



## FCC TEST REPORT

**Application No:** ZR/2019/A0003  
**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, GPS and NFC  
**Trade Mark:** Sony  
**FCC ID:** PY7-50352P  
**Standards:** 47 CFR FCC Part 15, Subpart C  
 47 CFR FCC Part 15, Subpart E  
 KDB 789033 D02 General UNII Test Procedures New Rules v02r01  
 FCC KDB 558074 D01 DTS Meas Guidance v0502  
 KDB 662911 D01 Multiple Transmitter Output v02r01  
**Test Method:** KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02  
 KDB 905462 D03 Client Without DFS New Rules v01r02  
 ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices  
**Date of Receipt:** 2019/10/15  
**Date of Test:** 2019/10/16 to 2019/12/20  
**Date of Issue:** 2019/12/20

<b>Test Result:</b>	<b>PASS *</b>
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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
00		2019/12/14		Original
01		2019/12/20		Remove 11ac mode

<b>Authorized for issue by:</b>			
<b>Tested By</b>	<i>Mike Hu</i>	2019/12/20	
	_____ <b>(Mike Hu) /Project Engineer</b>	_____ <b>Date</b>	
<b>Checked By</b>	<i>David Chen</i>	2019/12/20	
	_____ <b>(David Chen) /Reviewer</b>	_____ <b>Date</b>	



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## 2 Test Summary

Test Item	Band	FCC Rule	Requirements	Test Result	Verdict
26dB Emission Bandwidth	5150-5250	15.403(i) 15.407(a)(1)	No limit.	Clause 4.5	Pass
	5250-5350	15.403(i) 15.407(a)(2)			
	5470-5725	15.403(i) 15.407(a)(2)			
99% Occupied Bandwidth	5150-5250	KDB 789033 D02§ D	No limit.	Clause 4.6	Pass
	5250-5350				
	5470-5725				
Duty Cycle	5150-5725	--	No limit.	Clause 4.3	Pass
Maximum Conducted Output Power	5150-5250	15.407(a)(1) 15.407(a)(4)	FCC < 250mW (avg during transmission)	Clause 4.4	Pass
	5250-5350	15.407(a)(2) 15.407(a)(4)	<MIN{250mW, 11dBm+10*Ig(EBW)} (avg during transmission)		
	5470-5725	15.407(a)(2) 15.407(a)(4)	<MIN{250mW, 11dBm+10*Ig(EBW)} (avg during transmission)		
Maximum Power Spectral Density	5150-5250	15.407(a)(1) 15.407(a)(4)	<11dBm/MHz (avg during transmission)	Clause 4.7	Pass
	5250-5350	15.407(a)(2) 15.407(a)(4)	<11dBm/MHz (avg during transmission)		
	5470-5725	15.407(a)(2) 15.407(a)(4)	<11dBm/MHz (avg during transmission)		
Radiated Spurious Emission (Radiated)	5150-5250	15.407(b)(1) 15.407(b)(6) 15.407(b)(7) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.15-5.35 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).	Clause 4.8	Pass
	5250-5350	15.407(b)(2) 15.407(b)(6) 15.407(b)(7) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.25-5.35 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).		
	5470-5725	15.407(b)(3) 15.407(b)(6) 15.407(b)(7) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.47-5.725 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).		



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Test Item	Band	FCC Rule	Requirements	Test Result	Verdict
Band Edge(Radiated)	5150-5250 5250-5350 5470-5725	15.209	---	Clause 4.9	Pass
AC Power Line Conducted Emissions	5150-5250 5250-5350 5470-5725	15.207	---	Clause 4.2	Pass
Frequency Stability	5150-5250 5250-5350 5470-5725	15.209	---	Clause 4.10	Pass
Dynamic Frequency Selection	5250-5350 5470-5725	47 CFR Part 15, Subpart E 15.407	Channel Move Time:10 Seconds	Clause 4.11	Pass
			Transmission Time: milliseconds + an aggregate of 60 milliseconds over remaining 10 second period.		
			Non-occupancy period: Minimum 30 minutes		



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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
Telephone:	+86 (0) 755 2601 2053
Fax:	+86 (0) 755 2671 0594
E-mail:	ee.shenzhen@sgs.com

#### 3.3 Test Facility

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

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

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

• **VCCI**

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

• **FCC –Designation Number: CN1178**

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

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

• **Industry Canada (IC)**

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



### 3.4 General Description of EUT

EUT Description:	GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n, GPS and NFC
Trade Mark:	Sony
HW Version:	A
SW Version:	0.96
S/N:	HQ699U4688
IEEE 802.11 WLAN Mode Supported:	<input checked="" type="checkbox"/> 802.11a (20 MHz channel bandwidth) ; <input checked="" type="checkbox"/> 802.11n (20 MHz channel bandwidth); <input checked="" type="checkbox"/> 802.11n (40 MHz channel bandwidth);
Operation Frequency:	5150MHz to 5250MHz 5250MHz to 5350MHz 5470MHz to 5725MHz
Type of Modulation:	OFDM
DFS mode:	<input type="checkbox"/> Master <input type="checkbox"/> Slave with radar detection <input checked="" type="checkbox"/> Slave without radar detection
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 802.11a/n/ac), <input type="checkbox"/> MIMO (for 802.11n/ac) <input type="checkbox"/> Diversity (for 802.11a) : Tx & Rx
Antenna Gain:	-0.43dBi,
Power Supply	<input type="checkbox"/> AC/DC Adapter; <input checked="" type="checkbox"/> Battery; <input type="checkbox"/> PoE.; <input type="checkbox"/> Other:
Charger	Commercial Name:UCH20 Type Number: AC-0061-US
USB Cable	Commercial Name:UCB20 Type Number:AI-0160
Headset	Commercial Name:MH410C Type Number:AG-1100

Remark:

In FCC 15.31, for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table, and the selected channel to perform the test as below:

Frequency Range of Operation Operating Frequency Range (in each Band)	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	centre
1 MHz to 10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near centre



For UNII Band I:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n 20MHz	The Lowest channel	5180
	The Middle channel	5200
	The Highest channel	5240
IEEE 802.11n 40MHz	The Lowest channel	5190
	The Highest channel	5230

For UNII Band II-A:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n 20MHz	The Lowest channel	5260
	The Middle channel	5280
	The Highest channel	5320
IEEE 802.11n 40MHz	The Lowest channel	5270
	The Highest channel	5310

For UNII Band II-C:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n 20MHz	The Lowest channel	5500
	The Middle channel	5580
	The Highest channel	5700
IEEE 802.11n 40MHz	The Lowest channel	5510
	The Middle channel	5500
	The Highest channel	5670

Modulation	Data Rate
802.11a	6Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0



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### 3.5 Test Environment and Mode

<b>Operating Environment:</b>	
Temperature:	25.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	101.32 KPa
<b>Test mode:</b>	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

## 4 Test results and Measurement Data

### 4.1 Antenna Requirement

<b>Test Requirement:</b>	47 CFR Part 15 Section 15.203
The antenna is integrated antenna and no consideration of replacement. The best case gain of the antenna is -0.43dBi.	

### 4.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15 Section 15.407(b)		
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"> <li>1) The mains terminal disturbance voltage test was conducted in a shielded room.</li> <li>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.</li> <li>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,</li> <li>4) The test was performed with a vertical ground reference plane. The rear</li> </ol>		



	<p>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.</p> <p>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.</p>
<p><b>Test Setup:</b></p>	
<p><b>Exploratory Test Mode:</b></p>	<p>Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.</p>
<p><b>Final Test Mode:</b></p>	<p>Through Pre-scan, find the 6Mbps of rate of 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.</p>
<p><b>Instruments Used:</b></p>	<p>Refer to section 5.10 for details</p>
<p><b>Test Results:</b></p>	<p>Pass</p>

**Measurement Data**

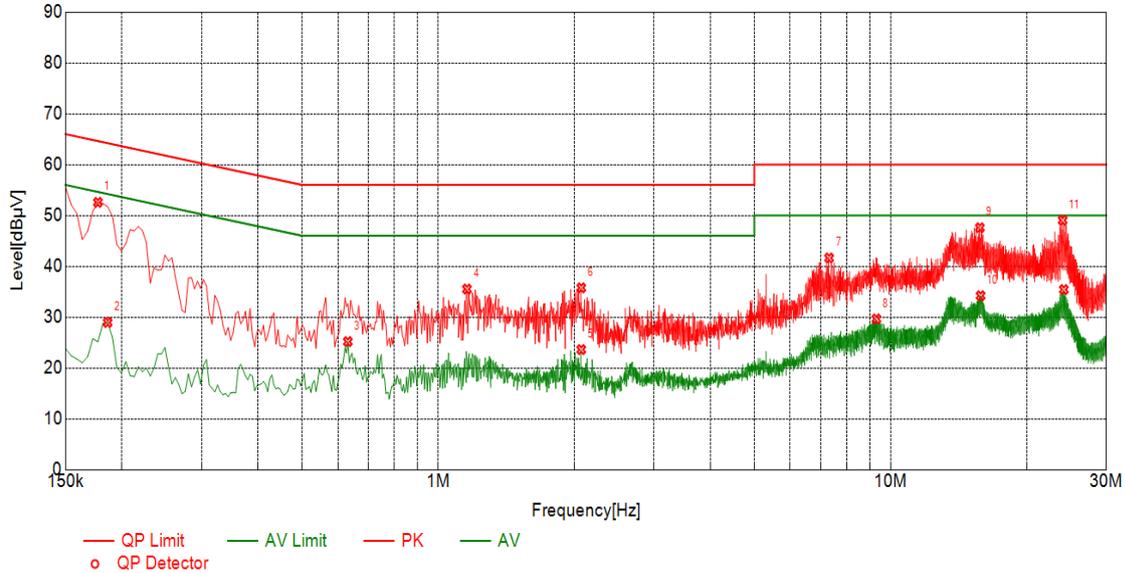
An initial pre-scan was performed on the live and neutral lines with peak detector.

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



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Live Line:



**Suspected List**

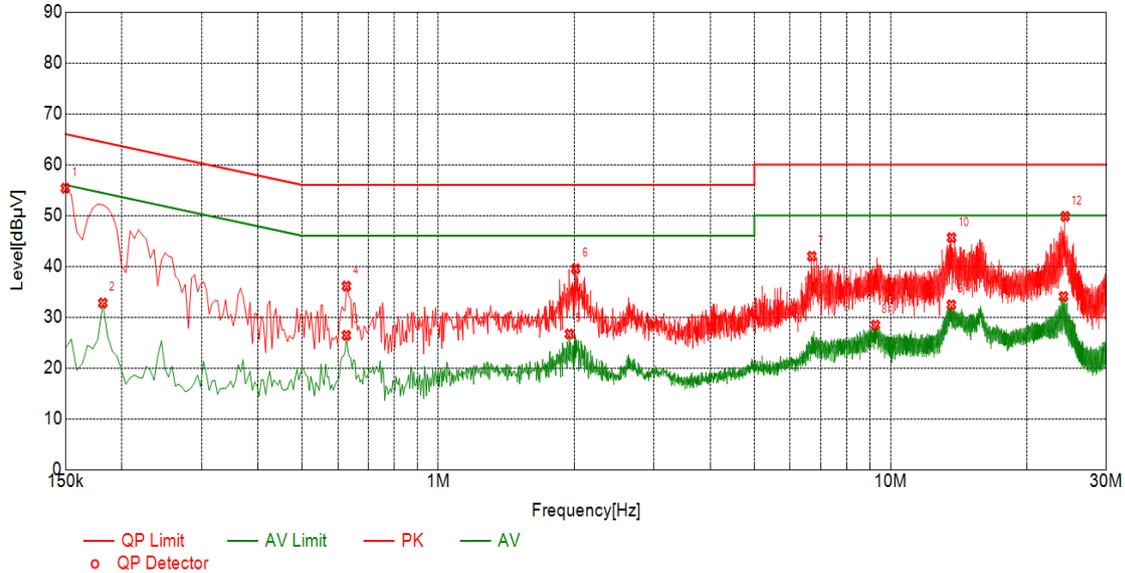
NO.	Freq.[MHz]	Level[dBµV]	Factor[dB]	Limit[dBµV]	Margin[dB]	Detector
1	0.1770	52.58	10.10	64.63	12.05	PK
2	0.1860	28.94	10.10	54.21	25.27	AV
3	0.6315	25.19	10.10	46.00	20.81	AV
4	1.1580	35.53	10.10	56.00	20.47	PK
5	2.0715	23.63	10.10	46.00	22.37	AV
6	2.0715	35.77	10.10	56.00	20.23	PK
7	7.3140	41.64	10.10	60.00	18.36	PK
8	9.3030	29.66	10.10	50.00	20.34	AV
9	15.7560	47.59	10.11	60.00	12.41	PK
10	15.8100	34.22	10.11	50.00	15.78	AV
11	24.0090	49.04	10.11	60.00	10.96	PK
12	24.1530	35.43	10.11	50.00	14.57	AV



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Neutral Line:



Suspected List						
NO.	Freq.[MHz]	Level[dBµV]	Factor[dB]	Limit[dBµV]	Margin[dB]	Detector
1	0.1500	55.35	10.10	66.00	10.65	PK
2	0.1815	32.78	10.10	54.42	21.64	AV
3	0.6270	26.43	10.10	46.00	19.57	AV
4	0.6270	36.10	10.10	56.00	19.90	PK
5	1.9500	26.68	10.10	46.00	19.32	AV
6	2.0130	39.50	10.10	56.00	16.50	PK
7	6.6975	41.97	10.10	60.00	18.03	PK
8	9.2580	28.42	10.10	50.00	21.58	AV
9	13.6230	32.42	10.11	50.00	17.58	AV
10	13.6365	45.63	10.11	60.00	14.37	PK
11	24.1125	34.06	10.11	50.00	15.94	AV
12	24.3195	49.83	10.11	60.00	10.17	PK

**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

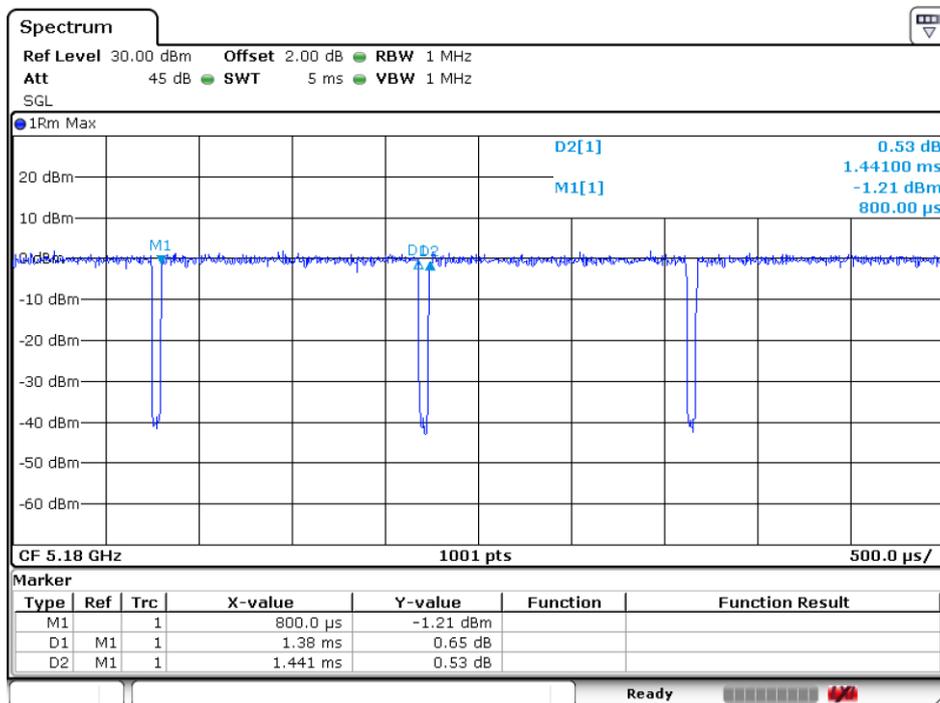
#### 4.3.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11A	Ant 1: CH36	95.77
11N20	Ant 1: CH36	95.47
11N40	Ant 1: CH38	88.36

#### 4.3.1 Test Plots

##### 4.3.1.1 ANT1

##### 4.3.1.1.1 11A



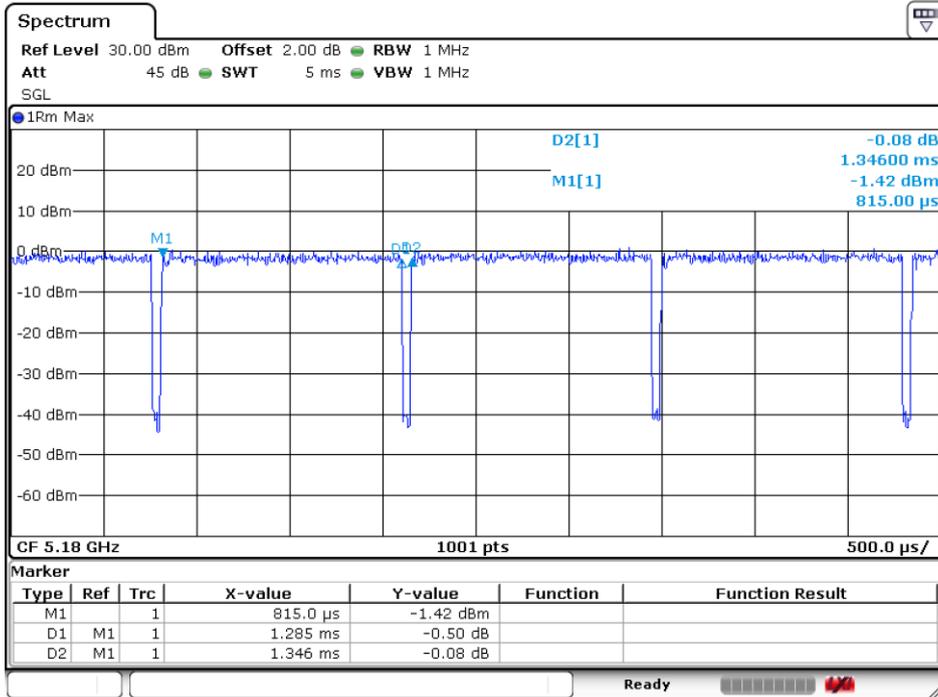
Date: 22.OCT.2019 22:16:40



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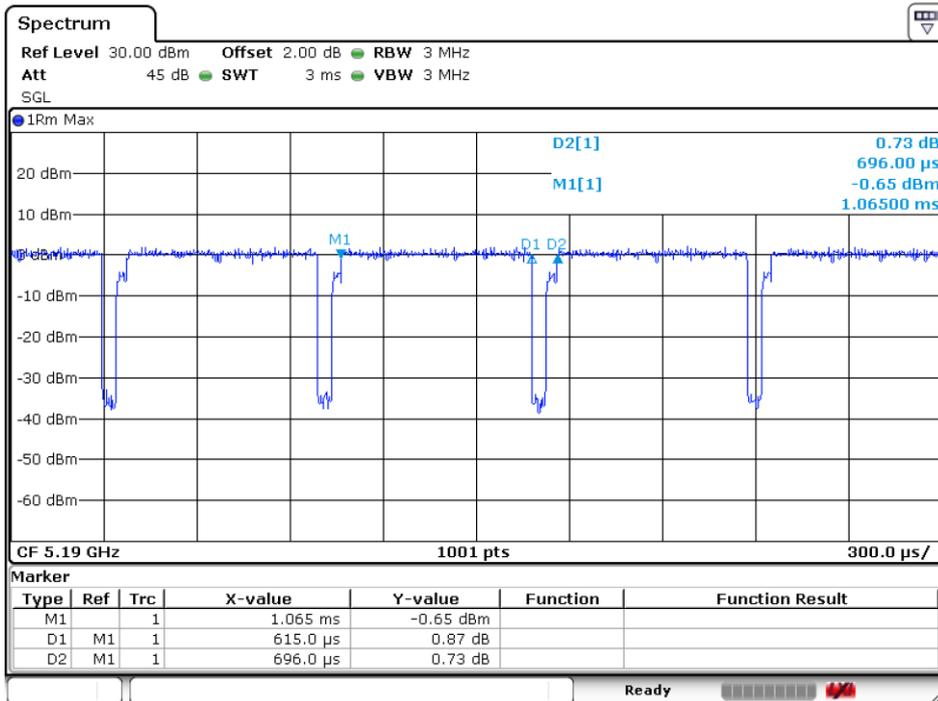
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**4.3.1.1.2 11N20**



Date: 22.OCT.2019 22:15:47

**4.3.1.1.3 11N40**



Date: 22.OCT.2019 22:14:36



### 4.4 Maximum Conducted Output Power

Test Requirement:	47 CFR Part 15 Section 15.407(a)	
Test Method:	ANSI C63.10: 2013 clause 11.9.2.3.2	
Test Setup:	<p>The diagram illustrates the test setup. A 'Power Meter' and an 'EUT' (Equipment Under Test) are placed on a 'Non-Conducted Table'. Below the table is a 'Ground Reference Plane'. A red line connects the Power Meter and the EUT, indicating a connection between them.</p>	
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 that 6Mbps of rate is the worst case of 802.11a (HT20); MCS0 of rate is the worst case of 802.11n (HT20); MCS0 of rate is the worst case of 802.11n (HT40); Only the worst case is recorded in the report.	
Limit:	Frequency Band	Limit
	5150-5250MHz	Not exceed 250mW(24dBm)
	5250-5350MHz	The lesser of 250mW(24dBm) or 11+ 10logB
	5470-5725MHz	The lesser of 250mW(24dBm) or 11+ 10logB
	*Where B is the 26dB emission bandwidth in MHz	
Test Results:	Pass	



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**4.4.1 Test Results for Conducted Output Power**

Test Mode	Test Channel	Frequency [MHz]	Antenna Port	Meas. Level (Cond.) [dBm]	Meas. Level (EIRP.) [dBm]	Verdict
11A20	36	5180	ANT 1	14.89	14.46	PASS
	48	5240	ANT 1	14.47	14.04	PASS
	52	5260	ANT 1	14.49	14.06	PASS
	64	5320	ANT 1	14.93	14.50	PASS
	100	5500	ANT 1	14.54	14.11	PASS
	140	5700	ANT 1	14.56	14.13	PASS
11N20	36	5180	ANT 1	14.86	14.43	PASS
	48	5240	ANT 1	14.74	14.31	PASS
	52	5260	ANT 1	14.82	14.39	PASS
	64	5320	ANT 1	14.94	14.51	PASS
	100	5500	ANT 1	14.83	14.40	PASS
	140	5700	ANT 1	14.85	14.42	PASS
11N40	38	5190	ANT 1	14.84	14.41	PASS
	46	5230	ANT 1	14.94	14.51	PASS
	54	5270	ANT 1	14.46	14.03	PASS
	62	5310	ANT 1	14.42	13.99	PASS
	102	5510	ANT 1	14.96	14.53	PASS
	134	5670	ANT 1	14.31	13.88	PASS



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### 4.5 26dB Emission Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(a)
Test Method:	ANSI C63.10: 2013
Test Setup:	<p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a (HT20); MCS0 of rate is the worst case of 802.11n (HT20); MCS0 of rate is the worst case of 802.11n (HT40); Only the worst case is recorded in the report.
Limit:	No restriction limits
Test Results:	Pass



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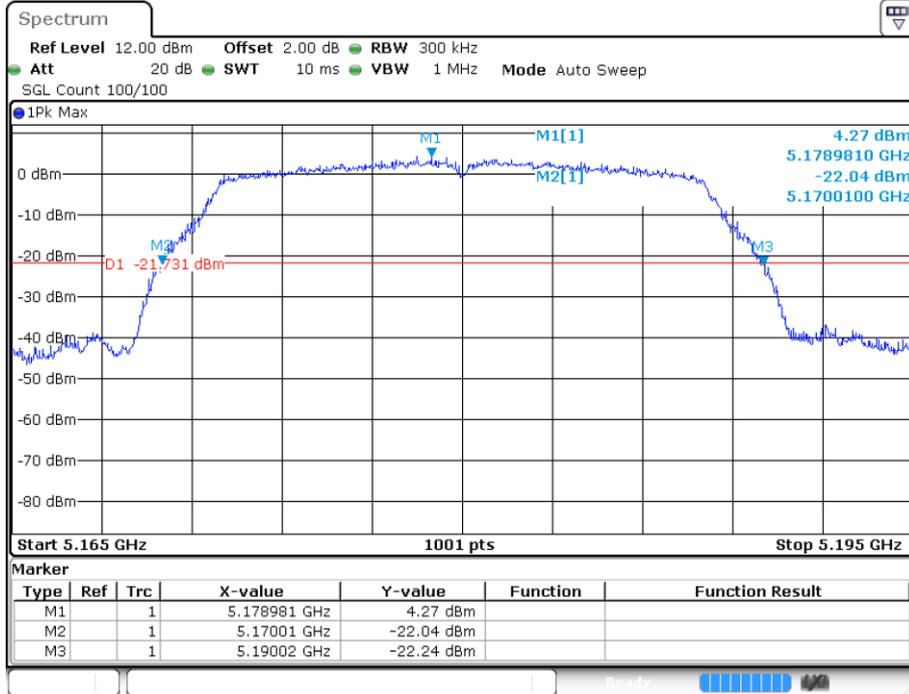
**4.5.1 Test Results for 26dB Emission Bandwidth**

Test Mode	Test Channel	Frequency [MHz]	Antenna Port	26dB Emission Bandwidth [MHz]	Verdict
11A20	36	5180	ANT 1	20.01	PASS
	48	5240	ANT 1	20.19	PASS
	52	5260	ANT 1	20.34	PASS
	64	5320	ANT 1	20.01	PASS
	100	5500	ANT 1	20.16	PASS
	140	5700	ANT 1	20.19	PASS
11N20	36	5180	ANT 1	20.61	PASS
	48	5240	ANT 1	20.58	PASS
	52	5260	ANT 1	20.52	PASS
	64	5320	ANT 1	20.52	PASS
	100	5500	ANT 1	20.52	PASS
	140	5700	ANT 1	20.46	PASS
11N40	38	5190	ANT 1	40.44	PASS
	46	5230	ANT 1	40.8	PASS
	54	5270	ANT 1	40.8	PASS
	62	5310	ANT 1	40.98	PASS
	102	5510	ANT 1	40.74	PASS
	134	5670	ANT 1	40.74	PASS



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4.5.2 Plots for 26dB Emission Bandwidth  
4.5.2.1 11A20\_36 ANT 1

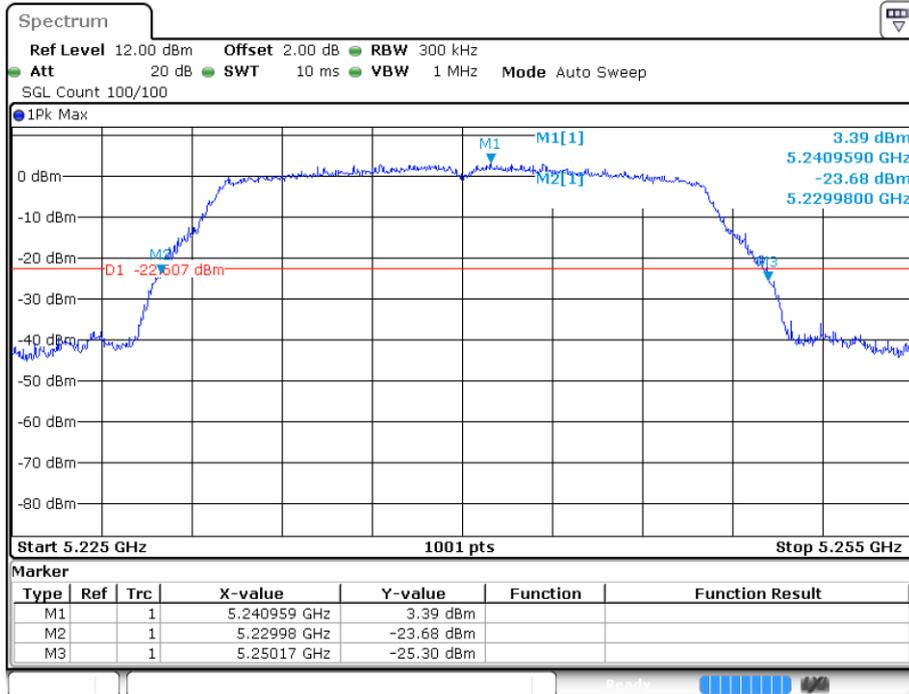


Date: 22.OCT.2019 20:34:48



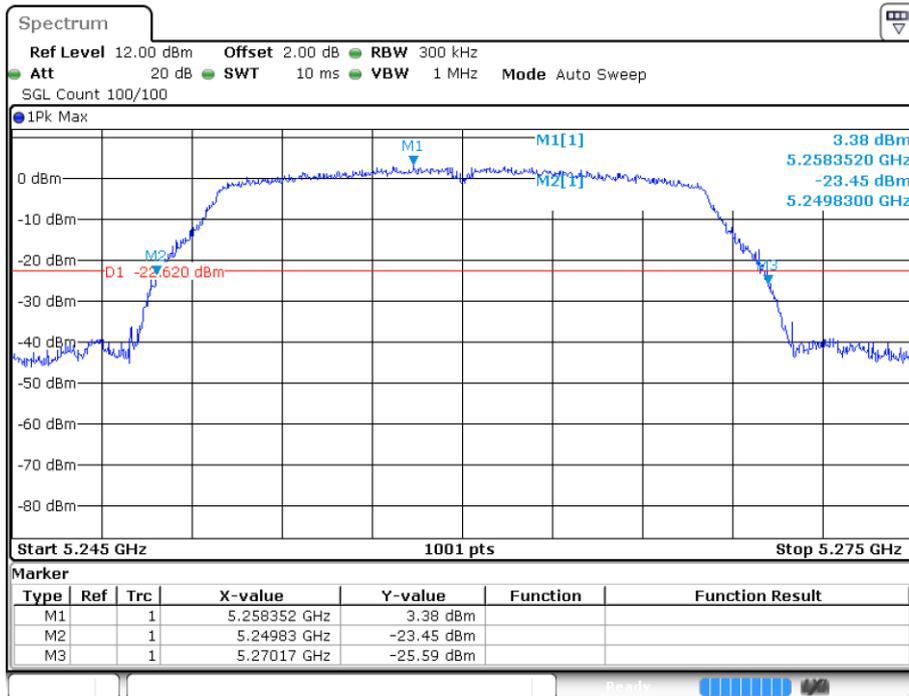
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**4.5.2.2 11A20\_48 ANT 1**



Date: 22.OCT.2019 20:36:47

**4.5.2.3 11A20\_52 ANT 1**

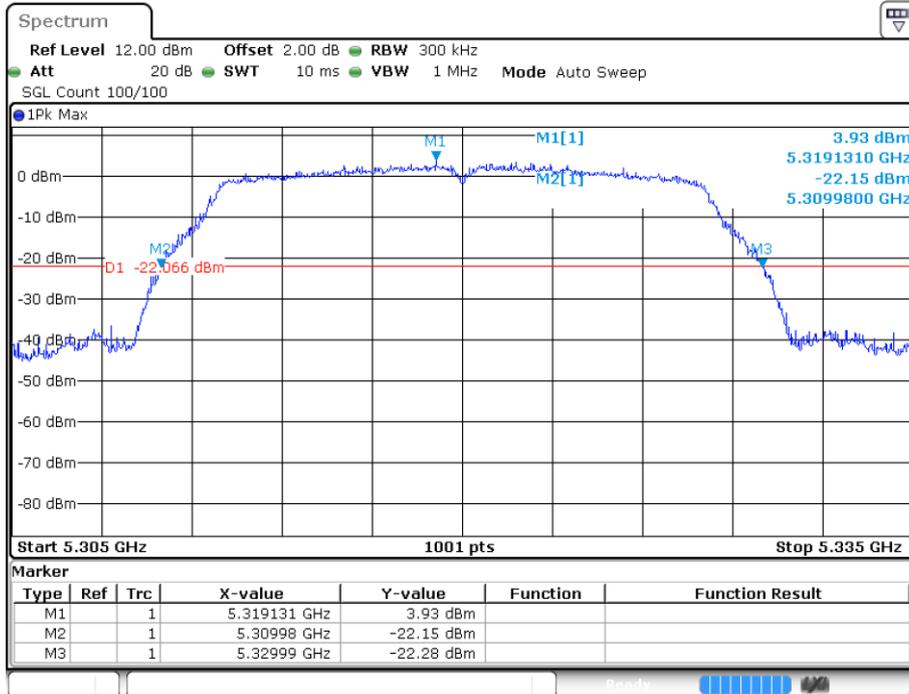


Date: 22.OCT.2019 20:37:50



4.5.2.4

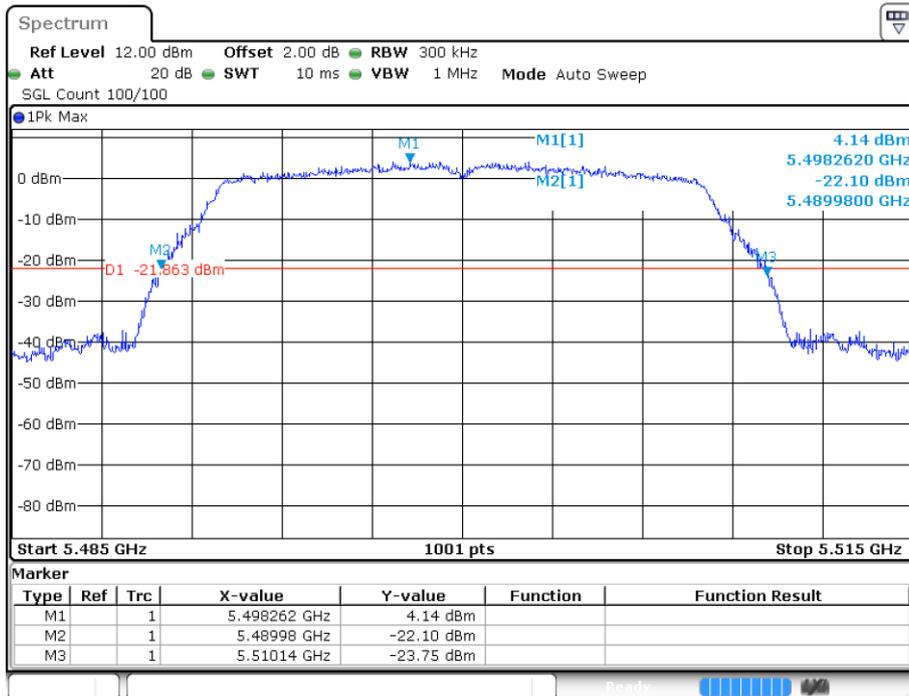
11A20\_64 ANT 1



Date: 22.OCT.2019 20:39:35

4.5.2.5

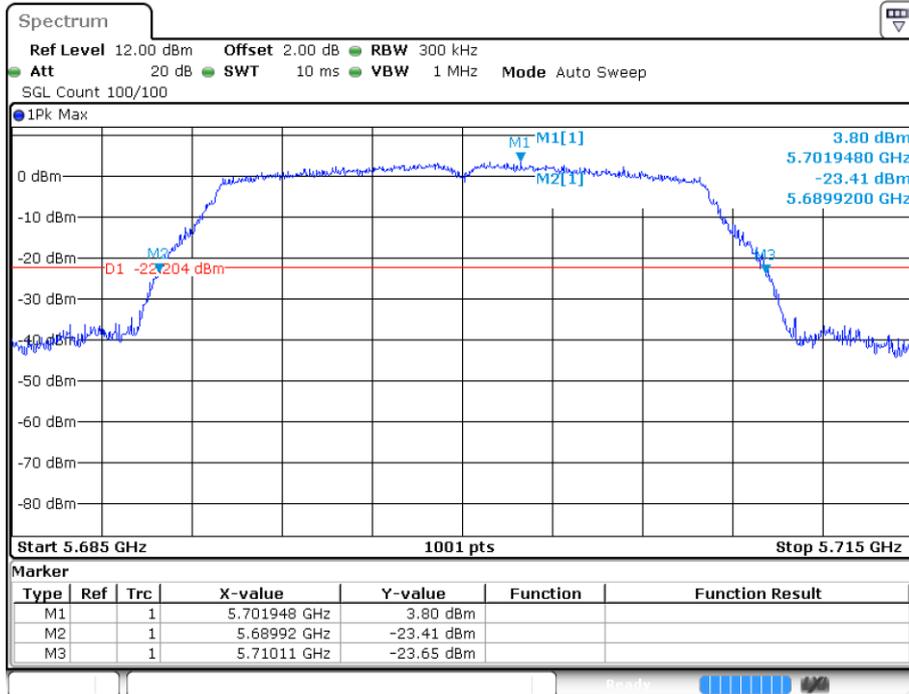
11A20\_100 ANT 1



Date: 22.OCT.2019 20:41:06

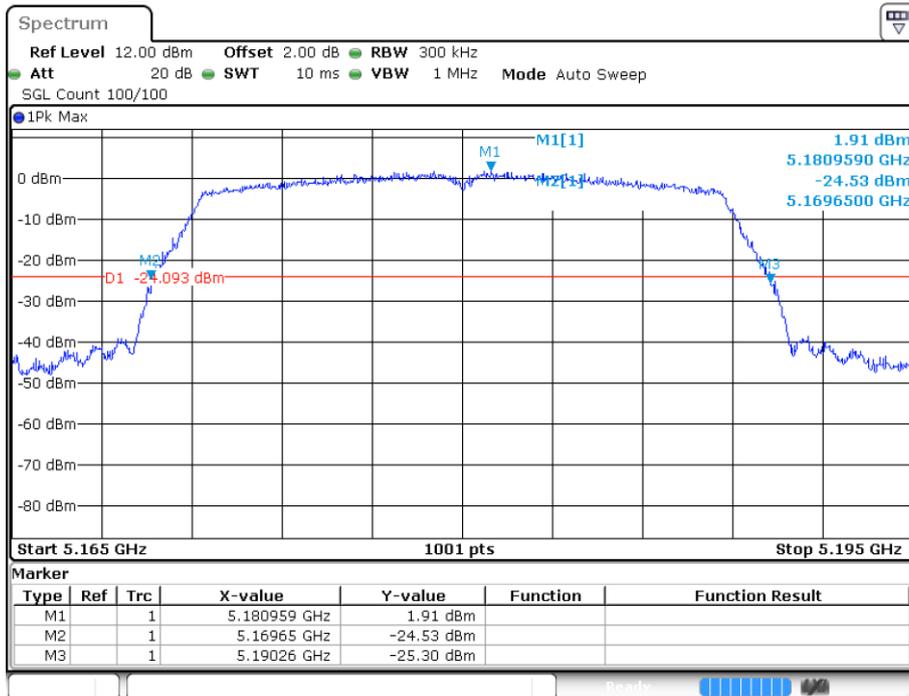


**4.5.2.6 11A20\_140 ANT 1**



Date: 22.OCT.2019 20:43:06

**4.5.2.7 11N20\_36 ANT 1**

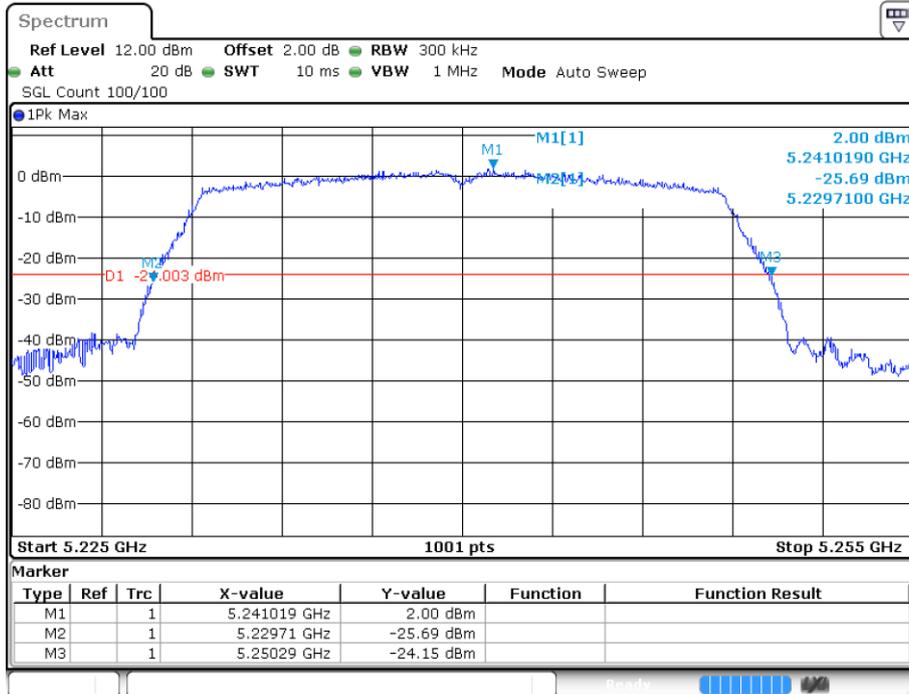


Date: 22.OCT.2019 20:50:58



**4.5.2.8**

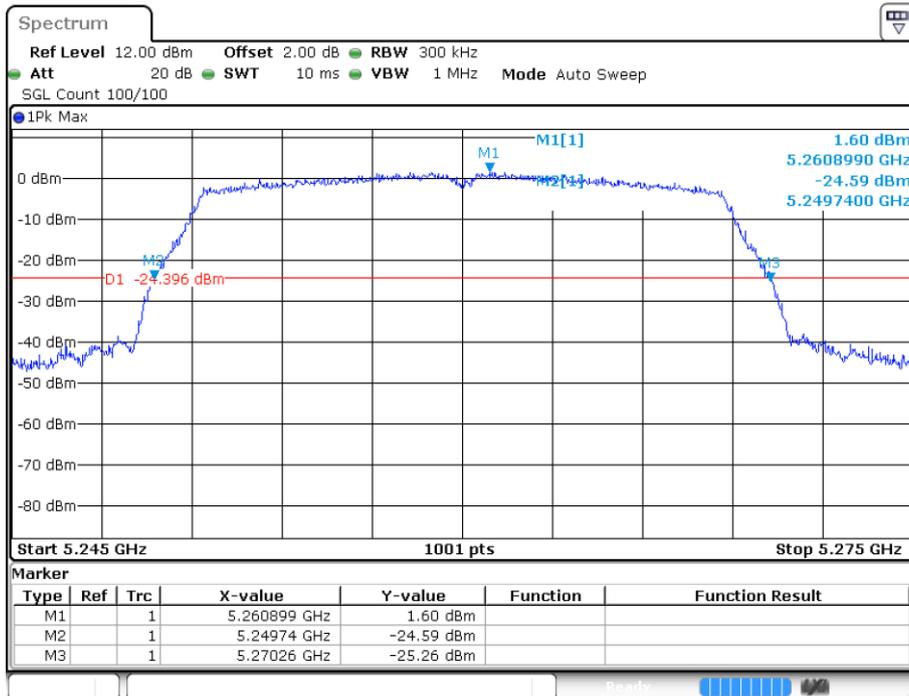
**11N20\_48 ANT 1**



Date: 22.OCT.2019 20:52:09

**4.5.2.9**

**11N20\_52 ANT 1**

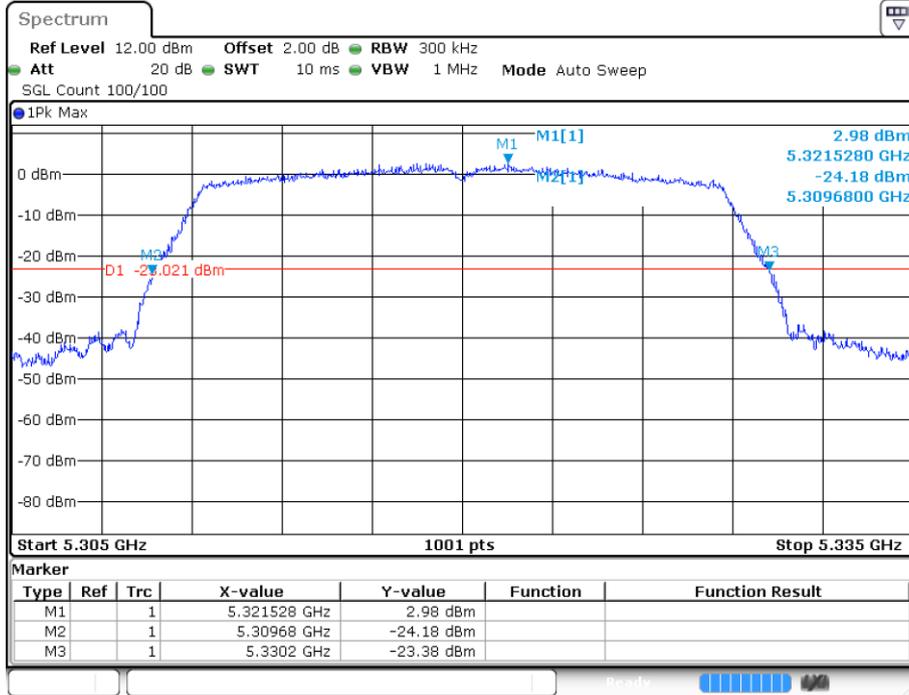


Date: 22.OCT.2019 21:00:33



4.5.2.10

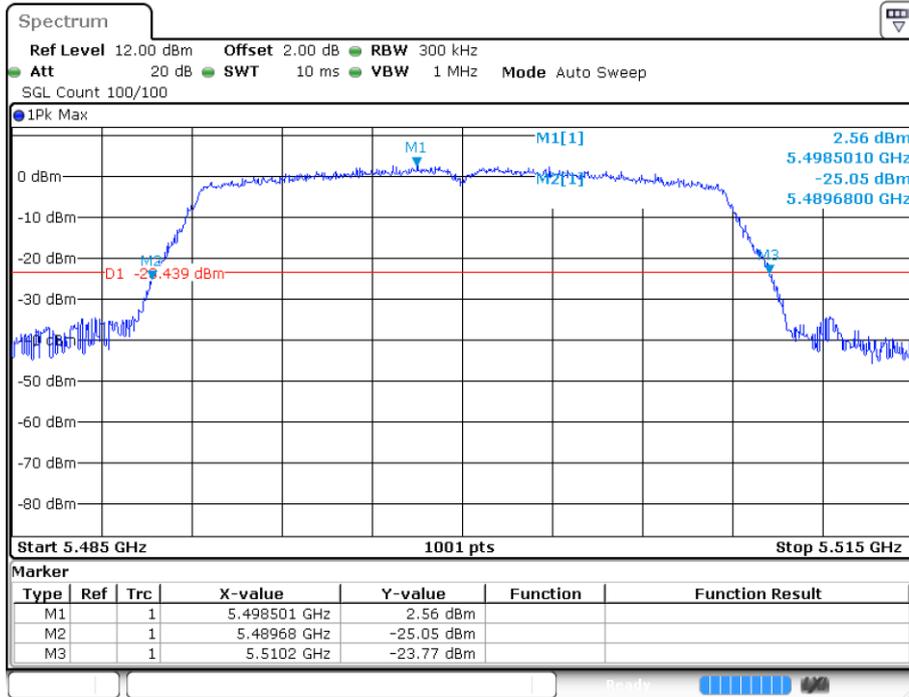
11N20\_64 ANT 1



Date: 22.OCT.2019 21:02:15

4.5.2.11

11N20\_100 ANT 1

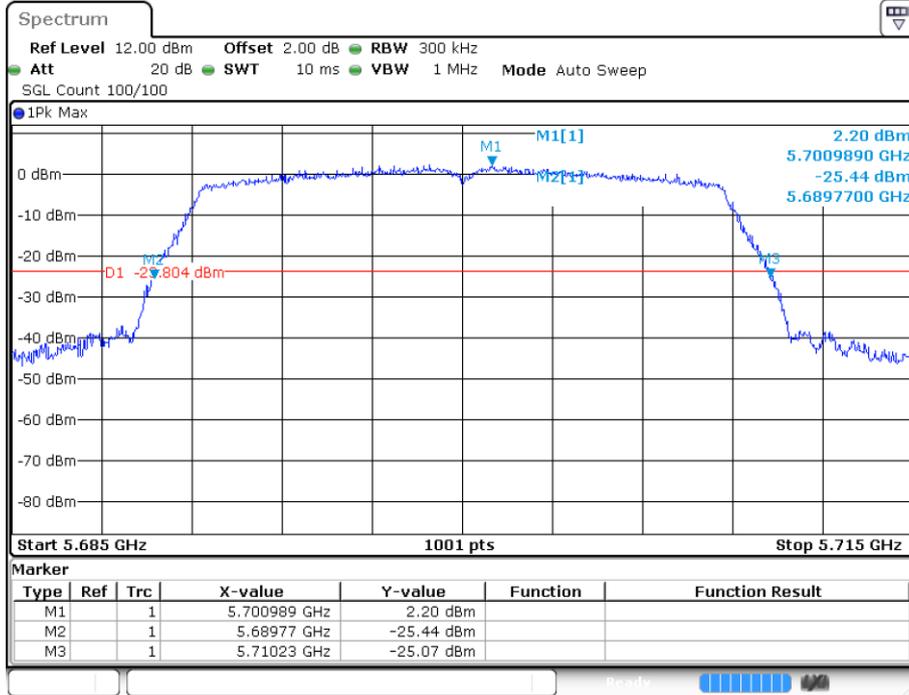


Date: 22.OCT.2019 21:36:51



4.5.2.12

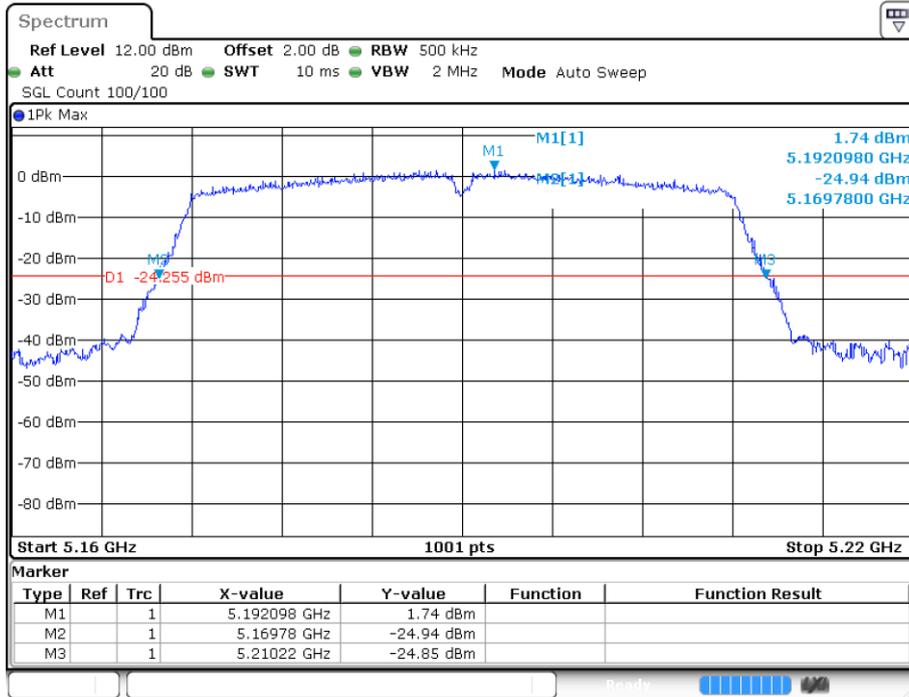
11N20\_140 ANT 1



Date: 22.OCT.2019 21:41:51

4.5.2.13

11N40\_38 ANT 1

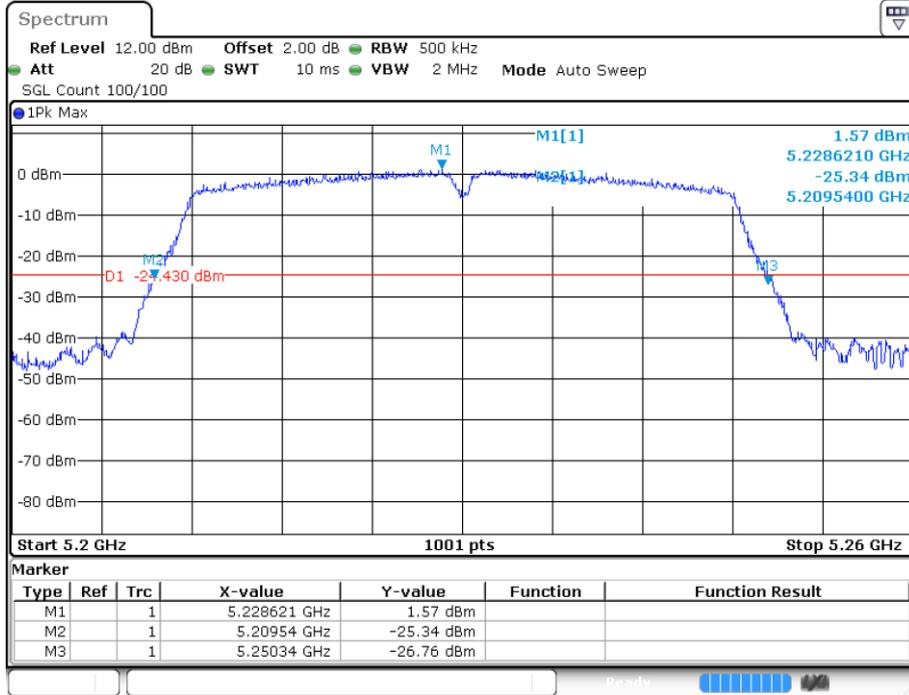


Date: 22.OCT.2019 21:48:41



4.5.2.14

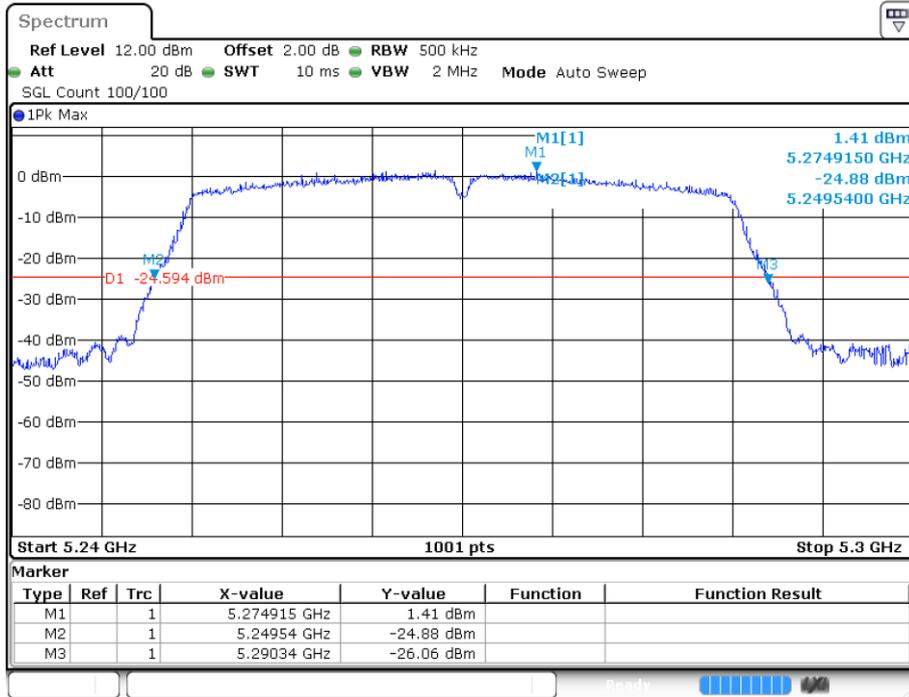
11N40\_46 ANT 1



Date: 22.OCT.2019 21:49:31

4.5.2.15

11N40\_54 ANT 1



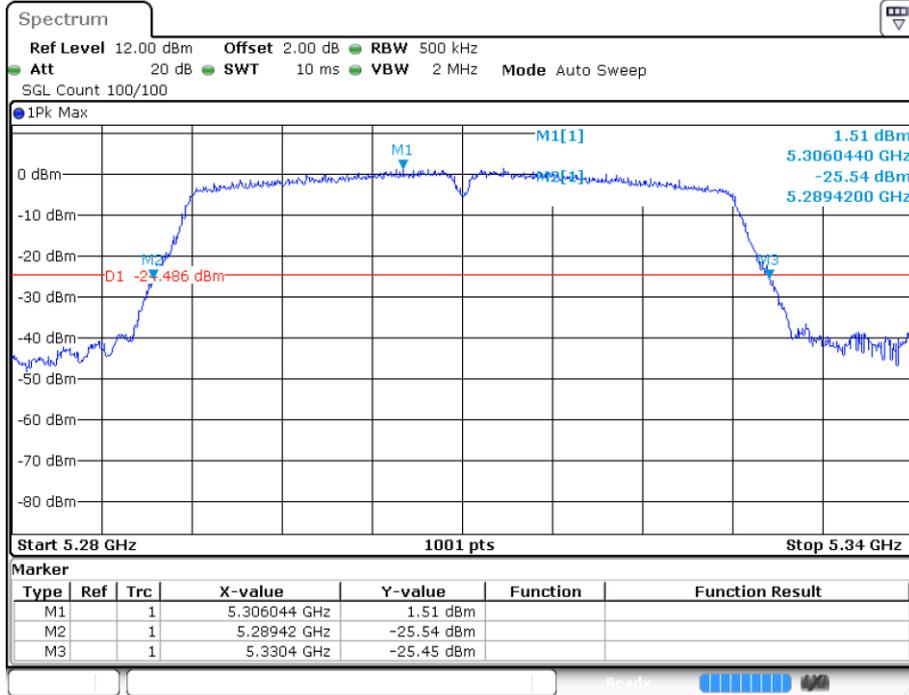
Date: 22.OCT.2019 21:51:05



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4.5.2.16

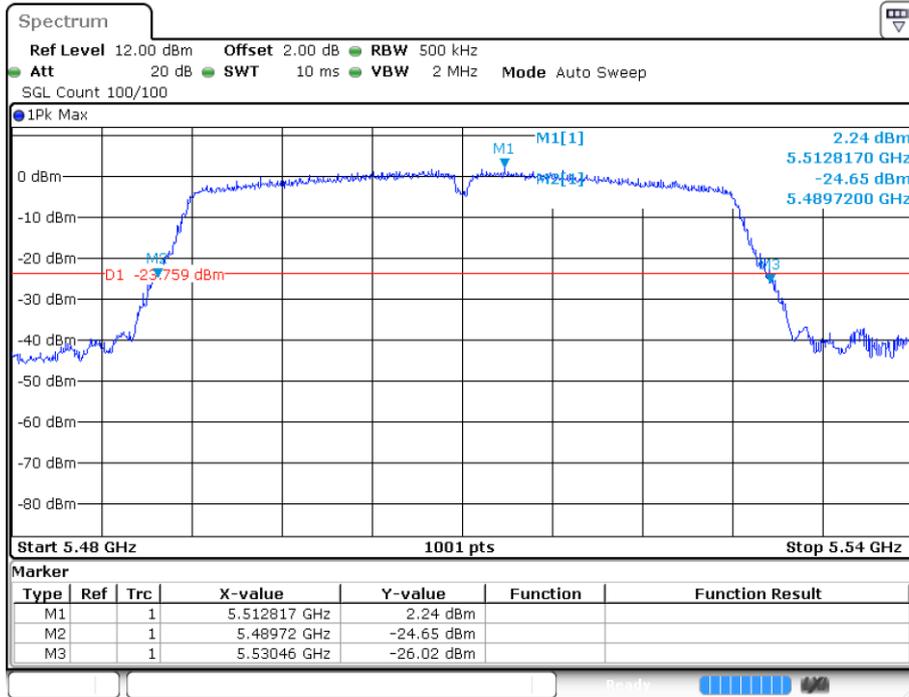
11N40\_62 ANT 1



Date: 22.OCT.2019 21:51:56

4.5.2.17

11N40\_102 ANT 1

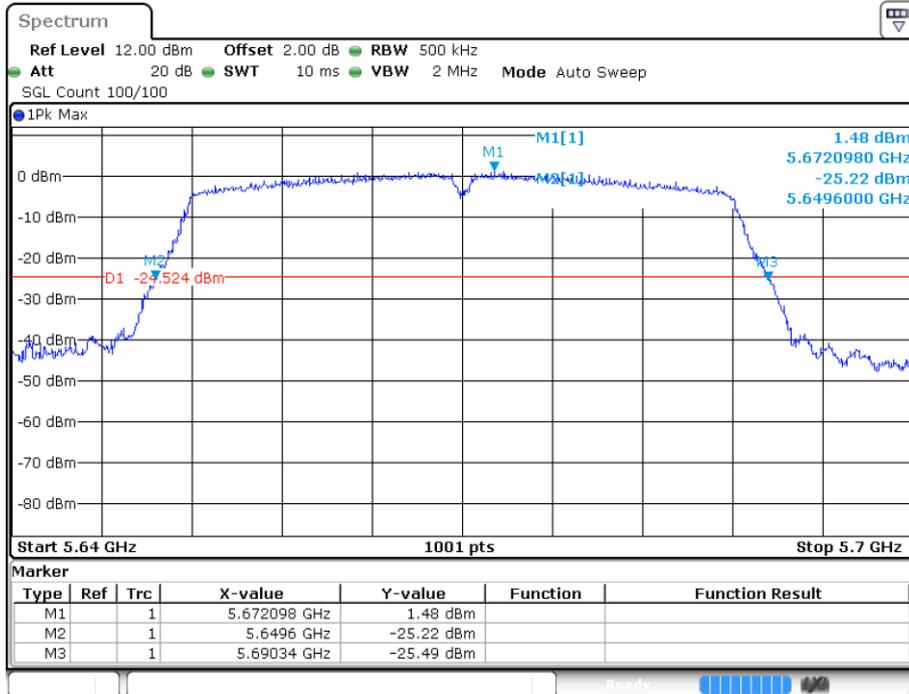


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**4.5.2.18**

**11N40\_134 ANT 1**



Date: 22.OCT.2019 22:08:13



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### 4.6 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(e)
Test Method:	ANSI C63.10: 2013
Test Setup:	<p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
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 6Mbps of rate is the worst case of 802.11a (HT20); MCS0 of rate is the worst case of 802.11n (HT20); MCS0 of rate is the worst case of 802.11n (HT40); Only the worst case is recorded in the report.
Test Results:	Pass



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**4.6.1 Test Results for 99% Occupied Bandwidth**

Test Mode	Test Channel	Frequency [MHz]	Antenna Port	Occupied Bandwidth [MHz]	Verdict
11A20	36	5180	ANT 1	16.6334	PASS
	48	5240	ANT 1	16.6334	PASS
	52	5260	ANT 1	16.6633	PASS
	64	5320	ANT 1	16.6334	PASS
	100	5500	ANT 1	16.6933	PASS
	140	5700	ANT 1	16.6933	PASS
11N20	36	5180	ANT 1	17.6523	PASS
	48	5240	ANT 1	17.6523	PASS
	52	5260	ANT 1	17.6823	PASS
	64	5320	ANT 1	17.6823	PASS
	100	5500	ANT 1	17.6523	PASS
	140	5700	ANT 1	17.6823	PASS
11N40	38	5190	ANT 1	36.0839	PASS
	46	5230	ANT 1	36.1439	PASS
	54	5270	ANT 1	36.1439	PASS
	62	5310	ANT 1	36.2038	PASS
	102	5510	ANT 1	36.2038	PASS
	134	5670	ANT 1	36.1439	PASS

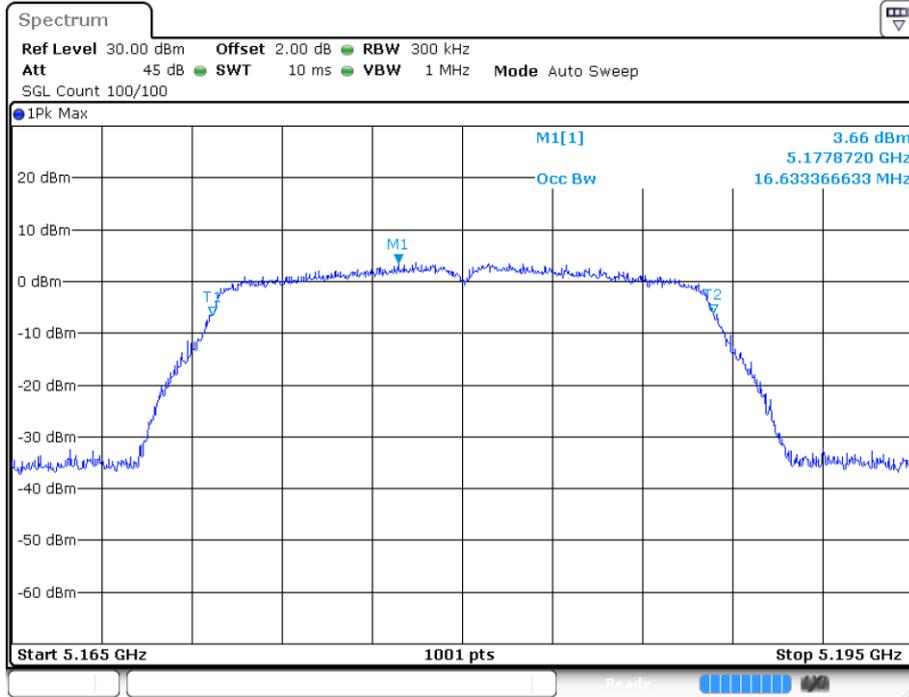


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**4.6.2 Plots for 99% Occupied Bandwidth**

**4.6.2.1 11A20\_36 ANT 1**



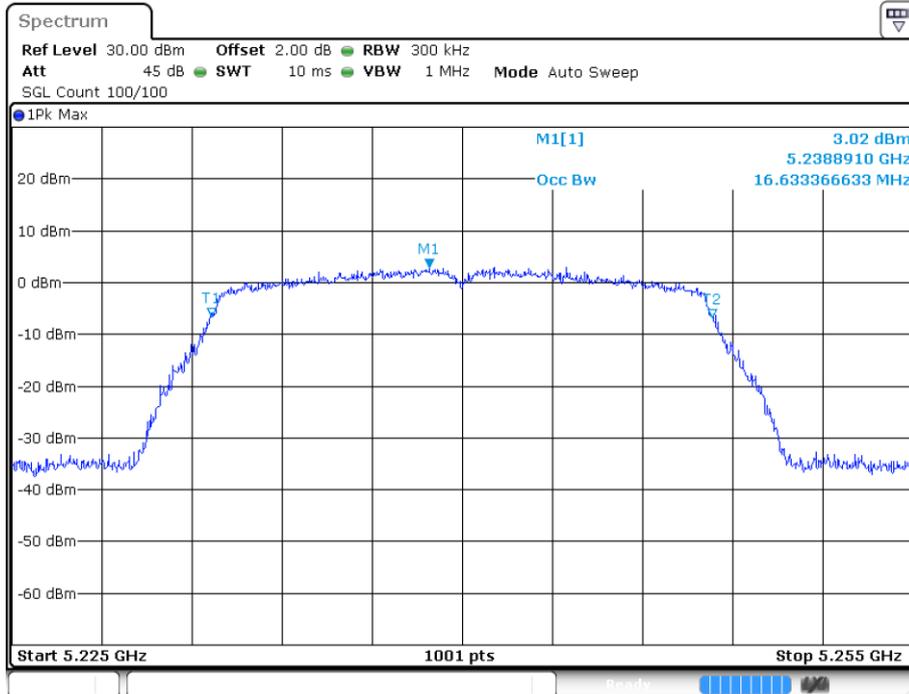
Date: 22.OCT.2019 20:34:54



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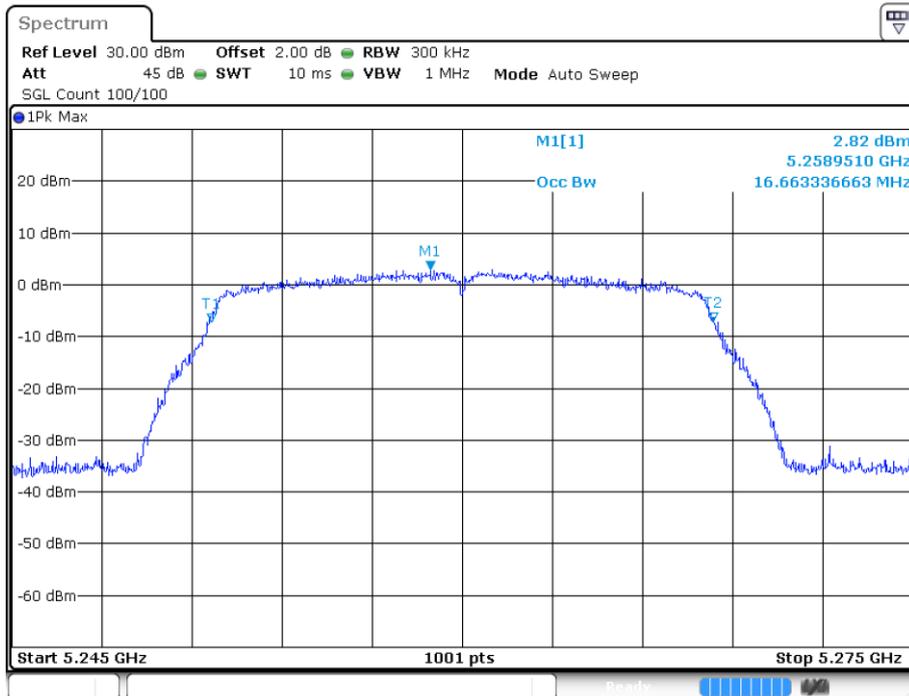
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**4.6.2.2 11A20\_48 ANT 1**



Date: 22.OCT.2019 20:36:53

**4.6.2.3 11A20\_52 ANT 1**



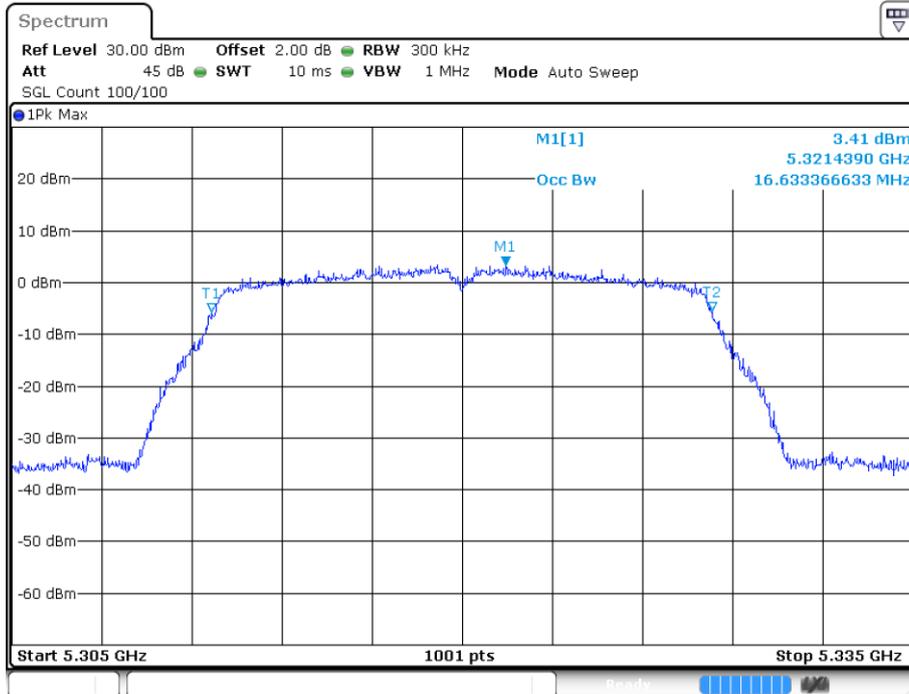
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4.6.2.4

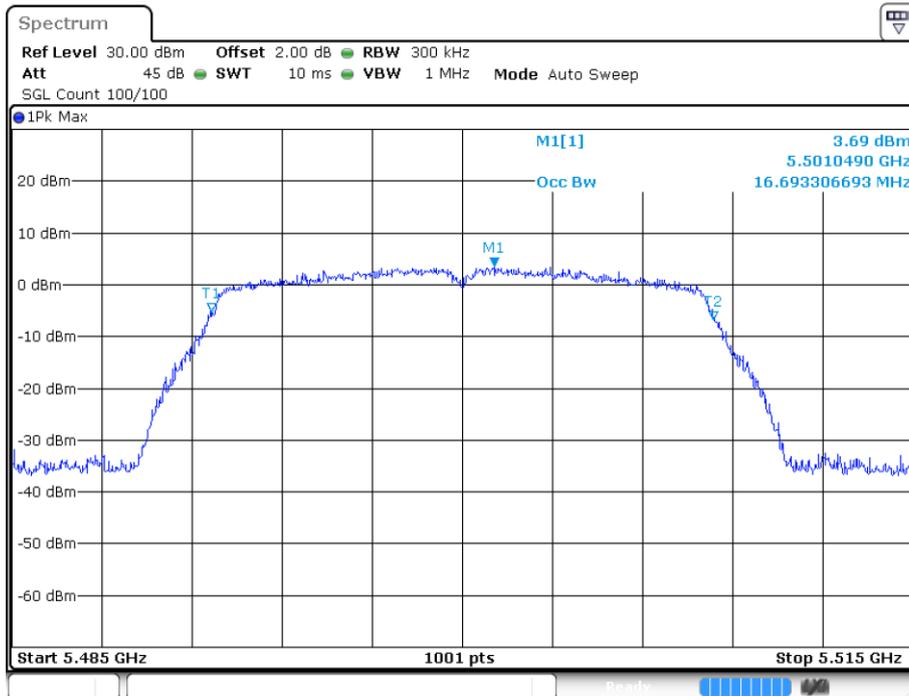
11A20\_64 ANT 1



Date: 22.OCT.2019 20:39:41

4.6.2.5

11A20\_100 ANT 1

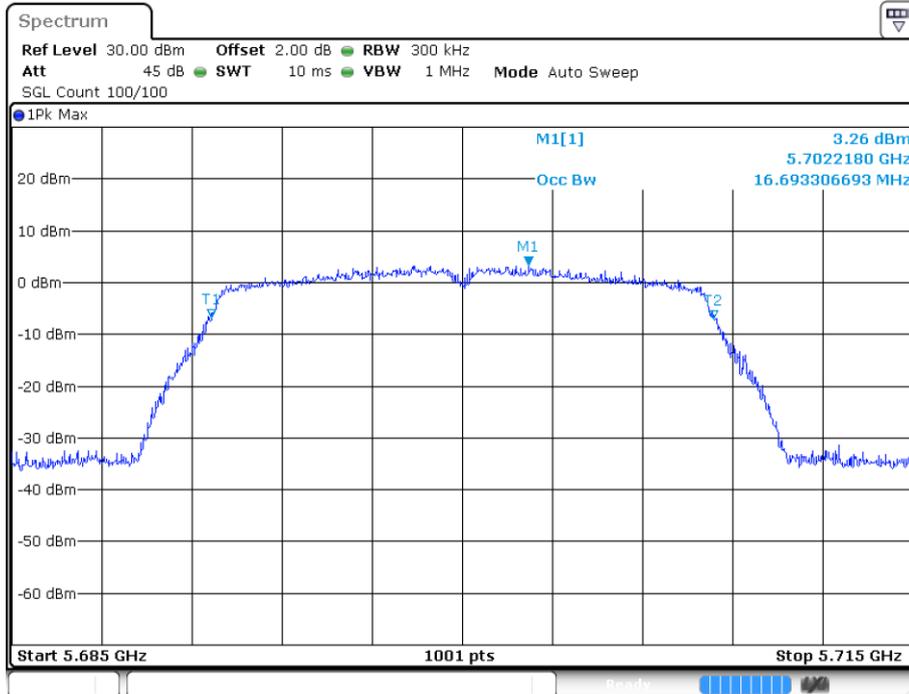


Date: 22.OCT.2019 20:41:12



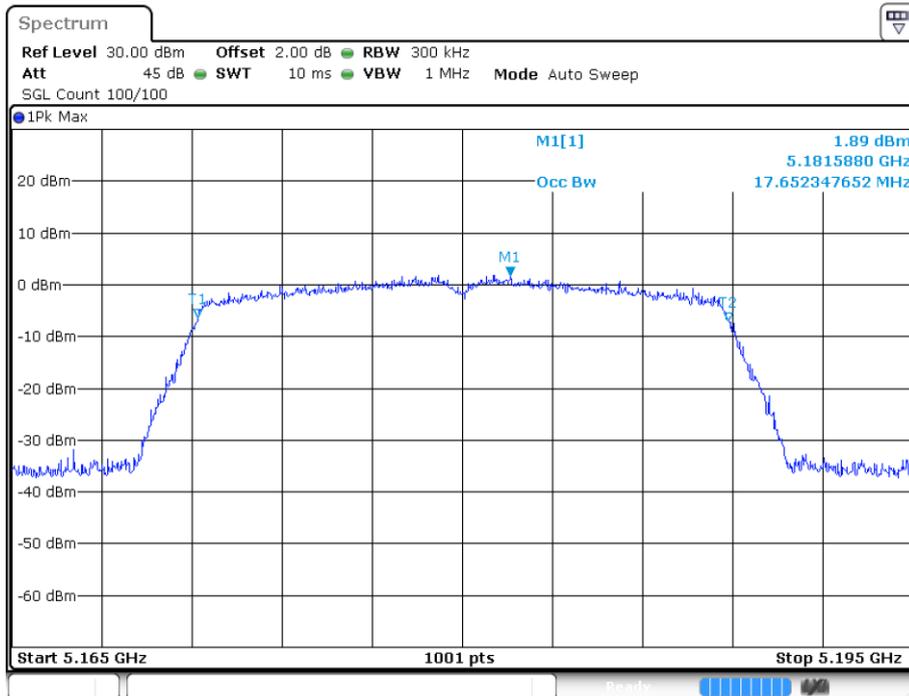
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**4.6.2.6 11A20\_140 ANT 1**



Date: 22.OCT.2019 20:43:12

**4.6.2.7 11N20\_36 ANT 1**

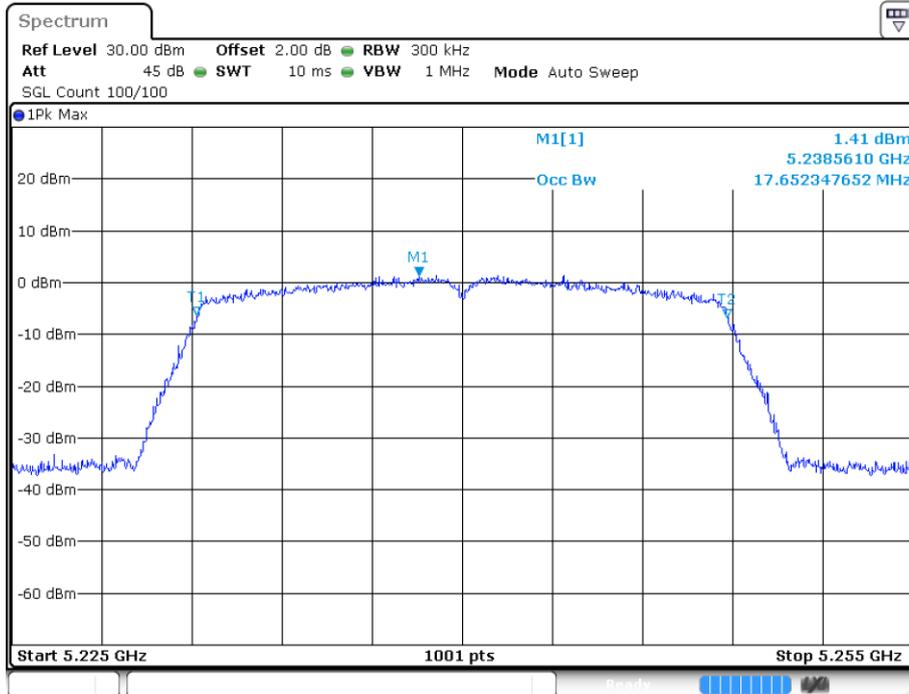


Date: 22.OCT.2019 20:51:04



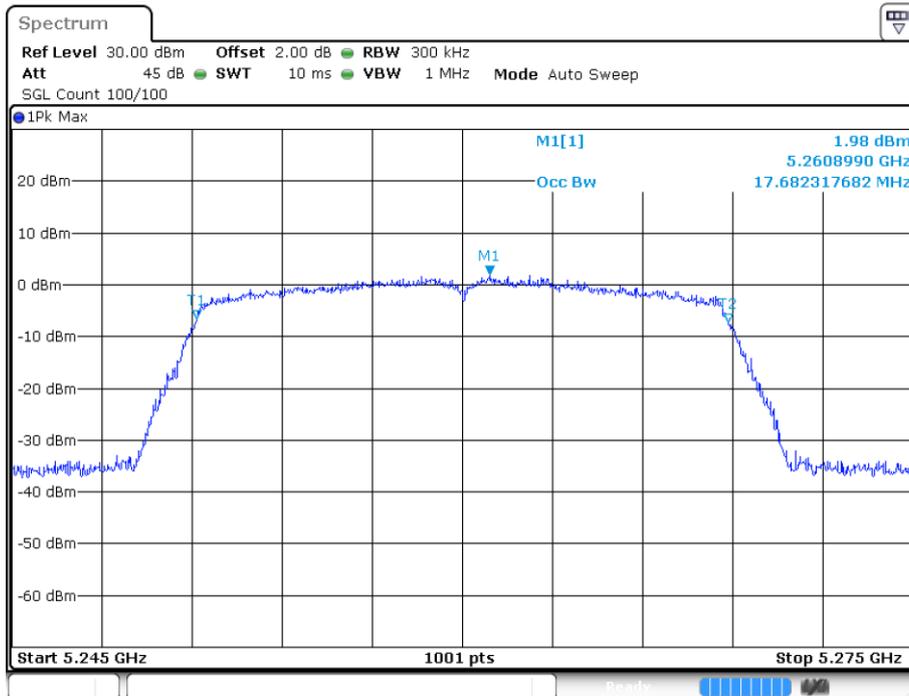
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**4.6.2.8 11N20\_48 ANT 1**



Date: 22.OCT.2019 20:52:16

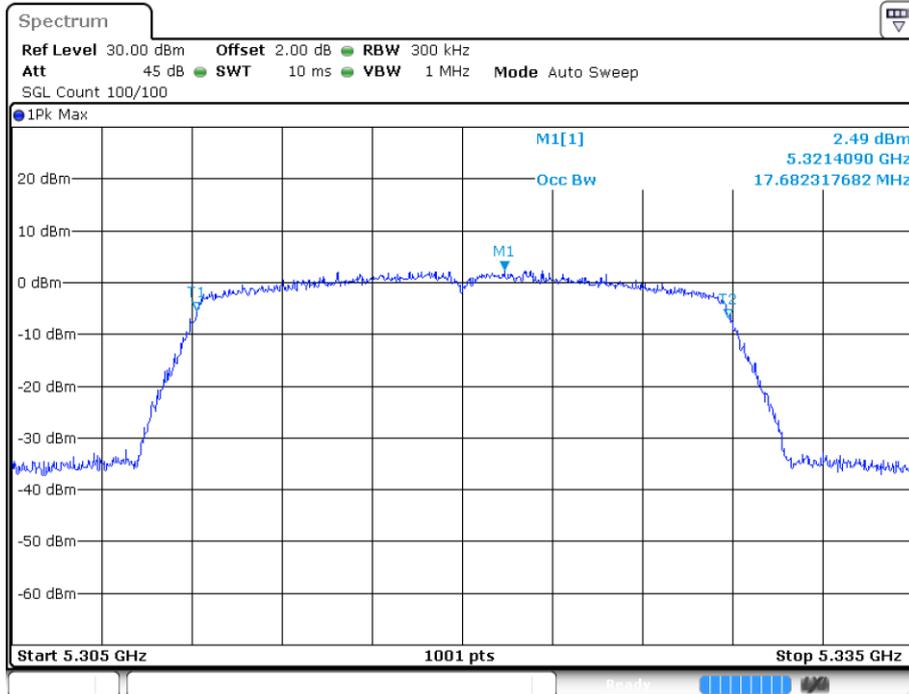
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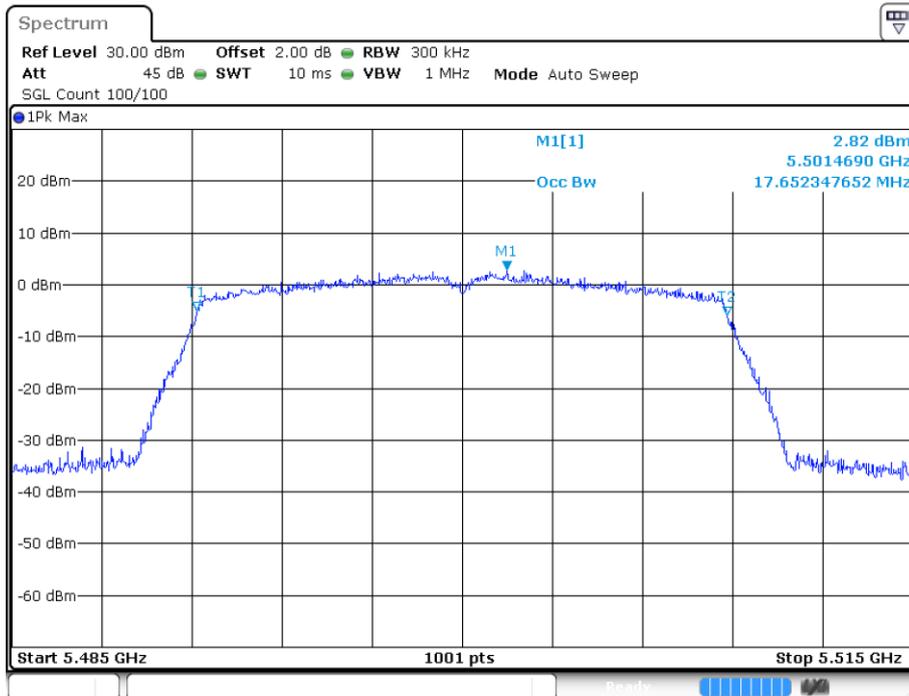


**4.6.2.10 11N20\_64 ANT 1**



Date: 22.OCT.2019 21:02:21

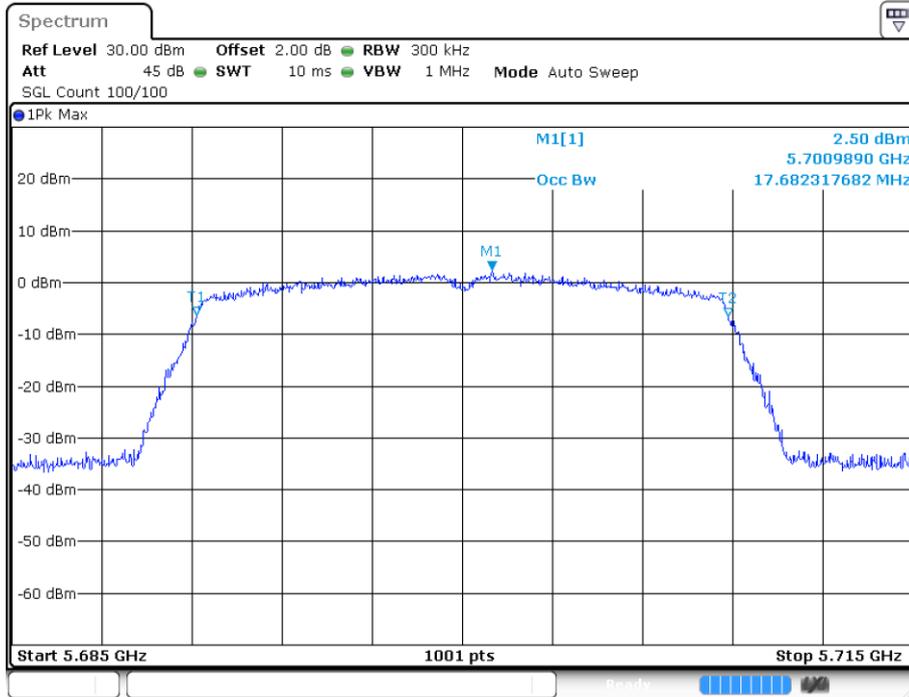
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Date: 22.OCT.2019 21:36:57

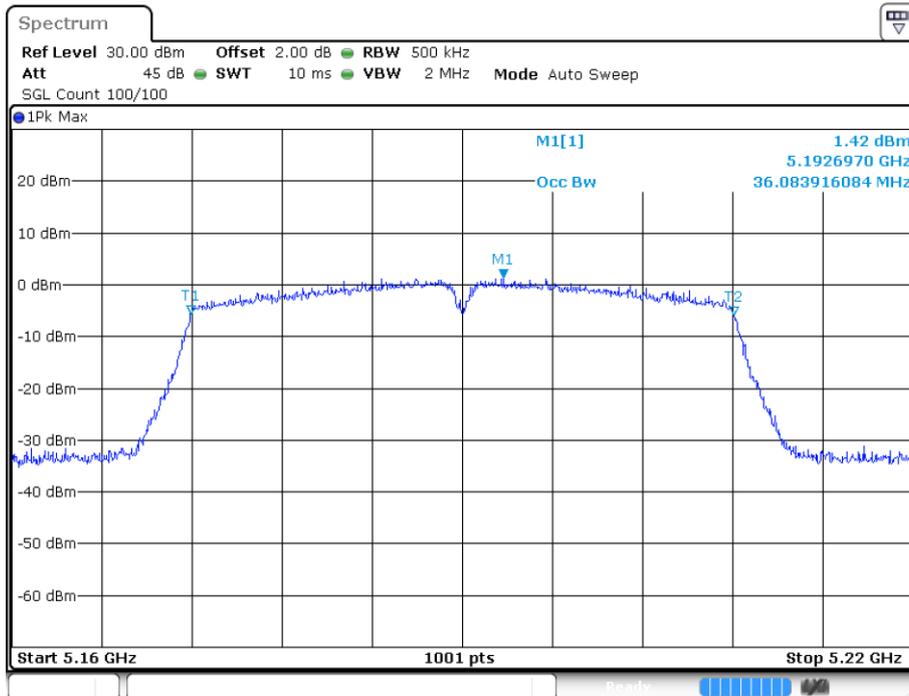


**4.6.2.12 11N20\_140 ANT 1**



Date: 22.OCT.2019 21:41:57

**4.6.2.13 11N40\_38 ANT 1**

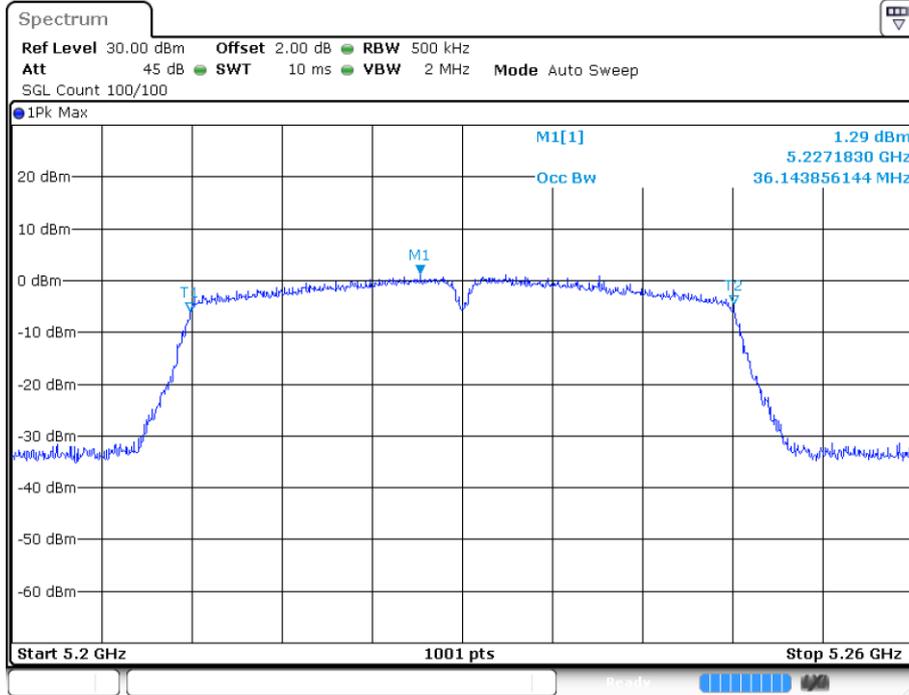


Date: 22.OCT.2019 21:48:47



4.6.2.14

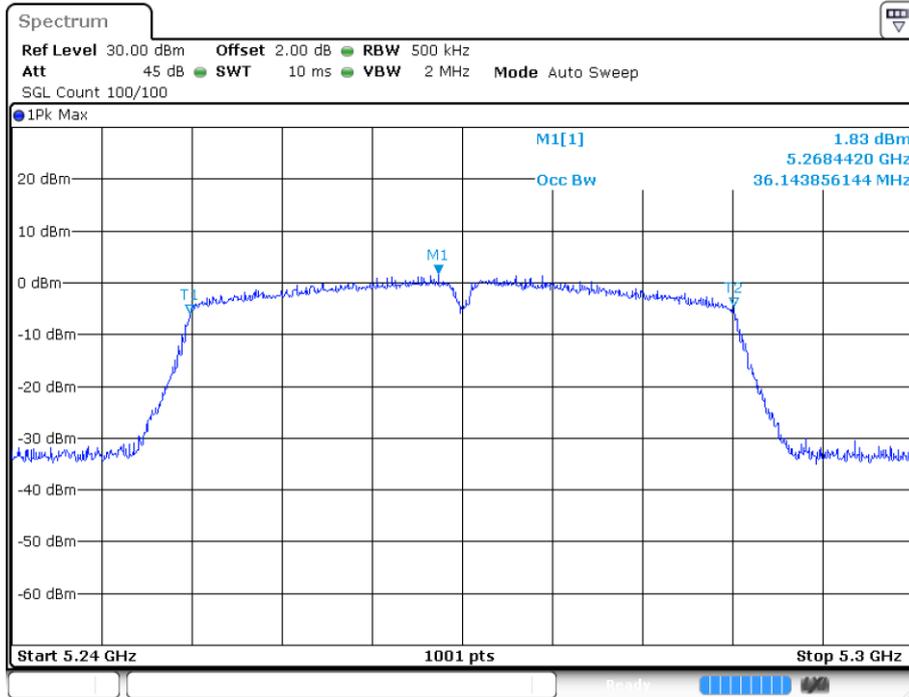
11N40\_46 ANT 1



Date: 22.OCT.2019 21:49:37

4.6.2.15

11N40\_54 ANT 1



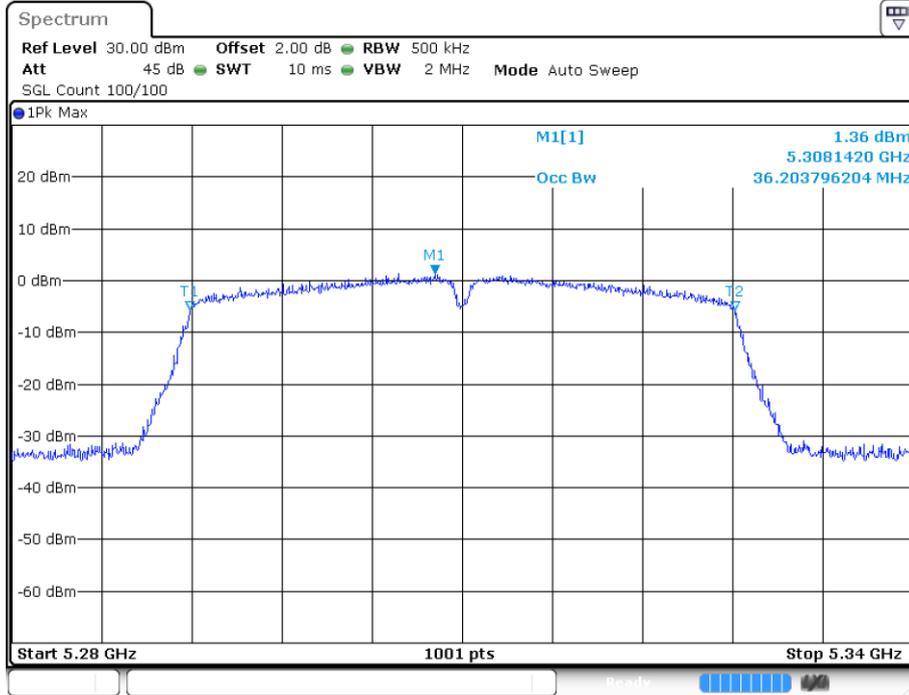
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4.6.2.16

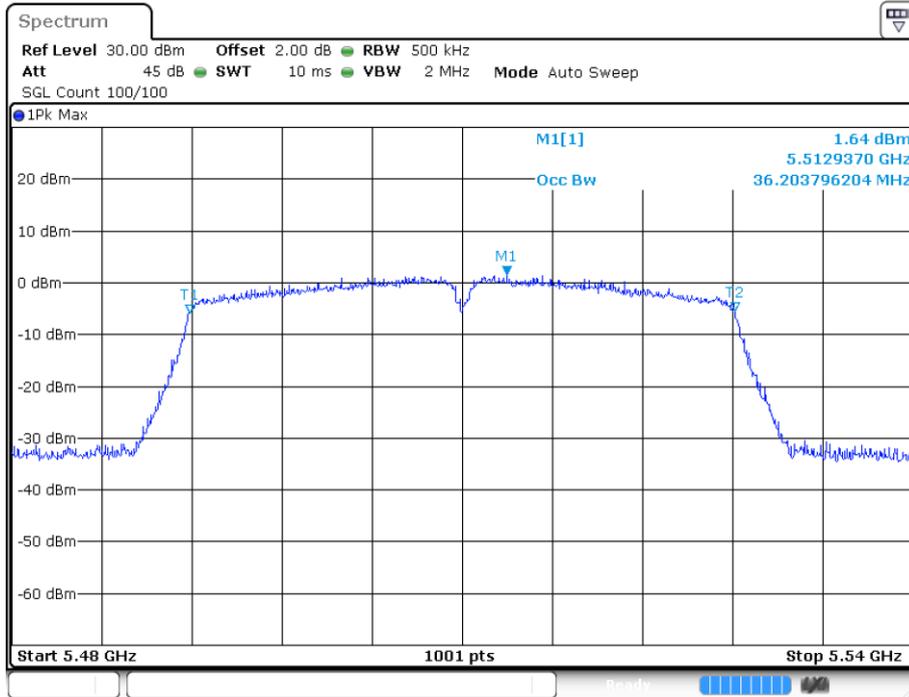
11N40\_62 ANT 1



Date: 22.OCT.2019 21:52:02

4.6.2.17

11N40\_102 ANT 1



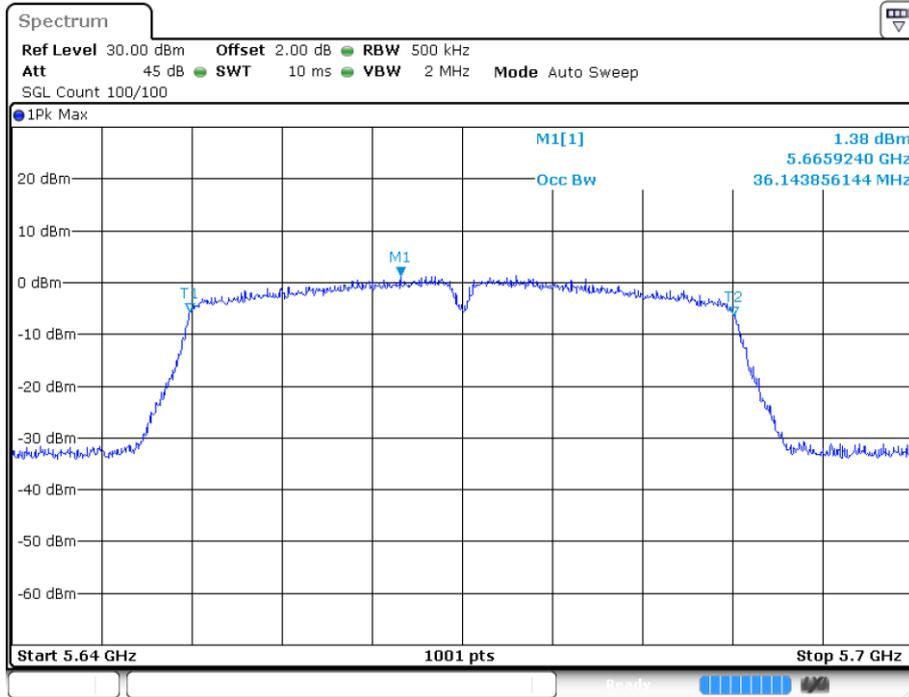
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**4.6.2.18**

**11N40\_134 ANT 1**



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### 4.7 Maximum Power Spectral Density

Test Requirement:	47 CFR Part 15 Section 15.407(a)	
Test Method:	ANSI C63.10: 2013	
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 6Mbps of rate is the worst case of 802.11a (HT20); MCS0 of rate is the worst case of 802.11n (HT20); MCS0 of rate is the worst case of 802.11n (HT40); Only the worst case is recorded in the report.	
Limit:	Frequency Band	Limit
	5150-5250MHz	The power spectral density less than 11dBm/1MHz
	5250-5350MHz	The power spectral density less than 11dBm/1MHz
	5470-5725MHz	The power spectral density less than 11dBm/1MHz
Test Results:	Pass	



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**4.7.1 Test Results For Power Density**

Test Mode	Test Channel	Frequency [MHz]	Antenna Port	Meas. Level (Cond.)	Unit	Verdict
11A20	36	5180	ANT 1	2.33	dBm/MHz	PASS
	48	5240	ANT 1	2.16	dBm/MHz	PASS
	52	5260	ANT 1	1.92	dBm/MHz	PASS
	64	5320	ANT 1	2.23	dBm/MHz	PASS
	100	5500	ANT 1	2.70	dBm/MHz	PASS
	140	5700	ANT 1	1.83	dBm/MHz	PASS
11N20	36	5180	ANT 1	0.47	dBm/MHz	PASS
	48	5240	ANT 1	0.36	dBm/MHz	PASS
	52	5260	ANT 1	0.60	dBm/MHz	PASS
	64	5320	ANT 1	1.58	dBm/MHz	PASS
	100	5500	ANT 1	1.02	dBm/MHz	PASS
	140	5700	ANT 1	1.32	dBm/MHz	PASS
11N40	38	5190	ANT 1	-1.72	dBm/MHz	PASS
	46	5230	ANT 1	-2.18	dBm/MHz	PASS
	54	5270	ANT 1	-2.06	dBm/MHz	PASS
	62	5310	ANT 1	-1.93	dBm/MHz	PASS
	102	5510	ANT 1	-1.95	dBm/MHz	PASS
	134	5670	ANT 1	-2.24	dBm/MHz	PASS

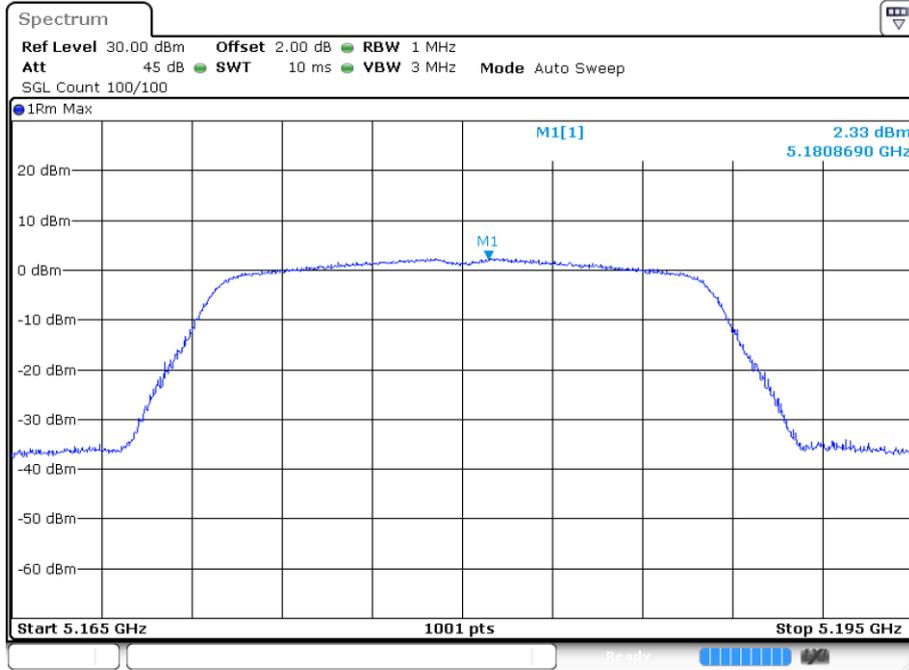


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**4.7.2 Test plots For Power Density**

**4.7.2.1 11A20\_36 ANT 1**



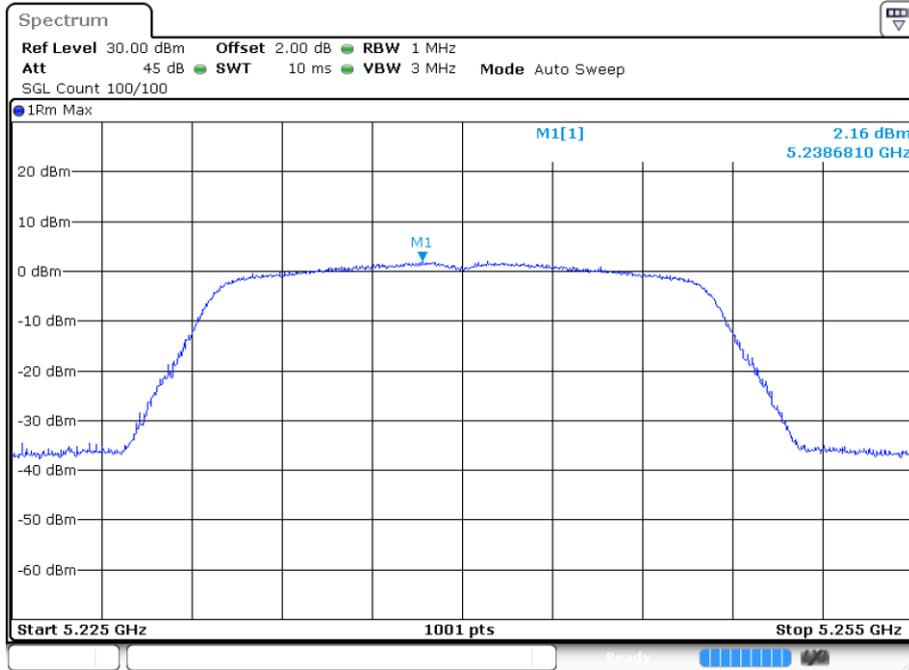
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4.7.2.2

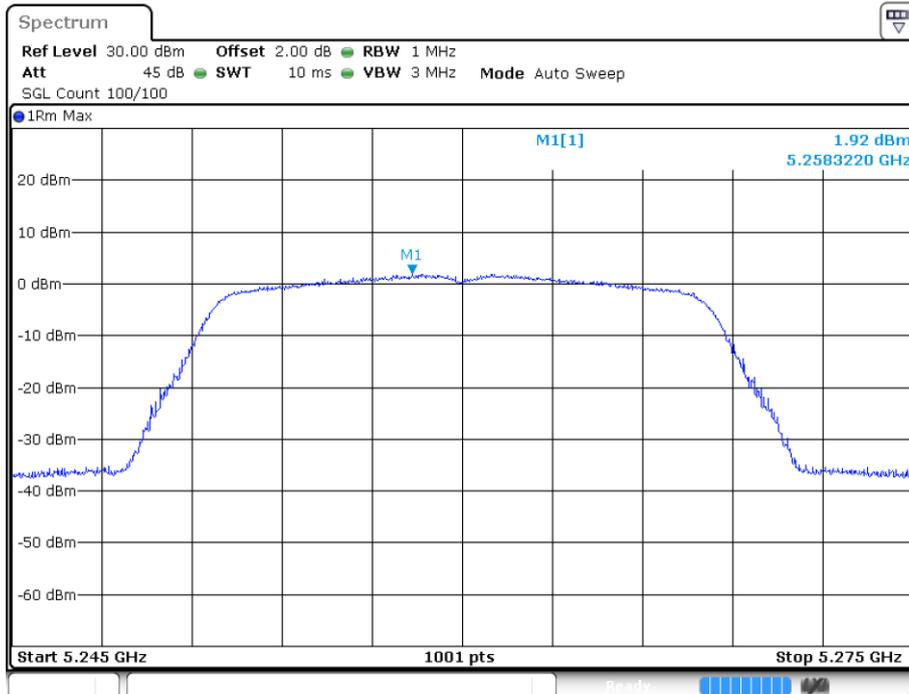
11A20\_48 ANT 1



Date: 22.OCT.2019 20:37:13

4.7.2.3

11A20\_52 ANT 1



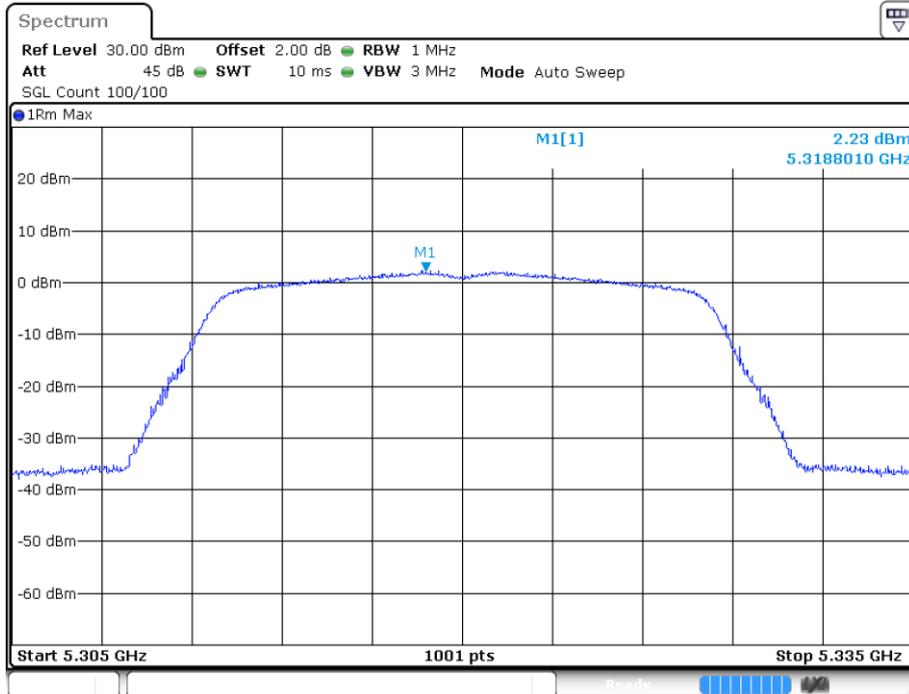
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4.7.2.4

11A20\_64 ANT 1



Date: 22.OCT.2019 20:40:01

4.7.2.5

11A20\_100 ANT 1



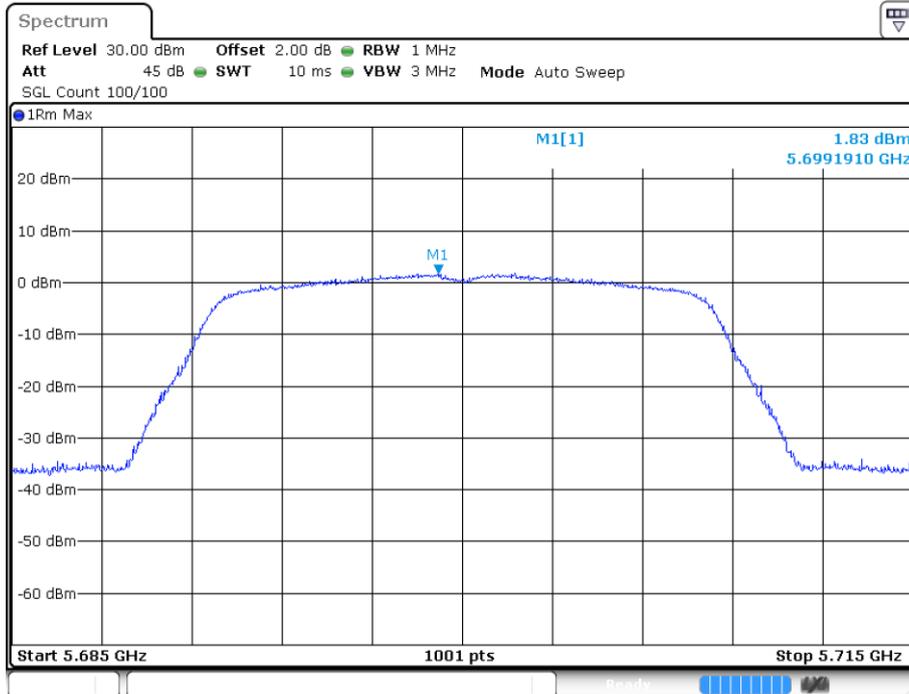
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4.7.2.6

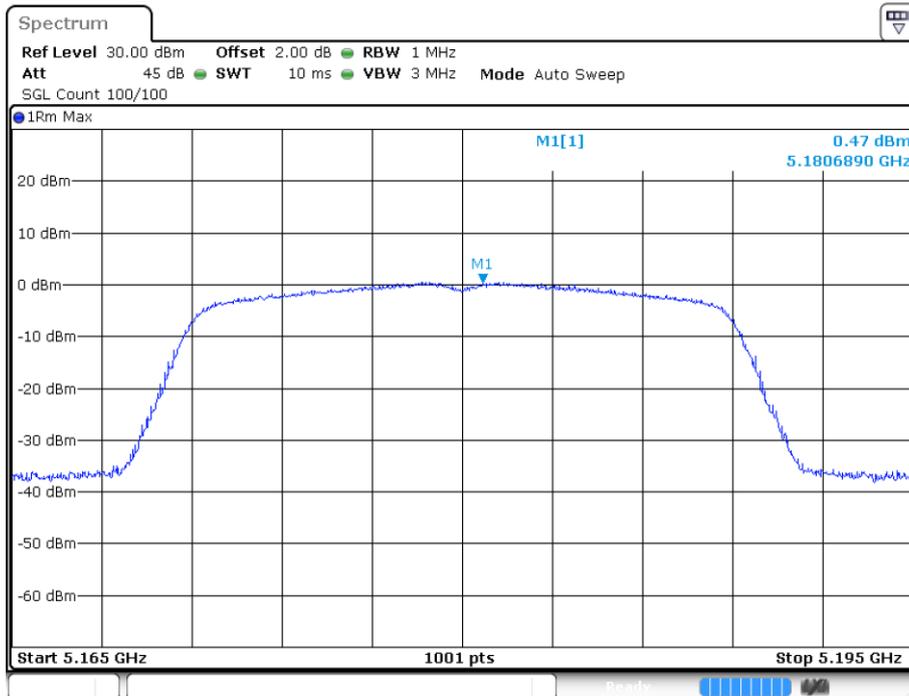
**11A20\_140 ANT 1**



Date: 22.OCT.2019 20:43:32

4.7.2.7

**11N20\_36 ANT 1**



Date: 22.OCT.2019 20:51:24

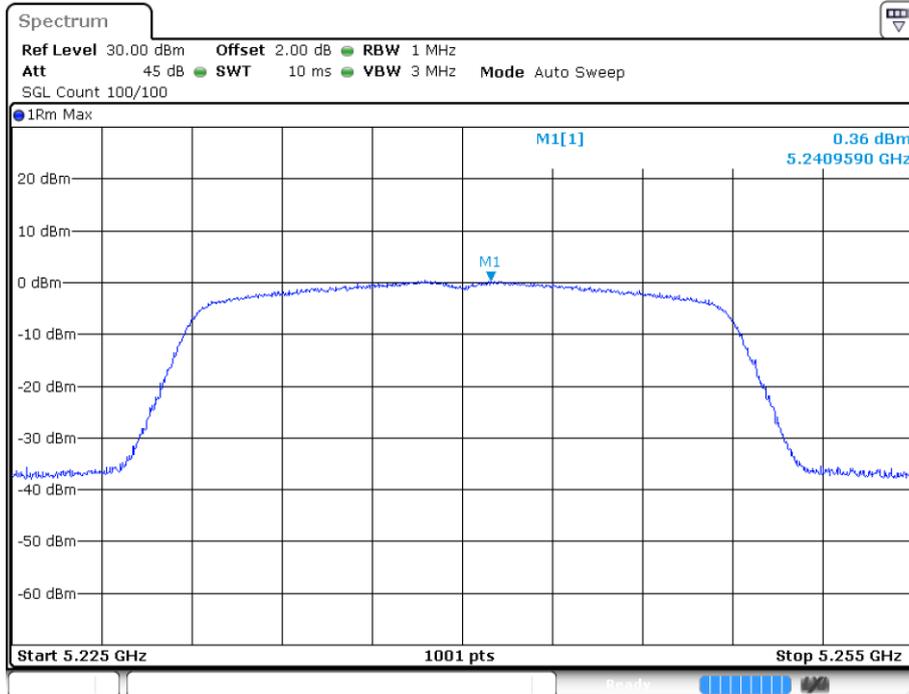


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**4.7.2.8**

**11N20\_48 ANT 1**



Date: 22.OCT.2019 20:52:36

**4.7.2.9**

**11N20\_52 ANT 1**



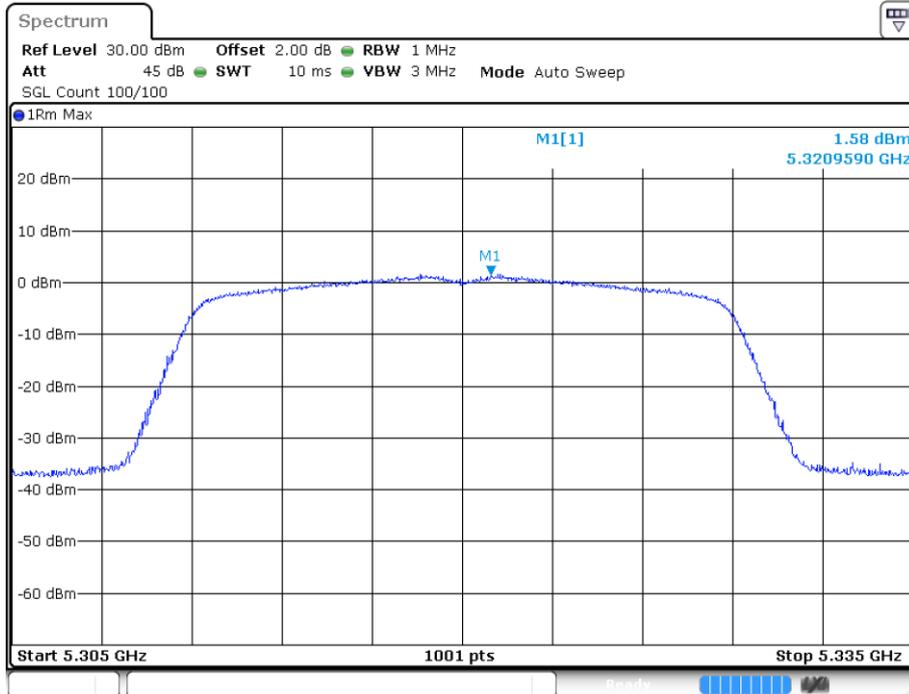
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4.7.2.10

11N20\_64 ANT 1



Date: 22.OCT.2019 21:02:41

4.7.2.11

11N20\_100 ANT 1



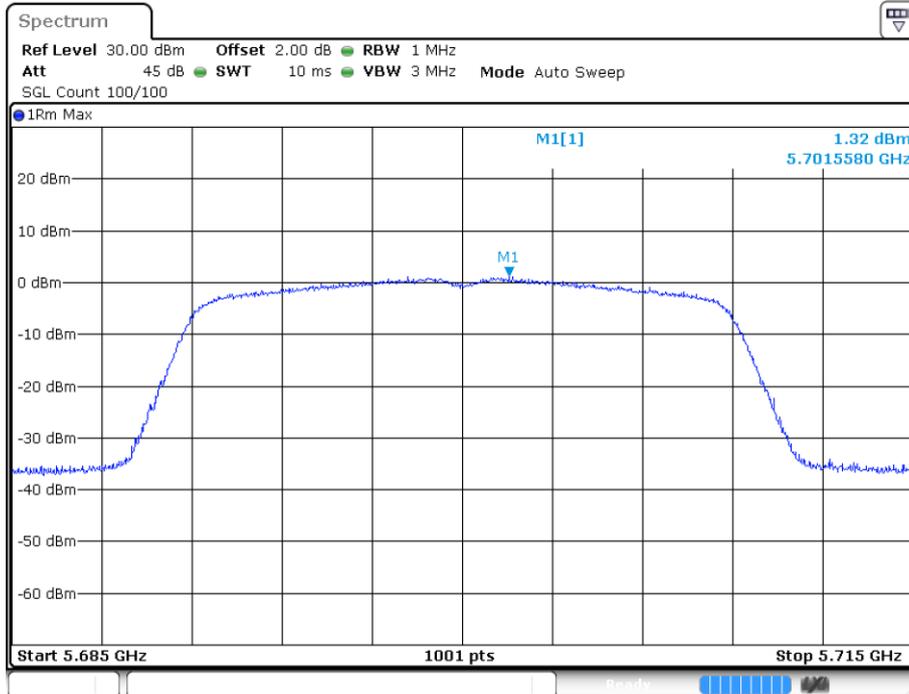
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4.7.2.12

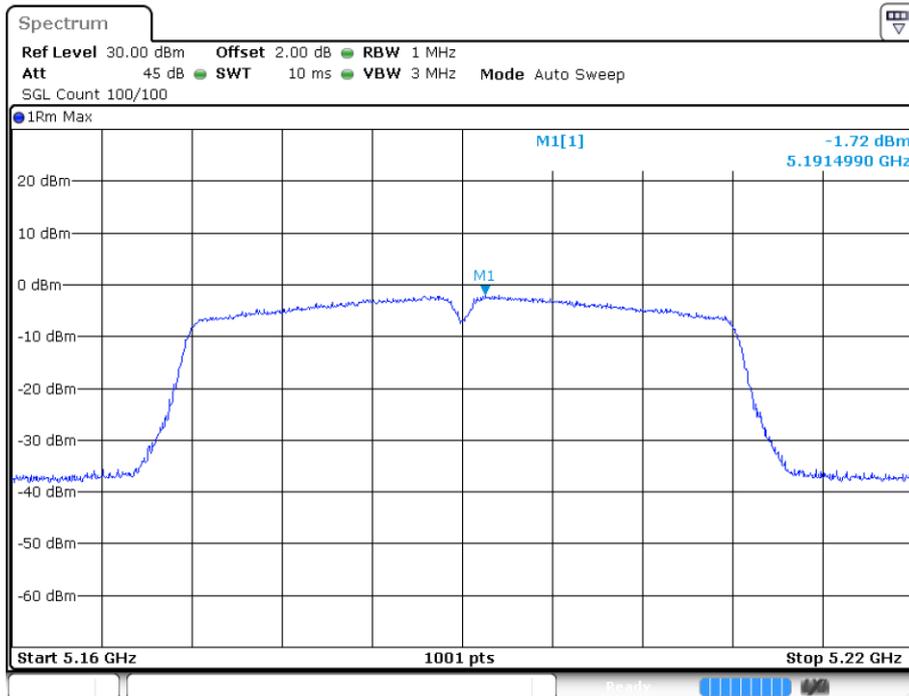
**11N20\_140 ANT 1**



Date: 22.OCT.2019 21:42:17

4.7.2.13

**11N40\_38 ANT 1**

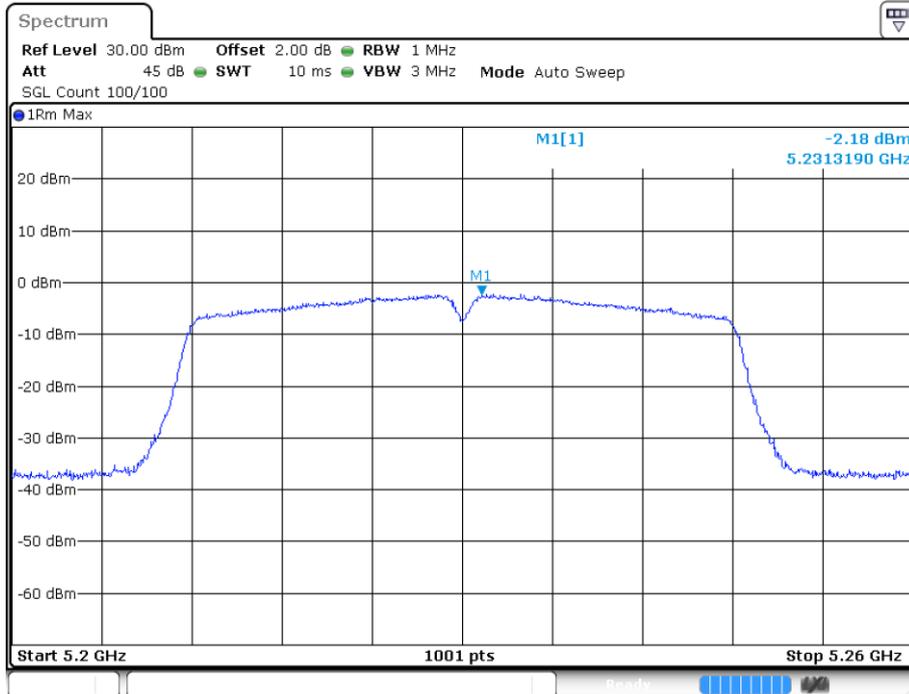


Date: 22.OCT.2019 21:49:08



4.7.2.14

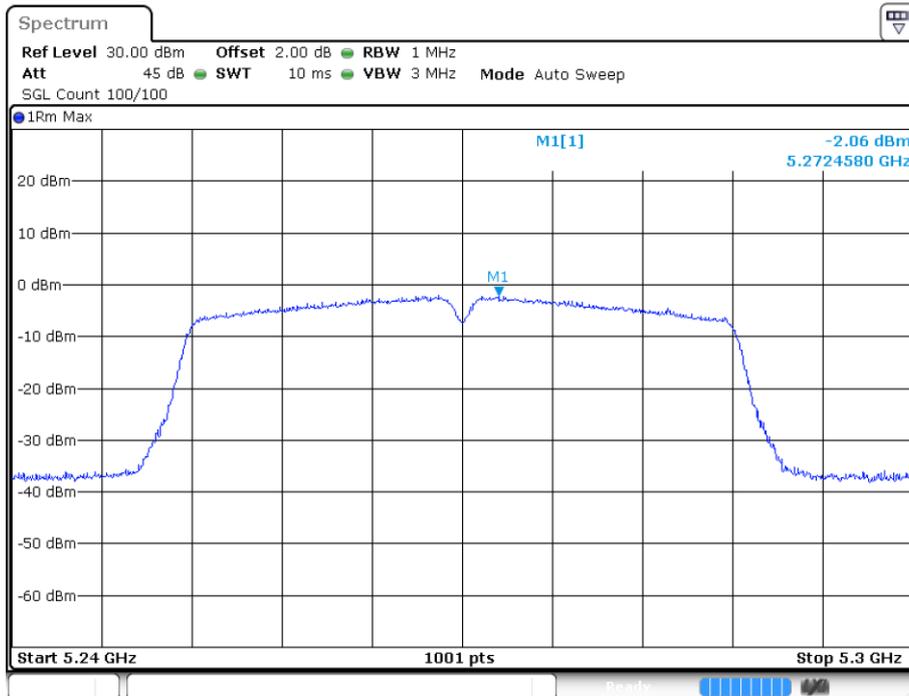
**11N40\_46 ANT 1**



Date: 22.OCT.2019 21:49:58

4.7.2.15

**11N40\_54 ANT 1**



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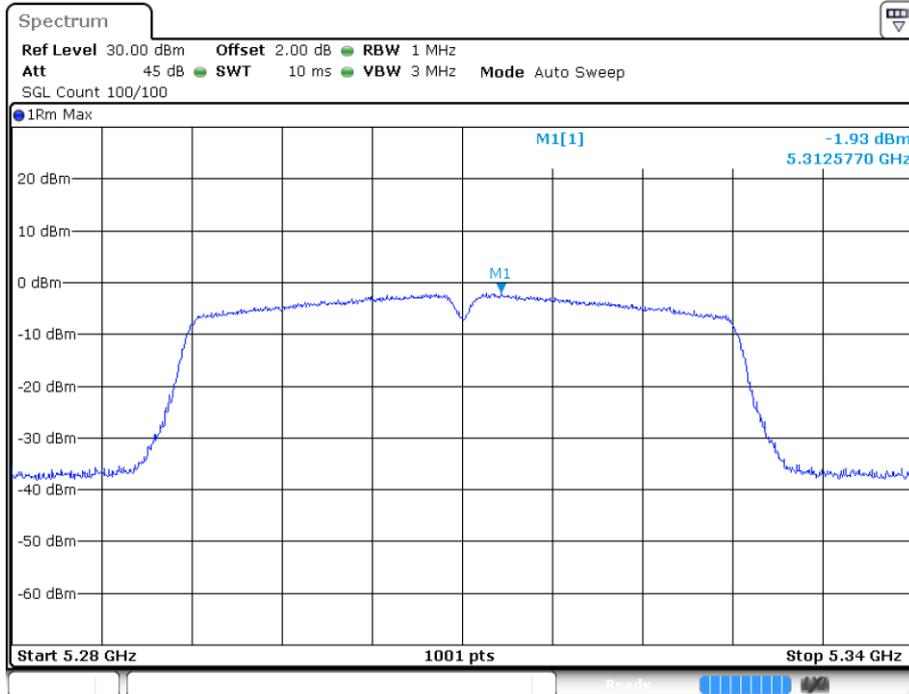


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4.7.2.16

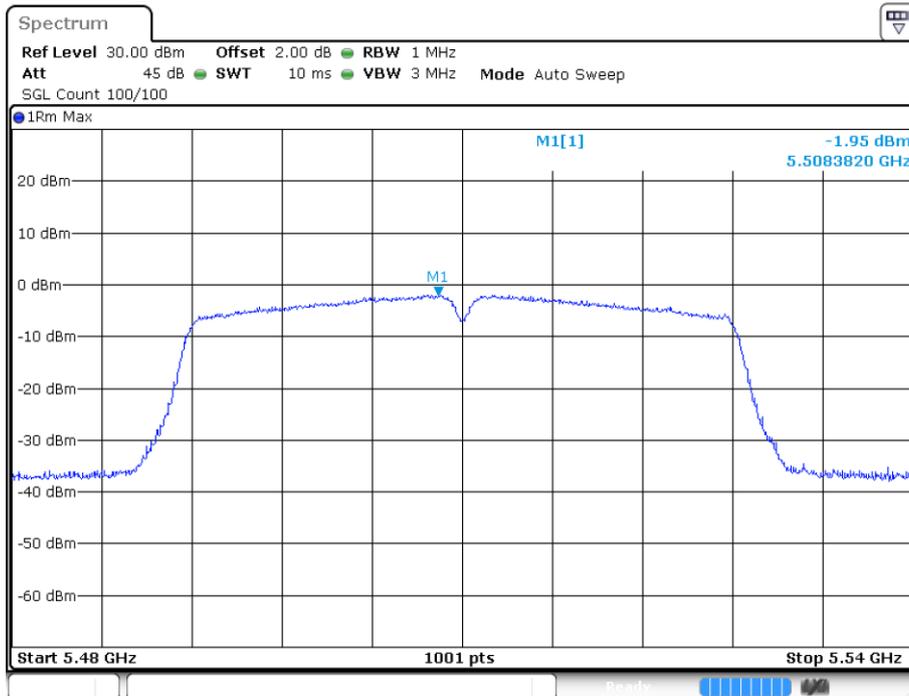
**11N40\_62 ANT 1**



Date: 22.OCT.2019 21:52:23

4.7.2.17

**11N40\_102 ANT 1**



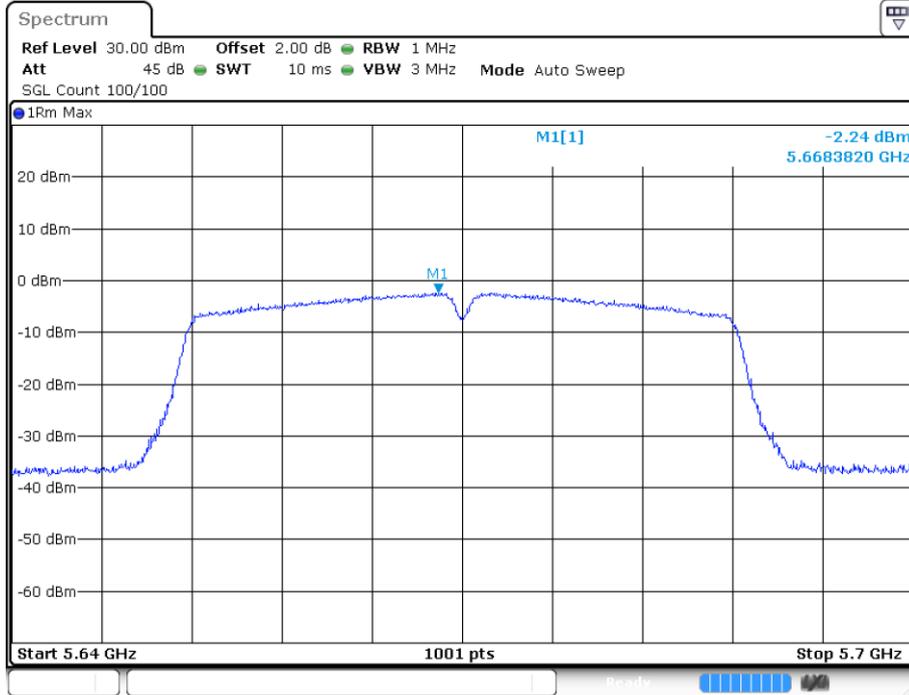
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4.7.2.18

11N40\_134 ANT 1



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### 4.8 Radiated Spurious Emission (Radiated)

Test Requirement:	47 CFR Part 15 Section 15.407(b)
Test Method:	ANSI C63.10: 2013
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)
Test Setup:	

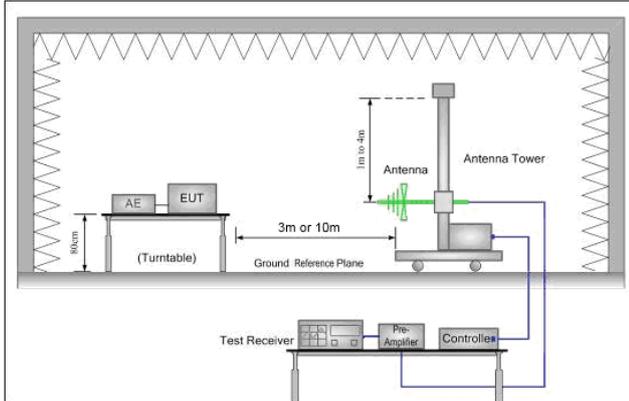


Figure 1. 30MHz to 1GHz

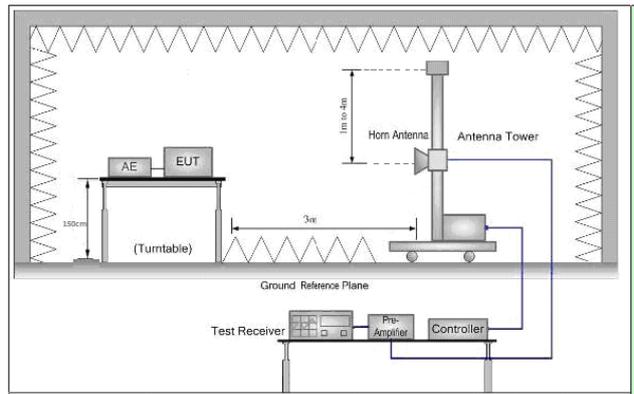


Figure 2. Above 1 GHz

Test Procedure:	<ol style="list-style-type: none"> <li>For below 1GHz test, 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.</li> <li>For above 1GHz test, 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.</li> <li>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.</li> <li>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.</li> <li>Use the following spectrum analyzer settings:             <ol style="list-style-type: none"> <li>Span shall wide enough to fully capture the emission being measured;</li> <li>Set RBW=100 kHz for <math>f &lt; 1</math> GHz; <math>VBW \geq RBW</math>; Sweep = auto; Detector function = peak; Trace = max hold;</li> <li>Set RBW = 1 MHz, <math>VBW = 3</math>MHz for <math>f \geq 1</math> GHz for peak measurement. For average measurement:                 <ul style="list-style-type: none"> <li>• <math>VBW = 10</math> Hz, when duty cycle is no less than 98 percent.</li> <li>• <math>VBW \geq 1/T</math>, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is</li> </ul> </li> </ol> </li> </ol>
-----------------	--



	<p>transmitting at its maximum power control level for the tested mode of operation.</p> <p>f. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>g. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>h. Test the EUT in the outermost channels.</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.
Final Test Mode:	<p>Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a (HT20); MCS0 of rate is the worst case of 802.11n (HT20); MCS0 of rate is the worst case of 802.11n (HT40);</p> <p>For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11a at lowest channel is the worst case.</p> <p>Only the worst case is recorded in the report.</p>
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

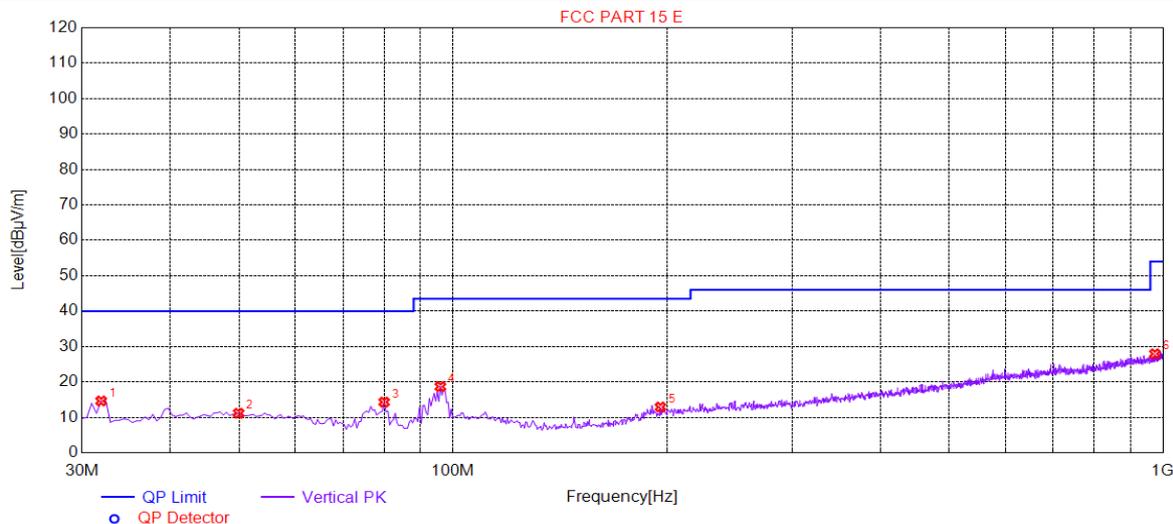


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**4.8.1 Radiated emission below 1GHz**

<b>30MHz~1GHz (QP)</b>		
Test mode:	Transmitting	Vertical

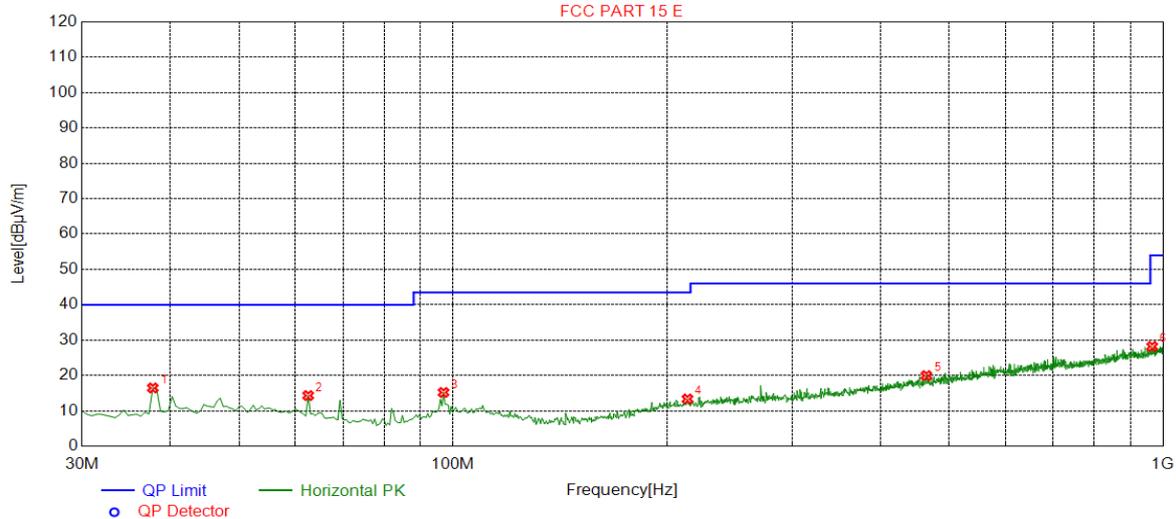


NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	31.9410	14.63	-33.03	40.00	25.37	100	167	PK	Vertical
2	49.8949	11.16	-30.36	40.00	28.84	100	277	PK	Vertical
3	79.9800	14.31	-36.15	40.00	25.69	200	123	PK	Vertical
4	95.9930	18.69	-32.71	43.50	24.81	100	180	PK	Vertical
5	195.9530	12.92	-31.61	43.50	30.58	100	173	PK	Vertical
6	974.2821	27.94	-15.14	54.00	26.06	100	275	PK	Vertical





Test mode:	Transmitting	Horizontal
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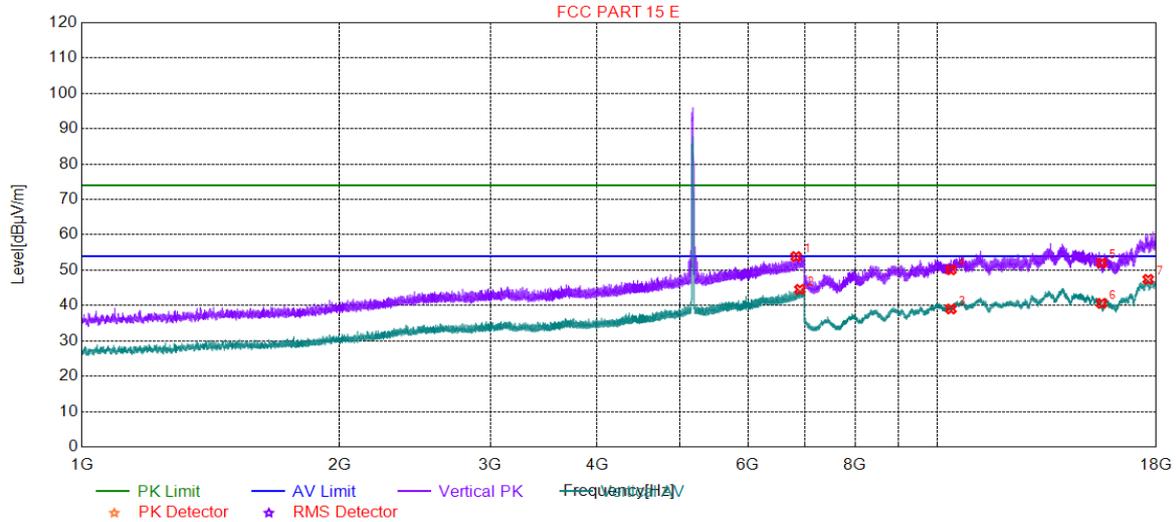
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	37.7639	16.48	-32.06	40.00	23.52	200	20	PK	Horizontal
2	62.5113	14.32	-32.51	40.00	25.68	200	20	PK	Horizontal
3	96.9635	15.20	-32.54	43.50	28.30	200	50	PK	Horizontal
4	213.9070	13.35	-30.87	43.50	30.15	100	140	PK	Horizontal
5	464.2921	19.95	-24.13	46.00	26.05	100	82	PK	Horizontal
6	965.5478	28.18	-15.27	54.00	25.82	100	263	PK	Horizontal



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### 4.8.2 Transmitter emission above 1GHz

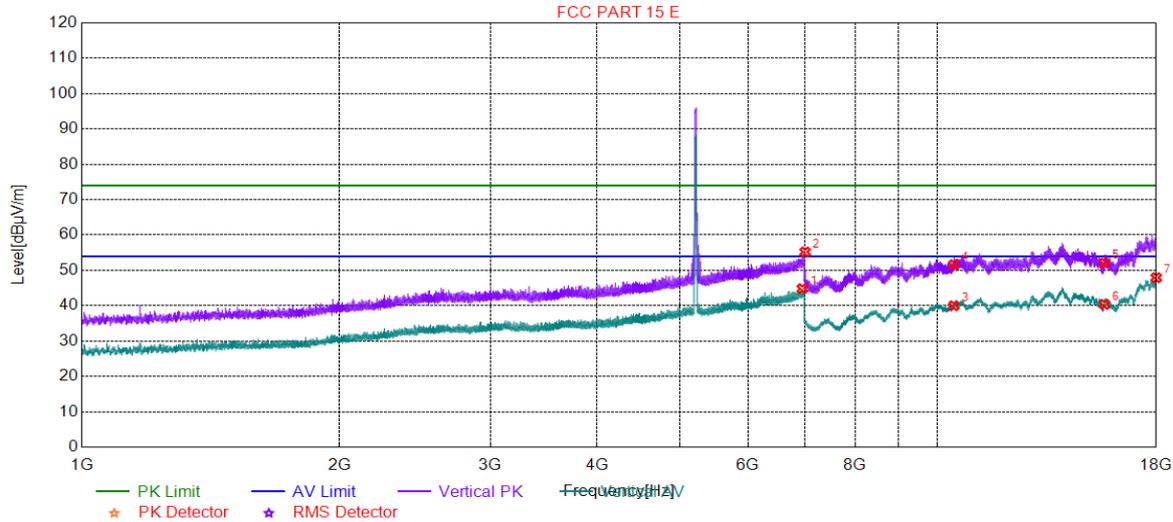
#### 4.8.2.1 11A20\_36 ANT 1\_Vertical



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	6829.8915	53.86	12.13	74.00	20.14	150	249	PK	Vertical
2	6900.9951	44.57	12.40	54.00	9.43	150	162	AV	Vertical
3	10360.0000	39.03	-5.35	54.00	14.97	150	168	AV	Vertical
4	10360.0000	50.10	-5.35	74.00	23.90	150	168	PK	Vertical
5	15540.0000	52.04	-3.26	74.00	21.96	150	221	PK	Vertical
6	15540.0000	40.61	-3.26	54.00	13.39	150	221	AV	Vertical
7	17611.1306	47.41	1.34	54.00	6.59	150	18	AV	Vertical



**4.8.2.2 11A20\_44 ANT 1\_Vertical**



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	6946.2973	44.84	12.57	54.00	9.16	150	18	PK	Vertical
2	6998.1999	55.21	12.76	74.00	18.79	150	76	AV	Vertical
3	10440.0000	40.00	-4.92	54.00	14.00	150	168	AV	Vertical
4	10440.0000	51.63	-4.92	74.00	22.37	150	217	PK	Vertical
5	15660.0000	52.06	-3.54	74.00	21.94	150	118	PK	Vertical
6	15660.0000	40.37	-3.54	54.00	13.63	150	317	AV	Vertical
7	17993.9497	47.94	-0.40	54.00	6.06	150	317	AV	Vertical



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