TEST REPORT

Applicant:	Qingdao Thunderobot Technology Co., Ltd
Address of Applicant:	No.1, Haier Road, Laoshan District, Qingdao City.
Manufacturer:	Qingdao Thunderobot Technology Co., Ltd
Address of Manufacturer:	No.1, Haier Road, Laoshan District, Qingdao City.
Factory:	LEIDE Technology (Dongguan) Co.Ltd
Address of Factory:	Room 101, Building 8, No. 780 Xiecao Road, Xiegang Town, Dongguan City, Guangdong Province
Product Name:	Mini PC
Model No.:	Mini GTR HP8745H
Trade Mark:	MACHENIKE
FCC ID:	2BG5P-8745H
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of Test:	Jun.06, 2025-Jun.19, 2025
Date of report issued:	Jun.20, 2025

Remark:

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The report would be invalid without specific stamp of test institute and the signatures of compiler and approver

Prepared By

Shenzhen ETR Standard Technology Co., Ltd.

Address: No.103, No.10, Phase I, Zone 3, Xinxing Industrial Park, Xinhe, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Compiled by:	Reviewed by:	Approved by:
Project Engineer	Project Manager	Authorized Signature

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Report Revision History		
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Contents

Page

1 TEST SUMMARY 4
1.1 MEASUREMENT UNCERTAINTY 4
2 GENERAL INFORMATION 5
2.1 GENERAL DESCRIPTION OF EUT 5
2.2 TEST MODE 7
2.3 DESCRIPTION OF SUPPORT UNITS 8
2.4 TEST FACILITY 8
2.5 ADDITIONAL INSTRUCTIONS 8
3 TEST INSTRUMENTS LIST 9
4 TEST RESULTS AND MEASUREMENT DATA 10
4.1 ANTENNA REQUIREMENT 10
4.2 CONDUCTED EMISSIONS 11
4.3 DUTY CYCLE 14
4.4 CONDUCTED OUTPUT POWER 18
4.5 BANDWIDTH &99% OCCUPY BANDWIDTH 20
4.6 POWER SPECTRAL DENSITY 28
4.7 BAND EDGE 36
4.8 SPURIOUS EMISSION 51
4.8.1 Radiated Emission Method 51
4.9 FREQUENCY STABILITY 61
5 TEST SETUP PHOTO 67
6 EUT CONSTRUCTIONAL DETAILS 67

1 Test Summary

Test Item	Section in CFR 47	Result	Test by
Antenna requirement	47CRF part 15.203	Pass	/
AC Power Line Conducted Emission	47CRF part 15.207	Pass	Jason Huang
Conducted Output Power	47CRF part 15.407 (a)(1)/(a)(3)	Pass	Kara Wu
26dB Bandwidth and 99% Occupied Bandwidth	47CRF part 15.407 (a)(12)	Pass	Kara Wu
6dB Bandwidth	47CRF part 15.407 (e)	Pass	Kara Wu
Power Spectral Density	47CRF part 15.407(a)(1)/(a)(3)	Pass	Kara Wu
Band Edge	47CRF part 15.407(b)(1)/(b)(4)	Pass	Kara Wu
Spurious Emission	47CRF part 15.205/15.209 47CRF part 15.407(b)(1)/(b)(4)/(b)(8)	Pass	Jason Huang
Frequency Stability	47CRF part 15.407(g)	Pass	Kara Wu

Remarks:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *Test according to ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.*
3. *Note: Compliance determination rules*

1).The Compliance determination of test results does not take into account measurement uncertainty. Measurement results are determined based on regulatory limitations or requirements specified by the applicant/manufacturer. If measurement uncertainty is taken into account, the applicant/manufacturer will bear all possible risks of non-compliance.

2).The measurement uncertainty please refer to each test result in the "Measurement Uncertainty"

1.1 Measurement Uncertainty

Test Item	Measurement Uncertainty	Notes
Occupied Channel Bandwidth	0.55%	(1)
RF output power, conducted	±0.57 dB	(1)
Power Spectral Density, conducted	±0.61 dB	(1)
Unwanted Emissions, conducted	±0.64 dB	(1)
AC Power Line Conducted Emission	± 2.55 dB	(1)
Radiated emissions 9K-30MHz	±3.79 dB	(1)
Radiated emissions 30M- 1GHz	± 4.24 dB	(1)
Radiated emissions 1GHz-18GHz	± 4.26 dB	(1)
Radiated emissions 18GHz-40GHz	±4.17 dB	(1)
Frequency error	Uc=1X10-7	(1)
Duty Cycle	0.03%	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.		

2 General Information

2.1 General Description of EUT

Product Name:	Mini PC
Model No.:	Mini GTR HP8745H
Difference of model(s)	N/A
Test Model:	Mini GTR HP8745H
Hardware Version:	V10,121
Software Version:	1.0
Sample(s) Status:	Engineer sample
Operation Frequency:	☒5180-5240MHz for 802.11a/n(HT20)/ac20(VHT20); 5190-5230MHz for 802.11n(HT40)/ac40(VHT40); 5210MHz for 802.11 ac80(VHT40); ☒5745-5825 MHz for 802.11a/n(HT20)/ac20(VHT20); 5755-5795 MHz for 802.11n(HT40)/ac40(VHT40); 5775MHz for 802.11 ac80(VHT40);
Channel numbers:	☒4 channels for 802.11a/n20(HT20)/ac20(VHT20) in the 5180-5240MHz band; 2 channels for 802.11 n40(HT40)/ac40(VHT40) in the 5190-5230MHz band ; 1 channels for 802.11 ac80 in the 5210(VHT80)MHz band ; ☒5 channels for 802.11802.11a/n20(HT20)/ac20(VHT20) in the 5745-5825MHz band ; 2 channels for 802.11 n40(HT40)/ac40(VHT40) in the 5755-5795MHz band ; 1 channels for 802.11 5210(VHT80) in the 5775MHz band
Channel bandwidth:	802.11a/802.11n(HT20)/ 802.11ac(VHT20): 20MHz 802.11n(HT40)/ 802.11ac(VHT40) : 40MHz 802.11ac(VHT80) : 80MHz
Data Rate	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40):MCS0-MCS15; 802.11ac(VHT/20/40/80):NSS1, MCS0-MCS9
Modulation technology:	Orthogonal Frequency Division Multiplexing (OFDM) with BPSK/QPSK/16QAM/64QAM/256QAM
Antenna Type:	FPC Antenna
Antenna gain:	4.35 dBi(Declare by applicant) Note: Antenna information is provided by applicant, Testing lab is not responsible for the accuracy of the information.
Battery	N/A
Power supply:	DC 19V From Adapter
Adapter Model:	Model: HKA11019058-0A2 Input:100-240V 50/60Hz 16A Output: DC 19V 5.26A

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190MHz	40	5200MHz	42	5210MHz
44	5220MHz	46	5230MHz	48	5240MHz	/	/
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745MHz	151	5755MHz	153	5765MHz	155	5775MHz
157	5785MHz	159	5795MHz	161	5805MHz	/	/
165	5825MHz	/					

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	**Frequency (MHz)**		
	802.11 a /n(HT20)/ac(VHT20)	802.11 n(HT40)/ac(VHT40)	802.11ac(VHT80)
Lowest channel	5180	5190	5210
Middle channel	5200		
Highest channel	5240	5230	

Test channel	**Frequency (MHz)**		
	802.11 a /n(HT20)/ac(VHT20)	802.11 n(HT40)/ac(VHT40)	802.11ac(VHT80)
Lowest channel	5745	5755	5775
Middle channel	5785		
Highest channel	5825	5795	

2.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode(or with a duty cycle ≥ 98%)

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:

Pretest Mode	Description
Mode 1	802.11a / n 20/ ac 20 CH36/ CH40/ CH 48 802.11a /n 20/ac 20 CH149/ CH157/ CH 165
Mode 2	802.11n 40/ac 40 CH38/ CH 46 802.11n 40/ac 40 CH 151 / CH 159
Mode 3	802.11 ac80 CH 42/CH 155
Mode 4	/
Mode 5	Link Mode

Conducted Emission	
Final Test Mode	Description
Mode 5	Link Mode

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

Note:

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

2.3 Description of Support Units

No.	Description	Manufacturer	Model	Serial Number
1	monitor	SKYWORTH	2BU1	/
2	mouse	DELL	MS116	/
3	keyboard	DELL	KB216t	/
4	Earphone	Feilida	i6	/

2.4 Test Facility

Test laboratory:	Shenzhen ETR Standard Technology Co., Ltd.
CNAS Registration Number:	L11864
A2LA Certificate Number:	6640.01
FCC Designation Number:	CN1326
FCC Test Firm Registration:	183064
IC Company Number:	28440
IC CAB identifier:	CN0132
Laboratory location:	No.103, No.10, Phase I, Zone 3, Xinxing Industrial Park, Xinhe, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

2.5 Additional Instructions

Test Software	MP TOOL.EXE（v1.09）
Power level setup	Default

3 Test Instruments list

Conducted Emission

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	EMI Test Receiver	Rohde&schwarz	ESCI3	100605	2025.3.06	2026.3.05
2	Artificial power network	schwarabeck	NSLK8127	8127483	2025.3.06	2026.3.05
3	Artificial power network	ETS	3186/2NM	1132	2025.3.06	2026.3.05
4	10dB attenuator	HUBER+SUHNER	10dB	/	2025.3.06	2026.3.05
5	Cable 4	HUBER SUNNER	3M	/	2025.3.06	2026.3.05
6	Absorbing Clamp	schwarabeck	MDS21	D69250	2025.3.06	2026.3.05

Radiated Emission &RF Conducted test:

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101032	2025.3.06	2026.3.05
2	Broadband antenna	schwarabeck	VULB9168	1064	2024.3.26	2026.3.25
3	Horn antenna	schwarabeck	BBHA9120D	9120D-1145	2024.3.22	2026.3.21
4	Amplifier	EMtrace	RP01A	50117	2025.3.06	2026.3.05
5	Amplifier	Space-Dtronics	EWLAN0118G-P40	19113001	2025.3.06	2026.3.05
6	Spectrum analyzer	KEYSIGHT	N9020A	MY55370280	2025.3.06	2026.3.05
7	Power detector meter	MWRFtest	MW100-PSB	MW201020JYT	2025.3.06	2026.3.05
8	Signal generator	Agilent	N5182A	MY49060455	2025.3.06	2026.3.05
9	Spectrum analyzer	Rohde&schwarz	FSV-40N	101321	2025.3.06	2026.3.05
10	Amplifier	SKET	LNPA_1840-50	SK2019040302	2025.3.06	2026.3.05
11	Horn antenna	schwarabeck	BBHA 9170	946	2024.3.22	2026.3.21
12	Loop antenna	schwarabeck	FMZB 1519 B	1519	2024.3.22	2026.3.21
13	Cable 6	HUBER SUNNER	0.5M	/	2025.3.06	2026.3.05
14	Cable7	HUBER SUNNER	2.0M	/	2025.3.06	2026.3.05
15	Cable8	HUBER SUNNER	6.0M	/	2025.3.06	2026.3.05
16	Filter	Xin bo	XBLBQ-GTA29	210410-3-2	2025.3.06	2026.3.05
17	Power Sensor	Keysight	U2021XA	MY54111006	2025.3.06	2026.3.05
18	Temp. & Humidity Chamber	Jiecheng Instrument	QA-LP-80	20160705001	2025/3/07	2026/3/06

Note: the calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to international system unit (SI).

Software Name	Manufacturer	Model	Version
RF test software	MWRFtest	MTS 8310	V2.0.0.0
Conducted test software	EZ-EMC	Farad	Ver.EMC-CON 3A1.1
Radiated test software	EZ-EMC	Farad	Ver.FA-03A2 RE

4 Test results and Measurement Data

4.1 Antenna requirement

Standard requirement:	47CRF Part 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.*	
E.U.T Antenna:	
The antennas are FPC Antenna, the best case gain of the antennas are 4.35dBi, reference to the appendix II for details.	

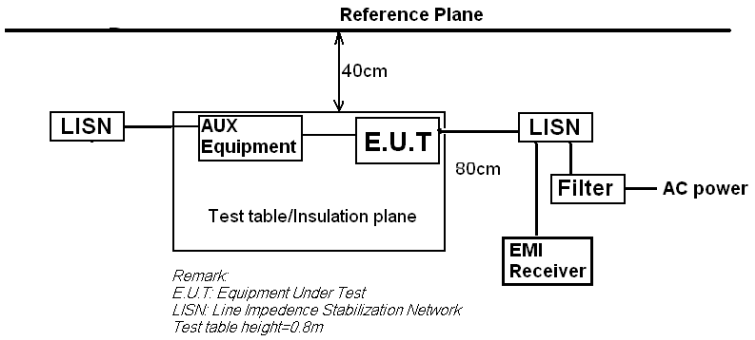
4.2 Conducted Emissions

Test Requirement:	47CRF Part 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test setup:



Test procedure:

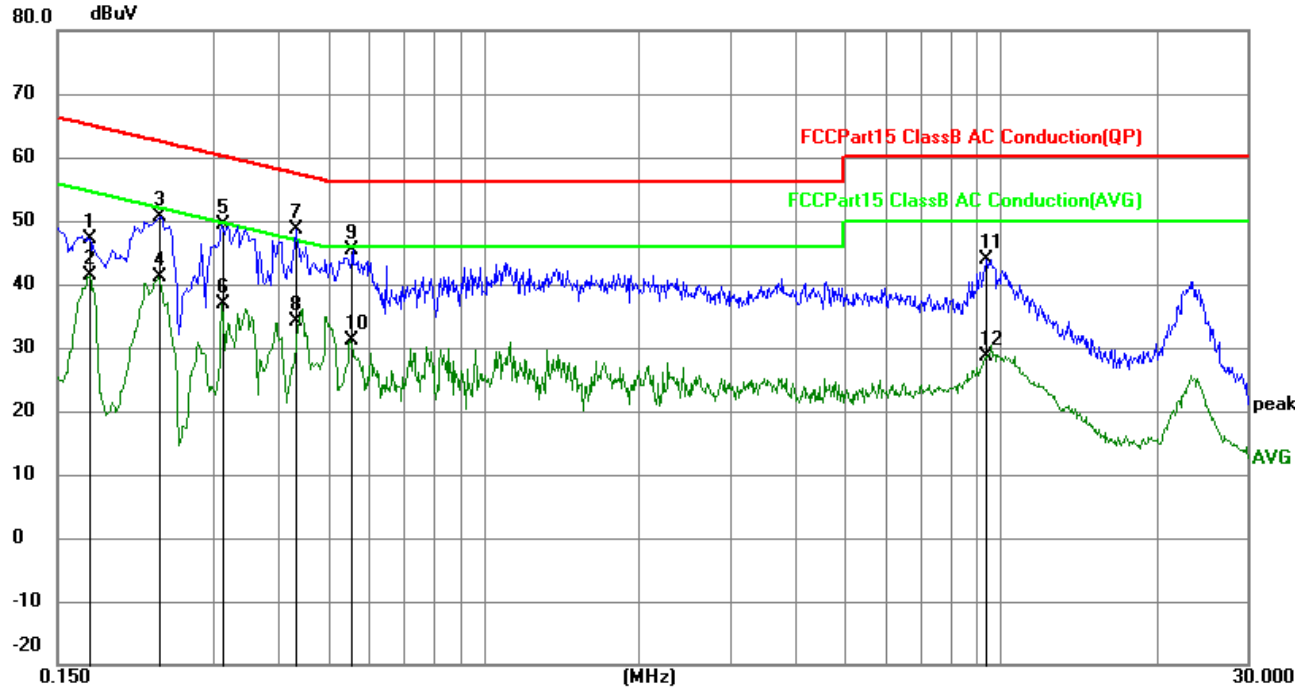
1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.

Test Instruments:	Refer to section 3.0 for details					
Test mode:	Refer to section 2.2 for details					
Test environment:	Temp.:	23.1°C	Humid.:	51%	Press.:	1012mbar
Test voltage:	AC 120V 60Hz					
Test results:	Pass					

Remark:
1. Both high voltage and low voltage have been tested, and the report only shows the worst case data with AC 120V/60Hz.
2. All mode have been tested, the report only shows the worst mode (802.11n20 5825MHz)

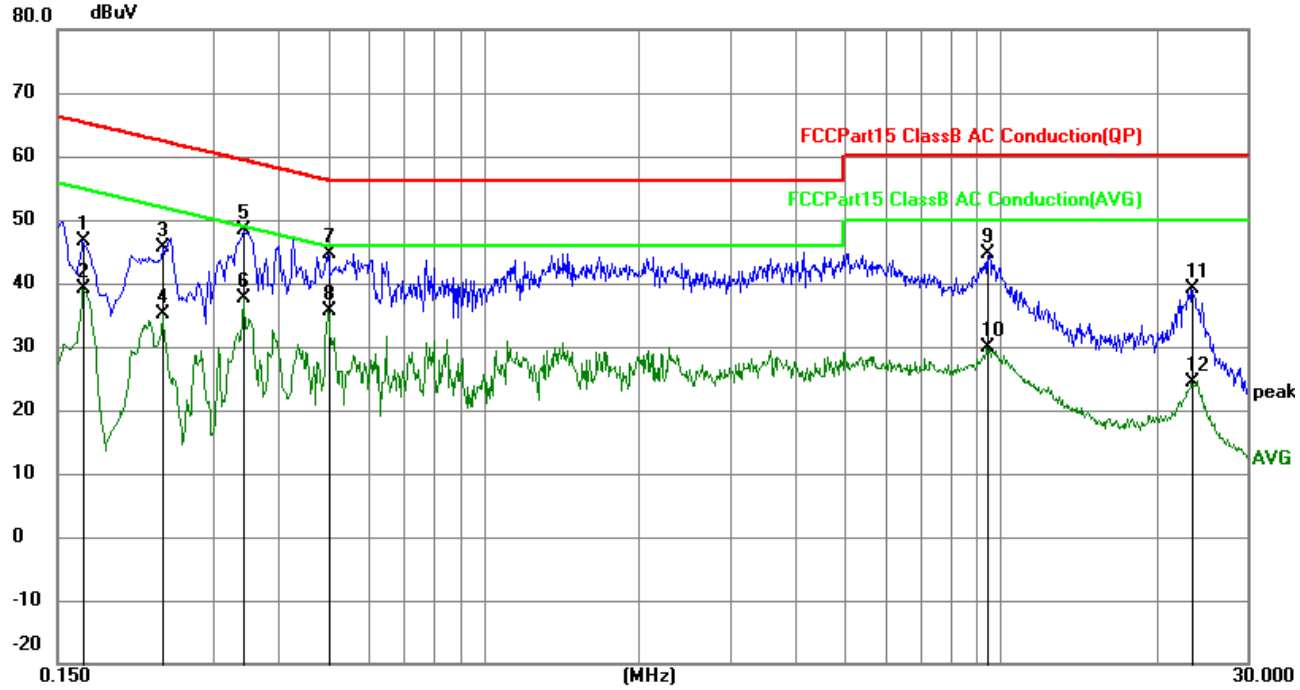
Measurement Result

Line:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1729	37.41	9.81	47.22	64.82	-17.60	QP
2	0.1729	31.65	9.81	41.46	54.82	-13.36	AVG
3	0.2354	40.72	9.82	50.54	62.26	-11.72	QP
4	0.2354	31.23	9.82	41.05	52.26	-11.21	AVG
5	0.3119	39.43	9.87	49.30	59.92	-10.62	QP
6	0.3119	27.03	9.87	36.90	49.92	-13.02	AVG
7	0.4334	38.69	9.91	48.60	57.19	-8.59	QP
8	0.4334	24.19	9.91	34.10	47.19	-13.09	AVG
9	0.5548	35.42	9.94	45.36	56.00	-10.64	QP
10	0.5548	21.26	9.94	31.20	46.00	-14.80	AVG
11	9.3569	34.10	9.84	43.94	60.00	-16.06	QP
12	9.3569	18.73	9.84	28.57	50.00	-21.43	AVG

Neutral:

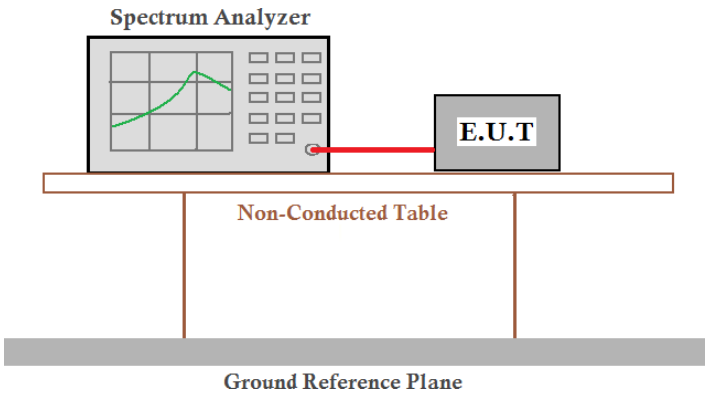


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1680	36.72	9.81	46.53	65.06	-18.53	QP
2	0.1680	29.28	9.81	39.09	55.06	-15.97	AVG
3	0.2400	35.86	9.82	45.68	62.10	-16.42	QP
4	0.2400	25.22	9.82	35.04	52.10	-17.06	AVG
5	0.3435	38.59	9.88	48.47	59.12	-10.65	QP
6	0.3435	27.69	9.88	37.57	49.12	-11.55	AVG
7	0.5010	34.64	9.94	44.58	56.00	-11.42	QP
8	0.5010	25.69	9.94	35.63	46.00	-10.37	AVG
9	9.4379	34.73	9.83	44.56	60.00	-15.44	QP
10	9.4379	19.93	9.83	29.76	50.00	-20.24	AVG
11	23.4059	29.57	9.61	39.18	60.00	-20.82	QP
12	23.4059	14.73	9.61	24.34	50.00	-25.66	AVG

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 =Receiver Read level + LISN Factor + Cable Loss
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

4.3 Duty cycle

Test Method :	ANSI C63.10:2013	
Limit:	/	
Test setup:		
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 23.2°C	Humid.: 57%RH
Test voltage:	DC 19V From Adapter	
Test results:	Pass	

Measurement Result

5180-5240MHz

Mode	Duty cycle (%)	Correction Factor (dB)
TX 802.11a Mode	97.55	0.11
TX 802.11n20 Mode	92.93	0.32
TX 802.11ac20 Mode	93.00	0.32
TX 802.11n40 Mode	83.76	0.77
TX 802.11ac40 Mode	83.76	0.77
TX 802.11ac80 Mode	86.44	0.63

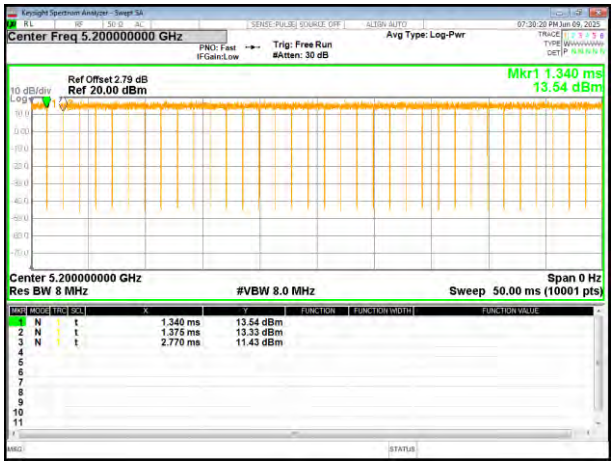
5745-5825 MHz

Mode	Duty cycle (%)	Correction Factor (dB)
TX 802.11a Mode	83.33	0.79
TX 802.11n20 Mode	83.33	0.79
TX 802.11ac20 Mode	83.33	0.79
TX 802.11n40 Mode	93.75	0.28
TX 802.11ac40 Mode	93.75	0.28
TX 802.11ac80 Mode	76.19	1.18

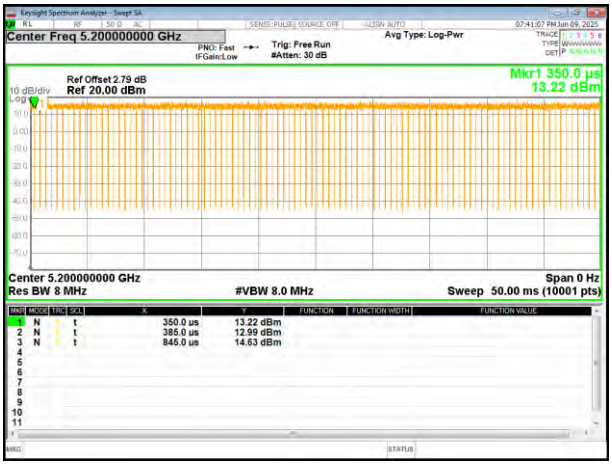
Test plot

5180-5240MHz

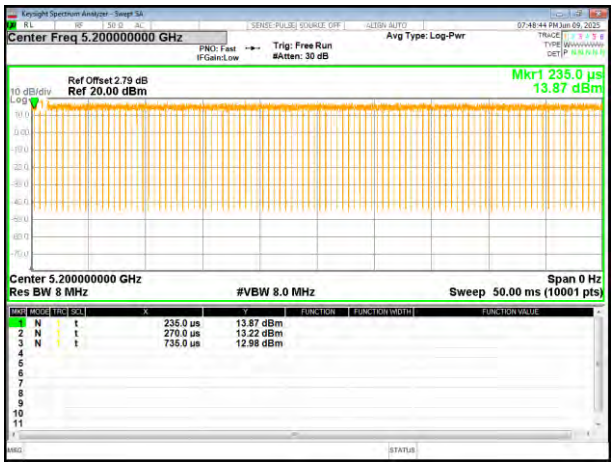
(802.11a) plot



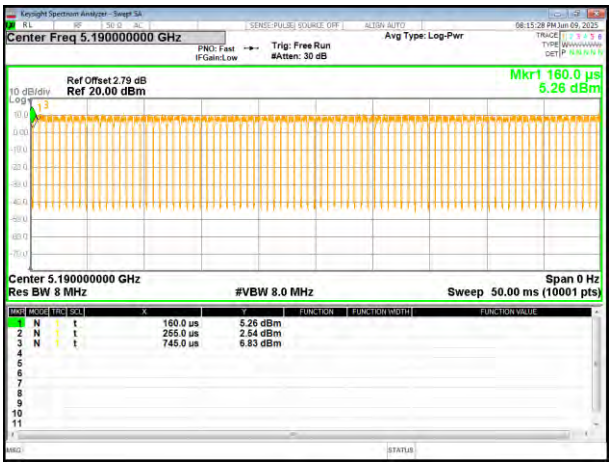
(802.11 n20) plot



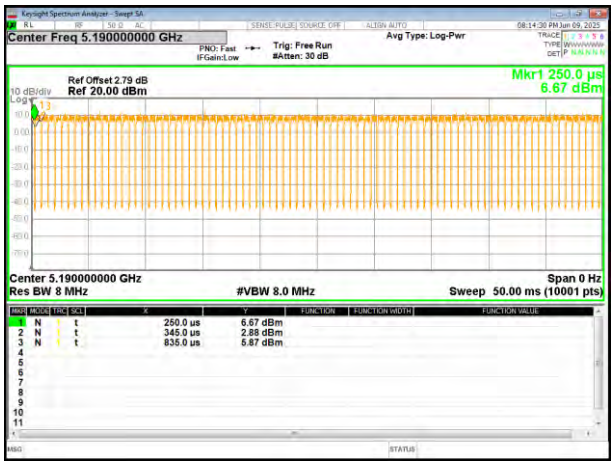
(802.11ac20) plot



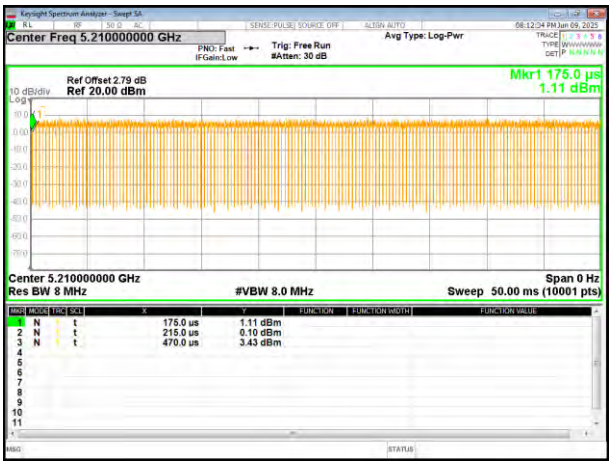
(802.11 n40) plot



(802.11ac40) plot



(802.11ac80) plot



5745-5825 MHz

(802.11a) plot

(802.11 n20) plot

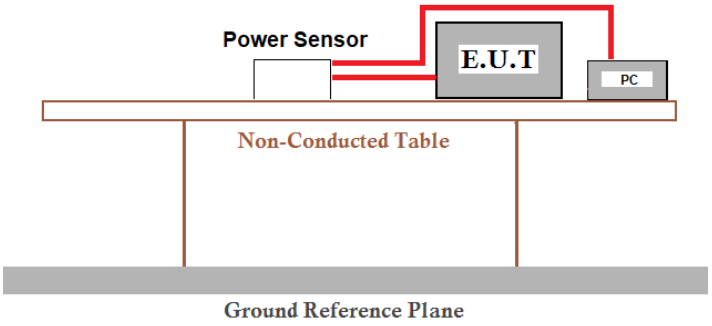
(802.11ac20) plot

(802.11 n40) plot

(802.11ac40) plot

(802.11ac80) plot

4.4 Conducted Output Power

Test Requirement:	47CRF Part 15.407 (a)(1)/(a)(3)	
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 ANSI C63.10-2013	
Limit:	5150-5250MHz : 250mW 5725~5850MHz : 1W	
Test setup:		
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 23.2°C	Humid.: 57%RH
Test voltage:	DC 19V From Adapter	
Test results:	Pass	

Measurement Result

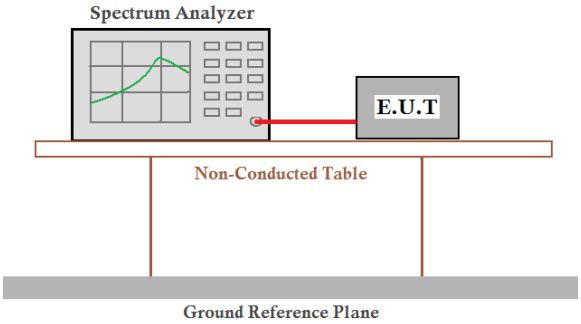
5180-5240MHz

Test Channel	Frequency	Correction Factor	Maximum output power	Total Power	LIMIT	Result
	(MHz)	(dB)	(dBm)	(dBm)	dBm	
TX 802.11a Mode						
CH36	5180	0.11	15.55	15.66	23.98	Pass
CH40	5200	0.11	15.47	15.58	23.98	Pass
CH48	5240	0.11	15.06	15.17	23.98	Pass
TX 802.11 n20 Mode						
CH36	5180	0.32	15.29	15.61	23.98	Pass
CH40	5200	0.32	15.23	15.55	23.98	Pass
CH48	5240	0.32	15.39	15.71	23.98	Pass
TX 802.11 ac20 Mode						
CH36	5180	0.32	15.36	15.68	23.98	Pass
CH40	5200	0.32	15.53	15.85	23.98	Pass
CH48	5240	0.32	15.04	15.36	23.98	Pass
TX 802.11 n40 Mode						
CH38	5190	0.77	13.52	14.29	23.98	Pass
CH46	5230	0.77	13.79	14.56	23.98	Pass
TX 802.11 ac40 Mode						
CH38	5190	0.77	13.41	14.18	23.98	Pass
CH46	5230	0.77	13.37	14.14	23.98	Pass
TX 802.11 ac80 Mode						
CH42	5210	0.63	12.17	12.80	23.98	Pass

5745-5825 MHz

Test Channel	Frequency	Correction Factor	Maximum output power	Total Power	LIMIT	Result
	(MHz)	(dB)	(dBm)	(dBm)	dBm	
TX 802.11a Mode						
CH149	5745	0.79	15.39	16.18	30	Pass
CH157	5785	0.79	15.88	16.67	30	Pass
CH165	5825	0.79	15.19	15.98	30	Pass
TX 802.11 n20 Mode						
CH149	5745	0.79	15.10	15.89	30	Pass
CH157	5785	0.79	15.50	16.29	30	Pass
CH165	5825	0.79	15.91	16.70	30	Pass
TX 802.11 ac20 Mode						
CH149	5745	0.79	15.12	15.91	30	Pass
CH157	5785	0.79	14.97	15.76	30	Pass
CH165	5825	0.79	15.82	16.61	30	Pass
TX 802.11 n40 Mode						
CH151	5755	0.28	13.60	13.88	30	Pass
CH159	5795	0.28	13.22	13.50	30	Pass
TX 802.11 ac40 Mode						
CH151	5755	0.28	13.58	13.86	30	Pass
CH159	5795	0.28	13.12	13.40	30	Pass
TX 802.11 ac80 Mode						
CH155	5775	1.18	12.79	13.97	30	Pass

4.5 Bandwidth &99% Occupy Bandwidth

Test Requirement:	47CRF Part 15.407(a)(12)&15.407(e),	
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01, ANSI C63.10:2013	
Limit:	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.	
Test setup:		
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 23.2°C	Humid.: 57%RH
Test voltage:	DC 19V From Adapter	
Test results:	Pass	

Measurement Result

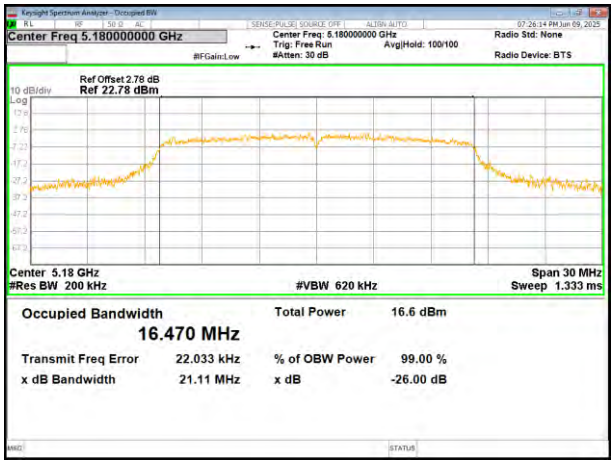
5180-5240MHz

Test CH	-26dB Channel Bandwidth (MHz)						Result
	802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11n (HT40)	802.11ac (VHT40)	802.11ac (VHT80)	
Lowest	21.11	20.28	20.71	40.21	39.99	--	Pass
Middle	25.54	20.01	22.00	--	--	79.96	
Highest	22.79	22.37	20.40	42.03	39.81	--	

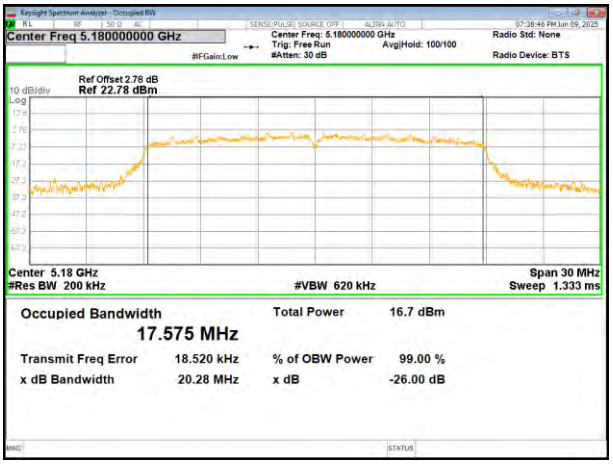
Remark: “---“is not applicable

Test plot 99% Occupy Bandwidth

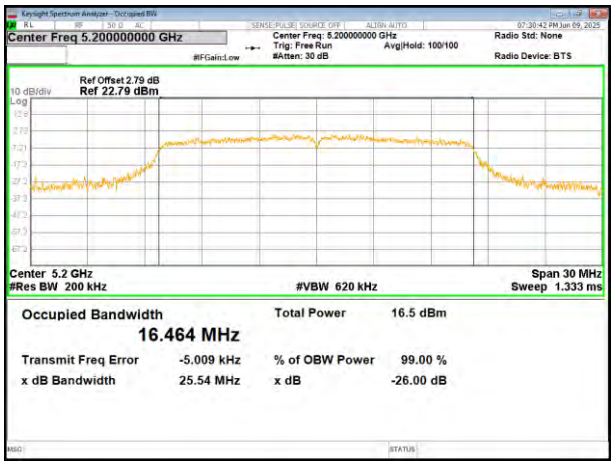
(802.11a) plot on channel 36



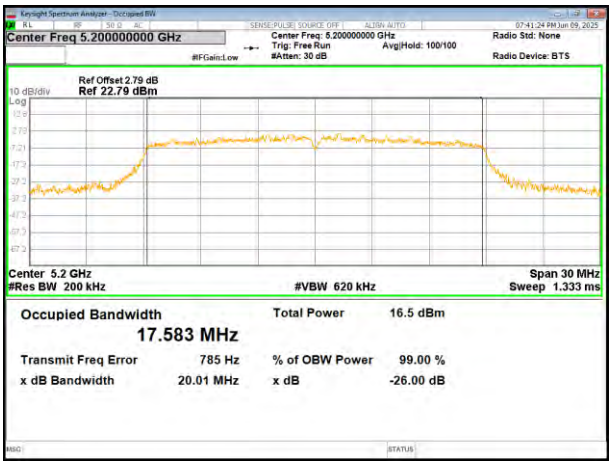
(802.11 n20) plot on channel 36



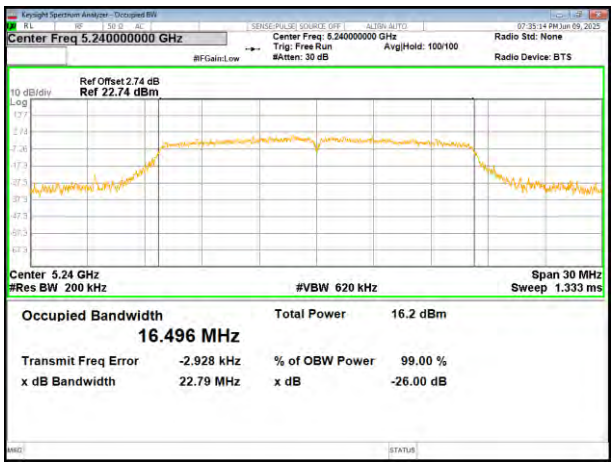
(802.11a) plot on channel 40



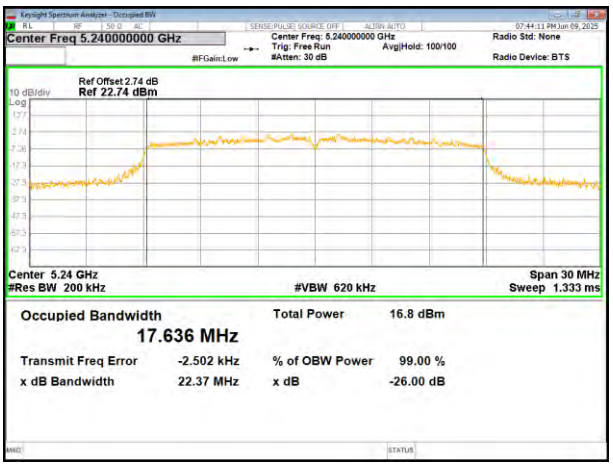
(802.11 n20) plot on channel 40



(802.11a) plot on channel 48

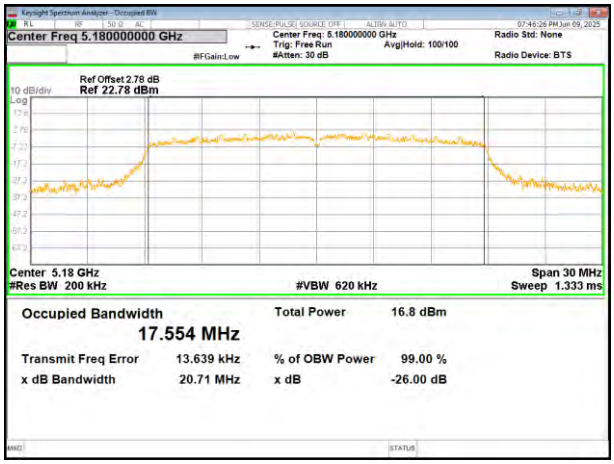


(802.11 n20) plot on channel 48

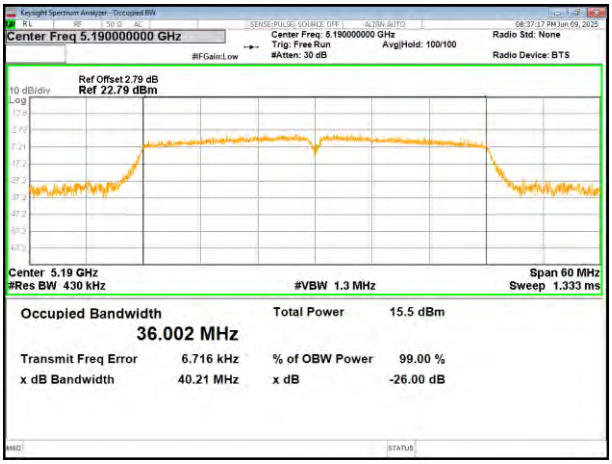


Test plot

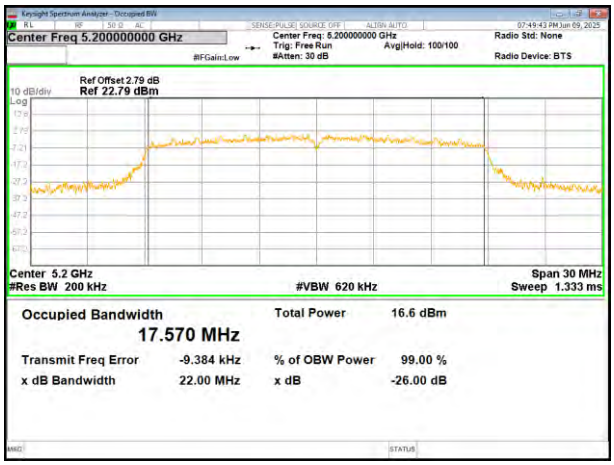
(802.11ac20) plot on channel 36



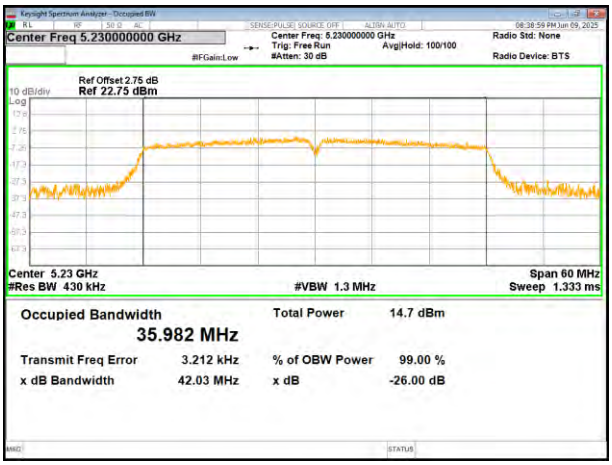
(802.11 n40) plot on channel 38



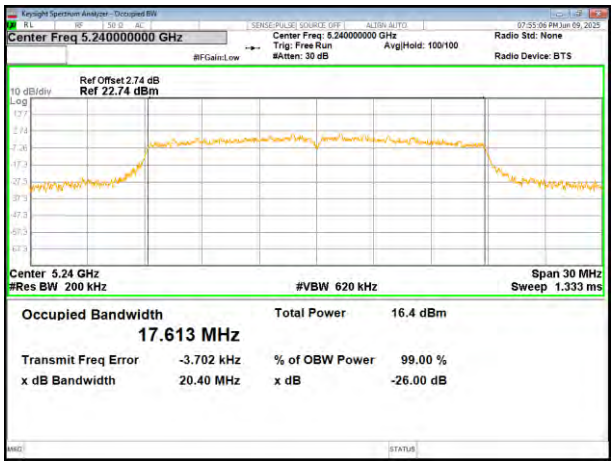
(802.11ac20) plot on channel 40



(802.11 n40) plot on channel 46

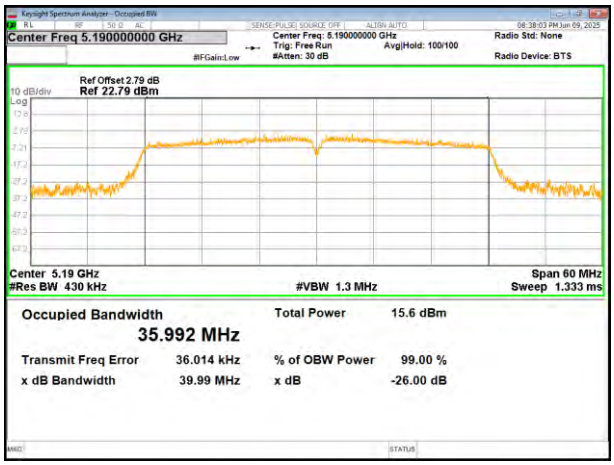


(802.11ac20) plot on channel 48

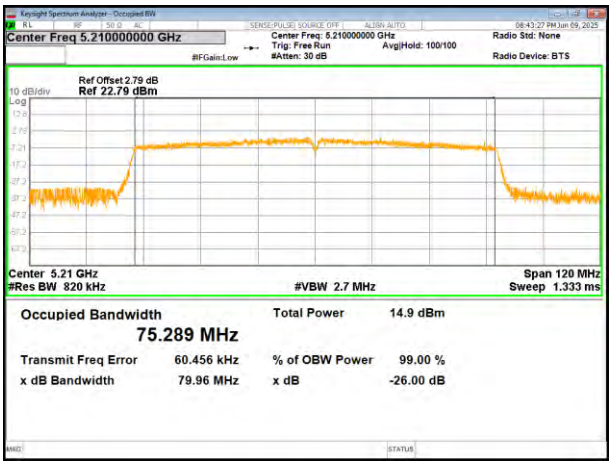


Test plot

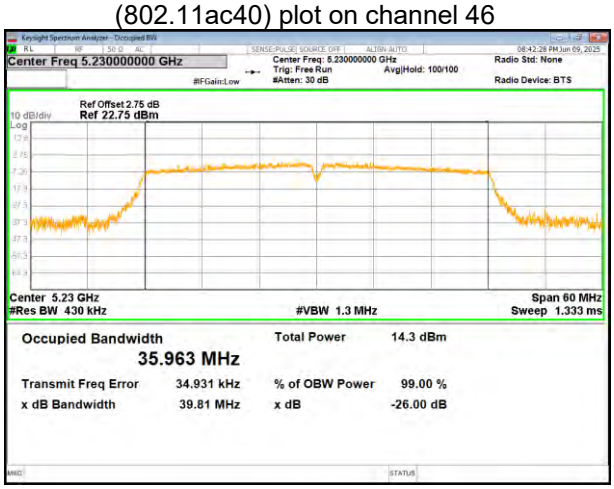
(802.11ac40) plot on channel 38



(802.11ac80) plot on channel 42



(802.11ac40) plot on channel 46



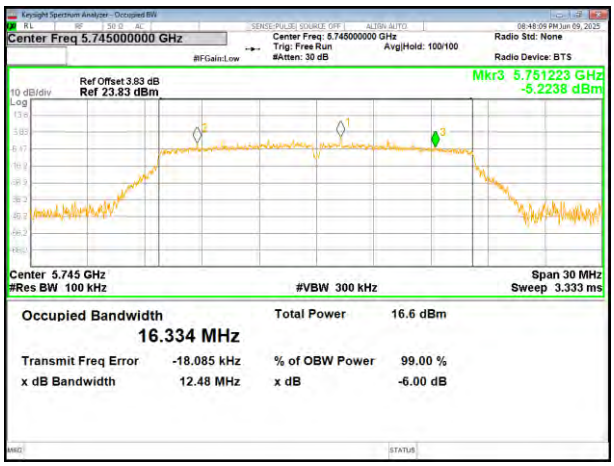
5745-5825MHz

Test CH	-6dB Channel Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11n (HT40)	802.11ac (VHT40)	802.11ac (VHT80)		
Lowest	12.48	16.19	15.06	35.12	35.10	--	>500	Pass
Middle	14.11	15.11	16.28	--	--	75.12		
Highest	15.31	15.11	15.33	35.09	35.08	--		

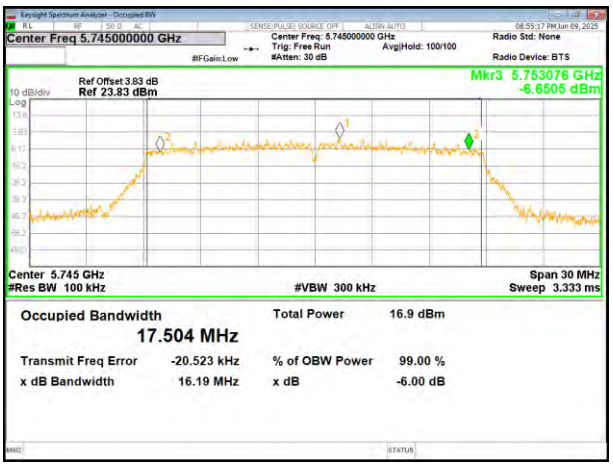
Remark: “---“is not applicable

Test plot

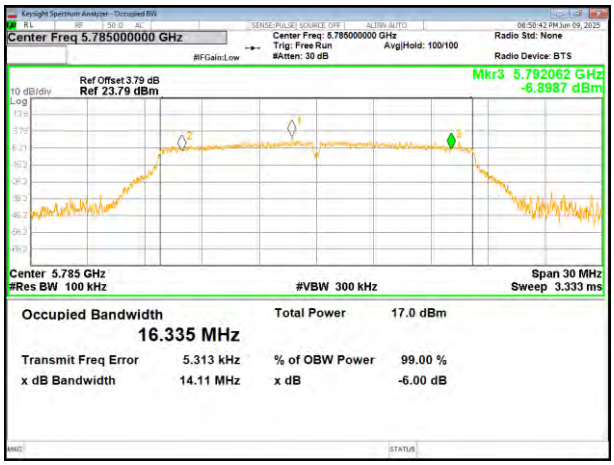
(802.11a) plot on channel 149



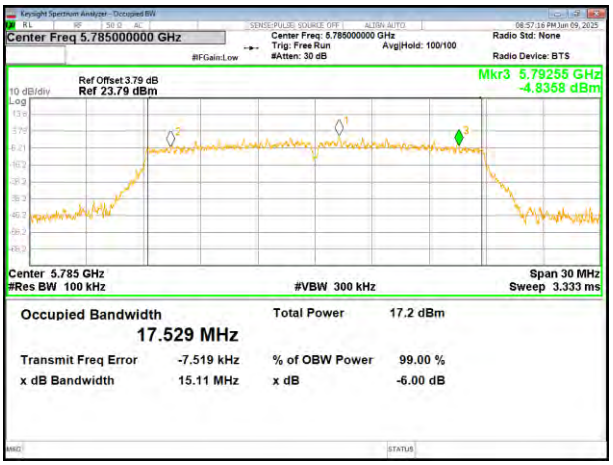
(802.11 n20) plot on channel 149



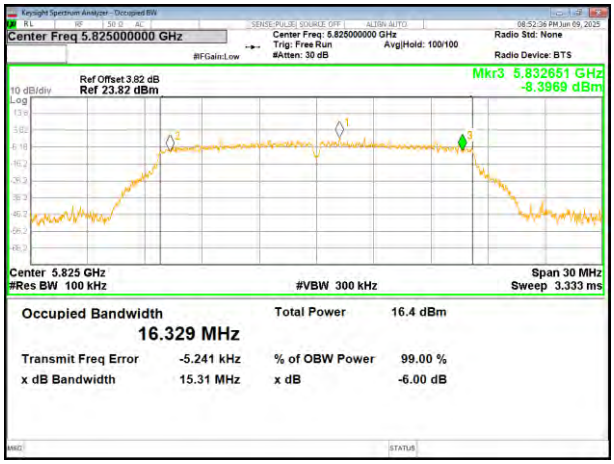
(802.11a) plot on channel 157



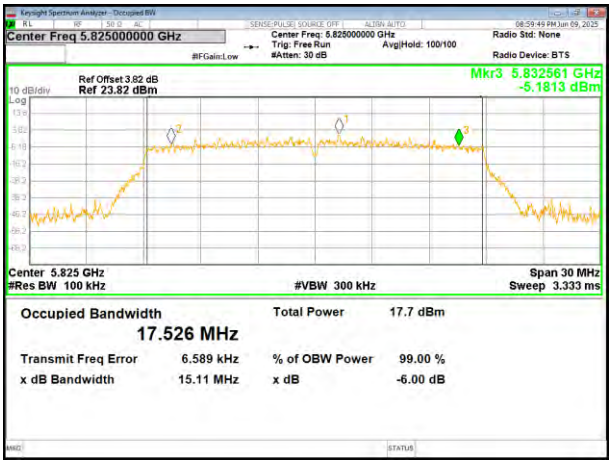
(802.11 n20) plot on channel 157



(802.11a) plot on channel 165

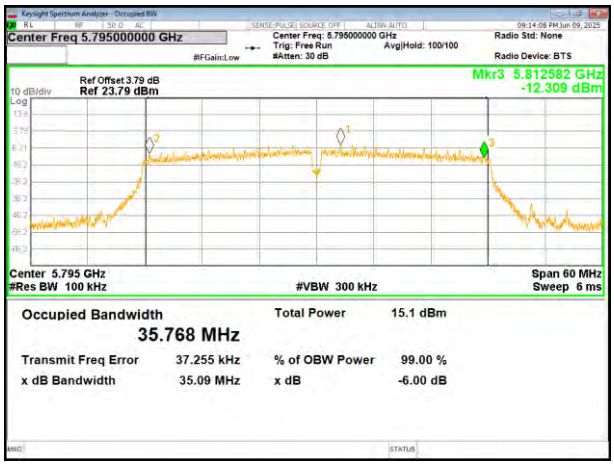


(802.11 n20) plot on channel 165

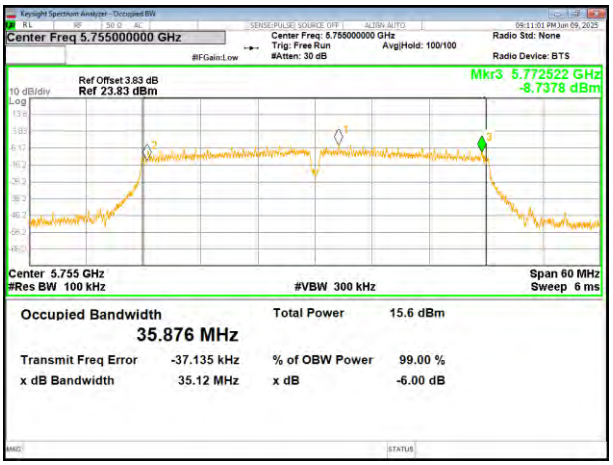


Test plot

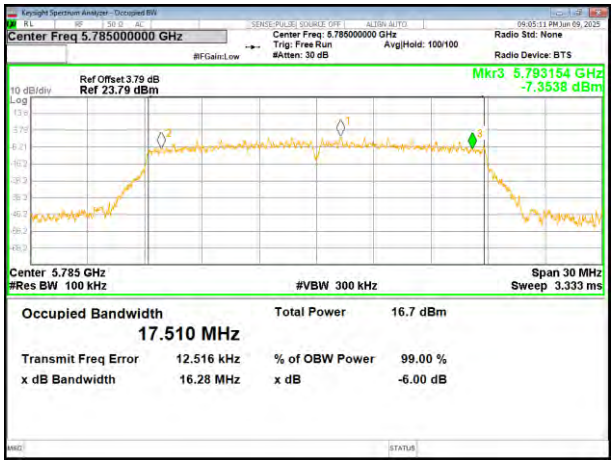
(802.11ac20) plot on channel 149



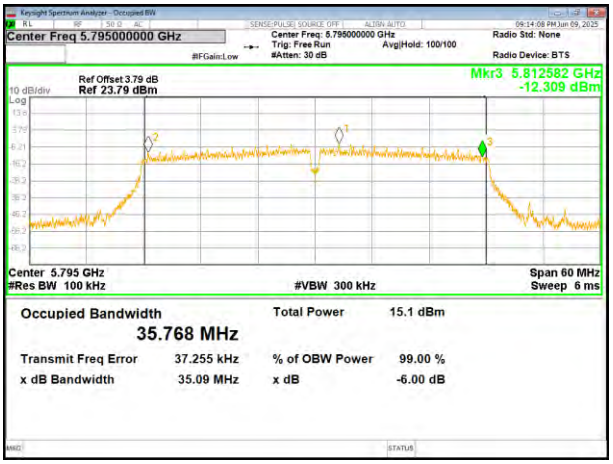
(802.11 n40) plot on channel 151



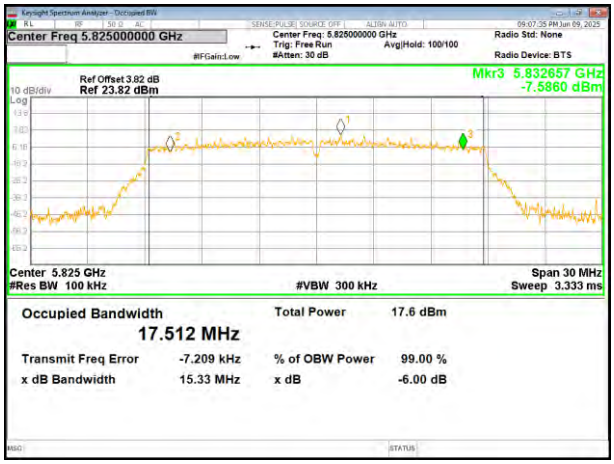
(802.11ac20) plot on channel 157



(802.11 n40) plot on channel 159

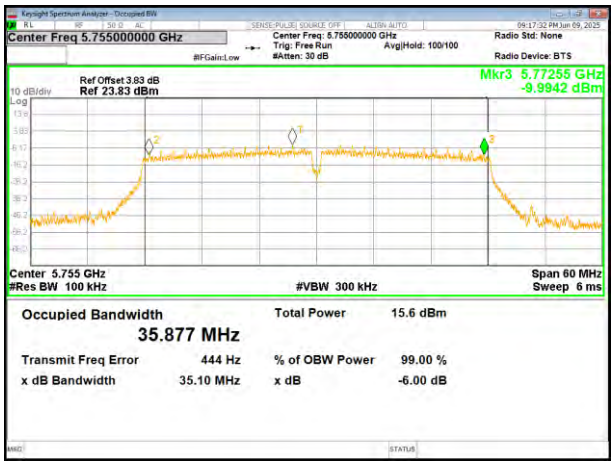


(802.11ac20) plot on channel 165

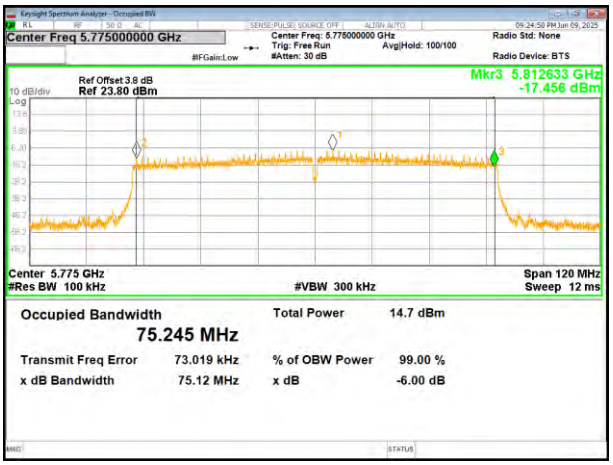


Test plot

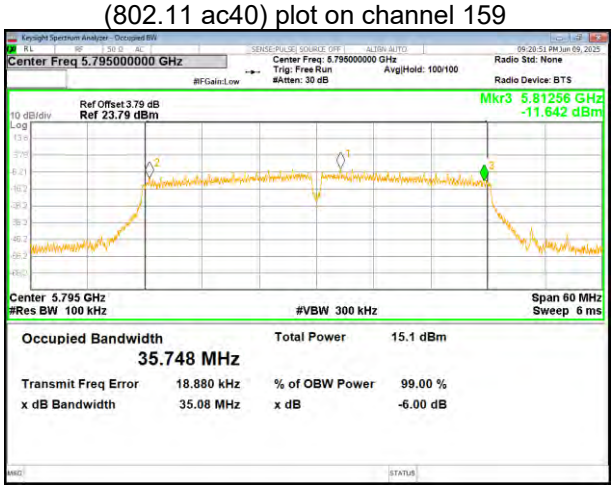
(802.11 ac40) plot on channel 151



(802.11 ac80) plot on channel 155



(802.11 ac40) plot on channel 159

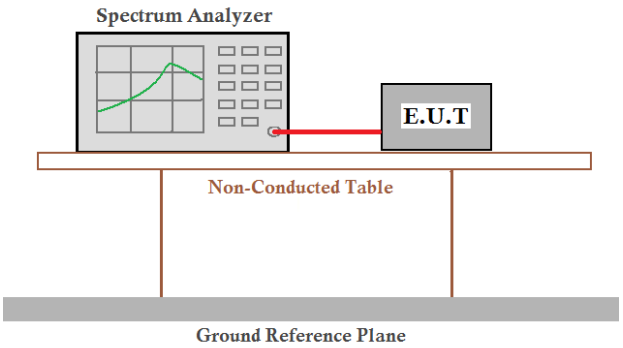


4.6 Power Spectral Density

Test Requirement:	47CRF Part 15.407(a)(1)/ (a)(3)
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01, ANSI C63.10:2013
Limit:	

Frequency band (MHz)	Limit
5150-5250	≤17dBm/1MHz for master device
	≤11dBm/1MHz for client device
5250-5350	≤11dBm/1MHz for client device
5470-5725	≤11dBm/1MHz for client device
5725-5850	≤30dBm/500kHz

Test setup:



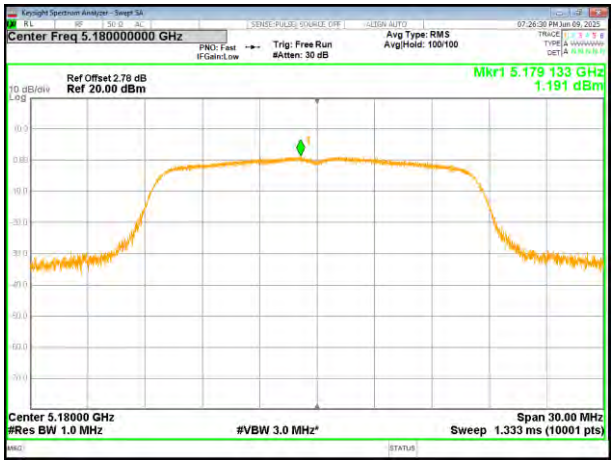
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 23.2°C	Humid.: 57%RH
Test voltage:	DC 19V From Adapter	
Test results:	Pass	

Measurement Result

5180-5240MHz

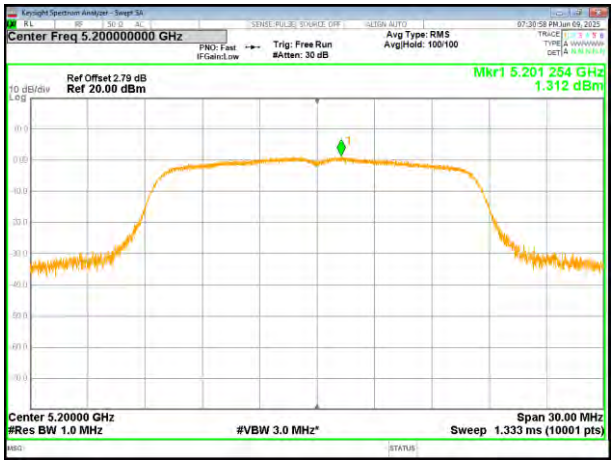
Mode	Frequency	Measured Power Density (dBm/MHz)	Correction Factor (dB)	Total Measured Power Density (dBm/MHz)	Limit (dBm/MHz)
802.11 a	5180 MHz	1.191	0.110	1.301	11
	5200 MHz	1.312	0.110	1.422	11
	5240 MHz	0.788	0.110	0.898	11
802.11 n20	5180 MHz	0.931	0.320	1.251	11
	5200 MHz	0.605	0.320	0.925	11
	5240 MHz	1.260	0.320	1.580	11
802.11 ac20	5180 MHz	1.065	0.320	1.385	11
	5200 MHz	0.579	0.320	0.899	11
	5240 MHz	0.480	0.320	0.800	11
802.11 n40	5190 MHz	-4.054	0.770	-3.284	11
	5230 MHz	-4.792	0.770	-4.022	11
802.11 ac40	5190 MHz	-3.909	0.770	-3.139	11
	5230 MHz	-4.050	0.770	-3.280	11
802.11 ac80	5210 MHz	-8.805	0.630	-8.175	11

(802.11a) PSD plot on channel 36

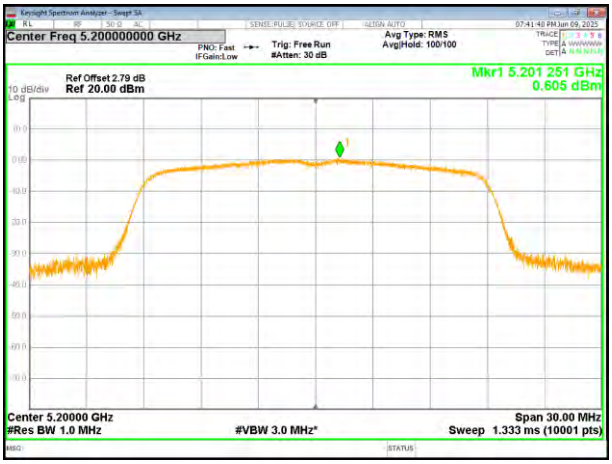


(802.11n20) PSD plot on channel 36

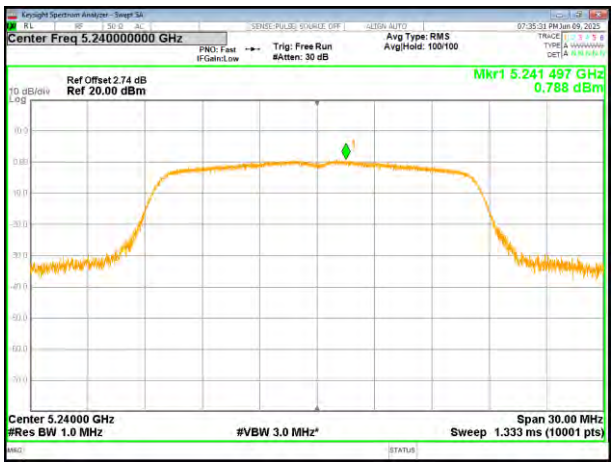
(802.11a) PSD plot on channel 40



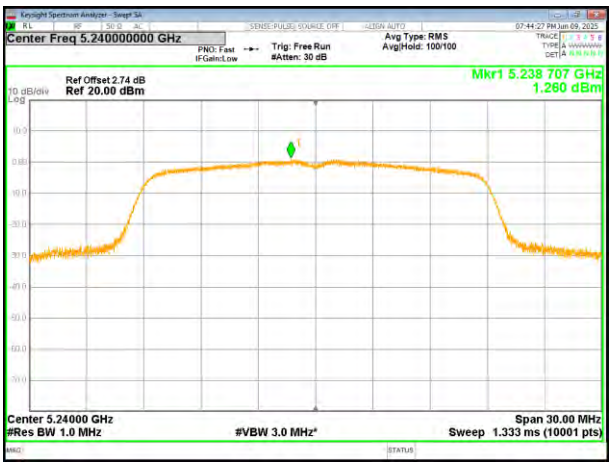
(802.11n20) PSD plot on channel 40



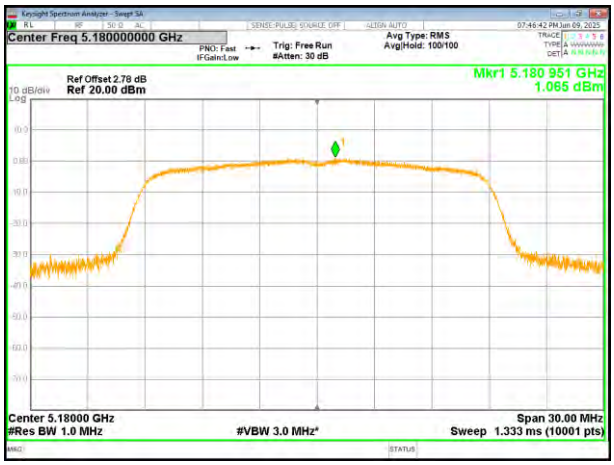
(802.11a) PSD plot on channel 48



(802.11n20) PSD plot on channel 48



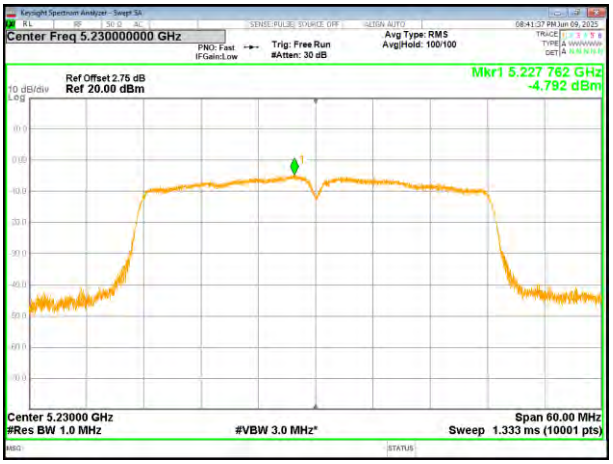
(802.11ac20) PSD plot on channel 36



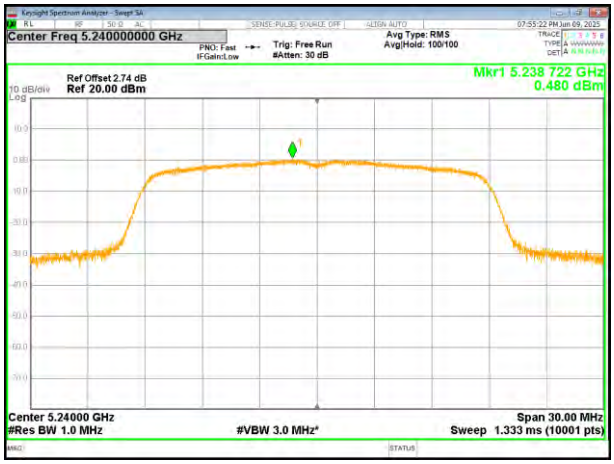
(802.11n40) PSD plot on channel 38

(802.11ac20) PSD plot on channel 40

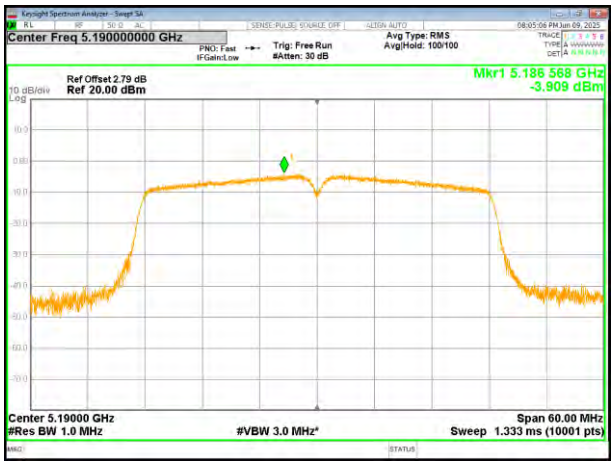
(802.11n40) PSD plot on channel 46



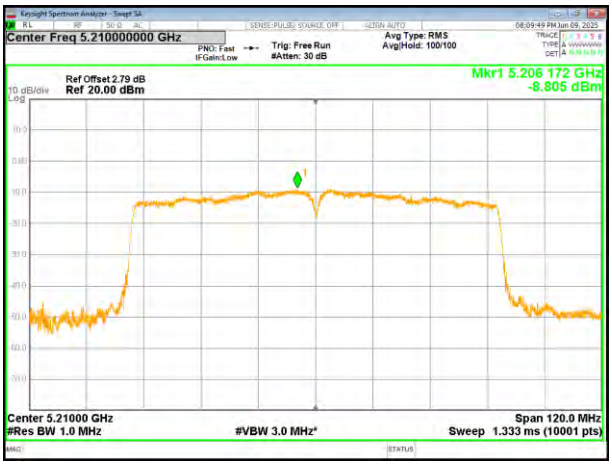
(802.11ac20) PSD plot on channel 48



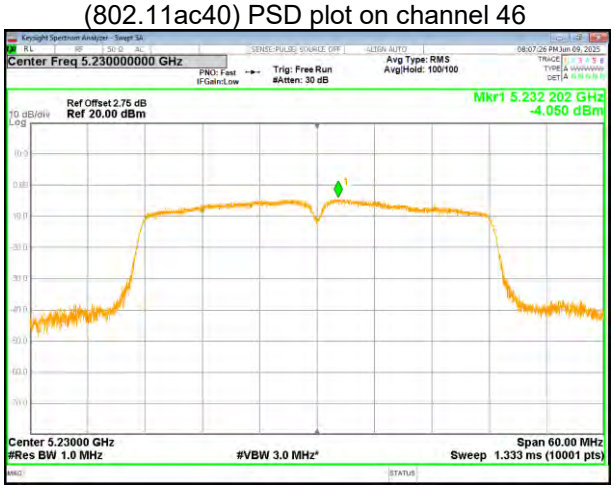
(802.11ac40) PSD plot on channel 38



(802.11ac80) PSD plot on channel 42



(802.11ac40) PSD plot on channel 46

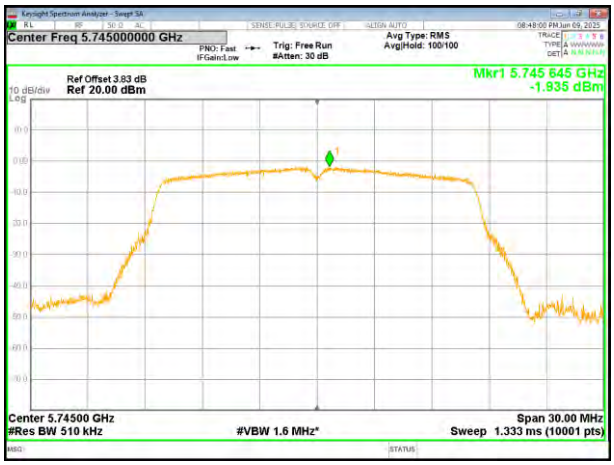


Mode	Frequency	Measured Power Density (dBm/510KHz)	Measured Power Density (dBm/500KHz)	Correction Factor (dB)	Total Measured Power Density (dBm/500KHz)	Limit (dBm/500 KHz)
802.11 a	5745 MHz	-1.935	-2.021	0.790	-1.231	30
	5785 MHz	-1.311	-1.397	0.790	-0.607	30
	5825 MHz	-1.821	-1.907	0.790	-1.117	30
802.11 n20	5745 MHz	-2.478	-2.564	0.790	-1.774	30
	5785 MHz	-2.433	-2.519	0.790	-1.729	30
	5825 MHz	-2.056	-2.142	0.790	-1.352	30
802.11ac20	5745 MHz	-2.506	-2.592	0.790	-1.802	30
	5785 MHz	-2.971	-3.057	0.790	-2.267	30
	5825 MHz	-1.909	-1.995	0.790	-1.205	30
802.11 n40	5755 MHz	-8.247	-8.333	0.280	-8.053	30
	5795 MHz	-7.288	-7.374	0.280	-7.094	30
802.11ac40	5755 MHz	-7.636	-7.722	0.280	-7.442	30
	5795 MHz	0.875	0.789	0.280	1.069	30
802.11ac80	5775 MHz	-11.482	-11.568	1.180	-10.388	30

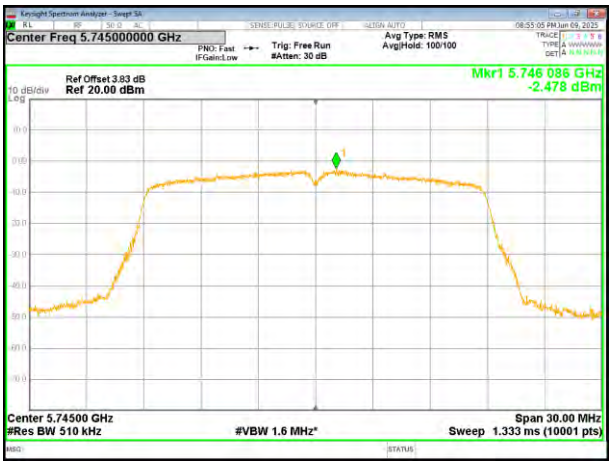
Note: 1. If the measurement is X dBm/510kHz, thus X dBm/510kHz = $(10^{X/10})$*(500 / 510) dBm/500kHz

2. Correction Factor (dB)= duty cycle factor

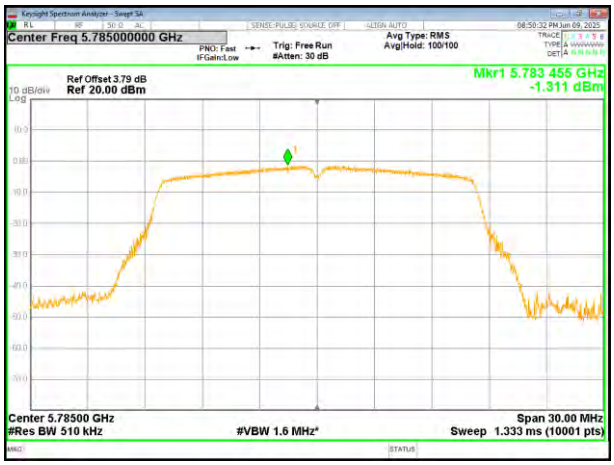
(802.11a) PSD plot on channel 149



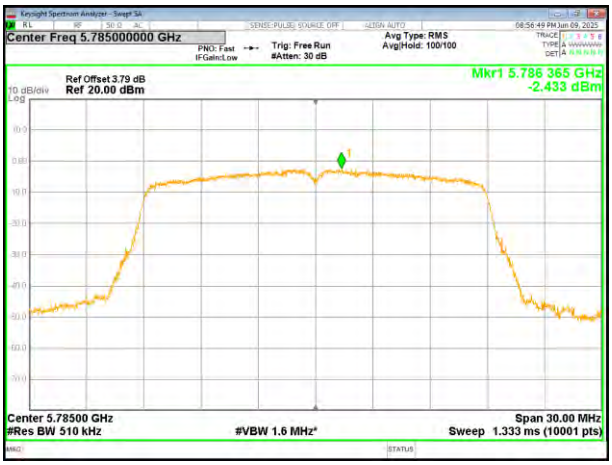
(802.11n20) PSD plot on channel 149



(802.11a) PSD plot on channel 157

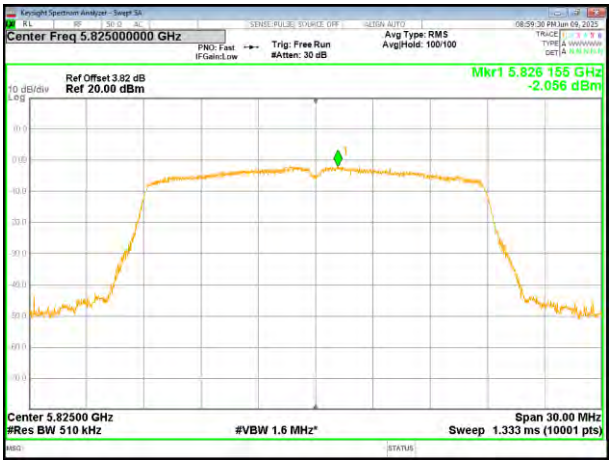


(802.11n20) PSD plot on channel 157

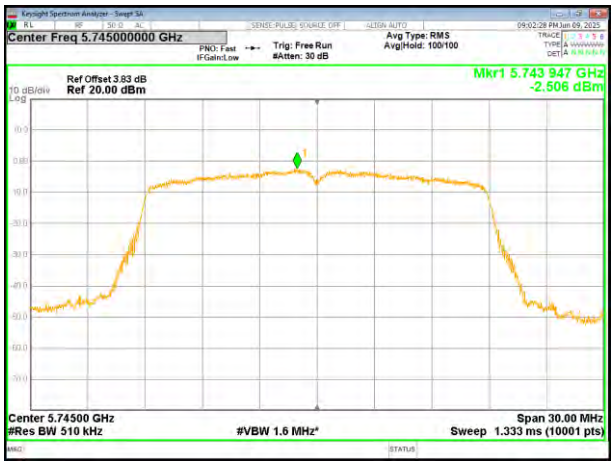


(802.11a) PSD plot on channel 165

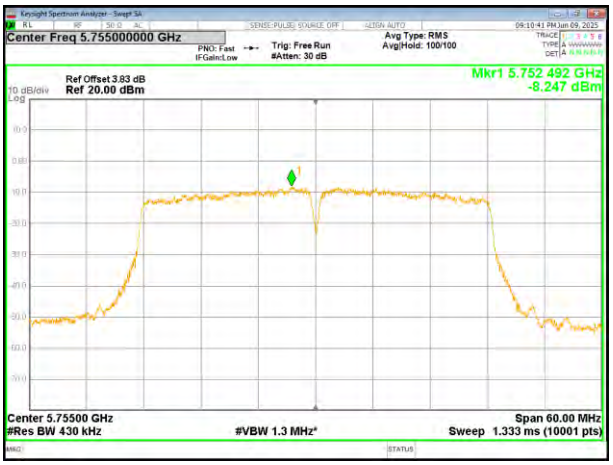
(802.11n20) PSD plot on channel 165



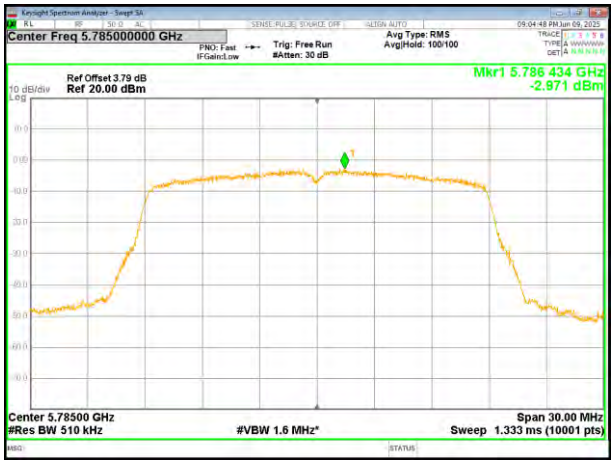
(802.11ac20) PSD plot on channel 149



(802.11n40) PSD plot on channel 151

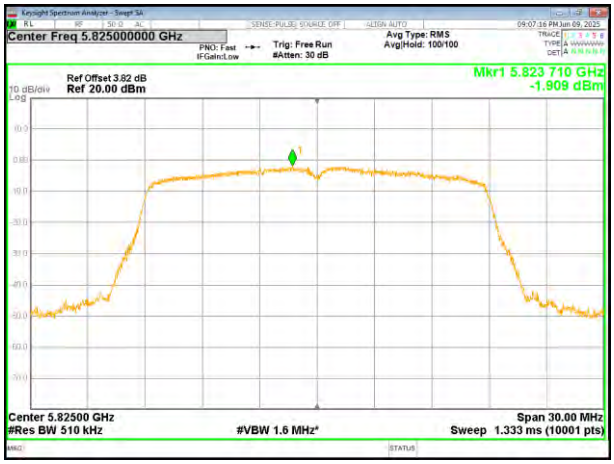


(802.11ac20) PSD plot on channel 157

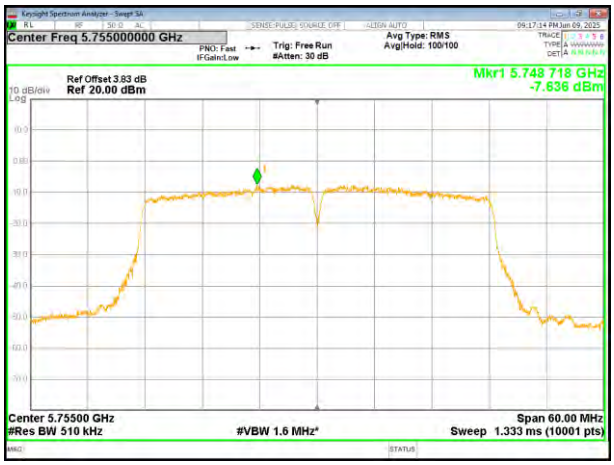


(802.11n40) PSD plot on channel 159

(802.11ac20) PSD plot on channel 165

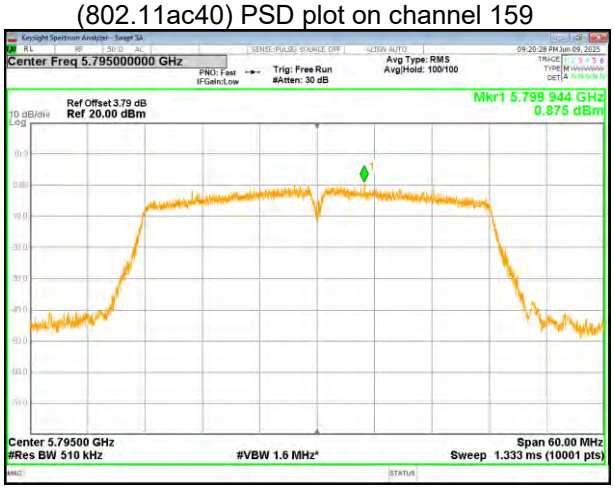


(802.11ac40) PSD plot on channel 151



(802.11ac80) PSD plot on channel 155

(802.11ac40) PSD plot on channel 159



4.7 Band edge

Test Requirement:	FCC Part15 E Section 15.407 and 5.205
Test Method:	ANSI C63.10:2013
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Receiver setup:	

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	3MHz	Average Value

Limit:

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	68.2	Peak Value

Undesirable emission 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 EIRP of -27 dBm/MHz.

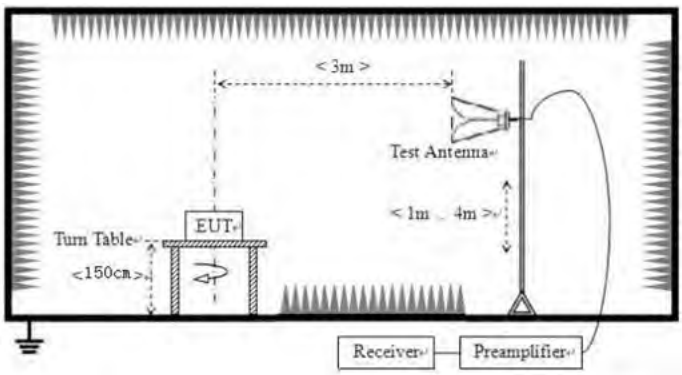
(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.

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.

Test setup:

Above 1GHz



Test Procedure:	a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.	
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 23.2°C	Humid.: 57%RH
Test voltage:	DC 19V From Adapter	
Test results:	Pass	

Remark:

1.Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2.The emission levels of other frequencies are very lower than the limit and not show in test report.

3.Two antennas are tested, only the worst case's (Main Antenna) data was showed.

4.The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.

5.According to KDB 789033 D02v02r01 section G) 1) d),for measurements above 1000 MHz @3m distance, the limit of field strength is computed as follows:

E[dBuV/m] = EIRP[dBm] + 95.2;

For example, if EIRP = -27dBm

E[dBuV/m] = -27 + 95.2 = 68.2dBuV/m

E[dBuV/m] = -27 + 95.2 = 68.2dBuV/m.

E[dBuV/m] = 10 + 95.2 = 105.2dBuV/m.

E[dBuV/m] = 15.6 + 95.2 = 110.8dBuV/m.

E[dBuV/m] = 27 + 95.2 = 122.2dBuV/m

Measurement Data:

IEEE 802.11a						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	48.67	-7.53	41.14	68.2	-27.06	Horizontal
5350.00	44.22	-7.06	37.16	68.2	-31.04	Horizontal
5150.00	47.98	-7.53	40.45	68.2	-27.75	Vertical
5350.00	49.43	-7.06	42.37	68.2	-25.83	Vertical

IEEE 802.11a						
Average value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	38.94	-7.53	31.406	54	-22.594	Horizontal
5350.00	35.38	-7.06	28.316	54	-25.684	Horizontal
5150.00	38.38	-7.53	30.854	54	-23.146	Vertical
5350.00	39.54	-7.06	32.484	54	-21.516	Vertical

IEEE 802.11n HT20						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	47.70	-7.53	40.17	68.20	-28.03	Horizontal
5350.00	43.34	-7.06	36.28	68.20	-31.92	Horizontal
5150.00	47.02	-7.53	39.49	68.20	-28.71	Vertical
5350.00	48.44	-7.06	41.38	68.20	-26.82	Vertical

IEEE 802.11n HT20						
Average value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	38.16	-7.53	30.63	54.00	-23.37	Horizontal
5350.00	34.67	-7.06	27.61	54.00	-26.39	Horizontal
5150.00	37.62	-7.53	30.09	54.00	-23.91	Vertical
5350.00	38.75	-7.06	31.69	54.00	-22.31	Vertical

IEEE 802.11ac HT20						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	50.13	-7.53	42.60	68.20	-25.60	Horizontal
5350.00	45.55	-7.06	38.49	68.20	-29.71	Horizontal
5150.00	49.42	-7.53	41.89	68.20	-26.31	Vertical
5350.00	50.91	-7.06	43.85	68.20	-24.35	Vertical

IEEE 802.11ac HT20						
Average value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	40.10	-7.53	32.57	54.00	-21.43	Horizontal
5350.00	36.44	-7.06	29.38	54.00	-24.62	Horizontal
5150.00	39.54	-7.53	32.01	54.00	-21.99	Vertical
5350.00	40.73	-7.06	33.67	54.00	-20.33	Vertical

IEEE 802.11n HT40						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	49.16	-7.53	41.63	68.20	-26.57	Horizontal
5350.00	44.66	-7.06	37.60	68.20	-30.60	Horizontal
5150.00	48.46	-7.53	40.93	68.20	-27.27	Vertical
5350.00	49.92	-7.06	42.86	68.20	-25.34	Vertical

IEEE 802.11n HT40						
Average value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	39.33	-7.53	31.80	54.00	-22.20	Horizontal
5350.00	35.73	-7.06	28.67	54.00	-25.33	Horizontal
5150.00	38.77	-7.53	31.24	54.00	-22.76	Vertical
5350.00	39.94	-7.06	32.88	54.00	-21.12	Vertical

IEEE 802.11ac HT40						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	51.59	-7.53	44.06	68.20	-24.14	Horizontal
5350.00	46.87	-7.06	39.81	68.20	-28.39	Horizontal
5150.00	50.86	-7.53	43.33	68.20	-24.87	Vertical
5350.00	52.40	-7.06	45.34	68.20	-22.86	Vertical

IEEE 802.11ac HT40						
Average value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	41.27	-7.53	33.74	54.00	-20.26	Horizontal
5350.00	37.50	-7.06	30.44	54.00	-23.56	Horizontal
5150.00	40.69	-7.53	33.16	54.00	-20.84	Vertical
5350.00	41.92	-7.06	34.86	54.00	-19.14	Vertical

IEEE 802.11ac HT80						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	51.10	-7.53	43.57	68.20	-24.63	Horizontal
5350.00	46.43	-7.06	39.37	68.20	-28.83	Horizontal
5150.00	50.38	-7.53	42.85	68.20	-25.35	Vertical
5350.00	51.90	-7.06	44.84	68.20	-23.36	Vertical

IEEE 802.11ac HT80						
Average value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	40.88	-7.53	33.35	54.00	-20.65	Horizontal
5350.00	37.14	-7.06	30.08	54.00	-23.92	Horizontal
5150.00	40.30	-7.53	32.77	54.00	-21.23	Vertical
5350.00	41.52	-7.06	34.46	54.00	-19.54	Vertical

Measurement data:

IEEE 802.11a						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	47.83	-6.34	41.49	68.20	-26.71	Horizontal
5700.00	45.32	-6.22	39.10	105.20	-66.10	Horizontal
5720.00	48.55	-6.17	42.38	110.80	-68.42	Horizontal
5725.00	50.00	-6.16	43.84	122.20	-78.36	Horizontal
5850.00	45.17	-5.87	39.30	122.20	-82.90	Horizontal
5855.00	43.49	-5.85	37.64	110.80	-73.16	Horizontal
5875.00	48.33	-5.80	42.53	105.20	-62.67	Horizontal
5925.00	57.18	-5.68	51.50	68.20	-16.70	Horizontal
5650.00	50.39	-6.34	44.05	68.20	-24.15	Vertical
5700.00	54.50	-6.22	48.28	105.20	-56.92	Vertical
5720.00	51.32	-6.17	45.15	110.80	-65.65	Vertical
5725.00	48.89	-6.16	42.73	122.20	-79.47	Vertical
5850.00	57.13	-5.87	51.26	122.20	-70.94	Vertical
5855.00	53.60	-5.85	47.75	110.80	-63.05	Vertical
5875.00	48.34	-5.80	42.54	105.20	-62.66	Vertical
5925.00	47.55	-5.68	41.87	68.20	-26.33	Vertical

IEEE 802.11n HT20						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	48.79	-6.34	42.45	68.20	-25.75	Horizontal
5700.00	46.23	-6.22	40.01	105.20	-65.19	Horizontal
5720.00	49.52	-6.17	43.35	110.80	-67.45	Horizontal
5725.00	51.00	-6.16	44.84	122.20	-77.36	Horizontal
5850.00	46.07	-5.87	40.20	122.20	-82.00	Horizontal
5855.00	44.36	-5.85	38.51	110.80	-72.29	Horizontal
5875.00	49.30	-5.80	43.50	105.20	-61.70	Horizontal
5925.00	58.32	-5.68	52.64	68.20	-15.56	Horizontal
5650.00	51.40	-6.34	45.06	68.20	-23.14	Vertical
5700.00	55.59	-6.22	49.37	105.20	-55.83	Vertical
5720.00	52.35	-6.17	46.18	110.80	-64.62	Vertical
5725.00	49.86	-6.16	43.70	122.20	-78.50	Vertical
5850.00	58.28	-5.87	52.41	122.20	-69.79	Vertical
5855.00	54.67	-5.85	48.82	110.80	-61.98	Vertical
5875.00	49.31	-5.80	43.51	105.20	-61.69	Vertical
5925.00	48.51	-5.68	42.83	68.20	-25.37	Vertical

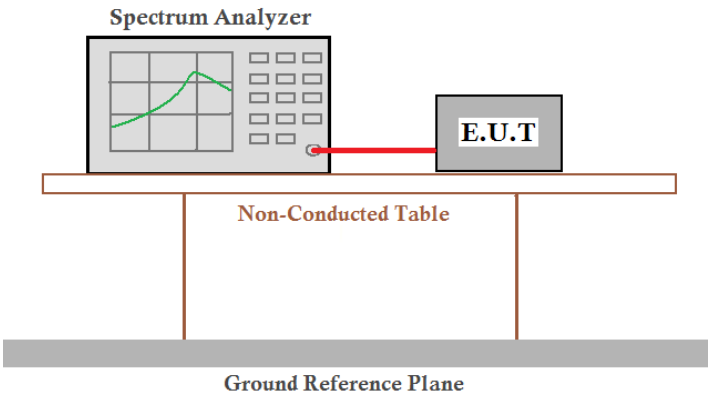
IEEE 802.11n HT40						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	53.57	-6.34	47.23	68.20	-20.97	Horizontal
5700.00	50.76	-6.22	44.54	105.20	-60.66	Horizontal
5720.00	54.37	-6.17	48.20	110.80	-62.60	Horizontal
5725.00	56.00	-6.16	49.84	122.20	-72.36	Horizontal
5850.00	50.59	-5.87	44.72	122.20	-77.48	Horizontal
5855.00	48.71	-5.85	42.86	110.80	-67.94	Horizontal
5875.00	54.13	-5.80	48.33	105.20	-56.87	Horizontal
5925.00	64.04	-5.68	58.36	68.20	-9.84	Horizontal
5650.00	56.44	-6.34	50.10	68.20	-18.10	Vertical
5700.00	61.04	-6.22	54.82	105.20	-50.38	Vertical
5720.00	57.48	-6.17	51.31	110.80	-59.49	Vertical
5725.00	54.75	-6.16	48.59	122.20	-73.61	Vertical
5850.00	63.99	-5.87	58.12	122.20	-64.08	Vertical
5855.00	60.03	-5.85	54.18	110.80	-56.62	Vertical
5875.00	54.15	-5.80	48.35	105.20	-56.85	Vertical
5925.00	53.26	-5.68	47.58	68.20	-20.62	Vertical

IEEE 802.11ac HT20						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	52.14	-6.34	45.80	68.20	-22.40	Horizontal
5700.00	49.40	-6.22	43.18	105.20	-62.02	Horizontal
5720.00	52.92	-6.17	46.75	110.80	-64.05	Horizontal
5725.00	54.50	-6.16	48.34	122.20	-73.86	Horizontal
5850.00	49.23	-5.87	43.36	122.20	-78.84	Horizontal
5855.00	47.41	-5.85	41.56	110.80	-69.24	Horizontal
5875.00	52.68	-5.80	46.88	105.20	-58.32	Horizontal
5925.00	62.33	-5.68	56.65	68.20	-11.55	Horizontal
5650.00	54.93	-6.34	48.59	68.20	-19.61	Vertical
5700.00	59.40	-6.22	53.18	105.20	-52.02	Vertical
5720.00	55.94	-6.17	49.77	110.80	-61.03	Vertical
5725.00	53.29	-6.16	47.13	122.20	-75.07	Vertical
5850.00	62.27	-5.87	56.40	122.20	-65.80	Vertical
5855.00	58.42	-5.85	52.57	110.80	-58.23	Vertical
5875.00	52.70	-5.80	46.90	105.20	-58.30	Vertical
5925.00	51.83	-5.68	46.15	68.20	-22.05	Vertical

IEEE 802.11ac HT40						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	50.70	-6.34	44.36	68.20	-23.84	Horizontal
5700.00	48.04	-6.22	41.82	105.20	-63.38	Horizontal
5720.00	51.46	-6.17	45.29	110.80	-65.51	Horizontal
5725.00	53.00	-6.16	46.84	122.20	-75.36	Horizontal
5850.00	47.88	-5.87	42.01	122.20	-80.19	Horizontal
5855.00	46.10	-5.85	40.25	110.80	-70.55	Horizontal
5875.00	51.23	-5.80	45.43	105.20	-59.77	Horizontal
5925.00	60.61	-5.68	54.93	68.20	-13.27	Horizontal
5650.00	53.41	-6.34	47.07	68.20	-21.13	Vertical
5700.00	57.77	-6.22	51.55	105.20	-53.65	Vertical
5720.00	54.40	-6.17	48.23	110.80	-62.57	Vertical
5725.00	51.82	-6.16	45.66	122.20	-76.54	Vertical
5850.00	60.56	-5.87	54.69	122.20	-67.51	Vertical
5855.00	56.81	-5.85	50.96	110.80	-59.84	Vertical
5875.00	51.25	-5.80	45.45	105.20	-59.75	Vertical
5925.00	50.41	-5.68	44.73	68.20	-23.47	Vertical

IEEE 802.11ac HT80						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	46.40	-6.34	40.06	68.20	-28.14	Horizontal
5700.00	43.96	-6.22	37.74	105.20	-67.46	Horizontal
5720.00	47.09	-6.17	40.92	110.80	-69.88	Horizontal
5725.00	48.50	-6.16	42.34	122.20	-79.86	Horizontal
5850.00	43.81	-5.87	37.94	122.20	-84.26	Horizontal
5855.00	42.19	-5.85	36.34	110.80	-74.46	Horizontal
5875.00	46.88	-5.80	41.08	105.20	-64.12	Horizontal
5925.00	55.46	-5.68	49.78	68.20	-18.42	Horizontal
5650.00	48.88	-6.34	42.54	68.20	-25.66	Vertical
5700.00	52.86	-6.22	46.64	105.20	-58.56	Vertical
5720.00	49.78	-6.17	43.61	110.80	-67.19	Vertical
5725.00	47.42	-6.16	41.26	122.20	-80.94	Vertical
5850.00	55.42	-5.87	49.55	122.20	-72.65	Vertical
5855.00	51.99	-5.85	46.14	110.80	-64.66	Vertical
5875.00	46.89	-5.80	41.09	105.20	-64.11	Vertical
5925.00	46.13	-5.68	40.45	68.20	-27.75	Vertical

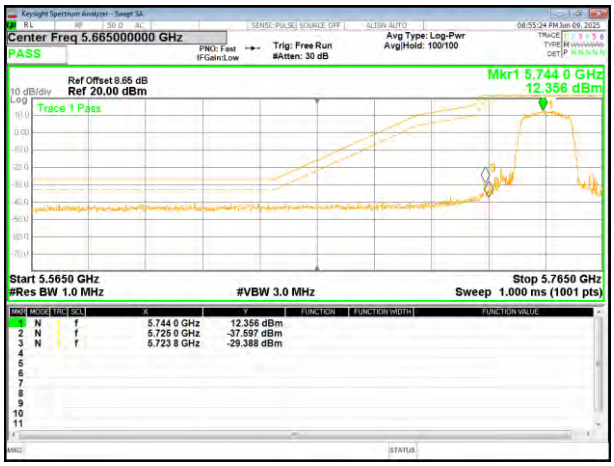
Remark:
Factor =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

Test Requirement:	FCC Part15 C Section 15.209 and 15.205	
Test Method:	ANSI C63.10: 2013	
Limit:	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.	
Test setup:		
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..	
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 24.3°C	Humid.: 61%RH
Test voltage:	DC 19V From Adapter	
Test results:	Pass	

Remark: Due to the margin value of the sideband test being greater than the antenna gain value, the test meets the requirements

(802.11a) Band Edge, Left Side

(802.11n20) Band Edge, Left Side

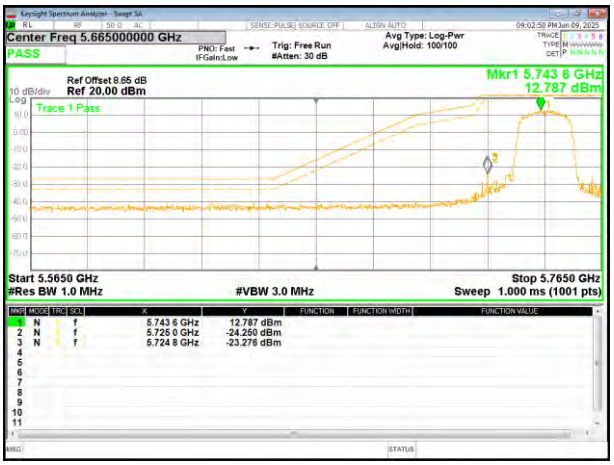


(802.11a) Band Edge, Right Side

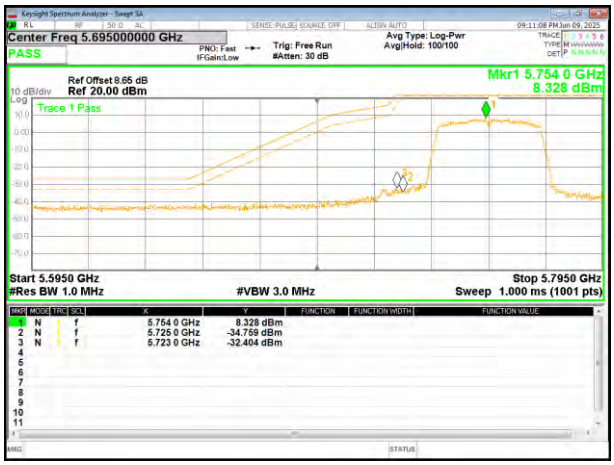
(802.11n20) Band Edge, Right Side

Remark: Antenna gain and cable loss data included in Offset.

(802.11ac20) Band Edge, Left Side

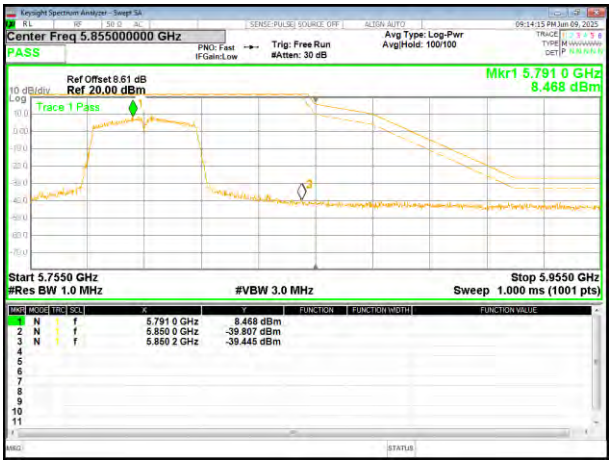


(802.11n40) Band Edge, Left Side



(802.11ac20) Band Edge, Right Side

(802.11n40) Band Edge, Right Side



Remark: Antenna gain and cable loss data included in Offset.

(802.11ac40) Band Edge, Left Side

(802.11ac80) Band Edge

(802.11ac40) Band Edge, Right Side

Remark: Antenna gain and cable loss data included in Offset.

4.8 Spurious Emission

4.8.1 Radiated Emission Method

Test Requirement:	47CRF Part 15.209, Part 15E Section 15.407(b)(4)
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 40GHz
Test site:	Measurement Distance: 3m

Receiver setup:

Frequency	Detector	RBW	VBW	Value
9kHz-150KHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	3MHz	Average Value

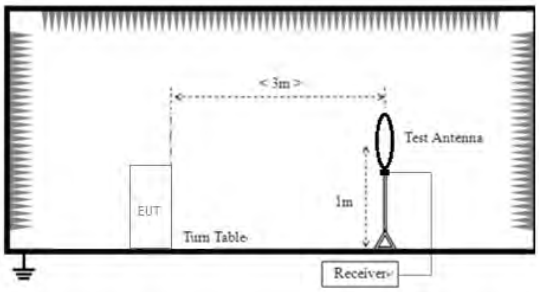
Limit:

Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	300m
1.705MHz-30MHz	30	QP	30m
30MHz-88MHz	100	QP	3m
88MHz-216MHz	150	QP	
216MHz-960MHz	200	QP	
960MHz-1GHz	500	QP	

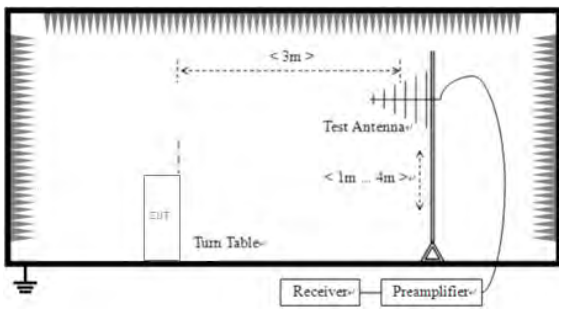
Frequency	Limit (dBm/MHz)	Remark
Above 1GHz	-27.0	Peak Value

Test setup:

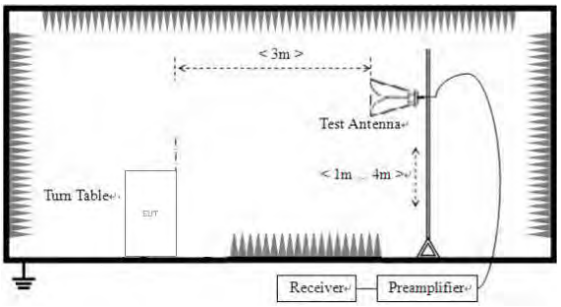
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz

	
Test Procedure:	1. Place the EUT on a rotating table on a horizontal surface. Rotate the table 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test Instruments:	Refer to section 3.0 for details
Test mode:	Refer to section 2.2 for details
Test results:	Pass

Remarks:

1. *The report only shows the worst mode.*
2. *Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

Measurement Data:

9 kHz ~ 30 MHz

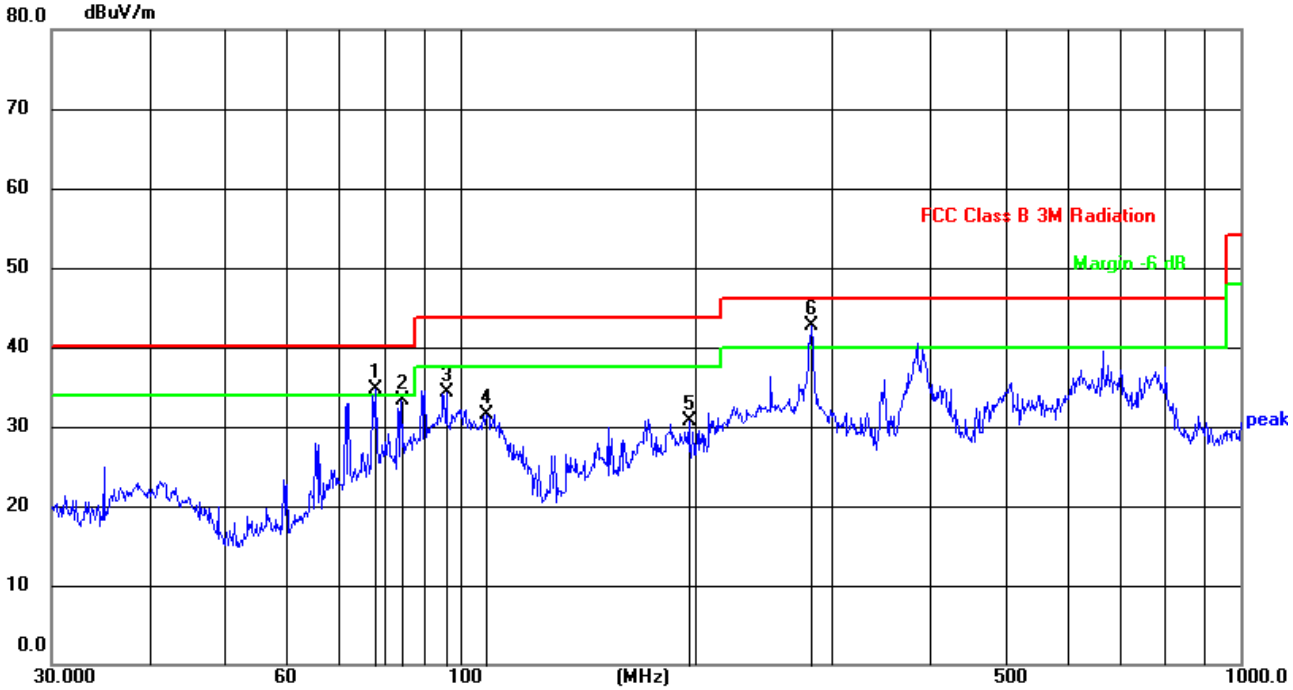
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

Below 1GHz

Remark: The test data shows only the worst case 802.11n20 mode.

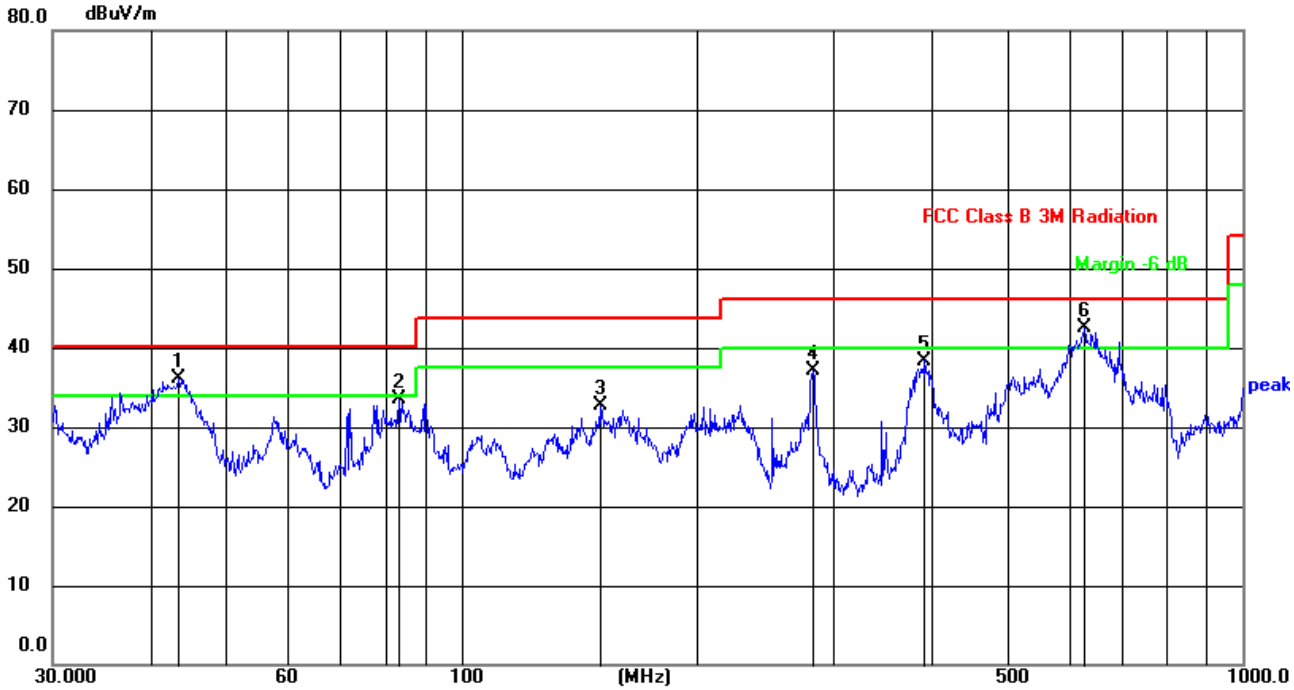
Temperature:	23.2℃	Relative Humidity:	57%
Pressure:	101.2kPar	Test Voltage :	AC 120V 60Hz
Test Mode :	5.8G TX- 802.11n20(5825MHz)		

Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	78.1388	55.19	-20.52	34.67	40.00	-5.33	QP
2	84.1100	53.77	-20.39	33.38	40.00	-6.62	QP
3	96.0985	54.51	-20.17	34.34	43.50	-9.16	QP
4	108.2664	51.45	-19.94	31.51	43.50	-11.99	QP
5	196.5098	49.21	-18.42	30.79	43.50	-12.71	QP
6	281.9945	61.22	-18.50	42.72	46.00	-3.28	QP

Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	43.5056	56.97	-20.82	36.15	40.00	-3.85	QP
2	83.2296	53.80	-20.22	33.58	40.00	-6.42	QP
3	150.5377	51.73	-19.00	32.73	43.50	-10.77	QP
4	281.9945	55.04	-17.96	37.08	46.00	-8.92	QP
5	392.0950	55.03	-16.63	38.40	46.00	-7.60	QP
6	627.2735	53.07	-10.52	42.55	46.00	-3.45	QP

Remarks:
1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. The test data shows only the worst case 802.11n20 mode

Above 1GHz:

Remark: The test data shows only the worst case 802.11n20 mode.

Temperature:	23.2℃	Relative Humidity:	57%
Pressure:	101.2kPar	Test Voltage :	AC 120V 60Hz
Test Mode :	5.2G TX- 802.11n20		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detect or Type
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
Low Channel:5180MHz							
V	10360.00	40.58	1.77	42.35	68.20	-25.85	PK
V	10360.00	36.10	1.77	37.87	54.00	-16.13	AV
V	15540.00	45.04	7.72	52.76	74.00	-21.24	PK
V	15540.00	34.70	7.72	42.42	54.00	-11.58	AV
V	20720.00	50.38	-5.73	44.65	68.20	-23.55	PK
V	20720.00	46.00	-5.73	40.27	54.00	-13.73	AV
V	25900.00	47.14	-2.89	44.25	68.20	-23.95	PK
V	25900.00	42.03	-2.89	39.14	54.00	-14.86	AV
V	31080.00	44.20	1.66	45.86	68.20	-22.34	PK
V	31080.00	39.59	1.66	41.25	54.00	-12.75	AV
V	36260.00	41.36	4.63	45.99	68.20	-22.21	PK
V	36260.00	36.71	4.63	41.34	54.00	-12.66	AV
H	10360.00	40.06	1.77	41.83	68.20	-26.37	PK
H	10360.00	35.59	1.77	37.36	54.00	-16.64	AV
H	15540.00	44.83	7.72	52.55	74.00	-21.45	PK
H	15540.00	35.08	7.72	42.80	54.00	-11.20	AV
H	20720.00	50.16	-5.73	44.43	68.20	-23.77	PK
H	20720.00	45.15	-5.73	39.42	54.00	-14.58	AV
H	25900.00	47.12	-2.89	44.23	68.20	-23.97	PK
H	25900.00	42.40	-2.89	39.51	54.00	-14.49	AV
H	31080.00	43.47	1.66	45.13	68.20	-23.07	PK
H	31080.00	38.48	1.66	40.14	54.00	-13.86	AV
H	36260.00	41.23	4.63	45.86	68.20	-22.34	PK
H	36260.00	37.17	4.63	41.80	54.00	-12.20	AV

Remark:

1. Emission Level = Meter Reading + Factor,
   Factor=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.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detect or Type
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
Middle Channel:5200Hz							
V	10400.00	40.04	1.85	41.89	68.20	-26.31	PK
V	10400.00	35.95	1.85	37.80	54.00	-16.20	AV
V	15600.00	44.56	7.64	52.20	74.00	-21.80	PK
V	15600.00	34.37	7.64	42.01	54.00	-11.99	AV
V	20800.00	50.16	-5.67	44.49	68.20	-23.71	PK
V	20800.00	45.32	-5.67	39.65	54.00	-14.35	AV
V	26000.00	47.26	-2.85	44.41	68.20	-23.79	PK
V	26000.00	42.21	-2.85	39.36	54.00	-14.64	AV
V	31200.00	43.57	1.57	45.14	68.20	-23.06	PK
V	31200.00	38.81	1.57	40.38	54.00	-13.62	AV
V	36400.00	41.36	4.93	46.29	68.20	-21.91	PK
V	36400.00	37.18	4.93	42.11	54.00	-11.89	AV
H	10400.00	40.48	1.85	42.33	68.20	-25.87	PK
H	10400.00	36.60	1.85	38.45	54.00	-15.55	AV
H	15600.00	46.18	7.64	53.82	74.00	-20.18	PK
H	15600.00	36.12	7.64	43.76	54.00	-10.24	AV
H	20800.00	51.12	-5.67	45.45	68.20	-22.75	PK
H	20800.00	45.98	-5.67	40.31	54.00	-13.69	AV
H	26000.00	45.21	-2.85	42.36	68.20	-25.84	PK
H	26000.00	33.25	-2.85	30.40	54.00	-23.60	AV
H	31200.00	43.44	1.57	45.01	68.20	-23.19	PK
H	31200.00	38.45	1.57	40.02	54.00	-13.98	AV
H	36400.00	41.10	4.93	46.03	68.20	-22.17	PK
H	36400.00	36.34	4.93	41.27	54.00	-12.73	AV

Remark:

1. Emission Level = Meter Reading + Factor,
   Factor=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.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detect or Type
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
High Channel:5240MHz							
V	10480.00	41.61	2.02	43.63	68.20	-24.57	PK
V	10480.00	36.99	2.02	39.01	54.00	-14.99	AV
V	15720.00	43.64	7.46	51.10	74.00	-22.90	PK
V	15720.00	33.96	7.46	41.42	54.00	-12.58	AV
V	20960.00	50.48	-5.56	44.92	68.20	-23.28	PK
V	20960.00	45.62	-5.56	40.06	54.00	-13.94	AV
V	26200.00	46.51	-2.50	44.01	68.20	-24.19	PK
V	26200.00	42.37	-2.50	39.87	54.00	-14.13	AV
V	31440.00	43.74	1.39	45.13	68.20	-23.07	PK
V	31440.00	38.99	1.39	40.38	54.00	-13.62	AV
V	36680.00	40.84	5.25	46.09	68.20	-22.11	PK
V	36680.00	36.75	5.25	42.00	54.00	-12.00	AV
H	10480.00	40.83	2.02	42.85	68.20	-25.35	PK
H	10480.00	36.06	2.02	38.08	54.00	-15.92	AV
H	15720.00	44.96	7.46	52.42	74.00	-21.58	PK
H	15720.00	34.92	7.46	42.38	54.00	-11.62	AV
H	20960.00	51.21	-5.56	45.65	68.20	-22.55	PK
H	20960.00	45.95	-5.56	40.39	54.00	-13.61	AV
H	26200.00	46.93	-2.50	44.43	68.20	-23.77	PK
H	26200.00	43.07	-2.50	40.57	54.00	-13.43	AV
H	31440.00	43.98	1.39	45.37	68.20	-22.83	PK
H	31440.00	39.98	1.39	41.37	54.00	-12.63	AV
H	36680.00	41.83	5.15	46.98	68.20	-21.22	PK
H	36680.00	41.61	5.15	46.76	54.00	-7.24	AV

Remark:
1. Emission Level = Meter Reading + Factor,
   Factor=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:	23.2℃	Relative Humidity:	57%
Pressure:	101.2kPar	Test Voltage :	AC 120V 60Hz
Test Mode :	5.8G TX- 802.11n20		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detect or Type
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
Low Channel:5745MHz							
V	11490.00	44.28	3.31	47.59	74.00	-26.41	PK
V	11490.00	35.30	3.31	38.61	54.00	-15.39	AV
V	17235.00	40.85	10.10	50.95	68.20	-17.25	PK
V	17235.00	35.87	10.10	45.97	54.00	-8.03	AV
V	22980.00	52.26	-4.61	47.65	74.00	-26.35	PK
V	22980.00	43.32	-4.61	38.71	54.00	-15.29	AV
V	28725.00	45.16	0.87	46.03	68.20	-22.17	PK
V	28725.00	40.24	0.87	41.11	54.00	-12.89	AV
V	34470.00	41.49	3.82	45.31	68.20	-22.89	PK
V	34470.00	37.12	3.82	40.94	54.00	-13.06	AV
H	11490.00	44.57	3.31	47.88	74.00	-26.12	PK
H	11490.00	34.68	3.31	37.99	54.00	-16.01	AV
H	17235.00	39.45	10.10	49.55	68.20	-18.65	PK
H	17235.00	34.59	10.10	44.69	54.00	-9.31	AV
H	22980.00	54.44	-4.61	49.83	74.00	-24.17	PK
H	22980.00	44.16	-4.61	39.55	54.00	-14.45	AV
H	28725.00	45.14	0.87	46.01	68.20	-22.19	PK
H	28725.00	41.03	0.87	41.90	54.00	-12.10	AV
H	34470.00	41.87	3.82	45.69	68.20	-22.51	PK
H	34470.00	37.86	3.82	41.68	54.00	-12.32	AV

Remark:

1. Emission Level = Meter Reading + Factor,
   Factor=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.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detect or Type
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
Low Channel:5785MHz							
V	11570.00	44.92	3.34	48.26	74.00	-25.74	PK
V	11570.00	35.05	3.34	38.39	54.00	-15.61	AV
V	17355.00	40.83	10.52	51.35	68.20	-16.85	PK
V	17355.00	36.39	10.52	46.91	54.00	-7.09	AV
V	23140.00	51.95	-4.66	47.29	74.00	-26.71	PK
V	23140.00	42.67	-4.66	38.01	54.00	-15.99	AV
V	28925.00	44.68	1.36	46.04	68.20	-22.16	PK
V	28925.00	41.14	1.36	42.50	54.00	-11.50	AV
V	34710.00	41.29	3.95	45.24	68.20	-22.96	PK
V	34710.00	36.76	3.95	40.71	54.00	-13.29	AV
H	11570.00	45.69	3.34	49.03	74.00	-24.97	PK
H	11570.00	35.97	3.34	39.31	54.00	-14.69	AV
H	17355.00	39.25	10.52	49.77	68.20	-18.43	PK
H	17355.00	37.93	10.52	48.45	54.00	-5.55	AV
H	23140.00	51.35	-4.66	46.69	74.00	-27.31	PK
H	23140.00	51.35	-4.66	46.69	54.00	-7.31	AV
H	28925.00	50.17	1.36	51.53	68.20	-16.67	PK
H	28925.00	45.37	1.36	46.73	54.00	-7.27	AV
H	34710.00	50.45	3.95	54.40	68.20	-13.80	PK
H	34710.00	41.86	3.95	45.81	54.00	-8.19	AV

Remark:

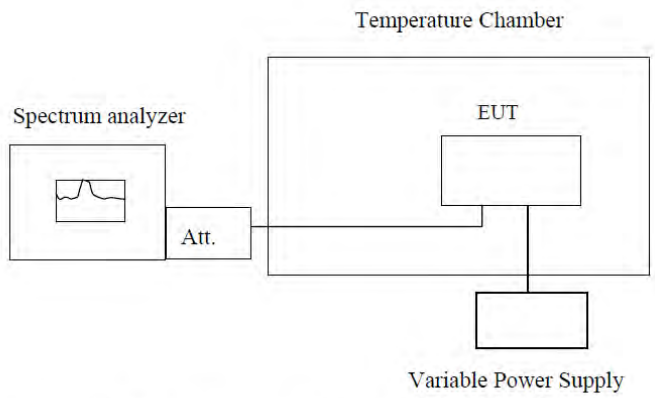
1. Emission Level = Meter Reading + Factor,
   Factor=Antenna Factor + Cable Loss – Pre-amplifier
   Margin= Emission Level – Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detect or Type
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
Low Channel:5825MHz							
V	11650.00	43.38	3.36	46.74	74.00	-27.26	PK
V	11650.00	34.46	3.36	37.82	54.00	-16.18	AV
V	17475.00	40.17	10.93	51.10	68.20	-17.10	PK
V	17475.00	35.91	10.93	46.84	54.00	-7.16	AV
V	23300.00	50.27	-4.77	45.50	68.20	-22.70	PK
V	23300.00	45.21	-4.77	40.44	54.00	-13.56	AV
V	29125.00	45.12	1.65	46.77	68.20	-21.43	PK
V	29125.00	39.94	1.65	41.59	54.00	-12.41	AV
V	34950.00	39.92	4.09	44.01	68.20	-24.19	PK
V	34950.00	36.37	4.09	40.46	54.00	-13.54	AV
H	11650.00	46.10	3.36	49.46	74.00	-24.54	PK
H	11650.00	35.83	3.36	39.19	54.00	-14.81	AV
H	17475.00	38.40	10.93	49.33	68.20	-18.87	PK
H	17475.00	34.87	10.93	45.80	54.00	-8.20	AV
H	23300.00	49.30	-4.77	44.53	68.20	-23.67	PK
H	23300.00	46.00	-4.77	41.23	54.00	-12.77	AV
H	29125.00	45.95	1.65	47.60	68.20	-20.60	PK
H	29125.00	41.69	1.65	43.34	54.00	-10.66	AV
H	34950.00	43.38	4.09	47.47	68.20	-20.73	PK
H	34950.00	34.46	4.09	38.55	54.00	-15.45	AV

Remark:

1. Emission Level = Meter Reading + Factor,
   Factor=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.

4.9 Frequency stability

Test Requirement:	47CRF Part 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055
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
Test Procedure:	a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minute s. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 3.0 for details
Test mode:	Refer to section 2.2 for details
Test results:	Pass

Remark: Set the EUT transmits at un-modulation mode to test frequency stability.

Measurement data:

Frequency stability versus Temp.					
Power Supply: DC 19V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5180	5180.003	5180.003	5180.017	5180.071
	5190	5189.993	5190.033	5190.017	5190.071
	5200	5200.003	5200.053	5200.007	5200.061
	5210	5209.993	5210.033	5300.017	5210.051
	5220	5220.013	5220.033	5220.007	5220.061
	5230	5229.993	5230.053	5230.027	5300.063
	5240	5240.013	5240.043	5240.007	5240.062
-20	5180	5180.013	5180.033	5180.017	5180.021
	5190	5190.013	5190.033	5190.007	5190.051
	5200	5200.003	5200.033	5200.017	5200.081
	5210	5210.013	5300.034	5210.007	5210.061
	5220	5220.003	5220.033	5220.027	5220.051
	5230	5230.003	5230.053	5230.007	5230.082
	5240	5239.973	5240.023	5240.027	5240.072
-10	5180	5179.963	5180.033	5180.017	5180.071
	5190	5189.993	5190.033	5190.007	5190.071
	5200	5200.023	5200.033	5200.017	5200.061
	5210	5210.003	5300.034	5210.007	5210.071
	5220	5219.993	5220.033	5220.027	5220.061
	5230	5230.023	5230.053	5230.007	5230.062
	5240	5240.013	5240.023	5240.027	5240.032
0	5180	5180.003	5180.003	5180.017	5180.071
	5190	5189.993	5190.033	5190.017	5190.071
	5200	5200.003	5200.053	5200.007	5200.061
	5210	5209.993	5210.033	5300.017	5210.051
	5220	5220.013	5220.033	5220.007	5220.061
	5230	5229.993	5230.053	5230.027	5300.063
	5240	5240.013	5240.043	5240.007	5240.062
10	5180	5179.993	5180.033	5180.017	5180.071
	5190	5190.003	5190.033	5190.007	5180.071
	5200	5199.993	5200.033	5200.017	5190.071
	5210	5209.993	5210.033	5210.007	5200.061
	5220	5220.003	5220.053	5220.027	5210.071
	5230	5230.023	5230.023	5230.007	5220.061
	5240	5239.993	5240.043	5240.027	5230.062
20	5180	5180.013	5180.033	5180.017	5180.021
	5190	5190.013	5190.033	5190.007	5190.051

	5200	5200.003	5200.033	5200.017	5200.081
	5210	5210.013	5300.034	5210.007	5210.061
	5220	5220.003	5220.033	5220.027	5220.051
	5230	5230.003	5230.053	5230.007	5230.082
	5240	5239.973	5240.023	5240.027	5240.072
30	5180	5180.013	5180.033	5180.017	5180.021
	5190	5190.013	5190.033	5190.007	5190.051
	5200	5200.003	5200.033	5200.017	5200.081
	5210	5210.013	5300.034	5210.007	5210.061
	5220	5220.003	5220.033	5220.027	5220.051
	5230	5230.003	5230.053	5230.007	5230.082
	5240	5239.973	5240.023	5240.027	5240.072
40	5180	5180.003	5180.023	5180.017	5180.061
	5190	5190.003	5190.033	5190.007	5190.061
	5200	5199.993	5200.023	5200.017	5200.051
	5210	5300.004	5210.033	5210.007	5300.063
	5220	5219.993	5220.033	5220.027	5220.051
	5230	5230.013	5230.053	5230.007	5230.072
	5240	5239.993	5240.023	5240.027	5240.052
50	5180	5179.963	5180.033	5180.007	5180.181
	5190	5189.993	5190.033	5190.017	5200.061
	5200	5200.023	5200.033	5200.007	5200.081
	5210	5210.003	5300.034	5210.007	5210.061
	5220	5219.993	5220.033	5220.017	5220.081
	5230	5230.023	5230.053	5230.037	5230.072
	5240	5240.013	5240.023	5240.007	5240.082

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VAC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
DC16.15V	5180	5180.003	5180.023	5180.027	5180.071
	5190	5189.993	5190.033	5190.027	5190.051
	5200	5200.003	5200.023	5200.017	5200.051
	5210	5210.013	5210.033	5210.027	5210.071
	5220	5219.993	5220.033	5220.017	5220.061
	5230	5229.993	5230.053	5230.017	5230.072
	5240	5180.133	5180.043	5180.017	5180.051
DC19V	5180	5200.003	5190.033	5190.007	5190.061
	5190	5200.033	5200.033	5200.017	5200.051
	5200	5210.003	5210.043	5210.007	5210.051
	5210	5220.023	5220.043	5220.027	5220.061
	5220	5230.013	5300.044	5230.007	5230.082
	5230	5240.023	5240.043	5240.027	5240.062
	5240	5180.133	5180.043	5180.017	5180.051
DC21.85V	5180	5180.013	5180.043	5180.007	5180.051
	5190	5190.013	5190.043	5190.017	5190.061
	5200	5200.003	5200.033	5200.007	5200.051
	5210	5210.013	5210.043	5210.007	5210.051
	5220	5220.003	5220.043	5220.017	5220.061
	5230	5230.003	5230.033	5230.037	5230.082
	5240	5239.973	5240.013	5240.007	5240.052

Frequency stability versus Temp.					
Power Supply: DC 19V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5745	5745.028	5745.023	5744.637	5745.042
	5755	5744.978	5755.033	5755.027	5755.062
	5775	5754.999	5775.033	5775.027	5775.072
	5785	5775.009	5785.033	5785.027	5785.063
	5795	5784.999	5795.043	5795.007	5795.073
	5825	5795.009	5825.033	5825.007	5825.083
-20	5745	5744.998	5745.023	5745.017	5745.062
	5755	5755.019	5755.033	5755.017	5755.092
	5775	5774.999	5775.033	5775.027	5775.082
	5785	5785.009	5785.033	5785.017	5785.073
	5795	5795.009	5795.043	5795.007	5795.063
	5825	5825.019	5825.033	5825.017	5824.993
-10	5745	5744.998	5745.033	5745.007	5745.132
	5755	5755.009	5755.033	5755.027	5744.692
	5775	5774.999	5775.053	5775.007	5755.082
	5785	5784.989	5785.033	5785.017	5775.082
	5795	5794.999	5795.023	5795.017	5785.083
	5825	5824.929	5825.033	5825.027	5795.063
0	5745	5744.998	5745.033	5745.007	5745.062
	5755	5755.009	5755.033	5755.017	5755.052
	5775	5775.029	5775.023	5775.037	5775.062
	5785	5784.999	5785.023	5785.007	5785.073
	5795	5794.999	5795.023	5795.007	5795.093
	5825	5824.999	5824.953	5825.007	5825.083
10	5745	5744.988	5745.043	5745.007	5745.072
	5755	5755.009	5755.043	5755.027	5755.092
	5775	5775.009	5775.043	5775.007	5775.072
	5785	5785.009	5785.033	5785.017	5785.063
	5795	5795.019	5795.023	5795.017	5795.053
	5825	5824.999	5825.033	5825.027	5825.094
20	5745	5745.008	5745.053	5745.017	5745.062
	5755	5755.029	5755.023	5755.037	5755.082
	5775	5775.009	5775.053	5775.017	5775.062
	5785	5784.999	5785.053	5785.007	5785.093
	5795	5794.989	5795.043	5794.997	5795.083
	5825	5825.029	5825.053	5825.037	5825.094
30	5745	5744.988	5745.043	5745.007	5745.072
	5755	5755.009	5755.043	5755.027	5755.092
	5775	5775.009	5775.043	5775.007	5775.072
	5785	5785.009	5785.033	5785.017	5785.063
	5795	5795.019	5795.023	5795.017	5795.053
	5825	5824.999	5825.033	5825.027	5825.094
40	5745	5745.008	5745.033	5745.007	5745.062
	5755	5755.019	5755.043	5755.027	5755.082
	5775	5775.019	5775.043	5775.007	5775.062
	5785	5785.009	5785.033	5785.017	5785.073

	5795	5794.999	5795.043	5795.017	5795.073
	5825	5825.009	5825.043	5825.027	5825.083
50	5745	5744.998	5745.033	5745.007	5745.062
	5755	5755.019	5755.043	5755.017	5755.072
	5775	5774.999	5775.043	5775.007	5775.093
	5785	5785.009	5785.033	5784.997	5785.063
	5795	5795.009	5795.043	5795.007	5795.063
	5825	5825.019	5825.043	5824.937	5825.063

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VAC)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
DC16.15V	5745	5744.988	5745.033	5745.007	5745.062
	5755	5755.009	5755.033	5755.027	5755.082
	5775	5775.009	5775.023	5775.027	5775.062
	5785	5785.009	5785.023	5785.007	5785.073
	5795	5795.019	5795.023	5795.027	5795.073
	5825	5824.999	5824.953	5825.027	5825.083
DC19V	5745	5744.988	5745.043	5745.007	5745.072
	5755	5755.009	5755.043	5755.027	5755.092
	5775	5775.009	5775.043	5775.007	5775.072
	5785	5785.009	5785.033	5785.017	5785.063
	5795	5795.019	5795.023	5795.017	5795.053
	5825	5824.999	5825.033	5825.027	5825.094
DC21.85V	5745	5745.008	5745.053	5745.017	5745.062
	5755	5755.029	5755.023	5755.037	5755.082
	5775	5775.009	5775.053	5775.017	5775.062
	5785	5784.999	5785.053	5785.007	5785.093
	5795	5794.989	5795.043	5794.997	5795.083
	5825	5825.029	5825.053	5825.037	5825.094

5 Test Setup Photo

Reference to the file No.: ET-25061729SP for details.

6 EUT Constructional Details

Reference to the file No.: ET-25061729EP and ET-25061729IP for details.

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