FCC TEST REPORT

Application No:	ZR/2020/60028
Applicant:	Fibocom Wireless Inc.
Address of Applicant:	5/F,Tower A,Technology Building II,1057 Nanhai Avenue,Shenzhen,China
Manufacturer:	Fibocom Wireless Inc.
Address of Manufacturer	5/F,Tower A,Technology Building II,1057 Nanhai Avenue,Shenzhen,China
Factory:	BYD Precision Manufacture Co.,Ltd.
Address of Factory:	No.3001, Bao He Road, Baolong industrial, Longgang Street ,Longgang Zone,Shenzhen
EUT Description:	LTE Module
Model No.:	SQ808-NA
Trade Mark:	Fibocom
FCC ID:	ZMOSQ808NA
Standards:	47 CFR FCC Part 2, Subpart J 47 CFR Part 15, Subpart C
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02 ANSI C63.10 (2013)
Date of Receipt:	2020/6/24
Date of Test:	2020/6/24 to 2020/7/13
Date of Issue:	2021/5/3
Test Result:	**PASS ***

. * 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		2020/7/22		Original
02		2021/5/3	James Qin	1.Add test site Information 2.Modify data conversion error of antenna height 3.Update equipment list

Authorized for issue by:		
Prepared By		**(James Qin) / Engineer**
Checked By		**(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

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

通标标准技术服务有限公司深圳分公司
检验检测专用章
Inspection & Testing Services
SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch Testing Center EEC Laboratory.

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3 General Information

3.1 Client Information

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Address of Applicant:	5/F,Tower A,Technology Building II,1057 Nanhai Avenue,Shenzhen,China
Manufacturer:	Fibocom Wireless Inc.
Address of Manufacturer:	5/F,Tower A,Technology Building II,1057 Nanhai Avenue,Shenzhen,China
Factory:	BYD Precision Manufacture Co.,Ltd.
Address of Factory:	No.3001, Bao He Road, Baolong industrial, Longgang Street ,Longgang Zone,Shenzhen

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

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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 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.

Designation Number: CN1271.

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3.4 General Description of EUT

EUT Description::	LTE Module
Model No.:	SQ808-NA
Trade Mark:	Fibocom
Hardware Version:	V1.0.4
Software Version:	SQ808-NA-Q62.01.001
IEEE 802.11 WLAN Mode Supported	☒ 802.11B (20 MHz channel bandwidth), ☒ 802.11G (20 MHz channel bandwidth) ☒ 802.11N (20 MHz channel bandwidth), ☐ 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
Sample Type:	☐ Portable Device, ☒Module
Antenna Type:	☒ External, ☐ Integrated
Antenna Ports	☒ Ant 1, ☐ Ant 2, ☐ Ant 3
Smart System	☒ SISO (for 802.11B/G/N), ☐ MIMO (for 802.11N): 2 Tx & 2 Rx, ☐ Diversity (for 802.11B/G) : Tx & Rx
Antenna Gain:	2.0dBi
Power Supply	☒ AC/DC Adapter; ☐ Battery ☐ PoE:; ☐ 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		

Remark:

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

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

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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)
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. 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.	
The antenna is external and no consideration of replacement. The best case gain of the antenna is 2.0dBi.	

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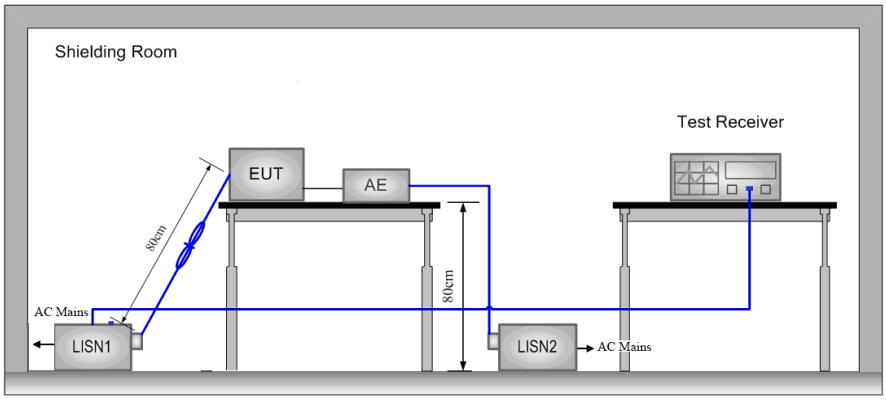
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate of 802.11B at lowest channel is the worst case. Charge + Transmitting mode. Only the worst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

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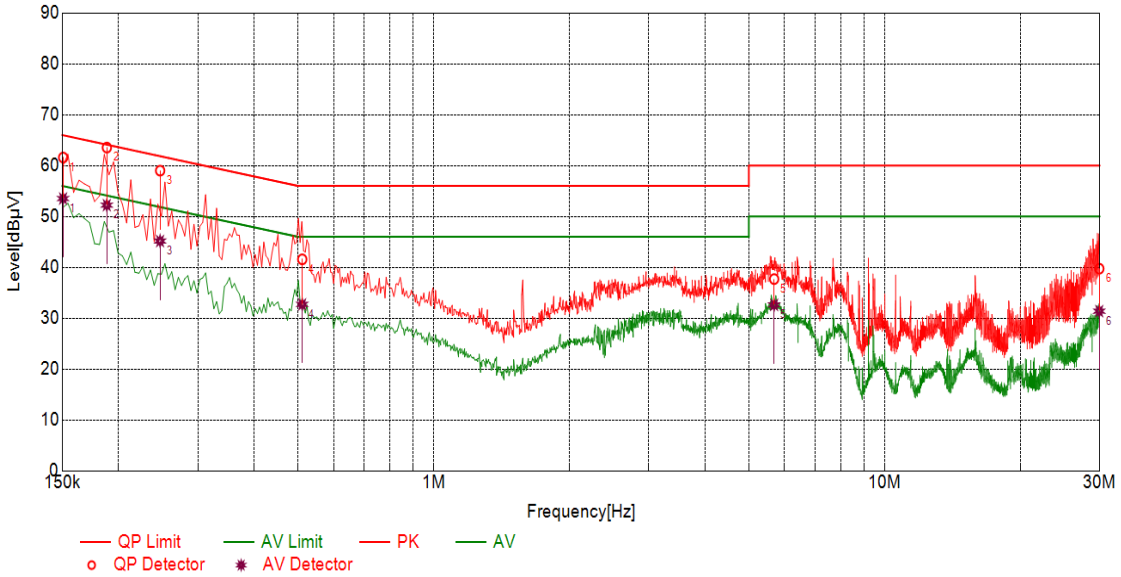
Measurement Data

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

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	0.1507	10.10	61.58	65.96	4.38	53.52	55.96	2.44	L
2	0.1884	10.10	63.54	64.11	0.57	52.22	54.11	1.89	L
3	0.2473	10.10	59.00	61.85	2.85	45.16	51.85	6.69	L
4	0.5110	10.10	41.58	56.00	14.42	32.71	46.00	13.29	L
5	5.6888	10.10	37.69	60.00	22.31	32.61	50.00	17.39	L
6	29.9257	10.11	39.74	60.00	20.26	31.38	50.00	18.62	L

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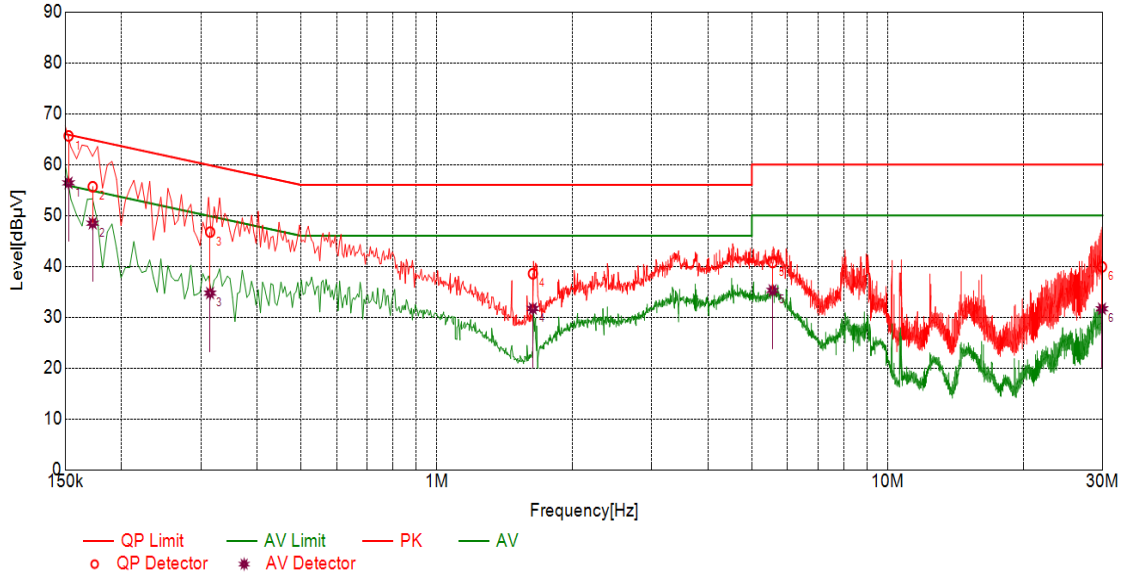
Neutral Line:



Test Graph

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	0.1526	10.10	65.63	65.86	0.23	56.40	55.86	-0.54	N
2	0.1726	10.10	55.65	64.84	9.19	48.47	54.84	6.37	N
3	0.3144	10.10	46.73	59.85	13.12	34.74	49.85	15.11	N
4	1.6341	10.10	38.55	56.00	17.45	31.70	46.00	14.30	N
5	5.5577	10.10	40.76	60.00	19.24	35.27	50.00	14.73	N
6	29.8863	10.11	39.90	60.00	20.10	31.65	50.00	18.35	N

Remarks:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

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4.3 Duty Cycle

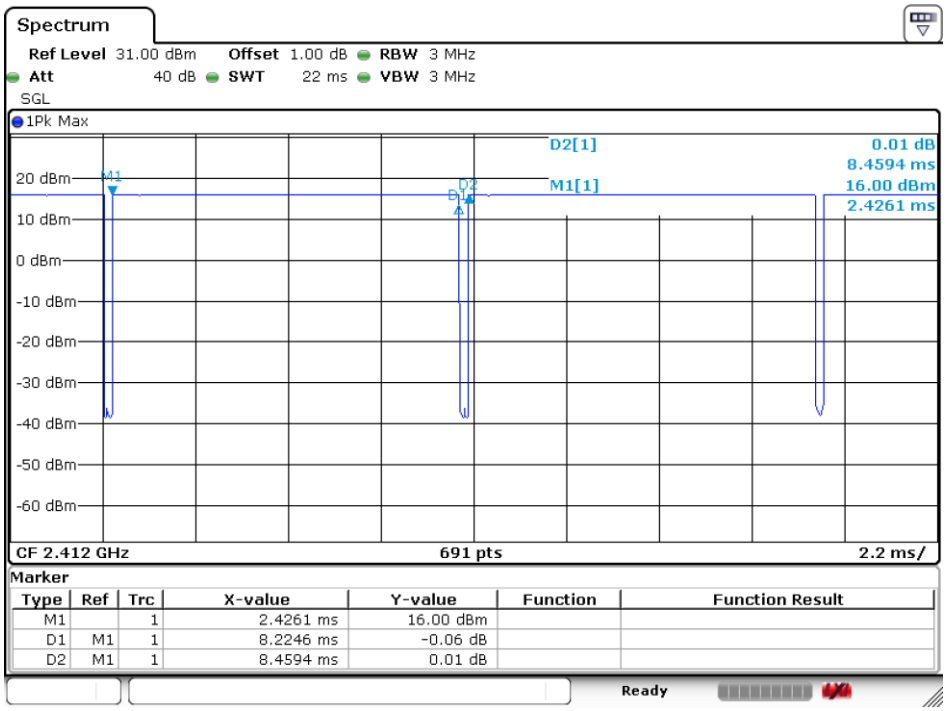
4.3.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11B	Ant 1: CH1,CH6,CH11	97.22
11G	Ant 1: CH1,CH6,CH11	87.10
11N20	Ant 1: CH1,CH6,CH11	86.29

4.3.1 Test Plots

4.3.1.1 ANT1

4.3.1.1.1 11B



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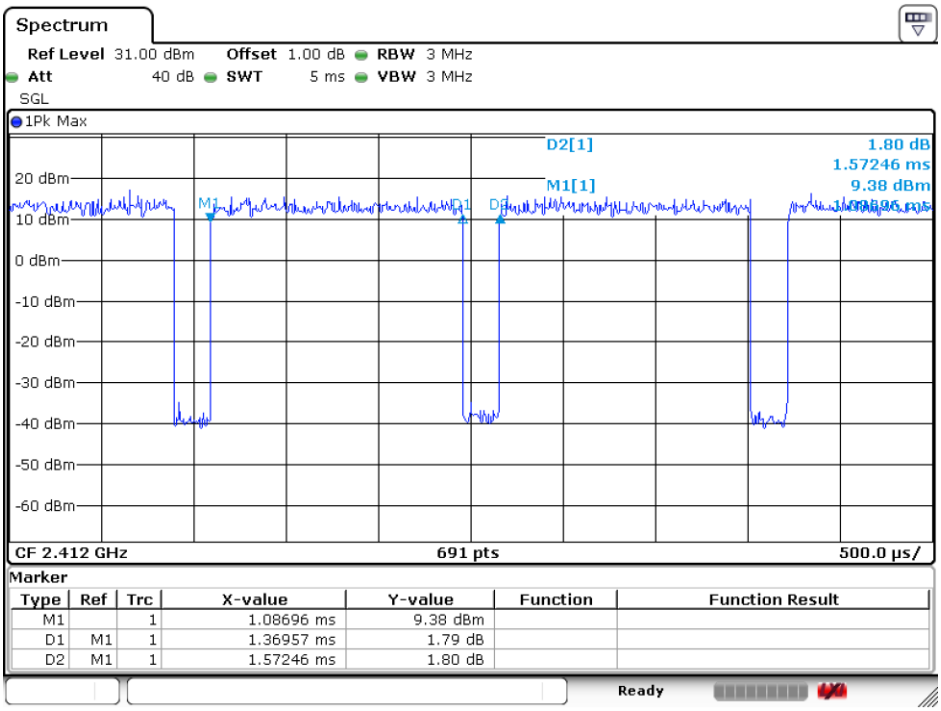
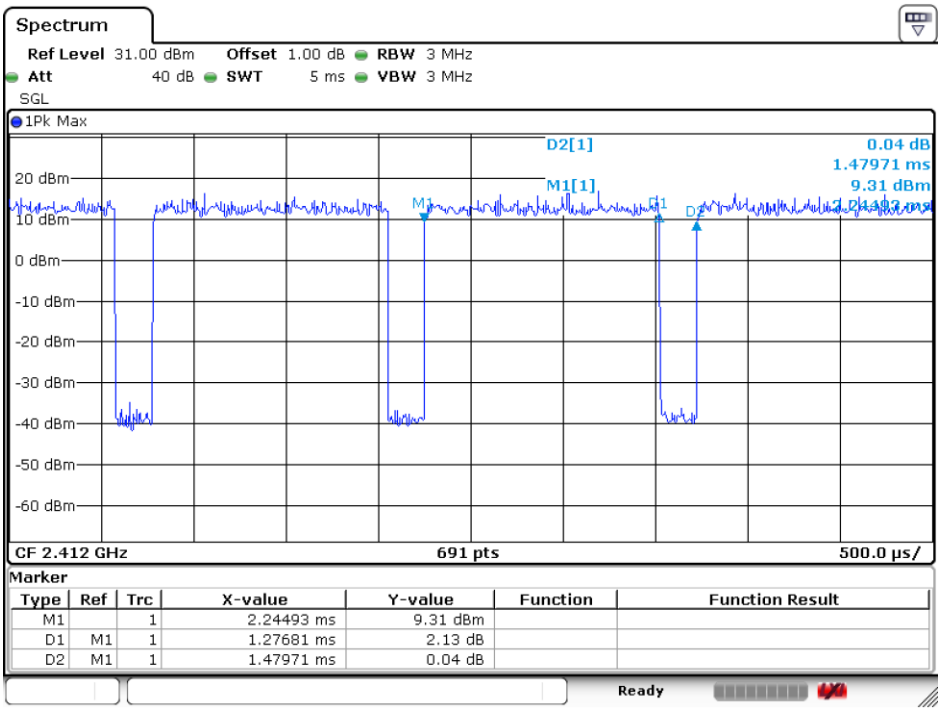
4.3.1.1.2 11G



Date: 30.JUN.2020 13:02:36

4.3.1.1.3 11N20



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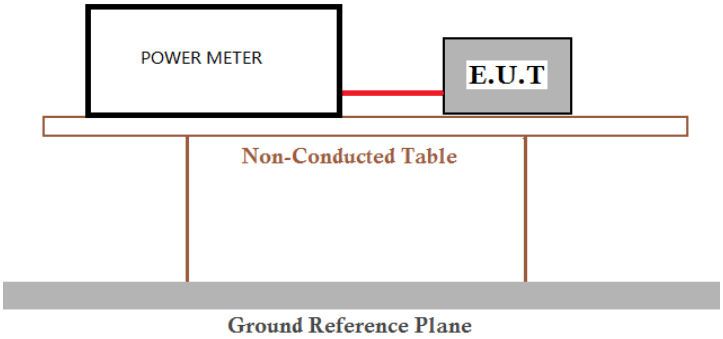
4.4 Conducted Output Power

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);
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	17.49	30.00	Pass
	Middle	17.57	30.00	Pass
	Highest	17.13	30.00	Pass
802.11G	Lowest	15.00	30.00	Pass
	Middle	14.89	30.00	Pass
	Highest	14.64	30.00	Pass
802.11N20	Lowest	13.01	30.00	Pass
	Middle	13.07	30.00	Pass
	Highest	12.78	30.00	Pass

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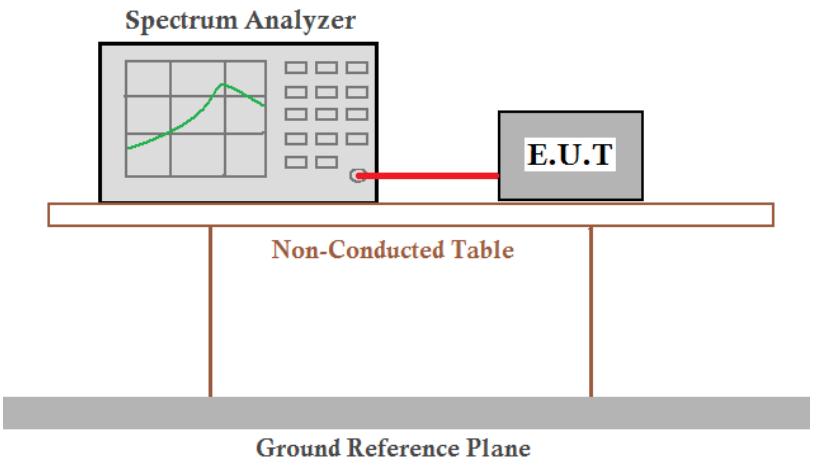
4.5 DTS (6 dB) Bandwidth & 99% Occupied Bandwidth

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);
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	12.16	8.03	≥500	Pass
	Middle	12.11	8.03	≥500	Pass
	Highest	12.24	8.03	≥500	Pass
802.11G	Lowest	17.37	16.45	≥500	Pass
	Middle	17.24	16.50	≥500	Pass
	Highest	17.45	16.50	≥500	Pass
802.11N20	Lowest	18.19	17.67	≥500	Pass
	Middle	18.10	17.67	≥500	Pass
	Highest	18.28	17.67	≥500	Pass

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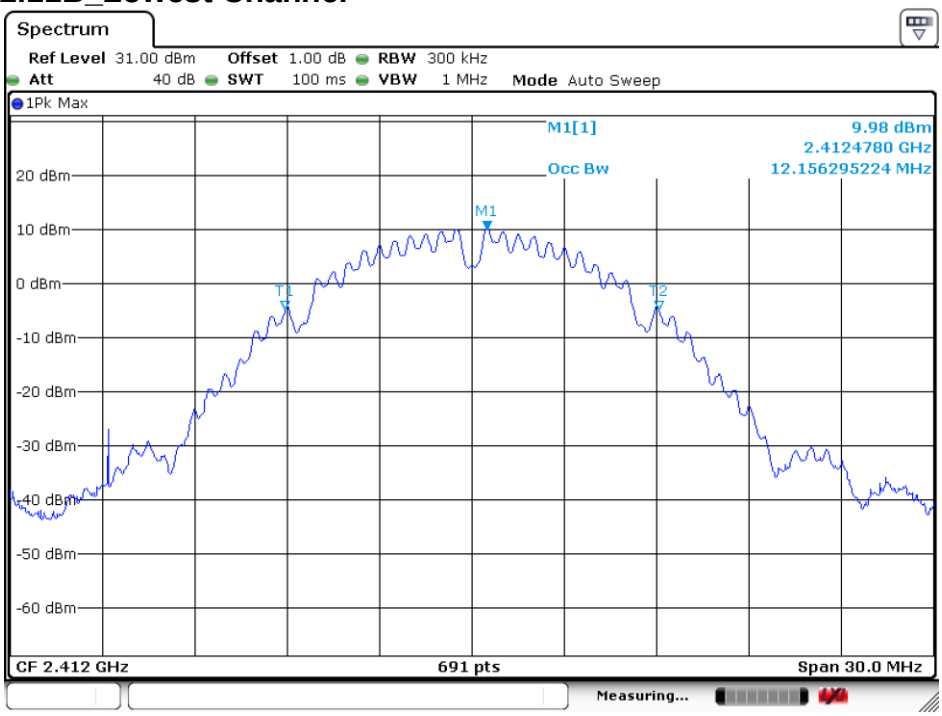
4.5.2 Test plots

4.5.2.1 ANT1

4.5.2.1.1 802.11B_Lowest Channel



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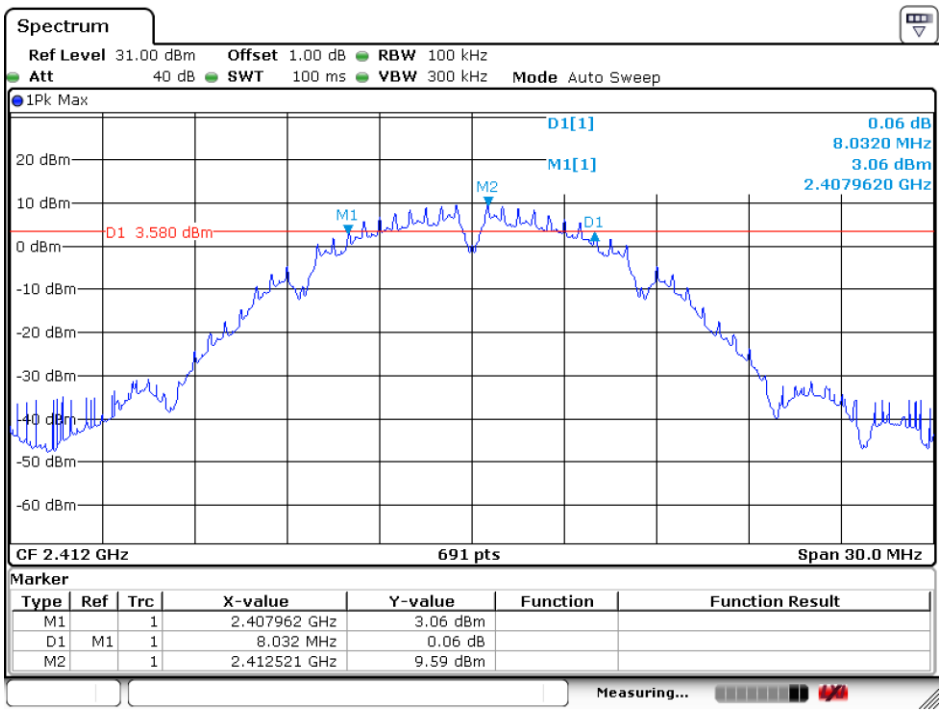

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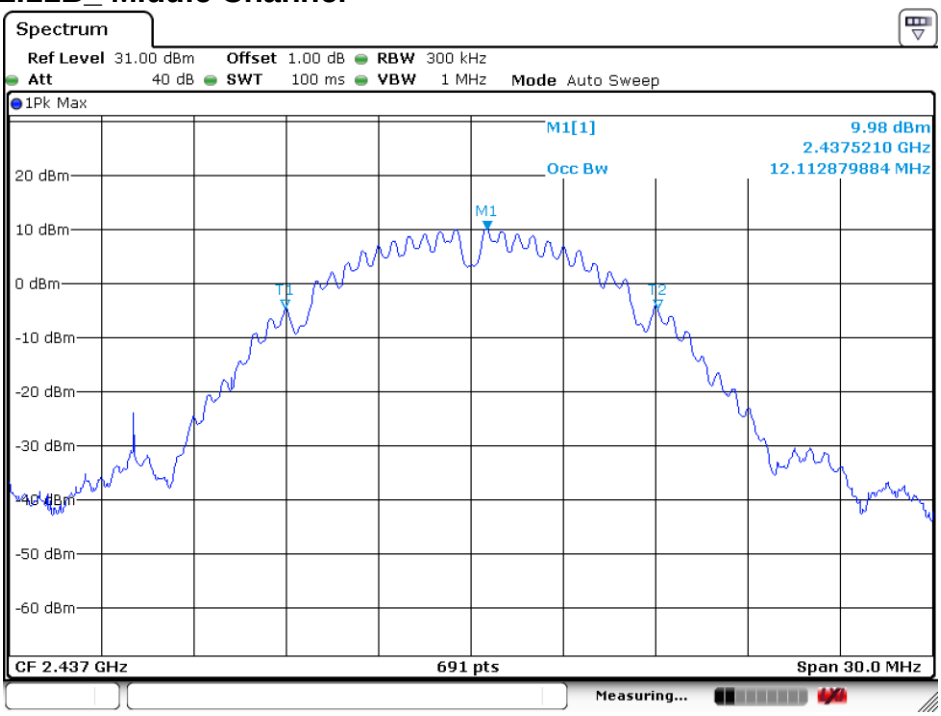
4.5.2.1.2 802.11B_ Middle Channel



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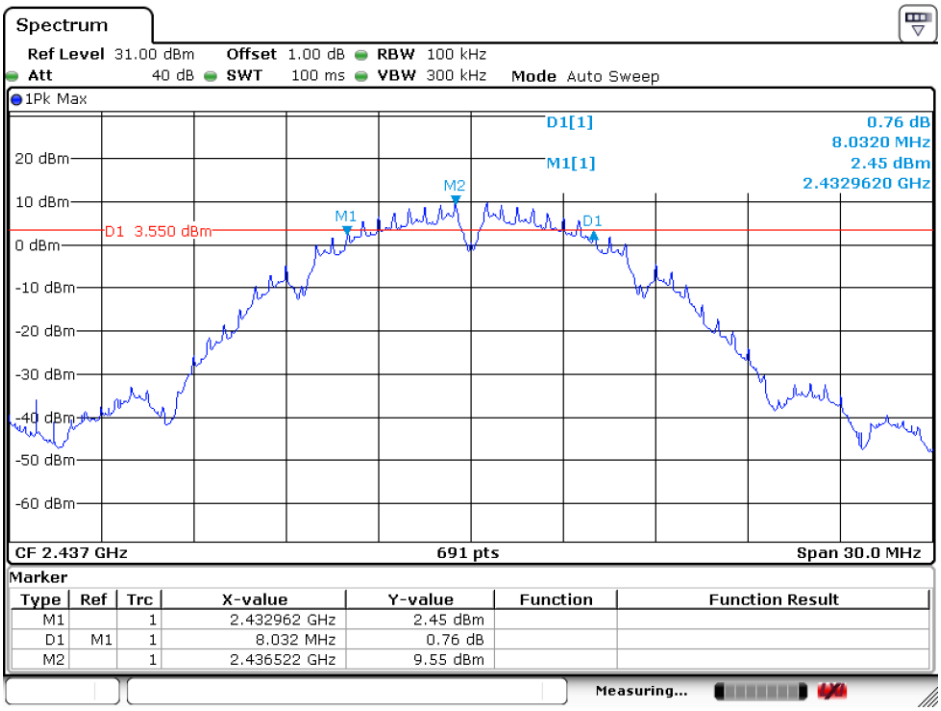

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.432962 GHz	2.45 dBm		
D1	M1	1	8.032 MHz	0.76 dB		
M2		1	2.436522 GHz	9.55 dBm		

Date: 30.JUN.2020 12:36:18

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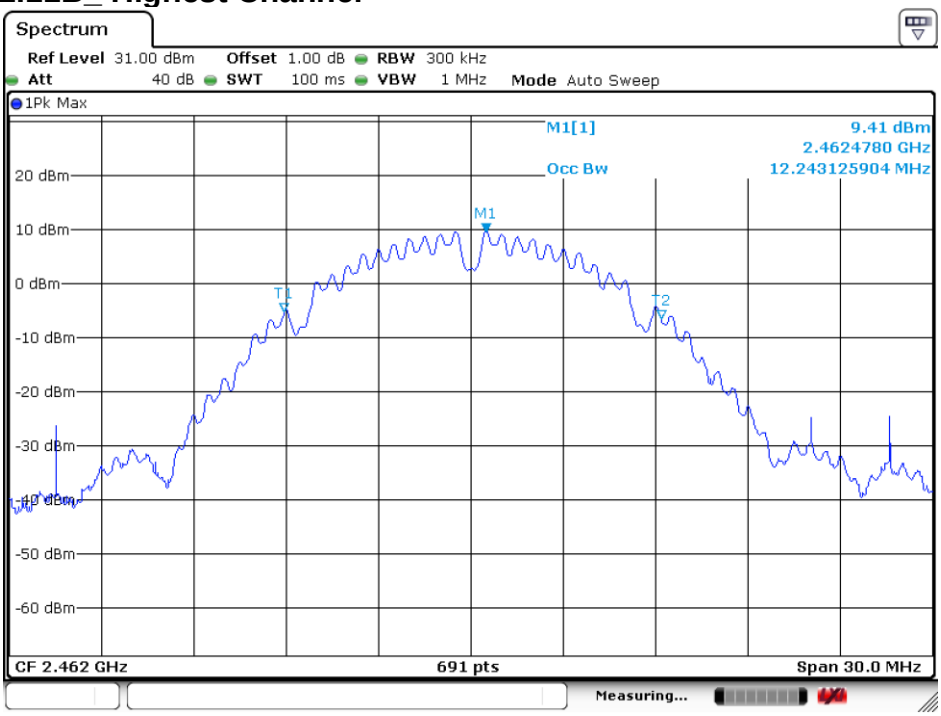
4.5.2.1.3 802.11B_ Highest Channel



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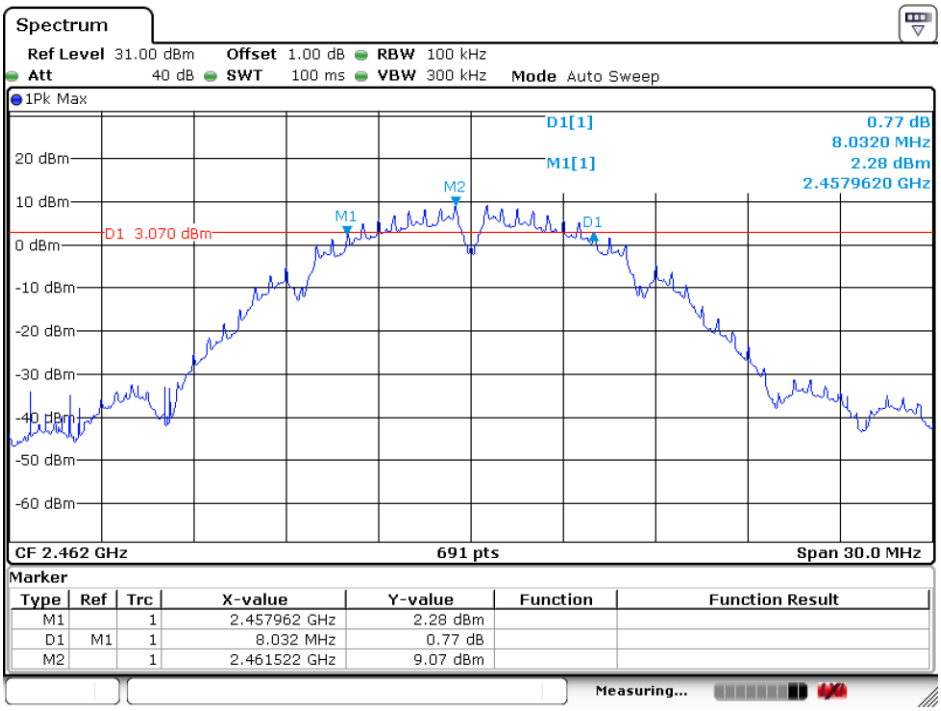

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.457962 GHz	2.28 dBm		
D1	M1	1	8.032 MHz	0.77 dB		
M2		1	2.461522 GHz	9.07 dBm		

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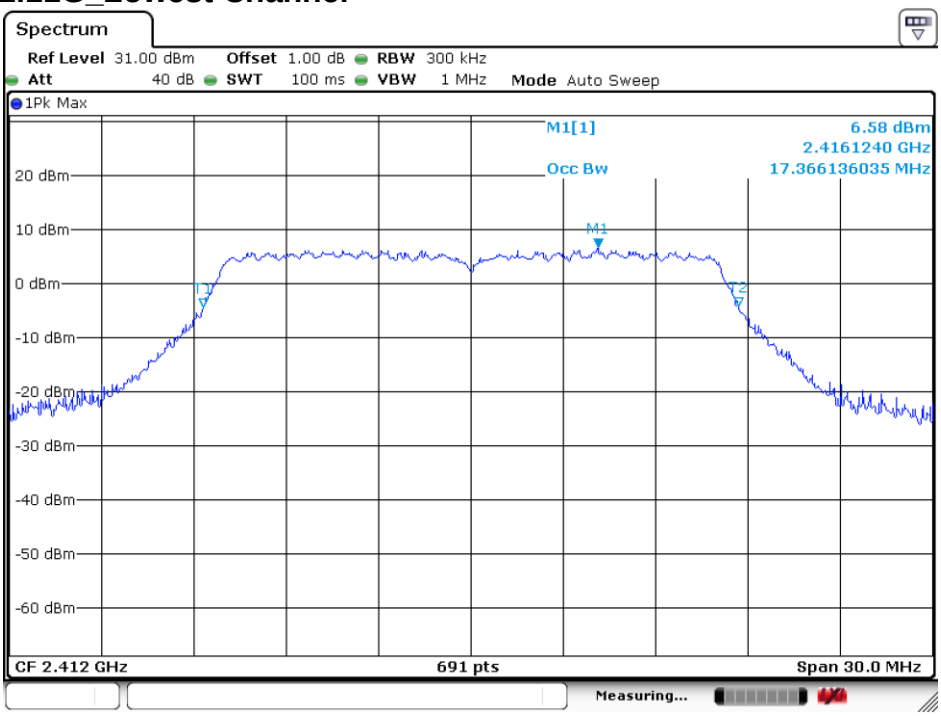
4.5.2.1.4 802.11G_Lowest Channel



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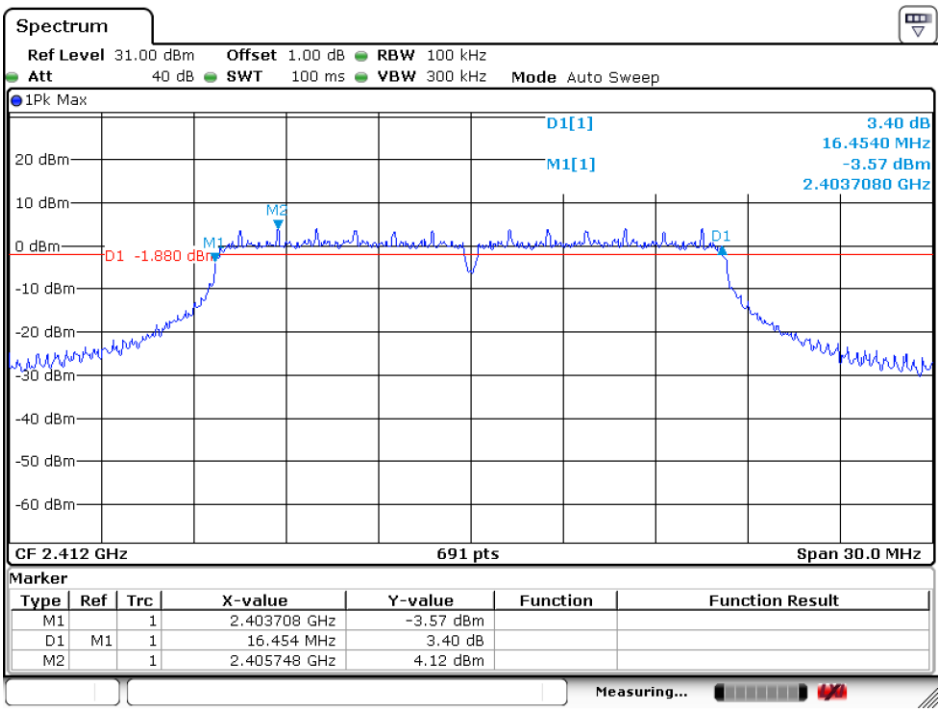

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.403708 GHz	-3.57 dBm		
D1	M1	1	16.454 MHz	3.40 dB		
M2		1	2.405748 GHz	4.12 dBm		

Date: 30.JUN.2020 12:40:56

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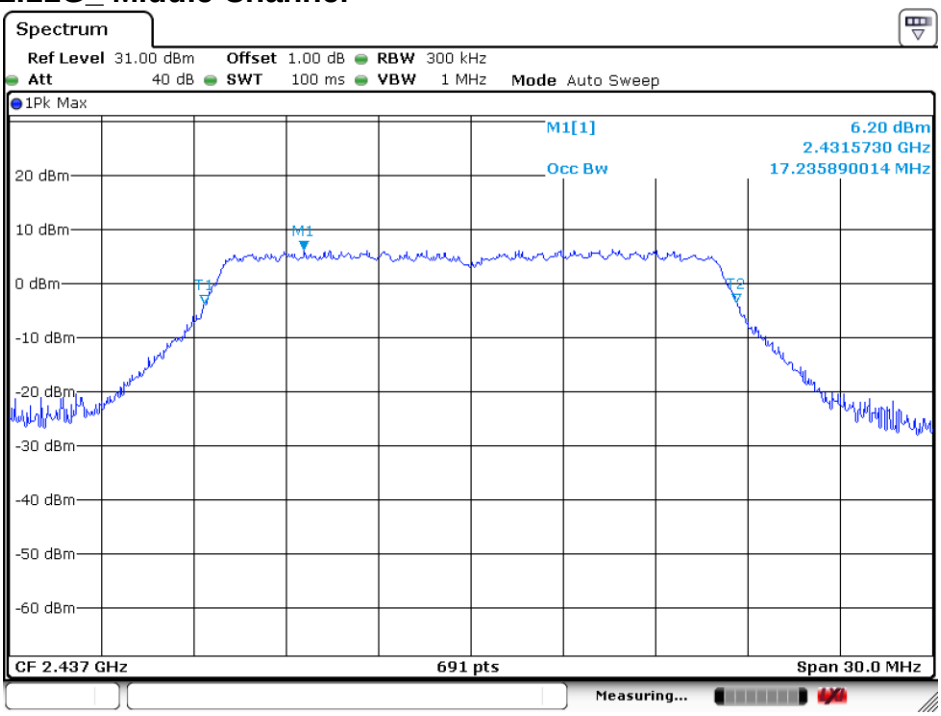
4.5.2.1.5 802.11G_ Middle Channel



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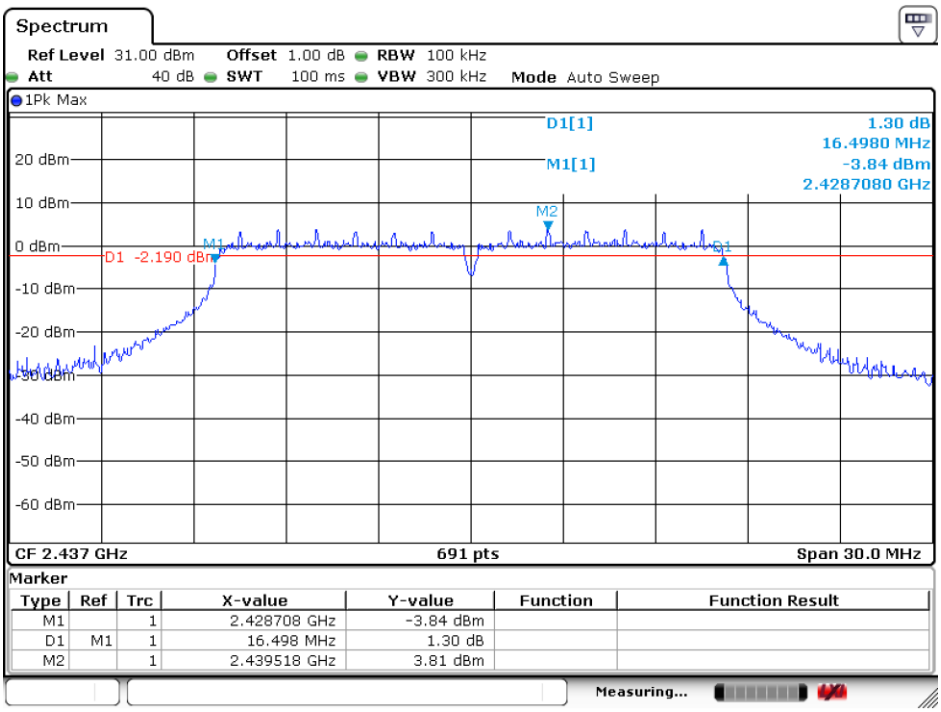

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.428708 GHz	-3.84 dBm		
D1	M1	1	16.498 MHz	1.30 dB		
M2		1	2.439518 GHz	3.81 dBm		

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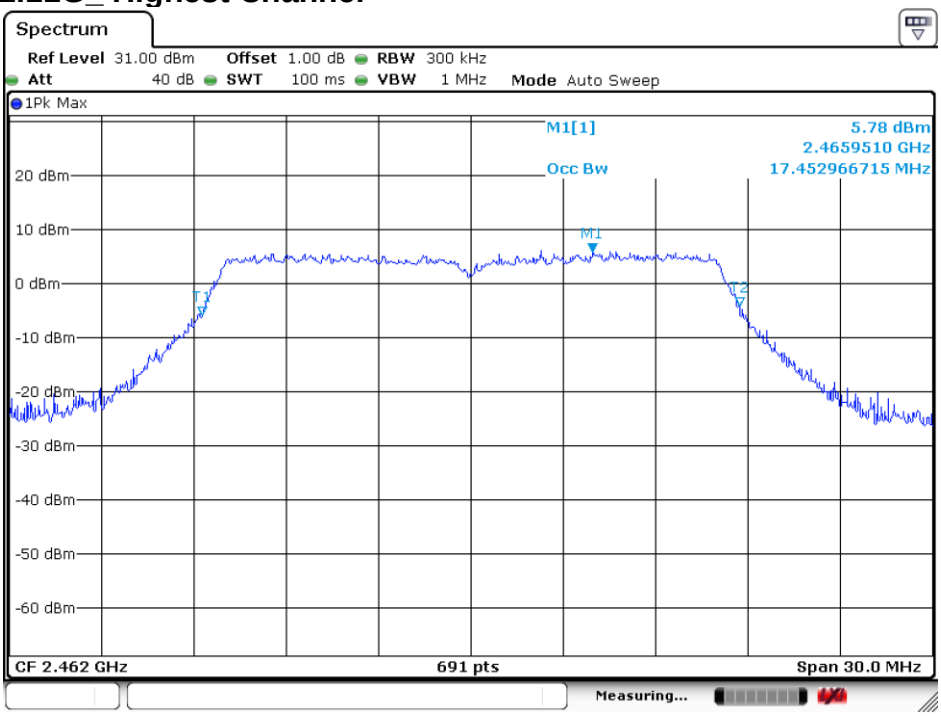
4.5.2.1.6 802.11G_ Highest Channel



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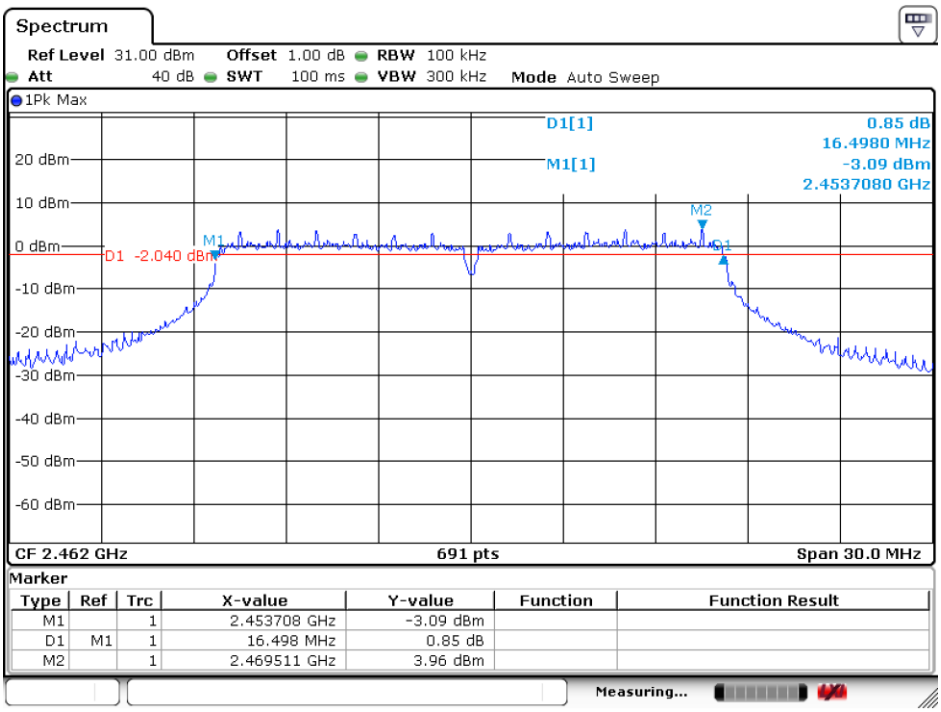

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.453708 GHz	-3.09 dBm		
D1	M1	1	16.498 MHz	0.85 dB		
M2		1	2.469511 GHz	3.96 dBm		

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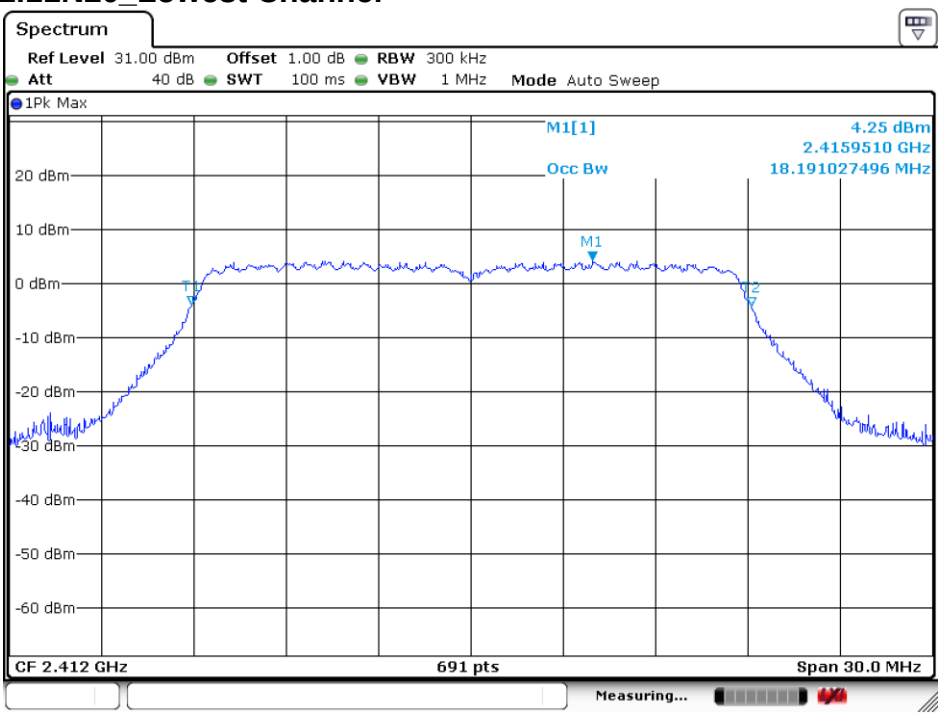
4.5.2.1.7 802.11N20_Lowest Channel



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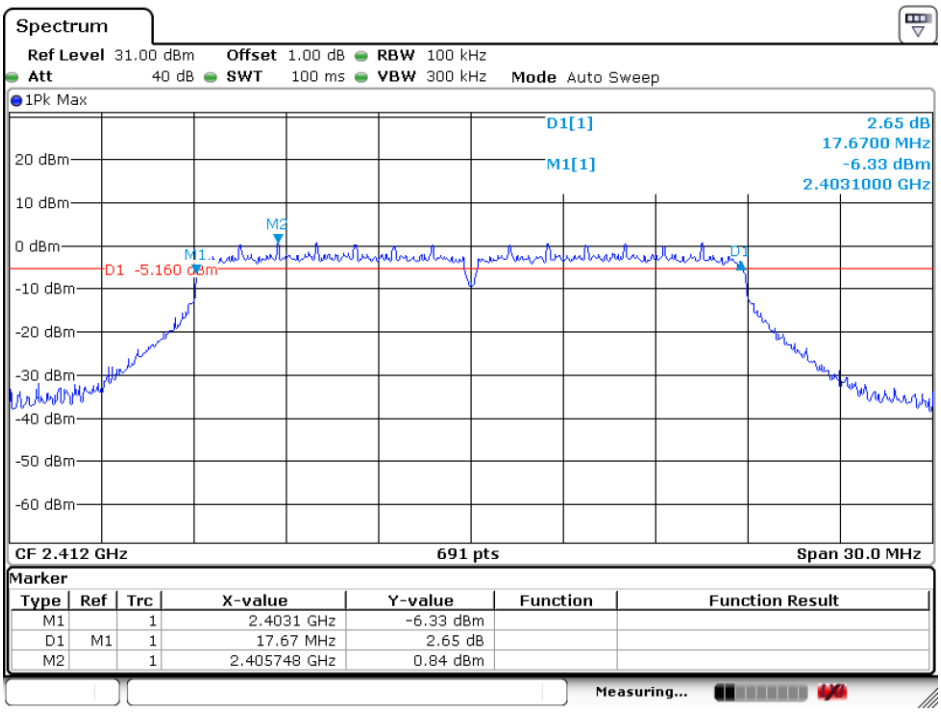

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4031 GHz	-6.33 dBm		
D1	M1	1	17.67 MHz	2.65 dB		
M2		1	2.405748 GHz	0.84 dBm		

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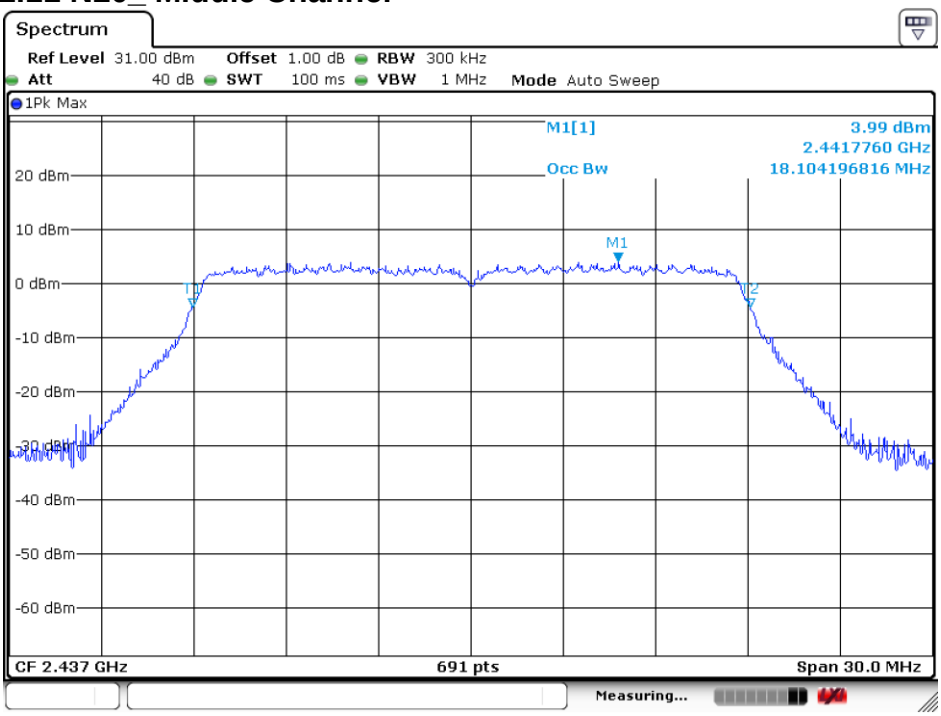
4.5.2.1.8 802.11 N20_ Middle Channel



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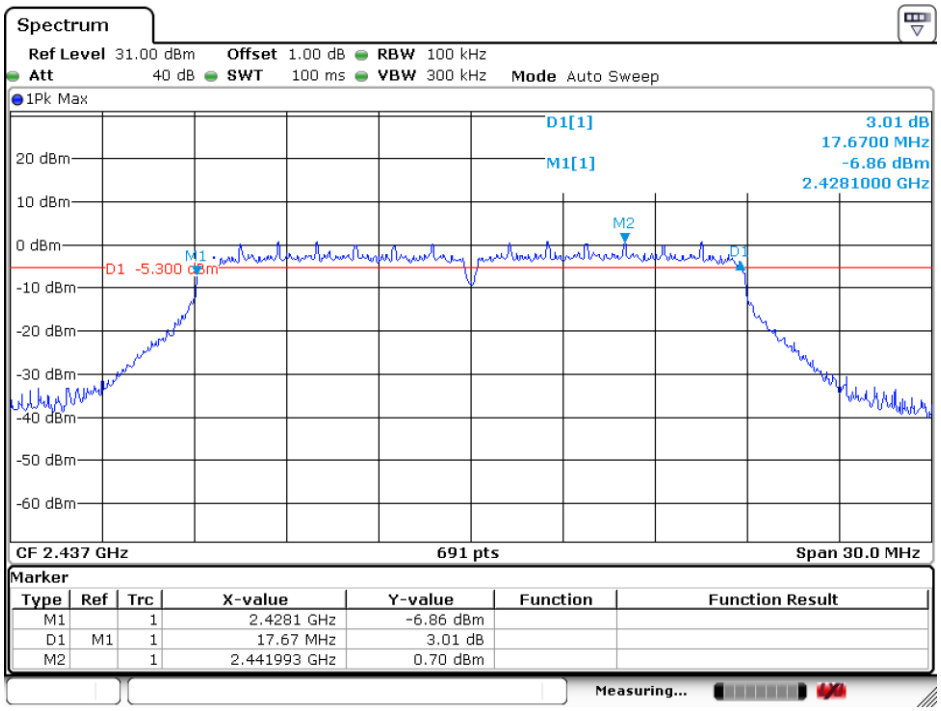

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4281 GHz	-6.86 dBm		
D1	M1	1	17.67 MHz	3.01 dB		
M2		1	2.441993 GHz	0.70 dBm		

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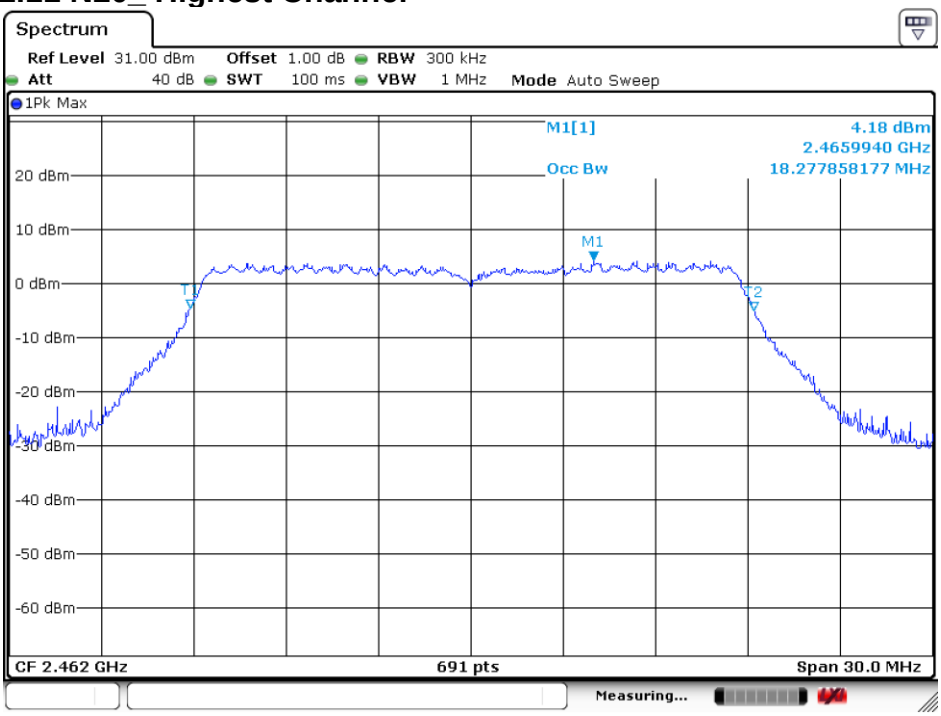
4.5.2.1.9 802.11 N20_ Highest Channel



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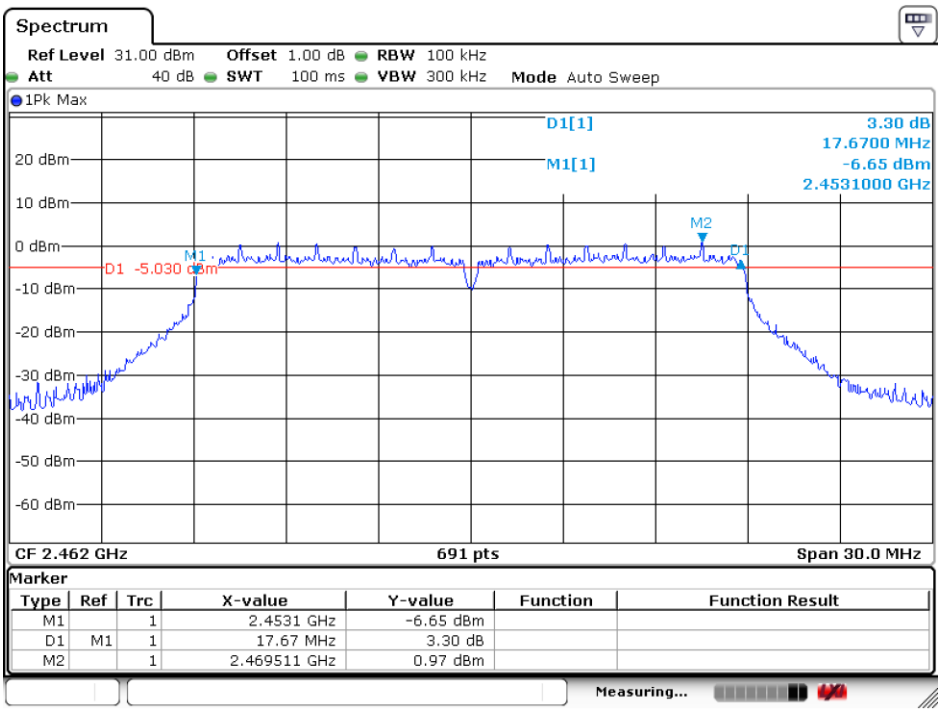

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4531 GHz	-6.65 dBm		
D1	M1	1	17.67 MHz	3.30 dB		
M2		1	2.469511 GHz	0.97 dBm		

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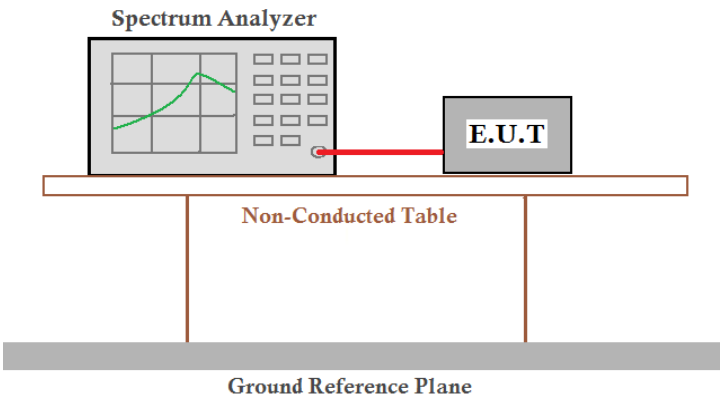
4.6 Power Spectral Density

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);
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	-2.96	≤8.00	Pass
	Middle	-3.48	≤8.00	Pass
	Highest	-4.60	≤8.00	Pass
802.11G	Lowest	-8.38	≤8.00	Pass
	Middle	-8.57	≤8.00	Pass
	Highest	-7.93	≤8.00	Pass
802.11N20	Lowest	-9.12	≤8.00	Pass
	Middle	-8.76	≤8.00	Pass
	Highest	-10.34	≤8.00	Pass

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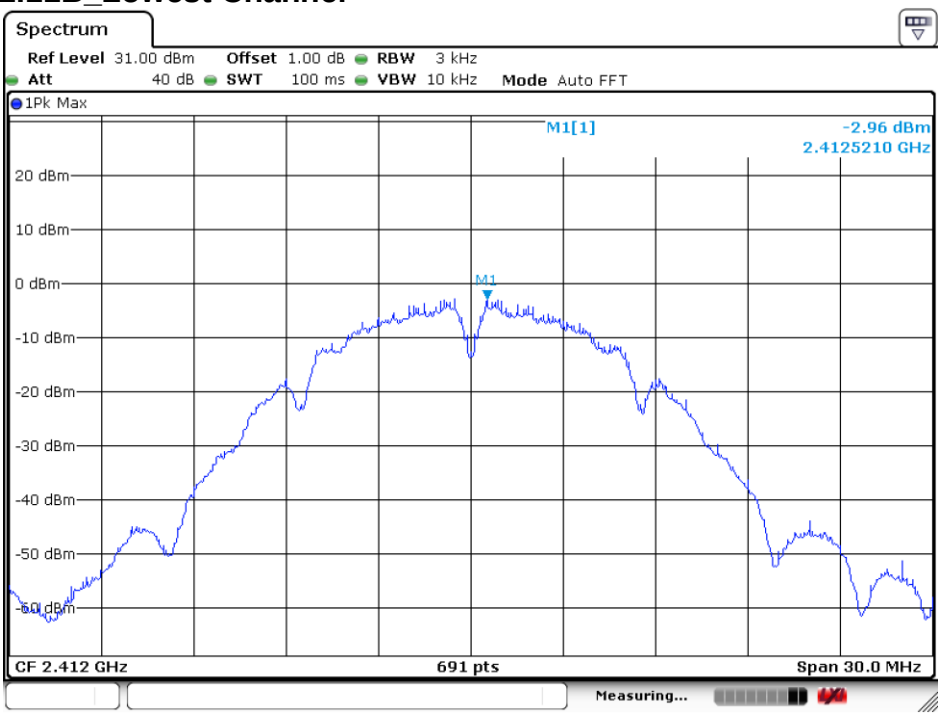
4.6.2 Test plots

4.6.2.1 ANT1

4.6.2.1.1 802.11B_Lowest Channel



Date: 30.JUN.2020 12:32:55

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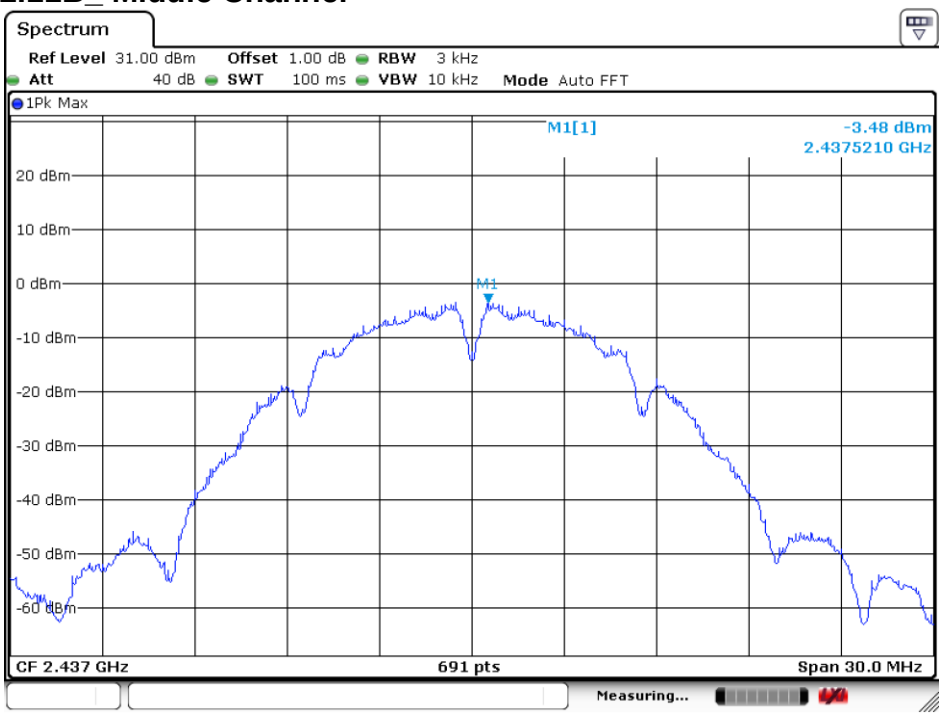
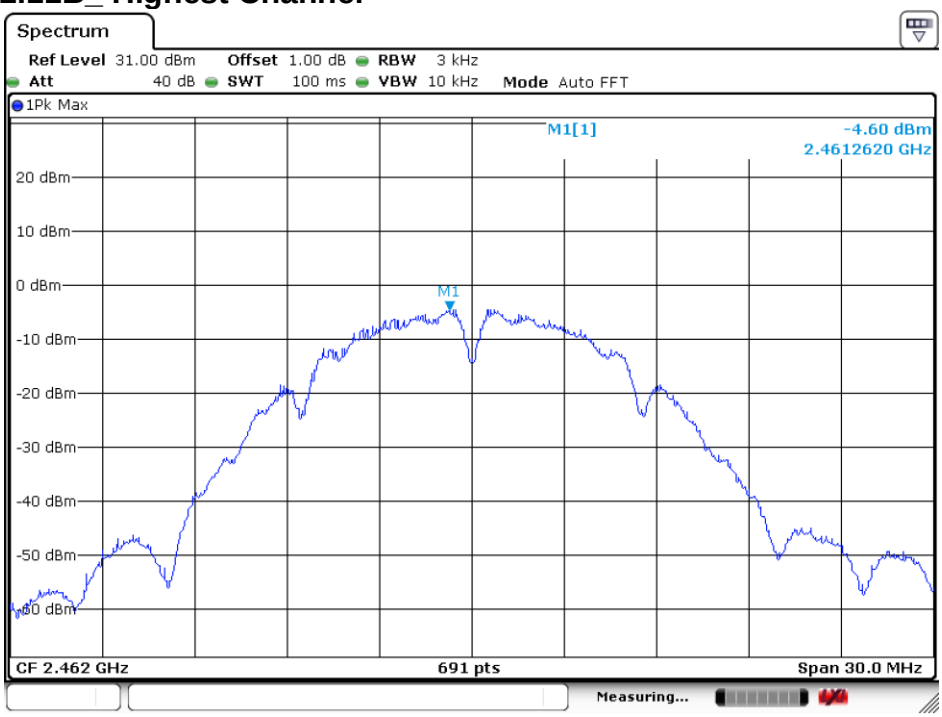
4.6.2.1.2 802.11B_ Middle Channel



Date: 30.JUN.2020 12:33:26

4.6.2.1.3 802.11B_ Highest Channel



Date: 30.JUN.2020 12:33:53

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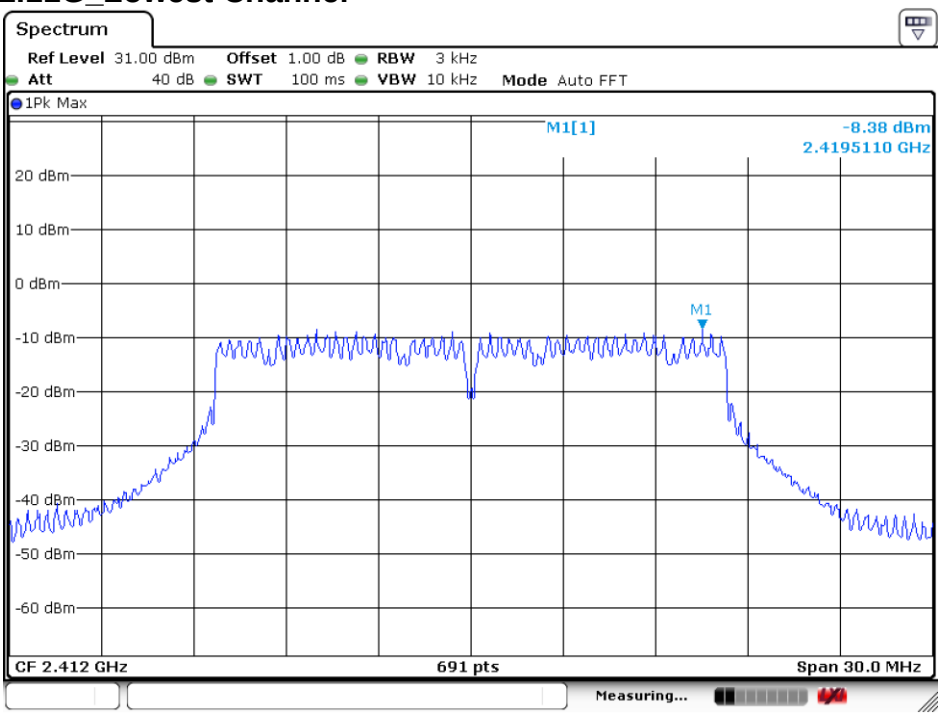
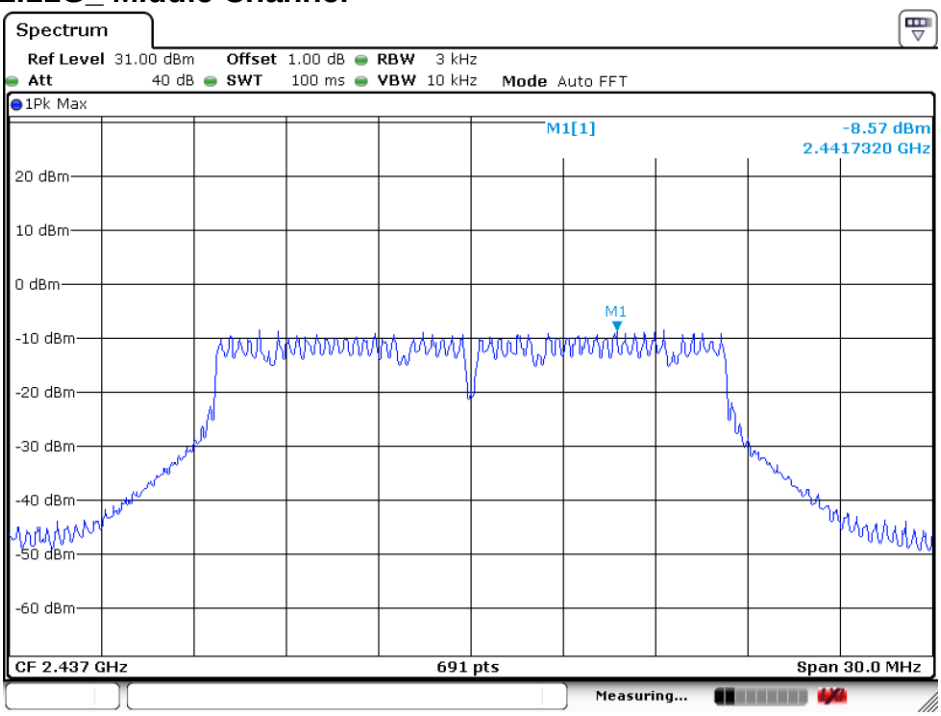
4.6.2.1.4 802.11G_Lowest Channel



Date: 30.JUN.2020 11:25:11

4.6.2.1.5 802.11G_ Middle Channel



Date: 30.JUN.2020 11:24:41

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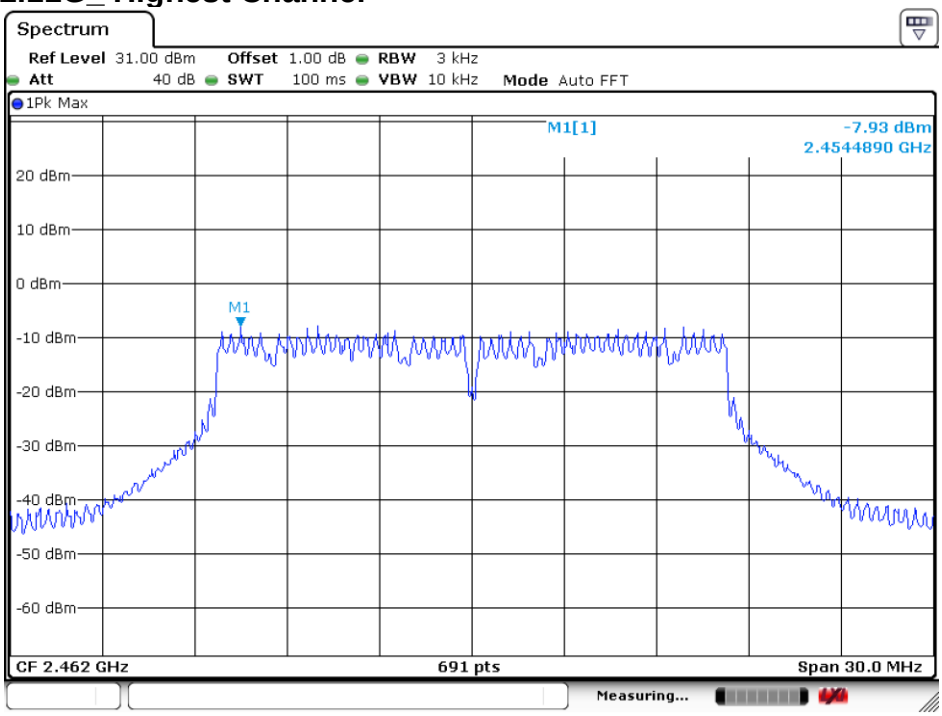
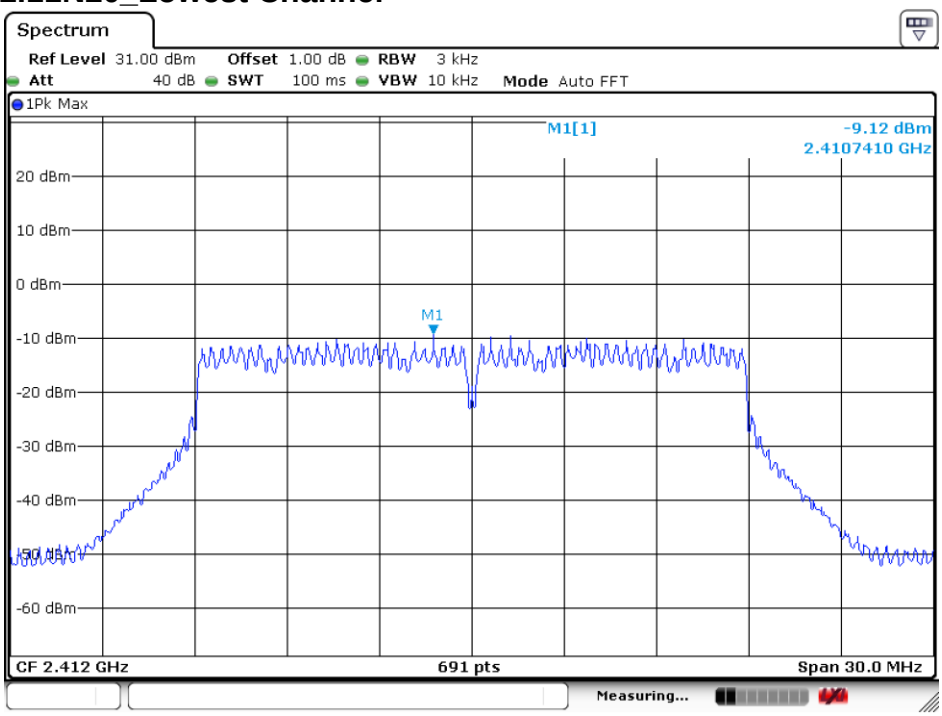
4.6.2.1.6 802.11G_ Highest Channel



Date: 30.JUN.2020 11:23:59

4.6.2.1.7 802.11N20_Lowest Channel



Date: 30.JUN.2020 11:13:52

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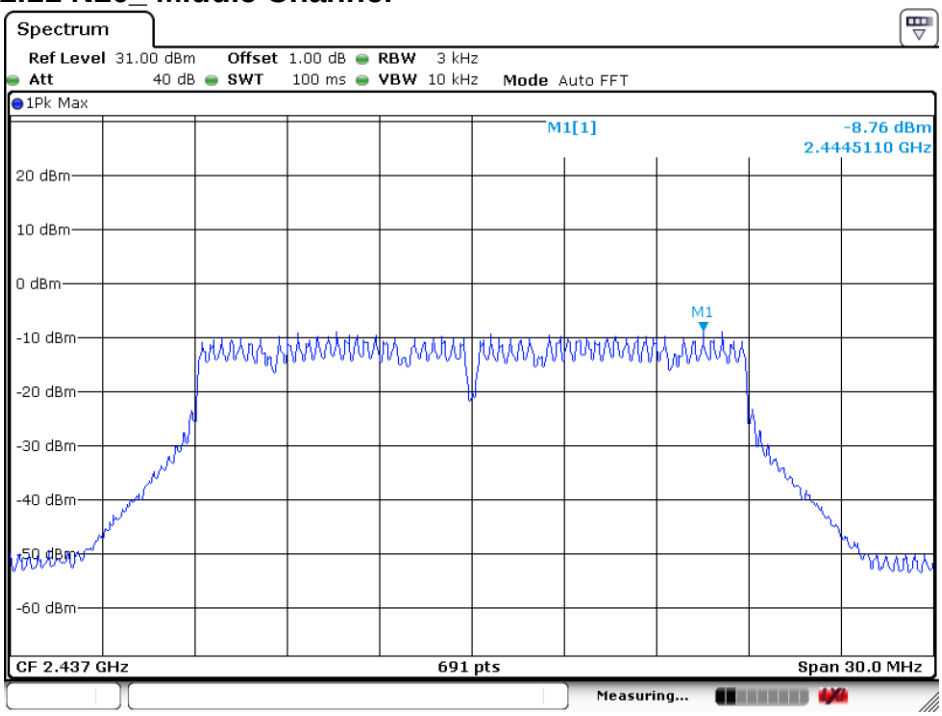
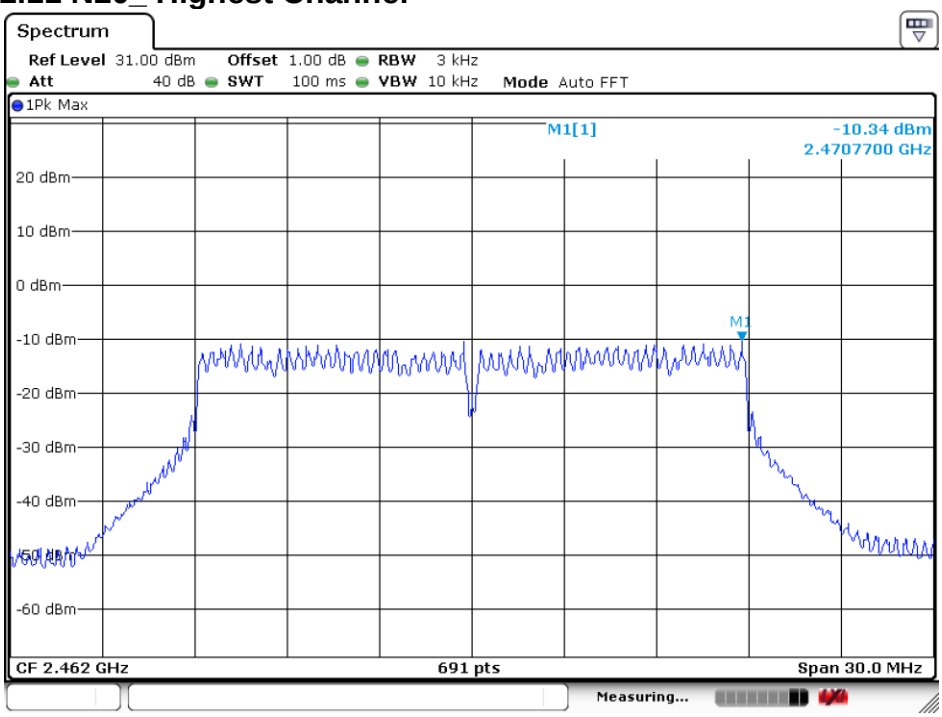
4.6.2.1.8 802.11 N20_ Middle Channel



Date: 30.JUN.2020 11:22:22

4.6.2.1.9 802.11 N20_ Highest Channel



Date: 30.JUN.2020 11:23:00

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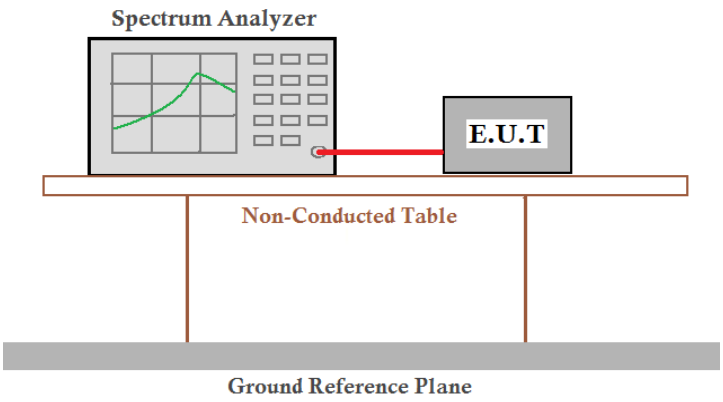
4.7 Band-edge for RF Conducted Emissions

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) ;
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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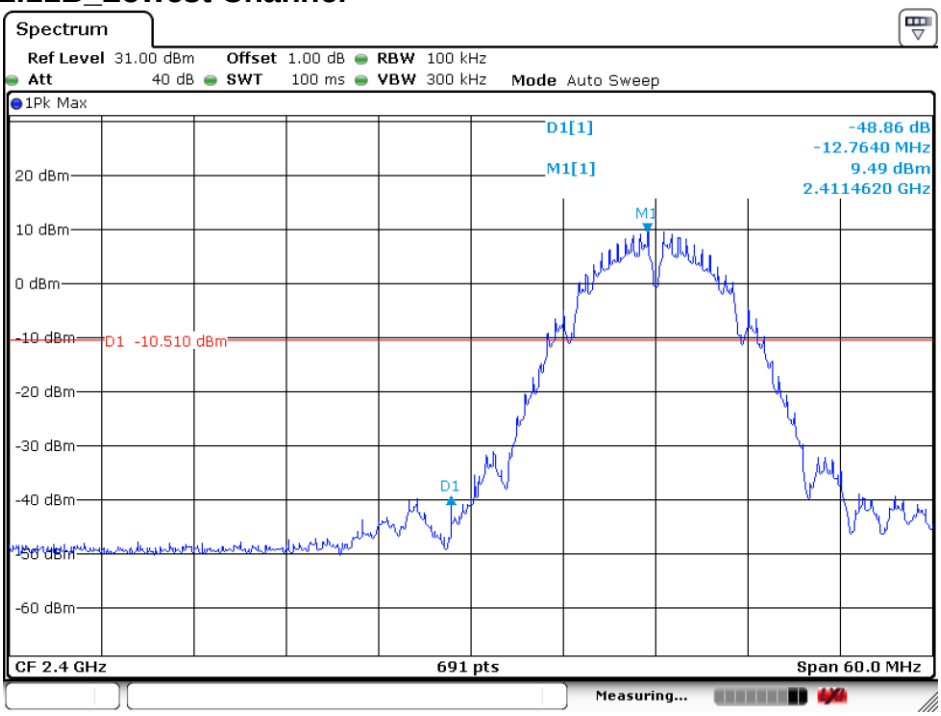
4.7.1 Test plots

4.7.1.1 ANT1

4.7.1.1.1 802.11B_Lowest Channel



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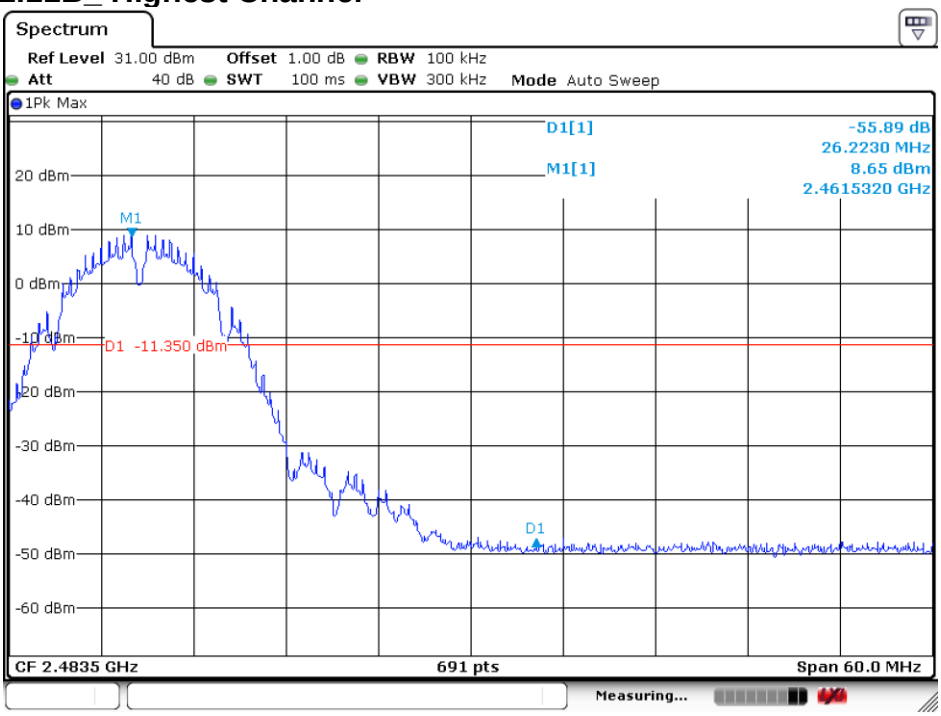
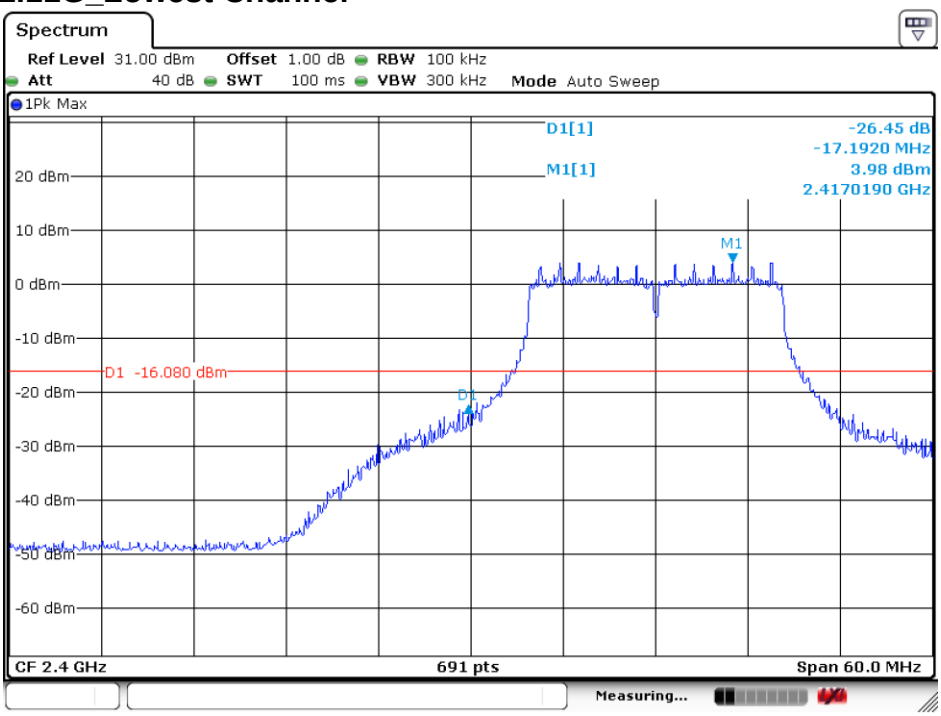
4.7.1.1.2 802.11B_ Highest Channel



Date: 30.JUN.2020 12:58:27

4.7.1.1.3 802.11G_Lowest Channel



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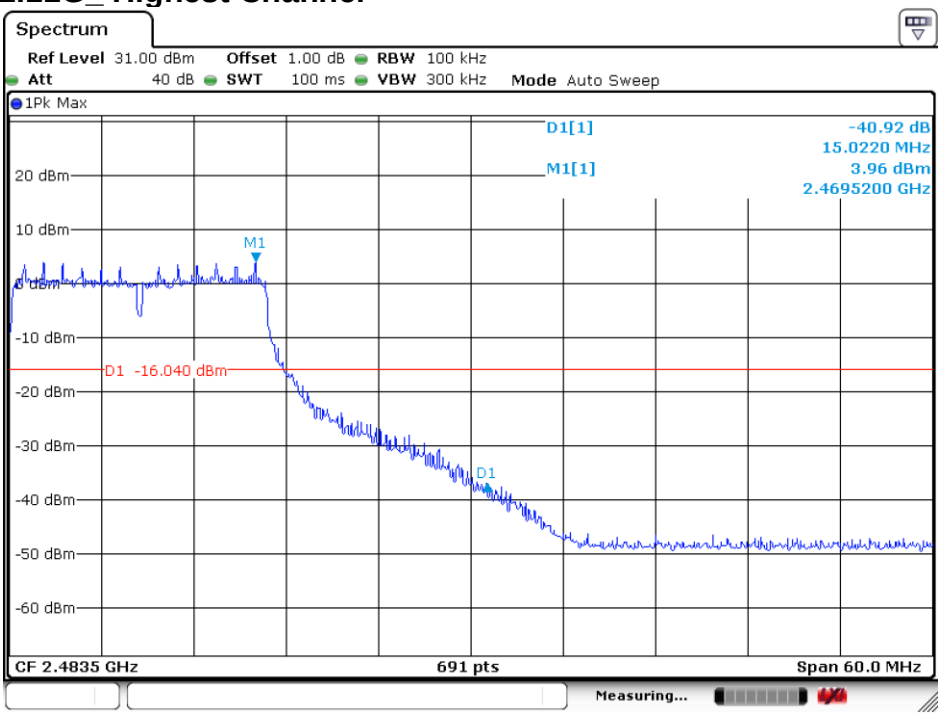
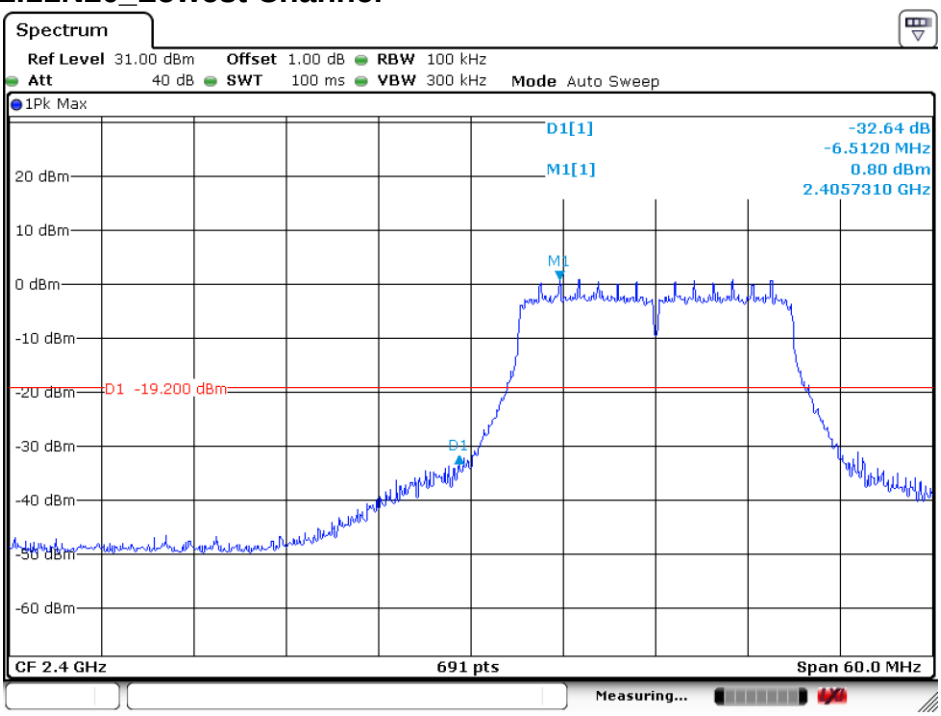
4.7.1.1.4 802.11G_ Highest Channel



Date: 30.JUN.2020 13:00:08

4.7.1.1.5 802.11N20_Lowest Channel



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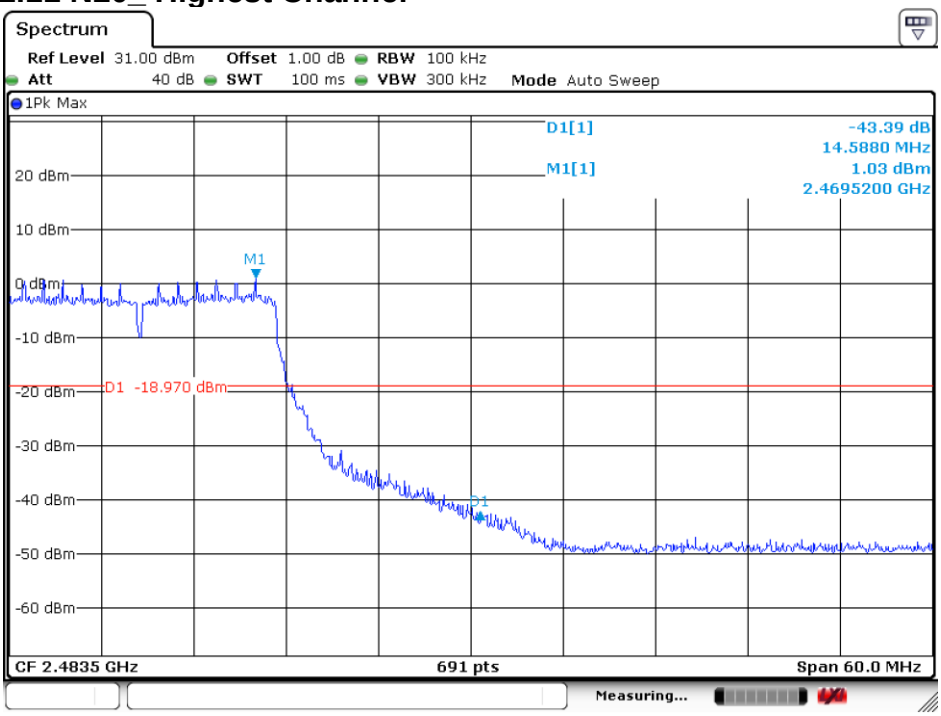
4.7.1.1.6 802.11 N20_ Highest Channel



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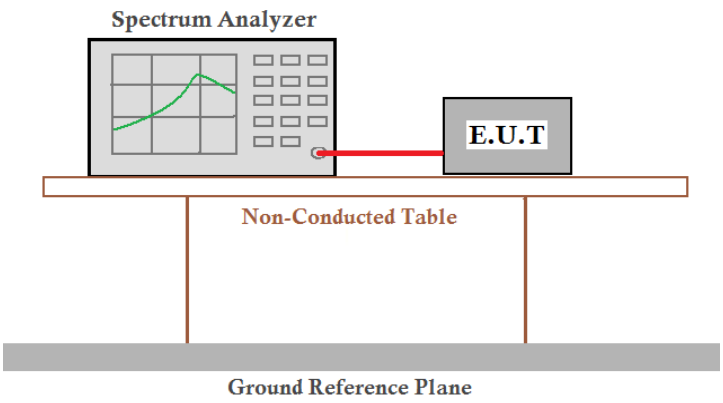
4.8 RF Conducted Spurious Emissions

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);
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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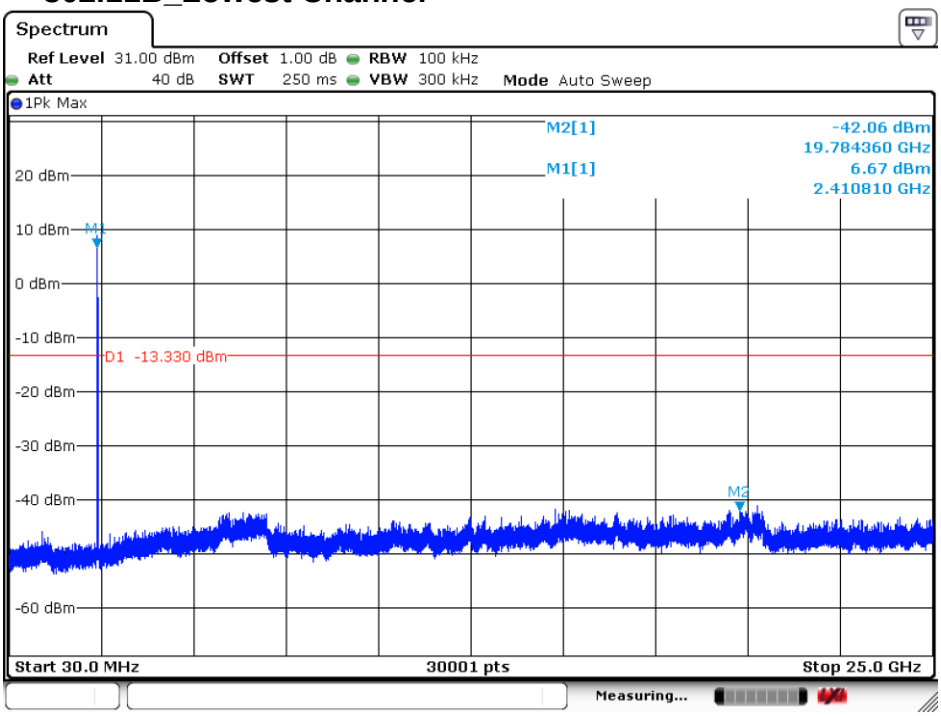
4.8.1 Test plots

4.8.1.1 ANT1

4.8.1.1.1 802.11B_Lowest Channel



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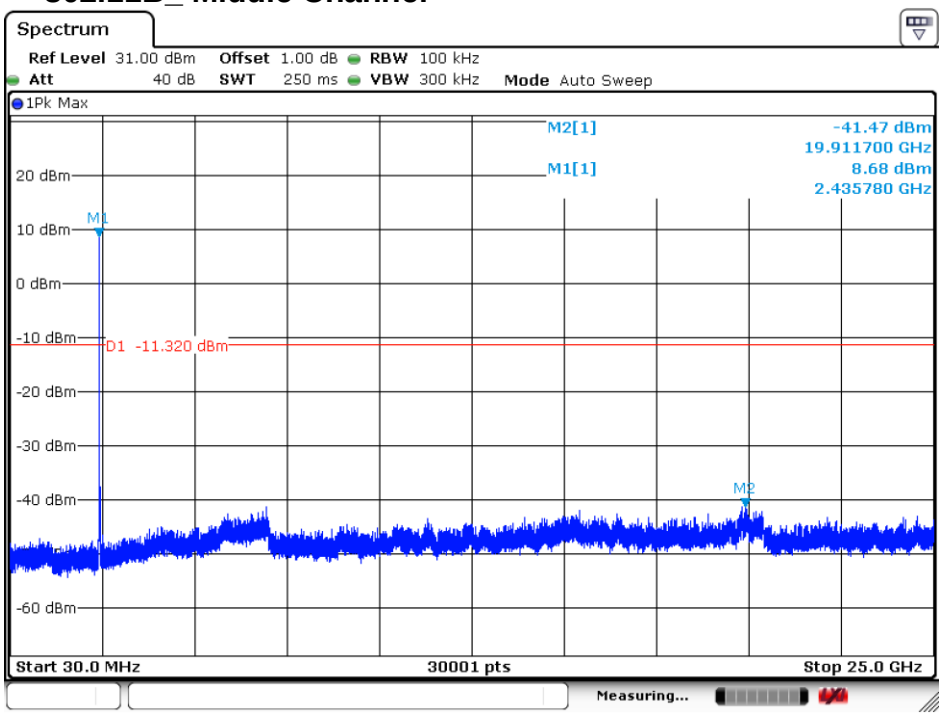
4.8.1.1.2 802.11B_ Middle Channel



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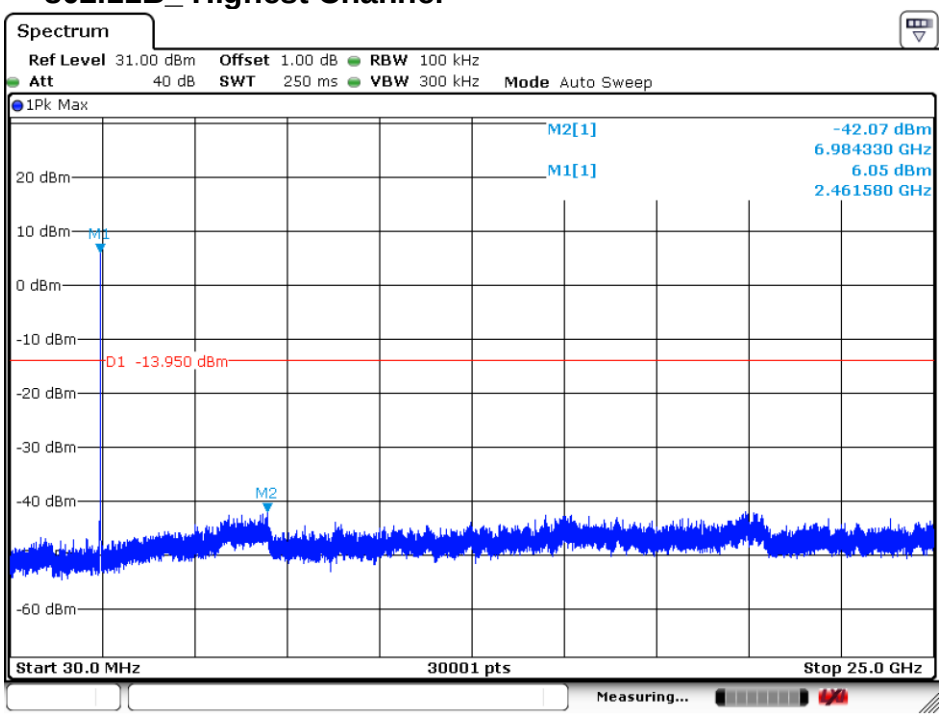
4.8.1.1.3 802.11B_ Highest Channel



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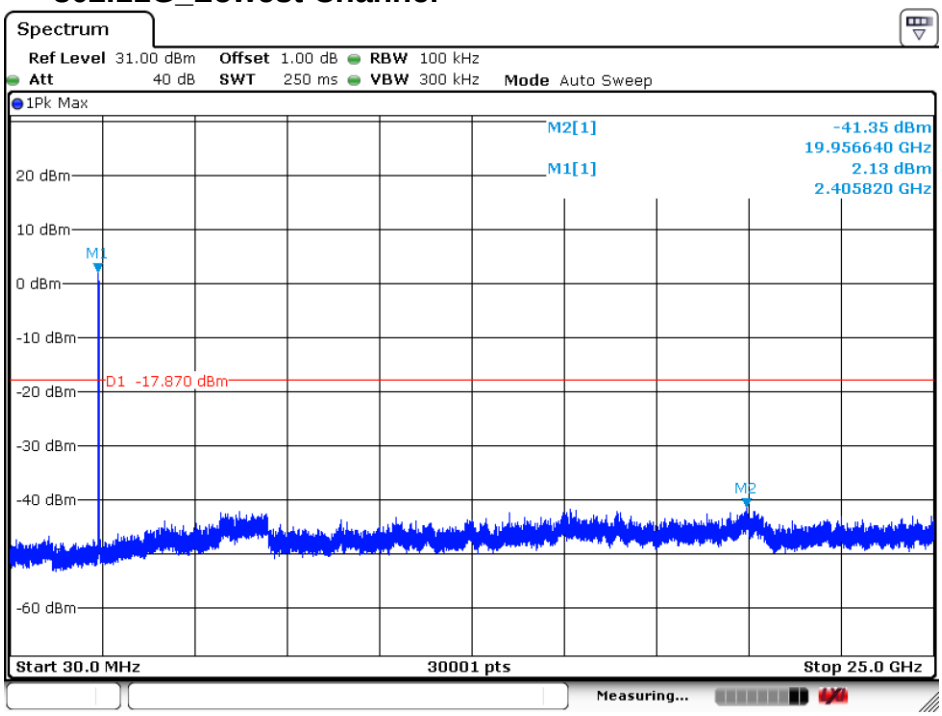
4.8.1.1.4 802.11G_Lowest Channel



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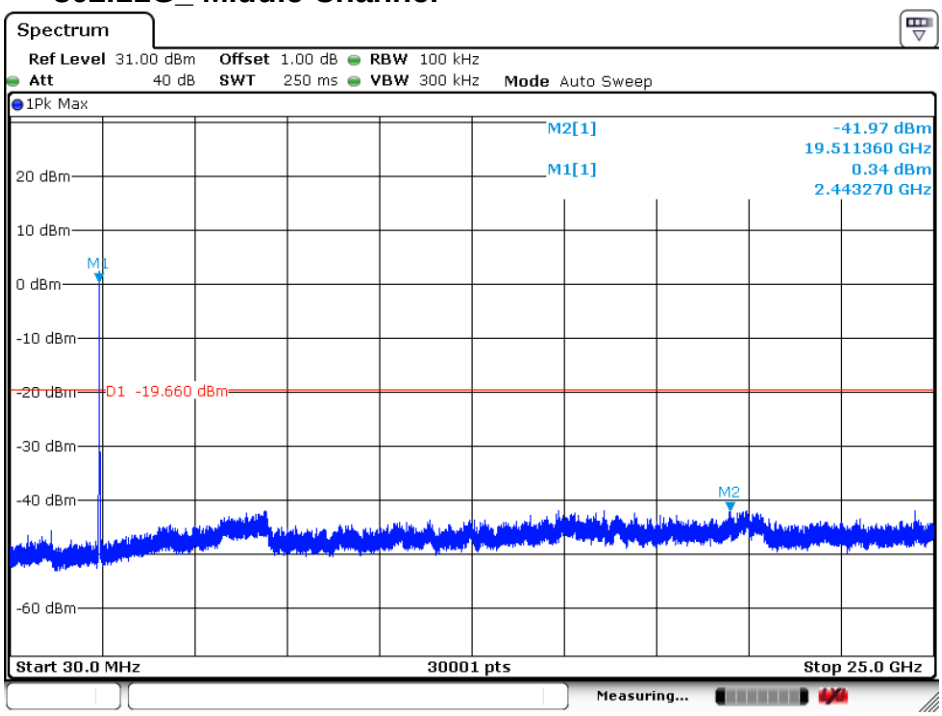
4.8.1.1.5 802.11G_ Middle Channel



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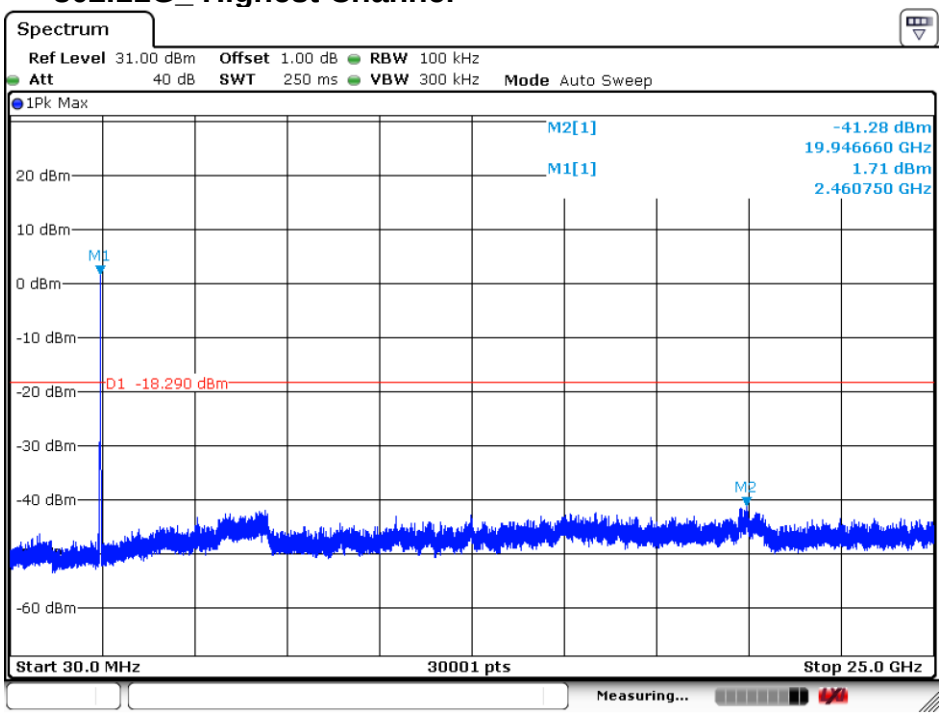
4.8.1.1.6 802.11G_ Highest Channel



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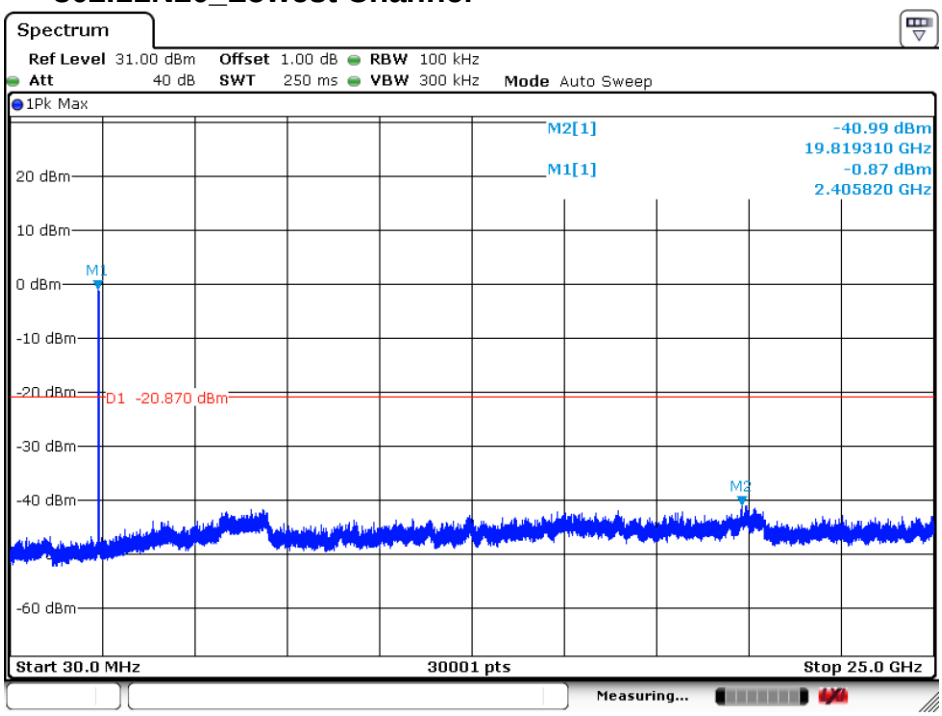
4.8.1.1.7 802.11N20_Lowest Channel



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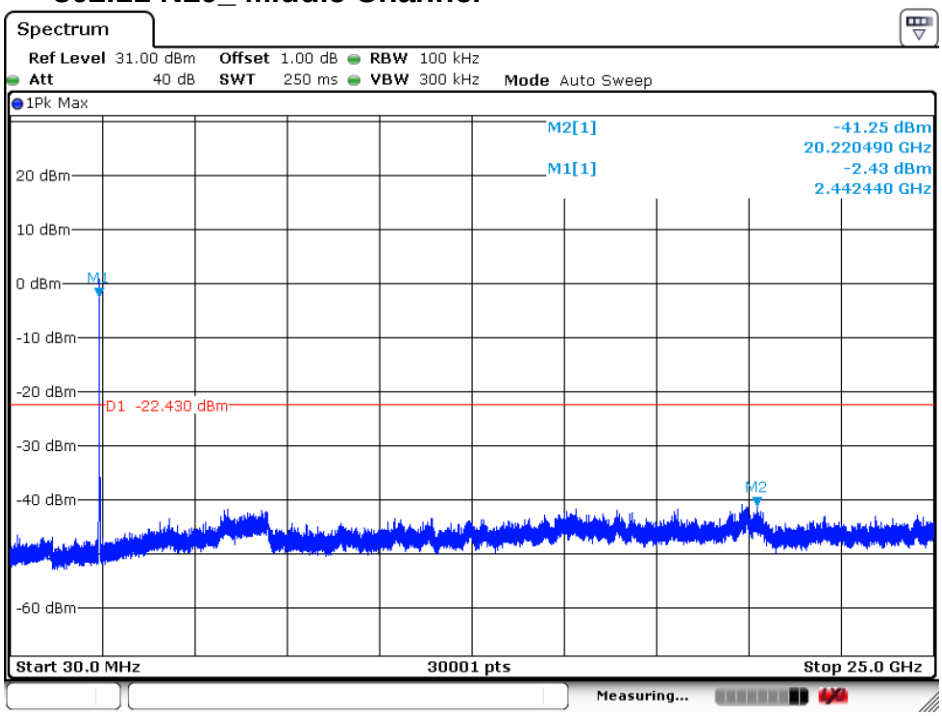
4.8.1.1.8 802.11 N20_ Middle Channel



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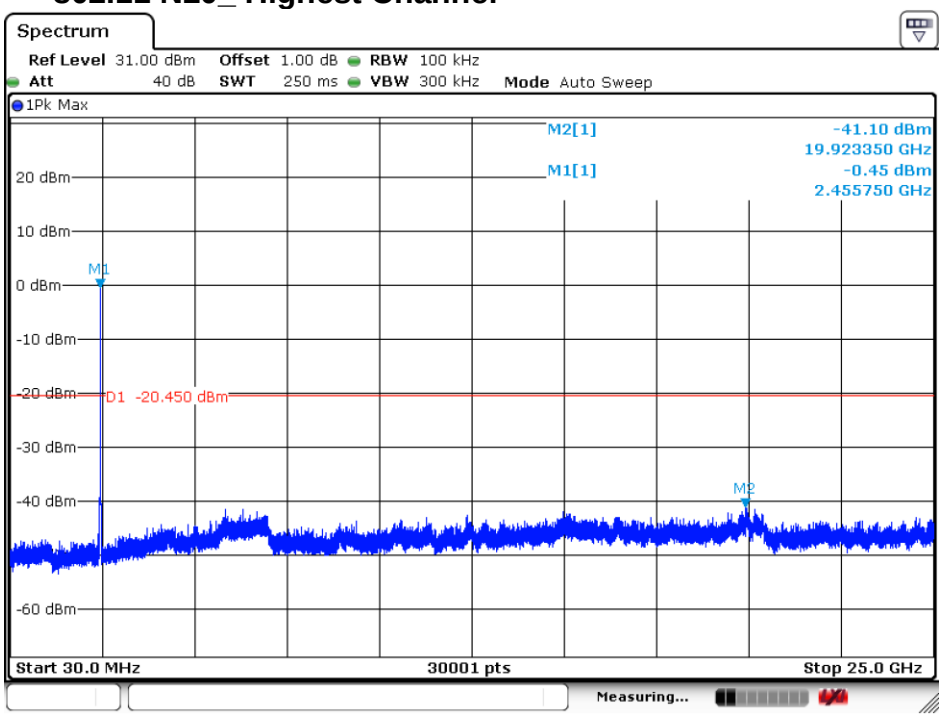
4.8.1.1.9 802.11 N20_ Highest Channel



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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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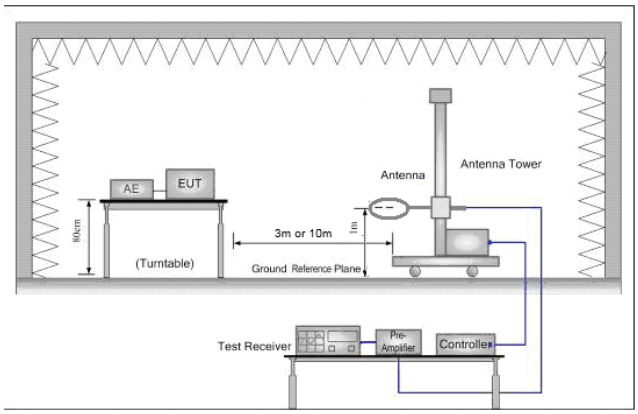

Figure 1. Below 30MHz

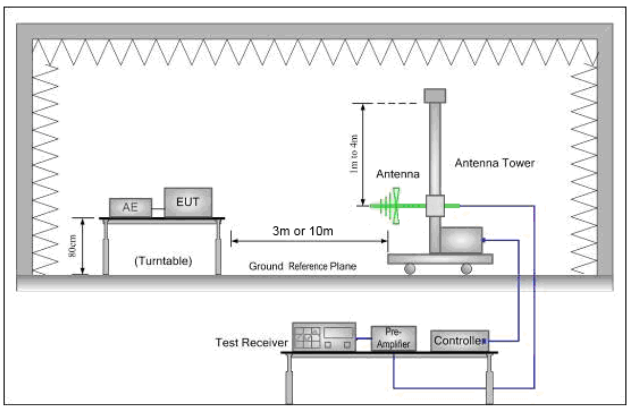

Figure 2. 30MHz to 1GHz

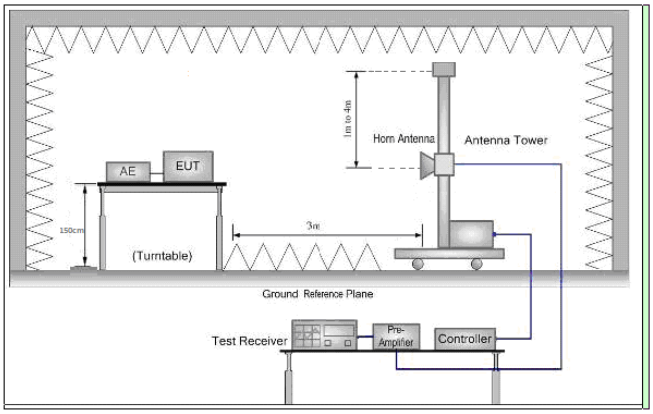

Figure 3. Above 1 GHz

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 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. 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>1GHz ; VBW ⩾ 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

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	On time = N 1 *L 1 +N 2 *L 2 +...+N n-1 *LN 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(Duty cycl 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. g. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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. i. Test the EUT in the lowest channel, the middle channel ,the Highest channel 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. k. Repeat above procedures until all frequencies measured was complete.
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); 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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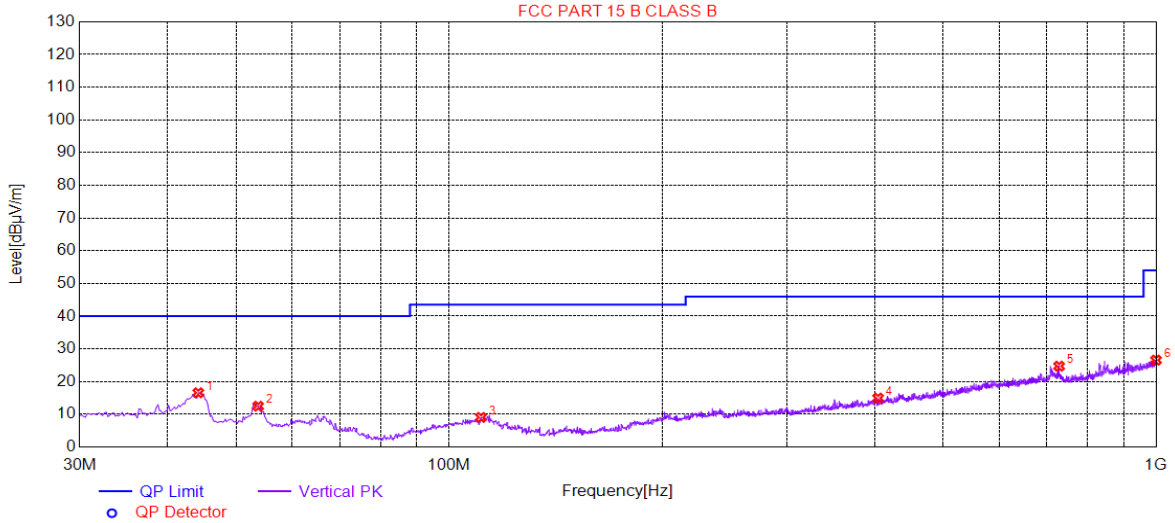
4.9.1 Radiated emission below 1GHz

4.9.1.1 Charge + Transmitting, Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.1648	16.59	-30.08	40.00	23.41	295	283	Vertical
2	53.6727	12.48	-30.92	40.00	27.52	250	298	Vertical
3	110.914	9.06	-32.14	43.50	34.44	277	193	Vertical
4	404.300	14.96	-25.40	46.00	31.04	156	346	Vertical
5	729.121	24.72	-18.82	46.00	21.28	258	223	Vertical
6	999.806	26.56	-14.79	54.00	27.44	285	308	Vertical

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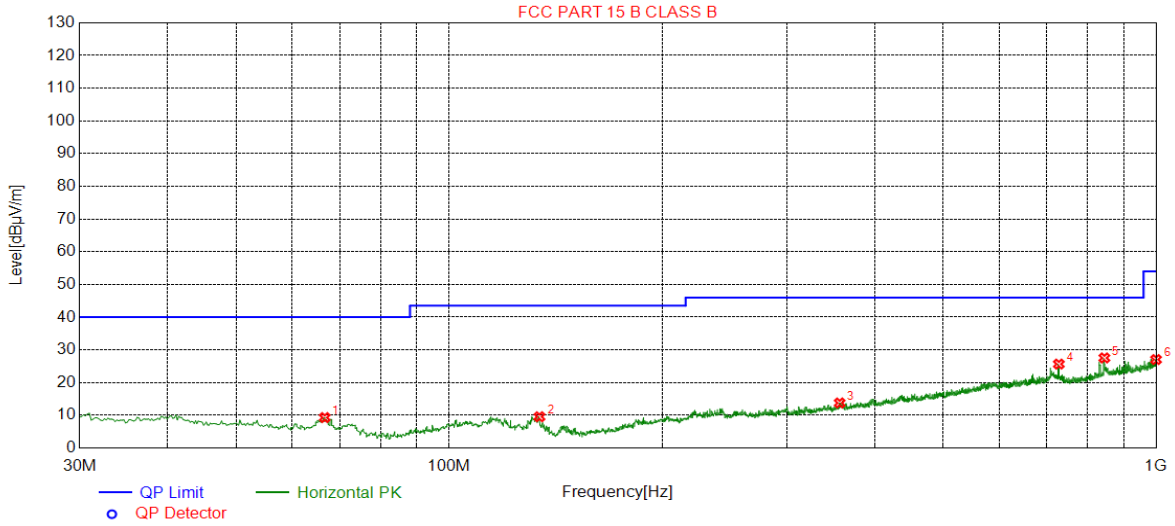
4.9.1.2 Charge + Transmitting, Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	66.6733	9.31	-33.57	40.00	30.69	138	200	Horizontal
2	134.198	9.57	-35.27	43.50	33.93	237	52	Horizontal
3	356.761	13.78	-26.69	46.00	32.22	233	346	Horizontal
4	728.539	25.67	-18.84	46.00	20.33	102	14	Horizontal
5	844.963	27.54	-16.97	46.00	18.46	244	200	Horizontal
6	999.806	27.05	-14.79	54.00	26.95	103	136	Horizontal

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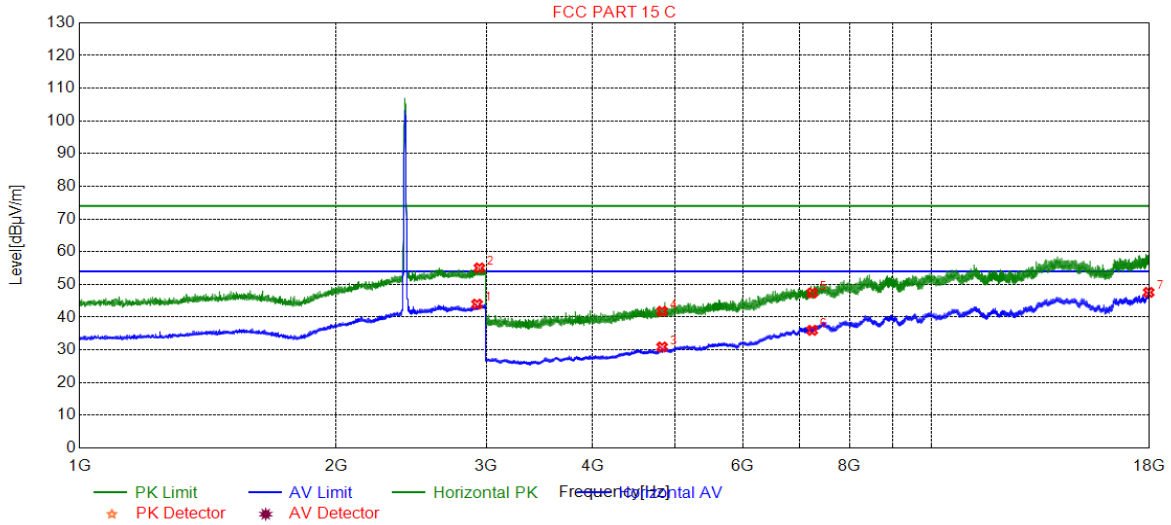
4.9.2 Transmitter emission above 1GHz

4.9.2.1 802.11B-CH1

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2926.48	44.00	9.43	54.00	10.00	135	304	Horizontal
2	2944.98	55.06	9.63	74.00	18.94	154	182	Horizontal
3	4824.00	30.90	-18.21	54.00	23.10	215	290	Horizontal
4	4824.00	41.80	-18.21	74.00	32.20	103	100	Horizontal
5	7236.00	47.41	-9.99	74.00	26.59	212	92	Horizontal
6	7236.00	35.98	-9.99	54.00	18.02	210	342	Horizontal
7	17960.9	47.59	0.71	54.00	6.41	193	141	Horizontal

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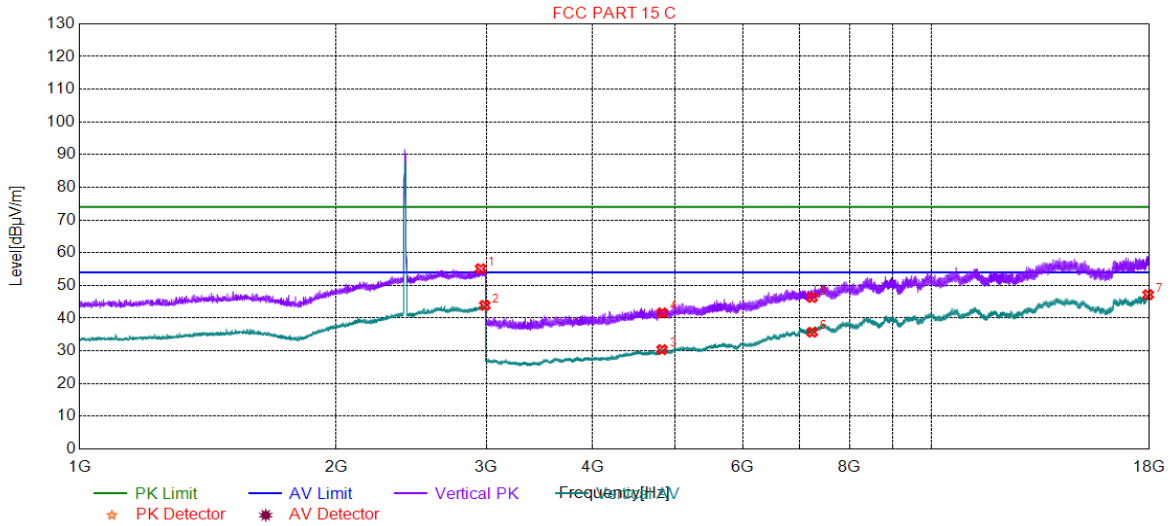
4.9.2.2 802.11B-CH1

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2954.98	55.14	9.66	74.00	18.86	295	342	Vertical
2	2988.99	43.92	9.50	54.00	10.08	295	342	Vertical
3	4824.00	30.40	-18.21	54.00	23.60	295	320	Vertical
4	4824.00	41.63	-18.21	74.00	32.37	206	99	Vertical
5	7236.00	46.32	-9.99	74.00	27.68	215	242	Vertical
6	7236.00	35.71	-9.99	54.00	18.29	229	342	Vertical
7	17934.5	47.18	0.70	54.00	6.82	271	85	Vertical

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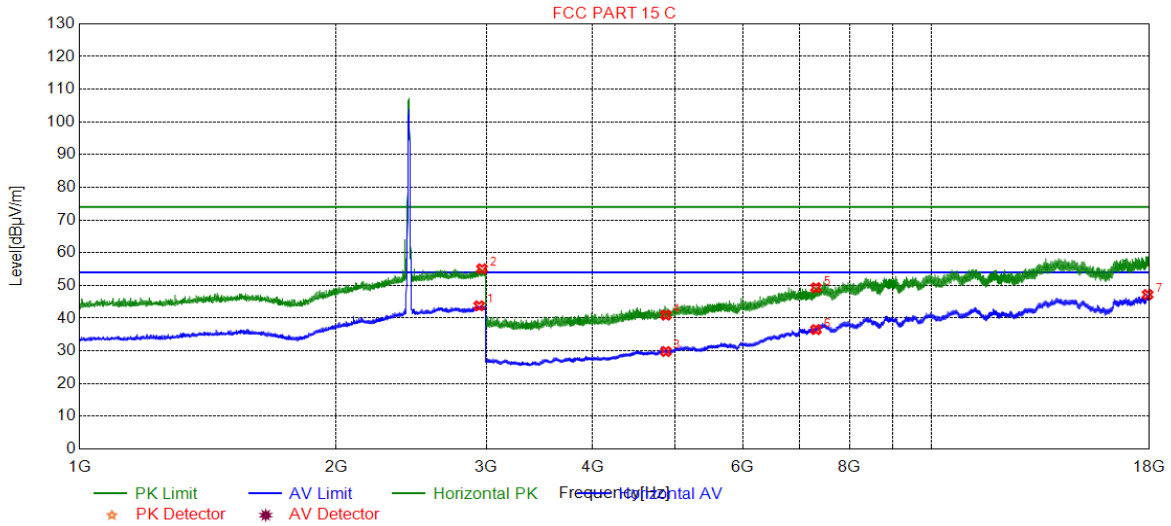
4.9.2.3 802.11B-CH6

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2943.48	43.80	9.61	54.00	10.20	149	360	Horizontal
2	2965.99	55.11	9.61	74.00	18.89	102	59	Horizontal
3	4874.00	29.81	-17.99	54.00	24.19	165	320	Horizontal
4	4874.00	40.94	-17.99	74.00	33.06	122	18	Horizontal
5	7311.00	49.32	-9.74	74.00	24.68	157	91	Horizontal
6	7311.00	36.53	-9.74	54.00	17.47	123	191	Horizontal
7	17909.2	47.23	0.69	54.00	6.77	134	241	Horizontal

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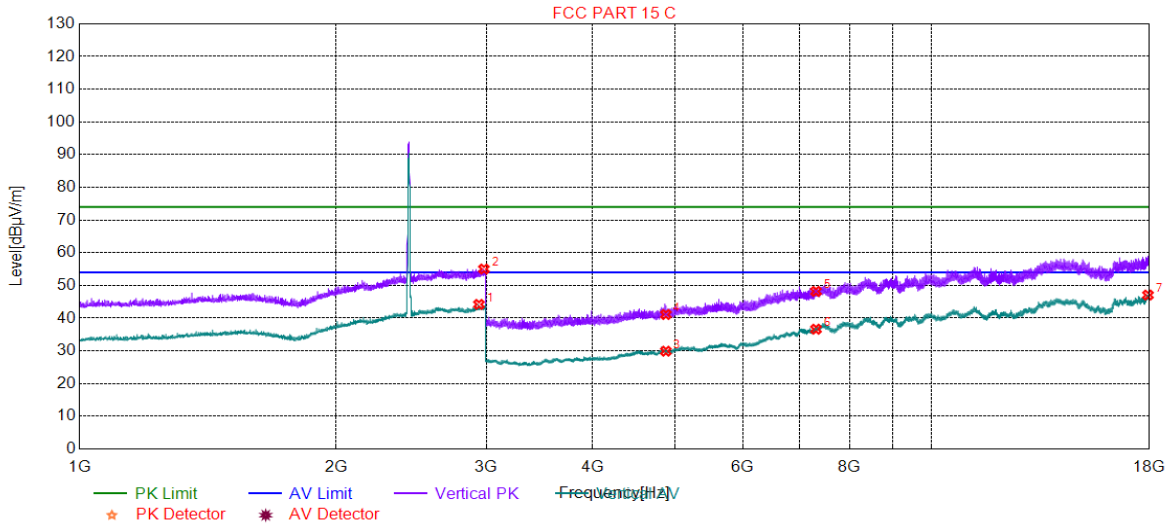
4.9.2.4 802.11B-CH6

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2941.48	44.22	9.59	54.00	9.78	151	246	Vertical
2	2981.49	55.03	9.54	74.00	18.97	257	95	Vertical
3	4874.00	29.91	-17.99	54.00	24.09	288	187	Vertical
4	4874.00	41.12	-17.99	74.00	32.88	153	46	Vertical
5	7311.00	48.20	-9.74	74.00	25.80	229	191	Vertical
6	7311.00	36.64	-9.74	54.00	17.36	265	342	Vertical
7	17925.7	47.08	0.70	54.00	6.92	226	40	Vertical

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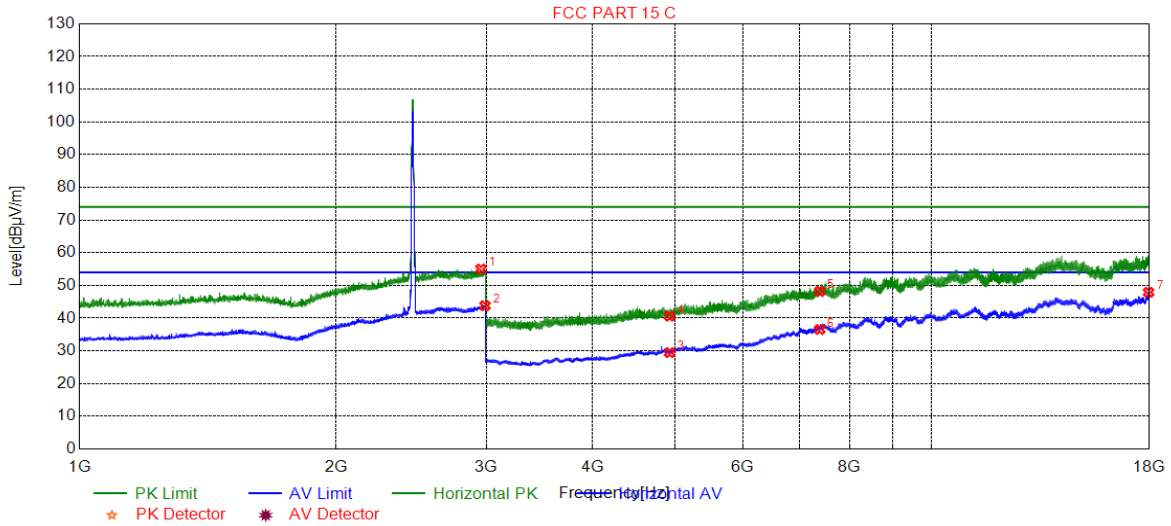
4.9.2.5 802.11B-CH11

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2957.48	55.04	9.65	74.00	18.96	220	32	Horizontal
2	2990.49	43.82	9.49	54.00	10.18	102	349	Horizontal
3	4924.00	29.49	-17.72	54.00	24.51	114	351	Horizontal
4	4924.00	40.63	-17.72	74.00	33.37	156	269	Horizontal
5	7386.00	48.20	-9.55	74.00	25.80	181	0	Horizontal
6	7386.00	36.55	-9.55	54.00	17.45	199	342	Horizontal
7	17954.8	47.93	0.71	54.00	6.07	237	342	Horizontal

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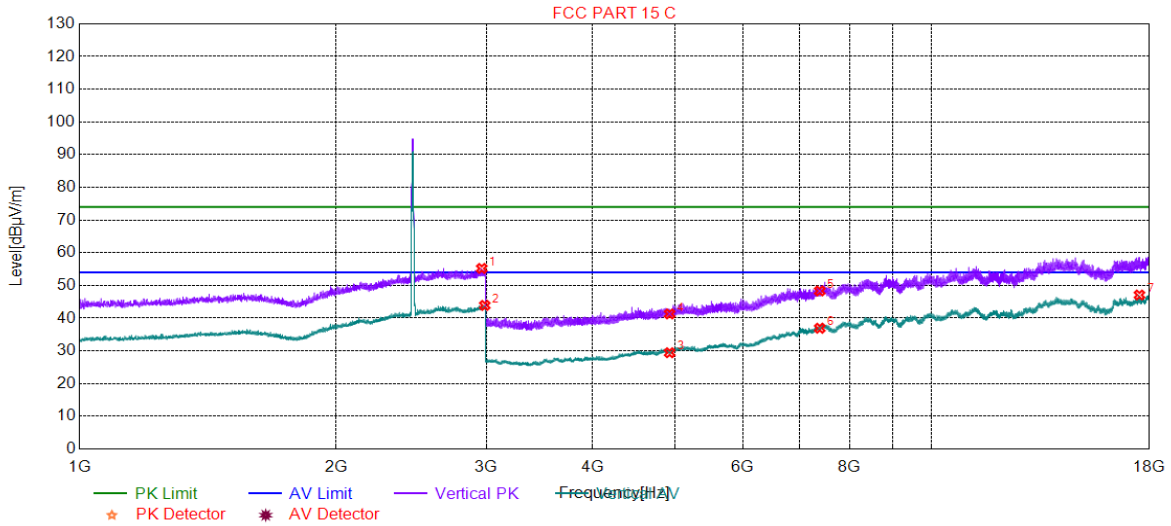
4.9.2.6 802.11B-CH11

Test Report

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	55.21	9.62	74.00	18.79	152	59	Vertical
2	2987.99	43.91	9.51	54.00	10.09	287	128	Vertical
3	4924.00	29.44	-17.72	54.00	24.56	271	208	Vertical
4	4924.00	41.31	-17.72	74.00	32.69	251	269	Vertical
5	7386.00	48.33	-9.55	74.00	25.67	239	90	Vertical
6	7386.00	36.94	-9.55	54.00	17.06	193	0	Vertical
7	17518.7	47.09	0.99	54.00	6.91	225	0	Vertical

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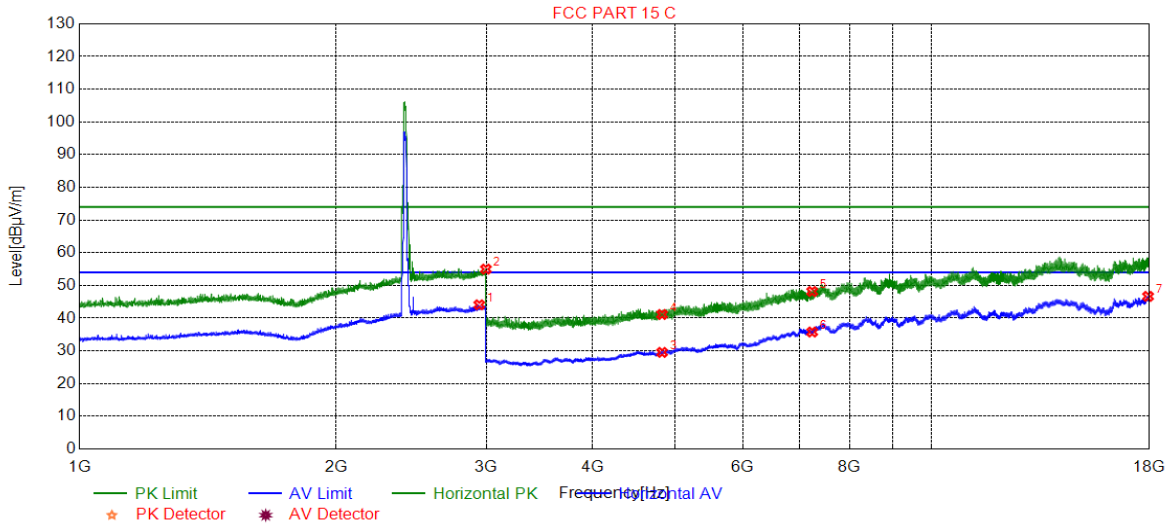
4.9.2.7 802.11G-CH1

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2943.98	44.10	9.62	54.00	9.90	192	148	Horizontal
2	2997.49	55.00	9.46	74.00	19.00	178	24	Horizontal
3	4824.00	29.55	-18.21	54.00	24.45	232	128	Horizontal
4	4824.00	41.14	-18.21	74.00	32.86	100	319	Horizontal
5	7236.00	48.16	-9.99	74.00	25.84	238	292	Horizontal
6	7236.00	35.78	-9.99	54.00	18.22	206	0	Horizontal
7	17931.2	46.67	0.70	54.00	7.33	139	141	Horizontal

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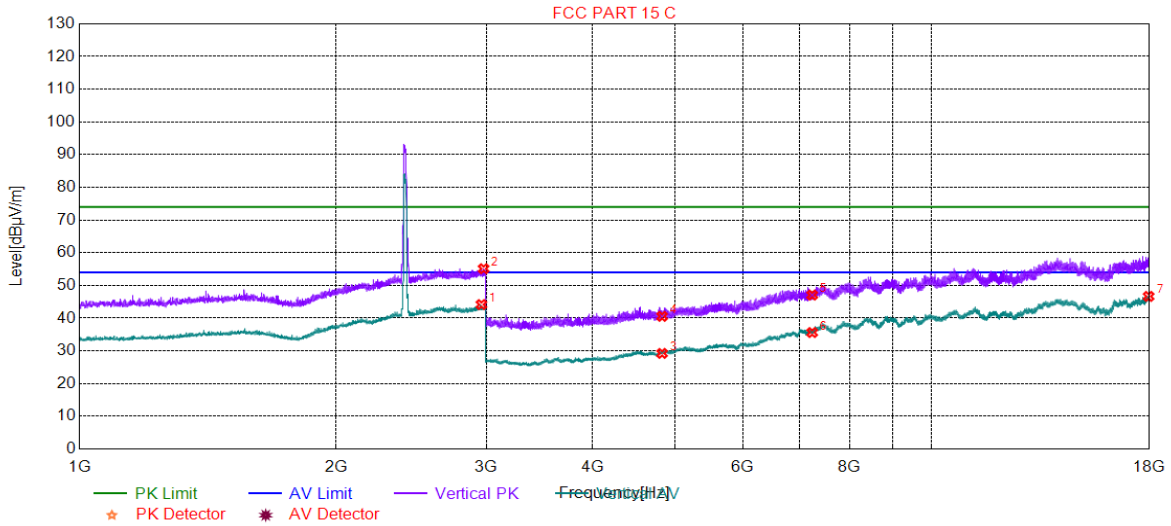
4.9.2.8 802.11G-CH1

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2960.99	44.17	9.63	54.00	9.83	289	168	Vertical
2	2978.99	55.13	9.55	74.00	18.87	162	346	Vertical
3	4824.00	29.24	-18.21	54.00	24.76	247	238	Vertical
4	4824.00	40.56	-18.21	74.00	33.44	169	45	Vertical
5	7236.00	47.08	-9.99	74.00	26.92	214	292	Vertical
6	7236.00	35.62	-9.99	54.00	18.38	166	242	Vertical
7	17957.0	46.67	0.71	54.00	7.33	208	142	Vertical

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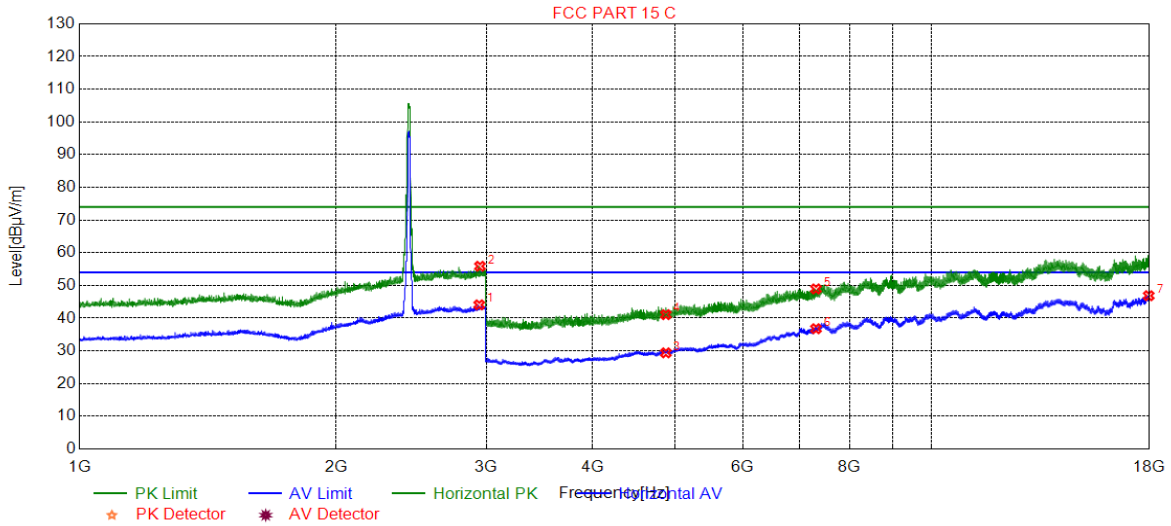
4.9.2.9 802.11G-CH6

Test Report

Test Graph



Suspected List

Suspected List								
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1	2943.48	44.08	9.61	54.00	9.92	133	342	Horizontal
2	2949.48	55.88	9.67	74.00	18.12	249	273	Horizontal
3	4874.00	29.41	-17.99	54.00	24.59	189	18	Horizontal
4	4874.00	41.08	-17.99	74.00	32.92	123	46	Horizontal
5	7311.00	48.95	-9.74	74.00	25.05	241	342	Horizontal
6	7311.00	36.78	-9.74	54.00	17.22	105	91	Horizontal
7	17962.0	46.87	0.71	54.00	7.13	190	241	Horizontal

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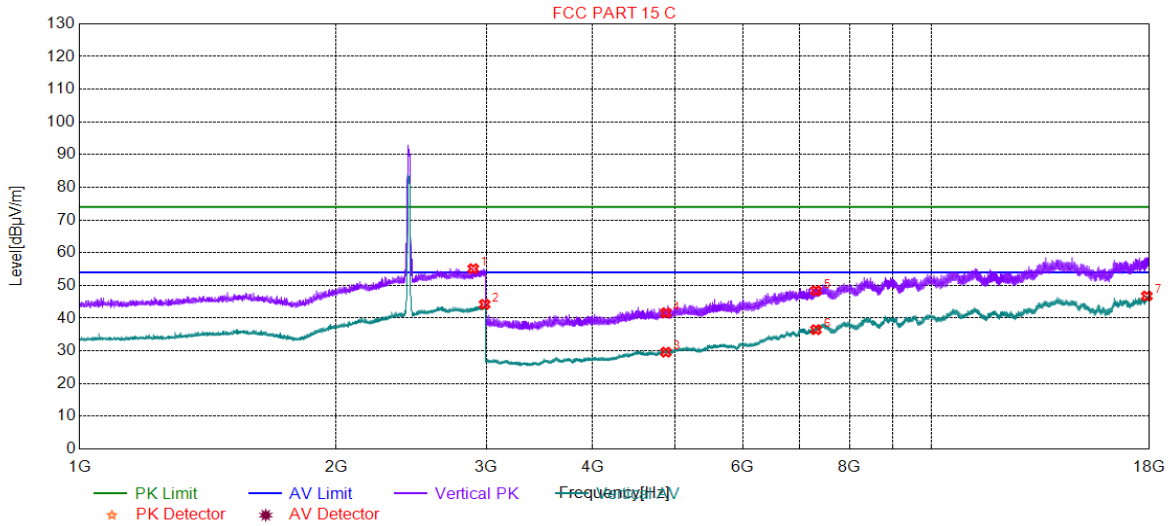
4.9.2.10 802.11G-CH6

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2896.47	55.14	9.15	74.00	18.86	199	209	Vertical
2	2987.49	44.24	9.51	54.00	9.76	253	182	Vertical
3	4874.00	29.61	-17.99	54.00	24.39	296	292	Vertical
4	4874.00	41.60	-17.99	74.00	32.40	209	18	Vertical
5	7311.00	48.41	-9.74	74.00	25.59	208	242	Vertical
6	7311.00	36.50	-9.74	54.00	17.50	244	242	Vertical
7	17870.7	46.78	0.30	54.00	7.22	251	342	Vertical

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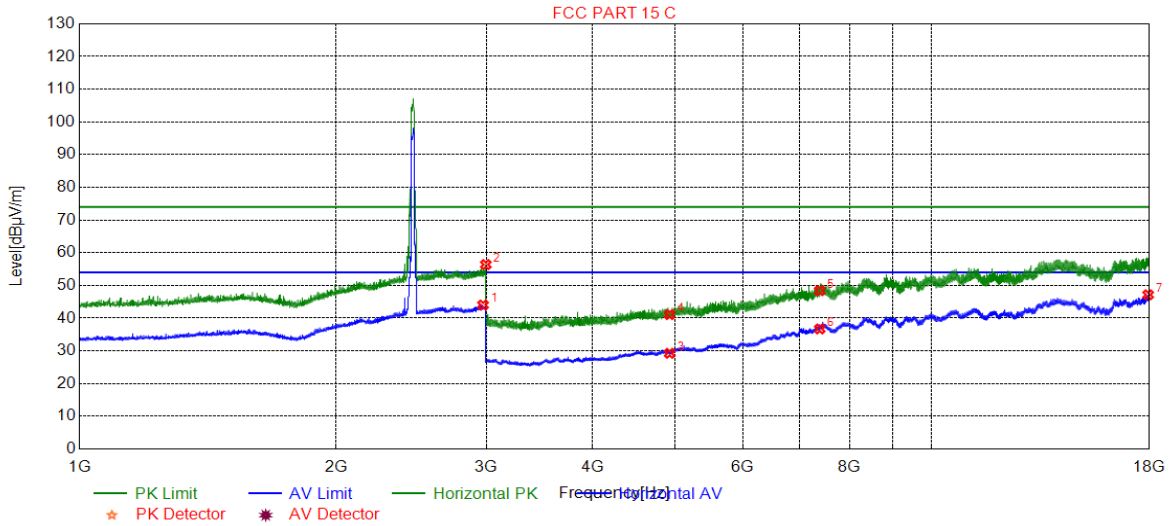
4.9.2.11 802.11G-CH11

Test Report

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	44.03	9.57	54.00	9.97	187	135	Horizontal
2	2996.49	56.40	9.47	74.00	17.60	239	218	Horizontal
3	4924.00	29.26	-17.72	54.00	24.74	228	155	Horizontal
4	4924.00	41.10	-17.72	74.00	32.90	199	46	Horizontal
5	7386.00	48.41	-9.55	74.00	25.59	114	40	Horizontal
6	7386.00	36.72	-9.55	54.00	17.28	202	342	Horizontal
7	17933.4	47.16	0.70	54.00	6.84	169	241	Horizontal

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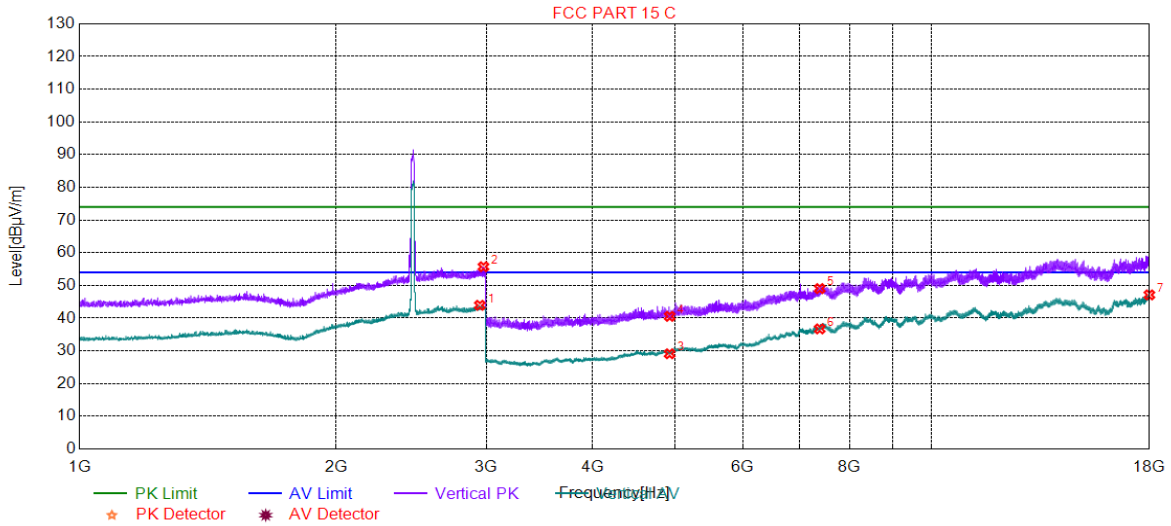
4.9.2.12 802.11G-CH11

Test Report

Test Graph



Suspected List

Suspected List								
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1	2948.48	43.95	9.66	54.00	10.05	213	183	Vertical
2	2977.49	55.73	9.55	74.00	18.27	284	18	Vertical
3	4924.00	29.13	-17.72	54.00	24.87	165	320	Vertical
4	4924.00	40.56	-17.72	74.00	33.44	175	266	Vertical
5	7386.00	49.05	-9.55	74.00	24.95	255	241	Vertical
6	7386.00	36.73	-9.55	54.00	17.27	186	90	Vertical
7	17993.3	47.13	0.72	54.00	6.87	285	241	Vertical

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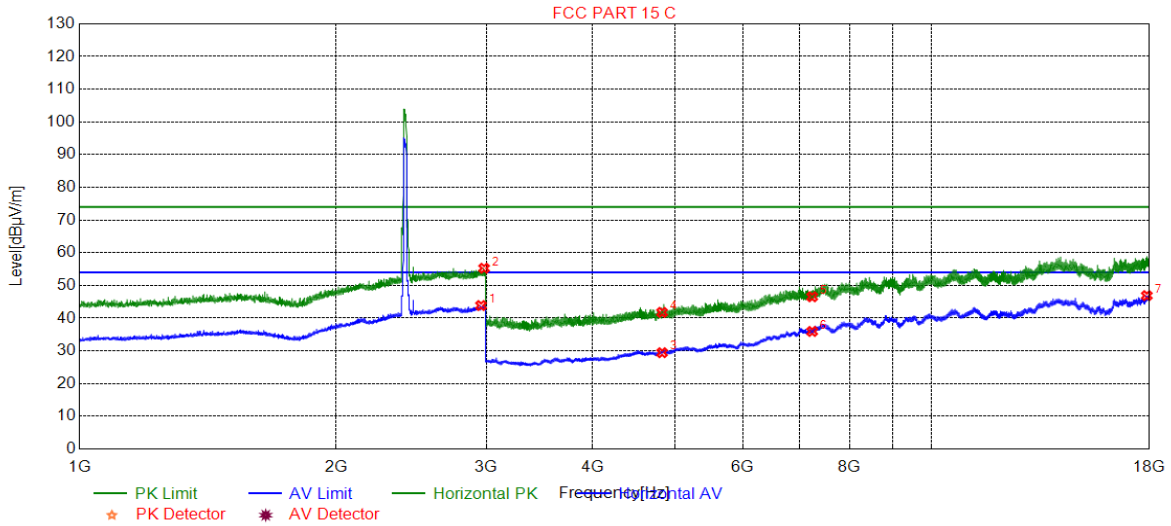
4.9.2.13 802.11N20-CH1

Test Report

Test Graph



Suspected List

Suspected List								
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1	2957.98	43.87	9.64	54.00	10.13	182	40	Horizontal
2	2982.49	55.28	9.53	74.00	18.72	227	150	Horizontal
3	4824.00	29.45	-18.21	54.00	24.55	165	183	Horizontal
4	4824.00	41.78	-18.21	74.00	32.22	194	100	Horizontal
5	7236.00	46.55	-9.99	74.00	27.45	226	142	Horizontal
6	7236.00	35.95	-9.99	54.00	18.05	146	142	Horizontal
7	17870.1	46.90	0.30	54.00	7.10	154	192	Horizontal

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4.9.2.14 802.11N20-CH1

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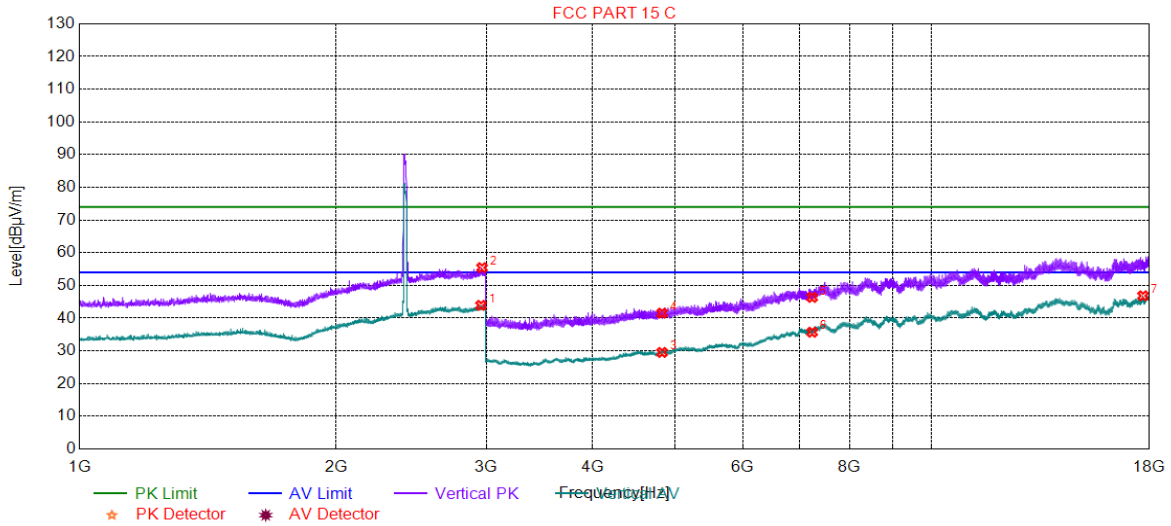

Suspected List

Suspected List								
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1	2957.98	43.93	9.64	54.00	10.07	227	88	Vertical
2	2965.99	55.45	9.61	74.00	18.55	298	18	Vertical
3	4824.00	29.54	-18.21	54.00	24.46	168	360	Vertical
4	4824.00	41.55	-18.21	74.00	32.45	217	72	Vertical
5	7236.00	46.36	-9.99	74.00	27.64	243	241	Vertical
6	7236.00	35.72	-9.99	54.00	18.28	270	40	Vertical
7	17688.1	46.84	1.35	54.00	7.16	217	90	Vertical

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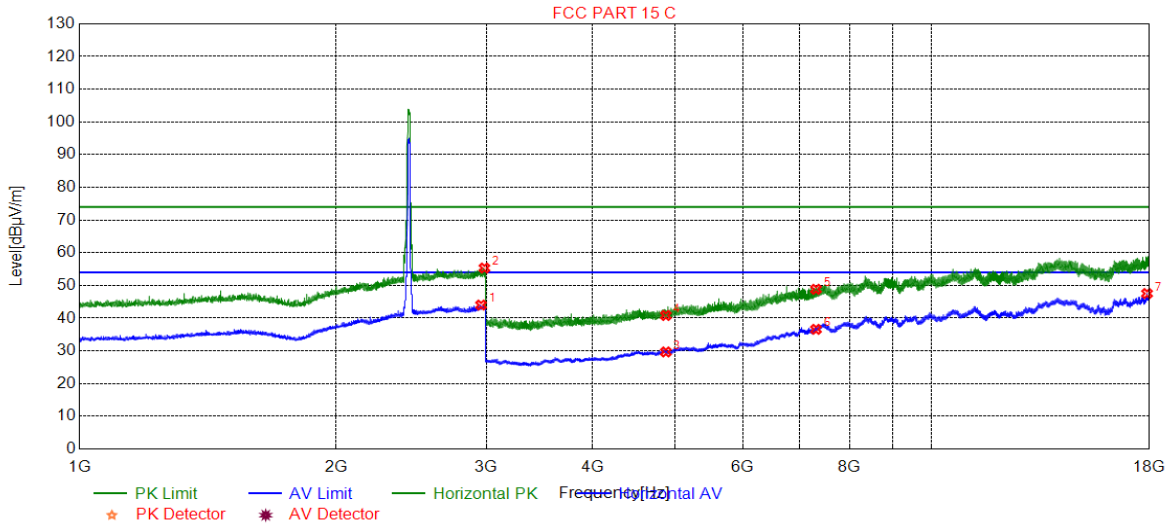
4.9.2.15 802.11N20-CH6

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2957.98	44.02	9.64	54.00	9.98	144	152	Horizontal
2	2985.49	55.33	9.52	74.00	18.67	158	219	Horizontal
3	4874.00	29.68	-17.99	54.00	24.32	202	264	Horizontal
4	4874.00	40.83	-17.99	74.00	33.17	150	264	Horizontal
5	7311.00	48.84	-9.74	74.00	25.16	174	140	Horizontal
6	7311.00	36.60	-9.74	54.00	17.40	216	140	Horizontal
7	17880.0	47.54	0.43	54.00	6.46	182	39	Horizontal

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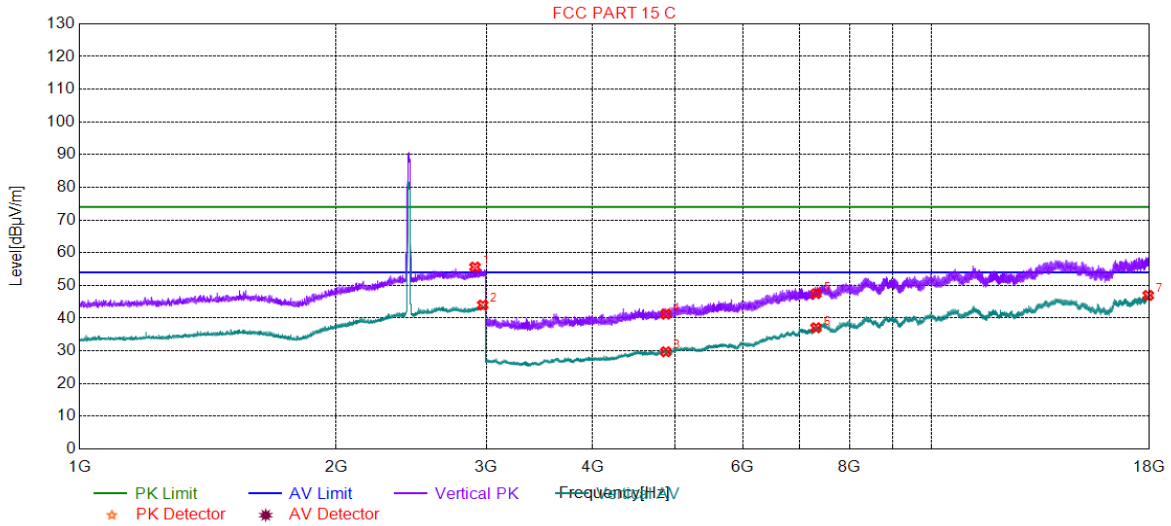
4.9.2.16 802.11N20-CH6

Test Report

Test Graph



Suspected List

Suspected List								
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1	2910.47	55.64	9.25	74.00	18.36	194	194	Vertical
2	2971.99	44.03	9.58	54.00	9.97	233	31	Vertical
3	4874.00	29.74	-17.99	54.00	24.26	200	18	Vertical
4	4874.00	41.23	-17.99	74.00	32.77	160	46	Vertical
5	7311.00	47.51	-9.74	74.00	26.49	201	291	Vertical
6	7311.00	37.08	-9.74	54.00	16.92	239	90	Vertical
7	17937.2	46.98	0.70	54.00	7.02	179	141	Vertical

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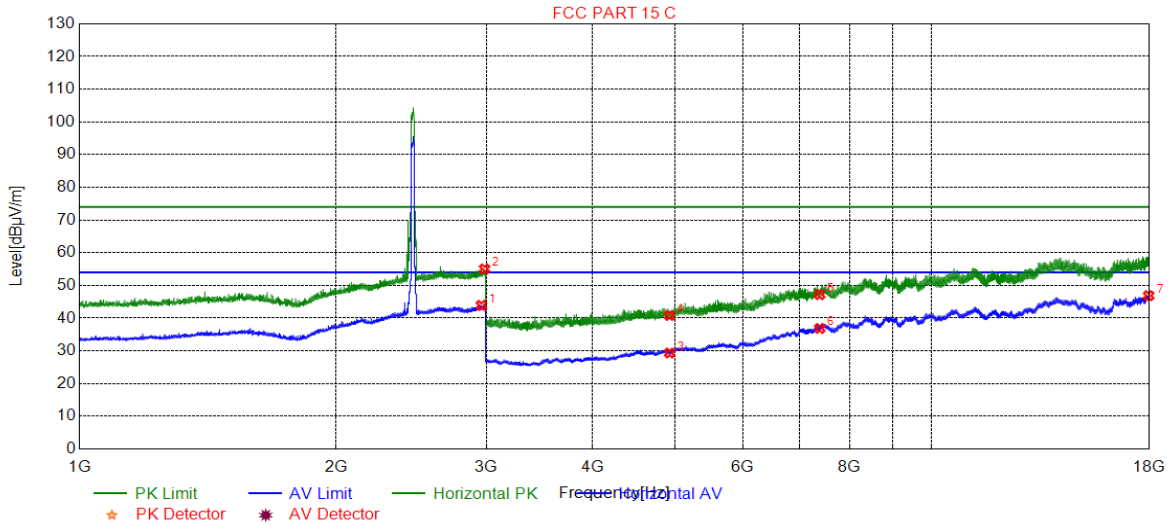
4.9.2.17 802.11N20-CH11

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2960.49	43.93	9.63	54.00	10.07	176	178	Horizontal
2	2986.49	55.06	9.51	74.00	18.94	165	95	Horizontal
3	4924.00	29.36	-17.72	54.00	24.64	230	163	Horizontal
4	4924.00	40.84	-17.72	74.00	33.16	128	300	Horizontal
5	7386.00	47.21	-9.55	74.00	26.79	190	0	Horizontal
6	7386.00	36.88	-9.55	54.00	17.12	130	342	Horizontal
7	17958.7	46.89	0.71	54.00	7.11	144	291	Horizontal

Final Data List

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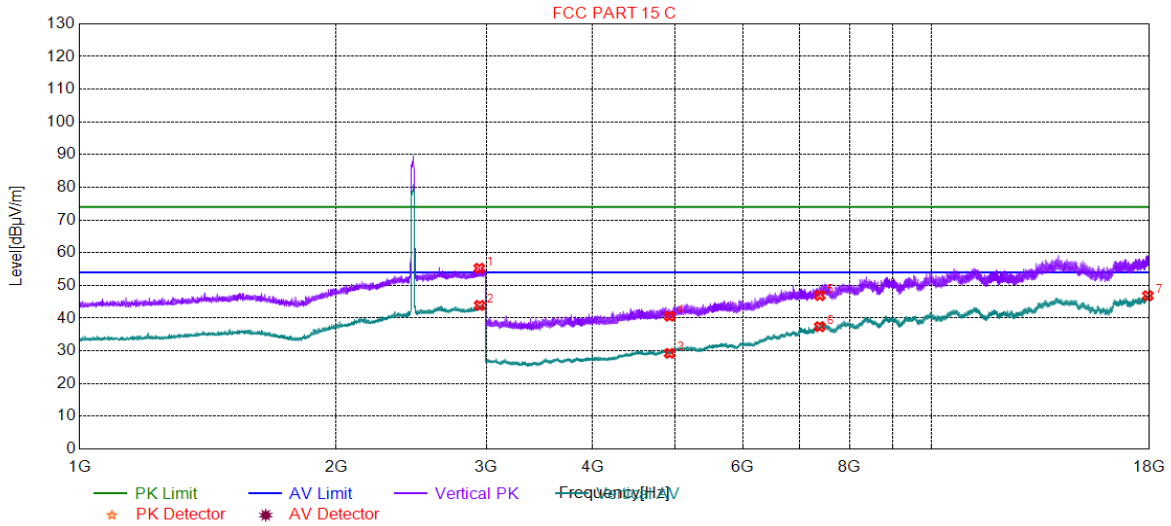
4.9.2.18 802.11N20-CH11

Test Report

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	55.28	9.62	74.00	18.72	197	71	Vertical
2	2946.98	43.92	9.65	54.00	10.08	151	277	Vertical
3	4924.00	29.27	-17.72	54.00	24.73	270	18	Vertical
4	4924.00	40.60	-17.72	74.00	33.40	276	18	Vertical
5	7386.00	46.94	-9.55	74.00	27.06	208	241	Vertical
6	7386.00	37.41	-9.55	54.00	16.59	227	241	Vertical
7	17921.8	46.88	0.70	54.00	7.12	270	241	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:			

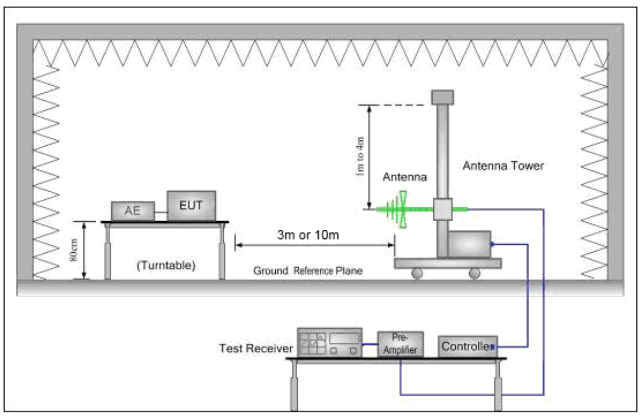

Figure 1. 30MHz to 1GHz

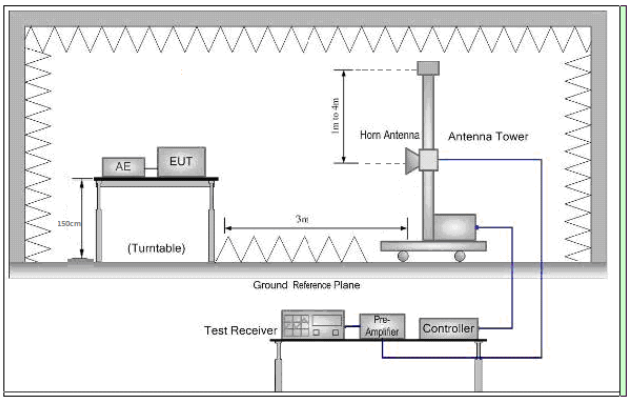

Figure 2. Above 1 GHz

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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 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.
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); 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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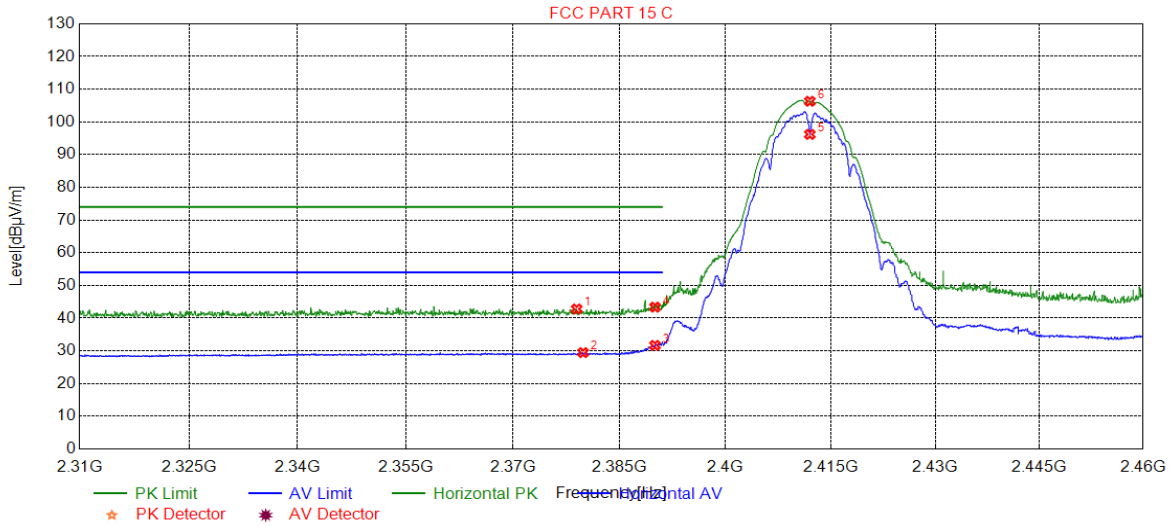
Test plot as follows:

4.10.1 ANT1

4.10.1.1 802.11B-CH1

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2378.95	42.82	7.78	74.00	31.18	153	145	Horizontal
2	2379.85	29.49	7.78	54.00	24.51	202	78	Horizontal
3	2390.00	31.70	7.77	54.00	22.30	135	67	Horizontal
4	2390.00	43.39	7.77	74.00	30.61	152	73	Horizontal
5	2412.00	96.20	7.81	0.00	-96.20	249	62	Horizontal
6	2412.00	106.33	7.81	0.00	-106.33	129	67	Horizontal

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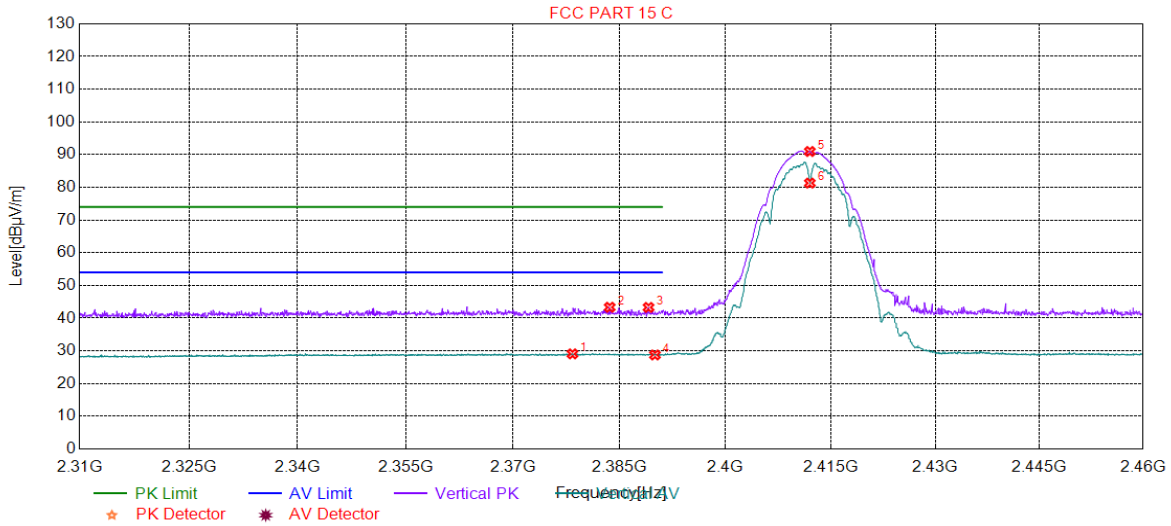
4.10.1.2 802.11B-CH1

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2378.35	29.10	7.78	54.00	24.90	263	270	Vertical
2	2383.61	43.34	7.78	74.00	30.66	248	260	Vertical
3	2389.08	43.30	7.77	74.00	30.70	154	57	Vertical
4	2390.00	28.76	7.77	54.00	25.24	281	79	Vertical
5	2412.00	90.97	7.81	0.00	-90.97	215	84	Vertical
6	2412.00	81.31	7.81	0.00	-81.31	171	90	Vertical

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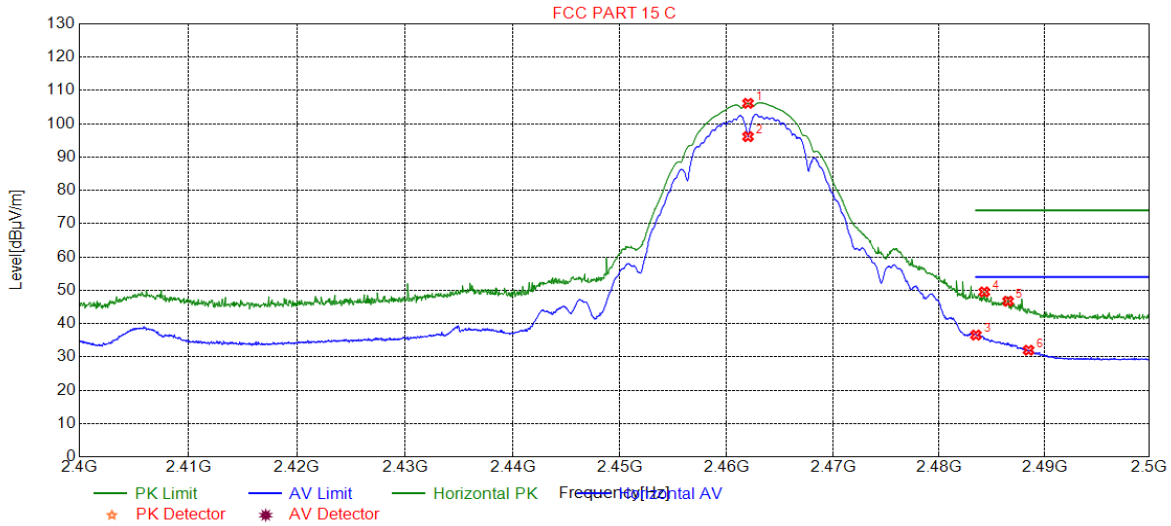
4.10.1.3 802.11B-CH11

Test Report

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	106.14	7.98	0.00	-106.14	121	61	Horizontal
2	2462.00	96.14	7.98	0.00	-96.14	170	61	Horizontal
3	2483.50	36.59	8.01	54.00	17.41	188	66	Horizontal
4	2484.29	49.55	8.01	74.00	24.45	208	93	Horizontal
5	2486.54	46.75	8.01	74.00	27.25	225	93	Horizontal
6	2488.49	32.04	8.02	54.00	21.96	149	61	Horizontal

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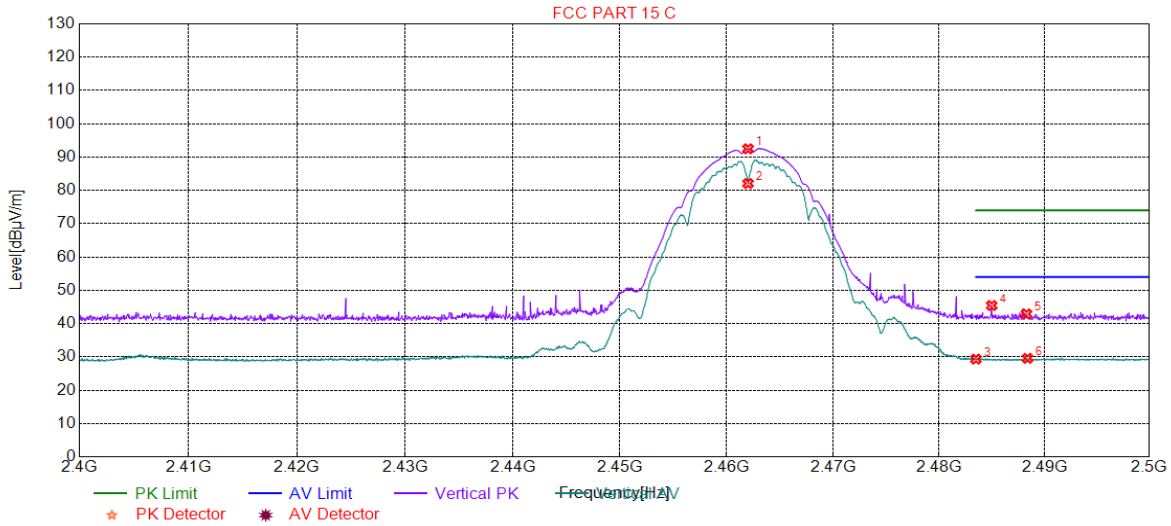
4.10.1.4 802.11B-CH11

Test Report

Test Graph



Suspected List

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NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	92.48	7.98	0.00	-92.48	251	243	Vertical
2	2462.00	82.07	7.98	0.00	-82.07	287	260	Vertical
3	2483.50	29.37	8.01	54.00	24.63	268	249	Vertical
4	2484.99	45.46	8.01	74.00	28.54	175	336	Vertical
5	2488.29	42.92	8.02	74.00	31.08	171	139	Vertical
6	2488.39	29.60	8.02	54.00	24.40	262	292	Vertical

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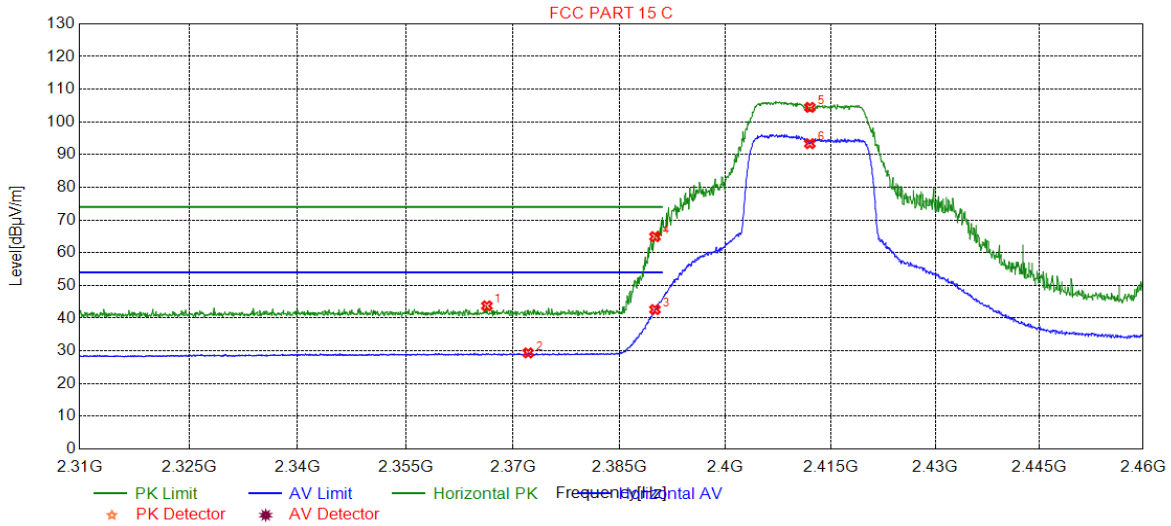
4.10.1.5 802.11G-CH1

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2366.35	43.77	7.79	74.00	30.23	117	166	Horizontal
2	2372.13	29.39	7.79	54.00	24.61	202	303	Horizontal
3	2390.00	42.64	7.77	54.00	11.36	151	66	Horizontal
4	2390.00	64.94	7.77	74.00	9.06	182	60	Horizontal
5	2412.00	104.47	7.81	0.00	-104.47	185	66	Horizontal
6	2412.00	93.36	7.81	0.00	-93.36	164	60	Horizontal

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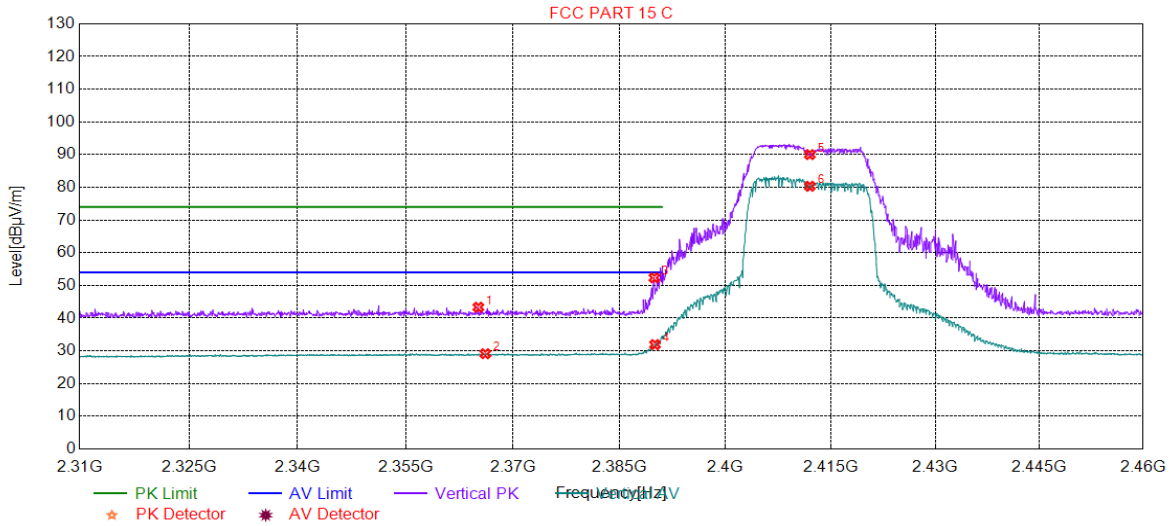
4.10.1.6 802.11G-CH1

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2365.15	43.35	7.79	74.00	30.65	219	348	Vertical
2	2366.12	29.14	7.79	54.00	24.86	258	210	Vertical
3	2389.91	52.35	7.77	74.00	21.65	234	265	Vertical
4	2390.00	31.94	7.77	54.00	22.06	288	265	Vertical
5	2412.00	90.03	7.81	0.00	-90.03	288	265	Vertical
6	2412.00	80.34	7.81	0.00	-80.34	273	260	Vertical

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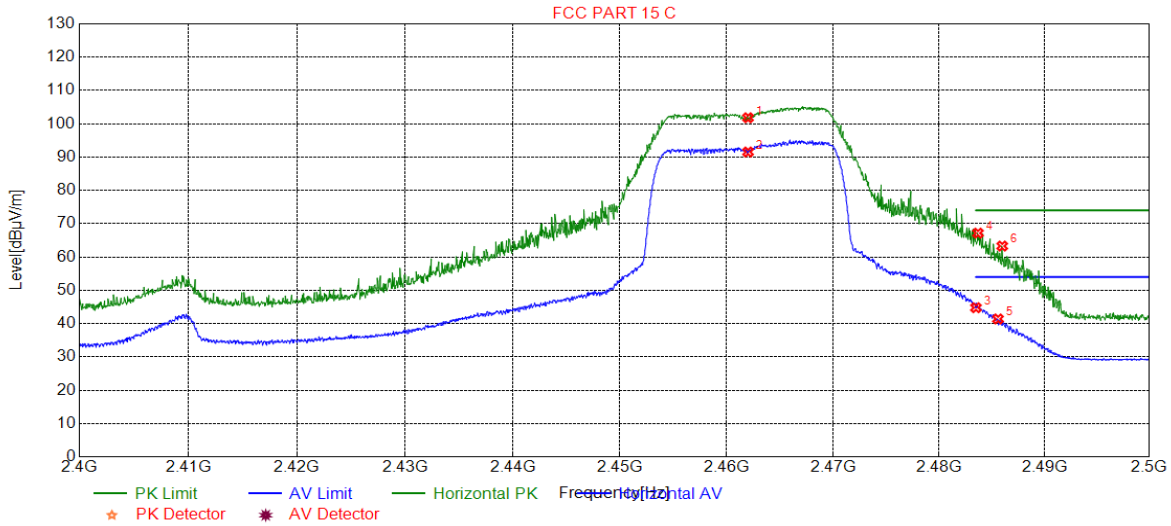
4.10.1.7 802.11G-CH11

Test Report

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	101.81	7.98	0.00	-101.81	120	56	Horizontal
2	2462.00	91.54	7.98	0.00	-91.54	119	61	Horizontal
3	2483.50	44.80	8.01	54.00	9.20	187	61	Horizontal
4	2483.69	67.18	8.01	74.00	6.82	164	6	Horizontal
5	2485.59	41.42	8.01	54.00	12.58	216	56	Horizontal
6	2485.99	63.30	8.01	74.00	10.70	232	61	Horizontal

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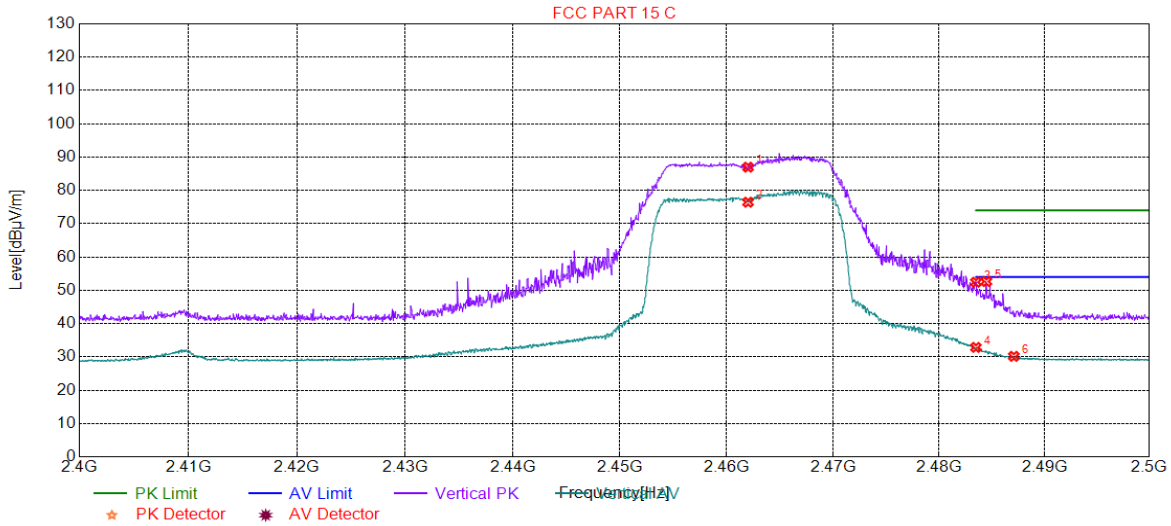
4.10.1.8 802.11G-CH11

Test Report

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	86.98	7.98	0.00	-86.98	214	259	Vertical
2	2462.00	76.46	7.98	0.00	-76.46	298	352	Vertical
3	2483.50	52.44	8.01	74.00	21.56	230	30	Vertical
4	2483.50	32.88	8.01	54.00	21.12	171	14	Vertical
5	2484.49	52.65	8.01	74.00	21.35	186	116	Vertical
6	2487.09	30.20	8.01	54.00	23.80	177	116	Vertical

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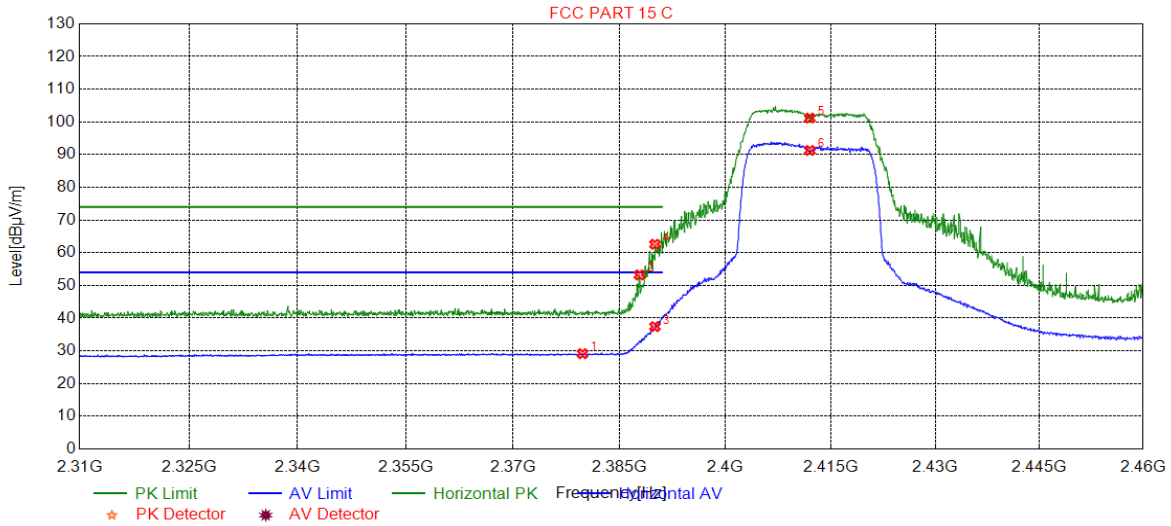
4.10.1.9 802.11N20-CH1

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2379.78	29.15	7.78	54.00	24.85	207	155	Horizontal
2	2387.81	53.23	7.77	74.00	20.77	224	78	Horizontal
3	2390.00	37.41	7.77	54.00	16.59	146	68	Horizontal
4	2390.00	62.60	7.77	74.00	11.40	129	24	Horizontal
5	2412.00	101.19	7.81	0.00	-101.19	203	57	Horizontal
6	2412.00	91.29	7.81	0.00	-91.29	112	62	Horizontal

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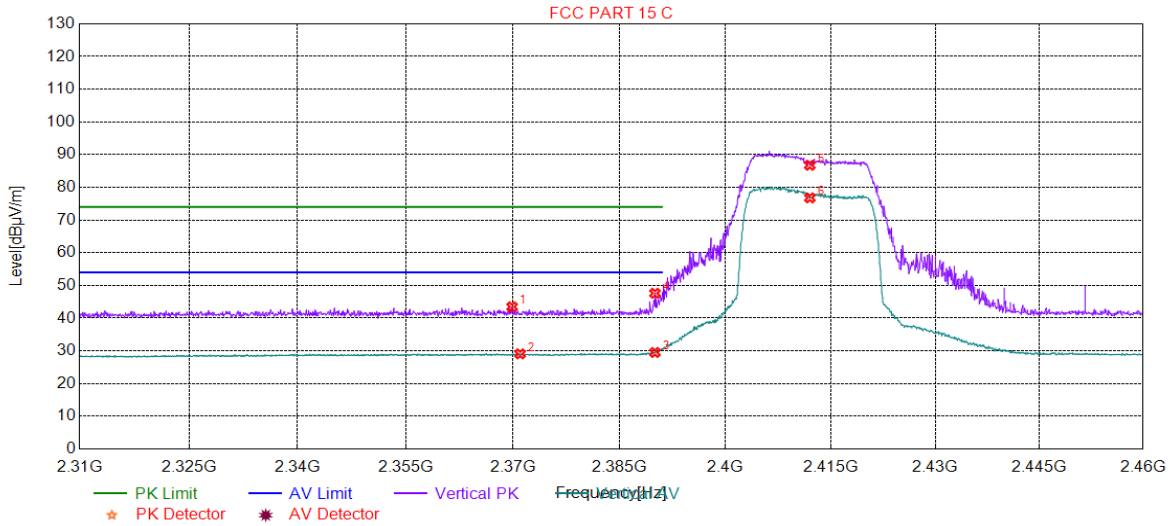
4.10.1.10 802.11N20-CH1

Test Report

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2369.87	43.48	7.79	74.00	30.52	187	315	Vertical
2	2371.00	29.09	7.79	54.00	24.91	261	266	Vertical
3	2390.00	29.53	7.77	54.00	24.47	182	271	Vertical
4	2390.00	47.62	7.77	74.00	26.38	173	266	Vertical
5	2412.00	86.76	7.81	0.00	-86.76	265	266	Vertical
6	2412.00	76.79	7.81	0.00	-76.79	261	260	Vertical

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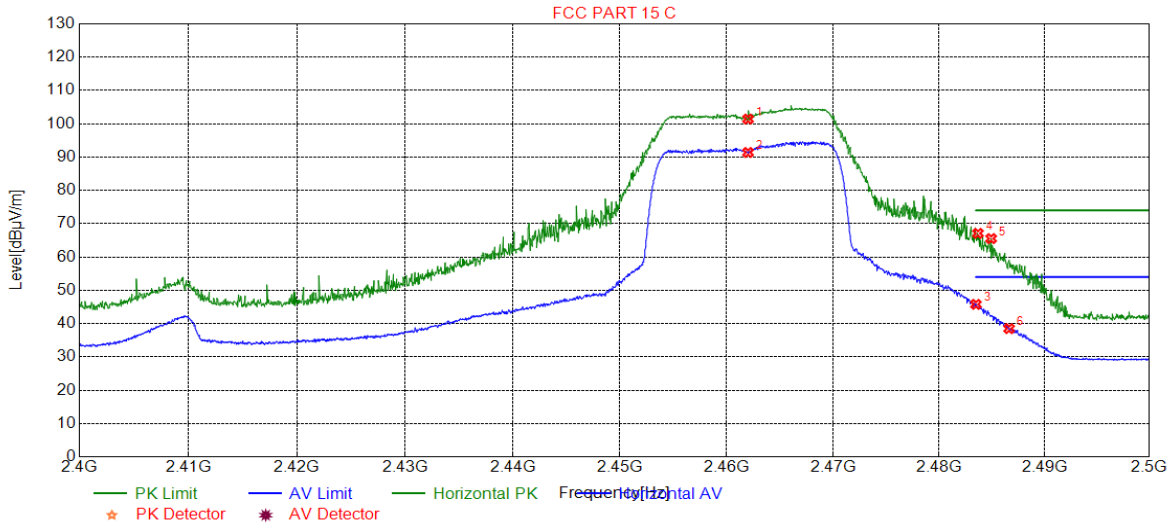
4.10.1.11 802.11N20-CH11

Test Report

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	101.41	7.98	0.00	-101.41	194	51	Horizontal
2	2462.00	91.39	7.98	0.00	-91.39	191	57	Horizontal
3	2483.50	45.80	8.01	54.00	8.20	110	57	Horizontal
4	2483.69	67.10	8.01	74.00	6.90	158	57	Horizontal
5	2484.94	65.54	8.01	74.00	8.46	228	57	Horizontal
6	2486.64	38.52	8.01	54.00	15.48	209	57	Horizontal

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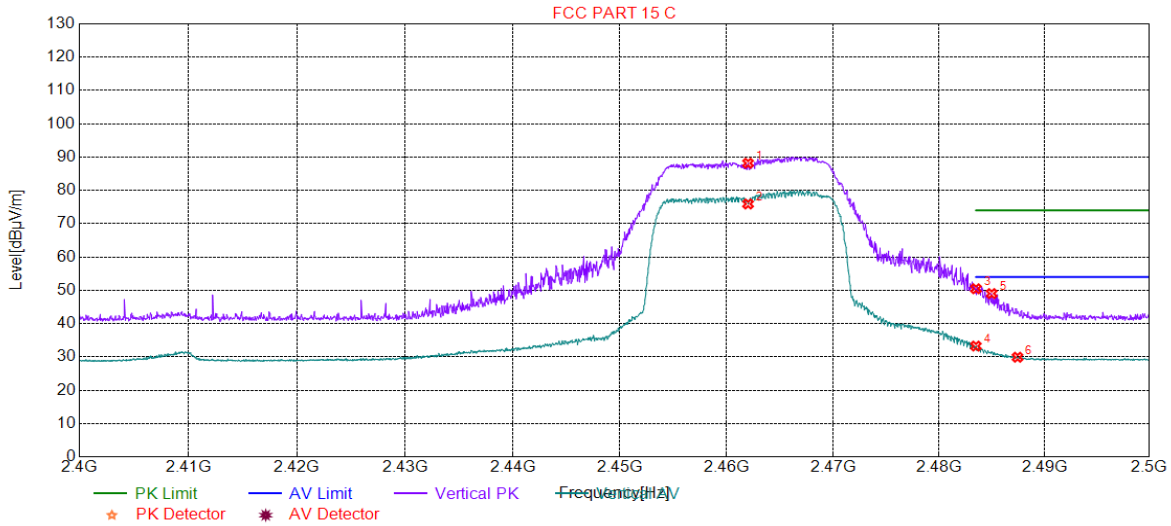
4.10.1.12 802.11N20-CH11

Test Report

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	88.16	7.98	0.00	-88.16	183	260	Vertical
2	2462.00	75.93	7.98	0.00	-75.93	236	354	Vertical
3	2483.50	50.49	8.01	74.00	23.51	163	260	Vertical
4	2483.50	33.28	8.01	54.00	20.72	177	138	Vertical
5	2484.99	49.04	8.01	74.00	24.96	216	354	Vertical
6	2487.44	29.93	8.01	54.00	24.07	238	354	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	Conduction Emission	± 3.0dB (150kHz to 30MHz)
2	Radiated Emission	± 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 (yyyy-mm-dd)	Cal.Duedate (yyyy-mm-dd)
DC Power Supply	Agilent Technologies Inc	66311B	W009-09	2019/7/15	2020/7/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2020/1/3	2021/1/2
Coaxial Cable	SGS	N/A	SEM031-01	2020/6/12	2021/6/11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019/7/14	2020/7/14
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2019/10/27	2020/10/27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019/7/14	2020/7/14

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	2019-09-07	2020-09-06
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-03	2019-12-11	2020-12-10
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-12-06	2020-12-05
Measurement Software	Tonscend	TS+ CE V2.5	XAW02-05-02	NCR	NCR

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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	2019-09-07	2020-09-06
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
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	2019-12-06	2020-12-05
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 ZR/2020/60028.

The End

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