



FCC TEST REPORT

FCC ID:2BTGH-F1227

Applicant: Dongguan Tengwen Electronics Technology Co., Ltd.

Address: Building 1, 3rd-4th Floors, Yueneng Industrial Park, Shangnan Road, Shangjiao Community, Changan Town, Dongguan City, Guangdong Province

Manufacturer: Dongguan Tengwen Electronics Technology Co., Ltd.

Address: Building 1, 3rd-4th Floors, Yueneng Industrial Park, Shangnan Road, Shangjiao Community, Changan Town, Dongguan City, Guangdong Province

EUT: HDMI Wireless video Transmitter and Receiver

Trade Mark: N/A

Model Number: F1227

Date of Receipt: Dec. 02, 2025

Test Date: Dec. 02, 2025 to Dec. 16, 2025

Date of Report: Dec. 16, 2025

Prepared By: Shenzhen DL Testing Technology Co., Ltd.

Address: 101-201, Comprehensive Building, Tongzhou Electronics Longgang Factory Area, No.1 Baolong Fifth Road, Baolong Community, Baolong Street, Longgang District, Shenzhen, China

Applicable Standards: FCC CFR Title 47 Part 15 Subpart E Section 15.407
ANSI C63.10:2020
KDB 789033 D02 v02r01

Test Result: Pass

Report Number: DLE-251216008R

Prepared (Test Engineer): Dimon Tan

Reviewer (Supervisor): Jack Bu

Approved (Manager): Jade Yang



This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.



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**1. VERSION**

Report No.	Version	Description	Approved
DLE-251216008R	Rev.01	Initial issue of report	Dec. 16, 2025



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 DL Testing Technology Co., Ltd.

Add. : 101-201, Building C, Shuanghuan, No.8, Baoqing Road Baolong Industrial Zone, Baolong Street, Longgang Shenzhen, Guangdong, China

FCC Test Firm Registration Number: 854456

Designation Number: CN1307

IC Registered No.: 27485

CAB identifier: CN0118

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)	$U=4.5\text{dB}$
2	3m chamber Radiated spurious emission (30MHz-1GHz)	$U=4.8\text{dB}$
3	3m chamber Radiated spurious emission (1GHz-6GHz)	$U=4.9\text{dB}$
4	3m chamber Radiated spurious emission (6GHz-40GHz)	$U=5.0\text{dB}$
5	Conducted Disturbance	$U=3.2\text{dB}$
6	RF Band Edge	$U=1.68\text{dB}$
7	RF Power Conducted	$U=1.86\text{dB}$
8	RF Conducted Spurious Emission	$U=2.2\text{dB}$
9	RF Occupied Bandwidth	$U=1.8\text{MHz}$
10	RF Power Spectral Density	$U=1.75\text{dB}$
11	Humidity Uncertainty	$U=5.3\%$
12	Temperature Uncertainty	$U=0.59^\circ\text{C}$



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	HDMI Wireless video Transmitter and Receiver		
Model No.:	F1227		
Serial Model:	N/A		
Model Different:	N/A		
Sample ID:	E-1		
Sample Number:	DLE-251216008R-A1		
Sample(s) Status:	Engineer sample		
Product Description:	IEEE 802.11 WLAN Mode Supported	☒ 802.11a/n	
	Data Rate	802.11a: 6/9/12/24/18/36/48/54Mbit/s 802.11n: MCS0-MCS7	
	Modulation	802.11a/n: Orthogonal Frequency Division Multiplexing (OFDM)	
	Frequency Range	☒ 5180-5240MHz for 802.11a/n (20M) ☒ 5745-5825MHz for 802.11a/n (20M)	
	Number of Channels	☒ 4 channels for 802.11 a/n (20M) in the 5180-5240MHz band ☒ 5 channels for 802.11a/n (20M) in the 5745-5825MHz band	
Channel List:	Please refer to the Note 2.		
Antenna Type:	PCB Antenna		
Antenna Gain:	Band	5.2G	5.8G
	Gain (dBi)	1.79	2.03
Power Supply:	Input: 5V  2A		



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(20MHz) Frequency Channel for 5.2G							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	40	5200	44	5220	48	5240
-	-	-	-	-	-	-	-

802.11a/n (20MHz) 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	-	-	-	-	-	-

3.2 DESCRIPTION OF TEST MODES

Pretest Mode	Description
Mode 1	802.11a/n (20M) CH 36 / CH 40 / CH 48
Mode 2	802.11a/n (20M) CH149 / CH157 / CH 165

Final Test Mode	For Conducted
	Description
Mode 1	802.11a/n (20M) CH 36 / CH 40 / CH 48
Mode 2	802.11a/n (20M) CH149 / CH157 / CH 165

Final Test Mode	For Radiated
	Description
Mode 1	802.11a/n (20M) CH 36 / CH 40 / CH 48
Mode 2	802.11a/n (20M) CH149 / CH157 / CH 165

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.	

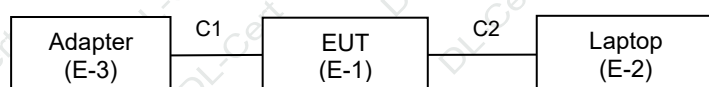
We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:			
Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst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

Test Software	REALTEK 8723FU
Power level setup	Default

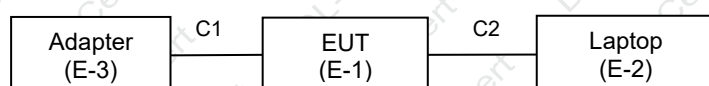


3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

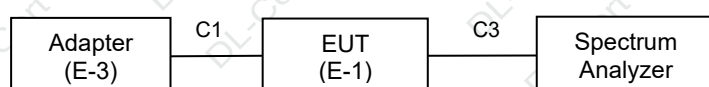
Conducted Emission



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	HDMI Wireless video Transmitter and Receiver	N/A	F1227	N/A	EUT
E-2	Laptop	Lenovo	G455A	N/A	Auxiliary
E-3	AC/DC Adapter	SAMSUNG	EP-T4510	N/A	Auxiliary

Item	Shielded Type	Ferrite Core	Length	Note
C1	NO	NO	0.8M	Type-C USB Cable
C2	NO	NO	0.3M	HDMI Extension Line
C3	NO	NO	0.3M	RF Line

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, Band-edge test and 6db bandwidth test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Oct. 25, 2025	Oct. 24, 2026
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Oct. 25, 2025	Oct. 24, 2026
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Oct. 27, 2025	Oct. 26, 2026
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Oct. 27, 2025	Oct. 26, 2026
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Oct. 25, 2025	Oct. 24, 2026
6	Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Oct. 25, 2025	Oct. 24, 2026
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Oct. 25, 2025	Oct. 24, 2026
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Oct. 25, 2025	Oct. 24, 2026
9	Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Oct. 25, 2025	Oct. 24, 2026
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Oct. 25, 2025	Oct. 24, 2026
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Oct. 25, 2025	Oct. 24, 2026
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Oct. 25, 2025	Oct. 24, 2026
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Oct. 25, 2025	Oct. 24, 2026
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Oct. 25, 2025	Oct. 24, 2026
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Oct. 25, 2025	Oct. 24, 2026
16	D.C. Power Supply	LongWei	PS-305D	010964729	Oct. 25, 2025	Oct. 24, 2026

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	843 Shielded Room	YIHENG	843 Room	843	Nov. 05, 2023	Nov. 04, 2026
2	EMI Receiver	R&S	ESR	101421	Oct. 25, 2025	Oct. 24, 2026
3	LISN	R&S	ENV216	102417	Oct. 25, 2025	Oct. 24, 2026
4	843 Cable 1#	ChengYu	CE Cable	001	Oct. 25, 2025	Oct. 24, 2026

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ EMC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ EMC	FA-03A2
3	RF test system	MAIWEI	MTS8310	2.0.0.0
4	RF communication test system	MAIWEI	MTS8200	2.0.0.0



4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2020
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

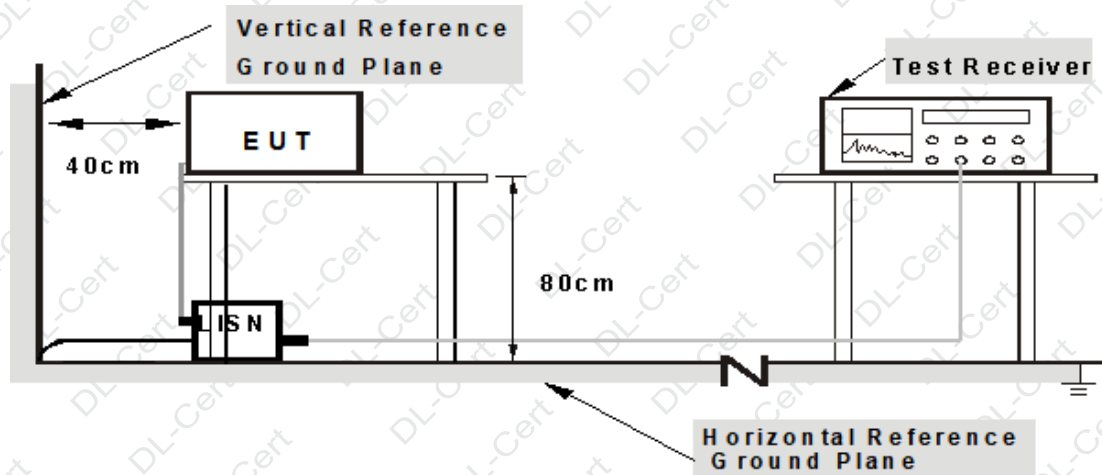
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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 cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
 - LISN at least 80 cm from nearest part of EUT chassis.
 - 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

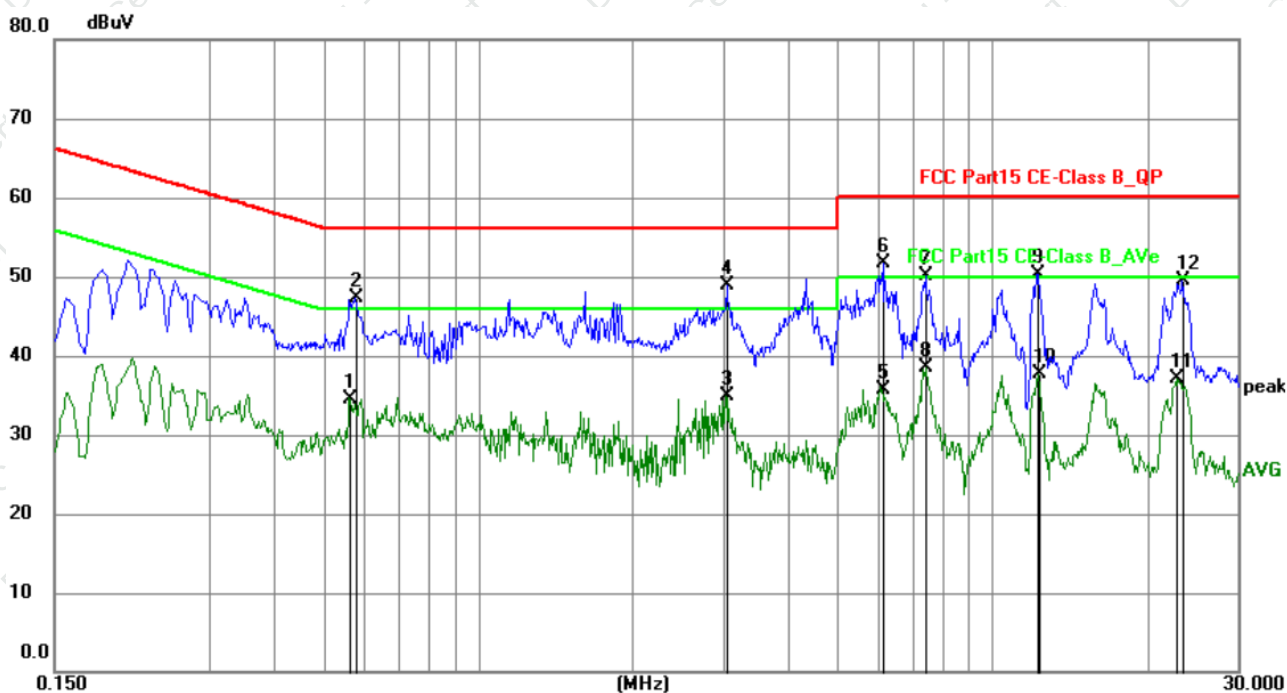
4.1.5 EUT OPERATING CONDITIONS

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°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	L
Test Voltage:	AC 120V/60Hz	Test Mode:	802.11n20 - 5240MHz
Test Band:	5.2G		



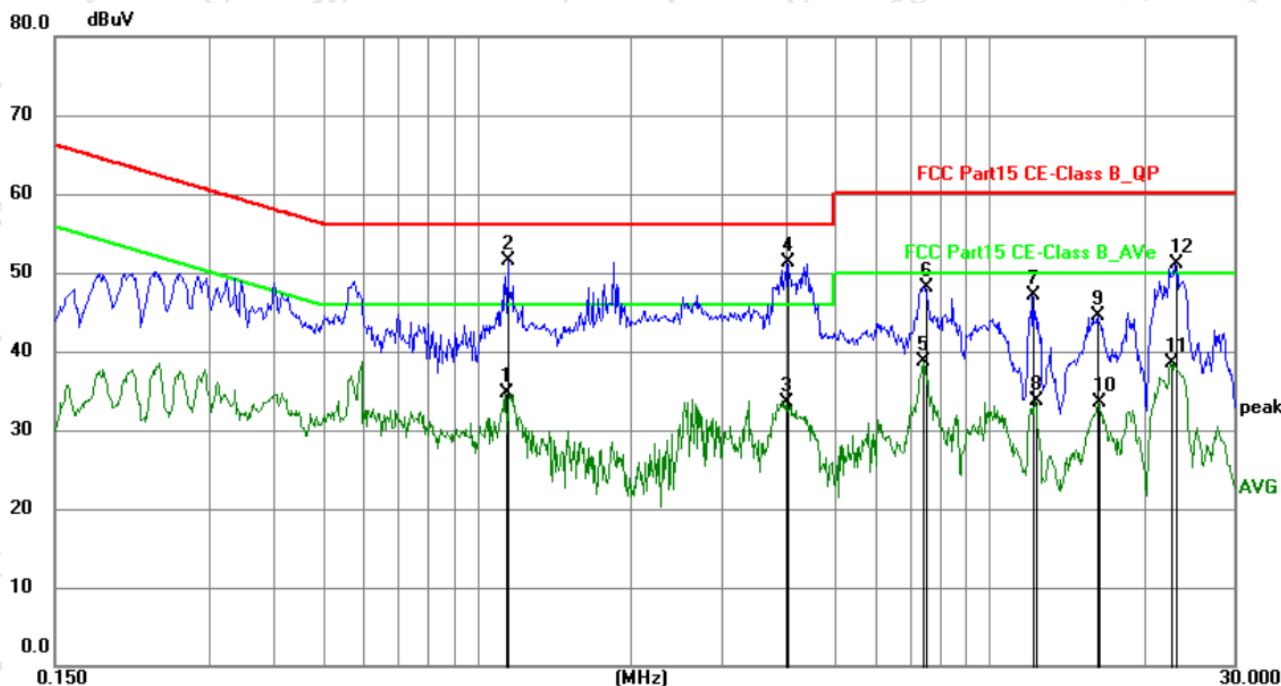
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.5637	14.96	19.63	34.59	46.00	-11.41	AVG	P	
2	0.5774	27.59	19.63	47.22	56.00	-8.78	QP	P	
3	3.0390	15.18	19.70	34.88	46.00	-11.12	AVG	P	
4	3.0480	29.15	19.70	48.85	56.00	-7.15	QP	P	
5	6.1035	15.95	19.73	35.68	50.00	-14.32	AVG	P	
6	6.1215	31.94	19.73	51.67	60.00	-8.33	QP	P	
7	7.4443	30.27	19.74	50.01	60.00	-9.99	QP	P	
8	7.4443	18.77	19.74	38.51	50.00	-11.49	AVG	P	
9	12.2415	30.55	19.76	50.31	60.00	-9.69	QP	P	
10	12.2820	18.01	19.76	37.77	50.00	-12.23	AVG	P	
11	22.8521	17.26	19.79	37.05	50.00	-12.95	AVG	P	
12	23.4555	29.80	19.78	49.58	60.00	-10.42	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 = Lissn factor+ Cable loss factor + limiter factor.
- 5.Margin = Measurement Level-Limit.
- 6.The test data shows only the worst case TX 802.11n20 - 5240MHz.



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	N
Test Voltage:	AC 120V/60Hz	Test Mode:	802.11n20 - 5240MHz
Test Band:	5.2G		



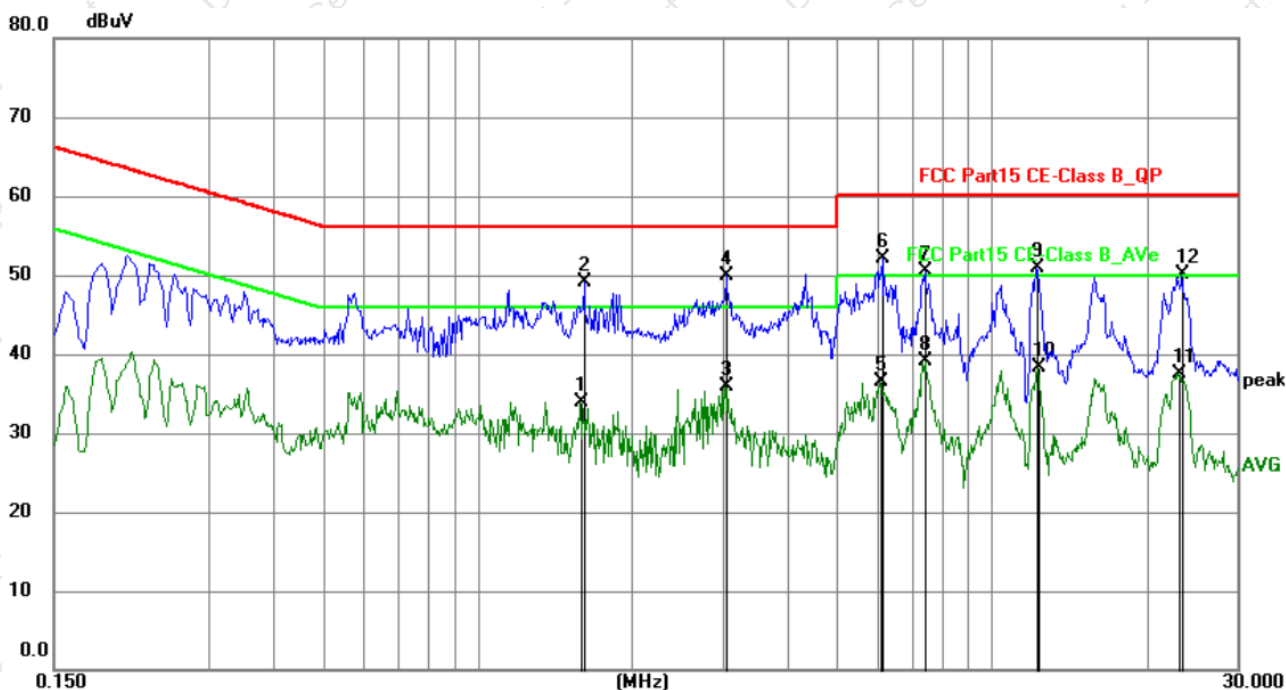
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	1.1400	15.07	19.65	34.72	46.00	-11.28	AVG	P	
2	1.1489	31.82	19.65	51.47	56.00	-4.53	QP	P	
3	4.0200	13.79	19.69	33.48	46.00	-12.52	AVG	P	
4	4.0335	31.58	19.69	51.27	56.00	-4.73	QP	P	
5	7.4175	19.07	19.73	38.80	50.00	-11.20	AVG	P	
6	7.4939	28.40	19.73	48.13	60.00	-11.87	QP	P	
7	12.1783	27.35	19.75	47.10	60.00	-12.90	QP	P	
8	12.2820	13.97	19.75	33.72	50.00	-16.28	AVG	P	
9	16.2555	24.67	19.75	44.42	60.00	-15.58	QP	P	
10	16.3410	13.70	19.76	33.46	50.00	-16.54	AVG	P	
11	22.6540	18.65	19.76	38.41	50.00	-11.59	AVG	P	
12	23.0820	31.25	19.76	51.01	60.00	-8.99	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 = Lissn factor+ Cable loss factor + limiter factor.
5. Margin = Measurement Level-Limit.
6. The test data shows only the worst case TX 802.11n20 - 5240MHz.



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	L
Test Voltage:	AC 120V/60Hz	Test Mode:	802.11n20 - 5825MHz
Test Band:	5.8G		



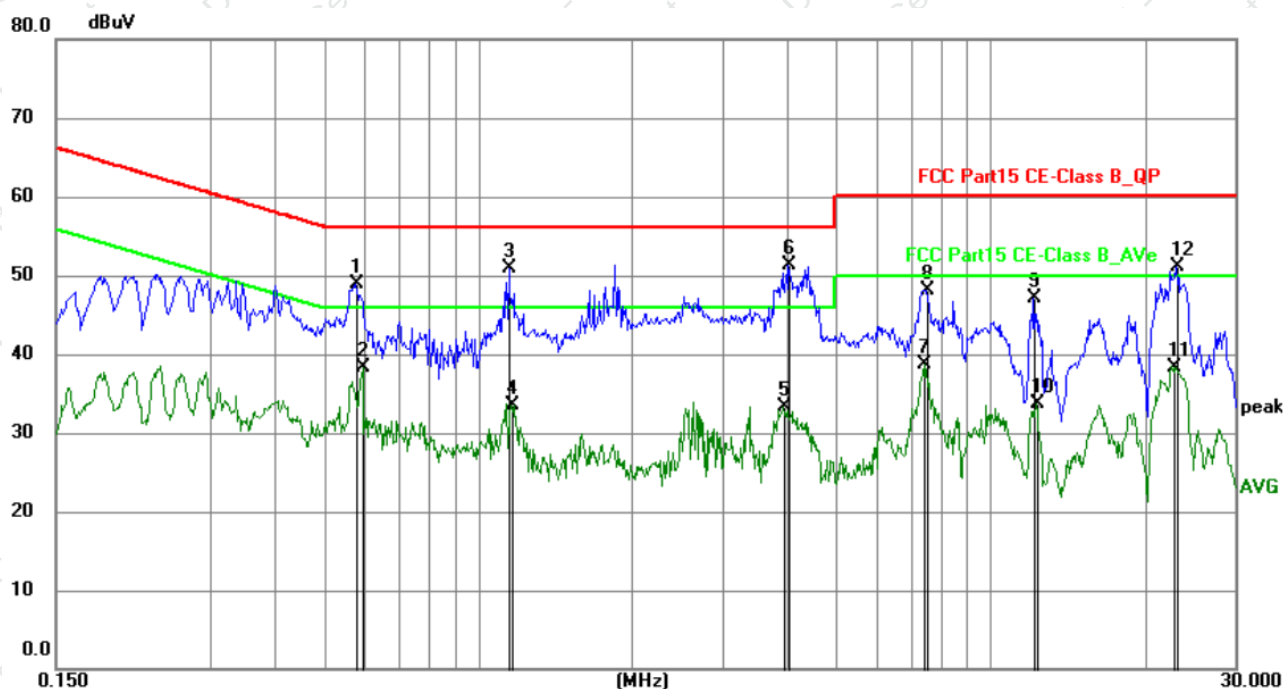
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	1.5900	14.31	19.67	33.98	46.00	-12.02	AVG	P	
2	1.6169	29.52	19.67	49.19	56.00	-6.81	QP	P	
3	3.0390	16.18	19.70	35.88	46.00	-10.12	AVG	P	
4	3.0480	30.15	19.70	49.85	56.00	-6.15	QP	P	
5	6.0720	16.79	19.73	36.52	50.00	-13.48	AVG	P	
6	6.1215	32.44	19.73	52.17	60.00	-7.83	QP	P	
7	7.4443	30.77	19.74	50.51	60.00	-9.49	QP	P	
8	7.4443	19.27	19.74	39.01	50.00	-10.99	AVG	P	
9	12.2415	31.05	19.76	50.81	60.00	-9.19	QP	P	
10	12.2820	18.51	19.76	38.27	50.00	-11.73	AVG	P	
11	23.0411	17.63	19.79	37.42	50.00	-12.58	AVG	P	
12	23.4555	30.30	19.78	50.08	60.00	-9.92	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 = Lism factor+ Cable loss factor + limiter factor.
5. Margin = Measurement Level-Limit.
6. The test data shows only the worst case TX 802.11n20 - 5825MHz.



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	N
Test Voltage:	AC 120V/60Hz	Test Mode:	802.11n20 - 5825MHz
Test Band:	5.8G		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.5774	29.20	19.62	48.82	56.00	-7.18	QP	P	
2	0.5954	18.64	19.62	38.26	46.00	-7.74	AVG	P	
3	1.1489	31.32	19.65	50.97	56.00	-5.03	QP	P	
4	1.1624	13.84	19.65	33.49	46.00	-12.51	AVG	P	
5	3.9615	13.61	19.69	33.30	46.00	-12.70	AVG	P	
6	4.0335	31.58	19.69	51.27	56.00	-4.73	QP	P	
7	7.4175	19.07	19.73	38.80	50.00	-11.20	AVG	P	
8	7.4939	28.40	19.73	48.13	60.00	-11.87	QP	P	
9	12.1783	27.35	19.75	47.10	60.00	-12.90	QP	P	
10	12.2820	13.97	19.75	33.72	50.00	-16.28	AVG	P	
11	22.8475	18.63	19.76	38.39	50.00	-11.61	AVG	P	
12	23.0820	31.25	19.76	51.01	60.00	-8.99	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 = Lism factor+ Cable loss factor + limiter factor.
5. Margin = Measurement Level-Limit.
6. The test data shows only the worst case TX 802.11n20 - 5825MHz.



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 ($\mu\text{V/m}$)	Field Strength ($\text{dB}\mu\text{V/m}$)	Measurement Distance
0.009~0.490	2400/F(KHz)	$20 \log (\mu\text{V/m})$	300
0.490~1.705	2400/F(KHz)	$20 \log (\mu\text{V/m})$	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 ($\text{dB}\mu\text{V/m}$) (at 3M)	
	Peak	Average
Above 1000	74	54

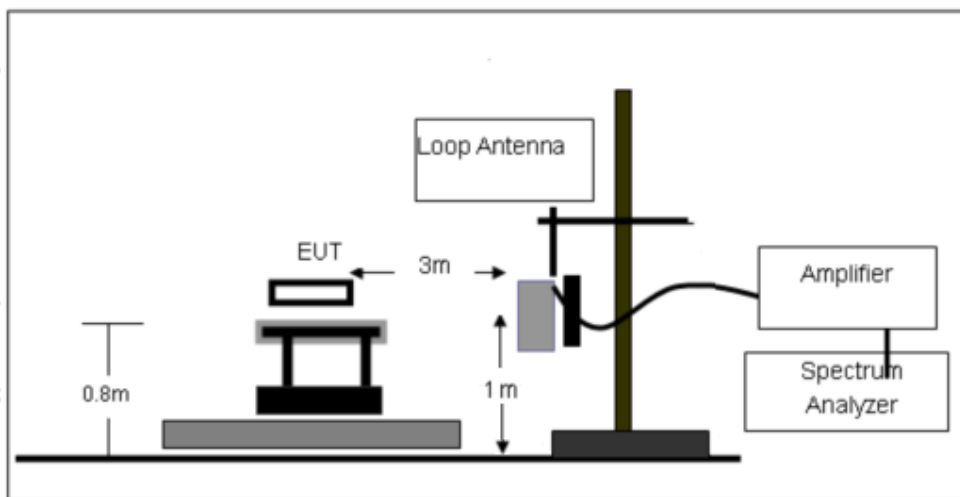
- Remark: 1. Emission level in $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$;
2. Measurement was performed at an antenna to the closed point of EUT distance of meters;
3. Distance extrapolation factor $= 40 \log (\text{Specific distance} / \text{test distance})$ (dB);
4. Limit line = Specific limits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

4.2.3 MEASURING INSTRUMENTS

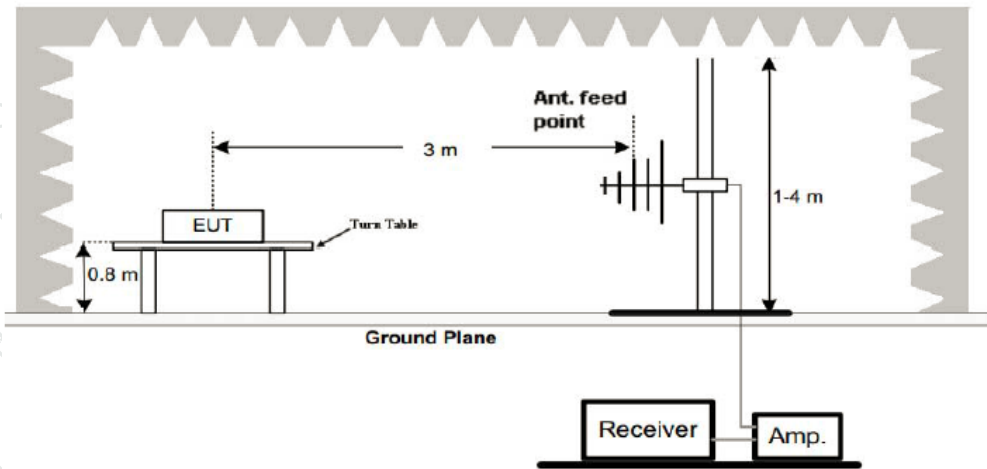
The Measuring equipment is listed in the section 3.5 of this test report.

4.2.4 TEST CONFIGURATION

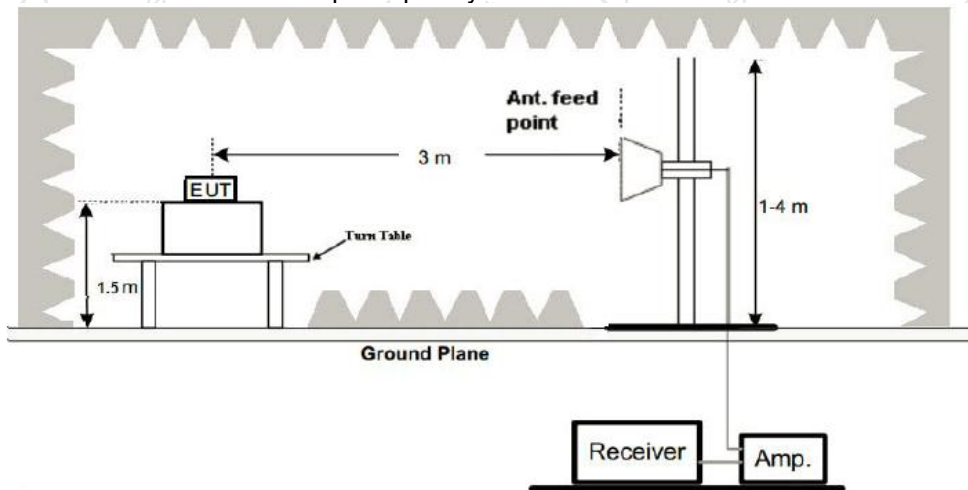
1. For radiated emissions below 30MHz



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. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10:2020 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 $RBWCF [dB] = 10 \cdot \lg(100 [kHz] / \text{narrower RBW} [kHz])$. , 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

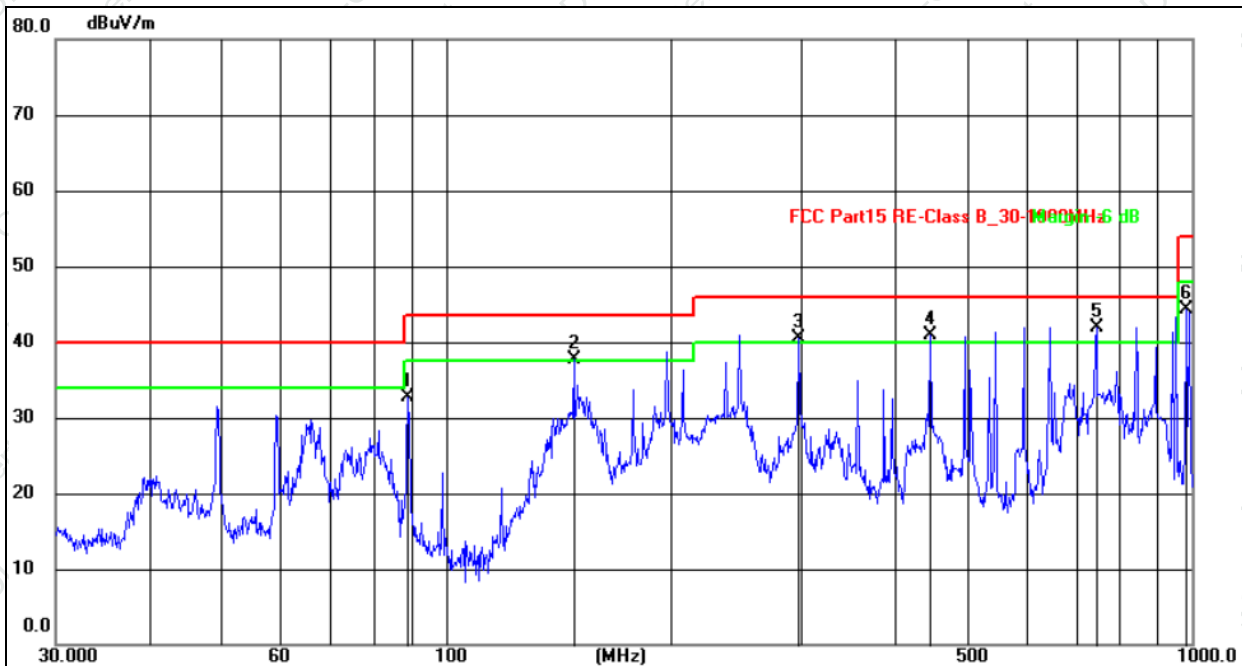
Between 9KHz – 30MHz

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 5V	Test Mode :	TX 802.11n20 - 5180MHz
Test Band:	5.2G		



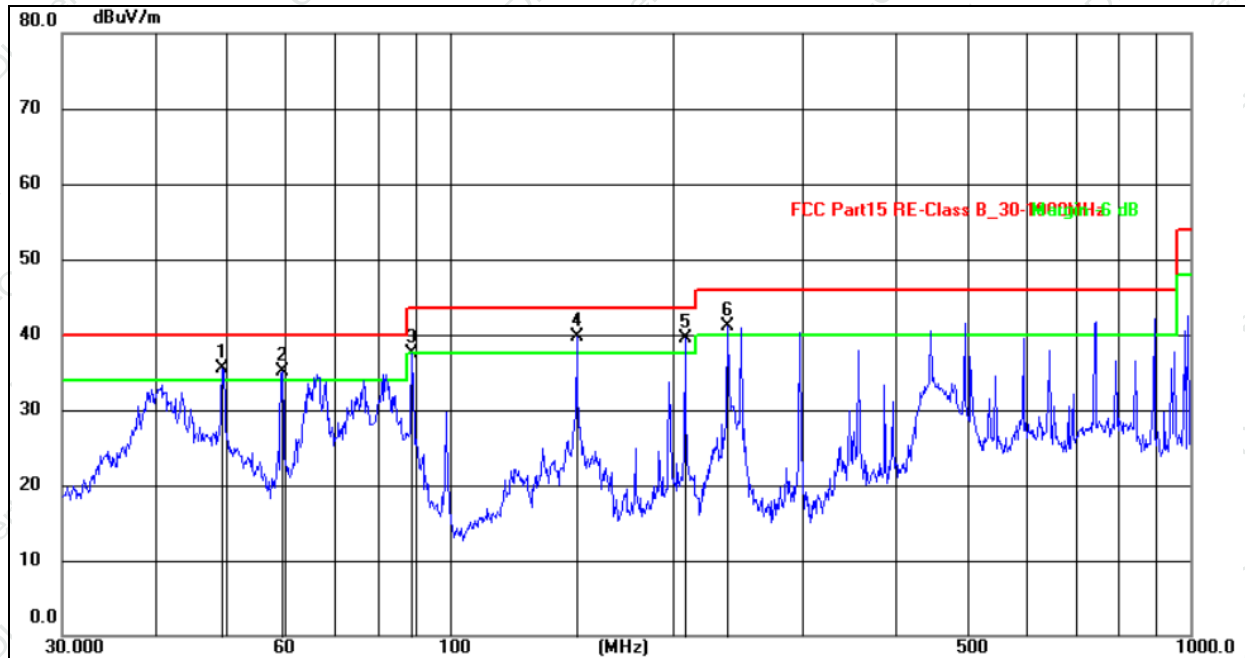
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	88.9637	54.46	-21.67	32.79	43.50	-10.71	QP
2	148.4410	56.67	-18.97	37.70	43.50	-5.80	QP
3	297.2238	61.69	-21.14	40.55	46.00	-5.45	QP
4	446.4139	60.07	-19.22	40.85	46.00	-5.15	QP
5	744.8659	54.61	-12.72	41.89	46.00	-4.11	QP
6	982.6200	56.10	-11.87	44.23	54.00	-9.77	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 - 5180MHz.



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 5V	Test Mode :	TX 802.11n20 -5180MHz
Test Band:	5.2G		



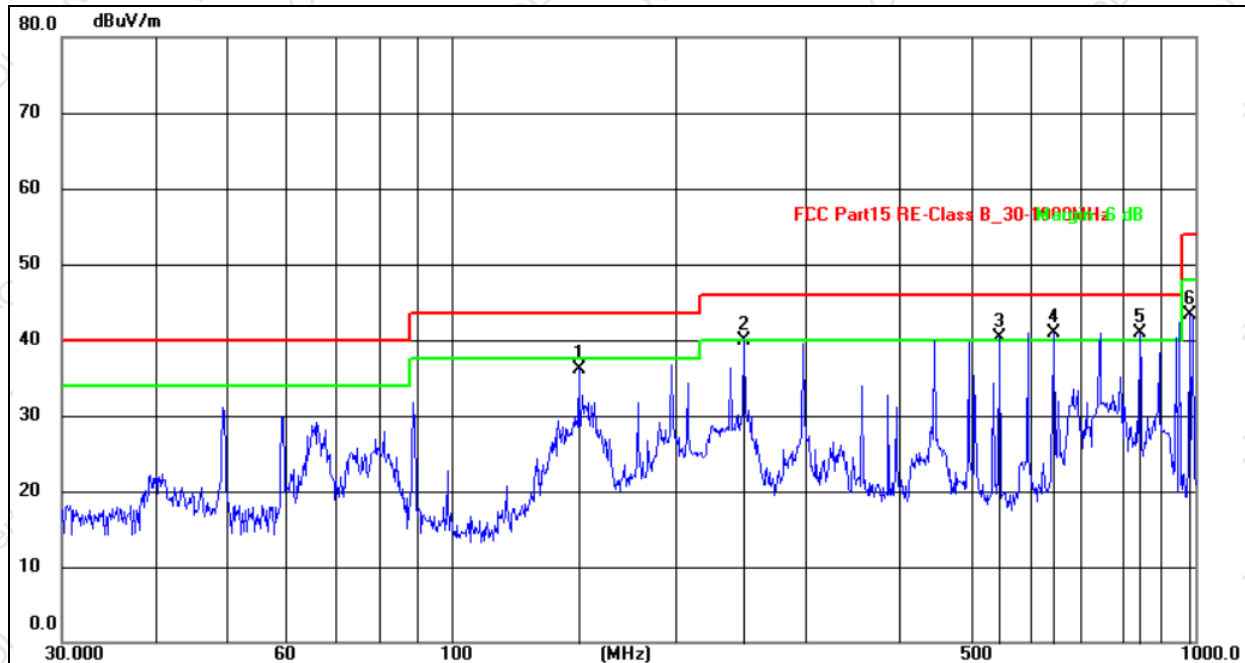
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	49.3594	54.09	-18.57	35.52	40.00	-4.48	QP
2	59.4405	54.63	-19.62	35.01	40.00	-4.99	QP
3	88.9637	60.51	-23.08	37.43	43.50	-6.07	QP
4	148.4410	62.58	-22.97	39.61	43.50	-3.89	QP
5	207.8500	63.44	-23.85	39.59	43.50	-3.91	QP
6	237.4758	65.09	-23.97	41.12	46.00	-4.88	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 - 5180MHz.



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 5V	Test Mode :	TX 802.11n20 - 5745MHz
Test Band:	5.8G		



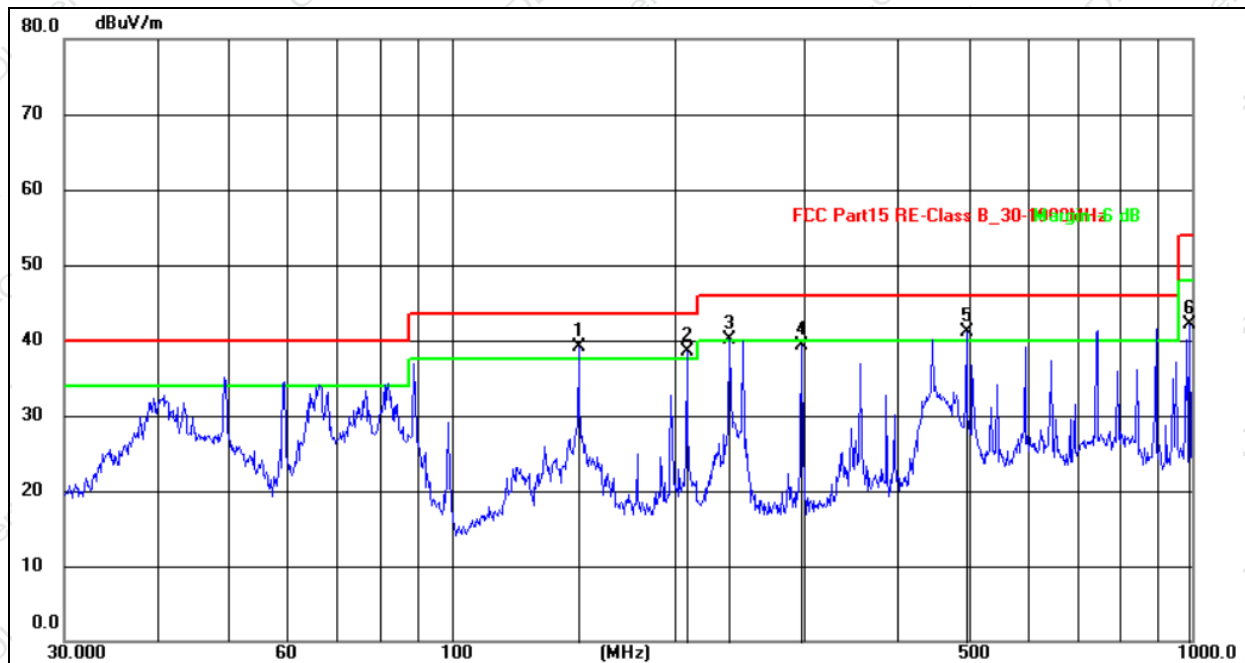
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	148.4410	55.17	-18.97	36.20	43.50	-7.30	QP
2	247.6818	59.76	-19.83	39.93	46.00	-6.07	QP
3	545.1825	55.85	-15.59	40.26	46.00	-5.74	QP
4	645.1194	54.30	-13.44	40.86	46.00	-5.14	QP
5	842.1295	54.16	-13.20	40.96	46.00	-5.04	QP
6	982.6200	55.10	-11.87	43.23	54.00	-10.77	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 - 5745MHz.



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 5V	Test Mode :	TX 802.11n20 - 5745MHz
Test Band:	5.8G		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	148.4410	62.08	-22.97	39.11	43.50	-4.39	QP
2	207.8500	62.44	-23.85	38.59	43.50	-4.91	QP
3	237.4755	64.09	-23.97	40.12	46.00	-5.88	QP
4	297.2238	62.32	-22.94	39.38	46.00	-6.62	QP
5	495.9343	57.84	-16.77	41.07	46.00	-4.93	QP
6	993.0113	49.01	-6.92	42.09	54.00	-11.91	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 - 5745MHz.



Between 1GHz – 40GHz:

Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 5V
Test Band :	5.2G		

802.11a

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:5180MHz									
V	10360.00	35.38	34.30	5.70	40.40	47.18	68.20	-21.02	PK
V	10360.00	24.38	34.30	5.70	40.40	36.18	54.00	-17.82	AV
V	15540.00	37.00	31.70	5.90	40.20	51.40	74.00	-22.60	PK
V	15540.00	26.80	31.70	5.90	40.20	41.20	54.00	-12.80	AV
V	20720.00	38.56	30.70	6.10	45.40	59.36	74.00	-14.64	PK
V	20720.00	27.68	30.70	6.10	45.40	48.48	54.00	-5.52	AV
V	25900.00	40.53	30.30	6.30	45.60	62.13	68.20	-6.07	PK
V	25900.00	29.86	30.30	6.30	45.60	51.46	54.00	-2.54	AV
H	10360.00	35.57	34.30	5.70	40.40	47.37	68.20	-20.83	PK
H	10360.00	24.26	34.30	5.70	40.40	36.06	54.00	-17.94	AV
H	15540.00	37.00	31.70	5.90	40.20	51.40	74.00	-22.60	PK
H	15540.00	26.79	31.70	5.90	40.20	41.19	54.00	-12.81	AV
H	20720.00	38.68	30.70	6.10	45.40	59.48	74.00	-14.52	PK
H	20720.00	27.68	30.70	6.10	45.40	48.48	54.00	-5.52	AV
H	25900.00	40.62	30.30	6.30	45.60	62.22	68.20	-5.98	PK
H	25900.00	29.66	30.30	6.30	45.60	51.26	54.00	-2.74	AV

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)	
Middle Channel:5200MHz									
V	10400.00	35.54	34.30	5.70	40.40	47.34	68.20	-20.86	PK
V	10400.00	24.47	34.30	5.70	40.40	36.27	54.00	-17.73	AV
V	15600.00	37.10	31.70	5.90	40.20	51.50	74.00	-22.50	PK
V	15600.00	26.70	31.70	5.90	40.20	41.10	54.00	-12.90	AV
V	20800.00	38.55	30.70	6.10	45.40	59.35	74.00	-14.65	PK
V	20800.00	27.85	30.70	6.10	45.40	48.65	54.00	-5.35	AV
V	26000.00	40.41	30.30	6.30	45.60	62.01	68.20	-6.19	PK
V	26000.00	29.86	30.30	6.30	45.60	51.46	54.00	-2.54	AV
H	10400.00	35.59	34.30	5.70	40.40	47.39	68.20	-20.81	PK
H	10400.00	24.38	34.30	5.70	40.40	36.18	54.00	-17.82	AV
H	15600.00	37.00	31.70	5.90	40.20	51.40	74.00	-22.60	PK
H	15600.00	26.83	31.70	5.90	40.20	41.23	54.00	-12.77	AV
H	20800.00	38.63	30.70	6.10	45.40	59.43	74.00	-14.57	PK
H	20800.00	27.84	30.70	6.10	45.40	48.64	54.00	-5.36	AV
H	26000.00	40.47	30.30	6.30	45.60	62.07	68.20	-6.13	PK
H	26000.00	29.62	30.30	6.30	45.60	51.22	54.00	-2.78	AV



Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:5240MHz									
V	10480.00	35.52	34.30	5.70	40.40	47.32	68.20	-20.88	PK
V	10480.00	24.26	34.30	5.70	40.40	36.06	54.00	-17.94	AV
V	15720.00	36.92	31.70	5.90	40.20	51.32	74.00	-22.68	PK
V	15720.00	26.89	31.70	5.90	40.20	41.29	54.00	-12.71	AV
V	20960.00	38.73	30.70	6.10	45.40	59.53	74.00	-14.47	PK
V	20960.00	27.62	30.70	6.10	45.40	48.42	54.00	-5.58	AV
V	26200.00	39.50	30.30	6.30	45.60	61.10	68.20	-7.10	PK
V	26200.00	29.90	30.30	6.30	45.60	51.50	54.00	-2.50	AV
H	10480.00	35.36	34.30	5.70	40.40	47.16	68.20	-21.04	PK
H	10480.00	24.50	34.30	5.70	40.40	36.30	54.00	-17.70	AV
H	15720.00	36.96	31.70	5.90	40.20	51.36	74.00	-22.64	PK
H	15720.00	26.78	31.70	5.90	40.20	41.18	54.00	-12.82	AV
H	20960.00	38.79	30.70	6.10	45.40	59.59	74.00	-14.41	PK
H	20960.00	27.88	30.70	6.10	45.40	48.68	54.00	-5.32	AV
H	26200.00	40.46	30.30	6.30	45.60	62.06	68.20	-6.14	PK
H	26200.00	29.84	30.30	6.30	45.60	51.44	54.00	-2.56	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:5180MHz									
V	10360.00	35.51	34.30	5.70	40.40	47.31	68.20	-20.89	PK
V	10360.00	24.38	34.30	5.70	40.40	36.18	54.00	-17.82	AV
V	15540.00	36.94	31.70	5.90	40.20	51.34	74.00	-22.66	PK
V	15540.00	26.89	31.70	5.90	40.20	41.29	54.00	-12.71	AV
V	20720.00	38.70	30.70	6.10	45.40	59.50	74.00	-14.50	PK
V	20720.00	27.75	30.70	6.10	45.40	48.55	54.00	-5.45	AV
V	25900.00	40.46	30.30	6.30	45.60	62.06	68.20	-6.14	PK
V	25900.00	29.85	30.30	6.30	45.60	51.45	54.00	-2.55	AV
H	10360.00	35.45	34.30	5.70	40.40	47.25	68.20	-20.95	PK
H	10360.00	24.26	34.30	5.70	40.40	36.06	54.00	-17.94	AV
H	15540.00	36.97	31.70	5.90	40.20	51.37	74.00	-22.63	PK
H	15540.00	26.85	31.70	5.90	40.20	41.25	54.00	-12.75	AV
H	20720.00	38.65	30.70	6.10	45.40	59.45	74.00	-14.55	PK
H	20720.00	27.71	30.70	6.10	45.40	48.51	54.00	-5.49	AV
H	25900.00	40.45	30.30	6.30	45.60	62.05	68.20	-6.15	PK
H	25900.00	29.78	30.30	6.30	45.60	51.38	54.00	-2.62	AV

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)	
Middle Channel:5200MHz									
V	10400.00	35.42	34.30	5.70	40.40	47.22	68.20	-20.98	PK
V	10400.00	24.49	34.30	5.70	40.40	36.29	54.00	-17.71	AV
V	15600.00	36.99	31.70	5.90	40.20	51.39	74.00	-22.61	PK
V	15600.00	26.84	31.70	5.90	40.20	41.24	54.00	-12.76	AV
V	20800.00	38.71	30.70	6.10	45.40	59.51	74.00	-14.49	PK
V	20800.00	27.61	30.70	6.10	45.40	48.41	54.00	-5.59	AV
V	26000.00	40.52	30.30	6.30	45.60	62.12	68.20	-6.08	PK
V	26000.00	29.66	30.30	6.30	45.60	51.26	54.00	-2.74	AV
H	10400.00	35.55	34.30	5.70	40.40	47.35	68.20	-20.85	PK
H	10400.00	24.28	34.30	5.70	40.40	36.08	54.00	-17.92	AV
H	15600.00	37.09	31.70	5.90	40.20	51.49	74.00	-22.51	PK
H	15600.00	26.93	31.70	5.90	40.20	41.33	54.00	-12.67	AV
H	20800.00	38.61	30.70	6.10	45.40	59.41	74.00	-14.59	PK
H	20800.00	27.76	30.70	6.10	45.40	48.56	54.00	-5.44	AV
H	26000.00	40.41	30.30	6.30	45.60	62.01	68.20	-6.19	PK
H	26000.00	29.83	30.30	6.30	45.60	51.43	54.00	-2.57	AV



Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:5240MHz									
V	10480.00	35.41	34.30	5.70	40.40	47.21	68.20	-20.99	PK
V	10480.00	24.43	34.30	5.70	40.40	36.23	54.00	-17.77	AV
V	15720.00	36.98	31.70	5.90	40.20	51.38	74.00	-22.62	PK
V	15720.00	26.77	31.70	5.90	40.20	41.17	54.00	-12.83	AV
V	20960.00	38.61	30.70	6.10	45.40	59.41	74.00	-14.59	PK
V	20960.00	27.82	30.70	6.10	45.40	48.62	54.00	-5.38	AV
V	26200.00	39.70	30.30	6.30	45.60	61.30	68.20	-6.90	PK
V	26200.00	29.92	30.30	6.30	45.60	51.52	54.00	-2.48	AV
H	10480.00	35.54	34.30	5.70	40.40	47.34	68.20	-20.86	PK
H	10480.00	24.34	34.30	5.70	40.40	36.14	54.00	-17.86	AV
H	15720.00	37.03	31.70	5.90	40.20	51.43	74.00	-22.57	PK
H	15720.00	26.76	31.70	5.90	40.20	41.16	54.00	-12.84	AV
H	20960.00	38.47	30.70	6.10	45.40	59.27	74.00	-14.73	PK
H	20960.00	27.66	30.70	6.10	45.40	48.46	54.00	-5.54	AV
H	26200.00	40.57	30.30	6.30	45.60	62.17	68.20	-6.03	PK
H	26200.00	29.91	30.30	6.30	45.60	51.51	54.00	-2.49	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.



Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 5V
Test Band :	5.8G		

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	11490.00	37.87	34.30	5.80	41.20	50.57	74.00	-23.43	PK
V	11490.00	26.14	34.30	5.80	41.20	38.84	54.00	-15.16	AV
V	17235.00	38.19	32.10	6.00	43.50	55.59	68.20	-12.61	PK
V	17235.00	26.66	32.10	6.00	43.50	44.06	54.00	-9.94	AV
V	22980.00	39.75	31.00	6.20	45.50	60.45	74.00	-13.55	PK
V	22980.00	27.64	31.00	6.20	45.50	48.34	54.00	-5.66	AV
V	28725.00	41.01	29.10	6.40	45.70	64.01	68.20	-4.19	PK
V	28725.00	28.82	29.10	6.40	45.70	51.82	54.00	-2.18	AV
H	11490.00	37.97	34.30	5.80	41.20	50.67	74.00	-23.33	PK
H	11490.00	26.16	34.30	5.80	41.20	38.86	54.00	-15.14	AV
H	17235.00	38.13	32.10	6.00	43.50	55.53	68.20	-12.67	PK
H	17235.00	26.74	32.10	6.00	43.50	44.14	54.00	-9.86	AV
H	22980.00	39.85	31.00	6.20	45.50	60.55	74.00	-13.45	PK
H	22980.00	27.60	31.00	6.20	45.50	48.30	54.00	-5.70	AV
H	28725.00	41.12	29.10	6.40	45.70	64.12	68.20	-4.08	PK
H	28725.00	28.97	29.10	6.40	45.70	51.97	54.00	-2.03	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)	Detect or Type
Middle Channel:5785MHz									
V	11570.00	37.77	34.30	5.80	41.20	50.47	74.00	-23.53	PK
V	11570.00	26.09	34.30	5.80	41.20	38.79	54.00	-15.21	AV
V	17355.00	38.02	32.10	6.00	43.50	55.42	68.20	-12.78	PK
V	17355.00	26.55	32.10	6.00	43.50	43.95	54.00	-10.05	AV
V	23140.00	39.64	31.00	6.20	45.50	60.34	68.20	-7.86	PK
V	23140.00	27.45	31.00	6.20	45.50	48.15	54.00	-5.85	AV
V	28925.00	40.94	29.10	6.40	45.70	63.94	68.20	-4.26	PK
V	28925.00	28.69	29.10	6.40	45.70	51.69	54.00	-2.31	AV
H	11570.00	37.74	34.30	5.80	41.20	50.44	74.00	-23.56	PK
H	11570.00	25.96	34.30	5.80	41.20	38.66	54.00	-15.34	AV
H	17355.00	38.00	32.10	6.00	43.50	55.40	68.20	-12.80	PK
H	17355.00	26.58	32.10	6.00	43.50	43.98	54.00	-10.02	AV
H	23140.00	39.71	31.00	6.20	45.50	60.41	68.20	-7.79	PK
H	23140.00	27.49	31.00	6.20	45.50	48.19	54.00	-5.81	AV
H	28925.00	40.77	29.10	6.40	45.70	63.77	68.20	-4.43	PK
H	28925.00	28.63	29.10	6.40	45.70	51.63	54.00	-2.37	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)	Detect or Type
High Channel:5825MHz									
V	11650.00	37.78	34.30	5.80	41.20	50.48	74.00	-23.52	PK
V	11650.00	25.96	34.30	5.80	41.20	38.66	54.00	-15.34	AV
V	17475.00	38.08	32.10	6.00	43.50	55.48	68.20	-12.72	PK
V	17475.00	26.50	32.10	6.00	43.50	43.90	54.00	-10.10	AV
V	23300.00	39.62	31.00	6.20	45.50	60.32	68.20	-7.88	PK
V	23300.00	27.44	31.00	6.20	45.50	48.14	54.00	-5.86	AV
V	29125.00	40.84	29.10	6.40	45.70	63.84	68.20	-4.36	PK
V	29125.00	28.60	29.10	6.40	45.70	51.60	54.00	-2.40	AV
H	11650.00	37.68	34.30	5.80	41.20	50.38	74.00	-23.62	PK
H	11650.00	25.96	34.30	5.80	41.20	38.66	54.00	-15.34	AV
H	17475.00	38.01	32.10	6.00	43.50	55.41	68.20	-12.79	PK
H	17475.00	26.51	32.10	6.00	43.50	43.91	54.00	-10.09	AV
H	23300.00	39.68	31.00	6.20	45.50	60.38	68.20	-7.82	PK
H	23300.00	27.41	31.00	6.20	45.50	48.11	54.00	-5.89	AV
H	29125.00	40.96	29.10	6.40	45.70	63.96	68.20	-4.24	PK
H	29125.00	28.57	29.10	6.40	45.70	51.57	54.00	-2.43	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.



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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	37.85	34.30	5.80	41.20	50.55	74.00	-23.45	PK
V	11490.00	26.16	34.30	5.80	41.20	38.86	54.00	-15.14	AV
V	17235.00	38.16	32.10	6.00	43.50	55.56	68.20	-12.64	PK
V	17235.00	26.78	32.10	6.00	43.50	44.18	54.00	-9.82	AV
V	22980.00	39.74	31.00	6.20	45.50	60.44	74.00	-13.56	PK
V	22980.00	27.64	31.00	6.20	45.50	48.34	54.00	-5.66	AV
V	28725.00	41.05	29.10	6.40	45.70	64.05	68.20	-4.15	PK
V	28725.00	28.82	29.10	6.40	45.70	51.82	54.00	-2.18	AV
H	11490.00	37.94	34.30	5.80	41.20	50.64	74.00	-23.36	PK
H	11490.00	26.18	34.30	5.80	41.20	38.88	54.00	-15.12	AV
H	17235.00	38.13	32.10	6.00	43.50	55.53	68.20	-12.67	PK
H	17235.00	26.71	32.10	6.00	43.50	44.11	54.00	-9.89	AV
H	22980.00	39.80	31.00	6.20	45.50	60.50	74.00	-13.50	PK
H	22980.00	27.60	31.00	6.20	45.50	48.30	54.00	-5.70	AV
H	28725.00	41.08	29.10	6.40	45.70	64.08	68.20	-4.12	PK
H	28725.00	28.94	29.10	6.40	45.70	51.94	54.00	-2.06	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)	Detect or Type
Middle Channel:5785MHz									
V	11570.00	37.74	34.30	5.80	41.20	50.44	74.00	-23.56	PK
V	11570.00	25.98	34.30	5.80	41.20	38.68	54.00	-15.32	AV
V	17355.00	38.01	32.10	6.00	43.50	55.41	68.20	-12.79	PK
V	17355.00	26.52	32.10	6.00	43.50	43.92	54.00	-10.08	AV
V	23140.00	39.60	31.00	6.20	45.50	60.30	68.20	-7.90	PK
V	23140.00	27.46	31.00	6.20	45.50	48.16	54.00	-5.84	AV
V	28925.00	40.79	29.10	6.40	45.70	63.79	68.20	-4.41	PK
V	28925.00	28.66	29.10	6.40	45.70	51.66	54.00	-2.34	AV
H	11570.00	37.81	34.30	5.80	41.20	50.51	74.00	-23.49	PK
H	11570.00	26.11	34.30	5.80	41.20	38.81	54.00	-15.19	AV
H	17355.00	37.99	32.10	6.00	43.50	55.39	68.20	-12.81	PK
H	17355.00	26.47	32.10	6.00	43.50	43.87	54.00	-10.13	AV
H	23140.00	39.70	31.00	6.20	45.50	60.40	68.20	-7.80	PK
H	23140.00	27.45	31.00	6.20	45.50	48.15	54.00	-5.85	AV
H	28925.00	40.94	29.10	6.40	45.70	63.94	68.20	-4.26	PK
H	28925.00	28.63	29.10	6.40	45.70	51.63	54.00	-2.37	AV



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-ampli fier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detect or Type
High Channel:5825MHz									
V	11650.00	37.77	34.30	5.80	41.20	50.47	74.00	-23.53	PK
V	11650.00	25.98	34.30	5.80	41.20	38.68	54.00	-15.32	AV
V	17475.00	37.98	32.10	6.00	43.50	55.38	68.20	-12.82	PK
V	17475.00	26.55	32.10	6.00	43.50	43.95	54.00	-10.05	AV
V	23300.00	39.69	31.00	6.20	45.50	60.39	68.20	-7.81	PK
V	23300.00	27.41	31.00	6.20	45.50	48.11	54.00	-5.89	AV
V	29125.00	40.92	29.10	6.40	45.70	63.92	68.20	-4.28	PK
V	29125.00	28.78	29.10	6.40	45.70	51.78	54.00	-2.22	AV
H	11650.00	37.79	34.30	5.80	41.20	50.49	74.00	-23.51	PK
H	11650.00	26.02	34.30	5.80	41.20	38.72	54.00	-15.28	AV
H	17475.00	37.98	32.10	6.00	43.50	55.38	68.20	-12.82	PK
H	17475.00	26.46	32.10	6.00	43.50	43.86	54.00	-10.14	AV
H	23300.00	39.67	31.00	6.20	45.50	60.37	68.20	-7.83	PK
H	23300.00	27.53	31.00	6.20	45.50	48.23	54.00	-5.77	AV
H	29125.00	40.75	29.10	6.40	45.70	63.75	68.20	-4.45	PK
H	29125.00	28.76	29.10	6.40	45.70	51.76	54.00	-2.24	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°C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 5V
Test Band :	5.2G		

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:5180MHz									
V	4500.00	44.24	34.10	3.60	33.90	47.64	74.00	-26.36	PK
V	4500.00	30.40	34.10	3.60	33.90	33.80	54.00	-20.20	AV
V	5100.00	45.15	34.20	3.70	36.00	50.65	74.00	-23.35	PK
V	5100.00	32.20	34.20	3.70	36.00	37.70	54.00	-16.30	AV
V	5150.00	44.51	34.20	3.71	36.20	50.22	74.00	-23.78	PK
V	5150.00	31.87	34.20	3.71	36.20	37.58	54.00	-16.42	AV
H	4500.00	44.34	34.10	3.60	33.90	47.74	74.00	-26.26	PK
H	4500.00	31.27	34.10	3.60	33.90	34.67	54.00	-19.33	AV
H	5100.00	44.24	34.20	3.70	36.00	49.74	74.00	-24.26	PK
H	5100.00	31.43	34.20	3.70	36.00	36.93	54.00	-17.07	AV
H	5150.00	43.27	34.20	3.71	36.20	48.98	74.00	-25.02	PK
H	5150.00	30.95	34.20	3.71	36.20	36.66	54.00	-17.34	PK

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:5240MHz									
V	5350.00	44.46	34.20	3.80	35.80	49.86	74.00	-24.14	PK
V	5350.00	30.66	34.20	3.80	35.80	36.06	54.00	-17.94	AV
V	5400.00	45.16	34.20	3.81	35.90	50.67	74.00	-23.33	PK
V	5400.00	31.96	34.20	3.81	35.90	37.47	54.00	-16.53	AV
V	5460.00	44.58	34.20	3.82	36.00	50.20	74.00	-23.80	PK
V	5460.00	32.10	34.20	3.82	36.00	37.72	54.00	-16.28	AV
H	5350.00	43.89	34.20	3.80	35.80	49.29	74.00	-24.71	PK
H	5350.00	31.08	34.20	3.80	35.80	36.48	54.00	-17.52	AV
H	5400.00	44.45	34.20	3.81	35.90	49.96	74.00	-24.04	PK
H	5400.00	31.18	34.20	3.81	35.90	36.69	54.00	-17.31	AV
H	5460.00	43.62	34.20	3.82	36.00	49.24	74.00	-24.76	PK
H	5460.00	30.52	34.20	3.82	36.00	36.14	54.00	-17.86	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:5180MHz									
V	4500.00	44.81	34.10	3.60	33.90	48.21	74.00	-25.79	PK
V	4500.00	30.86	34.10	3.60	33.90	34.26	54.00	-19.74	AV
V	5100.00	44.91	34.20	3.70	36.00	50.41	74.00	-23.59	PK
V	5100.00	31.66	34.20	3.70	36.00	37.16	54.00	-16.84	AV
V	5150.00	44.82	34.20	3.71	36.20	50.53	74.00	-23.47	PK
V	5150.00	31.77	34.20	3.71	36.20	37.48	54.00	-16.52	AV
H	4500.00	44.35	34.10	3.60	33.90	47.75	74.00	-26.25	PK
H	4500.00	31.30	34.10	3.60	33.90	34.70	54.00	-19.30	AV
H	5100.00	44.02	34.20	3.70	36.00	49.52	74.00	-24.48	PK
H	5100.00	31.26	34.20	3.70	36.00	36.76	54.00	-17.24	AV
H	5150.00	44.07	34.20	3.71	36.20	49.78	74.00	-24.22	PK
H	5150.00	30.89	34.20	3.71	36.20	36.60	54.00	-17.40	PK

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:5240MHz									
V	5350.00	44.52	34.20	3.80	35.80	49.92	74.00	-24.08	PK
V	5350.00	30.57	34.20	3.80	35.80	35.97	54.00	-18.03	AV
V	5400.00	44.86	34.20	3.81	35.90	50.37	74.00	-23.63	PK
V	5400.00	31.59	34.20	3.81	35.90	37.10	54.00	-16.90	AV
V	5460.00	44.76	34.20	3.82	36.00	50.38	74.00	-23.62	PK
V	5460.00	31.86	34.20	3.82	36.00	37.48	54.00	-16.52	AV
H	5350.00	44.16	34.20	3.80	35.80	49.56	74.00	-24.44	PK
H	5350.00	30.58	34.20	3.80	35.80	35.98	54.00	-18.02	AV
H	5400.00	44.41	34.20	3.81	35.90	49.92	74.00	-24.08	PK
H	5400.00	31.45	34.20	3.81	35.90	36.96	54.00	-17.04	AV
H	5460.00	43.65	34.20	3.82	36.00	49.27	74.00	-24.73	PK
H	5460.00	31.09	34.20	3.82	36.00	36.71	54.00	-17.29	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.



Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 5V
Test Band :	5.8G		

802.11a

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	64.34	34.80	3.86	36.20	69.60	110.80	-41.20	PK
V	5700.00	35.73	34.80	3.86	36.20	40.99	54.00	-13.01	AV
V	5725.00	62.83	34.80	3.86	36.20	68.09	122.20	-54.11	PK
V	5725.00	34.79	34.80	3.86	36.20	40.05	54.00	-13.95	AV
H	5700.00	63.86	34.80	3.86	36.20	69.12	110.80	-41.68	PK
H	5700.00	35.86	34.80	3.86	36.20	41.12	54.00	-12.88	AV
H	5725.00	64.79	34.80	3.86	36.20	70.05	122.20	-52.15	PK
H	5725.00	36.12	34.80	3.86	36.20	41.38	54.00	-12.62	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:5825MHz									
V	5850.00	65.40	34.90	3.88	36.30	70.68	122.20	-51.52	PK
V	5850.00	34.44	34.90	3.88	36.30	39.72	54.00	-14.28	AV
V	5875.00	65.19	34.90	3.88	36.30	70.47	110.80	-40.33	PK
V	5875.00	33.71	34.90	3.88	36.30	38.99	54.00	-15.01	AV
H	5850.00	65.87	34.90	3.88	36.30	71.15	122.20	-51.05	PK
H	5850.00	36.25	34.90	3.88	36.30	41.53	54.00	-12.47	AV
H	5875.00	64.06	34.90	3.88	36.30	69.34	110.80	-41.46	PK
H	5875.00	34.90	34.90	3.88	36.30	40.18	54.00	-13.82	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	64.90	34.80	3.86	36.20	70.16	110.80	-40.64	PK
V	5700.00	35.89	34.80	3.86	36.20	41.15	54.00	-12.85	AV
V	5725.00	63.22	34.80	3.86	36.20	68.48	122.20	-53.72	PK
V	5725.00	34.61	34.80	3.86	36.20	39.87	54.00	-14.13	AV
H	5700.00	64.05	34.80	3.86	36.20	69.31	110.80	-41.49	PK
H	5700.00	35.84	34.80	3.86	36.20	41.10	54.00	-12.90	AV
H	5725.00	65.31	34.80	3.86	36.20	70.57	122.20	-51.63	PK
H	5725.00	36.12	34.80	3.86	36.20	41.38	54.00	-12.62	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:5825MHz									
V	5850.00	65.97	34.90	3.88	36.30	71.25	122.20	-50.95	PK
V	5850.00	34.63	34.90	3.88	36.30	39.91	54.00	-14.09	AV
V	5875.00	64.70	34.90	3.88	36.30	69.98	110.80	-40.82	PK
V	5875.00	33.92	34.90	3.88	36.30	39.20	54.00	-14.80	AV
H	5850.00	65.54	34.90	3.88	36.30	70.82	122.20	-51.38	PK
H	5850.00	35.85	34.90	3.88	36.30	41.13	54.00	-12.87	AV
H	5875.00	64.48	34.90	3.88	36.30	69.76	110.80	-41.04	PK
H	5875.00	35.44	34.90	3.88	36.30	40.72	54.00	-13.28	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:

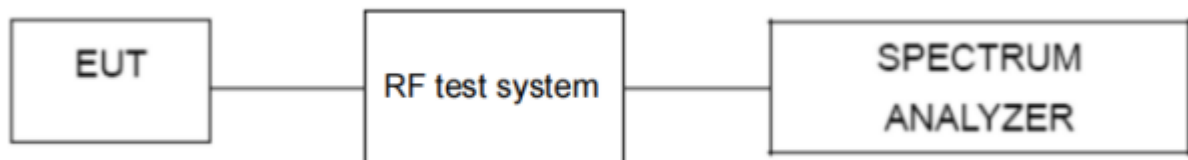
- a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3 RBW$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer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



5.6 TEST RESULTS

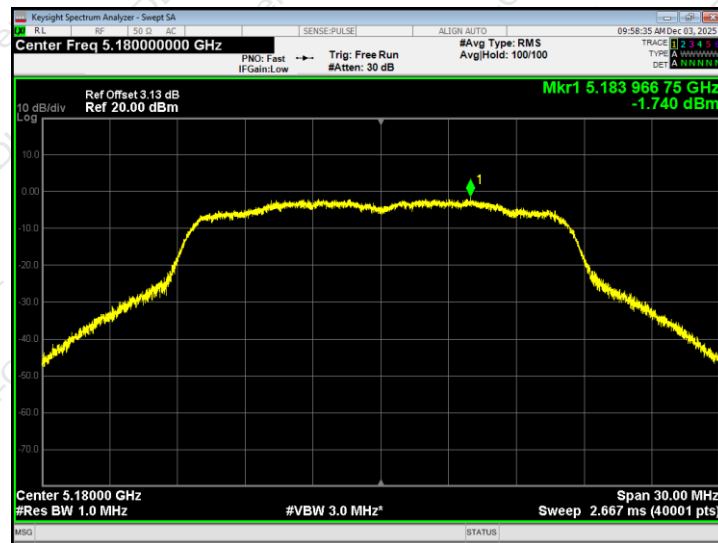
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1015 hPa	Test Voltage :	DC 5V
Test Band :	5.2G		

Test mode	Frequency (MHz)	PSD (dBm)	duty cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	5180	-1.740	0.00	-1.740	11	Pass
	5200	-2.042	0.00	-2.042	11	Pass
	5240	-1.736	0.00	-1.736	11	Pass
802.11n20	5180	-1.864	0.00	-1.864	11	Pass
	5200	-1.990	0.00	-1.990	11	Pass
	5240	-1.799	0.00	-1.799	11	Pass
Note: Total PSD = PSD + Duty Cycle Factor.						

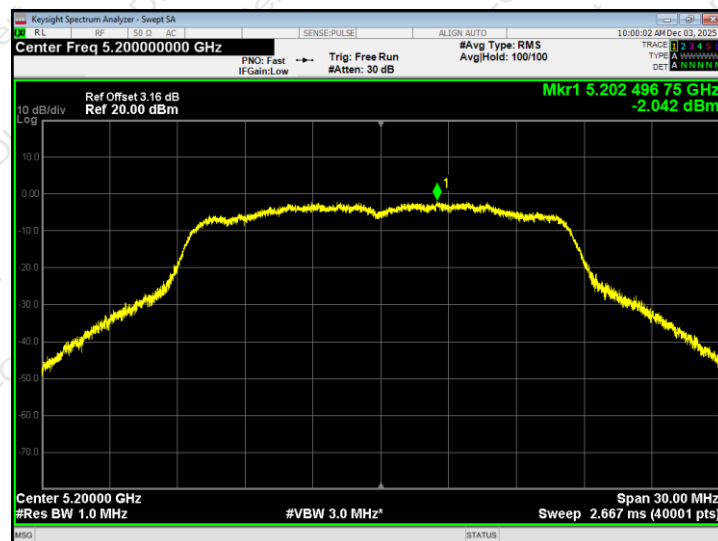


802.11a

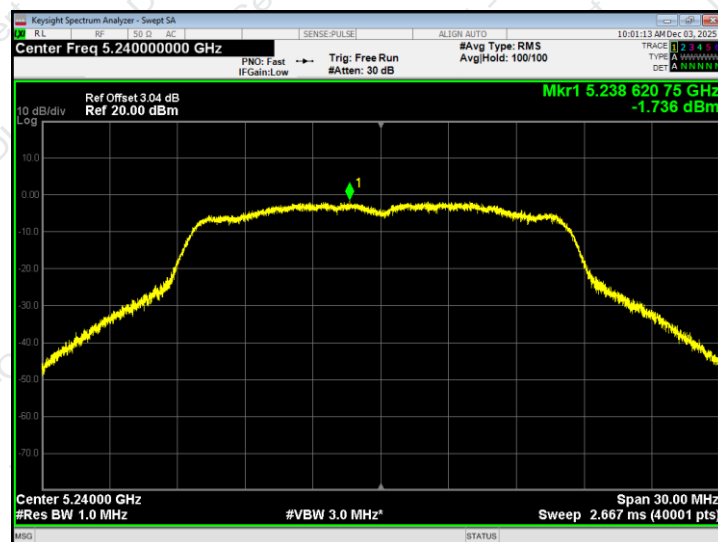
CH36



CH40



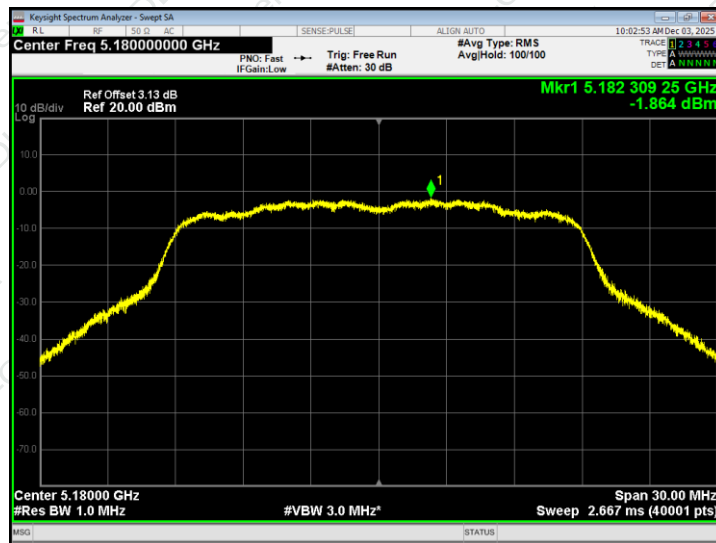
CH48



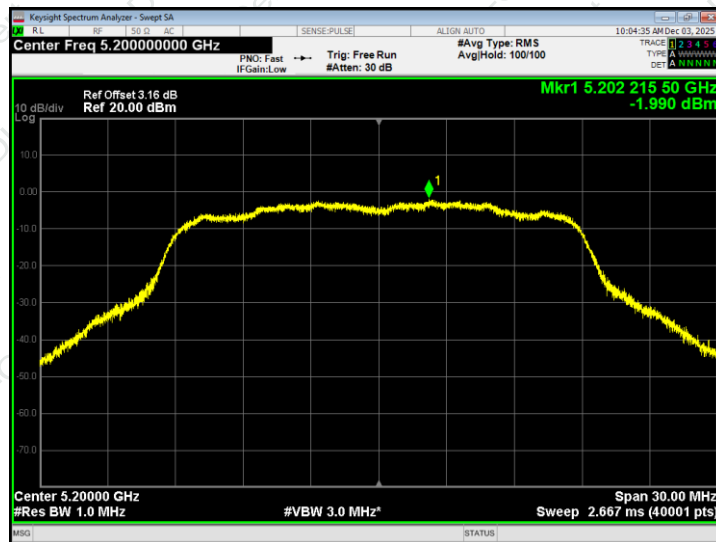


802.11n20

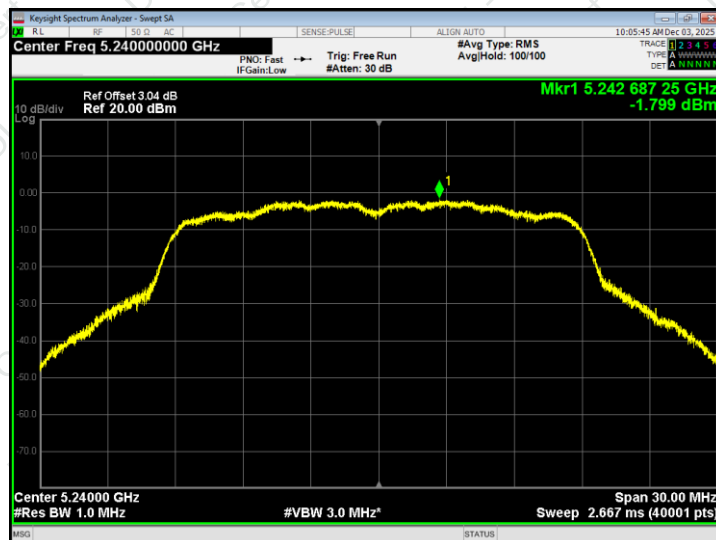
CH36



CH40



CH48





Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1015 hPa	Test Voltage :	DC 5V
Test Band :	5.8G		

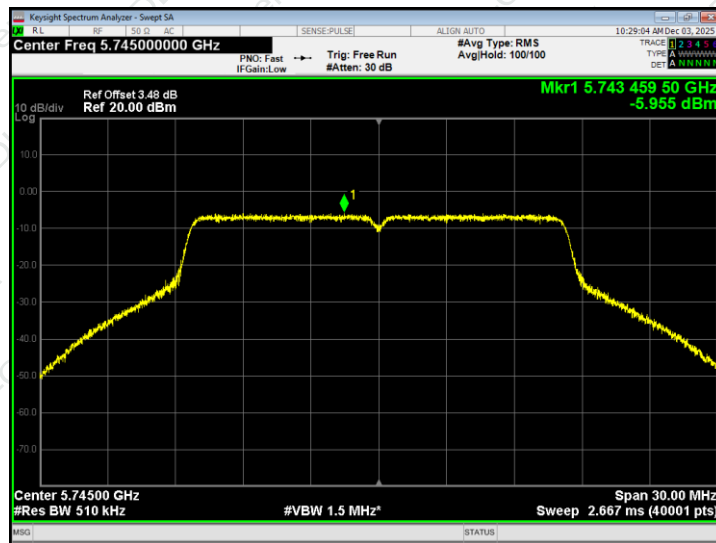
Test mode	Test Channel (MHz)	PSD (dBm/500kHz)	Duty Cycle Factor (dB)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
802.11a	5745	-5.955	0.00	-5.955	30	Pass
	5785	-4.862	0.00	-4.862	30	Pass
	5825	-4.640	0.00	-4.640	30	Pass
802.11n20	5745	-5.984	0.00	-5.984	30	Pass
	5785	-5.396	0.00	-5.396	30	Pass
	5825	-4.657	0.00	-4.657	30	Pass

Note: Total PSD = PSD + Duty Cycle Factor.

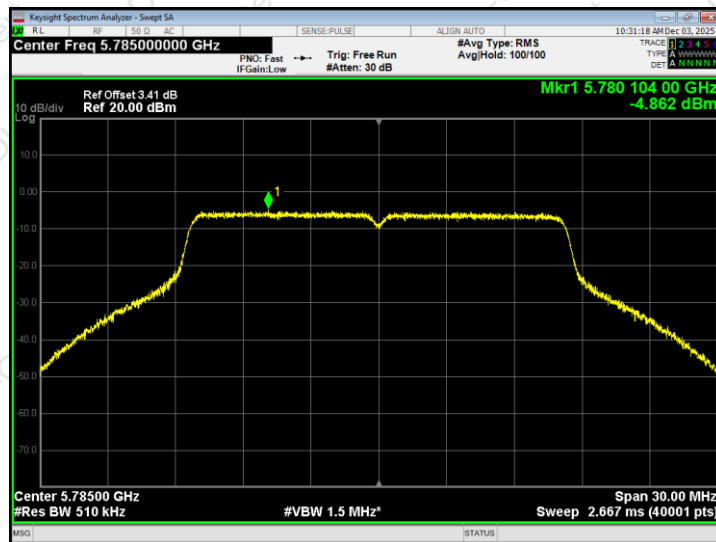


802.11a

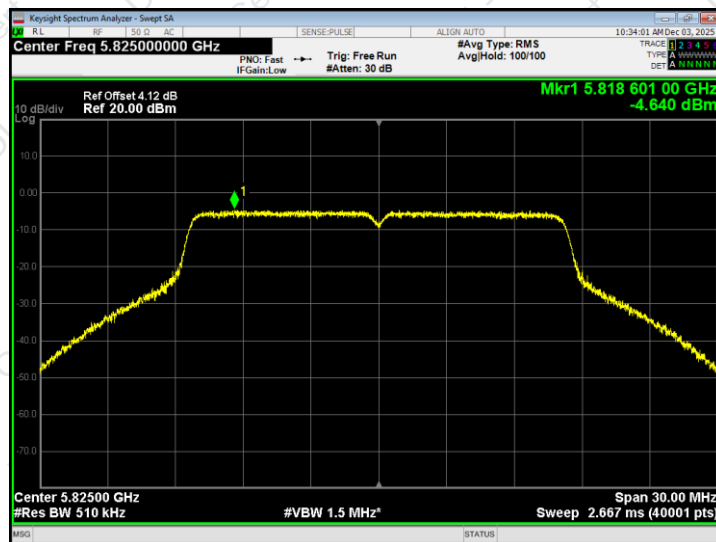
CH149



CH157



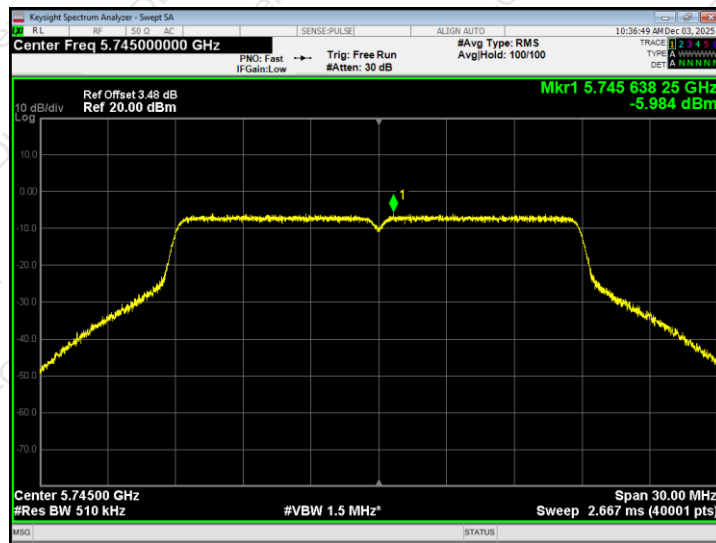
CH165



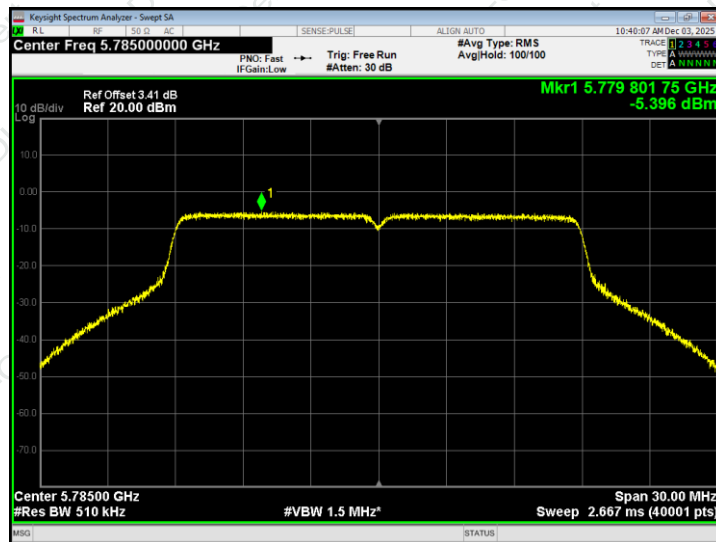


802.11n20

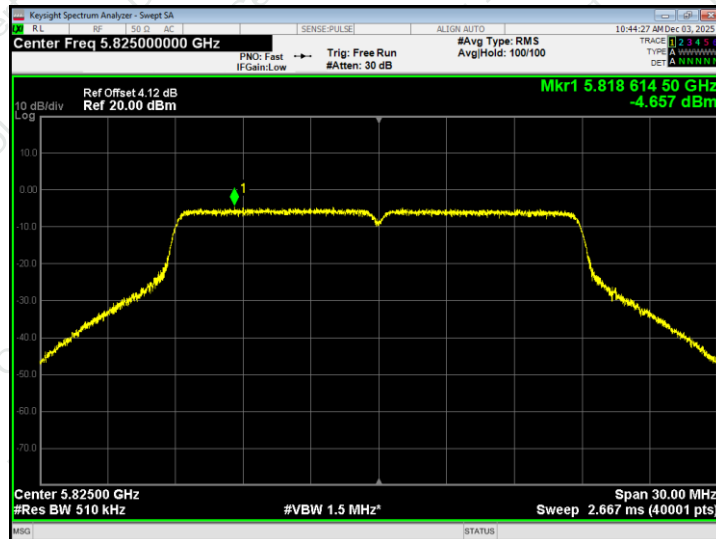
CH149



CH157



CH165





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) $\geq 3 \times$ 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 $\geq$ 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%.

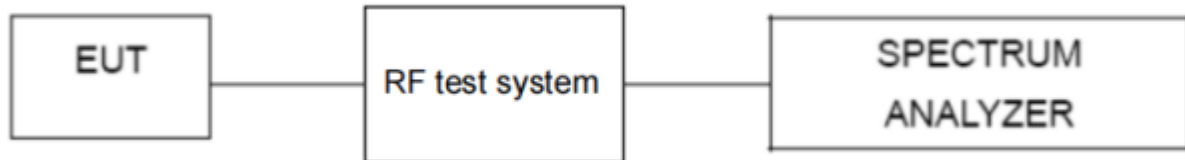
Note: The automatic bandwidth measurement capability of a spectrum analyzer or an EMI receiver may be employed if it implements the functionality described in the preceding items.



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.

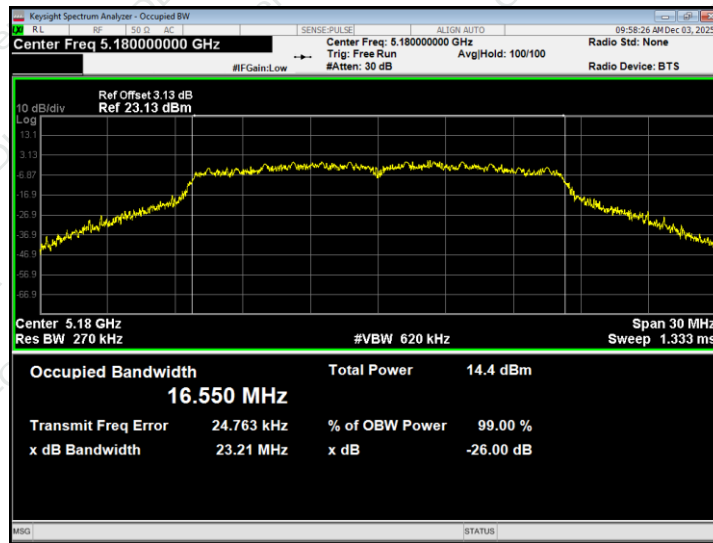
6.6 TEST RESULTS

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 5V
Test Band :	5.2G		

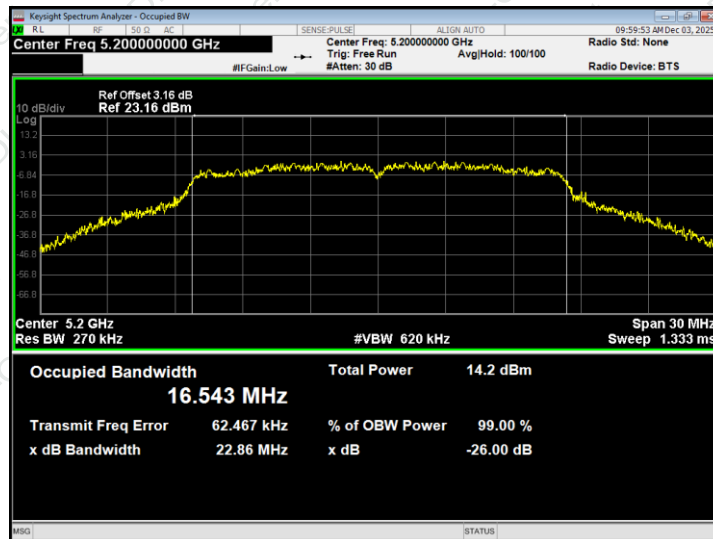
Test Mode	Frequency (MHz)	26dB Emission Bandwidth (MHz)	Limit (MHz)	Result
802.11a	5180	23.21	N/A	Pass
	5200	22.86		
	5240	23.56		
802.11n20	5180	23.00	N/A	Pass
	5200	22.83		
	5240	23.16		

802.11a

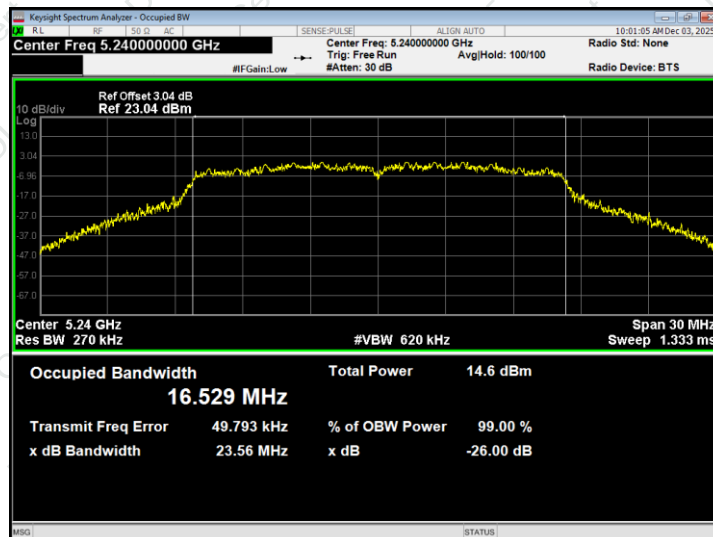
26dB Bandwidth plot on channel 36



26dB Bandwidth plot on channel 40



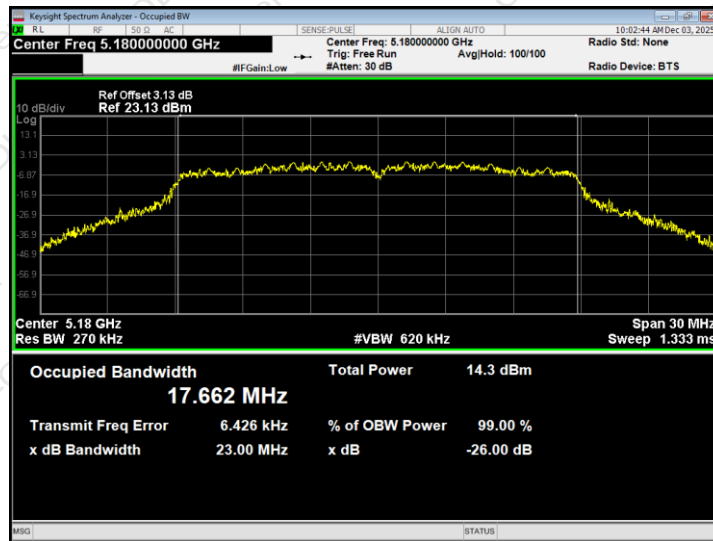
26dB Bandwidth plot on channel 48



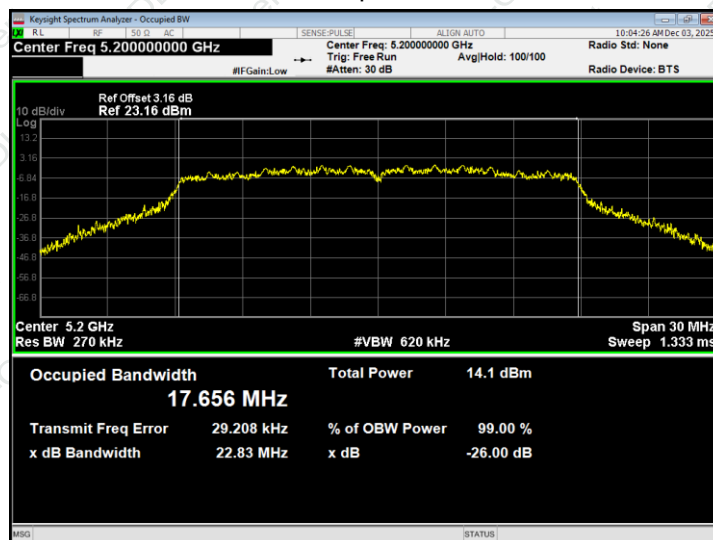


802.11n20

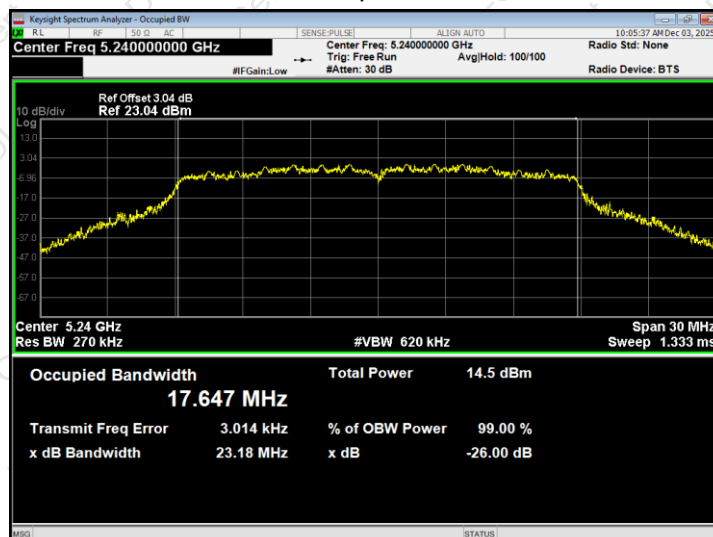
26dB Bandwidth plot on channel 36



26dB Bandwidth plot on channel 40



26dB Bandwidth plot on channel 48





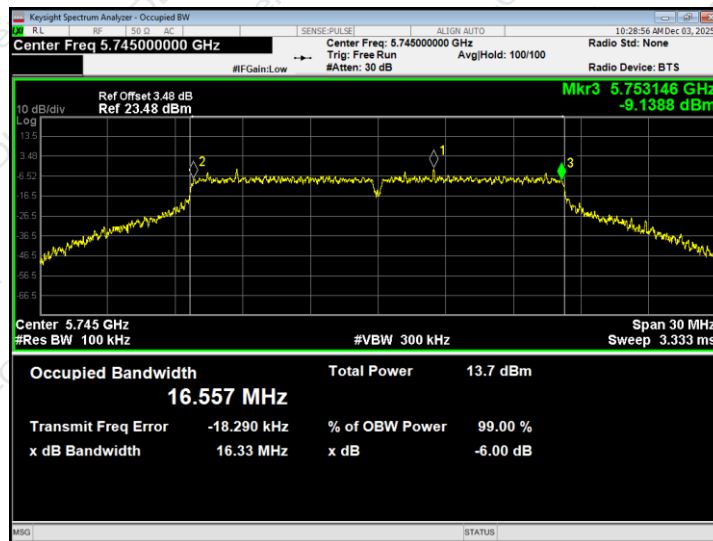
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 5V
Test Band :	5.8G		

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
802.11a	5745	16.33	>500	Pass
	5785	16.33		
	5825	16.35		
802.11n20	5745	17.57	>500	Pass
	5785	17.59		
	5825	17.56		

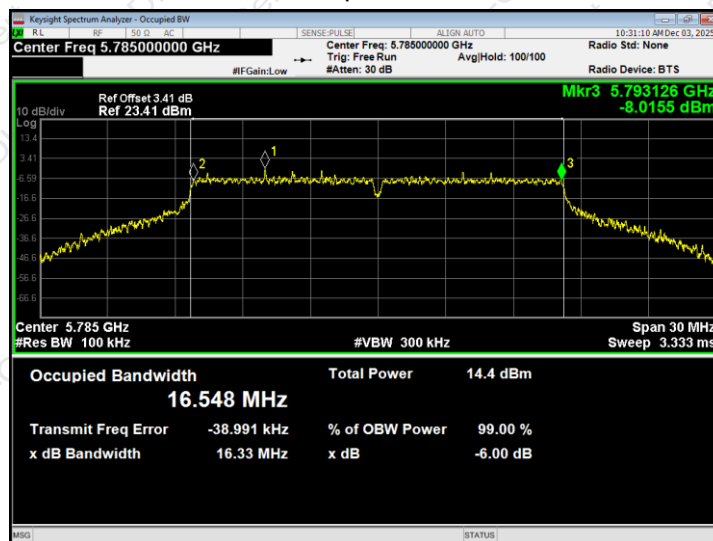


802.11a

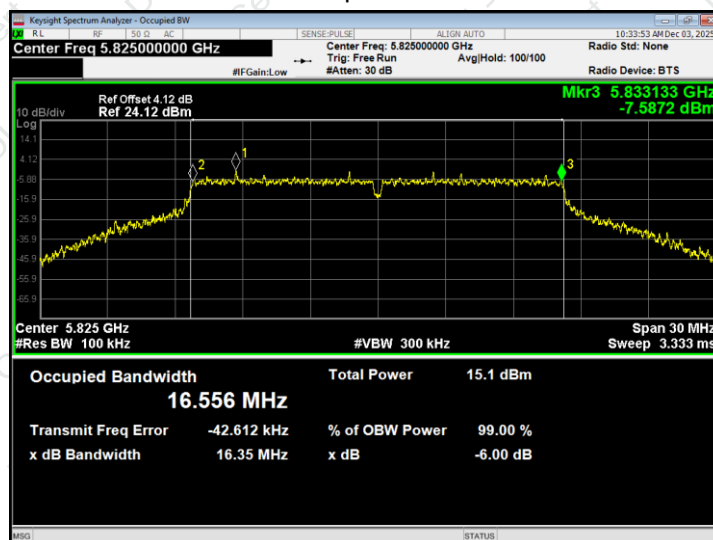
6dB Bandwidth plot on channel 149



6dB Bandwidth plot on channel 157



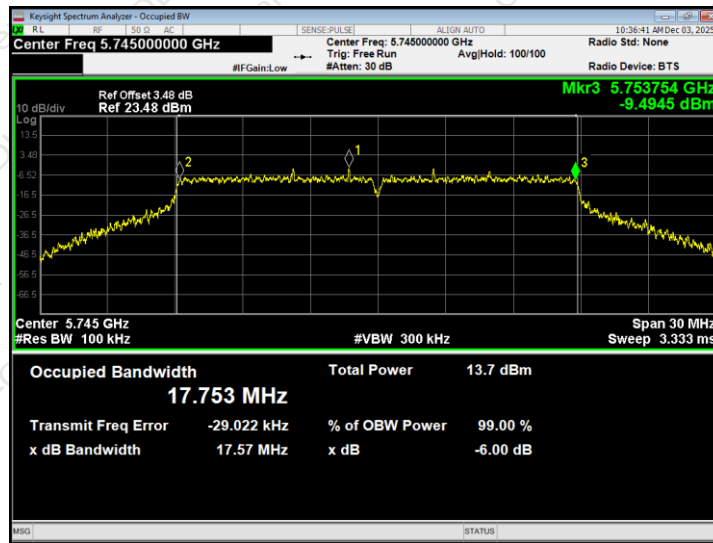
6dB Bandwidth plot on channel 165



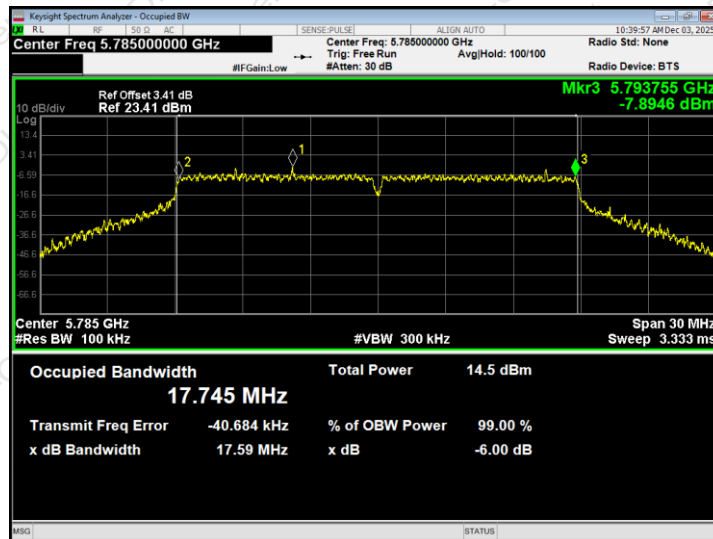


802.11n20

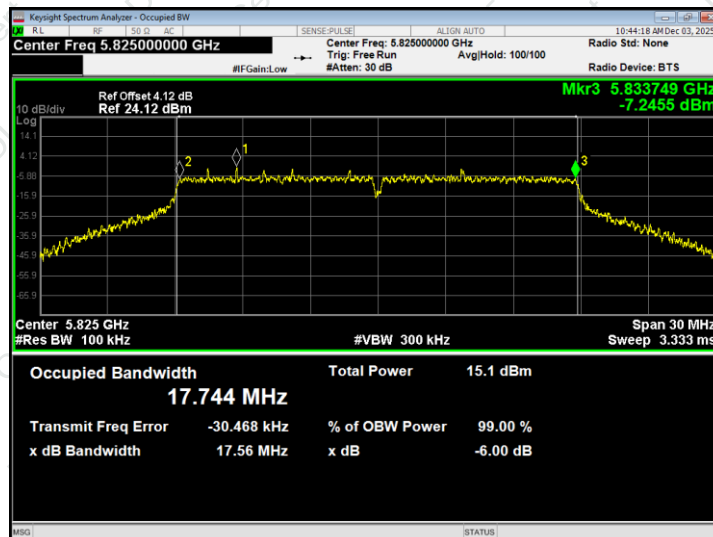
6dB Bandwidth plot on channel 149



6dB Bandwidth plot on channel 157



6dB Bandwidth plot on channel 165





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

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 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V

Test Mode	Frequency (MHz)	Output Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Result
802.11 a	5180	7.659	0.00	7.659	23.98	Pass
	5200	7.311	0.00	7.311	23.98	Pass
	5240	7.804	0.00	7.804	23.98	Pass
802.11 n20	5180	7.749	0.00	7.749	23.98	Pass
	5200	7.408	0.00	7.408	23.98	Pass
	5240	7.877	0.00	7.877	23.98	Pass

Note: Total Power = Output Power + Duty Cycle Factor.

Test Mode	Frequency (MHz)	Output Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Result
802.11 a	5745	6.201	0.00	6.201	30	Pass
	5785	6.524	0.00	6.524	30	Pass
	5825	6.881	0.00	6.881	30	Pass
802.11 n20	5745	6.642	0.00	6.642	30	Pass
	5785	6.775	0.00	6.775	30	Pass
	5825	6.928	0.00	6.928	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.

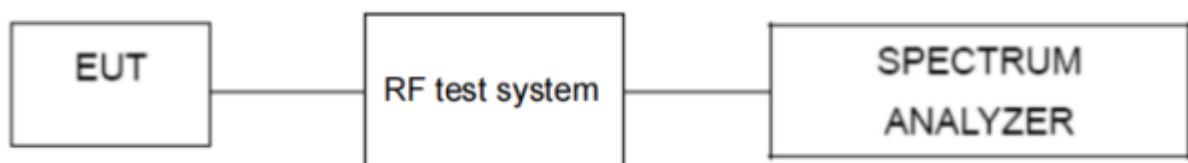
8.2 TEST PROCEDURE

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 5V
Test band :	5.2G	Antenna gain :	1.79dBi

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	5180	5147.050	-45.954	1.79	3.13	-42.824	Pass
	5240	5378.770	-46.723	1.79	3.04	-43.683	Pass
802.11n20	5180	5147.145	-46.212	1.79	3.13	-43.082	Pass
	5240	5404.345	-46.508	1.79	3.04	-43.468	Pass

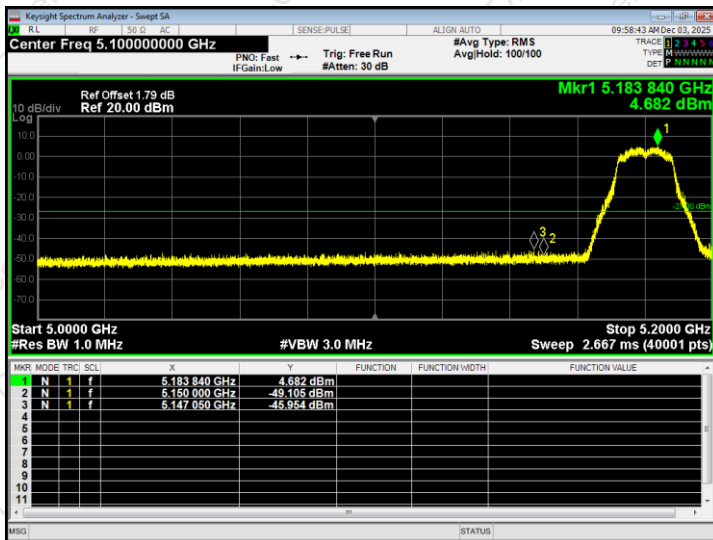
Note: Total Value = Measurement Value + RF Cable Loss.

Antenna gain has been compensated in the graph.

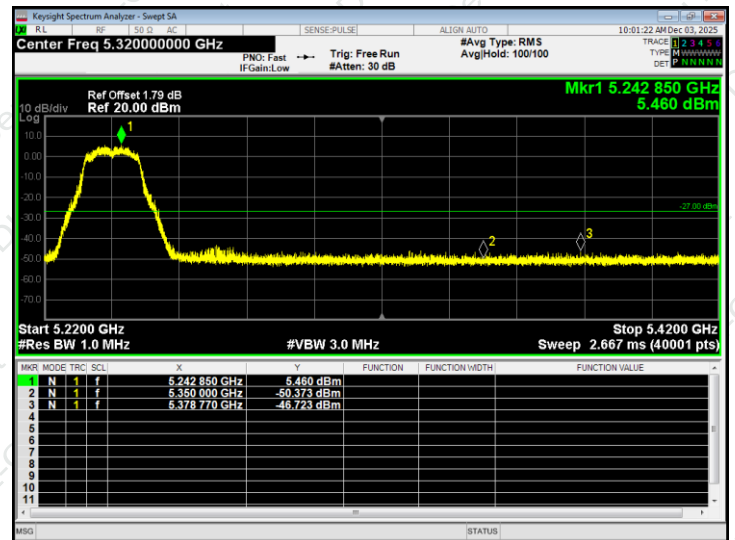


5.180~5.240 GHz

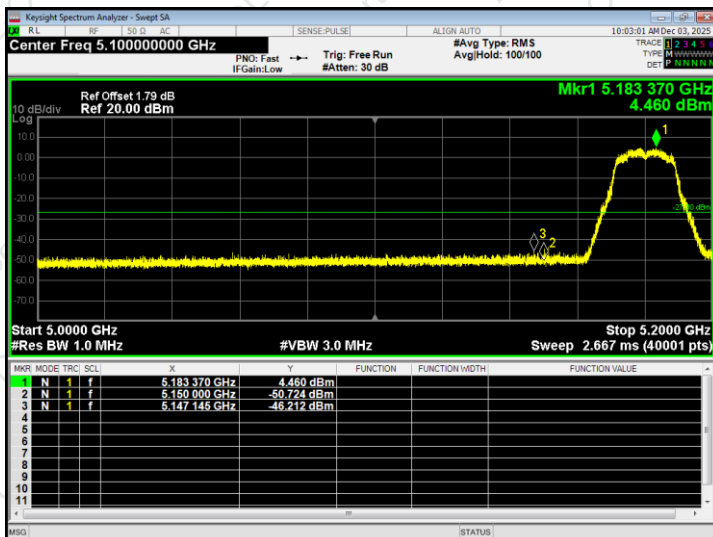
(802.11a) Band Edge, Left Side



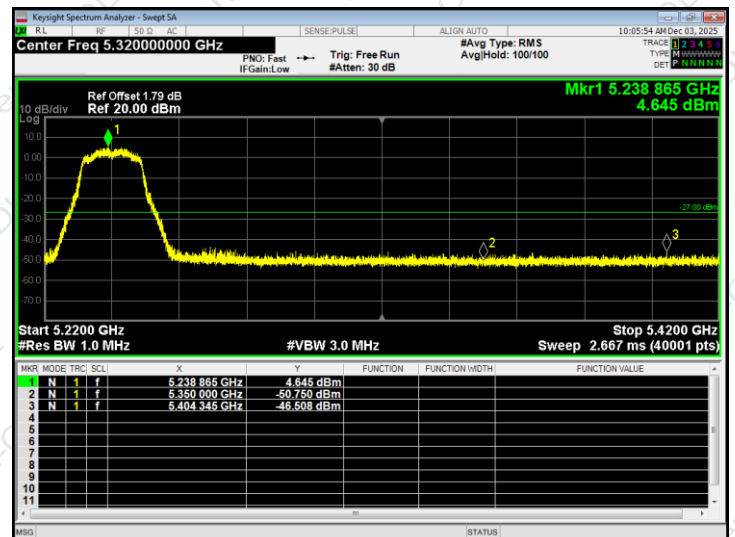
(802.11a) Band Edge, Right Side



(802.11n20) Band Edge, Left Side



(802.11n20) Band Edge, Right Side





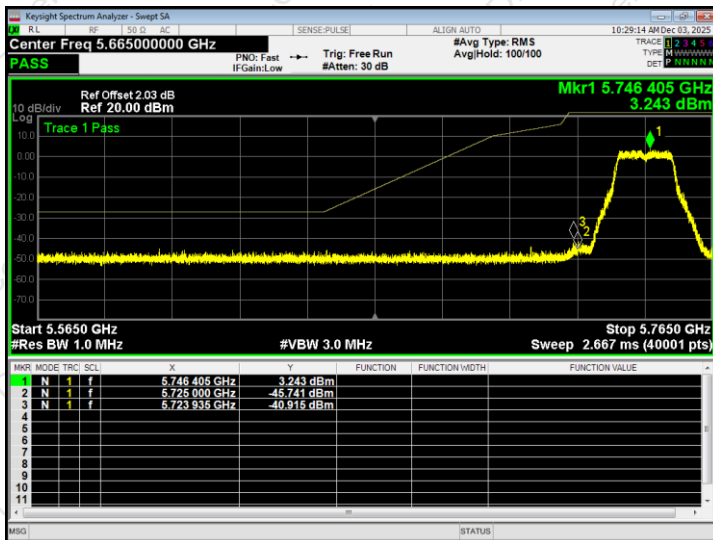
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
Test band :	5.8G	Antenna gain :	2.03dBi

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	5723.935	-40.915	2.03	3.48	-37.435	Pass
	5825	5946.325	-44.819	2.03	4.12	-40.699	Pass
802.11n20	5745	5724.620	-42.664	2.03	3.48	-39.184	Pass
	5825	5853.370	-44.804	2.03	4.12	-40.684	Pass
Note: Total Value = Measurement Value + RF Cable Loss. Antenna gain has been compensated in the graph.							

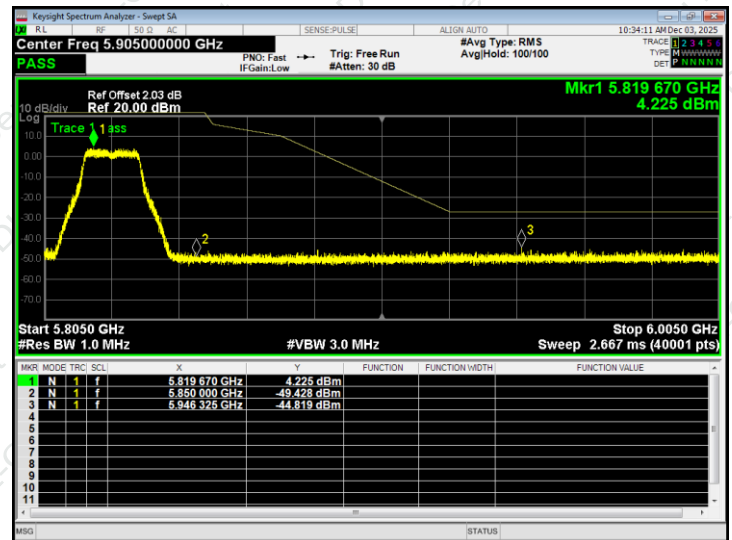


5.745~5.825 GHz

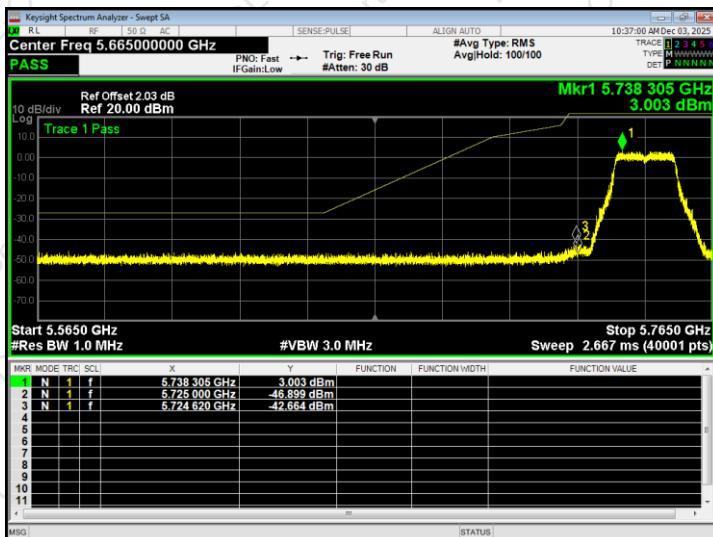
(802.11a) Band Edge, Left Side



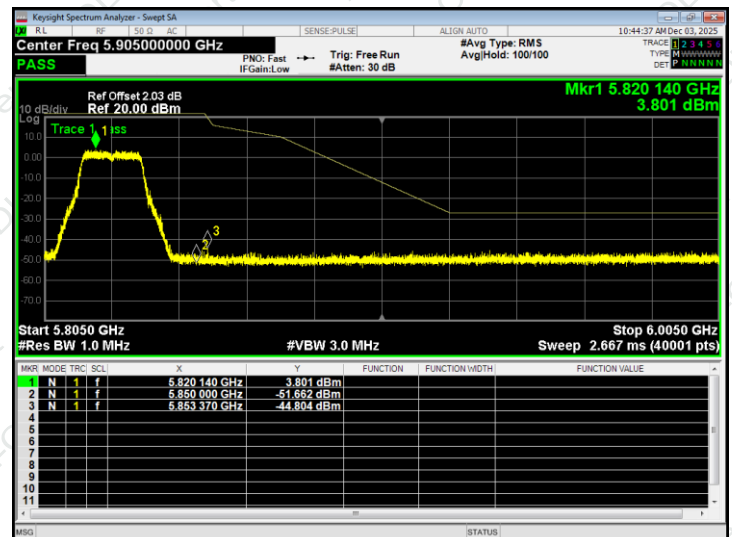
(802.11a) Band Edge, Right Side



(802.11n20) Band Edge, Left Side



(802.11n20) Band Edge, Right Side





9. FREQUENCY STABILITY MEASUREMENT

9.1 LIMIT

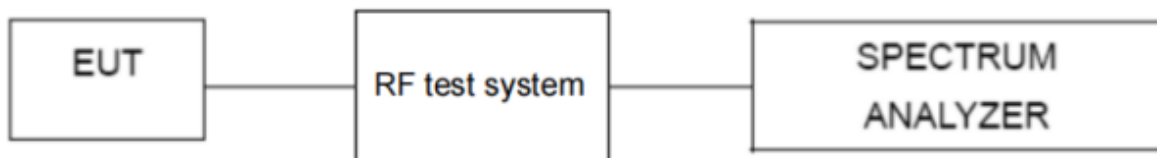
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

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 $(f_c - f)/f_c \times 10^6$ 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°C~70°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

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
Note: Note: All channels have been tested, and only the worst test data is recorded in this report.			

Extreme temperature frequency stability:

Reference Frequency: 802.11a - 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5179.974	-4.941
60	5	5179.968	-6.215
50	5	5179.987	-2.548
40	5	5179.988	-2.410
30	5	5179.975	-4.795
25	5	5179.978	-4.335
10	5	5179.988	-2.407
0	5	5179.972	-5.421
-10	5	5179.982	-3.385
-20	5	5179.987	-2.443

Reference Frequency: 802.11n20 - 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5179.988	-2.333
60	5	5179.982	-3.398
50	5	5179.989	-2.117
40	5	5179.982	-3.412
30	5	5179.978	-4.338
25	5	5179.974	-5.102
10	5	5179.981	-3.744
0	5	5179.974	-4.966
-10	5	5179.978	-4.295
-20	5	5179.982	-3.556



Reference Frequency: 802.11a - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5744.980	-3.486
60	5	5744.970	-5.159
50	5	5744.964	-6.199
40	5	5744.955	-7.757
30	5	5744.979	-3.714
25	5	5744.978	-3.809
10	5	5744.960	-6.945
0	5	5744.975	-4.356
-10	5	5744.971	-5.012
-20	5	5744.965	-6.107

Reference Frequency: 802.11n20 - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5744.980	-3.485
60	5	5744.969	-5.333
50	5	5744.974	-4.519
40	5	5744.957	-7.406
30	5	5744.963	-6.359
25	5	5744.953	-8.098
10	5	5744.950	-8.625
0	5	5744.973	-4.629
-10	5	5744.966	-5.894
-20	5	5744.966	-5.951



Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
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 - 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5179.985	-2.899
25	5.25	5179.972	-5.399
25	5	5179.986	-2.634
25	4.75	5179.976	-4.614
25	4.25	5179.978	-4.291

Reference Frequency: 802.11n20 - 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5179.976	-4.543
25	5.25	5179.973	-5.120
25	5	5179.987	-2.480
25	4.75	5179.971	-5.513
25	4.25	5179.986	-2.617

Reference Frequency: 802.11a - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5744.962	-6.580
25	5.25	5744.956	-7.647
25	5	5744.977	-3.961
25	4.75	5744.970	-5.145
25	4.25	5744.975	-4.434



Reference Frequency: 802.11n20 - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5744.951	-8.448
25	5.25	5744.979	-3.585
25	5	5744.970	-5.247
25	4.75	5744.976	-4.123
25	4.25	5744.967	-5.664



10. DUTY CYCLE

10.1 APPLIED PROCEDURES / LIMIT

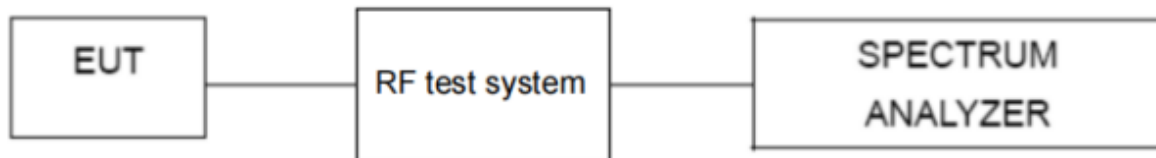
Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

- a) A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.
- b) 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:
 - 1) Set the center frequency of the instrument to the center frequency of the transmission.
 - 2) Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.
 - 3) Set $VBW \geq RBW$. Set detector = peak or average.
 - 4) The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ 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 the 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

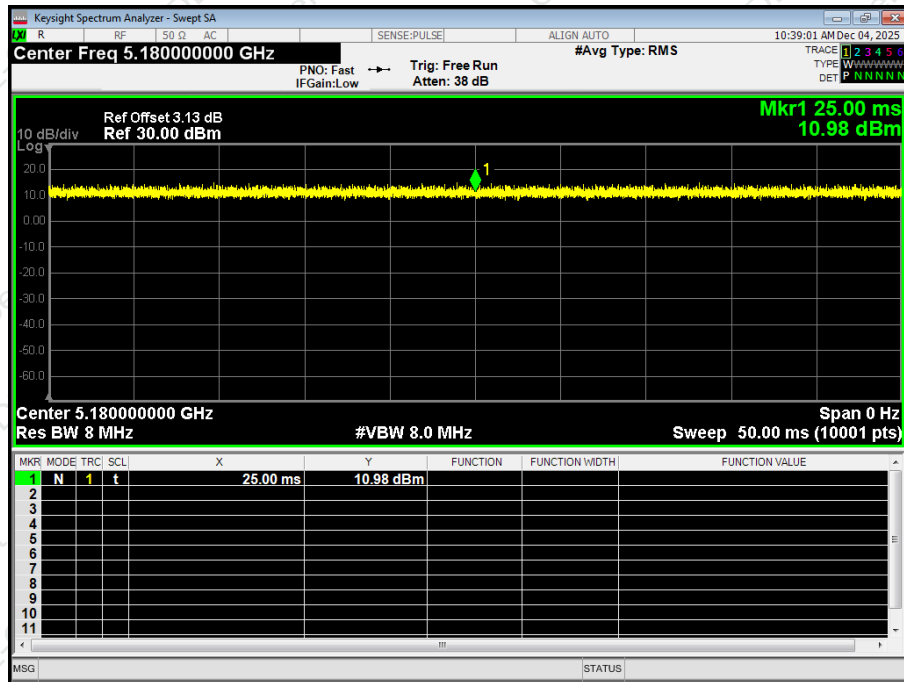
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
Note: All channels have been tested, and only the worst test data is recorded in this report.			

Test Mode	Frequency (MHz)	Duty Cycle (%)	Factor (dB)	Result
802.11a	5180	100	0.00	Pass
802.11n20	5180	100	0.00	Pass
Note: Duty Cycle= Ton /Total*100%				
Duty Cycle Correction Factor = 10log (1/Duty Cycle)				

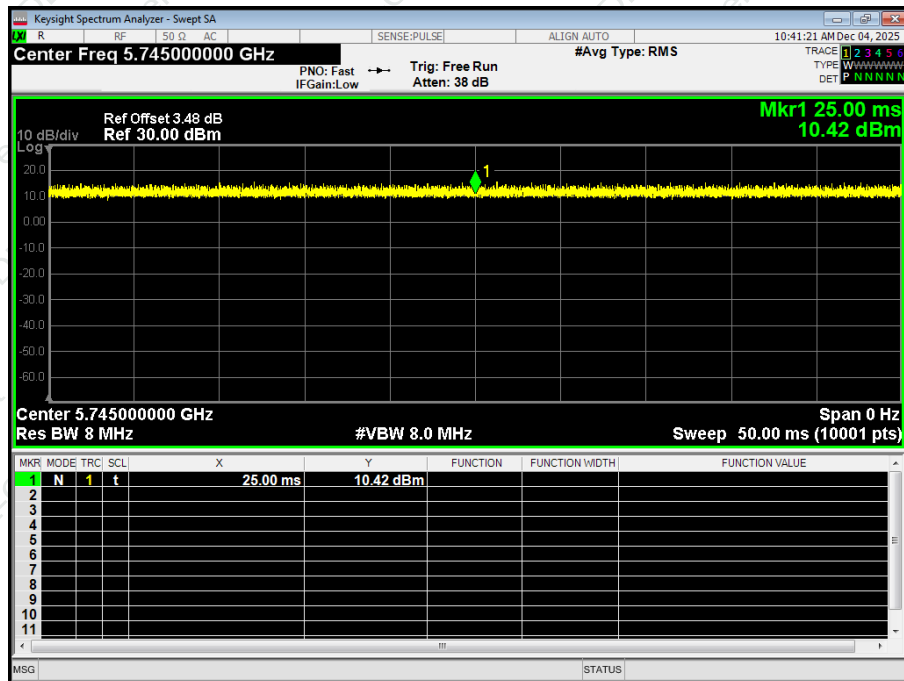
Test Mode	Frequency (MHz)	Duty Cycle (%)	Factor (dB)	Result
802.11a	5745	100	0.00	Pass
802.11n20	5745	100	0.00	Pass
Note: Duty Cycle= Ton /Total*100%				
Duty Cycle Correction Factor = 10log (1/Duty Cycle)				



802.11a - 5180MHz



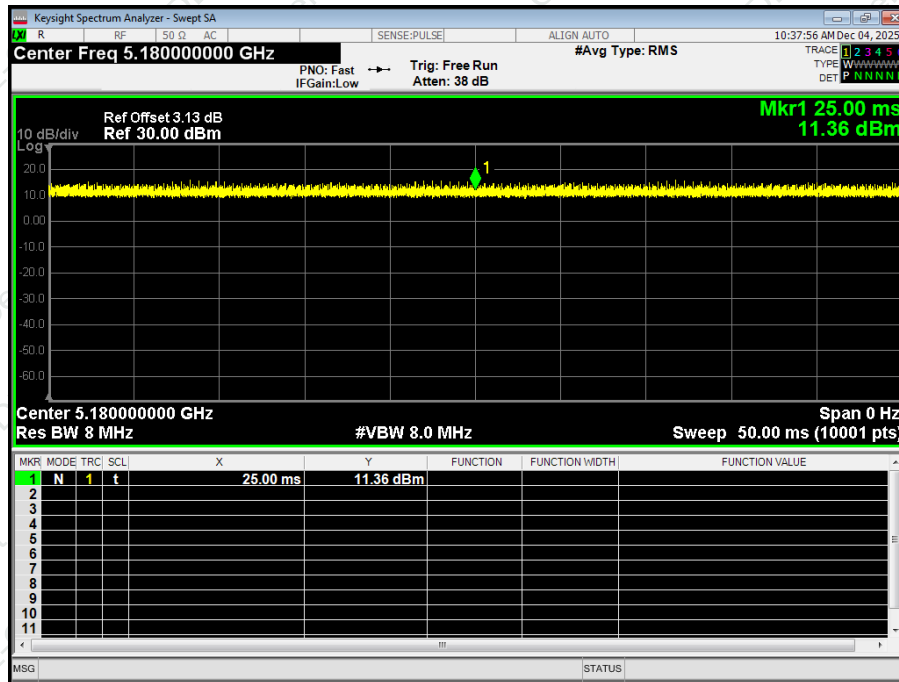
802.11a - 5745MHz



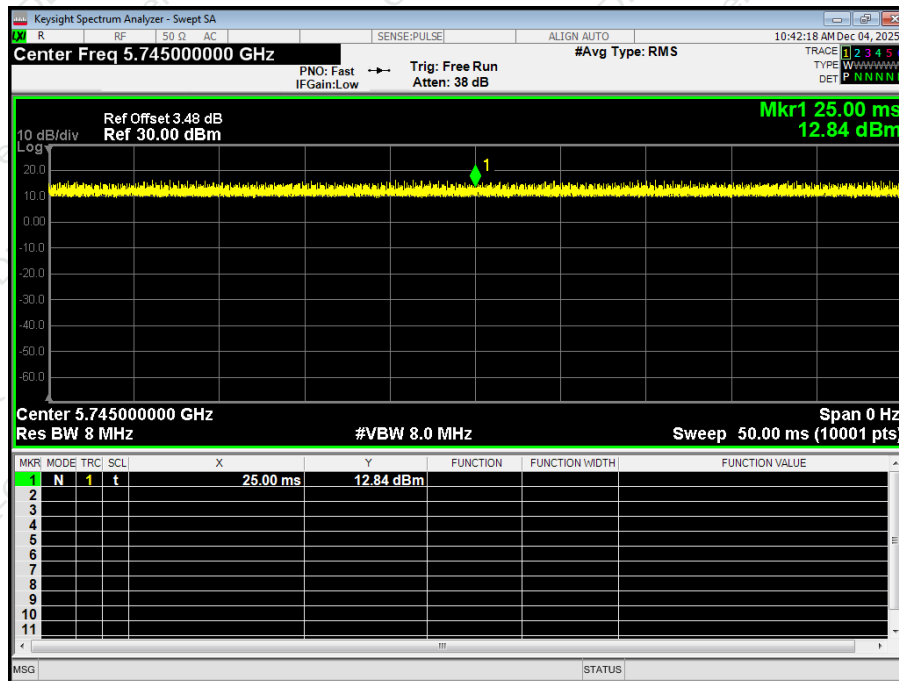
Note: All channel have been tested, and the report only reflects the worst case data.



802.11n20 - 5180MHz



802.11n20 - 5745MHz



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 PCB Antenna, the best case gain of the antenna is 1.79dBi for 5.2G and 2.03dBi 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 *****