FCC TEST REPORT

Product Name:	Mobile Phone
Trade Mark:	MI
Model No.:	M1803E7SH
Report Number:	180117025RFC-4
Test Standards:	FCC 47 CFR Part 15 Subpart E
FCC ID:	2AFZZ-RME7SH
Test Result:	PASS
Date of Issue:	February 24, 2018

Prepared for:

Xiaomi Communications Co., Ltd.
The Rainbow City of China Resources, NO.68,Qinghe Middle Street,
Haidian District, Beijing, China

Prepared by:

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Assistant Manager

Date: February 24, 2018

UnionTrust Laboratories * Certified *

Version

Version No.	Date	Description
V1.0	February 24, 2018	Original

CONTENTS

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Xiaomi Communications Co., Ltd.
Address of Applicant:	The Rainbow City of China Resources, NO.68,Qinghe Middle Street, Haidian District, Beijing, China
Manufacturer:	Xiaomi Communications Co., Ltd.
Address of Manufacturer:	The Rainbow City of China Resources, NO.68,Qinghe Middle Street, Haidian District, Beijing, China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Mobile Phone		
Model No.:	M1803E7SH		
Add. Model No.:	N/A		
Trade Mark:	MI		
DUT Stage:	Identical Prototype		
EUT Supports Function:	GSM Bands:	GSM850/1900	
	UTRA Bands:	Band II/ Band IV/ Band V	
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 7	
		TDD Band 38	
	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
		Bluetooth V5.0	
	5 GHz U-NII Bands:	5 150 MHz to 5 250 MHz	IEEE 802.11a/n/ac
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n/ac
		5 470 MHz to 5 725 MHz	IEEE 802.11a/n/ac
		5 725 MHz to 5 850 MHz	IEEE 802.11a/n/ac
	RNSS Bands:	1559 MHz to 1610 MHz	GPS/ GNSS/ GLONASS/ BDS
	BSR:	VHF Band II	FM
Software Version:	MIUI9		
Hardware Version:	P2.2		
IMEI Code:	867255030202727, 867255030205514		
Sample Received Date:	January 18, 2018		
Sample Tested Date:	January 20, 2018 to February 3, 2018		

1.2.2 Description of Accessories

Adapter(1)	
Trade Mark:	XIAOEZ
Model No.:	MDY-08-EZ
Input:	100-240V~50/60 Hz 0.35A
Output:	5V ⎓ 2A
AC Cable:	N/A
DC Cable:	N/A
Manufacturer:	Dongguan Aohai Power Technology Co., Ltd.

Adapter(2	
Trade Mark:	XIAOMI
Model No.:	MDY-08-EZ
Input:	100-240V~50/60 Hz 0.35A
Output:	5V ⎓ 2A
AC Cable:	N/A
DC Cable:	N/A
Manufacturer:	Jiangsu Chenyang Electron Co., Ltd.

Battery	
Trade Mark:	MI
Model No.:	BN45
Battery Type:	Lithium-ion Polymer Rechargeable Battery
Rated Voltage:	3.85 Vdc
Limited Charge Voltage:	4.4 Vdc
Rated Capacity:	3900 mAh
Manufacturer:	Sunwoda Electronic Co., Ltd.

Cable(1)	
Trade Mark:	MI
Model No.:	KLC-2639-1
Description:	USB Micro-B Plug Cable
Cable Type:	Shielded without ferrite
Length:	0.8 Meter

Cable(2)	
Trade Mark:	MI
Model No.:	OUS231XI0026
Description:	USB Micro-B Plug Cable
Cable Type:	Shielded without ferrite
Length:	0.8 Meter

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Frequency Range:	5150 MHz to 5250 MHz				
	5250 MHz to 5350 MHz				
	5470 MHz to 5725 MHz				
	5 725 MHz to 5 850 MHz				
Support Standards:	IEEE 802.11a/n/ac				
TPC Function:	Not Support				
DFS Operational mode:	Slave without radar Interference detection function				
Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK)				
	IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK)				
	IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)				
Channel Spacing:	IEEE 802.11a/n-HT20/ac-VHT20: 20 MHz				
	IEEE 802.11n-HT40/ac-VHT40: 40 MHz				
	IEEE 802.11ac-VHT80/: 80 MHz				
Data Rate:	IEEE 802.11a: Up to 54 Mbps				
	IEEE 802.11n-HT20: Up to MCS7				
	IEEE 802.11n-HT40: Up to MCS7				
	IEEE 802.11ac-VHT20: Up to MCS8				
	IEEE 802.11ac-VHT40: Up to MCS9				
	IEEE 802.11ac-VHT80: Up to MCS9				
Number of Channels:	5150 MHz to 5250 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40)/ac-VHT40 1 for IEEE 802.11acVHT80				
	5250 MHz to 5350 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40)/ac-VHT40 1 for IEEE 802.11acVHT80				
	5470 MHz to 5725 MHz: 11 for IEEE 802.11a/n-HT20/ac-VHT20 5 for IEEE 802.11n-HT40/ac-VHT40 2 for IEEE 802.11ac-VHT80				
	5725 MHz to 5850 MHz: 5 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40/ac-VHT40 1 for IEEE 802.11ac-VHT80				
Antenna Type:	PIFA Antenna				
Antenna Gain:	5150 MHz to 5250 MHz	1.58 dBi			
	5250 MHz to 5350 MHz	2.03 dBi			
	5470 MHz to 5725 MHz	2.21 dBi			
	5725 MHz to 5850 MHz	0.74 dBi			
Maximum Conducted Output Power (dBm):	**Mode**	**U-NII-1**	**U-NII-2A**	**U-NII-2C**	**U-NII-3**
	IEEE 802.11a	12.61	12.49	13.64	13.76
	IEEE 802.11n-HT20	12.56	12.49	13.55	13.67
	IEEE 802.11n-HT40	11.78	12.24	12.85	13.22
	IEEE 802.11ac-VHT20	12.07	12.08	12.84	12.99
	IEEE 802.11ac-VHT40	10.28	12.21	11.78	12.15
	IEEE 802.11ac-VHT80	11.56	11.46	11.31	11.50
Normal Test Voltage:	3.85 Vdc				

Extreme Test Voltage:	3.60 to 4.40 Vdc
Extreme Test Temperature:	-10 °C to +55 °C

1.4 OTHER INFORMATION

Operation Frequency Each of Channel				
	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
IEEE 802.11a, IEEE 802.11n-HT20, IEEE 802.11ac-VHT20	f = 5000 + 5k, k = 32 + 4n			f = 5000 + 5k, k = 145 + 4n
	n = 1,…, 4	n = 5,…, 8	n = 17,…, 27	n = 1,…, 5
IEEE 802.11n-HT40, IEEE 802.11ac-VHT40	f = 5000 + 5k, k = 30 + 8n			f = 5000 + 5k, k = 143 + 8n
	n = 1, 2	n = 1,…, 5	n = 9,…, 13	n = 1, 2
IEEE 802.11ac-VHT80	f = 5000 + 5k, k = 26 + 16n			f = 5000 + 5k, k = 155
	n = 1	n = 1, 2	n = 5, 6	
Note: **f** is the operating frequency (MHz); **k** is the operating channel.				

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	FCC ID	Supplied by
Notebook	Lenovo	E450	SL10G10780	N/A	UnionTrust
Wireless AP	Alcatel-Lucent	G-240W-B	N/A	2ADZRG240WB	UnionTrust
Mouse	DELL	MS111	CN-011D3V-738	N/A	UnionTrust
U Disk	Kingston	DTSE9 G2	N/A	N/A	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.30 Meter	UnionTrust

1.6 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.7 TEST FACILITY

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

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025

to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

IC-Registration No.: 21600-1

The 3m Semi-anechoic chamber of Shenzhen UnionTrust Quality and Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 21600-1.

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC Accredited Lab.

Designation Number: CN1194
Test Firm Registration Number: 259480

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.11 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 dB

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart E Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Antenna Requirement	FCC 47 CFR Part 15 Subpart C Section 15.203 FCC 47 CFR Part 15 Subpart C Section 15.407(a)(1) (2)	ANSI C63.10-2013	PASS(Note2)
26 dB emission bandwidth	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(2)(5)	KDB 789033 D02 v02r01 Section C.1	PASS(Note2)
6 dB bandwidth	FCC 47 CFR Part 15 Subpart E Section 15.407 (e)	KDB 789033 D02 v02r01 Section C.2	PASS(Note2)
Maximum conducted output power	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)	KDB 789033 D02 v02r01 Section E.3.a(Method PM)	PASS(Note2)
Peak Power Spectral Density	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)	KDB 789033 D02 v02r01 Section F	PASS(Note2)
Frequency stability	FCC 47 CFR Part 15 Subpart E Section 15.407 (g)	ANSI C63.10-2013	PASS(Note2)
Radiated Emissions and Band Edge Measurement	FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(1)(2)(3)(4)(6) FCC 47 CFR Part 15 Subpart C Section 15.209/205	KDB 789033 D02 v02r01 Section G.3, G.4, G.5, and G.6	PASS(Note2)
Dynamic Frequency Selection	FCC 47 CFR Part 15 Subpart E Section 15.407 (h)	KDB 905462 D03 Client Without DFS New Rules v01r02	PASS(Note2)
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(6) FCC 47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS(Note2)
Note: 1) N/A: In this whole report not application. 2) The EUT (M1803E7SH) and model (M1803E7SG) both mobile phone are identical in BT/WIFI/RNSS/FM design, about the difference between the both mobile phone, please refer to the attachment of difference statement. After assessment, all technical data is referred to previous report no. 180106002RFC-4 dated February 5, 2018.			

For Dynamic Frequency Selection

Test Case	Result
Channel Availability Check Time	N/A[1]
U-NII Detection Bandwidth	N/A[1]
Channel Closing Transmission Time	PASS
Channel Move Time	PASS
DFS Detection Threshold	N/A[1]
Non- Occupancy Period	N/A[1]
Note: 1) The EUT is slave, NA In this whole report not application.	

3. EQUIPMENT LIST

Radiated Emission Test Equipment List (3M Chamber)						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☑	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 20, 2015	Dec. 19, 2018
☑	Receiver	R&S	ESIB26	100114	Dec. 10, 2017	Dec. 10, 2018
☑	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Dec.10, 2017	Dec. 10, 2018
☑	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 17, 2017	Dec. 17, 2018
☑	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 17, 2017	Dec. 17, 2018
☑	Preamplifier	HP	8447F	2805A02960	Dec. 10, 2017	Dec. 10, 2018
☑	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	Dec. 17, 2017	Dec. 17, 2018
☑	Horn Antenna	ETS-LINDGREN	3116C	00200180	Jul. 28, 2015	Jul. 27, 2018
☑	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Dec. 17, 2017	Dec. 17, 2018
☑	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☑	Test Software	Audix	e3	Software Version: 9.160323		

Conducted RF test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☑	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Dec. 10, 2017	Dec. 10, 2018
☑	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	Dec. 10, 2017	Dec. 10, 2018
☑	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430023	Dec. 10, 2017	Dec. 10, 2018
☐	EXG-B RF Analog Signal Generator	KEYSIGHT	N5171B	MY53051777	Dec. 10, 2017	Dec. 10, 2018
☑	MXG X-Series RF Vector Signal Generator	KEYSIGHT	N5182B	MY51350267	Dec. 14, 2017	Dec. 14, 2018
☑	DC Source	KIKUSUI	PWR400L	LK003024	Sep. 14, 2017	Sep. 13, 2018
☑	Temp & Humidity chamber	Espec	GL(U)04KA(W)	16921H201P3	Sep. 14, 2017	Sep. 13, 2018
☑	Temp & Humidity chamber	Votisch	VT4002	58566133290020	Jun. 19, 2017	Jun. 18, 2018

Conducted Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☑	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Dec. 10, 2017	Dec. 10, 2018
☑	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Dec. 10, 2017	Dec. 10, 2018
☑	LISN	R&S	ESH2-Z5	860014/024	Dec. 10, 2017	Dec. 10, 2018
☐	LISN	ETS-Lindgren	3816/2SH	00201088	Dec. 10, 2017	Dec. 10, 2018
☑	Test Software	Audix	e3	Software Version: 9.160323		

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (Vdc)	Relative Humidity (%)
TN/VN	+15 to +35	3.85	20 to 75
TL/VL	-10	3.60	20 to 75
TH/VL	+55	3.60	20 to 75
TL/VH	-10	4.40	20 to 75
TH/VH	+55	4.40	20 to 75

Remark:

1) The EUT just work in such extreme temperature of -10 °C to +55 °C and the extreme voltage of 3.60 V to 4.40 V, so here the EUT is tested in the temperature of -10 °C to +55 °C and the voltage of 3.60 V to 4.40 V.
2) VN: Normal Voltage; TN: Normal Temperature;
TL: Low Extreme Test Temperature; TH: High Extreme Test Temperature;
VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage.

4.2 TEST CHANNELS

Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11a IEEE 802.11n-HT20 IEEE 802.11ac-VHT20	5150 MHz to 5250 MHz	Channel 36	Channel 44	Channel 48
		5180 MHz	5220 MHz	5240 MHz
	5250 MHz to 5350 MHz	Channel 52	Channel 60	Channel 64
		5260 MHz	5300 MHz	5320 MHz
	5470 MHz to 5725 MHz	Channel 100	Channel 120	Channel 140
		5500 MHz	5600 MHz	5700 MHz
	5725 MHz to 5850 MHz	Channel 149	Channel 157	Channel 165
		5745 MHz	5785 MHz	5825 MHz
IEEE 802.11n-HT40 IEEE 802.11ac-VHT40	5150 MHz to 5250 MHz	Channel 38	--	Channel 46
		5190 MHz	--	5230 MHz
	5250 MHz to 5350 MHz	Channel 54	--	Channel 62
		5270 MHz	--	5310 MHz
	5470 MHz to 5725 MHz	Channel 102	Channel 118	Channel 134
		5510 MHz	5590 MHz	5670 MHz
	5725 MHz to 5850 MHz	Channel 151	--	Channel 159
		5755 MHz	--	5795 MHz
IEEE 802.11ac-VHT80	5150 MHz to 5250 MHz	--	Channel 42	--
		--	5210 MHz	--
	5250 MHz to 5350 MHz	--	Channel 58	--
		--	5290 MHz	--
	5470 MHz to 5725 MHz	Channel 106	--	Channel 122
		5530 MHz	--	5610 MHz
	5725 MHz to 5850 MHz	--	Channel 155	--
		--	5775 MHz	--

4.3 EUT TEST STATUS

Mode	Tx/Rx Function	Description
IEEE 802.11a/n/ac	1Tx/1Rx	1. Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

Test software name: QRCT 3

4.4 PRE-SCAN

4.4.1 Pre-scan under all rates

Mode and Frequency	Maximum Conducted Average Power (dBm) for Data Rates (Mbps)							
IEEE 802.11a 5180 MHz	6	9	12	18	24	36	48	54
	11.92	11.93	11.87	**11.96**	11.90	11.88	11.78	11.67
IEEE 802.11n-HT20 5180 MHz	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	11.85	11.82	**11.88**	11.73	11.69	11.70	11.65	11.81
IEEE 802.11n-HT40 5190 MHz	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	11.30	11.14	11.21	10.78	10.89	11.03	10.79	10.65
IEEE 802.11ac-VHT20 5180 MHz	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	11.31	11.21	11.13	10.97	10.89	10.88	10.76	10.58
	MCS8							
	10.52							
IEEE 802.11ac-VHT40 5190 MHz	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	11.88	11.82	11.78	11.76	11.69	11.52	11.20	10.78
	MCS8	MCS9						
	10.54	9.998						
IEEE 802.11ac-VHT80 5210 MHz	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	10.79	10.38	10.43	9.87	9.12	8.98	8.88	8.76
	MCS8	MCS9						
	8.67	7.98						

4.4.2 Worst-case data rates

Mode	Worst-case data rates
IEEE 802.11a	18 Mbps
IEEE 802.11n-HT20	MCS2
IEEE 802.11n-HT40	MCS1
IEEE 802.11ac-VHT20	MCS3
IEEE 802.11ac-VHT40	MCS0
IEEE 802.11ac-VHT80	MCS0

4.5 TEST SETUP

4.5.1 For Radiated Emissions test setup

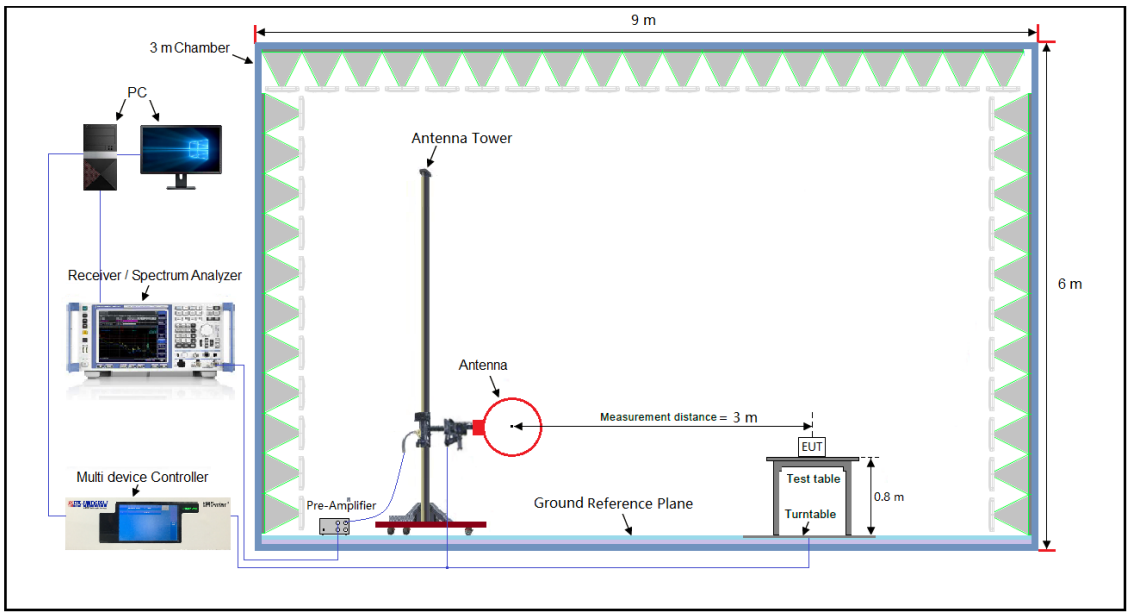


Figure 1. Below 30MHz

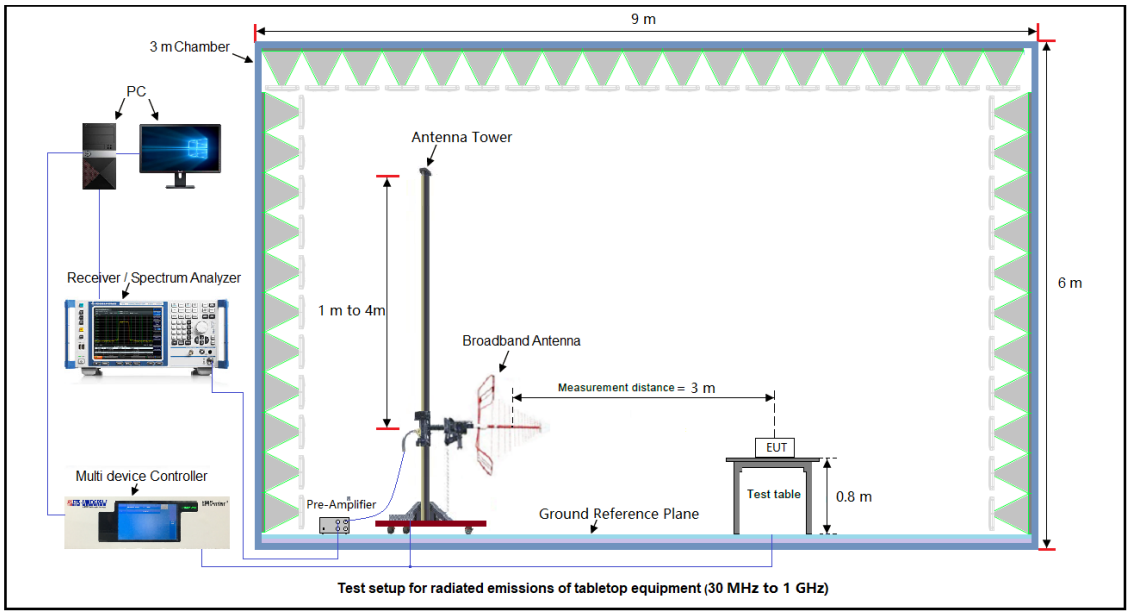


Figure 2. 30MHz to 1GHz

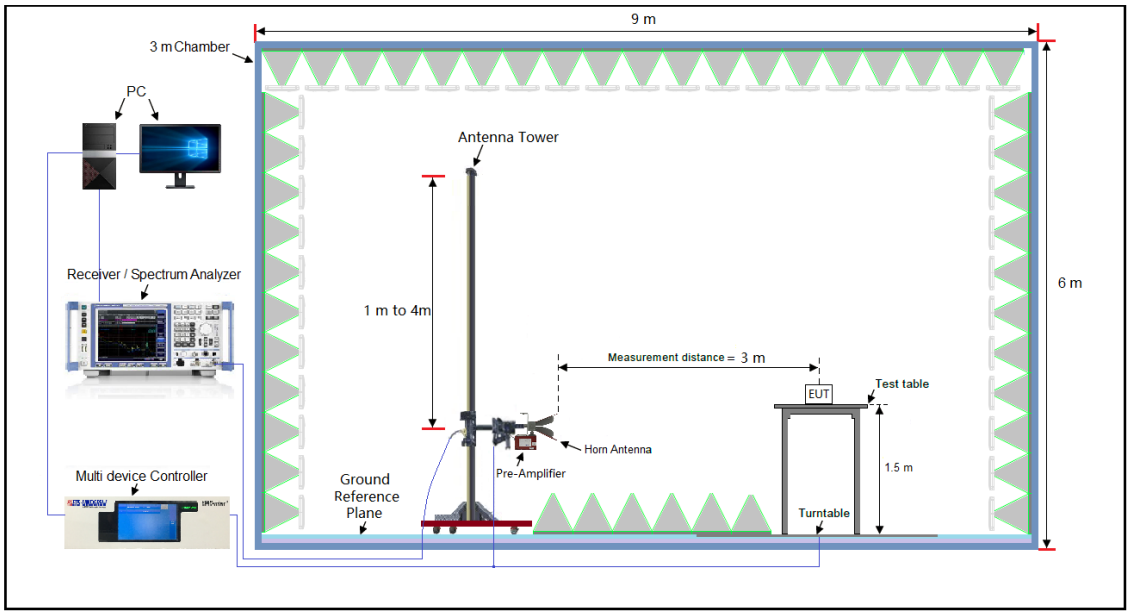
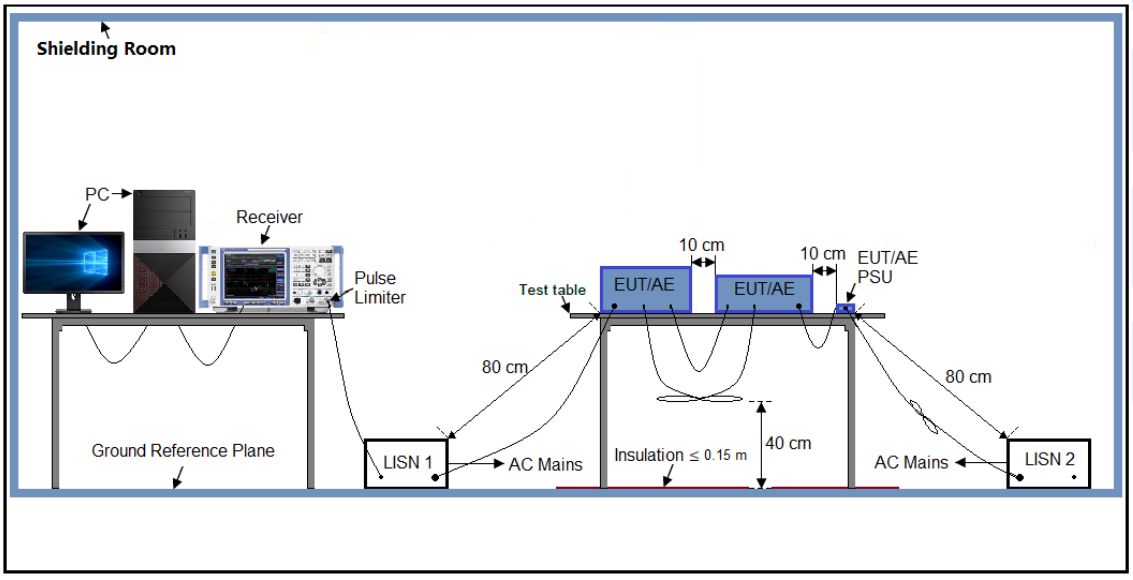


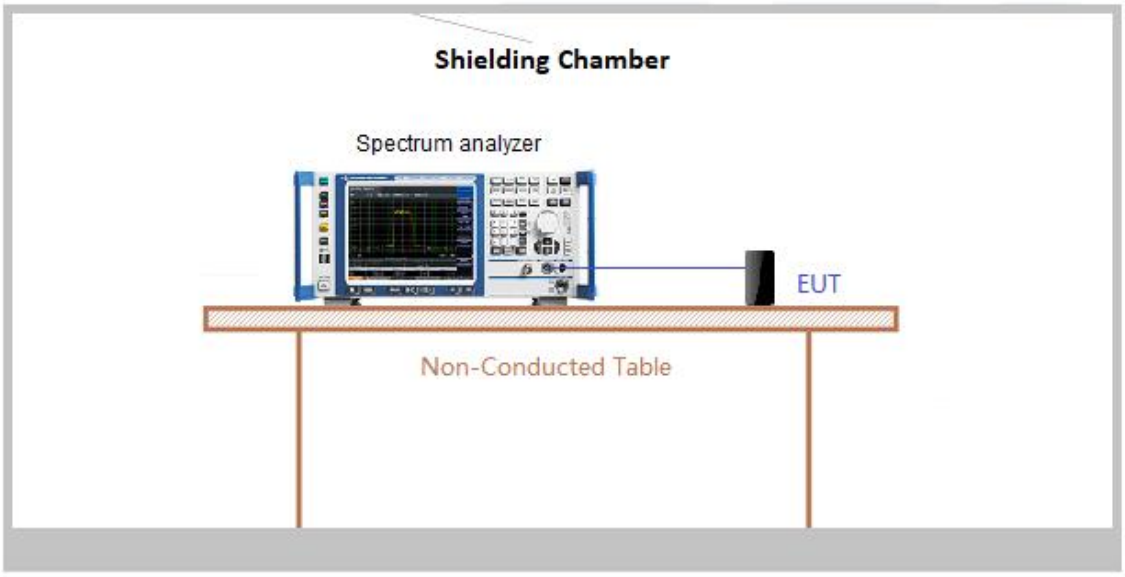
Figure 3. Above 1GHz

4.5.2 For Conducted Emissions test setup

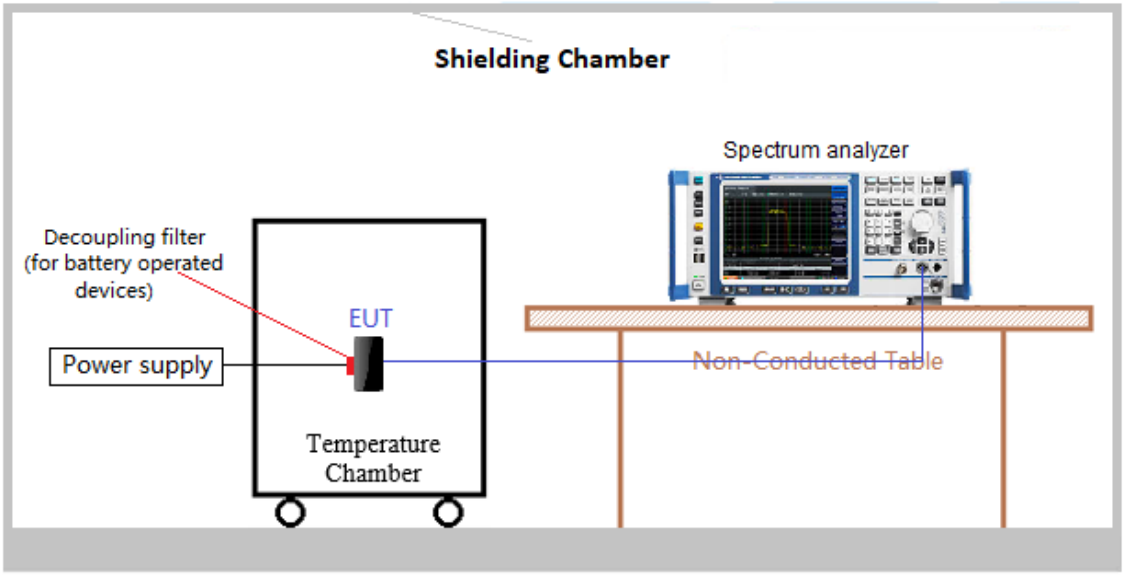
Figure 3. Conducted Emissions setup



4.5.3 For Conducted RF test setup



Normal Environment



Extreme Environment

4.6 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 3.85Vdc rechargeable Li-on battery. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. Therefore, all final radiated testing was performed with the EUT in (see table below) orientation.

Frequency	Mode	Antenna Port	Worst-case axis positioning
Above 1GHz	1TX	Chain 0	Y axis

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

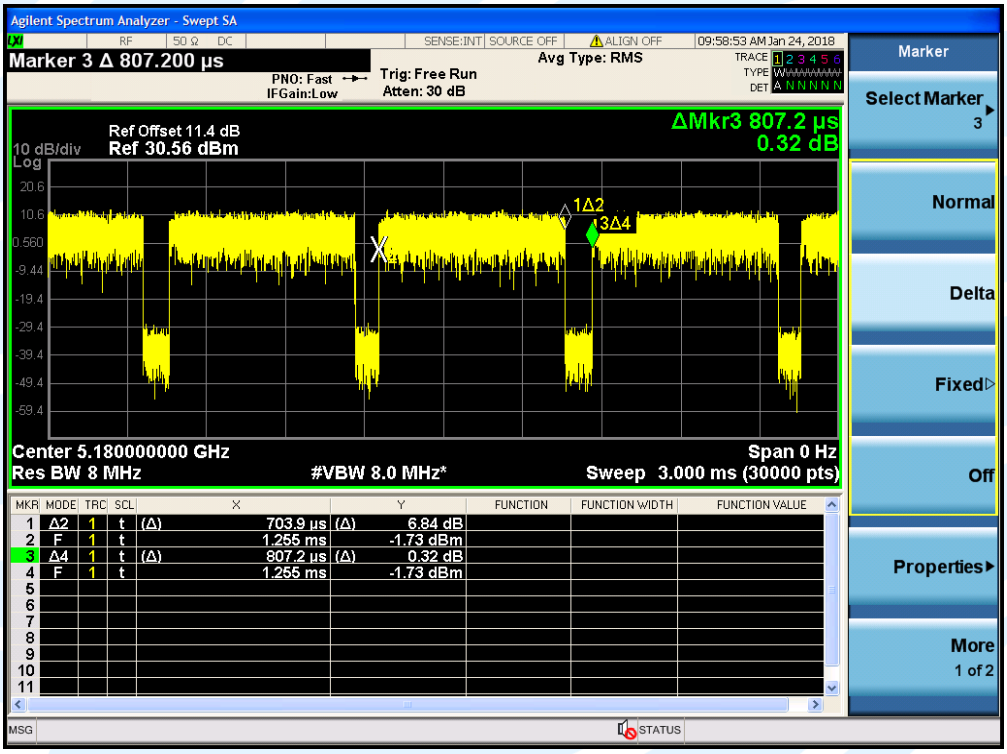
4.7 DUTY CYCLE

Mode	Data rates (Mbps)	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)	Average Factor (dB)
IEEE 802.11a	18	0.7039	0.8072	0.87	87.20	0.59	1.42	-1.19
IEEE 802.11n-HT20	MCS2	0.6056	0.7011	0.86	86.38	0.64	1.65	-1.27
IEEE 802.11n-HT40	MCS0	0.8567	0.9570	0.90	89.52	0.48	1.17	-0.96
IEEE 802.11ac-VHT20	MCS0	1.7420	1.8830	0.93	92.51	0.34	0.57	-0.68
IEEE 802.11ac-VHT40	MCS0	0.8616	0.9448	0.91	91.19	0.40	1.16	-0.80
IEEE 802.11ac-VHT80	MCS0	0.4211	0.5025	0.84	83.80	0.77	2.37	-1.54

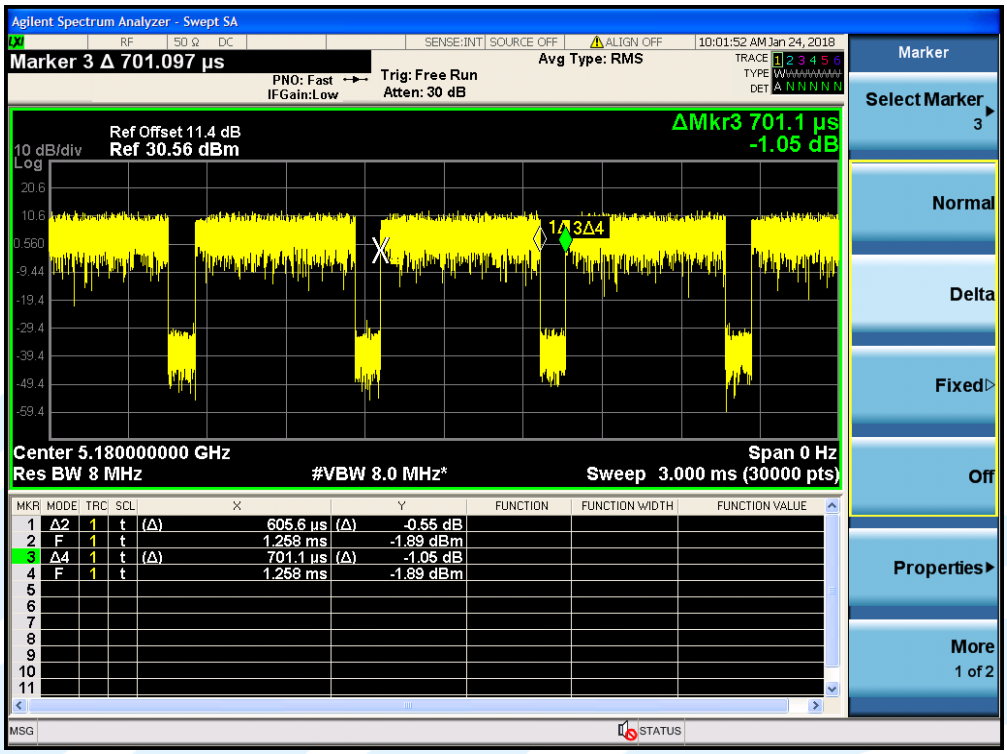
Remark:
1) Duty cycle= On Time/ Period;
2) Duty Cycle factor = 10 * log(1/ Duty cycle);
3) Average factor = 20 $\log_{10}$ Duty Cycle.

The test plot as follows

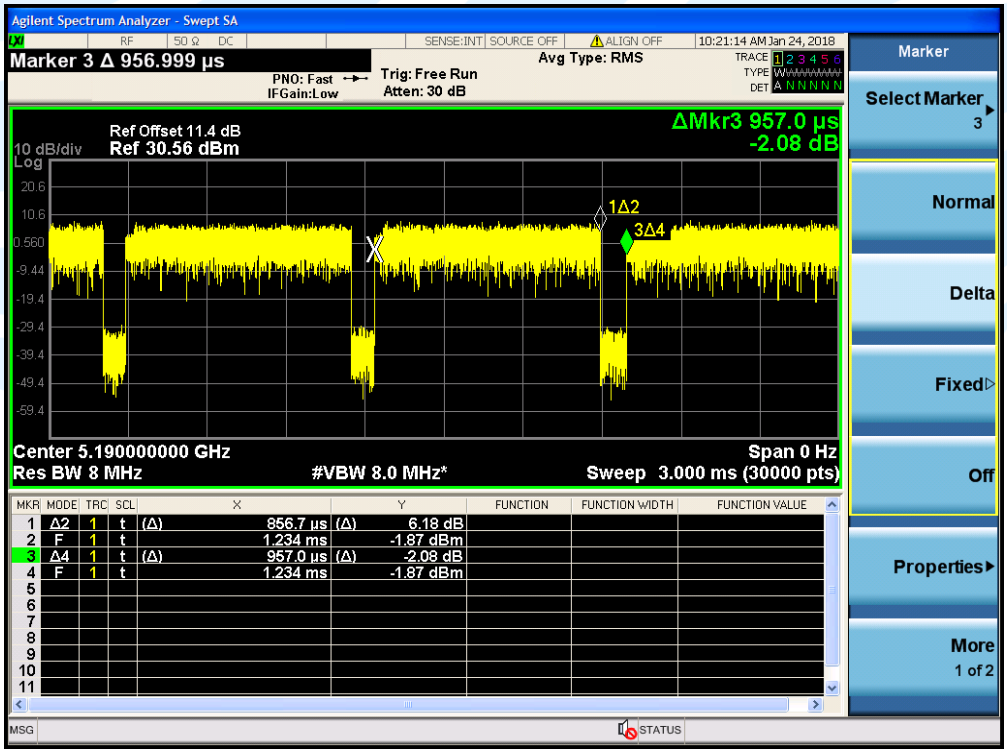
IEEE 802.11a



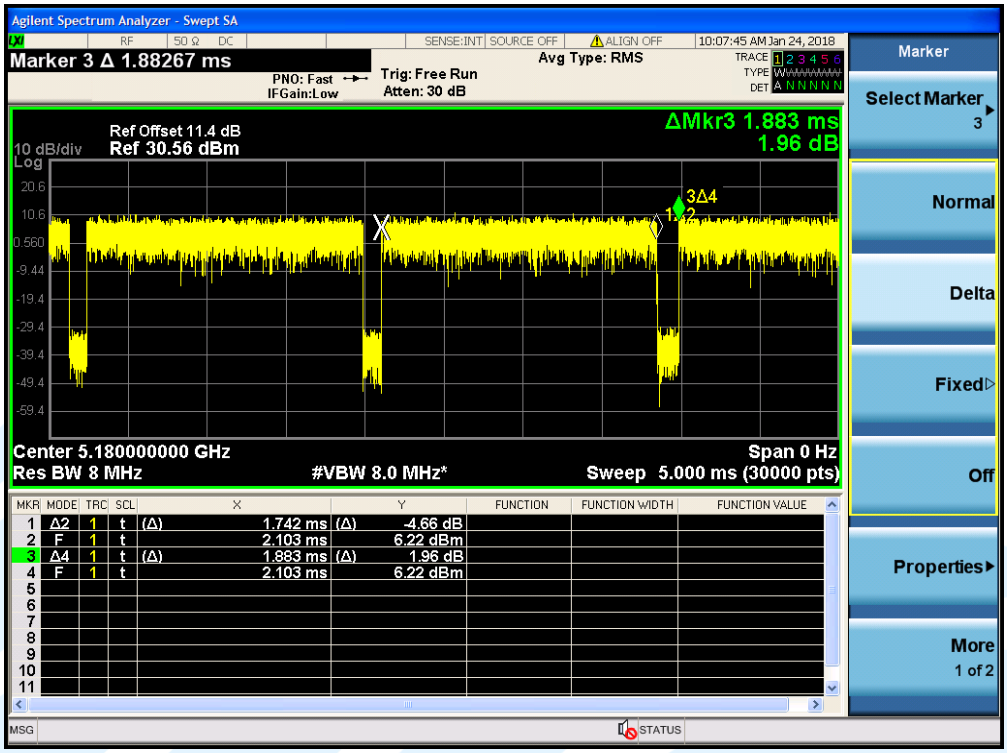
IEEE 802.11n-HT20



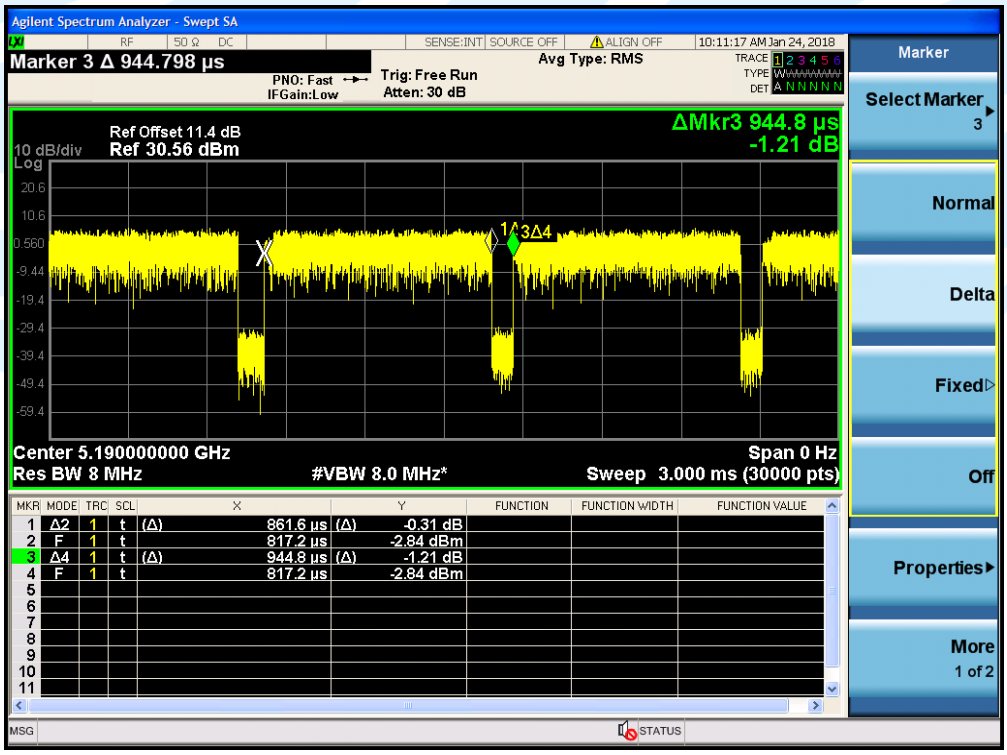
IEEE 802.11n-HT40



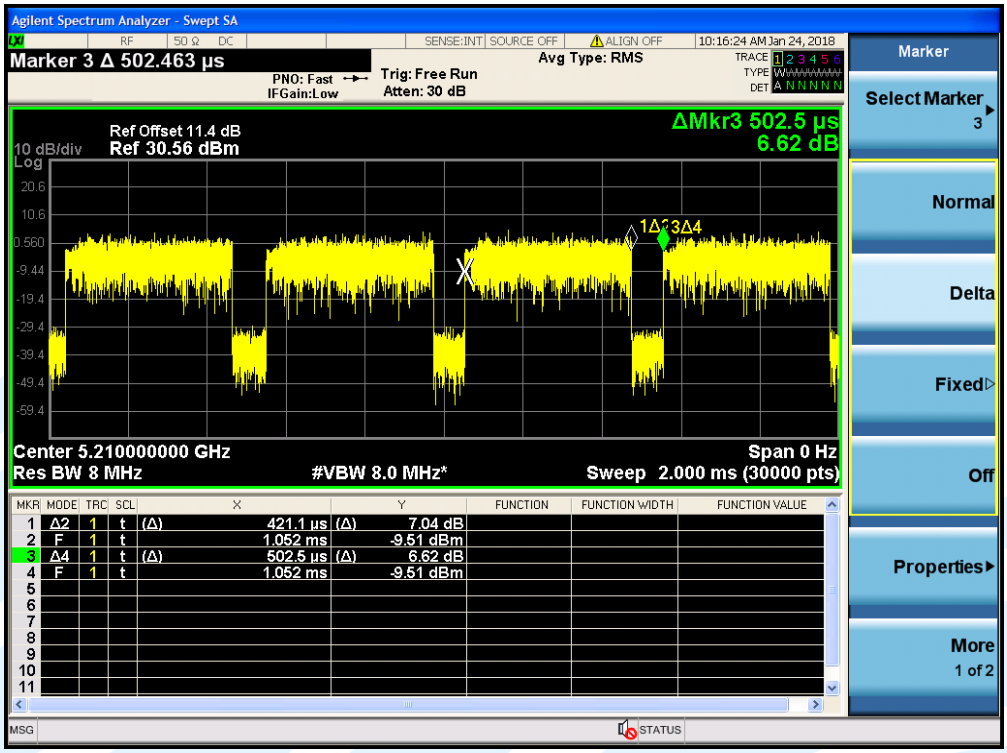
IEEE 802.11ac-VHT20



IEEE 802.11ac-VHT40



IEEE 802.11ac-VHT80



5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices
4	KDB 789033 D02 General UNII Test Procedures New Rules v02r01	Guidelines for compliance testing of unlicensed national information infrastructure (U-NII) device part 15 subpart E
5	905462 D06 802.11 Channel Plans New Rules v02	Operation in U-NII bands -802.11 channel PLAN(§15.407)
6	KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02	Compliance measurement procedures for Unlicensed –National Information Infrastructure devices operates in the frequency bands 5250 MHz to 5350 MHz and 5470 MHz to 5725 MHz bands incorporating dynamic frequency selection
7	KDB 905462 D03 Client Without DFS New Rules v01r02	U-NII client devices without radar detection capability

5.2 ANTENNA REQUIREMENT

Standard Requirement
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. **15.407(a)(1) (2) requirement:** The conducted output power limit specified in paragraph (a) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (a) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power and the peak power spectral density shall be reduced by the by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
EUT Antenna:
Antenna in the interior of the equipment and no consideration of replacement. The gain of the antenna is 2.21 dBi.

5.3 26 DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (a) (2)(5)

Test Method: KDB 789033 D02 v02r01 Section C.1

Limit: None; for reporting purposes only.

Test Procedure:

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum analyzer.

Spectrum analyzer according to the following Settings:
a) Set RBW = approximately 1 % of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

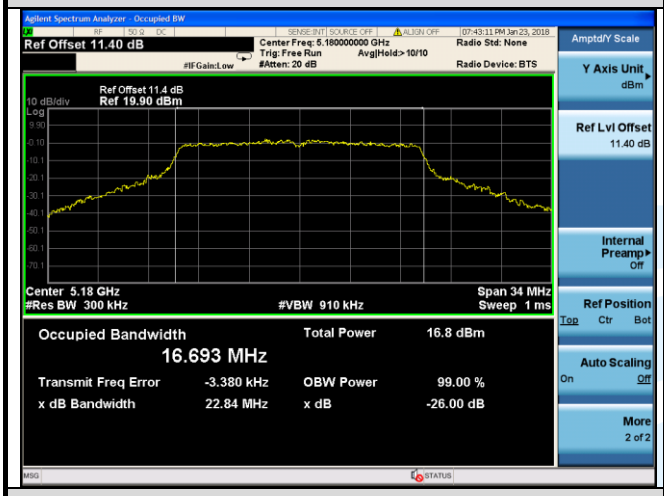
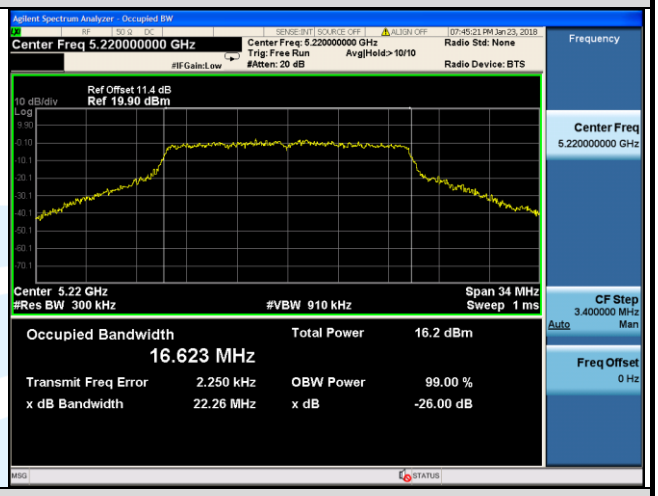
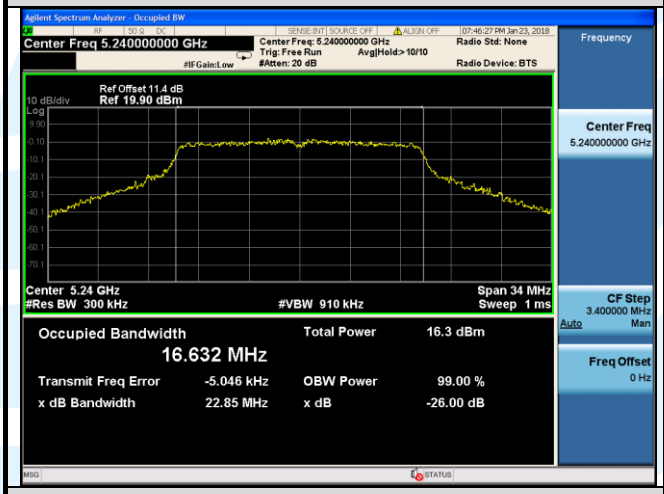
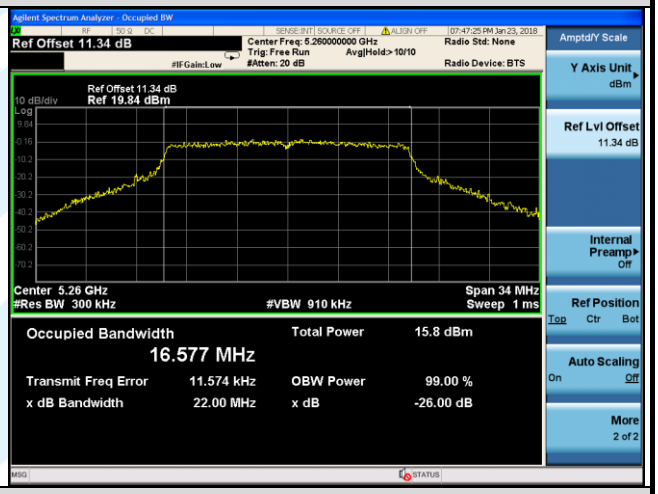
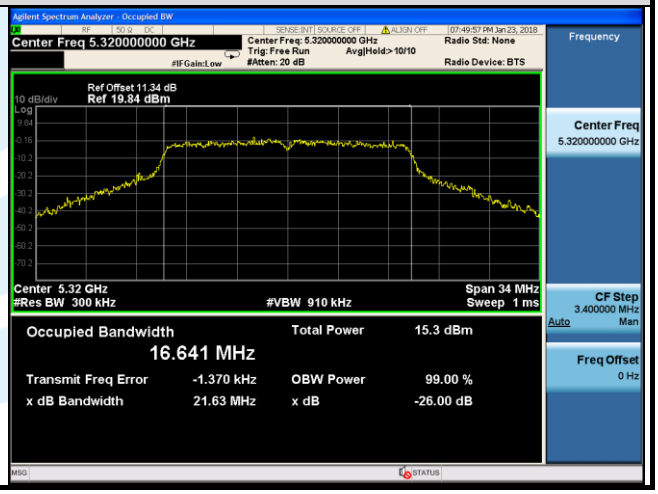
Test Mode: Transmitter mode

Test Results: Pass

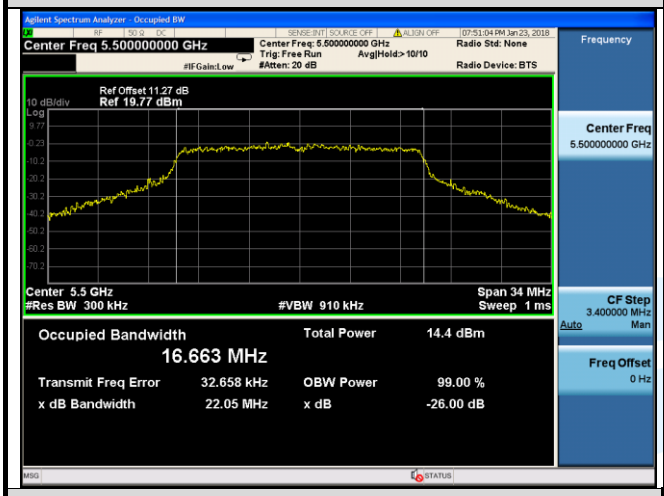
Test Data:

Mode	Channel	26 dB Bandwidth (MHz)
IEEE 802.11a	36 (5180)	22.84
	44 (5220)	22.26
	48 (5240)	22.85
	52 (5260)	22.00
	60 (5300)	22.00
	64 (5320)	21.63
	100 (5500)	22.05
	120 (5600)	22.93
	140 (5700)	22.41
IEEE 802.11n-HT20	36 (5180)	22.63
	44 (5220)	23.18
	48 (5240)	22.89
	52 (5260)	22.85
	60 (5300)	23.13
	64 (5320)	23.30
	100 (5500)	22.79
	120 (5600)	22.97
	140 (5700)	24.32
IEEE 802.11n-HT40	38 (5190)	40.50
	46 (5230)	40.92
	54 (5270)	40.29
	62 (5310)	40.98
	102 (5510)	40.97
	118 (5590)	40.14
	134 (5670)	40.36
IEEE 802.11ac-VHT80	42 (5230)	82.26
	58 (5290)	83.23
	106 (5530)	82.97
	122 (5610)	83.51

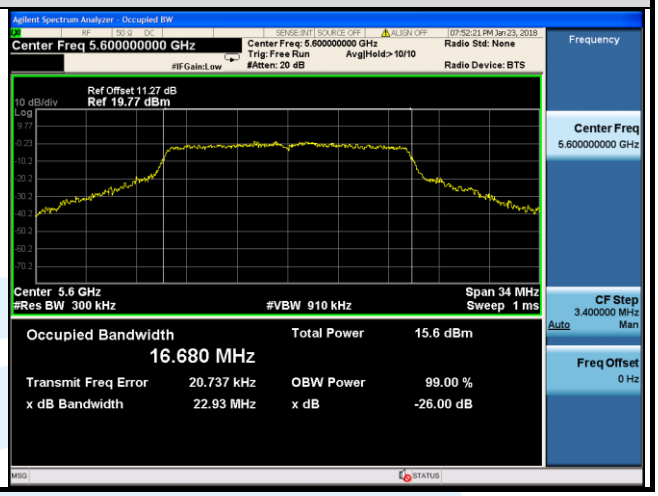
The test plot as follows:

IEEE 802.11a	
Channel 36	**Channel 44**
	
Channel 48	**Channel 52**
	
Channel 60	**Channel 64**
	

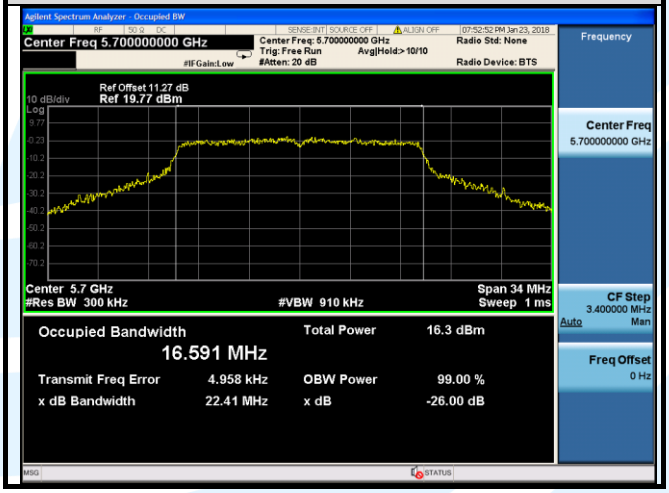
Channel 100

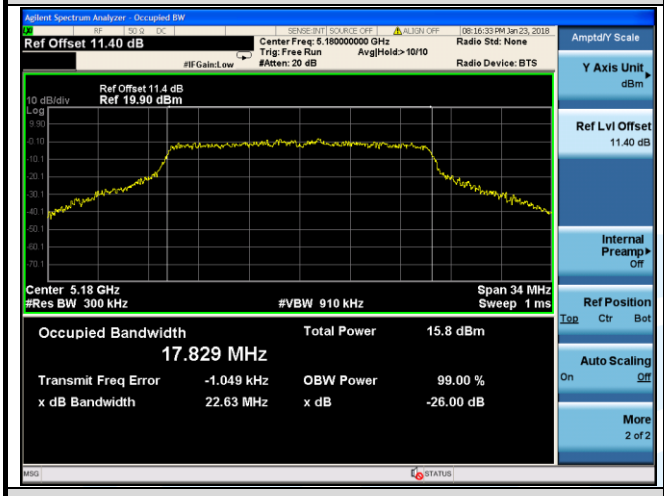
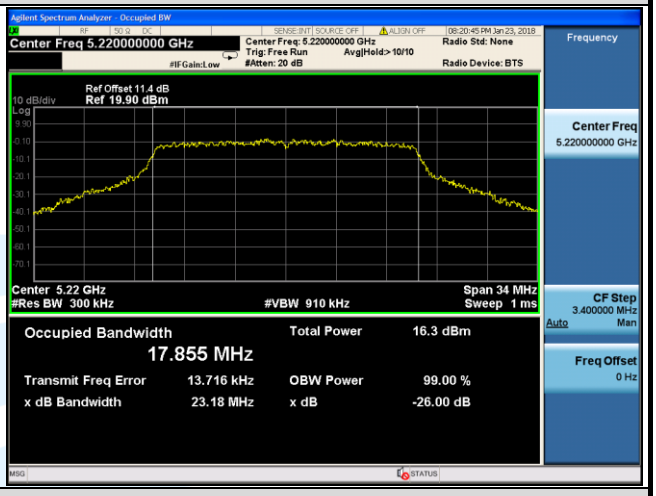
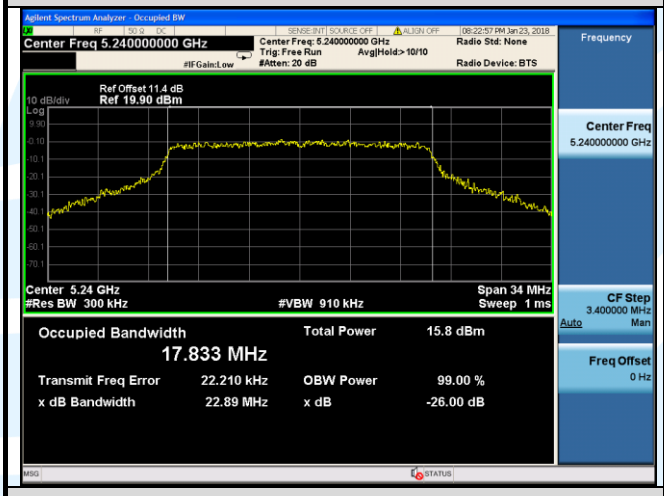
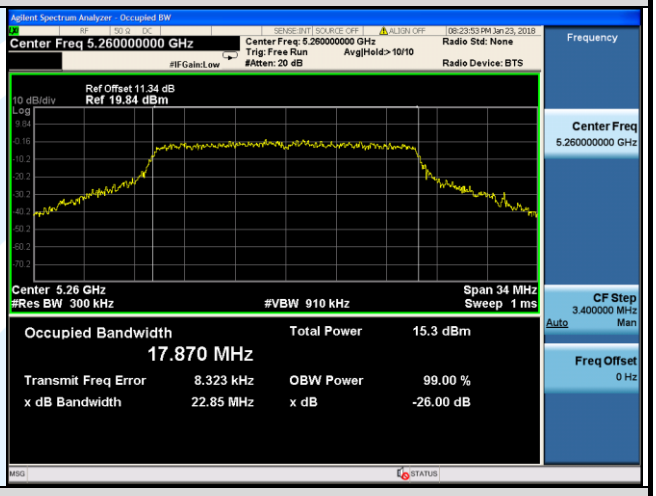
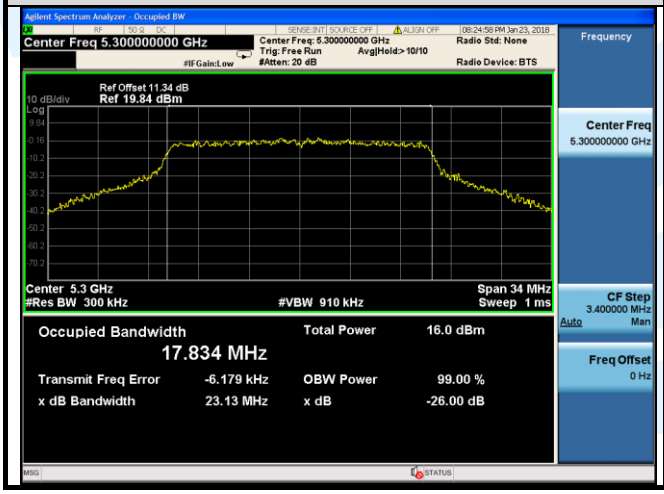
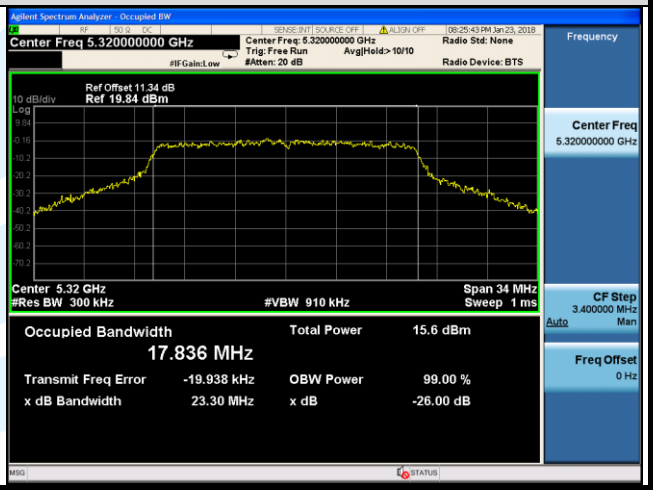


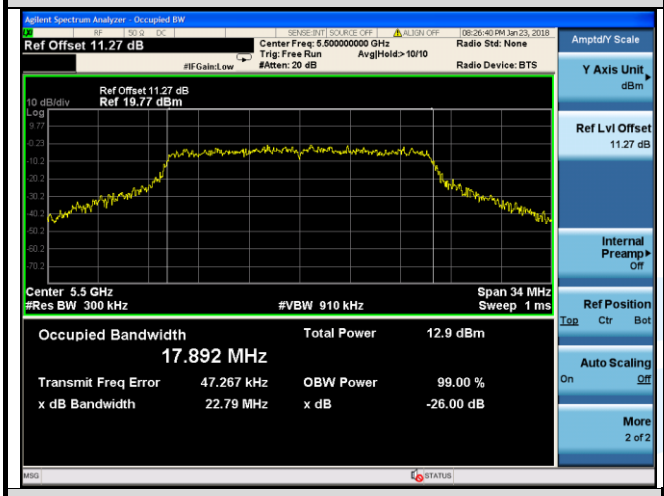
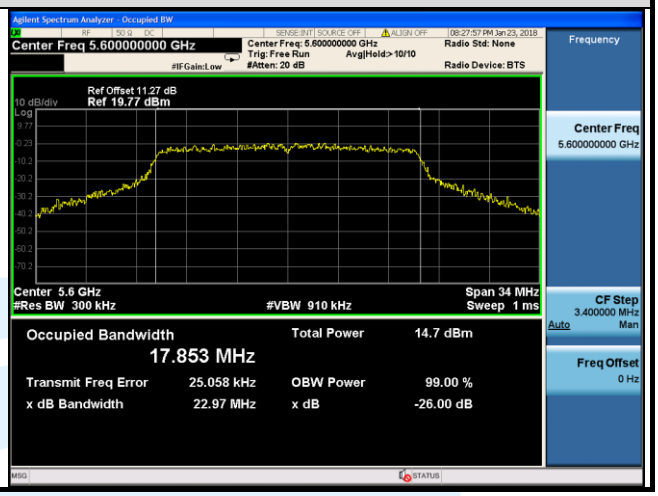
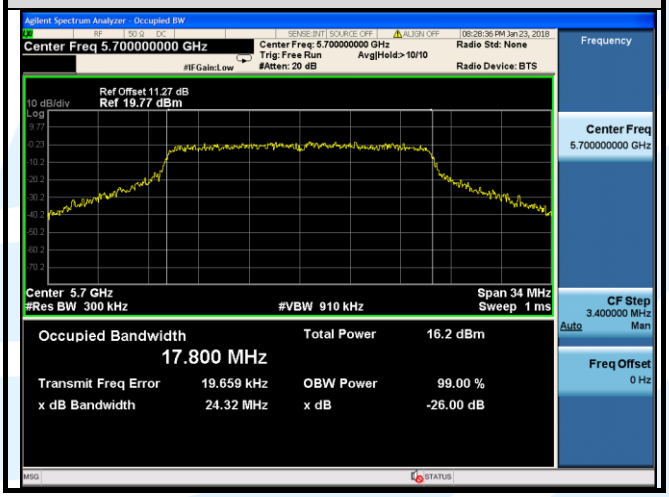
Channel 120



Channel 140

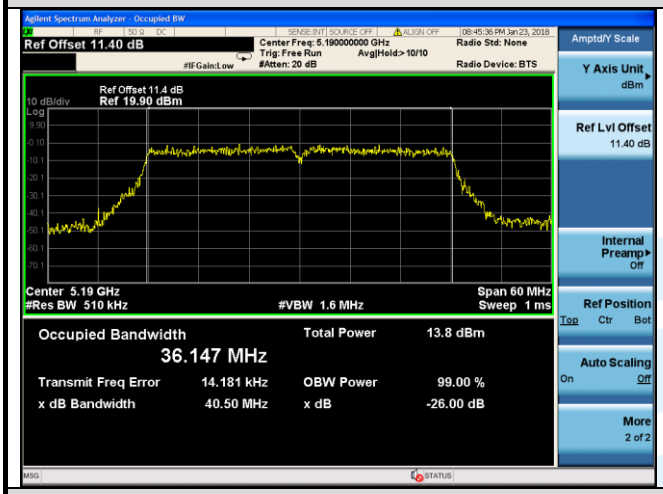


IEEE 802.11n-HT20	
Channel 36	**Channel 44**
	
Channel 48	**Channel 52**
	
Channel 60	**Channel 64**
	

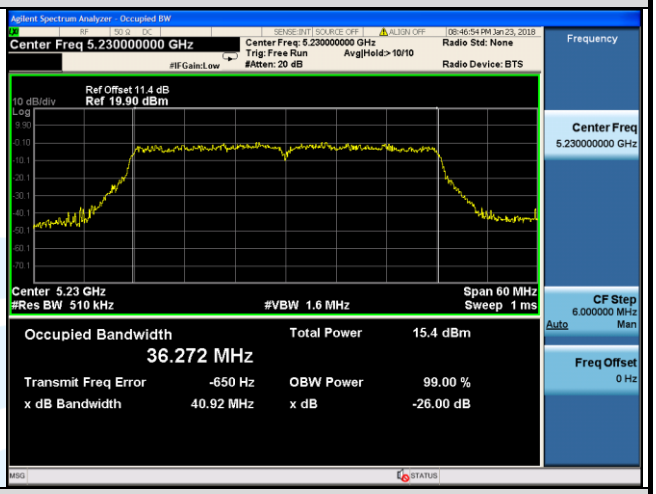
Channel 100	Channel 120
	
Channel 140	
	N/A

IEEE 802.11n-HT40

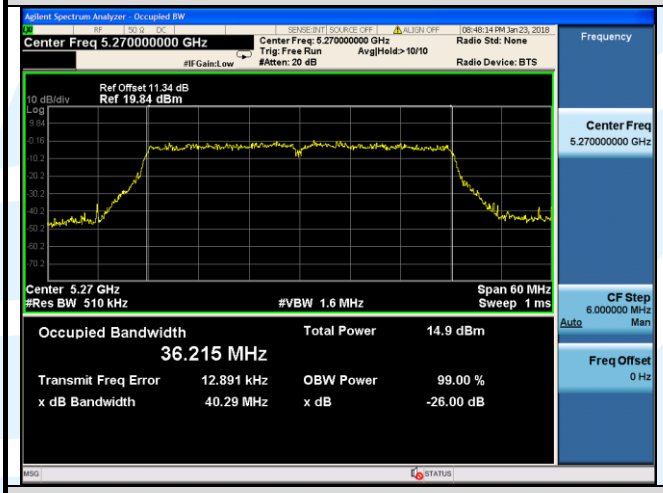
Channel 38



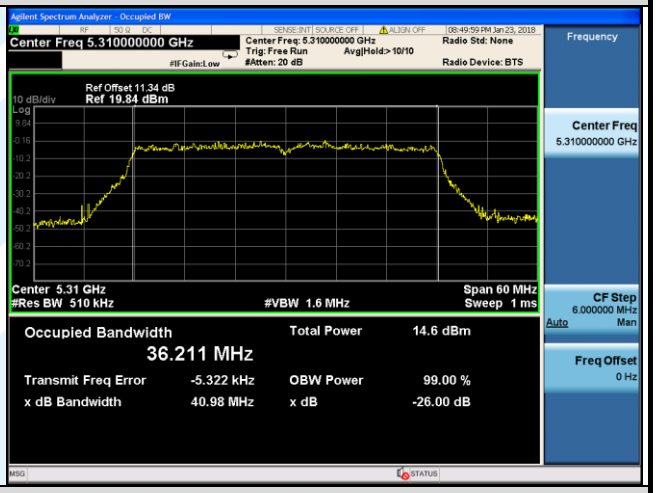
Channel 46



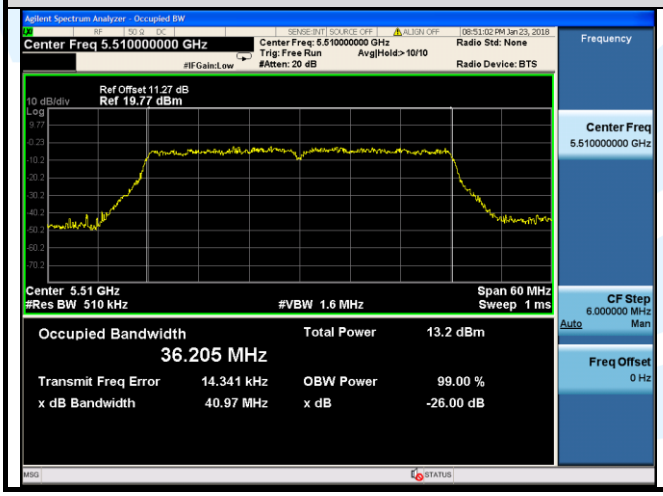
Channel 54



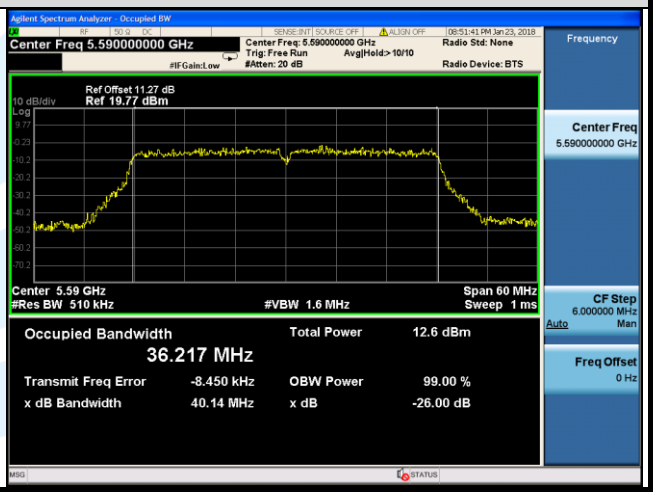
Channel 62

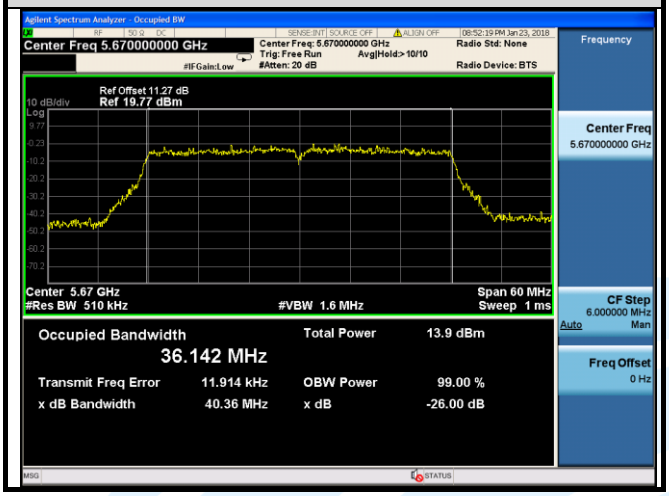


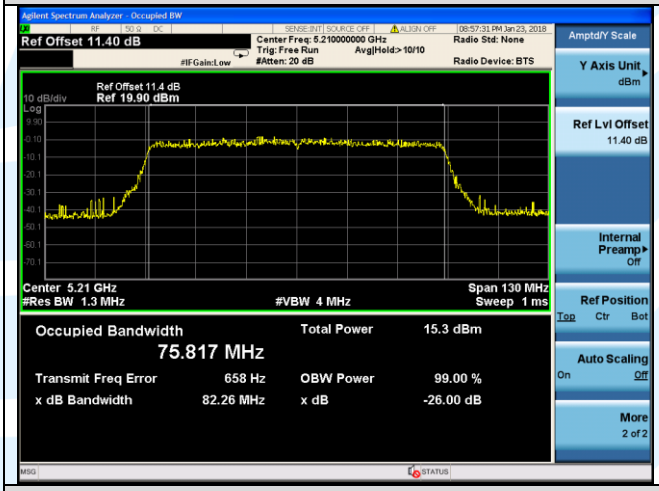
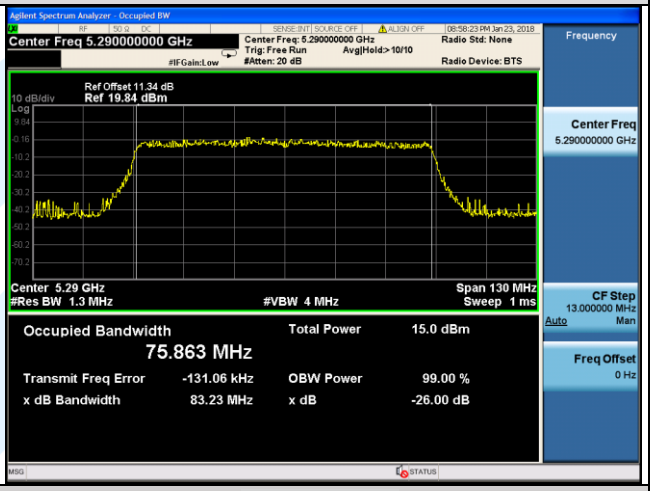
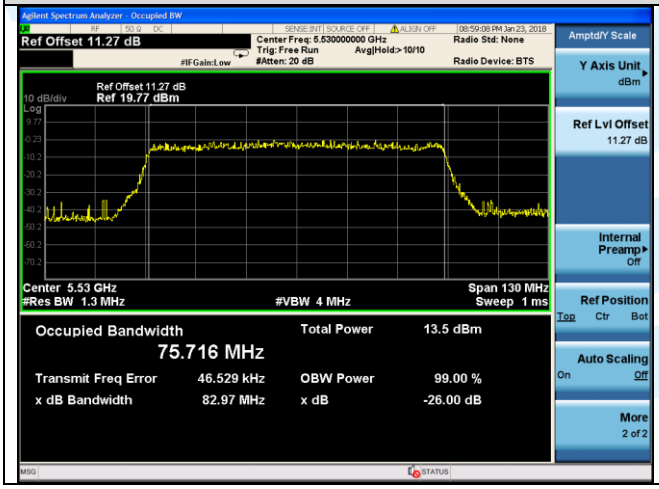
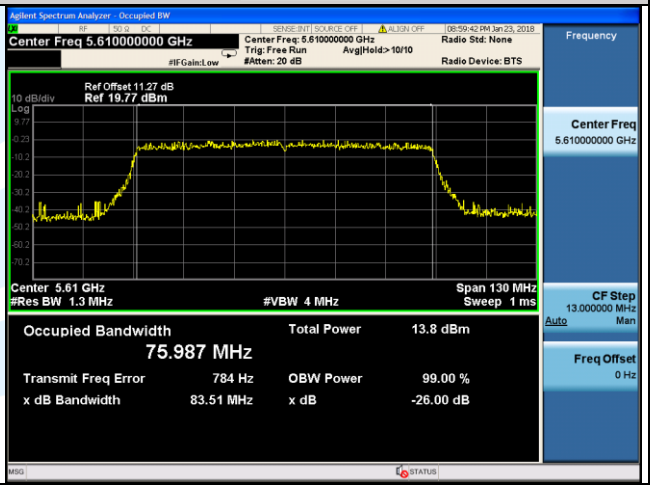
Channel 102



Channel 118



Channel 134


IEEE 802.11ac-VHT80	
Channel 42	Channel 58
	
Channel 106	Channel 122
	

5.46 DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.407 (e)

Test Method: KDB 789033 D02 v01r04Section C.2

Limit: Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure:

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum Analyzer.

Spectrum analyzer according to the following Settings:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 * RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

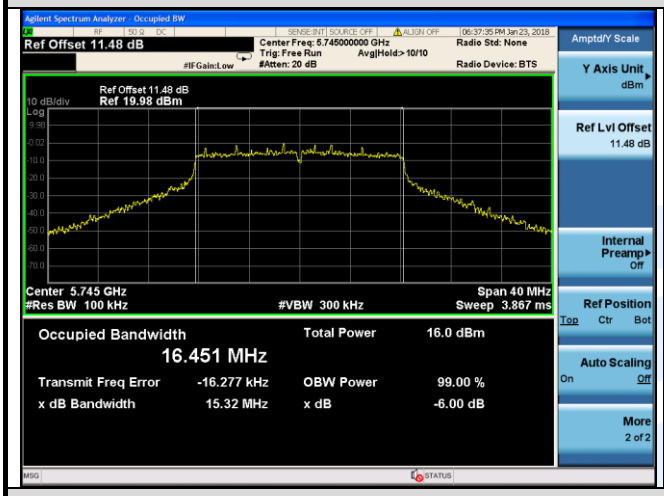
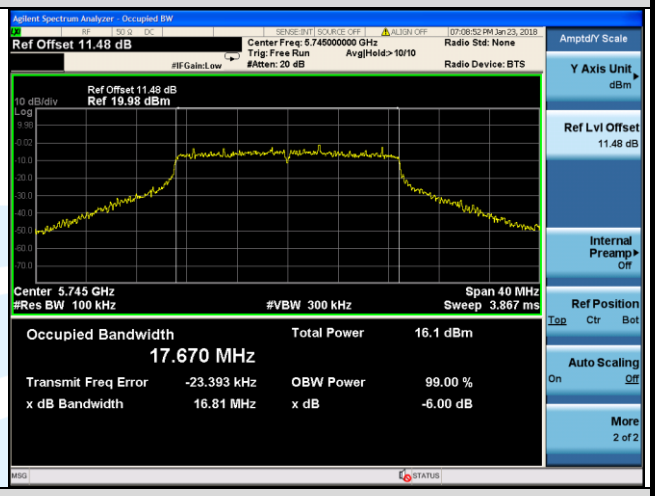
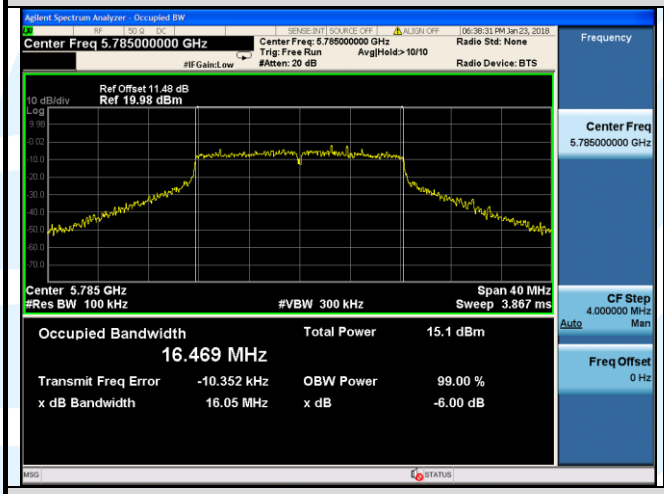
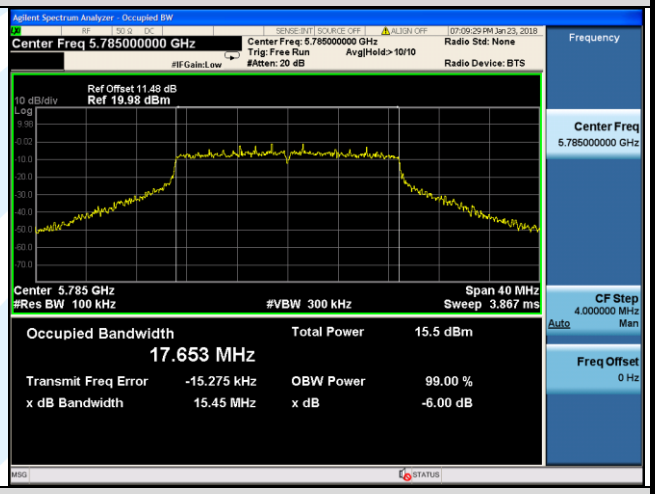
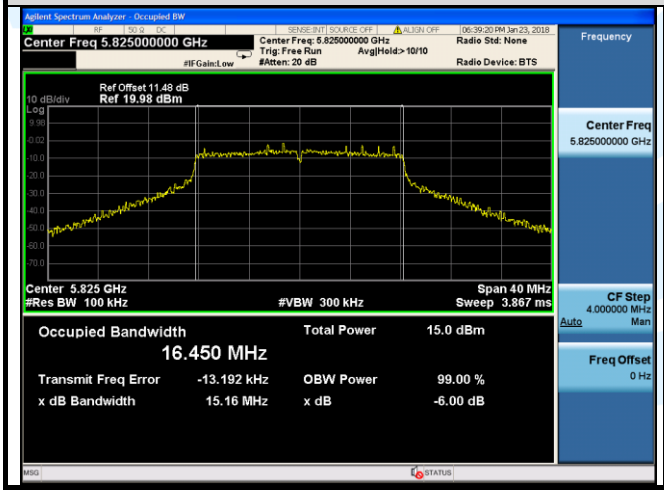
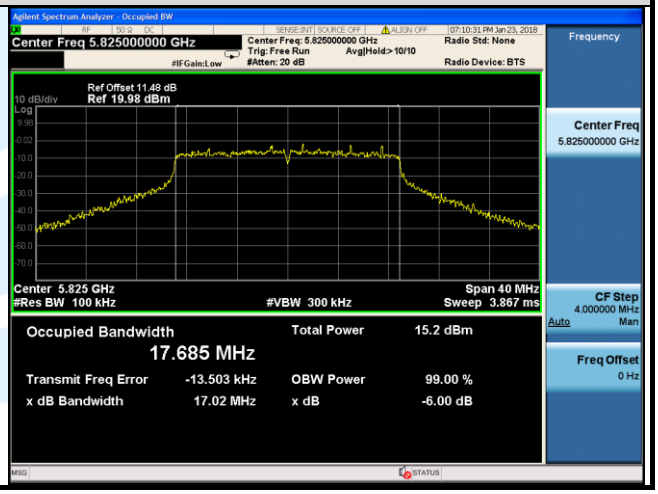
Test Mode: Transmitter mode

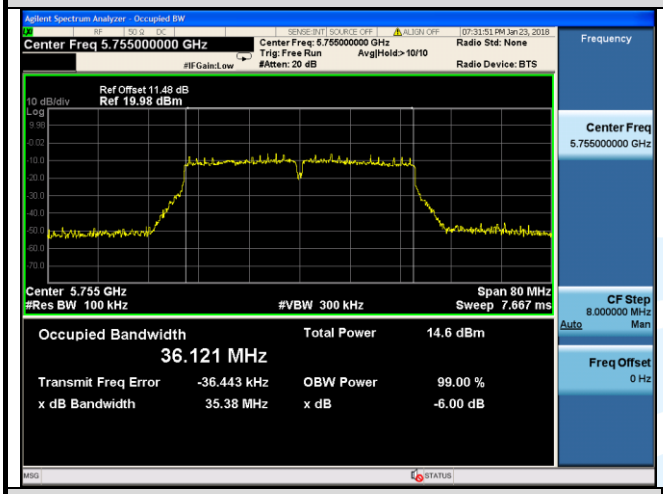
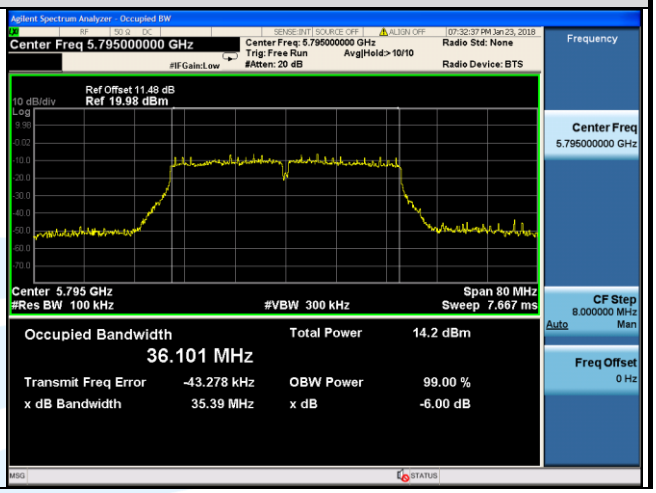
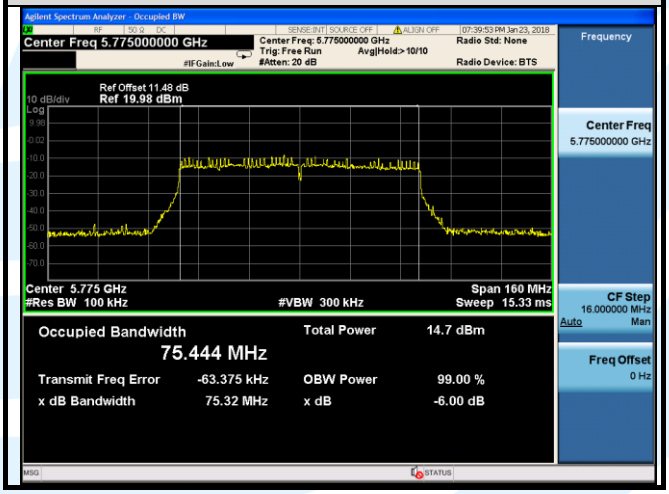
Test Results: Pass

Test Data:

Mode	Channel/ Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limit	Pass / Fail
IEEE 802.11a	149 (5745)	15.32	16.451	> 500 kHz	Pass
	157 (5785)	16.81	17.670	> 500 kHz	Pass
	165 (5825)	16.05	16.469	> 500 kHz	Pass
IEEE 802.11n-HT20	149 (5745)	15.45	17.653	> 500 kHz	Pass
	157 (5785)	15.16	16.450	> 500 kHz	Pass
	165 (5825)	17.02	17.685	> 500 kHz	Pass
IEEE 802.11n-HT40	151 (5755)	35.38	36.121	> 500 kHz	Pass
	159 (5795)	35.39	36.101	> 500 kHz	Pass
IEEE 802.11ac-VHT80	155 (5775)	75.32	75.444	> 500 kHz	Pass

The test plot as follows:

IEEE 802.11a	IEEE 802.11n-HT20
Channel 149	
	
Channel 157	
	
Channel 165	
	

IEEE 802.11n-HT40	
Channel 151	Channel 159
	
IEEE 802.11ac-VHT80	
Channel 155	
	

5.5 MAXIMUM CONDUCTED OUTPUT POWER

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)

Test Method: KDB 789033 D02 v02r01 Section E.3.a(Method PM)

Limits:

1. For the band 5.15-5.25 GHz.
   (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

   (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

   (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

   (iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure:

1. Connected the EUT's antenna port to measure device by 10dB attenuator.
2. Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of Tx on burst.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Transmitter mode

Test Results: Pass

Test Data:

Antenna gain and the maximum output power limit.

Frequency Band	Antenna Gain (dBi))	Peak Power Limits (dBm)
U-NII-1	1.58	24.00
U-NII-2A	2.03	24.00
U-NII-2C	2.21	24.00
U-NII-3	0.74	30.00

For U-NII-1 Band:

Mode	Power Setting	Channel/ Frequency (MHz)	Maximum conducted output power (dBm)		Limit (dBm)	Pass / Fail
			Meas Power	Corr'd Power		
IEEE 802.11a	12	36 (5180)	11.96	12.55	24	Pass
		44 (5220)	12.02	**12.61**	24	Pass
		48 (5240)	11.78	12.37	24	Pass
IEEE 802.11n-HT20	12	36 (5180)	11.88	12.52	24	Pass
		44 (5220)	11.92	**12.56**	24	Pass
		48 (5240)	11.88	12.52	24	Pass
IEEE 802.11n-HT40	12	38 (5190)	11.30	**11.78**	24	Pass
		46 (5230)	11.20	11.68	24	Pass
IEEE 802.11ac-VHT20	12	36 (5180)	11.73	**12.07**	24	Pass
		44 (5220)	11.69	11.03	24	Pass
		48 (5240)	11.68	12.02	24	Pass
IEEE 802.11ac-VHT40	12	38 (5190)	11.88	**10.28**	24	Pass
		46 (5230)	11.78	10.18	24	Pass
IEEE 802.11ac-VHT80	12	42 (5210)	10.79	**11.56**	24	Pass

Remark:

1. Corr'd Power = Meas Power + Duty Cycle Factor

For U-NII-2A Band:

Mode	Power Setting	Channel/ Frequency (MHz)	Maximum conducted output power (dBm)		Limit (dBm)	Pass / Fail
			Meas Power	Corr'd Power		
IEEE 802.11a	12	52 (5260)	11.90	**12.49**	24	Pass
		60 (5300)	11.89	12.48	24	Pass
		64 (5320)	11.86	12.45	24	Pass
IEEE 802.11n-HT20	12	52 (5260)	11.85	**12.49**	24	Pass
		60 (5300)	11.85	12.49	24	Pass
		64 (5320)	11.77	12.41	24	Pass
IEEE 802.11n-HT40	12	54 (5270)	11.44	**12.24**	24	Pass
		62 (5310)	11.44	12.24	24	Pass
IEEE 802.11ac-VHT20	12	52 (5260)	11.74	**12.08**	24	Pass
		60 (5300)	11.57	12.91	24	Pass
		64 (5320)	11.68	12.02	24	Pass
IEEE 802.11ac-VHT40	12	54 (5270)	11.81	**12.21**	24	Pass
		62 (5310)	11.76	12.16	24	Pass
IEEE 802.11ac-VHT80	12	58 (5290)	10.69	**11.46**	24	Pass

Remark:

1. Corr'd Power = Meas Power + Duty Cycle Factor

Note:

For IEEE 802.11 a/n/ac, the minimum 26 dB emission bandwidth is 21.63 MHz

11 dBm + $10\log_{10}(21.63)$ = 24.35 dBm > 24 dBm (250mW)

So the 24 dB limit applicable

For U-NII-2C Band:

Mode	Power Setting	Channel/ Frequency (MHz)	Maximum conducted output power (dBm)		Limit (dBm)	Pass / Fail
			Meas Power	Corr'd Power		
IEEE 802.11a	13	100 (5500)	11.51	13.10	24	Pass
		120 (5600)	12.78	13.37	24	Pass
		140 (5700)	13.05	**13.64**	24	Pass
IEEE 802.11n-HT20	13	100 (5500)	12.31	12.95	24	Pass
		120 (5600)	12.58	13.22	24	Pass
		140 (5700)	12.91	**13.55**	24	Pass
IEEE 802.11n-HT40	13	102 (5510)	12.08	12.56	24	Pass
		118 (5590)	12.24	12.72	24	Pass
		134 (5670)	12.37	**12.85**	24	Pass
IEEE 802.11ac-VHT20	13	100 (5500)	11.95	12.29	24	Pass
		120 (5600)	12.11	12.45	24	Pass
		140 (5700)	12.50	**12.84**	24	Pass
IEEE 802.11ac-VHT40	12	102 (5510)	11.29	11.69	24	Pass
		118 (5590)	11.25	11.65	24	Pass
		134 (5670)	11.38	**11.78**	24	Pass
IEEE 802.11ac-VHT80	12	106 (5530)	10.54	**11.31**	24	Pass
		122 (5610)	10.36	11.13	24	Pass

Remark:

1. Corr'd Power = Meas Power + Duty Cycle Factor

Note:

For IEEE 802.11 a/n/ac, the minimum 26 dB emission bandwidth is 22.05 MHz

11 dBm + $10\log_{10}(22.05)$ = 24.43 dBm > 24 dBm (250mW)

So the 24 dB limit applicable

For U-NII-3 Band:

Mode	Power Setting	Channel/ Frequency (MHz)	Maximum conducted output power (dBm)		Limit (dBm)	Pass / Fail
			Meas Power	Corr'd Power		
IEEE 802.11a	13	149 (5745)	13.17	**13.76**	30	Pass
		157 (5785)	13.09	13.68	30	Pass
		165 (5825)	12.90	13.49	30	Pass
IEEE 802.11n-HT20	13	149 (5745)	13.03	**13.67**	30	Pass
		157 (5785)	12.94	13.58	30	Pass
		165 (5825)	12.72	13.36	30	Pass
IEEE 802.11n-HT40	13	151 (5755)	12.74	**13.22**	30	Pass
		159 (5795)	12.66	13.14	30	Pass
IEEE 802.11ac-VHT20	13	149 (5745)	12.65	**12.99**	30	Pass
		157 (5785)	12.49	12.83	30	Pass
		165 (5825)	12.36	12.70	30	Pass
IEEE 802.11ac-VHT40	12	151 (5755)	11.75	**12.15**	30	Pass
		159 (5795)	11.58	11.98	30	Pass
IEEE 802.11ac-VHT80	12	155 (5775)	10.73	**11.50**	30	Pass

Remark:

1. Corr'd Power = Meas Power + Duty Cycle Factor

5.6 PEAK POWER SPECTRAL DENSITY

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)

Test Method: KDB 789033 D02 v02r01 Section F

Limits:

1. For the band 5.15-5.25 GHz.
   (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

   (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

   (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

   (iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
3. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure:
The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum Analyzer.

Spectrum analyzer according to the following Settings:
1. For U-NII-1, U-NII-2A, U-NII-2C band:
Using method SA-2
a) Set span to encompass the entire emission bandwidth (EBW) of the signal.
b) Set RBW = 1 MHz, Set VBW ≥ 3 RBW, Detector = RMS
c) Sweep time = auto, trigger set to “free run”.
d) Trace average at least 100 traces in power averaging mode.
e) Record the max value and add 10 log (1/duty cycle)
2. For U-NII-3 band:
a) Set span to encompass the entire emission bandwidth (EBW) of the signal.
b) Set RBW = 500 kHz, Set VBW ≥ 3 RBW, Detector = RMS
c) Use the peak marker function to determine the maximum power level in any 500 kHz band segment within the fundamental EBW.
d) Sweep time = auto, trigger set to “free run”.
e) Trace average at least 100 traces in power averaging mode.
f) Record the max value and add 10 log (1/duty cycle)

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.
Test Setup: Refer to section 4.5.3 for details.
Instruments Used: Refer to section 3 for details
Test Mode: Transmitter mode
Test Results: Pass
Test Data:

Antenna gain and the maximum output power limit.

Frequency Band	Antenna Gain (dBi))	PSD Limits (dBm/MHz or dBm/500kHz)
U-NII-1	1.58	11.00
U-NII-2A	2.03	11.00
U-NII-2C	2.21	11.00
U-NII-3	0.74	30.00

For U-NII-1 Band:

Mode	Channel/ Frequency (MHz)	Power spectral density (dBm/MHz)		Limit (dBm/MHz)	Pass / Fail
		Meas PSD	Corr’d PSD		
IEEE 802.11a	36 (5180)	-0.804	-0.214	11	Pass
	44 (5220)	-0.661	-0.071	11	Pass
	48 (5240)	-0.993	-0.403	11	Pass
IEEE 802.11n-HT20	36 (5180)	-1.339	-0.699	11	Pass
	44 (5220)	-0.682	-0.042	11	Pass
	48 (5240)	-1.236	-0.596	11	Pass
IEEE 802.11n-HT40	38 (5190)	-5.289	-4.809	11	Pass
	46 (5230)	-5.178	-4.698	11	Pass
IEEE 802.11ac-VHT80	42 (5210)	-9.042	-8.272	11	Pass

Remark:
1. Corr’d PSD = Meas PSD + Duty Cycle Factor

For U-NII-2A Band:

Mode	Channel/ Frequency (MHz)	Power spectral density (dBm/MHz)		Limit (dBm/MHz)	Pass / Fail
		Meas PSD	Meas PSD		
IEEE 802.11a	52 (5260)	-0.634	-0.044	11	Pass
	60 (5300)	-0.873	-0.283	11	Pass
	64 (5320)	-1.316	-0.726	11	Pass
IEEE 802.11n-HT20	52 (5260)	-1.226	-0.586	11	Pass
	60 (5300)	-1.192	-0.552	11	Pass
	64 (5320)	-1.455	-0.815	11	Pass
IEEE 802.11n-HT40	54 (5270)	-5.586	-5.106	11	Pass
	62 (5310)	-6.138	-5.658	11	Pass
IEEE 802.11ac-VHT80	58 (5290)	-9.629	-8.859	11	Pass

Remark:

1. Corr'd PSD = Meas PSD + Duty Cycle Factor

For U-NII-2C Band:

Mode	Channel/ Frequency (MHz)	Power spectral density (dBm/MHz)		Limit (dBm/MHz)	Pass / Fail
		Meas PSD	Meas PSD		
IEEE 802.11a	100 (5500)	-2.186	-1.596	11	Pass
	120 (5600)	-1.251	-0.661	11	Pass
	140 (5700)	-0.050	0.540	11	Pass
IEEE 802.11n-HT20	100 (5500)	-2.745	-2.105	11	Pass
	120 (5600)	-1.524	-0.884	11	Pass
	140 (5700)	-0.464	0.176	11	Pass
IEEE 802.11n-HT40	102 (5510)	-7.573	-7.093	11	Pass
	118 (5590)	-5.233	-4.753	11	Pass
	134 (5670)	-6.182	-5.702	11	Pass
IEEE 802.11ac-VHT80	106 (5530)	-10.911	-10.141	11	Pass
	122 (5610)	-10.460	-9.690	11	Pass

Remark:

1. Corr'd PSD = Meas PSD + Duty Cycle Factor

For U-NII-3 Band:

Mode	Channel/ Frequency (MHz)	Power spectral density (dBm/500KHz)		Limit (dBm/500KHz)	Pass / Fail
		Meas PSD	Meas PSD		
IEEE 802.11a	149 (5745)	-3.829	-3.239	30	Pass
	157 (5785)	-3.619	-3.029	30	Pass
	165 (5825)	-3.969	-3.379	30	Pass
IEEE 802.11n-HT20	149 (5745)	-4.600	-3.960	30	Pass
	157 (5785)	-4.350	-3.710	30	Pass
	165 (5825)	-5.008	-4.368	30	Pass
IEEE 802.11n-HT40	151 (5755)	-8.424	-7.944	30	Pass
	159 (5795)	-8.644	-8.164	30	Pass
IEEE 802.11ac-VHT80	155 (5775)	-12.724	-11.954	30	Pass

Remark:

1. Corr'd PSD = Meas PSD + Duty Cycle Factor