



FCC TEST REPORT

FCC ID:2AKLU-MV1518

Report Number.....: **ZKT-2607030235E-4**

Date of Test..... Jul. 03, 2026 to Jul. 30, 2026

Date of issue.....: Jul. 30, 2026

Total number of pages..... 63

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: DIGI-MARKS TECHNOLOGY LIMITED

Address: 9-1 Dongguan Erdui Huancun Road, Xinya Street, Huadu District, Guangzhou, Guangdong, China

Manufacturer's name: DIGI-MARKS TECHNOLOGY LIMITED

Address: 9-1 Dongguan Erdui Huancun Road, Xinya Street, Huadu District, Guangzhou, Guangdong, China

Test specification:

Standard.....: FCC CFR Title 47 Part 15 Subpart E Section 15.407
ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to
C63.10a-2024
KDB 789033 D02 v02r01

Test procedure.....: /

Non-standard test method: N/A

Test Report Form No.....: TRF-EL-111_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.....: speakers

Trademark: marengo

Model/Type reference.....: MV1518

MV1511, MV1512, MV1516, MV1519, MV1520, MV1521, MV1522,
MV1523, MV1524, MV1525, MV1526, MV1528

Ratings.....: Input: DC 15V-3A

Battery:DC 11.1V, 7200mAh, 79.92Wh



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).....: Jim Liu

Reviewer (name + signature).....: Jackson Fang

Approved (name + signature).....: Lake Xie





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1. VERSION

Report No.	Version	Description	Approved
ZKT-2607030235E-4	Rev.01	Initial issue of report	Jul. 30, 2026



2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
§15.207(a)	AC Power Line Conducted Emission	PASS	
§15.205(a)/§15.209(a) §15.407(b)(1) §15.407(b)(4) §15.407(b)(8)	Radiated Emissions and Band Edge	PASS	
§15.407 (e) 789033 D02 General U-NII	26dB Emission Bandwidth and 6dB Occupied Bandwidth	PASS	
§15.407(a)(1) §15.407 (a)(3) i	Power Spectral Density	PASS	
§15.407(a)(1) §15.407 (a)(3) i §15.407(a)(12)	Maximum Conducted Output Power	PASS	
§15.407(b)(1) §15.407(b)(4) §15.407(b)(8)	Conducted Band Edge	PASS	
§15.407(g)	Frequency Stability	PASS	
789033 D02 General U-NII	Duty Cycle	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: 927491
Designation Number: CN1431
IC Registered No.: 27033
CAB identifier: CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded 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 chamber Radiated spurious Emission (9KHz-30MHz)	U=4.5dB
2	3m chamber Radiated spurious emission (30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission (1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission (6GHz-40GHz)	U=5.0dB
5	Conducted Disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF Power Conducted	U=1.86dB
8	RF Conducted Spurious Emission	U=2.2dB
9	RF Occupied Bandwidth	U=1.8MHz
10	RF Power Spectral Density	U=1.75dB
11	Humidity Uncertainty	U=5.3%
12	Temperature Uncertainty	U=0.59°C



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	speakers	
Model No.:	MV1518	
Serial No.:	MV1511, MV1512, MV1516, MV1519, MV1520, MV1521, MV1522, MV1523, MV1524, MV1525, MV1526, MV1528	
Model Different.:	All the model are the same circuit , only the model name are different.	
Sample(s) Status:	Engineer sample	
Sample Number:	ZKT-2606050493	
Product Description:	IEEE 802.11 WLAN Mode Supported	☒ 802.11a/n/ac
	Data Rate	802.11a: 6/9/12/24/18/36/48/54Mbit/s 802.11n: MCS0-MCS7 802.11ac: MCS0-MCS9
	Modulation	802.11a/n/ac: Orthogonal Frequency Division Multiplexing (OFDM)
	Frequency Range	☒ 5745-5825MHz for 802.11a/n/ac (20M) ☒ 5745-5825MHz for 802.11n/ac (40M) ☒ 5775MHz for 802.11ac (80M)
	Number of Channels	☒ 5 channels for 802.11a/n/ac (20M) in the 5745-5825MHz band ☒ 2 channels for 802.11n/ac (40M) in the 5755-5795MHz band ☒ 1 channels for 802.11ac (80M) in the 5775MHz band
Channel List:	Please refer to the Note 2.	
Antenna Type:	Internal antenna	
Antenna Gain:	Band	5.8G
	Gain (dBi)	2.41
Power Supply:	Input: 15 V  3 A	
Battery Capacity:	DC 11.1V, 7200mAh, 79.92Wh	



Note:

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

802.11a/n/ac (20M) Frequency Channel for 5.8G							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	153	5765	157	5785	161	5805
165	5825	-	-	-	-	-	-

802.11n/ac (40M) Frequency Channel for 5.8G							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795	-	-	-	-

802.11ac (80M) Frequency Channel For 5.8G							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
155	5775	-	-	-	-	-	-



3.2 DESCRIPTION OF TEST MODES

Pretest Mode	Description
Mode 1	802.11a/n/ac (20M) CH149 / CH157 / CH 165 For 5.8G
Mode 2	802.11n/ac (40M) CH 151 / CH 159 For 5.8G
Mode 3	802.11ac (80M) CH 155 For 5.8G

Final Test Mode	For Conducted
	Description
Mode 1	802.11a/n/ac (20M) CH149 / CH157 / CH 165 For 5.8G
Mode 2	802.11n/ac (40M) CH 151 / CH 159 For 5.8G
Mode 3	802.11ac (80M) CH 155 For 5.8G

Final Test Mode	For Radiated
	Description
Mode 1	802.11a/n/ac (20M) CH149 / CH157 / CH 165 For 5.8G
Mode 2	802.11n/ac (40M) CH 151 / CH 159 For 5.8G
Mode 3	802.11ac (80M) CH 155 For 5.8G

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, 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.	

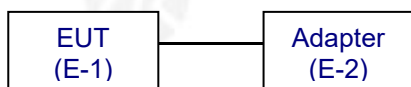
We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:				
Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.				
Mode	802.11a	802.11n20/n40	802.11ac20/ac40/ac80	
Data rate	6Mbps	MCS0(HT0)	MCS0(VHT0)	

Test Software	CMD
Power level setup	Default

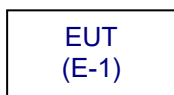


3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

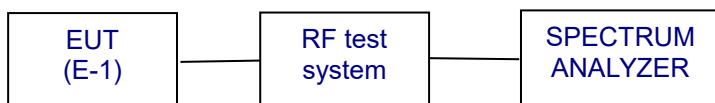
Conducted Emission



Radiated Emission



Conducted Spurious



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	speakers	N/A	MV1518	N/A	EUT
E-2	AC/DC Adapter	N/A	BYX3-1503000U	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

Conducted emissions Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	N/A	Sep. 23, 2025	Sep. 22, 2026
2	LISN	CYBERTEK	EM5040A	E1850400149	N/A	Sep. 19, 2025	Sep. 18, 2026
3	Test Cable	N/A	C-01	N/A	N/A	May. 25, 2026	May. 24, 2027
4	Test Cable	N/A	C-02	N/A	N/A	May. 25, 2026	May. 24, 2027
5	Test Cable	N/A	C-03	N/A	N/A	May. 25, 2026	May. 24, 2027
6	EMI Test Receiver	R&S	ESCI3	101393	4.42 SP3	Oct. 24, 2025	Oct. 23, 2026
7	Triple-Loop Antenna	N/A	RF300	9194	N/A	Sep. 19, 2025	Sep. 18, 2026
8	Absorbing Clamp	DZ	ZN23201	15034	N/A	Sep. 23, 2025	Sep. 22, 2026
9	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\

Radiation Emissions Test

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	N9020A	MY55370835	A.17.05	Sep. 20, 2025	Sep. 19, 2026
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Sep. 20, 2025	Sep. 19, 2026
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	100969	4.32	Oct. 24, 2025	Oct. 23, 2026
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	00877	N/A	Sep. 20, 2025	Sep. 19, 2026
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	N/A	Sep. 20, 2025	Sep. 19, 2026
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	N/A	Sep. 30, 2025	Sep. 29, 2026
7	Loop Antenna	TESEQ	HLA6121	58357	N/A	Sep. 20, 2025	Sep. 19, 2026
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	60747	N/A	Sep. 19, 2025	Sep. 18, 2026
9	Amplifier (1GHz-26.5GHz)	HuiPu	8449B	3008A00315	N/A	Sep. 19, 2025	Sep. 18, 2026
10	Amplifier (500MHz-40GHz)	QuanJuDa	DLE-161	097	N/A	Oct. 24, 2025	Oct. 23, 2026
11	Test Cable	N/A	R-01	N/A	N/A	May. 25, 2026	May. 24, 2027
12	Test Cable	N/A	R-02	N/A	N/A	May. 25, 2026	May. 24, 2027
13	Test Cable	N/A	R-03	N/A	N/A	May. 25, 2026	May. 24, 2027
14	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	\	\
15	EMC Software	Frad	EZ-EMC	Ver.EMC-CO N 3A1.1	N/A	\	\
16	Turntable	MF	MF-7802BS	N/A	N/A	\	\
17	Antenna tower	MF	MF-7802BS	N/A	N/A	\	\



RF Conducted Test

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	N9020A	MY55370835	A.17.05	Sep. 20, 2025	Sep. 19, 2026
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Sep. 20, 2025	Sep. 19, 2026
3	Test Cable	N/A	RF-01	N/A	N/A	May. 25, 2026	May. 24, 2027
4	Test Cable	N/A	RF-02	N/A	N/A	May. 25, 2026	May. 24, 2027
5	Test Cable	N/A	RF-03	N/A	N/A	May. 25, 2026	May. 24, 2027
6	ESG Signal Generator	Agilent	E4421B	N/A	B.03.84	Sep. 19, 2026	Sep. 18, 2026
7	Signal Generator	Agilent	N5182A	N/A	A.01.87	Sep. 20, 2025	Sep. 19, 2026
8	Magnetic Field Probe Tester	Narda	ELT-400	0-0344/M-1752	N/A	Sep. 25, 2025	Sep. 24, 2026
9	SHIELD BOX	TESCOM	TC-5970C	5970C015553	N/A	Dec. 18, 2025	Dec. 17, 2026
10	Wideband Radio Communication Test	R&S	CMW500	106504	V 3.7.22	Sep. 28, 2025	Sep. 27, 2026
11	MWRF Power Meter Test system	MW	MW100-RF CB	N/A	N/A	Sep. 19, 2025	Sep. 18, 2026
12	D.C. Power Supply	LongWei	TPR-6405 D	N/A	N/A	\	\
13	RF Software	MW	MTS8310	V2.0.0.0	N/A	\	\



4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
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

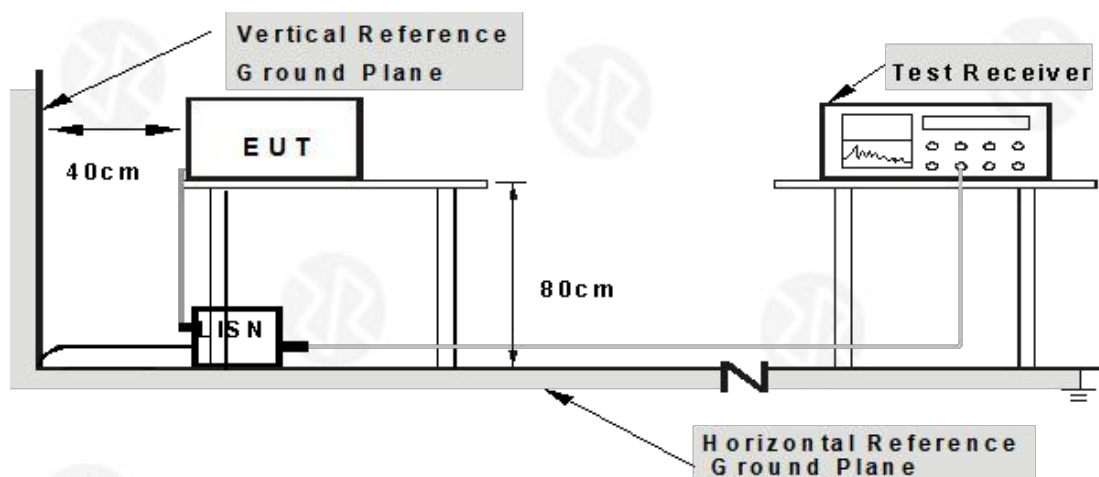
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments
- a. powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring 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.
I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the
 - c. 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 cm from other units and other metal planes

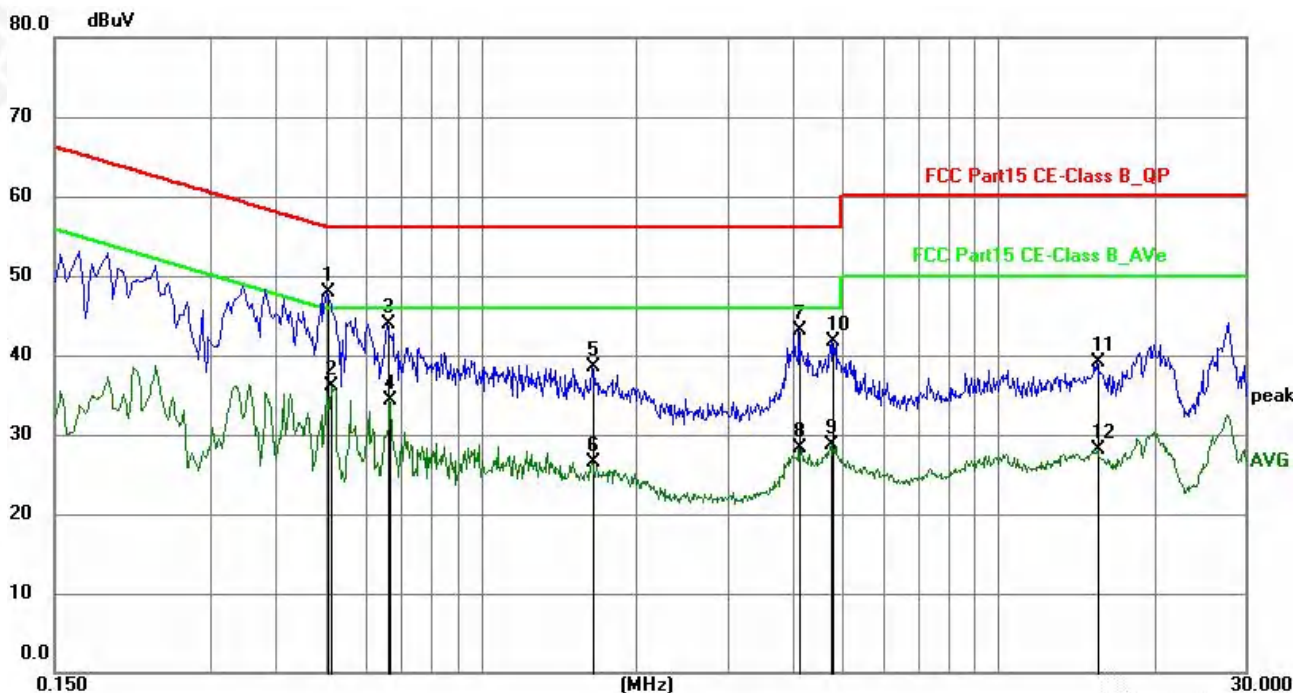
4.1.5 EUT OPERATING CONDITIONS

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.



4.1.6 TEST RESULT

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	L
Test Voltage:	DC 15V from adapter AC120V	Test Mode:	802.11n20 - 5785MHz



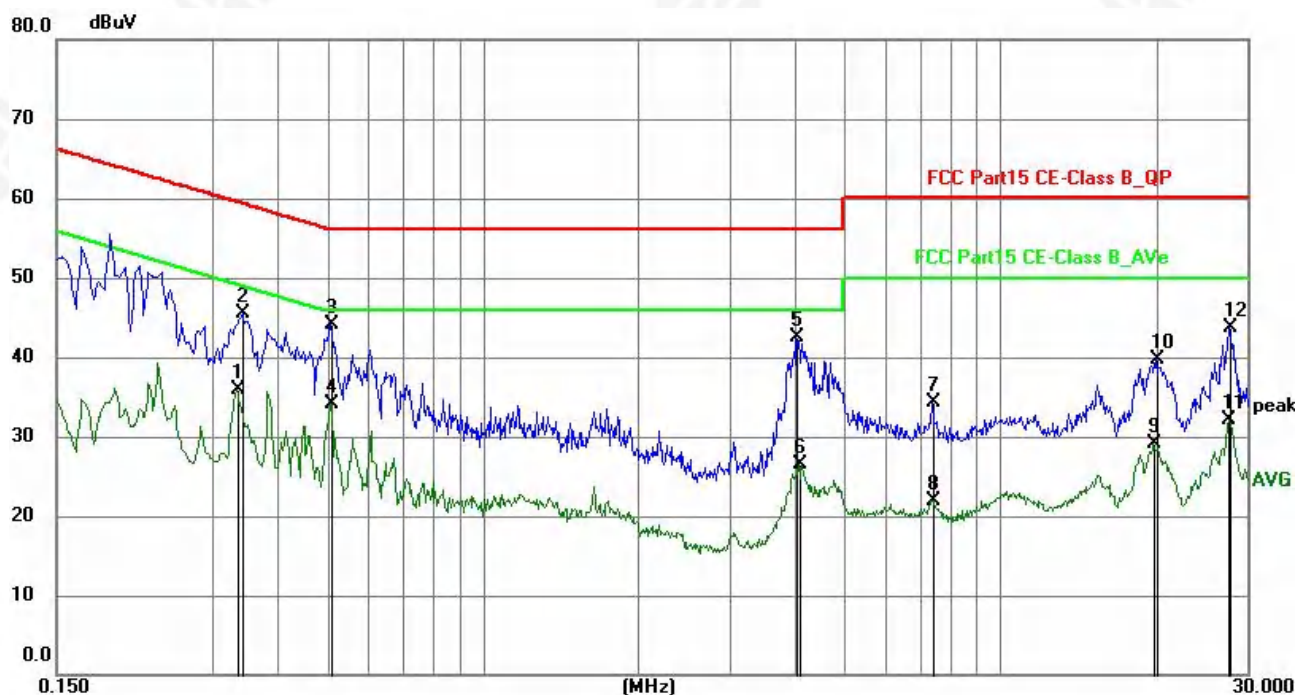
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.5054	28.27	19.64	47.91	56.00	-8.09	QP	P	
2	0.5144	16.50	19.64	36.14	46.00	-9.86	AVG	P	
3	0.6583	24.29	19.64	43.93	56.00	-12.07	QP	P	
4	0.6673	14.69	19.64	34.33	46.00	-11.67	AVG	P	
5	1.6438	18.82	19.67	38.49	56.00	-17.51	QP	P	
6	1.6438	6.90	19.67	26.57	46.00	-19.43	AVG	P	
7	4.1325	23.39	19.71	43.10	56.00	-12.90	QP	P	
8	4.1325	8.50	19.71	28.21	46.00	-17.79	AVG	P	
9	4.7714	9.05	19.71	28.76	46.00	-17.24	AVG	P	
10	4.7938	22.02	19.71	41.73	56.00	-14.27	QP	P	
11	15.4725	19.31	19.78	39.09	60.00	-20.91	QP	P	
12	15.5805	8.36	19.78	28.14	50.00	-21.86	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. Final Level = Reading level + Correct Factor.
4. Correct Factor = Lism factor+ Cable loss factor + limiter factor.
5. Margin = Measurement Level-Limit.
6. The test data shows only the worst case TX 802.11n20 - 5785MHz



Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	N
Test Voltage:	DC 15V from adapter AC120V	Test Mode:	802.11n20 - 5785MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3345	16.22	19.64	35.86	49.34	-13.48	AVG	P	
2	0.3435	25.88	19.64	45.52	59.12	-13.60	QP	P	
3	0.5100	24.50	19.64	44.14	56.00	-11.86	QP	P	
4	0.5100	14.49	19.64	34.13	46.00	-11.87	AVG	P	
5	4.0380	22.88	19.69	42.57	56.00	-13.43	QP	P	
6	4.0785	6.73	19.69	26.42	46.00	-19.58	AVG	P	
7	7.3724	14.60	19.73	34.33	60.00	-25.67	QP	P	
8	7.4130	2.25	19.73	21.98	50.00	-28.02	AVG	P	
9	19.7880	9.43	19.77	29.20	50.00	-20.80	AVG	P	
10	19.9679	19.87	19.77	39.64	60.00	-20.36	QP	P	
11	27.6675	12.44	19.73	32.17	50.00	-17.83	AVG	P	
12	27.7394	23.90	19.73	43.63	60.00	-16.37	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. Final Level = Reading level + Correct Factor.
4. Correct Factor = Lisen factor+ Cable loss factor + limiter factor.
5. Margin = Measurement Level-Limit.
6. The test data shows only the worst case TX 8802.11n20 - 5785MHz.



4.2 RADIATED EMISSION AND BAND EDGE MEASUREMENT

4.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(b)(1) and 15.407(b)(4)(i) and 15.205(a) and 15.209(a).

4.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b)(1) Undesirable emission limits. Except as shown in paragraph (b)(10) 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.

Frequency Range	Peak	Average
All emissions outside of the 5.15-5.35 GHz band shall not exceed	68.20 (dBuV/m)	54 (dBuV/m)

(4) For transmitters operating solely in the 5.725-5.850 GHz band:

(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Frequency Range	Peak	Average
All emissions shall be limited	68.20 (dBuV/m)	54 (dBuV/m)
Band edge $\pm$ 75 MHz	105.20 (dBuV/m)	54 (dBuV/m)
Band edge $\pm$ 25 MHz	110.80 (dBuV/m)	54 (dBuV/m)
Band edge $\pm$ 5 MHz	122.20 (dBuV/m)	54 (dBuV/m)

According to FCC Part 15.407(b)(10): 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 Part 15.205, 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			



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

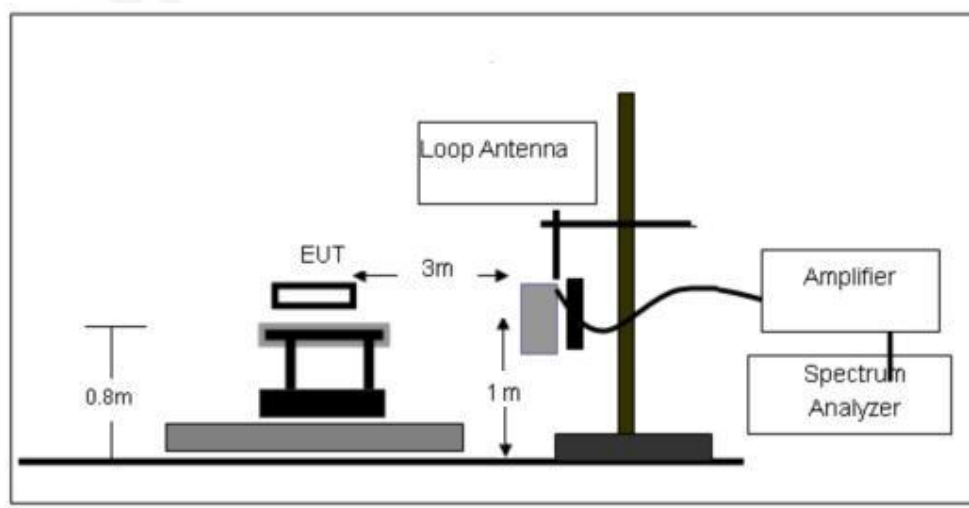
Remark: 1. Emission level in dBuV/m = 20 log (uV/m);
2. Measurement was performed at an antenna to the closed point of EUT distance of meters;
3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
4. Limit line=Specific limits(dBuV) + distance extrapolation factor;
5. Emission level in dBuV/m = (dBm) + 95.2.

4.2.3 MEASURING INSTRUMENTS

The Measuring equipment is listed in the section 3.5 of this test report.

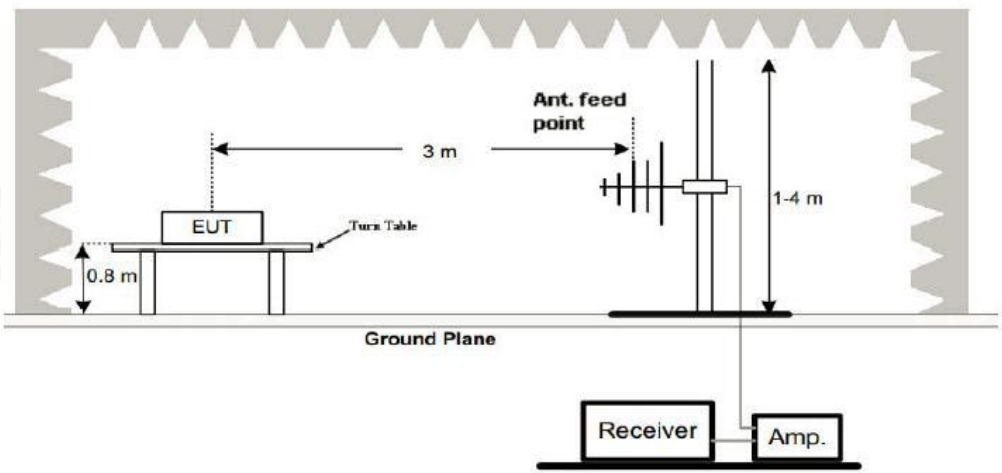
4.2.4 TEST CONFIGURATION

1.For radiated emissions below 30MHz

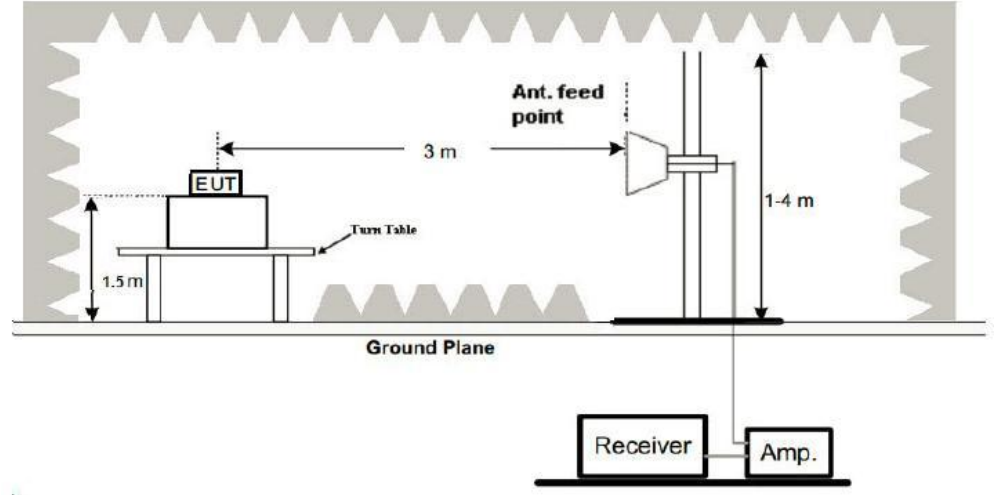




2. For radiated emissions from 30MHz to 1000MHz



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 C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 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



- 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.
- 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.
- 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.
- 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.
- 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.
- 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 $RBWCF [dB] = 10 \cdot \lg(100 [kHz] / \text{narrower RBW [kHz]})$. , 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 RADIATED EMISSION TEST RESULT

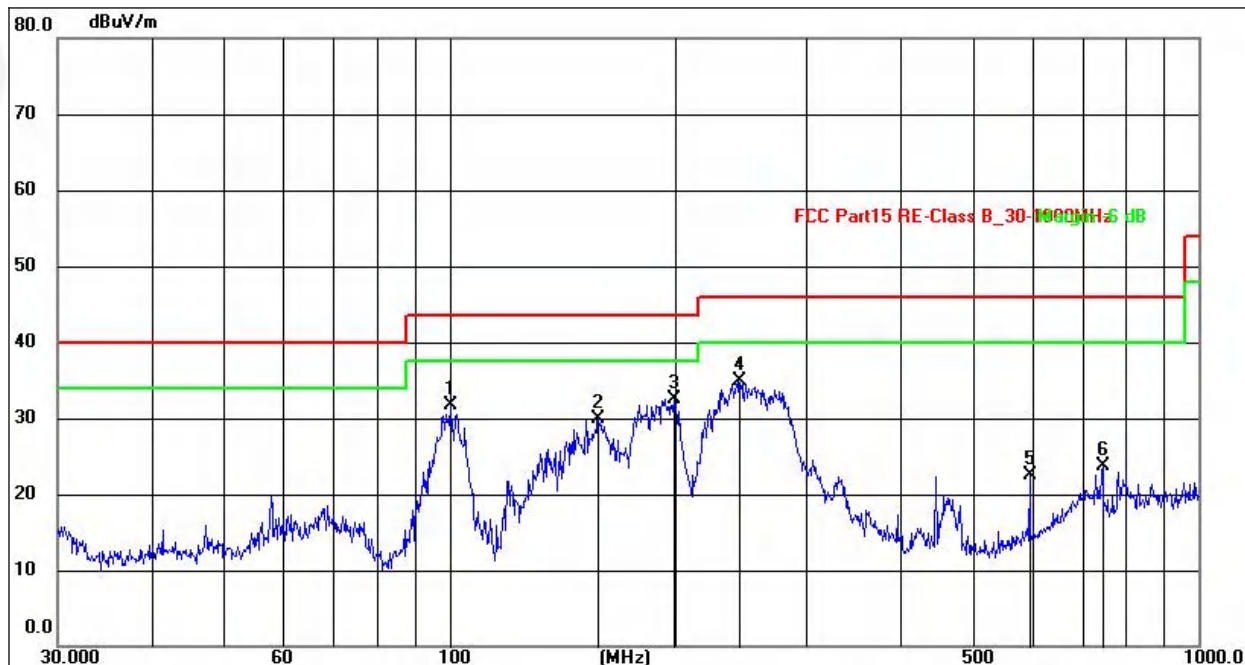
Between 9KHz – 30MHz

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:	DC 11.1V	Test Mode :	TX 802.11n20 - 5785MHz



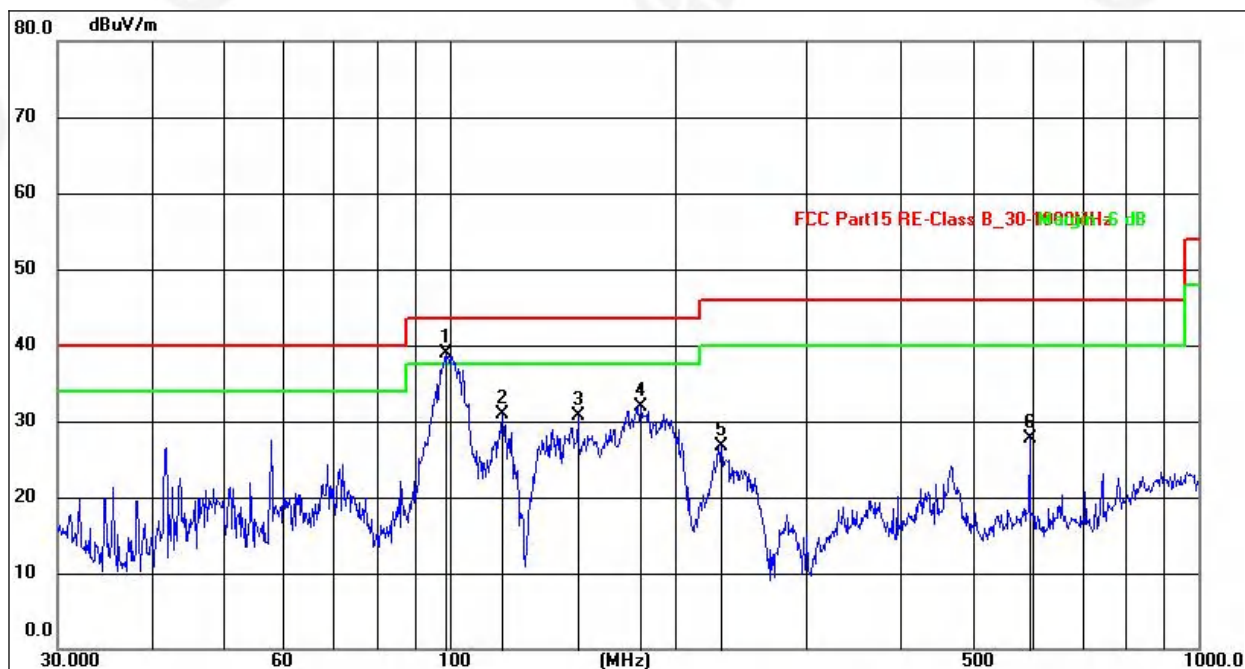
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	100.2286	53.07	-21.43	31.64	43.50	-11.86	QP
2	158.1123	48.66	-18.77	29.89	43.50	-13.61	QP
3	199.2855	54.41	-21.91	32.50	43.50	-11.00	QP
4	243.3772	54.89	-19.92	34.97	46.00	-11.03	QP
5	595.1329	36.85	-14.36	22.49	46.00	-23.51	QP
6	744.8661	36.49	-12.72	23.77	46.00	-22.23	QP

Notes:

- 1.An initial pre-scan was performed on the peak detector.
- 2.Quasi - Peak measurement were performed at the frequencies with maximized peak emission.
- 3.The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4.Final Level = Reading level + Correct Factor.
- 5.Correct Factor = Antenna factor+ Cable loss factor - Amplifier factor.
- 6.Margin = Measurement Level-Limit.
- 7.The test data shows only the worst case TX 802.11n20 - 5785MHz.



Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 11.1V	Test Mode :	TX 802.11n20 - 5785MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	99.1797	61.83	-22.86	38.97	43.50	-4.53	QP
2	117.7725	54.10	-23.24	30.86	43.50	-12.64	QP
3	148.4410	53.60	-22.97	30.63	43.50	-12.87	QP
4	180.0164	54.68	-22.69	31.99	43.50	-11.51	QP
5	230.9067	50.62	-23.92	26.70	46.00	-19.30	QP
6	595.1327	41.10	-13.35	27.75	46.00	-18.25	QP

Notes:

- 1.An initial pre-scan was performed on the peak detector.
- 2.Quasi - Peak measurement were performed at the frequencies with maximized peak emission.
- 3.The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4.Final Level = Reading level + Correct Factor.
- 5.Correct Factor = Antenna factor+ Cable loss factor - Amplifier factor.
- 6.Margin = Measurement Level-Limit.
- 7.The test data shows only the worst case TX 802.11n20 - 5785MHz.



Between 1GHz – 40GHz:

Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 11.1V
Test Band :	5.8G TX -802.11a/n20/n40/ac20/ac40/ac80		
Note: All patterns have been tested, and only the worst test data recorded in this report is 802.11a/n20/ac20.			

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)	Detect or Type
High Channel:5745MHz									
V	11490.00	37.94	34.30	5.80	41.20	50.64	74.00	-23.36	PK
V	11490.00	26.12	34.30	5.80	41.20	38.82	54.00	-15.18	AV
V	17235.00	38.11	32.10	6.00	43.50	55.51	68.20	-12.69	PK
V	17235.00	26.65	32.10	6.00	43.50	44.05	54.00	-9.95	AV
V	22980.00	39.76	31.00	6.20	45.50	60.46	74.00	-13.54	PK
V	22980.00	27.63	31.00	6.20	45.50	48.33	54.00	-5.67	AV
V	28725.00	41.08	29.10	6.40	45.70	64.08	68.20	-4.12	PK
V	28725.00	28.90	29.10	6.40	45.70	51.90	54.00	-2.10	AV
H	11490.00	37.88	34.30	5.80	41.20	50.58	74.00	-23.42	PK
H	11490.00	26.17	34.30	5.80	41.20	38.87	54.00	-15.13	AV
H	17235.00	38.19	32.10	6.00	43.50	55.59	68.20	-12.61	PK
H	17235.00	26.73	32.10	6.00	43.50	44.13	54.00	-9.87	AV
H	22980.00	39.84	31.00	6.20	45.50	60.54	74.00	-13.46	PK
H	22980.00	27.69	31.00	6.20	45.50	48.39	54.00	-5.61	AV
H	28725.00	41.09	29.10	6.40	45.70	64.09	68.20	-4.11	PK
H	28725.00	28.85	29.10	6.40	45.70	51.85	54.00	-2.15	AV
Low Channel:5785MHz									
V	11490.00	37.80	34.30	5.80	41.20	50.50	74.00	-23.50	PK
V	11490.00	26.01	34.30	5.80	41.20	38.71	54.00	-15.29	AV
V	17235.00	37.98	32.10	6.00	43.50	55.38	68.20	-12.82	PK
V	17235.00	26.59	32.10	6.00	43.50	43.99	54.00	-10.01	AV
V	22980.00	39.61	31.00	6.20	45.50	60.31	68.20	-7.89	PK
V	22980.00	27.45	31.00	6.20	45.50	48.15	54.00	-5.85	AV
V	28725.00	40.83	29.10	6.40	45.70	63.83	68.20	-4.37	PK
V	28725.00	28.69	29.10	6.40	45.70	51.69	54.00	-2.31	AV
H	11490.00	37.79	34.30	5.80	41.20	50.49	74.00	-23.51	PK
H	11490.00	26.06	34.30	5.80	41.20	38.76	54.00	-15.24	AV
H	17235.00	37.95	32.10	6.00	43.50	55.35	68.20	-12.85	PK
H	17235.00	26.58	32.10	6.00	43.50	43.98	54.00	-10.02	AV
H	22980.00	39.65	31.00	6.20	45.50	60.35	68.20	-7.85	PK
H	22980.00	27.46	31.00	6.20	45.50	48.16	54.00	-5.84	AV
H	28725.00	40.88	29.10	6.40	45.70	63.88	68.20	-4.32	PK
H	28725.00	28.67	29.10	6.40	45.70	51.67	54.00	-2.33	AV



Middle Channel:5825MHz									
V	11650.00	37.76	34.30	5.80	41.20	50.46	74.00	-23.54	PK
V	11650.00	25.99	34.30	5.80	41.20	38.69	54.00	-15.31	AV
V	17475.00	38.06	32.10	6.00	43.50	55.46	68.20	-12.74	PK
V	17475.00	26.50	32.10	6.00	43.50	43.90	54.00	-10.10	AV
V	23300.00	39.56	31.00	6.20	45.50	60.26	68.20	-7.94	PK
V	23300.00	27.39	31.00	6.20	45.50	48.09	54.00	-5.91	AV
V	29125.00	40.89	29.10	6.40	45.70	63.89	68.20	-4.31	PK
V	29125.00	28.63	29.10	6.40	45.70	51.63	54.00	-2.37	AV
H	11650.00	37.81	34.30	5.80	41.20	50.51	74.00	-23.49	PK
H	11650.00	26.06	34.30	5.80	41.20	38.76	54.00	-15.24	AV
H	17475.00	37.96	32.10	6.00	43.50	55.36	68.20	-12.84	PK
H	17475.00	26.48	32.10	6.00	43.50	43.88	54.00	-10.12	AV
H	23300.00	39.71	31.00	6.20	45.50	60.41	68.20	-7.79	PK
H	23300.00	27.55	31.00	6.20	45.50	48.25	54.00	-5.75	AV
H	29125.00	40.83	29.10	6.40	45.70	63.83	68.20	-4.37	PK
H	29125.00	28.63	29.10	6.40	45.70	51.63	54.00	-2.37	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.



802.11n20

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)	Detect or Type
Low Channel:5745MHz									
V	11490.00	37.87	34.30	5.80	41.20	50.57	74.00	-23.43	PK
V	11490.00	26.15	34.30	5.80	41.20	38.85	54.00	-15.15	AV
V	17235.00	38.17	32.10	6.00	43.50	55.57	68.20	-12.63	PK
V	17235.00	26.67	32.10	6.00	43.50	44.07	54.00	-9.93	AV
V	22980.00	39.77	31.00	6.20	45.50	60.47	74.00	-13.53	PK
V	22980.00	27.69	31.00	6.20	45.50	48.39	54.00	-5.61	AV
V	28725.00	41.07	29.10	6.40	45.70	64.07	68.20	-4.13	PK
V	28725.00	28.97	29.10	6.40	45.70	51.97	54.00	-2.03	AV
H	11490.00	37.95	34.30	5.80	41.20	50.65	74.00	-23.35	PK
H	11490.00	26.21	34.30	5.80	41.20	38.91	54.00	-15.09	AV
H	17235.00	38.17	32.10	6.00	43.50	55.57	68.20	-12.63	PK
H	17235.00	26.64	32.10	6.00	43.50	44.04	54.00	-9.96	AV
H	22980.00	39.87	31.00	6.20	45.50	60.57	74.00	-13.43	PK
H	22980.00	27.60	31.00	6.20	45.50	48.30	54.00	-5.70	AV
H	28725.00	41.01	29.10	6.40	45.70	64.01	68.20	-4.19	PK
H	28725.00	28.93	29.10	6.40	45.70	51.93	54.00	-2.07	AV
Middle Channel:5785MHz									
V	11570.00	37.74	34.30	5.80	41.20	50.44	74.00	-23.56	PK
V	11570.00	26.02	34.30	5.80	41.20	38.72	54.00	-15.28	AV
V	17355.00	38.01	32.10	6.00	43.50	55.41	68.20	-12.79	PK
V	17355.00	26.60	32.10	6.00	43.50	44.00	54.00	-10.00	AV
V	23140.00	39.58	31.00	6.20	45.50	60.28	68.20	-7.92	PK
V	23140.00	27.47	31.00	6.20	45.50	48.17	54.00	-5.83	AV
V	28925.00	40.82	29.10	6.40	45.70	63.82	68.20	-4.38	PK
V	28925.00	28.77	29.10	6.40	45.70	51.77	54.00	-2.23	AV
H	11570.00	37.82	34.30	5.80	41.20	50.52	74.00	-23.48	PK
H	11570.00	26.07	34.30	5.80	41.20	38.77	54.00	-15.23	AV
H	17355.00	38.07	32.10	6.00	43.50	55.47	68.20	-12.73	PK
H	17355.00	26.54	32.10	6.00	43.50	43.94	54.00	-10.06	AV
H	23140.00	39.67	31.00	6.20	45.50	60.37	68.20	-7.83	PK
H	23140.00	27.48	31.00	6.20	45.50	48.18	54.00	-5.82	AV
H	28925.00	40.89	29.10	6.40	45.70	63.89	68.20	-4.31	PK
H	28925.00	28.79	29.10	6.40	45.70	51.79	54.00	-2.21	AV



High Channel:5825MHz									
V	11650.00	37.77	34.30	5.80	41.20	50.47	74.00	-23.53	PK
V	11650.00	26.05	34.30	5.80	41.20	38.75	54.00	-15.25	AV
V	17475.00	38.03	32.10	6.00	43.50	55.43	68.20	-12.77	PK
V	17475.00	26.53	32.10	6.00	43.50	43.93	54.00	-10.07	AV
V	23300.00	39.70	31.00	6.20	45.50	60.40	68.20	-7.80	PK
V	23300.00	27.56	31.00	6.20	45.50	48.26	54.00	-5.74	AV
V	29125.00	40.91	29.10	6.40	45.70	63.91	68.20	-4.29	PK
V	29125.00	28.78	29.10	6.40	45.70	51.78	54.00	-2.22	AV
H	11650.00	37.69	34.30	5.80	41.20	50.39	74.00	-23.61	PK
H	11650.00	26.00	34.30	5.80	41.20	38.70	54.00	-15.30	AV
H	17475.00	38.04	32.10	6.00	43.50	55.44	68.20	-12.76	PK
H	17475.00	26.51	32.10	6.00	43.50	43.91	54.00	-10.09	AV
H	23300.00	39.59	31.00	6.20	45.50	60.29	68.20	-7.91	PK
H	23300.00	27.35	31.00	6.20	45.50	48.05	54.00	-5.95	AV
H	29125.00	40.96	29.10	6.40	45.70	63.96	68.20	-4.24	PK
H	29125.00	28.55	29.10	6.40	45.70	51.55	54.00	-2.45	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.



802.11ac20

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)	Detect or Type
Low Channel:5745MHz									
V	11490.00	37.86	34.30	5.80	41.20	50.56	74.00	-23.44	PK
V	11490.00	26.14	34.30	5.80	41.20	38.84	54.00	-15.16	AV
V	17235.00	38.21	32.10	6.00	43.50	55.61	68.20	-12.59	PK
V	17235.00	26.73	32.10	6.00	43.50	44.13	54.00	-9.87	AV
V	22980.00	39.83	31.00	6.20	45.50	60.53	74.00	-13.47	PK
V	22980.00	27.65	31.00	6.20	45.50	48.35	54.00	-5.65	AV
V	28725.00	40.97	29.10	6.40	45.70	63.97	68.20	-4.23	PK
V	28725.00	28.88	29.10	6.40	45.70	51.88	54.00	-2.12	AV
H	11490.00	37.87	34.30	5.80	41.20	50.57	74.00	-23.43	PK
H	11490.00	26.14	34.30	5.80	41.20	38.84	54.00	-15.16	AV
H	17235.00	38.24	32.10	6.00	43.50	55.64	68.20	-12.56	PK
H	17235.00	26.71	32.10	6.00	43.50	44.11	54.00	-9.89	AV
H	22980.00	39.73	31.00	6.20	45.50	60.43	74.00	-13.57	PK
H	22980.00	27.73	31.00	6.20	45.50	48.43	54.00	-5.57	AV
H	28725.00	40.99	29.10	6.40	45.70	63.99	68.20	-4.21	PK
H	28725.00	28.96	29.10	6.40	45.70	51.96	54.00	-2.04	AV
Middle Channel:5785MHz									
V	11570.00	37.82	34.30	5.80	41.20	50.52	74.00	-23.48	PK
V	11570.00	26.08	34.30	5.80	41.20	38.78	54.00	-15.22	AV
V	17355.00	38.02	32.10	6.00	43.50	55.42	68.20	-12.78	PK
V	17355.00	26.49	32.10	6.00	43.50	43.89	54.00	-10.11	AV
V	23140.00	39.57	31.00	6.20	45.50	60.27	68.20	-7.93	PK
V	23140.00	27.43	31.00	6.20	45.50	48.13	54.00	-5.87	AV
V	28925.00	40.80	29.10	6.40	45.70	63.80	68.20	-4.40	PK
V	28925.00	28.60	29.10	6.40	45.70	51.60	54.00	-2.40	AV
H	11570.00	37.71	34.30	5.80	41.20	50.41	74.00	-23.59	PK
H	11570.00	26.11	34.30	5.80	41.20	38.81	54.00	-15.19	AV
H	17355.00	38.09	32.10	6.00	43.50	55.49	68.20	-12.71	PK
H	17355.00	26.49	32.10	6.00	43.50	43.89	54.00	-10.11	AV
H	23140.00	39.63	31.00	6.20	45.50	60.33	68.20	-7.87	PK
H	23140.00	27.51	31.00	6.20	45.50	48.21	54.00	-5.79	AV
H	28925.00	40.91	29.10	6.40	45.70	63.91	68.20	-4.29	PK
H	28925.00	28.73	29.10	6.40	45.70	51.73	54.00	-2.27	AV



High Channel:5825MHz									
V	11650.00	37.83	34.30	5.80	41.20	50.53	74.00	-23.47	PK
V	11650.00	26.09	34.30	5.80	41.20	38.79	54.00	-15.21	AV
V	17475.00	38.04	32.10	6.00	43.50	55.44	68.20	-12.76	PK
V	17475.00	26.55	32.10	6.00	43.50	43.95	54.00	-10.05	AV
V	23300.00	39.58	31.00	6.20	45.50	60.28	68.20	-7.92	PK
V	23300.00	27.42	31.00	6.20	45.50	48.12	54.00	-5.88	AV
V	29125.00	40.87	29.10	6.40	45.70	63.87	68.20	-4.33	PK
V	29125.00	28.63	29.10	6.40	45.70	51.63	54.00	-2.37	AV
H	11650.00	37.70	34.30	5.80	41.20	50.40	74.00	-23.60	PK
H	11650.00	26.10	34.30	5.80	41.20	38.80	54.00	-15.20	AV
H	17475.00	38.10	32.10	6.00	43.50	55.50	68.20	-12.70	PK
H	17475.00	26.52	32.10	6.00	43.50	43.92	54.00	-10.08	AV
H	23300.00	39.53	31.00	6.20	45.50	60.23	68.20	-7.97	PK
H	23300.00	27.35	31.00	6.20	45.50	48.05	54.00	-5.95	AV
H	29125.00	40.90	29.10	6.40	45.70	63.90	68.20	-4.30	PK
H	29125.00	28.69	29.10	6.40	45.70	51.69	54.00	-2.31	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.



4.2.7 RADIATED BAND EDGE TEST RESULT

Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 11.1V
Test Band :	5.8G TX -802.11a/n20/n40/ac20/ac40/ac80		
Note: All patterns have been tested, and only the worst test data recorded in this report is a/n20/ac20			

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)	Detect or Type
Low Channel:5745MHz									
V	5700.00	64.49	34.80	3.86	36.20	69.75	110.80	-41.05	PK
V	5700.00	35.69	34.80	3.86	36.20	40.95	54.00	-13.05	AV
V	5725.00	63.00	34.80	3.86	36.20	68.26	122.20	-53.94	PK
V	5725.00	34.84	34.80	3.86	36.20	40.10	54.00	-13.90	AV
H	5700.00	63.71	34.80	3.86	36.20	68.97	110.80	-41.83	PK
H	5700.00	35.95	34.80	3.86	36.20	41.21	54.00	-12.79	AV
H	5725.00	65.12	34.80	3.86	36.20	70.38	122.20	-51.82	PK
H	5725.00	35.97	34.80	3.86	36.20	41.23	54.00	-12.77	AV
High Channel:5825MHz									
V	5850.00	65.50	34.90	3.88	36.30	70.78	122.20	-51.42	PK
V	5850.00	34.46	34.90	3.88	36.30	39.74	54.00	-14.26	AV
V	5875.00	64.63	34.90	3.88	36.30	69.91	110.80	-40.89	PK
V	5875.00	33.75	34.90	3.88	36.30	39.03	54.00	-14.97	AV
H	5850.00	65.81	34.90	3.88	36.30	71.09	122.20	-51.11	PK
H	5850.00	35.84	34.90	3.88	36.30	41.12	54.00	-12.88	AV
H	5875.00	64.10	34.90	3.88	36.30	69.38	110.80	-41.42	PK
H	5875.00	34.89	34.90	3.88	36.30	40.17	54.00	-13.83	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.



802.11n20

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:5745MHz									
V	5700.00	64.52	34.80	3.86	36.20	69.78	110.80	-41.02	PK
V	5700.00	35.83	34.80	3.86	36.20	41.09	54.00	-12.91	AV
V	5725.00	62.64	34.80	3.86	36.20	67.90	122.20	-54.30	PK
V	5725.00	34.53	34.80	3.86	36.20	39.79	54.00	-14.21	AV
H	5700.00	64.09	34.80	3.86	36.20	69.35	110.80	-41.45	PK
H	5700.00	35.78	34.80	3.86	36.20	41.04	54.00	-12.96	AV
H	5725.00	65.48	34.80	3.86	36.20	70.74	122.20	-51.46	PK
H	5725.00	35.65	34.80	3.86	36.20	40.91	54.00	-13.09	AV
High Channel:5825MHz									
V	5850.00	65.83	34.90	3.88	36.30	71.11	122.20	-51.09	PK
V	5850.00	34.72	34.90	3.88	36.30	40.00	54.00	-14.00	AV
V	5875.00	65.31	34.90	3.88	36.30	70.59	110.80	-40.21	PK
V	5875.00	34.09	34.90	3.88	36.30	39.37	54.00	-14.63	AV
H	5850.00	66.06	34.90	3.88	36.30	71.34	122.20	-50.86	PK
H	5850.00	35.93	34.90	3.88	36.30	41.21	54.00	-12.79	AV
H	5875.00	63.84	34.90	3.88	36.30	69.12	110.80	-41.68	PK
H	5875.00	34.94	34.90	3.88	36.30	40.22	54.00	-13.78	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.



802.11ac20

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:5745MHz									
V	5700.00	64.97	34.80	3.86	36.20	70.23	110.80	-40.57	PK
V	5700.00	35.50	34.80	3.86	36.20	40.76	54.00	-13.24	AV
V	5725.00	62.96	34.80	3.86	36.20	68.22	122.20	-53.98	PK
V	5725.00	34.81	34.80	3.86	36.20	40.07	54.00	-13.93	AV
H	5700.00	64.03	34.80	3.86	36.20	69.29	110.80	-41.51	PK
H	5700.00	36.20	34.80	3.86	36.20	41.46	54.00	-12.54	AV
H	5725.00	65.57	34.80	3.86	36.20	70.83	122.20	-51.37	PK
H	5725.00	36.42	34.80	3.86	36.20	41.68	54.00	-12.32	AV
High Channel:5825MHz									
V	5850.00	65.65	34.90	3.88	36.30	70.93	122.20	-51.27	PK
V	5850.00	35.05	34.90	3.88	36.30	40.33	54.00	-13.67	AV
V	5875.00	65.35	34.90	3.88	36.30	70.63	110.80	-40.17	PK
V	5875.00	33.69	34.90	3.88	36.30	38.97	54.00	-15.03	AV
H	5850.00	66.36	34.90	3.88	36.30	71.64	122.20	-50.56	PK
H	5850.00	36.31	34.90	3.88	36.30	41.59	54.00	-12.41	AV
H	5875.00	64.14	34.90	3.88	36.30	69.42	110.80	-41.38	PK
H	5875.00	35.31	34.90	3.88	36.30	40.59	54.00	-13.41	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.



5. POWER SPECTRAL DENSITY TEST

5.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(a) (1) Power limits:

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

According to FCC §15.407(a) (3) Power limits:

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:

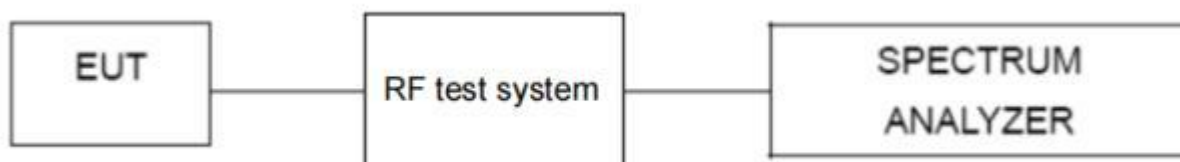
- a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3 RBW$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ to the measured result, whereas $RBW (< 500 \text{ kHz})$ is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10\log(1\text{MHz}/RBW)$ to the measured result, whereas $RBW (< 1 \text{ MHz})$ 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 $RBW=100 \text{ kHz}$ 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 chapter 3, Unless otherwise a special operating condition is specified in the follows during the testing.



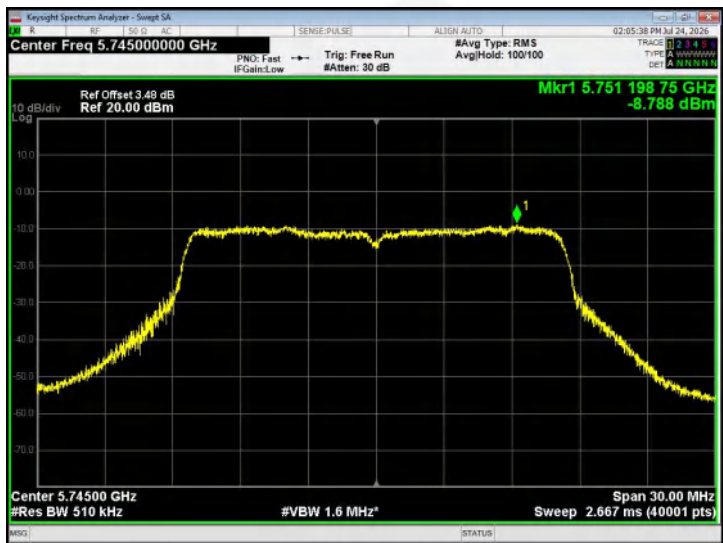
5.6 TEST RESULTS

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1015 hPa	Test Voltage :	DC 11.1V
Test Band :	5.8G		

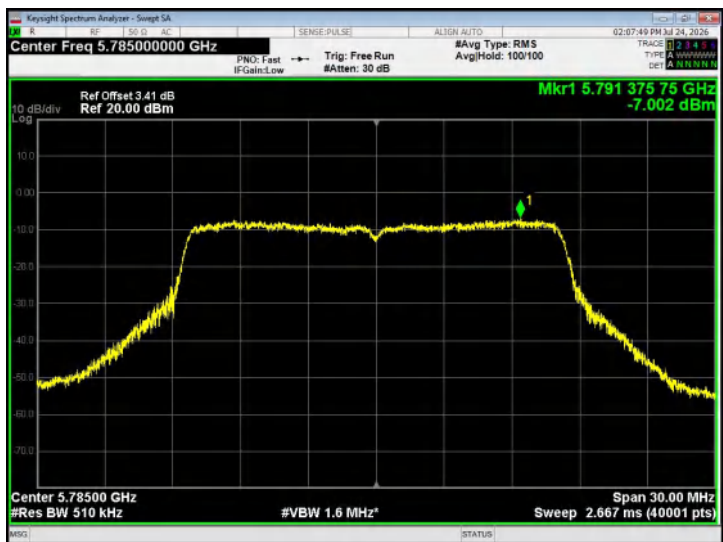
Test mode	Test Channel (MHz)	PSD (dBm/500kHz)	Duty cycle factor (dB)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
802.11a	5745	-8.788	2.04	-6.748	30	Pass
	5785	-7.002	2.04	-4.962	30	Pass
	5825	-6.633	2.04	-4.593	30	Pass
802.11n20	5745	-8.925	1.46	-7.465	30	Pass
	5785	-6.703	1.46	-5.243	30	Pass
	5825	-6.567	1.46	-5.107	30	Pass
802.11n40	5755	-11.775	1.41	-10.365	30	Pass
	5795	-10.592	1.41	-9.182	30	Pass
802.11ac20	5745	-10.991	1.46	-9.531	30	Pass
	5785	-9.403	1.46	-7.943	30	Pass
	5825	-8.655	1.46	-7.195	30	Pass
802.11ac40	5755	-11.938	2.48	-9.458	30	Pass
	5795	-10.219	2.48	-7.739	30	Pass
802.11ac80	5775	-12.186	3.01	-9.176	30	Pass
Note: Total PSD = PSD + Duty cycle factor.						



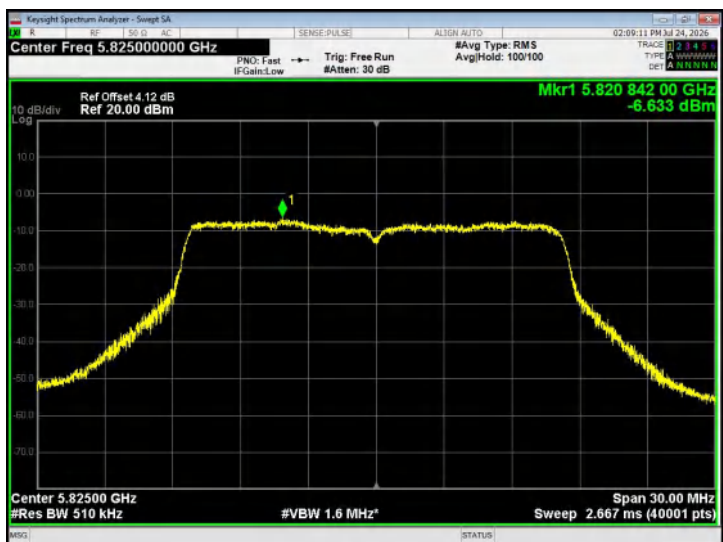
802.11a
CH149



CH157



CH165

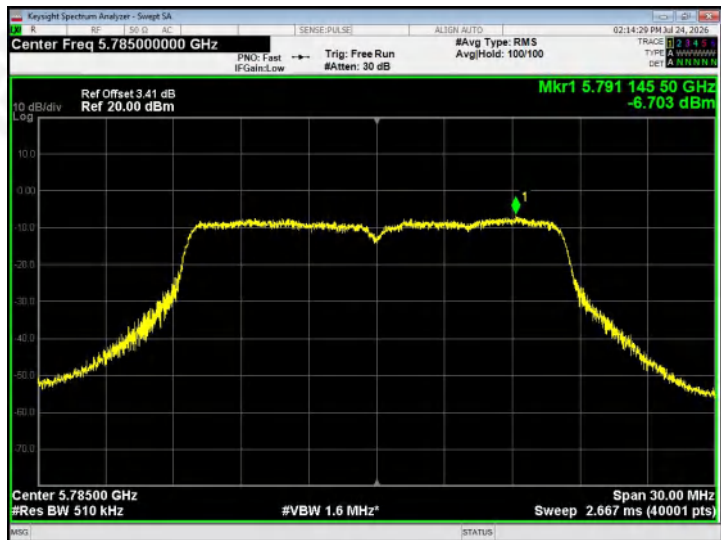




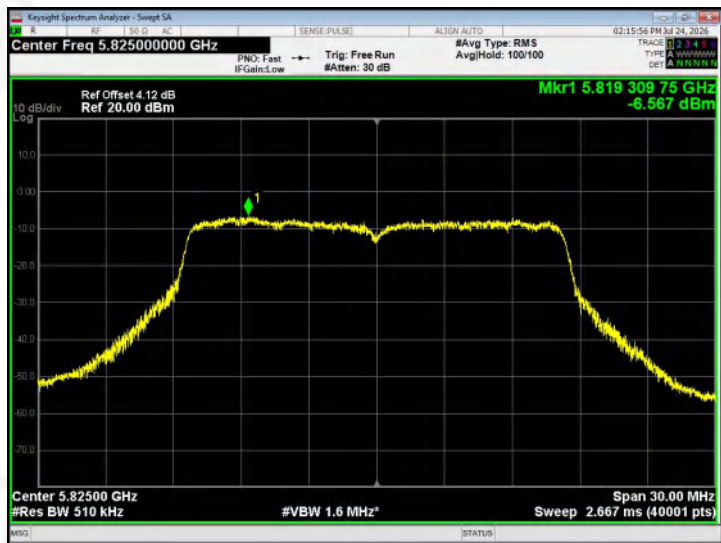
802.11n20
CH149



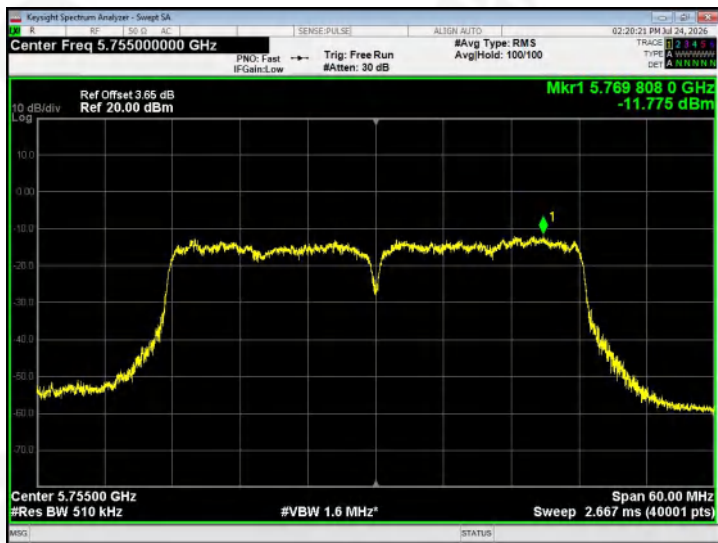
CH157



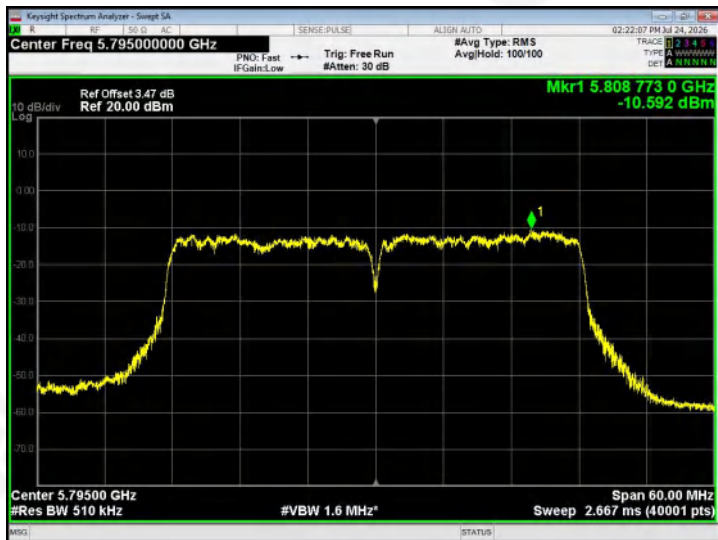
CH165



802.11n40
CH151

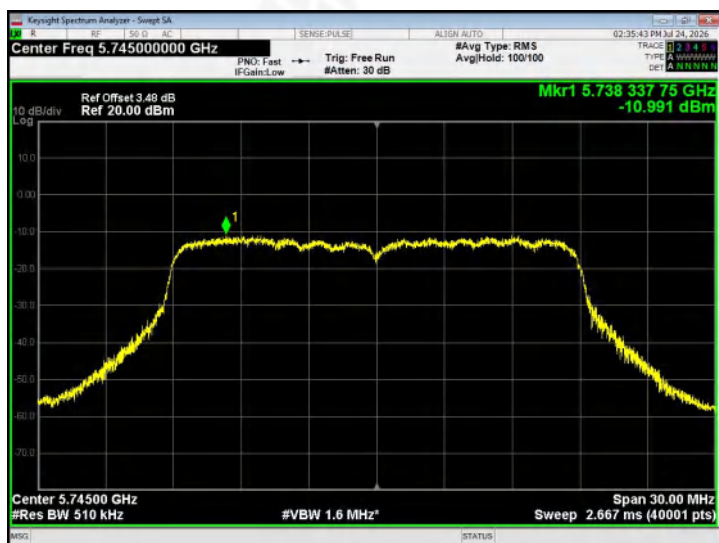


CH159

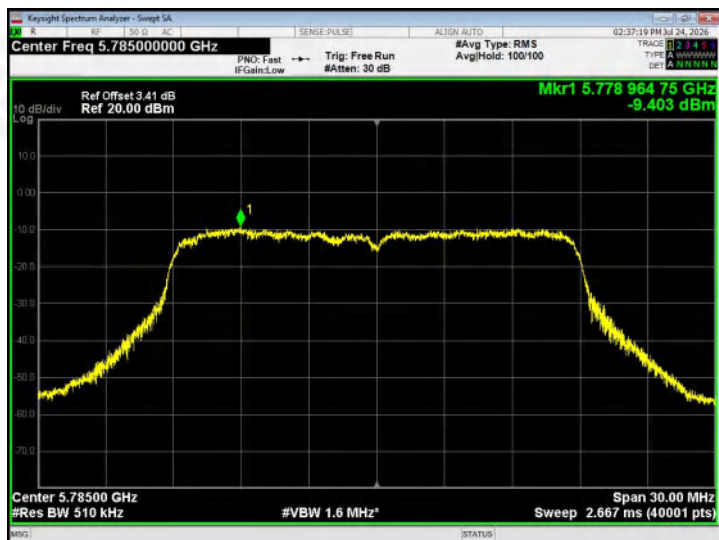




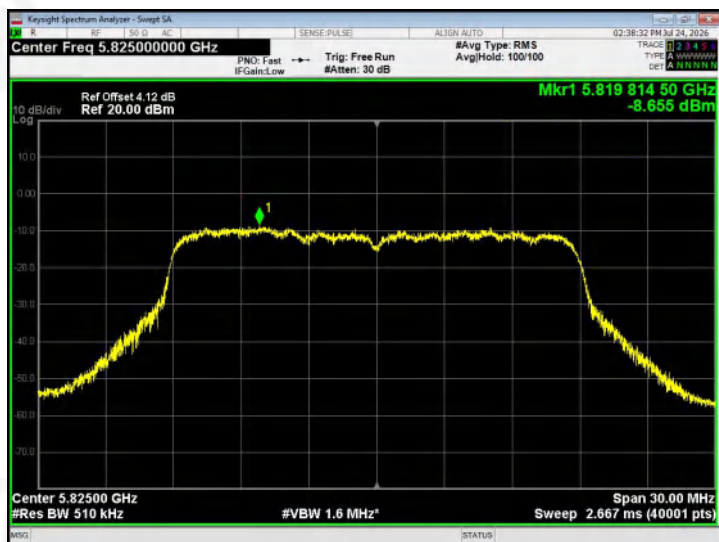
802.11ac20
CH149



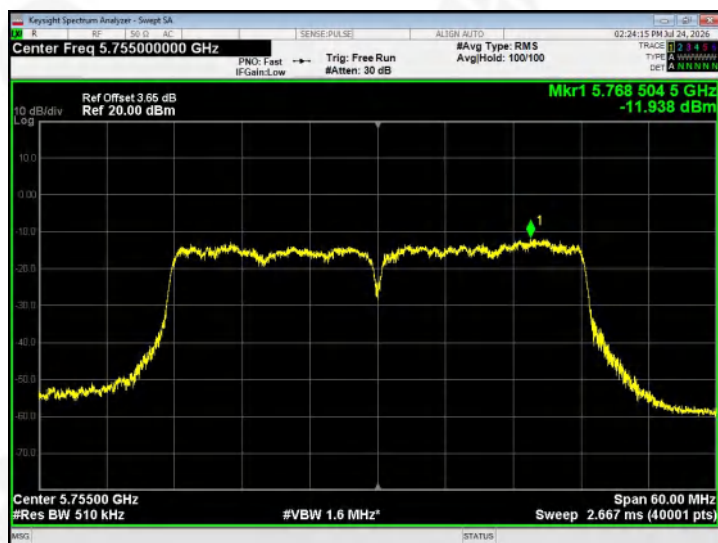
CH157



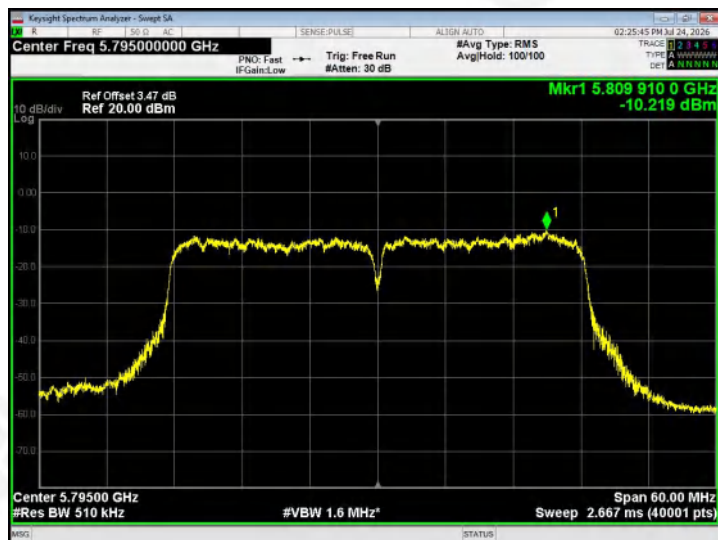
CH165



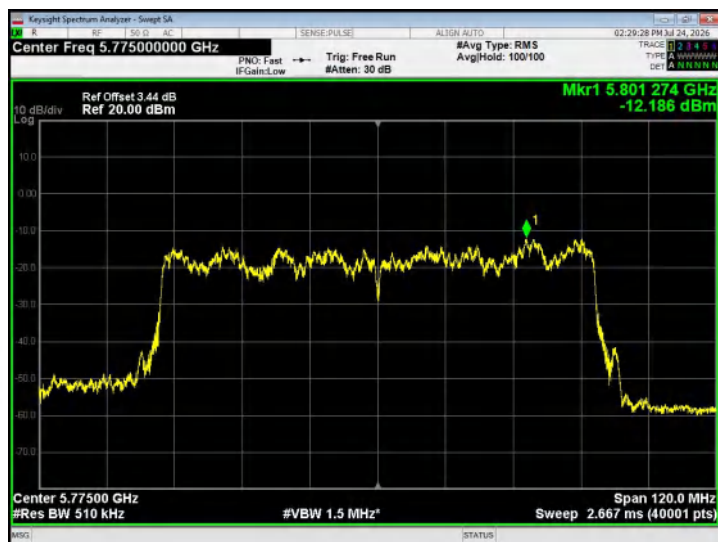
802.11ac40
CH151



CH159



802.11ac80 - CH 155





6. 26DB EMISSION BANDWIDTH & 6DB OCCUPIED 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

1) Emission bandwidth for the band 5.725 GHz to 5.85 GHz.

The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$.
- c) Detector = Peak.
- d) Trace mode = max-hold.
- e) Sweep = No faster than coupled (auto) time.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

2) Emission bandwidth for all other bands 5.15 GHz to 5.35 GHz.

The procedure for this method is as follows:

- a) Set RBW = shall be in the range of 1% to 5% of the emission bandwidth.
- b) Set the VBW $\geq \text{RBW}$.
- c) Detector = peak.
- d) Trace mode = max-hold.
- e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission.
Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is in the range of 1% to 5%.

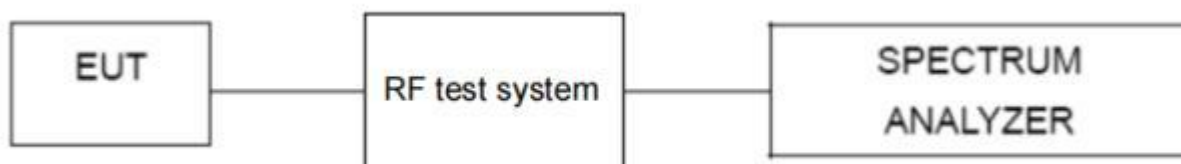
Note: The automatic bandwidth measurement capability of a spectrum analyzer or an EMI receiver may be employed if it implements the functionality described in the preceding items.

6.3 DEVIATION FROM STANDARD

No deviation.



6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of chapter 3, Unless otherwise a special operating condition is specified in the follows during the testing.

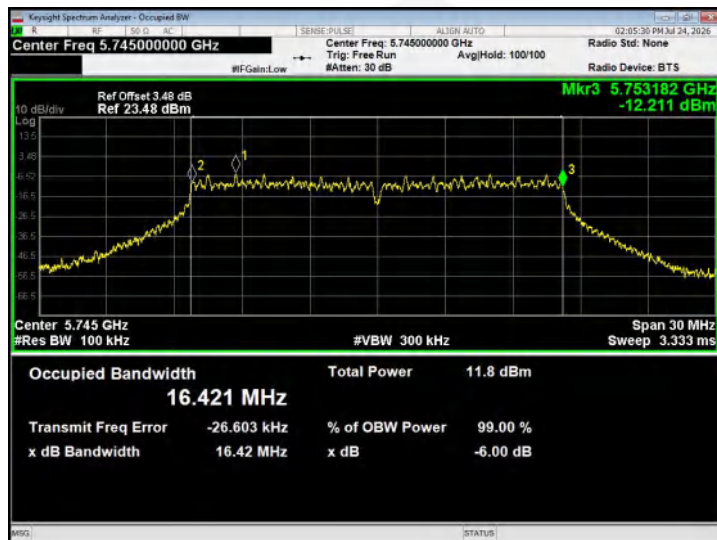
6.6 TEST RESULTS

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 11.1V
Test Band :	5.8G		

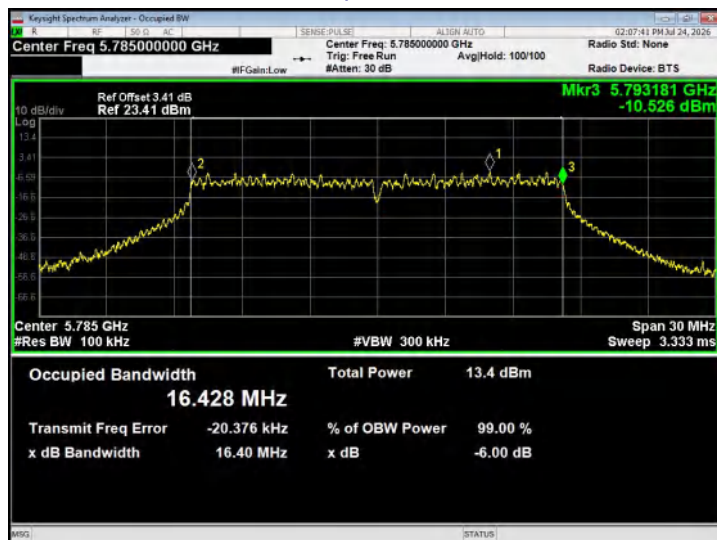
Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
802.11a	5745	16.418	>500	Pass
	5785	16.404		
	5825	16.376		
802.11n20	5745	16.383	>500	Pass
	5785	16.412		
	5825	16.386		
802.11n40	5755	35.608	>500	Pass
	5795	35.615		
802.11ac20	5745	17.612	>500	Pass
	5785	17.651		
	5825	17.022		
802.11ac40	5755	35.686	>500	Pass
	5795	35.682		
802.11ac80	5755	75.160	>500	Pass



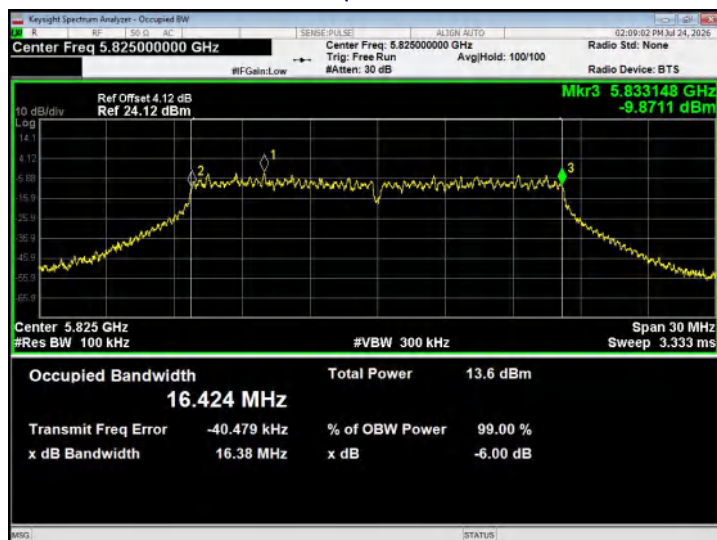
802.11a
6dB Bandwidth plot on channel 149



6dB Bandwidth plot on channel 157



6dB Bandwidth plot on channel 165

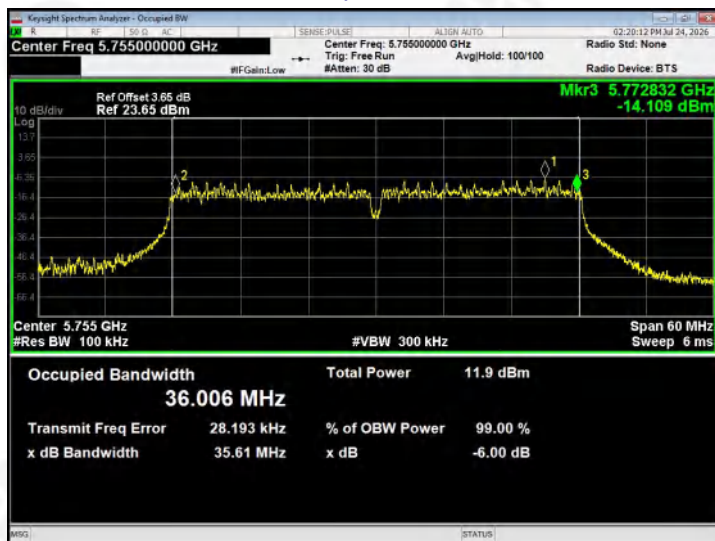




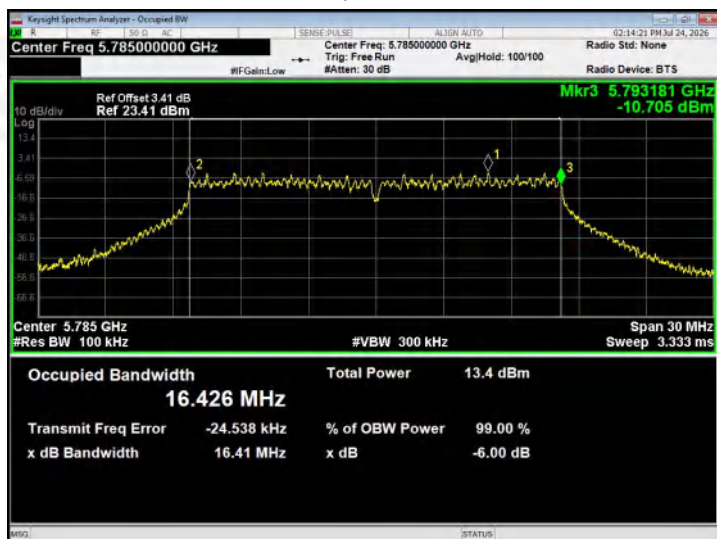
802.11n20
6dB Bandwidth plot on channel 149



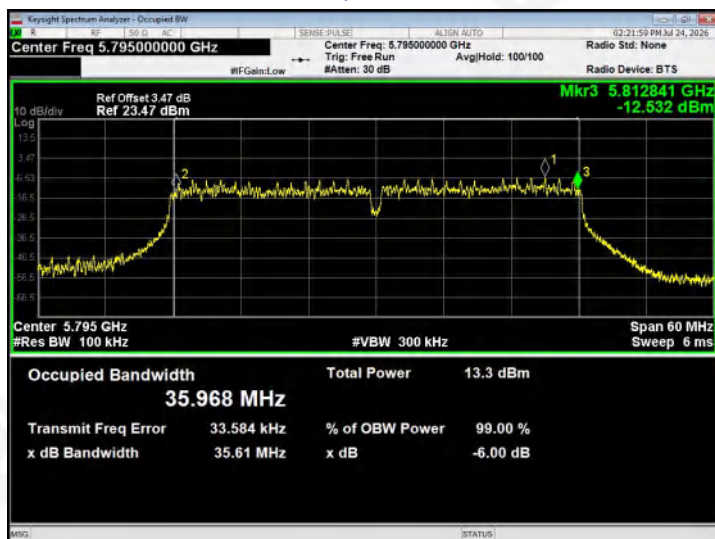
802.11n40
6dB Bandwidth plot on channel 151



6dB Bandwidth plot on channel 157



6dB Bandwidth plot on channel 159



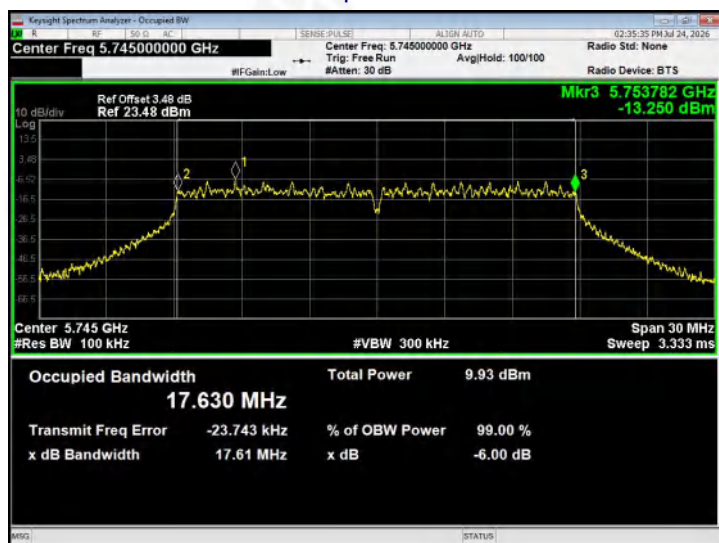
6dB Bandwidth plot on channel 165





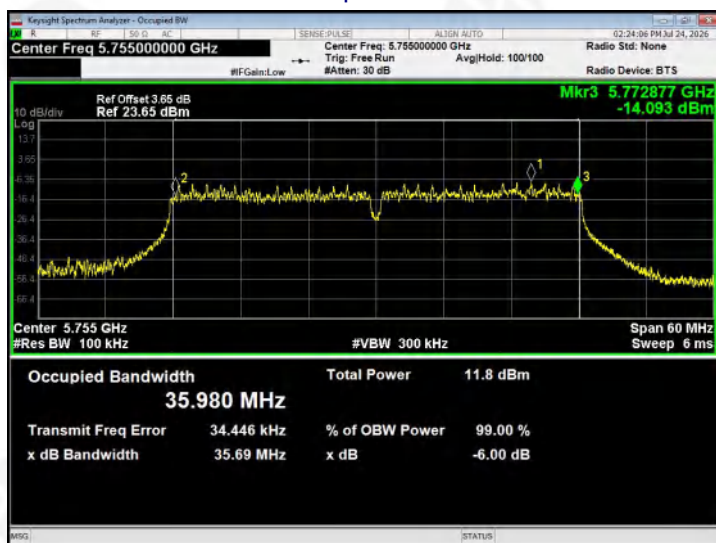
802.11ac20

6dB Bandwidth plot on channel 149

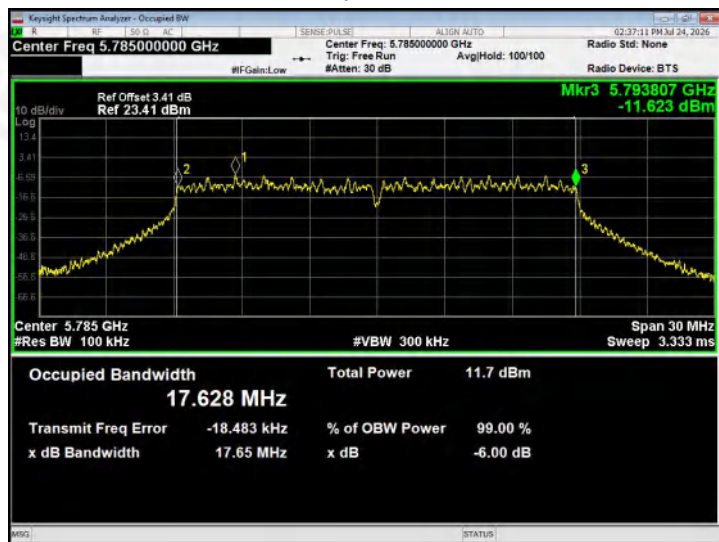


802.11ac40

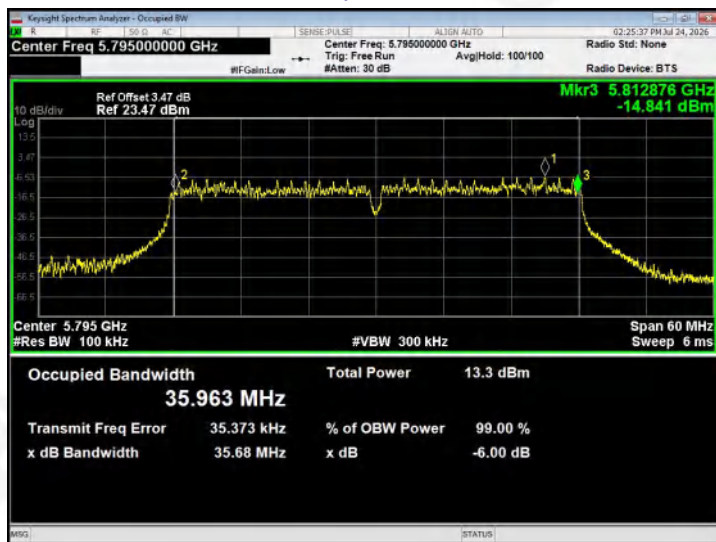
6dB Bandwidth plot on channel 151



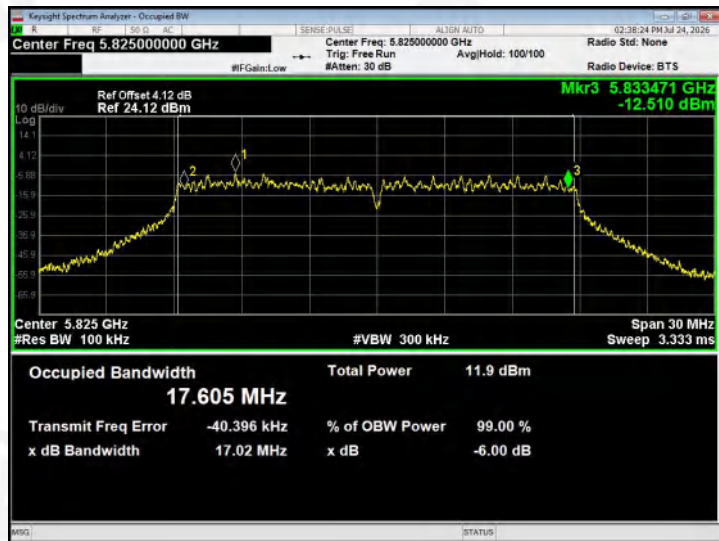
6dB Bandwidth plot on channel 157



6dB Bandwidth plot on channel 159

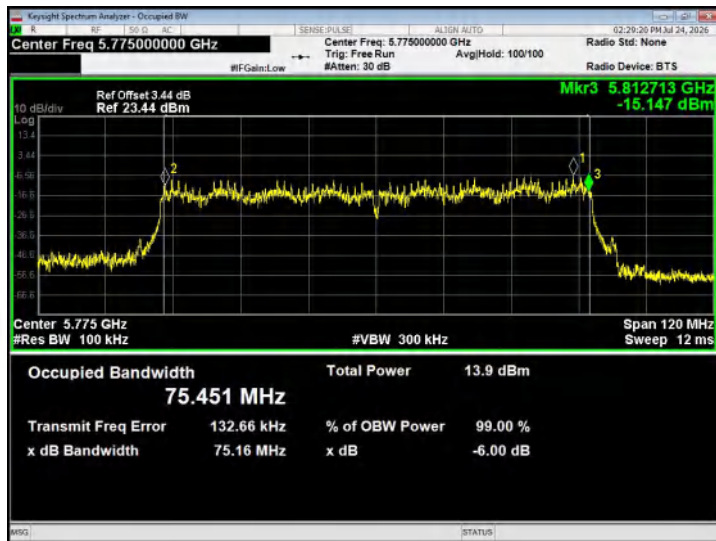


6dB Bandwidth plot on channel 165



802.11ac80

6dB Bandwidth plot on channel 155





7. MAXIMUM CONDUCTED OUTPUT POWER

7.1 PPLIED PROCEDURES / LIMIT

According to FCC §15.407 (a)(1) & (a)(3)(i)
The maximum conducted output power should not exceed:

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

7.2 TEST PROCEDURE

According 789033 D02 General UNII Test Procedures New Rules v02r01.

EUT Measurement using a Power Meter (PM)

a) Method PM (Measurement using an RF average power meter):

(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:

- The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
- At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
- The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

(ii) If the transmitter does not transmit continuously, measure the duty cycle, x , of the transmitter output signal as described in II.B.

(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

(iv) Adjust the measurement in dBm by adding $10 \log (1/x)$ where x is the duty cycle (e.g., $10 \log (1/0.25)$ if the duty cycle is 25%).

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 chapter 3, 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 :	DC 11.1V
Test Band :	5.8G		

Test Mode	Frequency (MHz)	Output Power (dBm)	Duty cycle factor (dB)	Total Power (dBm)	Limit (dBm)	Result
802.11 a	5745	5.278	2.04	7.318	30	Pass
	5785	5.125	2.04	7.165	30	Pass
	5825	5.071	2.04	7.111	30	Pass
802.11 n20	5745	5.065	1.46	6.525	30	Pass
	5785	5.069	1.46	6.529	30	Pass
	5825	5.026	1.46	6.486	30	Pass
802.11 n40	5755	4.279	1.41	5.689	30	Pass
	5785	4.755	1.41	6.165	30	Pass
802.11 ac20	5745	5.049	1.46	6.509	30	Pass
	5785	5.098	1.46	6.558	30	Pass
	5825	5.089	1.46	6.549	30	Pass
802.11 ac40	5755	4.145	2.48	6.625	30	Pass
	5785	4.589	2.48	7.069	30	Pass
802.11 ac80	5775	4.060	3.01	7.070	30	Pass
Note: Total Power = Output Power + Duty cycle factor.						



8. CONDUCTED BAND EDGE

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:

(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

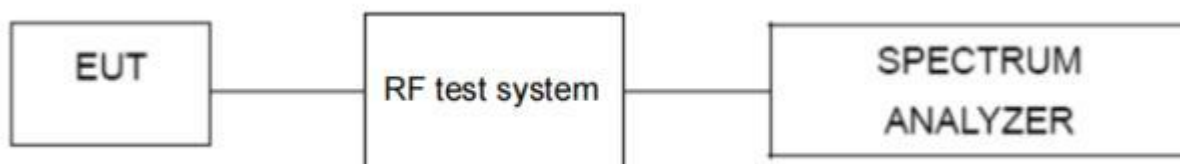
8.2 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its 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 graph with 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 chapter 3, Unless otherwise a special operating condition is specified in the follows during the testing.



8.6 TEST RESULTS

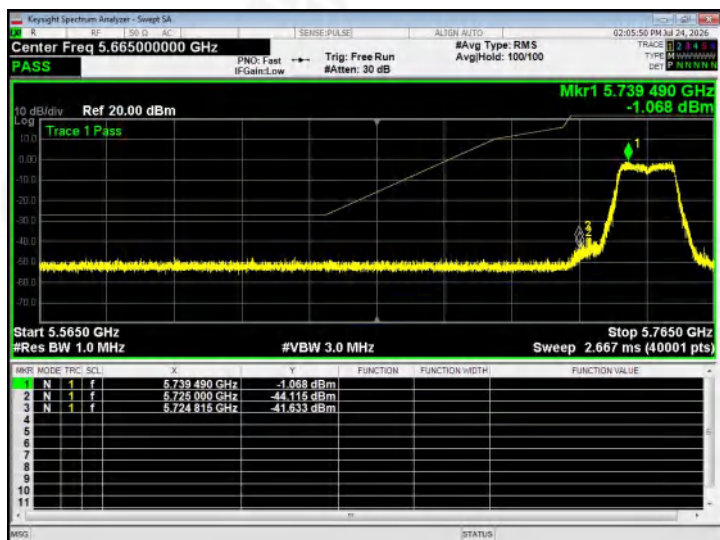
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 11.1V
Test band :	5.8G		

Test Mode	Frequency (MHz)	Emission Frequency (MHz)	Measurement Value Max (dBm)	Antenna gain (dBi)	RF Cable Loss (dB)	Total Value Max (dBm)	Result
802.11a	5745	5724.815	-41.633	2.41	1.10	-38.123	Pass
	5825	5872.650	-47.252	2.41	1.10	-43.742	Pass
802.11n20	5745	5724.950	-41.103	2.41	1.10	-37.593	Pass
	5825	5948.495	-47.190	2.41	1.10	-43.680	Pass
802.11n40	5755	5718.445	-39.075	2.41	1.10	-35.565	Pass
	5785	5941.515	-47.470	2.41	1.10	-43.960	Pass
802.11ac20	5745	5724.200	-45.148	2.41	1.10	-41.638	Pass
	5825	5921.290	-47.493	2.41	1.10	-43.983	Pass
802.11ac40	5755	5718.015	-38.780	2.41	1.10	-35.270	Pass
	5785	5950.585	-47.189	2.41	1.10	-43.679	Pass
802.11ac80	5775	5686.400	-37.215	2.41	1.10	-33.705	Pass
Note: Total Value = Measurement Value + RF Cable Loss + Antenna gain. The test diagram has added a calibration factor.							

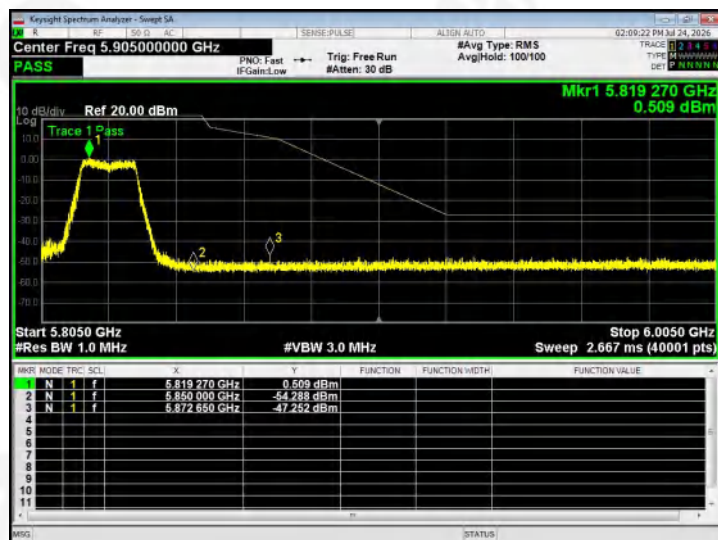


5.745~5.825 GHz

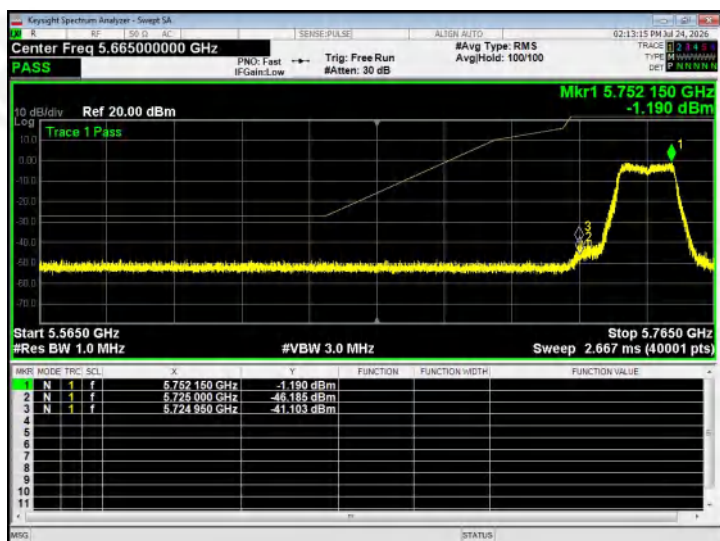
(802.11a) Band Edge, Left Side



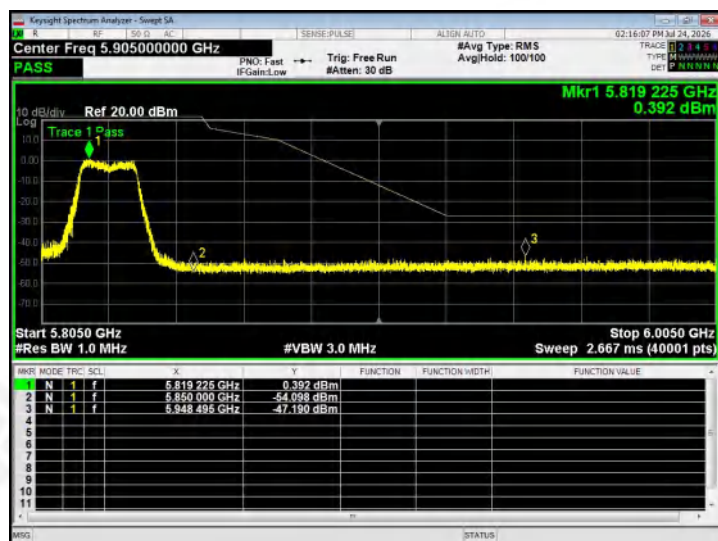
(802.11a) Band Edge, Right Side



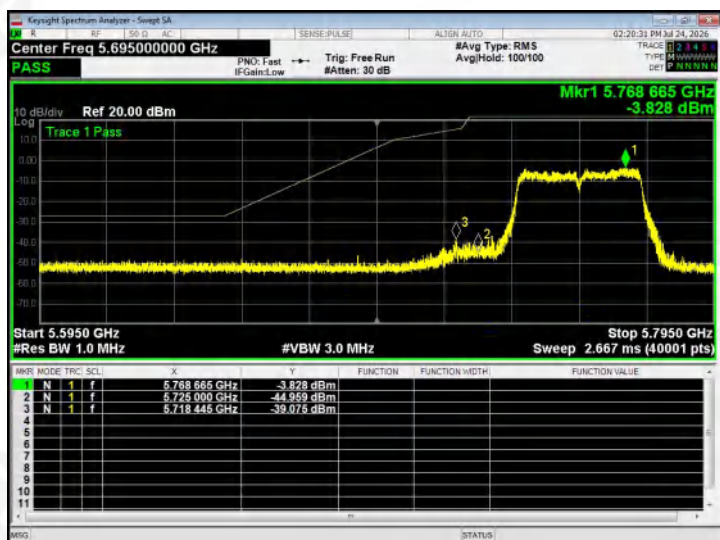
(802.11n20) Band Edge, Left Side



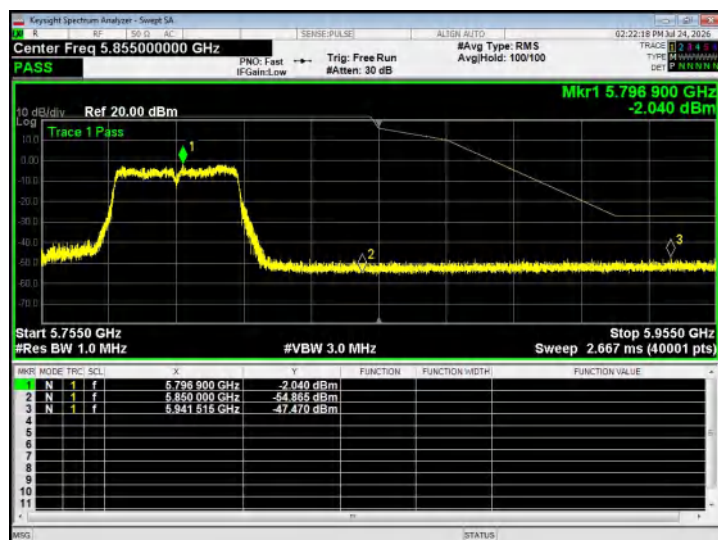
(802.11n20) Band Edge, Right Side



(802.11n40) Band Edge, Left Side

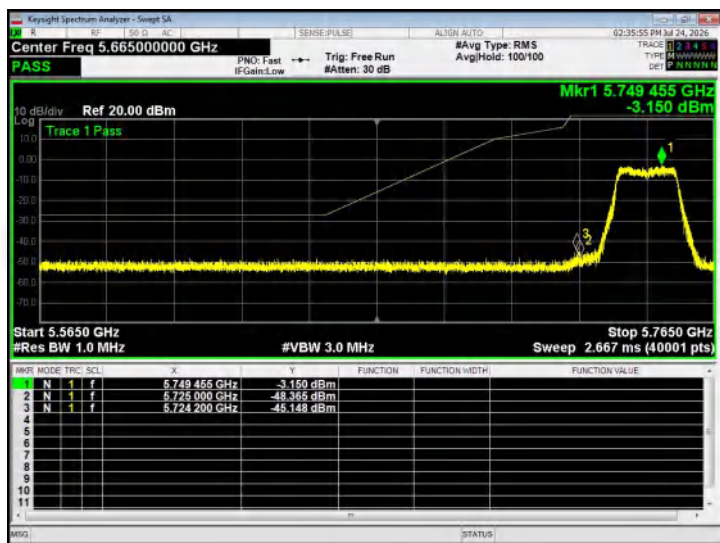


(802.11n40) Band Edge, Right Side

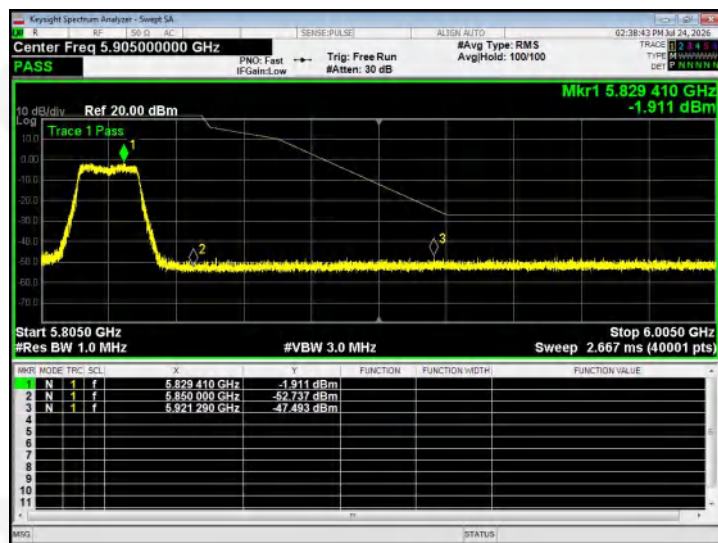




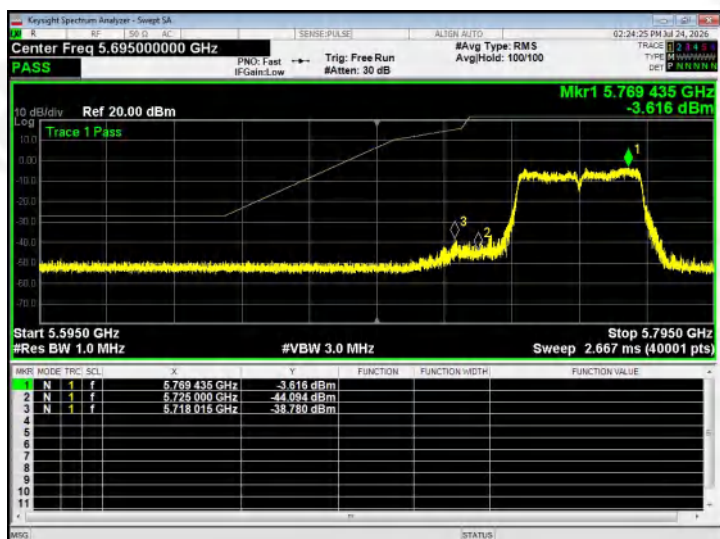
(802.11ac20) Band Edge, Left Side



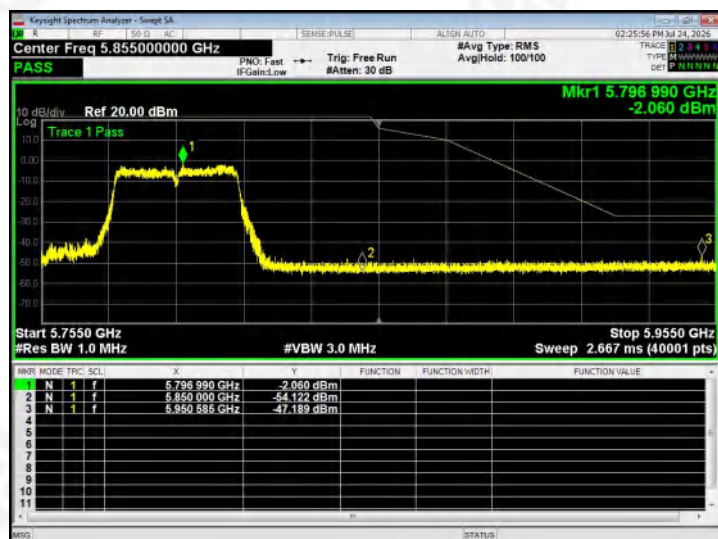
(802.11ac20) Band Edge, Right Side



(802.11ac40) Band Edge, Left Side

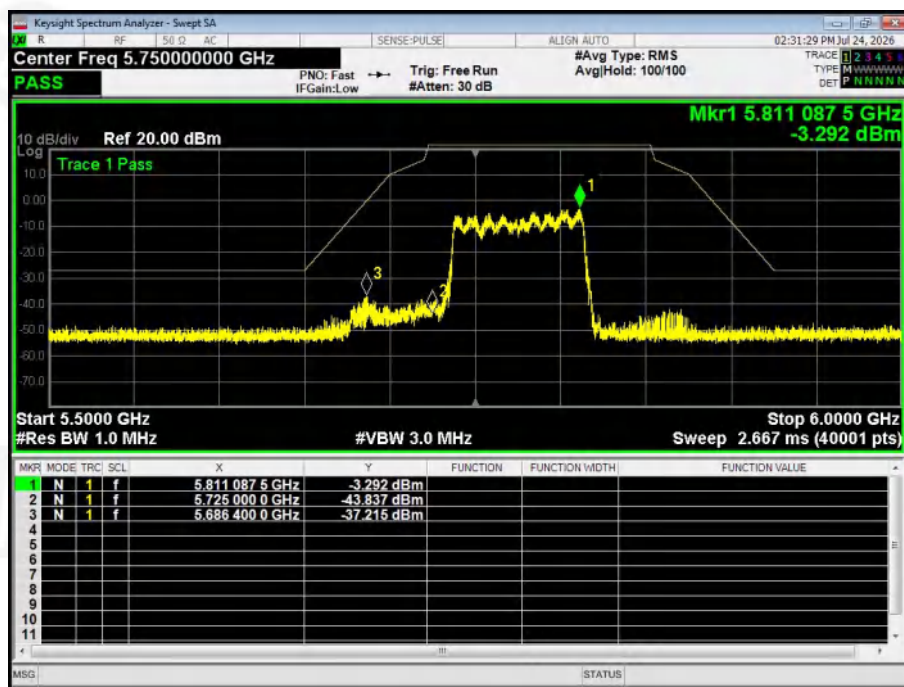


(802.11ac40) Band Edge, Right Side





(802.11ac80) Band Edge -Channel 155





9. FREQUENCY STABILITY MEASUREMENT

9.1 LIMIT

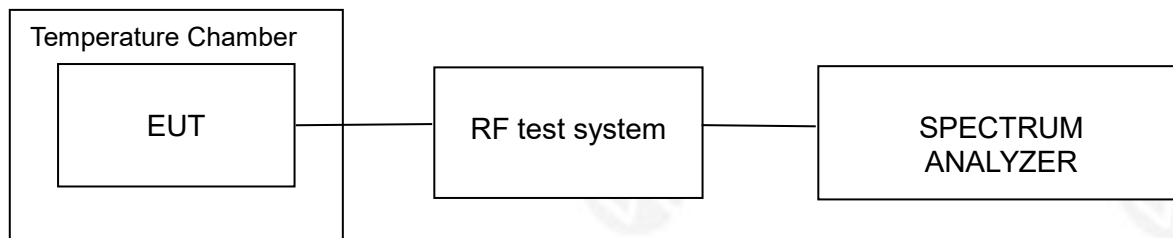
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be (IEEE 802.11n specification).

9.2 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. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 106 \text{ ppm}$.
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 $-20^{\circ}\text{C} \sim 70^{\circ}\text{C}$.

9.3 TEST SETUP LAYOUT



9.4 EUT OPERATION DURING TEST

The EUT tested system was configured as the statements of chapter 3, Unless otherwise a special operating condition is specified in the follows during the testing.



9.5 TEST RESULTS

Reference Frequency: 802.11a - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	11.1	5744.969	-5.375
60	11.1	5744.972	-4.879
50	11.1	5744.979	-3.648
40	11.1	5744.965	-6.155
30	11.1	5744.965	-6.075
25	11.1	5744.973	-4.771
10	11.1	5744.966	-5.944
0	11.1	5744.963	-6.451
-10	11.1	5744.971	-5.004
-20	11.1	5744.960	-6.876

Reference Frequency: 802.11n20 - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	11.1	5744.966	-5.993
60	11.1	5744.957	-7.412
50	11.1	5744.974	-4.602
40	11.1	5744.967	-5.772
30	11.1	5744.965	-6.137
25	11.1	5744.972	-4.843
10	11.1	5744.958	-7.373
0	11.1	5744.964	-6.278
-10	11.1	5744.974	-4.507
-20	11.1	5744.978	-3.862



Reference Frequency: 802.11n40 - 5755MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	11.1	5754.963	-6.345
60	11.1	5754.965	-6.063
50	11.1	5754.973	-4.723
40	11.1	5754.979	-3.732
30	11.1	5754.974	-4.463
25	11.1	5754.965	-6.117
10	11.1	5754.958	-7.310
0	11.1	5754.972	-4.822
-10	11.1	5754.971	-4.993
-20	11.1	5754.961	-6.730

Reference Frequency: 802.11ac20 - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	11.1	5744.977	-4.061
60	11.1	5744.965	-6.149
50	11.1	5744.969	-5.426
40	11.1	5744.960	-6.958
30	11.1	5744.964	-6.231
25	11.1	5744.954	-7.947
10	11.1	5744.973	-4.691
0	11.1	5744.961	-6.743
-10	11.1	5744.950	-8.618
-20	11.1	5744.979	-3.638



Reference Frequency: 802.11ac40 - 5755MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	11.1	5754.969	-5.412
60	11.1	5754.954	-8.061
50	11.1	5754.973	-4.626
40	11.1	5754.968	-5.559
30	11.1	5754.969	-5.419
25	11.1	5754.964	-6.234
10	11.1	5754.972	-4.900
0	11.1	5754.979	-3.715
-10	11.1	5754.966	-5.948
-20	11.1	5754.969	-5.315

Reference Frequency: 802.11ac80 - 5775MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	11.1	5774.989	-1.819
60	11.1	5774.989	-1.933
50	11.1	5774.974	-4.558
40	11.1	5774.971	-4.958
30	11.1	5774.978	-3.773
25	11.1	5774.988	-2.061
10	11.1	5774.990	-1.776
0	11.1	5774.971	-4.999
-10	11.1	5774.987	-2.182
-20	11.1	5774.975	-4.340



Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 11.1V
Note: Note: All channels have been tested, and only the worst test data is recorded in this report.			

Extreme voltage frequency stability:

Reference Frequency: 802.11a - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	12.77	5744.976	-4.217
25	11.66	5744.956	-7.670
25	11.1	5744.980	-3.500
25	10.55	5744.952	-8.423
25	9.44	5744.972	-4.836

Reference Frequency: 802.11n20 - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	12.77	5744.964	-6.205
25	11.66	5744.965	-6.125
25	11.1	5744.965	-6.068
25	10.55	5744.977	-3.987
25	9.44	5744.961	-6.796

Reference Frequency: 802.11n40 - 5755MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	12.77	5754.970	-5.189
25	11.66	5754.975	-4.280
25	11.1	5754.970	-5.169
25	10.55	5754.964	-6.236
25	9.44	5754.964	-6.172



Reference Frequency: 802.11ac20 - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	12.77	5744.977	-3.982
25	11.66	5744.960	-6.968
25	11.1	5744.965	-6.092
25	10.55	5744.980	-3.490
25	9.44	5744.966	-5.942

Reference Frequency: 802.11ac40 - 5755MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	12.77	5754.963	-6.484
25	11.66	5754.960	-6.942
25	11.1	5754.976	-4.191
25	10.55	5754.976	-4.189
25	9.44	5754.963	-6.483

Reference Frequency: 802.11ac80 - 5775MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	12.77	5774.984	-2.772
25	11.66	5774.977	-3.990
25	11.1	5774.988	-2.141
25	10.55	5774.989	-1.907
25	9.44	5774.983	-2.880



10. DUTY CYCLE

10.1 APPLIED PROCEDURES / LIMIT

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

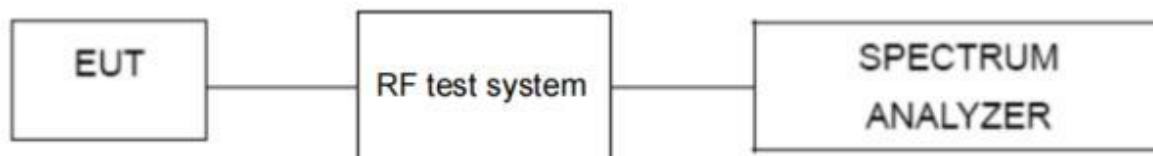
- 1) A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.
- 2) The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:
 - i) Set the center frequency of the instrument to the center frequency of the transmission.
 - ii) Set $RBW \geq EBW$ if possible; otherwise, set RBW to the largest available value.
 - iii) Set $VBW \geq RBW$.
 - iv) Set detector = peak.
- v) The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in item a1) of 12.2, and the number of sweep points across duration T exceeds 100.

For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7 \mu s$.

10.2 DEVIATION FROM STANDARD

No deviation.

10.3 TEST SETUP



10.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of chapter 3, Unless otherwise a special operating condition is specified in the follows during the testing.



10.5 TEST RESULTS

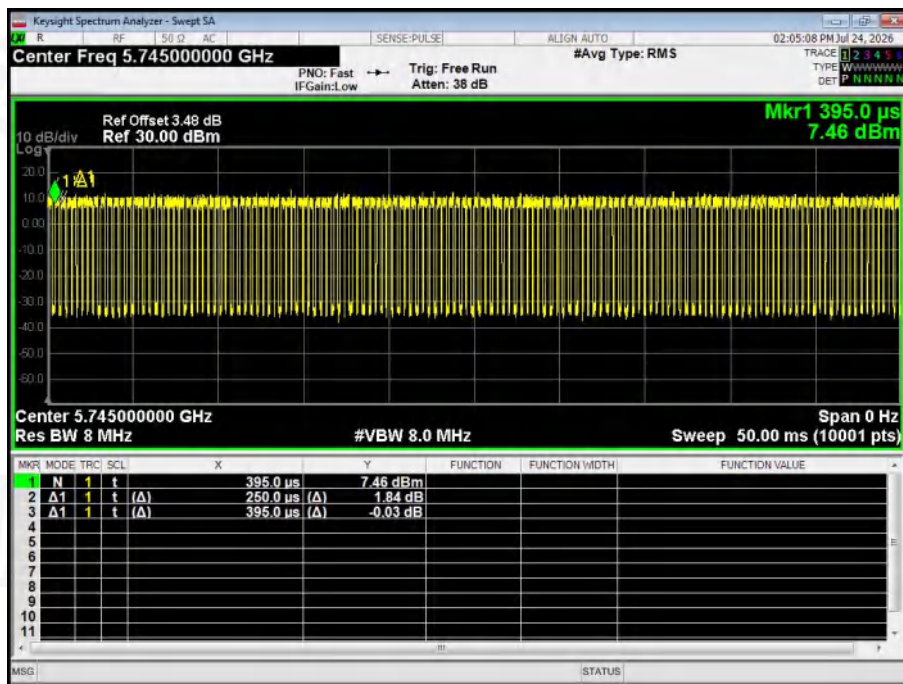
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 11.1V
Note: All channels have been tested, and only the worst test data is recorded in this report.			

Test Mode	Frequency (MHz)	Duty Cycle (%)	Factor (dB)	Result
802.11a	5745	62.50	2.04	Pass
802.11n20	5745	71.43	1.46	Pass
802.11n40	5755	72.22	1.41	Pass
802.11ac20	5745	71.43	1.46	Pass
802.11ac40	5755	56.52	2.48	Pass
802.11ac80	5775	50.00	3.01	Pass

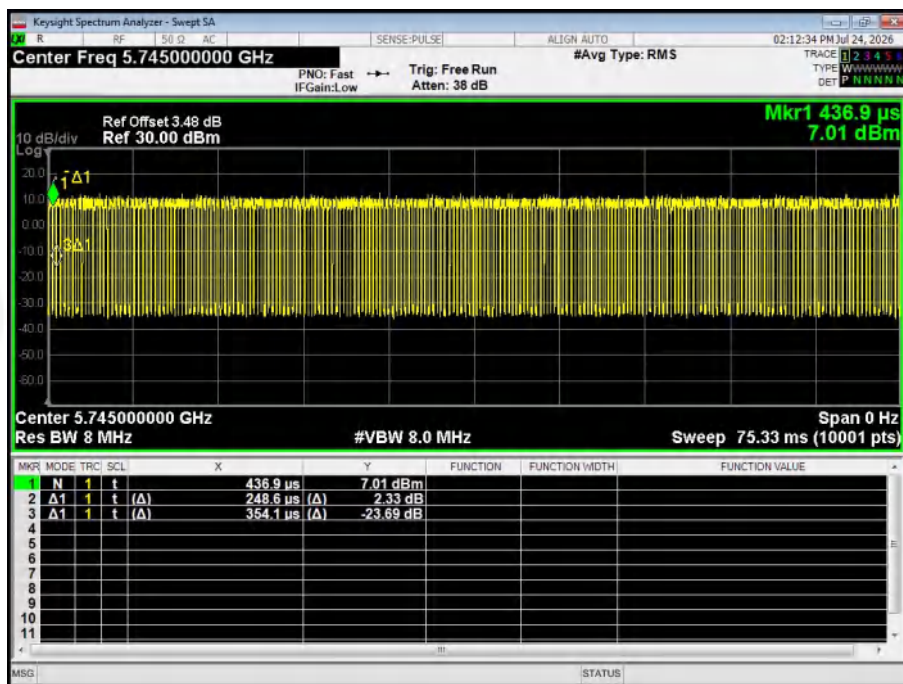
Note: Duty Cycle= Ton /Total*100%
Duty Cycle Correction Factor = 10log (1/Duty Cycle)



802.11a - 5745MHz



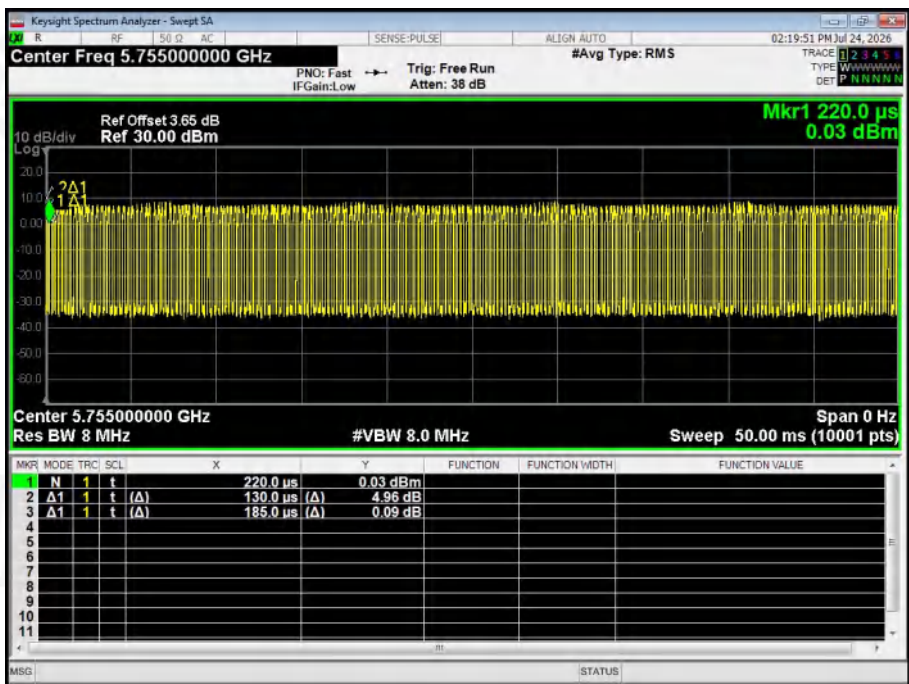
802.11n20 - 5745MHz



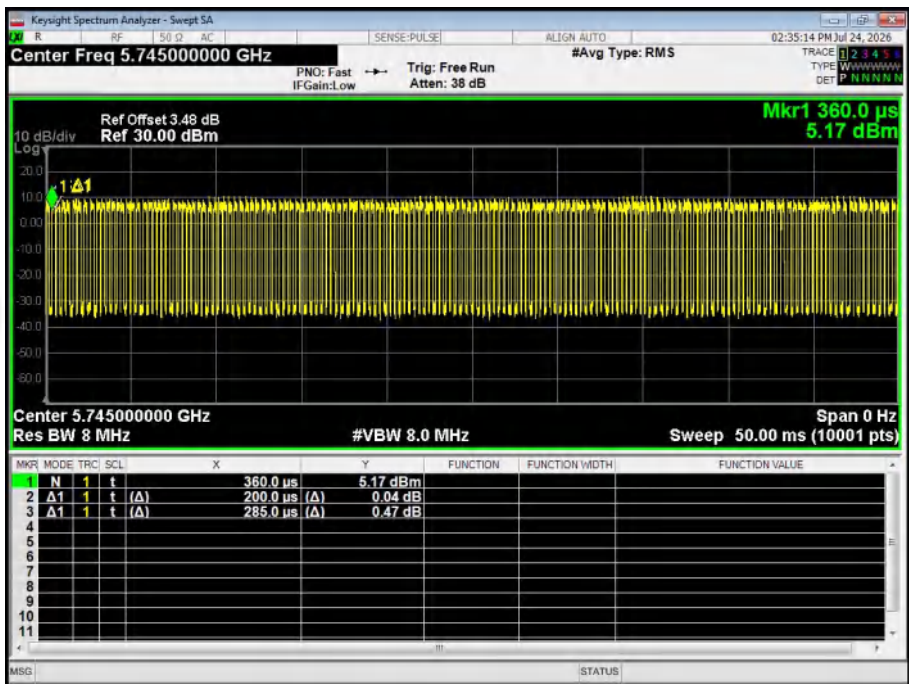
Note: All channel have been tested, and the report only reflects the worst case data.



802.11n40 - 5755MHz



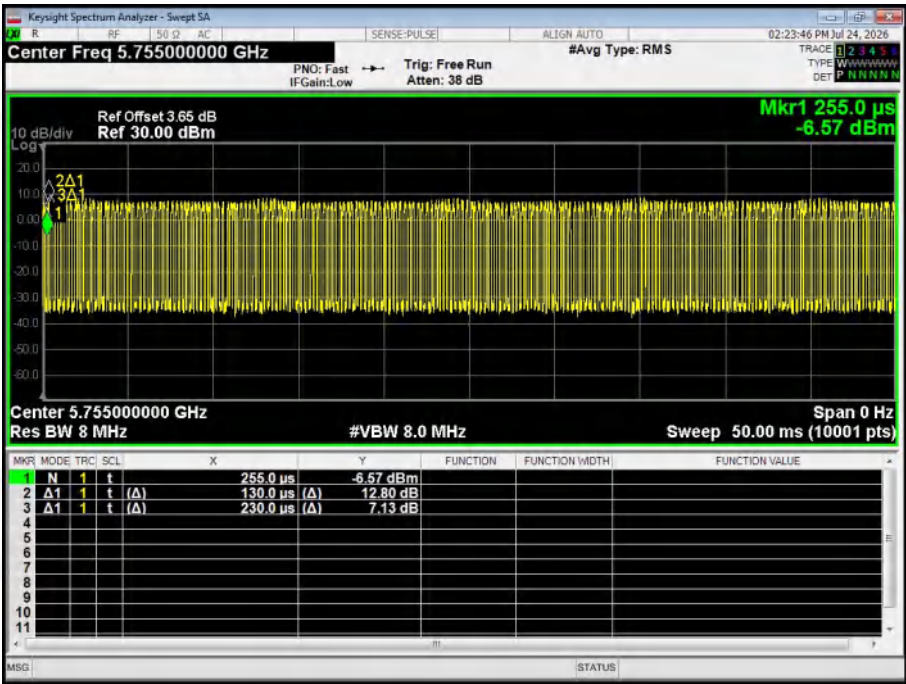
802.11ac20 - 5745MHz



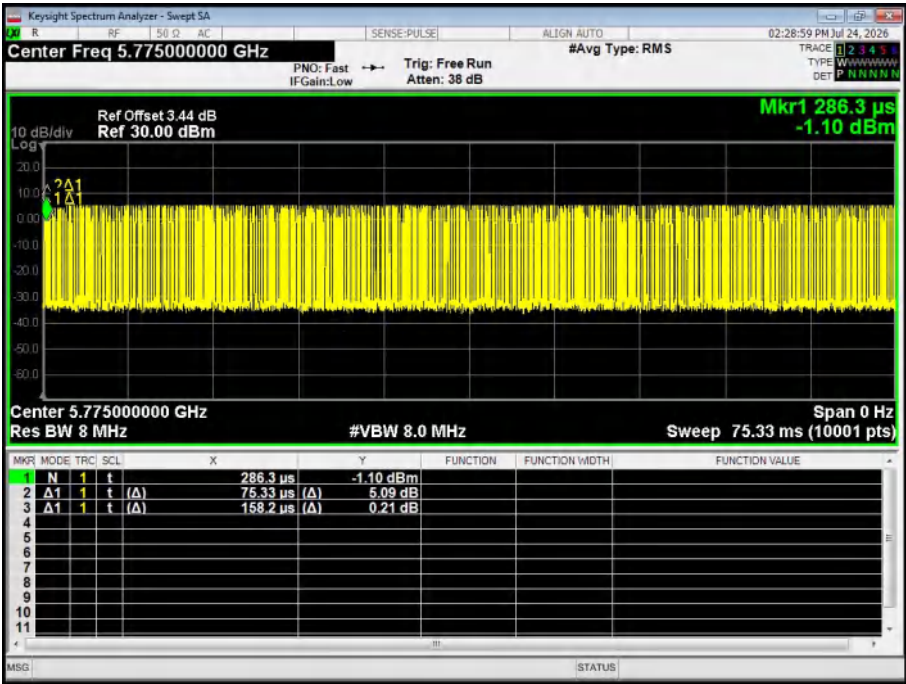
Note: All channel have been tested, and the report only reflects the worst case data.



802.11ac40 - 5755MHz



802.11ac80 - 5775MHz



Note: All channel have been tested, and the report only reflects the worst case data.



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 Internal antenna, the best case gain of the antenna is 2.41dBi for 5.8G, reference to the appendix II for details.	



12. TEST SETUP PHOTO

Reference to the appendix I for details.

13. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

***** END OF REPORT *****