Shenzhen Huaxia Testing Technology Co., Ltd

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

Telephone: +86-755-26648640
Fax: +86-755-26648637
Website: www.cqa-cert.com

Report Template Version: V03
Report Template Revision Date: Mar.1st, 2017

Test Report

Report No. :	CQASZ20190700037EX-02
Applicant:	Zhejiang Xunshi Technology Co., Ltd
Address of Applicant:	4th Floor, No.2 Qihang Building, Science and Technology Park, No.586 Xihuan Road, Shaoxing, Zhejiang, China
Manufacturer:	Zhejiang Xunshi Technology Co., Ltd
Address of Manufacturer:	4th Floor, No.2 Qihang Building, Science and Technology Park, No.586 Xihuan Road, Shaoxing, Zhejiang, China

Equipment Under Test (EUT):

Product:	Pro 3D Printer
All Model No.:	SPR1902A, SPR1906A
Test Model No.:	SPR1902A
Brand Name:	SprintRay
FCC ID:	2AUE5-SPRPRO
Standards:	47 CFR Part 15, Subpart E
Date of Test:	July. 15, 2019 to Aug. 30, 2019
Date of Issue:	Aug. 30, 2019
Test Result :	**PASS**

Tested By: Tom Chen

(Tom Chen)

Reviewed By: Aaron Ma

(Aaron Ma)

Approved By:

(Jack Ai)

SHENZHEN HUAXIA TESTING TECHNOLOGY CO., LTD 华夏准测 APPROVED

* In the configuration tested, the EUT complied with the standards specified above.

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1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20190700037EX-02	Rev.01	Initial report	Aug. 30, 2019

2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	FCC 47 CFR Part 15 Subpart C 15.203 /15.407(a)(1) (2)	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(6)	ANSI C63.10-2013	PASS
26 dB emission bandwidth	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(3)	KDB 789033 D02 v02r01 Section C.1	PASS
6 dB bandwidth	FCC 47 CFR Part 15 Subpart E Section 15.407 (e)	KDB 789033 D02 v02r01 Section C.2	PASS
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
Peak Power Spectral Density	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(3)(5)	KDB 789033 D02 v02r01 Section F	PASS
Frequency stability	FCC 47 CFR Part 15 Subpart E Section 15.407 (g)	ANSI C63.10-2013	PASS
Radiated Emissions and Band Edge Measurement	FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(1)(2)(4)(5)(6)(7)(8)	ANSI C63.10-2013	PASS
Dynamic Frequency Selection	FCC 47 CFR Part 15 Subpart E Section 15.407 (h)	KDB 905462 D03 Client Without DFS New Rules v01r02	N/A

Note: N/A: In this whole report not application.

3 Contents

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General Information

4.1 Client Information

Applicant:	Zhejiang Xunshi Technology Co., Ltd
Address of Applicant:	4th Floor, No.2 Qihang Building, Science and Technology Park, No.586 Xihuan Road, Shaoxing, Zhejiang, China
Manufacturer:	Zhejiang Xunshi Technology Co., Ltd
Address of Manufacturer:	4th Floor, No.2 Qihang Building, Science and Technology Park, No.586 Xihuan Road, Shaoxing, Zhejiang, China

4.2 General Description of EUT

Product Name:	Pro 3D Printer
All Model No.:	SPR1902A, SPR1906A
Test Model No.:	SPR1902A
Trade Mark:	SprintRay
Hardware version：	V 04.0419
Software version：	V1.0
Operation Frequency:	5180 ~ 5240 MHz, 5745 ~ 5825 MHz
Channel Numbers:	5180 ~ 5240 MHz: 4 for 802.11a, 802.11n, 802.11ac 2 for 802.11n40 , 802.11ac 40 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n , 802.11ac 2 for 802.11n40, 802.11ac40
Type of Modulation:	IEEE 802.11a/IEEE 802.11n/IEEE 802.11ac: OFDM
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location
Antenna Type:	IPEX Antenna
Antenna Gain:	2dBi
Power Supply:	AC 110V 60Hz
Adapter Information:	N/A

Note: 1. This report is only for 5GHz WiFi.

2. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3. There are many products, Only the model SPR1902A was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance and model name.

Operation Frequency Each of Channel							
Channel	**Frequency**	**Channel**	**Frequency**	**Channel**	**Frequency**	**Channel**	**Frequency**
For IEEE 802.11a/n-HT20/ac-VHT20 operation in the 5150 MHz to 5250 MHz band							

36	5180 MHz	40	5200 MHz	44	5220 MHz	48	5240 MHz
For IEEE 802.11a/n-HT20/ac-VHT20 operation in the 5725 MHz to 5850 MHz band							
149	5745 MHz	153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz	--	--	--	--	--	--
For IEEE 802.11n-HT40/ac-VHT40 operation in the 5150 MHz to 5250 MHz band							
38	5190 MHz	46	5230 MHz	--	--	--	--
For IEEE 802.11n-HT40/ac-VHT40 operation in the 5725 MHz to 5850 MHz band							
151	5755 MHz	159	5795 MHz	--	--	--	--

Note:

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

Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11a-20 IEEE 802.11n-20 IEEE 802.11ac-20	5150 MHz to 5250 MHz	Channel 36	Channel 40	Channel 48
		5180 MHz	5200 MHz	5240 MHz
	5725 MHz to 5850 MHz	Channel 149	Channel 157	Channel 165
		5745 MHz	5785 MHz	5825 MHz
IEEE 802.11n-40 IEEE 802.11ac-40	5150 MHz to 5250 MHz	Channel 38	--	Channel 46
		5190 MHz	--	5230 MHz
	5725 MHz to 5850 MHz	Channel 151	--	Channel 159
		5755 MHz	--	5795 MHz

Note: Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.3 Test Environment and Mode

Operating Environment:		
Conduction emission		
Temperature:	23 °C	
Humidity:	51 % RH	
Atmospheric Pressure:	992mbar	
Radiated Emission（Normal Conditions）		
Temperature:	25.1 °C~25.5 °C	
Humidity:	51 % RH~55 % RH	
Atmospheric Pressure:	992mbar	
RF item test（**RF test room** Normal Conditions）		
Temperature:	26 °C~27.3 °C	
Humidity:	58 % RH~59 % RH	
Atmospheric Pressure:	992mbar	
Test Condition	Temperature (°C)	Voltage (V)
TN/VN	15~ 35°C（Normal Conditions）	AC 110
TL/VL	-20	AC 100
TH/VL	50	AC 120
TL/VH	-20	AC 100
TH/VH	50	AC 120

Remark:

1)The EUT just work in such extreme temperature of -20 °C to 50 °C and the extreme voltage of AC 100 V to AC120 V, so here the EUT is tested in the temperature of -20 °C to 50 °C and the voltage of AC 100V to AC 120 V.

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.

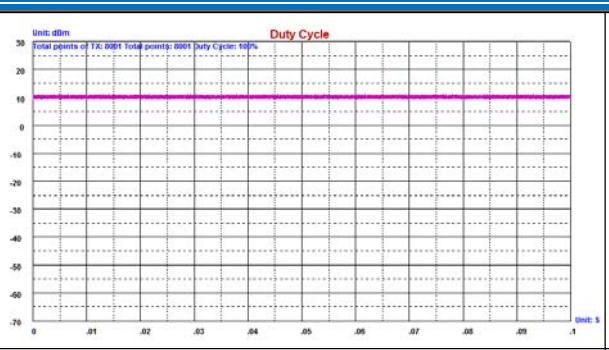
Transmitting mode

Use test software to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT.

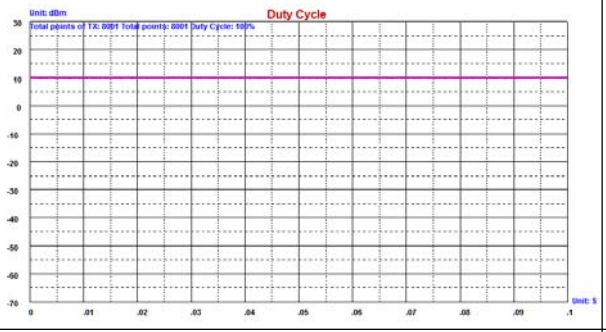
Note: In the process of transmitting of EUT, the duty cycle ＞98%.

duty cycle:

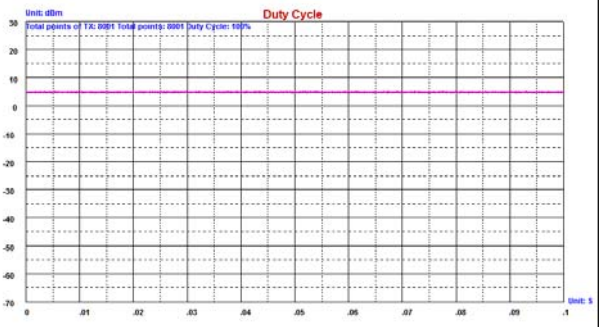
802.11a-5180	



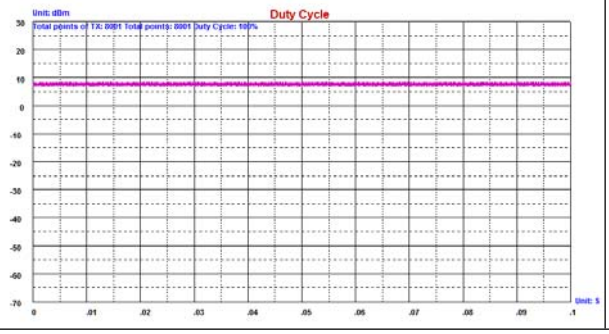
802.11ac-5180



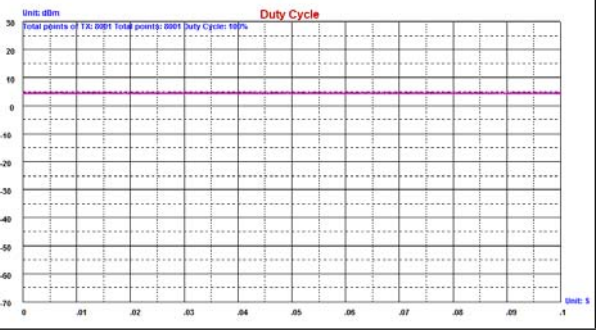
802.11ac40 -5190

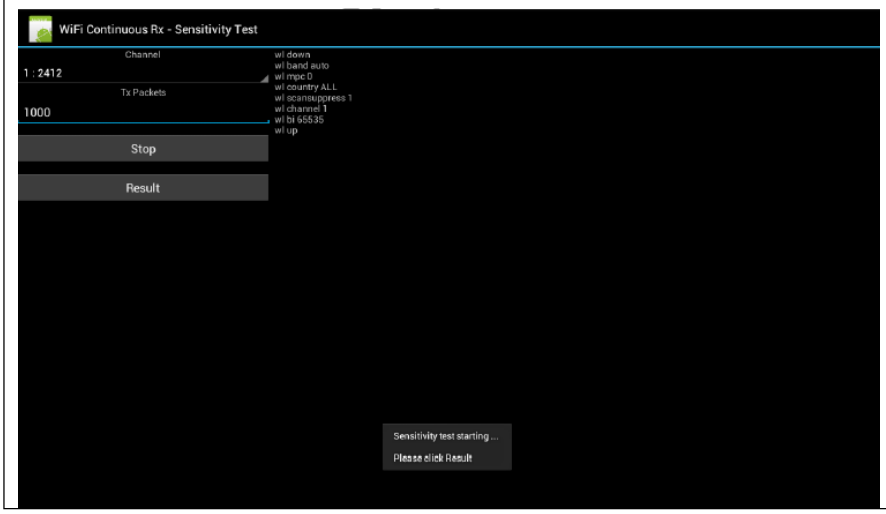


802.11n-5180



802.11n40-5190





4.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark	FCC certification
/	/	/	/	/

4.5 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua New District, Shenzhen, Guangdong, China

4.6 Test Facility

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

- **A2LA (Certificate No. 4742.01)**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

- **FCC Registration No.: 522263**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

4.7 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd.** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CQA laboratory is reported:

No.	Item	Uncertainty	Notes
1	Radiated Emission (Below 1GHz)	5.12dB	(1)
2	Radiated Emission (Above 1GHz)	4.60dB	(1)
3	Conducted Disturbance (0.15~30MHz)	3.34dB	(1)
4	Radio Frequency	3×10^{-8}	(1)
5	Duty cycle	0.6 %.	(1)
6	Occupied Bandwidth	1.1%	(1)
7	RF conducted power	0.86dB	(1)
8	RF power density	0.74	(1)
9	Conducted Spurious emissions	0.86dB	(1)
10	Temperature test	0.8℃	(1)
11	Humidity test	2.0%	(1)
12	Supply voltages	0.5 %.	(1)
13	Frequency Error	5.5 Hz	(1)

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.8 Deviation from Standards

None.

4.9 Abnormalities from Standard Conditions

None.

4.10 Other Information Requested by the Customer

15.407(c) requirement:

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signal ling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

Operation in the absence of information to the transmit

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ASK message transmitting from remote device and verify whether it shall resend or discontinue transmission. (manufacturer declare)

4.11 Equipment List

Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2018/9/26	2019/9/25
Spectrum analyzer	R&S	FSU26	CQA-038	2018/10/28	2019/10/27
Spectrum analyzer	Keysight	N9020A	CQA-105	2018/10/28	2019/10/27
Preamplifier	MITEQ	AFS4-00010300-18-10P-4	CQA-035	2018/9/26	2019/9/25
Preamplifier	MITEQ	AMF-6D-02001800-29-20P	CQA-036	2018/11/2	2019/11/1
Loop antenna	Schwarzbeck	FMZB1516	CQA-087	2018/9/26	2020/9/25
Bilog Antenna	R&S	HL562	CQA-011	2018/9/26	2020/9/25
Horn Antenna	R&S	HF906	CQA-012	2018/9/26	2020/9/25
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2018/9/26	2020/9/25
Horn Antenna	A.H.Systems, Inc.	SAS-573	CQA-104	2018/10/20	2020/10/19
Coaxial Cable (Above 1GHz)	CQA	N/A	C019	2018/9/26	2019/9/25
Coaxial Cable (Below 1GHz)	CQA	N/A	C020	2018/9/26	2019/9/25
Spectrum analyzer	Agilent	E4440A	CQA-103	2018/10/28	2019/10/27
Antenna Connector	CQA	RFC-01	CQA-080	2018/9/26	2019/9/25
RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2018/9/26	2019/9/25
Power Sensor	KEYSIGHT	U2021XA	CQA-30	2018/9/26	2019/9/25
N1918A Power	Agilent	N1918A	CQA-074	2018/9/26	2019/9/25

Analysis Manager Power Panel					
Power divider	MIDWEST	PWD-2533-02-SMA-79	CQA-067	2018/9/26	2019/9/25
EMI Test Receiver	R&S	ESPI3	CQA-013	2018/9/26	2019/9/25
LISN	R&S	ENV216	CQA-003	2018/11/5	2019/11/4
Coaxial cable (9KHz~300MHz)	CQA	N/A	CQA-C009	2018/9/26	2019/9/25
high-low temperature chamber	Auchno	OJN-9606	CQA-CB2	2018/9/26	2019/9/25
DC power	KEYSIGHT	E3631A	CQA-028	2018/9/26	2019/9/25

Note:

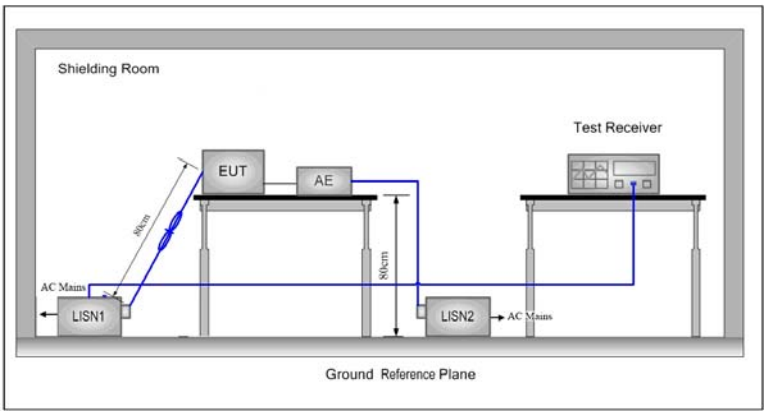
The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /407
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 (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
EUT Antenna:	Antenna 
The antenna is IFIA Antenna. The best case gain of the antenna is 2dBi.	

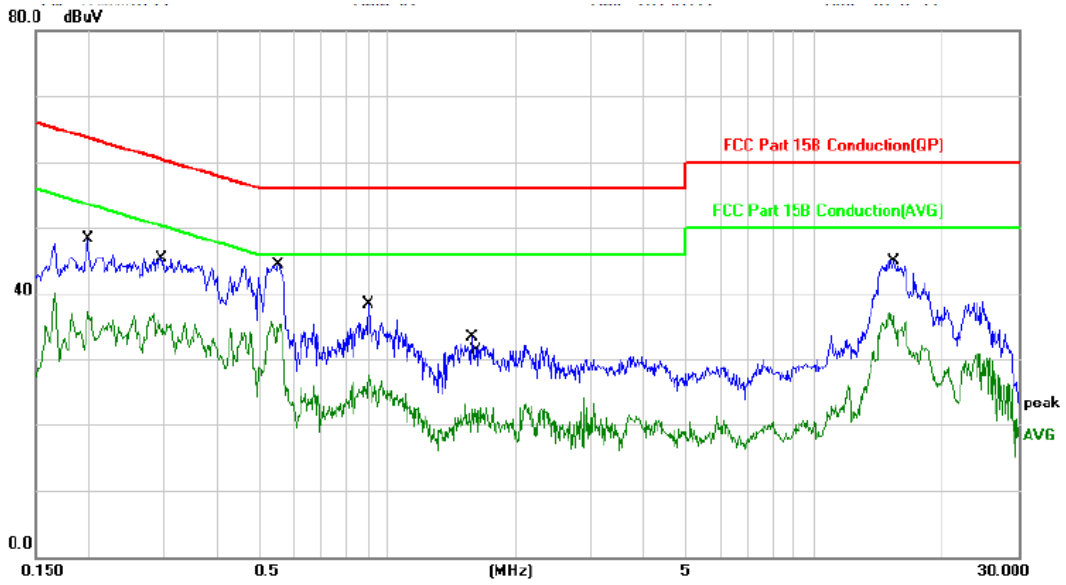
5.2 Conducted Emissions

Test Requirement:	47 CFR Part 15 Subpart C Section 15.207
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	150kHz to 30MHz
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test Procedure:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.

Final Test Mode:	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.
Test Voltage:	AC110V/60Hz
Test Results:	Pass

Measurement Data

Live Line:

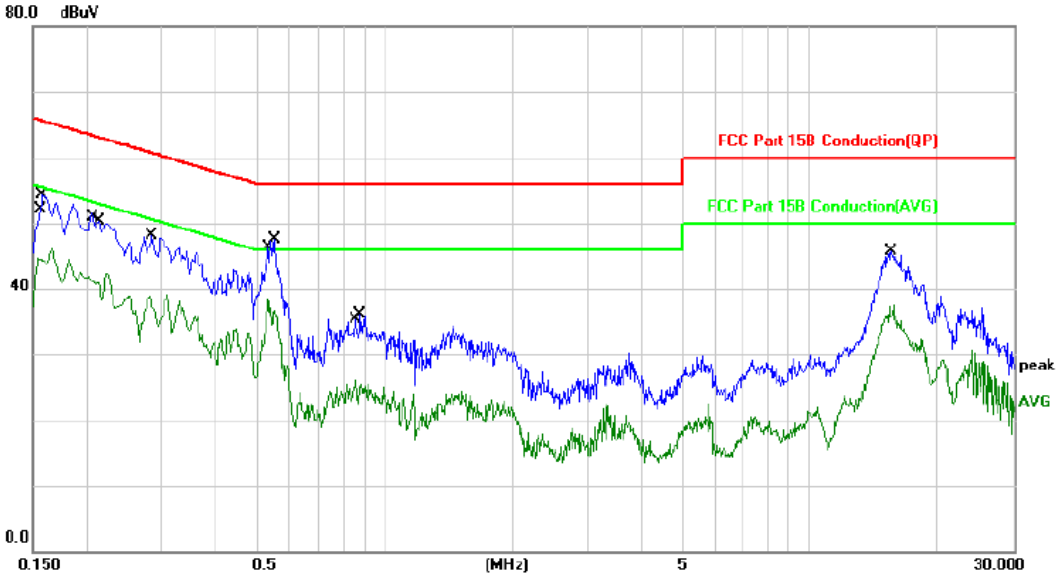


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1980	48.10	0.19	48.29	63.69	-15.40	QP	
2		0.1980	37.04	0.19	37.23	53.69	-16.46	AVG	
3		0.2908	35.51	0.31	35.82	50.50	-14.68	AVG	
4		0.2940	45.08	0.31	45.39	60.41	-15.02	QP	
5		0.5540	44.03	0.33	44.36	56.00	-11.64	QP	
6	*	0.5580	35.00	0.33	35.33	46.00	-10.67	AVG	
7		0.9020	37.99	0.30	38.29	56.00	-17.71	QP	
8		0.9020	27.11	0.30	27.41	46.00	-18.59	AVG	
9		1.5700	33.01	0.21	33.22	56.00	-22.78	QP	
10		1.5980	22.03	0.21	22.24	46.00	-23.76	AVG	
11		15.3019	45.00	-0.02	44.98	60.00	-15.02	QP	
12		15.3019	36.57	-0.02	36.55	50.00	-13.45	AVG	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral Line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1539	44.47	0.17	44.64	55.78	-11.14	AVG	
2		0.1580	54.03	0.18	54.21	65.56	-11.35	QP	
3		0.2083	40.82	0.19	41.01	53.27	-12.26	AVG	
4		0.2140	50.08	0.20	50.28	63.04	-12.76	QP	
5		0.2819	38.56	0.31	38.87	50.76	-11.89	AVG	
6		0.2860	47.80	0.31	48.11	60.64	-12.53	QP	
7	*	0.5340	38.22	0.32	38.54	46.00	-7.46	AVG	
8		0.5540	47.16	0.33	47.49	56.00	-8.51	QP	
9		0.8580	25.70	0.31	26.01	46.00	-19.99	AVG	
10		0.8780	35.73	0.30	36.03	56.00	-19.97	QP	
11		15.4139	45.67	-0.02	45.65	60.00	-14.35	QP	
12		15.5539	37.60	-0.02	37.58	50.00	-12.42	AVG	

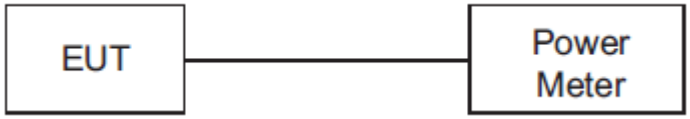
Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

3. If the Peak value under Average limit, the Average value is not recorded in the report.

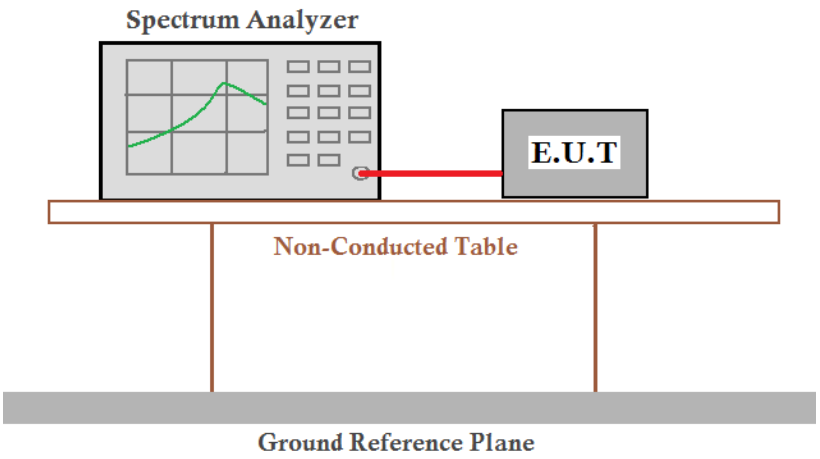
5.3 Conducted Average Output Power

Test Requirement:	47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)	
Test Method:	KDB 789033 D02 v02r01 Section F	
Test Setup:		
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 ; 6.5Mbps of rate is the worst case of 802.11n(20MHz) ; 13.5Mbps of rate is the worst case of 802.11n(40MHz); 6.5Mbps of rate is the worst case of 802.11ac(20MHz) ; 13.5Mbps of rate is the worst case of 802.11ac(40MHz); Only the worst case is recorded in the report.	
Limit:	U-NII-1	24dBm
	U-NII-2A	24dBm
	U-NII-2C	24dBm
	U-NII-3	30dBm
Test Results:	Pass	

Measurement Data

Test Mode	Test Channel	Level [dBm]	Duty Cycle factor (dB)	Power [dBm]	Limit [dBm]	Verdict
11A	5180	6.273	0	6.273	24.00	PASS
11A	5200	5.772	0	5.772	24.00	PASS
11A	5240	4.484	0	4.484	24.00	PASS
11A	5745	8.591	0	8.591	30.00	PASS
11A	5785	8.978	0	8.978	30.00	PASS
11A	5825	8.99	0	8.99	30.00	PASS
11N20	5180	5.562	0	5.562	24.00	PASS
11N20	5200	4.932	0	4.932	24.00	PASS
11N20	5240	3.854	0	3.854	24.00	PASS
11N20	5745	7.461	0	7.461	30.00	PASS
11N20	5785	7.934	0	7.934	30.00	PASS
11N20	5825	7.811	0	7.811	30.00	PASS
11N40	5190	4.979	0	4.979	24.00	PASS
11N40	5230	4.023	0	4.023	24.00	PASS
11N40	5755	7.744	0	7.744	30.00	PASS
11N40	5795	7.926	0	7.926	30.00	PASS
11AC20	5180	5.374	0	5.374	24.00	PASS
11AC20	5200	4.323	0	4.323	24.00	PASS
11AC20	5240	3.684	0	3.684	24.00	PASS
11AC20	5745	7.155	0	7.155	30.00	PASS
11AC20	5785	7.897	0	7.897	30.00	PASS
11AC20	5825	7.784	0	7.784	30.00	PASS
11AC40	5190	4.752	0	4.752	24.00	PASS
11AC40	5230	3.931	0	3.931	24.00	PASS
11AC40	5755	7.374	0	7.374	30.00	PASS
11AC40	5795	7.585	0	7.585	30.00	PASS

5.4 26dB Bandwidth

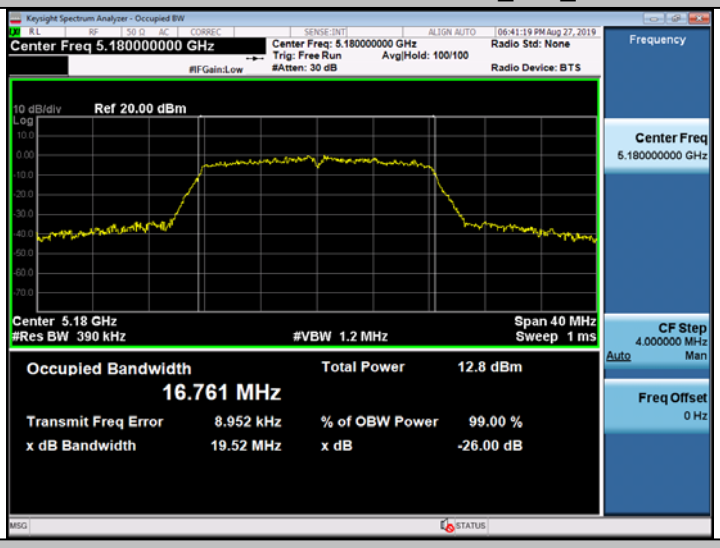
Test Requirement:	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)
Test Method:	KDB 789033 D02 v02r01 Section C.1
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a ; 6.5Mbps of rate is the worst case of 802.11n(20MHz) ; 13.5Mbps of rate is the worst case of 802.11n(40MHz); 6.5Mbps of rate is the worst case of 802.11ac(20MHz) ; 13.5Mbps of rate is the worst case of 802.11ac(40MHz);
Limit:	None; for reporting purposes only.
Test Results:	Pass

Measurement Data

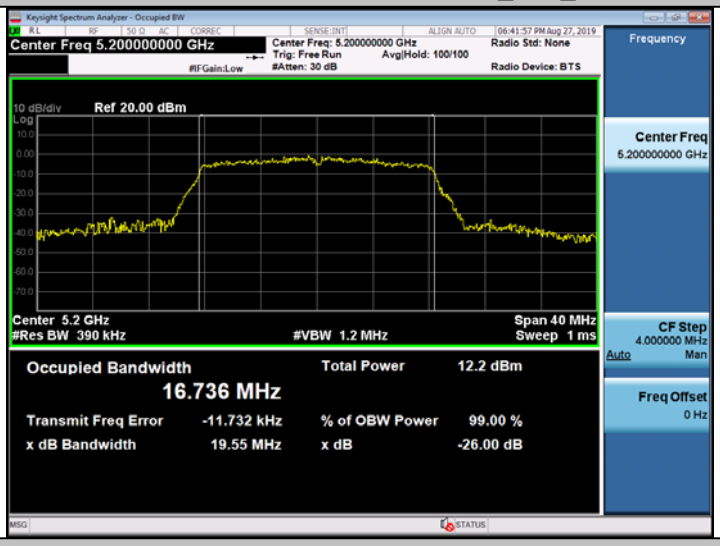
Test Mode	Test Channel	EBW[MHz]	Limit[MHz]	Verdict
11A	5180	19.52	---	PASS
11A	5200	19.55	---	PASS
11A	5240	19.46	---	PASS
11N20	5180	19.80	---	PASS
11N20	5200	19.91	---	PASS
11N20	5240	19.89	---	PASS
11N40	5190	39.91	---	PASS
11N40	5230	40.19	---	PASS
11AC20	5180	19.75	---	PASS
11AC20	5200	19.82	---	PASS
11AC20	5240	19.82	---	PASS
11AC40	5190	40.22	---	PASS
11AC40	5230	40.24	---	PASS

Test plot as follows:

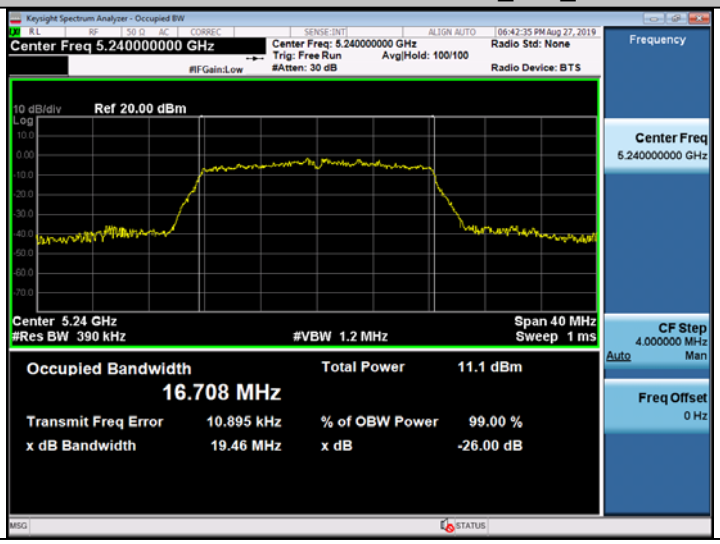
Emission Bandwidth Measurement_11A_5180



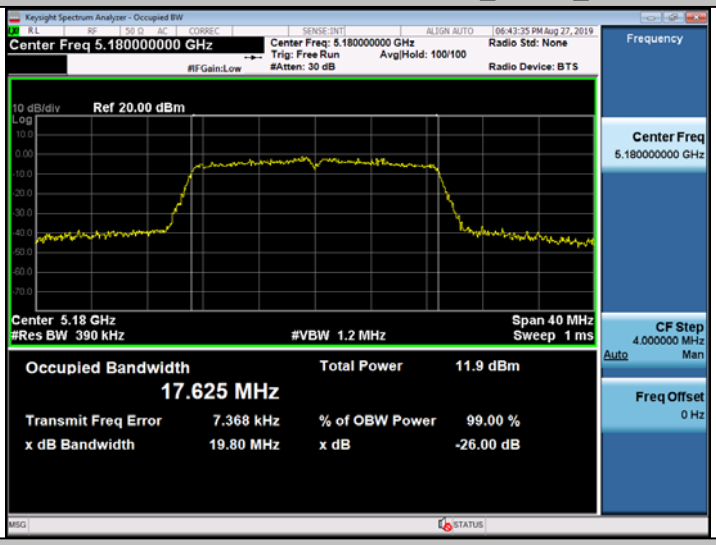
Emission Bandwidth Measurement_11A_5200



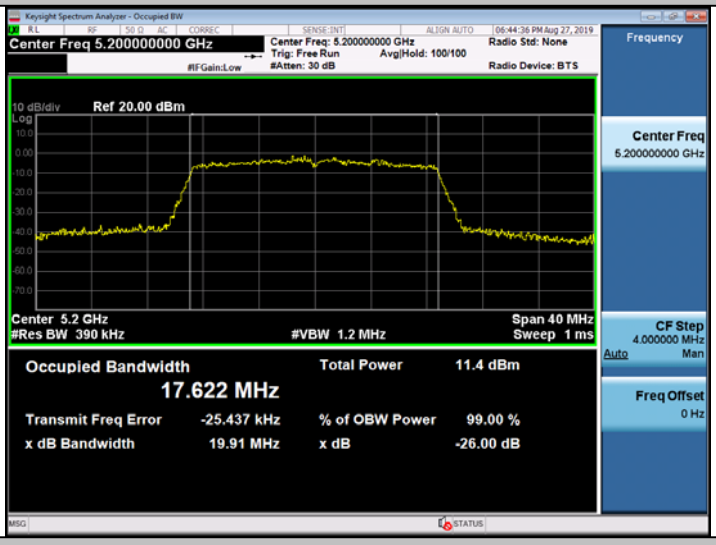
Emission Bandwidth Measurement_11A_5240



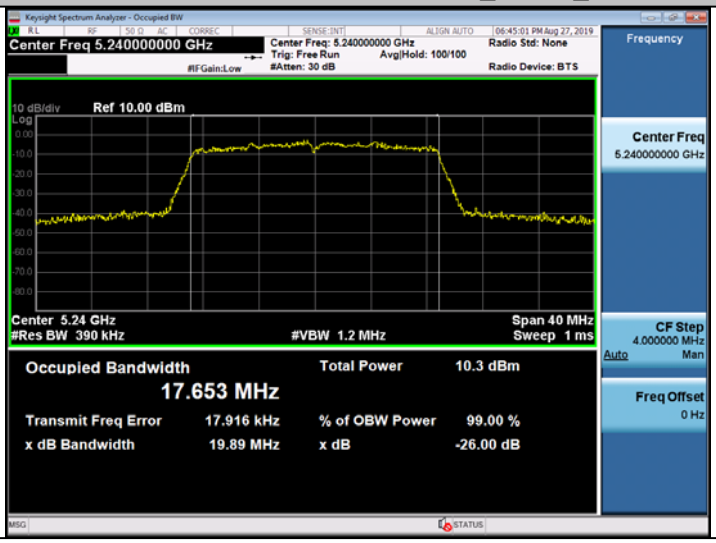
Emission Bandwidth Measurement_11N20_5180

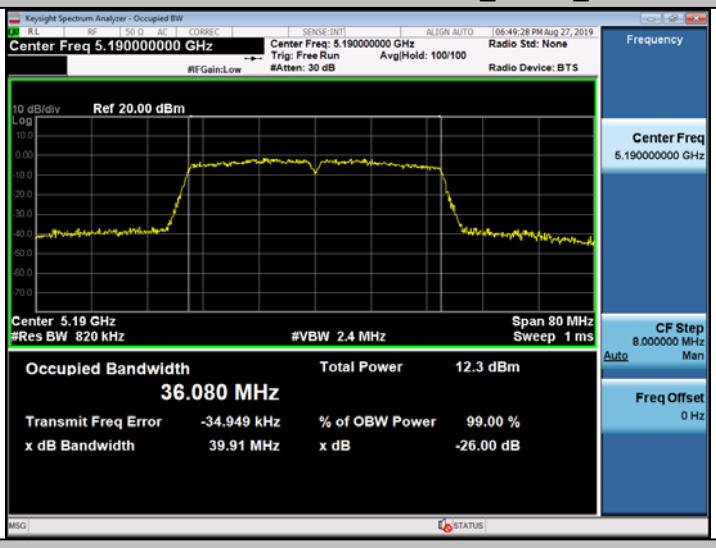
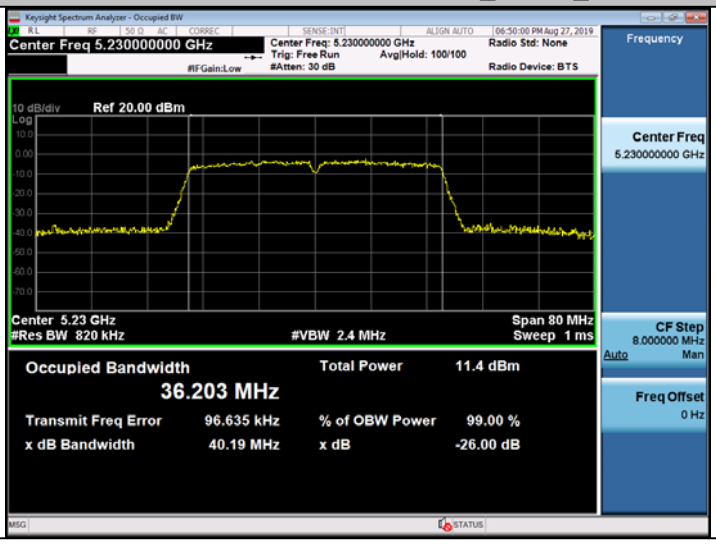


Emission Bandwidth Measurement_11N20_5200

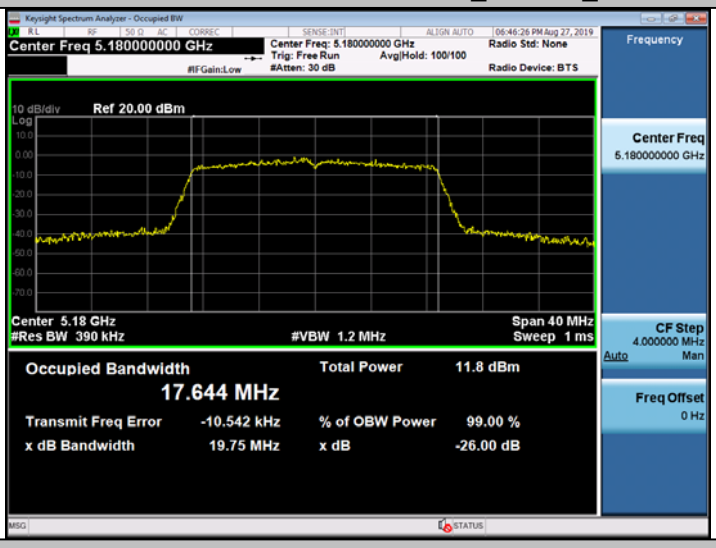


Emission Bandwidth Measurement_11N20_5240

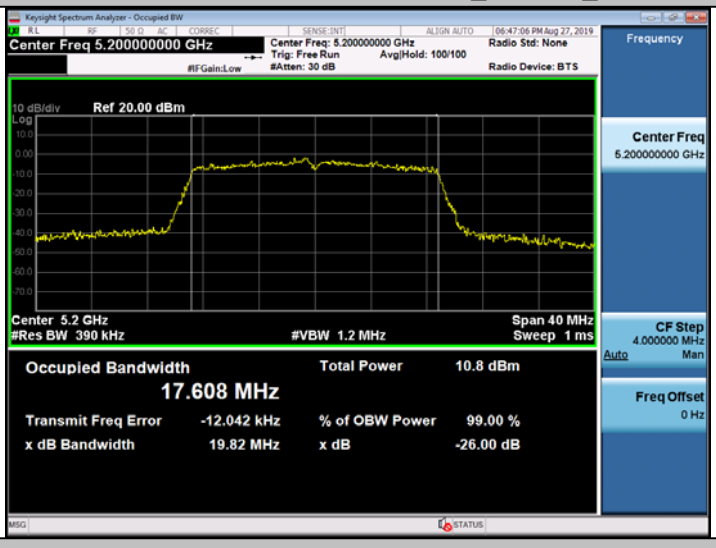


Emission Bandwidth Measurement_11N40_5190

Emission Bandwidth Measurement_11N40_5230


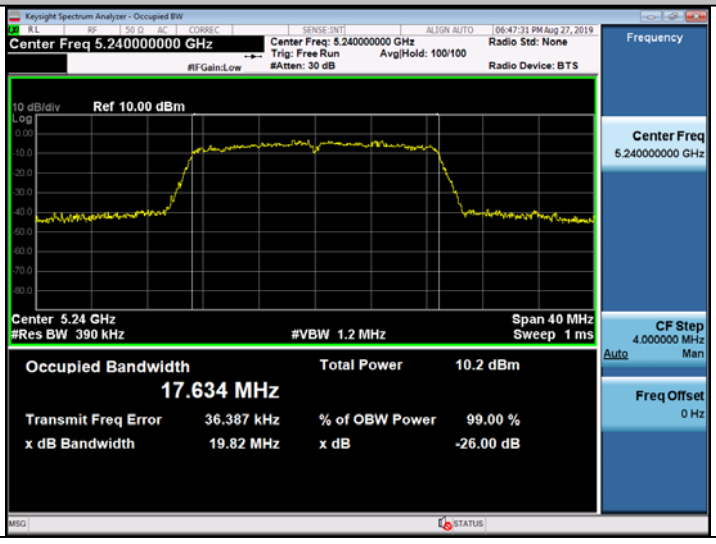
Emission Bandwidth Measurement_11AC20_5180

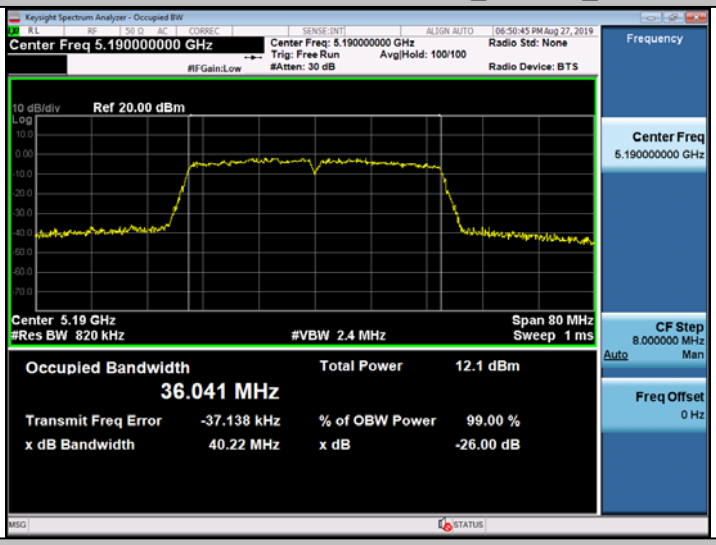
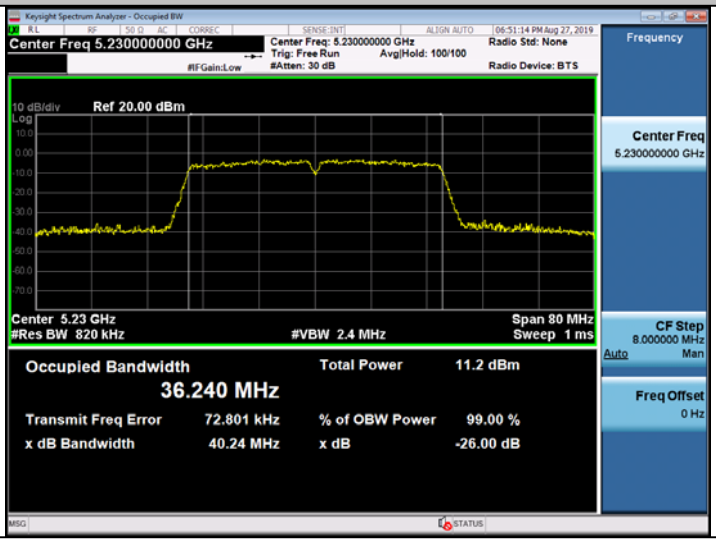


Emission Bandwidth Measurement_11AC20_5200

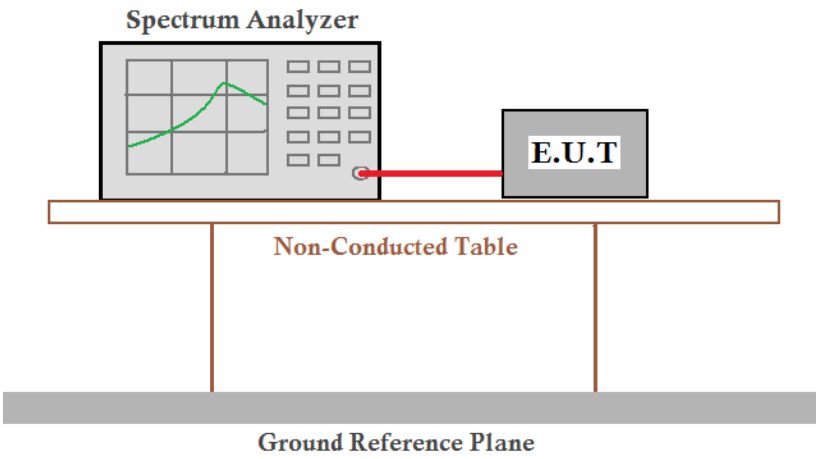


Emission Bandwidth Measurement_11AC20_5240



Emission Bandwidth Measurement_11AC40_5190

Emission Bandwidth Measurement_11AC40_5230


5.5 6dB Bandwidth

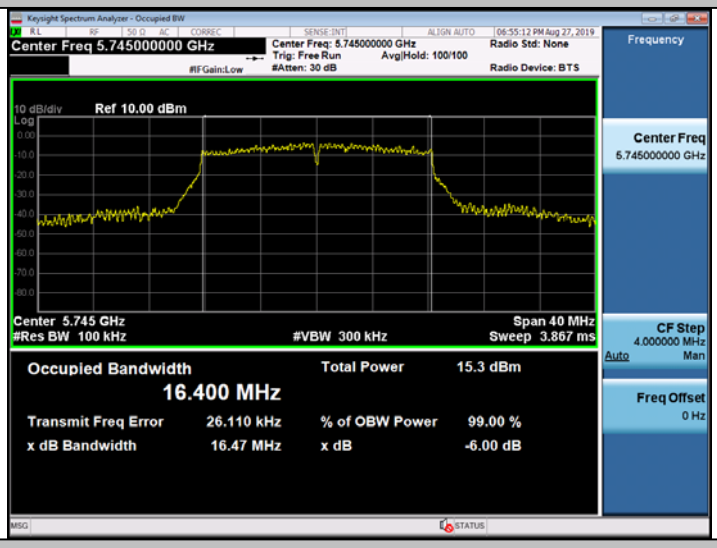
Test Requirement:	FCC 47 CFR Part 15 Subpart C Section 15.407 (e)
Test Method:	KDB 789033 D02 v02r01Section C.2
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a ; 6.5Mbps of rate is the worst case of 802.11n(20MHz) ; 13.5Mbps of rate is the worst case of 802.11n(40MHz); 6.5Mbps of rate is the worst case of 802.11ac(20MHz) ; 13.5Mbps of rate is the worst case of 802.11ac(40MHz);
Limit:	≥ 500 kHz
Test Results:	Pass

Measurement Data

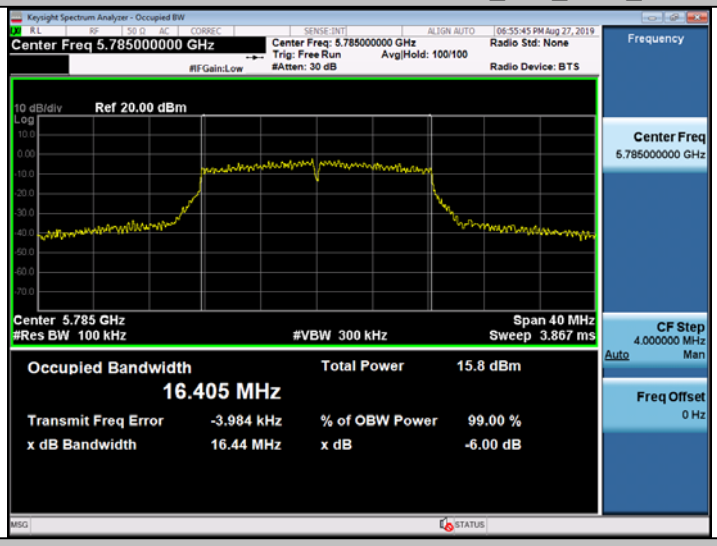
Test Mode	Test Channel	Ant	EBW[MHz]	Limit[MHz]	Verdict
11A	5745	Ant1	16.47	0.5	PASS
11A	5785	Ant1	16.44	0.5	PASS
11A	5825	Ant1	16.48	0.5	PASS
11N20	5745	Ant1	17.65	0.5	PASS
11N20	5785	Ant1	17.65	0.5	PASS
11N20	5825	Ant1	17.65	0.5	PASS
11N40	5755	Ant1	36.39	0.5	PASS
11N40	5795	Ant1	36.41	0.5	PASS
11AC20	5745	Ant1	17.62	0.5	PASS
11AC20	5785	Ant1	17.67	0.5	PASS
11AC20	5825	Ant1	17.64	0.5	PASS
11AC40	5755	Ant1	36.39	0.5	PASS
11AC40	5795	Ant1	36.41	0.5	PASS

Test plot as follows:

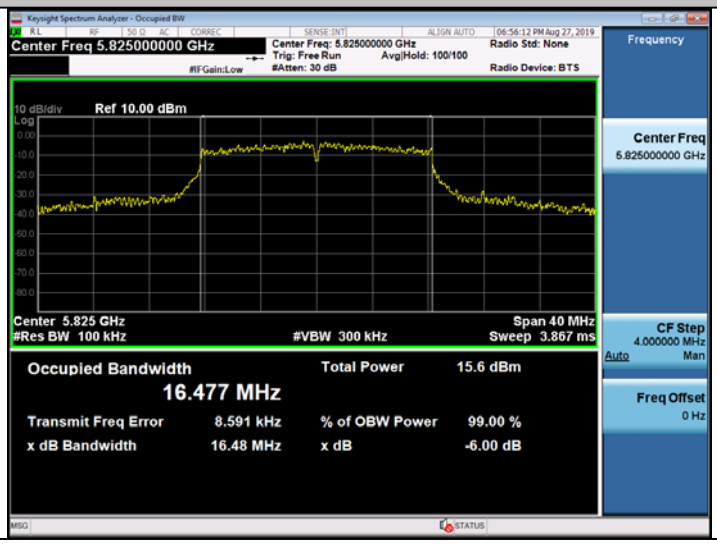
Emission Bandwidth Measurement 11A 5745



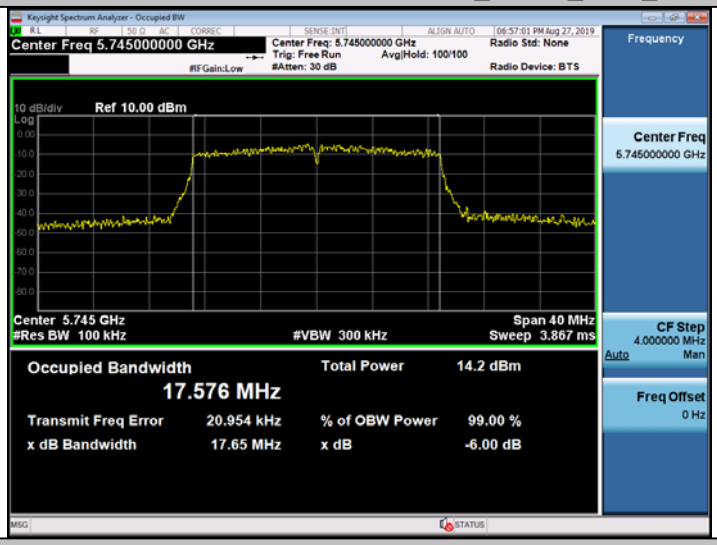
Emission Bandwidth Measurement_11A_5785_



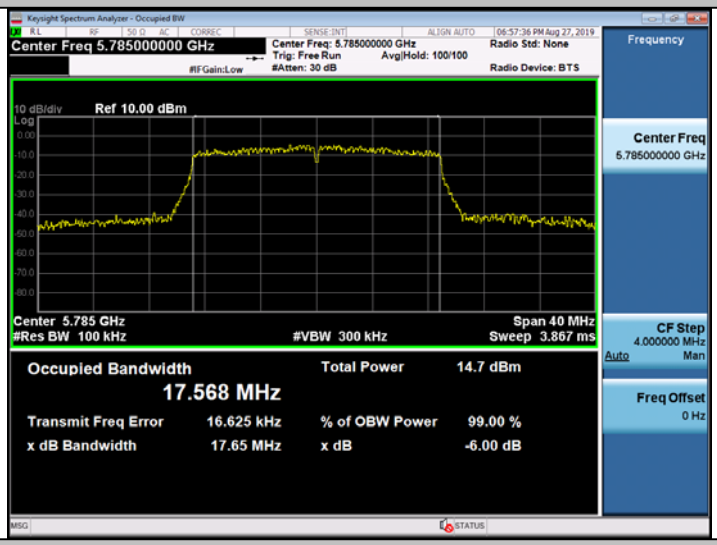
Emission Bandwidth Measurement 11A 5825



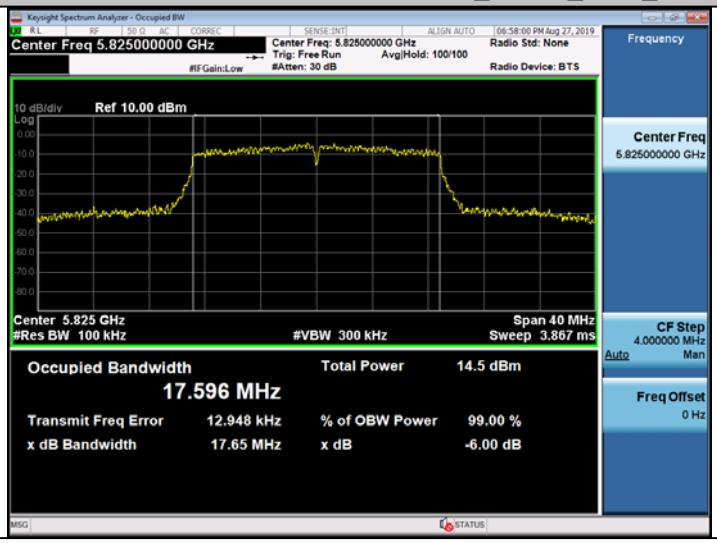
Emission Bandwidth Measurement_11N20_5745_

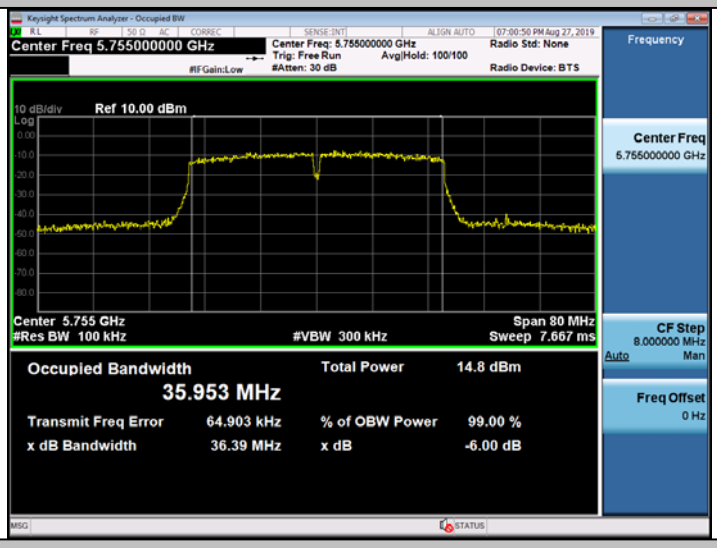
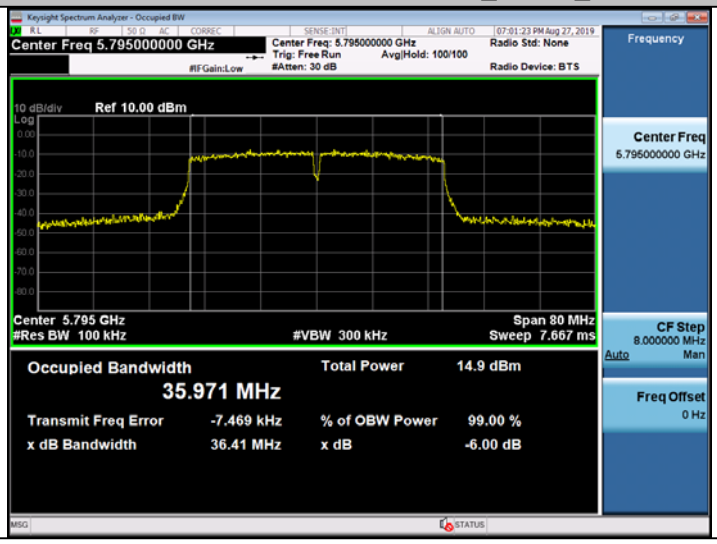


Emission Bandwidth Measurement 11N20 5785

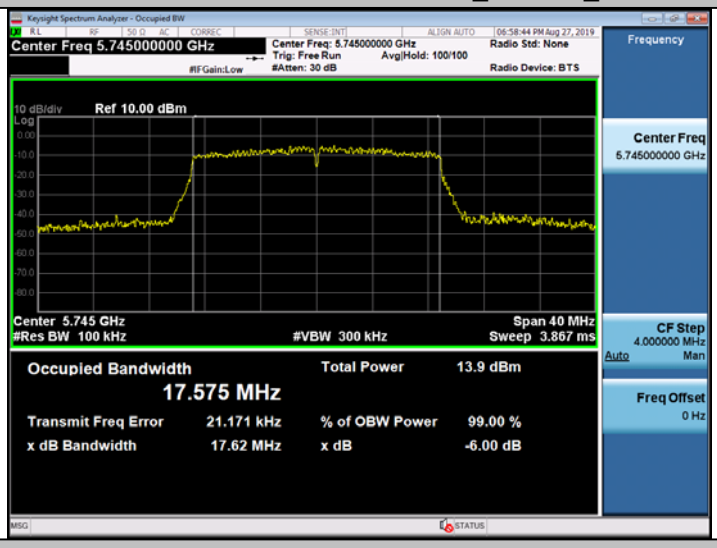


Emission Bandwidth Measurement_11N20_5825_

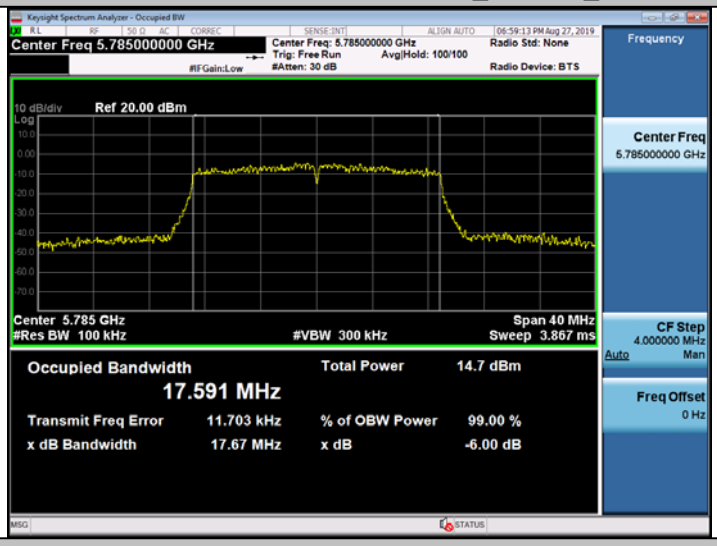


Emission Bandwidth Measurement 11N40 5755

Emission Bandwidth Measurement_11N40_5795


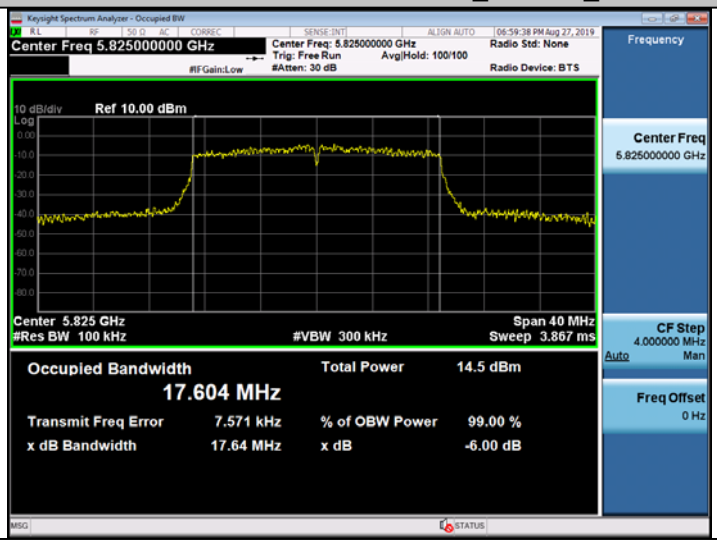
Emission Bandwidth Measurement_11AC20_5745

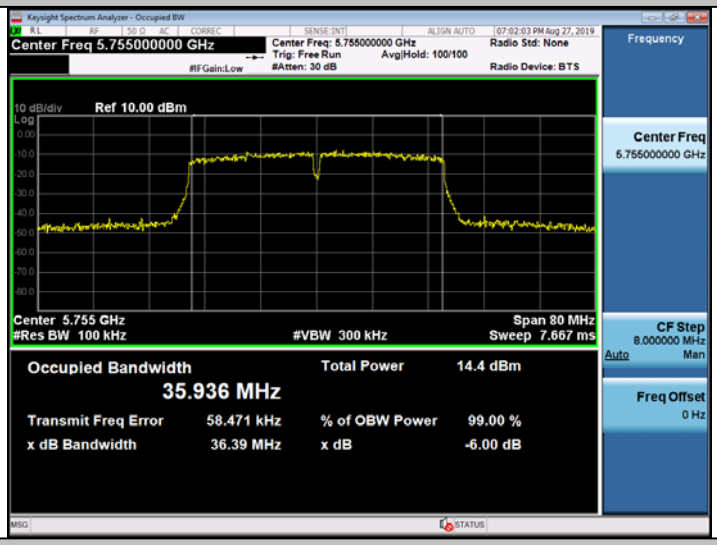
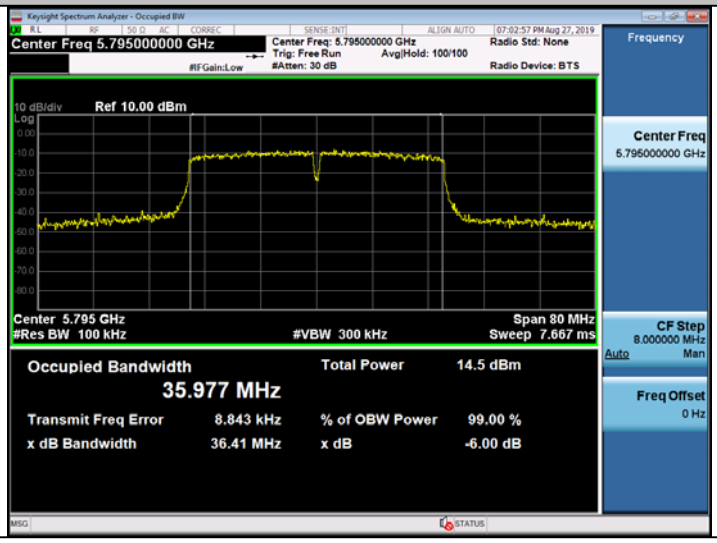


Emission Bandwidth Measurement_11AC20_5785

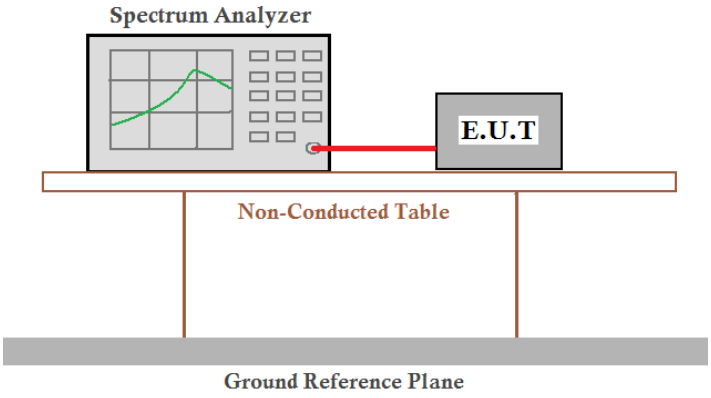


Emission Bandwidth Measurement_11AC20_5825



Emission Bandwidth Measurement 11AC40 5755

Emission Bandwidth Measurement_11AC40_5795


5.6 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	
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss in the spectrum analyzer.*	
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 ; 6.5Mbps of rate is the worst case of 802.11n(20MHz) ; 13.5Mbps of rate is the worst case of 802.11n(40MHz); 6.5Mbps of rate is the worst case of 802.11ac(20MHz) ; 13.5Mbps of rate is the worst case of 802.11ac(40MHz);	
Limit:	U-NII-1	11dBm/MHz
	U-NII-2A	11dBm/MHz
	U-NII-2C	11dBm/MHz
	U-NII-3	30dBm/500KHz
Test Results:	Pass	

Measurement Data

For U-NII-1 Band:

Test Mode	Test Channel	Meas PSD [dBm/MHz]	Duty Cycle Factor [dB]	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	5180	4.355	0	4.355	11.00	PASS
11A	5200	3.762	0	3.762	11.00	PASS
11A	5240	2.609	0	2.609	11.00	PASS
11N20	5180	3.555	0	3.555	11.00	PASS
11N20	5200	2.564	0	2.564	11.00	PASS
11N20	5240	1.192	0	1.192	11.00	PASS
11N40	5190	-0.697	0	-0.697	11.00	PASS
11N40	5230	-1.685	0	-1.685	11.00	PASS
11AC20	5180	2.871	0	2.871	11.00	PASS
11AC20	5200	2.438	0	2.438	11.00	PASS
11AC20	5240	1.303	0	1.303	11.00	PASS
11AC40	5190	-1.004	0	-1.004	11.00	PASS
11AC40	5230	-1.530	0	-1.530	11.00	PASS

Remark:

PSD = Meas PSD + Duty Cycle Factor

For U-NII-3 Band:

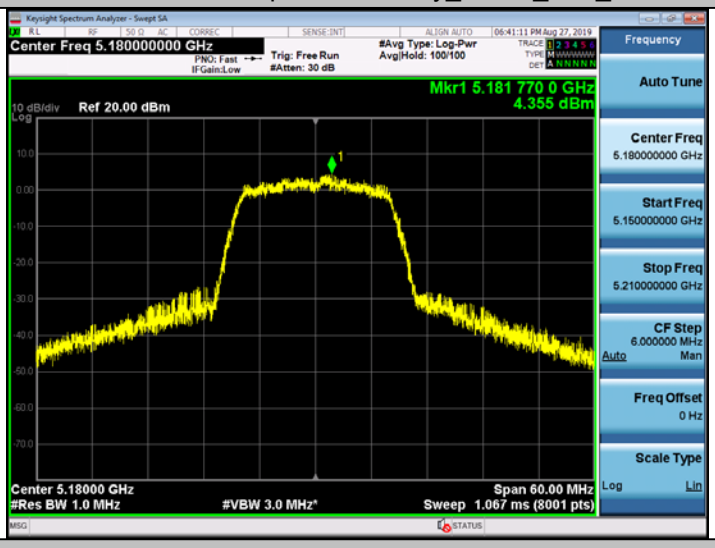
Test Mode	Test Channel	Meas PSD [dBm/500kHz]	Duty Cycle Factor [dB]	PSD [dBm/500kHz]	Limit [dBm/500kHz]	Verdict
11A	5745	3.968	0	3.968	30.00	PASS
11A	5785	3.818	0	3.818	30.00	PASS
11A	5825	3.957	0	3.957	30.00	PASS
11N20	5745	2.100	0	2.100	30.00	PASS
11N20	5785	2.840	0	2.840	30.00	PASS
11N20	5825	2.329	0	2.329	30.00	PASS
11N40	5755	-0.742	0	-0.742	30.00	PASS
11N40	5795	-0.584	0	-0.584	30.00	PASS
11AC20	5745	2.006	0	2.006	30.00	PASS
11AC20	5785	2.324	0	2.324	30.00	PASS
11AC20	5825	1.789	0	1.789	30.00	PASS
11AC40	5755	-1.431	0	-1.431	30.00	PASS
11AC40	5795	-1.429	0	-1.429	30.00	PASS

Remark:

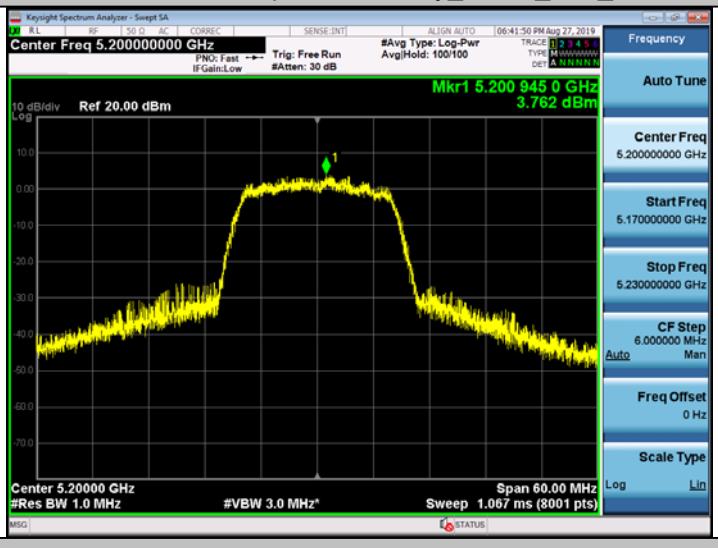
PSD = Meas PSD + Duty Cycle Factor

Test plot as follows:

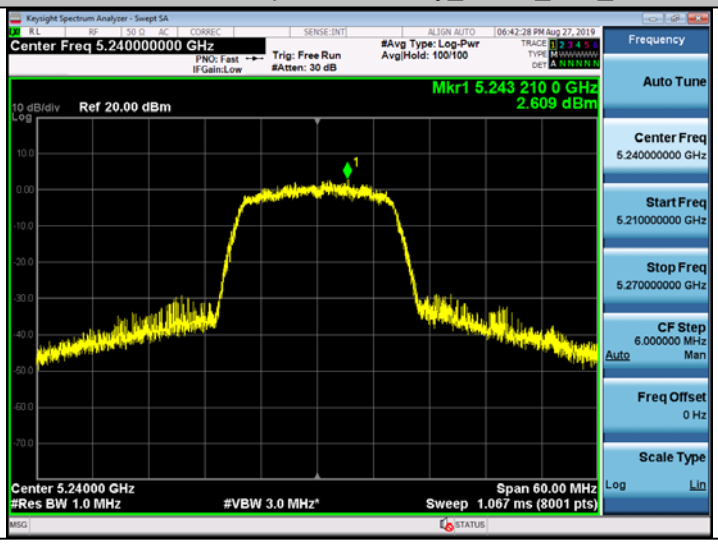
Maximum Power Spectral Density_TNVN_11A_5180



Maximum Power Spectral Density_TNVN_11A_5200



Maximum Power Spectral Density_TNVN_11A_5240

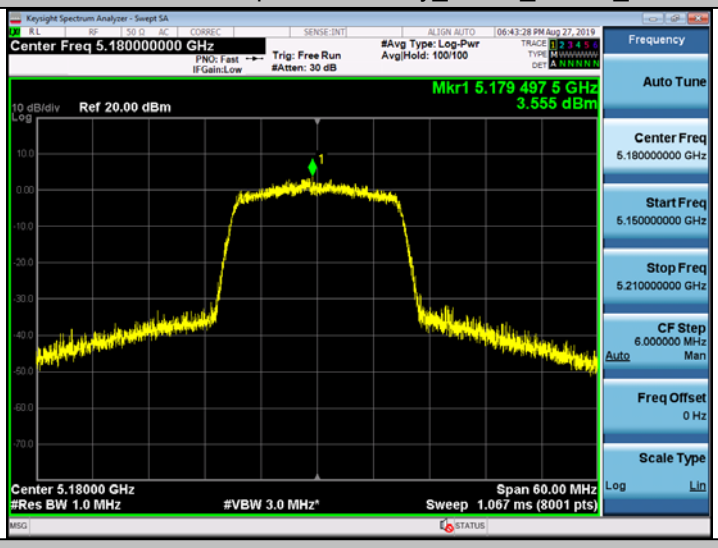


Maximum Power Spectral Density_TNVN_11A_5745

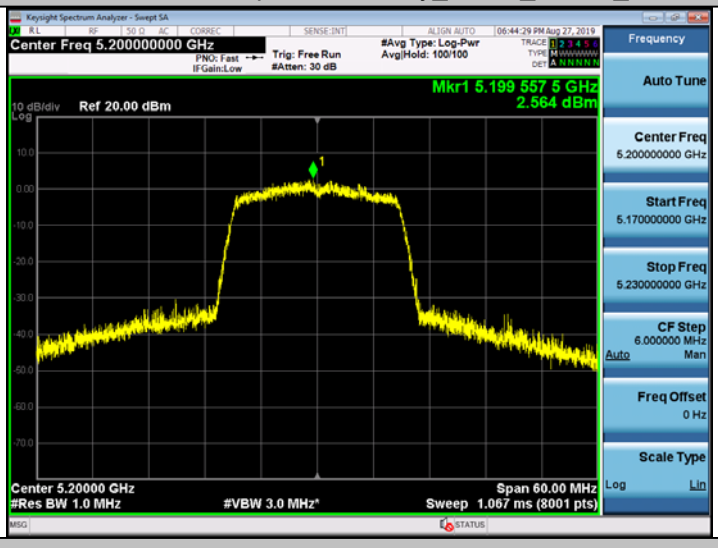
Maximum Power Spectral Density_TNVN_11A_5785

Maximum Power Spectral Density_TNVN_11A_5825

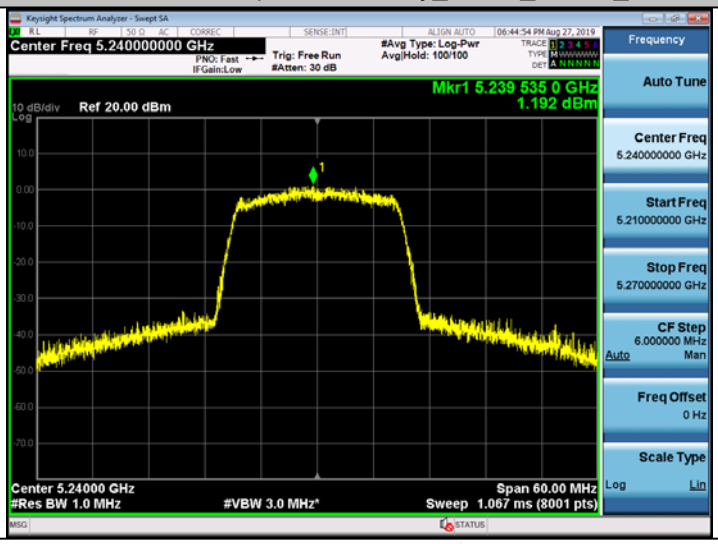
Maximum Power Spectral Density_TNVN_11N20_5180



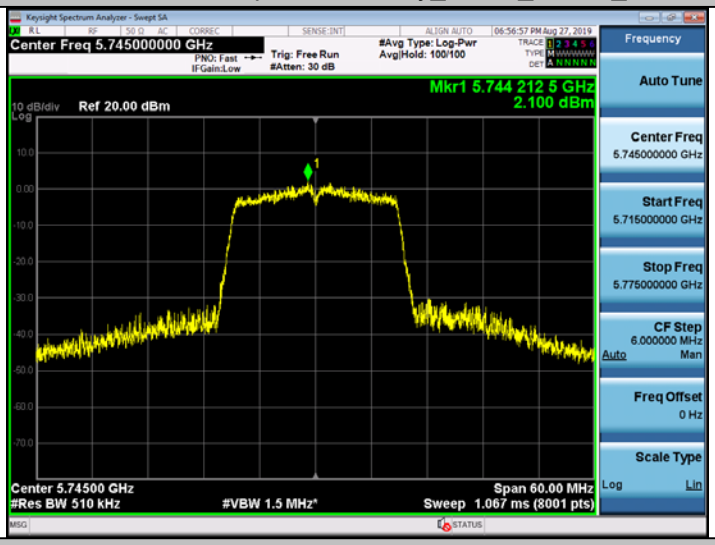
Maximum Power Spectral Density_TNVN_11N20_5200



Maximum Power Spectral Density_TNVN_11N20_5240

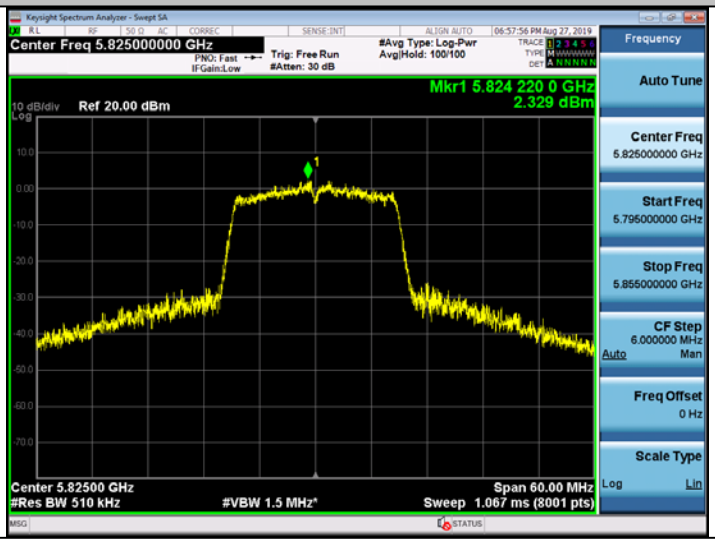


Maximum Power Spectral Density_TNVN_11N20_5745



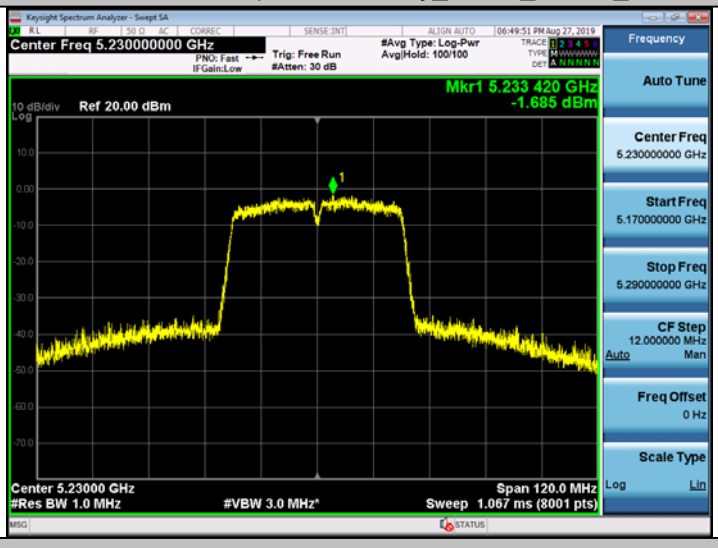
Maximum Power Spectral Density_TNVN_11N20_5785

Maximum Power Spectral Density_TNVN_11N20_5825



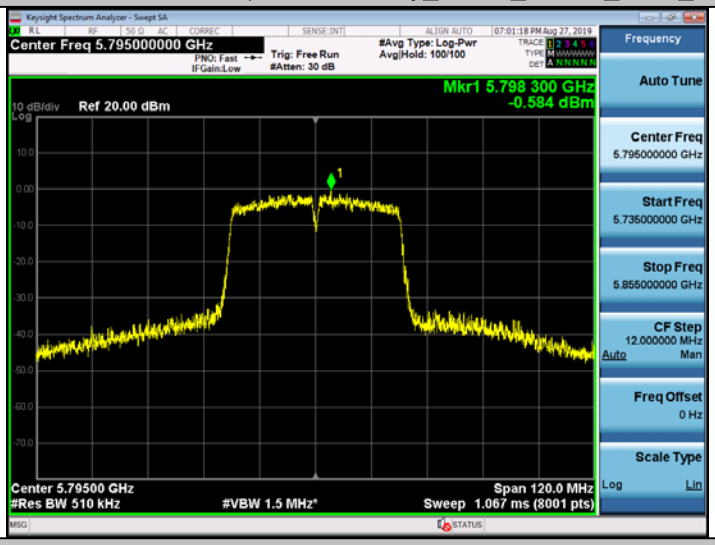
Maximum Power Spectral Density_TNVN_11N40_5190

Maximum Power Spectral Density_TNVN_11N40_5230

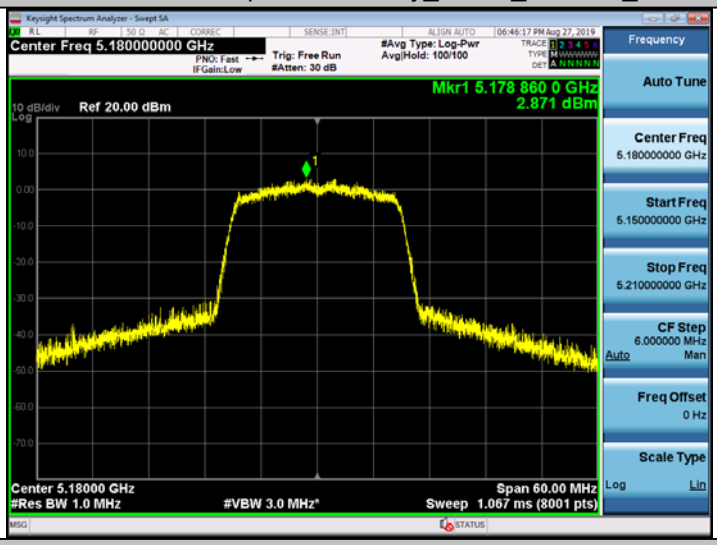


Maximum Power Spectral Density_TNVN_11N40_5755

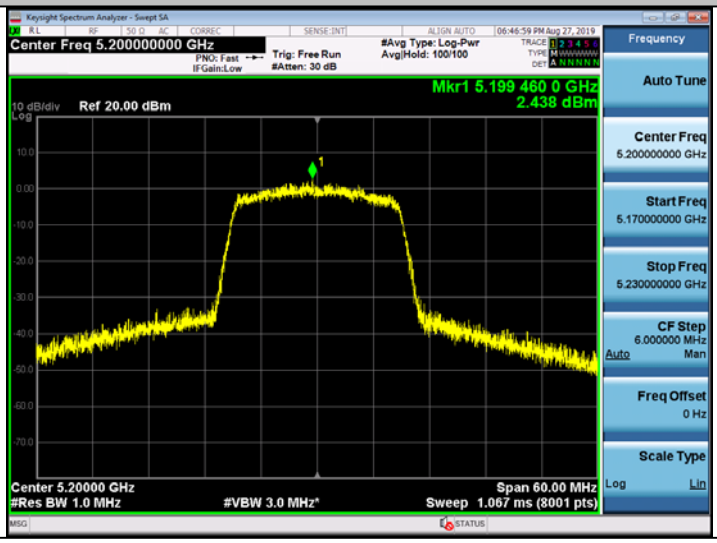
Maximum Power Spectral Density_TNVN_11N40_5795_



Maximum Power Spectral Density_TNVN_11AC20_5180



Maximum Power Spectral Density_TNVN_11AC20_5200



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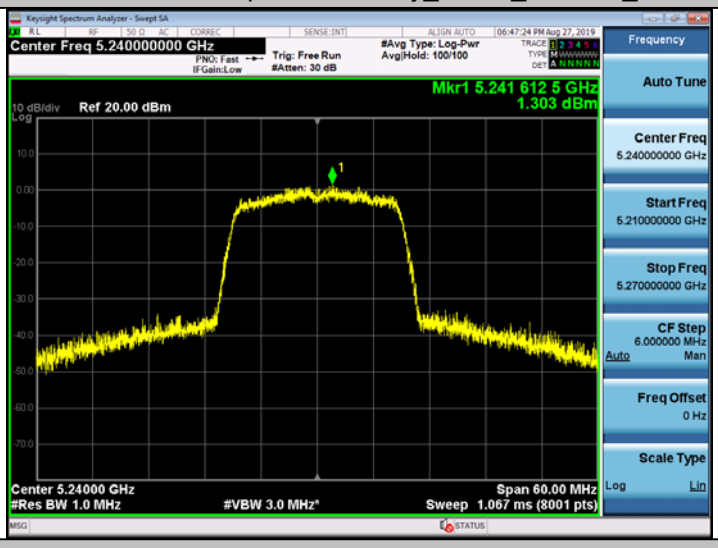
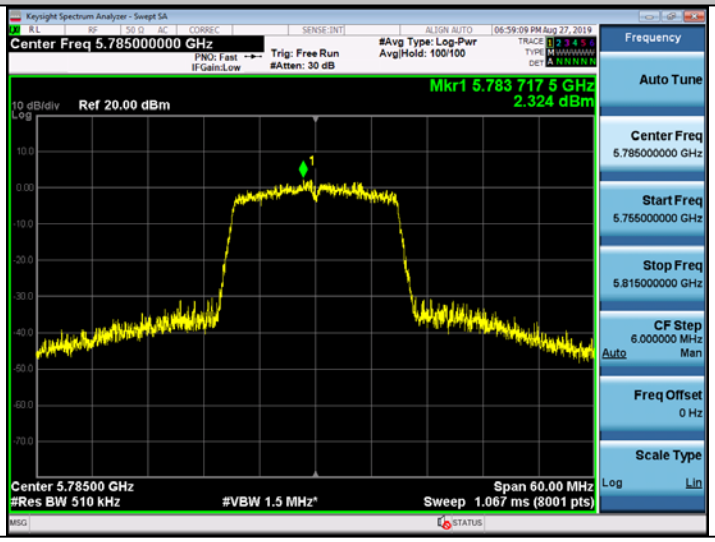


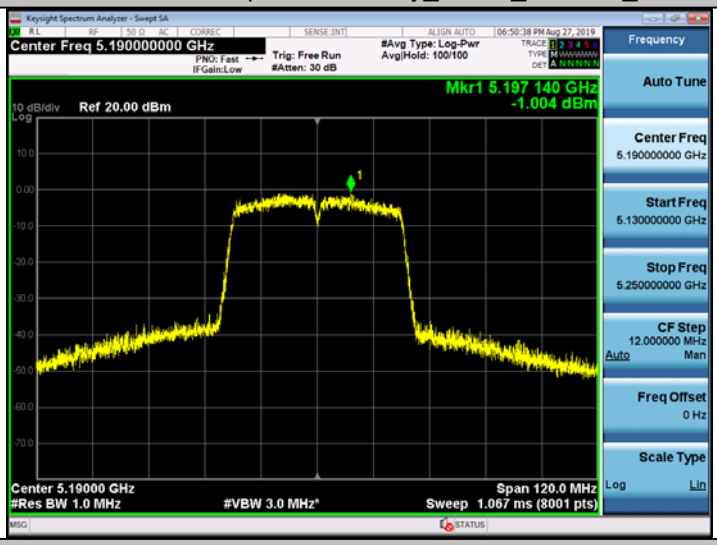
Maximum Power Spectral Density_TNVN_11AC20_5745

Maximum Power Spectral Density_TNVN_11AC20_5785_

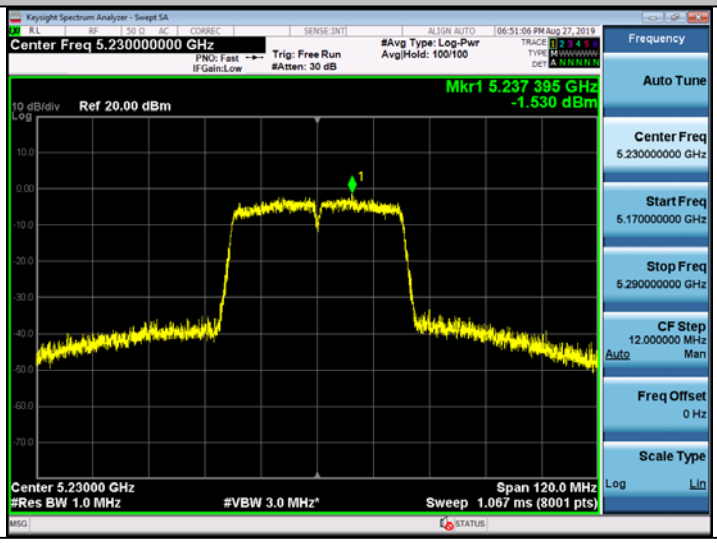


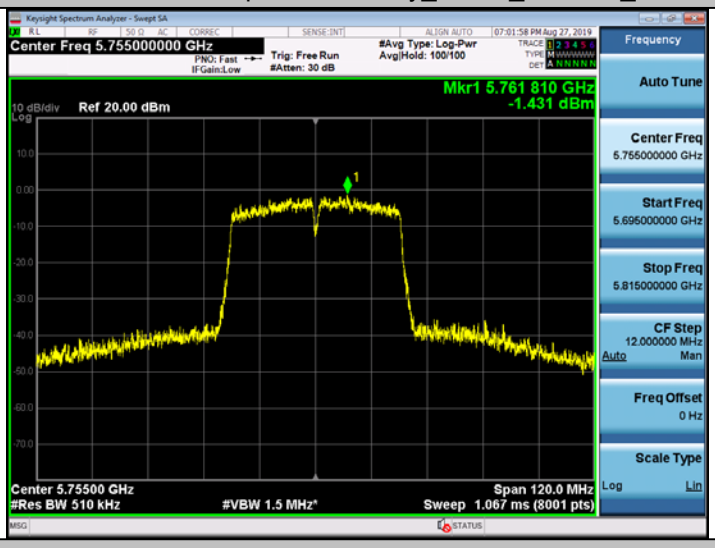
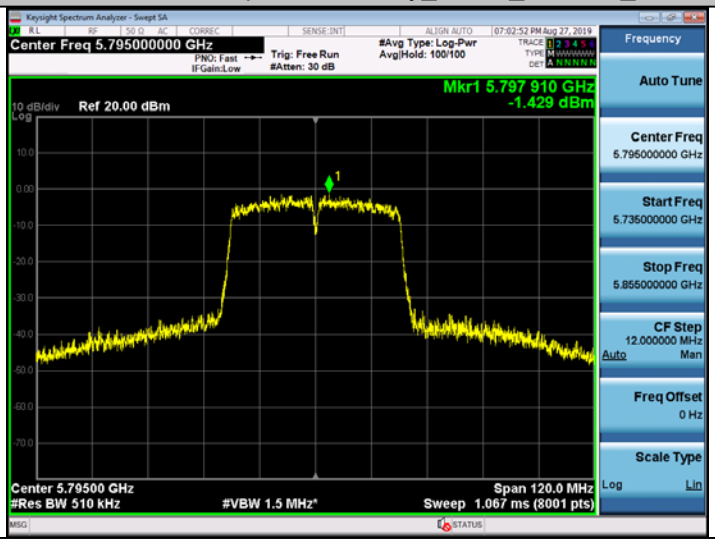
Maximum Power Spectral Density_TNVN_11AC20_5825

Maximum Power Spectral Density_TNVN_11AC40_5190

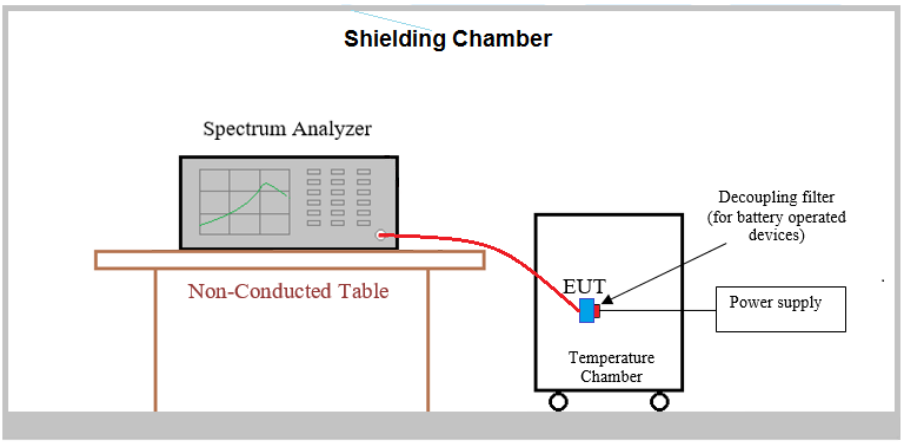


Maximum Power Spectral Density_TNVN_11AC40_5230



Maximum Power Spectral Density_TNVN_11AC40_5755

Maximum Power Spectral Density_TNVN_11AC40_5795


5.7 Frequency Stability

Test Requirement:	FCC 47 CFR Part 15 Subpart E Section 15.407 (g)
Test Method:	ANSI C63.10-2013
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss in the spectrum analyzer.*
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 ; 6.5Mbps of rate is the worst case of 802.11n(20MHz) ; 13.5Mbps of rate is the worst case of 802.11n(40MHz); 6.5Mbps of rate is the worst case of 802.11ac(20MHz) ; 13.5Mbps of rate is the worst case of 802.11ac(40MHz); Only the worst case is recorded in the report.
Limit:	The frequency of the carrier signal shall be maintained within band of operation.
Test Results:	Pass

Measurement Data

802.11a20--5180 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5179.956	-8.577
40		5179.927	-14.079
30		5179.921	-15.270
20		5179.973	-5.272
10		5179.961	-7.438
0		5179.925	-14.500
-10		5179.934	-12.779
-20		5179.998	-0.464

802.11a20--5200 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5199.964	-6.927
40		5199.981	-3.714
30		5199.909	-17.518
20		5199.972	-5.358
10		5199.988	-2.249
0		5199.952	-9.168
-10		5199.951	-9.401
-20		5199.953	-8.951

802.11a20-- 5240 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5240	-3.453
40		5240	-16.248
30		5240	-6.306
20		5240	-6.141
10		5240	-11.558
0		5240	-3.663
-10		5240	-13.117
-20		5240	-1.714

802.11n20--5180 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5179.926	-14.256
40		5179.946	-10.520
30		5180.000	-0.005
20		5179.977	-4.473
10		5179.975	-4.761
0		5179.994	-1.173
-10		5179.951	-9.481
-20		5179.965	-6.716

802.11n20--5200 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5199.956	-8.410
40		5199.927	-14.012
30		5199.957	-8.229
20		5199.953	-9.017
10		5199.926	-14.236
0		5199.925	-14.507
-10		5199.908	-17.633
-20		5199.995	-1.000

802.11n20-- 5240 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5239.929	-13.479
40		5239.982	-3.475
30		5239.920	-15.360
20		5239.919	-15.479
10		5239.962	-7.338
0		5239.994	-1.218
-10		5239.937	-11.938
-20		5239.941	-11.225

802.11n40 -- 5190 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5189.911	-17.106
40		5189.936	-12.271
30		5189.902	-18.873
20		5189.989	-2.137
10		5189.918	-15.706
0		5189.943	-10.924
-10		5189.971	-5.492
-20		5189.980	-3.914

802.11n40 -- 5230 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5229.946	-10.395
40		5229.913	-16.540
30		5229.910	-17.219
20		5229.911	-17.041
10		5229.993	-1.330
0		5229.932	-12.993
-10		5229.942	-11.157
-20		5229.991	-1.750

802.11ac20--5180 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5179.995	-0.952
40		5179.958	-8.196
30		5179.918	-15.816
20		5179.924	-14.659
10		5179.926	-14.258
0		5179.994	-1.161
-10		5179.998	-0.476
-20		5179.947	-10.192

802.11ac20--5200 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5199.977	-4.472
40		5199.934	-12.755
30		5199.903	-18.628
20		5199.944	-10.854
10		5199.961	-7.500
0		5199.989	-2.201
-10		5199.943	-11.040
-20		5199.915	-16.289

802.11ac20-- 5240 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5239.991	-1.677
40		5239.989	-2.101
30		5239.975	-4.688
20		5239.917	-15.820
10		5239.907	-17.748
0		5239.912	-16.794
-10		5239.939	-11.716
-20		5239.987	-2.484

802.11ac40 -- 5190 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5189.997	-0.532
40		5189.912	-16.900
30		5189.941	-11.383
20		5190.000	-0.043
10		5189.996	-0.720
0		5189.984	-3.135
-10		5189.956	-8.536
-20		5189.933	-12.883

802.11ac40 -- 5230 MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5229.979	-3.925
40		5229.941	-11.278
30		5229.979	-4.014
20		5229.992	-1.591
10		5229.932	-13.041
0		5229.932	-12.995
-10		5229.970	-5.822
-20		5229.920	-15.334

802.11a20-- 5745MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5744.977	-4.044
40		5744.950	-8.707
30		5744.992	-1.449
20		5744.947	-9.252
10		5744.923	-13.461
0		5744.940	-10.361
-10		5744.939	-10.554
-20		5744.956	-7.745

802.11a20-- 5785MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5784.934	-11.384
40		5784.935	-11.322
30		5784.986	-2.493
20		5784.985	-2.557
10		5784.985	-2.638
0		5784.968	-5.528
-10		5784.912	-15.162
-20		5784.927	-12.619

802.11a20-- 5825MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5824.948	-8.893
40		5824.981	-3.343
30		5824.929	-12.209
20		5824.931	-11.906
10		5824.925	-12.872
0		5824.907	-15.920
-10		5824.946	-9.196
-20		5824.911	-15.351

802.11n20-- 5745MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5744.954	-8.003
40		5744.913	-15.164
30		5744.971	-5.061
20		5744.948	-9.031
10		5744.975	-4.404
0		5744.970	-5.257
-10		5744.981	-3.223
-20		5744.913	-15.058

802.11n20-- 5785MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5784.956	-7.567
40		5784.977	-3.916
30		5784.928	-12.444
20		5784.934	-11.353
10		5784.968	-5.533
0		5784.912	-15.169
-10		5784.975	-4.364
-20		5784.924	-13.136

802.11n20-- 5825MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5824.967	-5.666
40		5824.915	-14.610
30		5824.975	-4.210
20		5824.989	-1.815
10		5824.911	-15.333
0		5824.942	-10.008
-10		5824.951	-8.390
-20		5824.989	-1.954

802.11n40-- 5755MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5754.990	-1.735
40		5754.997	-0.604
30		5754.983	-2.953
20		5754.960	-6.960
10		5754.953	-8.184
0		5754.964	-6.267
-10		5754.902	-17.004
-20		5754.951	-8.473

802.11n40-- 5795MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5794.918	-14.137
40		5794.929	-12.180
30		5794.966	-5.882
20		5794.940	-10.334
10		5794.987	-2.213
0		5794.974	-4.467
-10		5794.987	-2.277
-20		5794.934	-11.424

802.11ac20-- 5745MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5744.947	-9.291
40		5744.956	-7.707
30		5744.960	-6.951
20		5744.970	-5.271
10		5744.912	-15.312
0		5744.998	-0.427
-10		5744.907	-16.241
-20		5744.949	-8.964

802.11ac20-- 5785MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5784.998	-0.290
40		5784.904	-16.509
30		5784.980	-3.465
20		5784.957	-7.425
10		5784.944	-9.759
0		5784.939	-10.542
-10		5784.991	-1.619
-20		5784.995	-0.782

802.11ac20-- 5825MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5824.962	-6.544
40		5824.913	-14.933
30		5824.932	-11.658
20		5824.926	-12.646
10		5824.967	-5.675
0		5824.906	-16.178
-10		5824.908	-15.750
-20		5824.927	-12.571

802.11ac40-- 5755MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5754.966	-5.936
40		5754.929	-12.304
30		5754.913	-15.122
20		5754.904	-16.751
10		5754.920	-13.987
0		5754.939	-10.594
-10		5754.996	-0.710
-20		5754.935	-11.297

802.11ac40-- 5795MHz			
Temp (℃)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5794.996	-0.710
40		5794.987	-2.315
30		5794.970	-5.130
20		5794.911	-15.336
10		5794.930	-12.024
0		5794.909	-15.681
-10		5794.995	-0.848
-20		5794.957	-7.481

5.8 Radiated Spurious Emissions

Test Requirement:	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
Test Method:	KDB 789033 D02 v02r01 Section G.3, G.4, G.5, and G.6
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test Setup:	

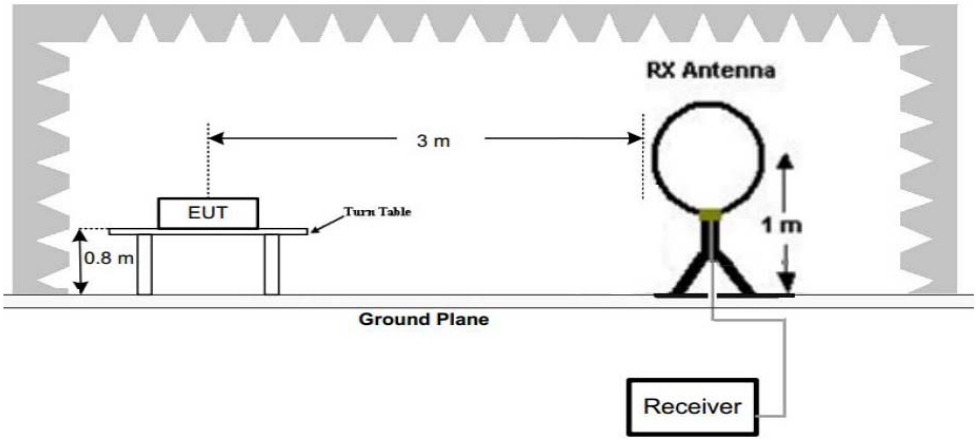


Figure 1. Below 30MHz

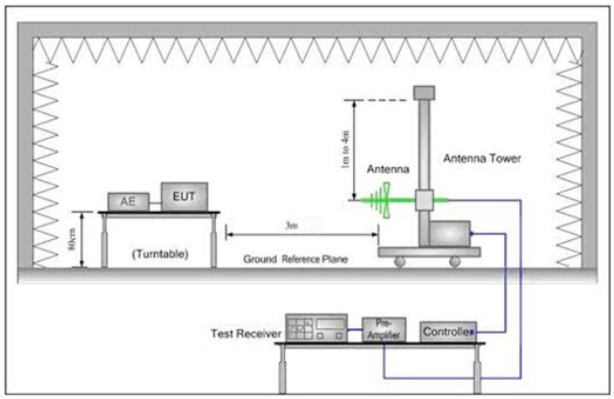


Figure 2. 30MHz to 1GHz

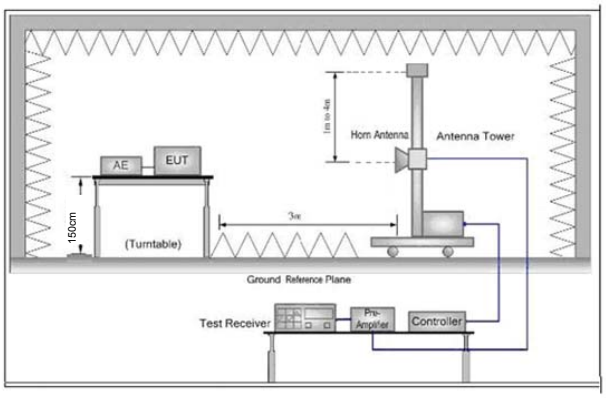


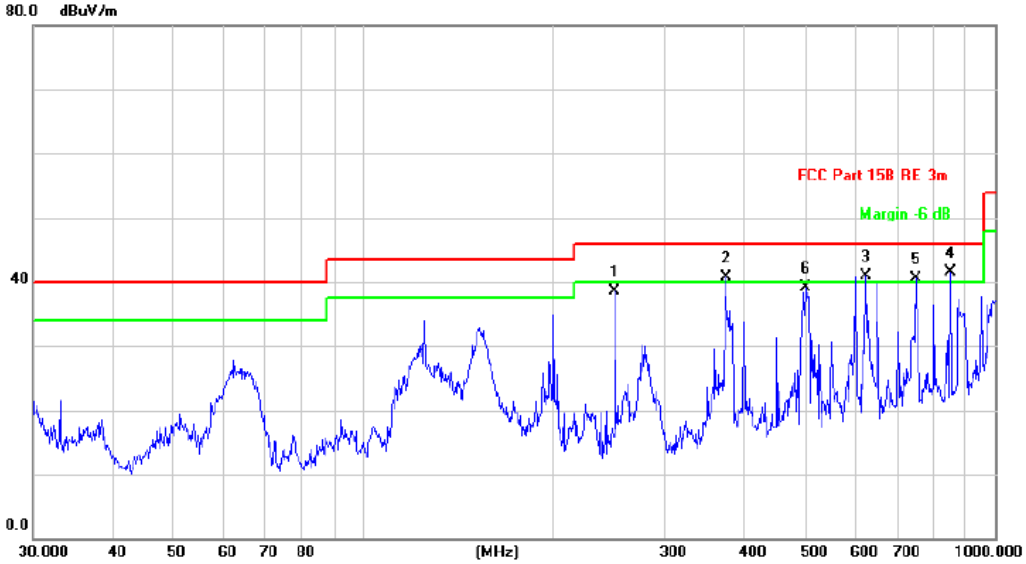
Figure 3. Above 1 GHz

Test Procedure:	a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. Note: For the radiated emission test above 1GHz: Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. 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.

	d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel ,the middle channel ,the Highest channel h. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode.
Final Test Mode:	Pretest the EUT at Transmitting mode, found the Transmitting mode which it is worse case 6.5Mbps of rate is the worst case of 802.11n(20MHz) ; 13.5Mbps of rate is the worst case of 802.11n(40MHz); 6.5Mbps of rate is the worst case of 802.11ac(20MHz) ; 13.5Mbps of rate is the worst case of 802.11ac(40MHz); Only the worst case is recorded in the report.
Test Results:	Pass

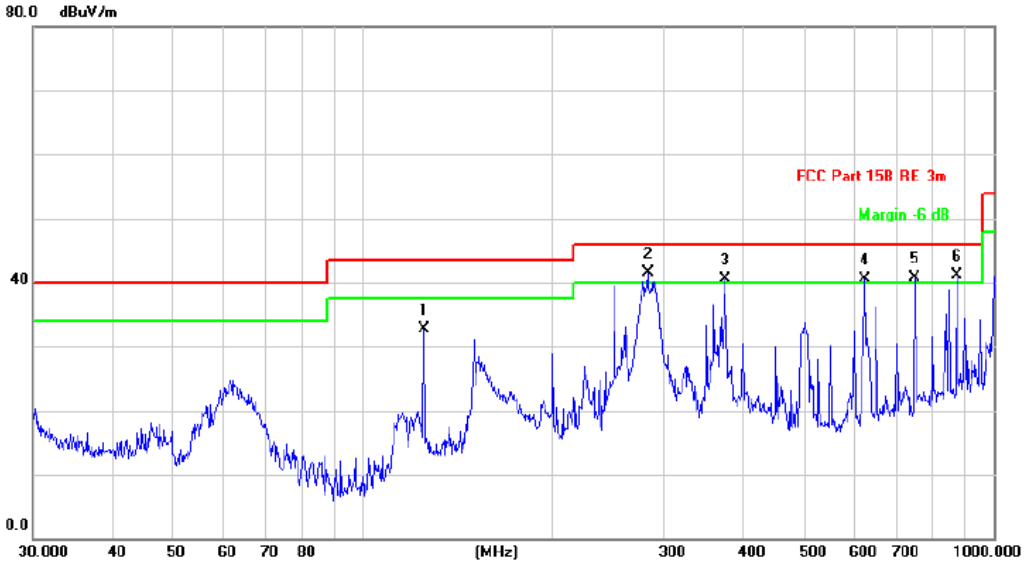
5.8.1 Radiated emission below 1GHz

30MHz~1GHz		
Test mode:	Transmitting	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		250.3009	51.36	-12.87	38.49	46.00	-7.51	QP			
2	!	374.6225	50.27	-9.60	40.67	46.00	-5.33	QP			
3	!	625.0778	45.13	-4.29	40.84	46.00	-5.16	QP			
4	*	851.0353	42.47	-1.01	41.46	46.00	-4.54	QP			
5	!	750.1082	42.98	-2.46	40.52	46.00	-5.48	QP			
6		501.1788	45.48	-6.41	39.07	46.00	-6.93	QP			

Test mode:	Transmitting	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		125.0066	45.27	-12.47	32.80	43.50	-10.70	QP			
2	*	282.9852	52.89	-11.43	41.46	46.00	-4.54	QP			
3	!	374.6225	49.84	-9.31	40.53	46.00	-5.47	QP			
4	!	625.0778	44.47	-3.99	40.48	46.00	-5.52	QP			
5	!	750.1082	42.73	-1.96	40.77	46.00	-5.23	QP			
6	!	875.2468	41.28	-0.13	41.15	46.00	-4.85	QP			

5.8.2 Transmitter emission above 1GHz

Test mode:		802.11a20(6Mbps)		Test channel:		36	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
10360.000	51.66	2.13	53.79	74	-20.21	peak	H
10360.000	38.16	2.13	40.29	54	-13.71	AVG	H
15540.000	48.76	3.62	52.38	74	-21.62	peak	H
15540.000	33.93	3.62	37.55	54	-16.45	AVG	H
10360.000	52.46	2.13	54.59	74	-19.41	peak	V
10360.000	38.23	2.13	40.36	54	-13.64	AVG	V
15540.000	49.06	3.62	52.68	74	-21.32	peak	V
15540.000	33.38	3.62	37.00	54	-17.00	AVG	V

Test mode:		802.11a20(6Mbps)		Test channel:		40	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
10440.000	52.11	2.23	54.34	74	-19.66	peak	H
10440.000	37.32	2.23	39.55	54	-14.45	AVG	H
15660.000	48.41	3.75	52.16	74	-21.84	peak	H
15660.000	33.20	3.75	36.95	54	-17.05	AVG	H
10440.000	49.84	2.23	52.07	74	-21.93	peak	V
10440.000	38.16	2.23	40.39	54	-13.61	AVG	V
15660.000	48.07	3.75	51.82	74	-22.18	peak	V
15660.000	33.14	3.75	36.89	54	-17.11	AVG	V

Test mode:		802.11a20(6Mbps)		Test channel:		48	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
10480.000	48.93	2.31	51.24	74	-22.76	peak	H
10480.000	38.66	2.31	40.97	54	-13.03	AVG	H
15720.000	49.39	3.82	53.21	74	-20.79	peak	H
15720.000	34.87	3.82	38.69	54	-15.31	AVG	H
10480.000	49.53	2.31	51.84	74	-22.16	peak	V
10480.000	38.77	2.31	41.08	54	-12.92	AVG	V
15720.000	49.08	3.82	52.90	74	-21.10	peak	V
15720.000	33.28	3.82	37.10	54	-16.90	AVG	V

Test mode:		802.11a20(6Mbps)		Test channel:		149	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
11490.000	49.03	2.42	51.45	74	-22.55	peak	H
11490.000	37.28	2.42	39.70	54	-14.30	AVG	H
17235.000	49.86	3.92	53.78	74	-20.22	peak	H
17235.000	33.79	3.92	37.71	54	-16.29	AVG	H
11490.000	51.43	2.42	53.85	74	-20.15	peak	V
11490.000	38.70	2.42	41.12	54	-12.88	AVG	V
17235.000	49.83	3.92	53.75	74	-20.25	peak	V
17235.000	34.22	3.92	38.14	54	-15.86	AVG	V

Test mode:		802.11a20(6Mbps)		Test channel:		157	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
11570.000	51.66	2.47	54.13	74	-19.87	peak	H
11570.000	38.41	2.47	40.88	54	-13.12	AVG	H
17355.000	48.74	3.96	52.70	74	-21.30	peak	H
17355.000	33.32	3.96	37.28	54	-16.72	AVG	H
11570.000	49.22	2.47	51.69	74	-22.31	peak	V
11570.000	38.36	2.47	40.83	54	-13.17	AVG	V
17355.000	49.72	3.96	53.68	74	-20.32	peak	V
17355.000	34.33	3.96	38.29	54	-15.71	AVG	V

Test mode:		802.11a20(6Mbps)		Test channel:		165	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
11650.000	51.69	2.55	54.24	74	-19.76	peak	H
11650.000	37.40	2.55	39.95	54	-14.05	AVG	H
17475.000	48.46	4.01	52.47	74	-21.53	peak	H
17475.000	34.40	4.01	38.41	54	-15.59	AVG	H
11650.000	51.78	2.55	54.33	74	-19.67	peak	V
11650.000	37.69	2.55	40.24	54	-13.76	AVG	V
17475.000	49.79	4.01	53.80	74	-20.20	peak	V
17475.000	34.21	4.01	38.22	54	-15.78	AVG	V

Test mode:		802.11n20(6.5Mbps)		Test channel:		36	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
10360.000	50.53	2.42	52.95	74	-21.05	peak	H
10360.000	40.25	2.42	42.67	54	-11.33	AVG	H
15540.000	48.44	3.92	52.36	74	-21.64	peak	H
15540.000	40.74	3.92	44.66	54	-9.34	AVG	H
10360.000	51.47	2.42	53.89	74	-20.11	peak	V
10360.000	39.84	2.42	42.26	54	-11.74	AVG	V
15540.000	48.31	3.92	52.23	74	-21.77	peak	V
15540.000	39.03	3.92	42.95	54	-11.05	AVG	V

Test mode:		802.11n20(6.5Mbps)		Test channel:		40	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
10440.000	51.72	2.23	53.95	74	-20.05	peak	H
10440.000	39.38	2.23	41.61	54	-12.39	AVG	H
15660.000	48.82	3.75	52.57	74	-21.43	peak	H
15660.000	40.06	3.75	43.81	54	-10.19	AVG	H
10440.000	52.95	2.23	55.18	74	-18.82	peak	V
10440.000	39.85	2.23	42.08	54	-11.92	AVG	V
15660.000	49.13	3.75	52.88	74	-21.12	peak	V
15660.000	39.21	3.75	42.96	54	-11.04	AVG	V

Test mode:		802.11n20(6.5Mbps)		Test channel:		48	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
10480.000	50.33	2.31	52.64	74	-21.36	peak	H
10480.000	40.19	2.31	42.50	54	-11.50	AVG	H
15720.000	49.49	3.82	53.31	74	-20.69	peak	H
15720.000	39.42	3.82	43.24	54	-10.76	AVG	H
10480.000	52.83	2.31	55.14	74	-18.86	peak	V
10480.000	40.93	2.31	43.24	54	-10.76	AVG	V
15720.000	49.57	3.82	53.39	74	-20.61	peak	V
15720.000	40.52	3.82	44.34	54	-9.66	AVG	V

Test mode:		802.11n20(6.5Mbps)		Test channel:		149	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
11490.000	51.14	2.42	53.56	74	-20.44	peak	H
11490.000	40.31	2.42	42.73	54	-11.27	AVG	H
17235.000	49.26	3.92	53.18	74	-20.82	peak	H
17235.000	40.81	3.92	44.73	54	-9.27	AVG	H
11490.000	49.03	2.42	51.45	74	-22.55	peak	V
11490.000	39.54	2.42	41.96	54	-12.04	AVG	V
17235.000	48.31	3.92	52.23	74	-21.77	peak	V
17235.000	40.20	3.92	44.12	54	-9.88	AVG	V

Test mode:		802.11n20(6.5Mbps)		Test channel:		157	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
11570.000	51.98	2.47	54.45	74	-19.55	peak	H
11570.000	40.35	2.47	42.82	54	-11.18	AVG	H
17355.000	49.36	3.96	53.32	74	-20.68	peak	H
17355.000	39.59	3.96	43.55	54	-10.45	AVG	H
11570.000	50.71	2.47	53.18	74	-20.82	peak	V
11570.000	39.79	2.47	42.26	54	-11.74	AVG	V
17355.000	48.89	3.96	52.85	74	-21.15	peak	V
17355.000	40.54	3.96	44.50	54	-9.50	AVG	V

Test mode:		802.11n20(6.5Mbps)		Test channel:		165	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
11650.000	52.28	2.55	54.83	74	-19.17	peak	H
11650.000	39.13	2.55	41.68	54	-12.32	AVG	H
17475.000	49.42	4.01	53.43	74	-20.57	peak	H
17475.000	39.37	4.01	43.38	54	-10.62	AVG	H
11650.000	49.37	2.55	51.92	74	-22.08	peak	V
11650.000	40.13	2.55	42.68	54	-11.32	AVG	V
17475.000	48.38	4.01	52.39	74	-21.61	peak	V
17475.000	39.06	4.01	43.07	54	-10.93	AVG	V

Test mode:		802.11ac20(6.5Mbps)		Test channel:		36	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
10360.000	49.33	2.13	51.46	74	-22.54	peak	H
10360.000	39.00	2.13	41.13	54	-12.87	AVG	H
15540.000	48.57	3.62	52.19	74	-21.81	peak	H
15540.000	40.06	3.62	43.68	54	-10.32	AVG	H
10360.000	49.45	2.13	51.58	74	-22.42	peak	V
10360.000	39.42	2.13	41.55	54	-12.45	AVG	V
15540.000	48.71	3.62	52.33	74	-21.67	peak	V
15540.000	39.82	3.62	43.44	54	-10.56	AVG	V

Test mode:		802.11ac20(6.5Mbps)		Test channel:		40	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
10440.000	49.39	2.23	51.62	74	-22.38	peak	H
10440.000	39.28	2.23	41.51	54	-12.49	AVG	H
15660.000	49.36	3.75	53.11	74	-20.89	peak	H
15660.000	40.05	3.75	43.80	54	-10.20	AVG	H
10440.000	52.81	2.23	55.04	74	-18.96	peak	V
10440.000	40.60	2.23	42.83	54	-11.17	AVG	V
15660.000	48.16	3.75	51.91	74	-22.09	peak	V
15660.000	39.48	3.75	43.23	54	-10.77	AVG	V

Test mode:		802.11ac20(6.5Mbps)		Test channel:		48	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
10480.000	48.97	2.31	51.28	74	-22.72	peak	H
10480.000	40.82	2.31	43.13	54	-10.87	AVG	H
15720.000	48.32	3.82	52.14	74	-21.86	peak	H
15720.000	39.79	3.82	43.61	54	-10.39	AVG	H
10480.000	50.68	2.31	52.99	74	-21.01	peak	V
10480.000	39.11	2.31	41.42	54	-12.58	AVG	V
15720.000	48.57	3.82	52.39	74	-21.61	peak	V
15720.000	40.08	3.82	43.90	54	-10.10	AVG	V

Test mode:		802.11ac20(6.5Mbps)		Test channel:		149	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
11490.000	51.78	2.42	54.20	74	-19.80	peak	H
11490.000	40.36	2.42	42.78	54	-11.22	AVG	H
17235.000	49.18	3.92	53.10	74	-20.90	peak	H
17235.000	39.12	3.92	43.04	54	-10.96	AVG	H
11490.000	49.87	2.42	52.29	74	-21.71	peak	V
11490.000	39.73	2.42	42.15	54	-11.85	AVG	V
17235.000	49.55	3.92	53.47	74	-20.53	peak	V
17235.000	39.50	3.92	43.42	54	-10.58	AVG	V

Test mode:		802.11ac20(6.5Mbps)		Test channel:		157	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
11570.000	52.72	2.47	55.19	74	-18.81	peak	H
11570.000	40.32	2.47	42.79	54	-11.21	AVG	H
17355.000	48.55	3.96	52.51	74	-21.49	peak	H
17355.000	40.92	3.96	44.88	54	-9.12	AVG	H
11570.000	50.56	2.47	53.03	74	-20.97	peak	V
11570.000	39.54	2.47	42.01	54	-11.99	AVG	V
17355.000	49.36	3.96	53.32	74	-20.68	peak	V
17355.000	39.00	3.96	42.96	54	-11.04	AVG	V

Test mode:		802.11ac20(6.5Mbps)		Test channel:		165	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
11650.000	53.95	2.55	56.50	74	-17.50	peak	H
11650.000	39.78	2.55	42.33	54	-11.67	AVG	H
17475.000	48.25	4.01	52.26	74	-21.74	peak	H
17475.000	39.20	4.01	43.21	54	-10.79	AVG	H
11650.000	50.68	2.55	53.23	74	-20.77	peak	V
11650.000	40.06	2.55	42.61	54	-11.39	AVG	V
17475.000	49.48	4.01	53.49	74	-20.51	peak	V
17475.000	39.28	4.01	43.29	54	-10.71	AVG	V

Remark:

1) The 6Mbps of rate of 802.11a is the worst case.

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

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

3) Scan from 9kHz to 40GHz,The disturbance above 18GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

5.9 Restricted bands around fundamental frequency

Test Requirement:	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
Test Method:	KDB 789033 D02 v02r01 Section G.3, G.4, G.5, and G.6
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	

Applicable To	**Limit**	
789033 D02 General U-NII Test Procedures New Rules v02r01	**Field Strength at 3 m**	
	PK: 74 (dBμV/m)	**AV: 54 (dBμV/m)**
Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
FCC 47 CFR Part 15 Subpart E Section 6.2.1.2	PK: -27 (dBm/MHz)	PK: 74 (dBμV/m)
FCC 47 CFR Part 15 Subpart E Section 6.2.2.2	PK: -27 (dBm/MHz)	PK: 74 (dBμV/m)
FCC 47 CFR Part 15 Subpart E Section 6.2.3.2	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
FCC 47 CFR Part 15 Subpart E Section 6.2.4.2	27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;	PK: 68.2 (dBμV/m)
	15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;	
	10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges;	
	-27 dBm/MHz at	

		frequencies more than 75 MHz above or below the band edges.	

Test Setup:

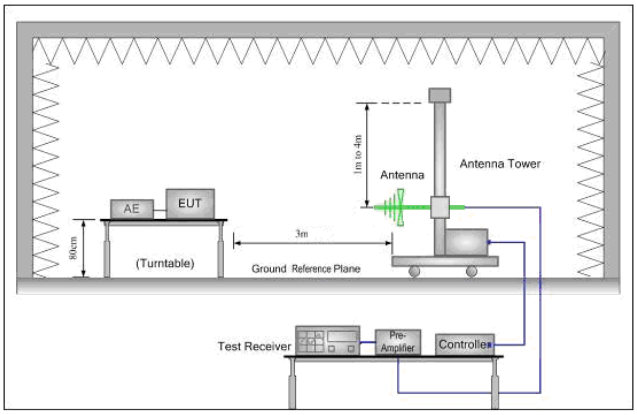


Figure 1. 30MHz to 1GHz

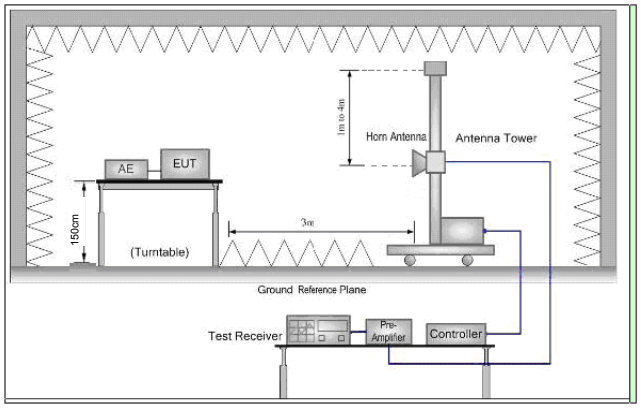


Figure 2. Above 1 GHz

Test Procedure:

a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
Note: For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. 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.

d. 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.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel

g. Test the EUT in the lowest channel , the Highest channel

	h. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode.
Final Test Mode:	Pretest the EUT at Transmitting mode, found the Transmitting mode which it is worse case Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40); 6.5Mbps of rate is the worst case of 802.11ac(VHT20) ; 13.5Mbps of rate is the worst case of 802.11ac(VHT40); Only the worst case is recorded in the report.
Test Results:	Pass

Test data:

Worse case mode:		802.11a(6Mbps)		Test channel:		36	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150.00	55.68	-3.63	52.05	74	-21.95	peak	H
5150.00	44.30	-3.63	40.67	54	-13.33	AVG	H
5150.00	54.22	-3.63	50.59	74	-23.41	peak	V
5150.00	42.23	-3.63	38.60	54	-15.40	AVG	V

Worse case mode:		802.11a(6Mbps)		Test channel:		48	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350.00	56.20	-3.59	52.61	74	-21.39	peak	H
5350.00	44.63	-3.59	41.04	54	-12.96	AVG	H
5350.00	54.78	-3.59	51.19	74	-22.81	peak	V
5350.00	42.94	-3.59	39.35	54	-14.65	AVG	V

Worse case mode:		802.11a(6Mbps)		Test channel:		149	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650.00	57.12	-3.46	53.66	68.2	-14.54	peak	H
5742.15	91.82	-3.44	88.38	122.2	-33.82	peak	H
5650.00	56.39	-3.46	52.93	68.2	-15.27	peak	V
5742.37	90.40	-3.44	86.96	122.2	-35.24	peak	V

Worse case mode:		802.11a(6Mbps)		Test channel:		165	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5824.77	90.98	-3.42	87.56	122.2	-34.64	peak	H
5925.00	57.43	-3.41	54.02	68.2	-14.18	peak	H
5818.71	90.65	-3.42	87.23	122.2	-34.97	peak	V
5925.00	57.43	-3.41	54.02	68.2	-14.18	peak	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		36	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150.00	56.04	-3.63	52.41	74	-21.59	peak	H
5150.00	43.92	-3.63	40.29	54	-13.71	AVG	H
5150.00	54.69	-3.63	51.06	74	-22.94	peak	V
5150.00	42.31	-3.63	38.68	54	-15.32	AVG	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		48	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350.00	59.77	-3.59	56.18	74	-17.82	peak	H
5350.00	43.56	-3.59	39.97	54	-14.03	AVG	H
5350.00	55.73	-3.59	52.14	74	-21.86	peak	V
5350.00	41.52	-3.59	37.93	54	-16.07	AVG	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		149	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650.00	61.06	-3.46	57.60	68.2	-10.60	peak	H
5751.09	92.17	-3.44	88.73	122.2	-33.47	peak	H
5650.00	56.11	-3.46	52.65	68.2	-15.55	peak	V
5744.27	90.29	-3.44	86.85	122.2	-35.35	peak	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		165	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5823.41	91.41	-3.42	87.99	122.2	-34.21	peak	H
5925.00	59.94	-3.41	56.53	68.2	-11.67	peak	H
5824.65	90.08	-3.42	86.66	122.2	-35.54	peak	V
5925.00	56.60	-3.41	53.19	68.2	-15.01	peak	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		38	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150.00	55.26	-3.63	51.63	74	-22.37	peak	H
5150.00	44.11	-3.63	40.48	54	-13.52	AVG	H
5150.00	55.24	-3.63	51.61	74	-22.39	peak	V
5150.00	42.35	-3.63	38.72	54	-15.28	AVG	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		46	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350.00	58.46	-3.59	54.87	74	-19.13	peak	H
5350.00	43.53	-3.59	39.94	54	-14.06	AVG	H
5350.00	54.23	-3.59	50.64	74	-23.36	peak	V
5350.00	41.32	-3.59	37.73	54	-16.27	AVG	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		151	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650.00	58.66	-3.46	55.20	68.2	-13.00	peak	H
5762.61	91.29	-3.44	87.85	122.2	-34.35	peak	H
5650.00	57.24	-3.46	53.78	68.2	-14.42	peak	V
5741.70	90.36	-3.44	86.92	122.2	-35.28	peak	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		159	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5743.60	92.50	-3.42	89.08	122.2	-33.12	peak	H
5925.00	59.14	-3.41	55.73	68.2	-12.47	peak	H
5779.52	90.58	-3.42	87.16	122.2	-35.04	peak	V
5925.00	56.25	-3.41	52.84	68.2	-15.36	peak	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		36	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150.00	56.74	-3.63	53.11	74	-20.89	peak	H
5150.00	43.12	-3.63	39.49	54	-14.51	AVG	H
5150.00	54.44	-3.63	50.81	74	-23.19	peak	V
5150.00	41.71	-3.63	38.08	54	-15.92	AVG	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		48	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350.00	58.95	-3.59	55.36	74	-18.64	peak	H
5350.00	44.22	-3.59	40.63	54	-13.37	AVG	H
5350.00	54.46	-3.59	50.87	74	-23.13	peak	V
5350.00	41.65	-3.59	38.06	54	-15.94	AVG	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		149	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650.00	60.06	-3.46	56.60	68.2	-11.60	peak	H
5743.54	92.25	-3.44	88.81	122.2	-33.39	peak	H
5650.00	57.01	-3.46	53.55	68.2	-14.65	peak	V
5739.28	92.58	-3.44	89.14	122.2	-33.06	peak	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		165	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5831.03	92.59	-3.42	89.17	122.2	-33.03	peak	H
5925.00	61.78	-3.41	58.37	68.2	-9.83	peak	H
5825.11	91.94	-3.42	88.52	122.2	-33.68	peak	V
5925.00	58.28	-3.41	54.87	68.2	-13.33	peak	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		38	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150.00	56.52	-3.63	52.89	74	-21.11	peak	H
5150.00	43.88	-3.63	40.25	54	-13.75	AVG	H
5150.00	54.55	-3.63	50.92	74	-23.08	peak	V
5150.00	41.56	-3.63	37.93	54	-16.07	AVG	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		46	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350.00	58.50	-3.59	54.91	74	-19.09	peak	H
5350.00	43.58	-3.59	39.99	54	-14.01	AVG	H
5350.00	55.69	-3.59	52.10	74	-21.90	peak	V
5350.00	42.33	-3.59	38.74	54	-15.26	AVG	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		151	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650.00	57.35	-3.46	53.89	68.2	-14.31	peak	H
5751.19	92.17	-3.44	88.73	122.2	-33.47	peak	H
5650.00	56.40	-3.46	52.94	68.2	-15.26	peak	V
5741.72	87.37	-3.44	83.93	122.2	-38.27	peak	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		159	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5771.12	91.64	-3.42	88.22	122.2	-33.98	peak	H
5925.00	58.81	-3.41	55.40	68.2	-12.80	peak	H
5806.53	90.32	-3.42	86.90	122.2	-35.30	peak	V
5925.00	56.26	-3.41	52.85	68.2	-15.35	peak	V

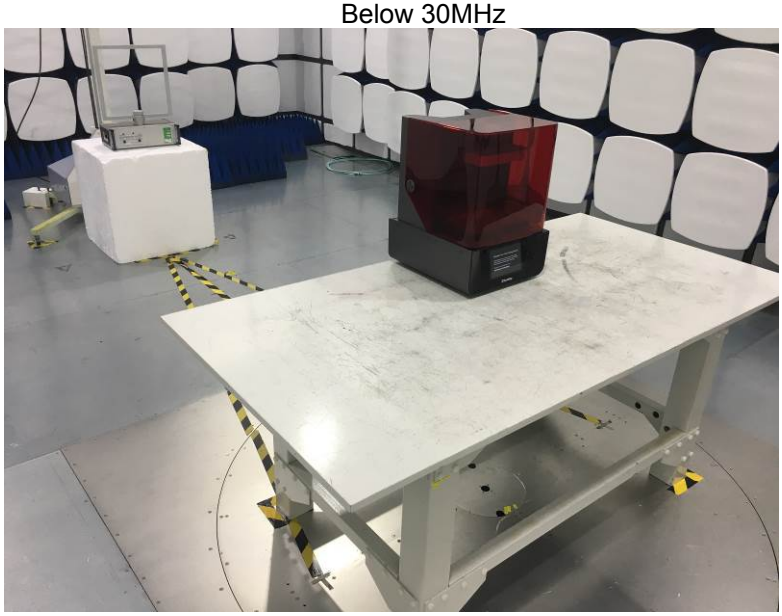
Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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

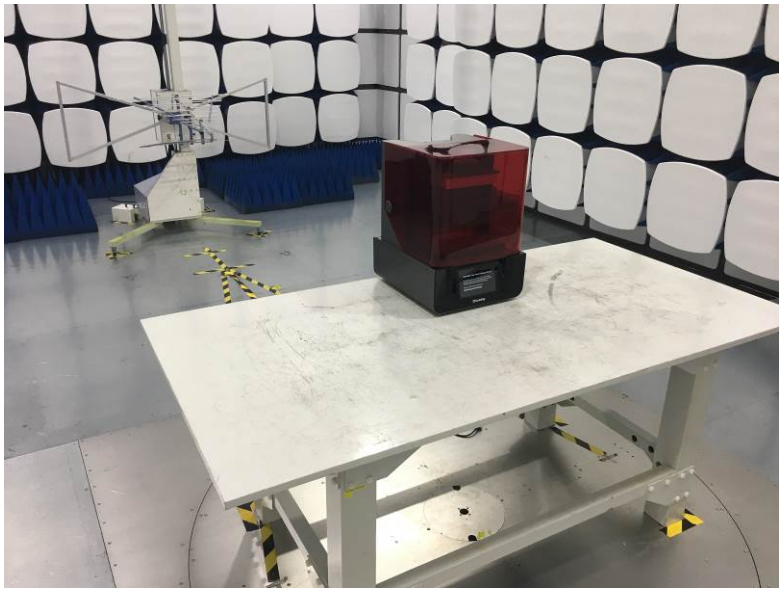
6 Photographs - EUT Test Setup

6.1 Radiated Spurious Emission

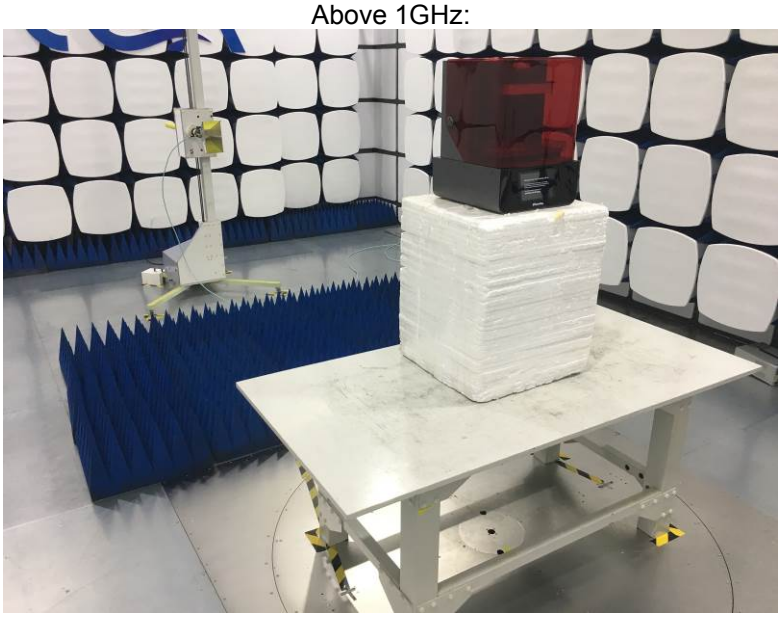
Below 30MHz



30MHz~1GHz:



Above 1GHz:



6.2 Conducted Emission

7 Photographs - EUT Constructional Details

Please refer to the report No: CQASZ20190700037EX-01

THE END