



FCC TEST REPORT

FCC ID:2BQUY-WH01

Applicant: Shenzhen Yiteng Technology Co., Ltd.

Address: 8th Floor, 8D, Yi'an Zhi Fu Building, Longcheng Street, Longgang District, Shenzhen China

Manufacturer: Shenzhen Yiteng Technology Co., Ltd.

Address: 8th Floor, 8D, Yi'an Zhi Fu Building, Longcheng Street, Longgang District, Shenzhen China

EUT: WH01 Wireless screen projector

Trade Mark: N/A

Model Number: WH01
WH01, WH02, WH03, WH04, WH05, WH06, WH07, WH08, WH09, WH10, WH11, WH12,
WH13, WH14, WH15, WH16

Date of Receipt: Jul. 16, 2025

Test Date: Jul. 16, 2025 to Sep. 05, 2025

Date of Report: Sep. 05, 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 C63.10:2013
KDB 789033 D02 v02r01

Test Result: Pass

Report Number: DLE-250821008R

Prepared (Test Engineer): Ken 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.



Table of Contents

Page

1. VERSION	4
2. SUMMARY OF TEST RESULTS	5
2.1 TEST FACILITY	6
2.2 MEASUREMENT UNCERTAINTY	6
3. GENERAL INFORMATION	7
3.1 GENERAL DESCRIPTION OF EUT	7
3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	9
3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	9
3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	10
4. EMC EMISSION TEST	11
4.1 CONDUCTED EMISSION MEASUREMENT	11
4.1.1 POWER LINE CONDUCTED EMISSION LIMITS	11
4.1.2 TEST PROCEDURE	11
4.1.3 DEVIATION FROM TEST STANDARD	11
4.1.4 TEST SETUP	12
4.1.5 EUT OPERATING CONDITIONS	12
4.1.6 TEST RESULT	13
4.2 RADIATED EMISSION AND BAND EDGE MEASUREMENT	17
4.2.1 APPLICABLE STANDARD	17
4.2.2 CONFORMANCE LIMIT	17
4.2.3 MEASURING INSTRUMENTS	18
4.2.4 TEST CONFIGURATION	18
4.2.5 TEST PROCEDURE	19
4.2.6 RADIATED EMISSION TEST RESULT	20
4.2.7 RADIATED BAND EDGE TEST RESULT	33
5. POWER SPECTRAL DENSITY TEST	37
5.1 APPLIED PROCEDURES / LIMIT	37
5.2 TEST PROCEDURE	38
5.3 DEVIATION FROM STANDARD	38
5.4 TEST SETUP	38
5.5 EUT OPERATION CONDITIONS	38
5.6 TEST RESULTS	39
6. 26DB EMISSION BANDWIDTH & 6DB OCCUPIED BANDWIDTH	45
6.1 APPLIED PROCEDURES / LIMIT	45
6.2 TEST PROCEDURE	45
6.3 EUT OPERATION CONDITIONS	46
6.4 TEST RESULTS	46
7. MAXIMUM CONDUCTED OUTPUT POWER	52
7.1 PPLIED PROCEDURES / LIMIT	52
7.2 TEST PROCEDURE	52
7.3 DEVIATION FROM STANDARD	52
7.4 TEST SETUP	52
7.5 EUT OPERATION CONDITIONS	52
7.6 TEST RESULTS	53
8. CONDUCTED BAND EMISSIONS	54
8.1 APPLICABLE STANDARD	54
8.2 TEST PROCEDURE	54
8.3 DEVIATION FROM STANDARD	54
8.4 TEST SETUP	54
8.5 EUT OPERATION CONDITIONS	54
8.6 TEST RESULTS	55
9. FREQUENCY STABILITY MEASUREMENT	57

**Table of Contents****Page**

9.1 LIMIT	57
9.2 TEST PROCEDURES	57
9.3 TEST SETUP LAYOUT	57
9.4 EUT OPERATION DURING TEST	57
9.5 TEST RESULTS	58
10. DUTY CYCLE	62
10.1 APPLIED PROCEDURES / LIMIT	62
10.2 DEVIATION FROM STANDARD	62
10.3 TEST SETUP	62
10.4 EUT OPERATION CONDITIONS	62
10.5 TEST RESULTS	63
11. ANTENNA REQUIREMENT	66
12. TEST SETUP PHOTO	67
13. EUT CONSTRUCTIONAL DETAILS	67



1. VERSION

Report No.	Version	Description	Approved
DLE-250821008R	Rev.01	Initial issue of report	Sep. 05, 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) 2.1051	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) 2.1051	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 Roa 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 camber Radiated spurious Emission (9KHz-30MHz)	U=4.5dB
2	3m camber 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:	WH01 Wireless screen projector		
Model No.:	WH01		
Serial Model:	WH01, WH02, WH03, WH04, WH05, WH06, WH07, WH08, WH09, WH10, WH11, WH12, WH13, WH14, WH15, WH16		
Model Different:	All the model are the same circuit and RF module,Only the model name different.		
Sample ID:	E-1		
Sample Number:	DLE-250821008R-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.	

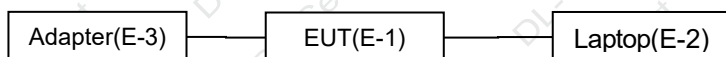
We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:			
Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst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

Test Software	REALTEK 8723FU
Power level setup	Default

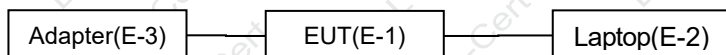


3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

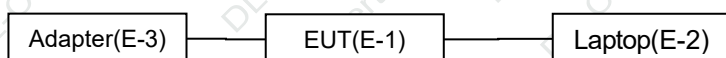
Conducted Emission



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	WH01 Wireless screen projector	N/A	WH01	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

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	Nov. 01, 2024	Oct. 31, 2025
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Nov. 01, 2024	Oct. 31, 2025
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Nov. 01, 2024	Oct. 31, 2025
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Nov. 01, 2024	Oct. 31, 2025
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Nov. 01, 2024	Oct. 31, 2025
6	Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Nov. 01, 2024	Oct. 31, 2025
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Nov. 01, 2024	Oct. 31, 2025
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Nov. 01, 2024	Oct. 31, 2025
9	Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Nov. 01, 2024	Oct. 31, 2025
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Nov. 01, 2024	Oct. 31, 2025
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Nov. 01, 2024	Oct. 31, 2025
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Nov. 01, 2024	Oct. 31, 2025
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Nov. 01, 2024	Oct. 31, 2025
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Nov. 01, 2024	Oct. 31, 2025
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Nov. 01, 2024	Oct. 31, 2025
16	D.C. Power Supply	LongWei	PS-305D	010964729	Nov. 01, 2024	Oct. 31, 2025

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	Nov. 01, 2024	Oct. 31, 2025
3	LISN	R&S	ENV216	102417	Nov. 01, 2024	Oct. 31, 2025
4	843 Cable 1#	ChengYu	CE Cable	001	Nov. 01, 2024	Oct. 31, 2025

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 C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION LIMITS

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

Note:

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

4.1.2 TEST PROCEDURE

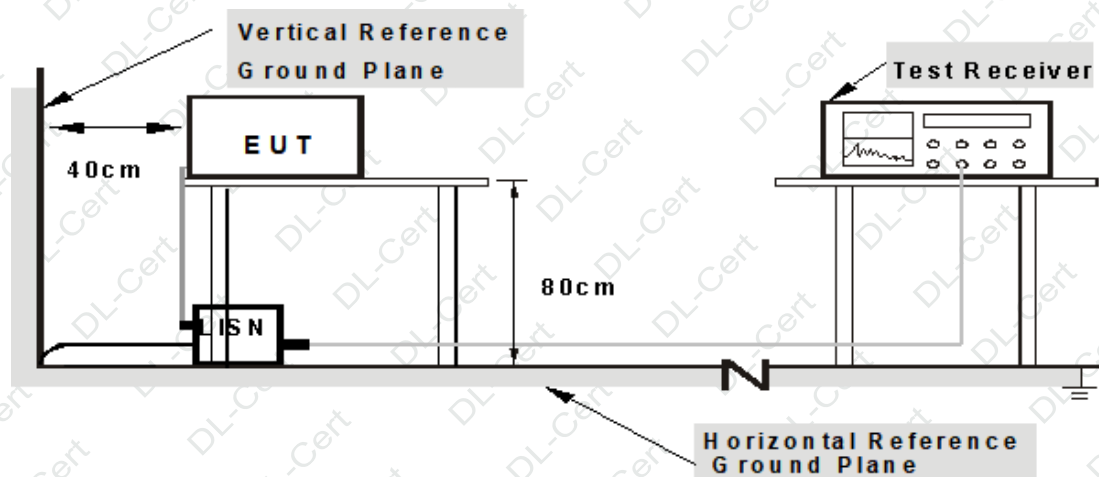
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.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

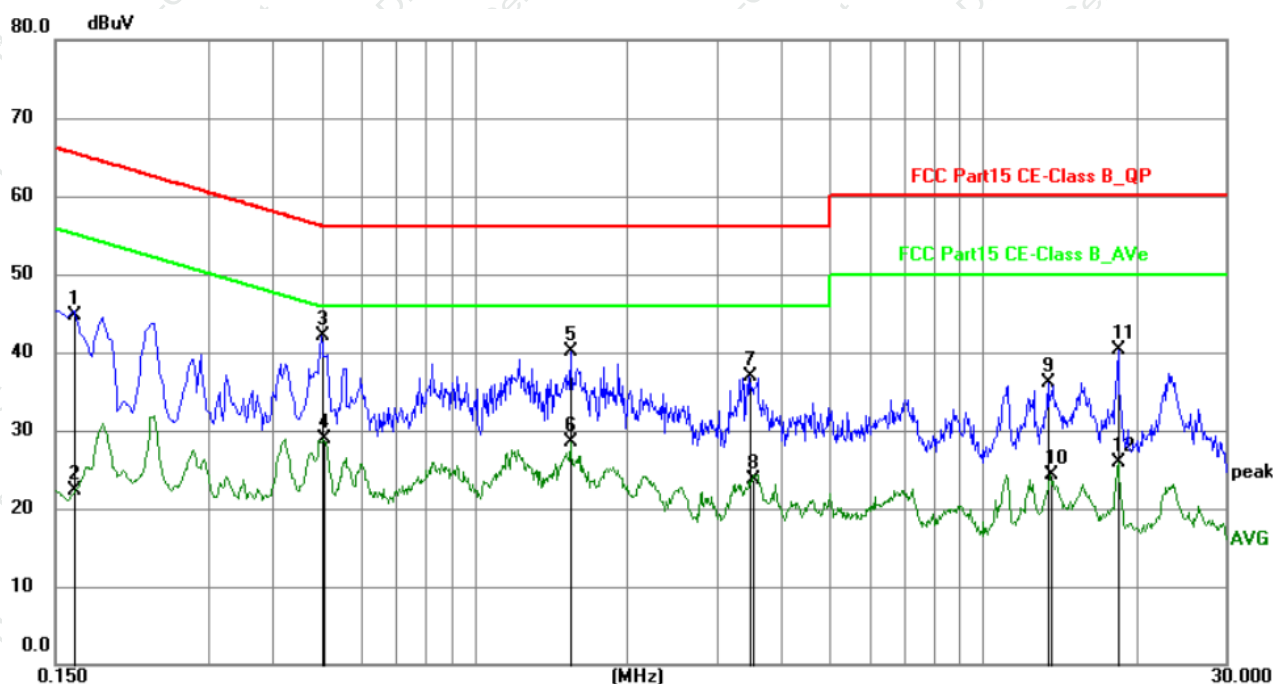
4.1.5 EUT OPERATING CONDITIONS

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 - 5180MHz
Test Band:	5.2G		



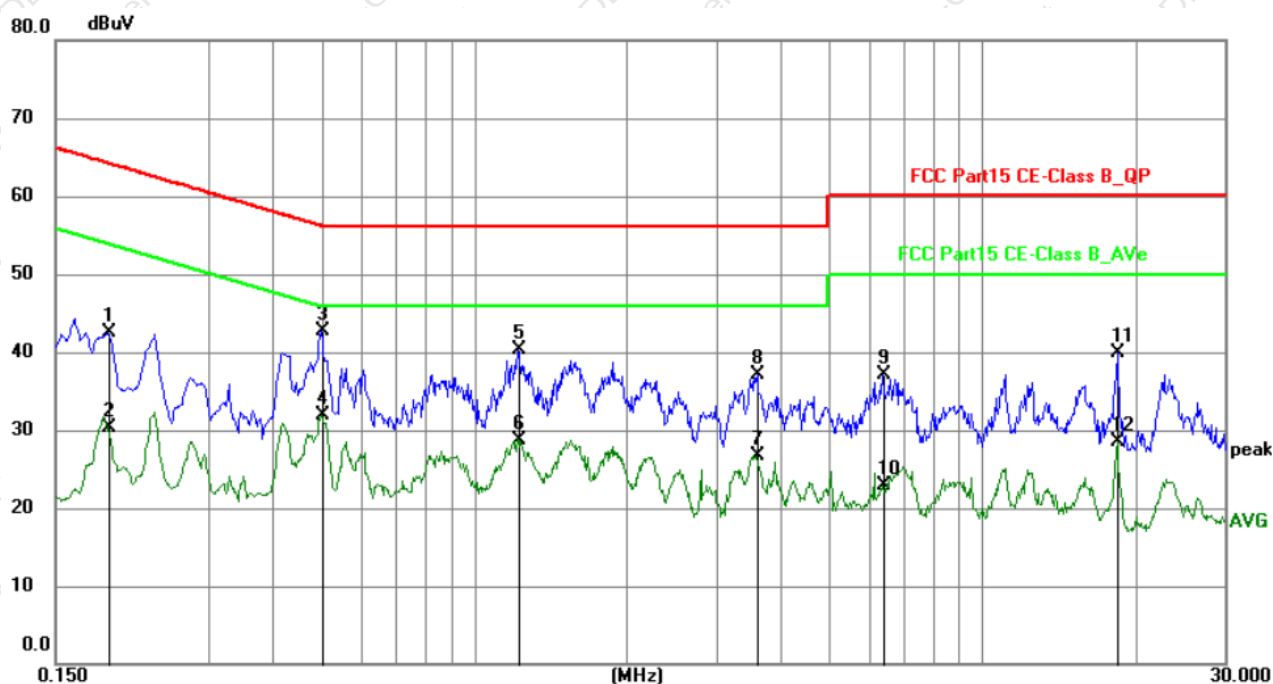
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1641	24.57	20.23	44.80	65.25	-20.45	QP	P	
2	0.1641	2.10	20.23	22.33	55.25	-32.92	AVG	P	
3	0.5010	21.87	20.30	42.17	56.00	-13.83	QP	P	
4	0.5055	8.61	20.30	28.91	46.00	-17.09	AVG	P	
5	1.5494	19.86	20.30	40.16	56.00	-15.84	QP	P	
6	1.5494	8.13	20.30	28.43	46.00	-17.57	AVG	P	
7	3.4845	16.50	20.34	36.84	56.00	-19.16	QP	P	
8	3.5160	3.41	20.34	23.75	46.00	-22.25	AVG	P	
9	13.4160	15.69	20.47	36.16	60.00	-23.84	QP	P	
10	13.5960	3.74	20.47	24.21	50.00	-25.79	AVG	P	
11	18.4470	19.77	20.50	40.27	60.00	-19.73	QP	P	
12	18.4470	5.40	20.50	25.90	50.00	-24.10	AVG	P	

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi - Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Reading level + Correct Factor.
4. Correct Factor = Liss factor + Cable loss factor + limiter factor.
5. Margin = Measurement Level - Limit.
6. The test data shows only the worst case TX 802.11n20 - 5180MHz.



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	N
Test Voltage:	AC 120V/60Hz	Test Mode:	802.11n20 - 5180MHz
Test Band:	5.2G		



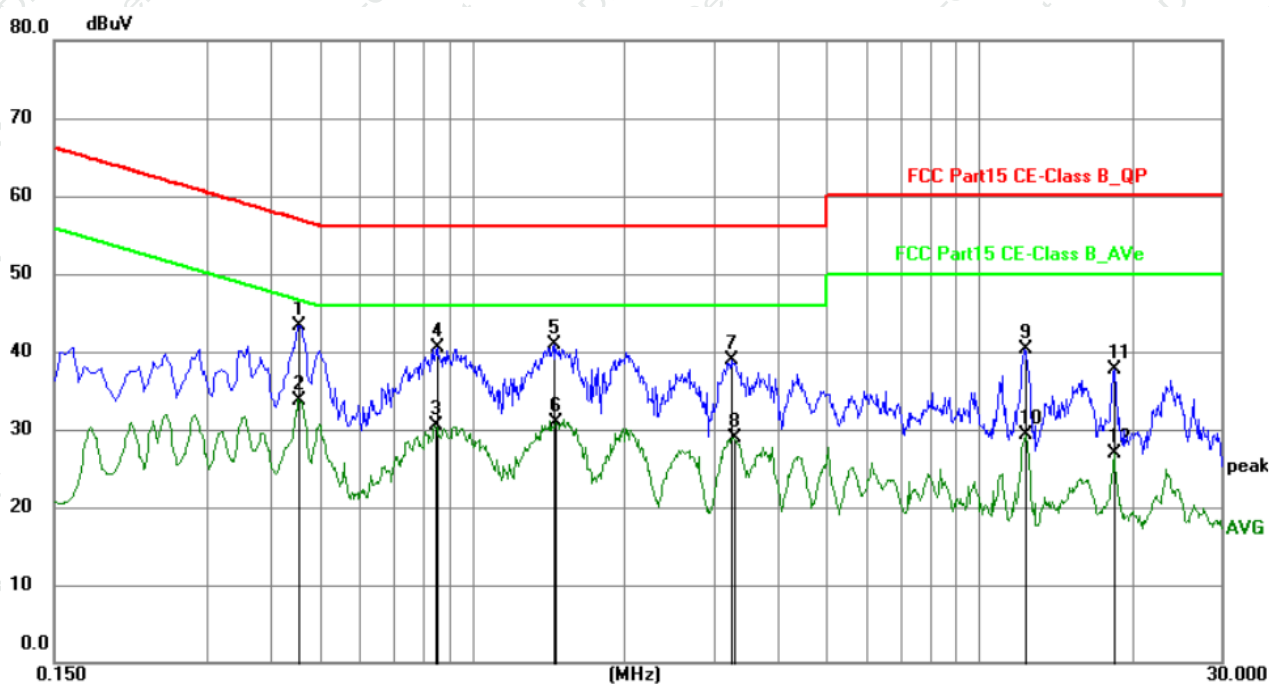
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1905	22.24	20.34	42.58	64.01	-21.43	QP	P	
2	0.1905	9.90	20.34	30.24	54.01	-23.77	AVG	P	
3	0.5010	22.43	20.30	42.73	56.00	-13.27	QP	P	
4	0.5010	11.62	20.30	31.92	46.00	-14.08	AVG	P	
5	1.2209	19.96	20.30	40.26	56.00	-15.74	QP	P	
6	1.2209	8.50	20.30	28.80	46.00	-17.20	AVG	P	
7	3.5970	6.44	20.34	26.78	46.00	-19.22	AVG	P	
8	3.6195	16.75	20.34	37.09	56.00	-18.91	QP	P	
9	6.3825	16.78	20.38	37.16	60.00	-22.84	QP	P	
10	6.3825	2.51	20.38	22.89	50.00	-27.11	AVG	P	
11	18.4470	19.34	20.50	39.84	60.00	-20.16	QP	P	
12	18.4470	8.02	20.50	28.52	50.00	-21.48	AVG	P	

Notes:

- 1.An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2.Quasi - Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3.Final Level = Reading level + Correct Factor.
- 4.Correct Factor = Lish factor+ Cable loss factor + limiter factor.
- 5.Margin = Measurement Level-Limit.
- 6.The test data shows only the worst case TX 802.11n20 - 5180MHz.



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	L
Test Voltage:	AC 120V/60Hz	Test Mode:	802.11n20 - 5745MHz
Test Band:	5.8G		



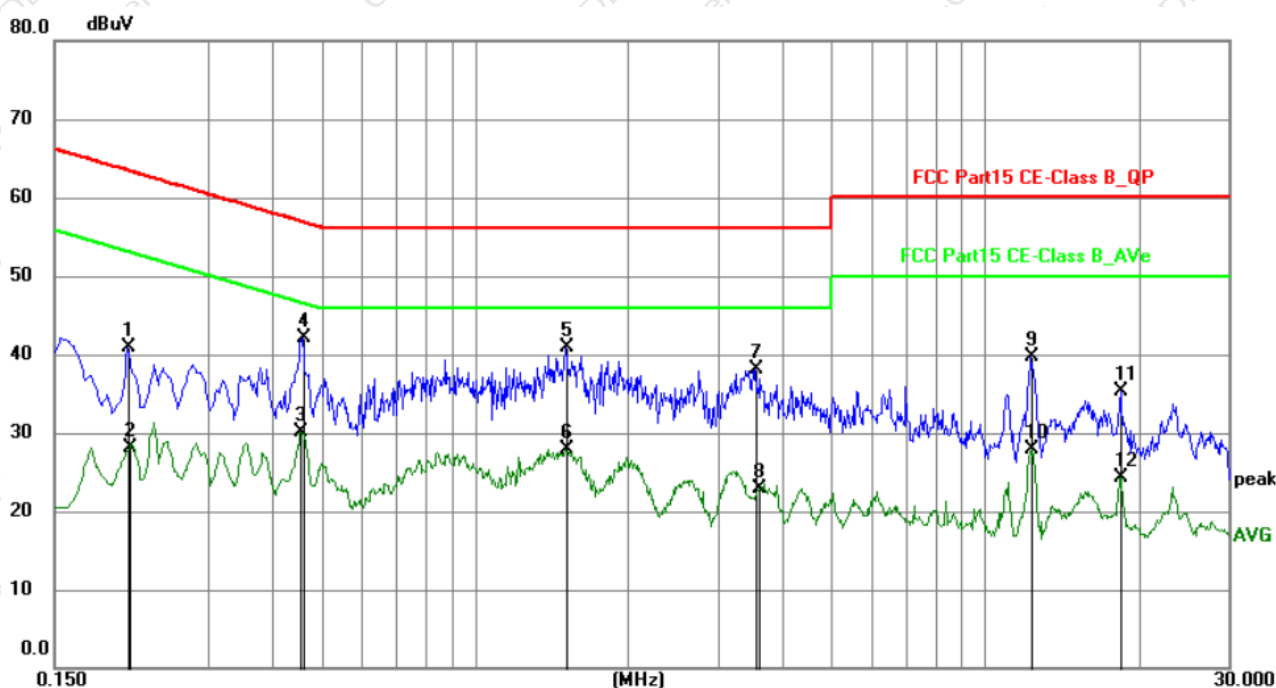
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.4560	23.05	20.31	43.36	56.77	-13.41	QP	P	
2	0.4560	13.49	20.31	33.80	46.77	-12.97	AVG	P	
3	0.8474	10.24	20.30	30.54	46.00	-15.46	AVG	P	
4	0.8564	20.21	20.30	40.51	56.00	-15.49	QP	P	
5	1.4549	20.50	20.31	40.81	56.00	-15.19	QP	P	
6	1.4639	10.56	20.31	30.87	46.00	-15.13	AVG	P	
7	3.2505	18.56	20.33	38.89	56.00	-17.11	QP	P	
8	3.2865	8.66	20.33	28.99	46.00	-17.01	AVG	P	
9	12.2775	19.91	20.47	40.38	60.00	-19.62	QP	P	
10	12.3540	8.77	20.47	29.24	50.00	-20.76	AVG	P	
11	18.4785	17.15	20.50	37.65	60.00	-22.35	QP	P	
12	18.4785	6.48	20.50	26.98	50.00	-23.02	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 = Liss factor+ Cable loss factor + limiter factor.
5. Margin = Measurement Level-Limit.
6. The test data shows only the worst case TX 802.11n20 - 5745MHz.



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	N
Test Voltage:	AC 120V/60Hz	Test Mode:	802.11n20 - 5745MHz
Test Band:	5.8G		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.2085	20.53	20.37	40.90	63.26	-22.36	QP	P	
2	0.2105	7.73	20.37	28.10	53.19	-25.09	AVG	P	
3	0.4560	9.80	20.31	30.11	46.77	-16.66	AVG	P	
4	0.4605	21.80	20.31	42.11	56.68	-14.57	QP	P	
5	1.5089	20.55	20.30	40.85	56.00	-15.15	QP	P	
6	1.5089	7.57	20.30	27.87	46.00	-18.13	AVG	P	
7	3.5520	17.83	20.33	38.16	56.00	-17.84	QP	P	
8	3.6150	2.65	20.33	22.98	46.00	-23.02	AVG	P	
9	12.2729	19.31	20.48	39.79	60.00	-20.21	QP	P	
10	12.3585	7.49	20.48	27.97	50.00	-22.03	AVG	P	
11	18.5009	14.70	20.52	35.22	60.00	-24.78	QP	P	
12	18.5009	3.71	20.52	24.23	50.00	-25.77	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 - 5745MHz.



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

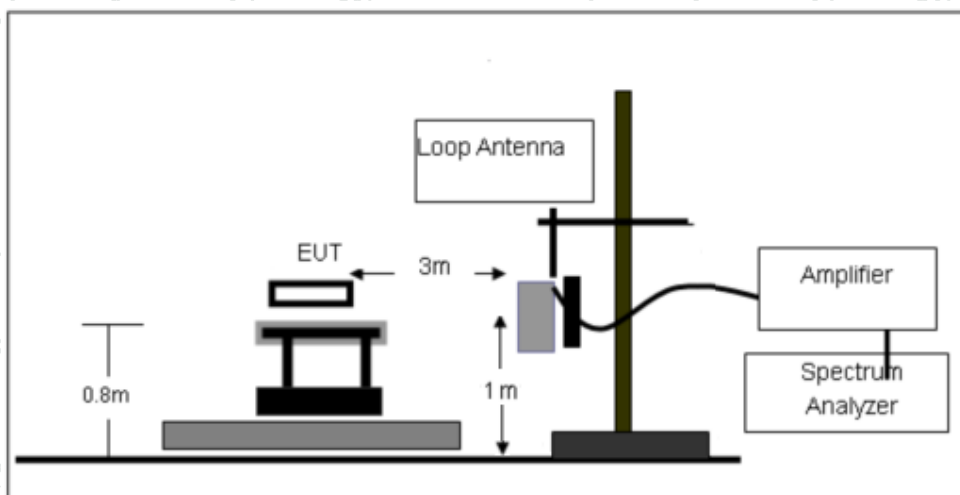
- Remark: 1. Emission level in $\text{dB}\mu\text{V/m}$ = 20 log ($\mu\text{V/m}$);
2. Measurement was performed at an antenna to the closed point of EUT distance of meters;
3. Distance extrapolation factor = $40\log(\text{Specific distance}/\text{test distance})$ (dB);
4. Limit line = Specific limits($\text{dB}\mu\text{V}$)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

4.2.3 MEASURING INSTRUMENTS

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

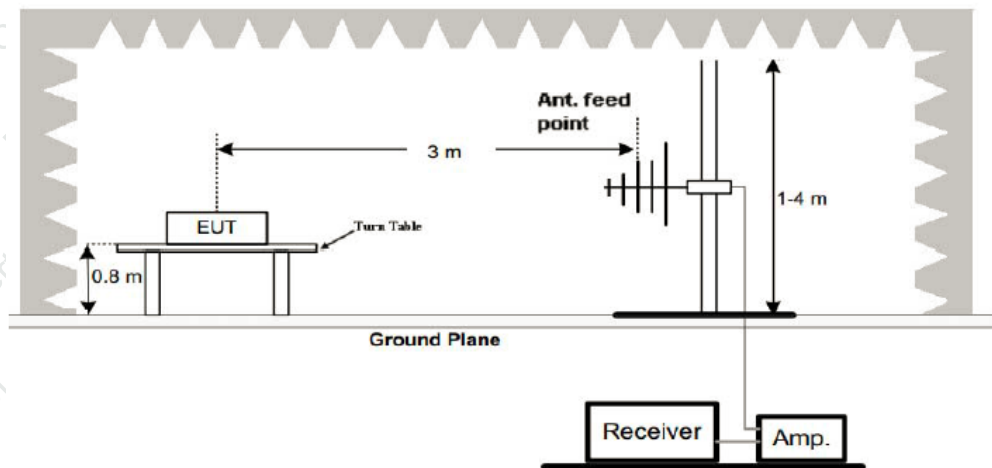
4.2.4 TEST CONFIGURATION

1. For radiated emissions below 30MHz

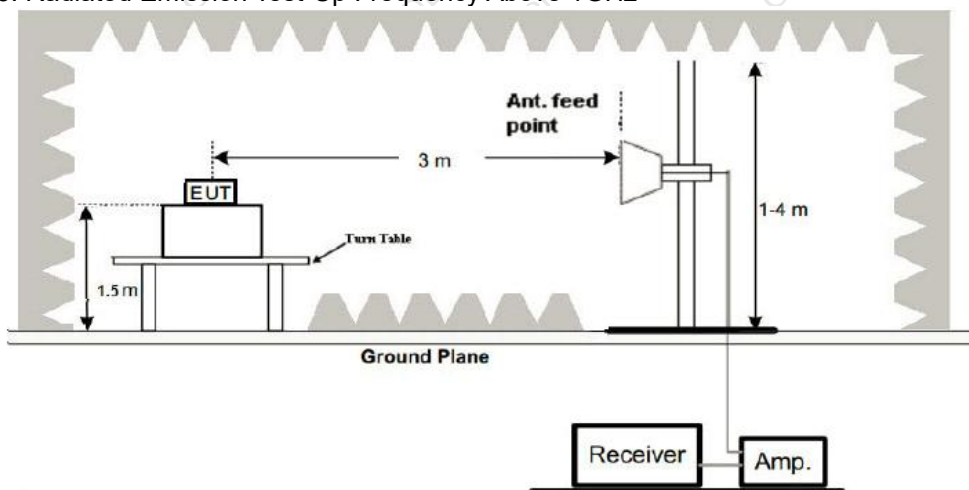




2. For radiated emissions from 30MHz to 1000MHz



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 C63.10-2013. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205.

It must be performed with the highest gain of each type of antenna proposed for use with the EUT.

Use the following spectrum analyzer settings:

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

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



- 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

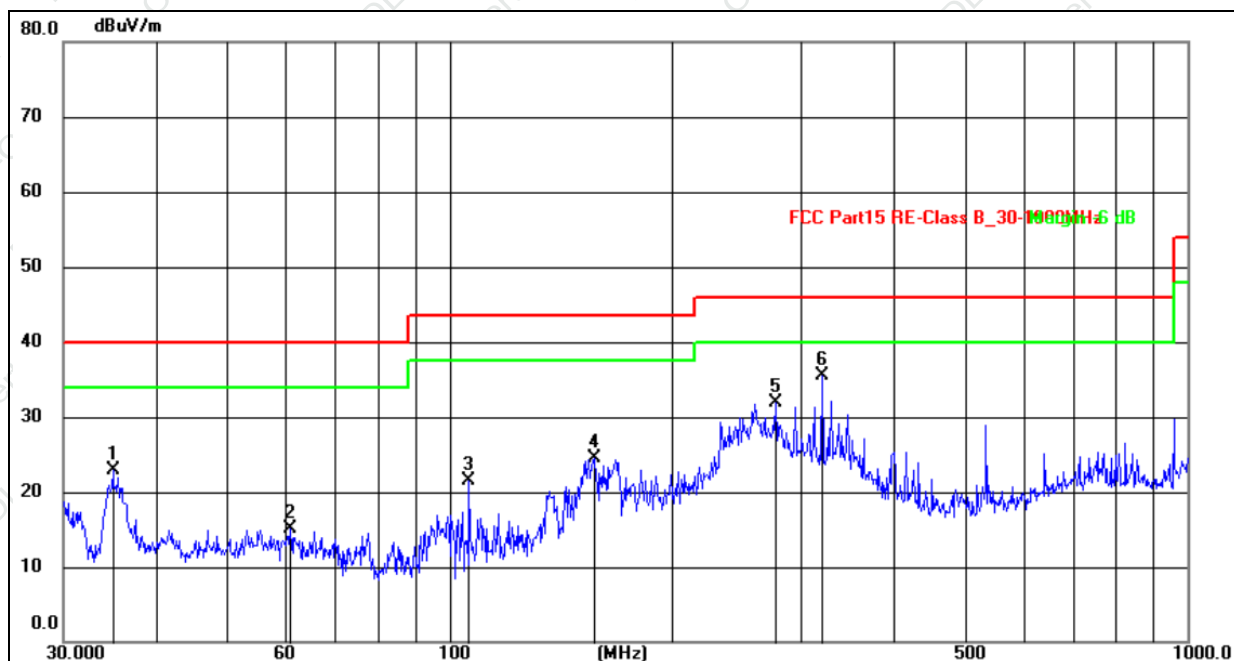
Between 9KHz – 30MHz

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



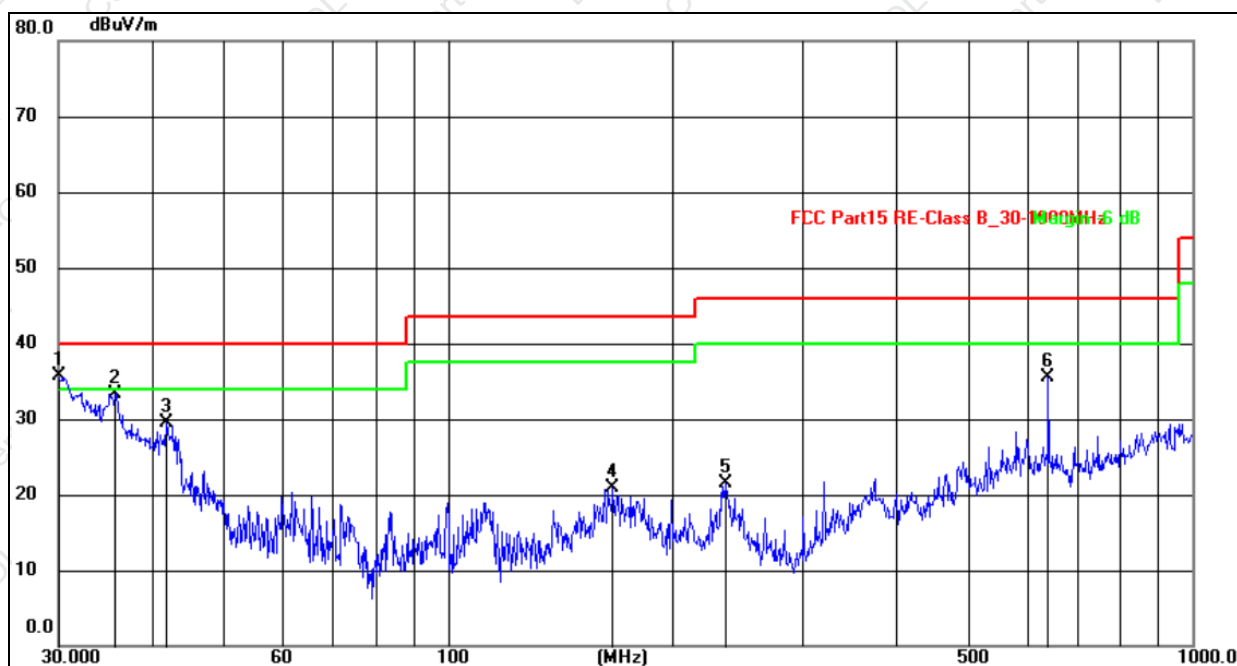
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	35.0048	37.90	-14.94	22.96	40.00	-17.04	QP
2	60.9174	29.49	-14.37	15.12	40.00	-24.88	QP
3	106.3850	40.76	-19.29	21.47	43.50	-22.03	QP
4	157.5587	40.57	-16.06	24.51	43.50	-18.99	QP
5	277.0935	46.06	-14.12	31.94	46.00	-14.06	QP
6	319.9368	51.94	-16.45	35.49	46.00	-10.51	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℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 5V	Test Mode :	TX 802.11n20 -5180MHz
Test Band:	5.2G		



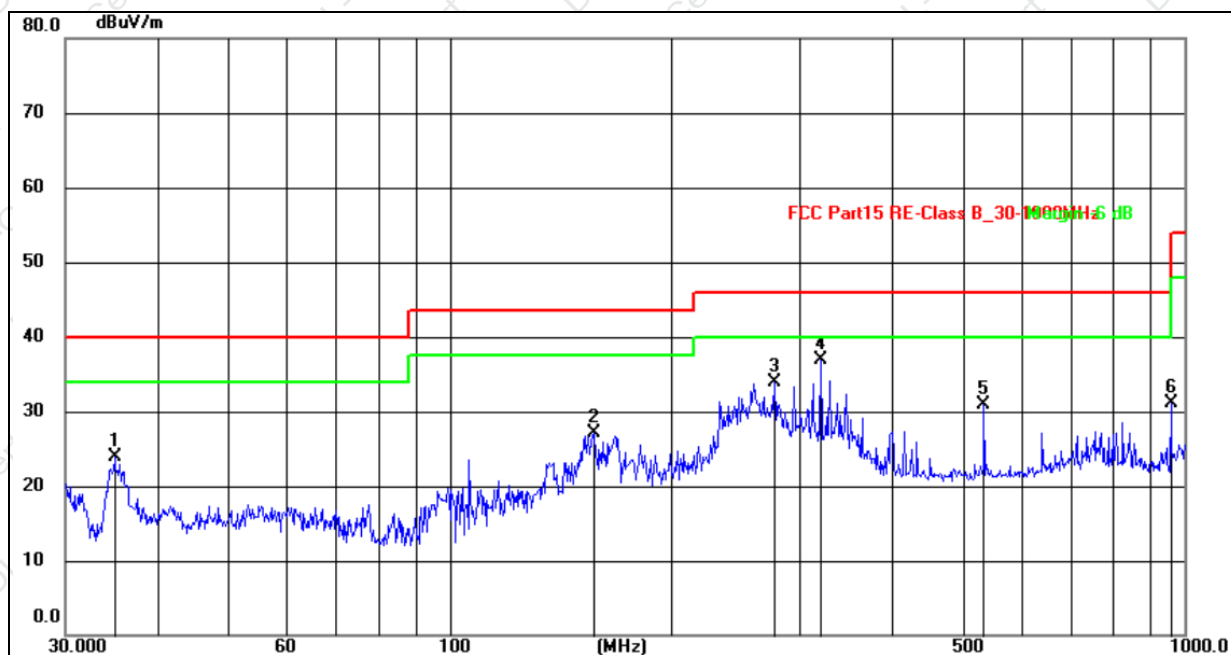
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.0000	54.00	-18.34	35.66	40.00	-4.34	QP
2	35.7490	50.68	-17.39	33.29	40.00	-6.71	QP
3	41.8594	46.36	-16.83	29.53	40.00	-10.47	QP
4	166.6512	40.71	-19.83	20.88	43.50	-22.62	QP
5	235.8163	41.46	-19.95	21.51	46.00	-24.49	QP
6	640.6109	42.84	-7.35	35.49	46.00	-10.51	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℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 5V	Test Mode :	TX 802.11n20 - 5745MHz
Test Band:	5.8G		



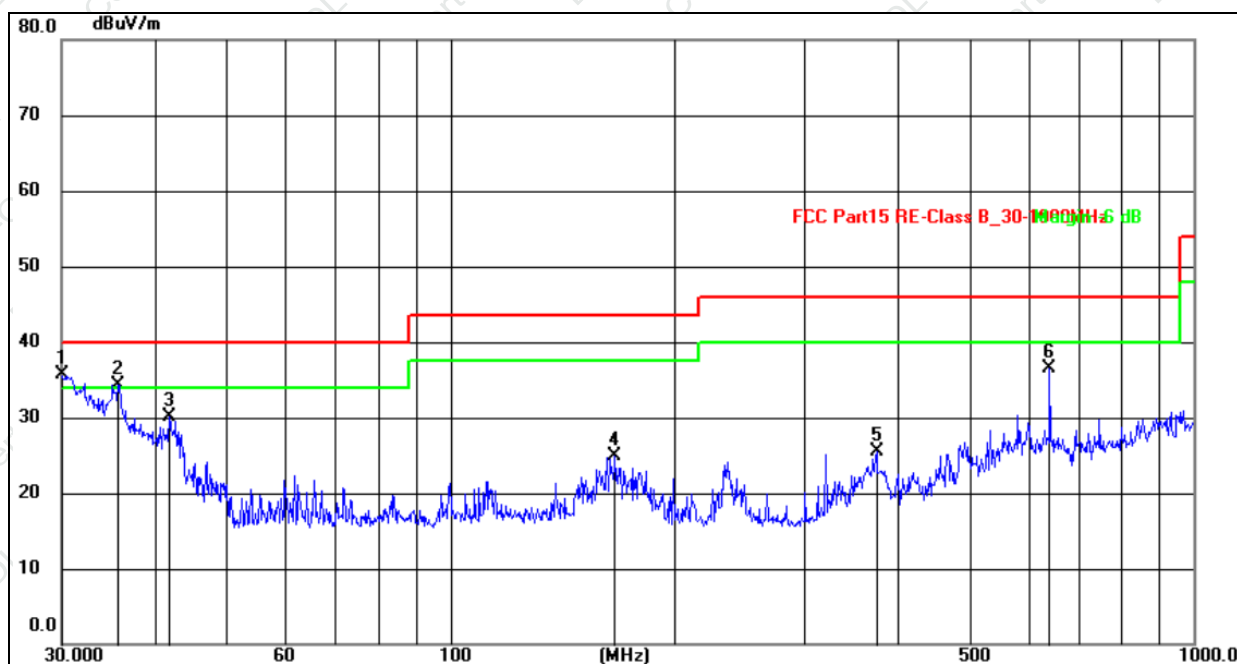
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	35.0048	38.90	-14.94	23.96	40.00	-16.04	QP
2	157.5586	43.07	-16.06	27.01	43.50	-16.49	QP
3	277.0935	48.06	-14.12	33.94	46.00	-12.06	QP
4	319.9368	53.44	-16.45	36.99	46.00	-9.01	QP
5	533.8318	41.07	-10.14	30.93	46.00	-15.07	QP
6	958.7943	36.60	-5.43	31.17	46.00	-14.83	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℃	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	30.0000	54.00	-18.34	35.66	40.00	-4.34	QP
2	35.7490	51.68	-17.39	34.29	40.00	-5.71	QP
3	41.8594	46.86	-16.83	30.03	40.00	-9.97	QP
4	166.6511	44.71	-19.83	24.88	43.50	-18.62	QP
5	374.6225	40.92	-15.39	25.53	46.00	-20.47	QP
6	640.6109	43.84	-7.35	36.49	46.00	-9.51	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	44.18	30.55	5.77	24.66	44.06	68.20	-24.14	PK
V	10360.00	30.53	30.55	5.77	24.66	30.41	54.00	-23.59	AV
V	15540.00	48.96	30.33	6.32	24.55	49.50	74.00	-24.50	PK
V	15540.00	37.38	30.33	6.32	24.55	37.92	54.00	-16.08	AV
V	20720.00	50.68	30.85	7.45	24.69	51.97	74.00	-22.03	PK
V	20720.00	39.33	30.85	7.45	24.69	40.62	54.00	-13.38	AV
V	25900.00	51.71	31.02	8.99	25.57	55.25	68.20	-12.95	PK
V	25900.00	38.21	31.02	8.99	25.57	41.75	54.00	-12.25	AV
H	10360.00	52.39	30.55	5.77	24.66	52.27	68.20	-15.93	PK
H	10360.00	40.97	30.55	5.77	24.66	40.85	54.00	-13.15	AV
H	15540.00	43.47	30.33	6.32	24.55	44.01	74.00	-29.99	PK
H	15540.00	30.87	30.33	6.32	24.55	31.41	54.00	-22.59	AV
H	20720.00	48.91	30.85	7.45	24.69	50.20	74.00	-23.80	PK
H	20720.00	40.33	30.85	7.45	24.69	41.62	54.00	-12.38	AV
H	25900.00	51.16	31.02	8.99	25.57	54.70	68.20	-13.50	PK
H	25900.00	39.78	31.02	8.99	25.57	43.32	54.00	-10.68	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	45.80	30.55	5.77	24.66	45.68	68.20	-22.52	PK
V	10400.00	31.19	30.55	5.77	24.66	31.07	54.00	-22.93	AV
V	15600.00	49.20	30.33	6.32	24.55	49.74	74.00	-24.26	PK
V	15600.00	38.22	30.33	6.32	24.55	38.76	54.00	-15.24	AV
V	20800.00	50.98	30.85	7.45	24.69	52.27	74.00	-21.73	PK
V	20800.00	41.37	30.85	7.45	24.69	42.66	54.00	-11.34	AV
V	26000.00	52.51	31.02	8.99	25.57	56.05	68.20	-12.15	PK
V	26000.00	42.95	31.02	8.99	25.57	46.49	54.00	-7.51	AV
H	10400.00	46.10	30.55	5.77	24.66	45.98	68.20	-22.22	PK
H	10400.00	31.28	30.55	5.77	24.66	31.16	54.00	-22.84	AV
H	15600.00	49.20	30.33	6.32	24.55	49.74	74.00	-24.26	PK
H	15600.00	38.18	30.33	6.32	24.55	38.72	54.00	-15.28	AV
H	20800.00	50.88	30.85	7.45	24.69	52.17	74.00	-21.83	PK
H	20800.00	41.75	30.85	7.45	24.69	43.04	54.00	-10.96	AV
H	26000.00	52.71	31.02	8.99	25.57	56.25	68.20	-11.95	PK
H	26000.00	43.71	31.02	8.99	25.57	47.25	54.00	-6.75	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	45.52	30.55	5.77	24.66	45.40	68.20	-22.80	PK
V	10480.00	36.94	30.55	5.77	24.66	36.82	54.00	-17.18	AV
V	15720.00	47.57	30.33	6.32	24.55	48.11	74.00	-25.89	PK
V	15720.00	38.20	30.33	6.32	24.55	38.74	54.00	-15.26	AV
V	20960.00	47.23	30.85	7.45	24.69	48.52	74.00	-25.48	PK
V	20960.00	39.62	30.85	7.45	24.69	40.91	54.00	-13.09	AV
V	26200.00	47.72	31.02	8.99	25.57	51.26	68.20	-16.94	PK
V	26200.00	39.74	31.02	8.99	25.57	43.28	54.00	-10.72	AV
H	10480.00	45.46	30.55	5.77	24.66	45.34	68.20	-22.86	PK
H	10480.00	37.11	30.55	5.77	24.66	36.99	54.00	-17.01	AV
H	15720.00	47.61	30.33	6.32	24.55	48.15	74.00	-25.85	PK
H	15720.00	38.73	30.33	6.32	24.55	39.27	54.00	-14.73	AV
H	20960.00	46.98	30.85	7.45	24.69	48.27	74.00	-25.73	PK
H	20960.00	40.16	30.85	7.45	24.69	41.45	54.00	-12.55	AV
H	26200.00	47.83	31.02	8.99	25.57	51.37	68.20	-16.83	PK
H	26200.00	39.65	31.02	8.99	25.57	43.19	54.00	-10.81	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:5180MHz									
V	10360.00	44.33	30.55	5.77	24.66	44.21	68.20	-23.99	PK
V	10360.00	31.03	30.55	5.77	24.66	30.91	54.00	-23.09	AV
V	15540.00	49.28	30.33	6.32	24.55	49.82	74.00	-24.18	PK
V	15540.00	37.25	30.33	6.32	24.55	37.79	54.00	-16.21	AV
V	20720.00	50.99	30.85	7.45	24.69	52.28	74.00	-21.72	PK
V	20720.00	38.73	30.85	7.45	24.69	40.02	54.00	-13.98	AV
V	25900.00	52.13	31.02	8.99	25.57	55.67	68.20	-12.53	PK
V	25900.00	38.16	31.02	8.99	25.57	41.70	54.00	-12.30	AV
H	10360.00	53.11	30.55	5.77	24.66	52.99	68.20	-15.21	PK
H	10360.00	40.50	30.55	5.77	24.66	40.38	54.00	-13.62	AV
H	15540.00	43.88	30.33	6.32	24.55	44.42	74.00	-29.58	PK
H	15540.00	31.60	30.33	6.32	24.55	32.14	54.00	-21.86	AV
H	20720.00	48.87	30.85	7.45	24.69	50.16	74.00	-23.84	PK
H	20720.00	39.16	30.85	7.45	24.69	40.45	54.00	-13.55	AV
H	25900.00	50.98	31.02	8.99	25.57	54.52	68.20	-13.68	PK
H	25900.00	40.65	31.02	8.99	25.57	44.19	54.00	-9.81	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:5200MHz									
V	10400.00	46.24	30.55	5.77	24.66	46.12	68.20	-22.08	PK
V	10400.00	30.35	30.55	5.77	24.66	30.23	54.00	-23.77	AV
V	15600.00	48.86	30.33	6.32	24.55	49.40	74.00	-24.60	PK
V	15600.00	38.34	30.33	6.32	24.55	38.88	54.00	-15.12	AV
V	20800.00	50.89	30.85	7.45	24.69	52.18	74.00	-21.82	PK
V	20800.00	40.87	30.85	7.45	24.69	42.16	54.00	-11.84	AV
V	26000.00	53.34	31.02	8.99	25.57	56.88	68.20	-11.32	PK
V	26000.00	43.35	31.02	8.99	25.57	46.89	54.00	-7.11	AV
H	10400.00	45.36	30.55	5.77	24.66	45.24	68.20	-22.96	PK
H	10400.00	31.15	30.55	5.77	24.66	31.03	54.00	-22.97	AV
H	15600.00	50.03	30.33	6.32	24.55	50.57	74.00	-23.43	PK
H	15600.00	37.98	30.33	6.32	24.55	38.52	54.00	-15.48	AV
H	20800.00	50.89	30.85	7.45	24.69	52.18	74.00	-21.82	PK
H	20800.00	41.17	30.85	7.45	24.69	42.46	54.00	-11.54	AV
H	26000.00	53.27	31.02	8.99	25.57	56.81	68.20	-11.39	PK
H	26000.00	43.41	31.02	8.99	25.57	46.95	54.00	-7.05	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	46.03	30.55	5.77	24.66	45.91	68.20	-22.29	PK
V	10480.00	36.67	30.55	5.77	24.66	36.55	54.00	-17.45	AV
V	15720.00	47.28	30.33	6.32	24.55	47.82	74.00	-26.18	PK
V	15720.00	38.16	30.33	6.32	24.55	38.70	54.00	-15.30	AV
V	20960.00	46.64	30.85	7.45	24.69	47.93	74.00	-26.07	PK
V	20960.00	40.10	30.85	7.45	24.69	41.39	54.00	-12.61	AV
V	26200.00	47.98	31.02	8.99	25.57	51.52	68.20	-16.68	PK
V	26200.00	40.37	31.02	8.99	25.57	43.91	54.00	-10.09	AV
H	10480.00	45.65	30.55	5.77	24.66	45.53	68.20	-22.67	PK
H	10480.00	36.96	30.55	5.77	24.66	36.84	54.00	-17.16	AV
H	15720.00	47.52	30.33	6.32	24.55	48.06	74.00	-25.94	PK
H	15720.00	38.66	30.33	6.32	24.55	39.20	54.00	-14.80	AV
H	20960.00	46.93	30.85	7.45	24.69	48.22	74.00	-25.78	PK
H	20960.00	39.89	30.85	7.45	24.69	41.18	54.00	-12.82	AV
H	26200.00	47.86	31.02	8.99	25.57	51.40	68.20	-16.80	PK
H	26200.00	40.39	31.02	8.99	25.57	43.93	54.00	-10.07	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	49.40	30.55	5.77	24.66	49.28	74.00	-24.72	PK
V	11490.00	38.33	30.55	5.77	24.66	38.21	54.00	-15.79	AV
V	17235.00	50.62	30.33	6.32	24.55	51.16	68.20	-17.04	PK
V	17235.00	41.03	30.33	6.32	24.55	41.57	54.00	-12.43	AV
V	22980.00	53.99	30.85	7.45	24.69	55.28	74.00	-18.72	PK
V	22980.00	43.83	30.85	7.45	24.69	45.12	54.00	-8.88	AV
V	28725.00	56.34	31.02	8.99	25.57	59.88	68.20	-8.32	PK
V	28725.00	45.95	31.02	8.99	25.57	49.49	54.00	-4.51	AV
H	11490.00	49.51	30.55	5.77	24.66	49.39	74.00	-24.61	PK
H	11490.00	39.50	30.55	5.77	24.66	39.38	54.00	-14.62	AV
H	17235.00	51.21	30.33	6.32	24.55	51.75	68.20	-16.45	PK
H	17235.00	41.71	30.33	6.32	24.55	42.25	54.00	-11.75	AV
H	22980.00	52.96	30.85	7.45	24.69	54.25	74.00	-19.75	PK
H	22980.00	44.04	30.85	7.45	24.69	45.33	54.00	-8.67	AV
H	28725.00	55.27	31.02	8.99	25.57	58.81	68.20	-9.39	PK
H	28725.00	45.00	31.02	8.99	25.57	48.54	54.00	-5.46	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	48.84	30.55	5.77	24.66	48.72	74.00	-25.28	PK
V	11570.00	37.68	30.55	5.77	24.66	37.56	54.00	-16.44	AV
V	17355.00	49.48	30.33	6.32	24.55	50.02	68.20	-18.18	PK
V	17355.00	39.63	30.33	6.32	24.55	40.17	54.00	-13.83	AV
V	23140.00	52.00	30.85	7.45	24.69	53.29	68.20	-14.91	PK
V	23140.00	42.38	30.85	7.45	24.69	43.67	54.00	-10.33	AV
V	28925.00	53.81	31.02	8.99	25.57	57.35	68.20	-10.85	PK
V	28925.00	44.38	31.02	8.99	25.57	47.92	54.00	-6.08	AV
H	11570.00	48.66	30.55	5.77	24.66	48.54	74.00	-25.46	PK
H	11570.00	37.52	30.55	5.77	24.66	37.40	54.00	-16.60	AV
H	17355.00	50.18	30.33	6.32	24.55	50.72	68.20	-17.48	PK
H	17355.00	39.71	30.33	6.32	24.55	40.25	54.00	-13.75	AV
H	23140.00	52.32	30.85	7.45	24.69	53.61	68.20	-14.59	PK
H	23140.00	41.65	30.85	7.45	24.69	42.94	54.00	-11.06	AV
H	28925.00	54.35	31.02	8.99	25.57	57.89	68.20	-10.31	PK
H	28925.00	44.71	31.02	8.99	25.57	48.25	54.00	-5.75	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	48.62	30.55	5.77	24.66	48.50	74.00	-25.50	PK
V	11650.00	37.71	30.55	5.77	24.66	37.59	54.00	-16.41	AV
V	17475.00	49.24	30.33	6.32	24.55	49.78	68.20	-18.42	PK
V	17475.00	39.58	30.33	6.32	24.55	40.12	54.00	-13.88	AV
V	23300.00	52.38	30.85	7.45	24.69	53.67	68.20	-14.53	PK
V	23300.00	41.96	30.85	7.45	24.69	43.25	54.00	-10.75	AV
V	29125.00	53.61	31.02	8.99	25.57	57.15	68.20	-11.05	PK
V	29125.00	44.78	31.02	8.99	25.57	48.32	54.00	-5.68	AV
H	11650.00	48.64	30.55	5.77	24.66	48.52	74.00	-25.48	PK
H	11650.00	38.42	30.55	5.77	24.66	38.30	54.00	-15.70	AV
H	17475.00	50.41	30.33	6.32	24.55	50.95	68.20	-17.25	PK
H	17475.00	40.67	30.33	6.32	24.55	41.21	54.00	-12.79	AV
H	23300.00	52.71	30.85	7.45	24.69	54.00	68.20	-14.20	PK
H	23300.00	41.67	30.85	7.45	24.69	42.96	54.00	-11.04	AV
H	29125.00	54.35	31.02	8.99	25.57	57.89	68.20	-10.31	PK
H	29125.00	44.94	31.02	8.99	25.57	48.48	54.00	-5.52	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	48.90	30.55	5.77	24.66	48.78	74.00	-25.22	PK
V	11490.00	38.85	30.55	5.77	24.66	38.73	54.00	-15.27	AV
V	17235.00	50.23	30.33	6.32	24.55	50.77	68.20	-17.43	PK
V	17235.00	41.51	30.33	6.32	24.55	42.05	54.00	-11.95	AV
V	22980.00	53.38	30.85	7.45	24.69	54.67	74.00	-19.33	PK
V	22980.00	43.50	30.85	7.45	24.69	44.79	54.00	-9.21	AV
V	28725.00	55.19	31.02	8.99	25.57	58.73	68.20	-9.47	PK
V	28725.00	45.41	31.02	8.99	25.57	48.95	54.00	-5.05	AV
H	11490.00	49.05	30.55	5.77	24.66	48.93	74.00	-25.07	PK
H	11490.00	39.13	30.55	5.77	24.66	39.01	54.00	-14.99	AV
H	17235.00	51.21	30.33	6.32	24.55	51.75	68.20	-16.45	PK
H	17235.00	41.23	30.33	6.32	24.55	41.77	54.00	-12.23	AV
H	22980.00	53.28	30.85	7.45	24.69	54.57	74.00	-19.43	PK
H	22980.00	43.52	30.85	7.45	24.69	44.81	54.00	-9.19	AV
H	28725.00	55.40	31.02	8.99	25.57	58.94	68.20	-9.26	PK
H	28725.00	46.35	31.02	8.99	25.57	49.89	54.00	-4.11	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	48.81	30.55	5.77	24.66	48.69	74.00	-25.31	PK
V	11570.00	38.05	30.55	5.77	24.66	37.93	54.00	-16.07	AV
V	17355.00	49.08	30.33	6.32	24.55	49.62	68.20	-18.58	PK
V	17355.00	39.61	30.33	6.32	24.55	40.15	54.00	-13.85	AV
V	23140.00	52.44	30.85	7.45	24.69	53.73	68.20	-14.47	PK
V	23140.00	42.41	30.85	7.45	24.69	43.70	54.00	-10.30	AV
V	28925.00	54.94	31.02	8.99	25.57	58.48	68.20	-9.72	PK
V	28925.00	44.60	31.02	8.99	25.57	48.14	54.00	-5.86	AV
H	11570.00	48.19	30.55	5.77	24.66	48.07	74.00	-25.93	PK
H	11570.00	38.18	30.55	5.77	24.66	38.06	54.00	-15.94	AV
H	17355.00	50.05	30.33	6.32	24.55	50.59	68.20	-17.61	PK
H	17355.00	40.09	30.33	6.32	24.55	40.63	54.00	-13.37	AV
H	23140.00	52.64	30.85	7.45	24.69	53.93	68.20	-14.27	PK
H	23140.00	41.65	30.85	7.45	24.69	42.94	54.00	-11.06	AV
H	28925.00	54.67	31.02	8.99	25.57	58.21	68.20	-9.99	PK
H	28925.00	44.97	31.02	8.99	25.57	48.51	54.00	-5.49	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	48.81	30.55	5.77	24.66	48.69	74.00	-25.31	PK
V	11650.00	38.05	30.55	5.77	24.66	37.93	54.00	-16.07	AV
V	17475.00	49.08	30.33	6.32	24.55	49.62	68.20	-18.58	PK
V	17475.00	39.61	30.33	6.32	24.55	40.15	54.00	-13.85	AV
V	23300.00	52.44	30.85	7.45	24.69	53.73	68.20	-14.47	PK
V	23300.00	42.41	30.85	7.45	24.69	43.70	54.00	-10.30	AV
V	29125.00	54.94	31.02	8.99	25.57	58.48	68.20	-9.72	PK
V	29125.00	44.60	31.02	8.99	25.57	48.14	54.00	-5.86	AV
H	11650.00	48.19	30.55	5.77	24.66	48.07	74.00	-25.93	PK
H	11650.00	38.18	30.55	5.77	24.66	38.06	54.00	-15.94	AV
H	17475.00	50.05	30.33	6.32	24.55	50.59	68.20	-17.61	PK
H	17475.00	40.09	30.33	6.32	24.55	40.63	54.00	-13.37	AV
H	23300.00	52.64	30.85	7.45	24.69	53.93	68.20	-14.27	PK
H	23300.00	41.65	30.85	7.45	24.69	42.94	54.00	-11.06	AV
H	29125.00	54.67	31.02	8.99	25.57	58.21	68.20	-9.99	PK
H	29125.00	44.97	31.02	8.99	25.57	48.51	54.00	-5.49	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.



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	44.86	30.45	8.77	38.66	61.84	74.00	-12.16	PK
V	4500.00	30.77	30.45	8.77	38.66	47.75	54.00	-6.25	AV
V	5100.00	44.53	30.45	8.77	38.66	61.51	74.00	-12.49	PK
V	5100.00	31.96	30.45	8.77	38.66	48.94	54.00	-5.06	AV
V	5150.00	44.98	30.45	8.77	38.66	61.96	74.00	-12.04	PK
V	5150.00	31.56	30.45	8.77	38.66	48.54	54.00	-5.46	AV
H	4500.00	44.58	30.45	8.77	38.66	61.56	74.00	-12.44	PK
H	4500.00	31.15	30.45	8.77	38.66	48.13	54.00	-5.87	AV
H	5100.00	44.02	30.45	8.77	38.66	61.00	74.00	-13.00	PK
H	5100.00	30.98	30.45	8.77	38.66	47.96	54.00	-6.04	AV
H	5150.00	43.70	30.45	8.77	38.66	60.68	74.00	-13.32	PK
H	5150.00	30.42	30.45	8.77	38.66	47.40	54.00	-6.60	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	44.23	30.45	8.77	38.66	61.21	74.00	-12.79	PK
V	5350.00	30.75	30.45	8.77	38.66	47.73	54.00	-6.27	AV
V	5400.00	45.13	30.45	8.77	38.66	62.11	74.00	-11.89	PK
V	5400.00	31.79	30.45	8.77	38.66	48.77	54.00	-5.23	AV
V	5460.00	44.54	30.45	8.77	38.66	61.52	74.00	-12.48	PK
V	5460.00	32.11	30.45	8.77	38.66	49.09	54.00	-4.91	AV
H	5350.00	44.49	30.45	8.77	38.66	61.47	74.00	-12.53	PK
H	5350.00	31.24	30.45	8.77	38.66	48.22	54.00	-5.78	AV
H	5400.00	44.46	30.45	8.77	38.66	61.44	74.00	-12.56	PK
H	5400.00	30.62	30.45	8.77	38.66	47.60	54.00	-6.40	AV
H	5460.00	44.10	30.45	8.77	38.66	61.08	74.00	-12.92	PK
H	5460.00	31.19	30.45	8.77	38.66	48.17	54.00	-5.83	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:5180MHz									
V	4500.00	44.20	30.45	8.77	38.66	61.18	74.00	-12.82	PK
V	4500.00	30.83	30.45	8.77	38.66	47.81	54.00	-6.19	AV
V	5100.00	45.29	30.45	8.77	38.66	62.27	74.00	-11.73	PK
V	5100.00	31.86	30.45	8.77	38.66	48.84	54.00	-5.16	AV
V	5150.00	45.25	30.45	8.77	38.66	62.23	74.00	-11.77	PK
V	5150.00	32.14	30.45	8.77	38.66	49.12	54.00	-4.88	AV
H	4500.00	44.42	30.45	8.77	38.66	61.40	74.00	-12.60	PK
H	4500.00	31.35	30.45	8.77	38.66	48.33	54.00	-5.67	AV
H	5100.00	44.58	30.45	8.77	38.66	61.56	74.00	-12.44	PK
H	5100.00	30.90	30.45	8.77	38.66	47.88	54.00	-6.12	AV
H	5150.00	44.12	30.45	8.77	38.66	61.10	74.00	-12.90	PK
H	5150.00	30.80	30.45	8.77	38.66	47.78	54.00	-6.22	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	44.27	30.45	8.77	38.66	61.25	74.00	-12.75	PK
V	5350.00	30.36	30.45	8.77	38.66	47.34	54.00	-6.66	AV
V	5400.00	44.49	30.45	8.77	38.66	61.47	74.00	-12.53	PK
V	5400.00	31.87	30.45	8.77	38.66	48.85	54.00	-5.15	AV
V	5460.00	45.29	30.45	8.77	38.66	62.27	74.00	-11.73	PK
V	5460.00	31.93	30.45	8.77	38.66	48.91	54.00	-5.09	AV
H	5350.00	43.90	30.45	8.77	38.66	60.88	74.00	-13.12	PK
H	5350.00	30.76	30.45	8.77	38.66	47.74	54.00	-6.26	AV
H	5400.00	44.39	30.45	8.77	38.66	61.37	74.00	-12.63	PK
H	5400.00	30.78	30.45	8.77	38.66	47.76	54.00	-6.24	AV
H	5460.00	43.80	30.45	8.77	38.66	60.78	74.00	-13.22	PK
H	5460.00	31.14	30.45	8.77	38.66	48.12	54.00	-5.88	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	64.67	30.45	8.77	38.66	81.65	110.80	-29.15	PK
V	5700.00	30.83	30.45	8.77	38.66	47.81	54.00	-6.19	AV
V	5725.00	62.84	30.45	8.77	38.66	79.82	122.20	-42.38	PK
V	5725.00	31.81	30.45	8.77	38.66	48.79	54.00	-5.21	AV
H	5700.00	63.97	30.45	8.77	38.66	80.95	110.80	-29.85	PK
H	5700.00	30.85	30.45	8.77	38.66	47.83	54.00	-6.17	AV
H	5725.00	65.11	30.45	8.77	38.66	82.09	122.20	-40.11	PK
H	5725.00	31.73	30.45	8.77	38.66	48.71	54.00	-5.29	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	65.67	30.45	8.77	38.66	82.65	122.20	-39.55	PK
V	5850.00	32.05	30.45	8.77	38.66	49.03	54.00	-4.97	AV
V	5875.00	64.52	30.45	8.77	38.66	81.50	110.80	-29.30	PK
V	5875.00	30.64	30.45	8.77	38.66	47.62	54.00	-6.38	AV
H	5850.00	65.77	30.45	8.77	38.66	82.75	122.20	-39.45	PK
H	5850.00	31.57	30.45	8.77	38.66	48.55	54.00	-5.45	AV
H	5875.00	63.92	30.45	8.77	38.66	80.90	110.80	-29.90	PK
H	5875.00	31.21	30.45	8.77	38.66	48.19	54.00	-5.81	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	64.32	30.45	8.77	38.66	81.30	110.80	-29.50	PK
V	5700.00	30.73	30.45	8.77	38.66	47.71	54.00	-6.29	AV
V	5725.00	62.94	30.45	8.77	38.66	79.92	122.20	-42.28	PK
V	5725.00	32.25	30.45	8.77	38.66	49.23	54.00	-4.77	AV
H	5700.00	63.53	30.45	8.77	38.66	80.51	110.80	-30.29	PK
H	5700.00	31.07	30.45	8.77	38.66	48.05	54.00	-5.95	AV
H	5725.00	65.17	30.45	8.77	38.66	82.15	122.20	-40.05	PK
H	5725.00	32.38	30.45	8.77	38.66	49.36	54.00	-4.64	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	65.35	30.45	8.77	38.66	82.33	122.20	-39.87	PK
V	5850.00	31.88	30.45	8.77	38.66	48.86	54.00	-5.14	AV
V	5875.00	64.59	30.45	8.77	38.66	81.57	110.80	-29.23	PK
V	5875.00	30.69	30.45	8.77	38.66	47.67	54.00	-6.33	AV
H	5850.00	66.13	30.45	8.77	38.66	83.11	122.20	-39.09	PK
H	5850.00	31.97	30.45	8.77	38.66	48.95	54.00	-5.05	AV
H	5875.00	64.32	30.45	8.77	38.66	81.30	110.80	-29.50	PK
H	5875.00	31.03	30.45	8.77	38.66	48.01	54.00	-5.99	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.

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:

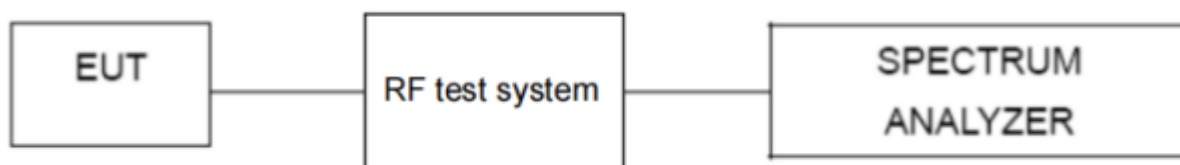
- a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3$ RBW.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer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

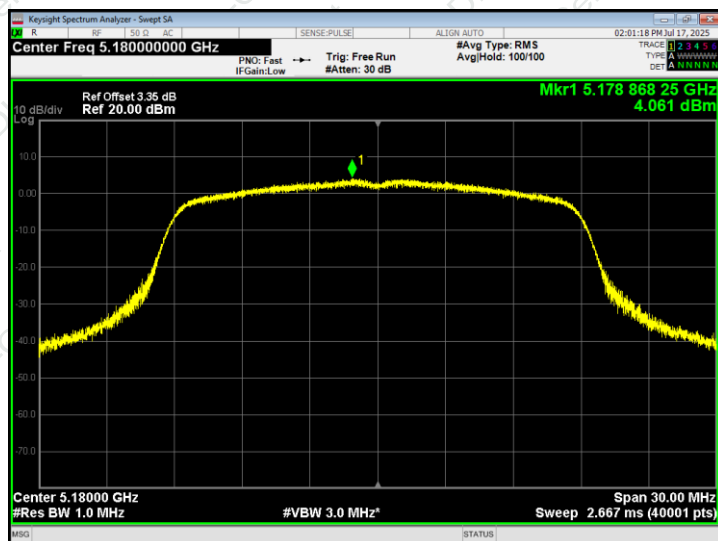
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1015 hPa	Test Voltage :	DC 5V
Test Band :	5.2G		

Test mode	Frequency (MHz)	PSD (dBm)	duty cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	5180	4.061	0.00	4.061	11	Pass
	5200	4.798	0.00	4.798	11	Pass
	5240	4.169	0.00	4.169	11	Pass
802.11n20	5180	4.116	0.00	4.116	11	Pass
	5200	4.302	0.00	4.302	11	Pass
	5240	4.304	0.00	4.304	11	Pass
Note: Total PSD = PSD + Duty Cycle Factor.						

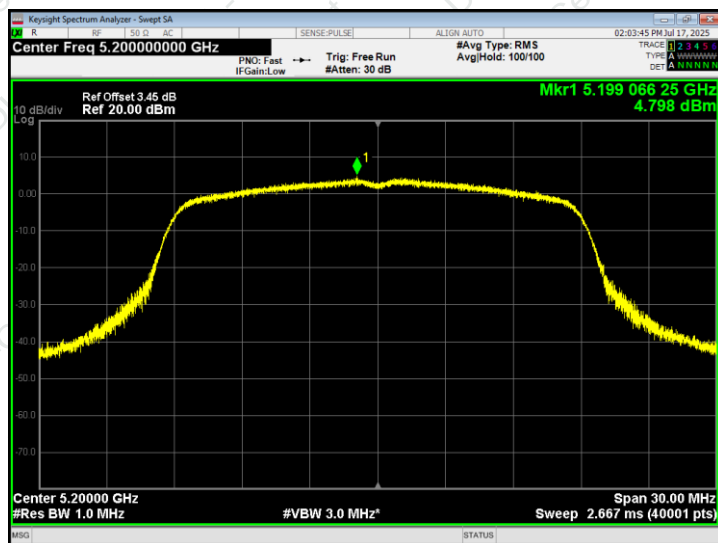


802.11a

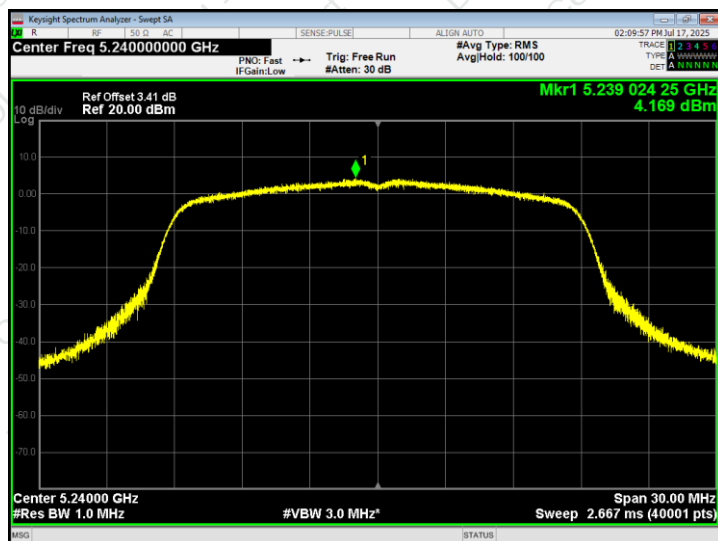
CH36



CH40



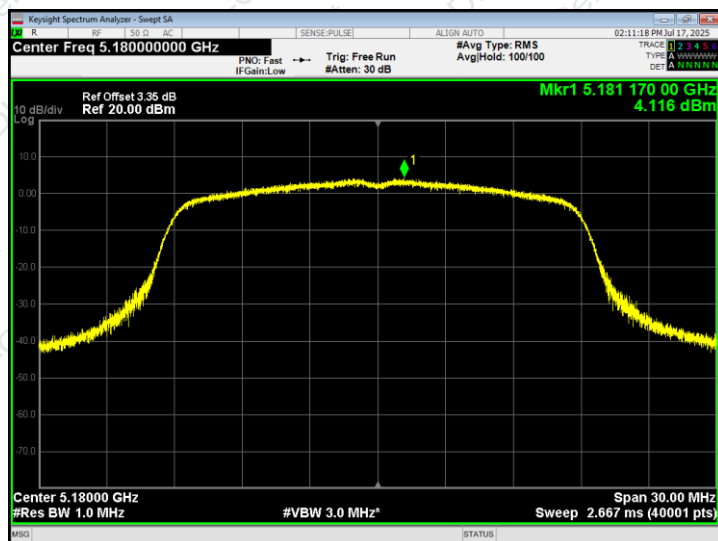
CH48



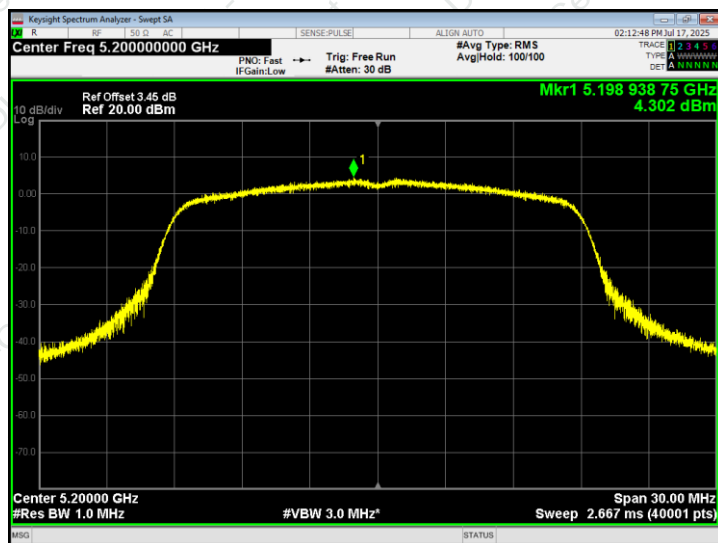


802.11n20

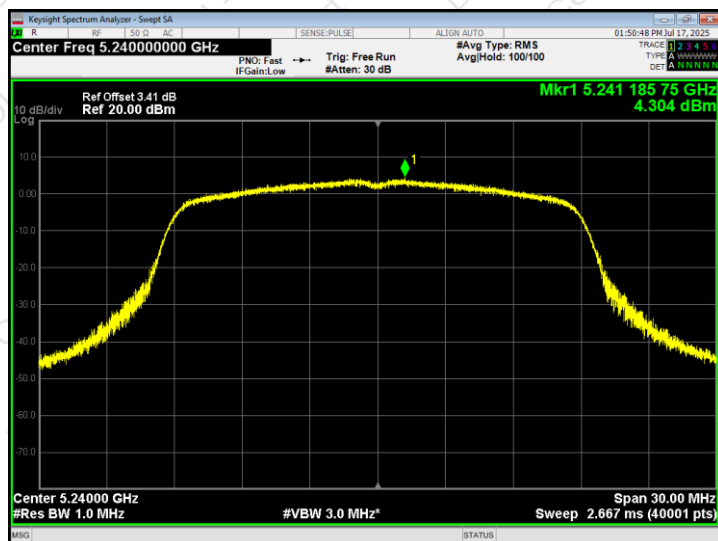
CH36



CH40



CH48





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

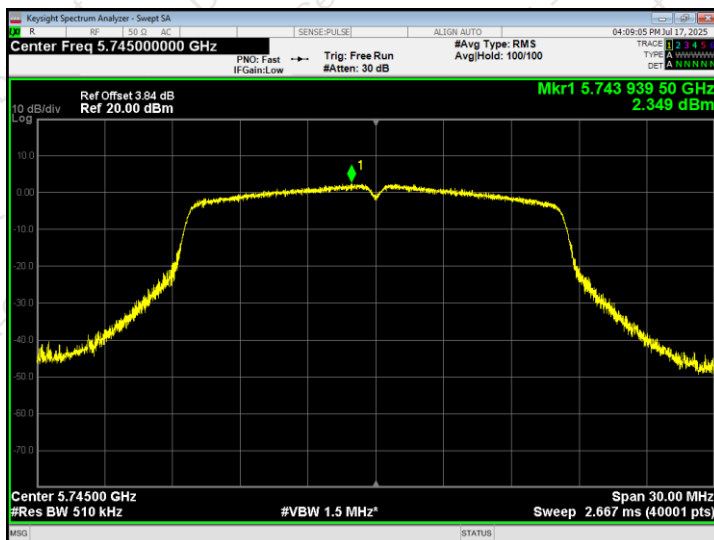
Test mode	Test Channel (MHz)	PSD (dBm/500kHz)	Duty Cycle Factor (dB)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
802.11a	5745	2.349	0.00	2.349	30	Pass
	5785	2.923	0.00	2.923	30	Pass
	5825	4.798	0.00	4.798	30	Pass
802.11n20	5745	2.608	0.00	2.608	30	Pass
	5785	2.810	0.00	2.810	30	Pass
	5825	5.018	0.00	5.018	30	Pass

Note: Total PSD = PSD + Duty Cycle Factor.

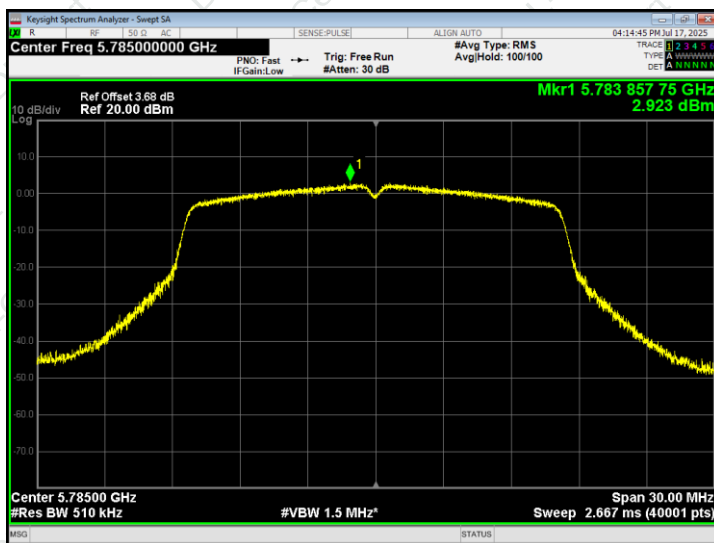


802.11a

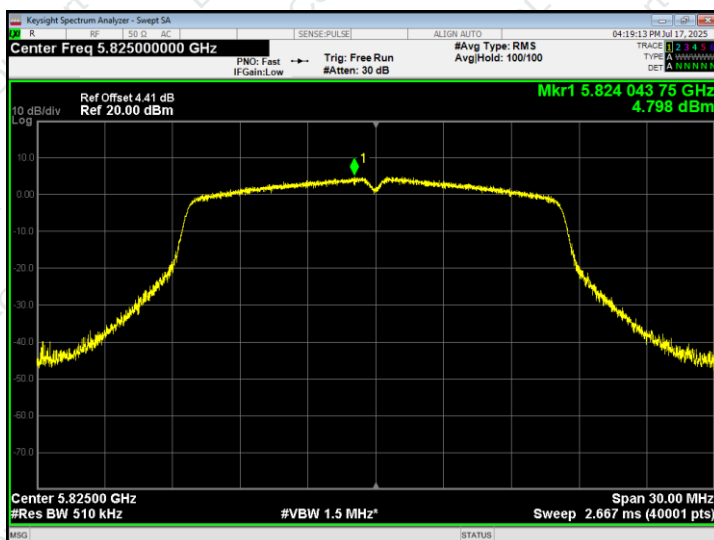
CH149



CH157



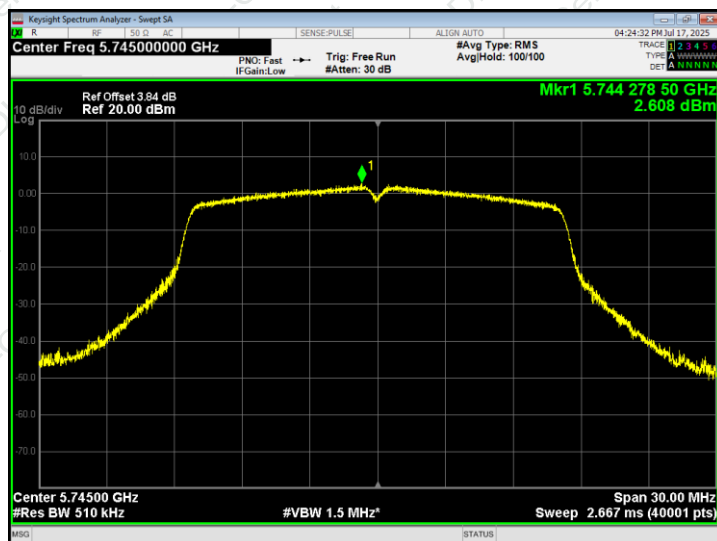
CH165



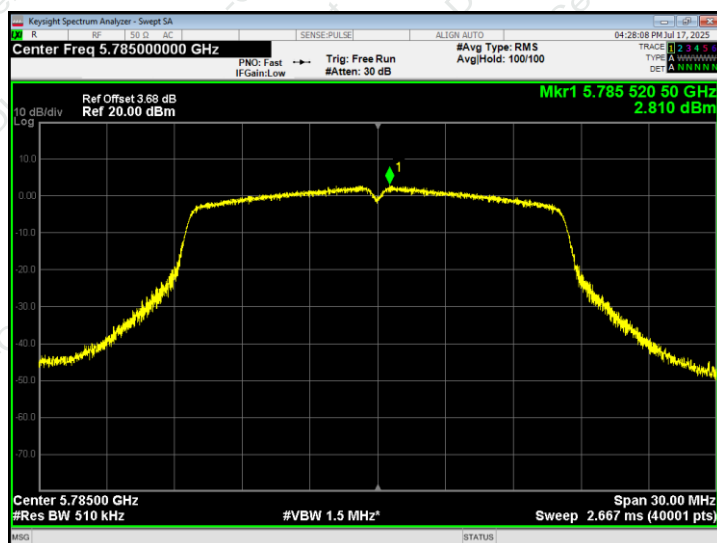


802.11n20

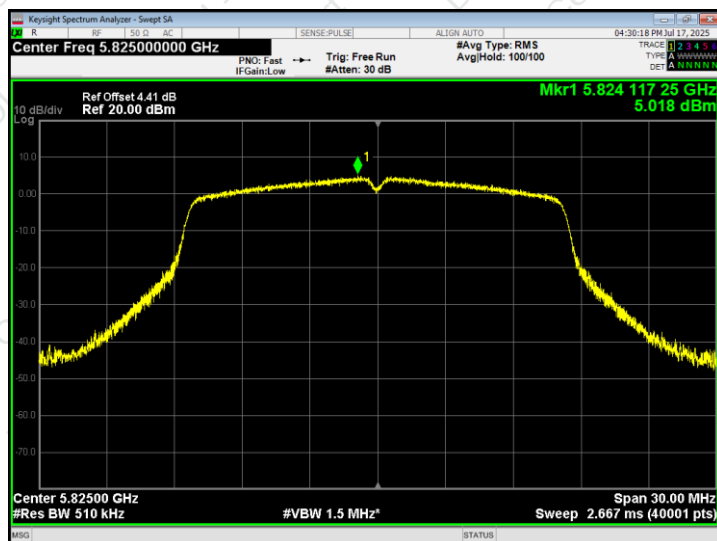
CH149



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

The following procedure shall be used for measuring 6dB Occupied Bandwidth:

The procedure for this method is as follows:

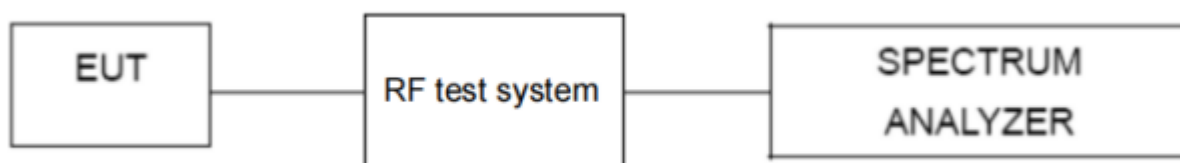
- Set RBW = 100KHz.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

The following procedure shall be used for measuring 26dB Emission bandwidth:

The procedure for this method is as follows:

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = peak.
- Trace mode = max hold.
- 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 approximately 1%.





6.3 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.

6.4 TEST RESULTS

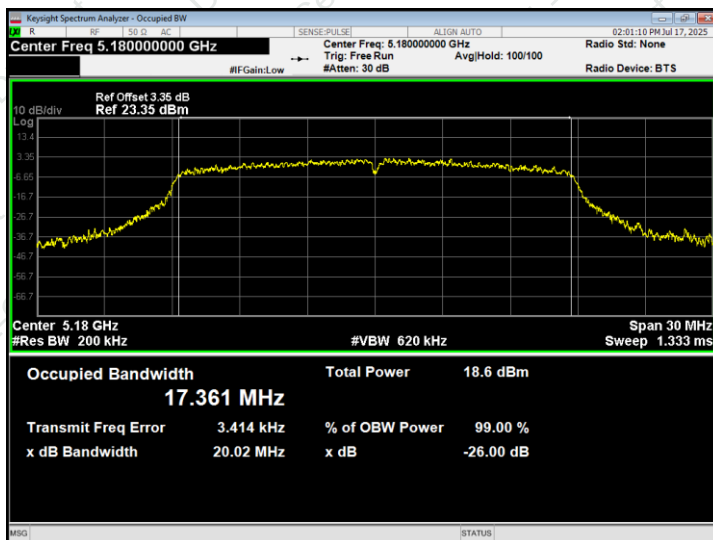
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 5V
Test Band :	5.2G		

Test Mode	Frequency (MHz)	26dB Emission Bandwidth (MHz)	Limit (MHz)	Result
802.11a	5180	20.02	N/A	Pass
	5200	20.16		
	5240	20.04		
802.11n20	5180	20.02	N/A	Pass
	5200	20.05		
	5240	20.14		

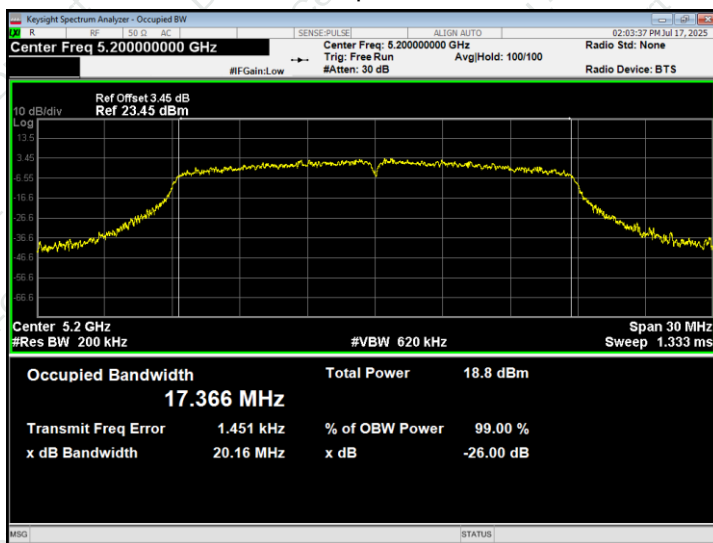


802.11a

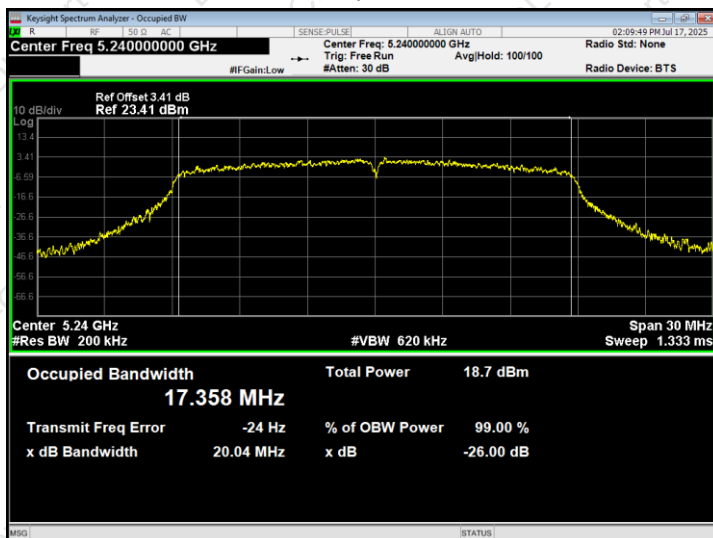
26dB Bandwidth plot on channel 36



26dB Bandwidth plot on channel 40



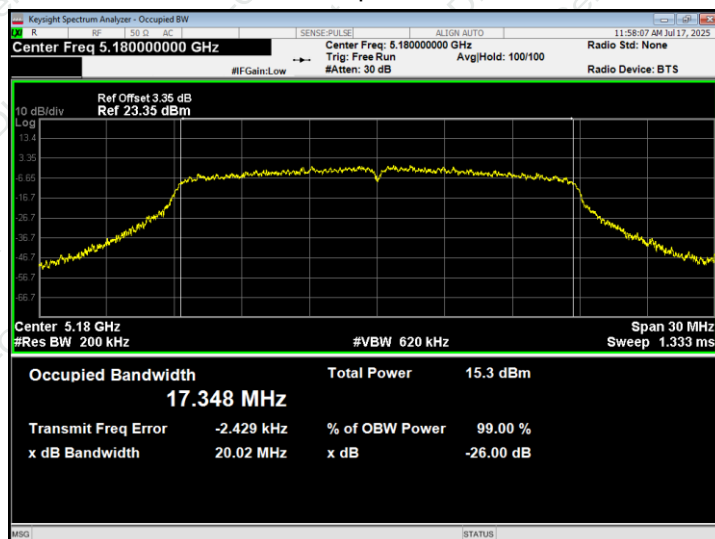
26dB Bandwidth plot on channel 48



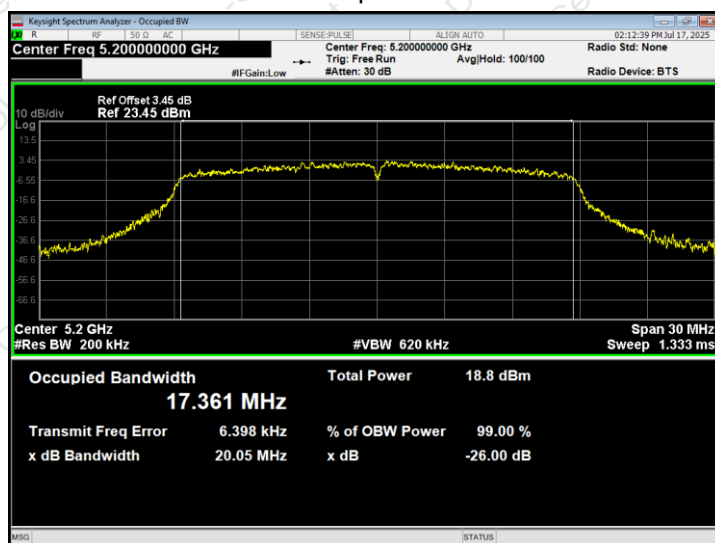


802.11n20

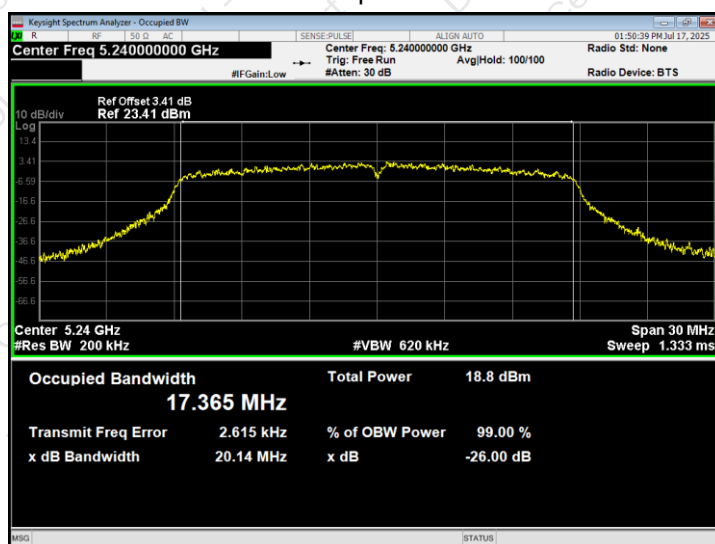
26dB Bandwidth plot on channel 36



26dB Bandwidth plot on channel 40



26dB Bandwidth plot on channel 48





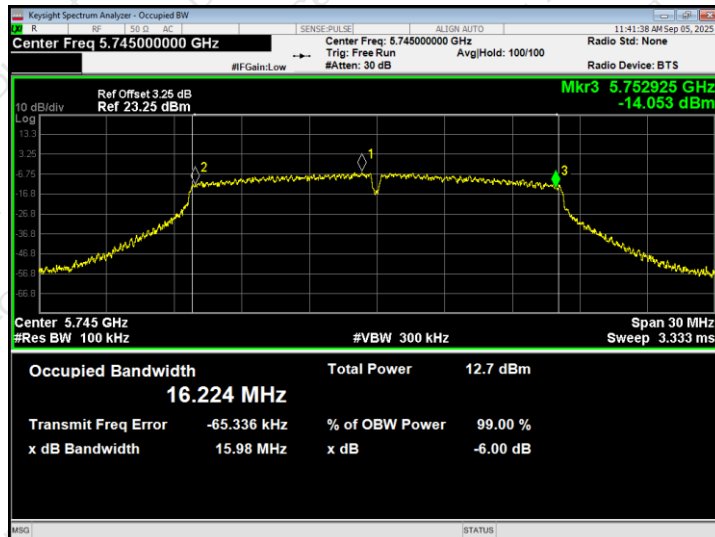
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 5V
Test Band :	5.8G		

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
802.11a	5745	15.98	>500	Pass
	5785	15.77		
	5825	15.93		
802.11n20	5745	16.80	>500	Pass
	5785	15.43		
	5825	16.31		

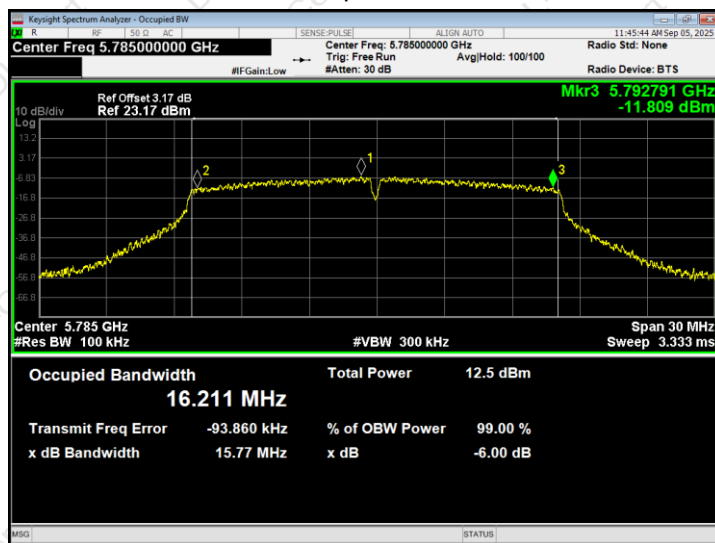


802.11a

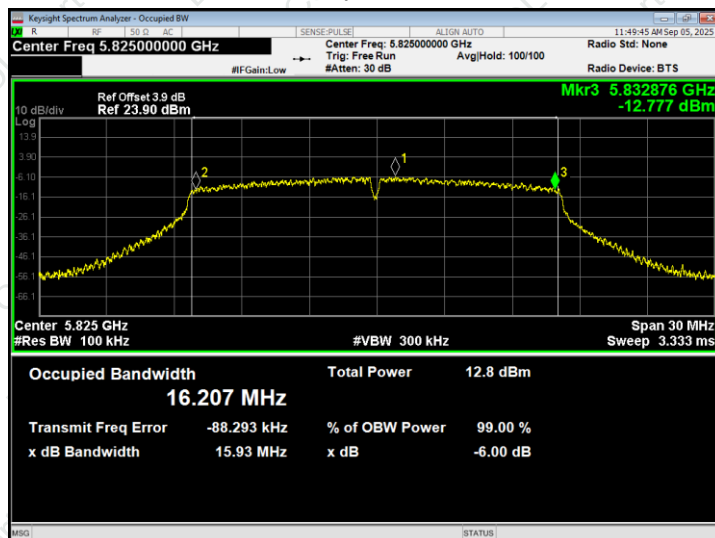
6dB Bandwidth plot on channel 149



6dB Bandwidth plot on channel 157



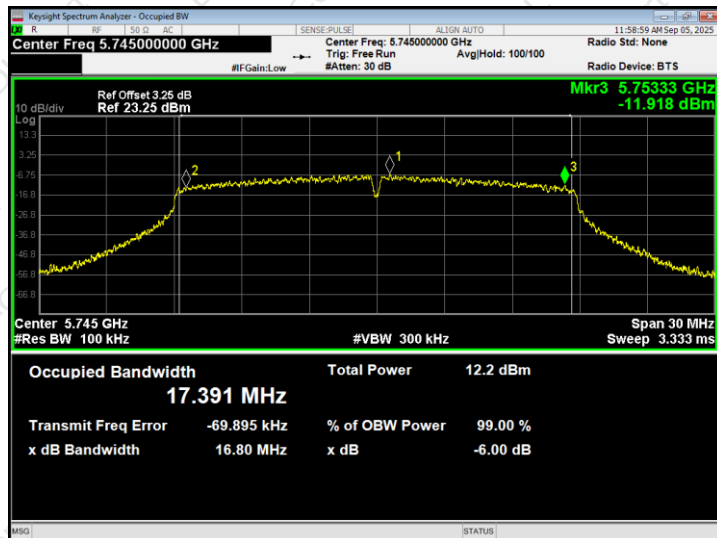
6dB Bandwidth plot on channel 165



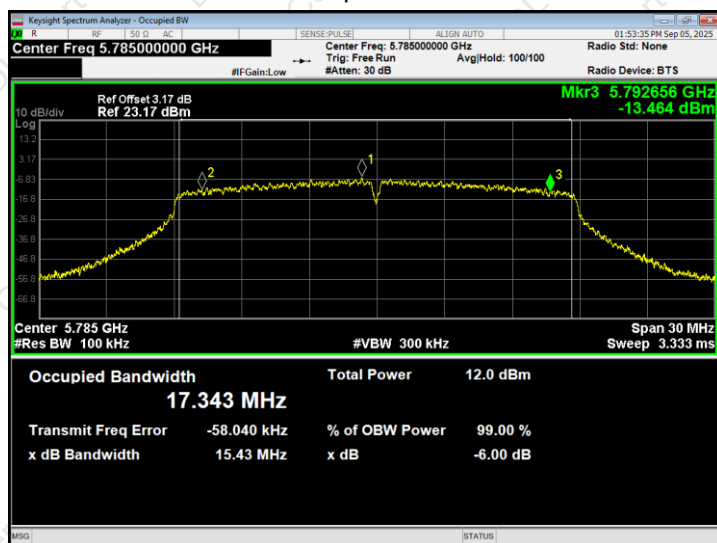


802.11n20

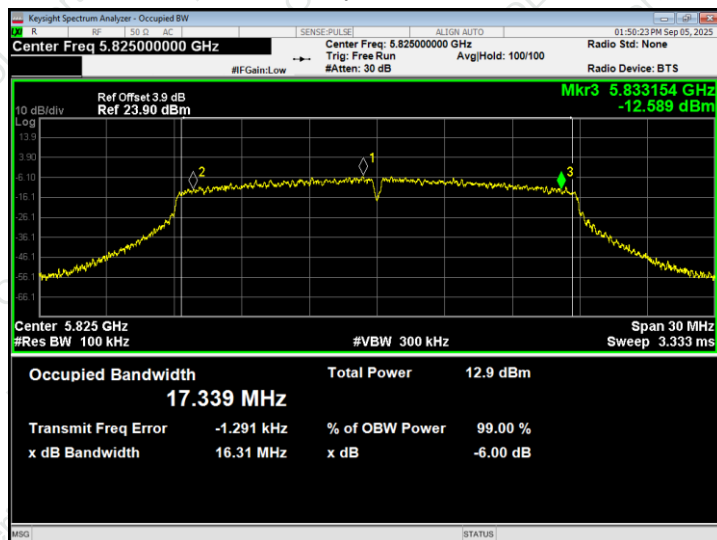
6dB Bandwidth plot on channel 149



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(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 °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	7.406	0.00	7.406	23.98	Pass
	5200	7.625	0.00	7.625	23.98	Pass
	5240	7.443	0.00	7.443	23.98	Pass
802.11 n20	5180	7.014	0.00	7.014	23.98	Pass
	5200	7.583	0.00	7.583	23.98	Pass
	5240	7.575	0.00	7.575	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	6.967	0.00	6.967	30	Pass
	5785	6.411	0.00	6.411	30	Pass
	5825	6.743	0.00	6.743	30	Pass
802.11 n20	5745	6.599	0.00	6.599	30	Pass
	5785	6.345	0.00	6.345	30	Pass
	5825	6.904	0.00	6.904	30	Pass

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



8. CONDUCTED BAND EMISSIONS

8.1 APPLICABLE STANDARD

According to FCC §15.407(b)

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

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

(2) For transmitters operating in the 5.725-5.85 GHz band:

(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.

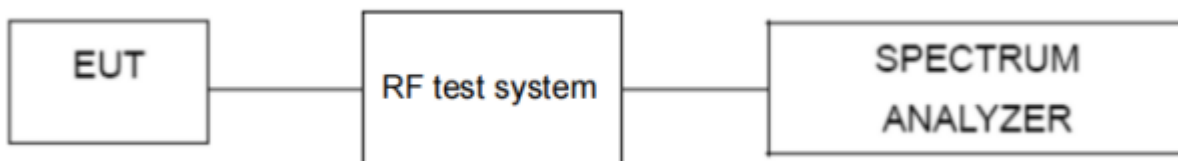
8.2 TEST PROCEDURE

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.

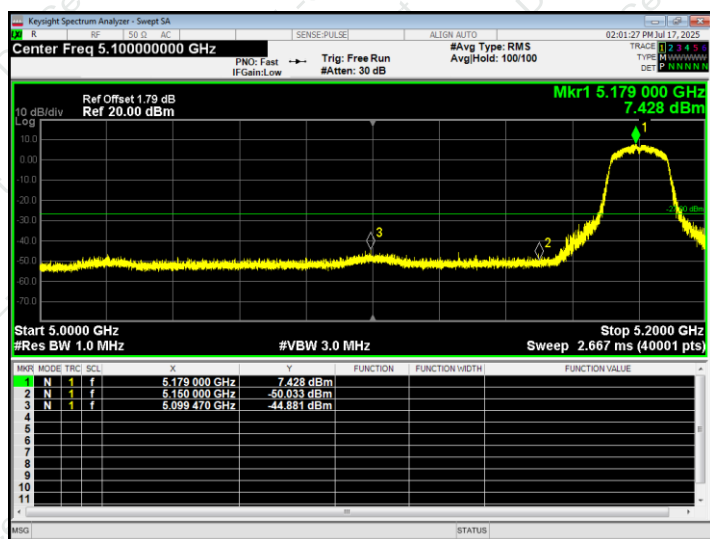


8.6 TEST RESULTS

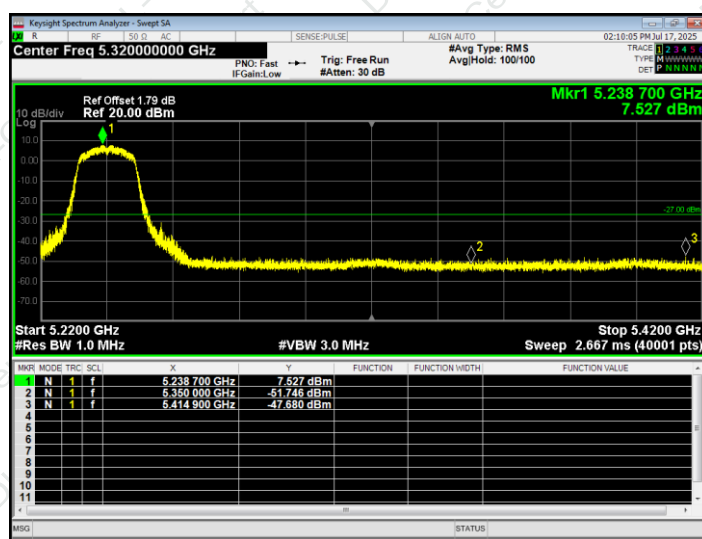
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
Test band :	5.2G	Antenna gain :	1.79dBi

5.180~5.240 GHz

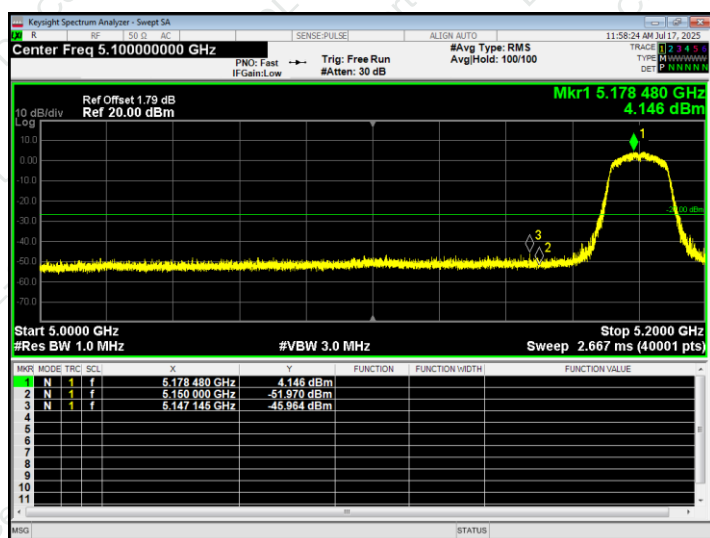
(802.11a) Band Edge, Left Side



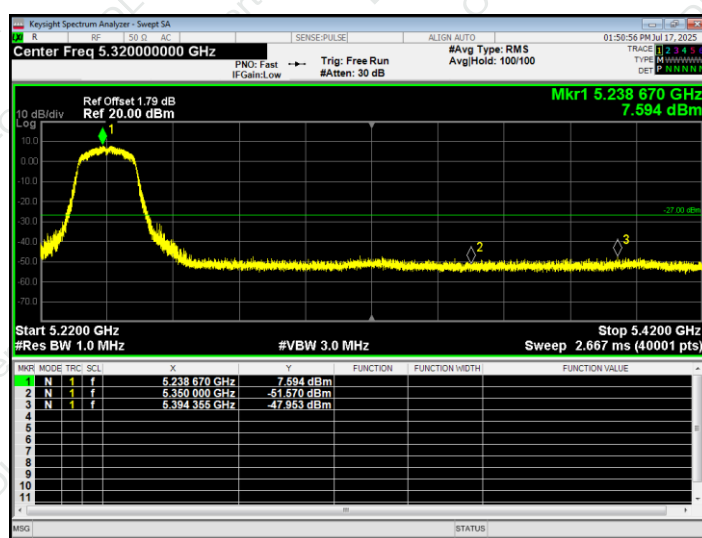
(802.11a) Band Edge, Right Side



(802.11n20) Band Edge, Left Side



(802.11n20) Band Edge, Right Side

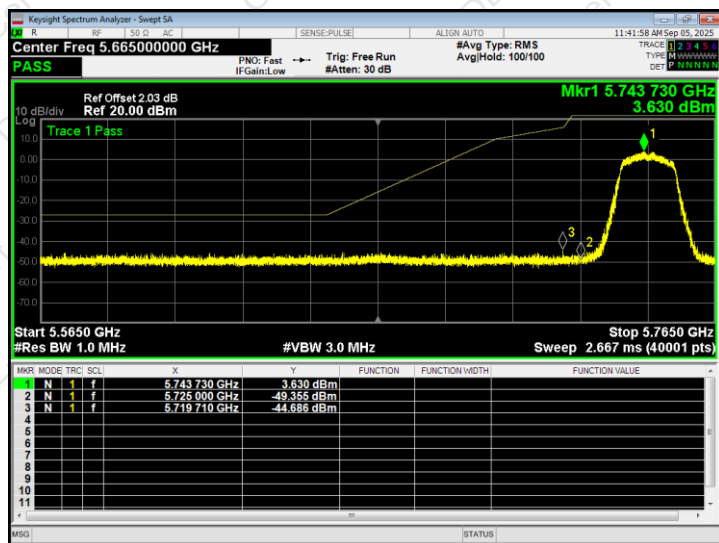




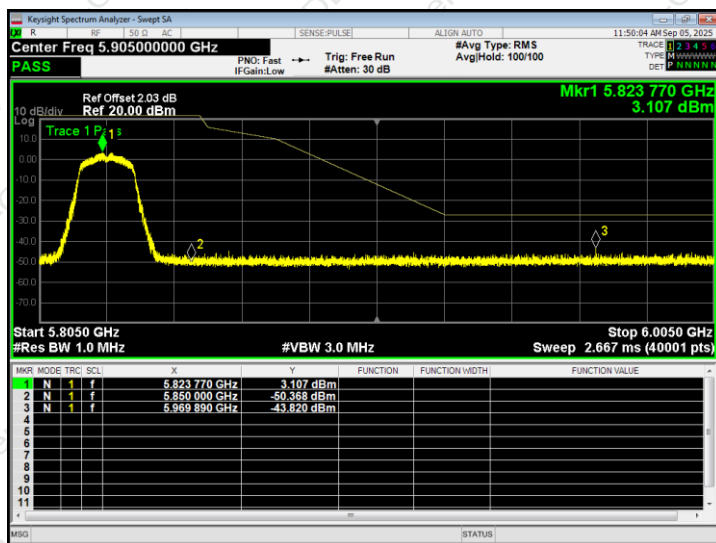
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
Test band :	5.8G	Antenna gain :	2.03dBi

5.745~5.825 GHz

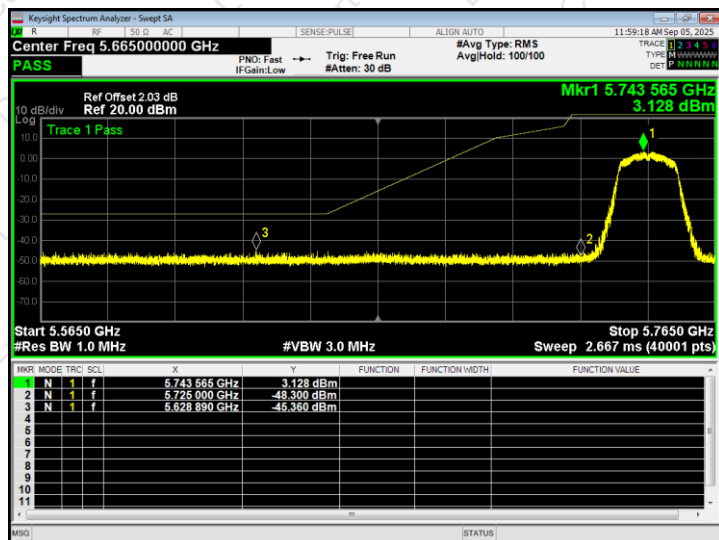
(802.11a) Band Edge, Left Side



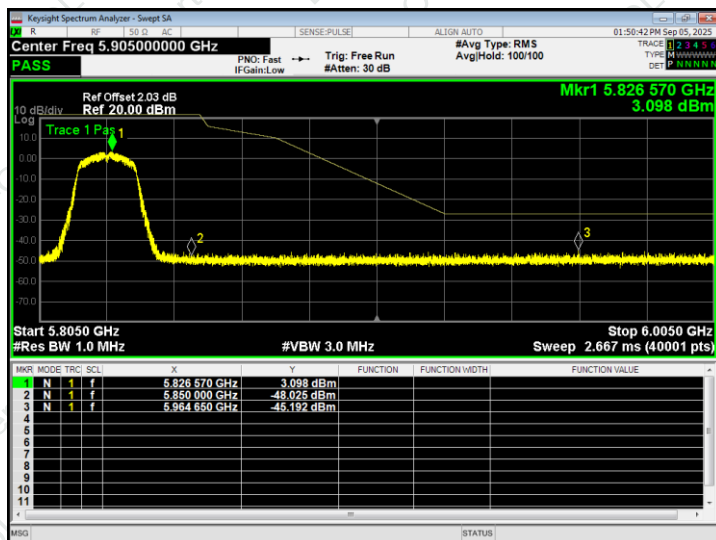
(802.11a) Band Edge, Right Side



(802.11n20) Band Edge, Left Side



(802.11n20) Band Edge, Right Side





9. FREQUENCY STABILITY MEASUREMENT

9.1 LIMIT

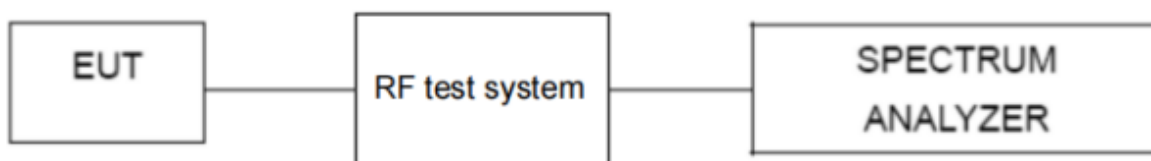
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

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 $(f_c - f)/f_c \times 106 \text{ ppm}$.
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

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	5179.978	-4.221
60	5	5179.962	-7.297
50	5	5179.982	-3.408
40	5	5179.972	-5.423
30	5	5179.972	-5.350
25	5	5179.984	-3.145
10	5	5179.984	-3.082
0	5	5179.978	-4.338
-10	5	5179.975	-4.732
-20	5	5179.968	-6.197

Reference Frequency: 802.11n20 - 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5179.986	-2.721
60	5	5179.988	-2.273
50	5	5179.984	-3.006
40	5	5179.980	-3.858
30	5	5179.989	-2.041
25	5	5179.989	-2.049
10	5	5179.987	-2.431
0	5	5179.975	-4.871
-10	5	5179.972	-5.339
-20	5	5179.977	-4.401



Reference Frequency: 802.11a - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5744.970	-5.146
60	5	5744.977	-4.026
50	5	5744.967	-5.800
40	5	5744.959	-7.087
30	5	5744.979	-3.701
25	5	5744.974	-4.453
10	5	5744.972	-4.897
0	5	5744.964	-6.232
-10	5	5744.974	-4.509
-20	5	5744.968	-5.654

Reference Frequency: 802.11n20 - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5744.979	-3.679
60	5	5744.979	-3.725
50	5	5744.972	-4.794
40	5	5744.970	-5.218
30	5	5744.980	-3.540
25	5	5744.972	-4.875
10	5	5744.965	-6.054
0	5	5744.972	-4.897
-10	5	5744.978	-3.836
-20	5	5744.960	-6.915



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	5179.978	-4.221
25	5.25	5179.962	-7.297
25	5	5179.982	-3.408
25	4.75	5179.972	-5.423
25	4.25	5179.972	-5.350

Reference Frequency: 802.11n20 - 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5179.986	-2.721
25	5.25	5179.988	-2.273
25	5	5179.984	-3.006
25	4.75	5179.980	-3.858
25	4.25	5179.989	-2.041

Reference Frequency: 802.11a - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5744.975	-4.358
25	5.25	5744.979	-3.617
25	5	5744.980	-3.552
25	4.75	5744.980	-3.483
25	4.25	5744.970	-5.180



Reference Frequency: 802.11n20 - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5744.969	-5.426
25	5.25	5744.975	-4.389
25	5	5744.969	-5.439
25	4.75	5744.974	-4.531
25	4.25	5744.970	-5.227



10. DUTY CYCLE

10.1 APPLIED PROCEDURES / LIMIT

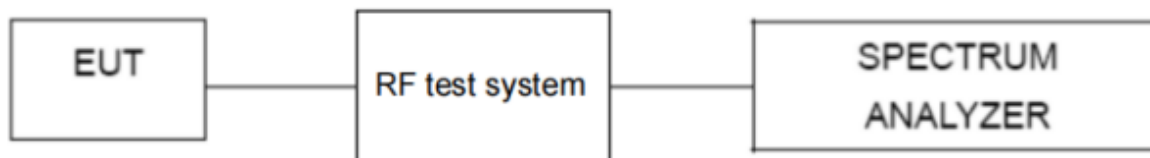
Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

- 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

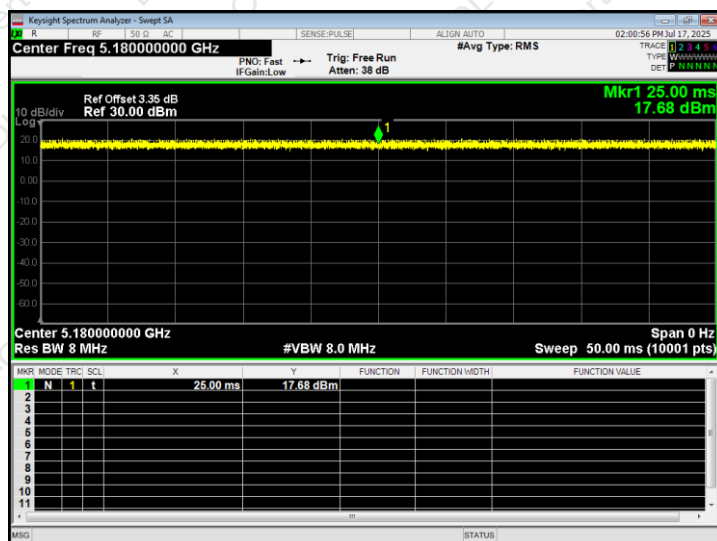
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
Note: All channels have been tested, and only the worst test data is recorded in this report.			

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)				

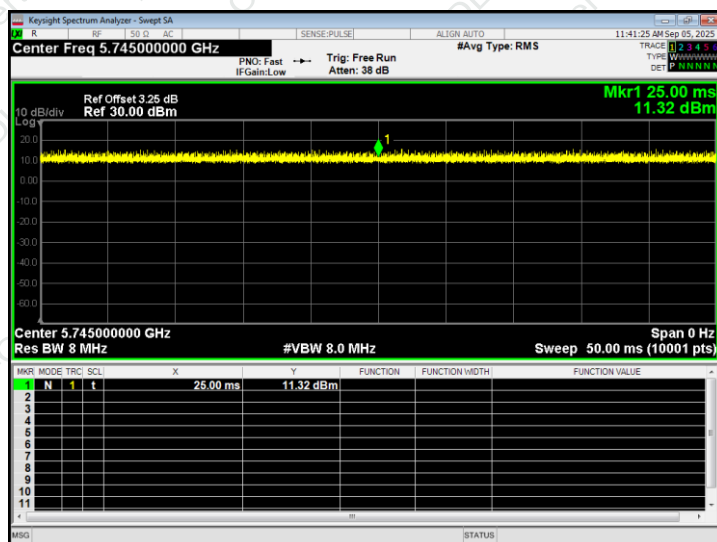
Test Mode	Frequency (MHz)	Duty Cycle (%)	Factor (dB)	Result
802.11a	5745	100	0.00	Pass
802.11n20	5745	100	0.00	Pass
Note: Duty Cycle= Ton /Total*100% Duty Cycle Correction Factor = 10log (1/Duty Cycle)				



802.11a - 5180MHz



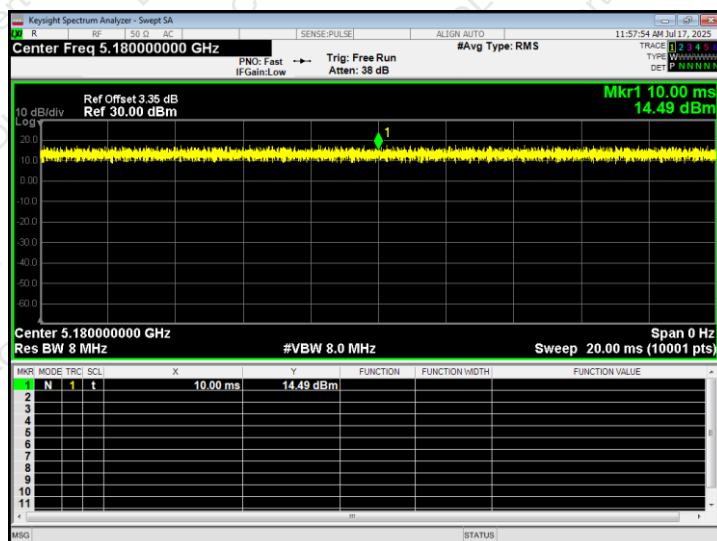
802.11a - 5745MHz



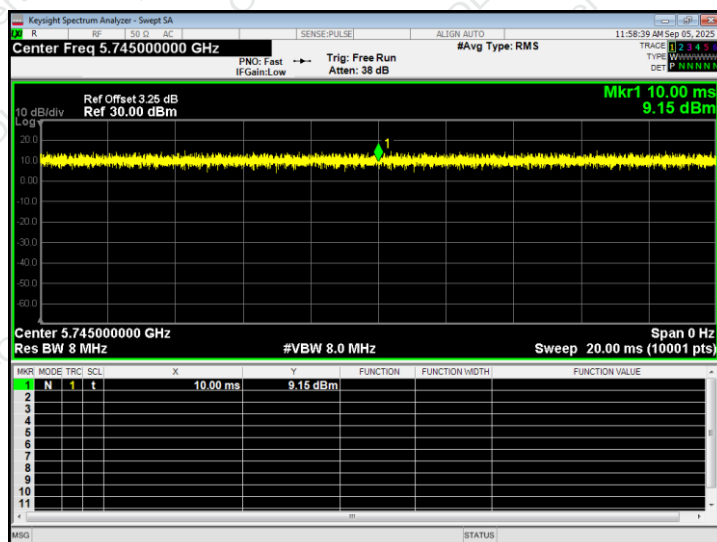
Note: All channel have been tested, and the report only reflects the worst case data.



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 *****