

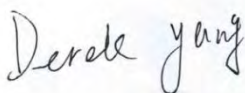
FCC TEST REPORT

Application No.: ZR/2021/20040
Applicant: Wingtech Group (Hongkong) Limited
Address of Applicant: Flat/RM 1903 ,19/F, Podium Plaza, 5 Hanoi Road, Tsim Sha Tsui, Kowloon, Hongkong
Manufacturer: Wingtech Group (Hongkong) Limited
Address of Manufacturer: Flat/RM 1903 ,19/F, Podium Plaza, 5 Hanoi Road, Tsim Sha Tsui, Kowloon, Hongkong
EUT Description: AIRSPEED MOBILE HOTSPOT
Model No.: ASMHS01
Trade Mark: AIRSPEED MOBILE HOTSPOT
FCC ID: 2APXW-ASMHS01
Standards: 47 CFR FCC Part 2, Subpart J
47 CFR Part 15, Subpart C
Date of Receipt: 2021/3/1
Date of Test: 2021/3/1 to 2021/4/15
Date of Issue: 2021/4/27

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

Authorized Signature:



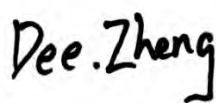
Derek Yang
Wireless Laboratory Manager



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1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2021-04-27		Original

Authorized for issue by:		
Prepared By		 _____ (Dee Zheng) / Engineer
Checked By		 _____ (Jim Huang) / Reviewer



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2 Test Summary

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

Remark : All test were performed by Lab A and B.

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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SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Inspection & Testing Services Laboratory

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgs.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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3 General Information

3.1 Details of Client

Applicant:	Wingtech Group (Hongkong) Limited
Address of Applicant	Flat/RM 1903 ,19/F, Podium Plaza, 5 Hanoi Road, Tsim Sha Tsui, Kowloon, Hongkong
Manufacturer:	Wingtech Group (Hongkong) Limited
Address of Manufacturer	Flat/RM 1903 ,19/F, Podium Plaza, 5 Hanoi Road, Tsim Sha Tsui, Kowloon, Hongkong

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,Swing Hu,Habit Zeng

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:	Leah Chen,Ken Liu,Andy Yao



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Shenzhen Branch 检验检测专用章 Laboratory

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
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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:	AIRSPPEED MOBILE HOTSPOT
Model No.:	ASMHS01
Trade Mark:	AIRSPPEED MOBILE HOTSPOT
Hardware Version:	DVT:89528_1_30
Software Version:	Perdix_0.00.15
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 $f_c = 2407 \text{ MHz} + N * 5 \text{ MHz}$, where: - f_c = "Operating Frequency" in MHz, -N = "Channel Number" with the range from 1 to 11 for the 20 MHz channel bandwidth, or 3 to 9 for the 40 MHz channel bandwidth.
Type of Modulation:	IEEE for 802.11B: DSSS IEEE for 802.11G : OFDM IEEE for 802.11N(HT20) : OFDM IEEE for 802.11N(HT40) : OFDM
Sample Type:	☒ Portable Device, ☐ Module
Antenna Type:	☐ External, ☒ Integrated
Antenna Ports	☒ Ant 1, ☐ Ant 2, ☐ Ant 3
Smart System	☒ SISO (for 802.11B/G/N), ☐ MIMO (for 802.11N): 2 Tx & 2 Rx, ☐ Diversity (for 802.11B/G) : Tx & Rx
Antenna Gain:	2.28dBi

Operation Frequency of each channel (802.11B/G/N HT20)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Operation Frequency of each channel (802.11N HT40)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
3	2422MHz	6	2437MHz	9	2452MHz		
4	2427MHz	7	2442MHz				
5	2432MHz	8	2447MHz				



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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)	Frequency for 802.11N (HT40)
The Lowest channel	2412MHz	2422MHz
The Middle channel	2437MHz	2437MHz
The Highest channel	2462MHz	2452MHz

3.5 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	50 % RH
Atmospheric Pressure:	101.30 KPa
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

3.6 Description of Support Units

The EUT has been tested independent unit.



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4 Test results and Measurement Data

4.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
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 2.28dBi.	



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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

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. 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.		



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 6 for details
Test Results:	Pass



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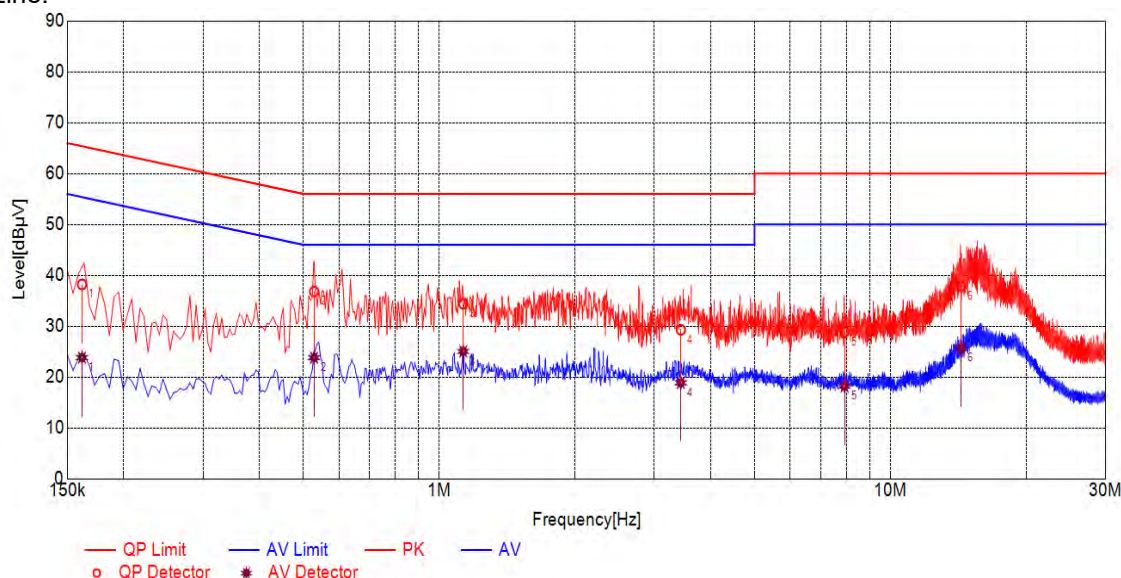
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Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live Line:



Test Graph

Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]
1	0.1617	10.10	38.25	65.37	27.12	23.78	55.37	31.59
2	0.5284	10.10	36.74	56.00	19.26	23.98	46.00	22.02
3	1.1311	10.10	34.65	56.00	21.35	25.12	46.00	20.88
4	3.4331	10.10	29.35	56.00	26.65	18.75	46.00	27.25
5	7.9159	10.10	28.77	60.00	31.23	18.23	50.00	31.77
6	14.3719	10.11	37.98	60.00	22.02	25.55	50.00	24.45

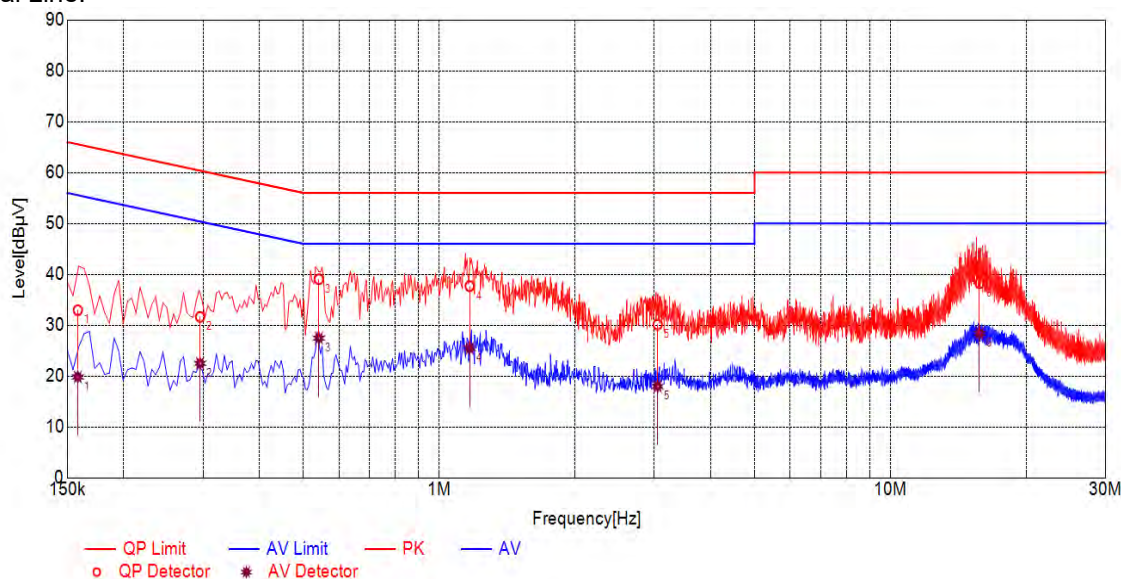


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Neutral Line:



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]
1	0.1583	10.10	32.89	65.55	32.66	19.78	55.55	35.77
2	0.2954	10.10	31.54	60.37	28.83	22.57	50.37	27.80
3	0.5415	10.10	39.12	56.00	16.88	27.55	46.00	18.45
4	1.1687	10.10	37.78	56.00	18.22	25.36	46.00	20.64
5	3.0500	10.10	30.21	56.00	25.79	17.87	46.00	28.13
6	15.7628	10.11	38.36	60.00	21.64	28.47	50.00	21.53

Remark1:

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

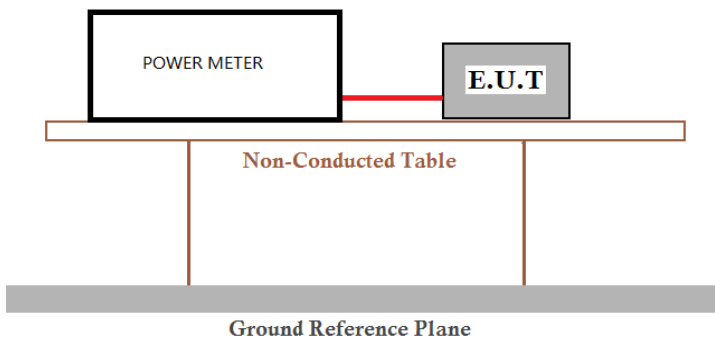
The detailed test data see: **Appendix**



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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 6 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40).
Limit:	30dBm
Test Results:	Pass

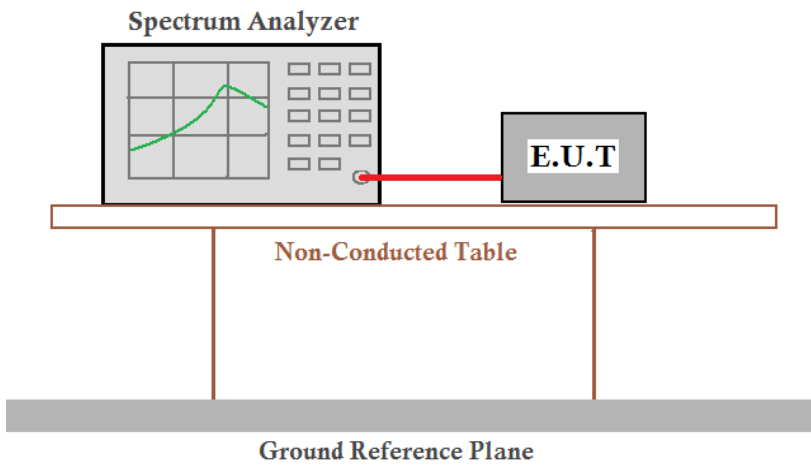
The detailed test data see: **Appendix**



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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 6 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40).
Limit:	≥ 500 kHz
Test Results:	Pass

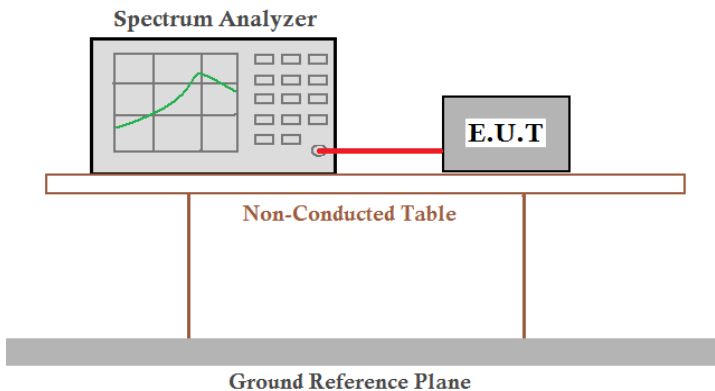
The detailed test data see: **Appendix**



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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 6 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40).
Limit:	≤8.00dBm/3kHz
Test Results:	Pass

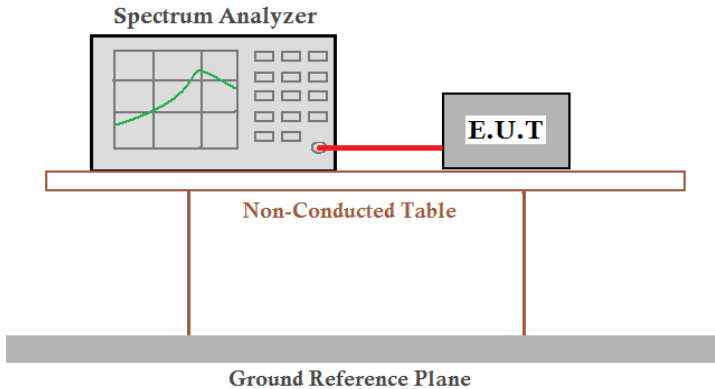
The detailed test data see: **Appendix**



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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:	
Instruments Used:	Refer to section 6 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40).
Limit:	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.
Test Results:	Pass

The detailed test data see: **Appendix**



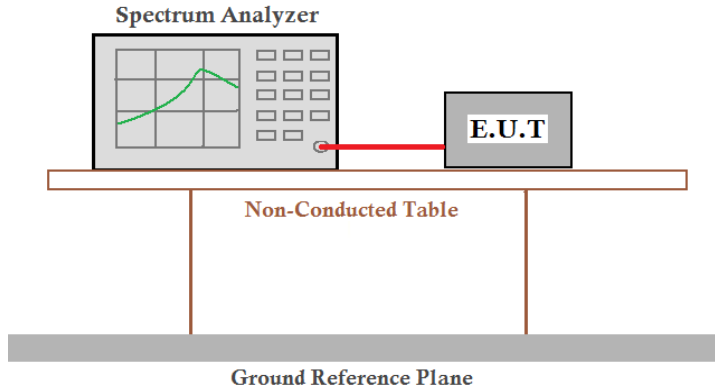
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4.8 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.11
Test Setup:	
Instruments Used:	Refer to section 6 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40).
Limit:	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.
Test Results:	Pass

The detailed test data see: **Appendix**



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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	120kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz (DC $\geq$ 0.98) $\geq$ 1/T (DC<0.98)	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:

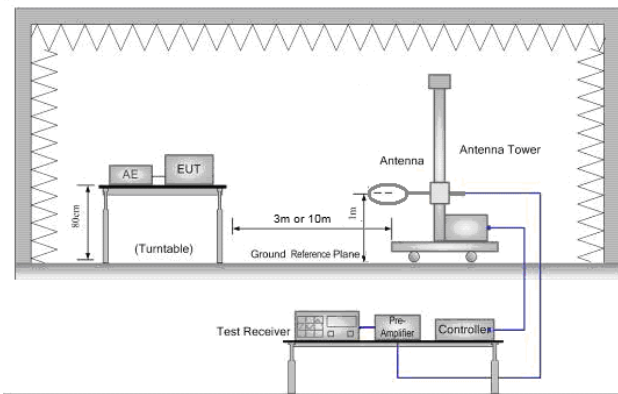


Figure 1. Below 30MHz

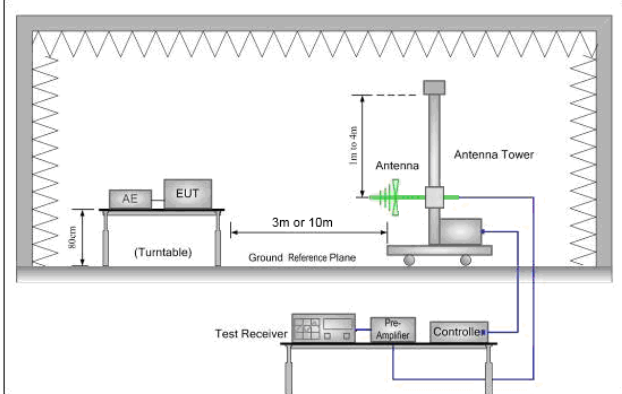


Figure 2. 30MHz to 1GHz

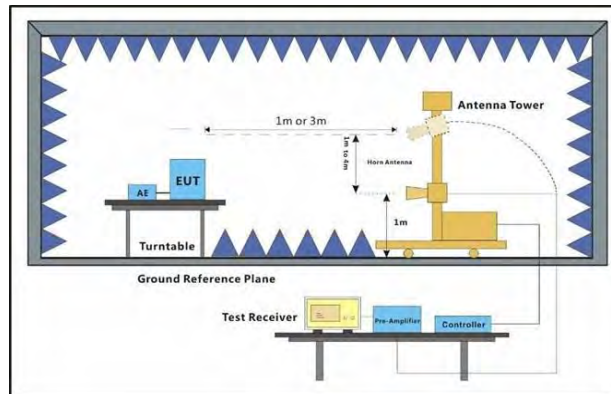


Figure 3. Above 1GHz

Test Procedure:

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation
- 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.
- 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.
- Use the following spectrum analyzer settings:
 - Span shall wide enough to fully capture the emission being measured;
 - Set RBW=100 kHz for $f < 1$ GHz, RBW=1MHz for $f > 1$ GHz ;
VBW $\geq$ RBW; Sweep = auto;
Detector function = peak; Trace = max hold for peak
 - For average measurement: use duty cycle correction factor method per 15.35(c).
Duty cycle = On time/100 milliseconds



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t (86-755) 26012053 f (86-755) 26710594
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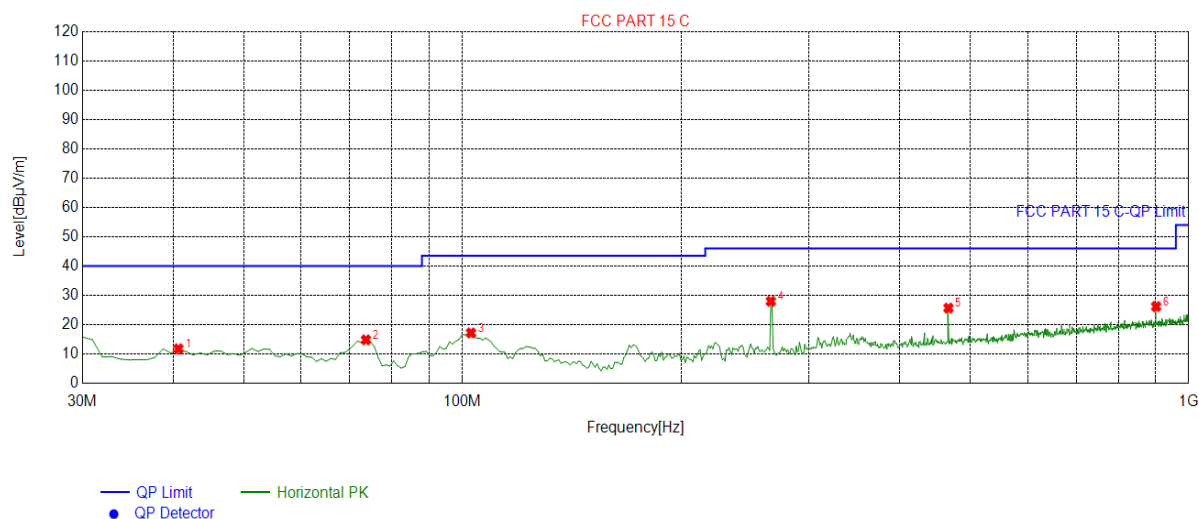
	On time = $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$ Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc. Average Emission Level = Peak Emission Level + $20 * \log(\text{Duty cycle})$ f. For each suspected emission, the EUT was arranged to its worst case and 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); 13.5Mbps of rate is the worst case of 802.11N(HT40); For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11B at lowest channel is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 6 for details
Test Results:	Pass



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4.9.1 Radiated emission below 1GHz



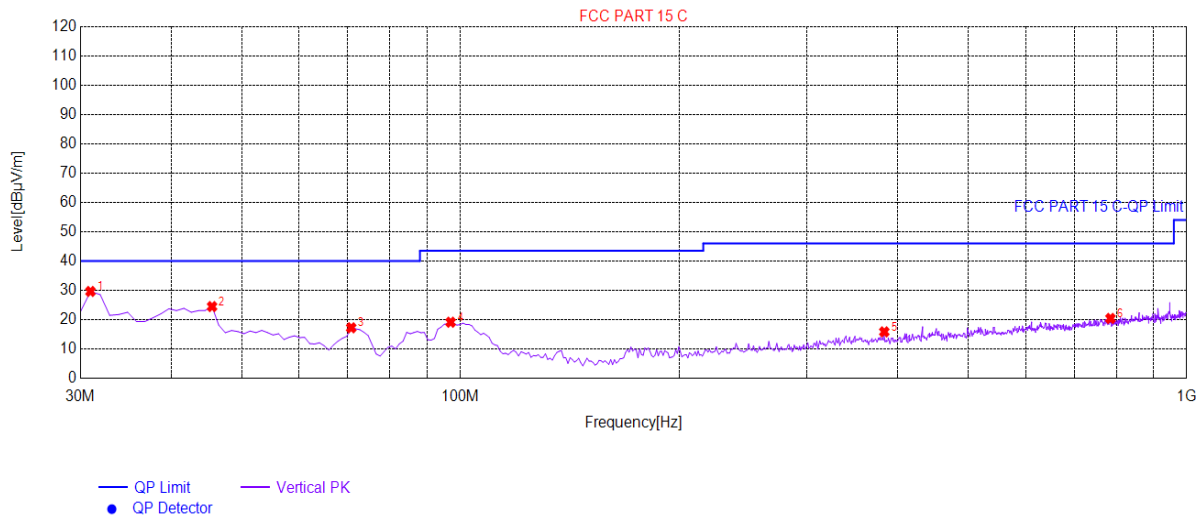
Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	40.6807	11.77	-27.34	40.00	28.23	198	109	Horizontal
2	73.6937	14.82	-31.17	40.00	25.18	254	245	Horizontal
3	102.8228	17.18	-28.13	43.50	26.32	247	270	Horizontal
4	265.9459	27.97	-26.47	46.00	18.03	158	90	Horizontal
5	466.9369	25.66	-21.60	46.00	20.34	165	180	Horizontal
6	901.9319	26.18	-14.25	46.00	19.82	186	279	Horizontal



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Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.9710	29.62	-29.32	40.00	10.38	214	23	Vertical
2	45.5355	24.47	-26.48	40.00	15.53	189	27	Vertical
3	70.7808	17.23	-30.65	40.00	22.77	258	128	Vertical
4	96.9970	19.13	-28.64	43.50	24.37	365	305	Vertical
5	383.4334	15.85	-23.02	46.00	30.15	189	24	Vertical
6	785.4154	20.42	-16.12	46.00	25.58	187	360	Vertical



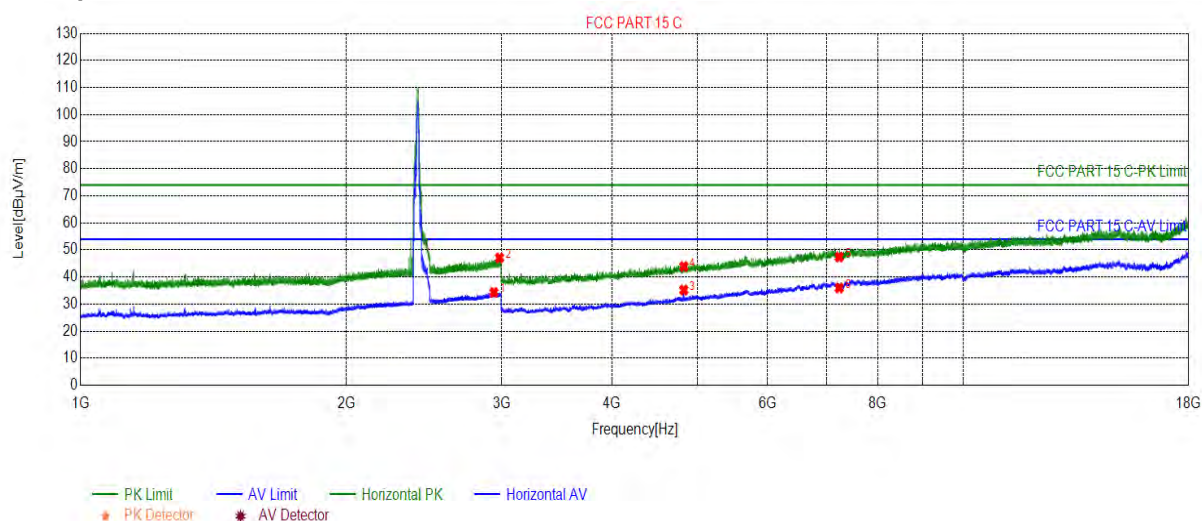
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4.9.2 Transmitter emission above 1GHz

4.9.2.1 802.11B_Channel CH1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2939.997	34.30	10.50	54.00	19.70	110	334	Horizontal
2	2982.599	47.07	10.53	74.00	26.93	211	235	Horizontal
3	4824.000	35.17	-15.31	54.00	18.83	181	170	Horizontal
4	4824.000	43.88	-15.31	74.00	30.12	216	180	Horizontal
5	7236.000	47.38	-8.82	74.00	26.62	130	196	Horizontal
6	7236.000	35.98	-8.82	54.00	18.02	182	77	Horizontal

Final Data List

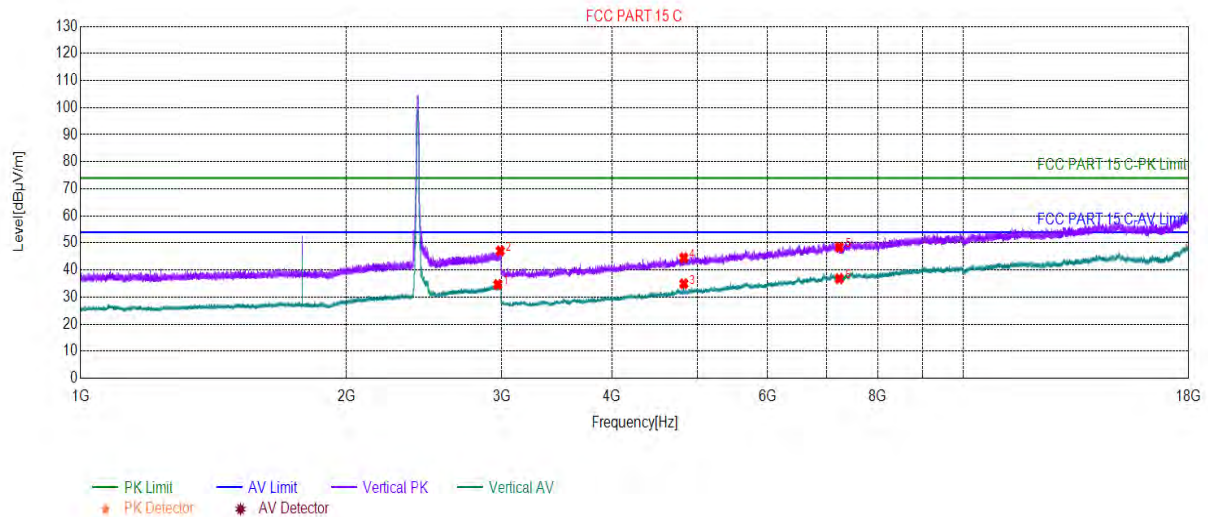


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4.9.2.2 802.11B_Channel CH1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2968.998	34.64	10.35	54.00	19.36	156	16	Vertical
2	2988.399	47.06	10.50	74.00	26.94	274	192	Vertical
3	4824.000	34.94	-15.31	54.00	19.06	273	124	Vertical
4	4824.000	44.53	-15.31	74.00	29.47	183	142	Vertical
5	7236.000	48.44	-8.82	74.00	25.56	227	235	Vertical
6	7236.000	36.78	-8.82	54.00	17.22	217	294	Vertical

Final Data List

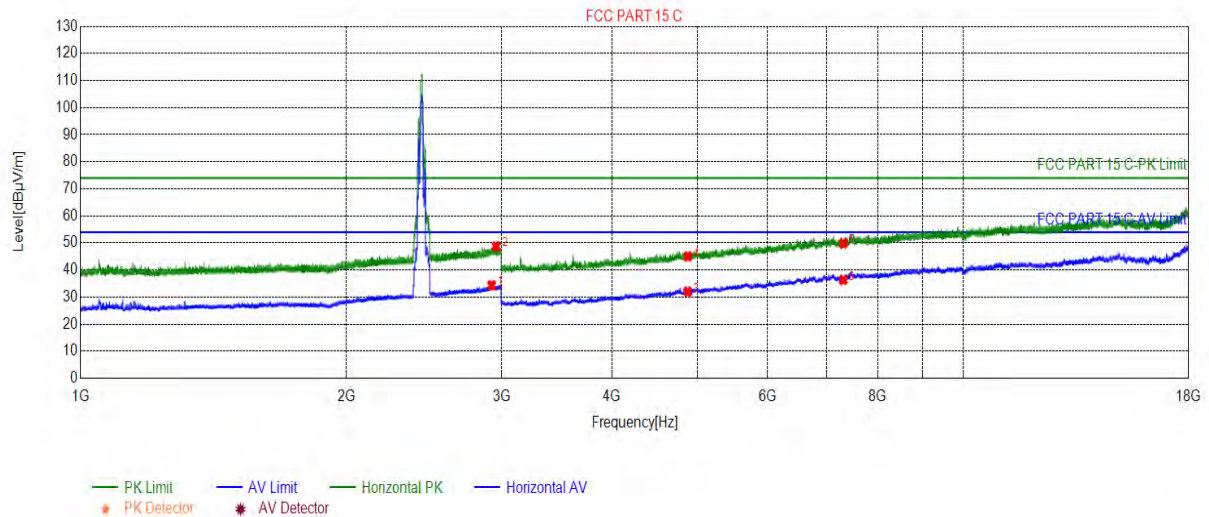


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4.9.2.3 802.11B_Channel CH6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2922.596	34.37	10.43	54.00	19.63	190	192	Horizontal
2	2957.197	48.73	10.53	74.00	25.27	191	228	Horizontal
3	4874.000	32.02	-15.09	54.00	21.98	126	278	Horizontal
4	4874.000	45.01	-15.09	74.00	28.99	191	123	Horizontal
5	7311.000	49.91	-8.93	74.00	24.09	247	334	Horizontal
6	7311.000	36.33	-8.93	54.00	17.67	209	322	Horizontal

Final Data List

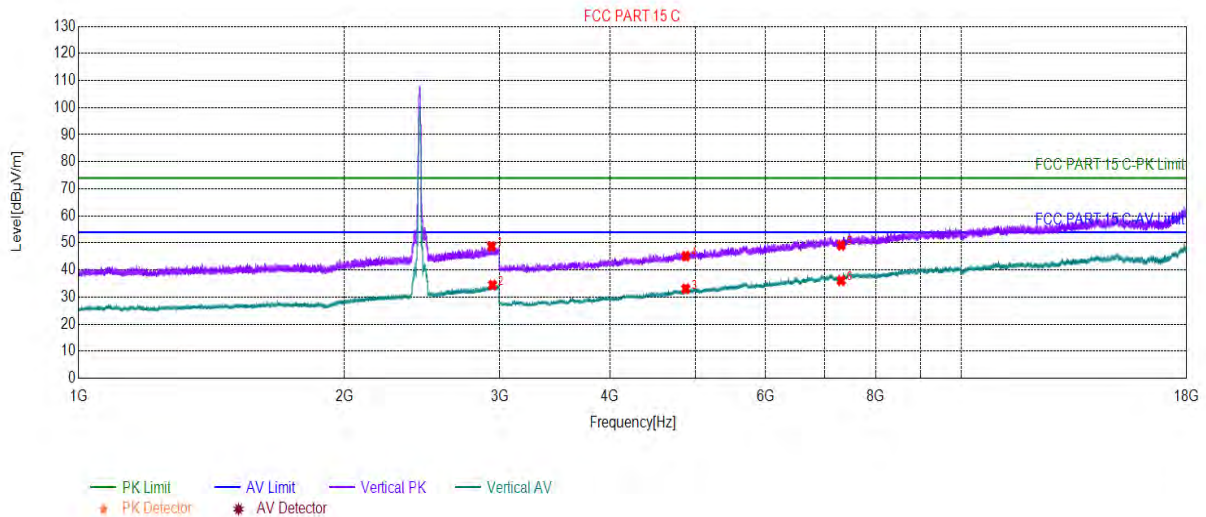


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4.9.2.4 802.11B_Channel CH6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2936.896	48.76	10.52	74.00	25.24	290	333	Vertical
2	2944.397	34.46	10.53	54.00	19.54	200	22	Vertical
3	4874.000	33.08	-15.09	54.00	20.92	167	122	Vertical
4	4874.000	45.11	-15.09	74.00	28.89	186	204	Vertical
5	7311.000	49.16	-8.93	74.00	24.84	184	264	Vertical
6	7311.000	36.10	-8.93	54.00	17.90	173	88	Vertical

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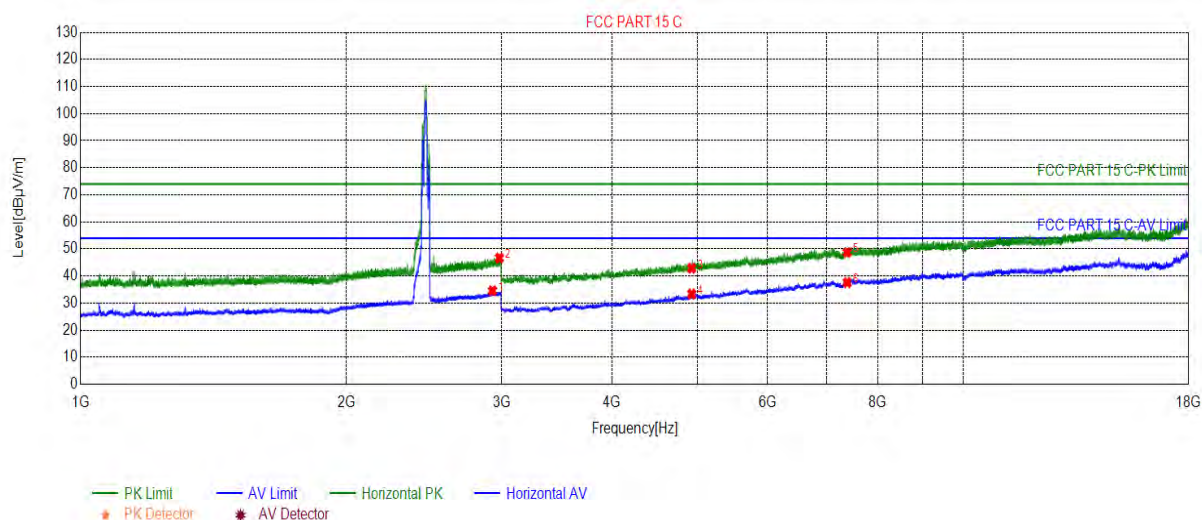
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4.9.2.5 802.11B_Channel CH11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2928.596	34.57	10.53	54.00	19.43	109	135	Horizontal
2	2981.999	46.67	10.54	74.00	27.33	109	175	Horizontal
3	4924.000	42.85	-14.74	74.00	31.15	177	88	Horizontal
4	4924.000	33.36	-14.74	54.00	20.64	112	130	Horizontal
5	7386.000	48.72	-7.78	74.00	25.28	223	221	Horizontal
6	7386.000	37.58	-7.78	54.00	16.42	117	354	Horizontal

Final Data List



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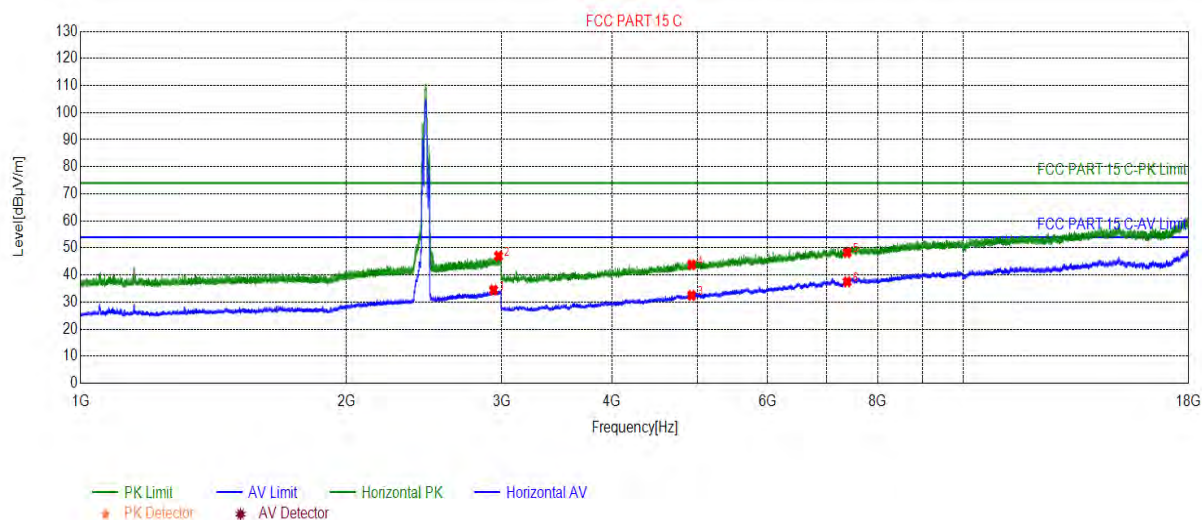
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4.9.2.6

802.11B_Channel CH11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2937.496	34.43	10.52	54.00	19.57	201	358	Horizontal
2	2975.598	46.99	10.45	74.00	27.01	248	58	Horizontal
3	4924.000	32.44	-14.74	54.00	21.56	180	86	Horizontal
4	4924.000	43.80	-14.74	74.00	30.20	170	130	Horizontal
5	7386.000	48.32	-7.78	74.00	25.68	128	278	Horizontal
6	7386.000	37.51	-7.78	54.00	16.49	236	60	Horizontal

Final Data List

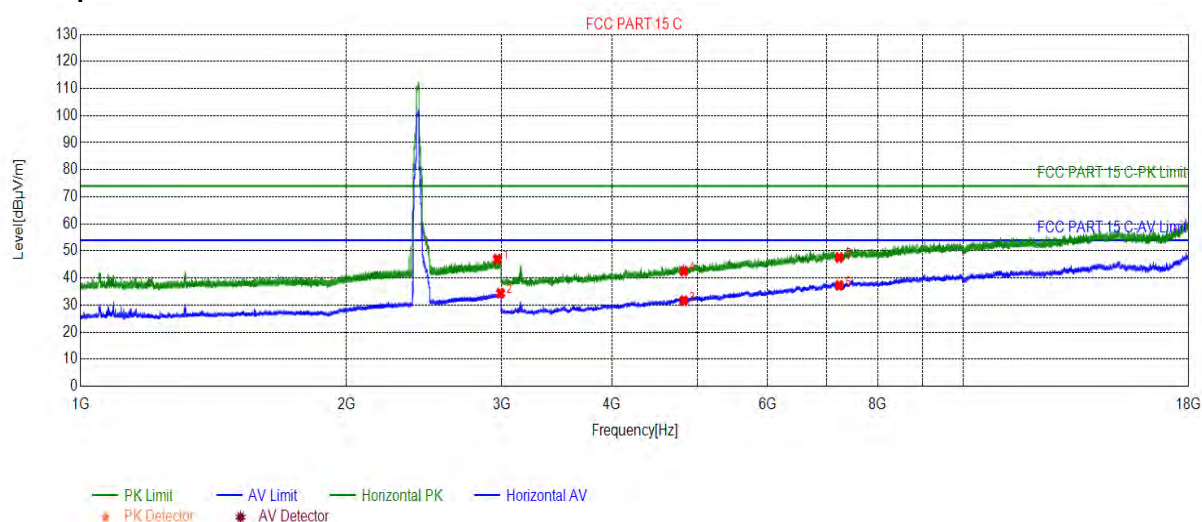


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4.9.2.7 802.11G_Channel CH1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2966.198	46.98	10.40	74.00	27.02	125	170	Horizontal
2	2991.599	34.37	10.54	54.00	19.63	223	77	Horizontal
3	4824.000	31.66	-15.31	54.00	22.34	195	184	Horizontal
4	4824.000	42.53	-15.31	74.00	31.47	188	184	Horizontal
5	7236.000	47.59	-8.82	74.00	26.41	238	114	Horizontal
6	7236.000	37.28	-8.82	54.00	16.72	121	6	Horizontal

Final Data List

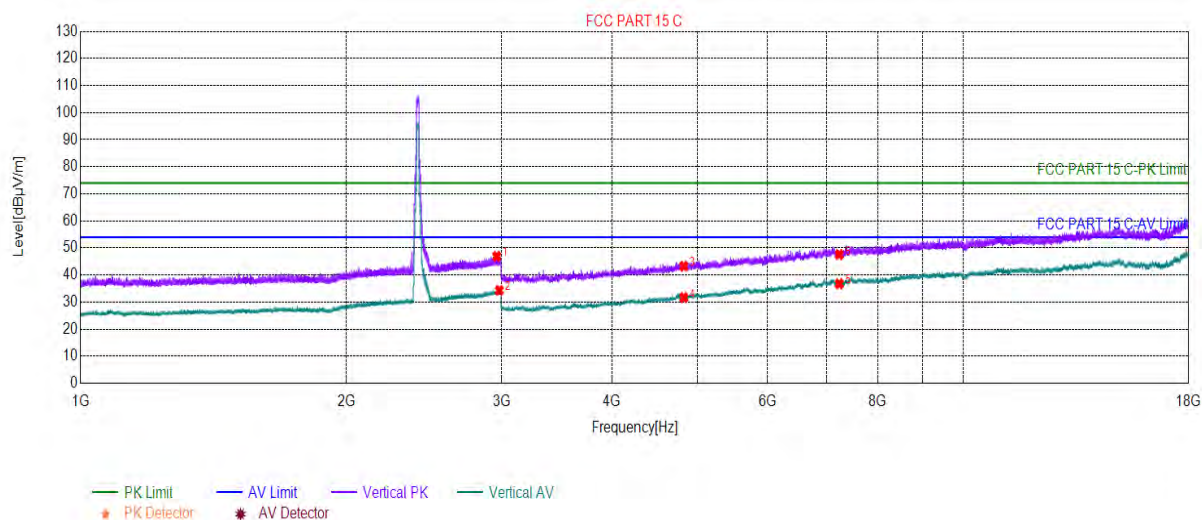


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4.9.2.8 802.11G_Channel CH1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2961.498	46.92	10.49	74.00	27.08	233	129	Vertical
2	2981.599	34.31	10.54	54.00	19.69	177	163	Vertical
3	4824.000	43.26	-15.31	74.00	30.74	299	31	Vertical
4	4824.000	31.65	-15.31	54.00	22.35	278	41	Vertical
5	7236.000	36.76	-8.82	54.00	17.24	266	154	Vertical
6	7236.000	47.55	-8.82	74.00	26.45	185	197	Vertical

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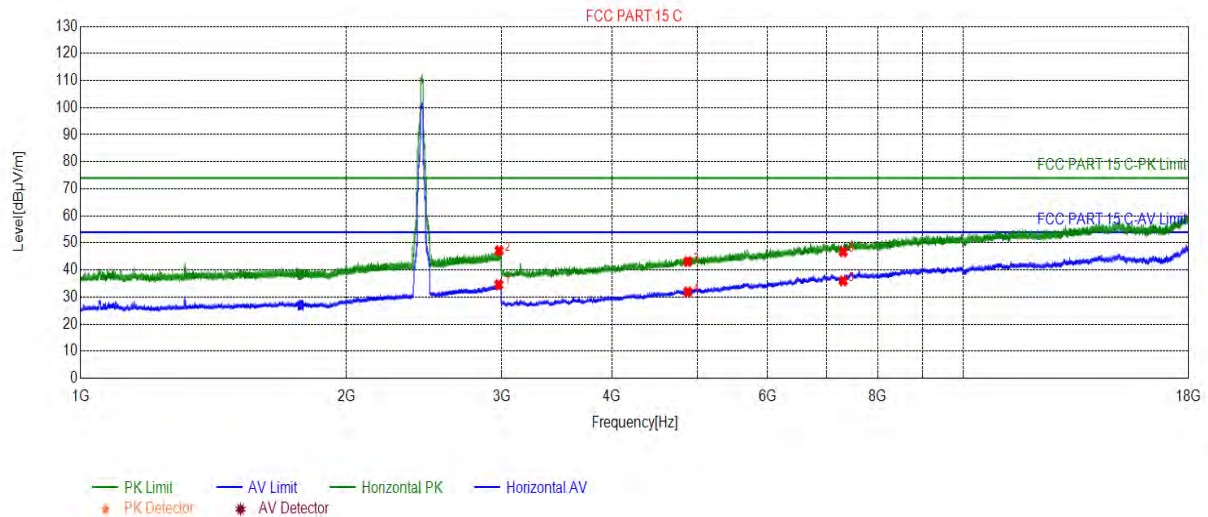
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4.9.2.9 802.11G_Channel CH6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2977.698	34.60	10.50	54.00	19.40	124	350	Horizontal
2	2979.599	47.13	10.54	74.00	26.87	210	22	Horizontal
3	4874.000	43.13	-15.09	74.00	30.87	119	264	Horizontal
4	4874.000	31.88	-15.09	54.00	22.12	154	237	Horizontal
5	7311.000	36.00	-8.93	54.00	18.00	235	179	Horizontal
6	7311.000	46.74	-8.93	74.00	27.26	208	302	Horizontal

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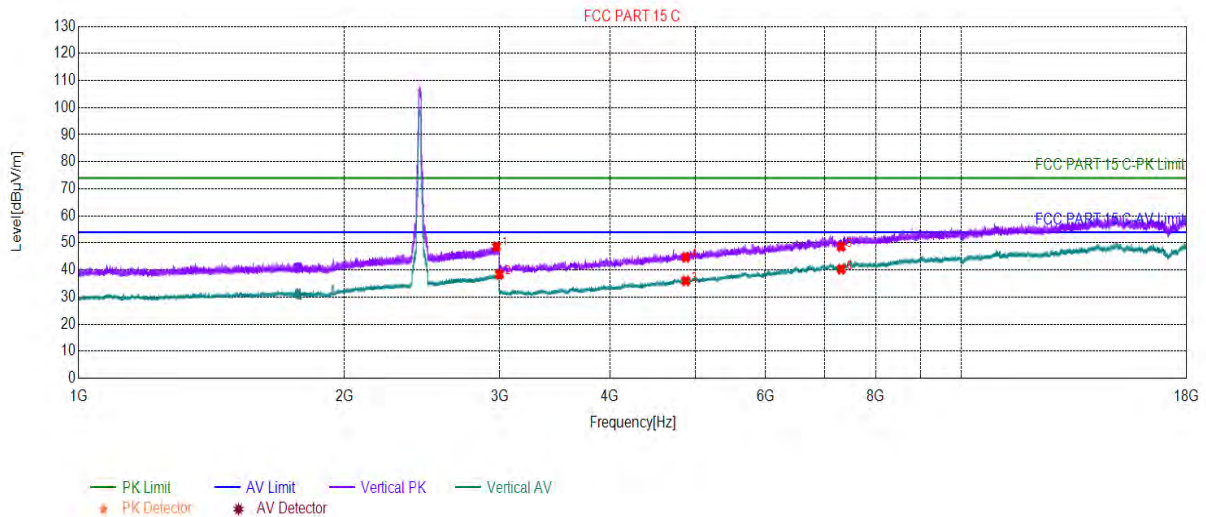
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4.9.2.10 802.11G_Channel CH6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2974.598	48.67	10.43	74.00	25.33	165	28	Vertical
2	2997.499	38.41	10.73	54.00	15.59	188	343	Vertical
3	4874.000	36.01	-15.09	54.00	17.99	205	295	Vertical
4	4874.000	44.70	-15.09	74.00	29.30	254	195	Vertical
5	7311.000	48.64	-8.93	74.00	25.36	298	240	Vertical
6	7311.000	40.31	-8.93	54.00	13.69	283	250	Vertical

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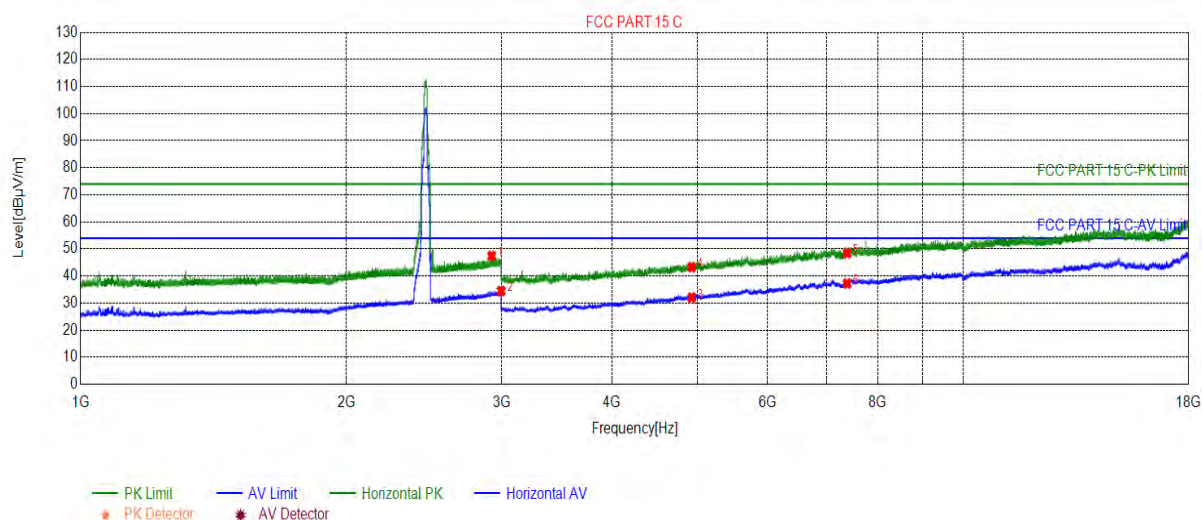
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4.9.2.11 802.11G_Channel CH11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2922.496	47.47	10.42	74.00	26.53	211	228	Horizontal
2	2995.799	34.48	10.68	54.00	19.52	234	173	Horizontal
3	4924.000	32.04	-14.74	54.00	21.96	170	173	Horizontal
4	4924.000	43.27	-14.74	74.00	30.73	124	290	Horizontal
5	7386.000	48.48	-7.78	74.00	25.52	149	60	Horizontal
6	7386.000	37.20	-7.78	54.00	16.80	219	178	Horizontal

Final Data List

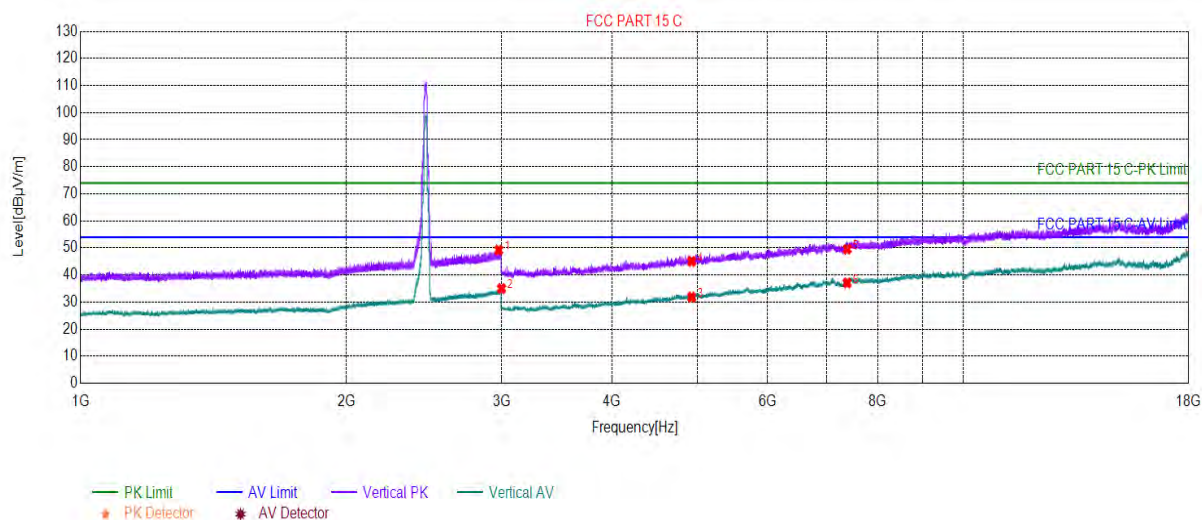


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4.9.2.12 802.11G_Channel CH11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2976.698	49.22	10.48	74.00	24.78	162	39	Vertical
2	2998.699	34.99	10.77	54.00	19.01	286	270	Vertical
3	4924.000	31.81	-14.74	54.00	22.19	181	302	Vertical
4	4924.000	45.03	-14.74	74.00	28.97	174	132	Vertical
5	7386.000	49.59	-7.78	74.00	24.41	236	242	Vertical
6	7386.000	37.05	-7.78	54.00	16.95	282	126	Vertical

Final Data List

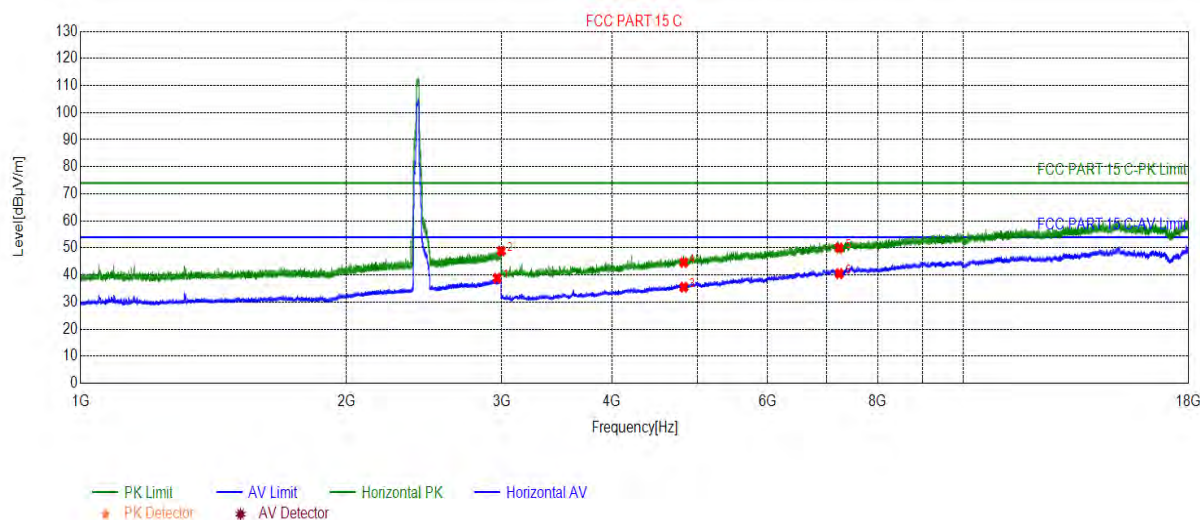


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4.9.2.13 802.11N20_Channel CH1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2964.898	38.86	10.42	54.00	15.14	155	145	Horizontal
2	2996.199	48.90	10.69	74.00	25.10	145	221	Horizontal
3	4824.000	35.50	-15.31	54.00	18.50	208	258	Horizontal
4	4824.000	44.61	-15.31	74.00	29.39	143	2	Horizontal
5	7236.000	50.05	-8.82	74.00	23.95	238	51	Horizontal
6	7236.000	40.50	-8.82	54.00	13.50	130	331	Horizontal

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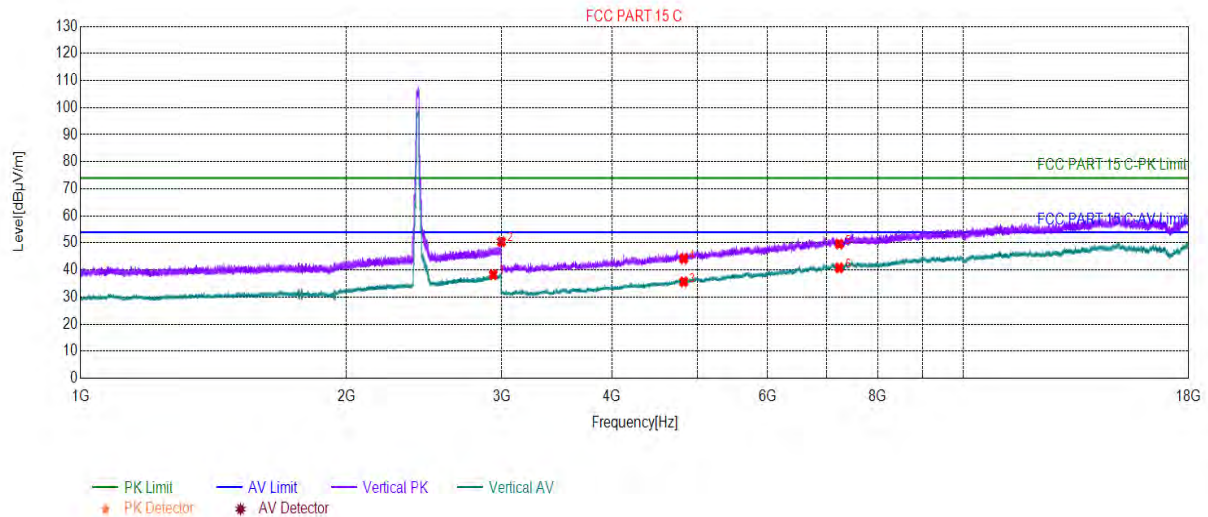
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4.9.2.14 802.11N20_Channel CH1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2934.396	38.27	10.53	54.00	15.73	216	270	Vertical
2	2998.199	50.46	10.75	74.00	23.54	164	152	Vertical
3	4824.000	35.65	-15.31	54.00	18.35	223	106	Vertical
4	4824.000	44.17	-15.31	74.00	29.83	218	89	Vertical
5	7236.000	49.64	-8.82	74.00	24.36	237	244	Vertical
6	7236.000	40.79	-8.82	54.00	13.21	198	322	Vertical

Final Data List

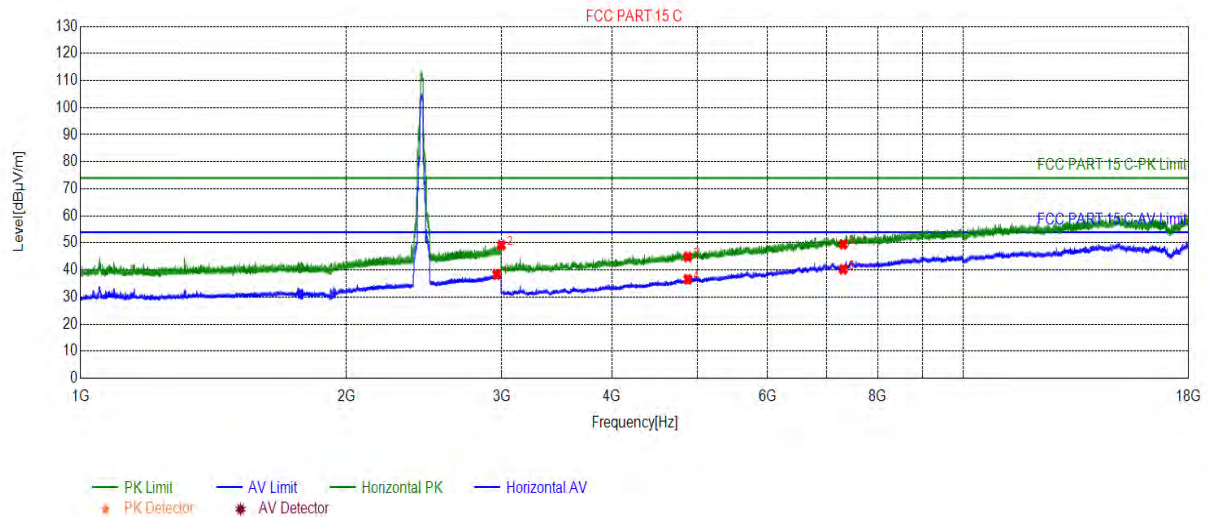


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4.9.2.15 802.11N20_Channel CH6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2961.898	38.38	10.48	54.00	15.62	136	150	Horizontal
2	2997.099	49.20	10.72	74.00	24.80	224	358	Horizontal
3	4874.000	44.86	-15.09	74.00	29.14	235	350	Horizontal
4	4874.000	36.58	-15.09	54.00	17.42	160	181	Horizontal
5	7311.000	40.26	-8.93	54.00	13.74	218	203	Horizontal
6	7311.000	49.51	-8.93	74.00	24.49	226	298	Horizontal

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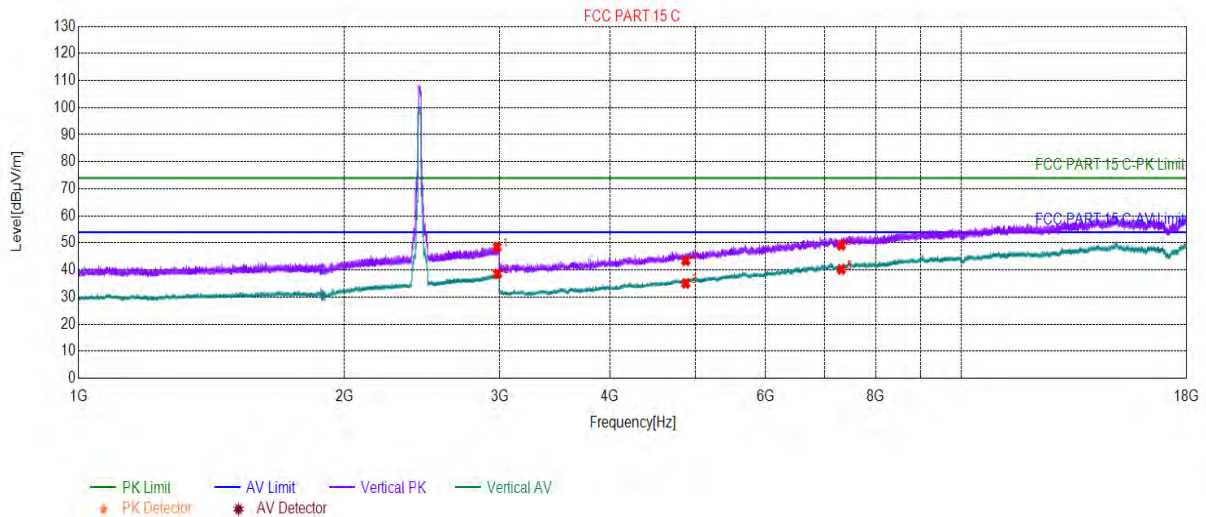
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4.9.2.16 802.11N20_Channel CH6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2979.499	48.46	10.54	74.00	25.54	275	256	Vertical
2	2982.799	38.64	10.53	54.00	15.36	281	13	Vertical
3	4874.000	35.03	-15.09	54.00	18.97	270	46	Vertical
4	4874.000	43.47	-15.09	74.00	30.53	153	165	Vertical
5	7311.000	40.23	-8.93	54.00	13.77	184	238	Vertical
6	7311.000	49.15	-8.93	74.00	24.85	213	204	Vertical

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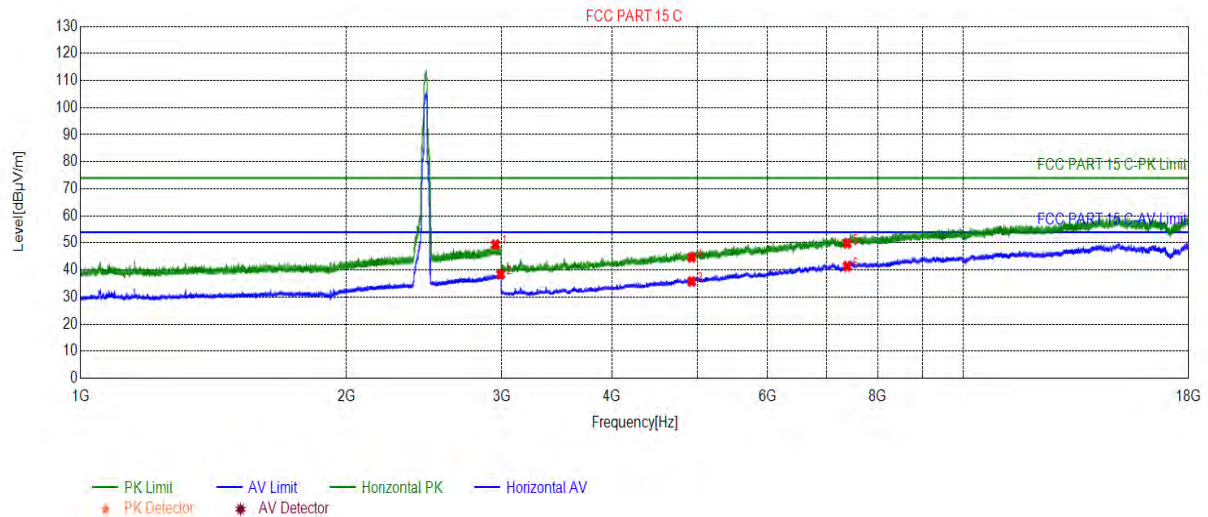
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4.9.2.17 802.11N20_Channel CH11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2951.297	49.38	10.56	74.00	24.62	199	107	Horizontal
2	2992.099	38.41	10.56	54.00	15.59	185	86	Horizontal
3	4924.000	35.74	-14.74	54.00	18.26	197	284	Horizontal
4	4924.000	44.68	-14.74	74.00	29.32	176	267	Horizontal
5	7386.000	49.88	-7.78	74.00	24.12	108	12	Horizontal
6	7386.000	41.37	-7.78	54.00	12.63	126	108	Horizontal

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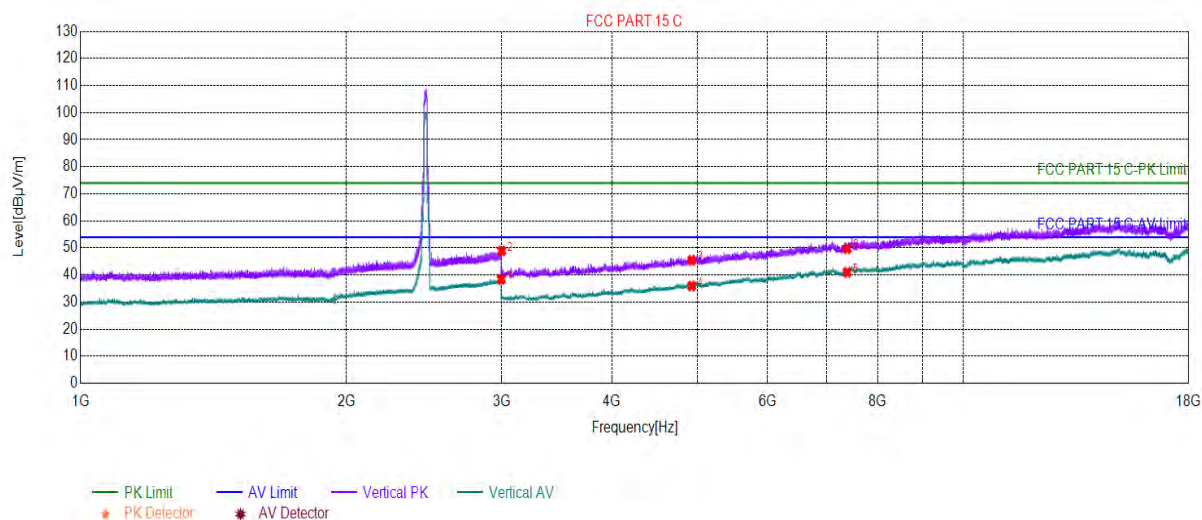
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4.9.2.18

802.11N20_Channel CH11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2996.099	38.41	10.68	54.00	15.59	280	209	Vertical
2	2999.900	48.94	10.81	74.00	25.06	194	93	Vertical
3	4924.000	45.42	-14.74	74.00	28.58	293	271	Vertical
4	4924.000	35.98	-14.74	54.00	18.02	182	277	Vertical
5	7386.000	40.99	-7.78	54.00	13.01	292	197	Vertical
6	7386.000	49.75	-7.78	74.00	24.25	299	136	Vertical

Final Data List



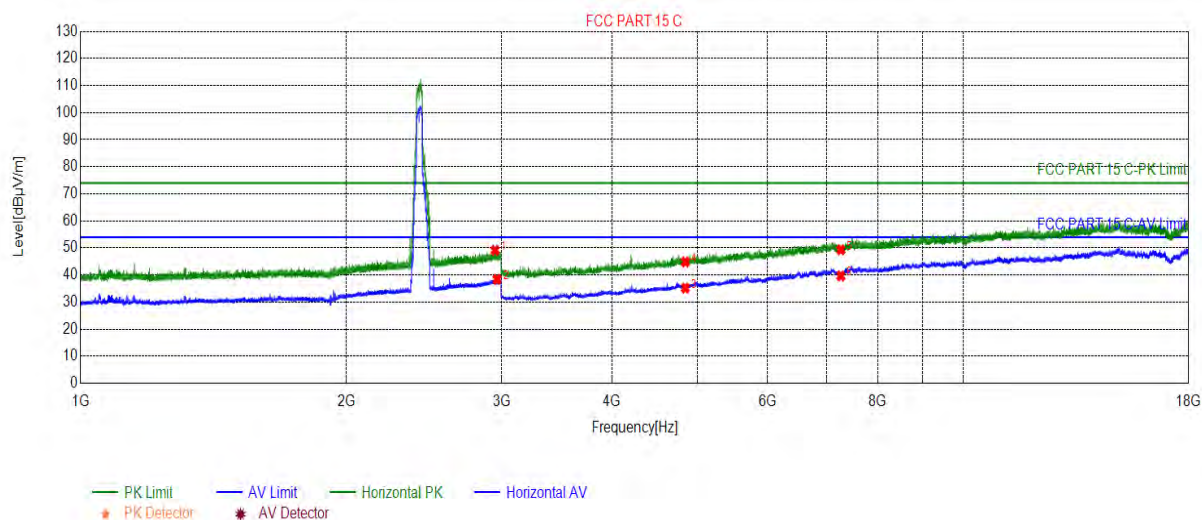
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4.9.2.19

802.11N40_Channel CH3

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2948.297	49.16	10.55	74.00	24.84	174	255	Horizontal
2	2963.898	38.41	10.44	54.00	15.59	133	176	Horizontal
3	4844.000	35.18	-15.21	54.00	18.82	116	308	Horizontal
4	4844.000	44.85	-15.21	74.00	29.15	199	223	Horizontal
5	7266.000	49.35	-9.04	74.00	24.65	224	303	Horizontal
6	7266.000	39.65	-9.04	54.00	14.35	134	125	Horizontal

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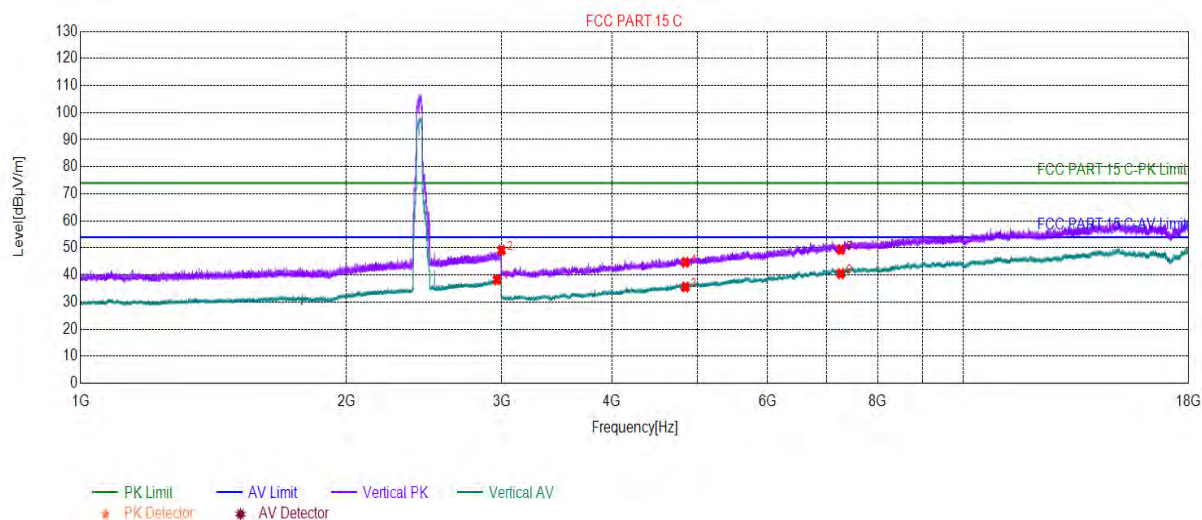
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4.9.2.20

802.11N40_Channel CH3

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2963.898	38.26	10.44	54.00	15.74	248	82	Vertical
2	2998.799	49.20	10.77	74.00	24.80	299	113	Vertical
3	4844.000	35.57	-15.21	54.00	18.43	232	144	Vertical
4	4844.000	44.65	-15.21	74.00	29.35	238	34	Vertical
5	7266.000	49.37	-9.04	74.00	24.63	202	232	Vertical
6	7266.000	40.49	-9.04	54.00	13.51	262	305	Vertical

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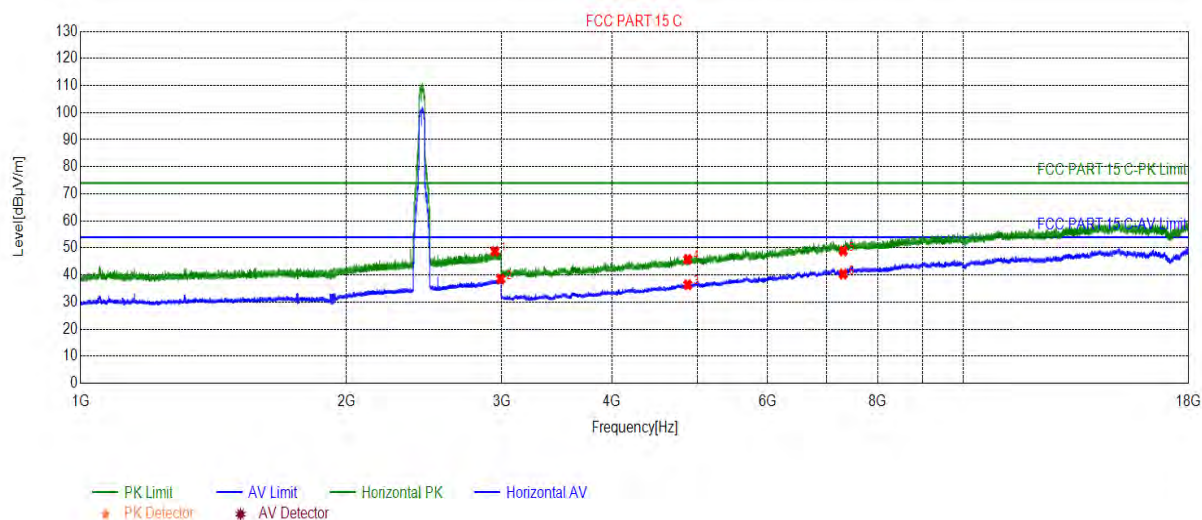
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4.9.2.21 802.11N40_Channel CH6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2947.597	48.81	10.55	74.00	25.19	126	83	Horizontal
2	2991.899	38.55	10.55	54.00	15.45	247	42	Horizontal
3	4874.000	36.39	-15.09	54.00	17.61	172	214	Horizontal
4	4874.000	45.77	-15.09	74.00	28.23	248	214	Horizontal
5	7311.000	48.92	-8.93	74.00	25.08	112	132	Horizontal
6	7311.000	40.34	-8.93	54.00	13.66	115	99	Horizontal

Final Data List



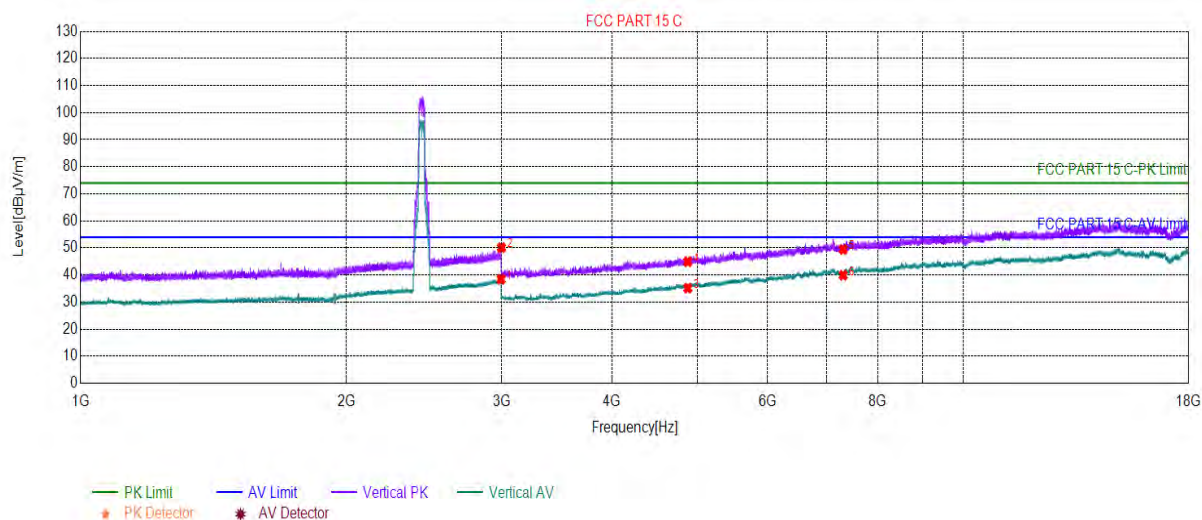
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4.9.2.22

802.11N40_Channel CH6

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2994.799	38.42	10.64	54.00	15.58	294	286	Vertical
2	2997.799	50.11	10.74	74.00	23.89	262	226	Vertical
3	4874.000	35.17	-15.09	54.00	18.83	218	54	Vertical
4	4874.000	44.92	-15.09	74.00	29.08	172	222	Vertical
5	7311.000	49.48	-8.93	74.00	24.52	190	154	Vertical
6	7311.000	39.92	-8.93	54.00	14.08	283	243	Vertical

Final Data List



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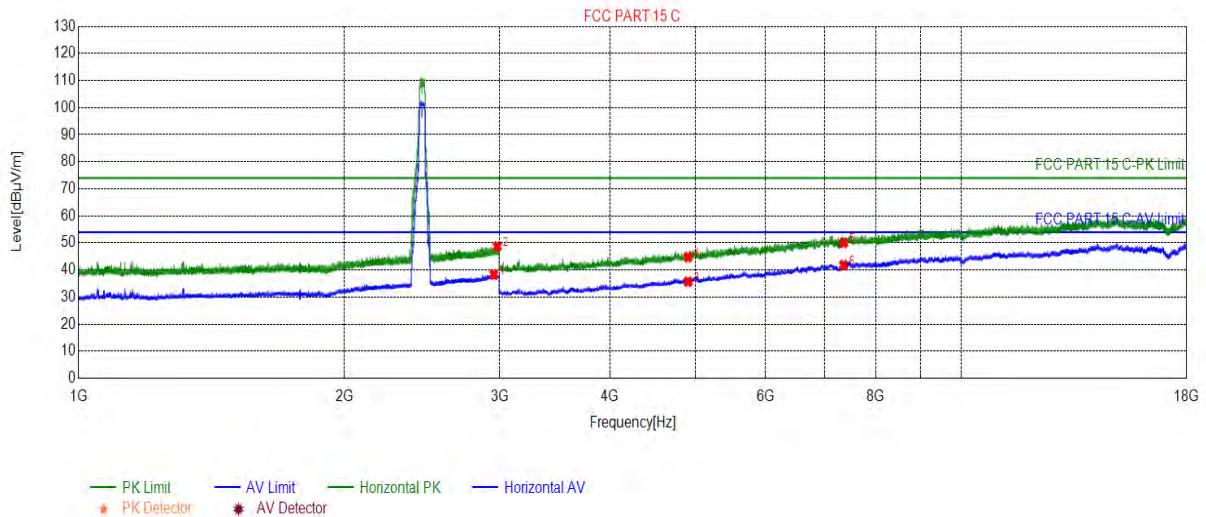
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4.9.2.23 802.11N40_Channel CH9

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2954.097	38.36	10.54	54.00	15.64	214	62	Horizontal
2	2980.699	48.67	10.54	74.00	25.33	244	162	Horizontal
3	4904.000	35.69	-14.95	54.00	18.31	200	60	Horizontal
4	4904.000	44.76	-14.95	74.00	29.24	243	144	Horizontal
5	7356.000	50.10	-7.68	74.00	23.90	241	192	Horizontal
6	7356.000	41.83	-7.68	54.00	12.17	167	173	Horizontal

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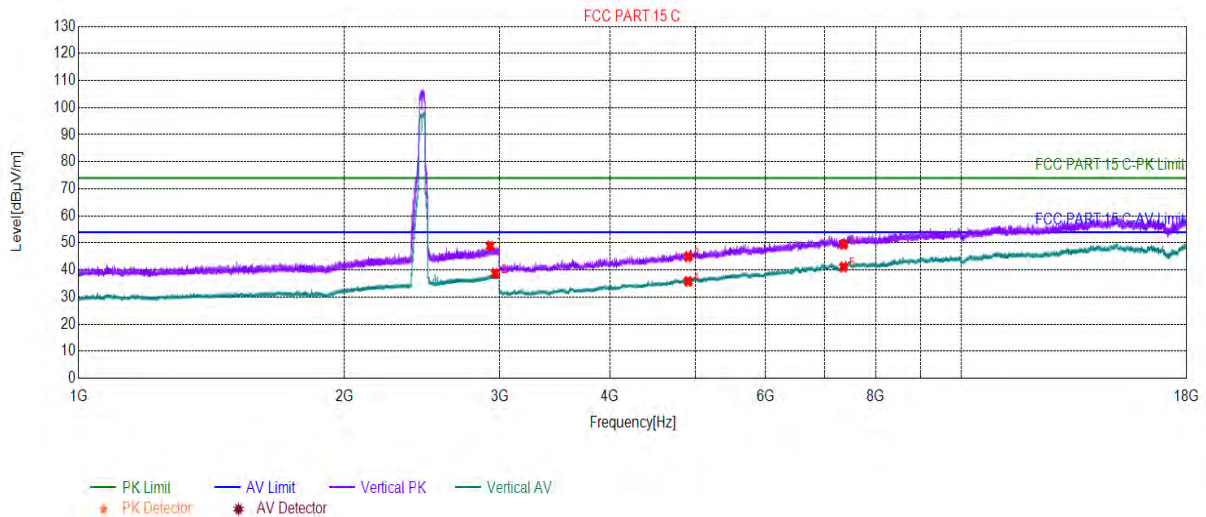
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4.9.2.24 802.11N40_Channel CH9

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2926.296	48.91	10.49	74.00	25.09	158	174	Vertical
2	2964.498	38.78	10.43	54.00	15.22	206	121	Vertical
3	4904.000	44.90	-14.95	74.00	29.10	183	294	Vertical
4	4904.000	35.81	-14.95	54.00	18.19	299	316	Vertical
5	7356.000	41.11	-7.68	54.00	12.89	290	338	Vertical
6	7356.000	49.48	-7.68	74.00	24.52	289	215	Vertical

Final Data List

Remark:

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 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.
- 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.
- 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)	Remark
	30MHz-88MHz	40.0	Quasi-peak
	88MHz-216MHz	43.5	Quasi-peak
	216MHz-960MHz	46.0	Quasi-peak
	960MHz-1GHz	54.0	Quasi-peak
	Above 1GHz	54.0	Average Value
		74.0	Peak Value
Test Setup:			

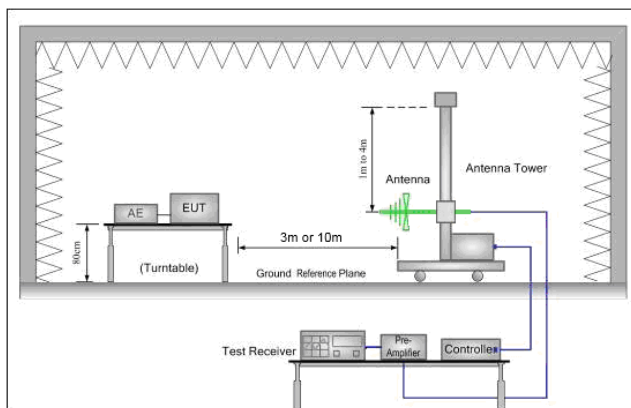


Figure 1. 30MHz to 1GHz

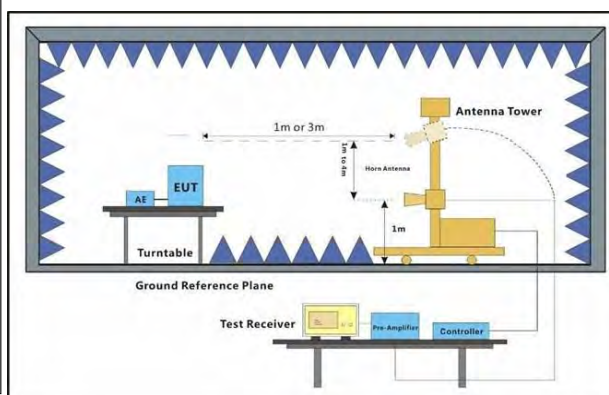


Figure 2. Above 1 GHz

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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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters 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); 13.5Mbps of rate is the worst case of 802.11N(HT40); Only the worst case is recorded in the report.
Instruments Used:	Refer to section 6 for details
Test Results:	Pass



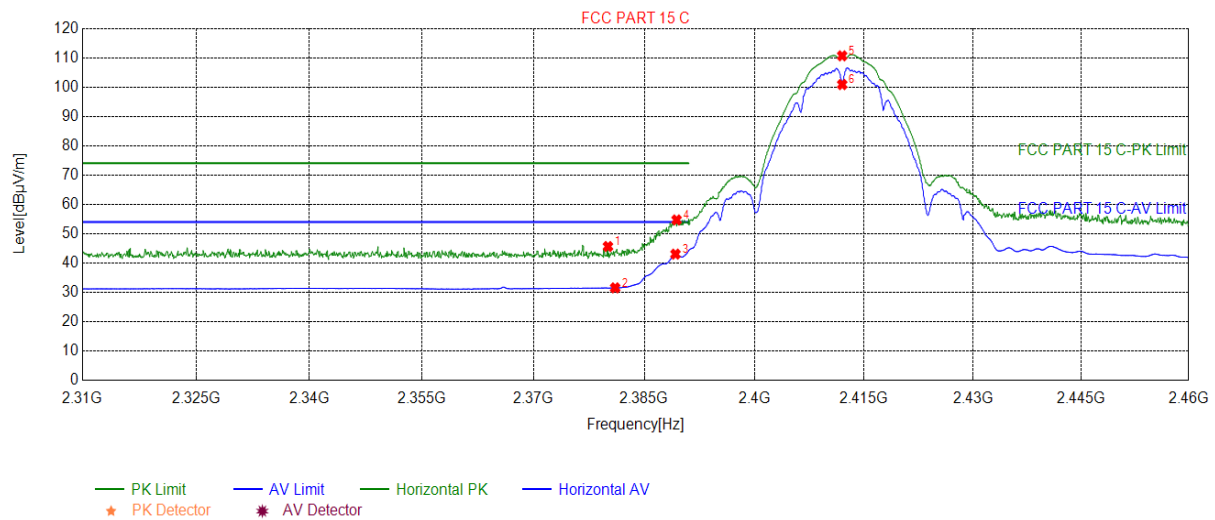
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4.10.1 Test Plots

4.10.1.1 802.11B_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2380.085	45.63	7.86	74.00	28.37	256	47	Horizontal
2	2381.060	31.53	7.89	54.00	22.47	157	89	Horizontal
3	2389.239	43.03	8.15	54.00	10.97	168	125	Horizontal
4	2389.389	54.69	8.15	74.00	19.31	177	147	Horizontal
5	2412.000	110.64	8.29	0.00	-110.64	265	231	Horizontal
6	2412.000	100.85	8.29	0.00	-100.85	231	122	Horizontal

Final Data List



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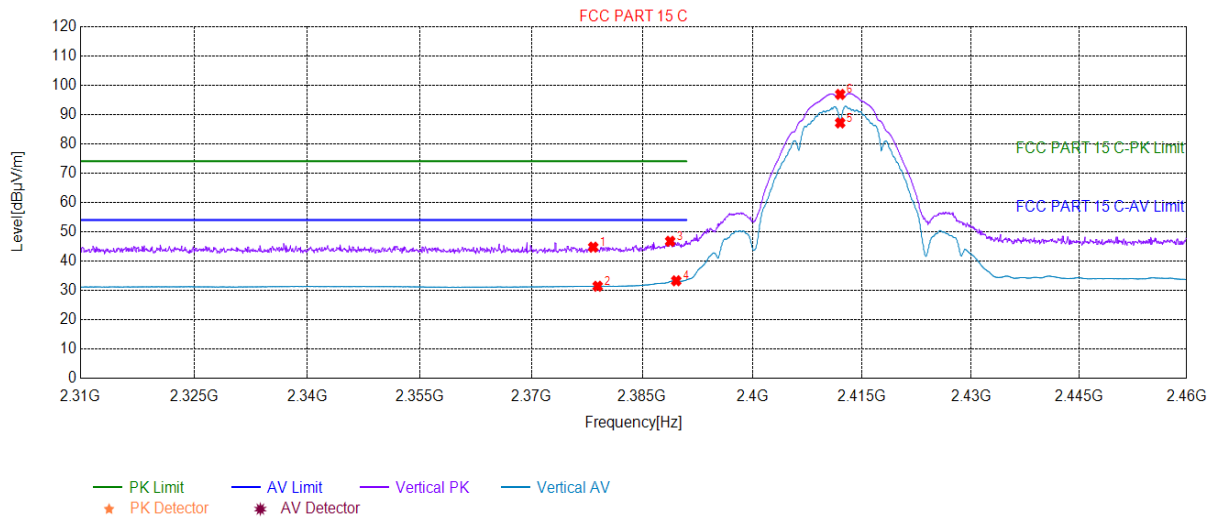
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4.10.1.2 802.11B_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2378.359	44.73	7.83	74.00	29.27	256	78	Vertical
2	2378.959	31.40	7.84	54.00	22.60	277	69	Vertical
3	2388.789	46.73	8.14	74.00	27.27	289	124	Vertical
4	2389.614	33.26	8.16	54.00	20.74	245	156	Vertical
5	2412.000	87.09	8.29	0.00	-87.09	214	178	Vertical
6	2412.000	96.81	8.29	0.00	-96.81	263	189	Vertical

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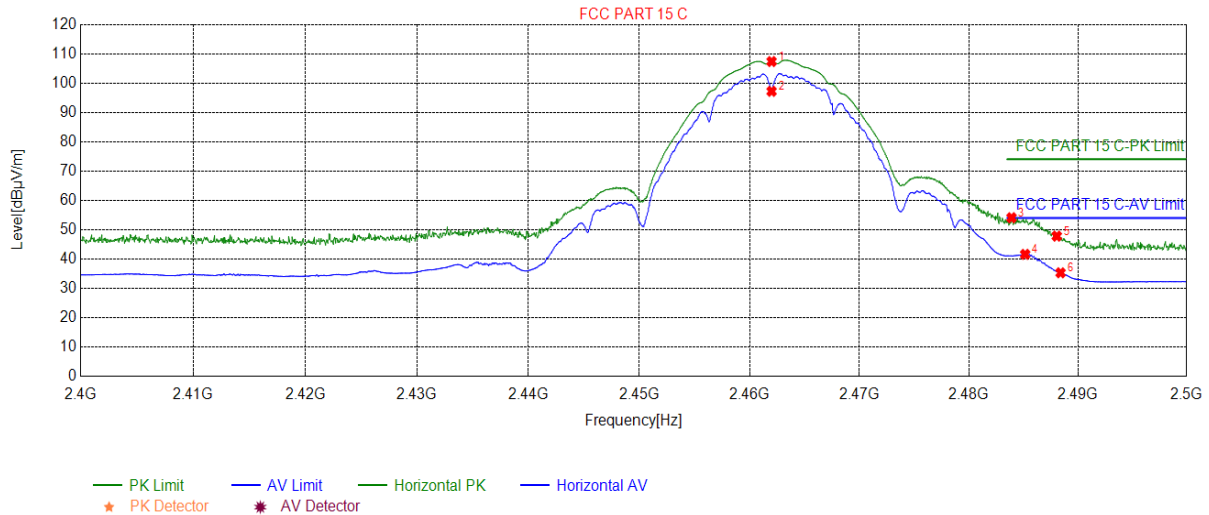
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4.10.1.3 802.11B_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	107.34	8.25	0.00	-107.34	254	69	Horizontal
2	2462.000	97.18	8.25	0.00	-97.18	265	123	Horizontal
3	2483.891	54.07	8.49	74.00	19.93	287	215	Horizontal
4	2485.142	41.59	8.49	54.00	12.41	245	145	Horizontal
5	2488.044	47.80	8.50	74.00	26.20	213	174	Horizontal
6	2488.394	35.29	8.50	54.00	18.71	233	58	Horizontal

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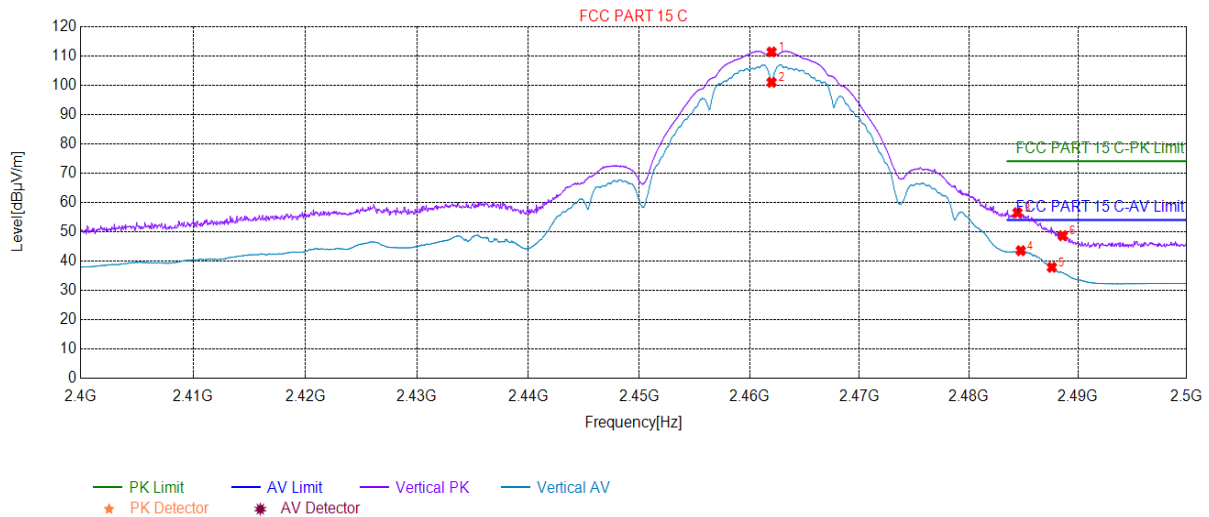
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4.10.1.4 802.11B_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	111.28	8.25	0.00	-111.28	263	125	Vertical
2	2462.000	100.90	8.25	0.00	-100.90	213	147	Vertical
3	2484.442	56.45	8.49	74.00	17.55	241	156	Vertical
4	2484.742	43.52	8.49	54.00	10.48	257	198	Vertical
5	2487.593	37.85	8.50	54.00	16.15	202	122	Vertical
6	2488.594	48.63	8.50	74.00	25.37	236	13	Vertical

Final Data List



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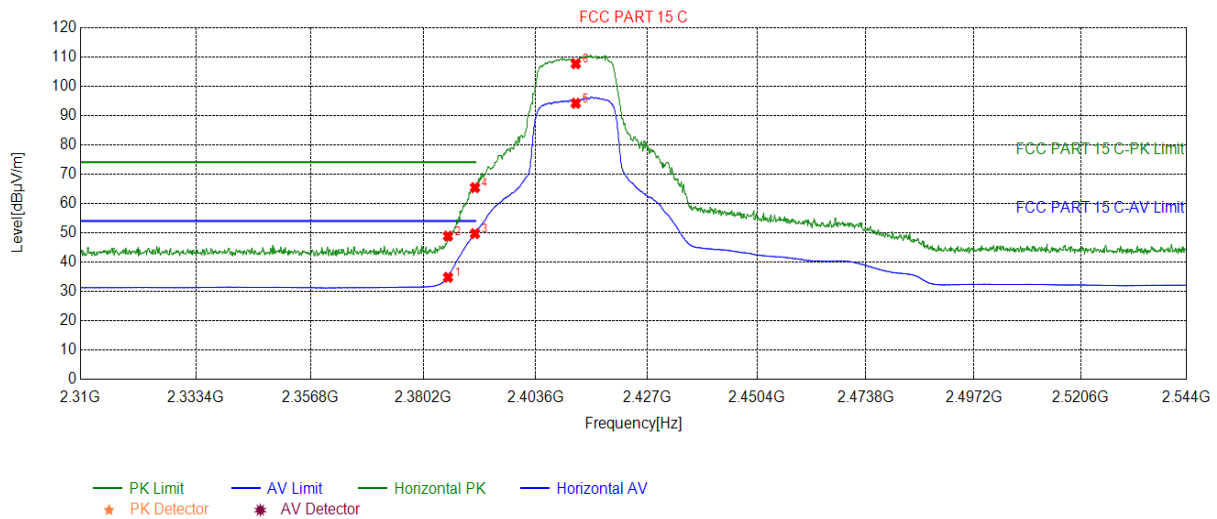
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4.10.1.5 802.11G_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2385.268	34.77	8.02	54.00	19.23	268	69	Horizontal
2	2385.268	48.83	8.02	74.00	25.17	254	123	Horizontal
3	2390.887	49.67	8.20	54.00	4.33	214	98	Horizontal
4	2390.887	65.36	8.20	74.00	8.64	274	147	Horizontal
5	2412.000	94.11	8.29	0.00	-94.11	251	158	Horizontal
6	2412.000	107.58	8.29	0.00	-107.58	236	169	Horizontal

Final Data List



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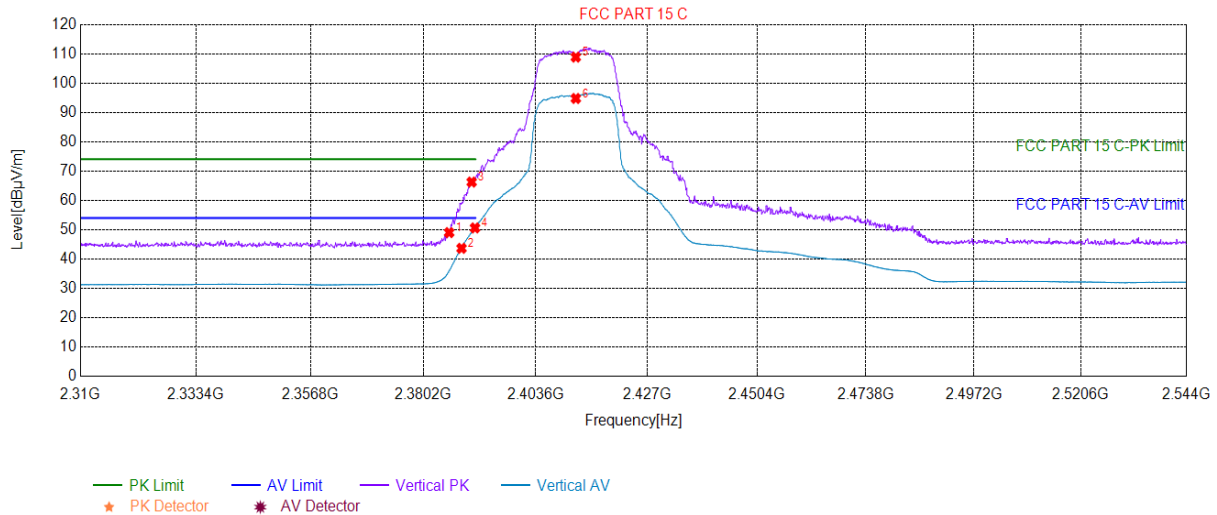
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4.10.1.6 802.11G_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2385.502	49.00	8.03	74.00	25.00	263	69	Vertical
2	2388.078	43.65	8.11	54.00	10.35	203	152	Vertical
3	2390.185	66.24	8.18	74.00	7.76	231	147	Vertical
4	2390.887	50.59	8.20	54.00	3.41	245	168	Vertical
5	2412.000	108.83	8.29	0.00	-108.83	287	195	Vertical
6	2412.000	94.74	8.29	0.00	-94.74	262	124	Vertical

Final Data List



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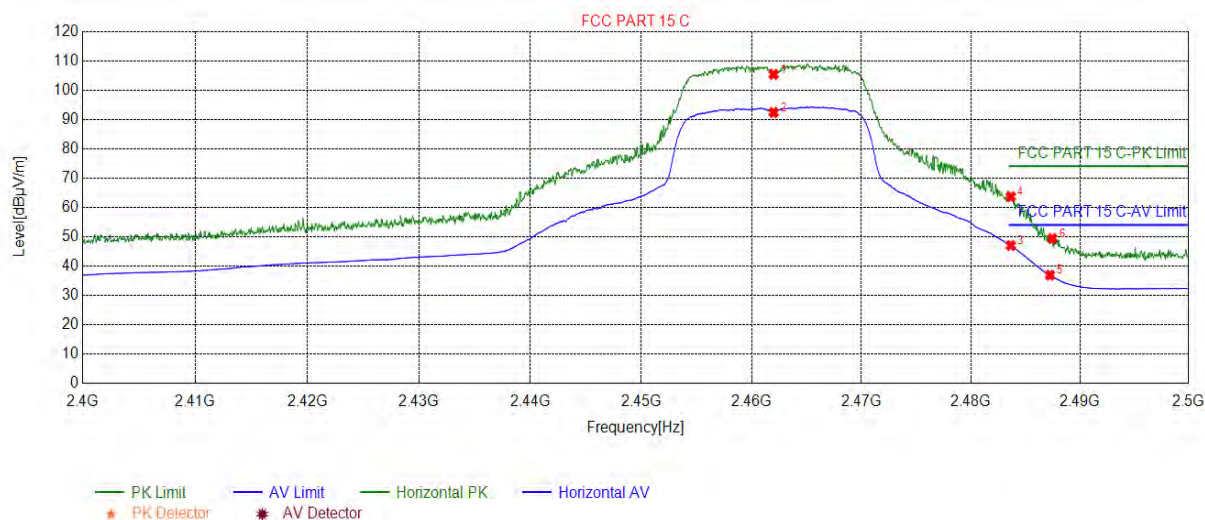
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4.10.1.7 802.11G_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	105.35	8.25	0.00	-105.35	265	125	Horizontal
2	2462.000	92.36	8.25	0.00	-92.36	287	164	Horizontal
3	2483.641	46.99	8.48	54.00	7.01	274	147	Horizontal
4	2483.641	63.64	8.48	74.00	10.36	214	185	Horizontal
5	2487.243	36.89	8.49	54.00	17.11	200	198	Horizontal
6	2487.443	49.37	8.50	74.00	24.63	250	157	Horizontal

Final Data List



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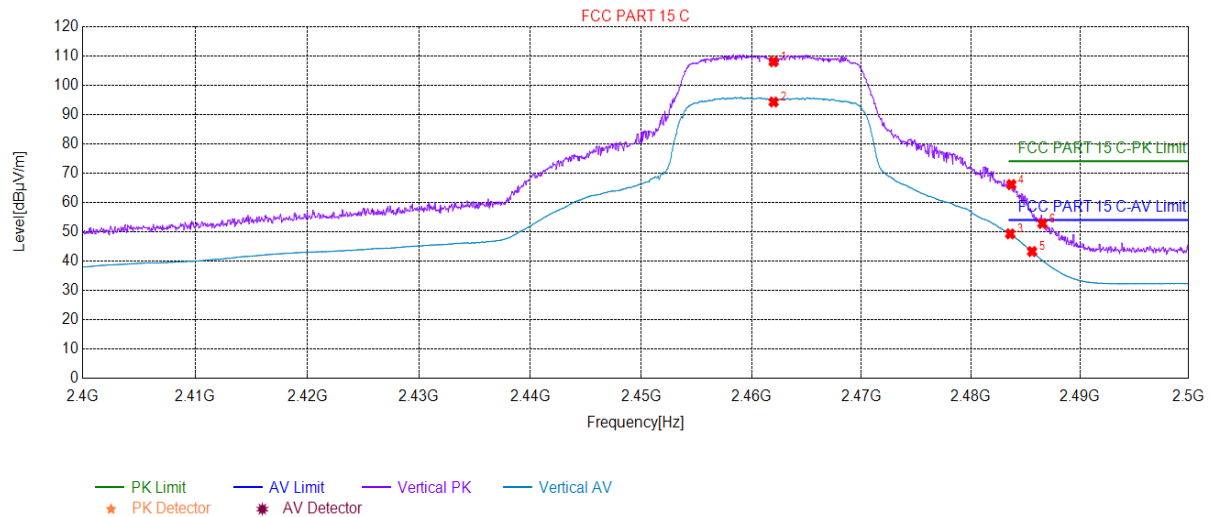
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4.10.1.8 802.11G_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	107.97	8.25	0.00	-107.97	231	65	Vertical
2	2462.000	94.22	8.25	0.00	-94.22	214	152	Vertical
3	2483.591	49.25	8.48	54.00	4.75	247	147	Vertical
4	2483.691	66.07	8.48	74.00	7.93	215	122	Vertical
5	2485.592	43.23	8.49	54.00	10.77	258	136	Vertical
6	2486.543	52.79	8.49	74.00	21.21	233	145	Vertical

Final Data List



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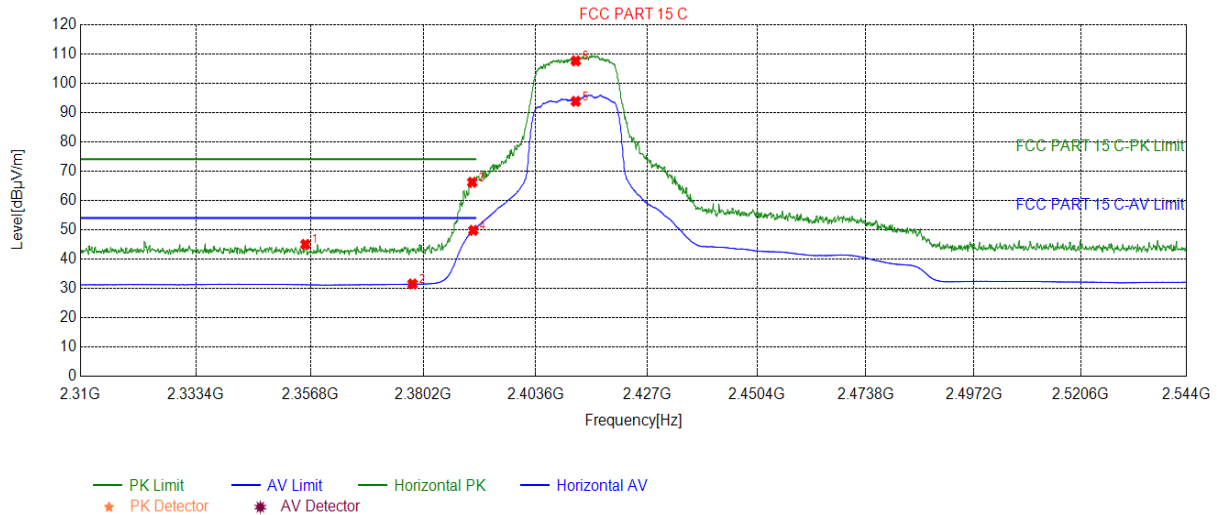
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4.10.1.9 802.11N20_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2355.769	44.98	7.65	74.00	29.02	210	258	Horizontal
2	2377.893	31.49	7.82	54.00	22.51	231	169	Horizontal
3	2390.302	66.16	8.18	74.00	7.84	241	69	Horizontal
4	2390.536	49.76	8.19	54.00	4.24	254	157	Horizontal
5	2412.000	93.77	8.29	0.00	-93.77	265	148	Horizontal
6	2412.000	107.55	8.29	0.00	-107.55	235	25	Horizontal

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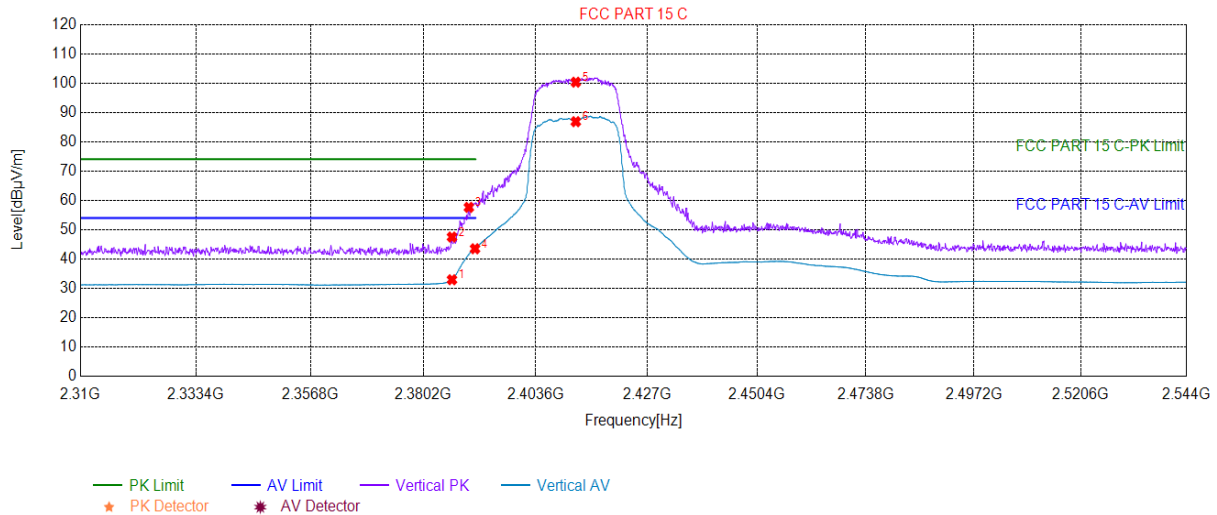
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4.10.1.10 802.11N20_Channel 1

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2386.088	32.93	8.05	54.00	21.07	256	69	Vertical
2	2386.088	47.49	8.05	74.00	26.51	236	78	Vertical
3	2389.599	57.61	8.16	74.00	16.39	231	125	Vertical
4	2390.887	43.50	8.20	54.00	10.50	241	124	Vertical
5	2412.000	100.30	8.29	0.00	-100.30	257	147	Vertical
6	2412.000	86.83	8.29	0.00	-86.83	250	152	Vertical

Final Data List



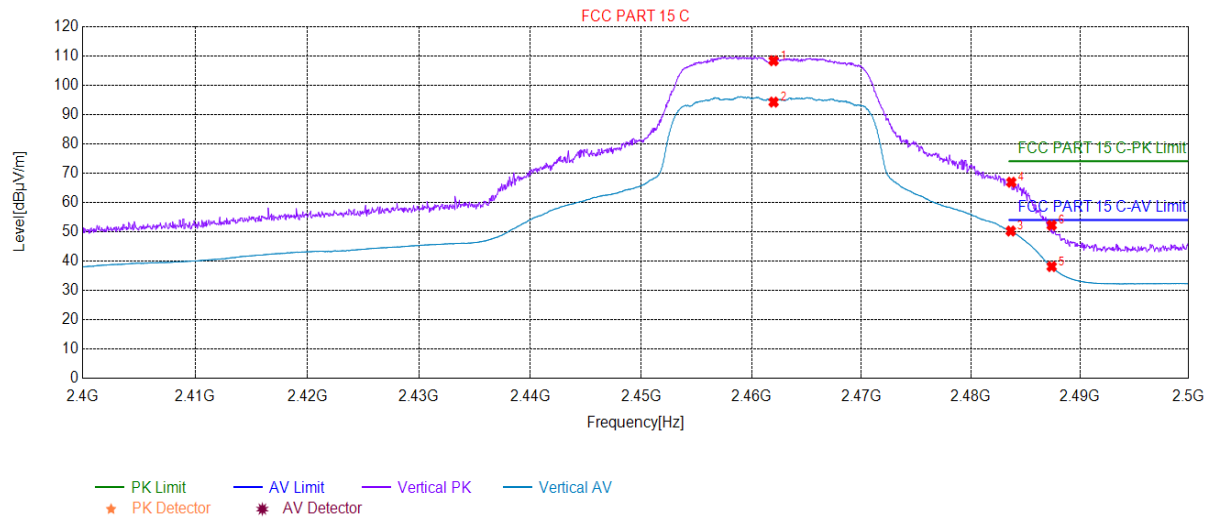
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4.10.1.11 802.11N20_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	108.29	8.25	0.00	-108.29	231	25	Vertical
2	2462.000	94.18	8.25	0.00	-94.18	245	46	Vertical
3	2483.641	50.22	8.48	54.00	3.78	321	123	Vertical
4	2483.691	66.84	8.48	74.00	7.16	214	256	Vertical
5	2487.393	38.11	8.49	54.00	15.89	211	247	Vertical
6	2487.393	52.18	8.49	74.00	21.82	236	321	Vertical

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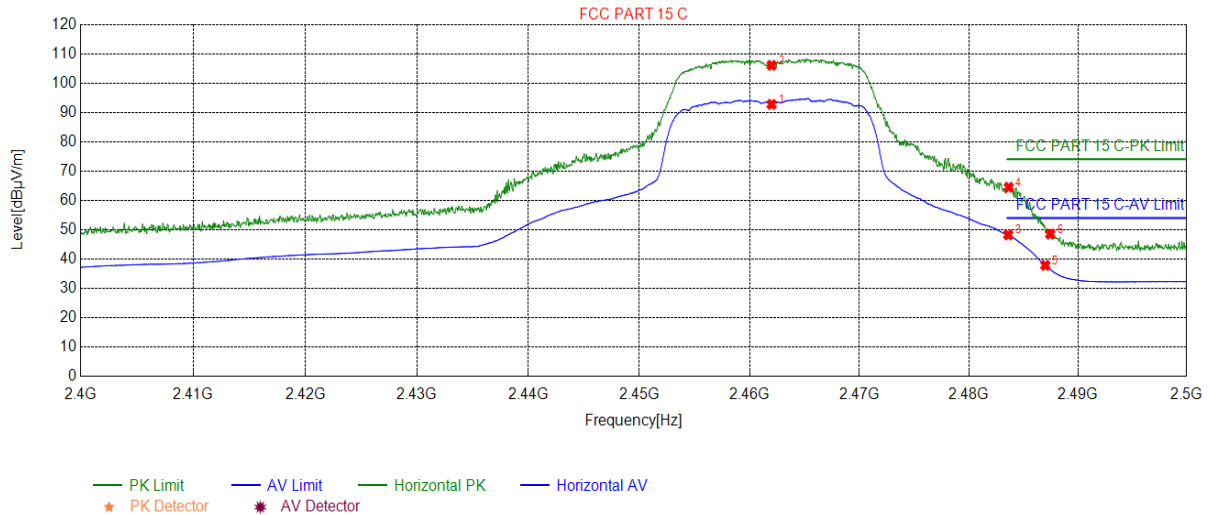
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4.10.1.12 802.11N20_Channel 11

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	92.73	8.25	0.00	-92.73	265	68	Horizontal
2	2462.000	106.04	8.25	0.00	-106.04	287	75	Horizontal
3	2483.591	48.24	8.48	54.00	5.76	298	124	Horizontal
4	2483.641	64.46	8.48	74.00	9.54	257	152	Horizontal
5	2486.993	37.85	8.49	54.00	16.15	265	24	Horizontal
6	2487.443	48.49	8.50	74.00	25.51	277	156	Horizontal

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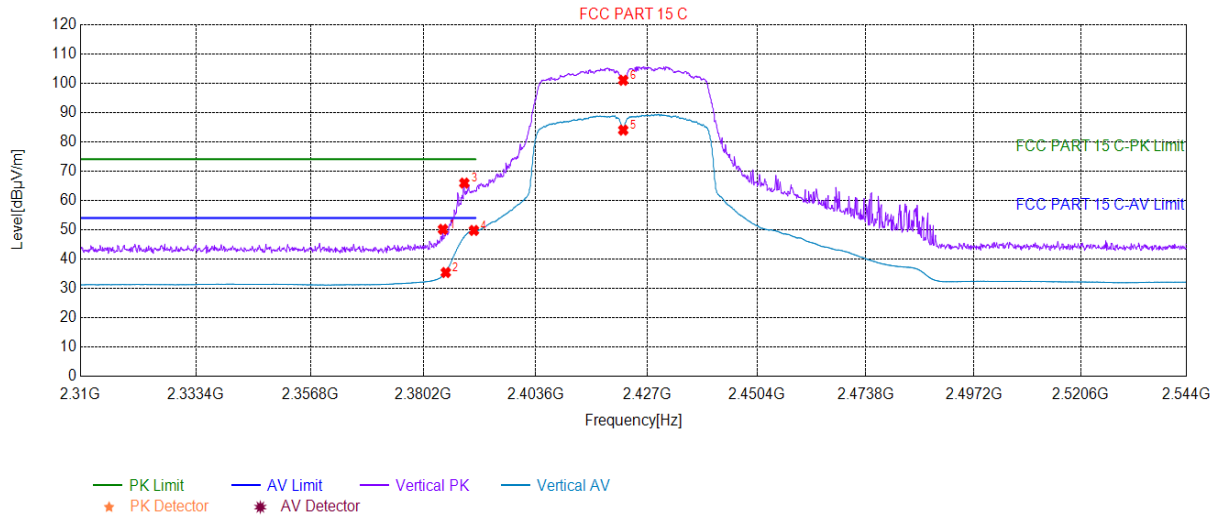
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4.10.1.13 802.11N40_Channel 3

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2384.215	50.11	7.99	74.00	23.89	254	177	Vertical
2	2384.800	35.39	8.01	54.00	18.61	213	178	Vertical
3	2388.663	65.88	8.13	74.00	8.12	203	24	Vertical
4	2390.653	49.74	8.19	54.00	4.26	236	54	Vertical
5	2422.000	83.96	8.28	0.00	-83.96	258	254	Vertical
6	2422.000	100.94	8.28	0.00	-100.94	265	163	Vertical

Final Data List



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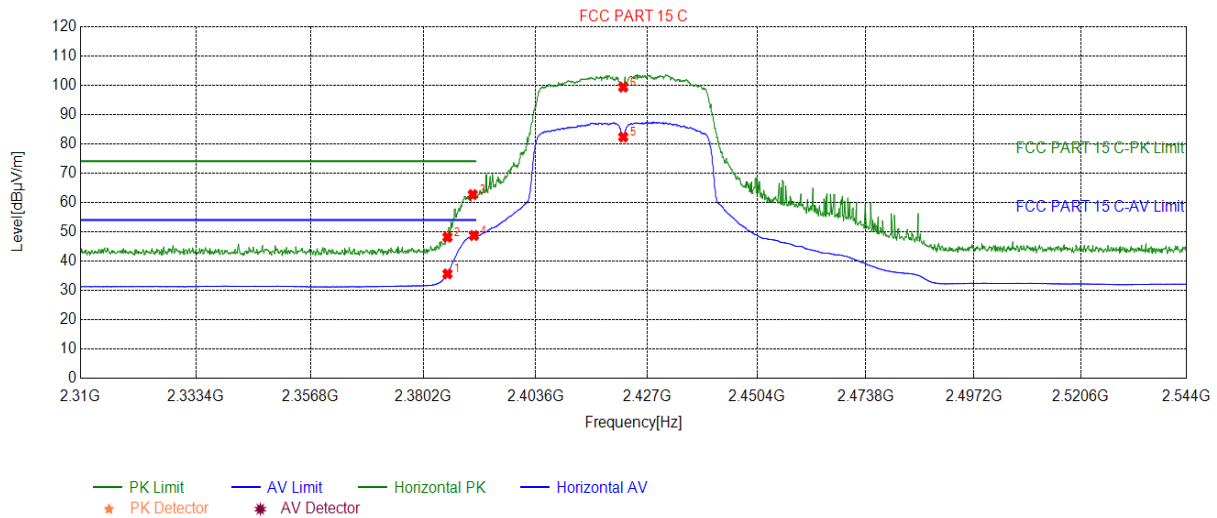
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4.10.1.14 802.11N40_Channel 3

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2385.151	35.61	8.02	54.00	18.39	246	124	Horizontal
2	2385.151	48.12	8.02	74.00	25.88	214	174	Horizontal
3	2390.419	62.66	8.18	74.00	11.34	236	125	Horizontal
4	2390.653	48.70	8.19	54.00	5.30	206	23	Horizontal
5	2422.000	82.27	8.28	0.00	-82.27	219	36	Horizontal
6	2422.000	99.30	8.28	0.00	-99.30	211	85	Horizontal

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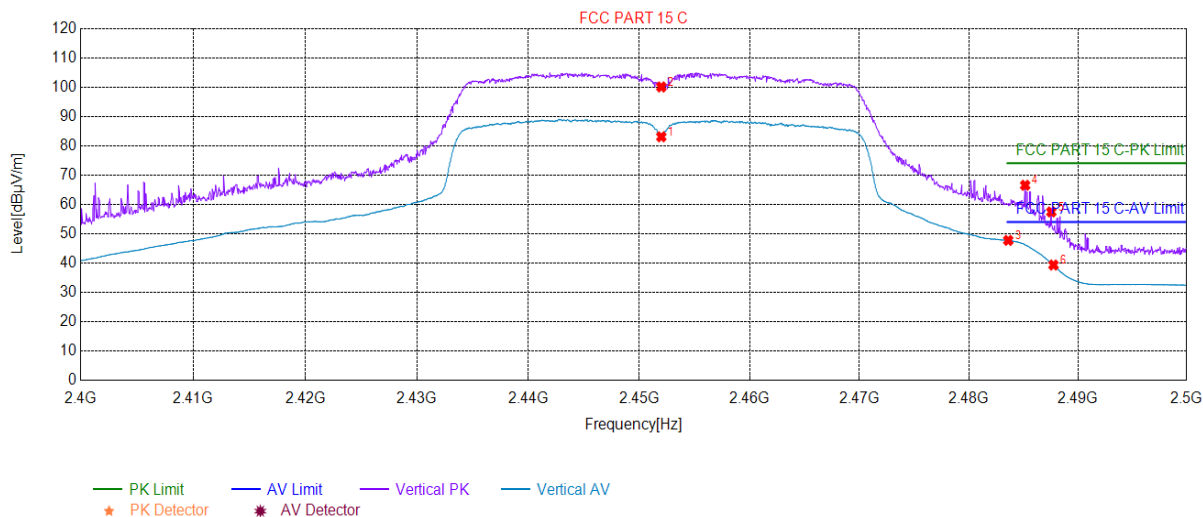
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4.10.1.15 802.11N40_Channel 9

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.000	83.03	8.27	0.00	-83.03	201	78	Vertical
2	2452.000	100.03	8.27	0.00	-100.03	241	45	Vertical
3	2483.591	47.72	8.48	54.00	6.28	254	254	Vertical
4	2485.142	66.50	8.49	74.00	7.50	274	152	Vertical
5	2487.543	57.42	8.50	74.00	16.58	256	163	Vertical
6	2487.743	39.31	8.50	54.00	14.69	236	187	Vertical

Final Data List



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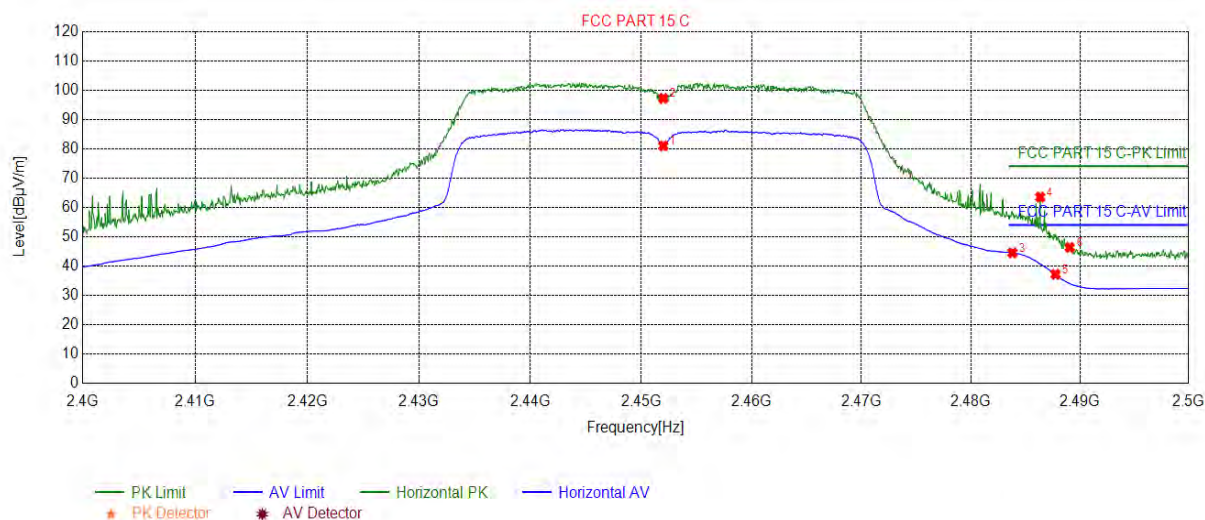
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4.10.1.16

802.11N40_Channel 9

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.000	80.94	8.27	0.00	-80.94	265	69	Horizontal
2	2452.000	97.15	8.27	0.00	-97.15	286	147	Horizontal
3	2483.791	44.49	8.48	54.00	9.51	214	263	Horizontal
4	2486.343	63.49	8.49	74.00	10.51	205	211	Horizontal
5	2487.743	37.16	8.50	54.00	16.84	264	247	Horizontal
6	2489.044	46.33	8.50	74.00	27.67	241	215	Horizontal

Final Data List

Remark:

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

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

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



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

Lab A:

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.41dB
2	RF power density, conducted	±1.96dB
3	Spurious emissions, conducted	±0.41dB
4	Radio Frequency	±7.10 x 10 ⁻⁸
5	Duty Cycle	±0.49%
6	Occupied Bandwidth	±0.2%

Lab B:

No.	Item	Measurement Uncertainty
1	Radiated Emission	± 4.8dB (Below 1GHz)
		± 4.8dB (1GHz to 6GHz)
		± 4.5dB (6GHz to 18GHz)
		± 5.02dB (Above 18GHz)



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6 Equipment List

RF conducted					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2020/4/16	2021/4/15
DC Power Supply	Rohde & Schwarz	HMP2020	W009-08	2020/7/15	2021/7/15
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2020/7/14	2021/7/13
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	HTC-1	W006-17	2020/4/21	2021/4/20

CE Test System					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	Brilliant-emc	N/A	XAW03-35-01	2019-09-11	2022-09-10
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2020-09-11	2021-09-10
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2020-08-04	2021-08-03
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2020-11-06	2021-11-05
Measurement Software	Tonscend	TS+ CE V2.5	XAW02-05-02	NCR	NCR



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RSE Test System					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Semi-Anechoic Chamber	Brilliant-emc	N/A	XAW03-35-01	2019-09-11	2022-09-10
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2020-04-02	2021-04-01
				2021-04-01	2022-03-31
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2020-09-11	2021-09-10
Receiving antenna (30MHz~3GHz)	Schwarzbeck	VULB 9163	XAW01-09-01	2019-10-13	2021-10-12
Receiving antenna (1GHz~18GHz)	Schwarzbeck	BBHA 9120D	XAW01-09-02	2019-10-13	2021-10-12
Receiving antenna (15GHz~40GHz)	Schwarzbeck	BBHA 9170	XAW01-09-03	2019-10-13	2021-10-12
Directional antenna rack controller	Max-Full	MF-7802BS	XAW03-03-01	NCR	NCR
High-speed antenna rack controller	Max-Full	MF-7802	XAW03-04-01	NCR	NCR
Filter bank	Tonscend	JS0806-F	XAW03-05-01	NCR	NCR
Filter bank	Tonscend	JS0806s	XAW03-05-02	NCR	NCR
Amplifier	Tonscend	TAP00903040	XAW01-41-01	2020-10-26	2021-10-25
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2020-10-26	2021-10-25
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2020-10-27	2021-10-26
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2020-10-26	2021-10-25
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2020-11-06	2021-11-05
Measurement Software	Tonscend	TS+ RSE V3.0.0.2	XAW02-05-01	NCR	NCR



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7 Photographs - EUT Constructional Details

Refer to Appendix A Setup Photos.



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Appdenix



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DTS Bandwidth

Test Result

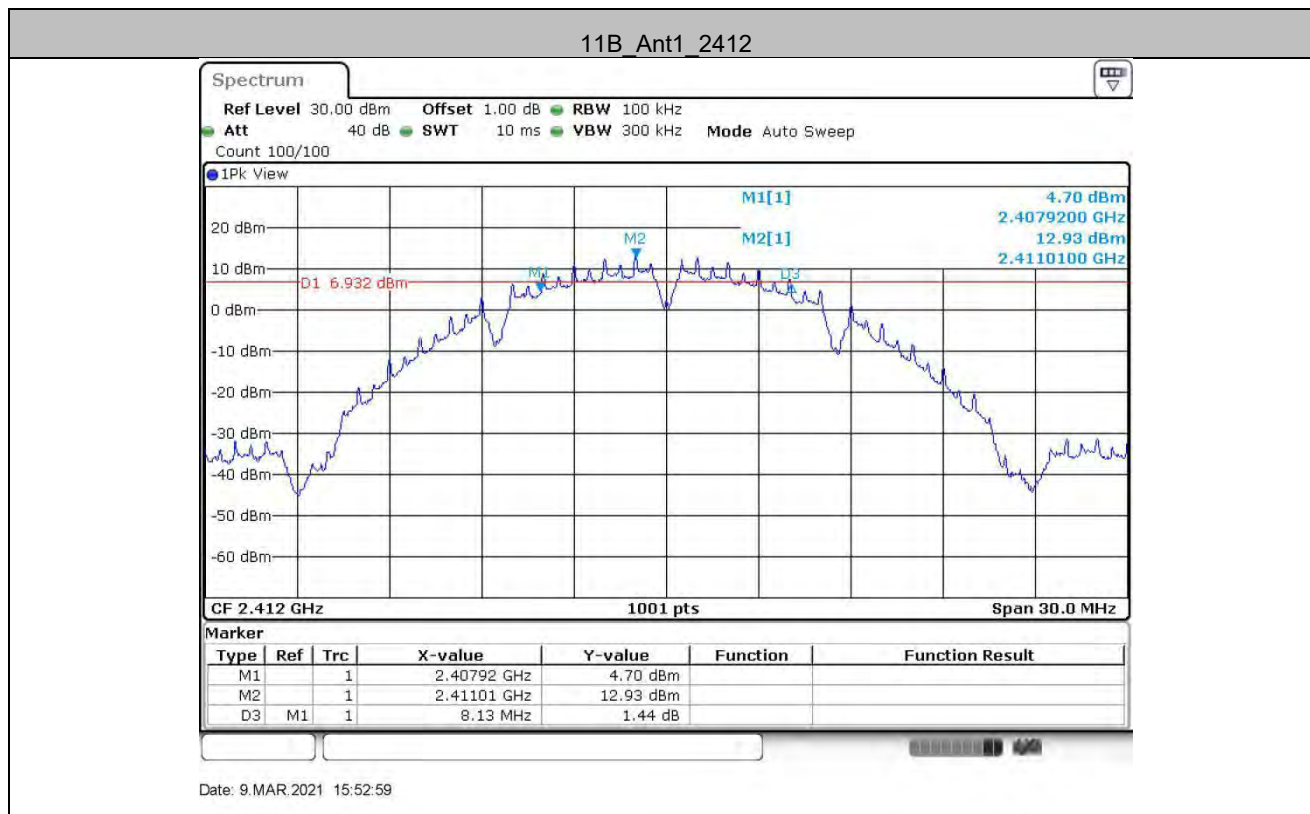
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
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		2437	8.100	2432.950	2441.050	0.5	PASS
		2462	8.160	2457.920	2466.080	0.5	PASS
11G	Ant1	2412	15.360	2404.200	2419.560	0.5	PASS
		2437	15.150	2429.410	2444.560	0.5	PASS
		2462	15.780	2454.410	2470.190	0.5	PASS
11N20SISO	Ant1	2412	15.750	2403.840	2419.590	0.5	PASS
		2437	15.150	2429.440	2444.590	0.5	PASS
		2462	15.990	2454.410	2470.400	0.5	PASS
11N40SISO	Ant1	2422	35.460	2404.360	2439.820	0.5	PASS
		2437	32.760	2420.620	2453.380	0.5	PASS
		2452	35.220	2434.420	2469.640	0.5	PASS



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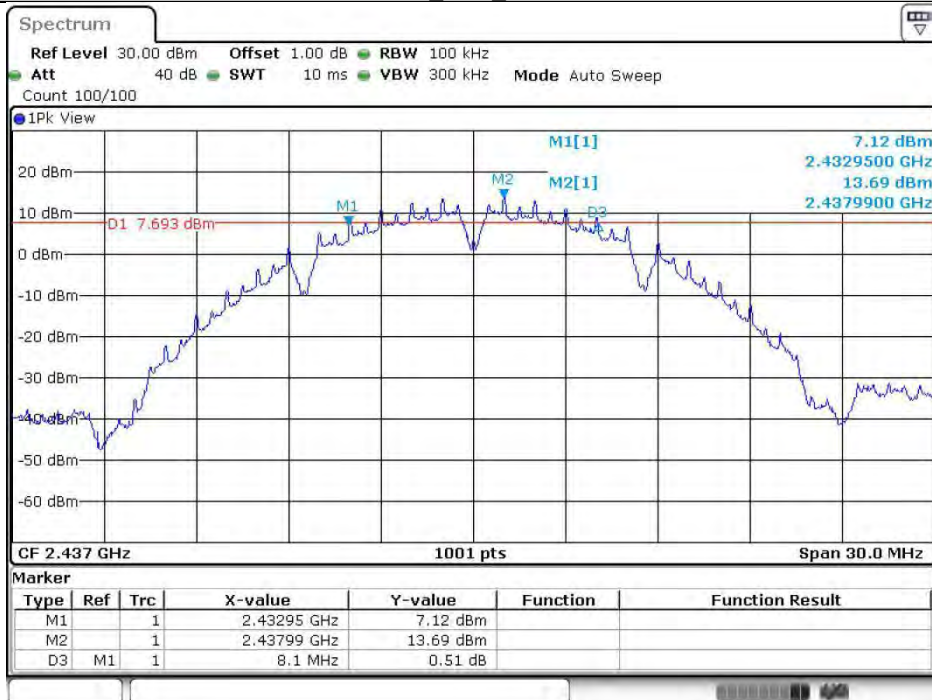
Test Graphs



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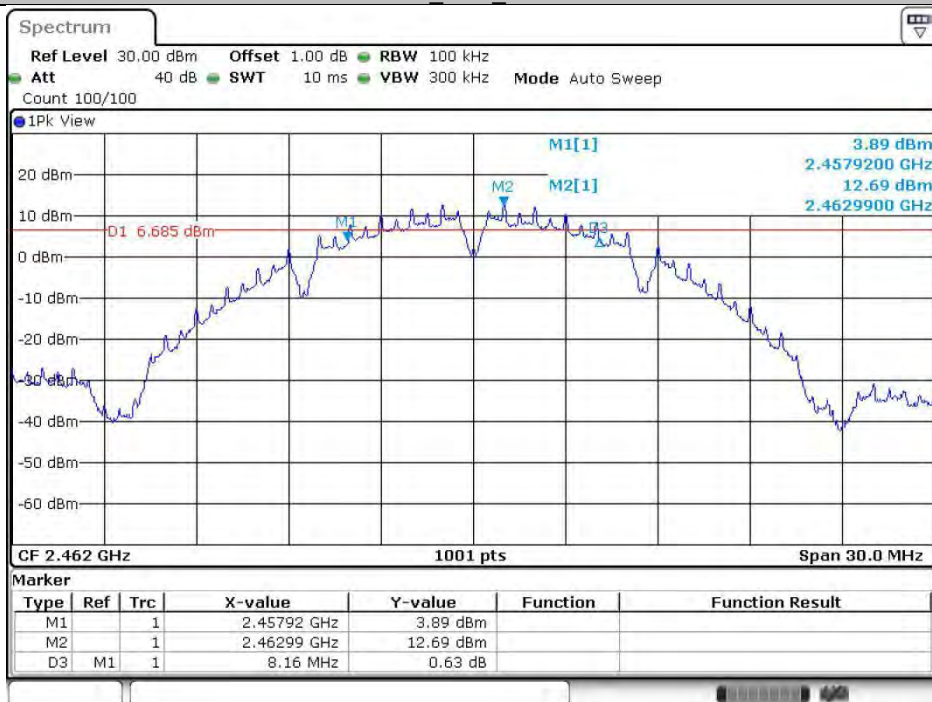
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11B_Ant1_2437



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11B_Ant1_2462



Date: 9.MAR.2021 15:58:29

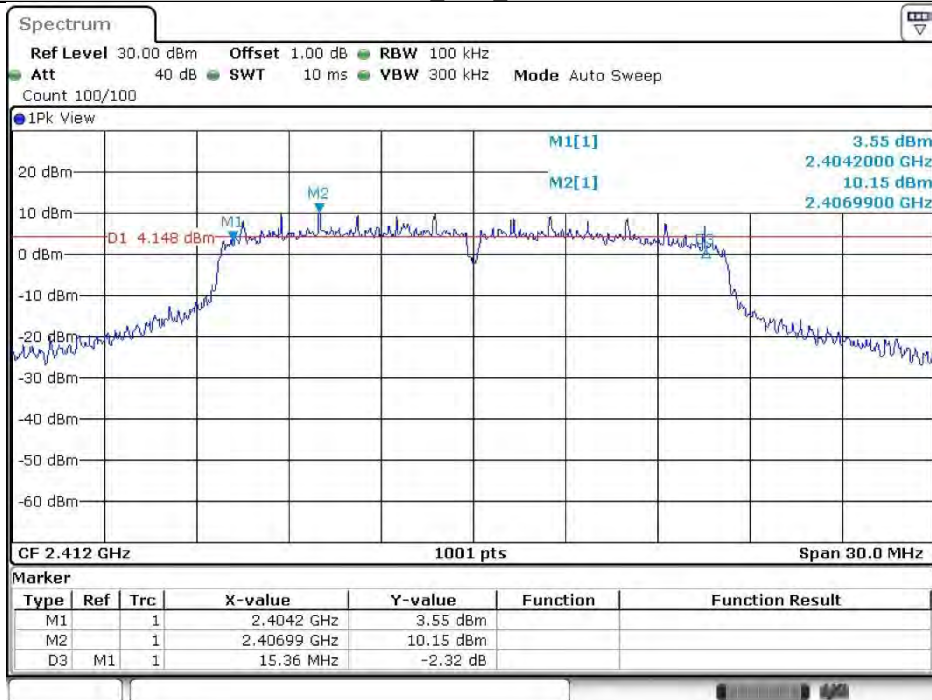


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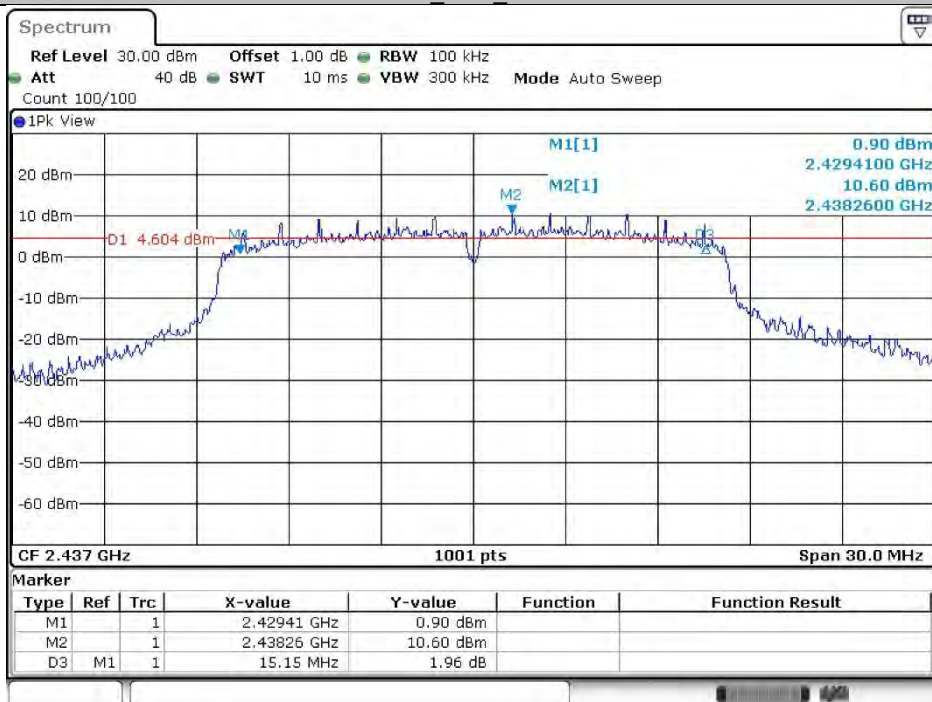
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11G Ant1 2412



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11G Ant1 2437



Date: 9.MAR.2021 16:03:03



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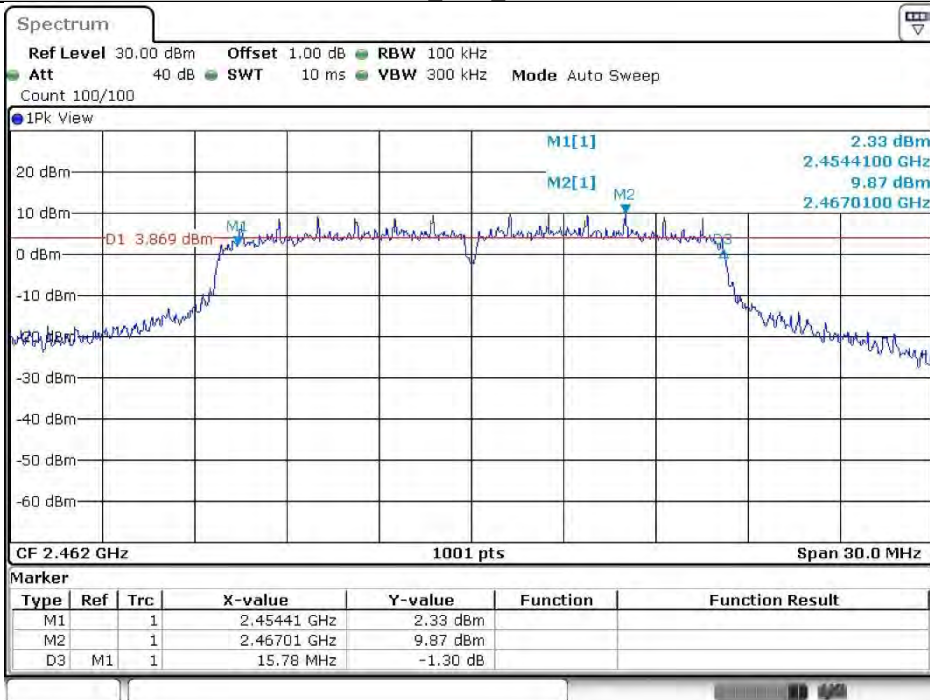
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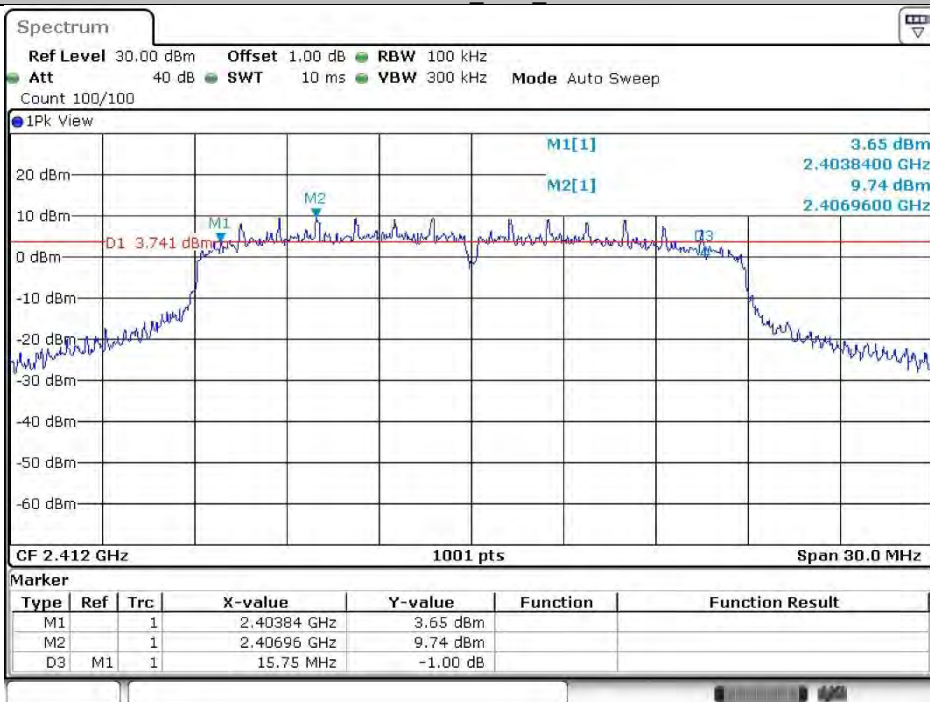
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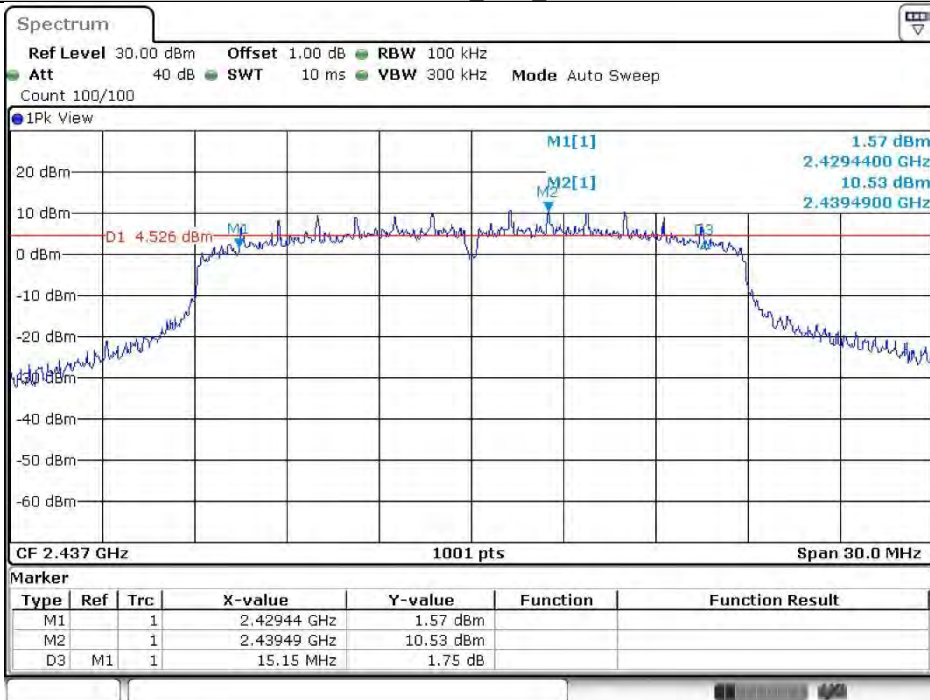
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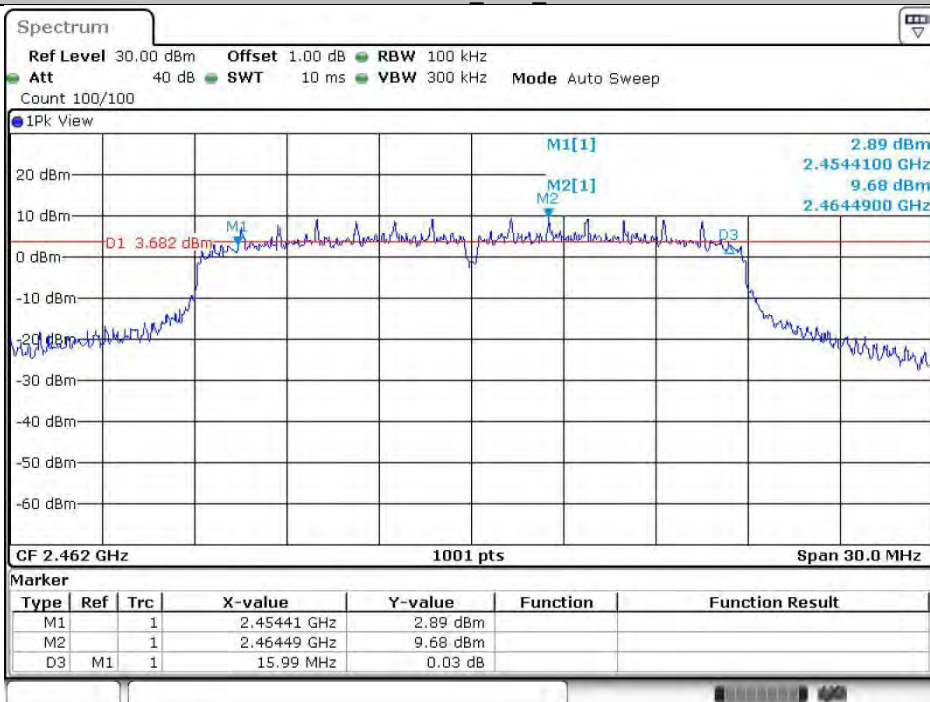
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11N20SISO_Ant1_2437



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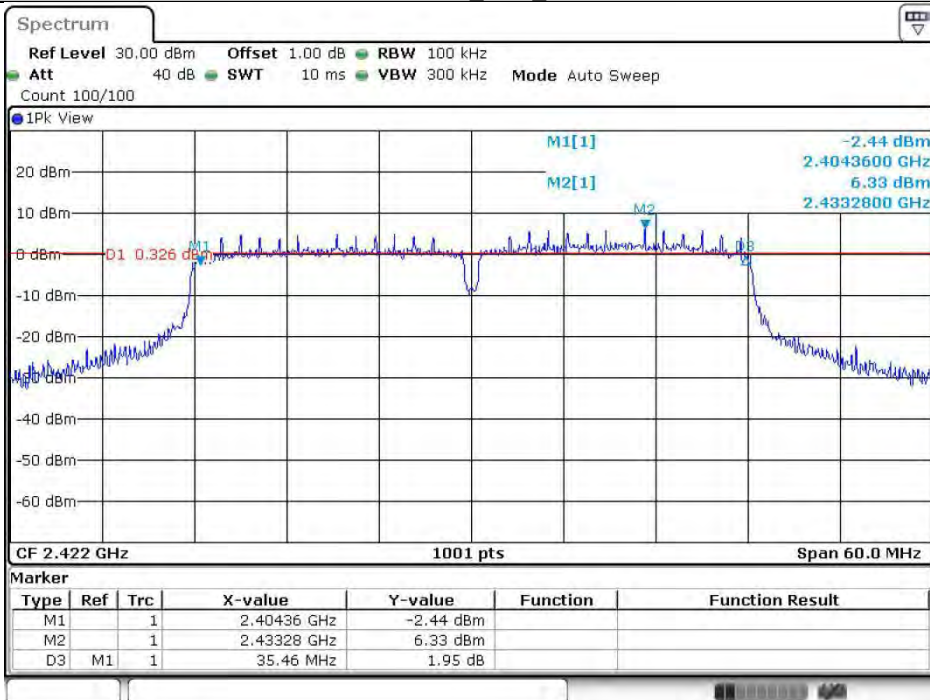
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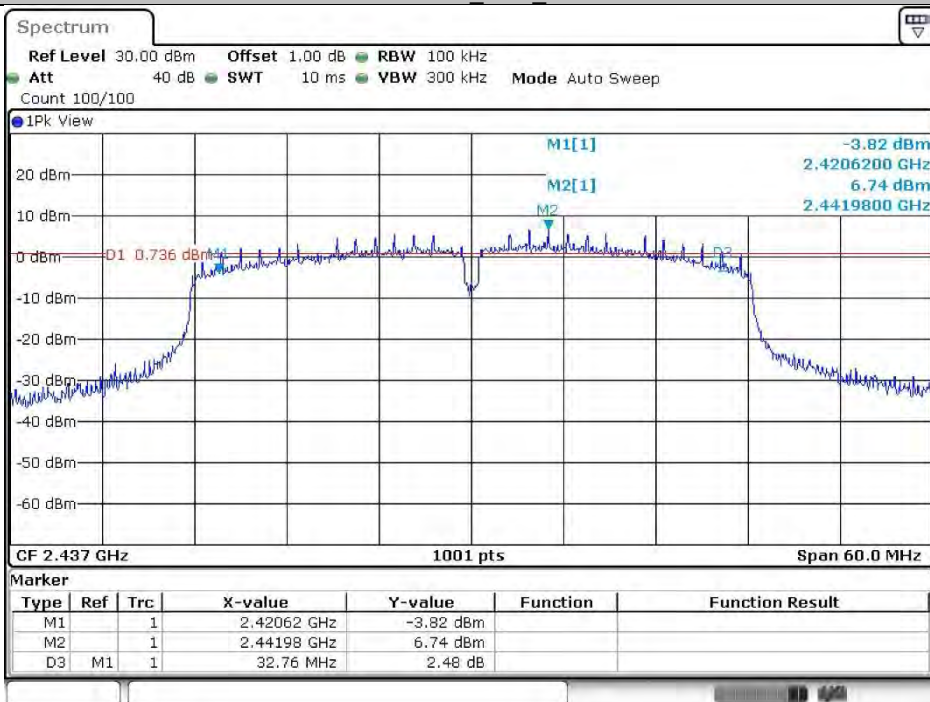
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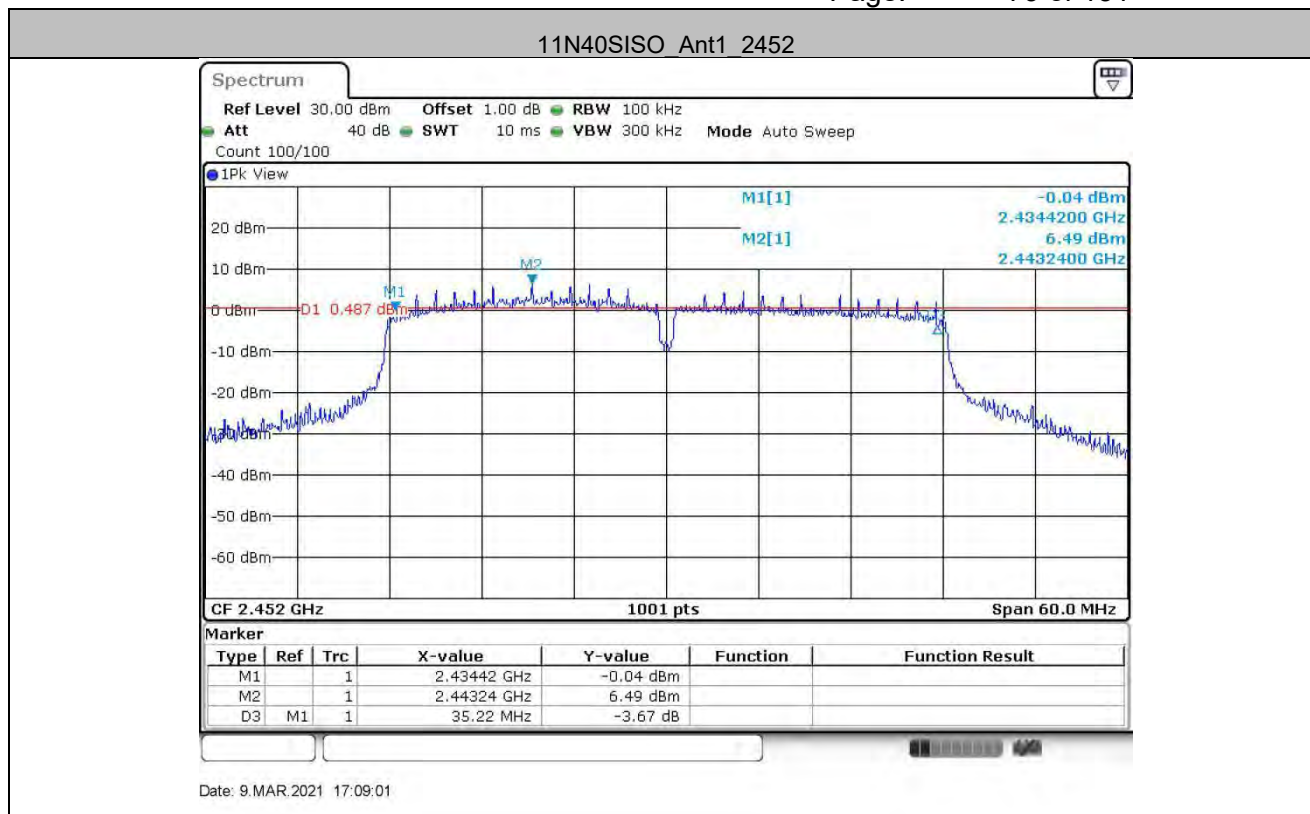


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Occupied Channel Bandwidth

Test Result

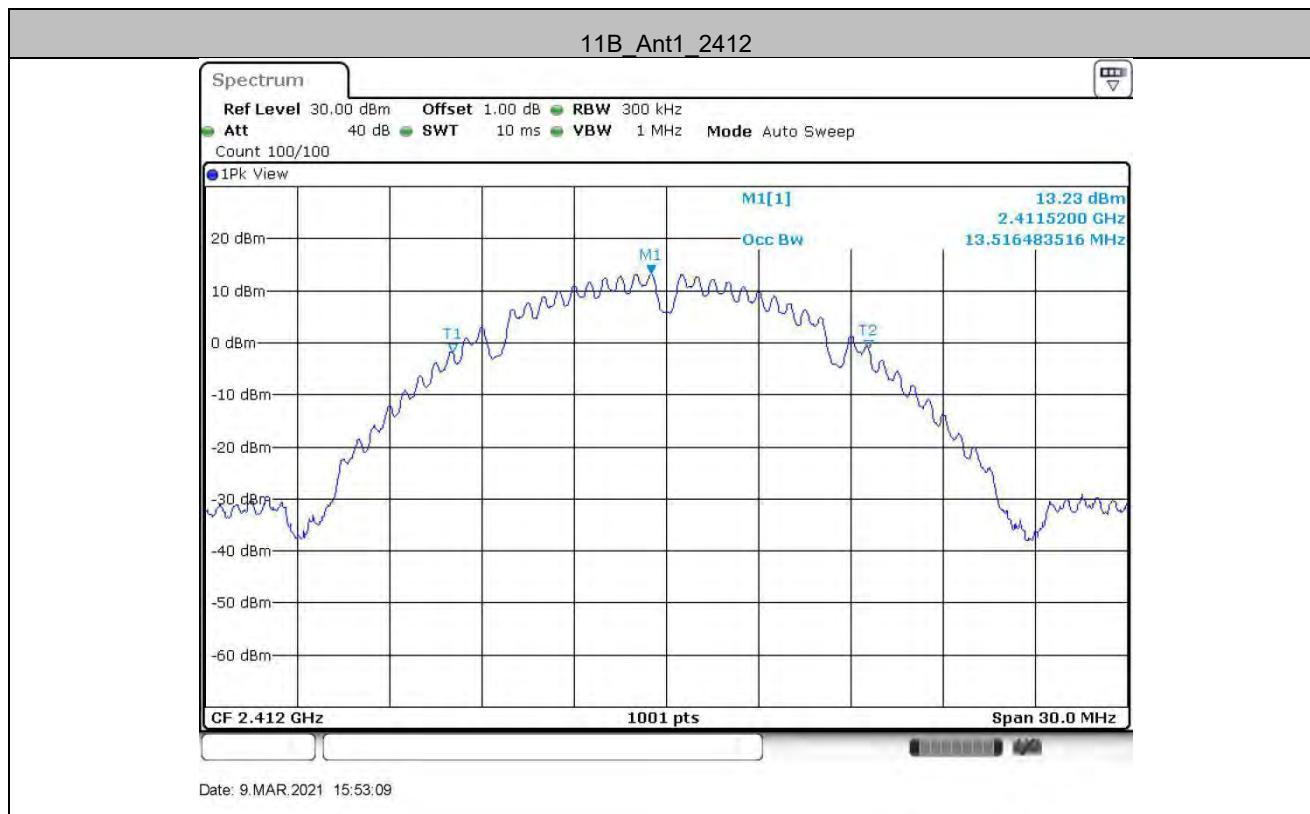
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	13.516	2405.047	2418.563	---	PASS
		2437	13.217	2430.556	2443.773	---	PASS
		2462	13.846	2455.167	2469.013	---	PASS
11G	Ant1	2412	16.454	2403.728	2420.182	---	PASS
		2437	16.334	2428.908	2445.242	---	PASS
		2462	16.603	2453.758	2470.362	---	PASS
11N20SISO	Ant1	2412	17.562	2403.159	2420.721	---	PASS
		2437	17.413	2428.369	2445.781	---	PASS
		2462	17.682	2453.189	2470.871	---	PASS
11N40SISO	Ant1	2422	36.563	2403.838	2440.402	---	PASS
		2437	35.664	2419.258	2454.922	---	PASS
		2452	36.384	2433.838	2470.222	---	PASS



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Test Graphs



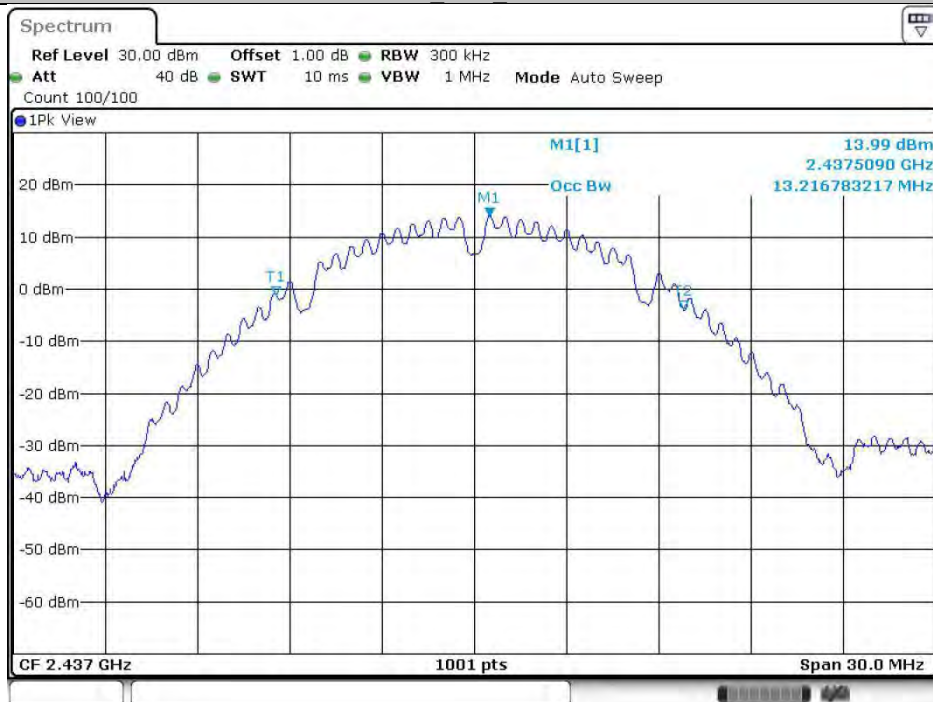
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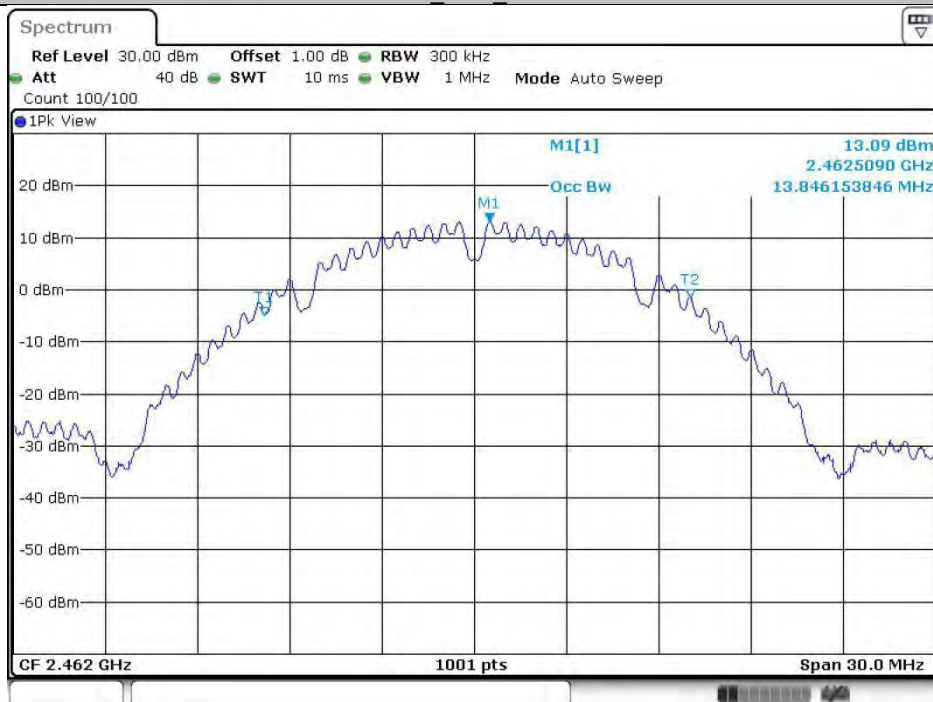
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11B_Ant1_2437



Date: 9.MAR.2021 15:56:29

11B_Ant1_2462



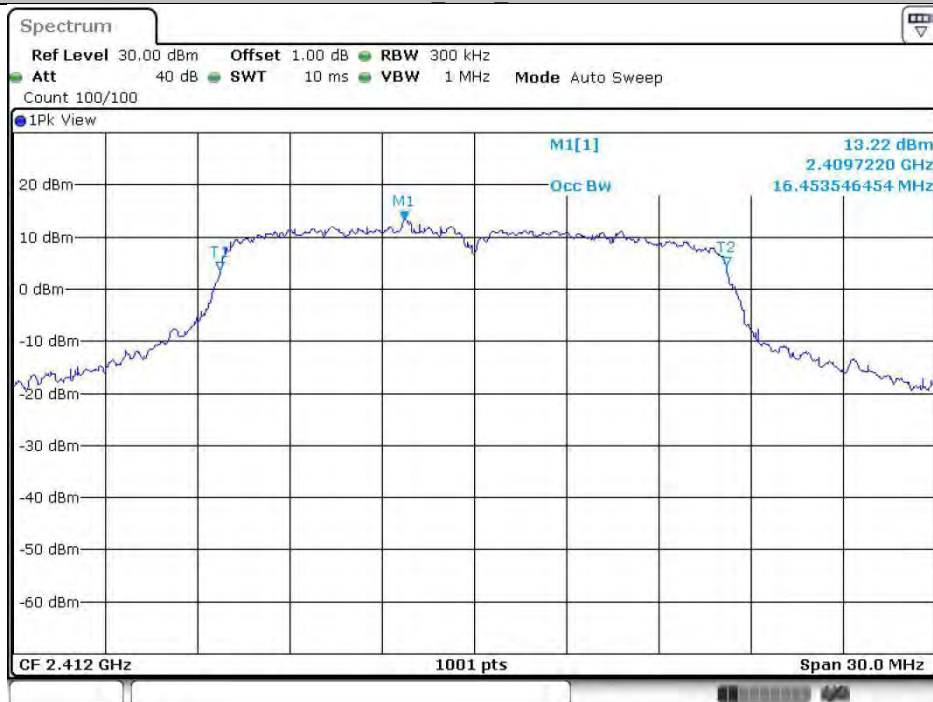
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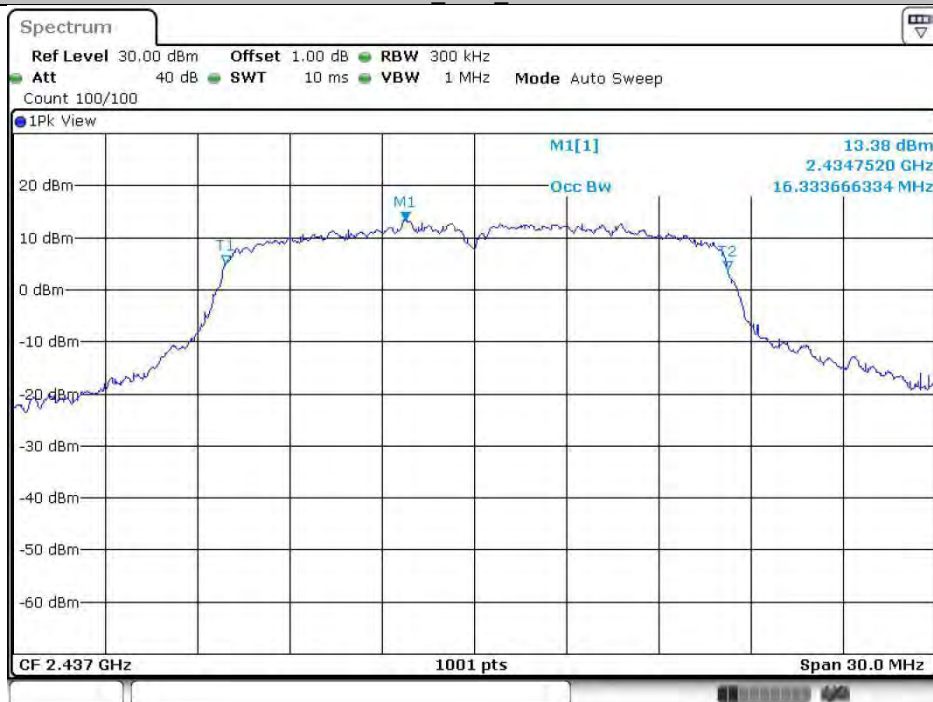
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11G_Ant1_2412



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11G_Ant1_2437



Date: 9.MAR.2021 16:03:12



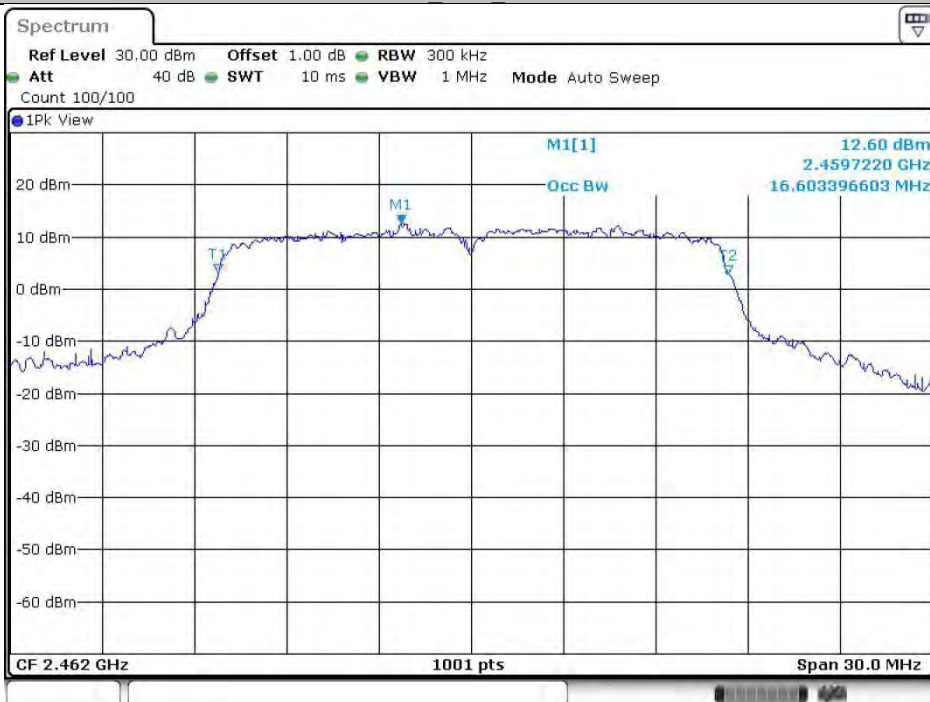
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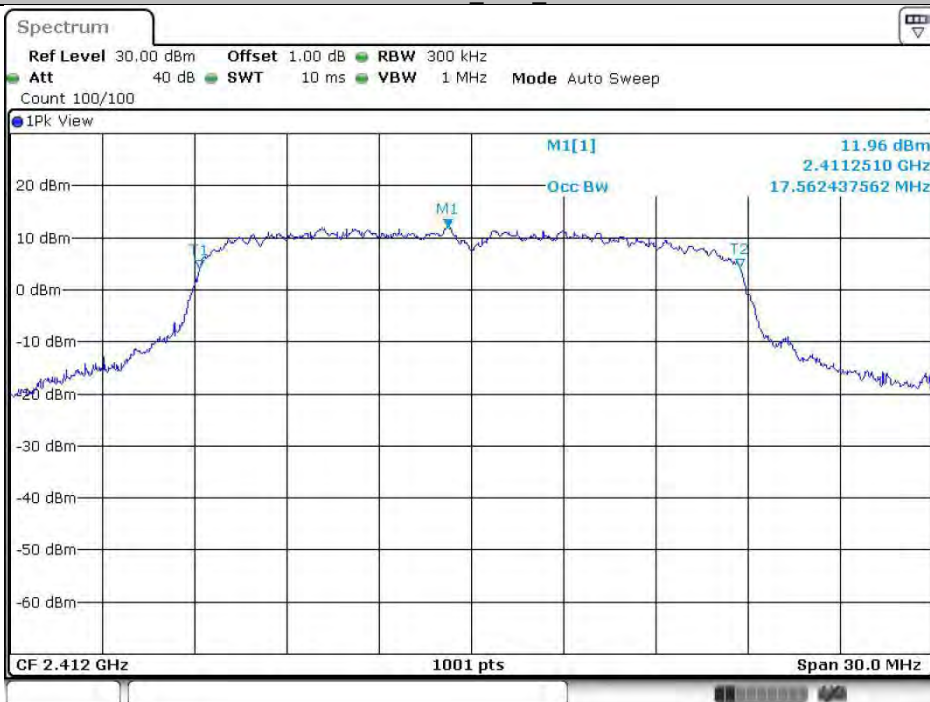
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11G Ant1 2462



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11N20SISO_Ant1_2412



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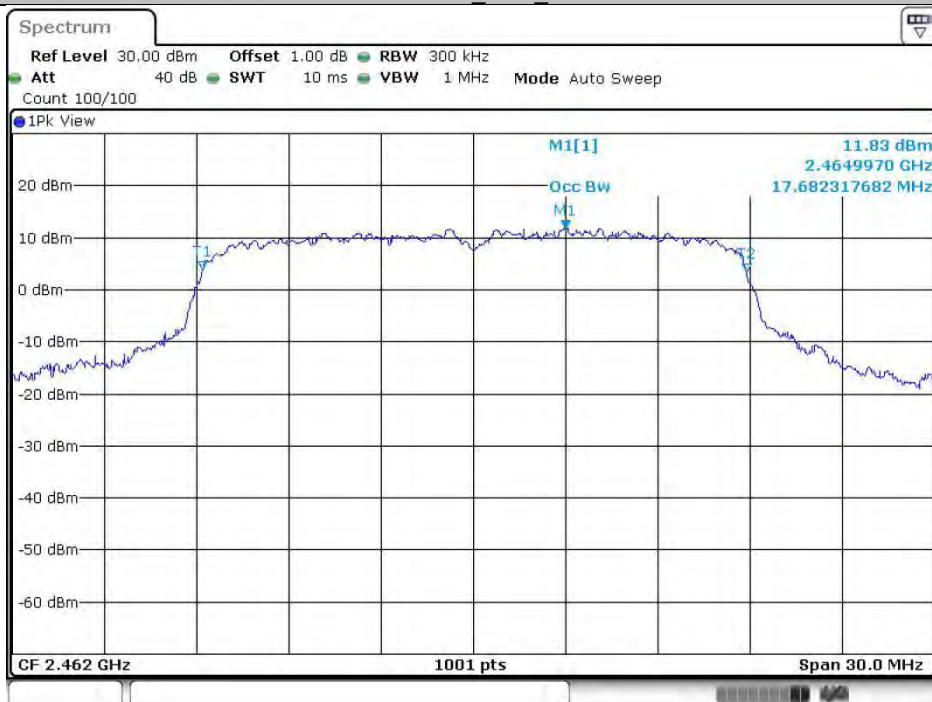
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11N20SISO_Ant1_2437



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11N20SISO_Ant1_2462



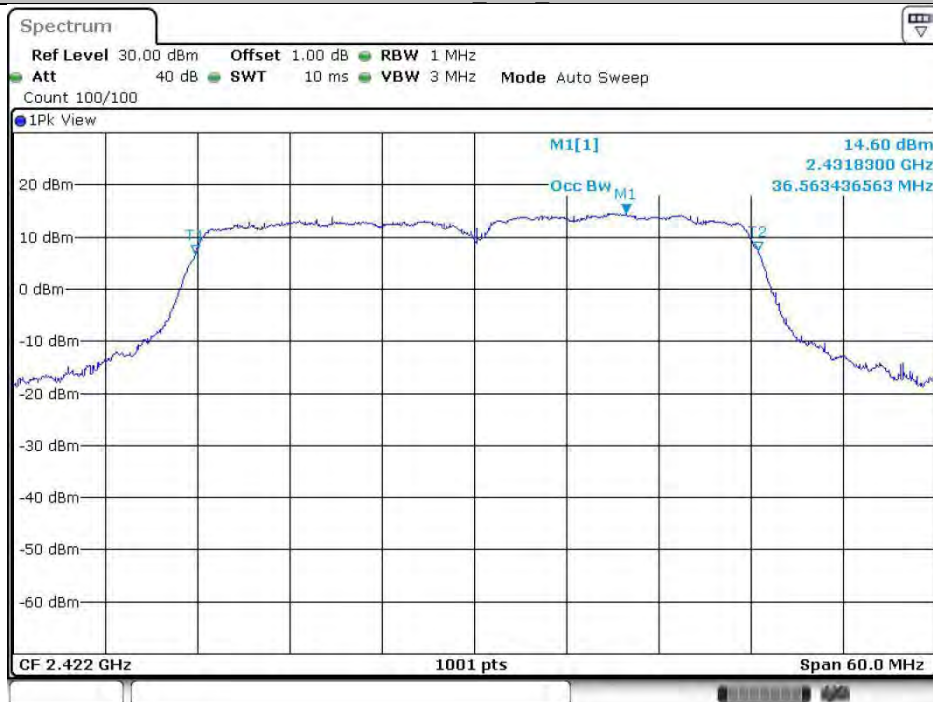
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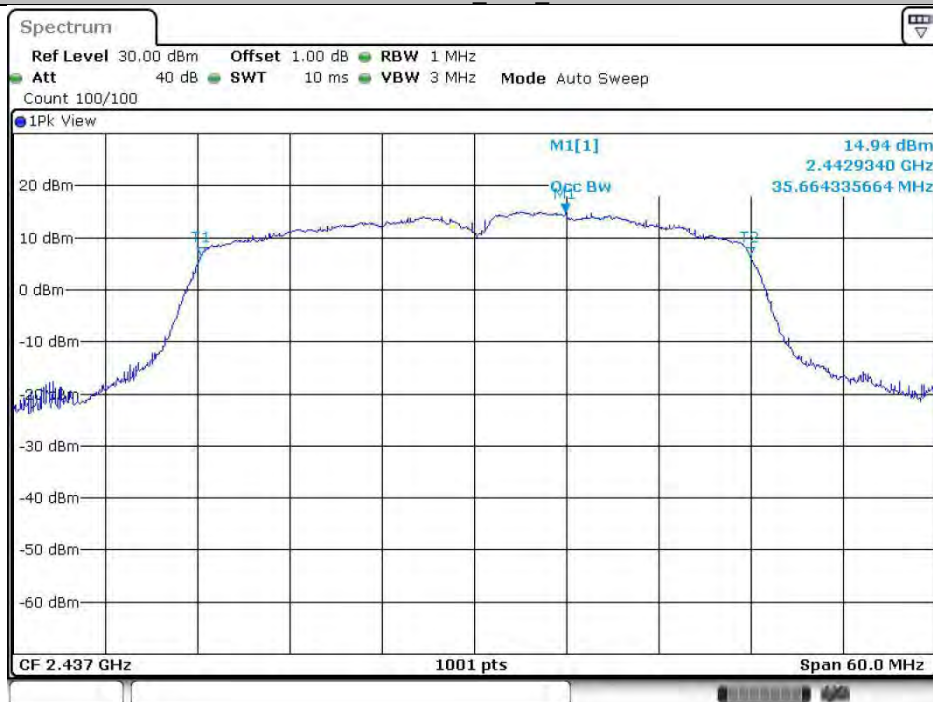
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11N40SISO_Ant1_2422



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Maximum conducted output power Test Result

TestMode	Antenna	Channel	Result[dBm]	Verdict
11B	Ant1	2412	23.45	PASS
		2437	24.10	PASS
		2462	23.37	PASS
11G	Ant1	2412	28.01	PASS
		2437	28.48	PASS
		2462	28.11	PASS
11N20SISO	Ant1	2412	27.76	PASS
		2437	28.23	PASS
		2462	27.84	PASS
11N40SISO	Ant1	2422	27.82	PASS
		2437	27.27	PASS
		2452	27.43	PASS



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Maximum power spectral density

Test Result

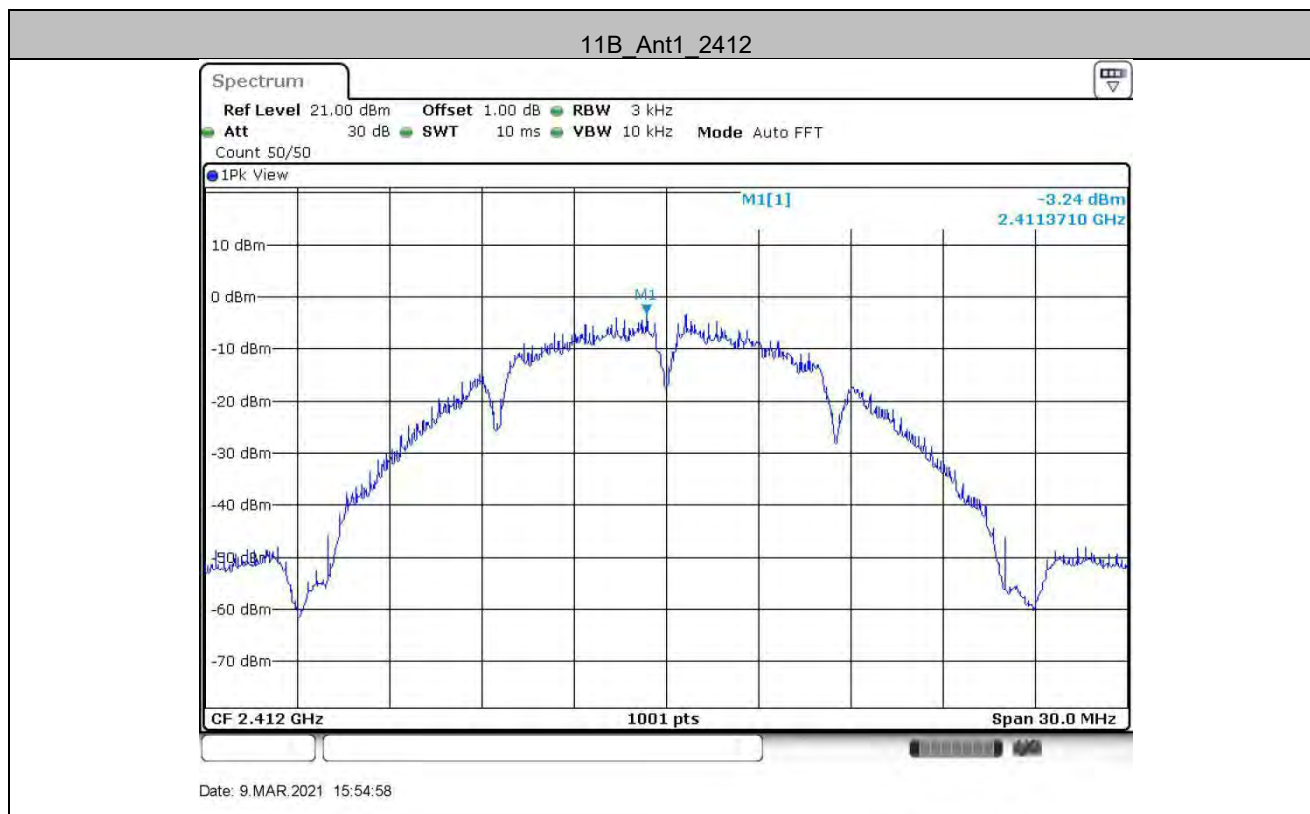
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		2437	-1.79	PASS
		2462	-3.97	PASS
11G	Ant1	2412	-5.8	PASS
		2437	-4.39	PASS
		2462	-5.61	PASS
11N20SISO	Ant1	2412	-6.09	PASS
		2437	-4.55	PASS
		2462	-4.77	PASS
11N40SISO	Ant1	2422	-8.92	PASS
		2437	-9.08	PASS
		2452	-8.45	PASS



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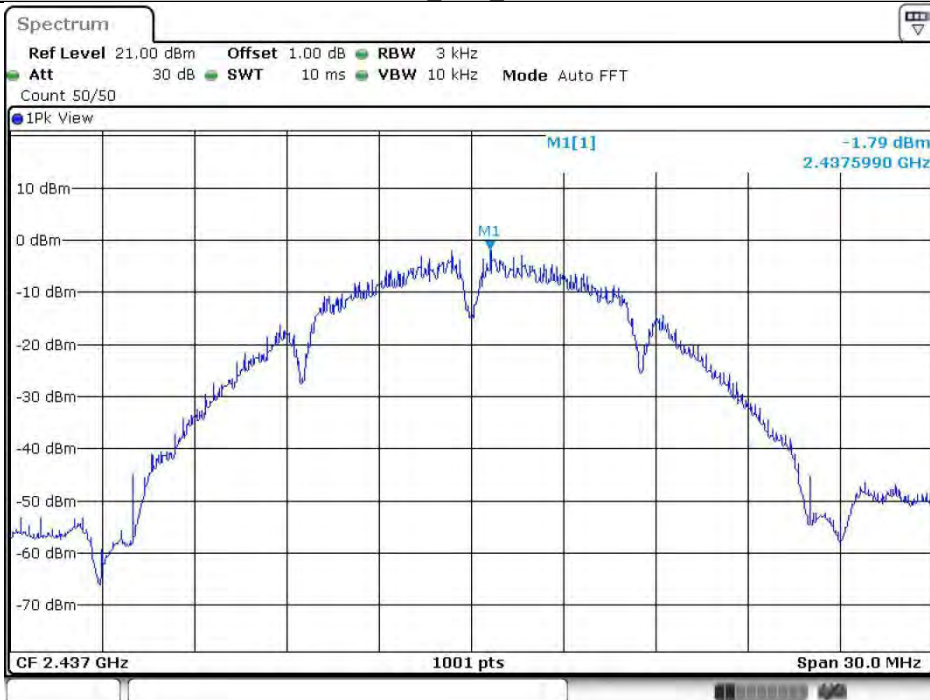
Test Graphs



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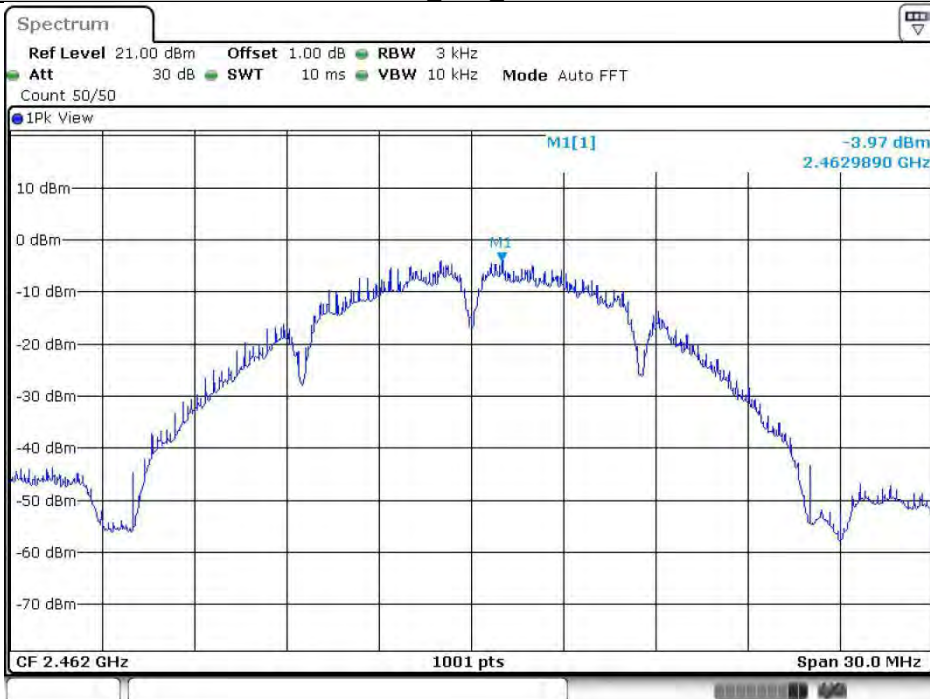
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11B_Ant1_2437



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11B_Ant1_2462



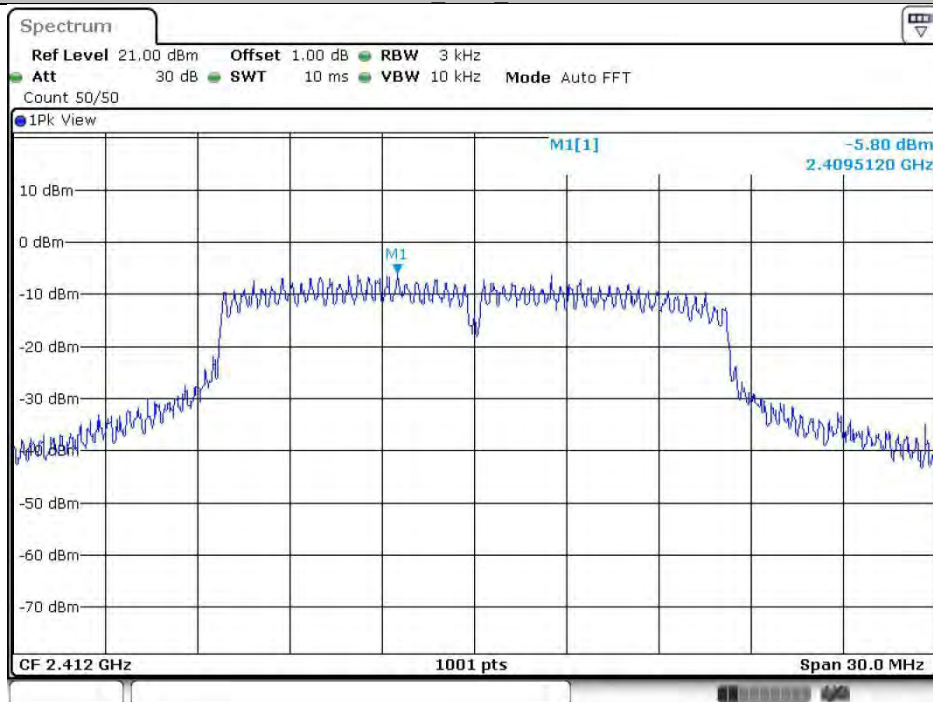
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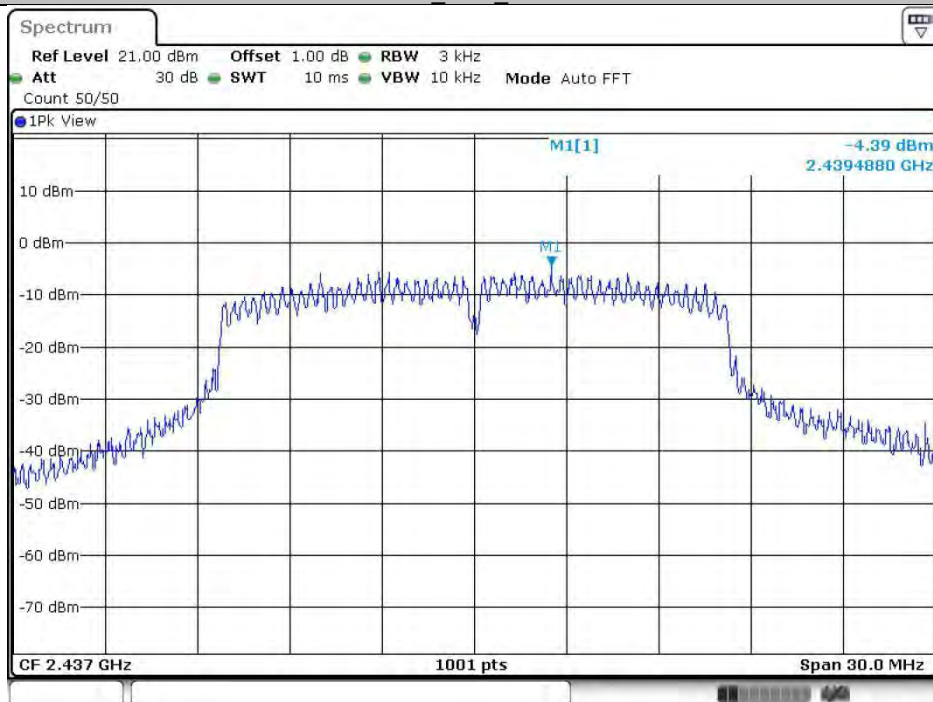
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11G_Ant1_2412



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11G_Ant1_2437



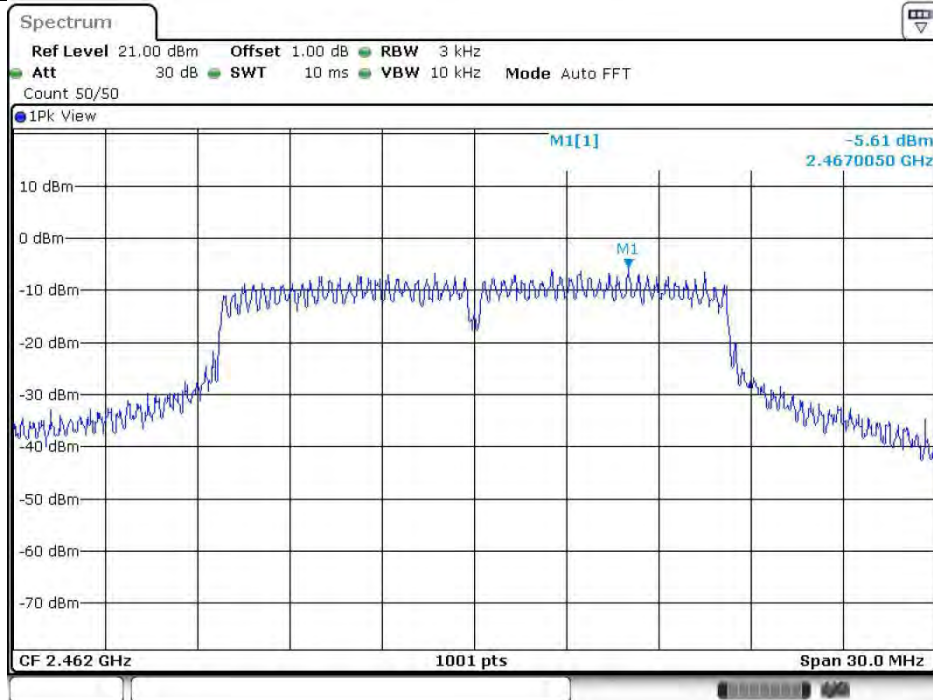
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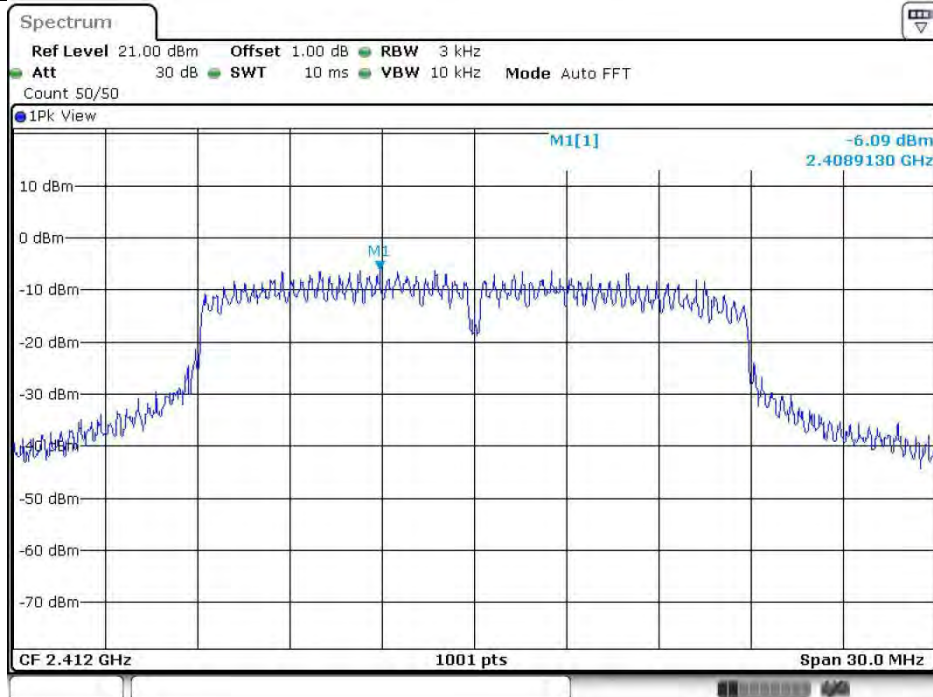
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11G Ant1 2462



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11N20SISO_Ant1_2412



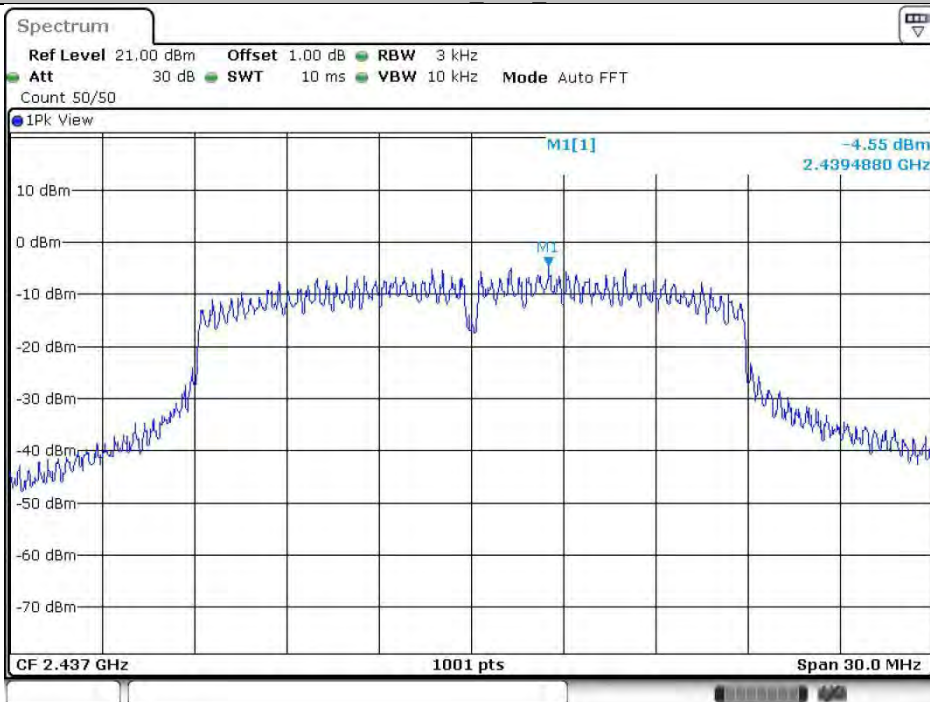
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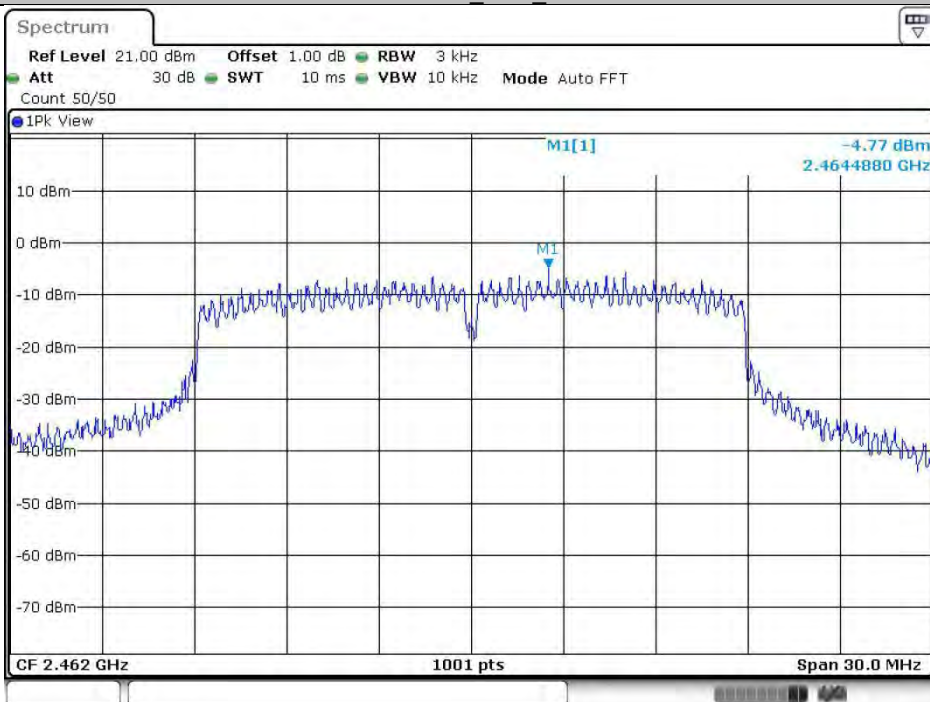
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11N20SISO_Ant1_2462



Date: 9.MAR.2021 16:12:39



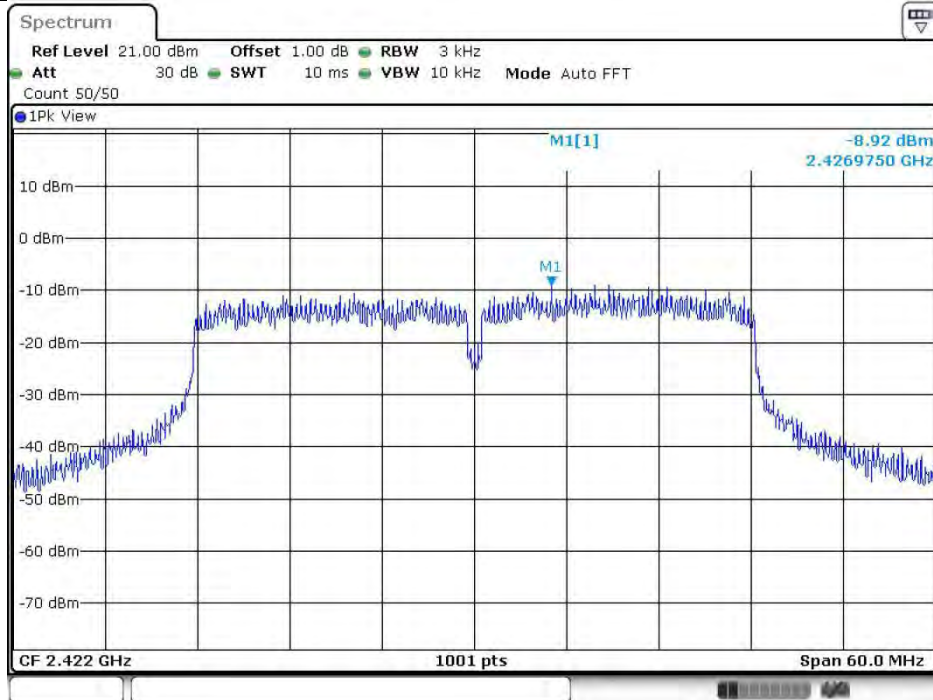
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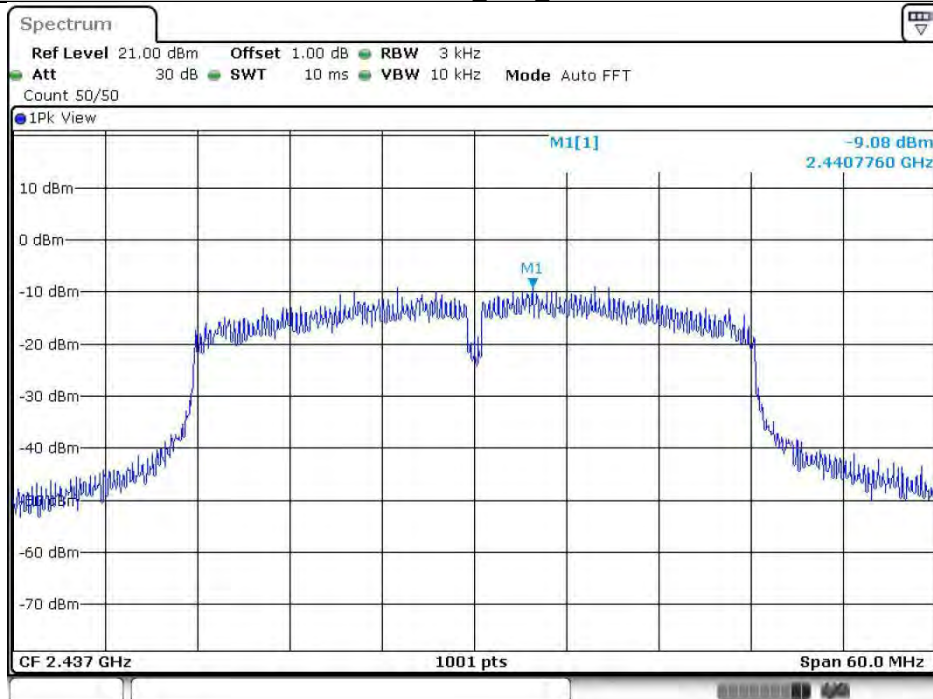
No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgs.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

11N40SISO_Ant1_2422



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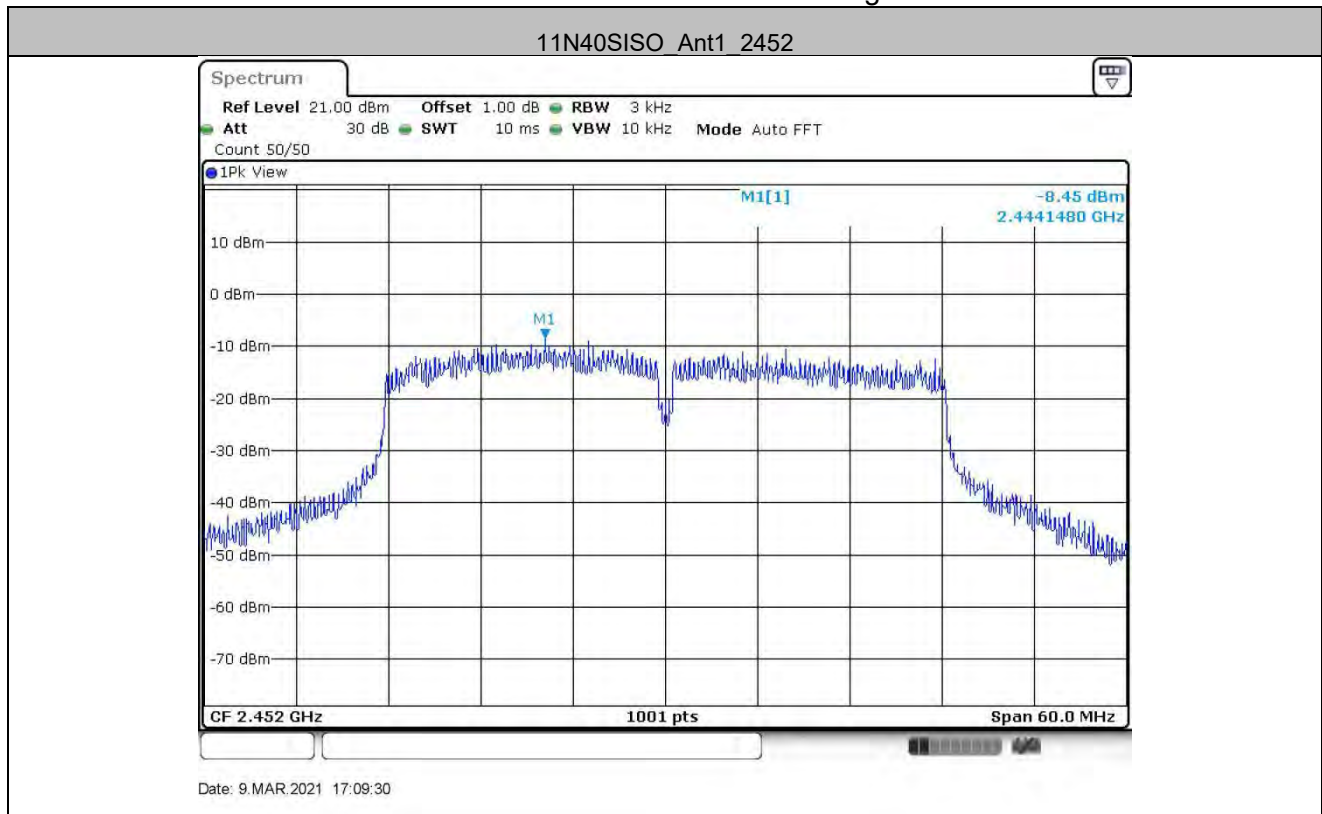


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