



FCC TEST REPORT

FCC ID:2A6FW-Y486AP

Report Number..... : ZKT-24111815739E-3

Date of Test..... Nov. 18, 2024 to Dec. 22, 2024

Date of issue : Dec. 22, 2024

Total number of pages 95

Test Result : PASS

Testing Laboratory..... : Shenzhen ZKT Technology Co., Ltd.

Address : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name : Xiamen Print Future Technology Co.,Ltd.

Address : Room 701, No.55 Dongling Road, Houxi Town, Jimei District,Xiamen City, Fujian Province,China

Manufacturer's name : Xiamen Print Future Technology Co.,Ltd.

Address : Room 701, No.55 Dongling Road, Houxi Town, Jimei District,Xiamen City, Fujian Province,China

Test specification:

**Standard..... : FCC CFR Title 47 Part 15 Subpart E Section 15.407
ANSI C63.10:2013
KDB 789033 D02 v02r01**

Test procedure..... : /

Non-standard test method : N/A

Test Report Form No. : /

Test Report Form(s) Originator : ZKT Testing

Master TRF : Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Product name..... : Thermal Printer

Trademark : N/A

**Model/Type reference : Y486AP
Y468AP, Y428AP, A428AP, Y888AP, RH40AP, Y528AP, Y41AP,
A486AP, B486AP, C486AP, D486AP, E486AP, F486AP, G486AP,
H486AP, J486AP, K486AP, L486AP, P486AP, QR486AP, R486AP,
S486AP, ED40AP**

Ratings..... : Input: 24V  2A From Adapter



Testing procedure and testing location:

Testing Laboratory: **Shenzhen ZKT Technology Co., Ltd.**

Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China

Tested by (name + signature): Jim Liu

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

Approved (name + signature): Lake Xie





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1. VERSION

Report No.	Version	Description	Approved
ZKT-24111815739E-3	Rev.01	Initial issue of report	Dec. 22, 2024



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	AC Power Line Conducted Emission	PASS	
789033 D02 General U-NII	Duty Cycle	PASS	
15.209(a) 15.407 (b)(1) 15.407 (b)(4) 15.407 (b)(8)	Spurious Radiated Emissions	PASS	
15.407 (a)(12) 15.407(e)	26dB Emission Bandwidth & 6dB Occupied Bandwidth	PASS	
15.407 (a)(1) 15.407 (a)(3)	Maximum Conducted Output Power	PASS	
2.1051, 15.407(b)(1) 15.407(b)(4)	Band Edge	PASS	
15.407 (a)(1) 15.407 (a)(3)	Power Spectral Density	PASS	
2.1051, 15.407(b)	Spurious Emissions at Antenna Terminals	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report



2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.
Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225
Designation Number: CN1299
IC Registered No.: 27033
CAB identifier: CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$ · where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$ · providing a level of confidence of approximately 95 % .

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission(6GHz-40GHz)	U=5.0dB
5	Conducted disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF power conducted	U=1.86dB
8	RF conducted Spurious Emission	U=2.2dB
9	RF Occupied Bandwidth	U=1.8MHz
10	RF Power Spectral Density	U=1.75dB
11	humidity uncertainty	U=5.3%
12	Temperature uncertainty	U=0.59°C



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Thermal Printer	
Model No.:	Y486AP	
Serial Model:	Y468AP, Y428AP, A428AP, Y888AP, RH40AP, Y528AP, Y41AP, A486AP, B486AP, C486AP, D486AP, E486AP, F486AP, G486AP, H486AP, J486AP, K486AP, L486AP, P486AP, QR486AP, R486AP, S486AP, ED40AP	
Model Different.:	All the model are the same circuit and RF module, only the model name is different.	
Sample(s) Status:	Engineer sample	
Product Description	IEEE 802.11 WLAN Mode Supported	☒ 802.11a/n/ac (20MHz channel bandwidth) ☒ 802.11ac/n (40MHz channel bandwidth) ☒ 802.11ac (80MHz channel bandwidth)
	Data Rate	802.11a 802.11n(HT20/HT40):MCS0-MCS7; 802.11ac(VHT20/VHT40/VHT80):MCS0-MCS9
	Modulation	OFDM with BPSK / QPSK / 16-QAM / 64-QAM for 802.11a/n; OFDM with BPSK / QPSK / 16-QAM / 64-QAM / 256-QAM for 802.11ac;
	Operating Frequency Range	☒ 5180-5240MHz for 802.11a/n20/ac20; ☒ 5190-5230MHz for 802.11ac40/n40; ☒ 5210MHz for 802.11 ac80. ☒ 5745-5825 MHz for 802.11a/n20/ac20; ☒ 5755-5795 MHz for 802.11ac40/n40; ☒ 5775MHz for 802.11 ac80.
	Number of Channels	☒ 4 channels for 802.11a/n20/ac20 in the 5180-5240MHz band ; ☒ 2 channels for 802.11 ac40/n40 in the 5190-5230 MHz band ; ☒ 1 channels for 802.11 ac80 in the 5210MHz band. ☒ 5 channels for 802.11a/n20/ac20 in the 5745-5825MHz band ; ☒ 2 channels for 802.11 ac40/n40 in the 5755-5795 MHz band ; ☒ 1 channels for 802.11 ac80 in the 5775MHz band
Channel List	Please refer to the Note 2.	
Antenna Type:	PCB antenna	
Antenna gain:	5.2G: 0.72dBi 5.8G: 0.56dBi	
Power supply:	Input: 24V  2A	
AC/DC Adapter:	Input: 100-240V ~ 50/60Hz, 2.0A Output: 24V  2A	
AC/DC Adapter Mode:	GM53-240200-F	

Note:

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



802.11a/n/ac(20MHz) Frequency Channel for 5.2G							
Channel	Frequenc y (MHz)	Channel	Frequenc y (MHz)	Channel	Frequenc y (MHz)	Channel	Frequenc y (MHz)
36	5180	44	5200	40	5220	48	5240

802.11n/ac(40MHz) Frequency Channel for 5.2G							
Channel	Frequenc y (MHz)	Channel	Frequenc y (MHz)	Channel	Frequenc y (MHz)	Channel	Frequenc y (MHz)
38	5190	46	5230	-	-	-	-

802.11ac (80MHz) Frequency Channel for 5.2G	
Channel	Frequency (MHz)
42	5210

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

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

802.11ac (80MHz) Frequency Channel for 5.8G	
Channel	Frequency (MHz)
155	5775



3.2 DESCRIPTION OF TEST MODES

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.	

Test Software	CMD
Power level setup	Default

Pretest Mode	Description
Mode 1	802.11a/n20/ac20 CH 36/ CH 40/ CH 48 for 5.2G 802.11a/n20/ac20 CH149/ CH157/ CH 165 for 5.8G
Mode 2	802.11n 40/ac 40 CH38/ CH 46 for 5.2G 802.11n 40/ac 40 CH 151 / CH 159 for 5.8G
Mode 3	802.11 ac80 CH 42 for 5.2G 802.11 ac80 CH 155 for 5.8G

For Conducted Emission	
Final Test Mode	Description
Mode 1	802.11a/n20/ac20 CH 36/ CH 40/ CH 48 for 5.2G 802.11a/n20/ac20 CH149/ CH157/ CH 165 for 5.8G
Mode 2	802.11n 40/ac 40 CH38/ CH 46 for 5.2G 802.11n 40/ac 40 CH 151 / CH 159 for 5.8G
Mode 3	802.11 ac80 CH 42 for 5.2G 802.11 ac80 CH 155 for 5.8G

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a/n20/ac20 CH 36/ CH 40/ CH 48 for 5.2G 802.11a/n20/ac20 CH149/ CH157/ CH 165 for 5.8G
Mode 2	802.11n 40/ac 40 CH38/ CH 46 for 5.2G 802.11n 40/ac 40 CH 151 / CH 159 for 5.8G
Mode 3	802.11 ac80 CH 42 for 5.2G 802.11 ac80 CH 155 for 5.8G

Note:

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

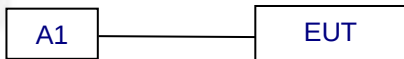


3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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	Thermal Printer	N/A	Y486AP	See page 8	EUT
A1	AC/DC Adapter	GVE	J GM53-240200-F	N/A	EUT

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

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	N/A	Sep. 30, 2024	Sep. 29, 2025
2	LISN	CYBERTEK	EM5040A	E1850400149	N/A	Sep. 30, 2024	Sep. 29, 2025
3	Test Cable	N/A	C-01	N/A	N/A	Sep. 30, 2024	Sep. 29, 2025
4	EMI Test Receiver	R&S	ESCI3	101393	4.42 SP3	Sep. 29, 2024	Sep. 28, 2025
5	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\

Radiation Emissions & Radiation Spurious Emissions Test

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	N9020A	MY55370835	A.17.05	Sep. 29, 2024	Sep. 28, 2025
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Sep. 30, 2024	Sep. 29, 2025
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	100969	4.32	Sep. 29, 2024	Sep. 28, 2025
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	00877	N/A	Sep. 30, 2024	Sep. 29, 2025
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	N/A	Sep. 30, 2024	Sep. 29, 2025
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	N/A	Sep. 30, 2024	Sep. 29, 2025
7	Loop Antenna	TESEQ	HLA6121	58357	N/A	Oct. 11, 2024	Oct. 10, 2025
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	60747	N/A	Sep. 29, 2024	Sep. 28, 2025
9	Amplifier (1GHz-26.5GHz)	HuiPu	8449B	3008A00315	N/A	Sep. 29, 2024	Sep. 28, 2025
10	Amplifier (500MHz-40GHz)	QuanJuDa	DLE-161	097	N/A	Sep. 30, 2024	Sep. 29, 2025
11	Test Cable	N/A	R-01	N/A	N/A	Sep. 30, 2024	Sep. 29, 2025
12	Test Cable	N/A	R-02	N/A	N/A	Sep. 30, 2024	Sep. 29, 2025
13	Test Cable	N/A	R-03	N/A	N/A	Sep. 30, 2024	Sep. 29, 2025
14	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	Sep. 29, 2024	Sep. 28, 2025
15	EMC Software	Frad	EZ-EMC	Ver.EMC-CO N 3A1.1	N/A	\	\
16	Turntable	MF	MF-7802BS	N/A	N/A	\	\
17	Antenna tower	MF	MF-7802BS	N/A	N/A	\	\

RF Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	N9020A	MY55370835	A.17.05	Sep. 29, 2024	Sep. 28, 2025



2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Sep. 30, 2024	Sep. 29, 2025
3	Test Cable	N/A	RF-01	N/A	N/A	Sep. 30, 2024	Sep. 29, 2025
4	Test Cable	N/A	RF-02	N/A	N/A	Sep. 30, 2024	Sep. 29, 2025
5	Test Cable	N/A	RF-03	N/A	N/A	Sep. 30, 2024	Sep. 29, 2025
6	ESG Signal Generator	Agilent	E4421B	GB40051203	B.03.84	Sep. 29, 2024	Sep. 28, 2025
7	Signal Generator	Agilent	N5182A	MY47420215	A.01.87	Sep. 29, 2024	Sep. 28, 2025
8	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	N/A	Sep. 29, 2024	Sep. 28, 2025
9	Van der Hoofden measuring head	Schwarzbeck Mess-elektron ik	VDHH 9502	9502-039	N/A	Sep. 30, 2024	Sep. 29, 2025
10	Wideband Radio Communication Test	R&S	CMW500	106504	V 3.7.22	Sep. 30, 2024	Sep. 29, 2025
11	MWRF Power Meter Test system	MW	MW100-RF CB	10371	N/A	Sep. 29, 2024	Sep. 28, 2025
12	Power Meter	KEYSIGHT	N1912AP	926431	A.05.00	Sep. 29, 2024	Sep. 28, 2025
13	D.C. Power Supply	LongWei	TPR-6405 D	GQ7516	N/A	Sep. 29, 2024	Sep. 28, 2025
14	RF Software	MW	MTS8310	V2.0.0.0	N/A	\	\



4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
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

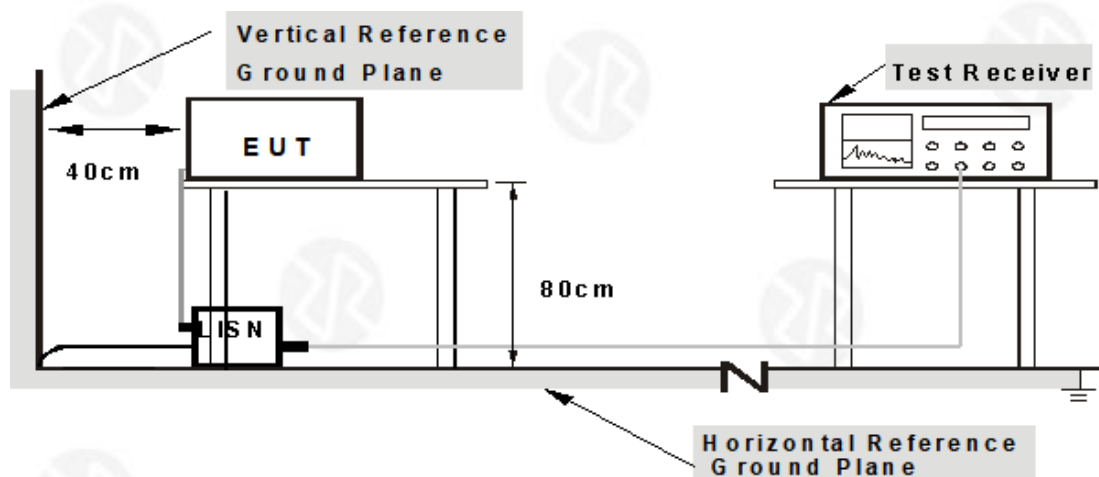
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.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

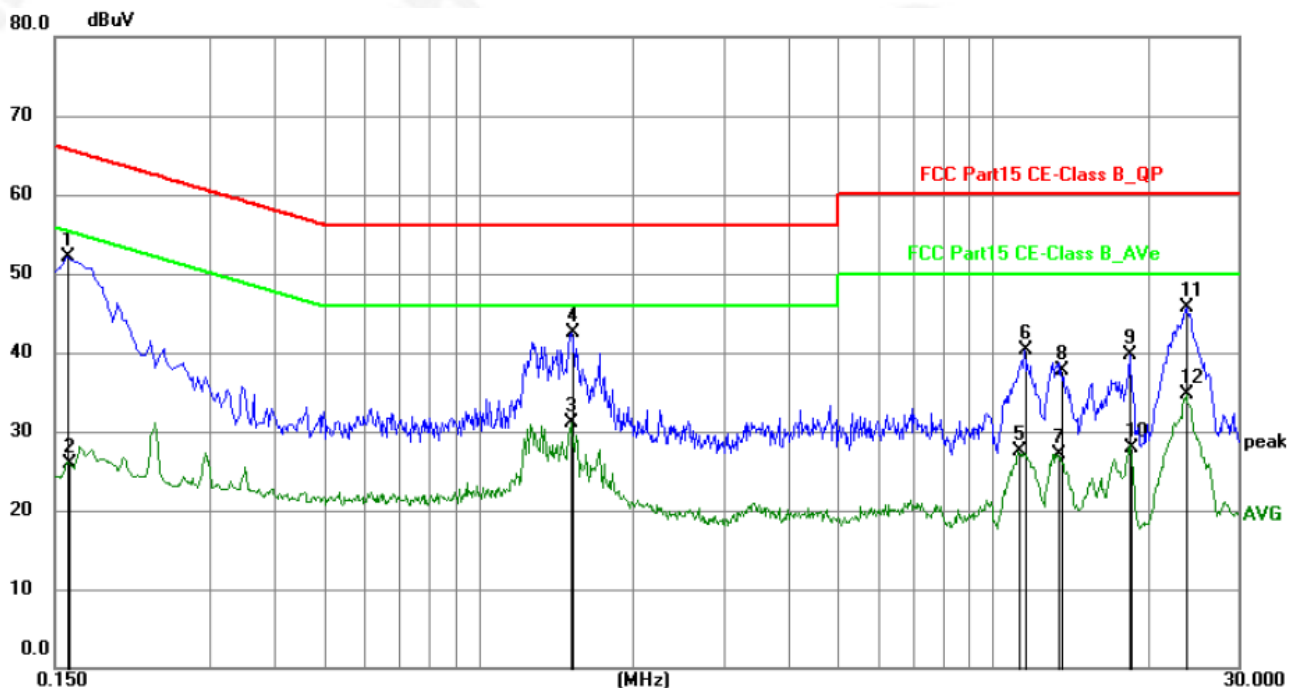
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



4.1.6 TEST RESULT

5.2G:

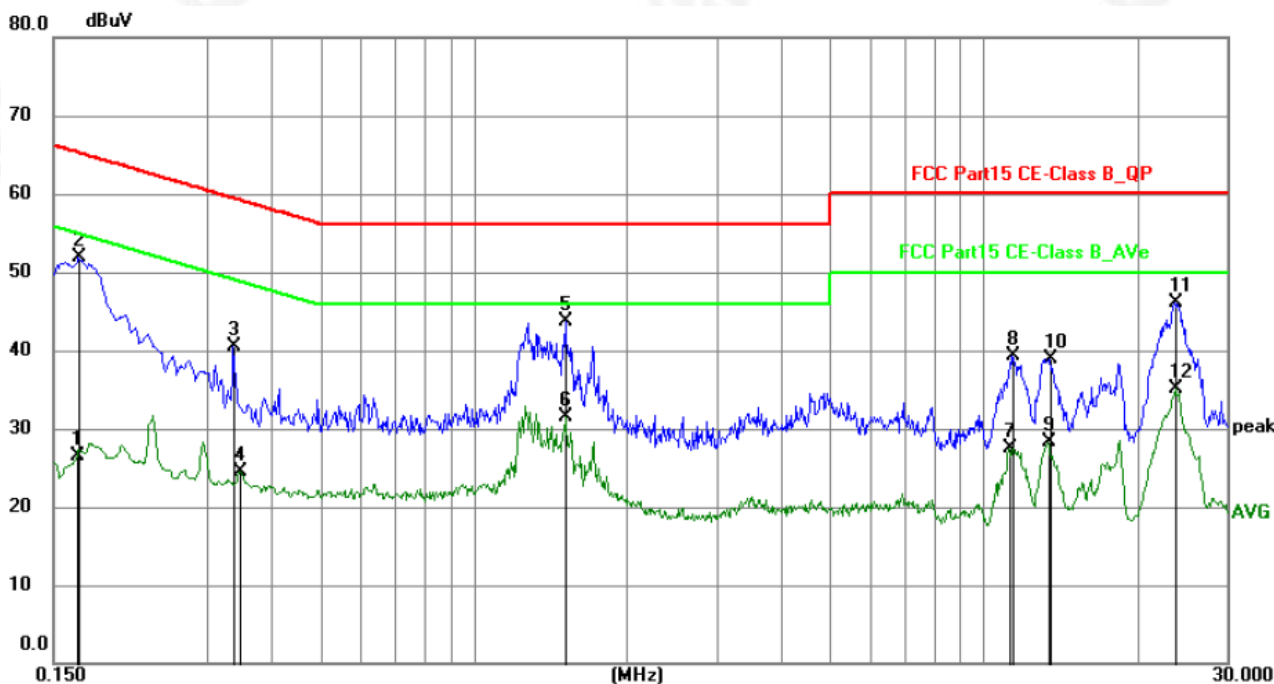
Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	L
Test Voltage:	AC 120V/60Hz	Test Mode:	802.11n20 - 5180MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1590	31.90	20.22	52.12	65.52	-13.40	QP	P
2	0.1597	5.73	20.22	25.95	55.48	-29.53	AVG	P
3	1.5179	10.85	20.30	31.15	46.00	-14.85	AVG	P
4	1.5267	22.11	20.30	42.41	56.00	-13.59	QP	P
5	11.2469	6.98	20.46	27.44	50.00	-22.56	AVG	P
6	11.5304	19.88	20.47	40.35	60.00	-19.65	QP	P
7	13.3933	6.63	20.47	27.10	50.00	-22.90	AVG	P
8	13.5510	17.18	20.47	37.65	60.00	-22.35	QP	P
9	18.4649	19.15	20.50	39.65	60.00	-20.35	QP	P
10	18.5685	7.45	20.50	27.95	50.00	-22.05	AVG	P
11	23.8515	25.03	20.60	45.63	60.00	-14.37	QP	P
12	23.8515	14.02	20.60	34.62	50.00	-15.38	AVG	P



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



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1665	6.22	20.23	26.45	55.13	-28.68	AVG	P
2	0.1680	31.66	20.24	51.90	65.06	-13.16	QP	P
3	0.3390	20.09	20.34	40.43	59.23	-18.80	QP	P
4	0.3478	4.18	20.34	24.52	49.01	-24.49	AVG	P
5	1.5179	23.33	20.30	43.63	56.00	-12.37	QP	P
6	1.5179	11.30	20.30	31.60	46.00	-14.40	AVG	P
7	11.2514	6.98	20.47	27.45	50.00	-22.55	AVG	P
8	11.4135	18.80	20.48	39.28	60.00	-20.72	QP	P
9	13.3665	7.74	20.49	28.23	50.00	-21.77	AVG	P
10	13.5419	18.45	20.49	38.94	60.00	-21.06	QP	P
11	23.6848	25.49	20.63	46.12	60.00	-13.88	QP	P
12	23.8515	14.45	20.63	35.08	50.00	-14.92	AVG	P

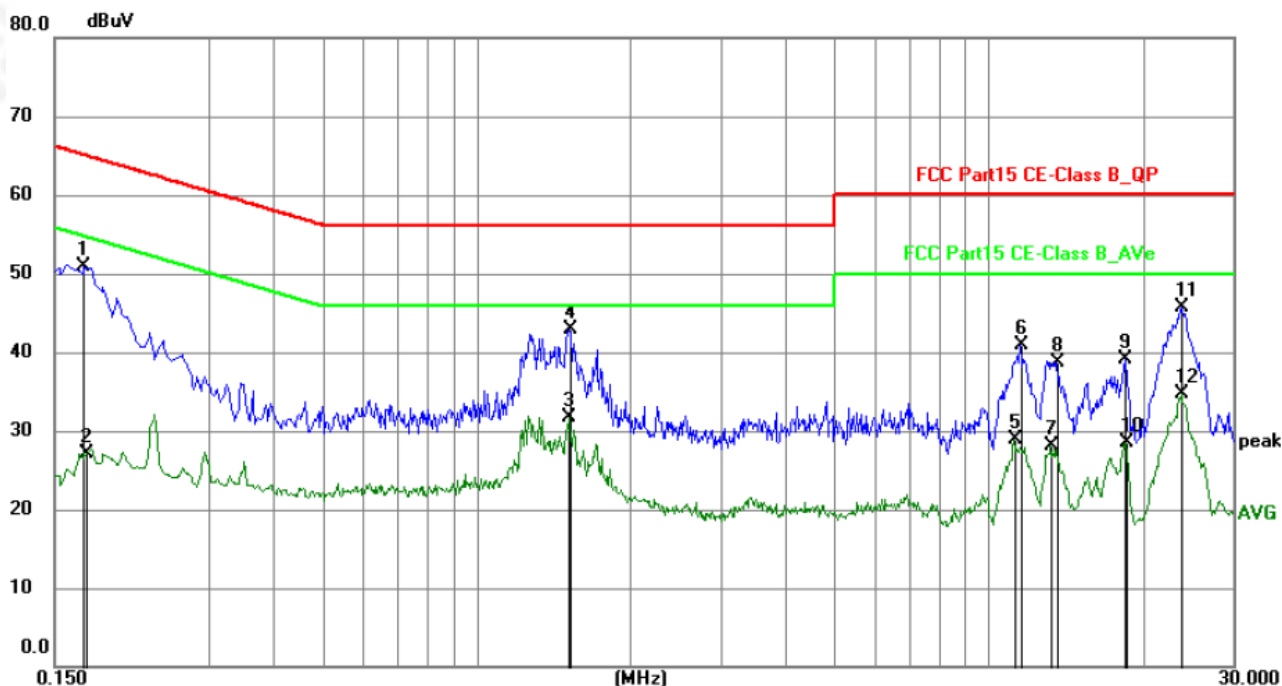
Notes:

- 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.Mesurement Level = Reading level + Correct Factor
- 4.The test data shows only the worst case 802.11n20 - 5180MHz.



5.8G:

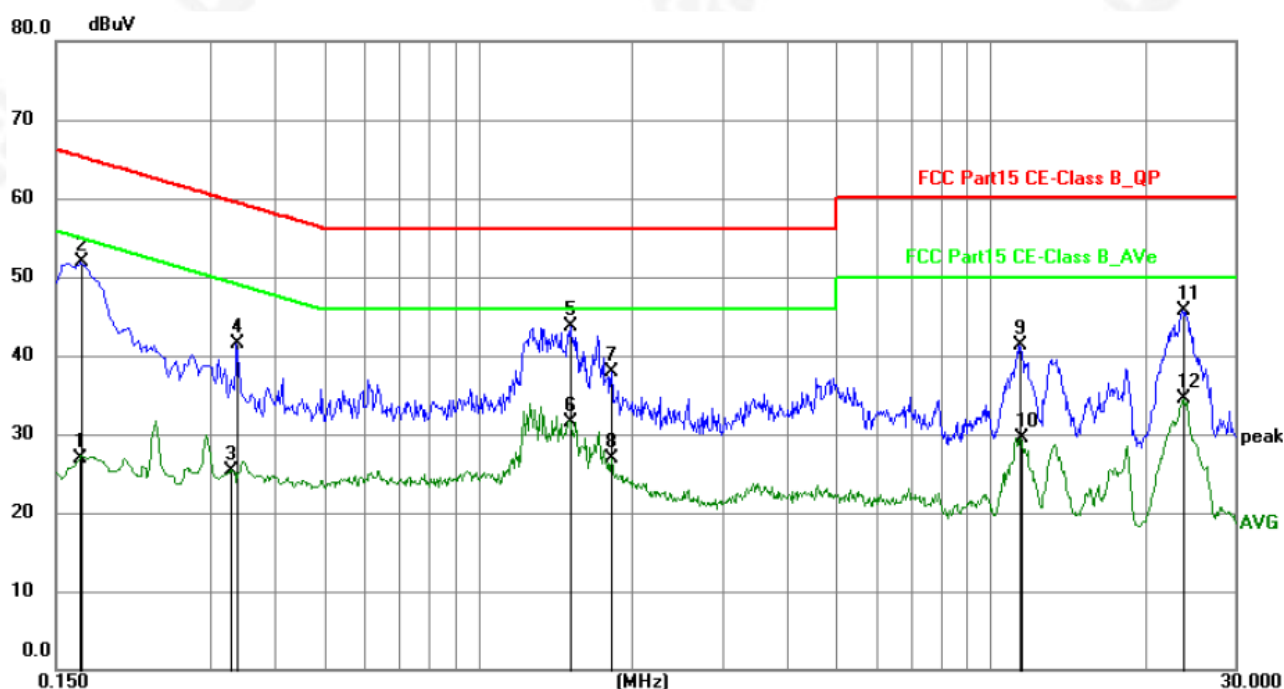
Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	L
Test Voltage:	AC 120V/60Hz	Test Mode:	802.11n20 - 5745MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1711	30.61	20.26	50.87	64.91	-14.04	QP	P
2	0.1728	6.78	20.27	27.05	54.82	-27.77	AVG	P
3	1.5179	11.35	20.30	31.65	46.00	-14.35	AVG	P
4	1.5265	22.61	20.30	42.91	56.00	-13.09	QP	P
5	11.2469	8.48	20.46	28.94	50.00	-21.06	AVG	P
6	11.5304	20.38	20.47	40.85	60.00	-19.15	QP	P
7	13.2270	7.56	20.47	28.03	50.00	-21.97	AVG	P
8	13.5510	18.18	20.47	38.65	60.00	-21.35	QP	P
9	18.4649	18.65	20.50	39.15	60.00	-20.85	QP	P
10	18.5685	7.95	20.50	28.45	50.00	-21.55	AVG	P
11	23.8515	25.03	20.60	45.63	60.00	-14.37	QP	P
12	23.8515	14.02	20.60	34.62	50.00	-15.38	AVG	P



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



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1665	6.72	20.23	26.95	55.13	-28.18	AVG	P
2	0.1680	31.66	20.24	51.90	65.06	-13.16	QP	P
3	0.3300	5.06	20.34	25.40	49.45	-24.05	AVG	P
4	0.3390	21.09	20.34	41.43	59.23	-17.80	QP	P
5	1.5179	23.33	20.30	43.63	56.00	-12.37	QP	P
6	1.5179	11.30	20.30	31.60	46.00	-14.40	AVG	P
7	1.8191	17.55	20.31	37.86	56.00	-18.14	QP	P
8	1.8191	6.56	20.31	26.87	46.00	-19.13	AVG	P
9	11.4135	20.80	20.48	41.28	60.00	-18.72	QP	P
10	11.4584	8.95	20.48	29.43	50.00	-20.57	AVG	P
11	23.6847	24.99	20.63	45.62	60.00	-14.38	QP	P
12	23.8515	13.95	20.63	34.58	50.00	-15.42	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. Measurement Level = Reading level + Correct Factor
4. The test data shows only the worst case 802.11n20 - 5745MHz.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(d) and 15.209

4.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b)(7): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to FCC Part 15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	20 log (uV/m)	300
0.490~1.705	2400/F(KHz)	20 log (uV/m)	30
1.705~30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Remark :1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);

Limit line=Specific limits(dBuV) + distance extrapolation factor.

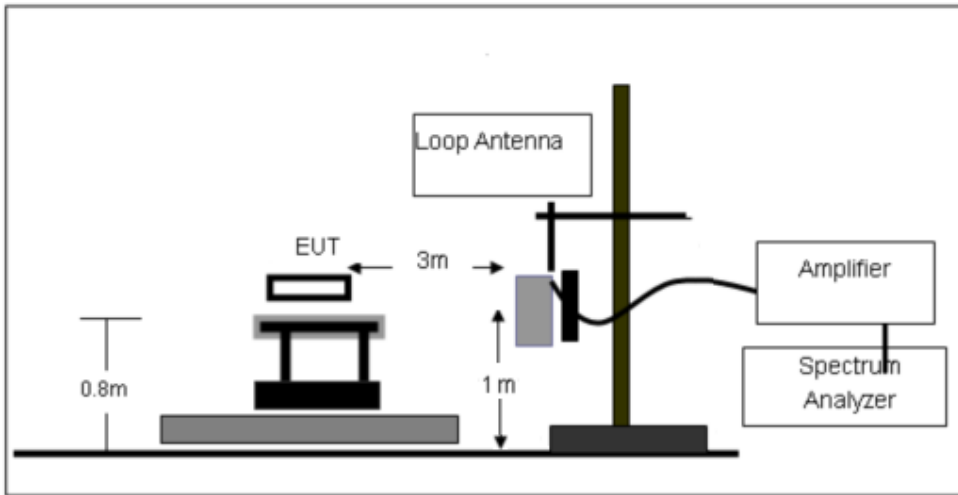
4.2.3 MEASURING INSTRUMENTS

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

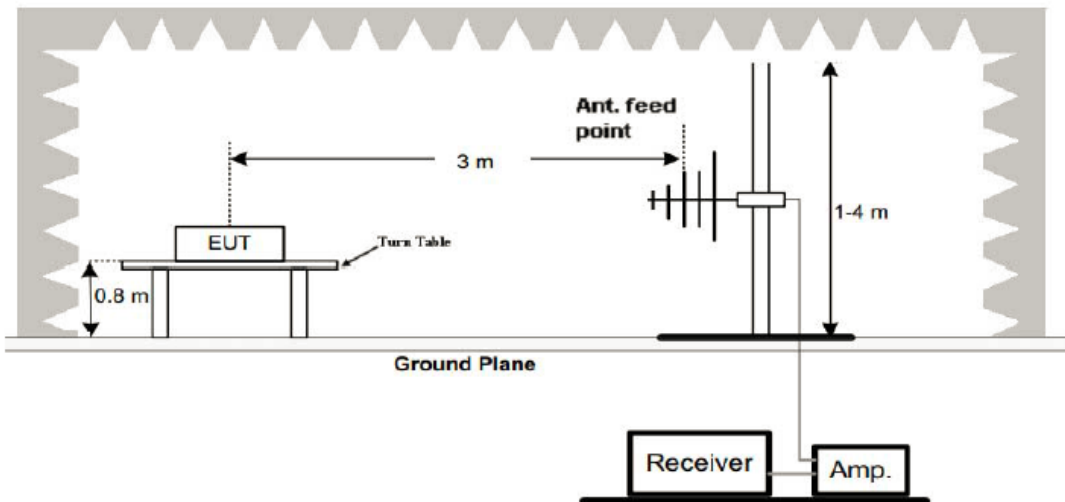


4.2.4 TEST CONFIGURATION

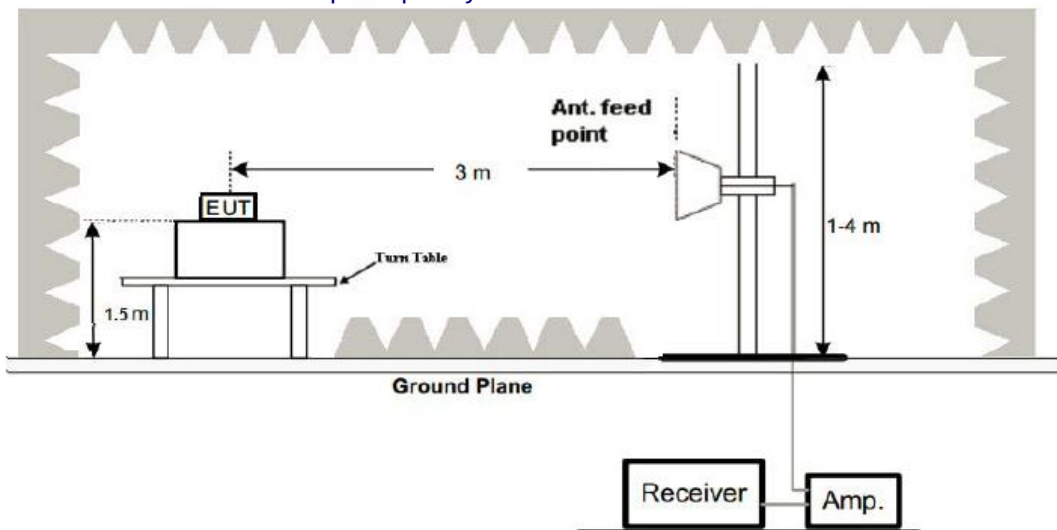
1. For radiated emissions below 30MHz



2. For radiated emissions from 30MHz to 1000MHz



3. Radiated Emission Test-Up Frequency Above 1GHz





4.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

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

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

- 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 TEST RESULT

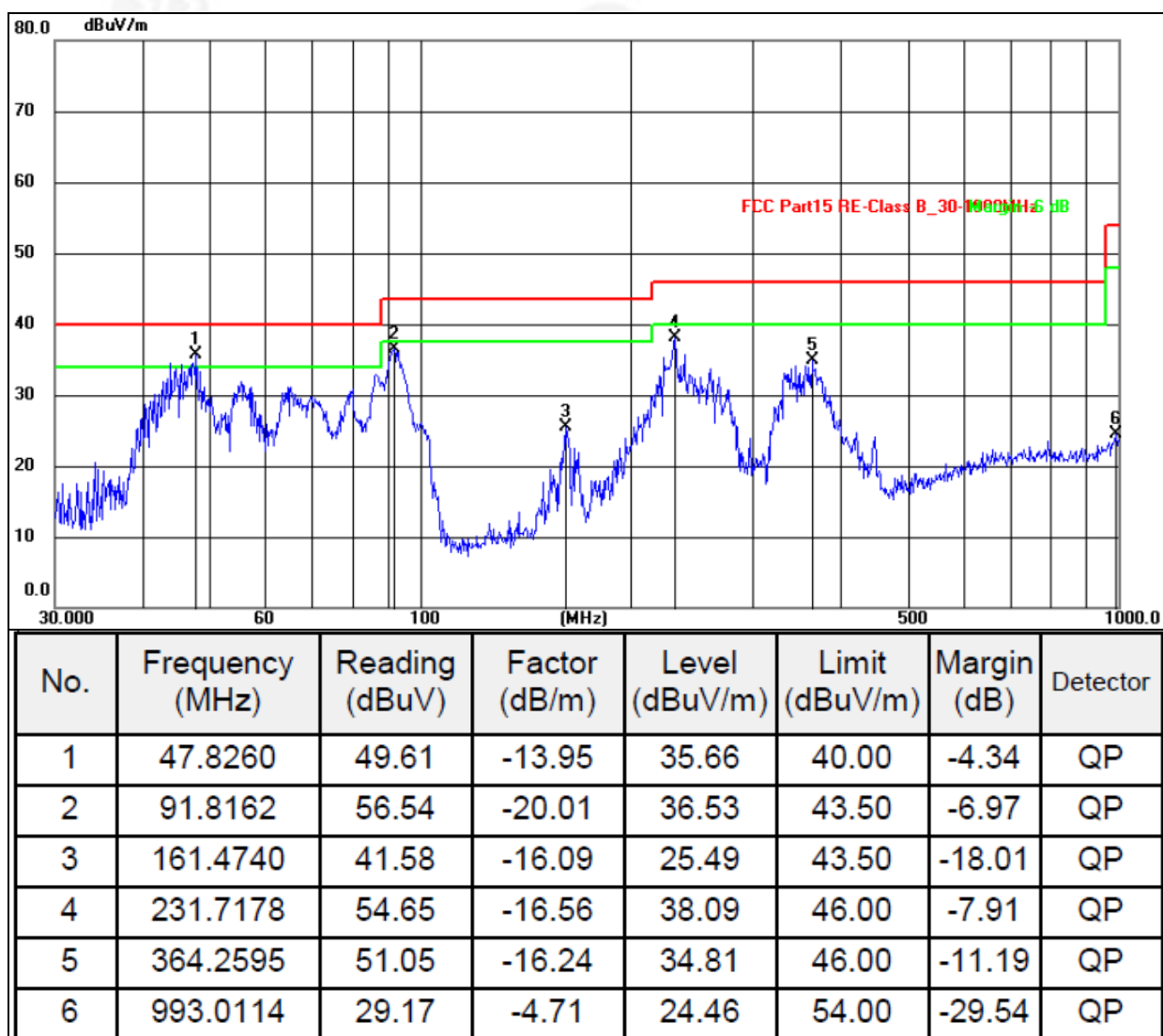
Between 9KHz – 30MHz

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

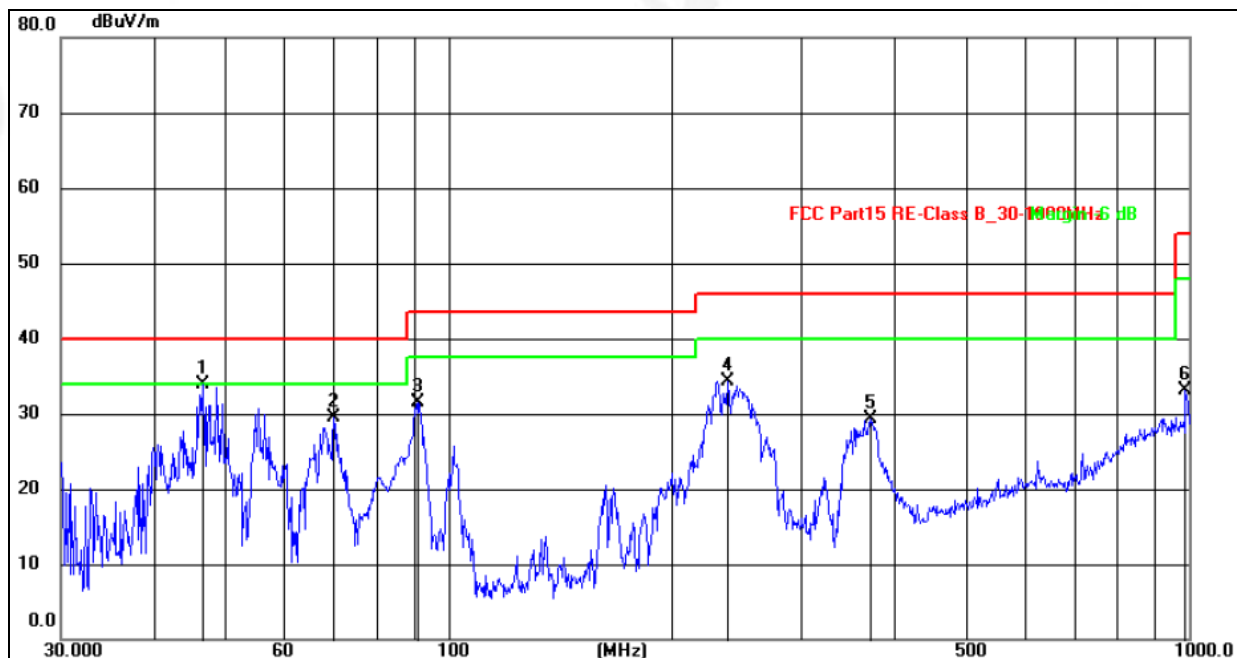
5.2G:

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 24V	Test Mode :	TX 802.11n20 - 5180MHz





Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 24V	Test Mode :	TX 802.11n20 - 5180MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	46.6663	50.96	-17.04	33.92	40.00	-6.08	QP
2	70.0902	48.77	-19.25	29.52	40.00	-10.48	QP
3	91.1745	52.82	-21.35	31.47	43.50	-12.03	QP
4	238.3101	54.21	-19.93	34.28	46.00	-11.72	QP
5	372.0045	44.77	-15.47	29.30	46.00	-16.70	QP
6	989.5354	33.13	0.04	33.17	54.00	-20.83	QP

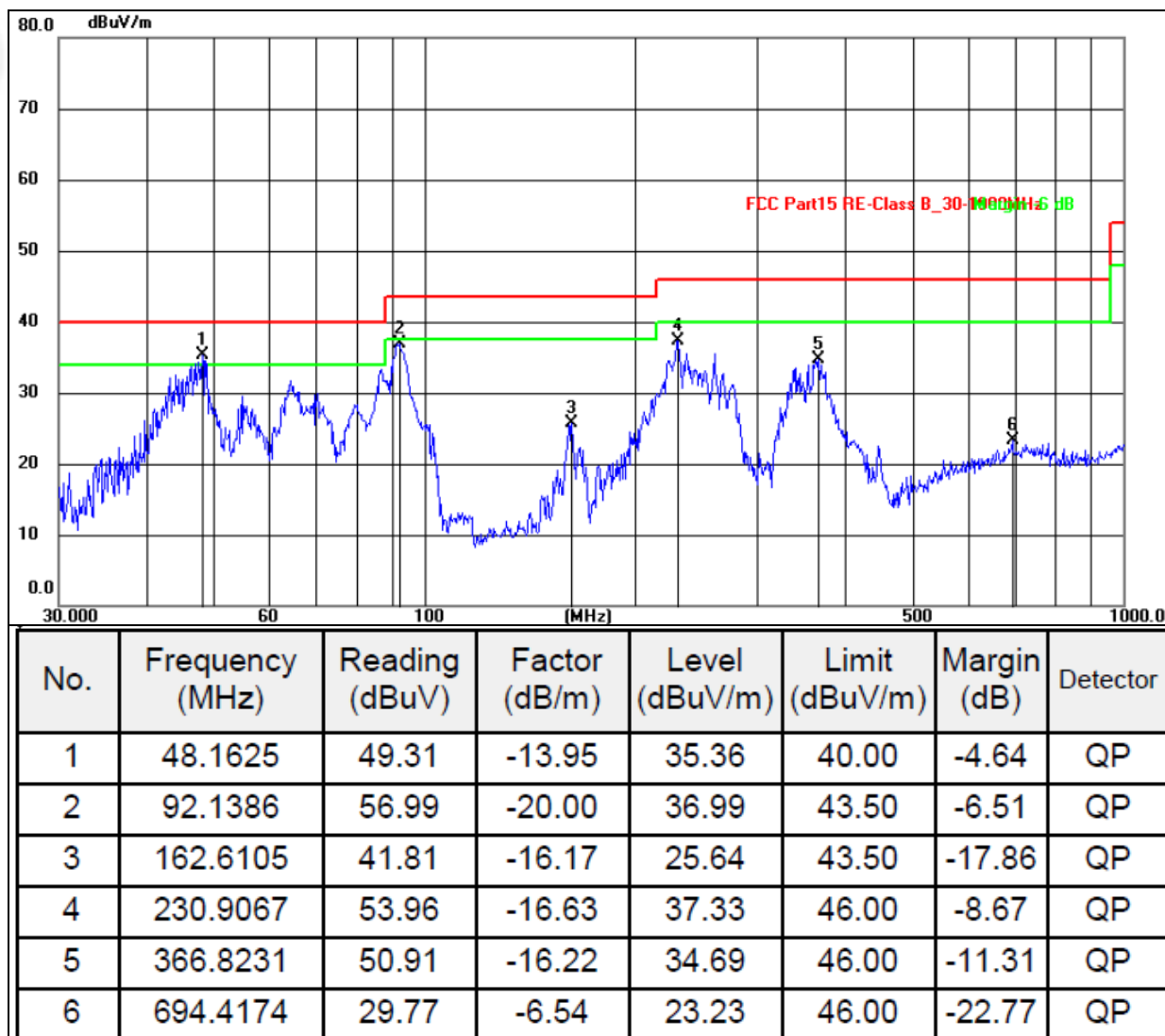
Remarks:

- 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.All modes were tested, and only the worst test data was recorded is 802.11n20 - 5180MHz.



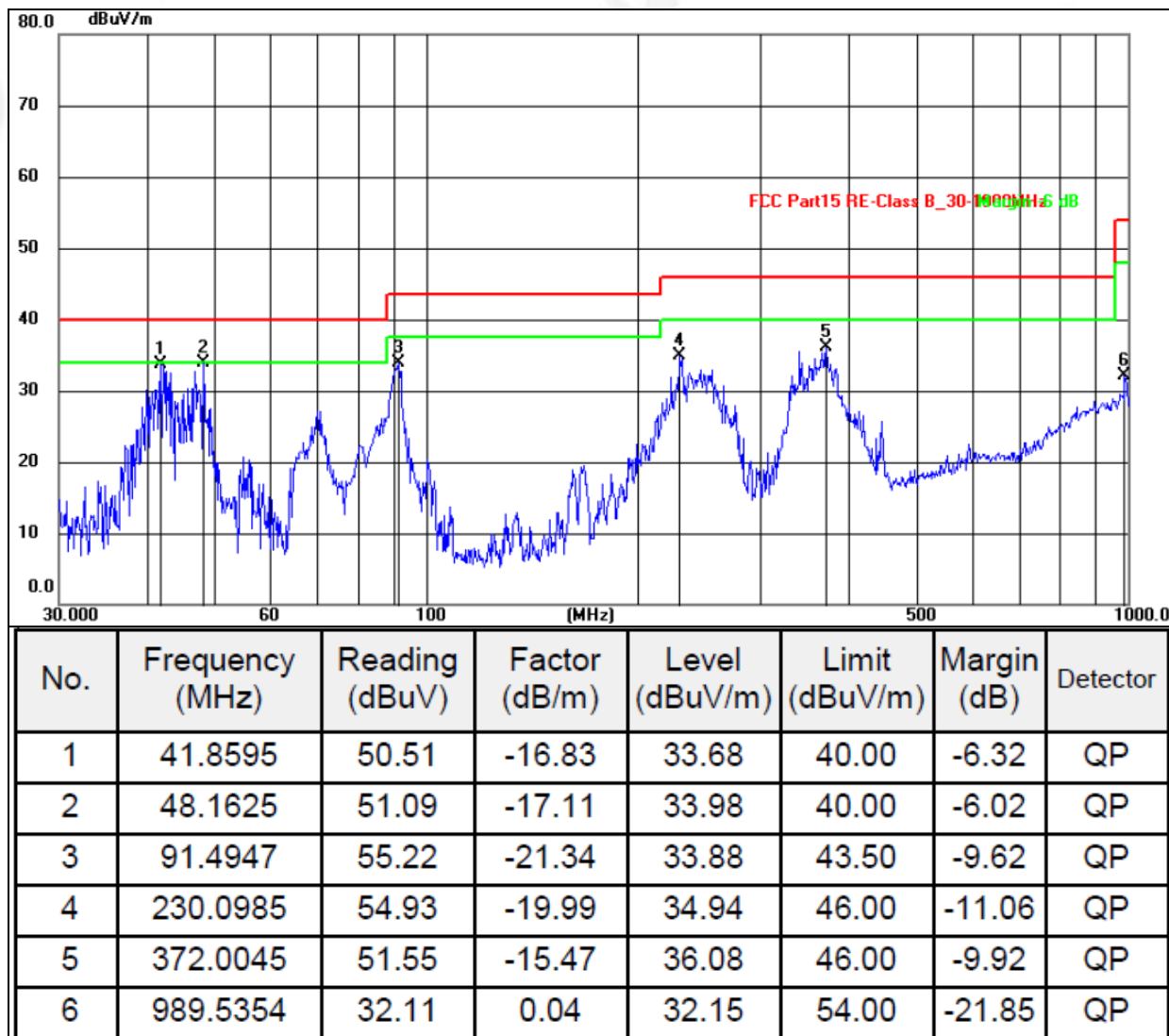
5.8G:

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 24V	Test Mode :	TX 802.11n20 - 5745MHz





Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 24V	Test Mode :	TX 802.11n20 - 5745MHz



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.All modes were tested, and only the worst test data was recorded is 802.11n20 - 5745MHz.



Between 1GHz – 40GHz

Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 24V
Test Mode :	5.2G TX - 802.11a/ n20/ ac20/ n40/ ac40/ac80		
Note: All patterns have been tested, and only the worst test data recorded in this report is 802.11a/n20/ac20.			

802.11a

Polar (H/V)	Frequency	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	5150.00	41.66	30.45	8.77	38.66	58.64	74.00	-15.36	PK
V	5150.00	31.54	30.45	8.77	38.66	48.52	54.00	-5.48	AV
V	10360.00	52.14	30.55	5.77	24.66	52.02	74.00	-21.98	PK
V	10360.00	42.99	30.55	5.77	24.66	42.87	54.00	-11.13	AV
V	15540.00	53.77	30.33	6.32	24.55	54.31	74.00	-19.69	PK
V	15540.00	42.88	30.33	6.32	24.55	43.42	54.00	-10.58	AV
V	20720.00	49.66	30.85	7.45	24.69	50.95	74.00	-23.05	PK
V	20720.00	42.91	30.85	7.45	24.69	44.20	54.00	-9.80	AV
V	25900.00	51.55	31.02	8.99	25.57	55.09	74.00	-18.91	PK
V	25900.00	42.75	31.02	8.99	25.57	46.29	54.00	-7.71	AV
H	5150.00	41.58	30.45	8.77	38.66	58.56	74.00	-15.44	PK
H	5150.00	31.69	30.45	8.77	38.66	48.67	54.00	-5.33	AV
H	10360.00	50.15	30.55	5.77	24.66	50.03	74.00	-23.97	PK
H	10360.00	42.44	30.55	5.77	24.66	42.32	54.00	-11.68	AV
H	15540.00	53.15	30.33	6.32	24.55	53.69	74.00	-20.31	PK
H	15540.00	42.99	30.33	6.32	24.55	43.53	54.00	-10.47	AV
H	20720.00	51.14	30.85	7.45	24.69	52.43	74.00	-21.57	PK
H	20720.00	43.04	30.85	7.45	24.69	44.33	54.00	-9.67	AV
H	25900.00	50.15	31.02	8.99	25.57	53.69	74.00	-20.31	PK
H	25900.00	42.83	31.02	8.99	25.57	46.37	54.00	-7.63	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	5150.00	40.33	30.45	8.77	38.66	57.31	74.00	-16.69	PK
V	5150.00	29.89	30.45	8.77	38.66	46.87	54.00	-7.13	AV
V	10400.00	50.33	30.55	5.77	24.66	50.21	74.00	-23.79	PK
V	10400.00	41.17	30.55	5.77	24.66	41.05	54.00	-12.95	AV
V	15600.00	51.91	30.33	6.32	24.55	52.45	74.00	-21.55	PK
V	15600.00	40.62	30.33	6.32	24.55	41.16	54.00	-12.84	AV
V	20800.00	47.73	30.85	7.45	24.69	49.02	74.00	-24.98	PK
V	20800.00	40.84	30.85	7.45	24.69	42.13	54.00	-11.87	AV
V	26000.00	49.76	31.02	8.99	25.57	53.30	74.00	-20.70	PK
V	26000.00	40.73	31.02	8.99	25.57	44.27	54.00	-9.73	AV
H	5150.00	39.85	30.45	8.77	38.66	56.83	74.00	-17.17	PK
H	5150.00	29.90	30.45	8.77	38.66	46.88	54.00	-7.12	AV
H	10400.00	47.94	30.55	5.77	24.66	47.82	74.00	-26.18	PK
H	10400.00	40.73	30.55	5.77	24.66	40.61	54.00	-13.39	AV
H	15600.00	50.80	30.33	6.32	24.55	51.34	74.00	-22.66	PK



H	15600.00	40.89	30.33	6.32	24.55	41.43	54.00	-12.57	AV
H	20800.00	49.06	30.85	7.45	24.69	50.35	74.00	-23.65	PK
H	20800.00	41.34	30.85	7.45	24.69	42.63	54.00	-11.37	AV
H	26000.00	48.43	31.02	8.99	25.57	51.97	74.00	-22.03	PK
H	26000.00	41.24	31.02	8.99	25.57	44.78	54.00	-9.22	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detect or Type
High Channel:5240MHz									
V	5350.00	40.63	30.45	8.77	38.66	57.61	74.00	-16.39	PK
V	5350.00	30.98	30.45	8.77	38.66	47.96	54.00	-6.04	AV
V	10480.00	50.89	30.55	5.77	24.66	50.77	74.00	-23.23	PK
V	10480.00	41.60	30.55	5.77	24.66	41.48	54.00	-12.52	AV
V	15720.00	52.78	30.33	6.32	24.55	53.32	74.00	-20.68	PK
V	15720.00	42.09	30.33	6.32	24.55	42.63	54.00	-11.37	AV
V	20960.00	48.61	30.85	7.45	24.69	49.90	74.00	-24.10	PK
V	20960.00	41.56	30.85	7.45	24.69	42.85	54.00	-11.15	AV
V	26200.00	50.86	31.02	8.99	25.57	54.40	74.00	-19.60	PK
V	26200.00	41.55	31.02	8.99	25.57	45.09	54.00	-8.91	AV
H	5350.00	40.65	30.45	8.77	38.66	57.63	74.00	-16.37	PK
H	5350.00	31.09	30.45	8.77	38.66	48.07	54.00	-5.93	AV
H	10480.00	48.90	30.55	5.77	24.66	48.78	74.00	-25.22	PK
H	10480.00	42.02	30.55	5.77	24.66	41.90	54.00	-12.10	AV
H	15720.00	51.57	30.33	6.32	24.55	52.11	74.00	-21.89	PK
H	15720.00	41.46	30.33	6.32	24.55	42.00	54.00	-12.00	AV
H	20960.00	49.92	30.85	7.45	24.69	51.21	74.00	-22.79	PK
H	20960.00	42.11	30.85	7.45	24.69	43.40	54.00	-10.60	AV
H	26200.00	49.10	31.02	8.99	25.57	52.64	74.00	-21.36	PK
H	26200.00	42.17	31.02	8.99	25.57	45.71	54.00	-8.29	AV

Remark:

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



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	5150.00	42.01	30.45	8.77	38.66	58.99	74.00	-15.01	PK
V	5150.00	31.89	30.45	8.77	38.66	48.87	54.00	-5.13	AV
V	10360.00	52.49	30.55	5.77	24.66	52.37	74.00	-21.63	PK
V	10360.00	43.34	30.55	5.77	24.66	43.22	54.00	-10.78	AV
V	15540.00	54.12	30.33	6.32	24.55	54.66	74.00	-19.34	PK
V	15540.00	43.23	30.33	6.32	24.55	43.77	54.00	-10.23	AV
V	20720.00	50.01	30.85	7.45	24.69	51.30	74.00	-22.70	PK
V	20720.00	43.26	30.85	7.45	24.69	44.55	54.00	-9.45	AV
V	25900.00	51.90	31.02	8.99	25.57	55.44	74.00	-18.56	PK
V	25900.00	43.10	31.02	8.99	25.57	46.64	54.00	-7.36	AV
H	5150.00	41.93	30.45	8.77	38.66	58.91	74.00	-15.09	PK
H	5150.00	32.04	30.45	8.77	38.66	49.02	54.00	-4.98	AV
H	10360.00	50.50	30.55	5.77	24.66	50.38	74.00	-23.62	PK
H	10360.00	42.79	30.55	5.77	24.66	42.67	54.00	-11.33	AV
H	15540.00	53.50	30.33	6.32	24.55	54.04	74.00	-19.96	PK
H	15540.00	43.34	30.33	6.32	24.55	43.88	54.00	-10.12	AV
H	20720.00	51.49	30.85	7.45	24.69	52.78	74.00	-21.22	PK
H	20720.00	43.39	30.85	7.45	24.69	44.68	54.00	-9.32	AV
H	25900.00	50.50	31.02	8.99	25.57	54.04	74.00	-19.96	PK
H	25900.00	43.18	31.02	8.99	25.57	46.72	54.00	-7.28	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	5150.00	41.59	30.45	8.77	38.66	58.57	74.00	-15.43	PK
V	5150.00	31.15	30.45	8.77	38.66	48.13	54.00	-5.87	AV
V	10400.00	51.59	30.55	5.77	24.66	51.47	74.00	-22.53	PK
V	10400.00	42.43	30.55	5.77	24.66	42.31	54.00	-11.69	AV
V	15600.00	53.17	30.33	6.32	24.55	53.71	74.00	-20.29	PK
V	15600.00	41.88	30.33	6.32	24.55	42.42	54.00	-11.58	AV
V	20800.00	48.99	30.85	7.45	24.69	50.28	74.00	-23.72	PK
V	20800.00	42.10	30.85	7.45	24.69	43.39	54.00	-10.61	AV
V	26000.00	51.02	31.02	8.99	25.57	54.56	74.00	-19.44	PK
V	26000.00	41.99	31.02	8.99	25.57	45.53	54.00	-8.47	AV
H	5150.00	41.11	30.45	8.77	38.66	58.09	74.00	-15.91	PK
H	5150.00	31.16	30.45	8.77	38.66	48.14	54.00	-5.86	AV
H	10400.00	49.20	30.55	5.77	24.66	49.08	74.00	-24.92	PK
H	10400.00	41.99	30.55	5.77	24.66	41.87	54.00	-12.13	AV
H	15600.00	52.06	30.33	6.32	24.55	52.60	74.00	-21.40	PK
H	15600.00	42.15	30.33	6.32	24.55	42.69	54.00	-11.31	AV
H	20800.00	50.32	30.85	7.45	24.69	51.61	74.00	-22.39	PK
H	20800.00	42.60	30.85	7.45	24.69	43.89	54.00	-10.11	AV
H	26000.00	49.69	31.02	8.99	25.57	53.23	74.00	-20.77	PK
H	26000.00	42.50	31.02	8.99	25.57	46.04	54.00	-7.96	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	5350.00	40.83	30.45	8.77	38.66	57.81	74.00	-16.19	PK
V	5350.00	31.18	30.45	8.77	38.66	48.16	54.00	-5.84	AV
V	10480.00	51.09	30.55	5.77	24.66	50.97	74.00	-23.03	PK
V	10480.00	41.80	30.55	5.77	24.66	41.68	54.00	-12.32	AV
V	15720.00	52.98	30.33	6.32	24.55	53.52	74.00	-20.48	PK
V	15720.00	42.29	30.33	6.32	24.55	42.83	54.00	-11.17	AV
V	20960.00	48.81	30.85	7.45	24.69	50.10	74.00	-23.90	PK
V	20960.00	41.76	30.85	7.45	24.69	43.05	54.00	-10.95	AV
V	26200.00	51.06	31.02	8.99	25.57	54.60	74.00	-19.40	PK
V	26200.00	41.75	31.02	8.99	25.57	45.29	54.00	-8.71	AV
H	5350.00	40.85	30.45	8.77	38.66	57.83	74.00	-16.17	PK
H	5350.00	31.29	30.45	8.77	38.66	48.27	54.00	-5.73	AV
H	10480.00	49.10	30.55	5.77	24.66	48.98	74.00	-25.02	PK
H	10480.00	42.22	30.55	5.77	24.66	42.10	54.00	-11.90	AV
H	15720.00	51.77	30.33	6.32	24.55	52.31	74.00	-21.69	PK
H	15720.00	41.66	30.33	6.32	24.55	42.20	54.00	-11.80	AV
H	20960.00	50.12	30.85	7.45	24.69	51.41	74.00	-22.59	PK
H	20960.00	42.31	30.85	7.45	24.69	43.60	54.00	-10.40	AV
H	26200.00	49.30	31.02	8.99	25.57	52.84	74.00	-21.16	PK
H	26200.00	42.37	31.02	8.99	25.57	45.91	54.00	-8.09	AV

Remark:

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



802.11ac20

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Low Channel:5180MHz									
V	5150.00	41.83	30.45	8.77	38.66	58.81	74.00	-15.19	PK
V	5150.00	31.71	30.45	8.77	38.66	48.69	54.00	-5.31	AV
V	10360.00	52.31	30.55	5.77	24.66	52.19	74.00	-21.81	PK
V	10360.00	43.16	30.55	5.77	24.66	43.04	54.00	-10.96	AV
V	15540.00	53.94	30.33	6.32	24.55	54.48	74.00	-19.52	PK
V	15540.00	43.05	30.33	6.32	24.55	43.59	54.00	-10.41	AV
V	20720.00	49.83	30.85	7.45	24.69	51.12	74.00	-22.88	PK
V	20720.00	43.08	30.85	7.45	24.69	44.37	54.00	-9.63	AV
V	25900.00	51.72	31.02	8.99	25.57	55.26	74.00	-18.74	PK
V	25900.00	42.92	31.02	8.99	25.57	46.46	54.00	-7.54	AV
H	5150.00	41.75	30.45	8.77	38.66	58.73	74.00	-15.27	PK
H	5150.00	31.86	30.45	8.77	38.66	48.84	54.00	-5.16	AV
H	10360.00	50.32	30.55	5.77	24.66	50.20	74.00	-23.80	PK
H	10360.00	42.61	30.55	5.77	24.66	42.49	54.00	-11.51	AV
H	15540.00	53.32	30.33	6.32	24.55	53.86	74.00	-20.14	PK
H	15540.00	43.16	30.33	6.32	24.55	43.70	54.00	-10.30	AV
H	20720.00	51.31	30.85	7.45	24.69	52.60	74.00	-21.40	PK
H	20720.00	43.21	30.85	7.45	24.69	44.50	54.00	-9.50	AV
H	25900.00	50.32	31.02	8.99	25.57	53.86	74.00	-20.14	PK
H	25900.00	43.00	31.02	8.99	25.57	46.54	54.00	-7.46	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	5150.00	40.72	30.45	8.77	38.66	57.70	74.00	-16.30	PK
V	5150.00	30.28	30.45	8.77	38.66	47.26	54.00	-6.74	AV
V	10400.00	50.72	30.55	5.77	24.66	50.60	74.00	-23.40	PK
V	10400.00	41.56	30.55	5.77	24.66	41.44	54.00	-12.56	AV
V	15600.00	52.30	30.33	6.32	24.55	52.84	74.00	-21.16	PK
V	15600.00	41.01	30.33	6.32	24.55	41.55	54.00	-12.45	AV
V	20800.00	48.12	30.85	7.45	24.69	49.41	74.00	-24.59	PK
V	20800.00	41.23	30.85	7.45	24.69	42.52	54.00	-11.48	AV
V	26000.00	50.15	31.02	8.99	25.57	53.69	74.00	-20.31	PK
V	26000.00	41.12	31.02	8.99	25.57	44.66	54.00	-9.34	AV
H	5150.00	40.24	30.45	8.77	38.66	57.22	74.00	-16.78	PK
H	5150.00	30.29	30.45	8.77	38.66	47.27	54.00	-6.73	AV
H	10400.00	48.33	30.55	5.77	24.66	48.21	74.00	-25.79	PK
H	10400.00	41.12	30.55	5.77	24.66	41.00	54.00	-13.00	AV
H	15600.00	51.19	30.33	6.32	24.55	51.73	74.00	-22.27	PK
H	15600.00	41.28	30.33	6.32	24.55	41.82	54.00	-12.18	AV
H	20800.00	49.45	30.85	7.45	24.69	50.74	74.00	-23.26	PK
H	20800.00	41.73	30.85	7.45	24.69	43.02	54.00	-10.98	AV
H	26000.00	48.82	31.02	8.99	25.57	52.36	74.00	-21.64	PK
H	26000.00	41.63	31.02	8.99	25.57	45.17	54.00	-8.83	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	5350.00	40.70	30.45	8.77	38.66	57.68	74.00	-16.32	PK
V	5350.00	31.05	30.45	8.77	38.66	48.03	54.00	-5.97	AV
V	10480.00	50.96	30.55	5.77	24.66	50.84	74.00	-23.16	PK
V	10480.00	41.67	30.55	5.77	24.66	41.55	54.00	-12.45	AV
V	15720.00	52.85	30.33	6.32	24.55	53.39	74.00	-20.61	PK
V	15720.00	42.16	30.33	6.32	24.55	42.70	54.00	-11.30	AV
V	20960.00	48.68	30.85	7.45	24.69	49.97	74.00	-24.03	PK
V	20960.00	41.63	30.85	7.45	24.69	42.92	54.00	-11.08	AV
V	26200.00	50.93	31.02	8.99	25.57	54.47	74.00	-19.53	PK
V	26200.00	41.62	31.02	8.99	25.57	45.16	54.00	-8.84	AV
H	5350.00	40.72	30.45	8.77	38.66	57.70	74.00	-16.30	PK
H	5350.00	31.16	30.45	8.77	38.66	48.14	54.00	-5.86	AV
H	10480.00	48.97	30.55	5.77	24.66	48.85	74.00	-25.15	PK
H	10480.00	42.09	30.55	5.77	24.66	41.97	54.00	-12.03	AV
H	15720.00	51.64	30.33	6.32	24.55	52.18	74.00	-21.82	PK
H	15720.00	41.53	30.33	6.32	24.55	42.07	54.00	-11.93	AV
H	20960.00	49.99	30.85	7.45	24.69	51.28	74.00	-22.72	PK
H	20960.00	42.18	30.85	7.45	24.69	43.47	54.00	-10.53	AV
H	26200.00	49.17	31.02	8.99	25.57	52.71	74.00	-21.29	PK
H	26200.00	42.24	31.02	8.99	25.57	45.78	54.00	-8.22	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 24V
Test Mode :	5.8G TX - 802.11a/ n20/ ac20/ n40/ ac40/ac80		
Note: All patterns have been tested, and only the worst test data recorded in this report is 802.11a/n20/ac20.			

802.11a

Polar (H/V)	Frequency	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	11490.00	50.21	30.55	5.77	24.66	50.09	74.00	-23.91	PK
V	11490.00	42.49	30.55	5.77	24.66	42.37	54.00	-11.63	AV
V	17235.00	51.48	30.33	6.32	24.55	52.02	68.20	-16.18	PK
V	17235.00	42.01	30.33	6.32	24.55	42.55	54.00	-11.45	AV
V	22980.00	49.09	30.85	7.45	24.69	50.38	74.00	-23.62	PK
V	22980.00	41.94	30.85	7.45	24.69	43.23	54.00	-10.77	AV
V	28725.00	52.34	31.02	8.99	25.57	55.88	68.20	-12.32	PK
V	28725.00	42.16	31.02	8.99	25.57	45.70	54.00	-8.30	AV
H	11490.00	50.96	30.55	5.77	24.66	50.84	74.00	-23.16	PK
H	11490.00	42.46	30.55	5.77	24.66	42.34	54.00	-11.66	AV
H	17235.00	52.97	30.33	6.32	24.55	53.51	68.20	-14.69	PK
H	17235.00	42.17	30.33	6.32	24.55	42.71	54.00	-11.29	AV
H	22980.00	50.93	30.85	7.45	24.69	52.22	74.00	-21.78	PK
H	22980.00	42.40	30.85	7.45	24.69	43.69	54.00	-10.31	AV
H	28725.00	51.52	31.02	8.99	25.57	55.06	68.20	-13.14	PK
H	28725.00	42.63	31.02	8.99	25.57	46.17	54.00	-7.83	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:5785MHz									
V	11570.00	50.36	30.55	5.77	24.66	50.24	74.00	-23.76	PK
V	11570.00	42.75	30.55	5.77	24.66	42.63	54.00	-11.37	AV
V	17355.00	49.50	30.33	6.32	24.55	50.04	68.20	-18.16	PK
V	17355.00	42.55	30.33	6.32	24.55	43.09	54.00	-10.91	AV
V	23140.00	51.58	30.85	7.45	24.69	52.87	68.20	-15.33	PK
V	23140.00	42.36	30.85	7.45	24.69	43.65	54.00	-10.35	AV
V	28925.00	49.53	31.02	8.99	25.57	53.07	68.20	-15.13	PK
V	28925.00	42.58	31.02	8.99	25.57	46.12	54.00	-7.88	AV
H	11570.00	49.71	30.55	5.77	24.66	49.59	74.00	-24.41	PK
H	11570.00	42.83	30.55	5.77	24.66	42.71	54.00	-11.29	AV
H	17355.00	53.94	30.33	6.32	24.55	54.48	68.20	-13.72	PK
H	17355.00	42.36	30.33	6.32	24.55	42.90	54.00	-11.10	AV
H	23140.00	51.45	30.85	7.45	24.69	52.74	68.20	-15.46	PK
H	23140.00	42.77	30.85	7.45	24.69	44.06	54.00	-9.94	AV
H	28925.00	49.35	31.02	8.99	25.57	52.89	68.20	-15.31	PK
H	28925.00	42.95	31.02	8.99	25.57	46.49	54.00	-7.51	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	11650.00	50.84	30.55	5.77	24.66	50.72	74.00	-23.28	PK
V	11650.00	42.65	30.55	5.77	24.66	42.53	54.00	-11.47	AV
V	17475.00	49.53	30.33	6.32	24.55	50.07	68.20	-18.13	PK
V	17475.00	42.40	30.33	6.32	24.55	42.94	54.00	-11.06	AV
V	23300.00	50.60	30.85	7.45	24.69	51.89	68.20	-16.31	PK
V	23300.00	42.49	30.85	7.45	24.69	43.78	54.00	-10.22	AV
V	29125.00	53.18	31.02	8.99	25.57	56.72	68.20	-11.48	PK
V	29125.00	42.43	31.02	8.99	25.57	45.97	54.00	-8.03	AV
H	11650.00	51.83	30.55	5.77	24.66	51.71	74.00	-22.29	PK
H	11650.00	42.19	30.55	5.77	24.66	42.07	54.00	-11.93	AV
H	17475.00	52.42	30.33	6.32	24.55	52.96	68.20	-15.24	PK
H	17475.00	42.63	30.33	6.32	24.55	43.17	54.00	-10.83	AV
H	23300.00	53.26	30.85	7.45	24.69	54.55	68.20	-13.65	PK
H	23300.00	42.43	30.85	7.45	24.69	43.72	54.00	-10.28	AV
H	29125.00	49.25	31.02	8.99	25.57	52.79	68.20	-15.41	PK
H	29125.00	42.81	31.02	8.99	25.57	46.35	54.00	-7.65	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	11490.00	50.58	30.55	5.77	24.66	50.46	74.00	-23.54	PK
V	11490.00	42.86	30.55	5.77	24.66	42.74	54.00	-11.26	AV
V	17235.00	51.85	30.33	6.32	24.55	52.39	68.20	-15.81	PK
V	17235.00	42.38	30.33	6.32	24.55	42.92	54.00	-11.08	AV
V	22980.00	49.46	30.85	7.45	24.69	50.75	74.00	-23.25	PK
V	22980.00	42.31	30.85	7.45	24.69	43.60	54.00	-10.40	AV
V	28725.00	52.71	31.02	8.99	25.57	56.25	68.20	-11.95	PK
V	28725.00	42.53	31.02	8.99	25.57	46.07	54.00	-7.93	AV
H	11490.00	51.33	30.55	5.77	24.66	51.21	74.00	-22.79	PK
H	11490.00	42.83	30.55	5.77	24.66	42.71	54.00	-11.29	AV
H	17235.00	53.34	30.33	6.32	24.55	53.88	68.20	-14.32	PK
H	17235.00	42.54	30.33	6.32	24.55	43.08	54.00	-10.92	AV
H	22980.00	51.30	30.85	7.45	24.69	52.59	74.00	-21.41	PK
H	22980.00	42.77	30.85	7.45	24.69	44.06	54.00	-9.94	AV
H	28725.00	51.89	31.02	8.99	25.57	55.43	68.20	-12.77	PK
H	28725.00	43.00	31.02	8.99	25.57	46.54	54.00	-7.46	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:5785MHz									
V	11570.00	50.59	30.55	5.77	24.66	50.47	74.00	-23.53	PK
V	11570.00	42.98	30.55	5.77	24.66	42.86	54.00	-11.14	AV
V	17355.00	49.73	30.33	6.32	24.55	50.27	68.20	-17.93	PK
V	17355.00	42.78	30.33	6.32	24.55	43.32	54.00	-10.68	AV
V	23140.00	51.81	30.85	7.45	24.69	53.10	68.20	-15.10	PK
V	23140.00	42.59	30.85	7.45	24.69	43.88	54.00	-10.12	AV
V	28925.00	49.76	31.02	8.99	25.57	53.30	68.20	-14.90	PK
V	28925.00	42.81	31.02	8.99	25.57	46.35	54.00	-7.65	AV
H	11570.00	49.94	30.55	5.77	24.66	49.82	74.00	-24.18	PK
H	11570.00	43.06	30.55	5.77	24.66	42.94	54.00	-11.06	AV
H	17355.00	54.17	30.33	6.32	24.55	54.71	68.20	-13.49	PK
H	17355.00	42.59	30.33	6.32	24.55	43.13	54.00	-10.87	AV
H	23140.00	51.68	30.85	7.45	24.69	52.97	68.20	-15.23	PK
H	23140.00	43.00	30.85	7.45	24.69	44.29	54.00	-9.71	AV
H	28925.00	49.58	31.02	8.99	25.57	53.12	68.20	-15.08	PK
H	28925.00	43.18	31.02	8.99	25.57	46.72	54.00	-7.28	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	11650.00	51.09	30.55	5.77	24.66	50.97	74.00	-23.03	PK
V	11650.00	42.90	30.55	5.77	24.66	42.78	54.00	-11.22	AV
V	17475.00	49.78	30.33	6.32	24.55	50.32	68.20	-17.88	PK
V	17475.00	42.65	30.33	6.32	24.55	43.19	54.00	-10.81	AV
V	23300.00	50.85	30.85	7.45	24.69	52.14	68.20	-16.06	PK
V	23300.00	42.74	30.85	7.45	24.69	44.03	54.00	-9.97	AV
V	29125.00	53.43	31.02	8.99	25.57	56.97	68.20	-11.23	PK
V	29125.00	42.68	31.02	8.99	25.57	46.22	54.00	-7.78	AV
H	11650.00	52.08	30.55	5.77	24.66	51.96	74.00	-22.04	PK
H	11650.00	42.44	30.55	5.77	24.66	42.32	54.00	-11.68	AV
H	17475.00	52.67	30.33	6.32	24.55	53.21	68.20	-14.99	PK
H	17475.00	42.88	30.33	6.32	24.55	43.42	54.00	-10.58	AV
H	23300.00	53.51	30.85	7.45	24.69	54.80	68.20	-13.40	PK
H	23300.00	42.68	30.85	7.45	24.69	43.97	54.00	-10.03	AV
H	29125.00	49.50	31.02	8.99	25.57	53.04	68.20	-15.16	PK
H	29125.00	43.06	31.02	8.99	25.57	46.60	54.00	-7.40	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



802.11ac20

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:5745MHz									
V	11490.00	50.66	30.55	5.77	24.66	50.54	74.00	-23.46	PK
V	11490.00	42.94	30.55	5.77	24.66	42.82	54.00	-11.18	AV
V	17235.00	51.93	30.33	6.32	24.55	52.47	68.20	-15.73	PK
V	17235.00	42.46	30.33	6.32	24.55	43.00	54.00	-11.00	AV
V	22980.00	49.54	30.85	7.45	24.69	50.83	74.00	-23.17	PK
V	22980.00	42.39	30.85	7.45	24.69	43.68	54.00	-10.32	AV
V	28725.00	52.79	31.02	8.99	25.57	56.33	68.20	-11.87	PK
V	28725.00	42.61	31.02	8.99	25.57	46.15	54.00	-7.85	AV
H	11490.00	51.41	30.55	5.77	24.66	51.29	74.00	-22.71	PK
H	11490.00	42.91	30.55	5.77	24.66	42.79	54.00	-11.21	AV
H	17235.00	53.42	30.33	6.32	24.55	53.96	68.20	-14.24	PK
H	17235.00	42.62	30.33	6.32	24.55	43.16	54.00	-10.84	AV
H	22980.00	51.38	30.85	7.45	24.69	52.67	74.00	-21.33	PK
H	22980.00	42.85	30.85	7.45	24.69	44.14	54.00	-9.86	AV
H	28725.00	51.97	31.02	8.99	25.57	55.51	68.20	-12.69	PK
H	28725.00	43.08	31.02	8.99	25.57	46.62	54.00	-7.38	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:5785MHz									
V	11570.00	50.71	30.55	5.77	24.66	50.59	74.00	-23.41	PK
V	11570.00	43.10	30.55	5.77	24.66	42.98	54.00	-11.02	AV
V	17355.00	49.85	30.33	6.32	24.55	50.39	68.20	-17.81	PK
V	17355.00	42.90	30.33	6.32	24.55	43.44	54.00	-10.56	AV
V	23140.00	51.93	30.85	7.45	24.69	53.22	68.20	-14.98	PK
V	23140.00	42.71	30.85	7.45	24.69	44.00	54.00	-10.00	AV
V	28925.00	49.88	31.02	8.99	25.57	53.42	68.20	-14.78	PK
V	28925.00	42.93	31.02	8.99	25.57	46.47	54.00	-7.53	AV
H	11570.00	50.06	30.55	5.77	24.66	49.94	74.00	-24.06	PK
H	11570.00	43.18	30.55	5.77	24.66	43.06	54.00	-10.94	AV
H	17355.00	54.29	30.33	6.32	24.55	54.83	68.20	-13.37	PK
H	17355.00	42.71	30.33	6.32	24.55	43.25	54.00	-10.75	AV
H	23140.00	51.80	30.85	7.45	24.69	53.09	68.20	-15.11	PK
H	23140.00	43.12	30.85	7.45	24.69	44.41	54.00	-9.59	AV
H	28925.00	49.70	31.02	8.99	25.57	53.24	68.20	-14.96	PK
H	28925.00	43.30	31.02	8.99	25.57	46.84	54.00	-7.16	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	51.01	30.55	5.77	24.66	50.89	74.00	-23.11	PK
V	11650.00	42.82	30.55	5.77	24.66	42.70	54.00	-11.30	AV
V	17475.00	49.70	30.33	6.32	24.55	50.24	68.20	-17.96	PK
V	17475.00	42.57	30.33	6.32	24.55	43.11	54.00	-10.89	AV
V	23300.00	50.77	30.85	7.45	24.69	52.06	68.20	-16.14	PK
V	23300.00	42.66	30.85	7.45	24.69	43.95	54.00	-10.05	AV
V	29125.00	53.35	31.02	8.99	25.57	56.89	68.20	-11.31	PK
V	29125.00	42.60	31.02	8.99	25.57	46.14	54.00	-7.86	AV
H	11650.00	52.00	30.55	5.77	24.66	51.88	74.00	-22.12	PK
H	11650.00	42.36	30.55	5.77	24.66	42.24	54.00	-11.76	AV
H	17475.00	52.59	30.33	6.32	24.55	53.13	68.20	-15.07	PK
H	17475.00	42.80	30.33	6.32	24.55	43.34	54.00	-10.66	AV
H	23300.00	53.43	30.85	7.45	24.69	54.72	68.20	-13.48	PK
H	23300.00	42.60	30.85	7.45	24.69	43.89	54.00	-10.11	AV
H	29125.00	49.42	31.02	8.99	25.57	52.96	68.20	-15.24	PK
H	29125.00	42.98	31.02	8.99	25.57	46.52	54.00	-7.48	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(3)

Power limits:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.



5.2 TEST PROCEDURE

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

- a) Set $RBW \geq 1/T$, 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 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.



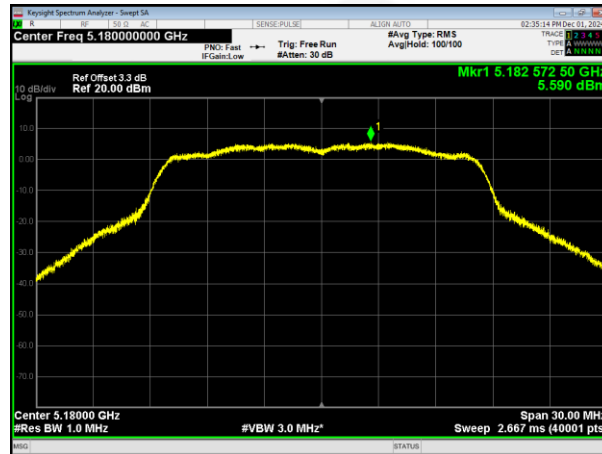
5.6 TEST RESULTS

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1015 hPa	Test Voltage :	DC 24V
Test Band :	5.2G		

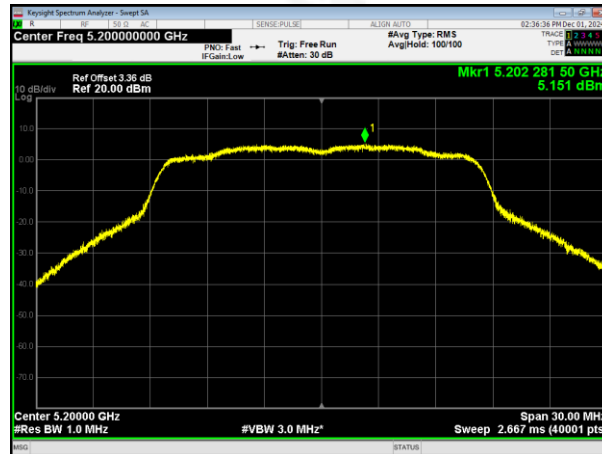
5.2G						
Test mode	Test Channel (MHz)	PSD (dBm)	duty cycle Factor (dB)	Total PSD (dBm)	Limit (dBm/MHz)	Result
802.11a	5180	5.590	0.51	6.100	11	Pass
	5200	5.151	0.51	5.661	11	Pass
	5240	5.622	0.51	6.132	11	Pass
802.11n20	5180	5.215	0.50	5.715	11	Pass
	5200	4.856	0.50	5.356	11	Pass
	5240	5.534	0.50	6.034	11	Pass
802.11n40	5190	1.813	0.49	2.303	11	Pass
	5230	2.044	0.49	2.534	11	Pass
802.11ac20	5180	5.054	0.51	5.564	11	Pass
	5200	4.797	0.51	5.307	11	Pass
	5240	5.414	0.51	5.924	11	Pass
802.11ac40	5190	1.624	0.51	2.134	11	Pass
	5230	1.982	0.51	2.492	11	Pass
802.11ac80	5210	-1.227	0.50	-0.727	11	Pass
Note: duty cycle Factor see page 86.						



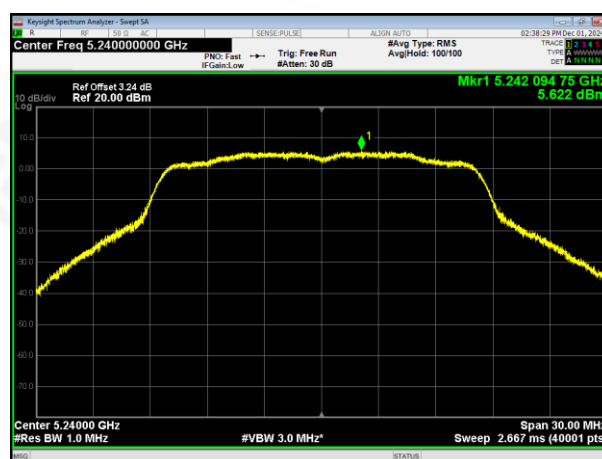
(802.11a) PSD plot on channel 36



(802.11a) PSD plot on channel 40

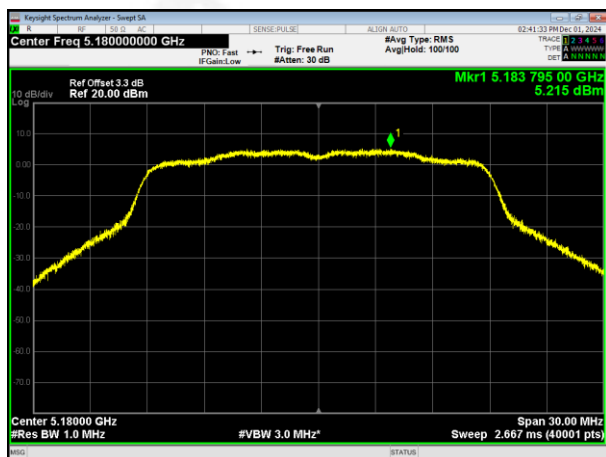


(802.11a) PSD plot on channel 48

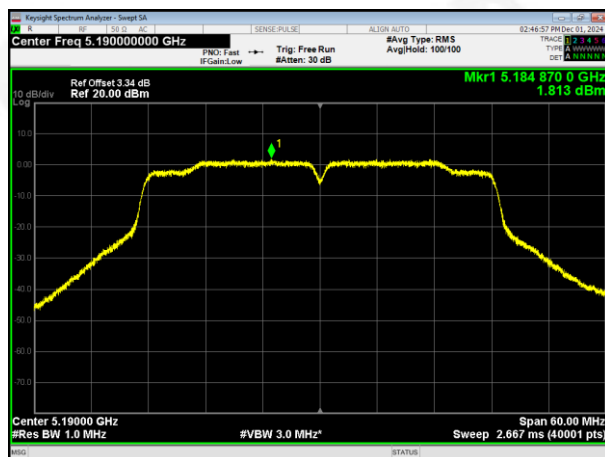




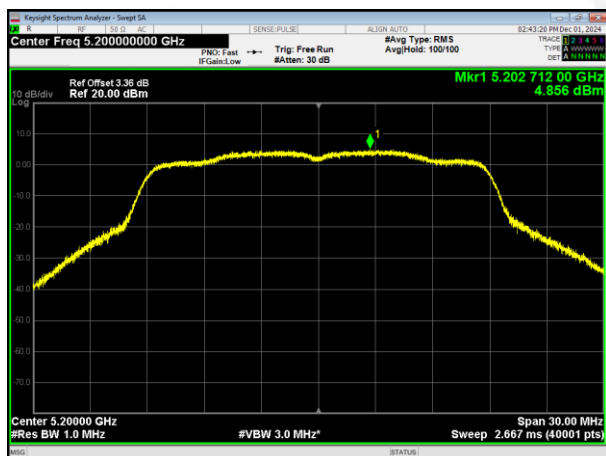
(802.11n20) PSD plot on channel 36



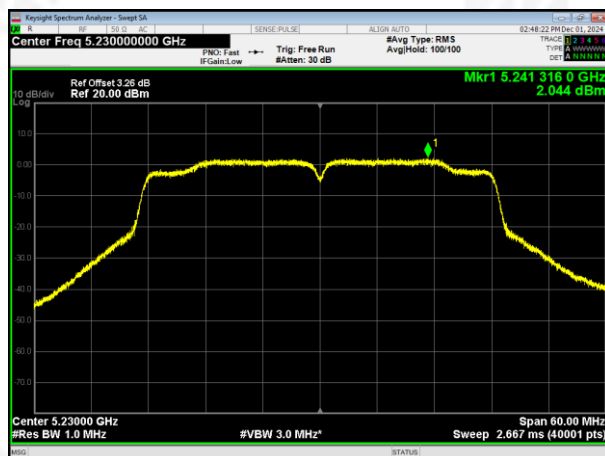
(802.11n40) PSD plot on channel 38



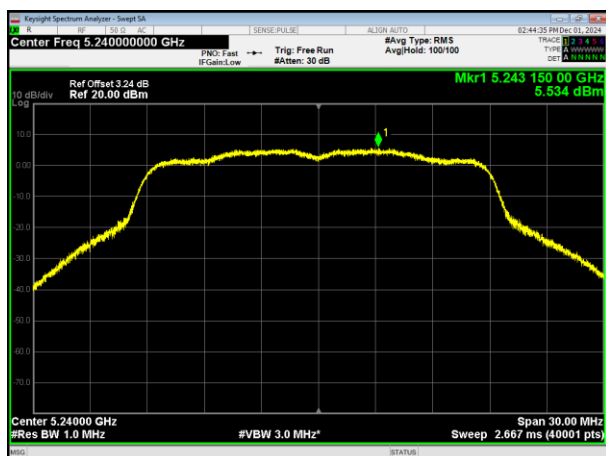
(802.11n20) PSD plot on channel 40



(802.11n40) PSD plot on channel 46

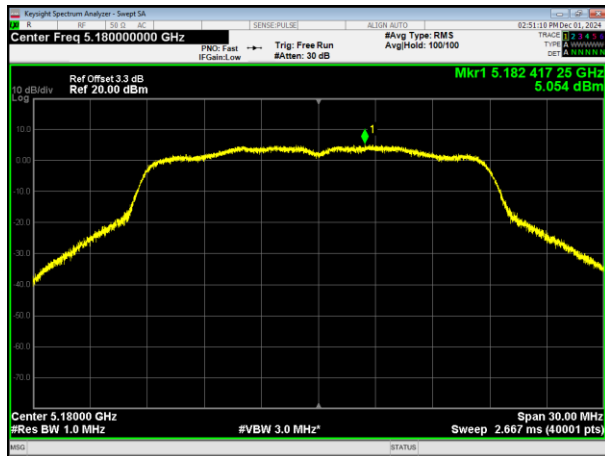


(802.11n20) PSD plot on channel 48

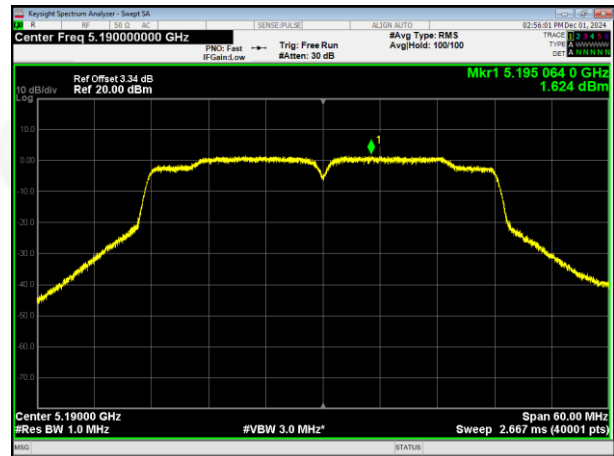


(802.11ac20) PSD plot on channel 36

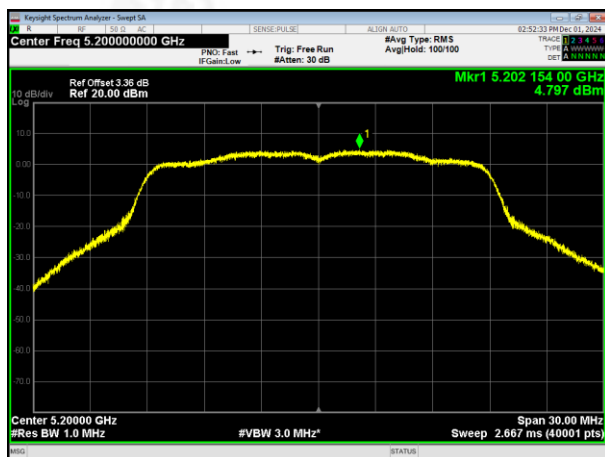
(802.11ac40) PSD plot on channel 38



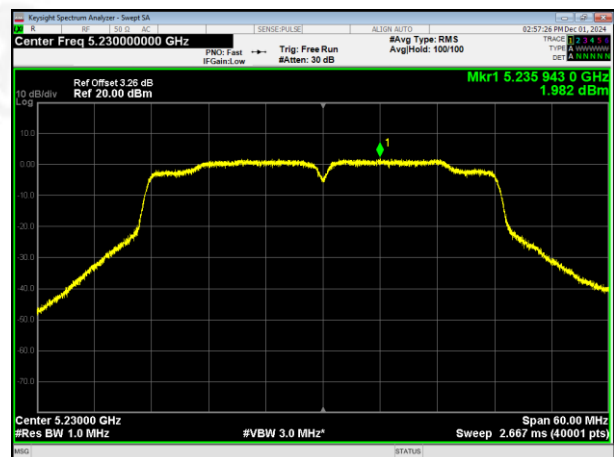
(802.11ac20) PSD plot on channel 40



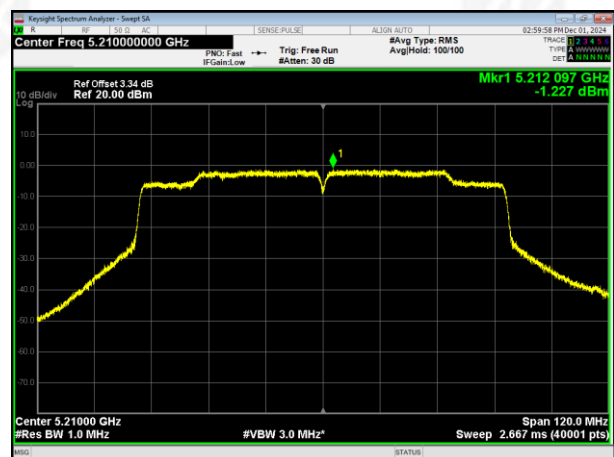
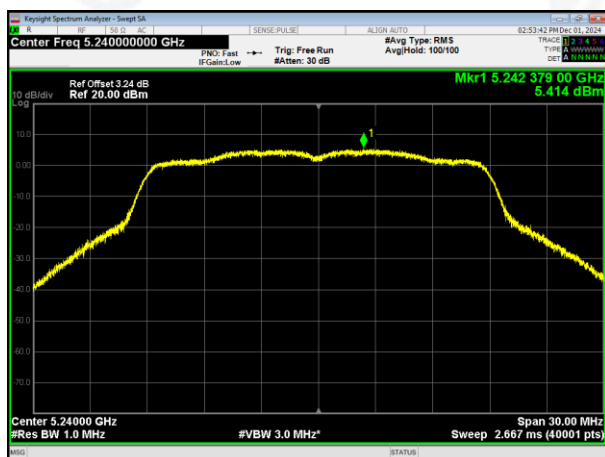
(802.11ac40) PSD plot on channel 46



(802.11ac20) PSD plot on channel 48



(802.11ac80) PSD plot on channel 42



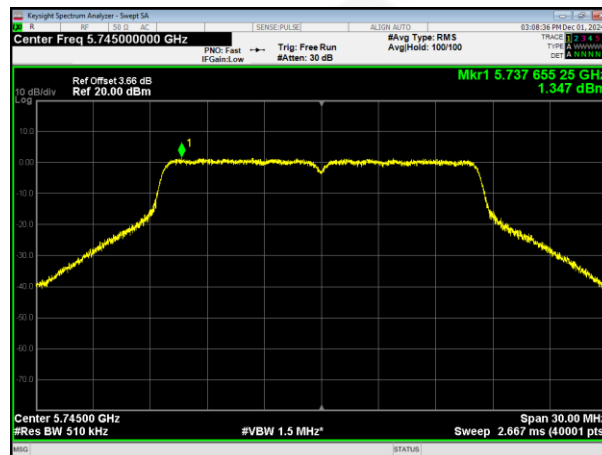


Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1015 hPa	Test Voltage :	DC 24V
Test Band :	5.8G		

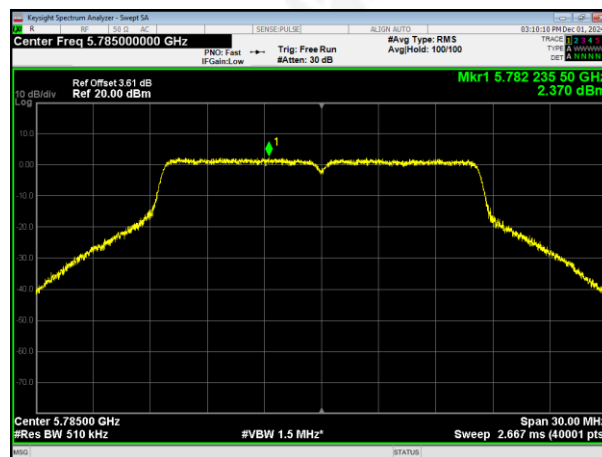
5.8G						
Test mode	Test Channel (MHz)	PSD (dBm/500kHz)	duty cycle Factor (dB)	Total PSD (dBm)	Limit (dBm/500kHz)	Result
802.11a	5745	1.347	0.51	1.857	30	Pass
	5785	2.370	0.51	2.88	30	Pass
	5825	3.083	0.51	3.593	30	Pass
802.11n20	5745	1.546	0.50	2.046	30	Pass
	5785	2.003	0.50	2.503	30	Pass
	5825	2.683	0.50	3.183	30	Pass
802.11n40	5755	-1.079	0.49	-0.589	30	Pass
	5795	-0.499	0.49	-0.009	30	Pass
802.11ac20	5745	1.054	0.41	1.464	30	Pass
	5785	1.769	0.41	2.179	30	Pass
	5825	2.435	0.41	2.845	30	Pass
802.11ac40	5755	-1.349	0.51	-0.839	30	Pass
	5795	-0.848	0.51	-0.338	30	Pass
802.11ac80	5775	-3.208	0.50	-2.708	30	Pass
Note: duty cycle Factor see page 90.						



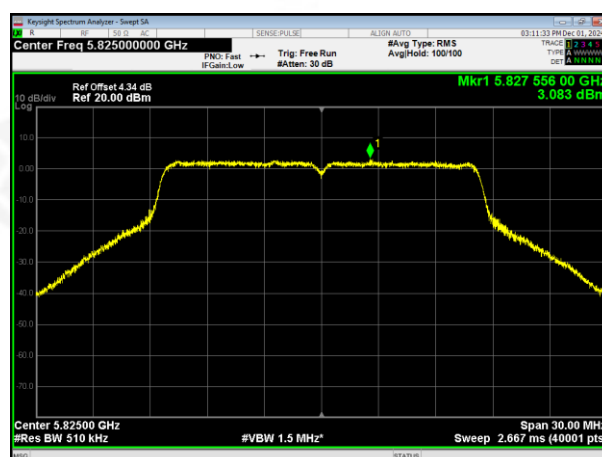
(802.11a) PSD plot on channel 149



(802.11a) PSD plot on channel 157

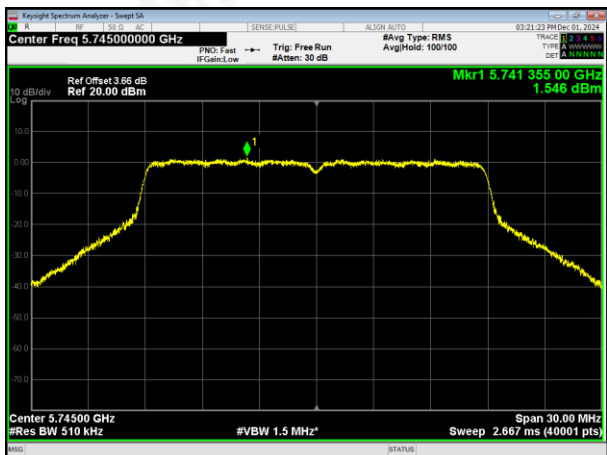


(802.11a) PSD plot on channel 165

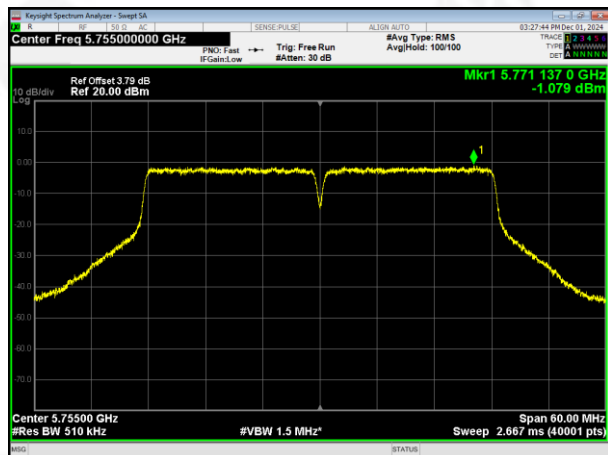




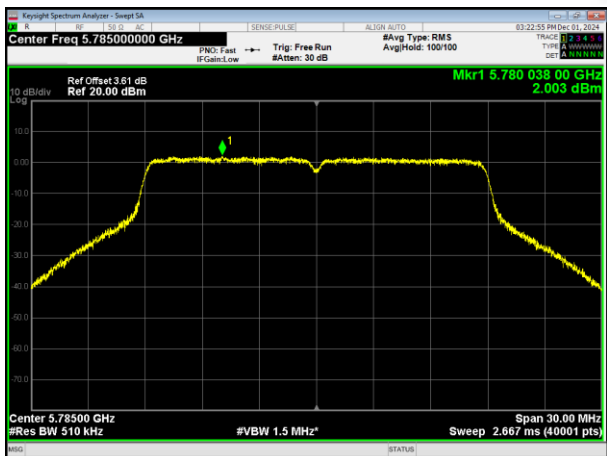
(802.11n20) PSD plot on channel 149



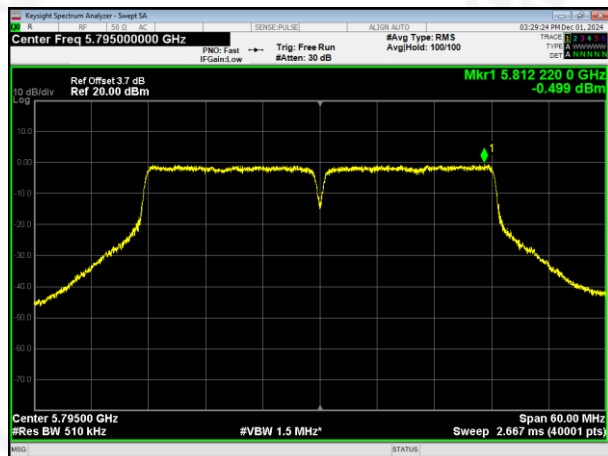
(802.11n40) PSD plot on channel 151



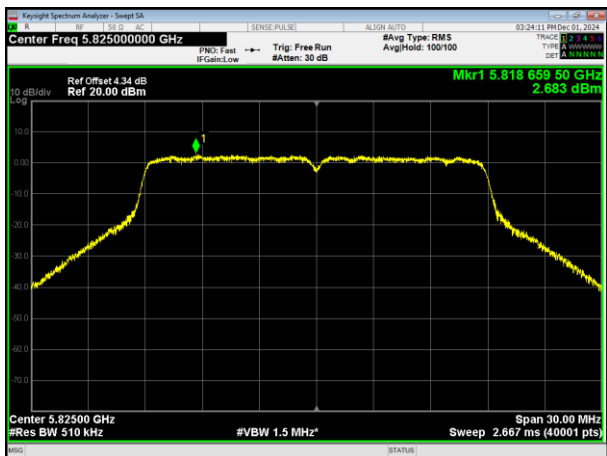
(802.11n20) PSD plot on channel 157



(802.11n40) PSD plot on channel 159

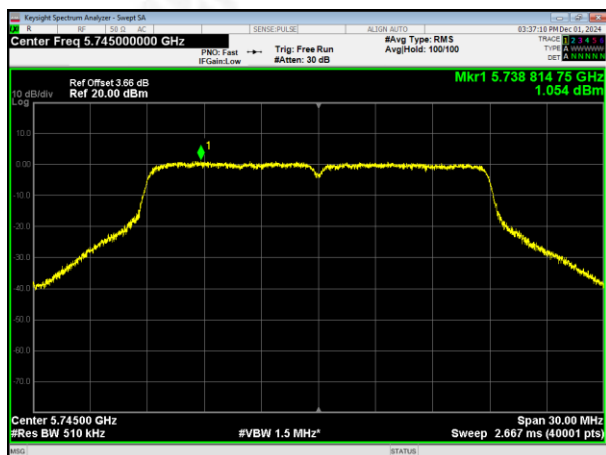


(802.11n20) PSD plot on channel 165

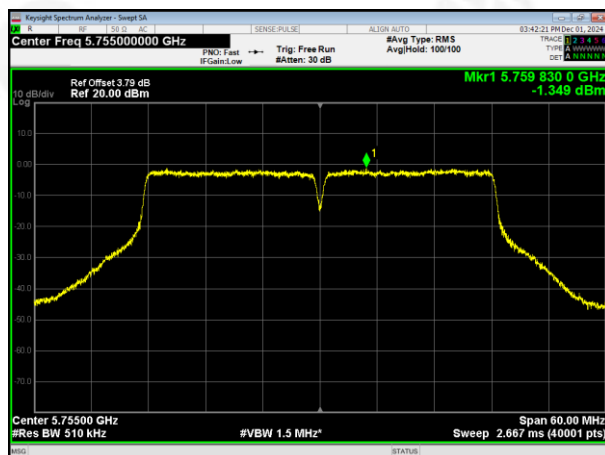




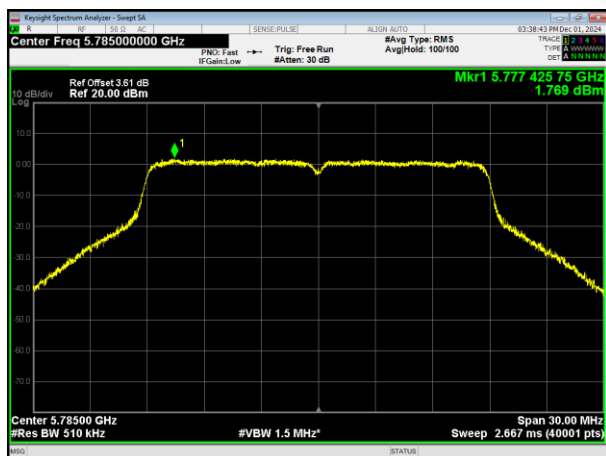
(802.11ac20) PSD plot on channel 149



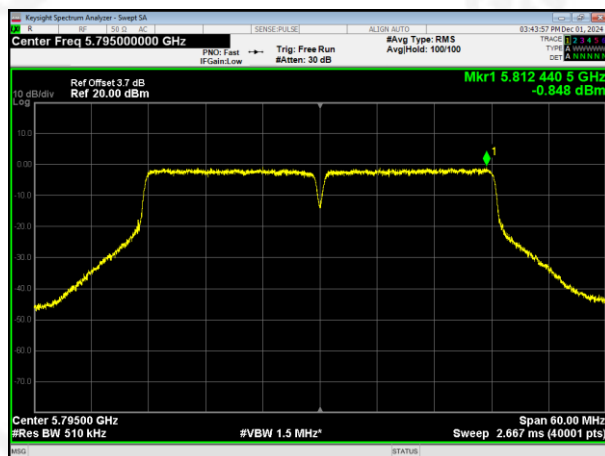
(802.11ac40) PSD plot on channel 151



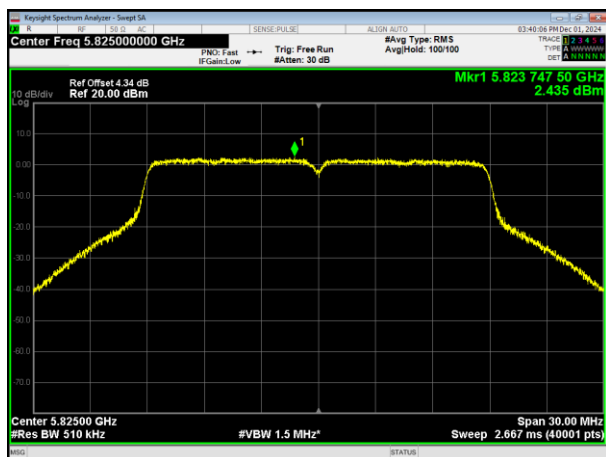
(802.11ac20) PSD plot on channel 157



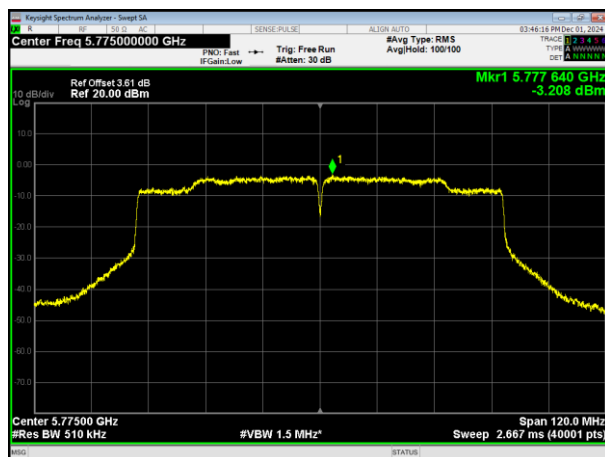
(802.11ac40) PSD plot on channel 159



(802.11ac20) PSD plot on channel 165



(802.11ac80) PSD plot on channel 155





6. 26DB EMISSION BANDWIDTH & 6DB OCCUPIED BANDWIDTH

6.1 APPLIED PROCEDURES / LIMIT

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band, the minimum bandwidth 6 dB bandwidth of U-NII devices shall be at least 500KHz. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

6.2 TEST PROCEDURE

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

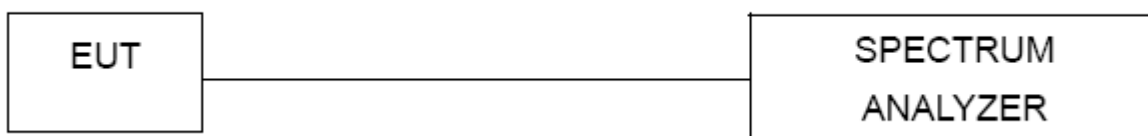
The procedure for this method is as follows:

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

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

The procedure for this method is as follows:

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.



6.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



6.4 TEST RESULTS

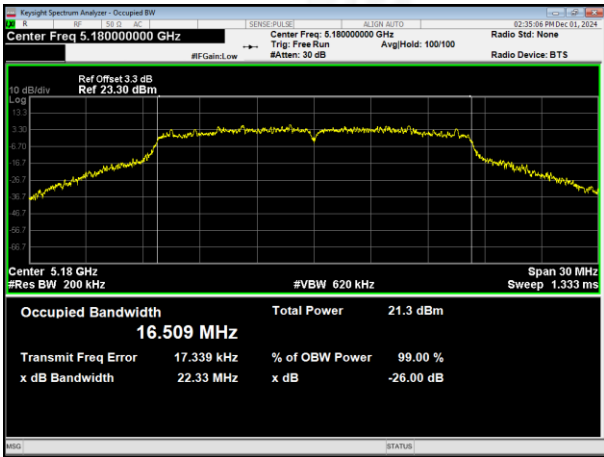
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 24V
Test Band :	5.2G		

5.2G				
Test Mode	Test Channel (MHz)	26dB Emission Bandwidth (MHz)	Limit(KHz)	Result
802.11a	5180	22.33	N/A	Pass
	5200	22.09		
	5240	22.65		
802.11n20	5180	22.87	N/A	Pass
	5200	22.46		
	5240	22.17		
802.11n40	5190	42.92	N/A	Pass
	5230	43.29		
802.11ac20	5180	22.41	N/A	Pass
	5200	22.43		
	5240	22.49		
802.11ac40	5190	43.12	N/A	Pass
	5230	42.54		
802.11ac80	5210	87.25	N/A	Pass

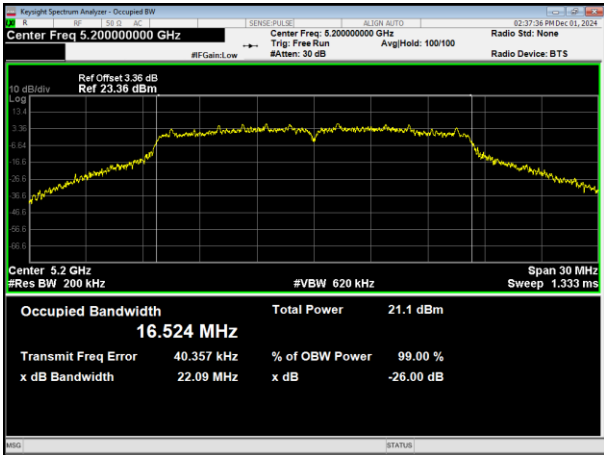


5.2G Test plot

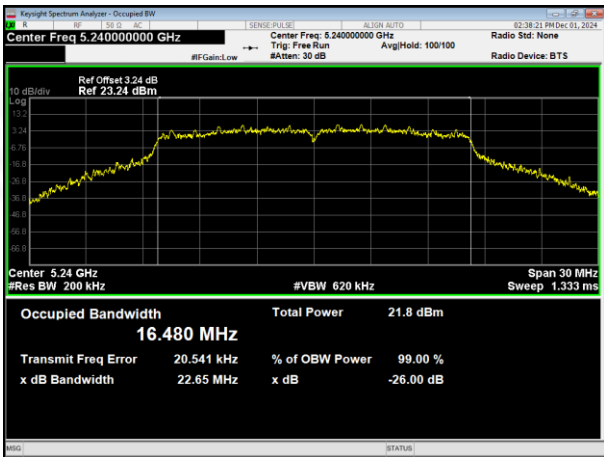
(802.11 a) 26dB Bandwidth plot on channel 36



(802.11 a) 26dB Bandwidth plot on channel 48



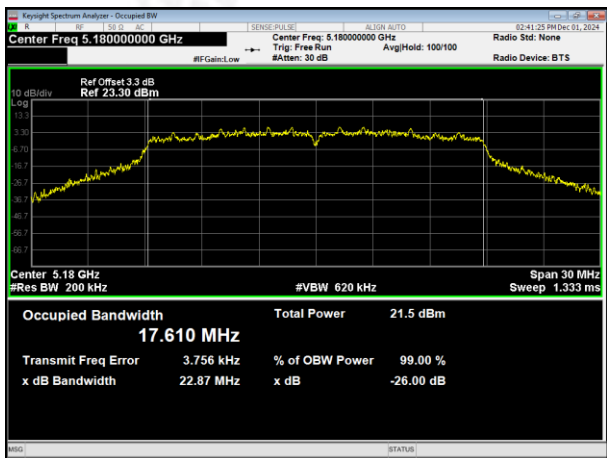
(802.11 a) 26dB Bandwidth plot on channel 48



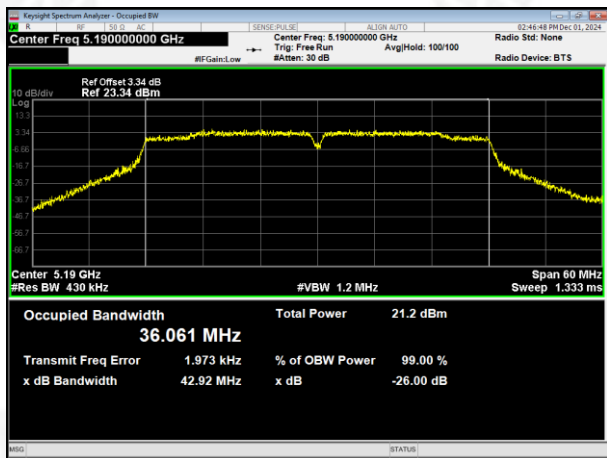


5.2G Test plot

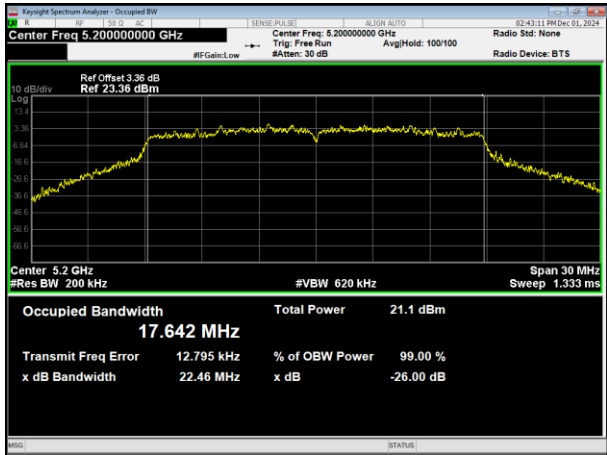
(802.11 n20) 26dB Bandwidth plot on channel 36



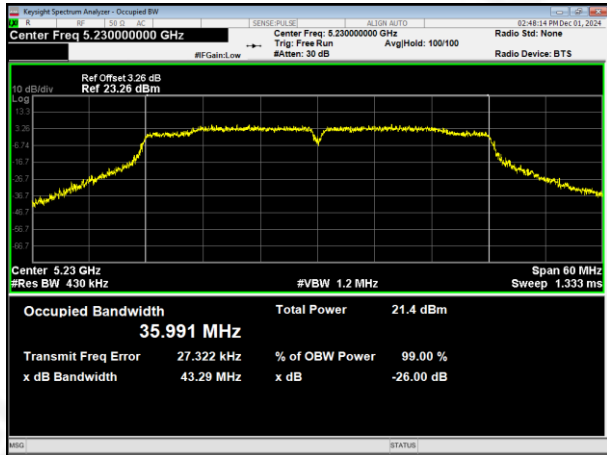
(802.11 n40) 26dB Bandwidth plot on channel 38



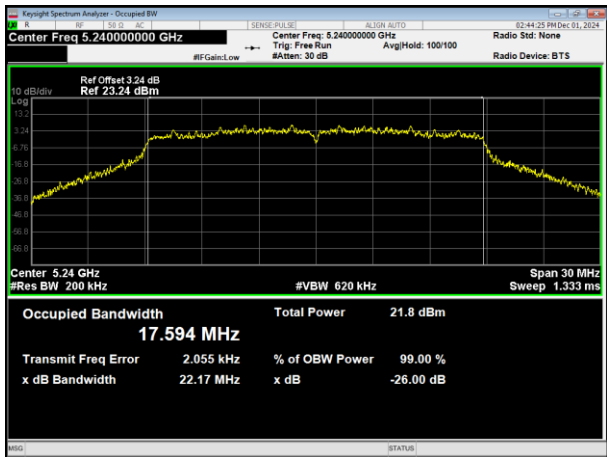
(802.11 n20) 26dB Bandwidth plot on channel 40



(802.11 n40) 26dB Bandwidth plot on channel 46



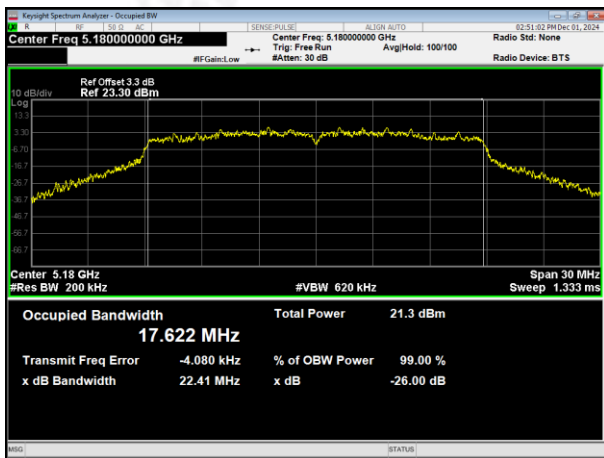
(802.11 n20) 26dB Bandwidth plot on channel 48



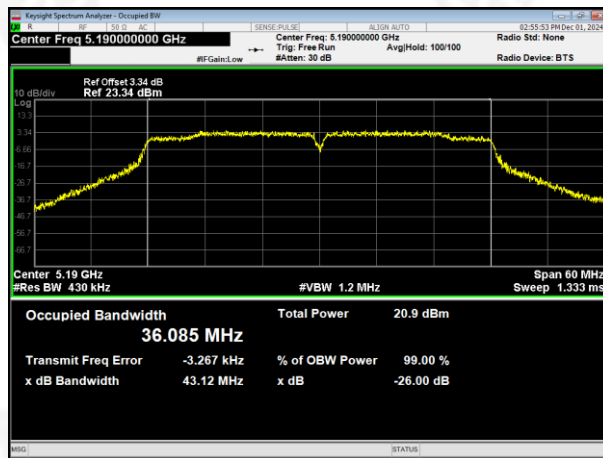


5.2G Test plot

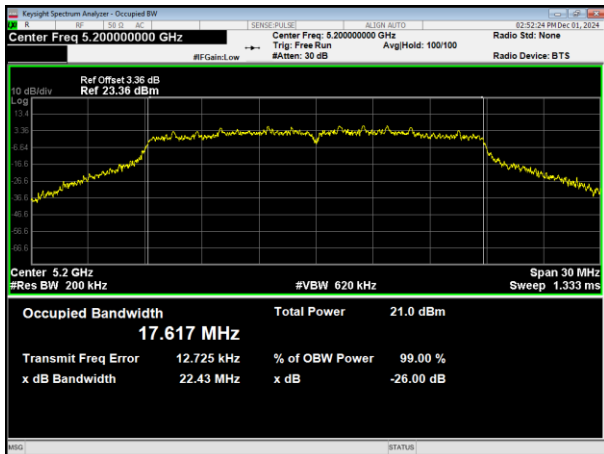
(802.11 ac20) 26dB Bandwidth plot on channel 36



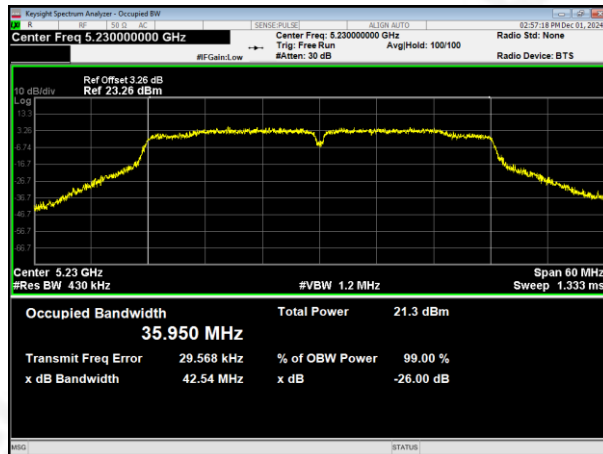
(802.11 ac40) 26dB Bandwidth plot on channel 38



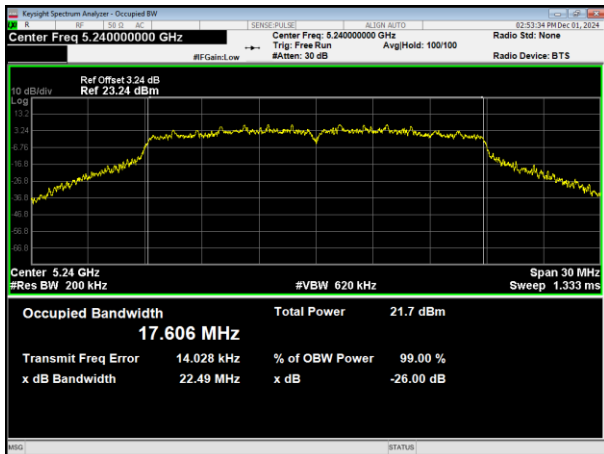
(802.11 ac20) 26dB Bandwidth plot on channel 40



(802.11 ac40) 26dB Bandwidth plot on channel 46



(802.11 ac20) 26dB Bandwidth plot on channel 48



(802.11 ac80) 26dB Bandwidth plot on channel 42

