



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: 2020/12/20

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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1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020/12/20		Original

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



2 Test Summary

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



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3 General Information

3.1 Client Information

Applicant:	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

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

3.3 Test Facility

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

• **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.



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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.



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>	



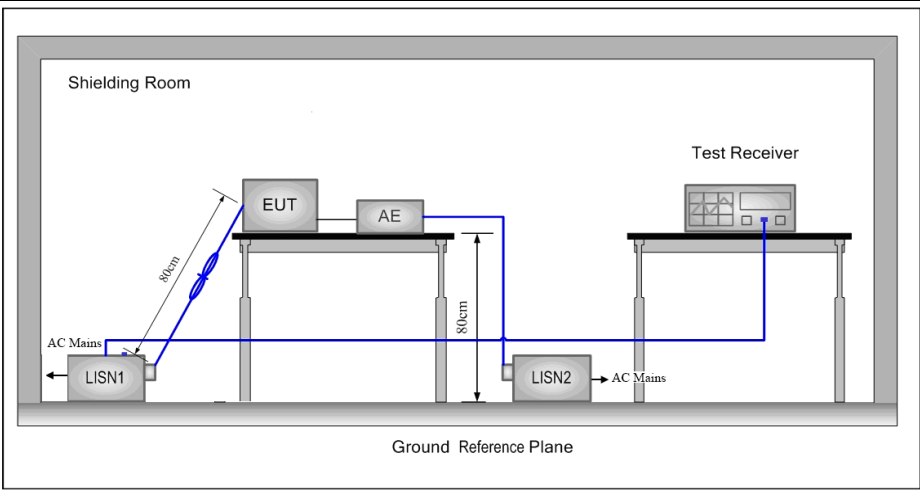
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4.2 AC Power Line Conducted Emissions

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

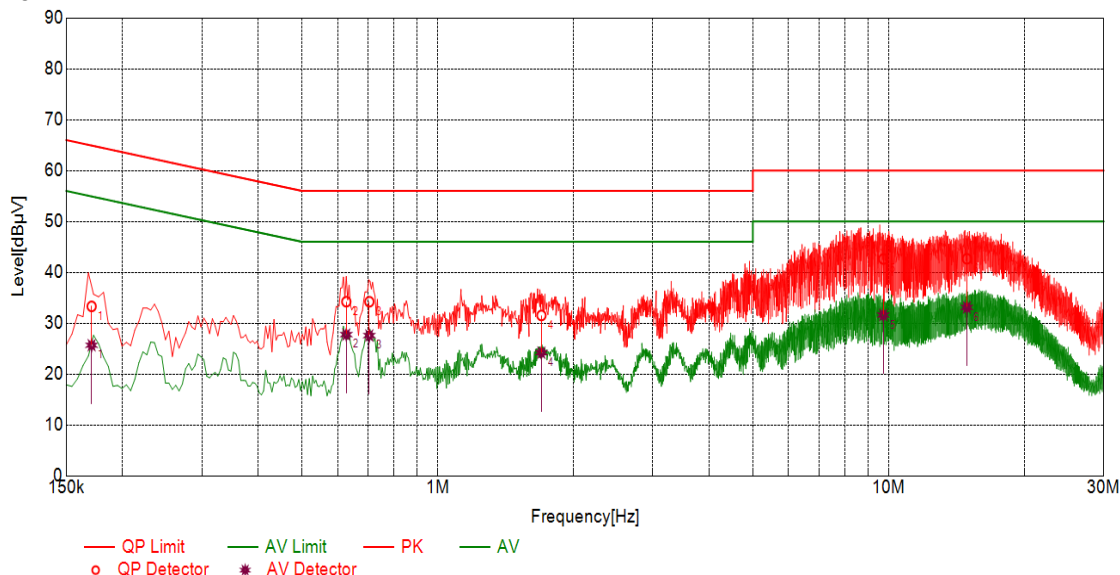


Measurement Data

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



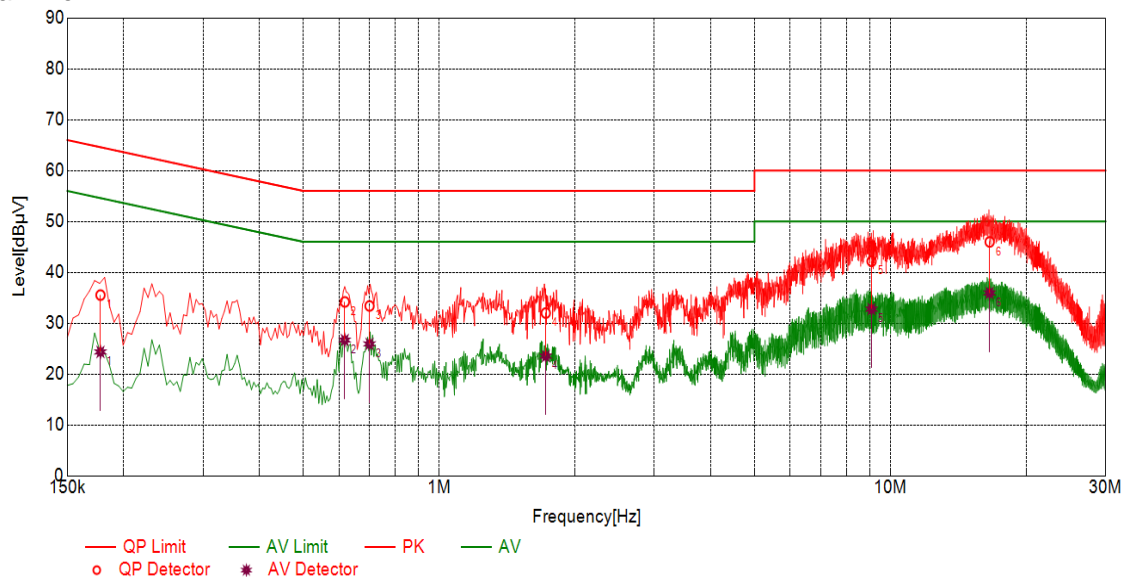
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Neutral Line:



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.





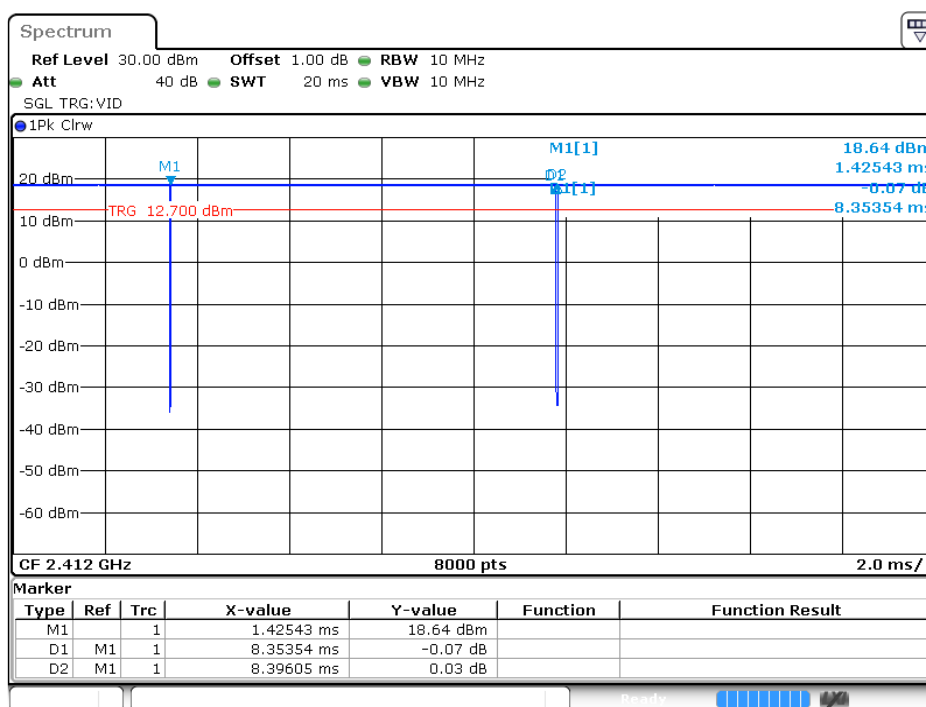
4.3 Duty Cycle

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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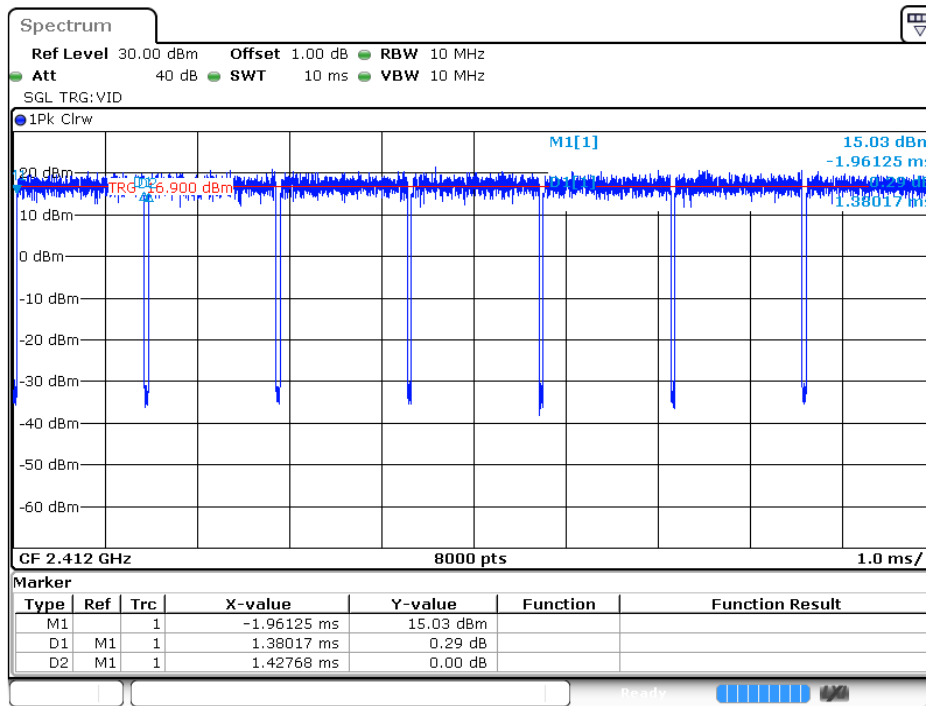
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4.3.2.2

11G@Ant 1



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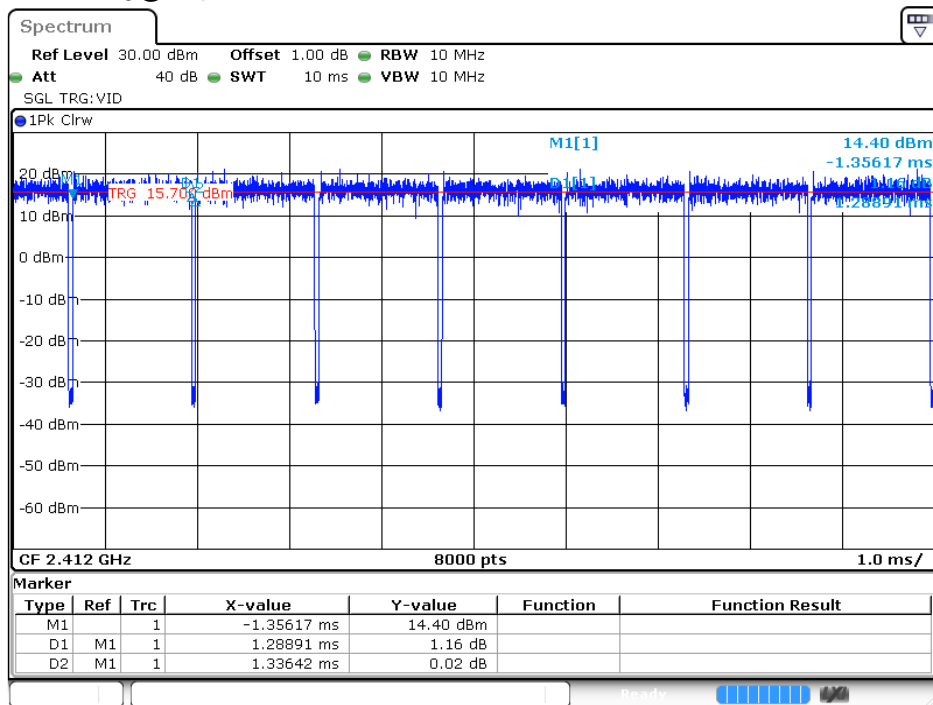
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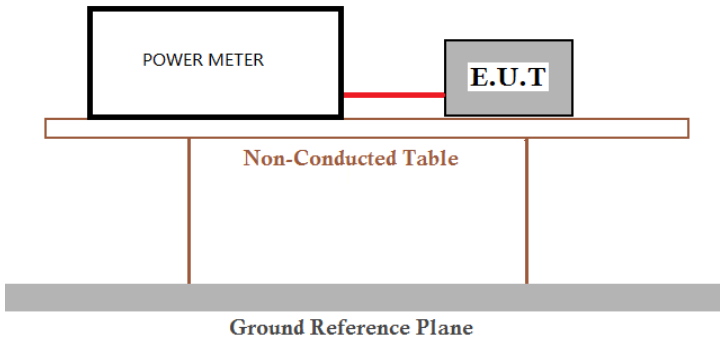


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4.4 Conducted Output Power

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

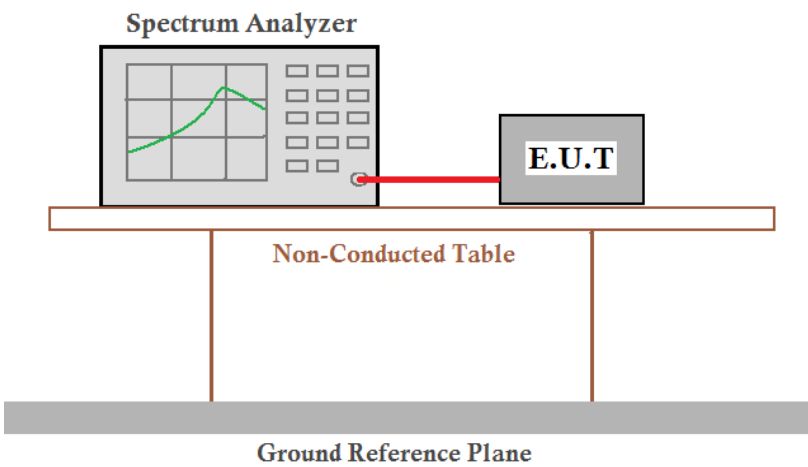


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4.5 DTS (6 dB) Bandwidth

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

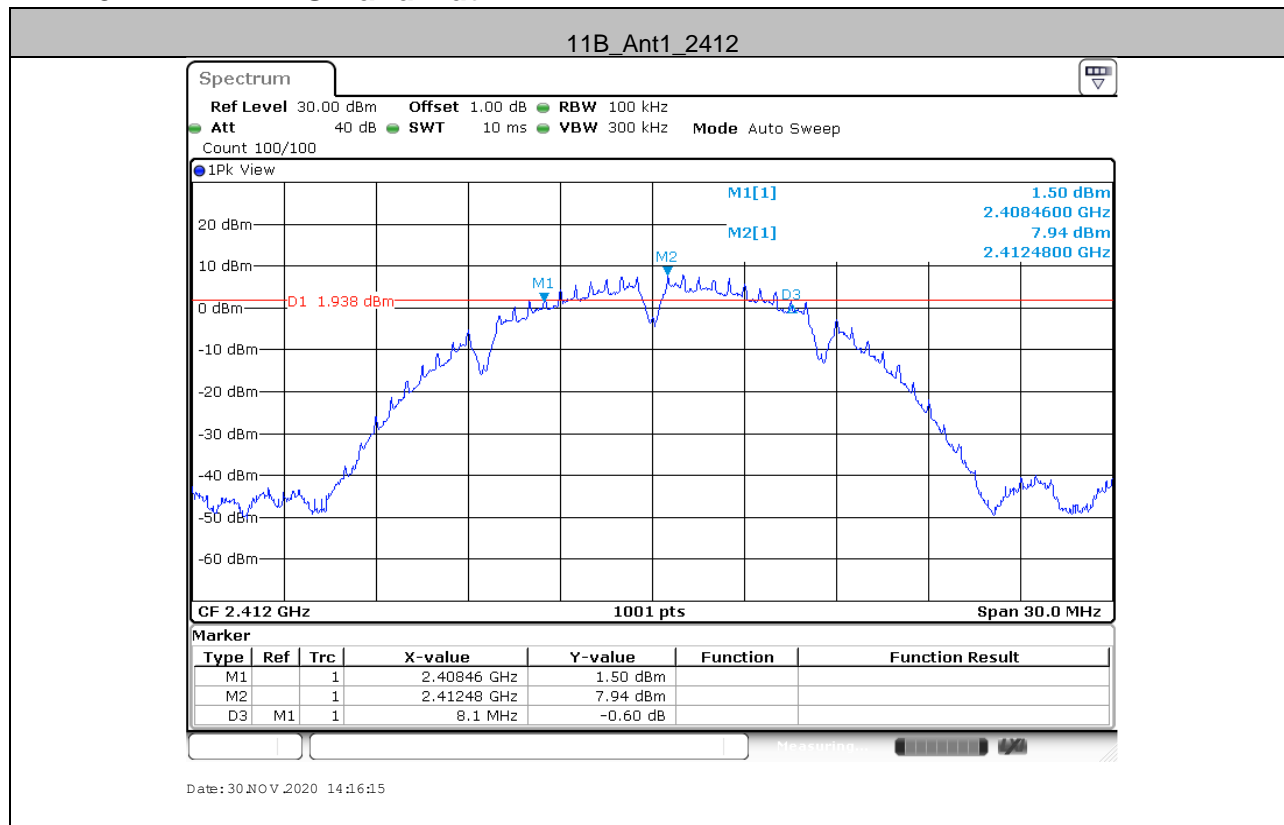


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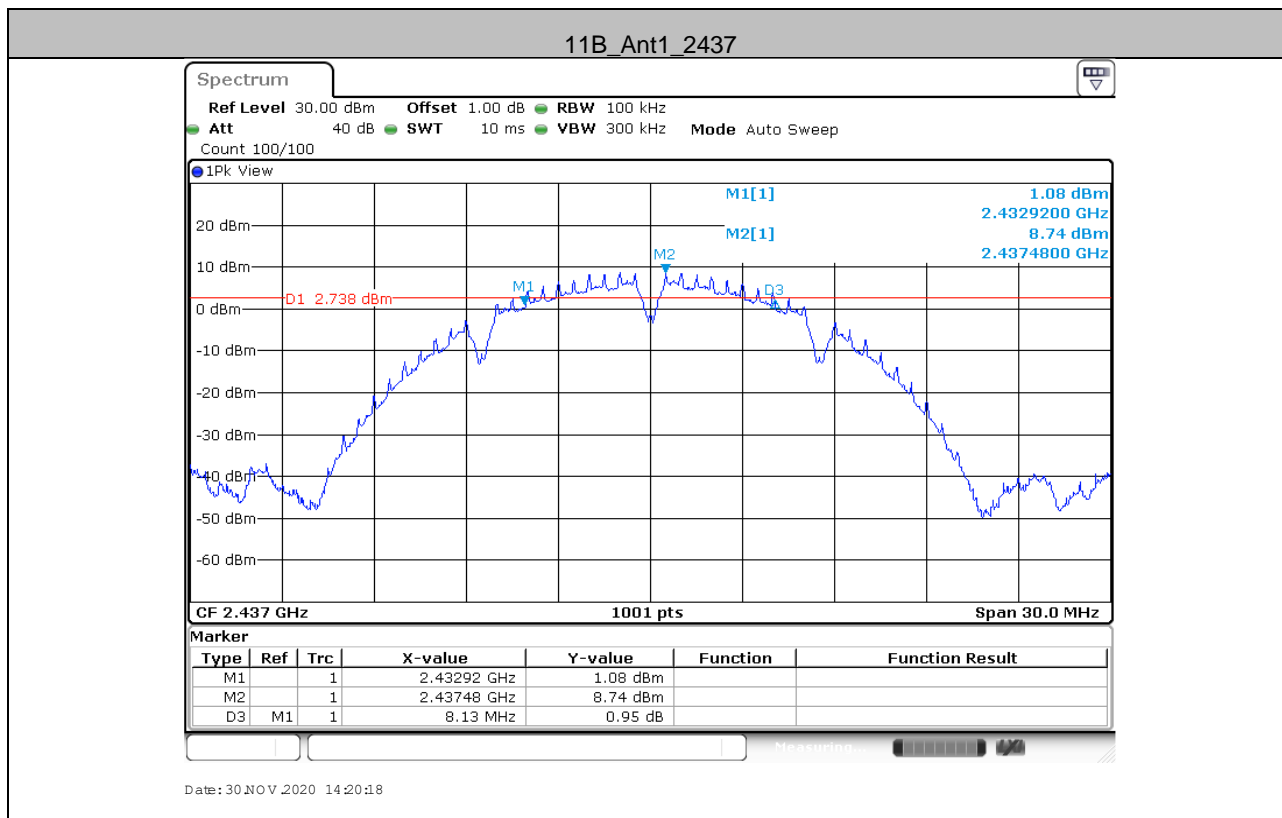


4.5.2 DTS Bandwidth



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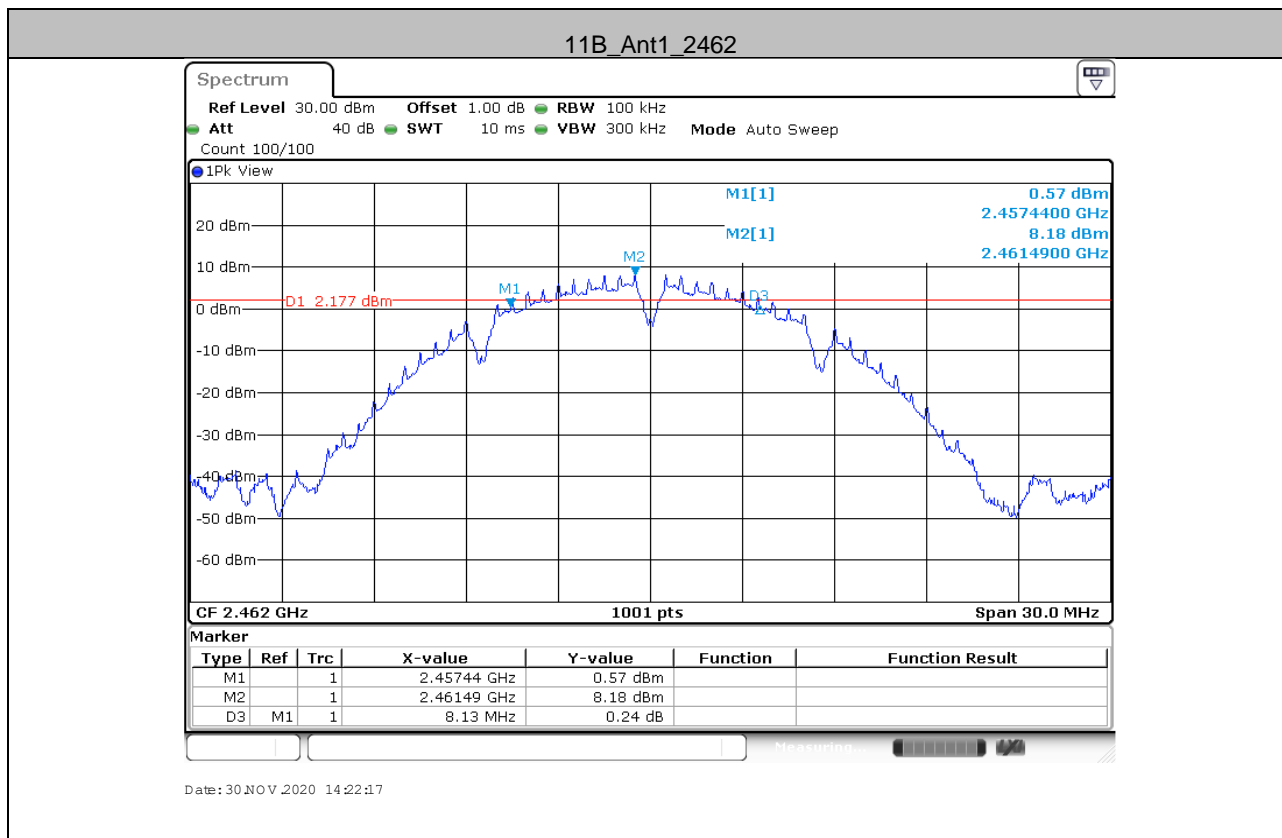


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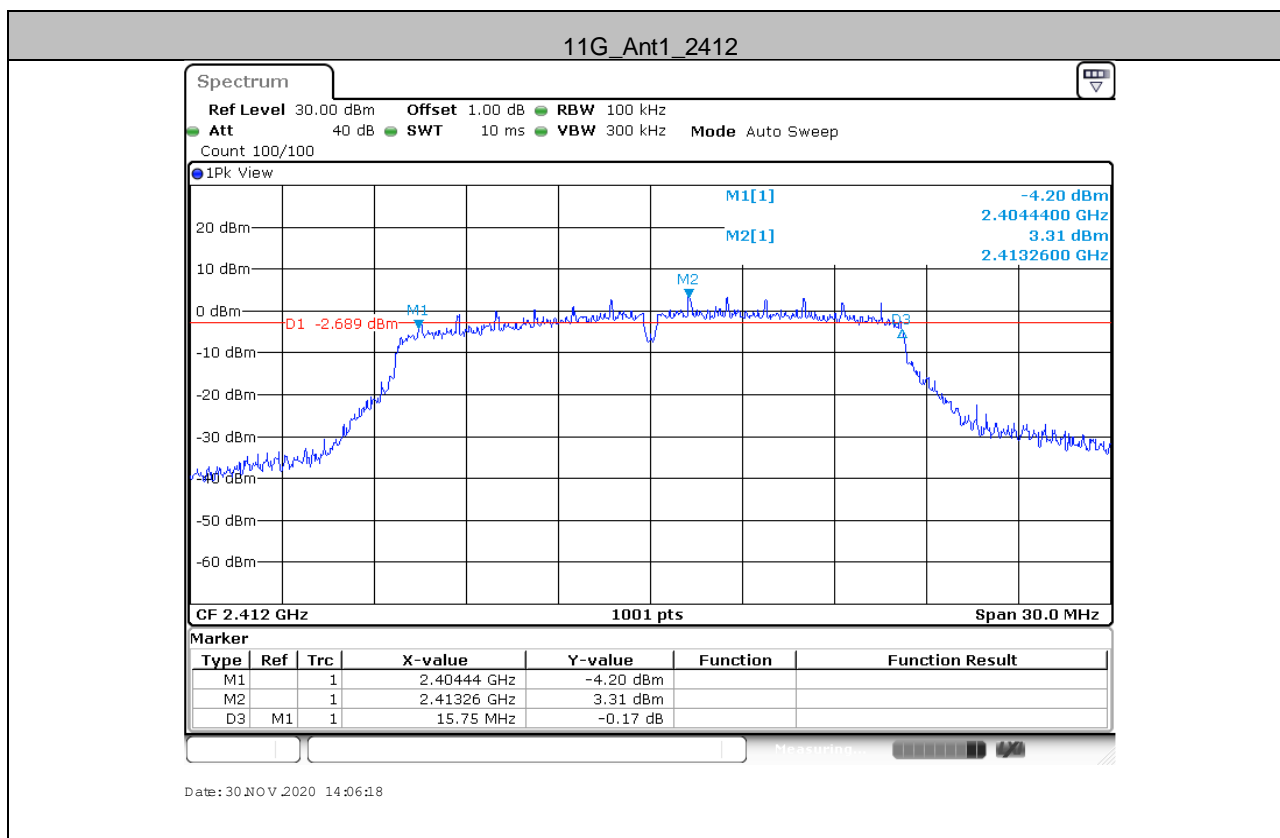
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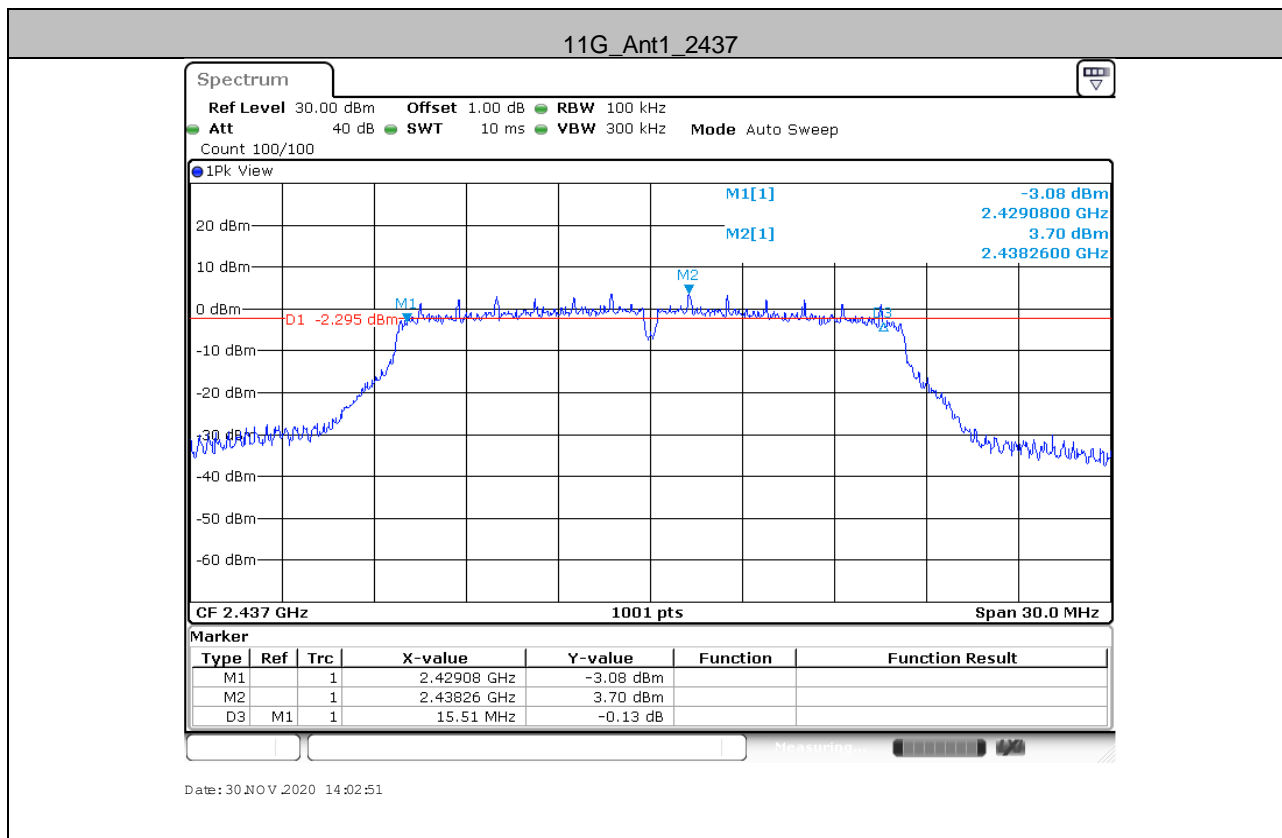
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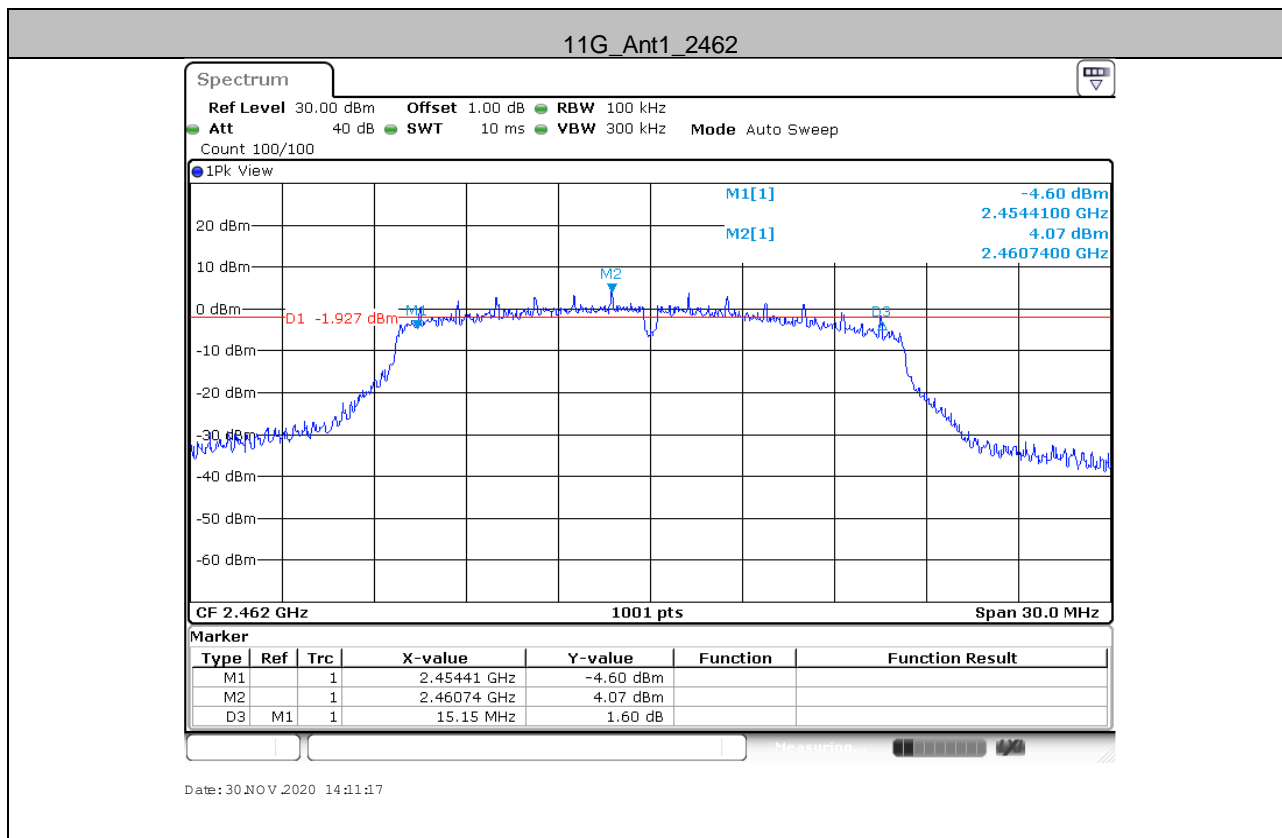
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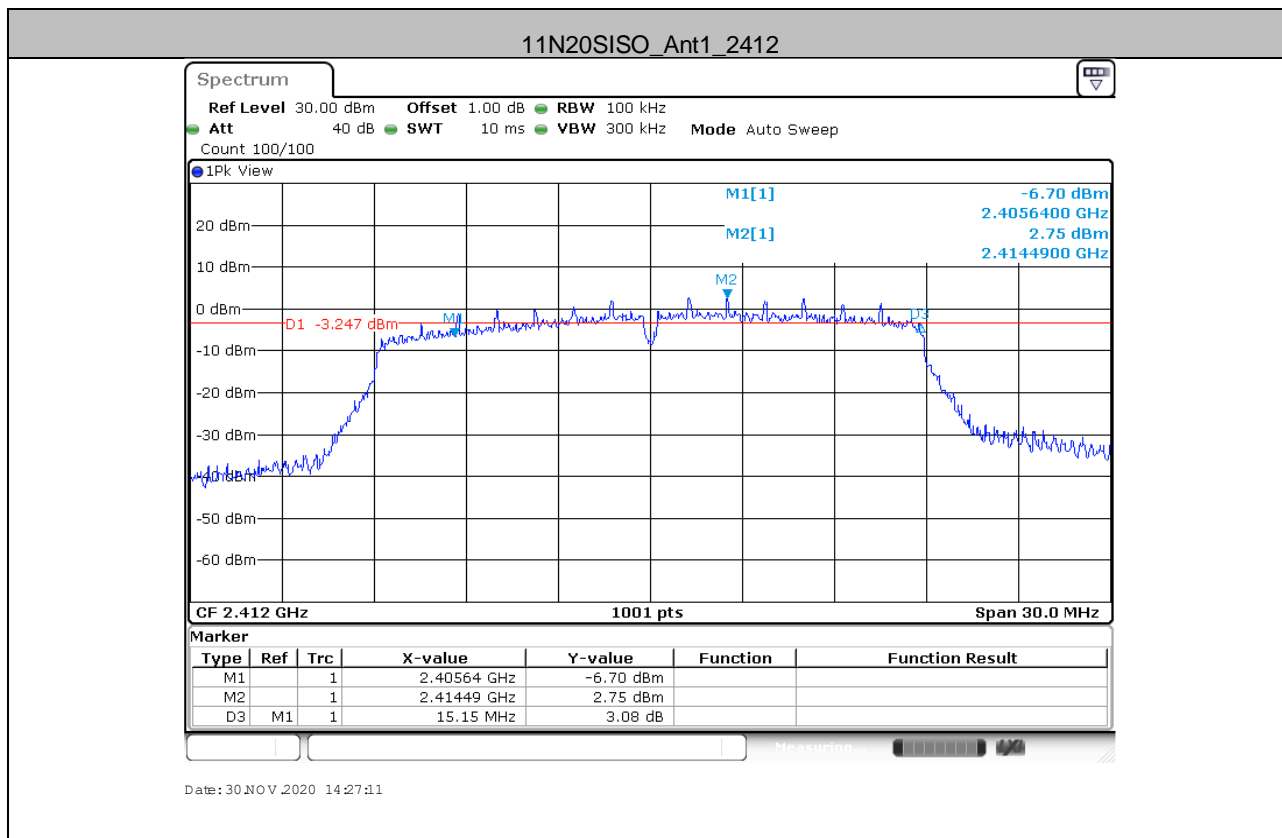
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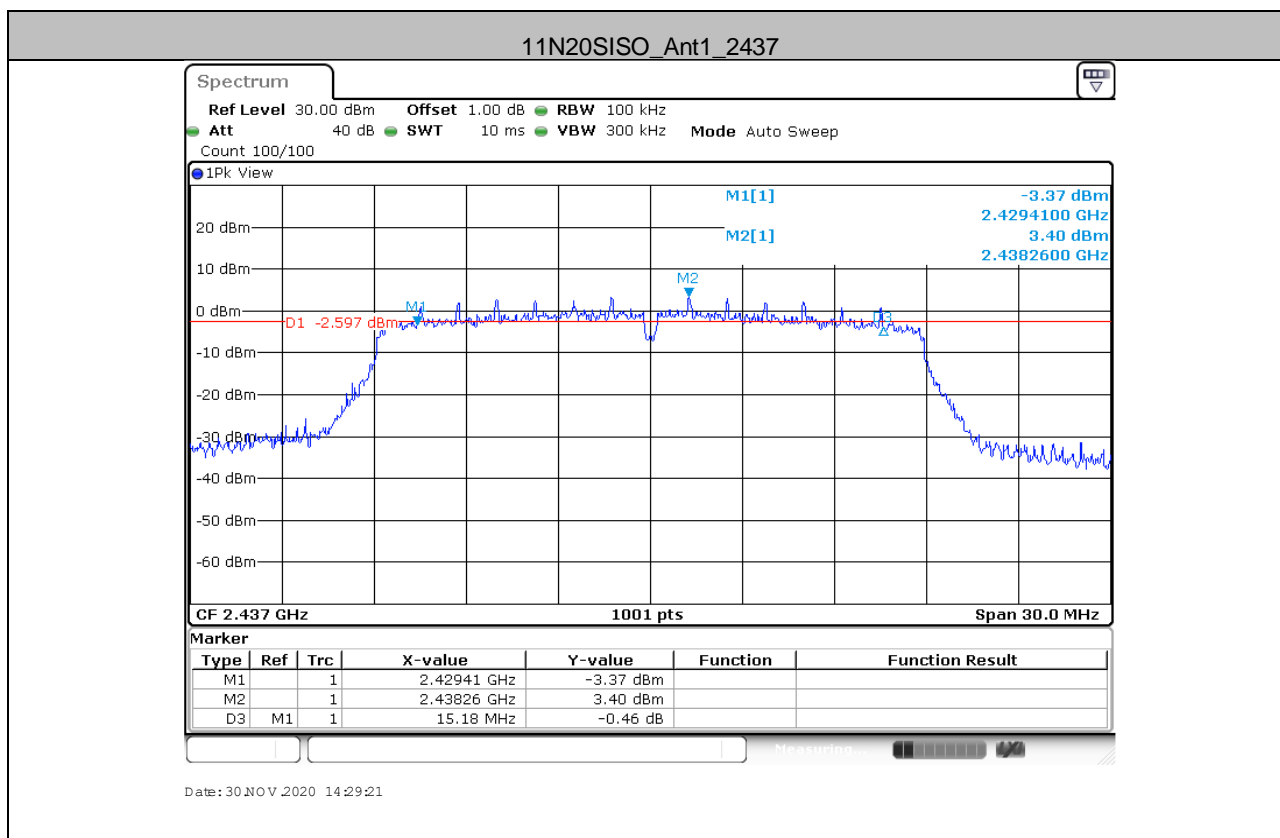


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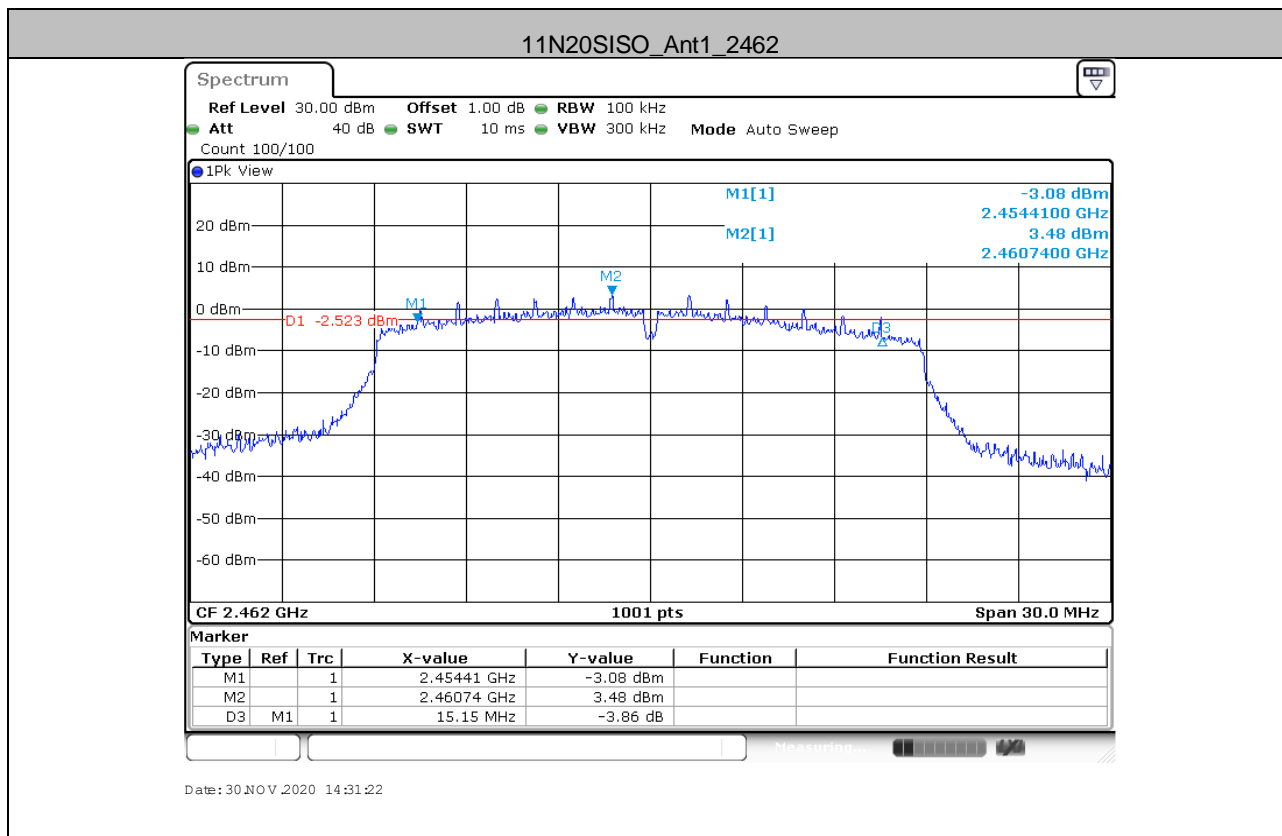


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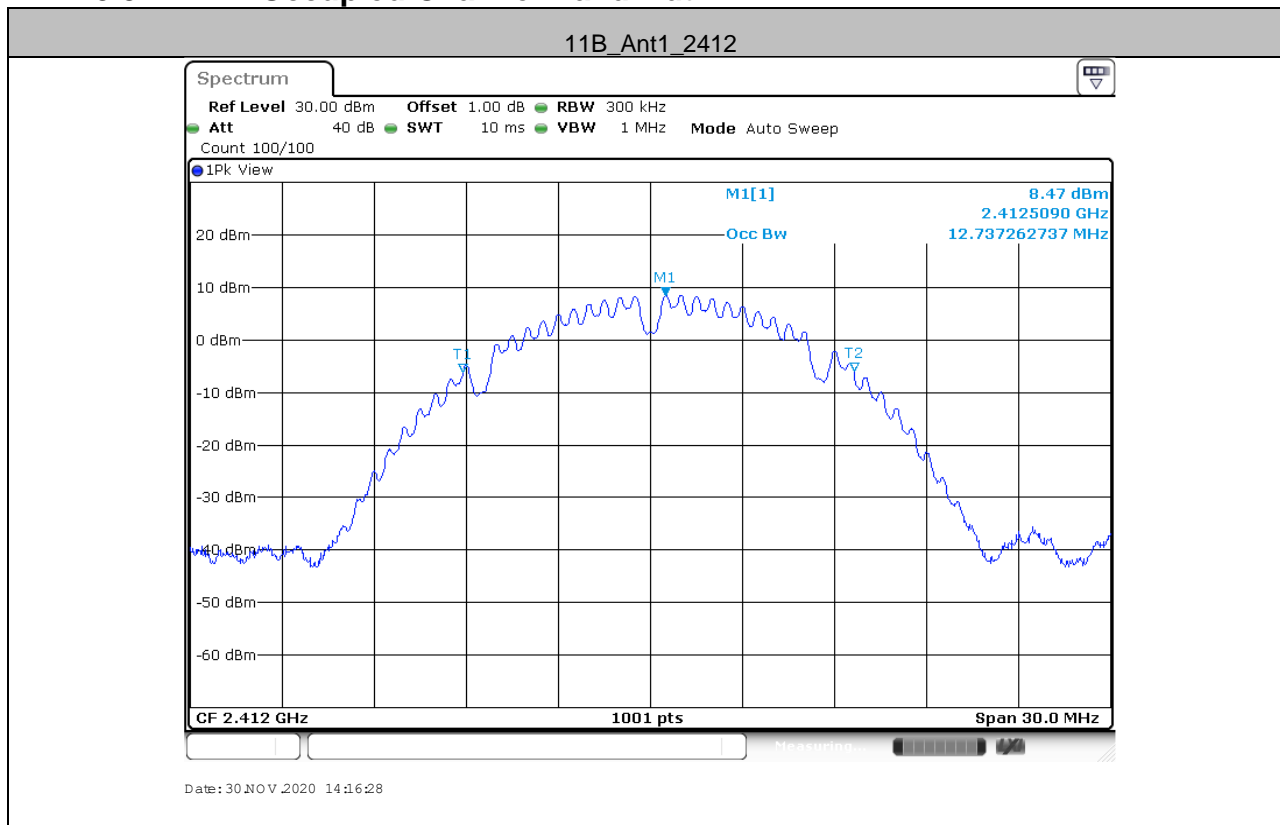
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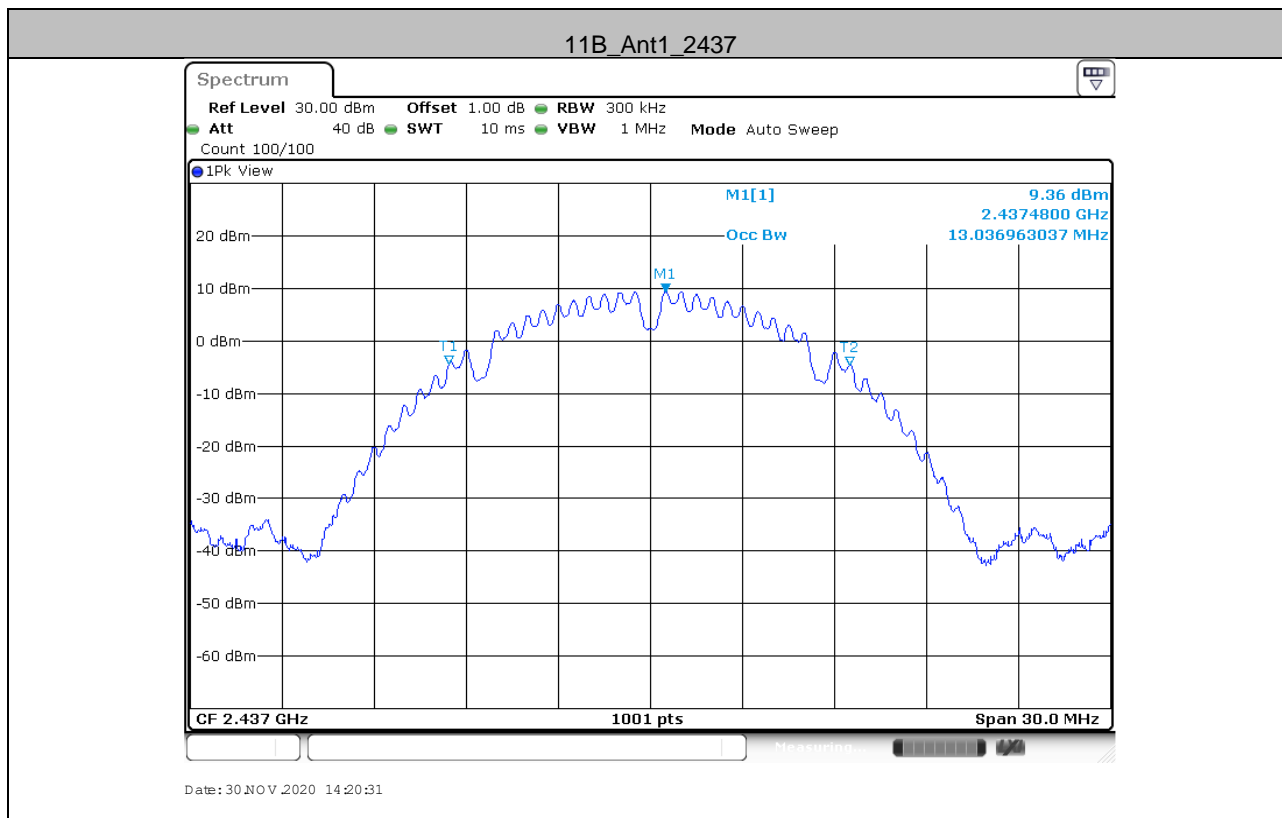
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4.5.3 Occupied Channel Bandwidth



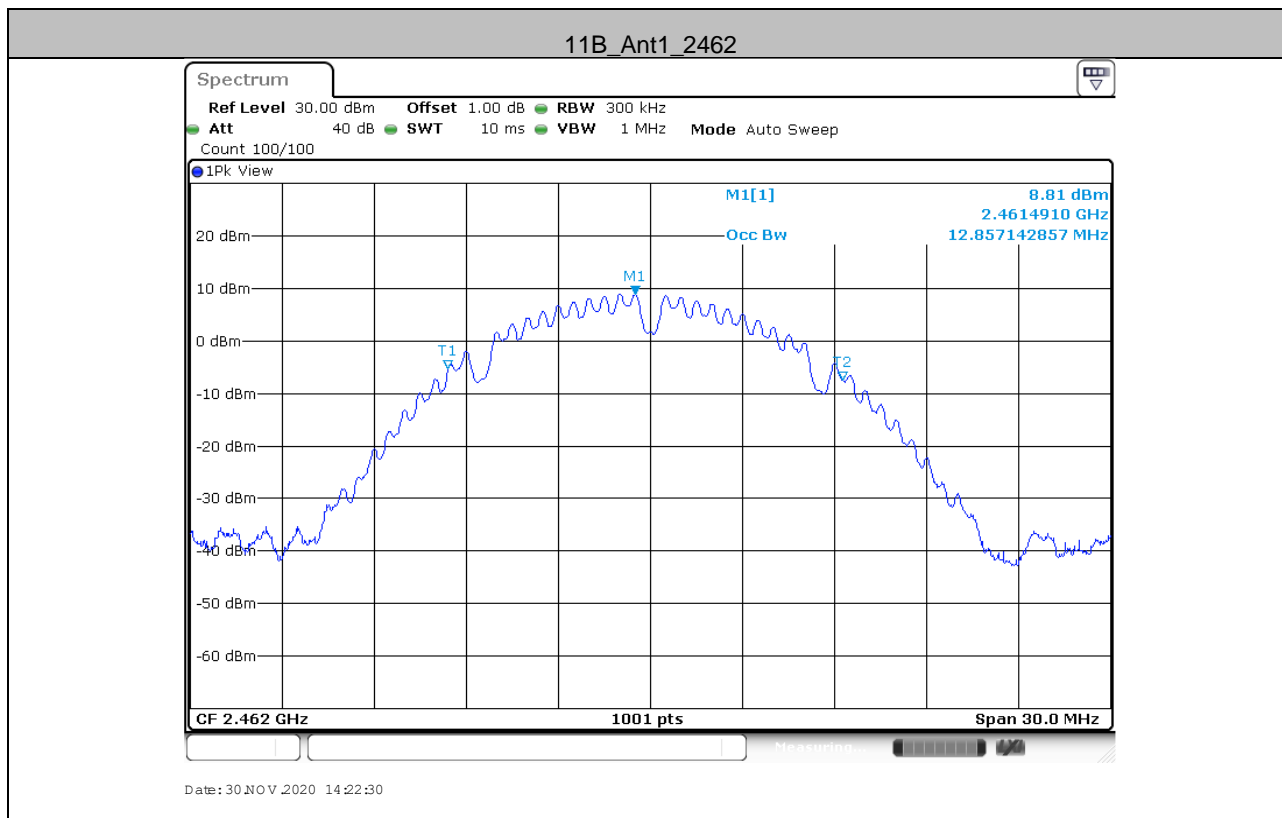


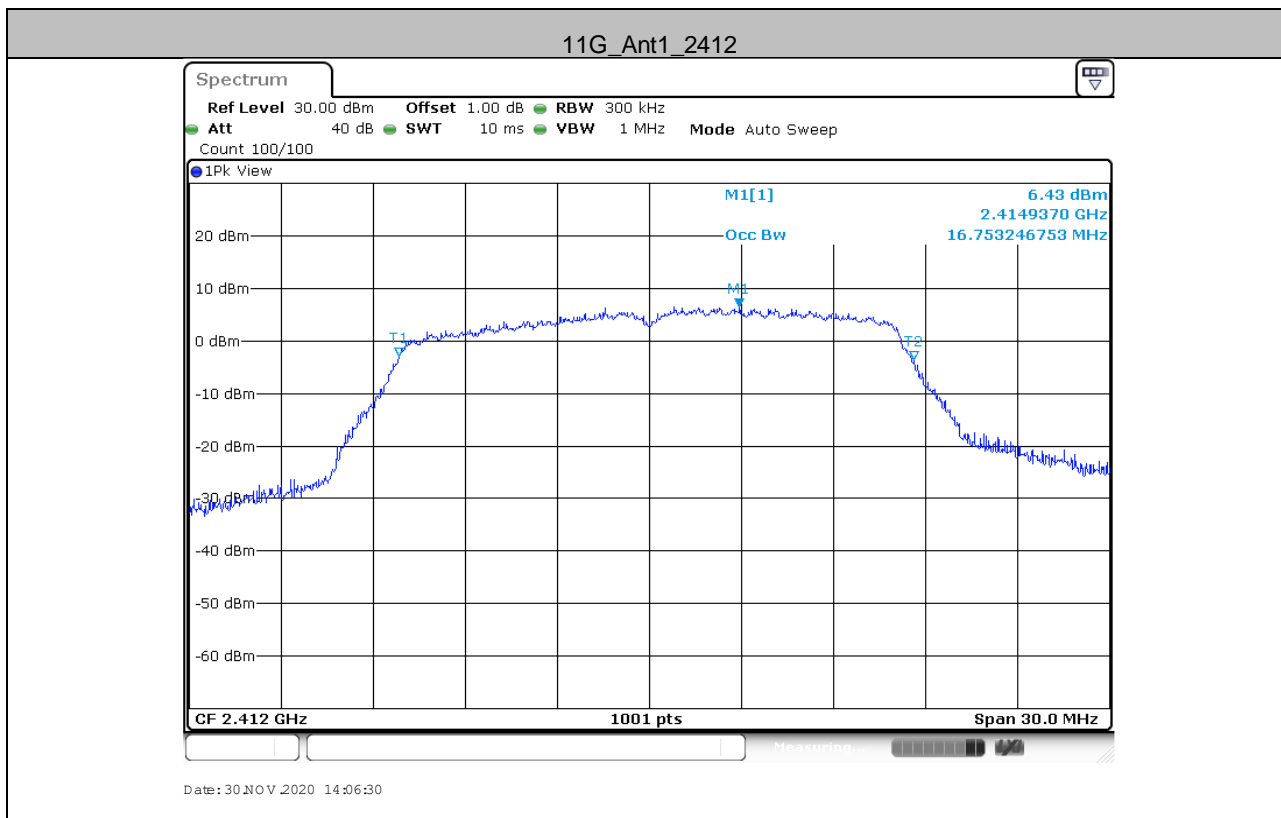
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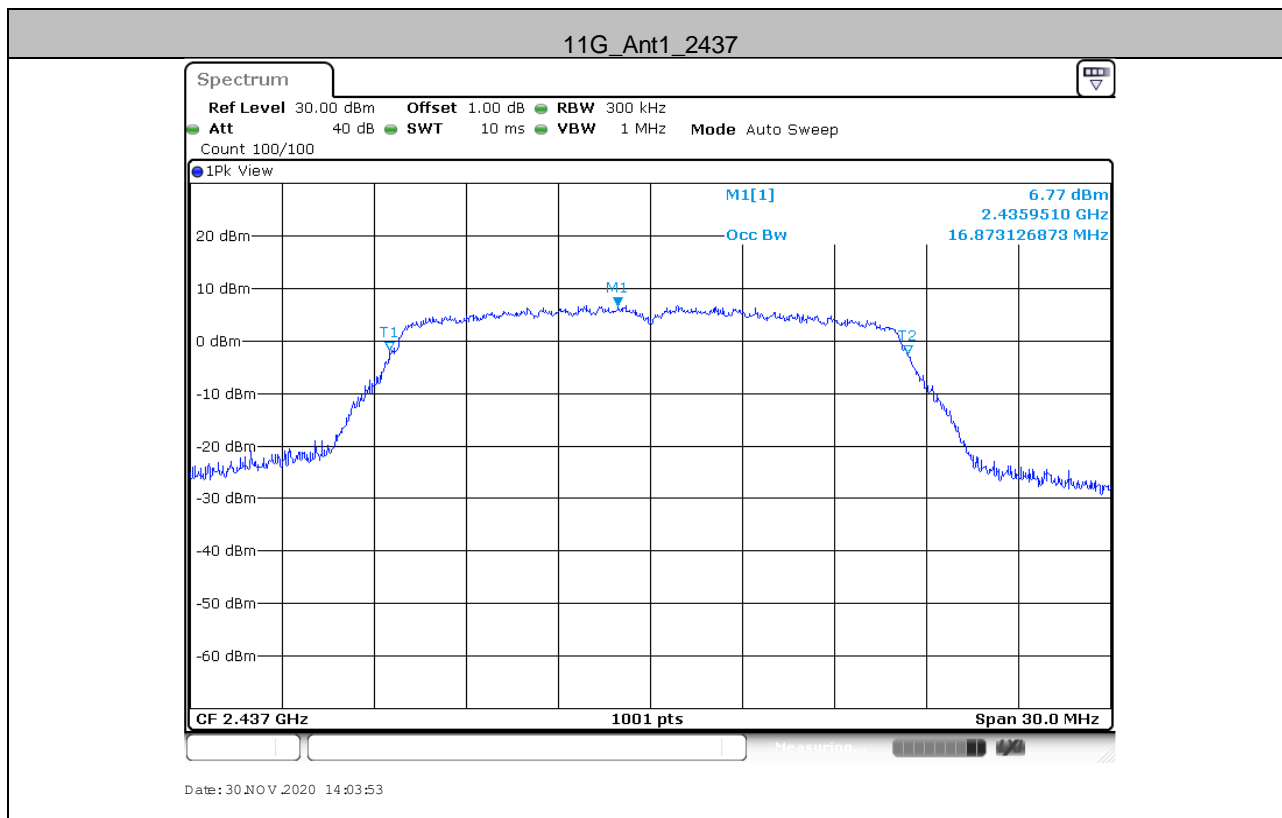


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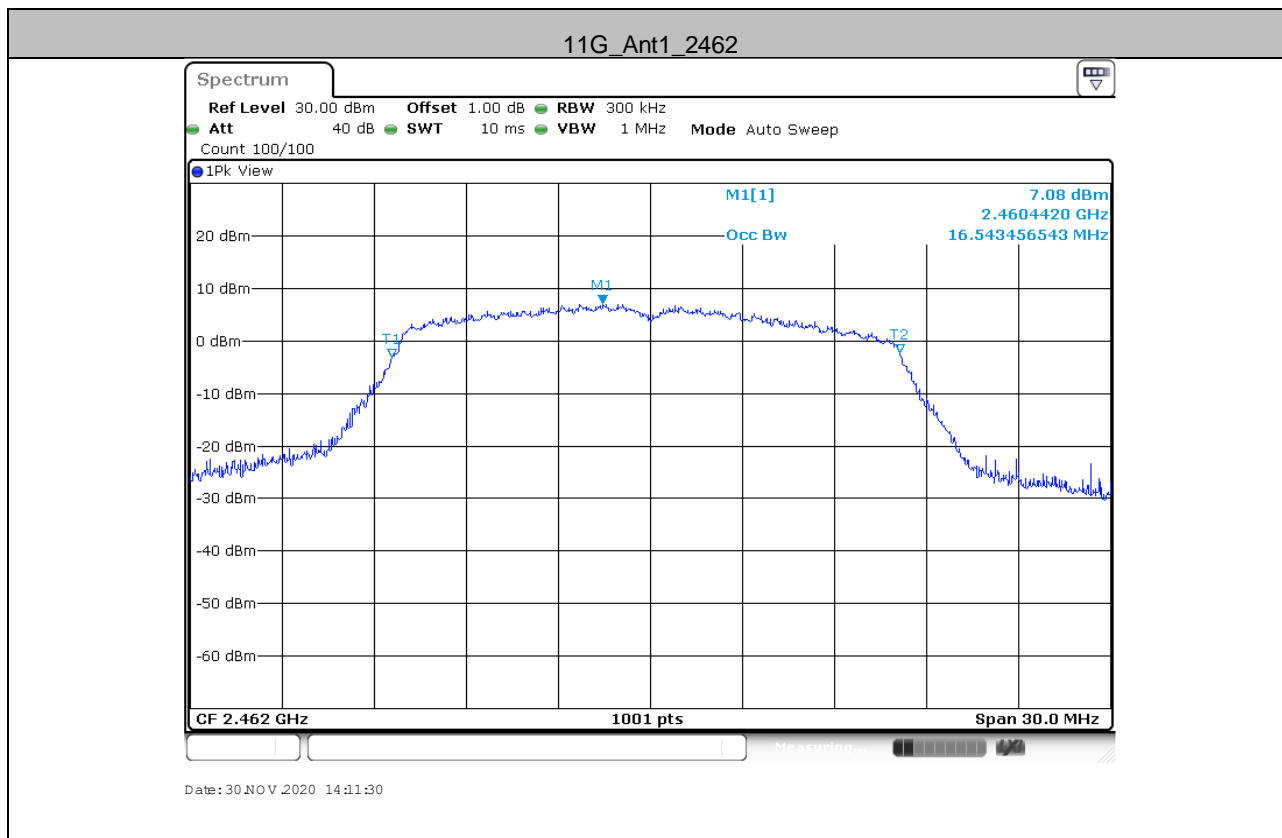
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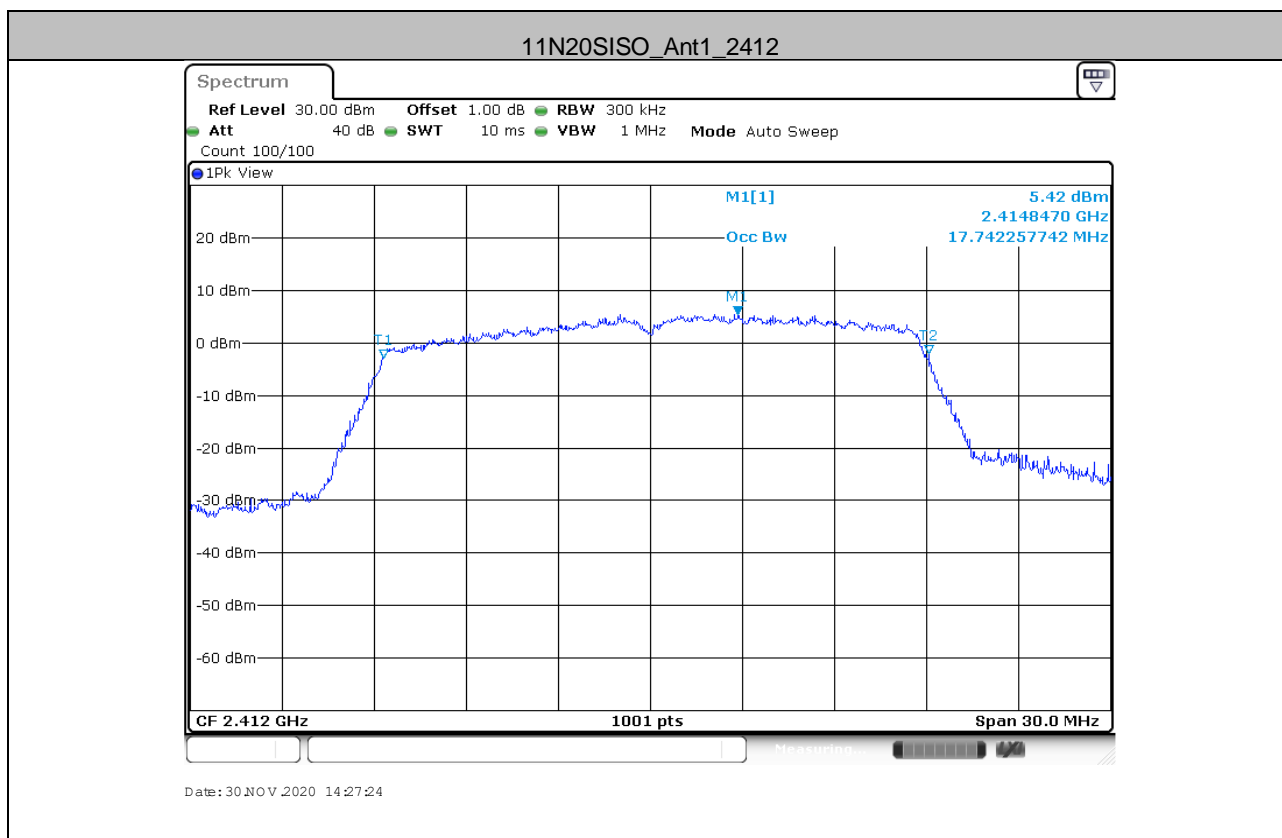
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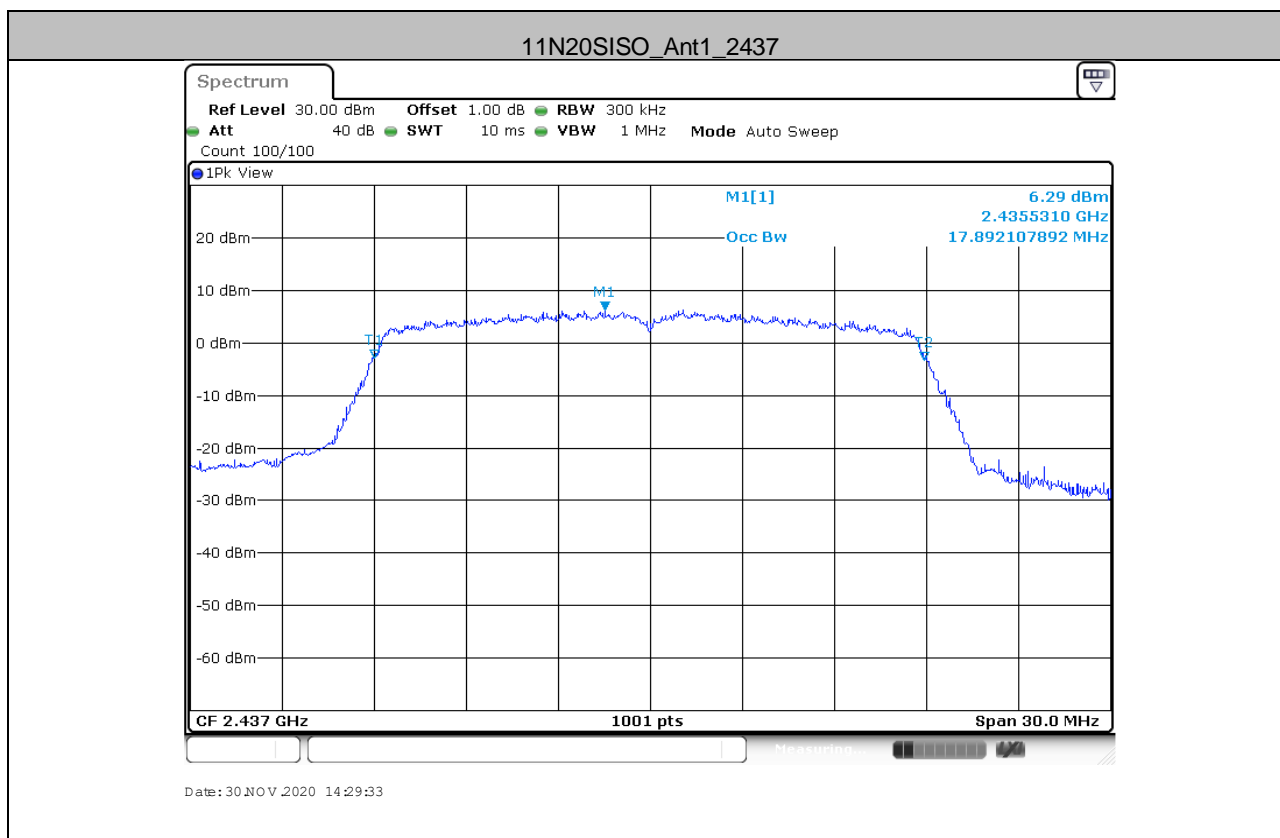


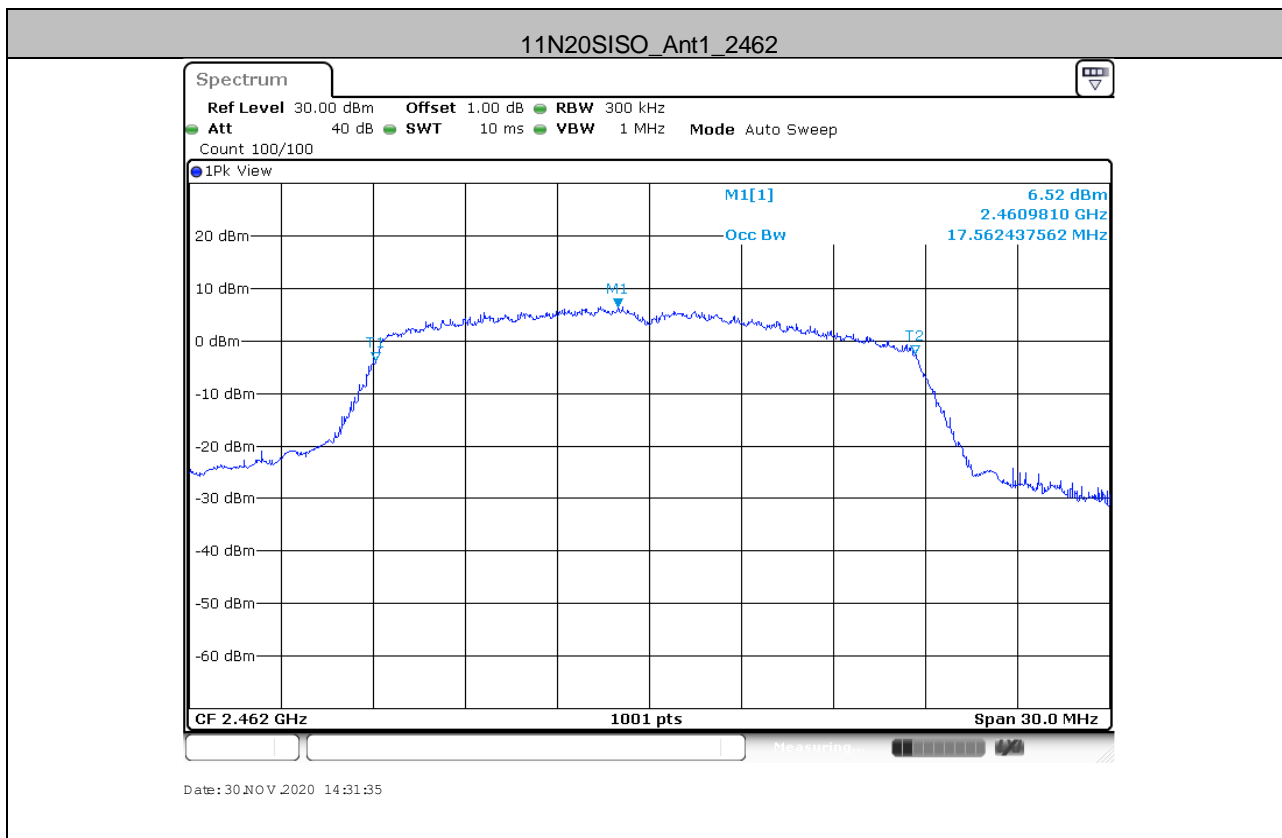
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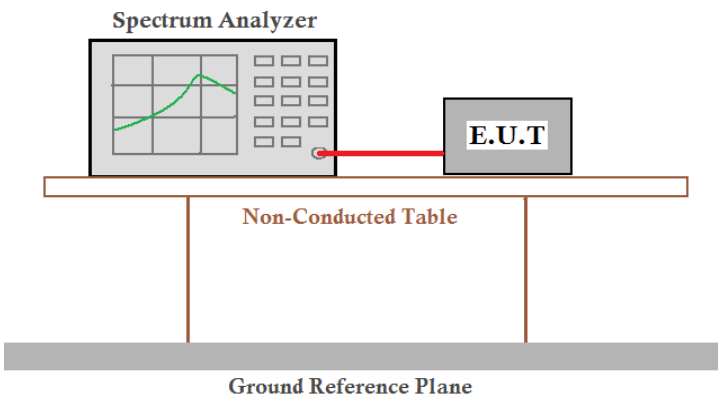
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4.6 Power Spectral Density

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

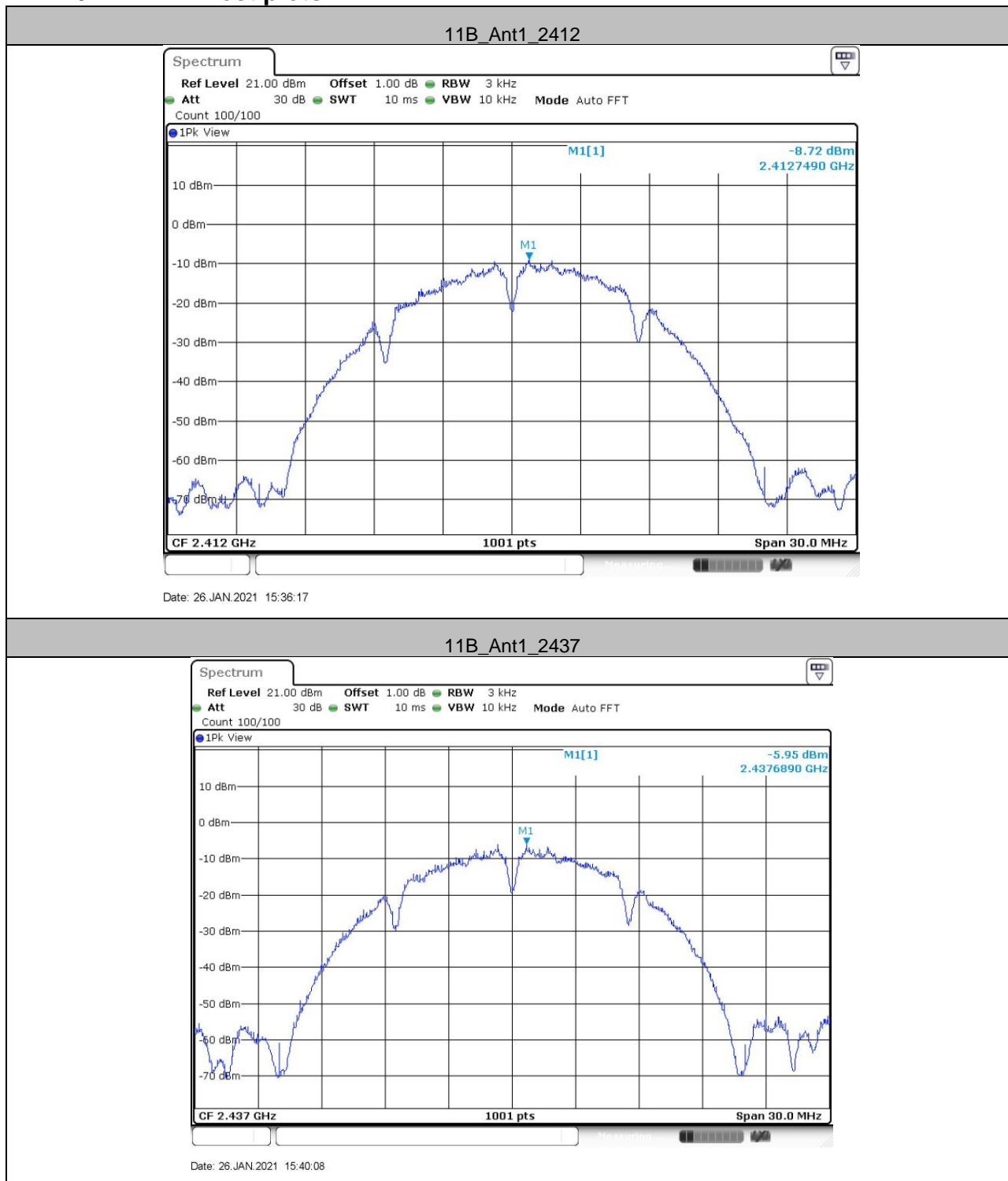
4.6.1 Test Results

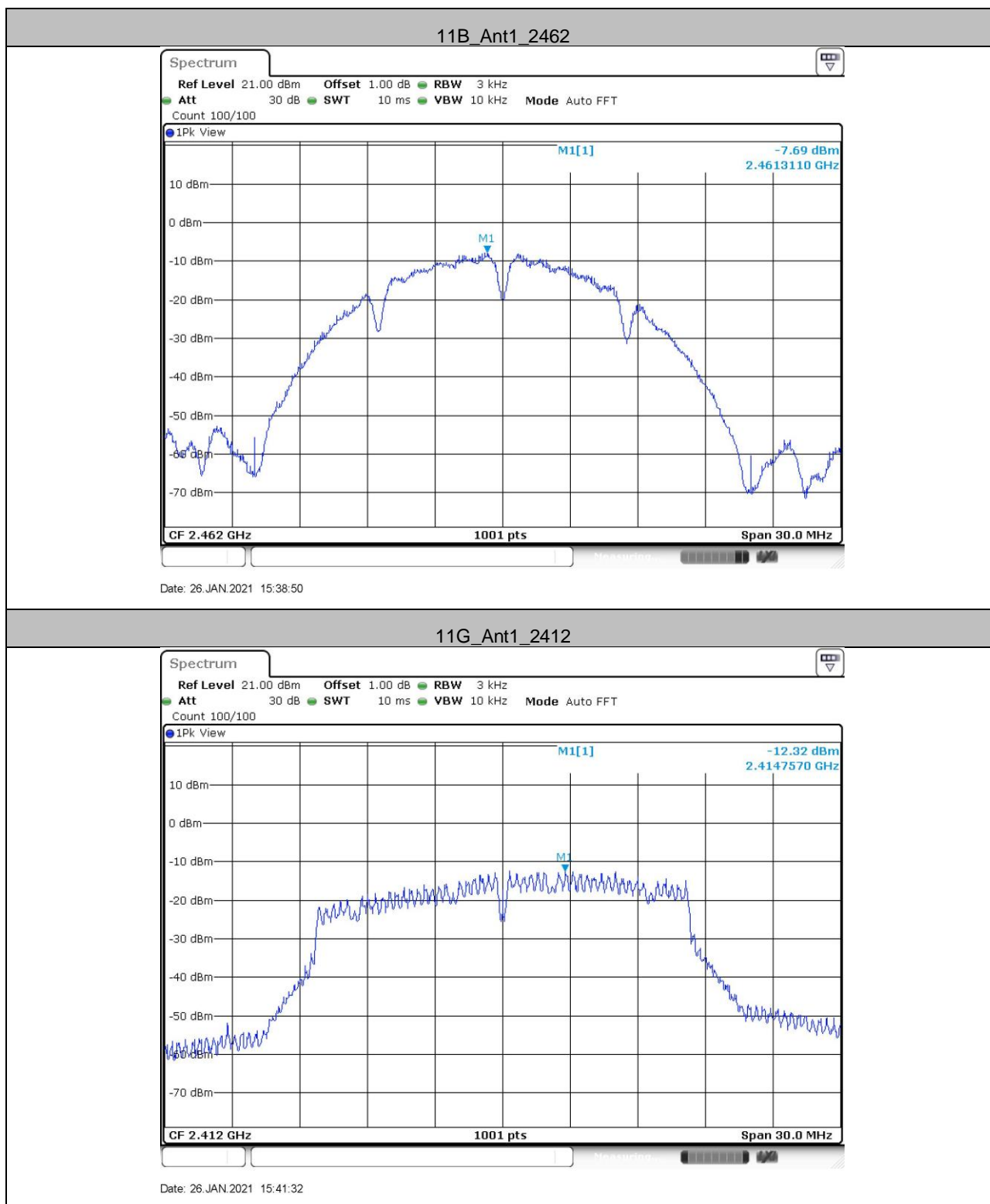
Mode	Test Channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11B	Lowest	-8.72	≤8.00	Pass
	Middle	-5.95	≤8.00	Pass
	Highest	-7.69	≤8.00	Pass
802.11G	Lowest	-12.32	≤8.00	Pass
	Middle	-11.1	≤8.00	Pass
	Highest	-11.01	≤8.00	Pass
802.11N20	Lowest	-11.91	≤8.00	Pass
	Middle	-11.74	≤8.00	Pass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





4.6.2 Test plots

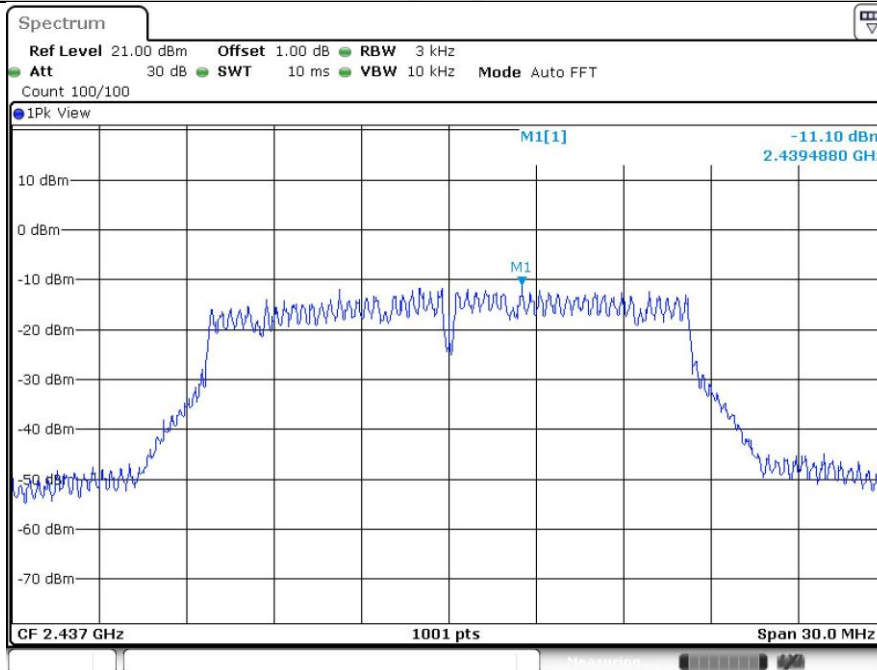




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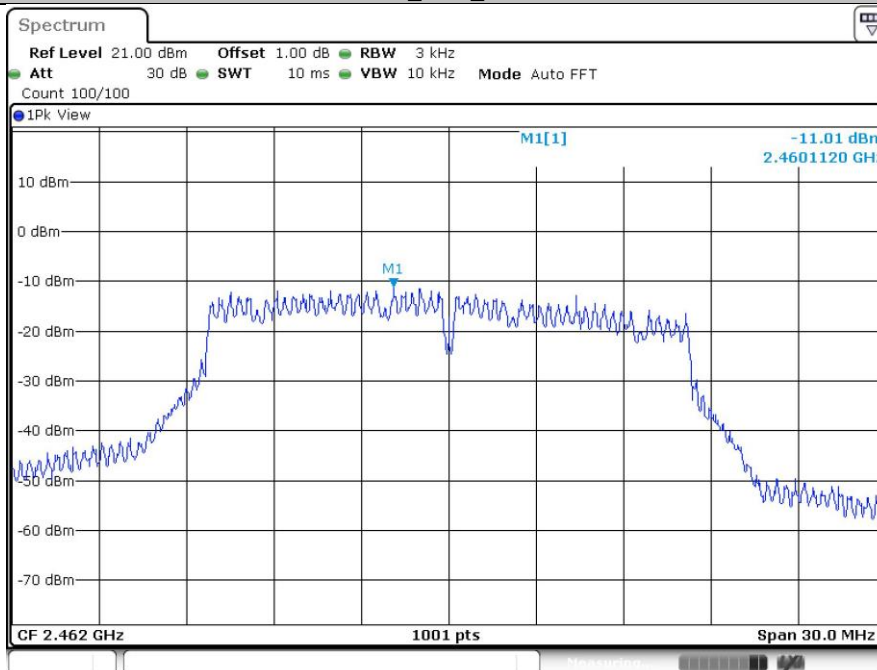
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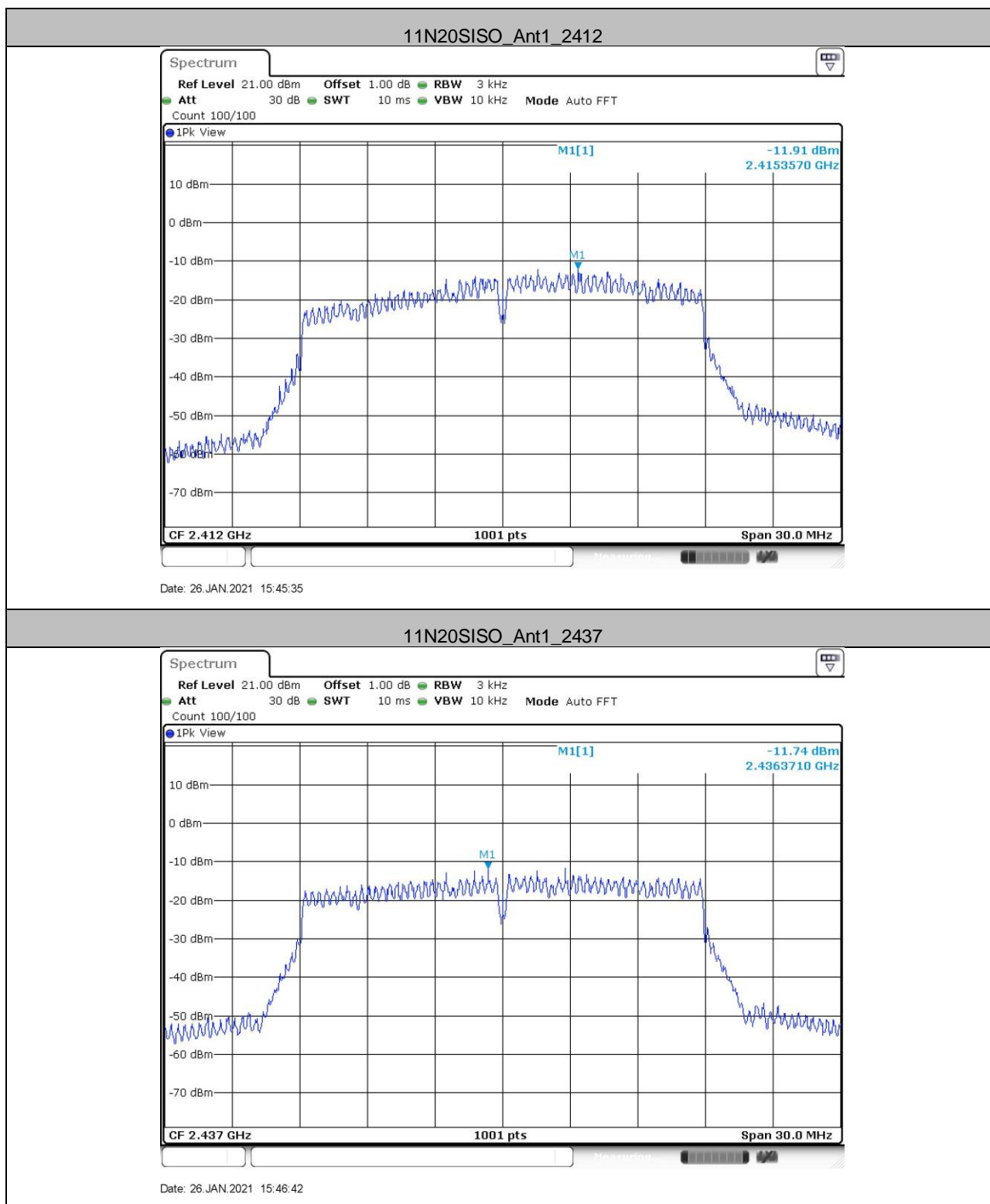
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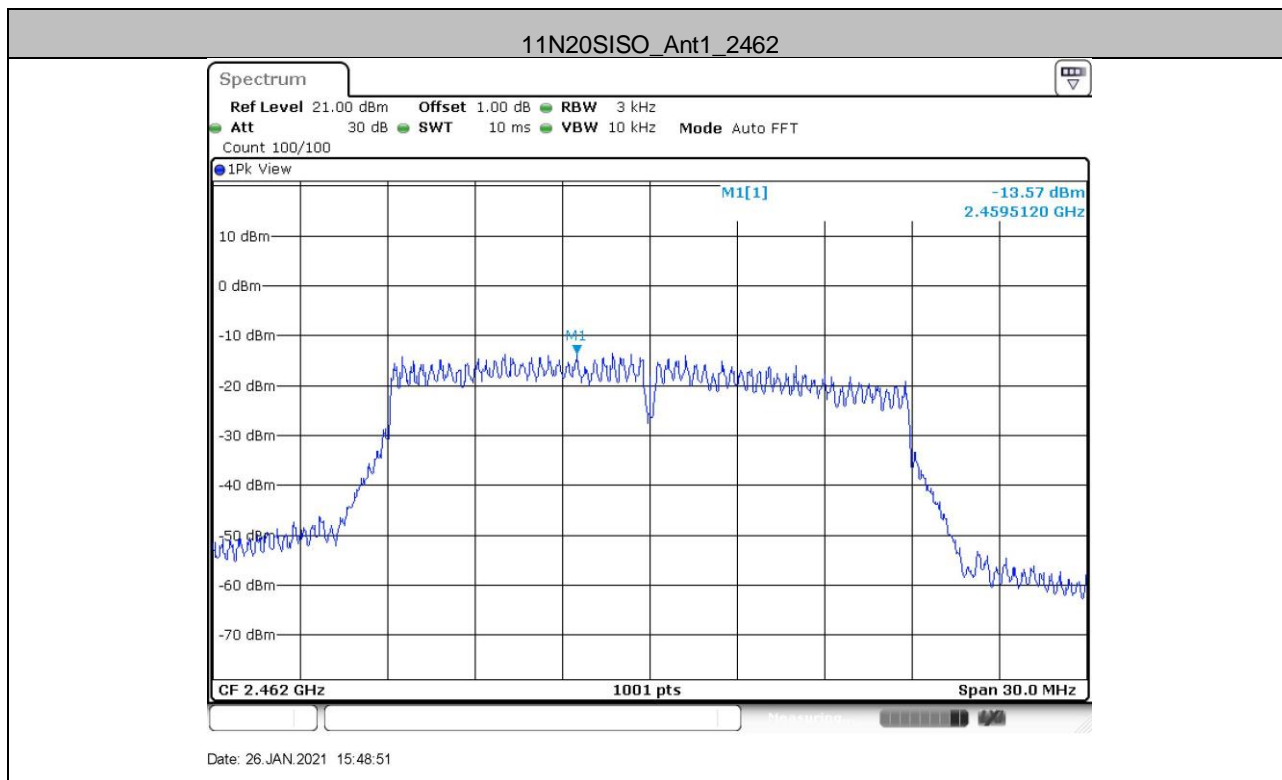
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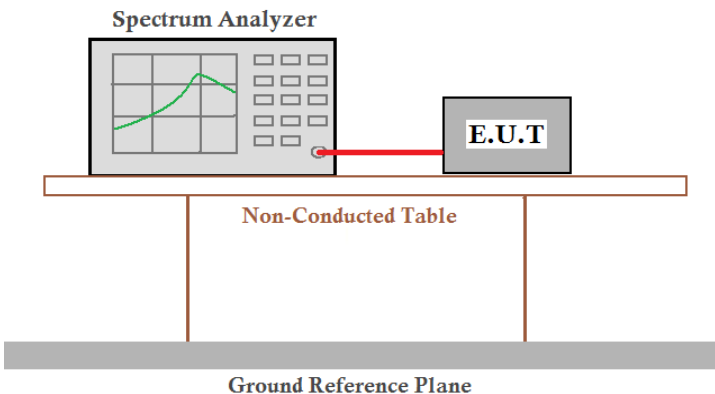
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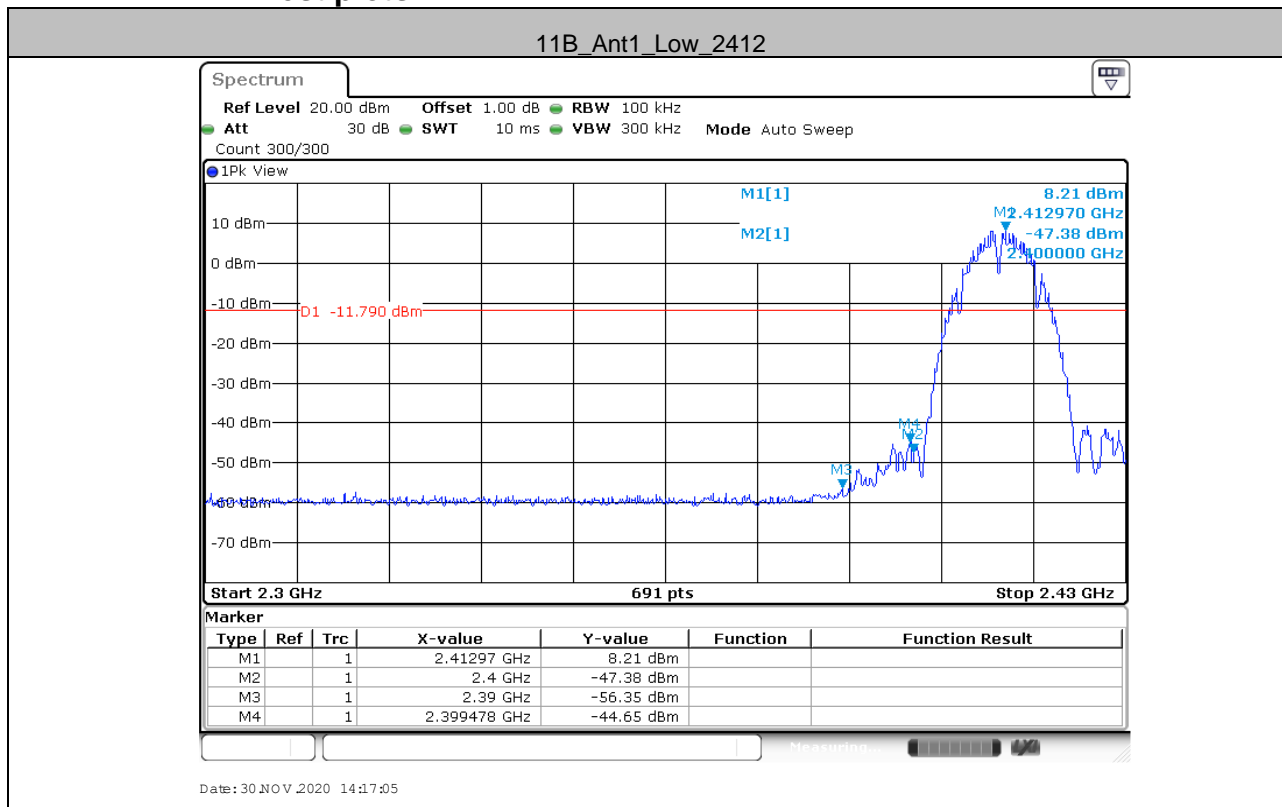
4.7 Band-edge for RF Conducted Emissions

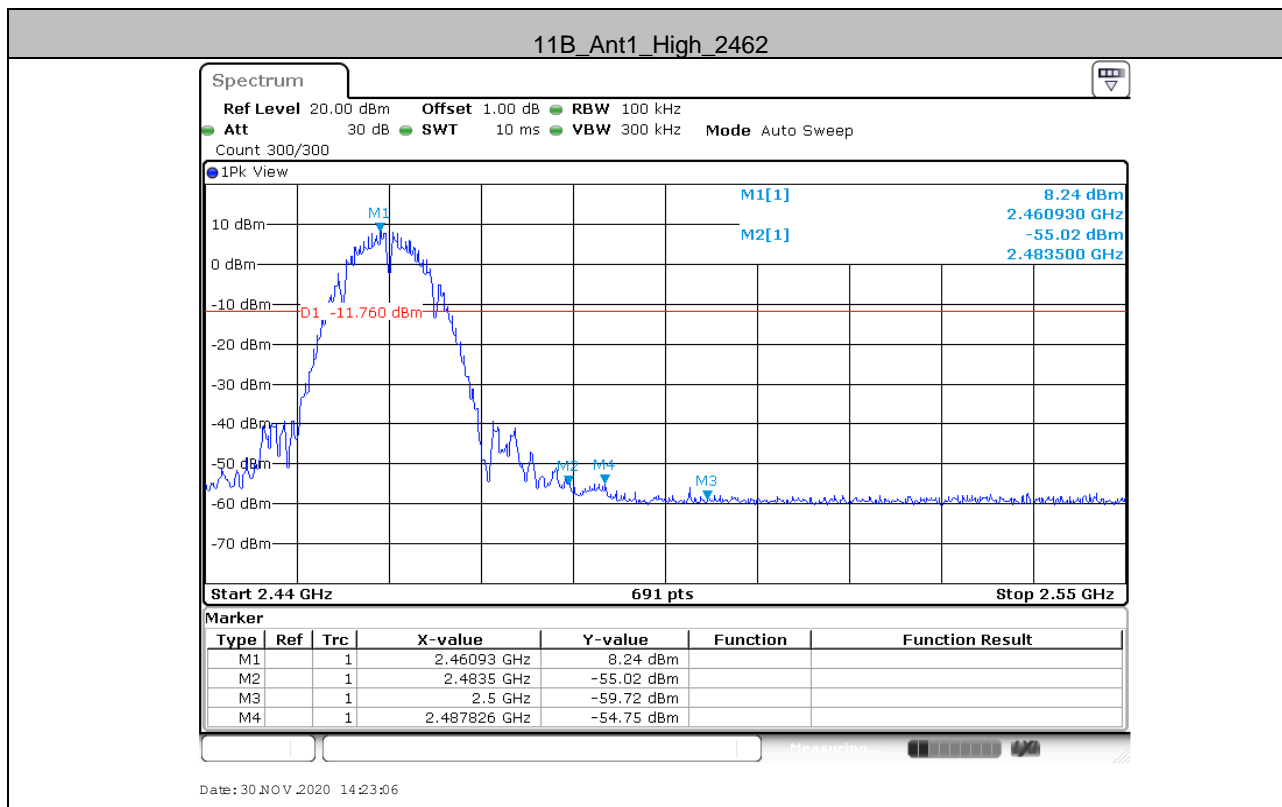
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.13
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst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





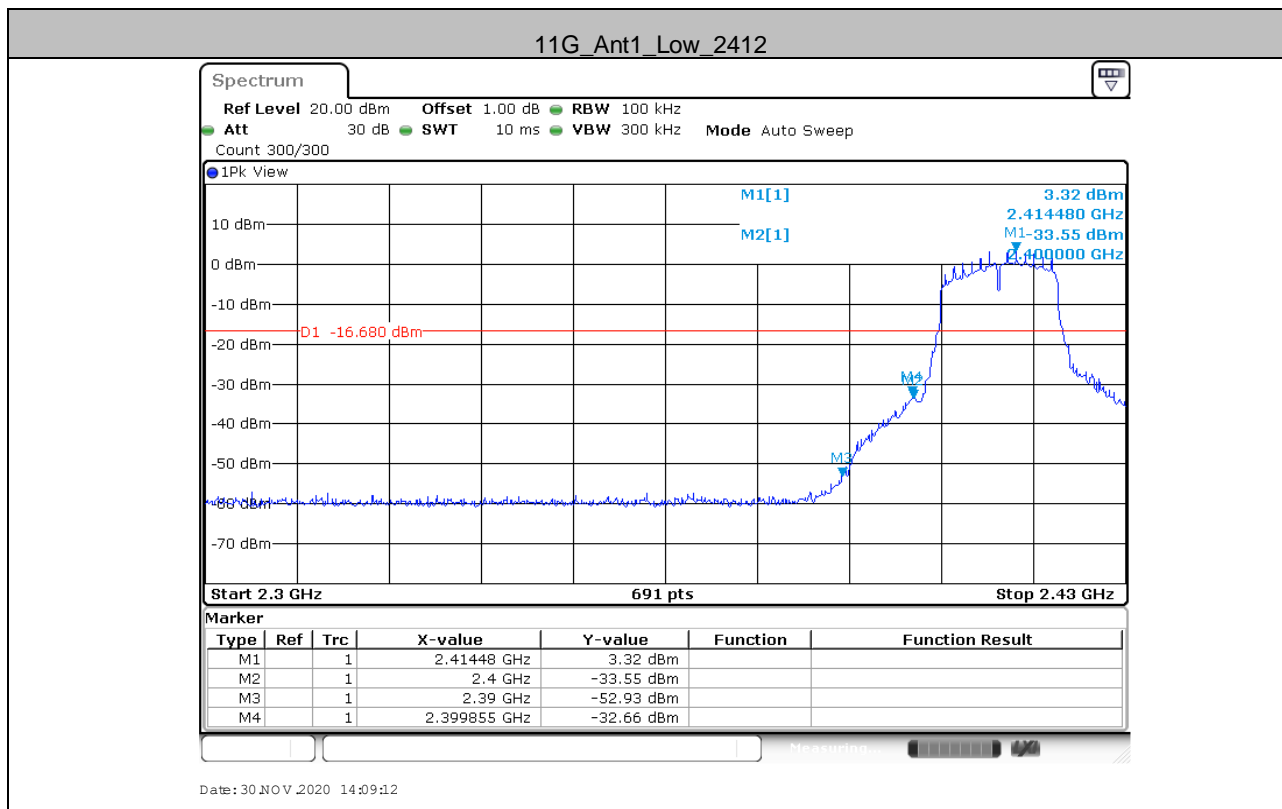
4.7.1 Test plots





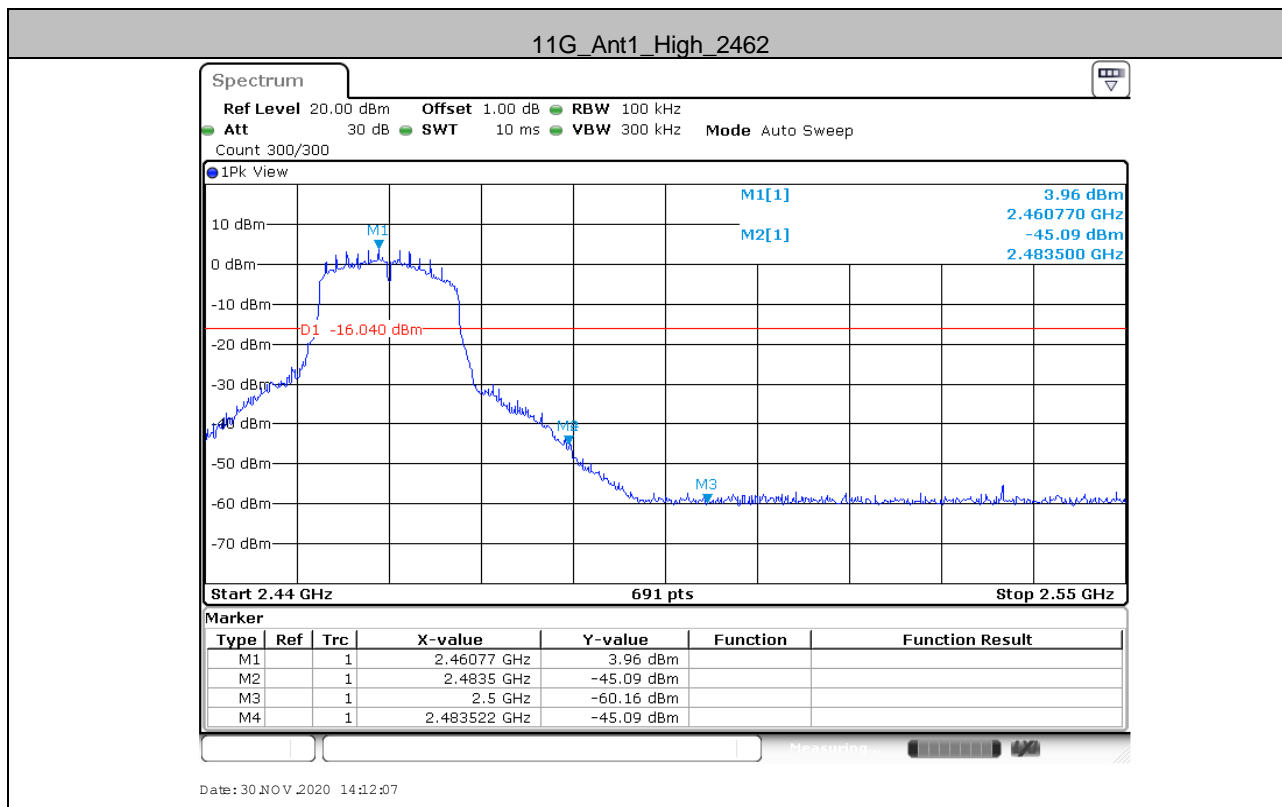
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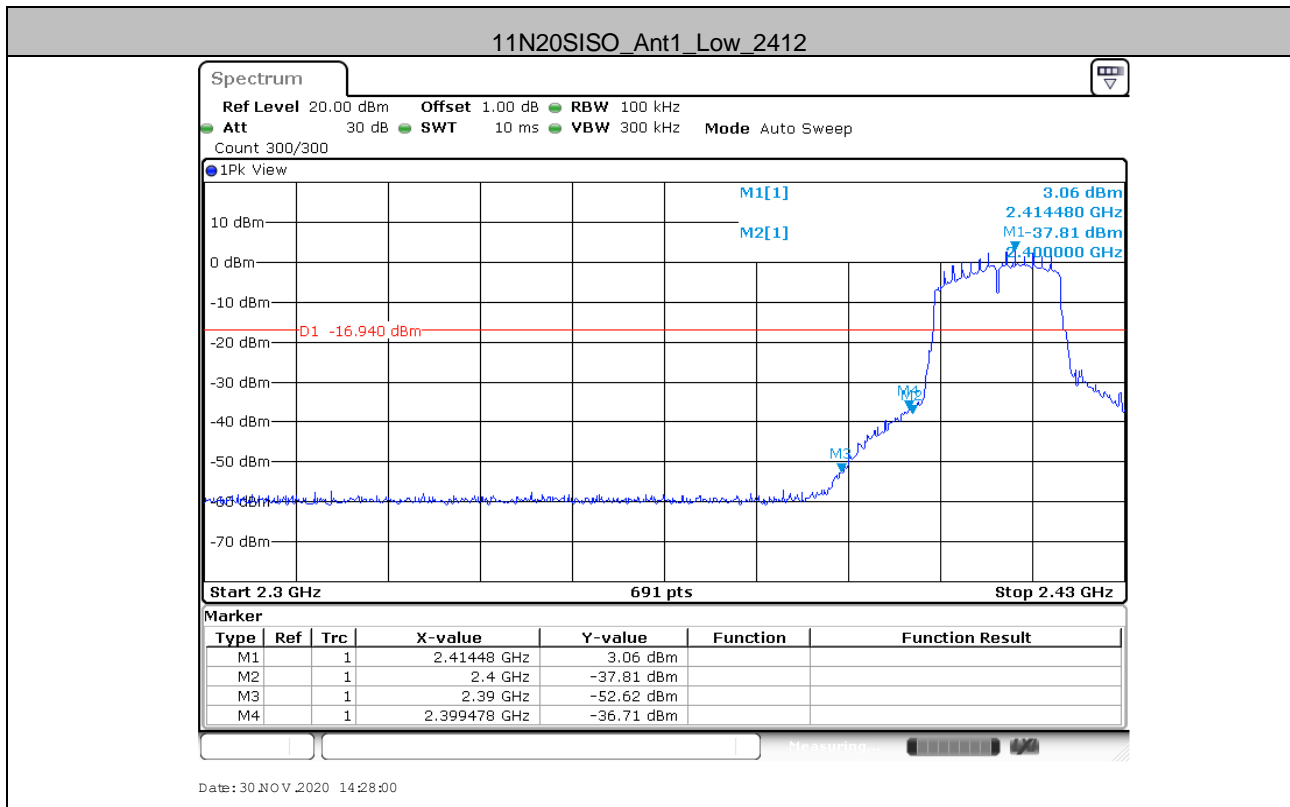
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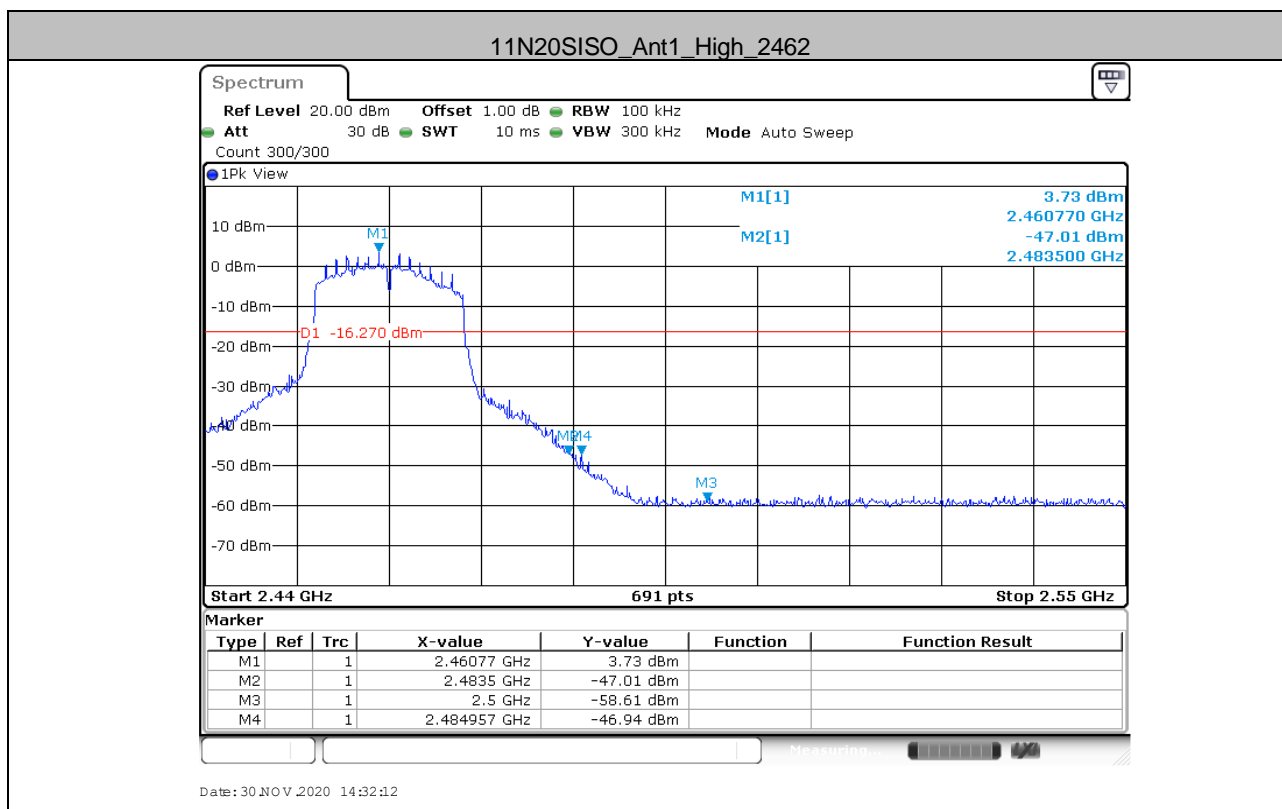
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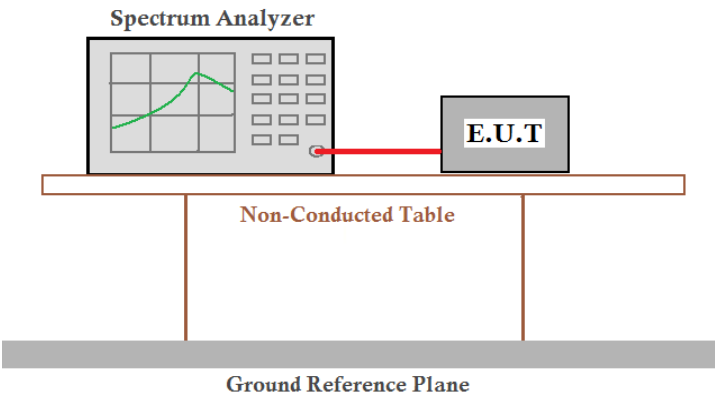


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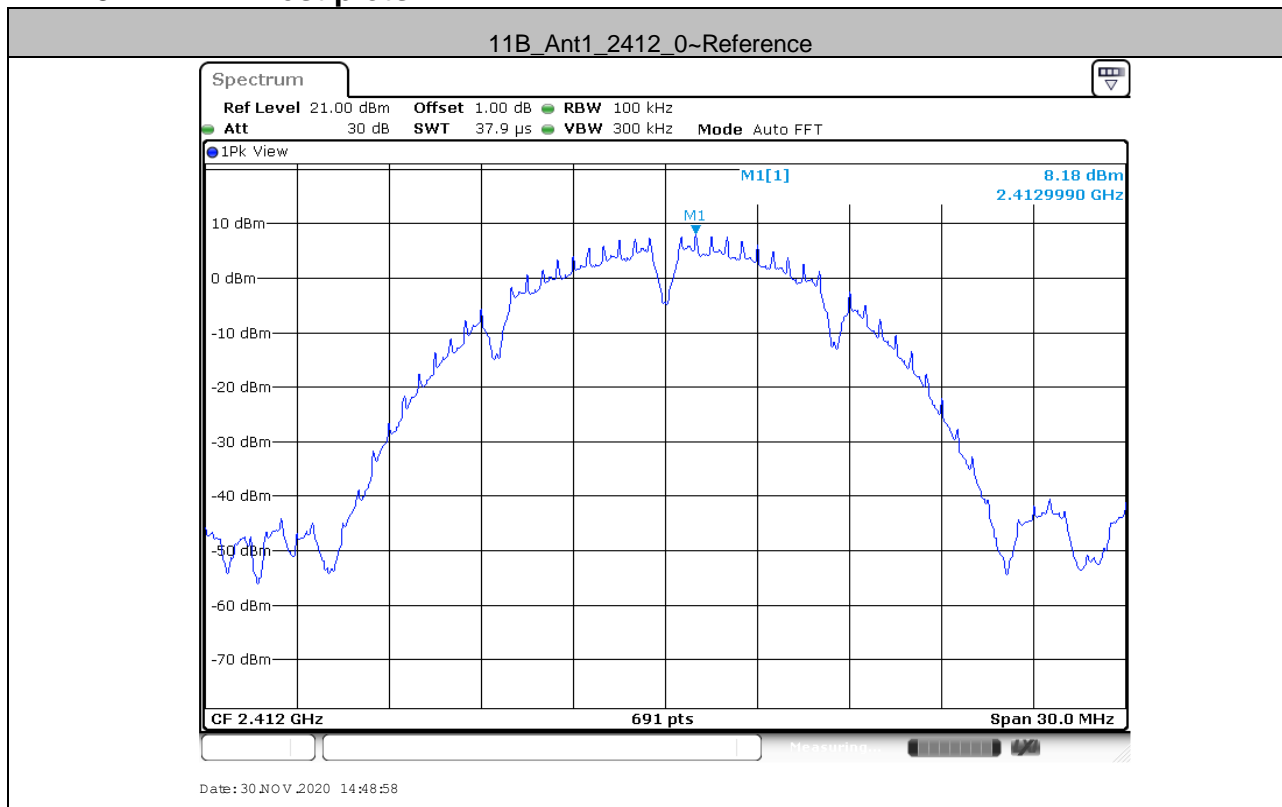


4.8 RF Conducted Spurious Emissions

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

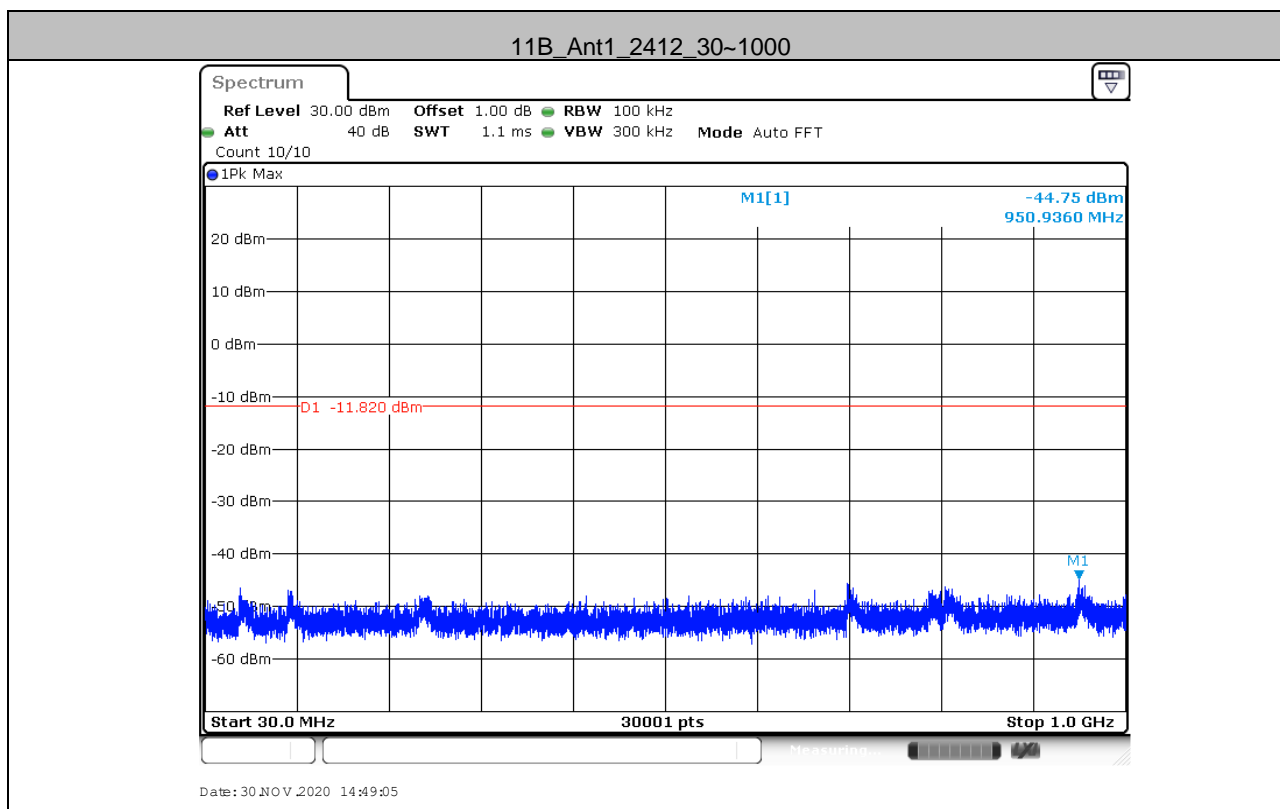


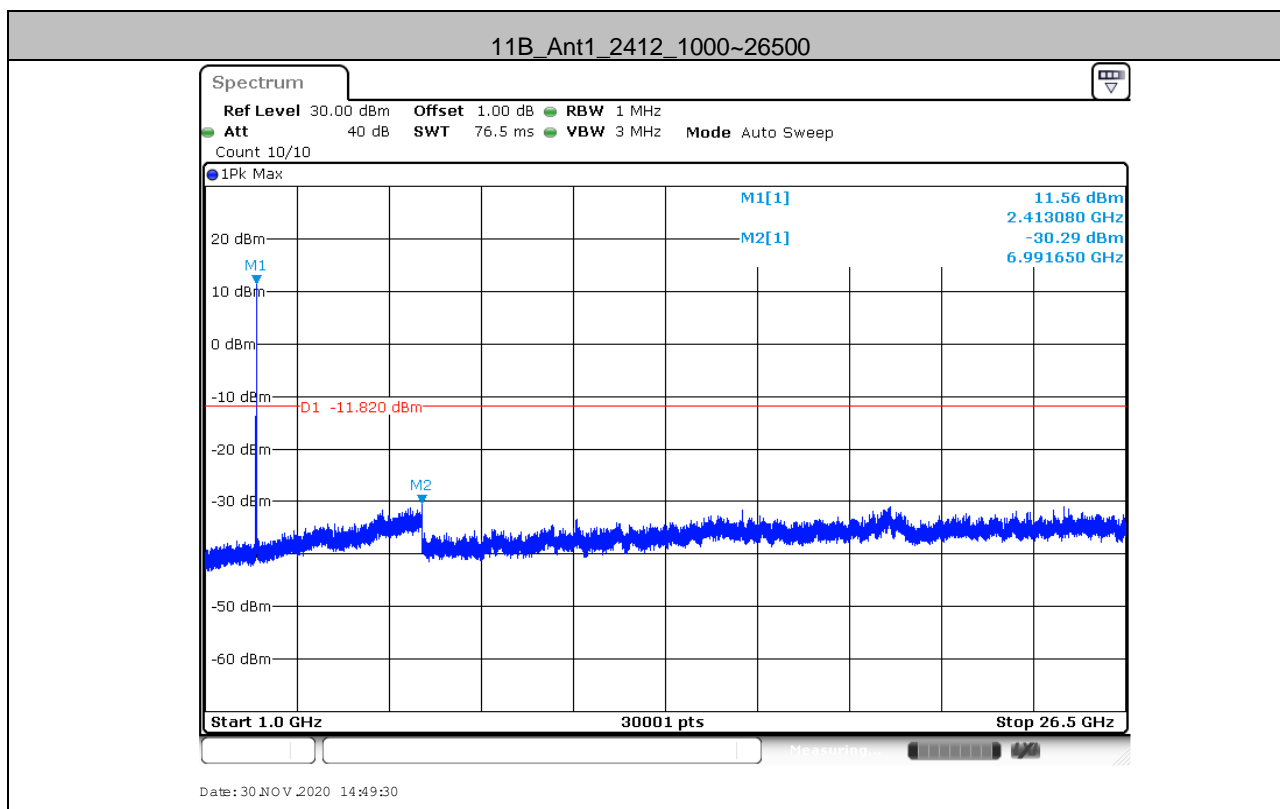
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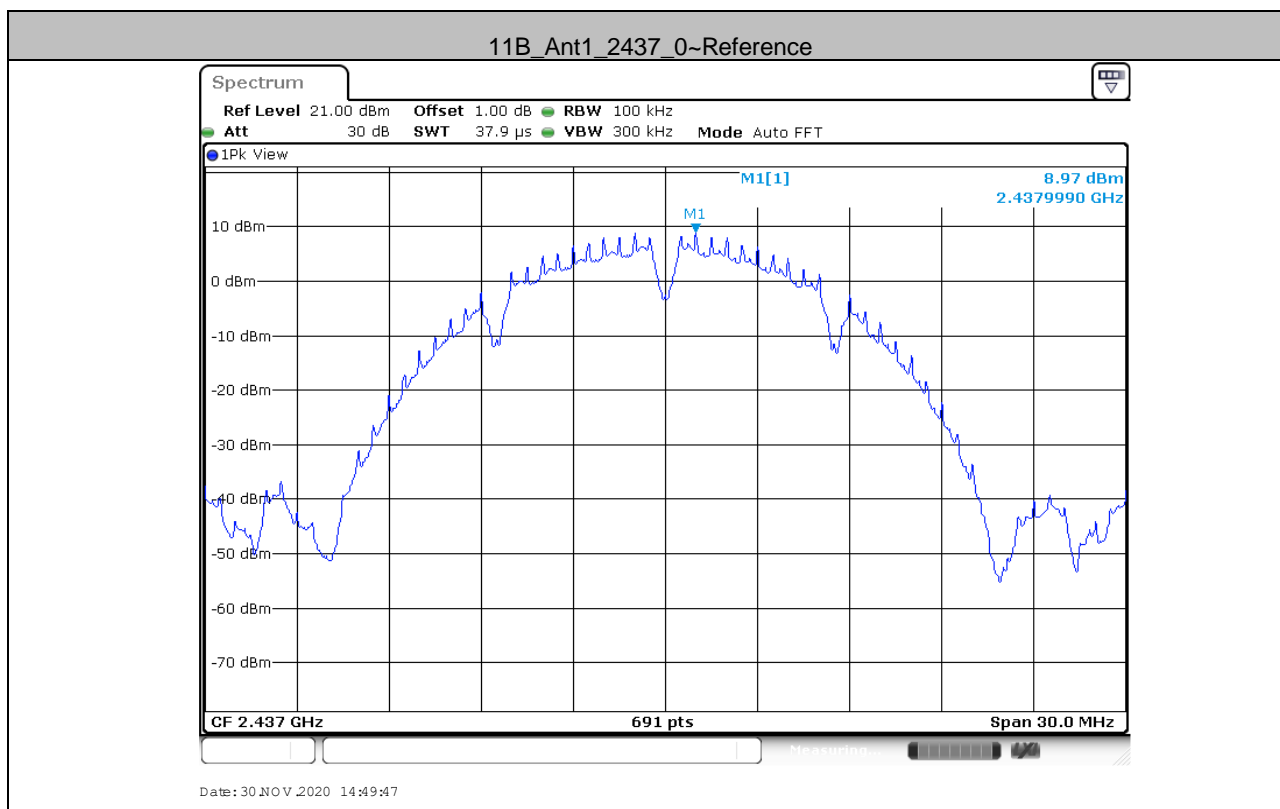
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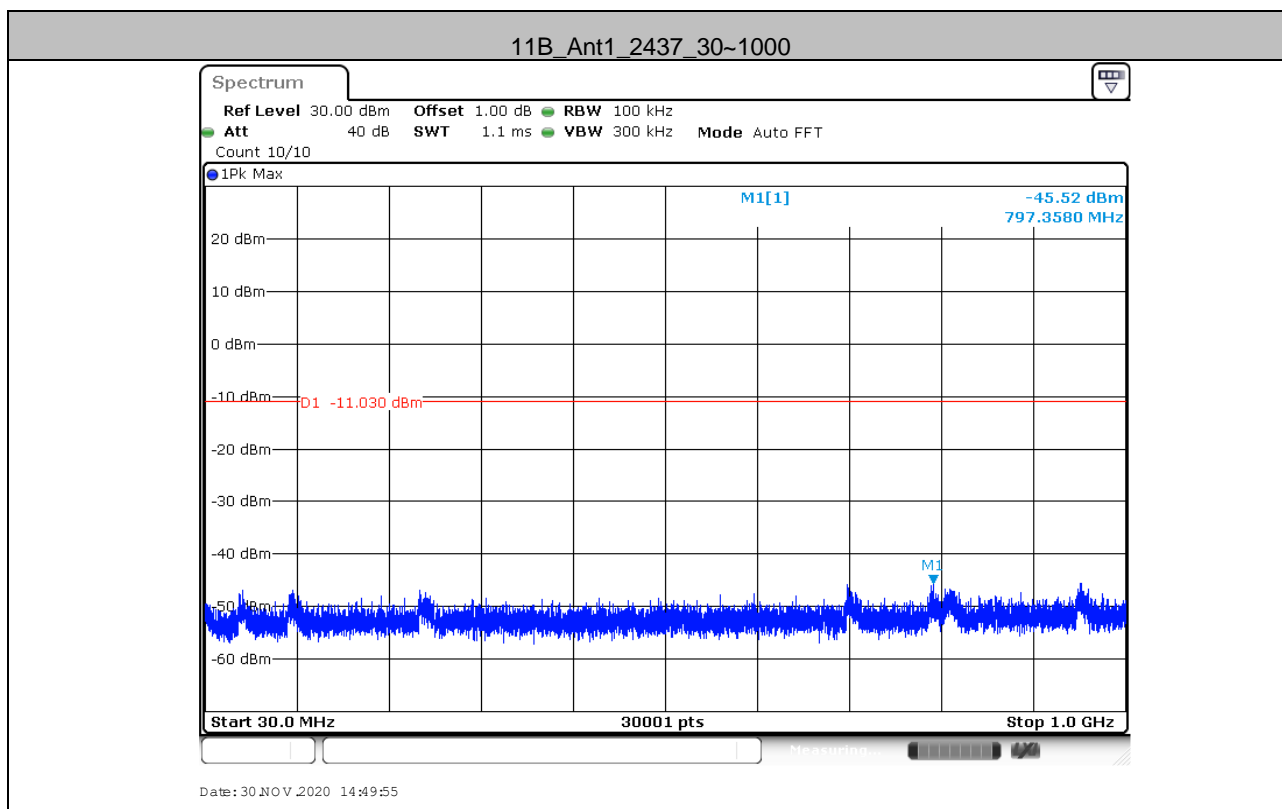


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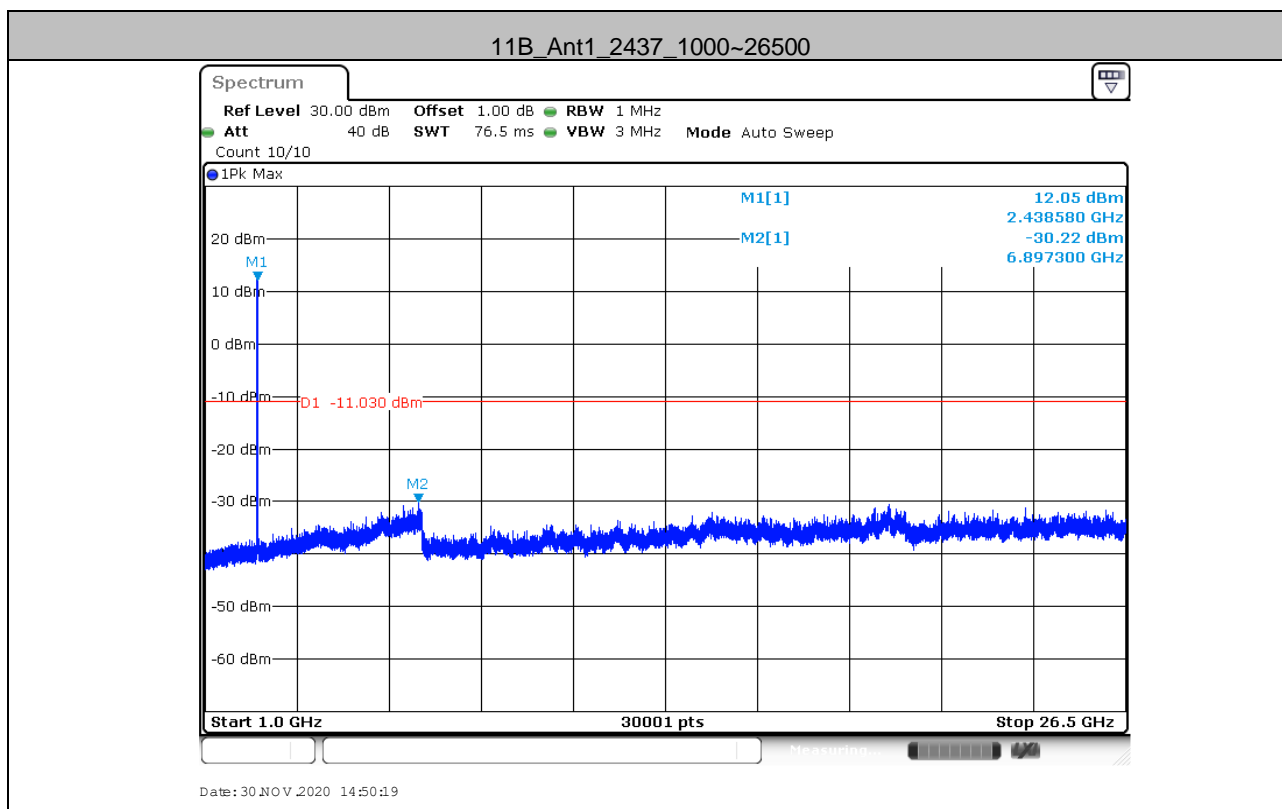
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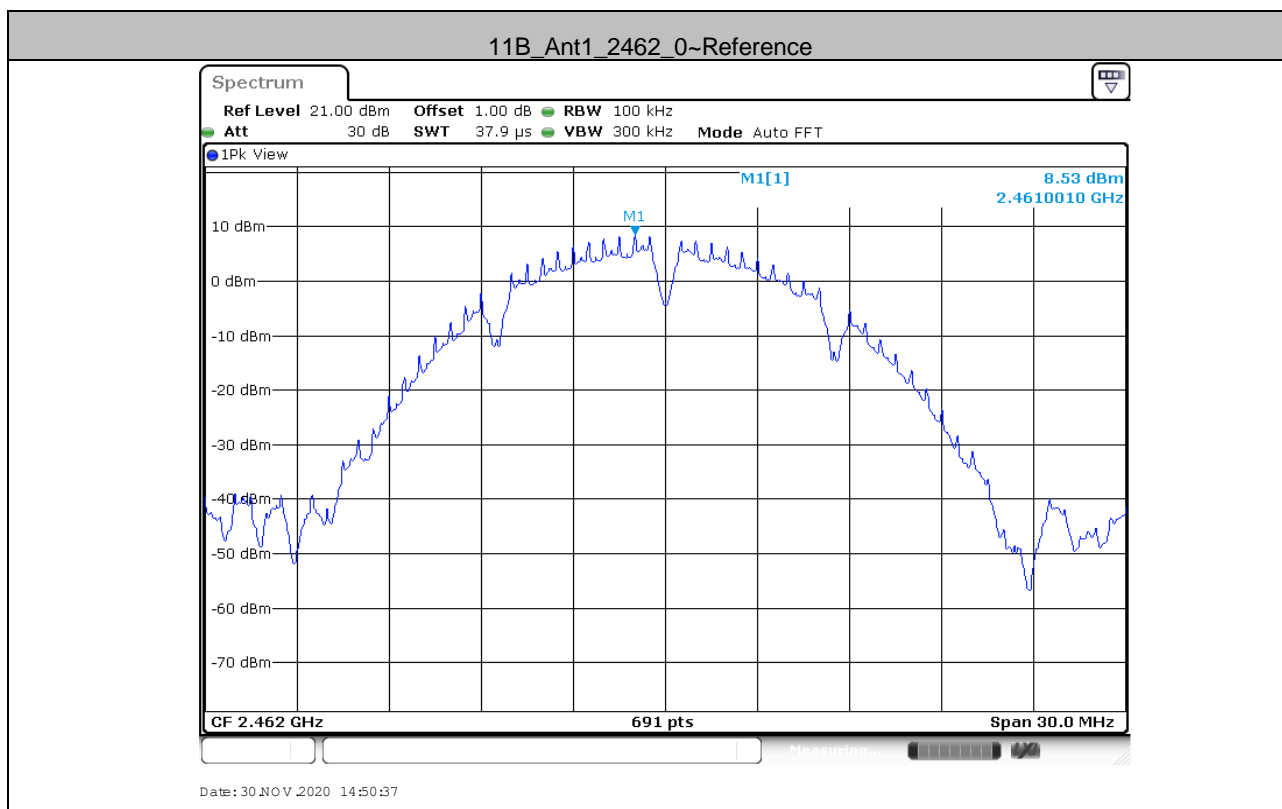
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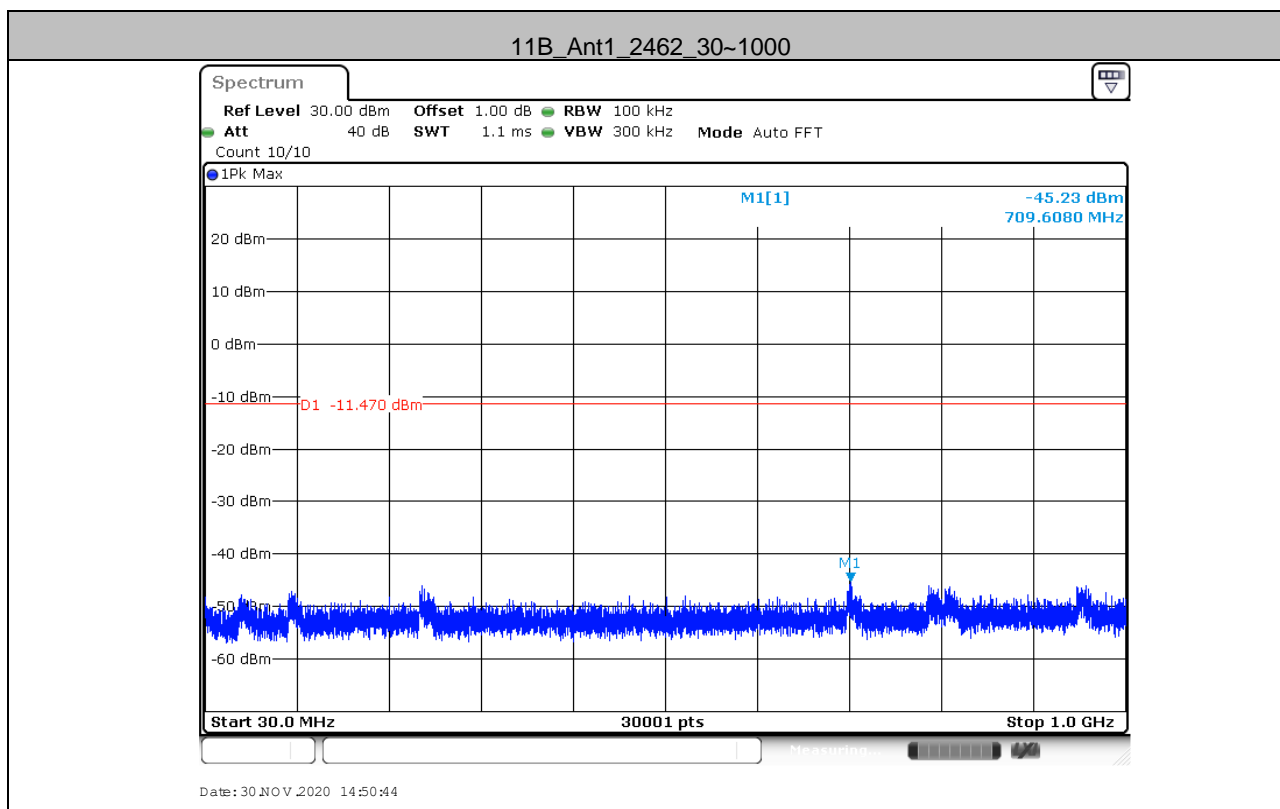
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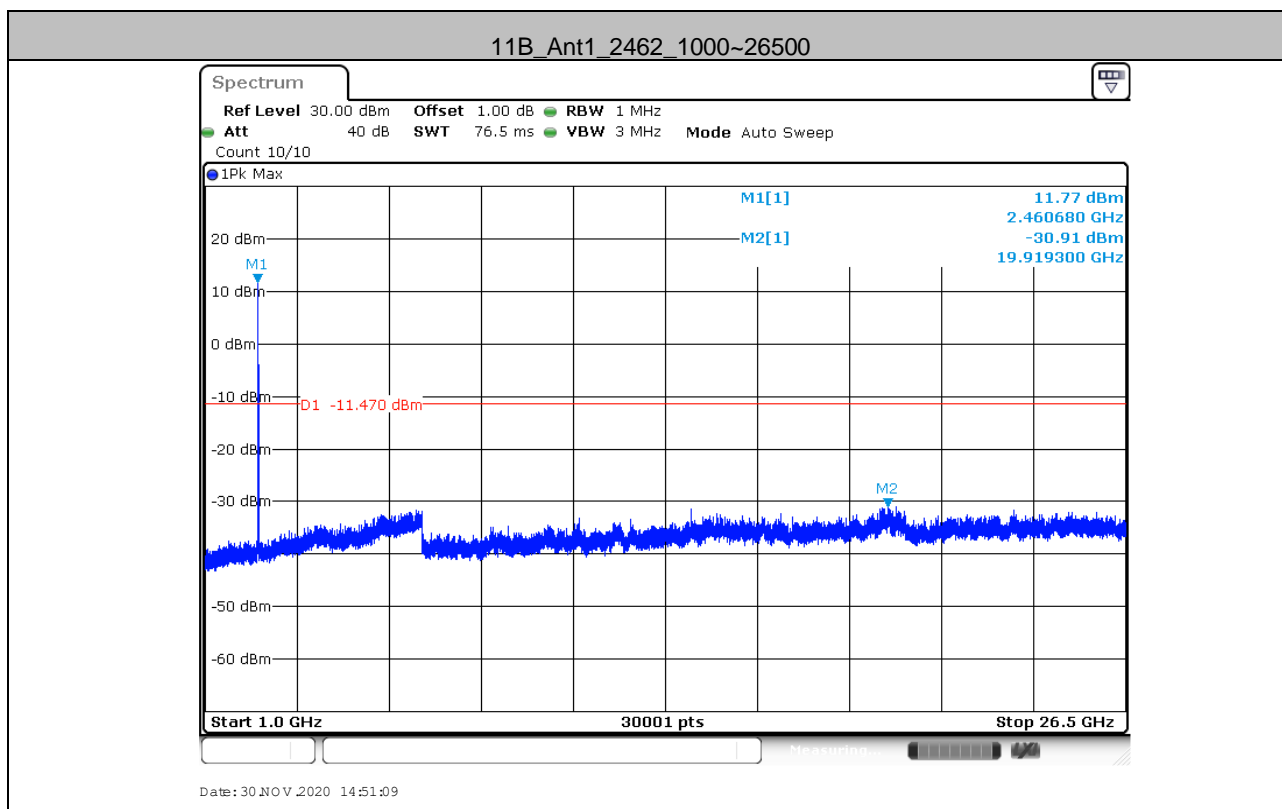


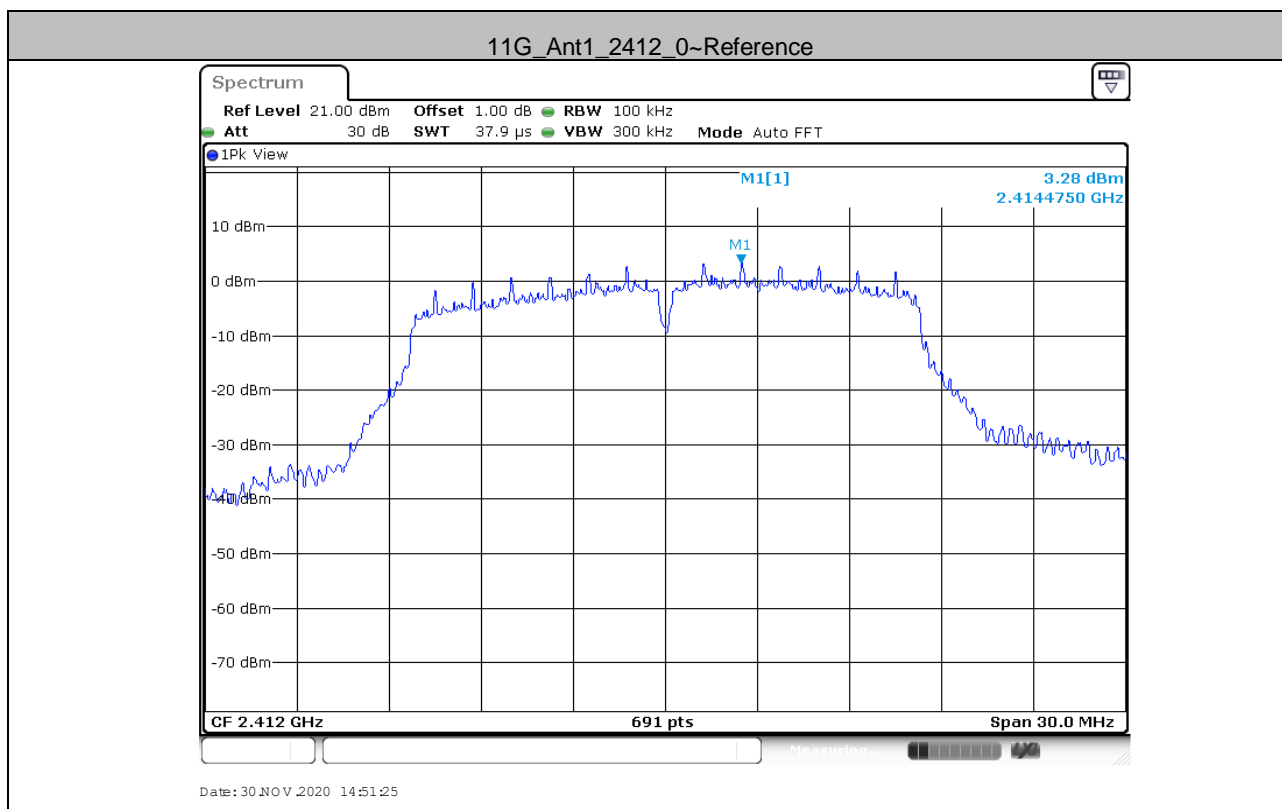


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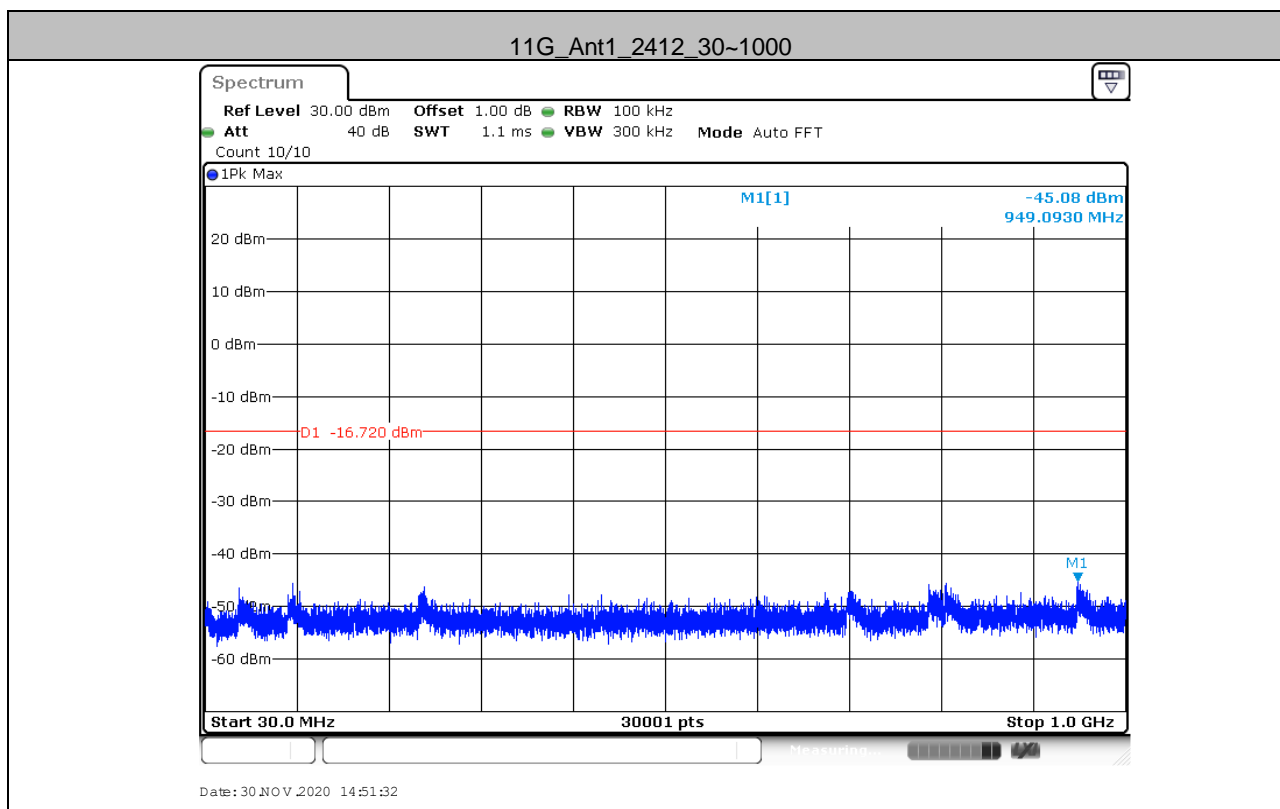


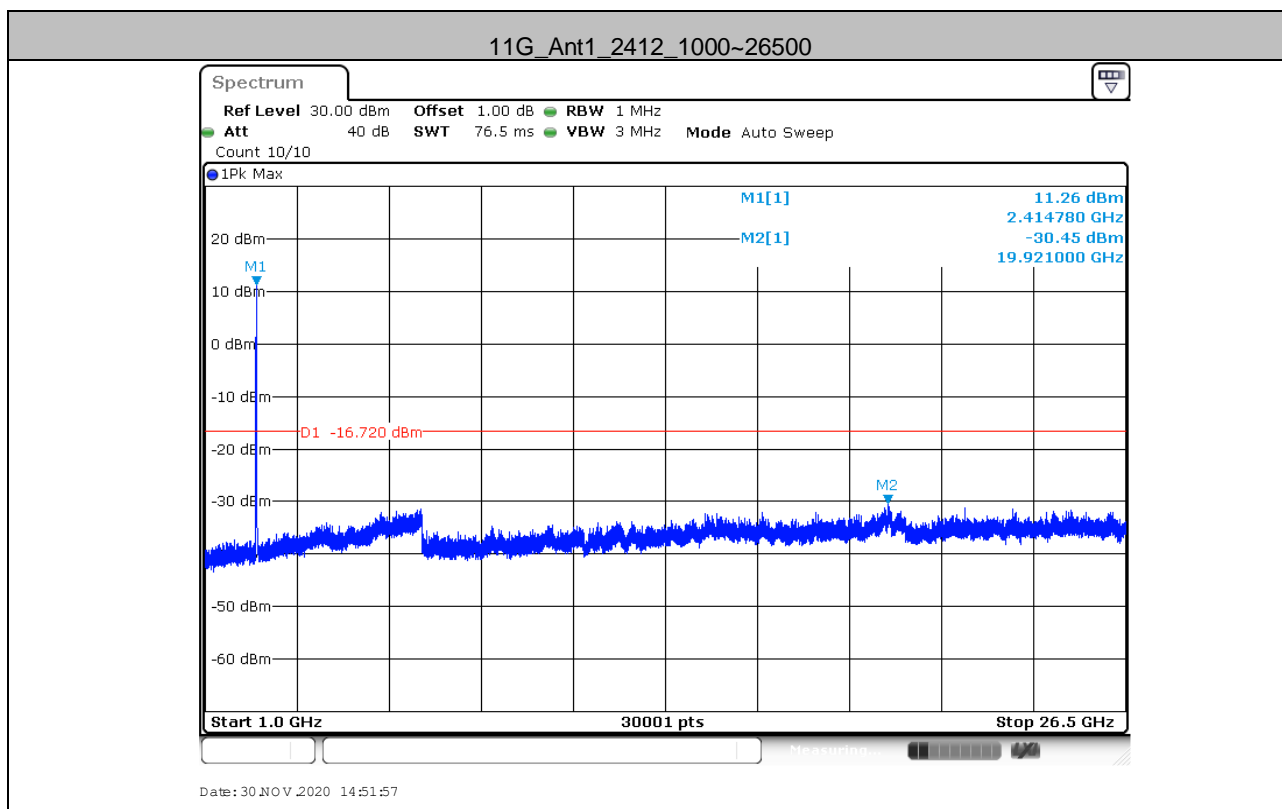


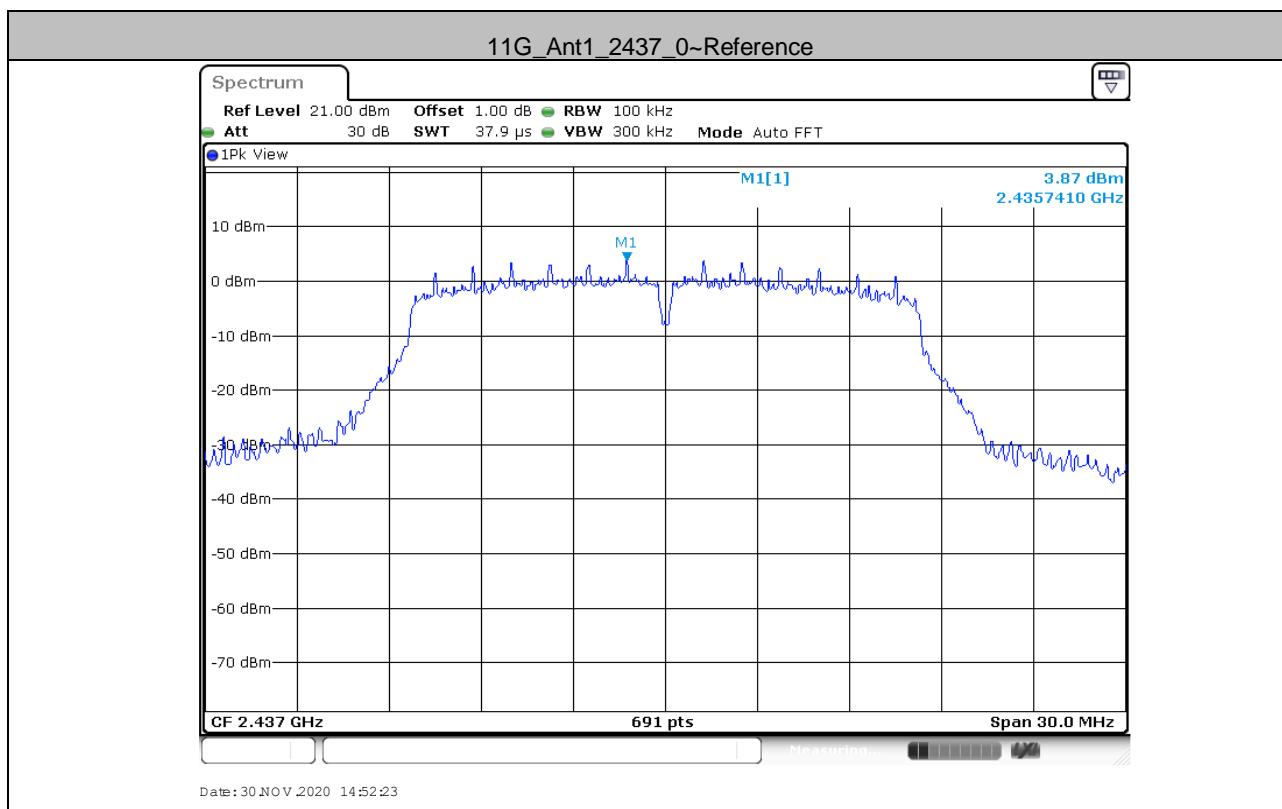


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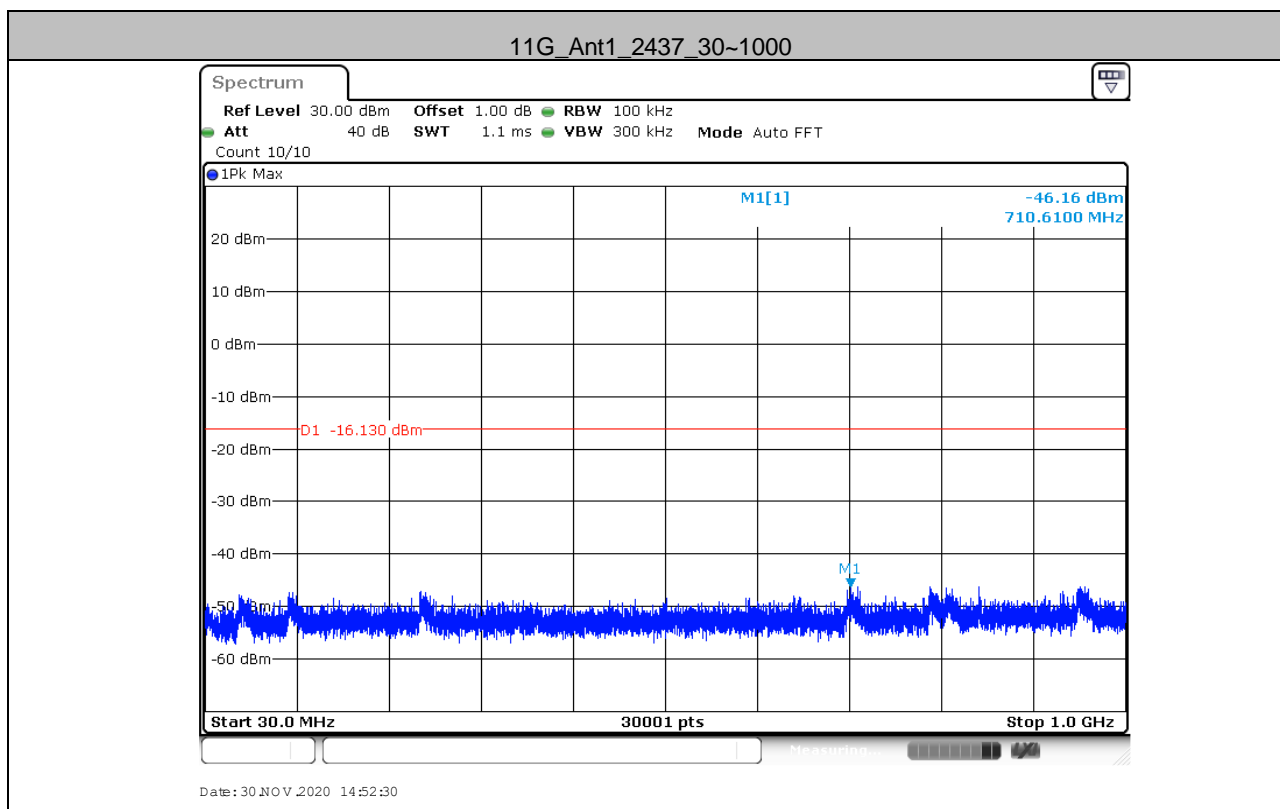


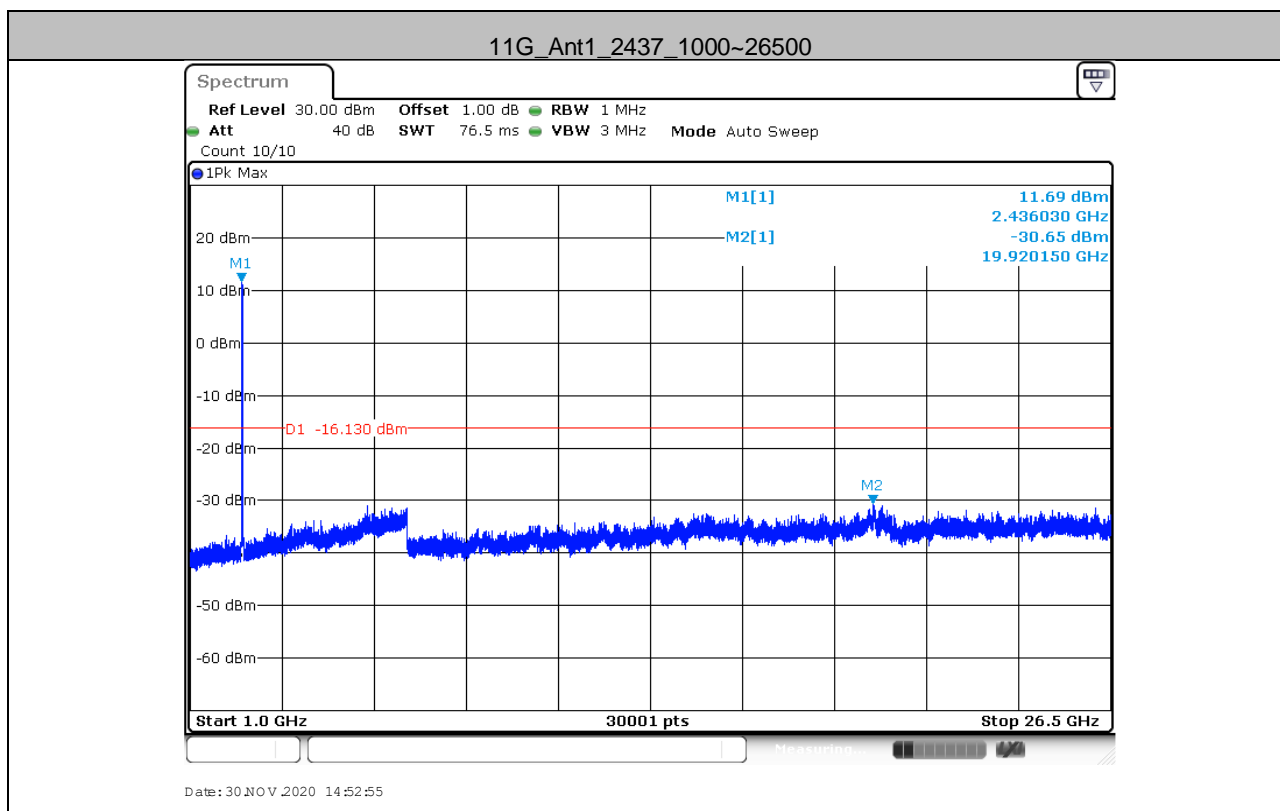


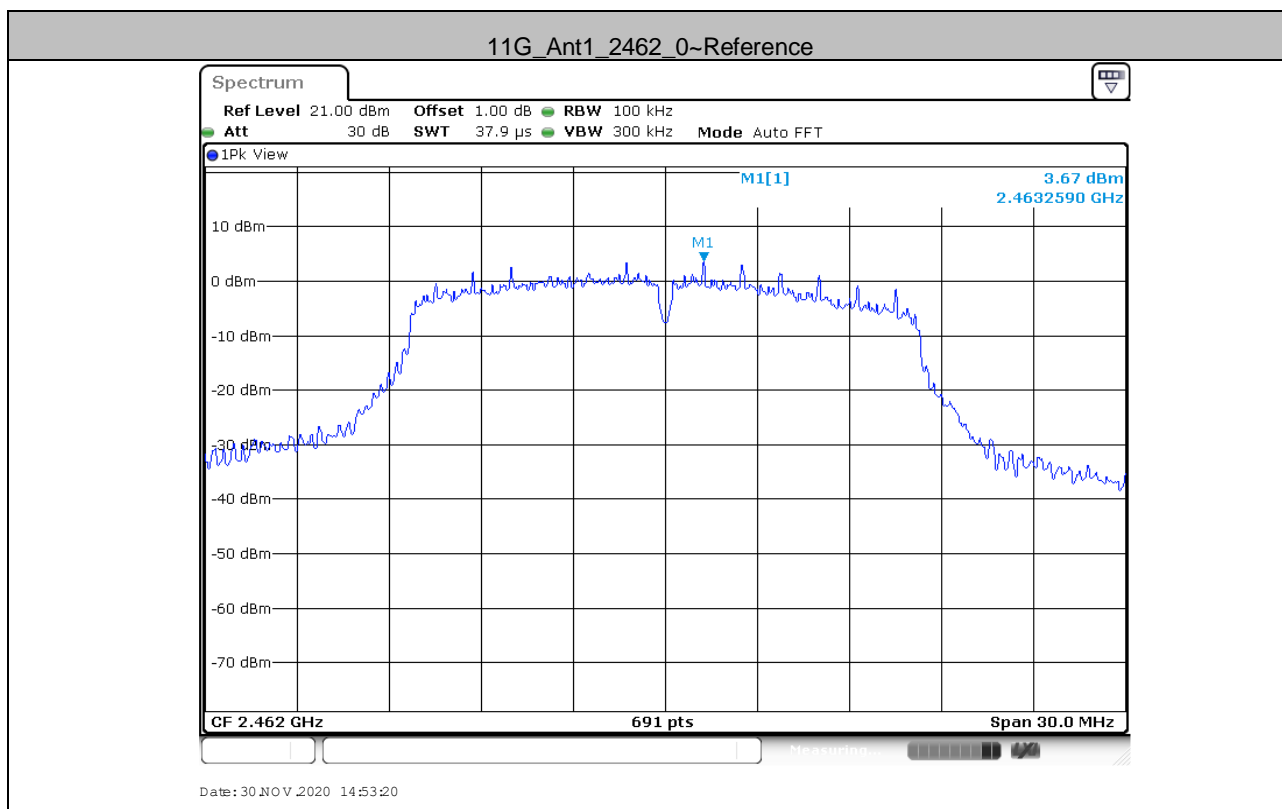


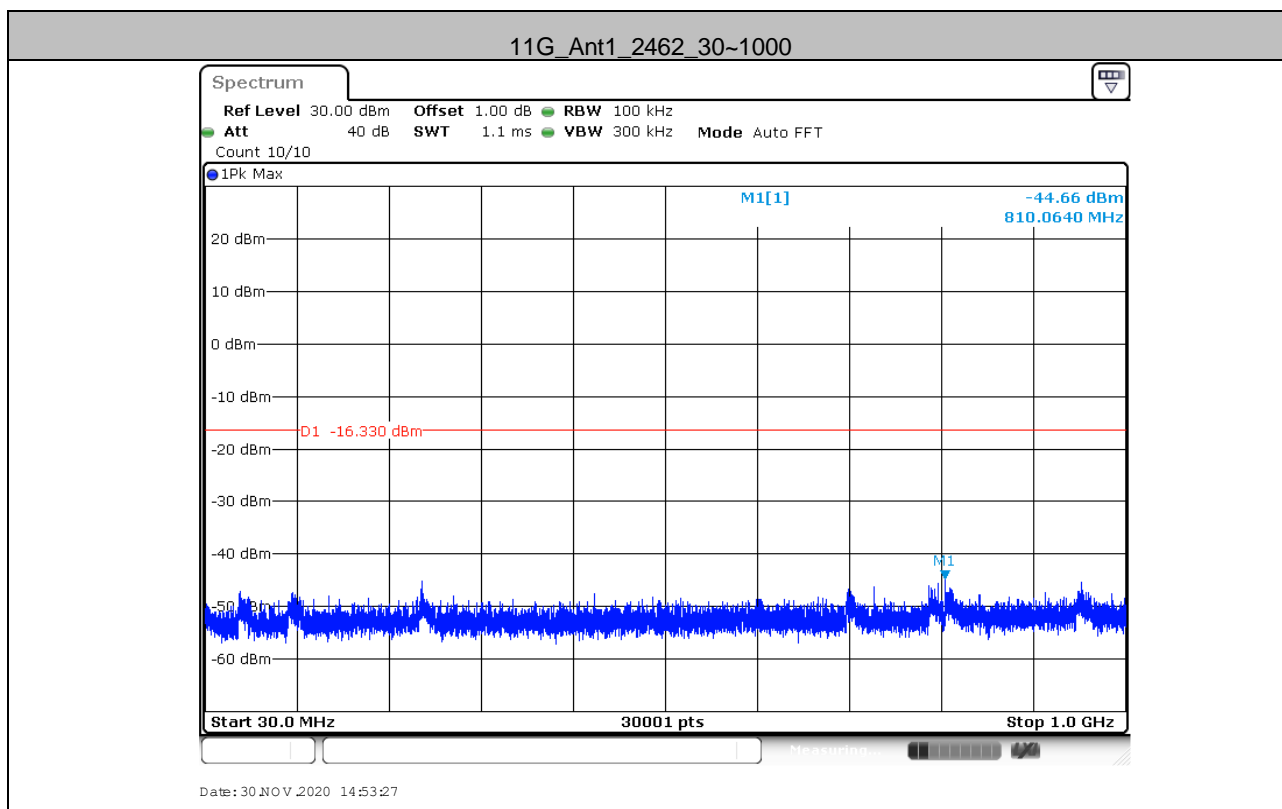
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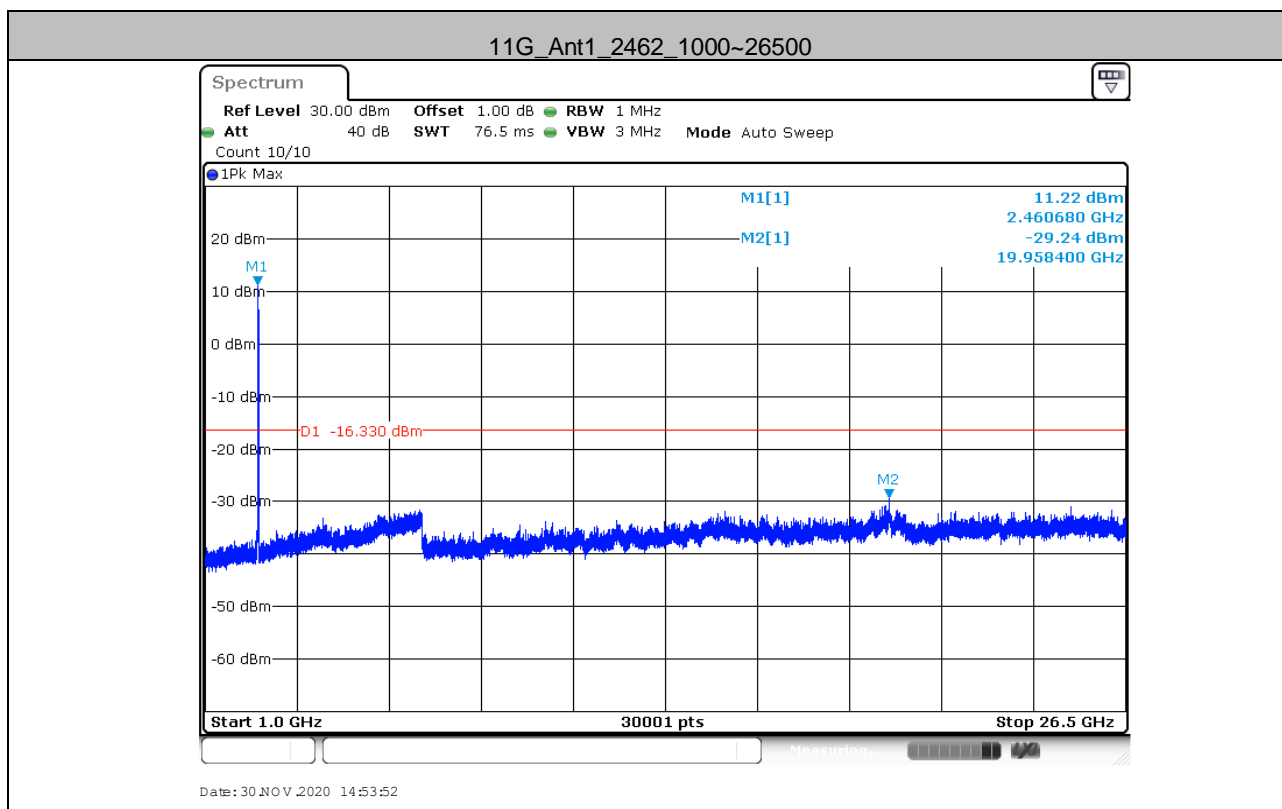
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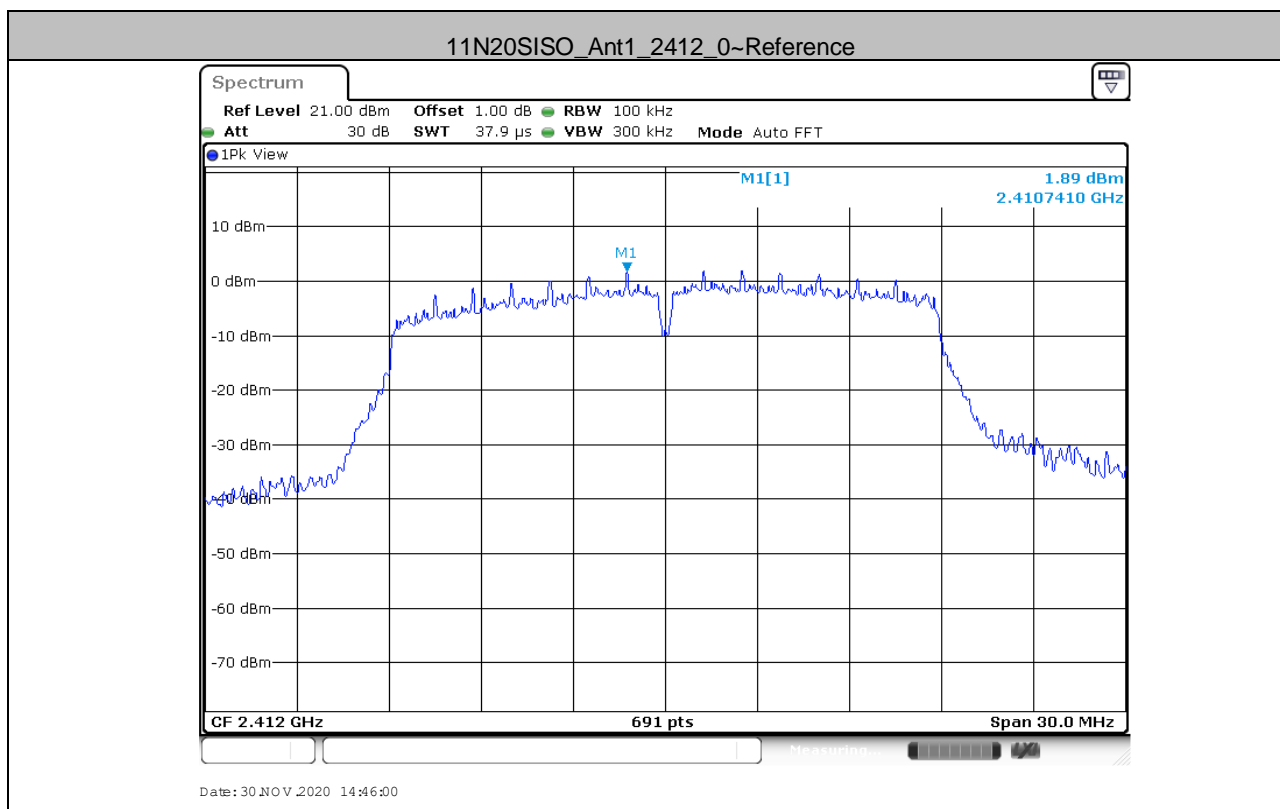








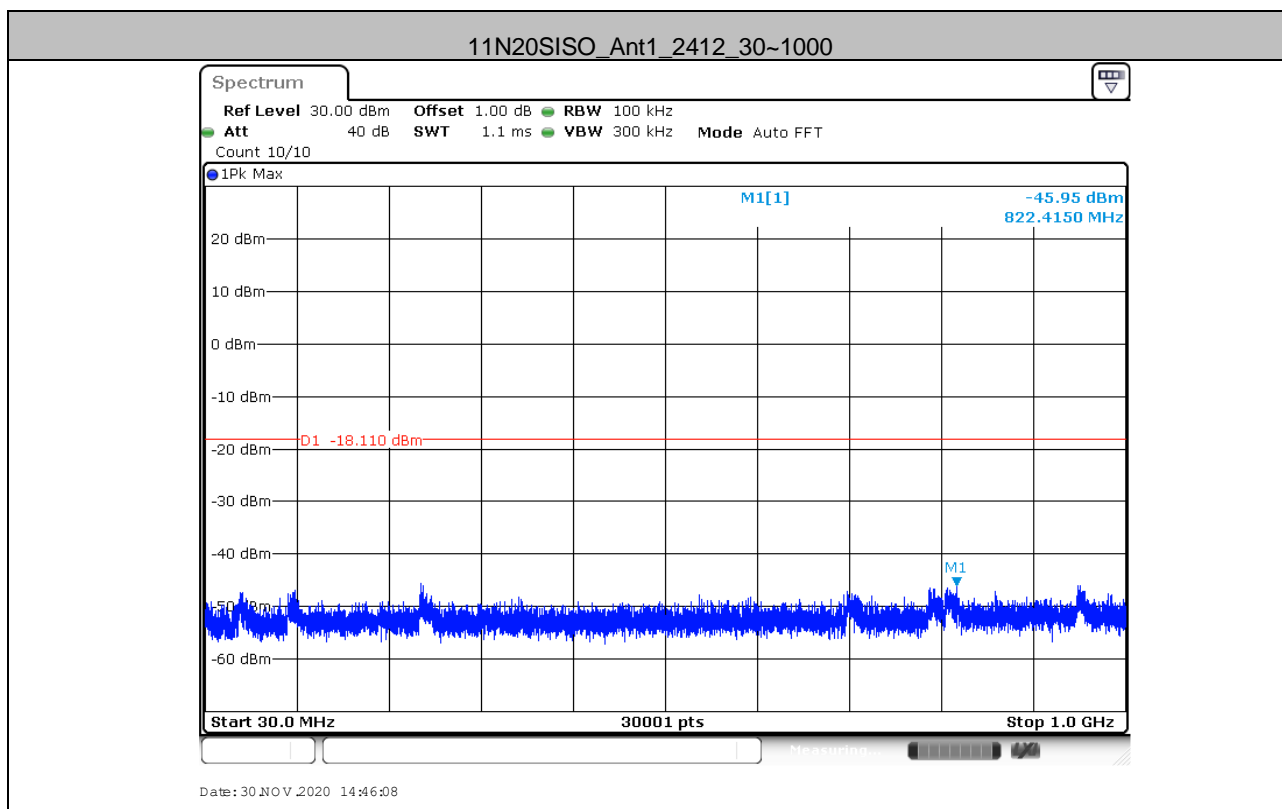


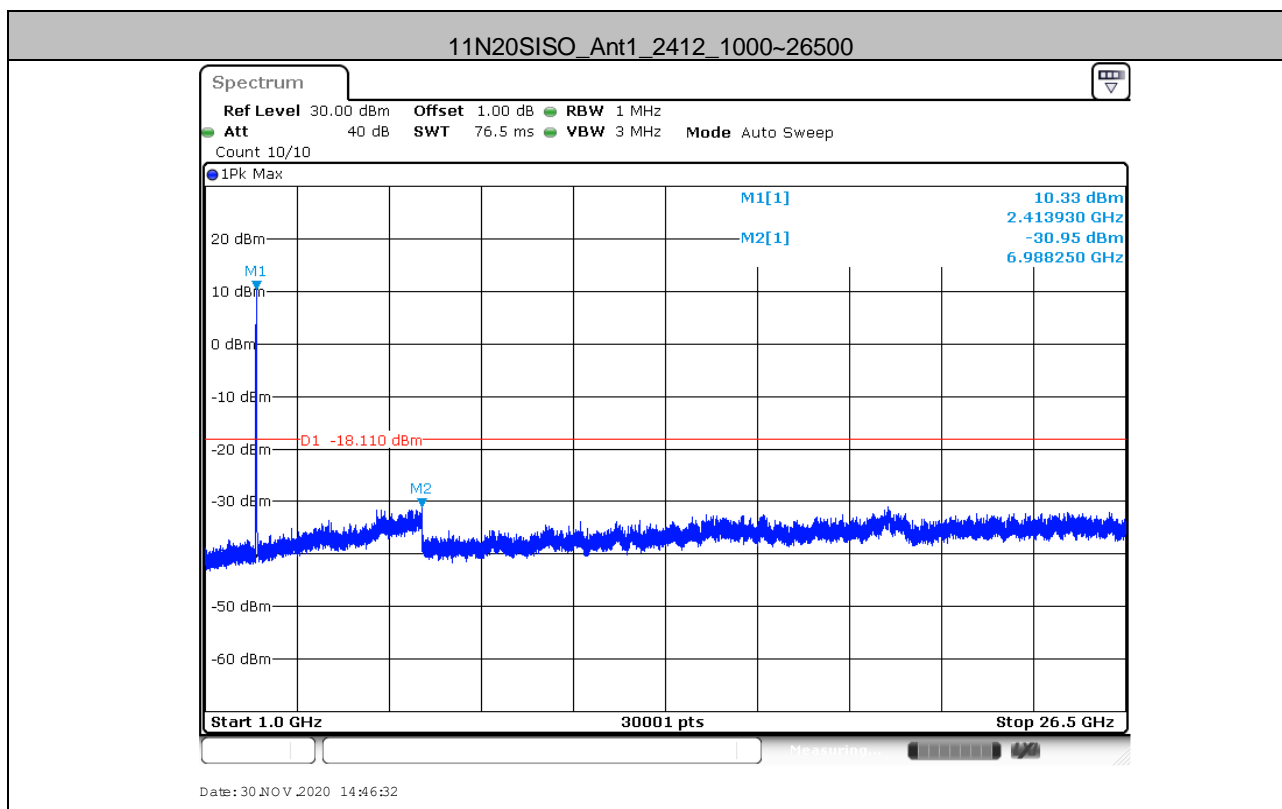


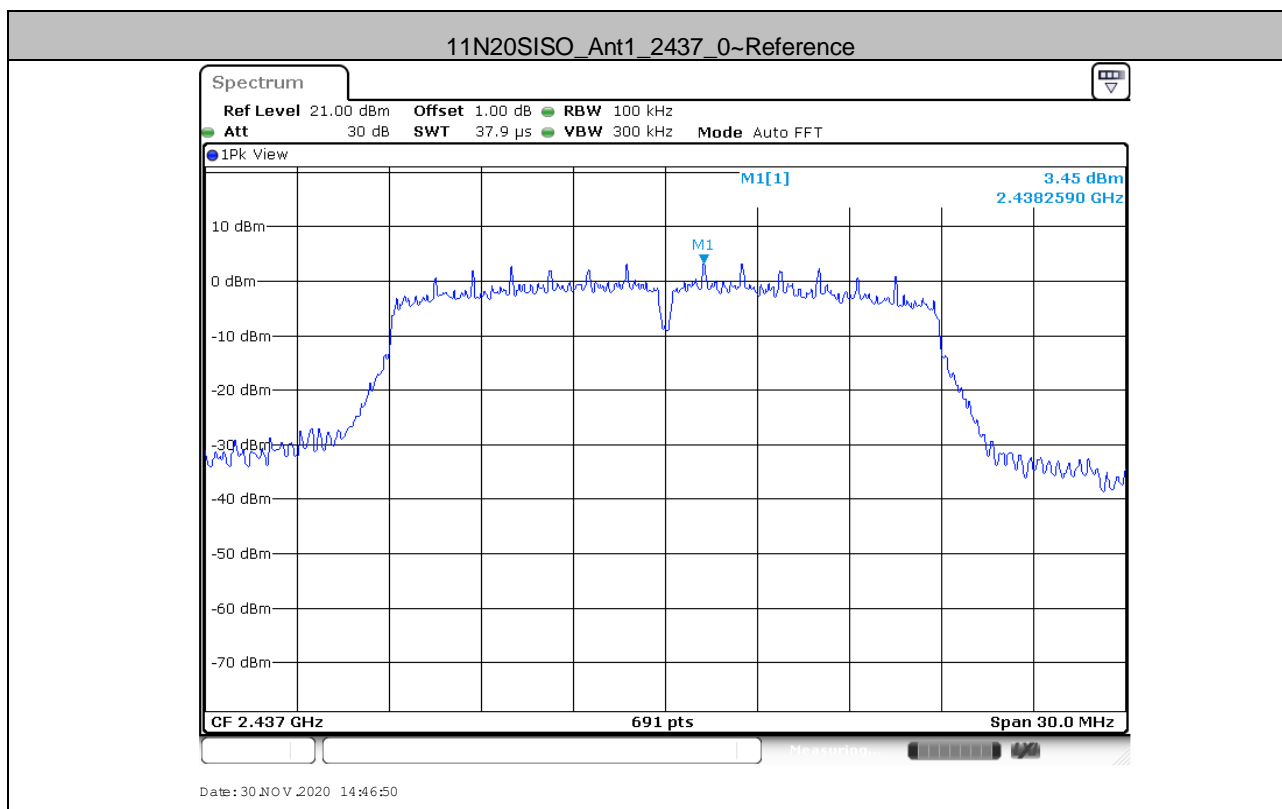
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Shenzhen Branch Testing Center, EMC Laboratory

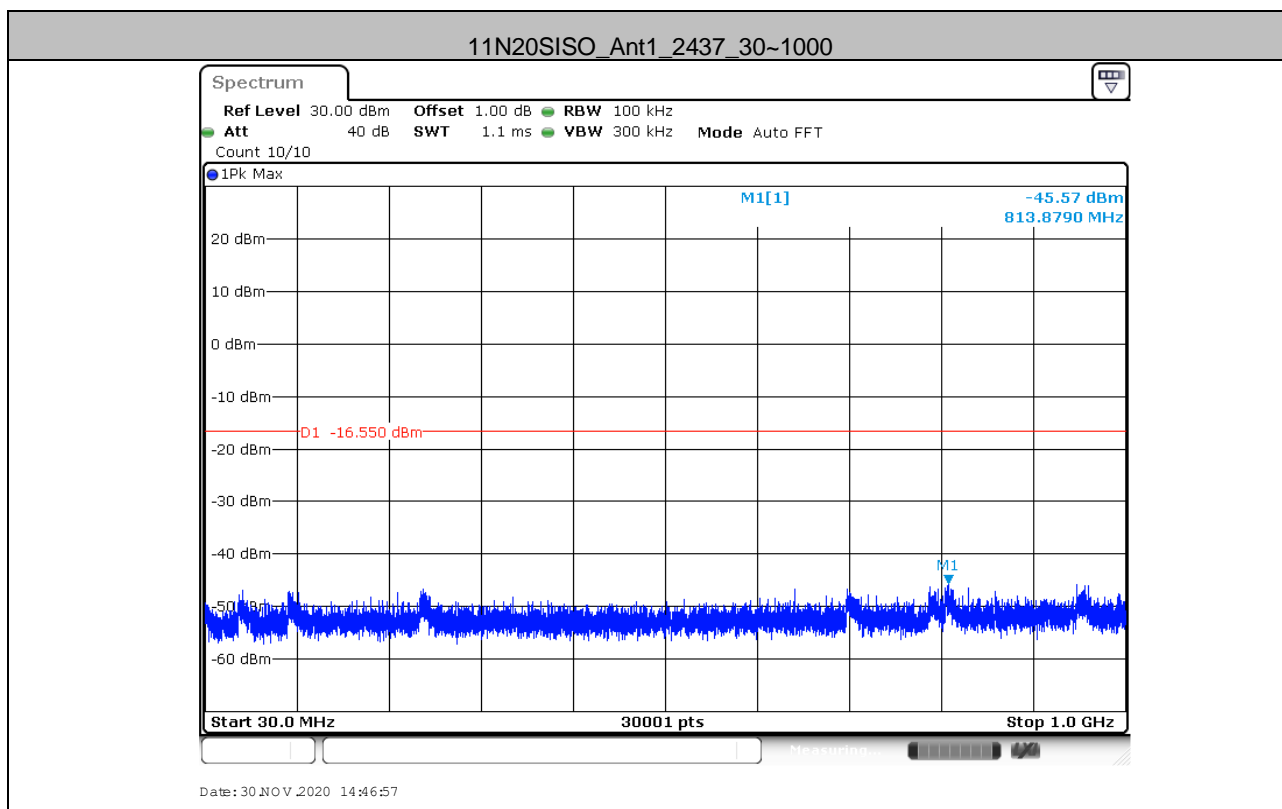
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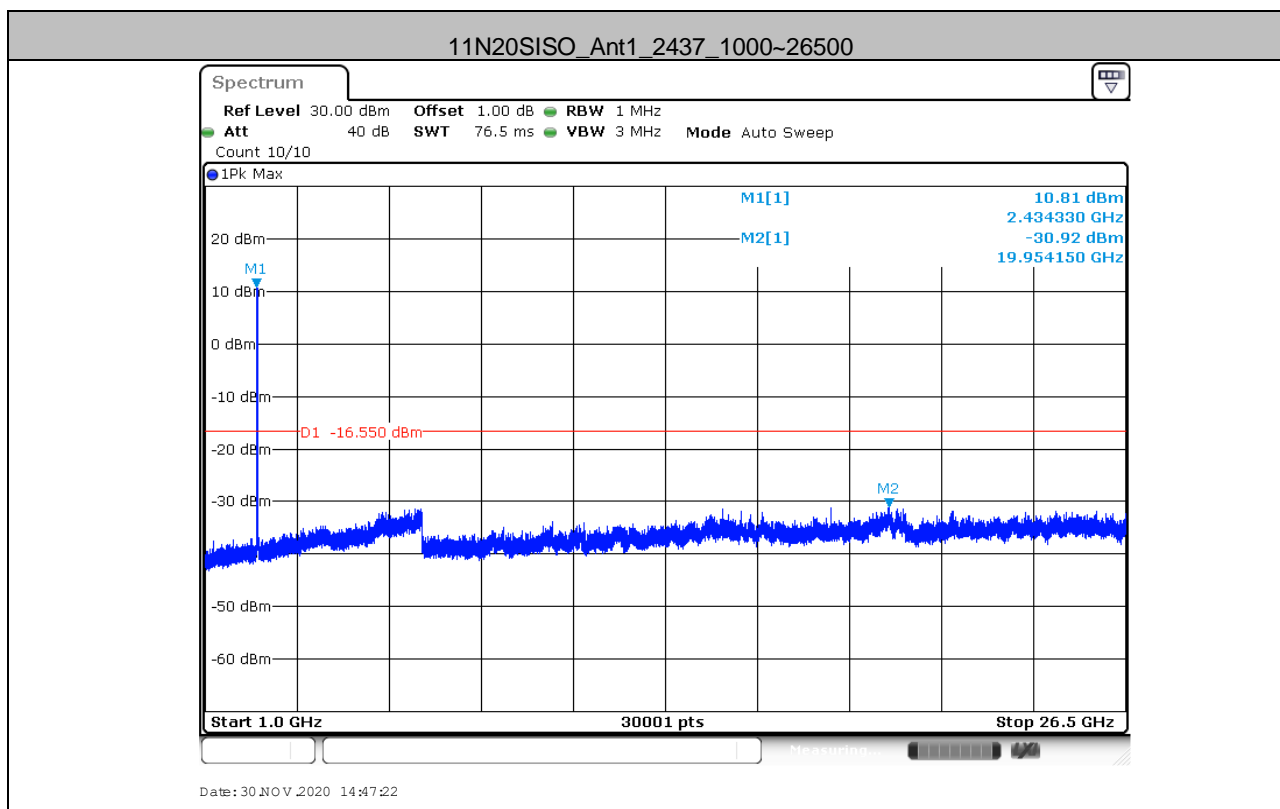
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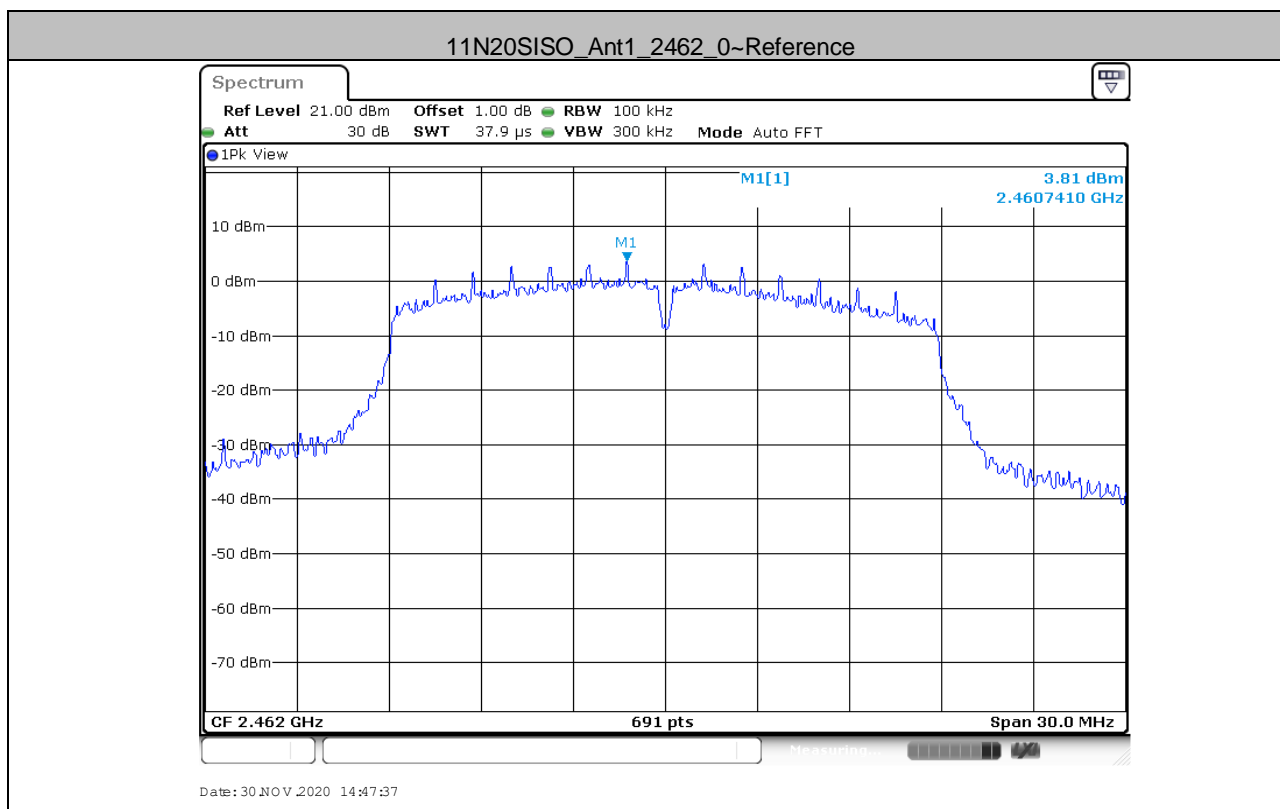


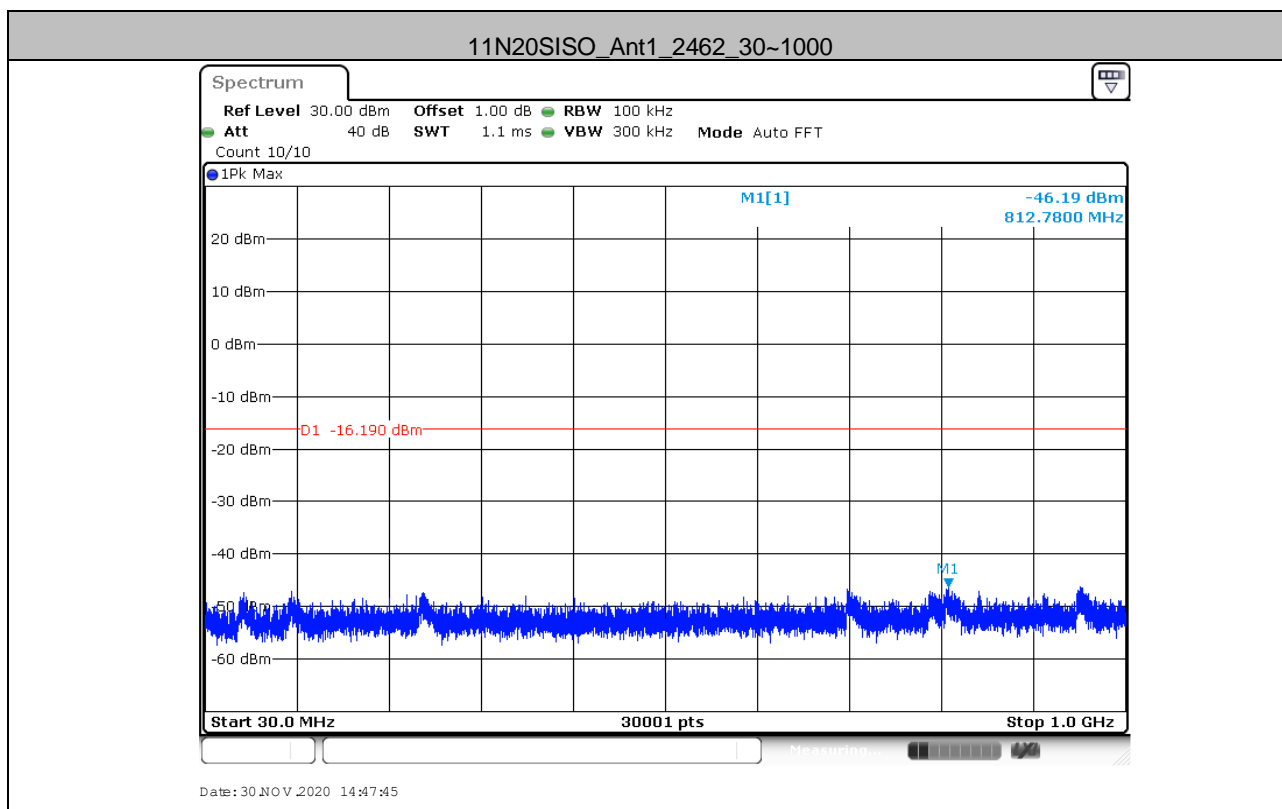


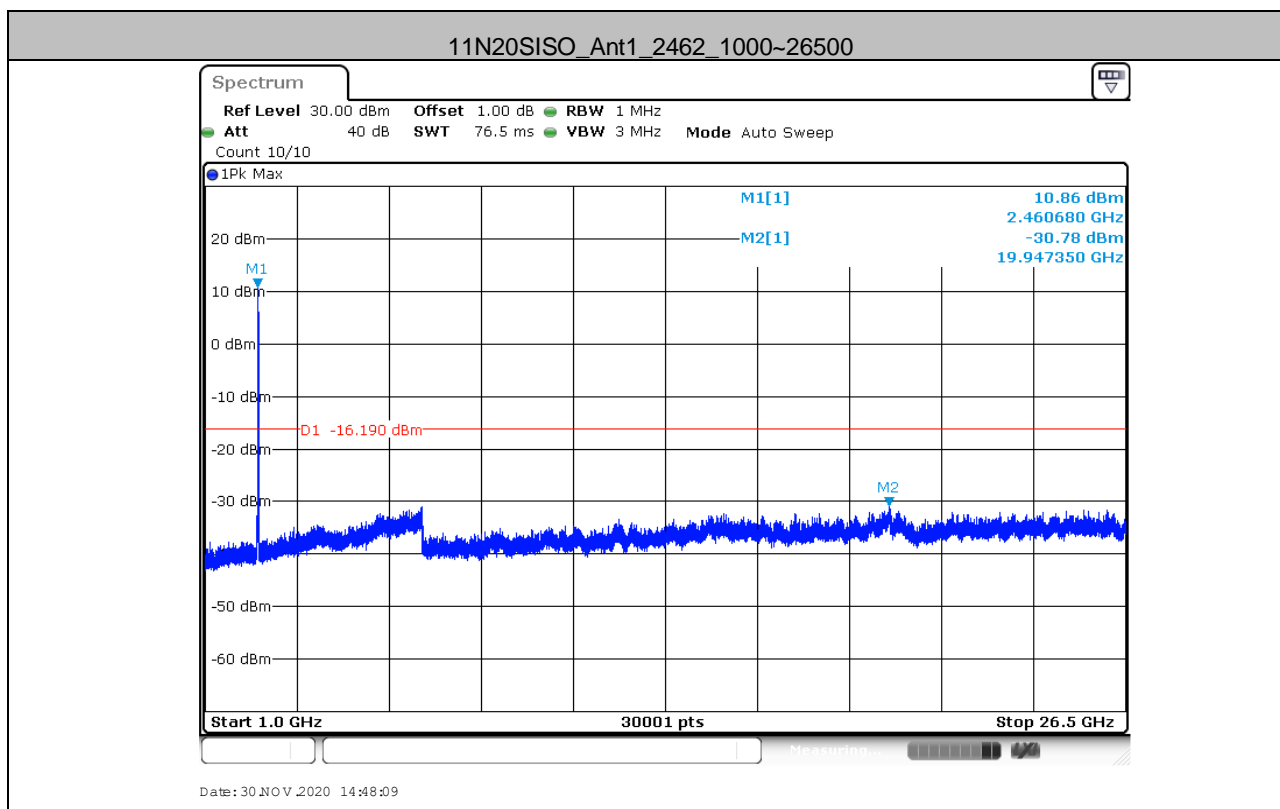














Remark:

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.



4.9 Radiated Spurious Emissions

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

Test Setup:	
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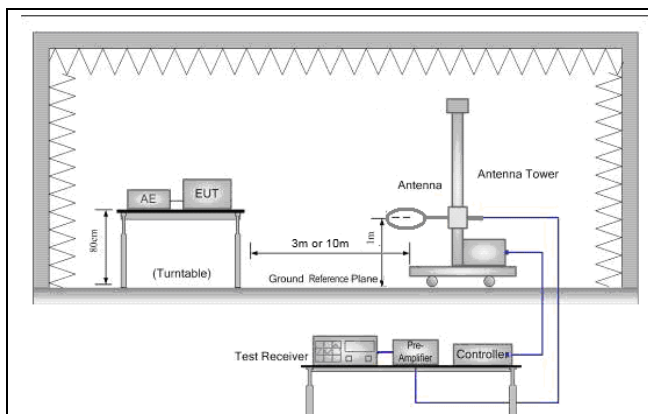


Figure 1. Below 30MHz

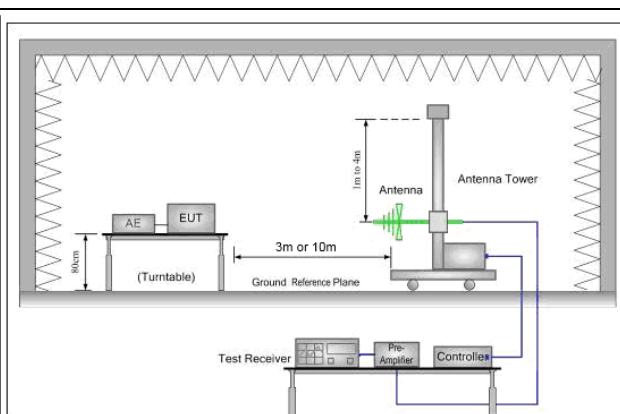


Figure 2. 30MHz to 1GHz

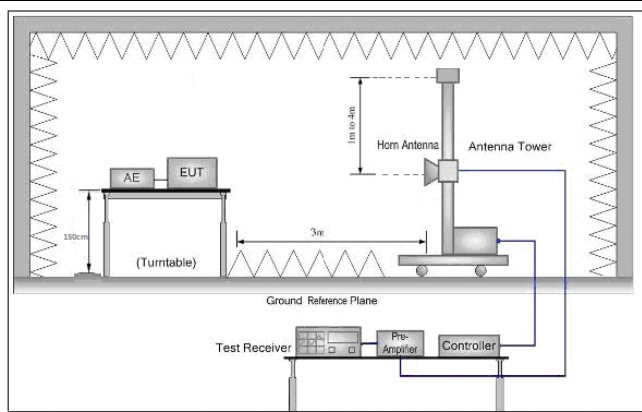


Figure 3. Above 1 GHz

Test Procedure:

- 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



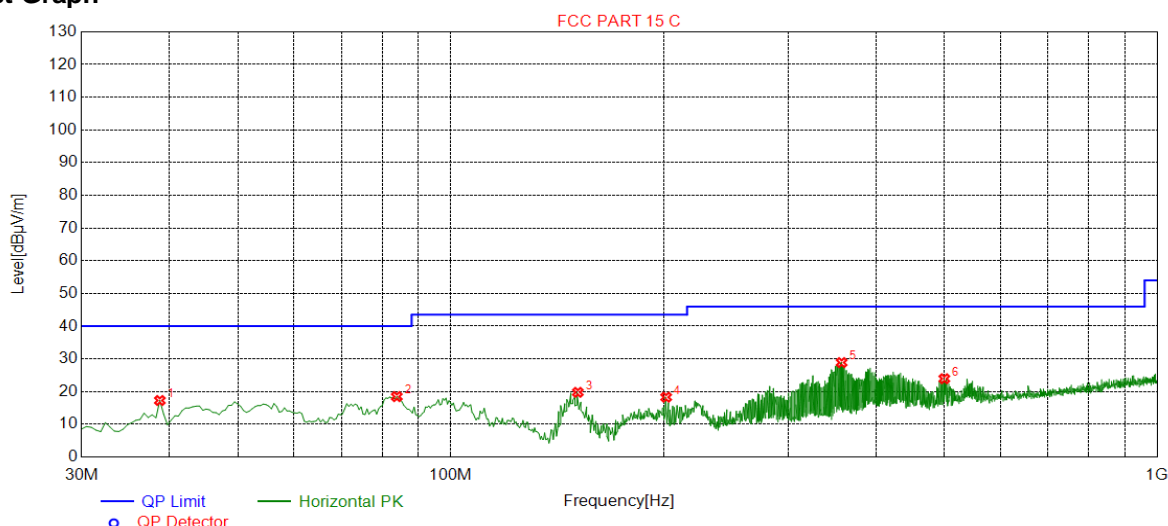


4.9.1 Radiated emission below 1GHz

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	150	83	Horizontal
2	83.8619	18.47	40.00	21.53	150	239	Horizontal
3	151.3107	19.78	43.50	23.72	150	89	Horizontal
4	201.7759	18.29	43.50	25.21	150	46	Horizontal
5	357.5388	28.88	46.00	17.12	150	130	Horizontal
6	499.7149	23.94	46.00	22.06	150	323	Horizontal

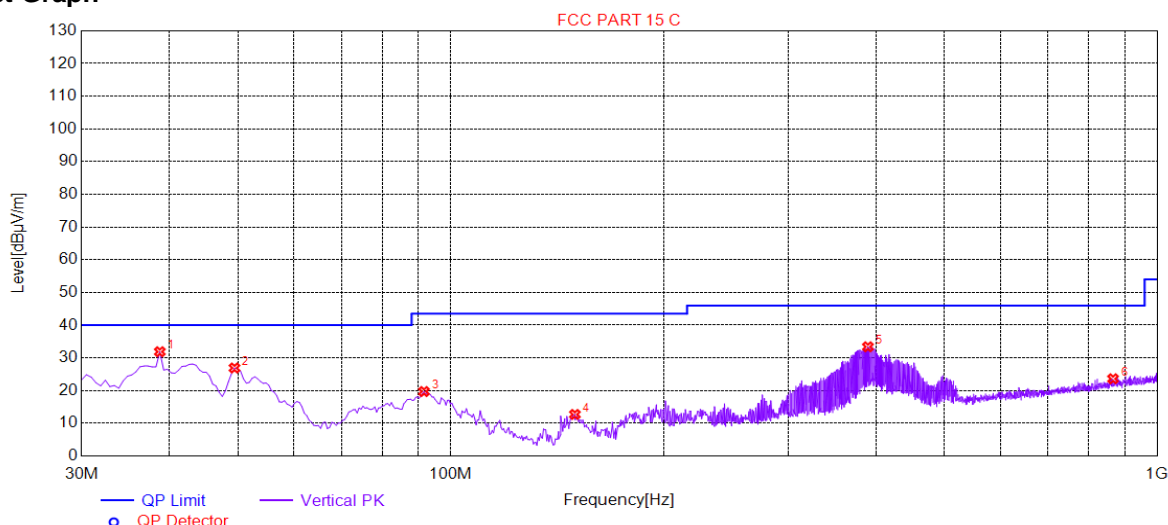
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Test Graph



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	150	289	Vertical
2	49.4097	26.92	40.00	13.08	150	25	Vertical
3	91.6258	19.72	43.50	23.78	150	80	Vertical
4	149.8549	12.72	43.50	30.78	150	330	Vertical
5	389.5648	33.40	46.00	12.60	150	118	Vertical
6	866.0730	23.62	46.00	22.38	150	327	Vertical

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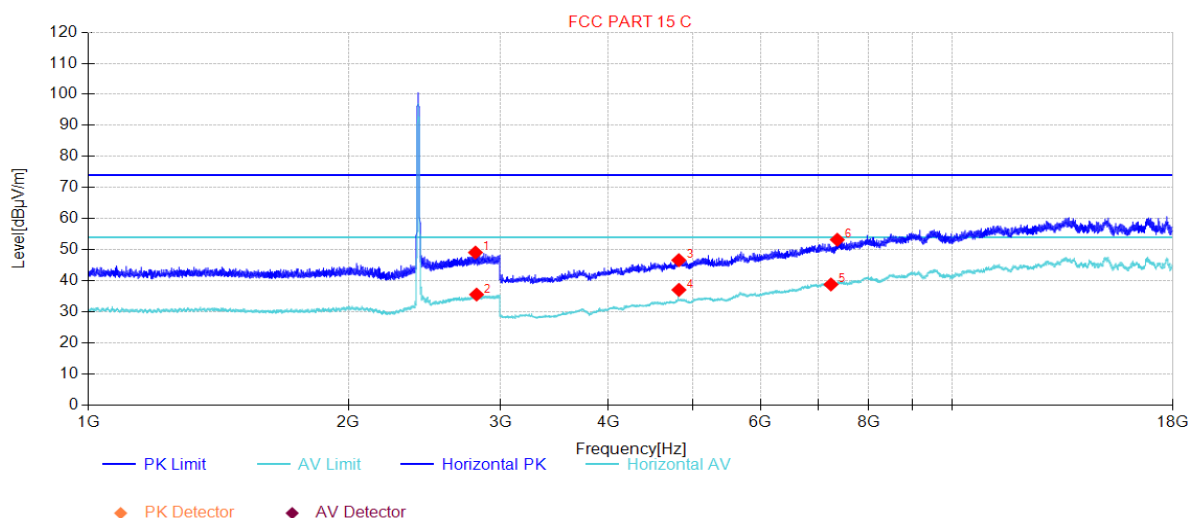
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4.10 Transmitter emission above 1GHz

4.10.1.1 802.11B_Channel 1

Test Graph



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2805.780	49.07	6.74	74.00	24.93	150	Horizontal
2	2814.181	35.53	6.76	54.00	18.47	150	Horizontal
3	4824.000	46.59	-10.56	74.00	27.41	150	Horizontal
4	4825.682	37.04	-10.55	54.00	16.96	150	Horizontal
5	7236.000	38.78	-2.59	54.00	15.22	150	Horizontal
6	7359.435	53.18	-2.24	74.00	20.82	150	Horizontal

Final Data List

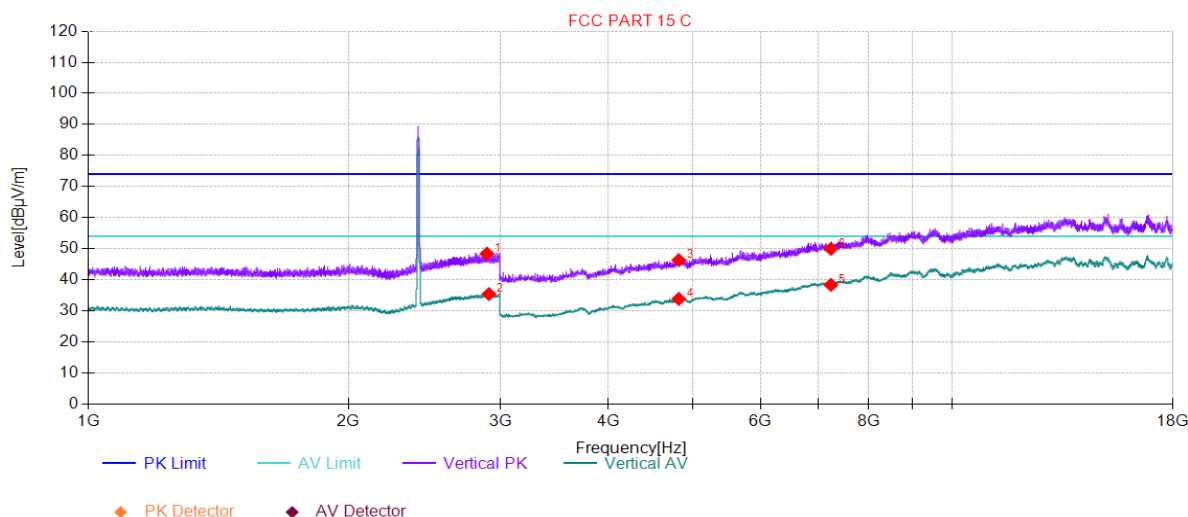


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4.10.1.2 802.11B_Channel 1

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	150	Vertical
2	2908.790	35.38	6.99	54.00	18.62	150	Vertical
3	4824.000	46.29	-10.56	74.00	27.71	150	Vertical
4	4824.000	33.79	-10.56	54.00	20.21	150	Vertical
5	7236.000	38.33	-2.59	54.00	15.67	150	Vertical
6	7236.000	49.94	-2.59	74.00	24.06	150	Vertical

Final Data List

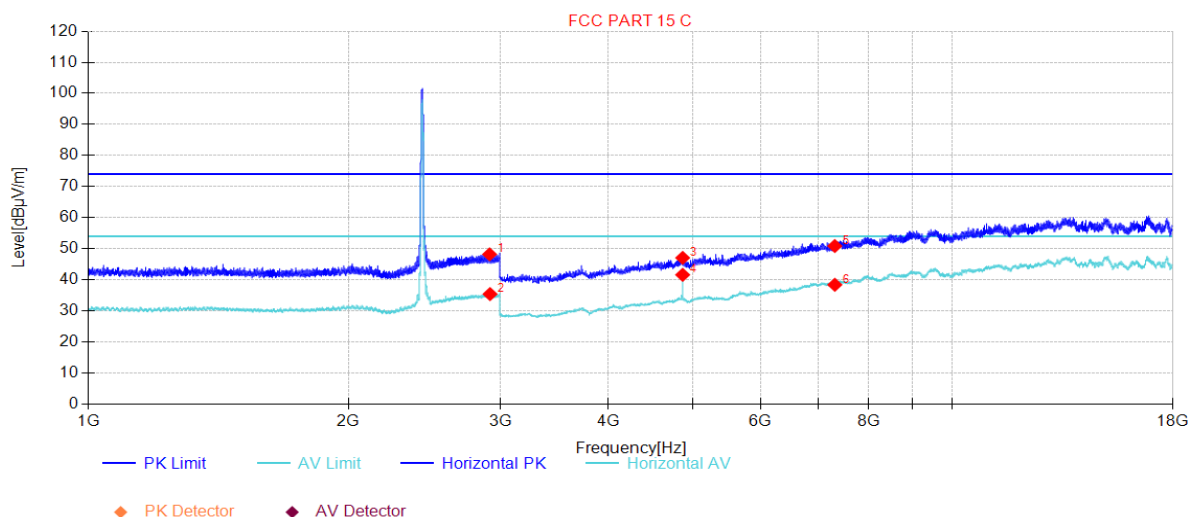


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4.10.1.3 802.11B_Channel 6

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	150	Horizontal
2	2916.791	35.36	7.03	54.00	18.64	150	Horizontal
3	4874.000	47.03	-10.40	74.00	26.97	150	Horizontal
4	4874.000	41.56	-10.40	54.00	12.44	150	Horizontal
5	7311.000	50.83	-2.57	74.00	23.17	150	Horizontal
6	7311.000	38.35	-2.57	54.00	15.65	150	Horizontal

Final Data List

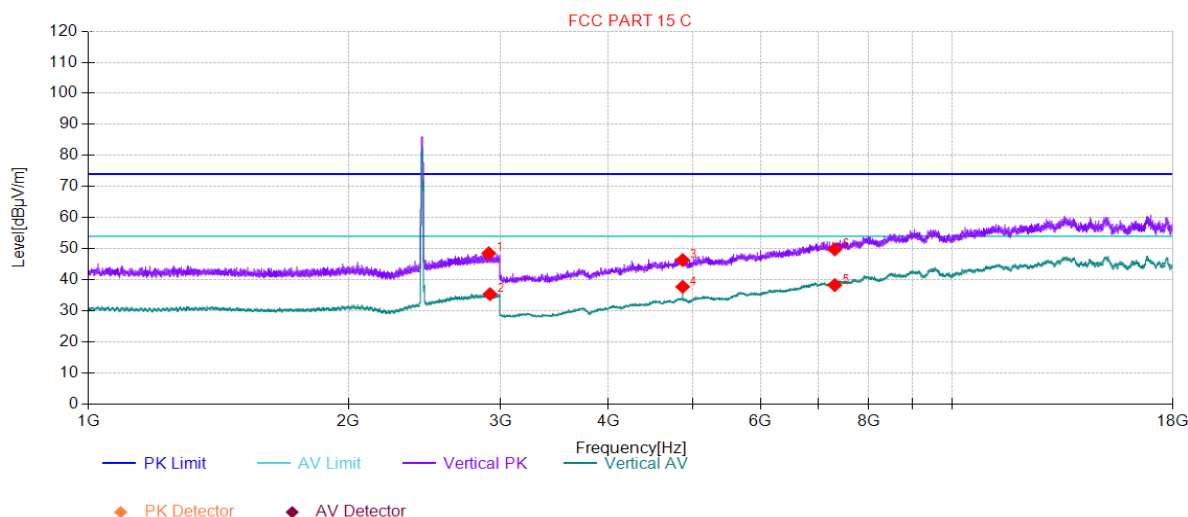


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4.10.1.4 802.11B_Channel 6

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	150	Vertical
2	2916.591	35.35	7.03	54.00	18.65	150	Vertical
3	4874.000	46.31	-10.40	74.00	27.69	150	Vertical
4	4874.000	37.71	-10.40	54.00	16.29	150	Vertical
5	7311.000	38.26	-2.57	54.00	15.74	150	Vertical
6	7311.000	49.79	-2.57	74.00	24.21	150	Vertical

Final Data List



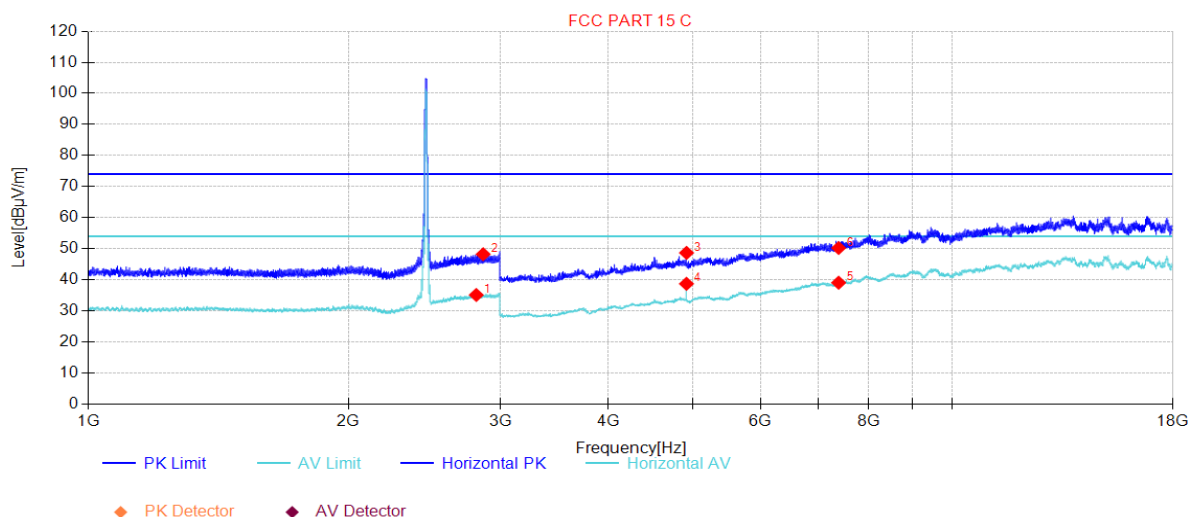
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4.10.1.5 802.11B_Channel 11

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	150	Horizontal
2	2863.986	48.20	6.87	74.00	25.80	150	Horizontal
3	4924.000	48.64	-10.22	74.00	25.36	150	Horizontal
4	4924.000	38.67	-10.22	54.00	15.33	150	Horizontal
5	7386.000	39.02	-2.06	54.00	14.98	150	Horizontal
6	7386.000	50.21	-2.06	74.00	23.79	150	Horizontal

Final Data List



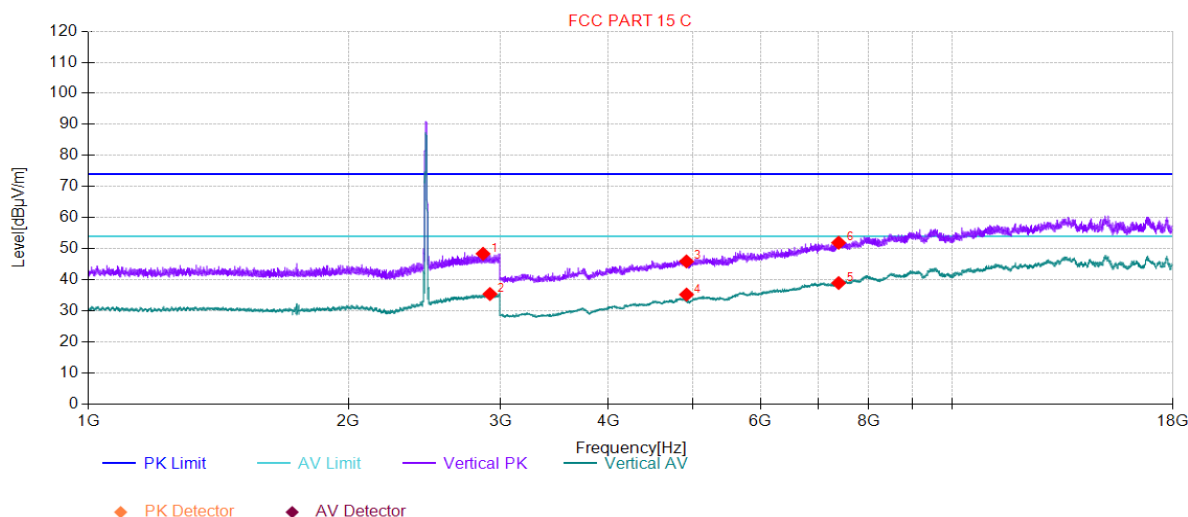
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4.10.1.6 802.11B_Channel 11

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	150	Vertical
2	2916.591	35.38	7.03	54.00	18.62	150	Vertical
3	4924.000	45.88	-10.22	74.00	28.12	150	Vertical
4	4924.000	35.21	-10.22	54.00	18.79	150	Vertical
5	7386.000	38.93	-2.06	54.00	15.07	150	Vertical
6	7386.000	51.90	-2.06	74.00	22.10	150	Vertical

Final Data List



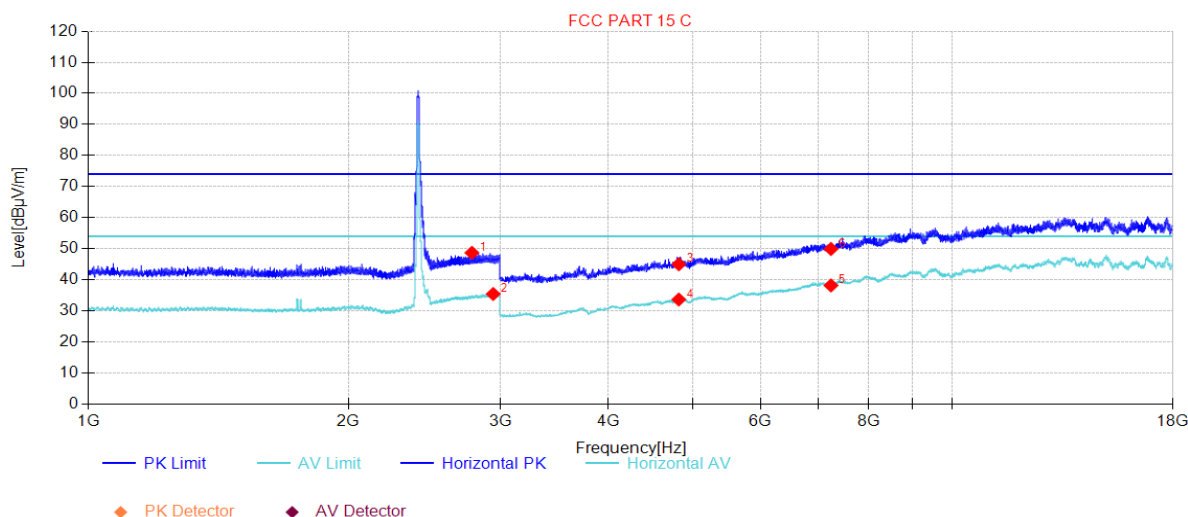
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4.10.1.7 802.11G_Channel 1

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	150	Horizontal
2	2941.594	35.39	7.14	54.00	18.61	150	Horizontal
3	4824.000	44.96	-10.56	74.00	29.04	150	Horizontal
4	4824.000	33.61	-10.56	54.00	20.39	150	Horizontal
5	7236.000	38.14	-2.59	54.00	15.86	150	Horizontal
6	7236.000	49.89	-2.59	74.00	24.11	150	Horizontal

Final Data List



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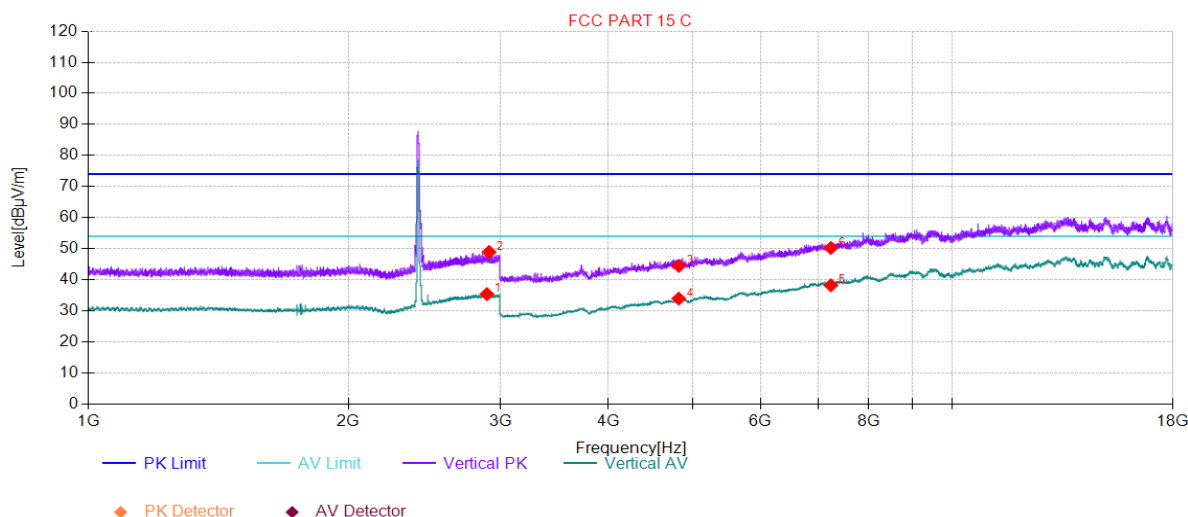
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4.10.1.8 802.11G_Channel 1

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	150	Vertical
2	2909.591	48.91	6.99	74.00	25.09	150	Vertical
3	4824.000	44.44	-10.56	74.00	29.56	150	Vertical
4	4824.000	33.90	-10.56	54.00	20.10	150	Vertical
5	7236.000	38.19	-2.59	54.00	15.81	150	Vertical
6	7236.000	50.21	-2.59	74.00	23.79	150	Vertical

Final Data List



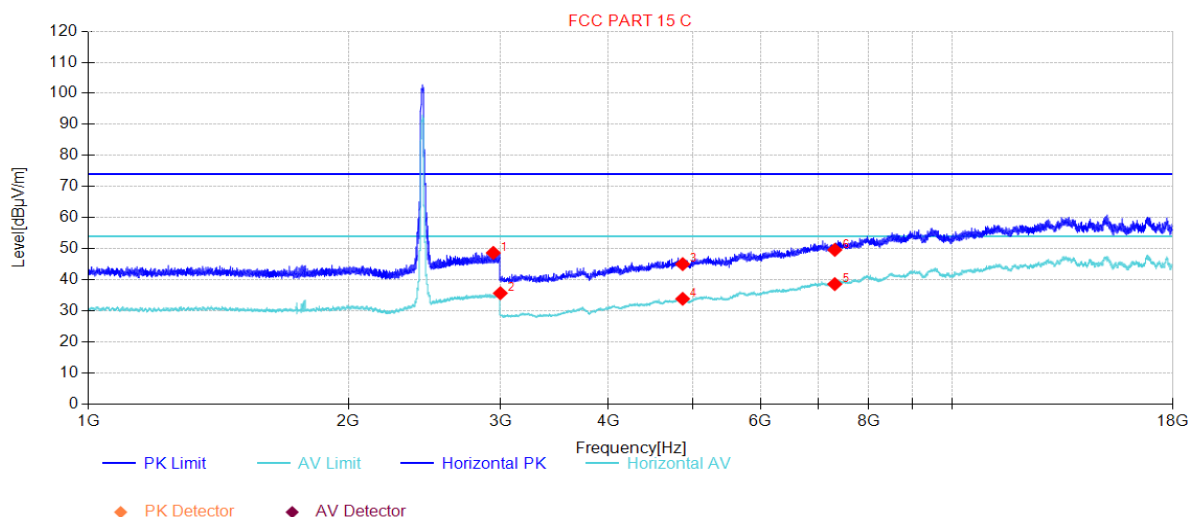
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4.10.1.9 802.11G_Channel 6

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	150	Horizontal
2	2997.999	35.65	7.40	54.00	18.35	150	Horizontal
3	4874.000	45.01	-10.40	74.00	28.99	150	Horizontal
4	4874.000	33.84	-10.40	54.00	20.16	150	Horizontal
5	7311.000	38.57	-2.57	54.00	15.43	150	Horizontal
6	7311.000	49.60	-2.57	74.00	24.40	150	Horizontal

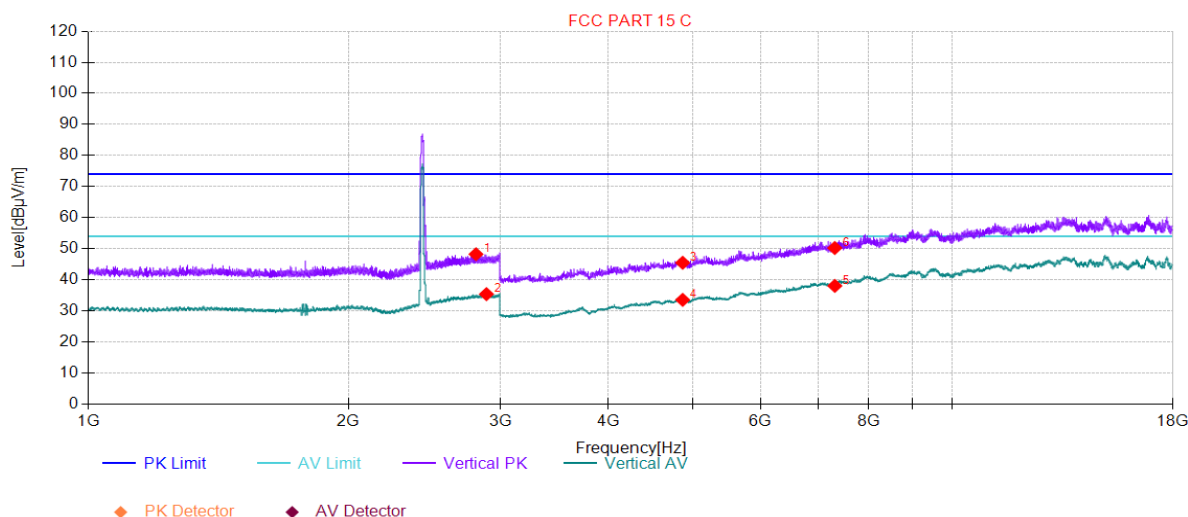
Final Data List





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	150	Vertical
2	2888.788	35.34	6.93	54.00	18.66	150	Vertical
3	4874.000	45.45	-10.40	74.00	28.55	150	Vertical
4	4874.000	33.50	-10.40	54.00	20.50	150	Vertical
5	7311.000	38.01	-2.57	54.00	15.99	150	Vertical
6	7311.000	50.20	-2.57	74.00	23.80	150	Vertical

Final Data List



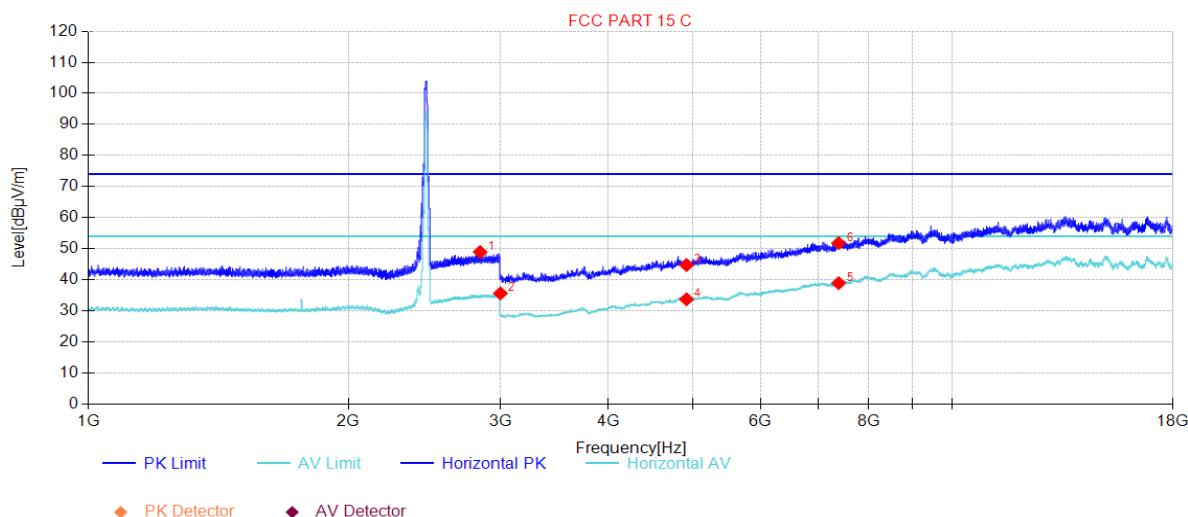
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4.10.1.11 802.11G_Channel 11

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	150	Horizontal
2	2998.599	35.59	7.40	54.00	18.41	150	Horizontal
3	4924.000	44.71	-10.22	74.00	29.29	150	Horizontal
4	4924.000	33.69	-10.22	54.00	20.31	150	Horizontal
5	7386.000	38.89	-2.06	54.00	15.11	150	Horizontal
6	7386.000	51.77	-2.06	74.00	22.23	150	Horizontal

Final Data List



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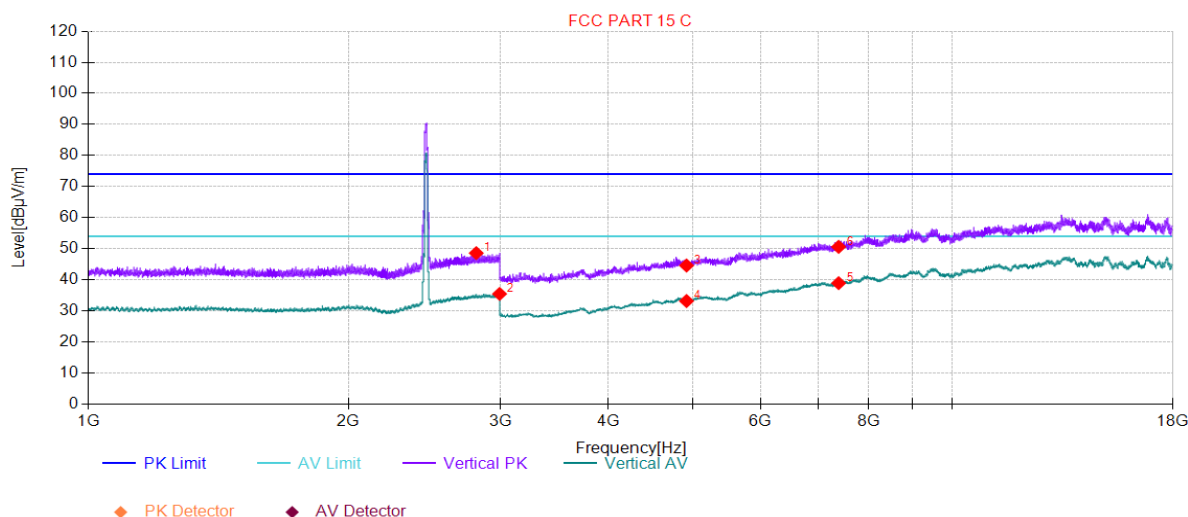
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4.10.1.12 802.11G_Channel 11

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	150	Vertical
2	2992.199	35.41	7.37	54.00	18.59	150	Vertical
3	4924.000	44.56	-10.22	74.00	29.44	150	Vertical
4	4924.000	33.12	-10.22	54.00	20.88	150	Vertical
5	7386.000	38.88	-2.06	54.00	15.12	150	Vertical
6	7386.000	50.57	-2.06	74.00	23.43	150	Vertical

Final Data List



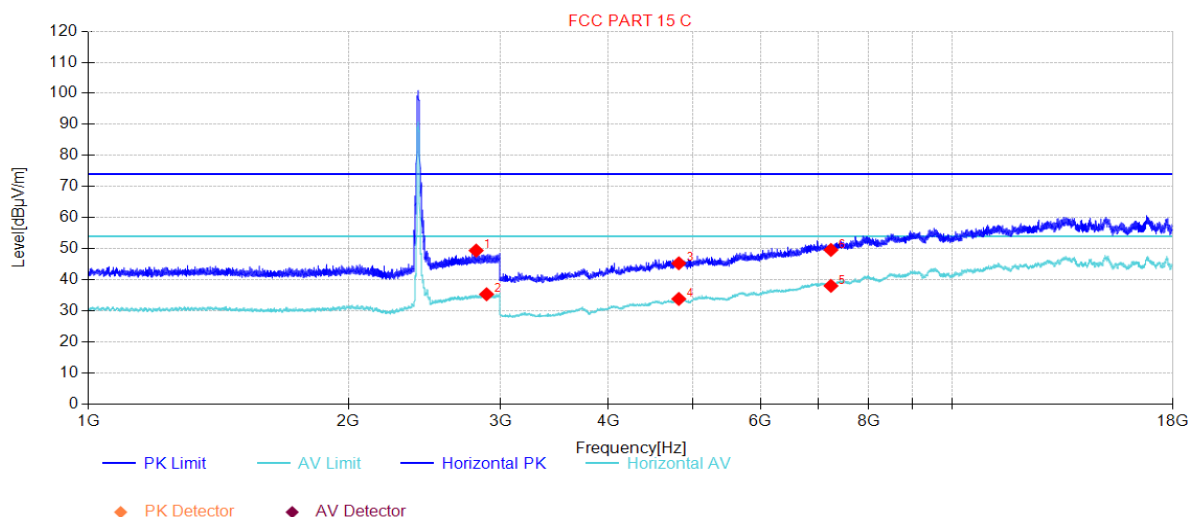
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4.10.1.13 802.11N20_Channel 1

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	150	Horizontal
2	2889.789	35.30	6.93	54.00	18.70	150	Horizontal
3	4824.000	45.28	-10.56	74.00	28.72	150	Horizontal
4	4824.000	33.79	-10.56	54.00	20.21	150	Horizontal
5	7236.000	38.02	-2.59	54.00	15.98	150	Horizontal
6	7236.000	49.59	-2.59	74.00	24.41	150	Horizontal

Final Data List



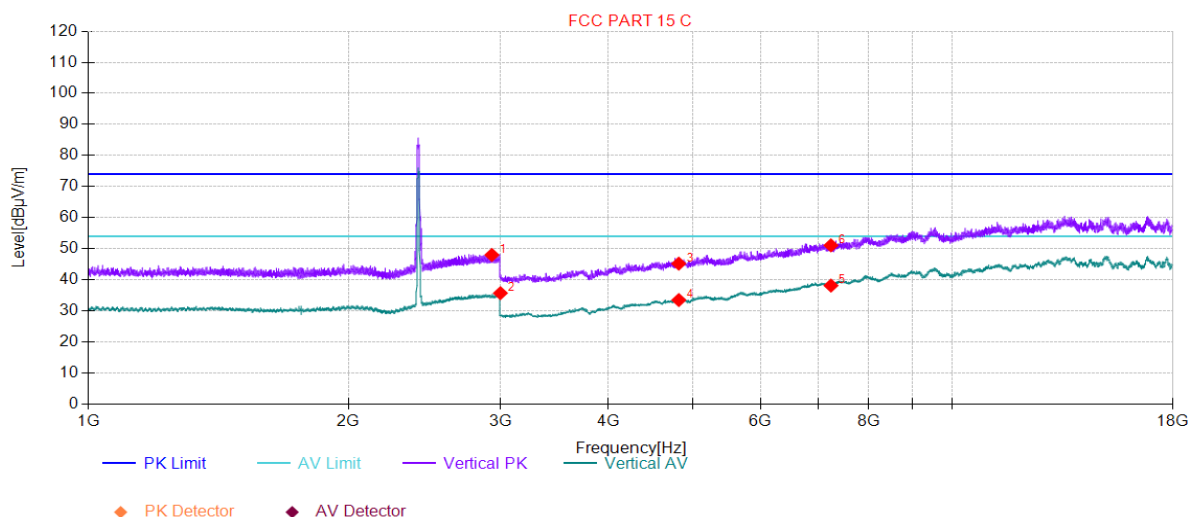
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4.10.1.14 802.11N20_Channel 1

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	150	Vertical
2	2998.599	35.67	7.40	54.00	18.33	150	Vertical
3	4824.000	45.17	-10.56	74.00	28.83	150	Vertical
4	4824.000	33.44	-10.56	54.00	20.56	150	Vertical
5	7236.000	38.10	-2.59	54.00	15.90	150	Vertical
6	7236.000	51.05	-2.59	74.00	22.95	150	Vertical

Final Data List



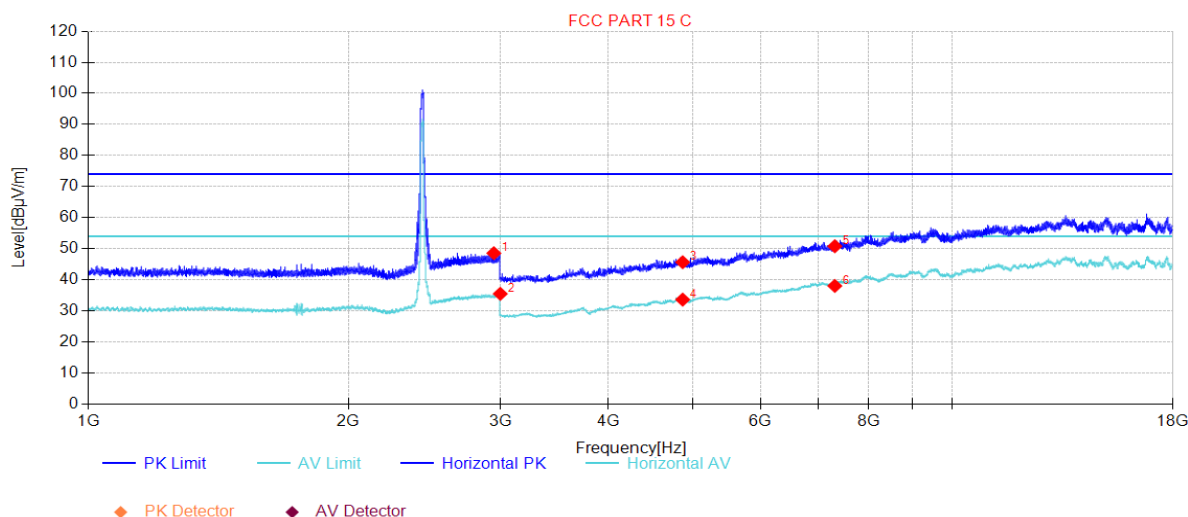
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4.10.1.15 802.11N20_Channel 6

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	150	Horizontal
2	2997.599	35.45	7.40	54.00	18.55	150	Horizontal
3	4874.000	45.62	-10.40	74.00	28.38	150	Horizontal
4	4874.000	33.58	-10.40	54.00	20.42	150	Horizontal
5	7311.000	50.77	-2.57	74.00	23.23	150	Horizontal
6	7311.000	37.99	-2.57	54.00	16.01	150	Horizontal

Final Data List



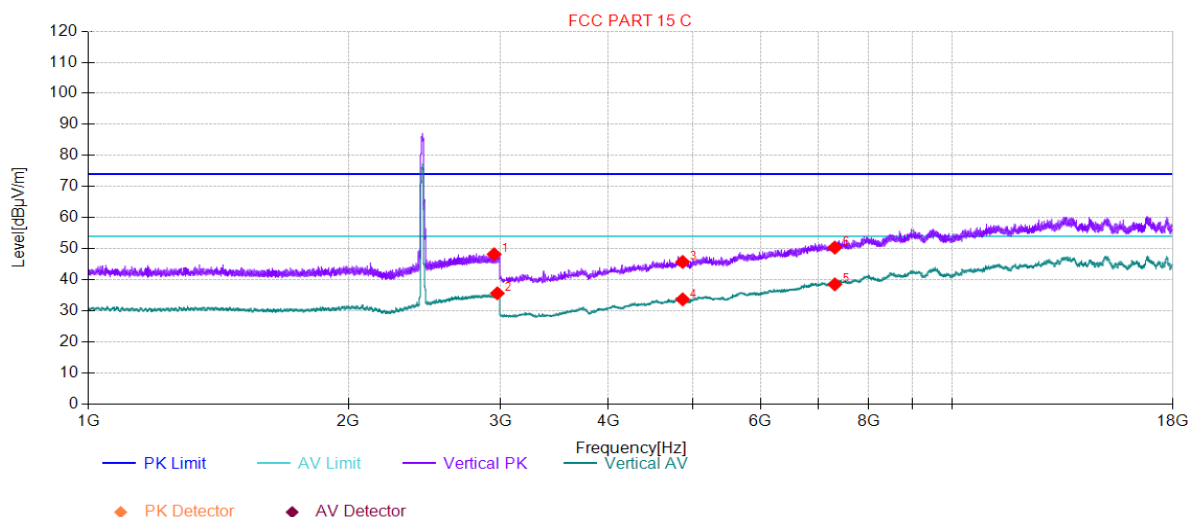
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4.10.1.16 802.11N20_Channel 6

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	150	Vertical
2	2974.197	35.60	7.29	54.00	18.40	150	Vertical
3	4874.000	45.72	-10.40	74.00	28.28	150	Vertical
4	4874.000	33.65	-10.40	54.00	20.35	150	Vertical
5	7311.000	38.49	-2.57	54.00	15.51	150	Vertical
6	7311.000	50.33	-2.57	74.00	23.67	150	Vertical

Final Data List



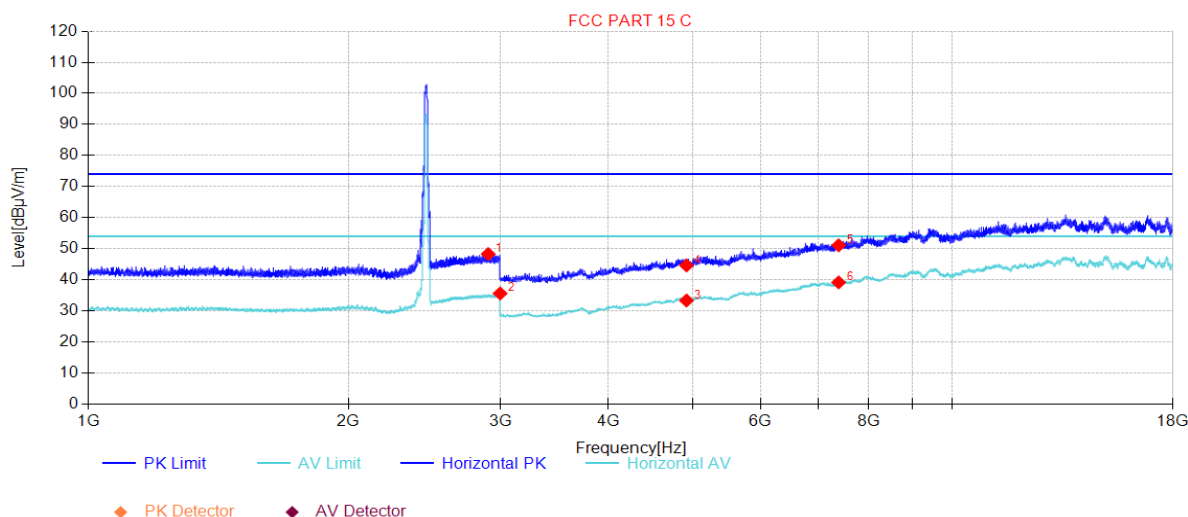
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4.10.1.17 802.11N20_Channel 11

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	150	Horizontal
2	2996.599	35.56	7.39	54.00	18.44	150	Horizontal
3	4924.000	33.30	-10.22	54.00	20.70	150	Horizontal
4	4924.000	44.59	-10.22	74.00	29.41	150	Horizontal
5	7386.000	51.06	-2.06	74.00	22.94	150	Horizontal
6	7386.000	39.11	-2.06	54.00	14.89	150	Horizontal

Final Data List

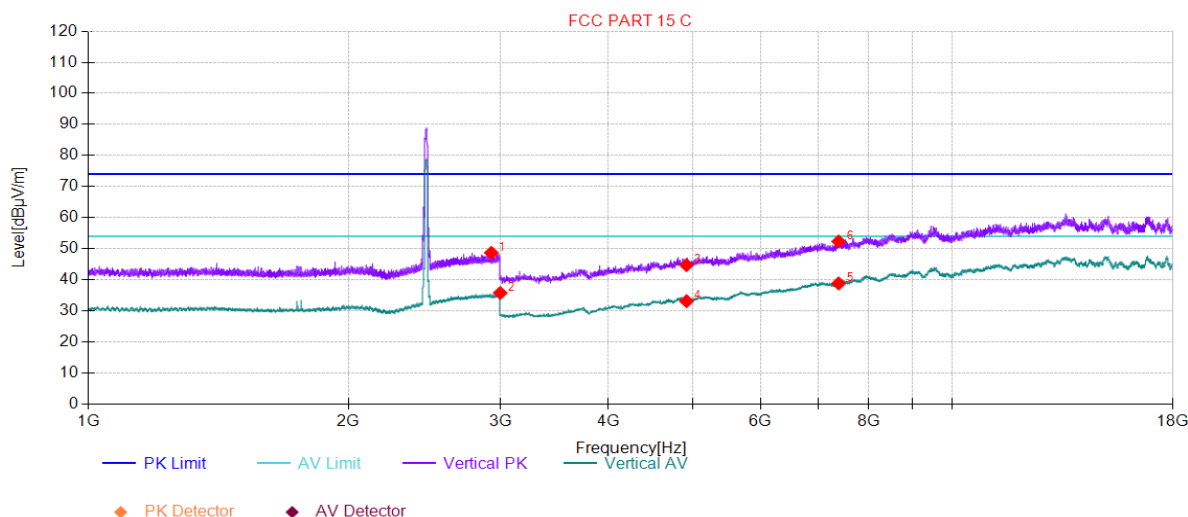


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4.10.1.18 802.11N20_Channel 11

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	150	Vertical
2	2997.399	35.73	7.40	54.00	18.27	150	Vertical
3	4924.000	44.69	-10.22	74.00	29.31	150	Vertical
4	4924.000	33.09	-10.22	54.00	20.91	150	Vertical
5	7386.000	38.79	-2.06	54.00	15.21	150	Vertical
6	7386.000	52.32	-2.06	74.00	21.68	150	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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4.11 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:			

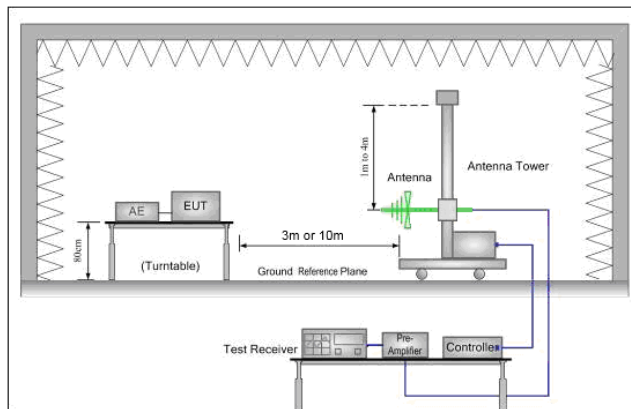


Figure 1. 30MHz to 1GHz

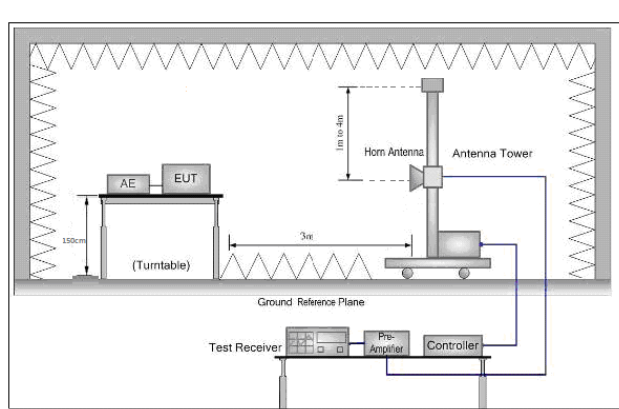


Figure 2. Above 1 GHz



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:	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>Only the worst case is recorded in the report.</p>
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

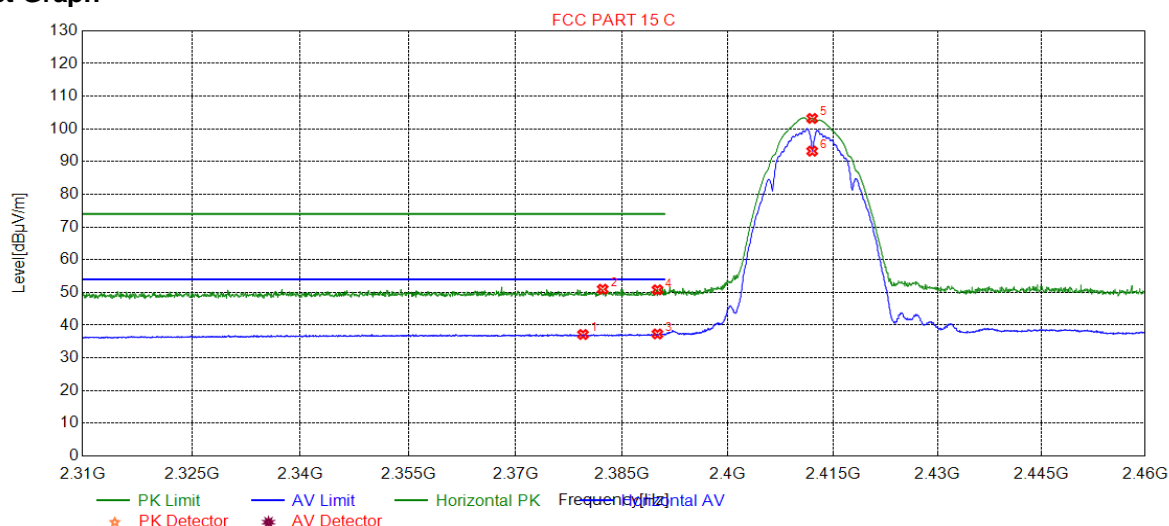




Test plot as follows:

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	150	322	Horizontal
2	2382.261	51.01	74.00	22.99	150	305	Horizontal
3	2390.000	37.32	54.00	16.68	150	14	Horizontal
4	2390.000	50.82	74.00	23.18	150	68	Horizontal
5	2412.000	103.22	0.00	-103.22	150	52	Horizontal
6	2412.000	93.21	0.00	-93.21	150	14	Horizontal

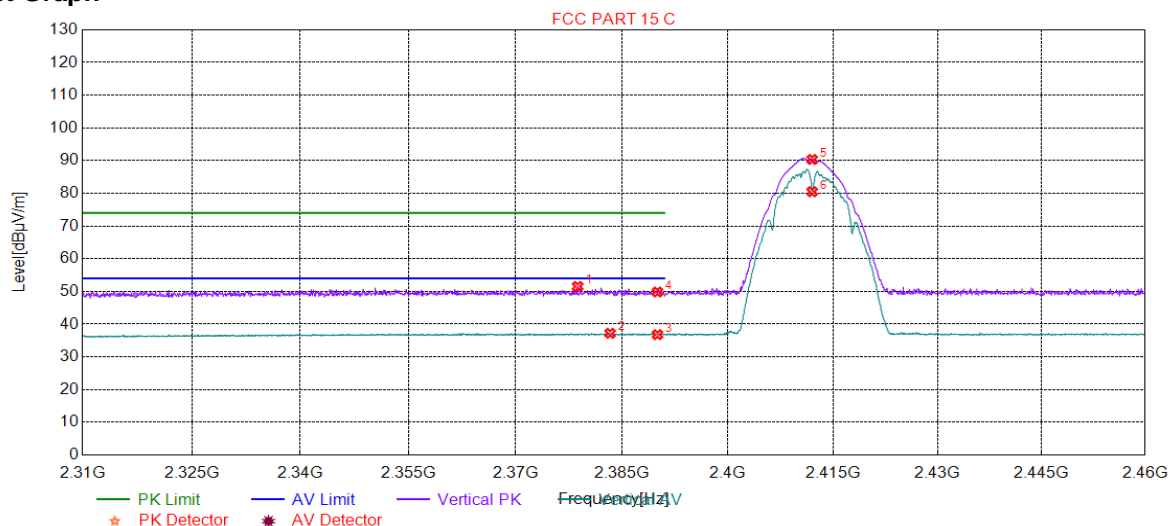
Final Data List





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	150	44	Vertical
2	2383.311	37.21	54.00	16.79	150	232	Vertical
3	2390.000	36.81	54.00	17.19	150	5	Vertical
4	2390.000	49.85	74.00	24.15	150	171	Vertical
5	2412.000	90.37	0.00	-90.37	150	149	Vertical
6	2412.000	80.50	0.00	-80.50	150	149	Vertical

Final Data List



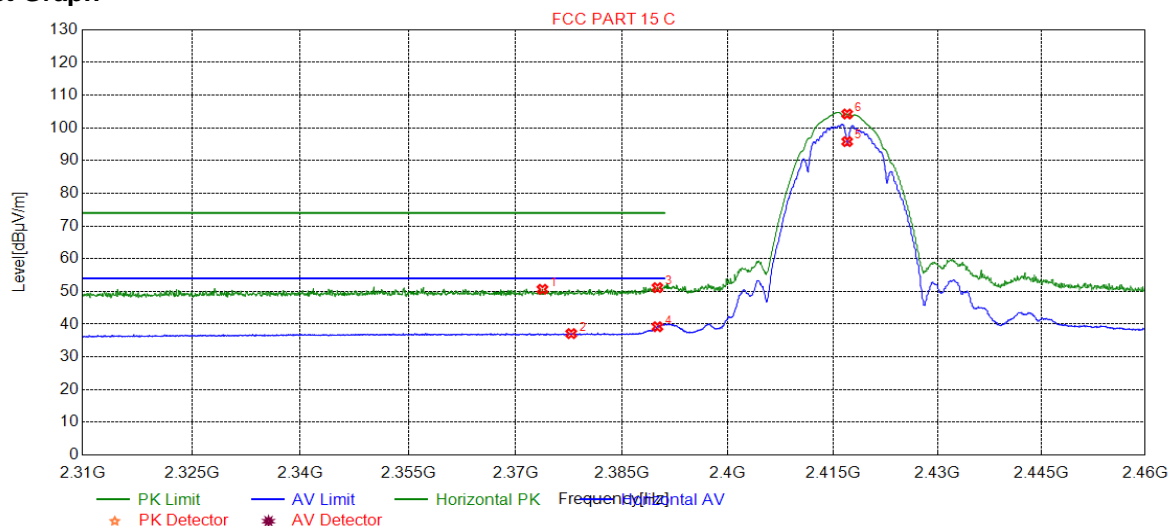
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4.11.1.3 802.11B_Channel 2

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	150	179	Horizontal
2	2377.833	37.12	54.00	16.88	150	52	Horizontal
3	2390.000	51.18	74.00	22.82	150	14	Horizontal
4	2390.000	39.22	54.00	14.78	150	14	Horizontal
5	2417.000	95.82	0.00	-95.82	150	14	Horizontal
6	2417.000	104.26	0.00	-104.26	150	14	Horizontal

Final Data List



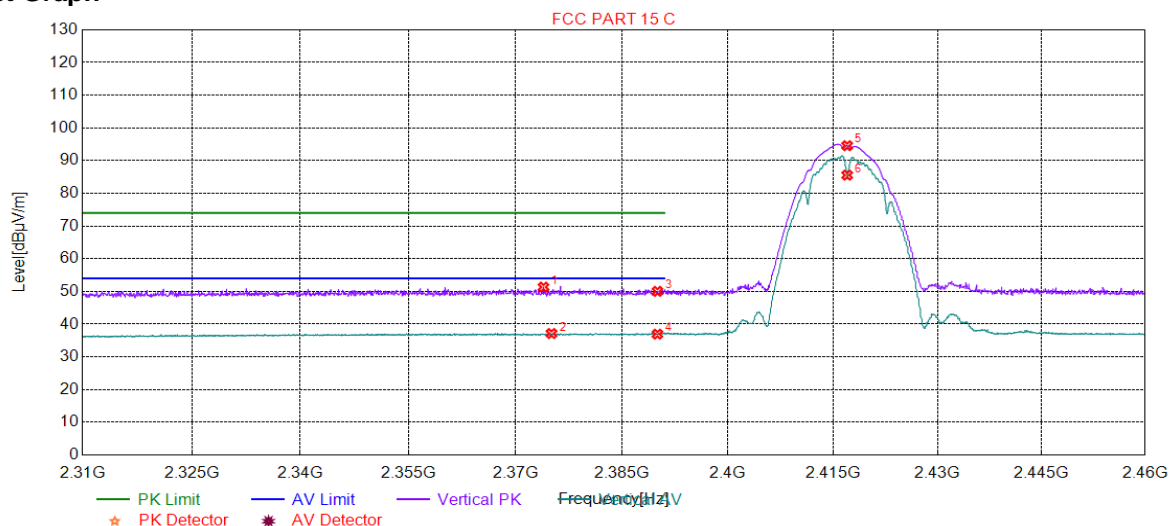
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4.11.1.4 802.11B_Channel 2

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	150	27	Vertical
2	2375.057	37.15	54.00	16.85	150	281	Vertical
3	2390.000	50.05	74.00	23.95	150	116	Vertical
4	2390.000	36.96	54.00	17.04	150	281	Vertical
5	2417.000	94.57	0.00	-94.57	150	232	Vertical
6	2417.000	85.57	0.00	-85.57	150	232	Vertical

Final Data List



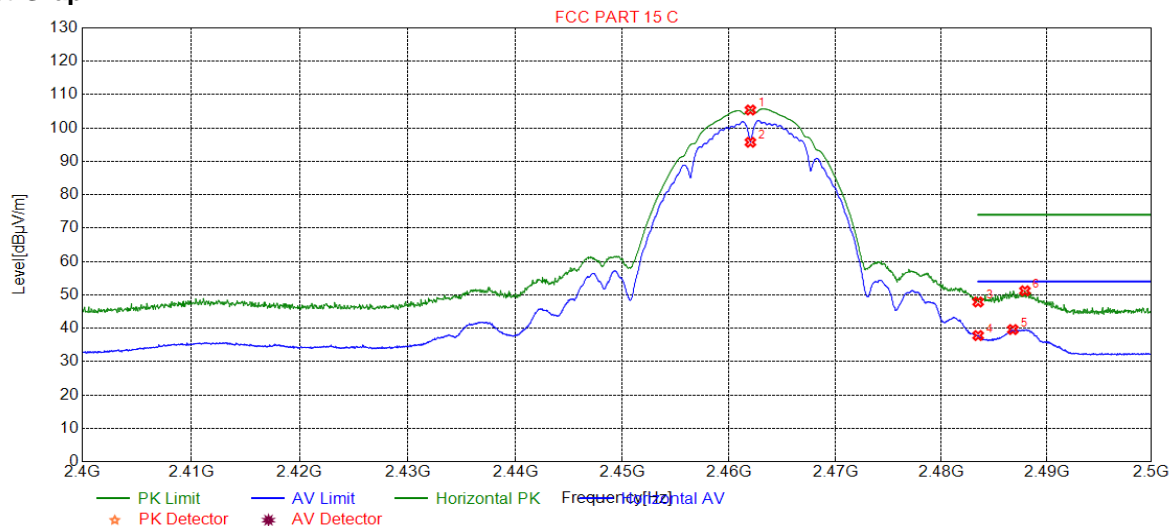
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4.11.1.5 802.11B_Channel 11

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	150	14	Horizontal
2	2462.000	95.72	0.00	-95.72	150	74	Horizontal
3	2483.500	47.88	74.00	26.12	150	344	Horizontal
4	2483.500	37.83	54.00	16.17	150	355	Horizontal
5	2486.793	39.62	54.00	14.38	150	14	Horizontal
6	2487.944	51.23	74.00	22.77	150	359	Horizontal

Final Data List



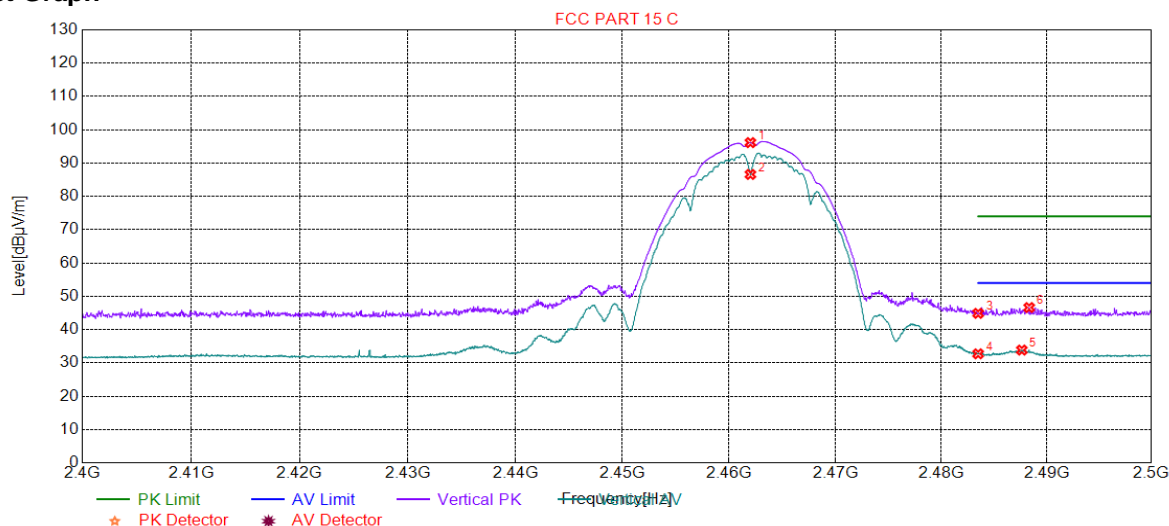
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4.11.1.6 802.11B_Channel 11

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	150	208	Vertical
2	2462.000	86.59	0.00	-86.59	150	208	Vertical
3	2483.500	44.90	74.00	29.10	150	158	Vertical
4	2483.500	32.76	54.00	21.24	150	208	Vertical
5	2487.643	33.89	54.00	20.11	150	202	Vertical
6	2488.344	46.65	74.00	27.35	150	69	Vertical

Final Data List



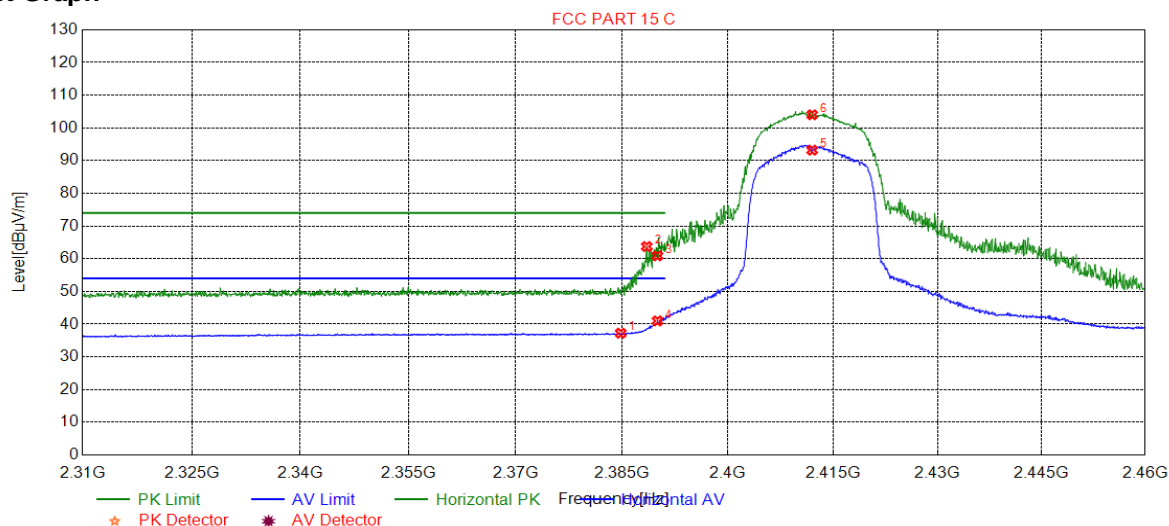
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4.11.1.7 802.11G_Channel 1

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	150	102	Horizontal
2	2388.489	63.74	74.00	10.26	150	35	Horizontal
3	2390.000	60.90	74.00	13.10	150	24	Horizontal
4	2390.000	41.01	54.00	12.99	150	30	Horizontal
5	2412.000	93.21	0.00	-93.21	150	41	Horizontal
6	2412.000	104.02	0.00	-104.02	150	19	Horizontal

Final Data List



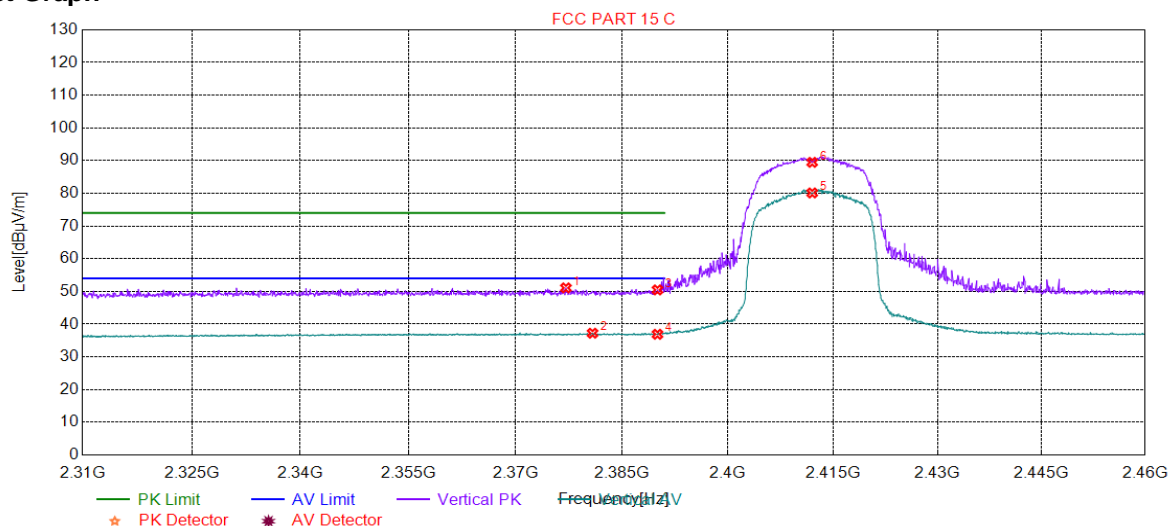
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4.11.1.8 802.11G_Channel 1

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	150	3	Vertical
2	2380.835	37.25	54.00	16.75	150	20	Vertical
3	2390.000	50.49	74.00	23.51	150	232	Vertical
4	2390.000	36.92	54.00	17.08	150	109	Vertical
5	2412.000	80.13	0.00	-80.13	150	232	Vertical
6	2412.000	89.48	0.00	-89.48	150	232	Vertical

Final Data List



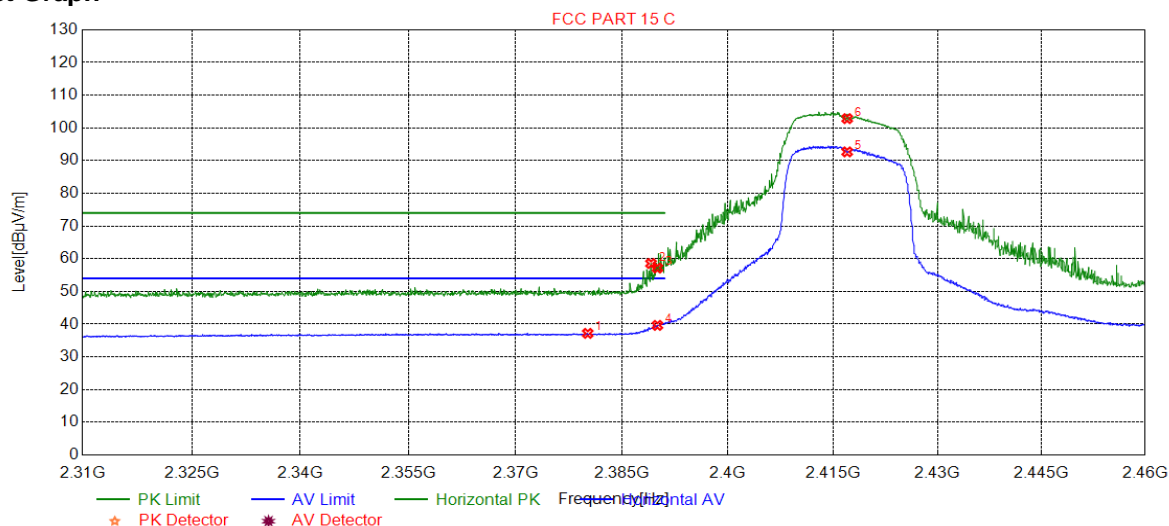
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4.11.1.9 802.11G_Channel 2

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	150	14	Horizontal
2	2389.089	58.56	74.00	15.44	150	56	Horizontal
3	2390.000	57.17	74.00	16.83	150	333	Horizontal
4	2390.000	39.64	54.00	14.36	150	34	Horizontal
5	2417.000	92.68	0.00	-92.68	150	29	Horizontal
6	2417.000	102.85	0.00	-102.85	150	29	Horizontal

Final Data List

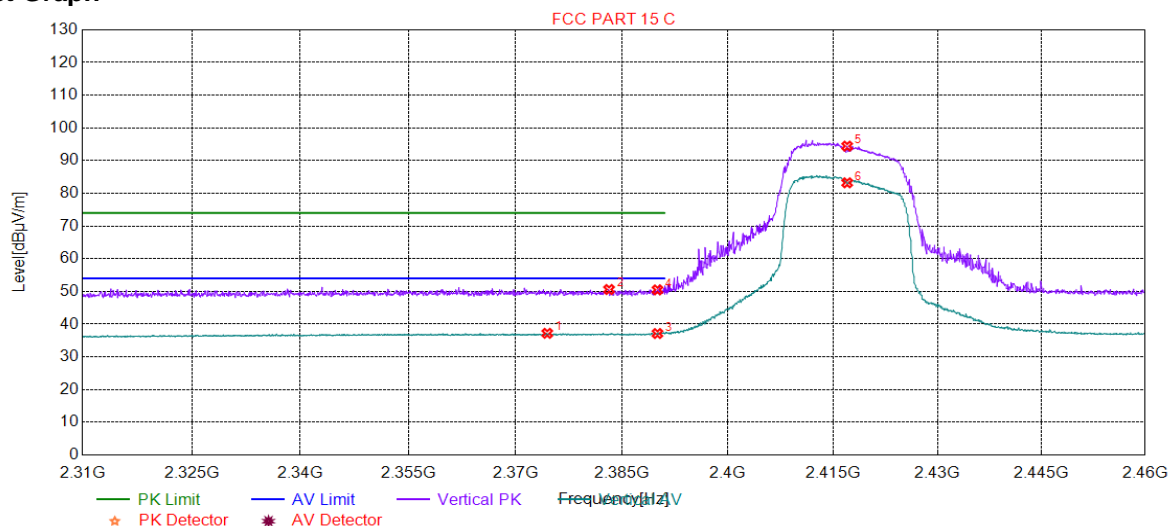


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4.11.1.10 802.11G_Channel 2

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	150	208	Vertical
2	2383.161	50.61	74.00	23.39	150	275	Vertical
3	2390.000	37.15	54.00	16.85	150	142	Vertical
4	2390.000	50.50	74.00	23.50	150	142	Vertical
5	2417.000	94.44	0.00	-94.44	150	126	Vertical
6	2417.000	83.23	0.00	-83.23	150	148	Vertical

Final Data List



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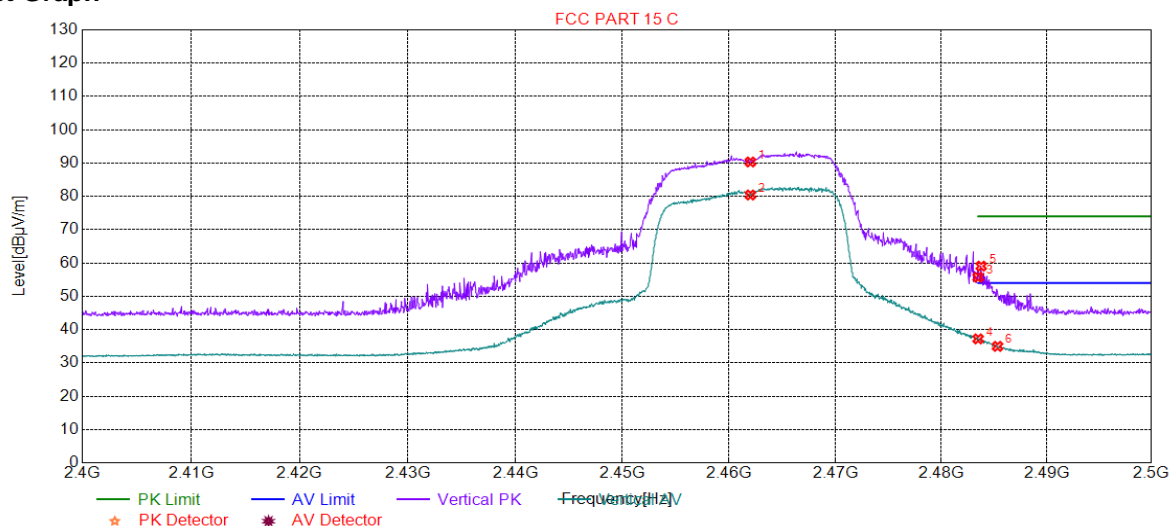
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4.11.1.11 802.11G_Channel 11

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	150	297	Vertical
2	2462.000	80.43	0.00	-80.43	150	286	Vertical
3	2483.500	55.74	74.00	18.26	150	286	Vertical
4	2483.500	37.24	54.00	16.76	150	286	Vertical
5	2483.791	59.08	74.00	14.92	150	286	Vertical
6	2485.342	35.00	54.00	19.00	150	290	Vertical

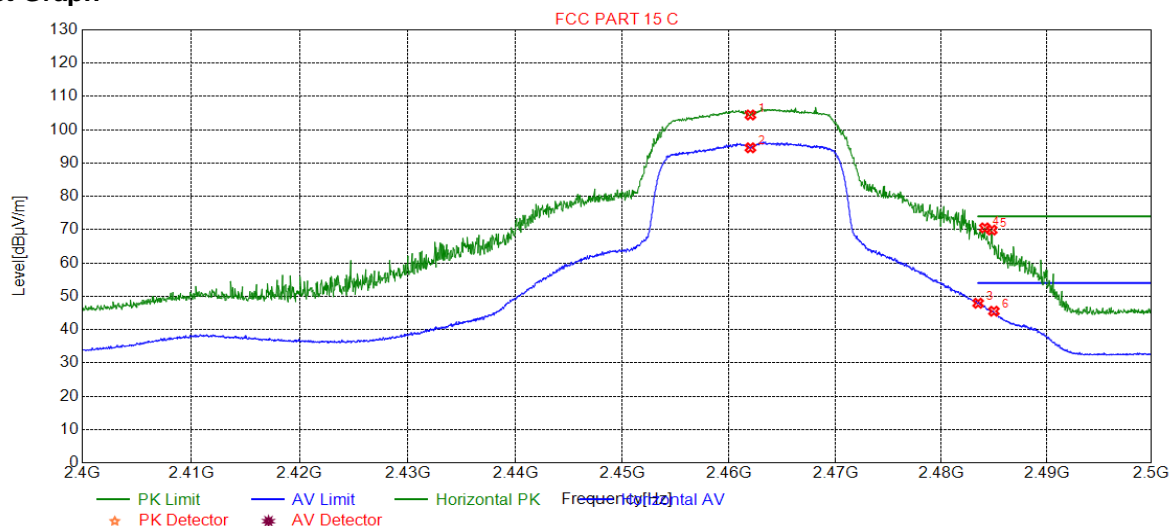
Final Data List





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	150	14	Horizontal
2	2462.000	94.59	0.00	-94.59	150	25	Horizontal
3	2483.500	47.94	54.00	6.06	150	29	Horizontal
4	2484.142	70.55	74.00	3.45	150	29	Horizontal
5	2484.792	69.90	74.00	4.10	150	36	Horizontal
6	2484.992	45.54	54.00	8.46	150	33	Horizontal

Final Data List



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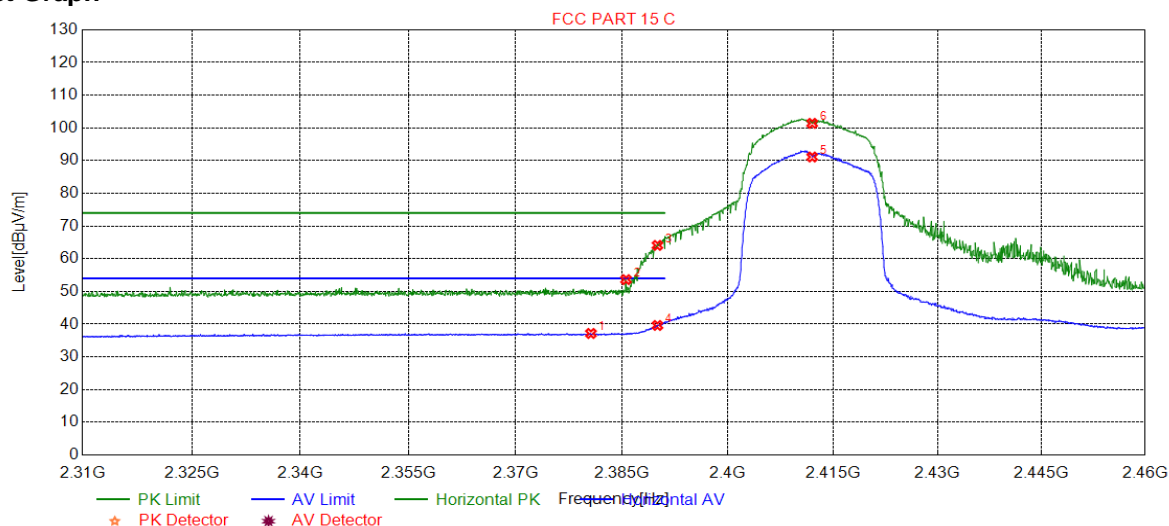
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4.11.1.13 802.11N20_Channel 1

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	150	248	Horizontal
2	2385.562	53.63	74.00	20.37	150	346	Horizontal
3	2390.000	64.10	74.00	9.90	150	23	Horizontal
4	2390.000	39.62	54.00	14.38	150	29	Horizontal
5	2412.000	91.12	0.00	-91.12	150	2	Horizontal
6	2412.000	101.41	0.00	-101.41	150	40	Horizontal

Final Data List

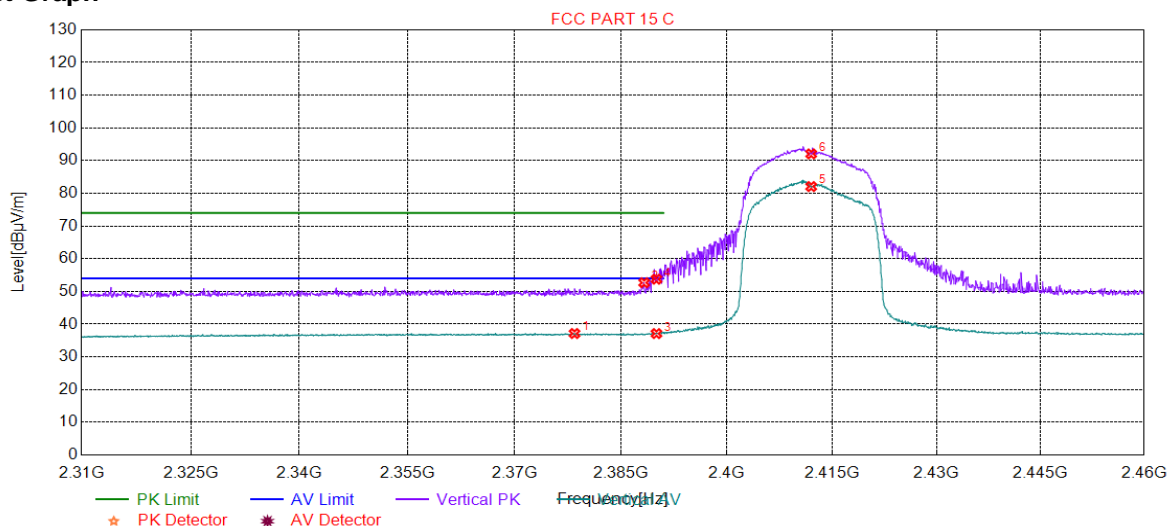


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4.11.1.14 802.11N20_Channel 1

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	150	311	Vertical
2	2388.264	52.69	74.00	21.31	150	151	Vertical
3	2390.000	37.13	54.00	16.87	150	244	Vertical
4	2390.000	53.75	74.00	20.25	150	146	Vertical
5	2412.000	82.08	0.00	-82.08	150	151	Vertical
6	2412.000	92.07	0.00	-92.07	150	151	Vertical

Final Data List



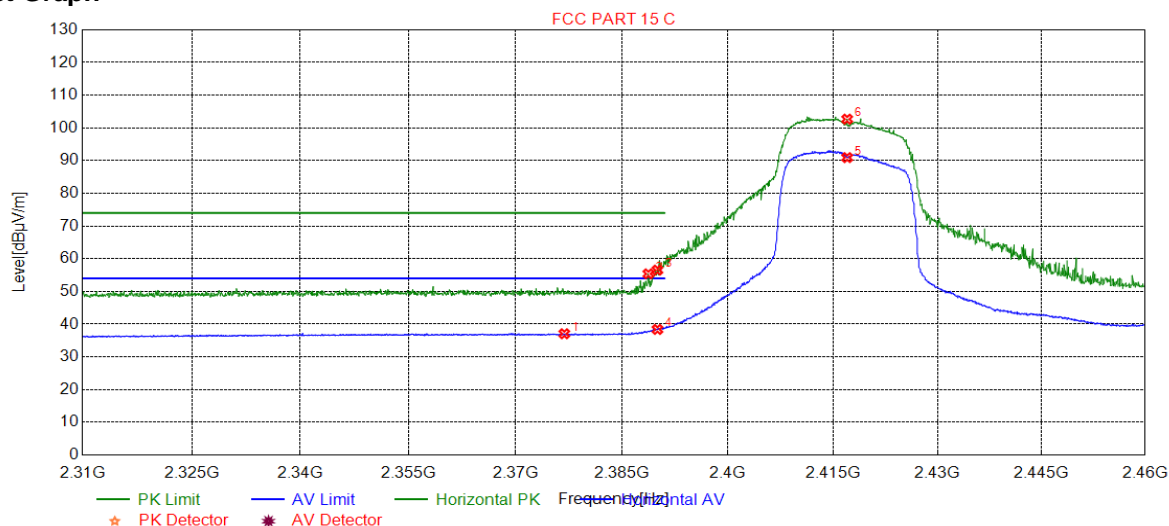
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4.11.1.15 802.11N20_Channel 2

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	150	336	Horizontal
2	2388.714	55.40	74.00	18.60	150	5	Horizontal
3	2390.000	56.54	74.00	17.46	150	50	Horizontal
4	2390.000	38.40	54.00	15.60	150	5	Horizontal
5	2417.000	90.93	0.00	-90.93	150	0	Horizontal
6	2417.000	102.69	0.00	-102.69	150	1	Horizontal

Final Data List



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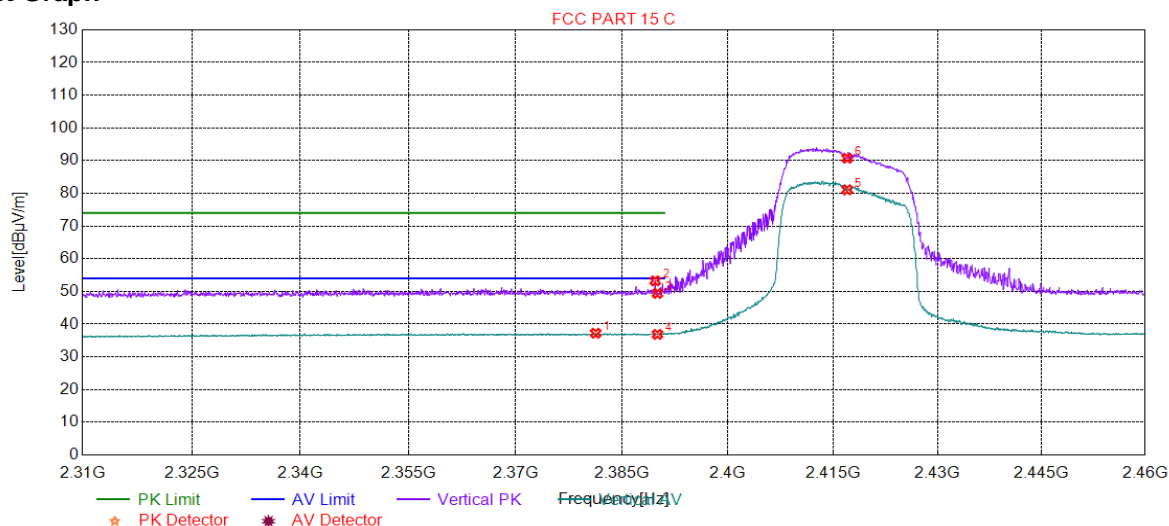
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4.11.1.16 802.11N20_Channel 2

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	150	290	Vertical
2	2389.689	53.25	74.00	20.75	150	152	Vertical
3	2390.000	49.42	74.00	24.58	150	14	Vertical
4	2390.000	36.89	54.00	17.11	150	74	Vertical
5	2417.000	81.09	0.00	-81.09	150	152	Vertical
6	2417.000	90.75	0.00	-90.75	150	152	Vertical

Final Data List

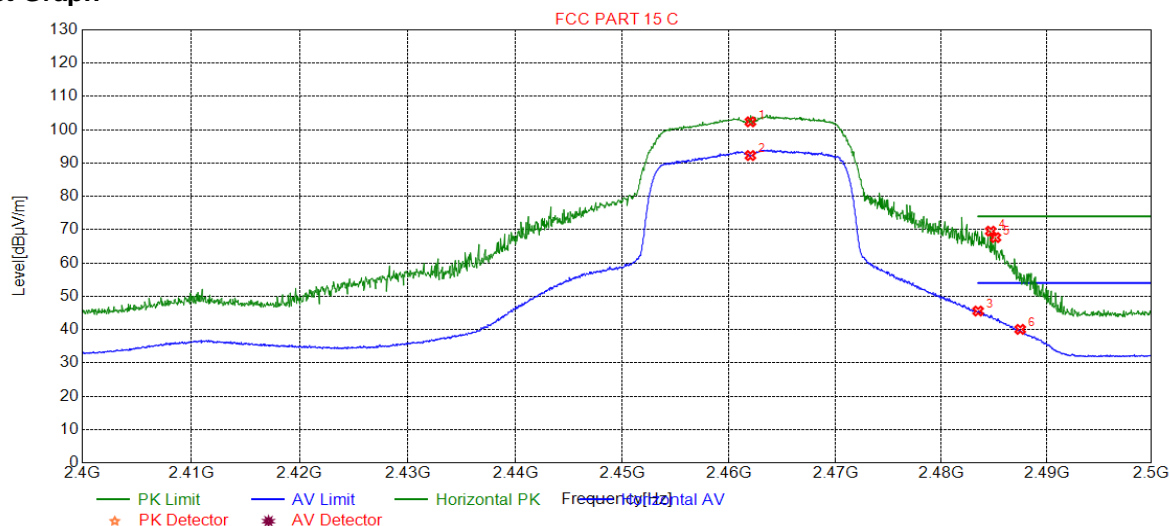


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4.11.1.17 802.11N20_Channel 11

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	150	15	Horizontal
2	2462.000	92.26	0.00	-92.26	150	26	Horizontal
3	2483.500	45.59	54.00	8.41	150	22	Horizontal
4	2484.692	69.57	74.00	4.43	150	30	Horizontal
5	2485.142	67.64	74.00	6.36	150	19	Horizontal
6	2487.493	40.09	54.00	13.91	150	26	Horizontal

Final Data List



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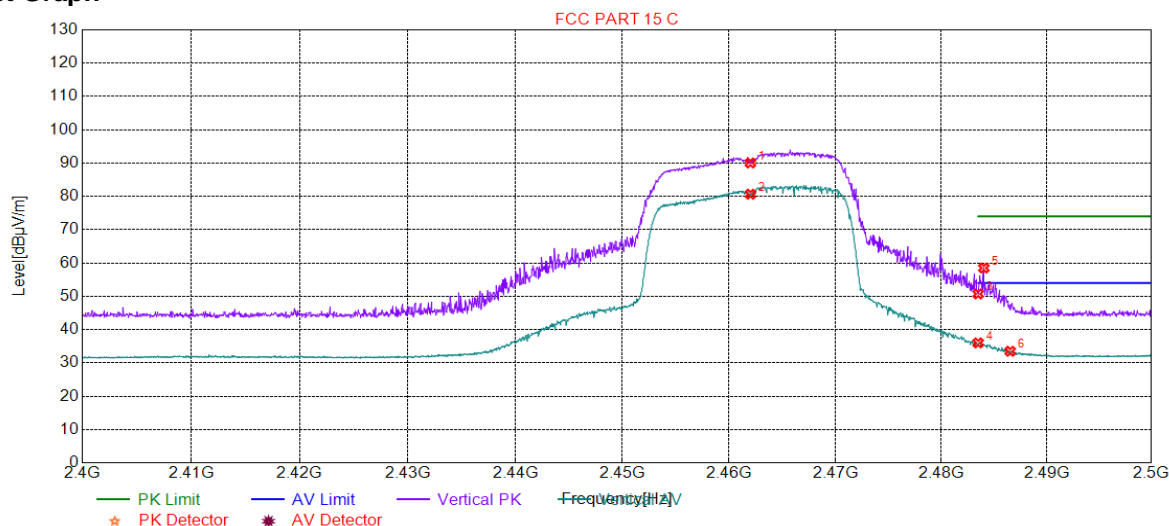
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4.11.1.18 802.11N20_Channel 11

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	150	145	Vertical
2	2462.000	80.67	0.00	-80.67	150	141	Vertical
3	2483.500	50.73	74.00	23.27	150	323	Vertical
4	2483.500	36.04	54.00	17.96	150	145	Vertical
5	2484.042	58.51	74.00	15.49	150	145	Vertical
6	2486.543	33.52	54.00	20.48	150	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.



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

Conducted Emission					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Duedate
				(yyyy-mm-dd)	(yyyy-mm-dd)
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2020/5/10	2023/5/9
LISN	Rohde & Schwarz	ENV216	SEM007-01	2020/7/14	2021/7/14
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2020/4/1	2021/3/31
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2020/6/12	2021/6/11
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2020/2/11	2021/2/10
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2020/3/2	2021/3/1
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	2020/1/3	2021/1/2
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



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RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018/3/13	2021/3/12
Measurement Software	AUDIX	e3V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020/6/12	2021/6/11
EXA Signal Analyzer (10Hz-26.5GHz)	Agilent Technologies Inc	N9010A	SEM004-09	2020/3/12	2021/3/11
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2020/6/27	2023/6/26
Horn Antenna (0.8-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018/4/13	2021/4/12
Pre-amplifier(0.1-1.3GHz)	HP	8447D	SEM005-02	2020/7/14	2021/7/14
Low Noise Amplifier(100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2020/9/3	2021/9/2
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2020/10/17	2023/10/16
Pre-amplifier(18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2020/3/2	2021/3/1
Band filter	N/A	N/A	SEM023-01	N/A	N/A

7 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for ZR/2020/B0030.

The End



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