



FCC TEST REPORT

Application No: AR/2020/A0007
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.: M2010J19SG, M2010J19ST
Trade Mark: Redmi
FCC ID: 2AFZZJ19CG
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: 2020/9/29
Date of Test: 2020/9/29 to 2020/10/16(for original report AR/2020/9001002-01)
2020/11/3 to 2020/11/10(for new report AR/2020/A000702-01)
Date of Issue: 2021/4/22

Test Result:	PASS *
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Derek Yang
Wireless Laboratory Manager

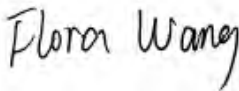



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1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020/11/13		Original
02		2021/4/22	Flora.Wang	1. Add test site Information 2.Modify data conversion error of antenna height 3.Update equipment list

Authorized for issue by:			
Prepared By		 <hr/> (Flora Wang) /Project Engineer	
Checked By		 <hr/> (David Chen) /Reviewer	



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2 Test Summary

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

Remark: All test were performed by Lab A and B.
 Parts of test items above were subcontracted to Lab B.
 Lab A SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch.
 Lab B SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.

Remark:

Item	M2010J19SG	M2010J19ST
LTE Band 41	Support	Not Support

Note: customer declaration, two models are the same,except for model. There are more than one model,each one should be applied throughout the compliance test respectively, However, only the worst case(M2010J19CG) will be recorded in this report.

This report is changed to model based on the original report number AR/2020/9001002-01
 The revised contents are as follow:

Model name	Camera specification	LED position	Camera position	Trade Mark	rear cover
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M2010J19CG, M2010J19CT	48M+2M+2M	The LED is located to the right of the macro camera	Viewed from the back, the macro camera, main camera and depth-of-field camera appear from top to bottom	POCO	The material is the same, Camera area coverage shape adjustment,
M2010J19SG M2010J19ST	48M+8M+2M+2M	The LED is located below the depth-of-field camera	Viewed from the back, the wide Angle camera, main camera and depth of field camera are in order from top to bottom, and add single macro camera is on the right	Redmi	drawing is different, laser engraving is different

Therefore in this report only radiated spurious emissions were performed based on the worst case (**Radiated Spurious Emissions** :mode:B Channel:1; **Restricted bands around fundamental frequency**:mode:B Channel:11) of the original report with report number AR/2020/9001002-01 and other test data in this report are base on the previous report with report number AR/2020/9001002-01.



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3 General Information

3.1 Client Information

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

3.2 Test Location

Lab A:

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
Test engineer:	Dee Zheng, Mike Hu

Lab B:

Company:	SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.
Address:	1/F, Unit D, Building 1, Kanghong Orange Technology Park, No.137, Keyuan 3rd Road, Fengdong New City, Xi'an, Shaanxi China
Post code:	710086
Test engineer:	Ben Huang, Leah Chen

3.3 Test Facility

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

Lab A:

- **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



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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.

• Innovation, Science and Economic Development Canada

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

CAB identifier: CN0006.

IC#: 4620C.

Lab B:

• A2LA (Certificate No. 4854.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.

• FCC –Designation Number: CN1271.



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3.4 General Description of EUT

EUT Description::	Mobile Phone
Model No.:	M2010J19SG, M2010J19ST
Trade Mark:	Redmi
Hardware Version:	P2
Software Version:	MIUI12
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:	PIFA Antenna
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:	0.8dBi
Power Supply	<input checked="" type="checkbox"/> AC/DC Adapter; <input checked="" 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

Standard requirement:	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 2.5dBi.</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"> 1) The mains terminal disturbance voltage test was conducted in a shielded room. 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. 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, 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. 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. 		



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<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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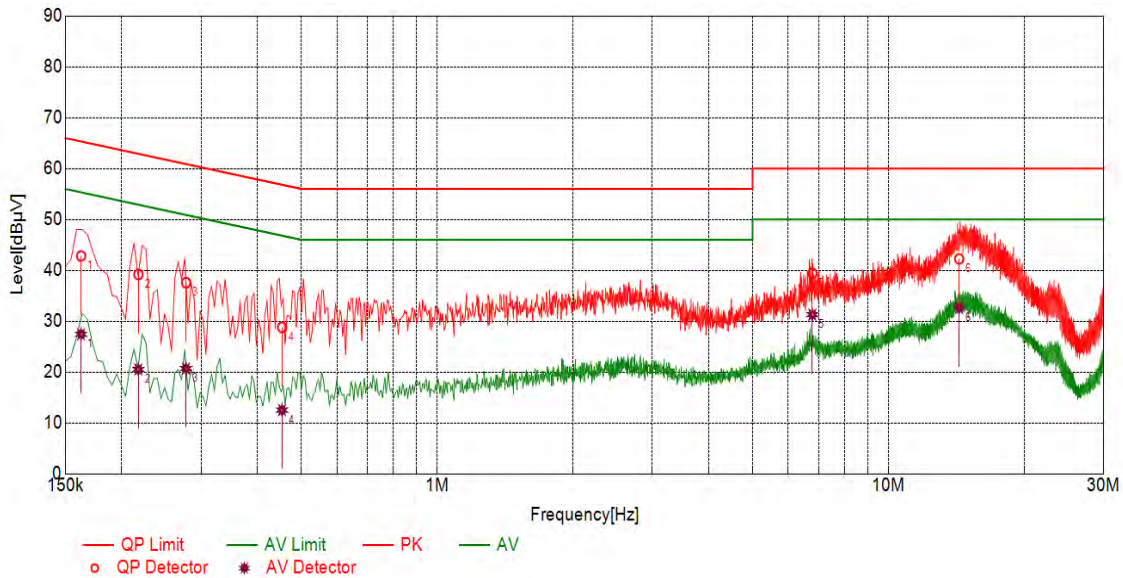
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Measurement Data

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:



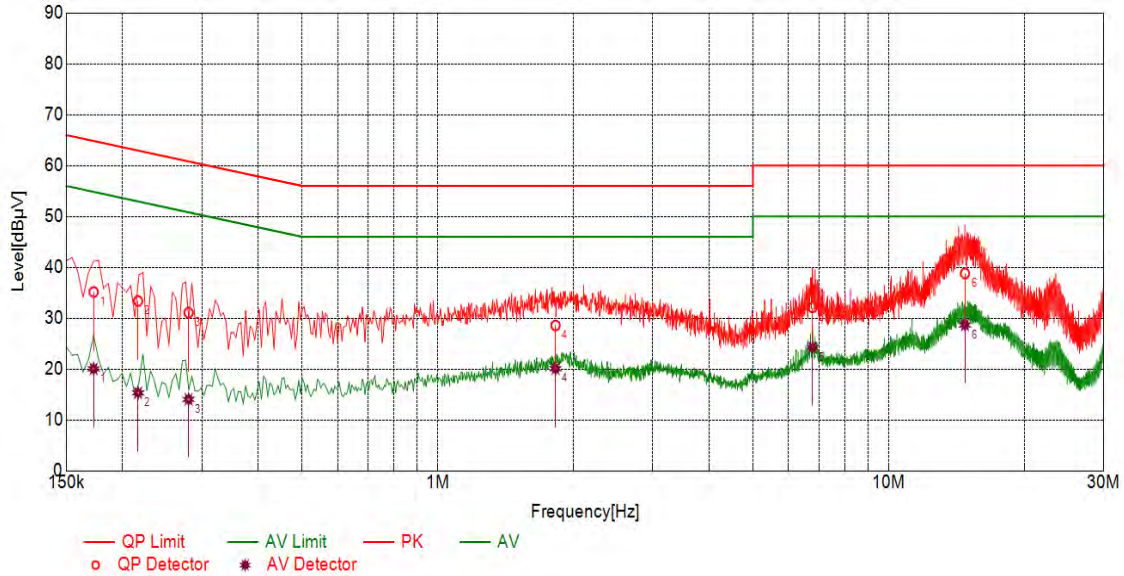
Test Graph

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Type
1	0.1626	10.10	42.82	65.33	22.51	27.43	55.33	27.90	L
2	0.2178	10.10	39.19	62.90	23.71	20.51	52.90	32.39	L
3	0.2778	10.10	37.58	60.88	23.30	20.69	50.88	30.19	L
4	0.4534	10.10	28.81	56.81	28.00	12.53	46.81	34.28	L
5	6.7843	10.10	39.41	60.00	20.59	31.29	50.00	18.71	L
6	14.3504	10.11	42.25	60.00	17.75	32.61	50.00	17.39	L



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Neutral Line:



Test Graph

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Type
1	0.1726	10.10	35.15	64.84	29.69	20.04	54.84	34.80	N
2	0.2165	10.10	33.38	62.95	29.57	15.31	52.95	37.64	N
3	0.2802	10.10	31.08	60.81	29.73	14.05	50.81	36.76	N
4	1.8251	10.10	28.58	56.00	27.42	20.08	46.00	25.92	N
5	6.7833	10.10	32.11	60.00	27.89	24.24	50.00	25.76	N
6	14.7700	10.11	38.81	60.00	21.19	28.68	50.00	21.32	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.



4.3 Duty Cycle

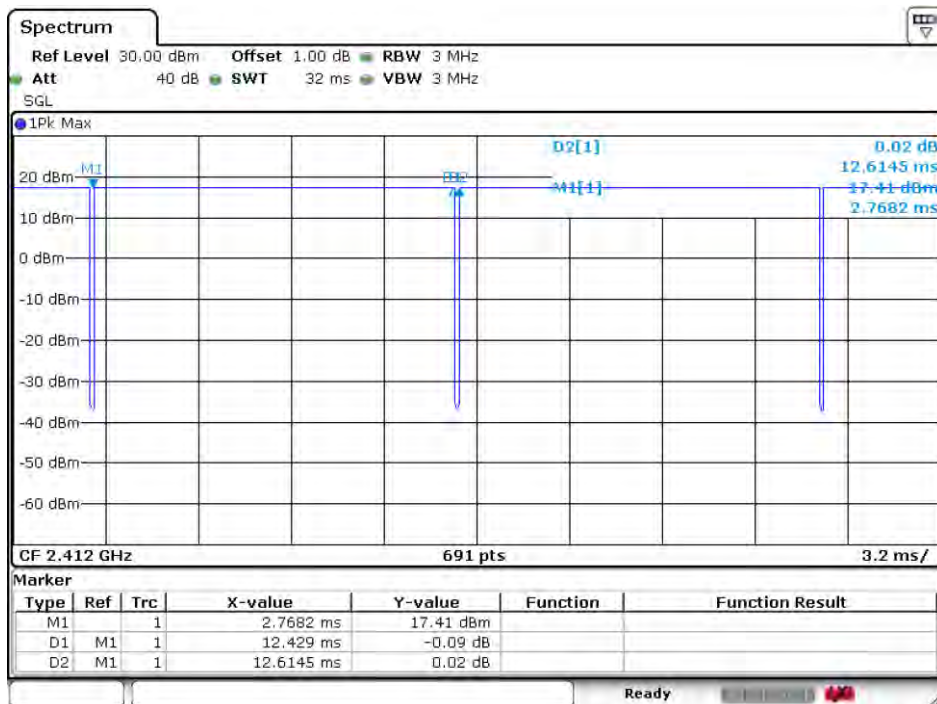
4.3.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11B	Ant 1: CH1,CH6,CH11	98.53
11G	Ant 1: CH1,CH6,CH11	98.34
11N20	Ant 1: CH1,CH6,CH11	97.78
11N40	Ant 1: CH3,CH6,CH9	94.80

4.3.1 Test Plots

4.3.1.1 ANT1

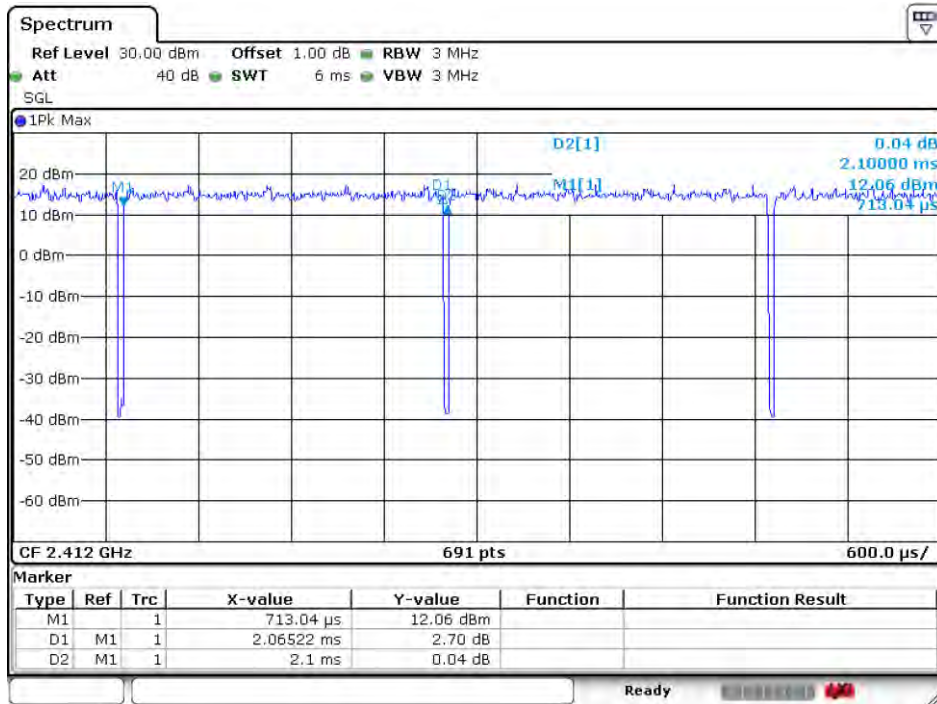
4.3.1.1.1 11B



Date: 13.OCT.2020 20:29:38

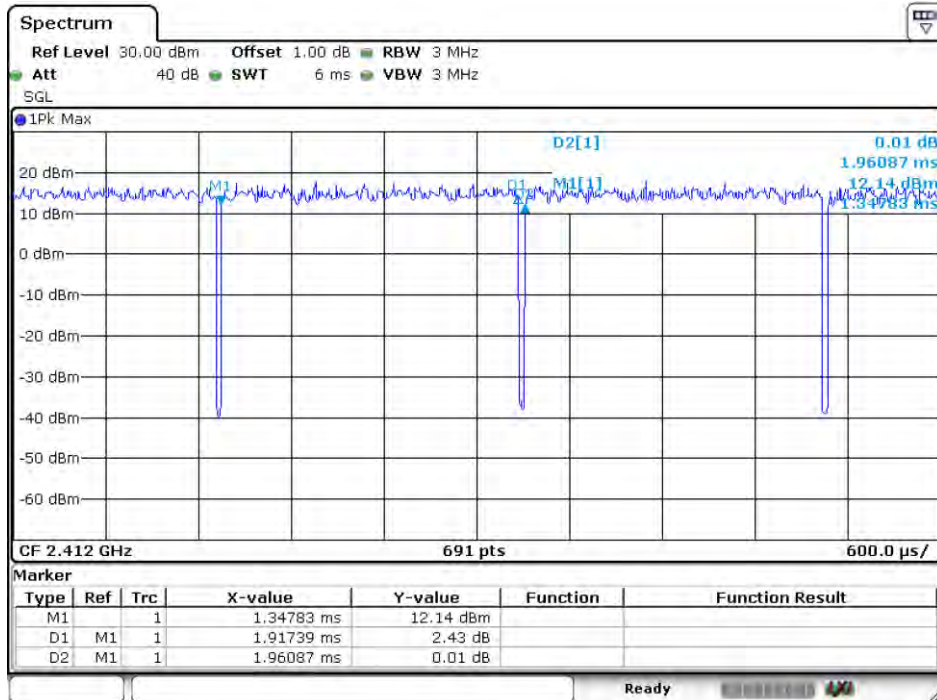


4.3.1.1.2 11G



Date: 13.OCT.2020 20:28:52

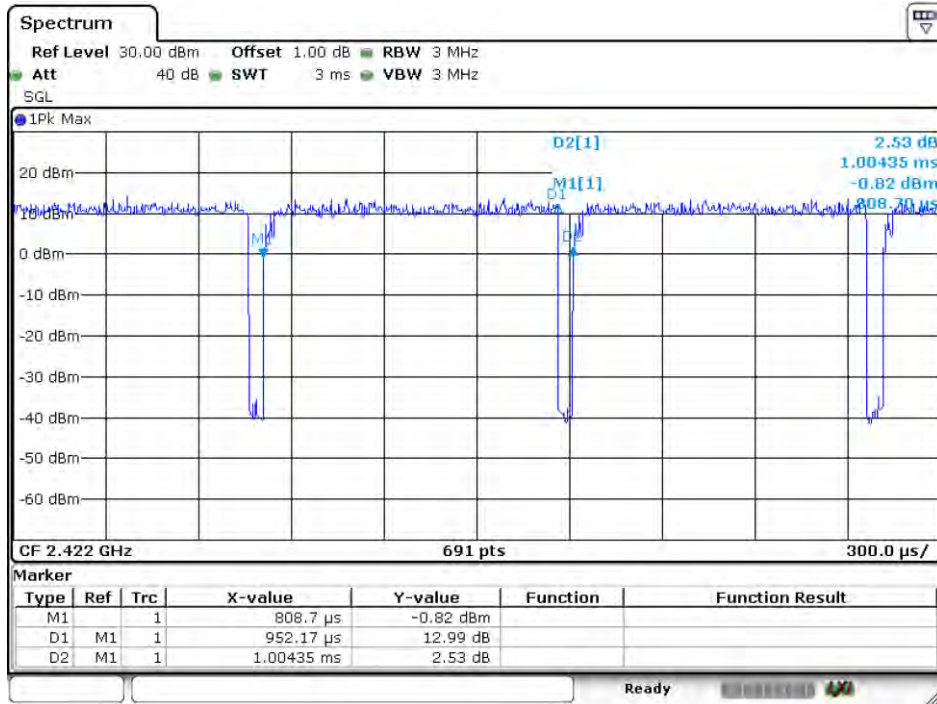
4.3.1.1.3 11N20



Date: 13.OCT.2020 20:26:39



4.3.1.1.4 11N40



Date: 13.OCT.2020 20:25:42



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 Peak Power:

Mode	Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result
802.11B	Lowest	18.62	30.00	Pass
	Middle	18.56	30.00	Pass
	Highest	18.46	30.00	Pass
802.11G	Lowest	19.78	30.00	Pass
	Middle	19.76	30.00	Pass
	Highest	19.76	30.00	Pass
802.11N20	Lowest	15.83	30.00	Pass
	Middle	16.01	30.00	Pass
	Highest	16.14	30.00	Pass
802.11N40	Lowest	16.38	30.00	Pass
	Middle	16.07	30.00	Pass
	Highest	16.88	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	15.46	10.07	≥500	Pass
	Middle	15.11	10.04	≥500	Pass
	Highest	15.37	10.01	≥500	Pass
802.11G	Lowest	18.67	15.91	≥500	Pass
	Middle	16.85	16.24	≥500	Pass
	Highest	16.89	15.70	≥500	Pass
802.11N20	Lowest	17.89	16.75	≥500	Pass
	Middle	17.97	17.17	≥500	Pass
	Highest	17.89	16.51	≥500	Pass
802.11N40	Lowest	36.12	35.10	≥500	Pass
	Middle	36.38	36.29	≥500	Pass
	Highest	36.30	35.11	≥500	Pass



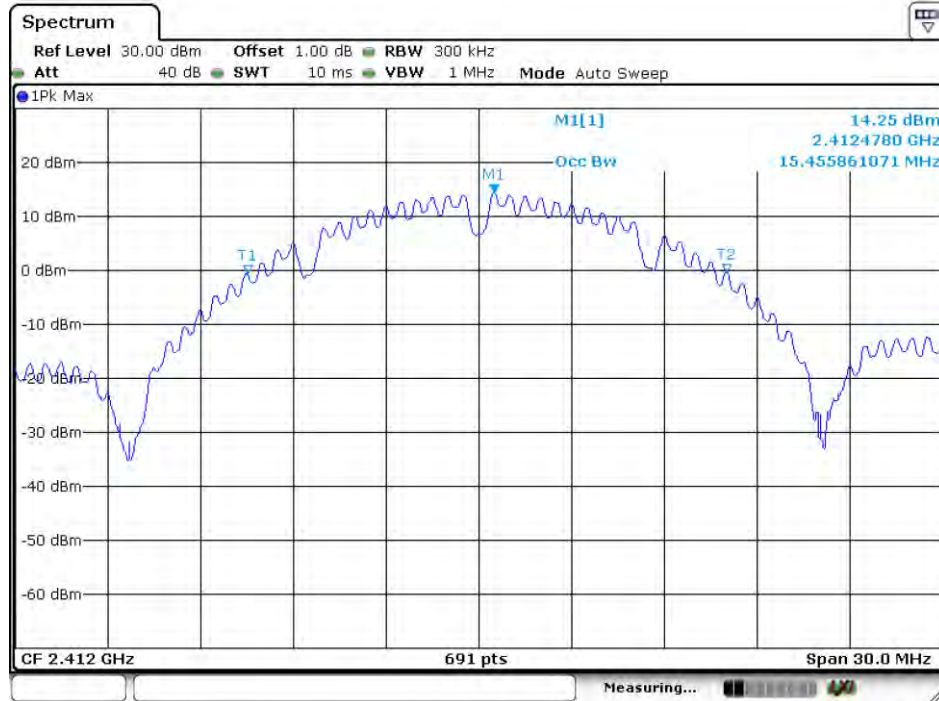
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4.5.2 Test plots

4.5.2.1 ANT1

4.5.2.1.1 802.11B_Lowest Channel

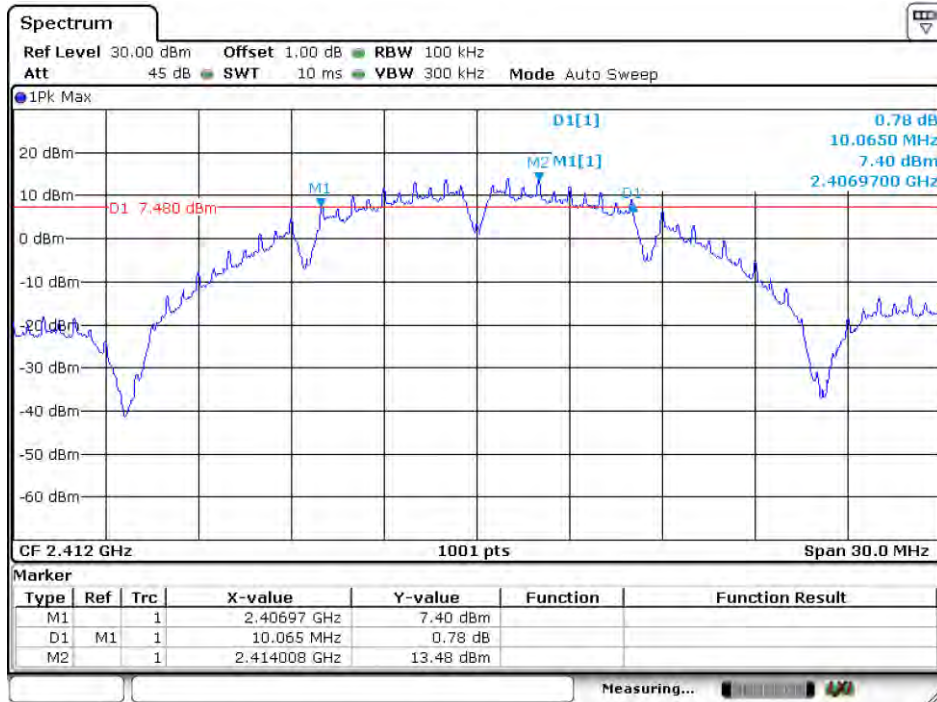


Date: 13.OCT.2020 19:38:36



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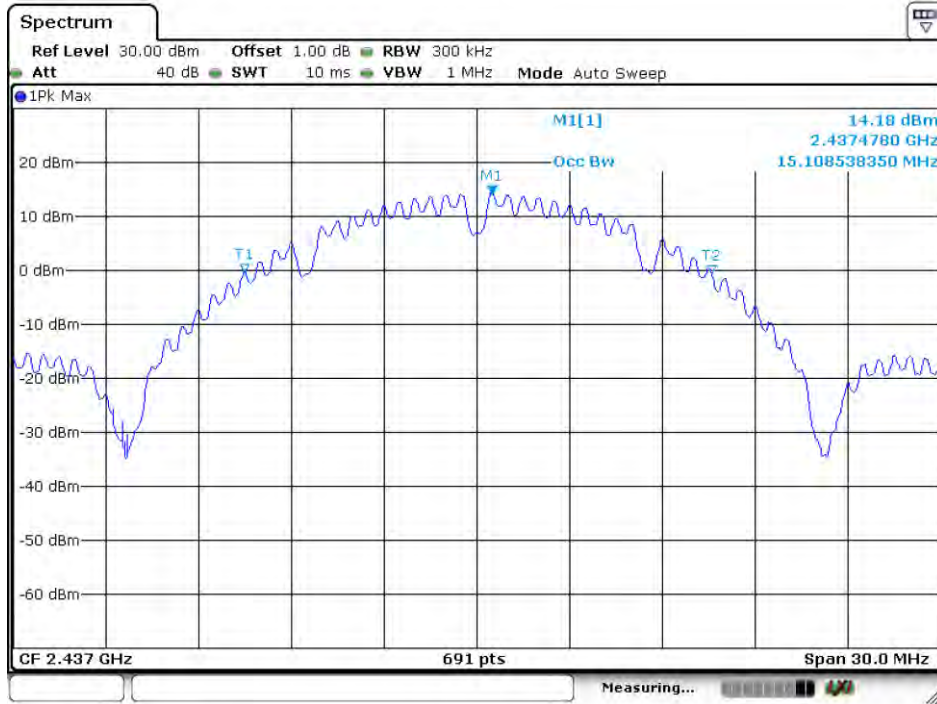
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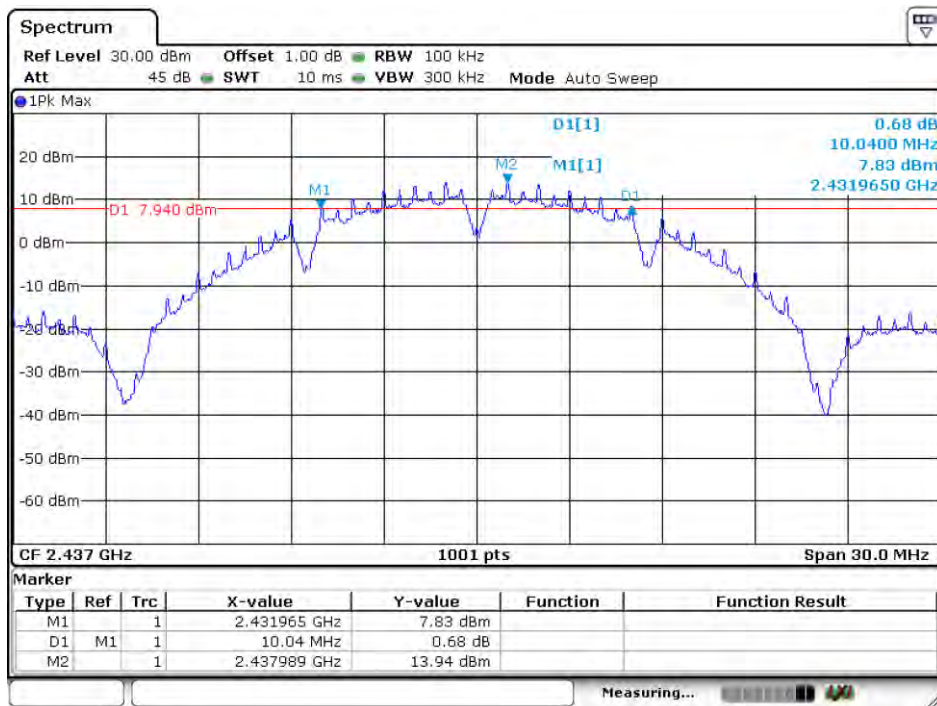
Date: 13.OCT.2020 16:52:35



4.5.2.1.2 802.11B_ Middle Channel



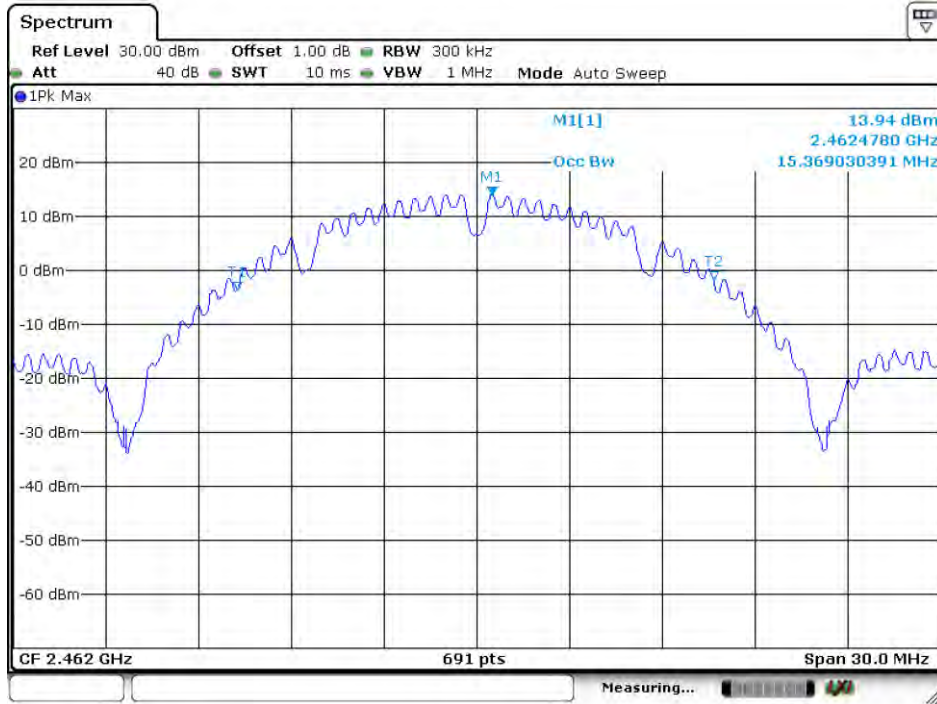
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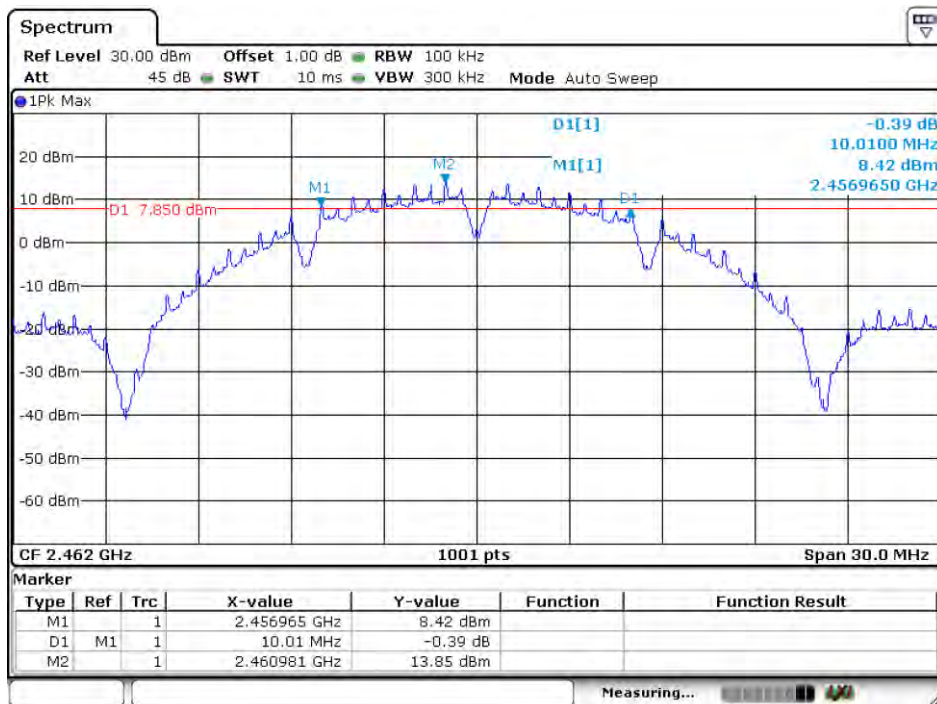
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4.5.2.1.3 802.11B_ Highest Channel



Date: 13.OCT.2020 19:41:55



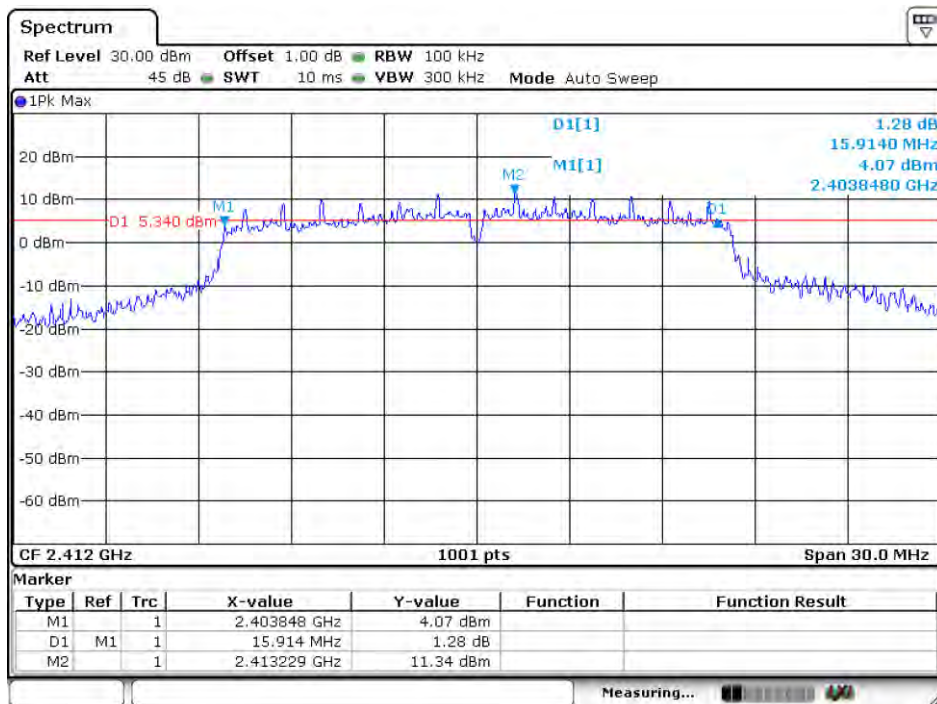
Date: 13.OCT.2020 16:55:04



4.5.2.1.4 802.11G_Lowest Channel



Date: 13.OCT.2020 19:42:51



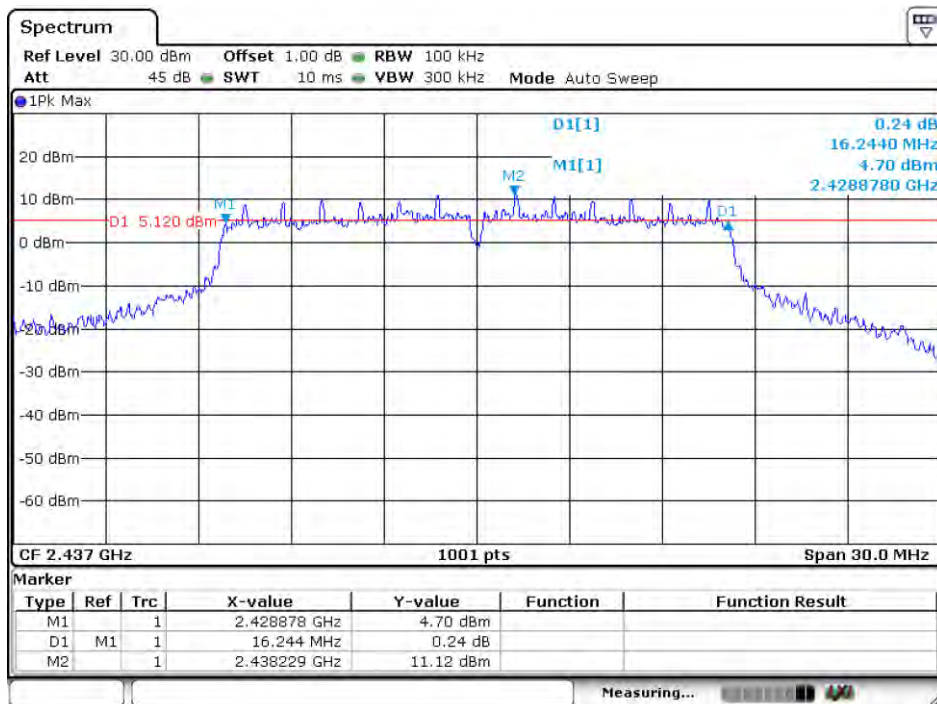
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4.5.2.1.5 802.11G_ Middle Channel



Date: 13.OCT.2020 19:42:30

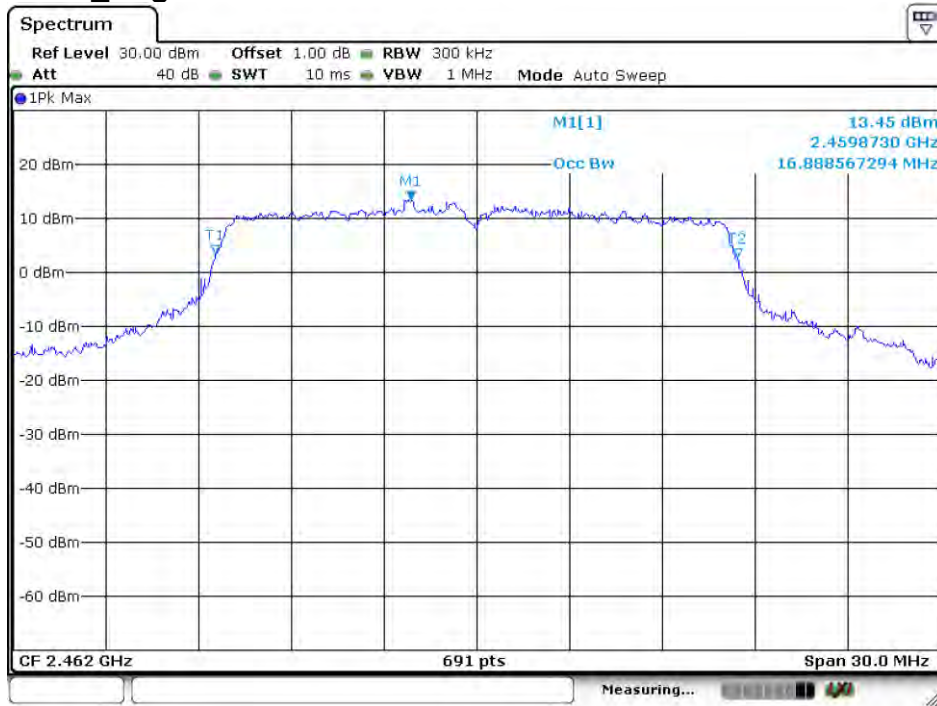


Date: 13.OCT.2020 16:58:19

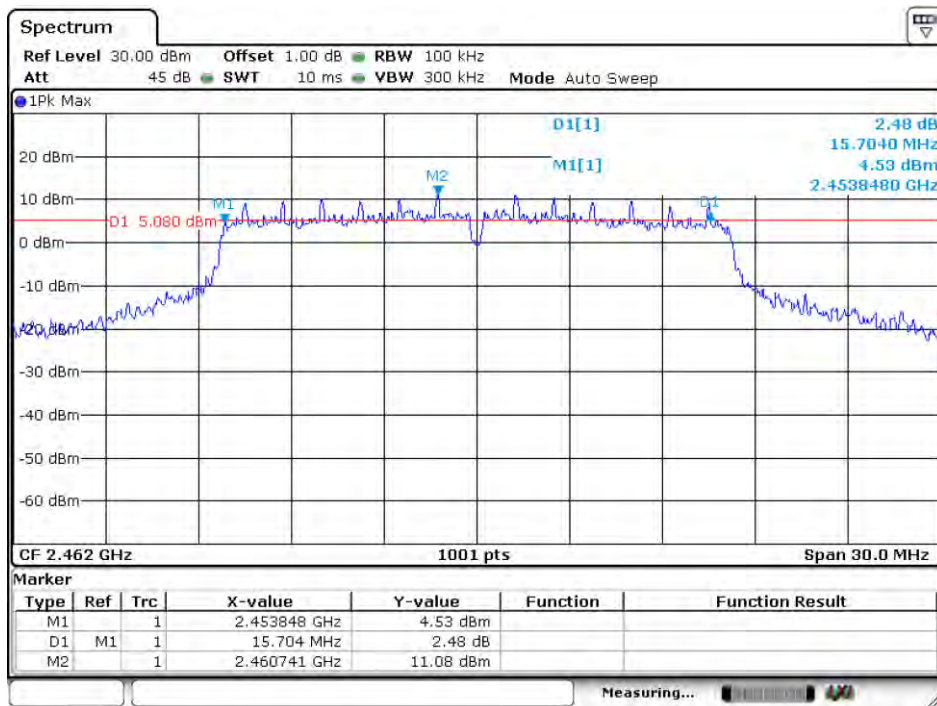


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4.5.2.1.6 802.11G_Highest Channel



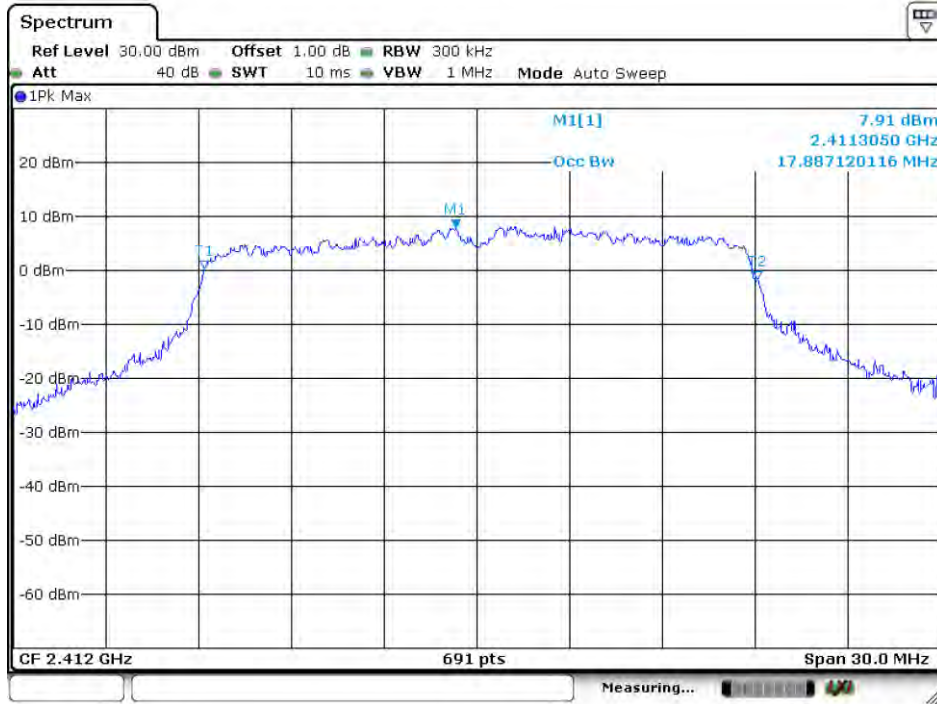
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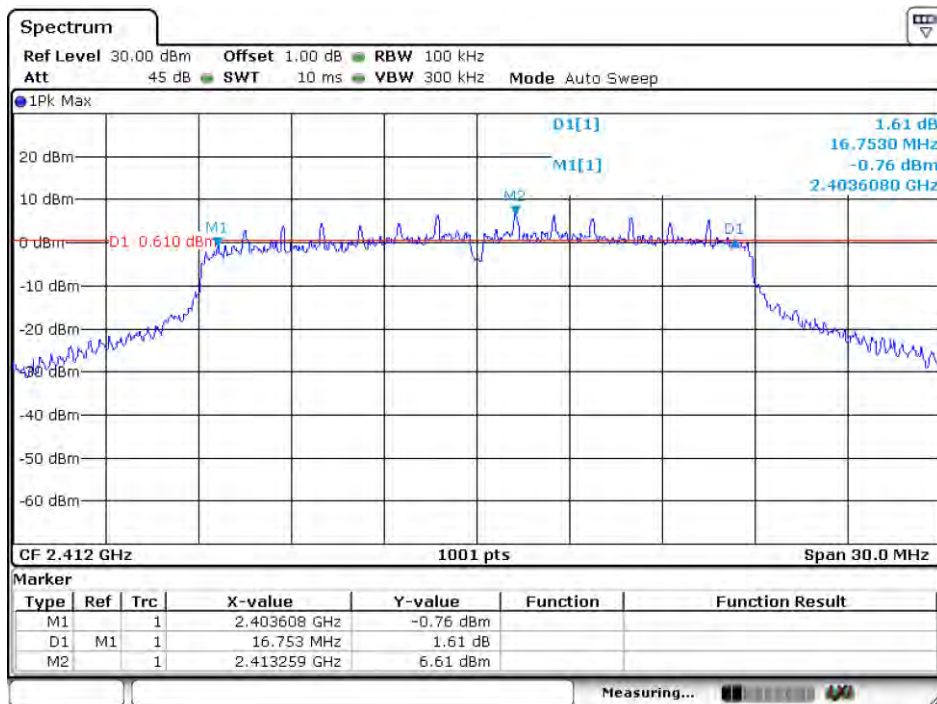
Date: 13.OCT.2020 16:55:58



4.5.2.1.7 802.11N20_Lowest Channel



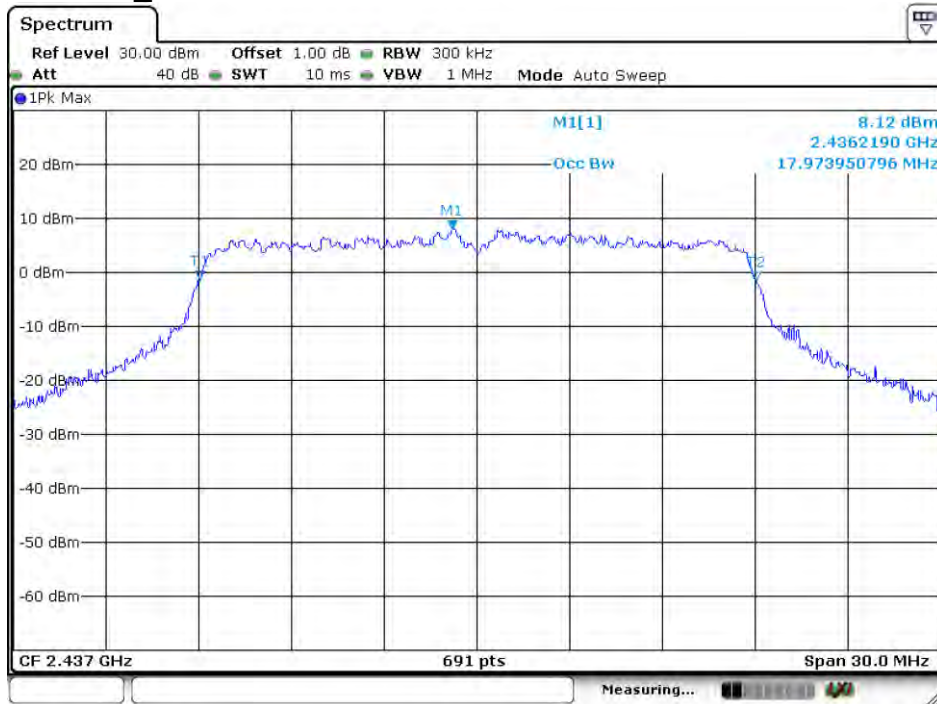
Date: 13.OCT.2020 19:43:17



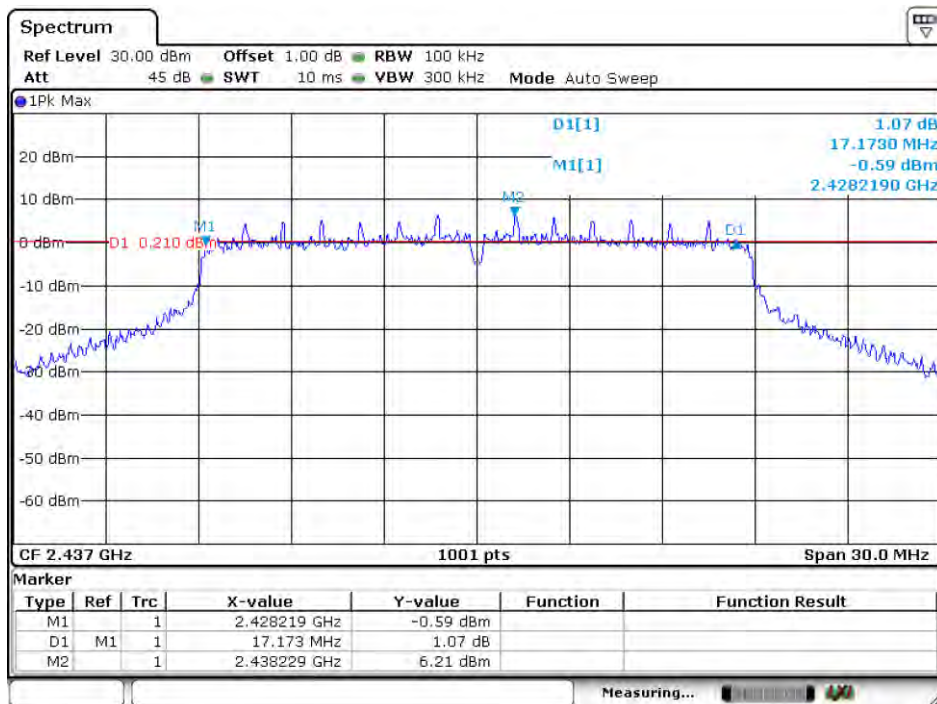
Date: 13.OCT.2020 16:47:50



4.5.2.1.8 802.11 N20_ Middle Channel



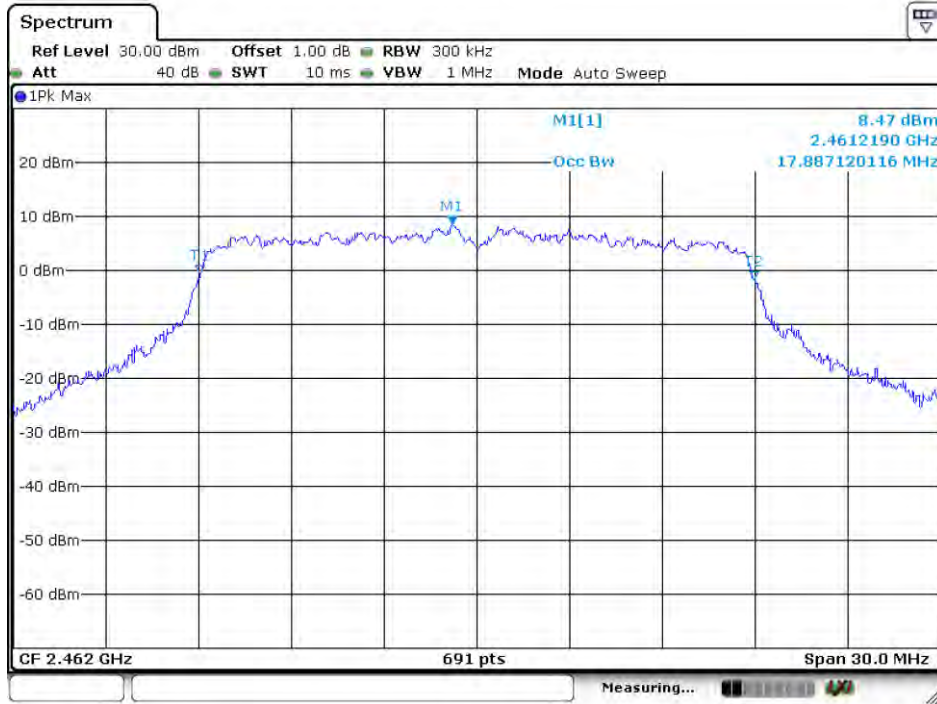
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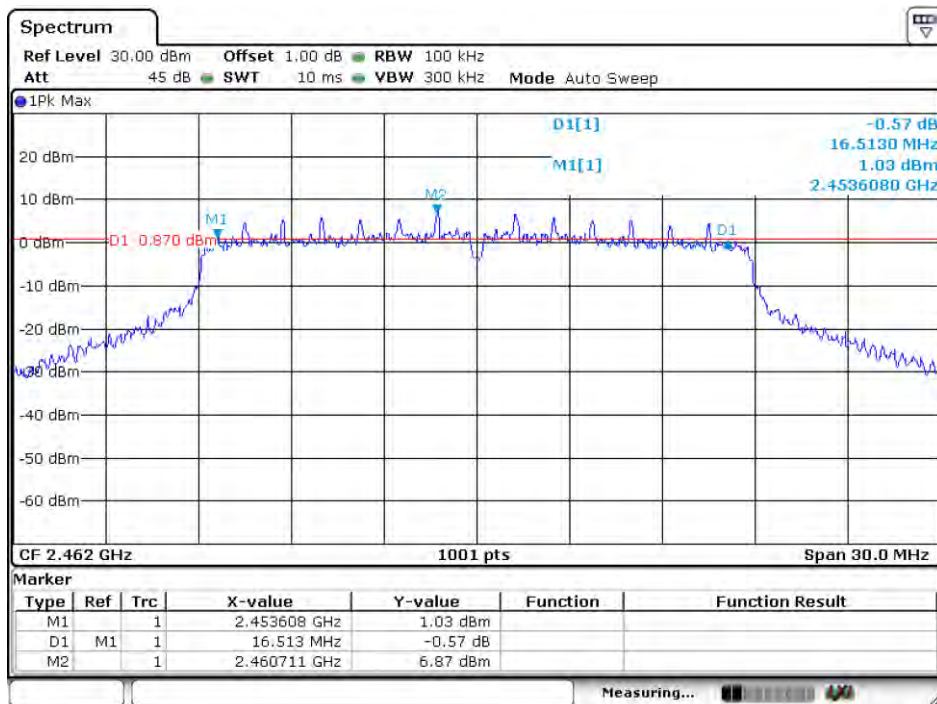
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4.5.2.1.9 802.11 N20_ Highest Channel



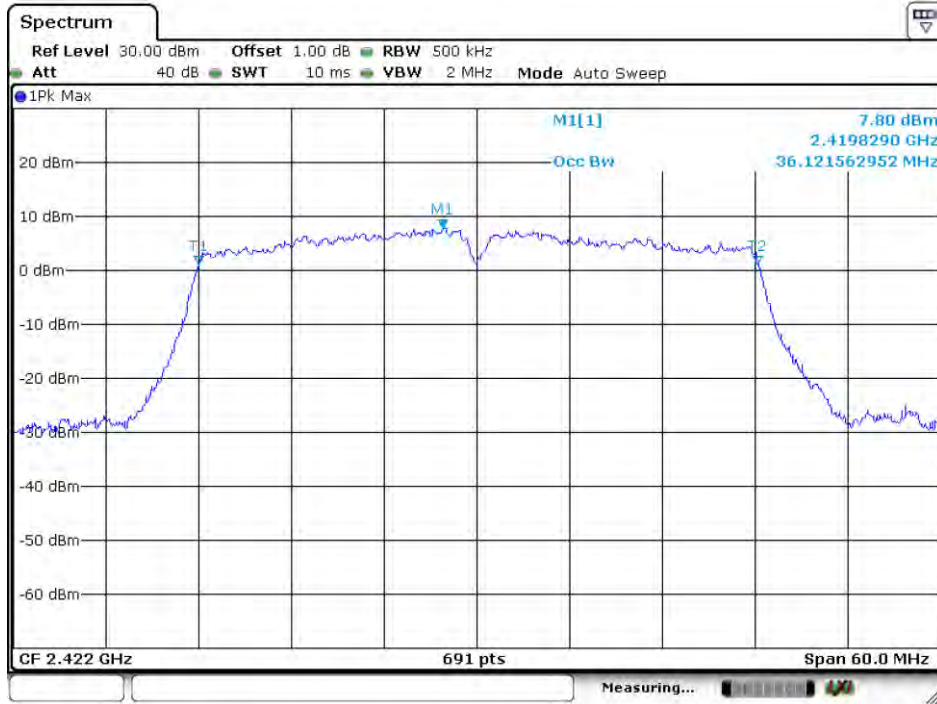
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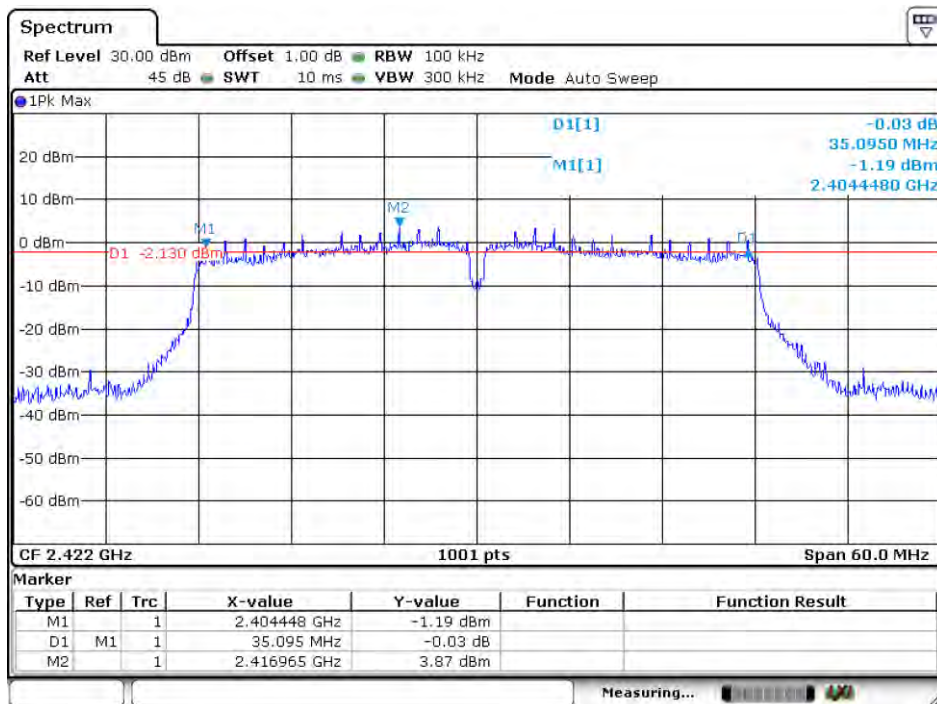
Date: 13.OCT.2020 16:45:21



4.5.2.1.10 802.11N40_Lowest Channel



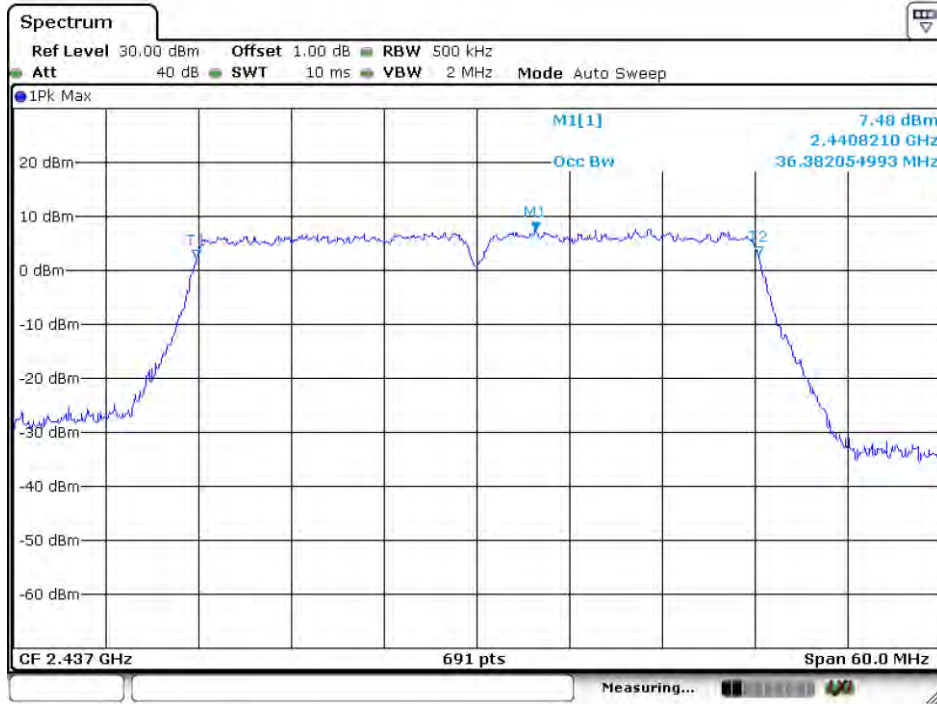
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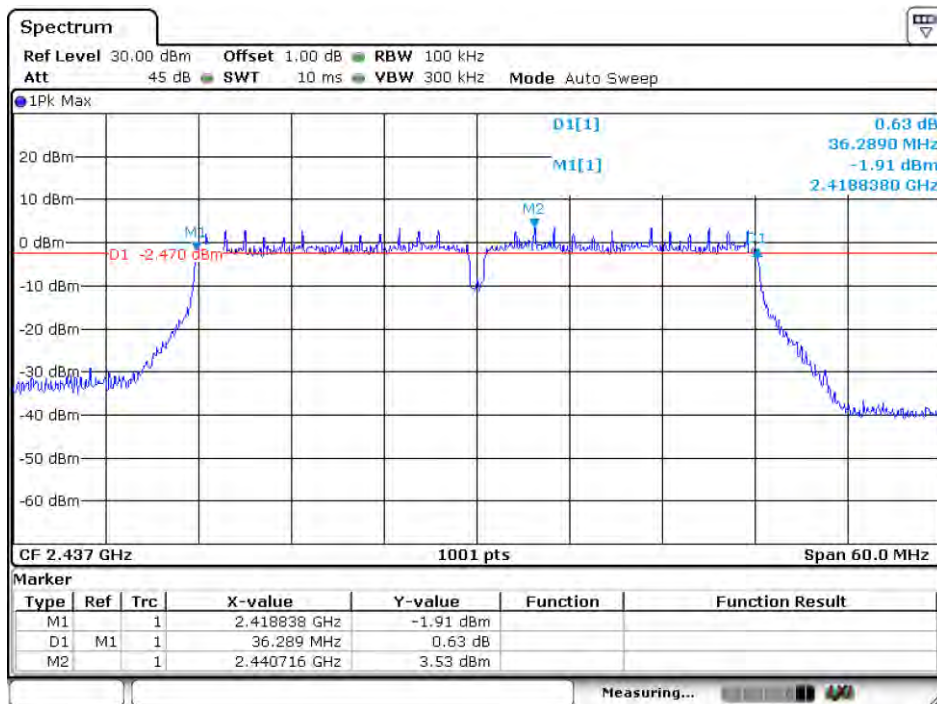
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4.5.2.1.11 802.11 N40_ Middle Channel



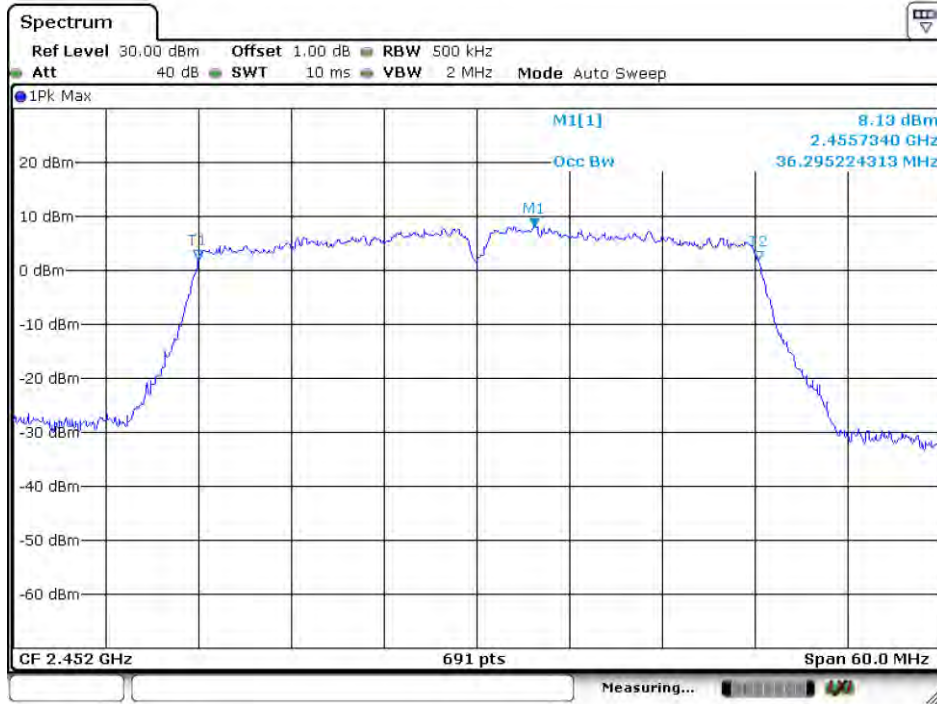
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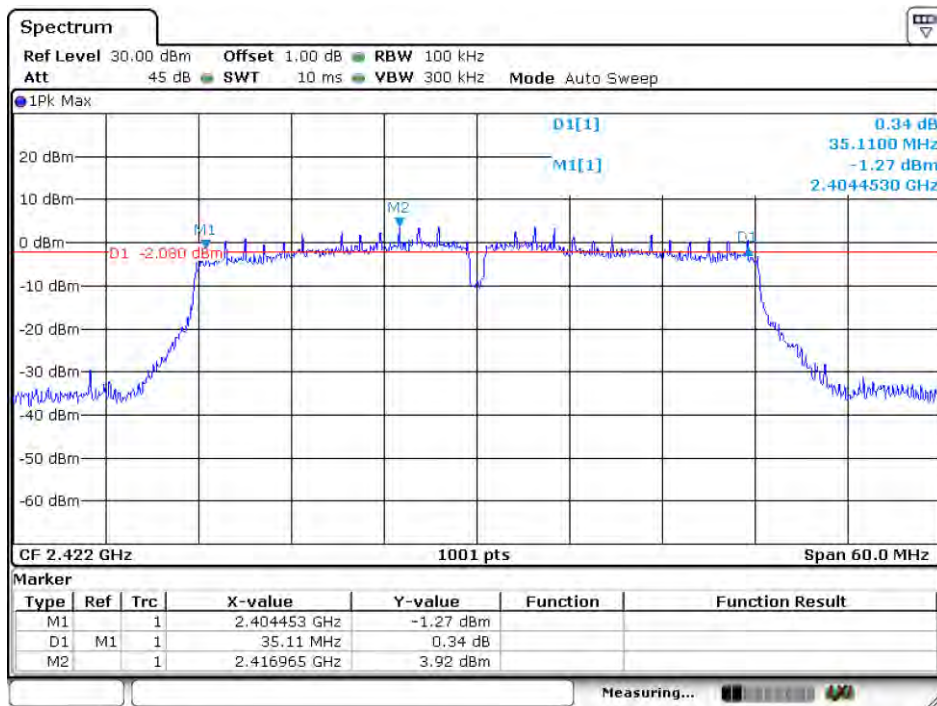
Date: 13.OCT.2020 16:50:14



4.5.2.1.12 802.11 N40_ Highest Channel



Date: 13.OCT.2020 19:45:07



Date: 13.OCT.2020 16:51:06



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	-2.98	≤8.00	Pass
	Middle	-3.34	≤8.00	Pass
	Highest	-4.97	≤8.00	Pass
802.11G	Lowest	-4.52	≤8.00	Pass
	Middle	-3.91	≤8.00	Pass
	Highest	-5.17	≤8.00	Pass
802.11N20	Lowest	-9.79	≤8.00	Pass
	Middle	-9.35	≤8.00	Pass
	Highest	-9.54	≤8.00	Pass
802.11N40	Lowest	-10.81	≤8.00	Pass
	Middle	-11.33	≤8.00	Pass
	Highest	-9.99	≤8.00	Pass



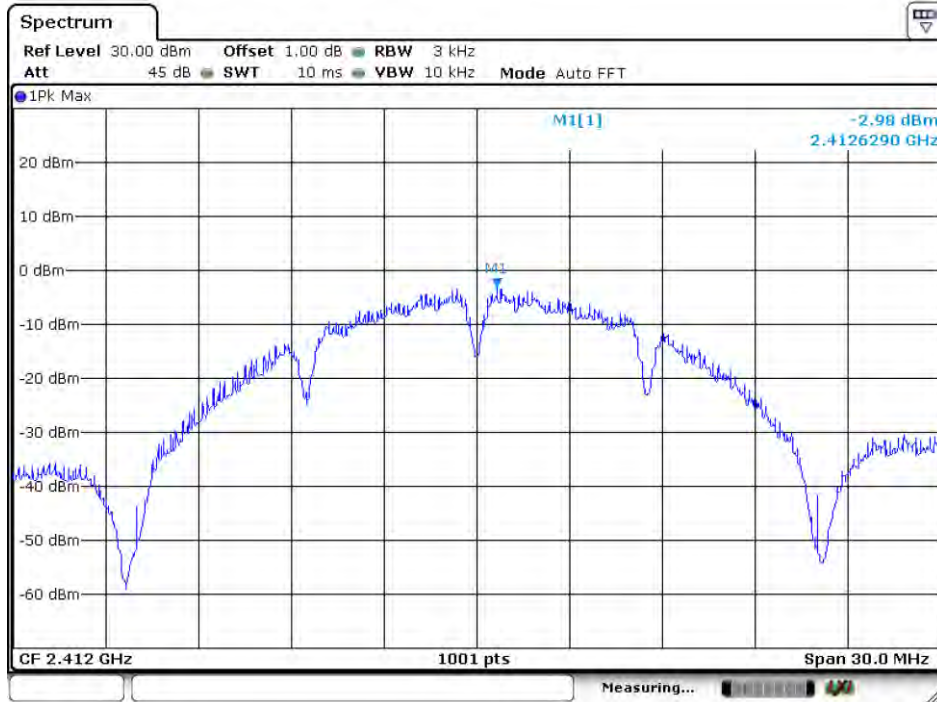
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4.6.2 Test plots

4.6.2.1 ANT1

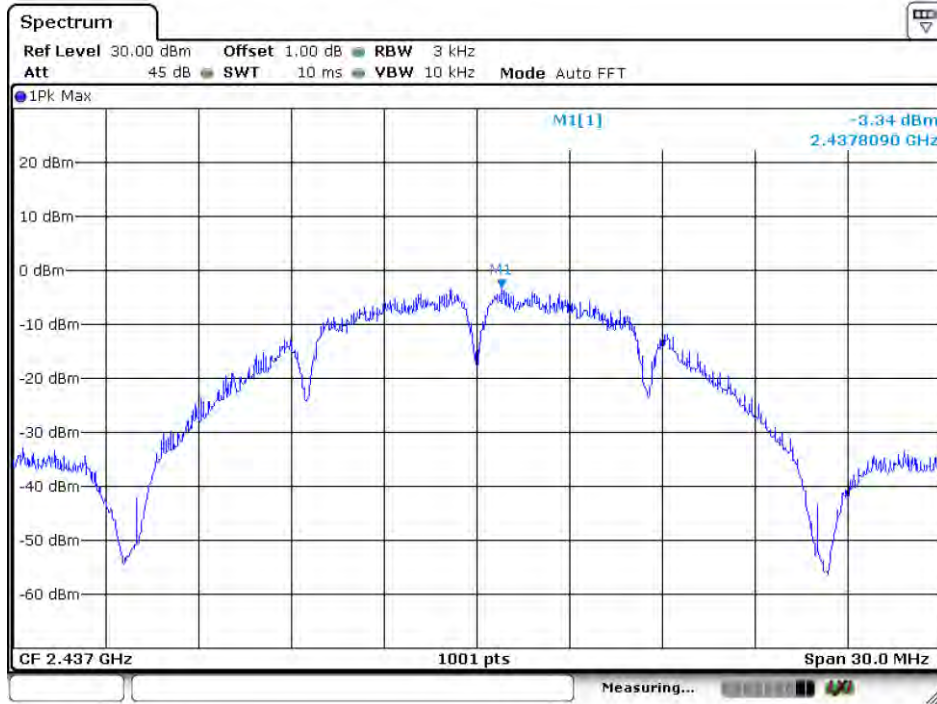
4.6.2.1.1 802.11B_Lowest Channel



Date: 13.OCT.2020 16:40:44

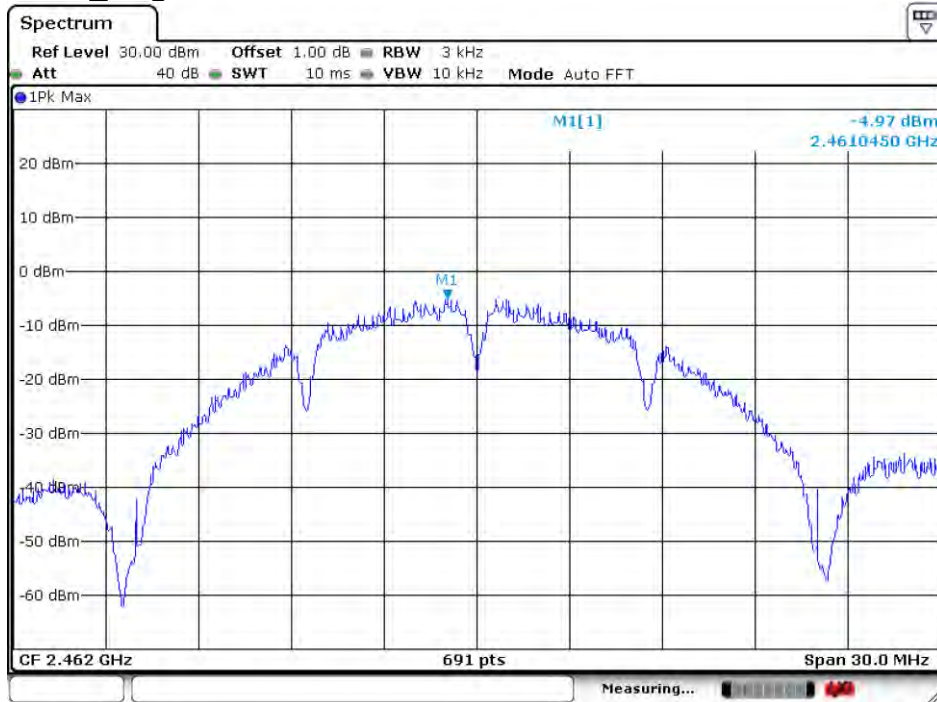


4.6.2.1.2 802.11B_ Middle Channel



Date: 13.OCT.2020 16:40:11

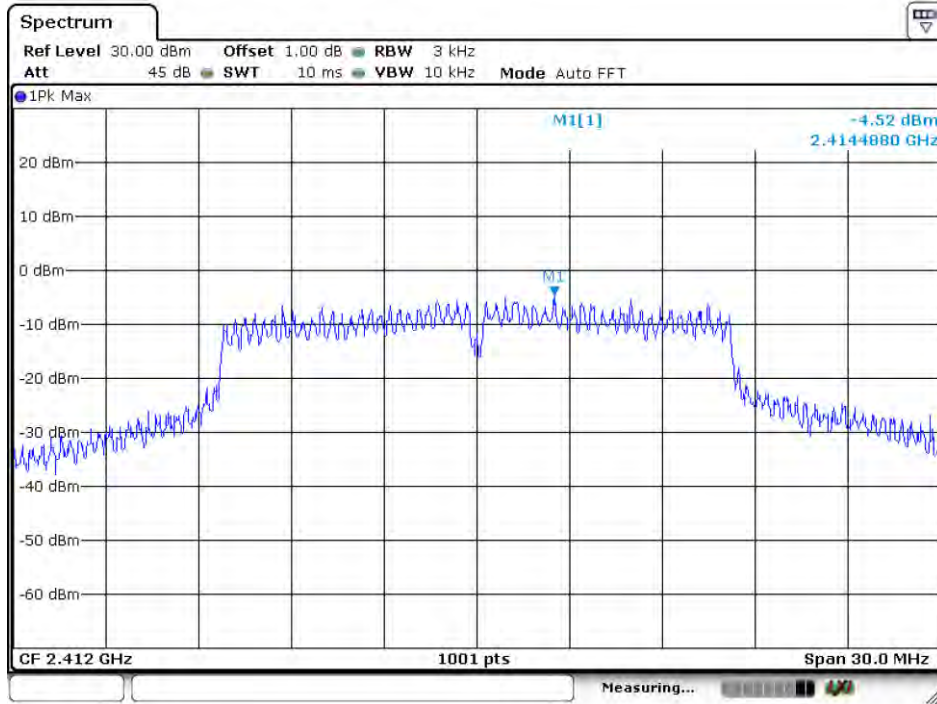
4.6.2.1.3 802.11B_ Highest Channel



Date: 21.OCT.2020 18:49:44

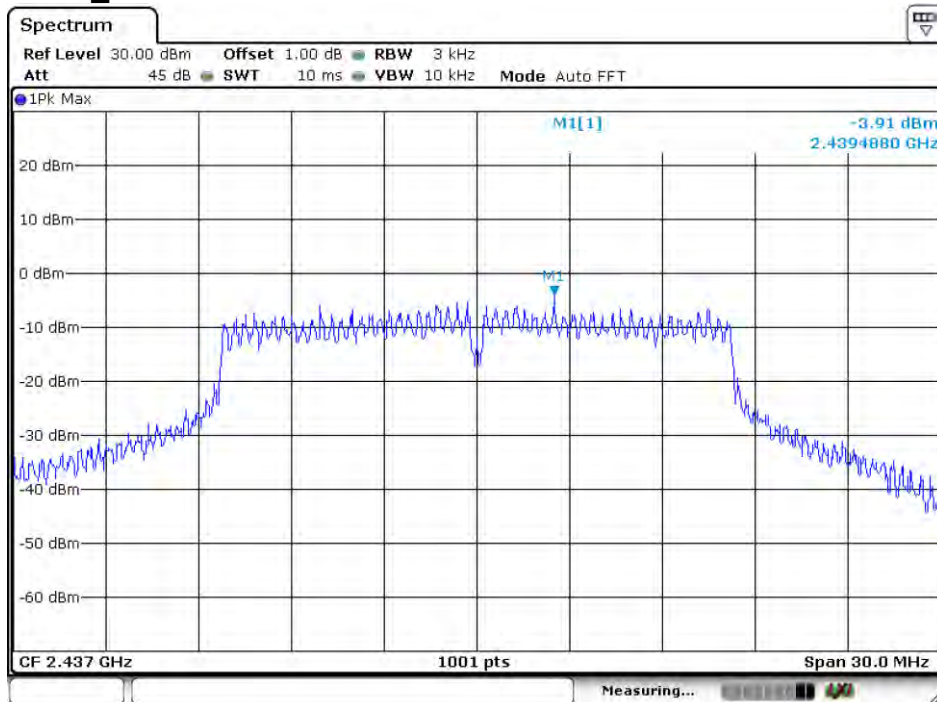


4.6.2.1.4 802.11G_Lowest Channel



Date: 13.OCT.2020 16:41:14

4.6.2.1.5 802.11G_Middle Channel



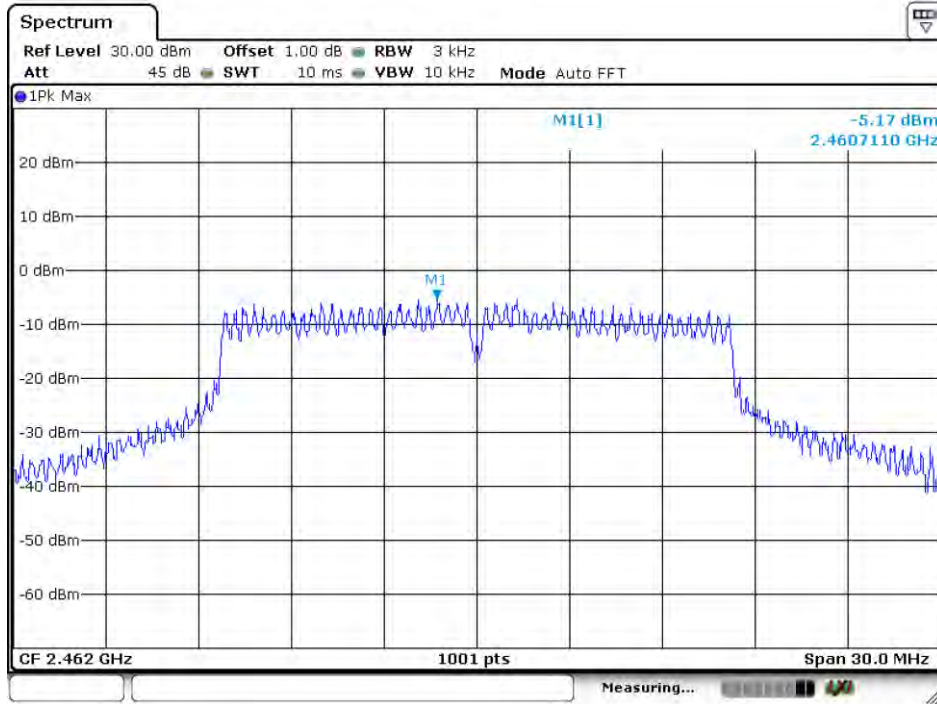
Date: 13.OCT.2020 16:41:41



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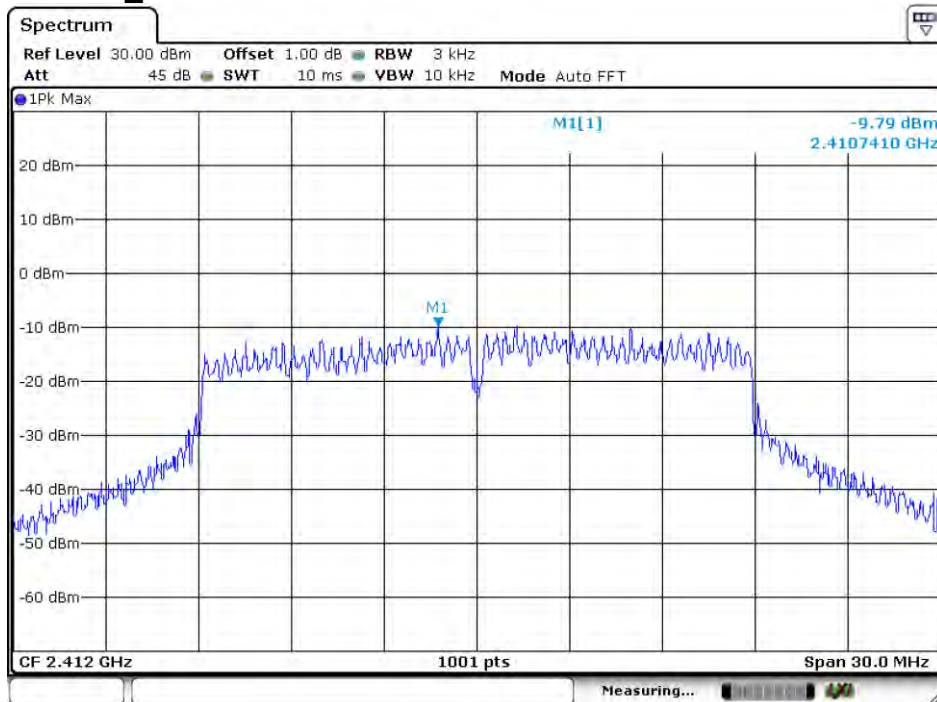
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4.6.2.1.6 802.11G_Highest Channel



Date: 13.OCT.2020 16:42:22

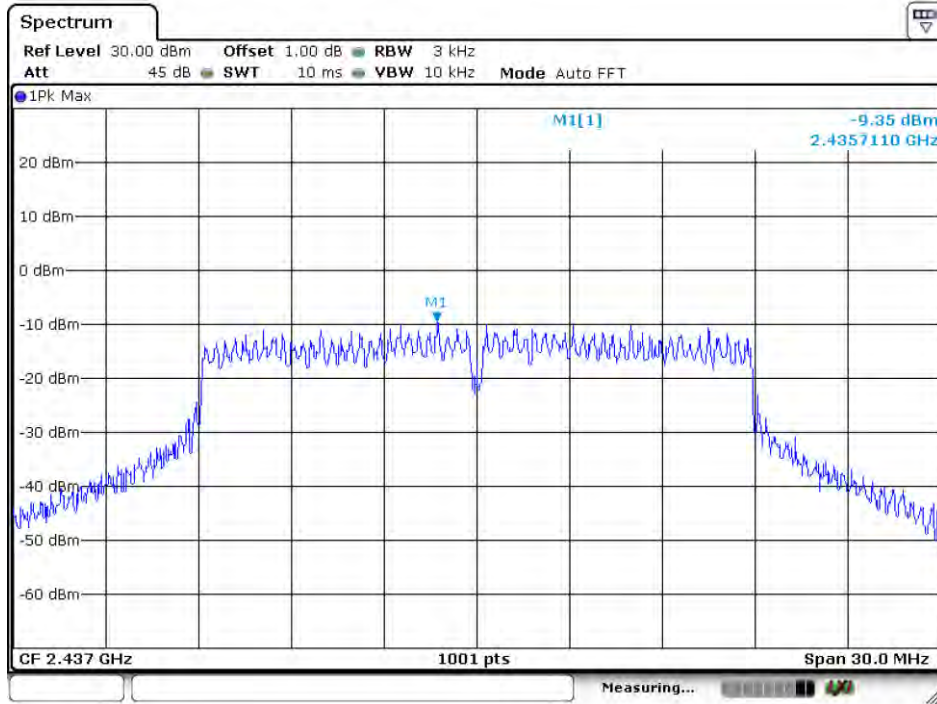
4.6.2.1.7 802.11N20_Lowest Channel



Date: 13.OCT.2020 16:38:29

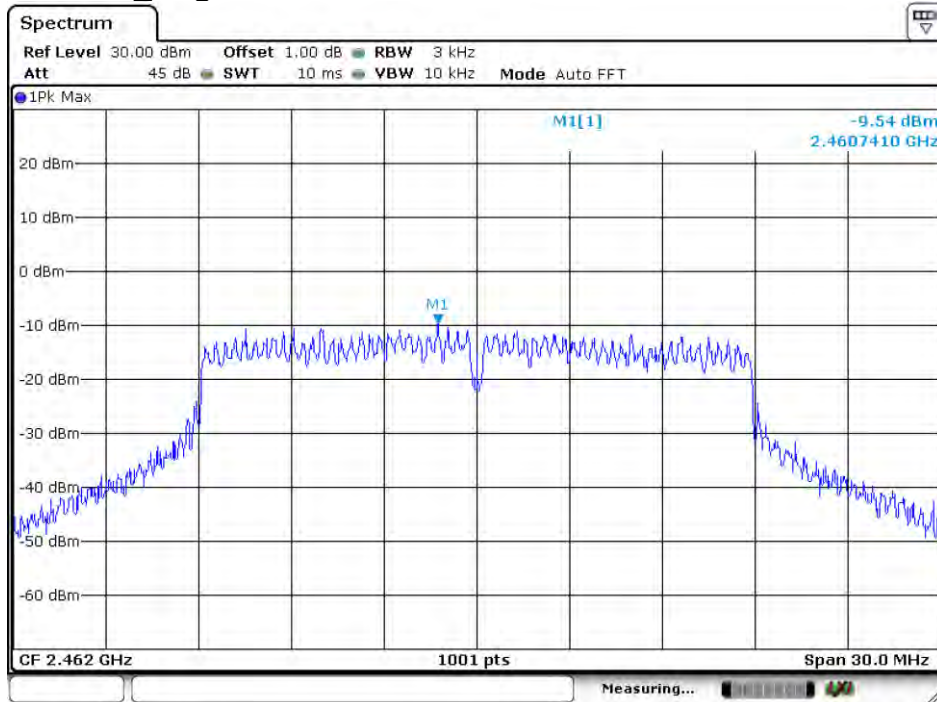


4.6.2.1.8 802.11 N20_ Middle Channel



Date: 13.OCT.2020 16:38:45

4.6.2.1.9 802.11 N20_ Highest Channel



Date: 13.OCT.2020 16:39:01

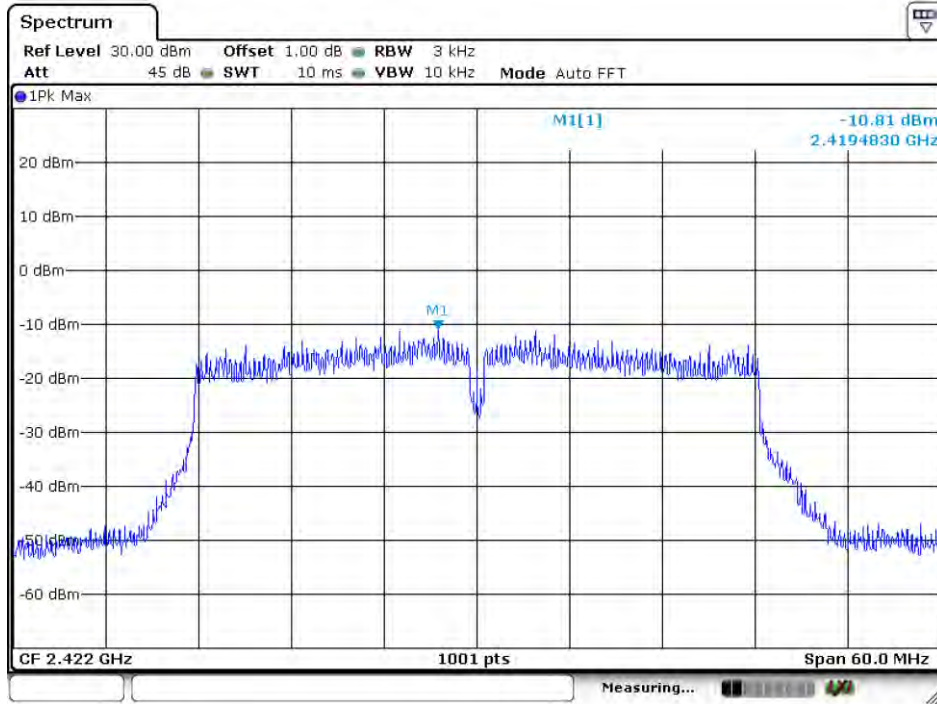


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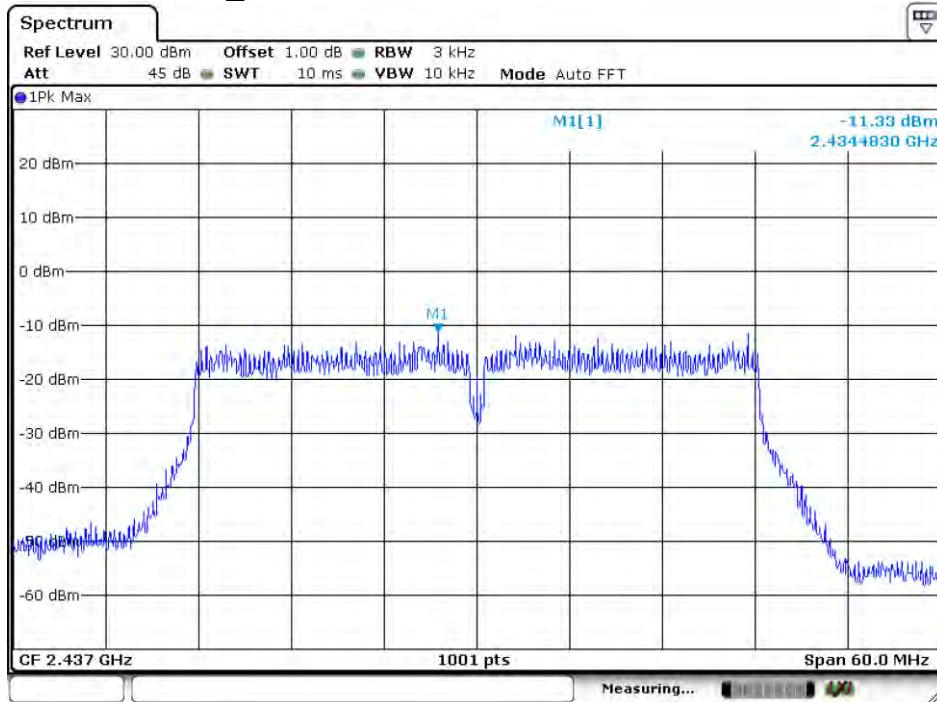
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4.6.2.1.10 802.11N40_Lowest Channel



Date: 13.OCT.2020 16:38:09

4.6.2.1.11 802.11 N40_ Middle Channel



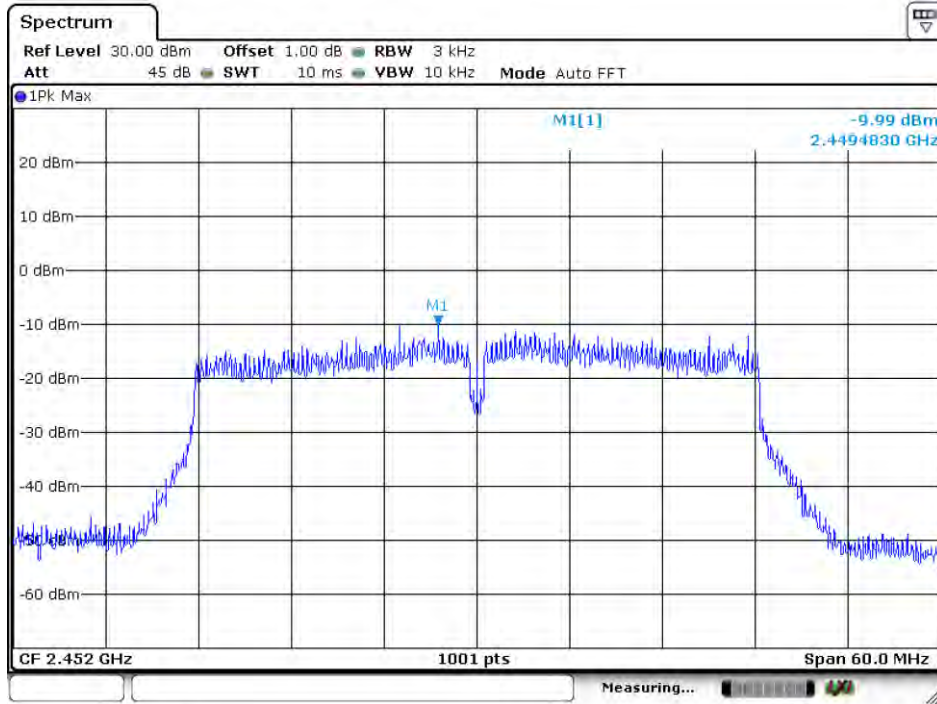
Date: 13.OCT.2020 16:37:50



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4.6.2.1.12 802.11 N40_ Highest Channel



Date: 13.OCT.2020 16:35:27



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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:	
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



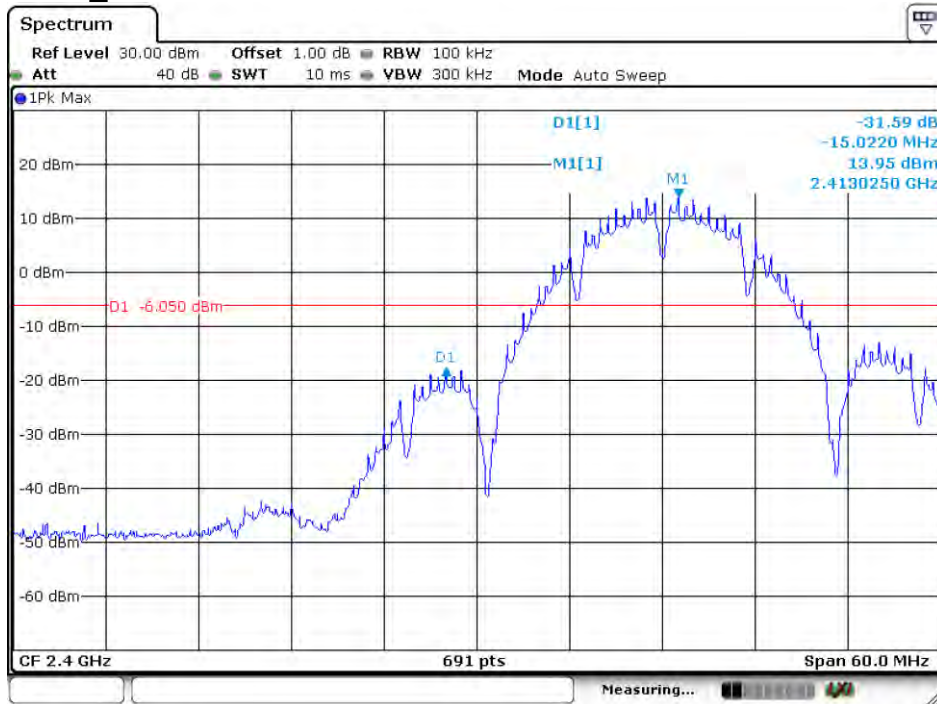
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4.7.1 Test plots

4.7.1.1 ANT1

4.7.1.1.1 802.11B_Lowest Channel



Date: 13.OCT.2020 19:56:20

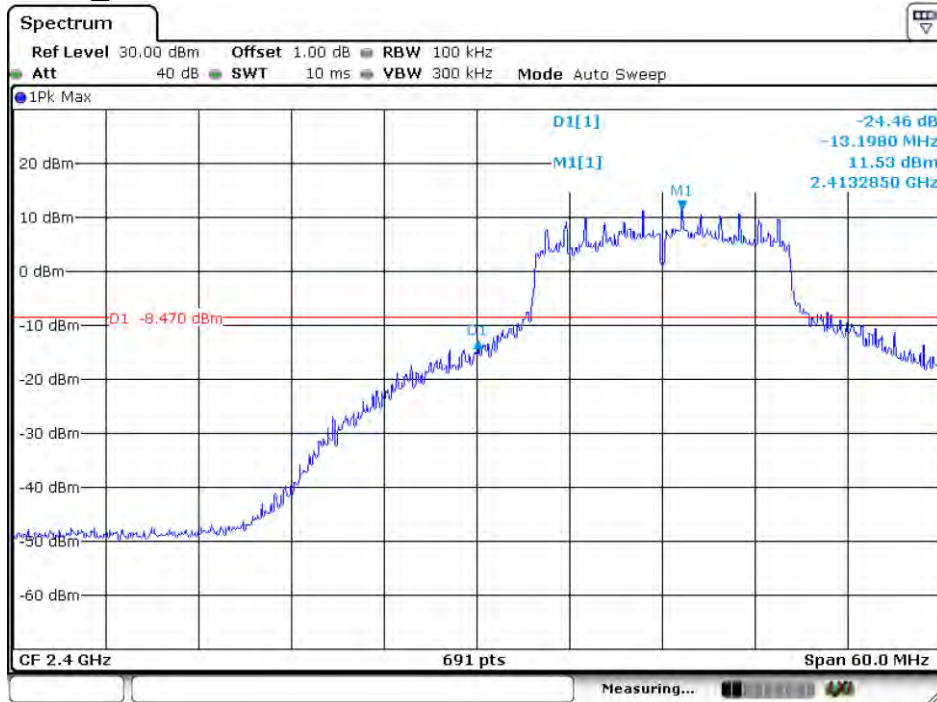


4.7.1.1.2 802.11B_Highest Channel



Date: 13.OCT.2020 20:00:11

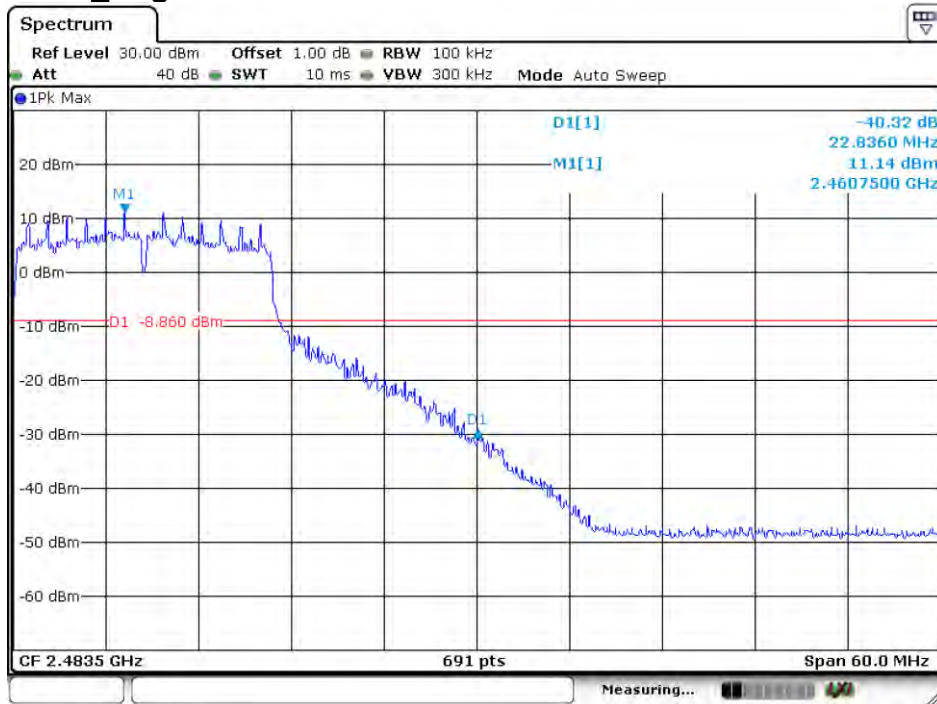
4.7.1.1.3 802.11G_Lowest Channel



Date: 13.OCT.2020 19:55:03

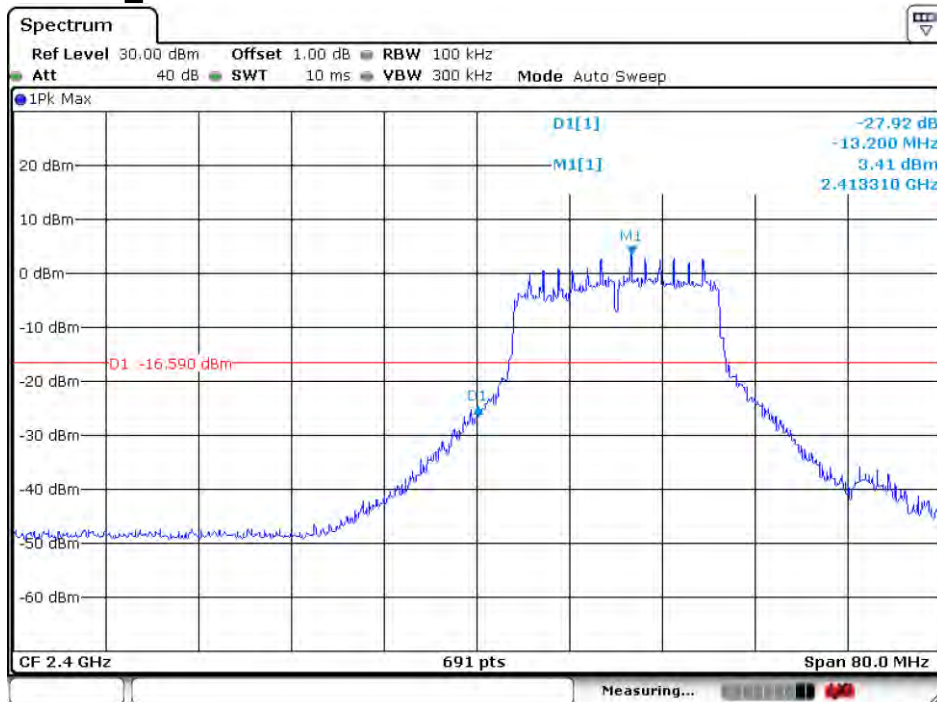


4.7.1.1.4 802.11G_Highest Channel



Date: 13.OCT.2020 19:54:07

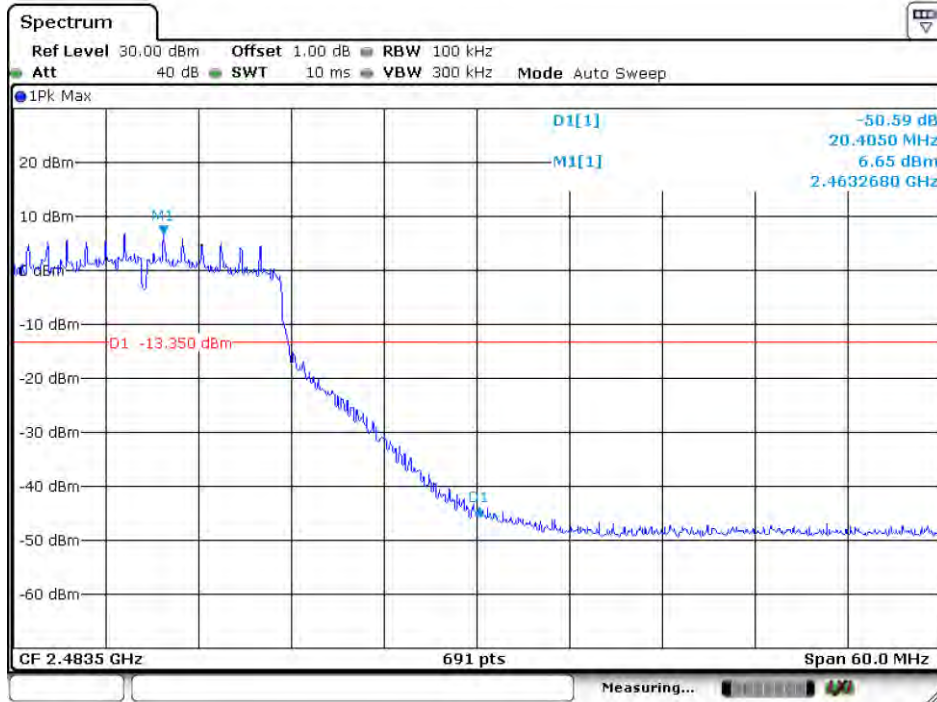
4.7.1.1.5 802.11N20_Lowest Channel



Date: 21.OCT.2020 18:51:35

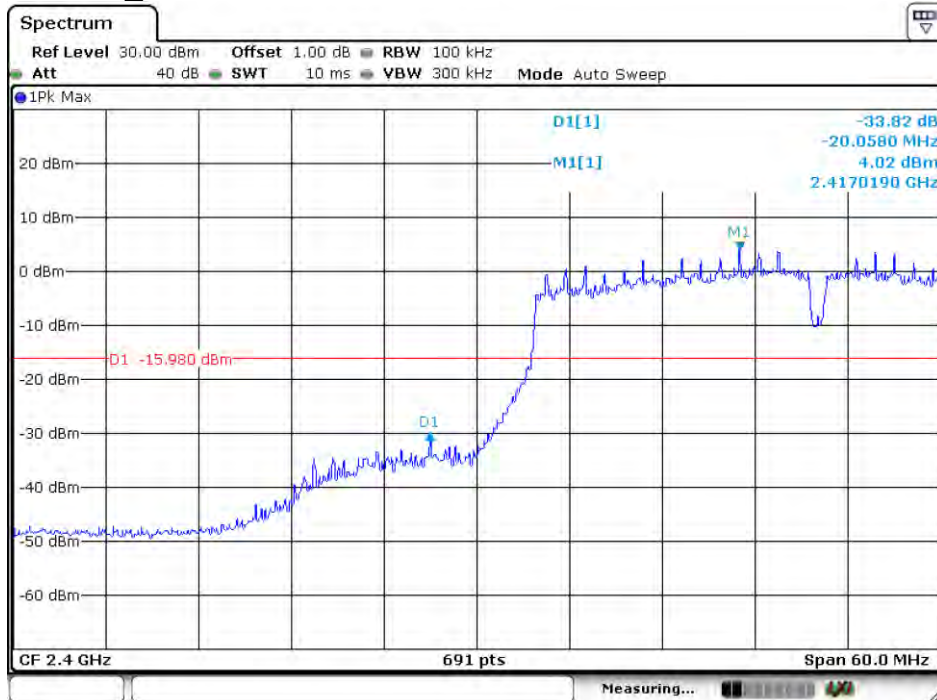


4.7.1.1.6 802.11 N20_ Highest Channel



Date: 13.OCT.2020 19:52:42

4.7.1.1.7 802.11N40_ Lowest Channel

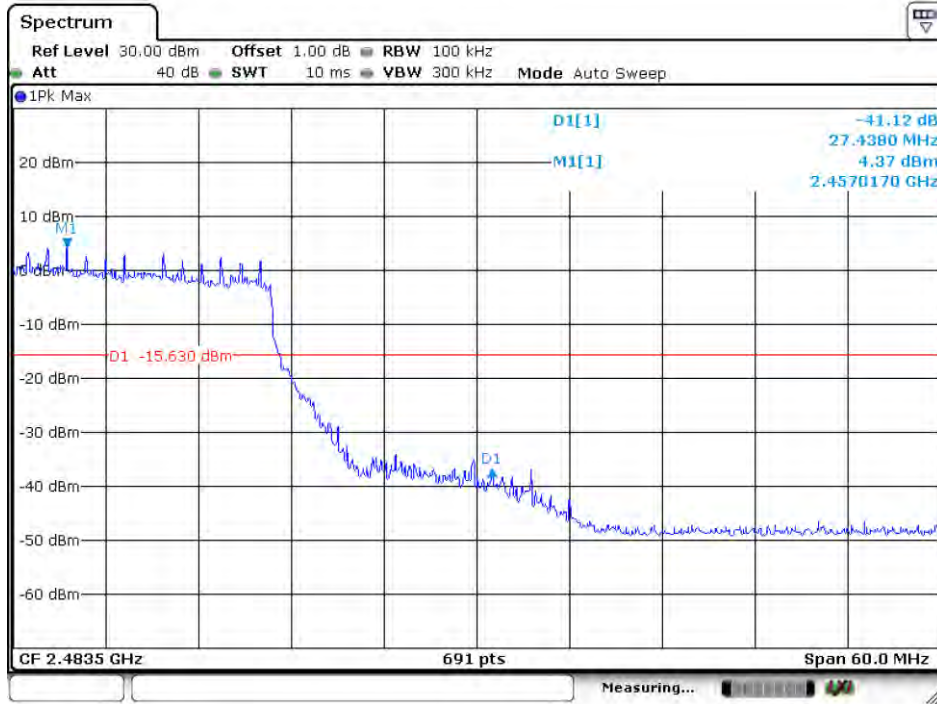


Date: 13.OCT.2020 19:50:42



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4.7.1.1.8 802.11 N40_ Highest Channel



Date: 13.OCT.2020 19:49:00



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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

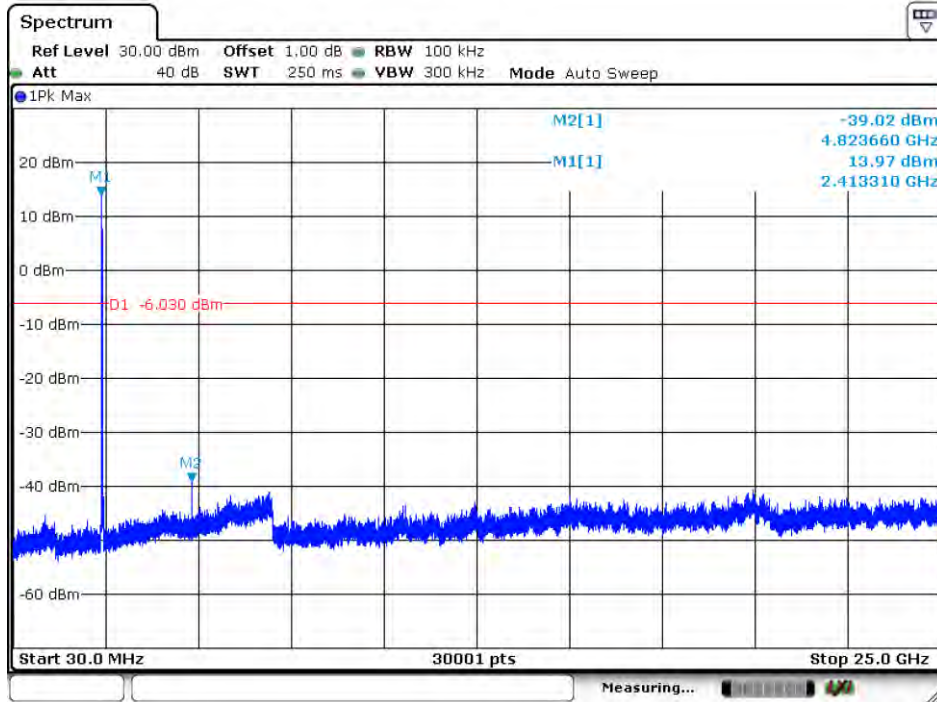


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4.8.1 Test plots

4.8.1.1 ANT1

4.8.1.1.1 802.11B_Lowest Channel



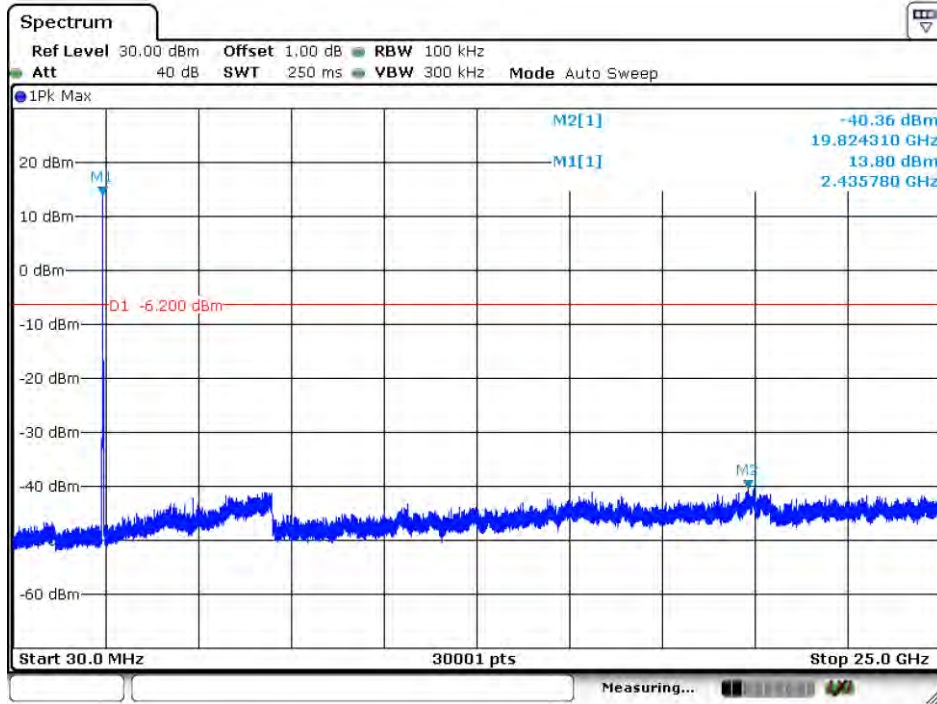
Date: 13.OCT.2020 20:03:54



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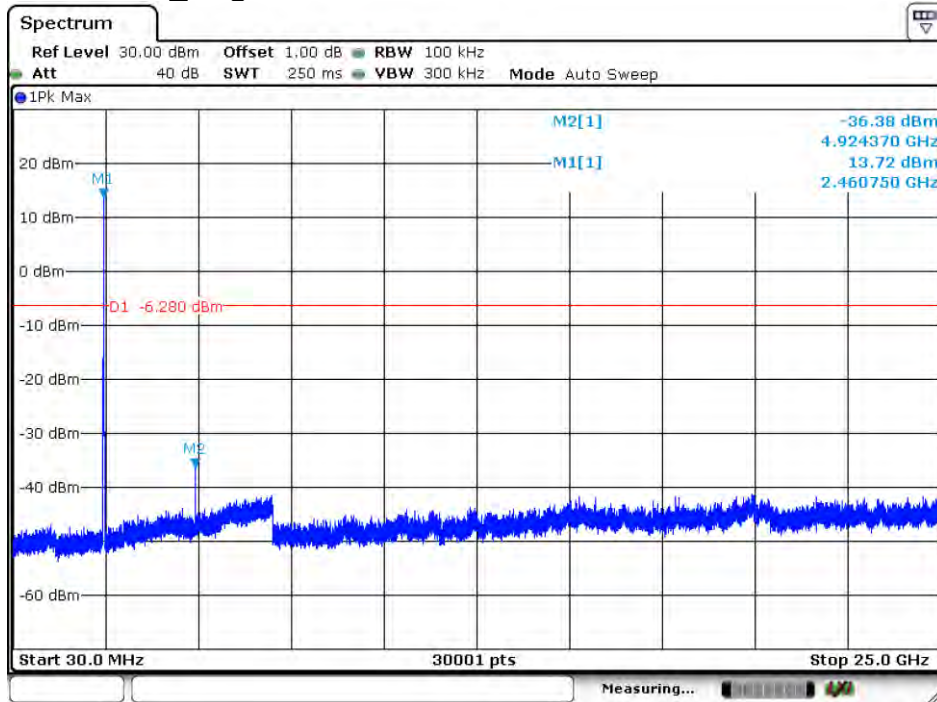
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4.8.1.1.2 802.11B_ Middle Channel



Date: 13.OCT.2020 20:09:06

4.8.1.1.3 802.11B_ Highest Channel



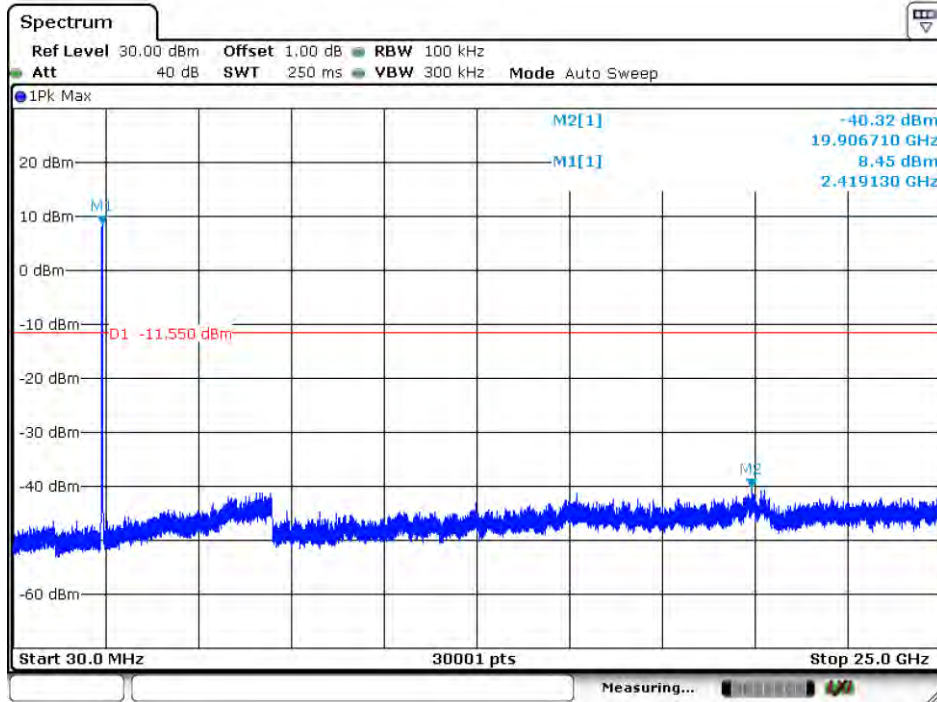
Date: 13.OCT.2020 20:02:35



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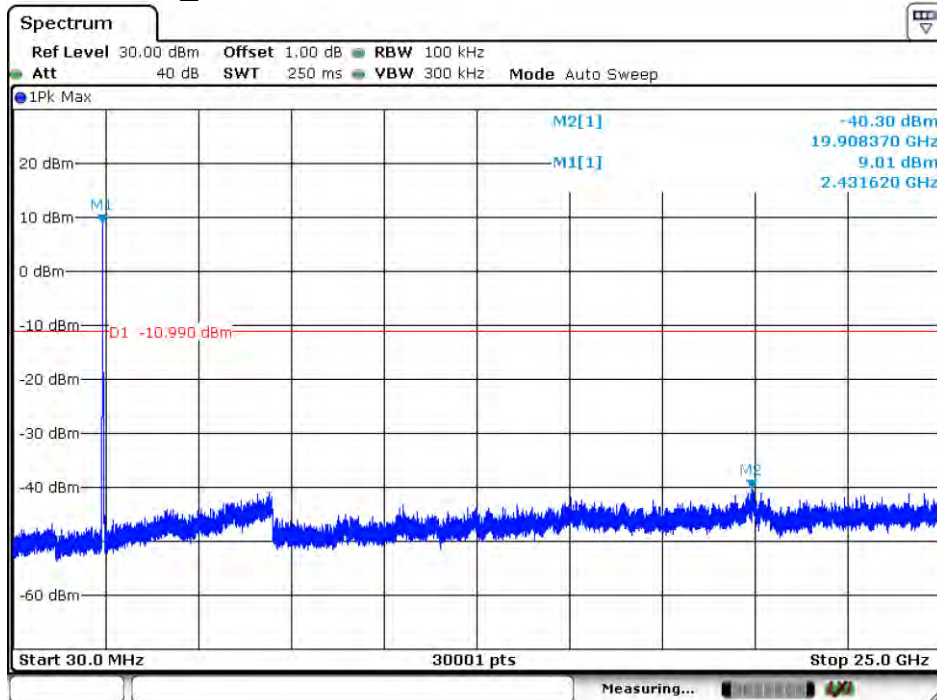
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4.8.1.1.4 802.11G_Lowest Channel



Date: 13.OCT.2020 20:10:31

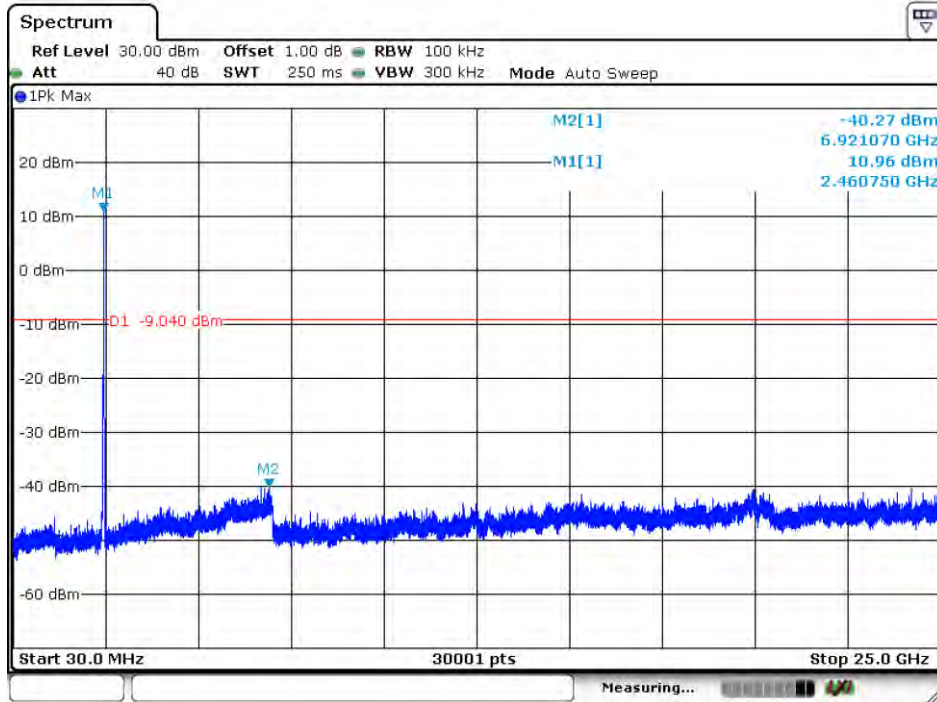
4.8.1.1.5 802.11G_Middle Channel



Date: 13.OCT.2020 20:11:14

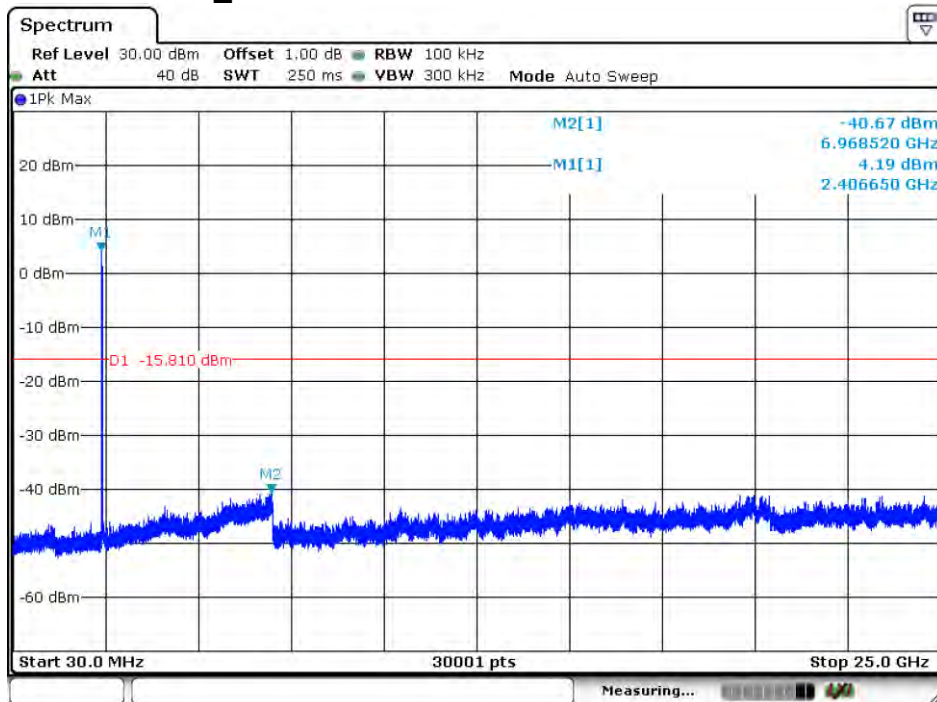


4.8.1.1.6 802.11G_Highest Channel



Date: 13.OCT.2020 20:12:56

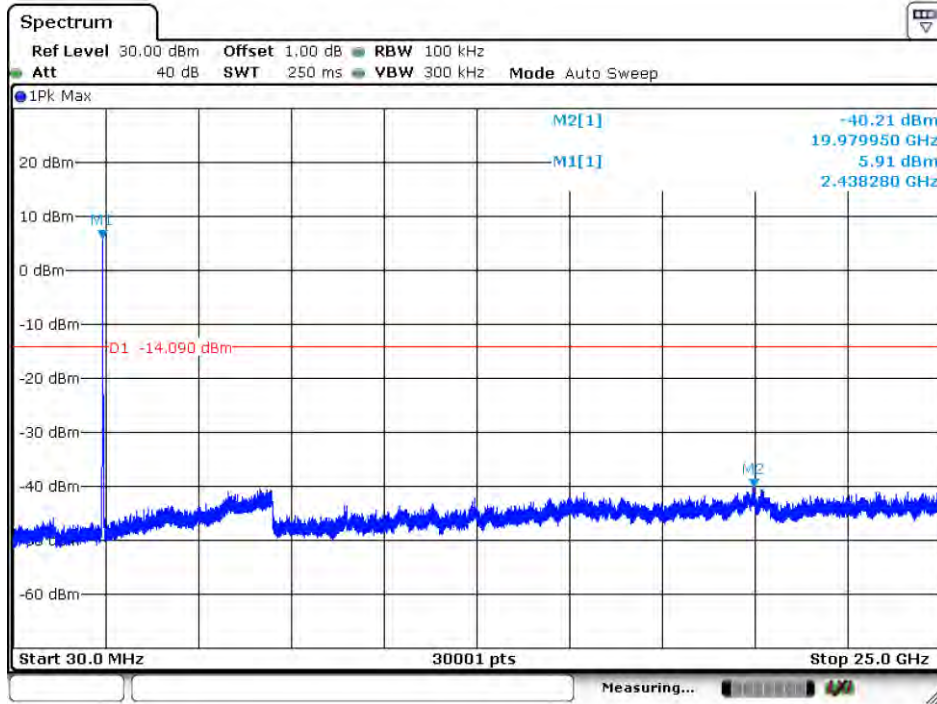
4.8.1.1.7 802.11N20_Lowest Channel



Date: 13.OCT.2020 20:18:56

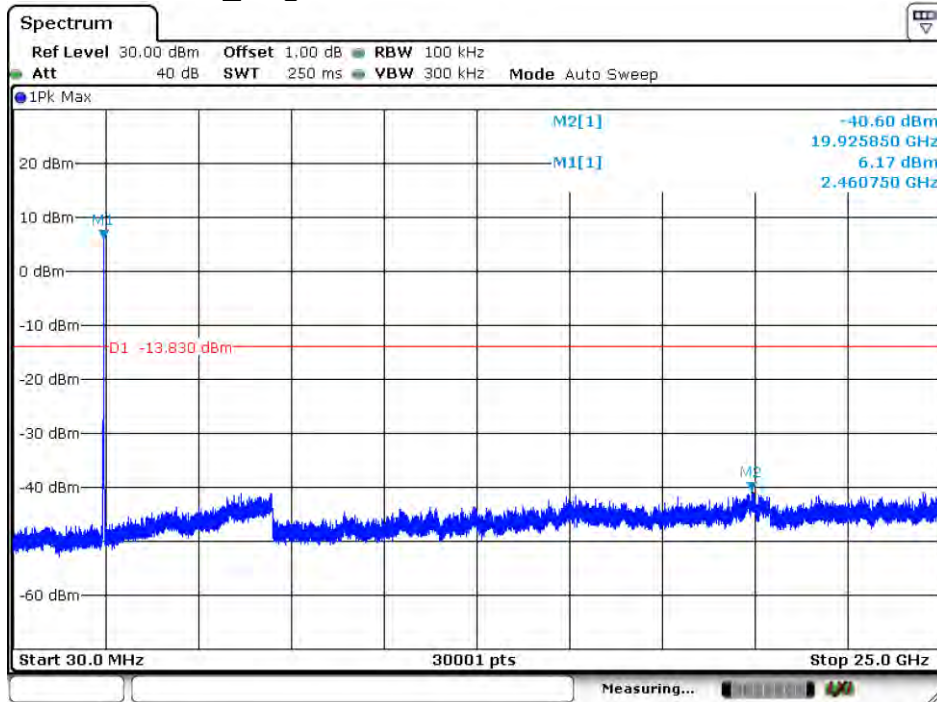


4.8.1.1.8 802.11 N20_ Middle Channel



Date: 13.OCT.2020 20:17:53

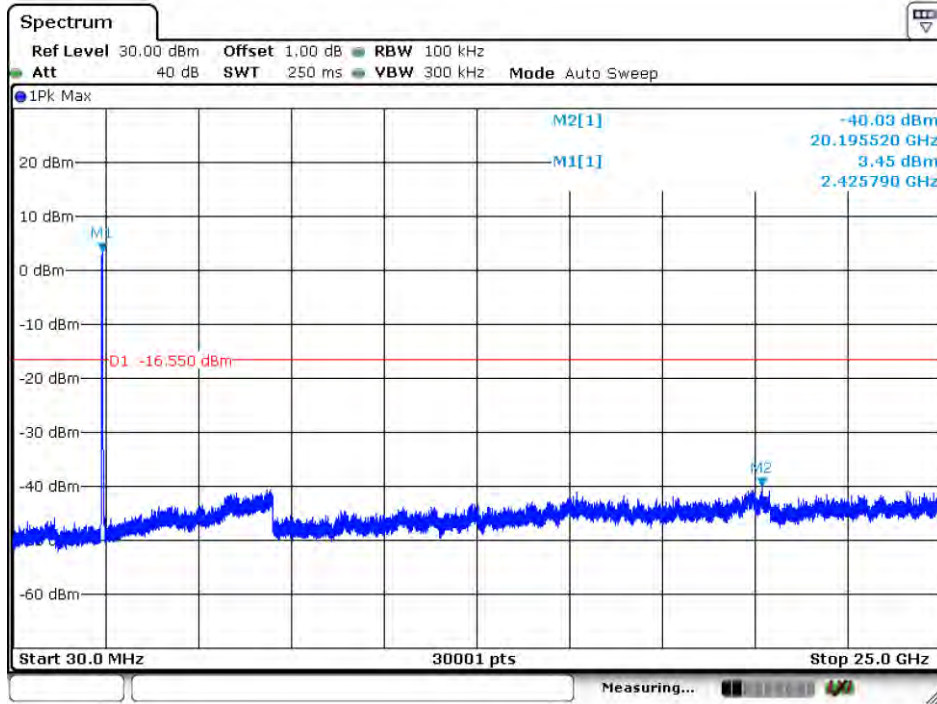
4.8.1.1.9 802.11 N20_ Highest Channel



Date: 13.OCT.2020 20:14:14

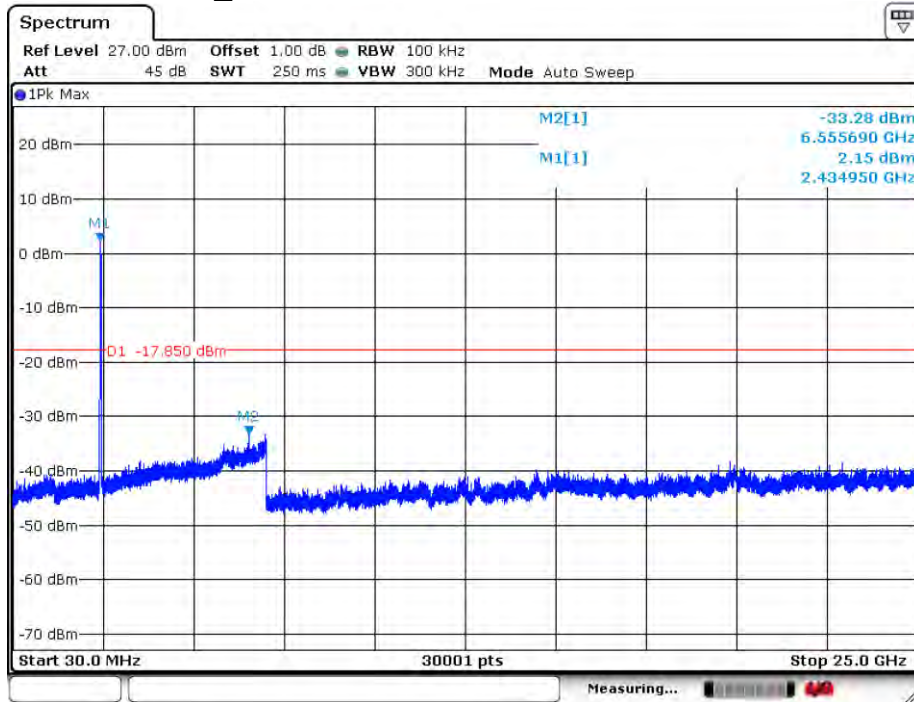


4.8.1.1.10 802.11N40_Lowest Channel



Date: 13.OCT.2020 20:21:28

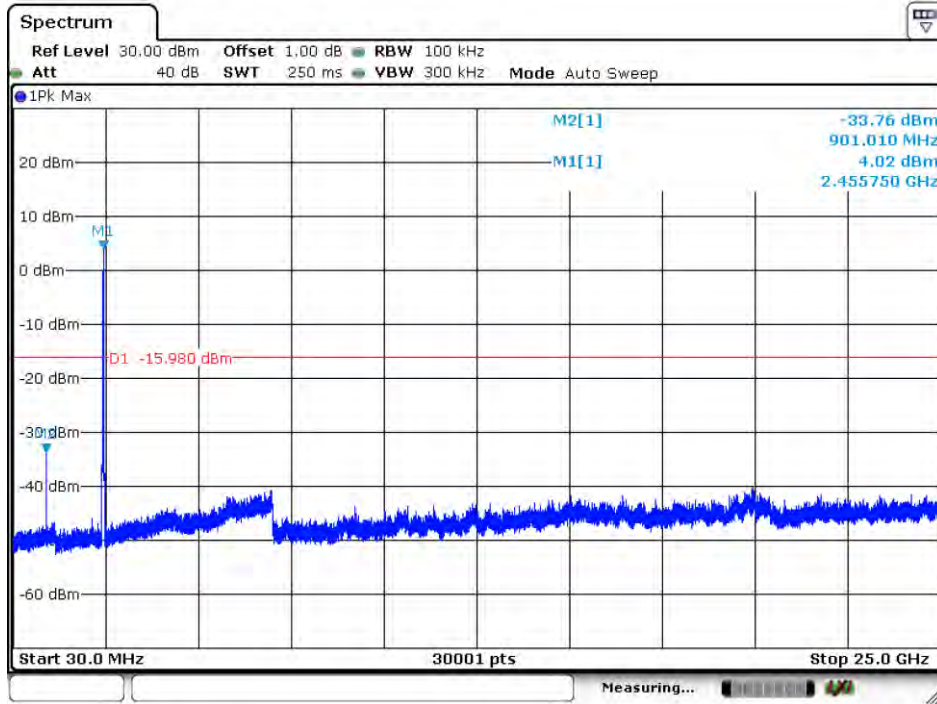
4.8.1.1.11 802.11 N40_ Middle Channel



Date: 28.SEP.2020 09:25:35



4.8.1.1.12 802.11 N40_ Highest Channel



Date: 13.OCT.2020 20:24:20

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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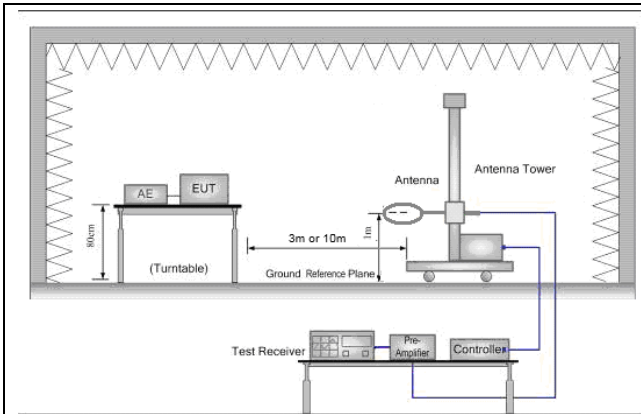


Figure 1. Below 30MHz

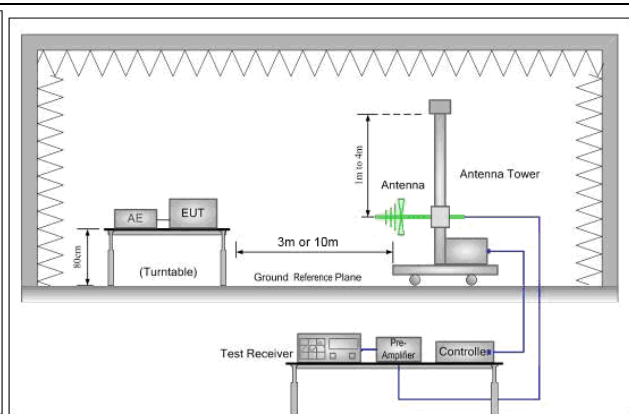


Figure 2. 30MHz to 1GHz

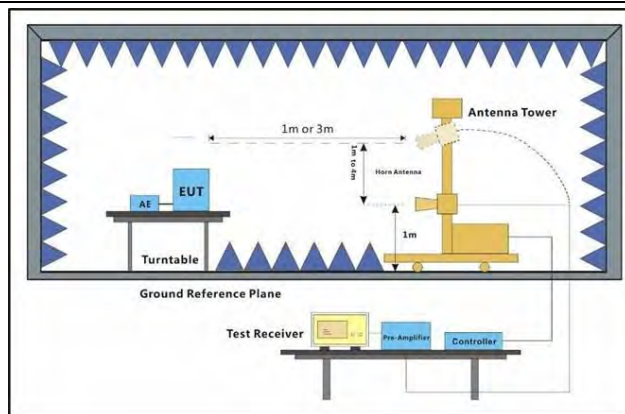


Figure 3. Above 1 GHz

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 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. 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 = $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$ Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc. Average Emission Level = Peak Emission Level + $20 * \log(\text{Duty cycl}$</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



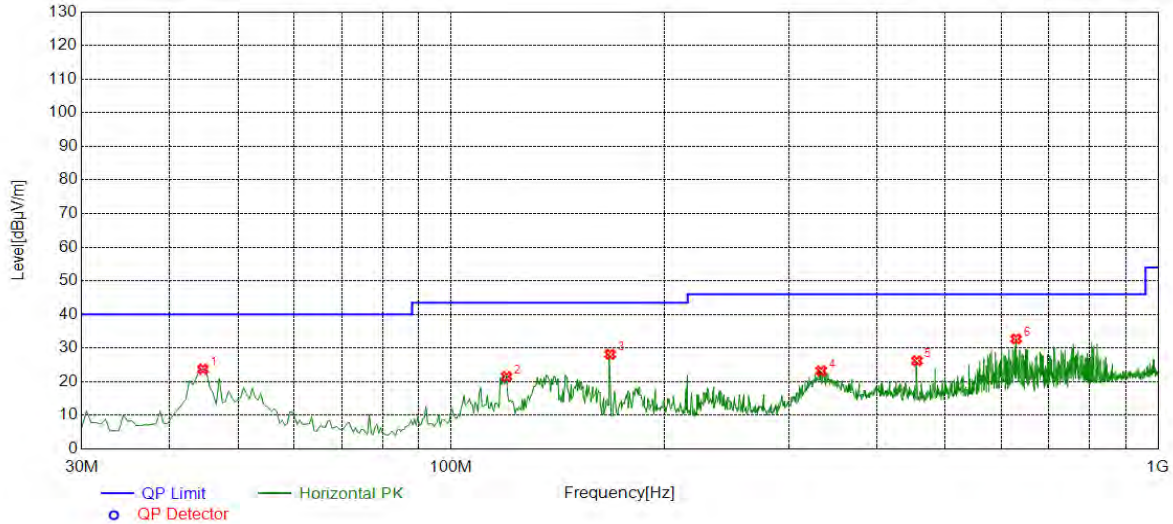
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4.9.1 Radiated emission below 1GHz

4.9.1.1 Charge + Transmitting

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.5573	23.76	-30.29	40.00	16.24	195	124	Horizontal
2	119.769	21.53	-33.22	43.50	21.97	222	234	Horizontal
3	167.808	28.19	-33.76	43.50	15.31	155	272	Horizontal
4	333.761	23.26	-26.89	46.00	22.74	174	228	Horizontal
5	456.043	26.22	-23.71	46.00	19.78	121	272	Horizontal
6	629.759	32.76	-19.66	46.00	13.24	198	26	Horizontal

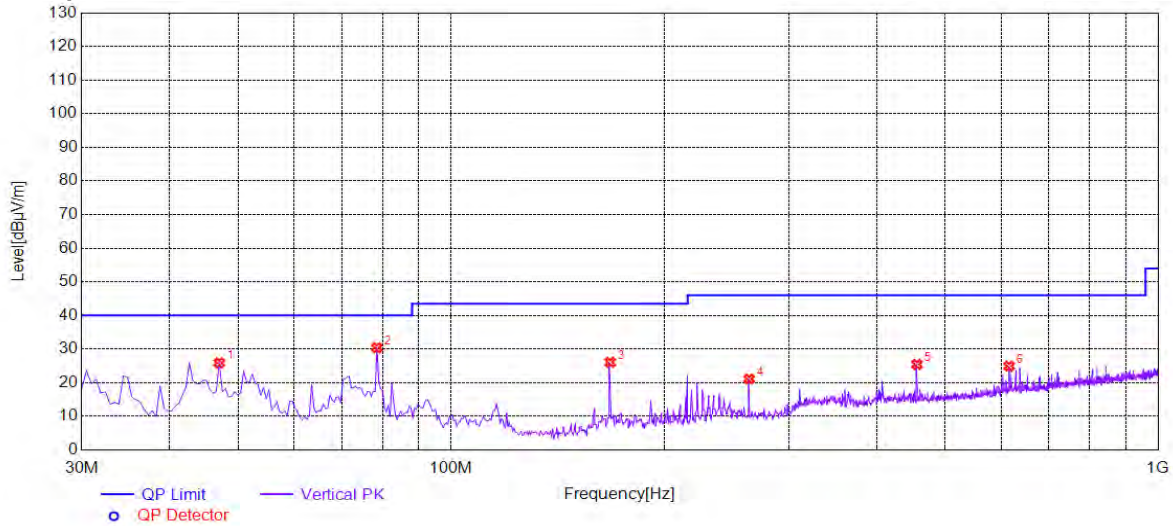
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Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	46.9835	25.94	-30.20	40.00	14.06	151	41	Vertical
2	78.5243	30.41	-35.63	40.00	9.59	191	278	Vertical
3	167.808	26.10	-33.76	43.50	17.40	292	183	Vertical
4	263.886	21.12	-28.87	46.00	24.88	253	152	Vertical
5	456.043	25.45	-23.71	46.00	20.55	228	339	Vertical
6	615.687	24.96	-19.86	46.00	21.04	155	291	Vertical

Final Data List



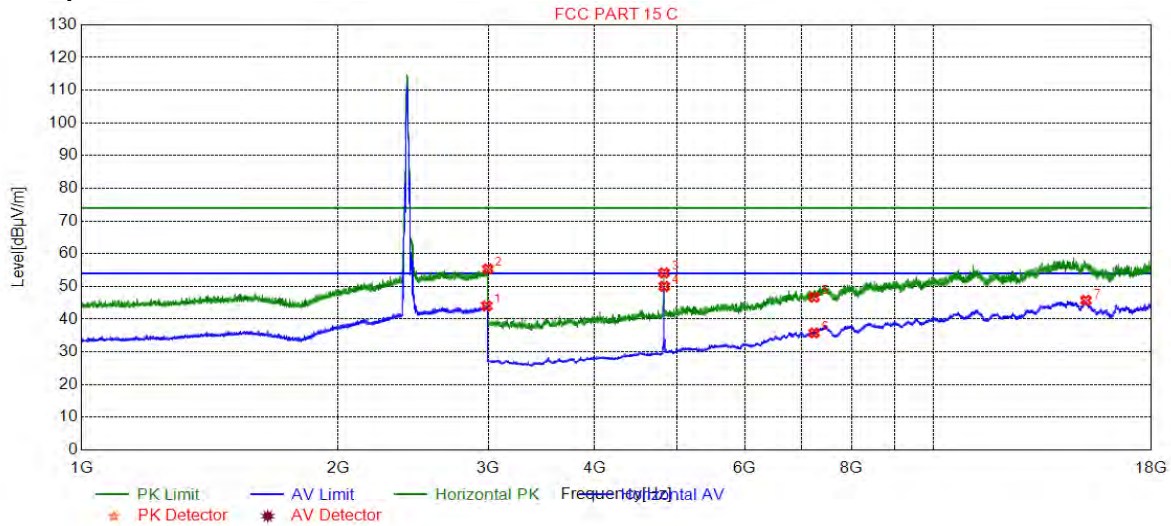
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4.9.2 Transmitter emission above 1GHz

4.9.2.1 802.11B_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2987.99	44.05	9.51	54.00	9.95	228	137	Horizontal
2	2997.99	55.34	9.46	74.00	18.66	139	246	Horizontal
3	4824.00	54.14	-18.21	74.00	19.86	101	259	Horizontal
4	4825.68	50.03	-18.21	54.00	3.97	105	259	Horizontal
5	7236.00	46.69	-9.76	74.00	27.31	201	205	Horizontal
6	7236.00	35.79	-9.76	54.00	18.21	185	42	Horizontal
7	15076.2	45.77	2.68	54.00	8.23	164	178	Horizontal

Final Data List

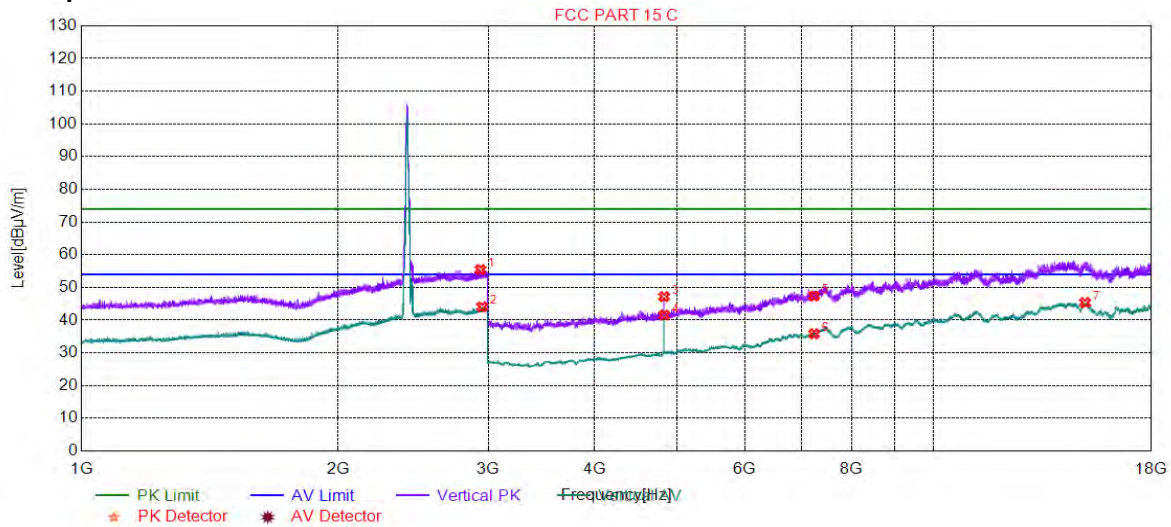


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4.9.2.2 802.11B_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2937.48	55.46	9.54	74.00	18.54	272	333	Vertical
2	2950.98	44.08	9.68	54.00	9.92	194	197	Vertical
3	4824.18	47.20	-18.21	74.00	26.80	282	126	Vertical
4	4825.68	41.56	-18.21	54.00	12.44	169	126	Vertical
5	7236.00	47.38	-9.76	74.00	26.62	193	317	Vertical
6	7236.00	35.84	-9.76	54.00	18.16	235	46	Vertical
7	15043.2	45.37	2.62	54.00	8.63	154	18	Vertical

Final Data List



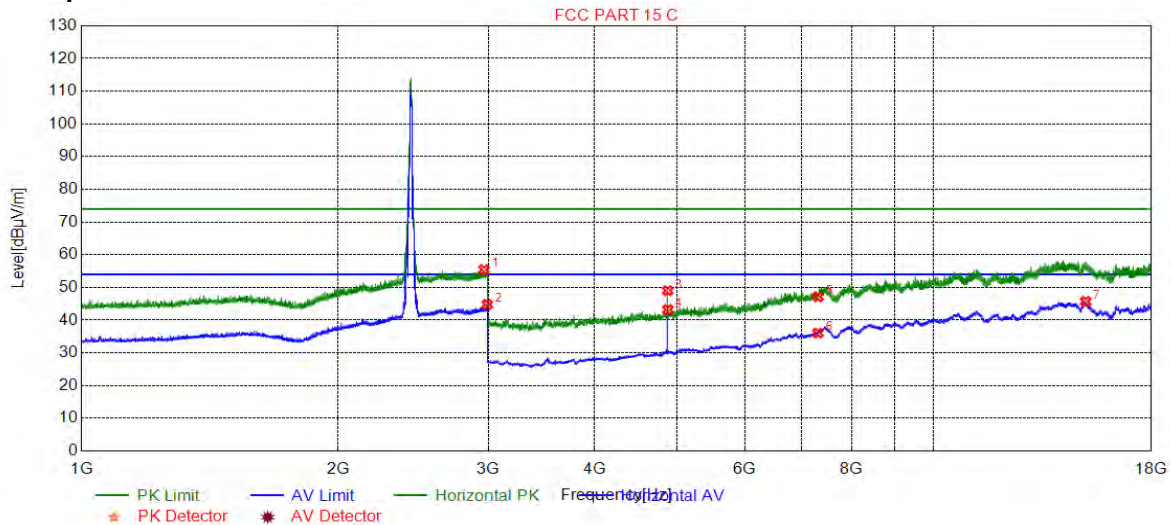
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4.9.2.3 802.11B_Channel 6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2965.99	55.44	9.61	74.00	18.56	249	302	Horizontal
2	2991.49	44.81	9.49	54.00	9.19	242	247	Horizontal
3	4873.68	49.02	-18.00	74.00	24.98	176	260	Horizontal
4	4875.18	43.25	-17.99	54.00	10.75	122	260	Horizontal
5	7311.00	47.15	-9.59	74.00	26.85	149	175	Horizontal
6	7311.00	36.07	-9.59	54.00	17.93	221	315	Horizontal
7	15065.7	45.74	2.66	54.00	8.26	242	260	Horizontal

Final Data List



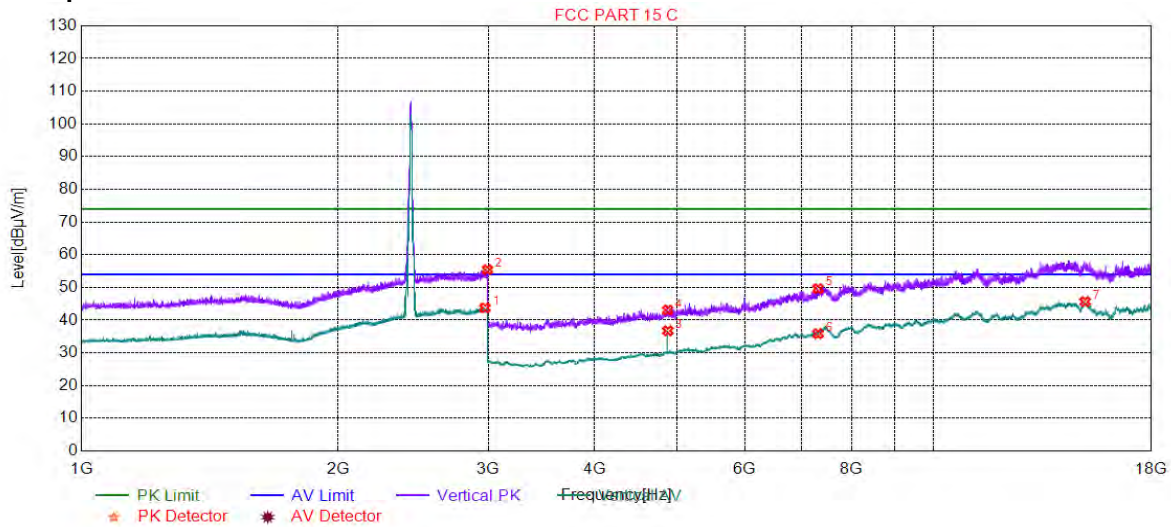
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4.9.2.4 802.11B_Channel 6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2974.49	43.77	9.57	54.00	10.23	287	143	Vertical
2	2993.99	55.43	9.48	74.00	18.57	176	305	Vertical
3	4874.00	36.76	-17.99	54.00	17.24	196	127	Vertical
4	4874.00	43.07	-17.99	74.00	30.93	220	127	Vertical
5	7311.00	49.65	-9.59	74.00	24.35	288	345	Vertical
6	7311.00	35.87	-9.59	54.00	18.13	193	182	Vertical
7	15043.2	45.68	2.62	54.00	8.32	226	100	Vertical

Final Data List



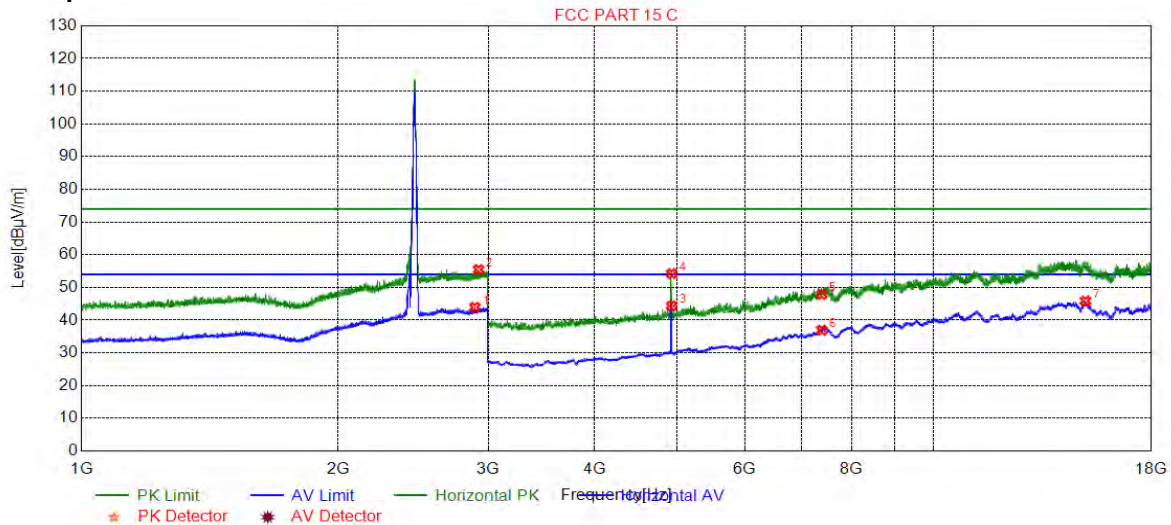
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4.9.2.5 802.11B_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2893.97	43.94	9.15	54.00	10.06	209	259	Horizontal
2	2922.48	55.46	9.38	74.00	18.54	242	287	Horizontal
3	4924.00	44.37	-17.71	54.00	9.63	235	258	Horizontal
4	4924.00	54.24	-17.71	74.00	19.76	107	258	Horizontal
5	7386.00	47.88	-9.20	74.00	26.12	135	38	Horizontal
6	7386.00	36.94	-9.20	54.00	17.06	210	258	Horizontal
7	15058.2	45.88	2.65	54.00	8.12	117	229	Horizontal

Final Data List



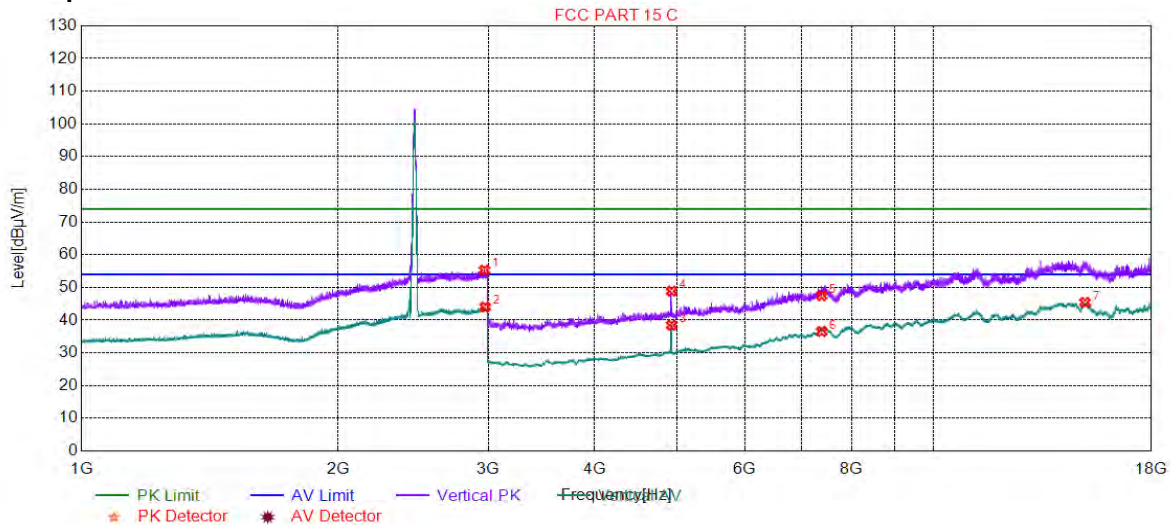
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4.9.2.6 802.11B_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2969.99	55.31	9.59	74.00	18.69	278	277	Vertical
2	2975.99	44.01	9.56	54.00	9.99	224	128	Vertical
3	4924.00	38.48	-17.71	54.00	15.52	264	127	Vertical
4	4924.00	48.88	-17.71	74.00	25.12	289	127	Vertical
5	7386.00	47.50	-9.20	74.00	26.50	202	319	Vertical
6	7386.00	36.52	-9.20	54.00	17.48	272	127	Vertical
7	15040.2	45.44	2.62	54.00	8.56	258	182	Vertical

Final Data List



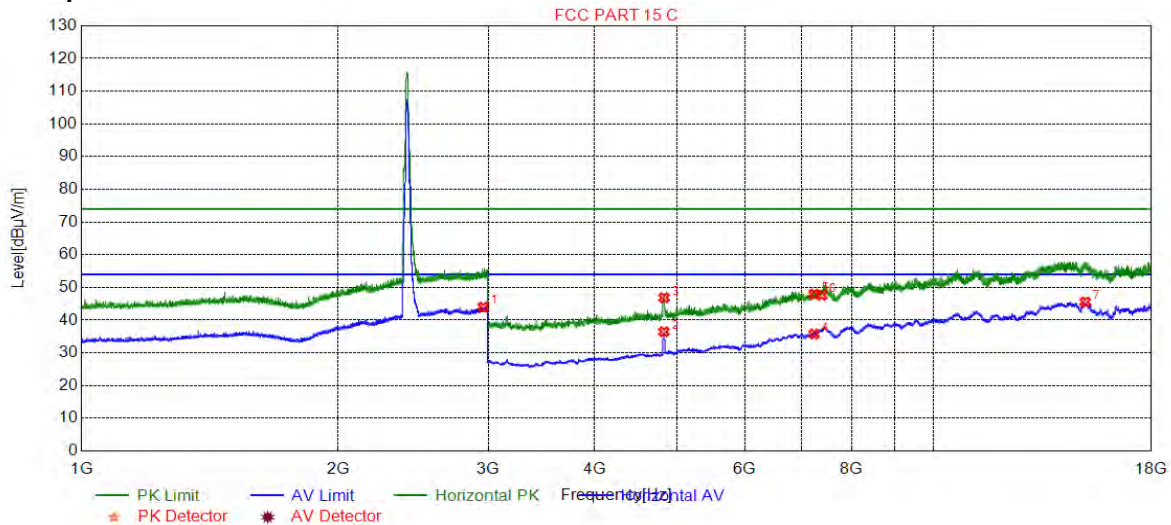
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4.9.2.7 802.11G_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2959.48	44.00	9.64	54.00	10.00	194	232	Horizontal
2	4822.68	36.46	-18.22	54.00	17.54	140	260	Horizontal
3	4824.00	46.89	-18.21	74.00	27.11	209	232	Horizontal
4	7236.00	35.77	-9.76	54.00	18.23	148	14	Horizontal
5	7236.00	48.00	-9.76	74.00	26.00	110	42	Horizontal
6	7386.00	47.66	-9.20	74.00	26.34	131	68	Horizontal
7	15050.7	45.59	2.64	54.00	8.41	227	68	Horizontal

Final Data List



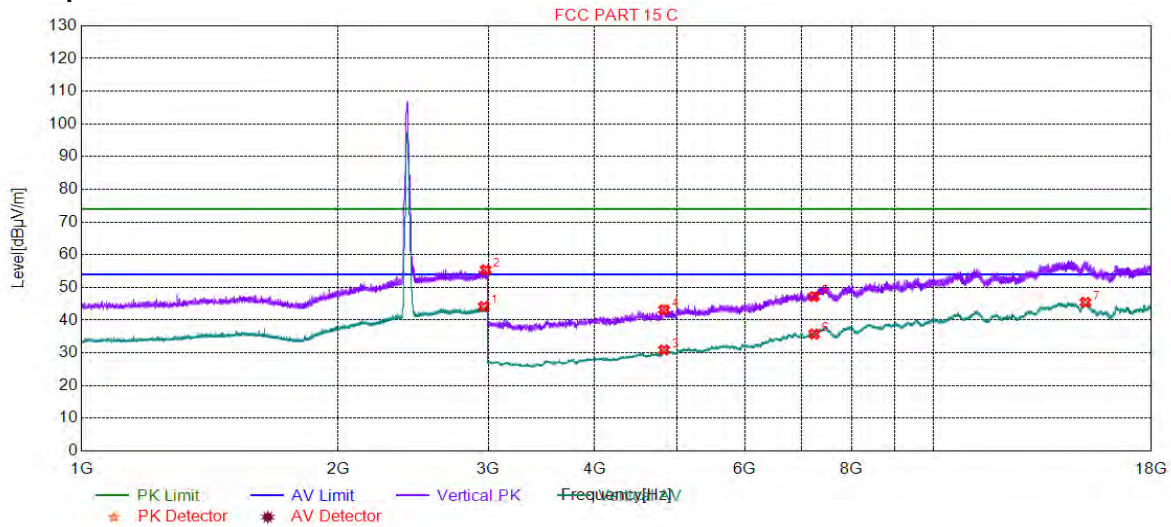
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4.9.2.8 802.11G_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2963.99	44.15	9.62	54.00	9.85	199	99	Vertical
2	2980.49	55.40	9.54	74.00	18.60	217	222	Vertical
3	4824.00	30.90	-18.21	54.00	23.10	241	127	Vertical
4	4824.00	43.17	-18.21	74.00	30.83	180	127	Vertical
5	7236.00	47.21	-9.76	74.00	26.79	288	18	Vertical
6	7236.00	35.75	-9.76	54.00	18.25	295	360	Vertical
7	15056.7	45.45	2.65	54.00	8.55	275	236	Vertical

Final Data List



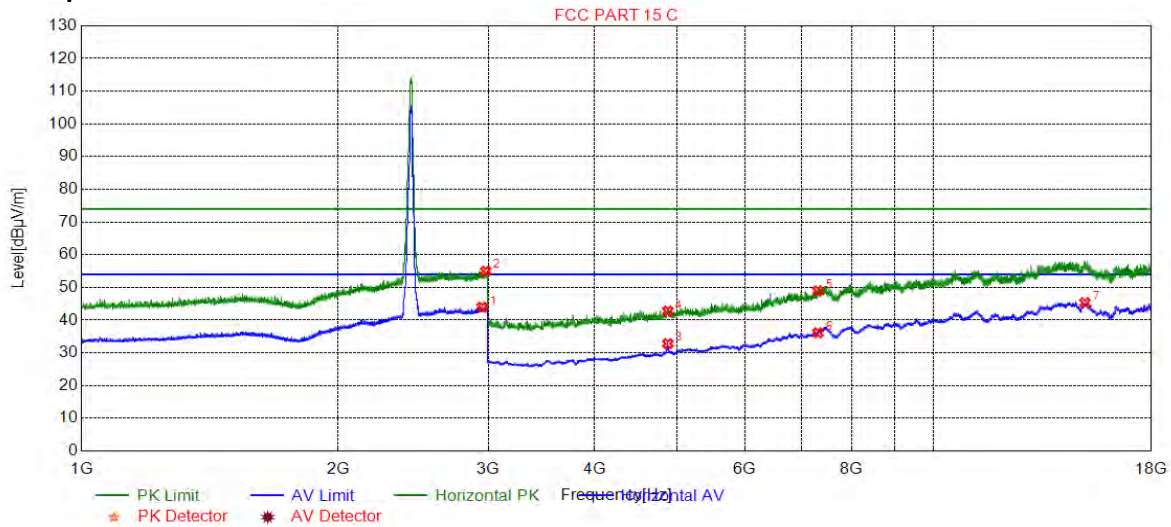
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4.9.2.9 802.11G_Channel 6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2951.48	43.98	9.67	54.00	10.02	176	111	Horizontal
2	2980.49	55.02	9.54	74.00	18.98	101	124	Horizontal
3	4874.00	32.84	-17.99	54.00	21.16	185	260	Horizontal
4	4874.00	42.79	-17.99	74.00	31.21	133	288	Horizontal
5	7311.00	48.98	-9.59	74.00	25.02	140	315	Horizontal
6	7311.00	36.15	-9.59	54.00	17.85	150	234	Horizontal
7	15037.2	45.34	2.61	54.00	8.66	134	206	Horizontal

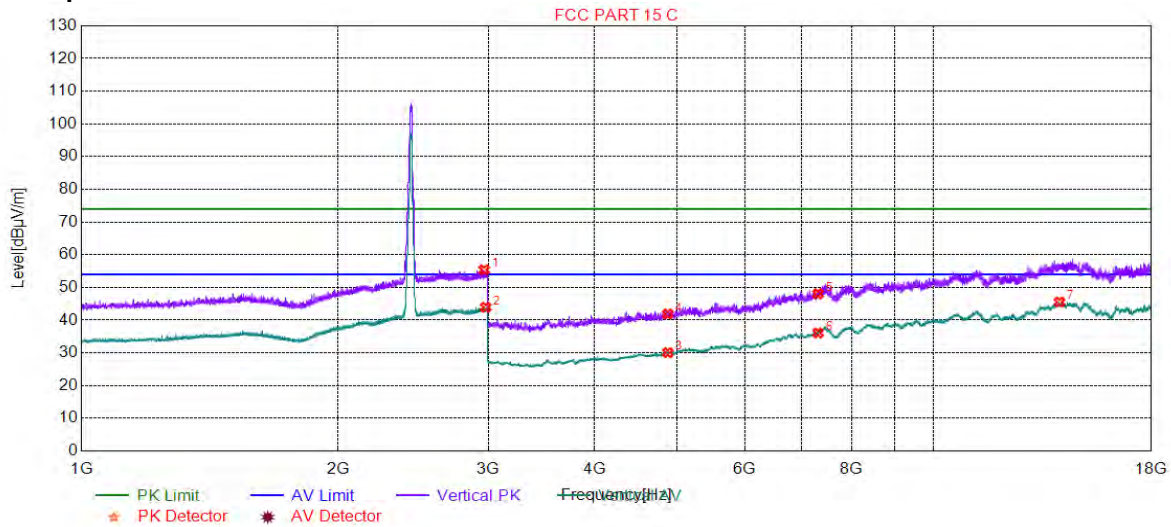
Final Data List



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4.9.2.10 802.11G_Channel 6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2967.49	55.42	9.60	74.00	18.58	246	198	Vertical
2	2980.49	43.95	9.54	54.00	10.05	245	347	Vertical
3	4874.00	30.09	-17.99	54.00	23.91	273	18	Vertical
4	4874.00	41.89	-17.99	74.00	32.11	190	128	Vertical
5	7311.00	48.09	-9.59	74.00	25.91	224	319	Vertical
6	7311.00	36.12	-9.59	54.00	17.88	217	319	Vertical
7	14038.1	45.56	2.47	54.00	8.44	216	128	Vertical

Final Data List



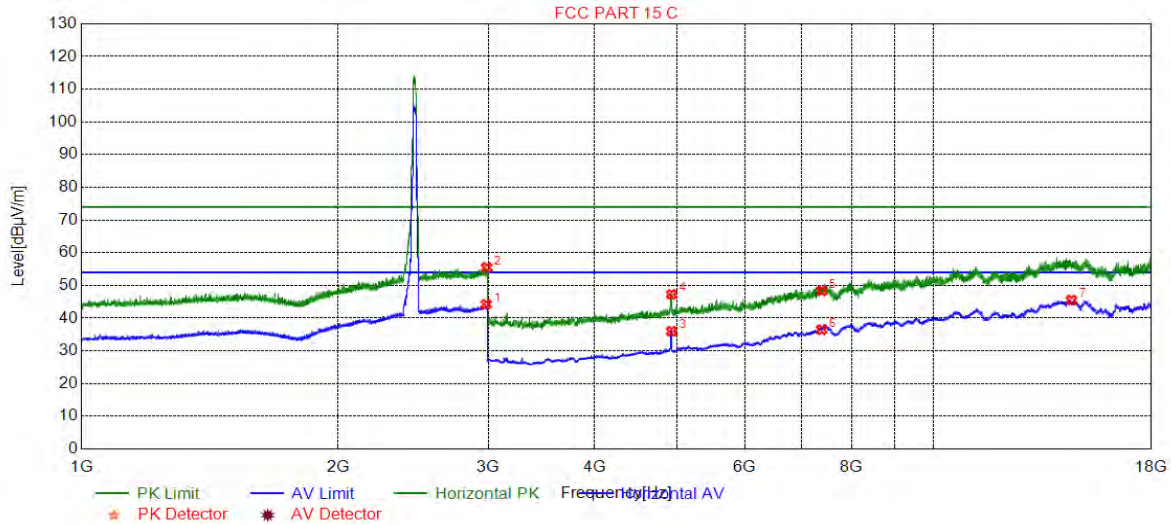
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4.9.2.11 802.11G_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2982.99	44.26	9.53	54.00	9.74	228	42	Horizontal
2	2987.99	55.49	9.51	74.00	18.51	196	55	Horizontal
3	4924.00	36.01	-17.71	54.00	17.99	106	260	Horizontal
4	4924.00	47.27	-17.71	74.00	26.73	228	233	Horizontal
5	7386.00	48.39	-9.20	74.00	25.61	200	260	Horizontal
6	7386.00	36.47	-9.20	54.00	17.53	225	69	Horizontal
7	14504.6	45.57	2.22	54.00	8.43	208	314	Horizontal

Final Data List

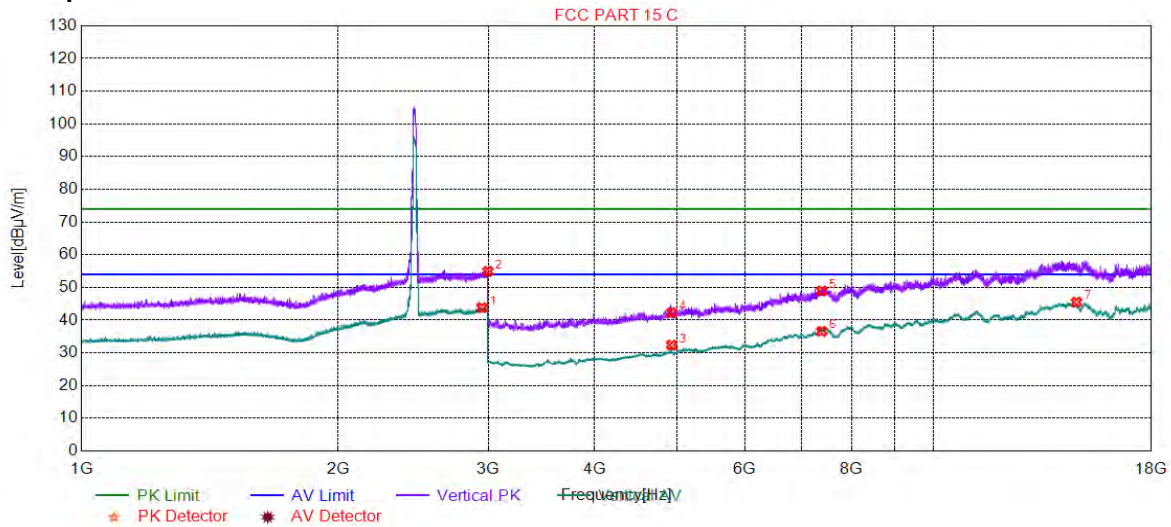


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4.9.2.12 802.11G_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2949.98	43.83	9.68	54.00	10.17	167	114	Vertical
2	2997.49	54.93	9.46	74.00	19.07	190	251	Vertical
3	4924.00	32.37	-17.71	54.00	21.63	239	127	Vertical
4	4924.00	42.29	-17.71	74.00	31.71	210	46	Vertical
5	7386.00	48.93	-9.20	74.00	25.07	257	264	Vertical
6	7386.00	36.59	-9.20	54.00	17.41	296	347	Vertical
7	14696.6	45.50	2.00	54.00	8.50	282	46	Vertical

Final Data List



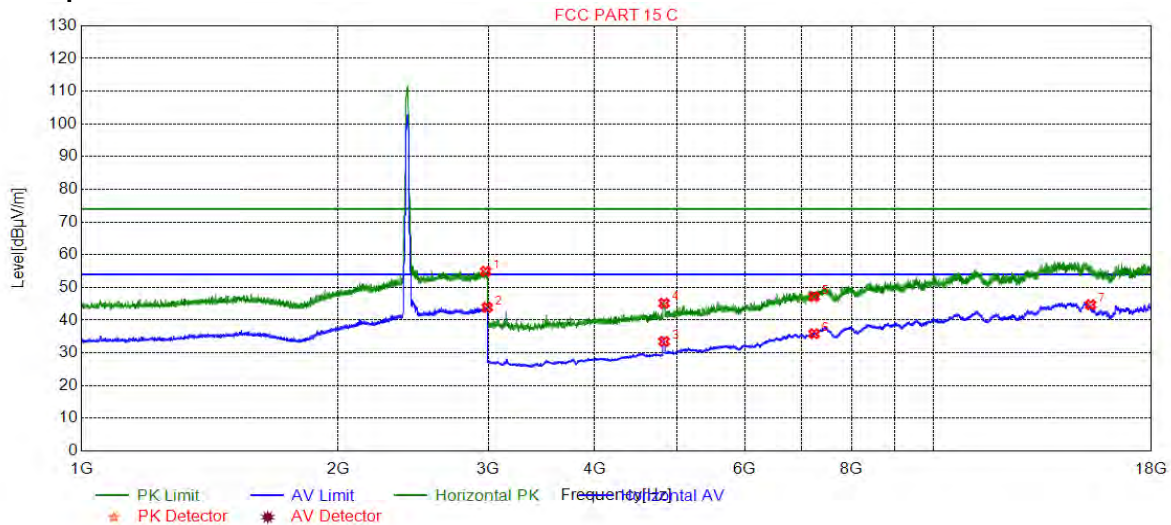
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4.9.2.13 802.11N20_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2979.49	54.94	9.54	74.00	19.06	224	83	Horizontal
2	2991.49	43.91	9.49	54.00	10.09	122	248	Horizontal
3	4824.00	33.49	-18.21	54.00	20.51	178	260	Horizontal
4	4824.00	45.19	-18.21	74.00	28.81	164	232	Horizontal
5	7236.00	47.19	-9.76	74.00	26.81	220	314	Horizontal
6	7236.00	35.84	-9.76	54.00	18.16	190	232	Horizontal
7	15272.7	44.72	1.43	54.00	9.28	125	15	Horizontal

Final Data List

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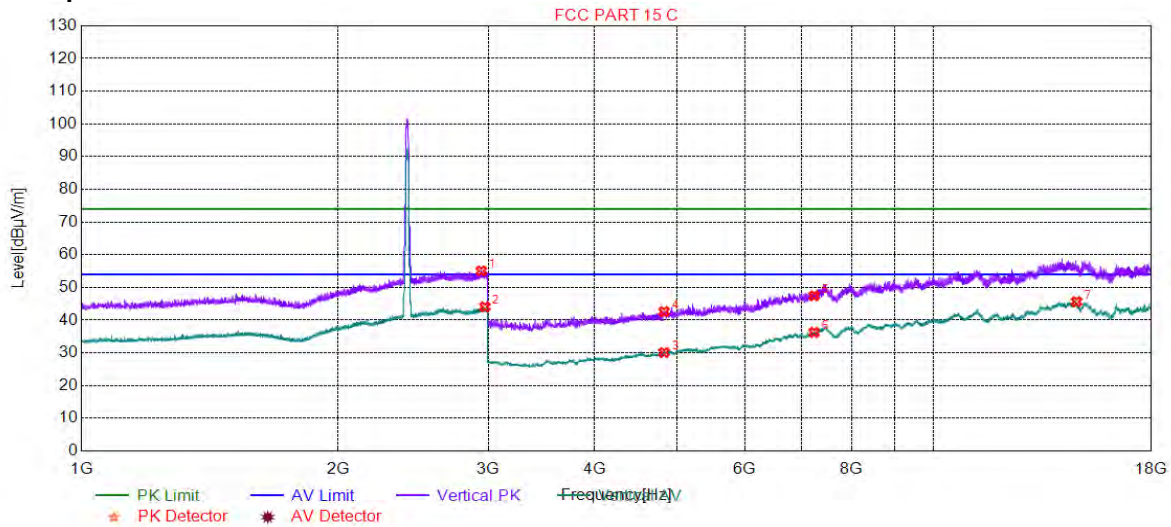
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4.9.2.14 802.11N20_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2944.48	55.09	9.62	74.00	18.91	210	128	Vertical
2	2972.99	44.09	9.57	54.00	9.91	166	360	Vertical
3	4824.00	30.13	-18.21	54.00	23.87	295	45	Vertical
4	4824.00	42.65	-18.21	74.00	31.35	202	45	Vertical
5	7236.00	47.46	-9.76	74.00	26.54	209	345	Vertical
6	7236.00	36.26	-9.76	54.00	17.74	269	208	Vertical
7	14699.6	45.68	1.99	54.00	8.32	190	181	Vertical

Final Data List

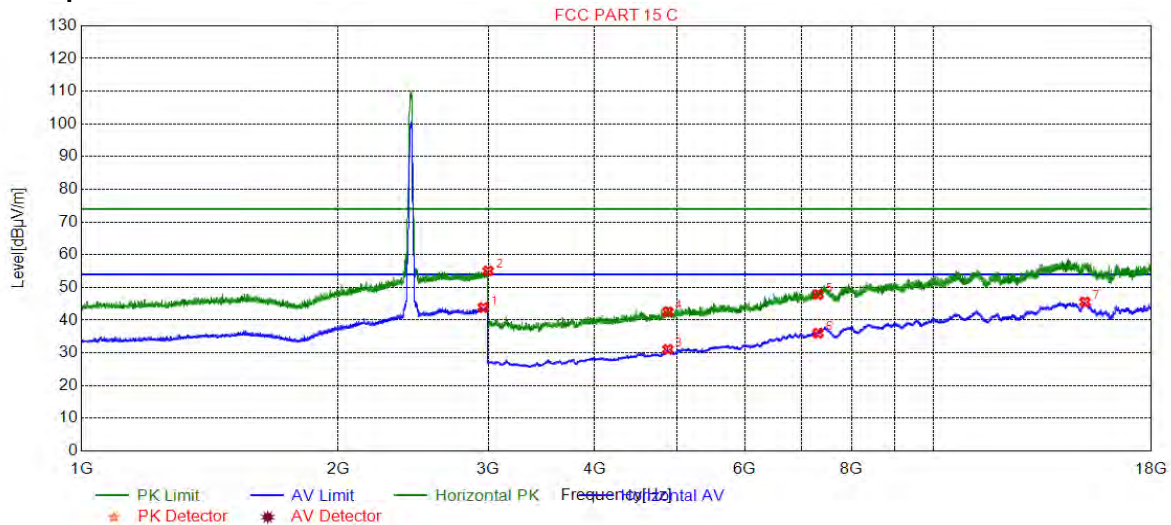


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4.9.2.15 802.11N20_Channel 6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2959.99	43.87	9.63	54.00	10.13	208	328	Horizontal
2	2998.99	55.04	9.45	74.00	18.96	162	274	Horizontal
3	4874.00	31.08	-17.99	54.00	22.92	239	259	Horizontal
4	4874.00	42.57	-17.99	74.00	31.43	238	233	Horizontal
5	7311.00	47.85	-9.59	74.00	26.15	226	178	Horizontal
6	7311.00	36.01	-9.59	54.00	17.99	152	150	Horizontal
7	15038.7	45.59	2.62	54.00	8.41	242	342	Horizontal

Final Data List



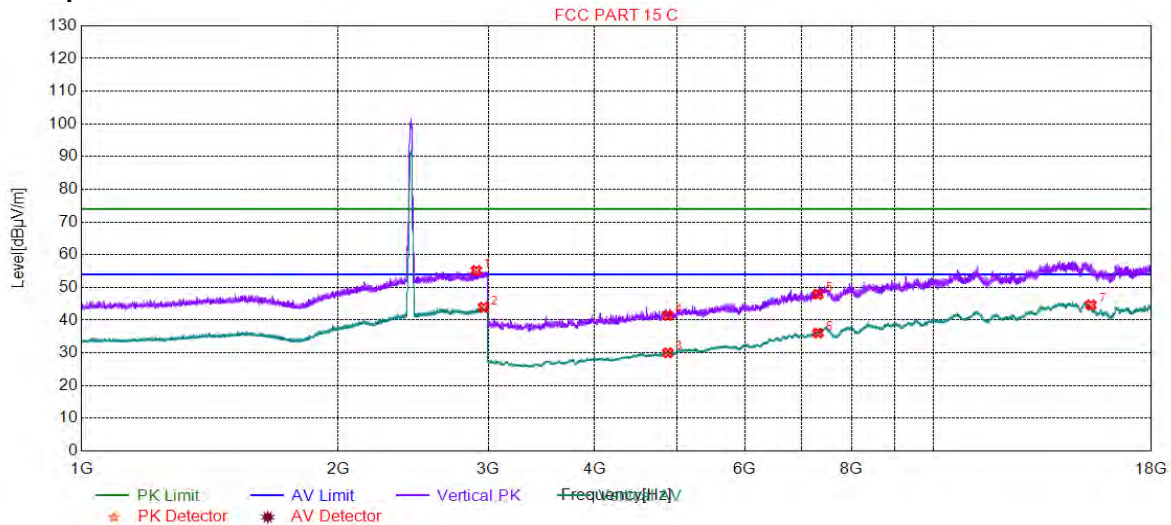
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4.9.2.16 802.11N20_Channel 6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2904.97	55.16	9.19	74.00	18.84	182	360	Vertical
2	2962.49	43.94	9.62	54.00	10.06	213	182	Vertical
3	4874.00	30.02	-17.99	54.00	23.98	206	181	Vertical
4	4874.00	41.44	-17.99	74.00	32.56	281	72	Vertical
5	7311.00	47.90	-9.59	74.00	26.10	271	263	Vertical
6	7311.00	36.07	-9.59	54.00	17.93	279	99	Vertical
7	15283.2	44.66	1.35	54.00	9.34	257	318	Vertical

Final Data List



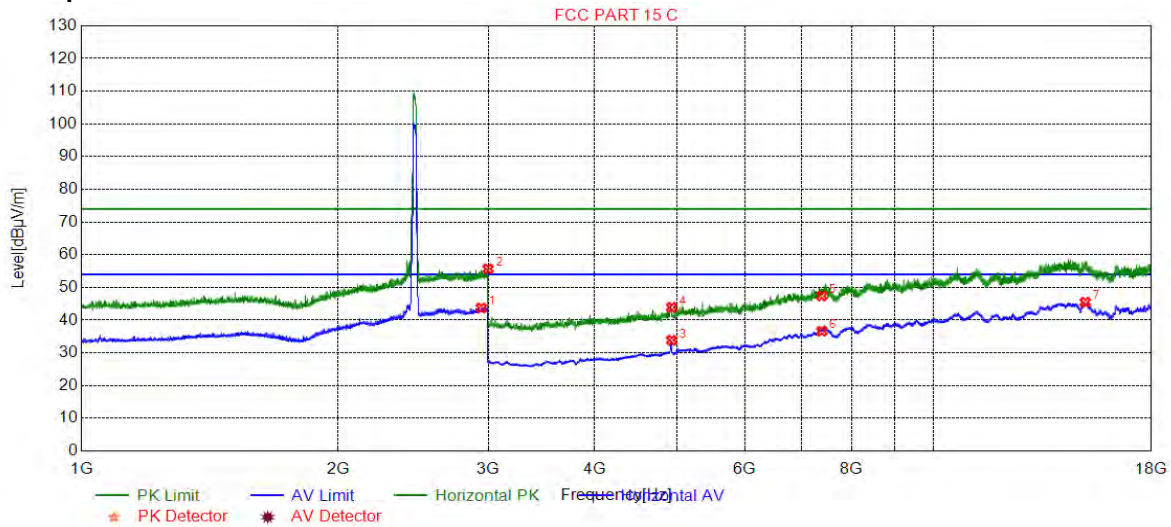
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4.9.2.17 802.11N20_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2944.98	43.74	9.63	54.00	10.26	228	205	Horizontal
2	2998.99	55.68	9.45	74.00	18.32	104	3	Horizontal
3	4924.00	33.87	-17.71	54.00	20.13	205	260	Horizontal
4	4924.00	43.94	-17.71	74.00	30.06	217	315	Horizontal
5	7386.00	47.42	-9.20	74.00	26.58	226	96	Horizontal
6	7386.00	36.66	-9.20	54.00	17.34	168	68	Horizontal
7	15053.7	45.49	2.64	54.00	8.51	104	233	Horizontal

Final Data List



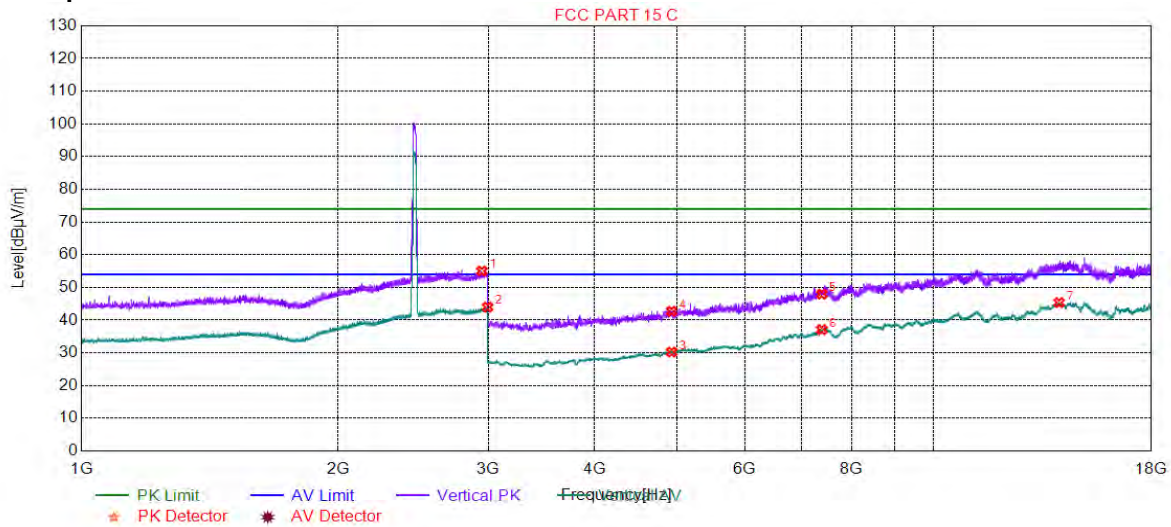
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4.9.2.18 802.11N20_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2948.48	55.03	9.66	74.00	18.97	168	114	Vertical
2	2995.49	44.00	9.47	54.00	10.00	167	18	Vertical
3	4924.00	30.27	-17.71	54.00	23.73	189	18	Vertical
4	4924.00	42.75	-17.71	74.00	31.25	259	72	Vertical
5	7386.00	47.98	-9.20	74.00	26.02	151	72	Vertical
6	7386.00	37.11	-9.20	54.00	16.89	268	182	Vertical
7	14024.6	45.38	2.44	54.00	8.62	190	346	Vertical

Final Data List



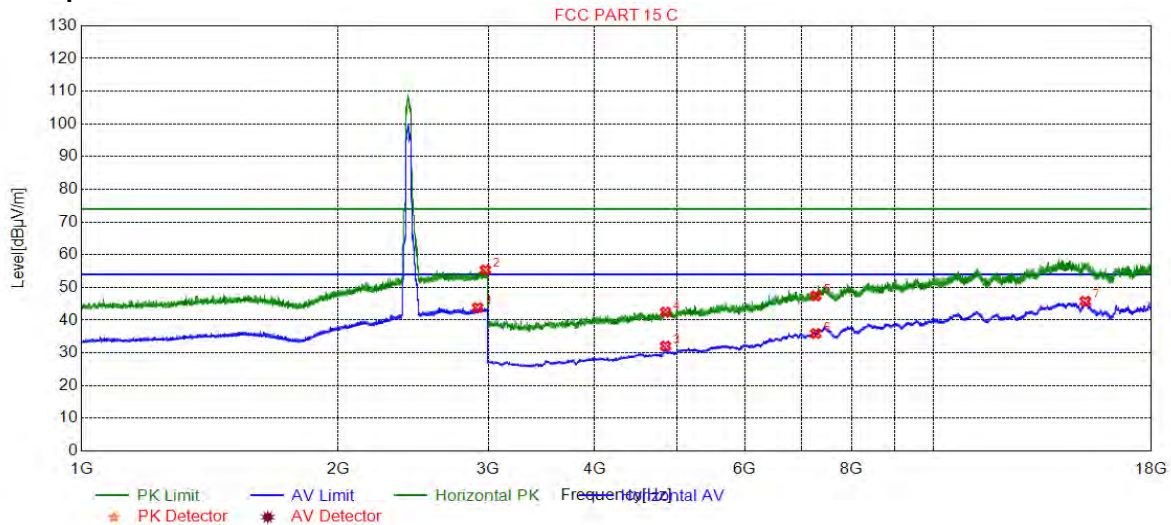
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4.9.2.19 802.11N40_Channel 3

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2914.97	43.84	9.30	54.00	10.16	156	0	Horizontal
2	2976.99	55.38	9.56	74.00	18.62	137	342	Horizontal
3	4844.00	32.08	-18.12	54.00	21.92	244	260	Horizontal
4	4844.00	42.48	-18.12	74.00	31.52	213	233	Horizontal
5	7266.00	47.44	-9.71	74.00	26.56	197	123	Horizontal
6	7266.00	35.93	-9.71	54.00	18.07	179	40	Horizontal
7	15058.2	45.78	2.65	54.00	8.22	122	95	Horizontal

Final Data List



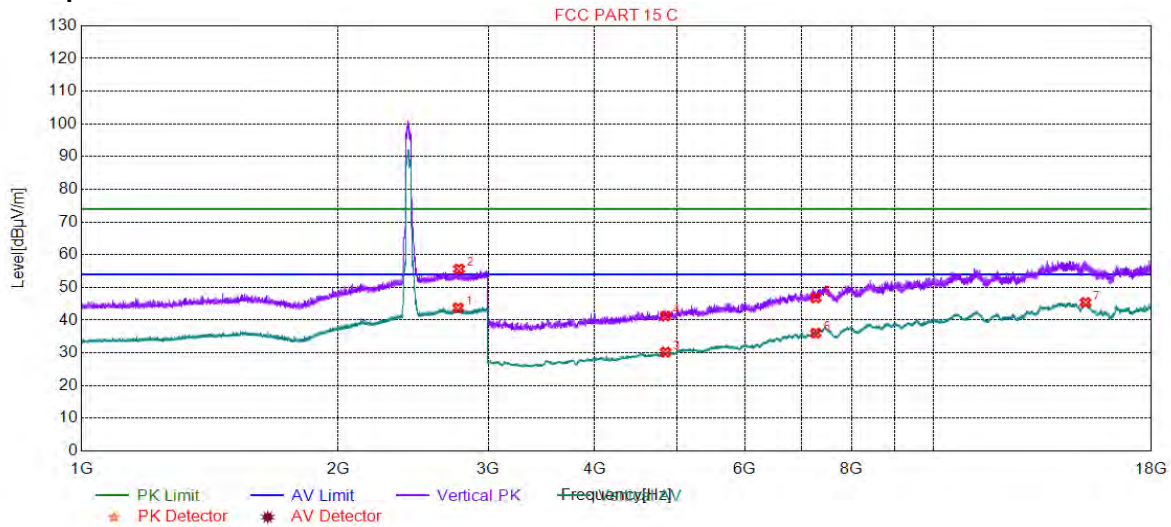
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4.9.2.20 802.11N40_Channel 3

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2766.44	43.80	9.07	54.00	10.20	294	45	Vertical
2	2772.94	55.67	9.05	74.00	18.33	293	221	Vertical
3	4844.00	30.24	-18.12	54.00	23.76	150	128	Vertical
4	4844.00	41.25	-18.12	74.00	32.75	171	209	Vertical
5	7266.00	46.82	-9.71	74.00	27.18	197	291	Vertical
6	7266.00	36.03	-9.71	54.00	17.97	276	100	Vertical
7	15061.2	45.42	2.65	54.00	8.58	292	45	Vertical

Final Data List



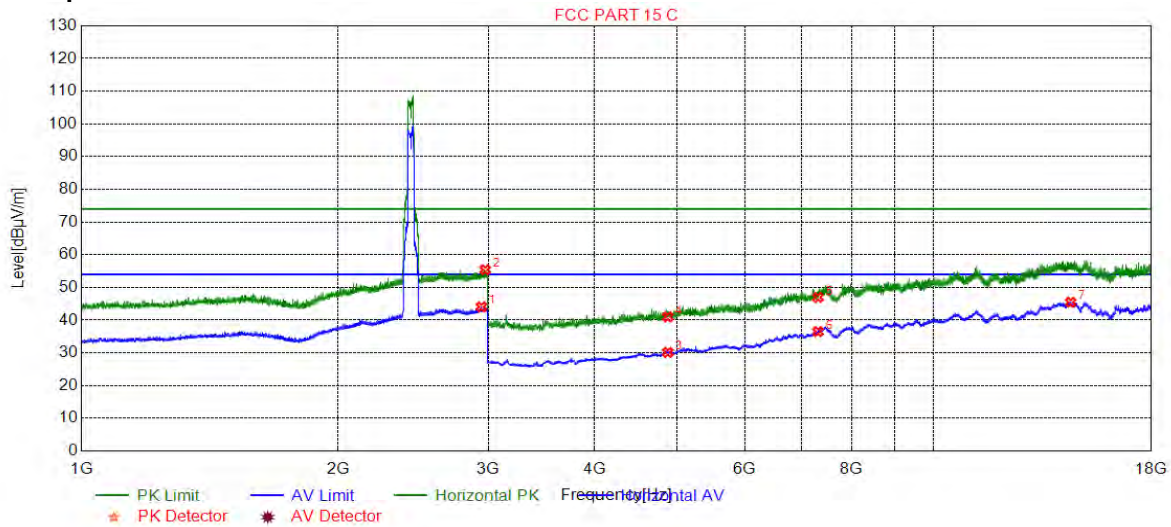
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4.9.2.21 802.11N40_Channel 6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2945.98	44.07	9.64	54.00	9.93	223	246	Horizontal
2	2975.49	55.43	9.56	74.00	18.57	173	136	Horizontal
3	4874.00	30.15	-17.99	54.00	23.85	180	260	Horizontal
4	4874.00	41.00	-17.99	74.00	33.00	239	0	Horizontal
5	7311.00	46.96	-9.59	74.00	27.04	150	151	Horizontal
6	7311.00	36.51	-9.59	54.00	17.49	206	0	Horizontal
7	14471.6	45.48	2.38	54.00	8.52	122	0	Horizontal

Final Data List

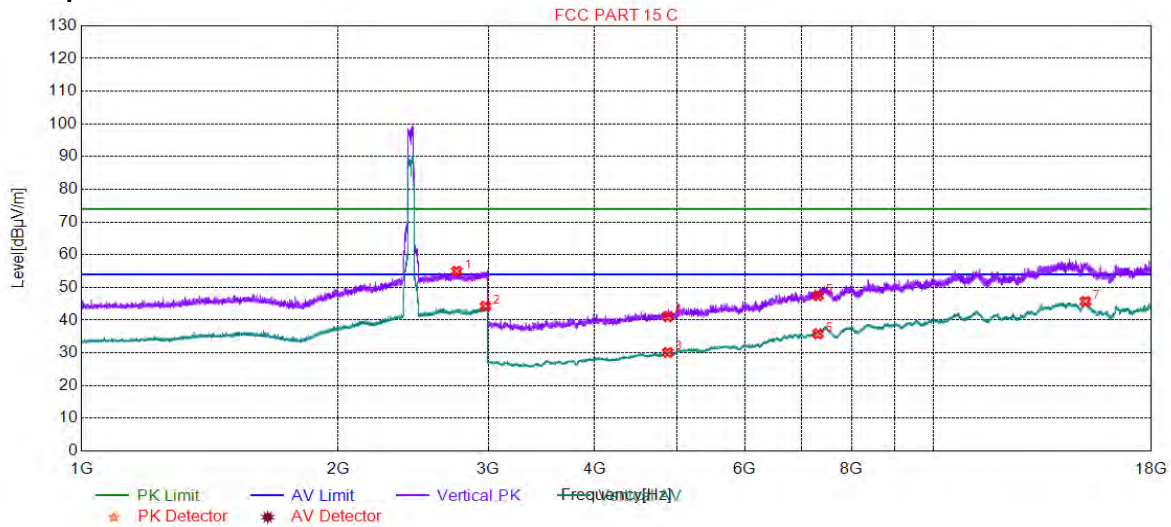


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4.9.2.22 802.11N40_Channel 6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2754.93	54.97	9.10	74.00	19.03	242	358	Vertical
2	2977.49	44.28	9.55	54.00	9.72	281	280	Vertical
3	4874.00	30.12	-17.99	54.00	23.88	176	208	Vertical
4	4874.00	41.11	-17.99	74.00	32.89	284	181	Vertical
5	7311.00	47.53	-9.59	74.00	26.47	254	18	Vertical
6	7311.00	35.83	-9.59	54.00	18.17	157	181	Vertical
7	15053.7	45.73	2.64	54.00	8.27	298	291	Vertical

Final Data List



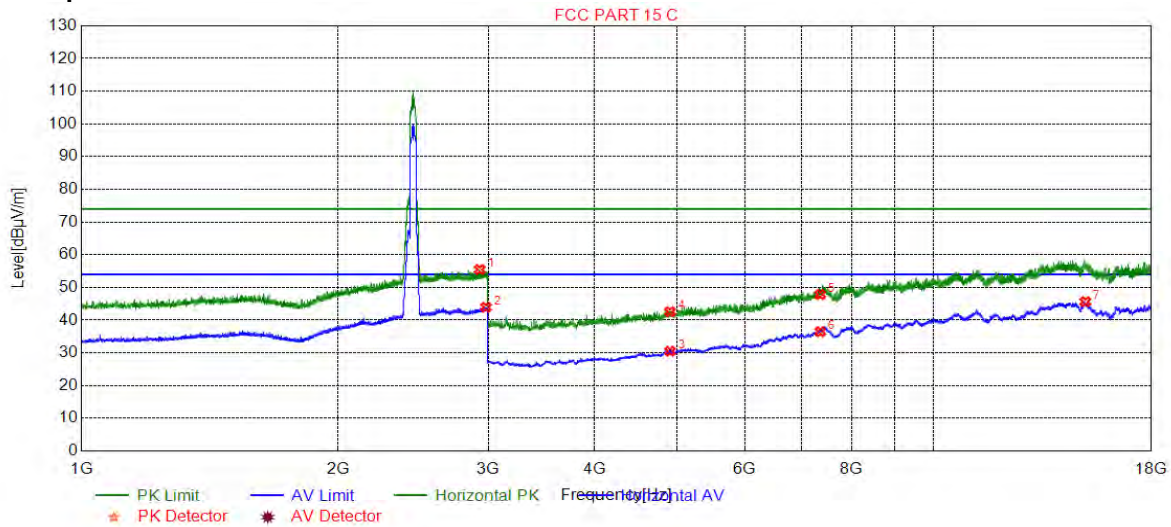
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4.9.2.23 802.11N40_Channel 9

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2931.98	55.48	9.49	74.00	18.52	227	0	Horizontal
2	2981.99	43.96	9.53	54.00	10.04	204	287	Horizontal
3	4904.00	30.52	-17.84	54.00	23.48	174	70	Horizontal
4	4904.00	42.61	-17.84	74.00	31.39	167	288	Horizontal
5	7356.00	47.84	-9.36	74.00	26.16	136	288	Horizontal
6	7356.00	36.47	-9.36	54.00	17.53	107	16	Horizontal
7	15055.2	45.67	2.64	54.00	8.33	125	206	Horizontal

Final Data List



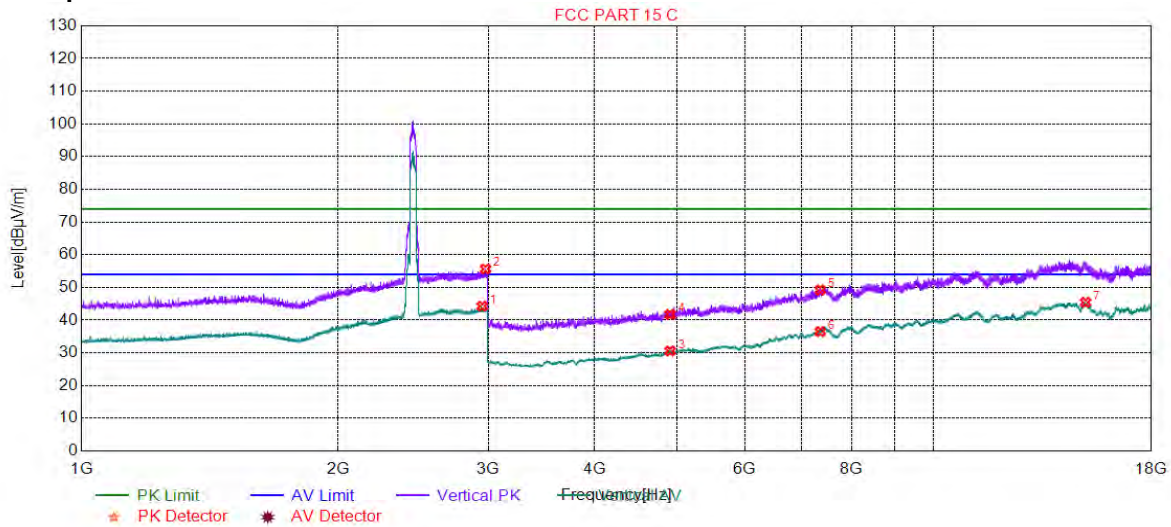
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4.9.2.24 802.11N40_Channel 9

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2951.48	44.26	9.67	54.00	9.74	186	46	Vertical
2	2978.99	55.69	9.55	74.00	18.31	191	59	Vertical
3	4904.00	30.57	-17.84	54.00	23.43	195	161	Vertical
4	4904.00	41.78	-17.84	74.00	32.22	181	243	Vertical
5	7356.00	49.25	-9.36	74.00	24.75	204	106	Vertical
6	7356.00	36.50	-9.36	54.00	17.50	263	243	Vertical
7	15064.2	45.44	2.66	54.00	8.56	237	189	Vertical

Final Data List



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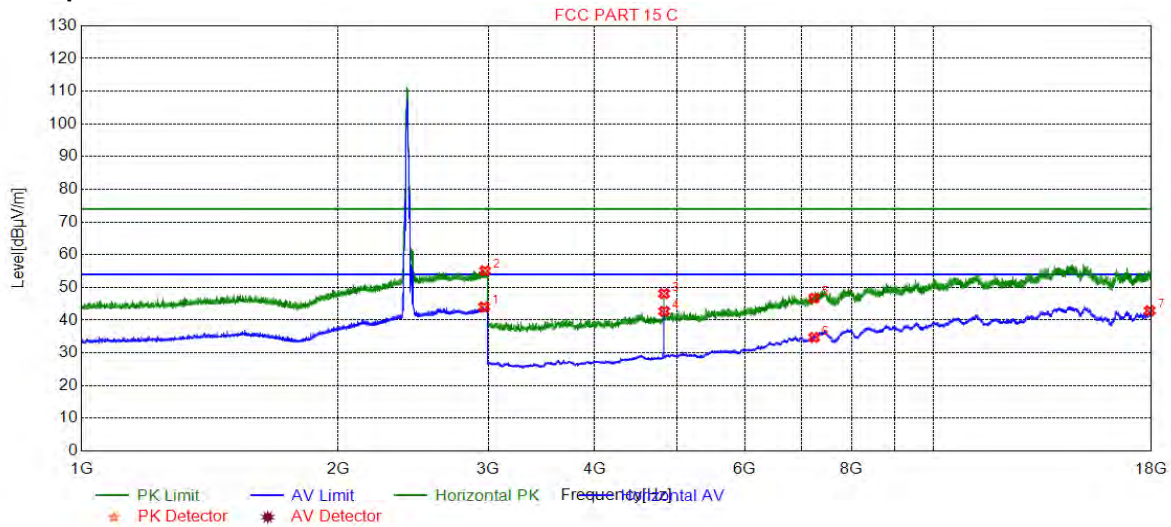
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Test on the worst case:

4.9.3 Transmitter emission above 1GHz

4.9.3.1 802.11B_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2966.49	44.03	9.60	54.00	9.97	189	261	Horizontal
2	2973.99	55.12	9.57	74.00	18.88	106	84	Horizontal
3	4824.18	48.12	-18.21	74.00	25.88	166	206	Horizontal
4	4825.68	42.74	-18.21	54.00	11.26	121	233	Horizontal
5	7236.00	46.75	-9.76	74.00	27.25	129	97	Horizontal
6	7236.00	34.70	-9.76	54.00	19.30	176	151	Horizontal
7	17914.4	42.89	-1.31	54.00	11.11	201	260	Horizontal

Final Data List

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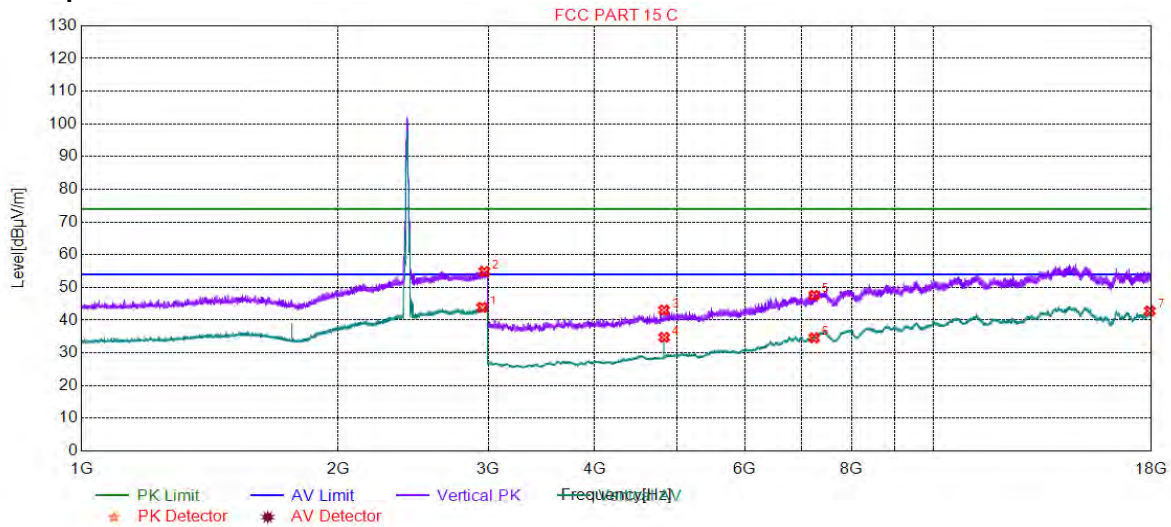
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4.9.3.2 802.11B_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2951.98	43.92	9.67	54.00	10.08	179	301	Vertical
2	2968.49	54.91	9.59	74.00	19.09	215	32	Vertical
3	4824.00	43.08	-18.21	74.00	30.92	256	44	Vertical
4	4825.68	34.75	-18.21	54.00	19.25	187	18	Vertical
5	7236.00	47.60	-9.76	74.00	26.40	245	18	Vertical
6	7236.00	34.59	-9.76	54.00	19.41	295	126	Vertical
7	17915.9	42.83	-1.31	54.00	11.17	209	236	Vertical

Final Data List

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:			

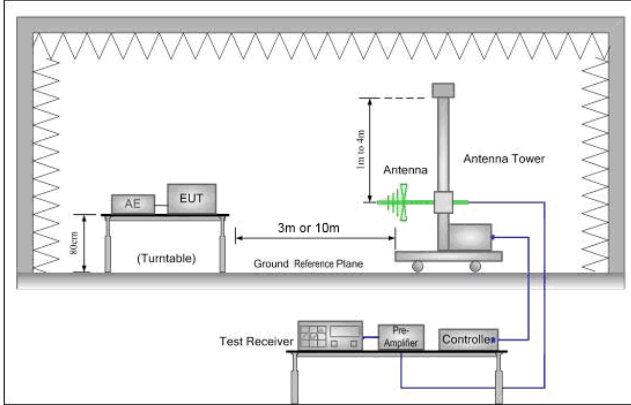


Figure 1. 30MHz to 1GHz

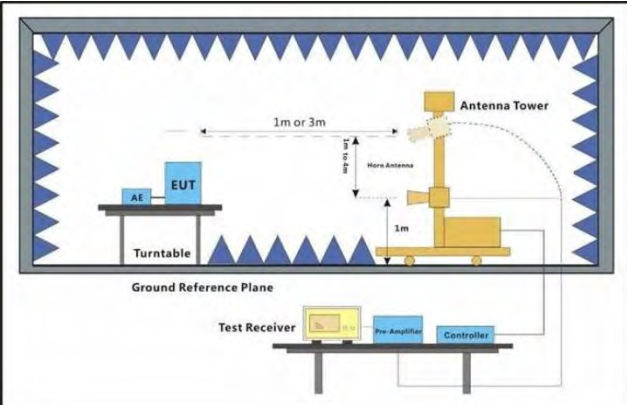


Figure 2. Above 1 GHz



<p>Test Procedure:</p>	<ol style="list-style-type: none"> 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. 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. 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 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. 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 h. Test the EUT in the lowest channel , the Highest channel 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. j. Repeat above procedures until all frequencies measured was complete.
<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>

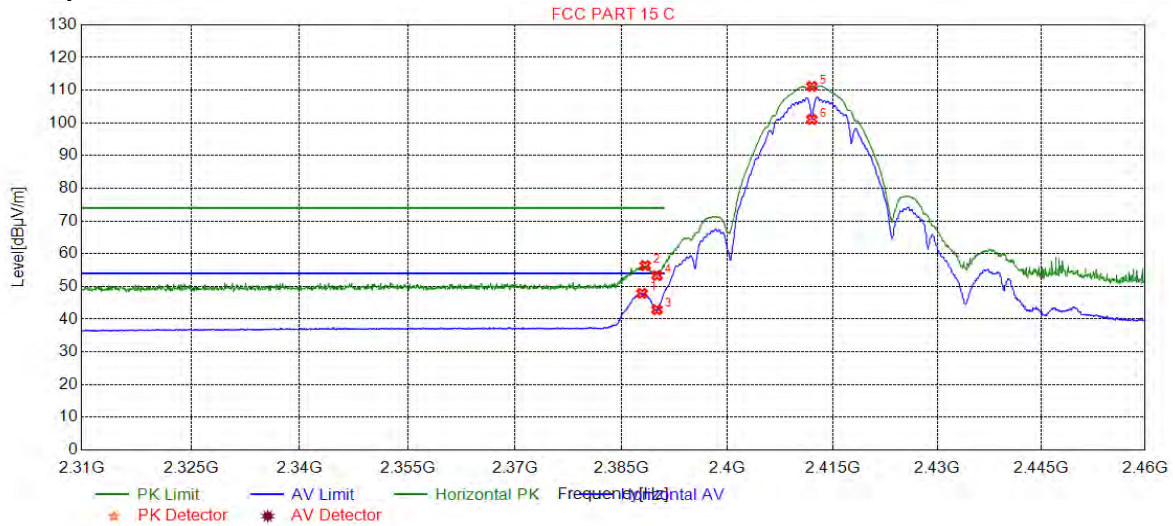


Test plot as follows:

4.10.1 Restricted bands around fundamental frequency

4.10.1.1 802.11B_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2387.88	47.90	7.77	54.00	6.10	151	200	Horizontal
2	2388.33	56.39	7.77	74.00	17.61	146	211	Horizontal
3	2390.00	42.89	7.77	54.00	11.11	205	200	Horizontal
4	2390.00	53.35	7.77	74.00	20.65	220	254	Horizontal
5	2412.00	111.17	7.81	0.00	-111.17	241	216	Horizontal
6	2412.00	101.07	7.81	0.00	-101.07	159	216	Horizontal

Final Data List

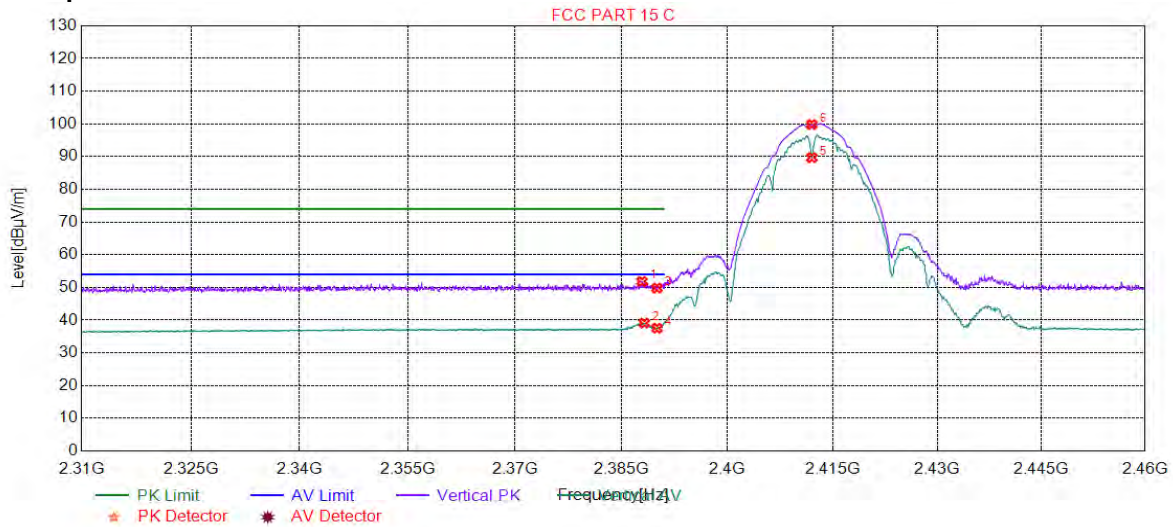


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4.10.1.2 802.11B_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2387.88	51.85	7.77	74.00	22.15	183	346	Vertical
2	2388.18	39.11	7.77	54.00	14.89	210	276	Vertical
3	2390.00	49.84	7.77	74.00	24.16	155	276	Vertical
4	2390.00	37.54	7.77	54.00	16.46	262	19	Vertical
5	2412.00	89.70	7.81	0.00	-89.70	154	270	Vertical
6	2412.00	99.85	7.81	0.00	-99.85	267	276	Vertical

Final Data List



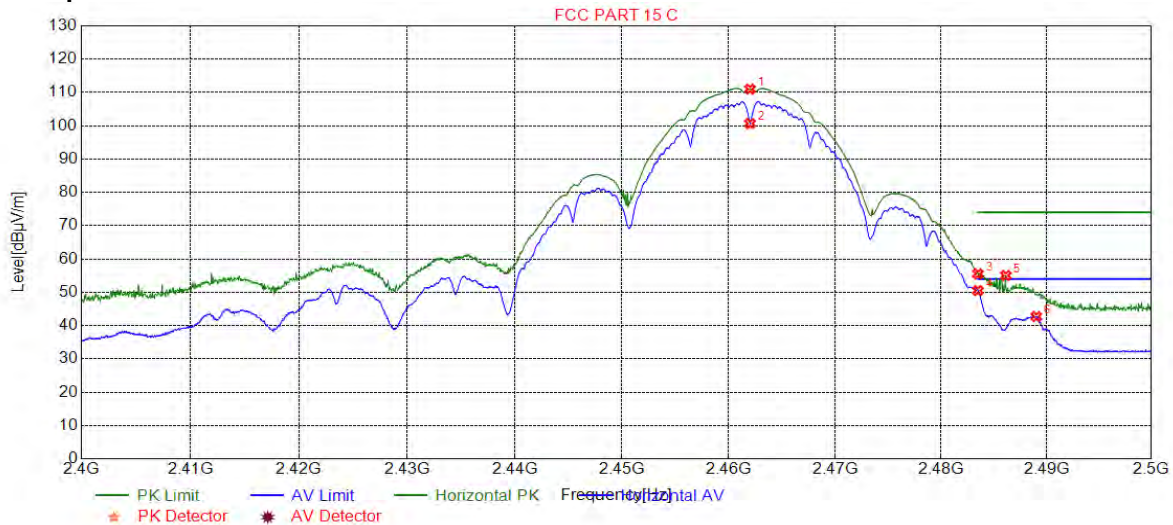
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4.10.1.3 802.11B_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	111.01	7.98	0.00	-111.01	145	210	Horizontal
2	2462.00	100.67	7.98	0.00	-100.67	202	216	Horizontal
3	2483.50	55.57	8.01	74.00	18.43	199	210	Horizontal
4	2483.50	50.53	8.01	54.00	3.47	187	210	Horizontal
5	2486.14	55.07	8.01	74.00	18.93	124	216	Horizontal
6	2489.04	42.74	8.02	54.00	11.26	192	216	Horizontal

Final Data List

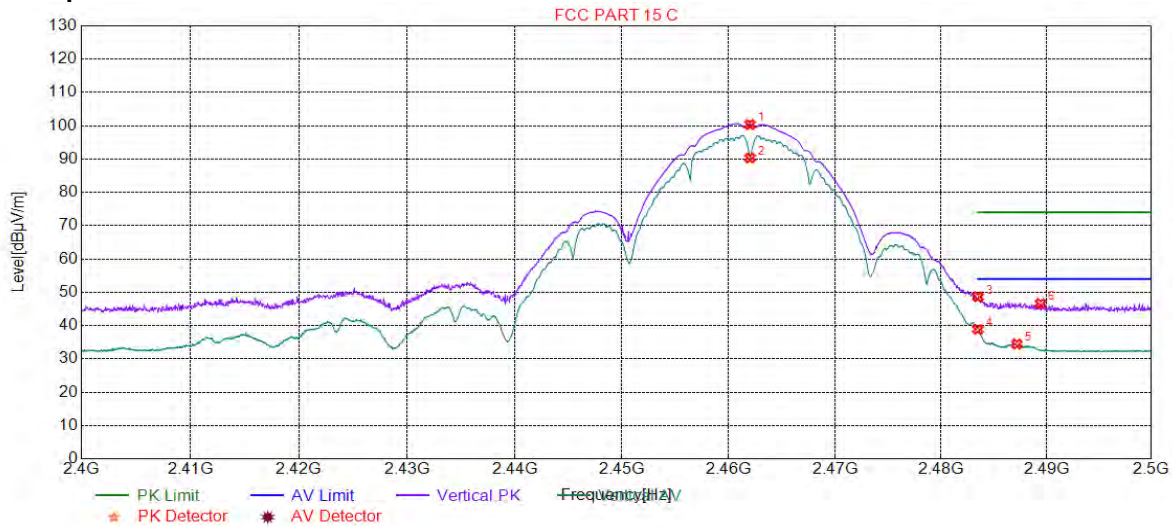


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4.10.1.4 802.11B_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	100.39	7.98	0.00	-100.39	174	62	Vertical
2	2462.00	90.35	7.98	0.00	-90.35	247	57	Vertical
3	2483.50	48.68	8.01	74.00	25.32	207	228	Vertical
4	2483.50	38.91	8.01	54.00	15.09	209	326	Vertical
5	2487.19	34.48	8.01	54.00	19.52	192	68	Vertical
6	2489.44	46.66	8.02	74.00	27.34	221	68	Vertical

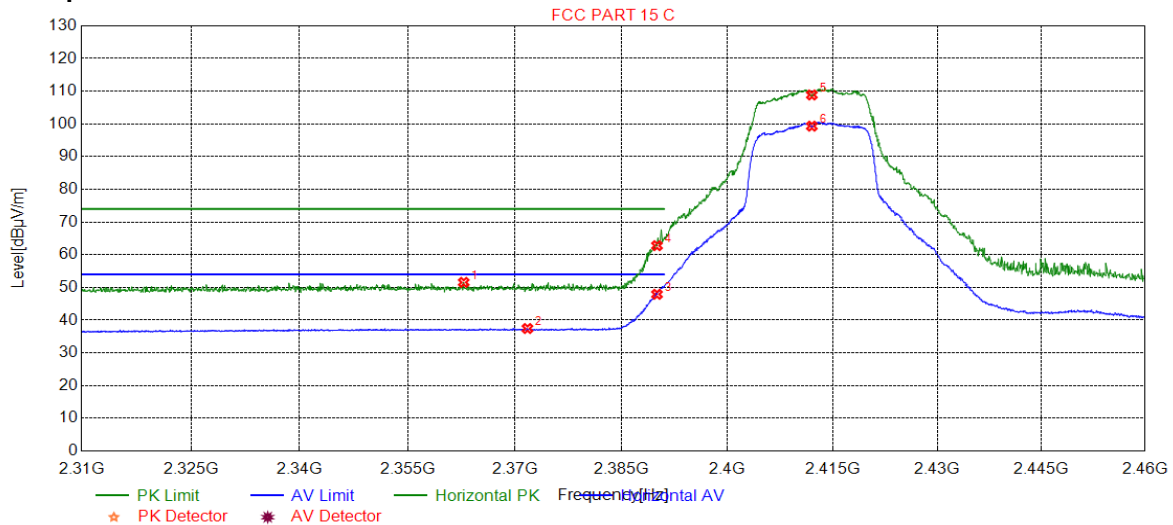
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4.10.1.5 802.11G_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2362.82	51.57	7.80	74.00	22.43	125	46	Horizontal
2	2371.75	37.46	7.79	54.00	16.54	146	172	Horizontal
3	2390.00	47.92	7.77	54.00	6.08	109	222	Horizontal
4	2390.00	62.78	7.77	74.00	11.22	161	222	Horizontal
5	2412.00	108.86	7.81	0.00	-108.86	158	260	Horizontal
6	2412.00	99.33	7.81	0.00	-99.33	154	222	Horizontal

Final Data List



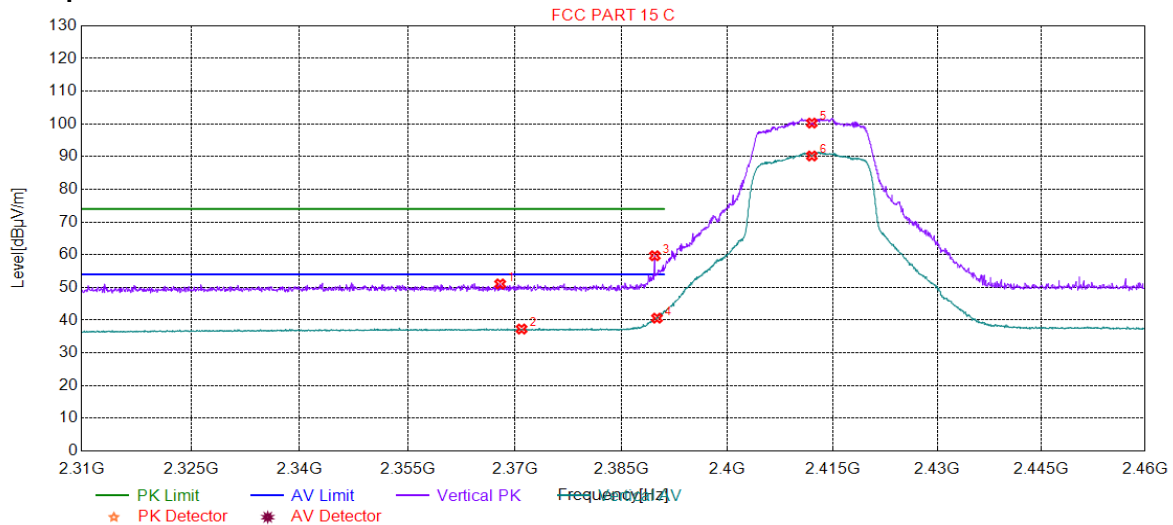
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4.10.1.6 802.11G_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2367.92	51.08	7.79	74.00	22.92	257	51	Vertical
2	2370.93	37.30	7.79	54.00	16.70	287	276	Vertical
3	2389.68	59.71	7.77	74.00	14.29	272	287	Vertical
4	2390.00	40.62	7.77	54.00	13.38	182	57	Vertical
5	2412.00	100.26	7.81	0.00	-100.26	215	51	Vertical
6	2412.00	90.21	7.81	0.00	-90.21	180	57	Vertical

Final Data List



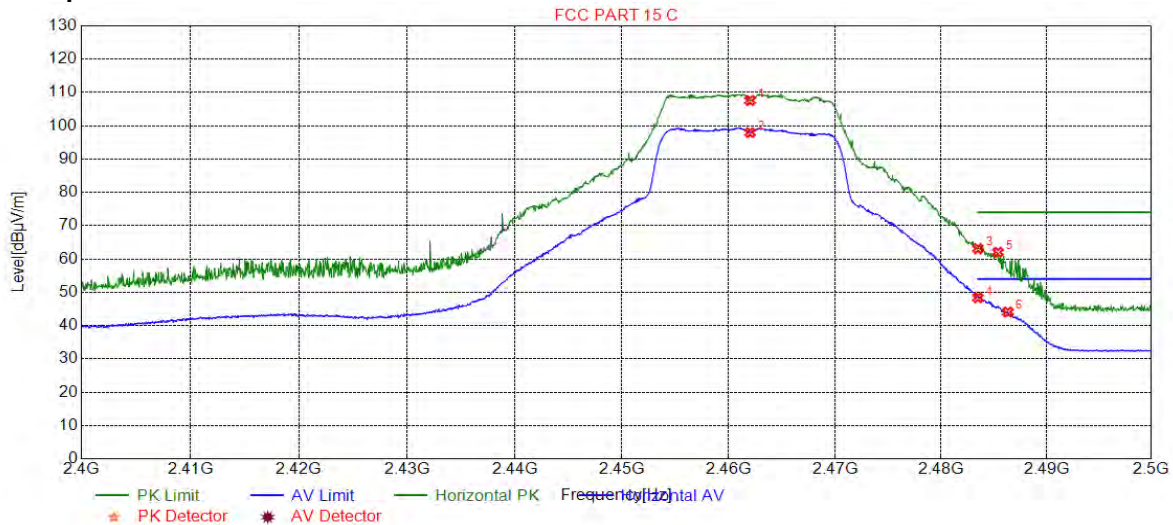
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4.10.1.7 802.11G_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	107.59	7.98	0.00	-107.59	200	242	Horizontal
2	2462.00	97.95	7.98	0.00	-97.95	244	220	Horizontal
3	2483.50	63.12	8.01	74.00	10.88	109	242	Horizontal
4	2483.50	48.39	8.01	54.00	5.61	235	259	Horizontal
5	2485.39	62.05	8.01	74.00	11.95	180	236	Horizontal
6	2486.34	44.10	8.01	54.00	9.90	248	236	Horizontal

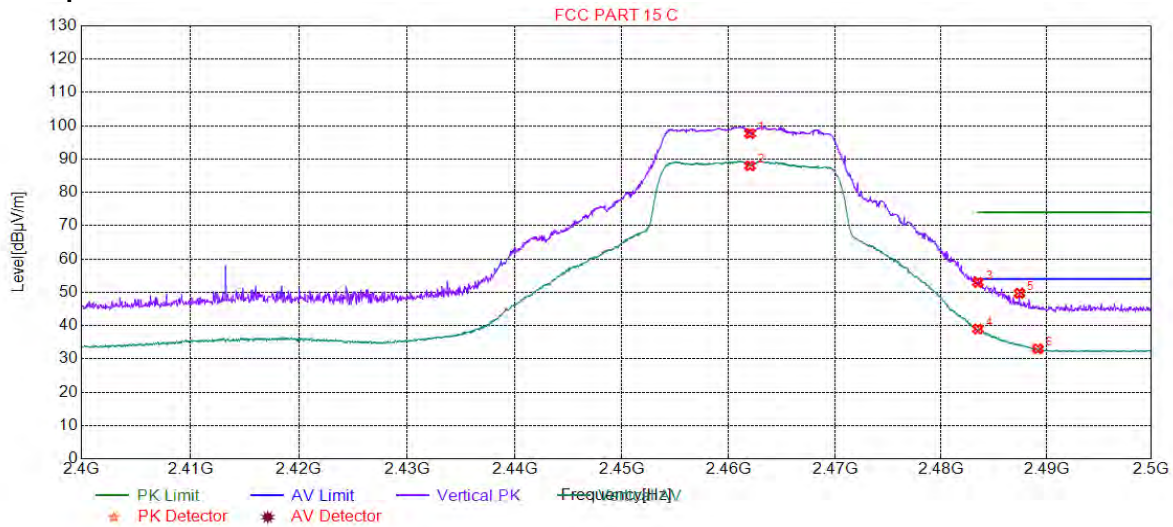
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4.10.1.8 802.11G_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	97.68	7.98	0.00	-97.68	217	45	Vertical
2	2462.00	87.97	7.98	0.00	-87.97	199	221	Vertical
3	2483.50	53.00	8.01	74.00	21.00	254	221	Vertical
4	2483.50	39.01	8.01	54.00	14.99	201	242	Vertical
5	2487.44	49.73	8.01	74.00	24.27	278	231	Vertical
6	2489.19	33.06	8.02	54.00	20.94	284	166	Vertical

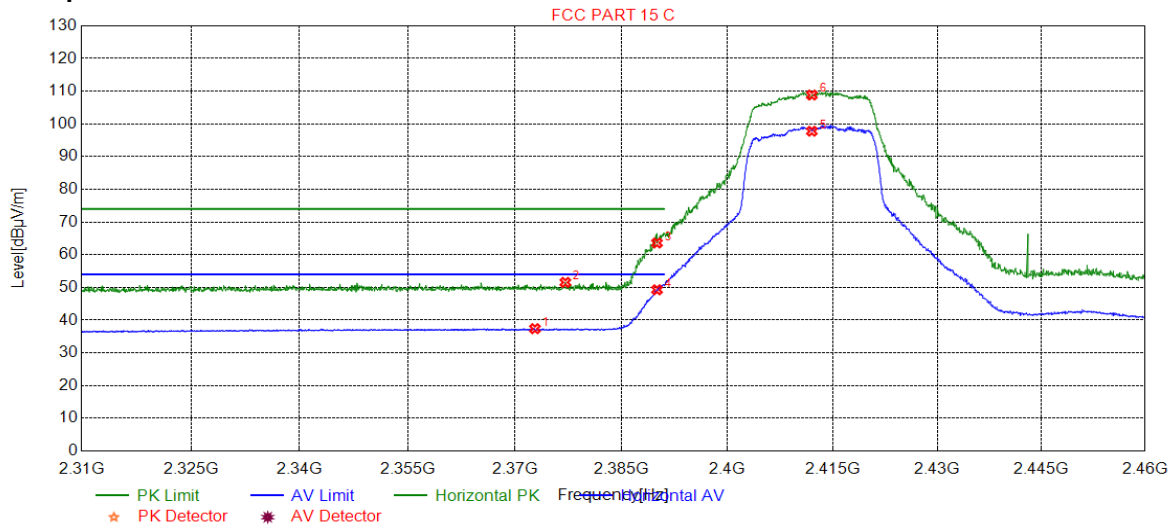
Final Data List



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4.10.1.9 802.11N20_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2372.80	37.41	7.79	54.00	16.59	239	14	Horizontal
2	2377.08	51.56	7.78	74.00	22.44	207	233	Horizontal
3	2390.00	63.60	7.77	74.00	10.40	150	260	Horizontal
4	2390.00	49.30	7.77	54.00	4.70	144	233	Horizontal
5	2412.00	97.77	7.81	0.00	-97.77	159	217	Horizontal
6	2412.00	108.84	7.81	0.00	-108.84	155	233	Horizontal

Final Data List



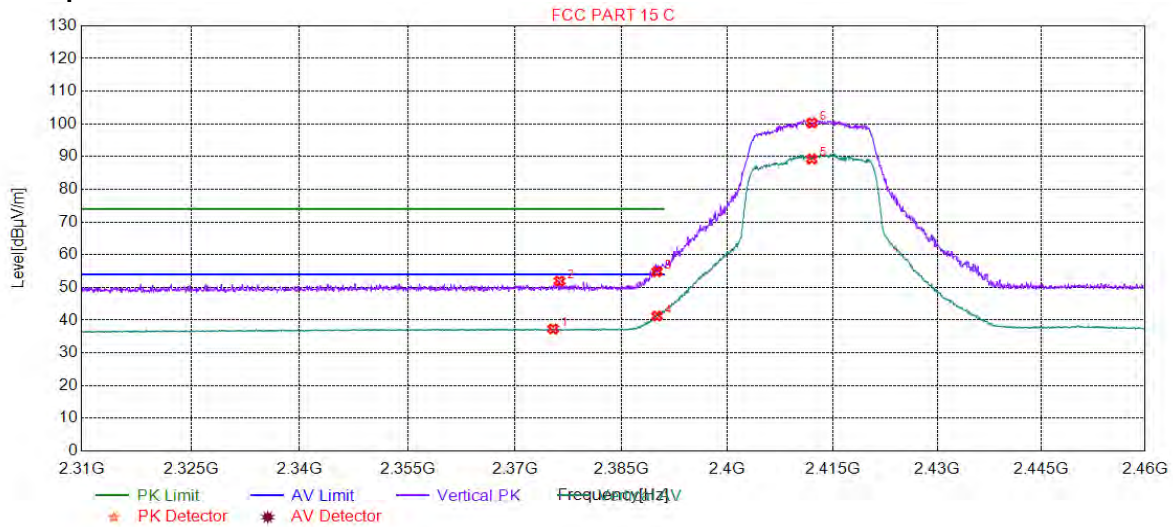
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4.10.1.10 802.11N20_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2375.35	37.32	7.78	54.00	16.68	273	67	Vertical
2	2376.25	51.98	7.78	74.00	22.02	185	309	Vertical
3	2390.00	54.83	7.77	74.00	19.17	218	220	Vertical
4	2390.00	41.26	7.77	54.00	12.74	216	56	Vertical
5	2412.00	89.29	7.81	0.00	-89.29	296	50	Vertical
6	2412.00	100.33	7.81	0.00	-100.33	280	50	Vertical

Final Data List



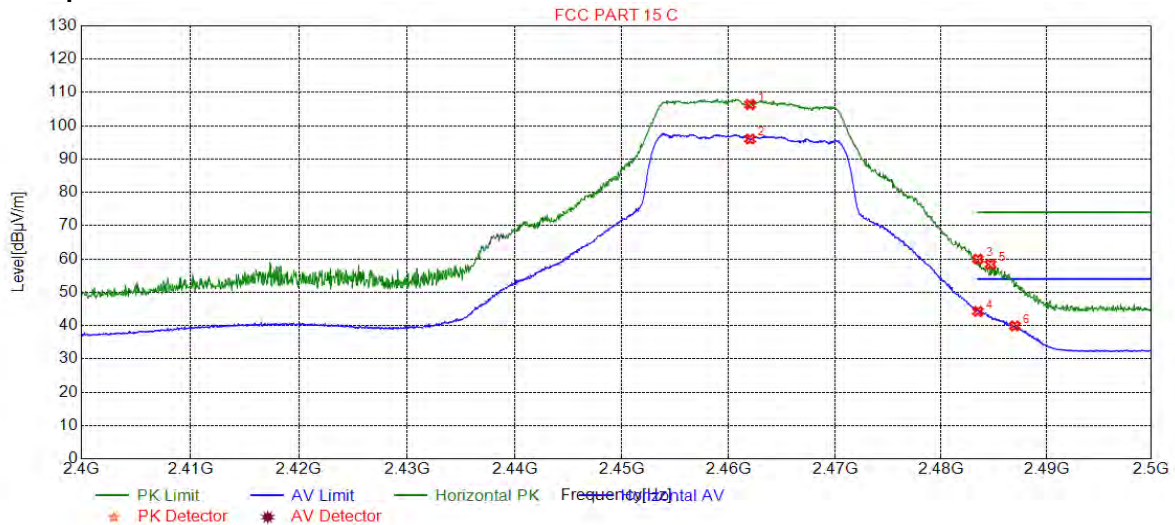
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4.10.1.11 802.11N20_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	106.38	7.98	0.00	-106.38	171	238	Horizontal
2	2462.00	96.02	7.98	0.00	-96.02	182	260	Horizontal
3	2483.50	59.98	8.01	74.00	14.02	153	260	Horizontal
4	2483.50	44.28	8.01	54.00	9.72	187	260	Horizontal
5	2484.69	58.43	8.01	74.00	15.57	218	232	Horizontal
6	2486.99	39.92	8.01	54.00	14.08	150	260	Horizontal

Final Data List



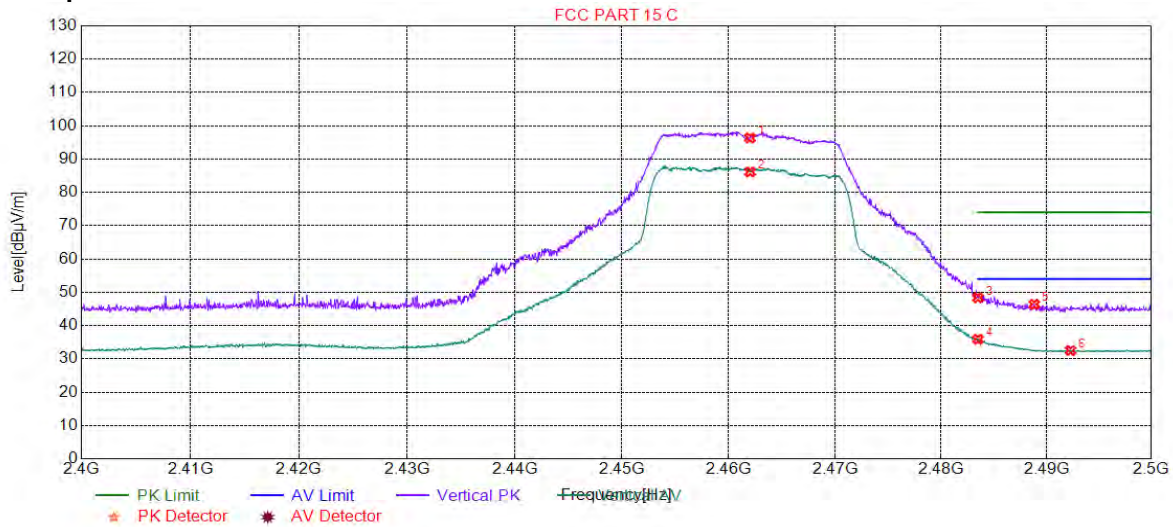
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4.10.1.12 802.11N20_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	96.35	7.98	0.00	-96.35	215	52	Vertical
2	2462.00	86.15	7.98	0.00	-86.15	296	52	Vertical
3	2483.50	48.39	8.01	74.00	25.61	291	234	Vertical
4	2483.50	35.93	8.01	54.00	18.07	186	239	Vertical
5	2488.84	46.40	8.02	74.00	27.60	196	277	Vertical
6	2492.29	32.58	8.02	54.00	21.42	268	217	Vertical

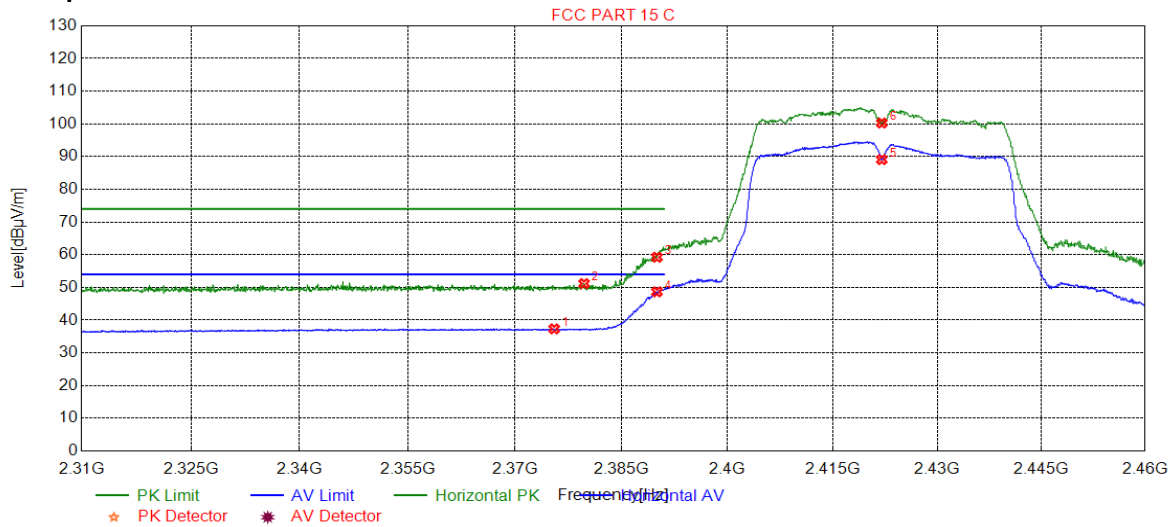
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4.10.1.13 802.11N40_Channel 3

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2375.50	37.35	7.78	54.00	16.65	249	259	Horizontal
2	2379.70	51.20	7.78	74.00	22.80	185	167	Horizontal
3	2390.00	59.25	7.77	74.00	14.75	242	227	Horizontal
4	2390.00	48.67	7.77	54.00	5.33	127	221	Horizontal
5	2422.00	89.10	7.85	0.00	-89.10	141	259	Horizontal
6	2422.00	100.28	7.85	0.00	-100.28	223	227	Horizontal

Final Data List



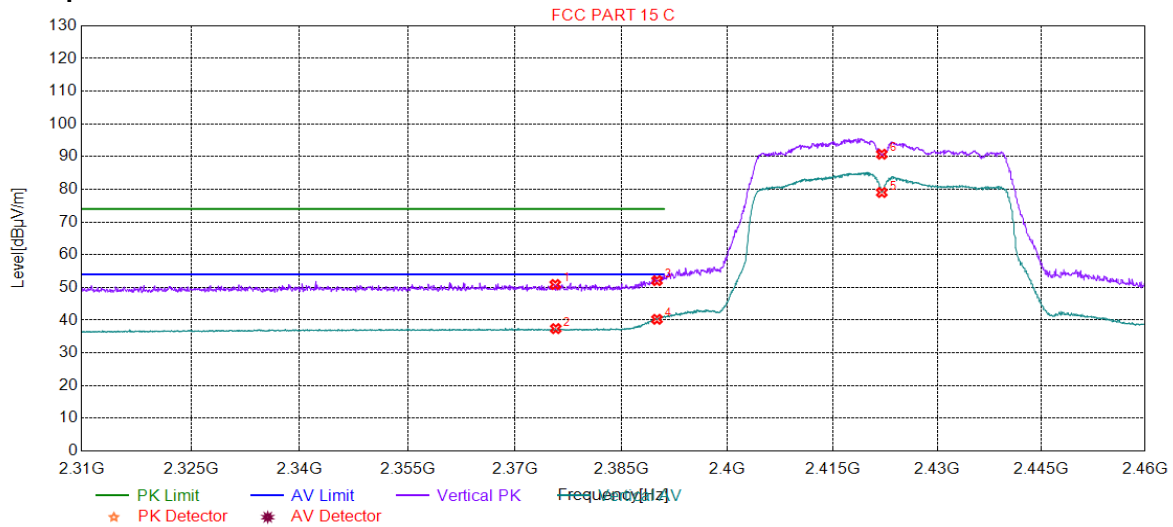
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4.10.1.14 802.11N40_Channel 3

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2375.65	50.91	7.78	74.00	23.09	254	0	Vertical
2	2375.73	37.43	7.78	54.00	16.57	283	321	Vertical
3	2390.00	52.09	7.77	74.00	21.91	186	233	Vertical
4	2390.00	40.27	7.77	54.00	13.73	279	222	Vertical
5	2422.00	79.04	7.85	0.00	-79.04	235	52	Vertical
6	2422.00	90.75	7.85	0.00	-90.75	297	58	Vertical

Final Data List

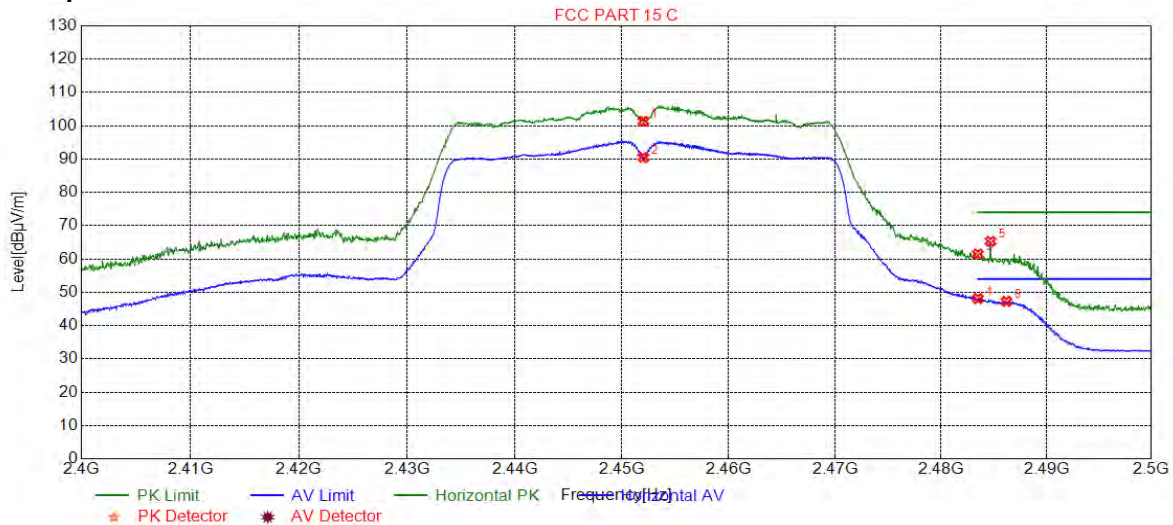


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4.10.1.15 802.11N40_Channel 9

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.00	101.35	7.97	0.00	-101.35	176	229	Horizontal
2	2452.00	90.52	7.97	0.00	-90.52	242	256	Horizontal
3	2483.50	61.54	8.01	74.00	12.46	187	256	Horizontal
4	2483.50	48.16	8.01	54.00	5.84	111	256	Horizontal
5	2484.69	65.35	8.01	74.00	8.65	202	206	Horizontal
6	2486.19	47.28	8.01	54.00	6.72	190	256	Horizontal

Final Data List



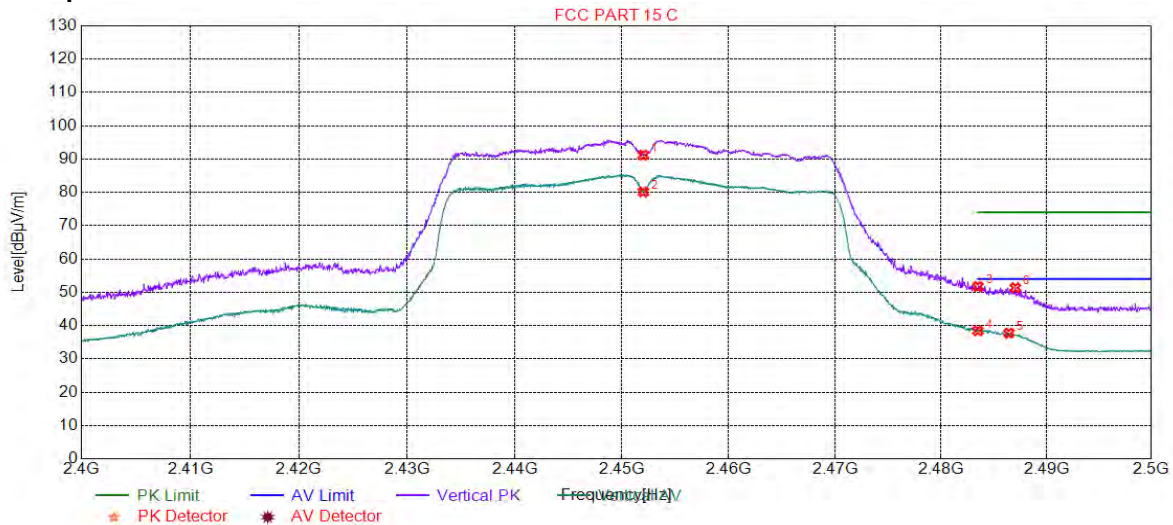
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4.10.1.16 802.11N40_Channel 9

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.00	91.20	7.97	0.00	-91.20	254	216	Vertical
2	2452.00	80.14	7.97	0.00	-80.14	170	56	Vertical
3	2483.50	51.77	8.01	74.00	22.23	222	238	Vertical
4	2483.50	38.46	8.01	54.00	15.54	226	238	Vertical
5	2486.44	37.77	8.01	54.00	16.23	278	238	Vertical
6	2487.04	51.38	8.01	74.00	22.62	181	232	Vertical

Final Data List



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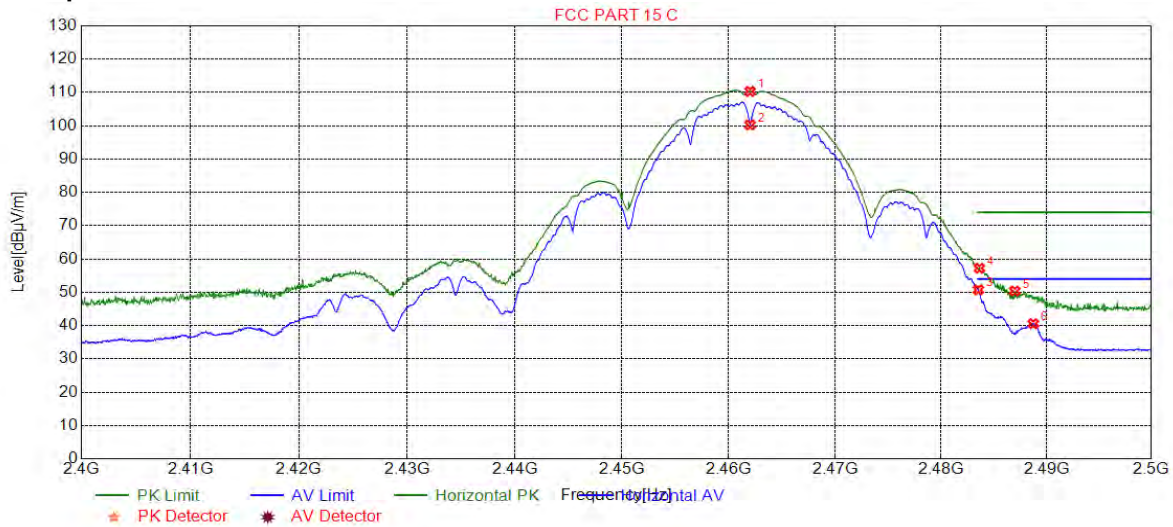
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Test on the worst case:

4.10.1.17 802.11B_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	110.32	7.98	0.00	-110.32	202	210	Horizontal
2	2462.00	100.27	7.98	0.00	-100.27	224	215	Horizontal
3	2483.54	50.76	8.01	54.00	3.24	221	215	Horizontal
4	2483.64	57.24	8.01	74.00	16.76	115	210	Horizontal
5	2486.99	50.41	8.01	74.00	23.59	202	215	Horizontal
6	2488.74	40.59	8.02	54.00	13.41	145	215	Horizontal

Final Data List

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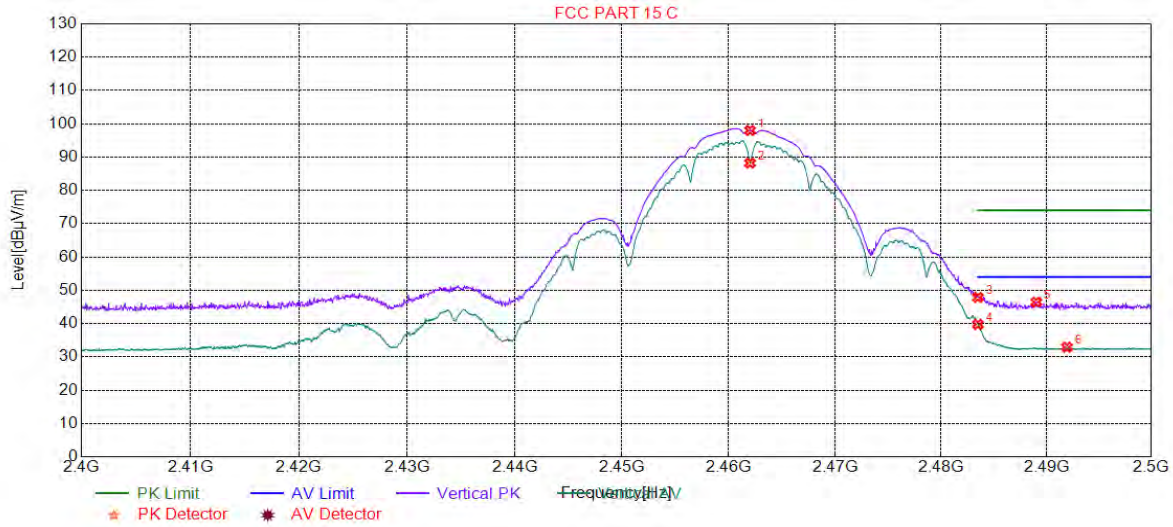
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4.10.1.18 802.11B_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	98.01	7.98	0.00	-98.01	213	185	Vertical
2	2462.00	88.20	7.98	0.00	-88.20	279	14	Vertical
3	2483.50	47.89	8.01	74.00	26.11	215	334	Vertical
4	2483.50	39.80	8.01	54.00	14.20	270	322	Vertical
5	2489.04	46.50	8.02	74.00	27.50	168	141	Vertical
6	2491.94	32.95	8.02	54.00	21.05	169	284	Vertical

Final Data List

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)

Lab A:

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	Temperature test	±1°C
5	Humidity test	±3%
6	DC and low frequency voltages	±0.5%

Lab B:

No.	Item	Measurement Uncertainty
1	Conduct emission test	± 3.0dB (150kHz to 30MHz)
2	Radiated Spurious emission test	± 4.8dB (Below 1GHz)
		± 4.8dB (1GHz to 6GHz)
		± 4.5dB (6GHz to 18GHz)
		± 5.02dB (Above 18GHz)



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6 Equipment List

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	2020/7/15	2021/7/15
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	2020/7/14	2021/7/14
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2019/10/27	2020/10/27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2020/7/14	2021/7/14

CE Test System					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	Brilliant-emc	N/A	XAW03-35-01	2019-09-11	2022-09-10
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2020-09-11	2021-09-10
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2020-08-04	2021-08-03
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-11-28	2020-11-28
Measurement Software	Tonscend	TS+ CE V2.5	XAW02-05-02	NCR	NCR

RSE Test System					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Semi-Anechoic Chamber	Brilliant-emc	N/A	XAW03-35-01	2019-09-11	2022-09-10
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2020-04-02	2021-04-01
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2020-09-11	2021-09-10
Receiving antenna (30MHz~3GHz)	Schwarzbeck	VULB 9163	XAW01-09-01	2019-10-13	2021-10-12
Receiving antenna (1GHz~18GHz)	Schwarzbeck	BBHA 9120D	XAW01-09-02	2019-10-13	2021-10-12
Receiving antenna (15GHz~40GHz)	Schwarzbeck	BBHA 9170	XAW01-09-03	2019-10-13	2021-10-12
Directional antenna rack controller	Max-Full	MF-7802BS	XAW03-03-01	NCR	NCR
High-speed antenna rack controller	Max-Full	MF-7802	XAW03-04-01	NCR	NCR
Filter bank	Tonscend	JS0806-F	XAW03-05-01	NCR	NCR



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Filter bank	Tonscend	JS0806s	XAW03-05-02	NCR	NCR
Amplifier	Tonscend	TAP00903040	XAW01-41-01	2019-11-18	2020-11-17
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2019-11-18	2020-11-17
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2019-12-03	2020-12-02
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2019-11-18	2020-11-17
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-11-18	2020-11-17
Measurement Software	Tonscend	TS+ RSE V3.0.0.2	XAW02-05-01	NCR	NCR

7 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of Set-Up for AR/2020/A0007.

The End



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