FCC TEST REPORT

Application No:	ZR/2020/50009
Applicant:	Motorola Mobility LLC
Address of Applicant:	222 W Merchandise Mart Plaza, Suite 1800, Chicago IL 60654, USA
Manufacturer:	Company Name: Motorola Mobility LLC
Address of Manufacturer	222 W Merchandise Mart Plaza, Suite 1800, Chicago IL 60654, USA
EUT Description:	Mobile Cellular Phone
Model No.:	XT2081-1
Type Name:	MC369
Trade Mark:	Motorola
FCC ID:	IHDT56ZD1
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:	2020/05/09
Date of Test:	2020/05/10 to 2020/06/21
Date of Issue:	2021/5/15
Test Result:	**PASS ***

. * In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Derek Yang

Derek Yang
Wireless Laboratory Manager

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1 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2020/08/10		Original
02		2021/4/30	Flora Wang	1.Add test site Information 2.Modify data conversion error of antenna height 3.Update equipment list

*This test report supersedes the original report (report No.: ZR/2020/5000903, issue date: 2020-08-10), original report shall be invalid.

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

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We, Motorola Mobility LLC. declare on our sole responsibility for the product of XT2081-1 Latam SS/DS(SKU1), XT2081-2 WE&APEM SS/DS(SKU2) , the detail differences as below:

RF Functionally Matrix-Same ROW indicates Signal Path is shared among SKUs		
Bands/Modes	SKU1	SKU2
Model	XT2081-1	XT2081-2
PCB	The same	The same
GSM	The same	The same
WCDMA	Band I/II/IV/V/VI/VIII	Band I/II /V/VIII
LTE	Band1/2/3/4/5/7/8/19/28/66	Band1/3/5/7/8/20/38/40/41
WLAN 2.4GHz	The same	The same
Bluetooth	The same	The same
Antenna	The same	The same
Hardware Version:	The same	The same
Software Version:	The same	The same

According to the difference description above: WIFi of XT2081-1 is same with XT2081-2, so radiated spurious emissions is spot check and others remain data are copied from XT2081-2 original report (Report No.: ZR/2020/5000702).

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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.

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3 General Information

3.1 Client Information

Applicant:	Motorola Mobility LLC
Address of Applicant:	222 W Merchandise Mart Plaza, Suite 1800, Chicago IL 60654, USA
Manufacturer:	Company Name: Motorola Mobility LLC
Address of Manufacturer:	222 W Merchandise Mart Plaza, Suite 1800, Chicago IL 60654, USA

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.

• FCC-Designation Number: CN1271.

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3.4 General Description of EUT

EUT Description:	Mobile Cellular Phone
Model No.:	XT2081-1
Type Name:	MC369
Trade Mark:	Motorola
Hardware Version:	DVT2-2
Software Version:	QPZ30.30-Q3
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:	-0.5dBi
Power Supply	☒ AC/DC Adapter; ☐ Battery ☐ PoE:; ☐ Other:
Accsessories	AC Aadpte:Model No.:SC-41;SC-42;SC-43;SC-46;SC-47;MC-101;MC-102;MC-103;MC-106;MC-107 I/P:100-240 300mA O/P:5V,2000mA; Battery: Model No.:JK50,3.8V

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

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channel see below:

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

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 integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -0.5dBi.	

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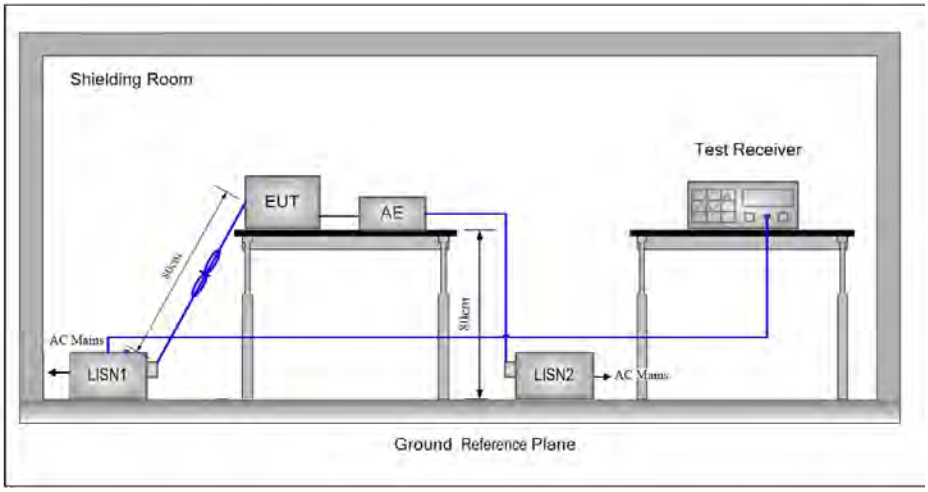
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate of 802.11B at lowest channel is the worst case. Charge + Transmitting mode. Only the worst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

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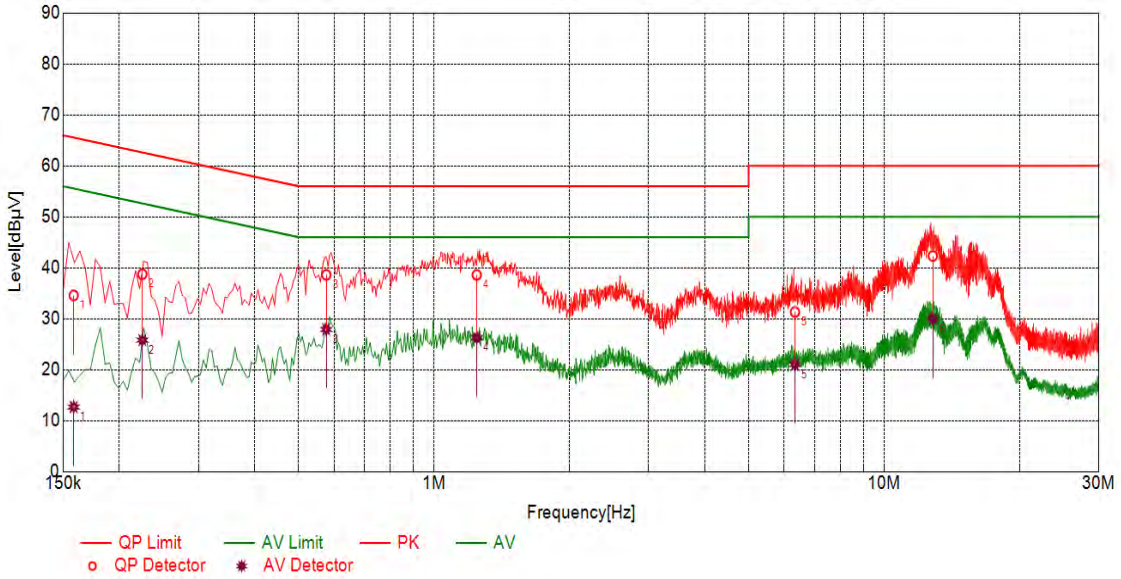
Measurement Data

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

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	0.1584	10.10	34.58	65.55	30.97	12.68	55.55	42.87	L
2	0.2250	10.10	38.74	62.63	23.89	25.81	52.63	26.82	L
3	0.5765	10.10	38.61	56.00	17.39	27.90	46.00	18.10	L
4	1.2446	10.10	38.60	56.00	17.40	26.24	46.00	19.76	L
5	6.3386	10.10	31.33	60.00	28.67	21.01	50.00	28.99	L
6	12.8275	10.11	42.32	60.00	17.68	29.99	50.00	20.01	L

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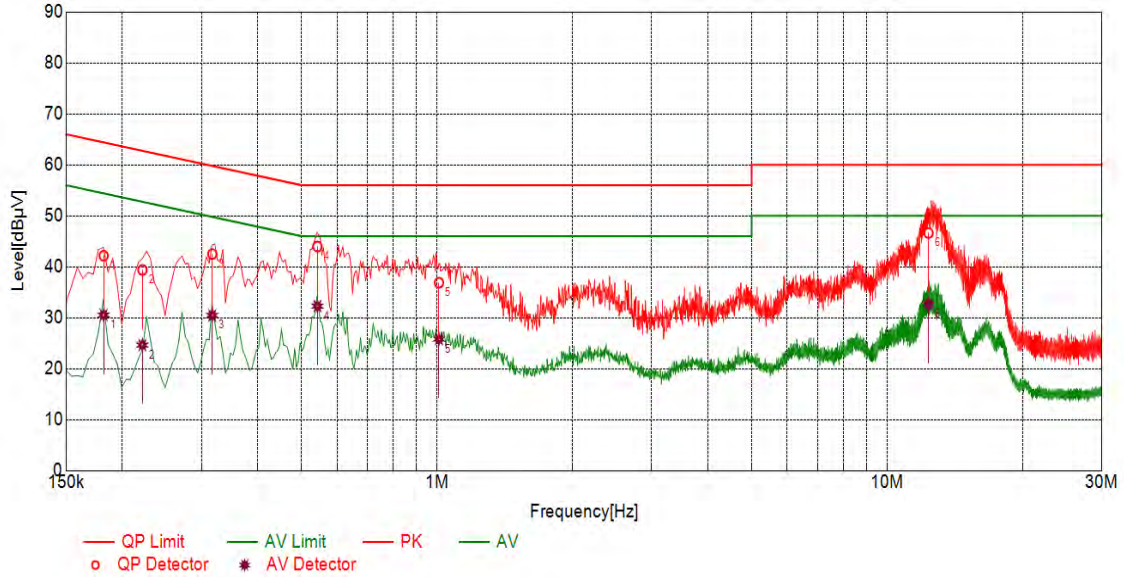
Neutral Line:



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	0.1818	10.10	42.16	64.40	22.24	30.53	54.40	23.87	N
2	0.2217	10.10	39.37	62.75	23.38	24.63	52.75	28.12	N
3	0.3169	10.10	42.50	59.79	17.29	30.46	49.79	19.33	N
4	0.5428	10.10	43.98	56.00	12.02	32.29	46.00	13.71	N
5	1.0105	10.10	36.87	56.00	19.13	25.81	46.00	20.19	N
6	12.3596	10.10	46.63	60.00	13.37	32.69	50.00	17.31	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

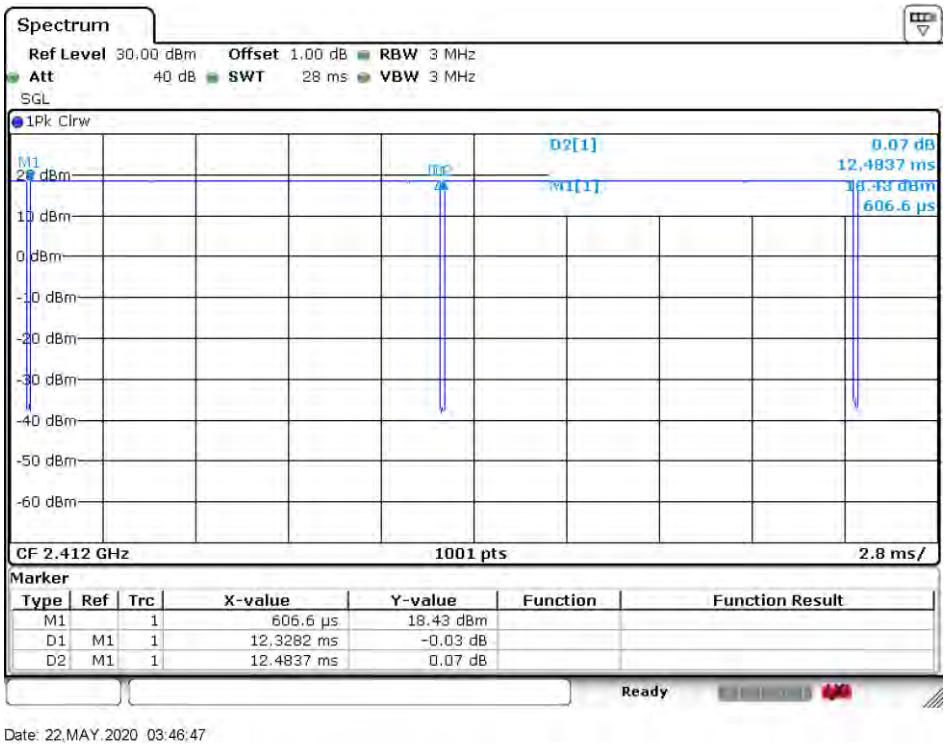
4.3.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11B	Ant 1: CH1,CH6,CH11	98.75
11G	Ant 1: CH1,CH6,CH11	97.93
11N20	Ant 1: CH1,CH6,CH11	97.78

4.3.1 Test Plots

4.3.1.1 ANT1

4.3.1.1.1 11B



Date: 22.MAY.2020 03:46:47

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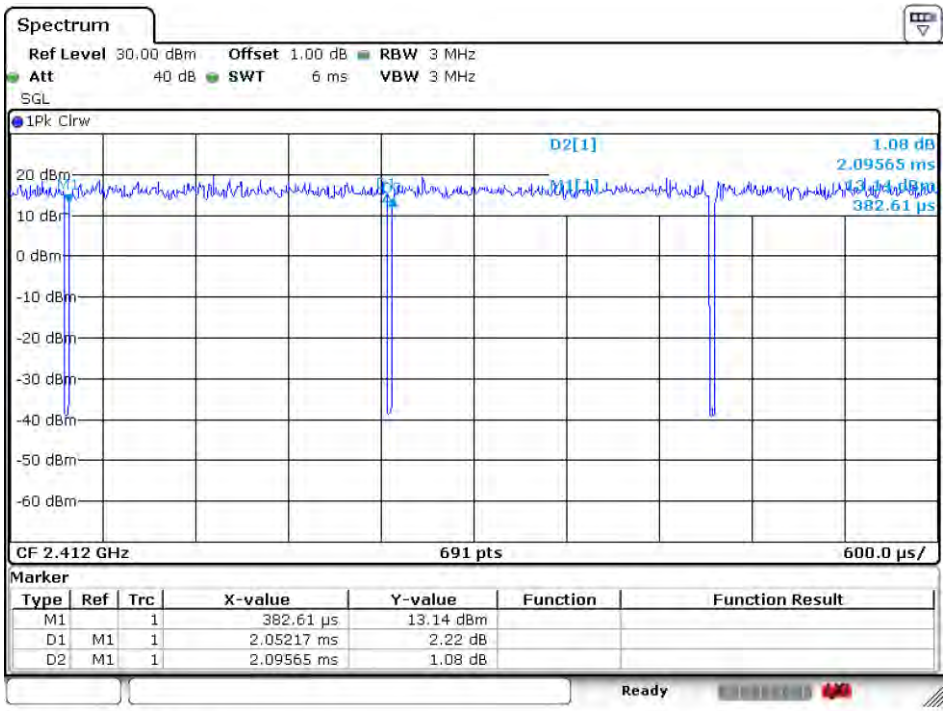
4.3.1.1.2 11G



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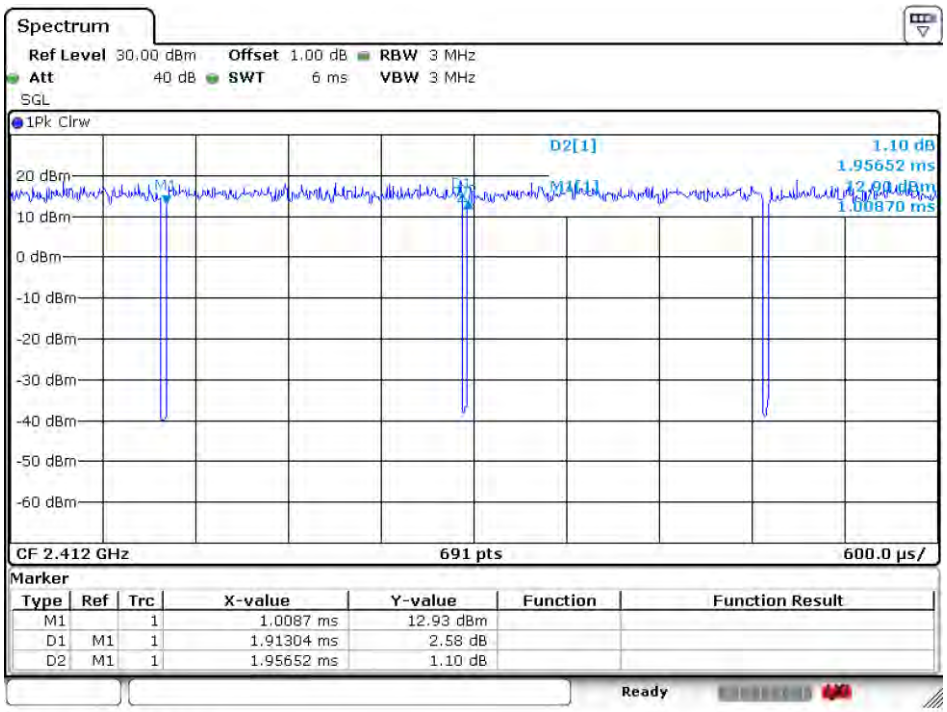
4.3.1.1.3 11N20



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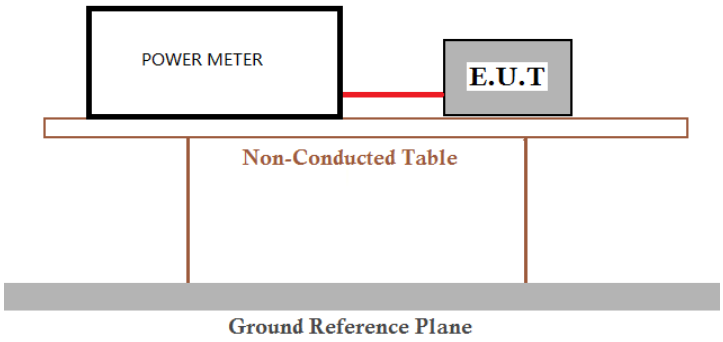
4.4 Conducted Output Power

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 Average Power:

Mode	Test Channel	Average Output Power (dBm) [Duty Cycle Considered]	Result
802.11B	Lowest	17.74	Report purpose only
	Middle	17.78	Report purpose only
	Highest	18.05	Report purpose only
802.11G	Lowest	15.92	Report purpose only
	Middle	15.94	Report purpose only
	Highest	16.29	Report purpose only
802.11N20	Lowest	14.83	Report purpose only
	Middle	14.78	Report purpose only
	Highest	15.11	Report purpose only

Measurement Data of Peak Power:

Mode	Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result
802.11B	Lowest	18.06	30.00	Pass
	Middle	18.22	30.00	Pass
	Highest	18.22	30.00	Pass
802.11G	Lowest	17.35	30.00	Pass
	Middle	17.24	30.00	Pass
	Highest	17.44	30.00	Pass
802.11N20	Lowest	17.03	30.00	Pass
	Middle	17.07	30.00	Pass
	Highest	17.18	30.00	Pass

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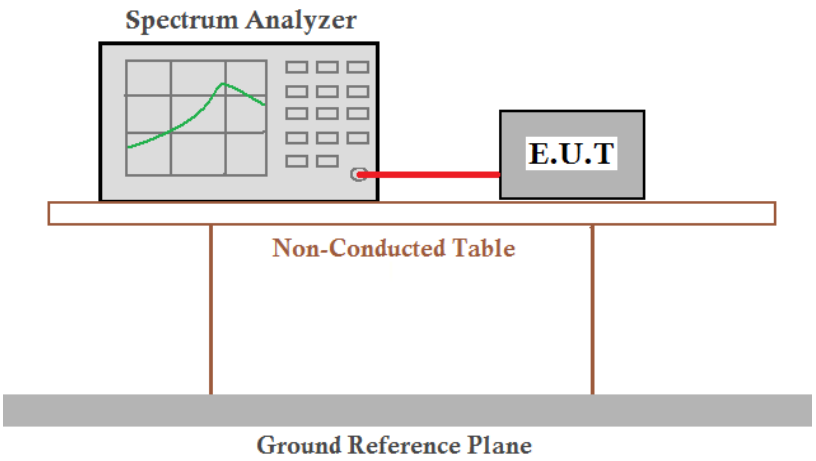
4.5 DTS (6 dB) Bandwidth & 99% Occupied Bandwidth

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	14.02	9.07	≥500	Pass
	Middle	13.89	9.03	≥500	Pass
	Highest	13.85	9.07	≥500	Pass
802.11G	Lowest	17.06	16.32	≥500	Pass
	Middle	16.93	15.98	≥500	Pass
	Highest	16.85	15.72	≥500	Pass
802.11N20	Lowest	18.10	17.33	≥500	Pass
	Middle	18.10	17.11	≥500	Pass
	Highest	17.97	16.59	≥500	Pass

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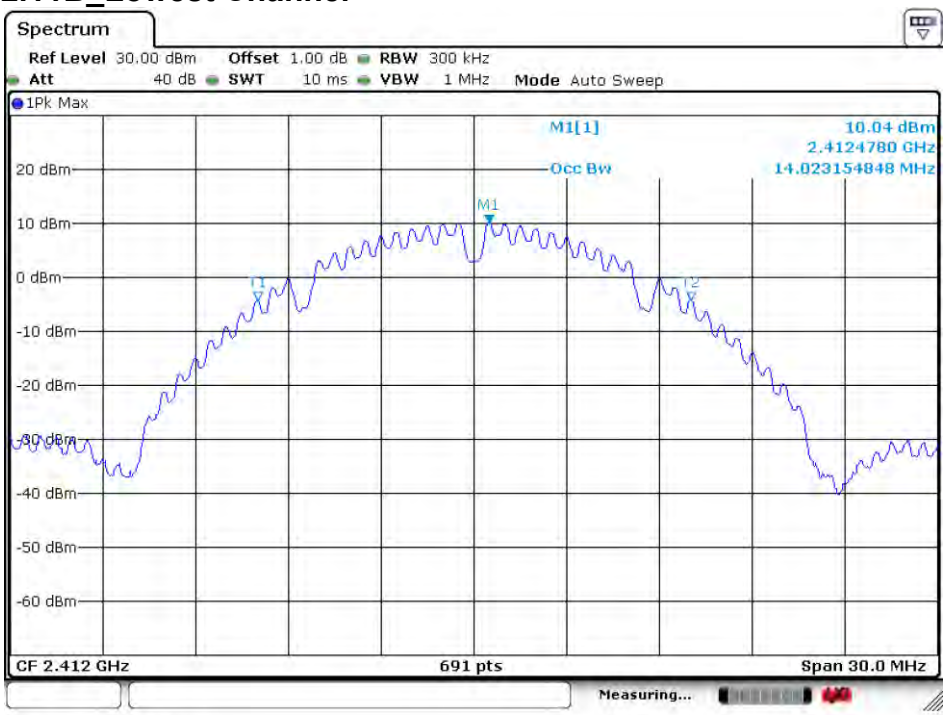
4.5.2 Test plots

4.5.2.1 ANT1

4.5.2.1.1 802.11B_Lowest Channel



Date: 22.MAY.2020 03:03:14

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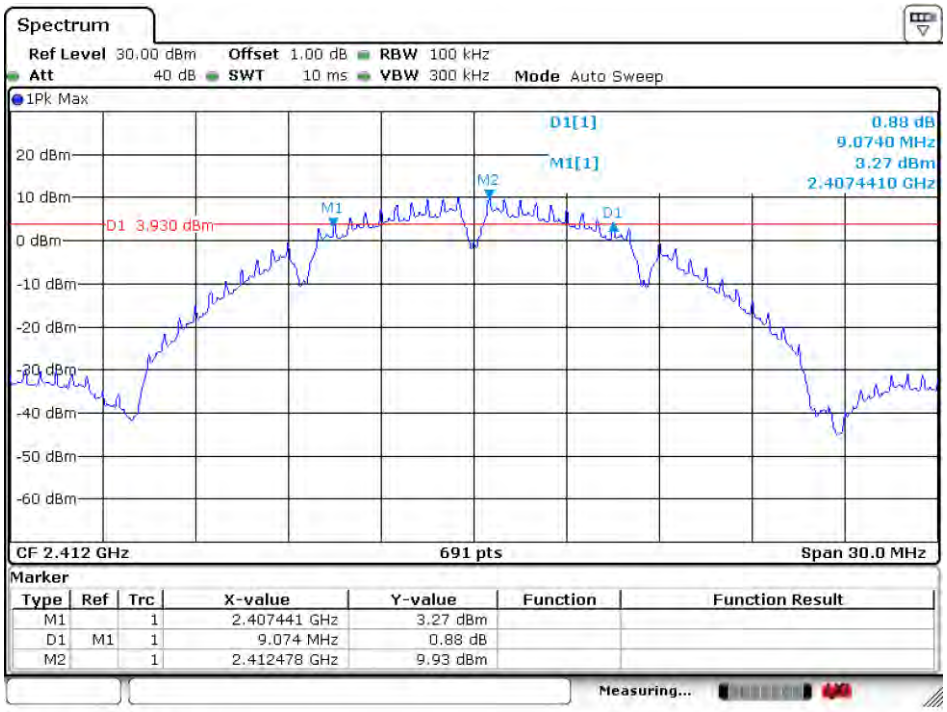
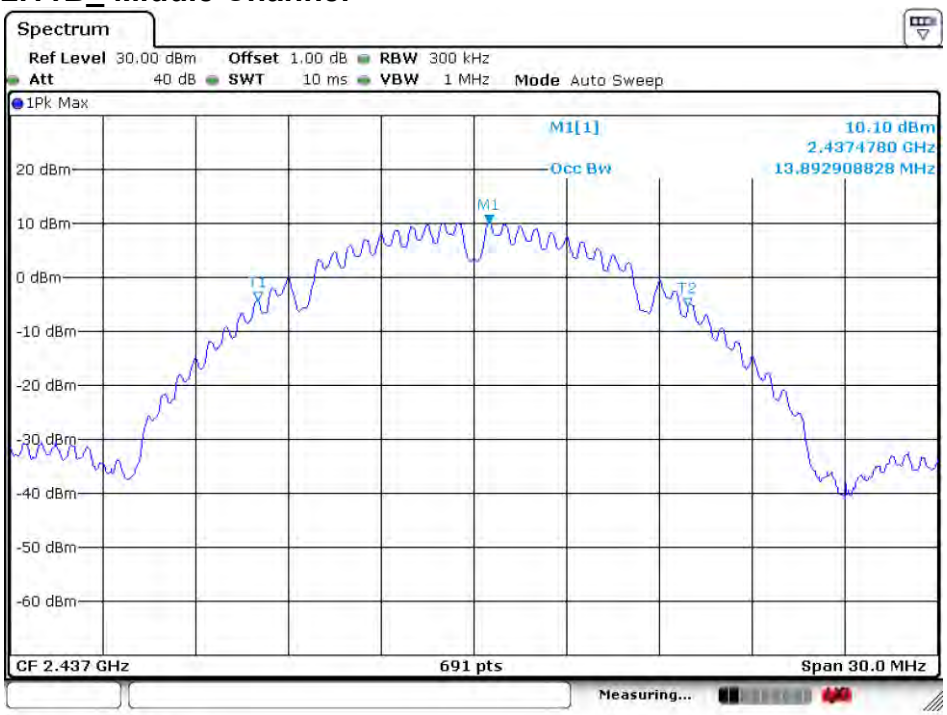


Date: 22.MAY.2020 02:55:02

4.5.2.1.2 802.11B_ Middle Channel



Date: 22.MAY.2020 03:02:55

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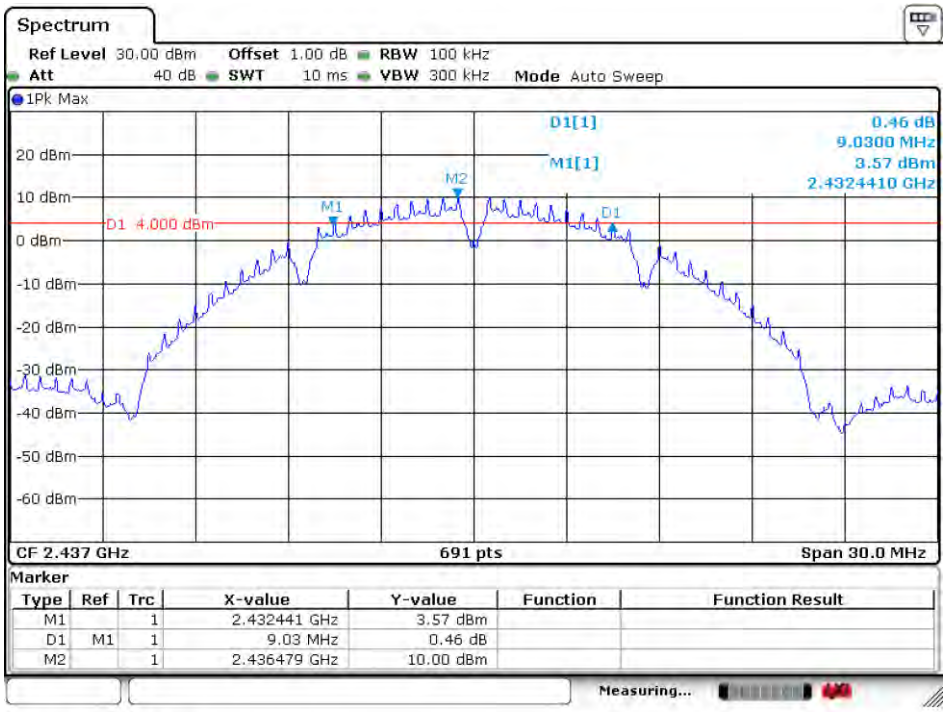

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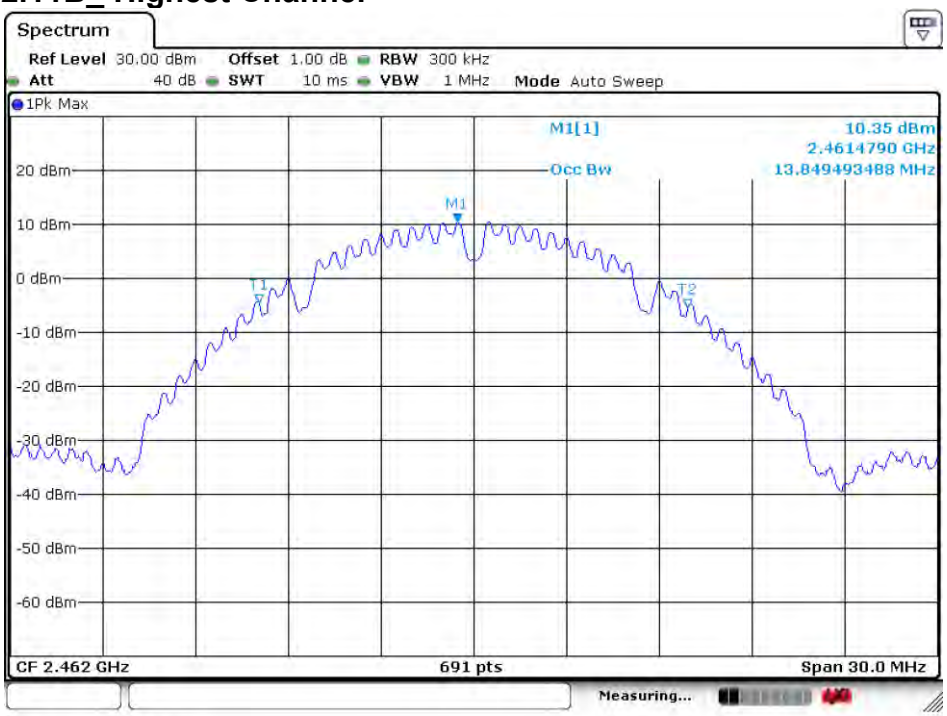
4.5.2.1.3 802.11B_ Highest Channel



Date: 22.MAY.2020 03:02:34

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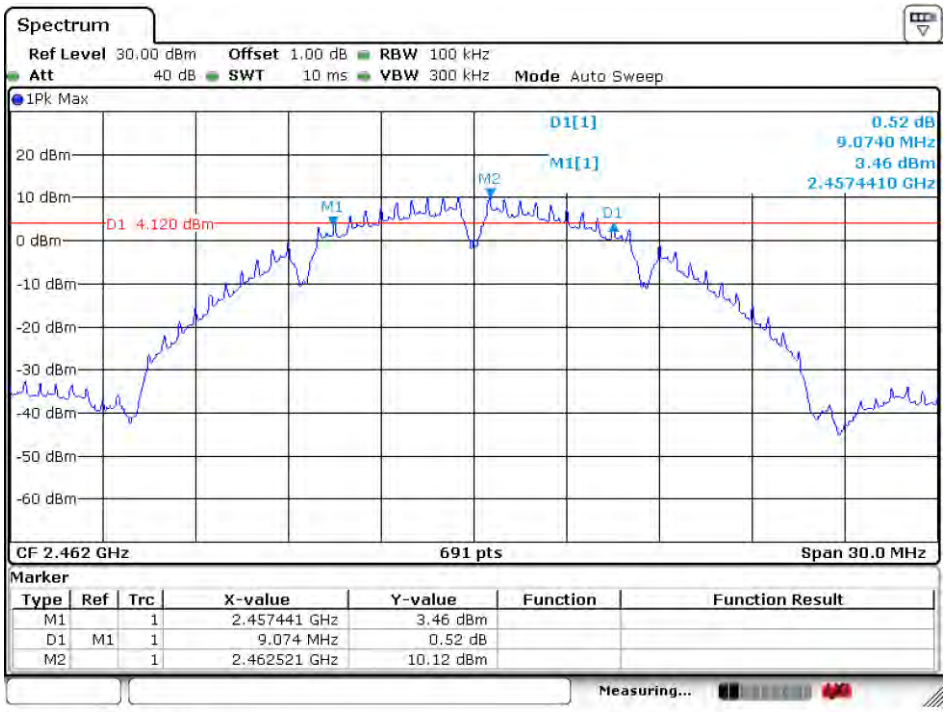
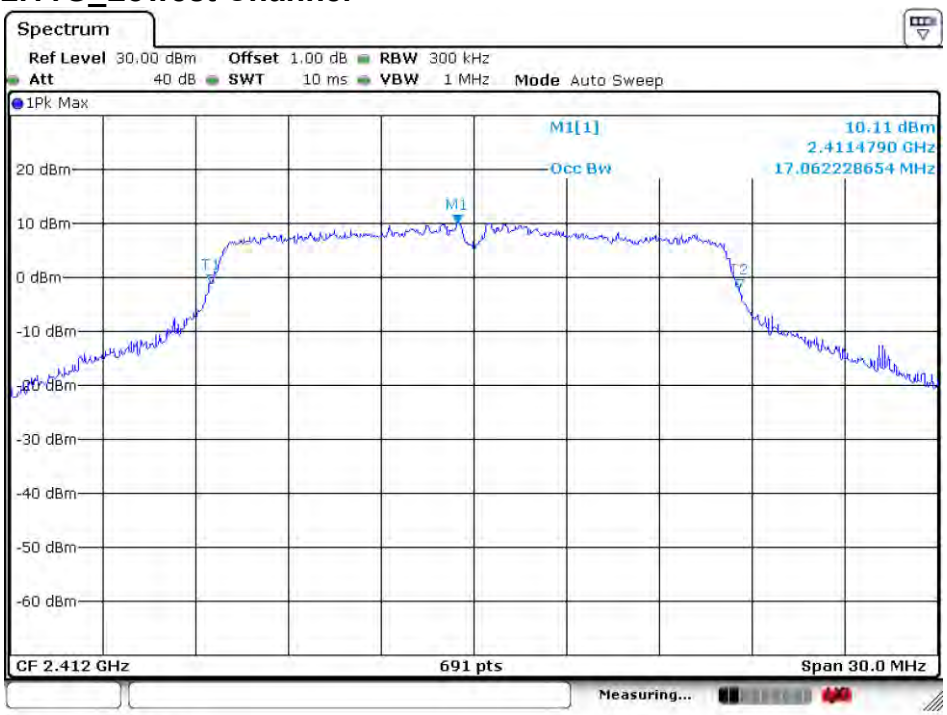


Date: 22.MAY.2020 03:00:33

4.5.2.1.4 802.11G_Lowest Channel



Date: 22.MAY.2020 03:03:38

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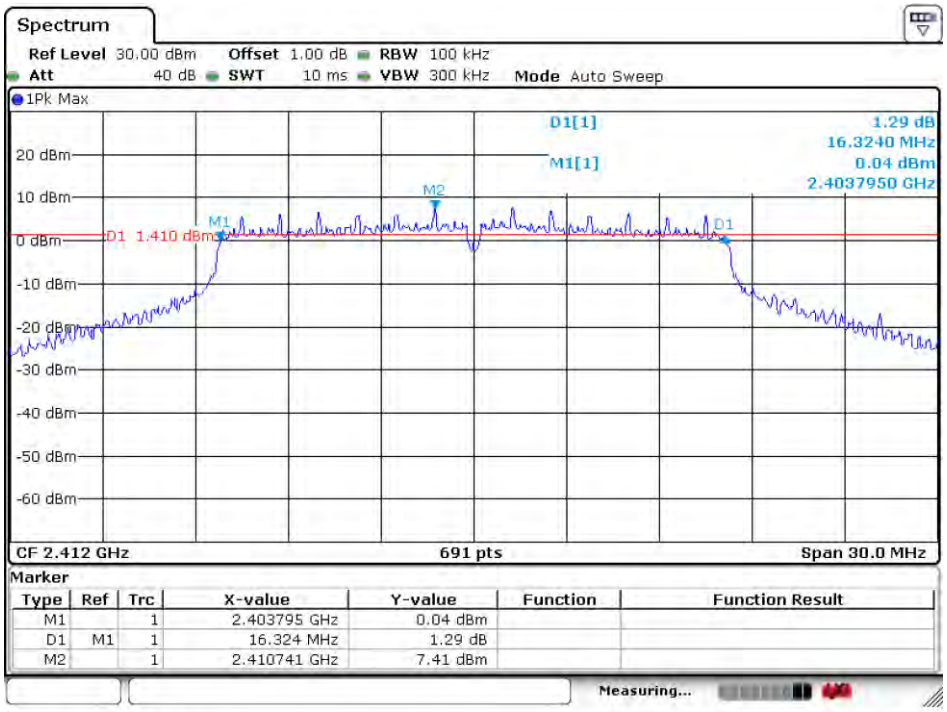

Date: 22.MAY.2020 02:50:18

4.5.2.1.5 802.11G_ Middle Channel

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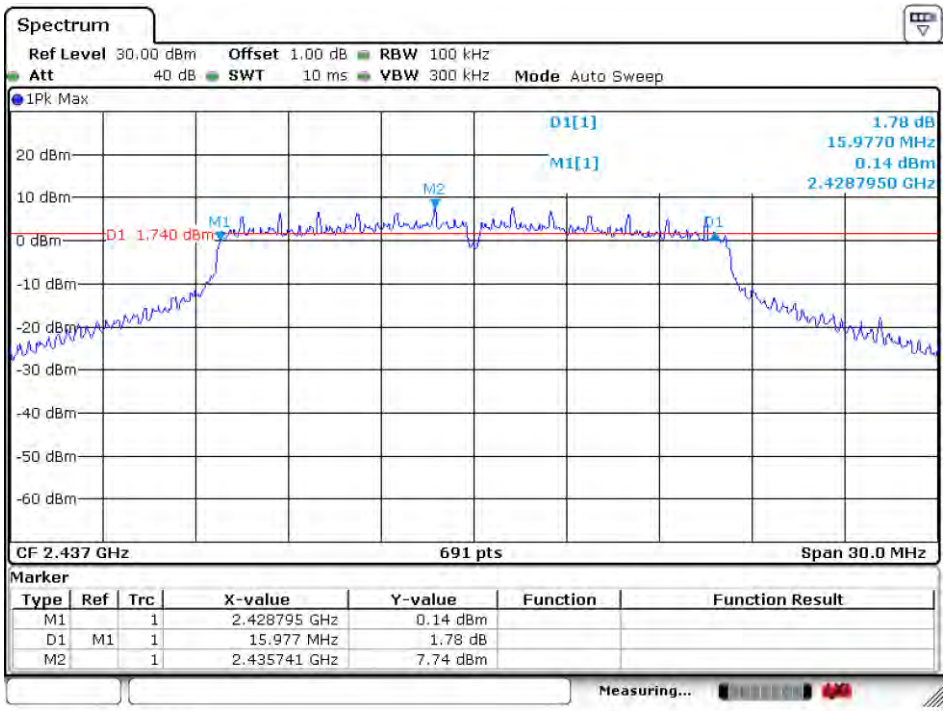

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4.5.2.1.6 802.11G_ Highest Channel

Date: 22.MAY.2020 03:04:11

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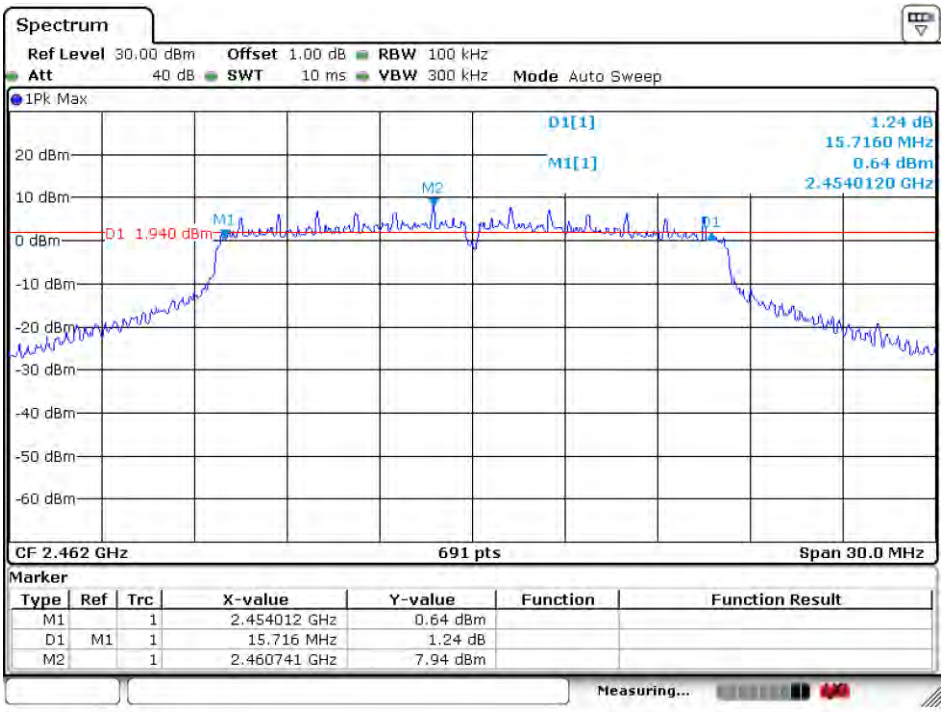
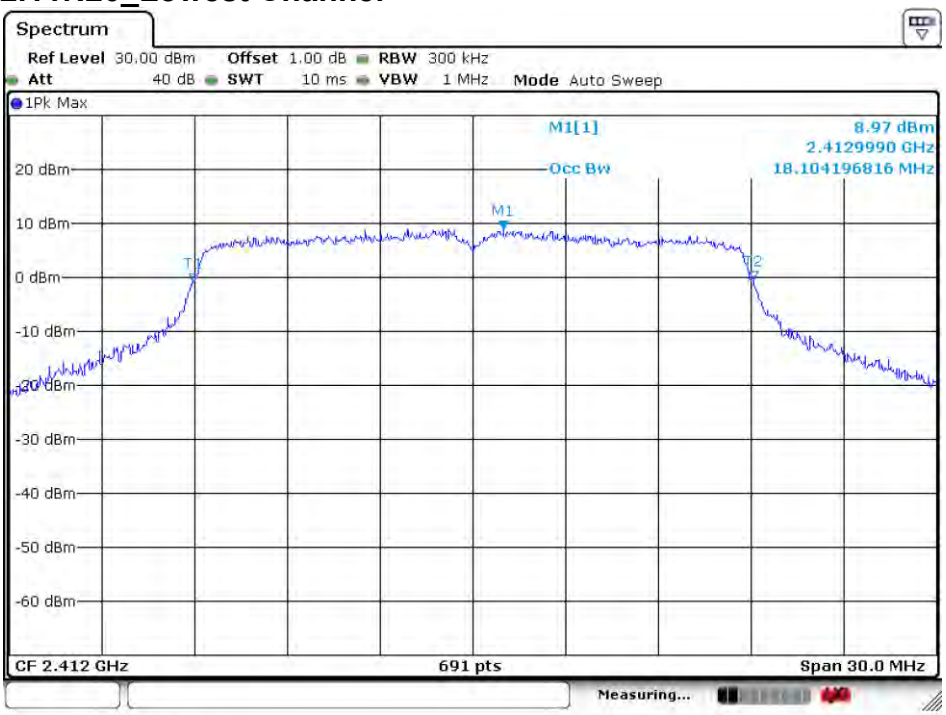


Date: 22.MAY.2020 02:47:27

4.5.2.1.7 802.11N20_Lowest Channel



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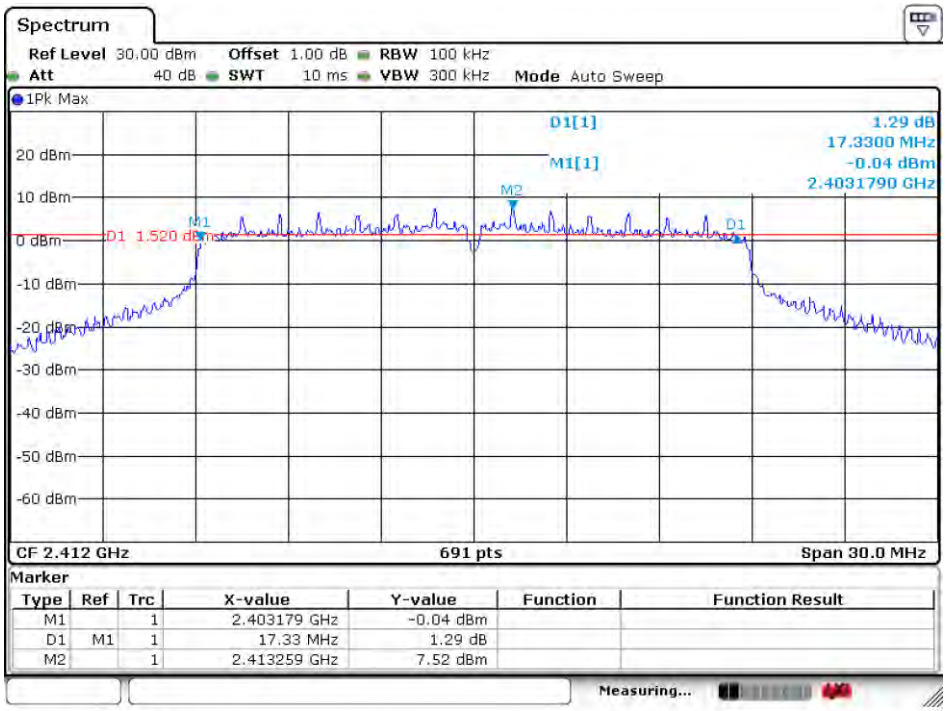
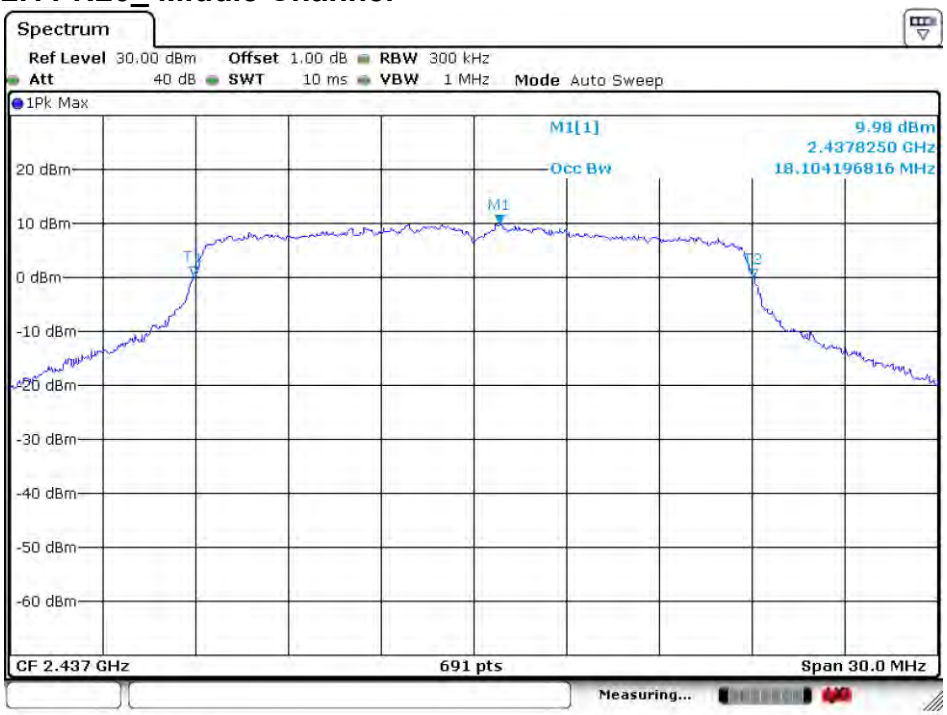


Date: 22.MAY.2020 02:41:49

4.5.2.1.8 802.11 N20_ Middle Channel



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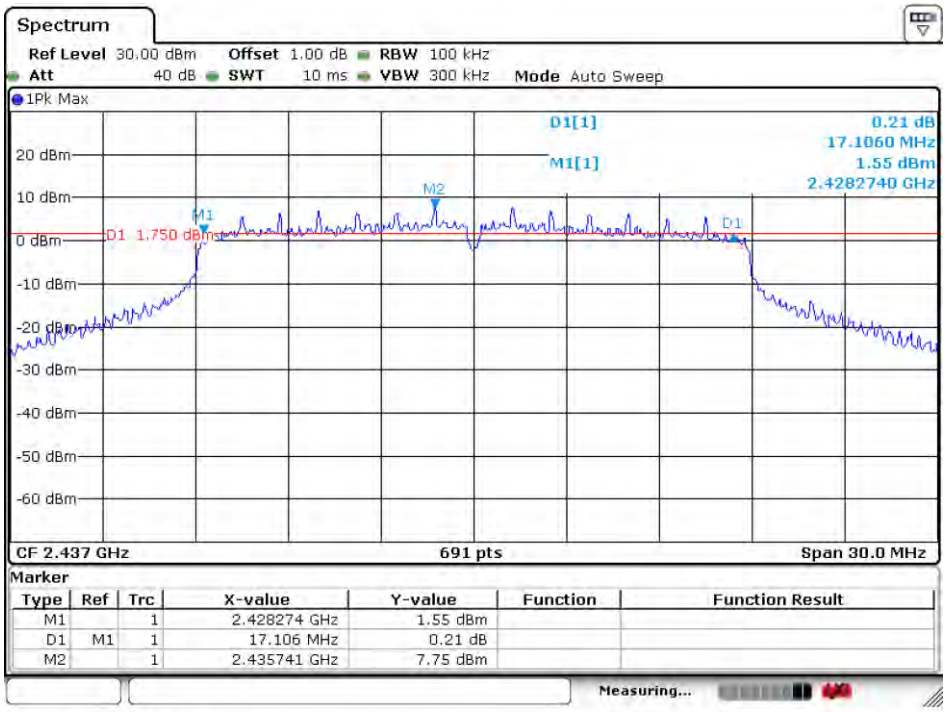
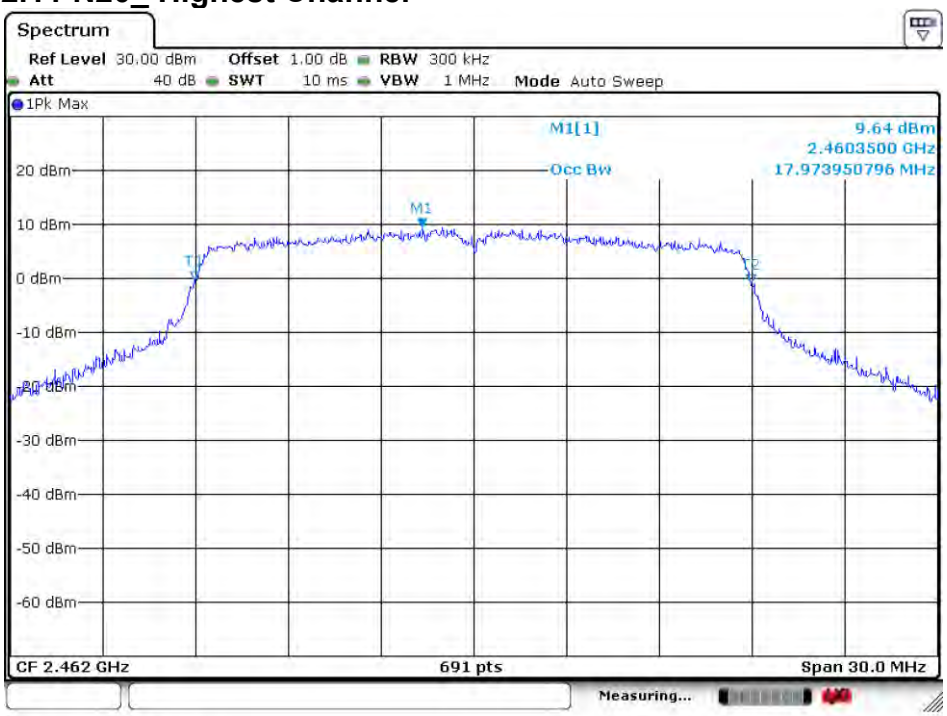


Date: 22.MAY.2020 02:44:44

4.5.2.1.9 802.11 N20_ Highest Channel



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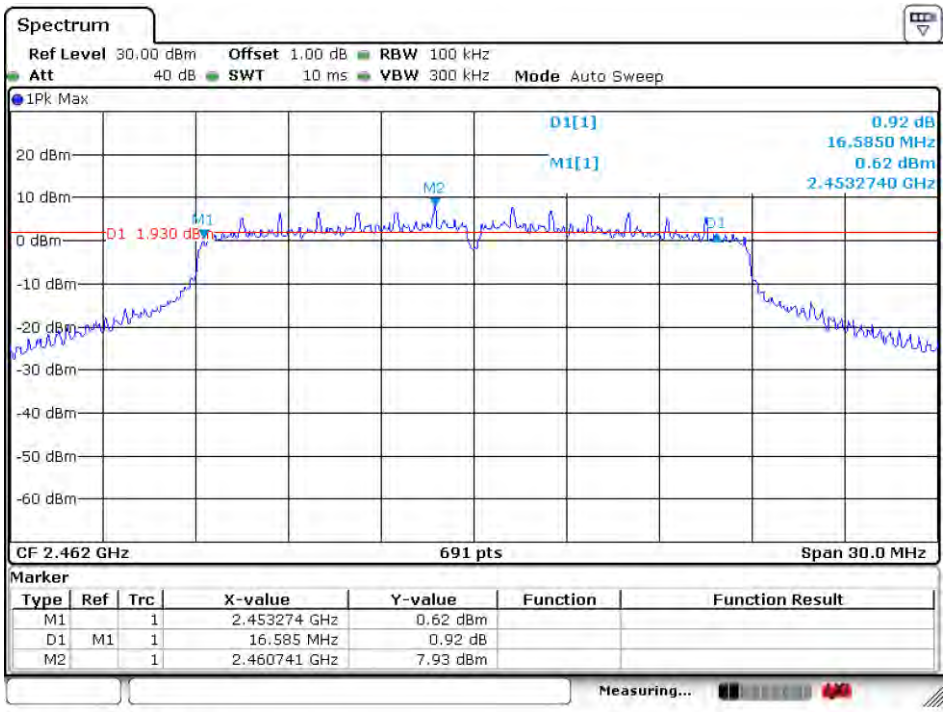

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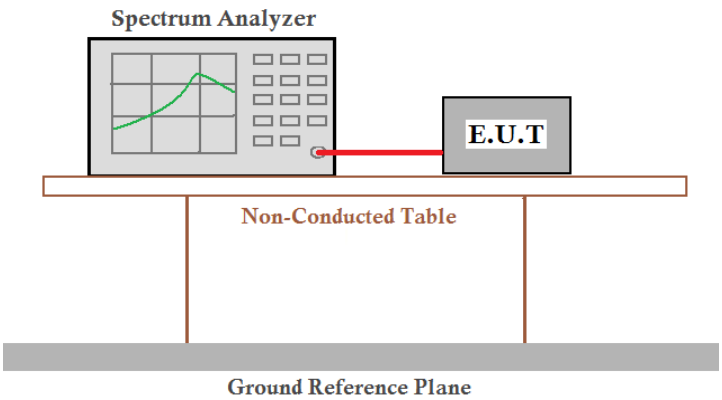
4.6 Power Spectral Density

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	-3.06	≤8.00	Pass
	Middle	-3.72	≤8.00	Pass
	Highest	-2.83	≤8.00	Pass
802.11G	Lowest	-7.78	≤8.00	Pass
	Middle	-7.74	≤8.00	Pass
	Highest	-7.37	≤8.00	Pass
802.11N20	Lowest	-7.53	≤8.00	Pass
	Middle	-7.70	≤8.00	Pass
	Highest	-8.01	≤8.00	Pass

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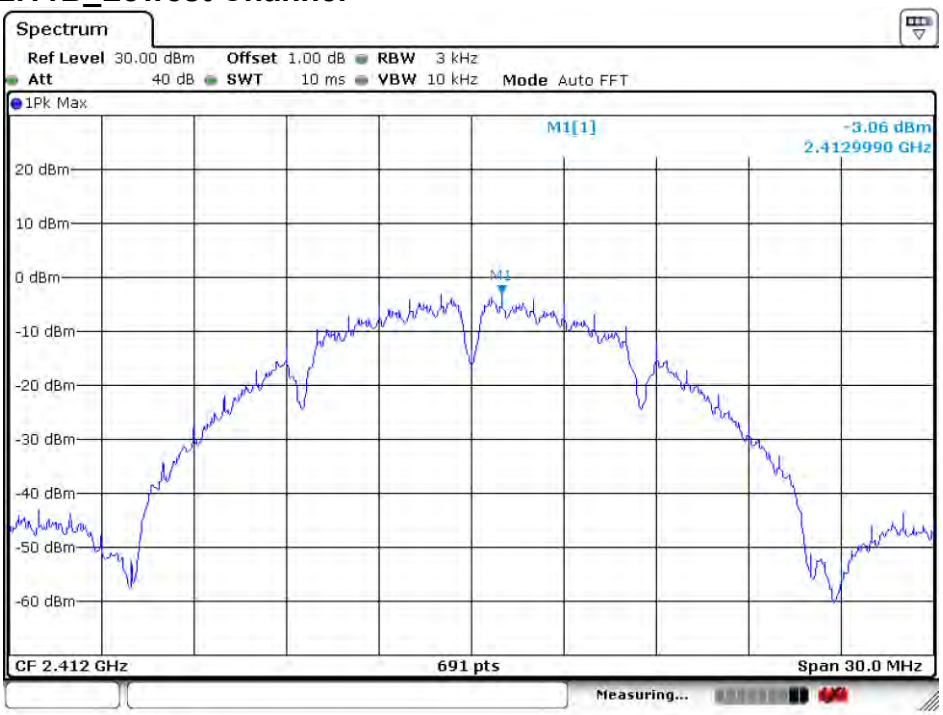
4.6.2 Test plots

4.6.2.1 ANT1

4.6.2.1.1 802.11B_Lowest Channel



Date: 22.MAY.2020 03:11:59

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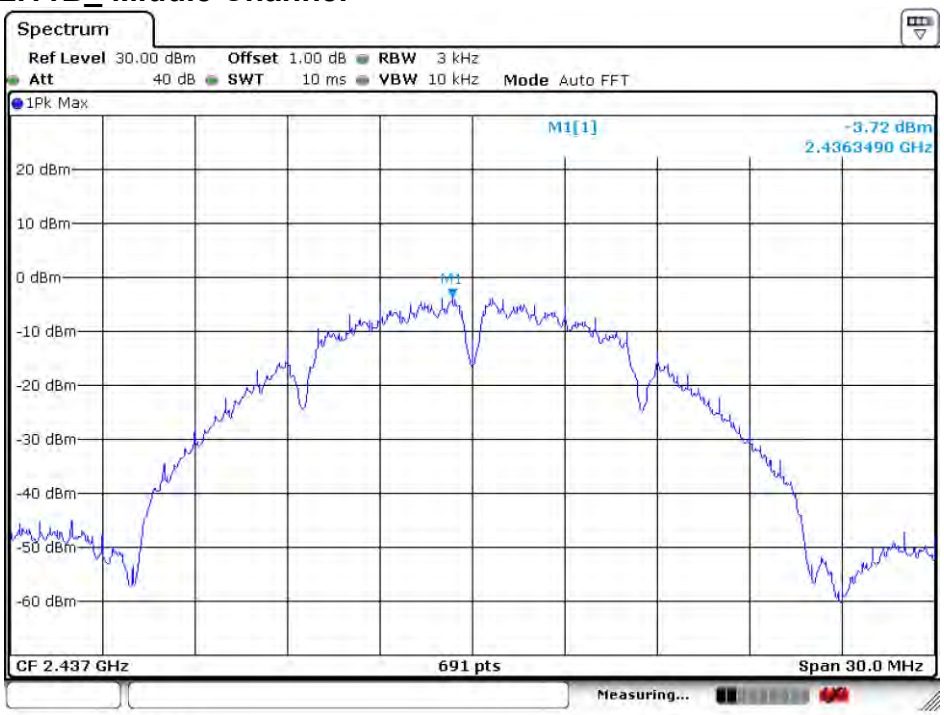
4.6.2.1.2 802.11B_ Middle Channel



Date: 22.MAY.2020 03:12:17

4.6.2.1.3 802.11B_ Highest Channel

Date: 22.MAY.2020 03:12:40

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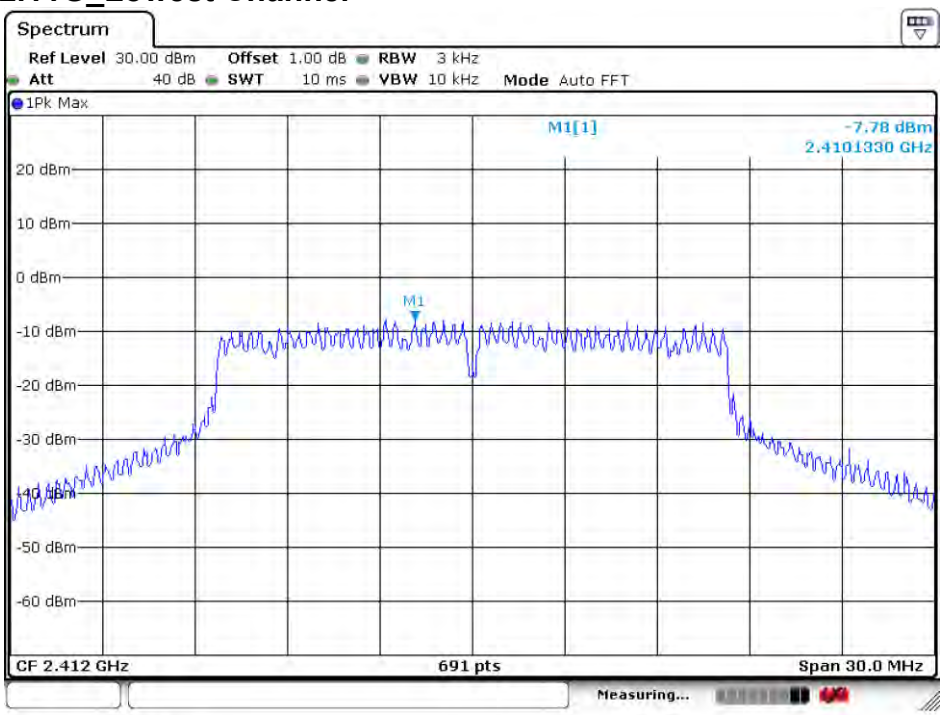
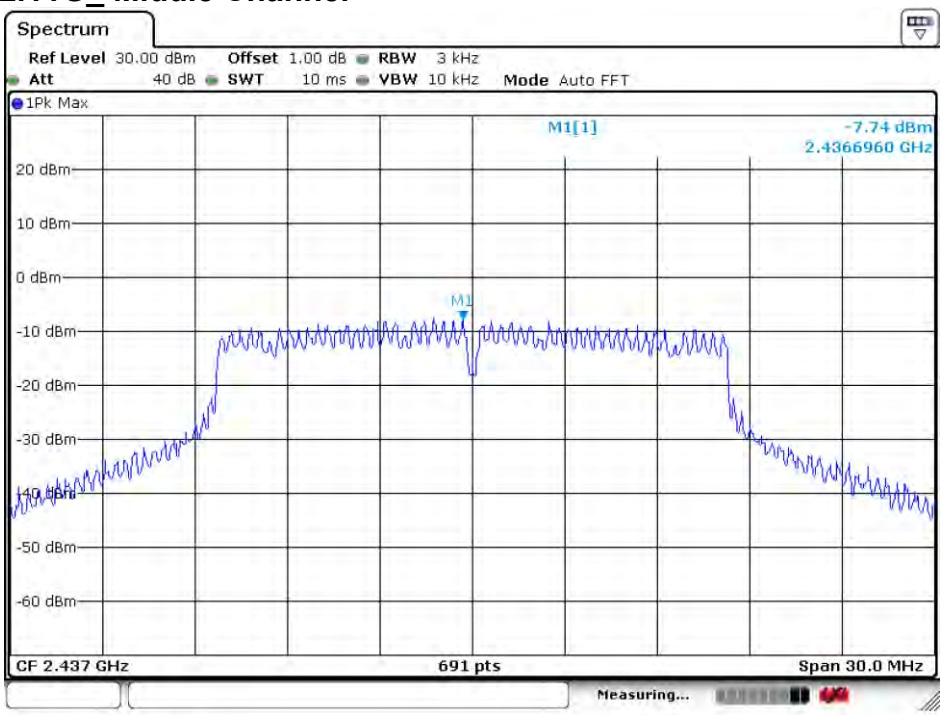
4.6.2.1.4 802.11G_Lowest Channel



Date: 22.MAY.2020 03:11:32

4.6.2.1.5 802.11G_ Middle Channel



Date: 22.MAY.2020 03:11:15

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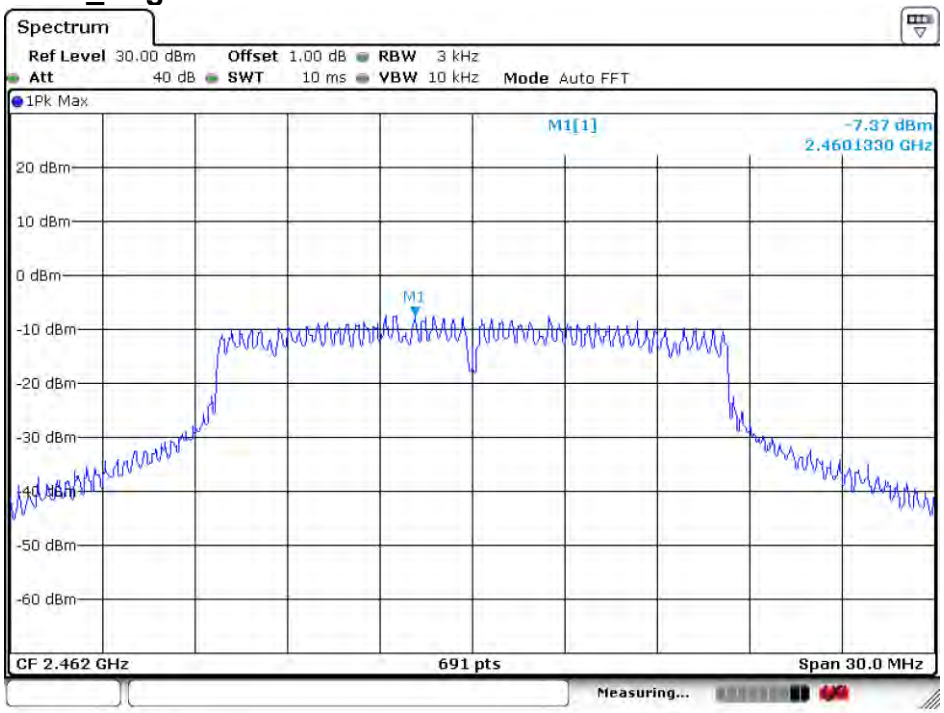
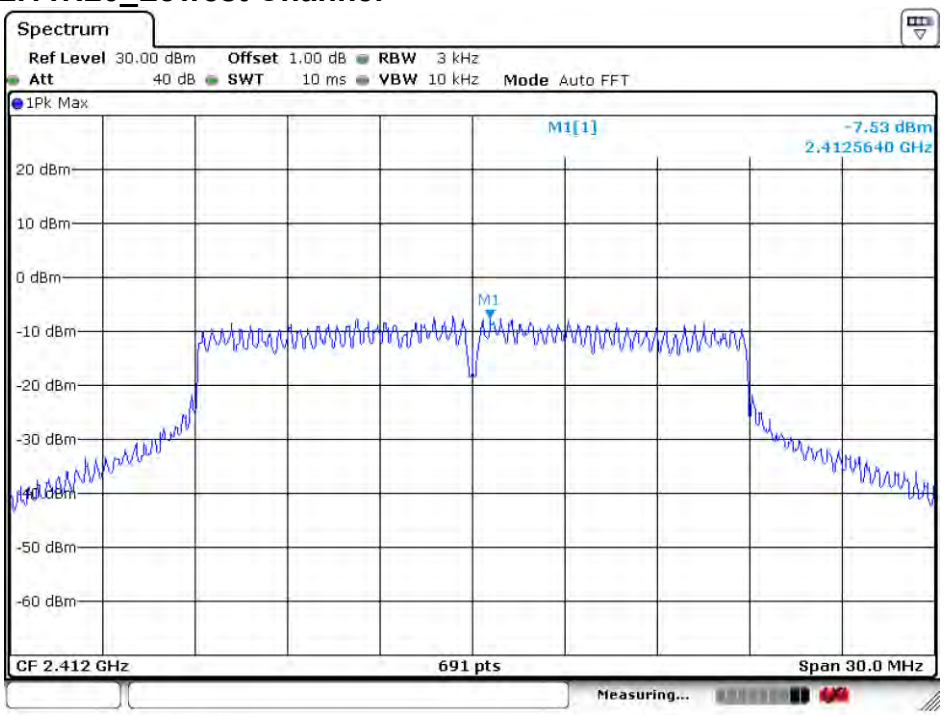
4.6.2.1.6 802.11G_ Highest Channel



Date: 22.MAY.2020 03:10:54

4.6.2.1.7 802.11N20_Lowest Channel



Date: 22.MAY.2020 03:09:20

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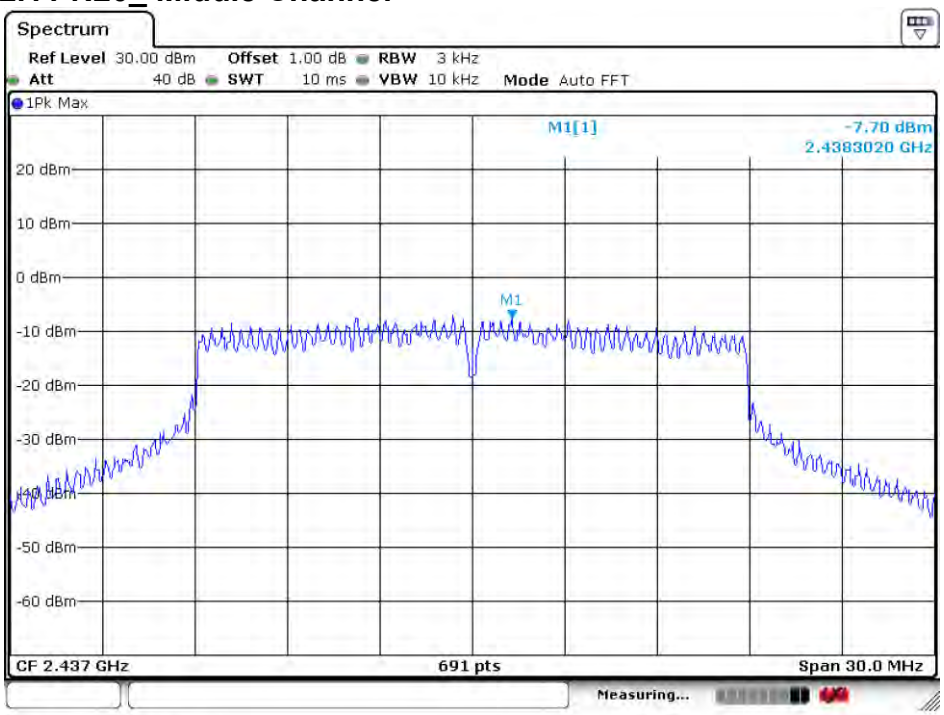
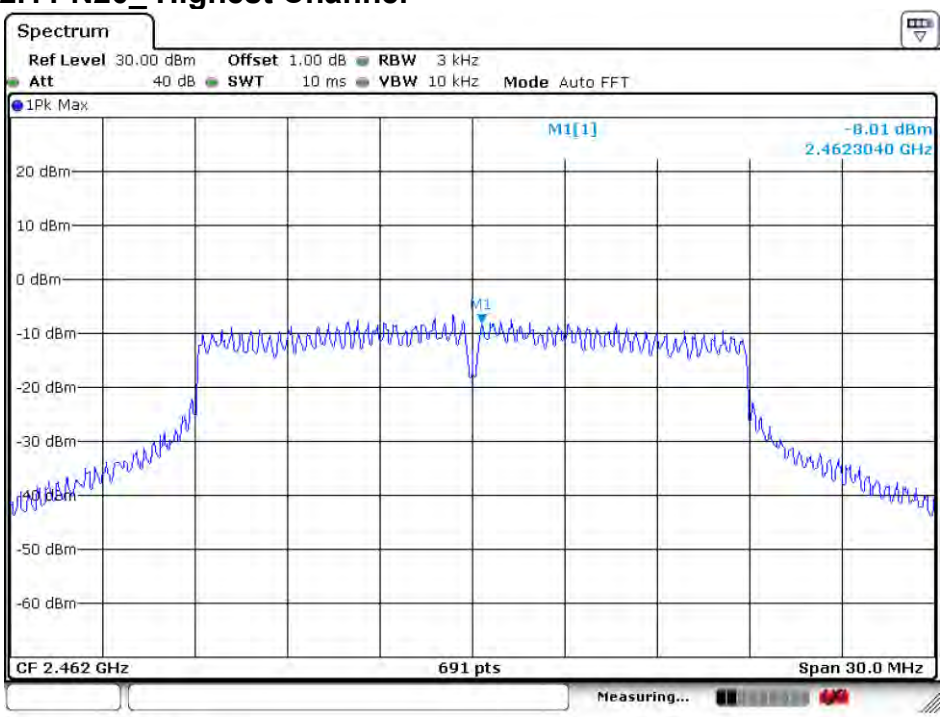
4.6.2.1.8 802.11 N20_ Middle Channel



Date: 22.MAY.2020 03:09:44

4.6.2.1.9 802.11 N20_ Highest Channel



Date: 22.MAY.2020 03:10:26

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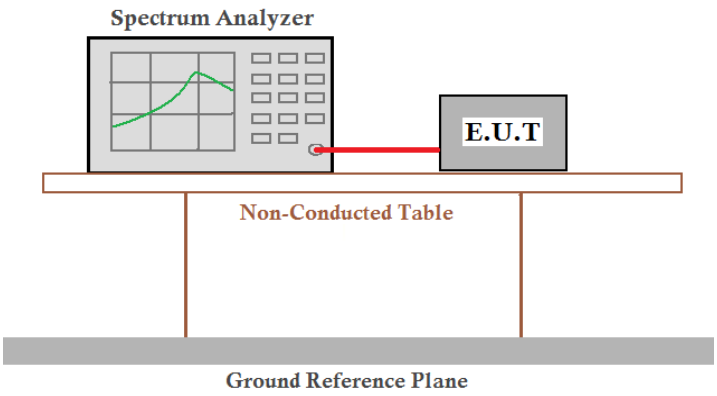
4.7 Band-edge for RF Conducted Emissions

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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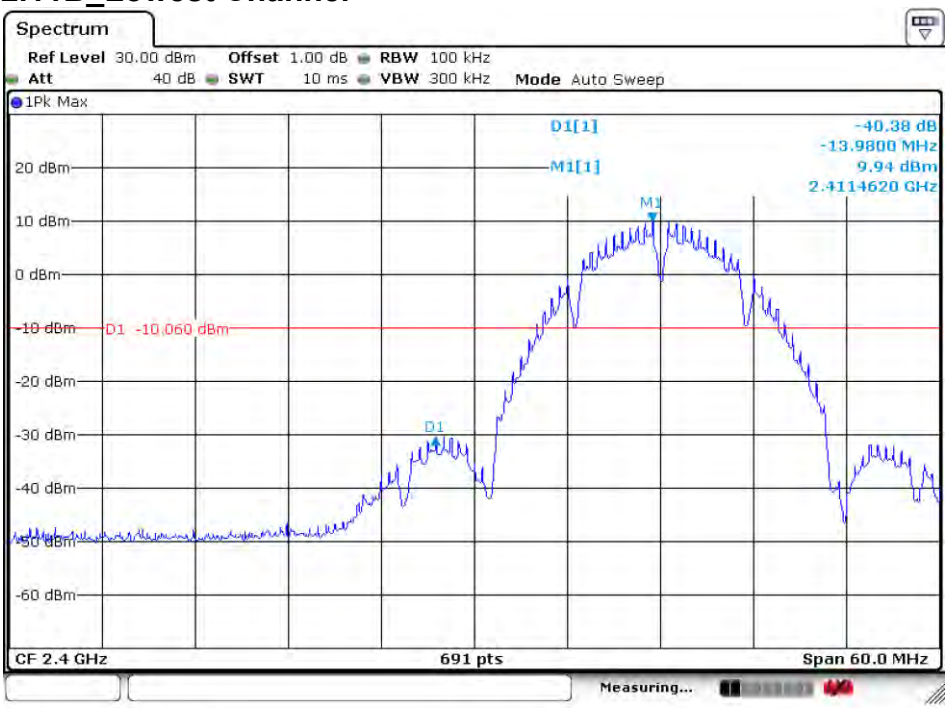
4.7.1 Test plots

4.7.1.1 ANT1

4.7.1.1.1 802.11B_Lowest Channel



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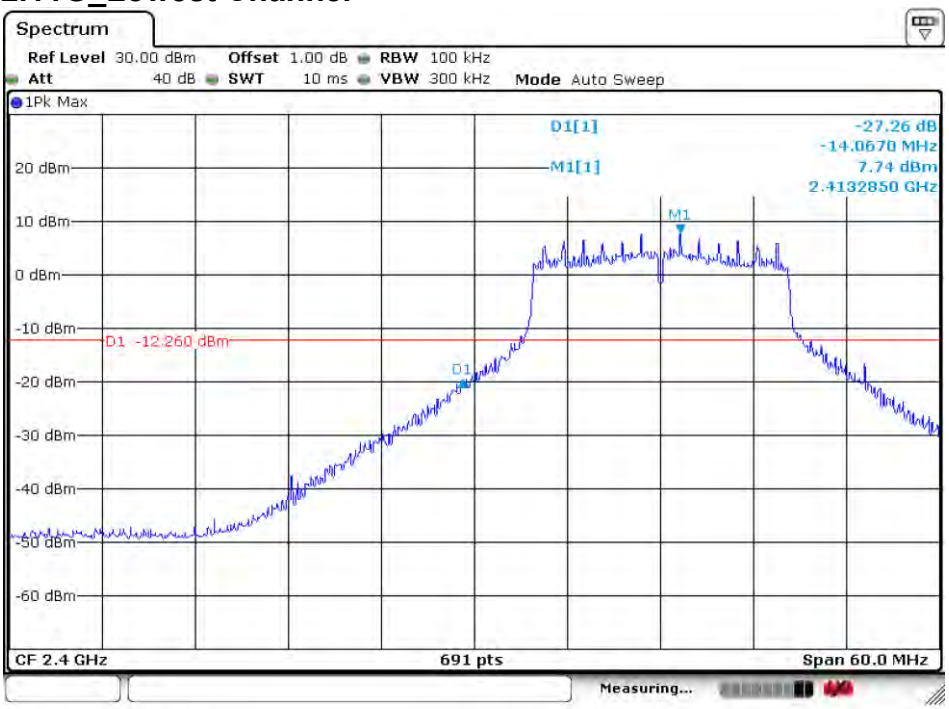
4.7.1.1.2 802.11B_ Highest Channel

Date: 22.MAY.2020 03:13:10

4.7.1.1.3 802.11G_Lowest Channel



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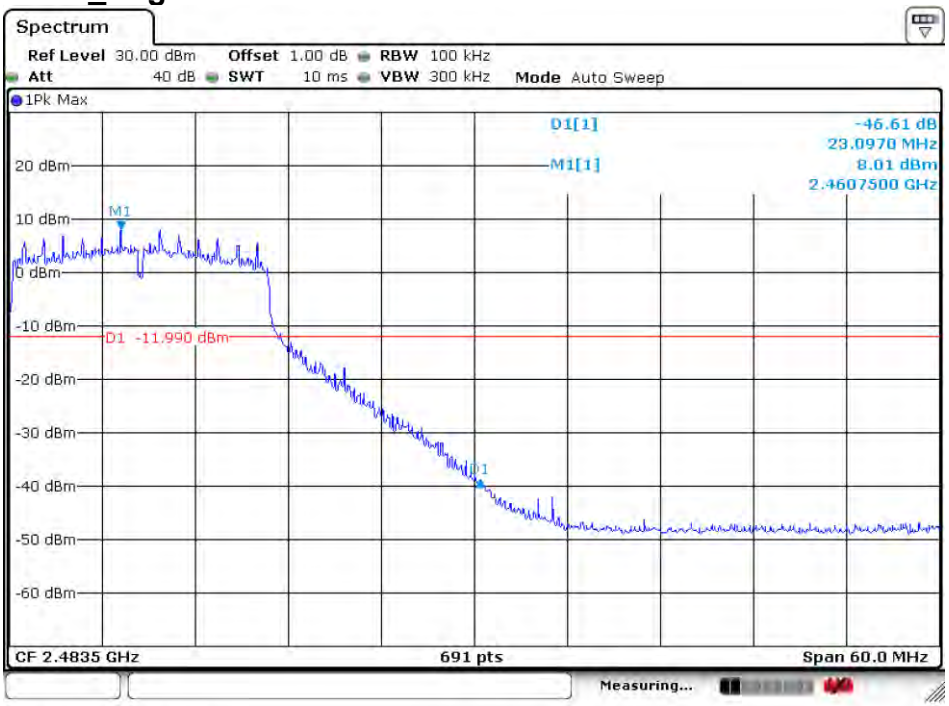
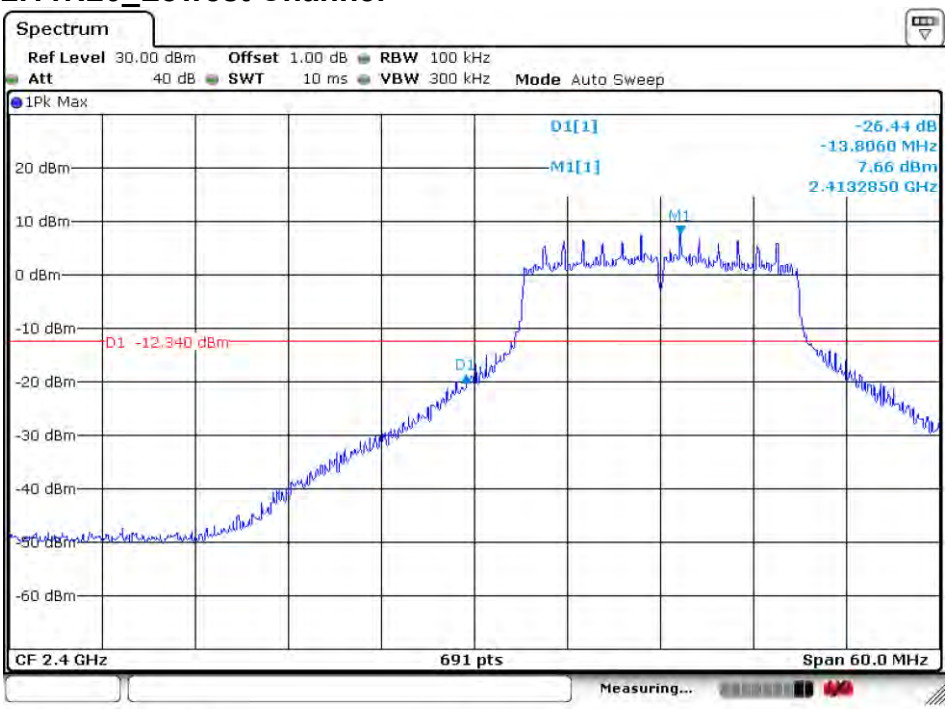
4.7.1.1.4 802.11G_ Highest Channel



Date: 22.MAY.2020 03:19:54

4.7.1.1.5 802.11N20_Lowest Channel



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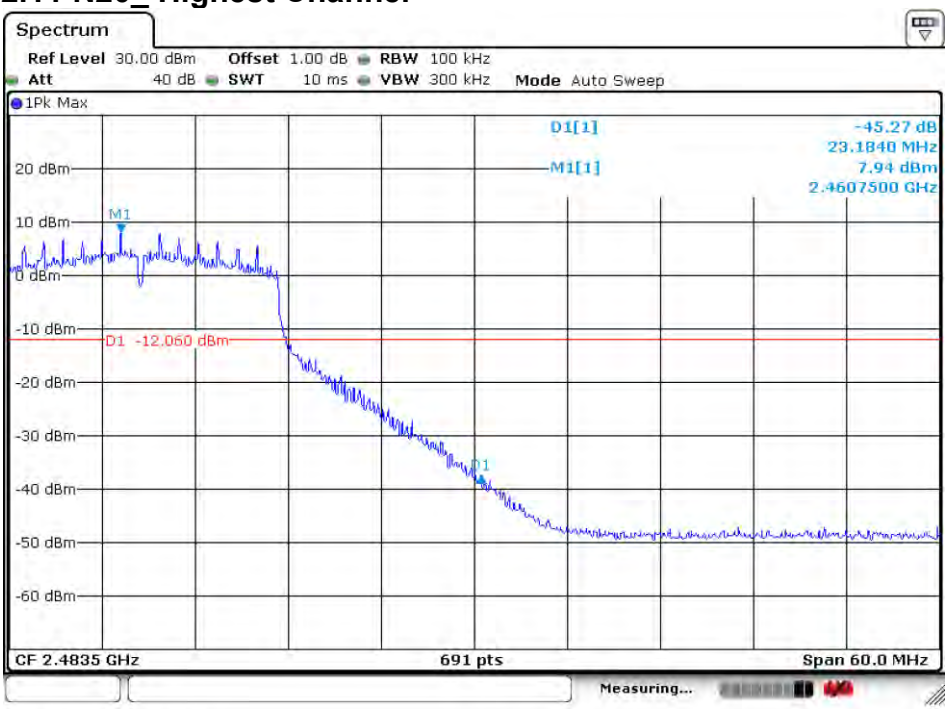
4.7.1.1.6 802.11 N20_ Highest Channel



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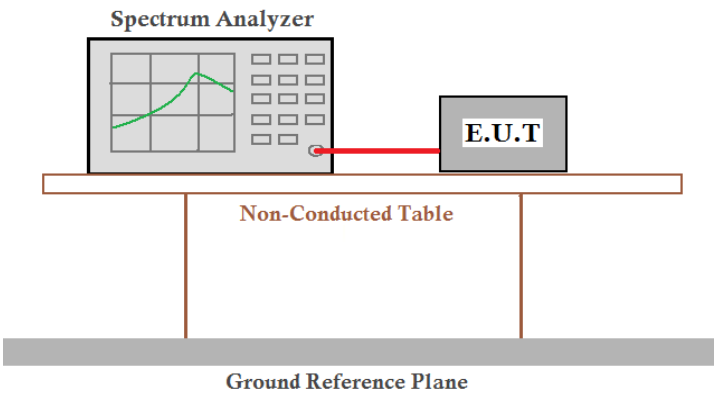
4.8 RF Conducted Spurious Emissions

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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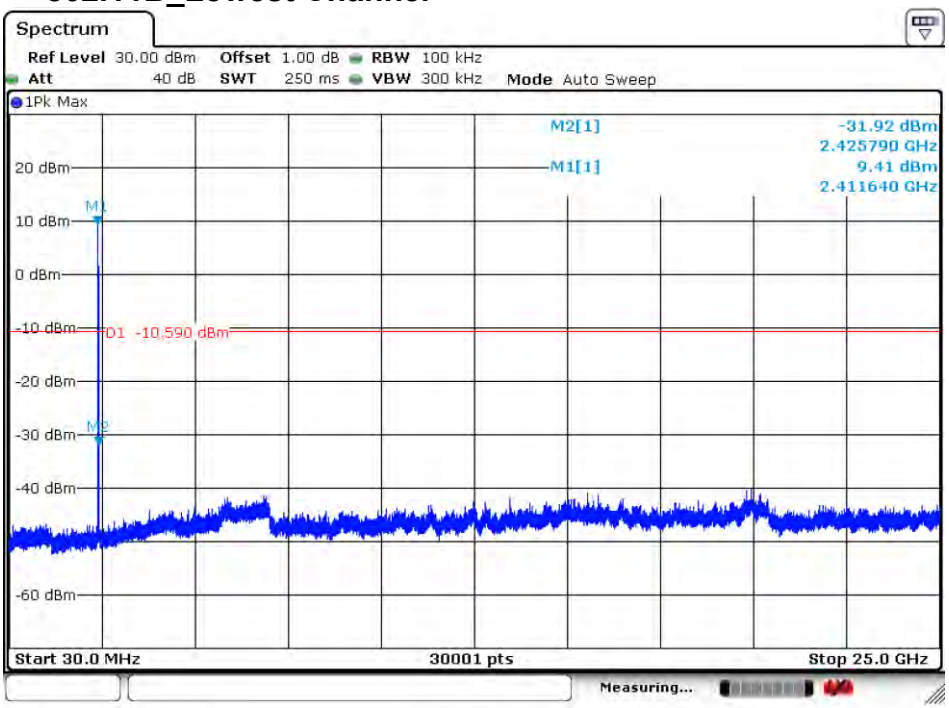
4.8.1 Test plots

4.8.1.1 ANT1

4.8.1.1.1 802.11B_Lowest Channel



Date: 22.MAY.2020 03:39:59

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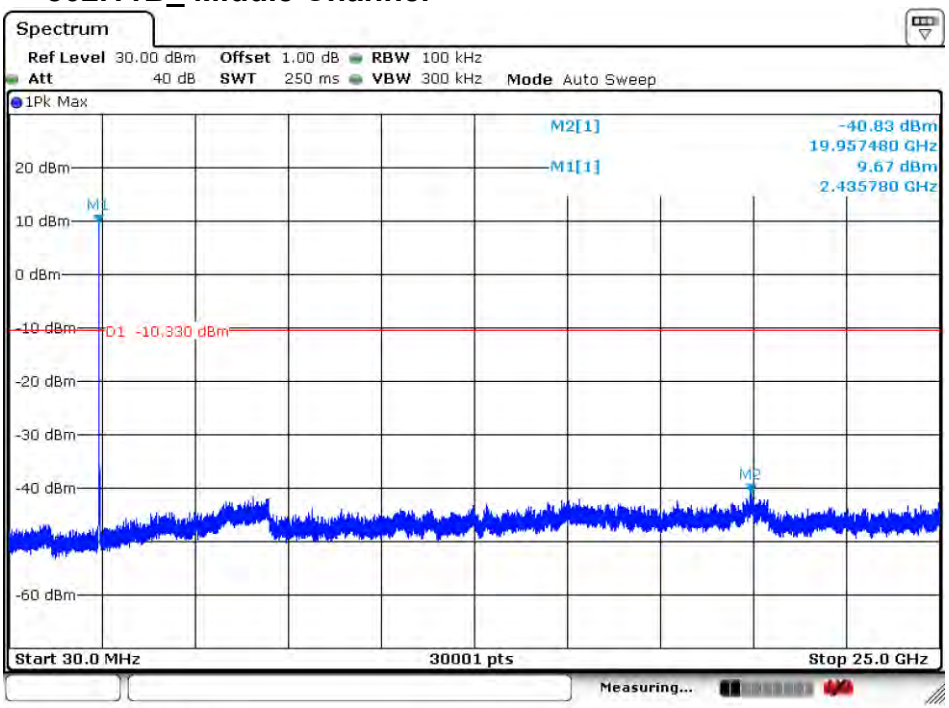
4.8.1.1.2 802.11B_ Middle Channel



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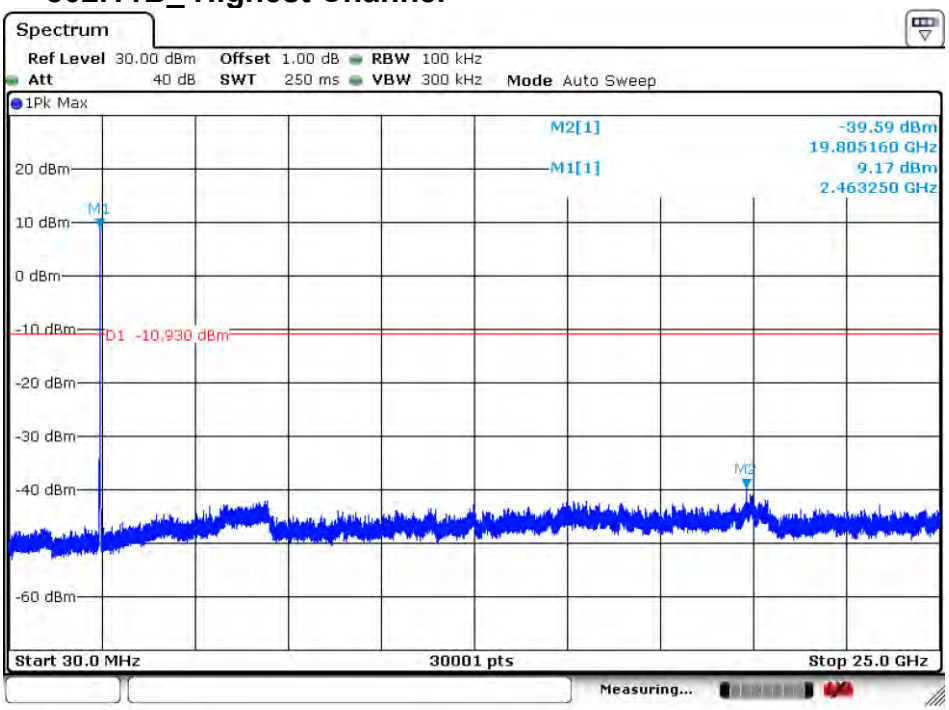
4.8.1.1.3 802.11B_ Highest Channel



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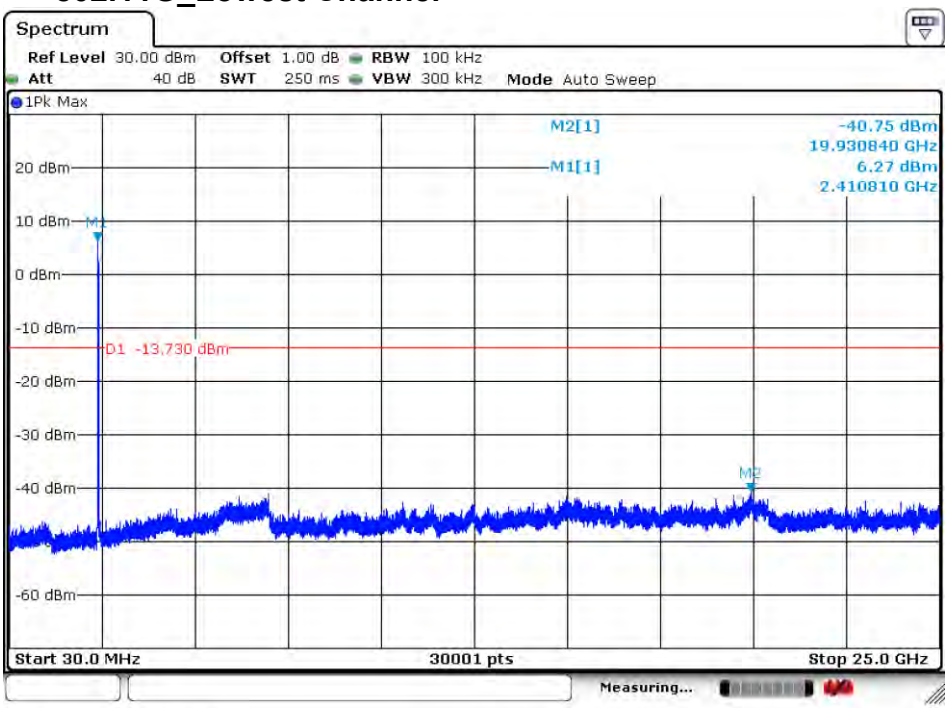
4.8.1.1.4 802.11G_Lowest Channel



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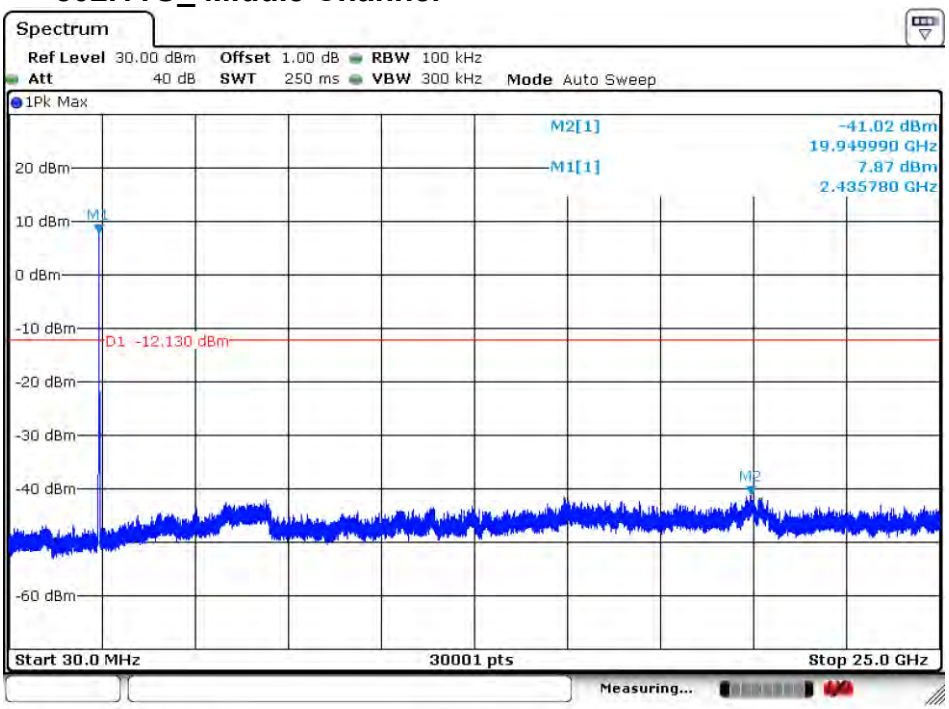
4.8.1.1.5 802.11G_ Middle Channel



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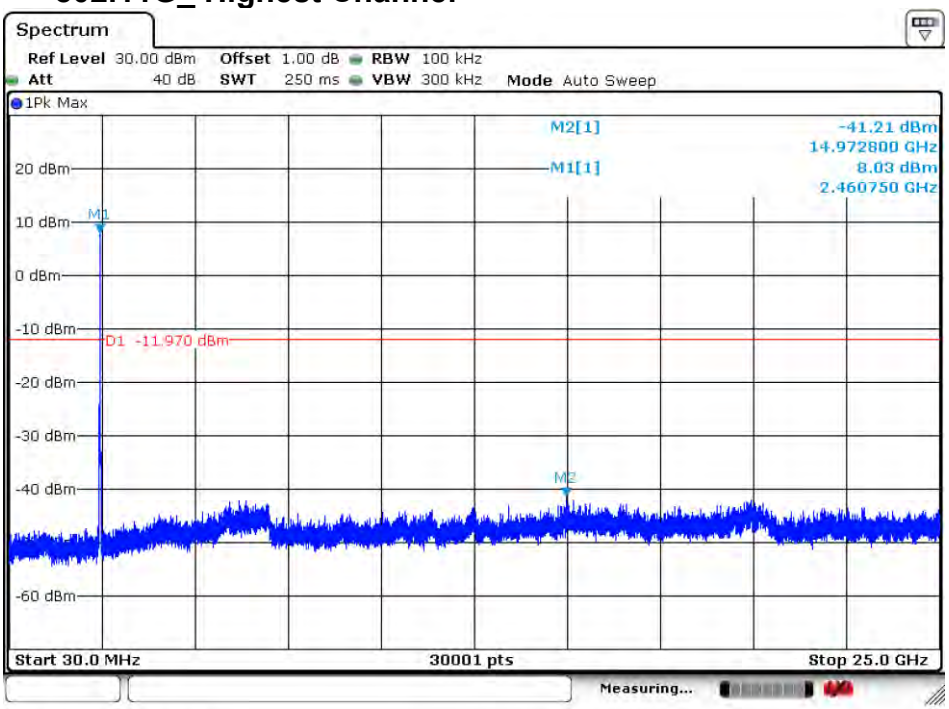
4.8.1.1.6 802.11G_ Highest Channel



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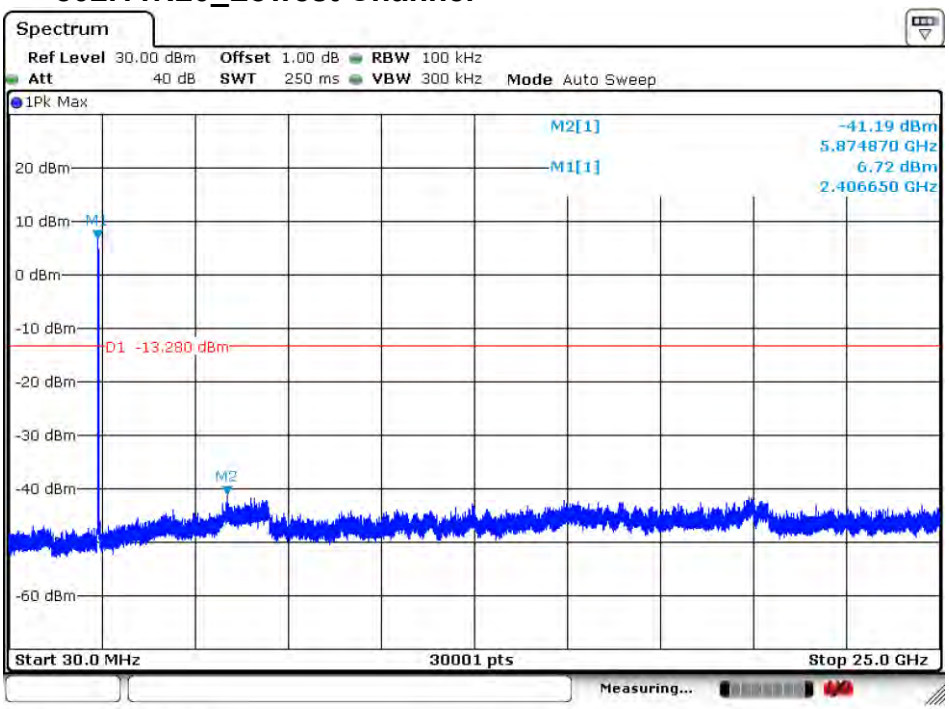
4.8.1.1.7 802.11N20_Lowest Channel



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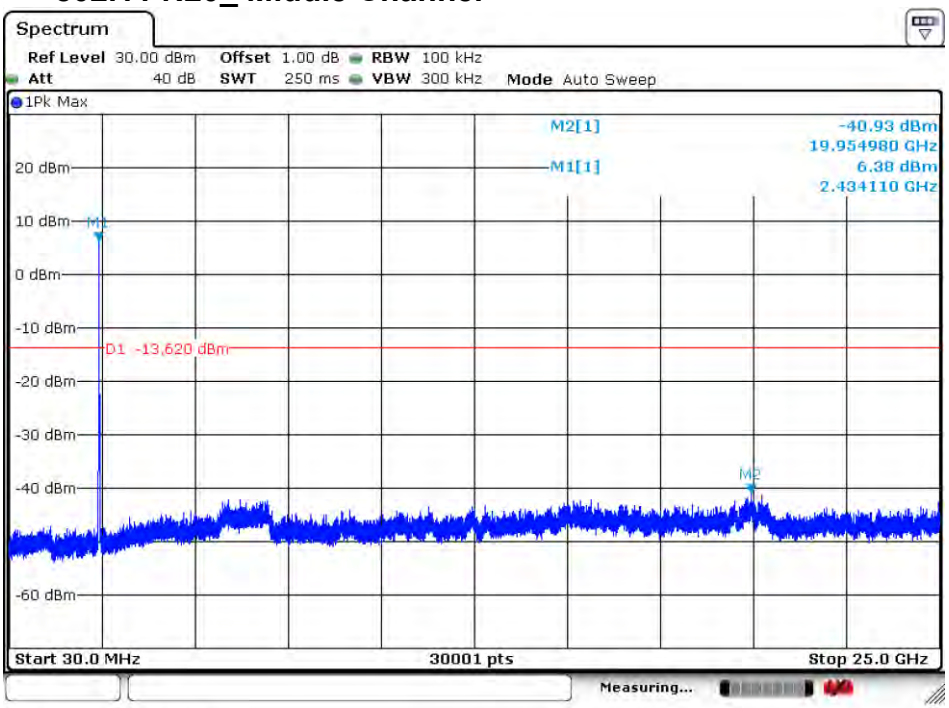
4.8.1.1.8 802.11 N20_ Middle Channel



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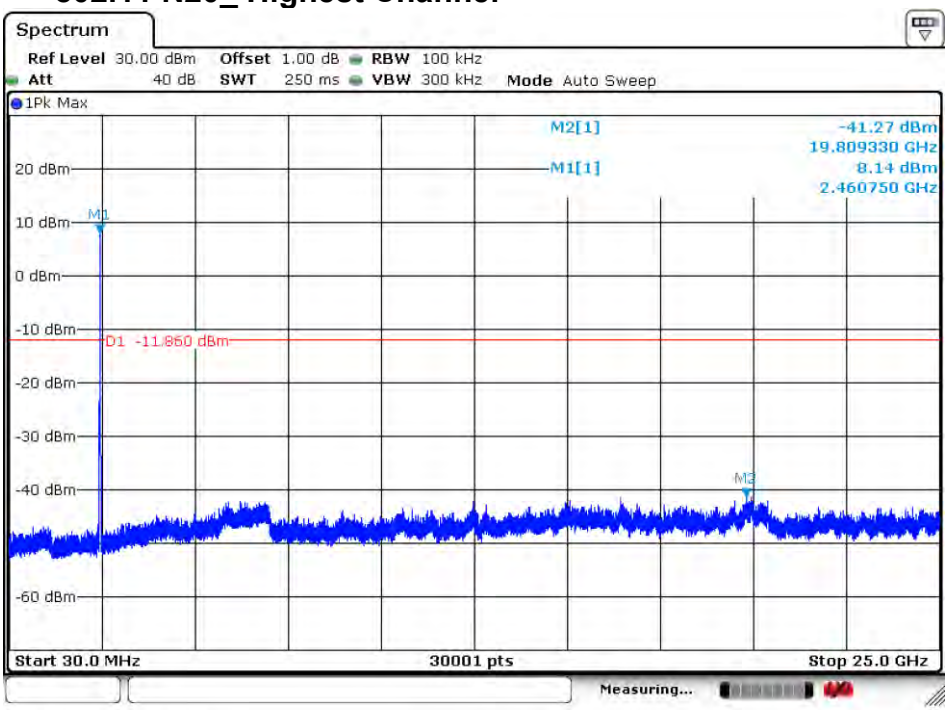
4.8.1.1.9 802.11 N20_ Highest Channel



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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 (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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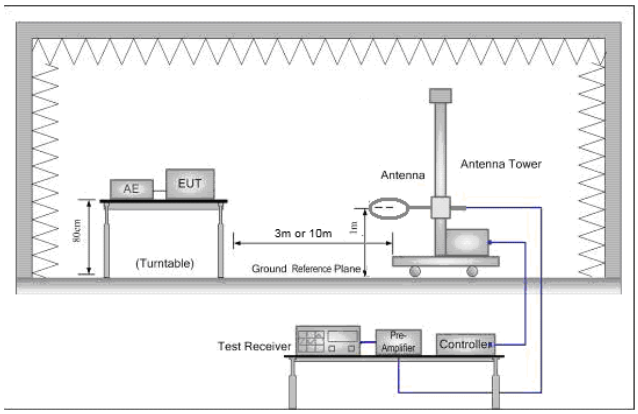

Figure 1. Below 30MHz

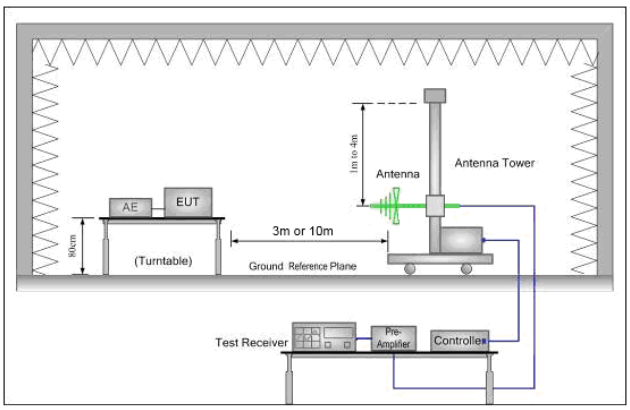

Figure 2. 30MHz to 1GHz

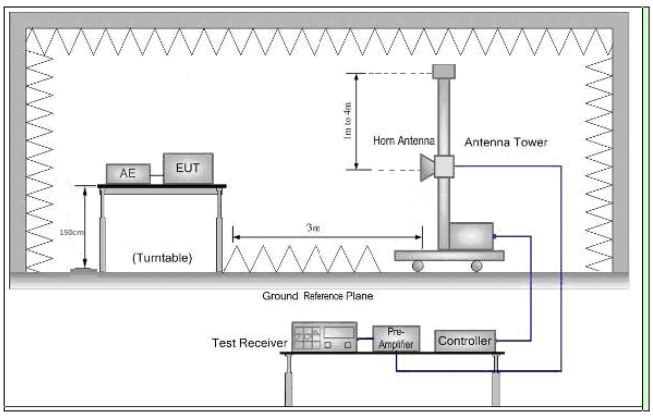

Figure 3. Above 1 GHz

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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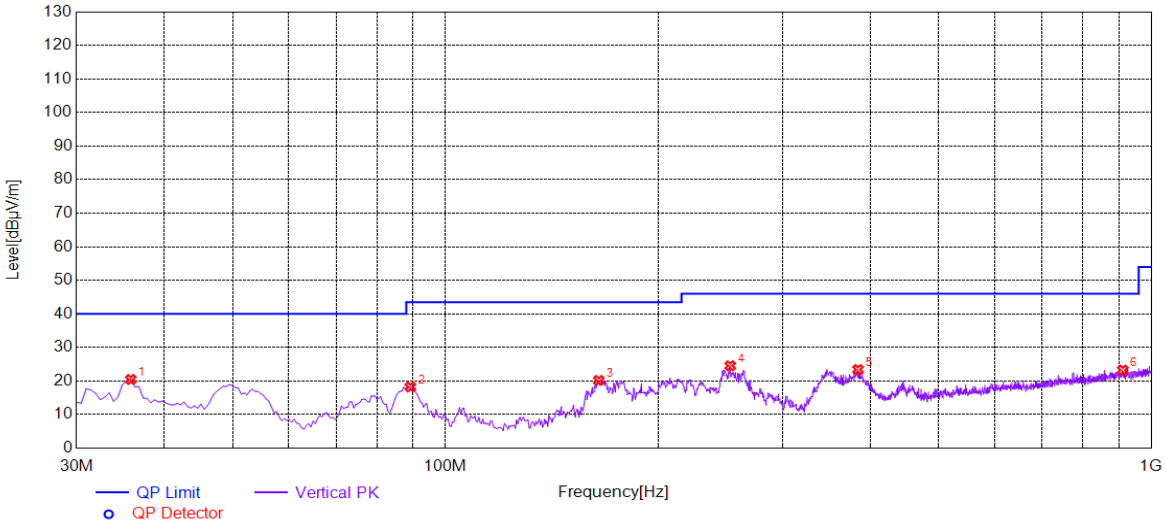
4.9.1 Radiated emission below 1GHz

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	35.8229	20.47	-32.50	40.00	19.53	232	290	Vertical
2	89.1996	18.24	-33.62	43.50	25.26	163	56	Vertical
3	164.897	20.20	-33.96	43.50	23.30	273	360	Vertical
4	253.211	24.56	-29.16	46.00	21.44	165	360	Vertical
5	384.227	23.45	-25.39	46.00	22.55	217	314	Vertical
6	911.200	23.28	-15.06	46.00	22.72	189	224	Vertical

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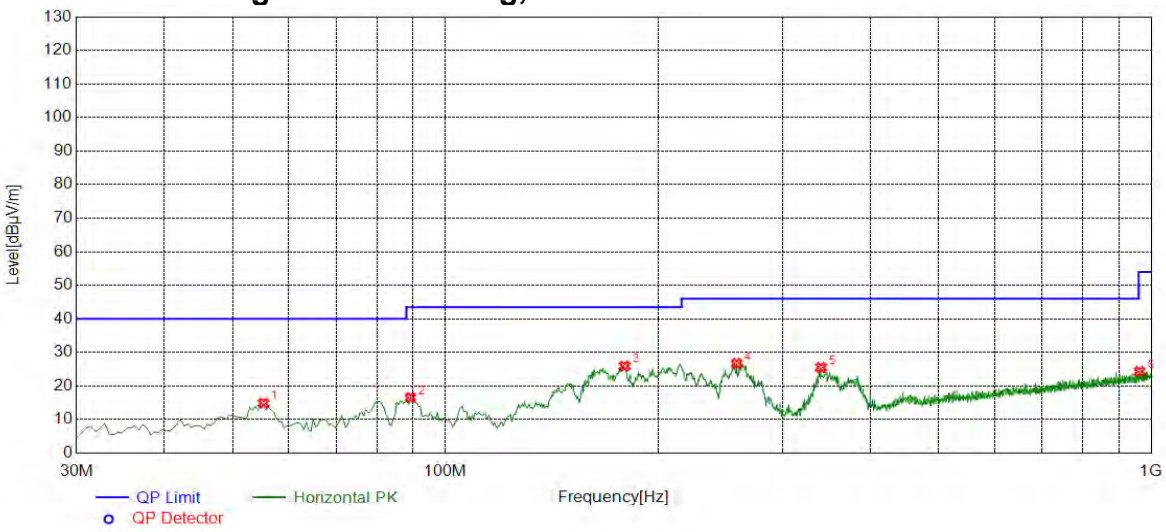
4.9.1.2 Charge + Transmitting, Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	55.2326	14.88	-30.96	40.00	25.12	109	192	Horizontal
2	89.1996	16.58	-33.62	43.50	26.92	182	246	Horizontal
3	179.454	25.95	-32.95	43.50	17.55	215	270	Horizontal
4	258.549	26.73	-28.99	46.00	19.27	201	110	Horizontal
5	340.555	25.50	-26.70	46.00	20.50	160	131	Horizontal
6	962.636	24.34	-14.32	54.00	29.66	136	64	Horizontal

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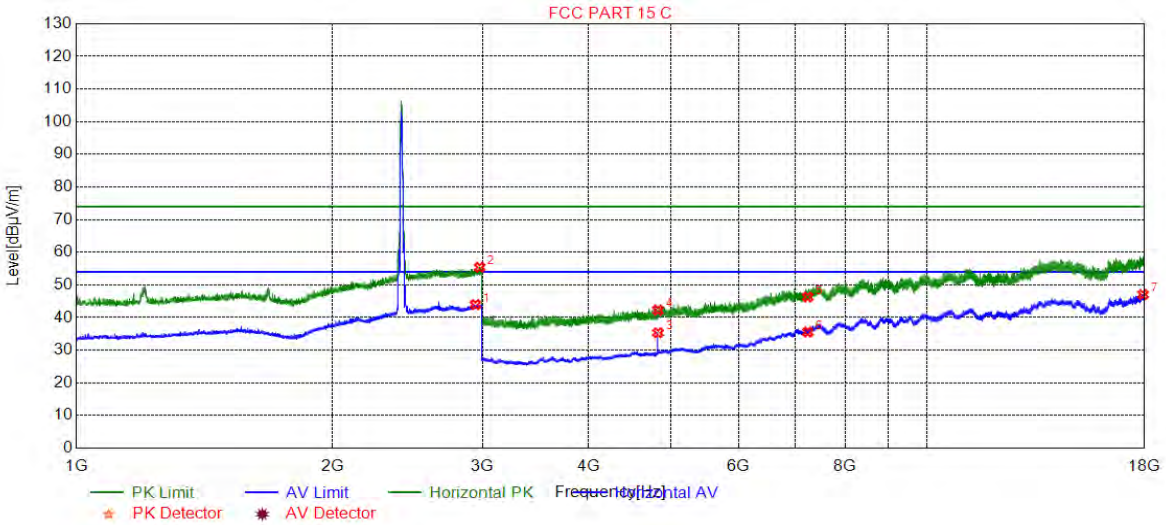
4.9.2 Transmitter emission above 1GHz

4.9.2.1 ANT1

4.9.2.1.1 802.11B_Lowest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2943.98	43.97	9.62	54.00	10.03	184	182	Horizontal
2	2978.49	55.41	9.55	74.00	18.59	135	121	Horizontal
3	4824.00	35.37	-18.21	54.00	18.63	237	313	Horizontal
4	4824.00	42.27	-18.21	74.00	31.73	193	313	Horizontal
5	7236.00	46.29	-9.99	74.00	27.71	196	296	Horizontal
6	7236.00	35.59	-9.99	54.00	18.41	143	31	Horizontal
7	17922.4	47.06	0.70	54.00	6.94	141	347	Horizontal

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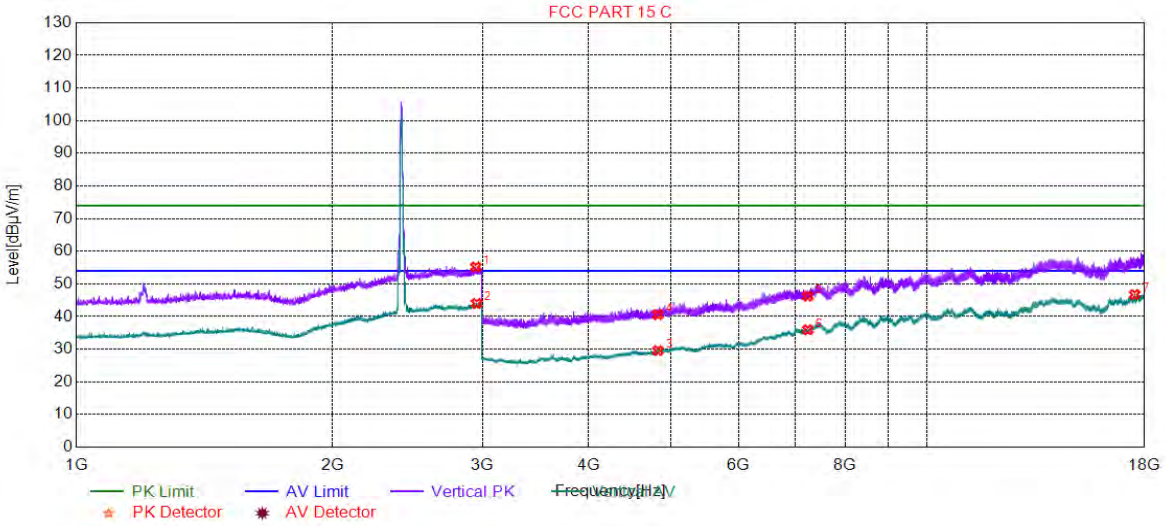
4.9.2.1.2 802.11B_Lowest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2947.48	55.21	9.65	74.00	18.79	177	36	Vertical
2	2952.98	44.05	9.67	54.00	9.95	230	359	Vertical
3	4824.00	29.58	-18.21	54.00	24.42	227	91	Vertical
4	4824.00	40.60	-18.21	74.00	33.40	156	222	Vertical
5	7236.00	46.28	-9.99	74.00	27.72	267	139	Vertical
6	7236.00	35.96	-9.99	54.00	18.04	218	360	Vertical
7	17525.3	46.78	1.02	54.00	7.22	273	213	Vertical

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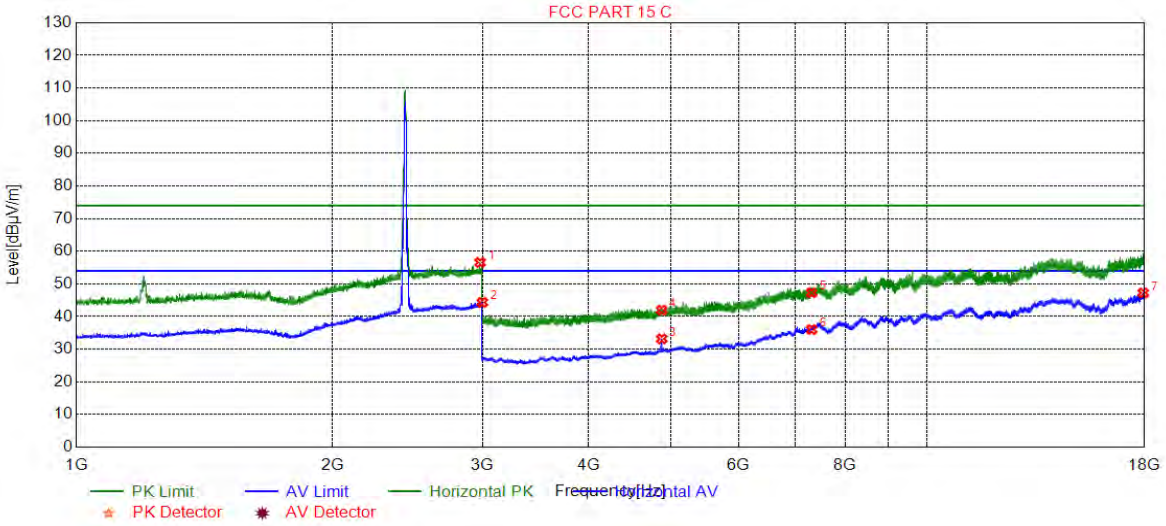
4.9.2.1.3 802.11B_ Middle Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2981.99	56.58	9.53	74.00	17.42	126	0	Horizontal
2	2999.49	44.35	9.45	54.00	9.65	187	195	Horizontal
3	4874.00	33.19	-17.99	54.00	20.81	207	325	Horizontal
4	4874.00	42.00	-17.99	74.00	32.00	197	294	Horizontal
5	7311.00	47.30	-9.74	74.00	26.70	210	88	Horizontal
6	7311.00	36.04	-9.74	54.00	17.96	174	40	Horizontal
7	17930.6	47.25	0.70	54.00	6.75	232	196	Horizontal

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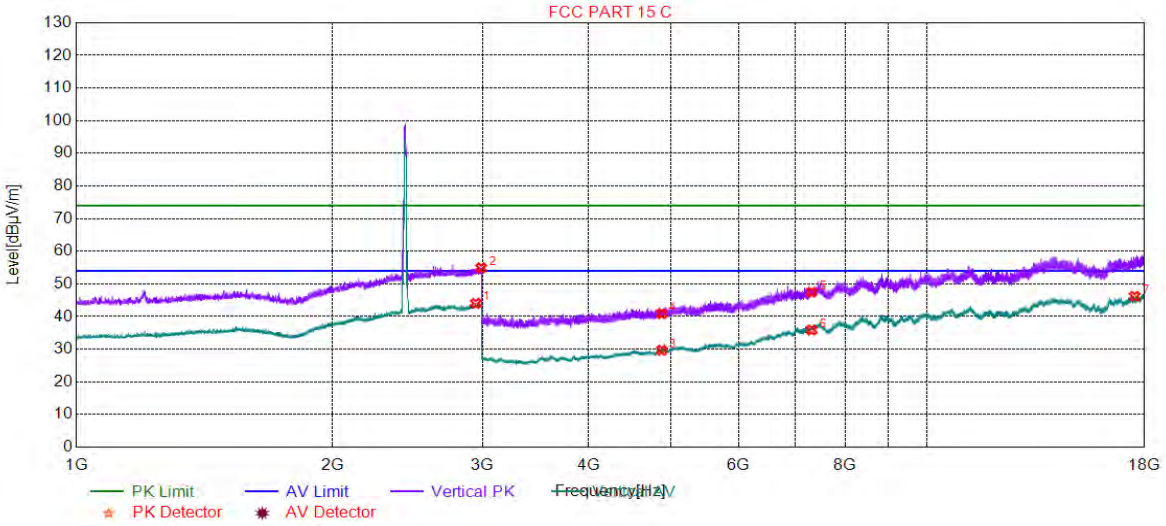
4.9.2.1.4 802.11B_ Middle Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2946.98	44.08	9.65	54.00	9.92	229	120	Vertical
2	2989.99	54.94	9.50	74.00	19.06	205	360	Vertical
3	4874.00	29.68	-17.99	54.00	24.32	292	16	Vertical
4	4874.00	40.88	-17.99	74.00	33.12	158	104	Vertical
5	7311.00	47.48	-9.74	74.00	26.52	188	231	Vertical
6	7311.00	35.88	-9.74	54.00	18.12	288	27	Vertical
7	17519.2	46.22	1.00	54.00	7.78	278	231	Vertical

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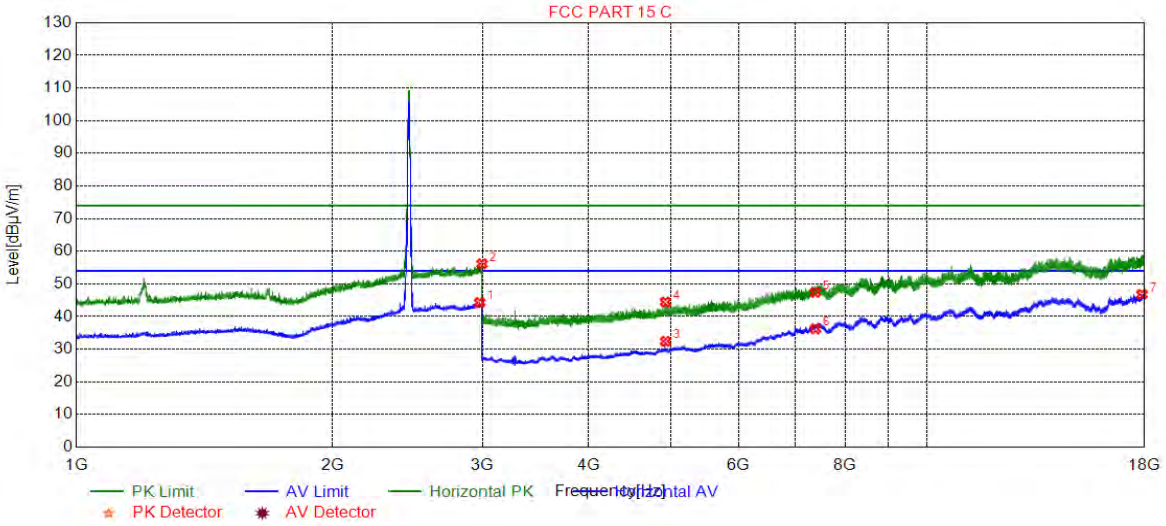
4.9.2.1.5 802.11B_ Highest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2978.99	44.32	9.55	54.00	9.68	148	117	Horizontal
2	2997.49	56.16	9.46	74.00	17.84	225	262	Horizontal
3	4924.00	32.42	-17.72	54.00	21.58	138	334	Horizontal
4	4924.00	44.46	-17.72	74.00	29.54	242	302	Horizontal
5	7386.00	47.43	-9.55	74.00	26.57	122	119	Horizontal
6	7386.00	36.26	-9.55	54.00	17.74	160	70	Horizontal
7	17872.9	46.82	0.33	54.00	7.18	112	70	Horizontal

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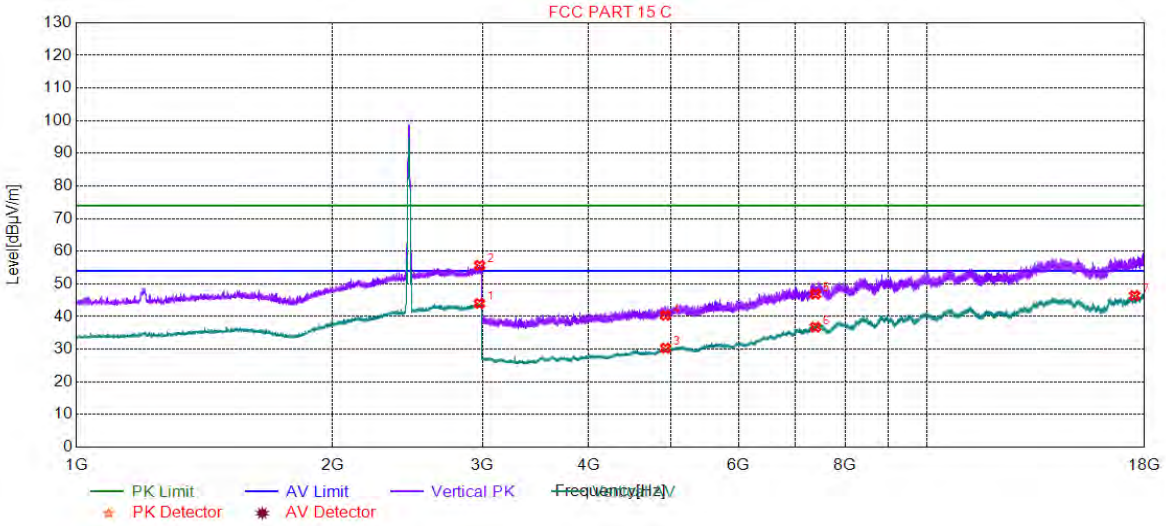
4.9.2.1.6 802.11B_ Highest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2975.49	44.02	9.56	54.00	9.98	192	360	Vertical
2	2978.49	55.70	9.55	74.00	18.30	296	142	Vertical
3	4924.00	30.35	-17.72	54.00	23.65	296	66	Vertical
4	4924.00	40.37	-17.72	74.00	33.63	275	194	Vertical
5	7386.00	46.90	-9.55	74.00	27.10	208	326	Vertical
6	7386.00	36.79	-9.55	54.00	17.21	230	35	Vertical
7	17519.8	46.41	1.00	54.00	7.59	270	146	Vertical

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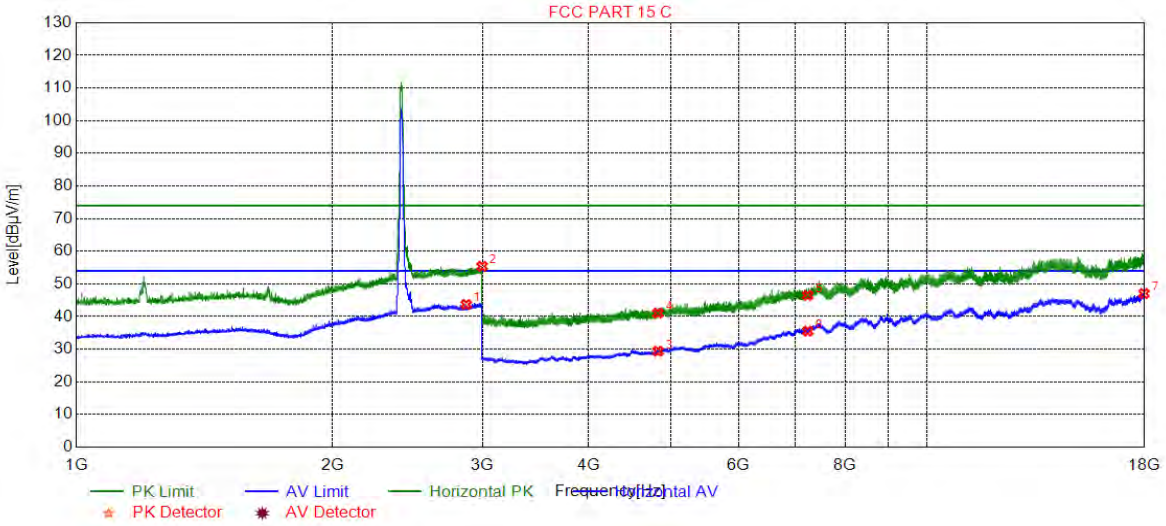
4.9.2.1.7 802.11G_Lowest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2871.46	43.70	9.20	54.00	10.30	166	95	Horizontal
2	2997.99	55.39	9.46	74.00	18.61	199	221	Horizontal
3	4824.00	29.41	-18.21	54.00	24.59	245	28	Horizontal
4	4824.00	41.05	-18.21	74.00	32.95	176	279	Horizontal
5	7236.00	46.50	-9.99	74.00	27.50	159	31	Horizontal
6	7236.00	35.57	-9.99	54.00	18.43	234	31	Horizontal
7	17966.4	47.06	0.71	54.00	6.94	131	140	Horizontal

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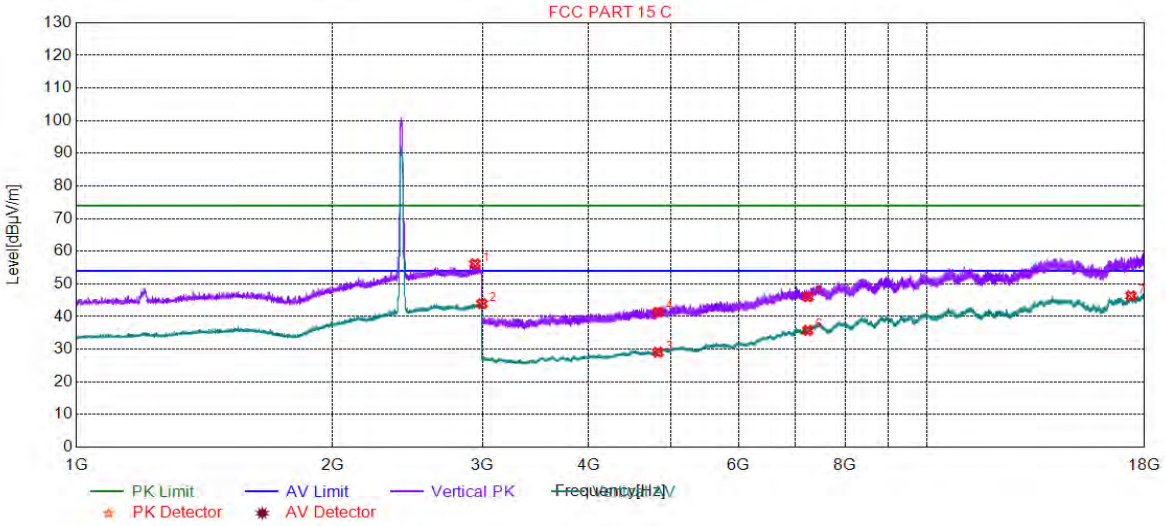
4.9.2.1.8 802.11G_Lowest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2939.98	56.18	9.57	74.00	17.82	158	232	Vertical
2	2996.99	43.97	9.46	54.00	10.03	252	126	Vertical
3	4824.00	29.09	-18.21	54.00	24.91	193	302	Vertical
4	4824.00	41.38	-18.21	74.00	32.62	191	302	Vertical
5	7236.00	46.03	-9.99	74.00	27.97	289	297	Vertical
6	7236.00	35.78	-9.99	54.00	18.22	297	82	Vertical
7	17346.5	46.37	0.02	54.00	7.63	264	351	Vertical

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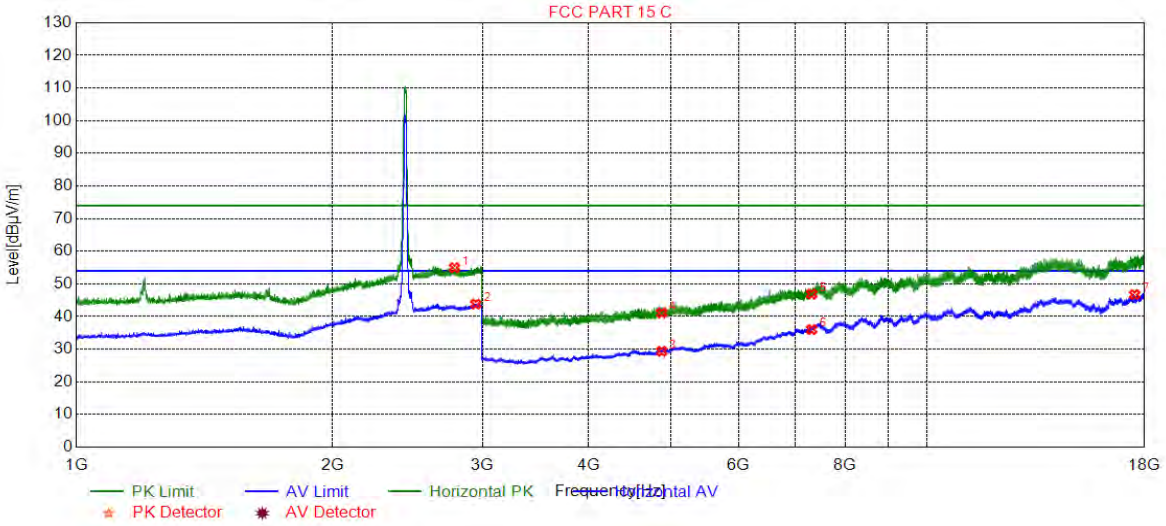
4.9.2.1.9 802.11G_ Middle Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2782.44	54.97	9.03	74.00	19.03	128	284	Horizontal
2	2947.98	43.84	9.66	54.00	10.16	176	52	Horizontal
3	4874.00	29.39	-17.99	54.00	24.61	222	264	Horizontal
4	4874.00	41.11	-17.99	74.00	32.89	135	74	Horizontal
5	7311.00	46.89	-9.74	74.00	27.11	225	99	Horizontal
6	7311.00	36.05	-9.74	54.00	17.95	220	259	Horizontal
7	17522.5	46.74	1.01	54.00	7.26	110	357	Horizontal

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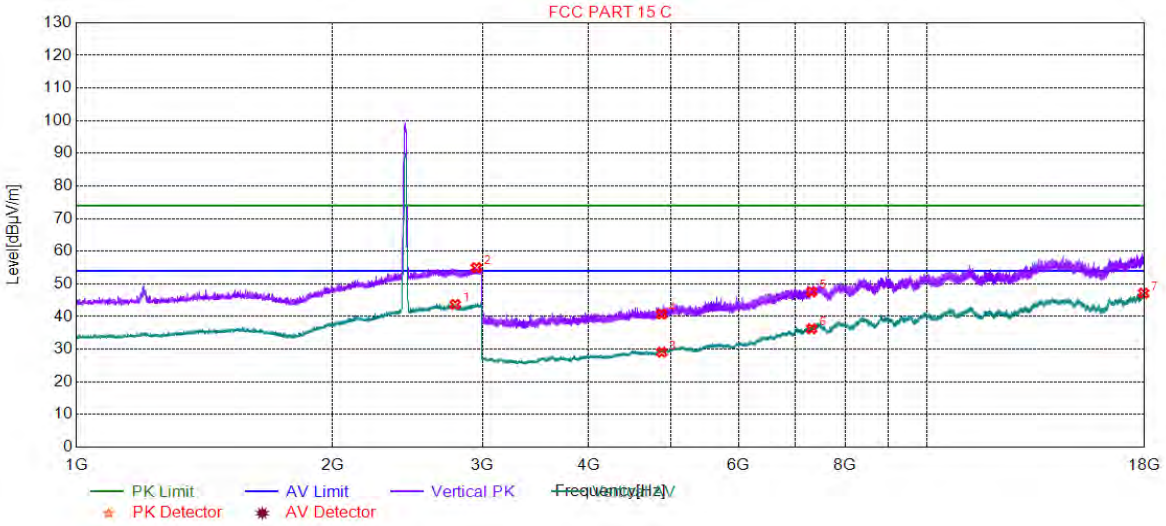
4.9.2.1.10 802.11G_ Middle Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2787.44	43.73	9.01	54.00	10.27	150	163	Vertical
2	2952.48	55.01	9.67	74.00	18.99	249	306	Vertical
3	4874.00	29.10	-17.99	54.00	24.90	295	179	Vertical
4	4874.00	40.75	-17.99	74.00	33.25	280	215	Vertical
5	7311.00	47.57	-9.74	74.00	26.43	208	90	Vertical
6	7311.00	36.29	-9.74	54.00	17.71	243	142	Vertical
7	17948.8	47.16	0.70	54.00	6.84	281	360	Vertical

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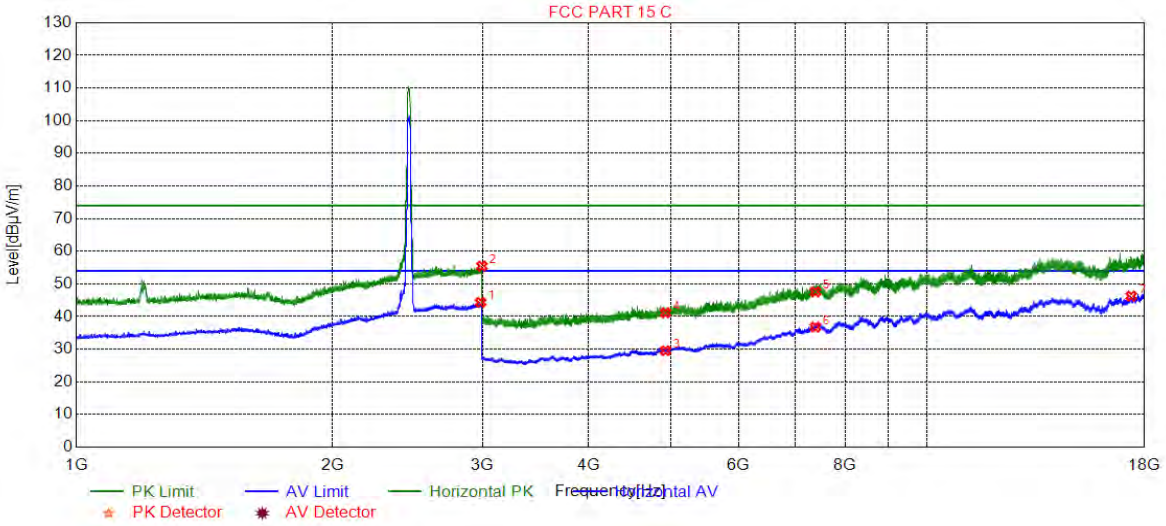
4.9.2.1.11 802.11G_ Highest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2985.49	44.38	9.52	54.00	9.62	225	189	Horizontal
2	2996.49	55.46	9.47	74.00	18.54	179	171	Horizontal
3	4924.00	29.57	-17.72	54.00	24.43	137	7	Horizontal
4	4924.00	41.14	-17.72	74.00	32.86	167	309	Horizontal
5	7386.00	47.59	-9.55	74.00	26.41	106	80	Horizontal
6	7386.00	36.80	-9.55	54.00	17.20	129	235	Horizontal
7	17359.2	46.29	0.08	54.00	7.71	187	284	Horizontal

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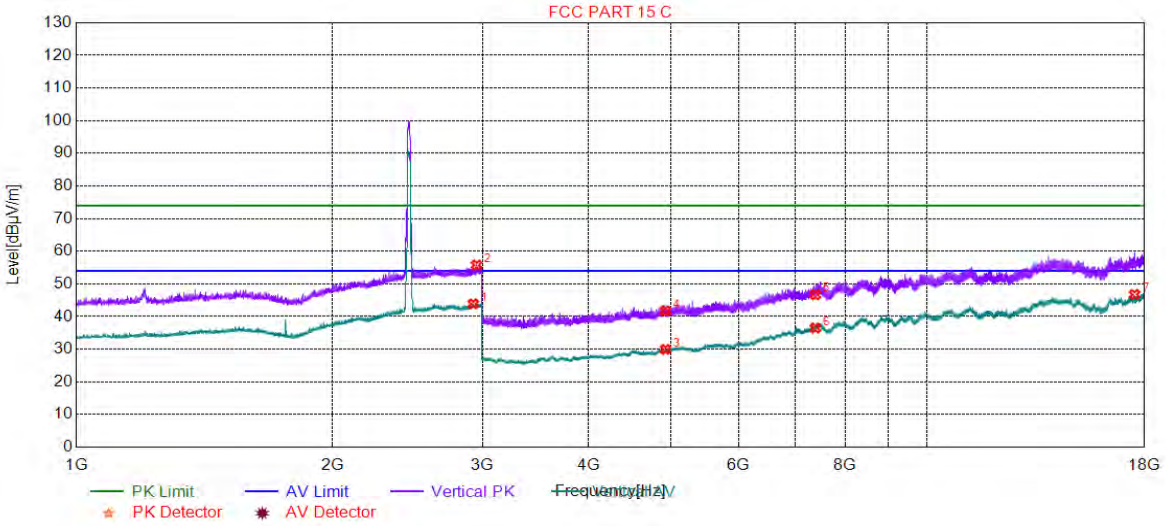
4.9.2.1.12 802.11G_ Highest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2927.48	43.90	9.44	54.00	10.10	220	306	Vertical
2	2952.98	55.81	9.67	74.00	18.19	179	160	Vertical
3	4924.00	29.95	-17.72	54.00	24.05	266	63	Vertical
4	4924.00	41.76	-17.72	74.00	32.24	274	306	Vertical
5	7386.00	46.69	-9.55	74.00	27.31	296	356	Vertical
6	7386.00	36.50	-9.55	54.00	17.50	265	147	Vertical
7	17519.8	46.81	1.00	54.00	7.19	279	308	Vertical

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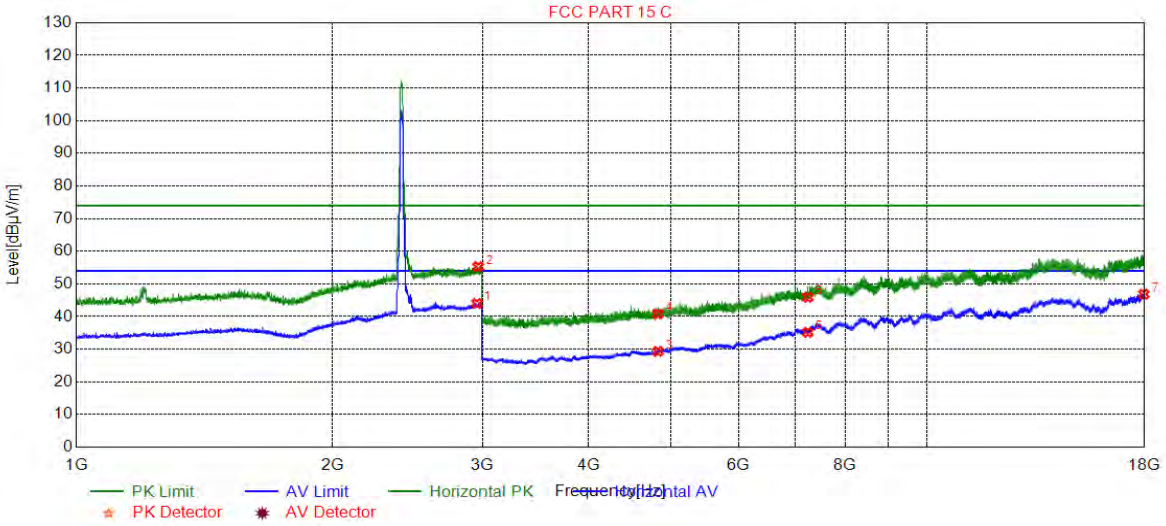
4.9.2.1.13 802.11N20_Lowest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2955.98	44.02	9.65	54.00	9.98	104	242	Horizontal
2	2965.99	55.28	9.61	74.00	18.72	199	18	Horizontal
3	4824.00	29.35	-18.21	54.00	24.65	127	326	Horizontal
4	4824.00	40.82	-18.21	74.00	33.18	216	68	Horizontal
5	7236.00	45.91	-9.99	74.00	28.09	229	281	Horizontal
6	7236.00	35.17	-9.99	54.00	18.83	158	179	Horizontal
7	17959.8	46.86	0.71	54.00	7.14	154	24	Horizontal

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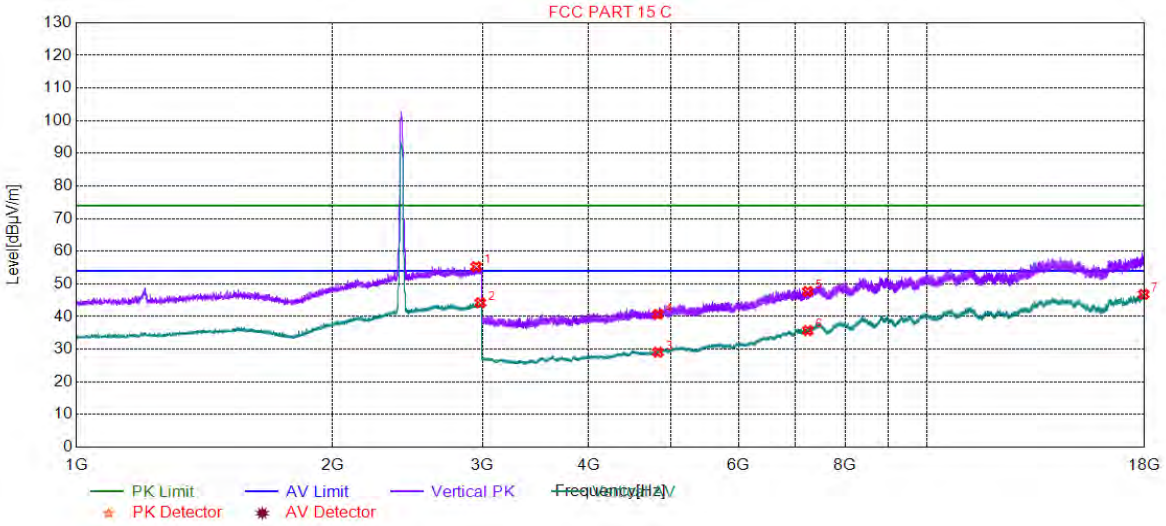
4.9.2.1.14 802.11N20_Lowest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2949.98	55.31	9.68	74.00	18.69	223	345	Vertical
2	2983.99	44.24	9.52	54.00	9.76	242	103	Vertical
3	4824.00	29.09	-18.21	54.00	24.91	297	238	Vertical
4	4824.00	40.71	-18.21	74.00	33.29	179	70	Vertical
5	7236.00	47.69	-9.99	74.00	26.31	235	182	Vertical
6	7236.00	35.74	-9.99	54.00	18.26	266	22	Vertical
7	17954.3	46.83	0.71	54.00	7.17	208	294	Vertical

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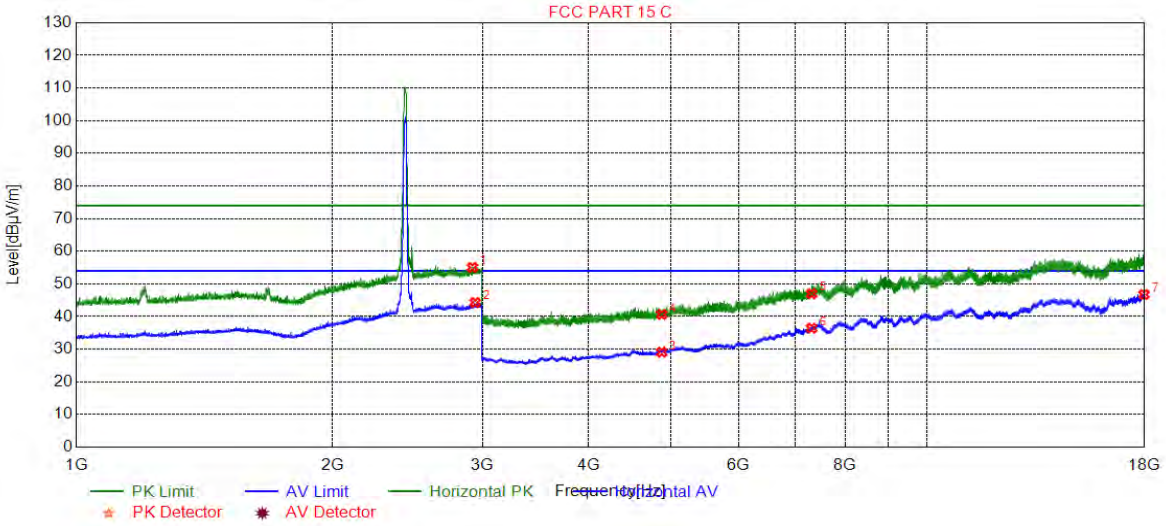
4.9.2.1.15 802.11N20_ Middle Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2920.48	55.07	9.36	74.00	18.93	245	321	Horizontal
2	2941.48	44.30	9.59	54.00	9.70	150	248	Horizontal
3	4874.00	29.12	-17.99	54.00	24.88	141	0	Horizontal
4	4874.00	40.66	-17.99	74.00	33.34	100	282	Horizontal
5	7311.00	47.01	-9.74	74.00	26.99	119	242	Horizontal
6	7311.00	36.45	-9.74	54.00	17.55	248	73	Horizontal
7	17970.8	46.76	0.71	54.00	7.24	237	128	Horizontal

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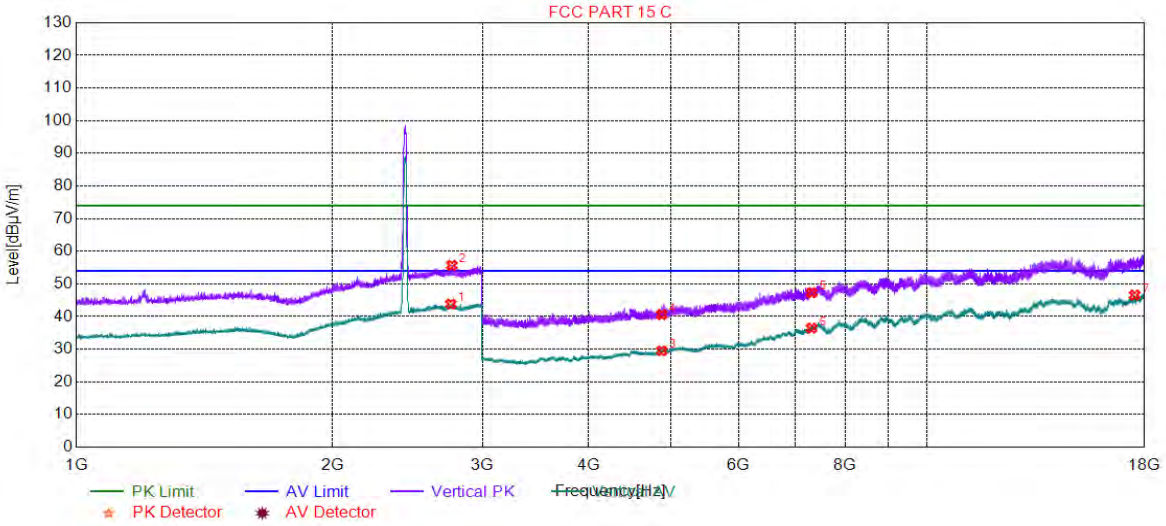
4.9.2.1.16 802.11N20_ Middle Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2754.43	43.84	9.10	54.00	10.16	180	318	Vertical
2	2761.94	55.70	9.08	74.00	18.30	153	272	Vertical
3	4874.00	29.50	-17.99	54.00	24.50	246	138	Vertical
4	4874.00	40.59	-17.99	74.00	33.41	220	337	Vertical
5	7311.00	47.31	-9.74	74.00	26.69	228	245	Vertical
6	7311.00	36.46	-9.74	54.00	17.54	202	309	Vertical
7	17522.5	46.60	1.01	54.00	7.40	246	245	Vertical

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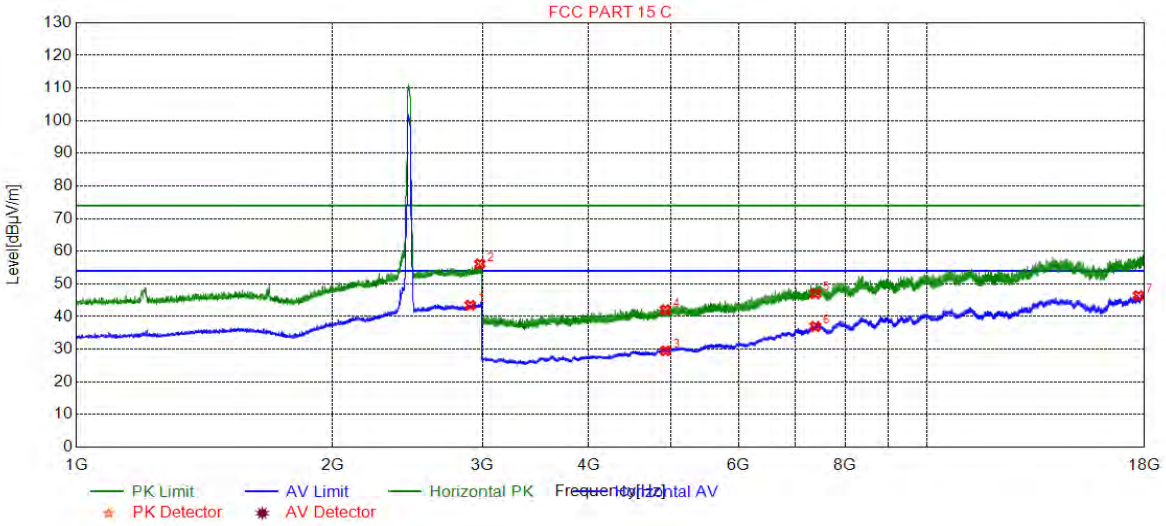
4.9.2.1.17 802.11N20_ Highest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2902.97	43.48	9.17	54.00	10.52	141	16	Horizontal
2	2979.49	56.15	9.54	74.00	17.85	189	322	Horizontal
3	4924.00	29.50	-17.72	54.00	24.50	248	141	Horizontal
4	4924.00	42.11	-17.72	74.00	31.89	204	214	Horizontal
5	7386.00	47.00	-9.55	74.00	27.00	128	142	Horizontal
6	7386.00	36.96	-9.55	54.00	17.04	139	82	Horizontal
7	17702.4	46.39	1.31	54.00	7.61	162	194	Horizontal

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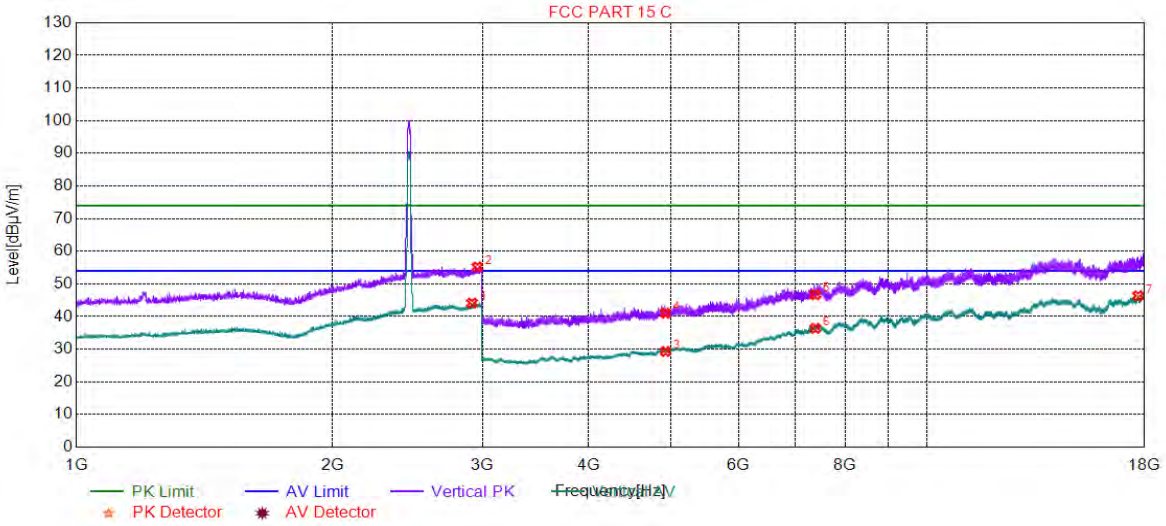
4.9.2.1.18 802.11N20_ Highest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2917.47	44.14	9.33	54.00	9.86	243	224	Vertical
2	2959.48	55.22	9.64	74.00	18.78	299	335	Vertical
3	4924.00	29.31	-17.72	54.00	24.69	241	297	Vertical
4	4924.00	41.05	-17.72	74.00	32.95	231	73	Vertical
5	7386.00	46.69	-9.55	74.00	27.31	183	334	Vertical
6	7386.00	36.40	-9.55	54.00	17.60	225	99	Vertical
7	17685.3	46.37	1.35	54.00	7.63	212	273	Vertical

Remark:

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

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

2) Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz and 18GHz to 25GHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3）As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

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

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4.10 Restricted bands around fundamental frequency

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

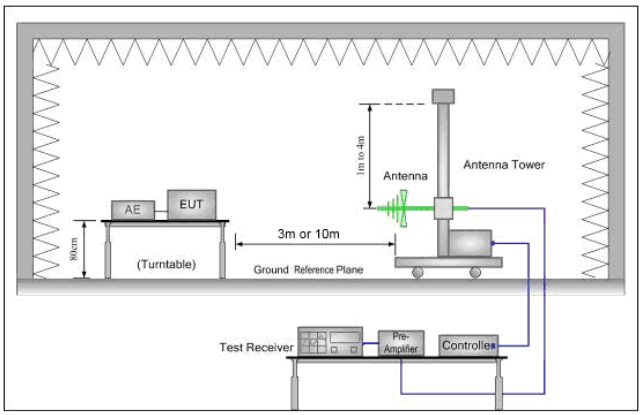

Figure 1. 30MHz to 1GHz

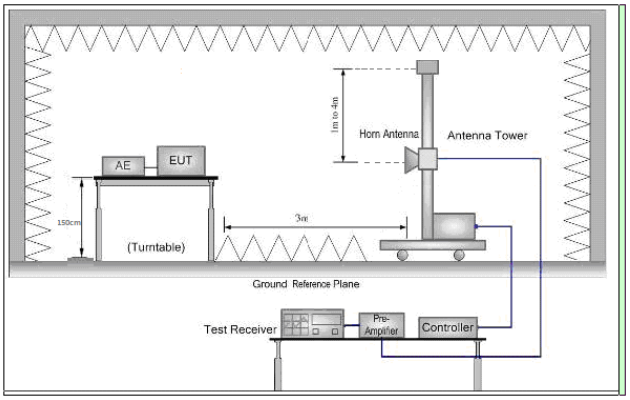

Figure 2. Above 1 GHz

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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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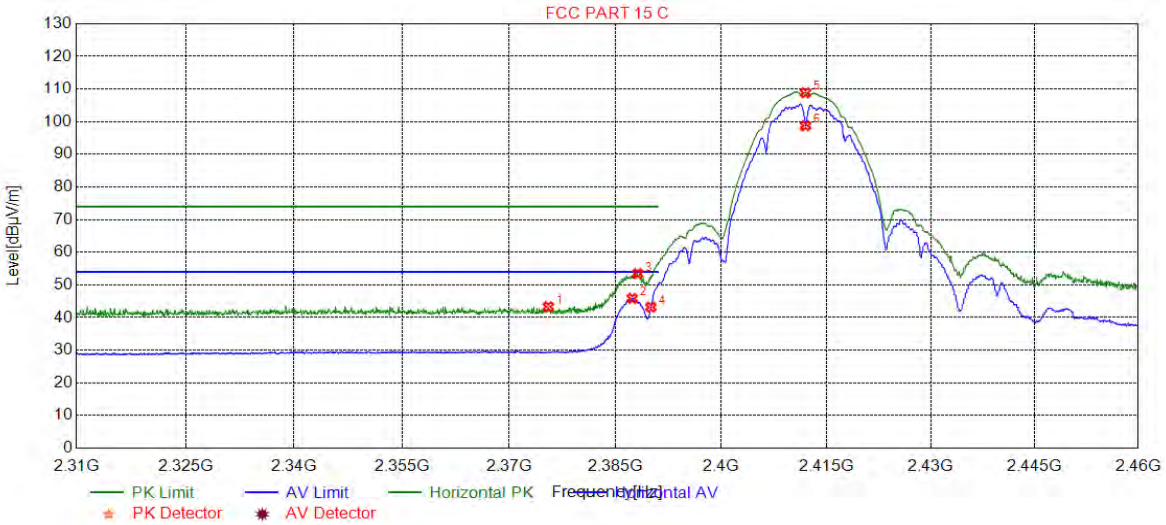
Test plot as follows:

4.10.1 ANT1

4.10.1.1 802.11B_Lowest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2375.50	43.35	7.78	74.00	30.65	239	100	Horizontal
2	2387.36	45.88	7.77	54.00	8.12	115	304	Horizontal
3	2388.11	53.47	7.77	74.00	20.53	145	298	Horizontal
4	2390.00	43.22	7.77	54.00	10.78	112	304	Horizontal
5	2412.00	108.84	7.81	0.00	-108.84	202	298	Horizontal
6	2412.00	98.76	7.81	0.00	-98.76	240	304	Horizontal

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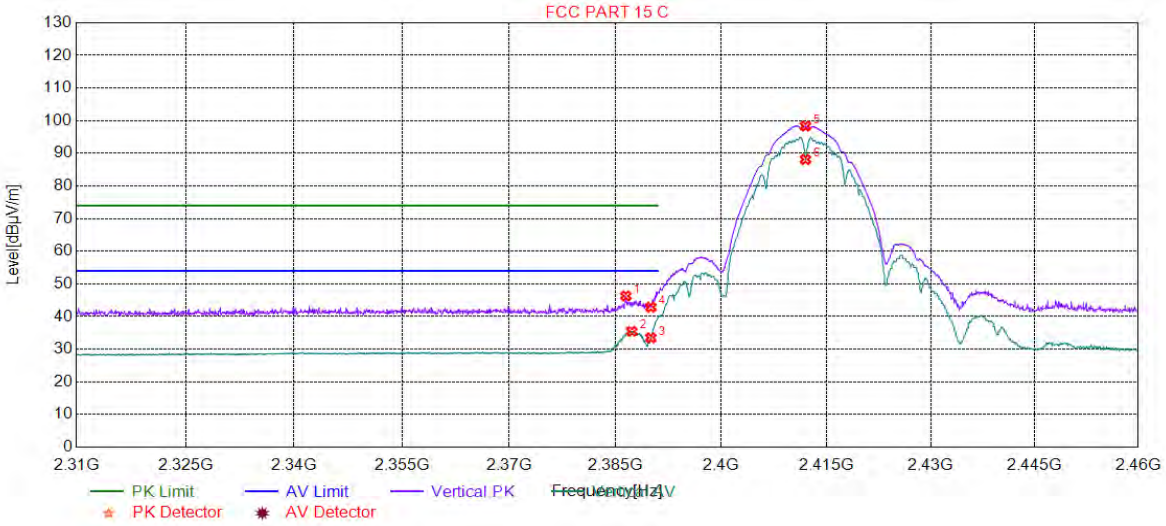
4.10.1.2 802.11B_Lowest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2386.46	46.33	7.77	74.00	27.67	167	241	Vertical
2	2387.28	35.48	7.77	54.00	18.52	275	241	Vertical
3	2390.00	33.48	7.77	54.00	20.52	248	241	Vertical
4	2390.00	42.88	7.77	74.00	31.12	282	241	Vertical
5	2412.00	98.34	7.81	0.00	-98.34	156	241	Vertical
6	2412.00	88.14	7.81	0.00	-88.14	158	241	Vertical

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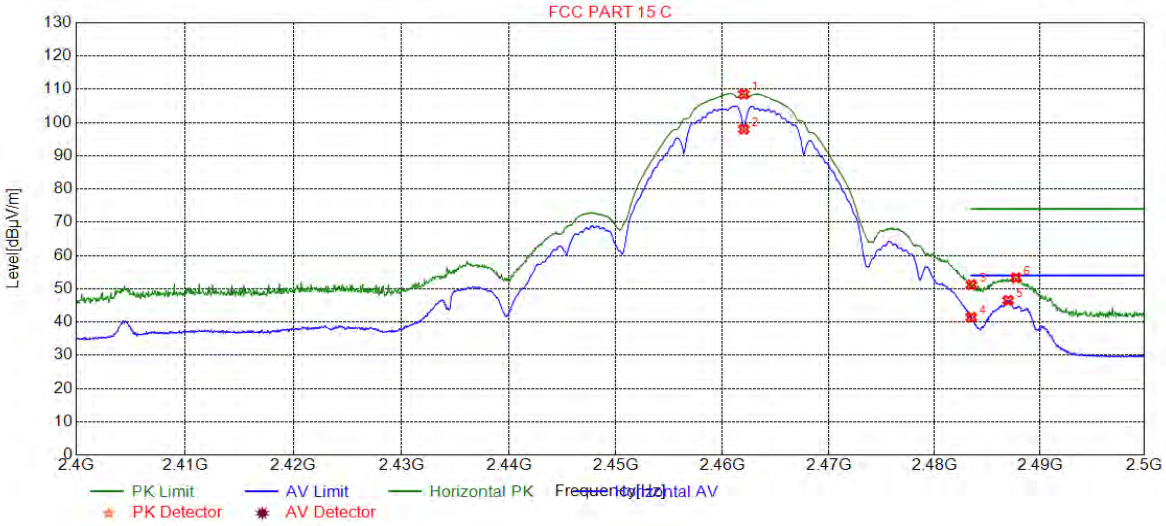
4.10.1.3 802.11B_ Highest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	108.54	7.98	0.00	-108.54	172	296	Horizontal
2	2462.00	98.00	7.98	0.00	-98.00	126	336	Horizontal
3	2483.50	51.22	8.01	74.00	22.78	222	328	Horizontal
4	2483.50	41.43	8.01	54.00	12.57	123	296	Horizontal
5	2486.99	46.54	8.01	54.00	7.46	199	296	Horizontal
6	2487.74	53.30	8.02	74.00	20.70	181	296	Horizontal

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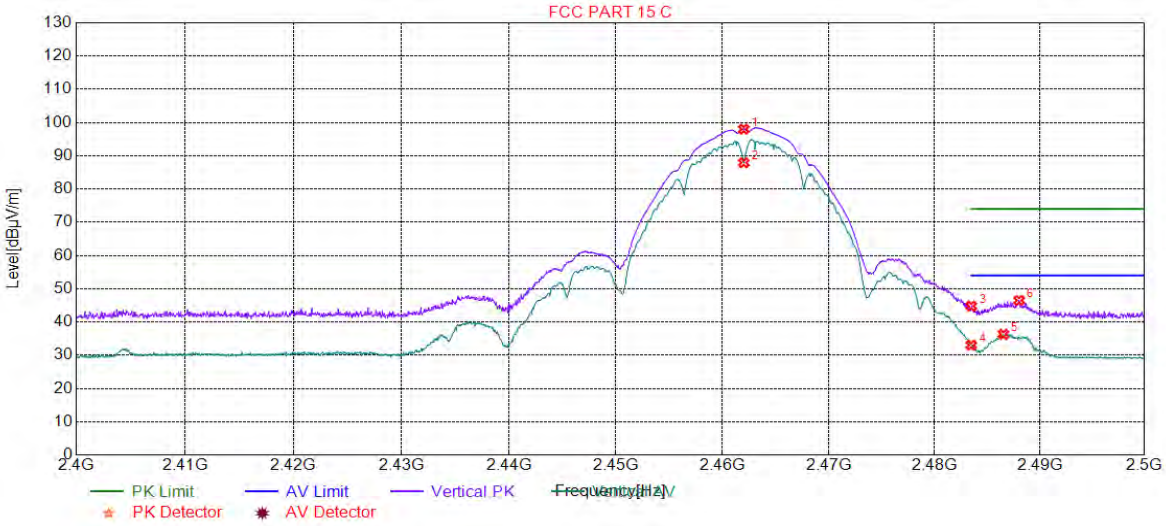
4.10.1.4 802.11B_ Highest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	98.02	7.98	0.00	-98.02	221	80	Vertical
2	2462.00	87.89	7.98	0.00	-87.89	153	80	Vertical
3	2483.50	44.82	8.01	74.00	29.18	194	80	Vertical
4	2483.50	33.06	8.01	54.00	20.94	255	80	Vertical
5	2486.54	36.31	8.01	54.00	17.69	279	80	Vertical
6	2488.04	46.53	8.02	74.00	27.47	219	80	Vertical

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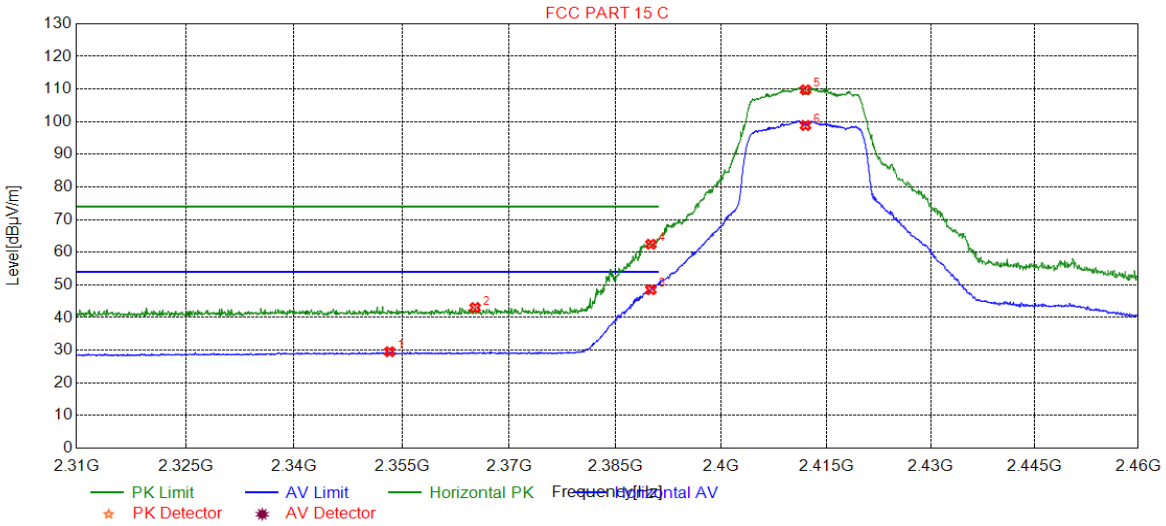
4.10.1.5 802.11G_Lowest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2353.29	29.56	7.81	54.00	24.44	200	287	Horizontal
2	2365.22	43.07	7.79	74.00	30.93	207	203	Horizontal
3	2390.00	48.54	7.77	54.00	5.46	159	298	Horizontal
4	2390.00	62.48	7.77	74.00	11.52	217	298	Horizontal
5	2412.00	109.76	7.81	0.00	-109.76	236	298	Horizontal
6	2412.00	98.86	7.81	0.00	-98.86	149	298	Horizontal

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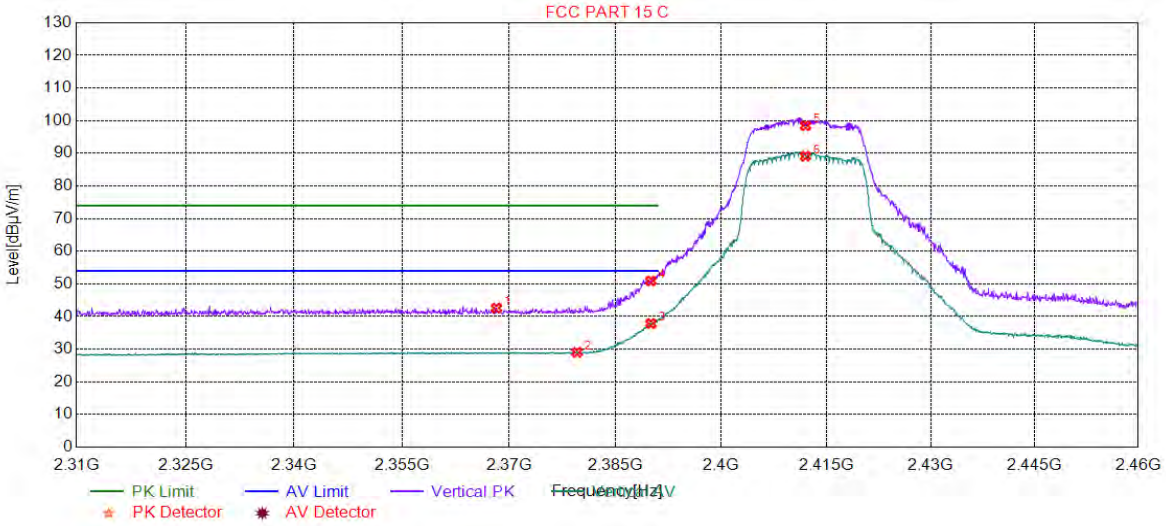
4.10.1.6 802.11G_Lowest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2368.22	42.61	7.79	74.00	31.39	213	280	Vertical
2	2379.55	29.09	7.78	54.00	24.91	272	261	Vertical
3	2390.00	37.88	7.77	54.00	16.12	191	75	Vertical
4	2390.00	50.90	7.77	74.00	23.10	280	301	Vertical
5	2412.00	98.46	7.81	0.00	-98.46	263	66	Vertical
6	2412.00	89.15	7.81	0.00	-89.15	182	66	Vertical

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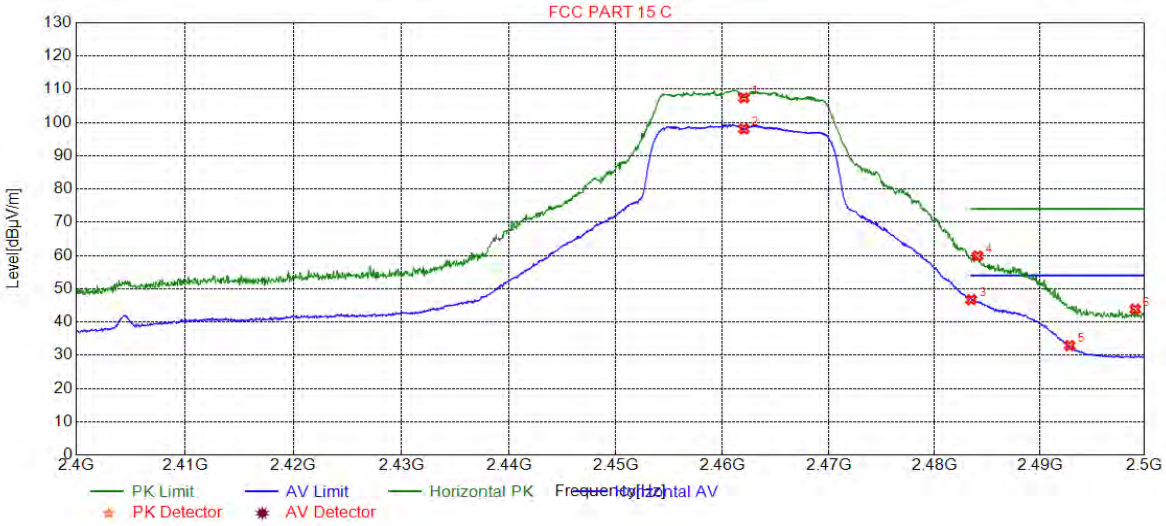
4.10.1.7 802.11G_ Highest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	107.45	7.98	0.00	-107.45	180	294	Horizontal
2	2462.00	98.10	7.98	0.00	-98.10	186	294	Horizontal
3	2483.50	46.74	8.01	54.00	7.26	189	300	Horizontal
4	2484.09	59.90	8.01	74.00	14.10	111	294	Horizontal
5	2492.84	32.92	8.02	54.00	21.08	127	294	Horizontal
6	2499.09	43.88	8.03	74.00	30.12	215	289	Horizontal

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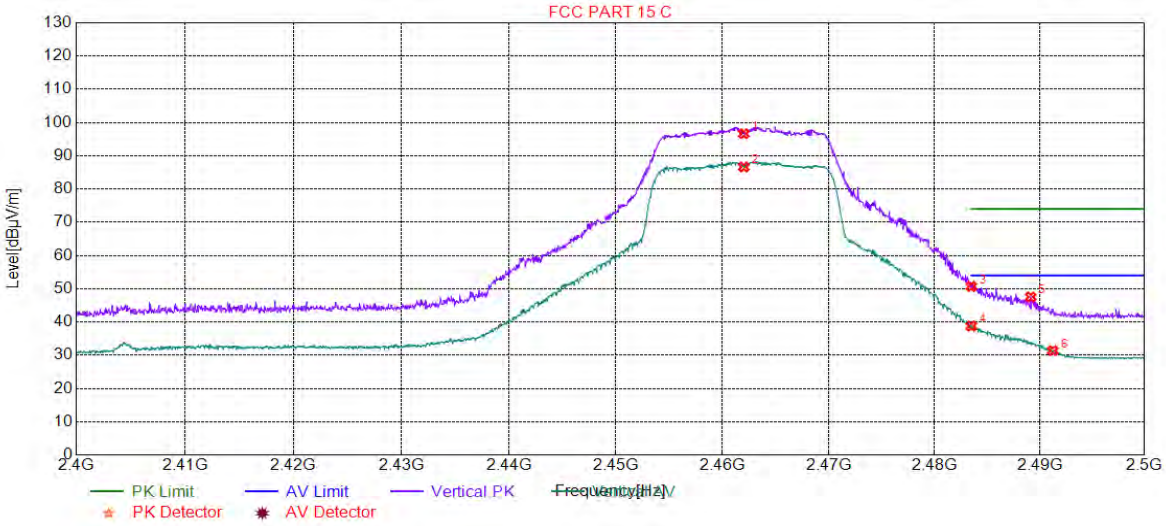
4.10.1.8 802.11G_ Highest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	96.63	7.98	0.00	-96.63	175	205	Vertical
2	2462.00	86.65	7.98	0.00	-86.65	251	205	Vertical
3	2483.50	50.72	8.01	74.00	23.28	201	85	Vertical
4	2483.50	38.80	8.01	54.00	15.20	291	78	Vertical
5	2489.14	47.56	8.02	74.00	26.44	163	85	Vertical
6	2491.24	31.40	8.02	54.00	22.60	237	78	Vertical

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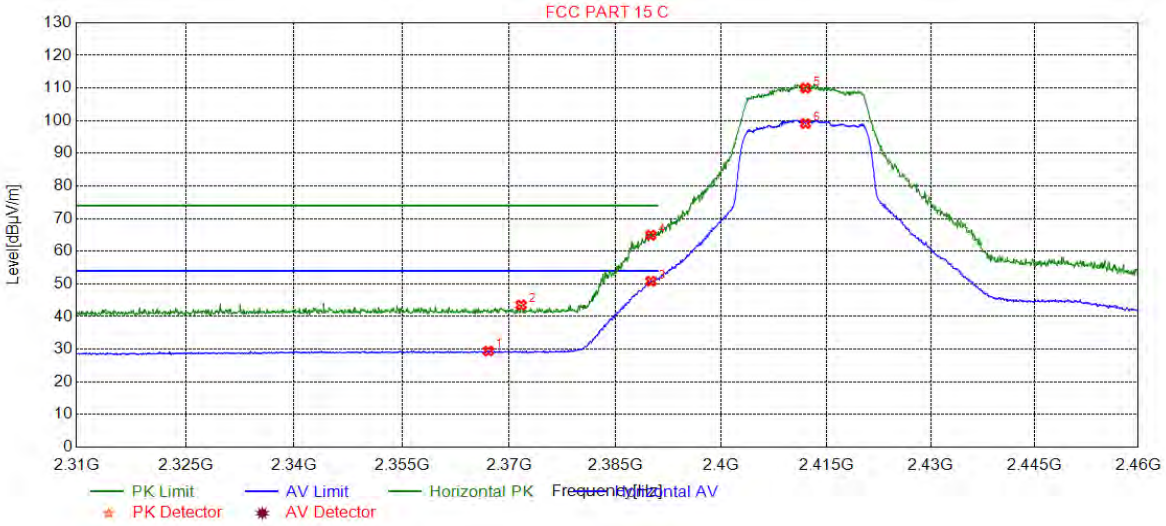
4.10.1.9 802.11N20_ Lowest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2367.10	29.44	7.79	54.00	24.56	117	291	Horizontal
2	2371.68	43.54	7.79	74.00	30.46	129	18	Horizontal
3	2390.00	50.81	7.77	54.00	3.19	230	291	Horizontal
4	2390.00	64.95	7.77	74.00	9.05	165	291	Horizontal
5	2412.00	109.99	7.81	0.00	-109.99	162	291	Horizontal
6	2412.00	99.14	7.81	0.00	-99.14	137	291	Horizontal

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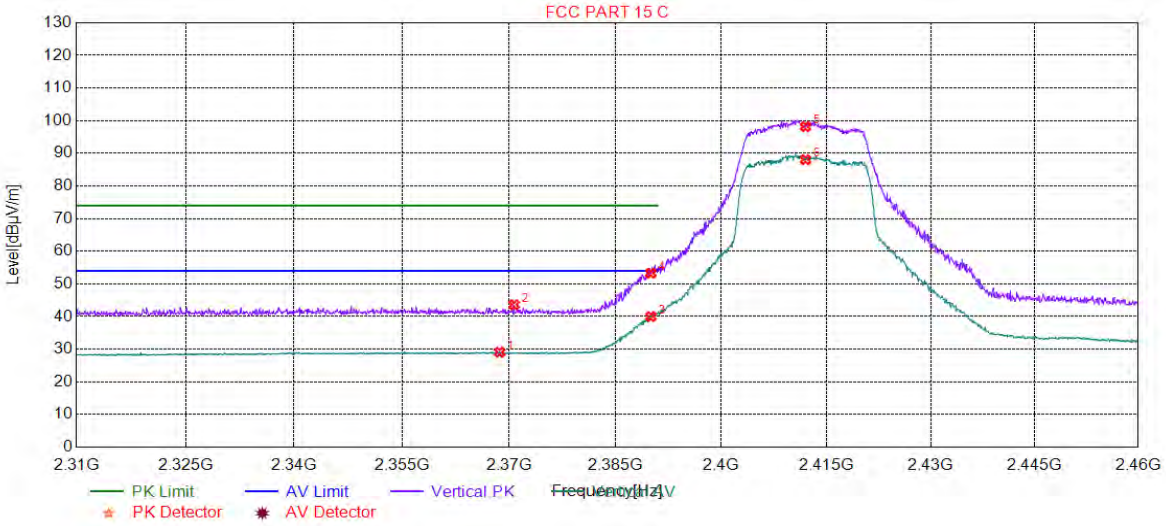
4.10.1.10 802.11N20_Lowest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2368.67	29.10	7.79	54.00	24.90	195	49	Vertical
2	2370.70	43.64	7.79	74.00	30.36	210	203	Vertical
3	2390.00	40.01	7.77	54.00	13.99	289	77	Vertical
4	2390.00	53.30	7.77	74.00	20.70	284	194	Vertical
5	2412.00	98.18	7.81	0.00	-98.18	236	77	Vertical
6	2412.00	88.09	7.81	0.00	-88.09	275	77	Vertical

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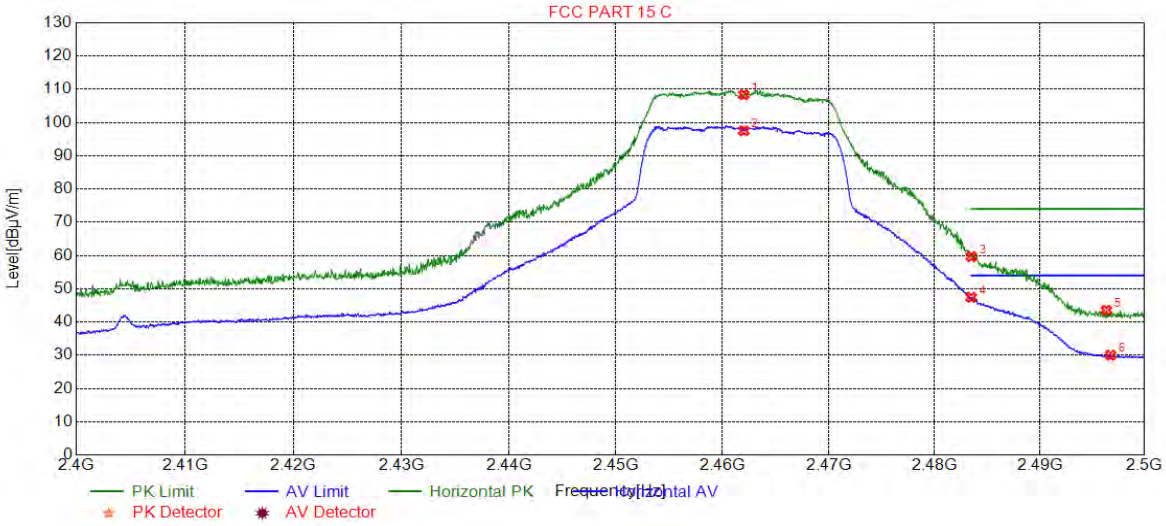
4.10.1.11 802.11N20_ Highest Channel_ Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	108.35	7.98	0.00	-108.35	116	294	Horizontal
2	2462.00	97.52	7.98	0.00	-97.52	100	294	Horizontal
3	2483.50	59.71	8.01	74.00	14.29	178	294	Horizontal
4	2483.50	47.44	8.01	54.00	6.56	103	287	Horizontal
5	2496.34	43.60	8.03	74.00	30.40	204	257	Horizontal
6	2496.74	30.05	8.03	54.00	23.95	183	294	Horizontal

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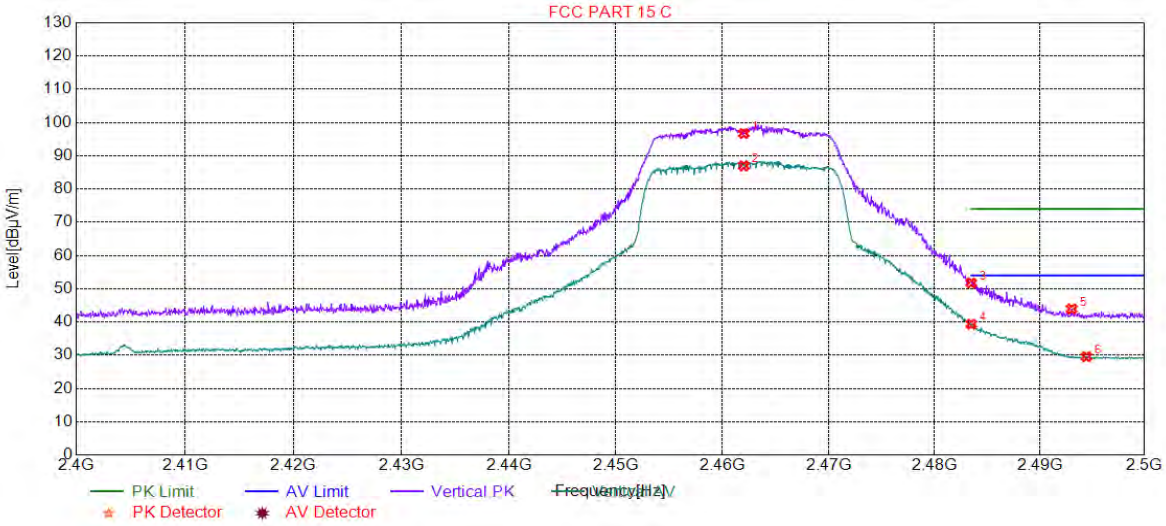
4.10.1.12 802.11N20_ Highest Channel_ Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	96.70	7.98	0.00	-96.70	175	200	Vertical
2	2462.00	86.99	7.98	0.00	-86.99	165	200	Vertical
3	2483.50	51.78	8.01	74.00	22.22	227	84	Vertical
4	2483.50	39.37	8.01	54.00	14.63	175	84	Vertical
5	2493.04	43.97	8.02	74.00	30.03	246	291	Vertical
6	2494.44	29.58	8.02	54.00	24.42	188	306	Vertical

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

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

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

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 (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	2019/7/12	2020/7/11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019/7/14	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	2019/7/14	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	2019-09-07	2020-09-06
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2019-07-16	2020-07-15
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	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

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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 ZR/2020/50009.

The End

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

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