



FCC TEST REPORT

Application No: ZR/2020/B0030
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
Trade Mark: Sony
FCC ID: PY7-10933K
Standards: 47 CFR Part 15, Subpart C
KDB 558074 D01 DTS Meas Guidance v0502
Test Method: ANSI C63.4(2014)
ANSI C63.10 (2013)
Date of Receipt: 2020/11/19
Date of Test: 2020/11/19 to 2020/12/18
Date of Issue: 2021/7/4

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

Authorized Signature:

Derek Yang
Wireless Laboratory Manager



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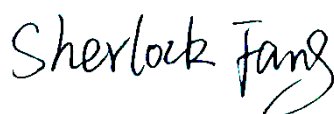

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1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020/12/20		Original
02		2021/7/4	Sherlock Fang	1.Add test site Information 2.Modify data conversion error of antenna height 3.Update equipment list

*This report supersedes our previous report ZR/2020/B0003004, issued on 2020-12-20, which is hereby deemed null and void.

Authorized for issue by:	
Prepared By	 (Sherlock Fang) / 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 4.3	PASS	B
Conducted Peak Output Power	15.247 (b)(1)	ANSI C63.10 (2013)	Clause 4.5	PASS	A
20dB Emission Bandwidth	15.247 (a)(1)	ANSI C63.10 (2013)	Clause 4.6	PASS	A
Carrier Frequencies Separation	15.247 (a)(1)	ANSI C63.10 (2013)	Clause 4.7	PASS	A
Hopping Channel Number	15.247 (a)(1)	ANSI C63.10 (2013)	Clause 4.8	PASS	A
Dwell Time	15.247 (a)(1)	ANSI C63.10 (2013)	Clause 4.9	PASS	A
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10 (2013)	Clause 4.10	PASS	A
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10 (2013)	Clause 4.11	PASS	A
Radiated Spurious emissions	15.247(d); 15.205/15.209	ANSI C63.10 (2013)	Clause 4.12	PASS	B
Restricted bands around fundamental frequency (Radiated Emission)	15.247(d); 15.205/15.209	ANSI C63.10 (2013)	Clause 4.13	PASS	B

Remark: All test were performed by Lab A and B.
Parts of test items above were subcontracted to Lab B.
Lab A SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Lab B SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.



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3 General Information

3.1 Client Information

Applicant:	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
Test Engineer	Dee Zheng, Mike Hu

Lab B:

Company:	SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.
Address:	1/F, Unit D, Building 1, Kanghong Orange Technology Park, No.137, Keyuan 3rd Road, Fengdong New City, Xi'an, Shaanxi China
Post code:	710086
Test Engineer	Ben Huang, Lean Chen



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3.3 Test Facility

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

Lab A:

• A2LA (Certificate No. 3816.01)

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

• VCCI

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

• FCC –Designation Number: CN1178

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

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

• Innovation, Science and Economic Development Canada

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

CAB identifier: CN0006.

IC#: 4620C.

Lab B:

A2LA (Certificate No. 4854.01)

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

FCC-Designation Number: CN1271.



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3.4 General Description of EUT

EUT Description:	GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac, GPS and NFC
Trade Mark:	Sony
S/N:	001265ADNVM2
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: - 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
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 type="checkbox"/> Ant 2, <input type="checkbox"/> Ant 3
Smart System	<input checked="" type="checkbox"/> SISO (for 802.11B/G/N), <input type="checkbox"/> MIMO (for 802.11N): 2 Tx & 2 Rx, <input type="checkbox"/> Diversity (for 802.11B/G) : Tx & Rx
Antenna Gain:	-3.0dBi

Operation Frequency of each channel (802.11B/G/N HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		



Remark:

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

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

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:</p> <p>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:</p> <p>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 -3.0dBi.</p>	



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4.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2013		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test Procedure:	<ol style="list-style-type: none"> 1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. 		



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

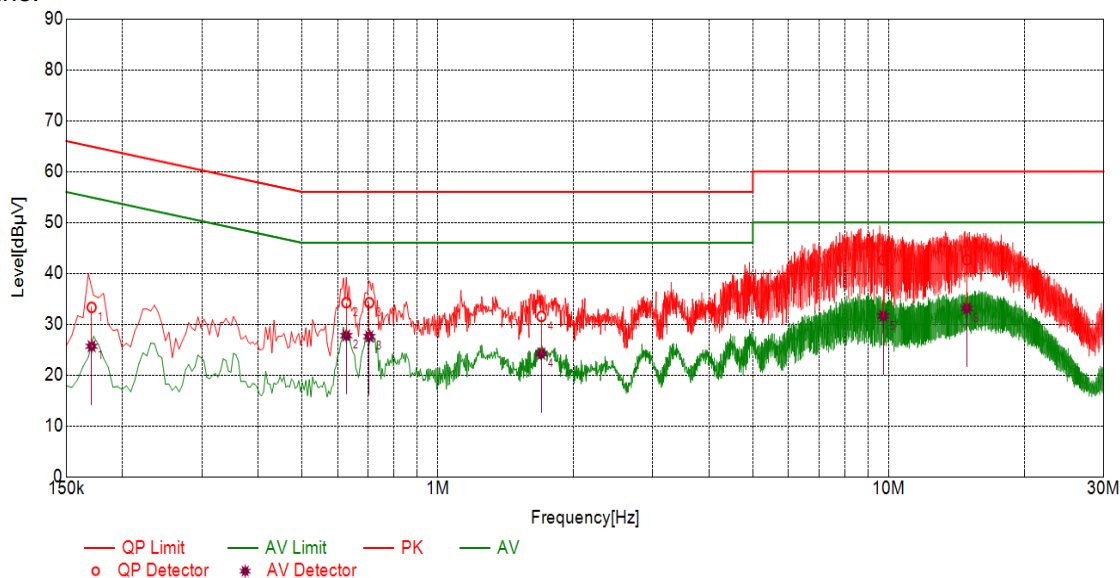


Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live Line:



Test Graph

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type
1	0.1708	10.10	33.30	64.92	31.62	25.67	54.92	29.25	L
2	0.6270	10.10	34.23	56.00	21.77	27.76	46.00	18.24	L
3	0.7053	10.10	34.22	56.00	21.78	27.58	46.00	18.42	L
4	1.6981	10.10	31.53	56.00	24.47	24.20	46.00	21.80	L
5	9.7314	10.10	42.62	60.00	17.38	31.60	50.00	18.40	L
6	14.9156	10.11	42.66	60.00	17.34	33.10	50.00	16.90	L

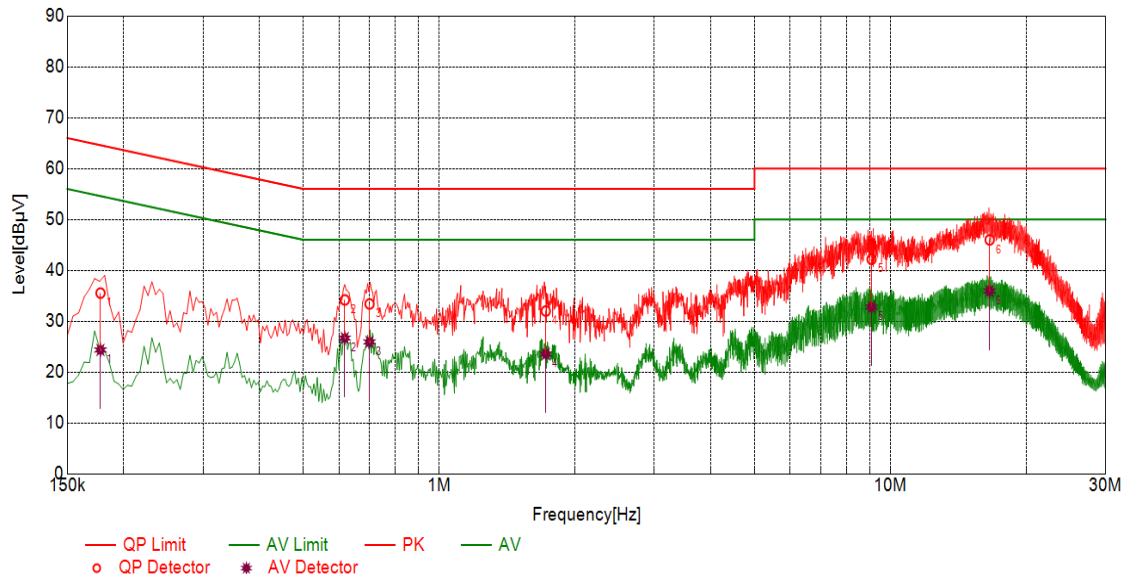


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Neutral Line:



Test Graph

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type
1	0.1777	10.10	35.53	64.59	29.06	24.35	54.59	30.24	N
2	0.6181	10.10	34.18	56.00	21.82	26.68	46.00	19.32	N
3	0.7013	10.10	33.39	56.00	22.61	25.92	46.00	20.08	N
4	1.7236	10.10	32.00	56.00	24.00	23.53	46.00	22.47	N
5	9.0856	10.10	42.18	60.00	17.82	32.77	50.00	17.23	N
6	16.5932	10.11	45.99	60.00	14.01	35.94	50.00	14.06	N

Remarks:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.



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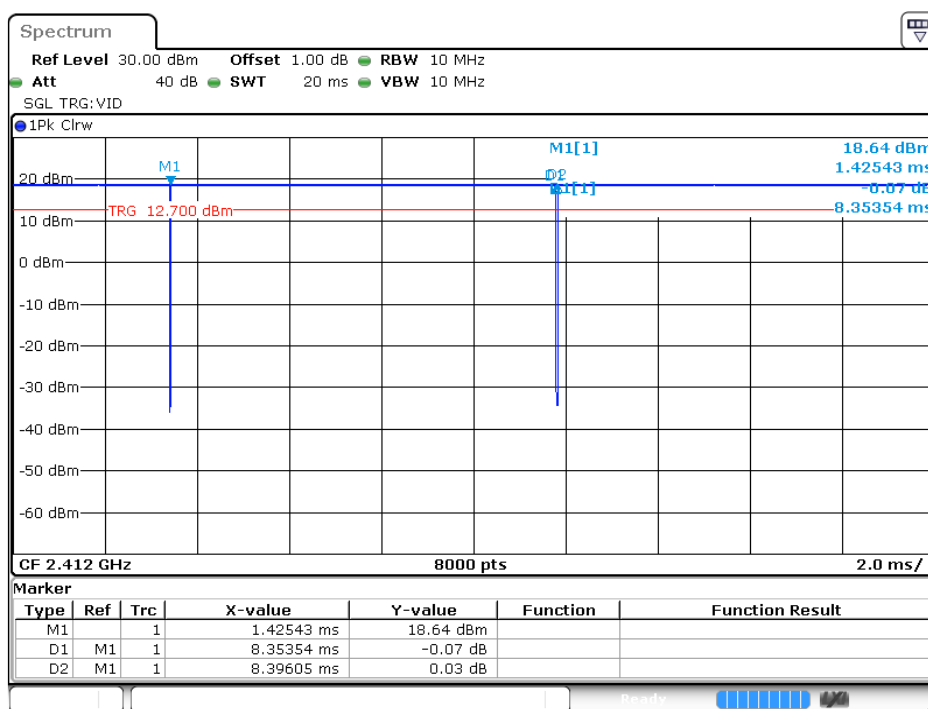
4.3 Duty Cycle

4.3.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11B	Ant 1: CH1,CH6,CH11	99.40
11G	Ant 1: CH1,CH6,CH11	96.50
11N_20	Ant 1: CH1,CH6,CH11	96.27

4.3.2 Test Plots

4.3.2.1 11B @Ant 1



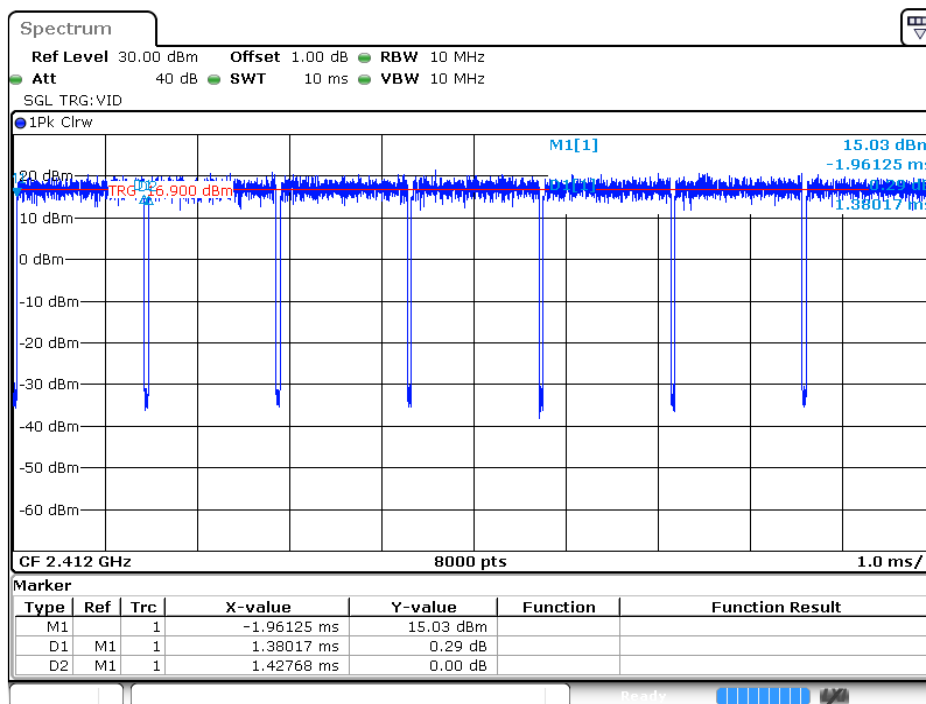
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4.3.2.2

11G@Ant 1



Date: 30.NOV.2020 14:06:06



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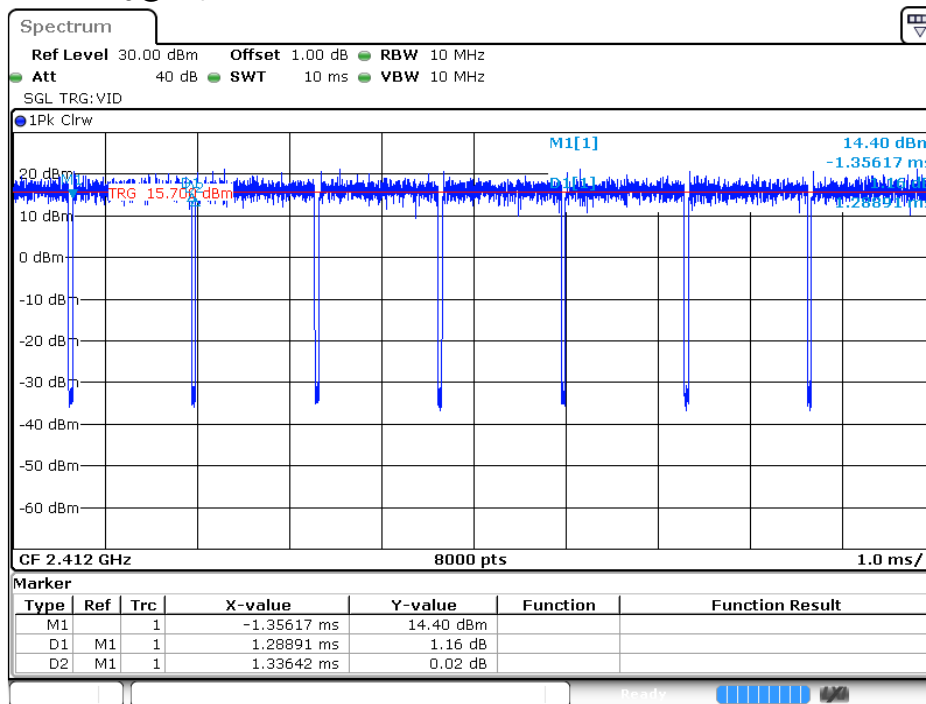
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4.3.2.3

11N20@Ant 1



Date: 30 NOV 2020 14:27:00

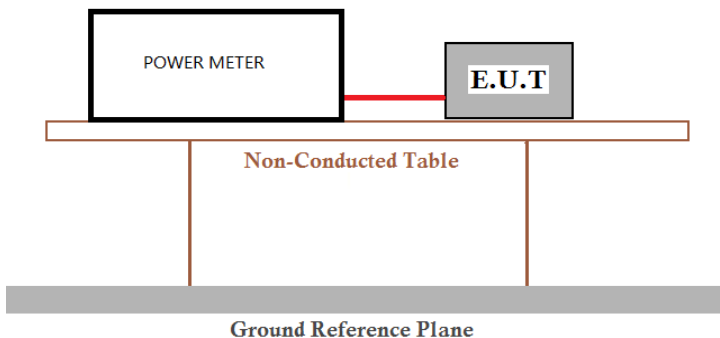


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4.4 Conducted Output Power

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



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4.4.1 Test Results

Measurement Data of Peak Power:

Mode	Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result
802.11B	Lowest	11.92	30.00	Pass
	Middle	14.49	30.00	Pass
	Highest	13.81	30.00	Pass
802.11G	Lowest	10.52	30.00	Pass
	Middle	12.25	30.00	Pass
	Highest	11.94	30.00	Pass
802.11N20	Lowest	10.34	30.00	Pass
	Middle	11.18	30.00	Pass
	Highest	9.96	30.00	Pass

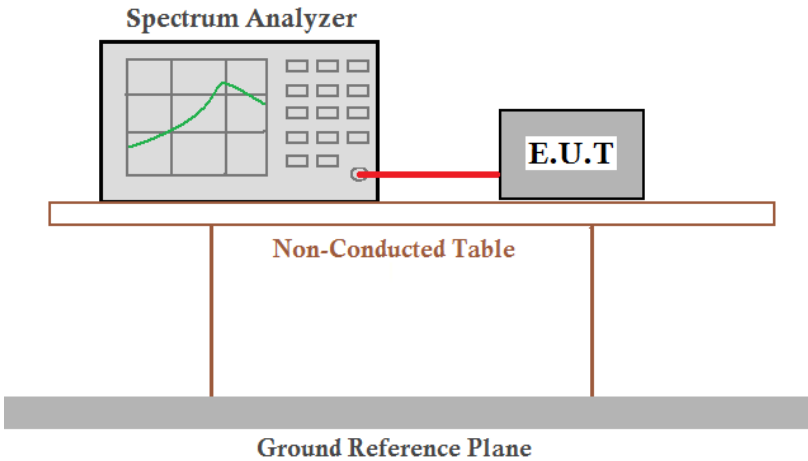


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4.5 DTS (6 dB) Bandwidth

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



4.5.1 Test Results

Mode	Test Channel	Occupied Bandwidth (MHz)	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
802.11B	Lowest	8.100	12.737	≥500	Pass
	Middle	8.130	13.037	≥500	Pass
	Highest	8.130	12.857	≥500	Pass
802.11G	Lowest	15.750	16.753	≥500	Pass
	Middle	15.510	16.873	≥500	Pass
	Highest	15.150	16.543	≥500	Pass
802.11N20	Lowest	15.150	17.742	≥500	Pass
	Middle	15.180	17.892	≥500	Pass
	Highest	15.150	17.562	≥500	Pass

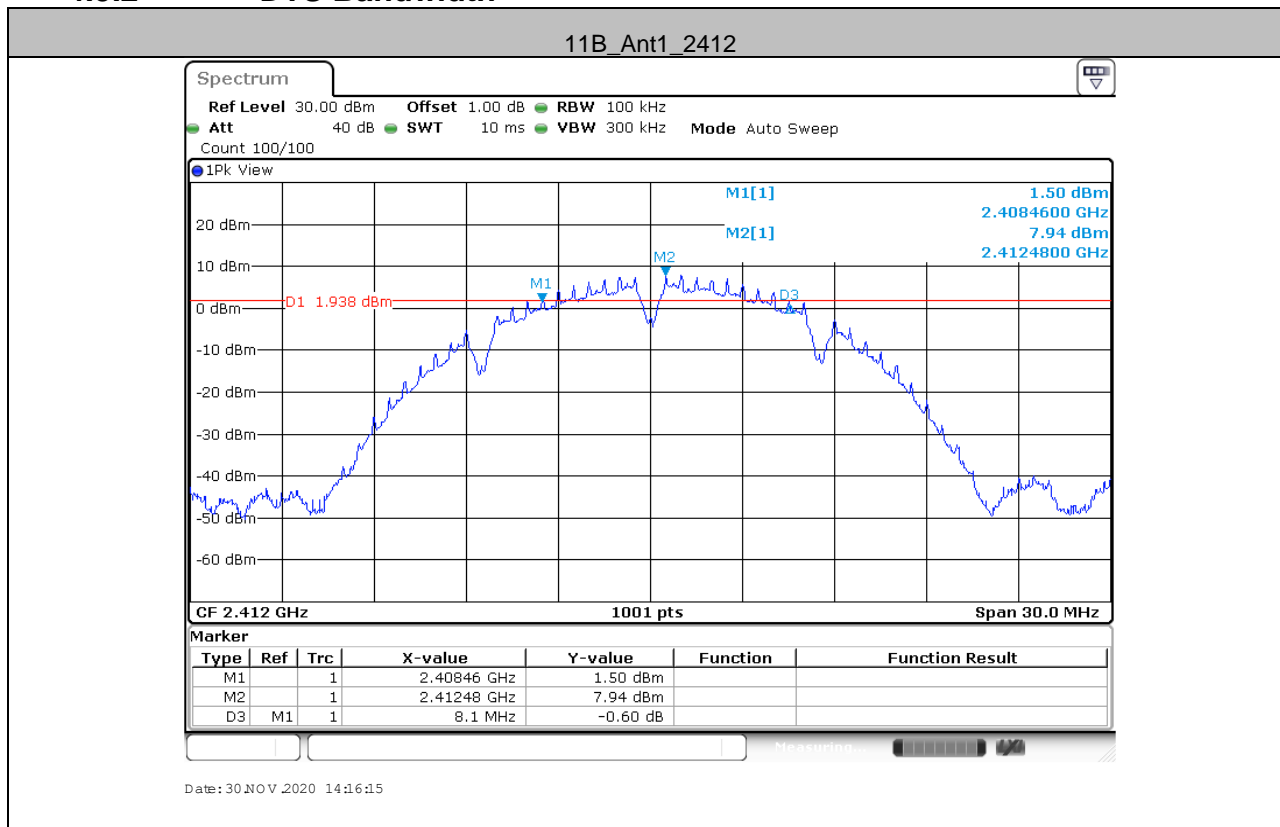


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4.5.2 DTS Bandwidth



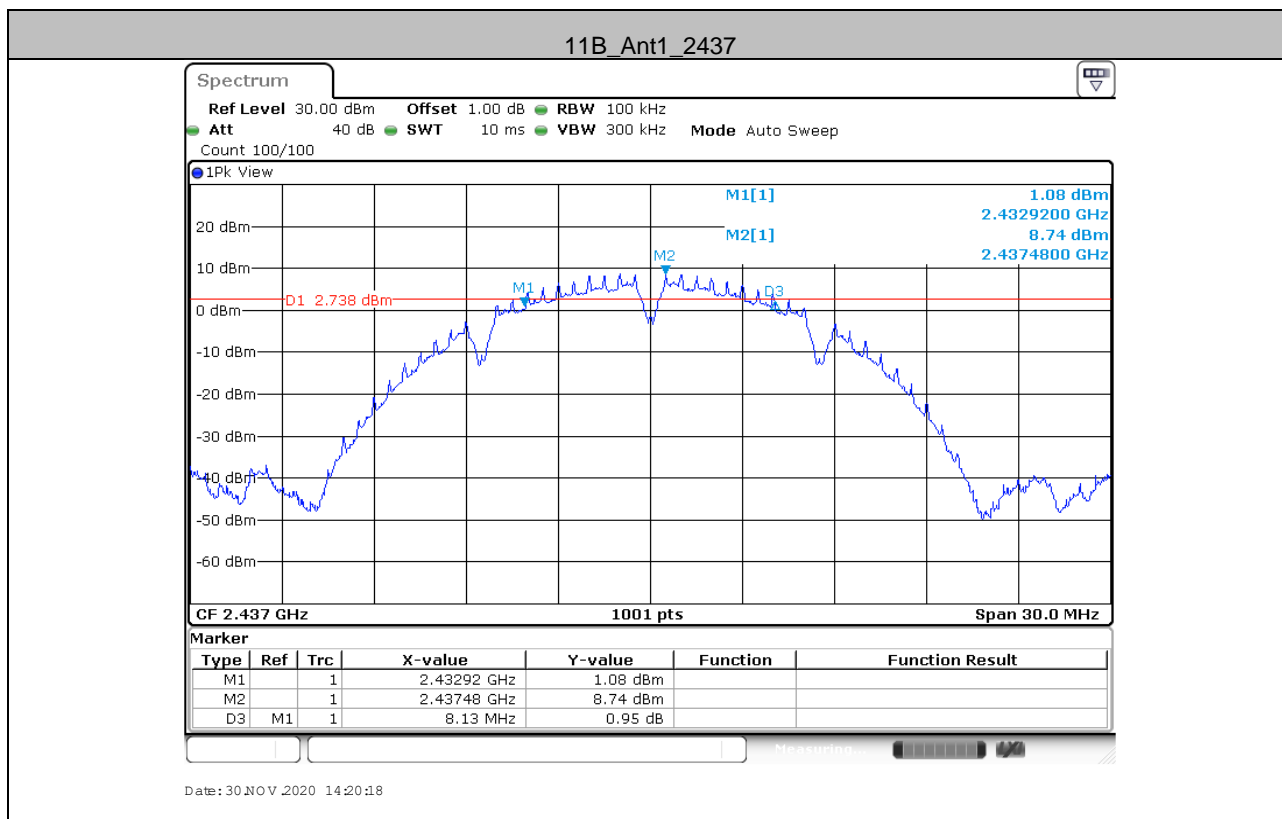
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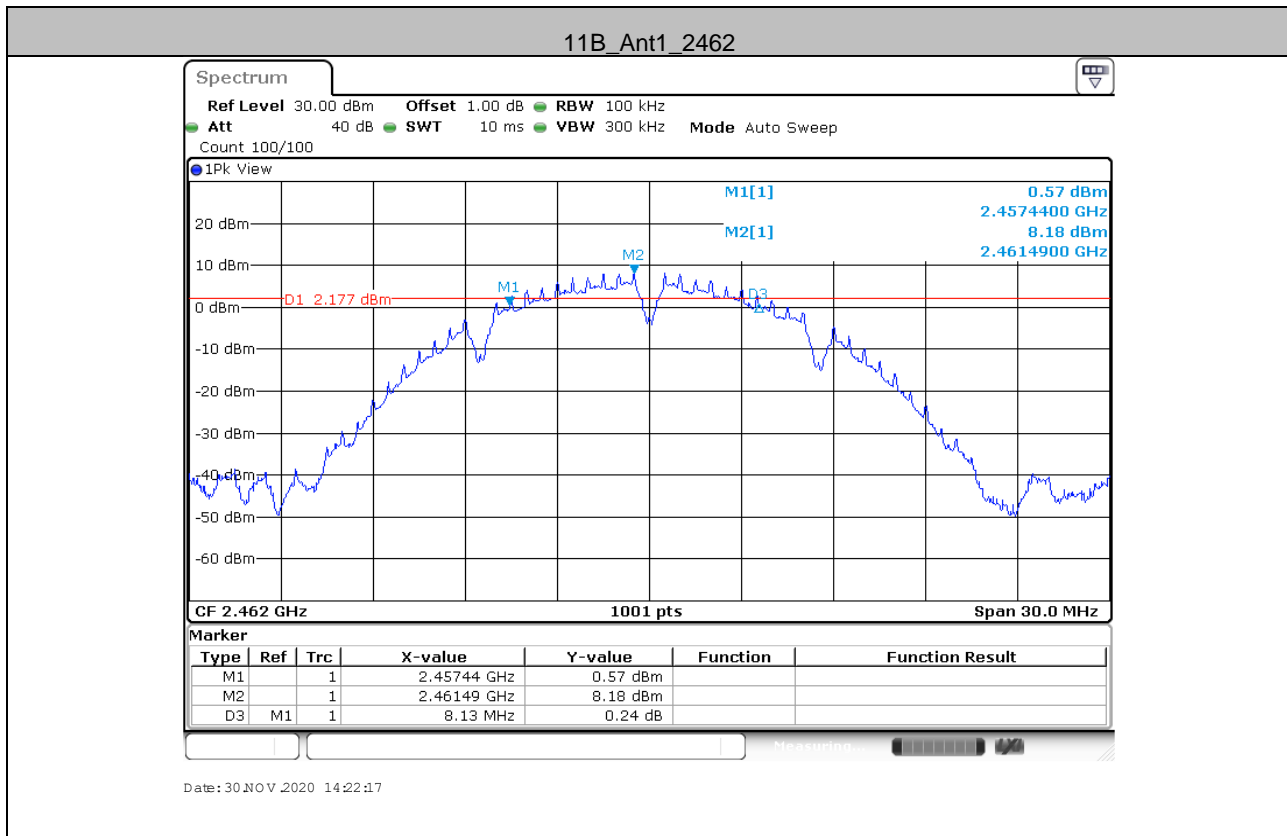
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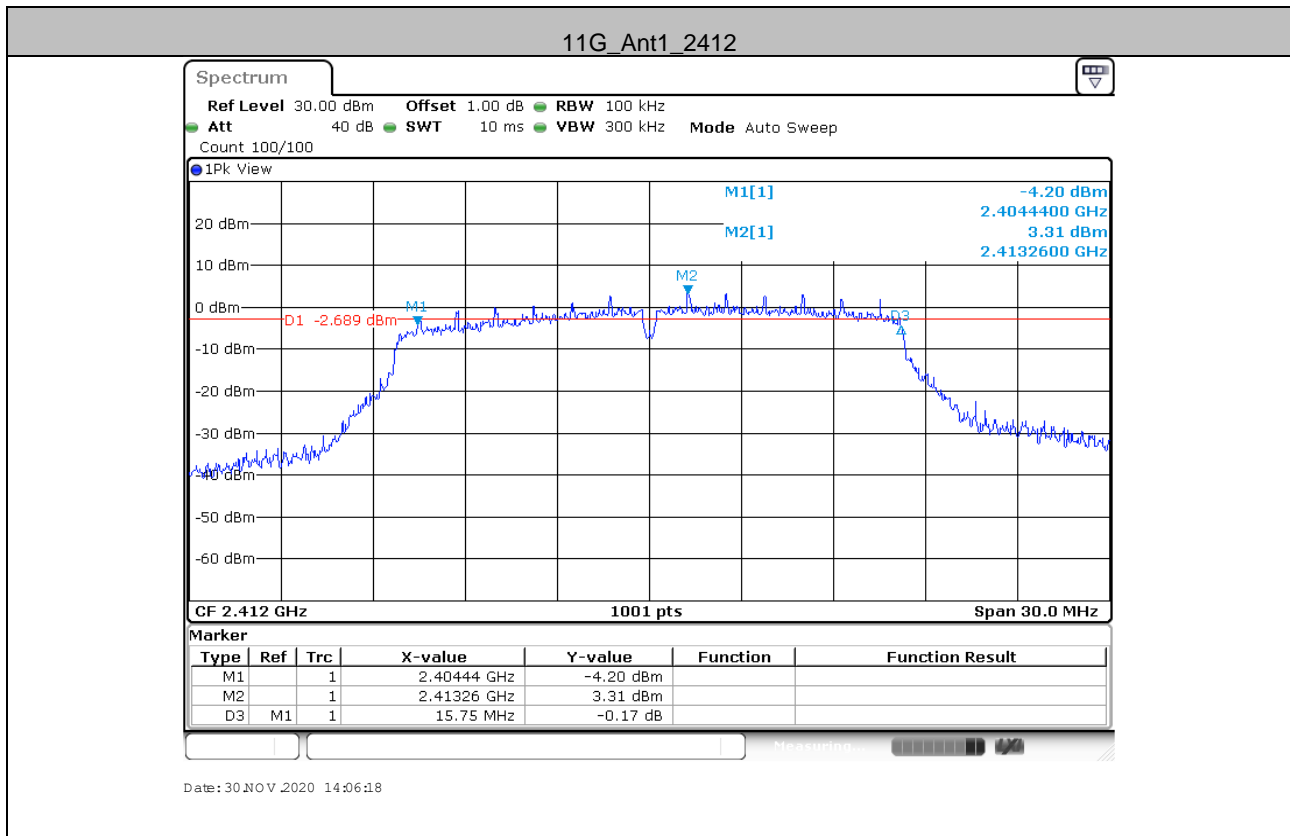


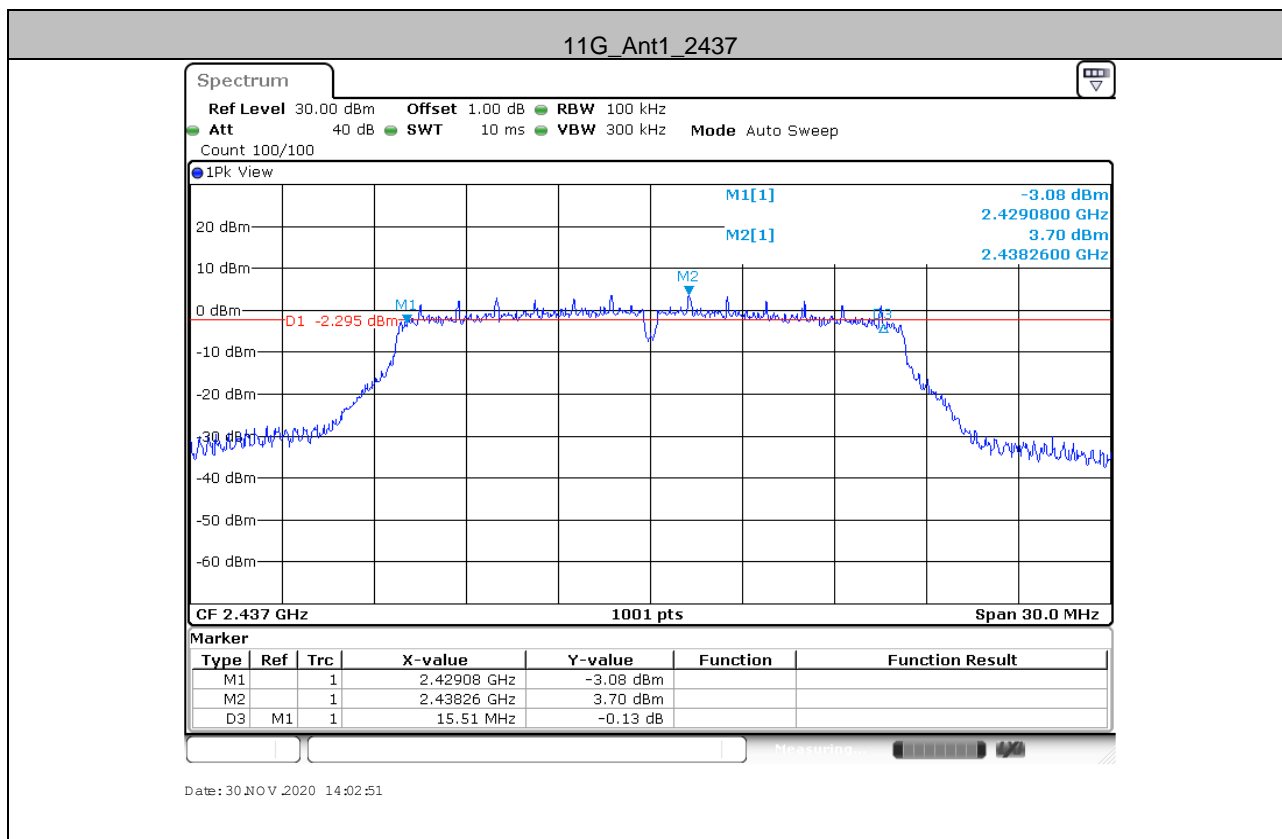
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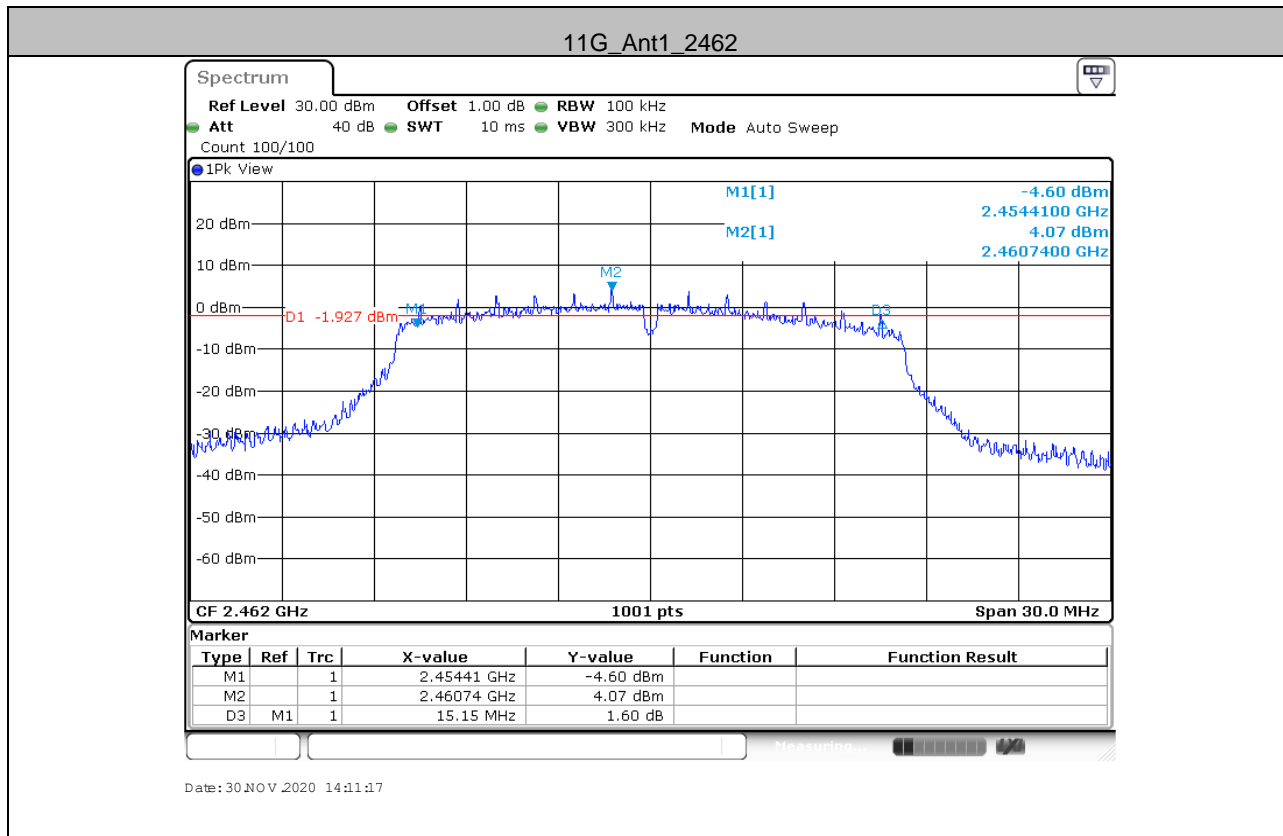
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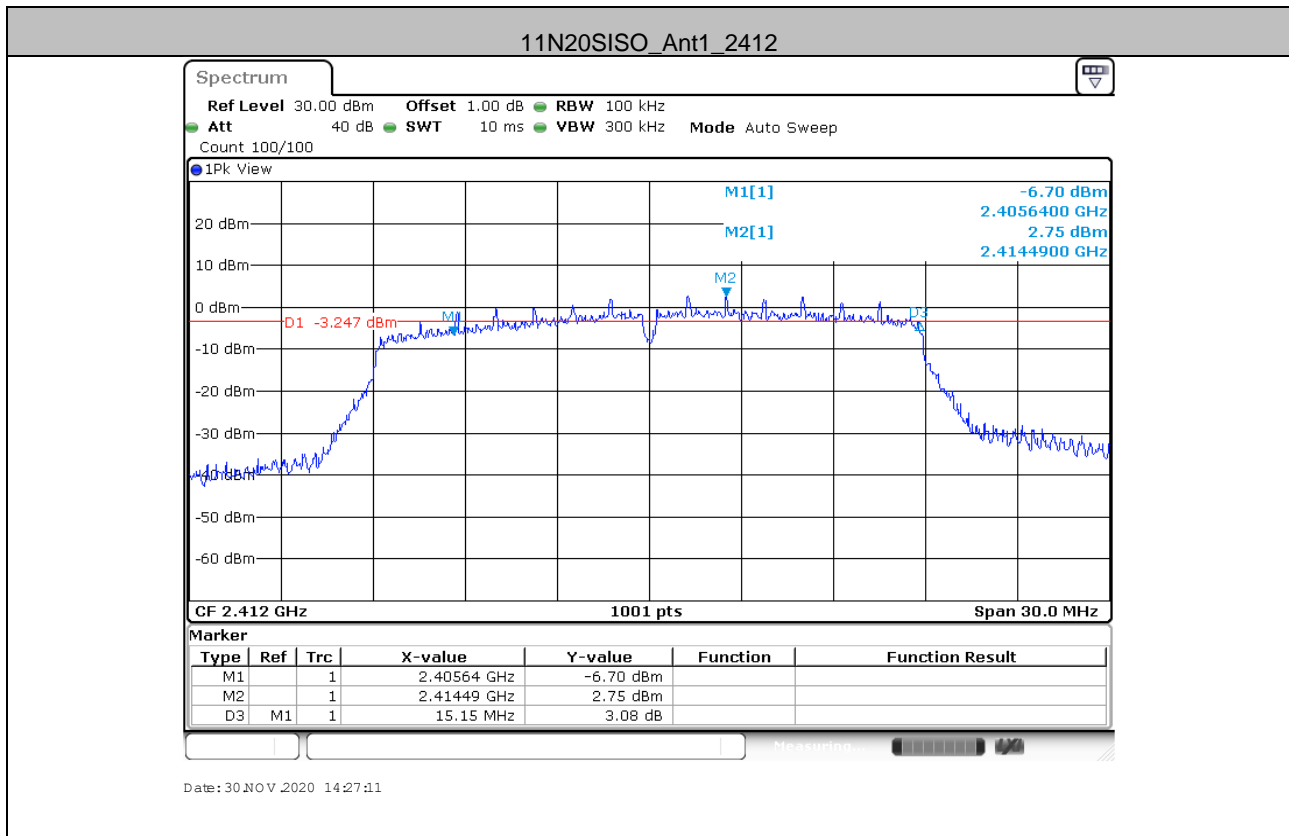
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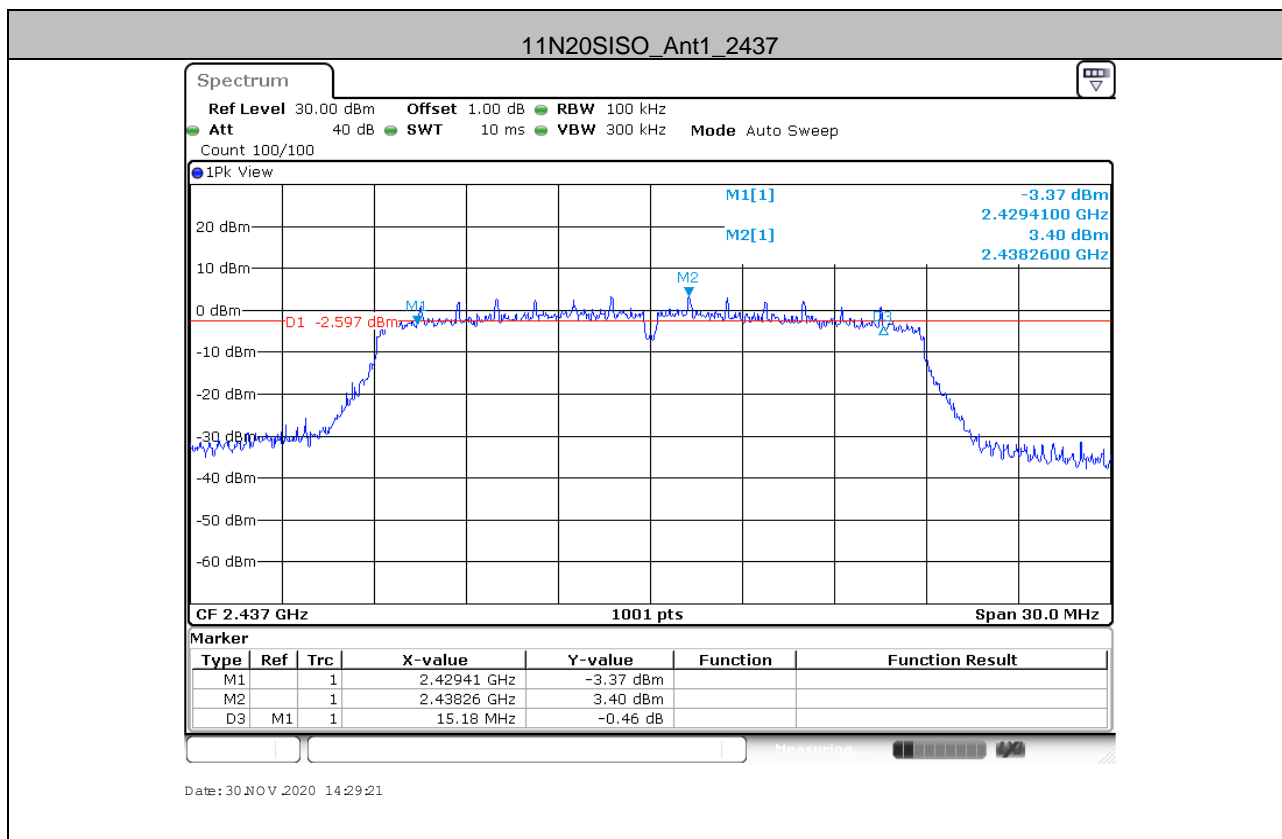


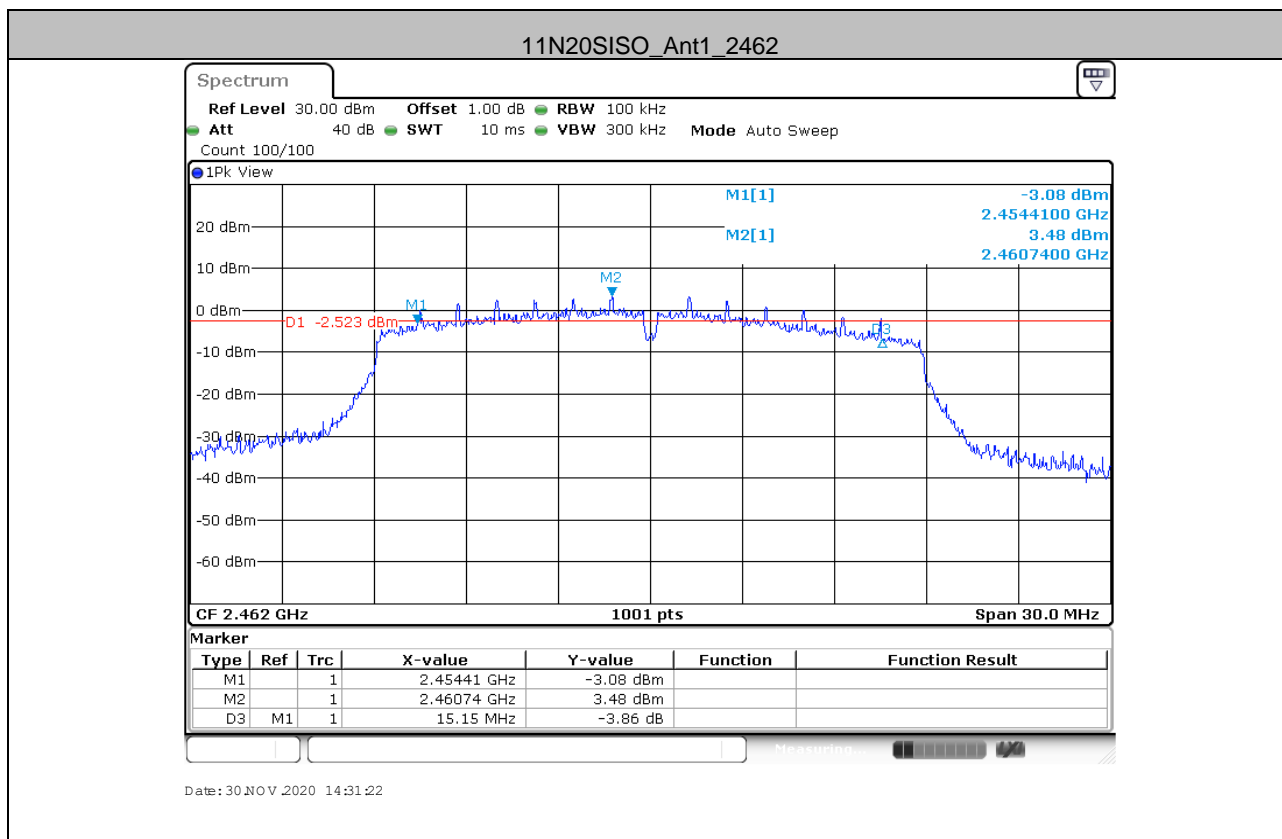






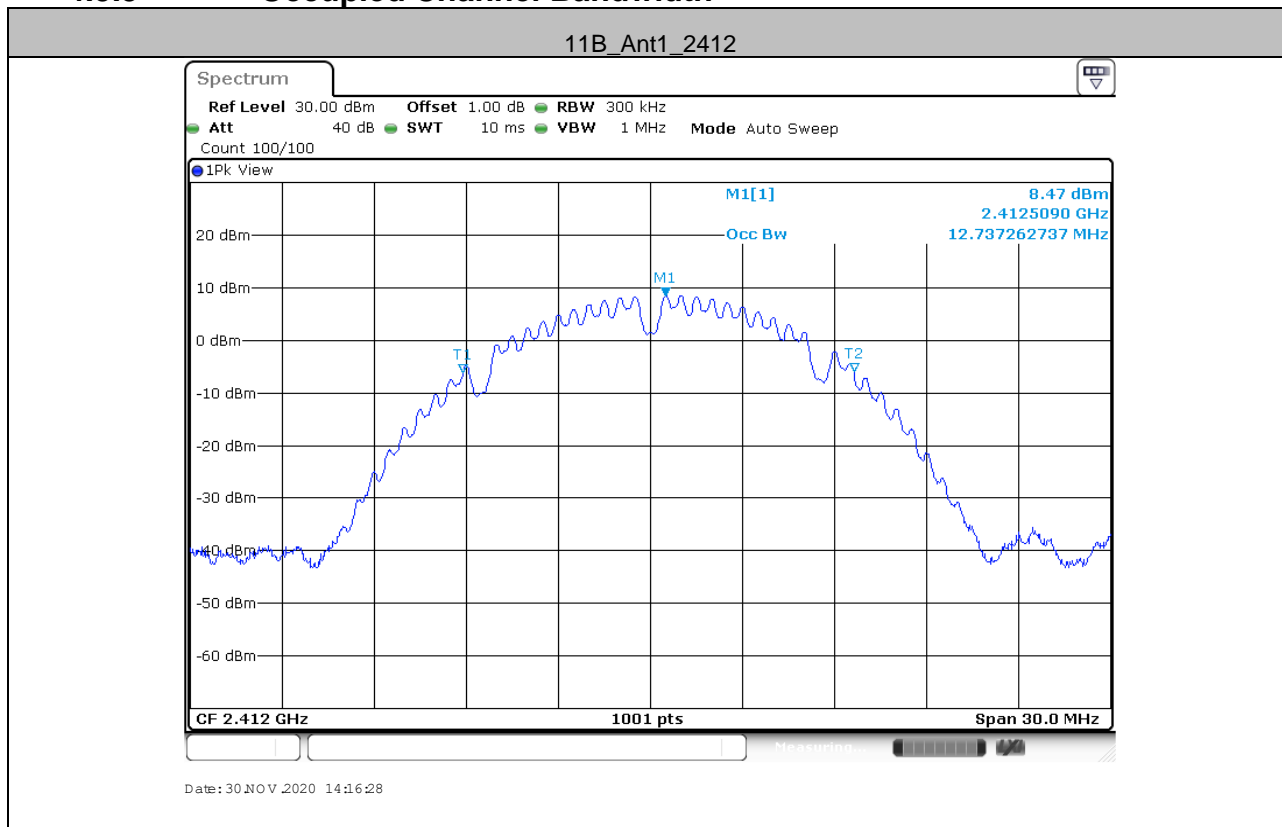


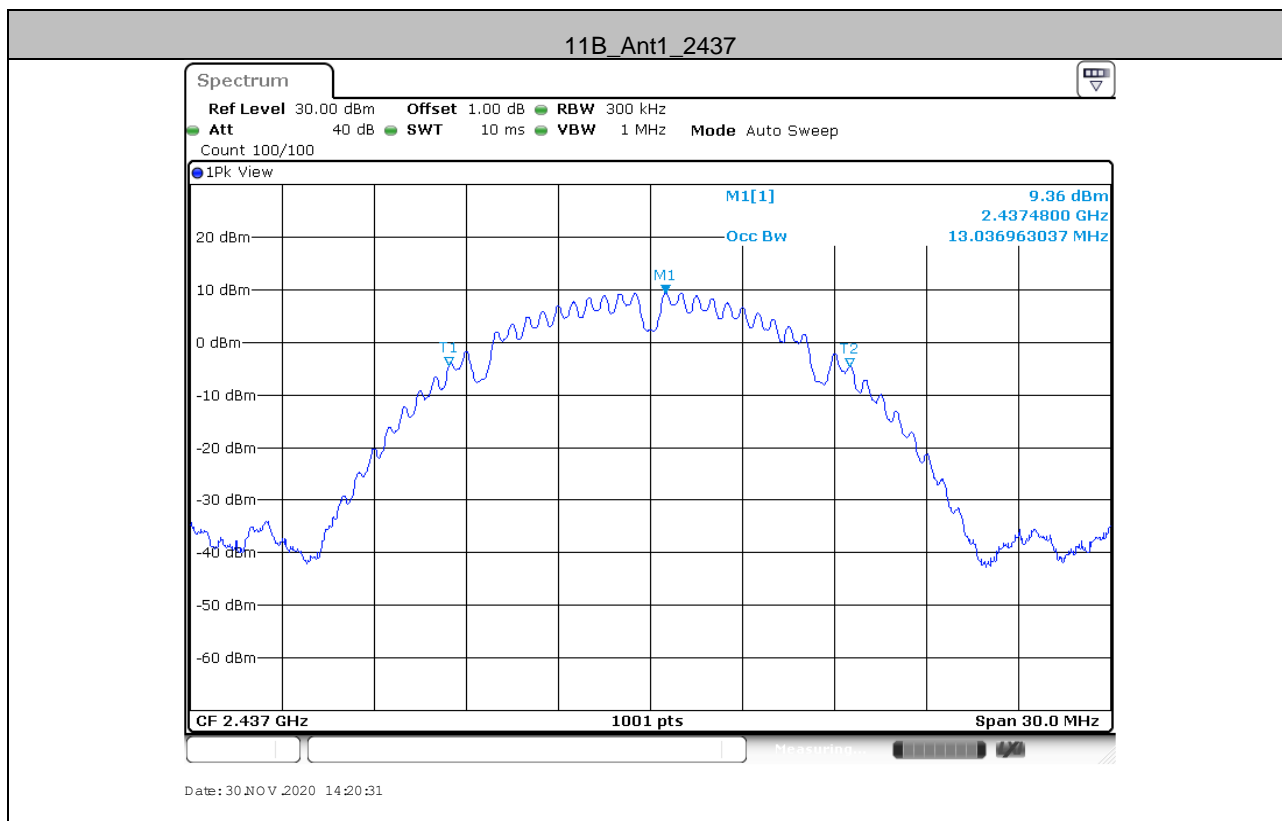






4.5.3 Occupied Channel Bandwidth



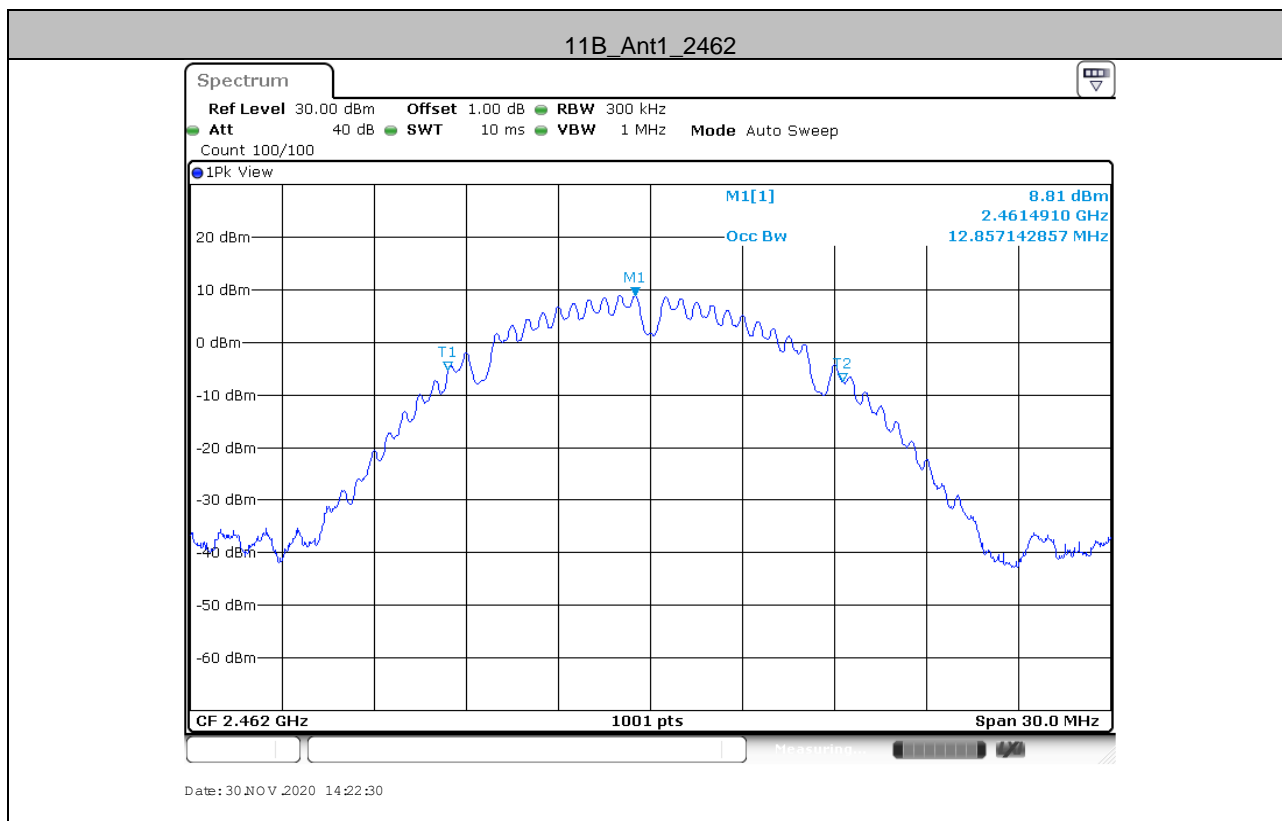


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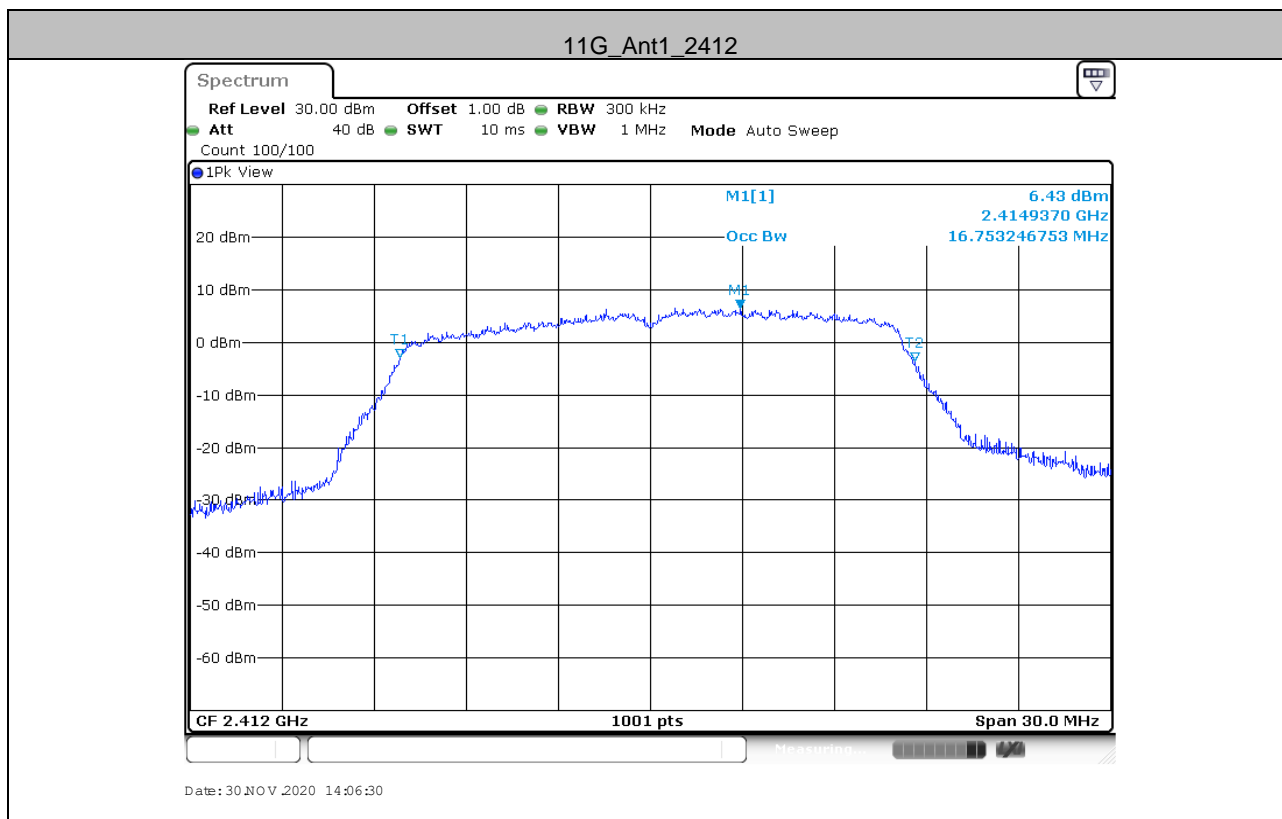


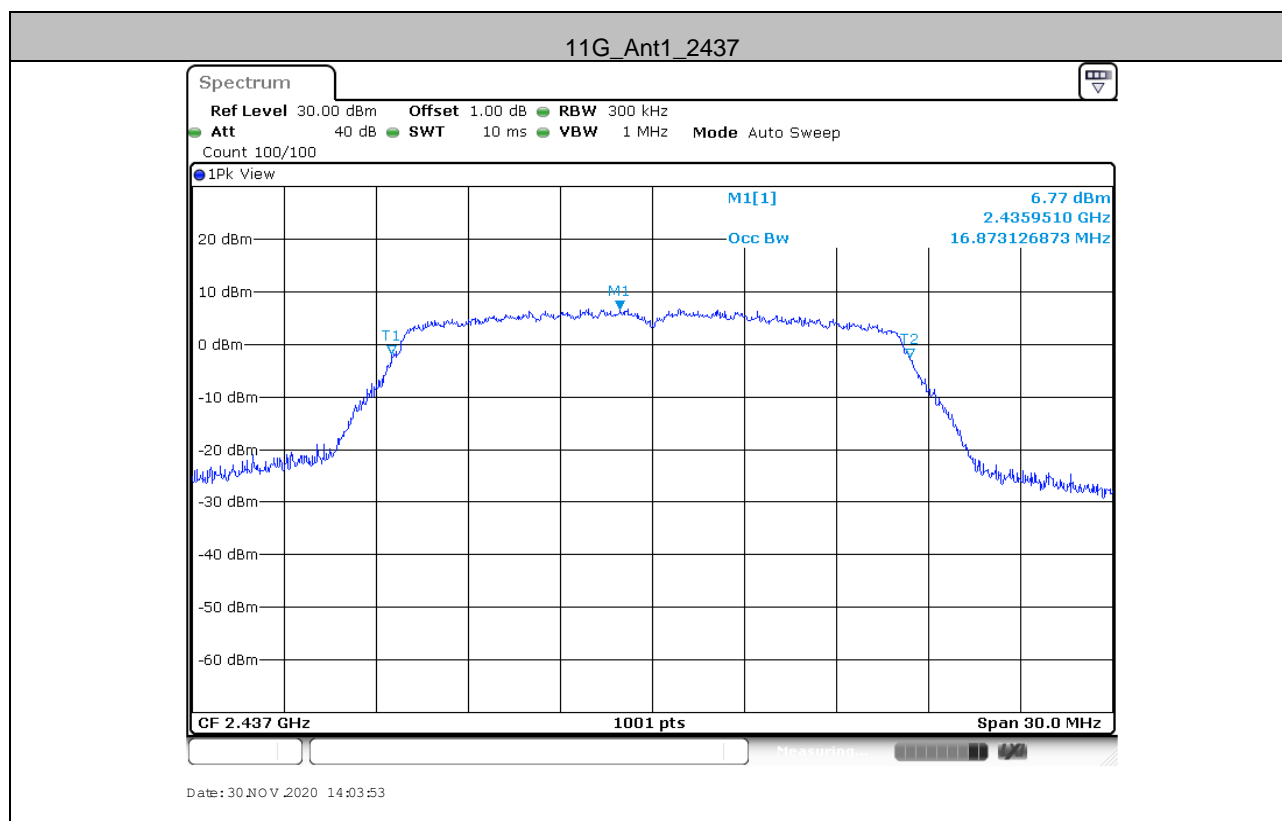
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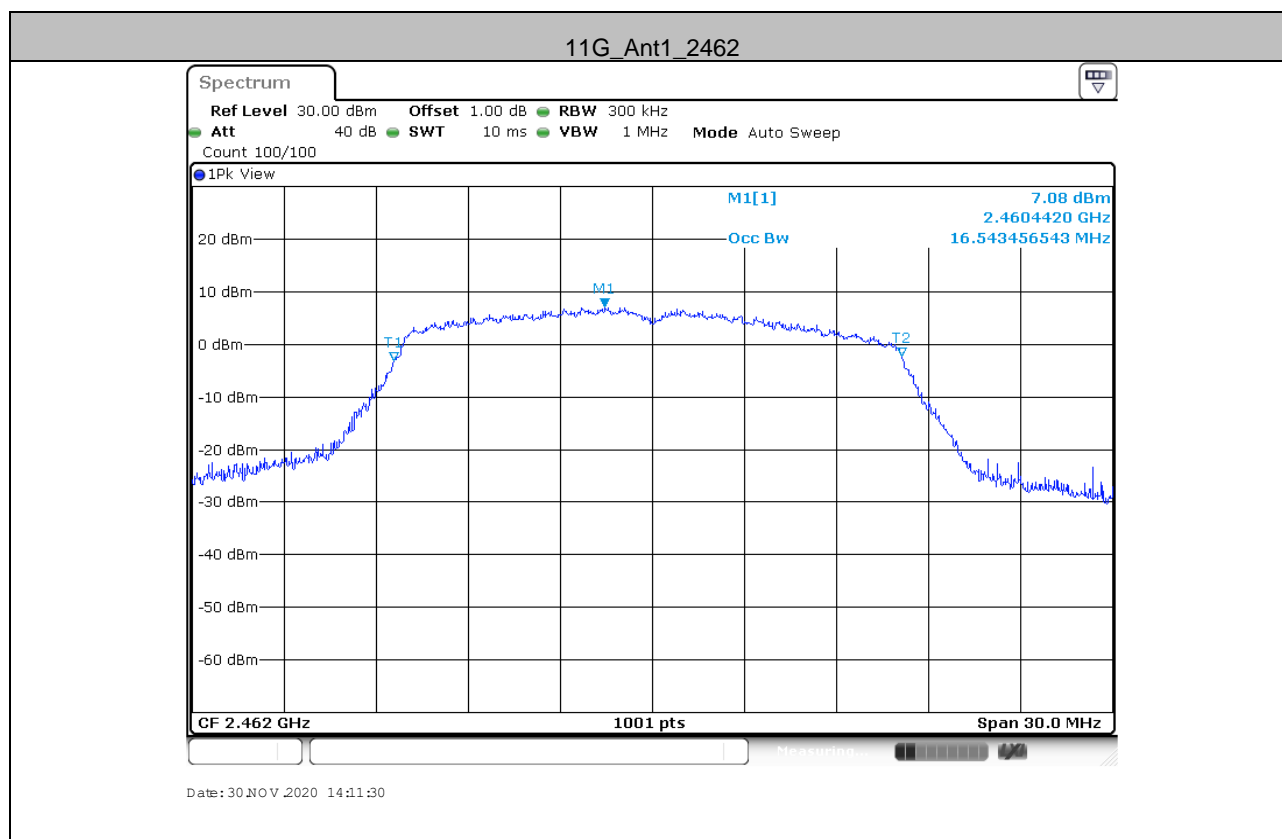
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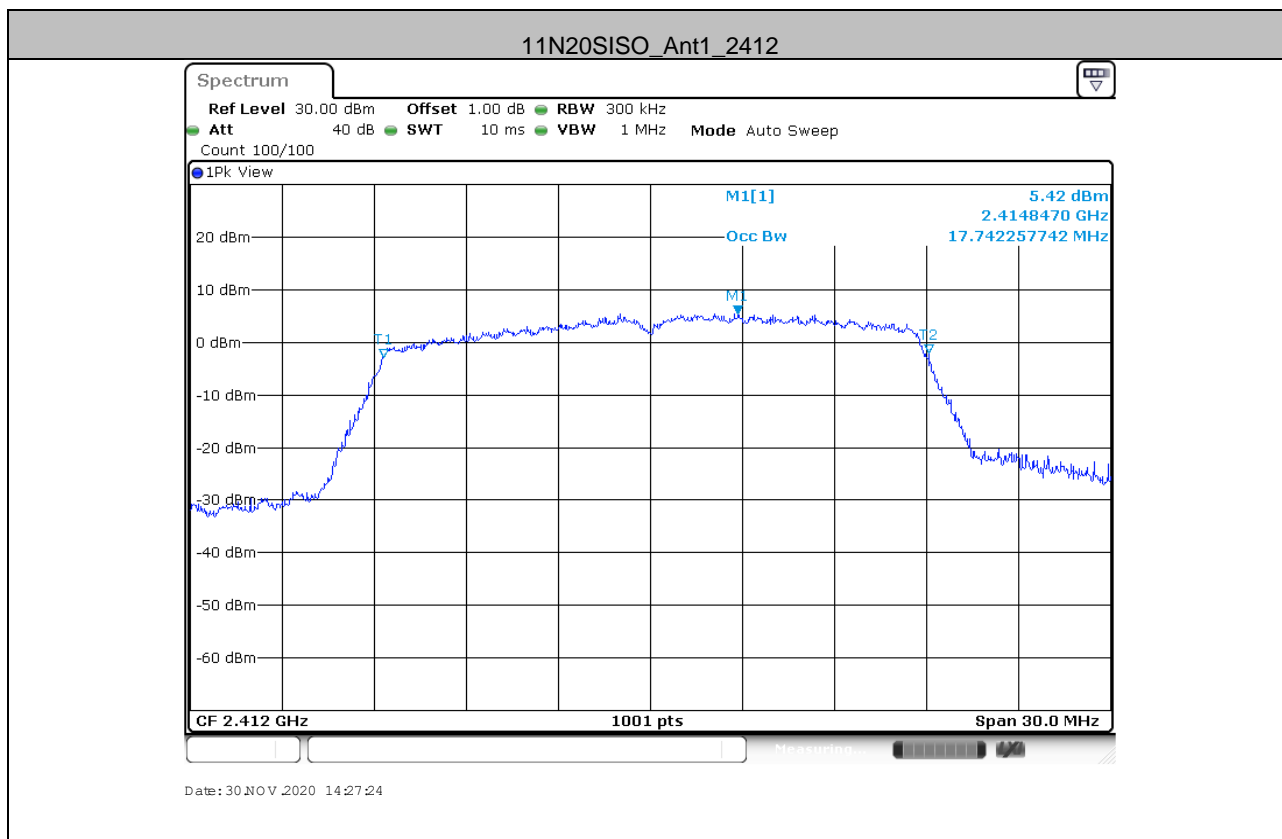
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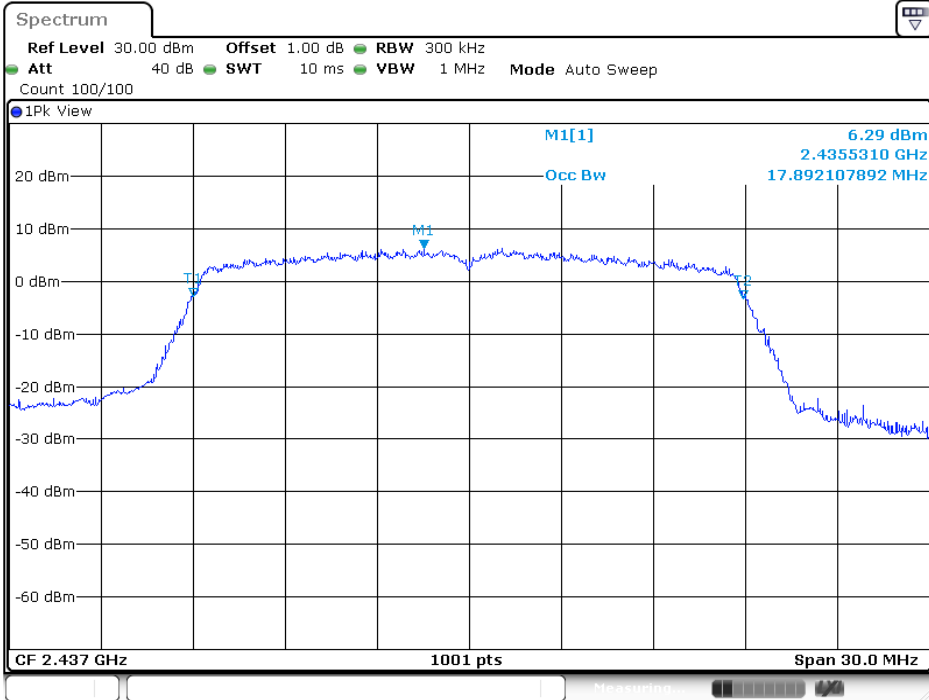


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Date: 30 NOV 2020 14:29:33

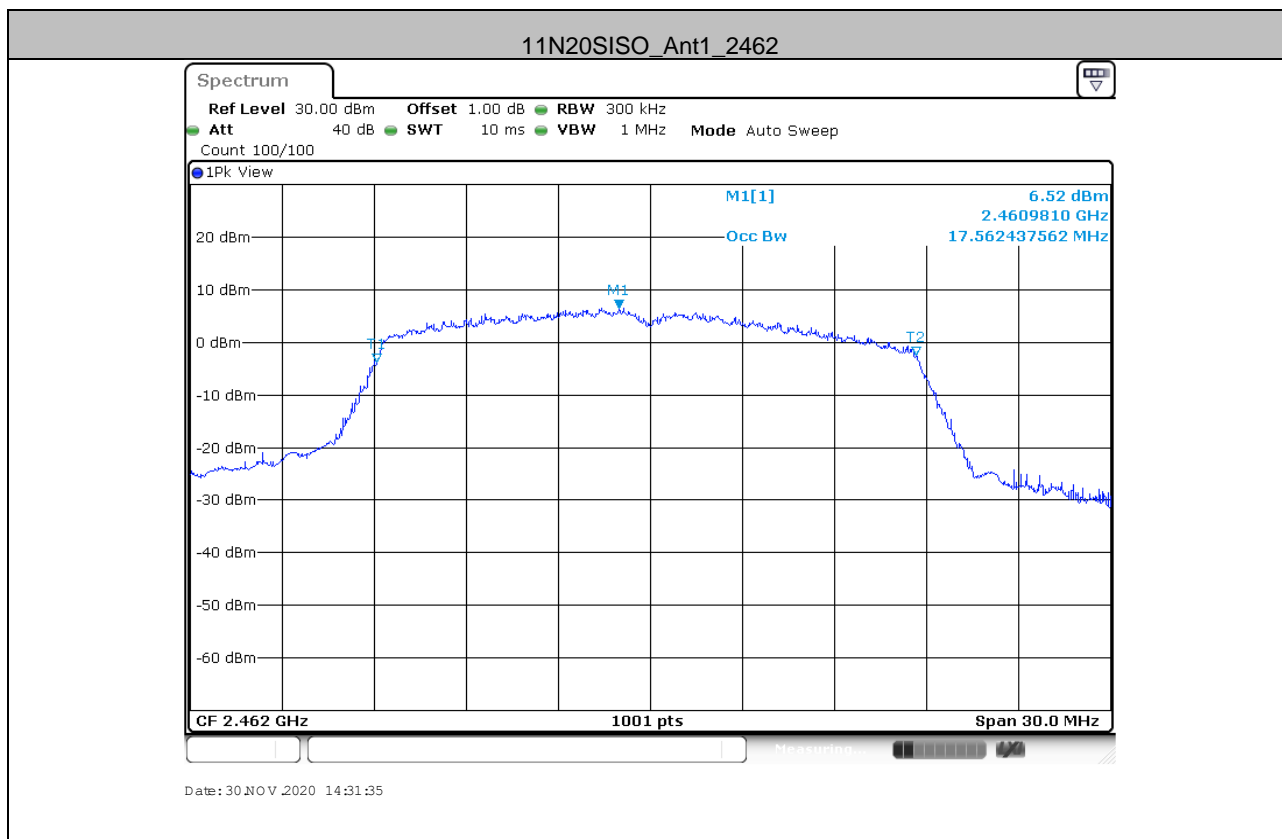


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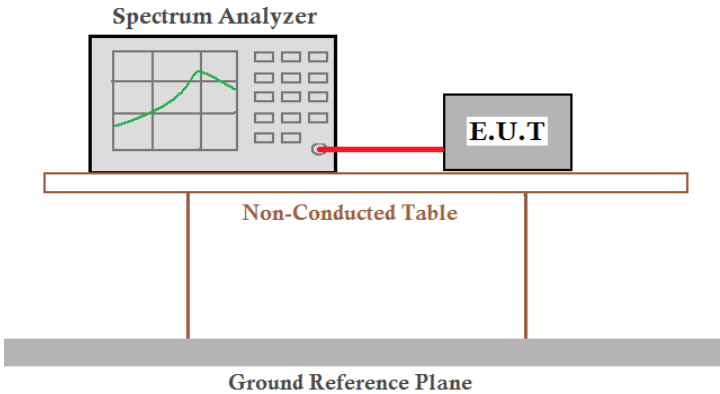
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4.6 Power Spectral Density

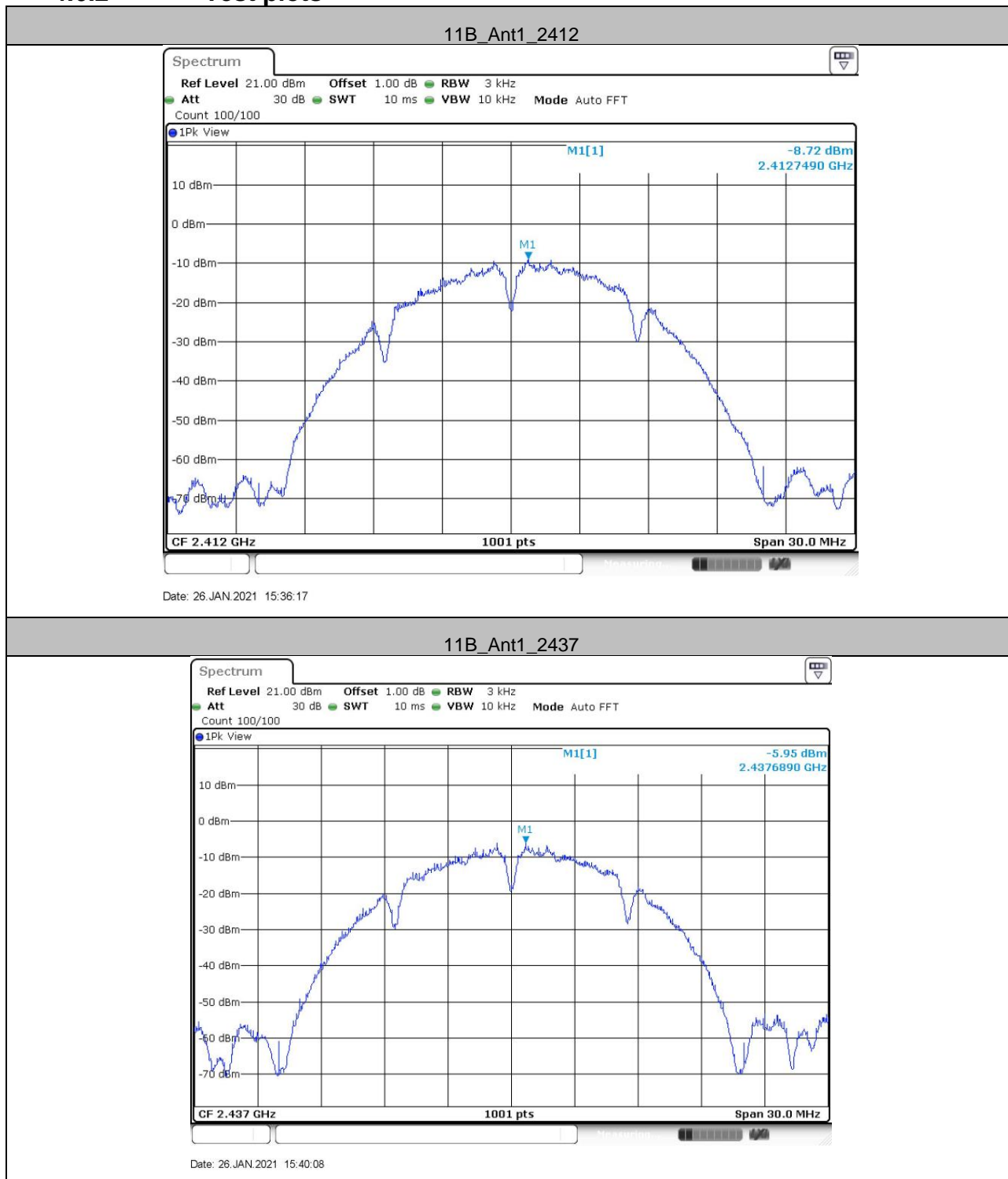
Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10 :2013 Section 11.10.2
Test Setup:	
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; MCS0 of rate is the worst case of 802.11N(HT20);
Limit:	≤8.00dBm/3kHz
Test Results:	Pass

4.6.1 Test Results

Mode	Test Channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11B	Lowest	-8.72	≤8.00	Pass
	Middle	-5.95	≤8.00	Pass
	Highest	-7.69	≤8.00	Pass
802.11G	Lowest	-12.32	≤8.00	Pass
	Middle	-11.1	≤8.00	Pass
	Highest	-11.01	≤8.00	Pass
802.11N20	Lowest	-11.91	≤8.00	Pass
	Middle	-11.74	≤8.00	Pass
	Highest	-13.57	≤8.00	Pass



4.6.2 Test plots



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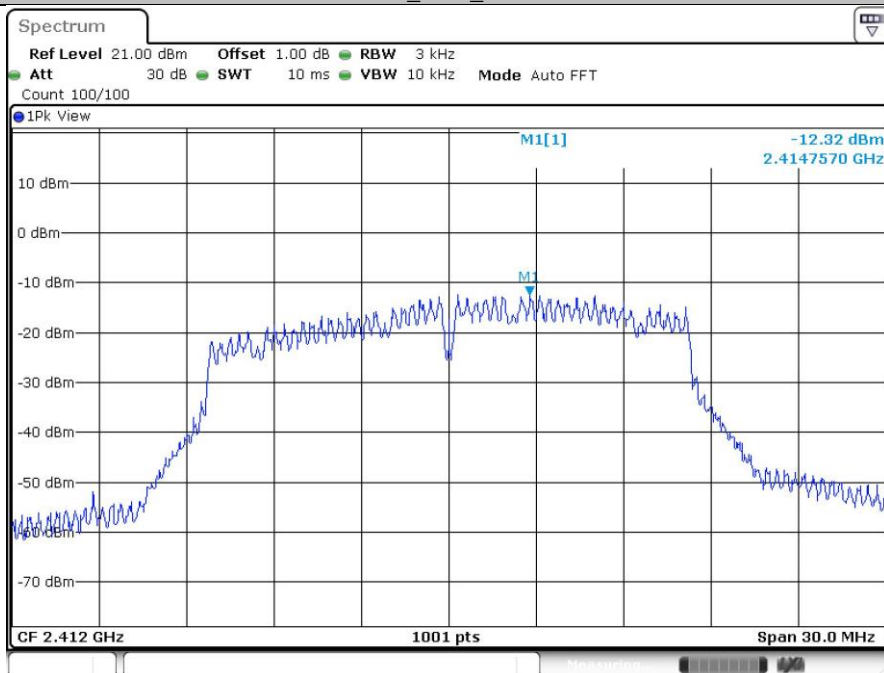


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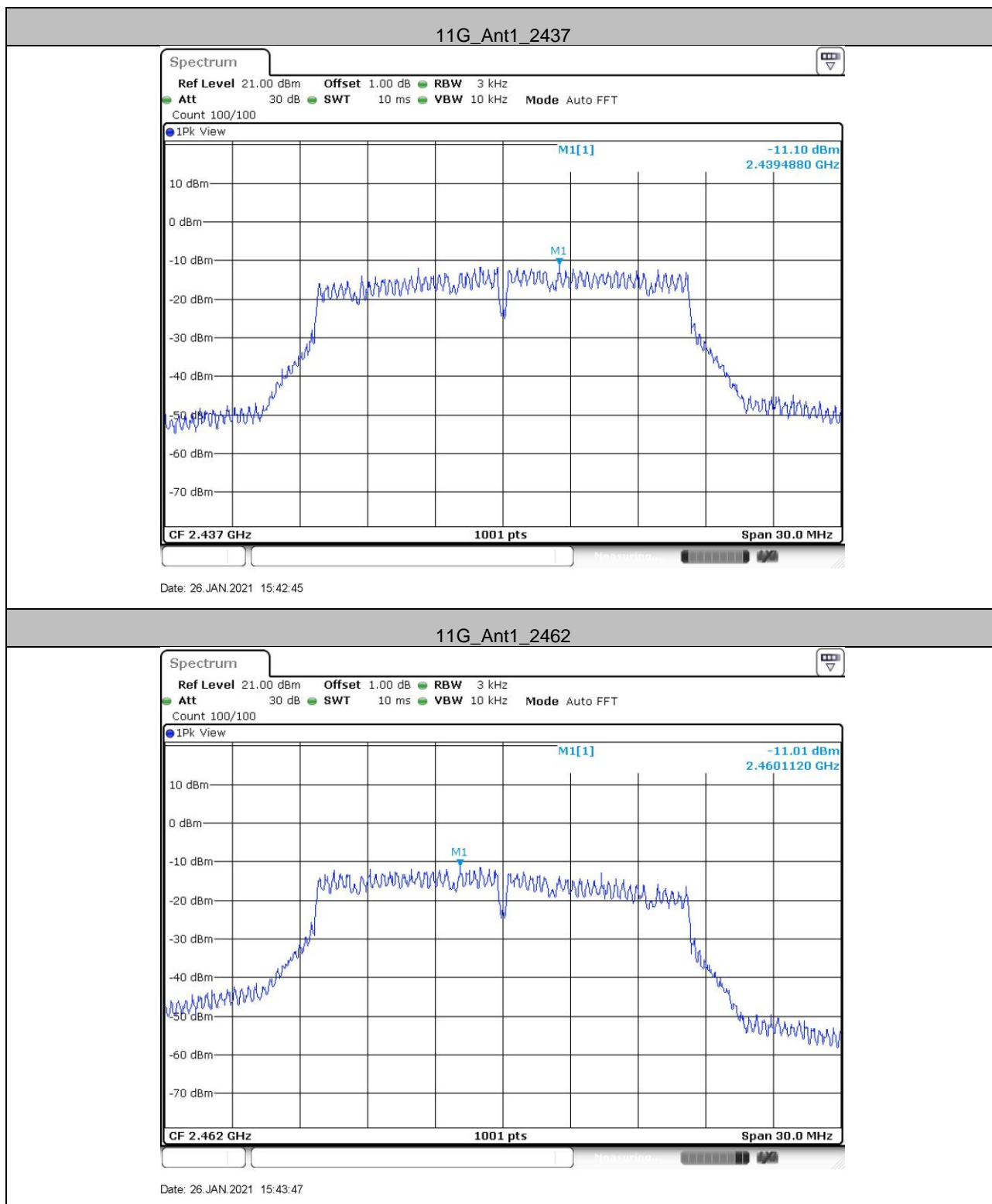
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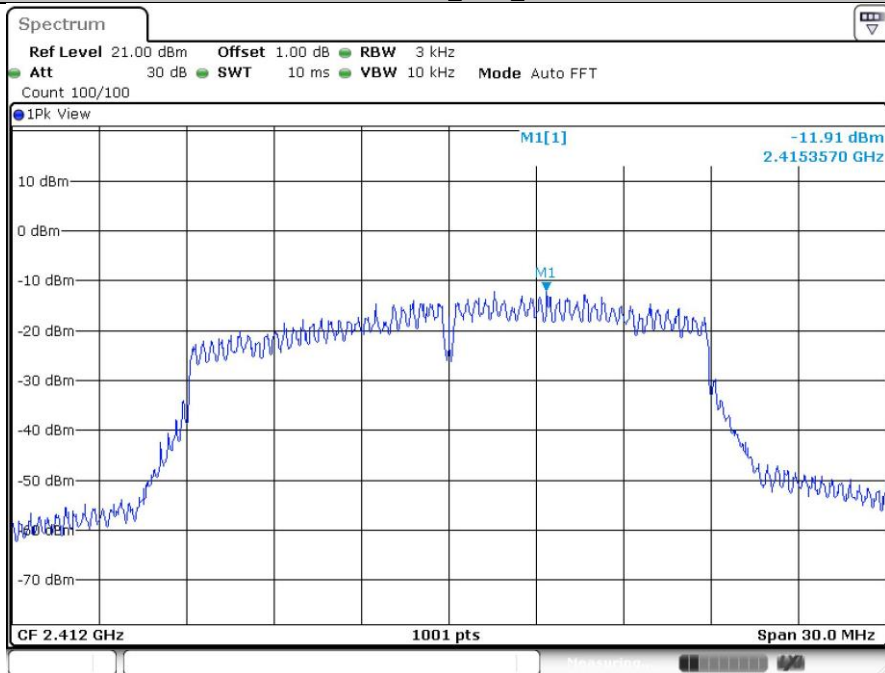
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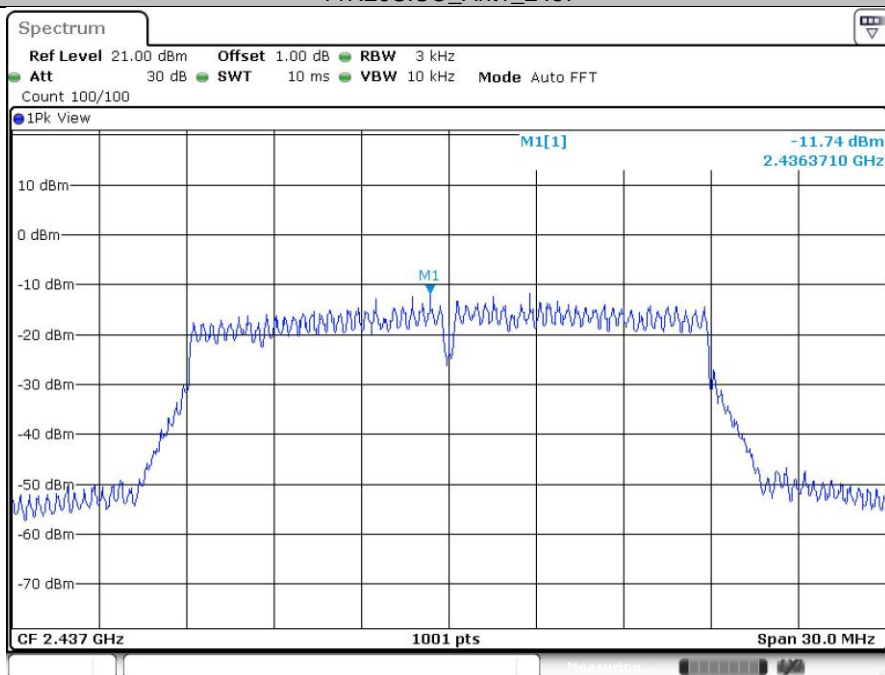


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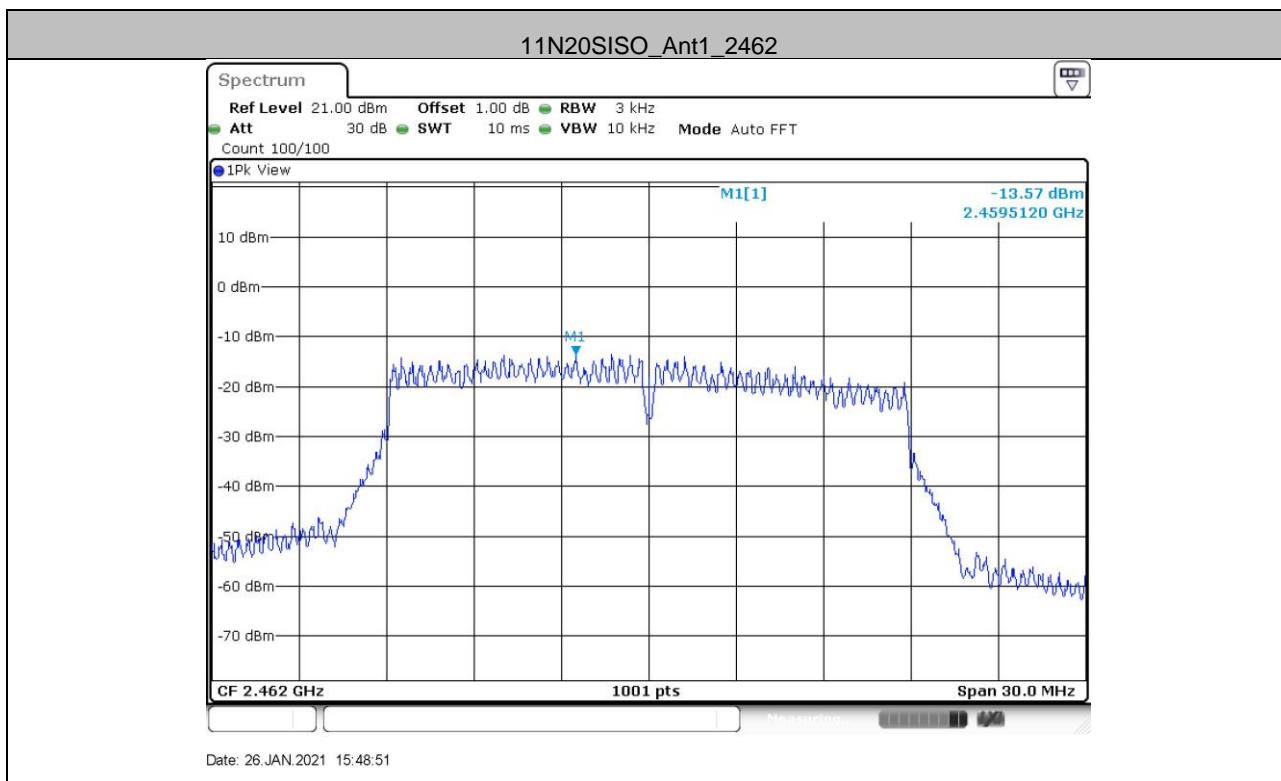
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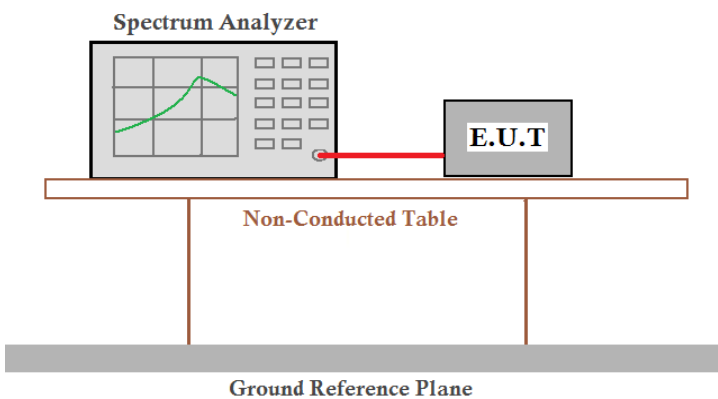
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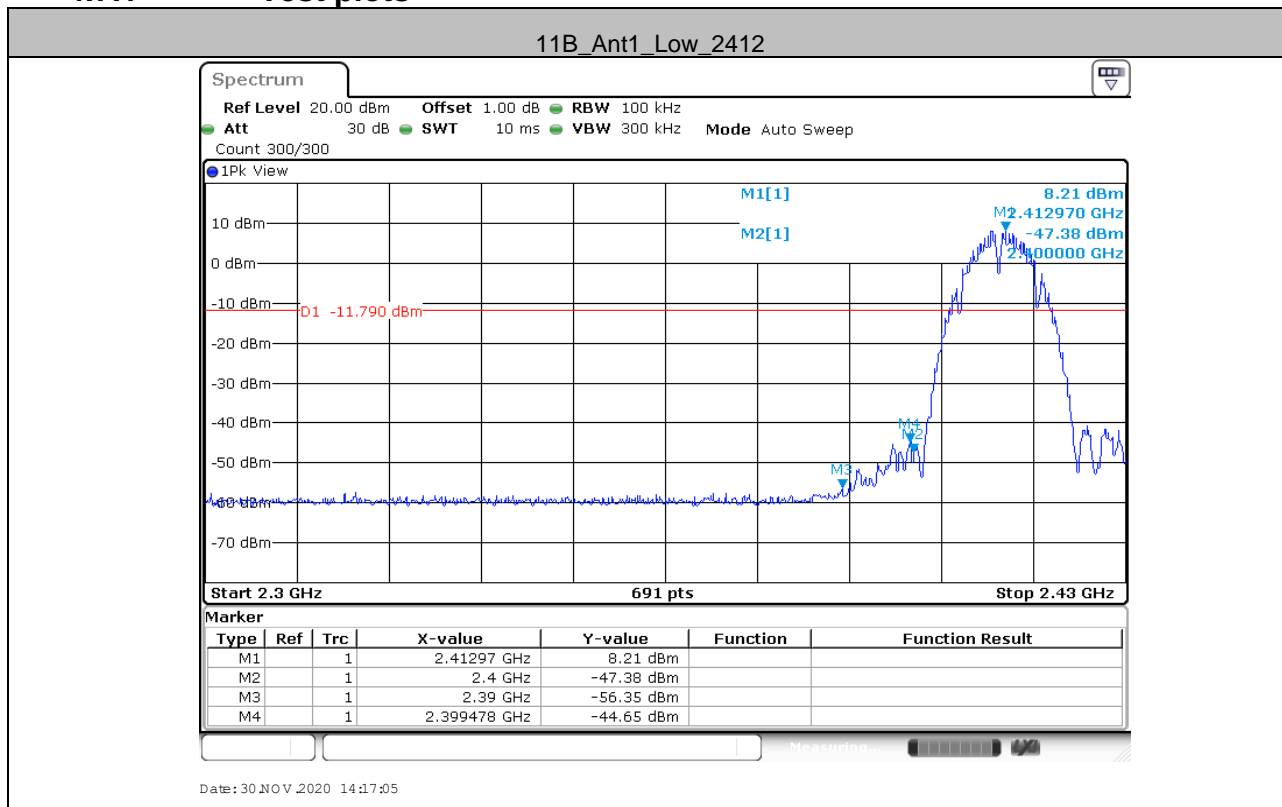
4.7 Band-edge for RF Conducted Emissions

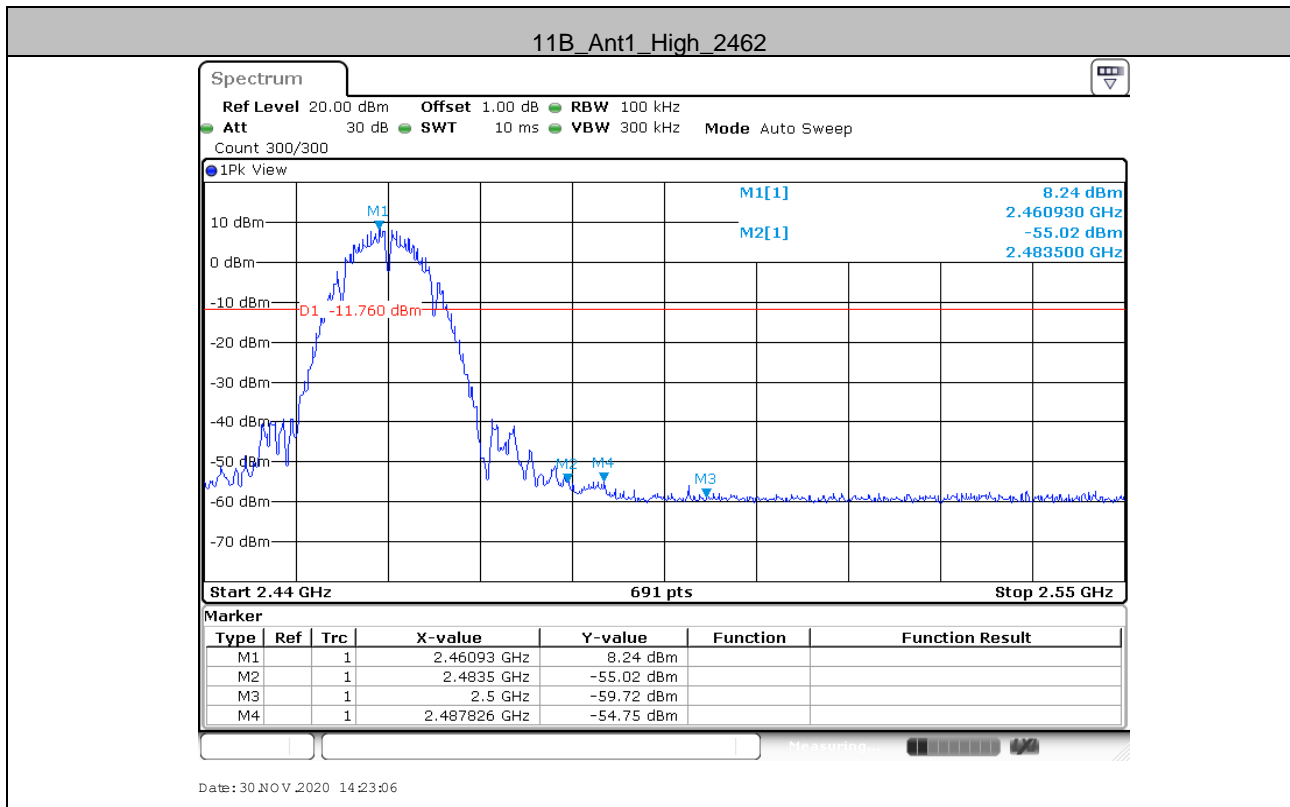
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.13
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 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.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

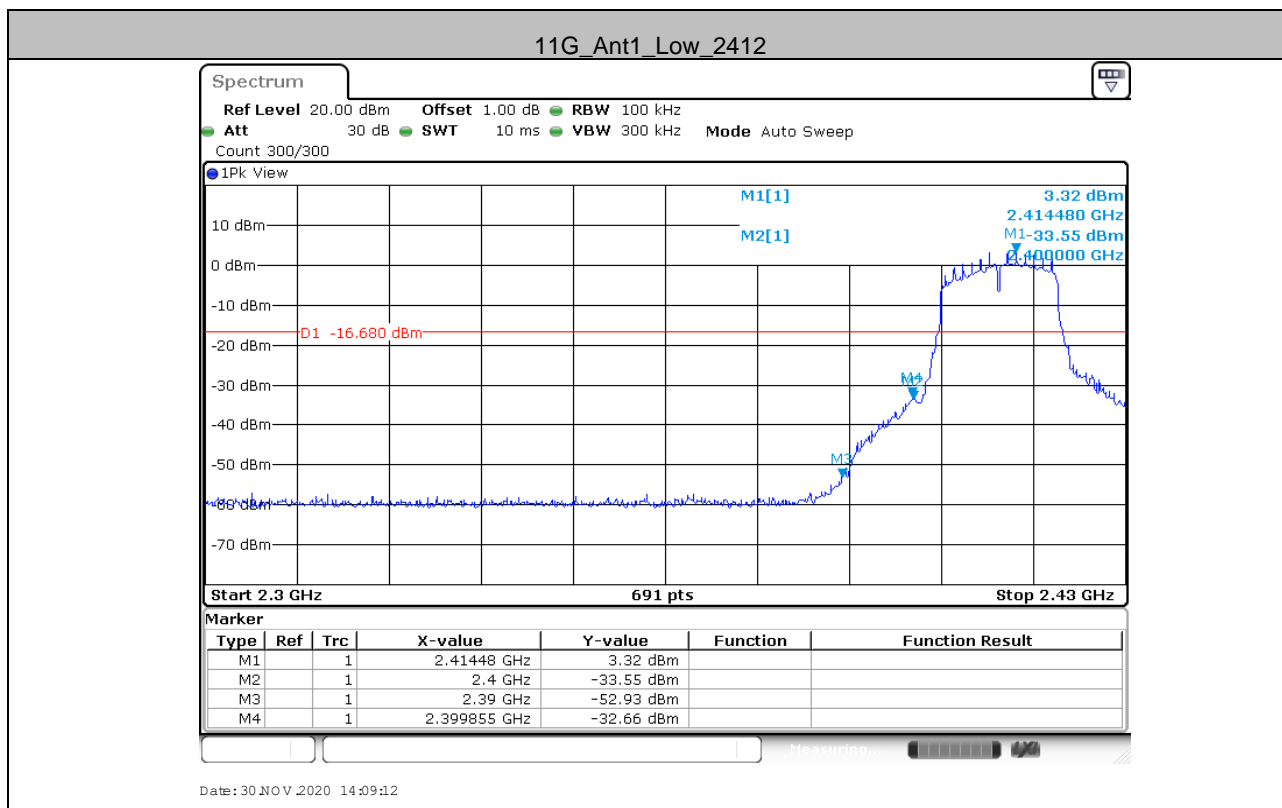


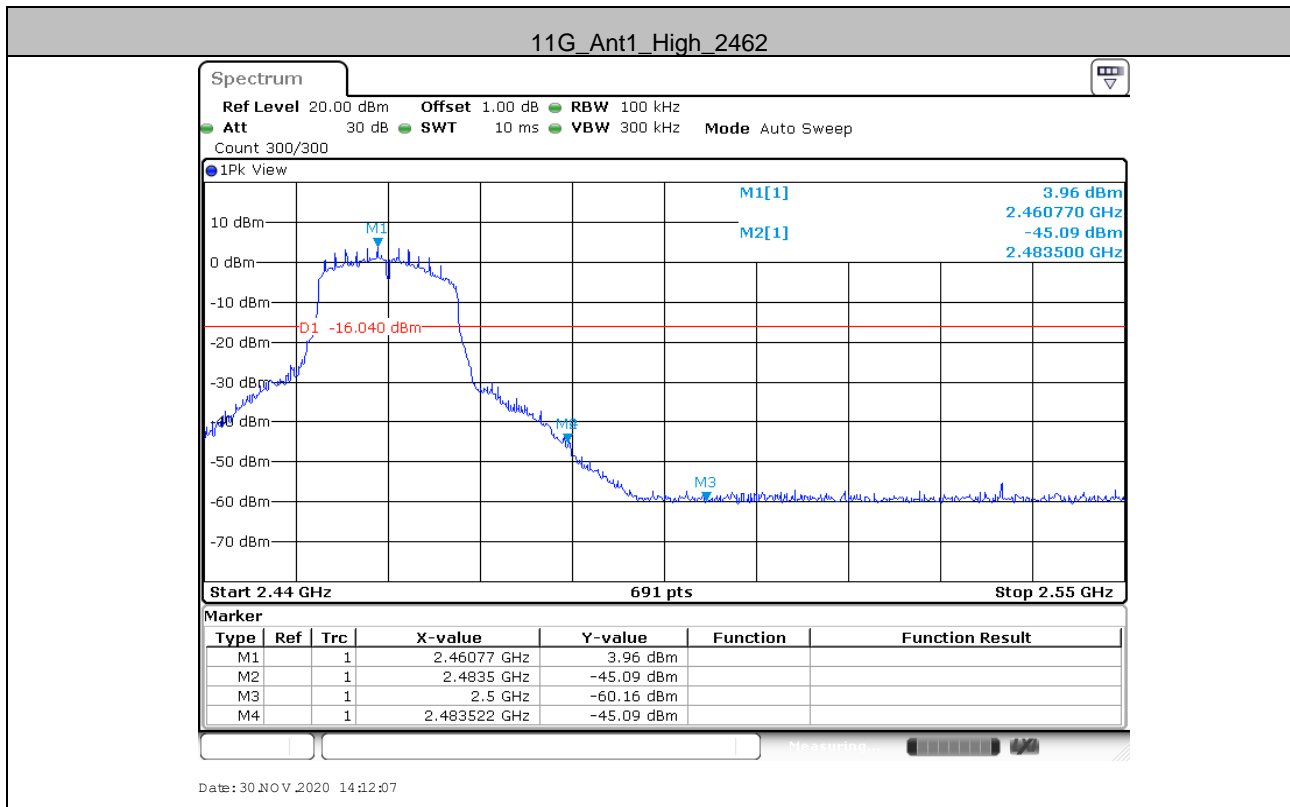


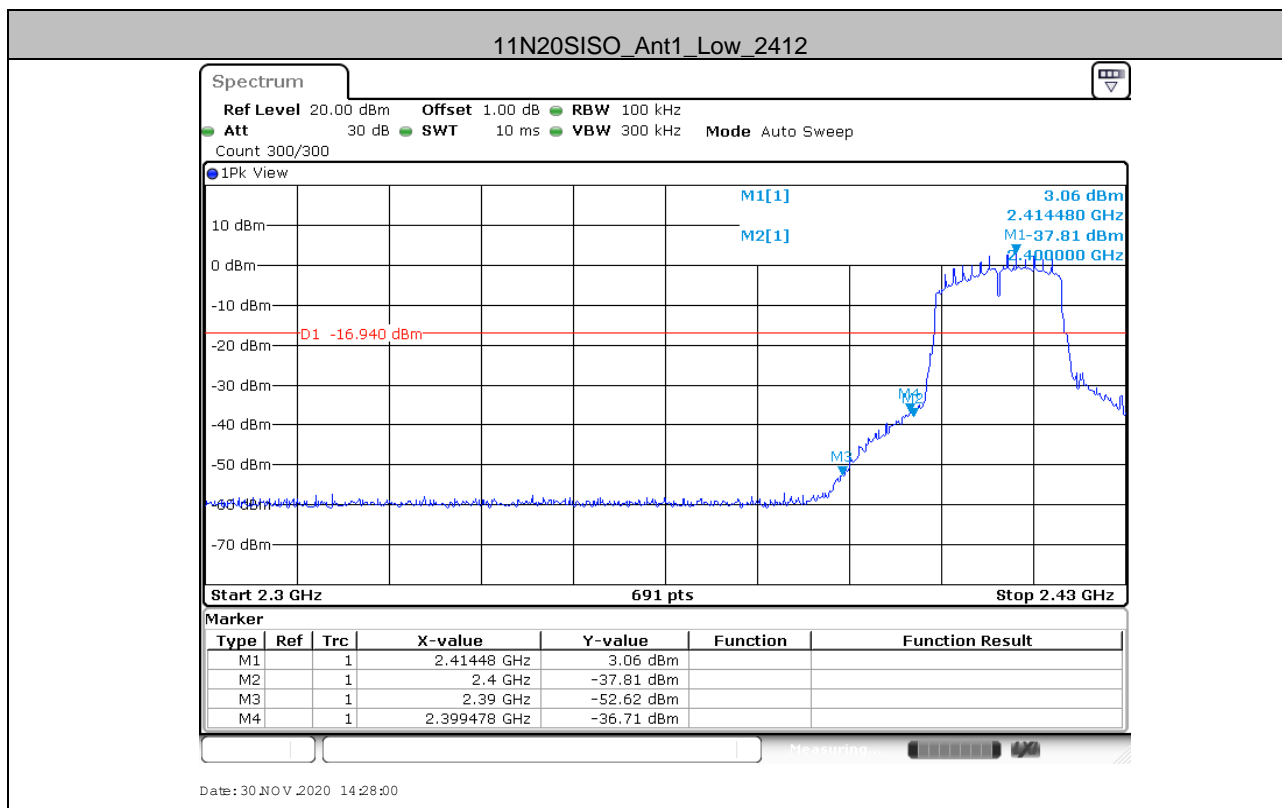
4.7.1 Test plots

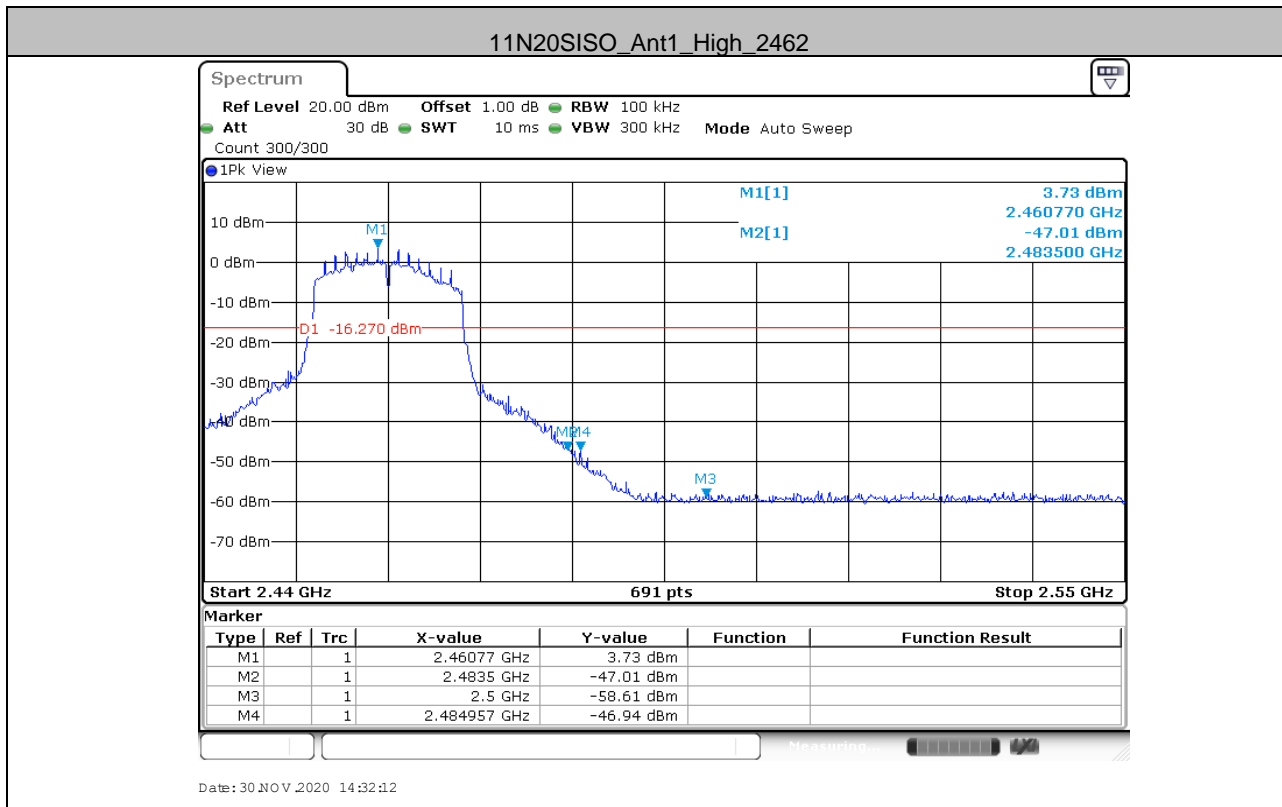








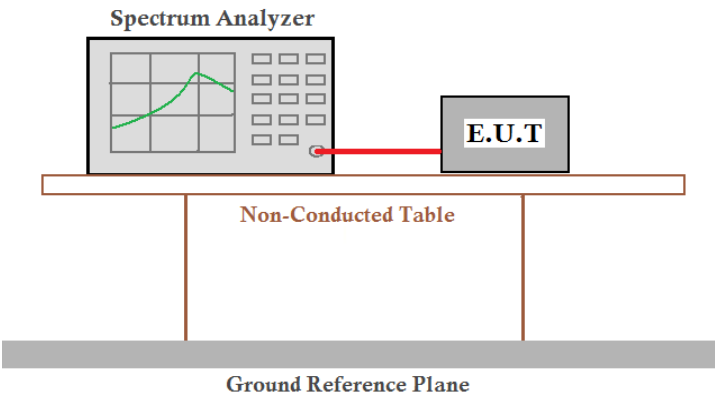




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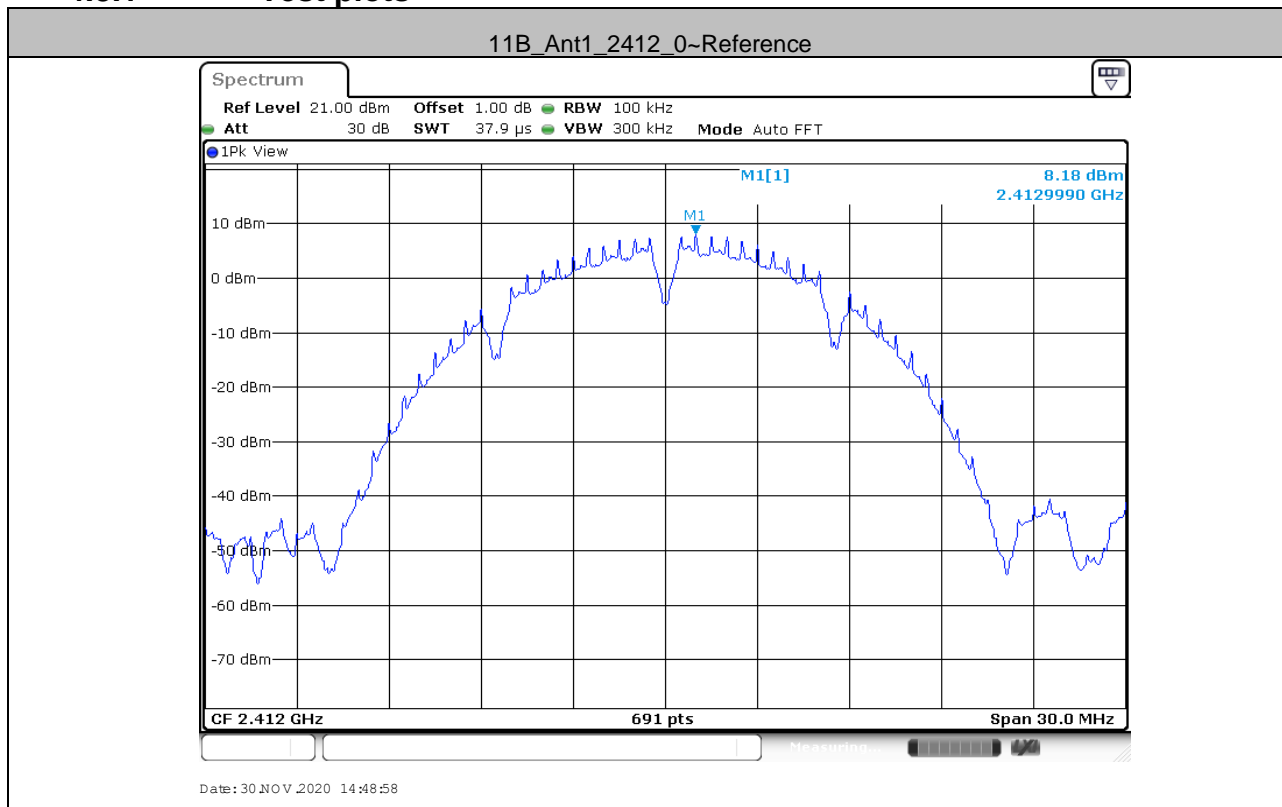
4.8 RF Conducted Spurious Emissions

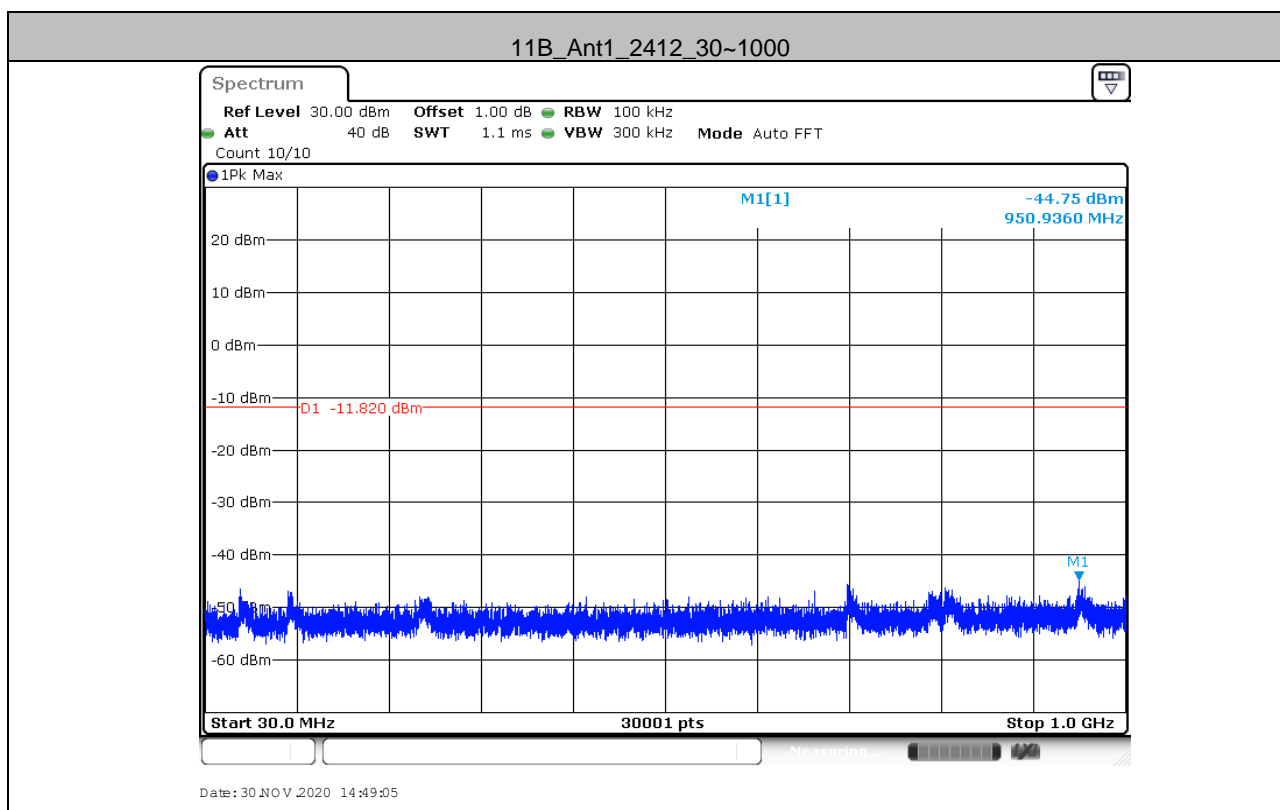
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.11
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 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.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

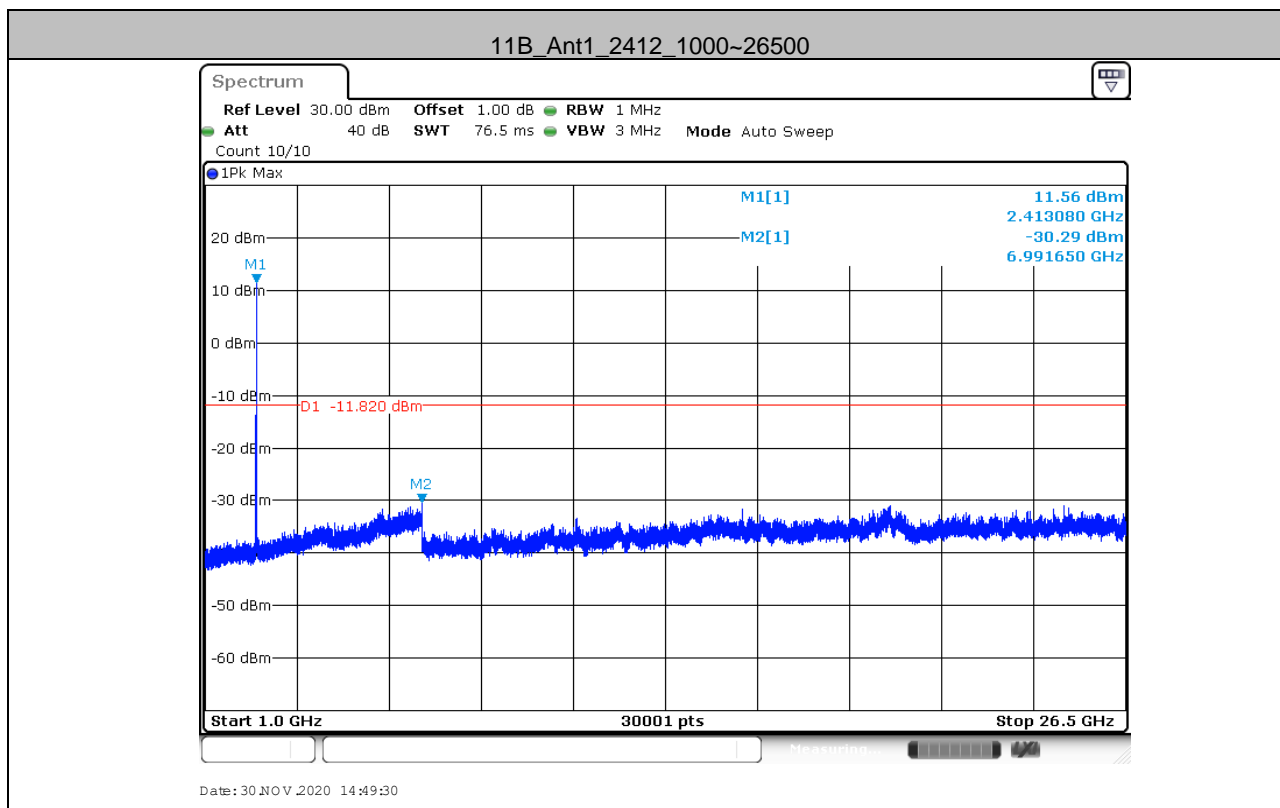


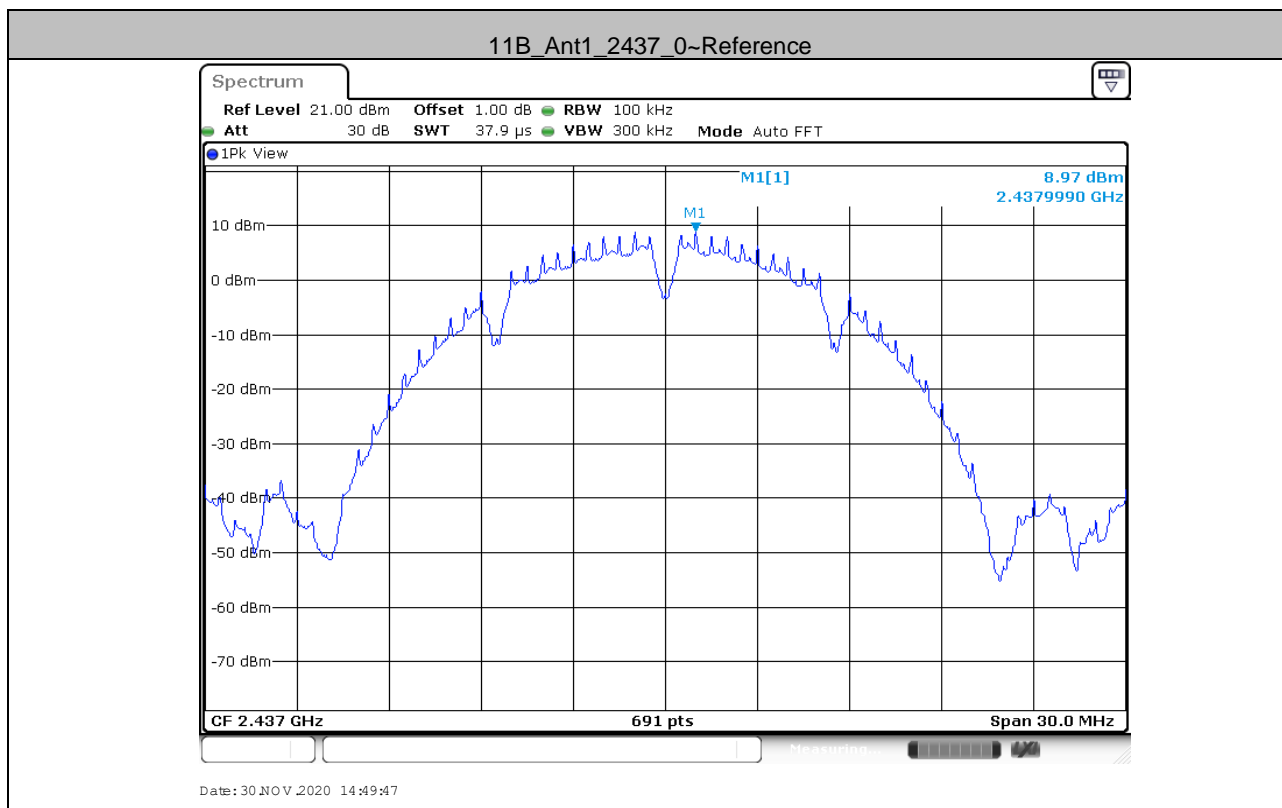


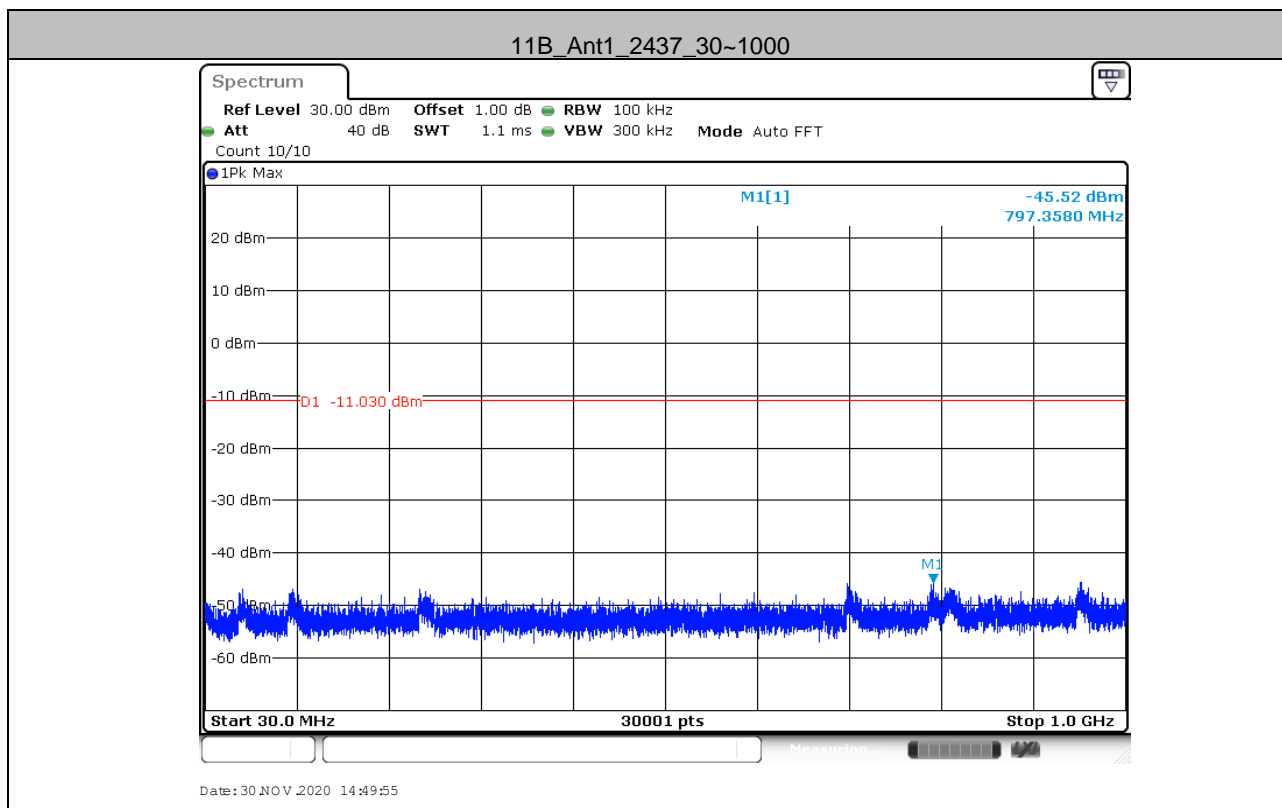
4.8.1 Test plots

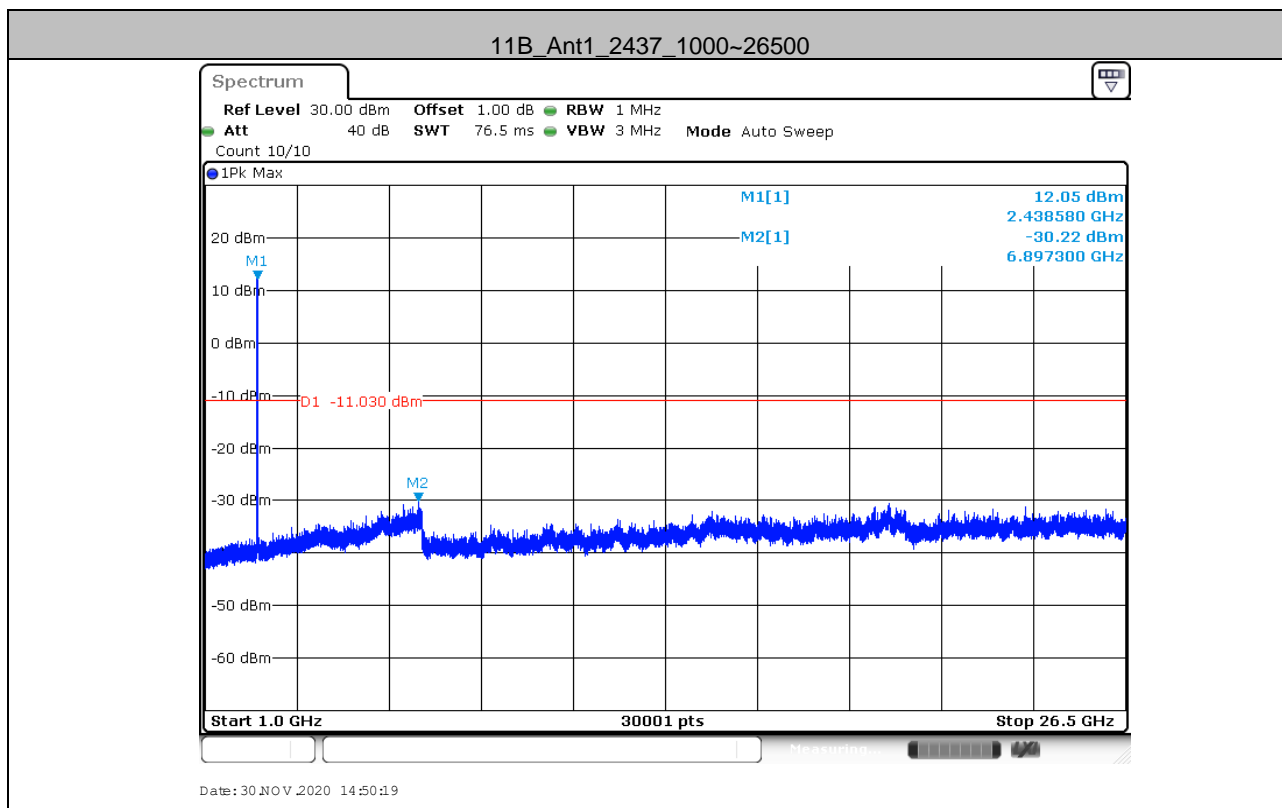


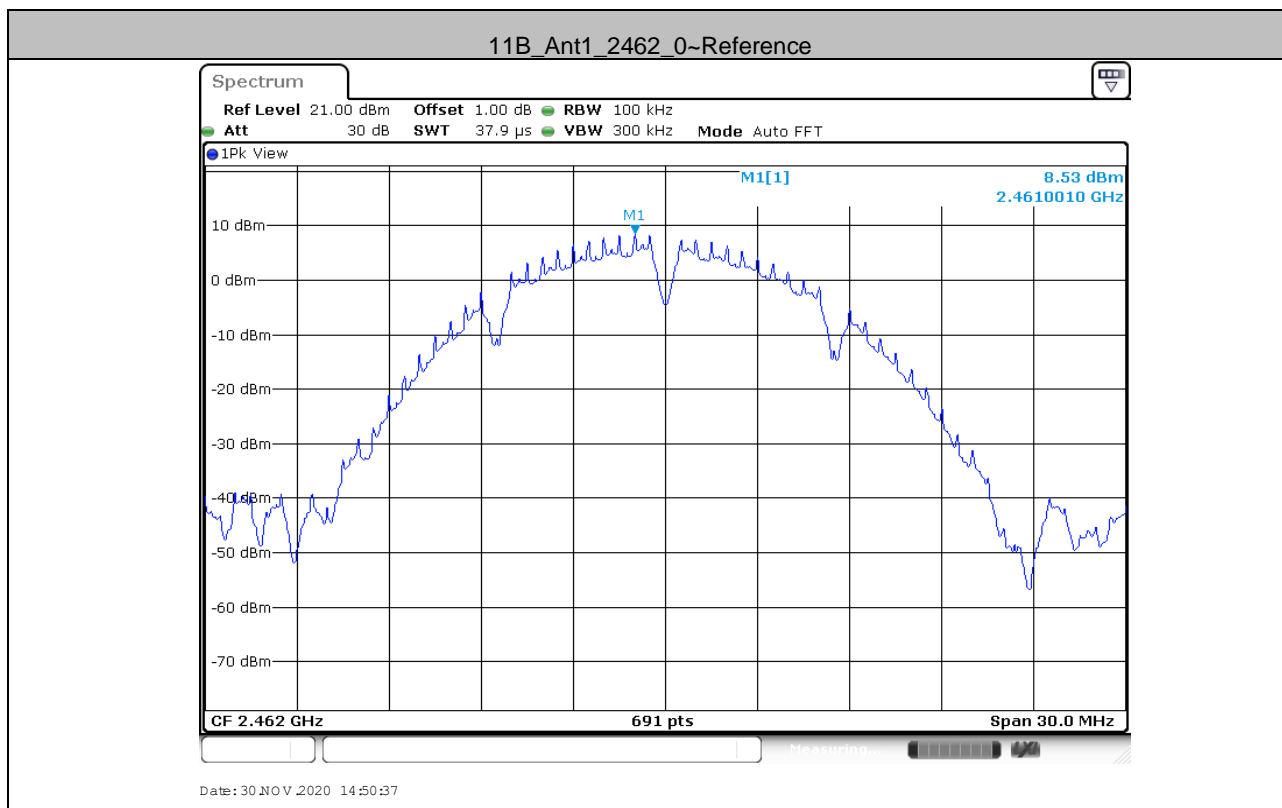


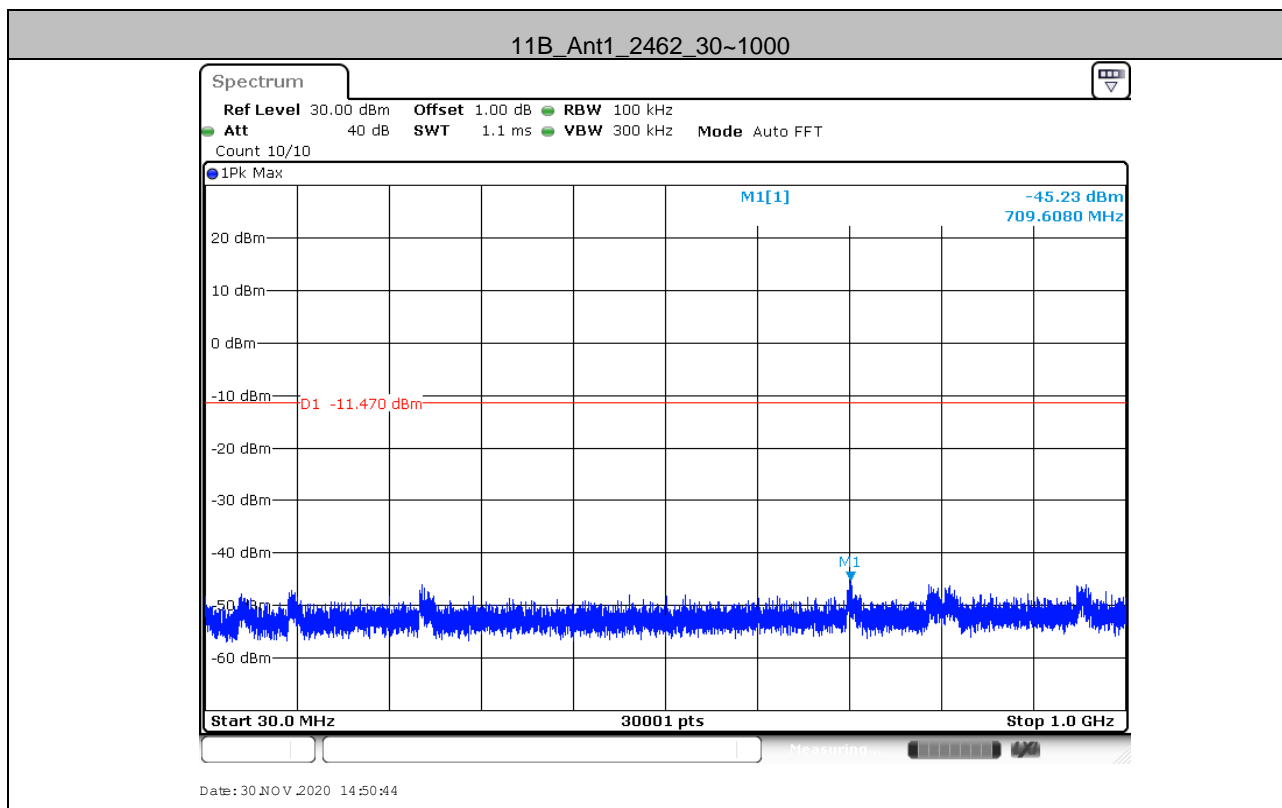


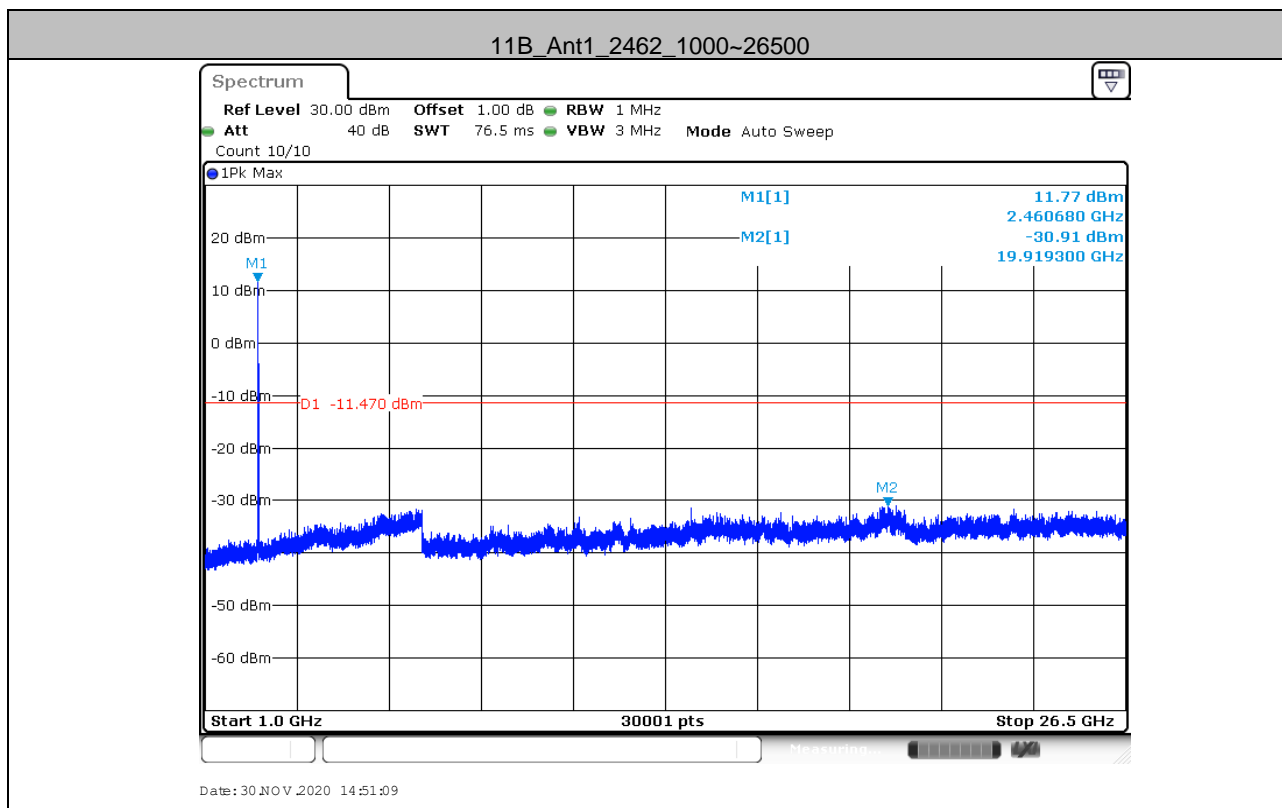


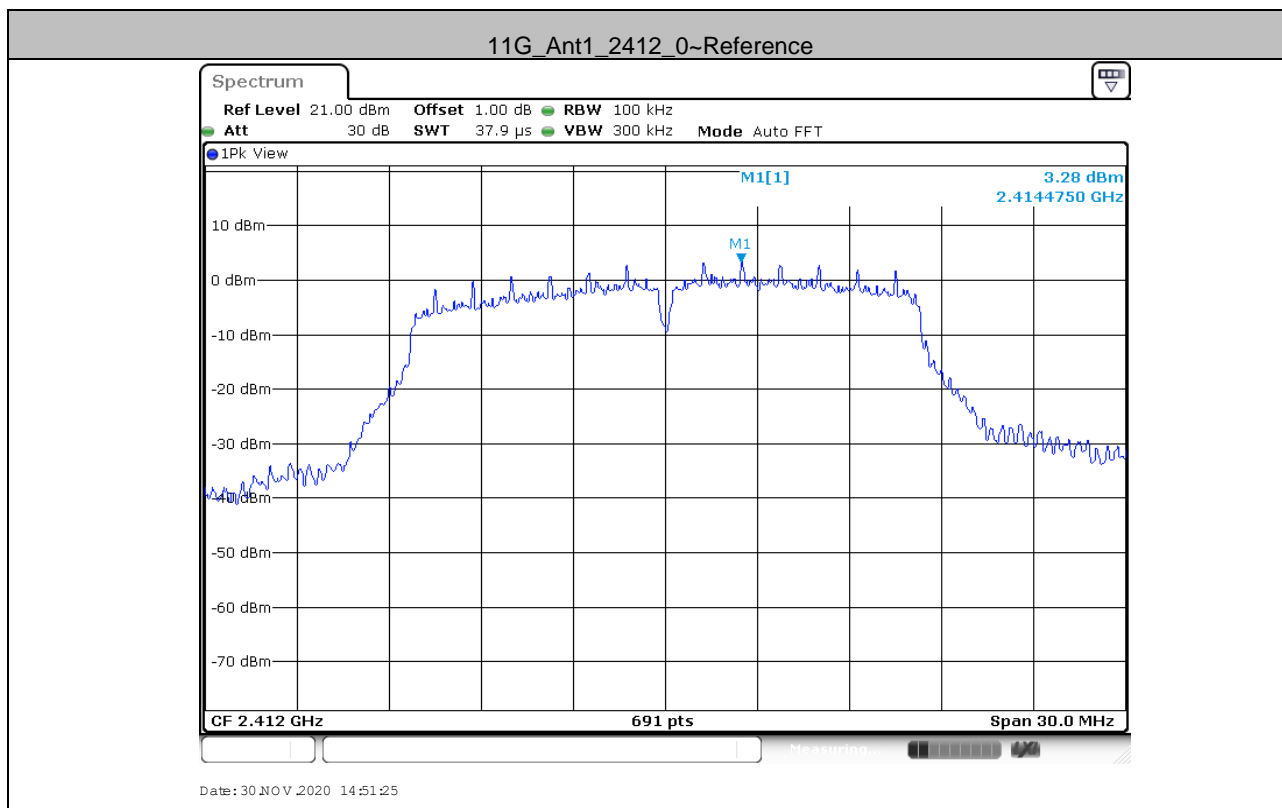


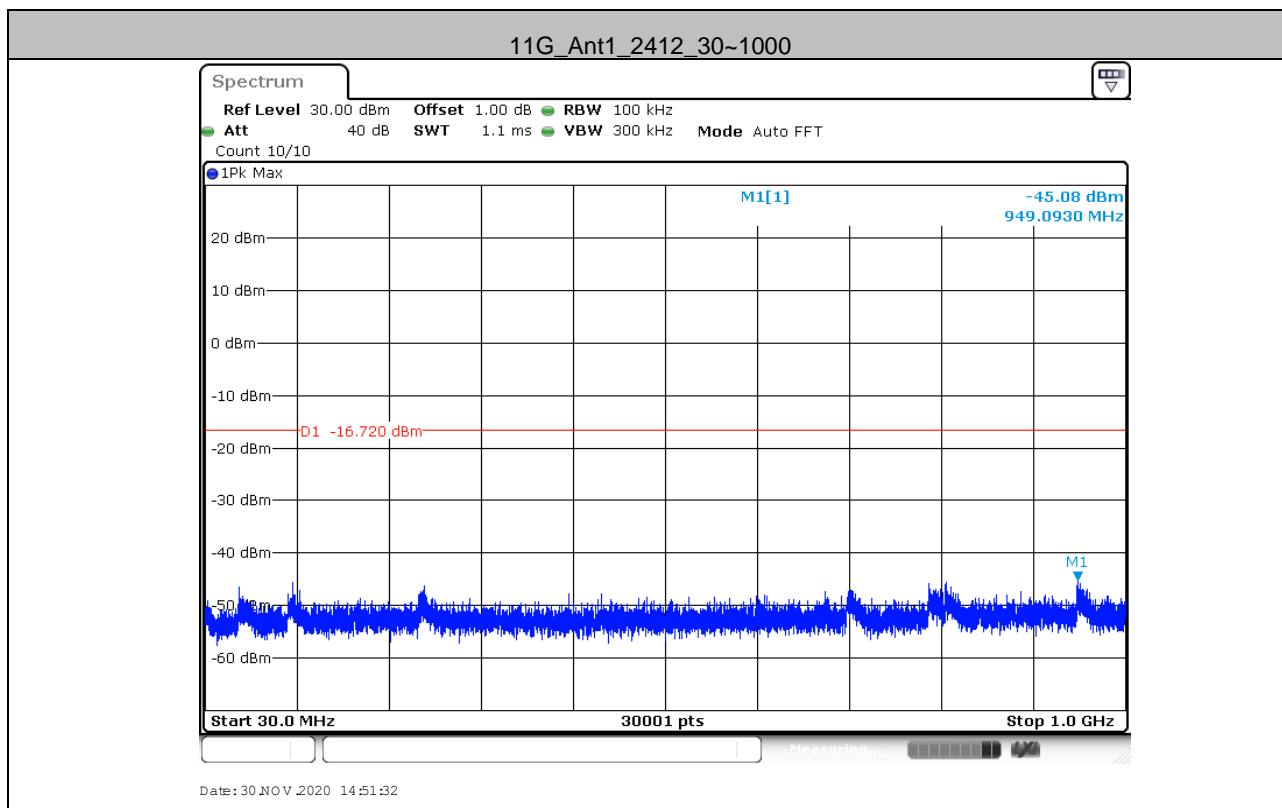


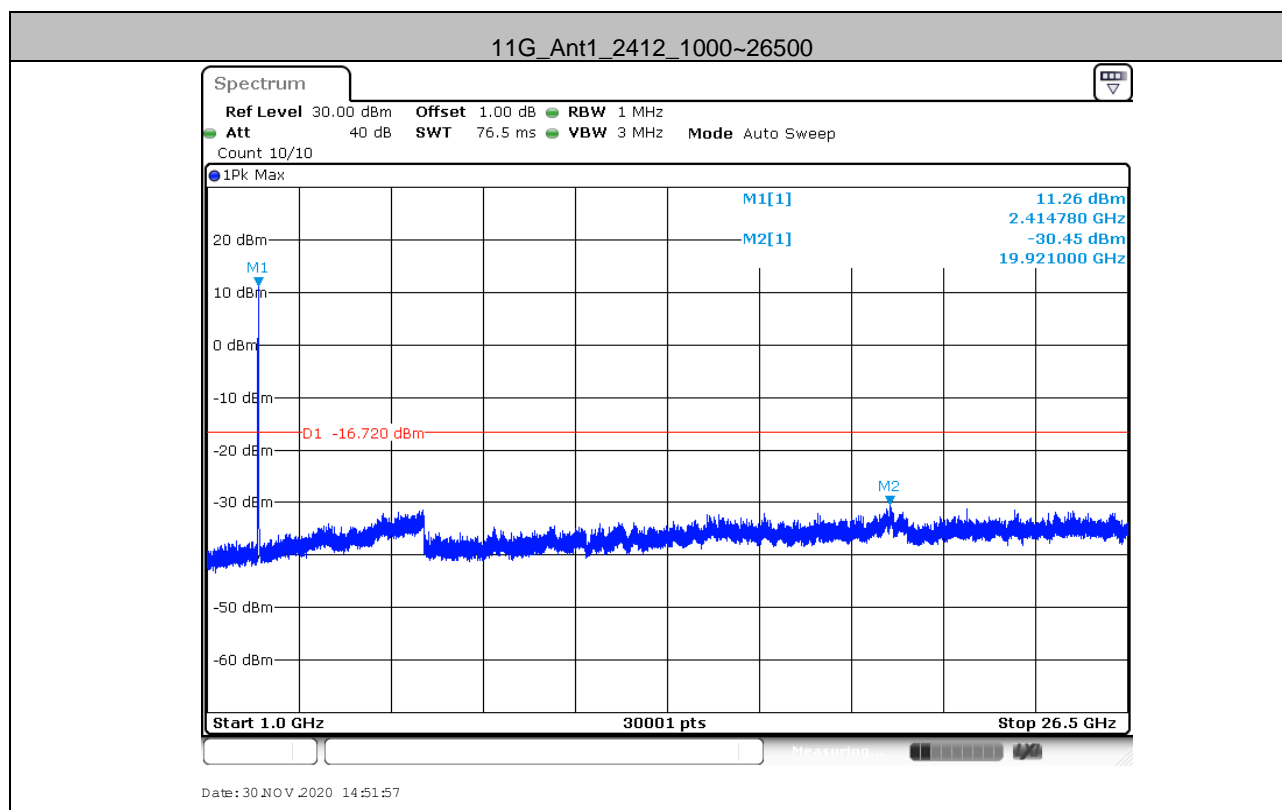


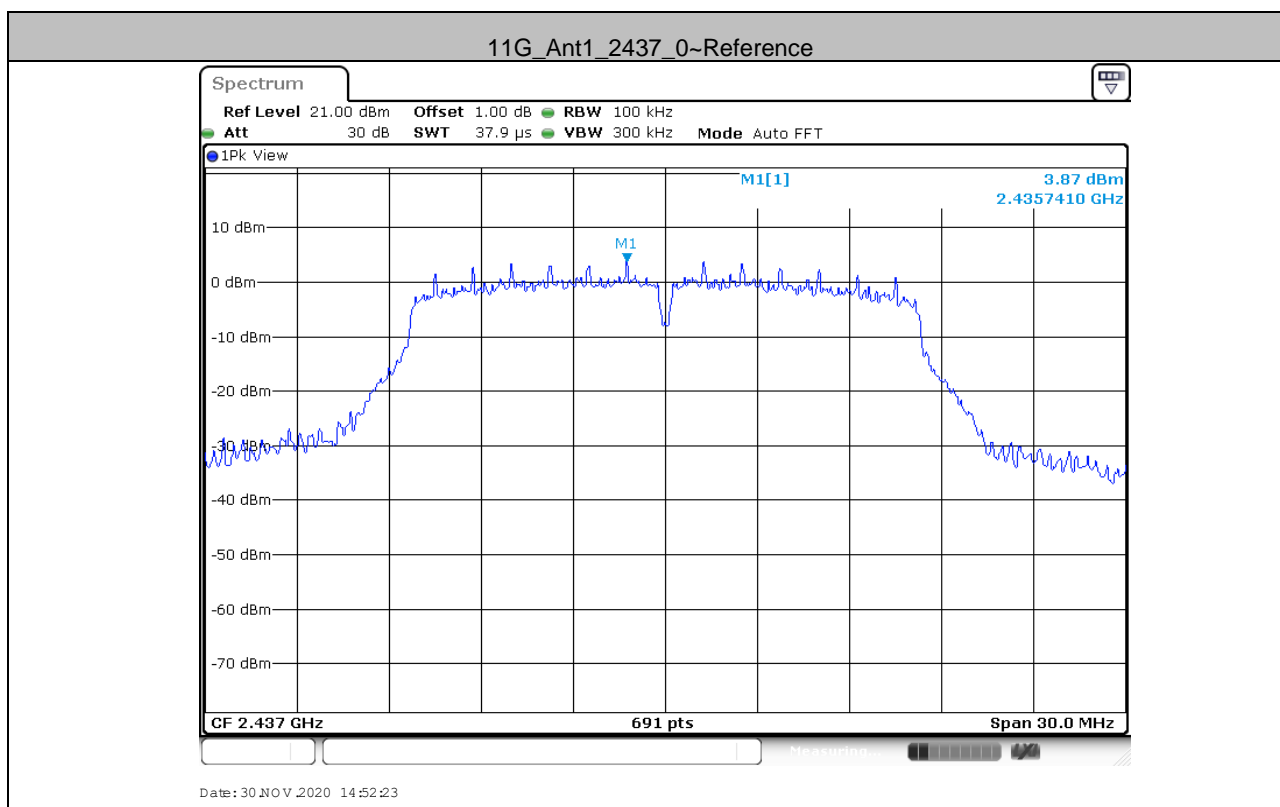










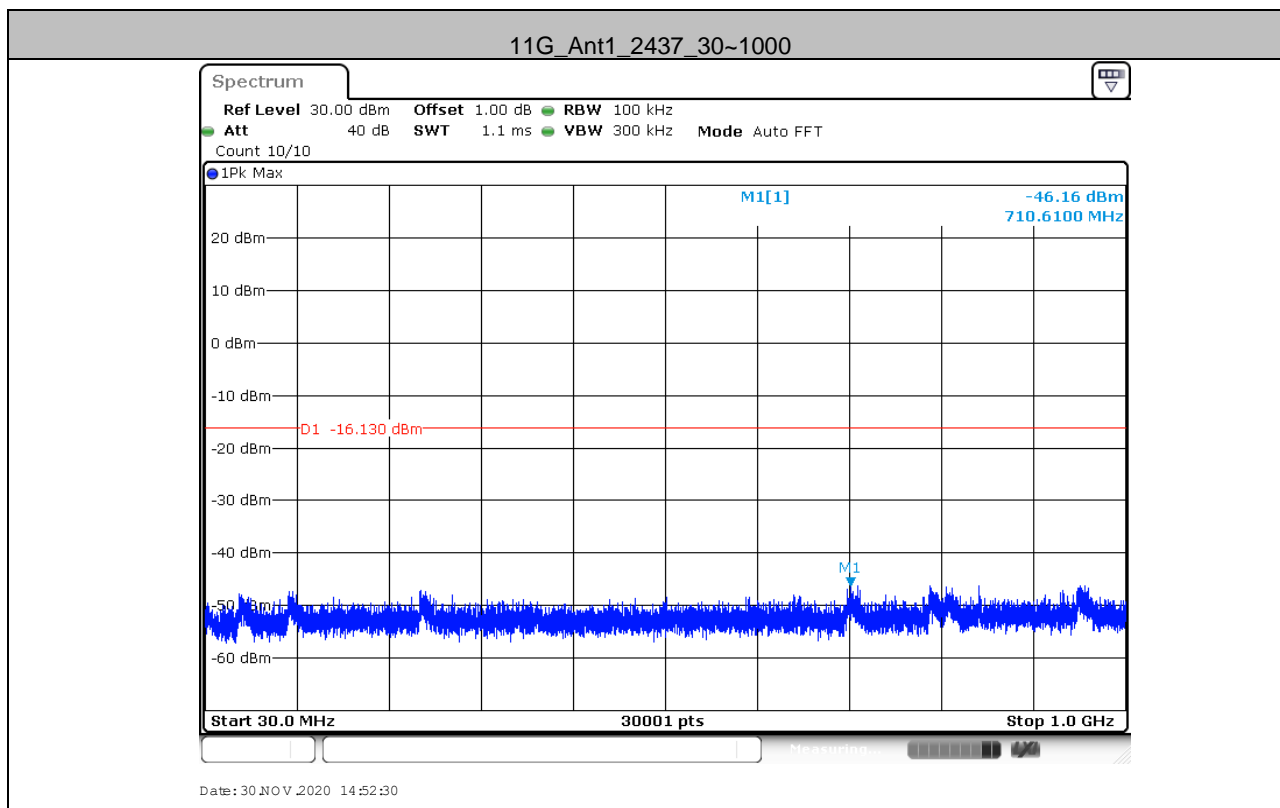


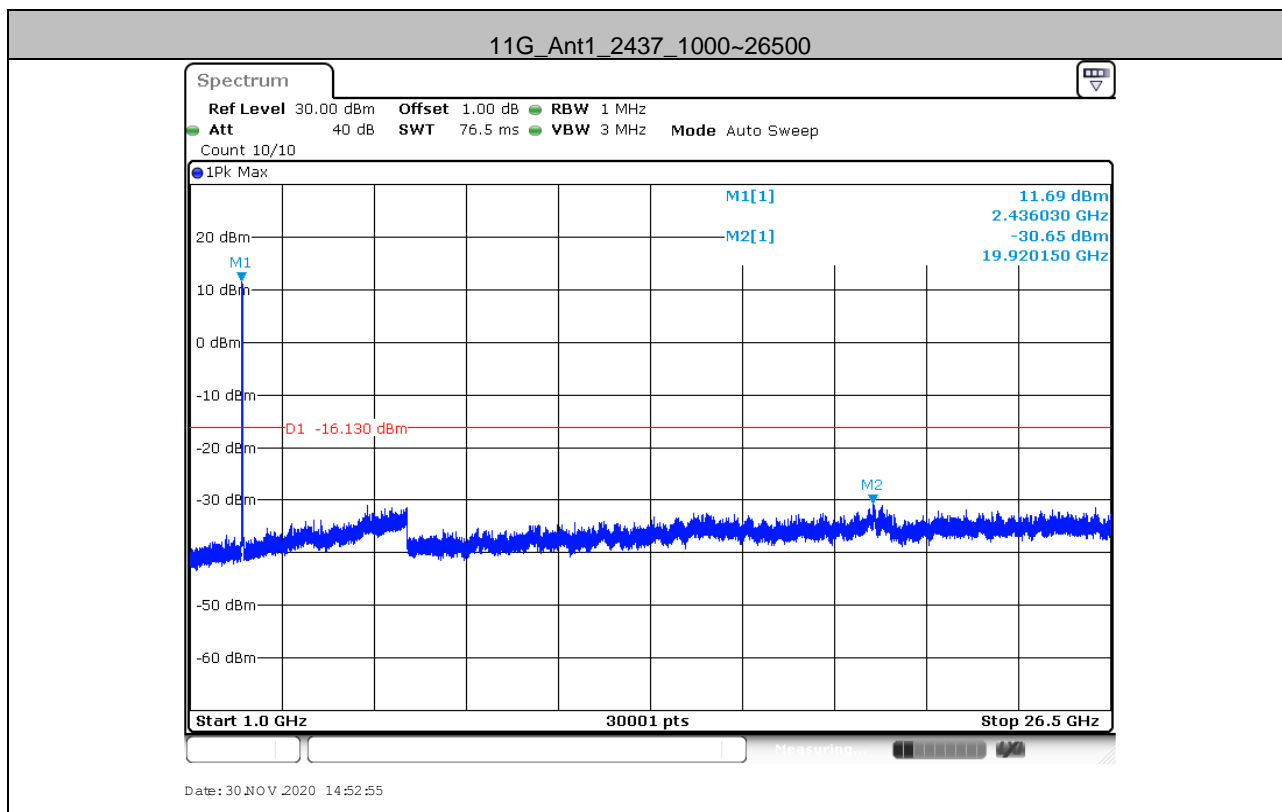
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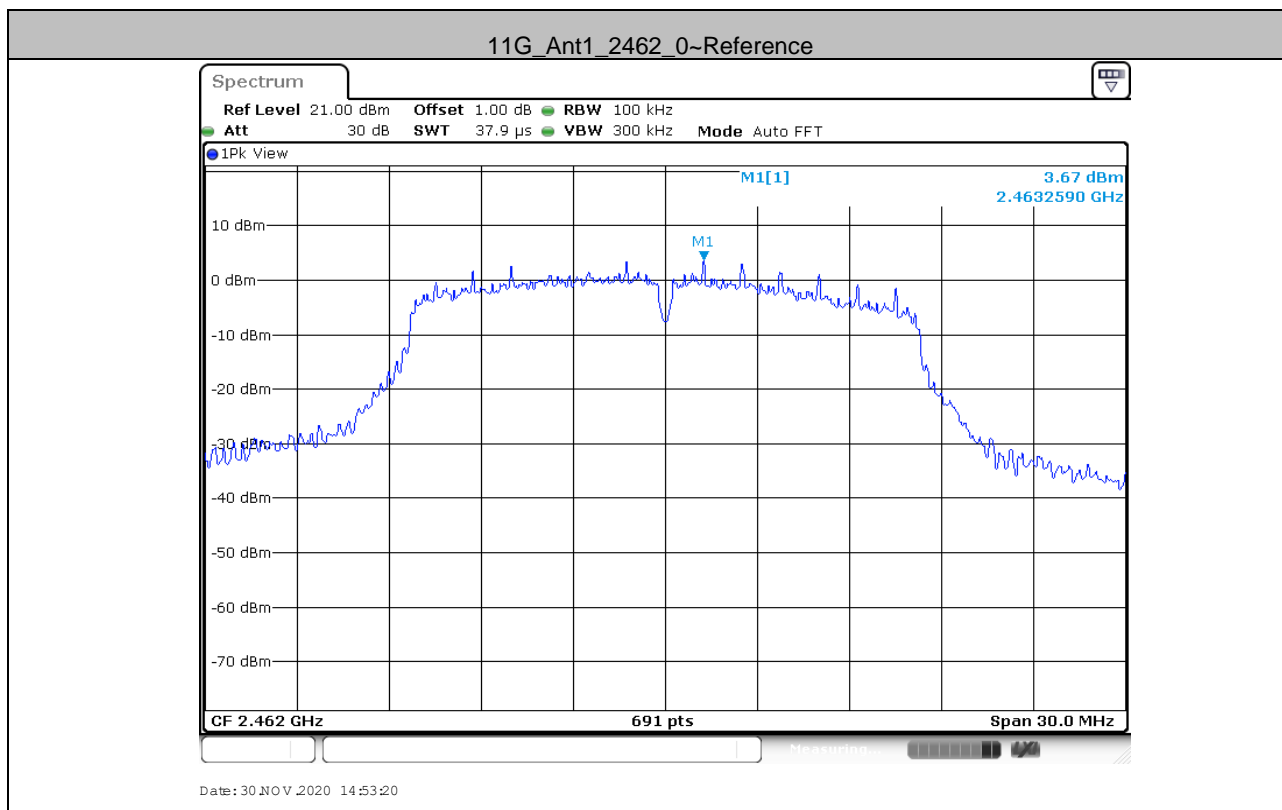
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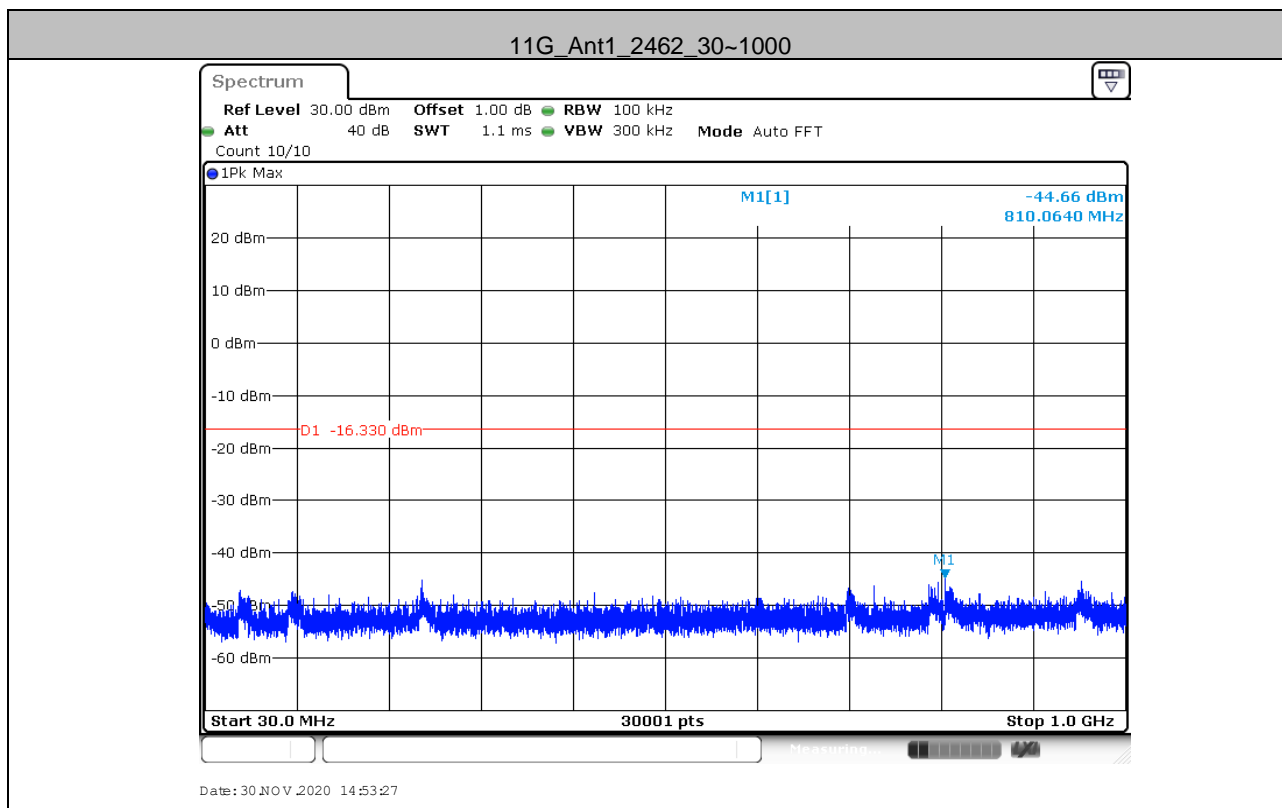
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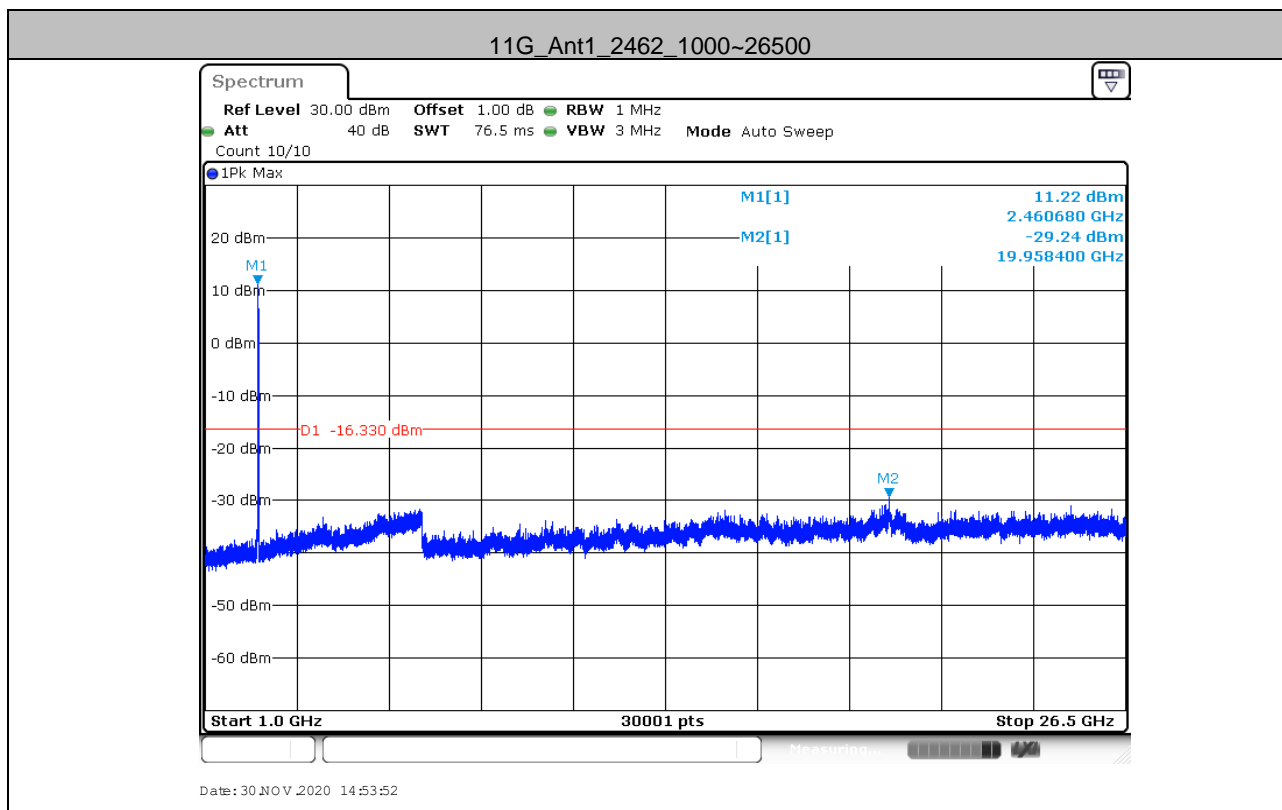
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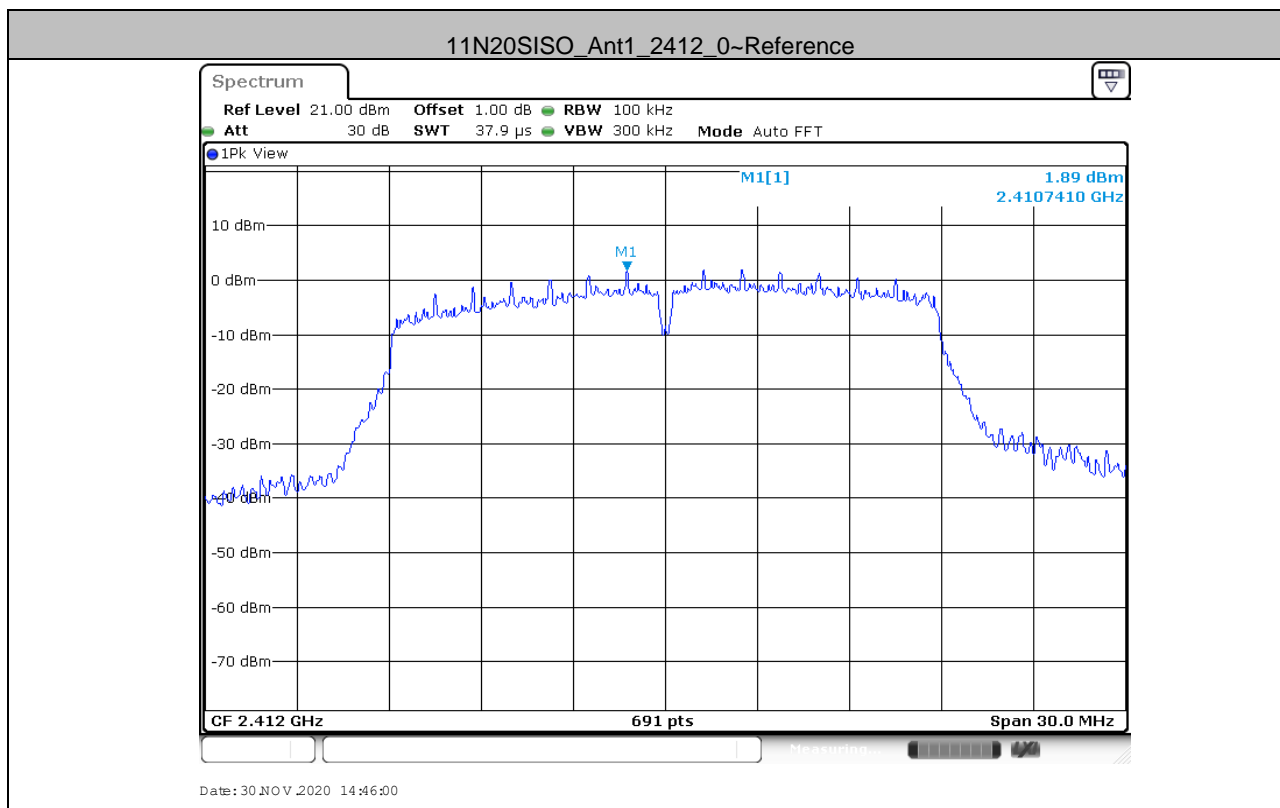


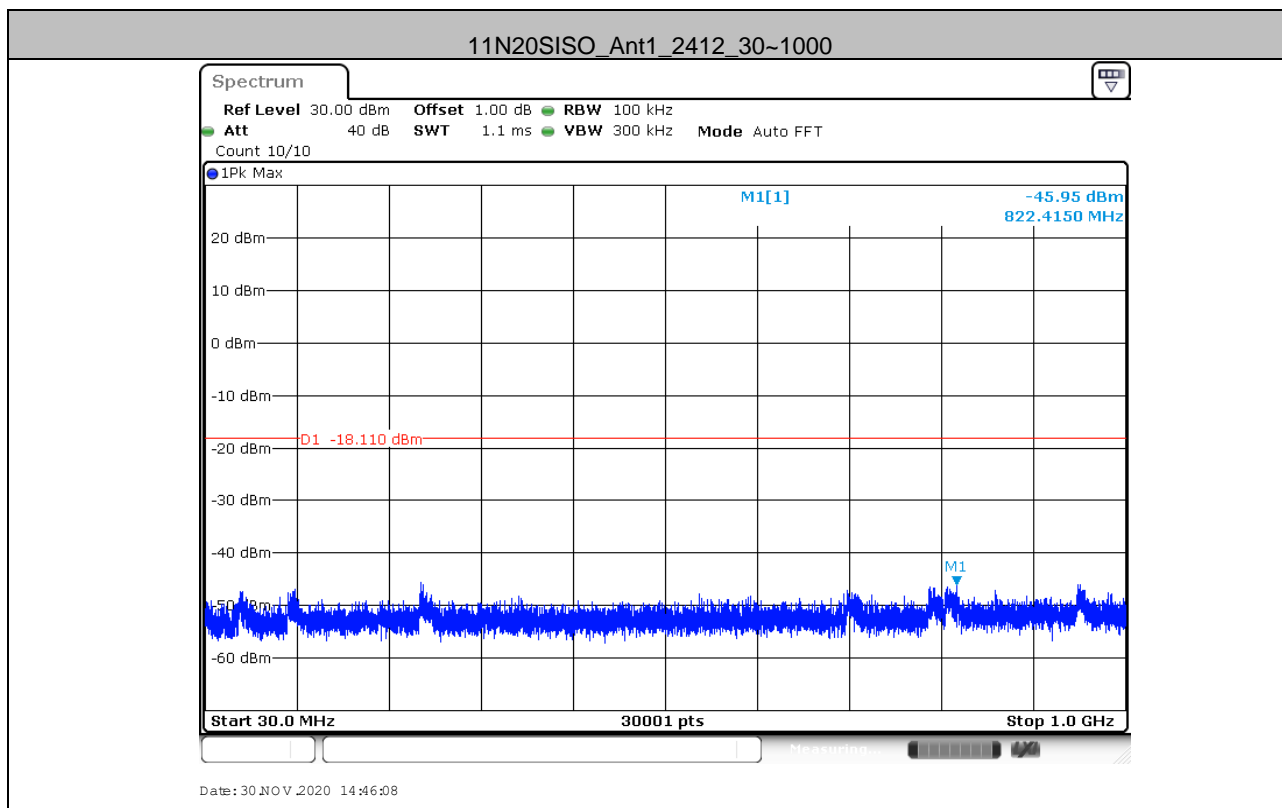


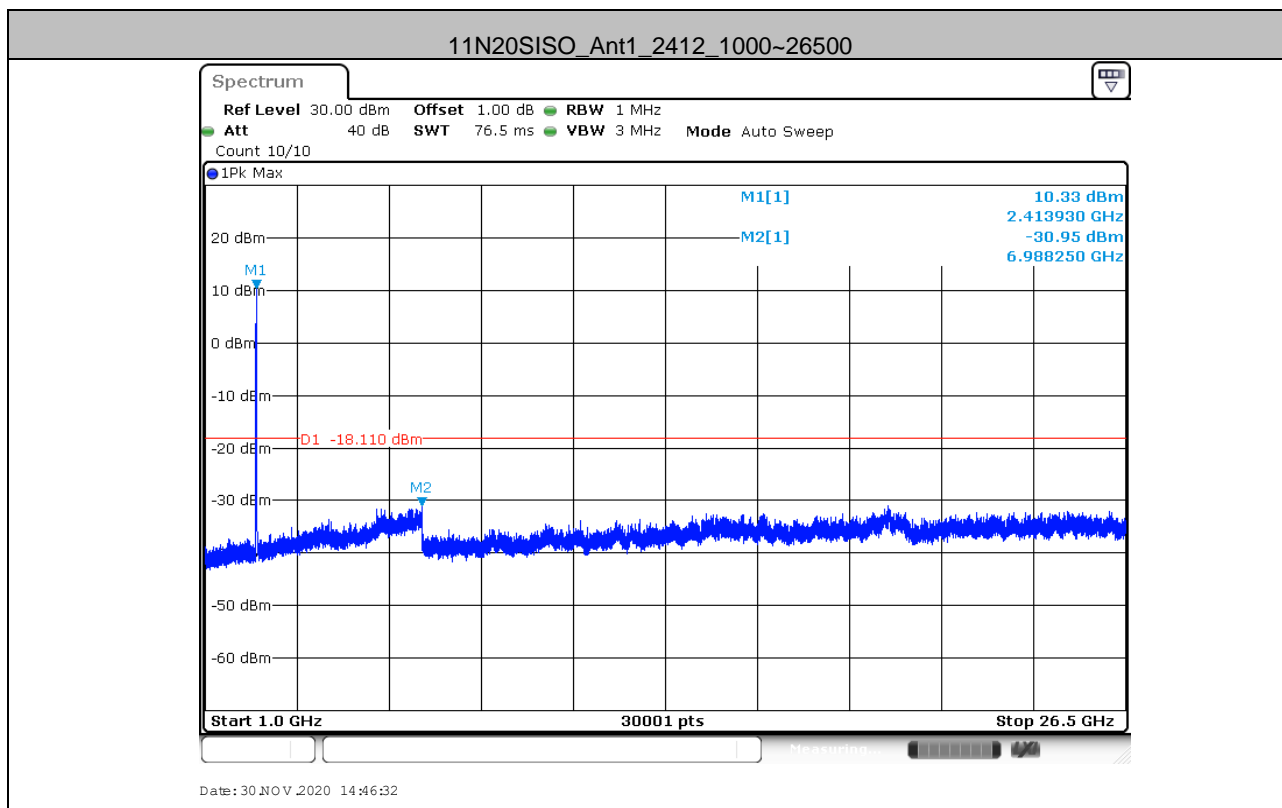


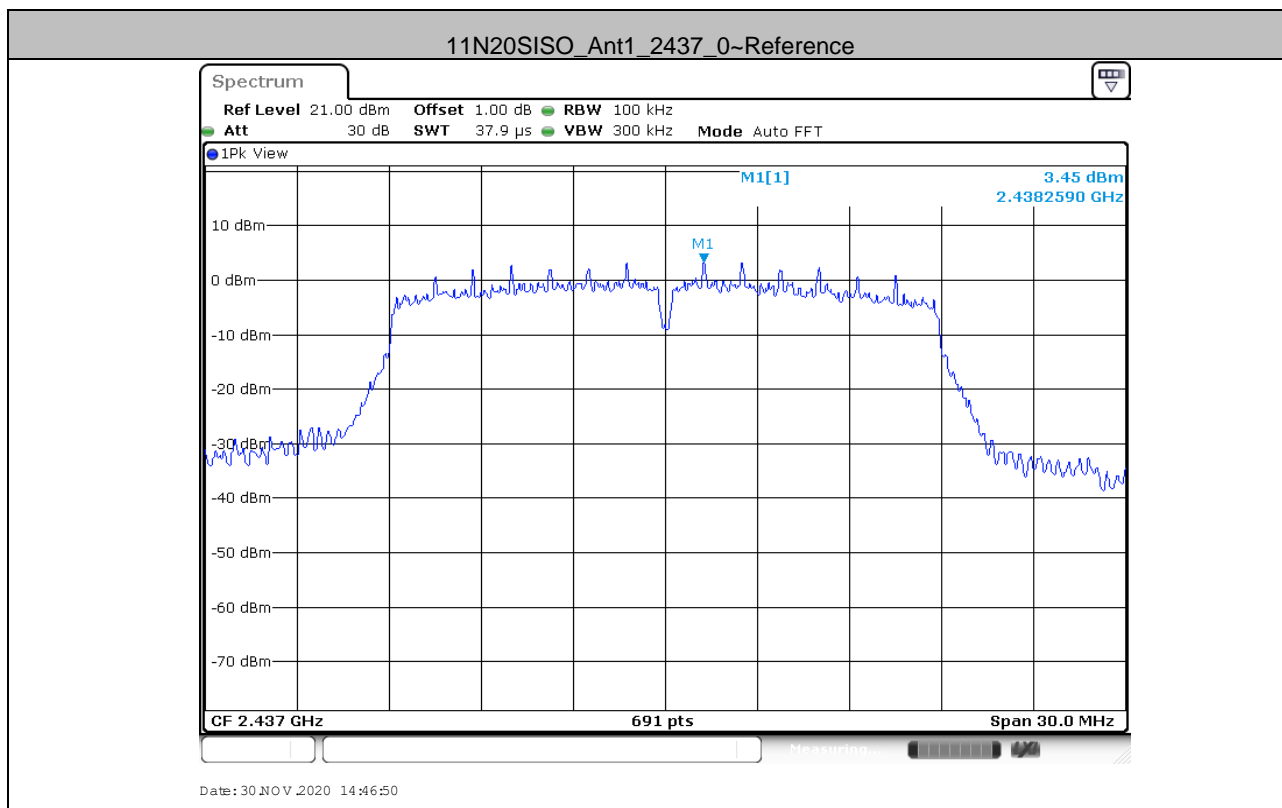


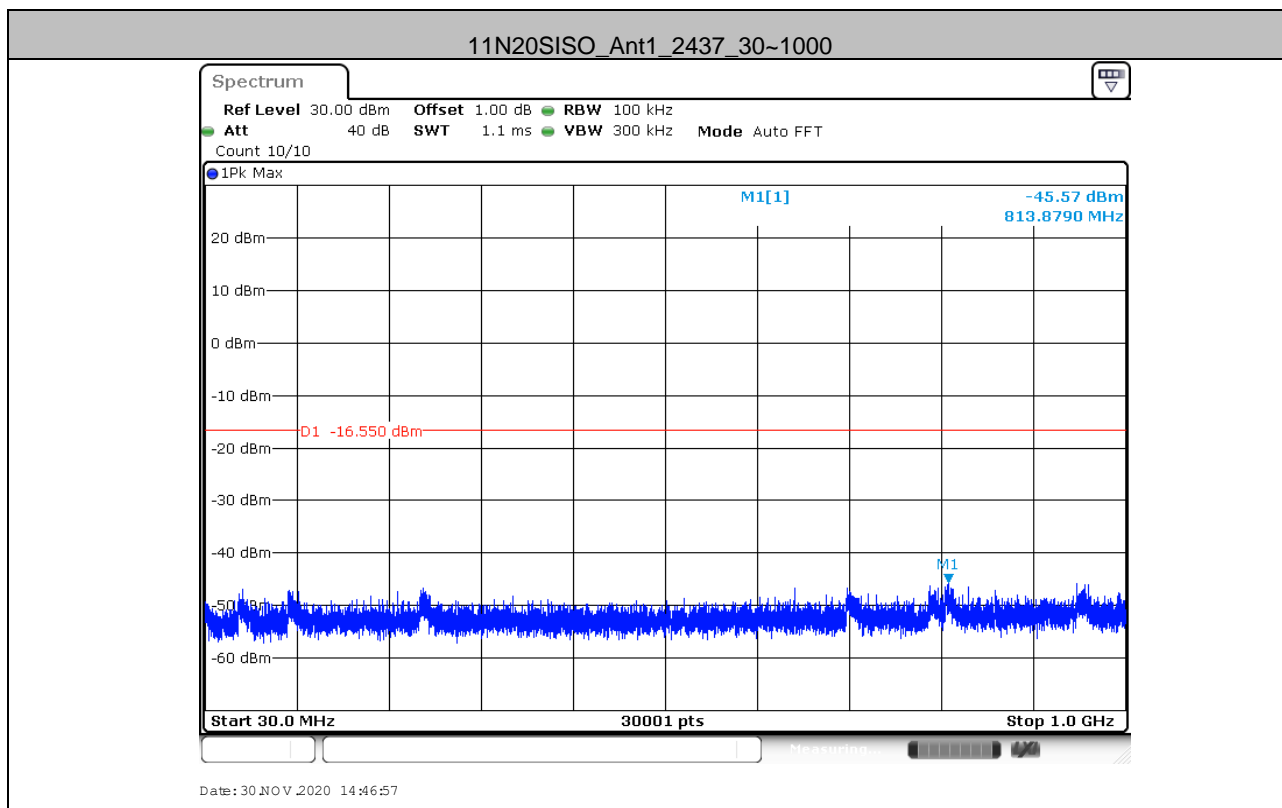


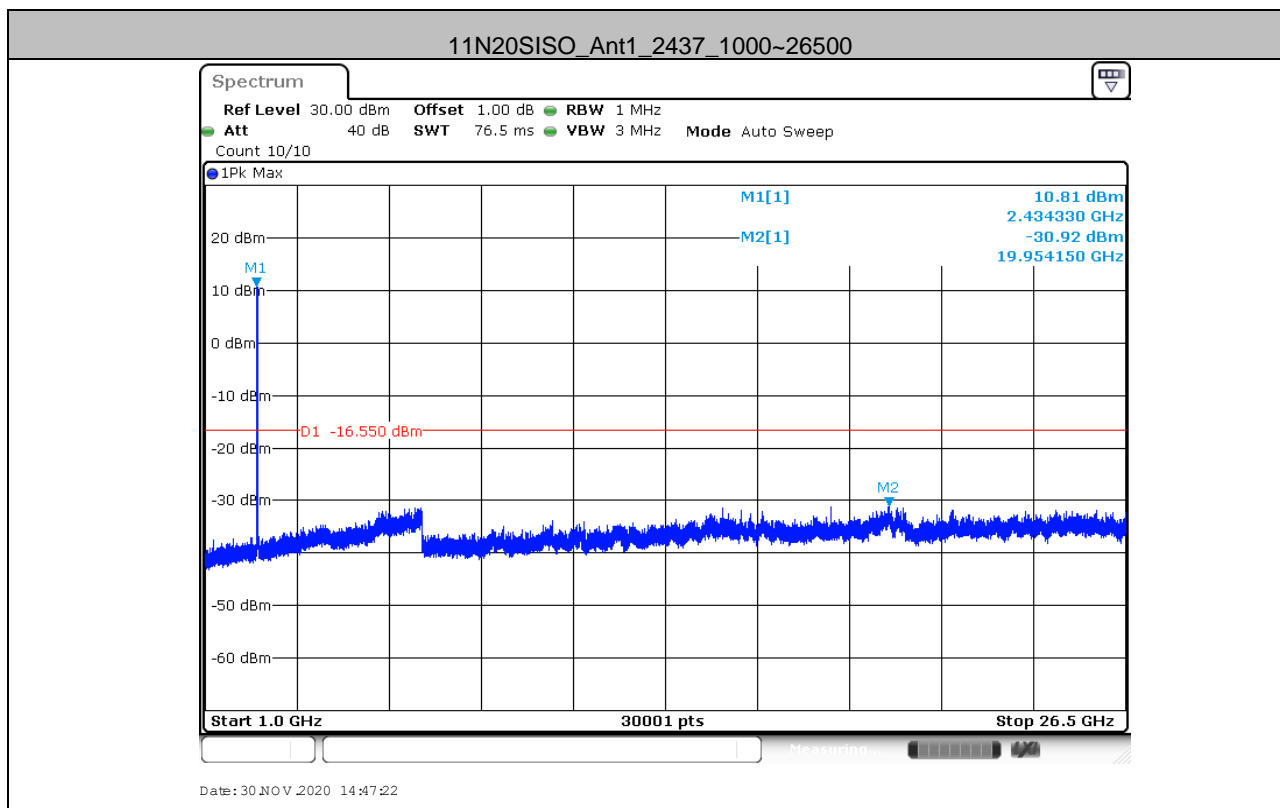


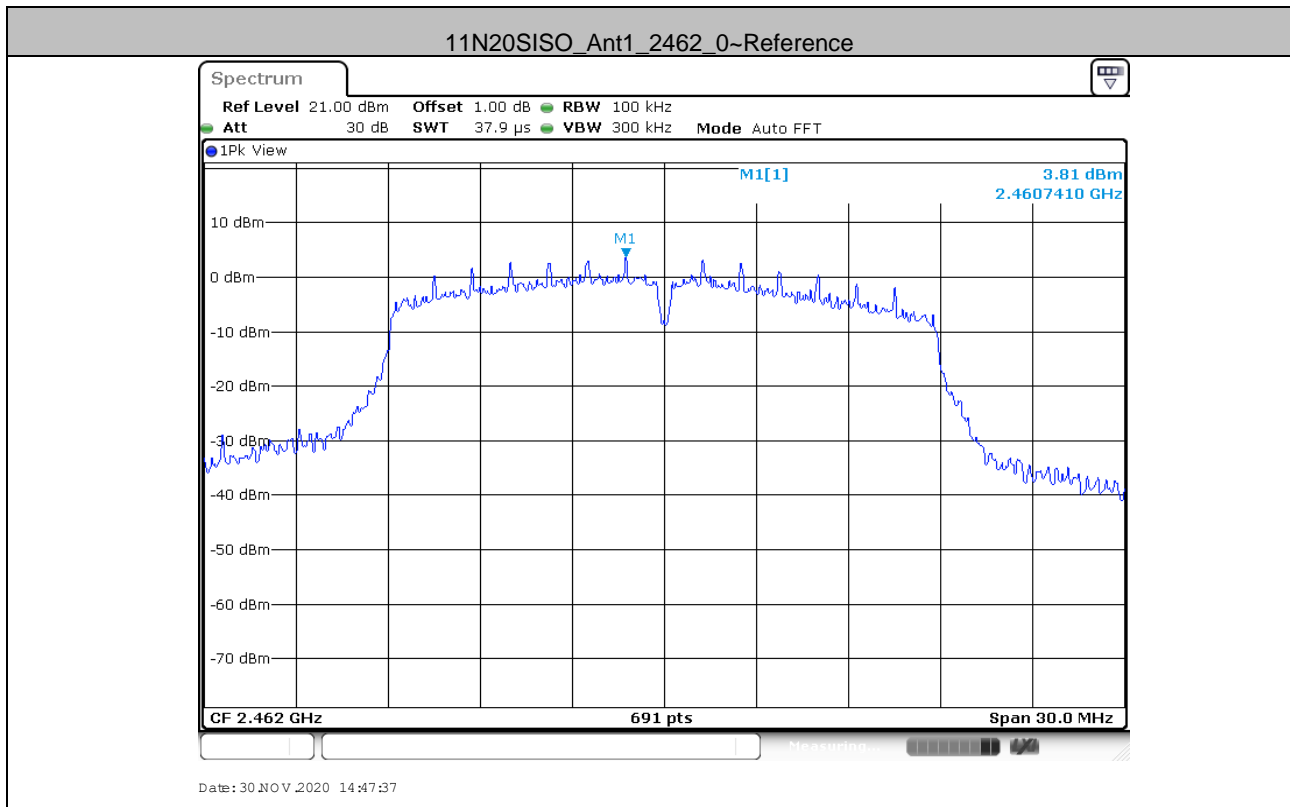


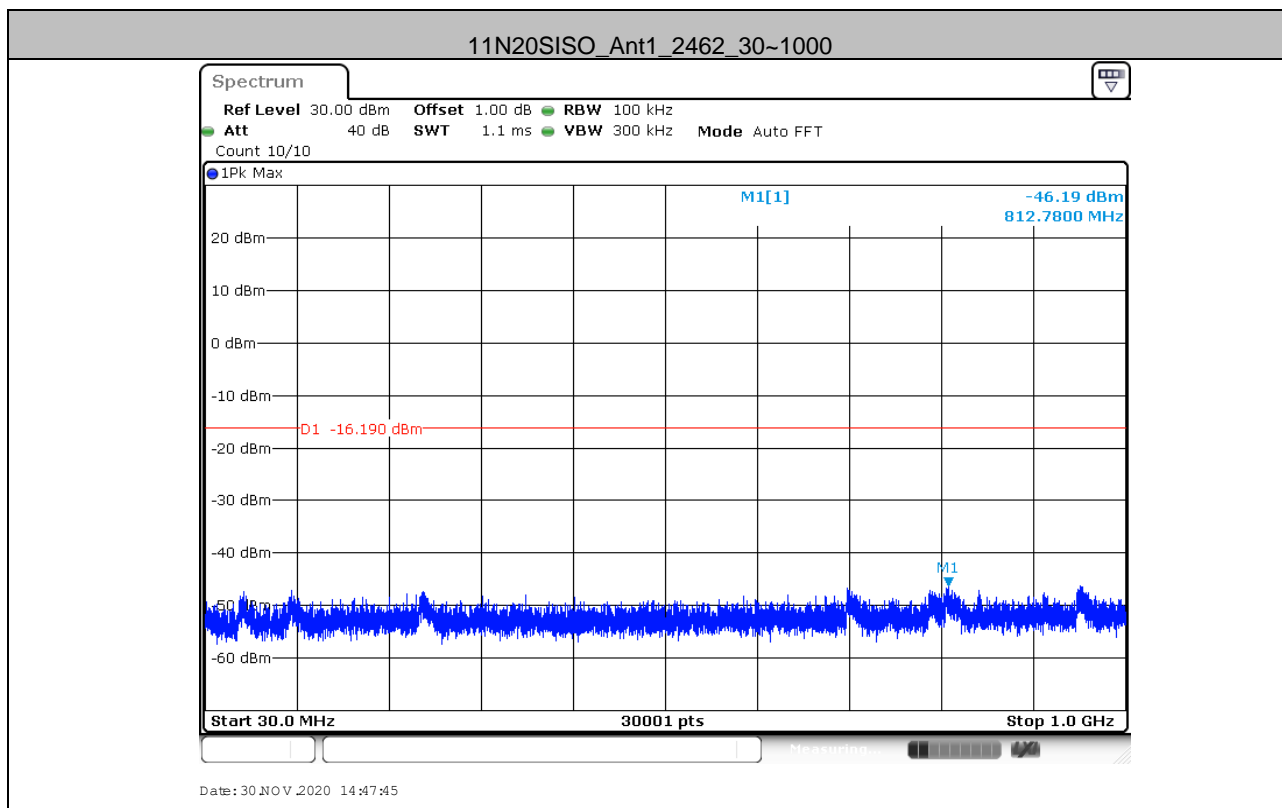








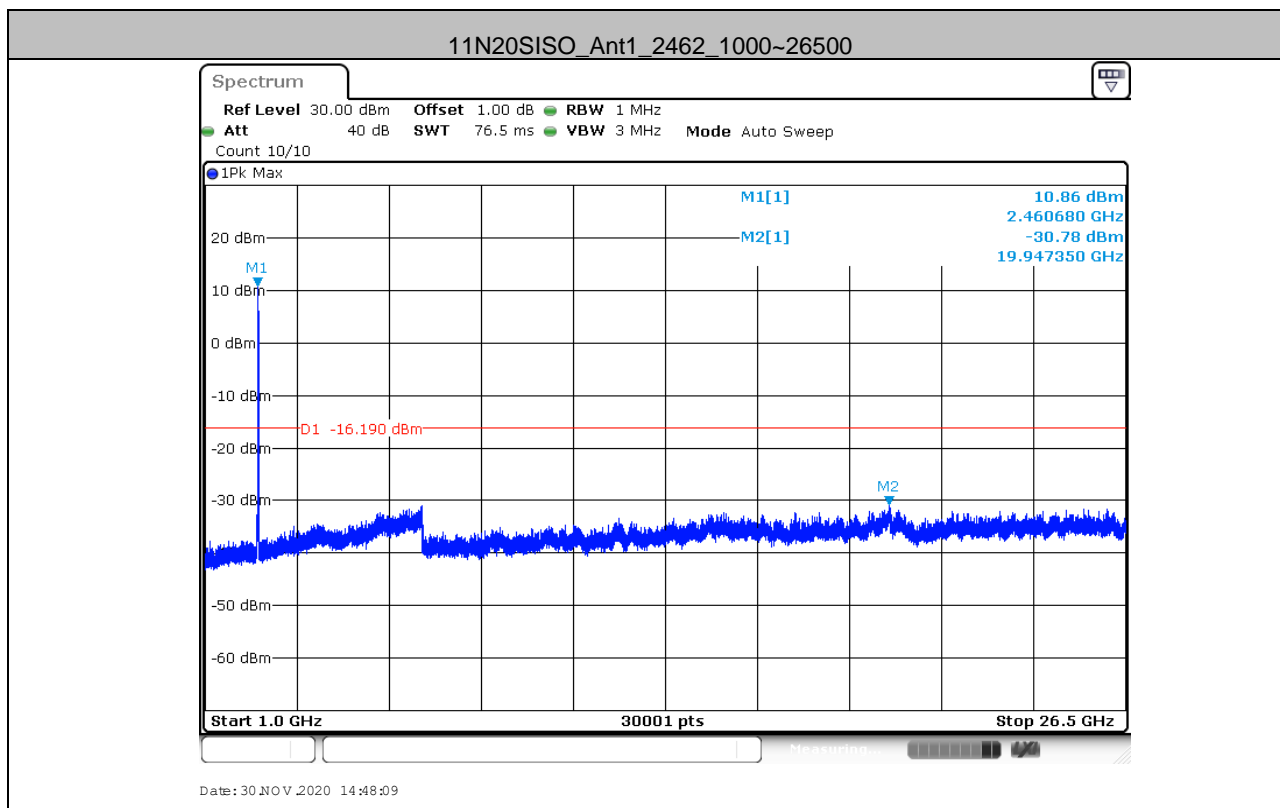




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Remark:

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



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4.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10 :2013 Section 11.12				
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
	Remark: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.				

Test Setup:	
-------------	--



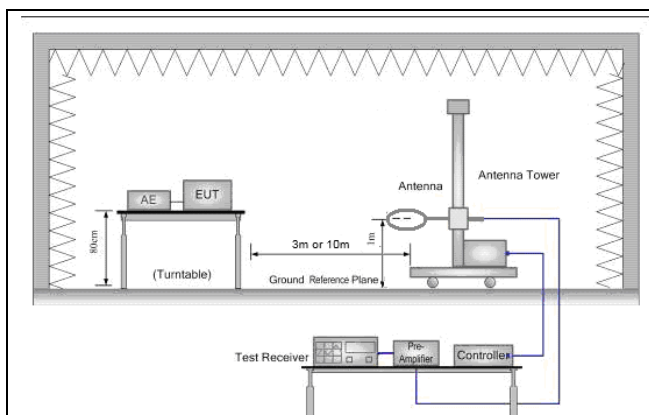


Figure 1. Below 30MHz

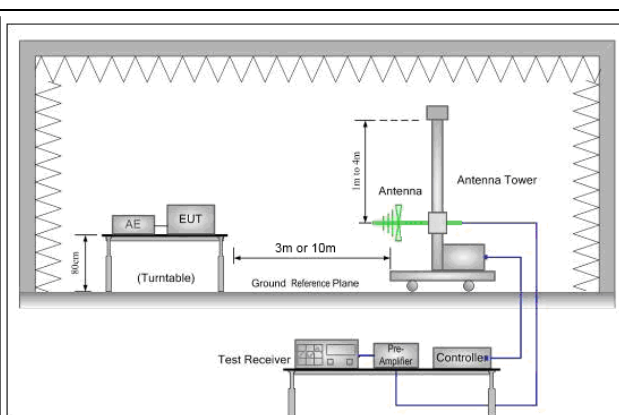


Figure 2. 30MHz to 1GHz

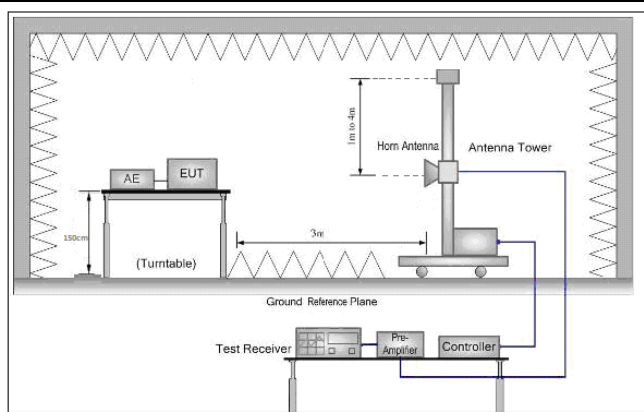


Figure 3. Above 1 GHz

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.
- 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



	<p>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.</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>
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Charge + Transmitting mode.
Final Test Mode:	<p>Pretest the EUT at Charge + Transmitting mode.</p> <p>Through Pre-scan, find the</p> <p>1Mbps of rate is the worst case of 802.11B;</p> <p>6Mbps of rate is the worst case of 802.11G;</p> <p>MCS0 of rate is the worst case of 802.11N(HT20);</p> <p>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



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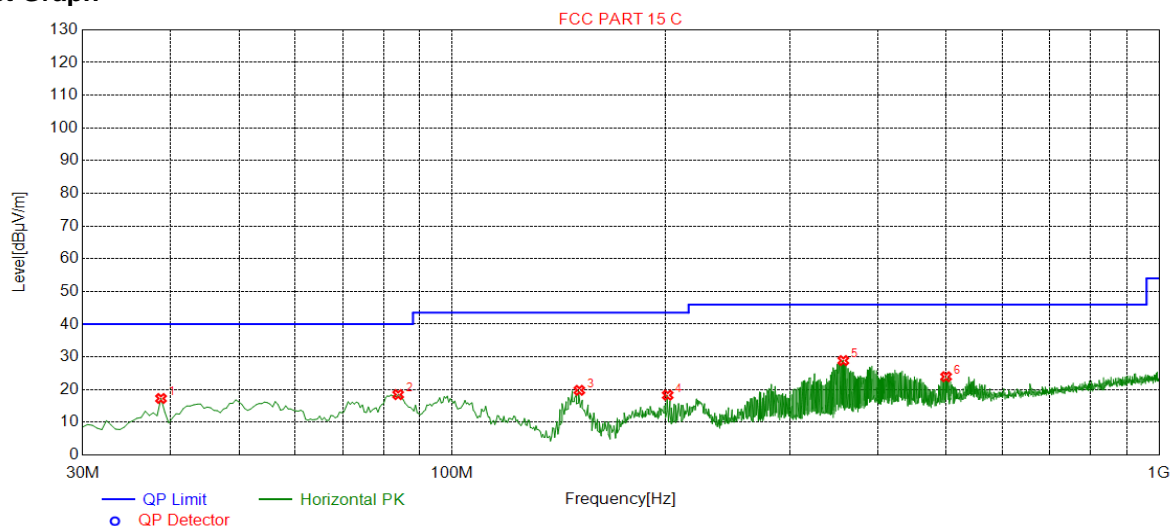


4.9.1 Radiated emission below 1GHz

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	38.7344	17.29	40.00	22.71	175	83	Horizontal
2	83.8619	18.47	40.00	21.53	285	239	Horizontal
3	151.3107	19.78	43.50	23.72	221	89	Horizontal
4	201.7759	18.29	43.50	25.21	294	46	Horizontal
5	357.5388	28.88	46.00	17.12	194	130	Horizontal
6	499.7149	23.94	46.00	22.06	264	323	Horizontal

Final Data List

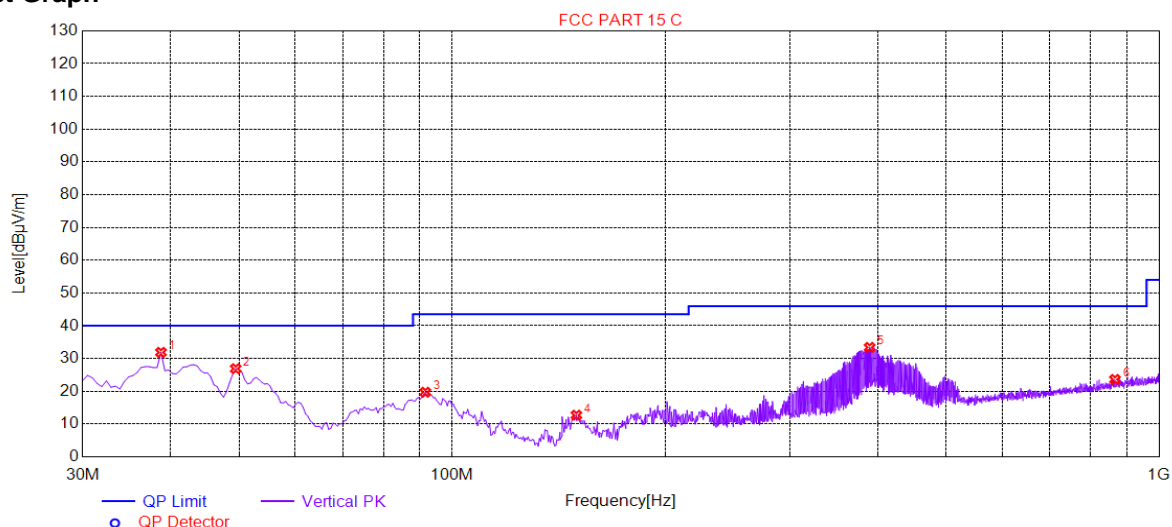


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Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	38.7344	31.89	40.00	8.11	227	289	Vertical
2	49.4097	26.92	40.00	13.08	354	25	Vertical
3	91.6258	19.72	43.50	23.78	331	80	Vertical
4	149.8549	12.72	43.50	30.78	249	330	Vertical
5	389.5648	33.40	46.00	12.60	294	118	Vertical
6	866.0730	23.62	46.00	22.38	357	327	Vertical

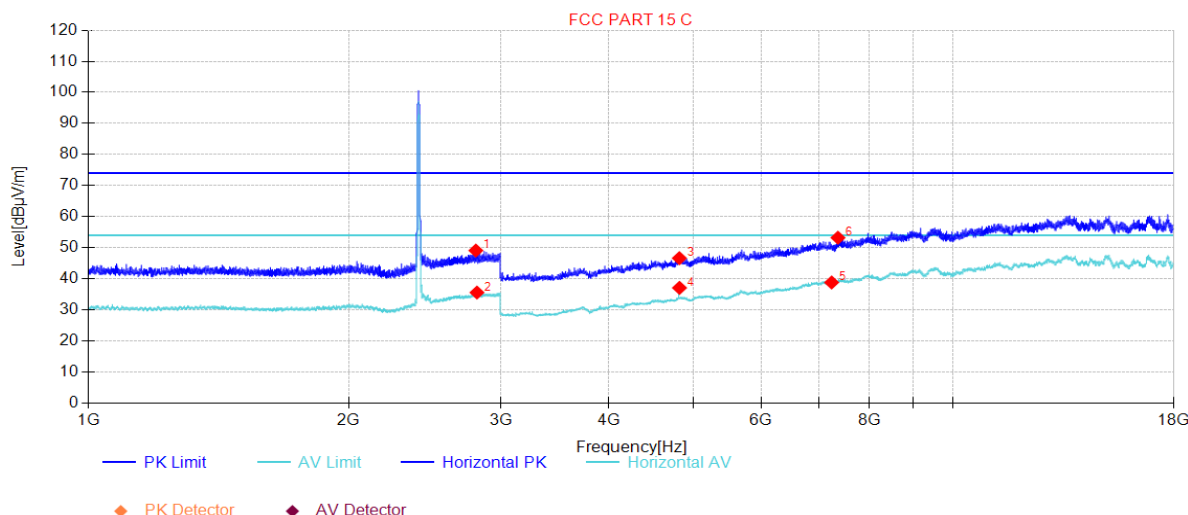
Final Data List



4.10 Transmitter emission above 1GHz

4.10.1.1 802.11B_Channel 1

Test Graph



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2805.780	49.07	6.74	74.00	24.93	178	Horizontal
2	2814.181	35.53	6.76	54.00	18.47	145	Horizontal
3	4824.000	46.59	-10.56	74.00	27.41	152	Horizontal
4	4825.682	37.04	-10.55	54.00	16.96	135	Horizontal
5	7236.000	38.78	-2.59	54.00	15.22	158	Horizontal
6	7359.435	53.18	-2.24	74.00	20.82	251	Horizontal

Final Data List

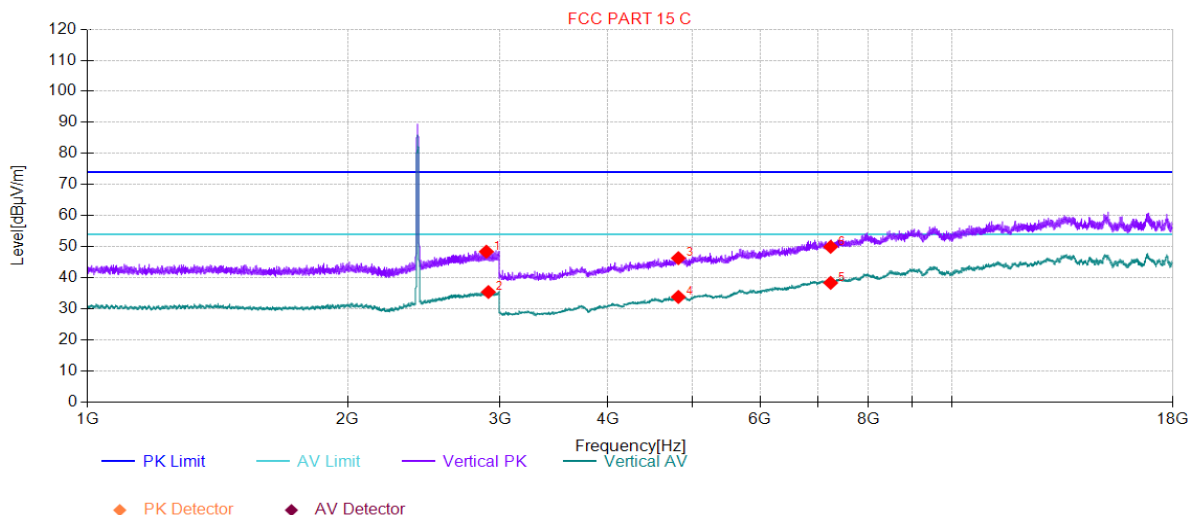


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4.10.1.2 802.11B_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2893.589	48.38	6.94	74.00	25.62	263	Vertical
2	2908.790	35.38	6.99	54.00	18.62	227	Vertical
3	4824.000	46.29	-10.56	74.00	27.71	271	Vertical
4	4824.000	33.79	-10.56	54.00	20.21	254	Vertical
5	7236.000	38.33	-2.59	54.00	15.67	282	Vertical
6	7236.000	49.94	-2.59	74.00	24.06	233	Vertical

Final Data List

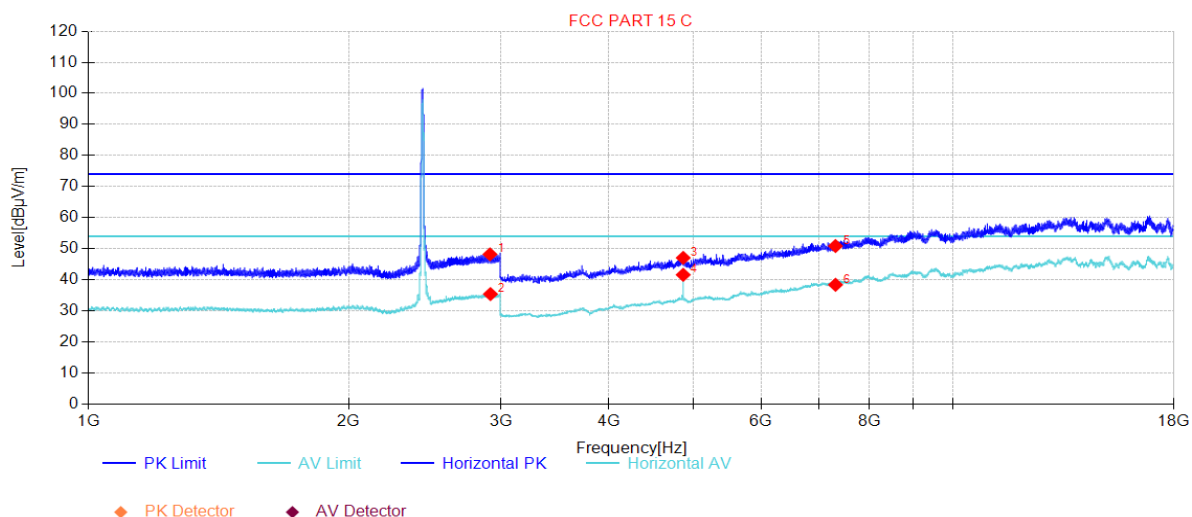


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4.10.1.3 802.11B_Channel 6

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2913.391	48.17	7.01	74.00	25.83	110	Horizontal
2	2916.791	35.36	7.03	54.00	18.64	102	Horizontal
3	4874.000	47.03	-10.40	74.00	26.97	172	Horizontal
4	4874.000	41.56	-10.40	54.00	12.44	153	Horizontal
5	7311.000	50.83	-2.57	74.00	23.17	185	Horizontal
6	7311.000	38.35	-2.57	54.00	15.65	158	Horizontal

Final Data List

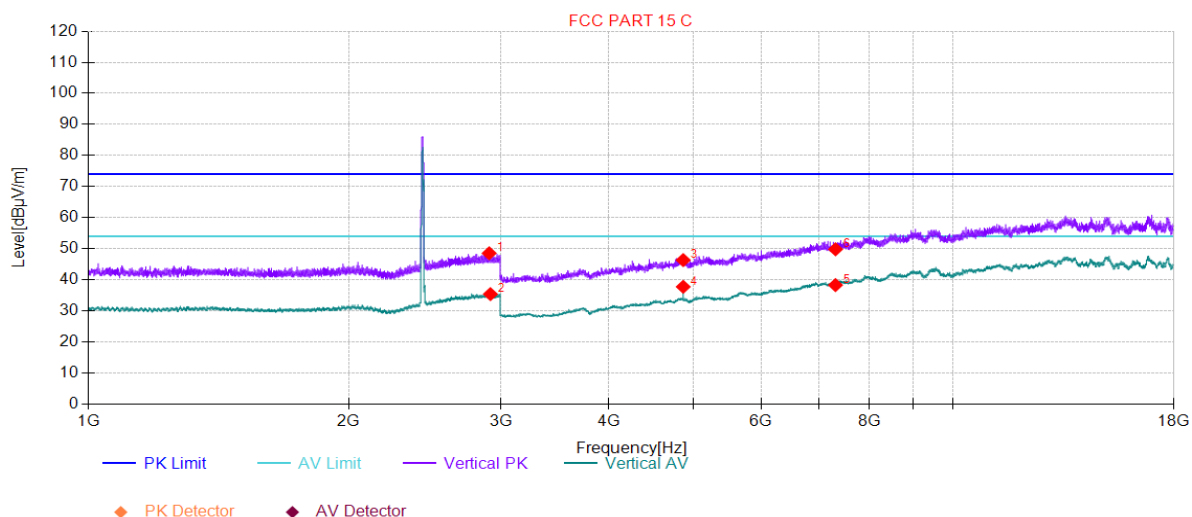


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4.10.1.4 802.11B_Channel 6

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2907.190	48.51	6.98	74.00	25.49	261	Vertical
2	2916.591	35.35	7.03	54.00	18.65	254	Vertical
3	4874.000	46.31	-10.40	74.00	27.69	369	Vertical
4	4874.000	37.71	-10.40	54.00	16.29	277	Vertical
5	7311.000	38.26	-2.57	54.00	15.74	287	Vertical
6	7311.000	49.79	-2.57	74.00	24.21	257	Vertical

Final Data List



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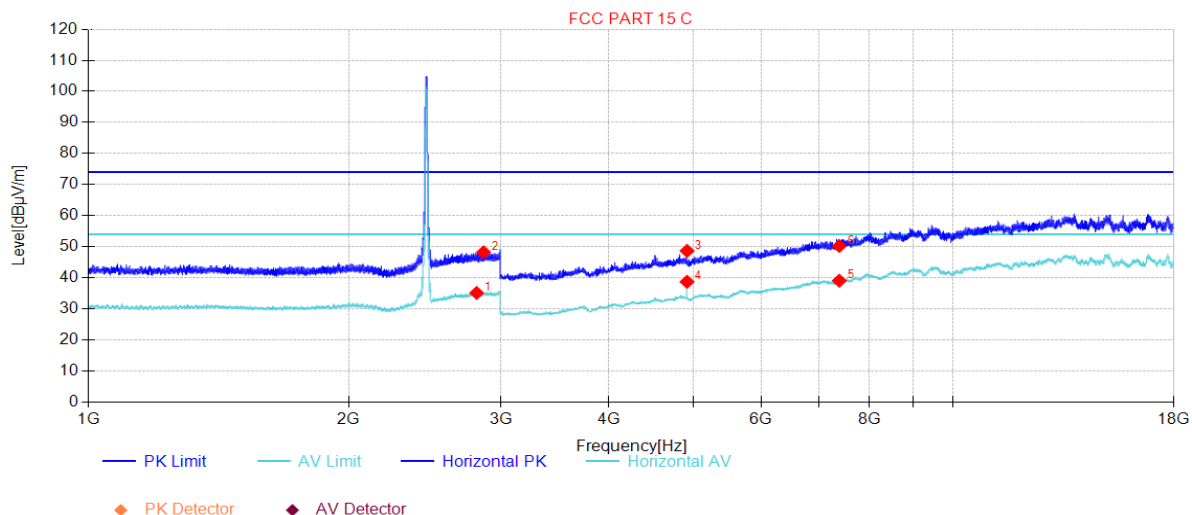
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4.10.1.5 802.11B_Channel 11

Test Graph



Suspected List

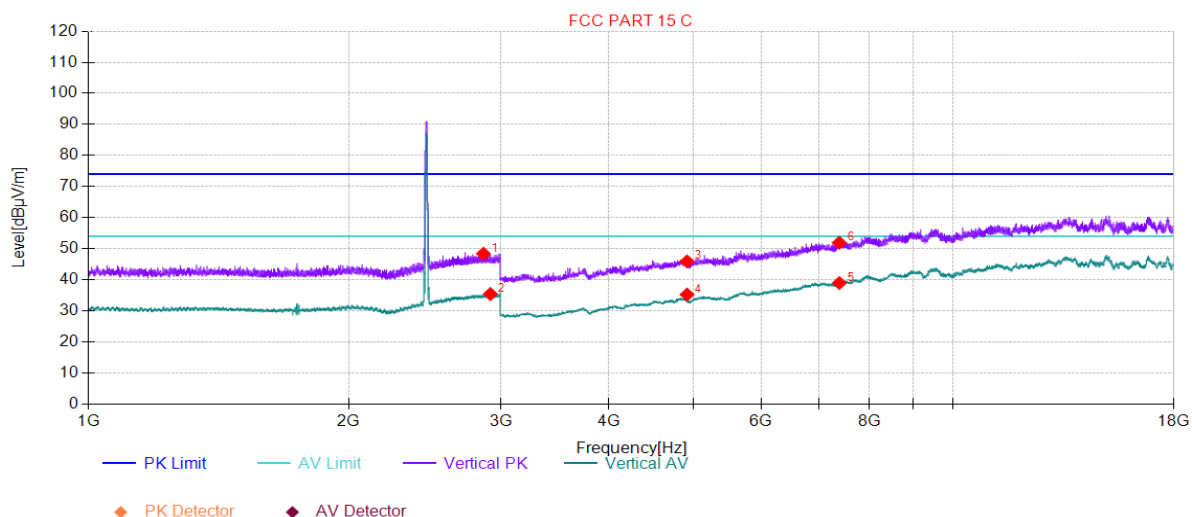
Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2811.981	35.08	6.76	54.00	18.92	136	Horizontal
2	2863.986	48.20	6.87	74.00	25.80	172	Horizontal
3	4924.000	48.64	-10.22	74.00	25.36	198	Horizontal
4	4924.000	38.67	-10.22	54.00	15.33	174	Horizontal
5	7386.000	39.02	-2.06	54.00	14.98	153	Horizontal
6	7386.000	50.21	-2.06	74.00	23.79	173	Horizontal

Final Data List



4.10.1.6 802.11B_Channel 11

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2863.386	48.35	6.87	74.00	25.65	211	Vertical
2	2916.591	35.38	7.03	54.00	18.62	294	Vertical
3	4924.000	45.88	-10.22	74.00	28.12	284	Vertical
4	4924.000	35.21	-10.22	54.00	18.79	222	Vertical
5	7386.000	38.93	-2.06	54.00	15.07	268	Vertical
6	7386.000	51.90	-2.06	74.00	22.10	261	Vertical

Final Data List



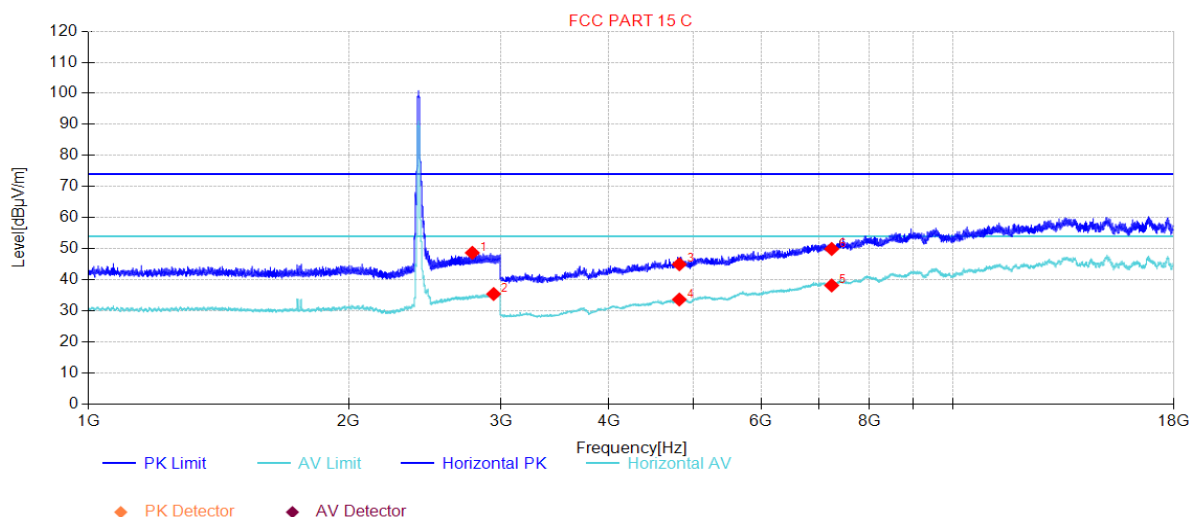
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4.10.1.7 802.11G_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2779.377	48.66	6.52	74.00	25.34	155	Horizontal
2	2941.594	35.39	7.14	54.00	18.61	122	Horizontal
3	4824.000	44.96	-10.56	74.00	29.04	186	Horizontal
4	4824.000	33.61	-10.56	54.00	20.39	174	Horizontal
5	7236.000	38.14	-2.59	54.00	15.86	163	Horizontal
6	7236.000	49.89	-2.59	74.00	24.11	182	Horizontal

Final Data List

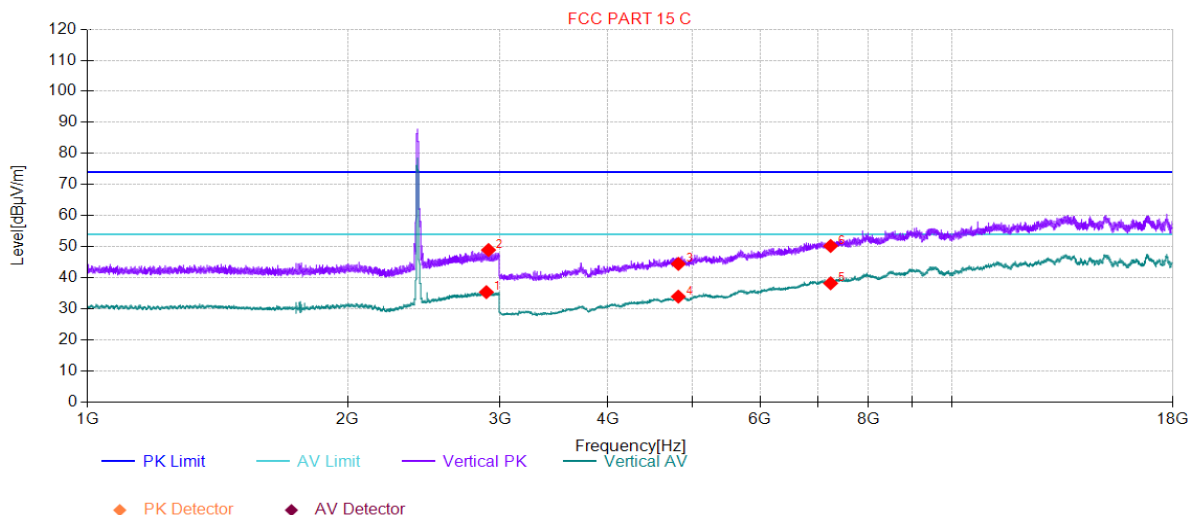


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4.10.1.8 802.11G_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2893.189	35.34	6.94	54.00	18.66	264	Vertical
2	2909.591	48.91	6.99	74.00	25.09	227	Vertical
3	4824.000	44.44	-10.56	74.00	29.56	252	Vertical
4	4824.000	33.90	-10.56	54.00	20.10	263	Vertical
5	7236.000	38.19	-2.59	54.00	15.81	274	Vertical
6	7236.000	50.21	-2.59	74.00	23.79	286	Vertical

Final Data List



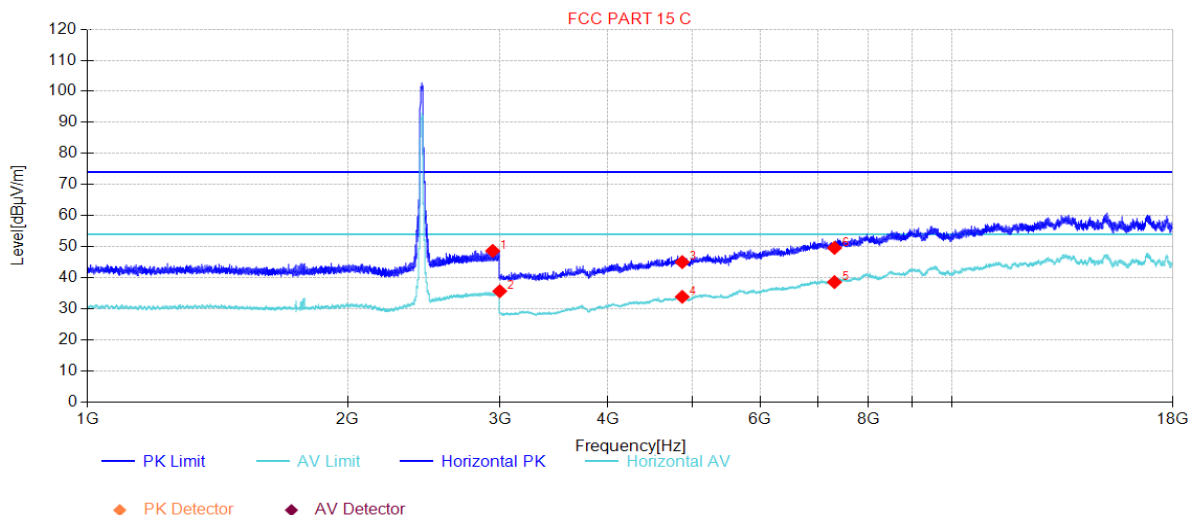
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4.10.1.9 802.11G_Channel 6

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2942.394	48.63	7.15	74.00	25.37	198	Horizontal
2	2997.999	35.65	7.40	54.00	18.35	152	Horizontal
3	4874.000	45.01	-10.40	74.00	28.99	145	Horizontal
4	4874.000	33.84	-10.40	54.00	20.16	174	Horizontal
5	7311.000	38.57	-2.57	54.00	15.43	133	Horizontal
6	7311.000	49.60	-2.57	74.00	24.40	178	Horizontal

Final Data List



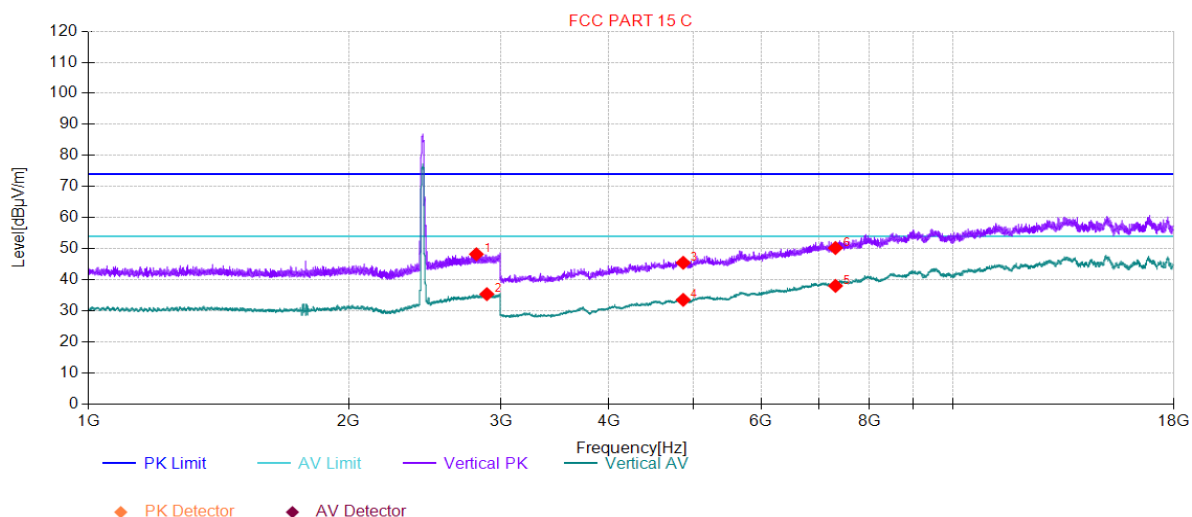
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4.10.1.10 802.11G_Channel 6

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2809.781	48.20	6.75	74.00	25.80	278	Vertical
2	2888.788	35.34	6.93	54.00	18.66	222	Vertical
3	4874.000	45.45	-10.40	74.00	28.55	274	Vertical
4	4874.000	33.50	-10.40	54.00	20.50	263	Vertical
5	7311.000	38.01	-2.57	54.00	15.99	233	Vertical
6	7311.000	50.20	-2.57	74.00	23.80	239	Vertical

Final Data List



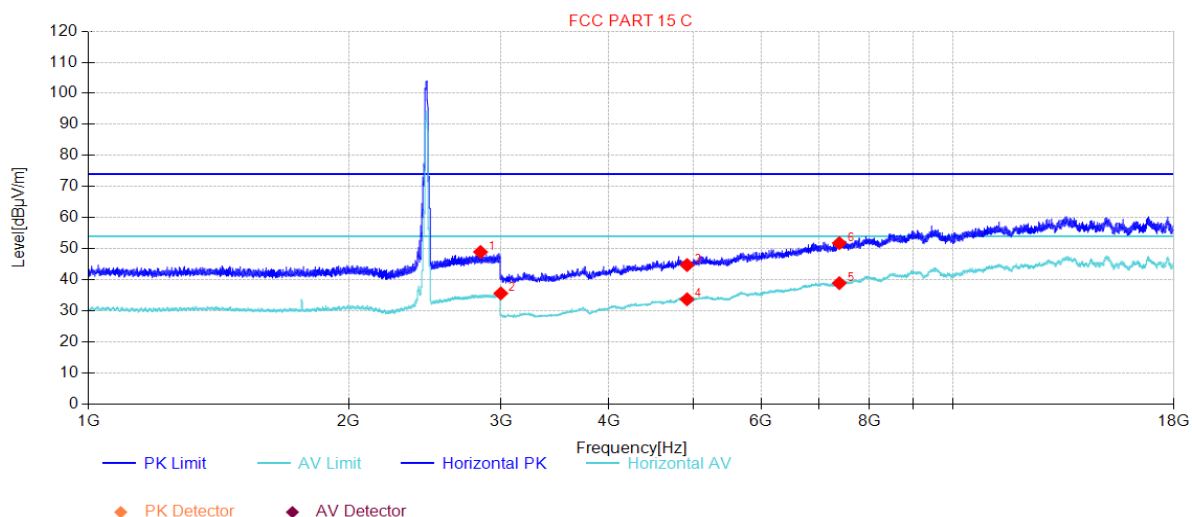
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4.10.1.11 802.11G_Channel 11

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2840.984	48.92	6.82	74.00	25.08	172	Horizontal
2	2998.599	35.59	7.40	54.00	18.41	145	Horizontal
3	4924.000	44.71	-10.22	74.00	29.29	135	Horizontal
4	4924.000	33.69	-10.22	54.00	20.31	127	Horizontal
5	7386.000	38.89	-2.06	54.00	15.11	125	Horizontal
6	7386.000	51.77	-2.06	74.00	22.23	154	Horizontal

Final Data List



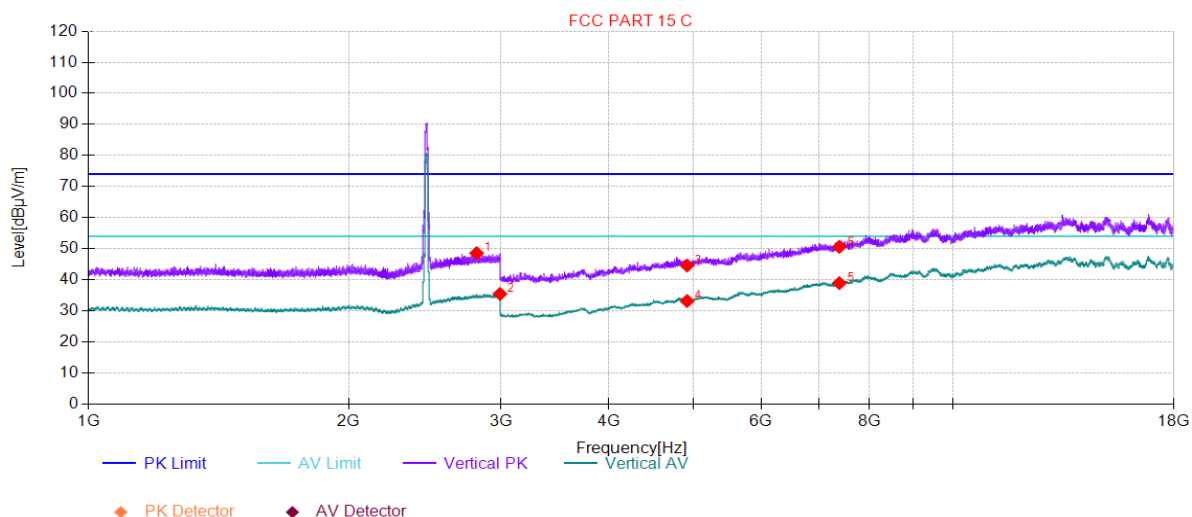
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4.10.1.12 802.11G_Channel 11

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2811.781	48.55	6.76	74.00	25.45	278	Vertical
2	2992.199	35.41	7.37	54.00	18.59	272	Vertical
3	4924.000	44.56	-10.22	74.00	29.44	256	Vertical
4	4924.000	33.12	-10.22	54.00	20.88	245	Vertical
5	7386.000	38.88	-2.06	54.00	15.12	242	Vertical
6	7386.000	50.57	-2.06	74.00	23.43	273	Vertical

Final Data List

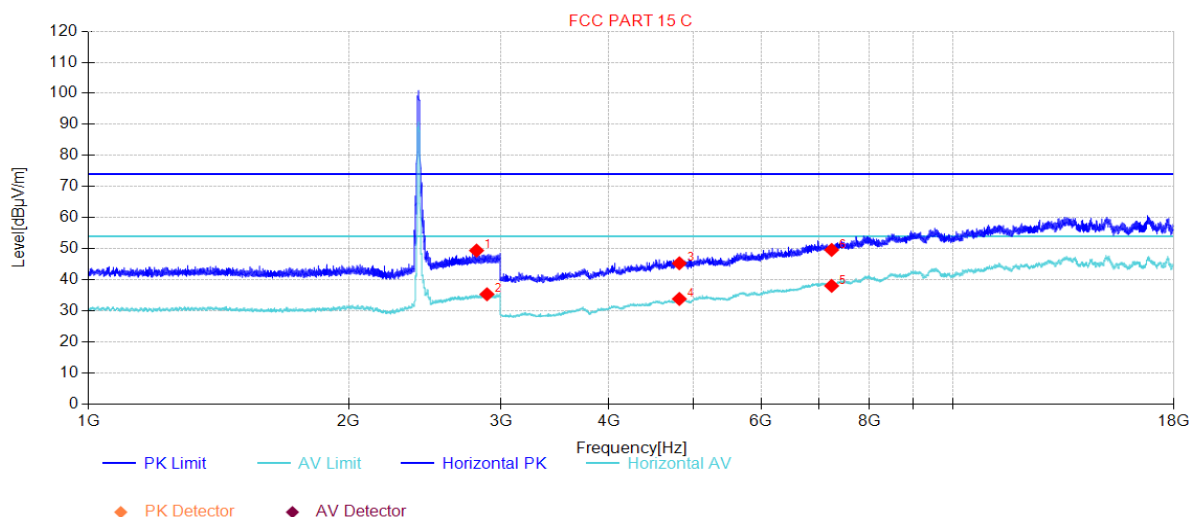


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4.10.1.13 802.11N20_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2811.181	49.38	6.75	74.00	24.62	172	Horizontal
2	2889.789	35.30	6.93	54.00	18.70	106	Horizontal
3	4824.000	45.28	-10.56	74.00	28.72	174	Horizontal
4	4824.000	33.79	-10.56	54.00	20.21	110	Horizontal
5	7236.000	38.02	-2.59	54.00	15.98	175	Horizontal
6	7236.000	49.59	-2.59	74.00	24.41	123	Horizontal

Final Data List



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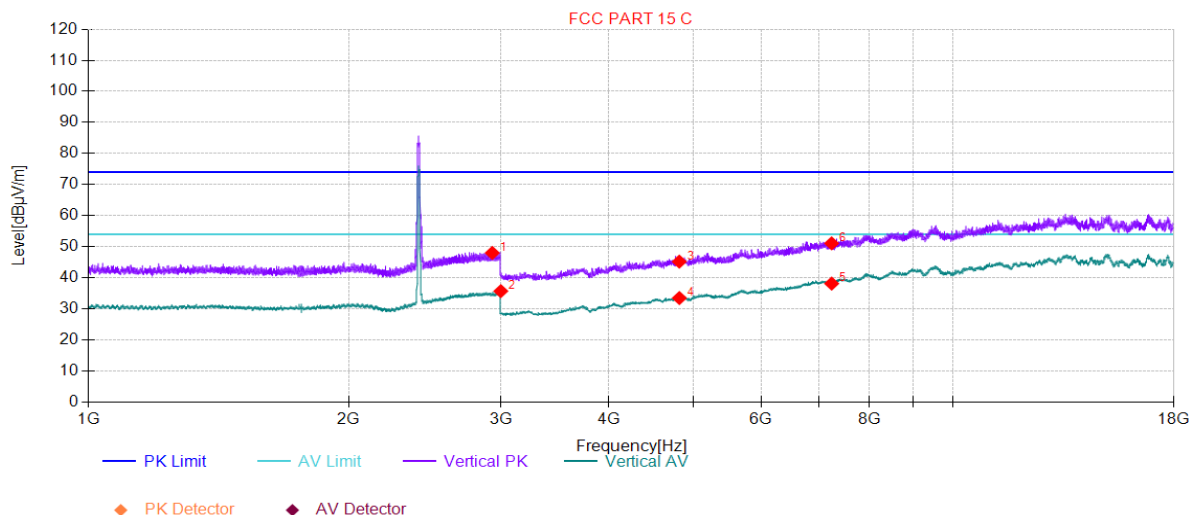
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4.10.1.14 802.11N20_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2931.193	47.96	7.09	74.00	26.04	265	Vertical
2	2998.599	35.67	7.40	54.00	18.33	287	Vertical
3	4824.000	45.17	-10.56	74.00	28.83	255	Vertical
4	4824.000	33.44	-10.56	54.00	20.56	274	Vertical
5	7236.000	38.10	-2.59	54.00	15.90	256	Vertical
6	7236.000	51.05	-2.59	74.00	22.95	272	Vertical

Final Data List

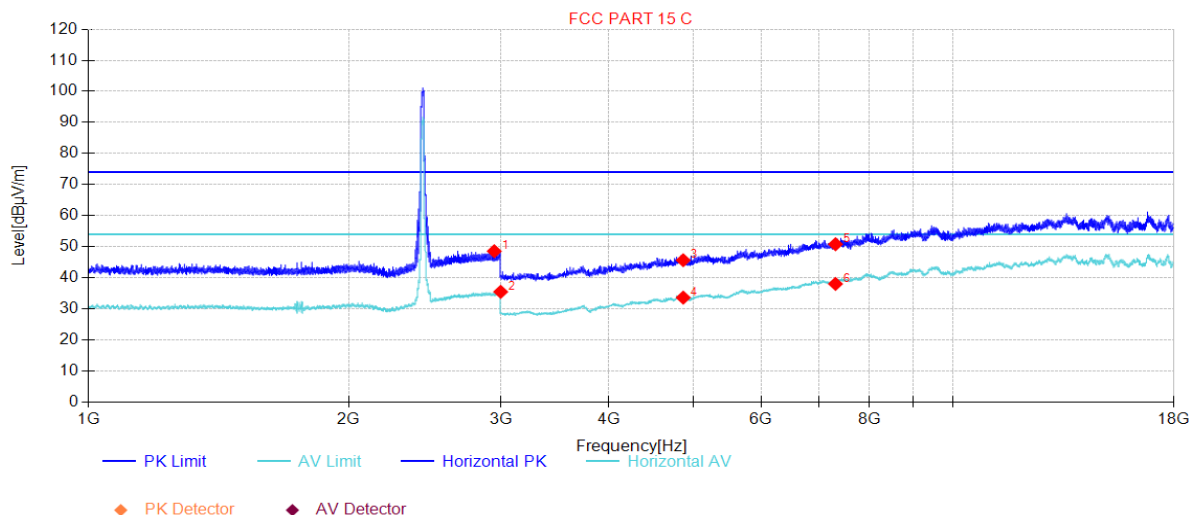


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4.10.1.15 802.11N20_Channel 6

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2946.794	48.52	7.17	74.00	25.48	152	Horizontal
2	2997.599	35.45	7.40	54.00	18.55	210	Horizontal
3	4874.000	45.62	-10.40	74.00	28.38	172	Horizontal
4	4874.000	33.58	-10.40	54.00	20.42	153	Horizontal
5	7311.000	50.77	-2.57	74.00	23.23	174	Horizontal
6	7311.000	37.99	-2.57	54.00	16.01	187	Horizontal

Final Data List

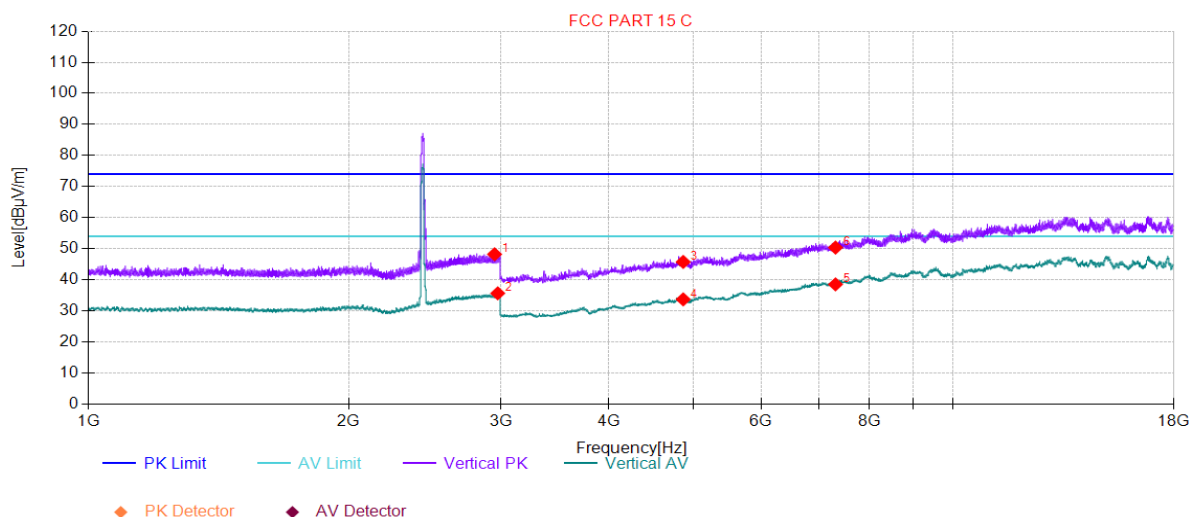


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4.10.1.16 802.11N20_Channel 6

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2948.994	48.18	7.18	74.00	25.82	211	Vertical
2	2974.197	35.60	7.29	54.00	18.40	256	Vertical
3	4874.000	45.72	-10.40	74.00	28.28	274	Vertical
4	4874.000	33.65	-10.40	54.00	20.35	266	Vertical
5	7311.000	38.49	-2.57	54.00	15.51	284	Vertical
6	7311.000	50.33	-2.57	74.00	23.67	263	Vertical

Final Data List

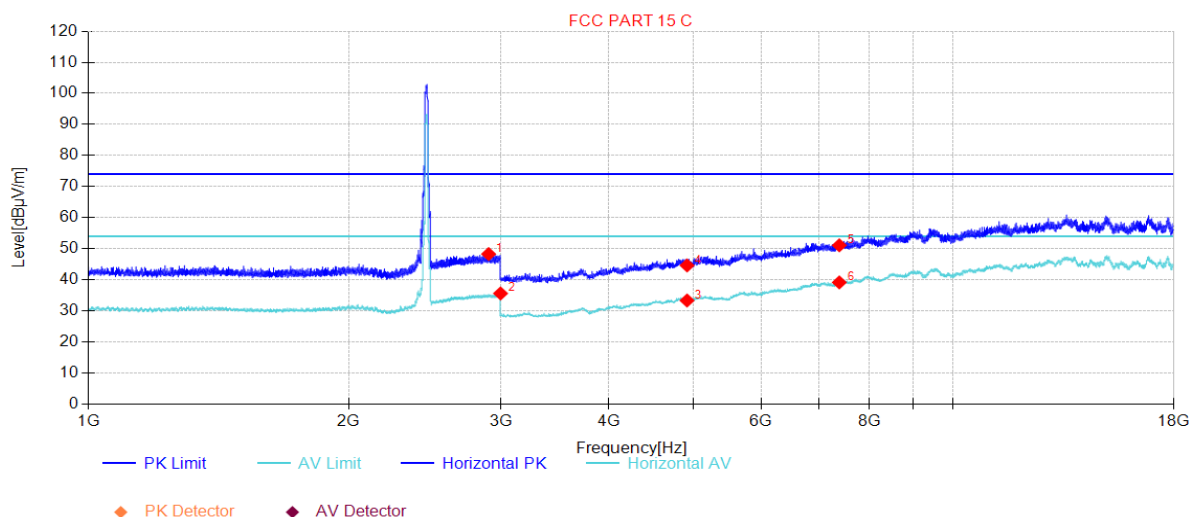


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4.10.1.17 802.11N20_Channel 11

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2902.990	48.26	6.96	74.00	25.74	182	Horizontal
2	2996.599	35.56	7.39	54.00	18.44	133	Horizontal
3	4924.000	33.30	-10.22	54.00	20.70	127	Horizontal
4	4924.000	44.59	-10.22	74.00	29.41	120	Horizontal
5	7386.000	51.06	-2.06	74.00	22.94	174	Horizontal
6	7386.000	39.11	-2.06	54.00	14.89	136	Horizontal

Final Data List



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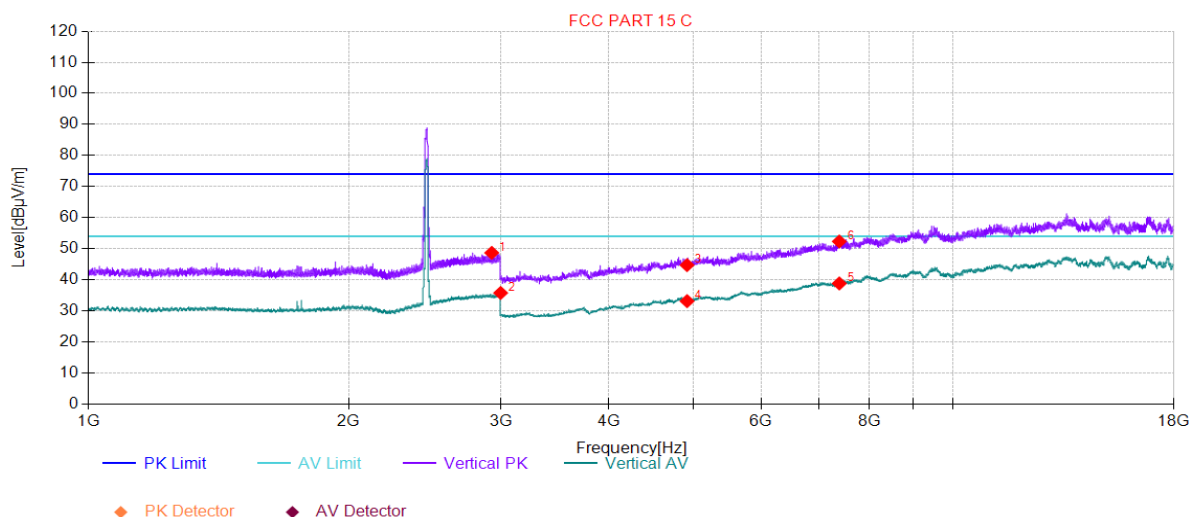
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4.10.1.18 802.11N20_Channel 11

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2926.992	48.65	7.07	74.00	25.35	369	Vertical
2	2997.399	35.73	7.40	54.00	18.27	264	Vertical
3	4924.000	44.69	-10.22	74.00	29.31	254	Vertical
4	4924.000	33.09	-10.22	54.00	20.91	245	Vertical
5	7386.000	38.79	-2.06	54.00	15.21	222	Vertical
6	7386.000	52.32	-2.06	74.00	21.68	238	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.



4.11 Restricted bands around fundamental frequency

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

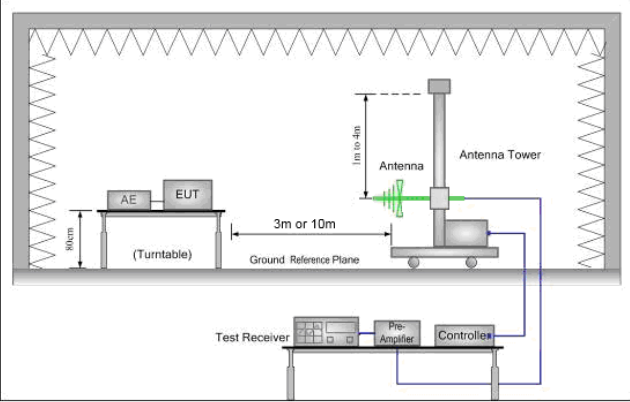


Figure 1. 30MHz to 1GHz

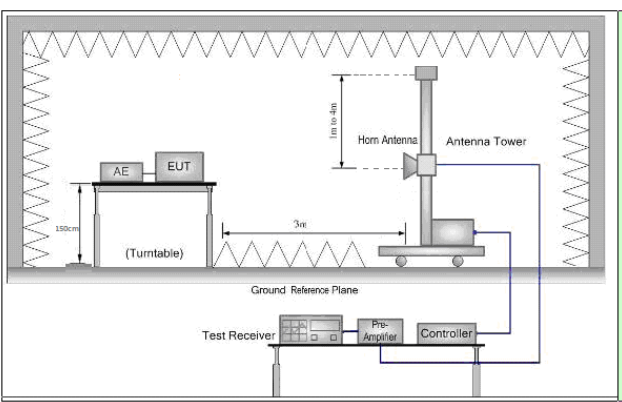


Figure 2. Above 1 GHz

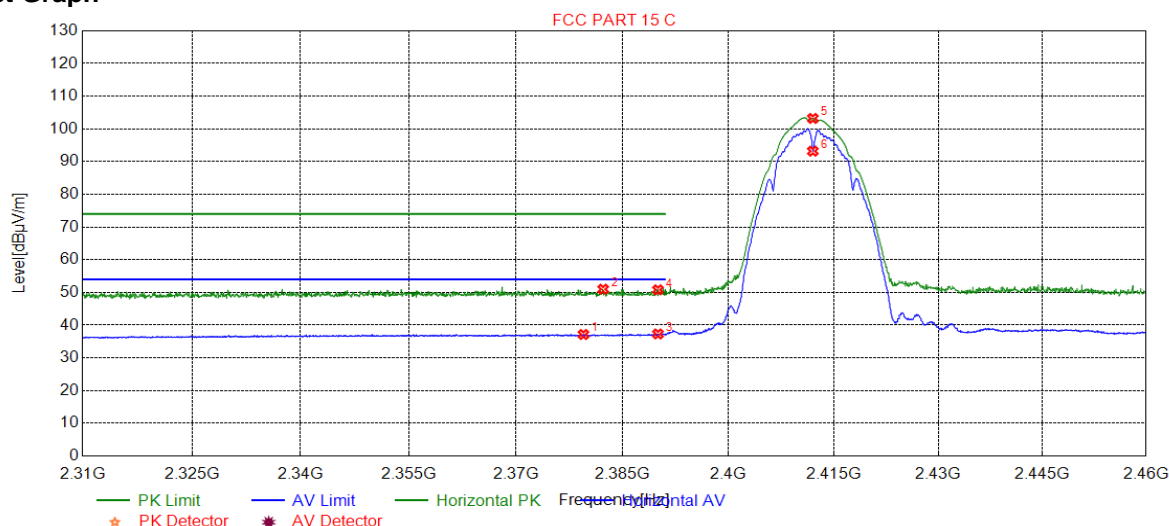
Test Procedure:	<p>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. For above 1GHz, the EUT was placed on the top of 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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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</p> <p>h. Test the EUT in the lowest 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>
Exploratory Test Mode:	<p>Transmitting with all kind of modulations, data rates.</p> <p>Charge + Transmitting mode.</p>
Final Test Mode:	<p>Pretest the EUT at Charge +Transmitting mode.</p> <p>Through Pre-scan, find the</p> <p>1Mbps of rate is the worst case of 802.11B;</p> <p>6Mbps of rate is the worst case of 802.11G ;</p> <p>MCS0 of rate is the worst case of 802.11N(HT20);</p> <p>Only the worst case is recorded in the report.</p>
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



Test plot as follows:

4.11.1.1 802.11B_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2379.484	37.16	54.00	16.84	228	322	Horizontal
2	2382.261	51.01	74.00	22.99	171	305	Horizontal
3	2390.000	37.32	54.00	16.68	124	14	Horizontal
4	2390.000	50.82	74.00	23.18	122	68	Horizontal
5	2412.000	103.22	0.00	-103.22	144	52	Horizontal
6	2412.000	93.21	0.00	-93.21	118	14	Horizontal

Final Data List



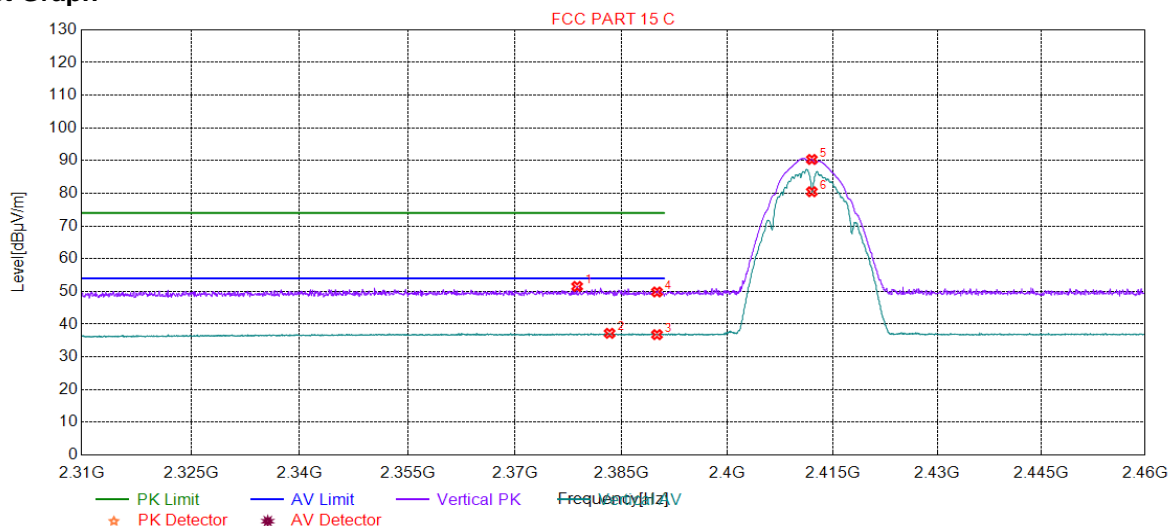
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4.11.1.2 802.11B_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2378.734	51.54	74.00	22.46	180	44	Vertical
2	2383.311	37.21	54.00	16.79	270	232	Vertical
3	2390.000	36.81	54.00	17.19	280	5	Vertical
4	2390.000	49.85	74.00	24.15	211	171	Vertical
5	2412.000	90.37	0.00	-90.37	258	149	Vertical
6	2412.000	80.50	0.00	-80.50	234	149	Vertical

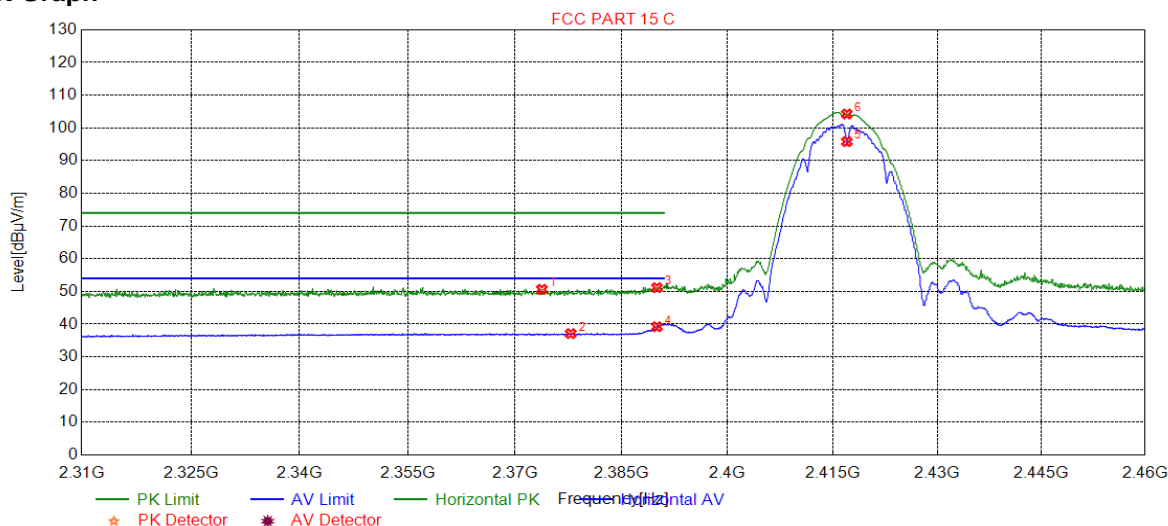
Final Data List





4.11.1.3 802.11B_Channel 2

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2373.781	50.67	74.00	23.33	132	179	Horizontal
2	2377.833	37.12	54.00	16.88	163	52	Horizontal
3	2390.000	51.18	74.00	22.82	201	14	Horizontal
4	2390.000	39.22	54.00	14.78	198	14	Horizontal
5	2417.000	95.82	0.00	-95.82	217	14	Horizontal
6	2417.000	104.26	0.00	-104.26	134	14	Horizontal

Final Data List



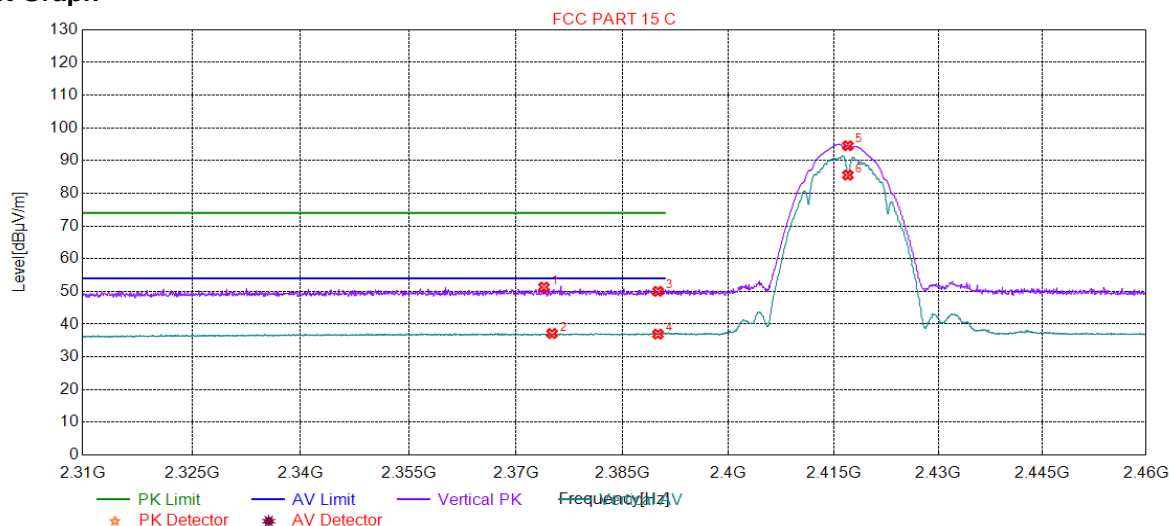
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4.11.1.4 802.11B_Channel 2

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2373.932	51.35	74.00	22.65	273	27	Vertical
2	2375.057	37.15	54.00	16.85	172	281	Vertical
3	2390.000	50.05	74.00	23.95	231	116	Vertical
4	2390.000	36.96	54.00	17.04	285	281	Vertical
5	2417.000	94.57	0.00	-94.57	179	232	Vertical
6	2417.000	85.57	0.00	-85.57	152	232	Vertical

Final Data List



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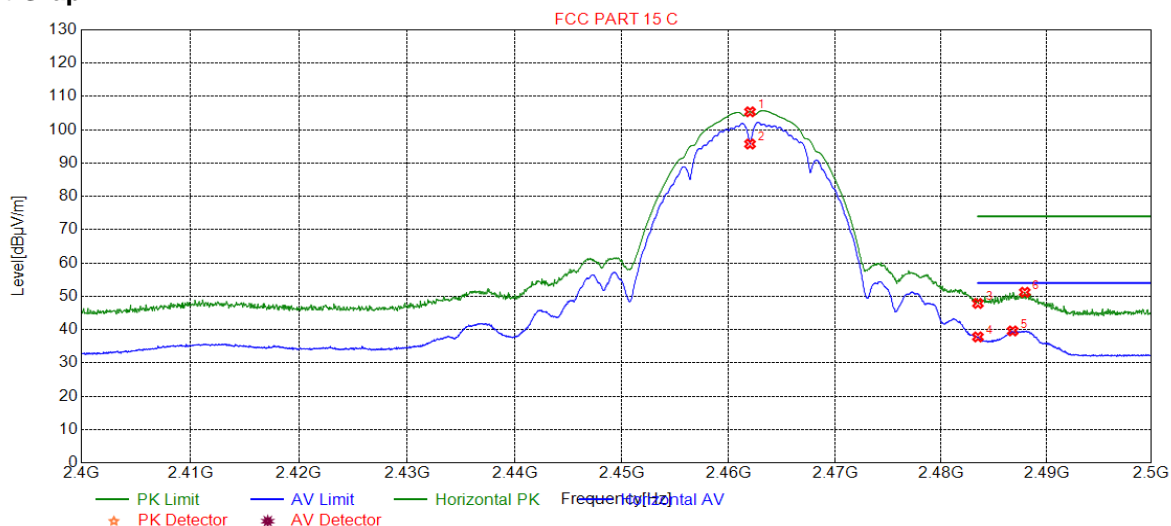
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4.11.1.5 802.11B_Channel 11

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	105.39	0.00	-105.39	134	14	Horizontal
2	2462.000	95.72	0.00	-95.72	109	74	Horizontal
3	2483.500	47.88	74.00	26.12	134	344	Horizontal
4	2483.500	37.83	54.00	16.17	133	355	Horizontal
5	2486.793	39.62	54.00	14.38	179	14	Horizontal
6	2487.944	51.23	74.00	22.77	224	359	Horizontal

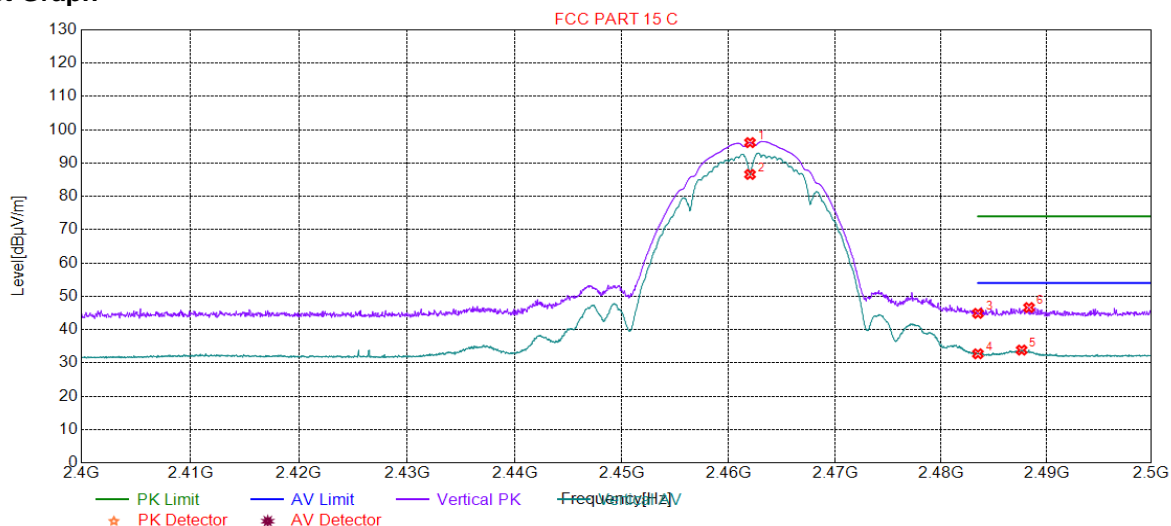
Final Data List





4.11.1.6 802.11B_Channel 11

Test Graph



Suspected List

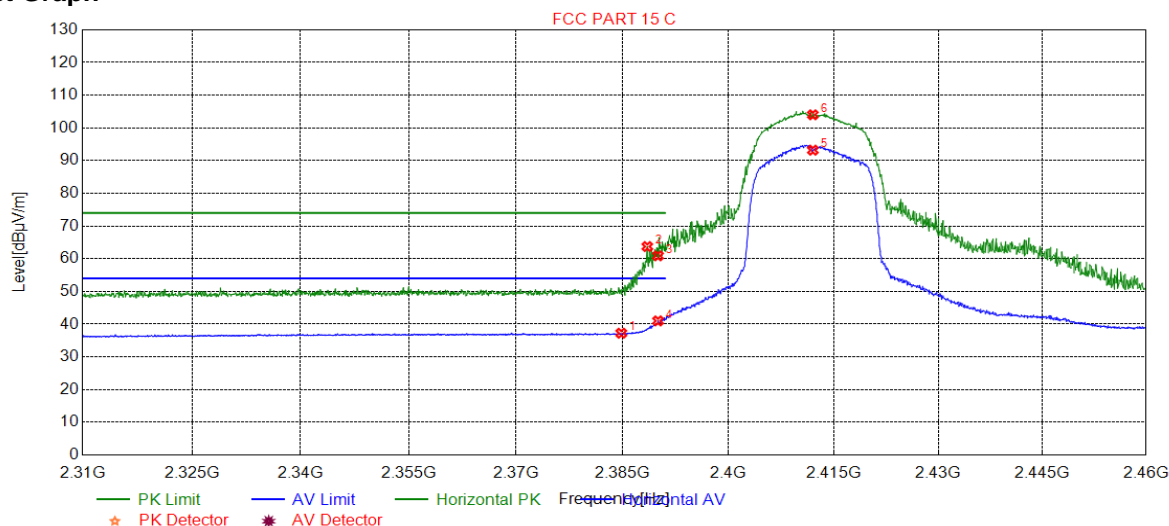
Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	96.15	0.00	-96.15	180	208	Vertical
2	2462.000	86.59	0.00	-86.59	219	208	Vertical
3	2483.500	44.90	74.00	29.10	151	158	Vertical
4	2483.500	32.76	54.00	21.24	245	208	Vertical
5	2487.643	33.89	54.00	20.11	166	202	Vertical
6	2488.344	46.65	74.00	27.35	294	69	Vertical

Final Data List



4.11.1.7 802.11G_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2384.812	37.25	54.00	16.75	187	102	Horizontal
2	2388.489	63.74	74.00	10.26	218	35	Horizontal
3	2390.000	60.90	74.00	13.10	174	24	Horizontal
4	2390.000	41.01	54.00	12.99	127	30	Horizontal
5	2412.000	93.21	0.00	-93.21	214	41	Horizontal
6	2412.000	104.02	0.00	-104.02	235	19	Horizontal

Final Data List



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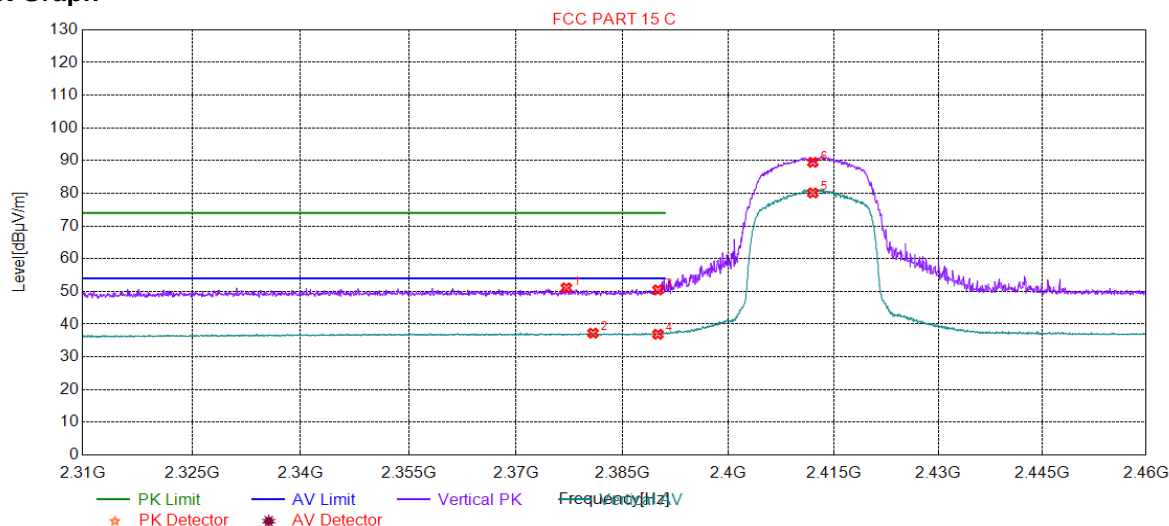
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4.11.1.8 802.11G_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2377.083	51.10	74.00	22.90	163	3	Vertical
2	2380.835	37.25	54.00	16.75	261	20	Vertical
3	2390.000	50.49	74.00	23.51	235	232	Vertical
4	2390.000	36.92	54.00	17.08	253	109	Vertical
5	2412.000	80.13	0.00	-80.13	210	232	Vertical
6	2412.000	89.48	0.00	-89.48	256	232	Vertical

Final Data List



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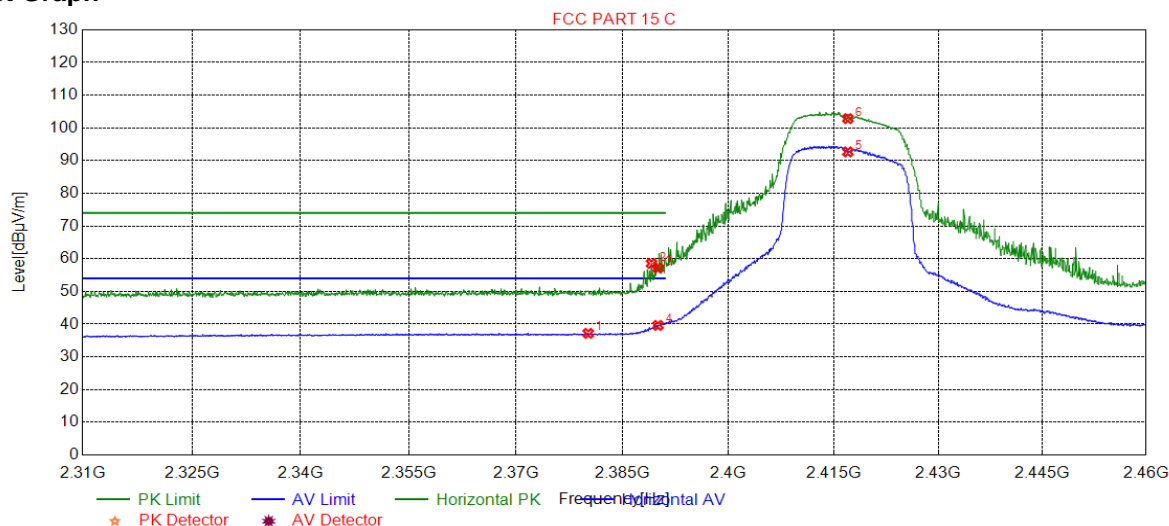
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4.11.1.9 802.11G_Channel 2

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2380.160	37.20	54.00	16.80	136	14	Horizontal
2	2389.089	58.56	74.00	15.44	232	56	Horizontal
3	2390.000	57.17	74.00	16.83	150	333	Horizontal
4	2390.000	39.64	54.00	14.36	143	34	Horizontal
5	2417.000	92.68	0.00	-92.68	167	29	Horizontal
6	2417.000	102.85	0.00	-102.85	185	29	Horizontal

Final Data List



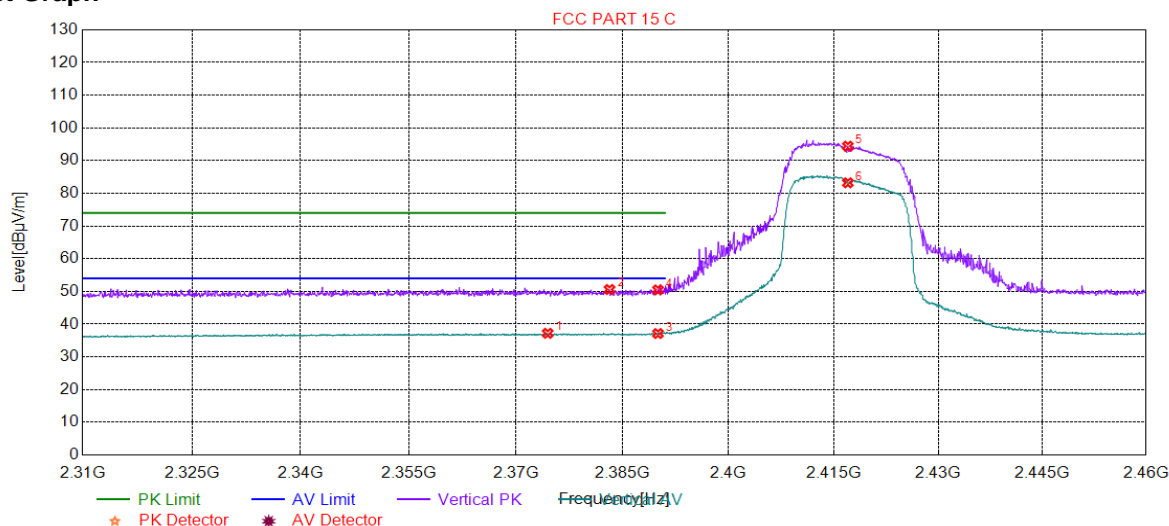
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4.11.1.10 802.11G_Channel 2

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2374.457	37.21	54.00	16.79	158	208	Vertical
2	2383.161	50.61	74.00	23.39	272	275	Vertical
3	2390.000	37.15	54.00	16.85	288	142	Vertical
4	2390.000	50.50	74.00	23.50	216	142	Vertical
5	2417.000	94.44	0.00	-94.44	237	126	Vertical
6	2417.000	83.23	0.00	-83.23	254	148	Vertical

Final Data List



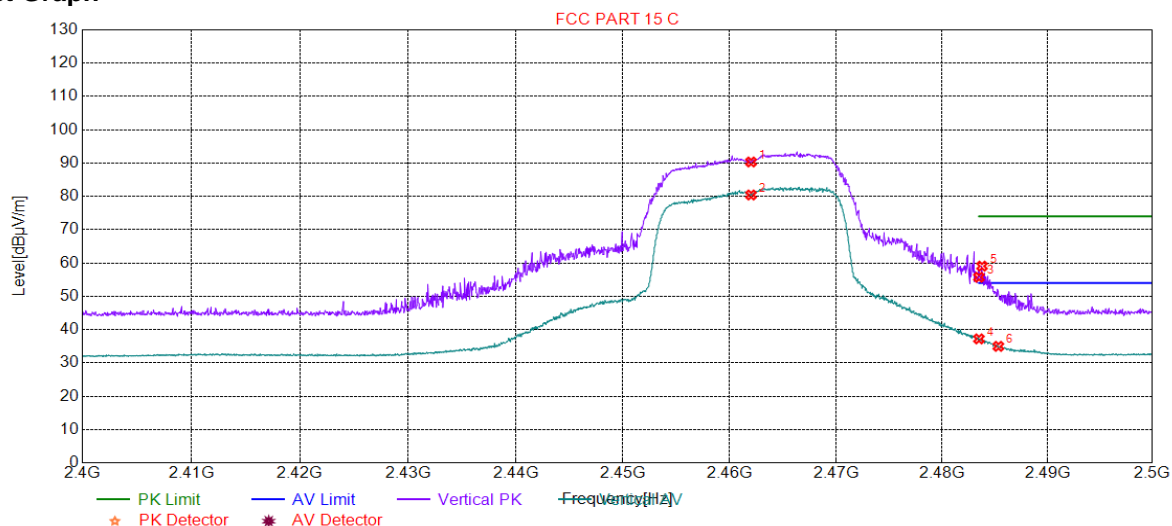
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4.11.1.11 802.11G_Channel 11

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	90.34	0.00	-90.34	218	297	Vertical
2	2462.000	80.43	0.00	-80.43	229	286	Vertical
3	2483.500	55.74	74.00	18.26	194	286	Vertical
4	2483.500	37.24	54.00	16.76	258	286	Vertical
5	2483.791	59.08	74.00	14.92	155	286	Vertical
6	2485.342	35.00	54.00	19.00	191	290	Vertical

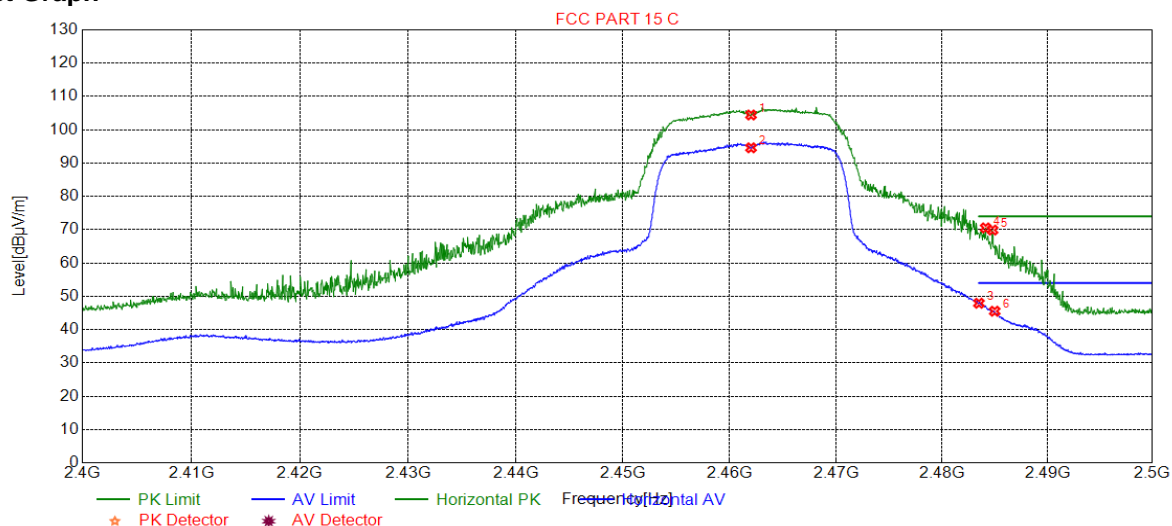
Final Data List





4.11.1.12 802.11G_Channel 11

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	104.44	0.00	-104.44	241	14	Horizontal
2	2462.000	94.59	0.00	-94.59	101	25	Horizontal
3	2483.500	47.94	54.00	6.06	117	29	Horizontal
4	2484.142	70.55	74.00	3.45	228	29	Horizontal
5	2484.792	69.90	74.00	4.10	202	36	Horizontal
6	2484.992	45.54	54.00	8.46	231	33	Horizontal

Final Data List



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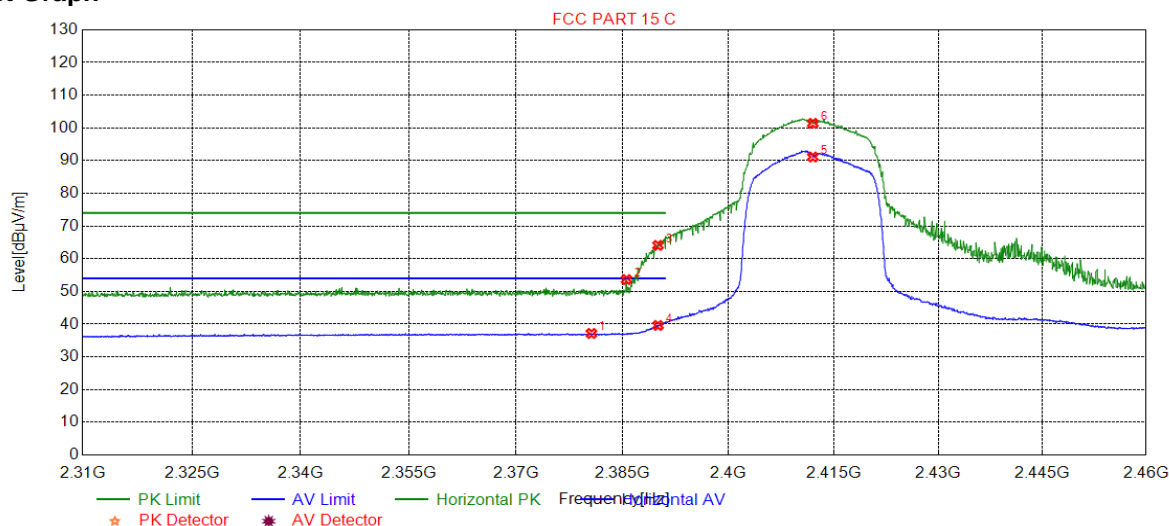
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4.11.1.13 802.11N20_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2380.610	37.17	54.00	16.83	238	248	Horizontal
2	2385.562	53.63	74.00	20.37	118	346	Horizontal
3	2390.000	64.10	74.00	9.90	160	23	Horizontal
4	2390.000	39.62	54.00	14.38	191	29	Horizontal
5	2412.000	91.12	0.00	-91.12	135	2	Horizontal
6	2412.000	101.41	0.00	-101.41	249	40	Horizontal

Final Data List



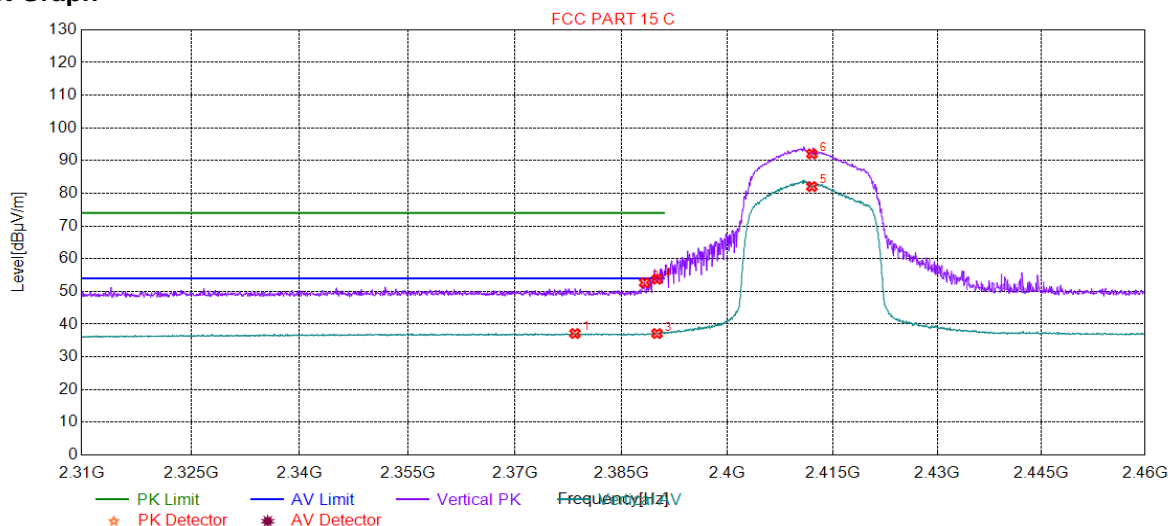
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4.11.1.14 802.11N20_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2378.434	37.16	54.00	16.84	261	311	Vertical
2	2388.264	52.69	74.00	21.31	178	151	Vertical
3	2390.000	37.13	54.00	16.87	253	244	Vertical
4	2390.000	53.75	74.00	20.25	270	146	Vertical
5	2412.000	82.08	0.00	-82.08	241	151	Vertical
6	2412.000	92.07	0.00	-92.07	245	151	Vertical

Final Data List



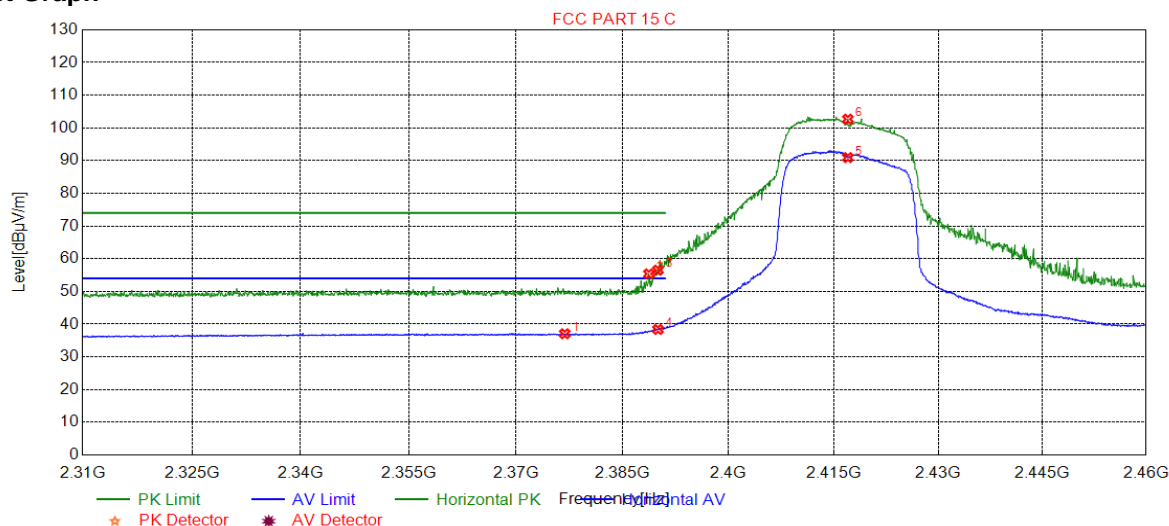
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4.11.1.15 802.11N20_Channel 2

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2376.858	37.08	54.00	16.92	115	336	Horizontal
2	2388.714	55.40	74.00	18.60	204	5	Horizontal
3	2390.000	56.54	74.00	17.46	174	50	Horizontal
4	2390.000	38.40	54.00	15.60	141	5	Horizontal
5	2417.000	90.93	0.00	-90.93	126	0	Horizontal
6	2417.000	102.69	0.00	-102.69	114	1	Horizontal

Final Data List



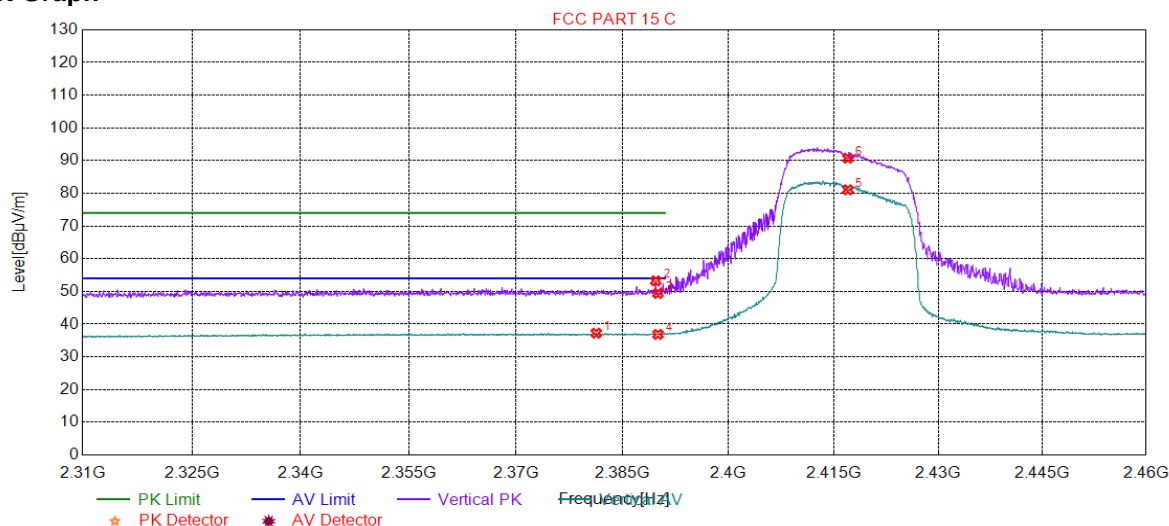
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4.11.1.16 802.11N20_Channel 2

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2381.285	37.24	54.00	16.76	163	290	Vertical
2	2389.689	53.25	74.00	20.75	185	152	Vertical
3	2390.000	49.42	74.00	24.58	205	14	Vertical
4	2390.000	36.89	54.00	17.11	291	74	Vertical
5	2417.000	81.09	0.00	-81.09	189	152	Vertical
6	2417.000	90.75	0.00	-90.75	230	152	Vertical

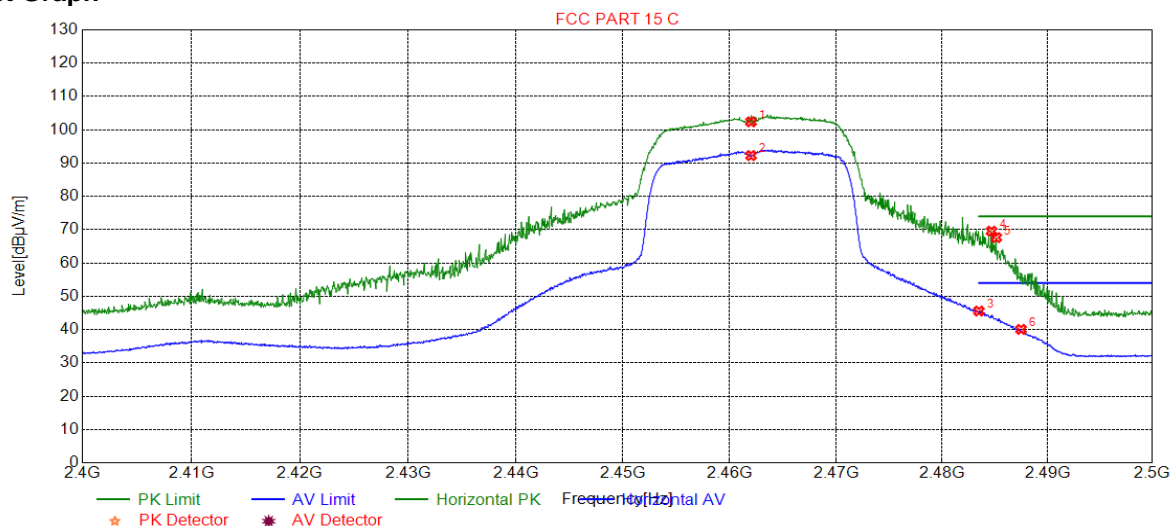
Final Data List





4.11.1.17 802.11N20_Channel 11

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	102.39	0.00	-102.39	230	15	Horizontal
2	2462.000	92.26	0.00	-92.26	161	26	Horizontal
3	2483.500	45.59	54.00	8.41	139	22	Horizontal
4	2484.692	69.57	74.00	4.43	199	30	Horizontal
5	2485.142	67.64	74.00	6.36	240	19	Horizontal
6	2487.493	40.09	54.00	13.91	239	26	Horizontal

Final Data List

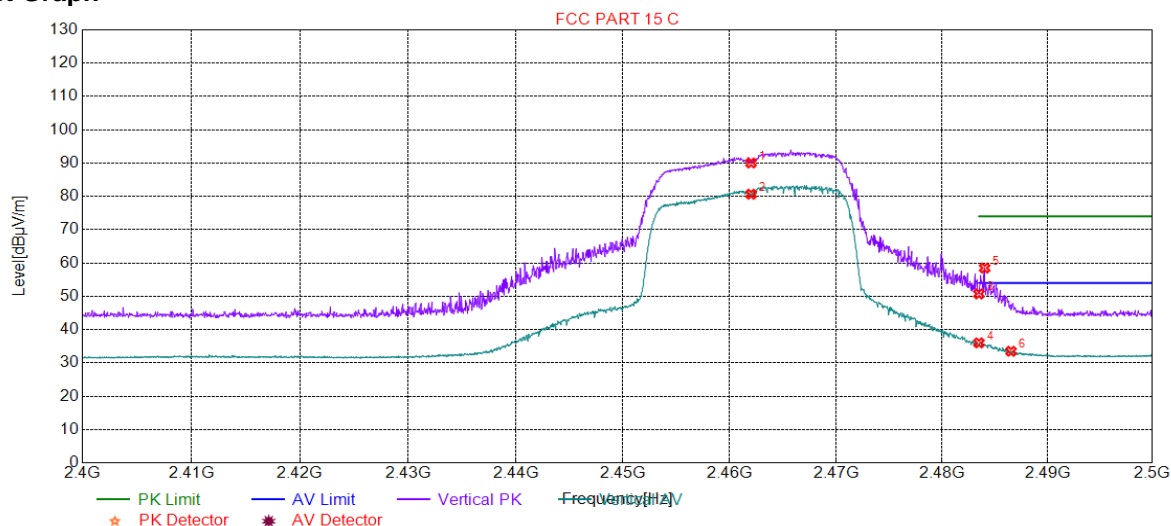


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4.11.1.18 802.11N20_Channel 11

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.000	90.04	0.00	-90.04	291	145	Vertical
2	2462.000	80.67	0.00	-80.67	168	141	Vertical
3	2483.500	50.73	74.00	23.27	154	323	Vertical
4	2483.500	36.04	54.00	17.96	172	145	Vertical
5	2484.042	58.51	74.00	15.49	165	145	Vertical
6	2486.543	33.52	54.00	20.48	282	145	Vertical

Final Data List

Remark:

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

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

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



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

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	$\pm 0.75\text{dB}$
2	RF power density, conducted	$\pm 2.84\text{dB}$
3	Spurious emissions, conducted	$\pm 0.75\text{dB}$
4	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (30MHz-1GHz)
		$\pm 4.8\text{dB}$ (1GHz-25GHz)
5	Conduct emission test	$\pm 3.12\text{ dB}$ (9KHz- 30MHz)
6	Temperature test	$\pm 1^{\circ}\text{C}$
7	Humidity test	$\pm 3\%$
8	DC and low frequency voltages	$\pm 0.5\%$



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6 Equipment List

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Duedate
				(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	2020/4/16	2021/4/15
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

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
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 - Photographs of EUT Constructional Details for ZR/2020/B0030.

The End

