TEST REPORT

Product Name:	Indoor/Out door WiFi AP/ brigde/CPE
FCC ID:	2A6IP-CPE920S
Trademark:	DODOLINK
Model Number:	CPE920S, CPE300S, CPE300D, CPE350D, CPE352S, CPE352D, CPE353S, CPE353D, CPE355S, CPE355D, CPE356S, CPE358S, CPE359S, CPE520S, CPE520GS, CPE550S, CPE550GS, CPE580S, CPE920S, CPE980S, CPE1200HS, CPE900HS, CPE1800HS, CPE2100HS, CPE3000HS
Prepared For:	Shenzhen Kangda Xin Intelligent Network Technology Co., Ltd.
Address:	Room 208, No. 151, polao village Dafu community, Guanlan street Longhua District, Shenzhen, China
Manufacturer:	Shenzhen Kangda Xin Intelligent Network Technology Co., Ltd.
Address:	Room 208, No. 151, polao village Dafu community, Guanlan street Longhua District, Shenzhen, China
Prepared By:	Shenzhen CTB Testing Technology Co., Ltd.
Address:	1&2/F., Building A, No.26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	Apr. 24, 2024
Sample tested Date:	Apr. 24, 2024 to May. 20, 2024
Issue Date:	May. 20, 2024
Report No.:	CTB240520007RFX
Test Standards	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Test Results	PASS
Remark:	This is WIFI-5GHz band radio test report.

Compiled by:	Reviewed by:	Approved by:
Zhou Kui	Arron Liu	Bin Mei / Director

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

TABLE OF CONTENT

(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB240520007RFX	May. 20, 2024	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
AC Power Line Conducted Emission	47 CFR Part 15 Subpart E Section 15.407 (b)(6)	ANSI C63.10-2013	PASS
Radiated Spurious emissions	47 CFR Part 15 Subpart E Section 15.205/15.407(b)	KDB789033	PASS
Band edge	47 CFR Part 15 Subpart E Section 15.205/15.407(b)	KDB789033	PASS
Conducted Peak Output Power	47 CFR Part 15 Subpart E Section 15.407 (a)	KDB789033	PASS
Emission Bandwidth & Occupied Bandwidth	47 CFR Part 15 Subpart E Section 15.407 (a)(e)	KDB789033	PASS
Power Spectral Density	47 CFR Part 15 Subpart E Section 15.407 (a)	KDB789033	PASS
Frequency stability	47 CFR Part 15 Subpart E Section 15.407 (g)	KDB789033	PASS
Operation in the absence of information to the transmit	47 CFR Part 15 Subpart E Section 15.407 (b)	47 CFR Part 15 Subpart E	PASS
Antenna Requirement	47 CFR Part 15 Subpart E Section 15.203	/	PASS

Remark:
Test according to ANSI C63.10-2013.

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	U=±54.3Hz
Adjacent channel power	U=±1.3dB
Conducted Adjacent channel power	U=±1.38dB
Conducted output power Above 1G	U=±1.0dB
Conducted output power below 1G	U=±0.9dB
Power Spectral Density , Conduction	U=±1.0dB
Conduction spurious emissions	U=±2.8dB
Out of band emission	U=±54Hz
3m camber Radiated spurious emission(9KHz-30MHz)	U=±4.8dB
3m camber Radiated spurious emission(30MHz-1GHz)	U=±4.3dB
3m chamber Radiated spurious emission(1GHz-18GHz)	U=±4.5dB
3m chamber Radiated spurious emission(18GHz-40GHz)	U=±3.4dB
humidity uncertainty	U=±5.3%
Temperature uncertainty	U=±0.59℃
Supply voltages	U=±3%
Time	U=±5%
Conducted emission(150K-30MHz)	3.2dB

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	CPE920S, CPE300S, CPE300D, CPE350D, CPE352S, CPE352D, CPE353S, CPE353D, CPE355S, CPE355D, CPE356S, CPE358S, CPE359S, CPE520S, CPE520GS, CPE550S, CPE550GS, CPE580S, CPE920S, CPE980S, CPE1200HS, CPE900HS, CPE1800HS, CPE2100HS, CPE3000HS
Model Description:	All the model are the same circuit and RF module, only different for model name.Test sample model: CPE920S
Wi-Fi Specification:	IEEE 802.11a/n/ac
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	IEEE 802.11a/n/ac(20M): 5725MHz ~5850MHz/ 5 channel IEEE 802.11n/ac(40M): 5725MHz ~5850MHz/ 2 channel IEEE 802.11ac(80M): 5725MHz ~5850MHz/ 1 channel
Max. RF output power:	WiFi (5G): 14.740dBm
Type of Modulation:	WiFi: OFDM
Antenna installation:	WiFi: Internal antenna
Antenna Gain:	WiFi (5.8G):Ant1: 6.58dBi Ant2: 6.58dBi
Ratings:	Input: 100-240V, 50-60Hz Output: 24V/1A

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1.	Laptop	DELL	Vostro 5490	N/A	N/A

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

For 802.11a/n/ac(20M) Operation in the 5745MHz ~5825 MHz band			
Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz	NA	NA
For 802.11n/ac(40M) Operation in the 5755MHz ~5795 MHz band			
Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz
For 802.11ac(80M) Operation in the 5775 MHz band			
Channel	Frequency	NA	NA
155	5775MHz	NA	NA

NOTE: Dutycycle>98%.

Test mode	rate
802.11a	54M
802.11n	500M
802.11/ac	500M

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11a/n/ac(20M)	5745MHz ~5825MHz	Channel 149	Channel 157	Channel 165
		5745MHz	5785MHz	5825MHz
802.11n/ac(40M)		Channel 151	N/A	Channel 159
		5755MHz	N/A	5795MHz
802.11ac(80M)		N/A	Channel 155	N/A
		N/A	5775MHz	N/A

4.6 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(AC):NV	120V
Normal Temperature(℃):NT	23
Low Temperature(℃):LT	0
High Temperature(℃):HT	40

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

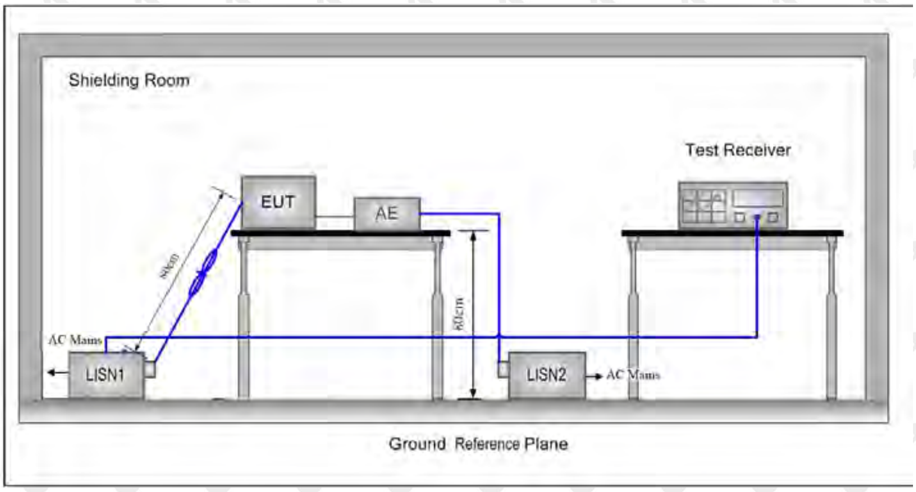
5.2 Test Instrument Used

No.	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	A.14.16	2024.07.05
2	Power Sensor	Agilent	U2021XA	MY56120032	/	2024.07.05
3	Power Sensor	Agilent	U2021XA	MY56120034	/	2024.07.05
4	Communication test set	R&S	CMW500	108058	V3.5.80	2024.07.05
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2024.07.05
6	Signal Generator	Agilent	N5181A	MY50140365	A.01.60	2024.07.05
7	Vector signal generator	Agilent	N5182A	MY47420195	A.01.87	2024.07.05
8	Communication test set	Agilent	E5515C	MY50102567	B.19.07（E1962B ）	2024.07.06
9	2.4 GHz Filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	/	2024.07.05
10	5 GHz Filter	Shenxiang	MSF5150-5850MS-1155	20181015001	/	2024.07.06
11	Filter	Xingbo	XBLBQ-DZA120	190821-1-1	/	2024.07.06
12	BT&WI-FI Automatic test software	Micowave	MTS8000	Ver. 2.0.0.0	/	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	/	2024.10.30
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	/	2024.07.05
15	234G Automatic test software	Micowave	MTS8200	Ver. 2.0.0.0	/	/
16	966 chamber	C.R.T.	966	/	/	2024.08.11
17	Receiver	R&S	ESPI	100362	RF_ATTEN_7（104489/003）	2024.07.05
18	Amplifier	HP	8447E	2945A02747	/	2024.07.05
19	Amplifier	Agilent	8449B	3008A01838	/	2024.07.05
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2024.07.08
21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	/	2024.07.08

22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2024.07.08
24	loop antenna	ZHINAN	ZN30900A	GTS534	/	/
25	40G Horn antenna	A/H/System	SAS-574	588	/	2024.10.30
26	Amplifier	AEROFLEX	Aeroflex	097	/	2024.07.05

6. AC POWER LINE CONDUCTED EMISSION

6.1 Block Diagram Of Test Setup



6.2 Limit

Table 4 – AC power-line conducted emissions limits		
Frequency (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 Note 1	56 to 46 Note 1
0.5 – 5	56	46
5 – 30	60	50

Note 1: The level decreases linearly with the logarithm of the frequency.

* Decreasing linearly with the logarithm of the frequency

6.3 Test procedure

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane.

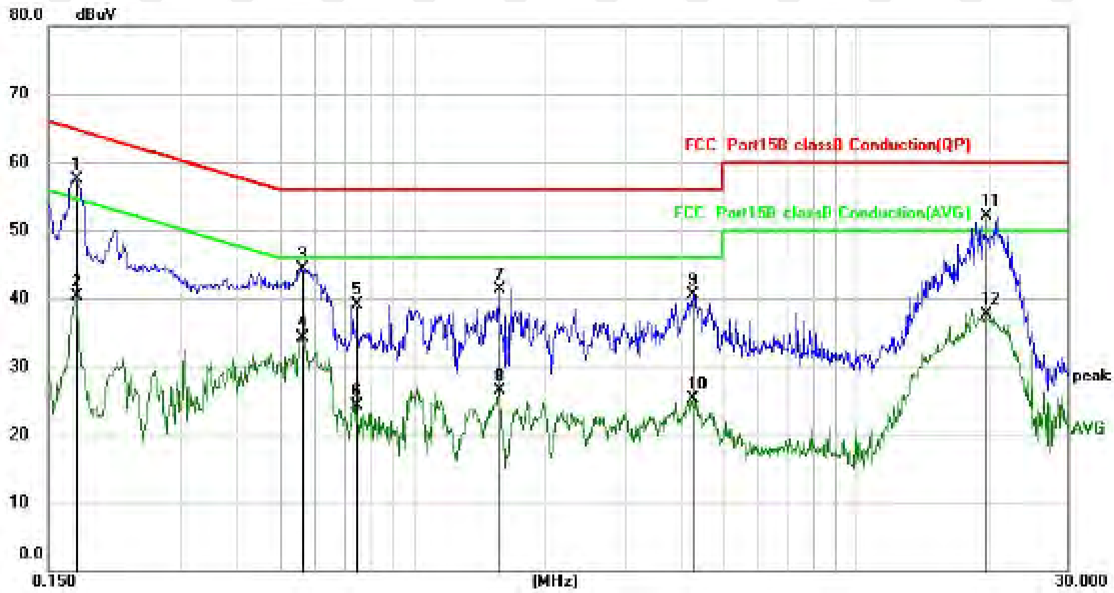
This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

5) 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 on conducted measurement.

6.4 Test Result

Modulation : 802.11a (the worst data)

L:

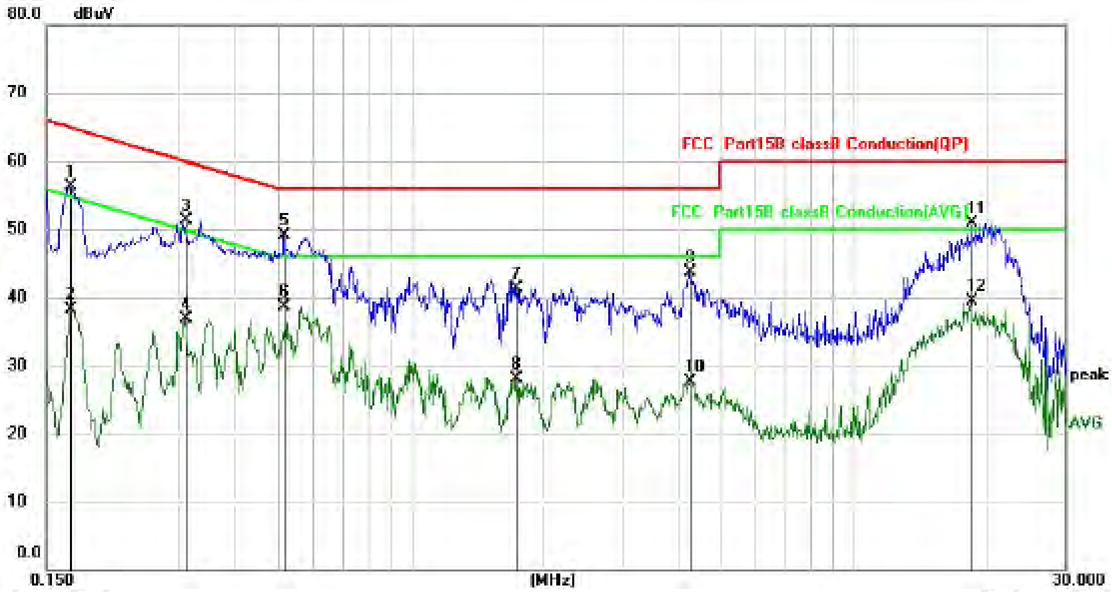


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1731	47.63	9.95	57.58	64.81	-7.23	QP
2		0.1731	30.31	9.95	40.26	54.81	-14.55	AVG
3		0.5620	34.40	10.00	44.40	56.00	-11.60	QP
4		0.5620	24.28	10.00	34.28	46.00	-11.72	AVG
5		0.7459	29.08	10.02	39.10	56.00	-16.90	QP
6		0.7459	14.20	10.02	24.22	46.00	-21.78	AVG
7		1.5620	31.31	10.05	41.36	56.00	-14.64	QP
8		1.5620	16.44	10.05	26.49	46.00	-19.51	AVG
9		4.2738	30.11	10.31	40.42	56.00	-15.58	QP
10		4.2738	15.08	10.31	25.39	46.00	-20.61	AVG
11		19.7058	41.24	10.81	52.05	60.00	-7.95	QP
12		19.7058	26.93	10.81	37.74	50.00	-12.26	AVG

Remark:

Factor = Cable loss + LISN factor, Margin = Measurement – Limit

N:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1700	46.32	9.95	56.27	64.96	-8.69	QP
2		0.1700	28.43	9.95	38.38	54.96	-16.58	AVG
3		0.3100	41.25	9.96	51.21	59.97	-8.76	QP
4		0.3100	26.88	9.96	36.84	49.97	-13.13	AVG
5	*	0.5180	39.04	9.99	49.03	56.00	-6.97	QP
6		0.5180	28.73	9.99	38.72	46.00	-7.28	AVG
7		1.7259	31.30	10.07	41.37	56.00	-14.63	QP
8		1.7259	18.00	10.07	28.07	46.00	-17.93	AVG
9		4.2579	33.35	10.31	43.66	56.00	-12.34	QP
10		4.2579	17.49	10.31	27.80	46.00	-18.20	AVG
11		18.3658	40.16	10.79	50.95	60.00	-9.05	QP
12		18.3658	28.70	10.79	39.49	50.00	-10.51	AVG

Remark:

Factor = Cable loss + LISN factor, Margin = Measurement – Limit

Remark:
1. Factor = Cable loss + LISN factor, Margin = Limit – Level
2. All modes were tested at AC 120V and 240V, only the worst result of AC 120V 60Hz was reported.
3. All the test modes completed for test. Only the worst result of was reported.

7. RADIATED SPURIOUS EMISSIONS

7.1 Block Diagram Of Test Setup

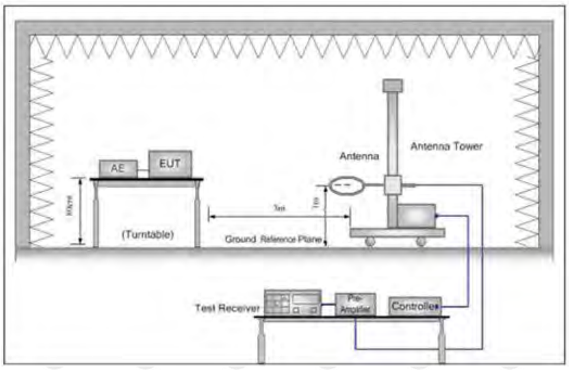


Figure 1. Below 30MHz

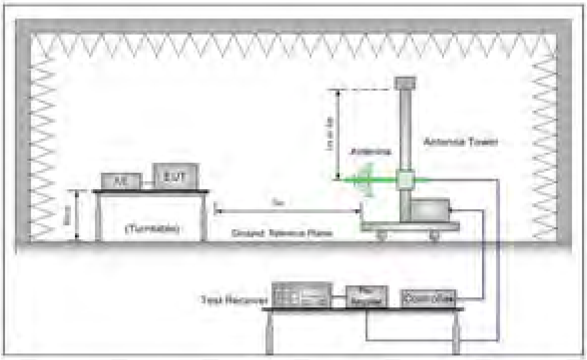


Figure 2. 30MHz to 1GHz

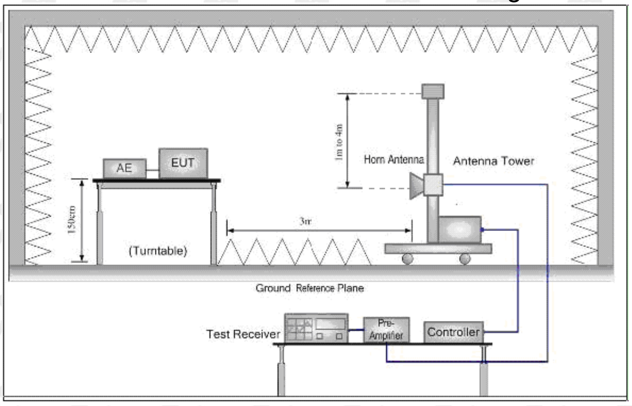


Figure 3. Above 1GHz

7.2 Limit

Spurious Emissions:

Frequency	Field strength (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	20log 2400/F (kHz) + 80	Quasi-peak	3
0.490MHz-1.705MHz	20log 24000/F (kHz) + 40	Quasi-peak	3
1.705MHz-30MHz	20log 30 + 40	Quasi-peak	3
30MHz-88MHz	40.0	Quasi-peak	3
88MHz-216MHz	43.5	Quasi-peak	3
216MHz-960MHz	46.0	Quasi-peak	3
960MHz-1GHz	54.0	Quasi-peak	3
Above 1GHz	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

If radiated measurements are performed, field strength is then converted to EIRP as follows:
(i) EIRP = ((E*d)^2) / 30
where:
• E is the field strength in V/m;
• d is the measurement distance in meters;
• EIRP is the equivalent isotropically radiated power in watts.
(ii) Working in dB units, the above equation is equivalent to:
EIRP[dBm] = E[dBμV/m] + 20 log(d[meters]) - 104.77
(iii) Or, if d is 3 meters:
EIRP[dBm] = E[dBμV/m] - 95.2

7.3 Test procedure

Below 1GHz test procedure as below:
a.The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table 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.
Above 1GHz test procedure as below:
g.Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
h.Test the EUT in the lowest channel ,the middle channel ,the Highest channel
j.Repeat above procedures until all frequencies measured was complete.

Receiver set:

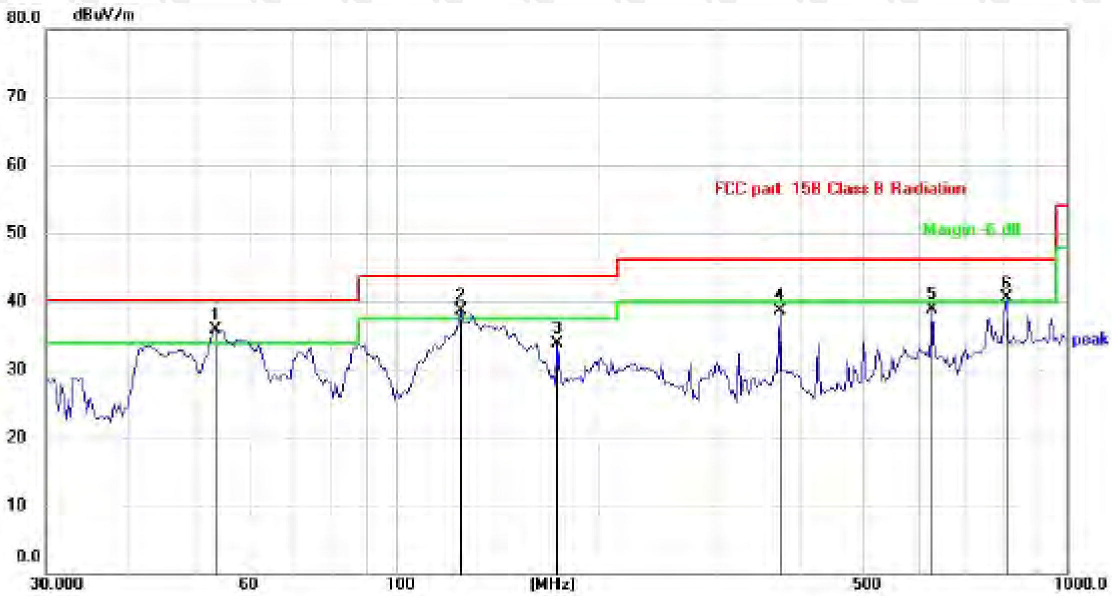
Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120 kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

7.4 Test Result

30MHz-1GHzTest Results:
Modulation : 802.11a (the worst data)
Test Channel : 5780MHz
Antenna polarity: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	44.9006	42.03	-5.69	36.34	40.00	-3.66	QP
2	!	146.6303	41.16	-3.58	37.58	43.50	-5.92	QP
3	!	225.3079	47.64	-7.18	40.46	46.00	-5.54	QP
4		374.6225	42.08	-2.81	39.27	46.00	-6.73	QP
5	!	575.6342	38.99	2.00	40.99	46.00	-5.01	QP
6	!	810.2653	33.80	6.47	40.27	46.00	-5.73	QP

Antenna polarity: V



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	53.9763	42.59	-6.68	35.91	40.00	-4.09	QP
2	!	125.2258	43.69	-5.03	38.66	43.50	-4.84	QP
3		174.7300	38.80	-4.90	33.90	43.50	-9.60	QP
4		374.6225	41.49	-2.81	38.68	46.00	-7.32	QP
5		628.3745	35.76	3.17	38.93	46.00	-7.07	QP
6	!	810.2653	34.05	6.47	40.52	46.00	-5.48	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

Radiated Spurious Emission (Above 1GHz):

Channel:5745MHz									
11490	41.67	17.46	59.13	74	-14.87	PK	1.85	112	H
11490	25.88	17.46	43.34	54	-10.66	AV	1.73	62	H
11490	41.04	17.46	58.50	74	-15.50	PK	1.44	38	V
11490	25.47	17.46	42.93	54	-11.07	AV	1.61	333	V
Channel:5825MHz									
11650	40.95	17.57	58.52	74	-15.48	PK	1.73	102	H
11650	26.91	17.57	44.48	54	-9.52	AV	1.61	127	H
11650	40.77	17.57	58.34	74	-15.66	PK	1.80	85	V
11650	27.64	17.57	45.21	54	-8.79	AV	1.33	118	V

Modulation : 802.11(n40) (the worst data)

Freq (MHz)	Rd_level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	detector	Height	Degree	Antenna polarization
Channel:5755MHz									
11510	40.64	17.49	58.13	74	-15.87	PK	1.81	154	H
11510	25.75	17.49	43.24	54	-10.76	AV	1.28	84	H
11510	39.73	17.49	57.22	74	-16.78	PK	1.16	148	V
11510	25.13	17.49	42.62	54	-11.38	AV	1.17	2	V
Channel:5795MHz									
11590	39.81	17.52	57.33	74	-17.43	PK	1.35	304	H
11590	25.16	17.52	42.68	54	-16.67	AV	1.73	179	H
11590	41.19	17.52	58.71	74	-15.29	PK	1.69	132	V
11590	25.96	17.52	43.48	54	-10.52	AV	1.50	40	V

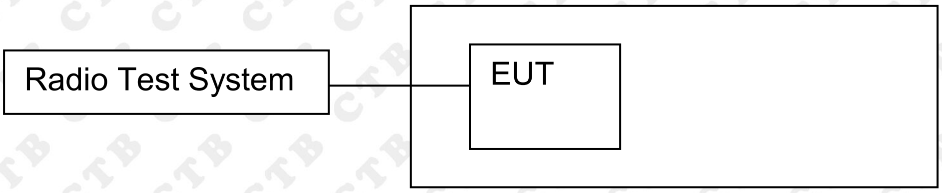
Modulation : 802.11(VH80) (the worst data)

Freq (MHz)	Rd_level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	detector	Height	Degree	Antenna polarization
Channel:5775MHz									
11550	39.86	17.50	57.36	74	-16.64	PK	1.51	232	H
11550	26.12	17.50	43.62	54	-10.38	AV	1.52	2	H
11550	40.88	17.50	58.38	74	-15.62	PK	1.82	157	V
11550	25.40	17.50	42.90	54	-11.10	AV	1.46	356	V

Remark:
1.Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits
2.The EUT was tested in the low, high channel and the worst case position data was reported.
3.Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

8. BAND EDGE

8.1 Block Diagram Of Test Setup



8.2 Limit

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(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 e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

8.3 Test procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

8.4 Test Result

Test Graph

ANT1:

802.11a-5745

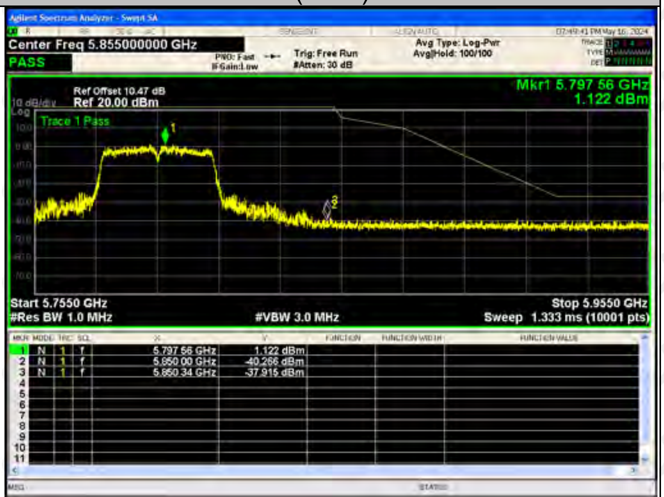
802.11a-5825

802.11(ac20)-5745

802.11(ac20)-5825

802.11(ac40)-5755

802.11(ac40)-5795



802.11n(VH20)-5745

802.11n(VH20)-5825

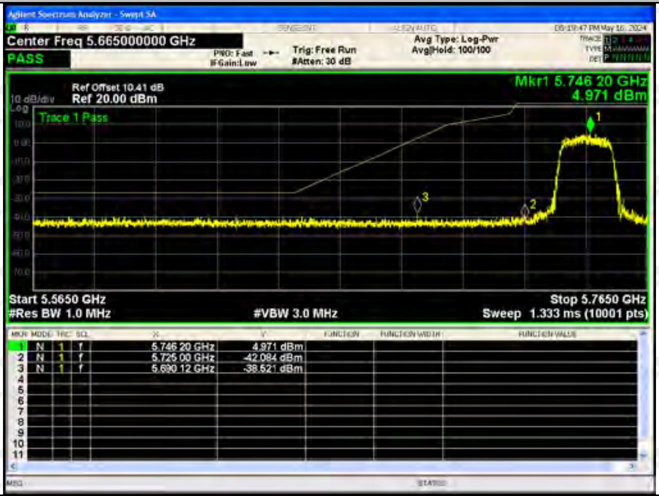
802.11n(VH40)-5755

802.11n(VH40)-5795

802.11ac(VH80)-5775

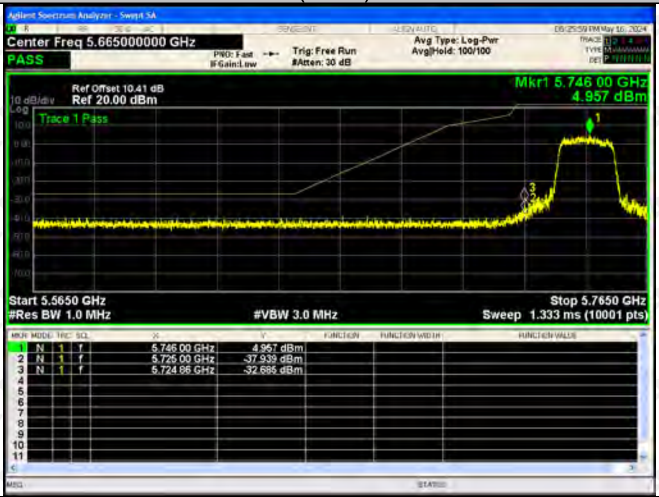
ANT2:

802.11a-5745



802.11a-5825

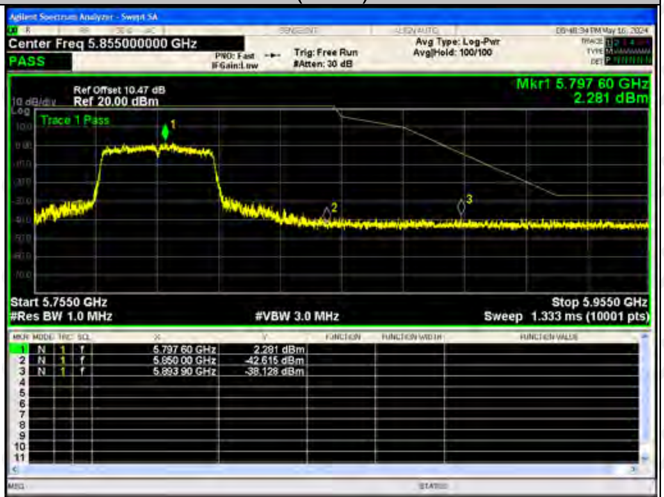
802.11(ac20)-5745



802.11(ac20)-5825

802.11(ac40)-5755

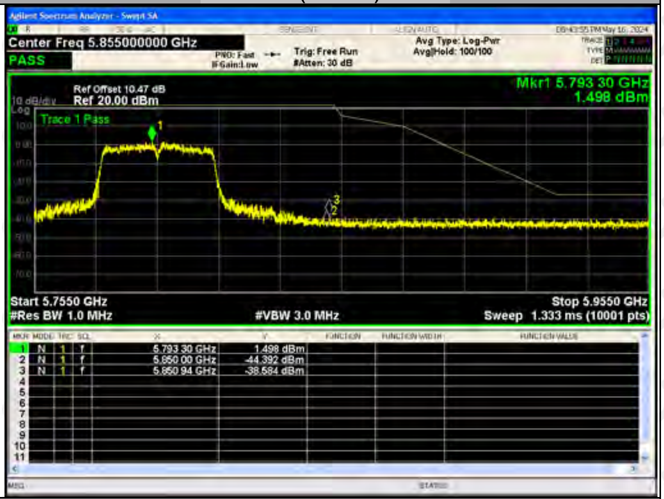
802.11(ac40)-5795



802.11n(VH20)-5745

802.11n(VH20)-5825

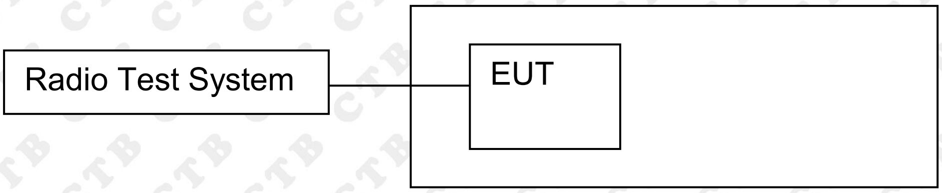
802.11n(VH40)-5755	802.11n(VH40)-5795



802.11ac(VH80)-5775	

9. CONDUCTED OUTPUT POWER

9.1 Block Diagram Of Test Setup



9.2 Limit

(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 conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, 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 conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition,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 conducted output power over the frequency band of operation shall not exceed 1 W. In addition, 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 mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(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 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.
(4) The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.
(5) 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 are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. 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.

(h) Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS).
(1) Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

9.3 Test procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98%, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run.”

(viii) Trace average at least 100 traces in power averaging (rms) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

9.4 Test Result

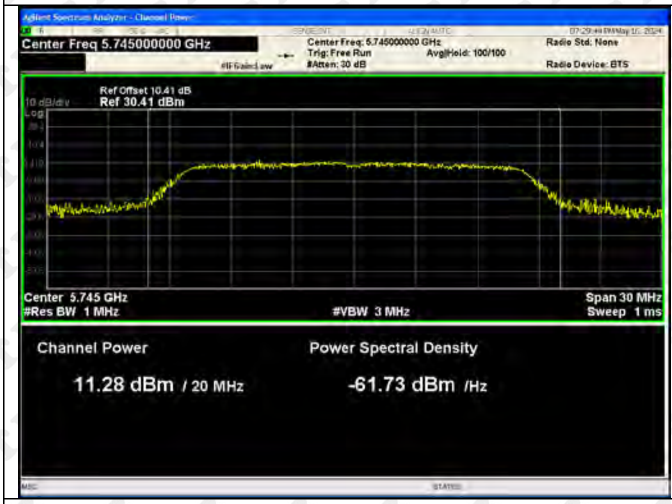
ANT 1+ANT 2

Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5745	11.283	11.404	/	30
	5785	11.392	10.394	/	30
	5825	11.049	11.018	/	30
802.11ac20	5745	10.527	11.908	14.282	30
	5785	11.094	12.16	14.670	30
	5825	11.28	12.035	14.684	30
802.11ac40	5755	10.695	11.413	14.079	30
	5795	11.458	11.787	14.636	30
802.11ac80	5775	11.33	11.527	14.440	30
802.11n(HT20)	5745	10.708	11.942	14.379	30
	5785	10.961	12.311	14.699	30
	5825	10.955	12.108	14.580	30
802.11n(HT40)	5755	11.02	11.445	14.248	30
	5795	11.595	11.86	14.740	30

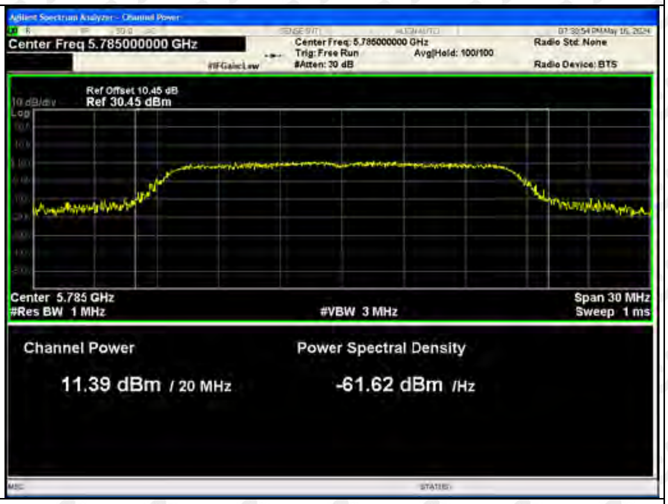
5745-5825MHz

ANT 1:

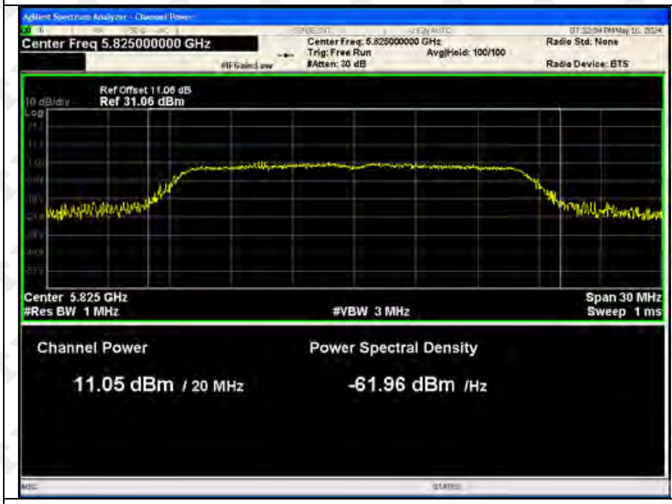
802.11a-5745



802.11a-5785



802.11a-5825



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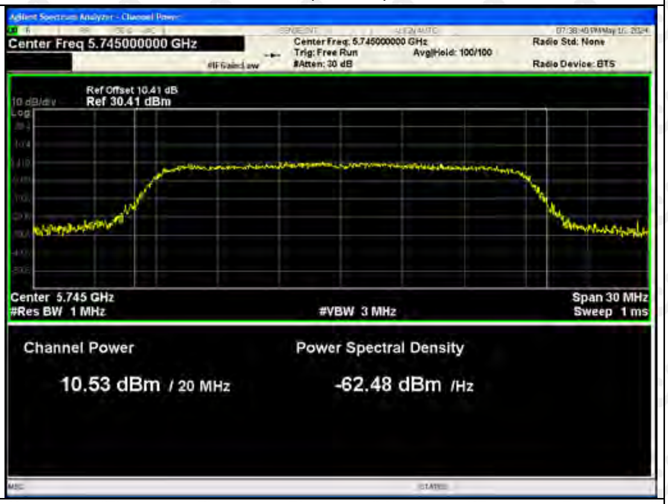

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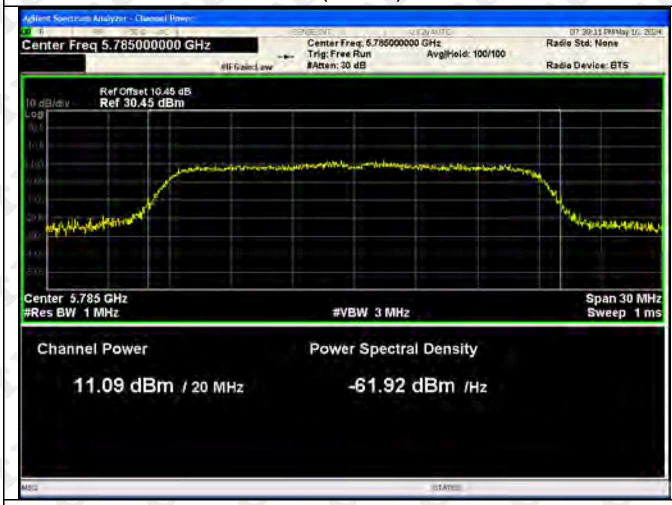

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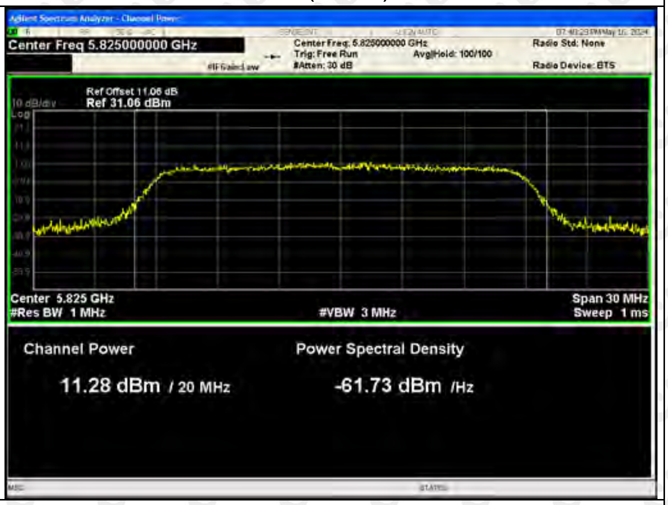
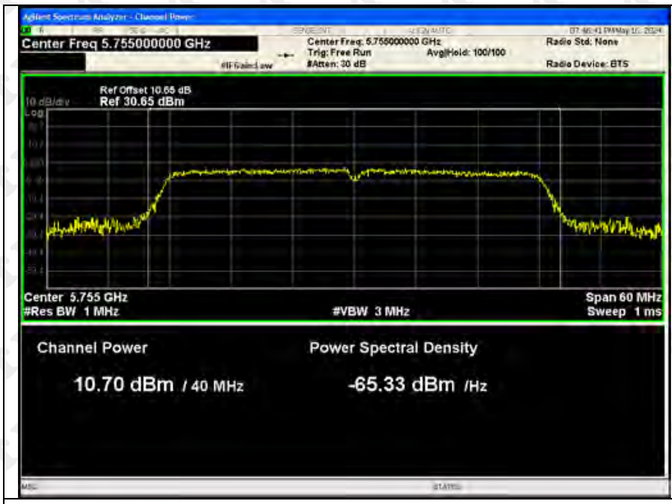


802.11ac(VH40)-5755

802.11ac(VH40)-5795



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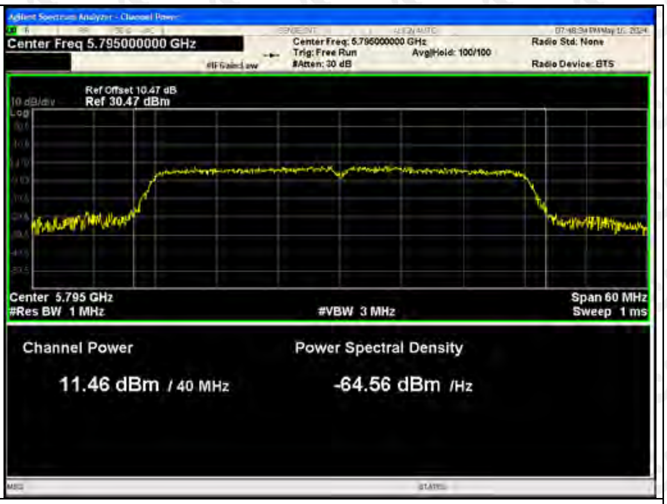
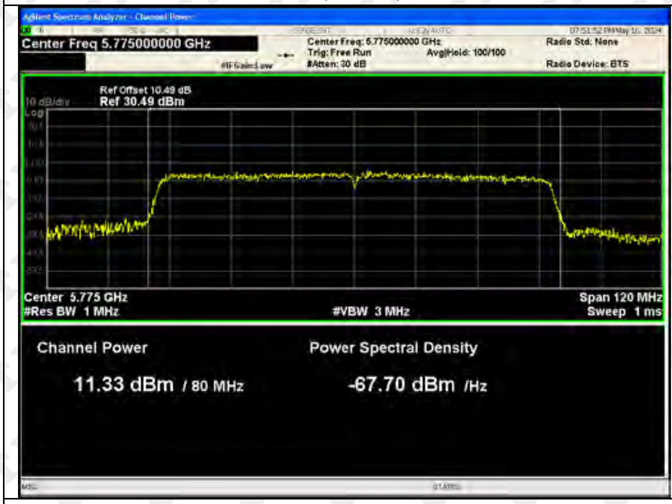


802.11n(HT20)-5745



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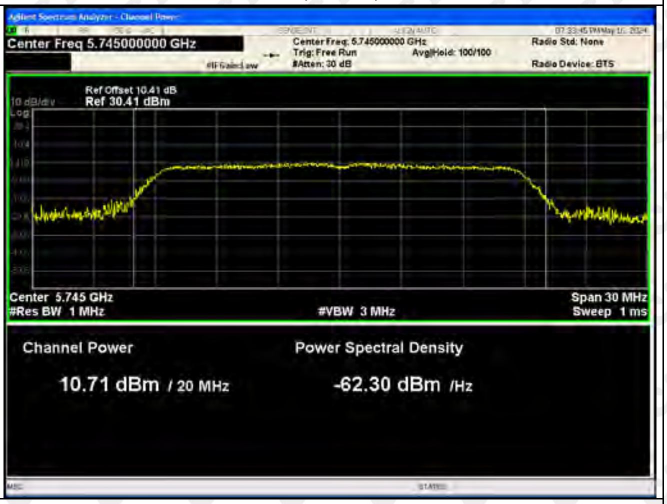

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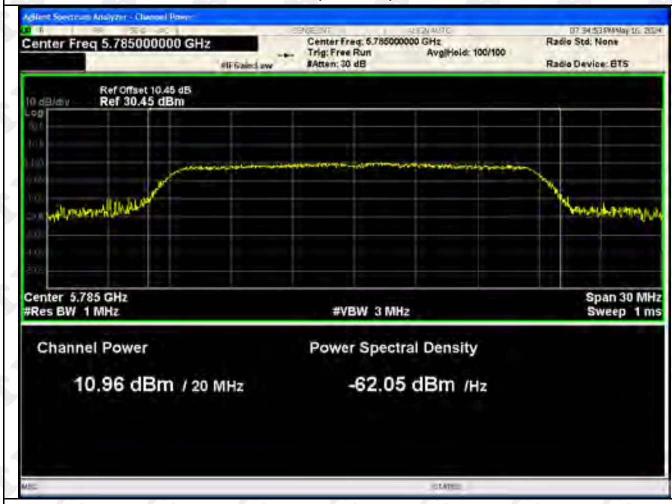

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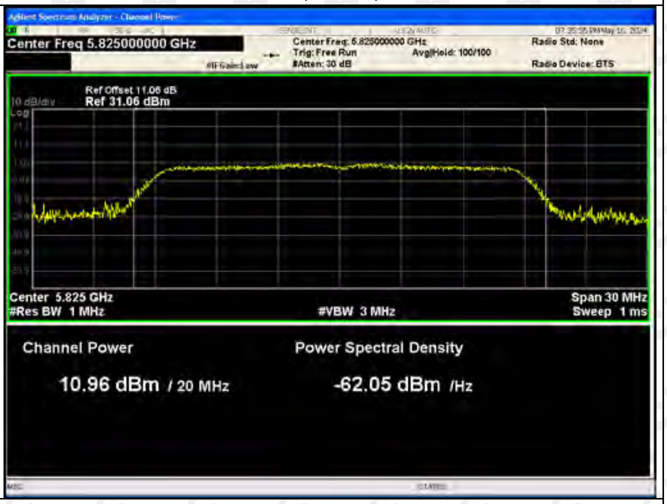

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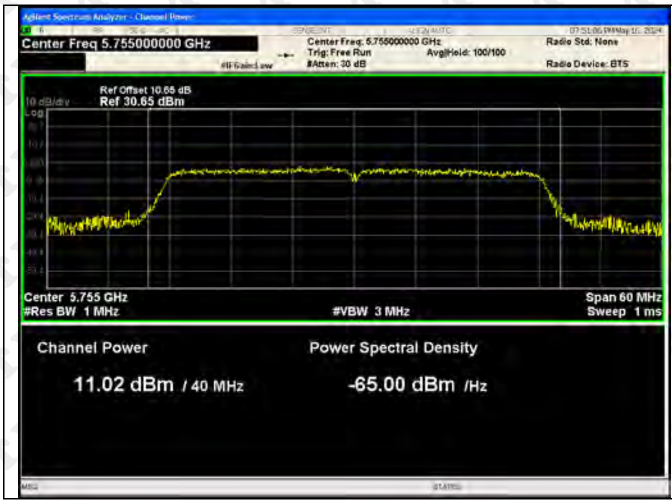
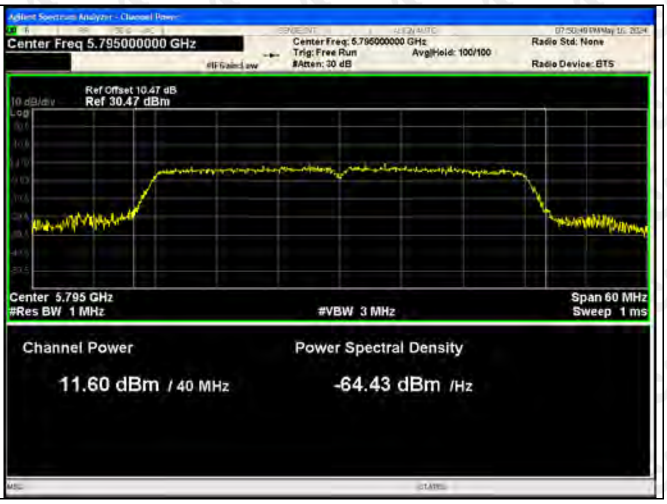
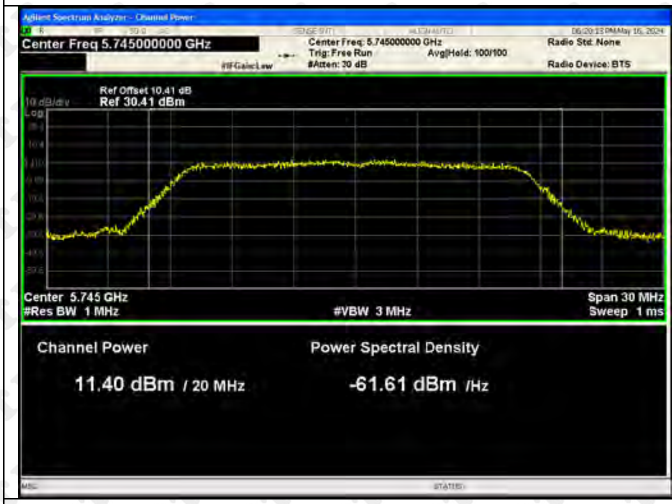


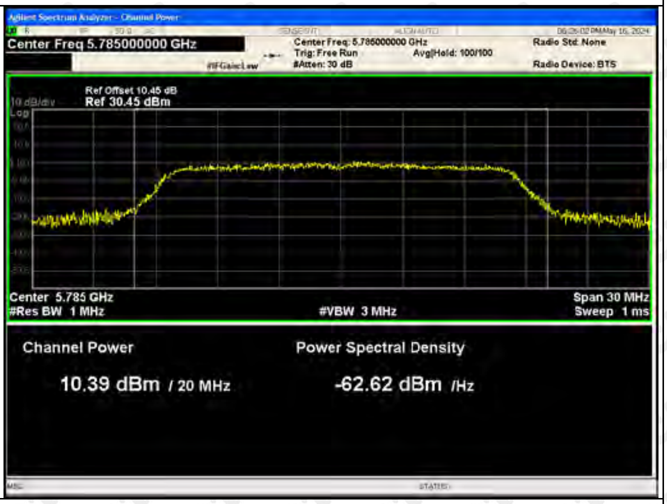


ANT2:

802.11a-5745

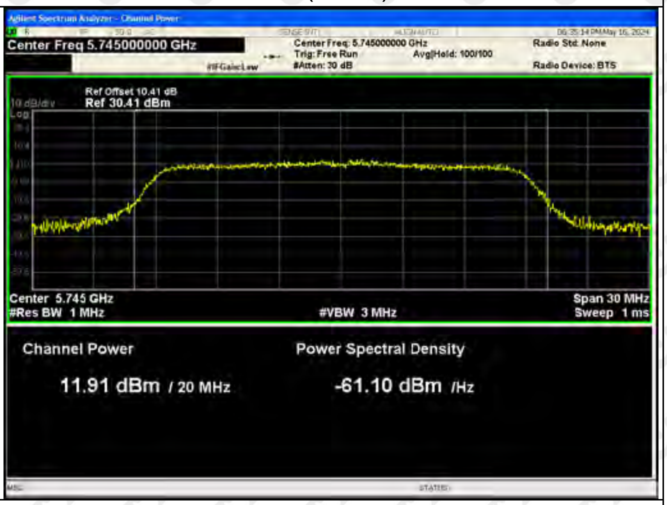


802.11a-5785



802.11a-5825

802.11ac(VH20)-5745



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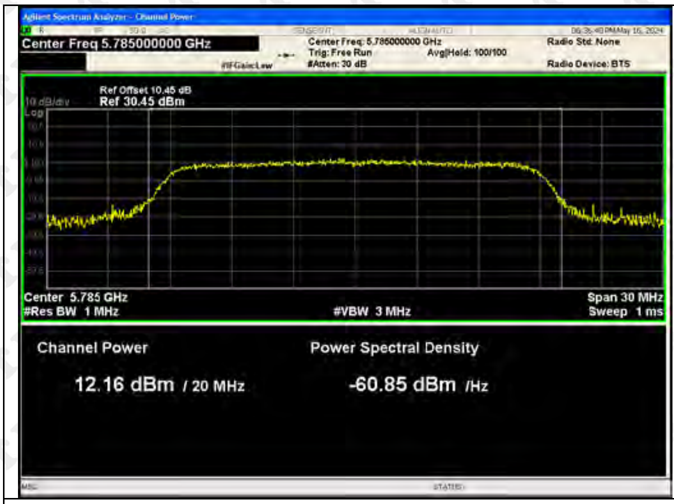
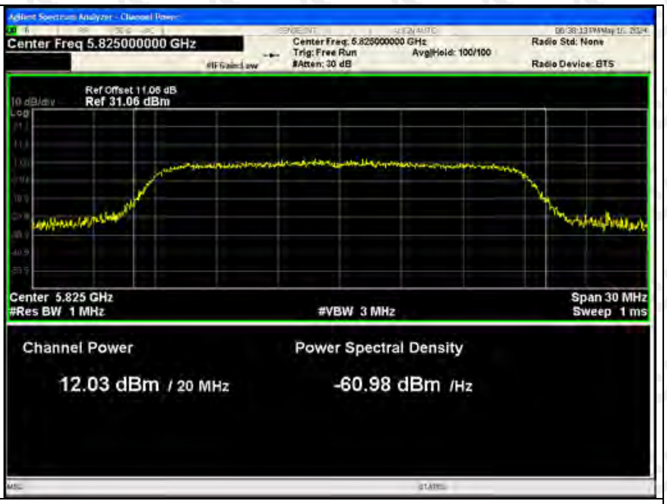
802.11ac(VH20)-5825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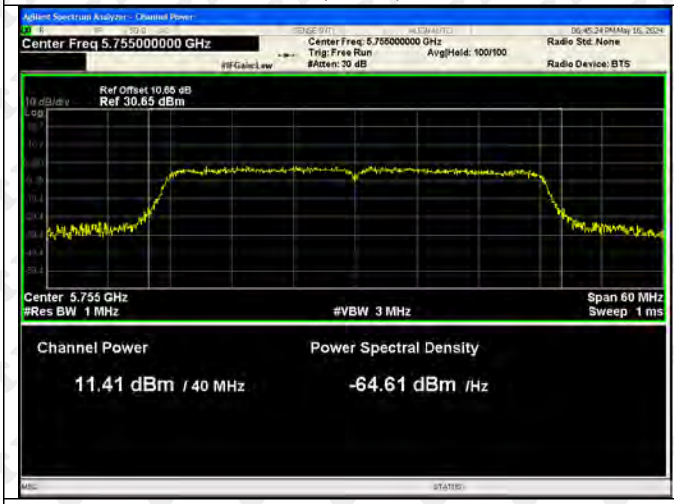	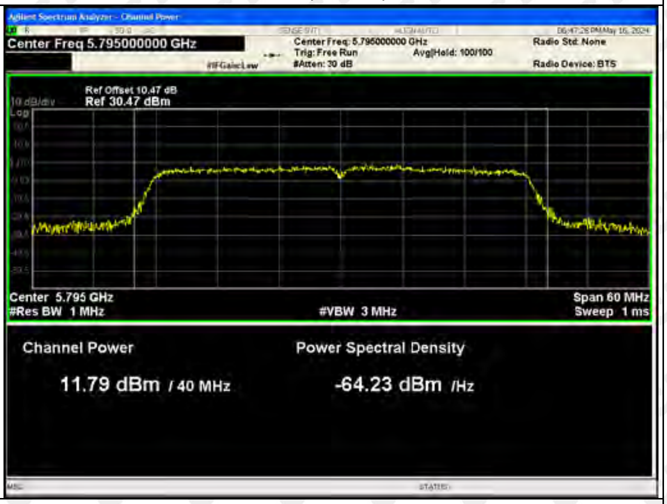
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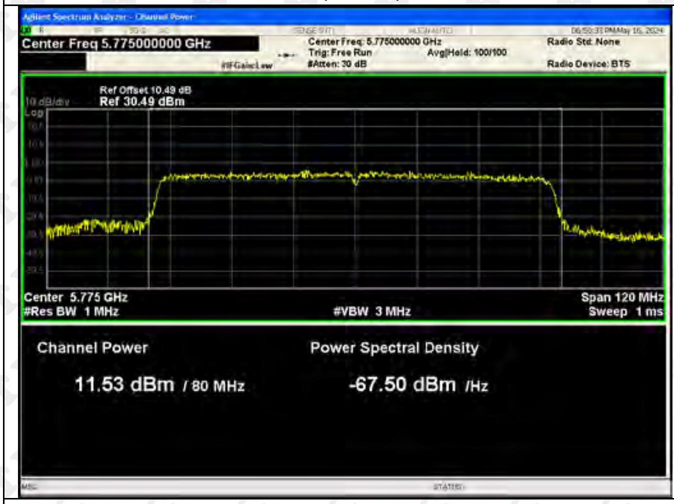
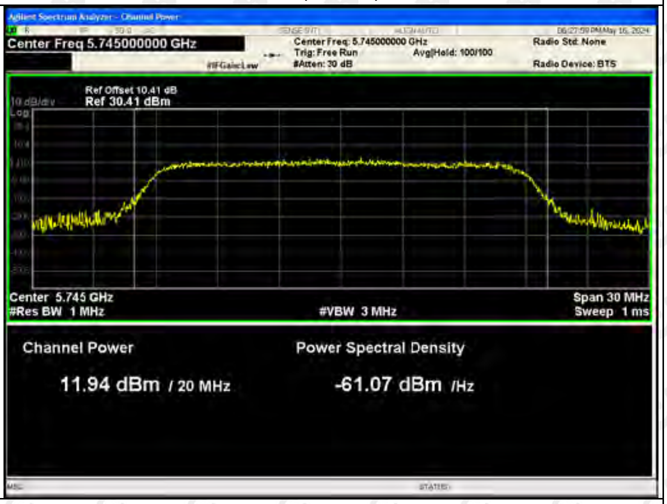
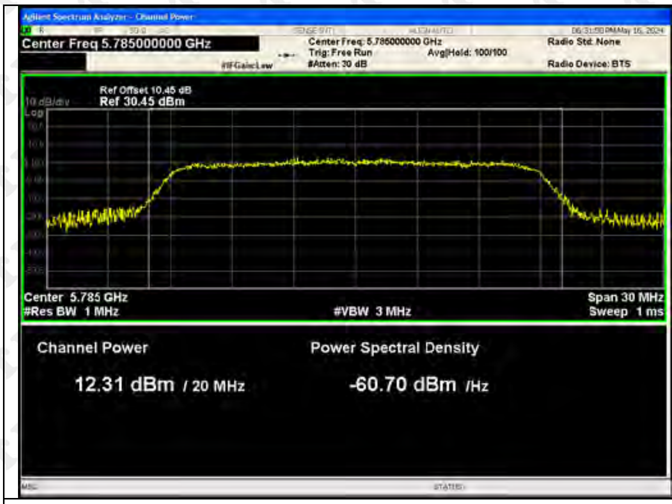
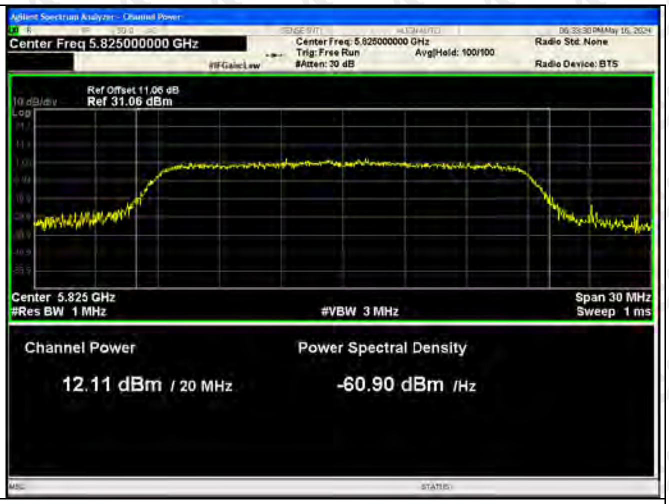
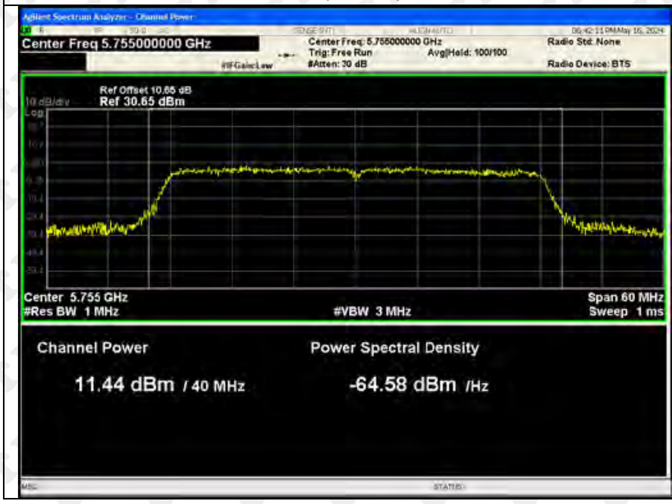
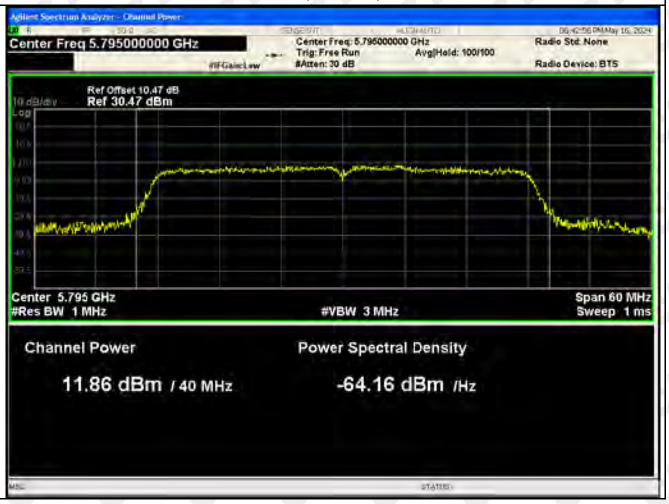
	
802.11n(HT20)-5785	802.11n(HT20)-5825





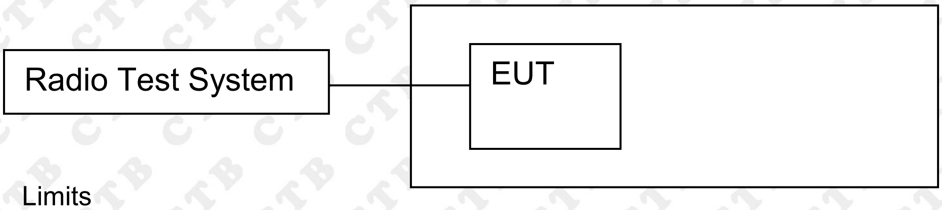
5802.11n(HT40)-5755	802.11n(HT40)-5795





10. EMISSION BANDWIDTH& OCCUPIED BANDWIDTH

10.1 Block Diagram Of Test Setup



10.2 Limits

(1) For the band 5.15-5.25 GHz.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(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 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.
(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

10.3 Test Procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

1. Emission Bandwidth (EBW)
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 maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
2. Minimum Emission Bandwidth for the band 5.725−5.85 GHz
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.725−5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 * RBW.
c) Detector = Peak.
d) Trace mode = max hold.

e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described in this section. For devices that use channel aggregation refer to III.A and III.C for determining emission bandwidth.

D. 99% Occupied Bandwidth

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. Measurement of the 99% occupied bandwidth is *required* only as a condition for using the optional band-edge measurement techniques described in II.G.3.d). Measurements of 99% occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the 789033 D02 General UNII Test Procedures New Rules v02r01 Page 4 spectrum is integrated when measuring maximum conducted output power as described in II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with Section 15.407(a).
The following procedure shall be used for measuring (99%) power bandwidth:
1. Set center frequency to the nominal EUT channel center frequency.

2. Set span = 1.5 times to 5.0 times the OBW.

3. Set RBW = 1% to 5% of the OBW

4. Set VBW ≥ 3 * RBW

5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

6. Use the 99% power bandwidth function of the instrument (if available).

7. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

10.4 Test Results

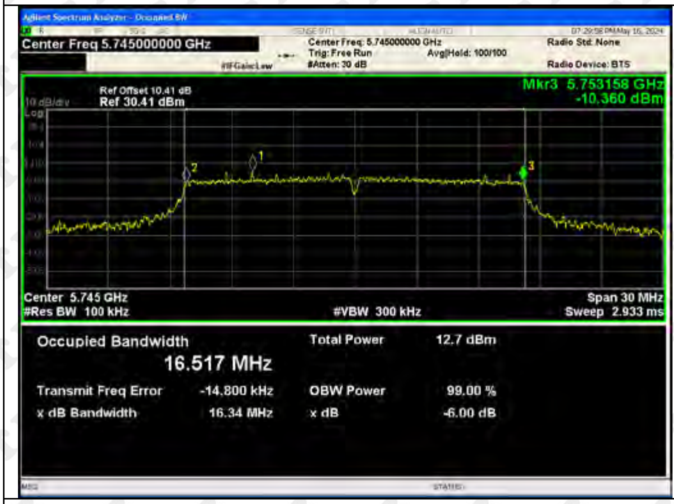
5725-5850 MHz

Test mode Ant 1	Test Channel (MHz)	6dB Bandwidth (MHz)	Result
802.11a	5745	16.345	Pass
	5785	15.64	Pass
	5825	16.342	Pass
802.11ac(VH20)	5745	16.193	Pass
	5785	15.442	Pass
	5825	15.467	Pass
802.11ac(VH40)	5755	35.487	Pass
	5795	35.23	Pass
802.11ac(VH80)	5775	75.23	Pass
802.11n(VH20)	5745	17.163	Pass
	5785	15.997	Pass
	5825	17.037	Pass
802.11n(VH40)	5755	35.179	Pass
	5795	35.138	Pass

Test mode Ant 2	Test Channel (MHz)	6dB Bandwidth (MHz)	Result
802.11a	5745	16.342	Pass
	5785	16.303	Pass
	5825	16.358	Pass
802.11ac(VH20)	5745	16.95	Pass
	5785	15.916	Pass
	5825	16.575	Pass
802.11ac(VH40)	5755	35.681	Pass
	5795	35.707	Pass
802.11ac(VH80)	5775	75.24	Pass
802.11n(VH20)	5745	16.922	Pass
	5785	16.352	Pass
	5825	16.324	Pass
802.11n(VH40)	5755	35.503	Pass
	5795	35.217	Pass

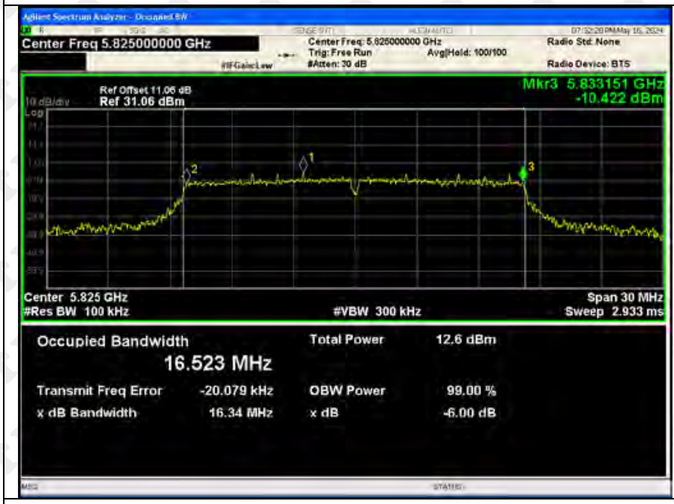
5745-5825MHz
ANT 1:

802.11a-5745

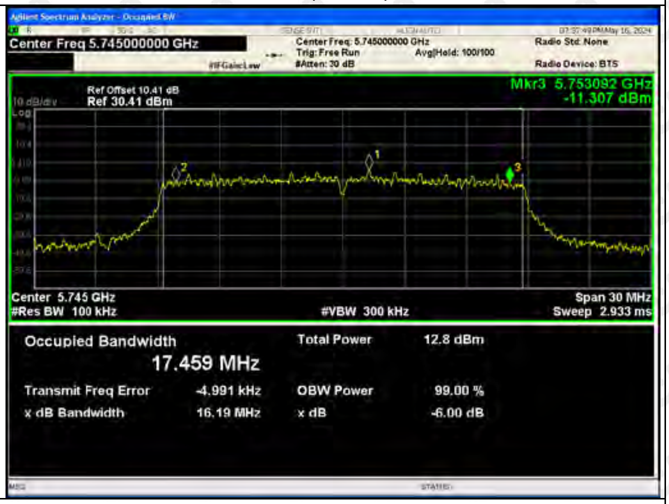


802.11a-5785

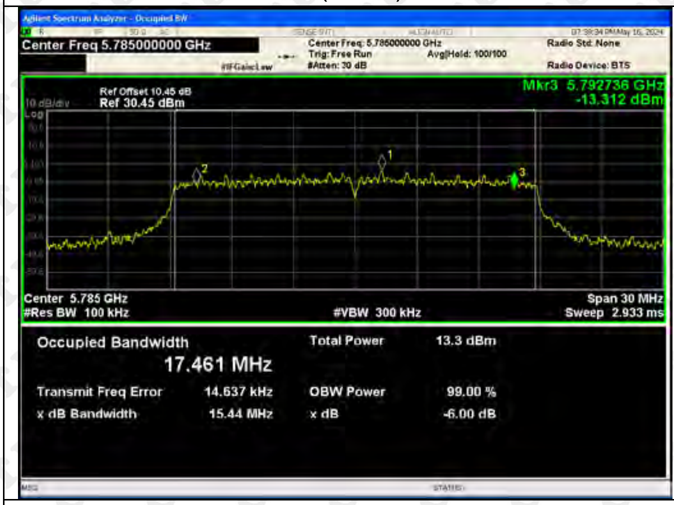
802.11a-5825



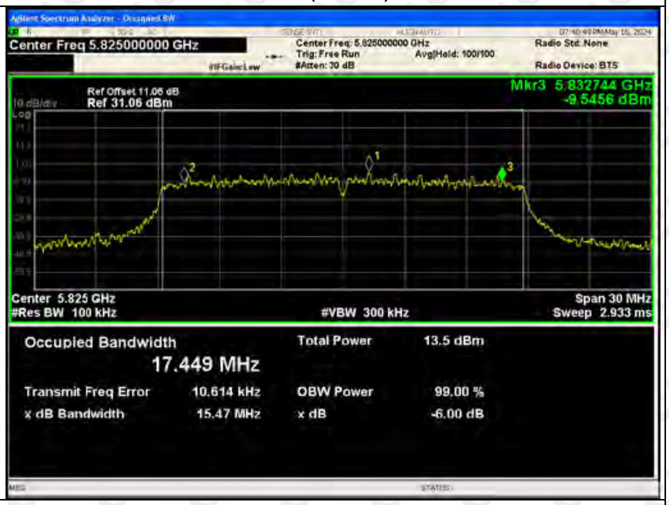
802.11ac(VH20)-5745



802.11ac(VH20)-5785

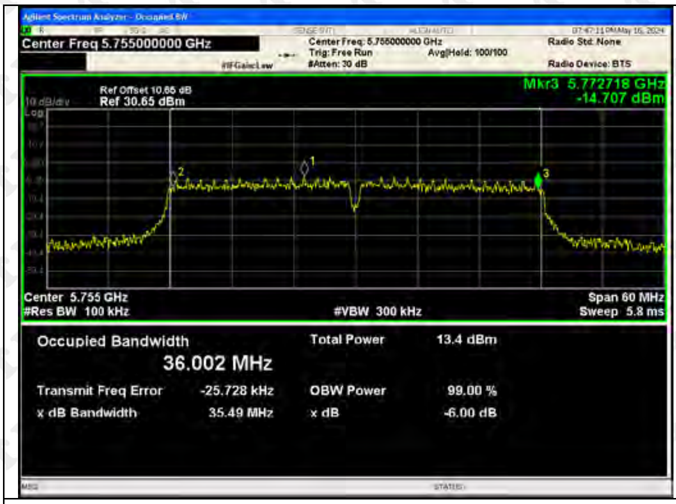
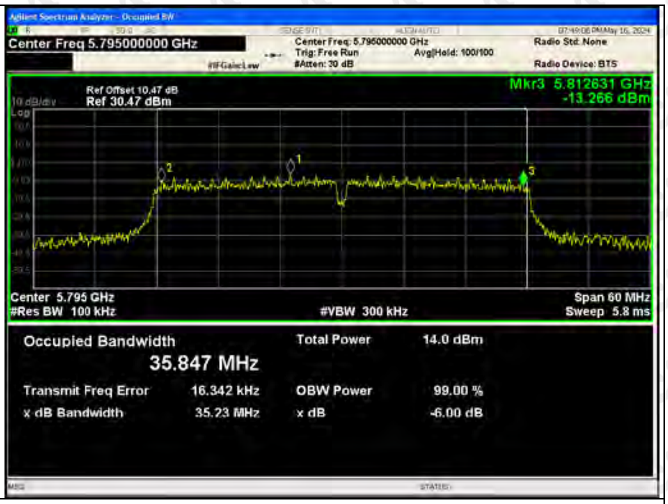
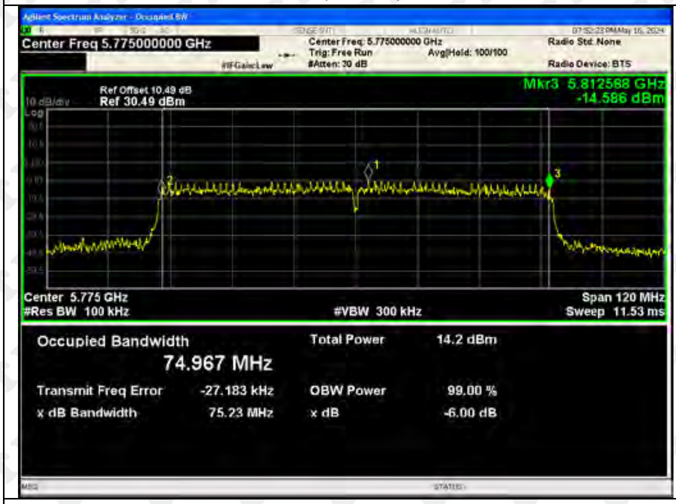


802.11ac(VH20)-5825



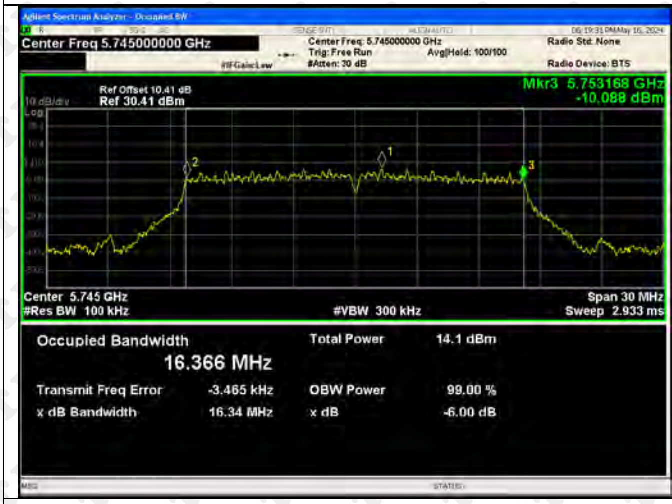
802.11ac(VH40)-5755

802.11ac(VH40)-5795

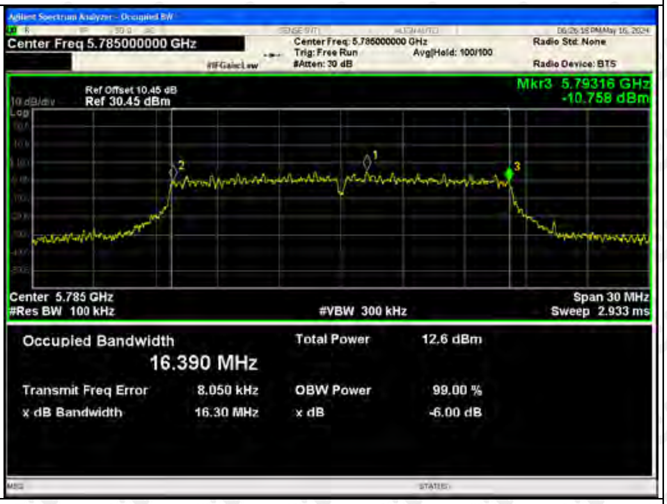
	
802.11ac(VH80)-5775	802.11n(HT20)-5745
	
802.11n(HT20)-5785	802.11n(HT20)-5825
	
5802.11n(HT40)-5755	802.11n(HT40)-5795

ANT2:

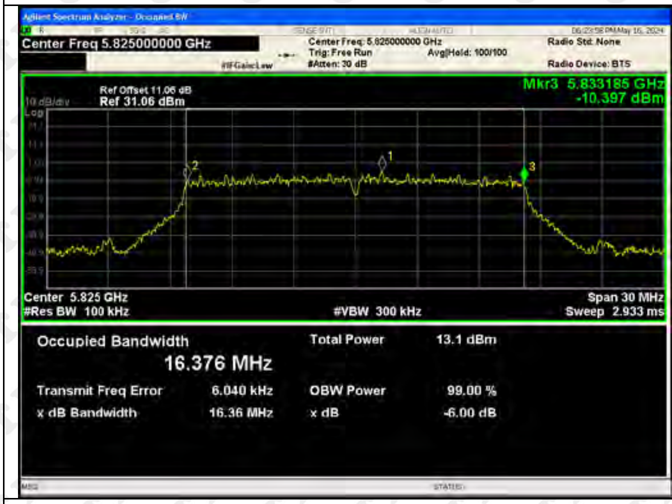
802.11a-5745



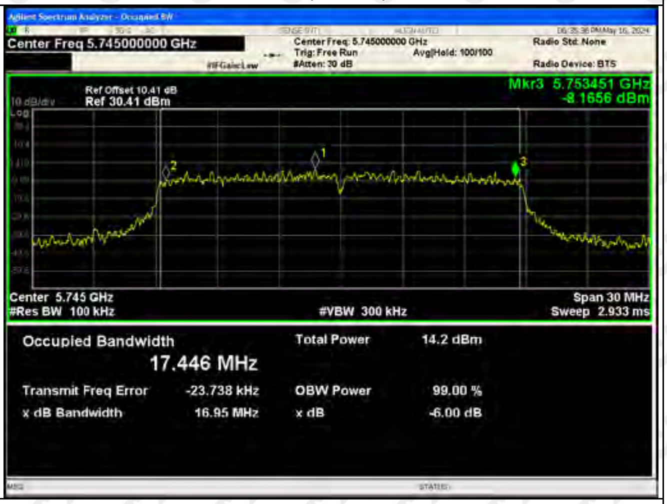
802.11a-5785



802.11a-5825

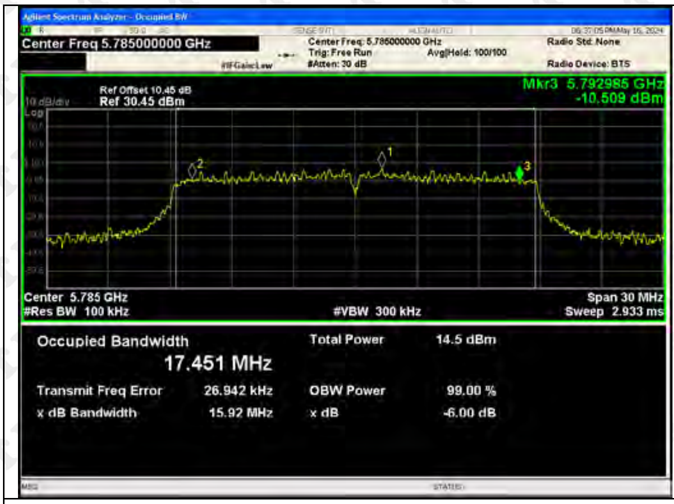


802.11ac(VH20)-5745

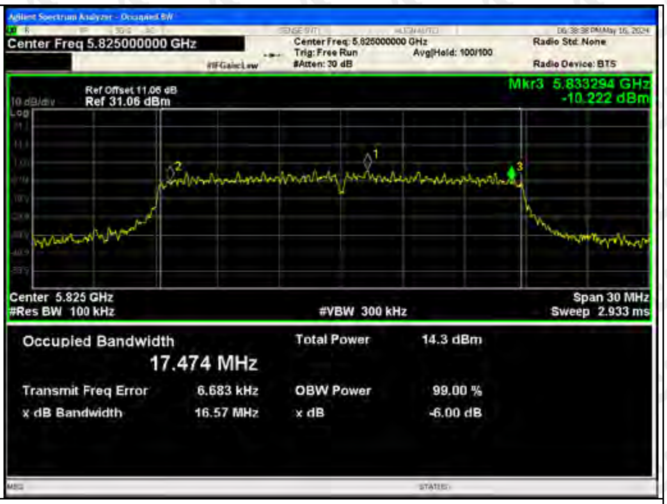


802.11ac(VH20)-5785

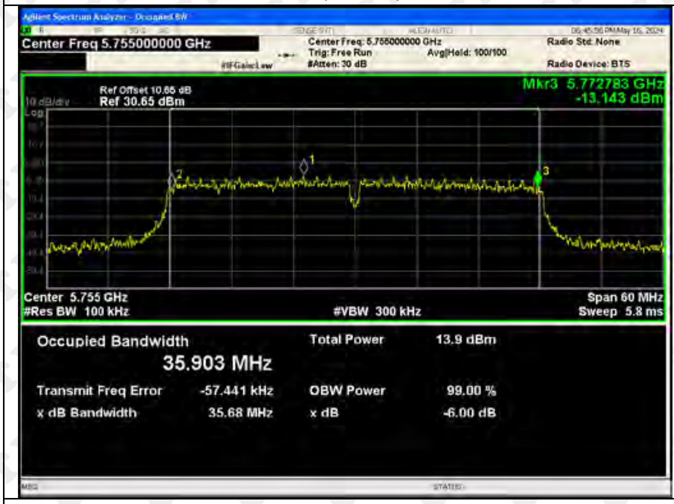
802.11ac(VH20)-5825



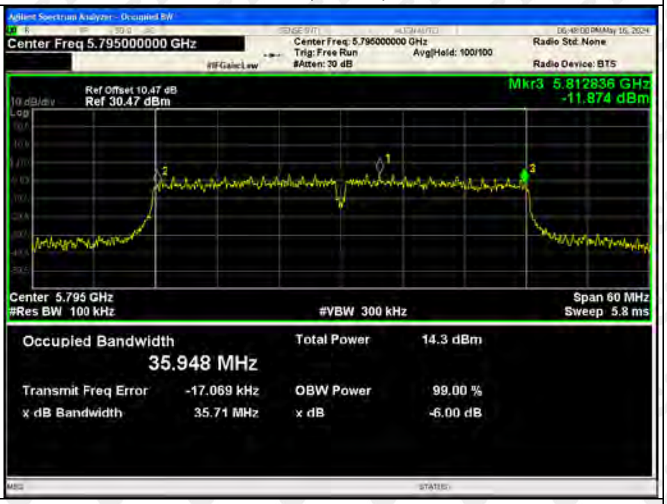
802.11ac(VH40)-5755



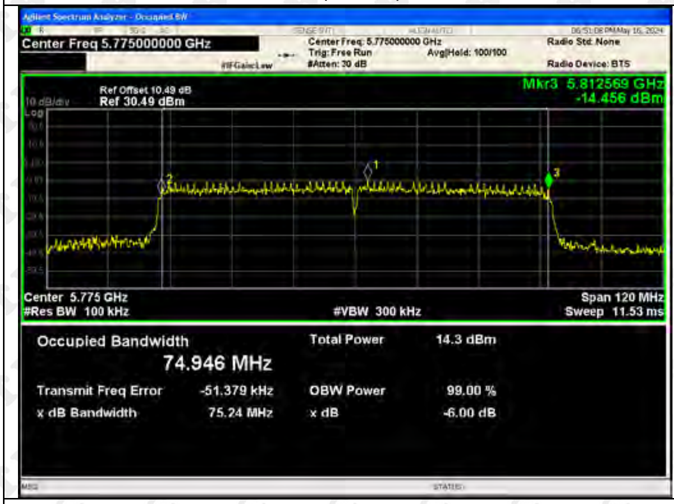
802.11ac(VH40)-5795



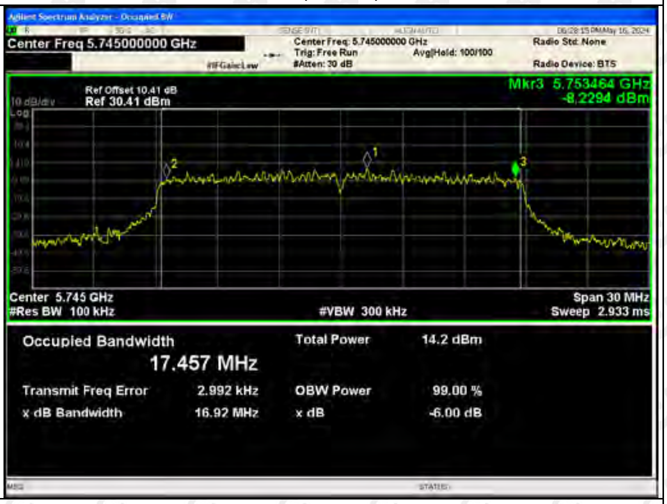
802.11ac(VH80)-5775



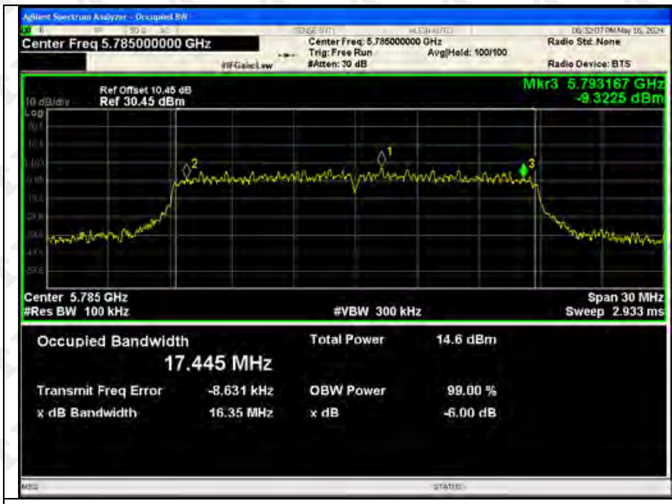
802.11n(HT20)-5745

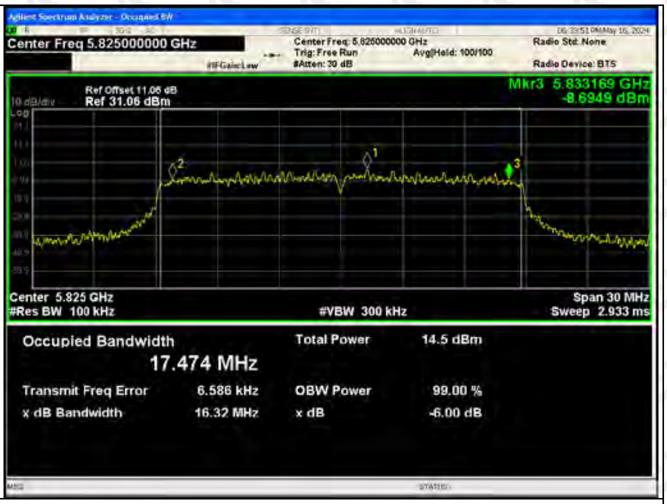


802.11n(HT20)-5785

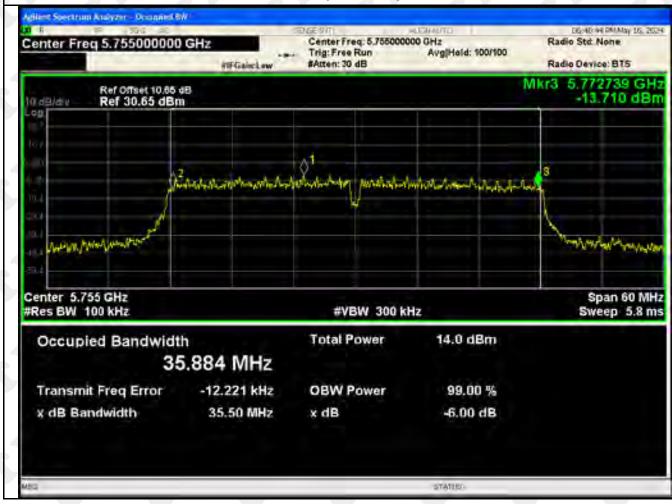


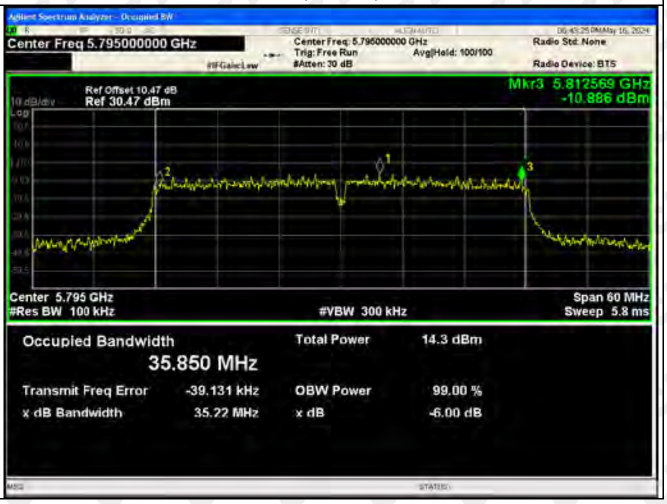
802.11n(HT20)-5825





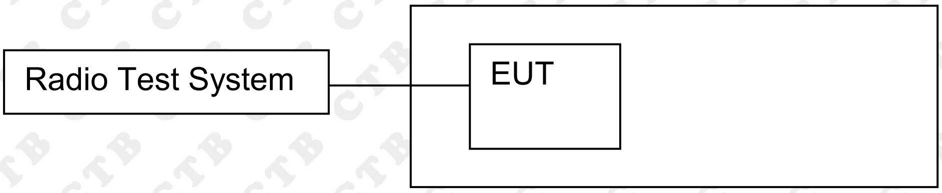
5802.11n(HT40)-5755 | 802.11n(HT40)-5795





11. POWER SPECTRAL DENSITY

11.1 Block Diagram Of Test Setup



11.2 Limit

(1) For the band 5.15-5.25 GHz.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(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 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.

11.3 Test procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

For devices operating in the bands 5.15−5.25 GHz, 5.25−5.35 GHz, and 5.47−5.725 GHz, the preceding procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in Section 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 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 ≥ 1/*T*, where *T* is defined in II.B.l.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 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 (1MHz/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 II.F.5.c) and II.F.5.d), since RBW=100 kHz is available on nearly all spectrum analyzers.

11.4 Test Result

Test mode	Test Channel (MHz)	PSD [dBm/MHz] ANT 1	PSD [dBm/MHz] ANT 2	PSD [dBm/MHz] Total	Limit (dBm)	Result
802.11a	5745	-6.587	-7.349	/	30	Pass
	5785	-6.624	-8.823	/	30	Pass
	5825	-7.135	-7.795	/	30	Pass
802.11ac(VH20)	5745	-8.931	-7.636	-5.225	30	Pass
	5785	-8.706	-7.09	-4.813	30	Pass
	5825	-8.309	-7.638	-4.950	30	Pass
802.11ac(VH40)	5755	-12.708	-12.23	-9.452	30	Pass
	5795	-12.152	-11.457	-8.780	30	Pass
802.11n(VH20)	5775	-15.811	-15.634	-12.711	30	Pass
	5745	-7.61	-7.56	-4.575	30	Pass
	5785	-7.405	-7.103	-4.241	30	Pass
802.11n(VH40)	5825	-7.494	-7.323	-4.397	30	Pass
	5755	-8.058	-12.24	-6.654	30	Pass
802.11ac(VH80)	5795	-7.673	-11.315	-6.113	30	Pass

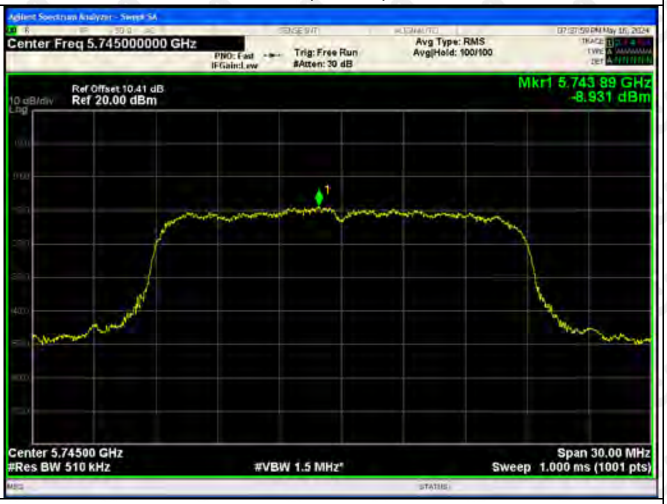
5745-5825MHz
ANT 1:

802.11a-5745

802.11a-5785

802.11a-5825

802.11ac(VH20)-5745



802.11ac(VH20)-5785

802.11ac(VH20)-5825

802.11ac(VH40)-5755

802.11ac(VH40)-5795

	
802.11ac(VH80)-5775	802.11n(HT20)-5745
	
802.11n(HT20)-5785	802.11n(HT20)-5825
	
5802.11n(HT40)-5755	802.11n(HT40)-5795

ANT2:

802.11a-5745

802.11a-5785

802.11a-5825

802.11ac(VH20)-5745

802.11ac(VH20)-5785

802.11ac(VH20)-5825

802.11ac(VH40)-5755

802.11ac(VH40)-5795

802.11ac(VH80)-5775

802.11n(HT20)-5745

802.11n(HT20)-5785

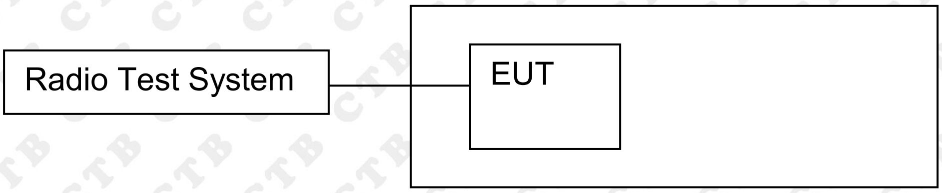
802.11n(HT20)-5825

5802.11n(HT40)-5755

802.11n(HT40)-5795

12. FREQUENCY STABILITY

12.1 Block Diagram Of Test Setup



12.2 Limit

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

12.3 Test procedure

1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.

2. Set EUT as normal operation.

3. Turn the EUT on and couple its output to spectrum.

4. Turn the EUT off and set the chamber to the highest temperature specified.

5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.

6. Repeat step with the temperature chamber set to the lowest temperature.

12.4 Test Result

ANT1:

TX Frequency (5725-5850MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.0	5745.0258	5745	0.0258	4.4909
		V max (V)	132.0	5745.0285	5745	0.0285	4.9524
		V min (V)	108.0	5745.0258	5745	0.0258	4.4909
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5745.0516	5745	0.0516	8.9762
		T (°C)	10	5745.0207	5745	0.0207	3.6089
		T (°C)	20	5745.0328	5745	0.0328	5.7090
		T (°C)	30	5745.0181	5745	0.0181	3.1555
		T (°C)	40	5745.0706	5745	0.0706	12.2945
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.0	5785.0355	5785	0.0355	6.1433
		V max (V)	132.0	5785.0812	5785	0.0812	14.0325
		V min (V)	108.0	5785.0585	5785	0.0585	10.1163
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5785.0574	5785	0.0574	9.9271
		T (°C)	10	5785.0475	5785	0.0475	8.2094
		T (°C)	20	5785.0540	5785	0.0540	9.3275
		T (°C)	30	5785.0745	5785	0.0745	12.8795
		T (°C)	40	5785.0695	5785	0.0695	12.0103
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.0	5825.0841	5825	0.0841	14.4425
		V max (V)	132.0	5825.0362	5825	0.0362	6.2067
		V min (V)	108.0	5825.0664	5825	0.0664	11.4025
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5825.0585	5825	0.0585	10.0440
		T (°C)	10	5825.0110	5825	0.0110	1.8953
		T (°C)	20	5825.0214	5825	0.0214	3.6776
		T (°C)	30	5825.0826	5825	0.0826	14.1785
		T (°C)	40	5825.0666	5825	0.0666	11.4254
Limits				±20ppm			
Result				Complies			

ANT2:

TX Frequency (5725-5850MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.0	5745.0895	5745	0.0895	15.5759
		V max (V)	132.0	5745.0005	5745	0.0005	0.0840
		V min (V)	108.0	5745.0557	5745	0.0557	9.7035
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5745.0574	5745	0.0574	9.9925
		T (°C)	10	5745.0251	5745	0.0251	4.3758
		T (°C)	20	5745.0444	5745	0.0444	7.7299
		T (°C)	30	5745.0567	5745	0.0567	9.8722
		T (°C)	40	5745.0721	5745	0.0721	12.5453
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.0	5785.0878	5785	0.0878	15.1814
		V max (V)	132.0	5785.0048	5785	0.0048	0.8322
		V min (V)	108.0	5785.0590	5785	0.0590	10.1972
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5785.0426	5785	0.0426	7.3565
		T (°C)	10	5785.0053	5785	0.0053	0.9244
		T (°C)	20	5785.0746	5785	0.0746	12.8917
		T (°C)	30	5785.0242	5785	0.0242	4.1799
		T (°C)	40	5785.0890	5785	0.0890	15.3915
		T (°C)	50	5785.0879	5785	0.0879	15.2028
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.0	5825.0543	5825	0.0543	9.3186
		V max (V)	132.0	5825.0591	5825	0.0591	10.1462
		V min (V)	108.0	5825.0036	5825	0.0036	0.6164
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5825.0703	5825	0.0703	12.0630
		T (°C)	10	5825.0166	5825	0.0166	2.8458
		T (°C)	20	5825.0425	5825	0.0425	7.3017
		T (°C)	30	5825.0922	5825	0.0922	15.8272
		T (°C)	40	5825.0913	5825	0.0913	15.6804
Limits				±20ppm			
Result				Complies			

13. OPERATION IN THE ABSENCE OF INFORMATION TO THE TRANSMIT

13.1 Requirement

15.407(c) requirement:
The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signal ling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

13.2 Test Results

Operation in the absence of information to the transmit:

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling
signal of ASK message transmitting from remote device and verify whether it shall resend or
discontinue transmission. (manufacturer declare)

14. ANTENNA REQUIREMENT

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.
15.247(b) (4) requirement:
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

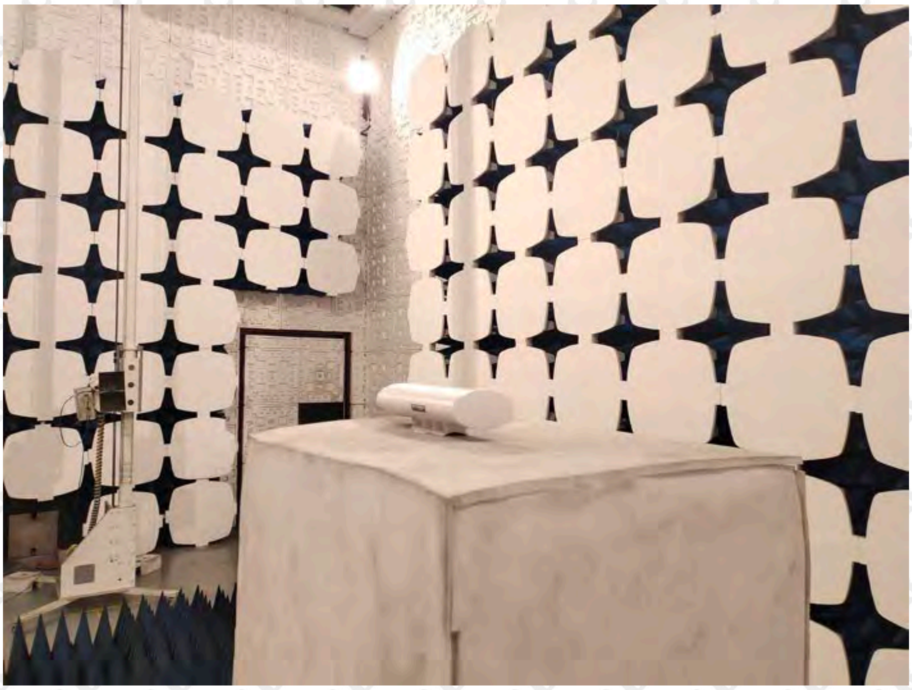
The antenna is Internal antenna and no consideration of replacement. The best case gain of the antenna is Ant1: 6.58dBi, Ant2: 6.58dBi.

15. EUT TEST SETUP PHOTOGRAPHS

Spurious emissions

Below 1GHz

Above 1GHz



Conducted Emission

※※※※※ **END OF REPORT** ※※※※※