TEST REPORT
FCC ID:2A9PI-L1

Report Number	:	ZKT-221125L8869E-2
Date of Test		November 23, 2022 toFebruary 24, 2023
Date of issue	:	February 24, 2023
Total number of pages		95
Test Result	:	PASS
Testing Laboratory.	:	**Shenzhen ZKT Technology Co., Ltd.**
Address	:	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name	:	**SHENZHEN XGRIDS-INNOVATION CO., LTD**
Address	:	2207, SHENZHEN OVERSEAS STUDENTS INCUBATOR PARK BUILDING 1, SHENZHEN, China
Manufacturer's name	:	**SHENZHEN XGRIDS-INNOVATION CO., LTD**
Address	:	2207, SHENZHEN OVERSEAS STUDENTS INCUBATOR PARK BUILDING 1, SHENZHEN, China
Test specification:		
Standard	:	FCC CFR Title 47 Part 15 Subpart C Section 15.407 ANSI C63.10:2013 KDB 789033 D02 v01r02 RSS-247 Issue 2 RSS-Gen Issue 5
Test procedure	:	/
Non-standard test method	:	N/A
Test Report Form No.	:	TRF-EL-113_V0
Test Report Form(s) Originator	:	ZKT Testing
Master TRF	:	Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Product name	:	**Mobile Lidar Scanner**
Trademark	:	XGRIDS
Model/Type reference	:	Lixel, L1
Ratings	:	DC 14.4V by battery, DC 17V charging by adapter

Testing procedure and testing location:

Testing Laboratory ..... :	Shenzhen ZKT Technology Co., Ltd.
Address ..... :	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Tested by (name + signature) ..... :	Tom Zou
Reviewer (name + signature)..... :	Jackson Fang
Approved (name + signature) ..... :	Lake Xie

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1. VERSION

ReportNo.	Version	Description	Approved
ZKT-221125L8869E-2	Rev.01	Initial issue of report	February 24, 2023

2.SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E RSS-247 Issue 2			
Standard Section	Test Item	Judgment	Remark
FCC part 15.209(a), FCC part 15.407 (b)(1) FCC part 15.407 (b)(4) FCC part 15.407 (b)(8)	Spurious Radiated Emissions	PASS	
FCC part 15.207 RSS-Gen Section 8.8	Conducted Emission	PASS	
FCC part 15.407 (a)(12) 15.1049 RSS-247 Section 5.2(a) RSS-Gen Section 6.7	26 dB and 99% Emission Bandwidth	PASS	
FCC part 15.407(e)	6 dB bandwidth	PASS	
FCC part 15.407 (a)(1) FCC part 15.407 (a)(3) RSS-247 Section 5.4(d)	Maximum Conducted Output Power	PASS	
2.1051, FCC part 15.407(b)(1) FCC part 15.407(b)(4) RSS-247 Section 5.5	Band Edge	PASS	
FCC part 15.407 (a)(1) FCC part 15.407 (a)(3) RSS-247 Section 5.2(b)	Power Spectral Density	PASS	
2.1051, FCC part 15.407(b)	Spurious Emissions at Antenna Terminals	PASS	
FCC part 15.203 RSS-Gen Section 6.8	Antenna Requirement	PASS	

NOTE:

(1)” N/A” denotes test is not applicable in this Test Report

2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.
Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225
Designation Number: CN1299
IC Registered No.: 27033
Designation Number: CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %。

No.	Item	Uncertainty
1	3m camber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
2	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
3	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
4	Conducted Adjacent channel power	U=1.38dB
5	Conducted output power uncertainty Above 1G	U=1.576dB
6	Conducted output power uncertainty below 1G	U=1.28dB
7	Occupied Bandwidth	U=0.5dB
8	humidity uncertainty	U=5.3%
9	Temperature uncertainty	U=0.59℃
10	Radiated disturbance(30MHz-1000MHz)	U=4.8dB
11	Radiated disturbance(1GHz-6GHz)	U=4.9dB
12	Radiated disturbance(1GHz-18GHz)	U=5.0dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Mobile Lidar Scanner	
Model No.:	Lixel, L1	
Model Different.:	The color of appearance and model name of series models listed are different from the main model, but the circuit and the electronic construction are the same, declared by the manufacturer.	
Sample ID	ZKT-221125L8869E	
Hardware Version:	V1.0	
Software Version:	V1.0	
Sample(s) Status:	Engineer sample	
Product Description	IEEE 802.11 WLAN Mode Supported	☒802.11a/ac/n (20MHz channel bandwidth) ☒802.11ac/n (40MHz channel bandwidth) ☒802.11ac(80MHz channel bandwidth)
	Data Rate	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n/ac(HT20/HT40):MCS0-MCS15; 802.11ac(VHT80):NSS1, MCS0-MCS9
	Modulation	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac;
	Operating Frequency Range	☒5180-5240MHz for 802.11a/n(HT20)/ac20; 5190-5230MHz for 802.11n(HT40)/ac40; 5210MHz for 802.11 ac80; ☒5745-5825MHz for 802.11a/n(HT20)/ac20; 5755-5795MHz for 802.11n(HT40)/ac40; 5775MHz for 802.11 ac80;
	Number of Channels	☒9 channels for 802.11a/n20/ac20 in the 5180-5240MHz band and 5745-5825MHz; 4 channels for 802.11 n40/ac40 in the 5190-5230 MHz band and 5755-5795MHz; 1 channels for 802.11 ac80 in the 5210MHz band; ☒5 channels for 802.11a/n20/ac20 in the 5745-5825MHz band; 2 channels for 802.11 n40/ac40 in the 5755-5795 MHz band; 1 channels for 802.11 ac80 in the 5775MHz band;
Channel List	Please refer to the Note 2.	
Antenna Type:	FPCBAntenna	
Antenna gain:	ANT. 1: 0dBi, ANT. 2: 0dBi	
Power supply:	DC 14.4V by battery, DC 17V charging by adapter	
SWITCHING POWER ADAPTER:	N/A	

Note:

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

802.11a/ac/n(20MHz) Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220	149	5745	161	5805
40	5200	48	5240	153	5765	165	5825
				157	5785	-	-

802.11n/ac(40MHz) Frequency Channel

802.11n/ac(40MHz)Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	-	-	151	5755	-	-
46	5230	-	-	159	5795	-	-

802.11ac(80MHz) Frequency Channel	
Channel	Frequency (MHz)
42	5210
155	5775

3.2 DESCRIPTION OF TEST MODES

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test,the dutycycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Pretest Mode	Description
Mode 1	802.11a / n 20/ac20 CH36/CH40/CH48/CH149/CH157/CH165
Mode 2	802.11n 40 / ac40 CH38/CH46/CH151/CH159
Mode 3	802.11 ac80 CH42/CH155

Conducted Emission	
Final Test Mode	Description
Mode 1	802.11a / n 20 /ac20 CH36/CH40/CH48/CH149/CH157/CH165
Mode 2	802.11n 40 / ac40 CH38/CH46/CH151/CH159
Mode 3	802.11 ac80 CH42/CH155

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a / n 20 CH36/CH40/CH48/CH149/CH157/CH165
Mode 2	802.11n 40 CH38/CH46/CH151/CH159
Mode 3	802.11 ac80 CH42/CH155

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.
(2) 802.11n20/ac20 and 802.11n40/ac40 are tested, but only the worst data of 11n20 and 11n40 was reported.

Test Software	QRCT 3
Powerlevelsetup	<15dBm

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission

AC Line — EUT

Radiated Emission

EUT

Conducted Spurious

EUT

3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Rhino X Pro	Ximmerse	AG1A0001	N/A	EUT
A-1	Smart Phone	Huawei	LIO-AN00	N/A	Auxiliary

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	Oct. 28, 2022	Oct. 27, 2023
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSQ	100363	Oct. 28, 2022	Oct. 27, 2023
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	101169	Oct. 28, 2022	Oct. 27, 2023
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	N/A	Nov. 02, 2022	Nov. 01, 2023
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	Nov. 01, 2022	Oct. 31, 2023
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	Oct. 28, 2022	Oct. 27, 2023
7	Loop Antenna	TESEQ	HLA6121	58357	Nov. 01, 2022	Oct. 31, 2023
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	060747	Nov. 15, 2022	Nov. 14, 2023
9	Amplifier (1GHz-26.5GHz)	Agilent	8449B	3008A00315	Oct. 28, 2022	Oct. 27, 2023
10	Amplifier (500MHz-40GHz)	QUANJUDA	DLE-161	097	Oct. 28, 2022	Oct. 27, 2023
11	Test Cable	N/A	R-01	N/A	Oct. 28, 2022	Oct. 27, 2023
12	Test Cable	N/A	R-02	N/A	Oct. 28, 2022	Oct. 27, 2023
13	Test Cable	N/A	R-03	N/A	Oct. 28, 2022	Oct. 27, 2023
14	Test Cable	N/A	RF-01	N/A	Oct. 28, 2022	Oct. 27, 2023
15	Test Cable	N/A	RF-02	N/A	Oct. 28, 2022	Oct. 27, 2023
16	Test Cable	N/A	RF-03	N/A	Oct. 28, 2022	Oct. 27, 2023
17	ESG SignalGenerator	Agilent	E4421B	N/A	Oct. 21, 2022	Oct. 20, 2023
18	Signal Generator	Agilent	N5182A	N/A	Oct. 21, 2022	Oct. 20, 2023
19	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	Nov. 15, 2022	Nov. 14, 2023
20	Wideband Radio Communication Test	R&S	CMW500	106504	Oct. 28, 2022	Oct. 27, 2023
21	RF Power Meter Test system	N/A	MW100-RPCB	N/A	Oct. 21, 2022	Oct. 20, 2023
22	D.C. Power Supply	LongWei	TPR-6405D	N/A	Oct. 21, 2022	Oct. 20, 2023
23	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	\	\
24	RF Software	MW	MTS8310	V2.0.0.0	\	\
25	Turntable	MF	MF-7802BS	N/A	\	\
26	Antenna tower	MF	MF-7802BS	N/A	\	\

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Oct. 21, 2022	Oct. 20, 2023
2	LISN	CYBERTEK	EM5040A	E1850400149	Oct. 21, 2022	Oct. 20, 2023
3	Test Cable	N/A	C-01	N/A	Oct. 21, 2022	Oct. 20, 2023
4	Test Cable	N/A	C-02	N/A	Oct. 21, 2022	Oct. 20, 2023
5	Test Cable	N/A	C-03	N/A	Oct. 21, 2022	Oct. 20, 2023
6	EMI Test Receiver	R&S	ESCI3	101393	Oct. 28, 2022	Oct. 27, 2023
7	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	\	\

4.EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) *Decreases with the logarithm of the frequency.

4.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

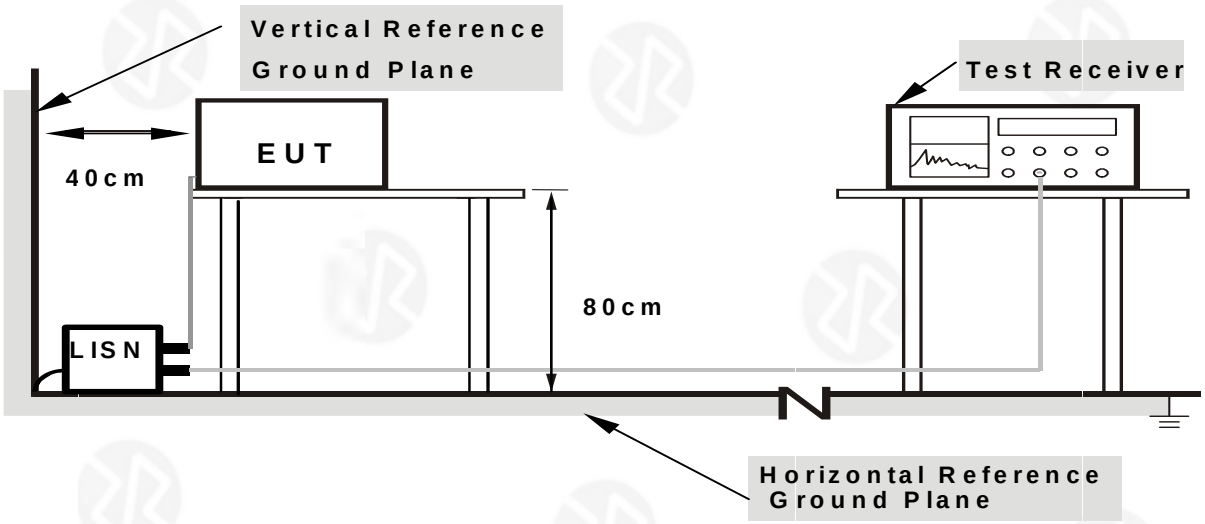
d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

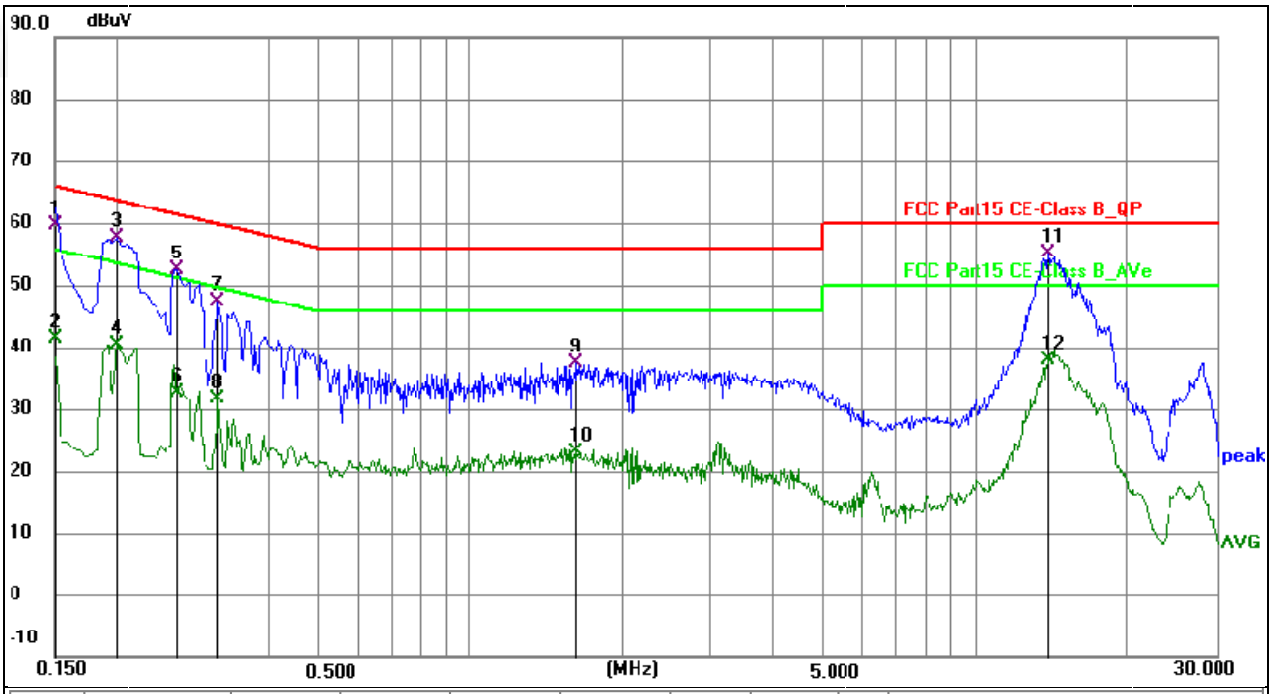
4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

The test mode is the Wi-Fi operating mode in the charging state, and the worstdataof 802.11ac_5180MHzwasreported.

4.1.6 TEST RESULT:

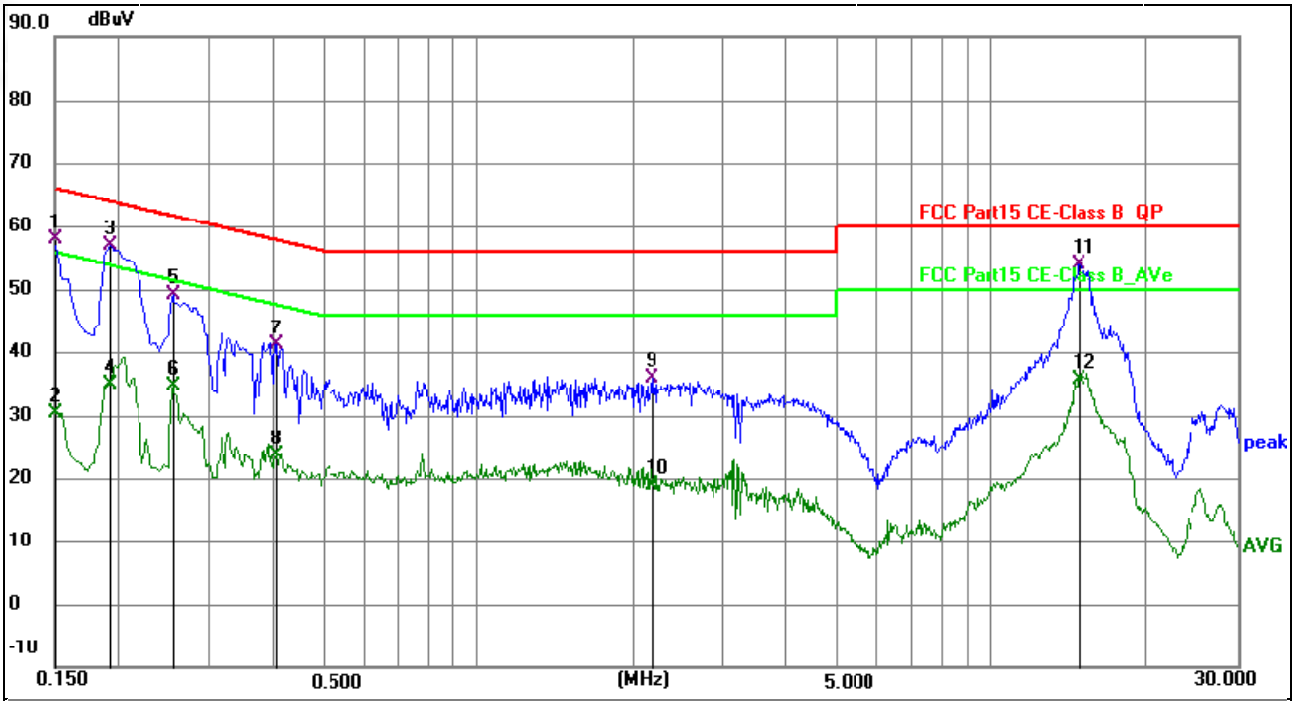
Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Phase：	L
Test Voltage：	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	50.04	9.51	59.55	66.00	-6.45	QP	P	
2	0.1500	31.90	9.51	41.41	56.00	-14.59	AVG	P	
3	0.1995	48.31	9.22	57.53	63.63	-6.10	QP	P	
4	0.1995	31.26	9.22	40.48	53.63	-13.15	AVG	P	
5	0.2625	42.56	9.73	52.29	61.35	-9.06	QP	P	
6	0.2625	22.89	9.73	32.62	51.35	-18.73	AVG	P	
7	0.3165	37.46	9.84	47.30	59.80	-12.50	QP	P	
8	0.3165	21.81	9.84	31.65	49.80	-18.15	AVG	P	
9	1.6215	27.35	10.07	37.42	56.00	-18.58	QP	P	
10	1.6215	13.15	10.07	23.22	46.00	-22.78	AVG	P	
11 *	13.9875	44.77	10.29	55.06	60.00	-4.94	QP	P	
12	13.9875	27.61	10.29	37.90	50.00	-12.10	AVG	P	

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Phase：	N
Test Voltage：	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	48.20	9.75	57.95	66.00	-8.05	QP	P	
2	0.1500	20.61	9.75	30.36	56.00	-25.64	AVG	P	
3	0.1905	47.06	9.71	56.77	64.01	-7.24	QP	P	
4	0.1905	25.19	9.71	34.90	54.01	-19.11	AVG	P	
5	0.2535	39.21	9.83	49.04	61.64	-12.60	QP	P	
6	0.2535	24.73	9.83	34.56	51.64	-17.08	AVG	P	
7	0.4020	31.19	10.03	41.22	57.81	-16.59	QP	P	
8	0.4020	13.48	10.03	23.51	47.81	-24.30	AVG	P	
9	2.1705	25.75	10.08	35.83	56.00	-20.17	QP	P	
10	2.1705	8.88	10.08	18.96	46.00	-27.04	AVG	P	
11 *	14.7975	43.69	10.12	53.81	60.00	-6.19	QP	P	
12	14.7975	25.40	10.12	35.52	50.00	-14.48	AVG	P	

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(d) and 15.209

4.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b)(7): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	20 log (uV/m)	300
0.490~1.705	2400/F(KHz)	20 log (uV/m)	30
1.705~30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

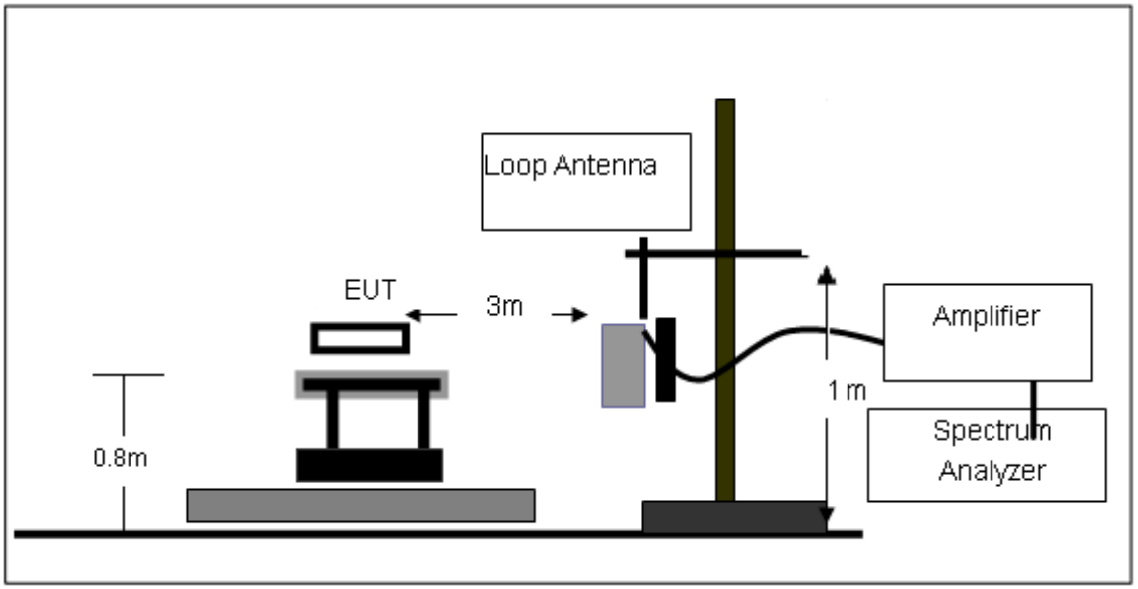
Remark :1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

4.2.3 MEASURING INSTRUMENTS

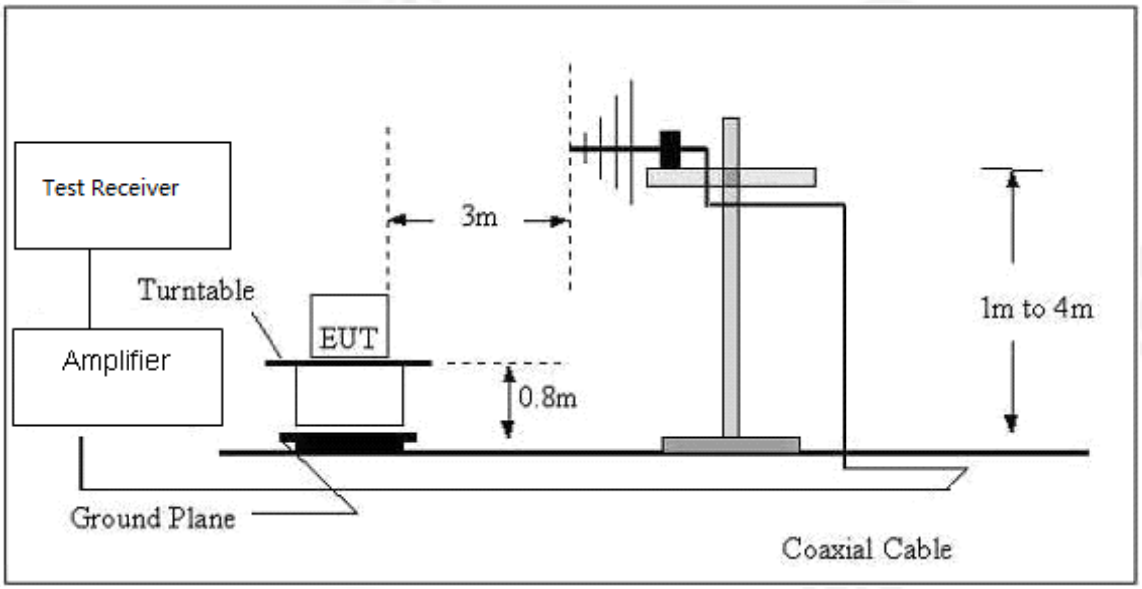
The Measuring equipment is listed in the section 6.3 of this test report.

4.2.4 TEST CONFIGURATION

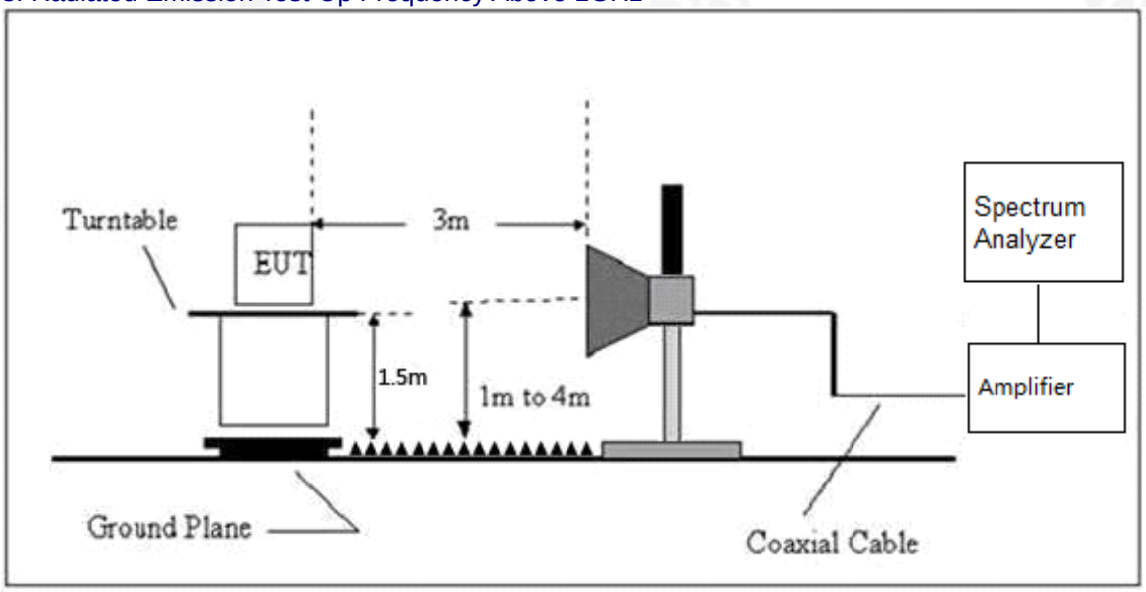
1.For radiated emissions below 30MHz



2.For radiated emissions from 30MHz to 1000MHz



3. Radiated Emission Test-Up Frequency Above 1GHz



4.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.
This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT.
Use the following spectrum analyzer settings:

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.

f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10*lg(100 [kHz]/narrower RBW [kHz]). , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

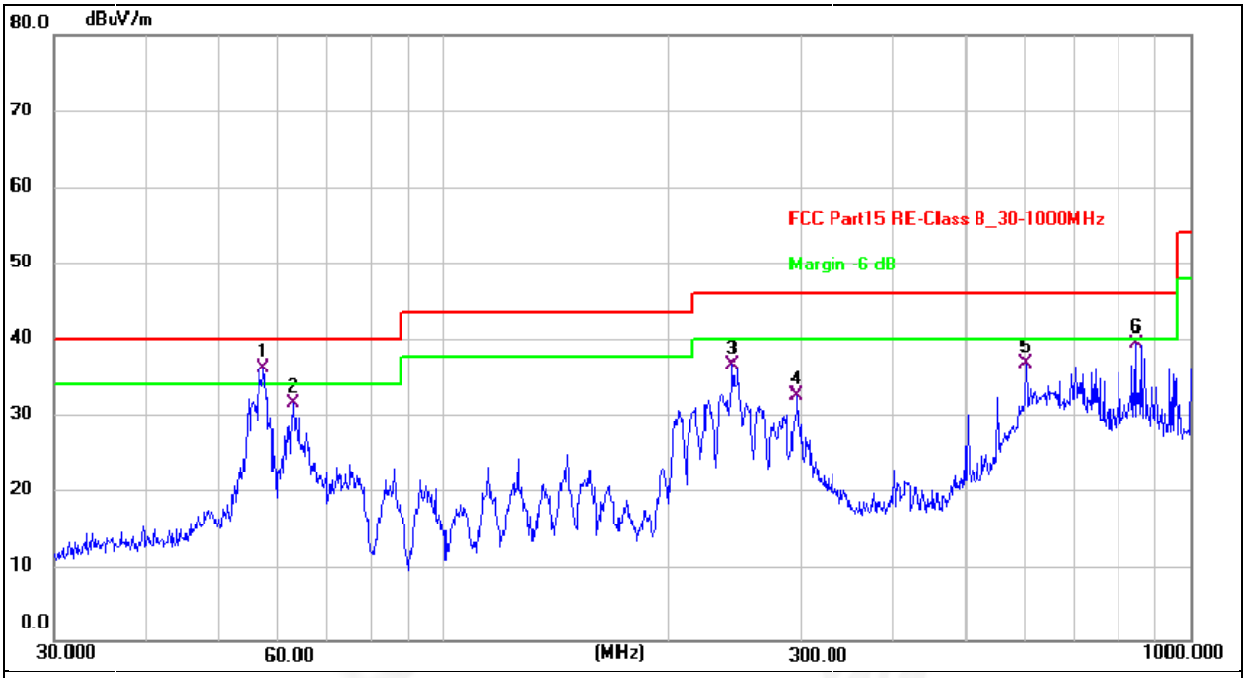
4.2.6 TEST RESULT

Between 9KHz – 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

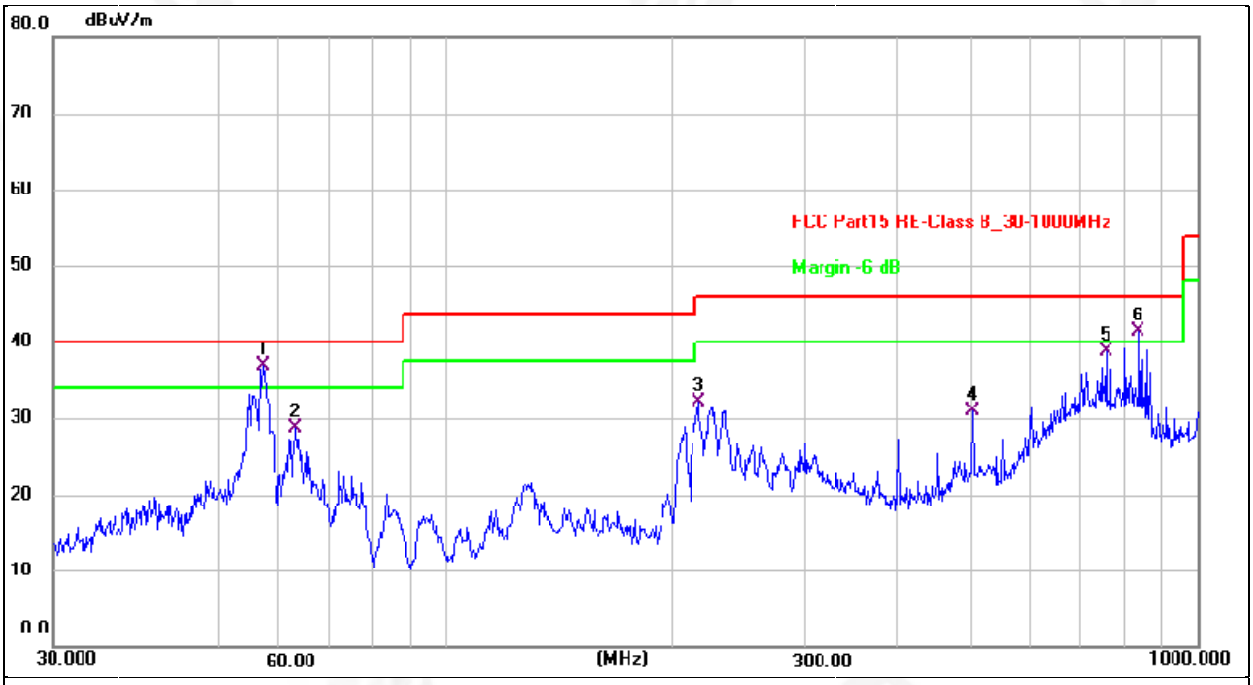
Between 30MHz – 1GHz

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	57.3923	45.85	-9.72	36.13	40.00	-3.87	QP	100	2	P	
2	62.8708	41.85	-10.32	31.53	40.00	-8.47	QP	100	14	P	
3	243.3772	46.74	-10.14	36.60	46.00	-9.40	QP	100	318	P	
4	296.1836	41.01	-8.56	32.45	46.00	-13.55	QP	100	307	P	
5	601.4265	37.86	-1.12	36.74	46.00	-9.26	QP	100	206	P	
6	845.0878	37.53	1.87	39.40	46.00	-6.60	QP	100	104	P	

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	56.9912	46.54	-9.67	36.87	40.00	-3.13	QP	100	71	P	
2	62.8708	39.01	-10.32	28.69	40.00	-11.31	QP	100	142	P	
3	216.7828	43.63	-11.60	32.03	46.00	-13.97	QP	100	265	P	
4	501.1790	34.45	-3.64	30.81	46.00	-15.19	QP	100	358	P	
5	755.3873	37.77	0.85	38.62	46.00	-7.38	QP	100	194	P	
6 !	836.2443	39.45	1.93	41.38	46.00	-4.62	QP	100	326	P	

Remarks:
1.Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2.The emission levels of other frequencies are very lower than the limit and not show in test report.
3.The test data shows only the worst case802.11ac_5180MHzANT. 1andANT. 2Simultaneous emission mode

Between1GHz – 40GHz

Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Voltage：	AC 120V/60Hz
Test Mode ：	5.2G TX- 802.11a		

Sub-band: 5180MHz~5240MHz 802.11a

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:5180MHz									
V	10360.00	37.4	30.45	8.77	38.66	54.38	74.00	-19.62	PK
V	10360.00	25.5	30.45	8.77	38.66	42.48	54.00	-11.52	AV
V	15540.00	38.92	30.44	9.31	38.55	56.34	74.00	-17.66	PK
V	15540.00	26.95	30.44	9.31	38.55	44.37	54.00	-9.63	AV
V	20720.00	40.95	30.72	9.45	38.69	58.37	74.00	-15.63	PK
V	20720.00	33.86	30.72	9.45	38.69	51.28	54.00	-2.72	AV
V	25900.00	43.36	30.65	9.99	38.57	61.27	74.00	-12.73	PK
V	25900.00	31.37	30.65	9.99	38.57	49.28	54.00	-4.72	AV
H	10360.00	41.54	30.45	8.77	38.66	58.52	74.00	-15.48	PK
H	10360.00	31.27	30.45	8.77	38.66	48.25	54.00	-5.75	AV
H	15540.00	39.21	30.44	9.31	38.55	56.63	74.00	-17.37	PK
H	15540.00	28.86	30.44	9.31	38.55	46.28	54.00	-7.72	AV
H	20720.00	39.85	30.72	9.45	38.69	57.27	74.00	-16.73	PK
H	20720.00	28.31	30.72	9.45	38.69	45.73	54.00	-8.27	AV
H	25900.00	38.45	30.65	9.99	38.57	56.36	74.00	-17.64	PK
H	25900.00	26.35	30.65	9.99	38.57	44.26	54.00	-9.74	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:5200MHz									
V	10400.00	40.4	30.45	8.77	38.66	57.38	74.00	-16.62	PK
V	10400.00	25.85	30.45	8.77	38.66	42.83	54.00	-11.17	AV
V	15600.00	40.21	30.44	9.31	38.55	57.63	74.00	-16.37	PK
V	15600.00	28.31	30.44	9.31	38.55	45.73	54.00	-8.27	AV
V	20800.00	39.36	30.72	9.45	38.69	56.78	74.00	-17.22	PK
V	20800.00	27.34	30.72	9.45	38.69	44.76	54.00	-9.24	AV
V	26000.00	38.82	30.65	9.99	38.57	56.73	74.00	-17.27	PK
V	26000.00	28.82	30.65	9.99	38.57	46.73	54.00	-7.27	AV
H	10400.00	39.84	30.45	8.77	38.66	56.82	74.00	-17.18	PK
H	10400.00	28.75	30.45	8.77	38.66	45.73	54.00	-8.27	AV
H	15600.00	40.1	30.44	9.31	38.55	57.52	74.00	-16.48	PK
H	15600.00	28.5	30.44	9.31	38.55	45.92	54.00	-8.08	AV
H	20800.00	36.42	30.72	9.45	38.69	53.84	74.00	-20.16	PK
H	20800.00	26.3	30.72	9.45	38.69	43.72	54.00	-10.28	AV
H	26000.00	39.46	30.65	9.99	38.57	57.37	74.00	-16.63	PK
H	26000.00	28.46	30.65	9.99	38.57	46.37	54.00	-7.63	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:5240MHz									
V	10480.00	40.58	30.45	8.77	38.66	57.56	74.00	-16.44	PK
V	10480.00	27.8	30.45	8.77	38.66	44.78	54.00	-9.22	AV
V	15720.00	39.31	30.44	9.31	38.55	56.73	74.00	-17.27	PK
V	15720.00	28.31	30.44	9.31	38.55	45.73	54.00	-8.27	AV
V	20960.00	39.42	30.72	9.45	38.69	56.84	74.00	-17.16	PK
V	20960.00	27.2	30.72	9.45	38.69	44.62	54.00	-9.38	AV
V	26200.00	37.62	30.65	9.99	38.57	55.53	74.00	-18.47	PK
V	26200.00	25.74	30.65	9.99	38.57	43.65	54.00	-10.35	AV
H	10480.00	38.65	30.45	8.77	38.66	55.63	74.00	-18.37	PK
H	10480.00	28.65	30.45	8.77	38.66	45.63	54.00	-8.37	AV
H	15720.00	42.31	30.44	9.31	38.55	59.73	74.00	-14.27	PK
H	15720.00	28.21	30.44	9.31	38.55	45.63	54.00	-8.37	AV
H	20960.00	40.31	30.72	9.45	38.69	57.73	74.00	-16.27	PK
H	20960.00	29.25	30.72	9.45	38.69	46.67	54.00	-7.33	AV
H	26200.00	41.82	30.65	9.99	38.57	59.73	74.00	-14.27	PK
H	26200.00	28.82	30.65	9.99	38.57	46.73	54.00	-7.27	AV

Sub-band: 5745MHz~5825MHz 802.11a

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:5745MHz									
V	11490.00	37.87	30.45	8.77	38.66	54.85	74.00	-19.15	PK
V	11490.00	28.65	30.45	8.77	38.66	45.63	54.00	-8.37	AV
V	17235.00	38.11	30.44	9.31	38.55	55.53	74.00	-18.47	PK
V	17235.00	26.22	30.44	9.31	38.55	43.64	54.00	-10.36	AV
V	22980.00	37.2	30.72	9.45	38.69	54.62	74.00	-19.38	PK
V	22980.00	26.2	30.72	9.45	38.69	43.62	54.00	-10.38	AV
V	28725.00	37.72	30.65	9.99	38.57	55.63	74.00	-18.37	PK
V	28725.00	25.73	30.65	9.99	38.57	43.64	54.00	-10.36	AV
H	11490.00	37.64	30.45	8.77	38.66	54.62	74.00	-19.38	PK
H	11490.00	26.64	30.45	8.77	38.66	43.62	54.00	-10.38	AV
H	17235.00	37.3	30.44	9.31	38.55	54.72	74.00	-19.28	PK
H	17235.00	25.92	30.44	9.31	38.55	43.34	54.00	-10.66	AV
H	22980.00	37.15	30.72	9.45	38.69	54.57	74.00	-19.43	PK
H	22980.00	26	30.72	9.45	38.69	43.42	54.00	-10.58	AV
H	28725.00	37.56	30.65	9.99	38.57	55.47	74.00	-18.53	PK
H	28725.00	25.34	30.65	9.99	38.57	43.25	54.00	-10.75	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:5785MHz									
V	11570.00	37.67	30.45	8.77	38.66	54.65	74.00	-19.35	PK
V	11570.00	27.38	30.45	8.77	38.66	44.36	54.00	-9.64	AV
V	17335.00	37.95	30.44	9.31	38.55	55.37	74.00	-18.63	PK
V	17335.00	26.22	30.44	9.31	38.55	43.64	54.00	-10.36	AV
V	23140.00	37.94	30.72	9.45	38.69	55.36	74.00	-18.64	PK
V	23140.00	28.31	30.72	9.45	38.69	45.73	54.00	-8.27	AV
V	28925.00	38.35	30.65	9.99	38.57	56.26	74.00	-17.74	PK
V	28925.00	24.46	30.65	9.99	38.57	42.37	54.00	-11.63	AV
H	11570.00	38.38	30.45	8.77	38.66	55.36	74.00	-18.64	PK
H	11570.00	28.36	30.45	8.77	38.66	45.34	54.00	-8.66	AV
H	17335.00	37.95	30.44	9.31	38.55	55.37	74.00	-18.63	PK
H	17335.00	26.21	30.44	9.31	38.55	43.63	54.00	-10.37	AV
H	23140.00	37.3	30.72	9.45	38.69	54.72	74.00	-19.28	PK
H	23140.00	26.22	30.72	9.45	38.69	43.64	54.00	-10.36	AV
H	28925.00	36.84	30.65	9.99	38.57	54.75	74.00	-19.25	PK
H	28925.00	25.73	30.65	9.99	38.57	43.64	54.00	-10.36	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:5825MHz									
V	11650.00	38.69	30.45	8.77	38.66	55.67	74.00	-18.33	PK
V	11650.00	25.66	30.45	8.77	38.66	42.64	54.00	-11.36	AV
V	17475.00	37.31	30.44	9.31	38.55	54.73	74.00	-19.27	PK
V	17475.00	26.25	30.44	9.31	38.55	43.67	54.00	-10.33	AV
V	23300.00	38.21	30.72	9.45	38.69	55.63	74.00	-18.37	PK
V	23300.00	27.31	30.72	9.45	38.69	44.73	54.00	-9.27	AV
V	29125.00	35.73	30.65	9.99	38.57	53.64	74.00	-20.36	PK
V	29125.00	24.85	30.65	9.99	38.57	42.76	54.00	-11.24	AV
H	11650.00	38.65	30.45	8.77	38.66	55.63	74.00	-18.37	PK
H	11650.00	25.48	30.45	8.77	38.66	42.46	54.00	-11.54	AV
H	17475.00	36.85	30.44	9.31	38.55	54.27	74.00	-19.73	PK
H	17475.00	25.92	30.44	9.31	38.55	43.34	54.00	-10.66	AV
H	23300.00	38.3	30.72	9.45	38.69	55.72	74.00	-18.28	PK
H	23300.00	25.05	30.72	9.45	38.69	42.47	54.00	-11.53	AV
H	29125.00	38.36	30.65	9.99	38.57	56.27	74.00	-17.73	PK
H	29125.00	26.35	30.65	9.99	38.57	44.26	54.00	-9.74	AV

Remark:
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
4. The worst mode is 802.11a, only the worst data is recorded.
5. The test data shows ANT. 1andANT. 2Simultaneous emission mode

5.POWER SPECTRAL DENSITY TEST

5.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(3)

Power 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 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 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 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 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.

5.2 TEST PROCEDURE

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.I.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

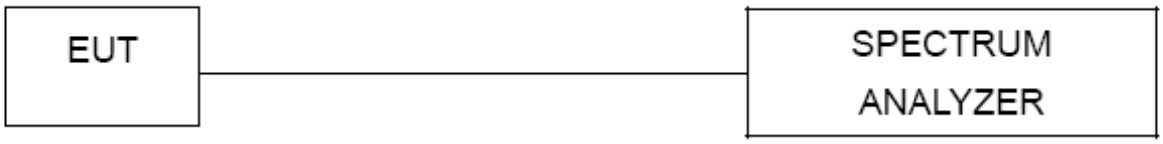
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1015 hPa	Test Voltage：	AC 120V/60Hz
Test Mode ：	TX		

Sub-band(5.2GHz): 5150-5250MHz

Mode	Frequency	ANT. 1 PSD (dBm/MHz)	ANT. 2 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Limit (dBm/MHz)
802.11 a	5180 MHz	-3.63	-4.45	-1.01	11
	5200 MHz	-1.51	-0.73	1.91	11
	5240 MHz	-1.22	-0.55	2.14	11
802.11 ac20	5180 MHz	-4.24	-3.92	-1.07	11
	5200 MHz	-2.38	-0.4	1.73	11
	5240 MHz	0.6	-1.56	2.66	11
802.11 n20	5180 MHz	-3.2	-2.52	0.16	11
	5200 MHz	-0.85	-1	2.09	11
	5240 MHz	-0.72	0.85	3.15	11
802.11 n40	5190 MHz	-11.37	-10.46	-7.88	11
	5230 MHz	-6.78	-7.65	-4.18	11
802.11 ac40	5190 MHz	-11.41	-10.31	-7.81	11
	5230 MHz	-7.41	-4.78	-2.89	11
802.11 ac80	5210 MHz	-18.4	-16.67	-14.44	11

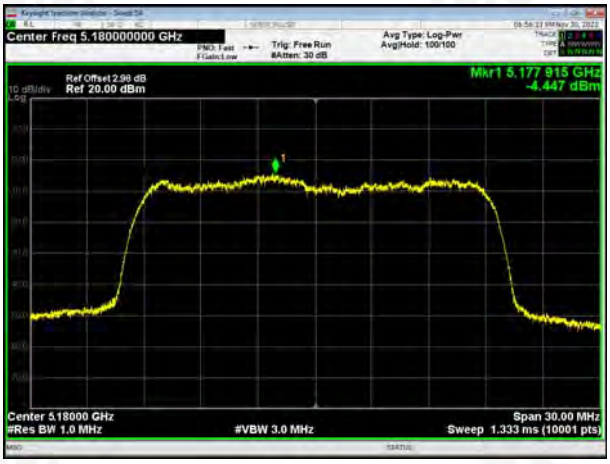
Sub-band(5.8GHz): 5725-5850MHz

Mode	Frequency	ANT. 1 PSD (dBm/500kHz)	ANT. 2 PSD (dBm/500kHz)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)
802.11 a	5745 MHz	-4.33	-5.03	-1.66	30
	5785 MHz	-4.4	-3.07	-0.67	30
	5825 MHz	-3.44	-4.19	-0.79	30
802.11 ac20	5745 MHz	-5.04	-4.59	-1.8	30
	5785 MHz	-4.61	-4.02	-1.29	30
	5825 MHz	-3.71	-5.85	-1.64	30
802.11 n20	5745 MHz	-3.38	-4.33	-0.82	30
	5785 MHz	-3.75	-3.73	-0.73	30
	5825 MHz	-4.46	-2.67	-0.46	30
802.11 n40	5755 MHz	-10.17	-12.12	-8.03	30
	5795 MHz	-12.33	-11.89	-9.09	30
802.11 ac40	5755 MHz	-10.7	-10.57	-7.62	30
	5795 MHz	-9.27	-9.95	-6.59	30
802.11 ac80	5775 MHz	-18.02	-19.24	-15.58	30

5.2GHz Power Spectrum Density

802.11a on channel 36 ANT. 1

802.11a on channel 36 ANT. 2



802.11a on channel 40 ANT. 1

802.11a on channel 40 ANT. 2

802.11a on channel 48 ANT. 1

802.11a on channel 48 ANT. 2

802.11ac20 on channel 36 ANT. 1

802.11ac20 on channel 36 ANT. 2

802.11ac20 on channel 40 ANT. 1

802.11ac20 on channel 40 ANT. 2

802.11ac20 on channel 48 ANT. 1

802.11ac20 on channel 48 ANT. 2

802.11n20 on channel 36 ANT. 1

802.11n20 on channel 36 ANT. 2

802.11n20 on channel 40 ANT. 1

802.11n20 on channel 40 ANT. 2

802.11n20 on channel 48 ANT. 1

802.11n20 on channel 48 ANT. 2

802.11n40 on channel 38ANT. 1

802.11n40 on channel 38ANT. 2

802.11n40 on channel 46ANT. 1

802.11n40 on channel 46ANT. 2

802.11ac40 on channel 38ANT. 1

802.11ac40 on channel 38ANT. 2

802.11ac40 on channel 46ANT. 1

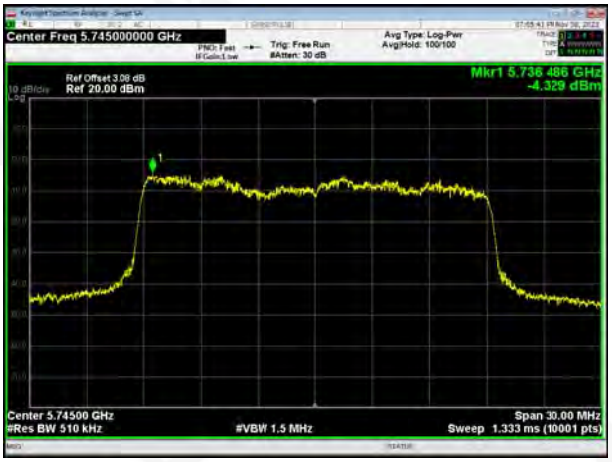
802.11ac40 on channel 46ANT. 2

802.11ac80 on channel 42ANT. 1

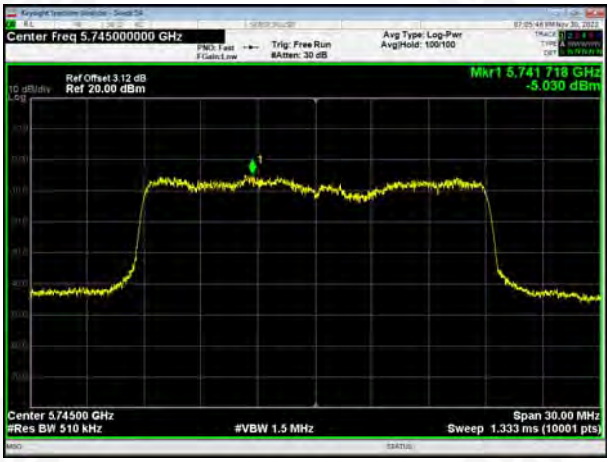
802.11ac80 on channel 42ANT. 2

5.8GHz Power Spectrum Density

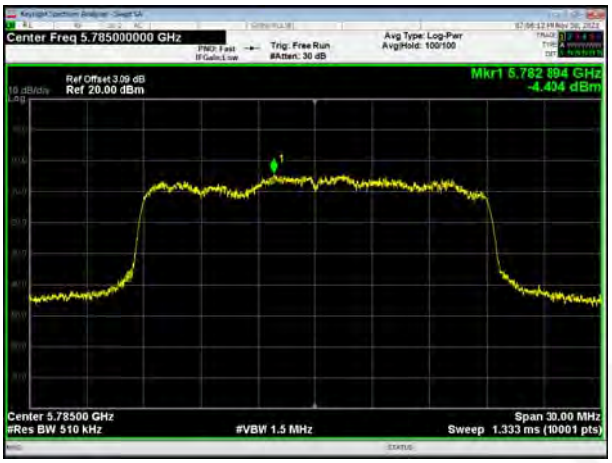
802.11a on channel 149 ANT. 1



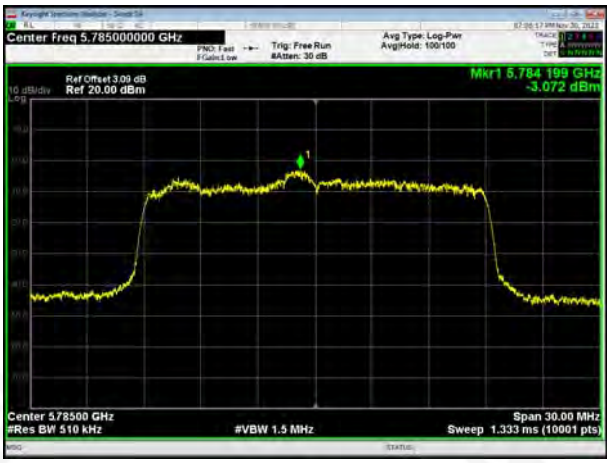
802.11a on channel 149 ANT. 2



802.11a on channel 157 ANT. 1



802.11a on channel 157 ANT. 2

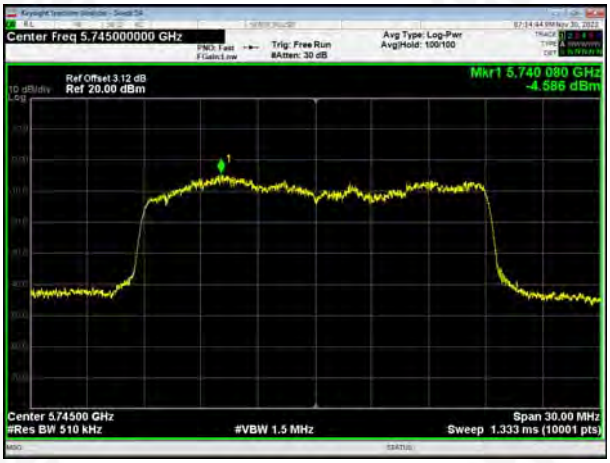


802.11a on channel 165 ANT. 1

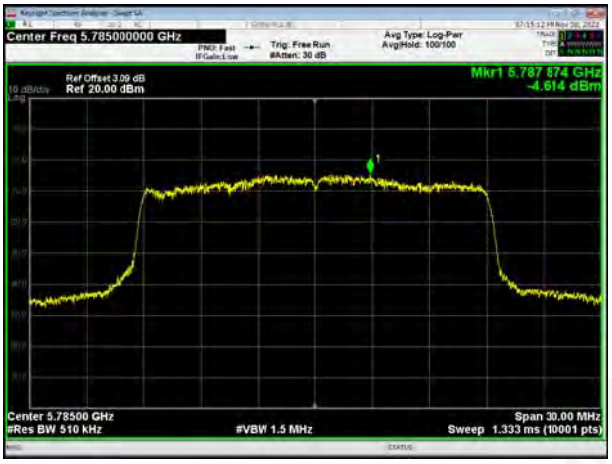
802.11a on channel 165 ANT. 2

802.11ac20 on channel 149 ANT. 1

802.11ac20 on channel 149 ANT. 2



802.11ac20 on channel 157 ANT. 1



802.11ac20 on channel 157 ANT. 2

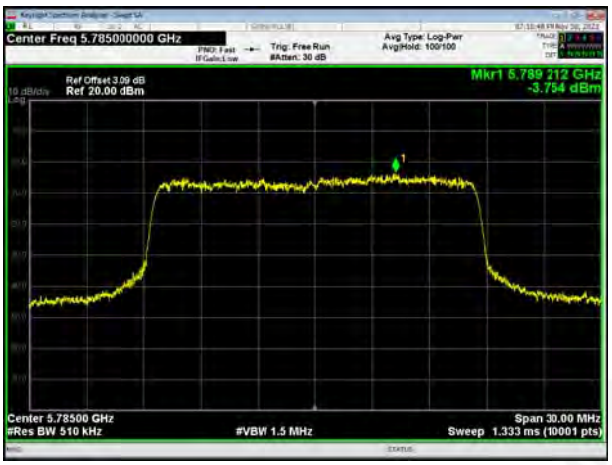
802.11ac20 on channel 165 ANT. 1

802.11ac20 on channel 165 ANT. 2

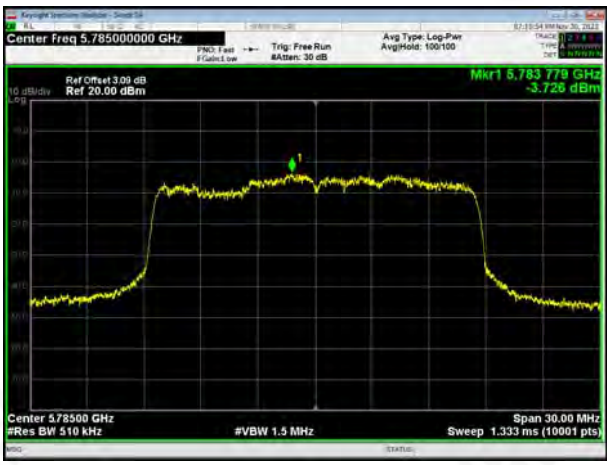
802.11n20 on channel 149 ANT. 1

802.11n20 on channel 149 ANT. 2

802.11n20 on channel 157 ANT. 1

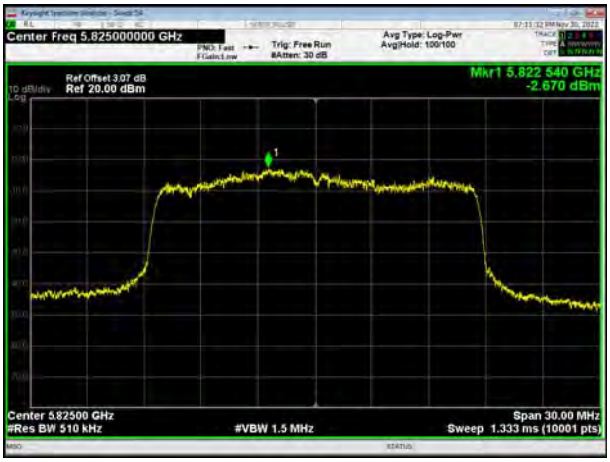


802.11n20 on channel 157 ANT. 2



802.11n20 on channel 165 ANT. 1

802.11n20 on channel 165 ANT. 2



802.11n40 on channel 151 ANT. 1

802.11n40 on channel 151 ANT. 2

802.11n40 on channel 159 ANT. 1

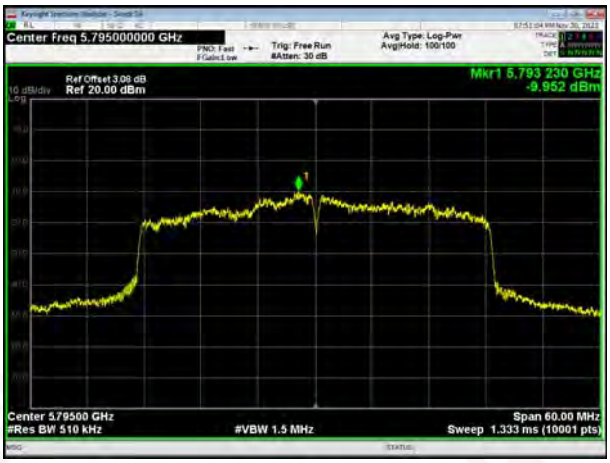
802.11n40 on channel 159 ANT. 2

802.11ac40 on channel 151 ANT. 1

802.11ac40 on channel 151 ANT. 2

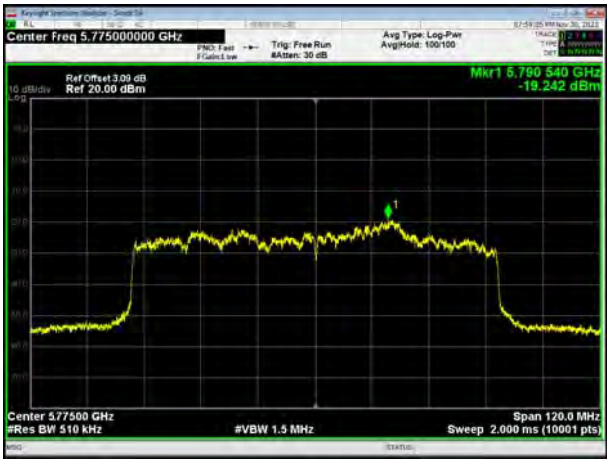
802.11ac40 on channel 159 ANT. 1

802.11ac40 on channel 159 ANT. 2



802.11ac80 on channel 155 ANT. 1

802.11ac80 on channel 155 ANT. 2



6. 26DB & 6DB &99% EMISSION BANDWIDTH

6.1 APPLIED PROCEDURES / LIMIT

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band, the minimum bandwidth 6 dB bandwidth of U-NII devices shall be at least 500KHz. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

6.2 TEST PROCEDURE

a) Set RBW = 100KHz.

b) Set the VBW > RBW.

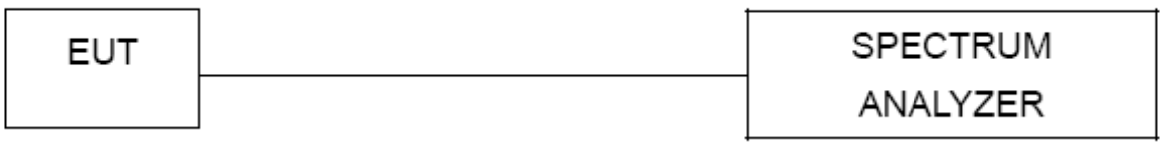
c) Detector = Peak.

d) Trace mode = max hold.

e) 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.

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.



6.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.4 TEST RESULTS

Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX		

Sub-band(5.2GHz): 5150-5250MHz

Mode	Frequency	-26dB Bandwidth		99% Bandwidth		Limit (kHz)
		ANT. 1 (MHz)	ANT. 2 (MHz)	ANT. 1 (MHz)	ANT. 2 (MHz)	
802.11 a	5180 MHz	19.52	19.443	17.546	17.559	500
	5200 MHz	19.527	19.691	17.585	17.572	500
	5240 MHz	21.346	21.423	17.585	17.555	500
802.11 ac20	5180 MHz	19.528	19.459	17.552	17.552	500
	5200 MHz	19.482	19.463	17.564	17.569	500
	5240 MHz	19.616	19.822	17.568	17.564	500
802.11 n20	5180 MHz	18.322	18.781	16.373	16.356	500
	5200 MHz	18.438	18.774	16.390	16.397	500
	5240 MHz	18.311	19.337	16.387	16.407	500
802.11 n40	5190 MHz	40.288	40.05	36.031	35.954	500
	5230 MHz	40.891	40.36	36.026	36.031	500
802.11 ac40	5190 MHz	39.89	39.661	35.936	35.902	500
	5230 MHz	39.772	39.659	35.974	35.997	500
802.11 ac80	5210 MHz	78.904	78.971	74.672	74.710	500

Sub-band(5.8GH): 5725-5850MHz

Mode	Frequency	-6dB Bandwidth		99% Bandwidth		Limit (kHz)
		ANT. 1 (MHz)	ANT. 2 (MHz)	ANT. 1 (MHz)	ANT. 2 (MHz)	
802.11 a	5745 MHz	17.538	17.539	17.542	17.553	500
	5785 MHz	17.542	17.53	17.536	17.52	500
	5825 MHz	17.526	17.56	17.546	17.542	500
802.11 ac20	5745 MHz	17.628	17.567	17.545	17.531	500
	5785 MHz	16.801	17.535	17.537	17.52	500
	5825 MHz	17.544	17.572	17.537	17.528	500
802.11 n20	5745 MHz	16.348	16.311	16.357	16.345	500
	5785 MHz	16.314	16.296	16.353	16.337	500
	5825 MHz	16.326	16.335	16.356	16.347	500
802.11 n40	5755 MHz	35.004	33.851	36.134	36.107	500
	5795 MHz	35.076	35.079	36.117	36.088	500
802.11 ac40	5755 MHz	34.987	35.083	36.087	36.022	500
	5795 MHz	33.909	35.162	36.043	36.036	500
802.11 ac80	5775 MHz	73.825	75.053	74.428	74.537	500

5.2GHz Bandwidth

802.11a on channel 36 ANT. 1

802.11a on channel 36 ANT. 2

802.11a on channel 40 ANT. 1

802.11a on channel 40 ANT. 2

802.11a on channel 48 ANT. 1

802.11a on channel 48 ANT. 2

802.11ac20 on channel 36 ANT. 1

802.11ac20 on channel 36 ANT. 2

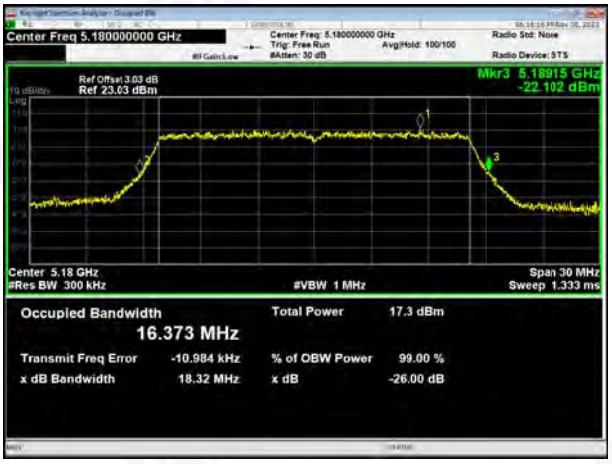
802.11ac20 on channel 40 ANT. 1

802.11ac20 on channel 40 ANT. 2

802.11ac20 on channel 48 ANT. 1

802.11ac20 on channel 48 ANT. 2

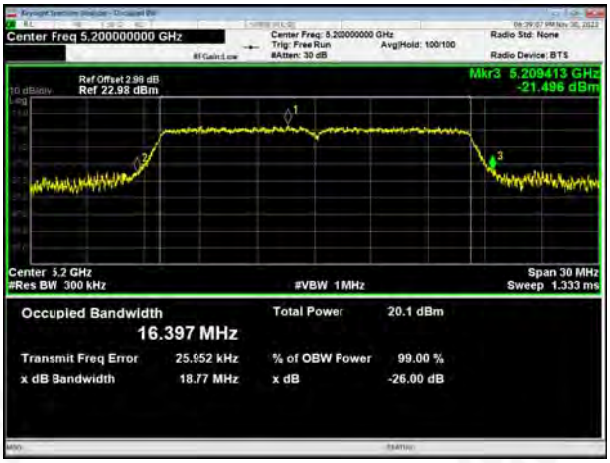
802.11n20 on channel 36 ANT. 1



802.11n20 on channel 36 ANT. 2

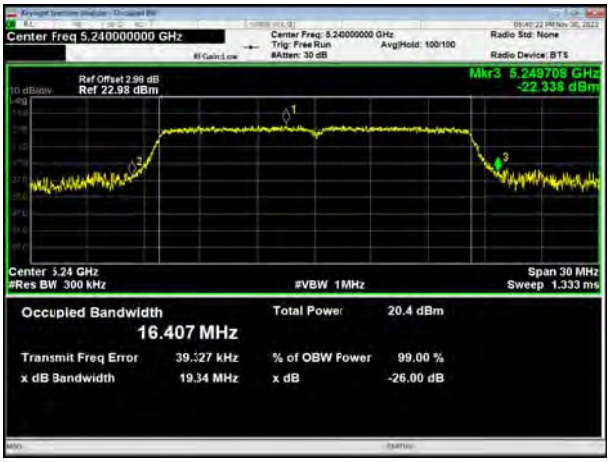
802.11n20 on channel 40 ANT. 1

802.11n20 on channel 40 ANT. 2



802.11n20 on channel 48 ANT. 1

802.11n20 on channel 48 ANT. 2



802.11n40 on channel 38ANT. 1

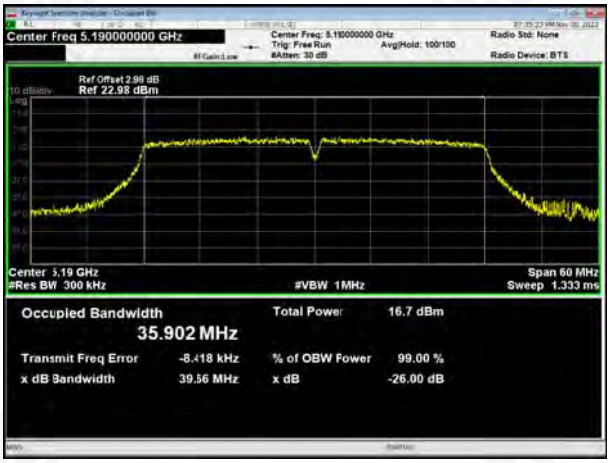
802.11n40 on channel 38ANT. 2

802.11n40 on channel 46ANT. 1

802.11n40 on channel 46ANT. 2

802.11ac40 on channel 38ANT. 1

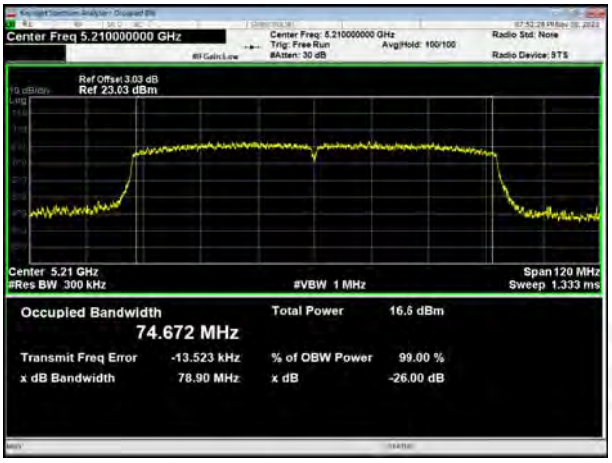
802.11ac40 on channel 38ANT. 2



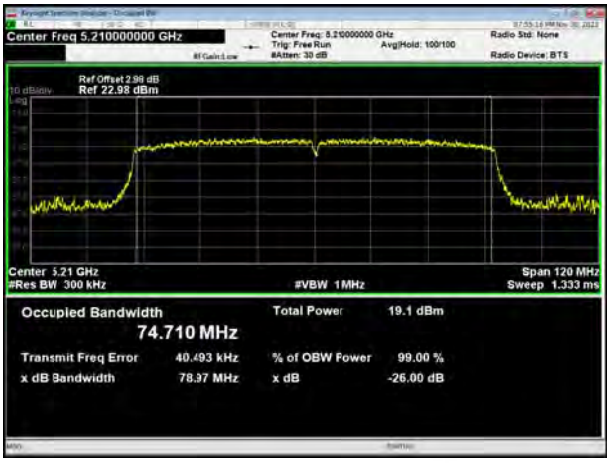
802.11ac40 on channel 46ANT. 1

802.11ac40 on channel 46ANT. 2

802.11ac80 on channel 42ANT. 1

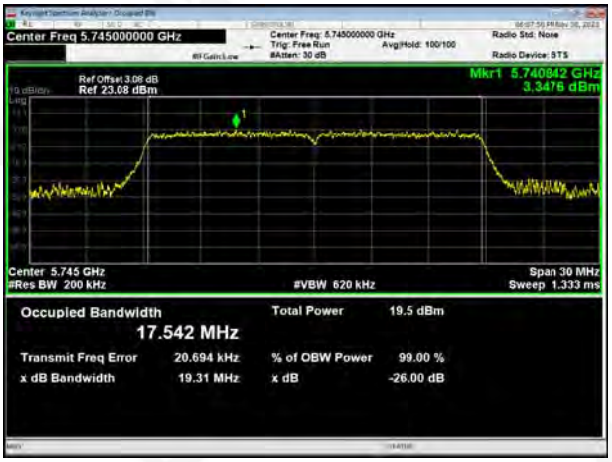


802.11ac80 on channel 42ANT. 2

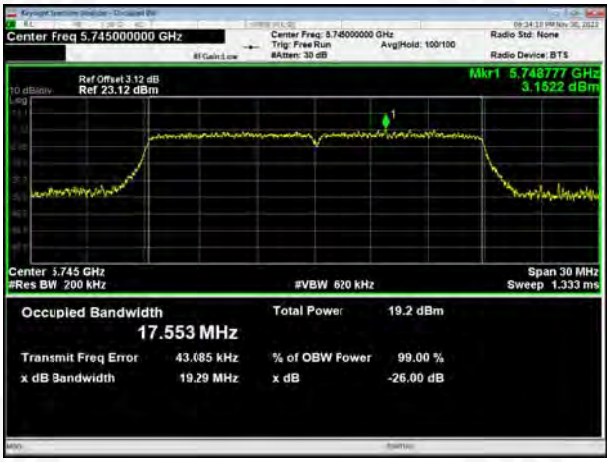


5.8GHz 99% Bandwidth

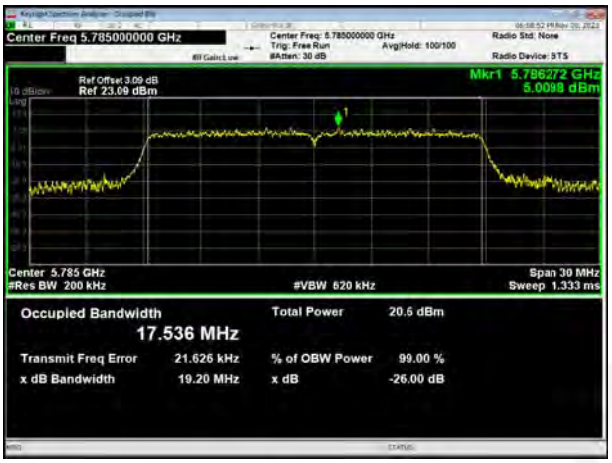
802.11a on channel 149 ANT. 1



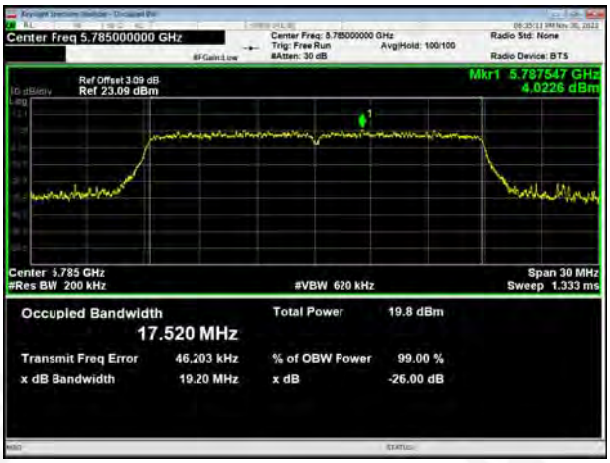
802.11a on channel 149 ANT. 2



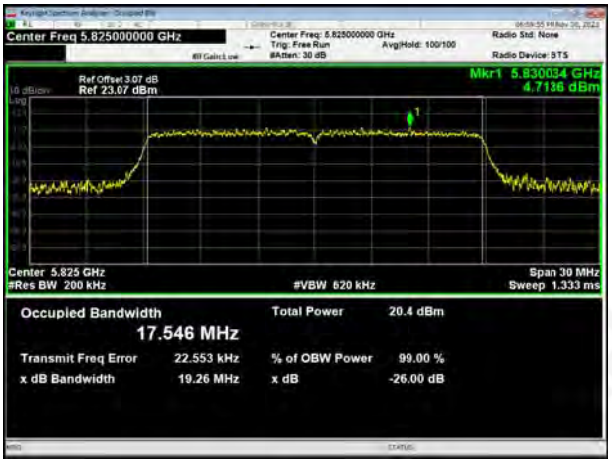
802.11a on channel 157 ANT. 1



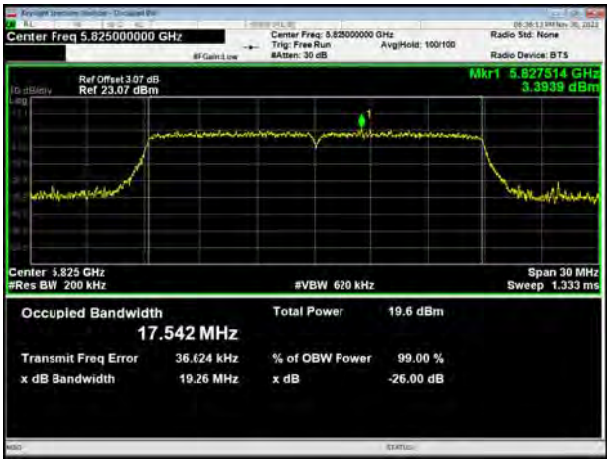
802.11a on channel 157 ANT. 2



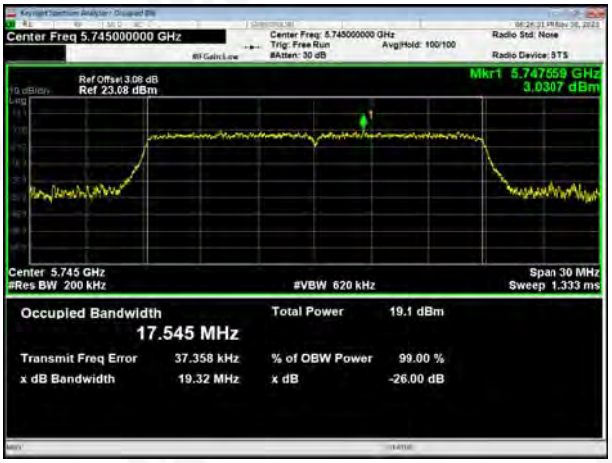
802.11a on channel 165 ANT. 1



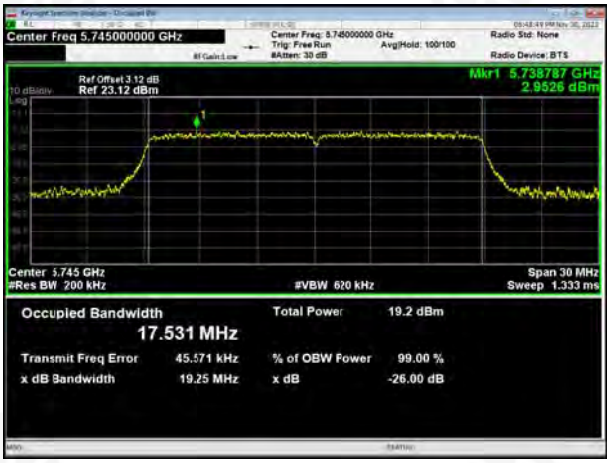
802.11a on channel 165 ANT. 2



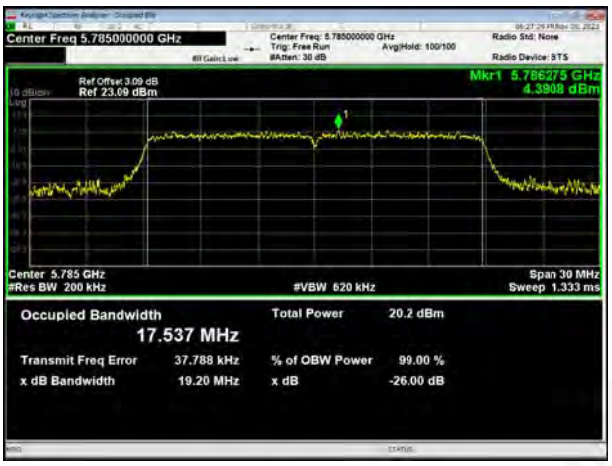
802.11ac20 on channel 149 ANT. 1



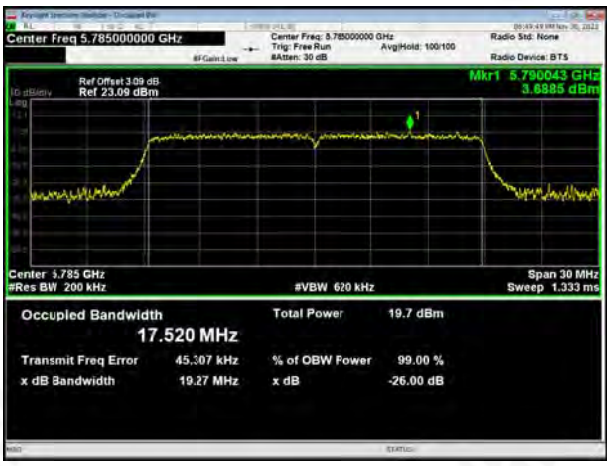
802.11ac20 on channel 149 ANT. 2



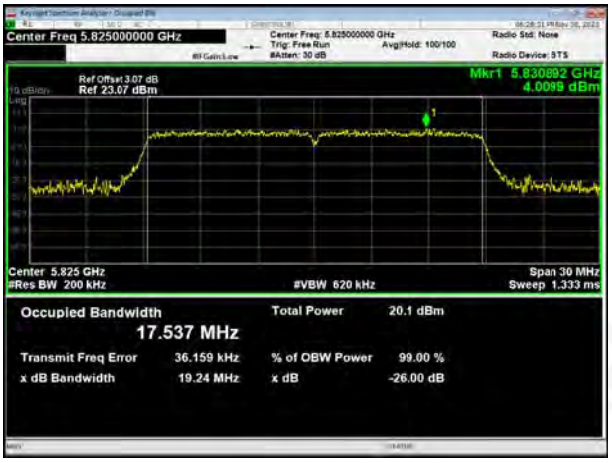
802.11ac20 on channel 157 ANT. 1



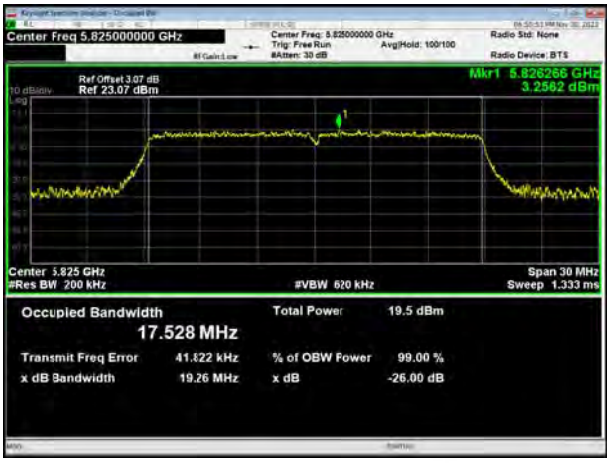
802.11ac20 on channel 157 ANT. 2



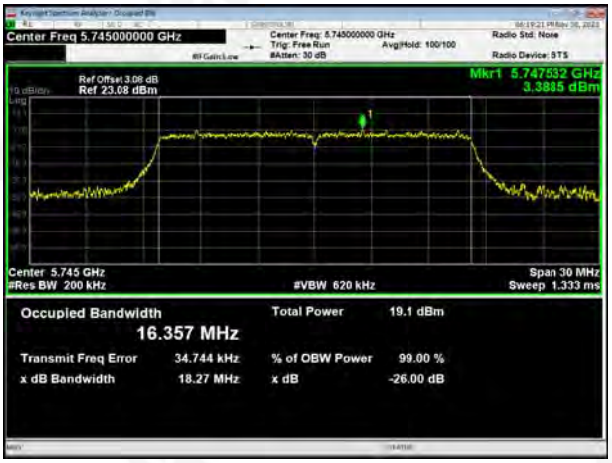
802.11ac20 on channel 165 ANT. 1



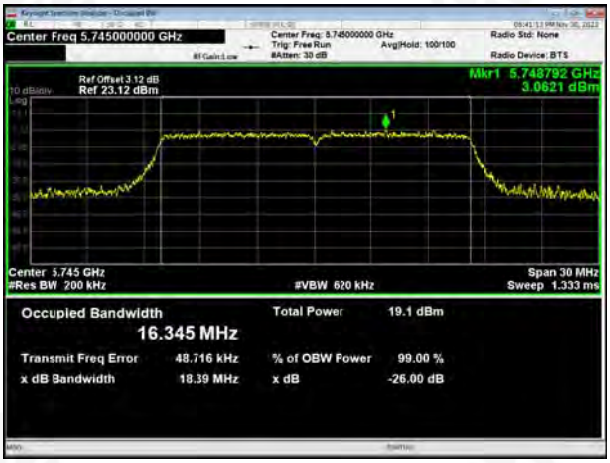
802.11ac20 on channel 165 ANT. 2



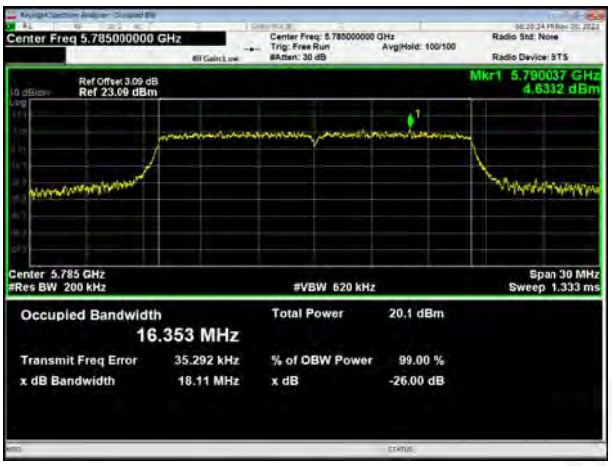
802.11n20 on channel 149 ANT. 1



802.11n20 on channel 149 ANT. 2

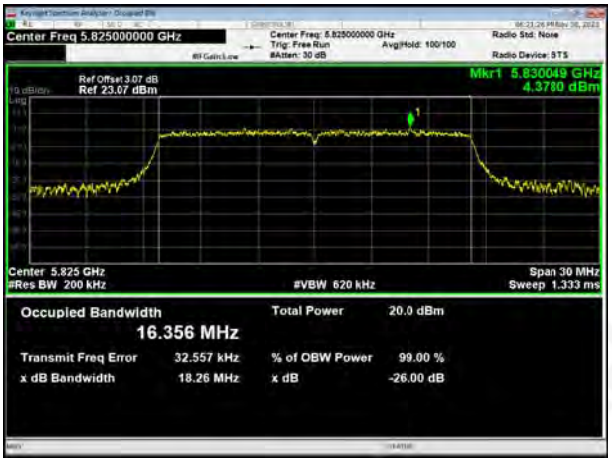


802.11n20 on channel 157 ANT. 1

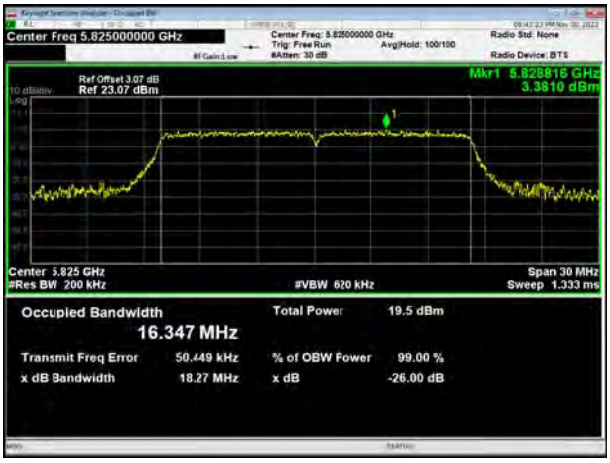


802.11n20 on channel 157 ANT. 2

802.11n20 on channel 165 ANT. 1

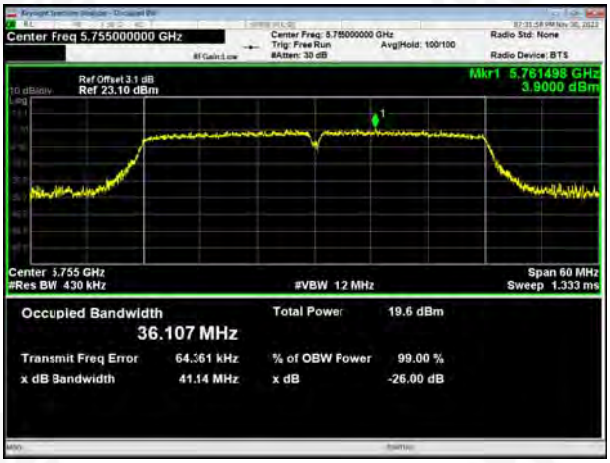


802.11n20 on channel 165 ANT. 2



802.11n40 on channel 151 ANT. 1

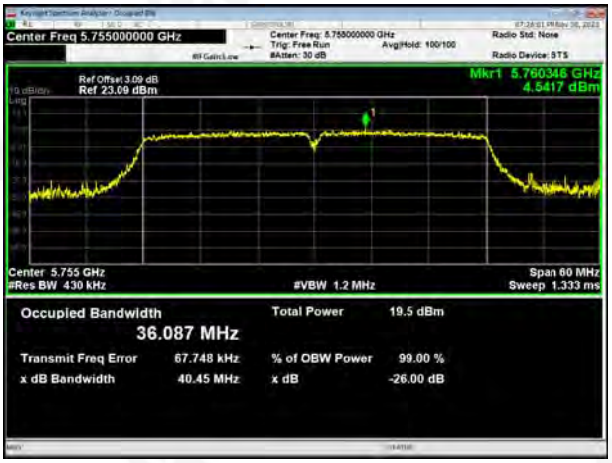
802.11n40 on channel 151 ANT. 2



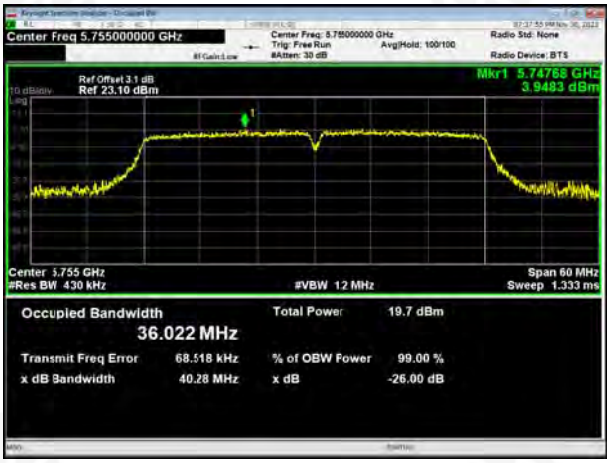
802.11n40 on channel 159 ANT. 1

802.11n40 on channel 159 ANT. 2

802.11ac40 on channel 151 ANT. 1



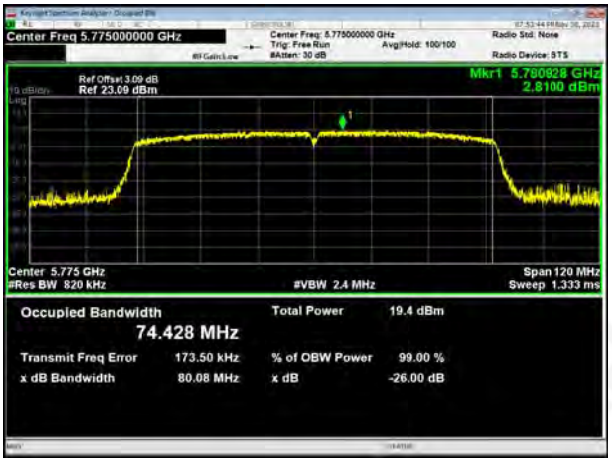
802.11ac40 on channel 151 ANT. 2



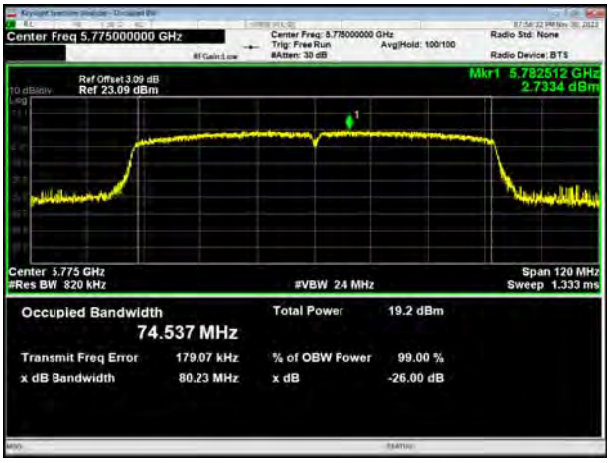
802.11ac40 on channel 159 ANT. 1

802.11ac40 on channel 159 ANT. 2

802.11ac80 on channel 155 ANT. 1



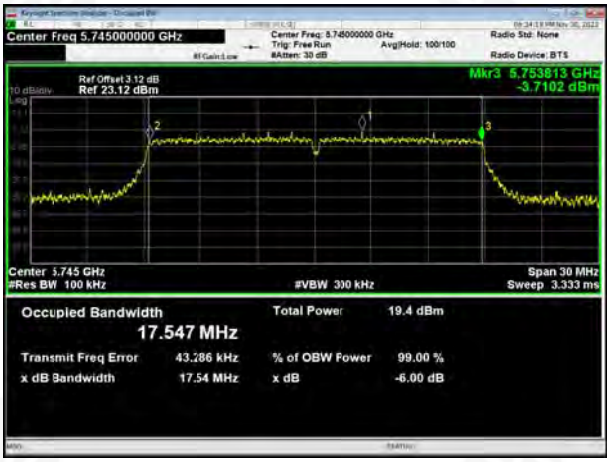
802.11ac80 on channel 155 ANT. 2



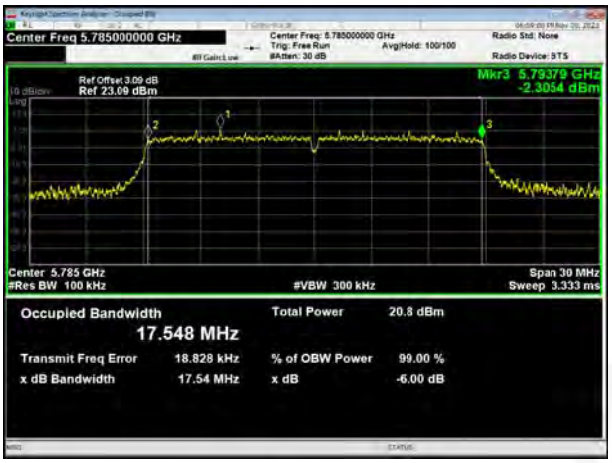
5.8GHz -6 dB Bandwidth

802.11a on channel 149 ANT. 1

802.11a on channel 149 ANT. 2



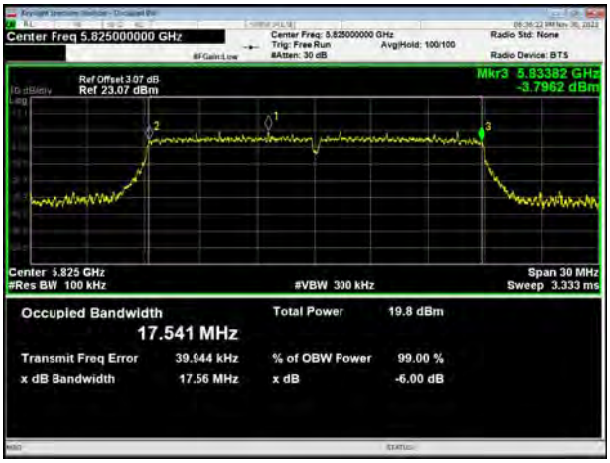
802.11a on channel 157 ANT. 1



802.11a on channel 157 ANT. 2

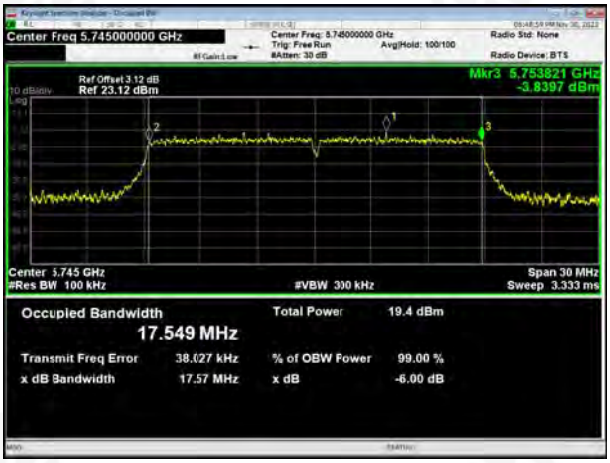
802.11a on channel 165 ANT. 1

802.11a on channel 165 ANT. 2



802.11ac20 on channel 149 ANT. 1

802.11ac20 on channel 149 ANT. 2

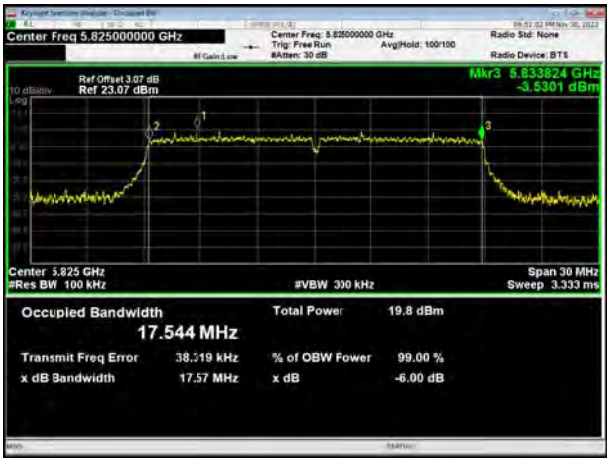


802.11ac20 on channel 157 ANT. 1

802.11ac20 on channel 157 ANT. 2

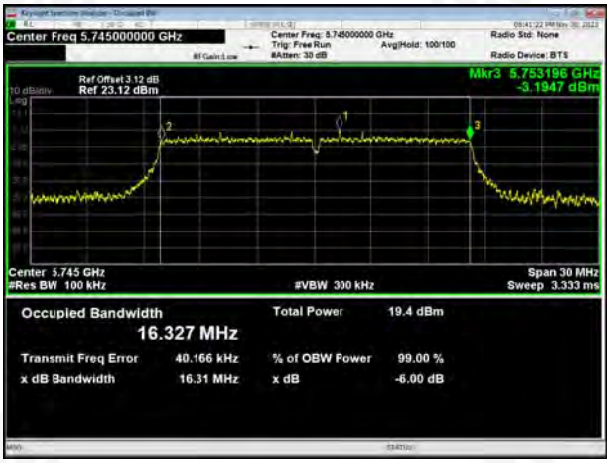
802.11ac20 on channel 165 ANT. 1

802.11ac20 on channel 165 ANT. 2

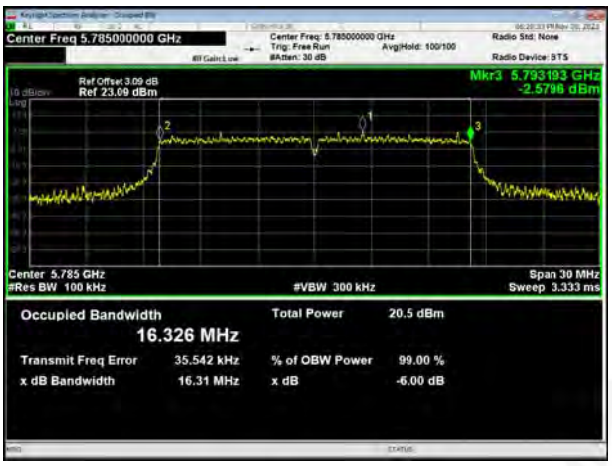


802.11n20 on channel 149 ANT. 1

802.11n20 on channel 149 ANT. 2



802.11n20 on channel 157 ANT. 1



802.11n20 on channel 157 ANT. 2

802.11n20 on channel 165 ANT. 1

802.11n20 on channel 165 ANT. 2

802.11n40 on channel 151 ANT. 1

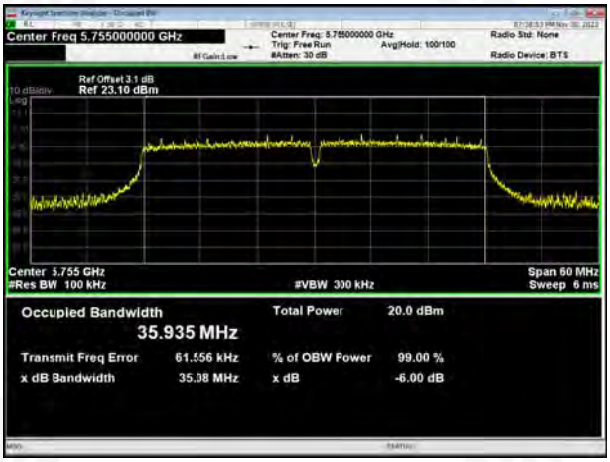
802.11n40 on channel 151 ANT. 2

802.11n40 on channel 159 ANT. 1

802.11n40 on channel 159 ANT. 2

802.11ac40 on channel 151 ANT. 1

802.11ac40 on channel 151 ANT. 2

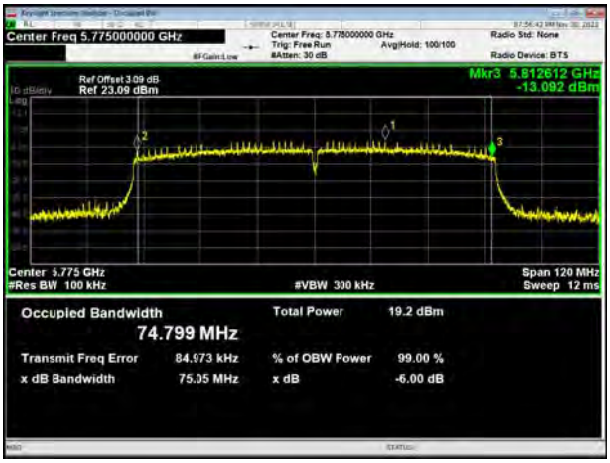


802.11ac40 on channel 159 ANT. 1

802.11ac40 on channel 159 ANT. 2

802.11ac80 on channel 155 ANT. 1

802.11ac80 on channel 155 ANT. 2



7.MAXIMUM CONDUCTED OUTPUT POWER

7.1 PPLIED PROCEDURES / LIMIT

According to FCC §15.407
The maximum conduced output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	250mW
5725~5850	1W

7.2 TEST PROCEDURE

The EUT was directly connected to the Power meter

1. Device Configuration
If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level (see section II.B.).
a) The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (to no lower than 98 percent) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.
b) If continuous transmission (or at least 98 percent duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level with the transmit duration as long as possible and the duty cycle as high as possible.

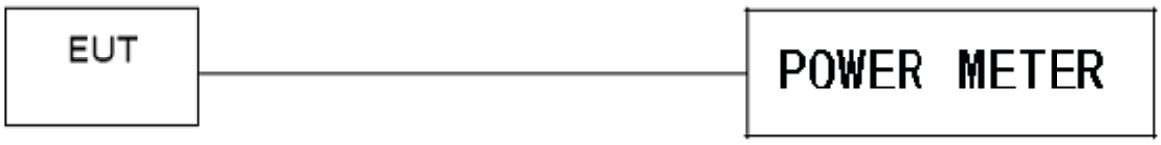
2. Measurement using a Spectrum Analyzer or EMI Receiver (SA)
Measurement of maximum conducted output power using a spectrum analyzer requires integrating the spectrum across a frequency span that encompasses, at a minimum, either the EBW or the 99-percent occupied bandwidth of the signal.1 However, the EBW must be used to determine bandwidth dependent limits on maximum conducted output power in accordance with § 15.407(a).
a) The test method shall be selected as follows: (i) Method SA-1 or SA-1 Alternative (averaging with the EUT transmitting at full power throughout each sweep) shall be applied if either of the following conditions can be satisfied:
• The EUT transmits continuously (or with a duty cycle ≥ 98 percent).
• Sweep triggering or gating can be implemented in a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the analyzer configured as in Method SA-1, below) is equal to or shorter than the duration T of each transmission from the EUT and if those transmissions exhibit full power throughout their durations.
(ii) Method SA-2 or SA-2 Alternative (averaging across on and off times of the EUT transmissions, followed by duty cycle correction) shall be applied if the conditions of (i) cannot be achieved and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than ± 2 percent.
(iii) Method SA-3 (RMS detection with max hold) or SA-3 Alternative (reduced VBW with max hold) shall be applied if the conditions of (i) and (ii) cannot be achieved.
b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep): (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(ii) Set RBW = 1 MHz.
(iii) Set VBW ≥ 3 MHz.
(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(v) Sweep time = auto.
(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX		

Sub-band(5.2GHz): 5150-5250MHz

Mode	Frequency	ANT. 1 Power (dBm)	ANT. 2 Power (dBm)	Total Power (dBm)	Limit (dBm/MHz)
802.11 a	5180 MHz	6.06	5.92	9	23.98
	5200 MHz	5.13	5.17	8.16	23.98
	5240 MHz	5.03	5.39	8.22	23.98
802.11 ac20	5180 MHz	6.05	5.81	8.94	23.98
	5200 MHz	5.36	5.43	8.41	23.98
	5240 MHz	5.19	5.55	8.38	23.98
802.11 n20	5180 MHz	6.13	5.97	9.06	23.98
	5200 MHz	5.23	5.22	8.24	23.98
	5240 MHz	5.11	5.42	8.28	23.98
802.11 n40	5190 MHz	5.5	5.31	8.42	23.98
	5230 MHz	4.34	4.52	7.44	23.98
802.11 ac40	5190 MHz	5.43	5.18	8.32	23.98
	5230 MHz	4.7	4.98	7.85	23.98
802.11 ac80	5210 MHz	4.49	4.45	7.48	23.98

Sub-band(5.8GHz): 5725-5850MHz

Mode	Frequency	ANT. 1 Power (dBm)	ANT. 2 Power (dBm)	Total Power (dBm)	Limit (dBm/MHz)
802.11 a	5745 MHz	5.29	5.59	8.45	30
	5785 MHz	6.24	6.37	9.32	30
	5825 MHz	5.85	6.2	9.04	30
802.11 ac20	5745 MHz	5.39	5.59	8.5	30
	5785 MHz	6.45	6.47	9.47	30
	5825 MHz	6.09	6.26	9.19	30
802.11 n20	5745 MHz	5.25	5.53	8.4	30
	5785 MHz	6.24	6.45	9.36	30
	5825 MHz	6.16	6.16	9.17	30
802.11 n40	5755 MHz	5.16	5.25	8.22	30
	5795 MHz	5.71	5.79	8.76	30
802.11 ac40	5755 MHz	5.55	5.47	8.52	30
	5795 MHz	5.92	6.17	9.06	30
802.11 ac80	5775 MHz	5.09	5.22	8.17	30

8.OUT OF BAND EMISSIONS

8.1 APPLICABLE STANDARD

According to FCC §15.407(b)

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

8.2 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal froman external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antennaterminal to measurement instrument via a low loss cable. Then set it to any one measured frequency withinits operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graphwith marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP

8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage ：	AC 120V/60Hz

Sub-band(5.2GHz): 5150-5250MHz

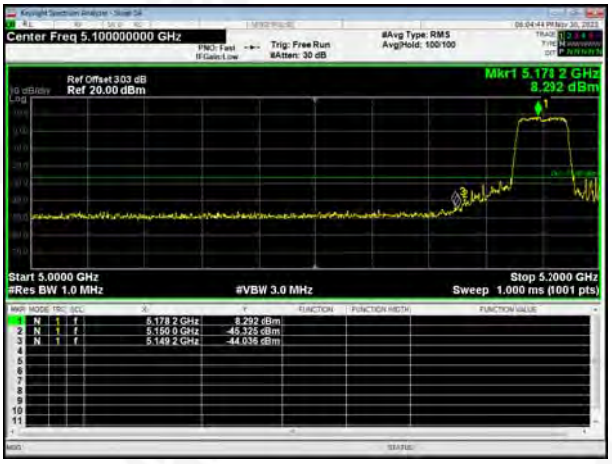
Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
11a	5180	ANT. 1	-44.03	-27	Pass
11a	5240	ANT. 1	-45.42	-27	Pass
11a	5180	ANT. 2	-43.65	-27	Pass
11a	5240	ANT. 2	-43.76	-27	Pass
11ac20	5180	ANT. 1	-45.71	-27	Pass
11ac20	5240	ANT. 1	-44.5	-27	Pass
11ac20	5180	ANT. 2	-40.54	-27	Pass
11ac20	5240	ANT. 2	-43.33	-27	Pass
11n20	5180	ANT. 1	-45.55	-27	Pass
11n20	5240	ANT. 1	-45.7	-27	Pass
11n20	5180	ANT. 2	-45.53	-27	Pass
11n20	5240	ANT. 2	-42.76	-27	Pass
11n40	5190	ANT. 1	-37.78	-27	Pass
11n40	5230	ANT. 1	-45.42	-27	Pass
11n40	5190	ANT. 2	-39.14	-27	Pass
11n40	5230	ANT. 2	-44.41	-27	Pass
11ac40	5190	ANT. 1	-37.42	-27	Pass
11ac40	5230	ANT. 1	-44.99	-27	Pass
11ac40	5190	ANT. 2	-36.98	-27	Pass
11ac40	5230	ANT. 2	-43.45	-27	Pass

Sub-band(5.8GHz): 5725-5850MHz

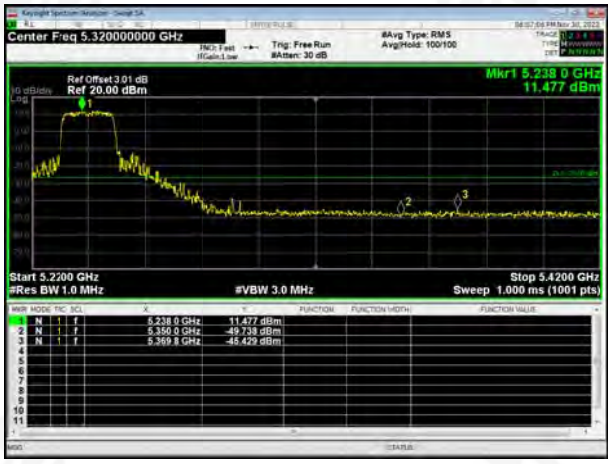
Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
11a	5745	ANT. 1	-25.08	-17	Pass
11a	5825	ANT. 1	-30.19	-17	Pass
11a	5745	ANT. 2	-25.98	-17	Pass
11a	5825	ANT. 2	-32.31	-17	Pass
11ac20	5745	ANT. 1	-26.77	-17	Pass
11ac20	5825	ANT. 1	-29.53	-17	Pass
11ac20	5745	ANT. 2	-25.89	-17	Pass
11ac20	5825	ANT. 2	-29.58	-17	Pass
11n20	5745	ANT. 1	-25.13	-17	Pass
11n20	5825	ANT. 1	-32.91	-17	Pass
11n20	5745	ANT. 2	-27.61	-17	Pass
11n20	5825	ANT. 2	-31.26	-17	Pass
11n40	5755	ANT. 1	-25.83	-17	Pass
11n40	5795	ANT. 1	-37.72	-17	Pass
11n40	5755	ANT. 2	-25.51	-17	Pass
11n40	5795	ANT. 2	-35.24	-17	Pass
11ac40	5755	ANT. 1	-27.43	-17	Pass
11ac40	5795	ANT. 1	-37.1	-17	Pass
11ac40	5755	ANT. 2	-22.32	-17	Pass
11ac40	5795	ANT. 2	-37.09	-17	Pass

5.2GHz Band Edge

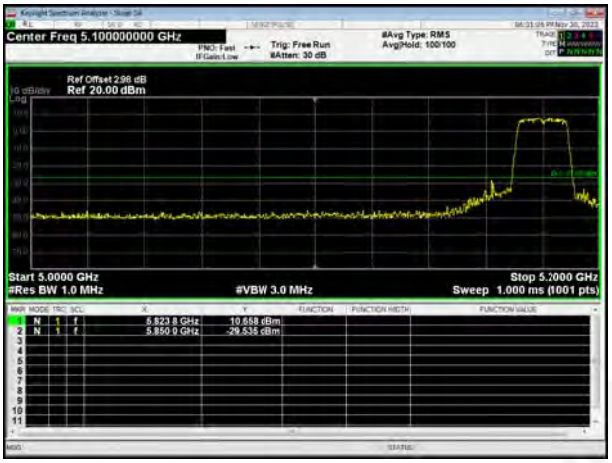
802.11aLeft Side, ANT. 1



802.11a Right Side, ANT. 1

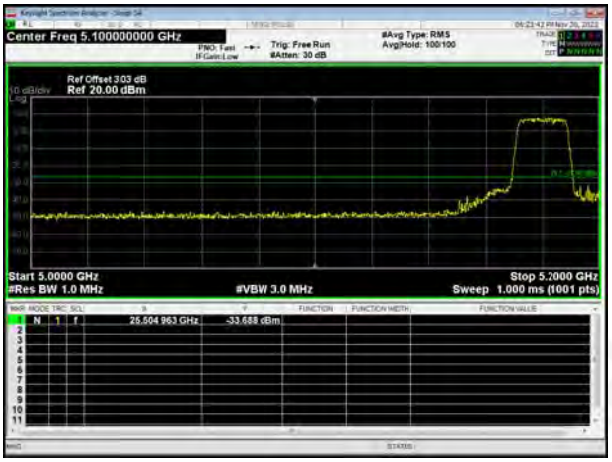


802.11a Left Side, ANT. 2

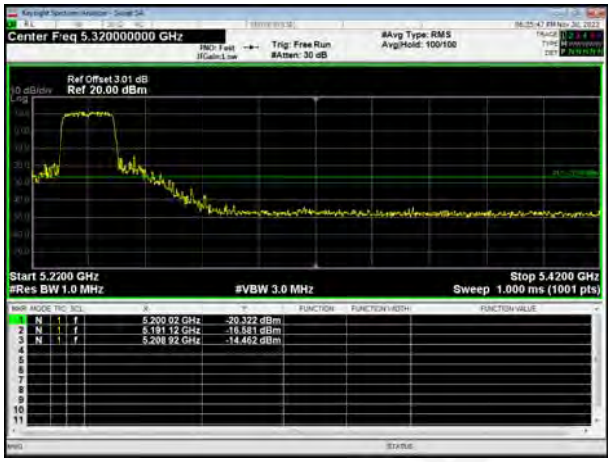


802.11a Right Side, ANT. 2

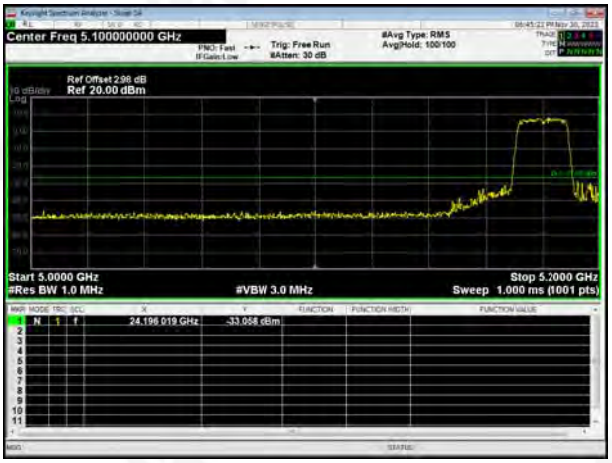
802.11ac20Left Side, ANT. 1



802.11ac20Right Side, ANT. 1

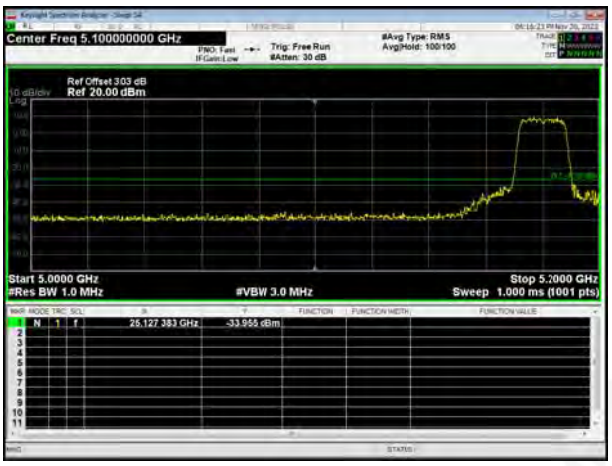


802.11ac20Left Side, ANT. 2

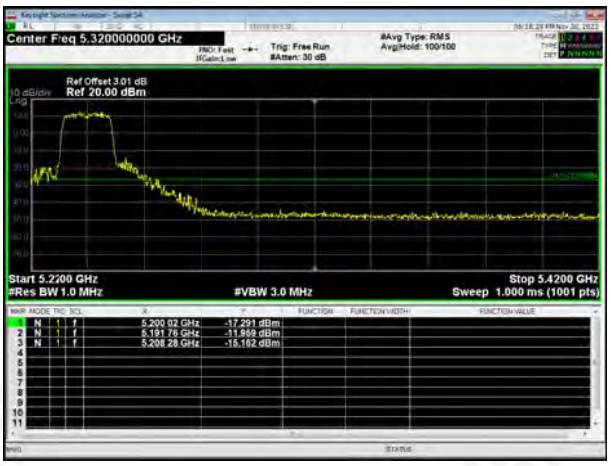


802.11ac20Right Side, ANT. 2

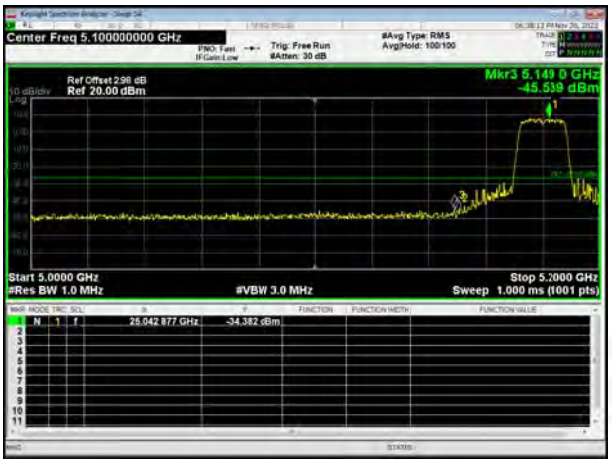
802.11n20Left Side, ANT. 1



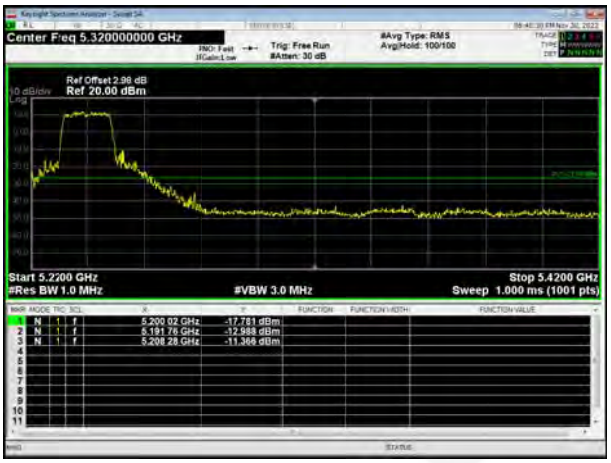
802.11n20Right Side, ANT. 1



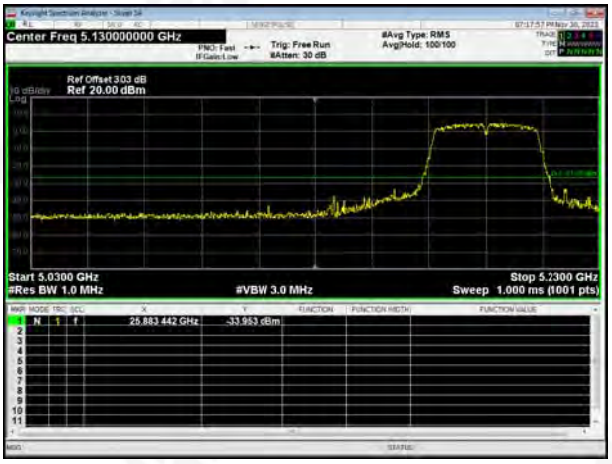
802.11n20Left Side, ANT. 2



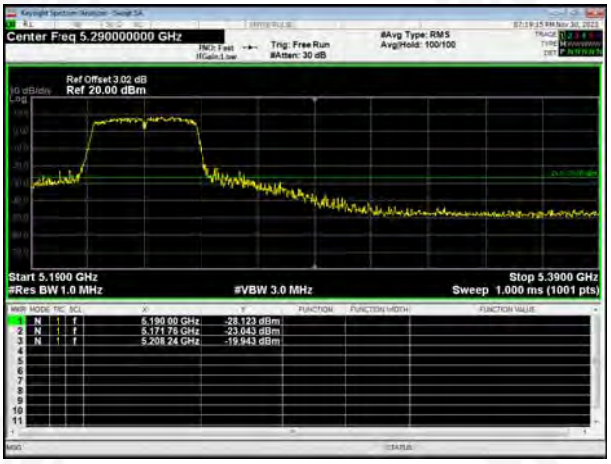
802.11n20Right Side, ANT. 2



802.11n40Left Side, ANT. 1

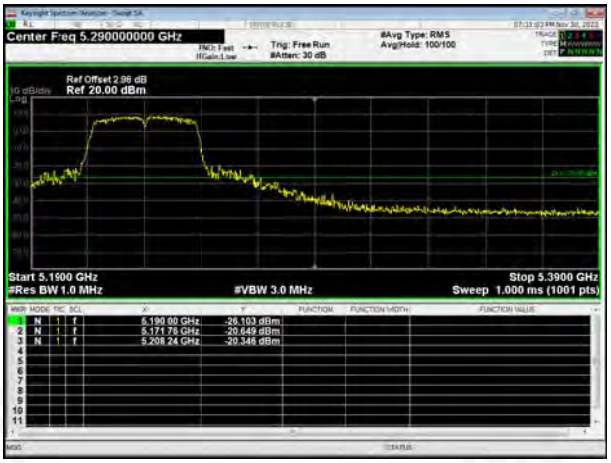


802.11n40Right Side, ANT. 1

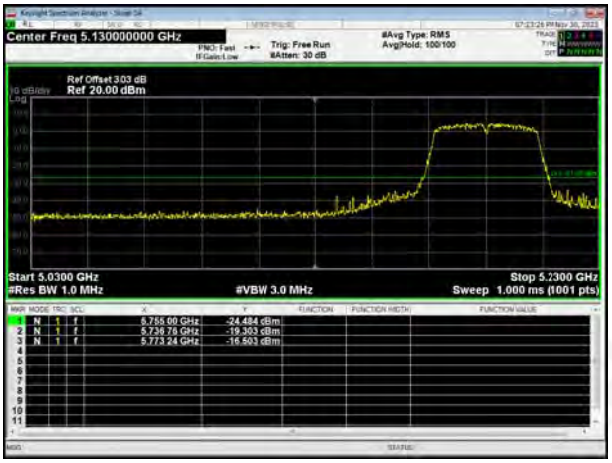


802.11n40Left Side, ANT. 2

802.11n40Right Side, ANT. 2

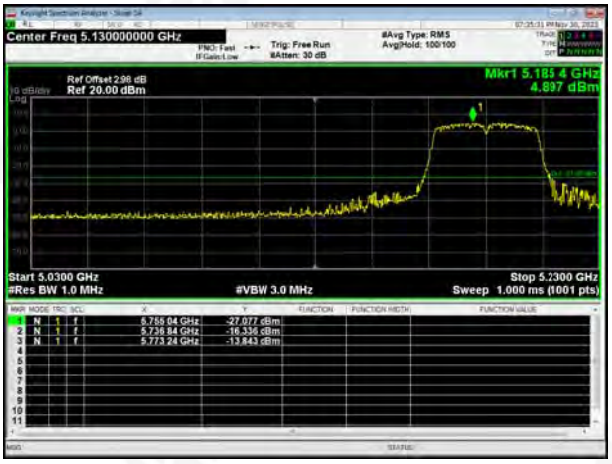


802.11ac40Left Side, ANT. 1



802.11ac40Right Side, ANT. 1

802.11ac40Left Side, ANT. 2



802.11ac40Right Side, ANT. 2

5.8GHz Band Edge

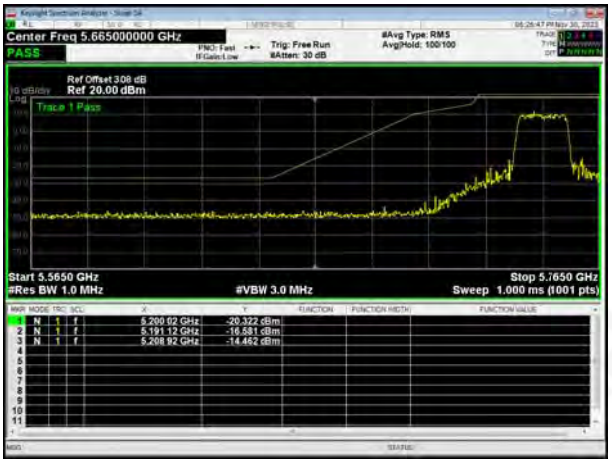
802.11a Left Side, ANT. 1

802.11a Right Side, ANT. 1

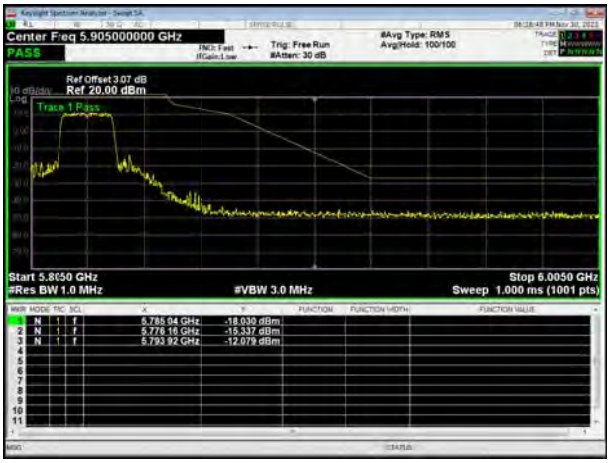
802.11a Left Side, ANT. 2

802.11a Right Side, ANT. 2

802.11ac20Left Side, ANT. 1

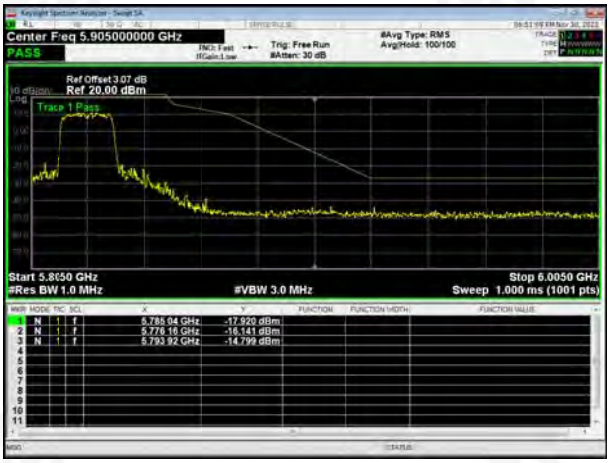


802.11ac20Right Side, ANT. 1



802.11ac20Left Side, ANT. 2

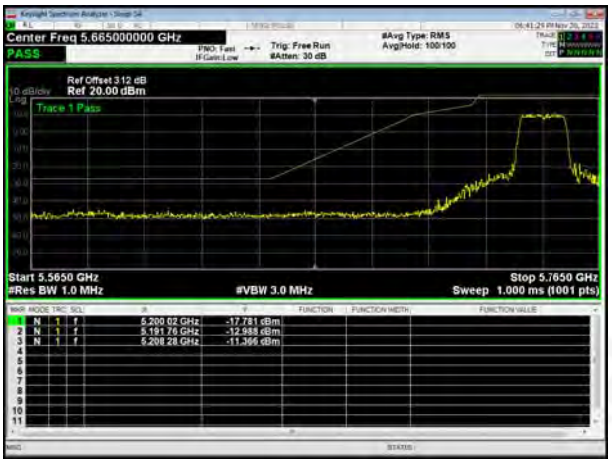
802.11ac20Right Side, ANT. 2



802.11n20Left Side, ANT. 1

802.11n20Right Side, ANT. 1

802.11n20Left Side, ANT. 2



802.11n20Right Side, ANT. 2

802.11n40Left Side, ANT. 1

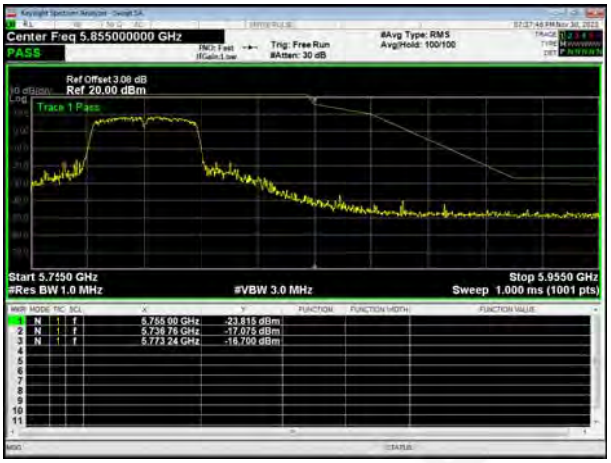
802.11n40Right Side, ANT. 1

802.11n40Left Side, ANT. 2

802.11n40Right Side, ANT. 2

802.11ac40Left Side, ANT. 1

802.11ac40Right Side, ANT. 1



802.11ac40Left Side, ANT. 2

802.11ac40Right Side, ANT. 2

9.SPURIOUS RF CONDUCTED EMISSIONS

9.1 CONFORMANCE LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listedin section 15.209.

9.2 MEASURING INSTRUMENTS

The Measuring equipment is listed in the section 6.3 of this test report.

9.3 TEST SETUP

9.4 TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW= 300KHz to measure the peak field strength, and measure frequency range from 30MHz to 26.5GHz.

9.5 TEST RESULTS

Remark: The measurement frequency range is from 30MHz to the 5th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandedge measurement data.

Sub-band(5.2GHz): 5150-5250MHz

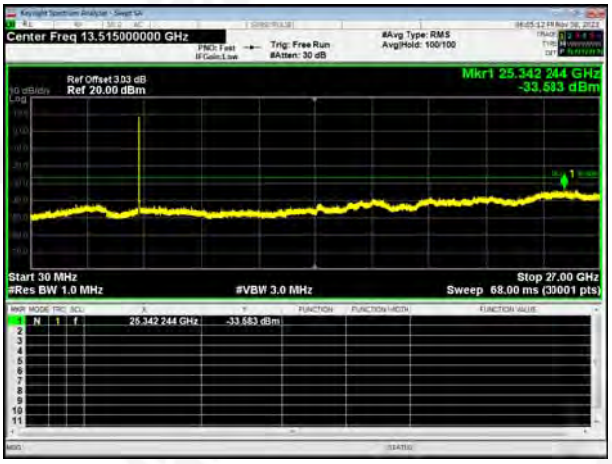
Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
11a	5180	Ant1	-33.58	-27	Pass
11a	5200	Ant1	-33.99	-27	Pass
11a	5240	Ant1	-34.28	-27	Pass
11a	5180	Ant2	-33.44	-27	Pass
11a	5200	Ant2	-33.28	-27	Pass
11a	5240	Ant2	-33.79	-27	Pass
11ac20	5180	Ant1	-33.86	-27	Pass
11ac20	5200	Ant1	-34.12	-27	Pass
11ac20	5240	Ant1	-34.23	-27	Pass
11ac20	5180	Ant2	-33.25	-27	Pass
11ac20	5200	Ant2	-34.06	-27	Pass
11ac20	5240	Ant2	-33.59	-27	Pass
11n20	5180	Ant1	-34.22	-27	Pass
11n20	5200	Ant1	-34.21	-27	Pass
11n20	5240	Ant1	-33.83	-27	Pass
11n20	5180	Ant2	-33.41	-27	Pass
11n20	5200	Ant2	-34.44	-27	Pass
11n20	5240	Ant2	-34	-27	Pass
11n40	5190	Ant1	-33.39	-27	Pass
11n40	5230	Ant1	-33.94	-27	Pass
11n40	5190	Ant2	-34.22	-27	Pass
11n40	5230	Ant2	-34.19	-27	Pass
11ac40	5190	Ant1	-34.28	-27	Pass
11ac40	5230	Ant1	-33.8	-27	Pass
11ac40	5190	Ant2	-33.81	-27	Pass
11ac40	5230	Ant2	-34.12	-27	Pass
11ac80	5210	Ant1	-34.04	-27	Pass
11ac80	5210	Ant2	-34.25	-27	Pass

Sub-band(5.8GHz): 5725-5850MHz

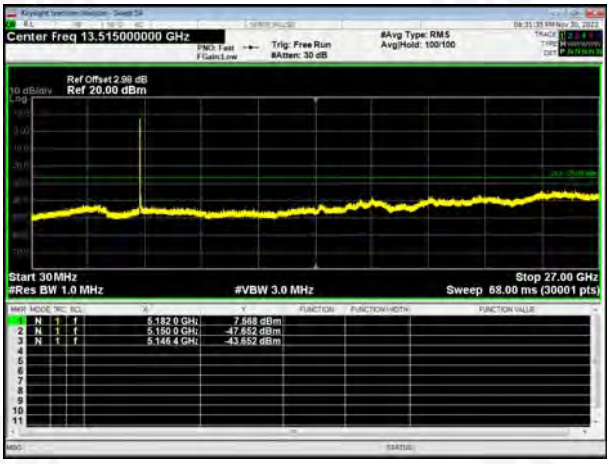
Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
11a	5745	Ant1	-33.59	-27	Pass
11a	5785	Ant1	-34.19	-27	Pass
11a	5825	Ant1	-33.95	-27	Pass
11a	5745	Ant2	-34.46	-27	Pass
11a	5785	Ant2	-33.08	-27	Pass
11a	5825	Ant2	-34.38	-27	Pass
11ac20	5745	Ant1	-33.92	-27	Pass
11ac20	5785	Ant1	-34.1	-27	Pass
11ac20	5825	Ant1	-34.46	-27	Pass
11ac20	5745	Ant2	-34.06	-27	Pass
11ac20	5785	Ant2	-33.62	-27	Pass
11ac20	5825	Ant2	-33.95	-27	Pass
11n20	5745	Ant1	-33.91	-27	Pass
11n20	5785	Ant1	-33.97	-27	Pass
11n20	5825	Ant1	-33.68	-27	Pass
11n20	5745	Ant2	-34.08	-27	Pass
11n20	5785	Ant2	-33.05	-27	Pass
11n20	5825	Ant2	-33.05	-27	Pass
11n40	5755	Ant1	-33.7	-27	Pass
11n40	5795	Ant1	-34.5	-27	Pass
11n40	5755	Ant2	-33.6	-27	Pass
11n40	5795	Ant2	-34.28	-27	Pass
11ac40	5755	Ant1	-33.6	-27	Pass
11ac40	5795	Ant1	-34.02	-27	Pass
11ac40	5755	Ant2	-33.82	-27	Pass
11ac40	5795	Ant2	-34.35	-27	Pass
11ac80	5775	Ant1	-33.75	-27	Pass
11ac80	5775	Ant2	-33.58	-27	Pass

5.2GHz Spurious Emission

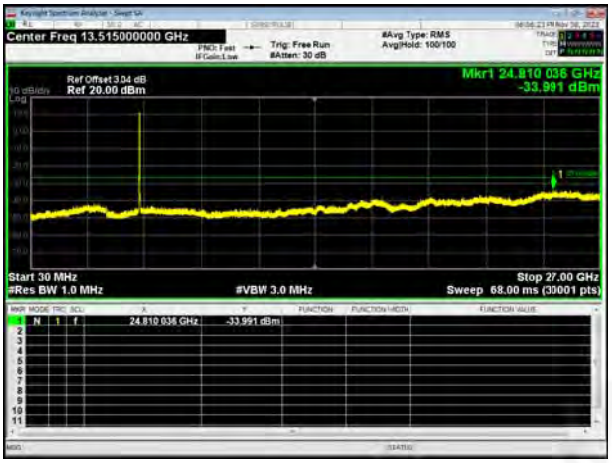
802.11a on channel 36 ANT. 1



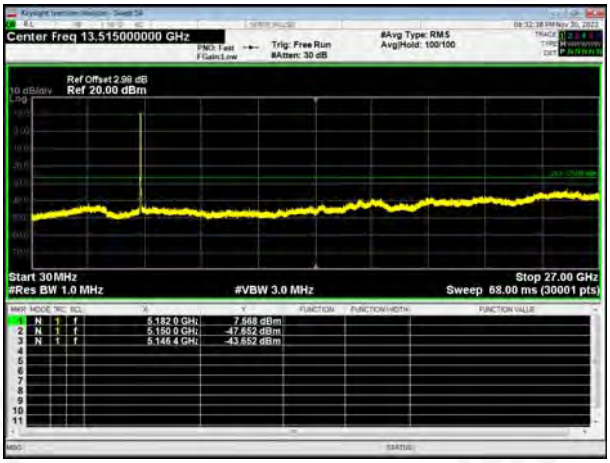
802.11a on channel 36 ANT. 2



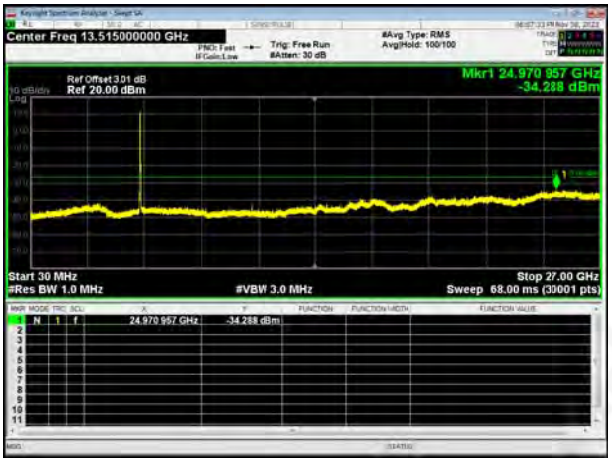
802.11a on channel 40 ANT. 1



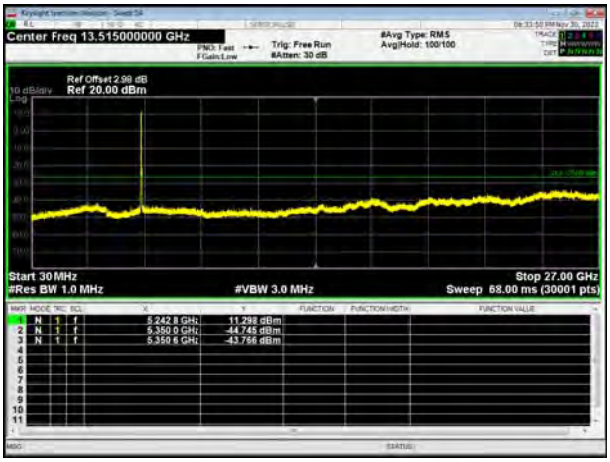
802.11a on channel 40 ANT. 2



802.11a on channel 48ANT. 1

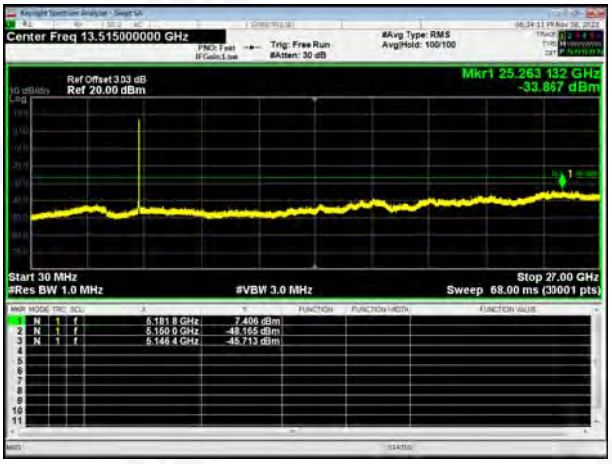


802.11a on channel 48ANT. 2

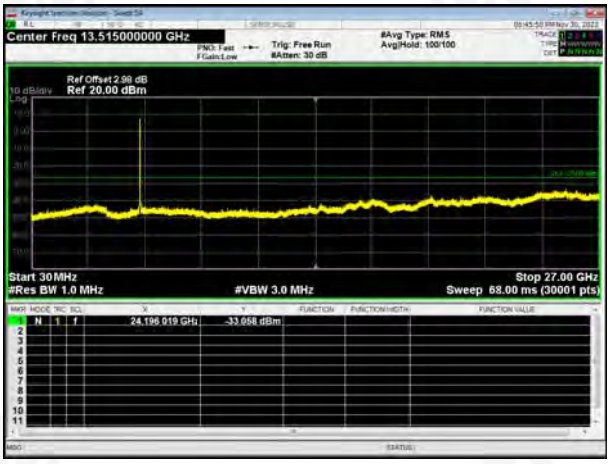


5.2GHz Spurious Emission

802.11ac20 on channel 36 ANT. 1



802.11ac20 on channel 36 ANT. 2



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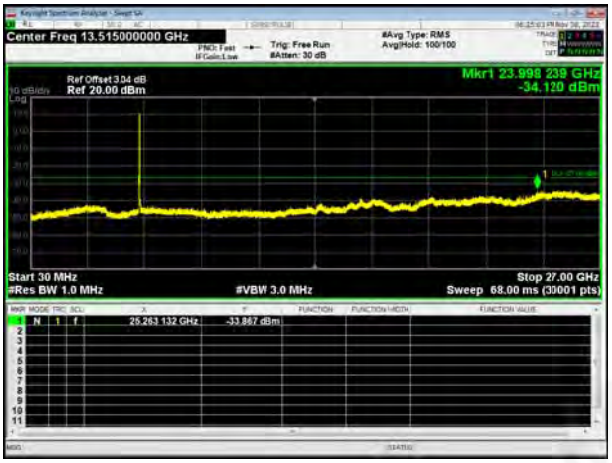
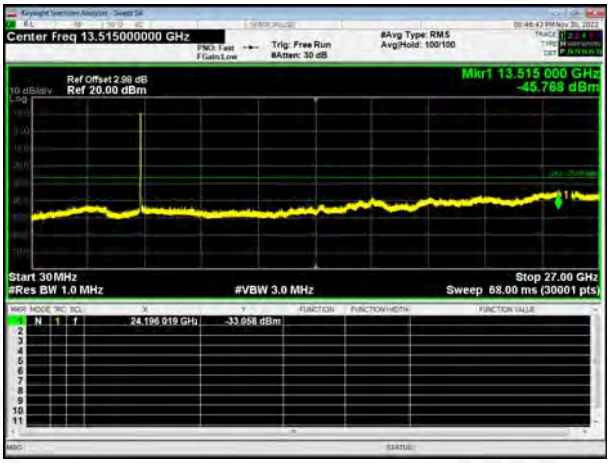
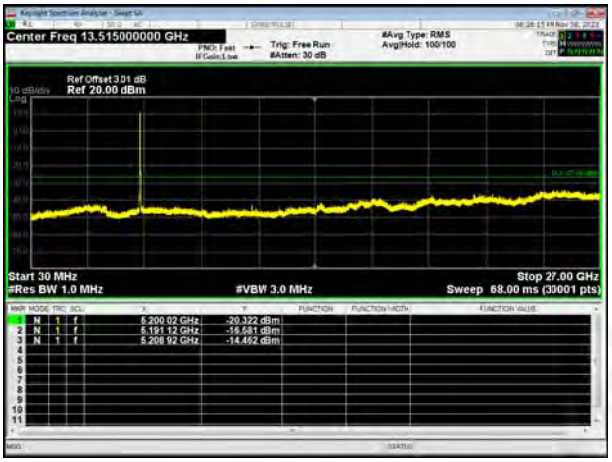


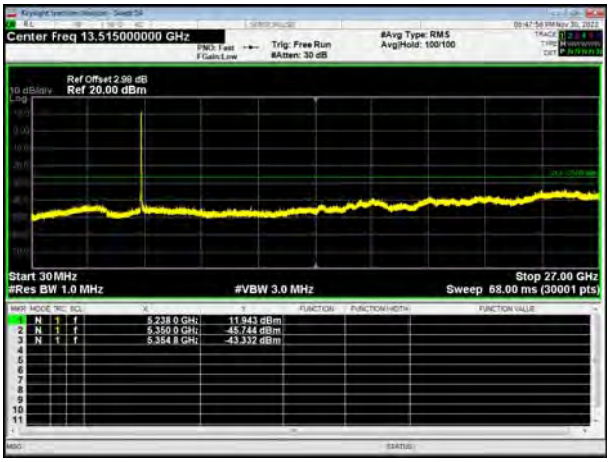
802.11ac20 on channel 40 ANT. 2



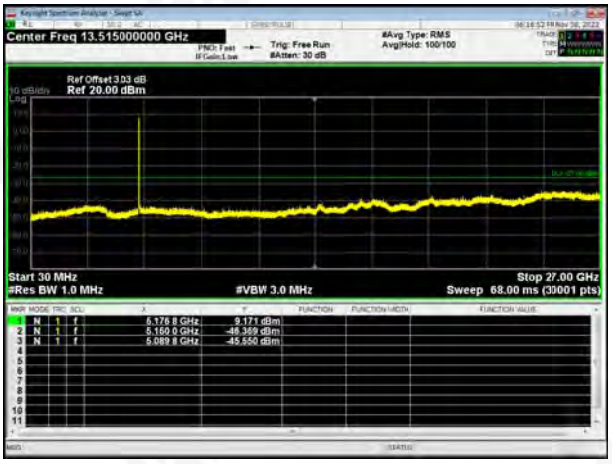
802.11ac20 on channel 48 ANT. 1



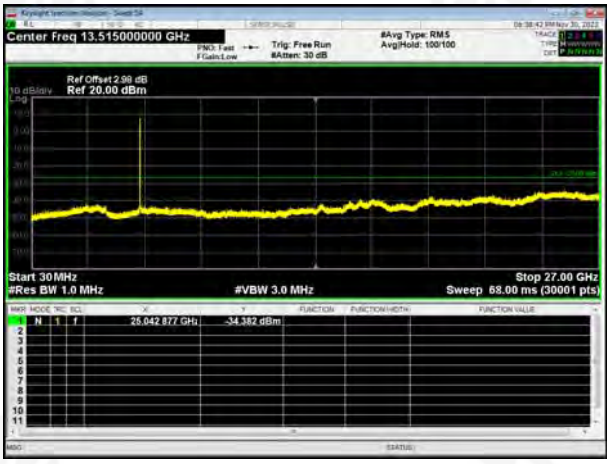
802.11ac20 on channel 48 ANT. 2



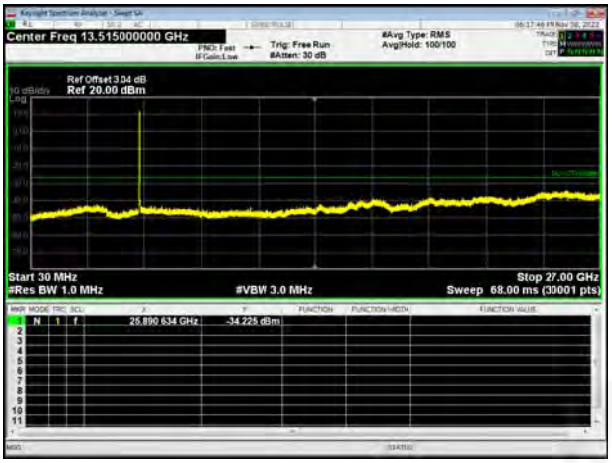
802.11n20 on channel 36 ANT. 1



802.11n20 on channel 36 ANT. 2



802.11n20 on channel 40 ANT. 1



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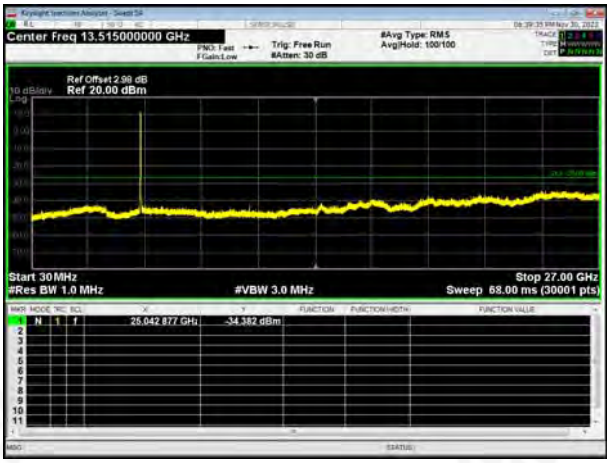
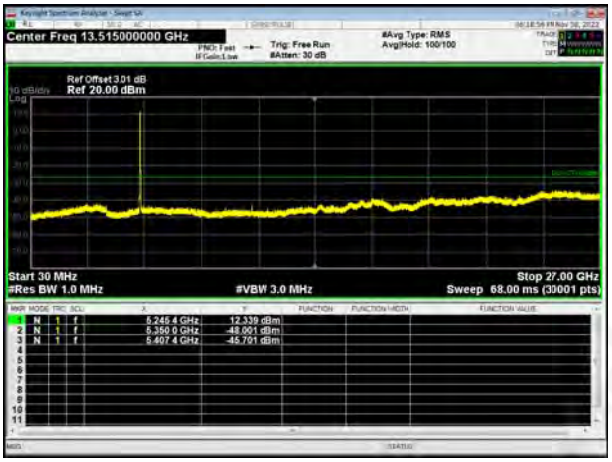
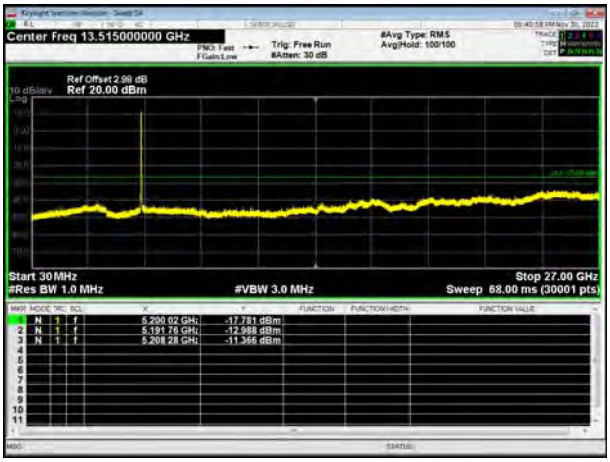


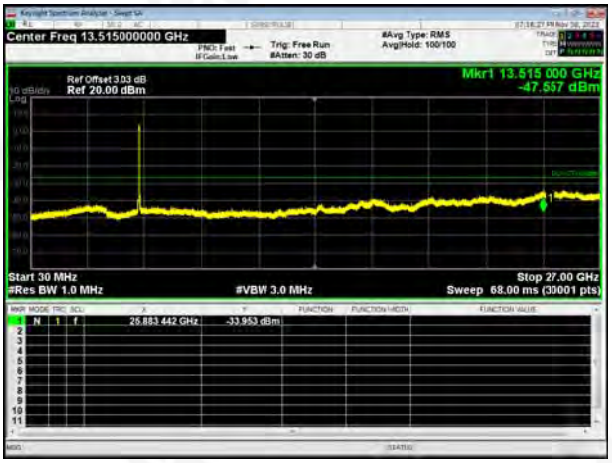
802.11n20 on channel 48 ANT. 1



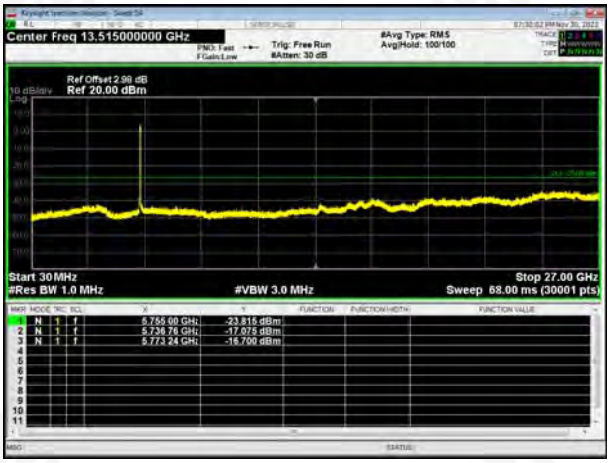
802.11n20 on channel 48 ANT. 2



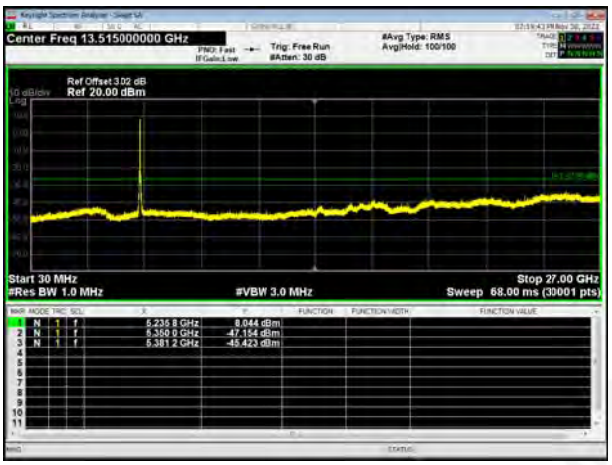
802.11n40 on channel 38ANT. 1



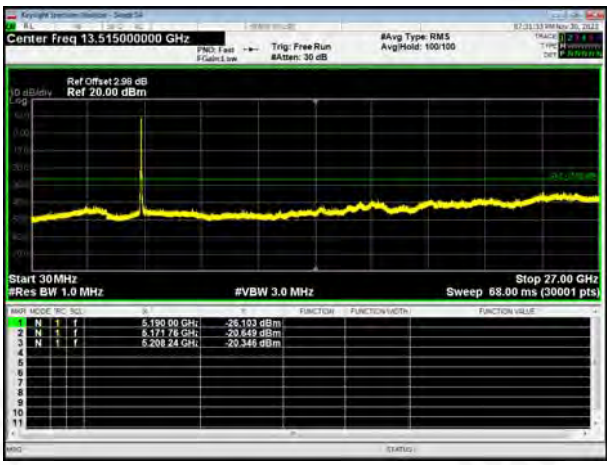
802.11n40 on channel 38ANT. 2



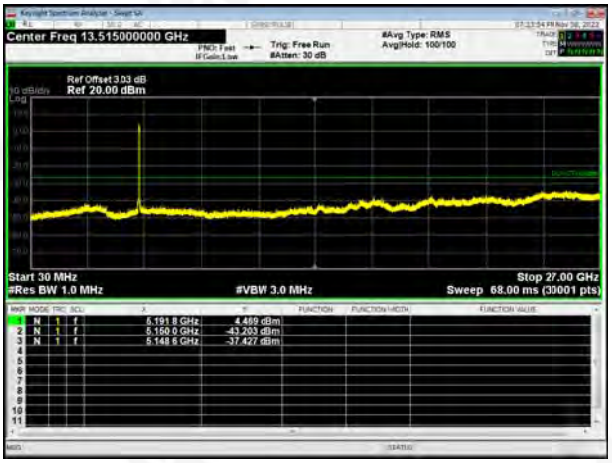
802.11n40 on channel 46ANT. 1



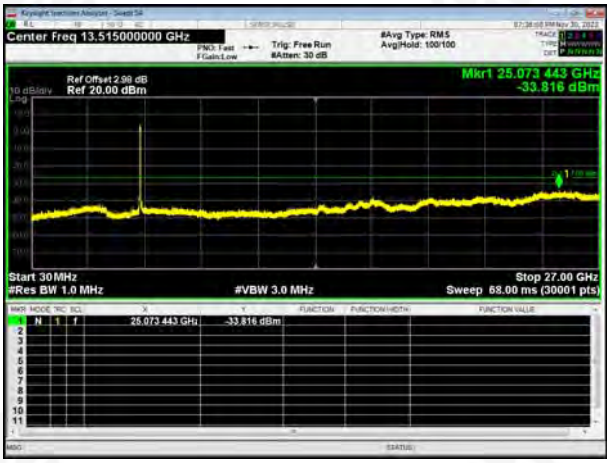
802.11n40 on channel 46ANT. 2



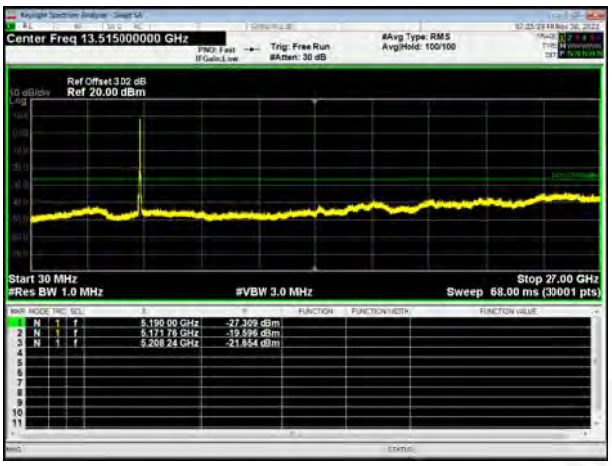
802.11ac40 on channel 38ANT. 1



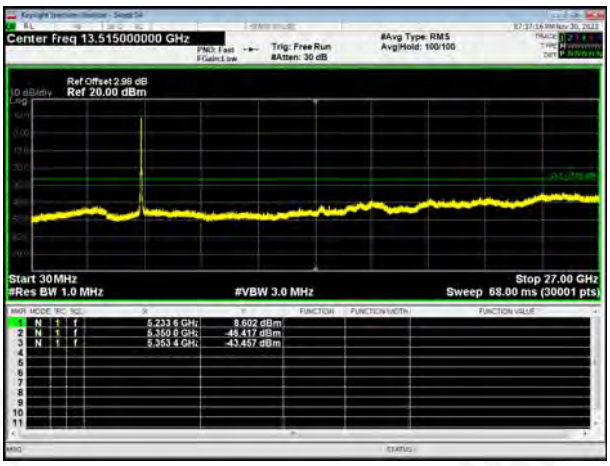
802.11ac40 on channel 38ANT. 2



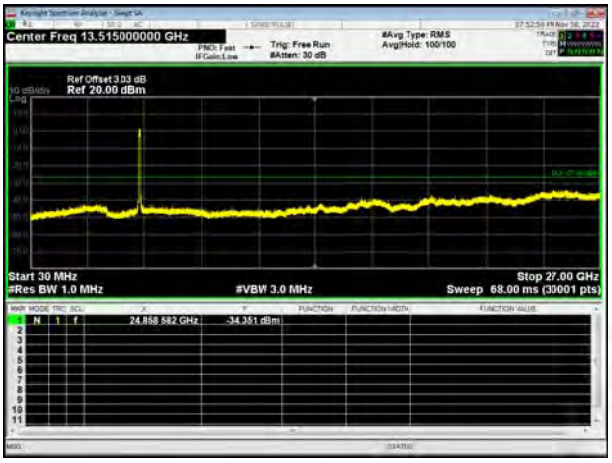
802.11ac40 on channel 46ANT. 1



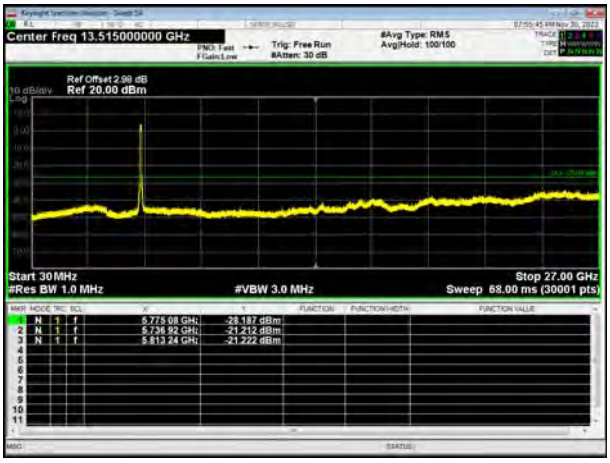
802.11ac40 on channel 46ANT. 2



802.11ac80 on channel 42ANT. 1

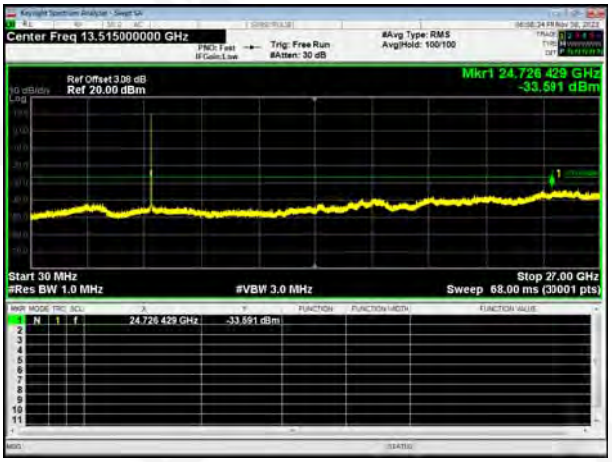


802.11ac80 on channel 42ANT. 2

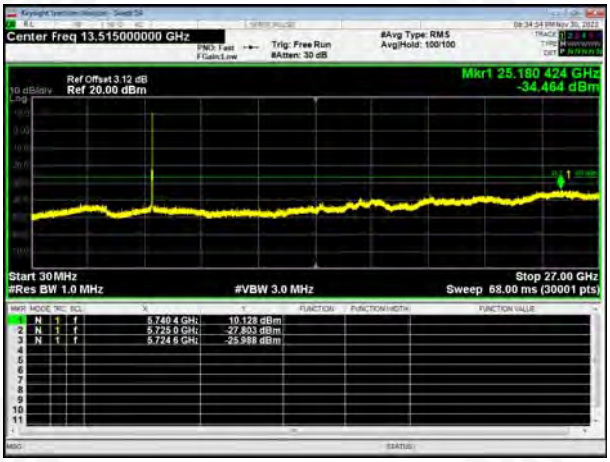


5.8GHz Spurious Emission

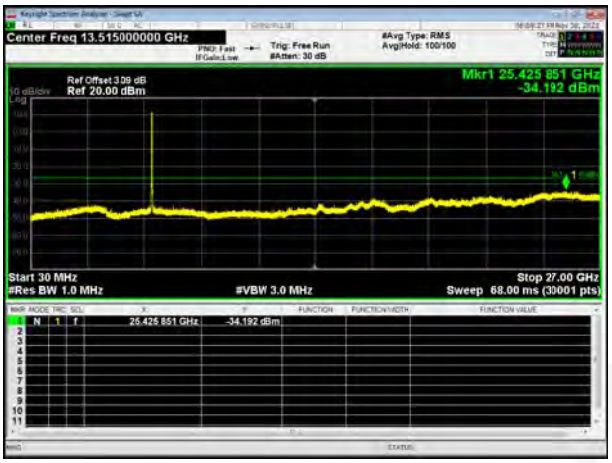
802.11a on channel 149 ANT. 1



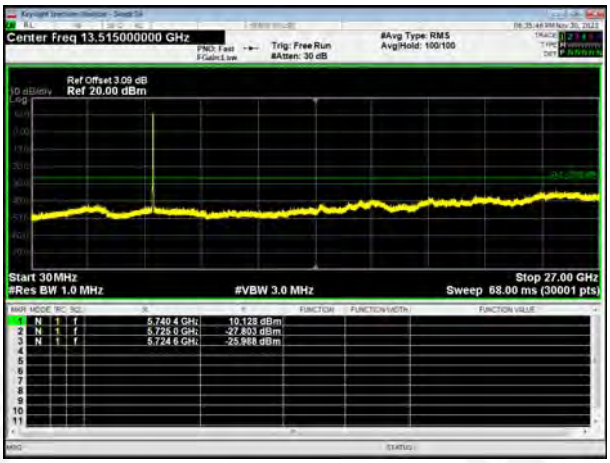
802.11a on channel 149 ANT. 2



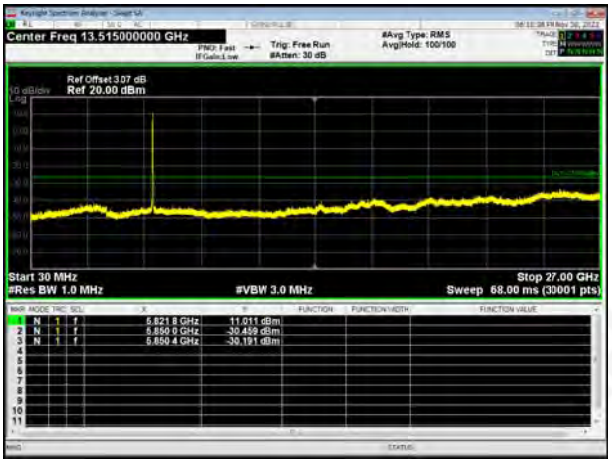
802.11a on channel 157 ANT. 1



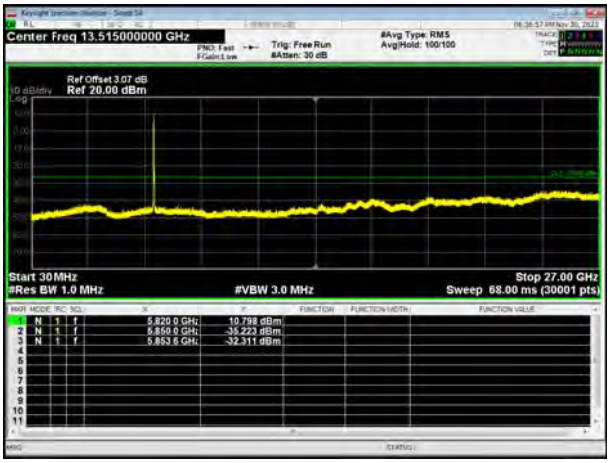
802.11a on channel 157 ANT. 2



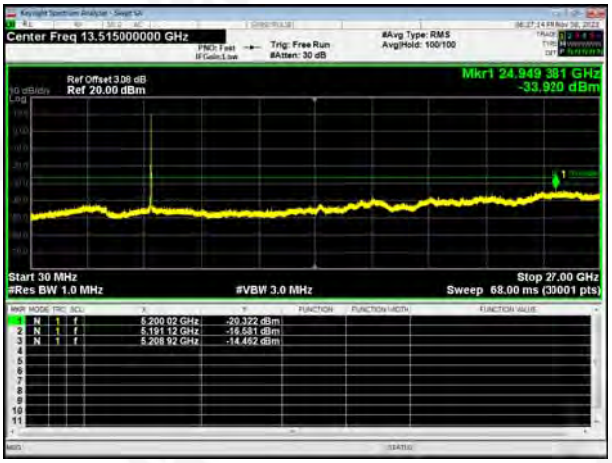
802.11a on channel 165 ANT. 1



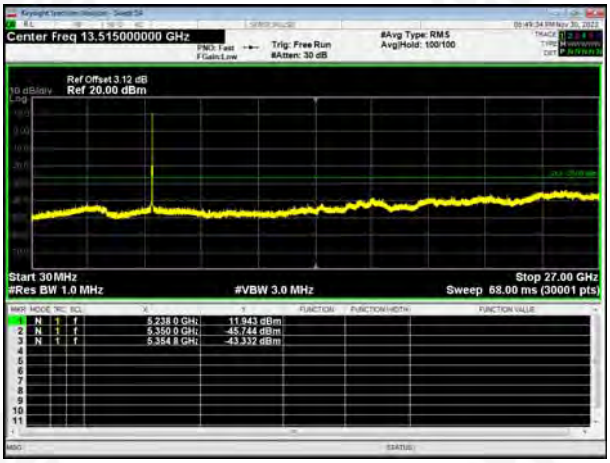
802.11a on channel 165 ANT. 2



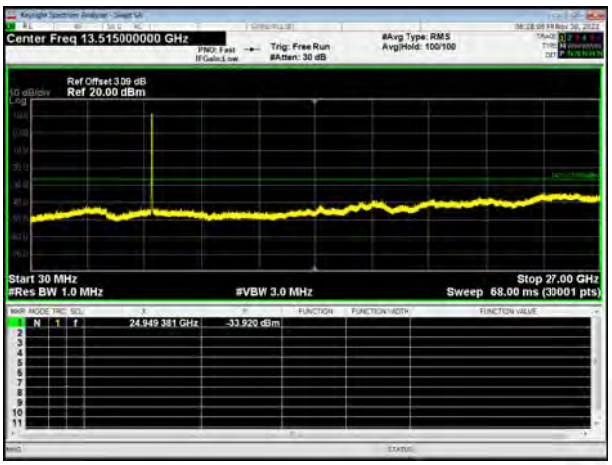
802.11ac20 on channel 149 ANT. 1



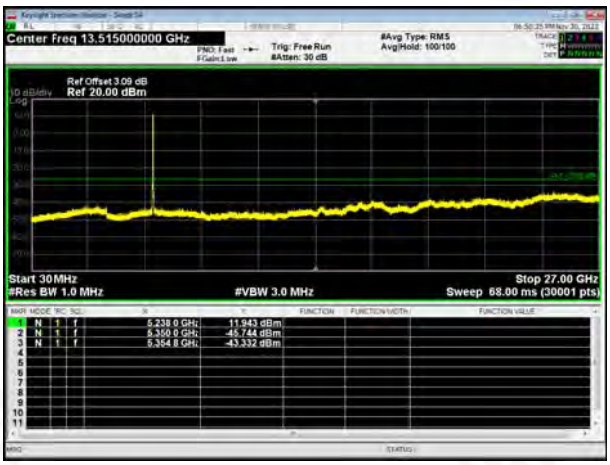
802.11ac20 on channel 149 ANT. 2



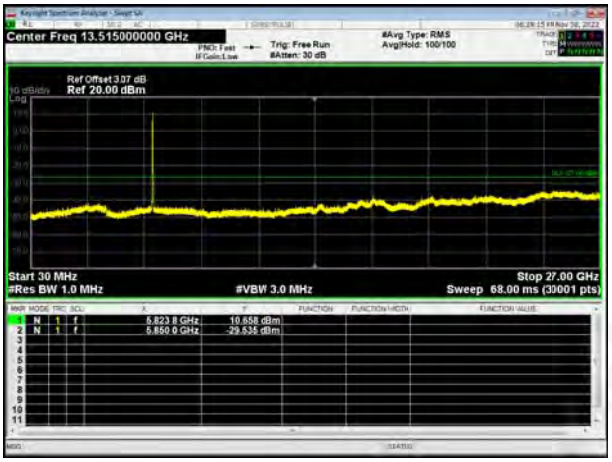
802.11ac20 on channel 157 ANT. 1



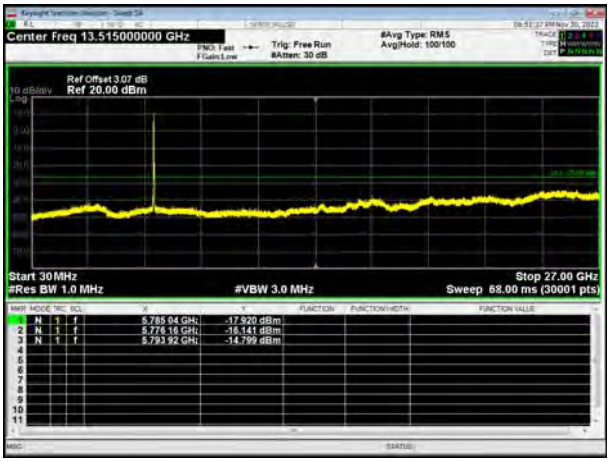
802.11ac20 on channel 157 ANT. 2



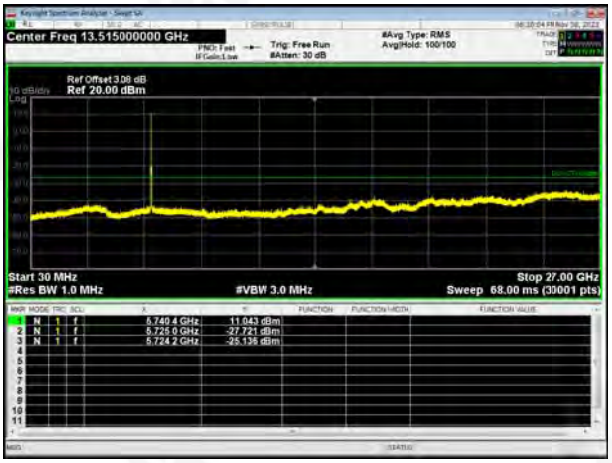
802.11ac20 on channel 165 ANT. 1



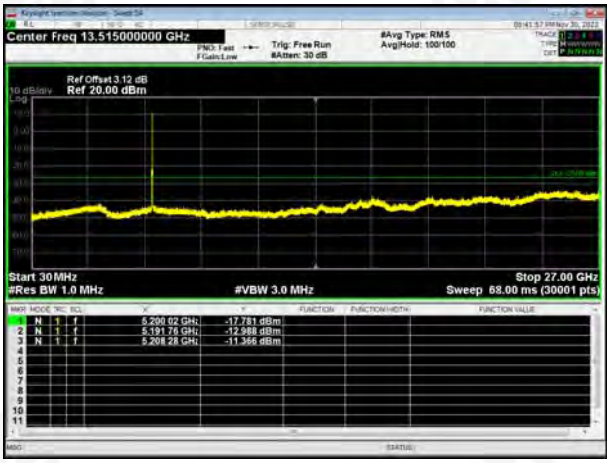
802.11ac20 on channel 165 ANT. 2



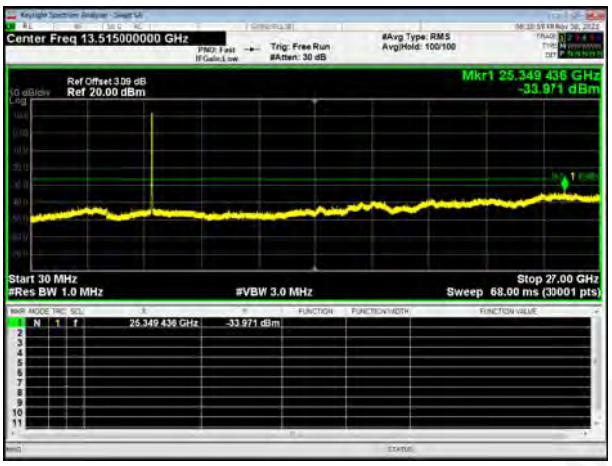
802.11n20 on channel 149 ANT. 1



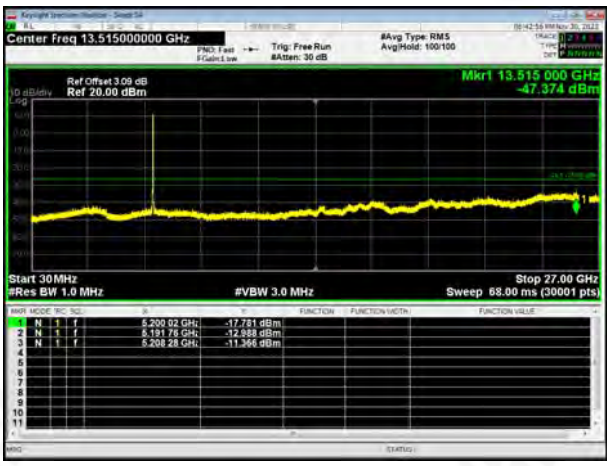
802.11n20 on channel 149 ANT. 2



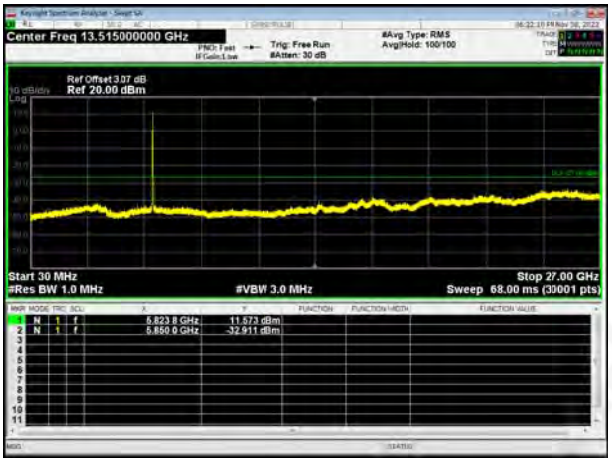
802.11n20 on channel 157 ANT. 1



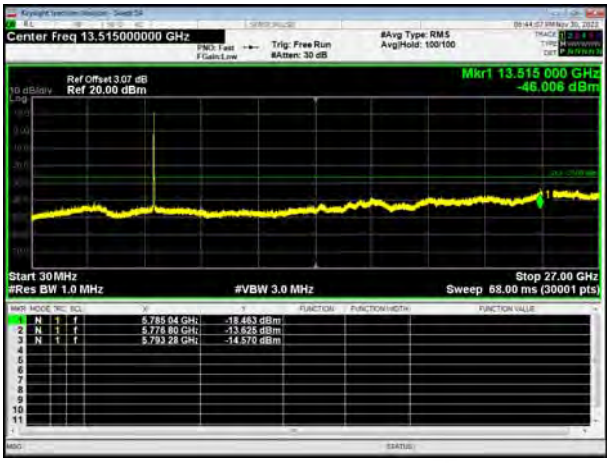
802.11n20 on channel 157 ANT. 2



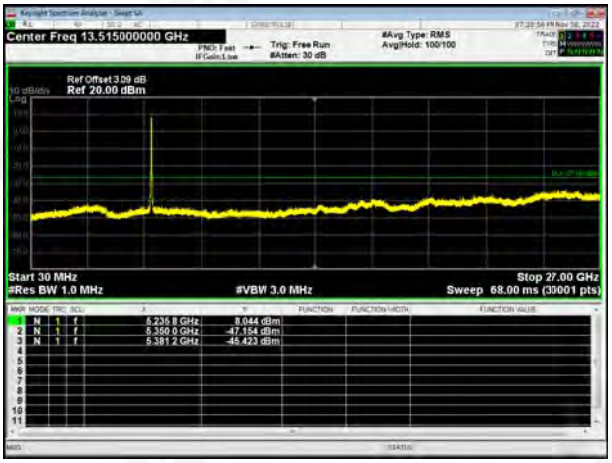
802.11n20 on channel 165 ANT. 1



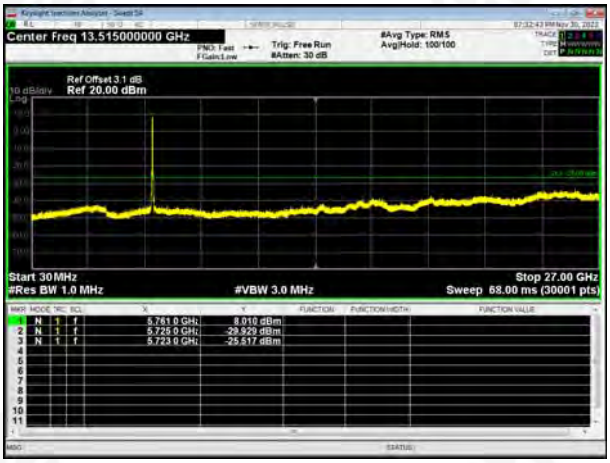
802.11n20 on channel 165 ANT. 2



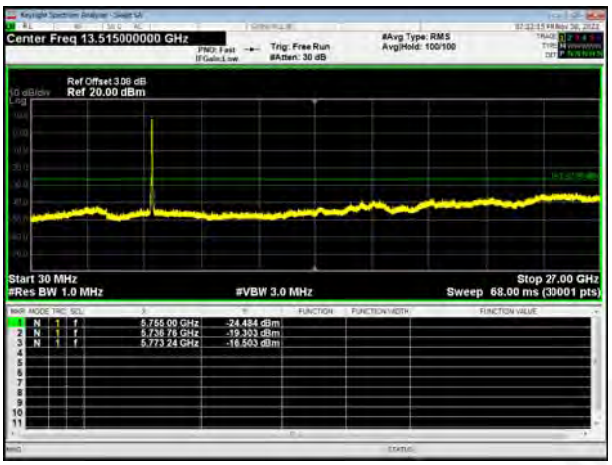
802.11n40 on channel 151 ANT. 1



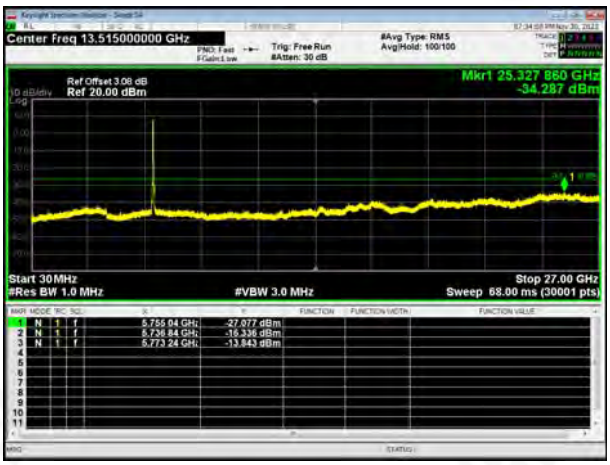
802.11n40 on channel 151ANT. 2



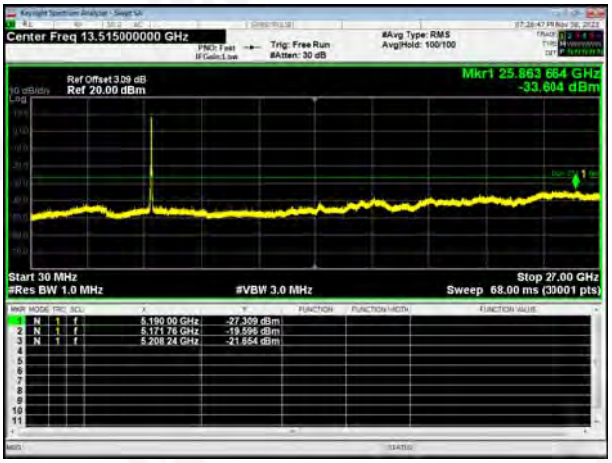
802.11n40 on channel 159ANT. 1



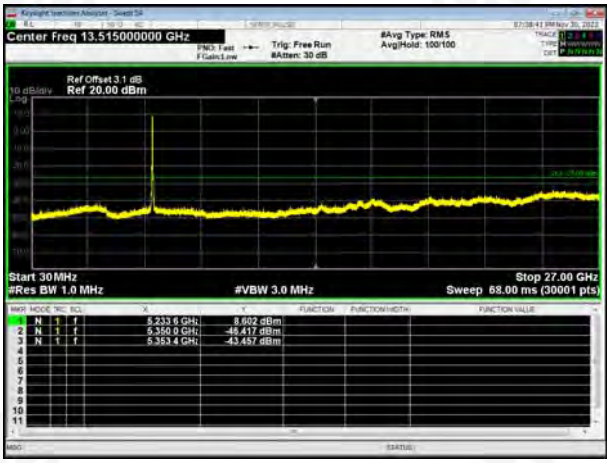
802.11n40 on channel 159ANT. 2



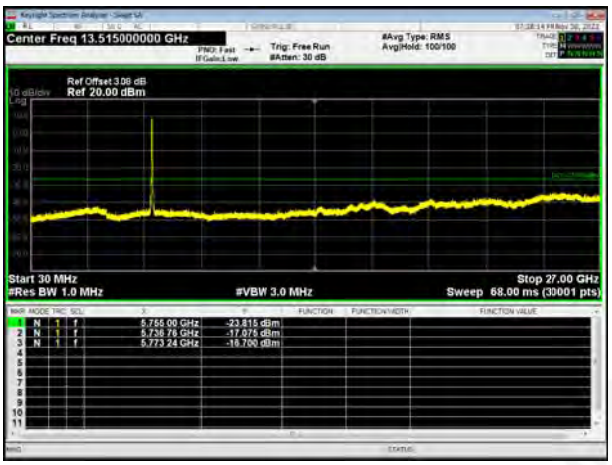
802.11ac40 on channel 151 ANT. 1



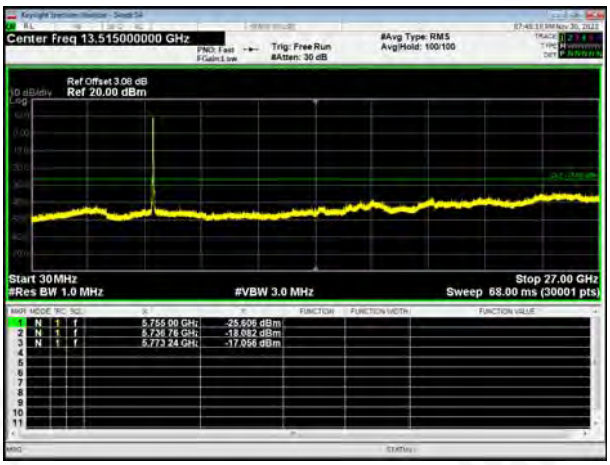
802.11ac40 on channel 151 ANT. 2



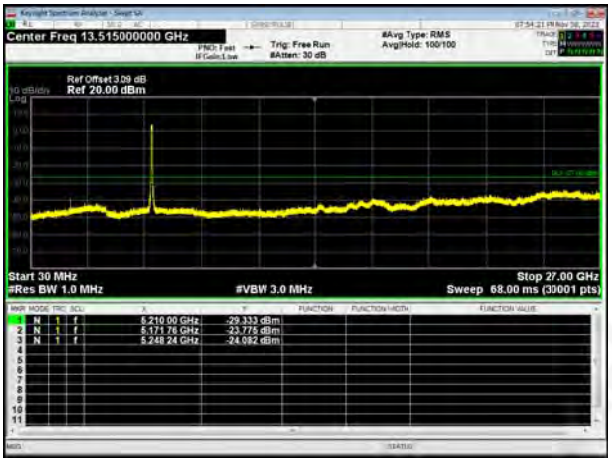
802.11ac40 on channel 159 ANT. 1



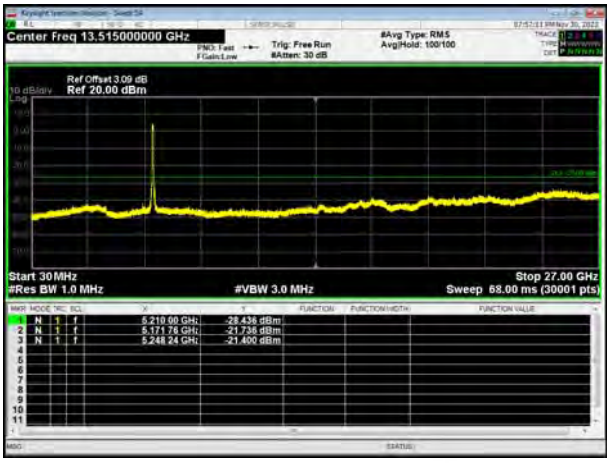
802.11ac40 on channel 159 ANT. 2



802.11ac80 on channel 155 ANT. 1



802.11ac80 on channel 155 ANT. 2



10.Frequency Stability Measurement

10.1 LIMIT

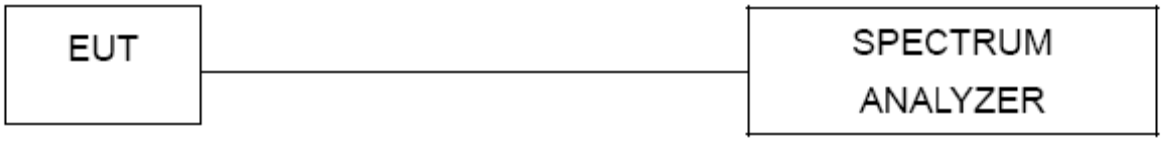
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

10.2 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 106 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C~70°C.

10.3 TEST SETUP LAYOUT



10.4 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously un-modulation transmitting mode.

10.5 TEST RESULTS

Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX		

5.2G

802.11a

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	65	0.01250
40	7.4	37	0.00712
30	7.4	47	0.00904
20	7.4	47	0.00904
10	7.4	38	0.00731
0	7.4	39	0.00750
-10	7.4	38	0.00731
-20	7.4	28	0.00538
-30	7.4	46	0.00885

802.11ac20

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	47	0.00904
40	7.4	34	0.00654
30	7.4	38	0.00731
20	7.4	24	0.00462
10	7.4	23	0.00442
0	7.4	38	0.00731
-10	7.4	48	0.00923
-20	7.4	48	0.00923
-30	7.4	38	0.00731

802.11n_HT20

Reference Frequency(Middle Channel): 5200MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	74	0.01423
40	7.4	37	0.00712
30	7.4	45	0.00865
20	7.4	28	0.00538
10	7.4	89	0.01712
0	7.4	35	0.00673
-10	7.4	63	0.01212
-20	7.4	37	0.00712
-30	7.4	37	0.00712

802.11ac40

Reference Frequency(Middle Channel): 5190MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	37	0.00713
40	7.4	46	0.00886
30	7.4	47	0.00906
20	7.4	23	0.00443
10	7.4	23	0.00443
0	7.4	36	0.00694
-10	7.4	37	0.00713
-20	7.4	28	0.00539
-30	7.4	47	0.00906

802.11n_HT40

Reference Frequency(Middle Channel): 5190MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	37	0.00713
40	7.4	34	0.00655
30	7.4	38	0.00732
20	7.4	47	0.00906
10	7.4	38	0.00732
0	7.4	29	0.00559
-10	7.4	48	0.00925
-20	7.4	37	0.00713
-30	7.4	78	0.01503

802.11ac80

Reference Frequency(Middle Channel): 5210MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	38	0.00729
40	7.4	34	0.00653
30	7.4	46	0.00883
20	7.4	73	0.01401
10	7.4	73	0.01401
0	7.4	26	0.00499
-10	7.4	36	0.00691
-20	7.4	67	0.01286
-30	7.4	83	0.01593

So, Frequency Stability Versus Input Voltage is:

802.11a

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	37	0.00712
	6.6	27	0.00519
	8.4	36	0.00692

802.11ac20

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	36	0.00692
	6.6	38	0.00731
	8.4	38	0.00731

802.11n_HT20

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	48	0.00923
	6.6	28	0.00538
	8.4	29	0.00558

802.11ac40

Reference Frequency(Middle Channel): 5190 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	77	0.01484
	6.6	62	0.01195
	8.4	58	0.01118

802.11n_HT40

Reference Frequency(Middle Channel): 5190 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	28	0.00539
	6.6	63	0.01214
	8.4	12	0.00231

802.11ac80

Reference Frequency(Middle Channel): 5210 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	64	0.01228
	6.6	62	0.01190
	8.4	82	0.01577

5.8G

802.11a

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	73	0.01262
40	7.4	63	0.01089
30	7.4	67	0.01158
20	7.4	34	0.00588
10	7.4	78	0.01348
0	7.4	82	0.01417
-10	7.4	67	0.01158
-20	7.4	63	0.01089
-30	7.4	72	0.01245

802.11ac20

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	63	0.01089
40	7.4	72	0.01245
30	7.4	73	0.01262
20	7.4	26	0.00449
10	7.4	63	0.01089
0	7.4	72	0.01245
-10	7.4	29	0.00501
-20	7.4	72	0.01245
-30	7.4	92	0.01590

802.11n_HT20

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	82	0.01417
40	7.4	62	0.01072
30	7.4	78	0.01348
20	7.4	73	0.01262
10	7.4	23	0.00398
0	7.4	23	0.00398
-10	7.4	63	0.01089
-20	7.4	37	0.00640
-30	7.4	28	0.00484

802.11ac40

Reference Frequency(Middle Channel): 5755 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	63	0.01095
40	7.4	26	0.00452
30	7.4	36	0.00626
20	7.4	47	0.00817
10	7.4	28	0.00487
0	7.4	67	0.01164
-10	7.4	83	0.01442
-20	7.4	72	0.01251
-30	7.4	23	0.00400

802.11n_HT40

Reference Frequency(Middle Channel): 5755 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	63	0.01095
40	7.4	72	0.01251
30	7.4	28	0.00487
20	7.4	36	0.00626
10	7.4	19	0.00330
0	7.4	37	0.00643
-10	7.4	37	0.00643
-20	7.4	47	0.00817
-30	7.4	27	0.00469

802.11ac80

Reference Frequency(Middle Channel): 5775 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	7.4	27	0.00468
40	7.4	38	0.00658
30	7.4	23	0.00398
20	7.4	47	0.00814
10	7.4	23	0.00398
0	7.4	49	0.00848
-10	7.4	37	0.00641
-20	7.4	45	0.00779
-30	7.4	23	0.00398

So, Frequency Stability Versus Input Voltage is:

802.11a

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	34	0.00588
	6.6	23	0.00398
	8.4	38	0.00657

802.11ac20

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	74	0.01279
	6.6	47	0.00812
	8.4	37	0.00640

802.11n_HT20

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	23	0.00398
	6.6	12	0.00207
	8.4	27	0.00467

802.11ac40

Reference Frequency(Middle Channel): 5755 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	83	0.01442
	6.6	34	0.00591
	8.4	63	0.01095

802.11n_HT40

Reference Frequency(Middle Channel): 5755 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	45	0.00782
	6.6	34	0.00591
	8.4	39	0.00678

802.11ac80

Reference Frequency(Middle Channel): 5775 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	7.4	64	0.01108
	6.6	53	0.00918
	8.4	52	0.00900

11.ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203
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.	
EUT Antenna:	
The antenna is FPCBAntenna, the best case gain of the ANT. 1 is 0dBi and ANT. 2 is 0dBi, reference to the Internal Photos for details	

12. TEST SETUP PHOTO

Reference to the Test SetupPhotos.

13. EUT CONSTRUCTIONAL DETAILS

Reference to the External Photos and Internal Photos.

※※※※※ END OF REPORT ※※※※※