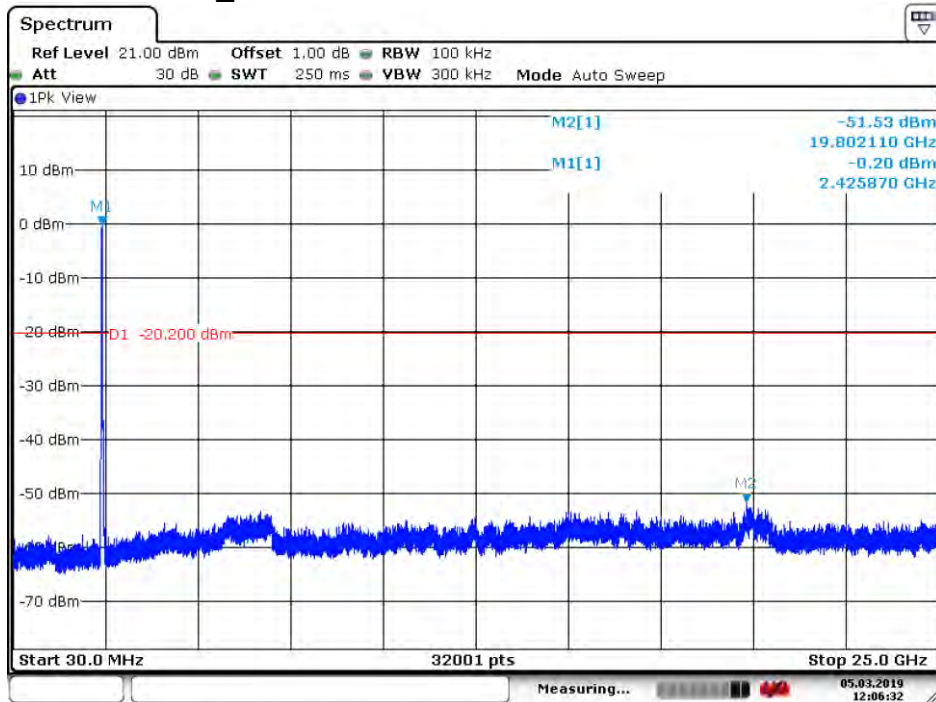
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**4.8.1.1.9 802.11 N20\_ Highest Channel**



Date: 5.MAR.2019 12:03:57

**4.8.1.1.10 802.11N40\_ Lowest Channel**



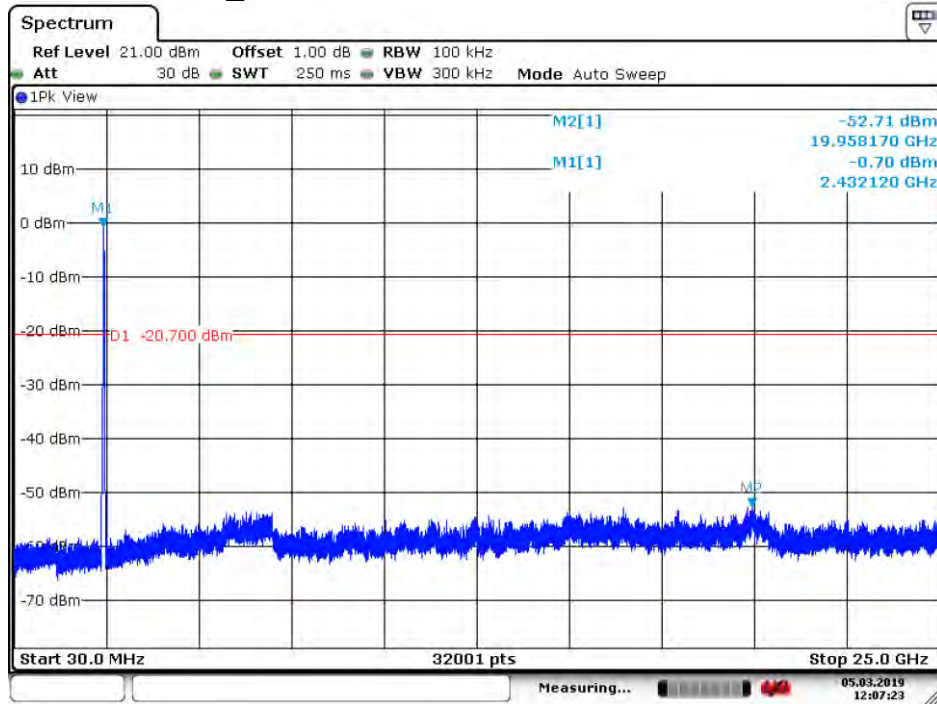
Date: 5.MAR.2019 12:06:33



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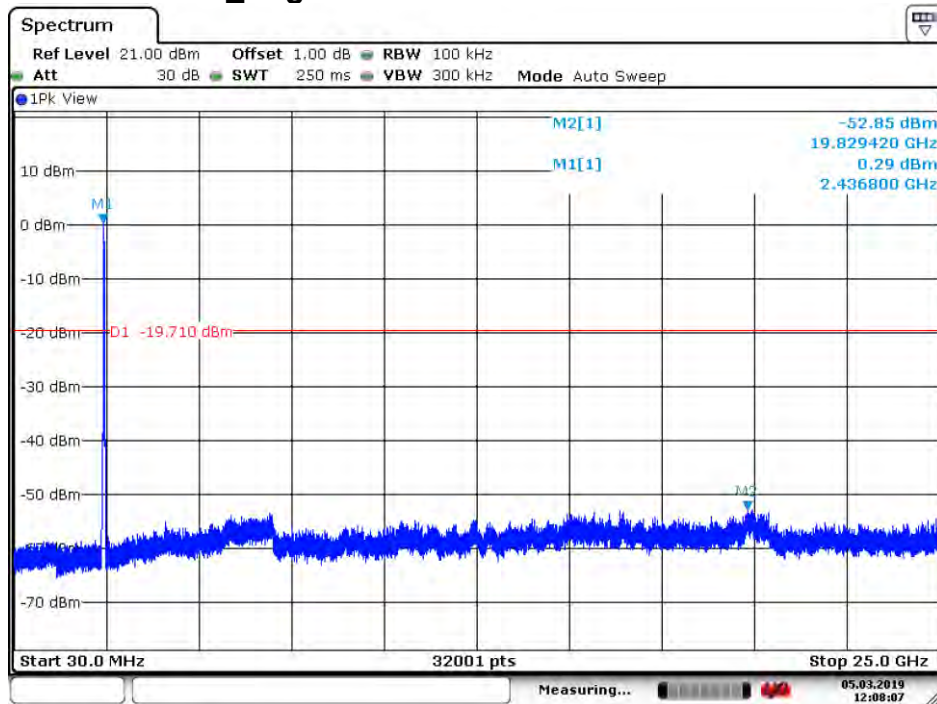


**4.8.1.1.11 802.11 N40\_ Middle Channel**



Date: 5.MAR.2019 12:07:23

**4.8.1.1.12 802.11 N40\_ Highest Channel**



Date: 5.MAR.2019 12:08:07





**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.



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### 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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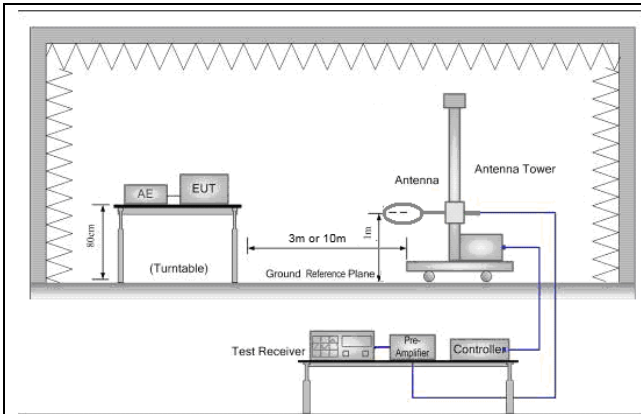


Figure 1. Below 30MHz

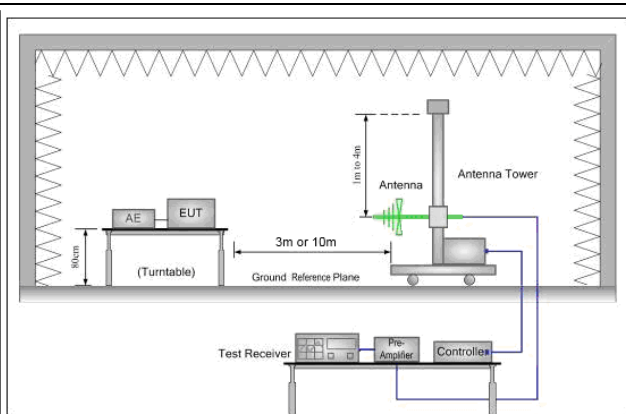


Figure 2. 30MHz to 1GHz

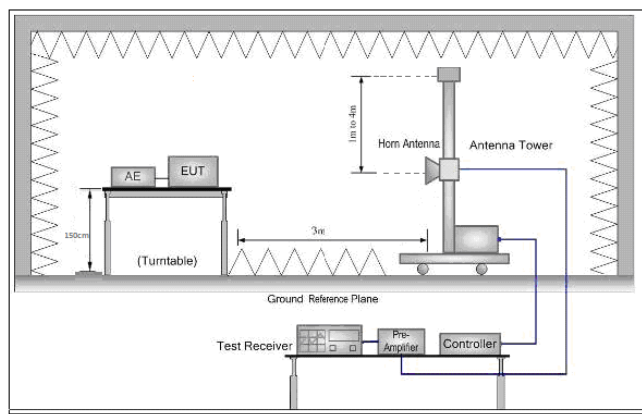


Figure 3. Above 1 GHz

**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 away 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. 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.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. 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



	<p>re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>h. Test the EUT in the lowest channel, the middle channel ,the Highest channel</p> <p>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.</p> <p>j. Repeat above procedures until all frequencies measured was complete.</p>
Exploratory Test Mode:	<p>Transmitting with all kind of modulations, data rates.</p> <p>Charge + Transmitting mode.</p>
Final Test Mode:	<p>Pretest the EUT at Charge + Transmitting mode.</p> <p>Through Pre-scan, find the</p> <p>1Mbps of rate is the worst case of 802.11B;</p> <p>6Mbps of rate is the worst case of 802.11G;</p> <p>6.5Mbps of rate is the worst case of 802.11N(HT20);</p> <p>13.5Mbps of rate is the worst case of 802.11N(HT40)</p> <p>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.</p>
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



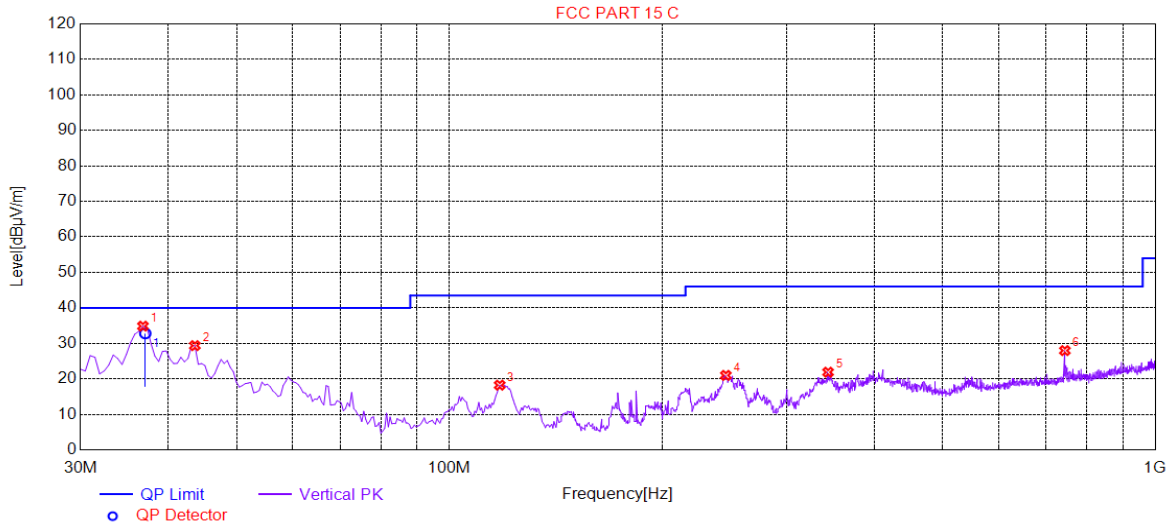
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### 4.9.1 Radiated emission below 1GHz

#### 4.9.1.1 Charge + Transmitting, Vertical



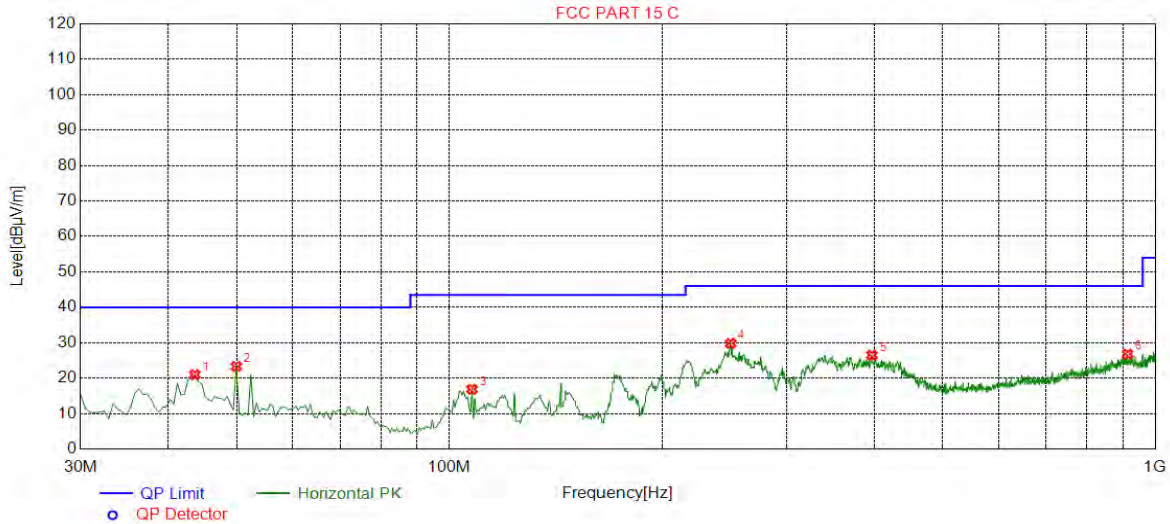
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7934	34.85	-32.19	40.00	5.15	100	38	Vertical
2	43.5868	29.36	-30.48	40.00	10.64	100	231	Vertical
3	117.8289	18.23	-32.92	43.50	25.27	100	0	Vertical
4	246.4182	20.98	-29.38	46.00	25.02	200	160	Vertical
5	343.9520	21.88	-26.58	46.00	24.12	100	64	Vertical
6	744.7624	27.97	-17.57	46.00	18.03	100	13	Vertical



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**4.9.1.2 Charge + Transmitting, Horizontal**



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	43.5868	20.98	-30.48	40.00	19.02	200	157	Horizontal
2	49.8949	23.30	-30.18	40.00	16.70	200	25	Horizontal
3	107.6388	16.87	-31.69	43.50	26.63	200	360	Horizontal
4	250.3002	29.82	-29.25	46.00	16.18	100	69	Horizontal
5	396.8434	26.48	-25.04	46.00	19.52	100	280	Horizontal
6	913.6268	26.79	-15.02	46.00	19.21	100	56	Horizontal



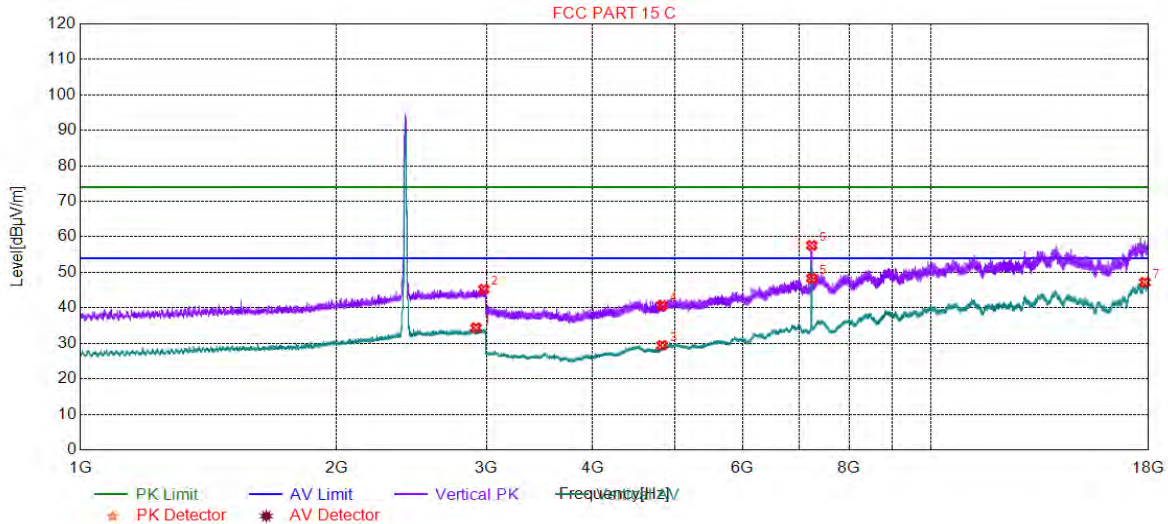
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### 4.9.2 Transmitter emission above 1GHz

#### 4.9.2.1 ANT1

##### 4.9.2.1.1 802.11B\_Lowest Channel\_Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2916.4791	34.40	2.27	54.00	19.60	150	208	Vertical
2	2978.9947	45.23	2.32	74.00	28.77	150	18	Vertical
3	4824.0000	29.45	-20.09	54.00	24.55	150	164	Vertical
4	4824.0000	40.70	-20.09	74.00	33.30	150	357	Vertical
5	7236.0000	48.31	-12.40	54.00	5.69	150	164	Vertical
6	7236.0000	57.59	-12.40	74.00	16.41	150	180	Vertical
7	17824.9913	47.18	-0.85	54.00	6.82	150	1	Vertical

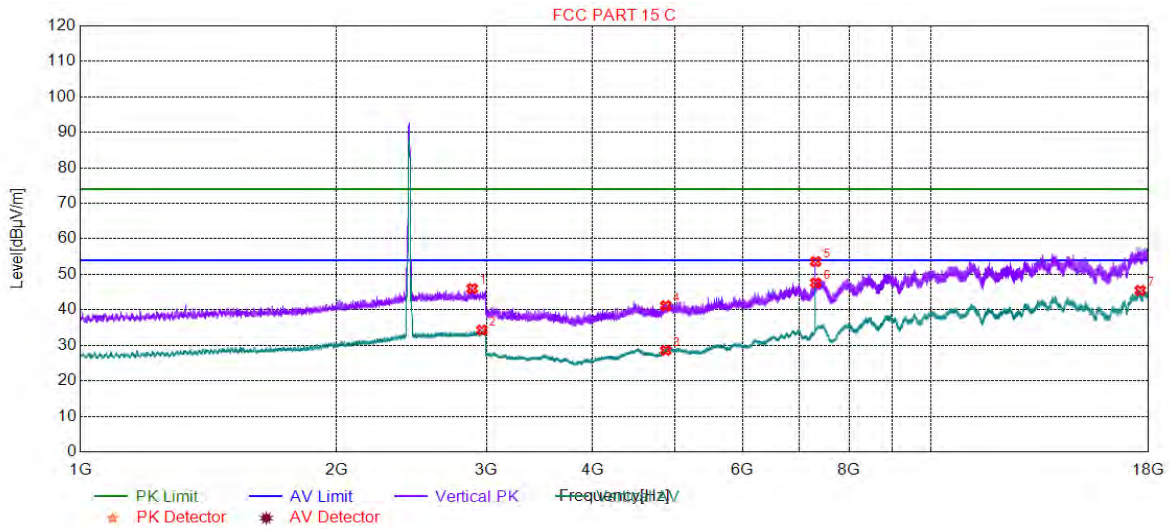


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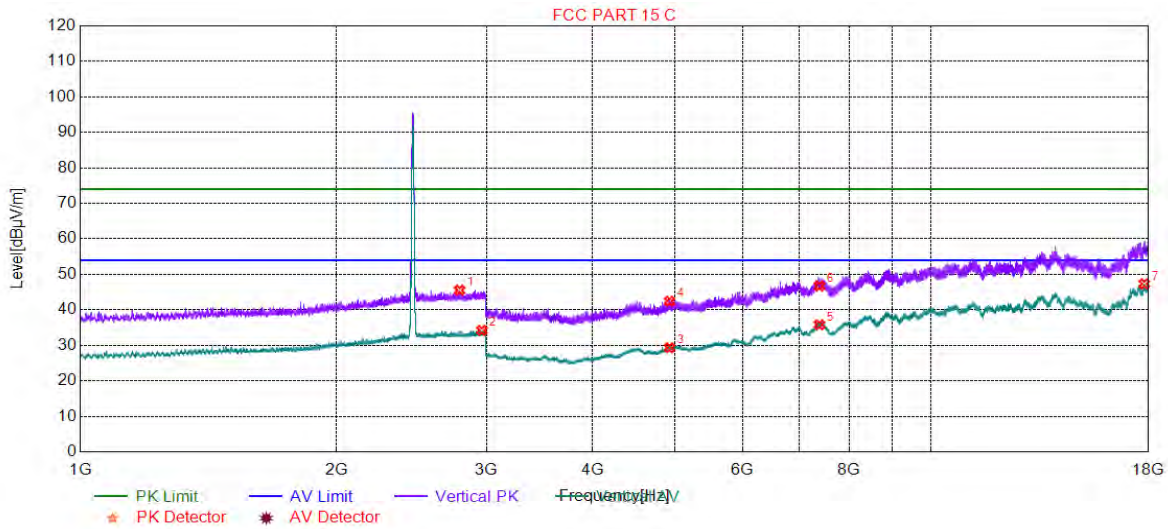
**4.9.2.1.2 802.11B\_ Middle Channel\_ Vertical**



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2887.4719	46.02	2.24	74.00	27.98	150	156	Vertical
2	2964.4911	34.29	2.31	54.00	19.71	150	18	Vertical
3	4874.0000	28.57	-19.37	54.00	25.43	150	244	Vertical
4	4874.0000	41.15	-19.37	74.00	32.85	150	356	Vertical
5	7312.4312	53.60	-11.49	74.00	20.40	150	164	Vertical
6	7312.4312	47.62	-11.49	54.00	6.38	150	164	Vertical
7	17598.4799	45.48	1.61	54.00	8.52	150	227	Vertical



**4.9.2.1.3 802.11B\_ Highest Channel\_ Vertical**



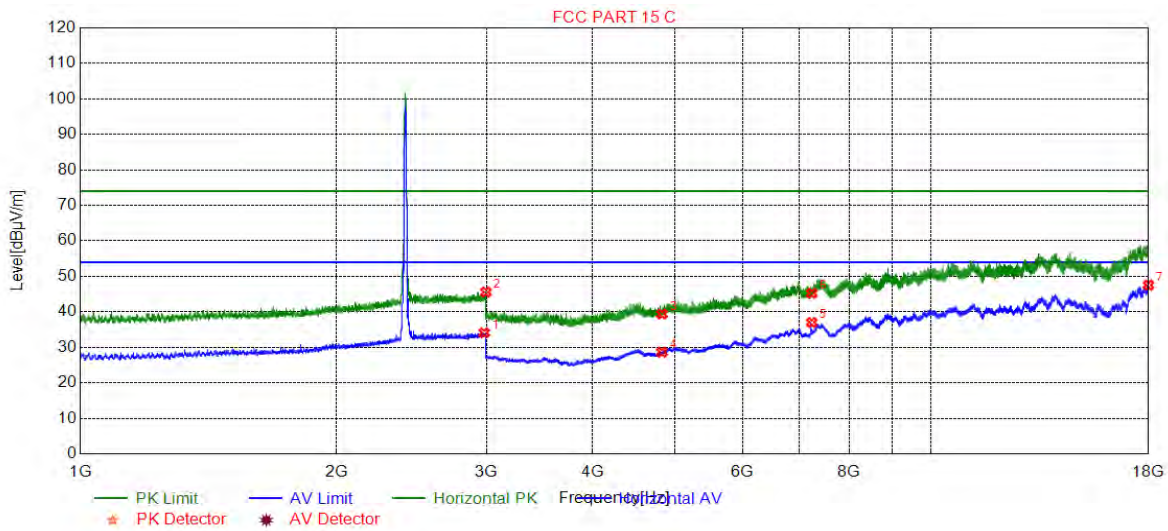
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2790.4476	45.56	2.12	74.00	28.44	150	356	Vertical
2	2963.4909	34.20	2.30	54.00	19.80	150	88	Vertical
3	4924.0000	29.30	-18.87	54.00	24.70	150	255	Vertical
4	4924.0000	42.43	-18.87	74.00	31.57	150	206	Vertical
5	7386.0000	35.80	-10.72	54.00	18.20	150	206	Vertical
6	7386.0000	46.71	-10.72	74.00	27.29	150	320	Vertical
7	17792.4896	47.35	-0.79	54.00	6.65	150	226	Vertical



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**4.9.2.1.4 802.11B\_Lowest Channel\_ Horizontal**



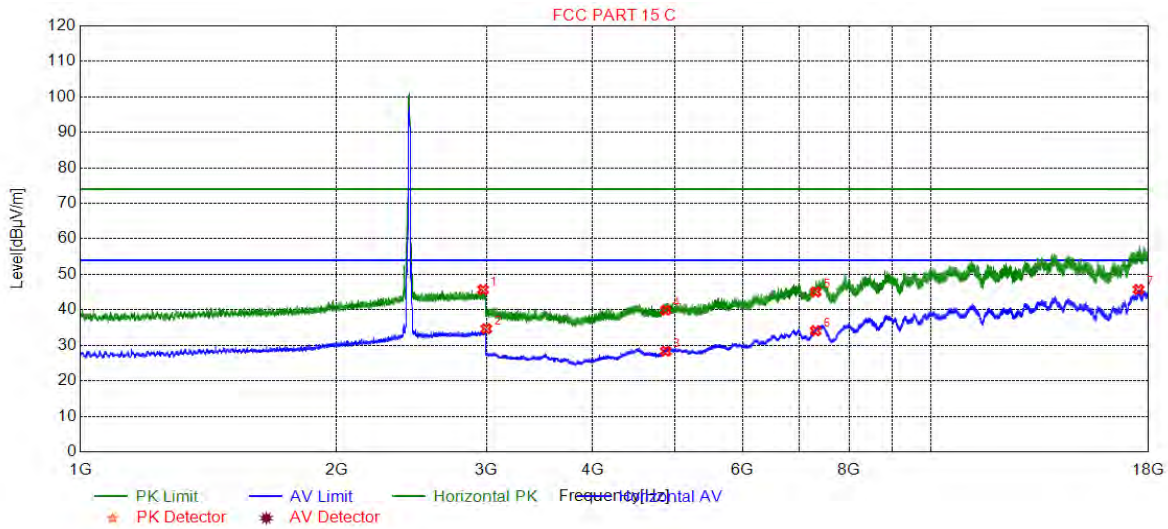
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2982.4956	34.11	2.32	54.00	19.89	150	39	Horizontal
2	2996.4991	45.59	2.33	74.00	28.41	150	4	Horizontal
3	4824.0000	39.38	-20.09	74.00	34.62	150	233	Horizontal
4	4824.0000	28.65	-20.09	54.00	25.35	150	85	Horizontal
5	7235.4235	37.00	-12.41	54.00	17.00	150	359	Horizontal
6	7236.0000	45.24	-12.40	74.00	28.76	150	36	Horizontal
7	17994.4997	47.53	-0.39	54.00	6.47	150	54	Horizontal



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



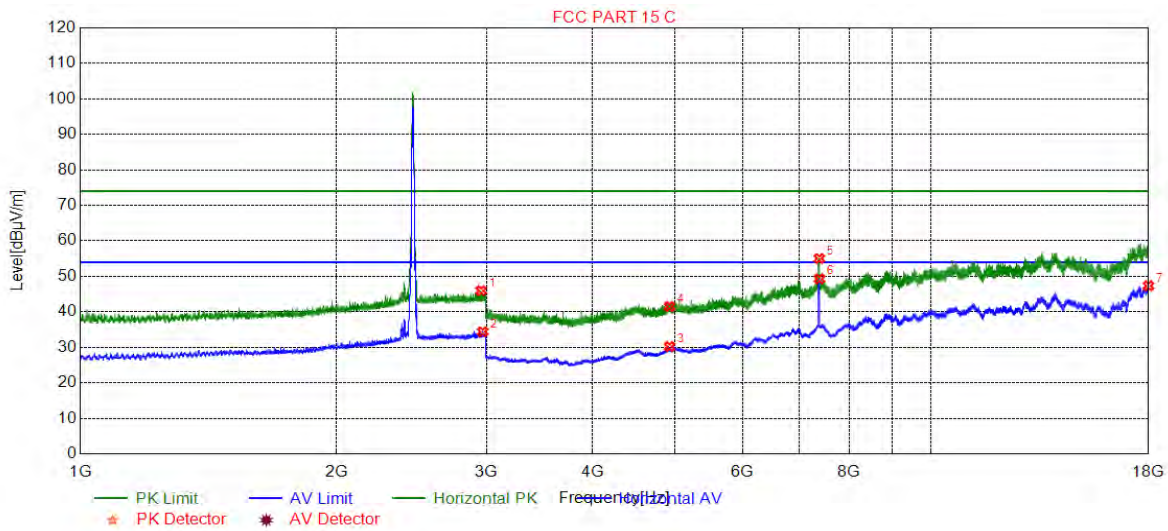
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2972.9932	45.68	2.31	74.00	28.32	150	176	Horizontal
2	2999.4999	34.67	2.33	54.00	19.33	150	133	Horizontal
3	4874.0000	28.36	-19.37	54.00	25.64	150	195	Horizontal
4	4874.0000	39.90	-19.37	74.00	34.10	150	276	Horizontal
5	7311.0000	45.06	-11.50	74.00	28.94	150	355	Horizontal
6	7311.0000	34.12	-11.50	54.00	19.88	150	211	Horizontal
7	17515.9758	45.72	0.55	54.00	8.28	150	200	Horizontal



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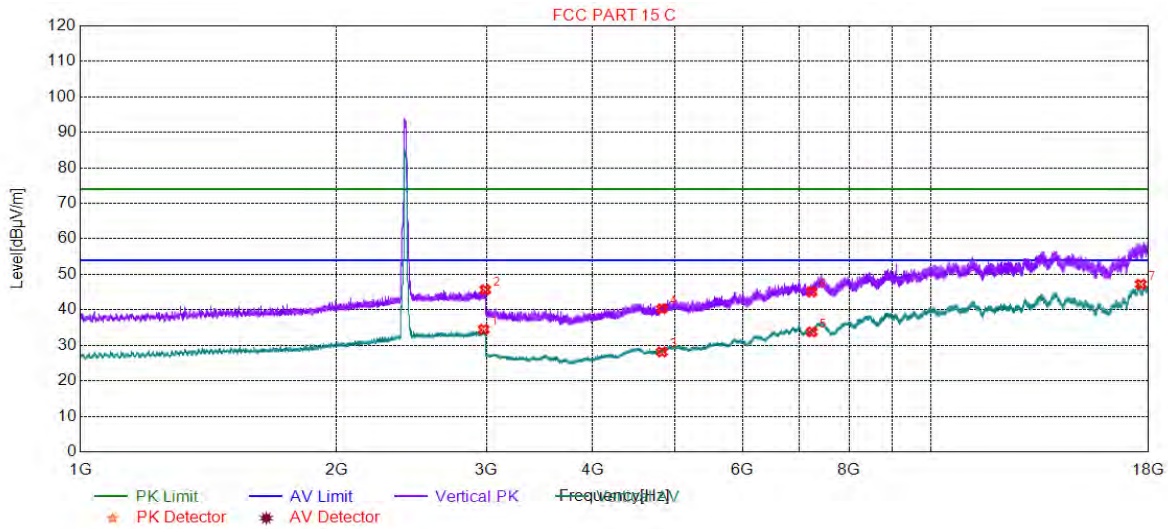
**4.9.2.1.6 802.11B\_ Highest Channel\_ Horizontal**



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2956.9892	45.97	2.30	74.00	28.03	150	68	Horizontal
2	2969.9925	34.42	2.31	54.00	19.58	150	193	Horizontal
3	4924.0000	30.22	-18.87	54.00	23.78	150	355	Horizontal
4	4924.0000	41.54	-18.87	74.00	32.46	150	340	Horizontal
5	7384.9385	55.03	-10.74	74.00	18.97	150	307	Horizontal
6	7387.4387	49.30	-10.71	54.00	4.70	150	307	Horizontal
7	17993.4997	47.34	-0.40	54.00	6.66	150	256	Horizontal



**4.9.2.1.7 802.11G\_Lowest Channel\_Vertical**



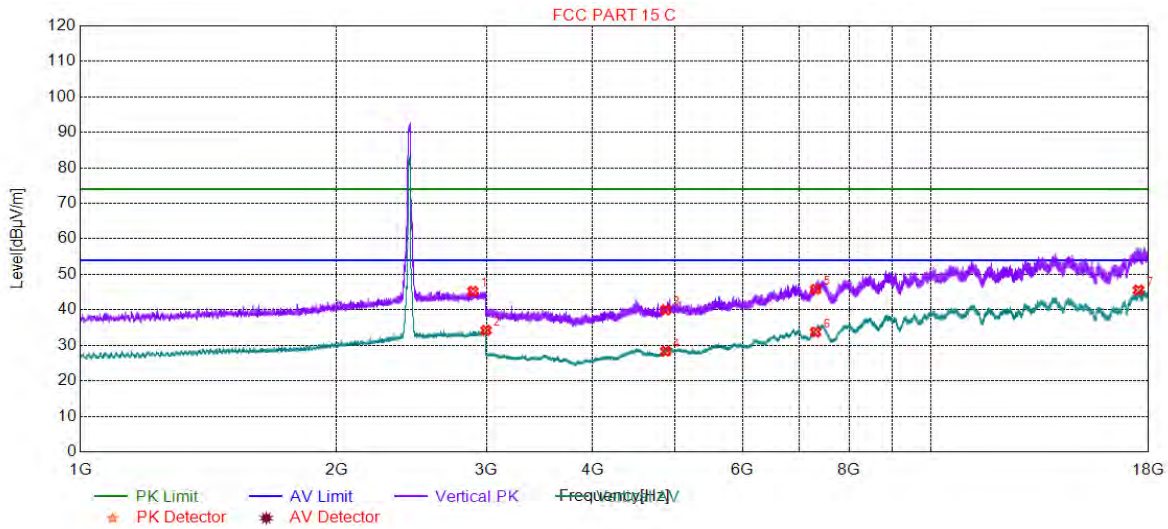
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2978.9947	34.50	2.32	54.00	19.50	150	263	Vertical
2	2991.4979	45.66	2.32	74.00	28.34	150	229	Vertical
3	4824.0000	28.15	-20.09	54.00	25.85	150	51	Vertical
4	4824.0000	40.30	-20.09	74.00	33.70	150	67	Vertical
5	7236.0000	33.79	-12.40	54.00	20.21	150	133	Vertical
6	7236.0000	45.08	-12.40	74.00	28.92	150	248	Vertical
7	17628.4814	47.20	0.89	54.00	6.80	150	23	Vertical



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**4.9.2.1.8 802.11G\_ Middle Channel\_ Vertical**



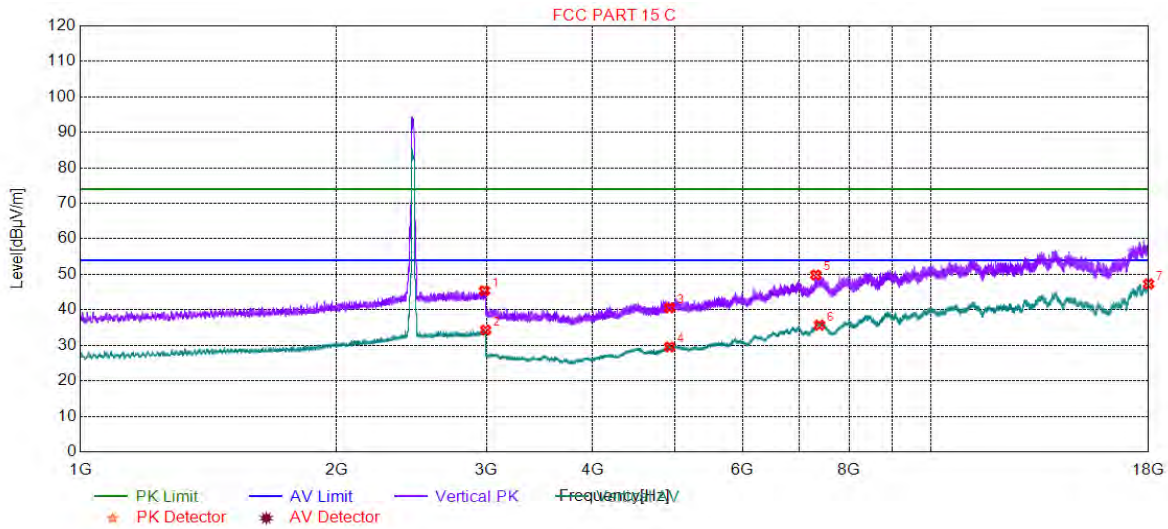
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2892.4731	45.22	2.25	74.00	28.78	150	192	Vertical
2	2996.4991	34.22	2.33	54.00	19.78	150	174	Vertical
3	4874.0000	39.99	-19.37	74.00	34.01	150	360	Vertical
4	4874.0000	28.34	-19.37	54.00	25.66	150	82	Vertical
5	7311.0000	45.78	-11.50	74.00	28.22	150	34	Vertical
6	7311.0000	33.75	-11.50	54.00	20.25	150	276	Vertical
7	17517.4759	45.57	0.57	54.00	8.43	150	257	Vertical



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**4.9.2.1.9 802.11G\_ Highest Channel\_ Vertical**



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2983.9960	45.39	2.32	74.00	28.61	150	80	Vertical
2	2993.4984	34.32	2.33	54.00	19.68	150	0	Vertical
3	4924.0000	40.58	-18.87	74.00	33.42	150	327	Vertical
4	4924.0000	29.54	-18.87	54.00	24.46	150	148	Vertical
5	7315.9316	49.84	-11.45	74.00	24.16	150	213	Vertical
6	7386.0000	35.69	-10.72	54.00	18.31	150	213	Vertical
7	17997.4999	47.31	-0.37	54.00	6.69	150	53	Vertical

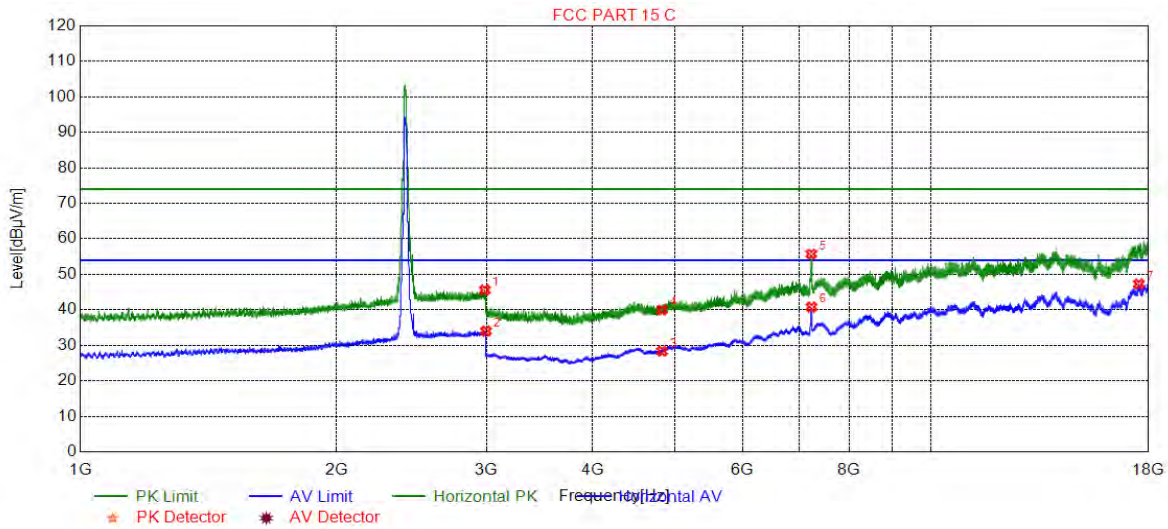


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**4.9.2.1.10 802.11G\_Lowest Channel\_ Horizontal**



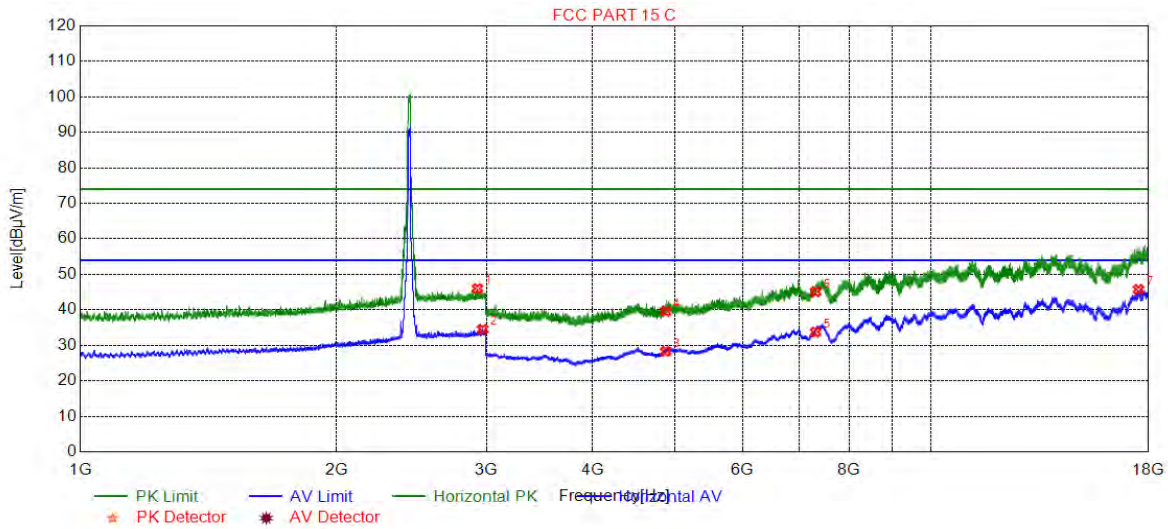
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2987.9970	45.62	2.32	74.00	28.38	150	281	Horizontal
2	2996.4991	34.01	2.33	54.00	19.99	150	264	Horizontal
3	4824.0000	28.36	-20.09	54.00	25.64	150	360	Horizontal
4	4824.0000	39.95	-20.09	74.00	34.05	150	70	Horizontal
5	7224.9225	55.75	-12.54	74.00	18.25	150	268	Horizontal
6	7230.4230	40.79	-12.47	54.00	13.21	150	252	Horizontal
7	17528.4764	47.27	0.71	54.00	6.73	150	284	Horizontal



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**4.9.2.1.11 802.11G\_Middle Channel\_Horizontal**



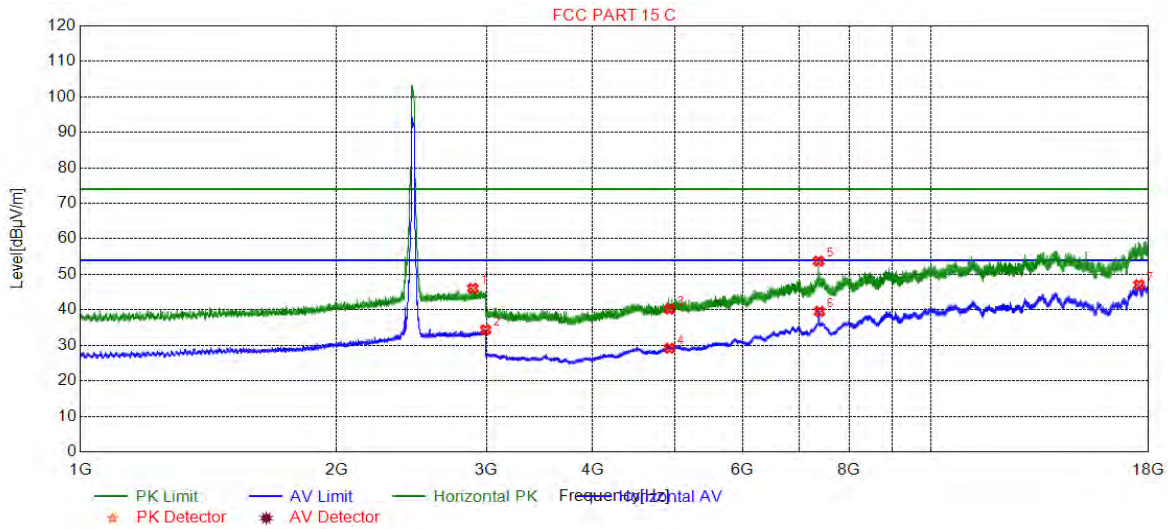
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2928.4821	46.02	2.28	74.00	27.98	150	297	Horizontal
2	2969.9925	34.50	2.31	54.00	19.50	150	158	Horizontal
3	4874.0000	28.33	-19.37	54.00	25.67	150	18	Horizontal
4	4874.0000	39.58	-19.37	74.00	34.42	150	356	Horizontal
5	7311.0000	33.73	-11.50	54.00	20.27	150	228	Horizontal
6	7311.0000	45.12	-11.50	74.00	28.88	150	325	Horizontal
7	17511.4756	45.74	0.50	54.00	8.26	150	171	Horizontal



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



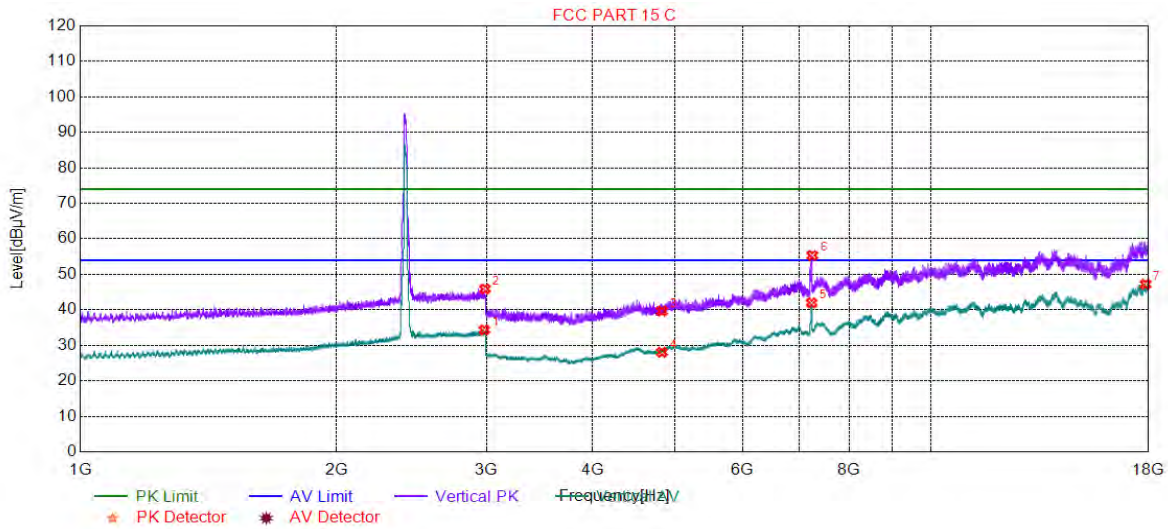
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2891.9730	46.07	2.25	74.00	27.93	150	340	Horizontal
2	2993.4984	34.39	2.33	54.00	19.61	150	18	Horizontal
3	4924.0000	40.21	-18.87	74.00	33.79	150	317	Horizontal
4	4924.0000	29.17	-18.87	54.00	24.83	150	268	Horizontal
5	7370.4370	53.74	-10.89	74.00	20.26	150	317	Horizontal
6	7386.0000	39.57	-10.72	54.00	14.43	150	252	Horizontal
7	17539.4770	47.07	0.86	54.00	6.93	150	82	Horizontal



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**4.9.2.1.13 802.11N20\_Lowest Channel\_Vertical**



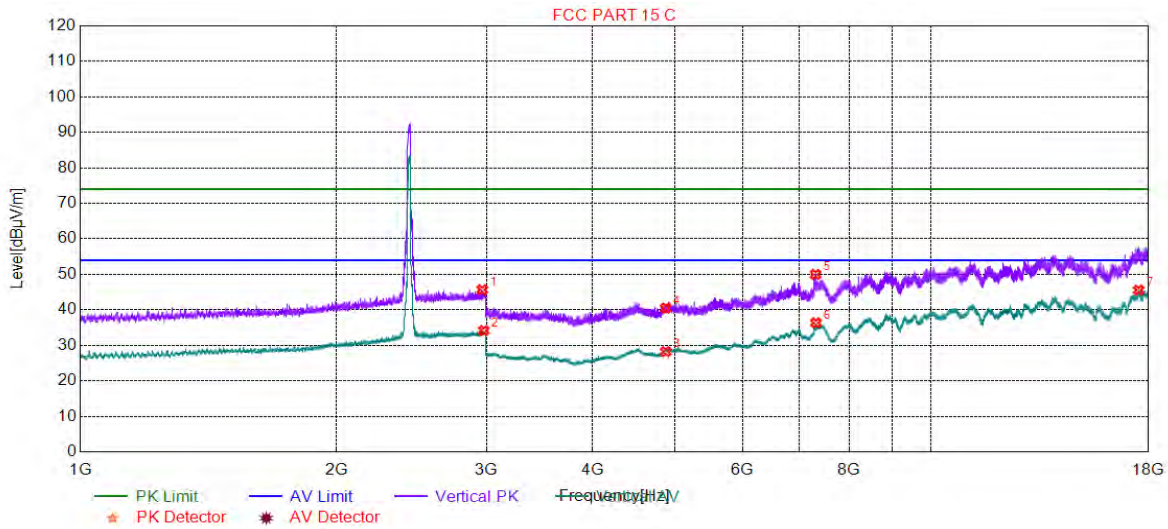
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2983.4959	34.37	2.32	54.00	19.63	150	220	Vertical
2	2988.4971	45.91	2.32	74.00	28.09	150	72	Vertical
3	4824.0000	39.67	-20.09	74.00	34.33	150	67	Vertical
4	4824.0000	28.07	-20.09	54.00	25.93	150	18	Vertical
5	7232.9233	41.98	-12.44	54.00	12.02	150	149	Vertical
6	7244.9245	55.33	-12.29	74.00	18.67	150	149	Vertical
7	17851.4926	47.22	-0.95	54.00	6.78	150	1	Vertical



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**4.9.2.1.14 802.11N20\_Middle Channel\_Vertical**



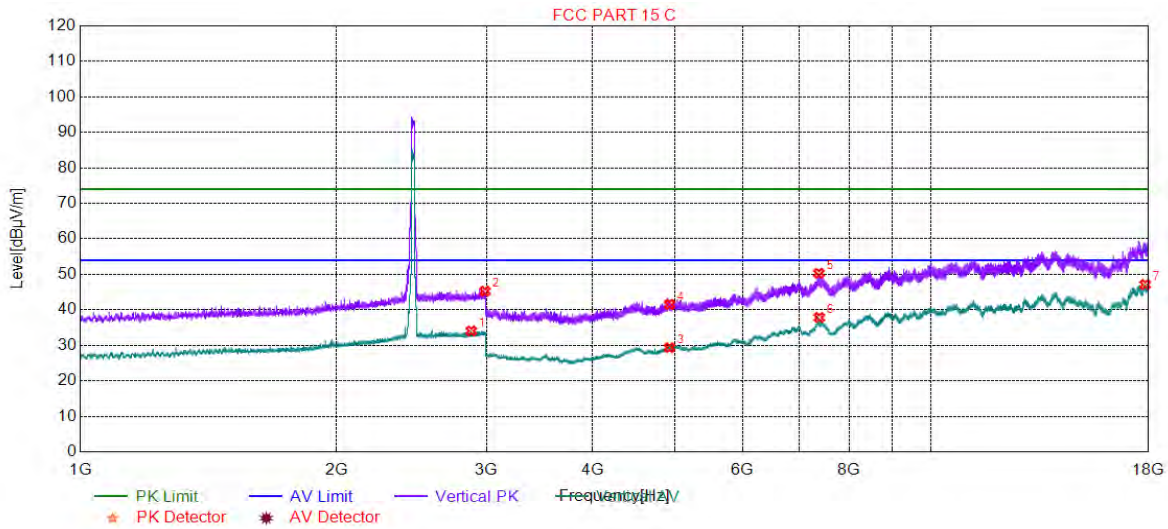
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2966.4916	45.67	2.31	74.00	28.33	150	316	Vertical
2	2978.9947	34.16	2.32	54.00	19.84	150	324	Vertical
3	4874.0000	28.24	-19.37	54.00	25.76	150	115	Vertical
4	4874.0000	40.49	-19.37	74.00	33.51	150	356	Vertical
5	7309.4309	49.98	-11.52	74.00	24.02	150	293	Vertical
6	7317.4317	36.34	-11.44	54.00	17.66	150	293	Vertical
7	17521.4761	45.57	0.62	54.00	8.43	150	113	Vertical



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**4.9.2.1.15 802.11N20\_ Highest Channel\_ Vertical**



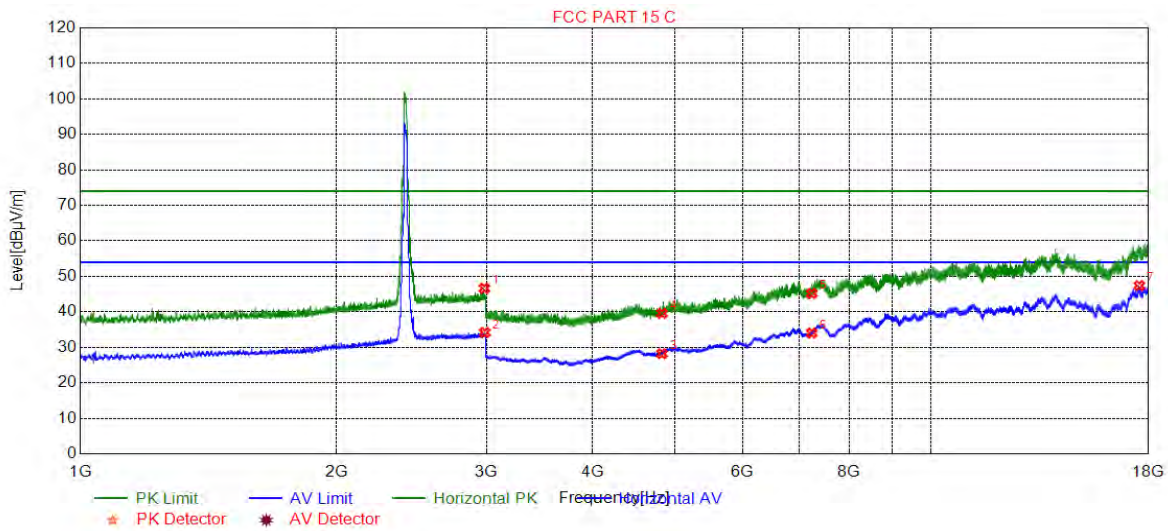
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2879.9700	34.07	2.24	54.00	19.93	150	115	Vertical
2	2988.4971	45.25	2.32	74.00	28.75	150	245	Vertical
3	4924.0000	29.34	-18.87	54.00	24.66	150	279	Vertical
4	4924.0000	41.56	-18.87	74.00	32.44	150	263	Vertical
5	7376.9377	50.31	-10.82	74.00	23.69	150	312	Vertical
6	7383.9384	37.86	-10.75	54.00	16.14	150	295	Vertical
7	17835.4918	47.14	-0.89	54.00	6.86	150	111	Vertical



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**4.9.2.1.16 802.11N20\_Lowest Channel\_Horizontal**



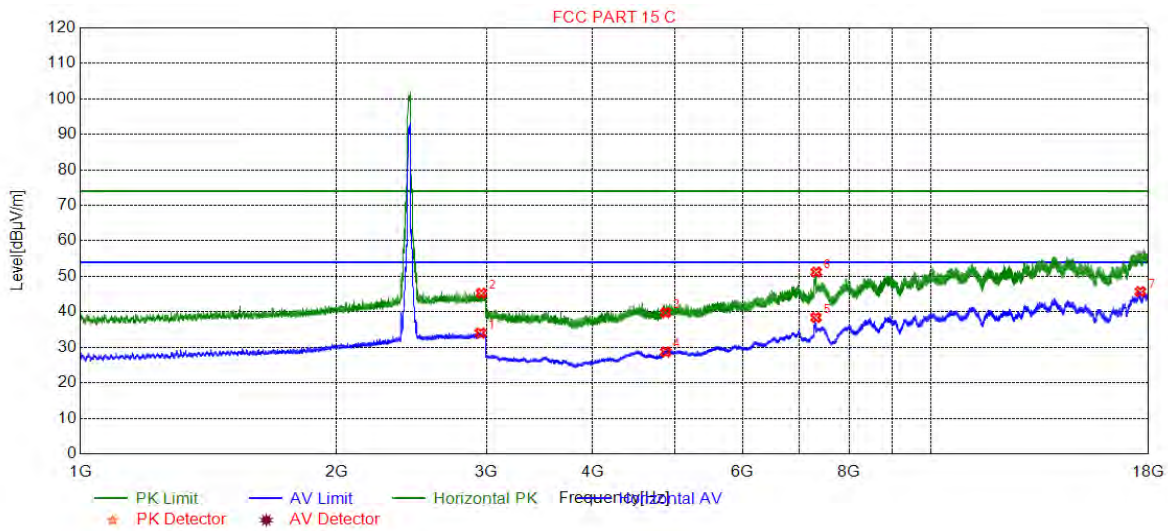
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2983.4959	46.62	2.32	74.00	27.38	150	201	Horizontal
2	2986.9967	34.18	2.32	54.00	19.82	150	70	Horizontal
3	4824.0000	28.24	-20.09	54.00	25.76	150	180	Horizontal
4	4824.0000	39.58	-20.09	74.00	34.42	150	213	Horizontal
5	7236.0000	45.17	-12.40	74.00	28.83	150	50	Horizontal
6	7236.0000	34.04	-12.40	54.00	19.96	150	328	Horizontal
7	17549.4775	47.40	0.98	54.00	6.60	150	53	Horizontal



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



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2952.9882	34.04	2.30	54.00	19.96	150	219	Horizontal
2	2958.9897	45.23	2.30	74.00	28.77	150	175	Horizontal
3	4874.0000	39.76	-19.37	74.00	34.24	150	131	Horizontal
4	4874.0000	28.70	-19.37	54.00	25.30	150	229	Horizontal
5	7317.9318	38.39	-11.43	54.00	15.61	150	213	Horizontal
6	7324.4324	51.20	-11.37	74.00	22.80	150	213	Horizontal
7	17602.9801	45.71	1.55	54.00	8.29	150	342	Horizontal

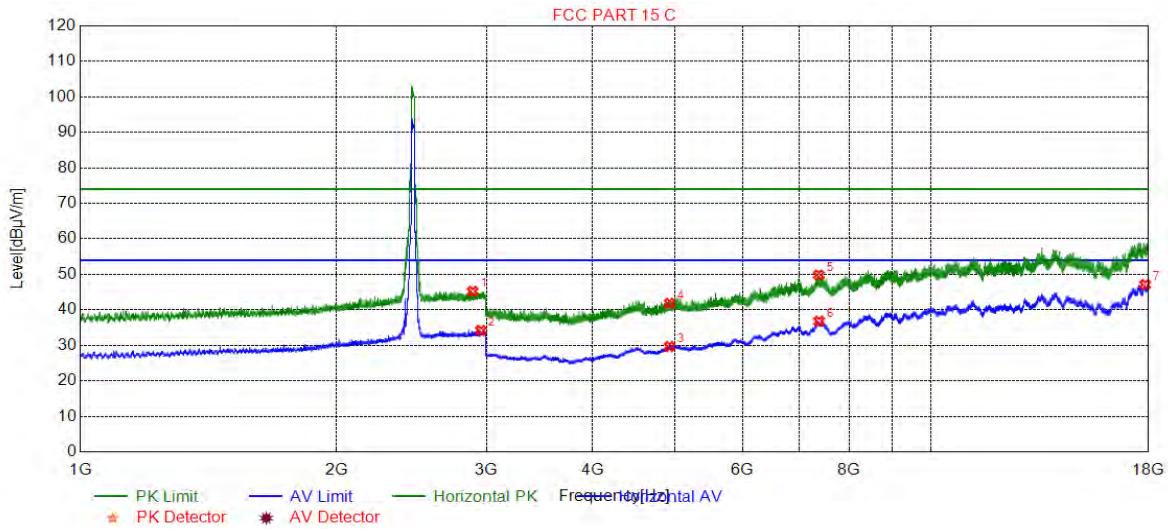


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**4.9.2.1.18 802.11N20\_ Highest Channel\_ Horizontal**



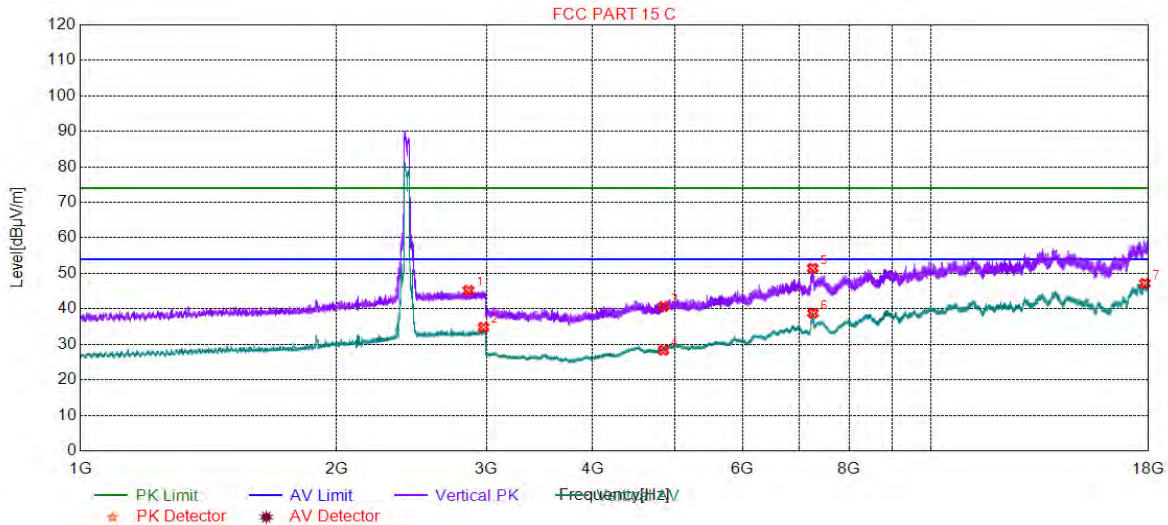
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2890.4726	45.21	2.25	74.00	28.79	150	298	Horizontal
2	2954.9887	34.23	2.30	54.00	19.77	150	342	Horizontal
3	4924.0000	29.70	-18.87	54.00	24.30	150	158	Horizontal
4	4924.0000	41.84	-18.87	74.00	32.16	150	276	Horizontal
5	7373.9374	49.83	-10.85	74.00	24.17	150	124	Horizontal
6	7379.9380	36.82	-10.79	54.00	17.18	150	208	Horizontal
7	17835.4918	47.13	-0.89	54.00	6.87	150	342	Horizontal



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**4.9.2.1.19 802.11N40\_Lowest Channel\_Vertical**

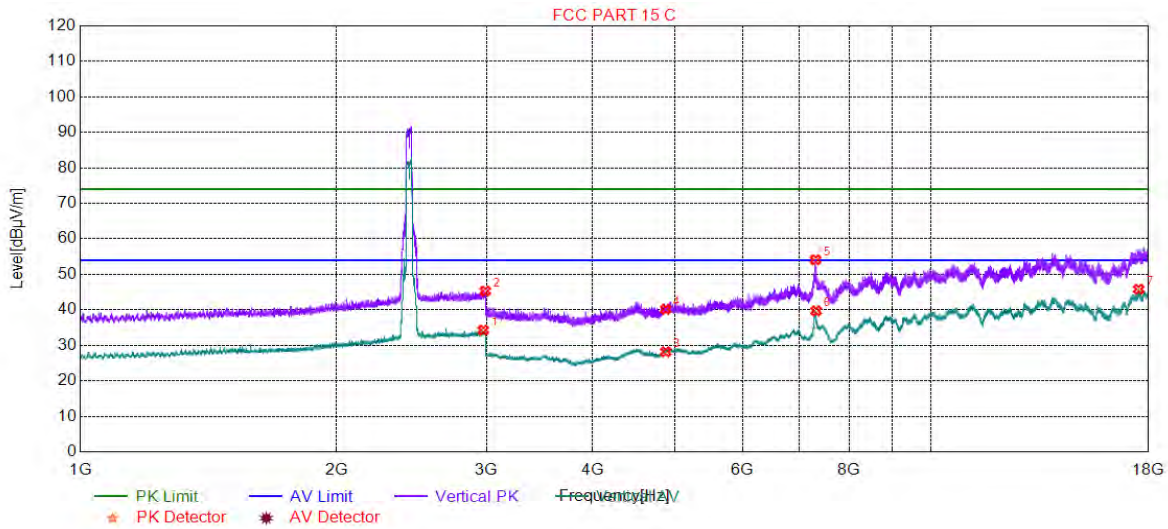


Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2857.9645	45.17	2.21	74.00	28.83	150	151	Vertical
2	2976.9942	34.79	2.31	54.00	19.21	150	186	Vertical
3	4844.0000	40.66	-19.80	74.00	33.34	150	83	Vertical
4	4844.0000	28.35	-19.80	54.00	25.65	150	312	Vertical
5	7253.9254	51.43	-12.18	74.00	22.57	150	148	Vertical
6	7258.9259	38.81	-12.12	54.00	15.19	150	165	Vertical
7	17821.9911	47.18	-0.84	54.00	6.82	150	82	Vertical



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**4.9.2.1.20 802.11N40\_Middle Channel\_Vertical**



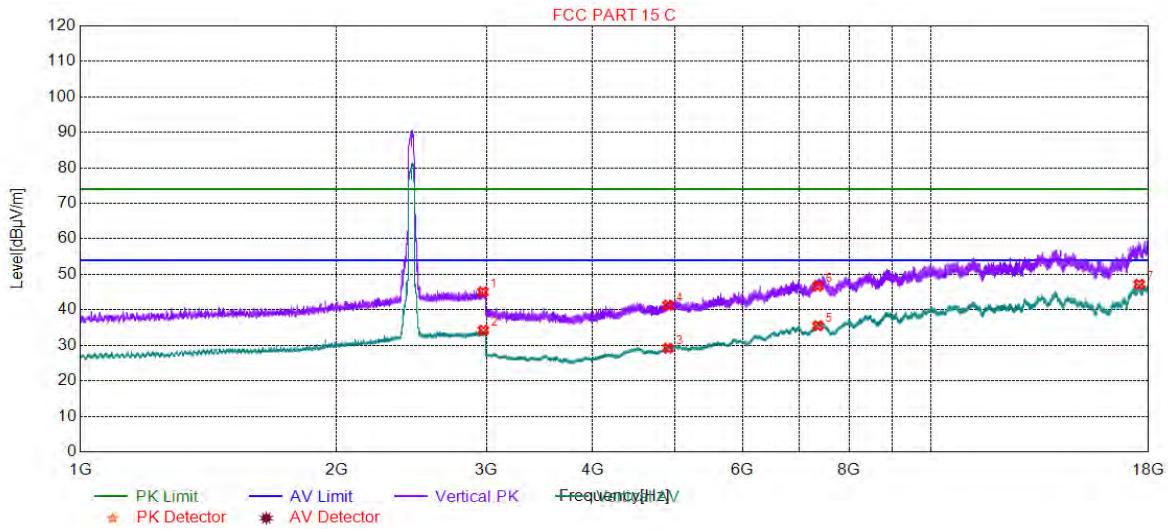
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2974.9937	34.30	2.31	54.00	19.70	150	289	Vertical
2	2990.4976	45.29	2.32	74.00	28.71	150	324	Vertical
3	4874.0000	28.18	-19.37	54.00	25.82	150	160	Vertical
4	4874.0000	40.14	-19.37	74.00	33.86	150	160	Vertical
5	7308.4308	54.12	-11.53	74.00	19.88	150	160	Vertical
6	7321.4321	39.70	-11.40	54.00	14.30	150	144	Vertical
7	17523.4762	45.83	0.65	54.00	8.17	150	197	Vertical



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**4.9.2.1.21 802.11N40\_ Highest Channel\_ Vertical**



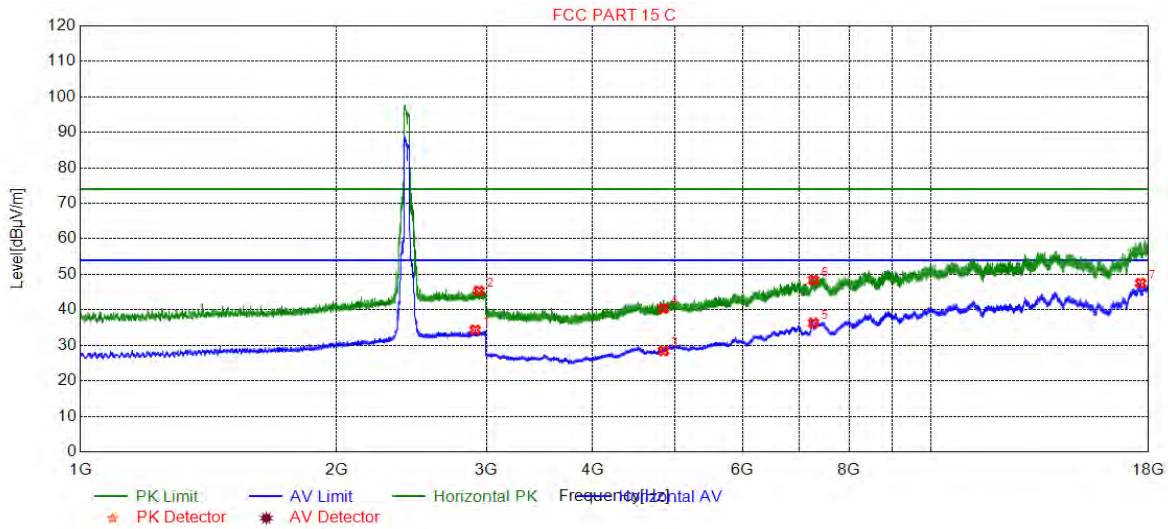
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2970.9927	45.04	2.31	74.00	28.96	150	18	Vertical
2	2975.9940	34.26	2.31	54.00	19.74	150	88	Vertical
3	4904.0000	29.19	-18.98	54.00	24.81	150	149	Vertical
4	4904.0000	41.32	-18.98	74.00	32.68	150	344	Vertical
5	7356.0000	35.52	-11.03	54.00	18.48	150	116	Vertical
6	7356.0000	46.69	-11.03	74.00	27.31	150	165	Vertical
7	17548.4774	47.20	0.97	54.00	6.80	150	24	Vertical



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**4.9.2.1.22 802.11N40\_Lowest Channel\_Horizontal**



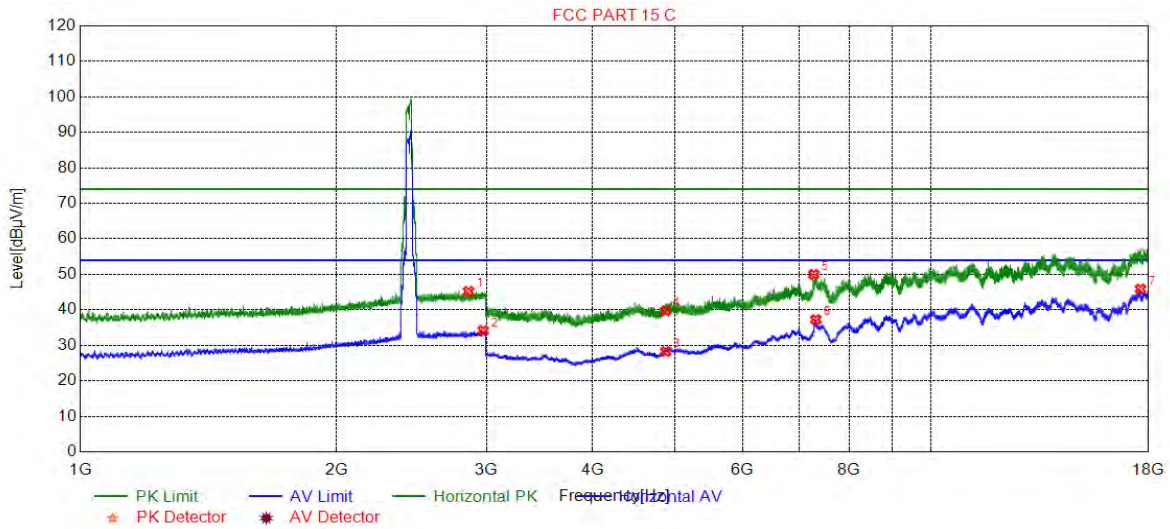
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2910.4776	34.37	2.27	54.00	19.63	150	14	Horizontal
2	2940.4851	45.34	2.29	74.00	28.66	150	253	Horizontal
3	4844.0000	28.44	-19.80	54.00	25.56	150	214	Horizontal
4	4844.0000	40.36	-19.80	74.00	33.64	150	132	Horizontal
5	7266.0000	36.28	-12.03	54.00	17.72	150	132	Horizontal
6	7266.0000	48.36	-12.03	74.00	25.64	150	149	Horizontal
7	17614.4807	47.54	1.25	54.00	6.46	150	54	Horizontal



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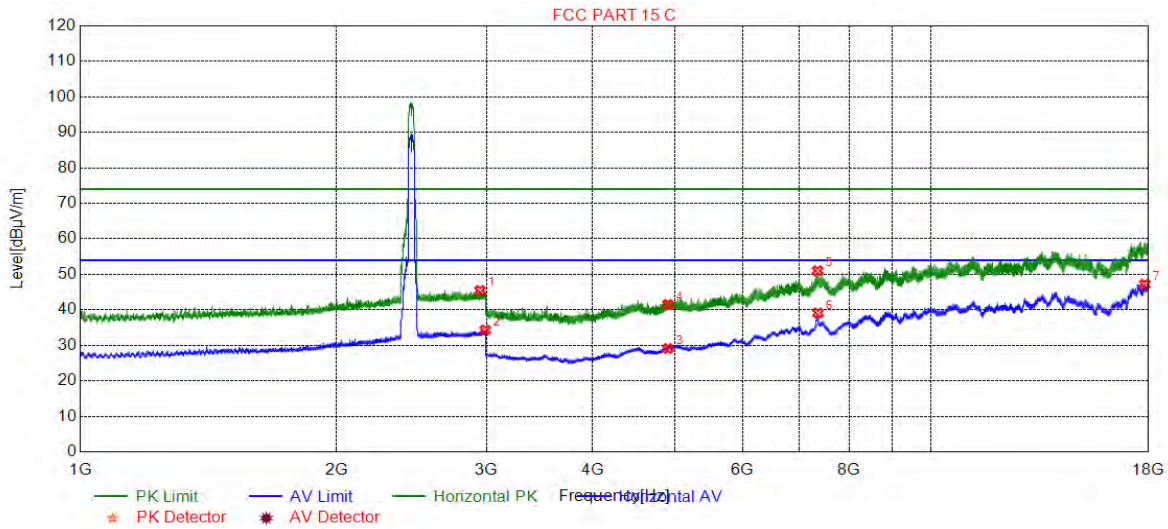
**4.9.2.1.23 802.11N40\_ Middle Channel\_ Horizontal**



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2858.4646	45.19	2.21	74.00	28.81	150	333	Horizontal
2	2973.4934	34.16	2.31	54.00	19.84	150	94	Horizontal
3	4874.0000	28.26	-19.37	54.00	25.74	150	157	Horizontal
4	4874.0000	39.71	-19.37	74.00	34.29	150	18	Horizontal
5	7276.4276	49.98	-11.91	74.00	24.02	150	137	Horizontal
6	7314.4314	37.27	-11.47	54.00	16.73	150	198	Horizontal
7	17609.4805	45.88	1.38	54.00	8.12	150	0	Horizontal



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



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2948.9872	45.46	2.29	74.00	28.54	150	4	Horizontal
2	2989.9975	34.33	2.32	54.00	19.67	150	193	Horizontal
3	4904.0000	29.10	-18.98	54.00	24.90	150	148	Horizontal
4	4904.0000	41.54	-18.98	74.00	32.46	150	67	Horizontal
5	7350.4350	51.00	-11.10	74.00	23.00	150	50	Horizontal
6	7358.9359	39.11	-11.01	54.00	14.89	150	50	Horizontal
7	17820.4910	47.21	-0.84	54.00	6.79	150	342	Horizontal

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Pre-amplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Pre-amplifier 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.



### 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:			

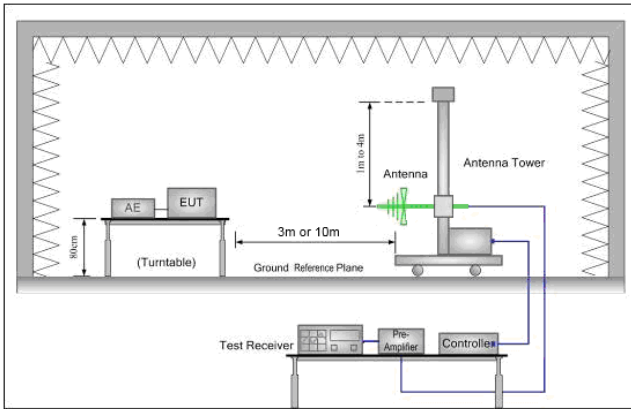


Figure 1. 30MHz to 1GHz

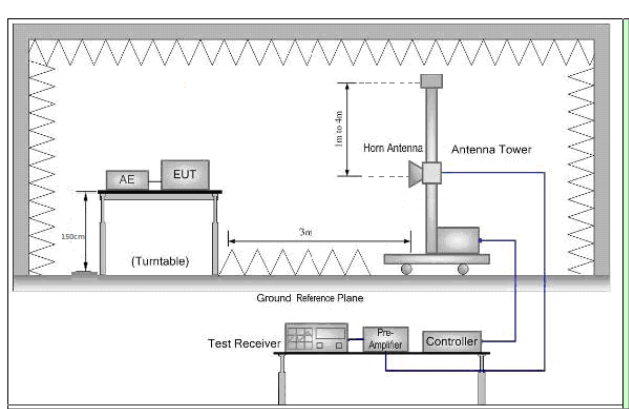


Figure 2. Above 1 GHz



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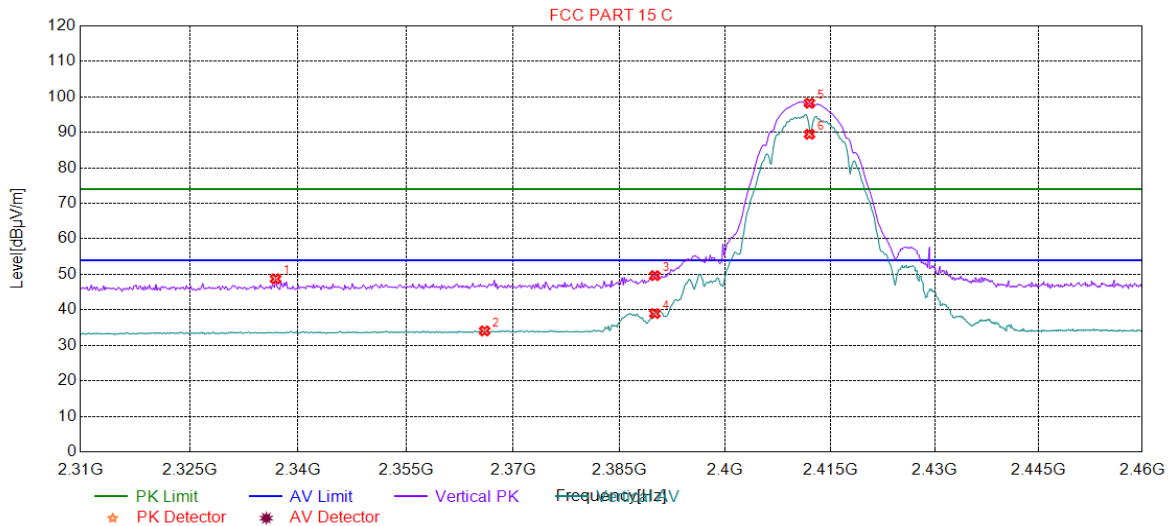
<p>Test Procedure:</p>	<ol style="list-style-type: none"> <li>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>b. For 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 chamber. 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>



Test plot as follows:

**4.10.1 ANT1**

**4.10.1.1 802.11B\_Lowest Channel \_ Vertical**



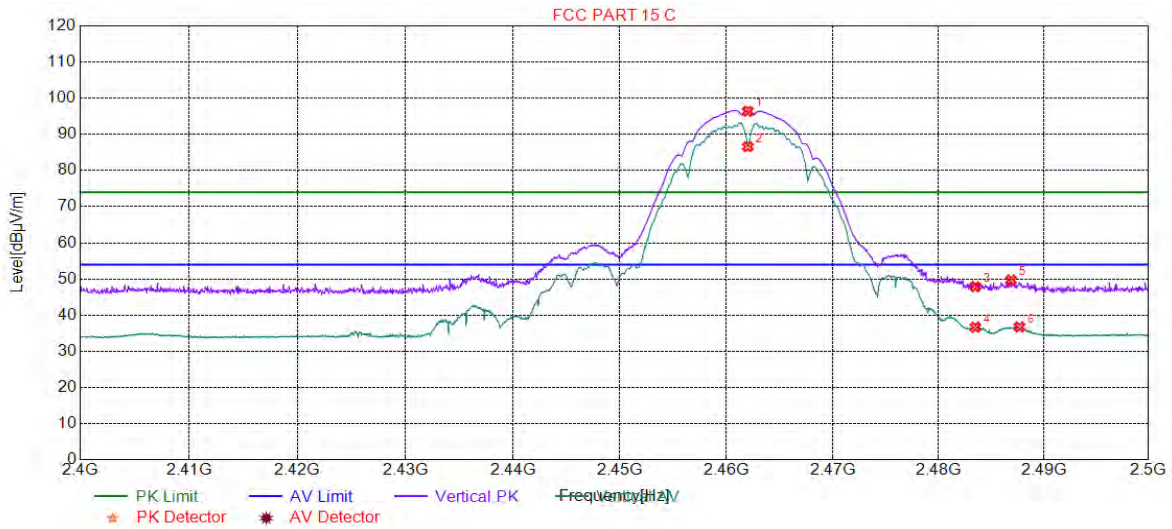
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2336.8769	48.74	1.01	74.00	25.26	150	154	Vertical
2	2366.0060	34.07	1.14	54.00	19.93	150	14	Vertical
3	2390.0000	49.64	1.25	74.00	24.36	150	339	Vertical
4	2390.0000	38.97	1.25	54.00	15.03	150	57	Vertical
5	2412.0000	98.22	1.32	74.00	-24.22	150	288	Vertical
6	2412.0000	89.46	1.32	54.00	-35.46	150	288	Vertical



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**4.10.1.2 802.11B\_ Highest Channel \_ Vertical**



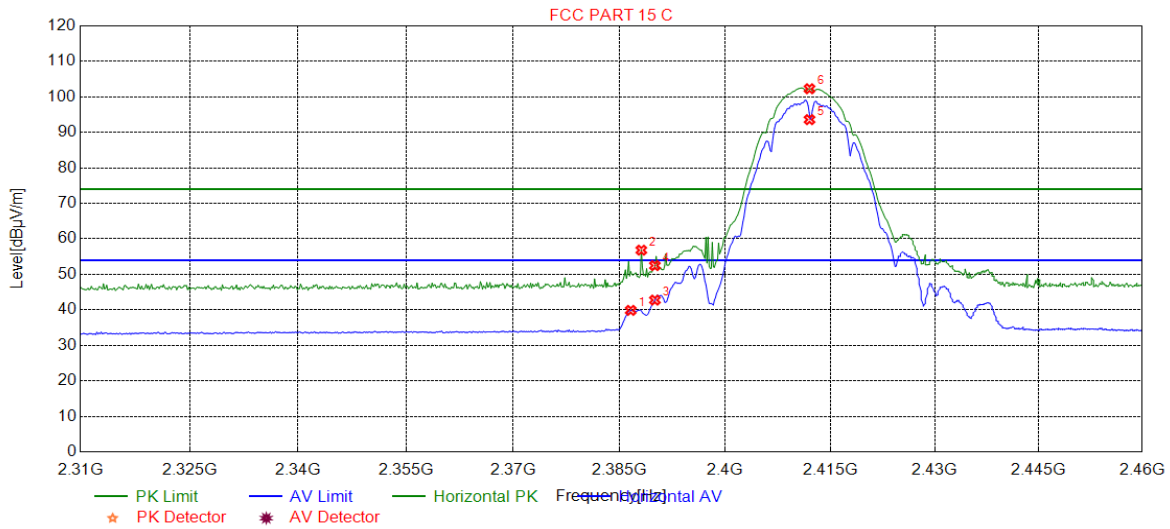
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	96.41	1.46	74.00	-22.41	150	49	Vertical
2	2462.0000	86.58	1.46	54.00	-32.58	150	41	Vertical
3	2483.5000	47.88	1.52	74.00	26.12	150	53	Vertical
4	2483.5000	36.67	1.52	54.00	17.33	150	49	Vertical
5	2486.8934	49.69	1.53	74.00	24.31	150	65	Vertical
6	2487.6938	36.73	1.54	54.00	17.27	150	104	Vertical



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



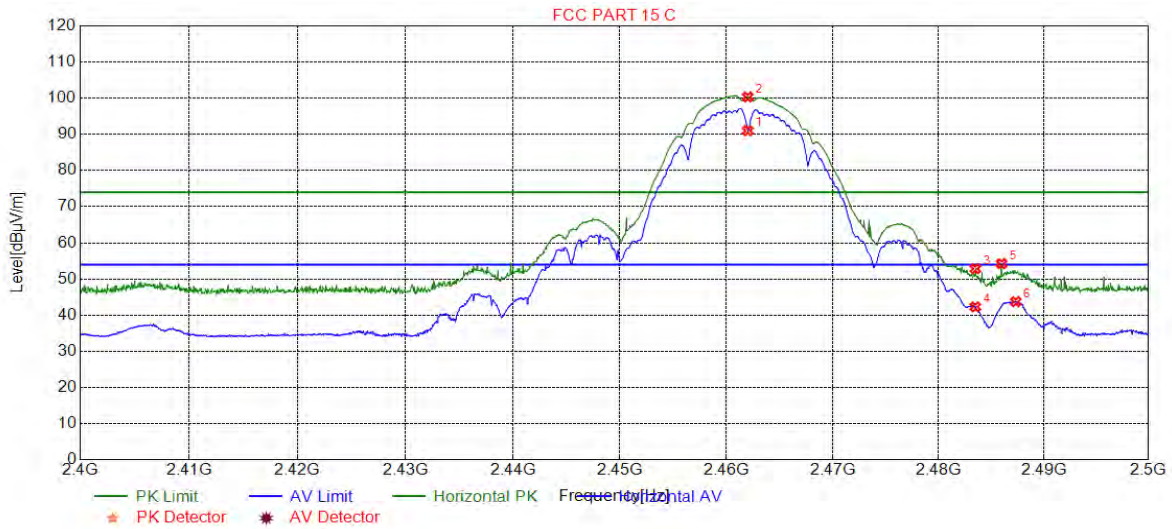
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2386.5766	39.86	1.23	54.00	14.14	150	188	Horizontal
2	2388.0781	56.82	1.24	74.00	17.18	150	27	Horizontal
3	2390.0000	42.75	1.25	54.00	11.25	150	194	Horizontal
4	2390.0000	52.47	1.25	74.00	21.53	150	209	Horizontal
5	2412.0000	93.59	1.32	54.00	-39.59	150	197	Horizontal
6	2412.0000	102.29	1.32	74.00	-28.29	150	203	Horizontal



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



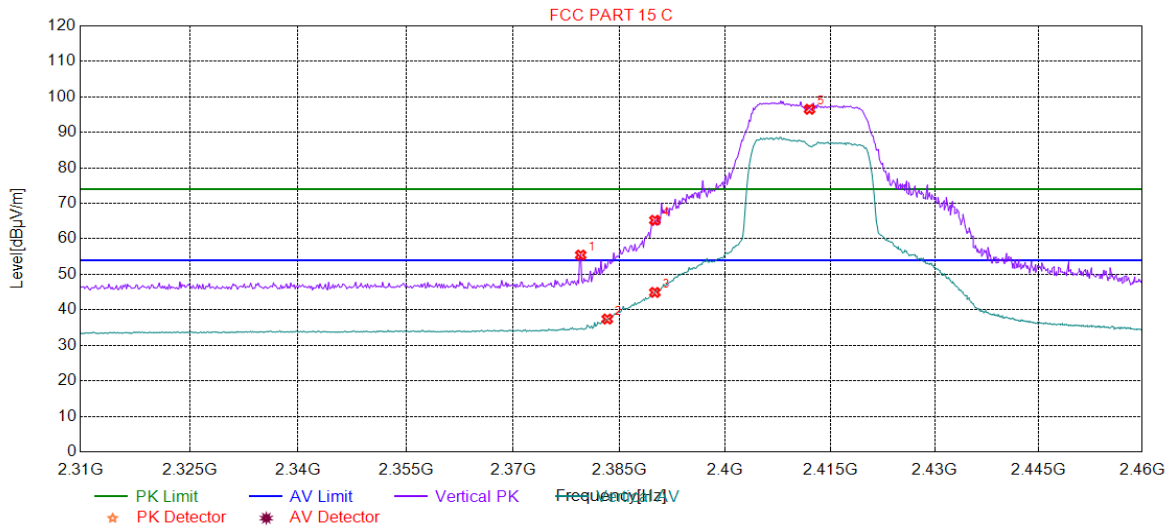
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	91.03	1.46	54.00	-37.03	150	204	Horizontal
2	2462.0000	100.33	1.46	74.00	-26.33	150	208	Horizontal
3	2483.5000	52.83	1.52	74.00	21.17	150	40	Horizontal
4	2483.5000	42.29	1.52	54.00	11.71	150	208	Horizontal
5	2485.9930	54.25	1.53	74.00	19.75	150	258	Horizontal
6	2487.3437	43.73	1.53	54.00	10.27	150	197	Horizontal



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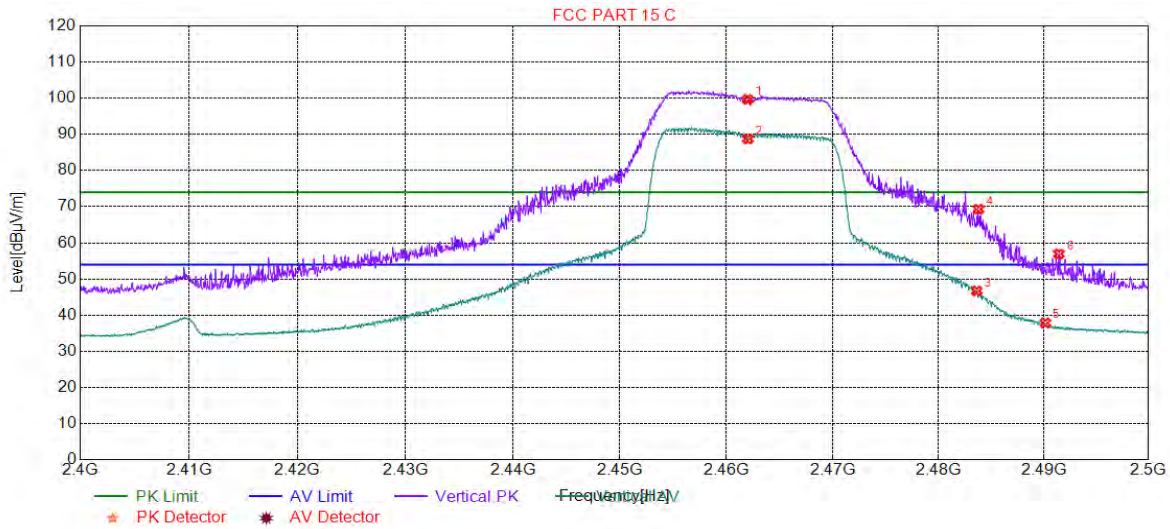
**4.10.1.5 802.11G\_Lowest Channel\_Vertical**



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2379.5195	55.44	1.20	74.00	18.56	150	310	Vertical
2	2383.2733	37.42	1.22	54.00	16.58	150	310	Vertical
3	2390.0000	44.92	1.25	54.00	9.08	150	165	Vertical
4	2390.0000	65.25	1.25	74.00	8.75	150	132	Vertical
5	2412.0000	96.51	1.32	74.00	-22.51	150	346	Vertical



**4.10.1.6 802.11G\_ Highest Channel\_ Vertical**



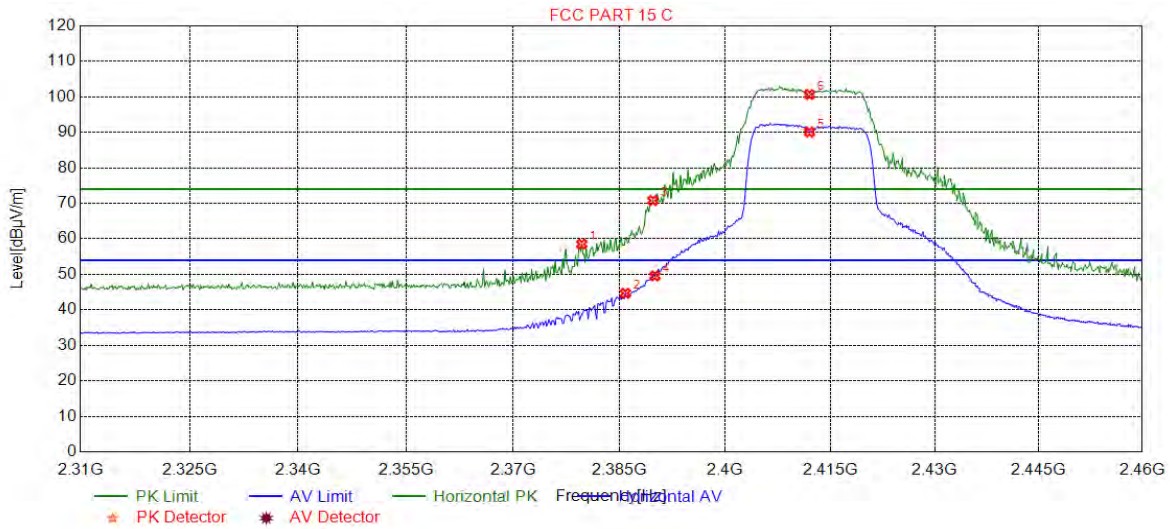
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	99.68	1.46	74.00	-25.68	150	19	Vertical
2	2462.0000	88.72	1.46	54.00	-34.72	150	26	Vertical
3	2483.6418	46.69	1.52	54.00	7.31	150	26	Vertical
4	2483.7919	69.29	1.52	74.00	4.71	150	30	Vertical
5	2490.1451	37.85	1.54	54.00	16.15	150	23	Vertical
6	2491.4457	56.95	1.55	74.00	17.05	150	38	Vertical



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**4.10.1.7 802.11G\_Lowest Channel\_Horizontal**

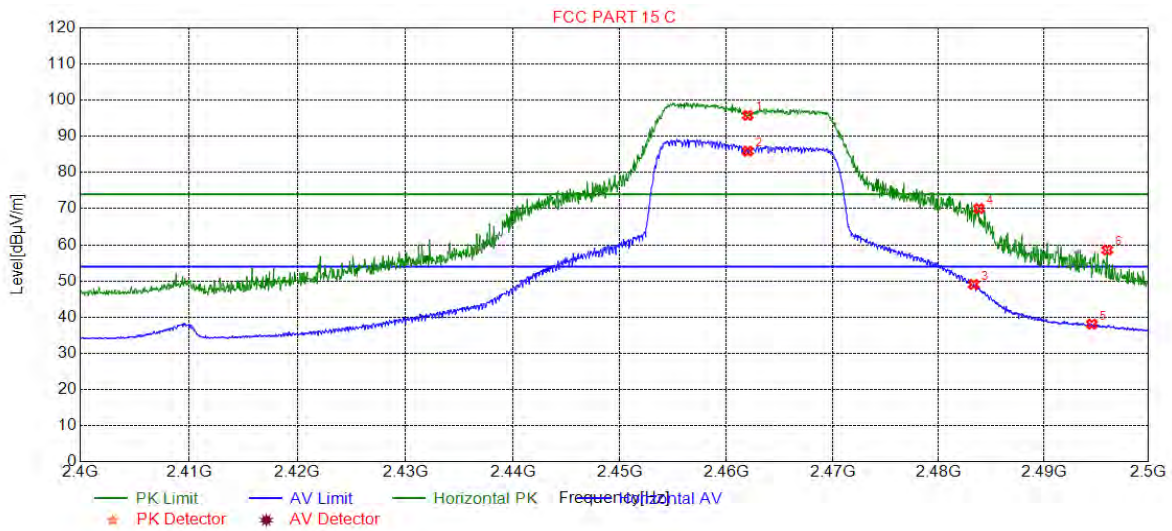


Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2379.6697	58.53	1.20	74.00	15.47	150	50	Horizontal
2	2385.8258	44.67	1.23	54.00	9.33	150	50	Horizontal
3	2389.7297	70.79	1.24	74.00	3.21	150	222	Horizontal
4	2390.0000	49.55	1.25	54.00	4.45	150	218	Horizontal
5	2412.0000	90.09	1.32	54.00	-36.09	150	218	Horizontal
6	2412.0000	100.65	1.32	74.00	-26.65	150	224	Horizontal





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



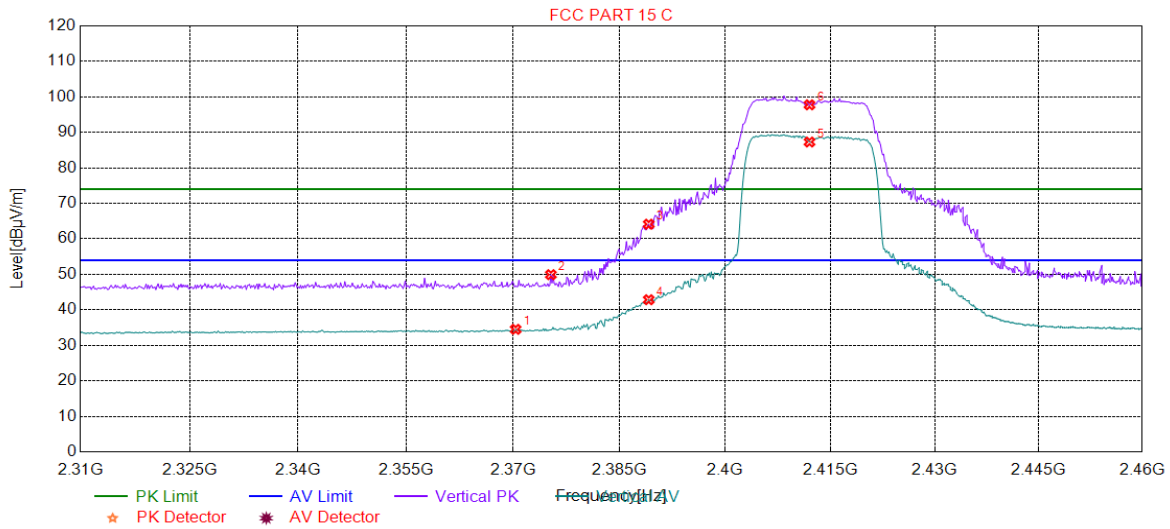
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	95.82	1.46	74.00	-21.82	150	350	Horizontal
2	2462.0000	85.89	1.46	54.00	-31.89	150	354	Horizontal
3	2483.3417	49.06	1.52	54.00	4.94	150	350	Horizontal
4	2483.8419	70.05	1.52	74.00	3.95	150	359	Horizontal
5	2494.5973	38.07	1.55	54.00	15.93	150	360	Horizontal
6	2496.0480	58.60	1.56	74.00	15.40	150	14	Horizontal



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**4.10.1.9 802.11N20\_Lowest Channel\_Vertical**



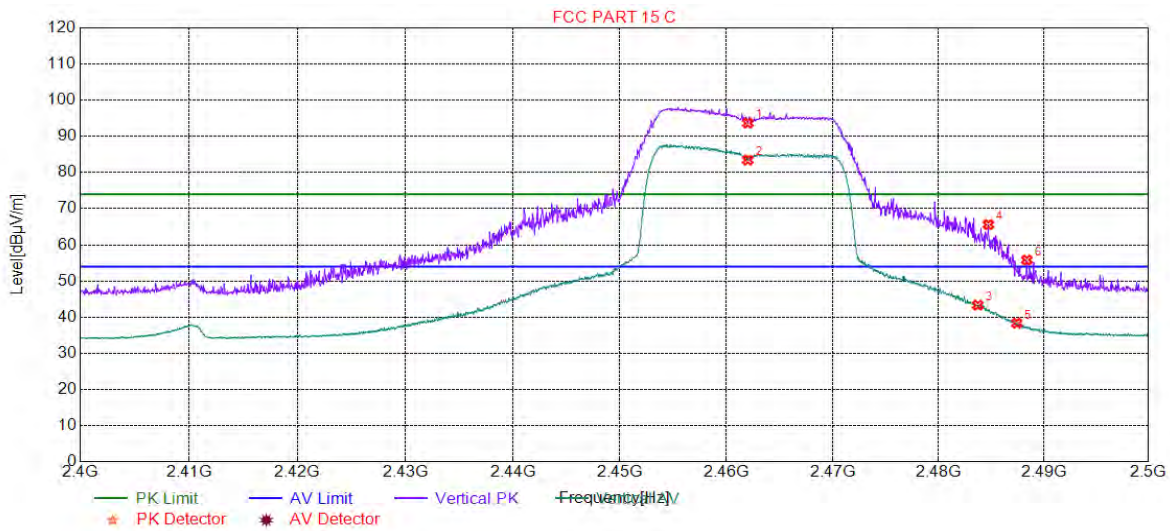
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2370.3604	34.52	1.16	54.00	19.48	150	126	Vertical
2	2375.3153	49.92	1.18	74.00	24.08	150	179	Vertical
3	2389.1291	64.13	1.24	74.00	9.87	150	163	Vertical
4	2389.1291	42.86	1.24	54.00	11.14	150	38	Vertical
5	2412.0000	87.29	1.32	54.00	-33.29	150	26	Vertical
6	2412.0000	97.76	1.32	74.00	-23.76	150	26	Vertical



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**4.10.1.10 802.11N20\_ Highest Channel\_ Vertical**



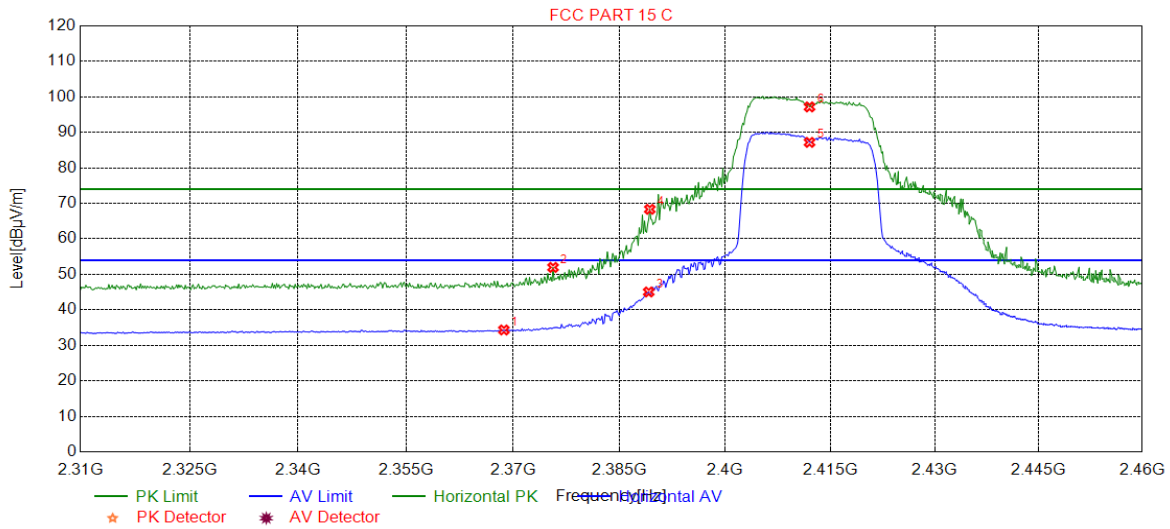
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	93.66	1.46	74.00	-19.66	150	277	Vertical
2	2462.0000	83.46	1.46	54.00	-29.46	150	254	Vertical
3	2483.7419	43.32	1.52	54.00	10.68	150	258	Vertical
4	2484.7424	65.60	1.53	74.00	8.40	150	270	Vertical
5	2487.4437	38.34	1.53	54.00	15.66	150	251	Vertical
6	2488.3942	55.79	1.54	74.00	18.21	150	251	Vertical



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**4.10.1.11 802.11N20\_Lowest Channel\_Horizontal**



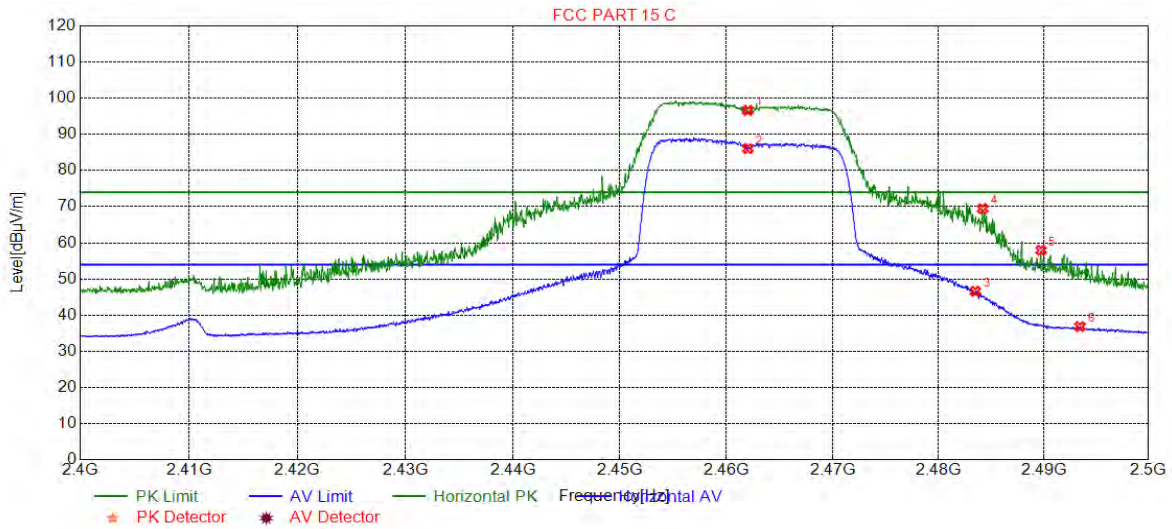
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2368.7087	34.34	1.15	54.00	19.66	150	167	Horizontal
2	2375.6156	51.96	1.18	74.00	22.04	150	161	Horizontal
3	2389.1291	45.04	1.24	54.00	8.96	150	161	Horizontal
4	2389.2793	68.33	1.24	74.00	5.67	150	226	Horizontal
5	2412.0000	87.18	1.32	54.00	-33.18	150	222	Horizontal
6	2412.0000	97.17	1.32	74.00	-23.17	150	229	Horizontal



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



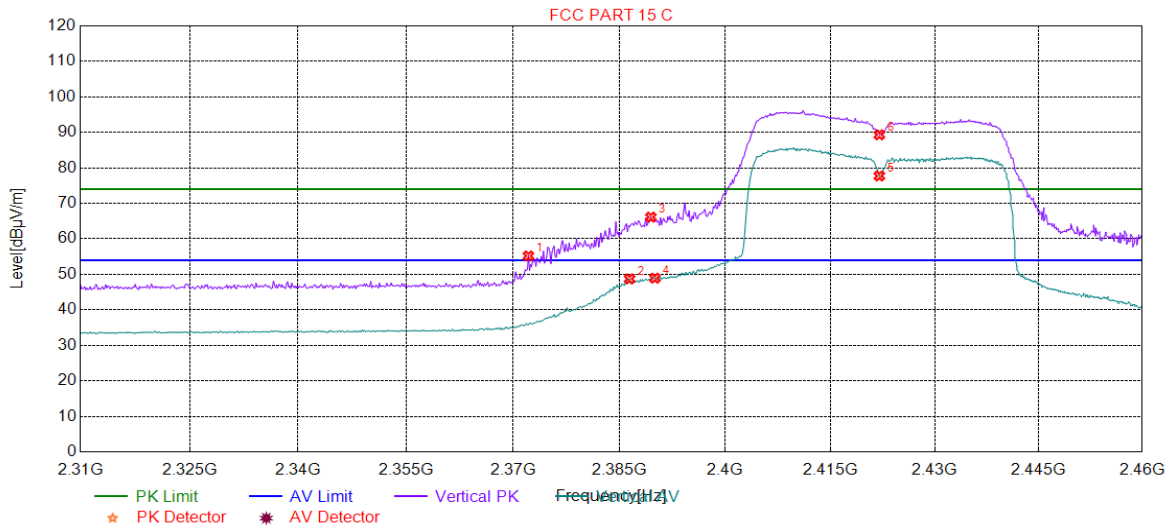
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	96.59	1.46	74.00	-22.59	150	21	Horizontal
2	2462.0000	86.05	1.46	54.00	-32.05	150	21	Horizontal
3	2483.5000	46.61	1.52	54.00	7.39	150	48	Horizontal
4	2484.1921	69.43	1.53	74.00	4.57	150	52	Horizontal
5	2489.7449	57.96	1.54	74.00	16.04	150	52	Horizontal
6	2493.4467	36.85	1.55	54.00	17.15	150	52	Horizontal



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 No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012063 f (86-755) 26710594 www.sgsgroup.com.cn  
 中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

**4.10.1.13 802.11N40\_Lowest Channel\_Vertical**



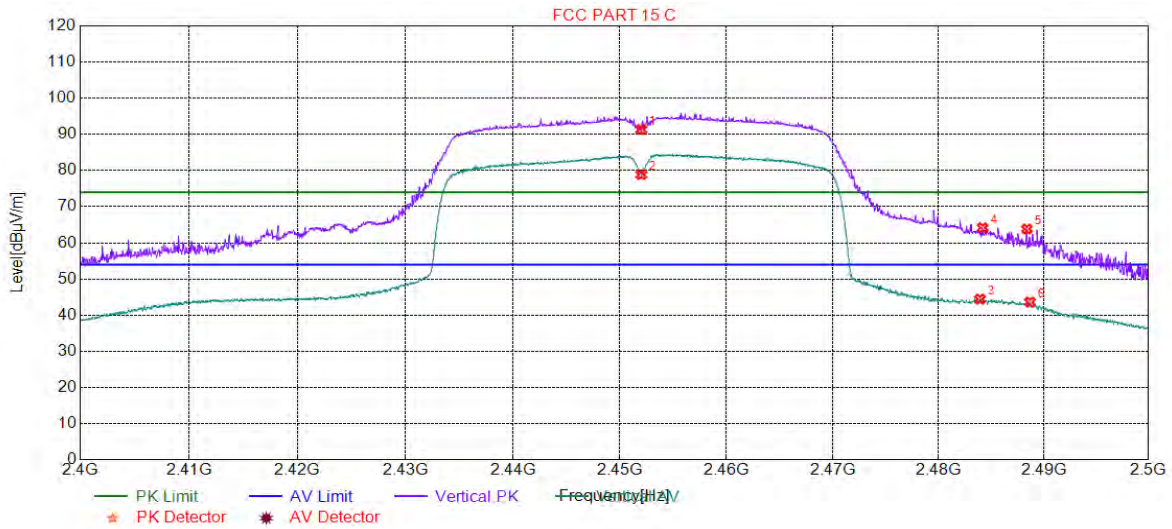
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2372.1622	55.20	1.17	74.00	18.80	150	325	Vertical
2	2386.4264	48.73	1.23	54.00	5.27	150	285	Vertical
3	2389.4294	66.14	1.24	74.00	7.86	150	281	Vertical
4	2390.0000	48.94	1.25	54.00	5.06	150	303	Vertical
5	2422.0000	77.72	1.35	54.00	-23.72	150	346	Vertical
6	2422.0000	89.32	1.35	74.00	-15.32	150	297	Vertical



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**4.10.1.14 802.11N40\_ Highest Channel\_ Vertical**



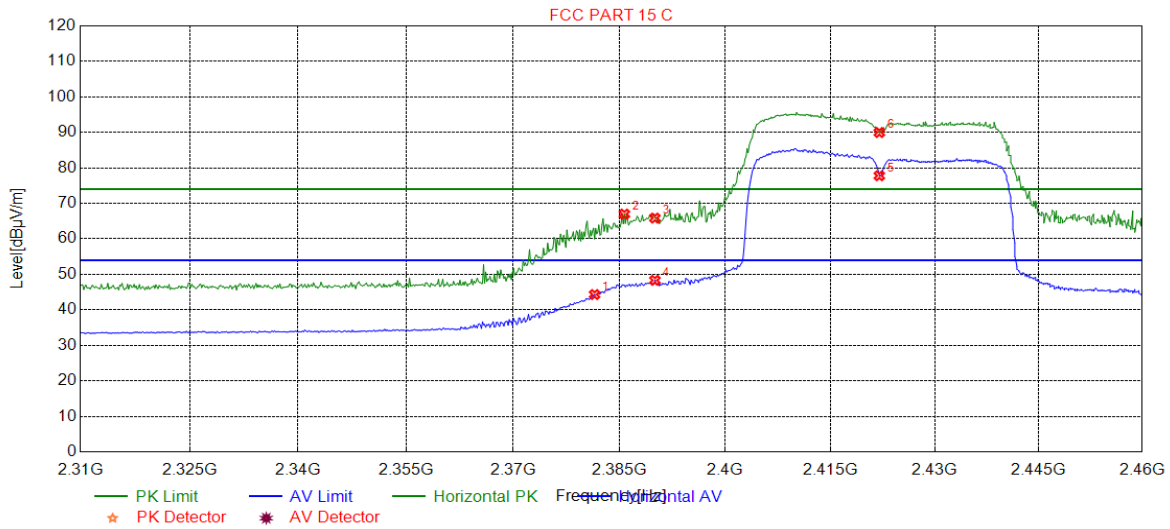
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.0000	91.31	1.44	74.00	-17.31	150	288	Vertical
2	2452.0000	78.87	1.44	54.00	-24.87	150	349	Vertical
3	2483.9420	44.44	1.53	54.00	9.56	150	143	Vertical
4	2484.1921	64.17	1.53	74.00	9.83	150	21	Vertical
5	2488.3942	63.83	1.54	74.00	10.17	150	21	Vertical
6	2488.6943	43.61	1.54	54.00	10.39	150	147	Vertical



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**4.10.1.15 802.11N40\_Lowest Channel\_Horizontal**



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2381.4715	44.32	1.21	54.00	9.68	150	54	Horizontal
2	2385.6757	66.99	1.23	74.00	7.01	150	60	Horizontal
3	2390.0000	65.85	1.25	74.00	8.15	150	17	Horizontal
4	2390.0000	48.33	1.25	54.00	5.67	150	341	Horizontal
5	2422.0000	77.78	1.35	54.00	-23.78	150	20	Horizontal
6	2422.0000	89.97	1.35	74.00	-15.97	150	38	Horizontal

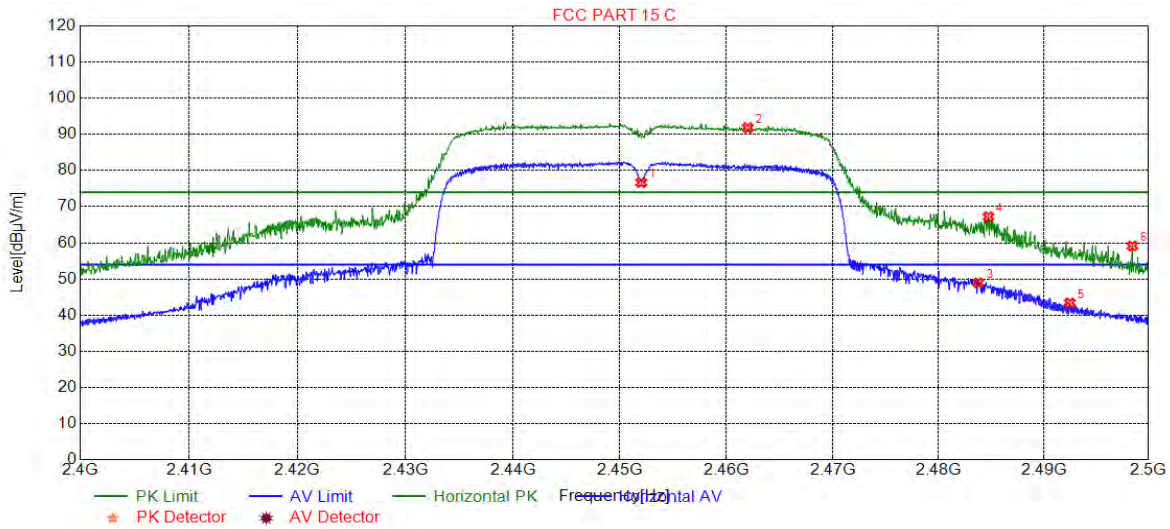


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**4.10.1.16 802.11N40\_ Highest Channel\_ Horizontal**



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.0000	76.67	1.44	54.00	-22.67	150	22	Horizontal
2	2462.0000	91.82	1.46	74.00	-17.82	150	225	Horizontal
3	2483.7919	48.94	1.52	54.00	5.06	150	26	Horizontal
4	2484.7424	67.22	1.53	74.00	6.78	150	22	Horizontal
5	2492.4962	43.37	1.55	54.00	10.63	150	26	Horizontal
6	2498.4492	59.12	1.57	74.00	14.88	150	15	Horizontal

**Remark:**

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

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

All Modes have been tested, but only the worst case sole 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	2017/5/10	2020/5/9
LISN	Rohde & Schwarz	ENV216	SEM007-01	2018/9/2	2019/9/2
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2018/4/2	2019/4/1
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2018/7/12	2019/7/11
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2019/2/11	2020/2/10
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2018/4/2	2019/4/1

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	2018/9/15	2019/9/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2019/1/13	2020/1/12
Coaxial Cable	SGS	N/A	SEM031-01	2018/7/13	2019/7/12
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018/9/2	2019/9/2
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2018/11/27	2019/11/27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018/9/2	2019/9/2

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	2018/7/12	2019/7/11
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2018/9/2	2019/9/2
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017/6/27	2020/6/26
Pre-amplifier (0.1-1.3GHz)	Agilent Technologies	8447D	SEM005-01	2018/4/2	2019/4/1

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	2018/7/12	2019/7/11
EXA Signal Analyzer (10Hz-26.5GHz)	Agilent Technologies Inc	N9010A	SEM004-09	2018/4/13	2019/4/12
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017/6/27	2020/6/26
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	2018/9/2	2019/9/2
Low Noise Amplifier(100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2018/9/27	2019/9/27
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	2018/4/2	2019/4/1
Band filter	N/A	N/A	SEM023-01	N/A	N/A



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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	2018/4/2	2019/4/1
Trilog-Broadband Antenna(25M-2GHz)	Schwarzbeck	VULB9168	SEM003-18	2016/6/29	2019/6/28
Pre-amplifier (9k-1GHz)	Sonoma	310N	SEM005-03	2018/4/13	2019/4/12
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	2018/7/12	2019/7/11

## 7 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for ZR/2019/20008.

The End



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