

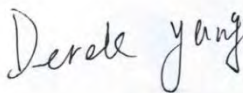
FCC TEST REPORT

Application No.: ZR/2020/C0034
Applicant: Sony Mobile Communications, Inc.
Address of Applicant: 4-12-3 Higashi-shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan
Manufacturer: Sony Mobile Communications, Inc.
Address of Manufacturer: 4-12-3 Higashi-shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan
EUT Description: GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac, GPS and NFC
Model No.: Sony
FCC ID: PY7-54955X
Standards: 47 CFR FCC Part 2, Subpart J
 47 CFR Part 15, Subpart C
Date of Receipt: 2020/12/11
Date of Test: 2020/12/11 to 2021/1/12
Date of Issue: 2021/3/16

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		2021-03-03		Original
02		2021-03-16		Comment Revised

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



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2 Test Summary

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



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3 General Information

3.1 Details of Client

Applicant:	Sony Mobile Communications, Inc.
Address of Applicant	4-12-3 Higashi-shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan
Manufacturer:	Sony Mobile Communications, Inc.
Address of Manufacturer	4-12-3 Higashi-shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan

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

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



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3.3 Test Facility

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

Lab A:

• **A2LA (Certificate No. 3816.01)**

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

• **VCCI**

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

• **FCC –Designation Number: CN1178**

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

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

• **Innovation, Science and Economic Development Canada**

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

CAB identifier: CN0006.

IC#: 4620C.

Lab B:

• **A2LA (Certificate No. 4854.01)**

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

Designation Number: CN1271.



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3.4 General Description of EUT

EUT Description:	GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac, GPS and NFC
Trade Mark:	Sony
S/N:	005059ADNVM2
IEEE 802.11 WLAN Mode Supported	<input checked="" type="checkbox"/> 802.11B (20 MHz channel bandwidth), <input checked="" type="checkbox"/> 802.11G (20 MHz channel bandwidth) <input checked="" type="checkbox"/> 802.11N (20 MHz channel bandwidth), <input type="checkbox"/> 802.11N (40 MHz channel bandwidth)
Operation Frequency:	2400 MHz -2483.5MHz $f_c = 2407 \text{ MHz} + N * 5 \text{ MHz}$, 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:	<input checked="" type="checkbox"/> Portable Device, <input type="checkbox"/> Module
Antenna Type:	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated
Antenna Ports	<input checked="" type="checkbox"/> Ant 1, <input checked="" type="checkbox"/> Ant 2, <input type="checkbox"/> Ant 3
Smart System	<input checked="" type="checkbox"/> SISO (for 802.11B/G/N), <input checked="" type="checkbox"/> MIMO (for 802.11B/G/N): 2 Tx & 2 Rx, <input type="checkbox"/> Diversity (for 802.11B/G) : Tx & Rx
Antenna Gain:	2.0dBi(ANT1); -3.0dBi(ANT2);

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		



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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)
The Lowest channel	2412MHz
The Middle channel	2437MHz
The Highest channel	2462MHz

3.5 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	50 % RH
Atmospheric Pressure:	101.30 KPa
Test mode:	
Modulation	Data Rate
802.11B	1Mbps
802.11G	6Mbps
802.11N HT20	MCS0

3.6 Description of Support Units

The EUT has been tested independent unit.



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4 Test results and Measurement Data

4.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
<p>15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p>	
<p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.0dBi.</p>	



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:	<p>1) The mains terminal disturbance voltage test was conducted in a shielded room.</p> <p>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.</p> <p>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,</p> <p>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.</p>		



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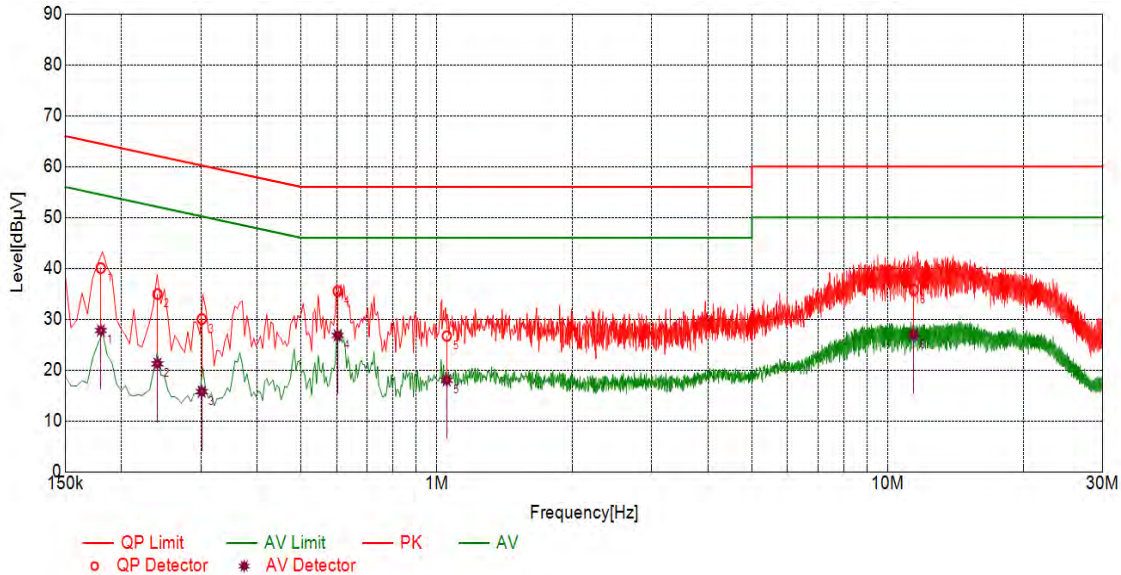
<p>Test Setup:</p>	
<p>Exploratory Test Mode:</p>	<p>Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. Charge + Transmitting mode.</p>
<p>Final Test Mode:</p>	<p>Through Pre-scan, find the 1Mbps of rate of 802.11B at lowest channel is the worst case. Charge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



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:



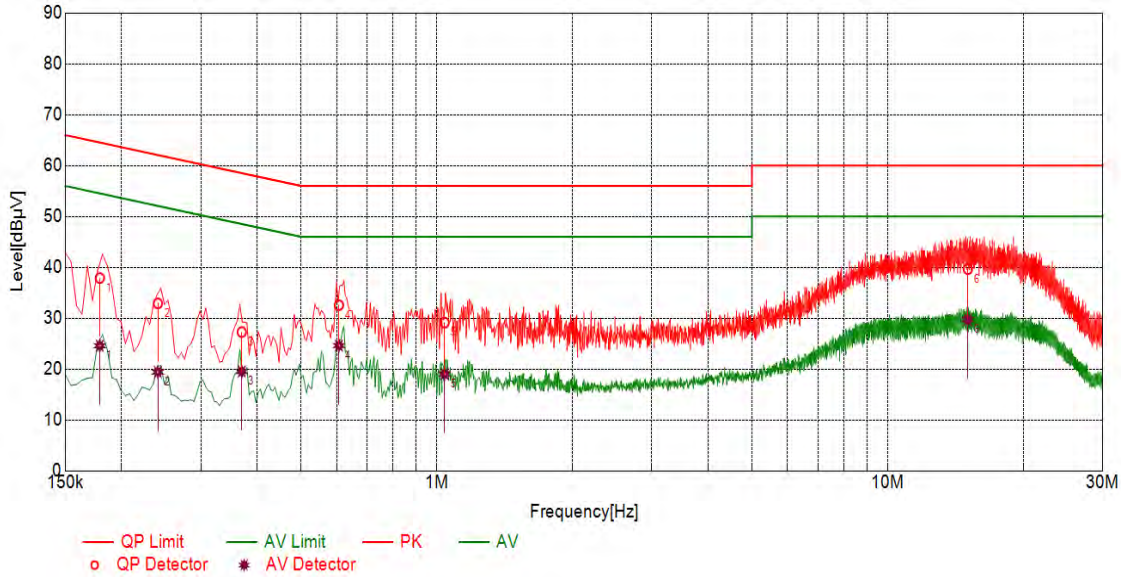
Test Graph

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	0.1800	10.10	40.05	64.48	24.43	27.79	54.48	26.69
2	0.2403	10.10	34.94	62.08	27.14	21.23	52.08	30.85
3	0.3013	10.10	30.03	60.21	30.18	15.75	50.21	34.46
4	0.6030	10.10	35.53	56.00	20.47	26.82	46.00	19.18
5	1.0528	10.10	26.70	56.00	29.30	18.00	46.00	28.00
6	11.4218	10.10	35.75	60.00	24.25	26.94	50.00	23.06



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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	0.1790	10.10	37.90	64.53	26.63	24.58	54.53	29.95
2	0.2408	10.10	32.91	62.07	29.16	19.41	52.07	32.66
3	0.3696	10.10	27.28	58.51	31.23	19.53	48.51	28.98
4	0.6070	10.10	32.56	56.00	23.44	24.61	46.00	21.39
5	1.0410	10.10	29.14	56.00	26.86	19.03	46.00	26.97
6	15.0610	10.11	39.64	60.00	20.36	29.70	50.00	20.30

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

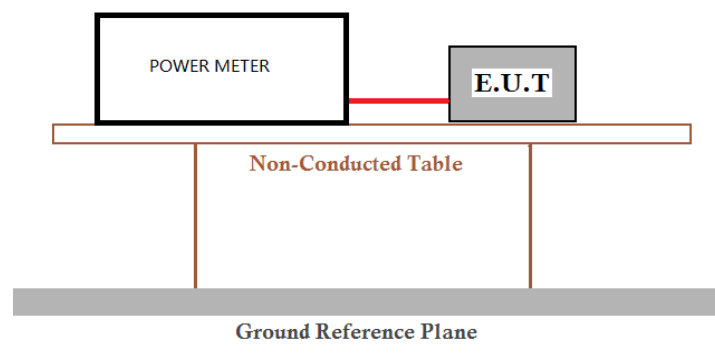
The detailed test data see: **Appendix**



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4.4 Conducted Output Power

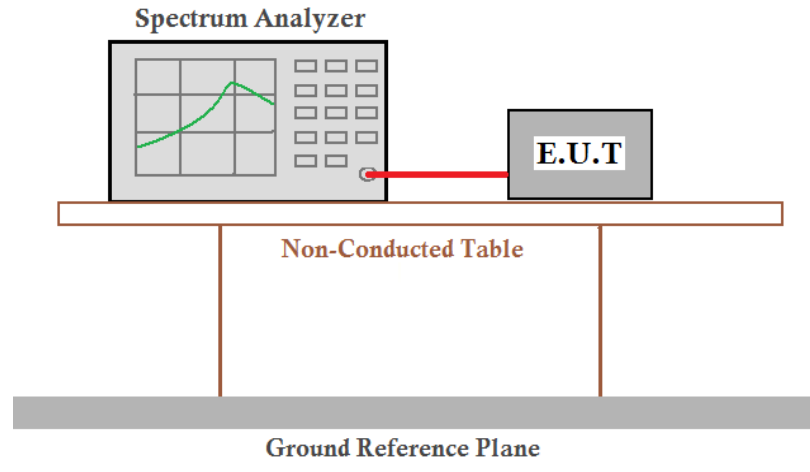
Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10 :2013 Section 11.9.1.3
Test Setup:	
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; MCS0 of rate is the worst case of 802.11N(HT20);
Limit:	30dBm
Test Results:	Pass

The detailed test data see: **Appendix**



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

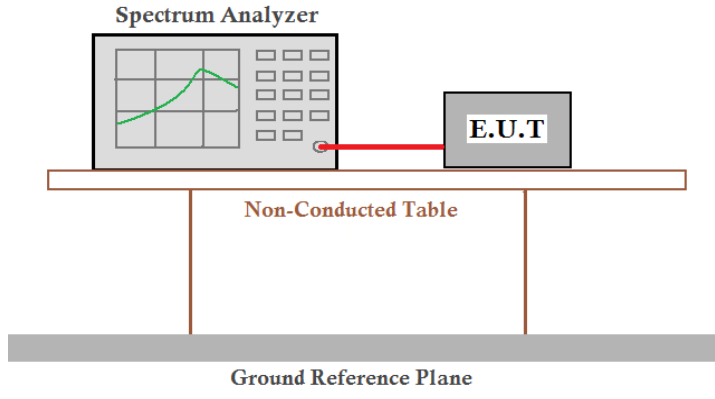
Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10: 2013 Section 11.8.1 Option 1
Test Setup:	
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; MCS0 of rate is the worst case of 802.11N(HT20);
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 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 ; MCS0 of rate is the worst case of 802.11N(HT20);
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

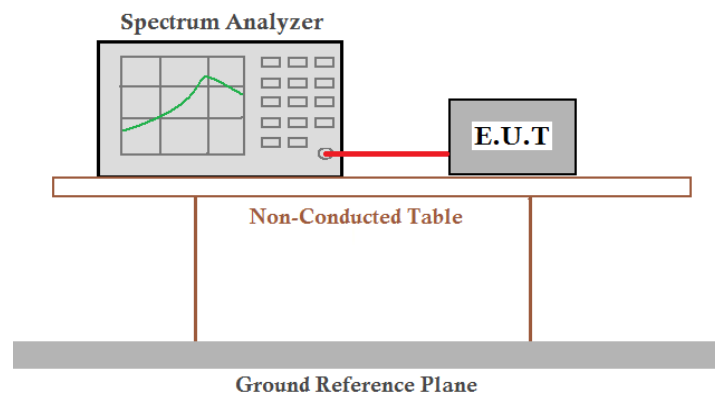
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.13
Test Setup:	<p>The diagram shows a Spectrum Analyzer on the left and an E.U.T. (Equipment Under Test) on the right, both resting on a Non-Conducted Table. A red line indicates the connection between the two. Below the table is a Ground Reference Plane.</p>
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 ; MCS0 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.
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 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 ; MCS0 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.
Test Results:	Pass

The detailed test data see: **Appendix**



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	100kHz	30kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak	
	Peak	1MHz	10Hz (DC≥0.98) ≥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.					



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<p>Test Setup:</p>	
<p>Figure 1. Below 30MHz</p>	<p>Figure 2. 30MHz to 1GHz</p>
<p>Figure 3. Above 1 GHz</p>	
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 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. 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. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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



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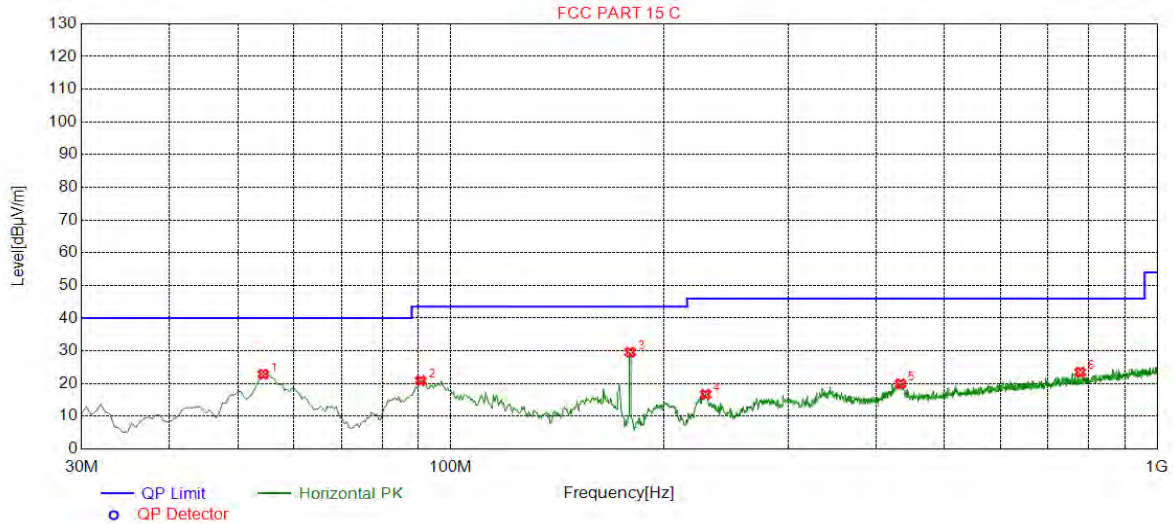
	<p>would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>h. Test the EUT in the lowest channel, the middle channel ,the Highest channel.</p> <p>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.</p> <p>j. Repeat above procedures until all frequencies measured was complete.</p>
Test Configuration:	<p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"> • RBW = 120 kHz • VBW = 300 kHz • Detector = Peak • Trace mode = max hold <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"> • RBW = 1 MHz • VBW \geq 3 MHz • Detector = Peak • Sweep time = auto • Trace mode = max hold <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"> • RBW = 1 MHz • VBW = 10 Hz, when duty cycle is no less than 98 percent. • VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Exploratory Test Mode:	<p>Transmitting with all kind of modulations, data rates. Charge + Transmitting mode.</p>
Final Test Mode:	<p>Pretest the EUT at Charge + Transmitting mode. Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G; MCS0 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.</p>
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass
Remark:	The Emission Test is performed by the Lab B



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4.9.1 Radiated emission below 1GHz

4.9.1.1 Charge + Transmitting Test Graph



Suspected List

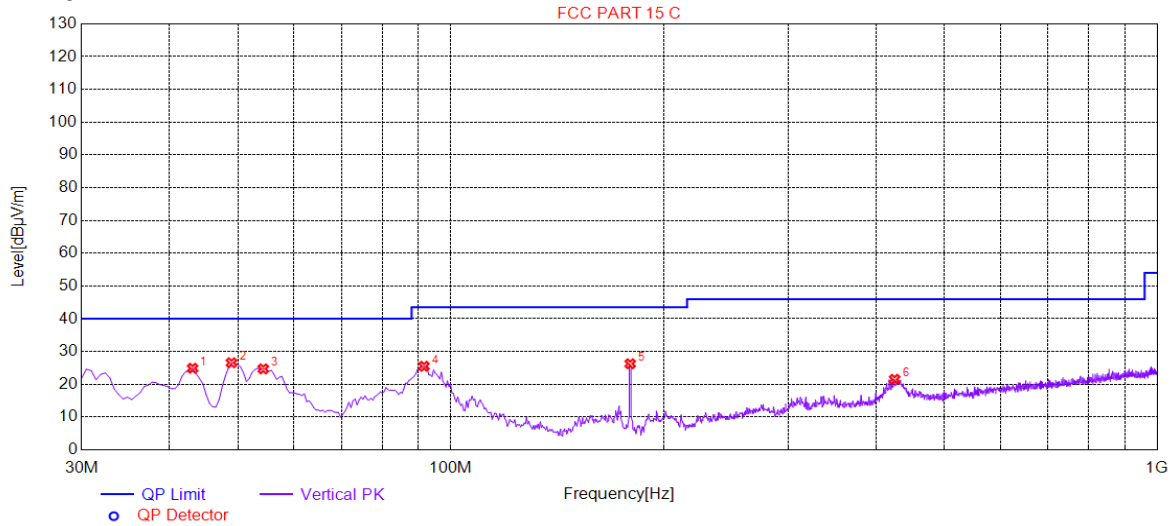
Suspected List							
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	54.2621	22.86	40.00	17.14	155	233	Horizontal
2	90.6553	20.90	43.50	22.60	245	252	Horizontal
3	179.4547	29.60	43.50	13.90	274	90	Horizontal
4	229.4347	16.69	46.00	29.31	156	96	Horizontal
5	433.2366	19.92	46.00	26.08	345	262	Horizontal
6	778.2441	23.49	46.00	22.51	247	305	Horizontal

Final Data List



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Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	43.1016	24.91	-30.57	40.00	15.09	125	288	Vertical
2	48.9245	26.58	-30.19	40.00	13.42	150	316	Vertical
3	54.2621	24.72	-30.82	40.00	15.28	154	313	Vertical
4	91.6258	25.52	-33.15	43.50	17.98	354	70	Vertical
5	179.454	26.29	-32.95	43.50	17.21	152	7	Vertical
6	424.987	21.54	-24.35	46.00	24.46	345	95	Vertical

Final Data List



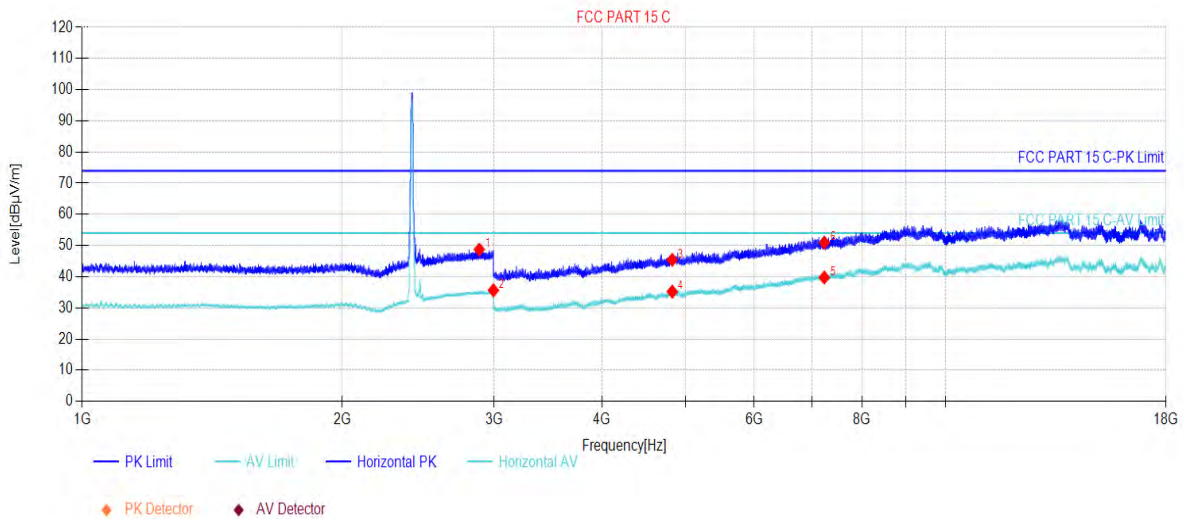
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4.9.2 Transmitter emission above 1GHz

4.9.2.1 802.11B_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2883.78	48.74	6.91	74.00	25.26	162	179	Horizontal
2	2994.79	35.64	7.39	54.00	18.36	170	91	Horizontal
3	4824.00	45.41	-10.56	74.00	28.59	142	107	Horizontal
4	4824.00	35.21	-10.56	54.00	18.79	186	140	Horizontal
5	7236.00	39.74	-2.59	54.00	14.26	201	64	Horizontal
6	7236.00	50.96	-2.59	74.00	23.04	143	248	Horizontal

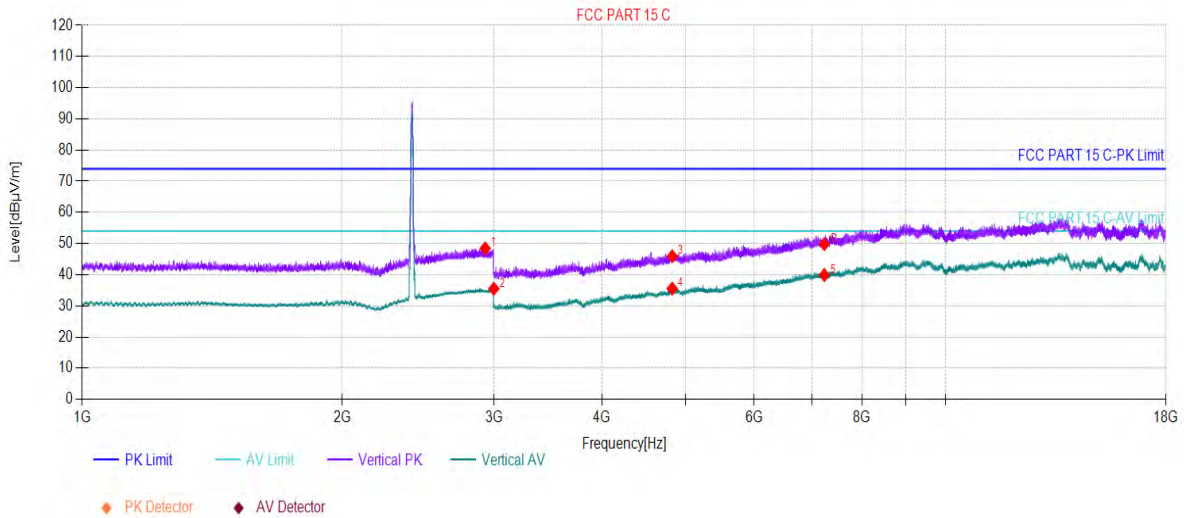
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4.9.2.2 802.11B_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2929.59	48.45	7.09	74.00	25.55	240	174	Vertical
2	2997.99	35.52	7.40	54.00	18.48	265	80	Vertical
3	4824.00	45.93	-10.56	74.00	28.07	235	206	Vertical
4	4824.00	35.55	-10.56	54.00	18.45	280	119	Vertical
5	7236.00	39.90	-2.59	54.00	14.10	274	357	Vertical
6	7236.00	49.80	-2.59	74.00	24.20	254	206	Vertical

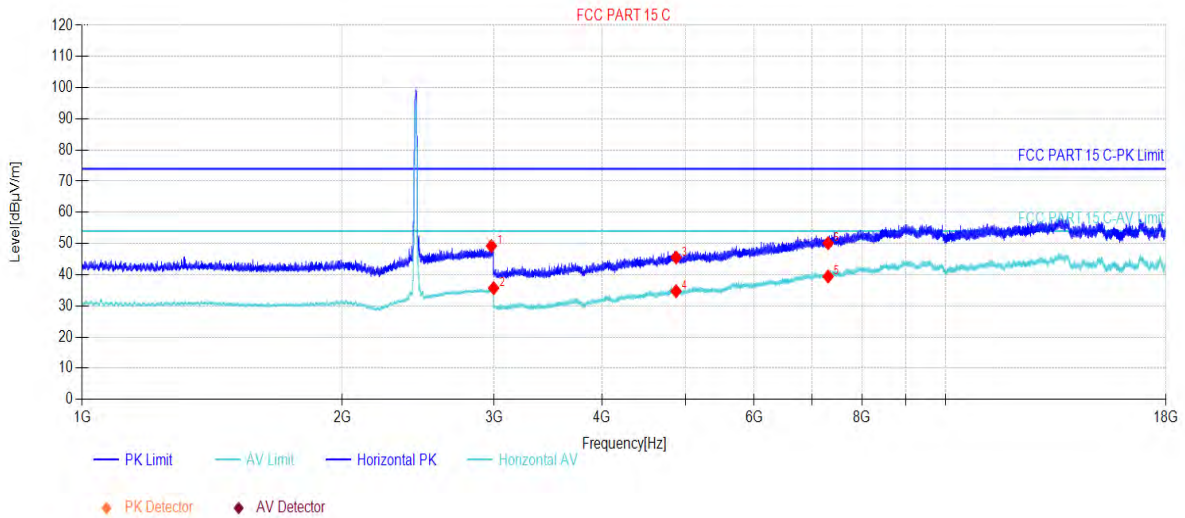
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4.9.2.3 802.11B_Channel 6 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2978.59	49.21	7.31	74.00	24.79	140	129	Horizontal
2	2996.39	35.69	7.39	54.00	18.31	138	162	Horizontal
3	4874.00	45.54	-10.40	74.00	28.46	165	40	Horizontal
4	4874.00	34.71	-10.40	54.00	19.29	157	84	Horizontal
5	7311.00	39.43	-2.58	54.00	14.57	182	314	Horizontal
6	7311.00	50.12	-2.58	74.00	23.88	144	139	Horizontal

Final Data List

Final Data List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2978.59	49.21	7.31	74.00	24.79	140	129	Horizontal
2	2996.39	35.69	7.39	54.00	18.31	138	162	Horizontal
3	4874.00	45.54	-10.40	74.00	28.46	165	40	Horizontal
4	4874.00	34.71	-10.40	54.00	19.29	157	84	Horizontal
5	7311.00	39.43	-2.58	54.00	14.57	182	314	Horizontal
6	7311.00	50.12	-2.58	74.00	23.88	144	139	Horizontal



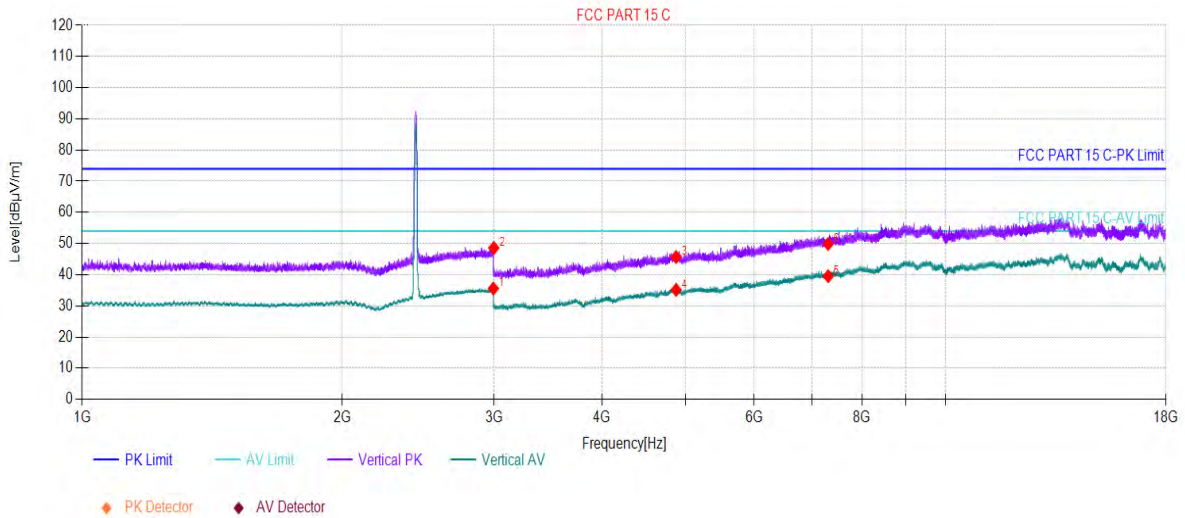
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4.9.2.4 802.11B_Channel 6 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2994.39	35.57	7.38	54.00	18.43	258	246	Vertical
2	2997.59	48.61	7.40	74.00	25.39	222	202	Vertical
3	4874.00	45.69	-10.40	74.00	28.31	243	182	Vertical
4	4874.00	35.13	-10.40	54.00	18.87	291	105	Vertical
5	7311.00	39.54	-2.58	54.00	14.46	244	281	Vertical
6	7311.00	49.88	-2.58	74.00	24.12	275	281	Vertical

Final Data List

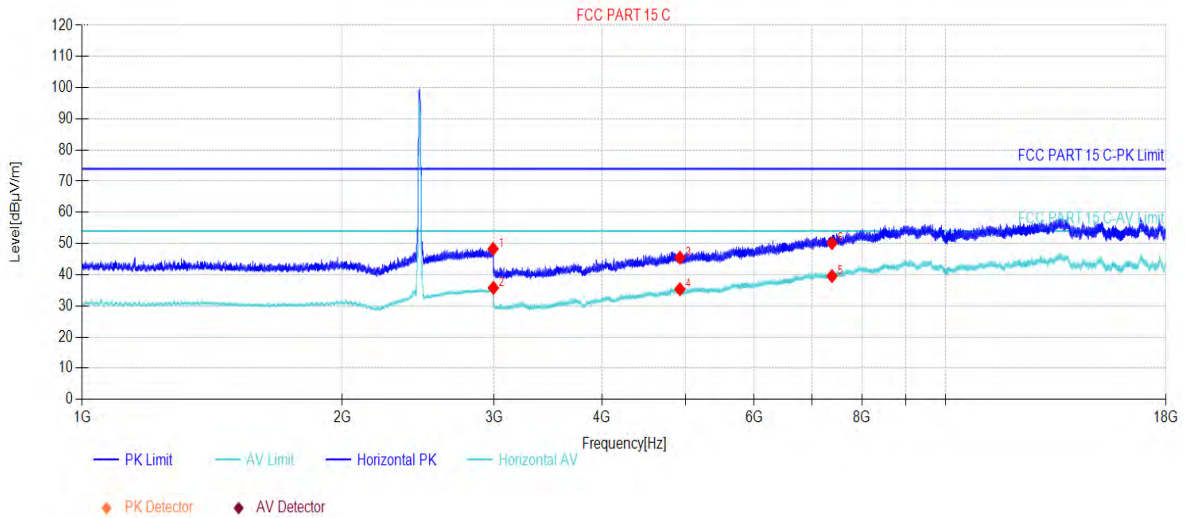


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4.9.2.5 802.11B_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2991.99	48.31	7.37	74.00	25.69	142	68	Horizontal
2	2994.19	35.78	7.38	54.00	18.22	152	207	Horizontal
3	4924.00	45.50	-10.22	74.00	28.50	147	260	Horizontal
4	4924.00	35.37	-10.22	54.00	18.63	168	52	Horizontal
5	7386.00	39.58	-2.06	54.00	14.42	175	96	Horizontal
6	7386.00	50.13	-2.06	74.00	23.87	135	195	Horizontal

Final Data List

Final Data List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2991.99	48.31	7.37	74.00	25.69	142	68	Horizontal
2	2994.19	35.78	7.38	54.00	18.22	152	207	Horizontal
3	4924.00	45.50	-10.22	74.00	28.50	147	260	Horizontal
4	4924.00	35.37	-10.22	54.00	18.63	168	52	Horizontal
5	7386.00	39.58	-2.06	54.00	14.42	175	96	Horizontal
6	7386.00	50.13	-2.06	74.00	23.87	135	195	Horizontal

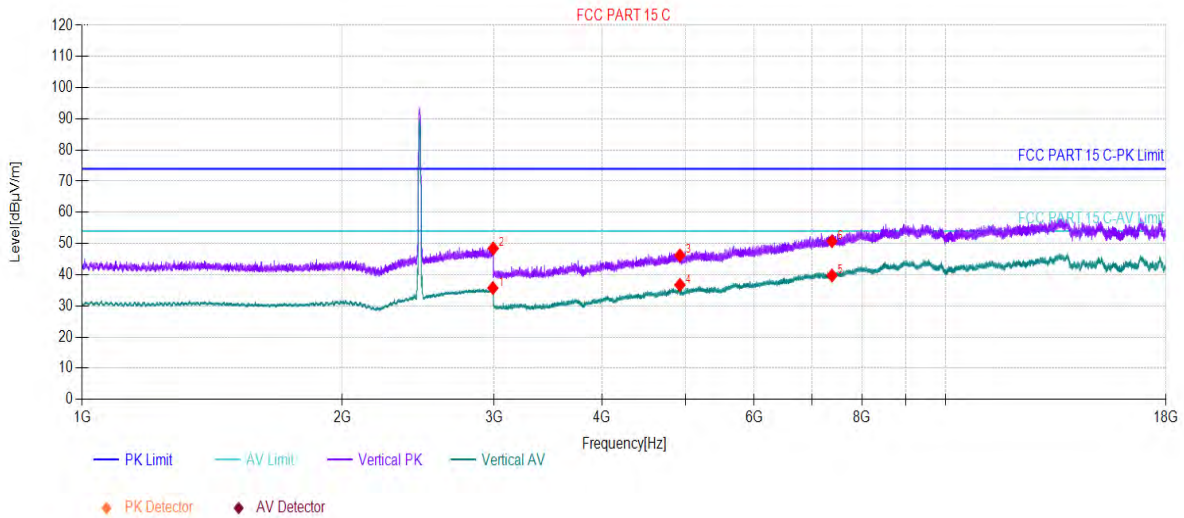


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4.9.2.6 802.11B_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2989.79	35.74	7.36	54.00	18.26	280	119	Vertical
2	2992.59	48.44	7.38	74.00	25.56	240	180	Vertical
3	4924.00	46.22	-10.22	74.00	27.78	245	357	Vertical
4	4924.00	36.74	-10.22	54.00	17.26	267	163	Vertical
5	7386.00	39.74	-2.06	54.00	14.26	290	357	Vertical
6	7386.00	50.76	-2.06	74.00	23.24	254	336	Vertical

Final Data List

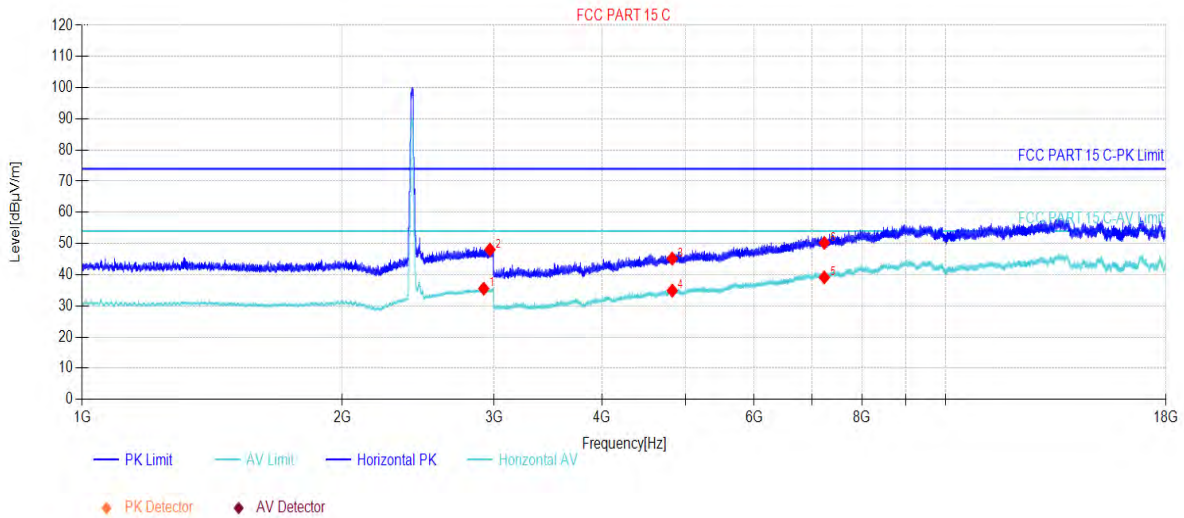


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4.9.2.7 802.11G_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2917.99	35.54	7.03	54.00	18.46	142	256	Horizontal
2	2967.19	48.07	7.26	74.00	25.93	182	273	Horizontal
3	4824.00	45.17	-10.56	74.00	28.83	175	151	Horizontal
4	4824.00	34.90	-10.56	54.00	19.10	145	324	Horizontal
5	7236.00	39.16	-2.59	54.00	14.84	165	249	Horizontal
6	7236.00	50.22	-2.59	74.00	23.78	174	118	Horizontal

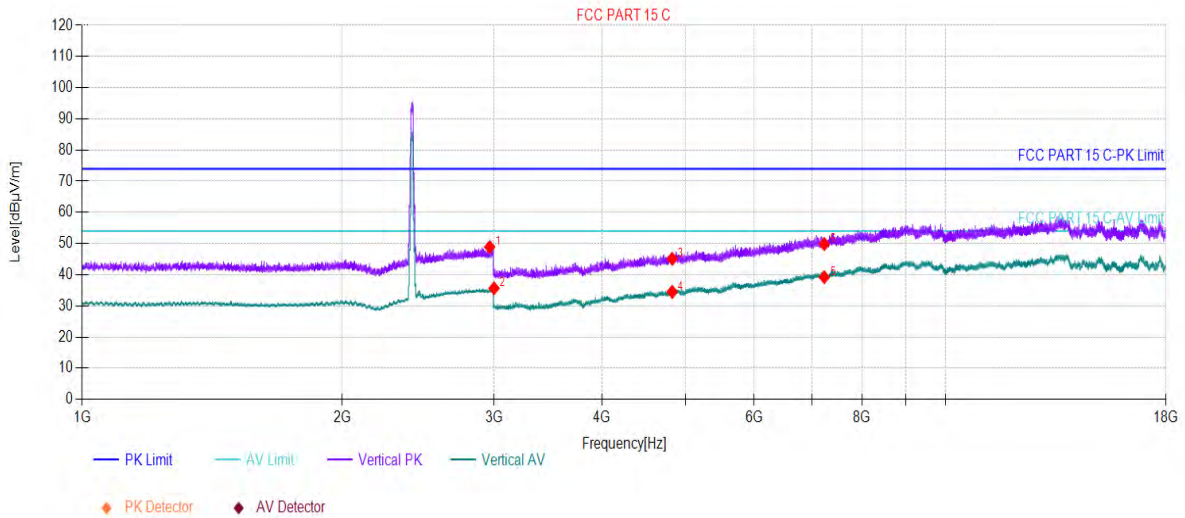
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4.9.2.8 802.11G_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2964.39	48.90	7.25	74.00	25.10	258	52	Vertical
2	2999.39	35.66	7.41	54.00	18.34	281	330	Vertical
3	4824.00	45.10	-10.56	74.00	28.90	243	325	Vertical
4	4824.00	34.51	-10.56	54.00	19.49	274	293	Vertical
5	7236.00	39.22	-2.59	54.00	14.78	241	227	Vertical
6	7236.00	49.85	-2.59	74.00	24.15	284	325	Vertical

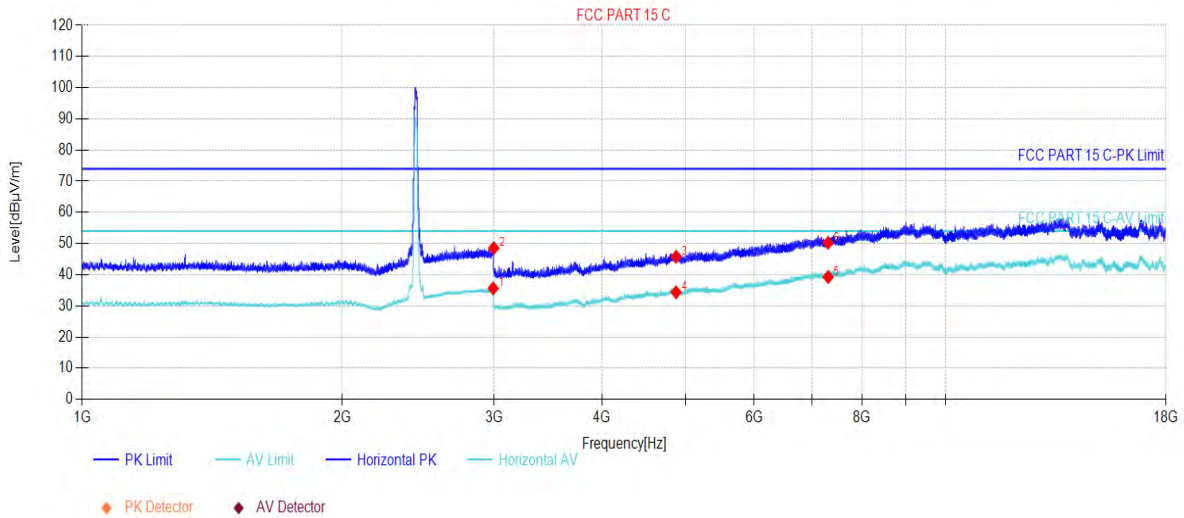
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4.9.2.9 802.11G_Channel 6 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2992.39	35.62	7.38	54.00	18.38	154	130	Horizontal
2	2997.19	48.55	7.40	74.00	25.45	168	340	Horizontal
3	4874.00	45.75	-10.40	74.00	28.25	178	118	Horizontal
4	4874.00	34.38	-10.40	54.00	19.62	195	63	Horizontal
5	7311.00	39.27	-2.58	54.00	14.73	145	336	Horizontal
6	7311.00	50.26	-2.58	74.00	23.74	132	347	Horizontal

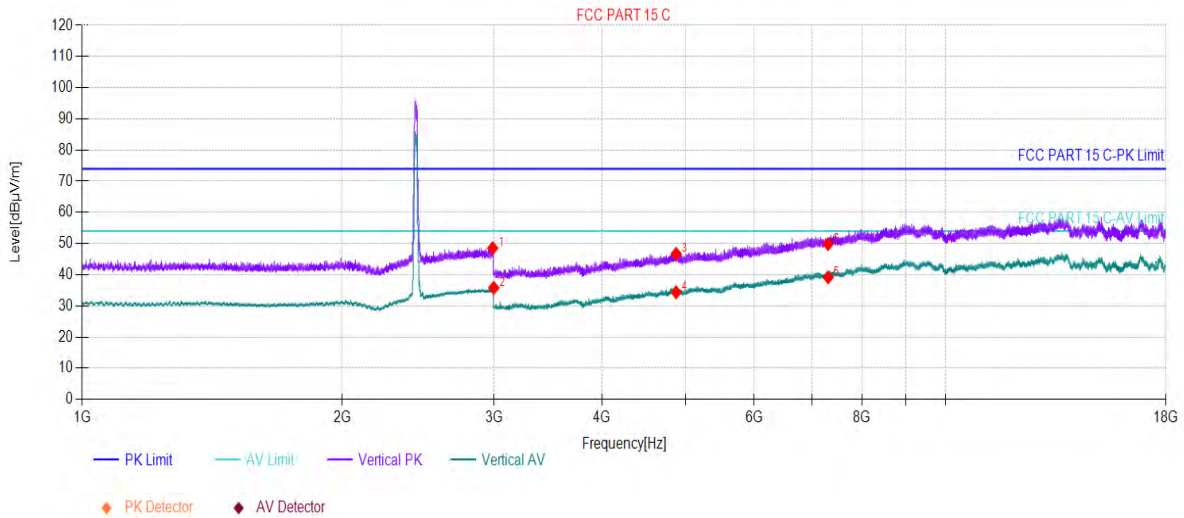
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4.9.2.10 802.11G_Channel 6 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2988.79	48.52	7.36	74.00	25.48	245	13	Vertical
2	2996.99	35.80	7.40	54.00	18.20	267	212	Vertical
3	4874.00	46.70	-10.40	74.00	27.30	213	119	Vertical
4	4874.00	34.37	-10.40	54.00	19.63	289	152	Vertical
5	7311.00	39.17	-2.58	54.00	14.83	209	271	Vertical
6	7311.00	49.84	-2.58	74.00	24.16	255	239	Vertical

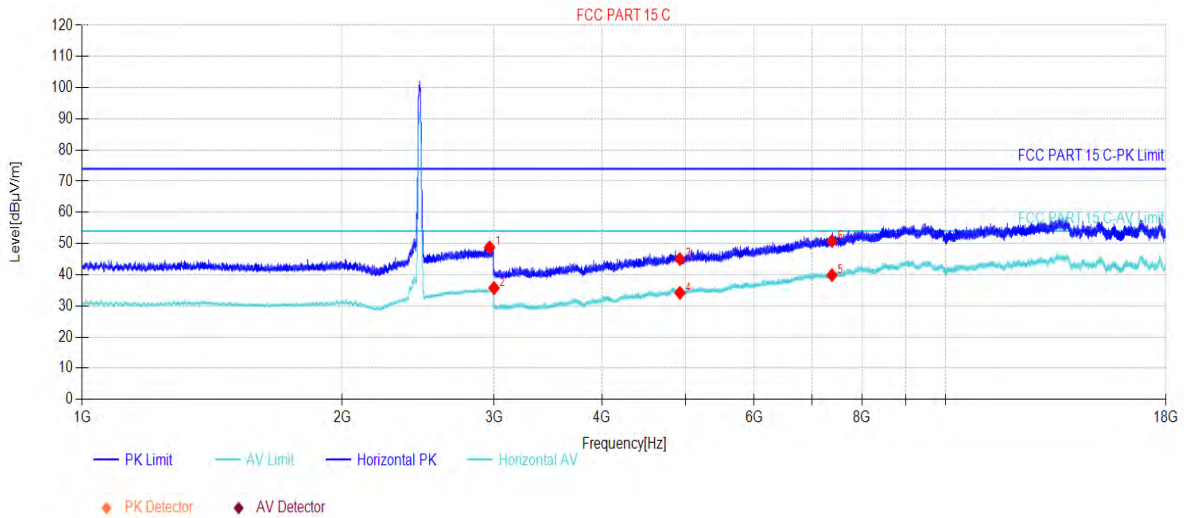
Final Data List



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4.9.2.11 802.11G_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2963.79	48.83	7.24	74.00	25.17	154	263	Horizontal
2	2999.60	35.74	7.41	54.00	18.26	210	269	Horizontal
3	4924.00	45.00	-10.22	74.00	29.00	128	0	Horizontal
4	4924.00	34.19	-10.22	54.00	19.81	189	39	Horizontal
5	7386.00	39.87	-2.06	54.00	14.13	175	314	Horizontal
6	7386.00	50.79	-2.06	74.00	23.21	168	72	Horizontal

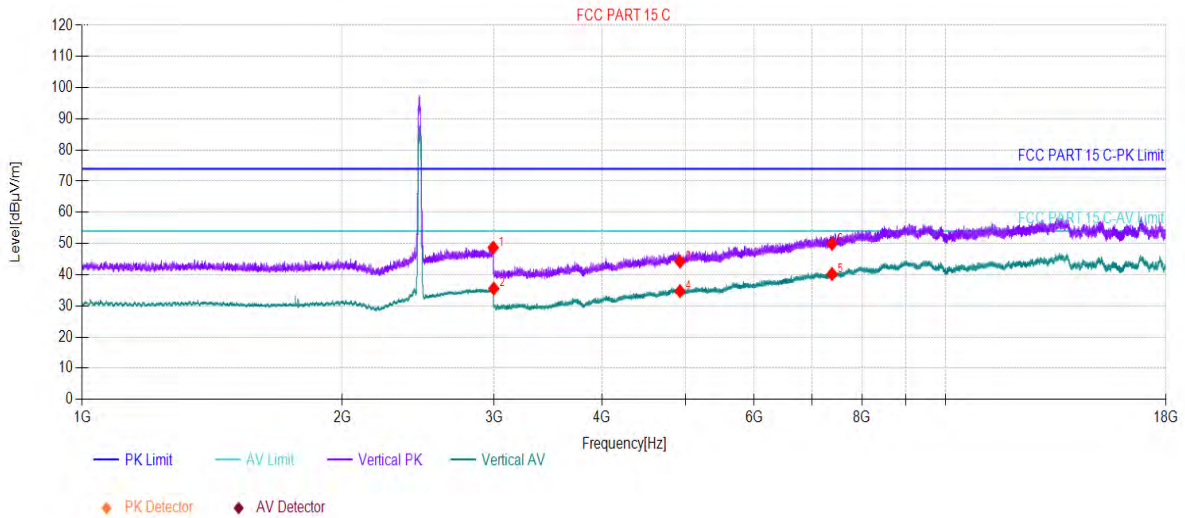
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4.9.2.12 802.11G_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2992.59	48.70	7.38	74.00	25.30	258	240	Vertical
2	2997.39	35.57	7.40	54.00	18.43	267	107	Vertical
3	4924.00	44.25	-10.22	74.00	29.75	244	303	Vertical
4	4924.00	34.73	-10.22	54.00	19.27	235	161	Vertical
5	7386.00	40.19	-2.06	54.00	13.81	278	0	Vertical
6	7386.00	49.89	-2.06	74.00	24.11	248	118	Vertical

Final Data List

(This section contains a large number of empty rows in the original document, which have been omitted for brevity.)

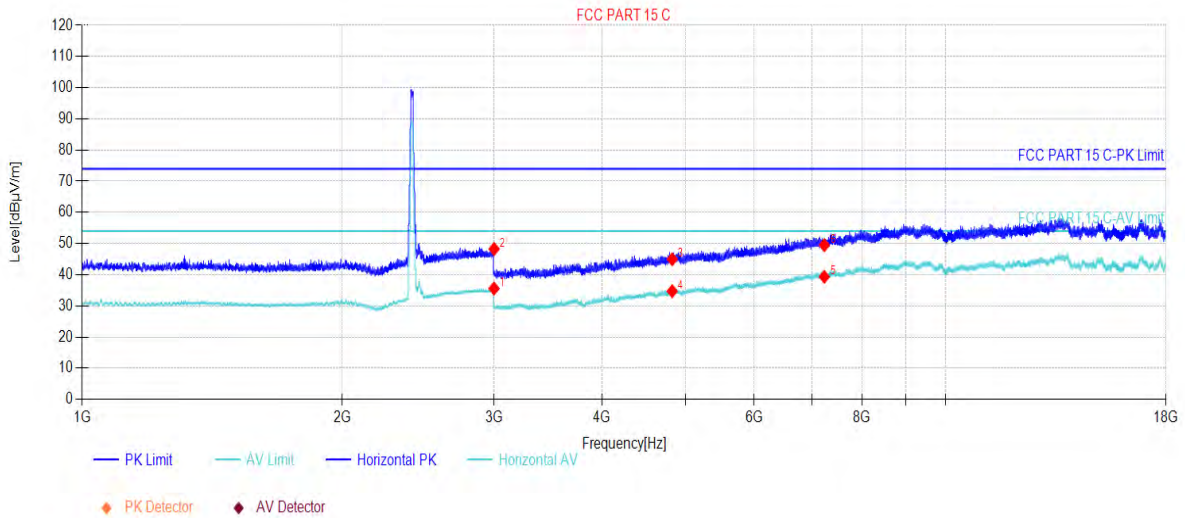


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4.9.2.13 802.11N20_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2998.79	35.59	7.40	54.00	18.41	178	80	Horizontal
2	3000.00	48.27	7.41	74.00	25.73	156	30	Horizontal
3	4824.00	44.98	-10.56	74.00	29.02	124	17	Horizontal
4	4824.00	34.71	-10.56	54.00	19.29	157	325	Horizontal
5	7236.00	39.33	-2.59	54.00	14.67	187	116	Horizontal
6	7236.00	49.50	-2.59	74.00	24.50	178	260	Horizontal

Final Data List

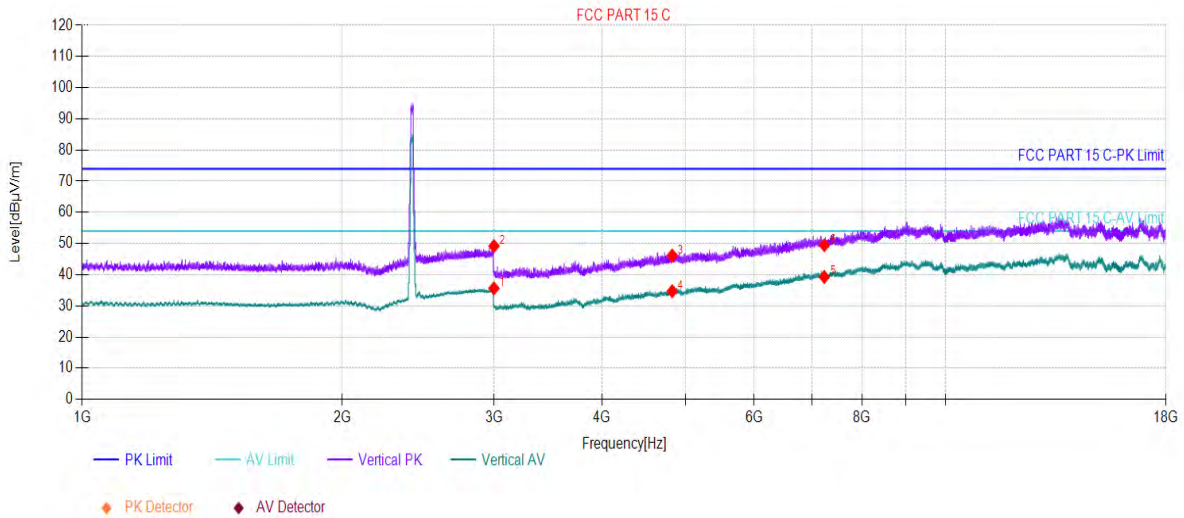


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4.9.2.14 802.11N20_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2998.79	35.61	7.40	54.00	18.39	278	80	Vertical
2	2999.60	49.20	7.41	74.00	24.80	254	331	Vertical
3	4824.00	46.16	-10.56	74.00	27.84	244	238	Vertical
4	4824.00	34.71	-10.56	54.00	19.29	235	205	Vertical
5	7236.00	39.30	-2.59	54.00	14.70	222	150	Vertical
6	7236.00	49.48	-2.59	74.00	24.52	277	238	Vertical

Final Data List

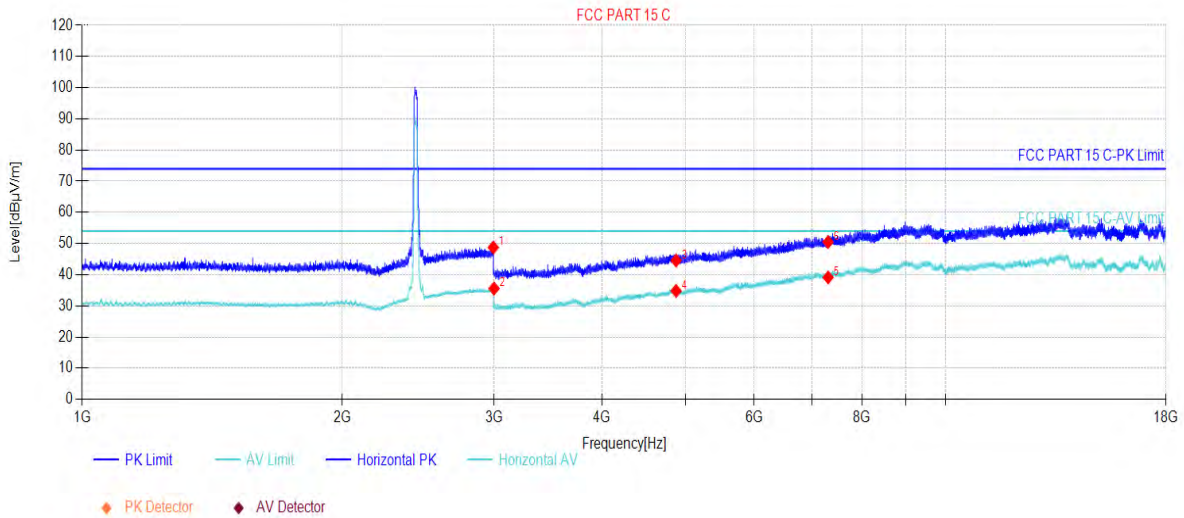


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4.9.2.15 802.11N20_Channel 6 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2993.39	48.75	7.38	74.00	25.25	154	238	Horizontal
2	2998.99	35.58	7.41	54.00	18.42	133	24	Horizontal
3	4874.00	44.57	-10.40	74.00	29.43	155	138	Horizontal
4	4874.00	34.81	-10.40	54.00	19.19	187	182	Horizontal
5	7311.00	39.14	-2.58	54.00	14.86	168	0	Horizontal
6	7311.00	50.52	-2.58	74.00	23.48	134	138	Horizontal

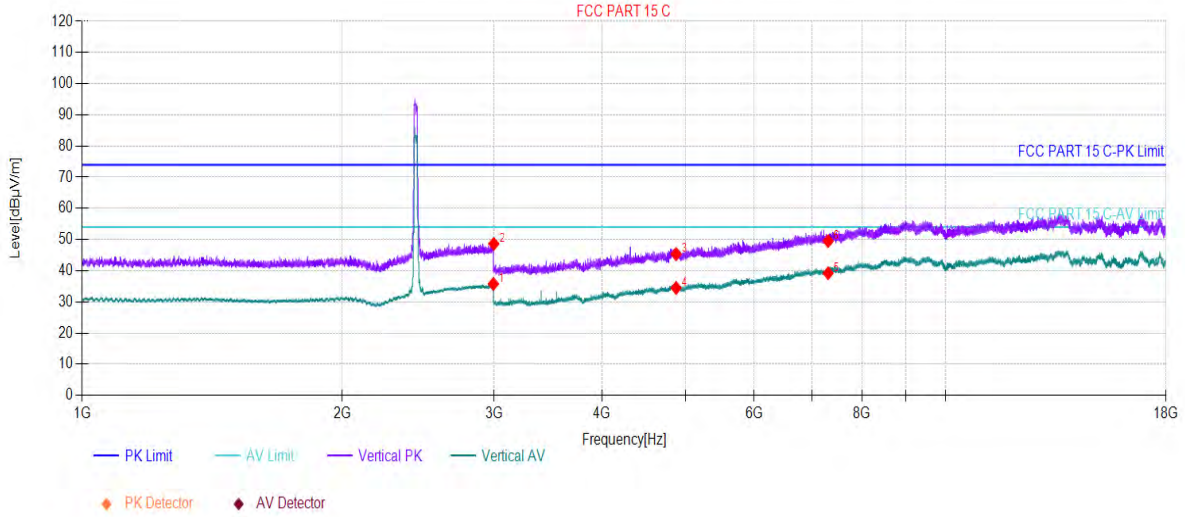
Final Data List



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4.9.2.16 802.11N20_Channel 6 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2993.79	35.75	7.38	54.00	18.25	258	351	Vertical
2	2997.19	48.66	7.40	74.00	25.34	264	284	Vertical
3	4874.00	45.33	-10.40	74.00	28.67	201	207	Vertical
4	4874.00	34.49	-10.40	54.00	19.51	224	234	Vertical
5	7311.00	39.22	-2.58	54.00	14.78	248	152	Vertical
6	7311.00	49.51	-2.58	74.00	24.49	278	185	Vertical

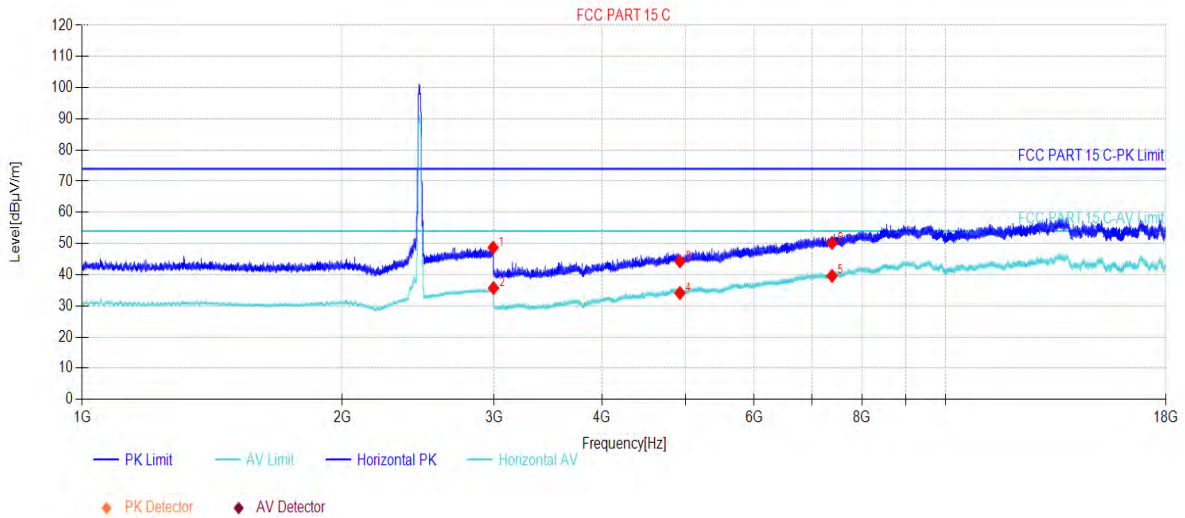
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4.9.2.17 802.11N20_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2991.59	48.72	7.37	74.00	25.28	184	75	Horizontal
2	2994.99	35.72	7.39	54.00	18.28	205	130	Horizontal
3	4924.00	44.28	-10.22	74.00	29.72	154	62	Horizontal
4	4924.00	34.13	-10.22	54.00	19.87	168	51	Horizontal
5	7386.00	39.63	-2.06	54.00	14.37	235	117	Horizontal
6	7386.00	50.18	-2.06	74.00	23.82	304	18	Horizontal

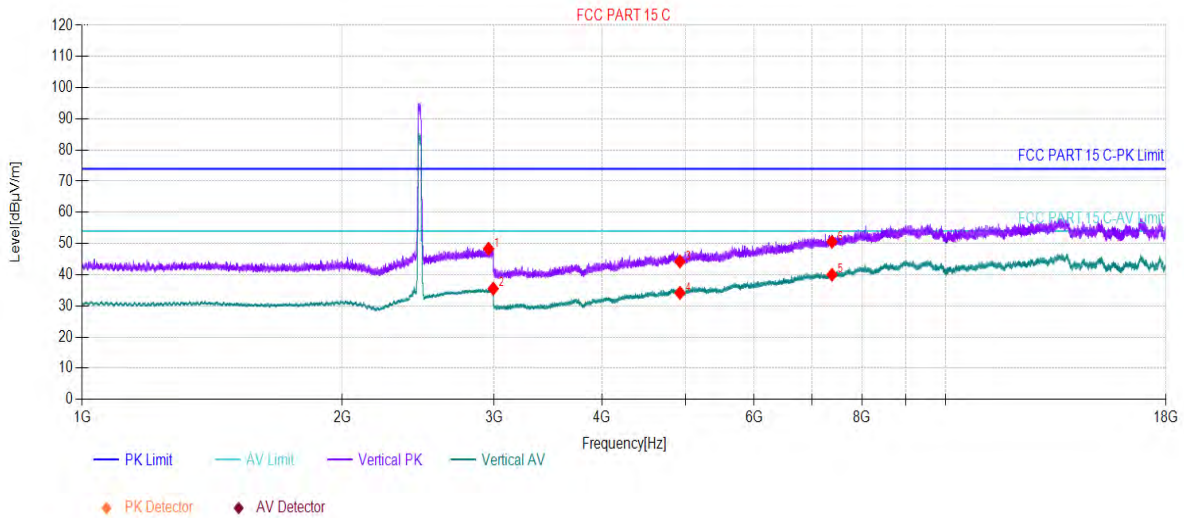
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4.9.2.18 802.11N20_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2956.19	48.34	7.21	74.00	25.66	245	256	Vertical
2	2992.79	35.53	7.38	54.00	18.47	248	360	Vertical
3	4924.00	44.25	-10.22	74.00	29.75	265	281	Vertical
4	4924.00	34.18	-10.22	54.00	19.82	287	150	Vertical
5	7386.00	39.98	-2.06	54.00	14.02	241	18	Vertical
6	7386.00	50.55	-2.06	74.00	23.45	213	73	Vertical

Final Data List

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
 Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 2) Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz and 18GHz to 25GHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.
- 4) All Modes have been tested, but only the worst case data displayed in this report.



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4.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205		
Test Method:	ANSI C63.10: 2013 Section 11.12		
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m)	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:			

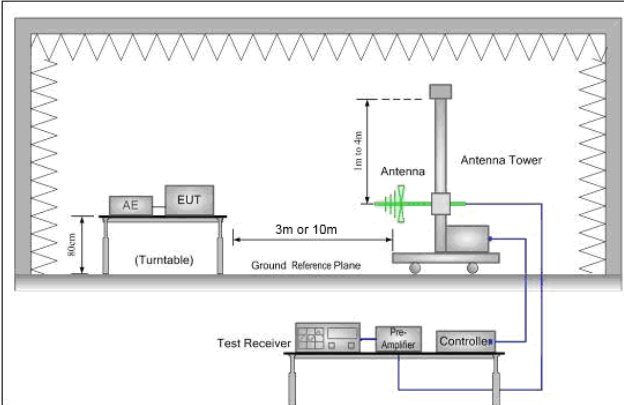


Figure 1. 30MHz to 1GHz

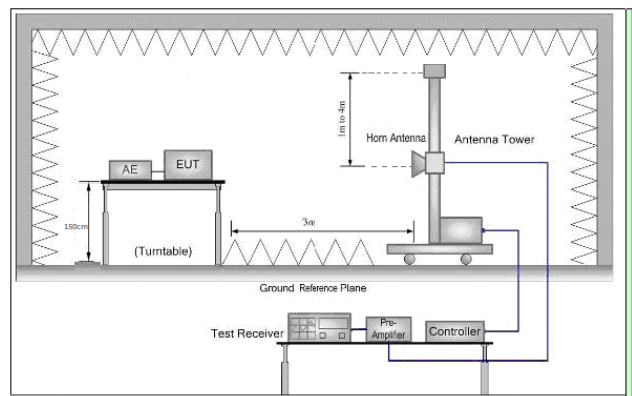


Figure 2. Above 1 GHz

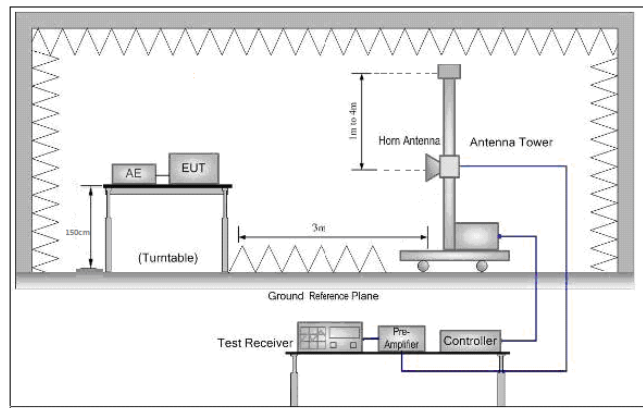


Figure 3. Above 1 GHz



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<p>Test Procedure:</p>	<ol style="list-style-type: none"> a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic 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.
<p>Exploratory Test Mode:</p>	<p>Transmitting with all kind of modulations, data rates. Charge + Transmitting mode.</p>
<p>Test Configuration:</p>	<p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"> • RBW = 120 kHz • VBW = 300 kHz • Detector = Peak • Trace mode = max hold <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"> • RBW = 1 MHz • VBW ≥ 3 MHz • Detector = Peak • Sweep time = auto • Trace mode = max hold <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"> • RBW = 1 MHz • VBW = 10 Hz, when duty cycle is no less than 98 percent. • VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.



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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; MCS0 of rate is the worst case of 802.11N(HT20); Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass
Remark:	The Emission Test is performed by the Lab B

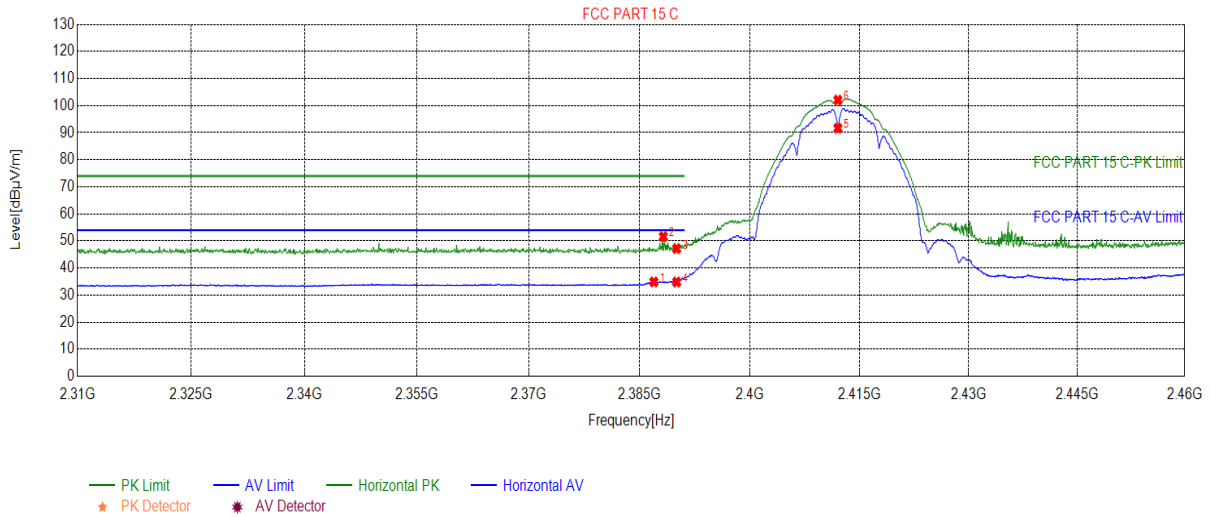


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4.10.1 Test Plots

4.10.1.1 802.11B_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2386.91	34.87	7.89	54.00	19.13	156	159	Horizontal
2	2388.18	51.59	7.93	74.00	22.41	175	166	Horizontal
3	2390.00	47.18	7.98	74.00	26.82	159	106	Horizontal
4	2390.00	34.83	7.98	54.00	19.17	179	166	Horizontal
5	2412.00	91.64	8.16	0.00	-91.64	156	170	Horizontal
6	2412.00	102.04	8.16	0.00	-102.04	203	170	Horizontal

Final Data List

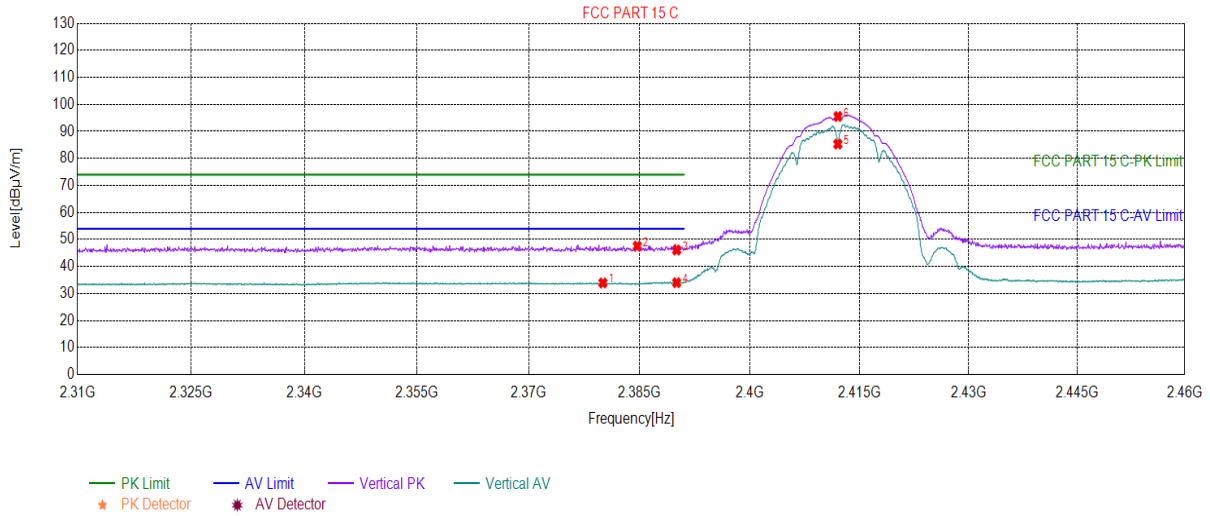


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4.10.1.2 802.11B_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2380.01	33.91	8.00	54.00	20.09	243	161	Vertical
2	2384.66	47.56	7.84	74.00	26.44	214	82	Vertical
3	2390.00	46.09	7.98	74.00	27.91	276	225	Vertical
4	2390.00	34.01	7.98	54.00	19.99	216	187	Vertical
5	2412.00	85.31	8.16	0.00	-85.31	246	74	Vertical
6	2412.00	95.52	8.16	0.00	-95.52	276	74	Vertical

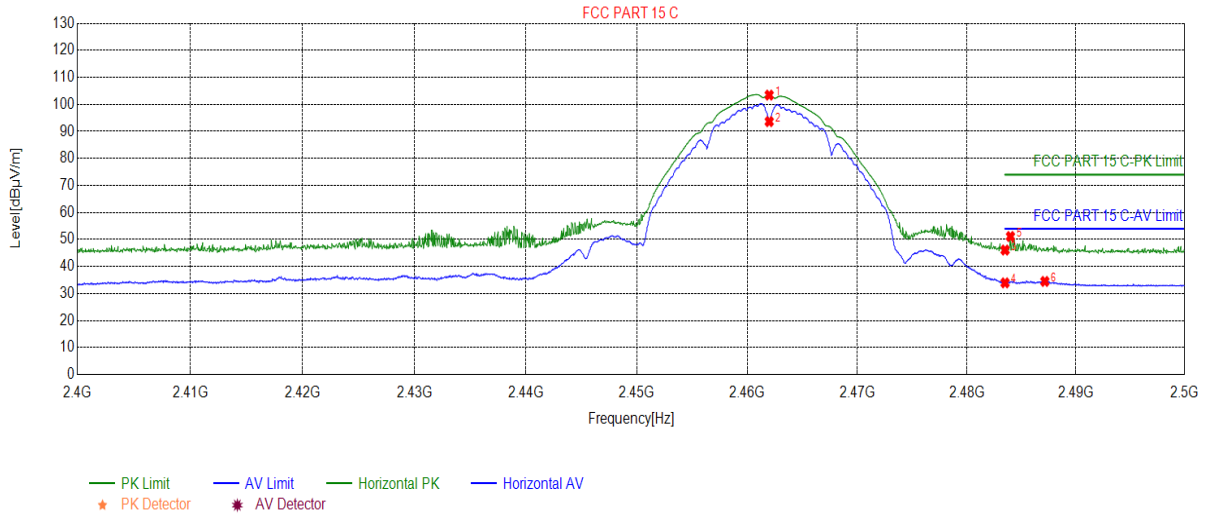
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4.10.1.3 802.11B_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	103.43	8.75	0.00	-103.43	156	171	Horizontal
2	2462.00	93.63	8.75	0.00	-93.63	153	171	Horizontal
3	2483.50	46.08	8.50	74.00	27.92	175	90	Horizontal
4	2483.50	33.94	8.50	54.00	20.06	154	171	Horizontal
5	2483.99	51.11	8.50	74.00	22.89	169	168	Horizontal
6	2487.14	34.48	8.55	54.00	19.52	201	273	Horizontal

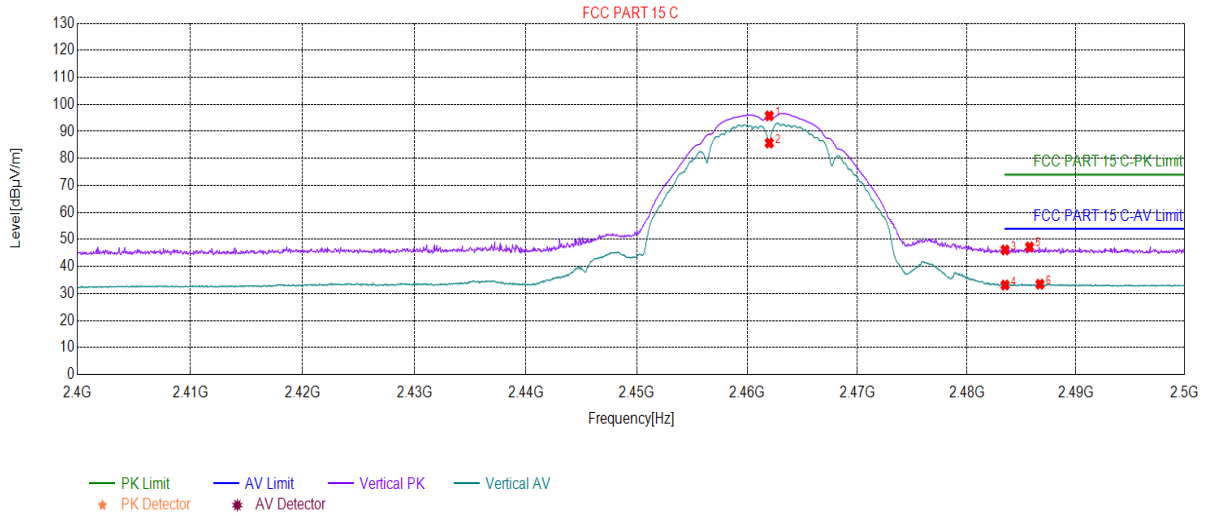
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4.10.1.4 802.11B_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	95.75	8.75	0.00	-95.75	203	270	Vertical
2	2462.00	85.69	8.75	0.00	-85.69	243	266	Vertical
3	2483.50	46.12	8.50	74.00	27.88	216	158	Vertical
4	2483.50	33.12	8.50	54.00	20.88	302	297	Vertical
5	2485.74	47.22	8.51	74.00	26.78	245	158	Vertical
6	2486.69	33.44	8.53	54.00	20.56	276	266	Vertical

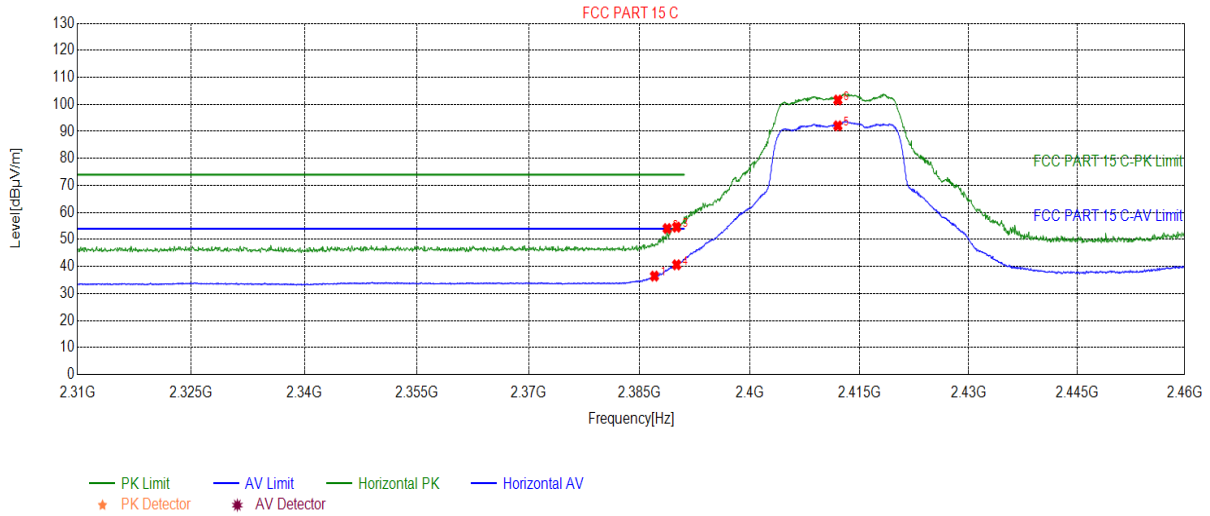
Final Data List



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4.10.1.5 802.11G_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2386.98	36.45	7.89	54.00	17.55	146	168	Horizontal
2	2388.71	54.05	7.94	74.00	19.95	189	164	Horizontal
3	2390.00	54.57	7.98	74.00	19.43	176	171	Horizontal
4	2390.00	40.64	7.98	54.00	13.36	201	168	Horizontal
5	2412.00	92.07	8.16	0.00	-92.07	146	168	Horizontal
6	2412.00	101.61	8.16	0.00	-101.61	156	171	Horizontal

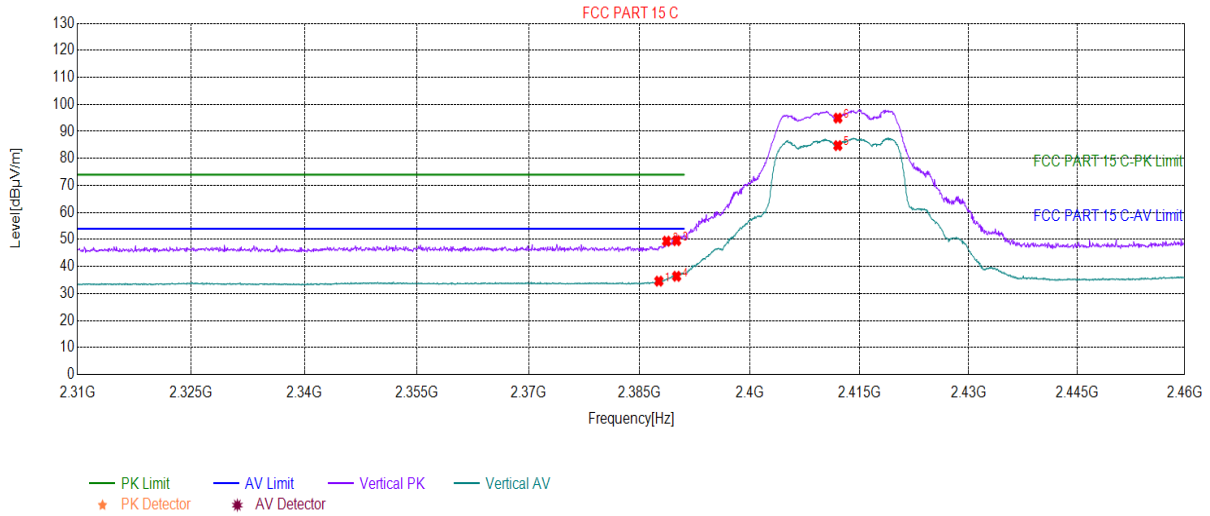
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4.10.1.6 802.11G_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2387.58	34.58	7.91	54.00	19.42	226	346	Vertical
2	2388.63	49.37	7.94	74.00	24.63	246	190	Vertical
3	2390.00	49.57	7.98	74.00	24.43	279	186	Vertical
4	2390.00	36.37	7.98	54.00	17.63	302	210	Vertical
5	2412.00	84.76	8.16	0.00	-84.76	256	73	Vertical
6	2412.00	94.93	8.16	0.00	-94.93	276	73	Vertical

Final Data List

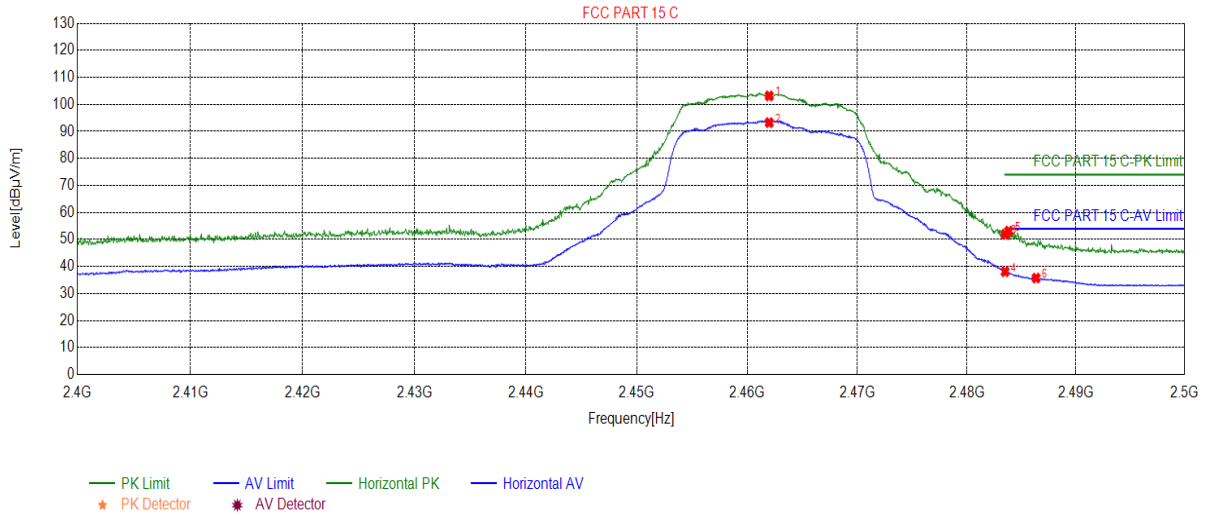


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4.10.1.7 802.11G_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	103.13	8.75	0.00	-103.13	186	168	Horizontal
2	2462.00	93.25	8.75	0.00	-93.25	156	168	Horizontal
3	2483.50	51.94	8.50	74.00	22.06	143	214	Horizontal
4	2483.50	38.09	8.50	54.00	15.91	203	157	Horizontal
5	2483.84	53.10	8.50	74.00	20.90	186	222	Horizontal
6	2486.34	35.72	8.52	54.00	18.28	176	172	Horizontal

Final Data List

(This section is intentionally blank in the provided image)



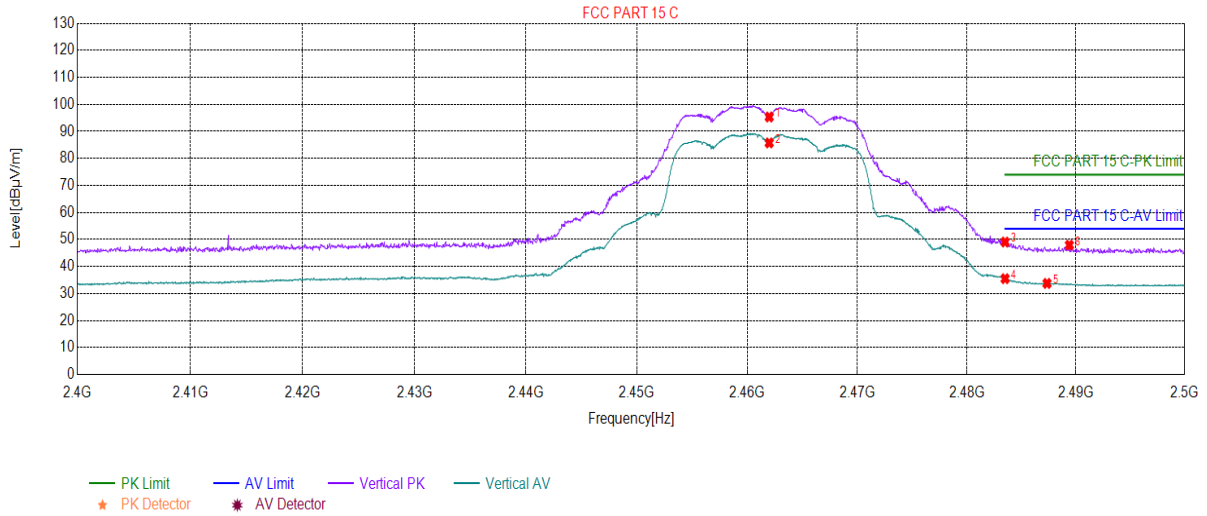
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 中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

4.10.1.8 802.11G_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	95.34	8.75	0.00	-95.34	201	272	Vertical
2	2462.00	85.75	8.75	0.00	-85.75	246	272	Vertical
3	2483.50	49.05	8.50	74.00	24.95	243	268	Vertical
4	2483.50	35.50	8.50	54.00	18.50	213	302	Vertical
5	2487.34	33.75	8.55	54.00	20.25	304	310	Vertical
6	2489.39	47.91	8.61	74.00	26.09	276	310	Vertical

Final Data List

(This section is intentionally left blank in the provided image.)

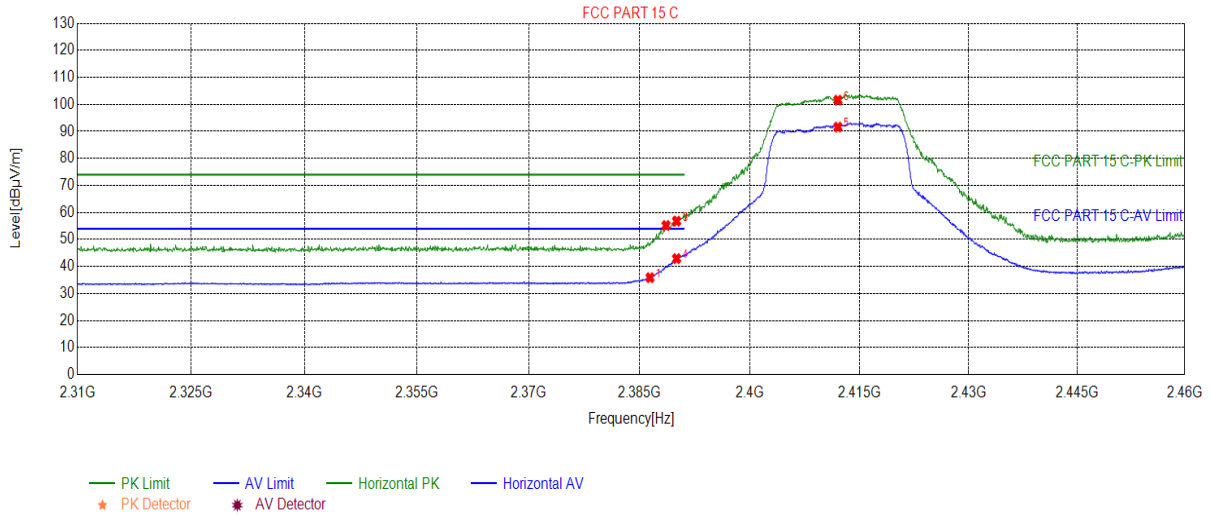


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4.10.1.9 802.11N20_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2386.38	35.88	7.87	54.00	18.12	146	164	Horizontal
2	2388.56	55.17	7.94	74.00	18.83	179	160	Horizontal
3	2390.00	56.78	7.98	74.00	17.22	156	164	Horizontal
4	2390.00	42.92	7.98	54.00	11.08	146	164	Horizontal
5	2412.00	91.60	8.16	0.00	-91.60	205	164	Horizontal
6	2412.00	101.56	8.16	0.00	-101.56	148	171	Horizontal

Final Data List

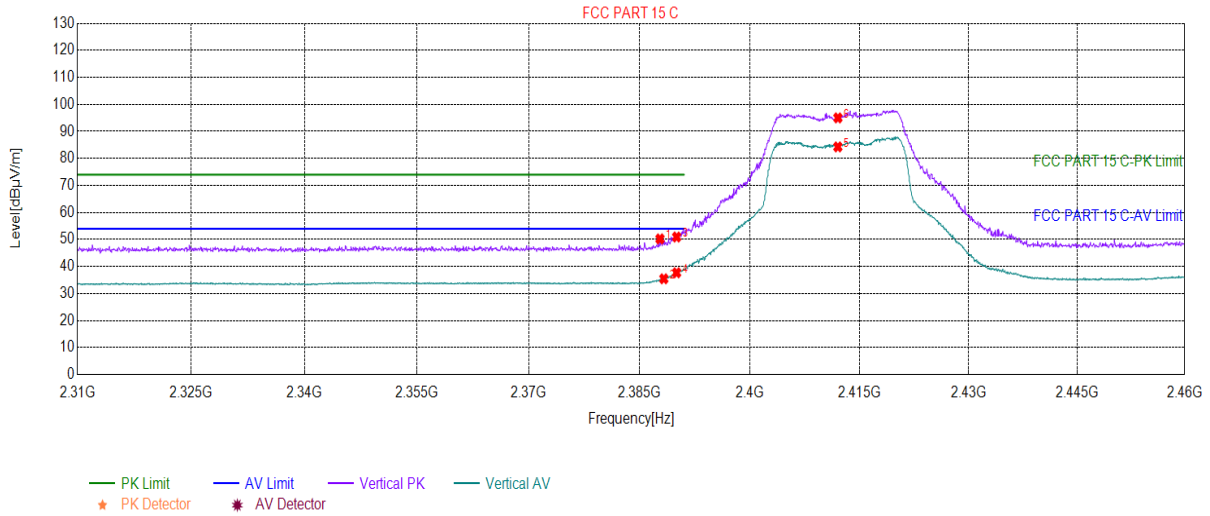


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4.10.1.10 802.11N20_Channel 1 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2387.73	50.22	7.91	74.00	23.78	254	14	Vertical
2	2388.26	35.45	7.93	54.00	18.55	263	214	Vertical
3	2390.00	50.92	7.98	74.00	23.08	246	354	Vertical
4	2390.00	37.69	7.98	54.00	16.31	176	354	Vertical
5	2412.00	84.27	8.16	0.00	-84.27	246	77	Vertical
6	2412.00	95.01	8.16	0.00	-95.01	155	77	Vertical

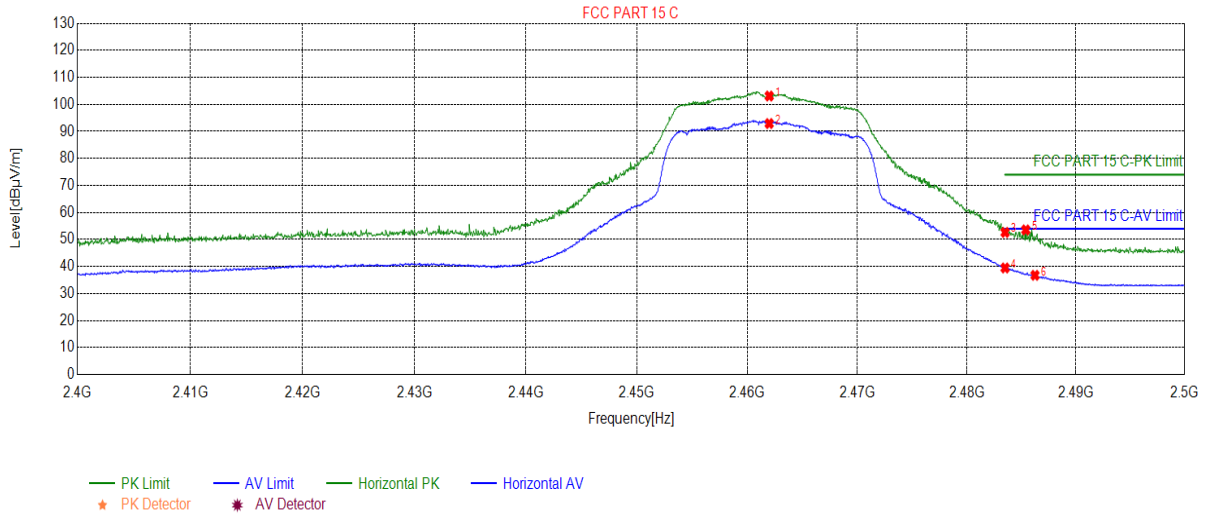
Final Data List



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4.10.1.11 802.11N20_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	103.09	8.75	0.00	-103.09	156	168	Horizontal
2	2462.00	92.92	8.75	0.00	-92.92	146	168	Horizontal
3	2483.50	52.62	8.50	74.00	21.38	176	293	Horizontal
4	2483.50	39.47	8.50	54.00	14.53	186	232	Horizontal
5	2485.39	53.54	8.50	74.00	20.46	205	232	Horizontal
6	2486.24	36.74	8.52	54.00	17.26	146	232	Horizontal

Final Data List

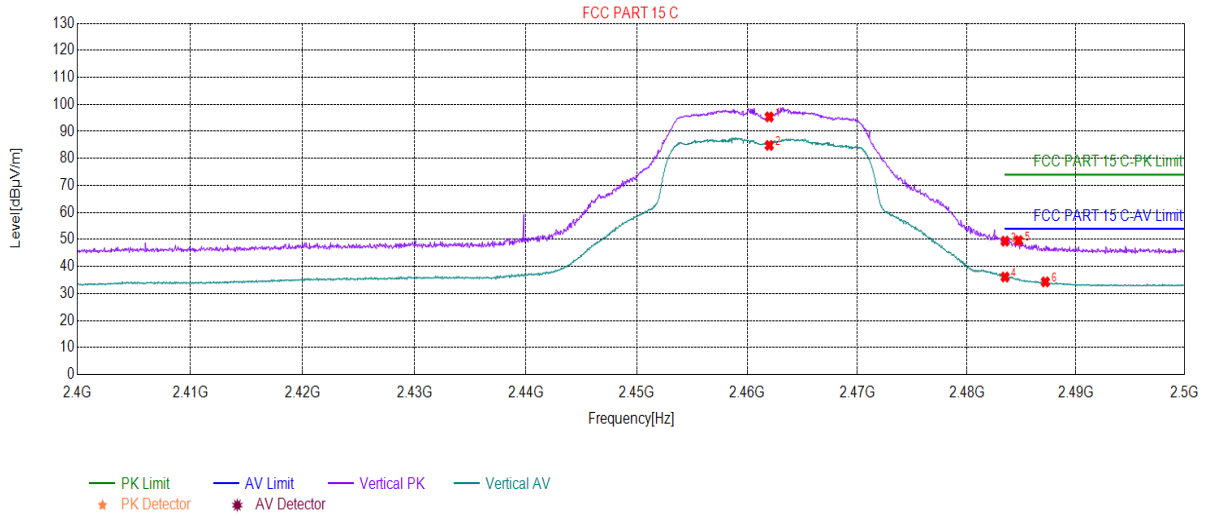


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4.10.1.12 802.11N20_Channel 11 MIMO

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	95.37	8.75	0.00	-95.37	246	272	Vertical
2	2462.00	84.83	8.75	0.00	-84.83	263	272	Vertical
3	2483.50	49.37	8.50	74.00	24.63	241	234	Vertical
4	2483.50	36.11	8.50	54.00	17.89	265	272	Vertical
5	2484.74	49.60	8.49	74.00	24.40	231	303	Vertical
6	2487.19	34.30	8.55	54.00	19.70	302	188	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:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

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



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

Lab A:

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.75dB
2	RF power density, conducted	±2.84dB
3	Spurious emissions, conducted	±0.75dB
4	Temperature test	±1°C
5	Humidity test	±3%
6	DC and low frequency voltages	±0.5%

Lab B:

No.	Item	Measurement Uncertainty
1	Radiated Spurious emission test	±4.8dB (30MHz-1GHz)
		±5.2dB (1GHz-6GHz)
		±5.5dB (6GHz-18GHz)
		±5.02dB (18GHz-40GHz)
2	Conduct emission test	±3.4 dB (9KHz- 30MHz)



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6 Equipment List

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
DC Power Supply	Agilent Technologies Inc	66311B	W009-09	2020/7/15	2021/7/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2021/1/3	2022/1/2
				2020/1/4	2021/1/3
Coaxial Cable	SGS	N/A	SEM031-01	2020/6/12	2021/6/11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2020/7/14	2021/7/14
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2020/10/27	2021/10/27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2020/7/14	2021/7/14



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RSE&RE&CE Test System					
Equipment	Manufacturer	Model No.	Cal Date	Cal Due Date	Inventory No.
Semi-Anechoic Chamber	Brilliant-emc	966	NCR	NCR	XAW03-35-01
MXA signal analyzer	Keysight	N9020A	2020-04-02	2021-04-02	XAW01-06-01
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	2020-04-02	2021-04-02	XAW01-03-02
Test receiver	ROHDE&SCHWARZ	ESR	2020-09-11	2021-09-10	XAW01-08-01
Receiving antenna	Rosenberger	VULB 9163	2019-10-13	2021-10-12	XAW01-09-01
Receiving antenna	Rosenberger	BBHA 9120D	2019-10-13	2021-10-12	XAW01-09-02
Receiving antenna	Rosenberger	BBHA 9170	2019-10-13	2021-10-12	XAW01-09-03
Directional antenna rack controller	Max-Full	MF-7802BS	NCR	NCR	XAW03-03-01
High-speed antenna rack controller	Max-Full	MF-7802	NCR	NCR	XAW03-04-01
Filter bank	Tonscend	JS0806-F	NCR	NCR	XAW03-05-01
Filter bank	Tonscend	JS0806s	NCR	NCR	XAW03-05-02
Amplifier	Tonscend	TAP00903040	2020-10-26	2021-10-25	XAW01-41-01
Amplifier	Tonscend	TAP01018048	2020-10-26	2021-10-25	XAW01-41-02
Amplifier	Tonscend	TAP18040048	2020-10-26	2021-10-25	XAW01-41-03
Amplifier	Shanghai Steed	YX28980930	2020-10-26	2021-10-25	XAW01-41-06
Artificial network	ROHDE&SCHWARZ	ENV216	2020-08-04	2021-08-03	XAW01-19-02
Temperature and humidity meter	MingGao	TH101B	2020-06-11	2021-05-11	XAW01-01-01
Measurement Software	Tonscend	TS+ RSE&RE	NCR	NCR	XAW02-05-01
Measurement Software	Tonscend	TS+ CE	NCR	NCR	XAW02-05-02



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7 Photographs - EUT Constructional Details

Refer to Appendix A PCE Setup Photos.



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Appendix



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DTS Bandwidth

Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	8.580	2407.950	2416.530	0.5	PASS
	Ant2	2412	8.580	2407.950	2416.530	0.5	PASS
	Ant1	2437	8.610	2432.920	2441.530	0.5	PASS
	Ant2	2437	9.090	2432.440	2441.530	0.5	PASS
	Ant1	2462	8.580	2457.440	2466.020	0.5	PASS
	Ant2	2462	9.090	2457.440	2466.530	0.5	PASS
11G	Ant1	2412	15.180	2404.410	2419.590	0.5	PASS
	Ant2	2412	15.390	2404.410	2419.800	0.5	PASS
	Ant1	2437	15.480	2429.410	2444.890	0.5	PASS
	Ant2	2437	15.720	2429.080	2444.800	0.5	PASS
	Ant1	2462	15.510	2454.050	2469.560	0.5	PASS
	Ant2	2462	15.750	2453.810	2469.560	0.5	PASS
11N20SISO	Ant1	2412	15.150	2404.440	2419.590	0.5	PASS
	Ant2	2412	15.990	2404.380	2420.370	0.5	PASS
	Ant1	2437	15.780	2429.380	2445.160	0.5	PASS
	Ant2	2437	15.180	2429.380	2444.560	0.5	PASS
	Ant1	2462	15.990	2453.570	2469.560	0.5	PASS
	Ant2	2462	15.720	2453.840	2469.560	0.5	PASS
11B-CDD	Ant1	2412	8.580	2407.950	2416.530	0.5	PASS
	Ant2	2412	9.120	2407.410	2416.530	0.5	PASS
	Ant1	2437	8.580	2432.950	2441.530	0.5	PASS
	Ant2	2437	8.640	2432.410	2441.050	0.5	PASS
	Ant1	2462	8.610	2457.440	2466.050	0.5	PASS
	Ant2	2462	8.610	2457.440	2466.050	0.5	PASS
11G-CDD	Ant1	2412	15.120	2404.470	2419.590	0.5	PASS



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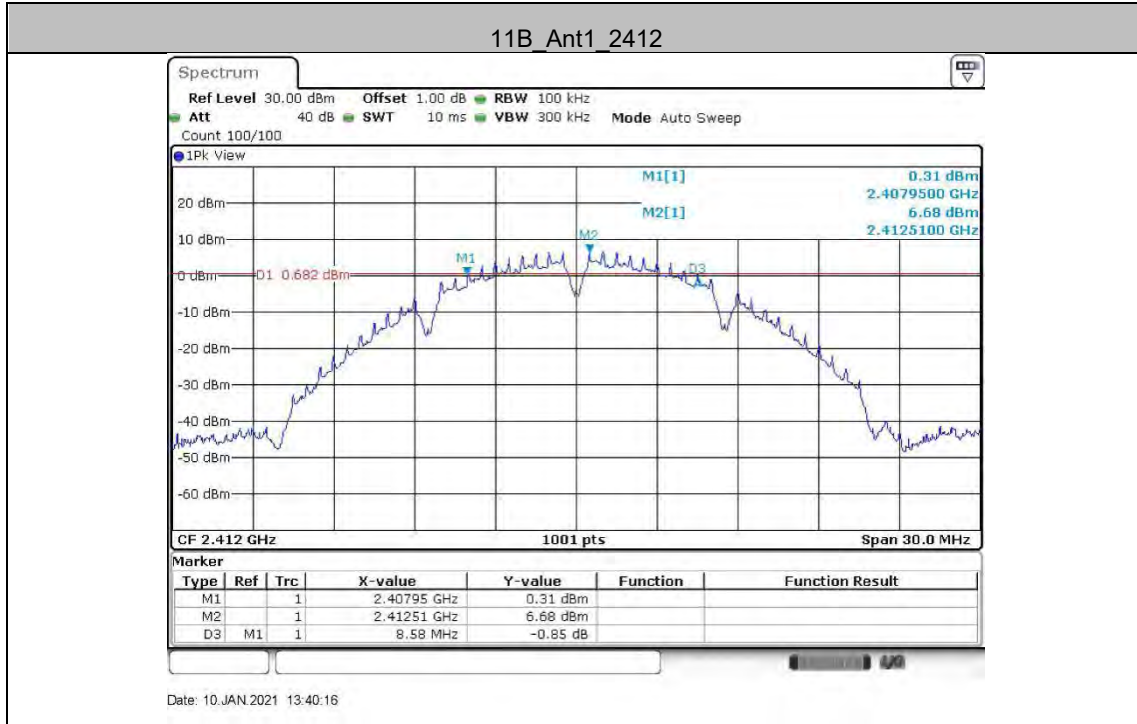
	Ant2	2412	15.990	2403.810	2419.800	0.5	PASS
	Ant1	2437	15.480	2429.410	2444.890	0.5	PASS
	Ant2	2437	15.780	2428.810	2444.590	0.5	PASS
	Ant1	2462	15.780	2453.810	2469.590	0.5	PASS
	Ant2	2462	15.780	2453.810	2469.590	0.5	PASS
11N20MIMO	Ant1	2412	15.150	2404.410	2419.560	0.5	PASS
	Ant2	2412	15.990	2404.170	2420.160	0.5	PASS
	Ant1	2437	16.020	2429.380	2445.400	0.5	PASS
	Ant2	2437	15.750	2428.810	2444.560	0.5	PASS
	Ant1	2462	16.350	2453.210	2469.560	0.5	PASS
	Ant2	2462	15.750	2453.810	2469.560	0.5	PASS



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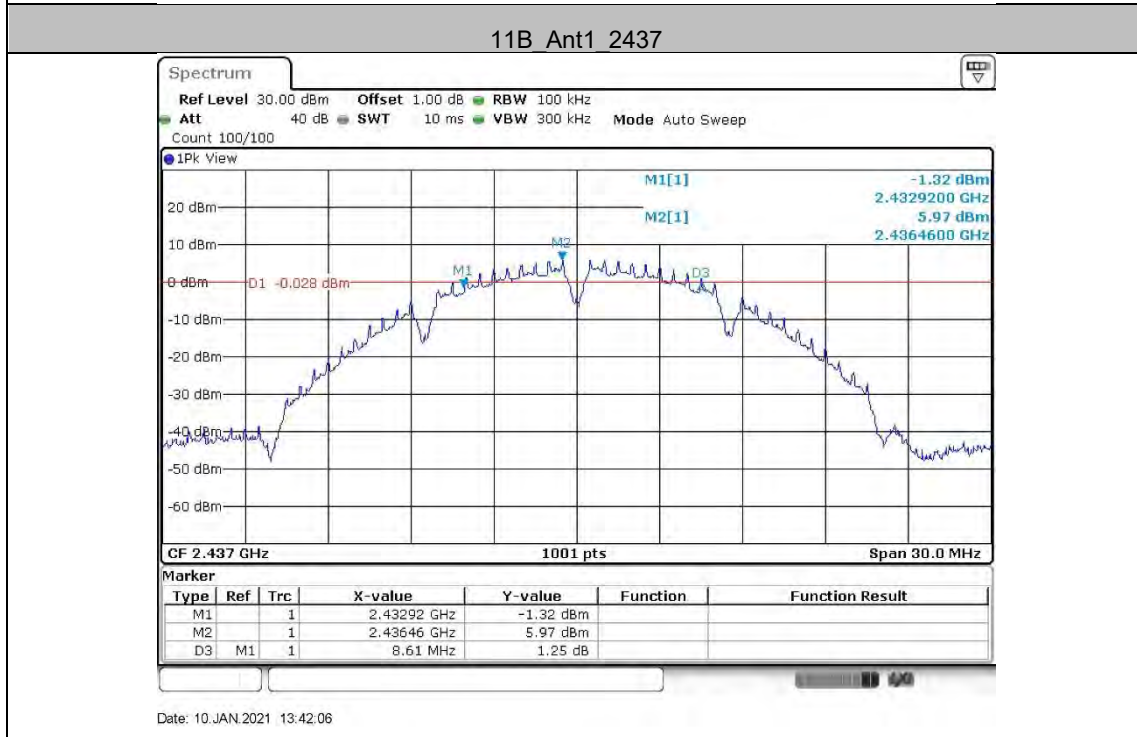
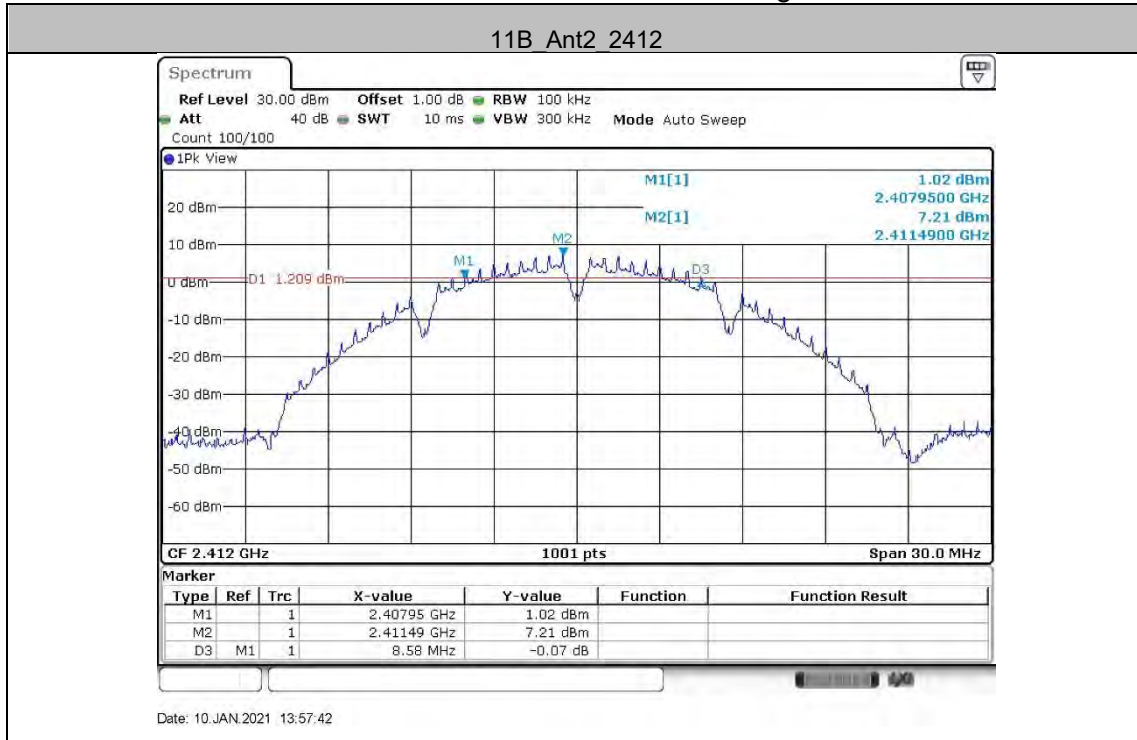
Test Graphs



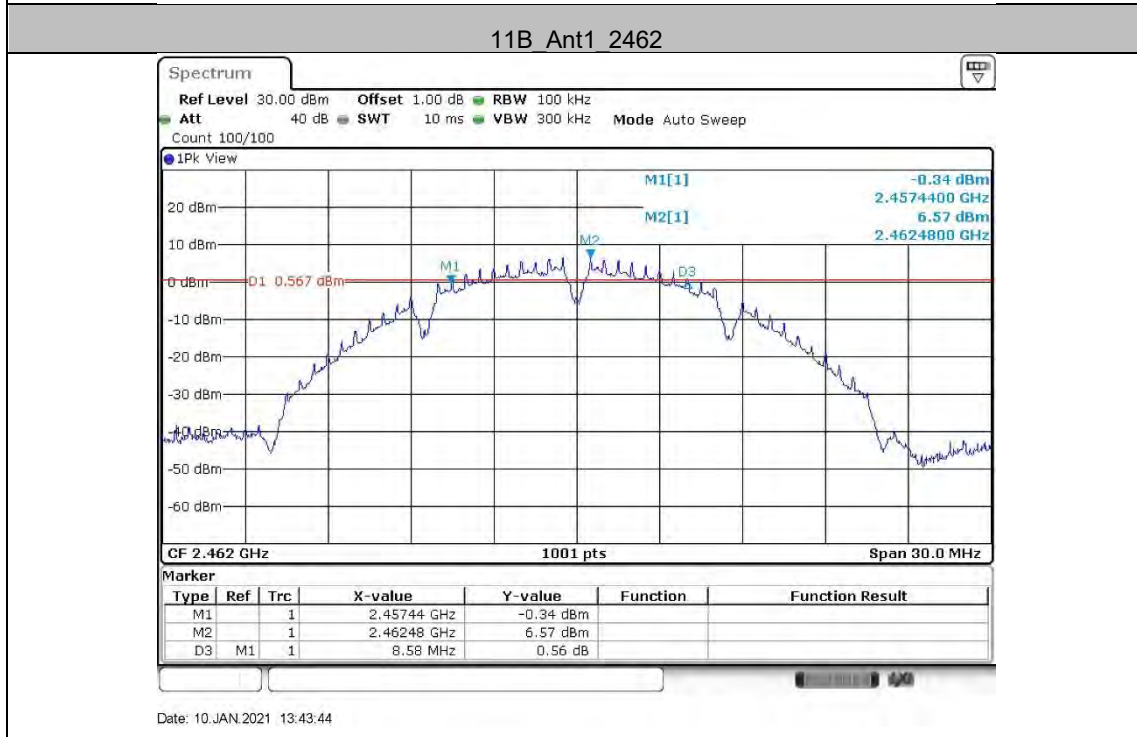
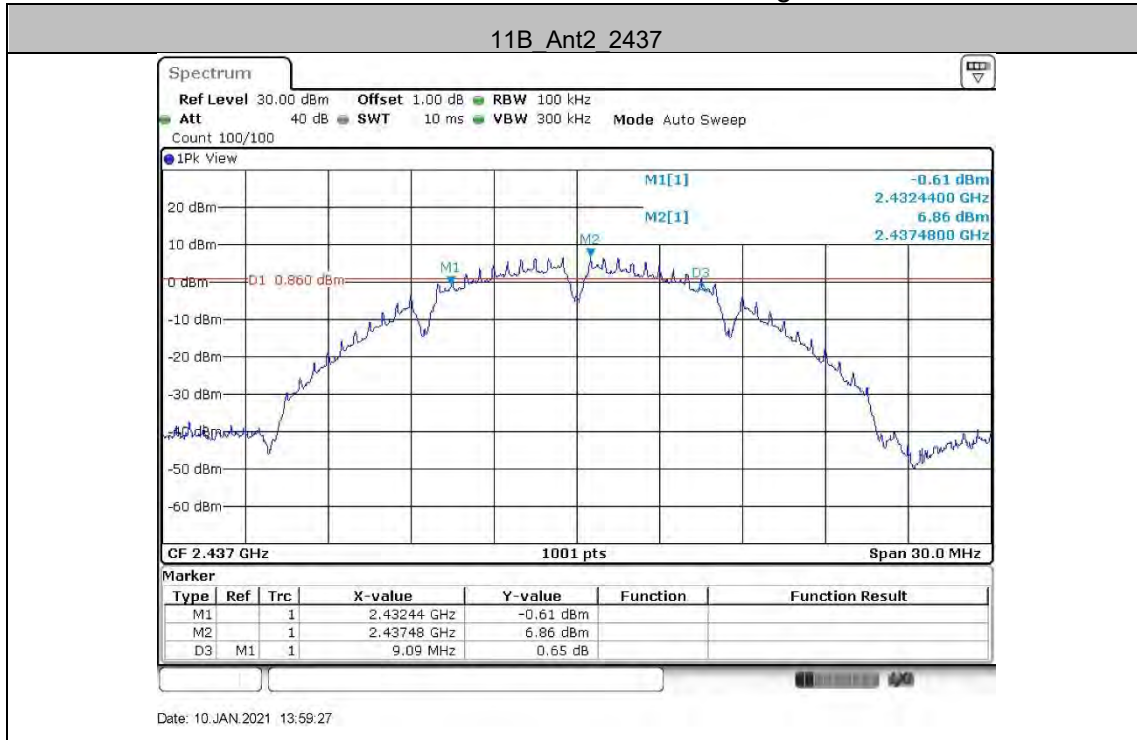
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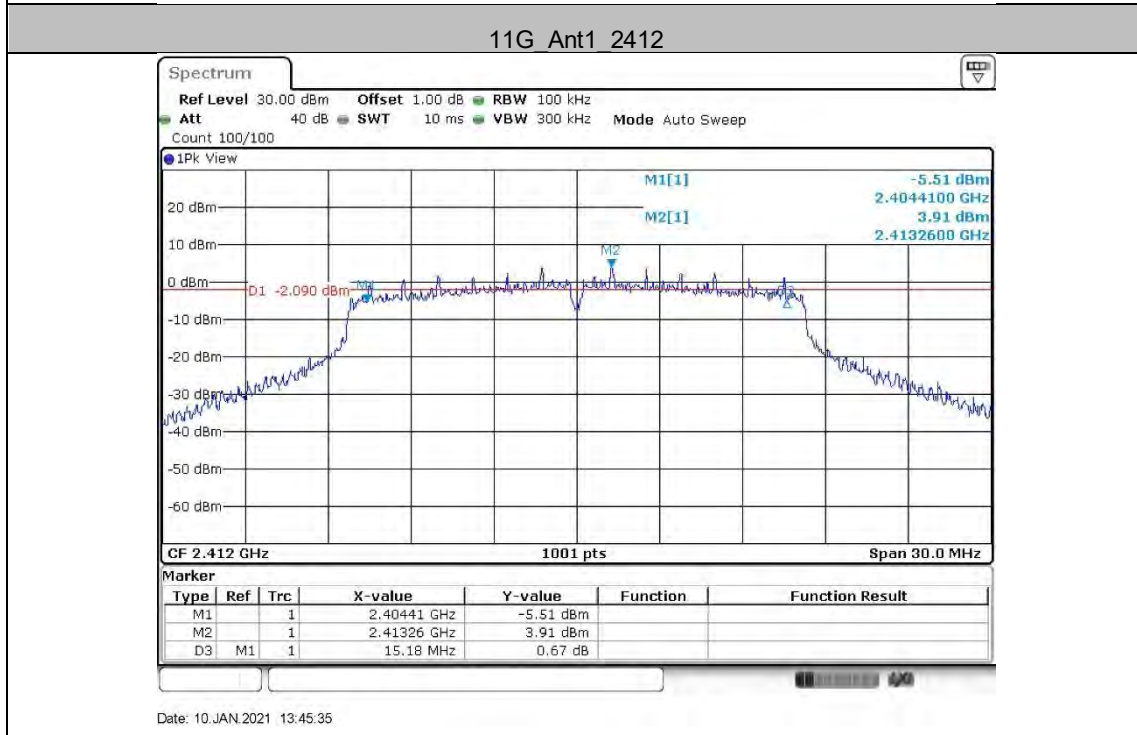
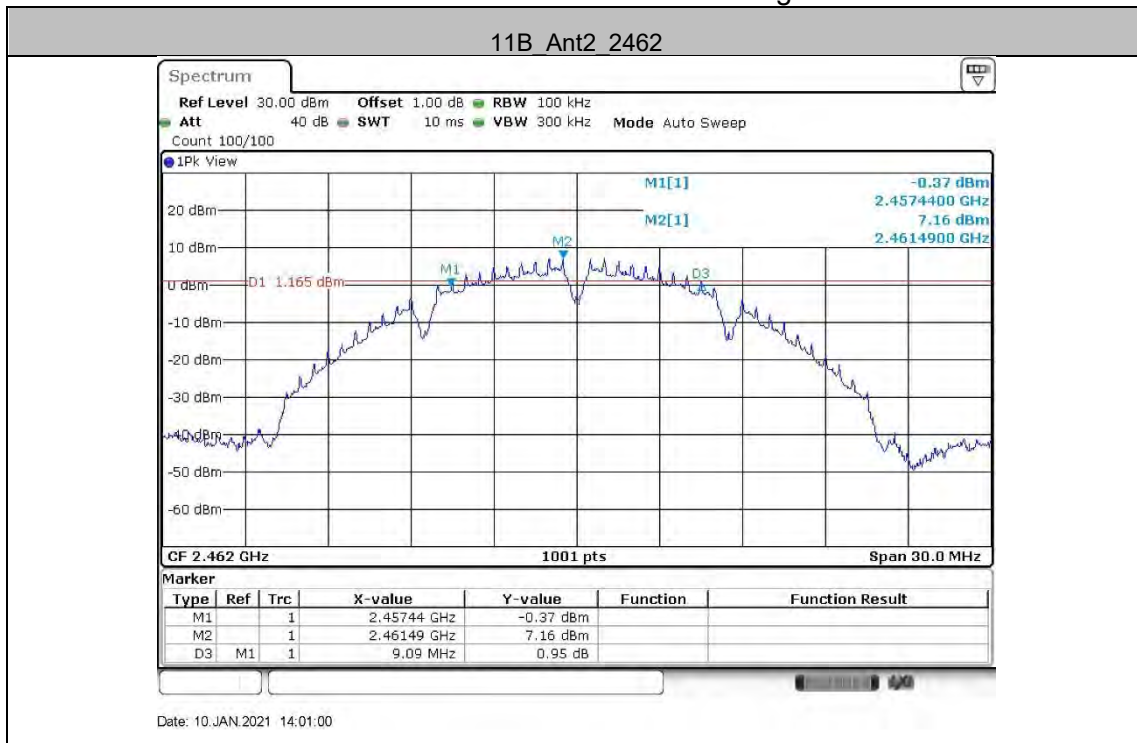
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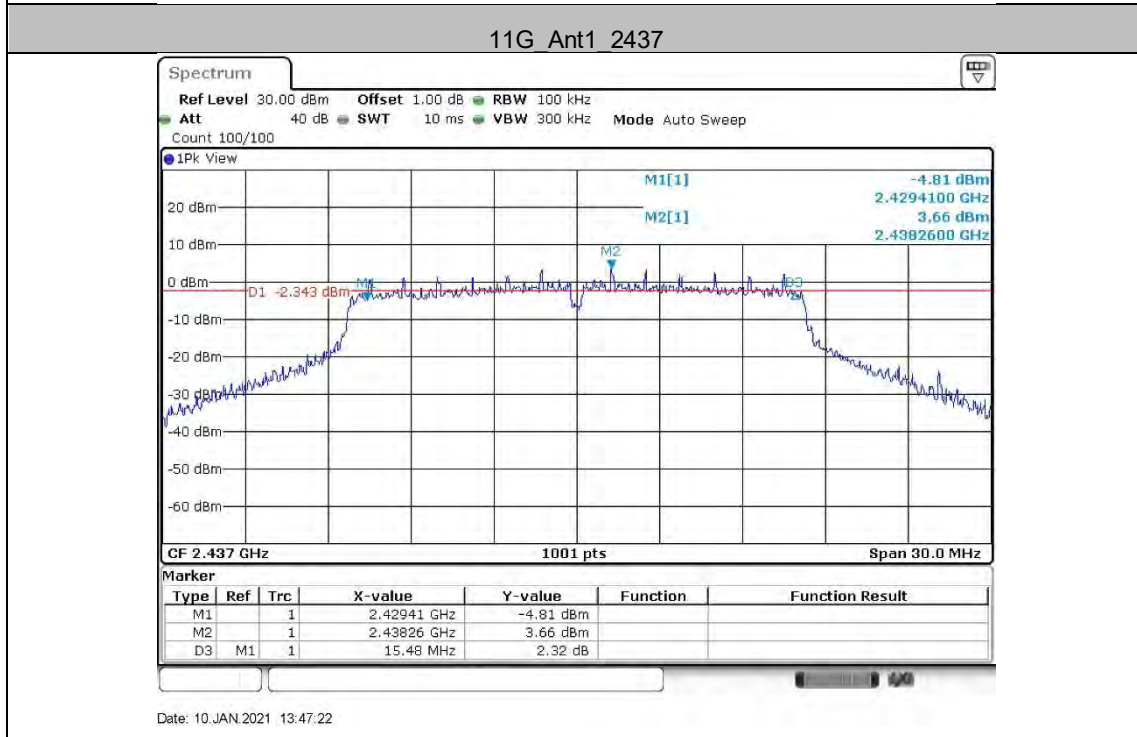
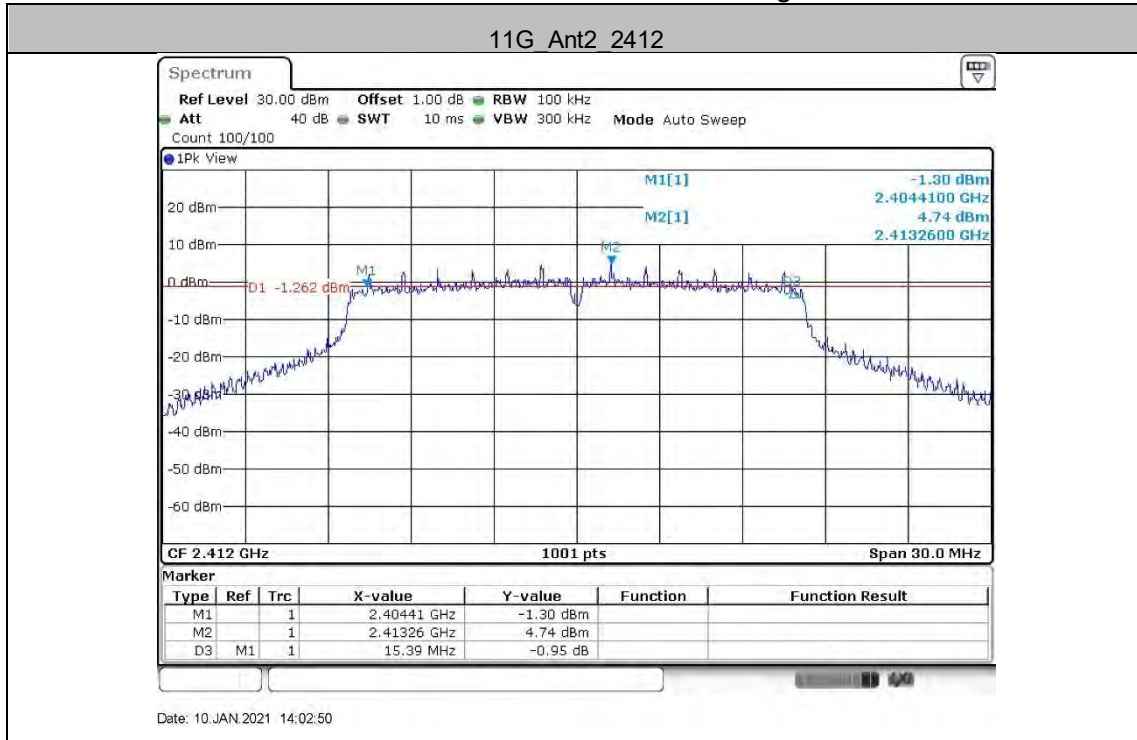


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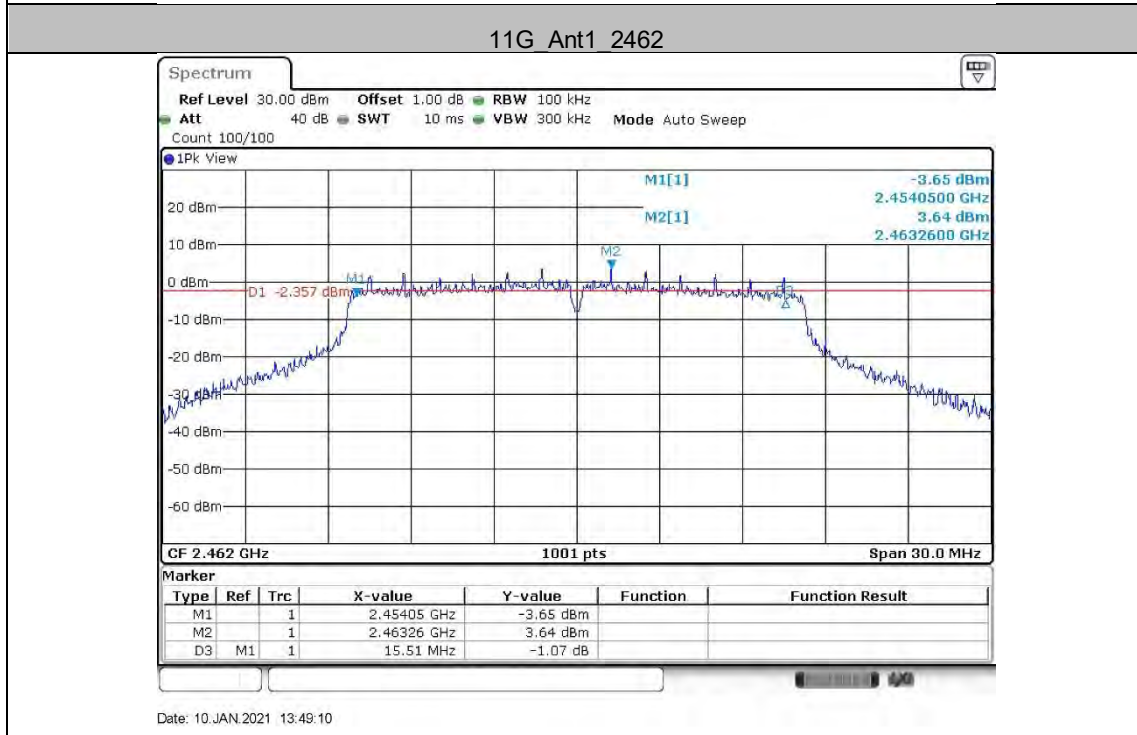
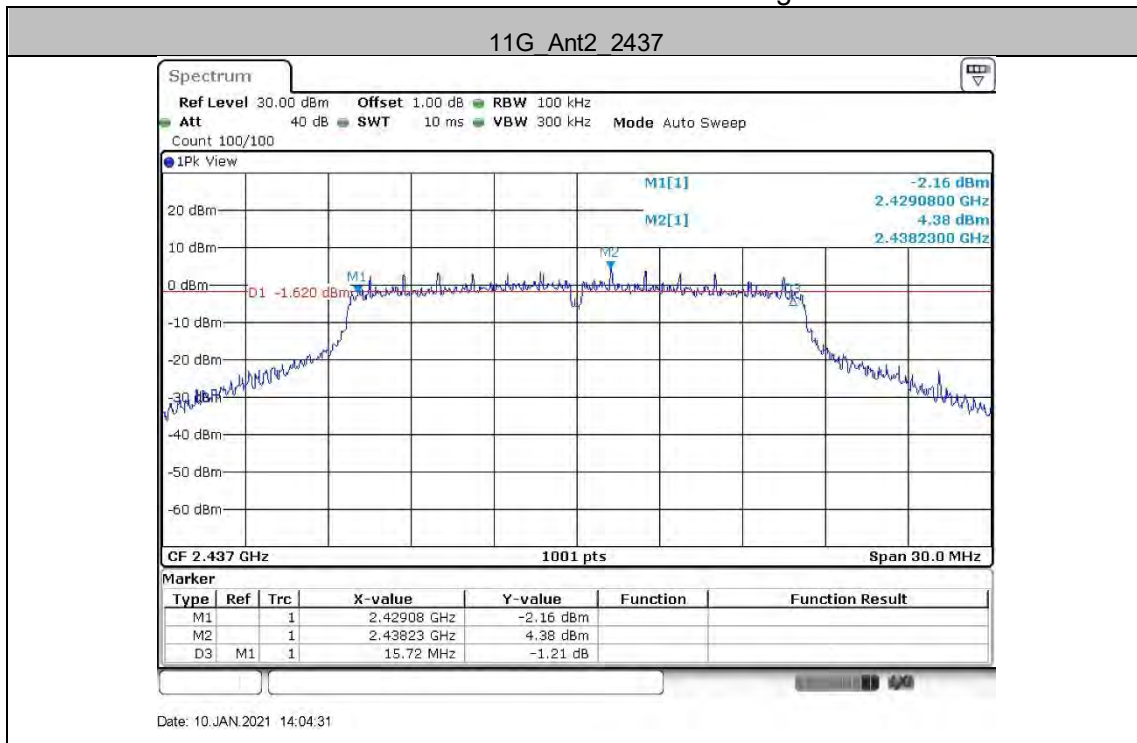
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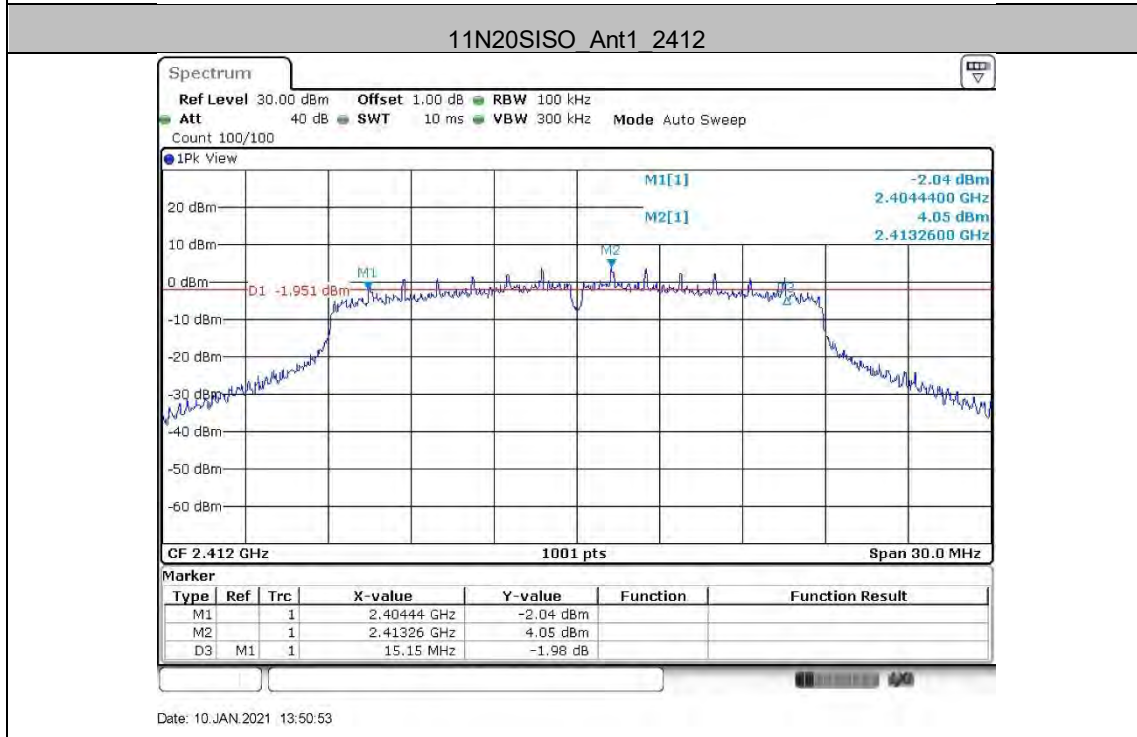
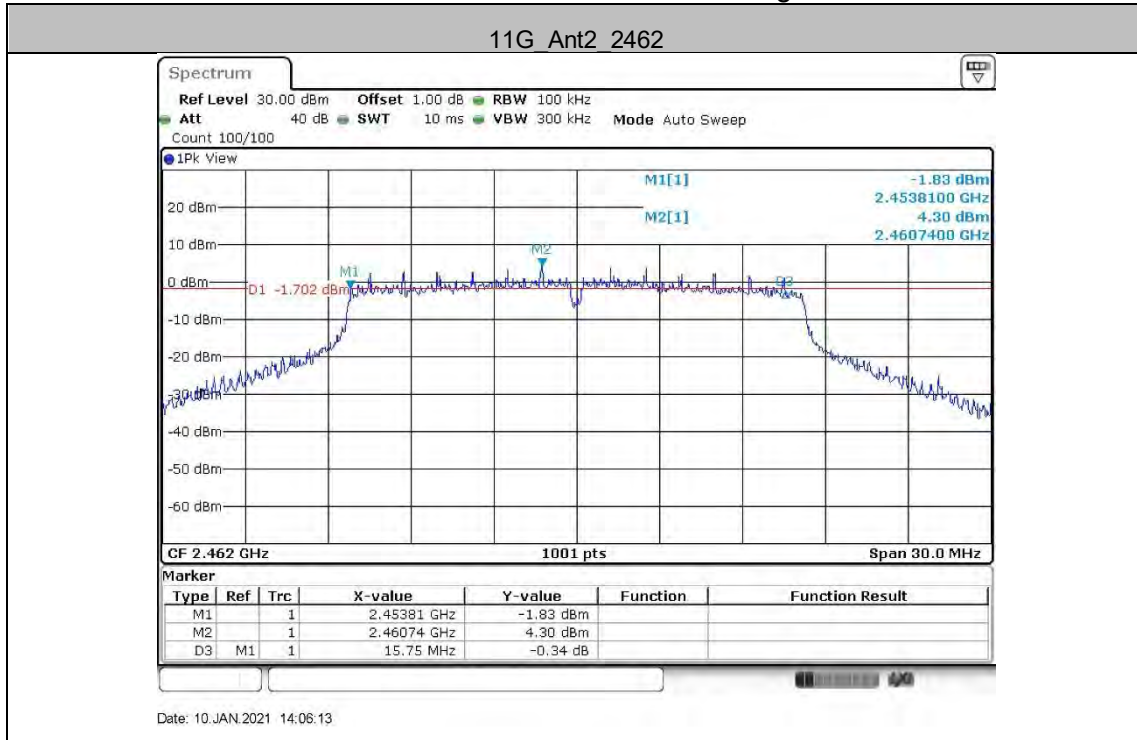
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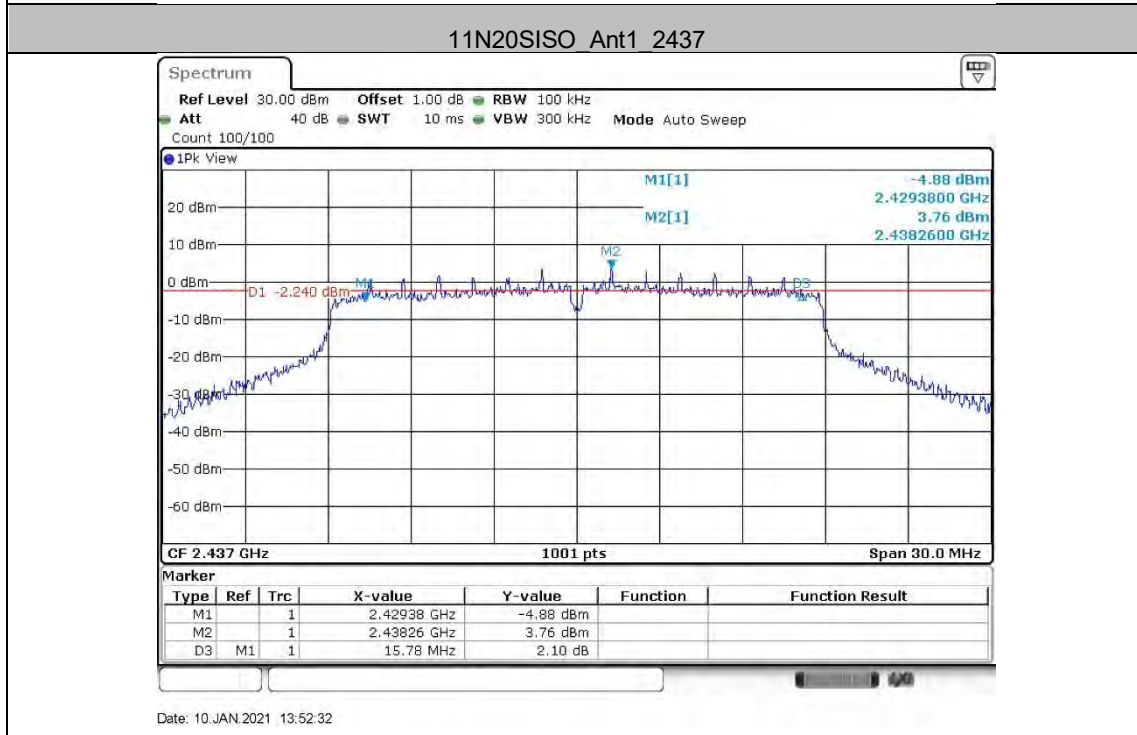
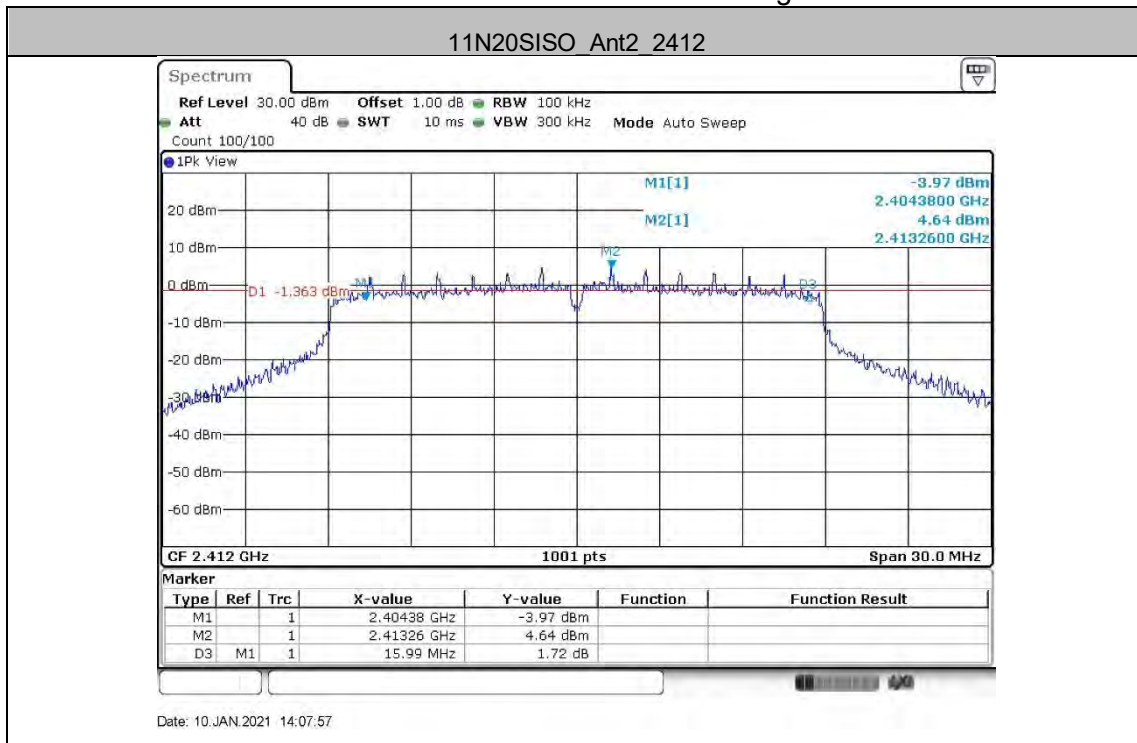


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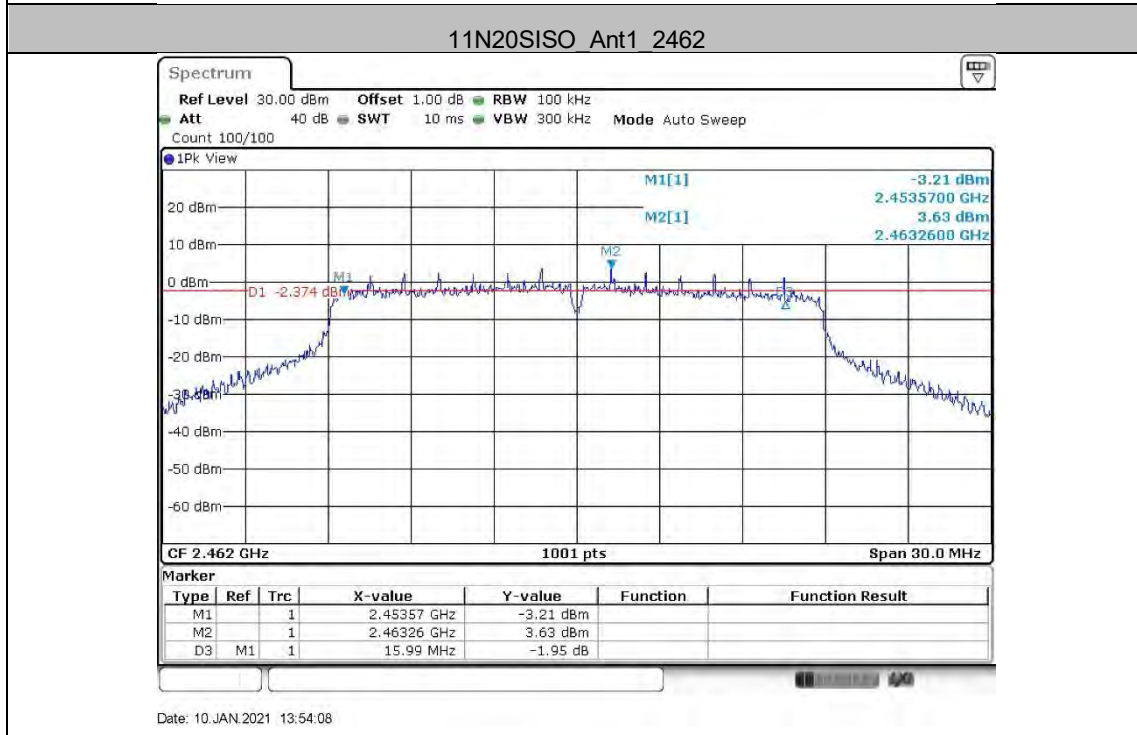
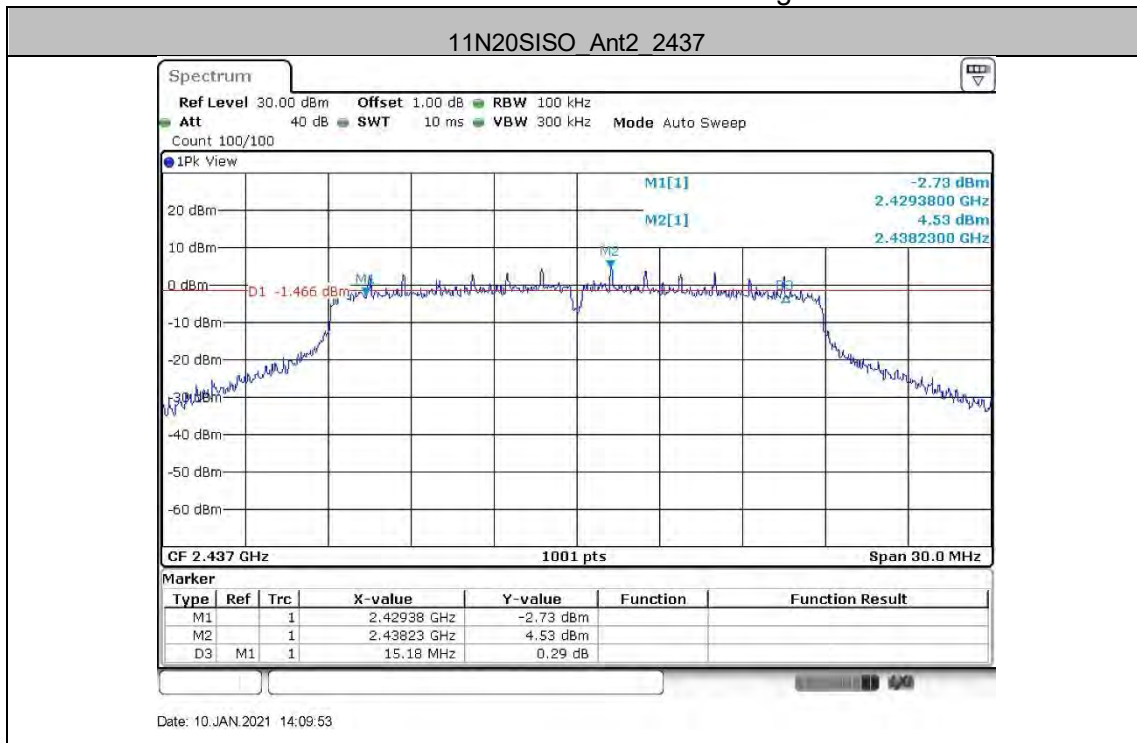


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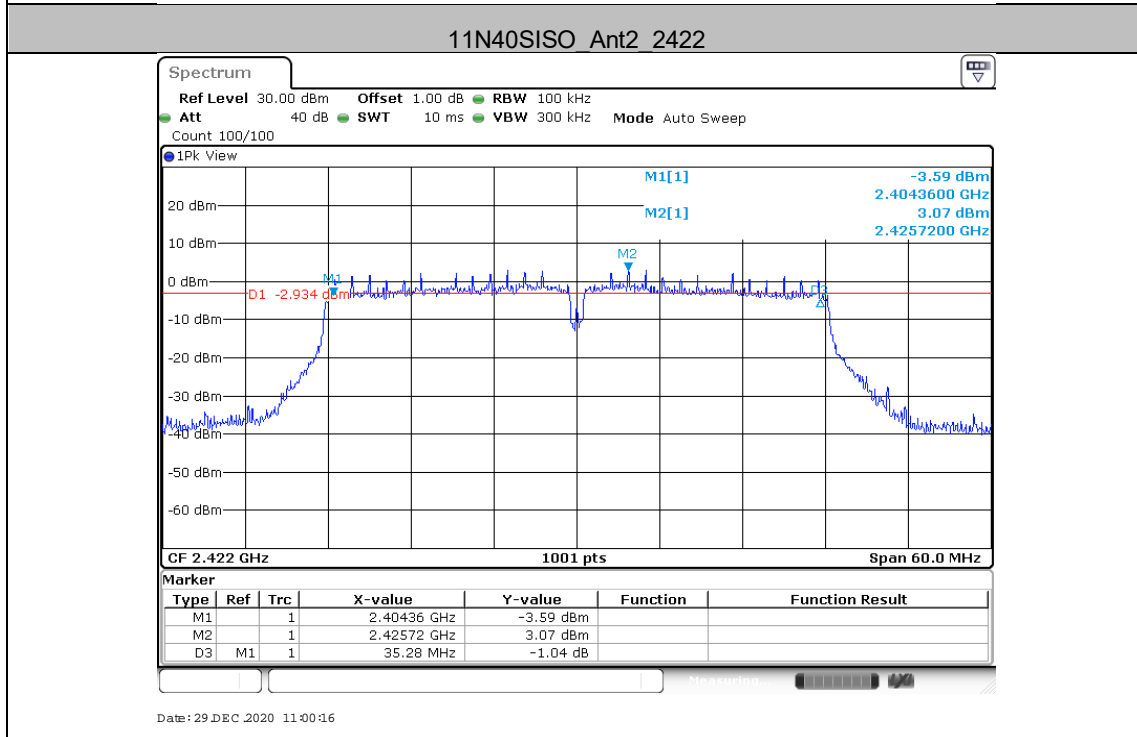
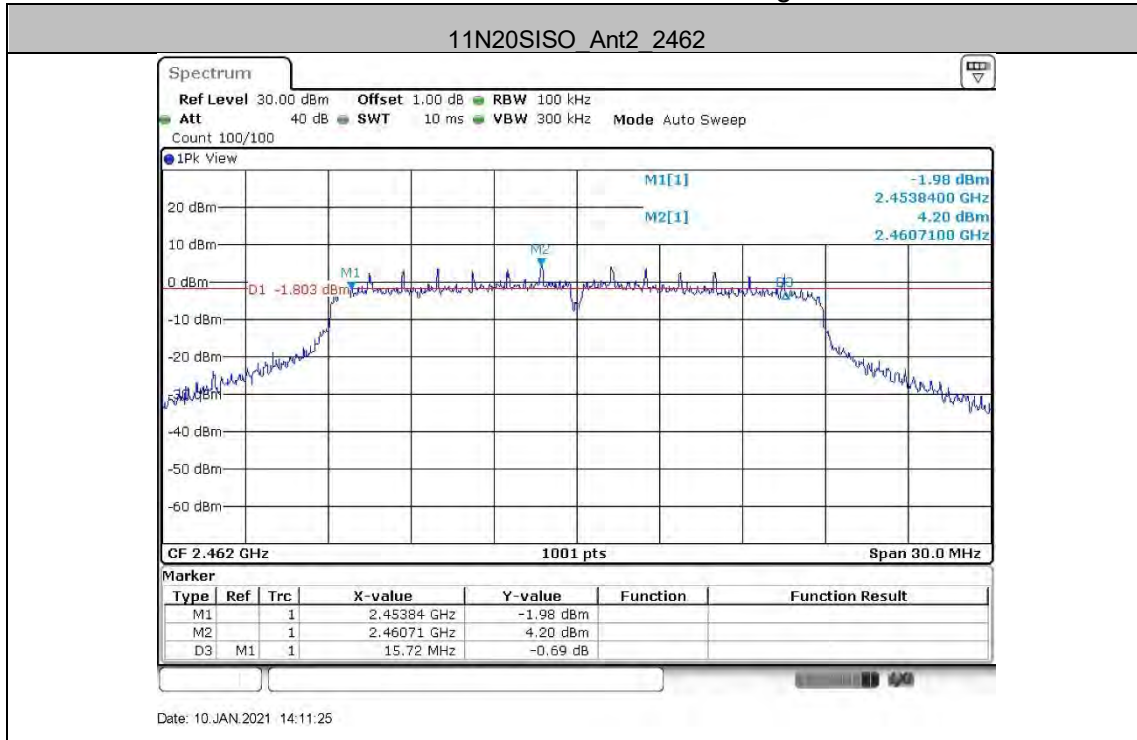
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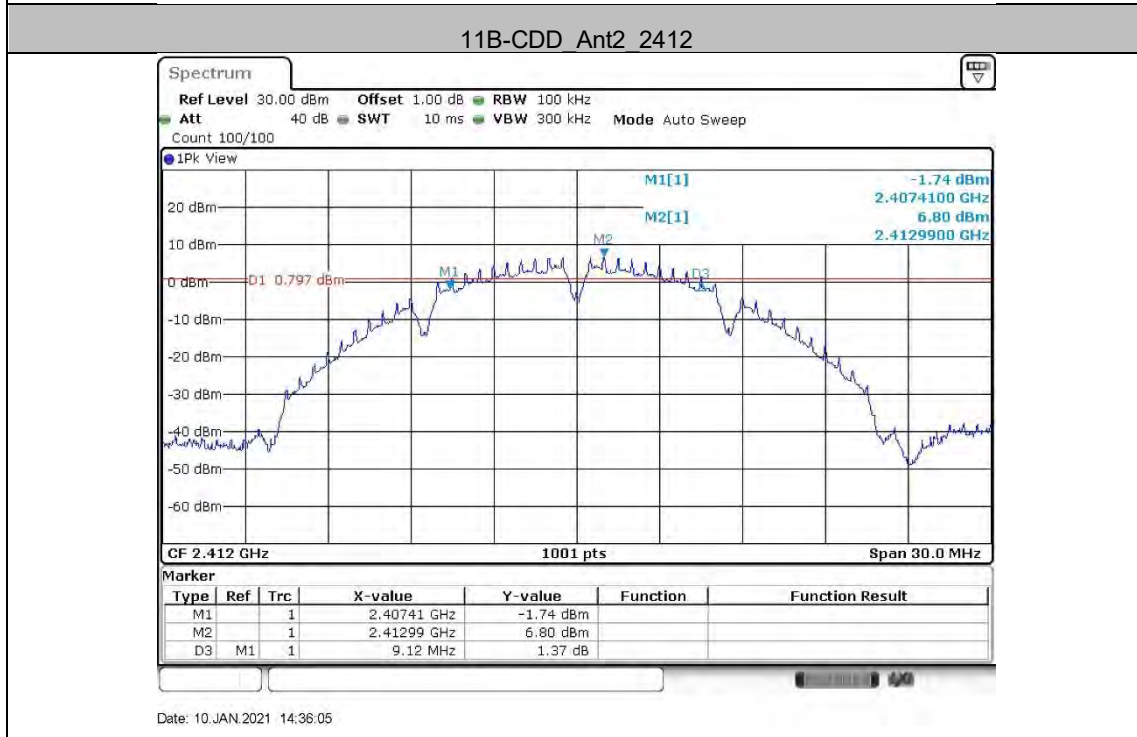
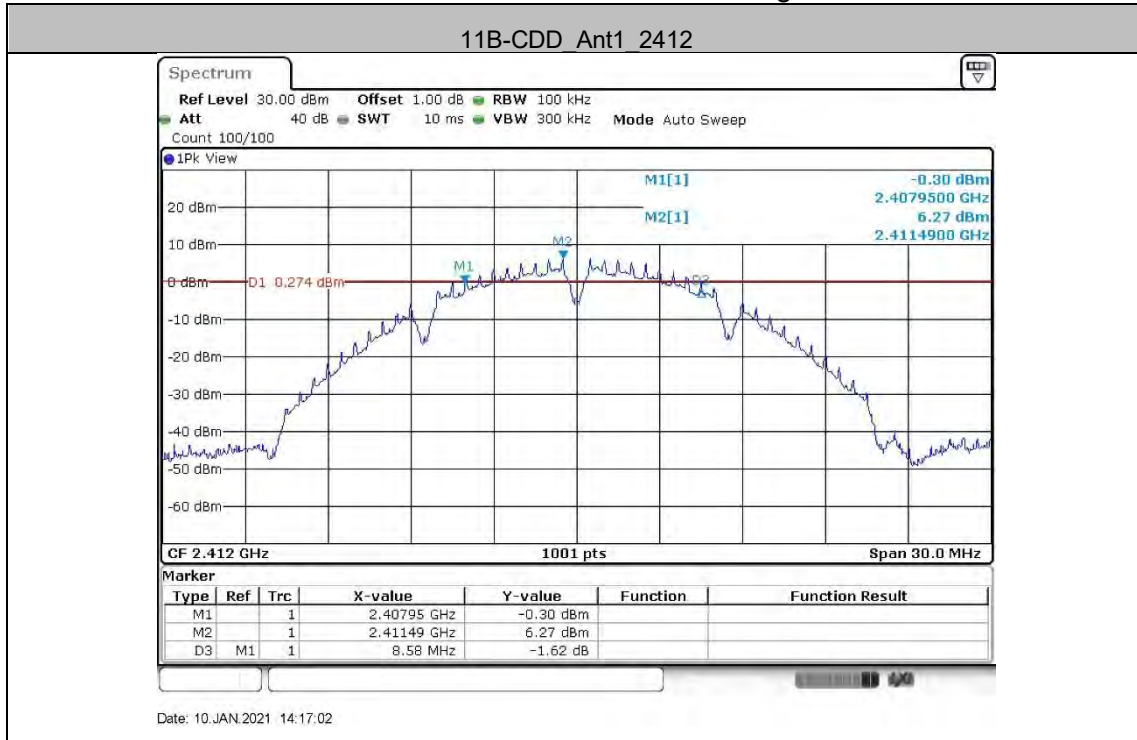
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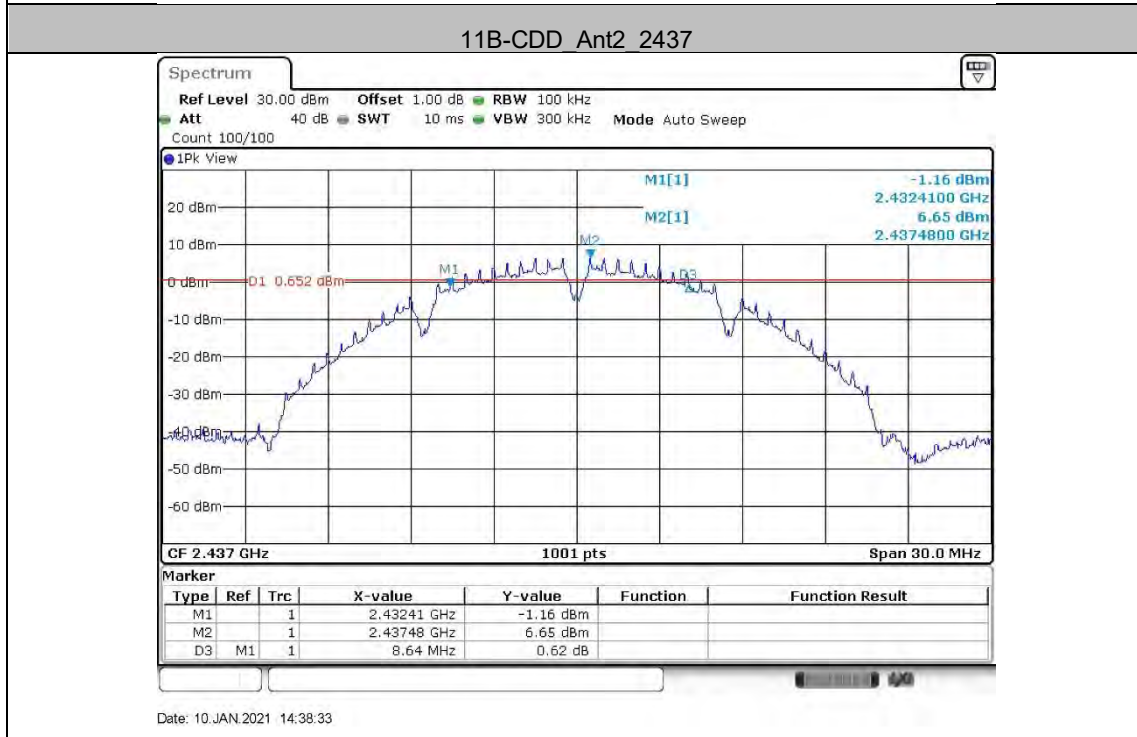
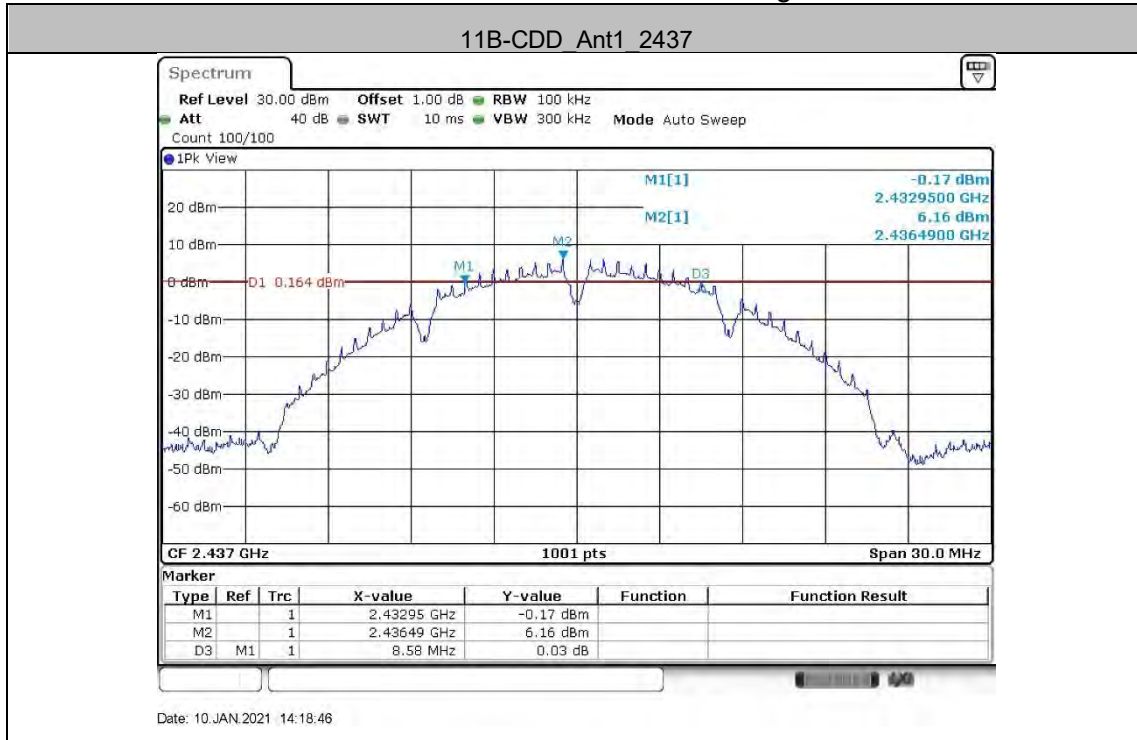
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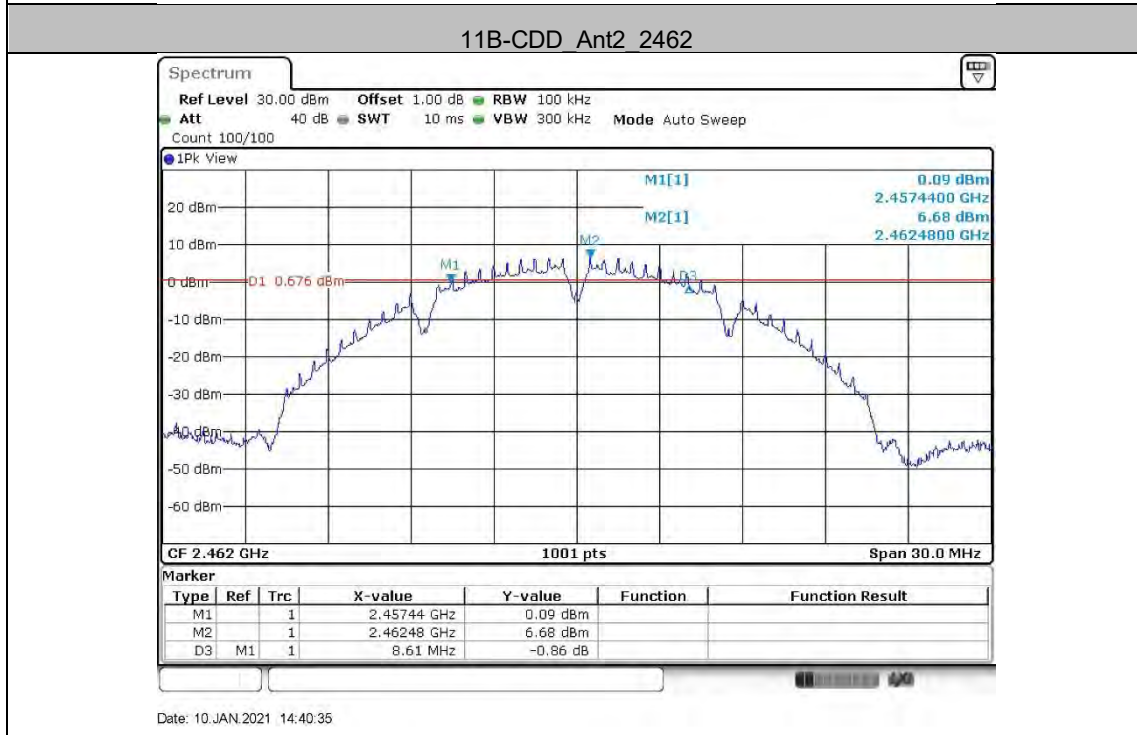
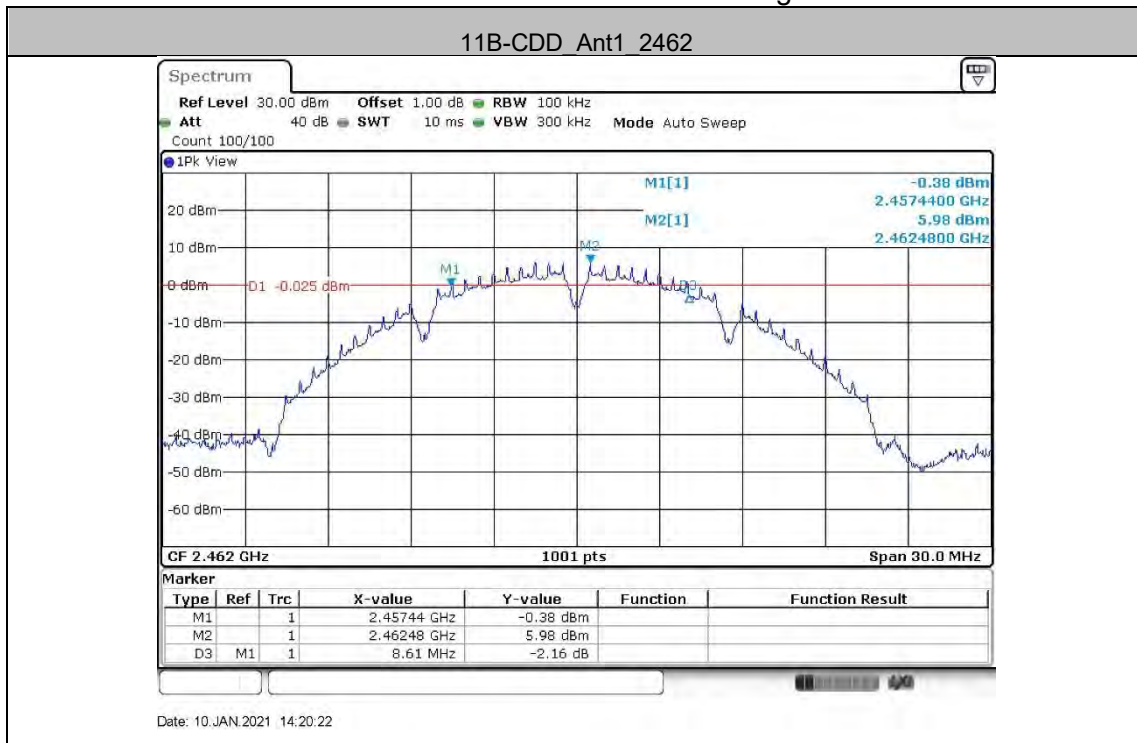
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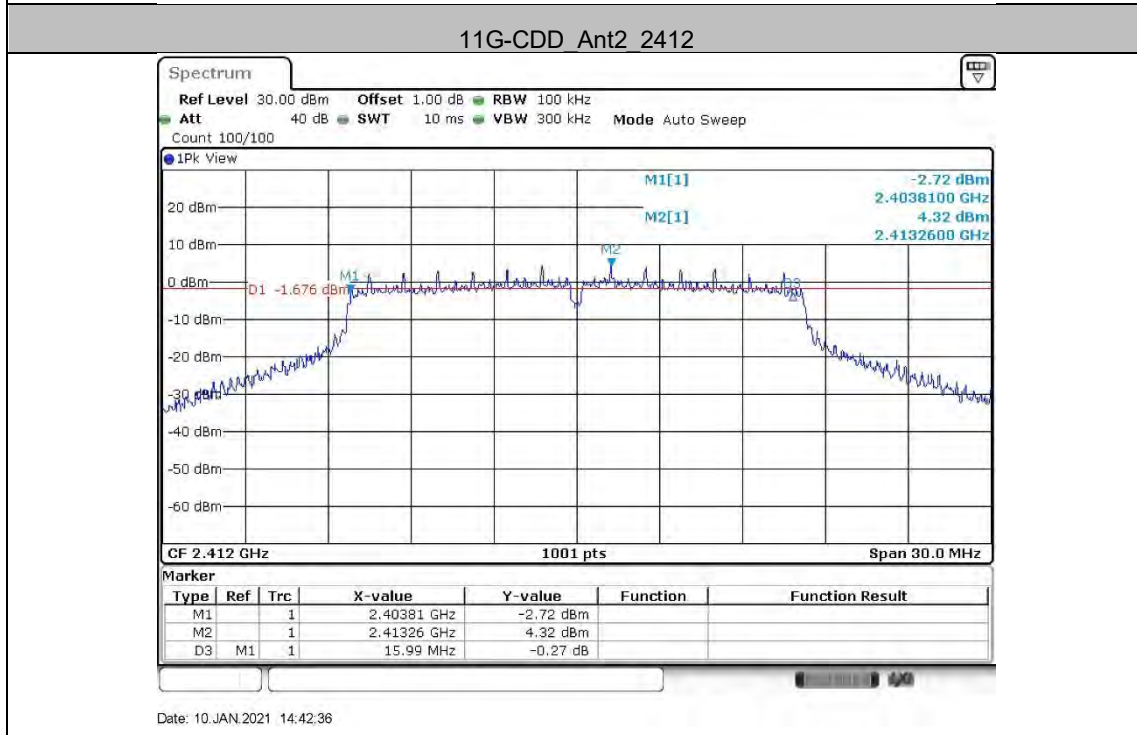
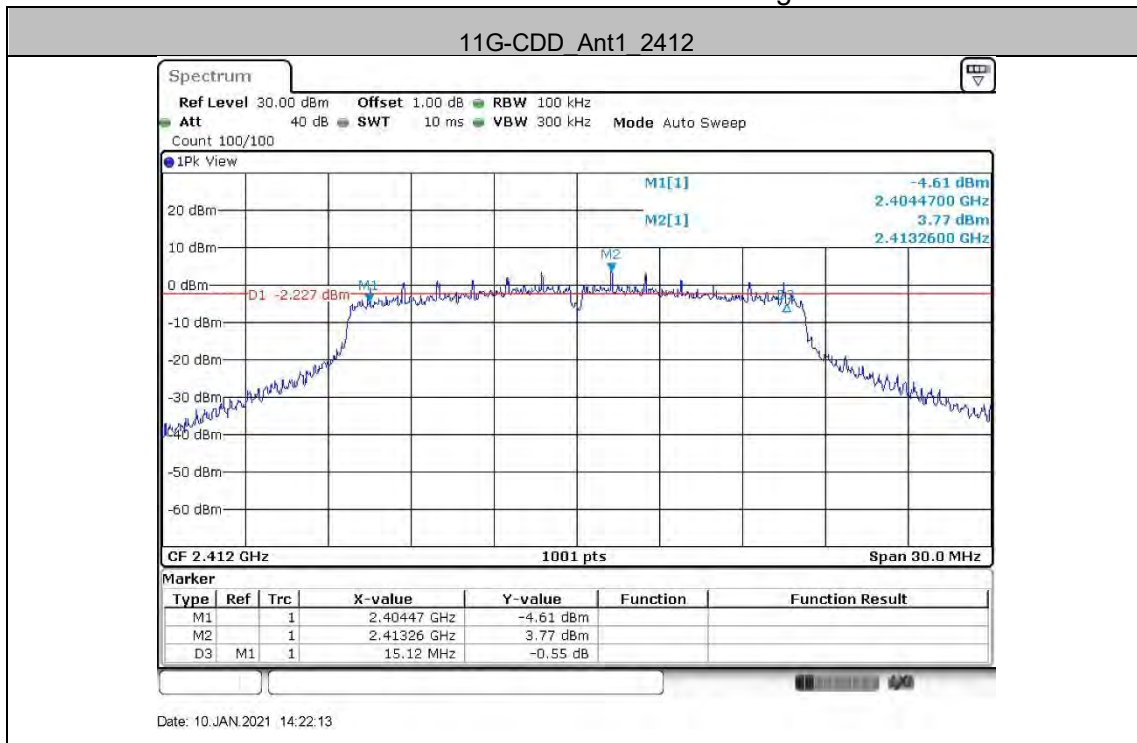
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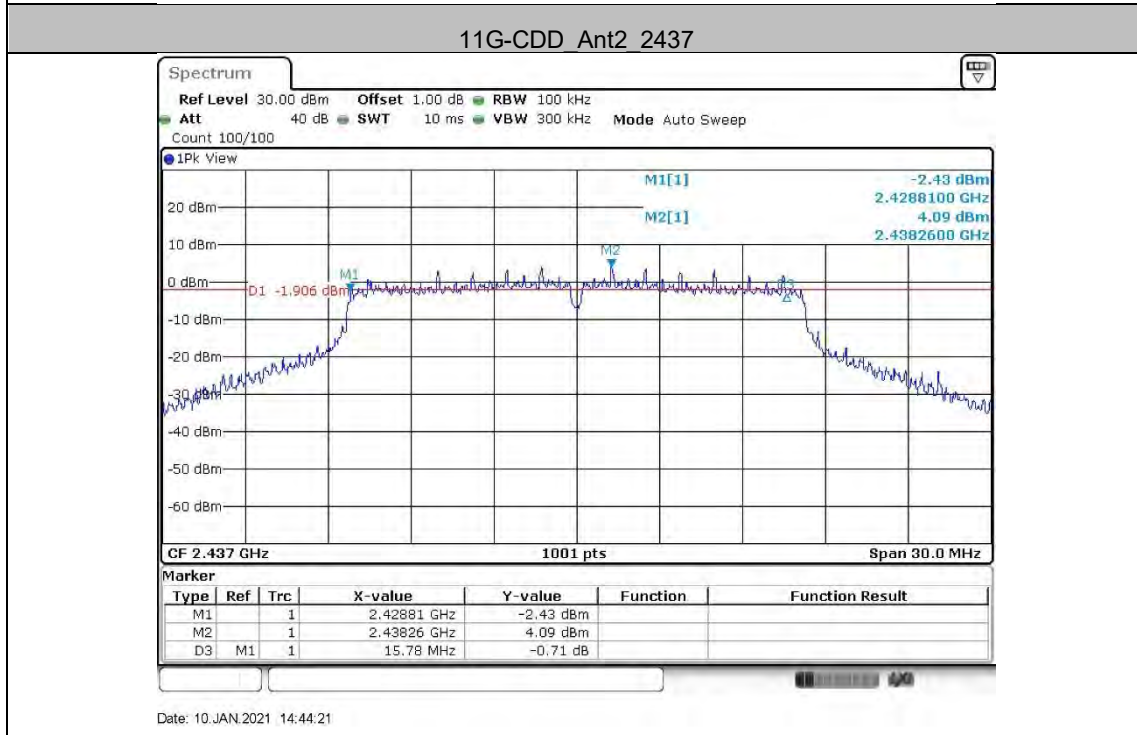
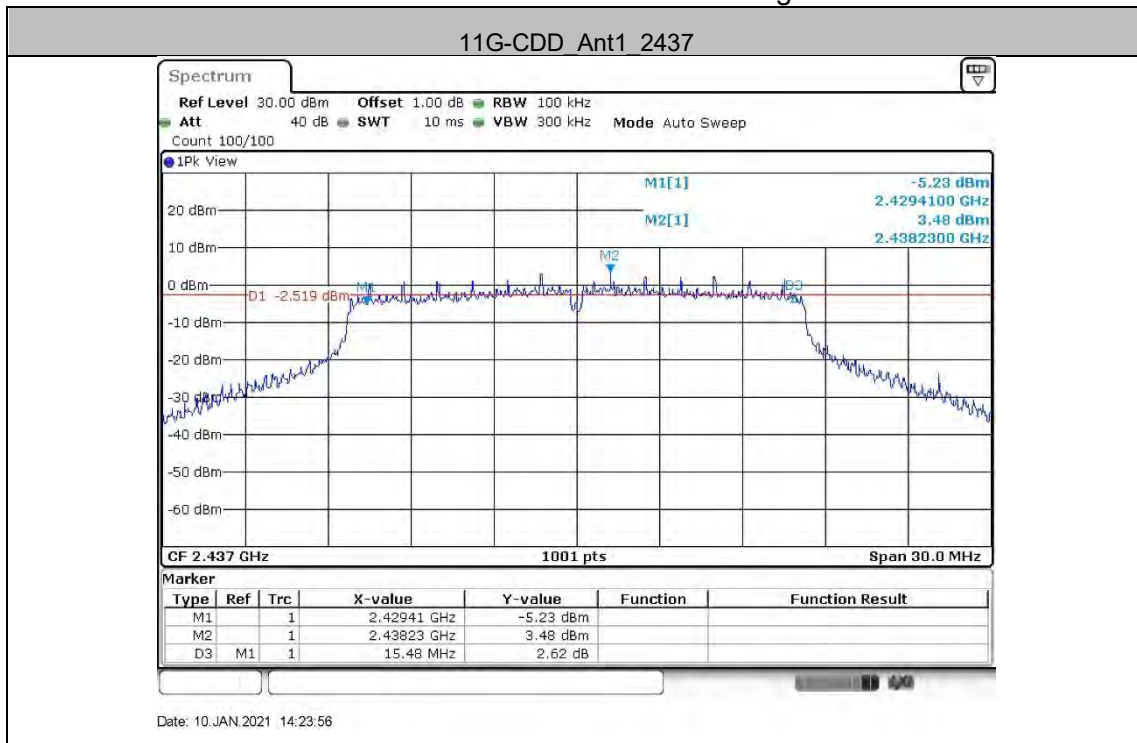


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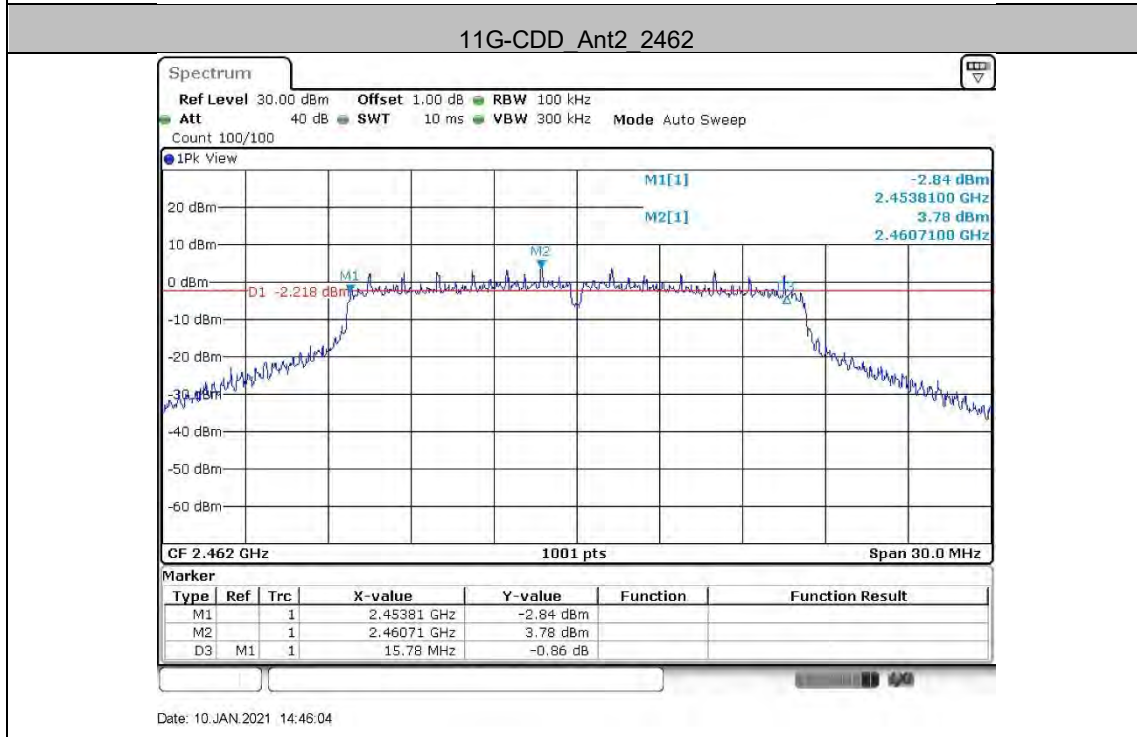
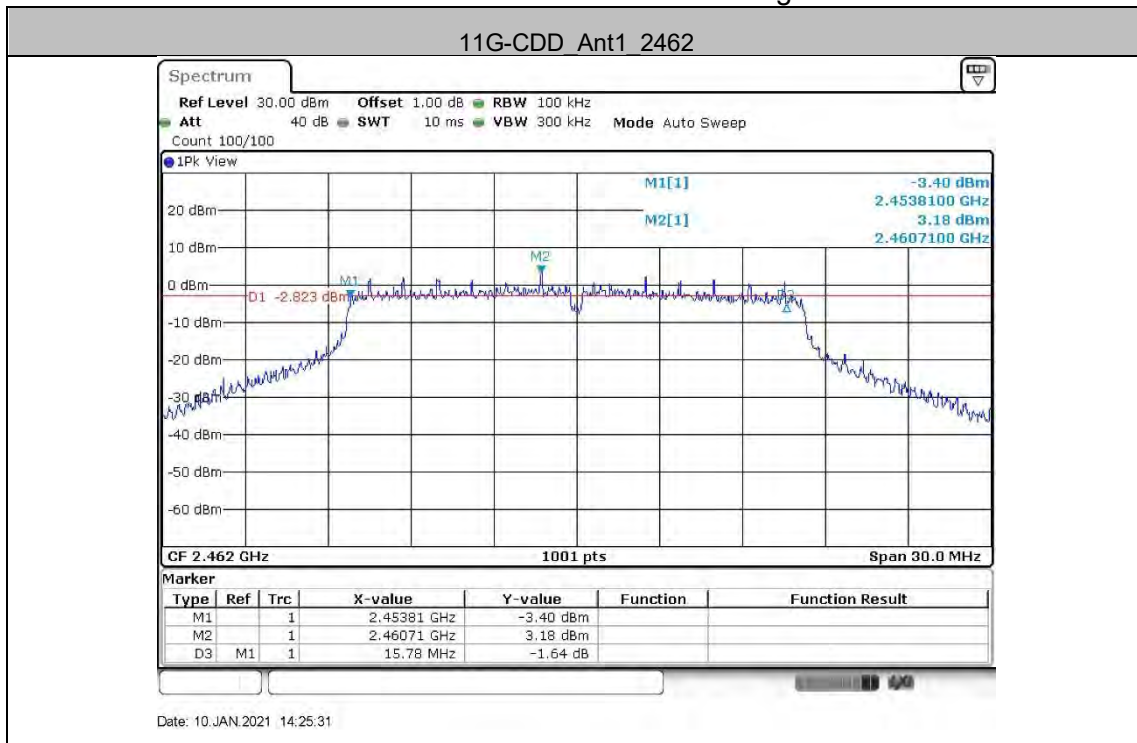
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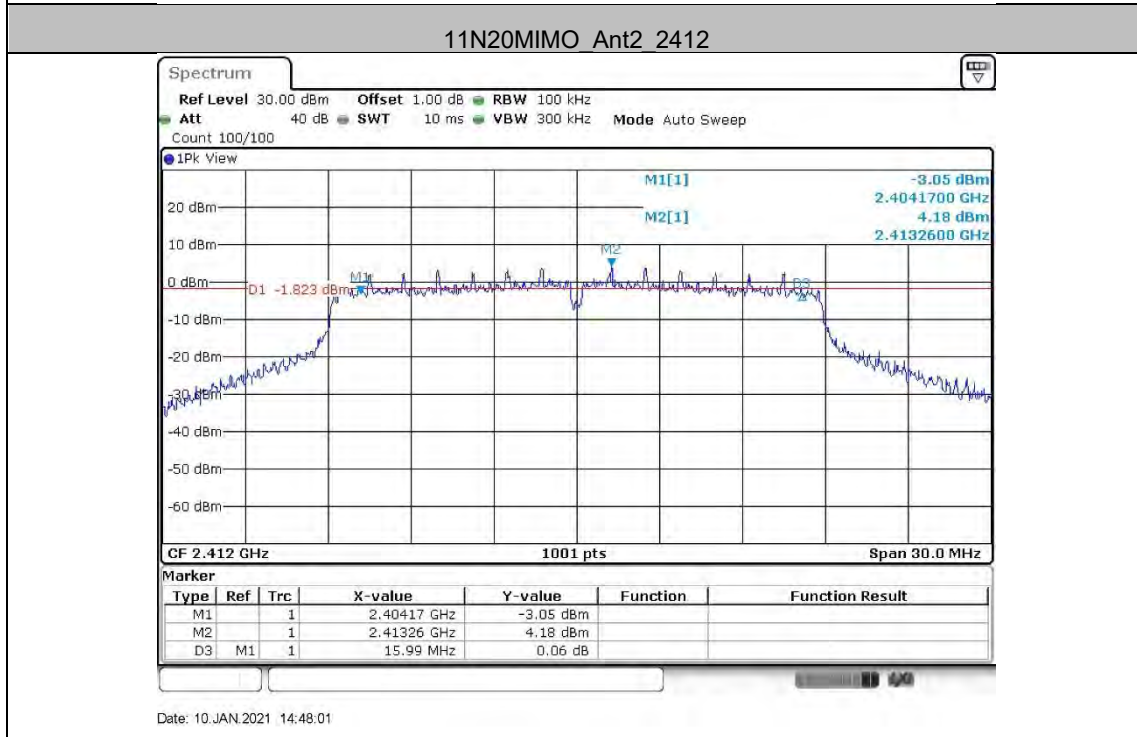
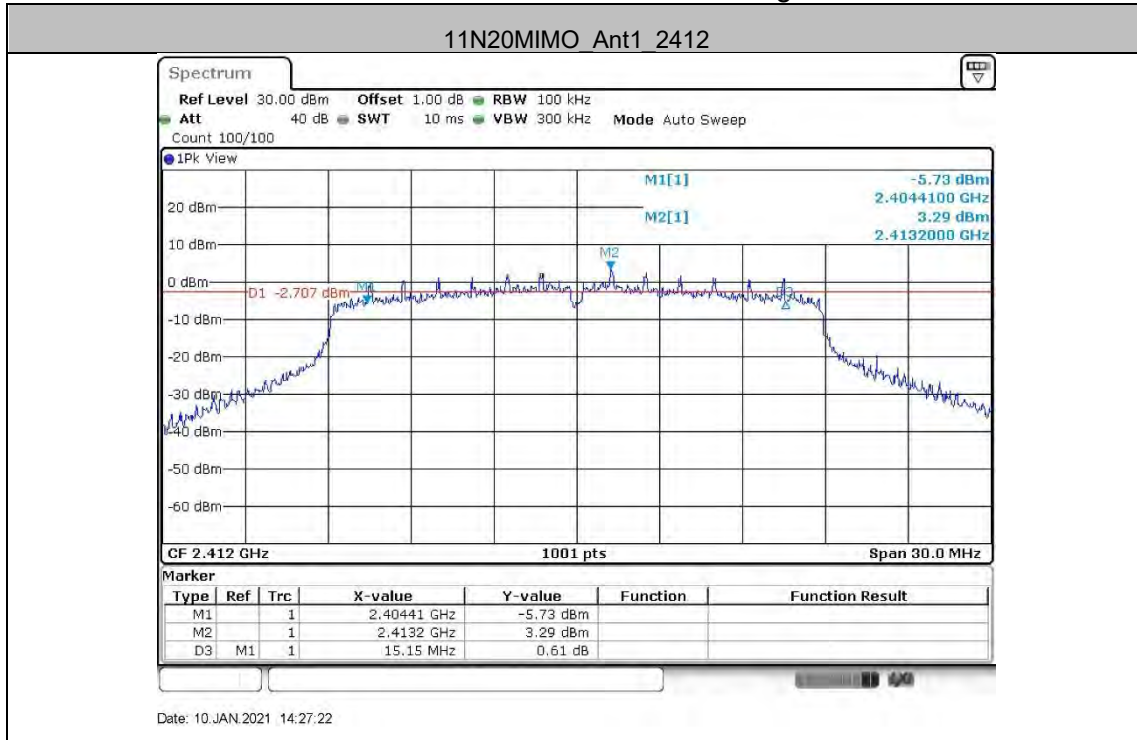
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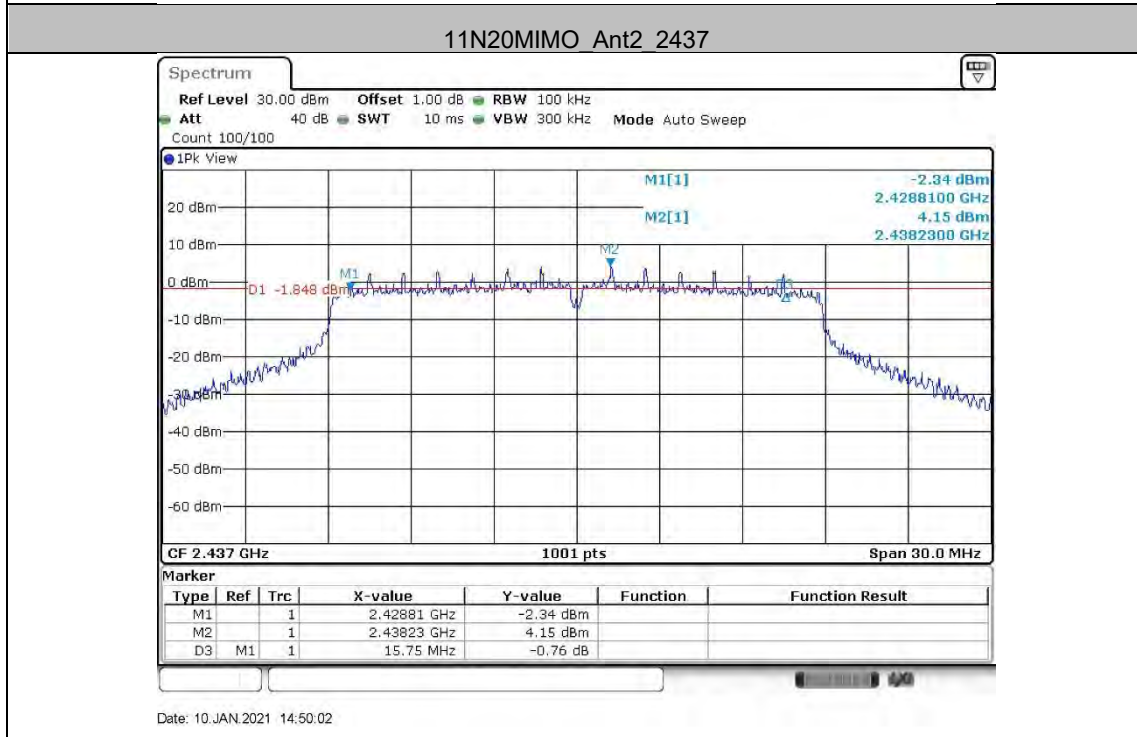
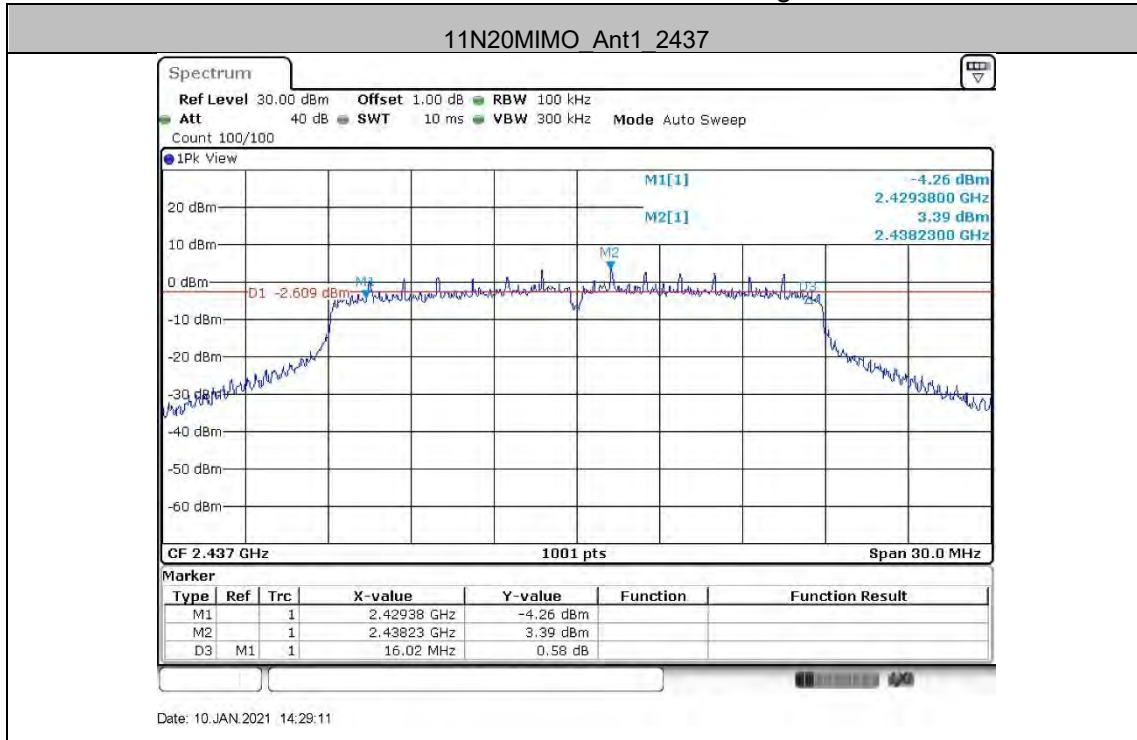
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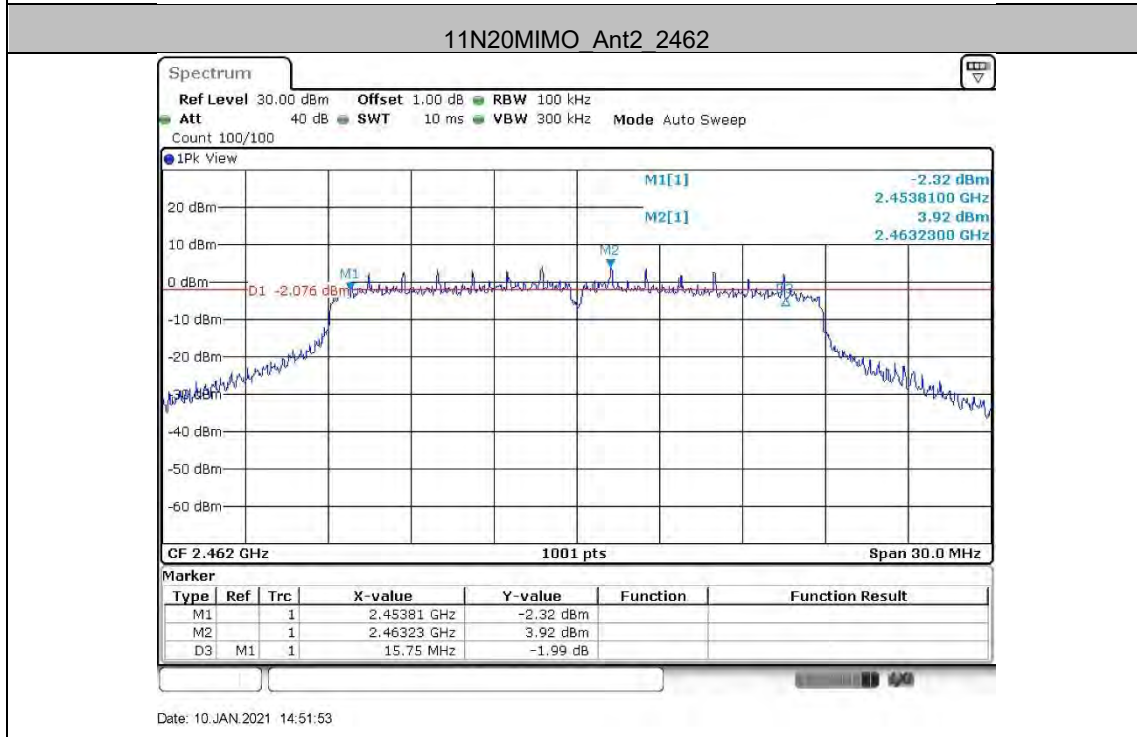
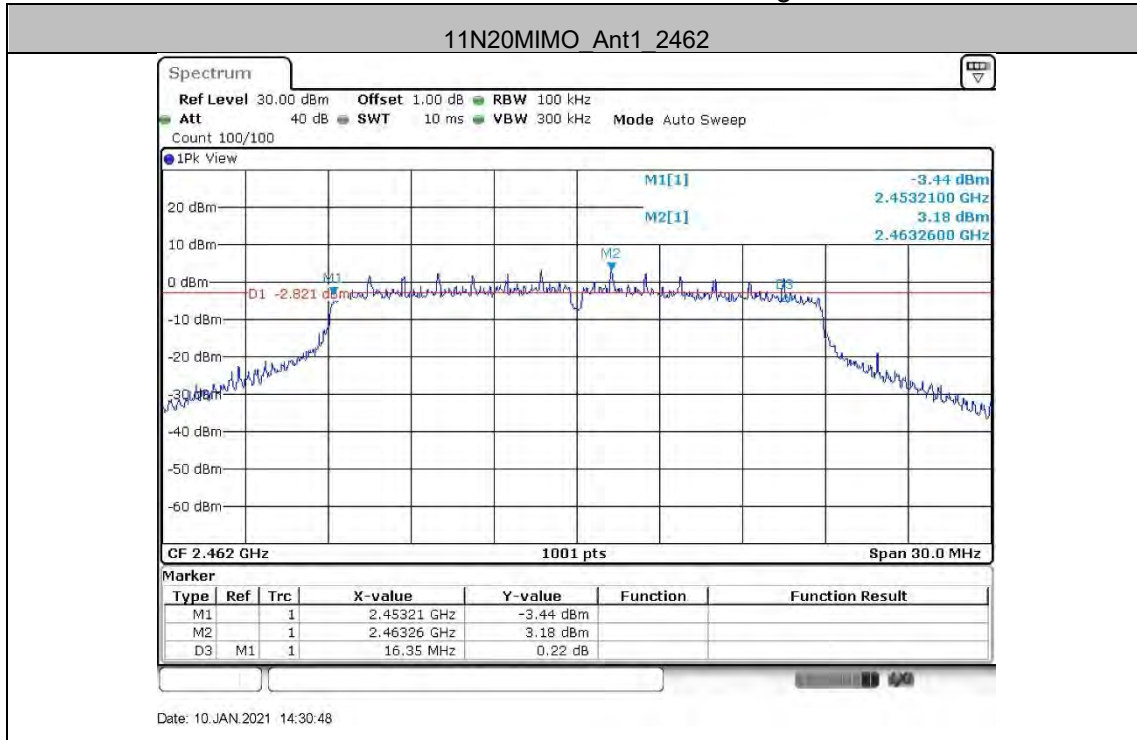
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Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	13.277	2405.556	2418.833	---	PASS
	Ant2	2412	13.876	2405.137	2419.013	---	PASS
	Ant1	2437	13.696	2430.347	2444.043	---	PASS
	Ant2	2437	13.846	2430.077	2443.923	---	PASS
	Ant1	2462	13.816	2454.987	2468.803	---	PASS
	Ant2	2462	13.846	2454.987	2468.833	---	PASS
11G	Ant1	2412	16.603	2403.758	2420.362	---	PASS
	Ant2	2412	16.843	2403.608	2420.452	---	PASS
	Ant1	2437	16.813	2428.638	2445.452	---	PASS
	Ant2	2437	16.843	2428.548	2445.392	---	PASS
	Ant1	2462	16.843	2453.489	2470.332	---	PASS
	Ant2	2462	16.813	2453.518	2470.332	---	PASS
11N20SISO	Ant1	2412	17.742	2403.189	2420.931	---	PASS
	Ant2	2412	17.982	2403.039	2421.021	---	PASS
	Ant1	2437	17.952	2428.099	2446.051	---	PASS
	Ant2	2437	17.982	2428.009	2445.991	---	PASS
	Ant1	2462	17.952	2452.949	2470.901	---	PASS
	Ant2	2462	17.952	2452.979	2470.931	---	PASS
11B-CDD	Ant1	2412	13.277	2405.497	2418.773	---	PASS
	Ant2	2412	13.966	2405.047	2419.013	---	PASS
	Ant1	2437	13.726	2430.317	2444.043	---	PASS
	Ant2	2437	13.966	2430.017	2443.983	---	PASS
	Ant1	2462	13.846	2454.987	2468.833	---	PASS
	Ant2	2462	13.936	2454.957	2468.893	---	PASS
11G-CDD	Ant1	2412	16.573	2403.758	2420.332	---	PASS



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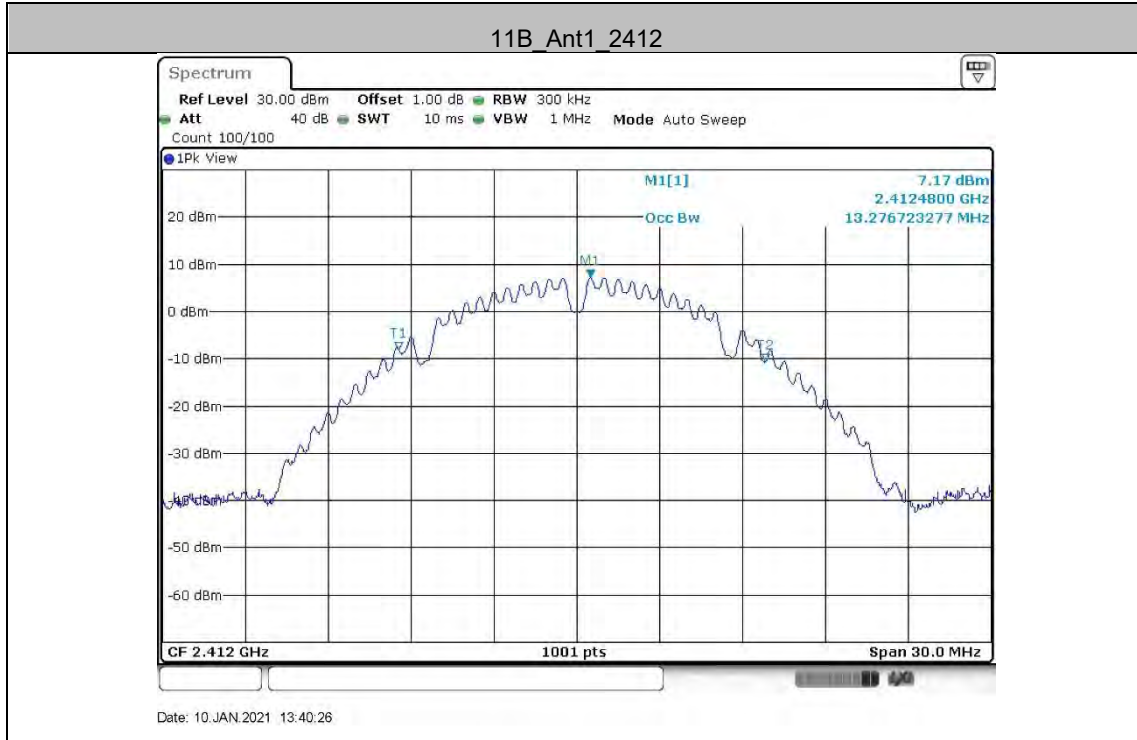
	Ant2	2412	16.813	2403.608	2420.422	---	PASS
	Ant1	2437	16.813	2428.638	2445.452	---	PASS
	Ant2	2437	16.813	2428.548	2445.362	---	PASS
	Ant1	2462	16.843	2453.489	2470.332	---	PASS
	Ant2	2462	16.783	2453.518	2470.302	---	PASS
11N20MIMO	Ant1	2412	17.712	2403.189	2420.901	---	PASS
	Ant2	2412	17.952	2403.039	2420.991	---	PASS
	Ant1	2437	17.922	2428.099	2446.021	---	PASS
	Ant2	2437	17.952	2428.009	2445.961	---	PASS
	Ant1	2462	17.952	2452.949	2470.901	---	PASS
	Ant2	2462	17.922	2452.949	2470.871	---	PASS



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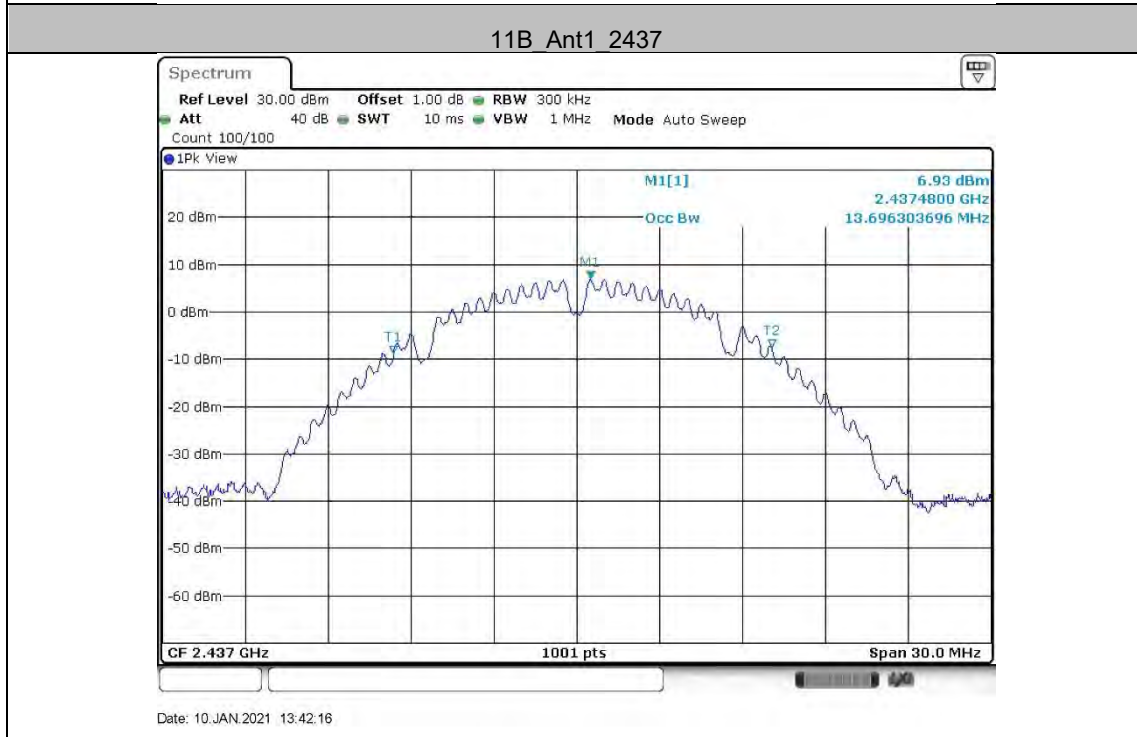
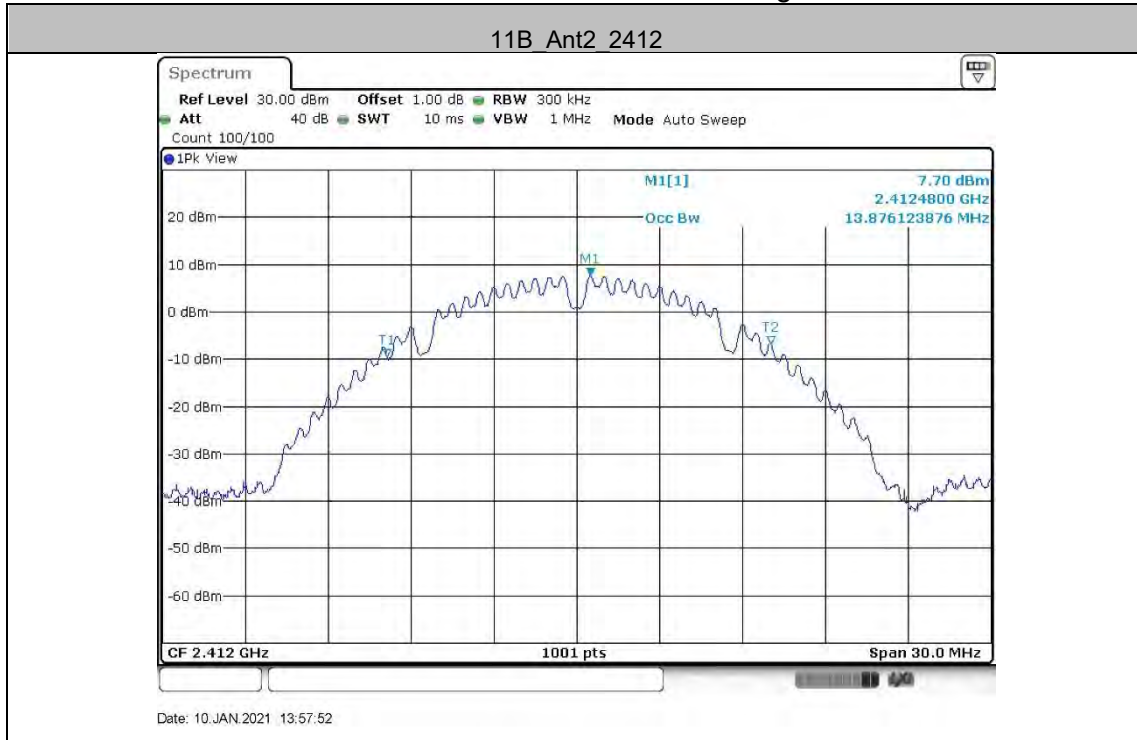
Test Graphs



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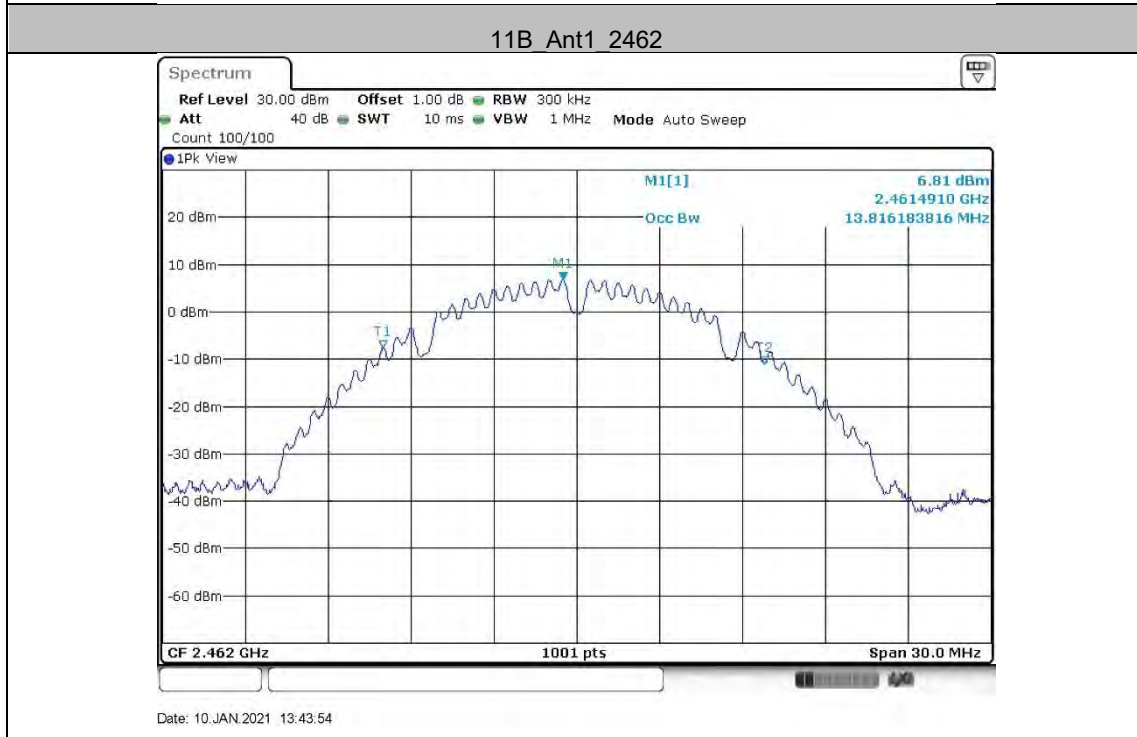
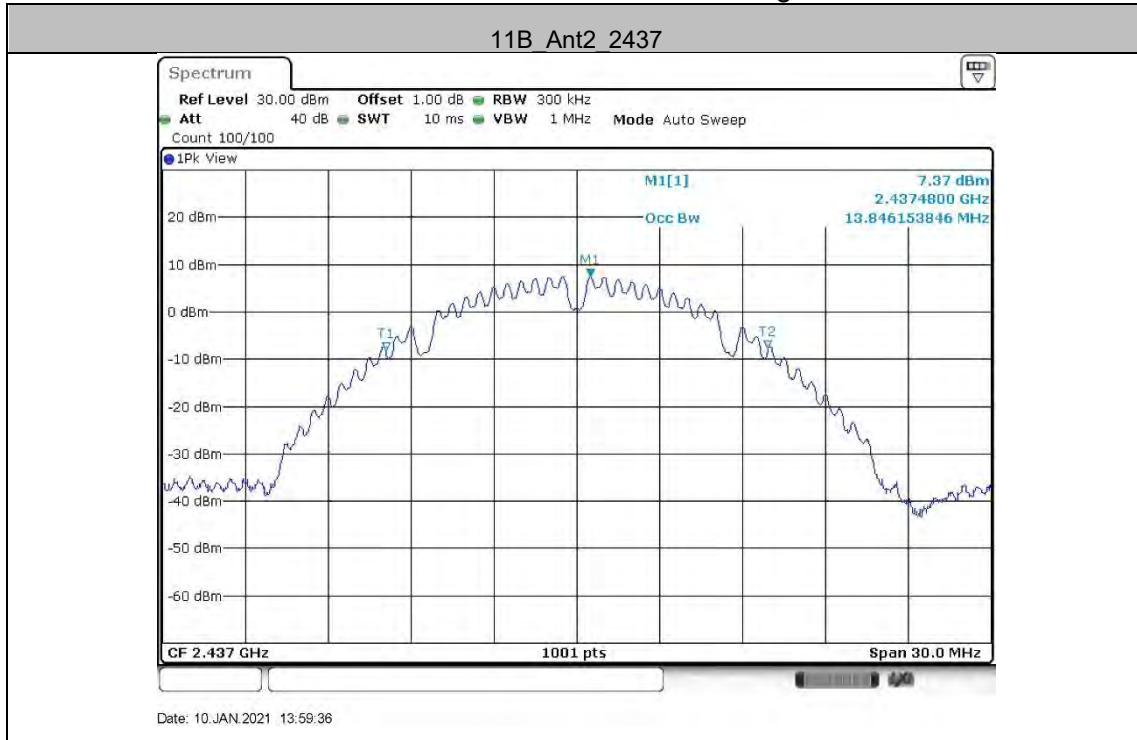
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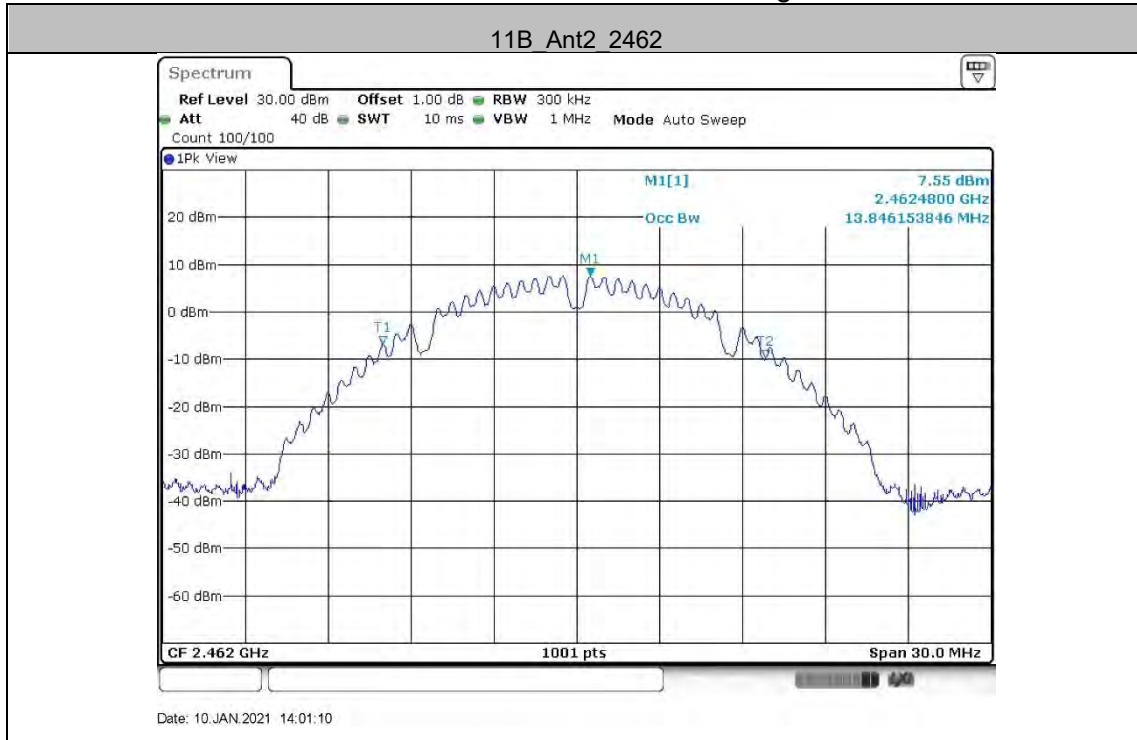
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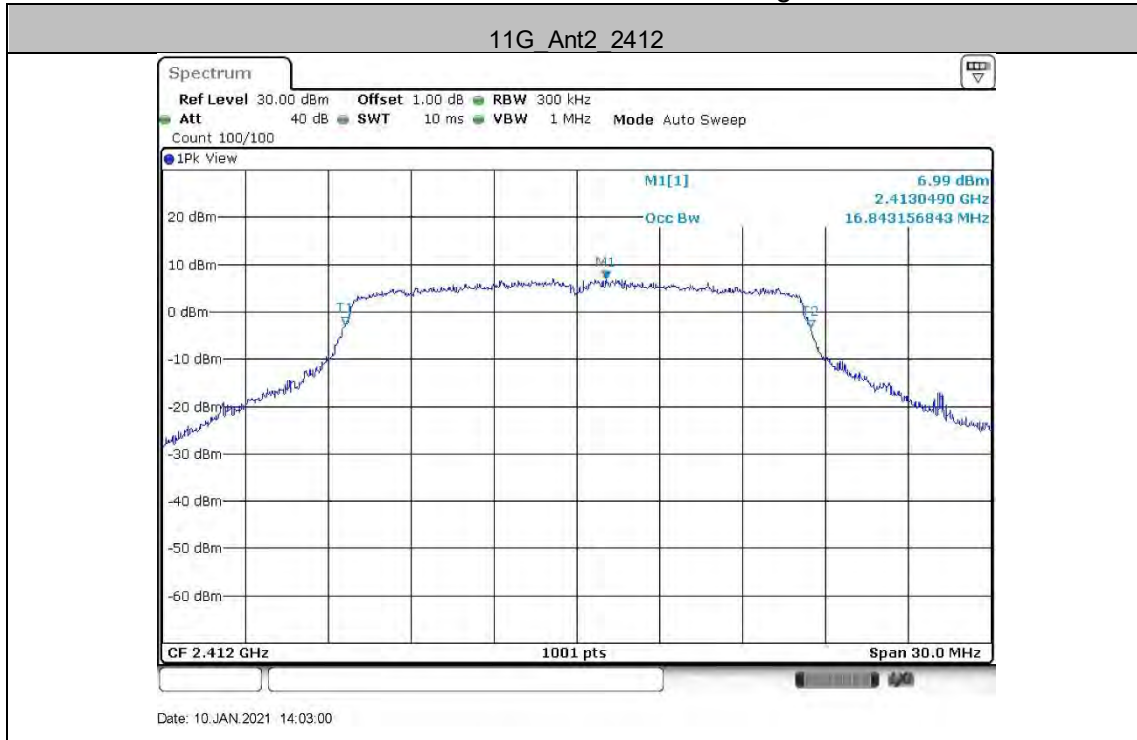
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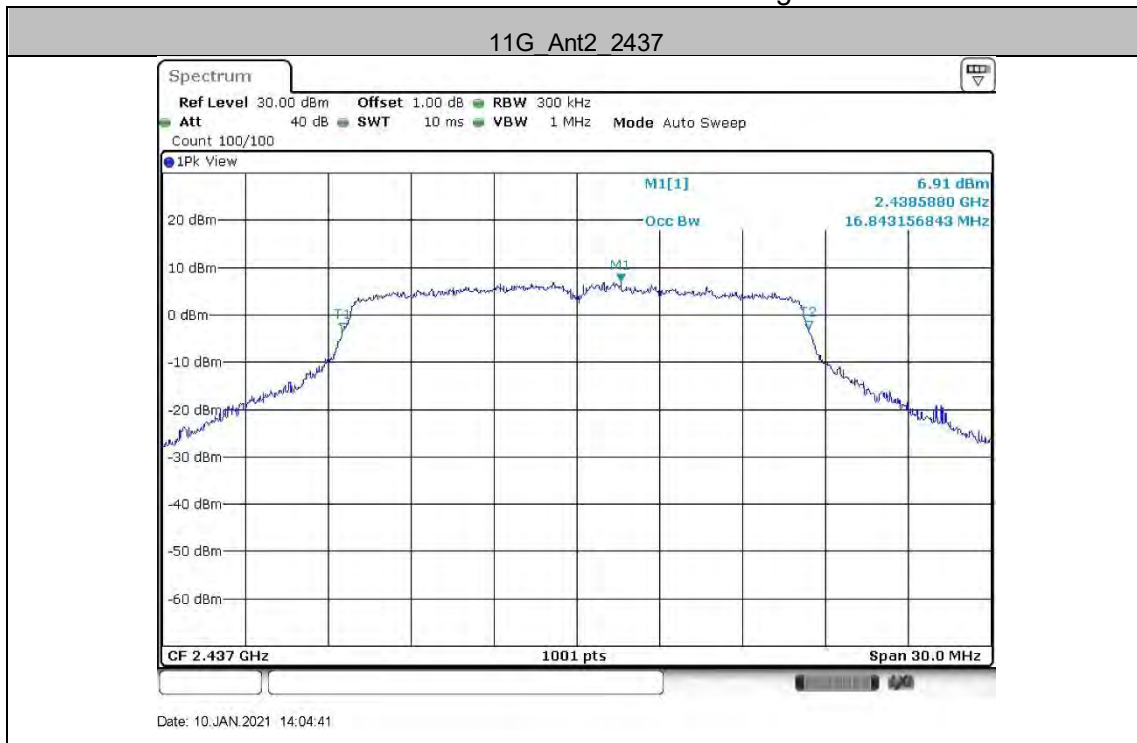
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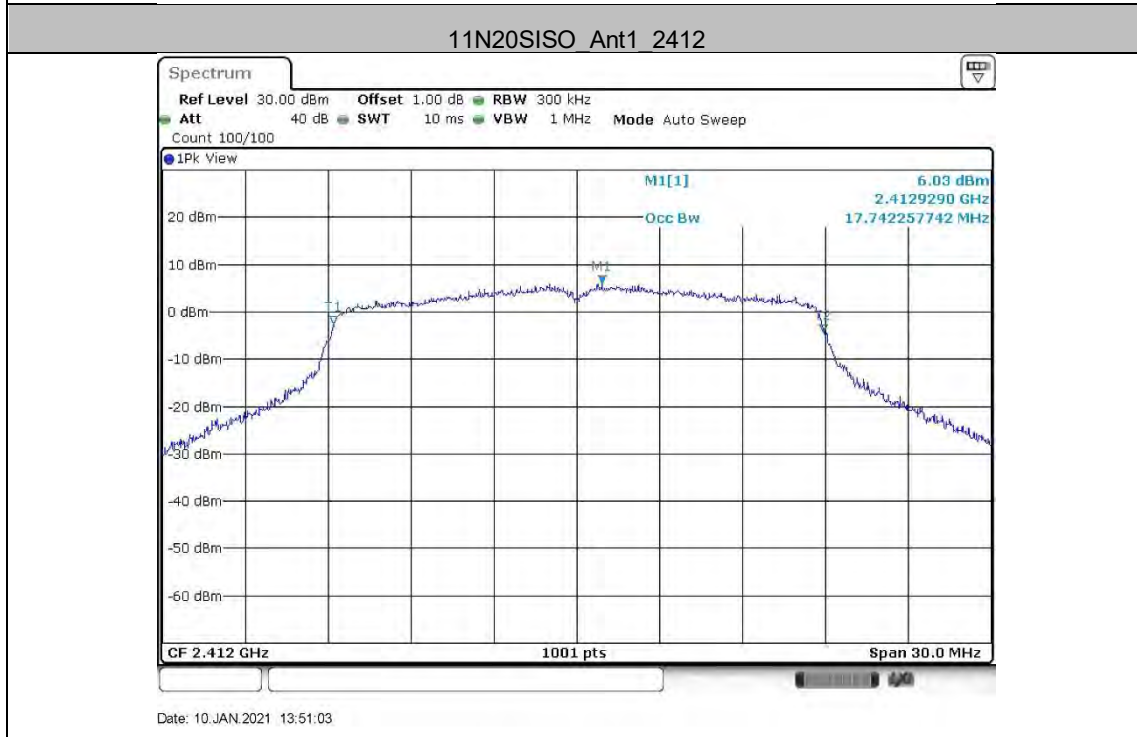
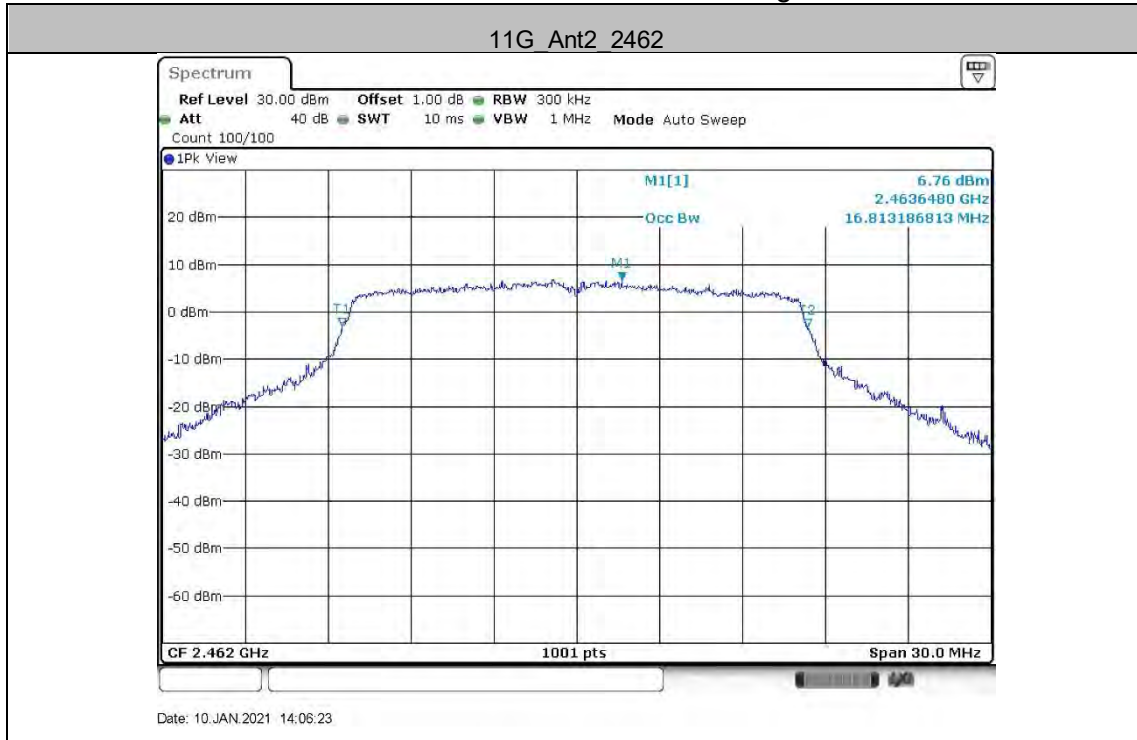
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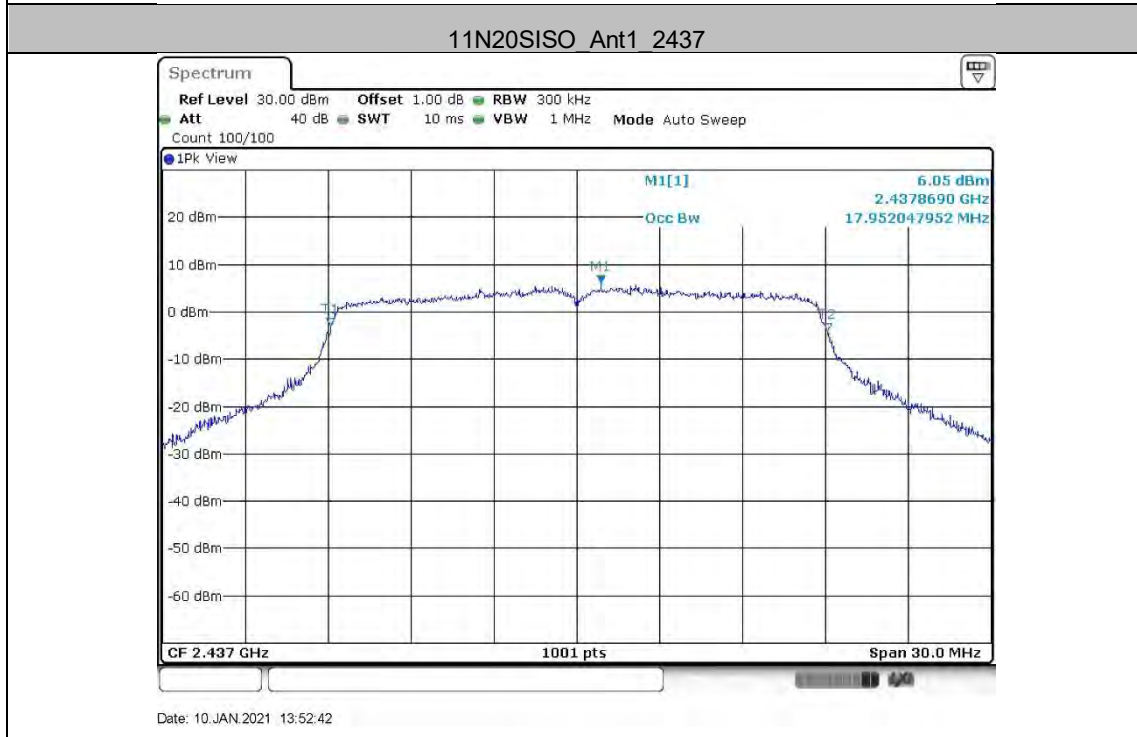
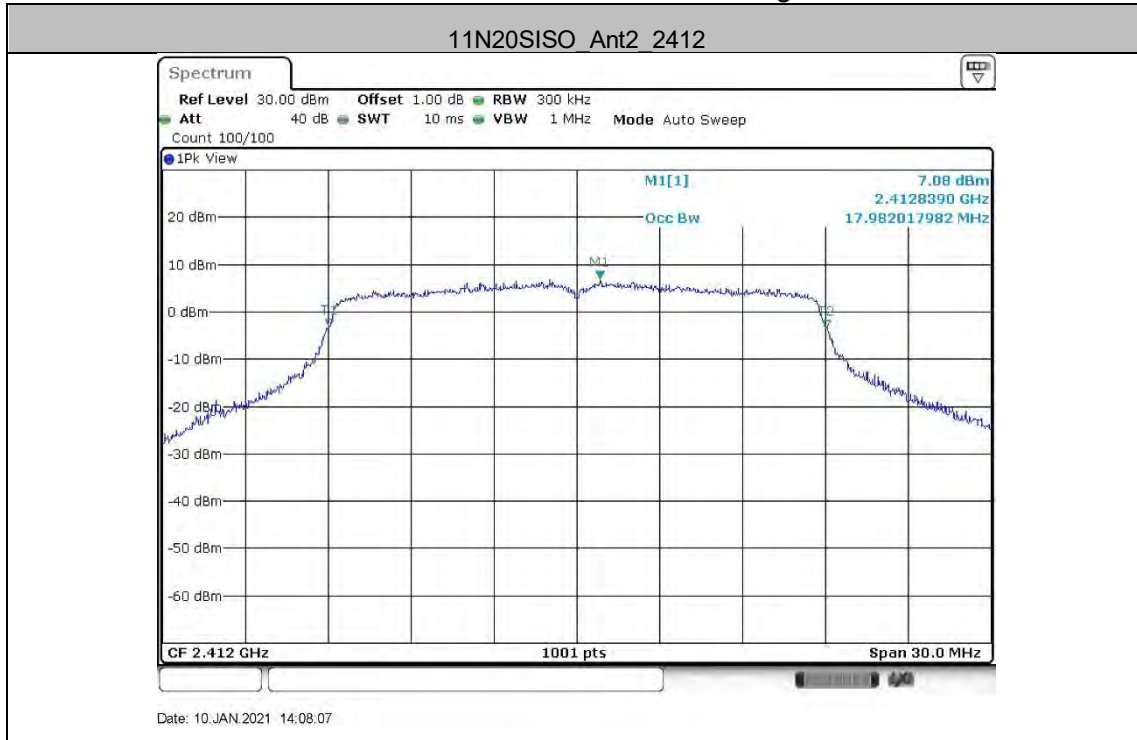
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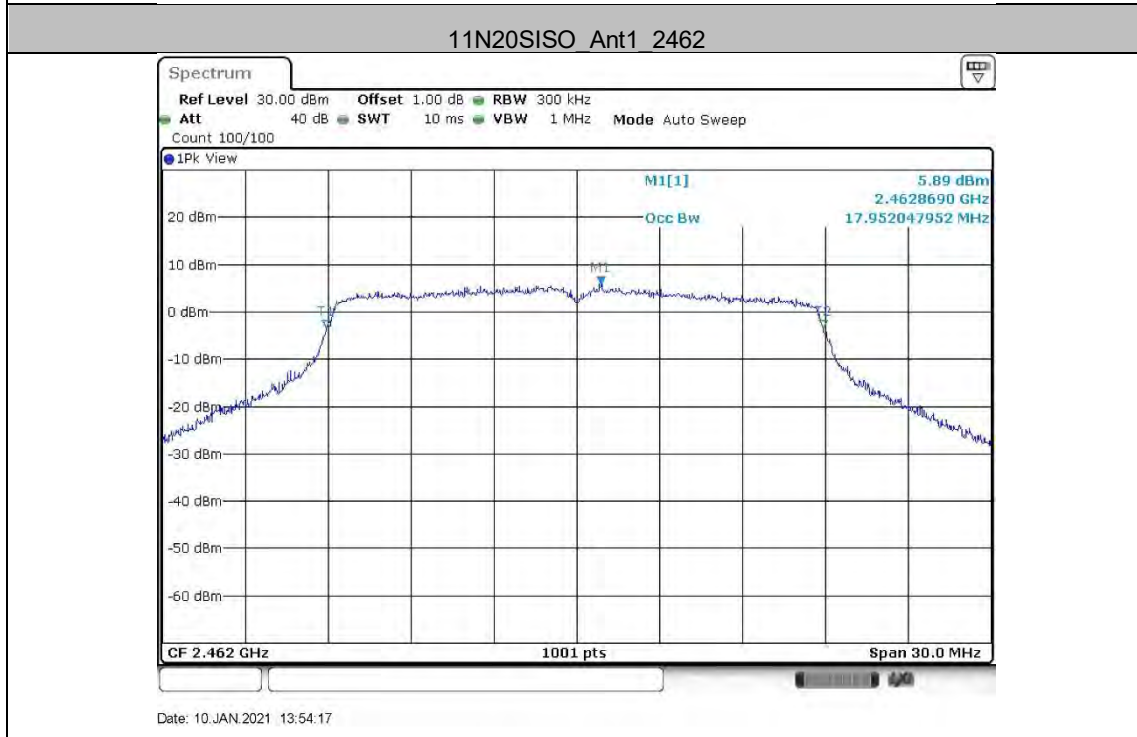
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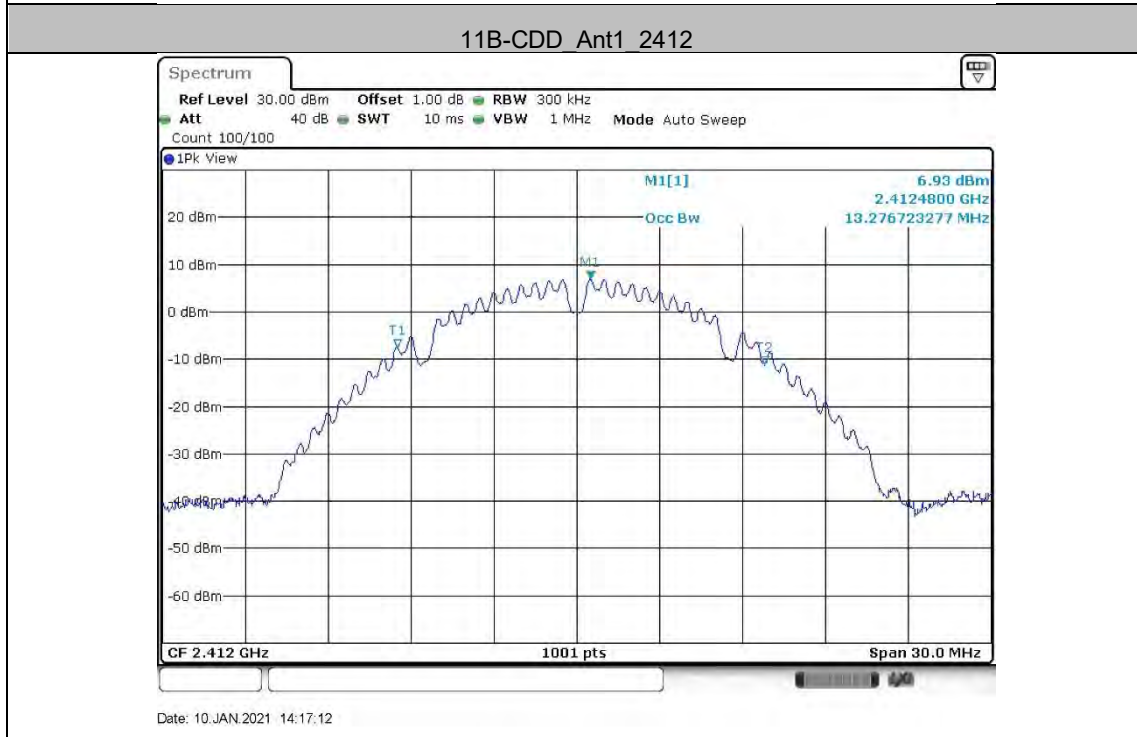
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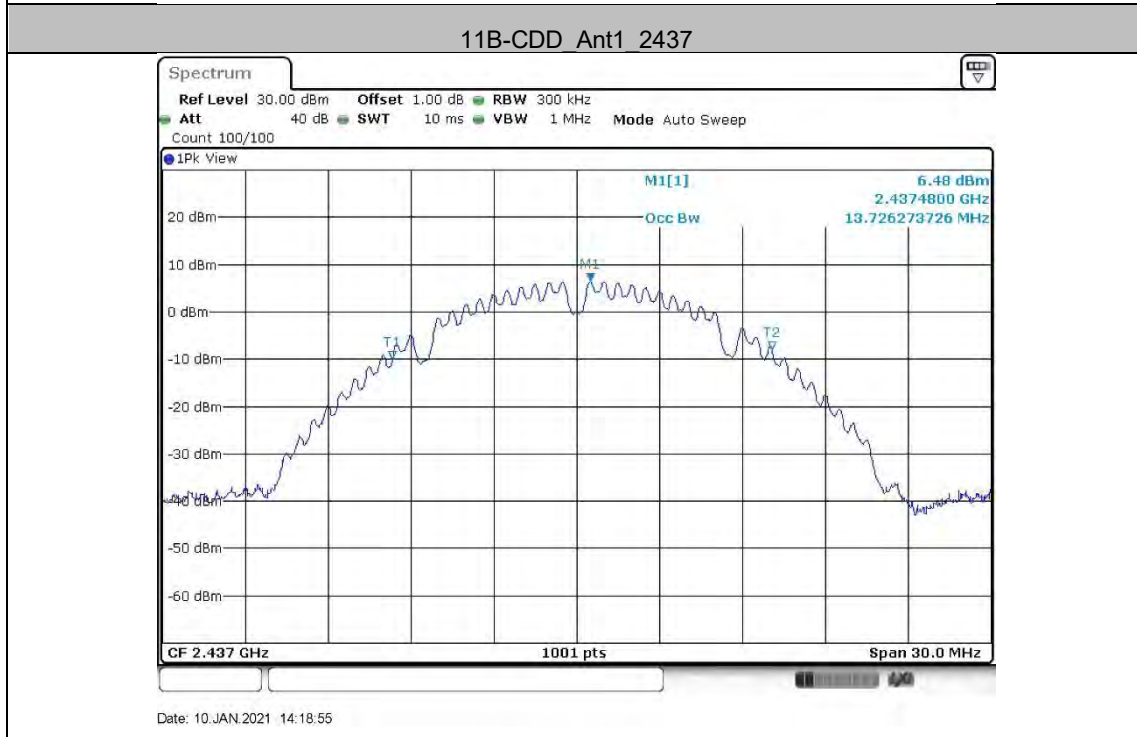
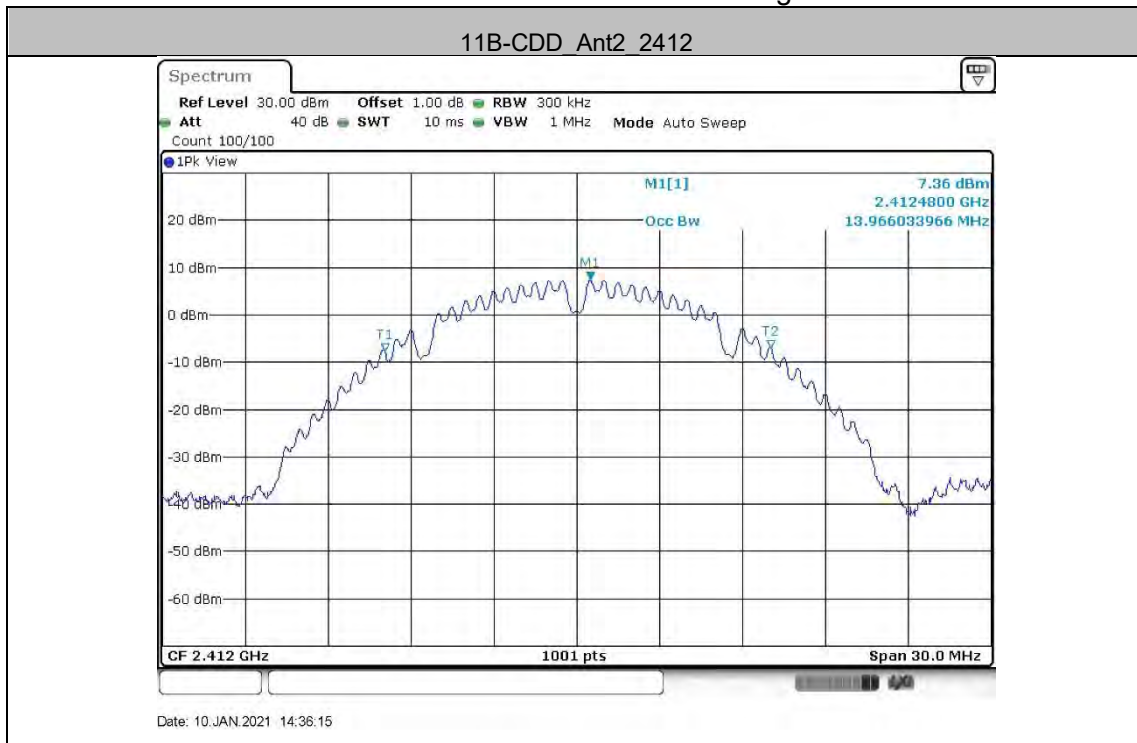


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