FCCTEST REPORT

Application No:	ZR/2020/70006
Applicant:	LG Electronics USA, Inc
Address of Applicant:	111 Sylvan Avenue, North Building Englewood Cliffs, NJ 07632
Manufacturer:	Huaqin Telecom Technology Co.,Ltd.
Address of Manufacturer:	No.1 Building, No.9 Building, No.399,Keyuan Road,Zhangjiang Hi-tech Park,Shanghai,P.R.China
EUT Description:	Mobile handset
Model No.:	LM-K520HMW, LM-K520HM, LM-K525HMW, LM-K525HM
Trade Mark:	LG
FCC ID:	ZNFK520HMW
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:	2020/7/10
Date of Test:	2020/7/10 to 2020/8/13
Date of Issue:	2020/8/13
Test Result:	**PASS ***

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

Derek Yang
Wireless Laboratory Manager

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1 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2020/8/13		Original

Authorized for issue by:				
Tested By		Mike Hu **(Mike Hu) /Project Engineer**		
Checked By		David Chen **(David Chen) /Reviewer**		

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2 Test Summary

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

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3 General Information

3.1 Client Information

Applicant:	LG Electronics USA, Inc
Address of Applicant:	111 Sylvan Avenue, North Building Englewood Cliffs, NJ 07632
Manufacturer:	Huaqin Telecom Technology Co.,Ltd.
Address of Manufacturer:	No.1 Building, No.9 Building, No.399,Keyuan Road,Zhangjiang Hi-tech Park,Shanghai,P.R.China

3.2 Test Location

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
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Telephone:	+86 (0) 755 2601 2053
Fax:	+86 (0) 755 2671 0594
E-mail:	ee.shenzhen@sgs.com

3.3 Test Facility

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

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 3816.01)

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

• VCCI

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

• FCC –Designation Number: CN1178

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

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

• Industry Canada (IC)

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

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3.4 General Description of EUT

EUT Description:	Mobile handset
Model No.:	LM-K520HMW, LM-K520HM, LM-K525HMW, LM-K525HM
Trade Mark:	LG
IEEE 802.11 WLAN Mode Supported:	☒ 802.11B (20 MHz channel bandwidth), ☒ 802.11G (20 MHz channel bandwidth) ☒ 802.11N (20 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:	-5.56dBi
Power Supply:	☒ AC/DC Adapter; ☒ Battery ☐ PoE:; ☐ Other:

Difference description:

The differences between LM-K520HMW and other models are shown in the below table:

Model		LM-K520HMW (Full approval)	LM-K520HM (Update approval)	LM-K525HMW (Updated approval)	LM-K525HM (Update approval)
Software version		different	different	different	different
Licensed Frequency	LTE	B1/B2/B3/B4/ B5/B7/B8/B12/B13/B17/B28/ B38/B66	B1/B2/B3/B4/ B5/B7/B8/B12/B13/B17/B28/ B38/B66	B1/B2/B3/B4/ B5/B7/B8/B12/B13/ B17/B28/ B38/B66	B1/B2/B3/B4/ B5/B7/B8/B12/B13/B17/B28/ B38/B66
	UMTS	B1/B2/B4/B5/ B8	B1/B2/B4/B5/ B8	B1/B2/B4/B5/ B8	B1/B2/B4/B5/ B8
	GSM	the same	the same	the same	the same
	IC	the same	the same	the same	the same
	Antenna	the same	the same	the same	the same
Unlicensed Frequency	Bluetooth	the same	the same	the same	the same
	2.4G Wi-Fi	the same	the same	the same	the same

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	IC	the same	the same	the same	the same
	Antenna	the same	the same	the same	the same
Hardware	Ram / Rom	4G/64G	4G/64G	4G/128G	4G/128G
	Camera	the same	the same	the same	the same
	PCB	the same	the same	the same	the same
	USB Port	the same	the same	the same	the same
	RJ11 Port	the same	the same	the same	the same
	RJ45 Port	the same	the same	the same	the same
	NFC	Not support	Not support	Not support	Not support
	FM	Support	Support	Support	Support
Appearance	Dimension	the same	the same	the same	the same
	Color	the same	the same	the same	the same
Accessory	Battery	the same	the same	the same	the same
	External Charger	the same	the same	the same	the same
	USB label	the same	the same	the same	the same
other	SIM card	Double SIM	Single SIM	Double SIM	Single SIM

Remark:

According to the difference description above, only the model LM-K520HMW was fully tested, for other models were performed the Radiated Emission test for discrepancy, since the electrical circuit design, layout, components used and internal wiring were identical for all above models. With difference being on mode, appearance and color.

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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	12	2467MHz
13	2472MHz						

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)
CH 1	2412MHz
CH 6	2437MHz
CH 11	2462MHz
CH 12	2467MHz
CH 13	2472MHz

3.5 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	50 % RH
Atmospheric Pressure:	101.30KPa
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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3.7 MCC Country code detection mechanism specification

Network mode	Description
No country code received	The device only operates with the default country code. (12 /13 channels enable)
Invalid country code received	The device can't get invalid country code. If the network is connected, the country code is set in US. (12/13 channels in low power mode) Otherwise, if the network is not connected, the device oper ates with the default country code. (12/13 channels enable)
US country code	If the network is connected, the country code is set in US. (12/13 channels in low power mode) Otherwise, if the network is not connected, the device oper ates with the default country code. (12/13 channels enable)
US territories country code (Guam, Puerto Rico)	If the network is connected, the country code is set accordi ng to the network service. Otherwise, if the network is not connected, the device oper ates with the default country code. (12/13 channels enable)
Airplane mode	The device only operates with the default county code. (12/ 13 channels enable)
On loss of non- US country code (drop the link any verify device returns to default state)	The device only operates with the default county code. (12/ 13 channels enable)

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Remark:

1.Channel 12 and 13 are enable in default mode for this device.Channel 12 and 13 use lower target power.

2.The device always use country code as geo-location information and it is determined only when the device is attached to 2G/3G/LTE network.Additionally,in case of the invalid country code, Wi-Fi driver will revert to the NV Binary code in which channels 1-13 are enabled.Therefore there will be no problem with those scenarios.

3.The device always use the country code as location information and it periodically checks the information in a few seconds until the device is attached to 2G/3G/LTE network.For the multiple cell network environment with different MCC codes, there will be network roam search with intervals below and the device will get the updated country code when the device is attached to the different network.

-2G/3G/LTE network:Every 2 seconds

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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 -5.56dBi.	

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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 wereconnected 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 equipmentand all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.		

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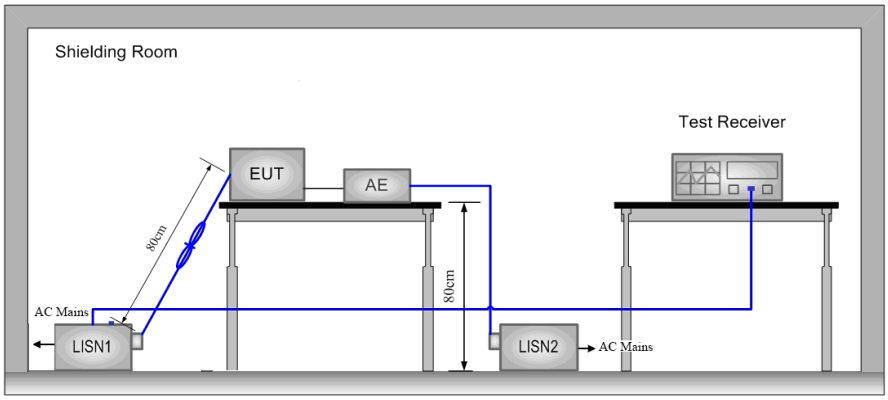
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate of 802.11B at lowest channel is the worst case. Charge + Transmitting mode. Only the worst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

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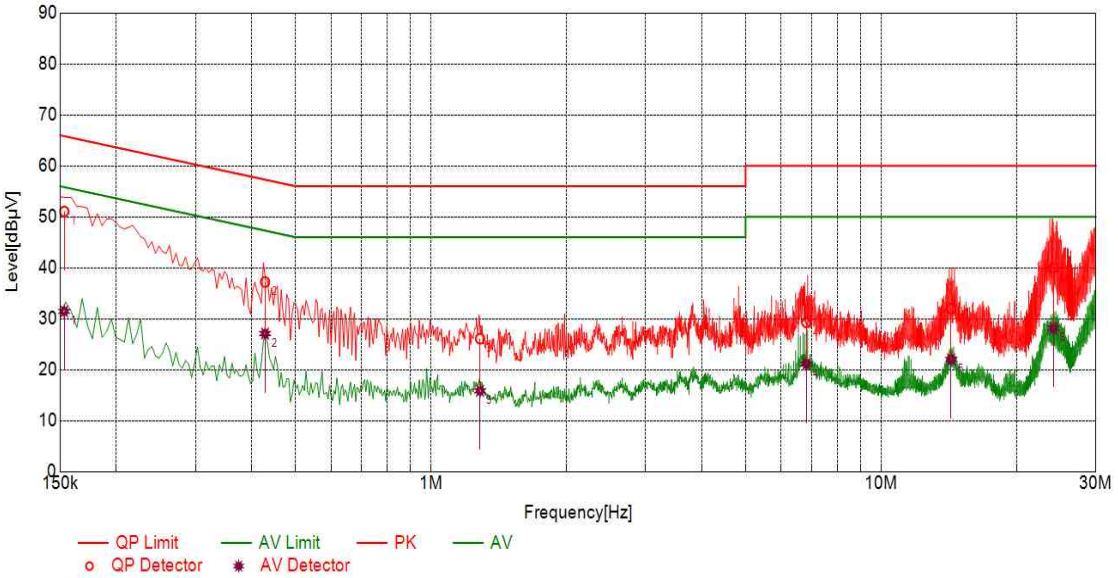
Measurement Data

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	0.1533	10.10	51.06	65.82	14.76	31.45	55.82	24.37	L
2	0.4281	10.10	37.21	57.29	20.08	27.09	47.29	20.20	L
3	1.2854	10.10	26.08	56.00	29.92	15.85	46.00	30.15	L
4	6.8208	10.10	29.29	60.00	30.71	21.10	50.00	28.90	L
5	14.3120	10.11	31.96	60.00	28.04	22.00	50.00	28.00	L
6	24.1482	10.11	40.00	60.00	20.00	28.16	50.00	21.84	L

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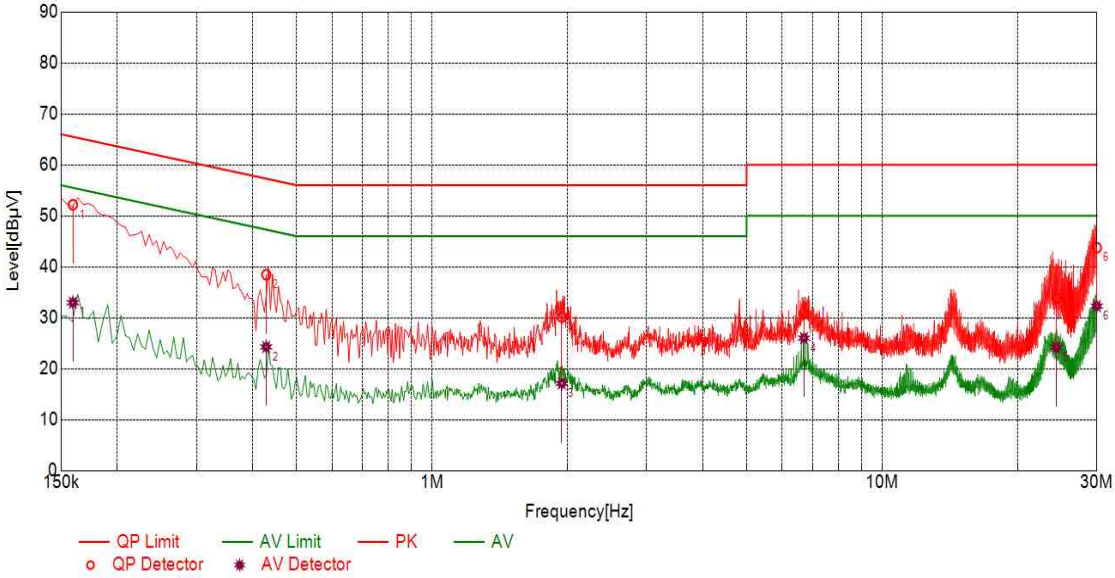
Neutral Line:



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	0.1594	10.10	52.17	65.49	13.32	32.96	55.49	22.53	N
2	0.4285	10.10	38.45	57.28	18.83	24.27	47.28	23.01	N
3	1.9428	10.10	30.12	56.00	25.88	17.11	46.00	28.89	N
4	6.7074	10.10	30.92	60.00	29.08	26.00	50.00	24.00	N
5	24.3947	10.11	33.88	60.00	26.12	24.19	50.00	25.81	N
6	29.9904	10.11	43.74	60.00	16.26	32.28	50.00	17.72	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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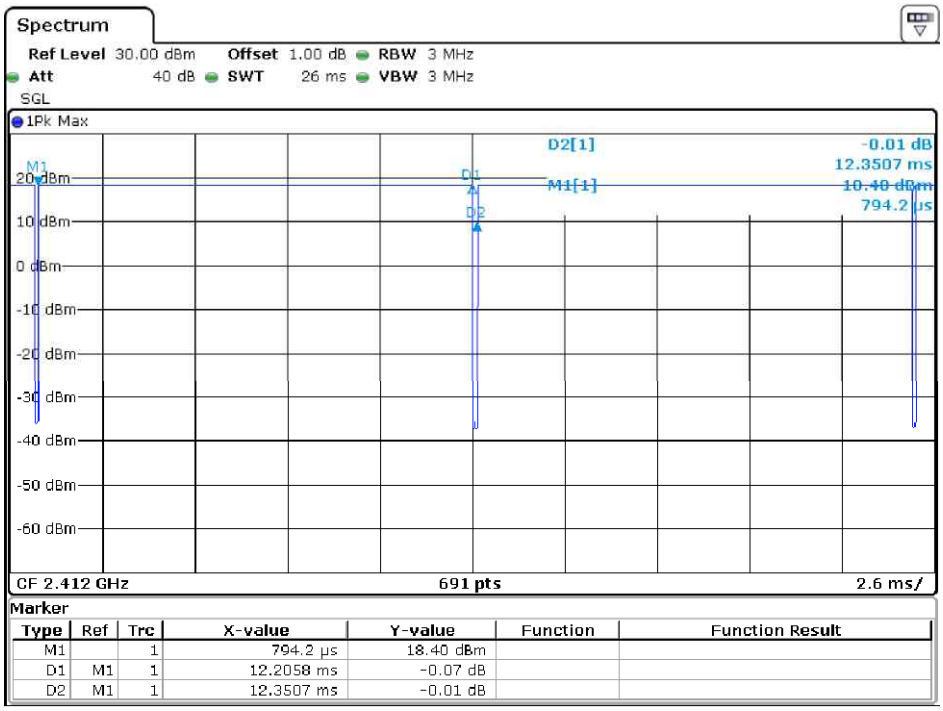
4.3 Duty Cycle

4.3.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11B	Ant 1: CH1,CH6,CH11	98.83
11G	Ant 1: CH1,CH6,CH11	94.92
11N20	Ant 1: CH1,CH6,CH11	95.63

4.3.1 Test Plots

4.3.1.1 11B



Date: 15.JUL.2020 13:15:30

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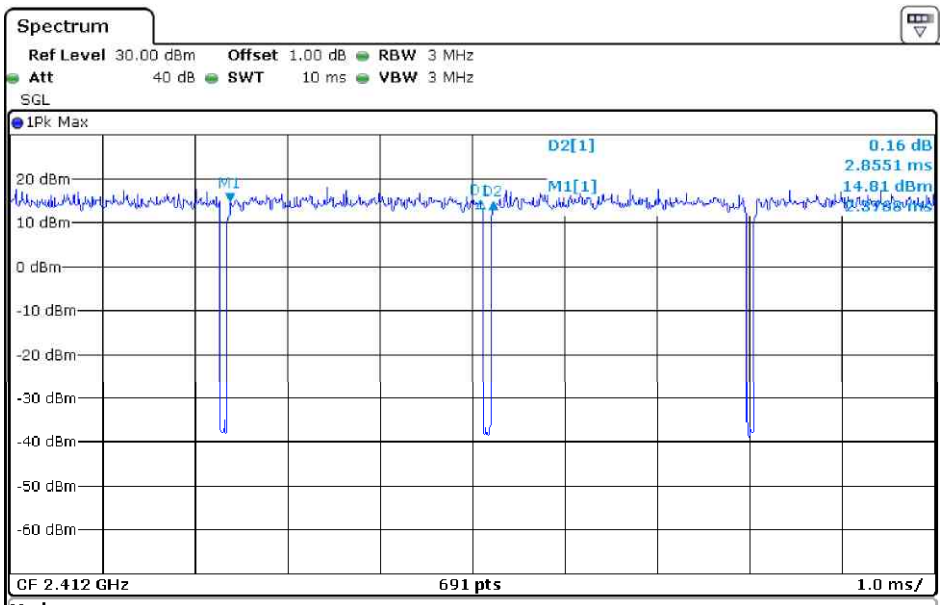
4.3.1.2 11G

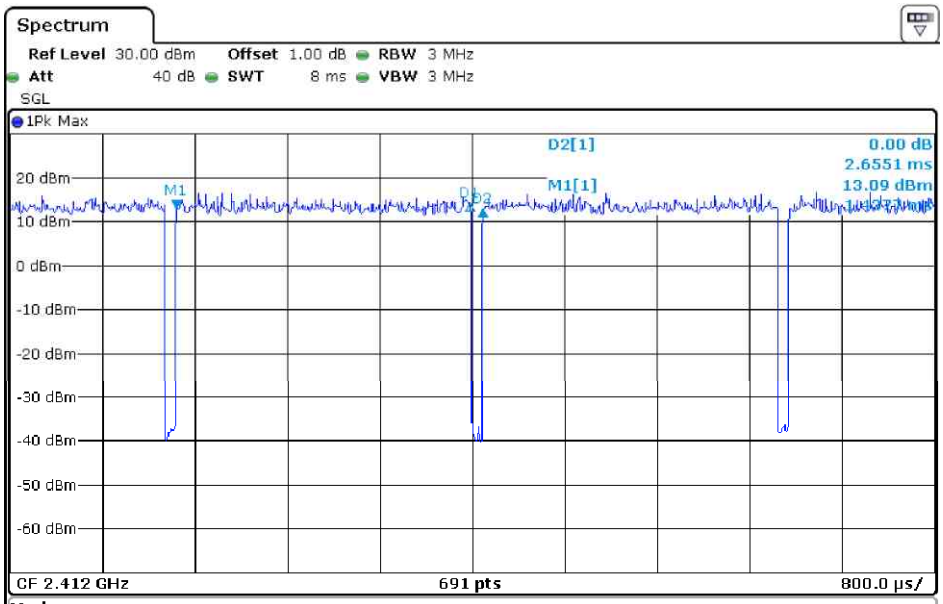


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.3768 ms	14.81 dBm		
D1	M1	1	2.7101 ms	0.29 dB		
D2	M1	1	2.8551 ms	0.16 dB		

Date: 15.JUL.2020 13:14:49

4.3.1.3 11N20



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.4377 ms	13.09 dBm		
D1	M1	1	2.5391 ms	1.09 dB		
D2	M1	1	2.6551 ms	0.00 dB		

Date: 15.JUL.2020 13:16:26

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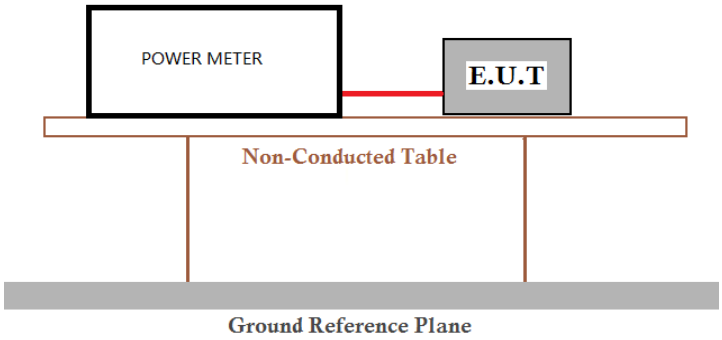
4.4 Conducted Output Power

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	CH1	17.06	30.00	Pass
	CH6	18.09	30.00	Pass
	CH11	17.26	30.00	Pass
	CH12	5.54	30.00	Pass
	CH13	5.39	30.00	Pass
802.11G	CH1	14.83	30.00	Pass
	CH6	15.91	30.00	Pass
	CH11	15.21	30.00	Pass
	CH12	5.11	30.00	Pass
	CH13	4.96	30.00	Pass
802.11N20	CH1	13.84	30.00	Pass
	CH6	14.85	30.00	Pass
	CH11	14.14	30.00	Pass
	CH12	5.28	30.00	Pass
	CH13	5.04	30.00	Pass

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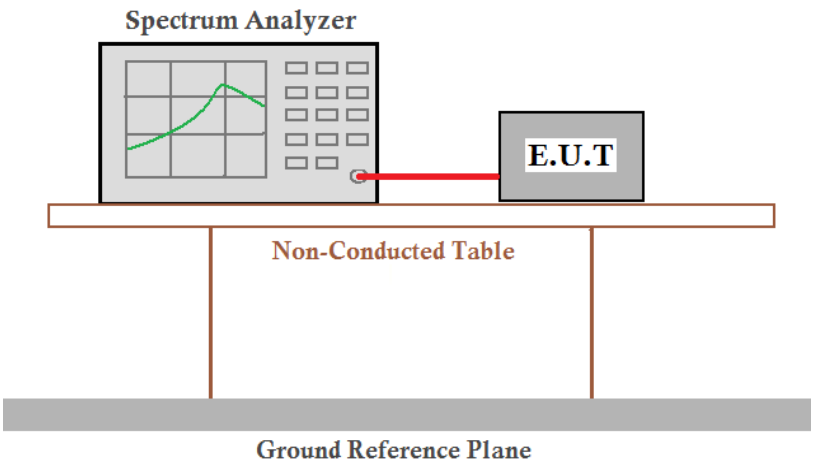
4.5 DTS (6 dB) Bandwidth & 99% Occupied Bandwidth

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	CH1	12.73	9.03	≥500	Pass
	CH6	12.85	8.55	≥500	Pass
	CH11	12.85	8.51	≥500	Pass
	CH12	12.76	8.51	≥500	Pass
	CH13	12.94	8.99	≥500	Pass
802.11G	CH1	16.67	15.72	≥500	Pass
	CH6	16.98	15.72	≥500	Pass
	CH11	16.67	15.72	≥500	Pass
	CH12	17.06	15.37	≥500	Pass
	CH13	17.11	16.11	≥500	Pass
802.11N20	CH1	17.76	16.32	≥500	Pass
	CH6	18.06	16.37	≥500	Pass
	CH11	17.76	16.63	≥500	Pass
	CH12	18.06	17.63	≥500	Pass
	CH13	18.06	17.67	≥500	Pass

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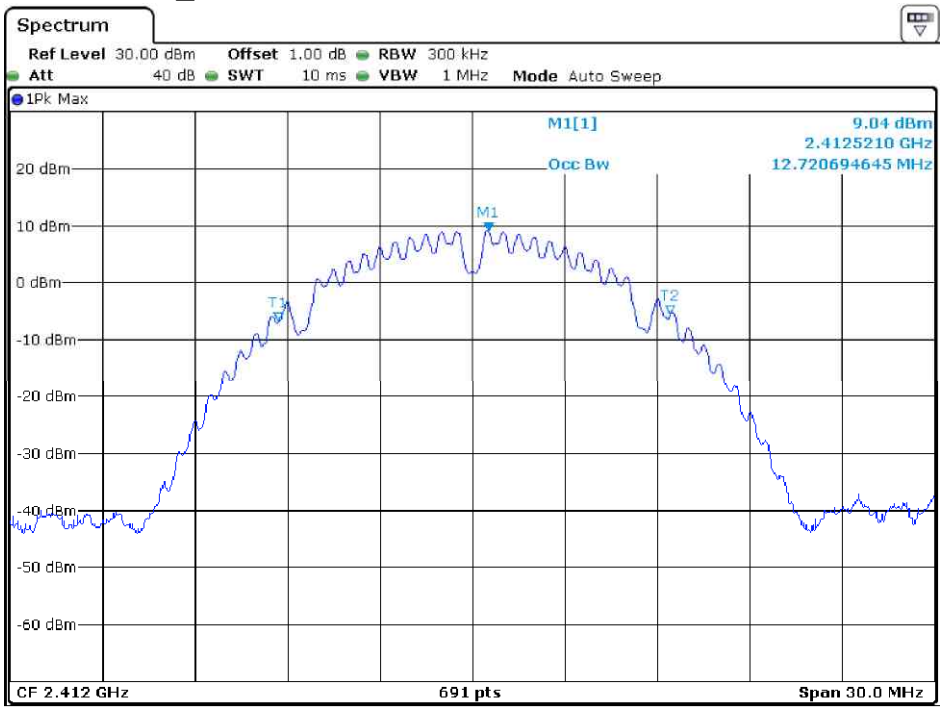
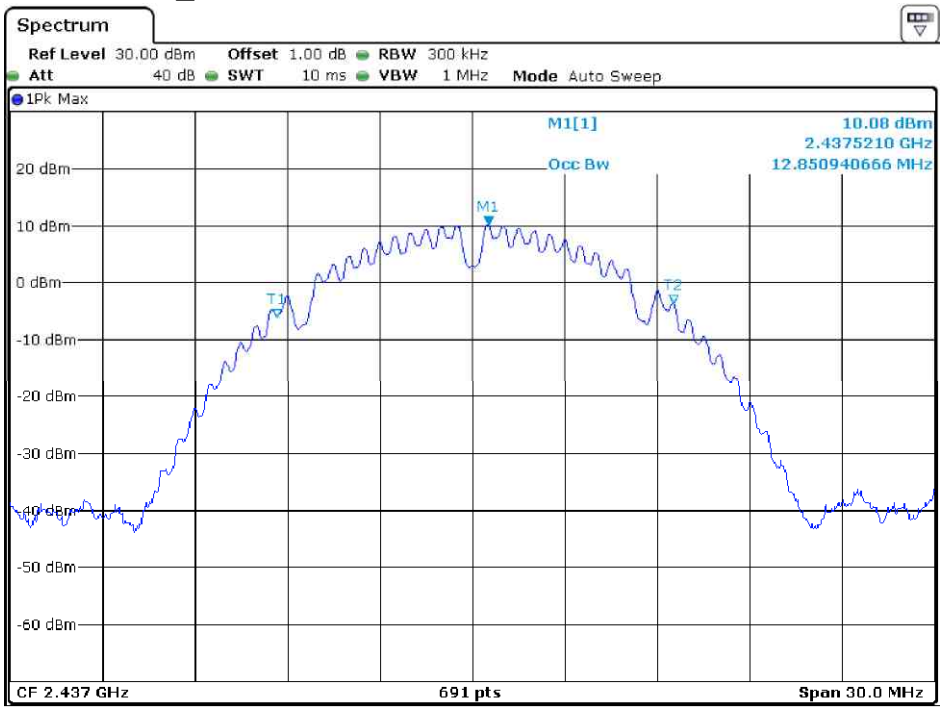
4.5.2 Test plots For Occupied Bandwidth

4.5.2.1 802.11B_CH1



Date: 15.JUL.2020 12:35:42

4.5.2.2 802.11B_CH6



Date: 15.JUL.2020 12:36:01

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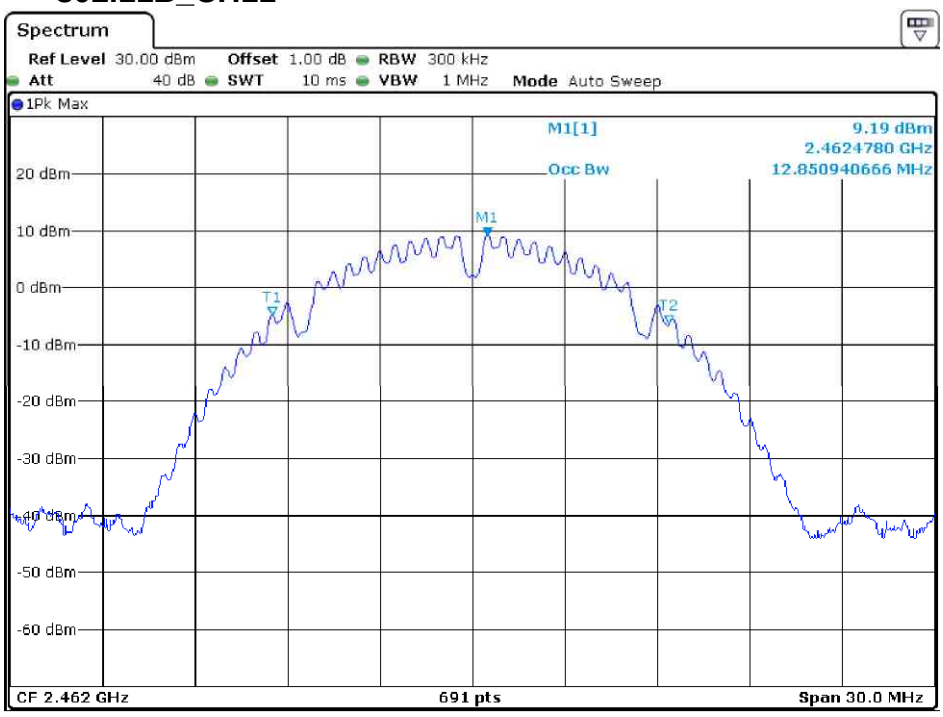
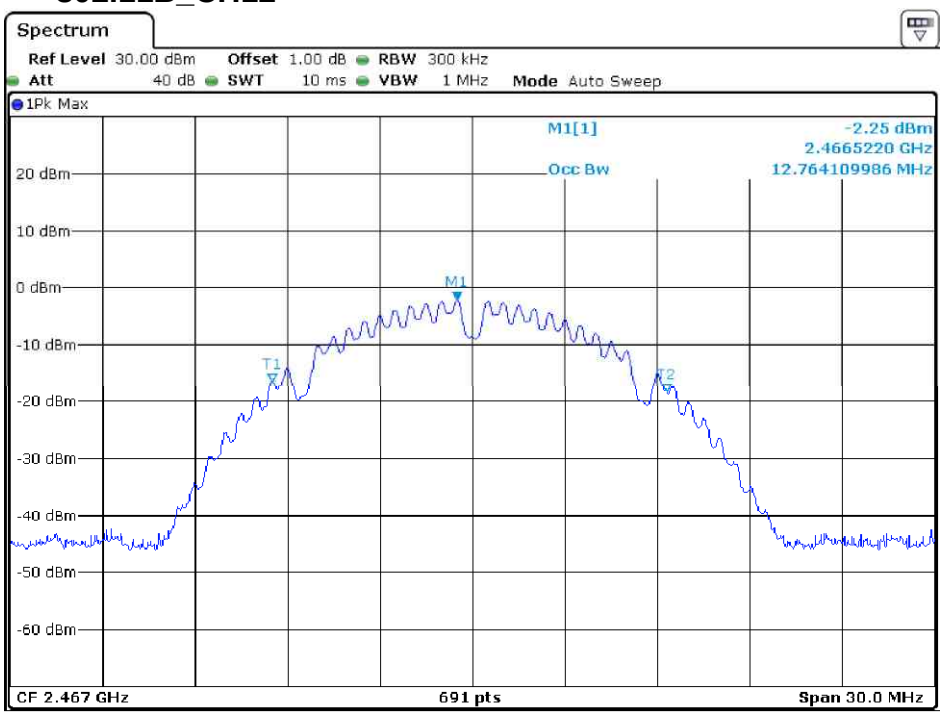
4.5.2.3 802.11B_CH11



Date: 15.JUL.2020 12:36:14

4.5.2.4 802.11B_CH12



Date: 15.JUL.2020 12:36:31

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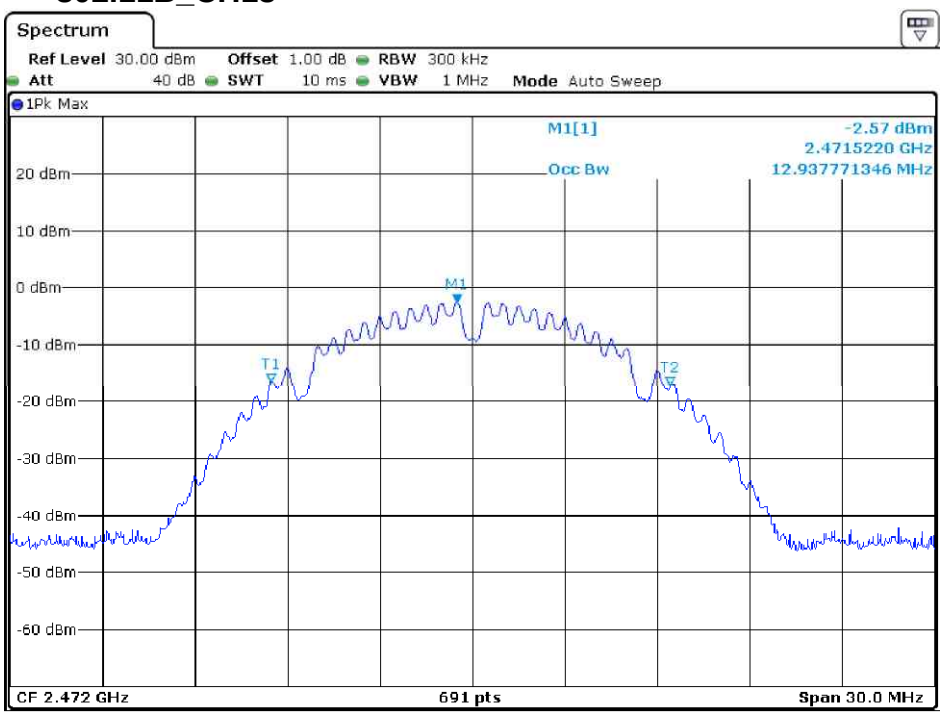
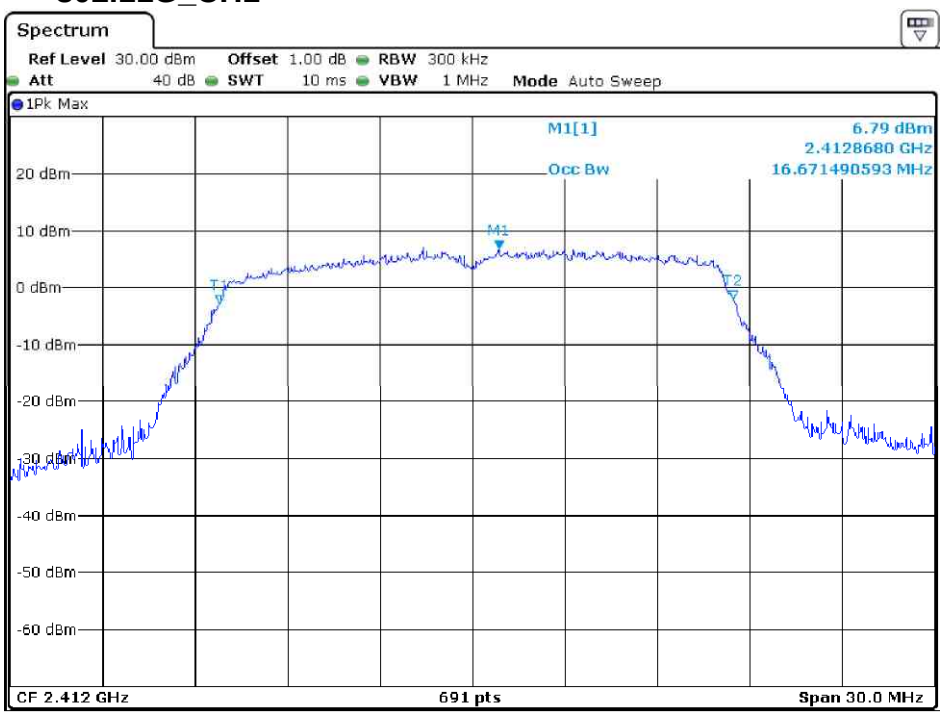
4.5.2.5 802.11B_CH13



Date: 15.JUL.2020 12:36:44

4.5.2.6 802.11G_CH1



Date: 15.JUL.2020 12:38:14

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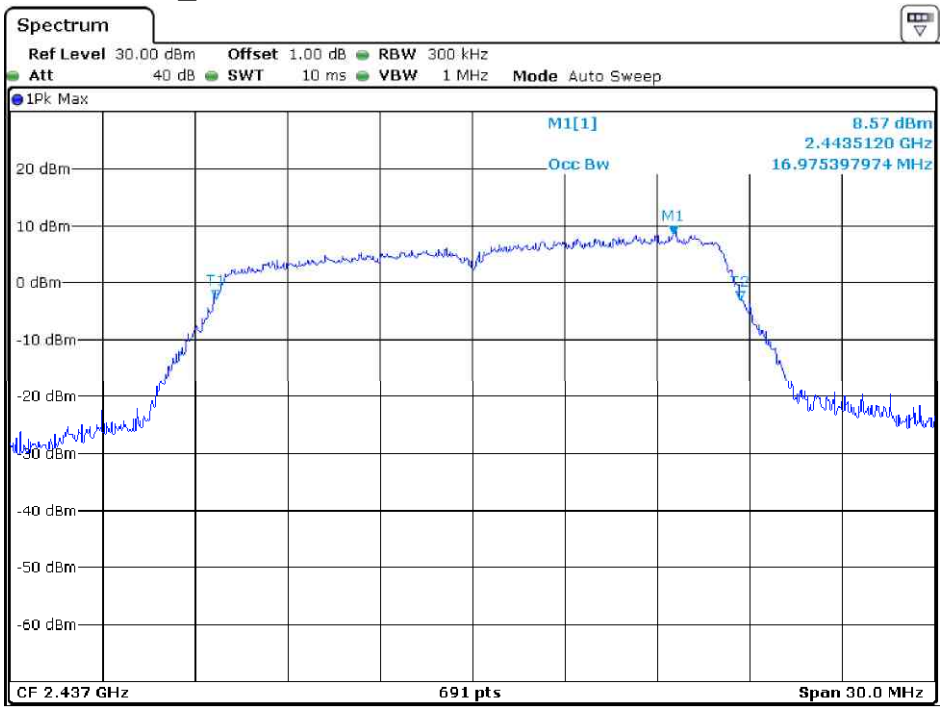
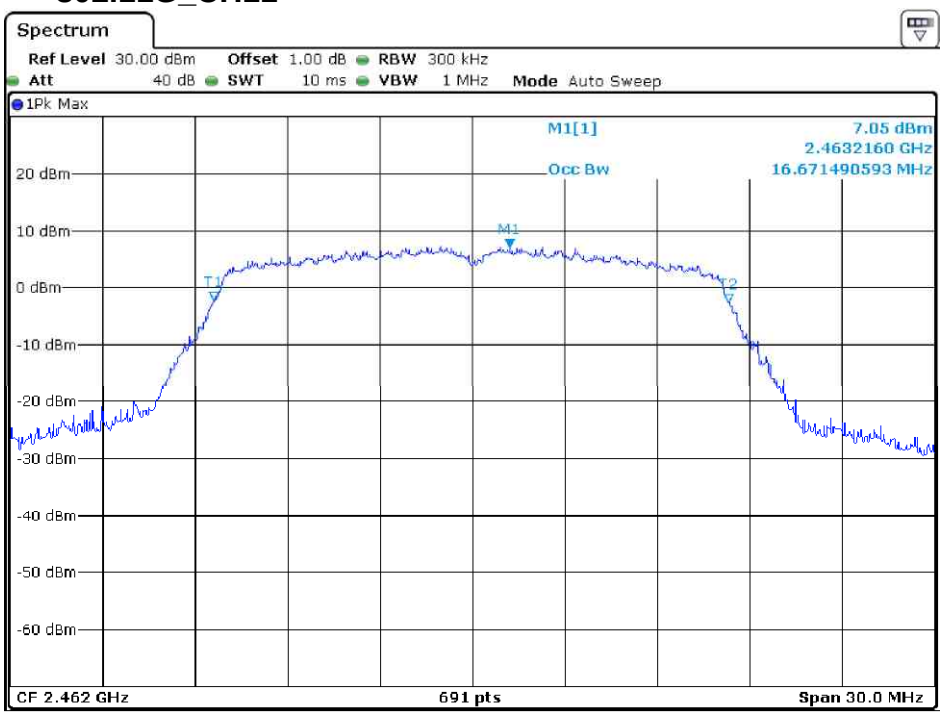
4.5.2.7 802.11G_CH6



Date: 15.JUL.2020 12:37:52

4.5.2.8 802.11G_CH11



Date: 15.JUL.2020 12:37:39

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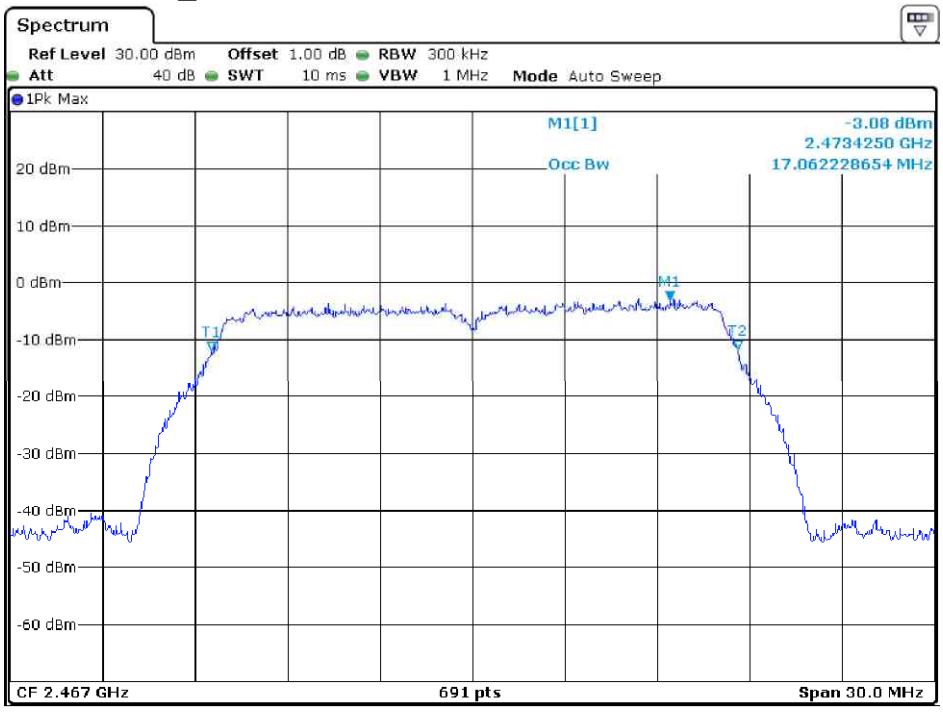
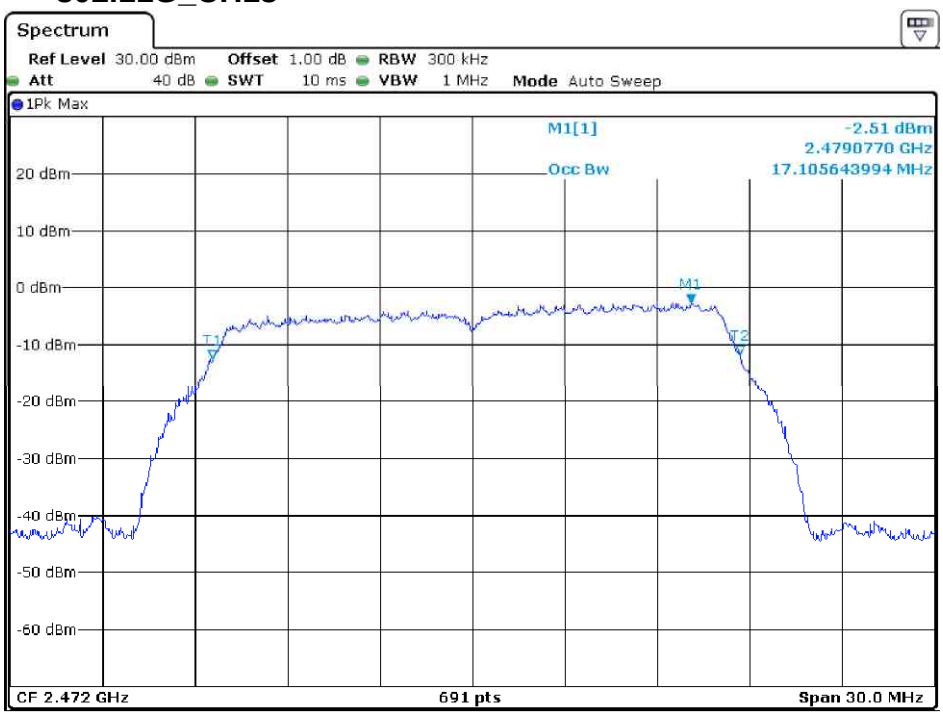
4.5.2.9 802.11G_CH12



Date: 15.JUL.2020 12:37:24

4.5.2.10 802.11G_CH13



Date: 15.JUL.2020 12:37:08

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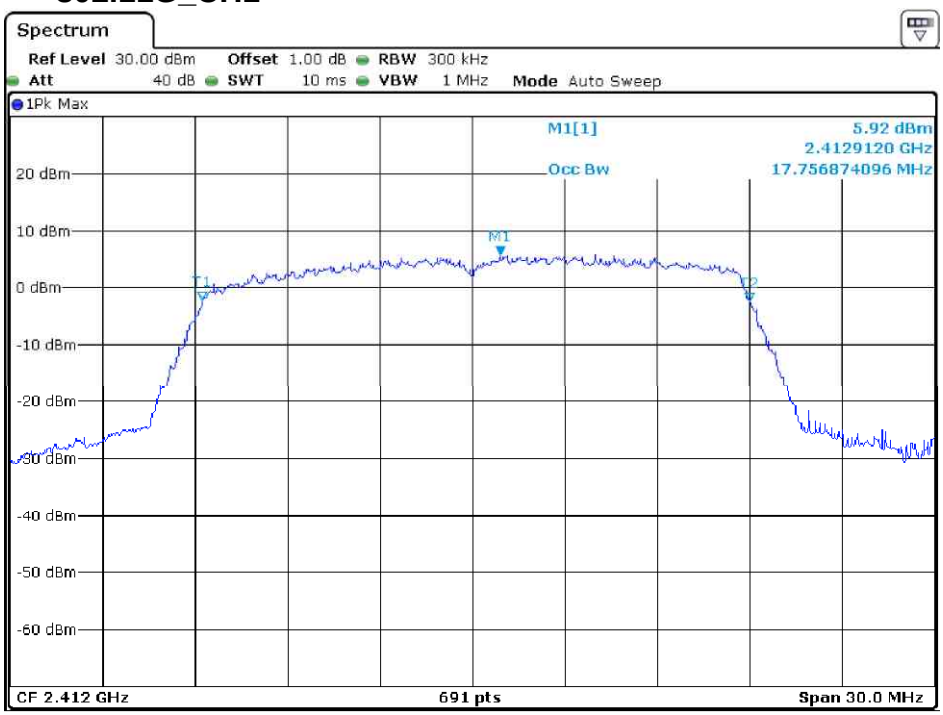
4.5.2.11 802.11G_CH1



Date: 15.JUL.2020 12:35:14

4.5.2.12 802.11G_CH6

Date: 15.JUL.2020 12:34:40

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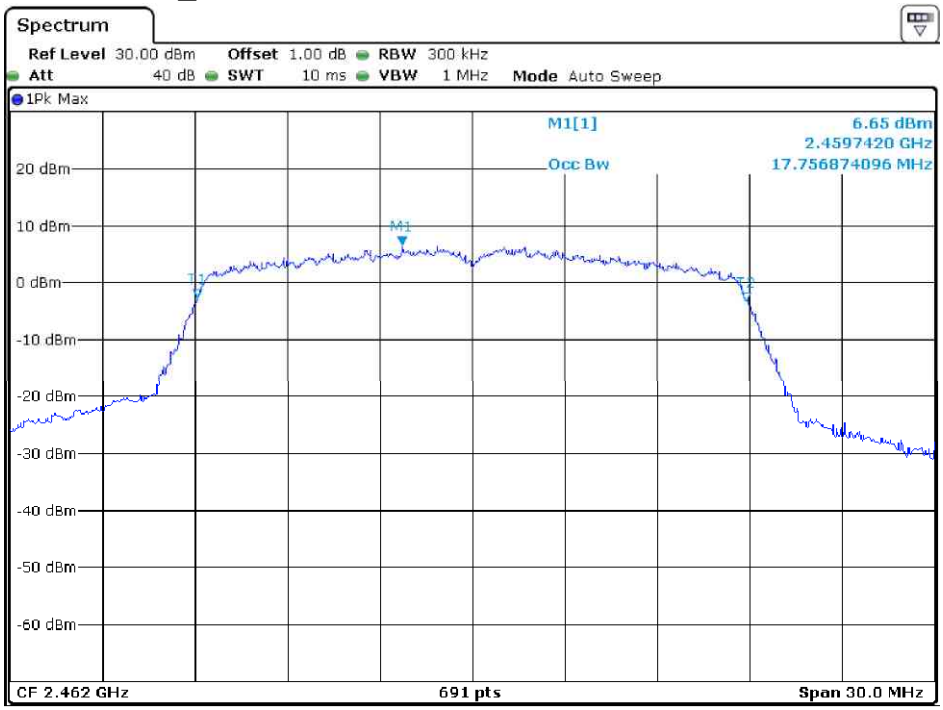
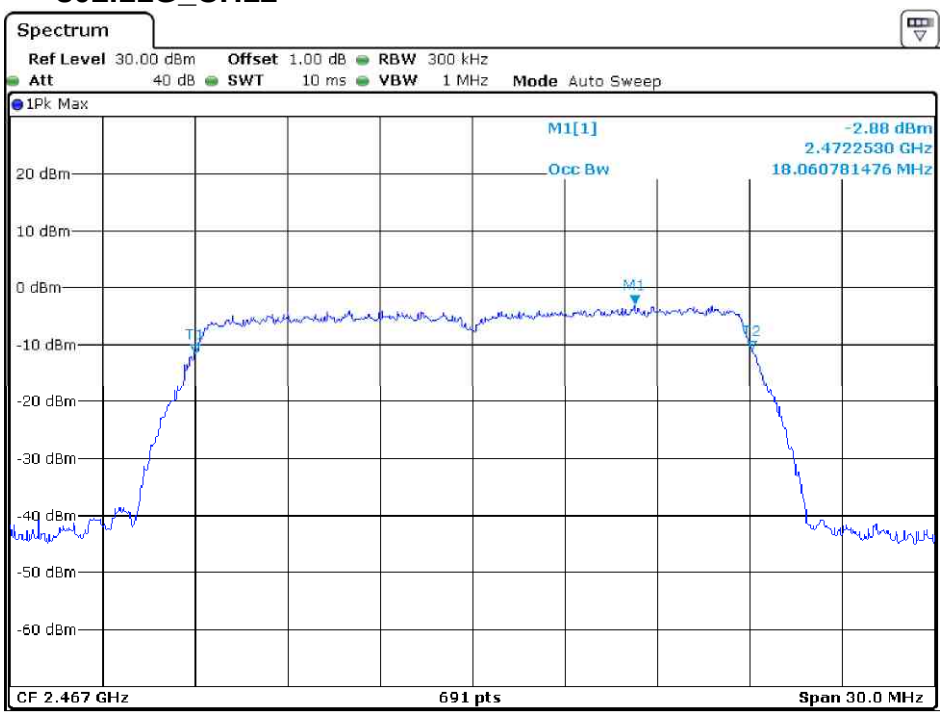
4.5.2.13 802.11G_CH11



Date: 15.JUL.2020 12:30:03

4.5.2.14 802.11G_CH12



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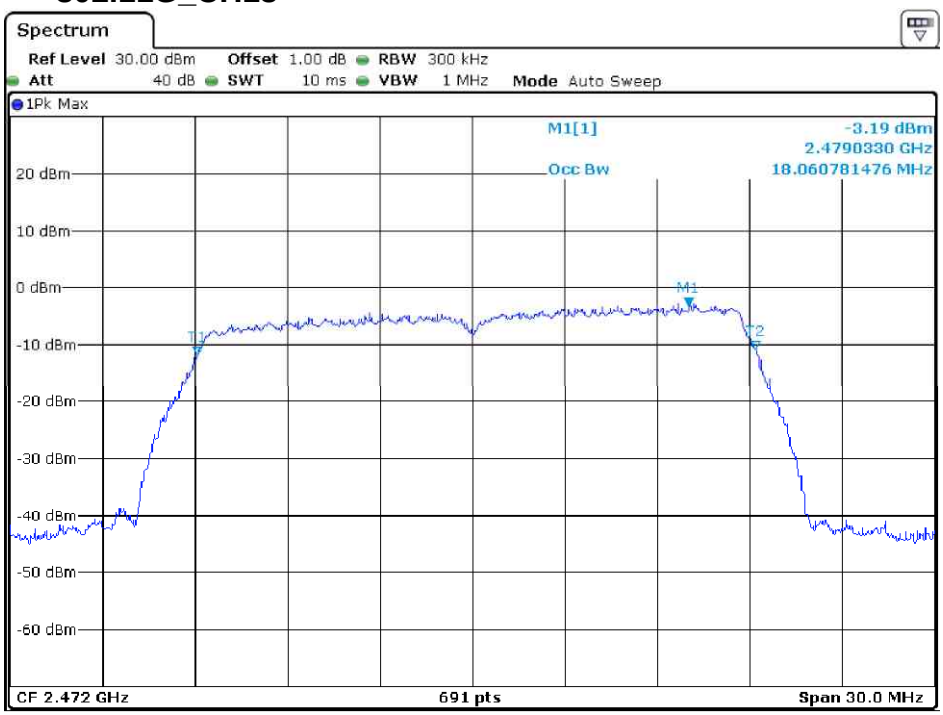
4.5.2.15 802.11G_CH13



Date: 15.JUL.2020 12:29:24

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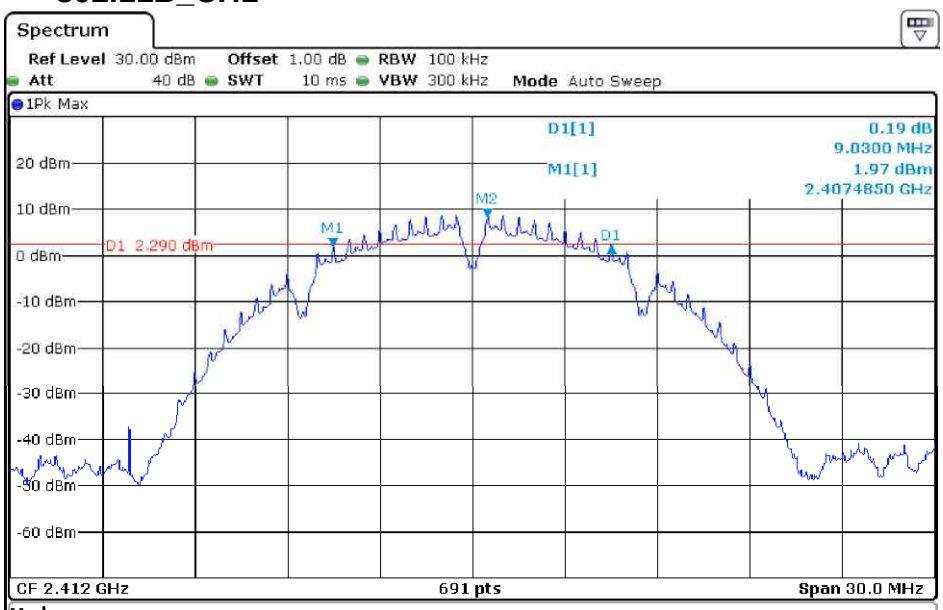
4.5.3 Test plots For 6dB Emission Bandwidth

4.5.3.1 802.11B_CH1

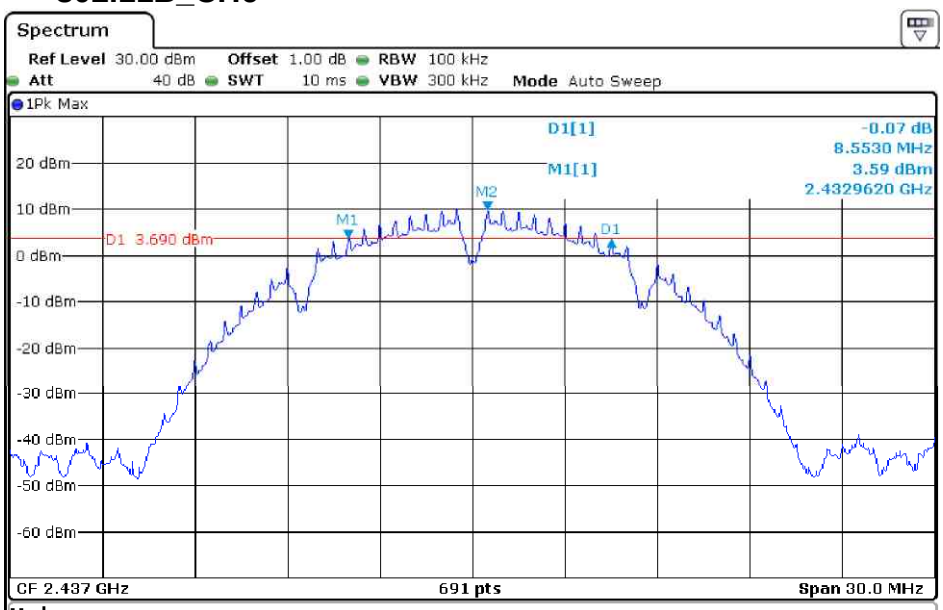


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.407485 GHz	1.97 dBm		
D1	M1	1	9.03 MHz	0.19 dB		
M2		1	2.412478 GHz	8.29 dBm		

Date: 15.JUL.2020 12:24:40

4.5.3.2 802.11B_CH6



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.432962 GHz	3.59 dBm		
D1	M1	1	8.553 MHz	-0.07 dB		
M2		1	2.437478 GHz	9.69 dBm		

Date: 15.JUL.2020 12:23:58

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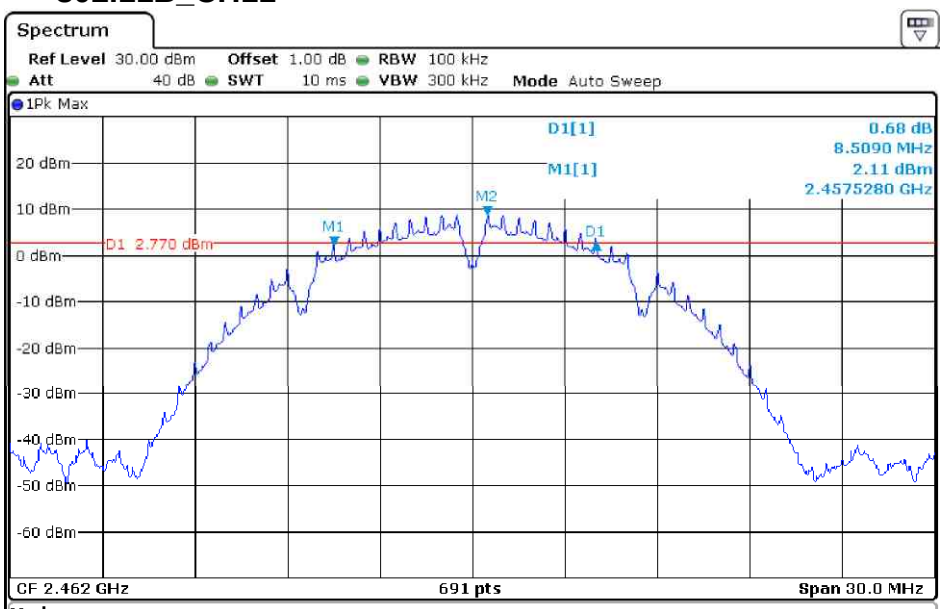
4.5.3.3 802.11B_CH11

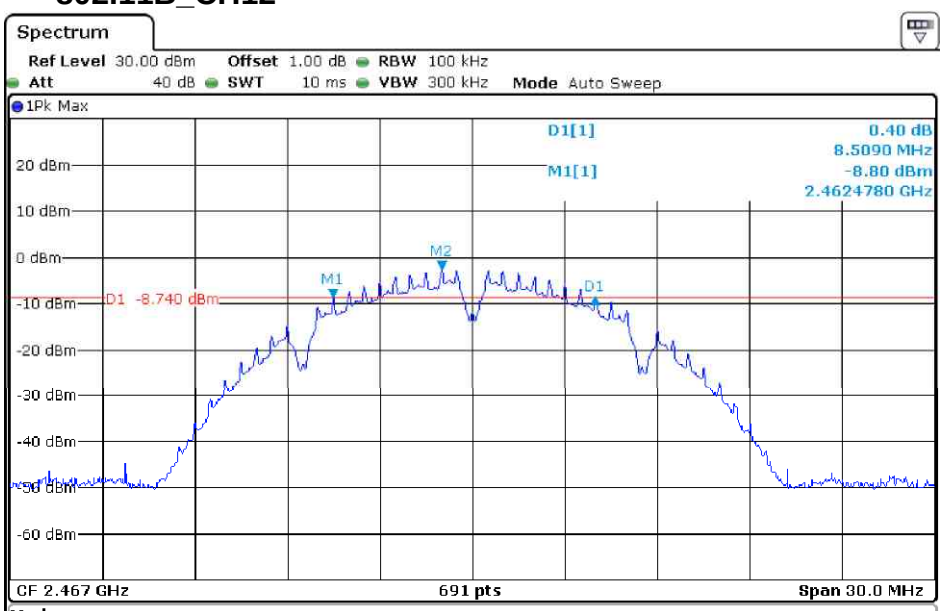


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.457528 GHz	2.11 dBm		
D1	M1	1	8.509 MHz	0.68 dB		
M2		1	2.462478 GHz	8.77 dBm		

Date: 15.JUL.2020 12:23:07

4.5.3.4 802.11B_CH12



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.462478 GHz	-8.80 dBm		
D1	M1	1	8.509 MHz	0.40 dB		
M2		1	2.466001 GHz	-2.74 dBm		

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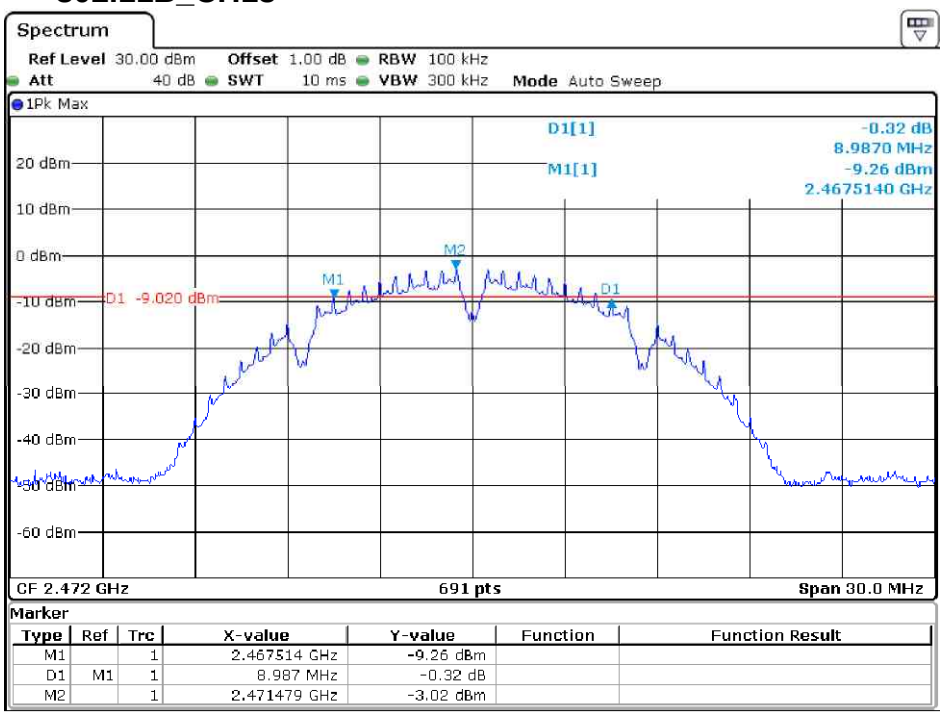
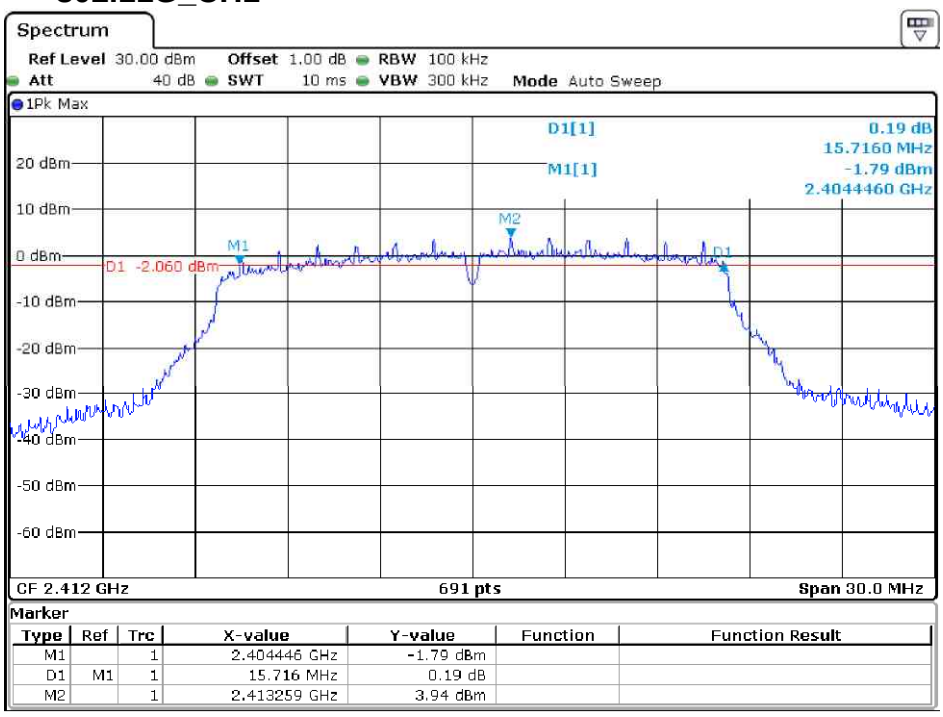
4.5.3.5 802.11B_CH13



Date: 15.JUL.2020 12:21:40

4.5.3.6 802.11G_CH1



Date: 15.JUL.2020 12:09:12

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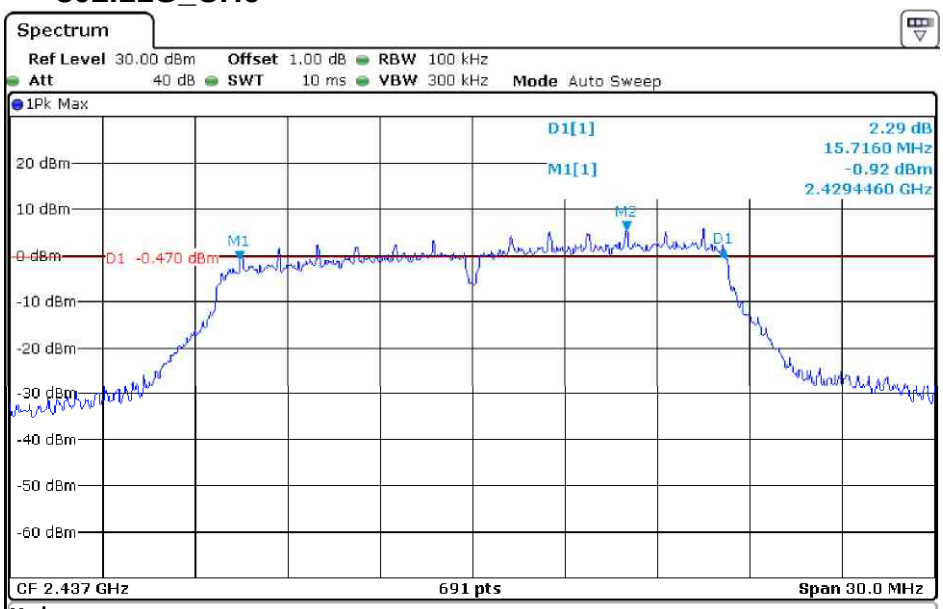
4.5.3.7 802.11G_CH6

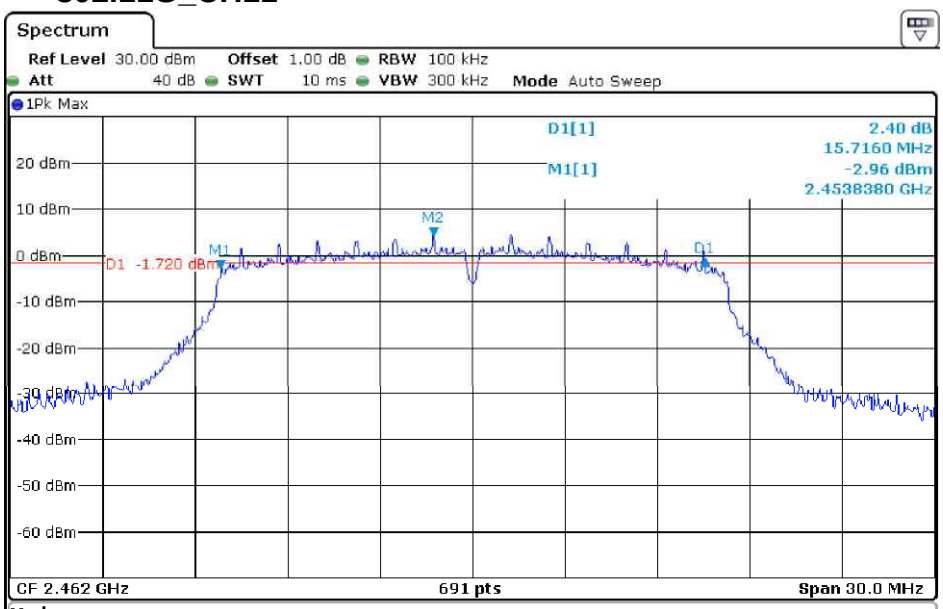


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.429446 GHz	-0.92 dBm		
D1	M1	1	15.716 MHz	2.29 dB		
M2		1	2.441993 GHz	5.53 dBm		

Date: 15.JUL.2020 12:09:59

4.5.3.8 802.11G_CH11



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.453838 GHz	-2.96 dBm		
D1	M1	1	15.716 MHz	2.40 dB		
M2		1	2.460741 GHz	4.28 dBm		

Date: 15.JUL.2020 12:10:45

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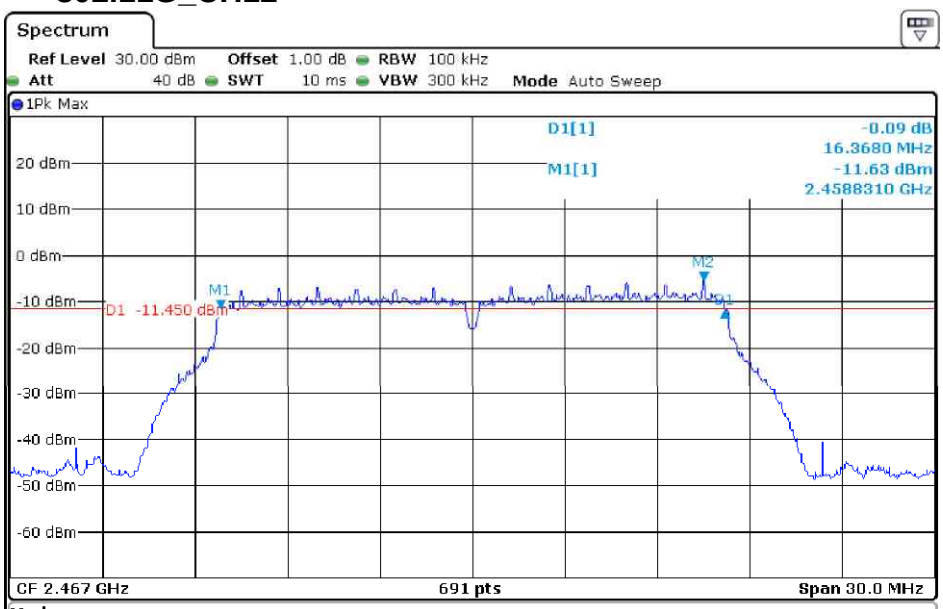
4.5.3.9 802.11G_CH12

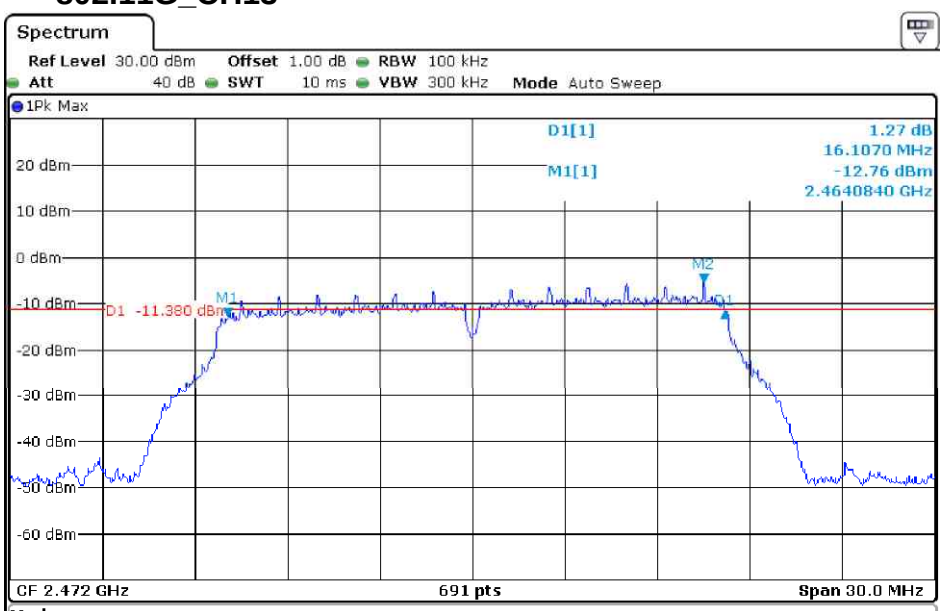


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.458831 GHz	-11.63 dBm		
D1	M1	1	16.368 MHz	-0.09 dB		
M2		1	2.474511 GHz	-5.45 dBm		

Date: 15.JUL.2020 12:20:05

4.5.3.10 802.11G_CH13



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.464084 GHz	-12.76 dBm		
D1	M1	1	16.107 MHz	1.27 dB		
M2		1	2.479511 GHz	-5.38 dBm		

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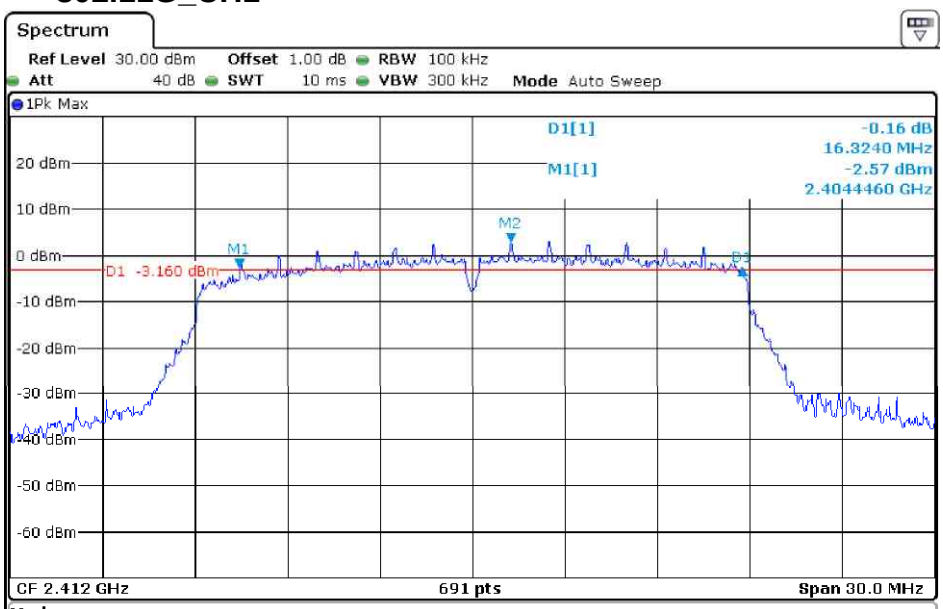
4.5.3.11 802.11G_CH1

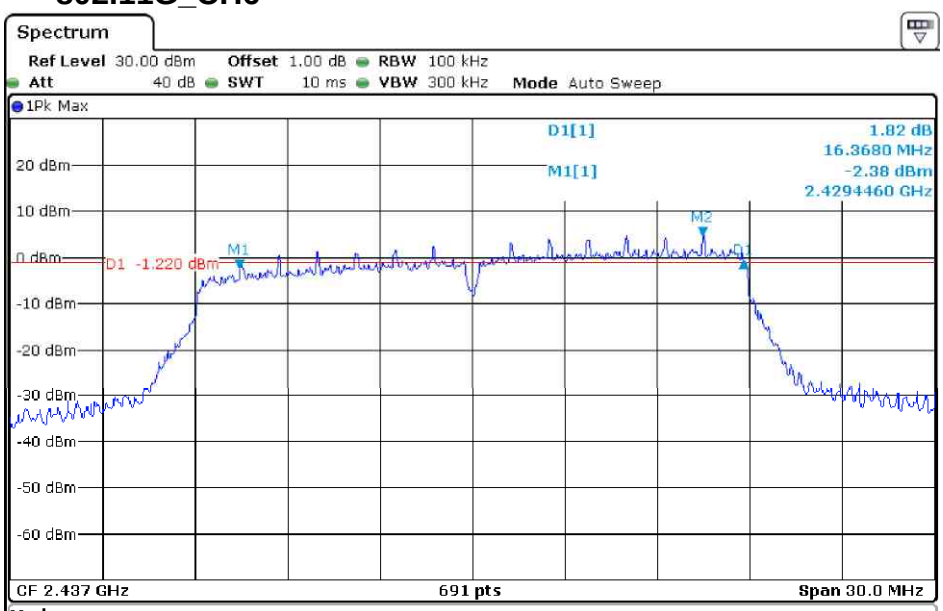


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.404446 GHz	-2.57 dBm		
D1	M1	1	16.324 MHz	-0.16 dB		
M2		1	2.413259 GHz	2.84 dBm		

Date: 15.JUL.2020 12:25:33

4.5.3.12 802.11G_CH6



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.429446 GHz	-2.38 dBm		
D1	M1	1	16.368 MHz	1.82 dB		
M2		1	2.444467 GHz	4.78 dBm		

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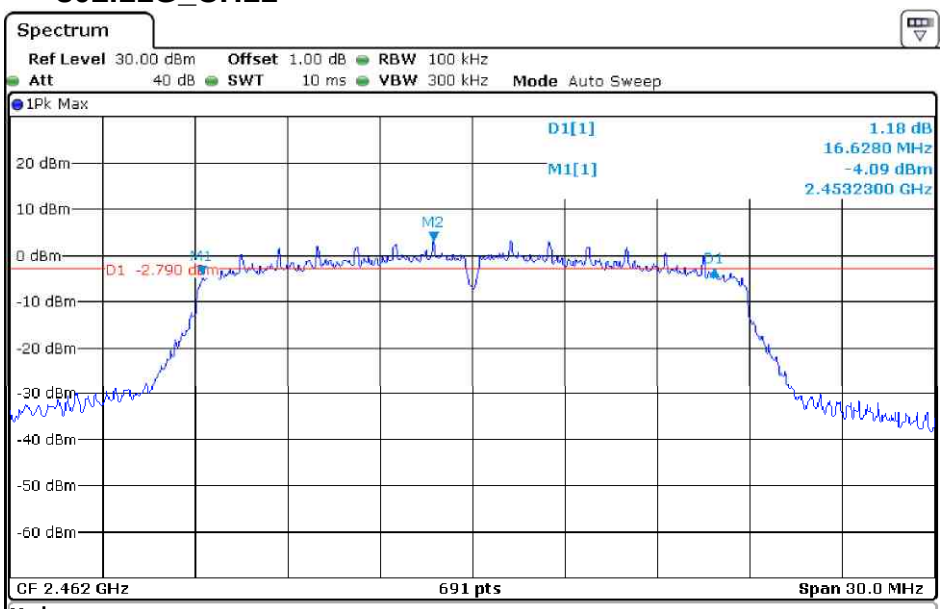
4.5.3.13 802.11G_CH11

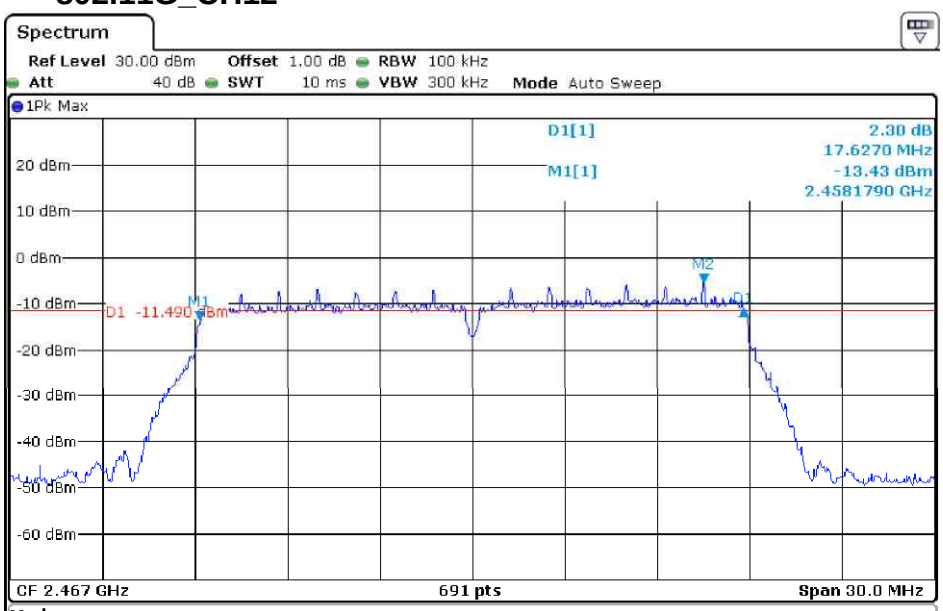


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45323 GHz	-4.09 dBm		
D1	M1	1	16.628 MHz	1.18 dB		
M2		1	2.460741 GHz	3.21 dBm		

Date: 15.JUL.2020 12:27:06

4.5.3.14 802.11G_CH12



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.458179 GHz	-13.43 dBm		
D1	M1	1	17.627 MHz	2.30 dB		
M2		1	2.474511 GHz	-5.49 dBm		

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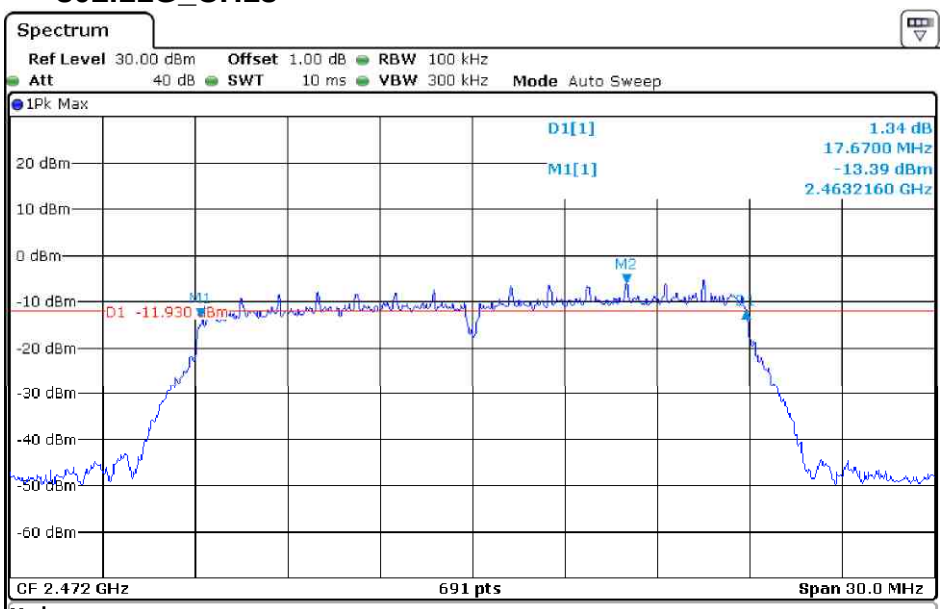
4.5.3.15 802.11G_CH13



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.463216 GHz	-13.39 dBm		
D1	M1	1	17.67 MHz	1.34 dB		
M2		1	2.476993 GHz	-5.93 dBm		

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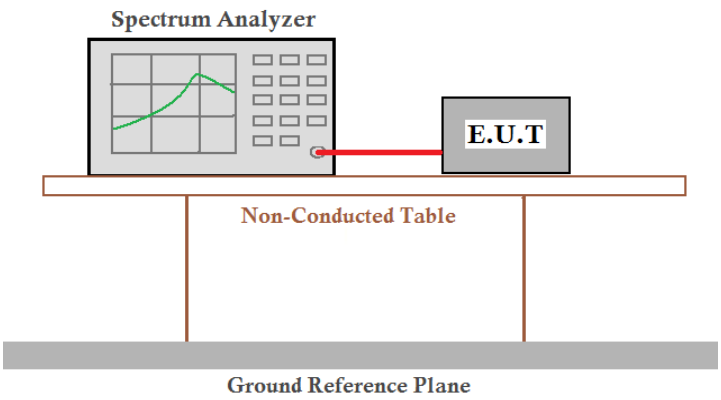
4.6 Power Spectral Density

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	CH1	-4.00	≤8.00	Pass
	CH6	-2.87	≤8.00	Pass
	CH11	-4.30	≤8.00	Pass
	CH12	-15.73	≤8.00	Pass
	CH13	-16.05	≤8.00	Pass
802.11G	CH1	-7.95	≤8.00	Pass
	CH6	-7.76	≤8.00	Pass
	CH11	-7.24	≤8.00	Pass
	CH12	-19.28	≤8.00	Pass
	CH13	-18.04	≤8.00	Pass
802.11N20	CH1	-10.09	≤8.00	Pass
	CH6	-7.99	≤8.00	Pass
	CH11	-8.73	≤8.00	Pass
	CH12	-18.29	≤8.00	Pass
	CH13	-17.61	≤8.00	Pass

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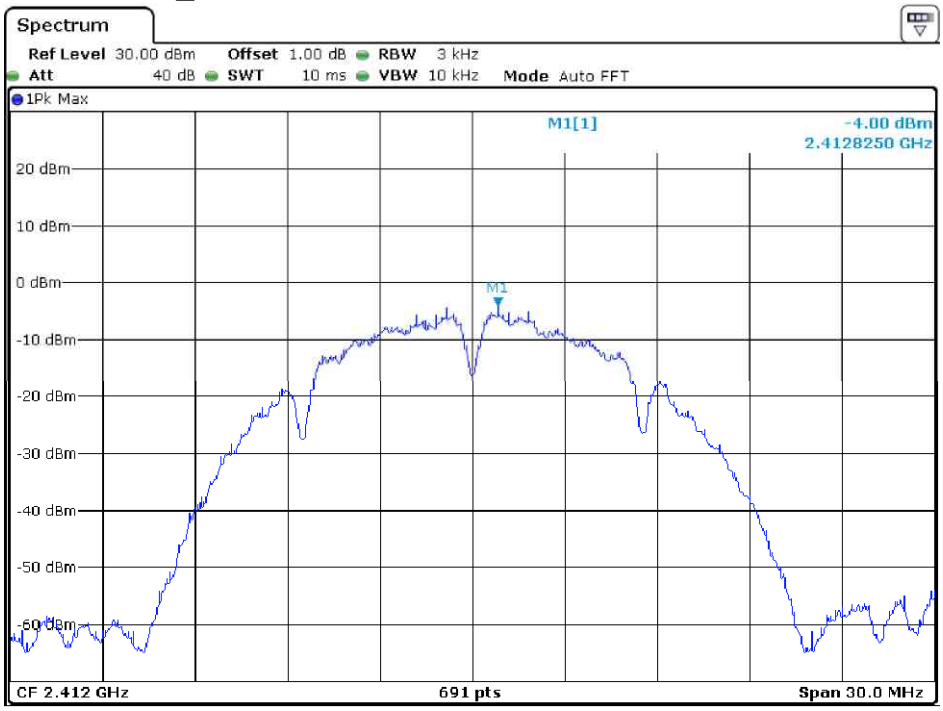
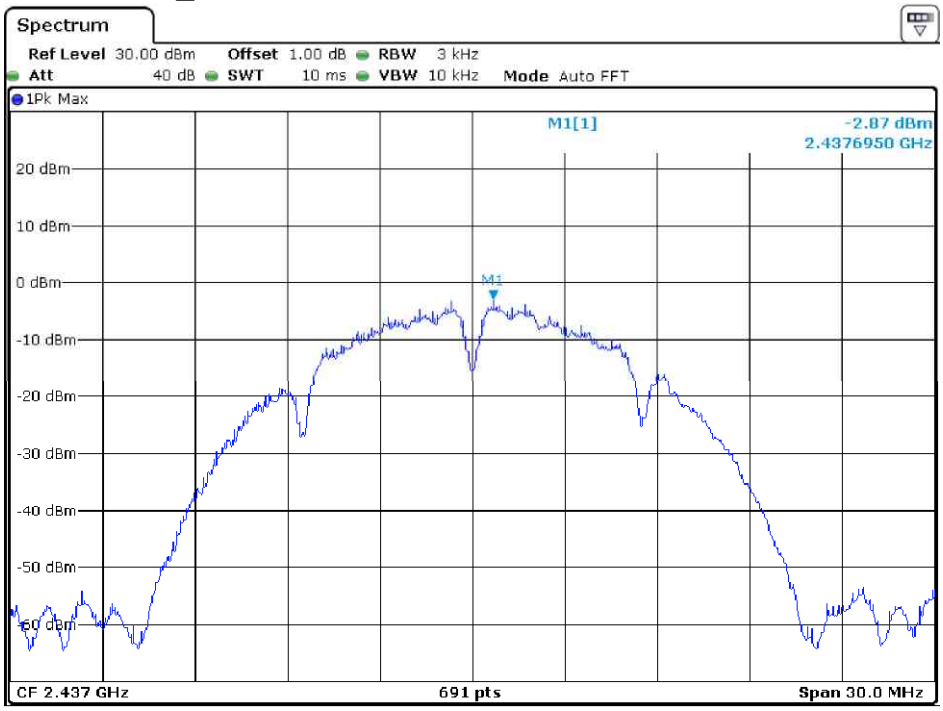
4.6.2 Test plots

4.6.2.1 802.11B_CH1



Date: 15.JUL.2020 12:04:50

4.6.2.2 802.11B_CH6



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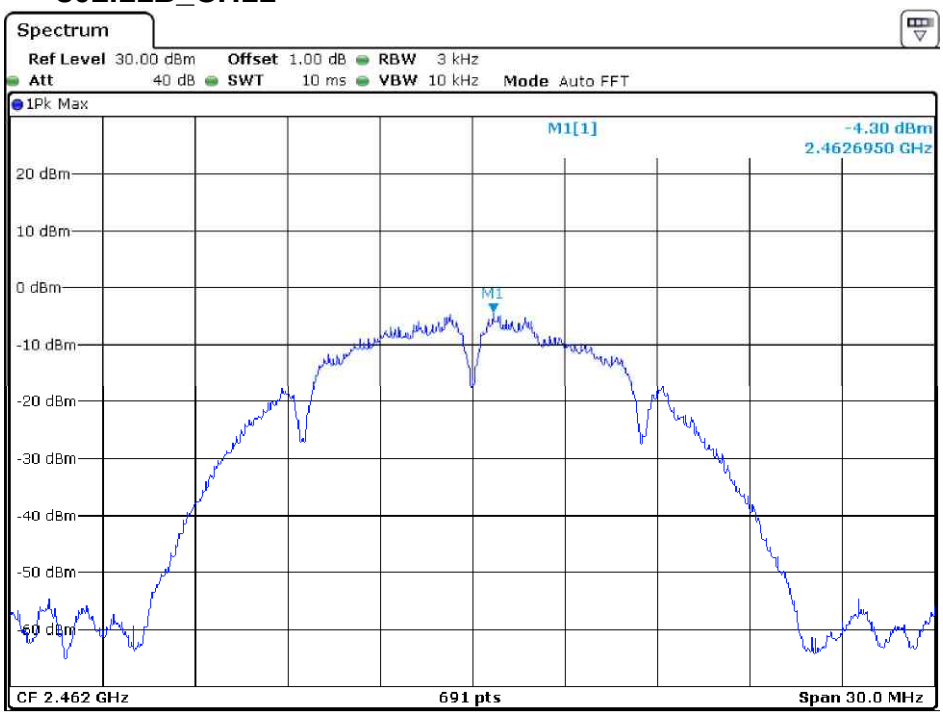
4.6.2.3 802.11B_CH11



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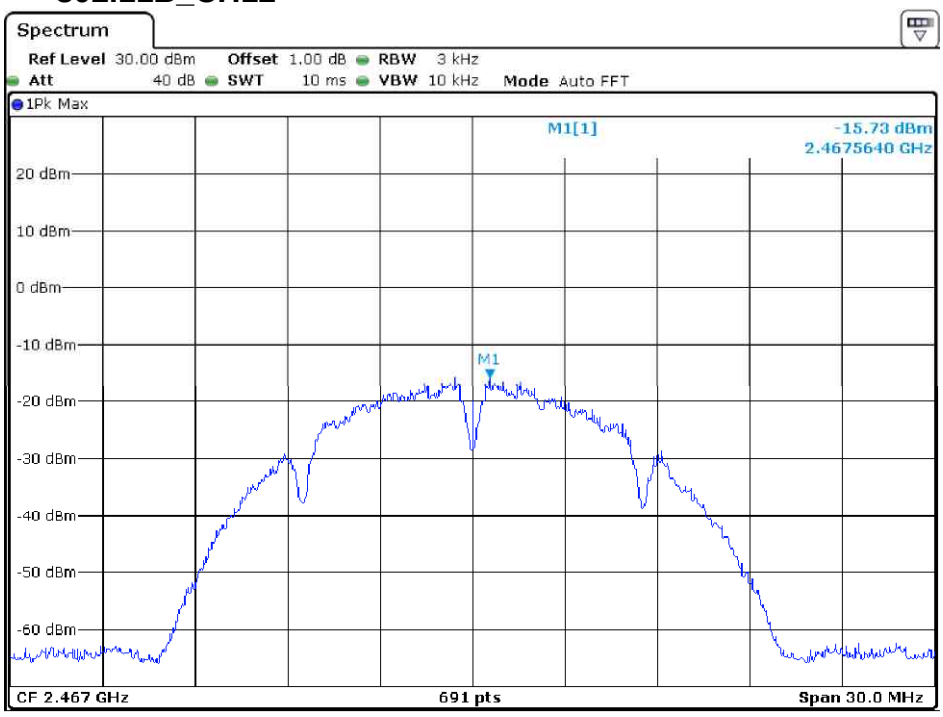
4.6.2.4 802.11B_CH12



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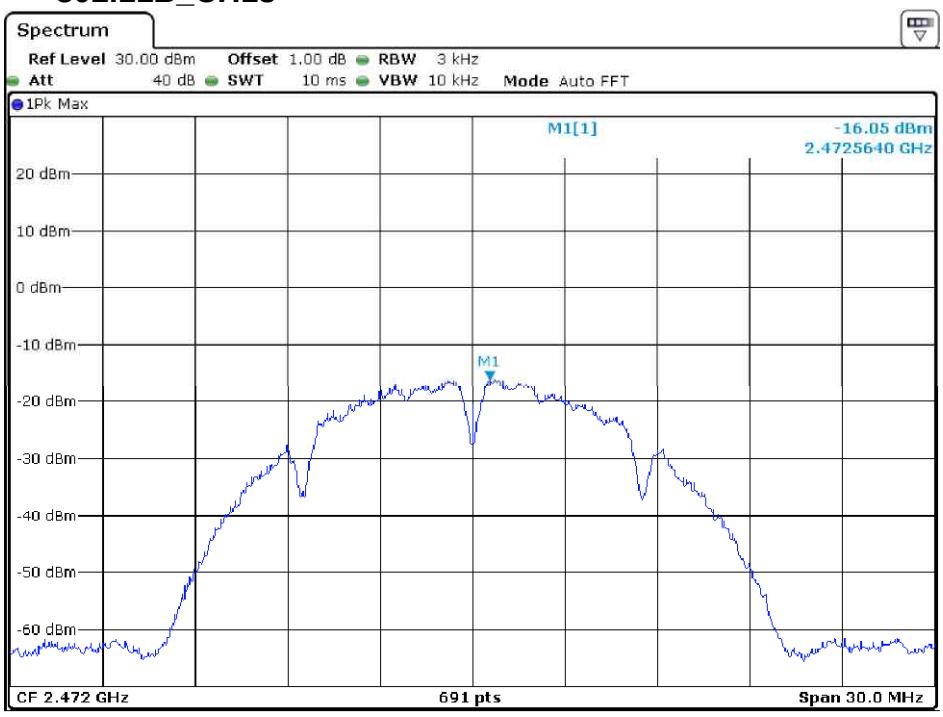
4.6.2.5 802.11B_CH13



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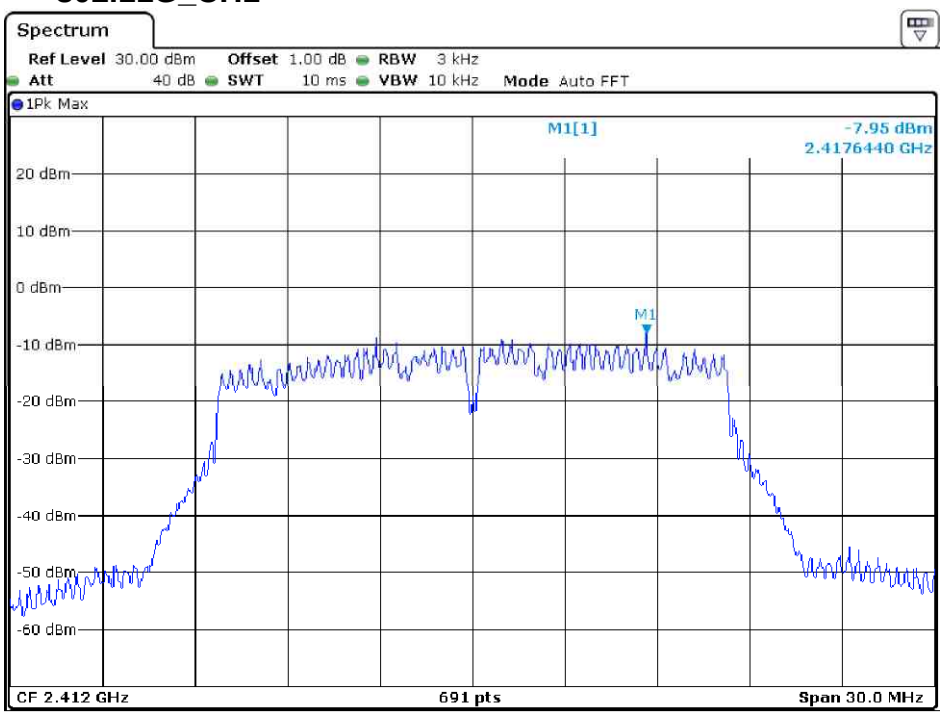
4.6.2.6 802.11G_CH1



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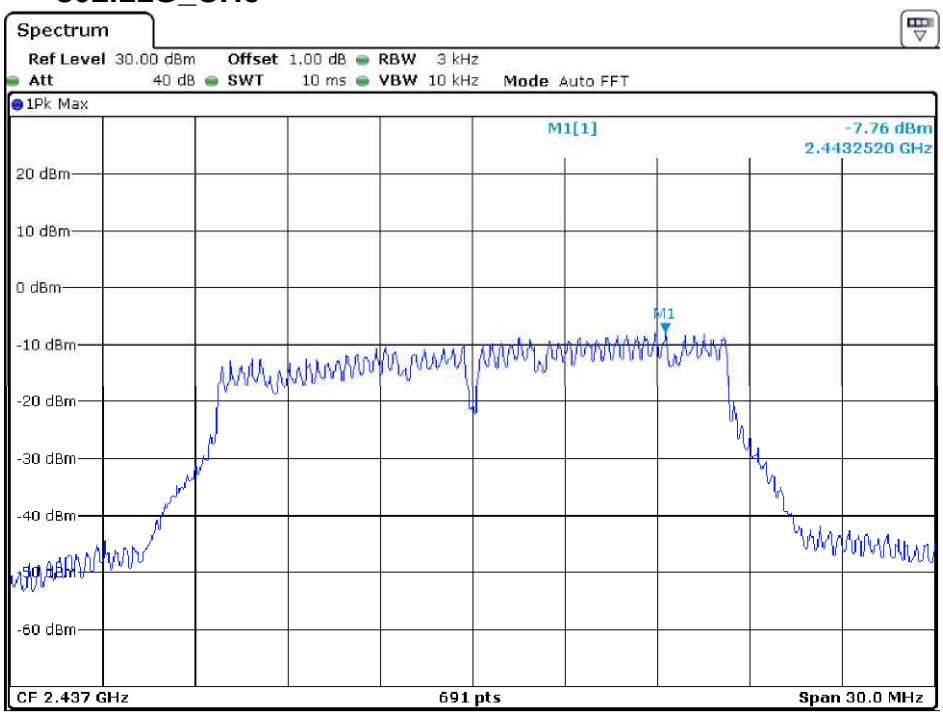
4.6.2.7 802.11G_CH6



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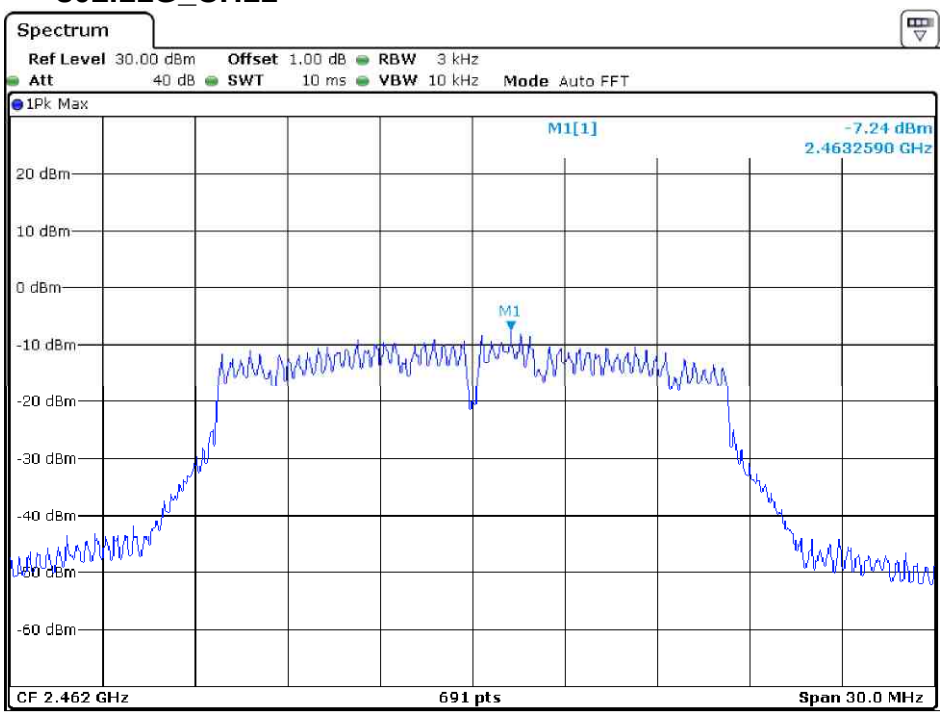
4.6.2.8 802.11G_CH11



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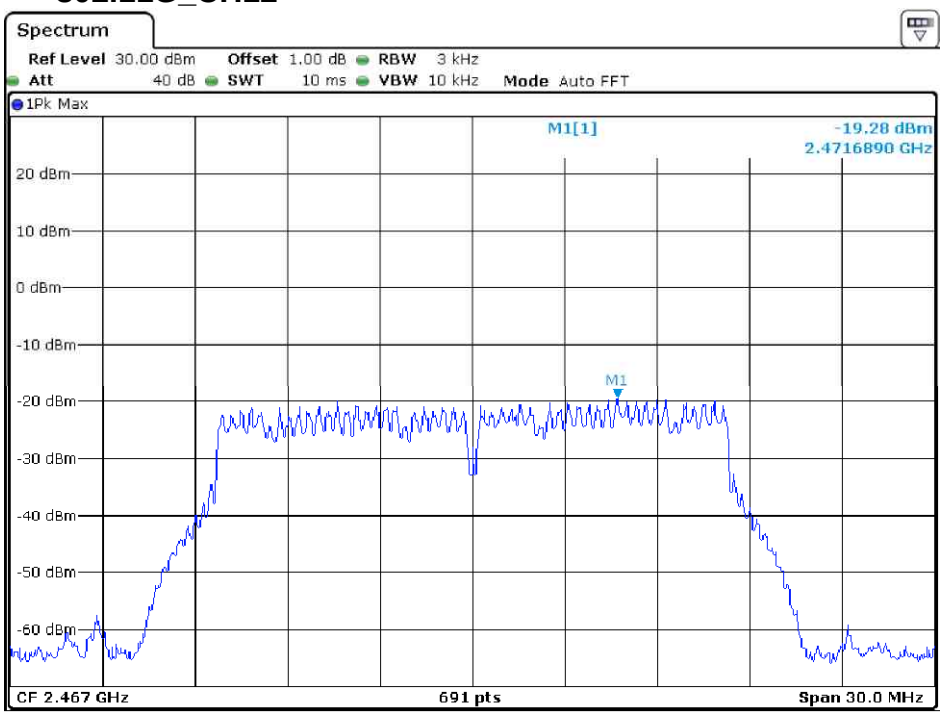
4.6.2.9 802.11G_CH12



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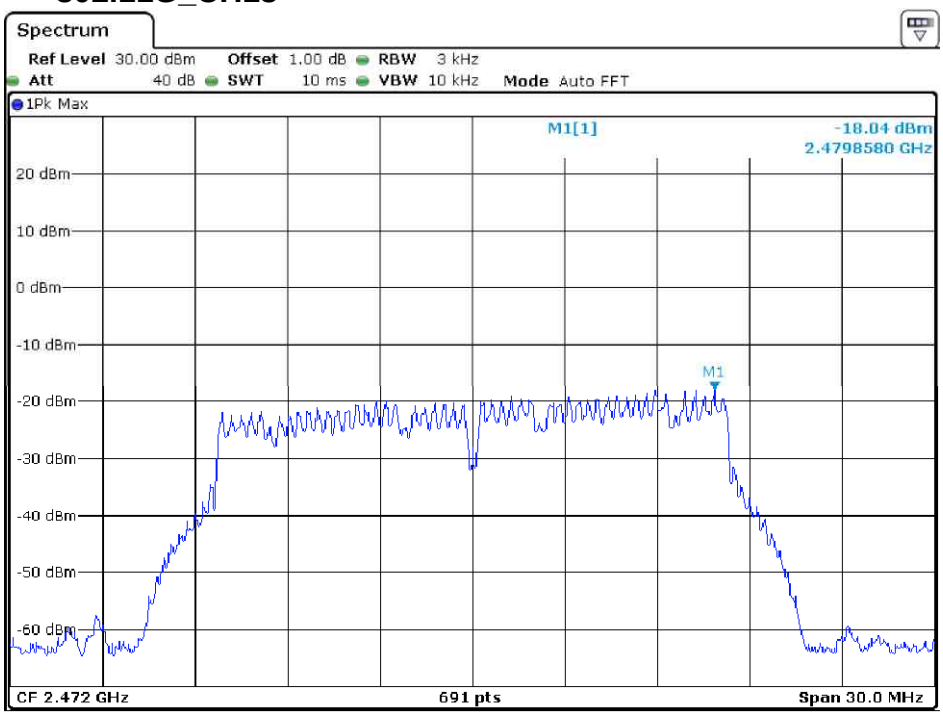
4.6.2.10 802.11G_CH13



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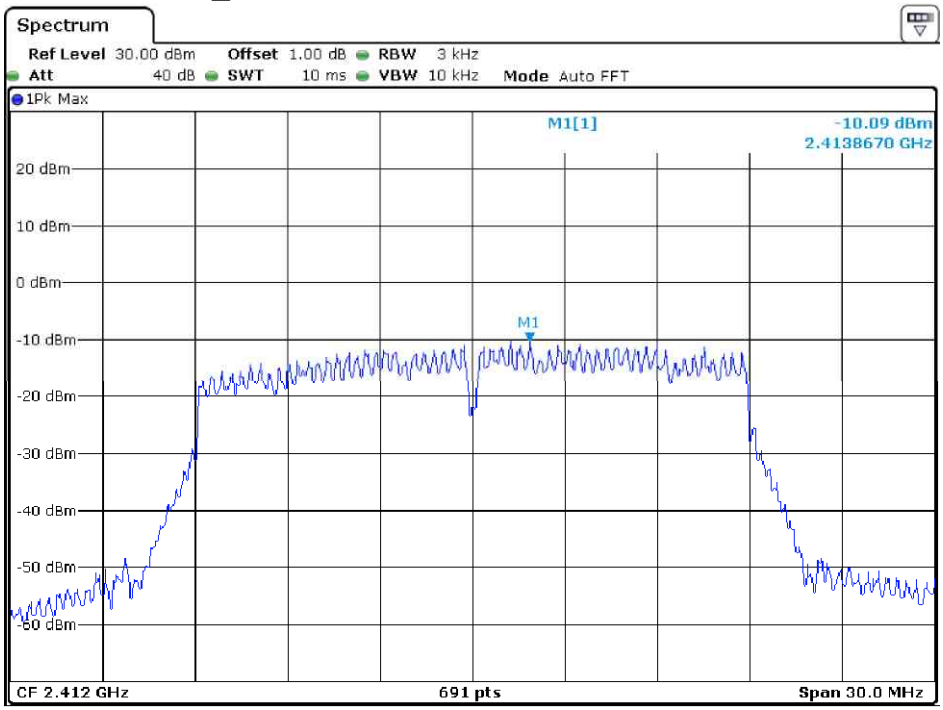
4.6.2.11 802.11N20_CH1



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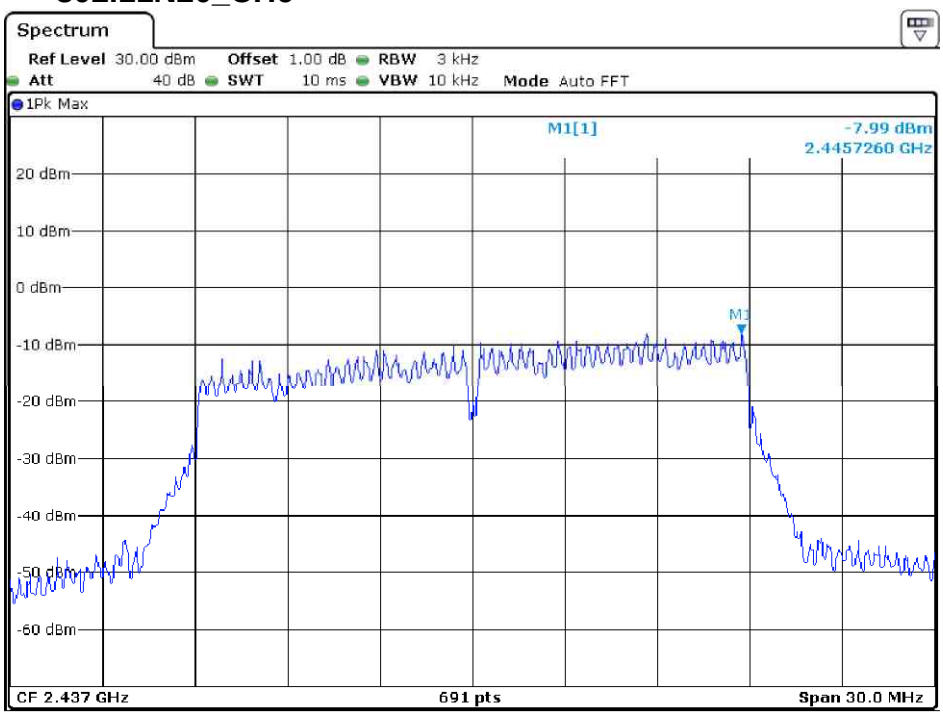
4.6.2.12 802.11N20_CH6



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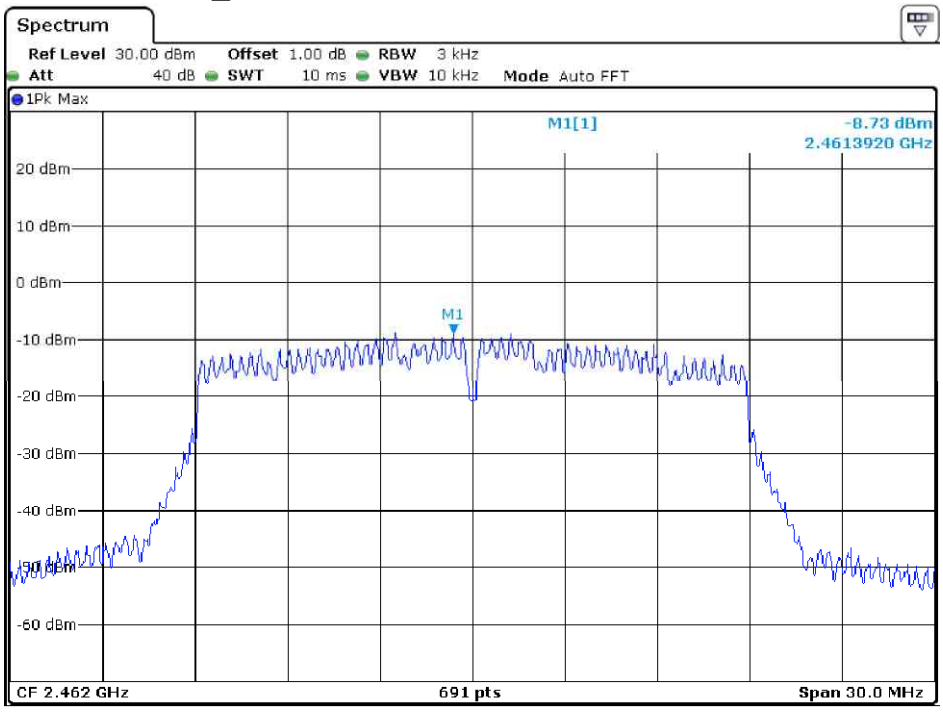
4.6.2.13 802.11N20_CH11



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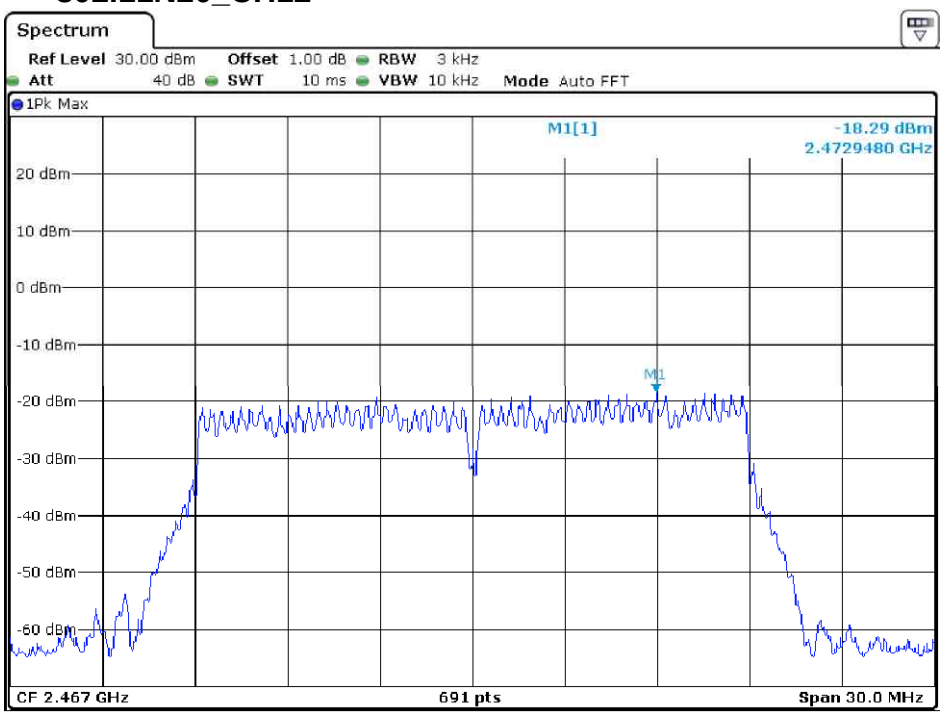
4.6.2.14 802.11N20_CH12



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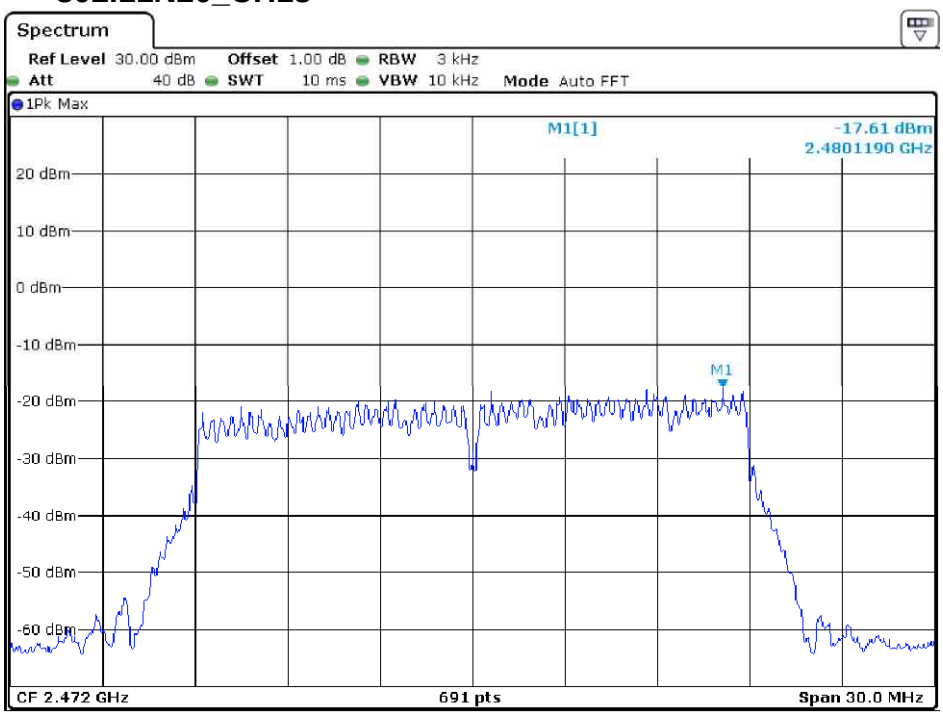
4.6.2.15 802.11N20_CH13



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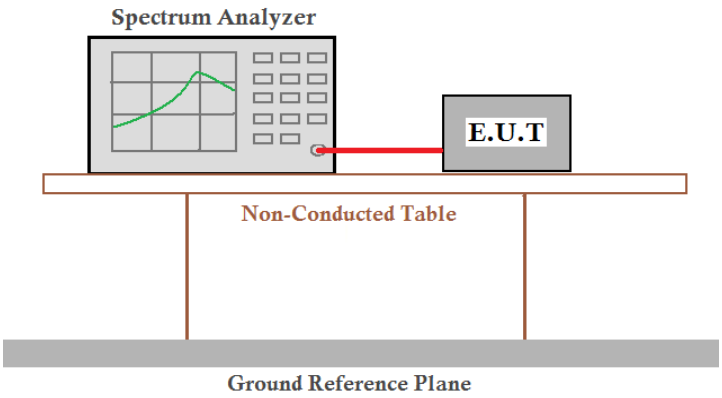
4.7 Band-edge for RF Conducted Emissions

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 radiatedmeasurement.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

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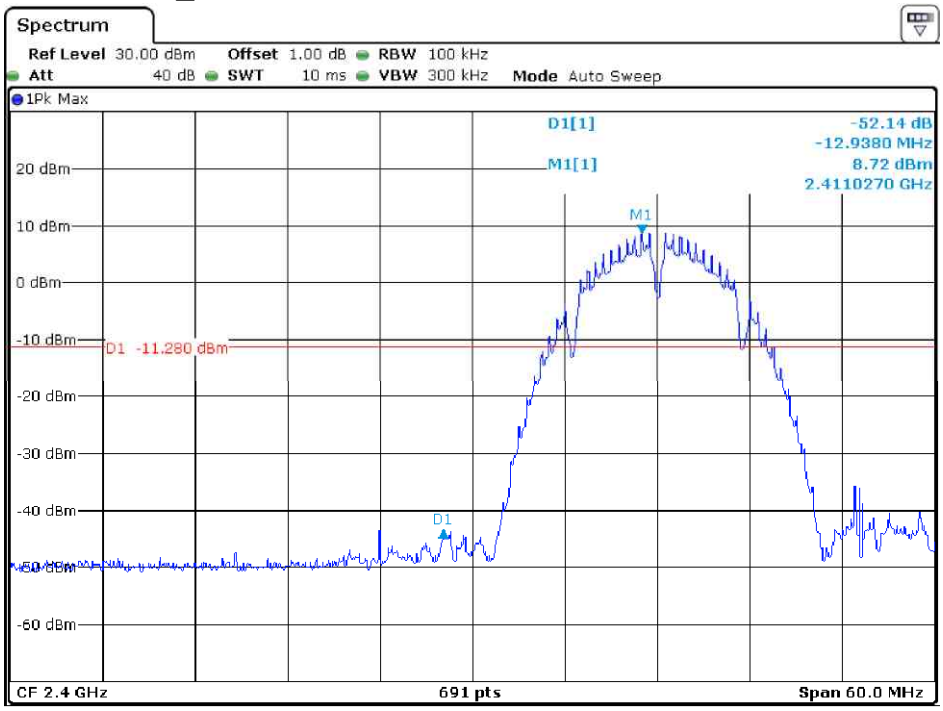
4.7.1 Test plots

4.7.1.1 802.11B_CH1



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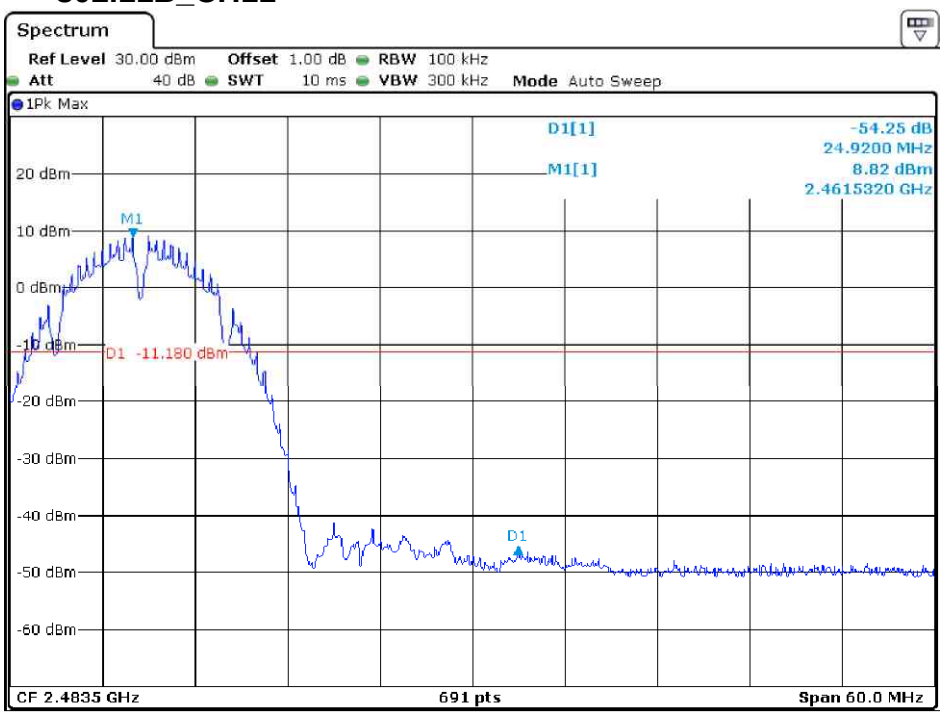
4.7.1.2 802.11B_CH11



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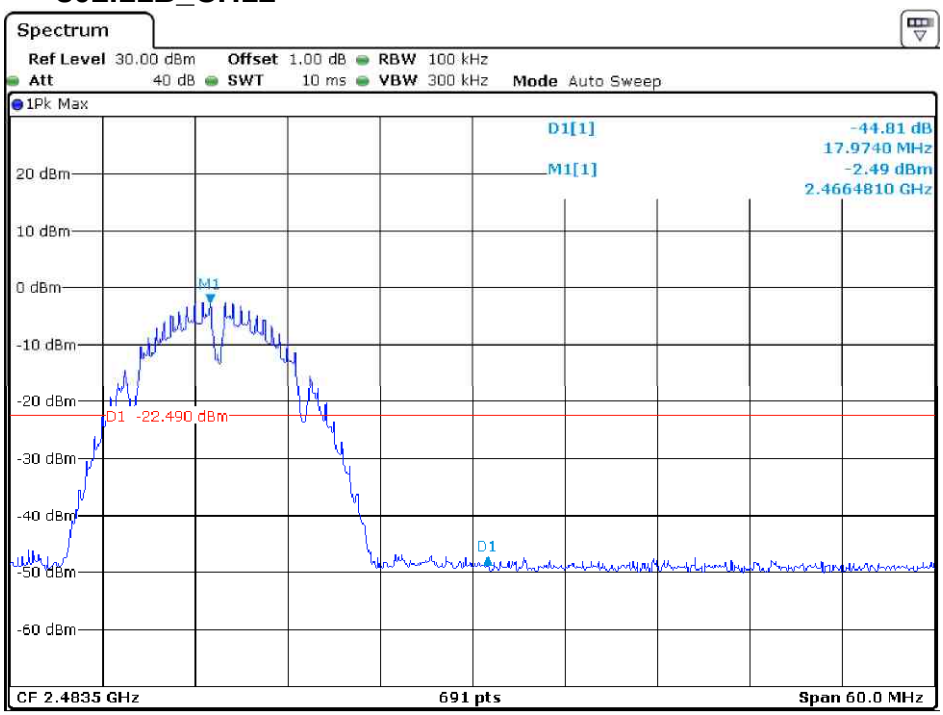
4.7.1.3 802.11B_CH12



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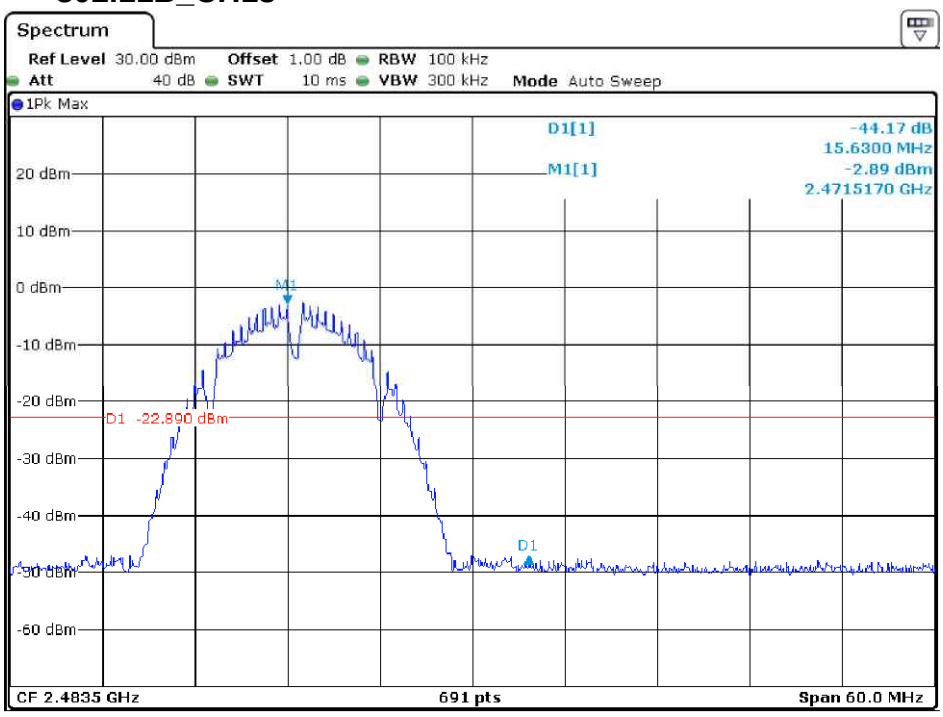
4.7.1.4 802.11B_CH13



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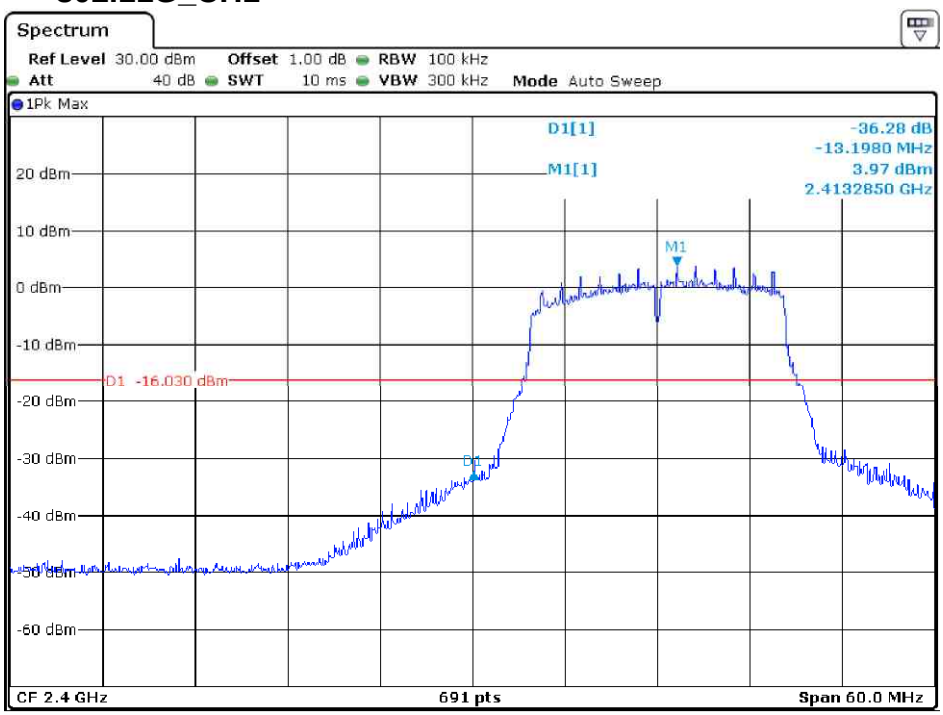
4.7.1.5 802.11G_CH1



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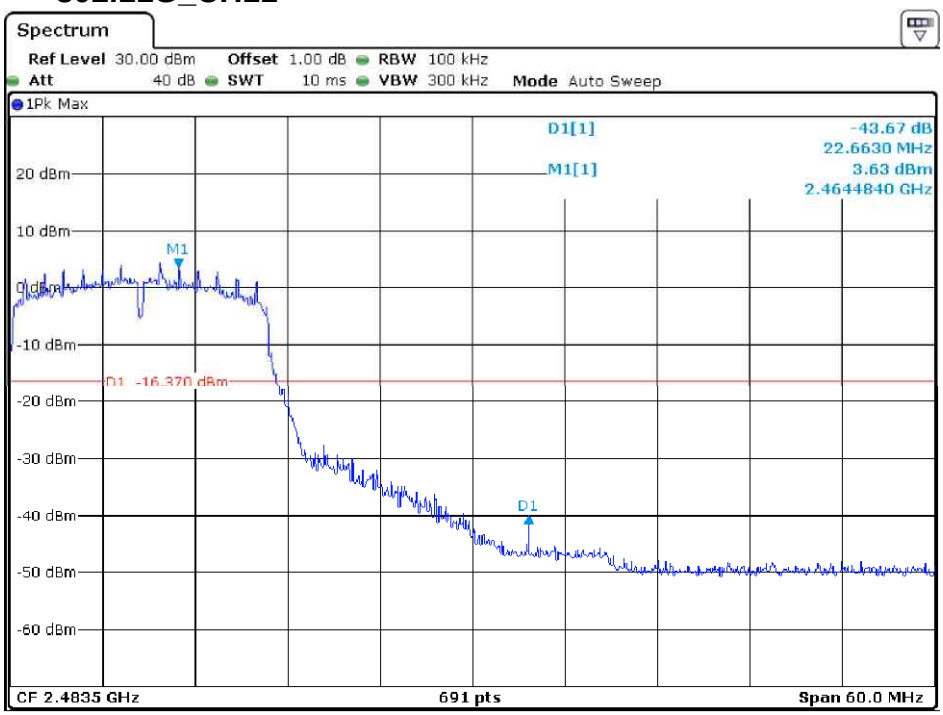
4.7.1.6 802.11G_CH11



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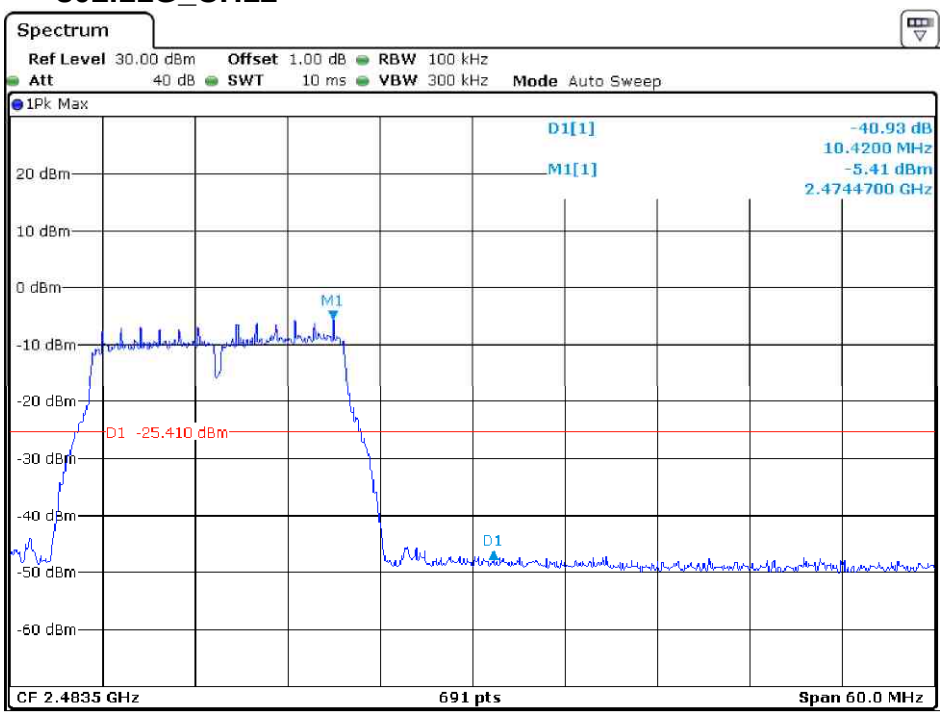
4.7.1.7 802.11G_CH12



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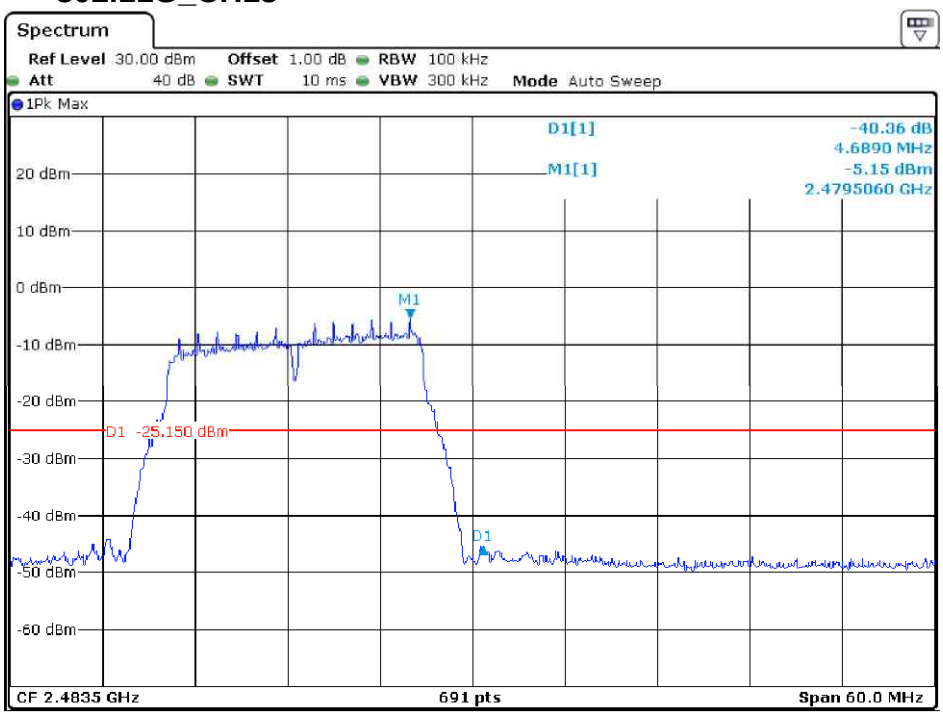
4.7.1.8 802.11G_CH13



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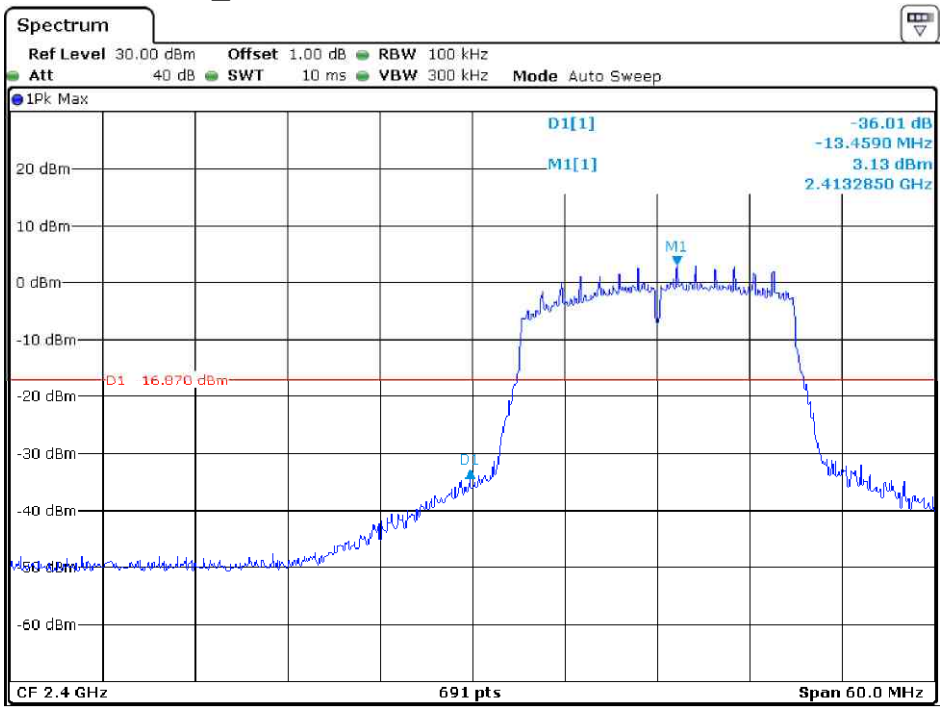
4.7.1.9 802.11N20_CH1



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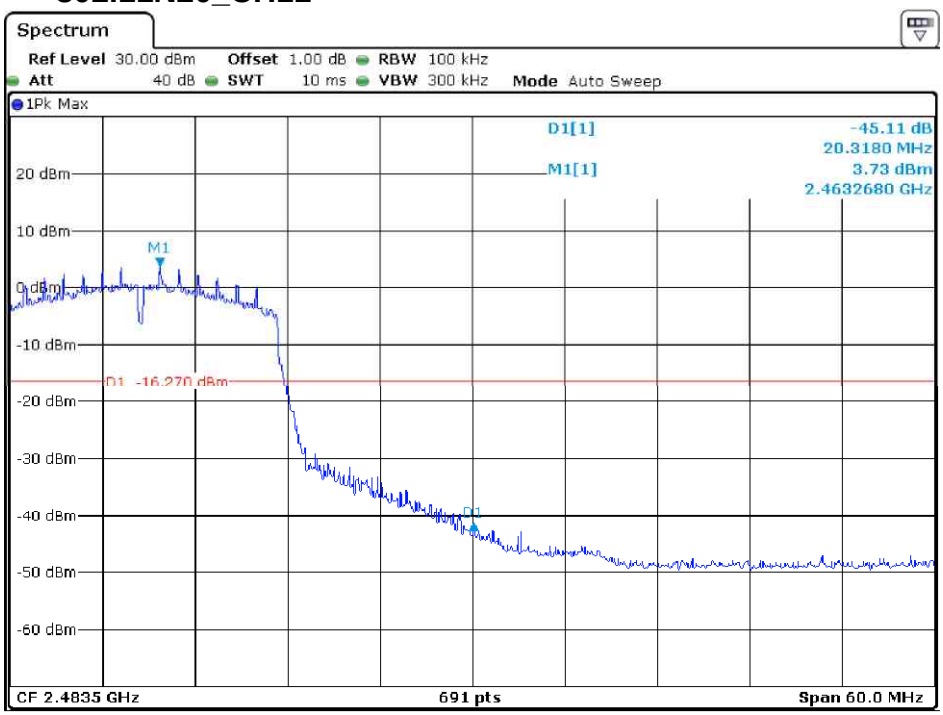
4.7.1.10 802.11N20_CH11



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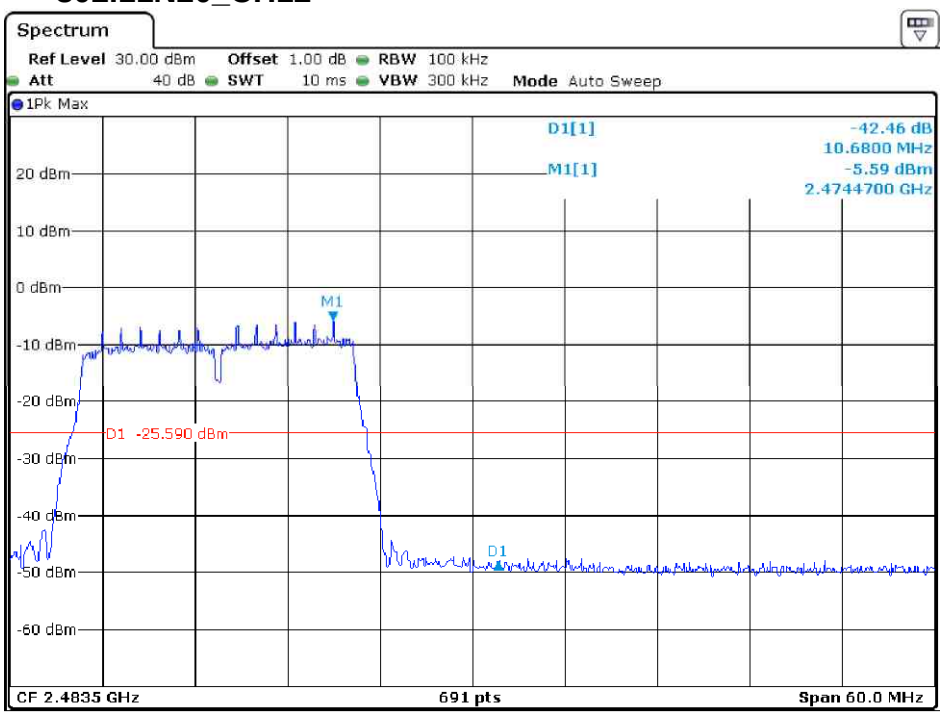
4.7.1.11 802.11N20_CH12



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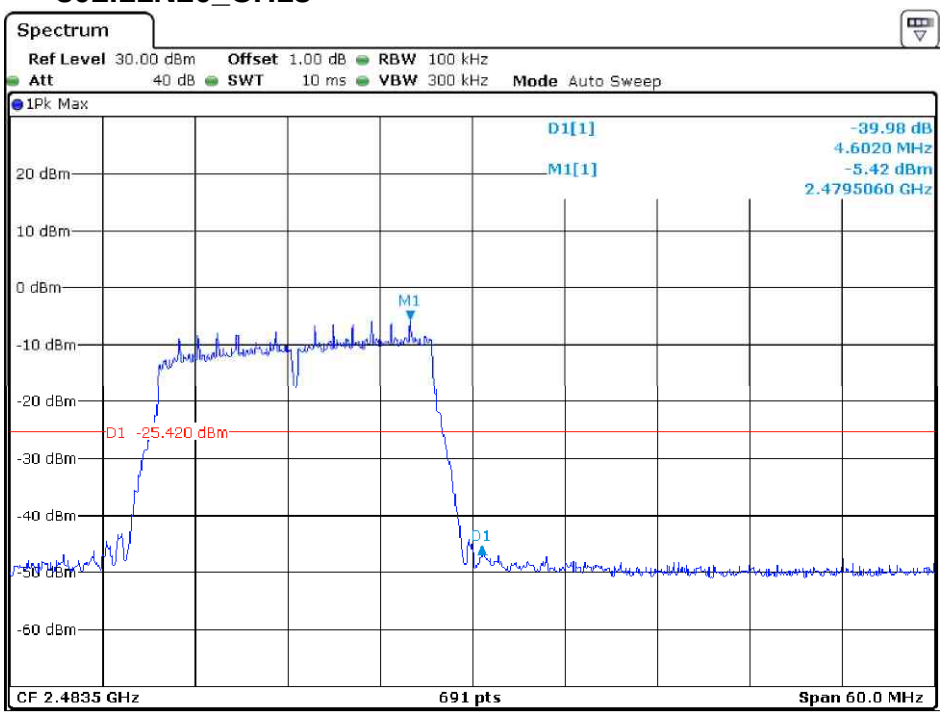
4.7.1.12 802.11N20_CH13



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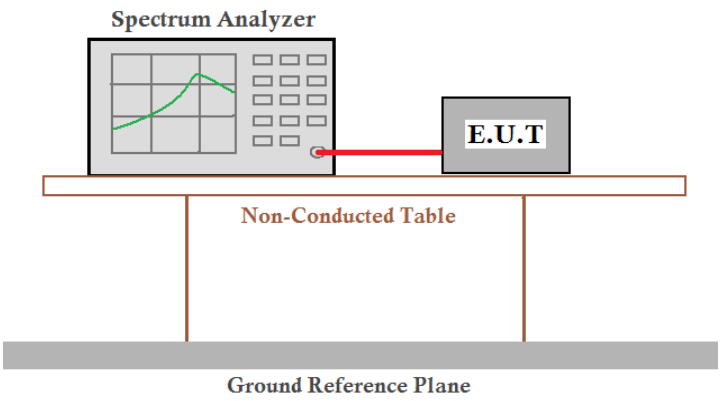
4.8 RF Conducted Spurious Emissions

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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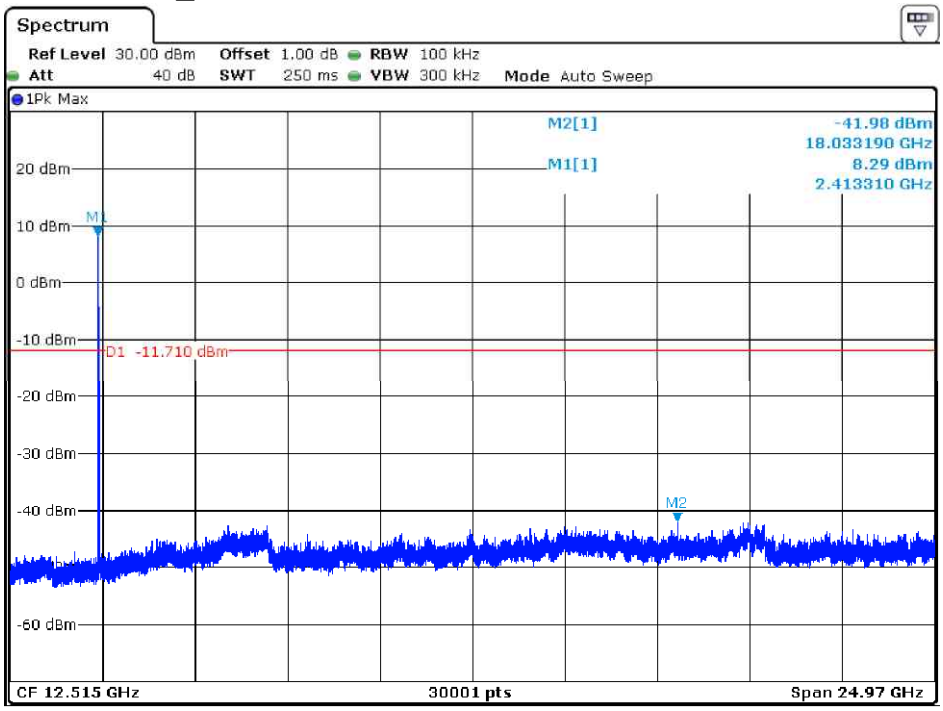
4.8.1 Test plots

4.8.1.1 802.11B_CH1



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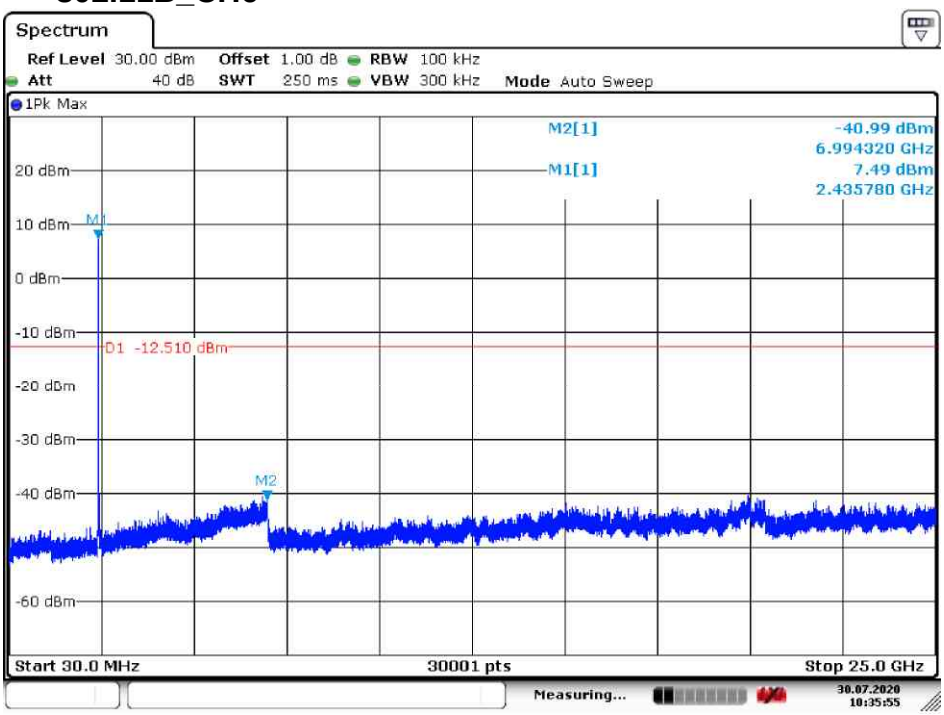
4.8.1.2 802.11B_CH6



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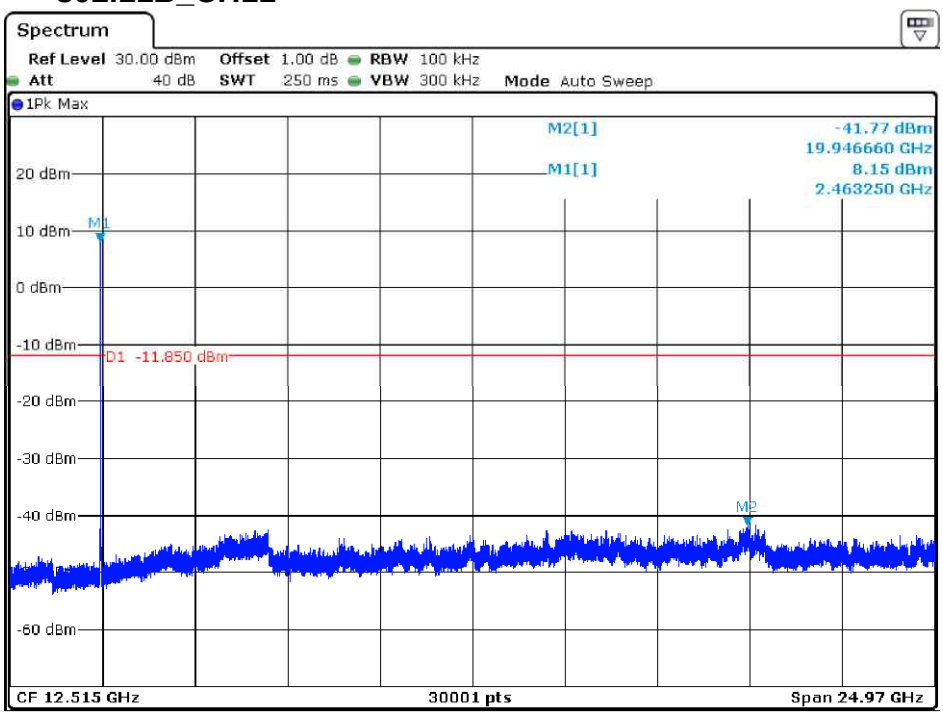
4.8.1.3 802.11B_CH11



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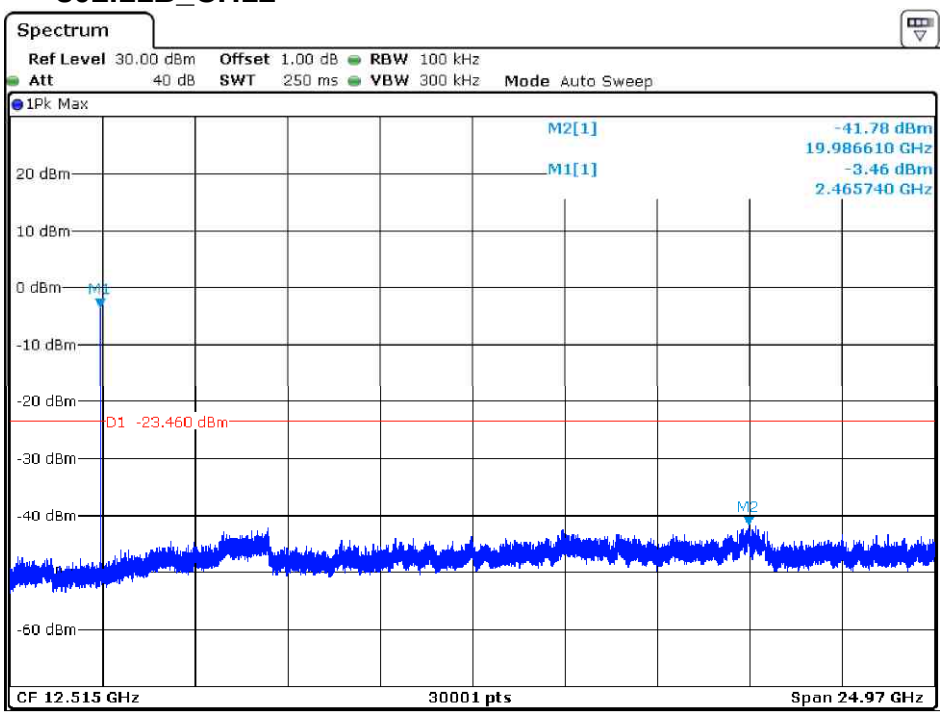
4.8.1.4 802.11B_CH12



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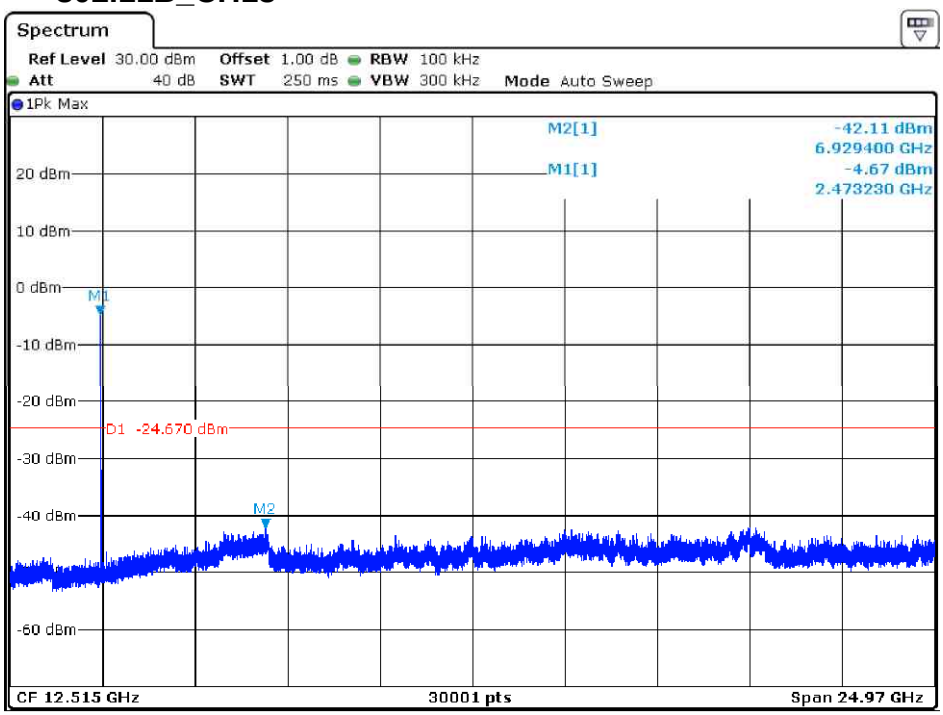
4.8.1.5 802.11B_CH13



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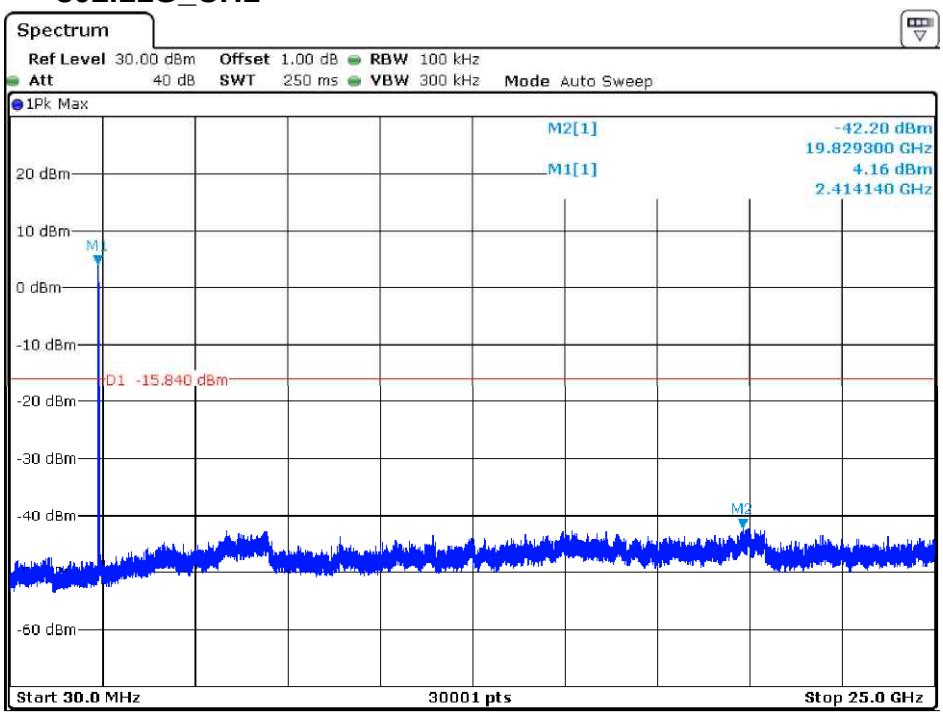
4.8.1.6 802.11G_CH1



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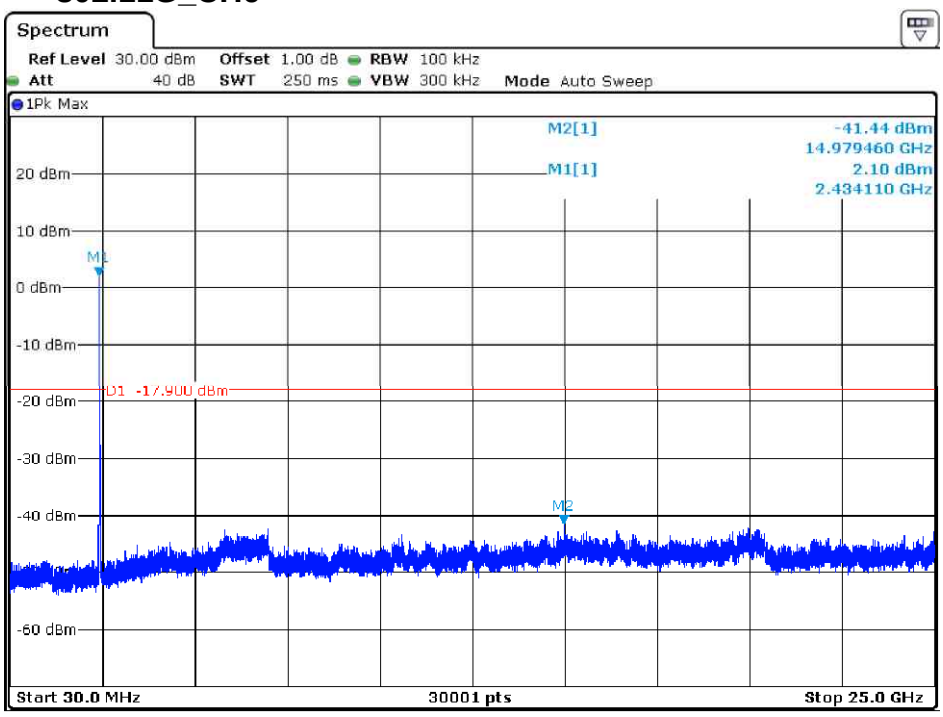
4.8.1.7 802.11G_CH6



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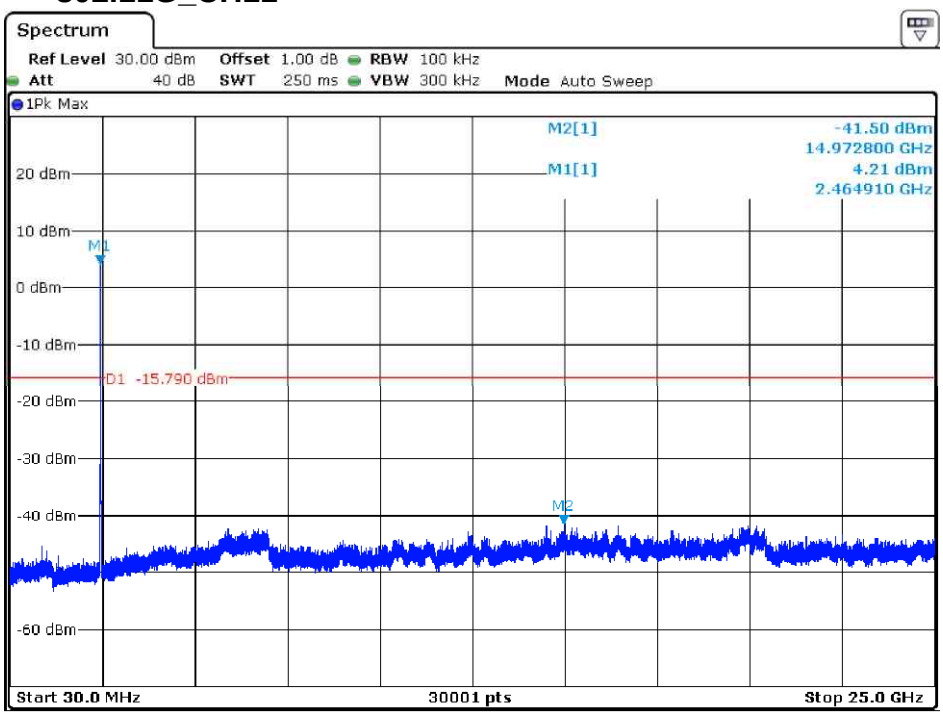
4.8.1.8 802.11G_CH11



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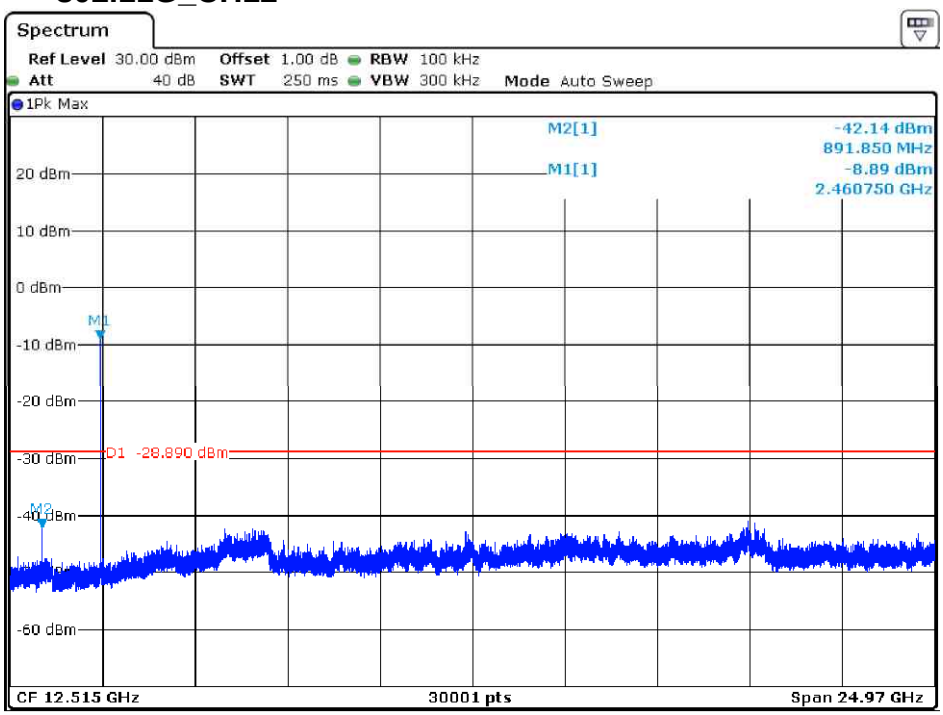
4.8.1.9 802.11G_CH12



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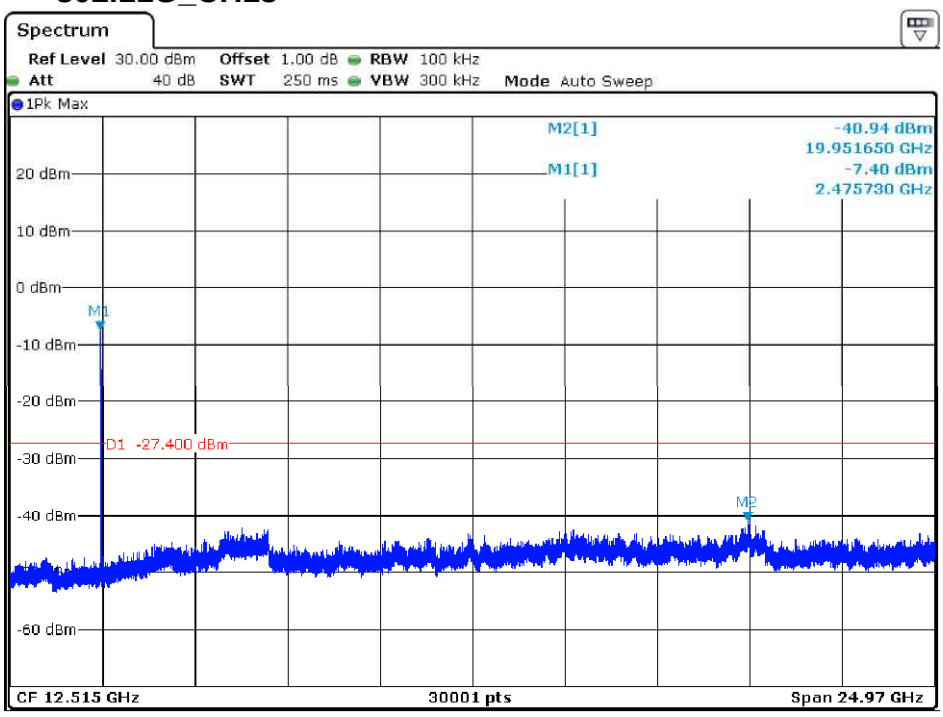
4.8.1.10 802.11G_CH13



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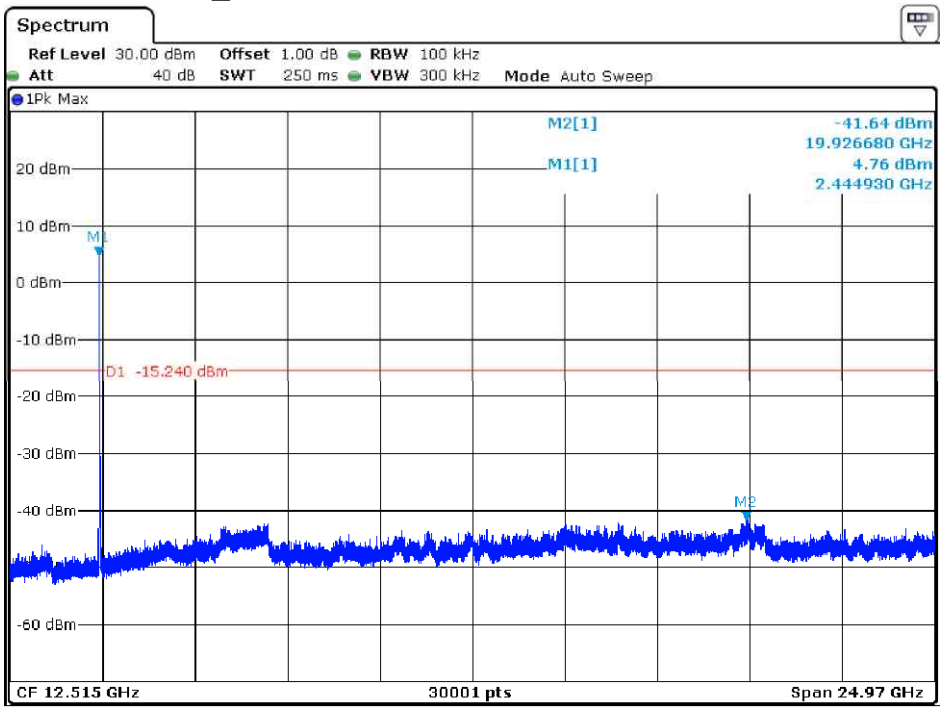
4.8.1.11 802.11N20_CH1



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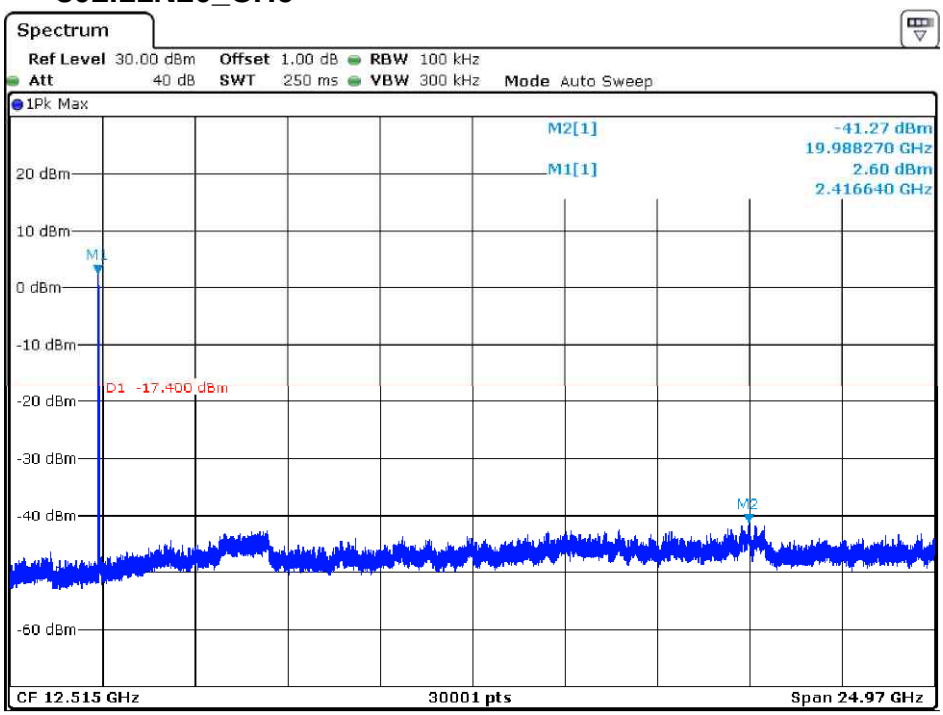
4.8.1.12 802.11N20_CH6



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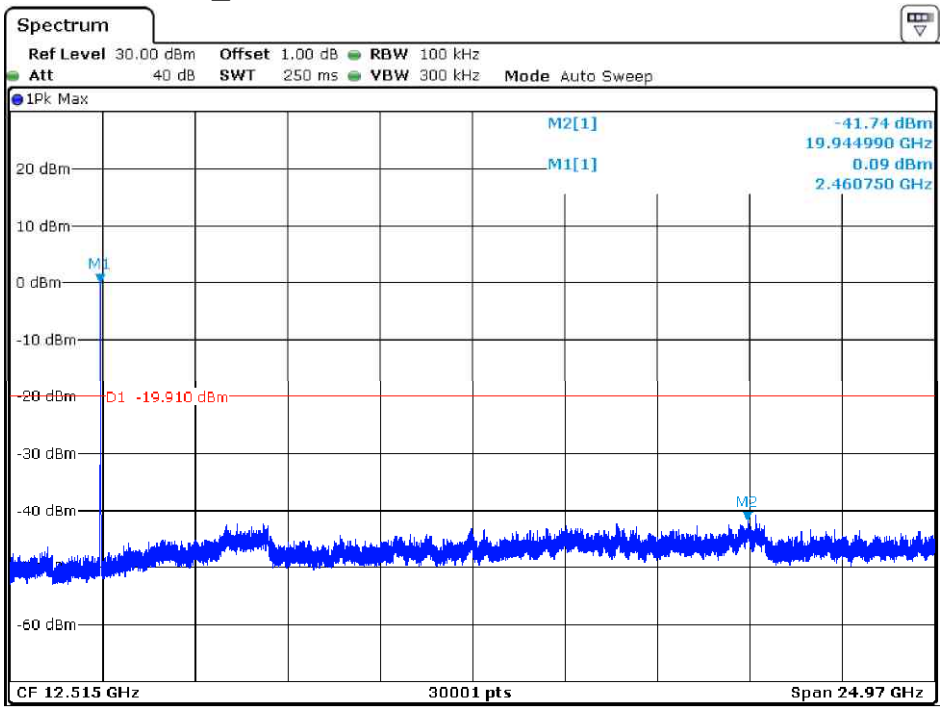
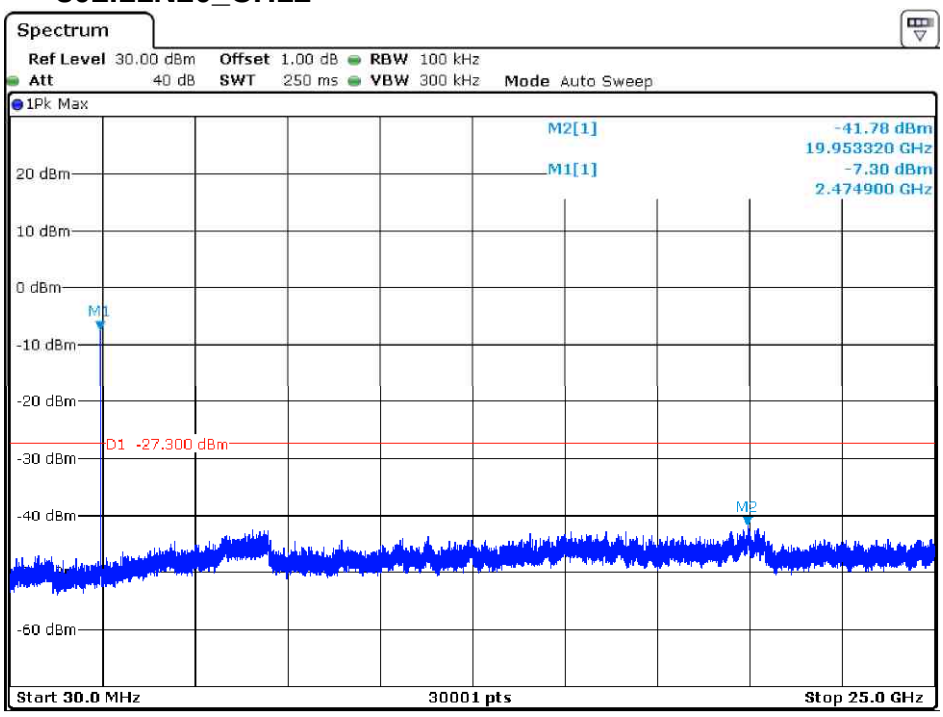
4.8.1.13 802.11N20_CH11



Date: 15.JUL.2020 13:01:29

4.8.1.14 802.11N20_CH12



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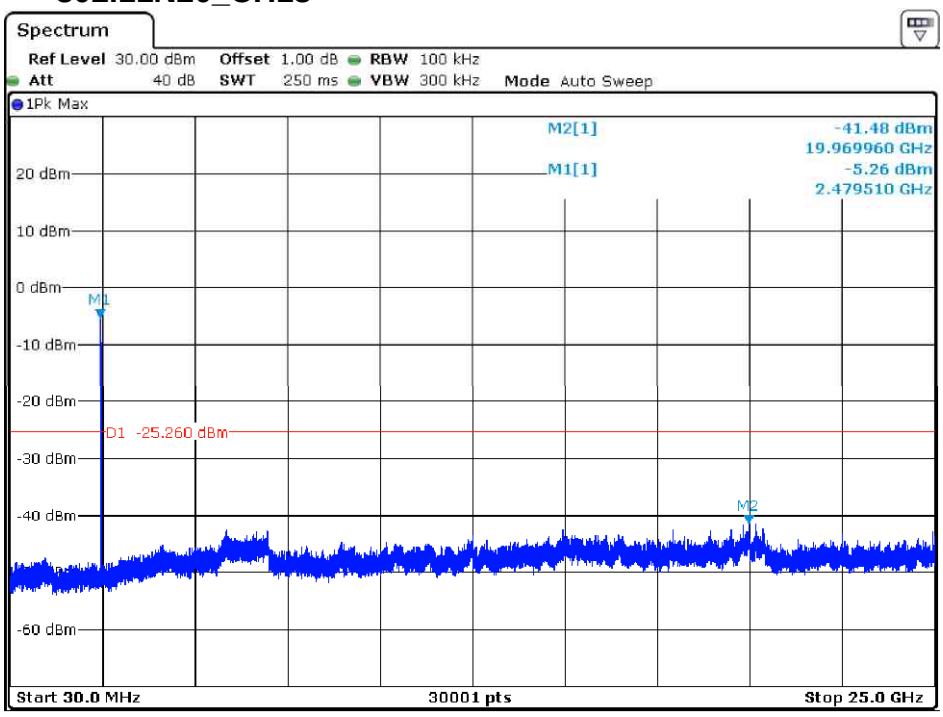
4.8.1.15 802.11N20_CH13



Date: 15.JUL.2020 12:59:30

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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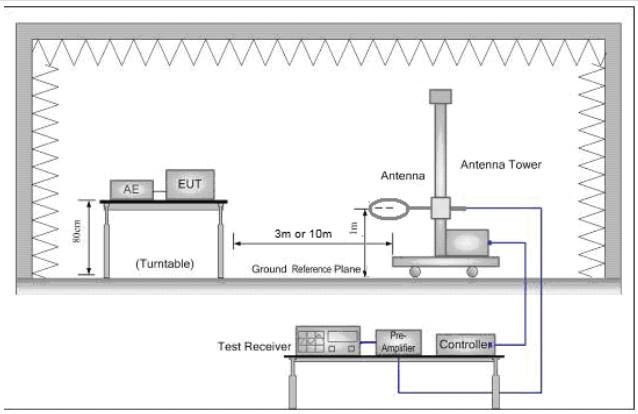

Figure 1. Below 30MHz

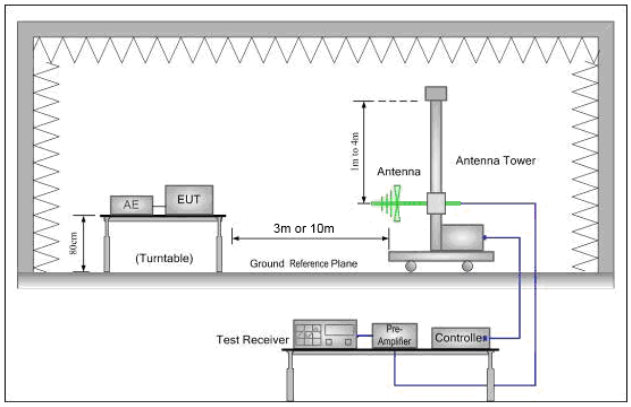

Figure 2. 30MHz to 1GHz

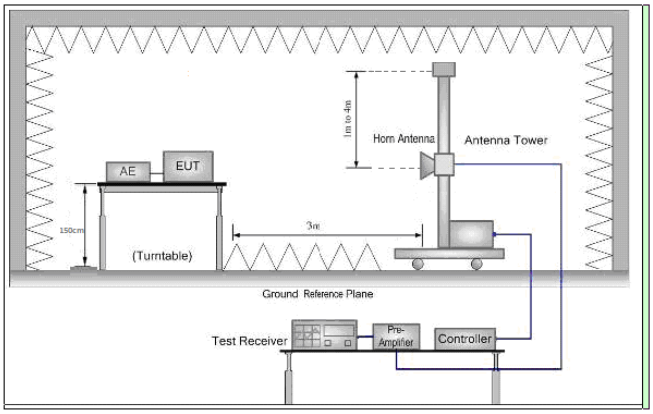

Figure 3. Above 1 GHz

Test Procedure:	a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the groundat a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees todetermine 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 groundat a 3 meter semi-anechoic camber. The table was rotated 360 degrees todetermine the position of the highest radiation c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, whichwas 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 thenthe 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 rotatabletable was turned from 0 degrees to 360 degrees to find the maximum reading. f. 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;

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	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 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 cycle) g. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth 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

4.9.1 Radiated emission below 1GHz

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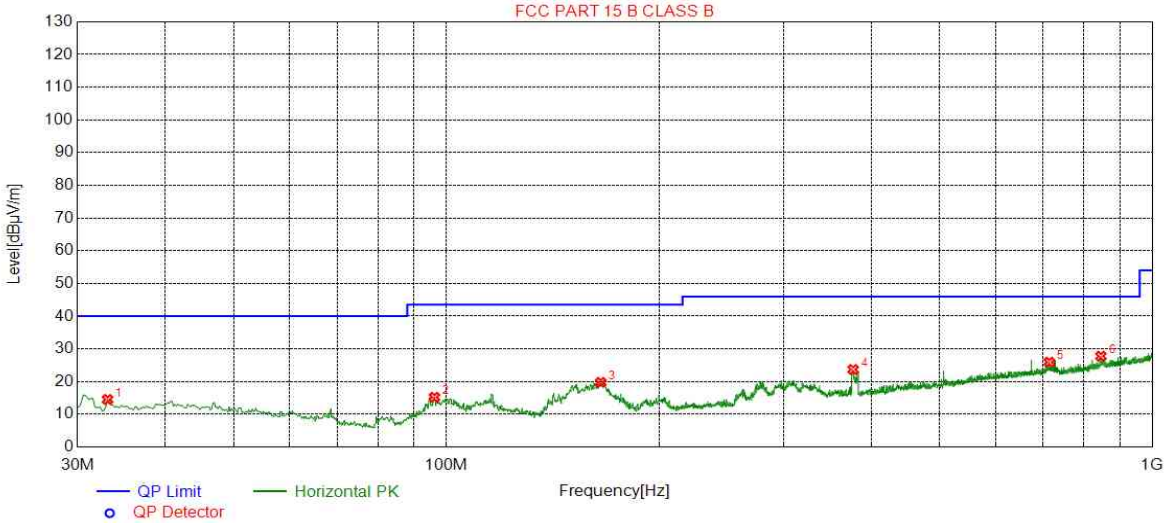
4.9.1.1 Charge + Transmitting, Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.1046	14.53	-30.01	40.00	25.47	200	273	Horizontal
2	96.1672	15.22	-32.68	43.50	28.28	200	282	Horizontal
3	165.439	19.77	-34.31	43.50	23.73	100	206	Horizontal
4	376.941	23.71	-26.15	46.00	22.29	100	119	Horizontal
5	714.763	25.94	-19.16	46.00	20.06	200	127	Horizontal
6	845.933	27.78	-16.95	46.00	18.22	100	107	Horizontal

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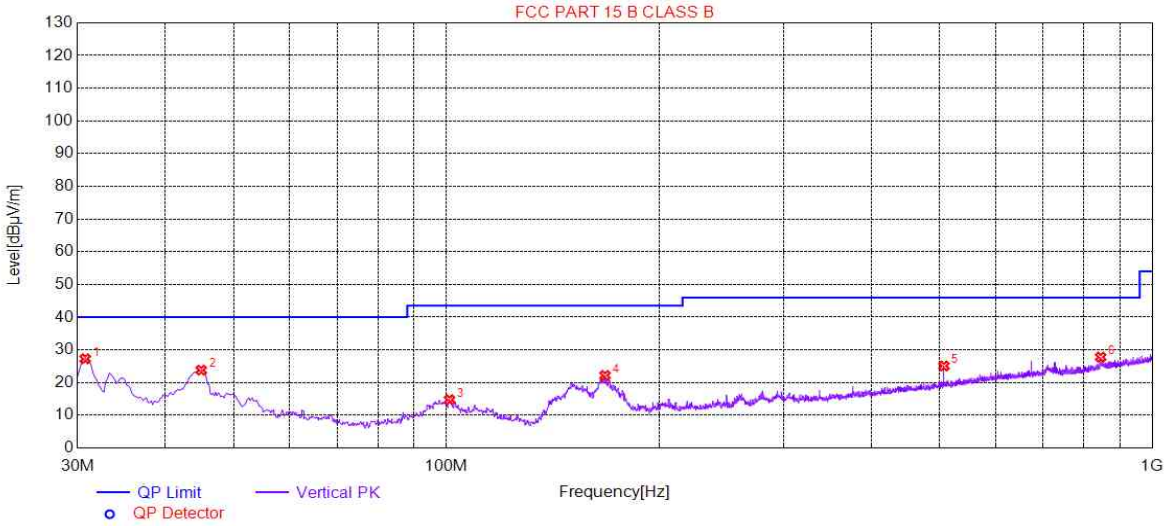
4.9.1.2 Charge + Transmitting, Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.7762	27.28	-30.06	40.00	12.72	100	303	Vertical
2	44.9410	23.82	-30.41	40.00	16.18	100	224	Vertical
3	101.018	14.76	-32.00	43.50	28.74	100	58	Vertical
4	167.767	22.20	-34.17	43.50	21.30	100	346	Vertical
5	506.947	25.09	-23.14	46.00	20.91	100	346	Vertical
6	845.351	27.80	-16.96	46.00	18.20	200	14	Vertical

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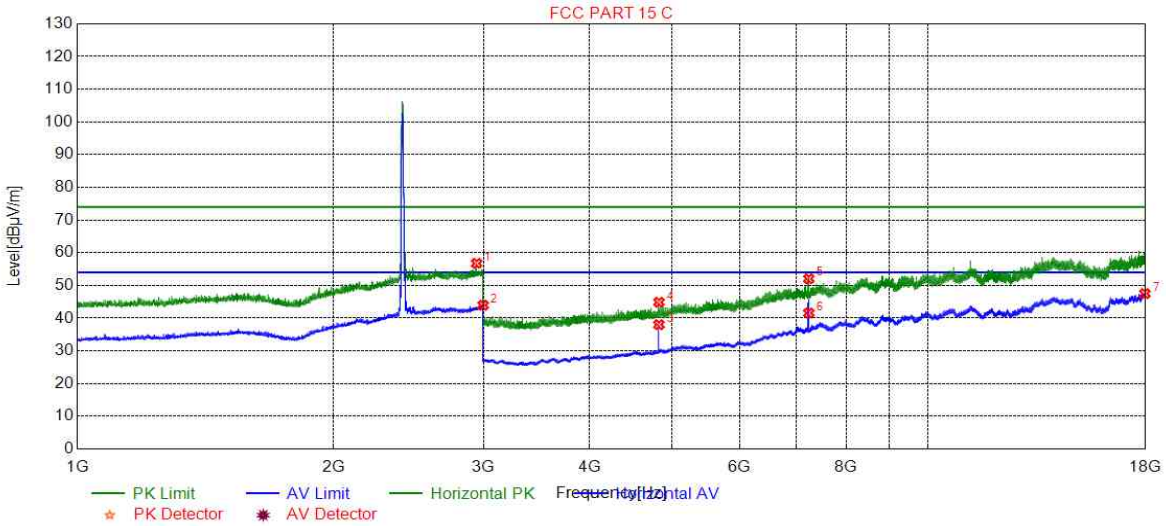
4.9.2 Transmitter emission above 1GHz

4.9.2.1 802.11B_Channel 1



Suspected List

NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2945.48	56.77	9.63	74.00	17.23	150	218	Horizontal
2	2997.99	43.96	9.46	54.00	10.04	150	190	Horizontal
3	4824.00	38.03	-18.21	54.00	15.97	150	342	Horizontal
4	4824.00	44.88	-18.21	74.00	29.12	150	342	Horizontal
5	7236.00	52.05	-9.99	74.00	21.95	150	118	Horizontal
6	7236.00	41.58	-9.99	54.00	12.42	150	68	Horizontal
7	17964.2	47.52	0.71	54.00	6.48	150	266	Horizontal

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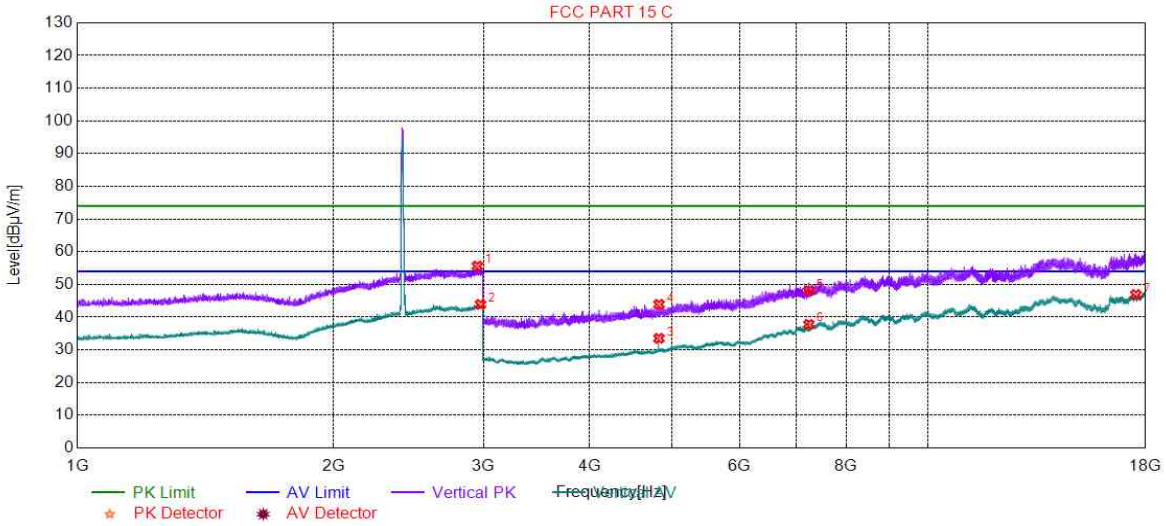
4.9.2.2 802.11B_Channel 1



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2950.48	55.62	9.68	74.00	18.38	150	100	Vertical
2	2976.49	43.91	9.56	54.00	10.09	150	360	Vertical
3	4824.00	33.55	-18.21	54.00	20.45	150	70	Vertical
4	4824.00	43.91	-18.21	74.00	30.09	150	342	Vertical
5	7236.00	48.07	-9.99	74.00	25.93	150	168	Vertical
6	7236.00	37.79	-9.99	54.00	16.21	150	168	Vertical
7	17530.2	46.91	1.04	54.00	7.09	150	18	Vertical

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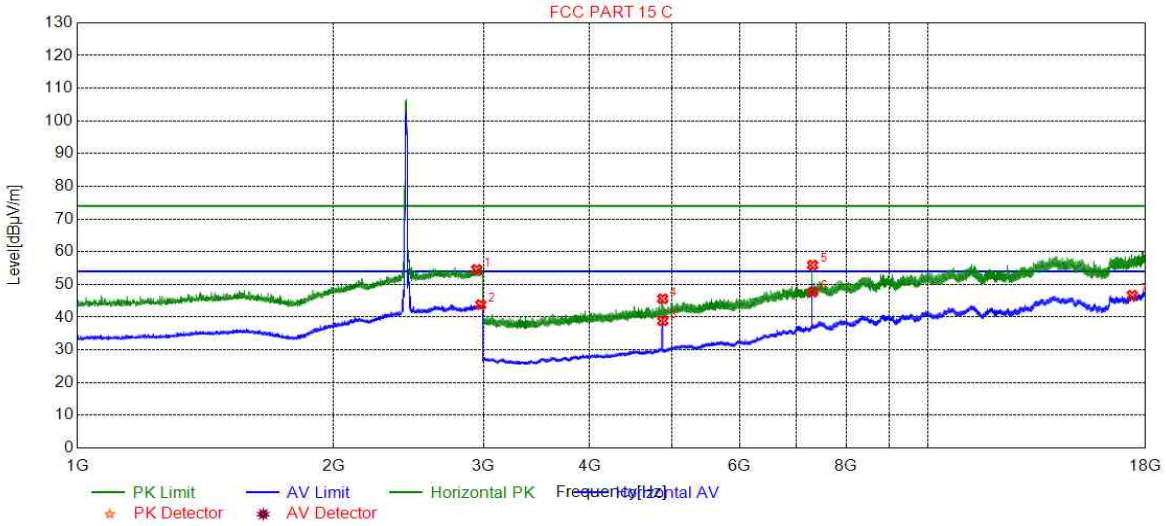
4.9.2.3 802.11B_Channel 6



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2946.48	54.61	9.64	74.00	19.39	150	192	Horizontal
2	2978.99	43.85	9.55	54.00	10.15	150	342	Horizontal
3	4874.00	38.89	-17.99	54.00	15.11	150	315	Horizontal
4	4874.00	45.63	-17.99	74.00	28.37	150	315	Horizontal
5	7311.00	55.94	-9.74	74.00	18.06	150	118	Horizontal
6	7311.00	47.66	-9.74	54.00	6.34	150	68	Horizontal
7	17364.7	46.72	0.11	54.00	7.28	150	168	Horizontal

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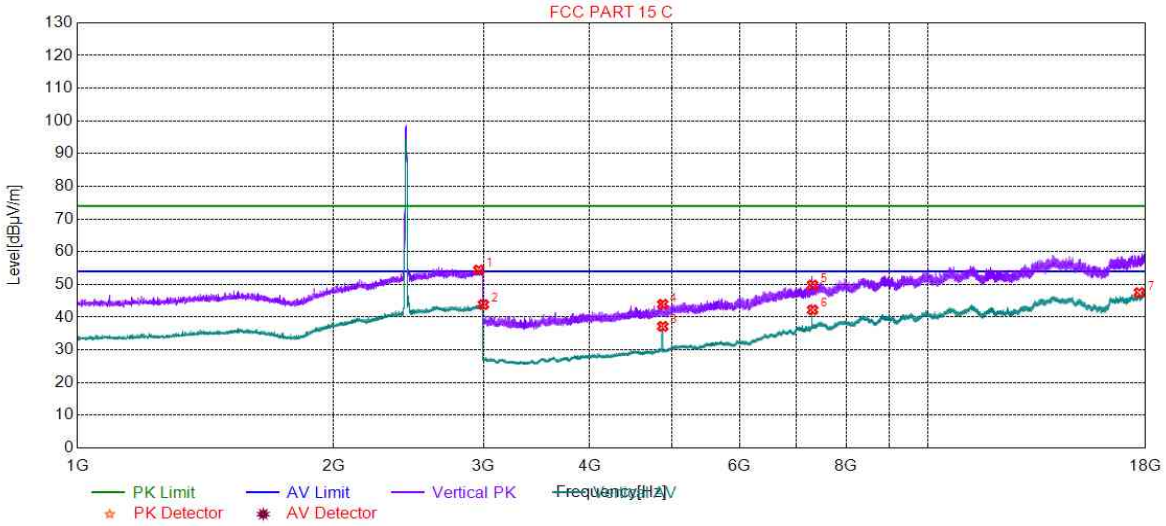
4.9.2.4 802.11B_Channel 6



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2961.99	54.43	9.62	74.00	19.57	150	113	Vertical
2	2999.49	43.85	9.45	54.00	10.15	150	278	Vertical
3	4874.00	37.19	-17.99	54.00	16.81	150	96	Vertical
4	4874.00	43.97	-17.99	74.00	30.03	150	41	Vertical
5	7311.00	49.86	-9.74	74.00	24.14	150	119	Vertical
6	7311.00	42.23	-9.74	54.00	11.77	150	68	Vertical
7	17703.5	47.50	1.29	54.00	6.50	150	169	Vertical

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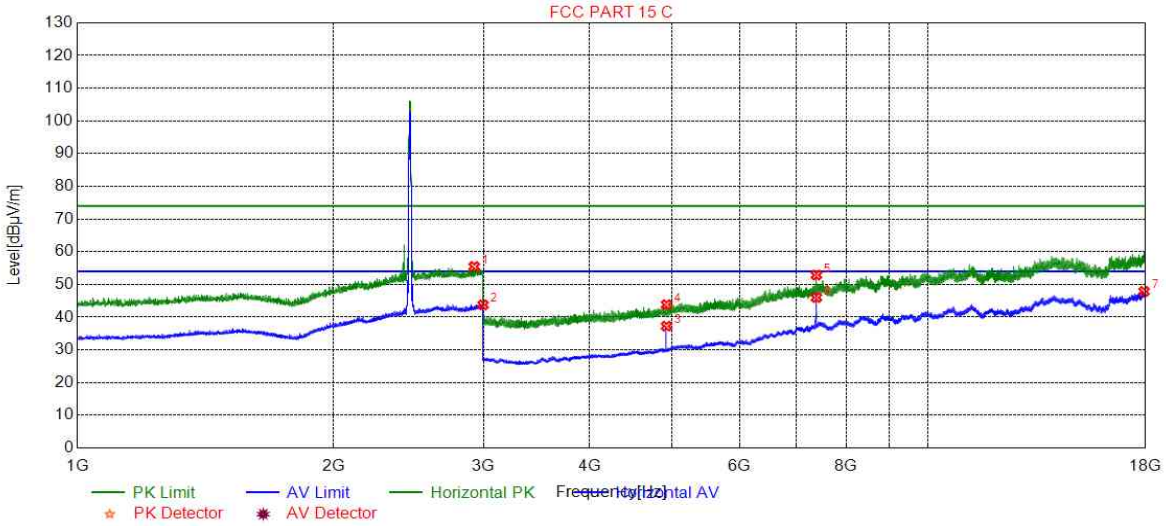
4.9.2.5 802.11B_Channel 11



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2926.48	55.48	9.43	74.00	18.52	150	218	Horizontal
2	2997.49	43.76	9.46	54.00	10.24	150	96	Horizontal
3	4924.00	37.27	-17.72	54.00	16.73	150	42	Horizontal
4	4924.00	43.84	-17.72	74.00	30.16	150	342	Horizontal
5	7386.00	52.89	-9.55	74.00	21.11	150	117	Horizontal
6	7386.00	46.01	-9.55	54.00	7.99	150	68	Horizontal
7	17924.6	47.87	0.70	54.00	6.13	150	117	Horizontal

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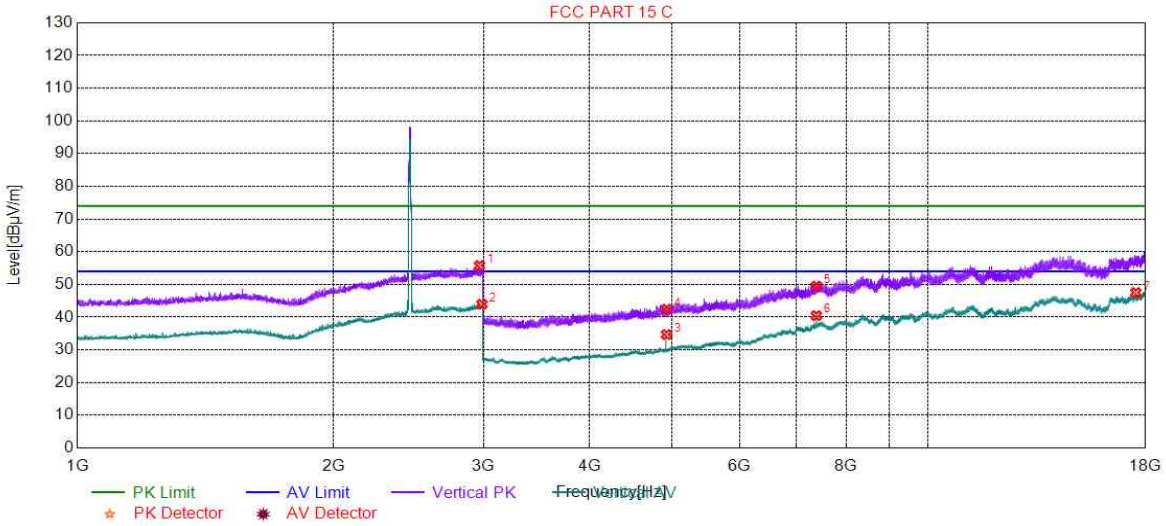
4.9.2.6 802.11B_Channel 11



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2968.49	55.78	9.59	74.00	18.22	150	181	Vertical
2	2988.49	43.95	9.50	54.00	10.05	150	222	Vertical
3	4924.00	34.70	-17.72	54.00	19.30	150	38	Vertical
4	4924.00	42.46	-17.72	74.00	31.54	150	38	Vertical
5	7386.00	49.51	-9.55	74.00	24.49	150	68	Vertical
6	7386.00	40.46	-9.55	54.00	13.54	150	18	Vertical
7	17528.0	47.55	1.03	54.00	6.45	150	168	Vertical

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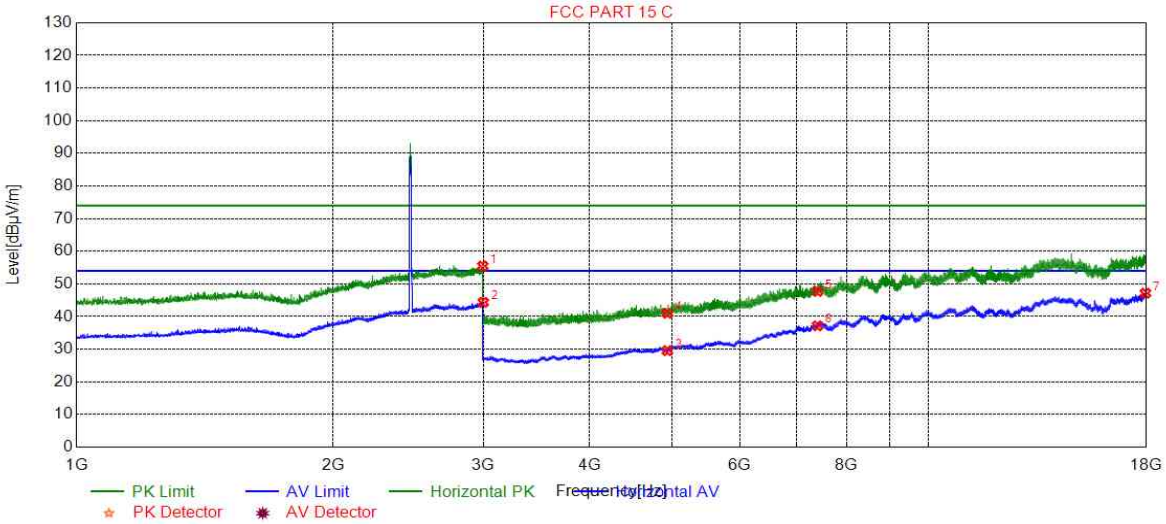
4.9.2.7 802.11B_Channel 12



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2995.99	55.48	9.47	74.00	18.52	150	3	Horizontal
2	3000.00	44.37	9.45	54.00	9.63	150	342	Horizontal
3	4934.00	29.57	-17.65	54.00	24.43	150	342	Horizontal
4	4934.00	41.03	-17.65	74.00	32.97	150	40	Horizontal
5	7401.00	47.70	-9.50	74.00	26.30	150	218	Horizontal
6	7401.00	37.17	-9.50	54.00	16.83	150	360	Horizontal
7	17948.8	47.15	0.70	54.00	6.85	150	18	Horizontal

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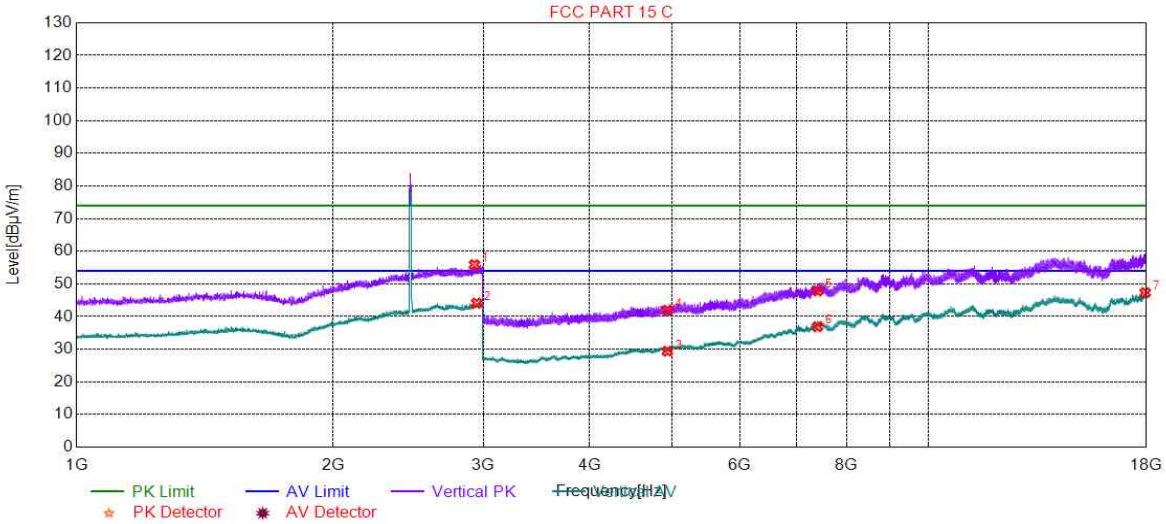
4.9.2.8 802.11B_Channel 12



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2929.48	55.90	9.46	74.00	18.10	150	292	Vertical
2	2947.48	44.14	9.65	54.00	9.86	150	154	Vertical
3	4934.00	29.40	-17.65	54.00	24.60	150	67	Vertical
4	4934.00	41.97	-17.65	74.00	32.03	150	342	Vertical
5	7401.00	47.86	-9.50	74.00	26.14	150	320	Vertical
6	7401.00	36.90	-9.50	54.00	17.10	150	169	Vertical
7	17931.2	47.33	0.70	54.00	6.67	150	270	Vertical

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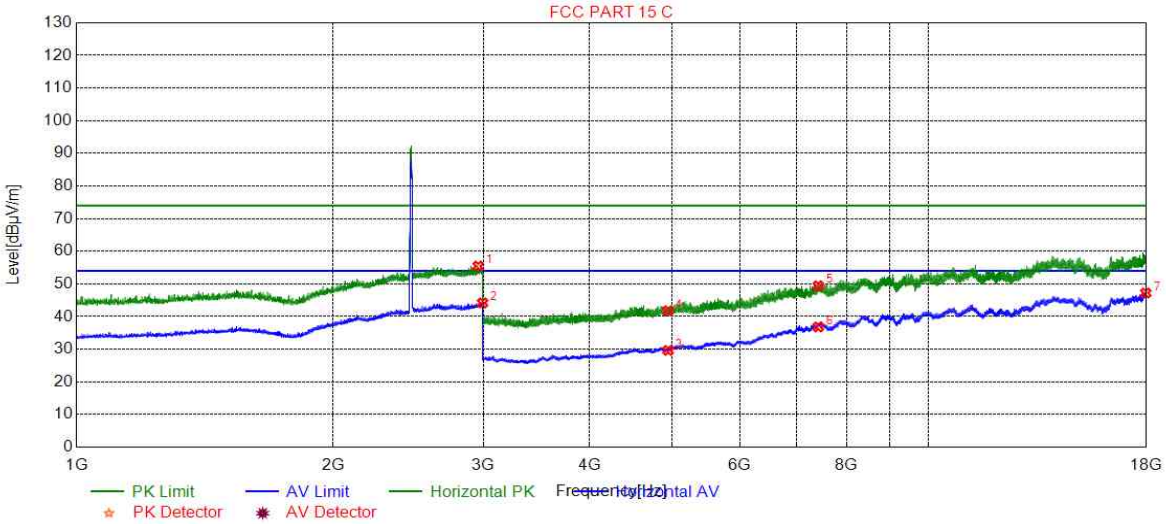
4.9.2.9 802.11B_Channel 13



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2959.48	55.50	9.64	74.00	18.50	150	1	Horizontal
2	2994.99	44.19	9.47	54.00	9.81	150	8	Horizontal
3	4944.00	29.66	-17.58	54.00	24.34	150	94	Horizontal
4	4944.00	41.81	-17.58	74.00	32.19	150	13	Horizontal
5	7416.00	49.44	-9.44	74.00	24.56	150	119	Horizontal
6	7416.00	36.83	-9.44	54.00	17.17	150	320	Horizontal
7	17963.6	47.23	0.71	54.00	6.77	150	119	Horizontal

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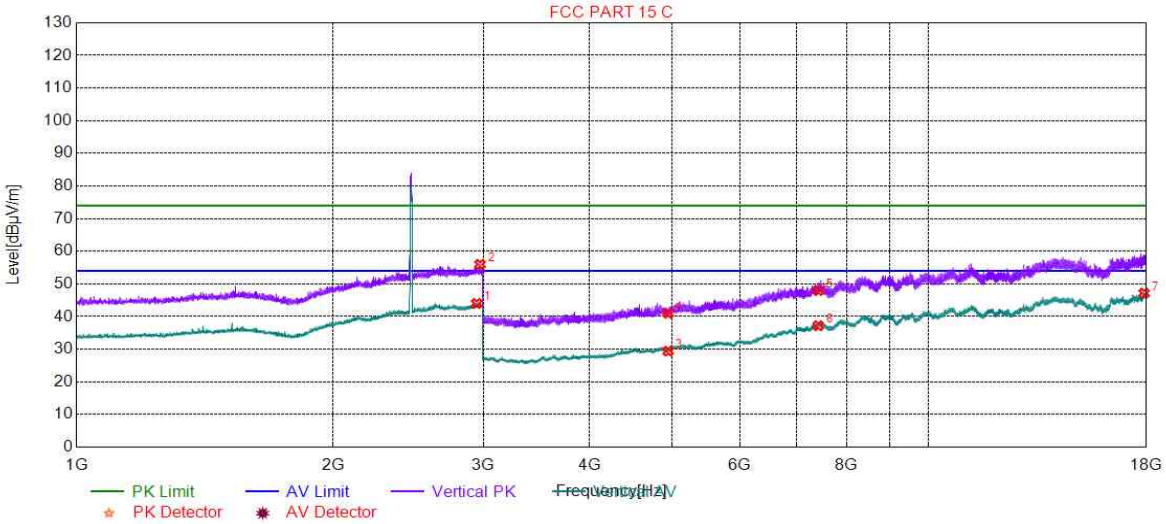
4.9.2.10 802.11B_Channel 13



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2946.98	44.04	9.65	54.00	9.96	150	168	Vertical
2	2973.99	55.99	9.57	74.00	18.01	150	332	Vertical
3	4944.00	29.43	-17.58	54.00	24.57	150	342	Vertical
4	4944.00	41.02	-17.58	74.00	32.98	150	314	Vertical
5	7416.00	47.98	-9.44	74.00	26.02	150	270	Vertical
6	7416.00	37.21	-9.44	54.00	16.79	150	18	Vertical
7	17883.3	47.19	0.47	54.00	6.81	150	169	Vertical

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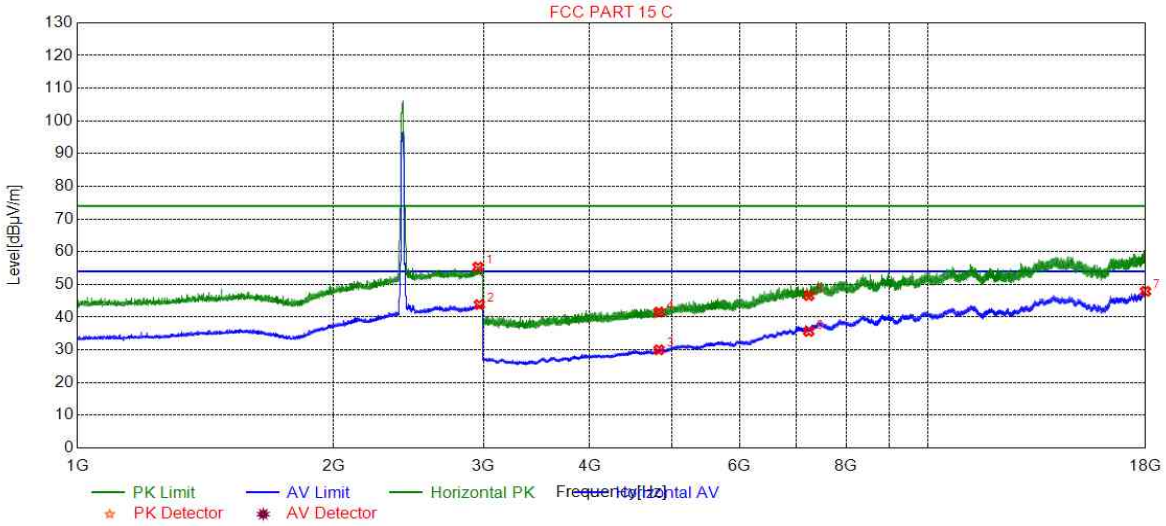
4.9.2.11 802.11G_Channel 1



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2956.48	55.34	9.65	74.00	18.66	150	69	Horizontal
2	2966.99	43.85	9.60	54.00	10.15	150	136	Horizontal
3	4824.00	30.02	-18.21	54.00	23.98	150	42	Horizontal
4	4824.00	41.55	-18.21	74.00	32.45	150	288	Horizontal
5	7236.00	46.59	-9.99	74.00	27.41	150	218	Horizontal
6	7236.00	35.65	-9.99	54.00	18.35	150	18	Horizontal
7	17991.1	47.90	0.72	54.00	6.10	150	168	Horizontal

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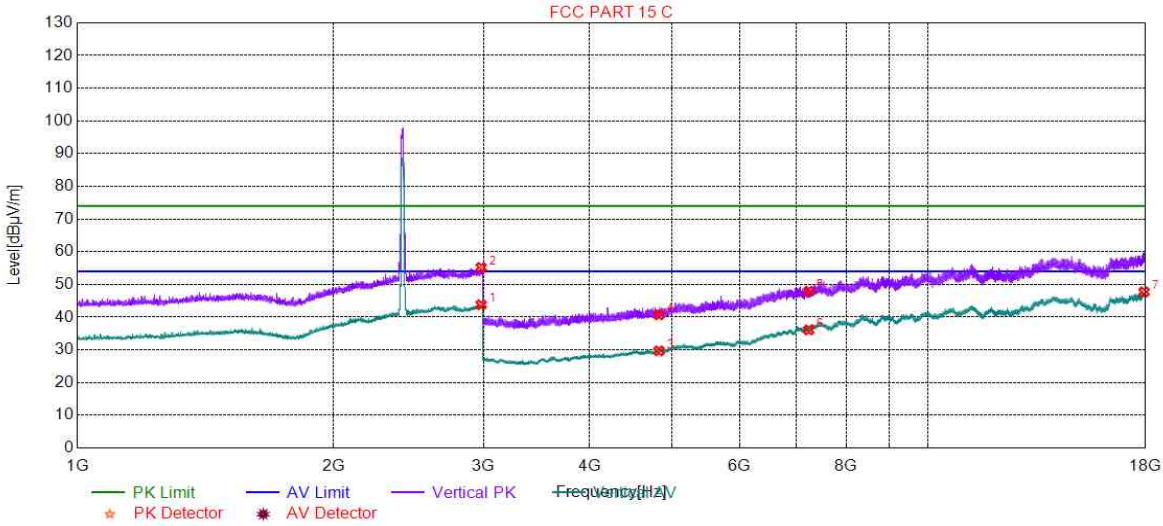
4.9.2.12 802.11G_Channel 1



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2981.49	43.81	9.54	54.00	10.19	150	153	Vertical
2	2981.99	55.21	9.53	74.00	18.79	150	31	Vertical
3	4824.00	29.71	-18.21	54.00	24.29	150	16	Vertical
4	4824.00	40.73	-18.21	74.00	33.27	150	179	Vertical
5	7236.00	47.95	-9.99	74.00	26.05	150	118	Vertical
6	7236.00	36.13	-9.99	54.00	17.87	150	360	Vertical
7	17925.1	47.73	0.70	54.00	6.27	150	118	Vertical

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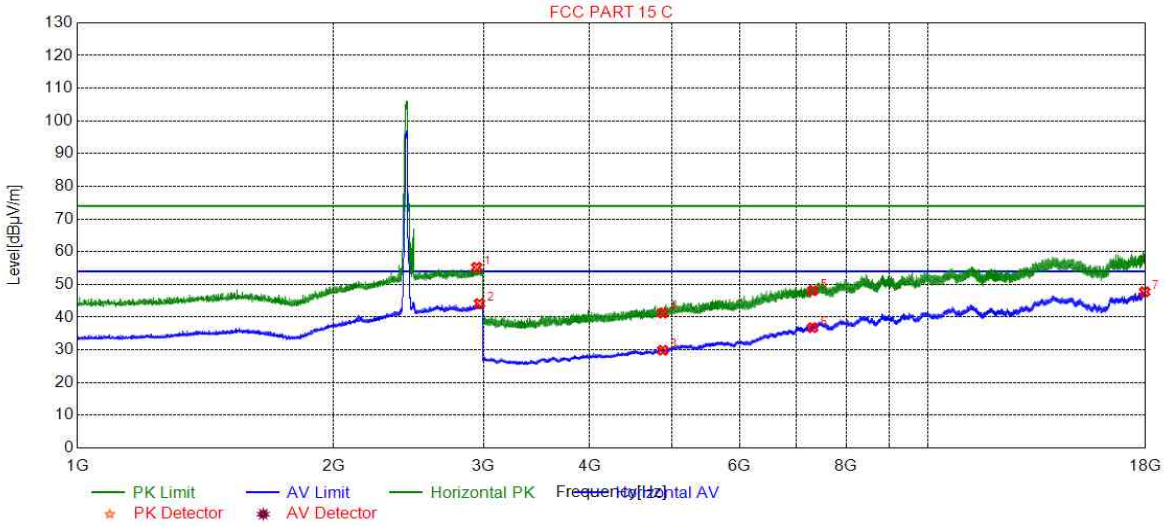
4.9.2.13 802.11G_Channel 6



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2946.48	55.27	9.64	74.00	18.73	150	0	Horizontal
2	2967.49	44.17	9.60	54.00	9.83	150	342	Horizontal
3	4874.00	29.89	-17.99	54.00	24.11	150	208	Horizontal
4	4874.00	41.23	-17.99	74.00	32.77	150	180	Horizontal
5	7311.00	48.08	-9.74	74.00	25.92	150	268	Horizontal
6	7311.00	36.80	-9.74	54.00	17.20	150	118	Horizontal
7	17953.7	47.76	0.71	54.00	6.24	150	118	Horizontal

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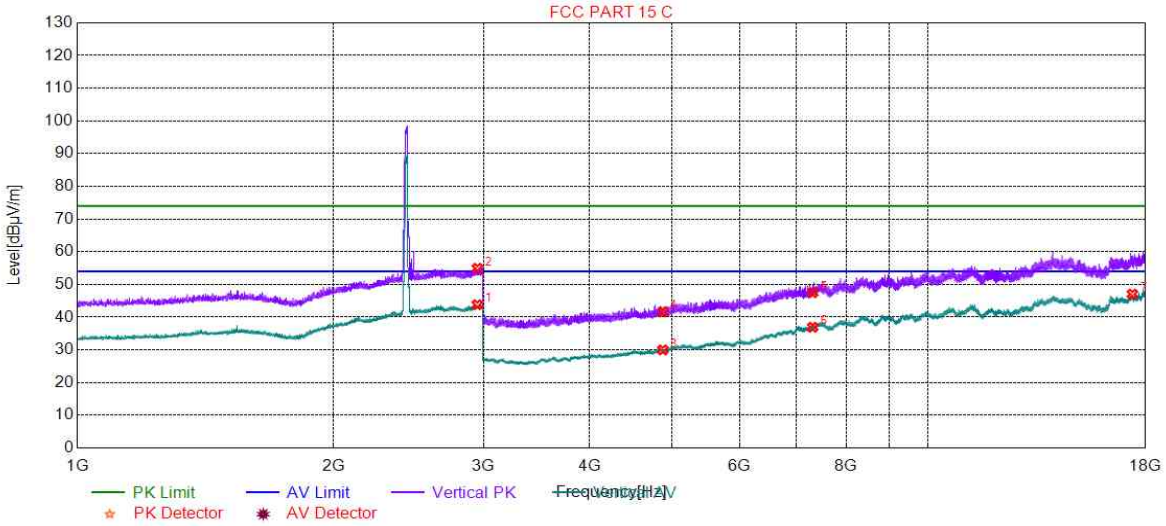
4.9.2.14 802.11G_Channel 6



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2950.48	43.82	9.68	54.00	10.18	150	114	Vertical
2	2951.98	54.96	9.67	74.00	19.04	150	31	Vertical
3	4874.00	30.01	-17.99	54.00	23.99	150	150	Vertical
4	4874.00	41.65	-17.99	74.00	32.35	150	178	Vertical
5	7311.00	47.49	-9.74	74.00	26.51	150	18	Vertical
6	7311.00	36.94	-9.74	54.00	17.06	150	218	Vertical
7	17369.1	47.07	0.13	54.00	6.93	150	268	Vertical

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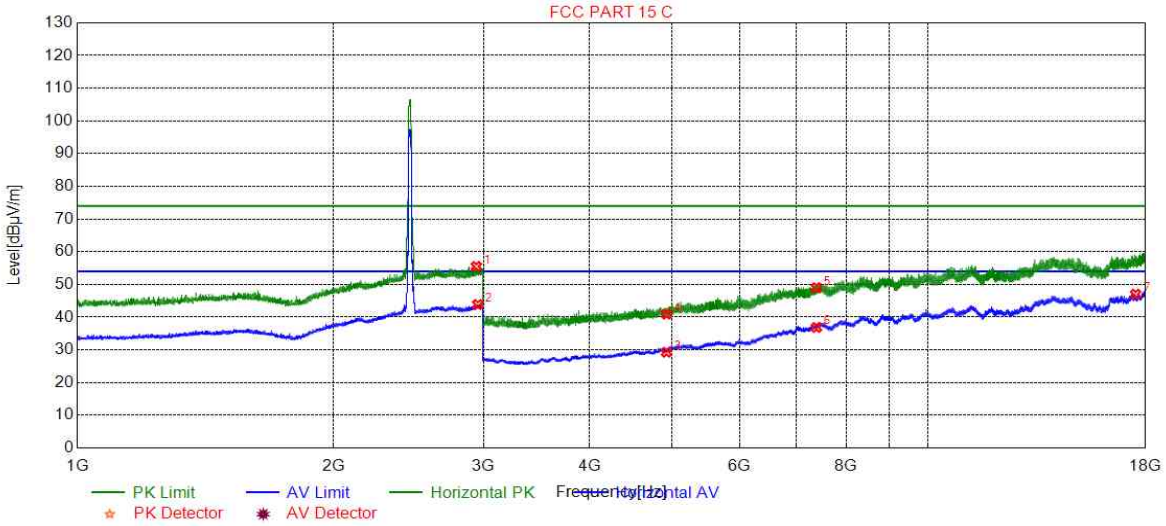
4.9.2.15 802.11G_Channel 11



Suspected List

NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2942.98	55.51	9.60	74.00	18.49	150	220	Horizontal
2	2954.48	43.88	9.66	54.00	10.12	150	4	Horizontal
3	4924.00	29.31	-17.72	54.00	24.69	150	342	Horizontal
4	4924.00	40.93	-17.72	74.00	33.07	150	94	Horizontal
5	7386.00	49.02	-9.55	74.00	24.98	150	118	Horizontal
6	7386.00	36.86	-9.55	54.00	17.14	150	18	Horizontal
7	17517.6	47.02	0.99	54.00	6.98	150	18	Horizontal

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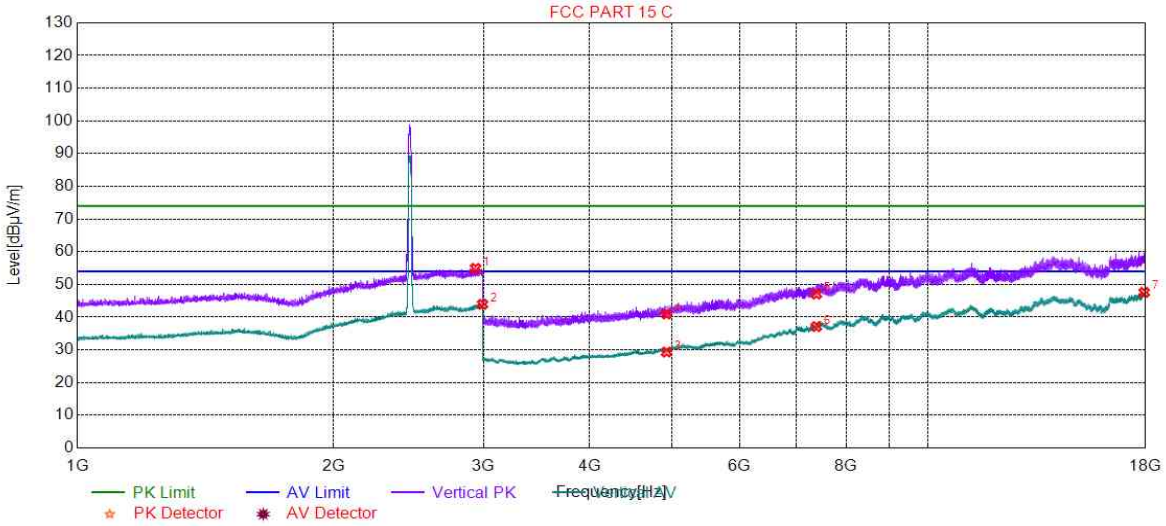
4.9.2.16 802.11G_Channel 11



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2936.98	54.94	9.54	74.00	19.06	150	18	Vertical
2	2992.99	43.93	9.48	54.00	10.07	150	236	Vertical
3	4924.00	29.34	-17.72	54.00	24.66	150	288	Vertical
4	4924.00	40.96	-17.72	74.00	33.04	150	15	Vertical
5	7386.00	47.07	-9.55	74.00	26.93	150	167	Vertical
6	7386.00	37.13	-9.55	54.00	16.87	150	217	Vertical
7	17931.7	47.57	0.70	54.00	6.43	150	118	Vertical

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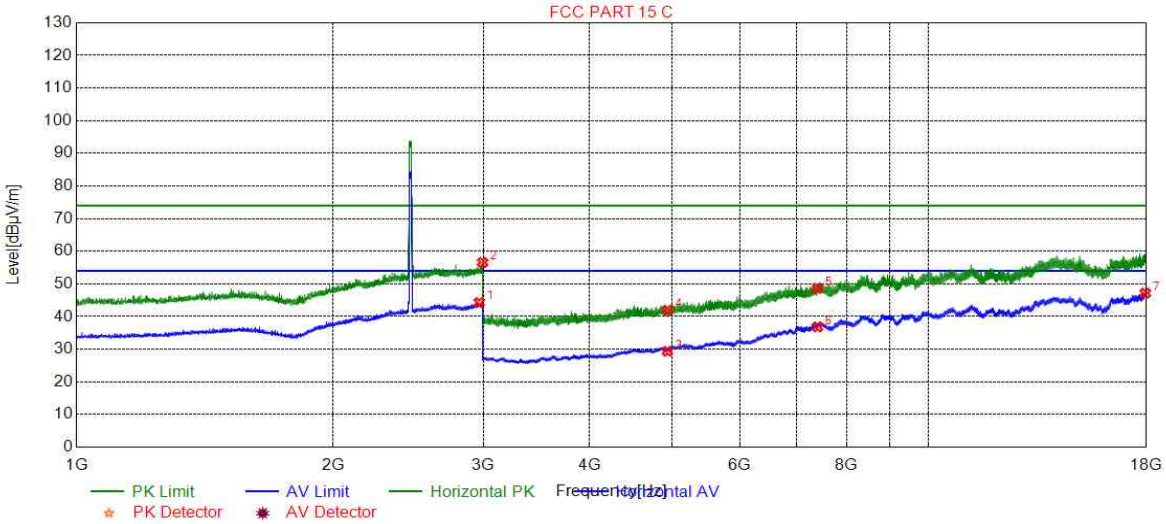
4.9.2.17 802.11G_Channel 12



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2967.99	44.30	9.60	54.00	9.70	150	0	Horizontal
2	2995.49	56.58	9.47	74.00	17.42	150	234	Horizontal
3	4934.00	29.38	-17.65	54.00	24.62	150	44	Horizontal
4	4934.00	41.96	-17.65	74.00	32.04	150	44	Horizontal
5	7401.00	48.63	-9.50	74.00	25.37	150	360	Horizontal
6	7401.00	36.84	-9.50	54.00	17.16	150	360	Horizontal
7	17940.0	47.17	0.70	54.00	6.83	150	69	Horizontal

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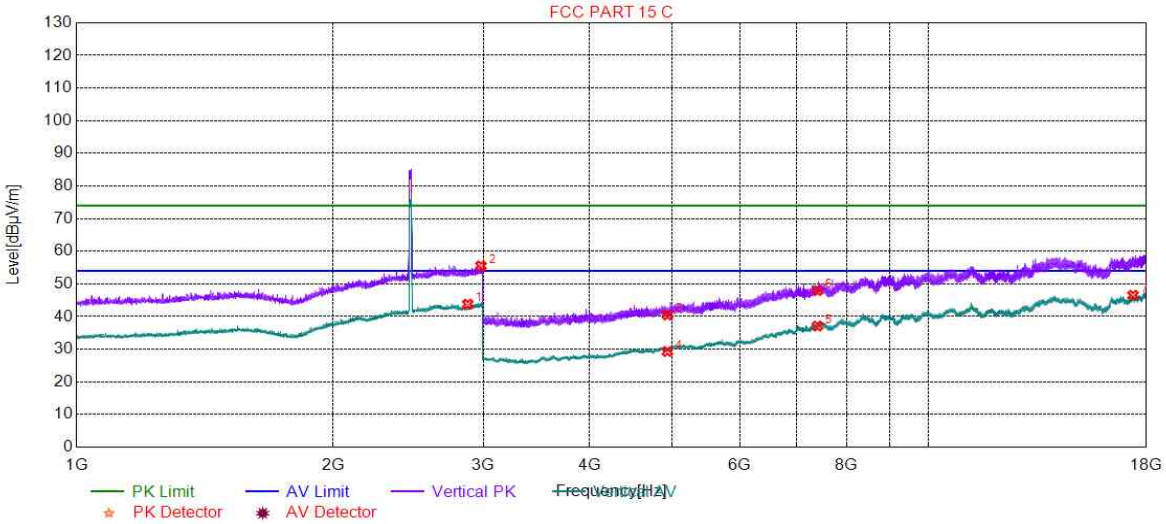
4.9.2.18 802.11G_Channel 12



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2877.46	43.79	9.19	54.00	10.21	150	184	Vertical
2	2981.49	55.53	9.54	74.00	18.47	150	74	Vertical
3	4934.00	40.52	-17.65	74.00	33.48	150	287	Vertical
4	4934.00	29.32	-17.65	54.00	24.68	150	94	Vertical
5	7401.00	37.12	-9.50	54.00	16.88	150	168	Vertical
6	7401.00	47.95	-9.50	74.00	26.05	150	269	Vertical
7	17355.9	46.53	0.06	54.00	7.47	150	168	Vertical

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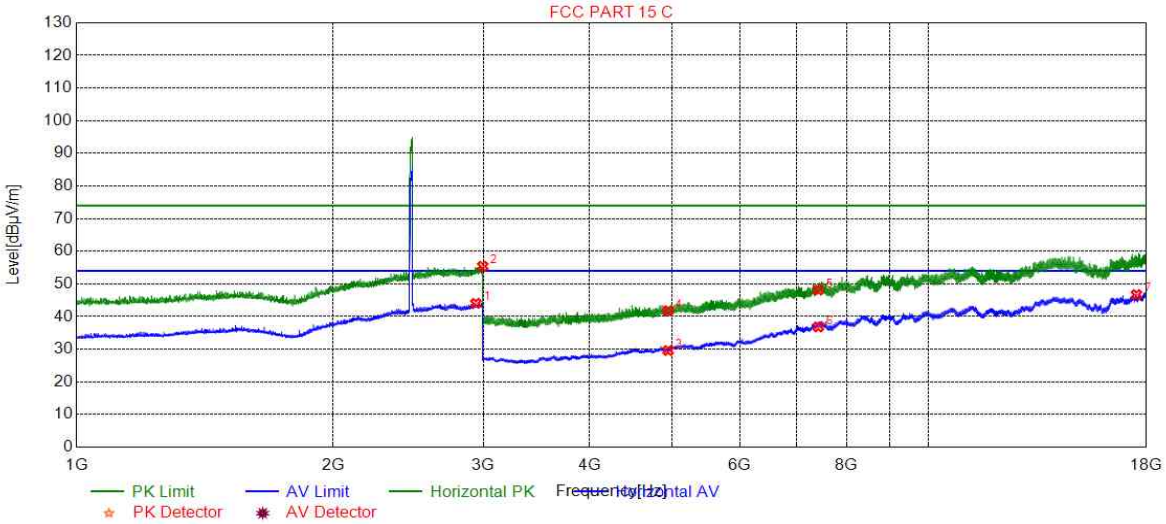
4.9.2.19 802.11G_Channel 13



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2940.98	44.06	9.58	54.00	9.94	150	220	Horizontal
2	2995.99	55.40	9.47	74.00	18.60	150	0	Horizontal
3	4944.00	29.62	-17.58	54.00	24.38	150	66	Horizontal
4	4944.00	41.81	-17.58	74.00	32.19	150	342	Horizontal
5	7416.00	48.14	-9.44	74.00	25.86	150	167	Horizontal
6	7416.00	36.84	-9.44	54.00	17.16	150	68	Horizontal
7	17517.0	46.73	0.99	54.00	7.27	150	360	Horizontal

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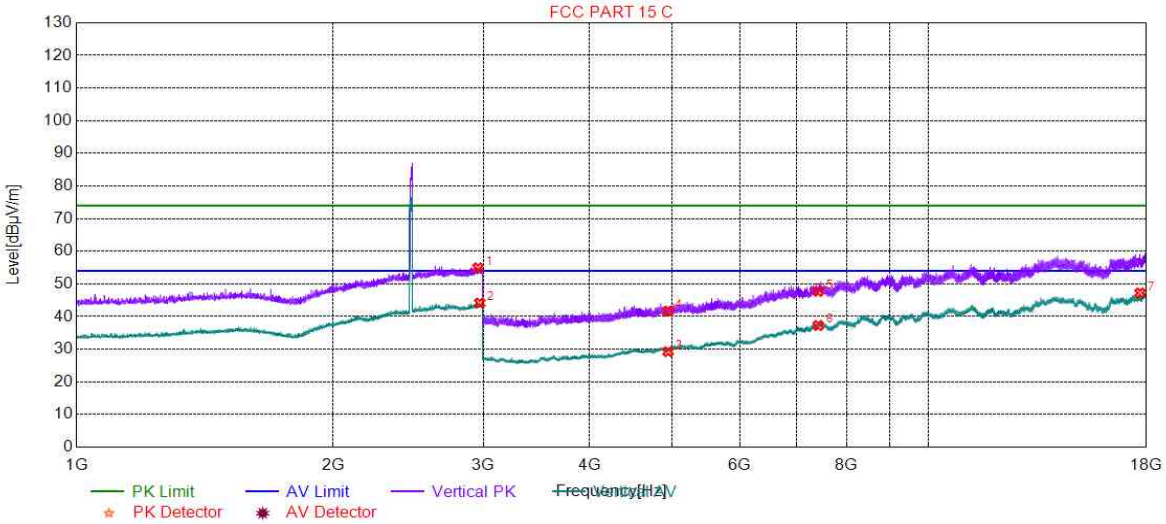
4.9.2.20 802.11G_Channel 13



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2957.98	54.94	9.64	74.00	19.06	150	99	Vertical
2	2971.49	44.18	9.58	54.00	9.82	150	251	Vertical
3	4944.00	29.26	-17.58	54.00	24.74	150	314	Vertical
4	4944.00	41.72	-17.58	74.00	32.28	150	259	Vertical
5	7416.00	47.72	-9.44	74.00	26.28	150	18	Vertical
6	7416.00	37.28	-9.44	54.00	16.72	150	68	Vertical
7	17691.4	47.25	1.36	54.00	6.75	150	324	Vertical

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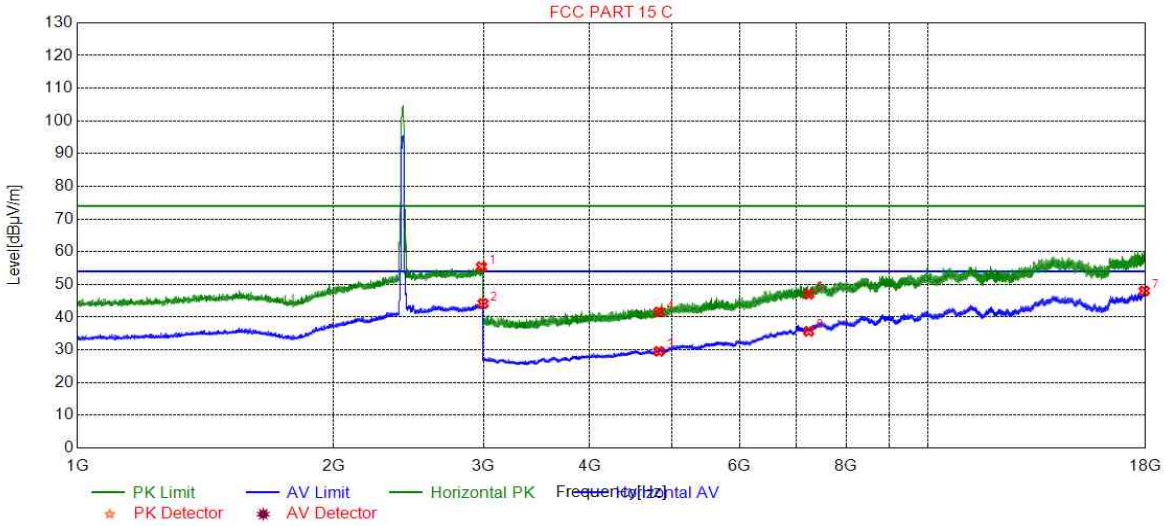
4.9.2.21 802.11N20_Channel 1



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2983.99	55.41	9.52	74.00	18.59	150	2	Horizontal
2	2996.99	44.17	9.46	54.00	9.83	150	14	Horizontal
3	4824.00	29.56	-18.21	54.00	24.44	150	97	Horizontal
4	4824.00	41.61	-18.21	74.00	32.39	150	233	Horizontal
5	7236.00	47.06	-9.99	74.00	26.94	150	18	Horizontal
6	7236.00	35.69	-9.99	54.00	18.31	150	68	Horizontal
7	17931.2	48.03	0.70	54.00	5.97	150	267	Horizontal

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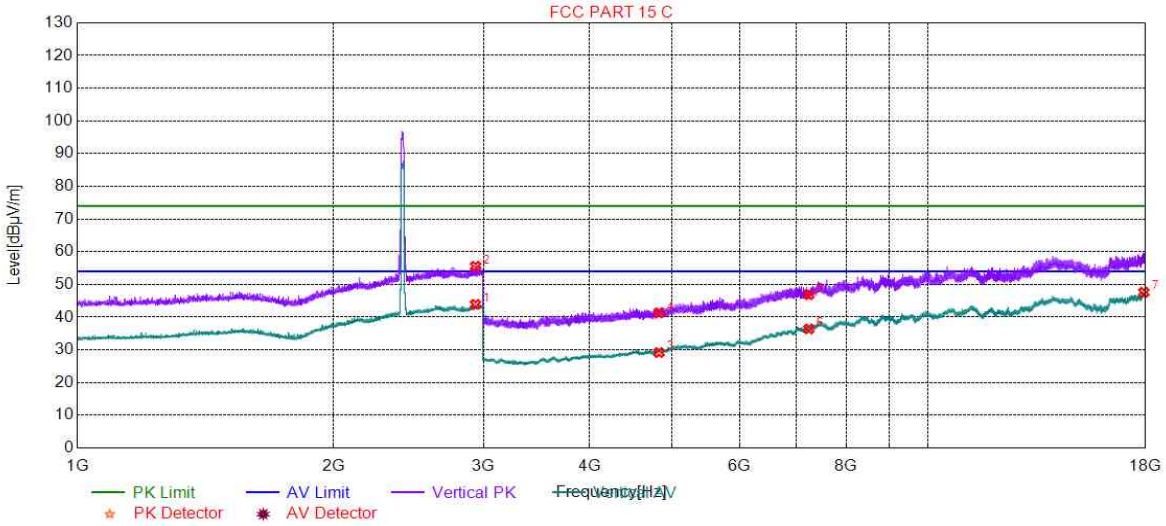
4.9.2.22 802.11N20_Channel 1



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2936.48	43.92	9.53	54.00	10.08	150	236	Vertical
2	2936.98	55.55	9.54	74.00	18.45	150	291	Vertical
3	4824.00	29.20	-18.21	54.00	24.80	150	36	Vertical
4	4824.00	41.30	-18.21	74.00	32.70	150	64	Vertical
5	7236.00	46.91	-9.99	74.00	27.09	150	167	Vertical
6	7236.00	36.42	-9.99	54.00	17.58	150	67	Vertical
7	17914.1	47.62	0.69	54.00	6.38	150	67	Vertical

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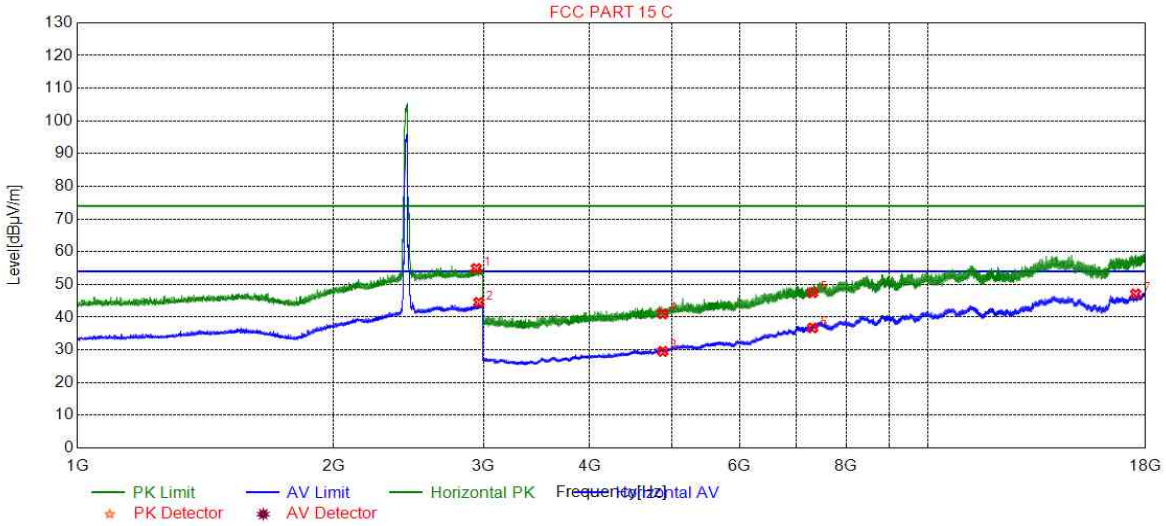
4.9.2.23 802.11N20_Channel 6



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2942.98	54.90	9.60	74.00	19.10	150	0	Horizontal
2	2962.49	44.52	9.62	54.00	9.48	150	151	Horizontal
3	4874.00	29.55	-17.99	54.00	24.45	150	0	Horizontal
4	4874.00	41.04	-17.99	74.00	32.96	150	206	Horizontal
5	7311.00	47.49	-9.74	74.00	26.51	150	318	Horizontal
6	7311.00	36.73	-9.74	54.00	17.27	150	68	Horizontal
7	17519.2	47.12	1.00	54.00	6.88	150	269	Horizontal

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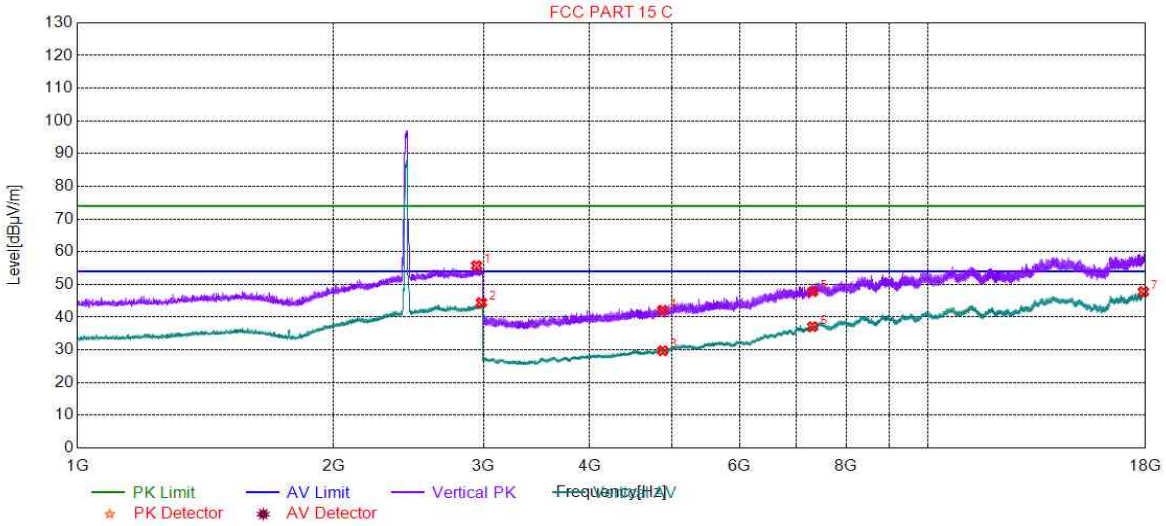
4.9.2.24 802.11N20_Channel 6



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2945.48	55.75	9.63	74.00	18.25	150	194	Vertical
2	2983.49	44.46	9.53	54.00	9.54	150	317	Vertical
3	4874.00	29.77	-17.99	54.00	24.23	150	315	Vertical
4	4874.00	42.12	-17.99	74.00	31.88	150	288	Vertical
5	7311.00	47.81	-9.74	74.00	26.19	150	18	Vertical
6	7311.00	37.10	-9.74	54.00	16.90	150	118	Vertical
7	17892.1	47.79	0.59	54.00	6.21	150	118	Vertical

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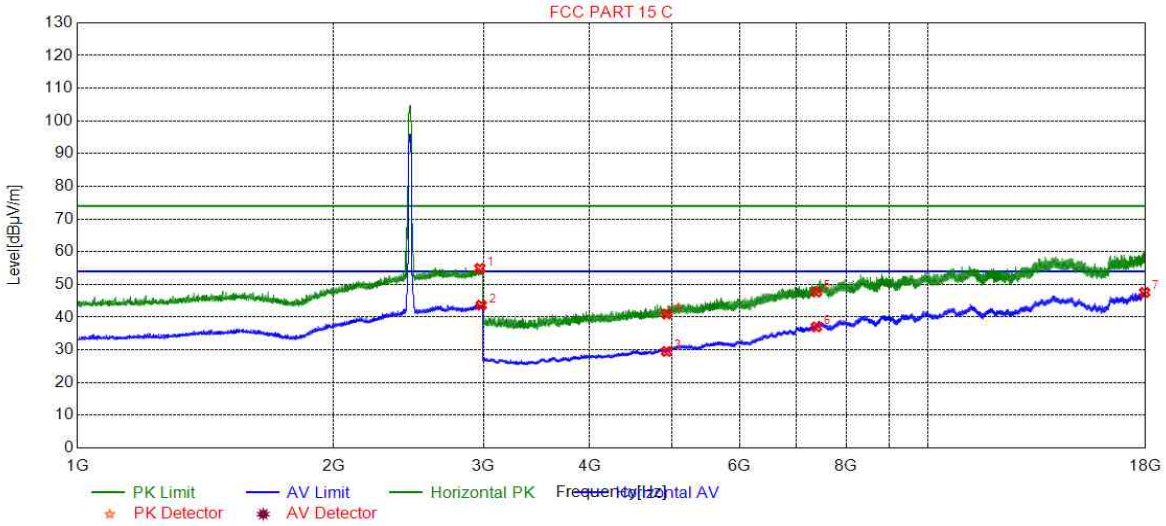
4.9.2.25 802.11N20_Channel 11



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2971.49	54.93	9.58	74.00	19.07	150	166	Horizontal
2	2982.49	43.67	9.53	54.00	10.33	150	180	Horizontal
3	4924.00	29.52	-17.72	54.00	24.48	150	13	Horizontal
4	4924.00	40.98	-17.72	74.00	33.02	150	231	Horizontal
5	7386.00	47.70	-9.55	74.00	26.30	150	217	Horizontal
6	7386.00	37.03	-9.55	54.00	16.97	150	68	Horizontal
7	17951.0	47.57	0.71	54.00	6.43	150	359	Horizontal

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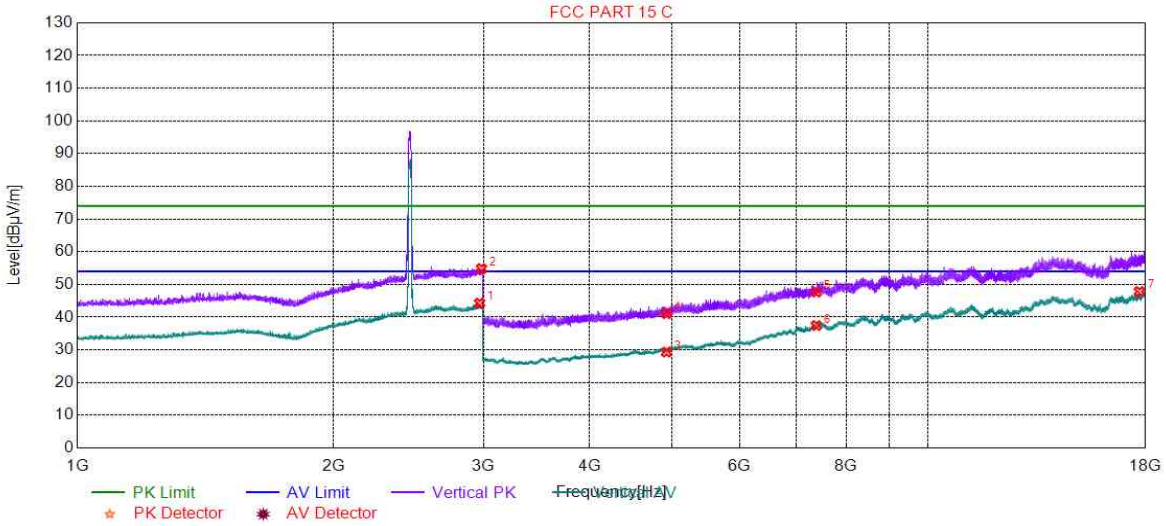
4.9.2.26 802.11N20_Channel 11



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2969.49	44.30	9.59	54.00	9.70	150	86	Vertical
2	2984.49	54.85	9.52	74.00	19.15	150	113	Vertical
3	4924.00	29.33	-17.72	54.00	24.67	150	43	Vertical
4	4924.00	41.08	-17.72	74.00	32.92	150	288	Vertical
5	7386.00	47.70	-9.55	74.00	26.30	150	68	Vertical
6	7386.00	37.44	-9.55	54.00	16.56	150	360	Vertical
7	17703.5	47.87	1.29	54.00	6.13	150	118	Vertical

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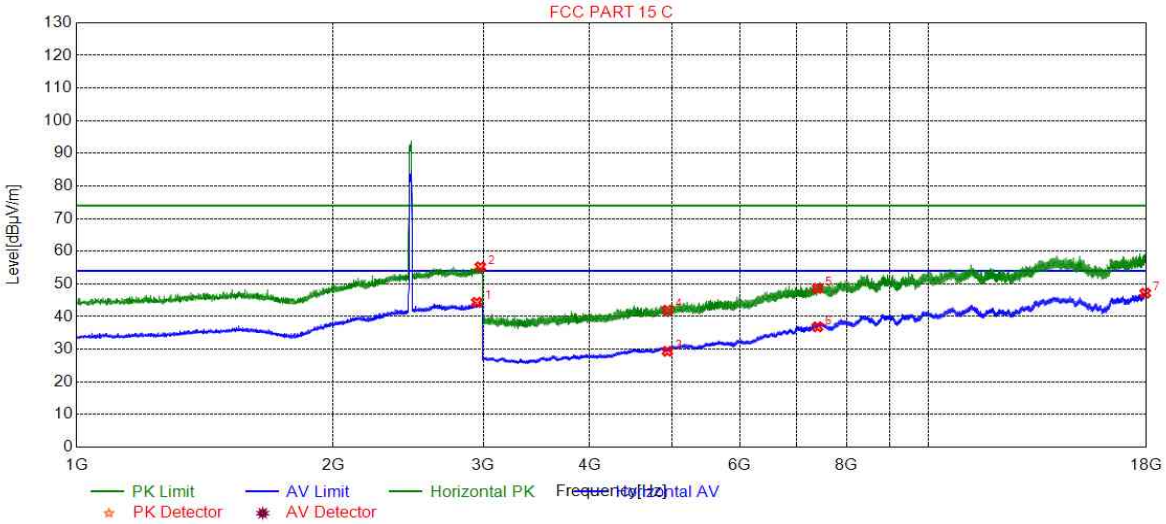
4.9.2.27 802.11N20_Channel 12



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2948.48	44.37	9.66	54.00	9.63	150	220	Horizontal
2	2976.49	55.25	9.56	74.00	18.75	150	84	Horizontal
3	4934.00	29.38	-17.65	54.00	24.62	150	44	Horizontal
4	4934.00	41.96	-17.65	74.00	32.04	150	44	Horizontal
5	7401.00	48.63	-9.50	74.00	25.37	150	360	Horizontal
6	7401.00	36.84	-9.50	54.00	17.16	150	360	Horizontal
7	17940.0	47.17	0.70	54.00	6.83	150	69	Horizontal

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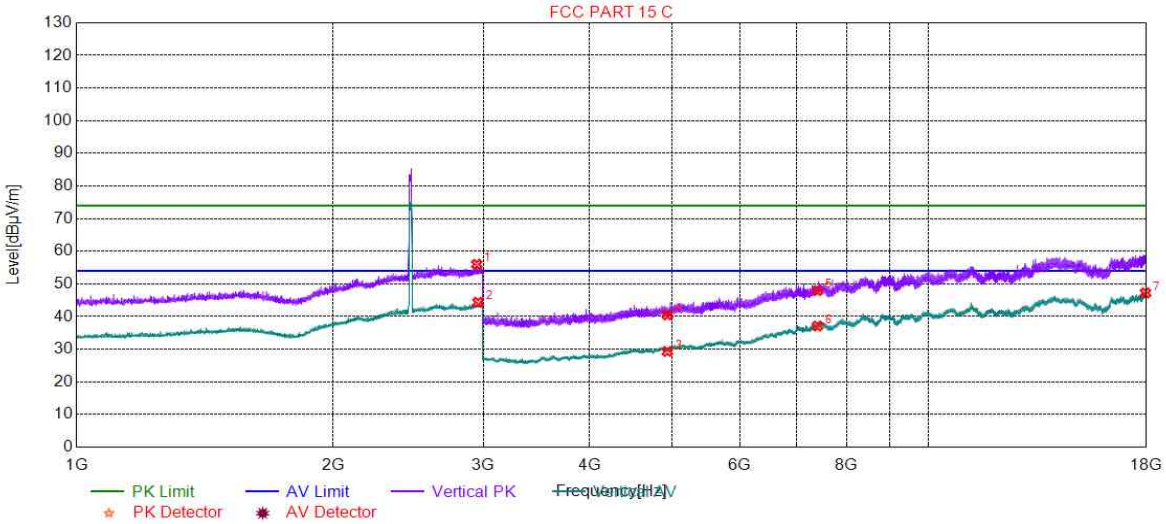
4.9.2.28 802.11N20_Channel 12



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2947.48	56.03	9.65	74.00	17.97	150	86	Vertical
2	2958.48	44.38	9.64	54.00	9.62	150	46	Vertical
3	4934.00	29.32	-17.65	54.00	24.68	150	94	Vertical
4	4934.00	40.52	-17.65	74.00	33.48	150	287	Vertical
5	7401.00	47.95	-9.50	74.00	26.05	150	269	Vertical
6	7401.00	37.12	-9.50	54.00	16.88	150	168	Vertical
7	17950.4	47.25	0.71	54.00	6.75	150	218	Vertical

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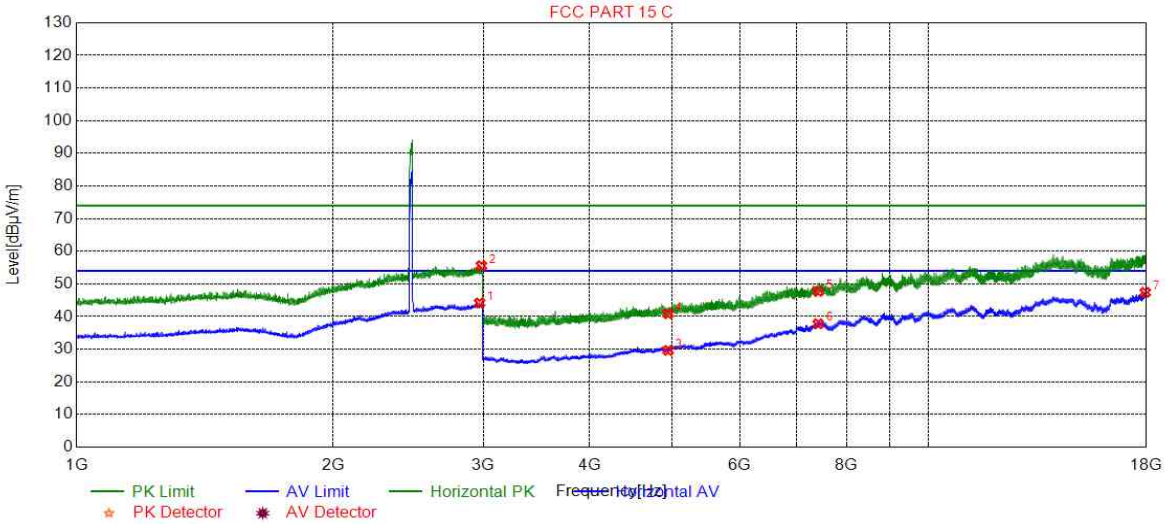
4.9.2.29 802.11N20_Channel 13



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2970.49	44.19	9.59	54.00	9.81	150	342	Horizontal
2	2985.49	55.57	9.52	74.00	18.43	150	108	Horizontal
3	4944.00	29.64	-17.58	54.00	24.36	150	149	Horizontal
4	4944.00	40.88	-17.58	74.00	33.12	150	287	Horizontal
5	7416.00	47.73	-9.44	74.00	26.27	150	220	Horizontal
6	7416.00	37.79	-9.44	54.00	16.21	150	320	Horizontal
7	17935.0	47.40	0.70	54.00	6.60	150	360	Horizontal

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