FCC TEST REPORT
FCC ID:2AL6KBL-M7663BU1

Report Number	ZKT-2109024660E-2
Date of Test	Sep. 02, 2021 to Sep. 16, 2021
Date of issue	Sep. 16, 2021
Total number of pages	93
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 Bilian Electronic Co.,Ltd.**
Address	Room 501, Building 3, No. 32, Dafu Road, Zhangge Community, Fucheng Street, Longhua District, Shenzhen City
Manufacturer's name	**Shenzhen Bilian Electronic Co.,Ltd.**
Address	Room 501, Building 3, No. 32, Dafu Road, Zhangge Community, Fucheng Street, Longhua District, Shenzhen City
Test specification:	
Standard	FCC CFR Title 47 Part 15 Subpart C Section 15.407 ANSI C63.10:2013 KDB 789033 D02 v01r02
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	**IEEE 802.11a/b/g/n/ac 867Mbps WLAN + Bluetooth v5.1 USB Combo Module**
Trademark	N/A
Model/Type reference	BL-M7663BU1
Ratings	Input: DC 3.3V

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) ..... :	Alen He
Reviewer (name + signature)..... :	Joe Liu
Approved (name + signature) ..... :	Lake Xie

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1. VERSION

Report No.	Version	Description	Approved
ZKT-2109024660E-2	Rev.01	Initial issue of report	Sep. 16, 2021

2.SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.209(a), 15.407 (b)(1) 15.407 (b)(4) 15.407 (b)(8)	Spurious Radiated Emissions	PASS	
15.207	Conducted Emission	PASS	
15.407 (a)(12) 15.1049	26 dB and 99% Emission Bandwidth	PASS	
15.407(e)	6 dB bandwidth	N/A	
15.407 (a)(1) 15.407 (a)(3)	Maximum Conducted Output Power	PASS	
2.1051, 15.407(b)(1) 15.407(b)(4)	Band Edge	PASS	
15.407 (a)(1) 15.407 (a)(3)	Power Spectral Density	PASS	
2.1051, 15.407(b)	Spurious Emissions at Antenna Terminals	PASS	
15.203	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

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	humidity uncertainty	U=5.3%
8	Temperature uncertainty	U=0.59℃
9	Radiated disturbance(30MHz-1000MHz)	U=4.8dB
10	Radiated disturbance(1GHz-6GHz)	U=4.9dB
11	Radiated disturbance(1GHz-18GHz)	U=5.0dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN + Bluetooth v5.1 USB Combo Module	
Model No.:	BL-M7663BU1	
Model Different.:	N/A	
Serial No.:	N/A	
Product Description	IEEE 802.11 WLAN Mode Supported	☒802.11a/n/ac (20MHz channel bandwidth) ☒802.11n/ac (40MHz channel bandwidth) ☒802.11ac(80MHz channel bandwidth)
	Data Rate	802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n (HT20): MCS0~MCS7(1T1R_SISO) 6.5~72.2Mbps; 802.11n (HT20): MCS8~MCS15(2T2R_MIMO) 13~144.4Mbps; 802.11n (HT40): MCS0~MCS7(1T1R) 13.5~150Mbps; 802.11n (HT40): MCS8~MCS15(2T2R) 27~300Mbps; 802.11ac (VHT20): MCS0~MCS8(1T1R) 6.5~86.7Mbps; 802.11ac (VHT20): MCS0~MCS8(2T2R) 13~173.3Mbps; 802.11ac (VHT40): MCS0~MCS9(1T1R)13.5~200Mbps; 802.11ac (VHT40): MCS0~MCS9(2T2R)27~400Mbps; 802.11ac (VHT80): MCS0~MCS9(1T1R)29.3~433.3Mbps; 802.11ac (VHT80): MCS0~MCS9(2T2R)58.5~866.7Mbps;
	Modulation	802.11a (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11ac (OFDM): BPSK, QPSK, QAM16, QAM64, QAM256;
	Operating Frequency Range	☒5180-5240MHz for 802.11a/n(HT20)/ac20; 5190-5230MHz for 802.11n(HT40)/ac40; 5210MHz for 802.11 ac80; ☒5745-5825 MHz for 802.11a/n(HT20)/ac20; 5755-5795 MHz for 802.11a/n(HT40)/ac40; 5775MHz for 802.11 ac80;
	Number of Channels	☒4 channels for 802.11a/n20/ac20 in the 5180-5240MHz band ; 2 channels for 802.11 n40/ac40 in the 5190-5230 MHz band ; 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:	External Antenna 1 External Antenna 2	
Worst Case：	The 5.2G,5.8G WIFI can MIMO transmitting for External Antenna 1	

	and External Antenna 2. The report only record the worst data, and the worst data is the External Antenna 1.
Antenna gain:	Antenna 1: 2dBi Antenna 2: 2dBi MIMO Antenna 1+ Antenna 2: 5.01dBi
Power supply:	Input: DC 3.3V
SWITCHING POWER ADAPTER:	N/A

The antenna information of EUT

ANT NO.	Brand	Model Name	ANT Tape	Connector	Gain(dBi)
1	-	-	External	-	2
2	-	-	External	-	2

(1) The EUT can work as CDD mode in IEEE 802.11n and IEEE 802.11a,and can operate with one spatial stream.
According to KDB 662911 F 2) f) (i):
Directional gain=2dBi+10×log(2/1)dB=**5.01dBi<6dBi**
So,the output power limit and power spectral density should **not** be reduced.

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

802.11a/n/ac(20MHz) Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220	-	-	-	-
40	5200	48	5240	-	-	-	-
802.11n /ac(40MHz) Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	-	-	-	-	-	-
46	5230	-	-	-	-	-	-

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

802.11a/n/ac(20 MHz) Frequency Channel							
Channel	Frequenc y (MHz)	Channel	Frequenc y (MHz)	Channel	Frequenc y (MHz)	Channel	Frequenc y (MHz)
149	5745	153	5765	157	5785	161	5805
165	5825	-	-	-	-	-	-

802.11n/ac 40MHz Frequency Channel					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795	-	-

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

The External Antenna 2 support for 5.2G and 5.8G, no transmitting at the same time.

3.2 DESCRIPTION OF TEST MODES

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the duty cycle >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 CH36/ CH40/ CH 48 802.11a /n 20 CH149/ CH157/ CH 165
Mode 2	802.11n 40 CH38/ CH 46 802.11n 40 CH 151 / CH 159
Mode 3	802.11 ac80 CH 42/CH 155
Mode 4	802.11a / n 20 CH36/ CH40/ CH 48 802.11a /n 20 CH149/ CH157/ CH 165
Mode 5	Link Mode

Conducted Emission	
Final Test Mode	Description
Mode 5	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a / n 20 CH36/ CH40/ CH 48 802.11a /n 20 CH149/ CH157/ CH 165
Mode 2	802.11n 40 CH38/ CH 46 802.11n 40 CH 151 / CH 159
Mode 3	802.11 ac80 CH 42/CH 155
Mode 4	802.11a / n 20 CH36/ CH40/ CH 48 802.11a /n 20 CH149/ CH157/ CH 165

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

Test Software	Realtek Test Tool
Power level setup	<8dBm

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission

DC 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	IEEE 802.11a/b/g/n/ac 867Mbps WLAN + Bluetooth v5.1 USB Combo Module	N/A	BL-M7663BU1	N/A	EUT
E-2	Notebook	ASUS	X542UR8250	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	MY45109572	Sep. 22, 2020	Sep. 21, 2021
2	Spectrum Analyzer (1GHz-40GHz)	Agilent	E4446A	100363	Sep. 22, 2020	Sep. 21, 2021
3	Test Receiver (9kHz-7GHz)	R&S	ESCI7	101169	Sep. 22, 2020	Sep. 21, 2021
4	Bilog Antenna (30MHz-1400MHz)	Schwarzbeck	VULB9168	00877	Sep. 22, 2020	Sep. 21, 2021
5	Horn Antenna (1GHz-18GHz)	SCHWARZBECK	BBHA9120D	1541	Sep. 22, 2020	Sep. 21, 2021
6	Horn Antenna (18GHz-40GHz)	A.H. System	SAS-574	588	Sep. 22, 2020	Sep. 21, 2021
7	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	N/A	Sep. 22, 2020	Sep. 21, 2021
8	Amplifier (1GHz-40GHz)	全聚达	DLE-161	097	Sep. 22, 2020	Sep. 21, 2021
9	Loop Antenna (9KHz-30MHz)	SCHWARZBECK	FMZB1519B	014	Sep. 22, 2020	Sep. 21, 2021
10	RF cables1 (9kHz-30MHz)	N/A	9kHz-30MHz	N/A	Sep. 22, 2020	Sep. 21, 2021
11	RF cables2 (30MHz-1GHz)	N/A	30MHz-1GHz	N/A	Sep. 22, 2020	Sep. 21, 2021
12	RF cables3 (1GHz-40GHz)	N/A	1GHz-40GHz	N/A	Sep. 22, 2020	Sep. 21, 2021
13	CMW500 Test	R&S	CMW500	106504	Sep. 22, 2020	Sep. 21, 2021
14	ESG Signal Generator	Agilent	E4421B	GB40051203	Sep. 22, 2020	Sep. 21, 2021
15	Signal Generator	Agilent	N5182A	MY47420215	Sep. 22, 2020	Sep. 21, 2021
16	D.C. Power Supply	LongWei	TPR-6405D	\	\	\
17	Software	Frad	EZ-EMC	FA-03A2 RE	\	\

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Sep. 22, 2020	Sep. 21, 2021
2	LISN	CYBERTEK	EM5040A	E1850400149	Sep. 22, 2020	Sep. 21, 2021
3	Test Cable	N/A	C01	N/A	Sep. 22, 2020	Sep. 21, 2021
4	Test Cable	N/A	C02	N/A	Sep. 22, 2020	Sep. 21, 2021
5	EMI Test Receiver	R&S	ESRP3	101946	Sep. 22, 2020	Sep. 21, 2021
6	Absorbing Clamp	DZ	ZN23201	N/A	Sep. 22, 2020	Sep. 21, 2021

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.

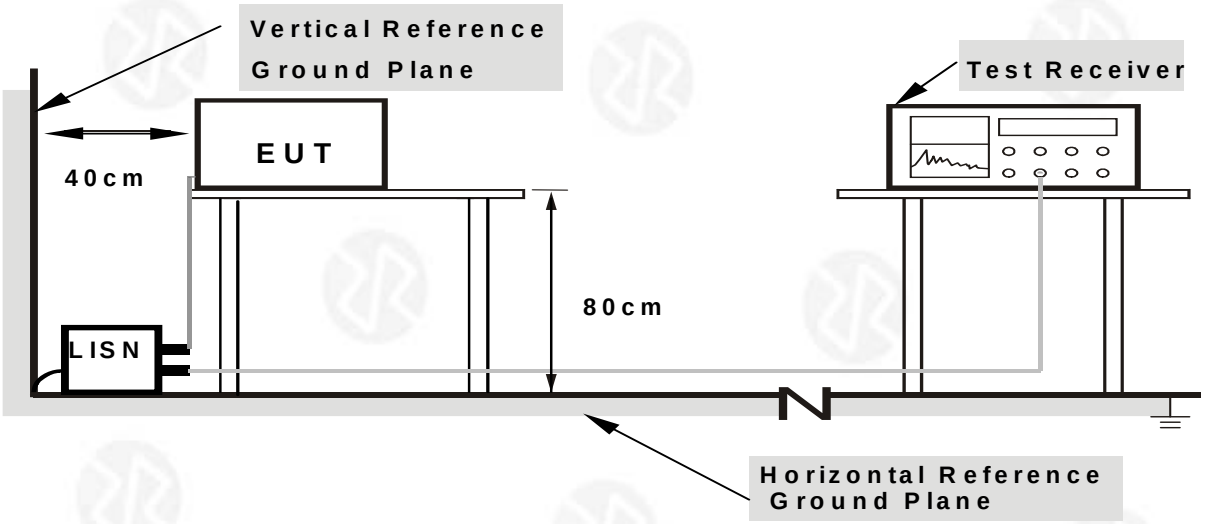
d. LISN at least 80 cm from nearest part of EUT chassis.

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

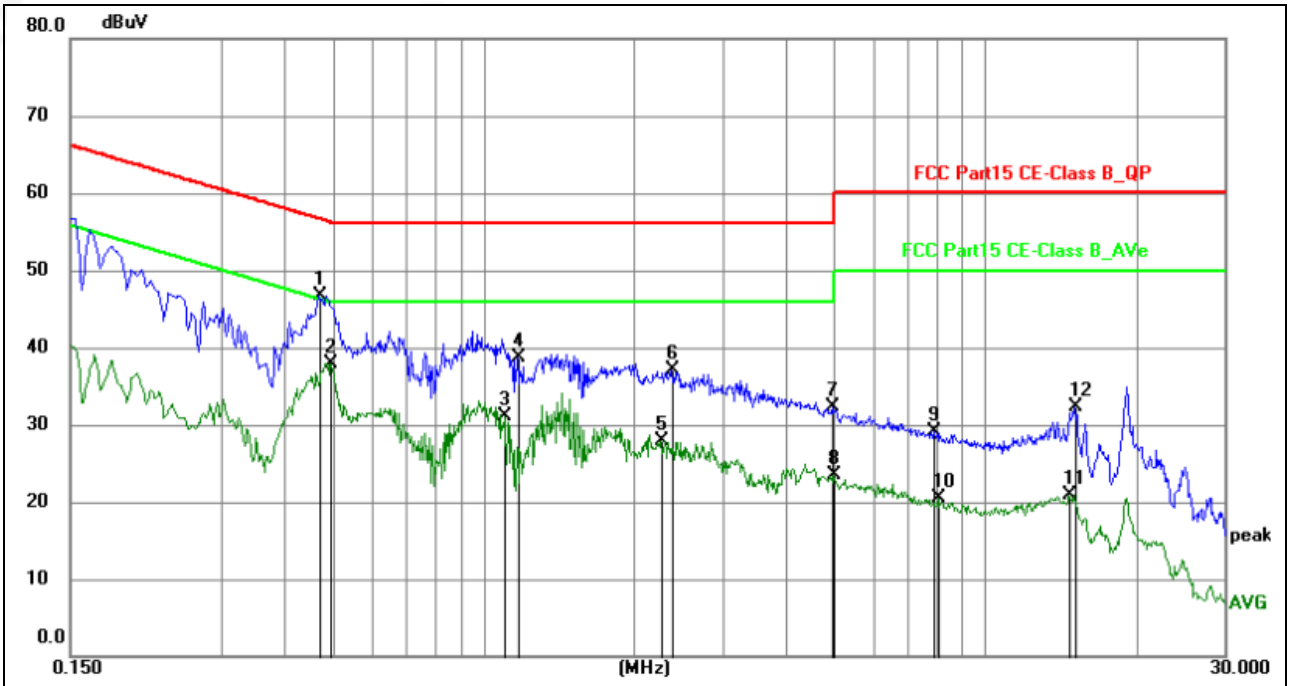
4.1.5 EUT OPERATING CONDITIONS

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.

We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

4.1.6 错误！未指定书签。TEST RESULTS

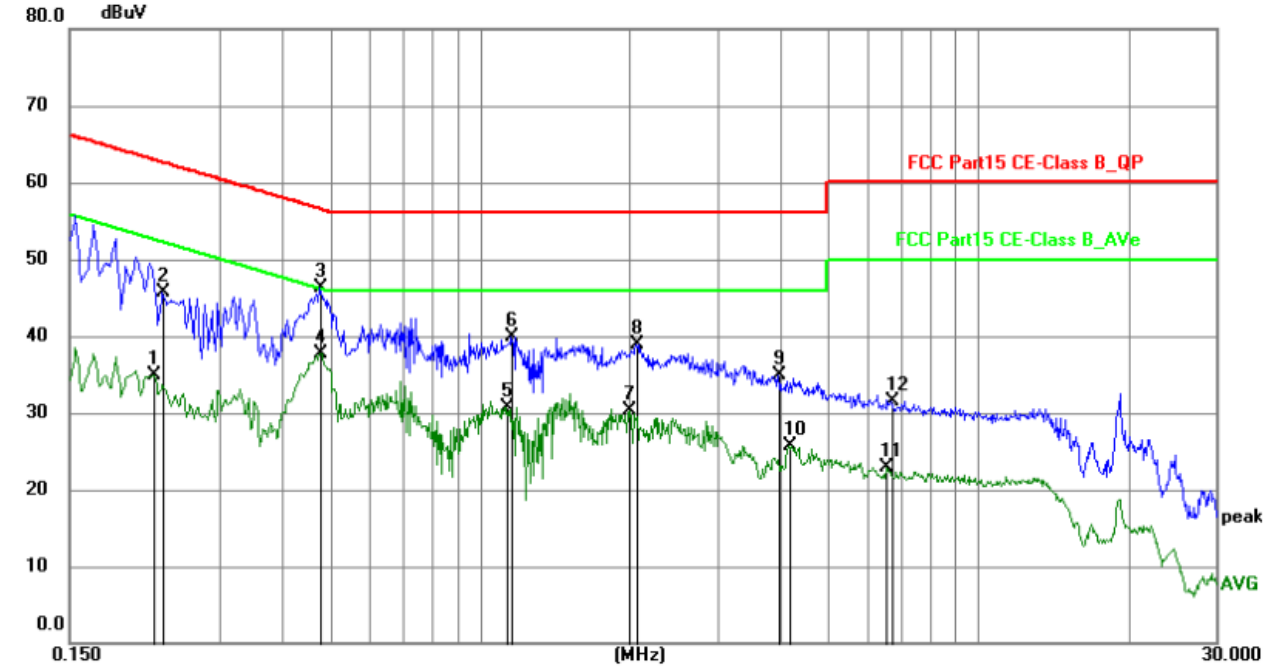
Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Phase：	L
Test Voltage ：	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.4695	35.98	10.68	46.66	56.52	-9.86	QP	P	
2	0.4965	27.43	10.56	37.99	46.06	-8.07	AVG	P	
3	1.1040	20.69	10.41	31.10	46.00	-14.90	AVG	P	
4	1.1670	28.36	10.40	38.76	56.00	-17.24	QP	P	
5	2.2605	17.79	10.12	27.91	46.00	-18.09	AVG	P	
6	2.3820	26.93	10.09	37.02	56.00	-18.98	QP	P	
7	4.9694	23.64	8.67	32.31	56.00	-23.69	QP	P	
8	4.9785	14.75	8.66	23.41	46.00	-22.59	AVG	P	
9	7.9170	20.65	8.54	29.19	60.00	-30.81	QP	P	
10	8.0970	11.90	8.54	20.44	50.00	-29.56	AVG	P	
11	14.7030	11.83	9.12	20.95	50.00	-29.05	AVG	P	
12	15.1170	23.20	9.18	32.38	60.00	-27.62	QP	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	0.2220	23.15	11.82	34.97	52.74	-17.77	AVG	P	
2	0.2310	33.90	11.78	45.68	62.41	-16.73	QP	P	
3	0.4785	35.69	10.64	46.33	56.37	-10.04	QP	P	
4	0.4785	27.10	10.64	37.74	46.37	-8.63	AVG	P	
5	1.1310	20.32	10.41	30.73	46.00	-15.27	AVG	P	
6	1.1580	29.51	10.40	39.91	56.00	-16.09	QP	P	
7	1.9950	20.04	10.19	30.23	46.00	-15.77	AVG	P	
8	2.0625	28.78	10.17	38.95	56.00	-17.05	QP	P	
9	3.9750	25.50	9.31	34.81	56.00	-21.19	QP	P	
10	4.1730	16.52	9.19	25.71	46.00	-20.29	AVG	P	
11	6.5534	14.28	8.59	22.87	50.00	-27.13	AVG	P	
12	6.7200	22.94	8.58	31.52	60.00	-28.48	QP	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

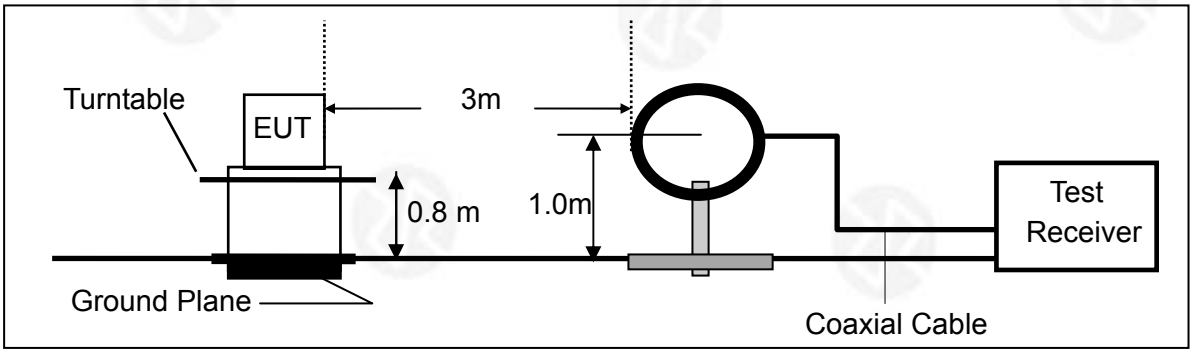
Remark :1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

4.2.3 MEASURING INSTRUMENTS

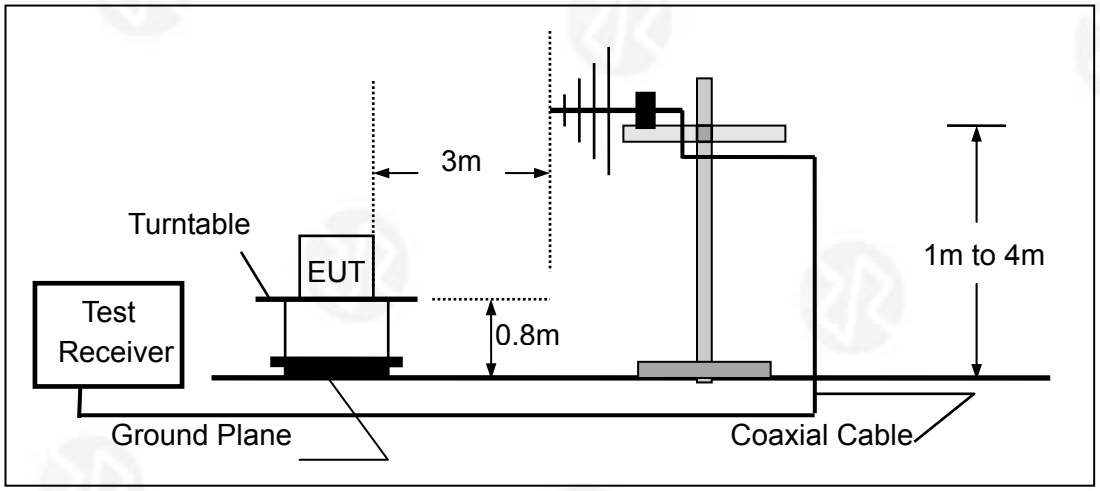
The Measuring equipment is listed in the section 6.3 of this test report.

4.2.4 TEST CONFIGURATION

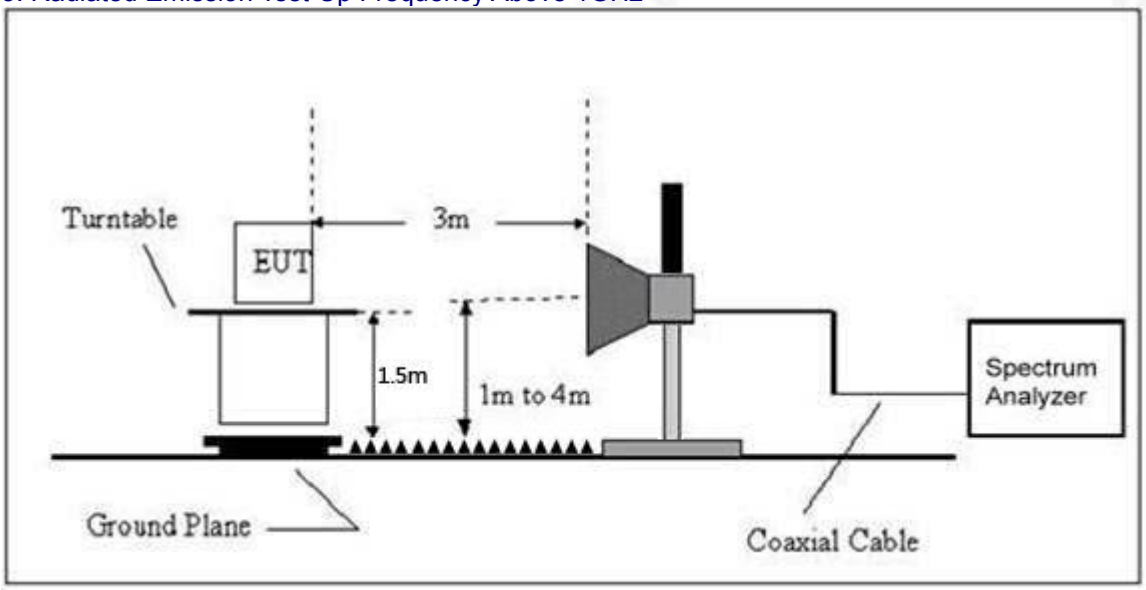
1.For radiated emissions below 30MHz



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.

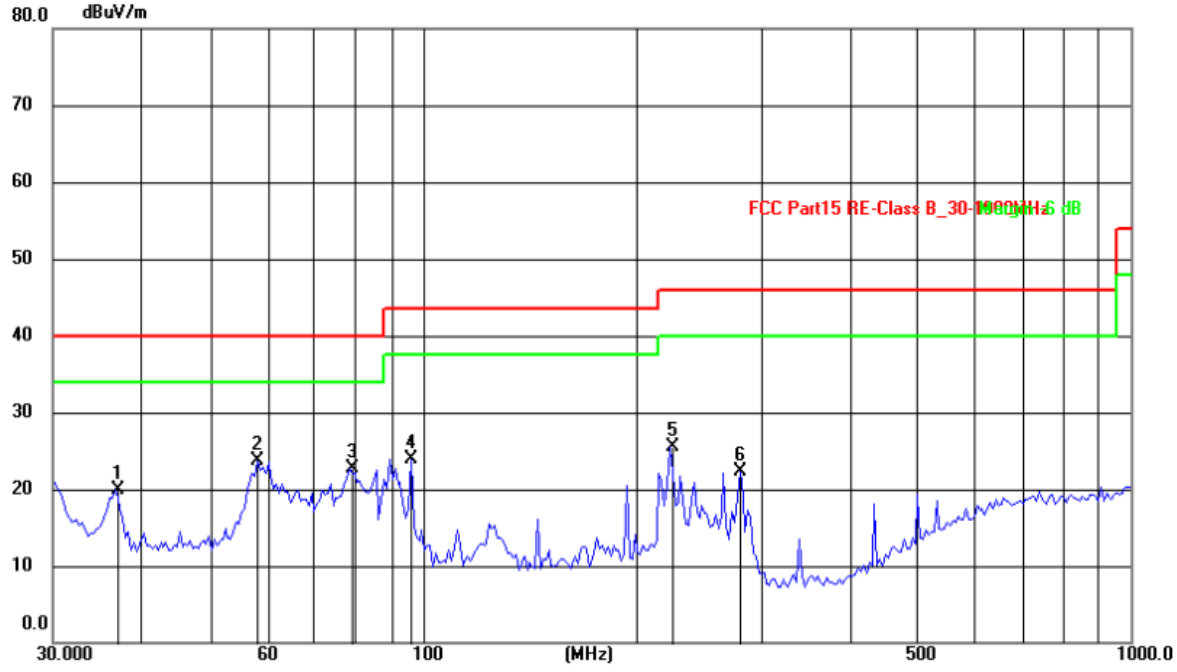
4.2.6 TEST RESULT

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.

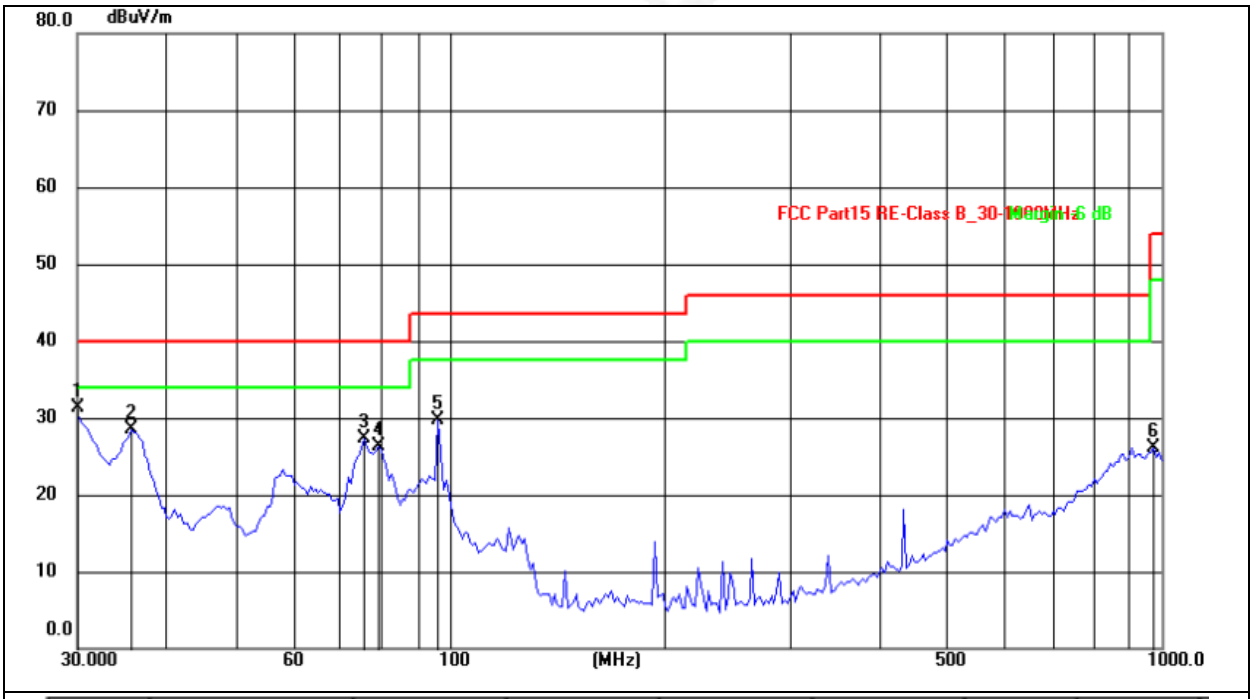
Between 30MHz – 1GHz

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
1	36.7018	34.54	-14.73	19.81	40.00	-20.19	QP
2	58.4074	37.88	-14.21	23.67	40.00	-16.33	QP
3	78.6888	41.78	-19.12	22.66	40.00	-17.34	QP
4	96.2672	43.90	-19.96	23.94	43.50	-19.56	QP
5	223.3415	44.30	-18.77	25.53	46.00	-20.47	QP
6	280.5152	38.51	-16.22	22.29	46.00	-23.71	QP

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
1	30.0000	49.73	-18.44	31.29	40.00	-8.71	QP
2	35.7490	45.91	-17.49	28.42	40.00	-11.58	QP
3	75.9773	48.06	-20.84	27.22	40.00	-12.78	QP
4	79.3816	48.00	-21.72	26.28	40.00	-13.72	QP
5	96.2672	50.97	-21.32	29.65	43.50	-13.85	QP
6	974.0436	28.48	-2.35	26.13	54.00	-27.87	QP

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 case 802.11a mode

Between 1GHz – 40GHz

Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	5.2G TX- 802.11a		

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	42.26	30.45	8.77	38.66	59.24	74.00	-14.76	PK
V	10360.00	32.14	30.45	8.77	38.66	49.12	54.00	-4.88	AV
V	15540.00	41.85	30.44	9.31	38.55	59.27	74.00	-14.73	PK
V	15540.00	31.58	30.44	9.31	38.55	49.00	54.00	-5.00	AV
V	20720.00	42.58	30.72	9.45	38.69	60.00	74.00	-14.00	PK
V	20720.00	32.65	30.72	9.45	38.69	50.07	54.00	-3.93	AV
V	25900.00	42.55	30.65	9.99	38.57	60.46	74.00	-13.54	PK
V	25900.00	32.68	30.65	9.99	38.57	50.59	54.00	-3.41	AV
H	10360.00	42.55	30.45	8.77	38.66	59.53	74.00	-14.47	PK
H	10360.00	32.65	30.45	8.77	38.66	49.63	54.00	-4.37	AV
H	15540.00	42.16	30.44	9.31	38.55	59.58	74.00	-14.42	PK
H	15540.00	32.66	30.44	9.31	38.55	50.08	54.00	-3.92	AV
H	20720.00	42.99	30.72	9.45	38.69	60.41	74.00	-13.59	PK
H	20720.00	32.15	30.72	9.45	38.69	49.57	54.00	-4.43	AV
H	25900.00	42.65	30.65	9.99	38.57	60.56	74.00	-13.44	PK
H	25900.00	32.25	30.65	9.99	38.57	50.16	54.00	-3.84	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	41.52	30.45	8.77	38.66	58.50	74.00	-15.50	PK
V	10400.00	32.66	30.45	8.77	38.66	49.64	54.00	-4.36	AV
V	15600.00	41.33	30.44	9.31	38.55	58.75	74.00	-15.25	PK
V	15600.00	32.28	30.44	9.31	38.55	49.70	54.00	-4.30	AV
V	20800.00	41.68	30.72	9.45	38.69	59.10	74.00	-14.90	PK
V	20800.00	32.06	30.72	9.45	38.69	49.48	54.00	-4.52	AV
V	26000.00	41.66	30.65	9.99	38.57	59.57	74.00	-14.43	PK
V	26000.00	32.15	30.65	9.99	38.57	50.06	54.00	-3.94	AV
H	10400.00	42.57	30.45	8.77	38.66	59.55	74.00	-14.45	PK
H	10400.00	32.98	30.45	8.77	38.66	49.96	54.00	-4.04	AV
H	15600.00	42.11	30.44	9.31	38.55	59.53	74.00	-14.47	PK
H	15600.00	33.02	30.44	9.31	38.55	50.44	54.00	-3.56	AV
H	20800.00	42.51	30.72	9.45	38.69	59.93	74.00	-14.07	PK
H	20800.00	32.57	30.72	9.45	38.69	49.99	54.00	-4.01	AV
H	26000.00	41.36	30.65	9.99	38.57	59.27	74.00	-14.73	PK
H	26000.00	32.16	30.65	9.99	38.57	50.07	54.00	-3.93	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	42.13	30.45	8.77	38.66	59.11	74.00	-14.89	PK
V	10480.00	32.77	30.45	8.77	38.66	49.75	54.00	-4.25	AV
V	15720.00	42.56	30.44	9.31	38.55	59.98	74.00	-14.02	PK
V	15720.00	33.06	30.44	9.31	38.55	50.48	54.00	-3.52	AV
V	20960.00	42.17	30.72	9.45	38.69	59.59	74.00	-14.41	PK
V	20960.00	32.65	30.72	9.45	38.69	50.07	54.00	-3.93	AV
V	26200.00	41.55	30.65	9.99	38.57	59.46	74.00	-14.54	PK
V	26200.00	32.24	30.65	9.99	38.57	50.15	54.00	-3.85	AV
H	10480.00	42.16	30.45	8.77	38.66	59.14	74.00	-14.86	PK
H	10480.00	32.65	30.45	8.77	38.66	49.63	54.00	-4.37	AV
H	15720.00	42.16	30.44	9.31	38.55	59.58	74.00	-14.42	PK
H	15720.00	32.65	30.44	9.31	38.55	50.07	54.00	-3.93	AV
H	20960.00	42.16	30.72	9.45	38.69	59.58	74.00	-14.42	PK
H	20960.00	32.65	30.72	9.45	38.69	50.07	54.00	-3.93	AV
H	26200.00	42.16	30.65	9.99	38.57	60.07	74.00	-13.93	PK
H	26200.00	32.65	30.65	9.99	38.57	50.56	54.00	-3.44	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.

Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	5.8G TX- 802.11a		

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	42.51	30.45	8.77	38.66	59.49	74.00	-14.51	PK
V	11490.00	32.37	30.45	8.77	38.66	49.35	54.00	-4.65	AV
V	17235.00	40.62	30.44	9.31	38.55	58.04	74.00	-15.96	PK
V	17235.00	33.08	30.44	9.31	38.55	50.50	54.00	-3.50	AV
V	22980.00	41.12	30.72	9.45	38.69	58.54	74.00	-15.46	PK
V	22980.00	32.98	30.72	9.45	38.69	50.40	54.00	-3.60	AV
V	28725.00	41.22	30.65	9.99	38.57	59.13	74.00	-14.87	PK
V	28725.00	32.98	30.65	9.99	38.57	50.89	54.00	-3.11	AV
H	11490.00	42.85	30.45	8.77	38.66	59.83	74.00	-14.17	PK
H	11490.00	32.75	30.45	8.77	38.66	49.73	54.00	-4.27	AV
H	17235.00	41.49	30.44	9.31	38.55	58.91	74.00	-15.09	PK
H	17235.00	32.75	30.44	9.31	38.55	50.17	54.00	-3.83	AV
H	22980.00	41.49	30.72	9.45	38.69	58.91	74.00	-15.09	PK
H	22980.00	32.75	30.72	9.45	38.69	50.17	54.00	-3.83	AV
H	28725.00	41.49	30.65	9.99	38.57	59.40	74.00	-14.60	PK
H	28725.00	31.75	30.65	9.99	38.57	49.66	54.00	-4.34	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	41.51	30.45	8.77	38.66	58.49	74.00	-15.51	PK
V	11570.00	32.42	30.45	8.77	38.66	49.40	54.00	-4.60	AV
V	17355.00	40.04	30.44	9.31	38.55	57.46	74.00	-16.54	PK
V	17355.00	32.08	30.44	9.31	38.55	49.50	54.00	-4.50	AV
V	23140.00	40.11	30.72	9.45	38.69	57.53	74.00	-16.47	PK
V	23140.00	32.08	30.72	9.45	38.69	49.50	54.00	-4.50	AV
V	28925.00	40.01	30.65	9.99	38.57	57.92	74.00	-16.08	PK
V	28925.00	32.08	30.65	9.99	38.57	49.99	54.00	-4.01	AV
H	11570.00	42.87	30.45	8.77	38.66	59.85	74.00	-14.15	PK
H	11570.00	32.43	30.45	8.77	38.66	49.41	54.00	-4.59	AV
H	17355.00	41.58	30.44	9.31	38.55	59.00	74.00	-15.00	PK
H	17355.00	32.21	30.44	9.31	38.55	49.63	54.00	-4.37	AV
H	23140.00	43.58	30.72	9.45	38.69	61.00	74.00	-13.00	PK
H	23140.00	33.21	30.72	9.45	38.69	50.63	54.00	-3.37	AV
H	28925.00	41.08	30.65	9.99	38.57	58.99	74.00	-15.01	PK
H	28925.00	32.21	30.65	9.99	38.57	50.12	54.00	-3.88	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	41.23	30.45	8.77	38.66	58.21	74.00	-15.79	PK
V	11650.00	32.77	30.45	8.77	38.66	49.75	54.00	-4.25	AV
V	17475.00	43.74	30.44	9.31	38.55	61.16	74.00	-12.84	PK
V	17475.00	33.09	30.44	9.31	38.55	50.51	54.00	-3.49	AV
V	23300.00	43.74	30.72	9.45	38.69	61.16	74.00	-12.84	PK
V	23300.00	33.58	30.72	9.45	38.69	51.00	54.00	-3.00	AV
V	29125.00	42.74	30.65	9.99	38.57	60.65	74.00	-13.35	PK
V	29125.00	32.98	30.65	9.99	38.57	50.89	54.00	-3.11	AV
H	11650.00	41.32	30.45	8.77	38.66	58.30	74.00	-15.7	PK
H	11650.00	32.99	30.45	8.77	38.66	49.97	54.00	-4.03	AV
H	17475.00	42.91	30.44	9.31	38.55	60.33	74.00	-13.67	PK
H	17475.00	33.25	30.44	9.31	38.55	50.67	54.00	-3.33	AV
H	23300.00	43.51	30.72	9.45	38.69	60.93	74.00	-13.07	PK
H	23300.00	33.35	30.72	9.45	38.69	50.77	54.00	-3.23	AV
H	29125.00	43.41	30.65	9.99	38.57	61.32	74.00	-12.68	PK
H	29125.00	33.35	30.65	9.99	38.57	51.26	54.00	-2.74	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.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.

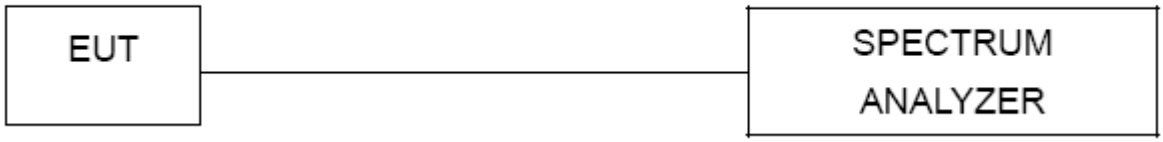
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

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.

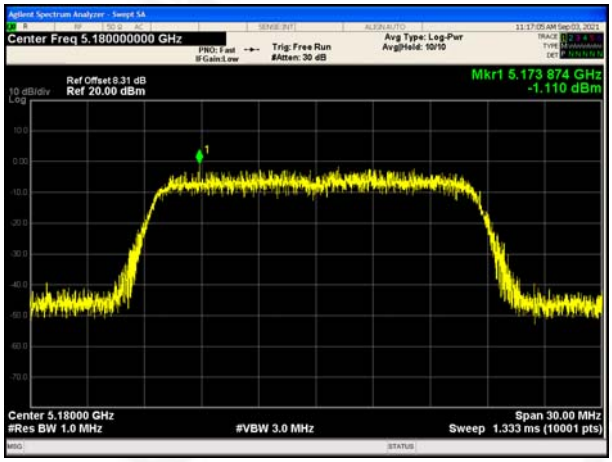
5.6 TEST RESULTS

Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	1015 hPa	Test Voltage :	DC 3.3V
Test Mode :	TX		

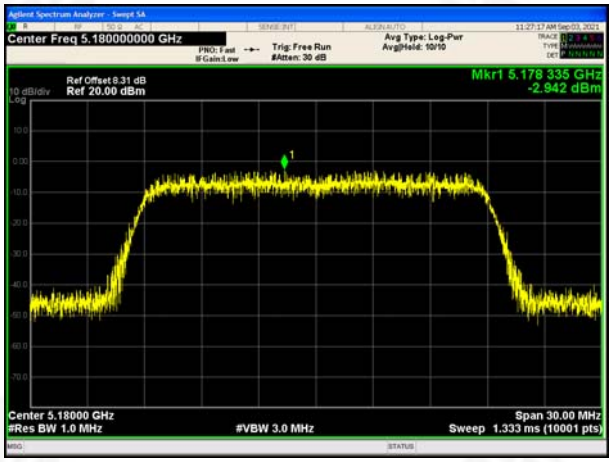
Test mode	Test Channel (MHz)	PSD [dBm/MHz] ANT 1	PSD [dBm/MHz] ANT 2	PSD [dBm/MHz] Total	Limit (dBm)	Result
802.11a	5180	-1.110	-1.204	/	11	Pass
	5200	-0.805	-1.970	/	11	Pass
	5240	-0.534	-1.168	/	11	Pass
802.11n(HT20)	5180	-2.942	-1.513	0.841	11	Pass
	5200	-2.523	-2.267	0.617	11	Pass
	5240	-2.683	-1.588	0.909	11	Pass
802.11n(HT40)	5190	-5.945	-7.076	-3.463	11	Pass
	5230	-6.138	-6.603	-3.354	11	Pass
802.11ac(VH20)	5210	-2.048	-1.489	1.251	11	Pass
	5180	-2.667	-1.033	1.237	11	Pass
	5200	-2.513	-1.403	1.088	11	Pass
802.11ac(VH40)	5240	-6.271	-6.26	-3.255	11	Pass
	5190	-6.07	-6.909	-3.459	11	Pass
802.11ac(VH80)	5230	-10.152	-11.193	-7.631	11	Pass

ANT1

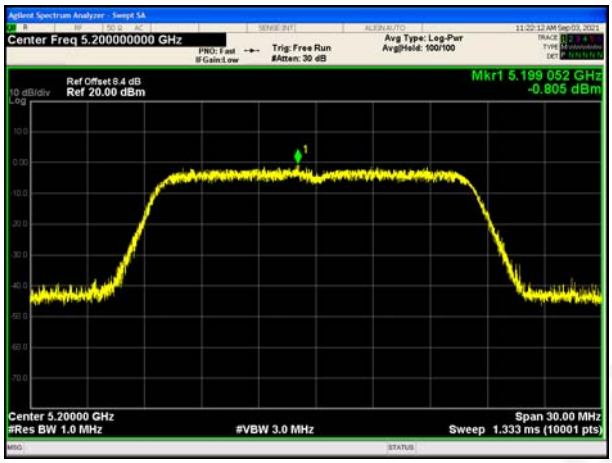
(802.11a) PSD plot on channel 36



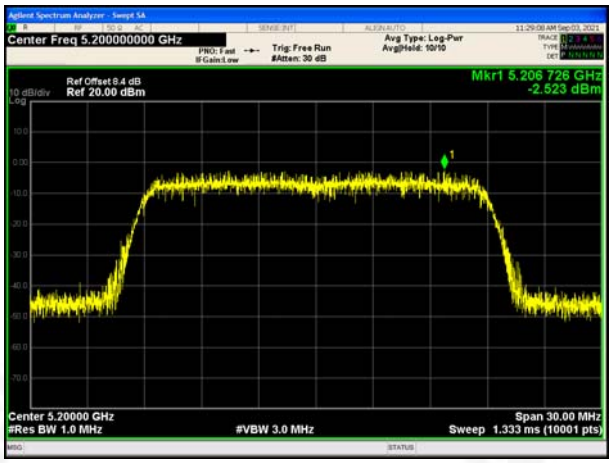
(802.11n20) PSD plot on channel 36



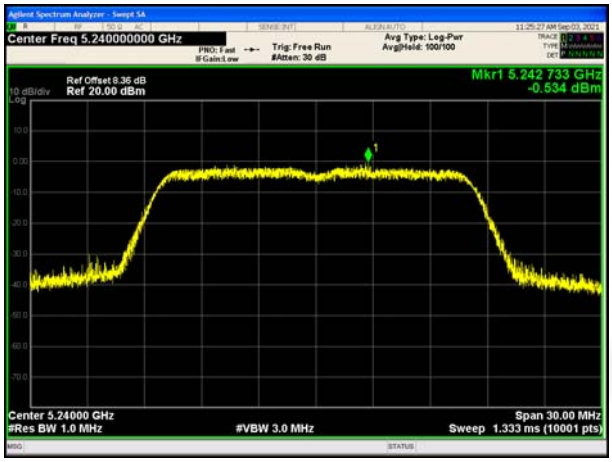
(802.11a) PSD plot on channel 40



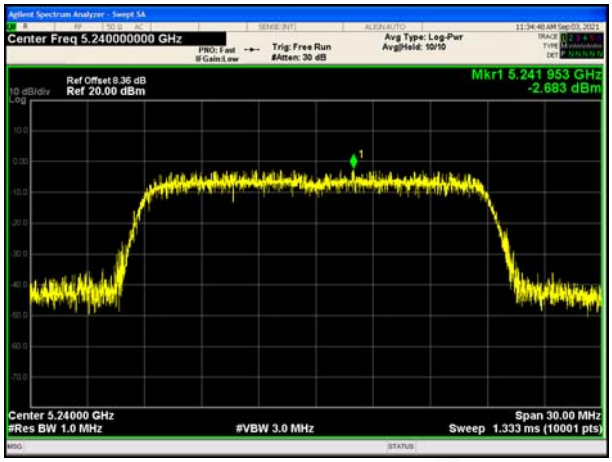
(802.11n20) PSD plot on channel 40



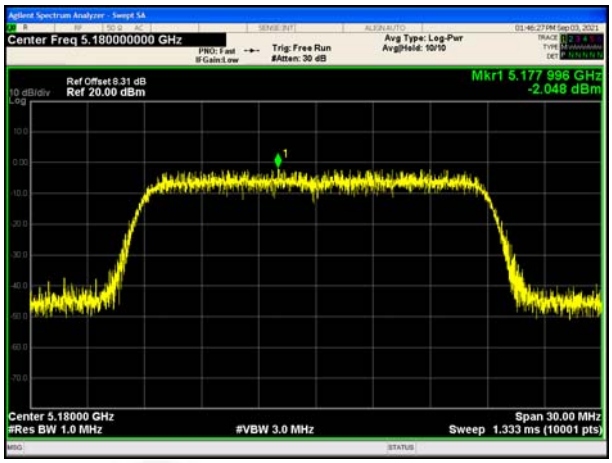
(802.11a) PSD plot on channel 48



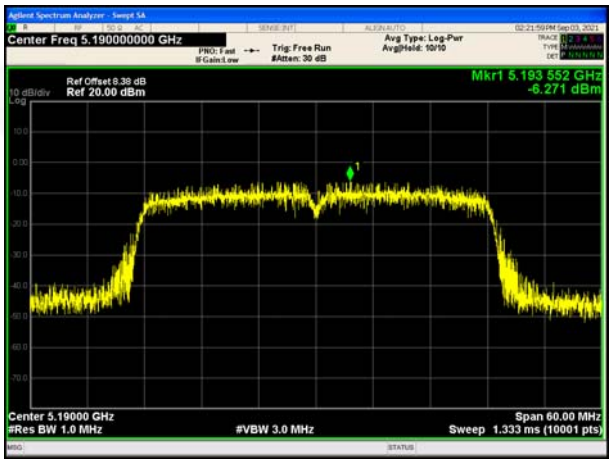
(802.11n20) PSD plot on channel 48



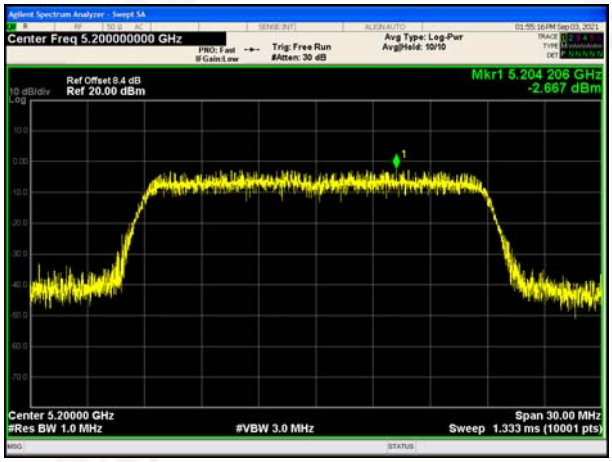
(802.11ac20) PSD plot on channel 36



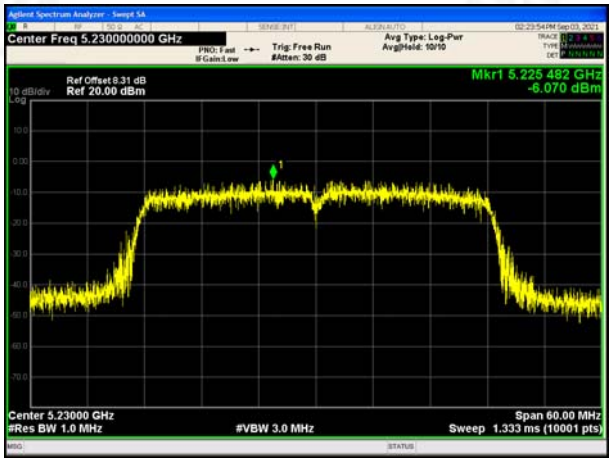
(802.11ac40) PSD plot on channel 38



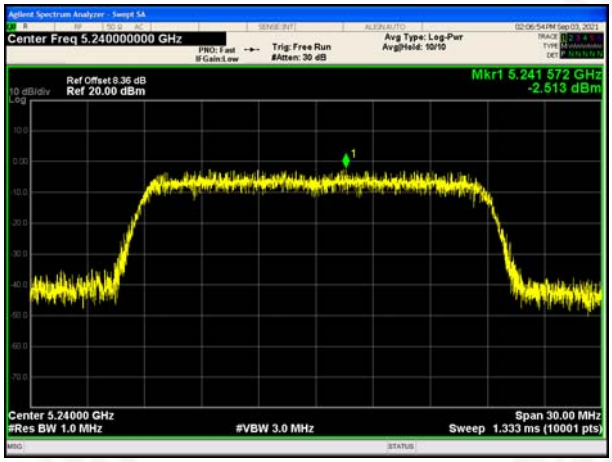
(802.11ac20) PSD plot on channel 40



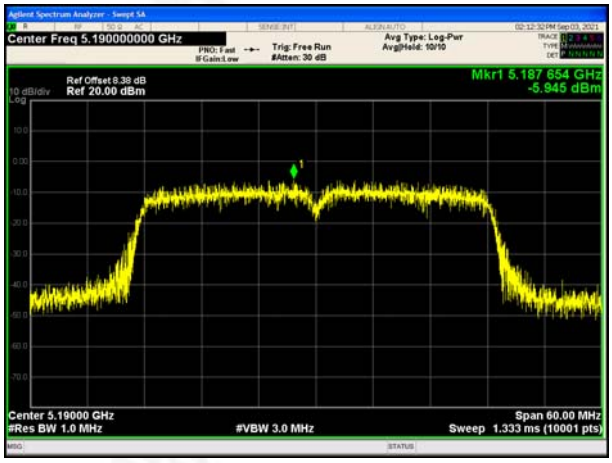
(802.11ac40) PSD plot on channel 46



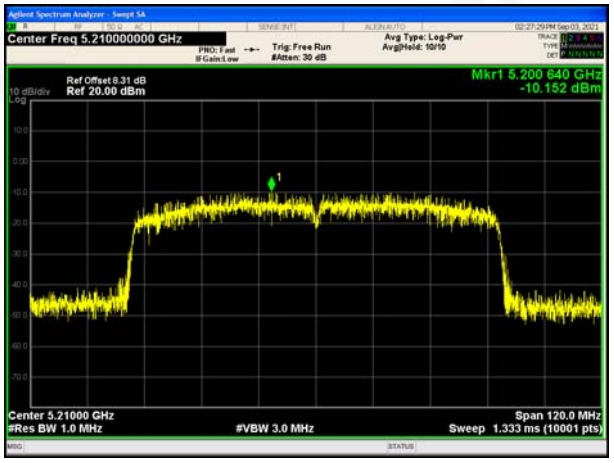
(802.11ac20) PSD plot on channel 48



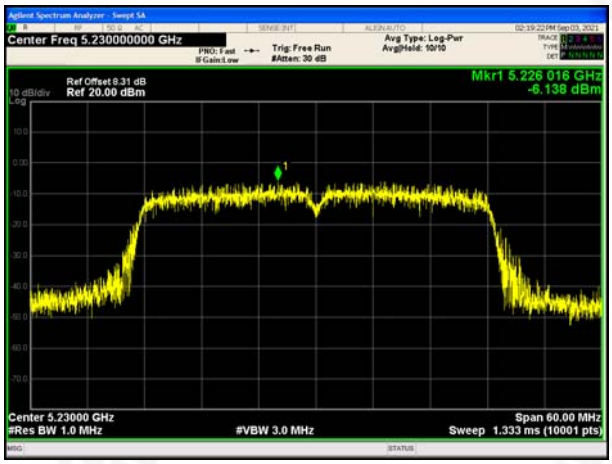
(802.11n40) PSD plot on channel 38



(802.11ac80) PSD plot on channel 42



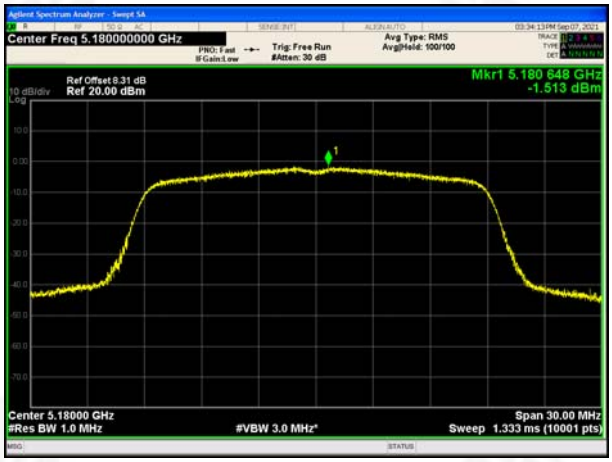
(802.11n40) PSD plot on channel 46



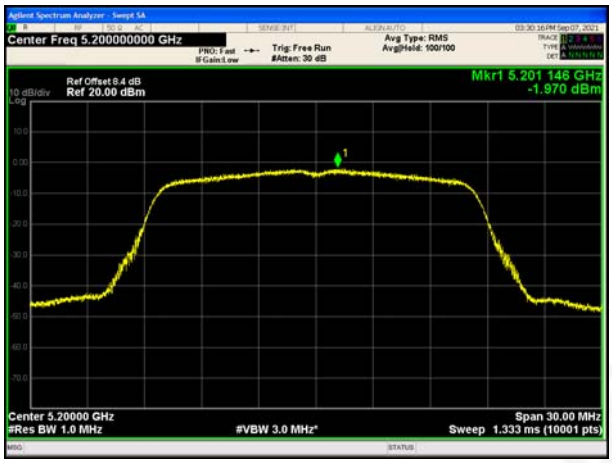
ANT2

(802.11a) PSD plot on channel 36

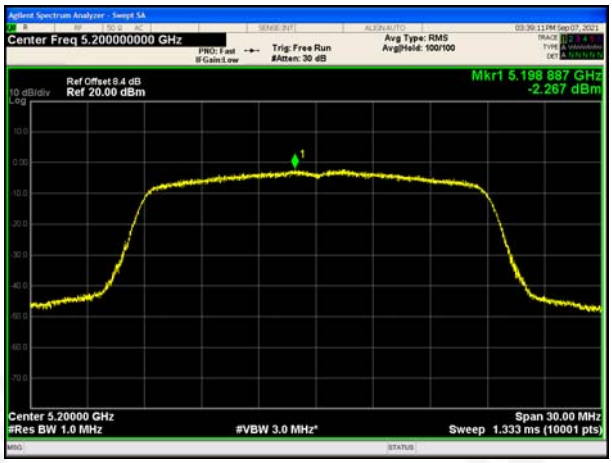
(802.11n20) PSD plot on channel 36



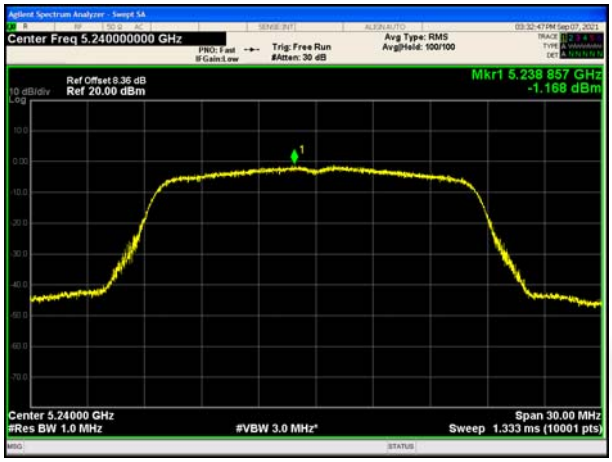
(802.11a) PSD plot on channel 40



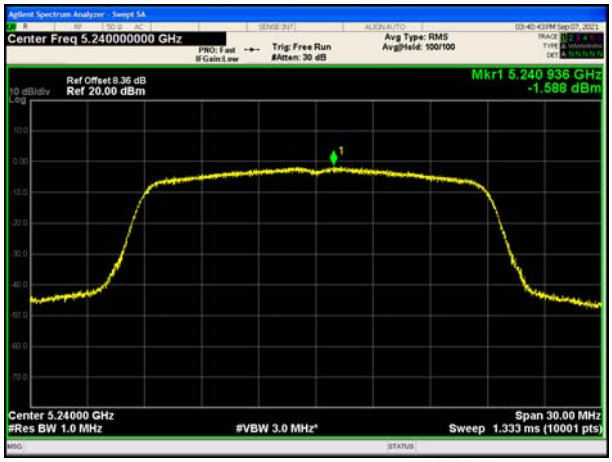
(802.11n20) PSD plot on channel 40



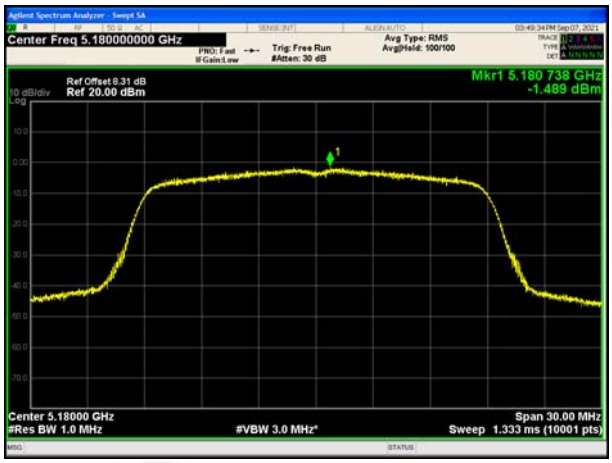
(802.11a) PSD plot on channel 48



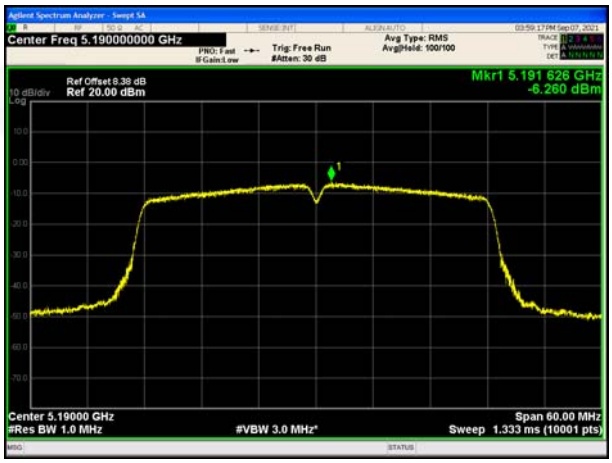
(802.11n20) PSD plot on channel 48



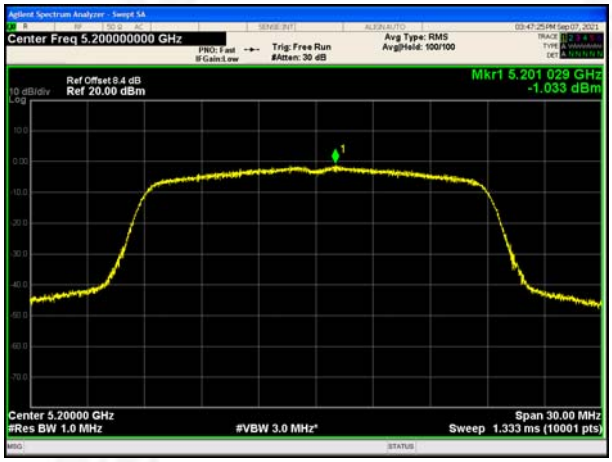
(802.11ac20) PSD plot on channel 36



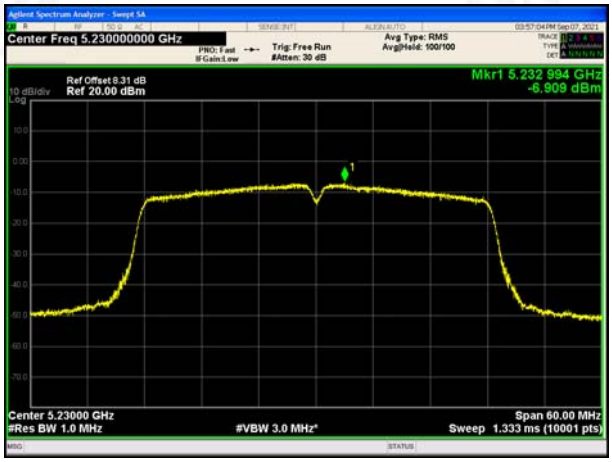
(802.11ac40) PSD plot on channel 38



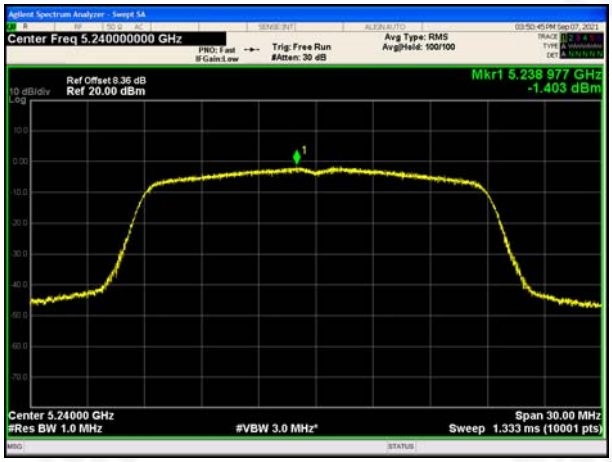
(802.11ac20) PSD plot on channel 40



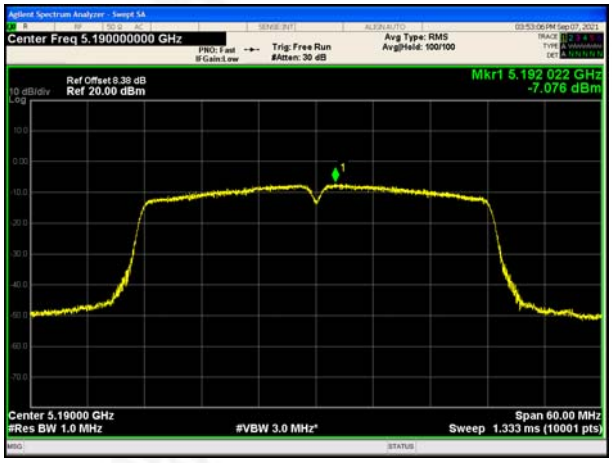
(802.11ac40) PSD plot on channel 46



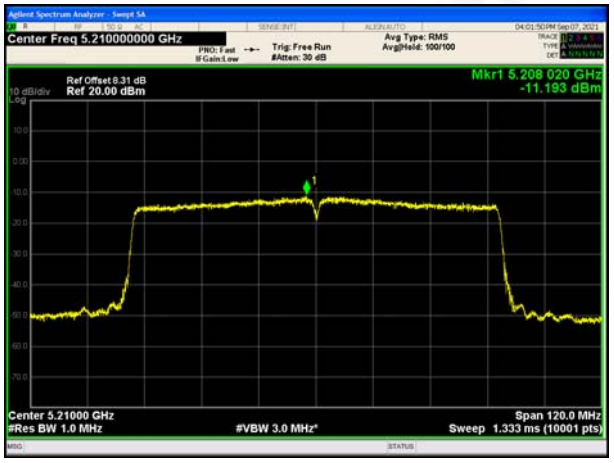
(802.11ac20) PSD plot on channel 48



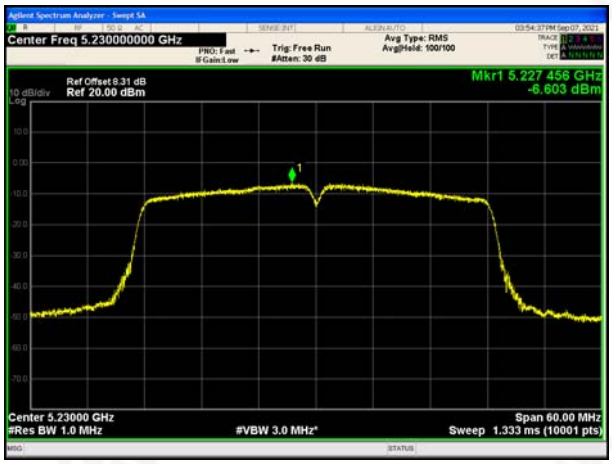
(802.11n40) PSD plot on channel 38



(802.11ac80) PSD plot on channel 42



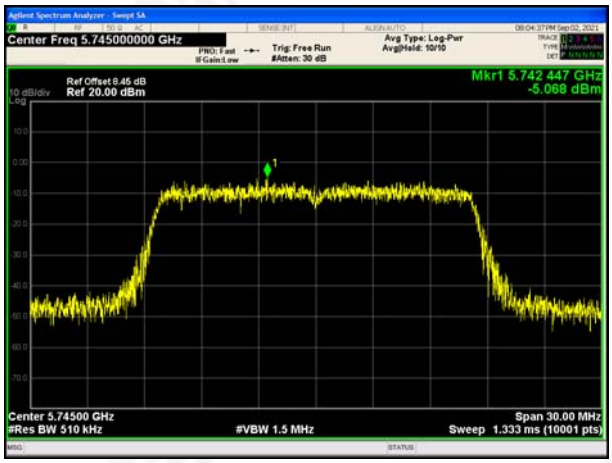
(802.11n40) PSD plot on channel 46



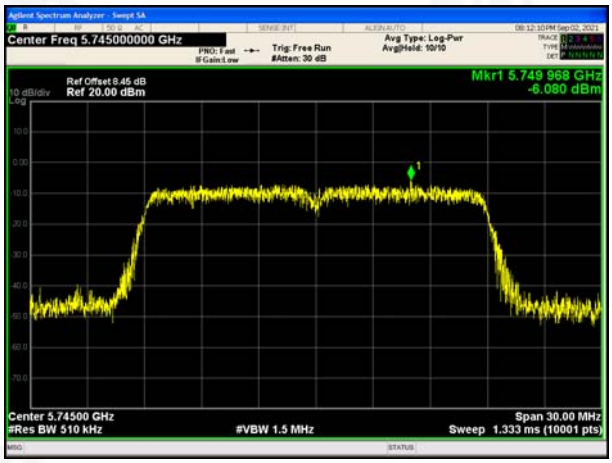
Test mode	Test Channel (MHz)	PSD [dBm/500kHz] ANT 1	PSD [dBm/500kHz] ANT 2	PSD [dBm/500kHz] Total	Limit (dBm)	Result
802.11a	5745	-5.068	-4.935	/	30	Pass
	5785	-5.228	-4.632	/	30	Pass
	5825	-5.142	-3.966	/	30	Pass
802.11n(HT20)	5745	-6.08	-5.461	-2.749	30	Pass
	5785	-6.074	-6.924	-3.468	30	Pass
	5825	-6.475	-6.032	-3.238	30	Pass
802.11n(HT40)	5755	-10.133	-10.482	-7.294	30	Pass
	5795	-9.823	-10.055	-6.927	30	Pass
802.11ac(VH20)	5745	-6.164	-6.093	-3.118	30	Pass
	5785	-6.025	-4.609	-2.249	30	Pass
	5825	-6.091	-5.7	-2.881	30	Pass
802.11ac(VH40)	5755	-9.017	-9.689	-6.330	30	Pass
	5795	-10.12	-10.374	-7.235	30	Pass
802.11ac(VH80)	5775	-14.705	-14.405	-11.542	30	Pass

ANT1

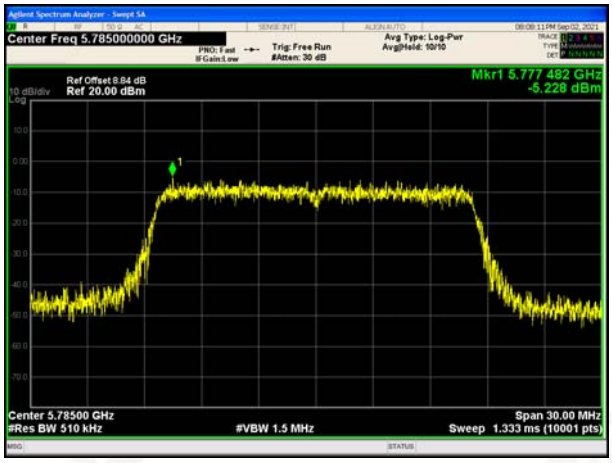
(802.11a) PSD plot on channel 149



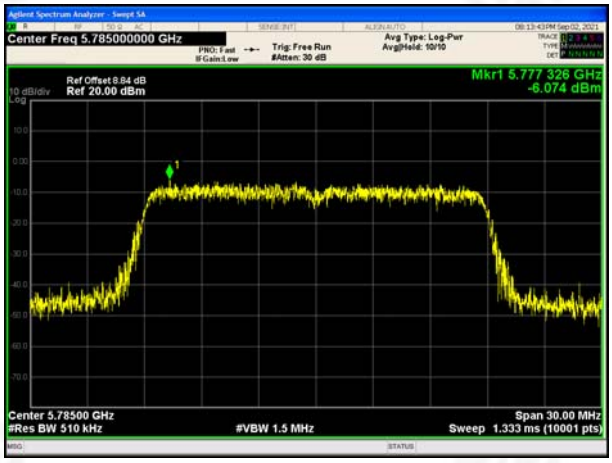
(802.11n20) PSD plot on channel 149



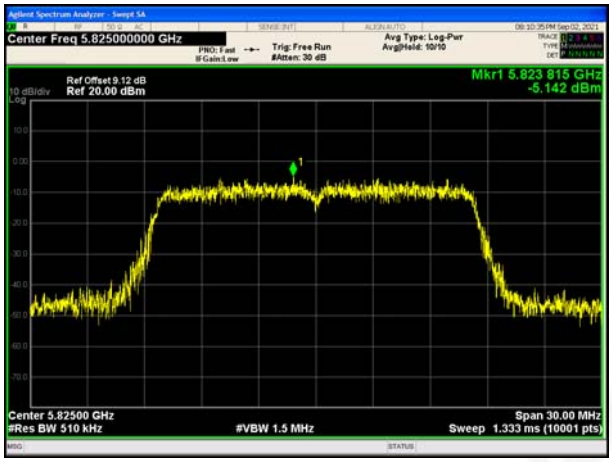
(802.11a) PSD plot on channel 157



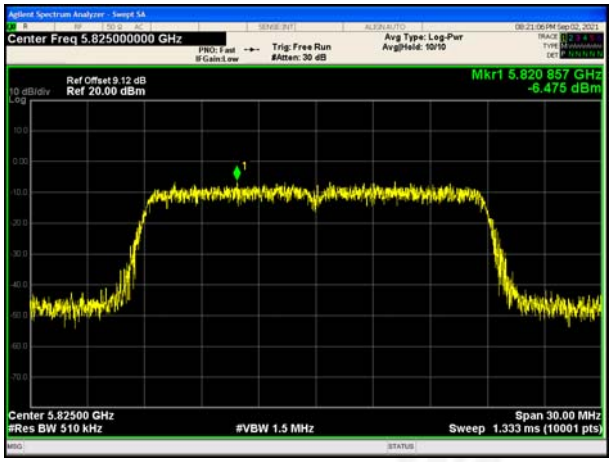
(802.11n20) PSD plot on channel 157



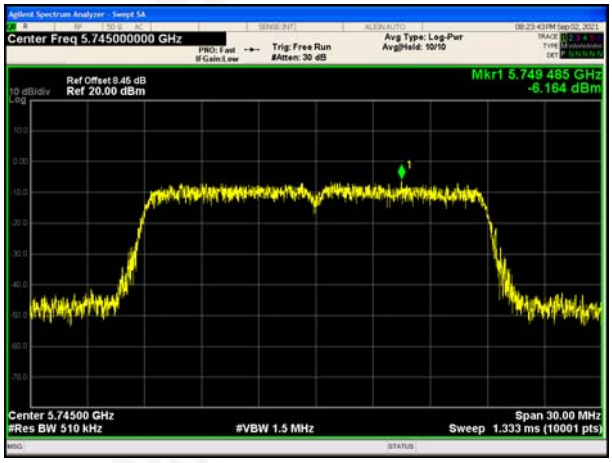
(802.11a) PSD plot on channel 165



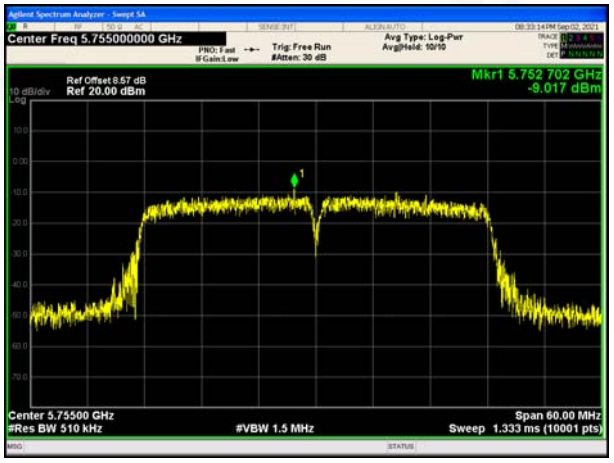
(802.11n20) PSD plot on channel 165



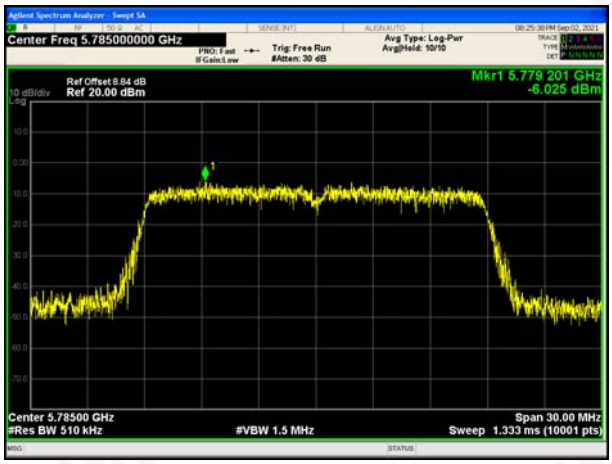
(802.11ac20) PSD plot on channel 149



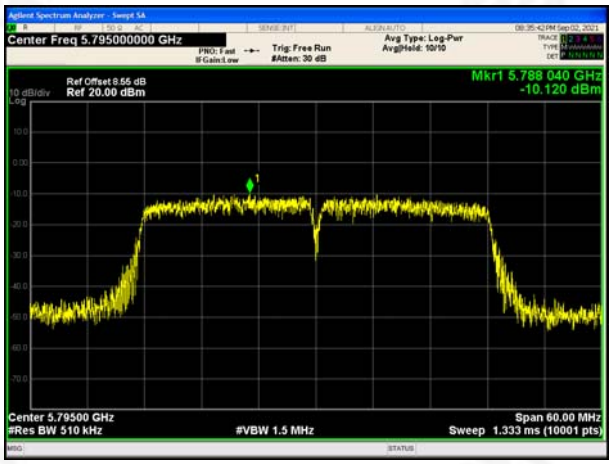
(802.11ac40) PSD plot on channel 151



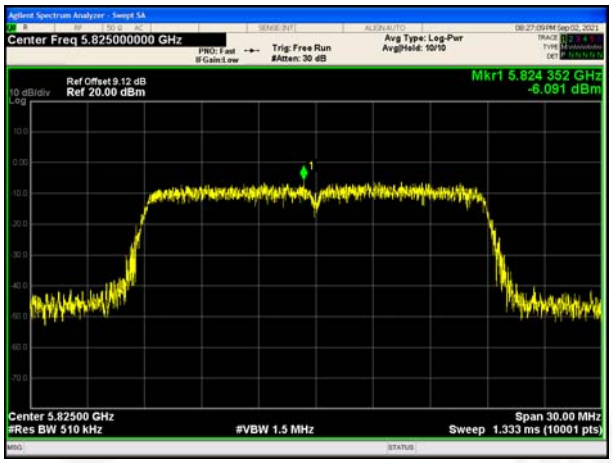
(802.11ac20) PSD plot on channel 157



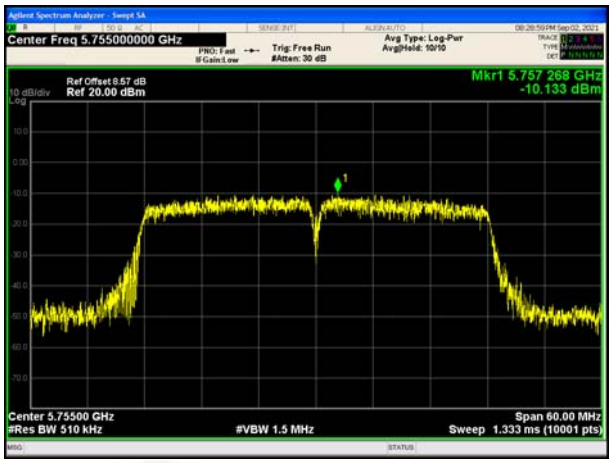
(802.11ac40) PSD plot on channel 159



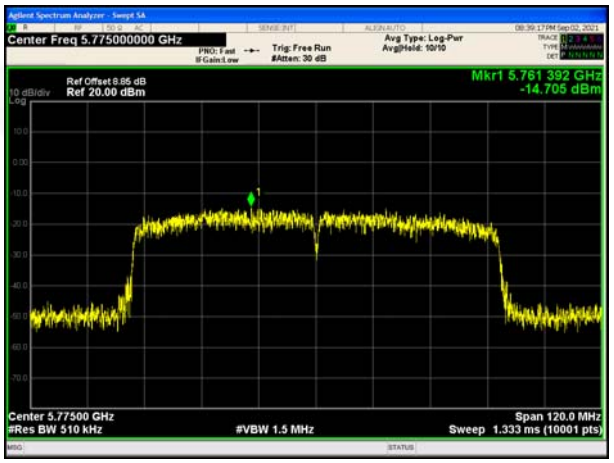
(802.11ac20) PSD plot on channel 165



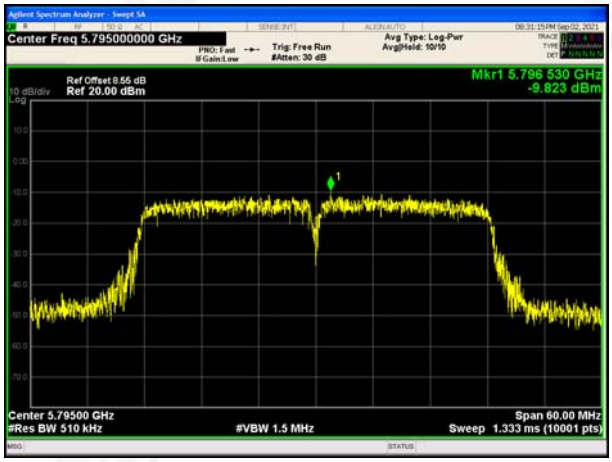
(802.11n40) PSD plot on channel 151



(802.11ac80) PSD plot on channel 155

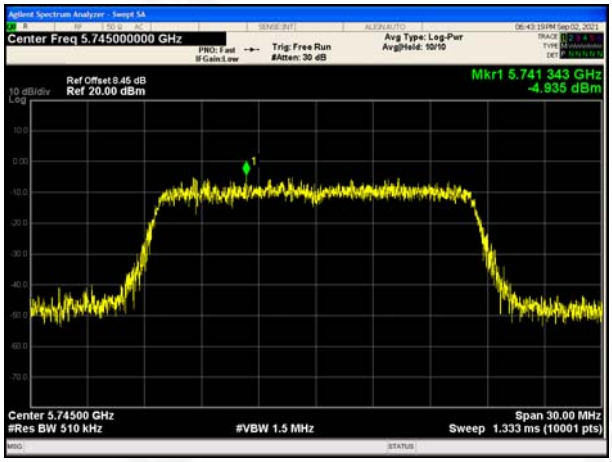


(802.11n40) PSD plot on channel 159

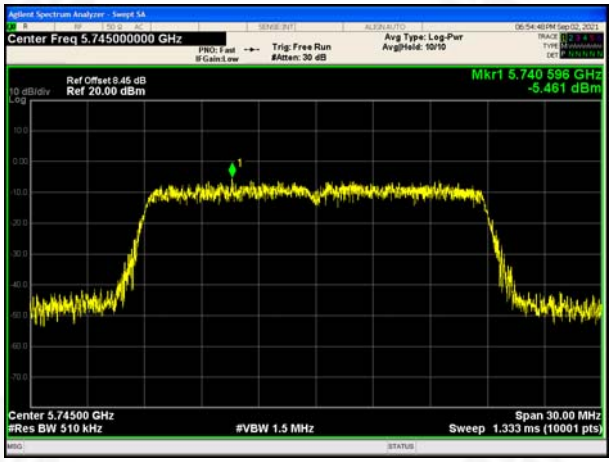


ANT2

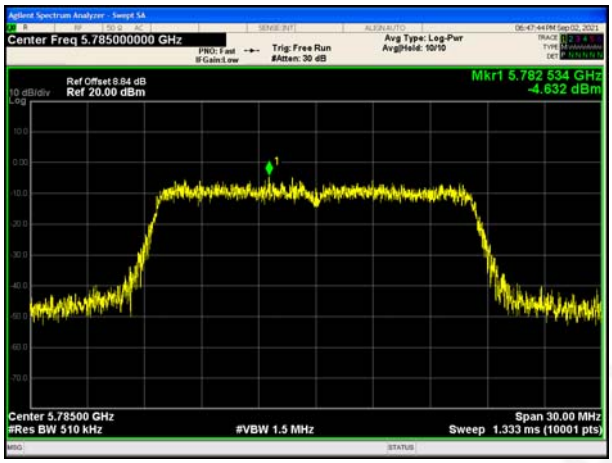
(802.11a) PSD plot on channel 149



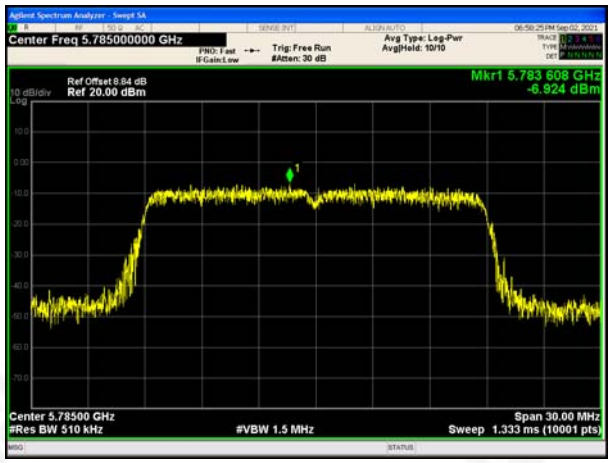
(802.11n20) PSD plot on channel 149



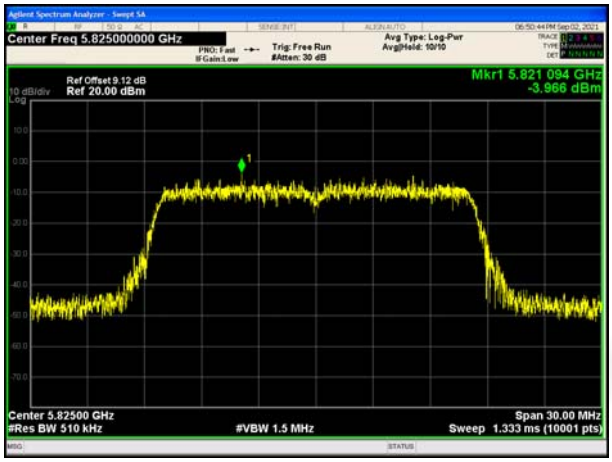
(802.11a) PSD plot on channel 157



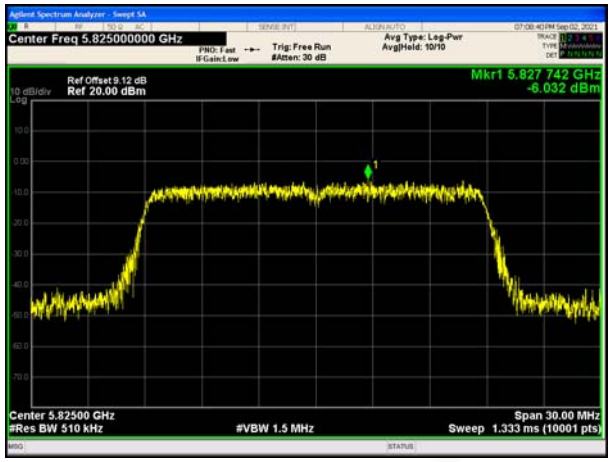
(802.11n20) PSD plot on channel 157



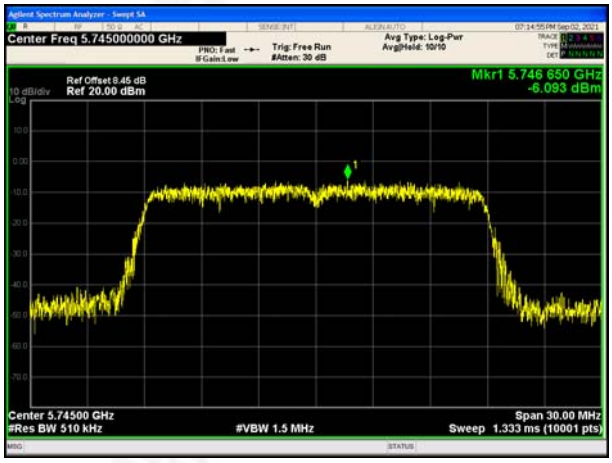
(802.11a) PSD plot on channel 165



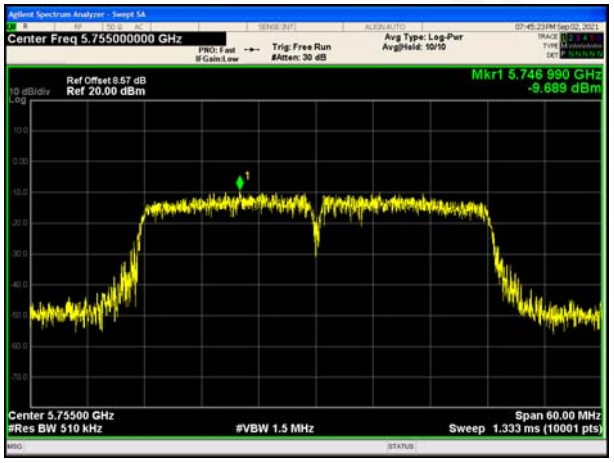
(802.11n20) PSD plot on channel 165



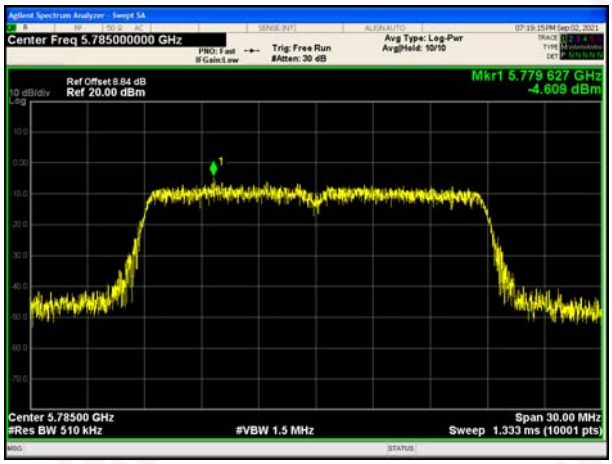
(802.11ac20) PSD plot on channel 149



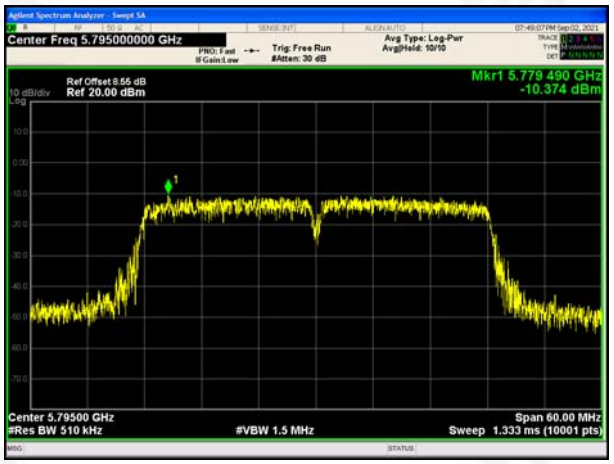
(802.11ac40) PSD plot on channel 151



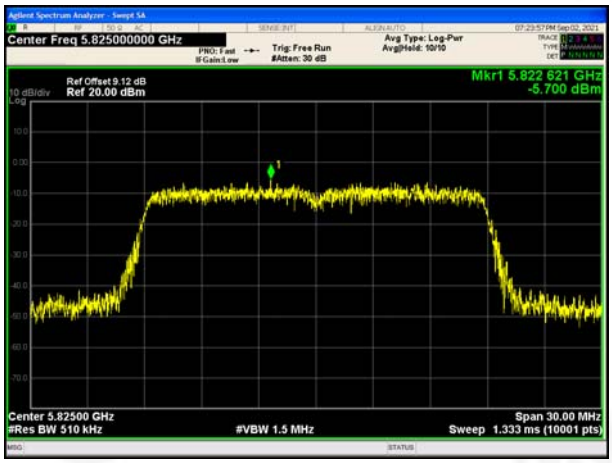
(802.11ac20) PSD plot on channel 157



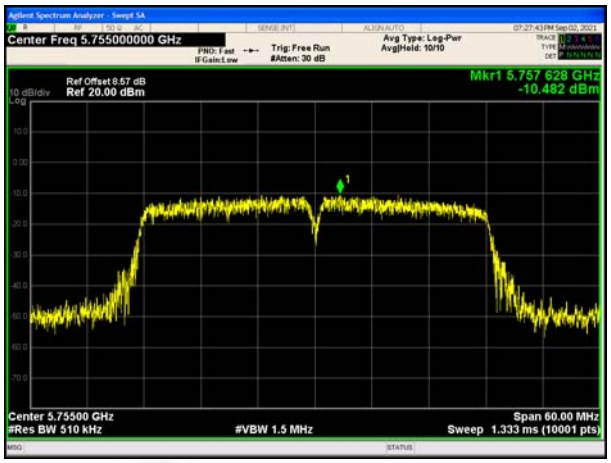
(802.11ac40) PSD plot on channel 159



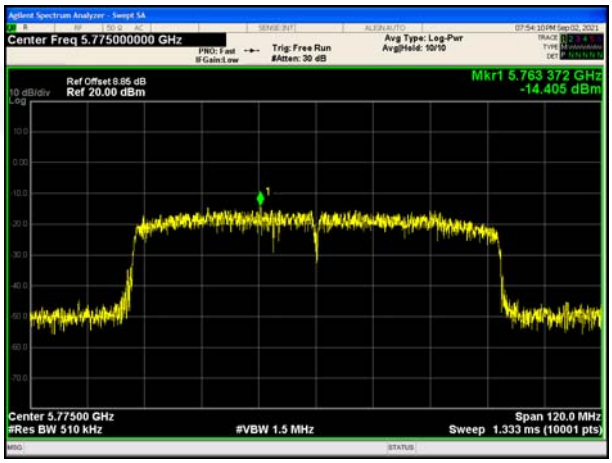
(802.11ac20) PSD plot on channel 165



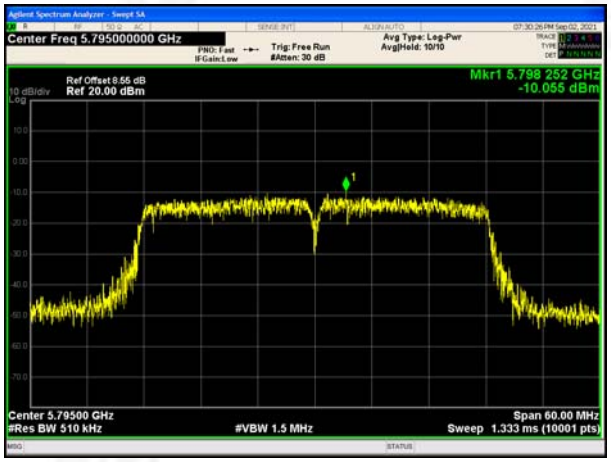
(802.11n40) PSD plot on channel 151



(802.11ac80) PSD plot on channel 155



(802.11n40) PSD plot on channel 159



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.

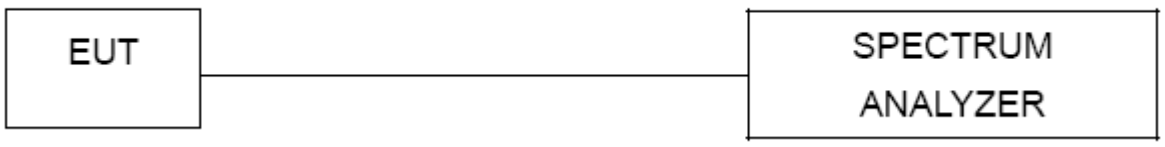
c) Detector = Peak.

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 :	DC 3.3V
Test Mode :	TX ANT1		

Test CH	-26dB Channel Bandwidth (MHz)				Limit(KHz)	Result
	802.11a	802.11n(HT20)	802.11n(HT40)	802.11ac(HT80)		
Lowest	18.416	19.589	40.21		>500	Pass
Middle	18.465	19.435		79.024		
Highest	18.529	19.523	40.69			

Test CH	-26dB Channel Bandwidth (MHz)				Limit(KHz)	Result
		802.11ac(HT20)	802.11ac(HT40)			
Lowest		19.42	40.755		>500	Pass
Middle		19.54				
Highest		19.517	41.141			

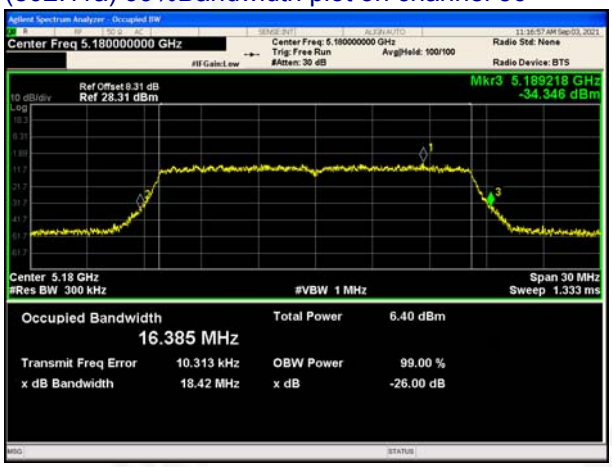
Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 3.3V
Test Mode :	TX ANT2		

Test CH	-26dB Channel Bandwidth (MHz)				Limit(KHz)	Result
	802.11a	802.11n(HT20)	802.11n(HT40)	802.11ac(HT80)		
Lowest	19.882	20.156	39.517		>500	Pass
Middle	20.255	20.324		79.674		
Highest	20.029	20.193	39.576			

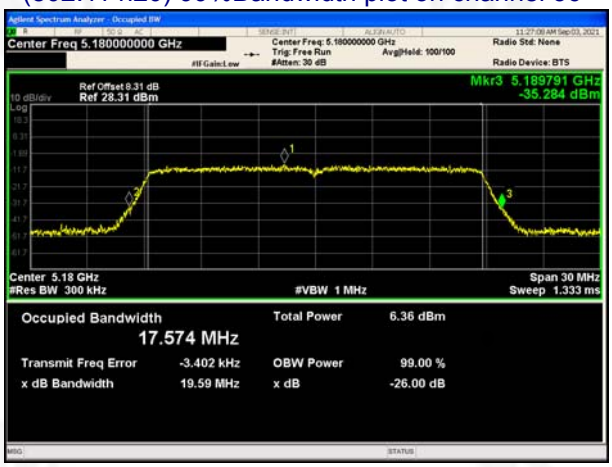
Test CH	-26dB Channel Bandwidth (MHz)				Limit(KHz)	Result
		802.11ac(HT20)	802.11ac(HT40)			
Lowest		20.195	40.027		>500	Pass
Middle		20.114				
Highest		20.199	39.818			

Test plot ANT1

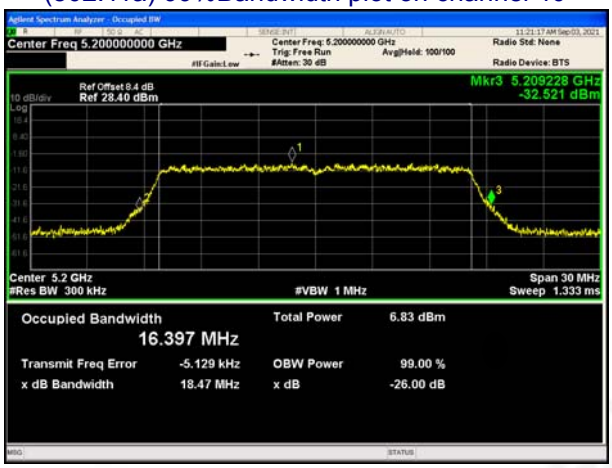
(802.11a) 99%Bandwidth plot on channel 36



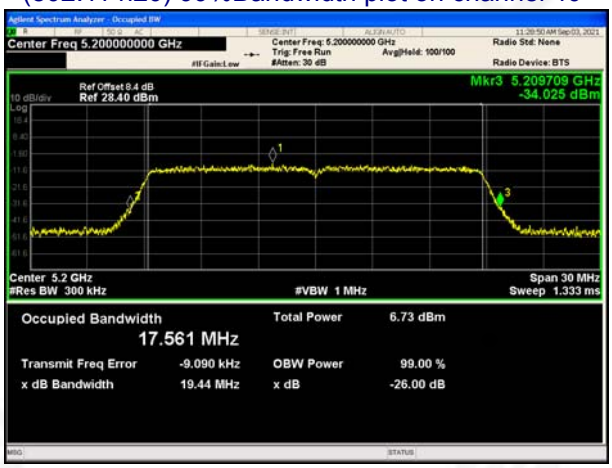
(802.11 n20) 99%Bandwidth plot on channel 36



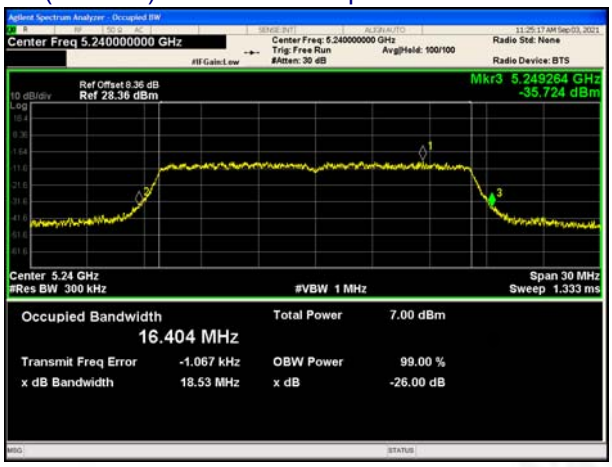
(802.11a) 99%Bandwidth plot on channel 40



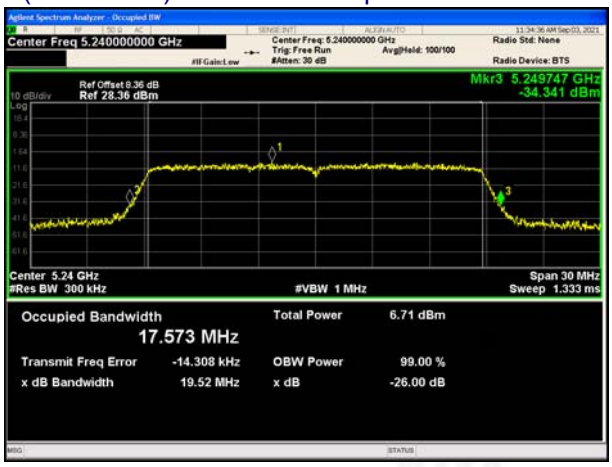
(802.11 n20) 99%Bandwidth plot on channel 40



(802.11a) 99%Bandwidth plot on channel 48

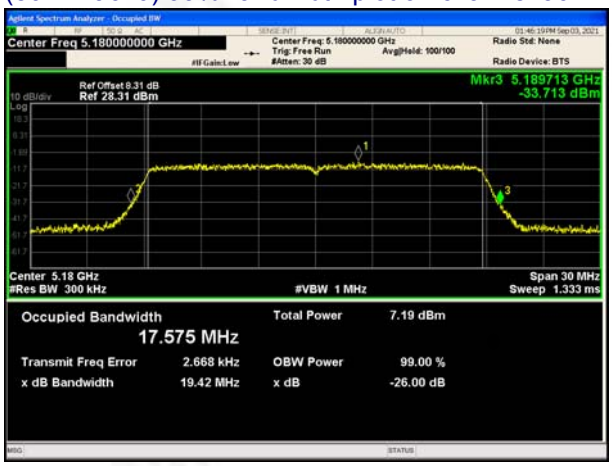


(802.11 n20) 99%Bandwidth plot on channel 48

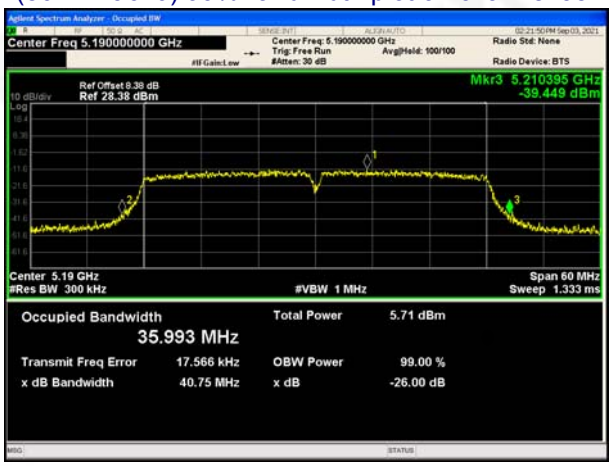


Test plot

(802.11ac20) 99%Bandwidth plot on channel 36

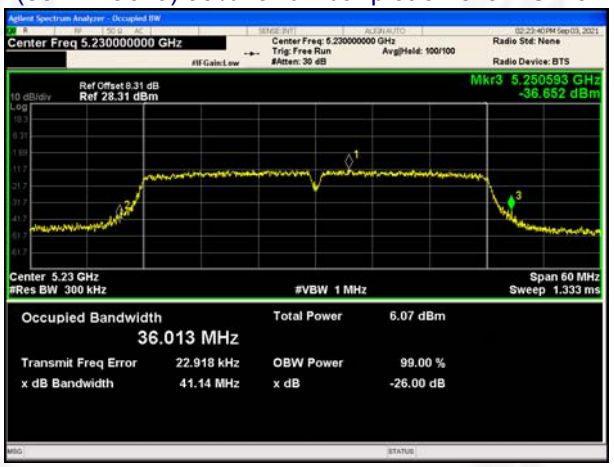


(802.11 ac40) 99%Bandwidth plot on channel 38

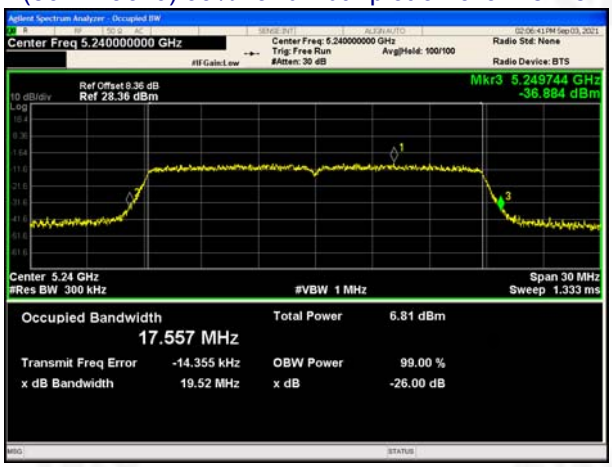


(802.11ac20) 99%Bandwidth plot on channel 40

(802.11 ac40) 99%Bandwidth plot on channel 46



(802.11ac20) 99%Bandwidth plot on channel 48

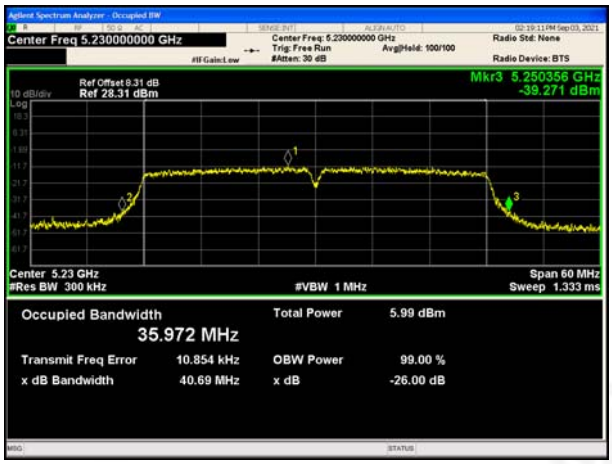


Test plot

(802.11 n40) 99%Bandwidth plot on channel 38

(802.11 ac80) 99%Bandwidth plot on channel 42

(802.11 n40) 99%Bandwidth plot on channel 46

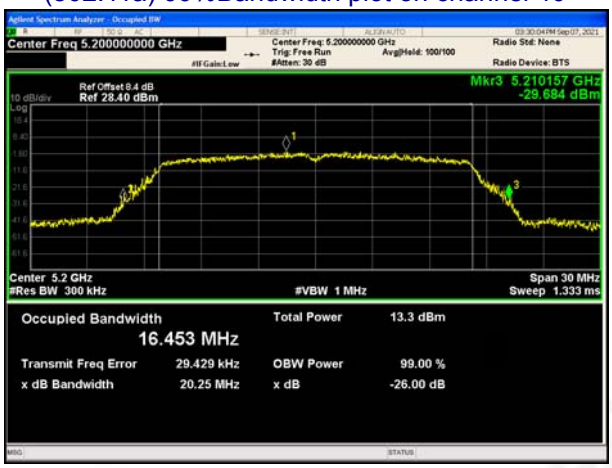


Test plot ANT2

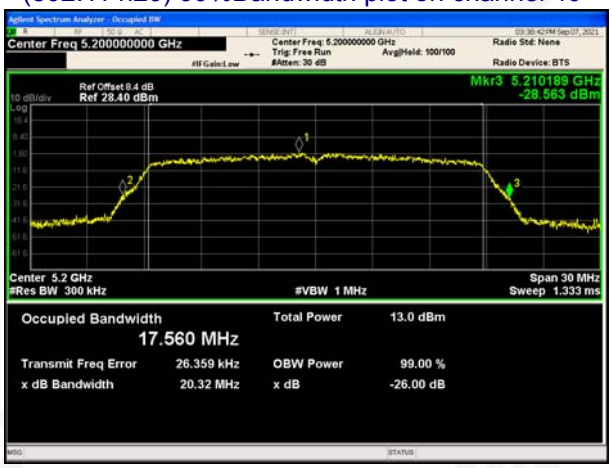
(802.11a) 99%Bandwidth plot on channel 36

(802.11 n20) 99%Bandwidth plot on channel 36

(802.11a) 99%Bandwidth plot on channel 40



(802.11 n20) 99%Bandwidth plot on channel 40

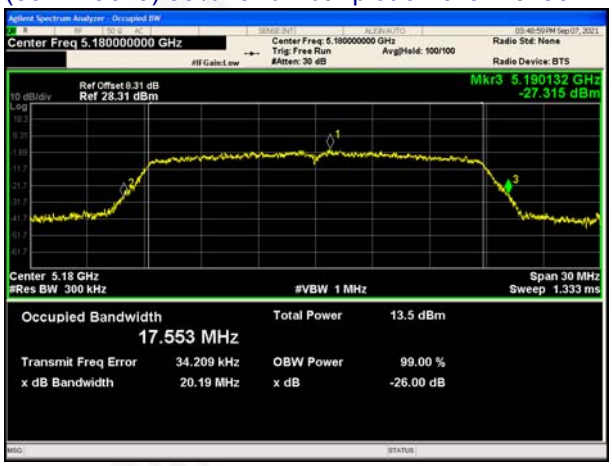


(802.11a) 99%Bandwidth plot on channel 48

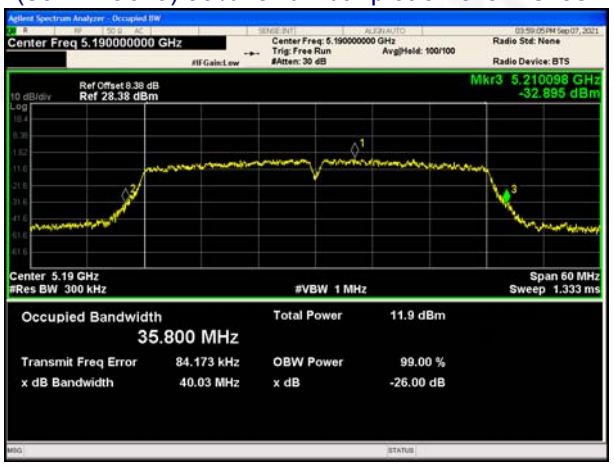
(802.11 n20) 99%Bandwidth plot on channel 48

Test plot

(802.11ac20) 99%Bandwidth plot on channel 36

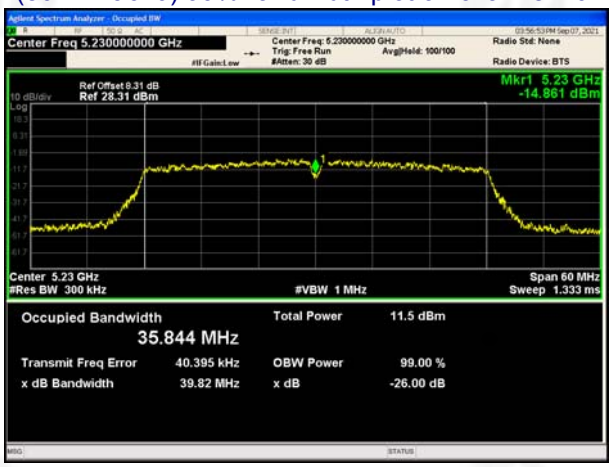


(802.11 ac40) 99%Bandwidth plot on channel 38



(802.11ac20) 99%Bandwidth plot on channel 40

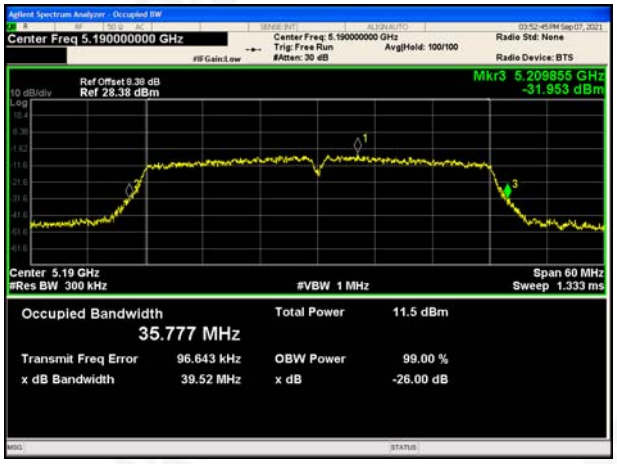
(802.11 ac40) 99%Bandwidth plot on channel 46



(802.11ac20) 99%Bandwidth plot on channel 48

Test plot

(802.11 n40) 99%Bandwidth plot on channel 38



(802.11 ac80) 99%Bandwidth plot on channel 42

(802.11 n40) 99%Bandwidth plot on channel 46