



诺检标准
NTT STANDARD

TEST REPORT

FCC ID: 2BYJC-Y5

Product : Mini PC

Model Name :

Y5, Y5Air, Y5PLUS, Y5Pro, Y5Power, Y5Turbo
Y6, Y6Air, Y6PLUS, Y6Pro, Y6Power, Y6Turbo
Y7, Y7Air, Y7PLUS, Y7Pro, Y7Power, Y7Turbo
Y8, Y8Air, Y8PLUS, Y8Pro, Y8Power, Y8Turbo
Y9, Y9Air, Y9PLUS, Y9Pro, Y9Power, Y9Turbo
S5, S5Air, S5PLUS, S5Pro, S5Power, S5Turbo
S6, S6Air, S6PLUS, S6Pro, S6Power, S6Turbo
S7, S7Air, S7PLUS, S7Pro, S7Power, S7Turbo
S8, S8Air, S8PLUS, S8Pro, S8Power, S8Turbo
S9, S9Air, S9PLUS, S9Pro, S9Power, S9Turbo
M5, M5Air, M5PLUS, M5Pro, M5Power, M5Turbo
M6, M6Air, M6PLUS, M6Pro, M6Power, M6Turbo
M7, M7Air, M7PLUS, M7Pro, M7Power, M7Turbo
M8, M8Air, M8PLUS, M8Pro, M8Power, M8Turbo

Brand : SOYO

Report No. : SZNTT26040492E1-4

Prepared for

Shenzhen Phantom Home Digital Technology Co., Ltd.

**Room 307, 3rd Floor, Building 4 East, SEG Technology Park No. 3012 Huaqiang North
Road Licun Community, Huaqiangbei Subdistrict Futian District, Shenzhen, 518000
China**



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NTT STANDARD

Report No.: SZNTT26040492E1-4

Prepared by

Shenzhen NTT Testing Technology Co., Ltd.

**1B, Building 2, Factory Building & 103, Building 3, Factory Building, Dayang
Industrial Park No.4, Industrial Avenue, Tangwei Community, Fuhai Sub-district,
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TEL: 0755-27889935



1 TEST RESULT CERTIFICATION

Applicant : Shenzhen Phantom Home Digital Technology Co., Ltd.
Address : Room 307, 3rd Floor, Building 4 East, SEG Technology Park No. 3012 Huaqiang
North Road Licun Community, Huaqiangbei Subdistrict Futian District, Shenzhen,
518000 China

Manufacturer : Shenzhen Phantom Home Digital Technology Co., Ltd.
Address : Room 307, 3rd Floor, Building 4 East, SEG Technology Park No. 3012 Huaqiang
North Road Licun Community, Huaqiangbei Subdistrict Futian District, Shenzhen,
518000 China

Product name : Mini PC

Model name : Y5, Y5Air, Y5PLUS, Y5Pro, Y5Power, Y5Turbo
Y6, Y6Air, Y6PLUS, Y6Pro, Y6Power, Y6Turbo
Y7, Y7Air, Y7PLUS, Y7Pro, Y7Power, Y7Turbo
Y8, Y8Air, Y8PLUS, Y8Pro, Y8Power, Y8Turbo
Y9, Y9Air, Y9PLUS, Y9Pro, Y9Power, Y9Turbo
S5, S5Air, S5PLUS, S5Pro, S5Power, S5Turbo
S6, S6Air, S6PLUS, S6Pro, S6Power, S6Turbo
S7, S7Air, S7PLUS, S7Pro, S7Power, S7Turbo
S8, S8Air, S8PLUS, S8Pro, S8Power, S8Turbo
S9, S9Air, S9PLUS, S9Pro, S9Power, S9Turbo
M5, M5Air, M5PLUS, M5Pro, M5Power, M5Turbo
M6, M6Air, M6PLUS, M6Pro, M6Power, M6Turbo
M7, M7Air, M7PLUS, M7Pro, M7Power, M7Turbo
M8, M8Air, M8PLUS, M8Pro, M8Power, M8Turbo
M9, M9Air, M9PLUS, M9Pro, M9Power, M9Turbo

Additional model : All the model are the same circuit and RF module, only the names are different, used
to distinguish between different sales customers. Test sample model: Y5

Standards : FCC CFR47 Part 15 Section 15.247

Test procedure : ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Date of test : Aug. 11, 2026 to Sep. 16, 2026

Date of Issue : Sep. 16, 2026

This device described above has been tested by NTT, 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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Contents

Page

1 TEST RESULT CERTIFICATION	3
2 TEST SUMMARY	7
3 TEST FACILITY	8
4 GENERAL INFORMATION	9
4.1 GENERAL DESCRIPTION OF E.U.T.	9
4.2 TEST SETUP CONFIGURATION	12
4.3 TEST MODE	12
5 EQUIPMENT DURING TEST	13
5.1 EQUIPMENTS LIST	13
5.2 MEASUREMENT UNCERTAINTY	16
5.3 DESCRIPTION OF SUPPORT UNITS	16
6 CONDUCTED EMISSION	17
6.1 E.U.T. OPERATION	17
6.2 EUT SETUP	17
6.3 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	18
6.4 MEASUREMENT PROCEDURE:	18
6.5 CONDUCTED EMISSION LIMIT	18
6.6 MEASUREMENT DESCRIPTION	19
6.7 CONDUCTED EMISSION TEST RESULT	19
7 RADIATED SPURIOUS EMISSIONS	23
7.1 EUT OPERATION	24
7.2 TEST SETUP	25
7.3 SPECTRUM ANALYZER SETUP	27
7.4 TEST PROCEDURE	28
7.5 SUMMARY OF TEST RESULTS	29
8 DUTY CYCLE	37
8.1 LIMIT	37
8.2 TEST SETUP	37
8.3 TEST PROCEDURE	37



8.4 TEST RESULT	38
9 POWER SPECTRAL DENSITY TEST	48
9.1 TEST STANDARD AND LIMIT	48
9.2 TEST SETUP	49
9.3 TEST PROCEDURE	49
9.4 TEST DATA	50
10 26DB & 6DB & 99% EMISSION BANDWIDTH TEST	59
10.1 TEST STANDARD	59
10.2 TEST SETUP	59
10.3 TEST PROCEDURE	59
10.4 TEST DATA	61
11 MAXIMUM CONDUCTED OUTPUT POWER	79
11.1 TEST STANDARD AND LIMIT	79
11.2 TEST SETUP	80
11.3 TEST PROCEDURE	80
11.4 TEST DATA	82
12 OUT OF BAND EMISSIONS AND SPURIOUS EMISSION	91
12.1 TEST STANDARD AND LIMIT	91
12.2 TEST SETUP	91
12.3 TEST PROCEDURE	91
12.4 TEST DATA	92
13 FREQUENCY STABILITY MEASUREMENT	98
13.1 TEST STANDARD AND LIMIT	98
13.2 TEST SETUP	98
13.3 TEST PROCEDURE	98
13.4 TEST DATA	99
14 ANTENNA REQUIREMENT	106
14.1 TEST STANDARD AND REQUIREMENT	106
14.2 ANTENNA CONNECTED CONSTRUCTION	106
15 TEST SETUP & EUT PHOTOGRAPH	107



2 Test Summary

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.407(b), 15.209	Radiated Spurious Emission	PASS	
15.207	AC Power Line conducted emission	PASS	
15.407 (a) 15.407 (e)	99% , 6dB and 26dB Bandwidth	PASS	
15.407 (a)	Maximum Conducted Output Power	PASS	
15.407(b)	Band Edge	PASS	
15.407 (a)	Power Spectral Density	PASS	
15.407(g)	Frequency Stability	PASS	
15.203	Antenna Requirement	PASS	

Remark:

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



3 TEST FACILITY

Site Description

Designation Number: CN3446

EMC Lab.

: Test Firm Registration Number: 129414
Accredited by ANAB, Dec. 19, 2025
The Certificate Registration Number is AT-3446

Name of Firm

: Shenzhen NTT Testing Technology Co., Ltd.

Site Location

: 1B, Building 2, Factory Building & 103, Building 3, Factory Building, Dayang
Industrial Park No.4, Industrial Avenue, Tangwei Community, Fuhai Sub-district, Bao
'an District, Shenzhen City, China



4 General Information

4.1 General Description of E.U.T.

Product Name:	Mini PC
Model No.:	Y5
Sample ID:	SZNTT26040492E1-4
Sample(s) Status:	N/A
series model:	Y5Air, Y5PLUS, Y5Pro, Y5Power, Y5Turbo Y6, Y6Air, Y6PLUS, Y6Pro, Y6Power, Y6Turbo Y7, Y7Air, Y7PLUS, Y7Pro, Y7Power, Y7Turbo Y8, Y8Air, Y8PLUS, Y8Pro, Y8Power, Y8Turbo Y9, Y9Air, Y9PLUS, Y9Pro, Y9Power, Y9Turbo S5, S5Air, S5PLUS, S5Pro, S5Power, S5Turbo S6, S6Air, S6PLUS, S6Pro, S6Power, S6Turbo S7, S7Air, S7PLUS, S7Pro, S7Power, S7Turbo S8, S8Air, S8PLUS, S8Pro, S8Power, S8Turbo S9, S9Air, S9PLUS, S9Pro, S9Power, S9Turbo M5, M5Air, M5PLUS, M5Pro, M5Power, M5Turbo M6, M6Air, M6PLUS, M6Pro, M6Power, M6Turbo M7, M7Air, M7PLUS, M7Pro, M7Power, M7Turbo M8, M8Air, M8PLUS, M8Pro, M8Power, M8Turbo M9, M9Air, M9PLUS, M9Pro, M9Power, M9Turbo
Model Different.:	All the model are the same circuit and RF module, only the names are different, used to distinguish between different sales customers. Test sample model: Y5
Operation Frequency:	UNII-3: 5745MHz~5825MHz(20MHz bandwidth) 5755MHz~5795MHz(40MHz bandwidth) 5775 MHz (80MHz bandwidth)
Number of Channel:	UNII-3: 5 channels for 20MHz bandwidth 2 channels for 40MHz bandwidth 2 channels for 80MHz bandwidth
Modulation type:	802.11a: (64-QAM, 16-QAM, QPSK, BPSK) OFDM 802.11n: (64-QAM, 16-QAM, QPSK, BPSK) OFDM 802.11ac: (256-QAM, 64-QAM, 16-QAM, QPSK, BPSK) OFDM
Antenna Type:	FPC antenna
Antenna gain:	WIFI 5.8G: ANT 1: 2.51dBi; ANT 2: 2.51dBi



Power supply:	DC 12V 3A 36W
Hardware Version:	N/A
Software Version:	N/A
Note:	N/A
Remark:	the Antenna gain is provided by customer from Antenna spec. and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.

EUT has two Internal Antenna with Max Antenna Gain 2.51dBi on every antenna, CDD device with one spatial streams, according to KDB662911 D01 v02r01,

Directional gain= GANT + Array Gain, where Array Gain is as follows.

1) For power spectral density(PSD) measurements,

Array Gain=10log(NANT/NSS)dB=10log(2/1)=3.01dB,

So the directional gain for PSD is 5.52dBi

2) For power measurements,

The Array gain=0 dB for NANT≤4,

So the directional gain for Power measurements is 2.51dBi

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

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

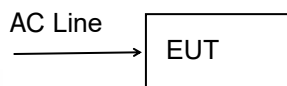


802.11ac (80MHz) Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
155	5775	-	-	-	-	-	-

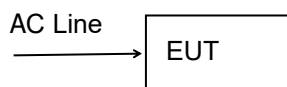


4.2 Test Setup Configuration

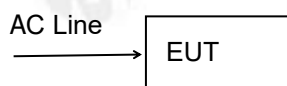
Conducted Emission



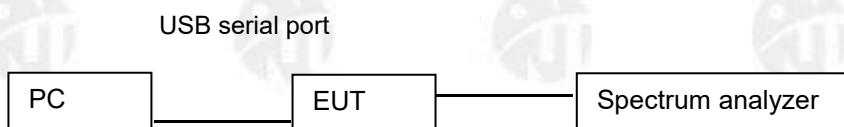
Radiated Emission(30MHz-1GHz)



Radiated Emission(above 1GHz)



RF Conducted Test



4.3 Test Mode

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	The EUT enters engineering mode
Power level setup	Default



5 Equipment During Test

5.1 Equipments List

Conducted Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	HSRCE944	/	HTEC	2025/4/30	2028/4/29
EMI Test Receiver	ESCI	100881/003	ROHDE&SCHW ARZ	2025/09/08 2026/09/04	2026/09/07 2027/09/03
LISN	AMN6500	101185	ROHDE&SCHW ARZ	2025/09/08 2026/09/04	2026/09/07 2027/09/03
LISN	NNLK 8129	00603	SCHWARZBECK	2025/09/08 2026/09/04	2026/09/07 2027/09/03
Pulse Limiters	VTSD 9561 F	00343	SCHWARZBECK	2025/09/08 2026/09/04	2026/09/07 2027/09/03
Cable	RG223-2M	/	RG	2025/09/08 2026/09/04	2026/09/07 2027/09/03

Radiated Test Site(Below 1G and Above 1G)&RF Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2025/7/24	2028/7/23
EMI Test Receiver	ESPI	101018	ROHDE&SCHW ARZ	2025/09/08 2026/09/04	2026/09/07 2027/09/03
Amplifi (30MHz-1GHz)	BBV 9745	00431	SCHWARZBECK	2025/09/08 2026/09/09	2026/09/07 2027/09/08
Bilog Antenna (30MHz-1GHz)	VULB9168	1858	SCHWARZBECK	2025/09/09 2026/09/05	2026/09/08 2027/09/04



Horn antenna (1GHz-18GHz)	BBHA 9120 D	02622	SCHWARZBECK	2025/09/09 2026/09/05	2026/09/08 2027/09/04
Pream plifier (1GHz- 18GHz)	BBV 9718D	0024	SCHWARZBECK	2025/09/08 2026/09/04	2026/09/07 2027/09/03
Spectrum Analyze (10Hz-40GHz)	FSV 40	100952	ROHDE&SCHW ARZ	2025/09/08 2026/09/04	2026/09/07 2027/09/03
Pream plifier (18GHz-40GHz)	BBV 9721	0056	SCHWARZBECK	2025/09/08 2026/09/04	2026/09/07 2027/09/03
Double Ridge Guide Horn Antenna (18GHz-40GHz)	SAS-574	588	A.H.System	2025/09/09 2026/09/05	2026/09/08 2027/09/04
Loop Antenna (9KHz-30MHz)	FMZB 1513-60	00115	SCHWARZBECK	2025/09/08 2026/09/04	2026/09/07 2027/09/03
MXG Signal Analyzer	N9020A	MY49100730	Agilent	2025/09/08 2026/09/04	2026/09/07 2027/09/03
MXG Vector Signal Generator	N5182A	MY50144920	Agilent	2025/09/08 2026/09/04	2026/09/07 2027/09/03
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	/	ROHDE&SCHW ARZ	2025/09/08 2026/09/07	2026/09/07 2027/09/06
Power Sensor	MW100- RFCB-2	MW260105N TT-64	MWRFtest	2025/09/08 2026/09/04	2026/09/07 2027/09/03
RF Swith	MW100- RFCB-1	MW260105N TT-64	MWRFtest	2025/09/08 2026/09/04	2026/09/07 2027/09/03
Cable	RG223-3M	/	DA	2025/09/08 2026/09/04	2026/09/07 2027/09/03
Cable	RG223-12M	/	DA	2025/09/08 2026/09/04	2026/09/07 2027/09/03



Cable	SFT205-NMNMSW-2.5M	/	DA	2025/09/08 2026/09/04	2026/09/07 2027/09/03
Cable	SFT205-NMNM-12M	/	DA	2025/09/08 2026/09/04	2026/09/07 2027/09/03
Cable	UCA500-NJWSM-1.5M	017	MWRFtest	2025/09/08 2026/09/04	2026/09/07 2027/09/03

Test software

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ-EMC	Ver.EMC-CON 3A1.1+
2	EMC radiation test system	FALA	EZ-EMC	Ver.FA-03A2 RE+
3	RF test system	TACHOY	RFTest	V1.0.0
4	RF communication test system	TACHOY	RFTest	V1.0.0



5.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10 ⁻⁶
Bandwidth	± 1.5 x 10 ⁻⁶
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(9KHz~30MHz)	±4.51dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark:When making a conformity declaration based on test results for regulations/standards or specifications,the default is to use Clause 4.2.1of ILAC-G8:09/2019 and the guidelines on decision rules and conformity declaration in IEC Guide 115:2023.	

5.3 Description of Support Units

The EUT has been tested as an independent unit .



6 Conducted Emission

Test Requirement: : FCC CFR 47 Part 15 Section 15.207

Test Method: : ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024

Test Result: : PASS

Frequency Range: : 150kHz to 30MHz

Class/Severity: : Class B

Detector: : Peak for pre-scan (9kHz Resolution Bandwidth)

6.1 E.U.T. Operation

Operating Environment :

Temperature: : 26°C

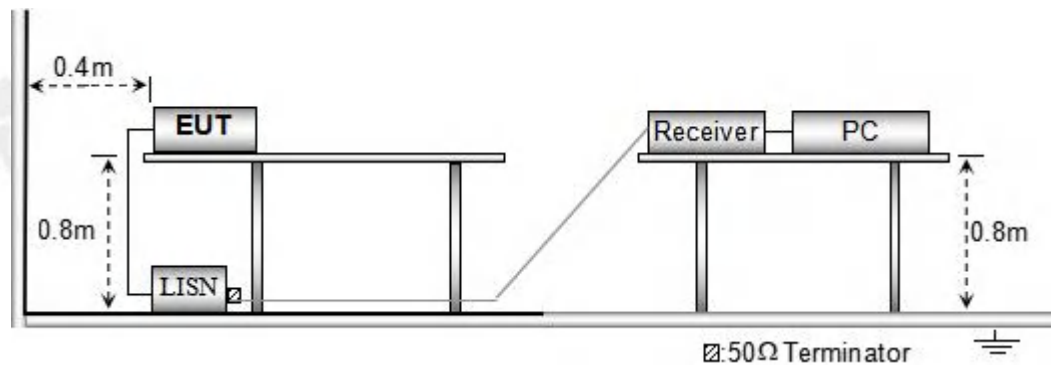
Humidity: : 54 % RH

Atmospheric Pressure: : 101.12 kPa

Test Voltage : AC 120V/60Hz

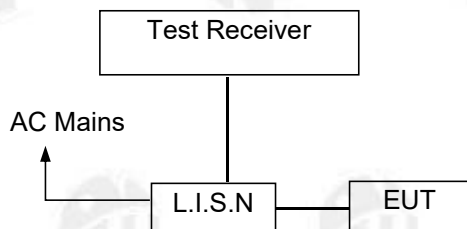
6.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024.





6.3 Test SET-UP (Block Diagram of Configuration)



6.4 Measurement Procedure:

1. 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.
2. 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.
3. 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.
4. LISN at least 80 cm from nearest part of EUT chassis.
5. For the actual test configuration, please refer to the related Item - EUT Test Photos.

6.5 Conducted Emission Limit

Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.



6.6 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

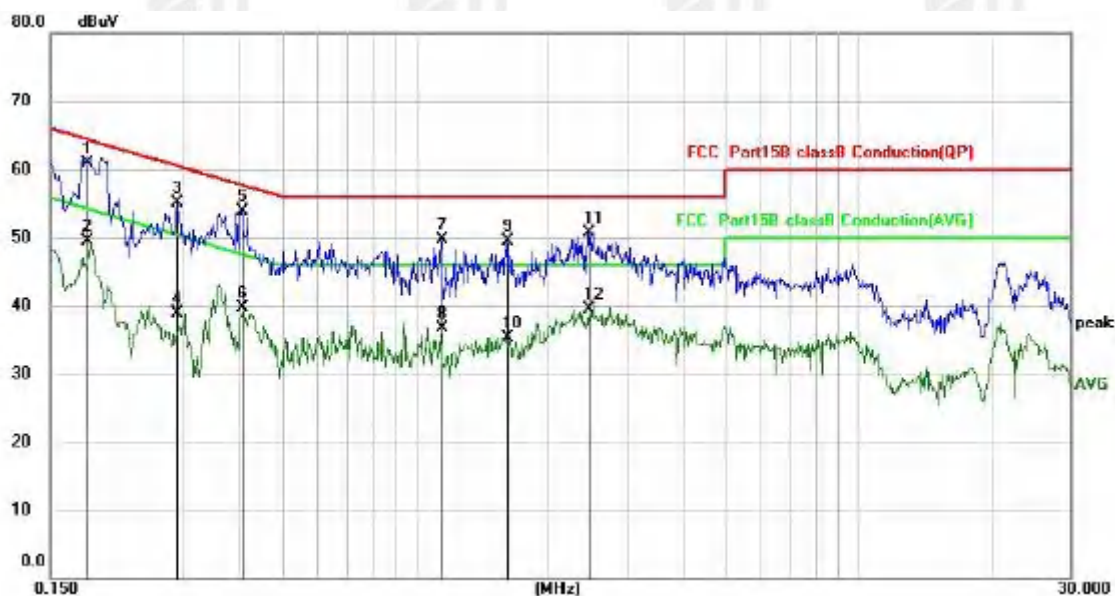
6.7 Conducted Emission Test Result

Pass

All the modulation modes were tested the data of the worst mode (802.11a,Lowest channel) are recorded in the following pages and the others modulation methods do not exceed the limits.



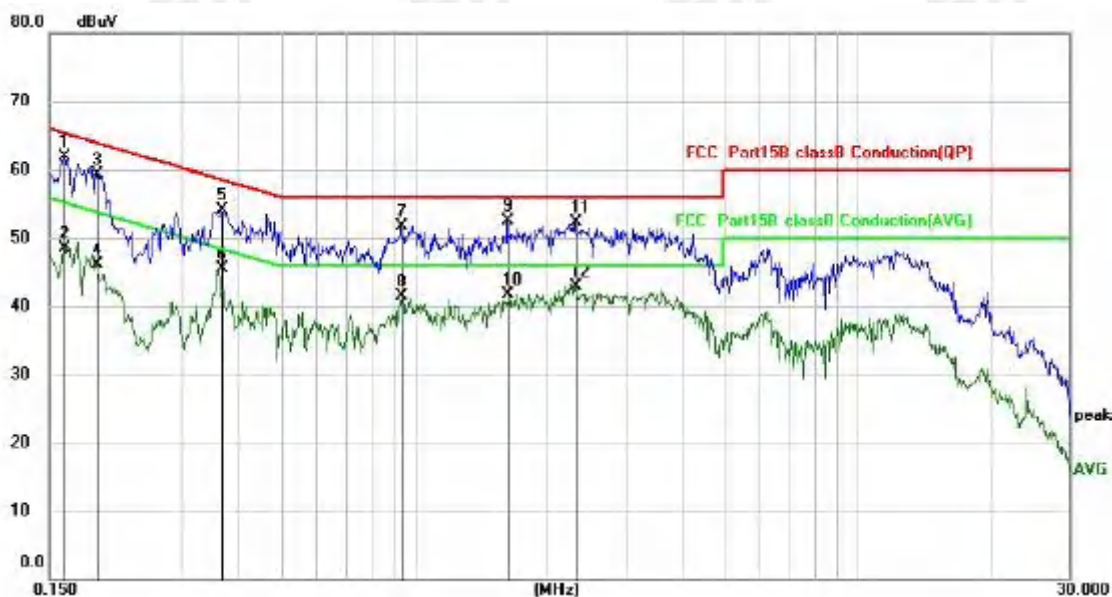
Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Phase :	L
Test Voltage :	DC 12V from Adapter Input AC 120V/60Hz		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1819	50.12	10.80	60.92	64.40	-3.48	QP
2		0.1819	38.66	10.80	49.46	54.40	-4.94	AVG
3		0.2900	44.34	10.67	55.01	60.52	-5.51	QP
4		0.2900	28.17	10.67	38.84	50.52	-11.68	AVG
5		0.4060	43.38	10.56	53.94	57.73	-3.79	QP
6		0.4060	29.09	10.56	39.65	47.73	-8.08	AVG
7		1.1455	39.27	10.46	49.73	56.00	-6.27	QP
8		1.1455	26.15	10.46	36.61	46.00	-9.39	AVG
9		1.6100	38.95	10.47	49.42	56.00	-6.58	QP
10		1.6100	24.92	10.47	35.39	46.00	-10.61	AVG
11		2.4539	40.30	10.48	50.78	56.00	-5.22	QP
12		2.4539	29.10	10.48	39.58	46.00	-6.42	AVG



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Phase :	N
Test Voltage :	DC 12V from Adapter Input AC 120V/60Hz		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1620	50.98	10.85	61.83	65.36	-3.53	QP
2		0.1620	37.68	10.85	48.53	55.36	-6.83	AVG
3		0.1922	48.58	10.78	59.36	63.94	-4.58	QP
4		0.1922	35.36	10.78	46.14	53.94	-7.80	AVG
5		0.3673	43.42	10.60	54.02	58.56	-4.54	QP
6		0.3673	34.81	10.60	45.41	48.56	-3.15	AVG
7		0.9376	41.29	10.46	51.75	56.00	-4.25	QP
8		0.9376	31.06	10.46	41.52	46.00	-4.48	AVG
9		1.6255	41.96	10.47	52.43	56.00	-3.57	QP
10		1.6255	31.14	10.47	41.61	46.00	-4.39	AVG
11		2.3060	41.86	10.47	52.33	56.00	-3.67	QP
12	*	2.3060	32.46	10.47	42.93	46.00	-3.07	AVG



Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor
Correct Factor = Insertion loss of LISN + Cable loss.
4. Margin = Measurement Level - Limit



7 Radiated Spurious Emissions

Test Requirement	:	FCC CFR47 Part 15 Section 15.209 & 15.407
Test Method	:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
Test Result	:	PASS
Measurement Distance	:	3m
Limit	:	See the follow table

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
1.705 ~ 30	30	30	$100 * 30$	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54



Undesirable emission limits

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 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 shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge

Requirement	Limit(EIRP)	Limit (Field strength at 3m)
15.407(b)(1)	PK:-27(dBm/MHz)	PK:68.2(dB μ V/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)		

7.1 EUT Operation

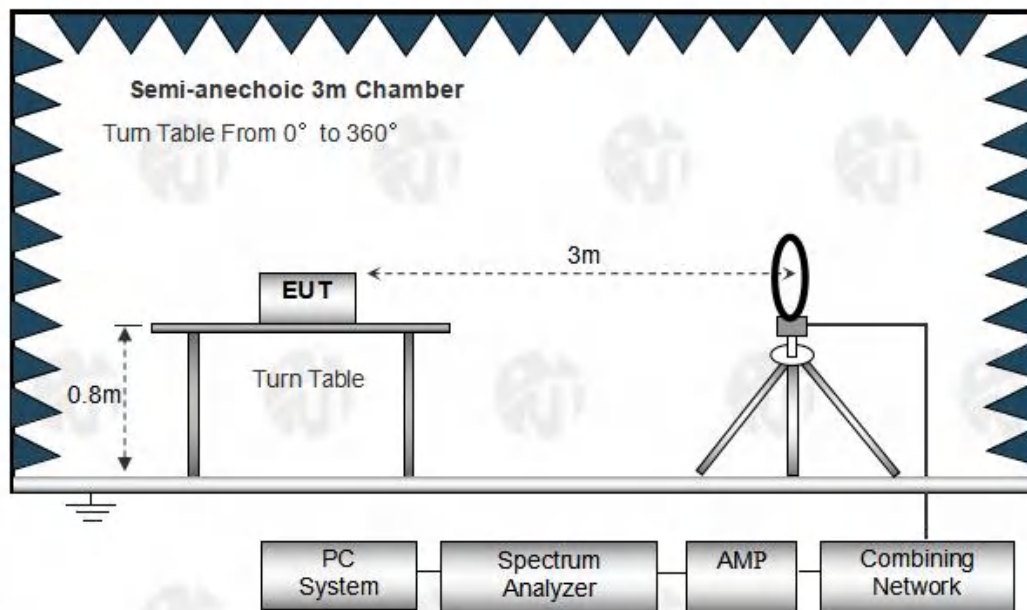
Operating Environment :

Temperature	: 26 °C
Humidity	: 54% RH
Atmospheric Pressure	: 101.3kPa
Test Voltage	: AC 120V60Hz

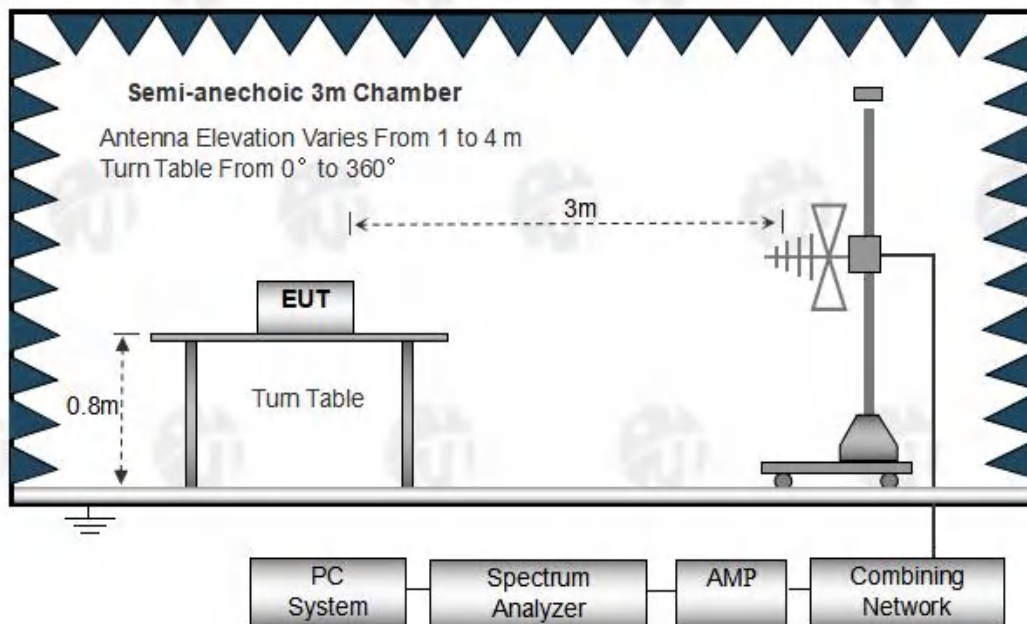
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

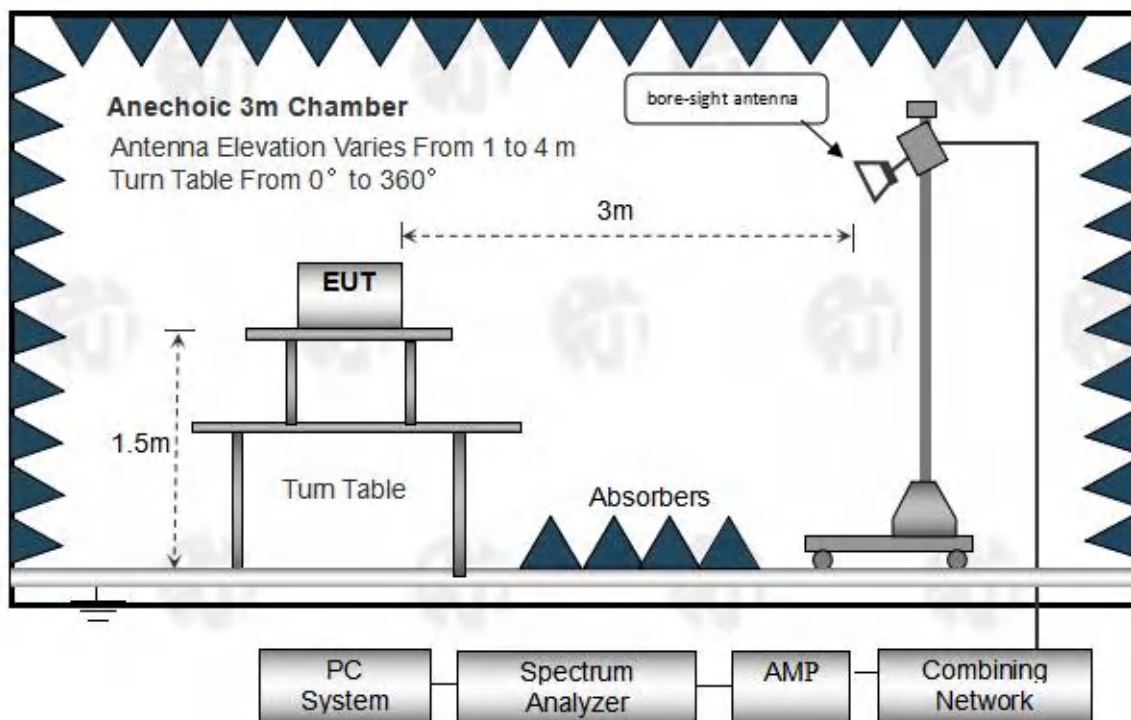
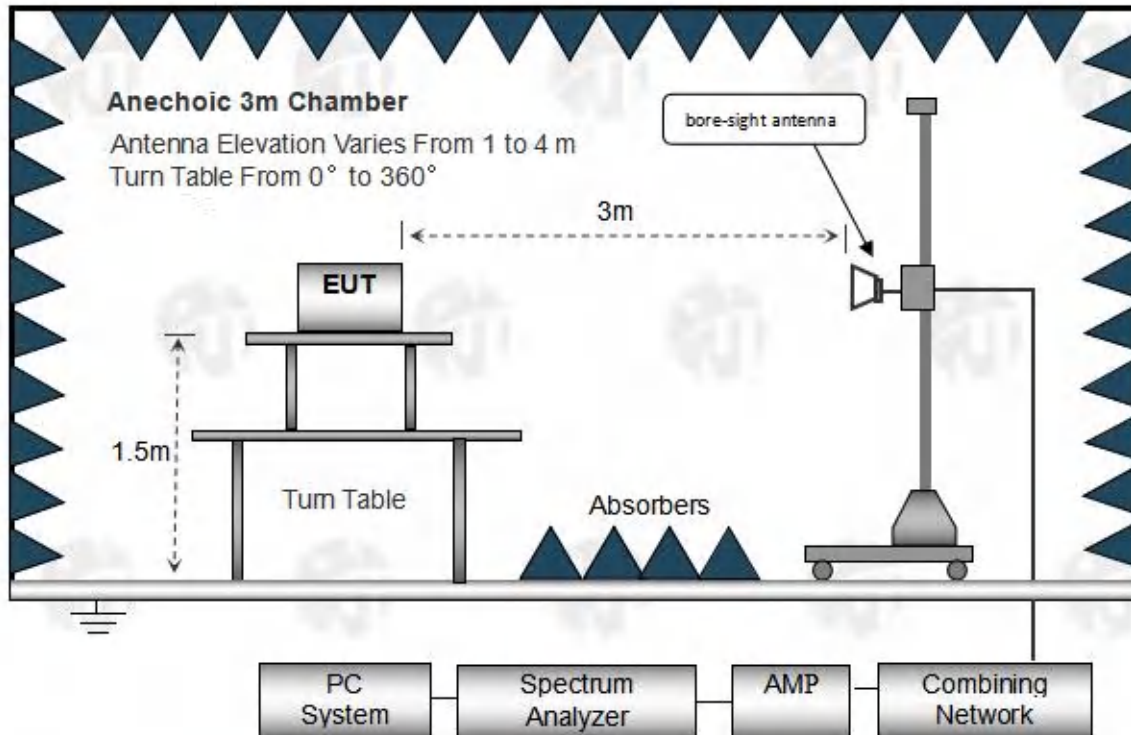
The test setup for emission measurement below 30MHz



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz





7.3 Spectrum Analyzer Setup

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 3 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



7.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024.
2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.
7. Test Procedure of measurement (For Above 1GHz):
 - 1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).
 - 2) Change the antenna polarization and repeat 1) with vertical polarization.
 - 3) Make a hardcopy of the spectrum.
 - 4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
 - 5) Change the analyser mode to Clear/ Write and found the cone of emission.
 - 6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.
 - 7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.
 - 8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.
7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.



7.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq. (MHz)	Ant. Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	>20

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor = $40\log(\text{Specific distance} / \text{test distance})$ (dB);
Limit line = Specific limits (dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

Please refer to the following test plots, Low Channel Worst case 802.11a for record:



Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Horizontal
Test Voltage:	DC 12V from Adapter Input AC 120V/60Hz		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		45.6946	33.32	-5.65	27.67	40.00	-12.33	QP
2		153.2000	36.07	-4.44	31.63	43.50	-11.87	QP
3		199.2855	43.19	-7.75	35.44	43.50	-8.06	QP
4		298.2681	42.29	-3.40	38.89	46.00	-7.11	QP
5		394.8543	35.13	-1.91	33.22	46.00	-12.78	QP
6	*	782.3451	33.83	7.61	41.44	46.00	-4.56	QP

Remark:Emission Level=Reading+Cable Loss+ANT Factor-AMP Factor

Margin= Emission Level - Limit



Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Vertical
Test Voltage:	DC 12V from Adapter Input AC 120V/60Hz		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	!	43.7351	41.83	-5.78	36.05	40.00	-3.95	QP
2		82.2145	42.23	-9.12	33.11	40.00	-6.89	QP
3	!	144.0817	43.75	-4.93	38.82	43.50	-4.68	QP
4	!	199.2855	46.61	-7.75	38.86	43.50	-4.64	QP
5	!	679.9600	35.81	5.29	41.10	46.00	-4.90	QP
6	*	789.2335	35.13	7.77	42.90	46.00	-3.10	QP

Remark:Emission Level=Reading+Cable Loss+ANT Factor-AMP Factor

Margin= Emission Level - Limit



Test Frequency 1GHz-40GHz

802.11a

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/ m)	Margin (dB)	Detect or Type
Low Channel:5745MHz									
V	11490	43.26	32.29	8.39	38.9	58.26	68.2	-9.94	PK
V	11490	28.15	32.29	8.39	38.9	43.15	54	-10.85	AV
V	17233.3	38.61	31.19	9.62	40.37	57.41	68.2	-10.79	PK
V	17233.3	23.79	31.19	9.62	40.37	42.59	54	-11.41	AV
V	22980	38.93	27.02	7.2	38.98	58.09	68.2	-10.11	PK
V	22980	23.27	27.02	7.2	38.98	42.43	54	-11.57	AV
V	28723.3	37.85	27.1	7.56	40.18	58.49	68.2	-9.71	PK
V	28723.3	22.09	27.1	7.56	40.18	42.73	54	-11.27	AV
H	11490	42.85	32.29	8.39	38.9	57.85	68.2	-10.35	PK
H	11490	27.26	32.29	8.39	38.9	42.26	54	-11.74	AV
H	17233.3	39.04	31.19	9.62	40.37	57.84	68.2	-10.36	PK
H	17233.3	24.66	31.19	9.62	40.37	43.46	54	-10.54	AV
H	22980	38.71	27.02	7.2	38.98	57.87	68.2	-10.33	PK
H	22980	24.11	27.02	7.2	38.98	43.27	54	-10.73	AV
H	28723.3	37.94	27.1	7.56	40.18	58.58	68.2	-9.62	PK
H	28723.3	19.23	27.1	7.56	40.18	39.87	54	-14.13	AV



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/ m)	Margin (dB)	Detect or Type
Middle Channel:5785MHz									
V	11570	42.91	32.26	8.48	38.9	58.03	68.2	-10.17	PK
V	11570	25.99	32.26	8.48	38.9	41.11	54	-12.89	AV
V	17353.3	37.51	31.08	9.67	40.61	56.71	68.2	-11.49	PK
V	17353.3	23.28	31.08	9.67	40.61	42.48	54	-11.52	AV
V	23140	36.80	27.03	7.24	39.03	56.04	68.2	-12.16	PK
V	23140	21.47	27.03	7.24	39.03	40.71	54	-13.29	AV
V	28923.3	36.88	27.1	7.58	40.34	57.70	68.2	-10.50	PK
V	28923.3	21.99	27.1	7.58	40.34	42.81	54	-11.19	AV
H	11570	38.90	32.26	8.48	38.9	54.02	68.2	-14.18	PK
H	11570	25.51	32.26	8.48	38.9	40.63	54	-13.37	AV
H	17353.3	38.18	31.08	9.67	40.61	57.38	68.2	-10.82	PK
H	17353.3	20.58	31.08	9.67	40.61	39.78	54	-14.22	AV
H	23140	37.66	27.03	7.24	39.03	56.90	68.2	-11.30	PK
H	23140	19.46	27.03	7.24	39.03	38.70	54	-15.30	AV
H	28923.3	37.55	27.1	7.58	40.34	58.37	68.2	-9.83	PK
H	28923.3	17.83	27.1	7.58	40.34	38.65	54	-15.35	AV



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/ m)	Margin (dB)	Detect or Type
High Channel:5825MHz									
V	11650	42.82	32.23	8.56	38.9	58.05	68.2	-10.15	PK
V	11650	29.87	32.23	8.56	38.9	45.10	54	-8.90	AV
V	17473.3	41.43	30.97	9.73	40.85	61.04	68.2	-7.16	PK
V	17473.3	26.50	30.97	9.73	40.85	46.11	54	-7.89	AV
V	23300	39.59	27.03	7.26	39.06	58.88	68.2	-9.32	PK
V	23300	22.74	27.03	7.26	39.06	42.03	54	-11.97	AV
V	29123.3	38.88	27.1	7.61	40.4	59.79	68.2	-8.41	PK
V	29123.3	21.94	27.1	7.61	40.4	42.85	54	-11.15	AV
H	11650	42.66	32.23	8.56	38.9	57.89	68.2	-10.31	PK
H	11650	27.91	32.23	8.56	38.9	43.14	54	-10.86	AV
H	17473.3	42.28	30.97	9.73	40.85	61.89	68.2	-6.31	PK
H	17473.3	25.38	30.97	9.73	40.85	44.99	54	-9.01	AV
H	23300	44.40	27.03	7.26	39.06	63.69	68.2	-4.51	PK
H	23300	22.67	27.03	7.26	39.06	41.96	54	-12.04	AV
H	29123.3	37.42	27.1	7.61	40.4	58.33	68.2	-9.87	PK
H	29123.3	22.43	27.1	7.61	40.4	43.34	54	-10.66	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss - Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
4. The worst mode is 802.11a, only the worst data is recorded.



The 1-40GHz range has been tested, and the report only records the worst performance of the 1-30G range.



Restrict Band EMISSION MEASUREMENT

U-NII-3

Frequency	Meter Reading	antenna Factor	cable loss	preamp factor	Emission Level	Limit	Margin	Polar	Detector Type	Result
(MHz)	(dBuV/m)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(H/V)		
802.11a:5745MHz										
5650	47.84	30.22	4.85	23.98	46.45	68.2	-21.75	V	PK	Pass
5725	71.04	30.22	4.85	23.98	69.65	122.2	-52.55	V	PK	Pass
5650	45.37	30.22	4.85	23.98	43.98	68.2	-24.22	H	PK	Pass
5725	64.44	30.22	4.85	23.98	63.05	122.2	-59.15	H	PK	Pass
802.11a:5825MHz										
5850	70.65	30.22	4.85	23.98	69.26	122.2	-52.94	V	PK	Pass
5925	46.39	30.22	4.85	23.98	45.00	68.2	-23.20	V	PK	Pass
5850	70.47	30.22	4.85	23.98	69.08	122.2	-53.12	H	PK	Pass
5925	43.63	30.22	4.85	23.98	42.24	68.2	-25.96	H	PK	Pass
Remark: All the modes have tested and recorded the worst mode(802.11a) in the report										

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.

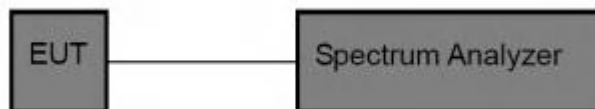


8 Duty cycle

8.1 Limit

Test Requirement: FCC CFR Title 47 Part 15 Subpart C Section 15.407
Test Method: ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to
C63.10a-2024
KDB 789033 D02 v02r01
Test Result: PASS

8.2 Test Setup



8.3 Test Procedure

The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW $\geq$ EBW if possible; otherwise, set RBW to the largest available value. Set VBW $\geq$ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in IILB.1.a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)



8.4 Test Result

ANT 1

5725-5850MHz:
Duty Cycle

Mode	Channel.	Duty Cycle (%)	Correction Factor (dB)
802.11a	5745	100	0
	5785	100	0
	5825	100	0
802.11ac(VHT20)	5745	100	0
	5785	100	0
	5825	100	0
802.11ac(VHT40)	5755	100	0
	5795	100	0
802.11ac(VHT80)	5775	100	0
802.11n(HT20)	5745	100	0
	5785	100	0
	5825	100	0
802.11n(HT40)	5755	100	0
	5795	100	0



ANT 2:

5725-5850MHz:

Duty Cycle

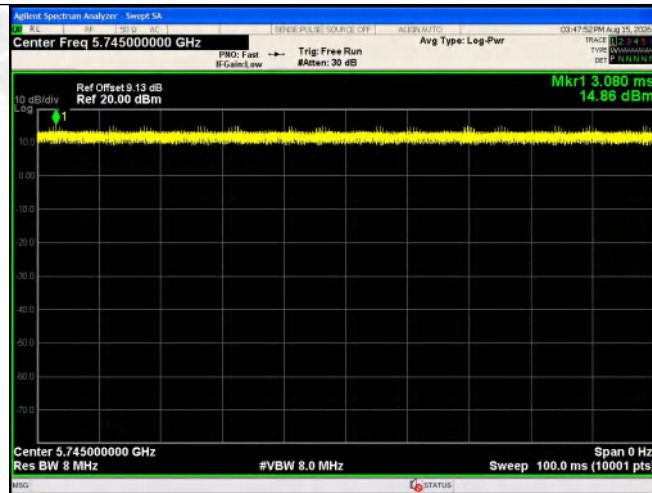
Mode	Channel.	Duty Cycle (%)	Correction Factor (dB)
802.11a	5745	100	0
	5785	100	0
	5825	100	0
802.11ac(VHT20)	5745	100	0
	5785	100	0
	5825	100	0
802.11ac(VHT40)	5755	100	0
	5795	100	0
802.11ac(VHT80)	5775	100	0
802.11n(HT20)	5745	100	0
	5785	100	0
	5825	100	0
802.11n(HT40)	5755	100	0
	5795	100	0



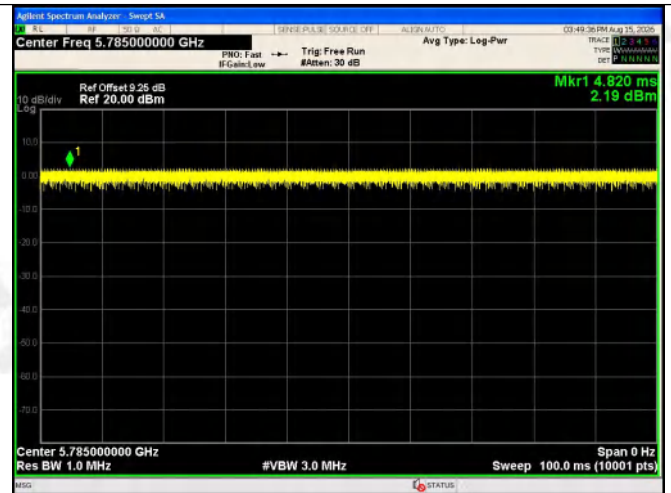
ANT 1

5725-5850MHz

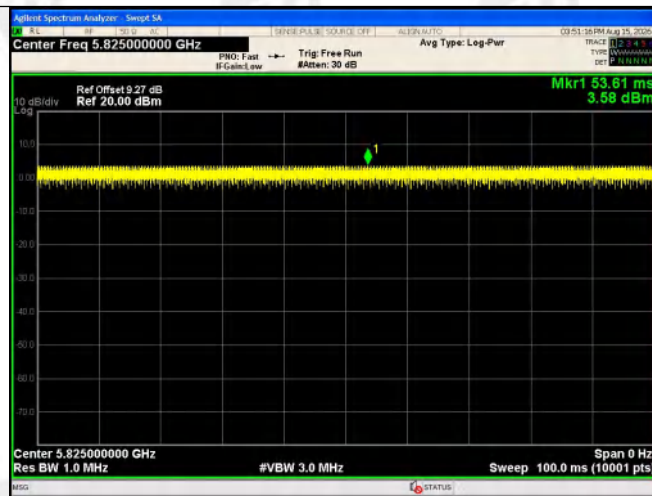
802.11a-5745



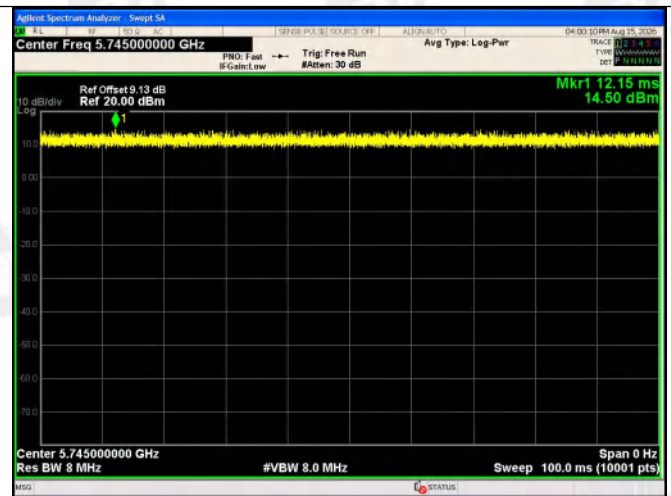
802.11a-5785



802.11a-5825

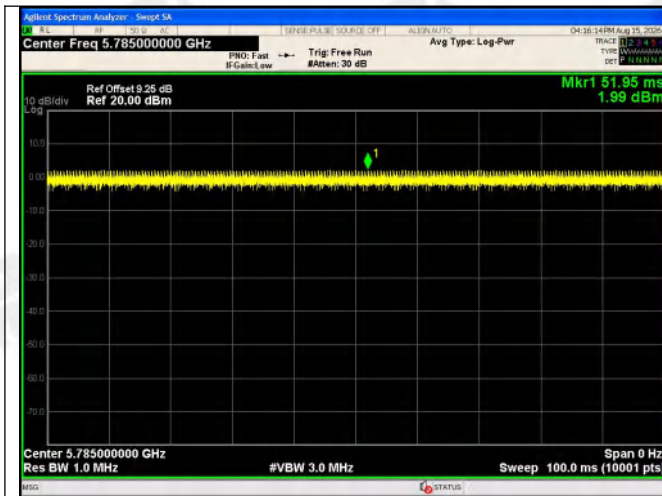


802.11ac(VHT20)-5745

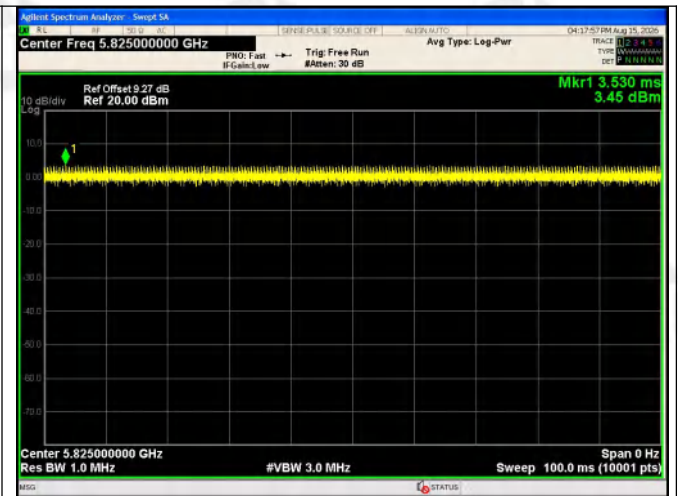


802.11ac(VHT20)-5785

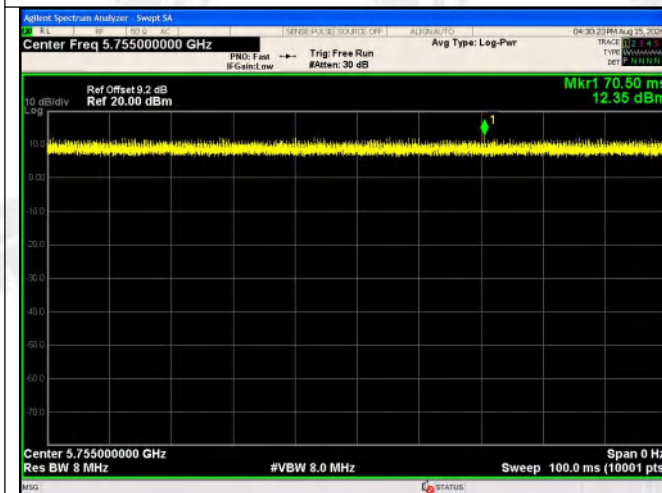
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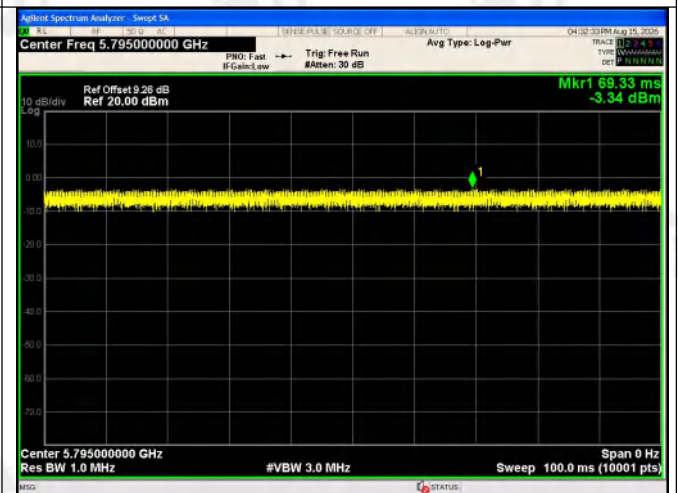
802.11ac(VHT40)-5755



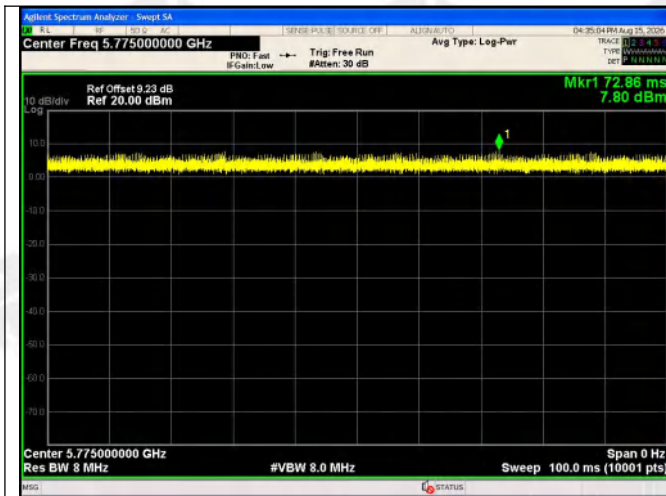
802.11ac(VHT40)-5795



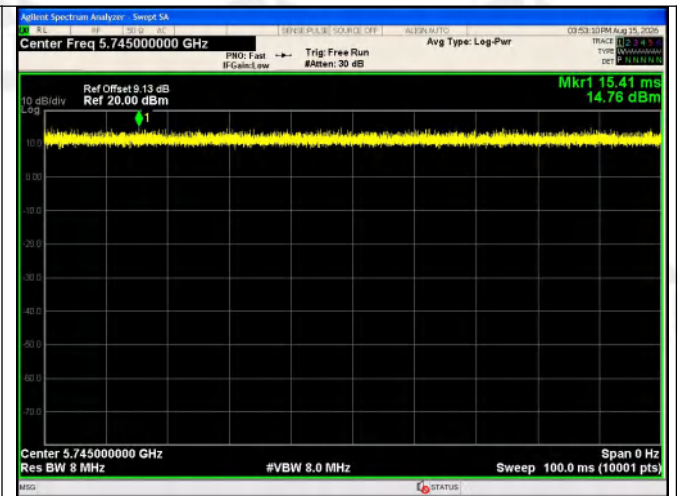
802.11ac(VHT80)-5775



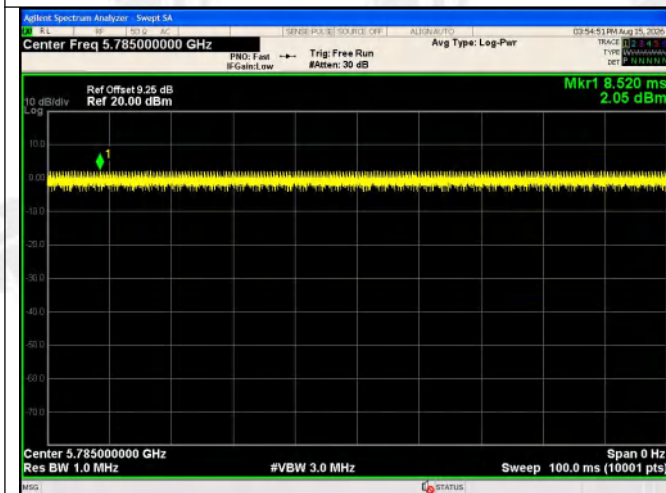
802.11n(HT20)-5745



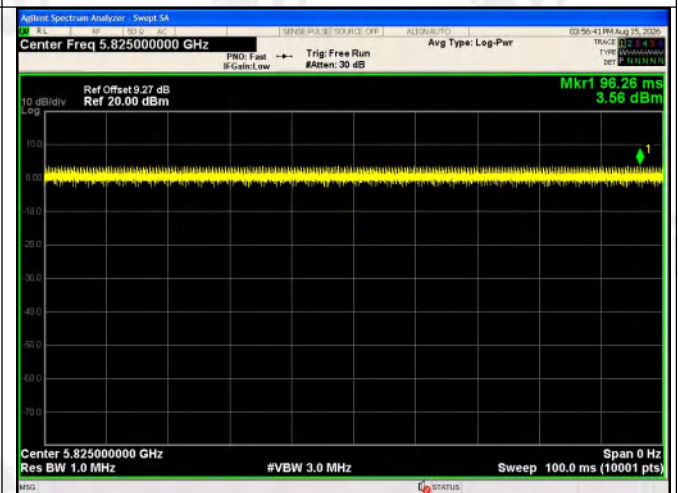
802.11n(HT20)-5785



802.11n(HT20)-5825



5802.11n(HT40)-5755



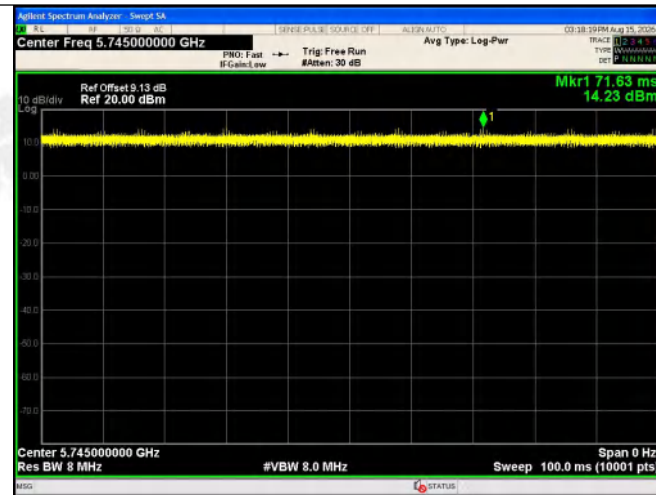
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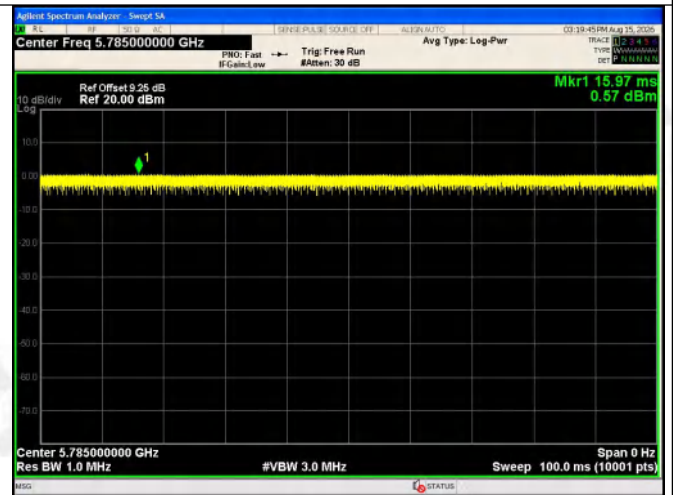


ANT 2:
5725-5850MHz

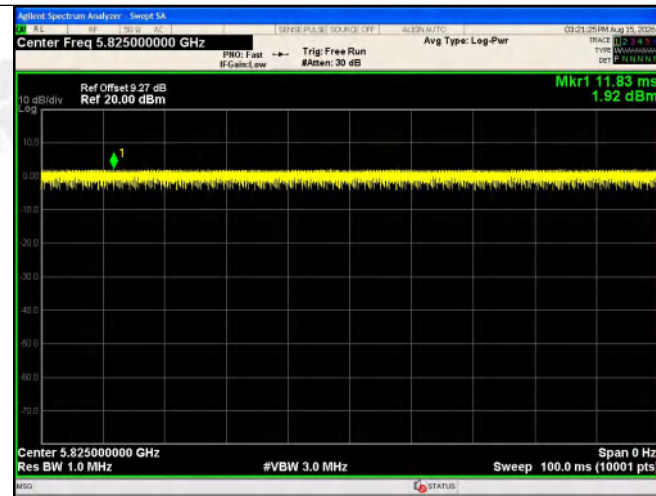
802.11a-5745



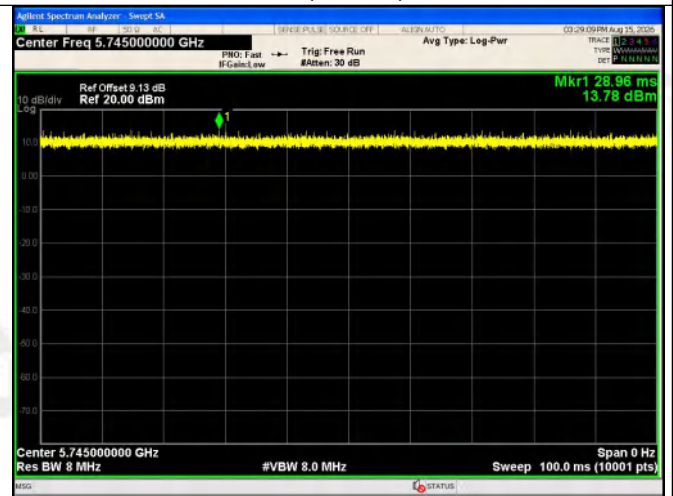
802.11a-5785



802.11a-5825

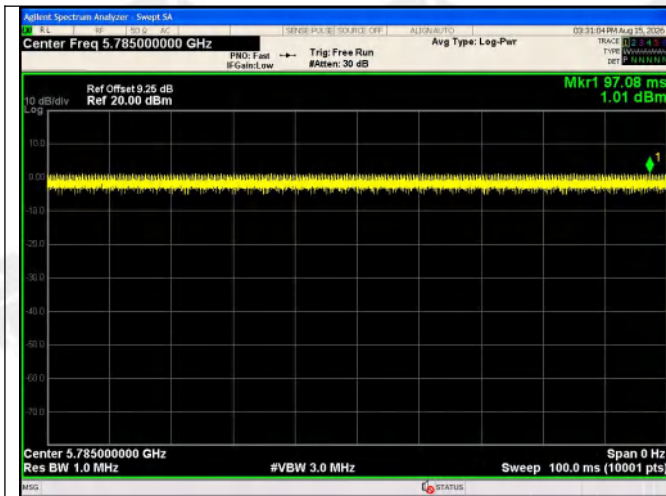


802.11ac(VHT20)-5745

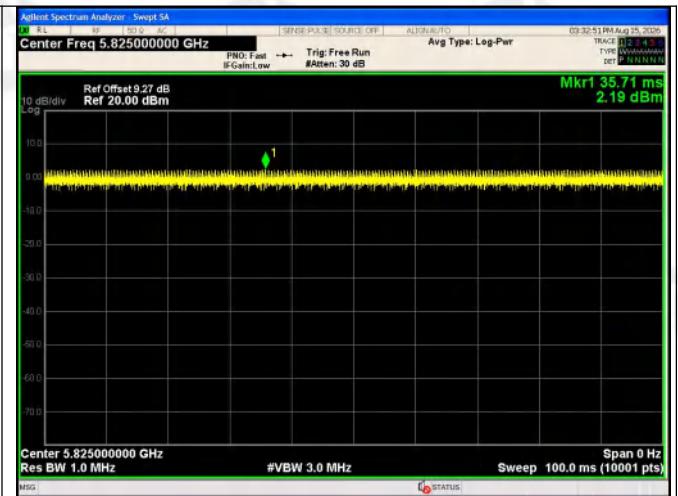


802.11ac(VHT20)-5785

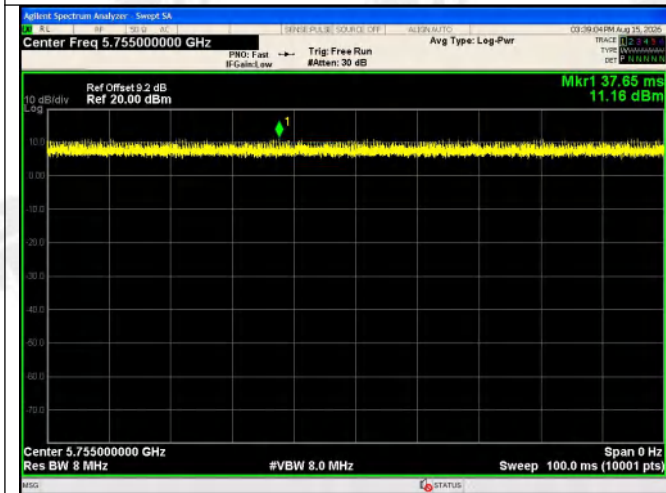
802.11ac(VHT20)-5825



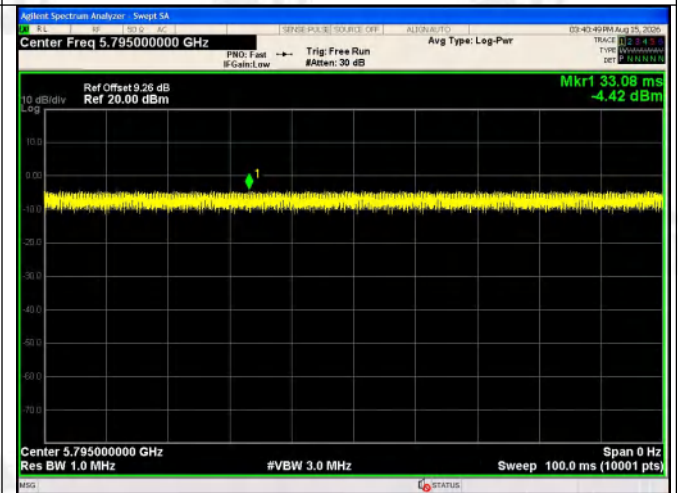
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802.11ac(VHT40)-5795



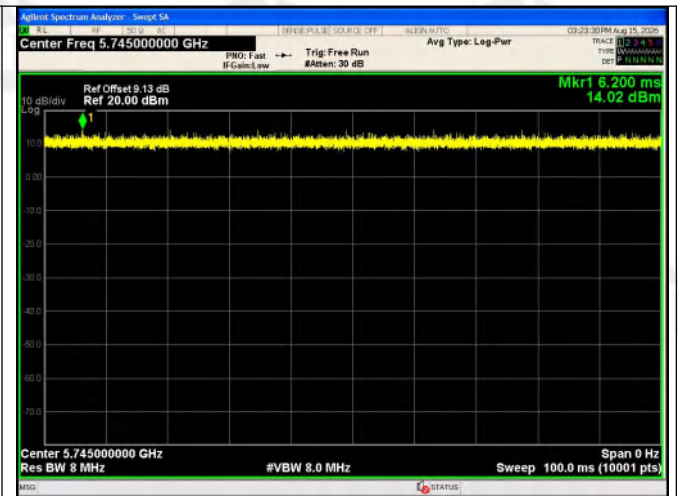
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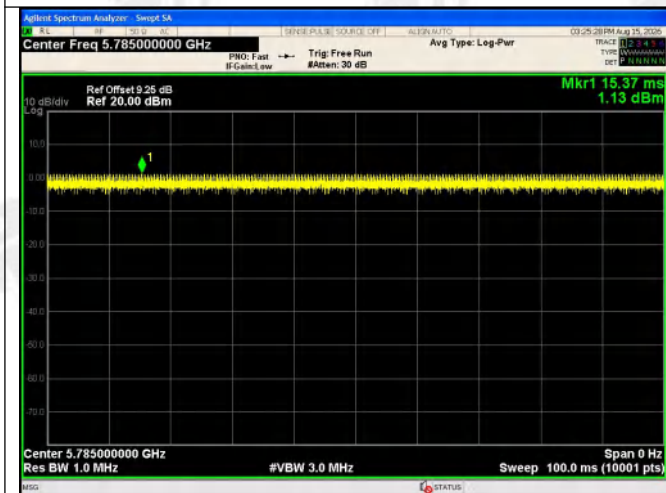
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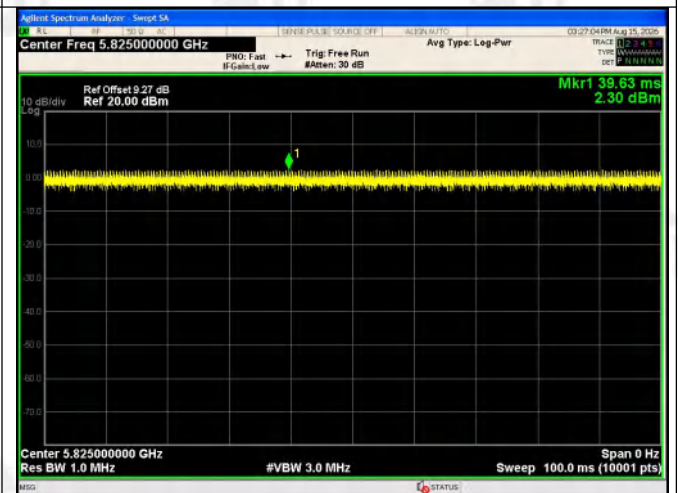
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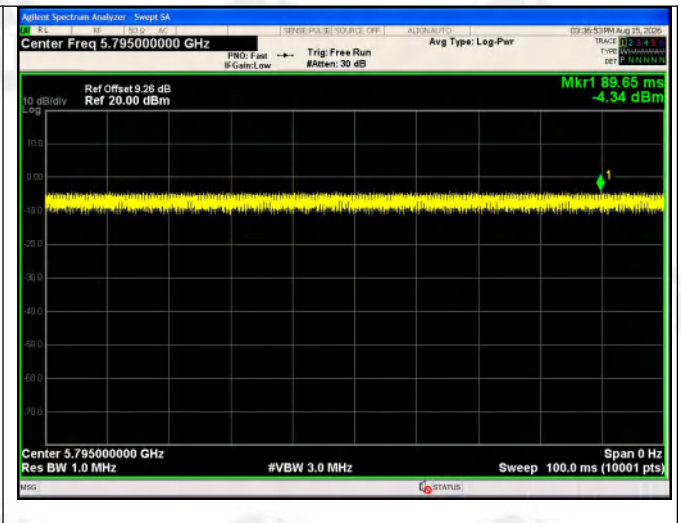
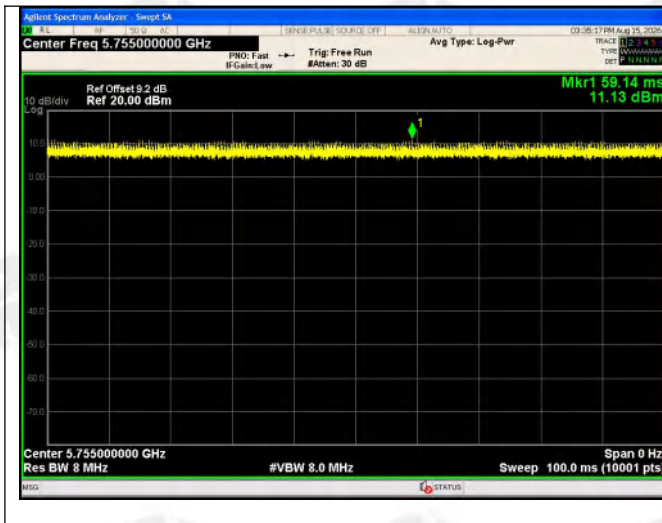
802.11n(HT20)-5825



5802.11n(HT40)-5755



802.11n(HT40)-5795





9 POWER SPECTRAL DENSITY TEST

9.1 Test Standard and Limit

According to FCC §15.407(3)

(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.

9.2 Test Setup



9.3 Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above,
2. The testing follows FCC KDB 789033 D02.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.

4. For U-NII1, U-NII-2A, U-NII-2C Band:

Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

For U-NII-3 Band:

Set RBW=510 kHz, VBW=3*RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

5. Use the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add $10 \log(1/\text{duty cycle})$.



9.4 Test Data

ANT1+ANT2

5725-5850MHz:

Test mode	Test Channel (MHz)	PSD [dBm/MHz] ANT 1	PSD [dBm/MHz] ANT 2	PSD [dBm/MHz] Total	Limit (dBm/MHz)	Result
802.11a	5745	1.179	0.299	/	30	Pass
	5785	0.541	-0.266	/	30	Pass
	5825	2.342	1.192	/	30	Pass
802.11ac(VHT20)	5745	0.998	-0.272	3.420	30	Pass
	5785	0.897	-0.044	3.462	30	Pass
	5825	2.619	1.104	4.938	30	Pass
802.11ac(VHT40)	5755	-2.592	-2.94	0.248	30	Pass
	5795	-1.882	-3.255	0.496	30	Pass
802.11ac(VHT80)	5775	-5.752	-5.537	-2.633	30	Pass
802.11n(HT20)	5745	1.03	-0.077	3.522	30	Pass
	5785	0.991	-0.05	3.512	30	Pass
	5825	2.309	1.335	4.860	30	Pass
802.11n(HT40)	5755	-2.305	-3.225	0.270	30	Pass
	5795	-2.187	-3.518	0.209	30	Pass



5725-5850MHz

ANT1:

802.11a-5745



802.11a-5785



802.11a-5825



802.11ac(VHT20)-5745

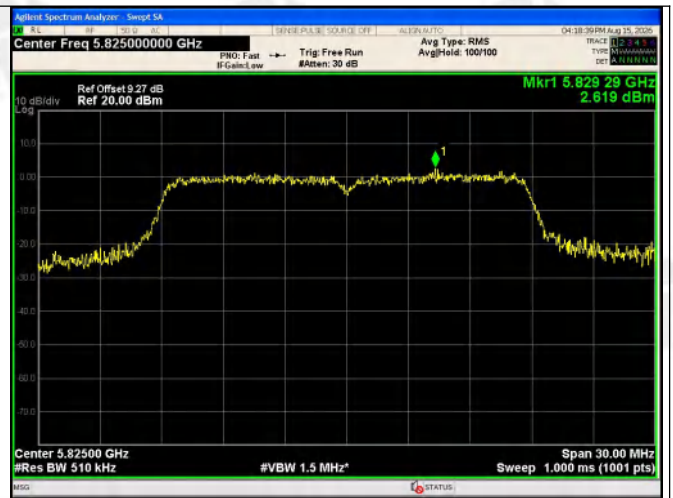


802.11ac(VHT20)-5785

802.11ac(VHT20)-5825



802.11ac(VHT40)-5755



802.11ac(VHT40)-5795



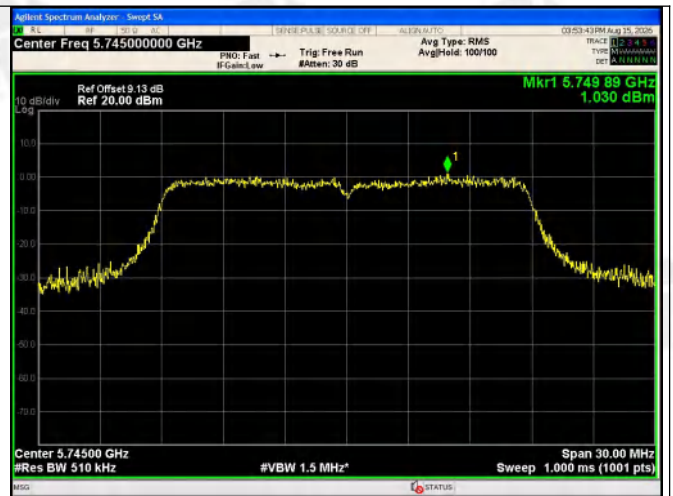
802.11ac(VHT80)-5775



802.11n(HT20)-5745



802.11n(HT20)-5785



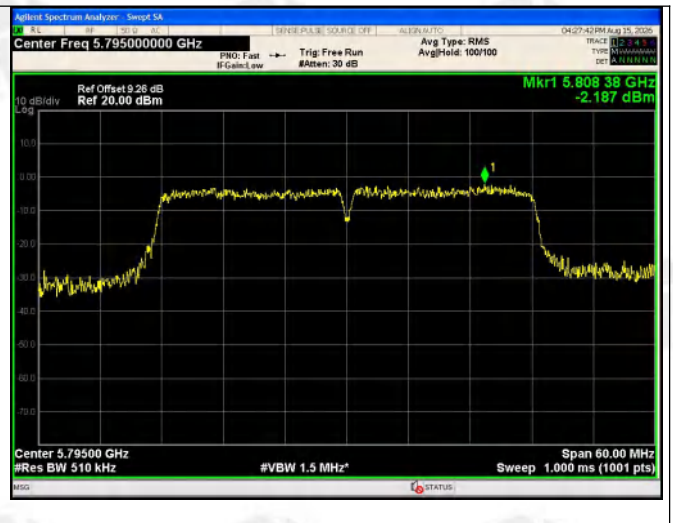
802.11n(HT20)-5825



5802.11n(HT40)-5755



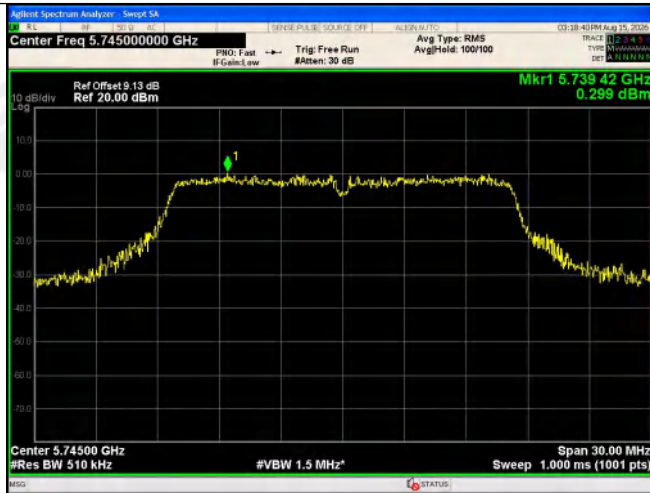
802.11n(HT40)-5795





ANT2:

802.11a-5745



802.11a-5785



802.11a-5825



802.11ac(VHT20)-5745



802.11ac(VHT20)-5785

802.11ac(VHT20)-5825



802.11ac(VHT40)-5755



802.11ac(VHT40)-5795



802.11ac(VHT80)-5775



802.11n(HT20)-5745



802.11n(HT20)-5785



802.11n(HT20)-5825



5802.11n(HT40)-5755



802.11n(HT40)-5795



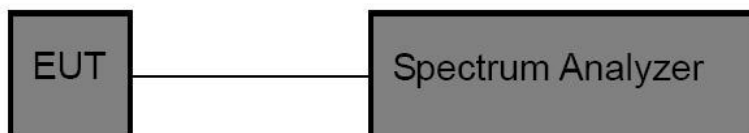


10 26DB & 6DB & 99% Emission Bandwidth Test

10.1 Test Standard

Test Standard	FCC Part15 C Section 15.407
	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.

10.2 Test Setup



10.3 Test Procedure

The following procedure shall be used for measuring 6db bandwidth:

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



The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 3.3 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW $\geq 3 \cdot$ 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.

The following procedure shall be used for measuring 26db bandwidth:

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = Peak
- 4) Trace mode = max hold.
- 5) 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 analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.



10.4 Test Data

ANT 1

5725-5850MHz:

Test mode	Test Channel (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11a	5745	16.531	16.5865
	5785	16.51	16.6200
	5825	16.523	16.7659
802.11ac20	5745	17.688	17.6671
	5785	17.757	17.6929
	5825	17.774	17.8041
802.11ac40	5755	36.452	36.2762
	5795	36.461	36.3800
802.11ac80	5775	76.108	75.7252
802.11n(HT20)	5745	17.76	17.6617
	5785	17.792	17.7107
	5825	17.783	17.7877
802.11n(HT40)	5755	36.465	36.2733
	5795	36.469	36.3846



ANT 2
5725-5850MHz:

Test mode	Test Channel (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11a	5745	16.493	16.5402
	5785	16.538	16.5652
	5825	16.526	16.6312
802.11ac20	5745	17.753	17.6259
	5785	17.762	17.6866
	5825	17.788	17.7480
802.11ac40	5755	36.466	36.1904
	5795	36.487	36.2772
802.11ac80	5775	76.284	75.6725
802.11n(HT20)	5745	17.758	17.6481
	5785	17.779	17.7104
	5825	17.774	17.7687
802.11n(HT40)	5755	36.497	36.1738
	5795	36.471	36.2730

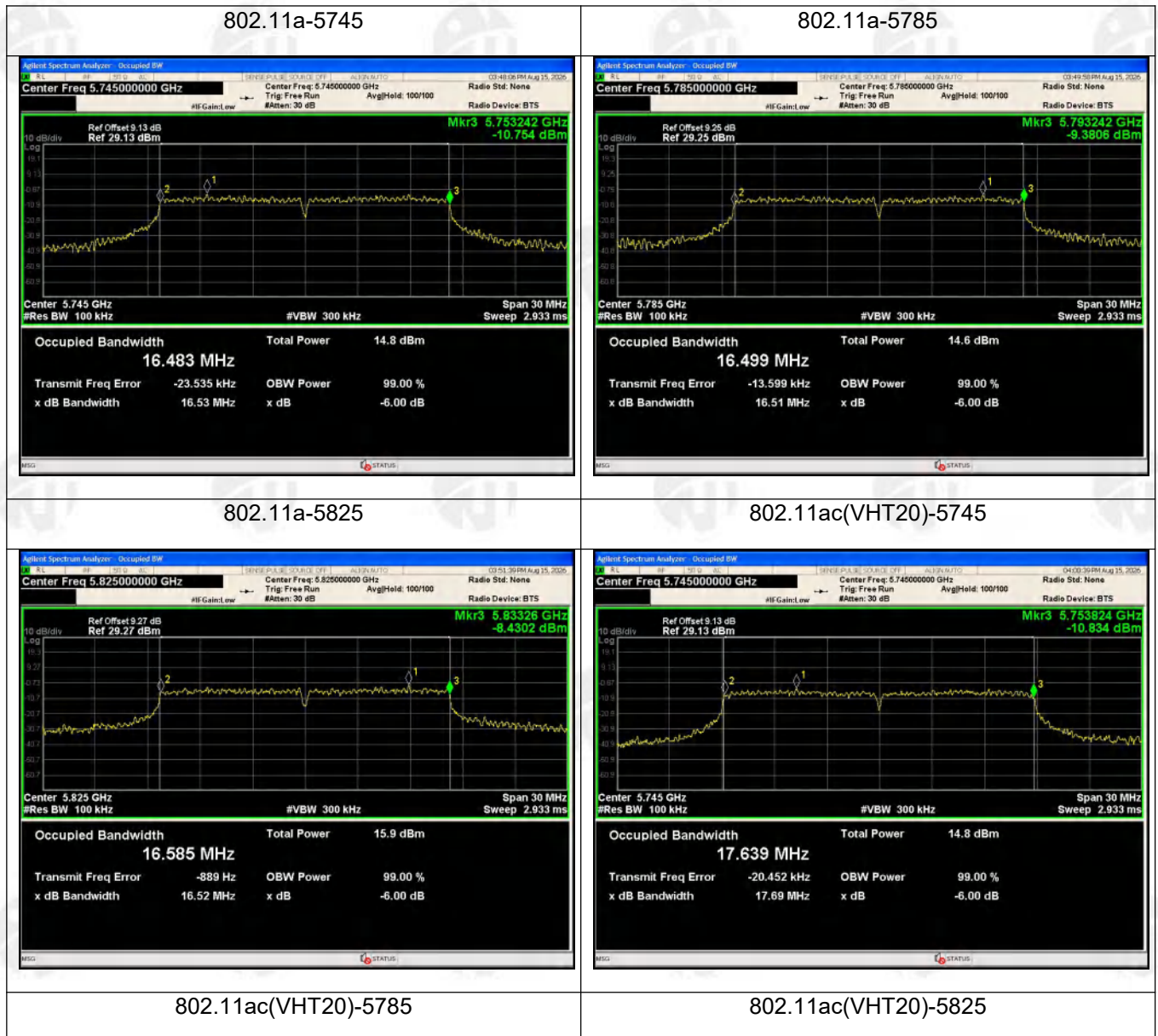


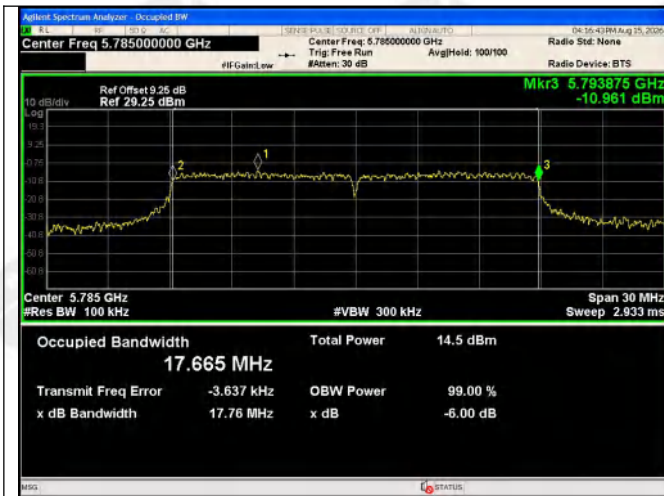
Test Graph

ANT 1

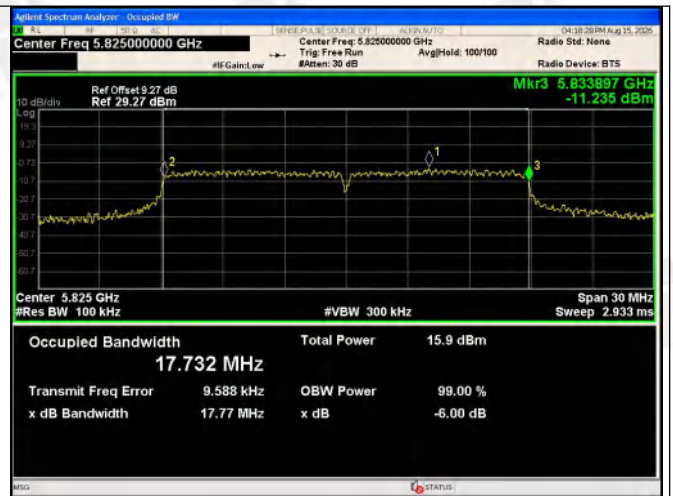
5725-5850MHz

6dB

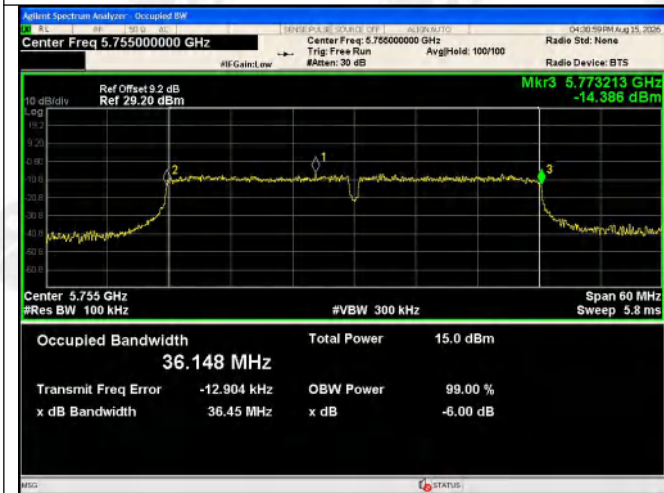




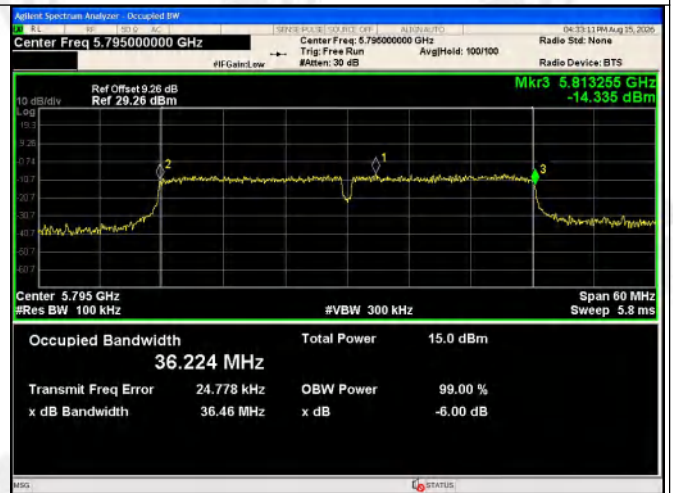
802.11ac(VHT40)-5755



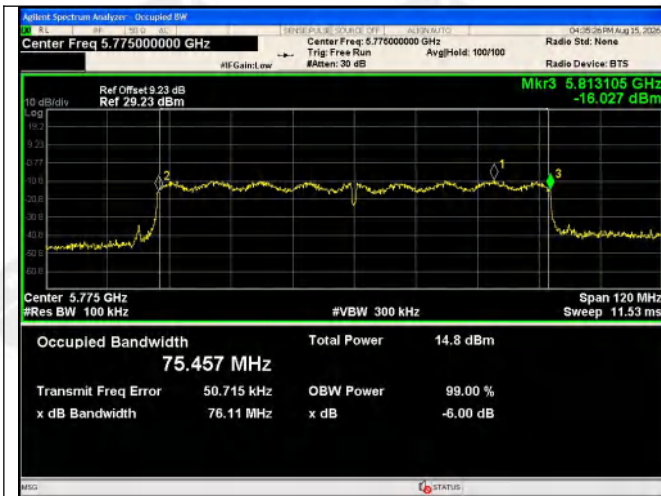
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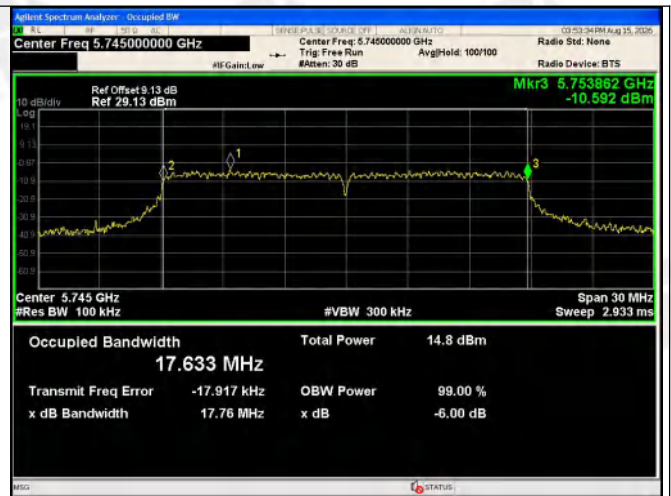
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802.11n(HT20)-5745



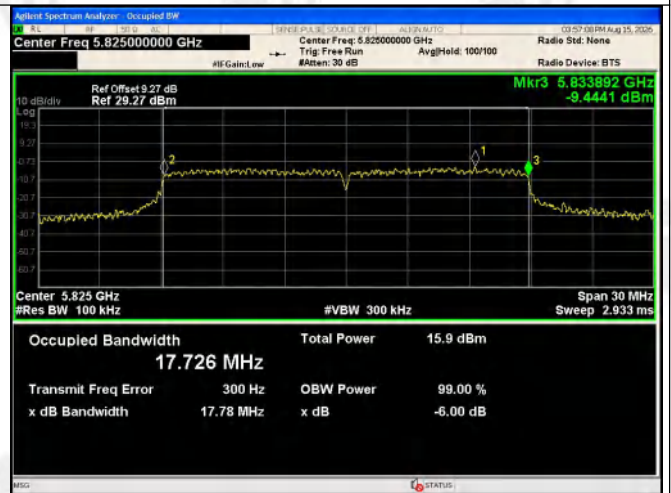
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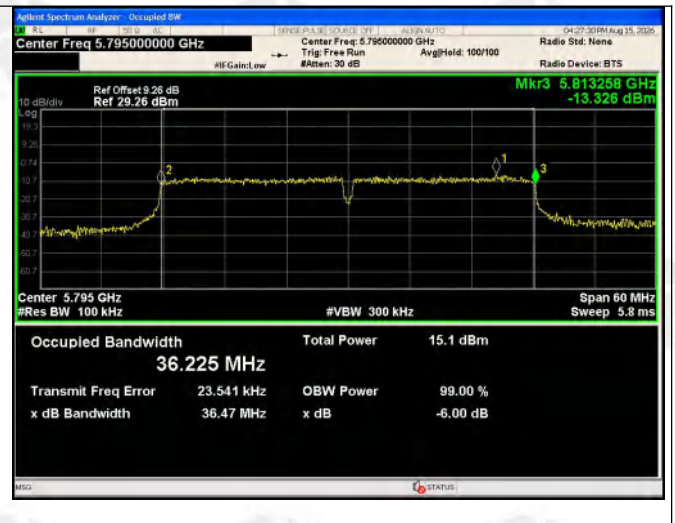
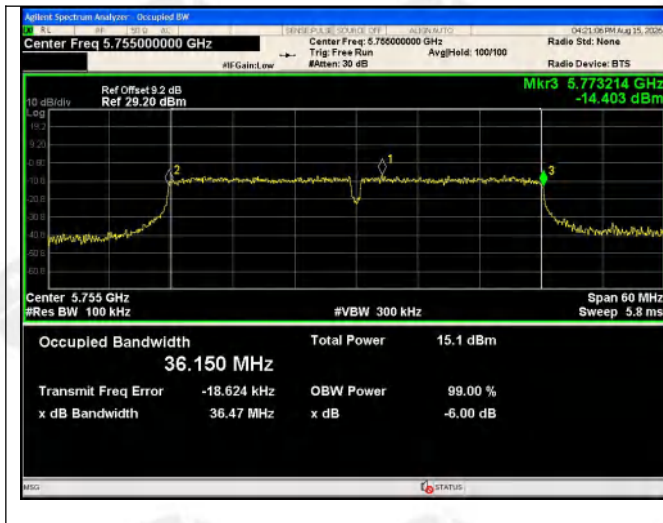
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5802.11n(HT40)-5755



802.11n(HT40)-5795

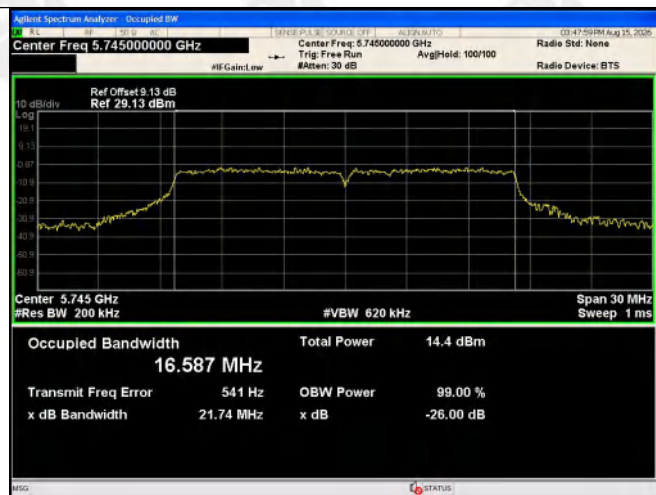




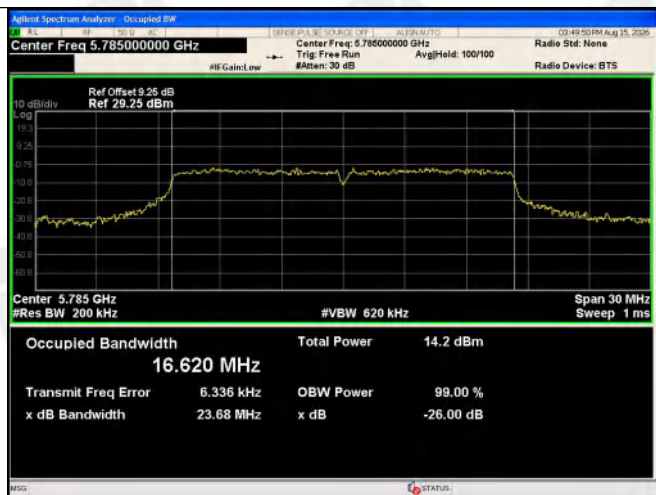
5725-5850MHz

99%

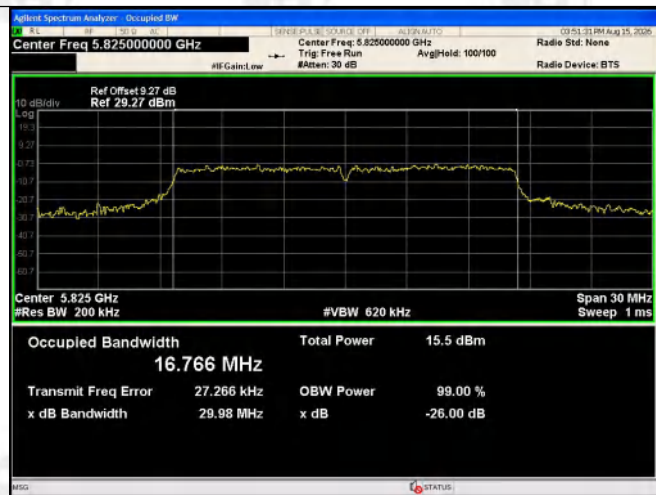
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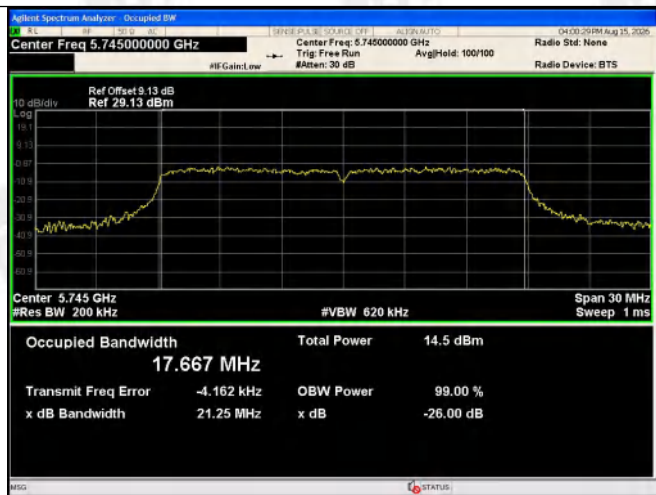
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802.11a-5825

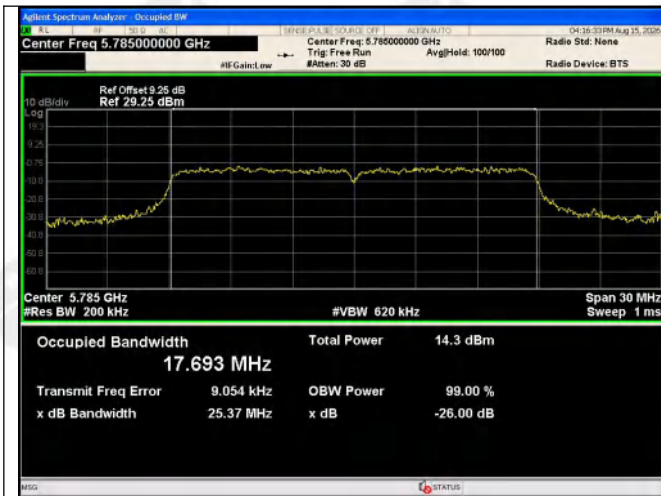


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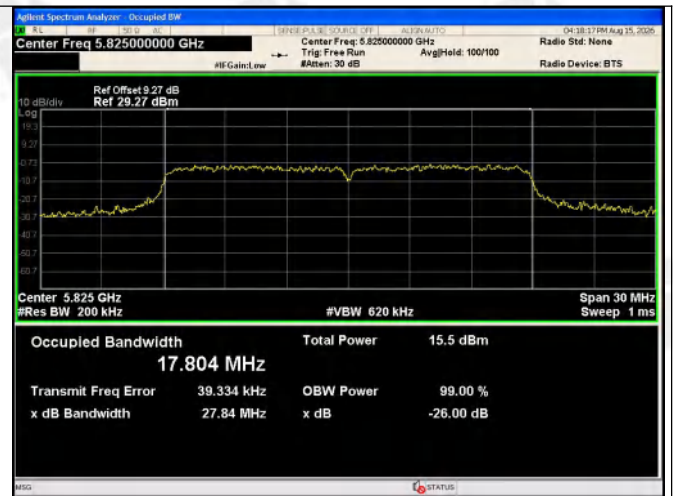


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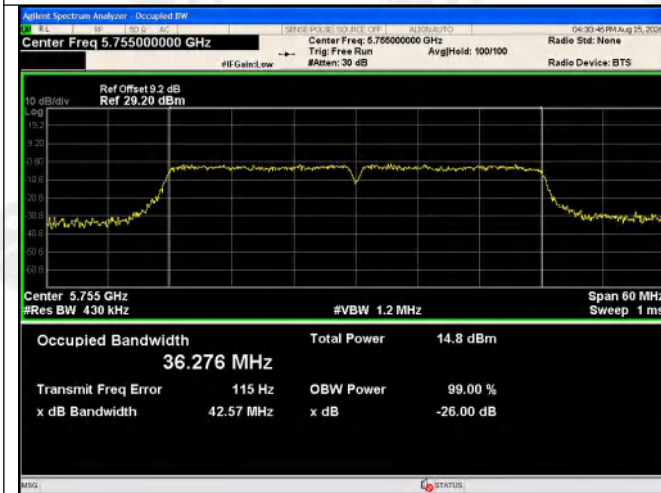
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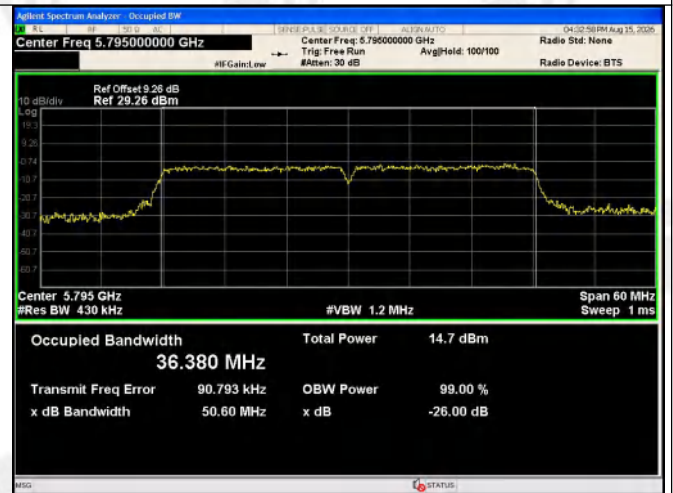
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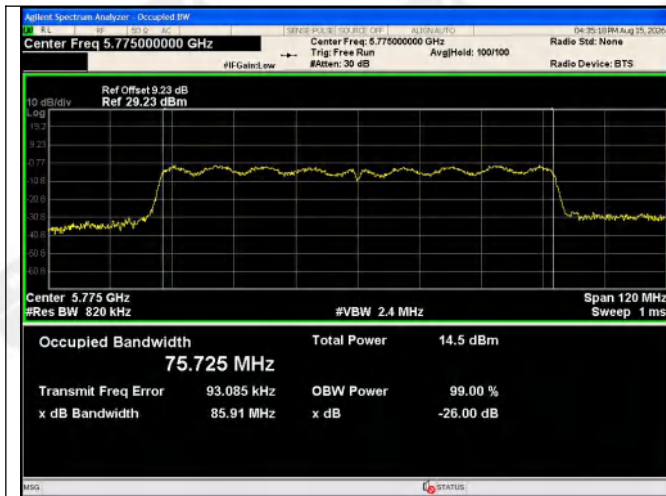
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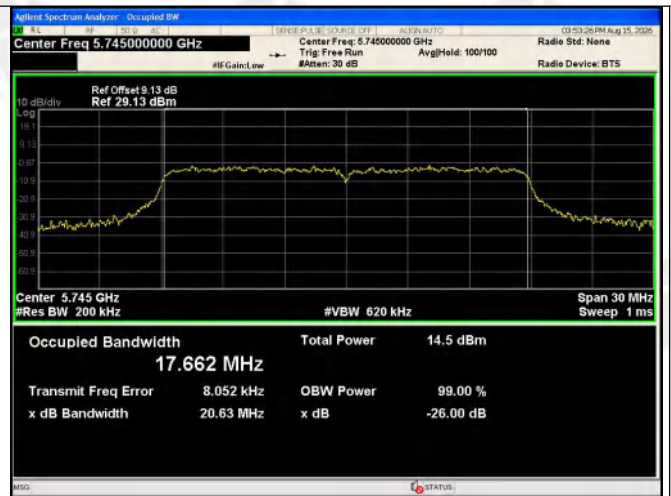
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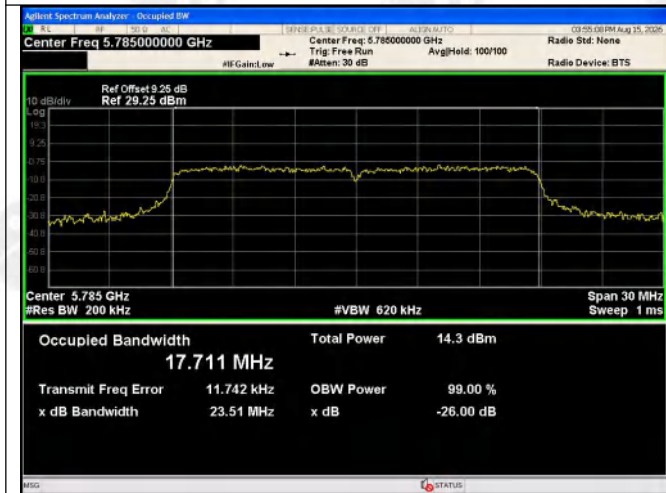
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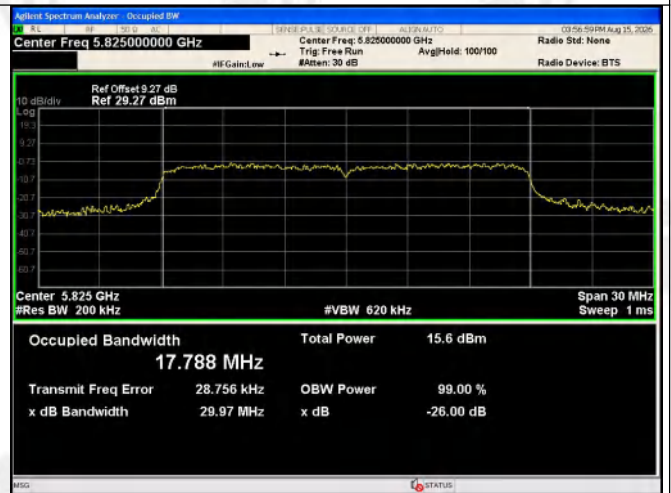
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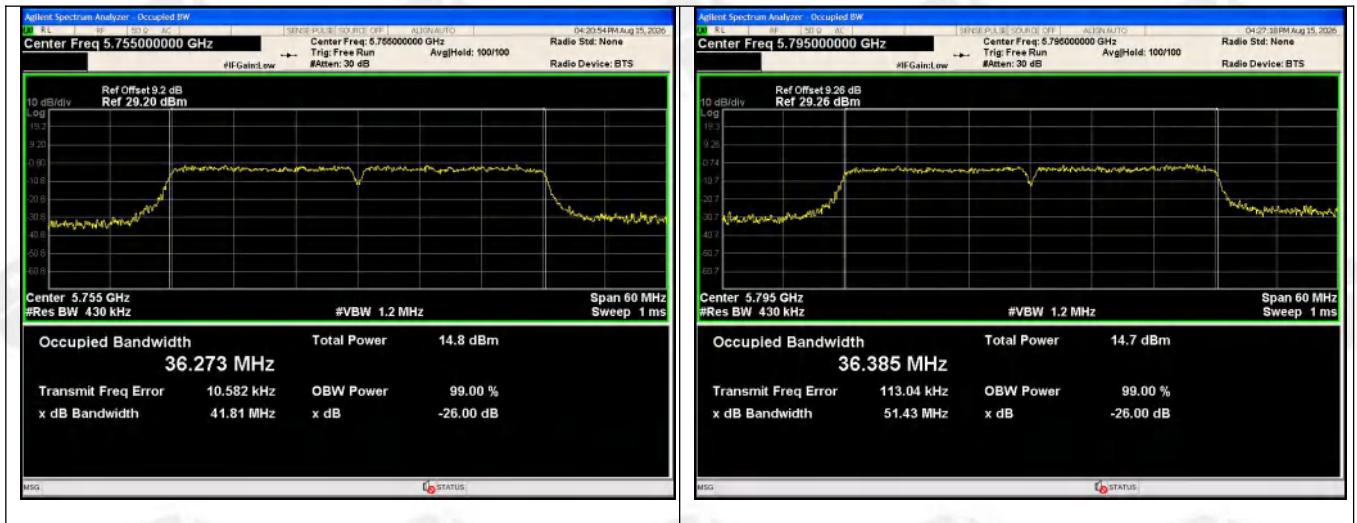
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5802.11n(HT40)-5755



802.11n(HT40)-5795





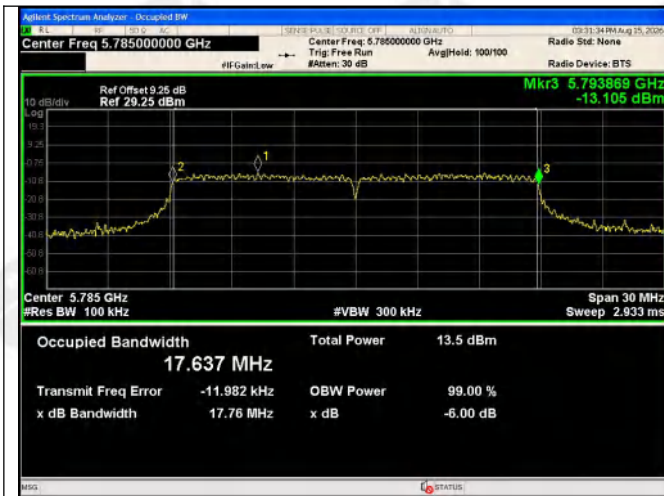
Test Graph

ANT 2

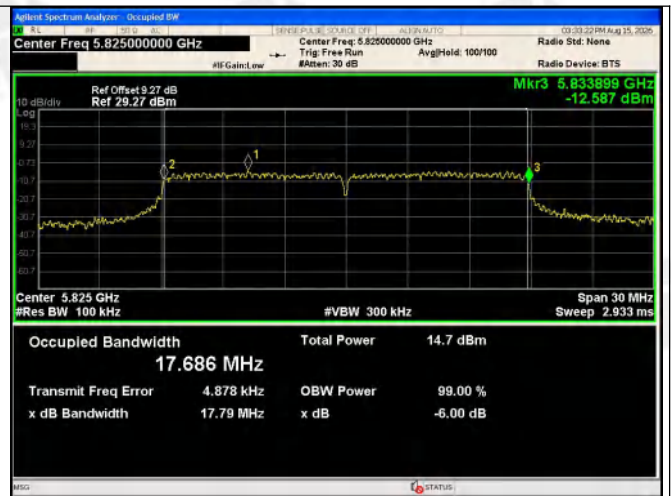
5725-5850MHz

6dB

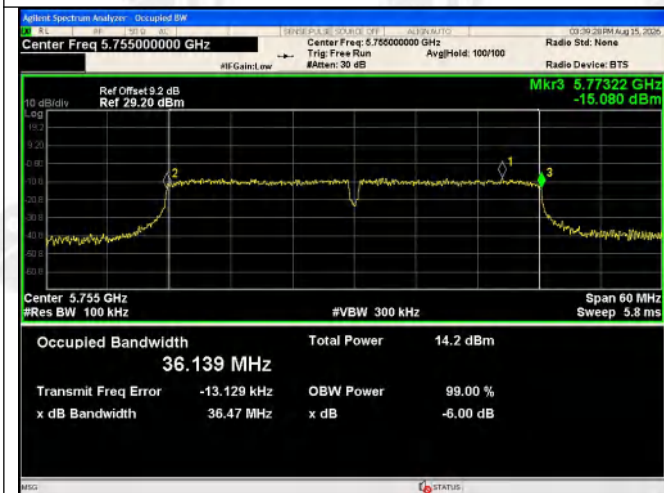




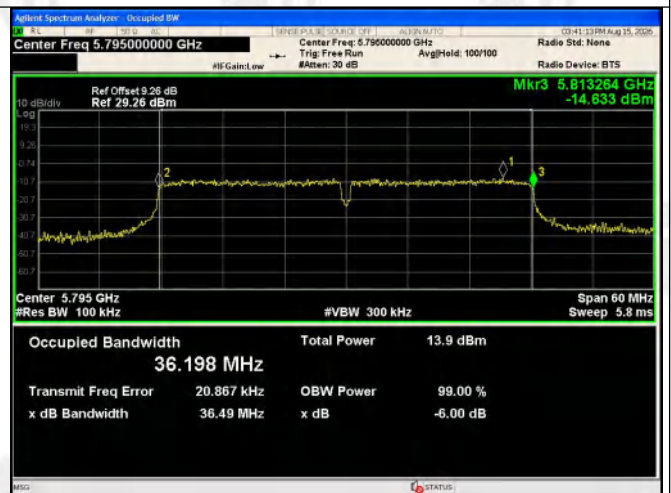
802.11ac(VHT40)-5755



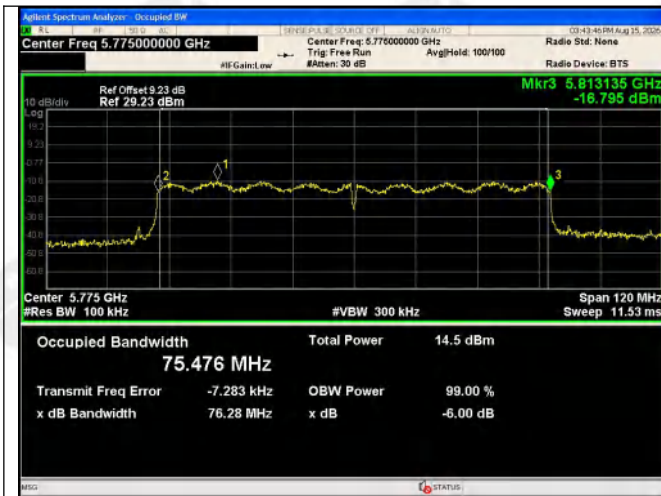
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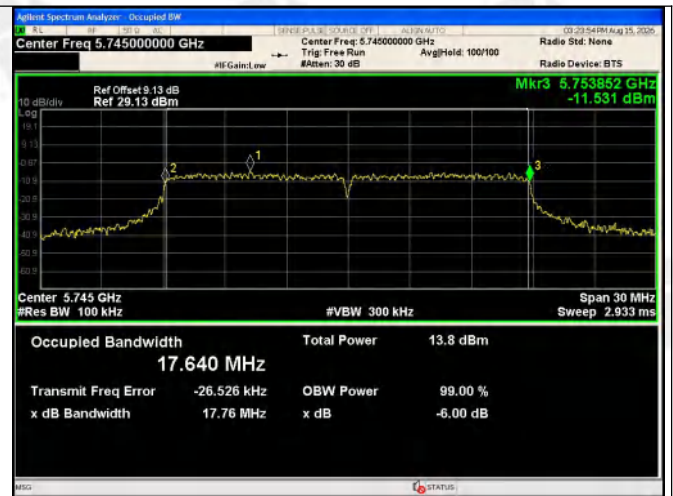
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802.11n(HT20)-5745



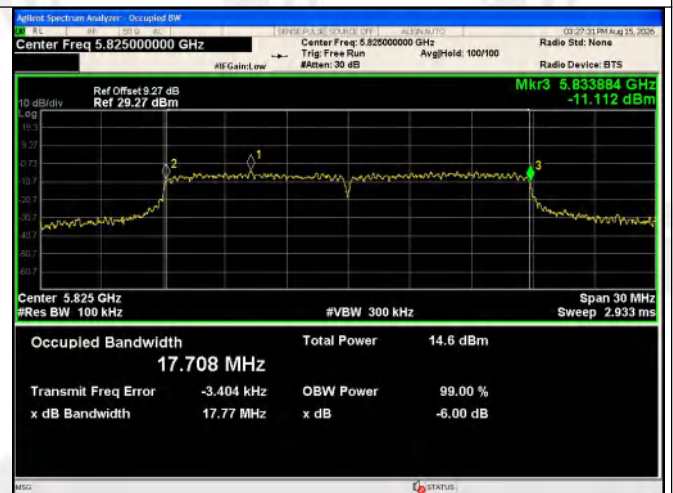
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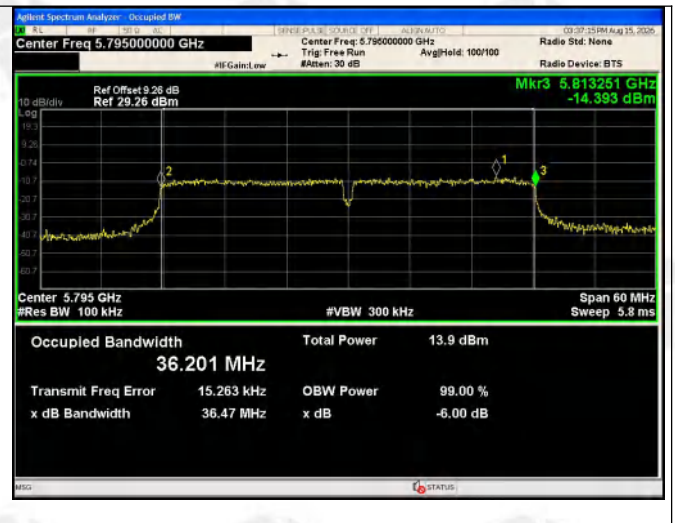
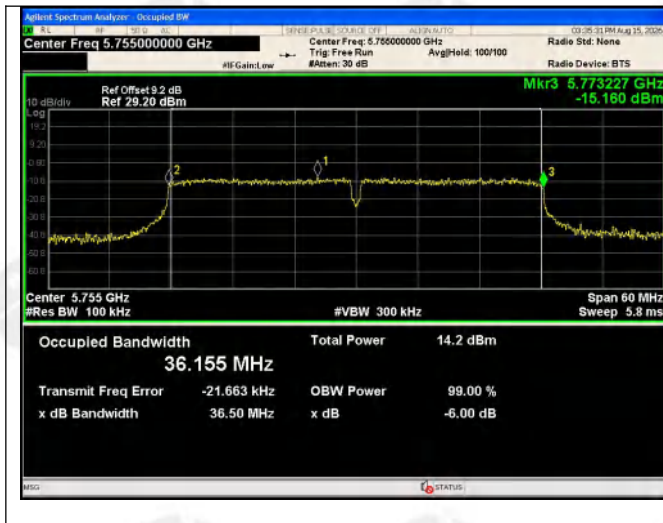
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5802.11n(HT40)-5755



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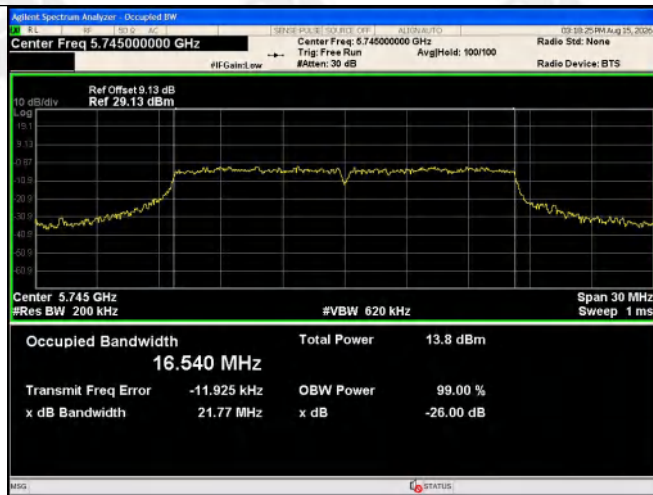




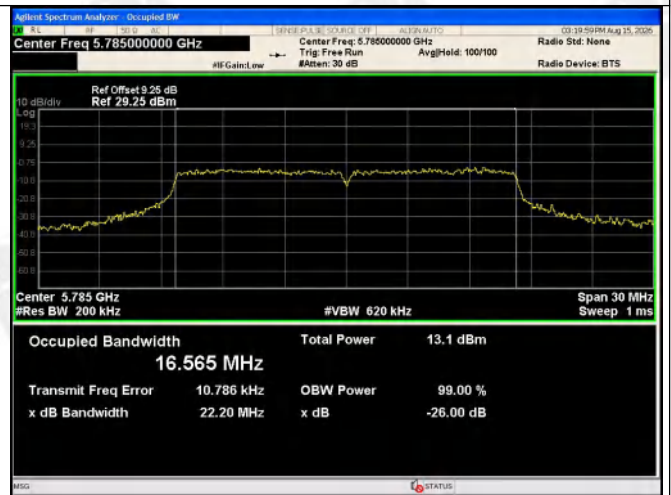
5725-5850MHz

99%

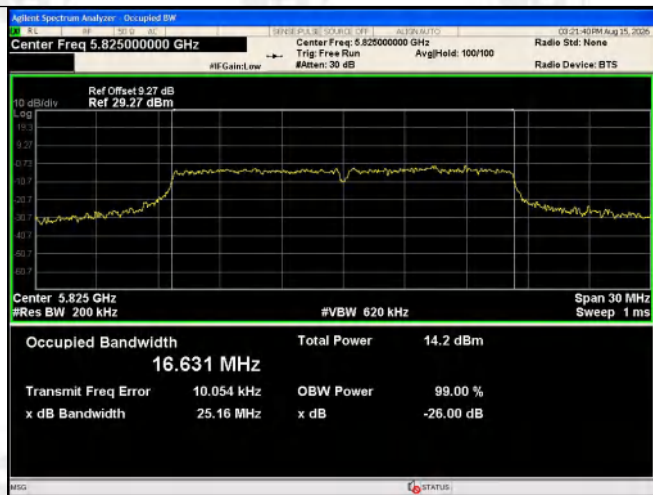
802.11a-5745



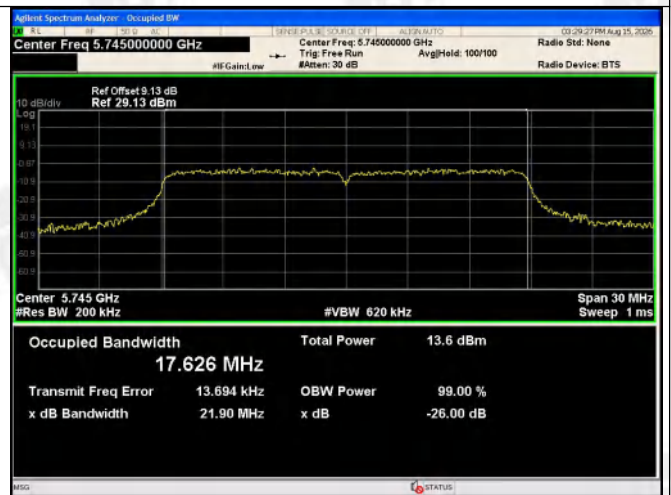
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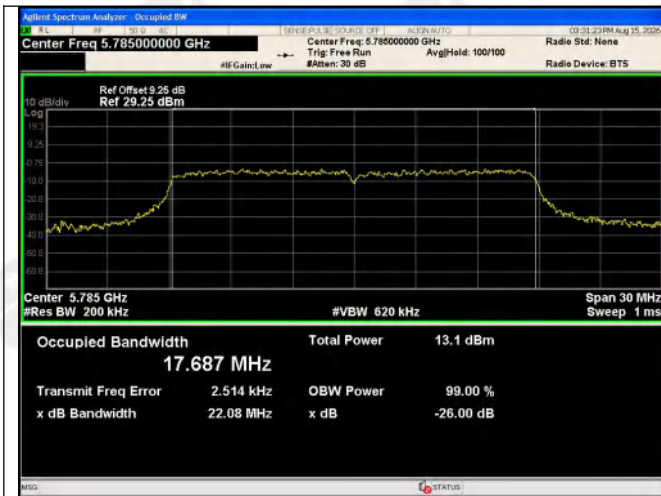


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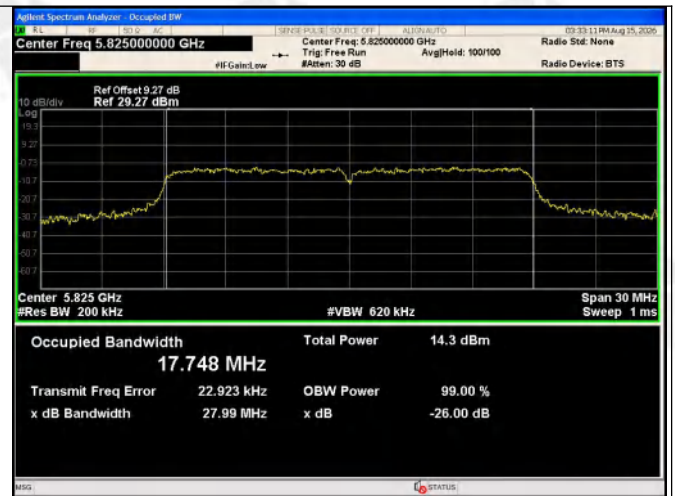


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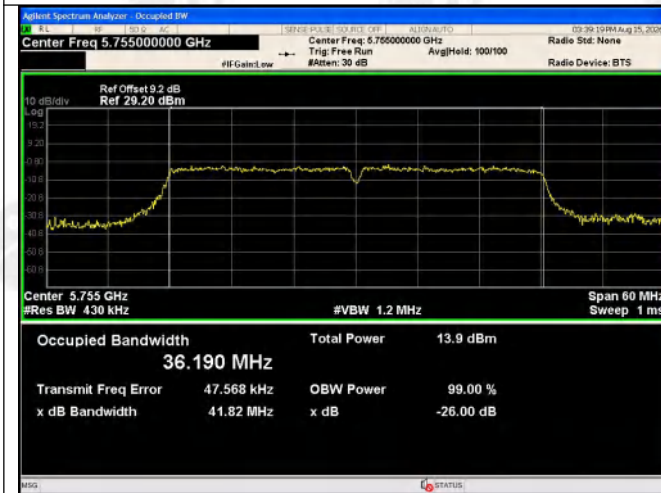
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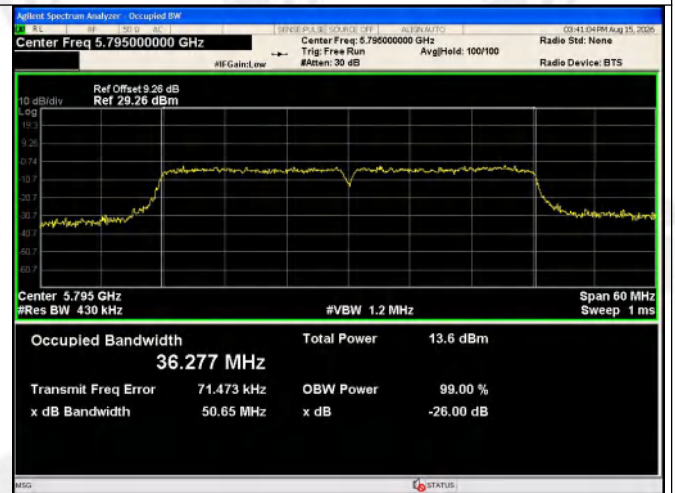
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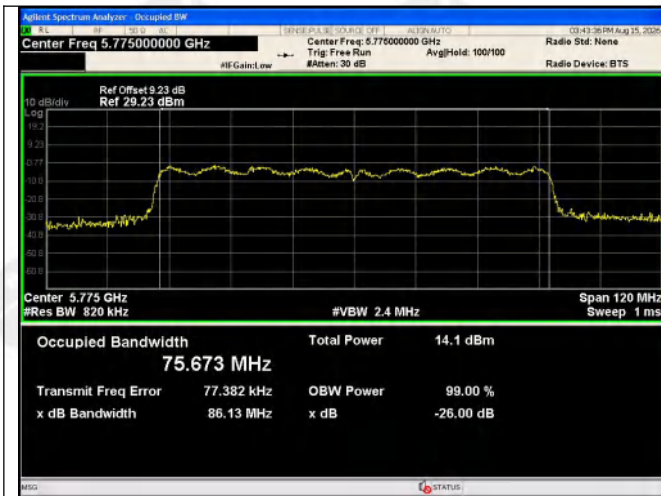
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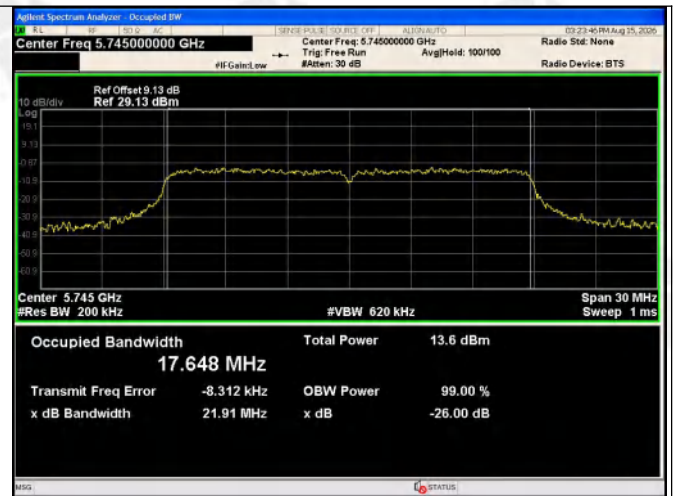
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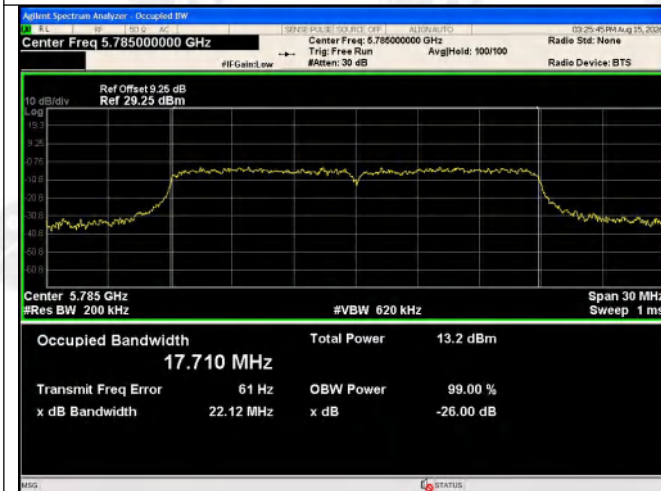
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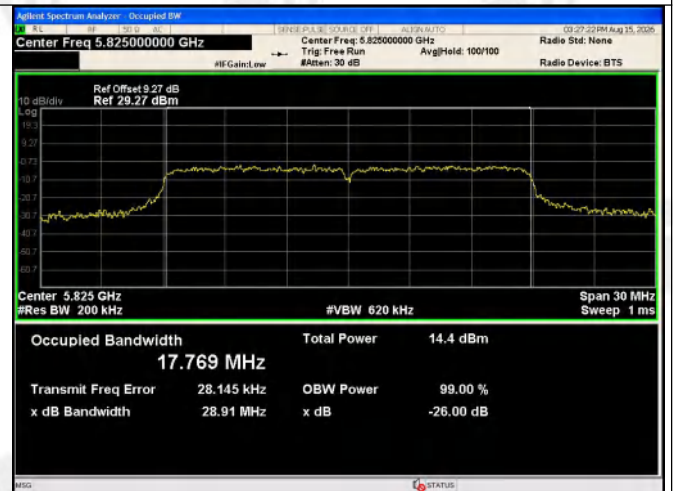
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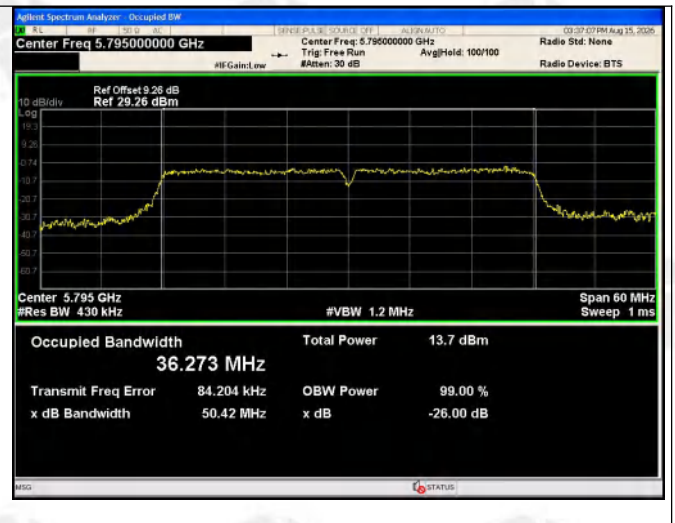
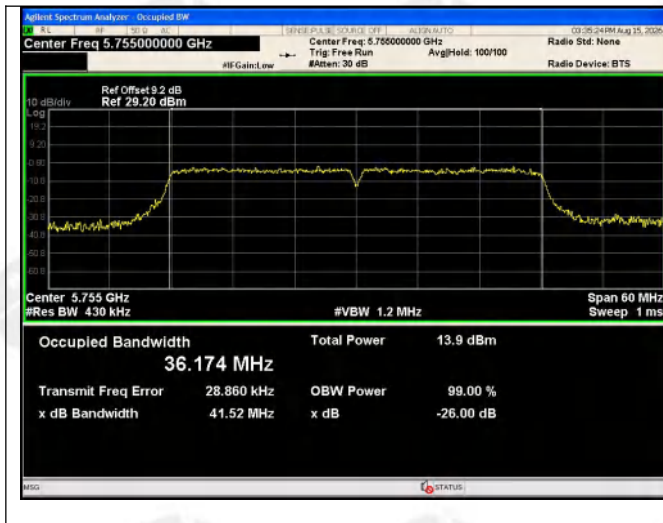
802.11n(HT20)-5825



5802.11n(HT40)-5755



802.11n(HT40)-5795





11 Maximum Conducted Output Power

11.1 Test Standard and Limit

According to FCC §15.407

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.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power 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).

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.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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.

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.

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 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.

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power 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.

11.2 Test Setup



11.3 Test Procedure

The EUT was directly connected to the Power meter

1. Device Configuration

If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level (see section II.B.).

The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (to no lower than 98 percent) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

b) If continuous transmission (or at least 98 percent duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level with the transmit duration as long as possible and the duty cycle as high as possible.

Measurement using a Power Meter(PM)

a) Method PM (Measurement using an RF average power meter):

(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:

- The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
- At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.

- The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

(i) If the transmitter does not transmit continuously, measure the duty cycle, x , of the transmitter output signal as described in IIL.B.

(ii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.



(iv) Adjust the measurement in dBm by adding $10 \log (1/x)$ where x is the duty cycle (e.g. $10 \log (1/0.25)$ if the duty cycle is 25%).

b) Method PM-G (Measurement using a gated RF average power meter):

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.



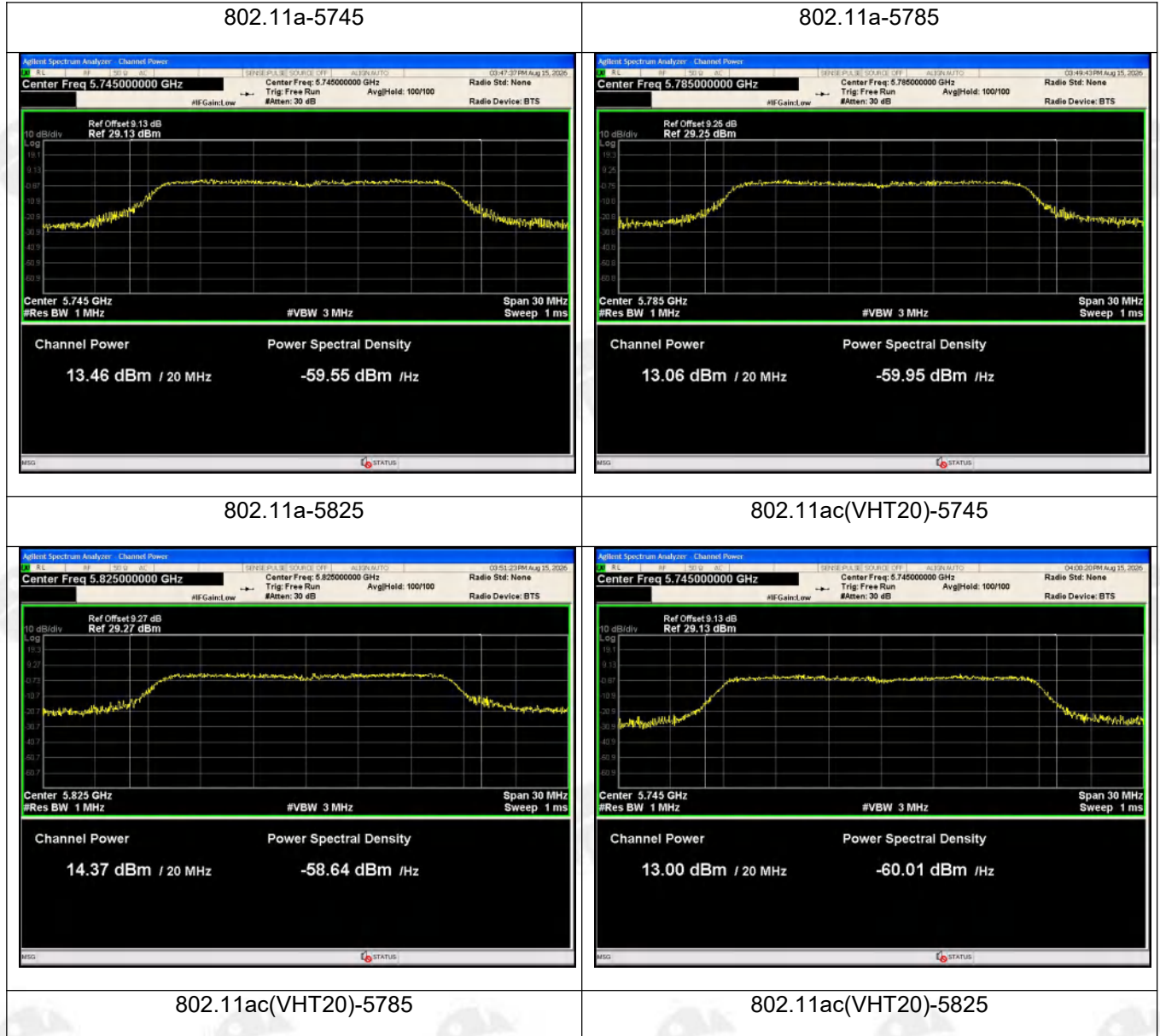
11.4 Test Data

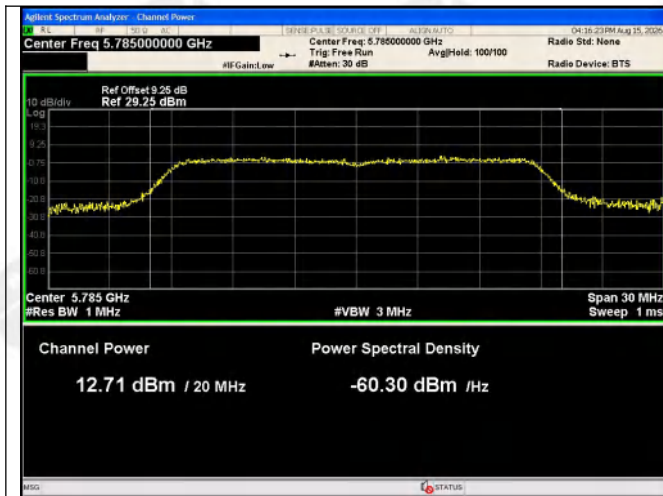
ANT 1+ANT 2

Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5745	13.462	12.882	/	30
	5785	13.057	11.953	/	30
	5825	14.373	13.163	/	30
802.11ac(VHT20)	5745	12.998	12.174	15.616	30
	5785	12.707	11.743	15.262	30
	5825	14.077	12.89	16.534	30
802.11ac(VHT40)	5755	13.185	12.302	15.776	30
	5795	13.123	12.031	15.622	30
802.11ac(VHT80)	5775	12.238	11.933	15.098	30
802.11n(HT20)	5745	13.053	12.213	15.664	30
	5785	12.822	11.888	15.390	30
	5825	14.13	12.931	16.582	30
802.11n(HT40)	5755	13.248	12.452	15.879	30
	5795	13.154	12.051	15.648	30

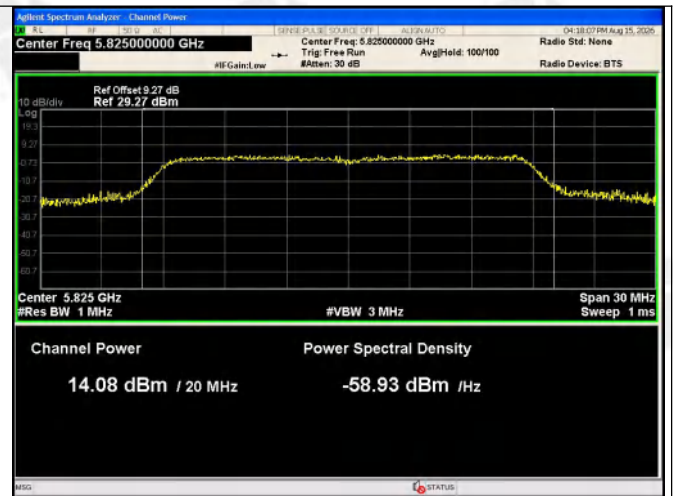


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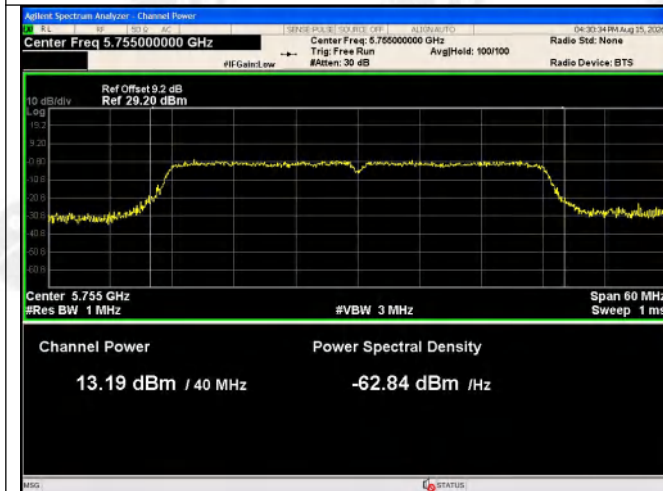




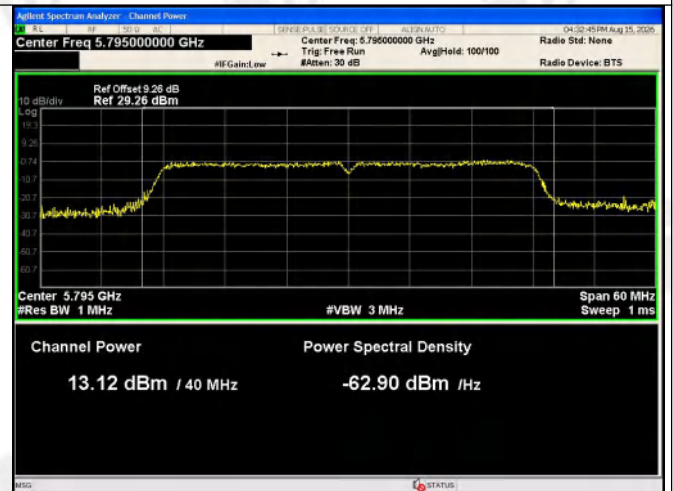
802.11ac(VHT40)-5755



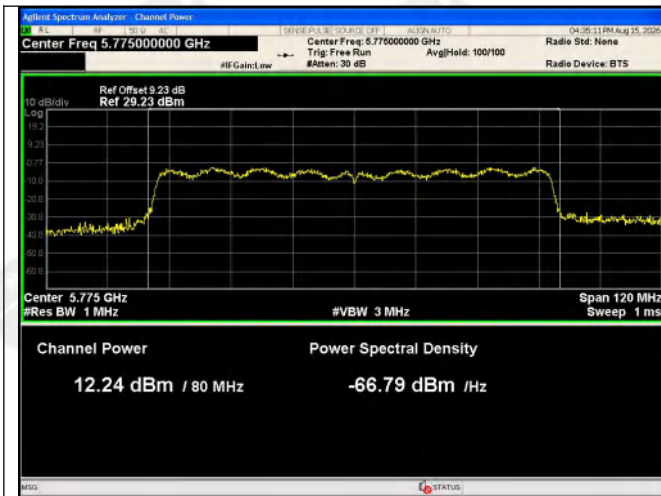
802.11ac(VHT40)-5795



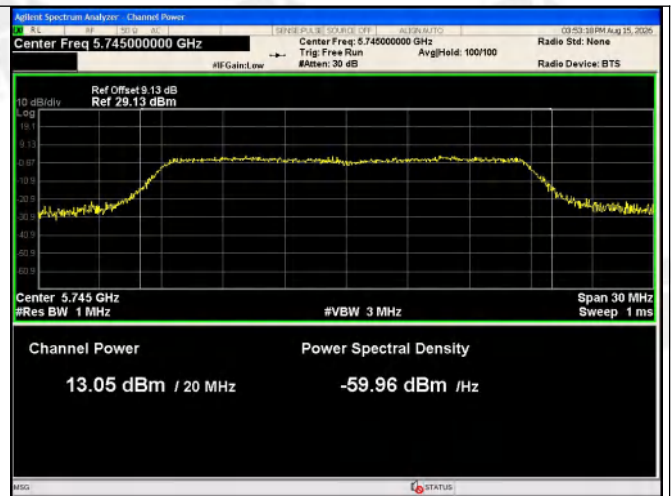
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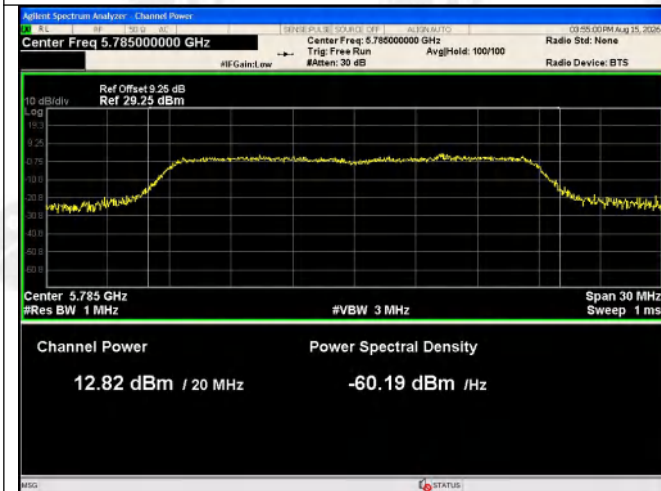
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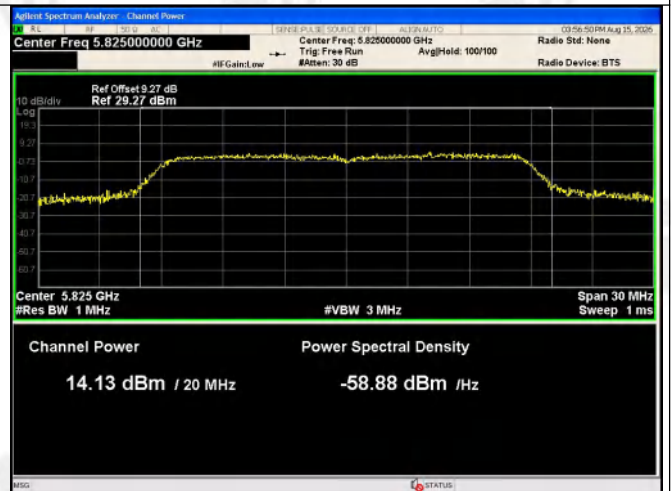
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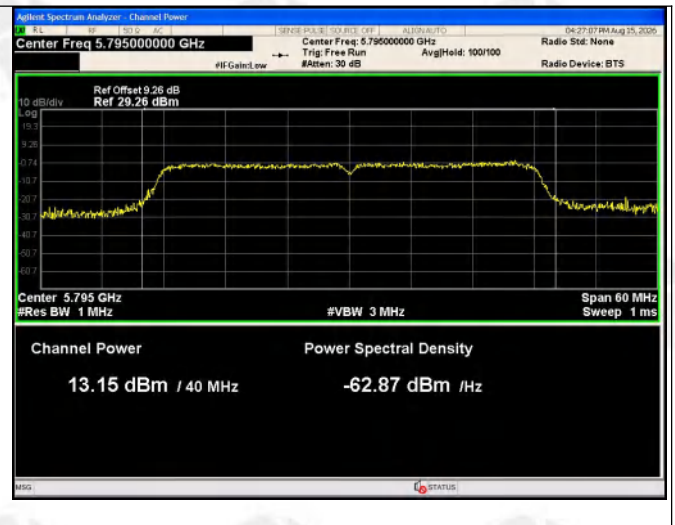
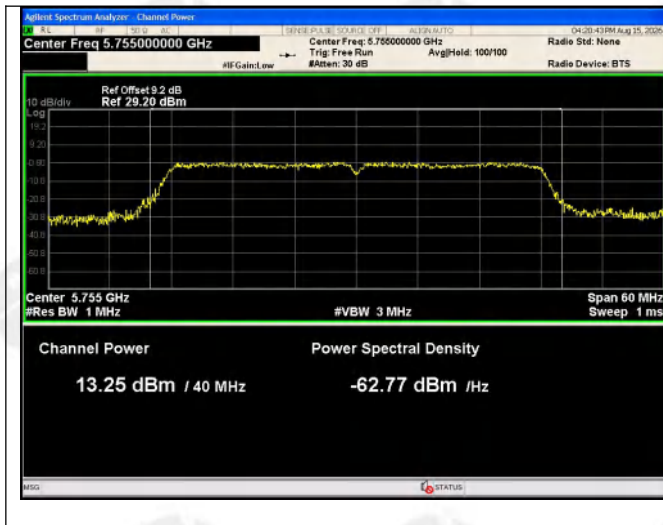
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5802.11n(HT40)-5755

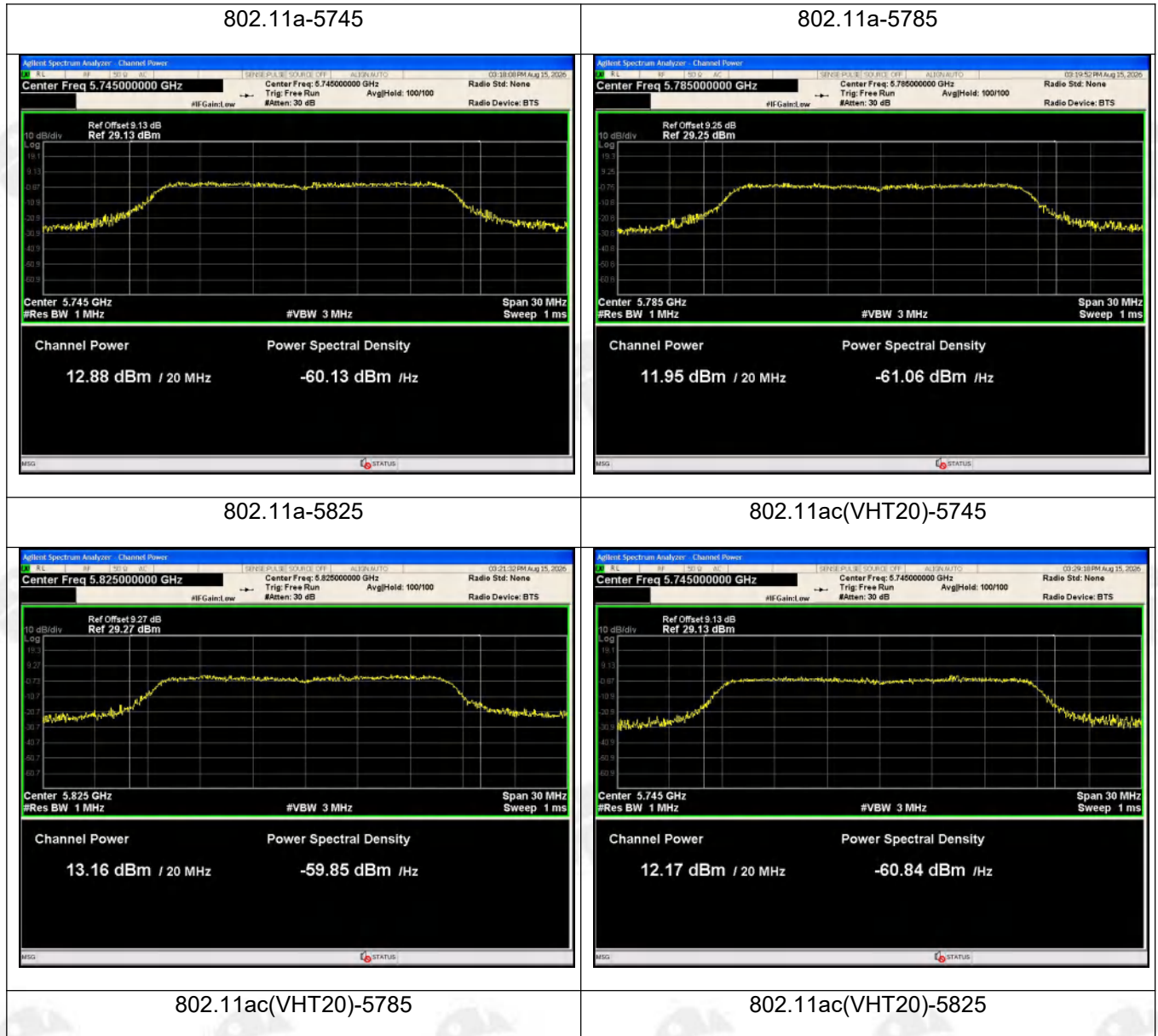


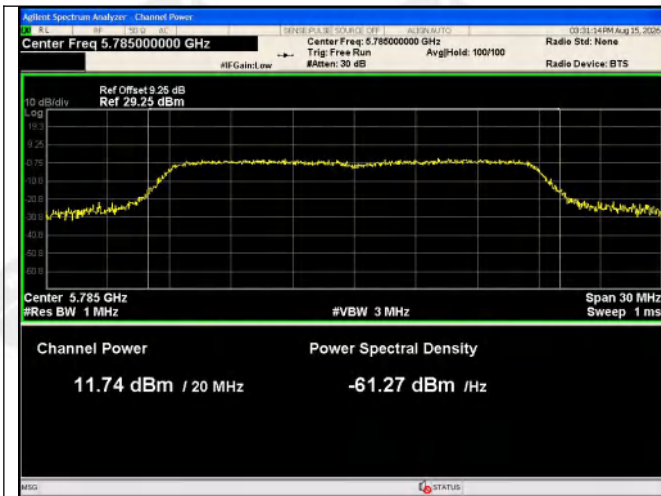
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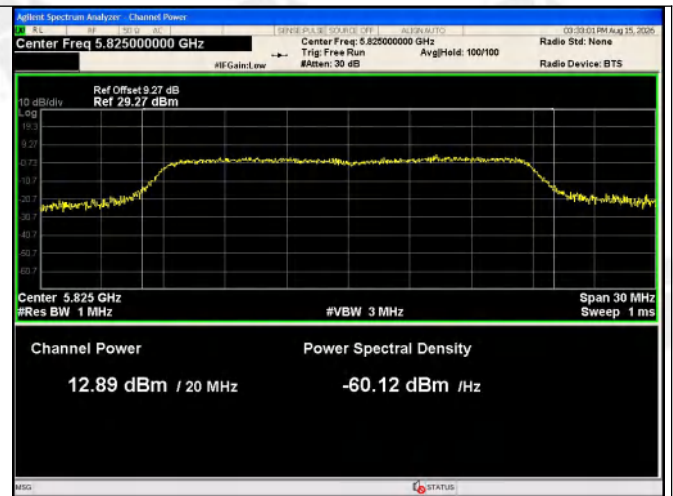


ANT2:

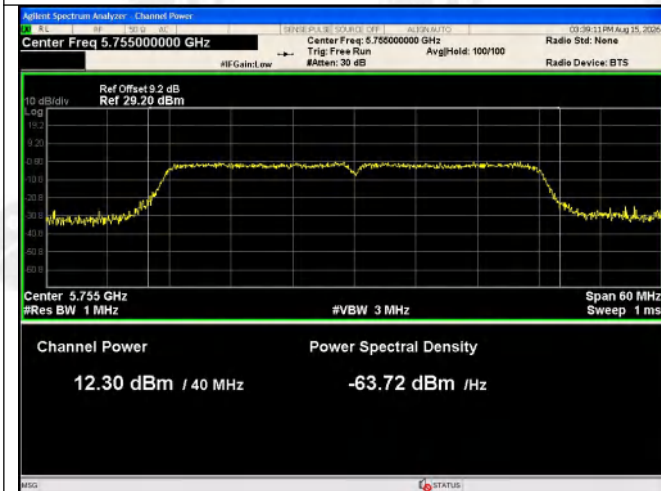




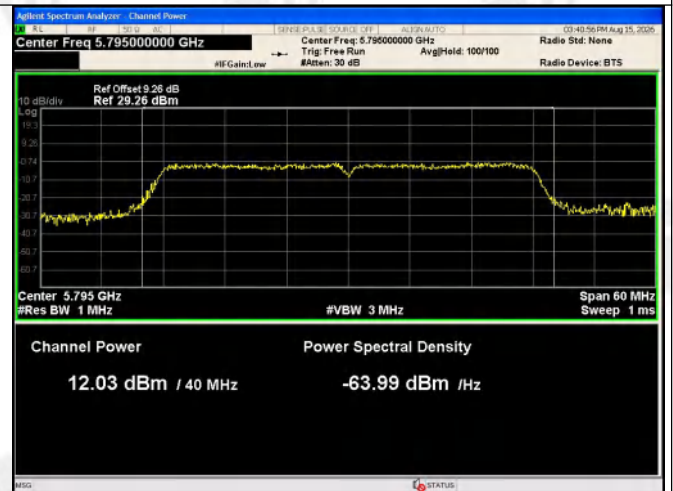
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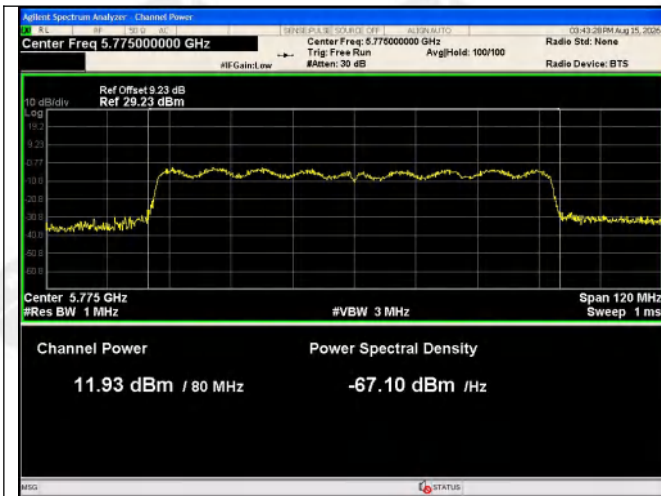
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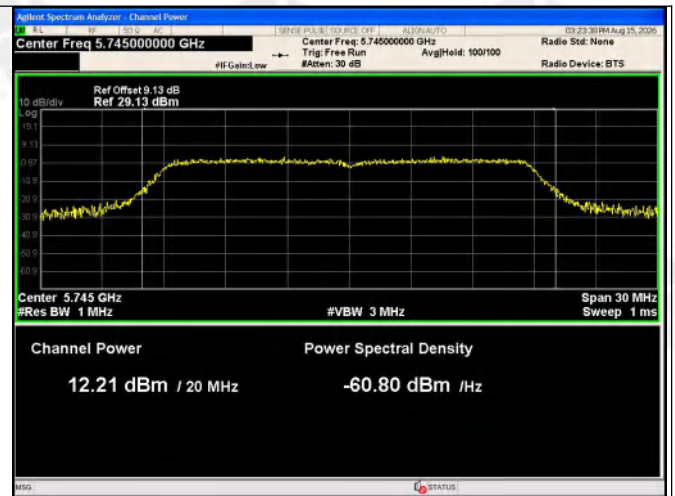
802.11ac(VHT80)-5775



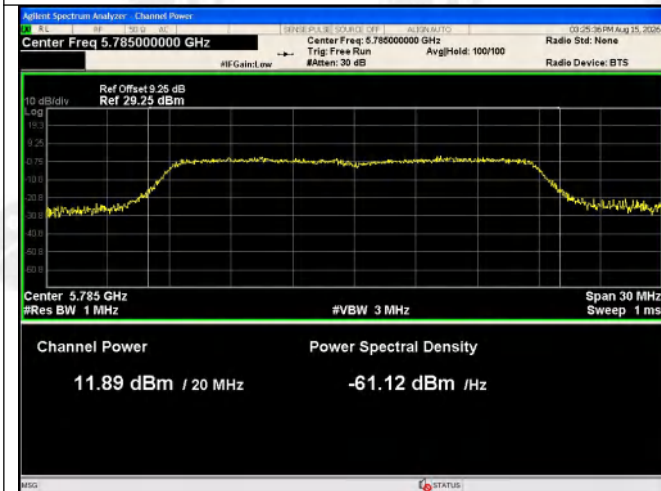
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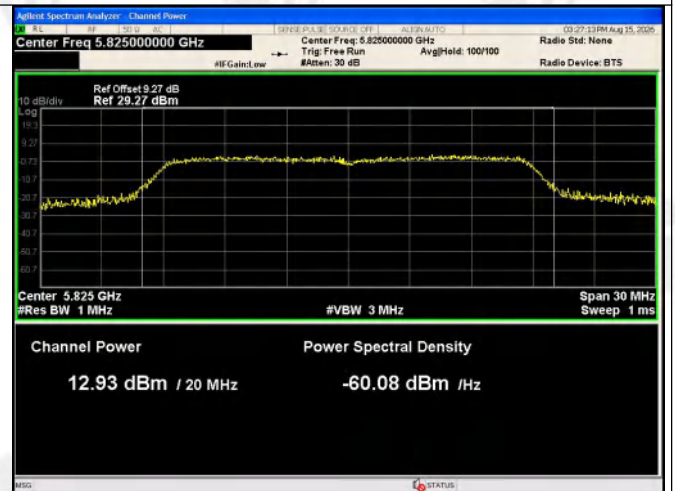
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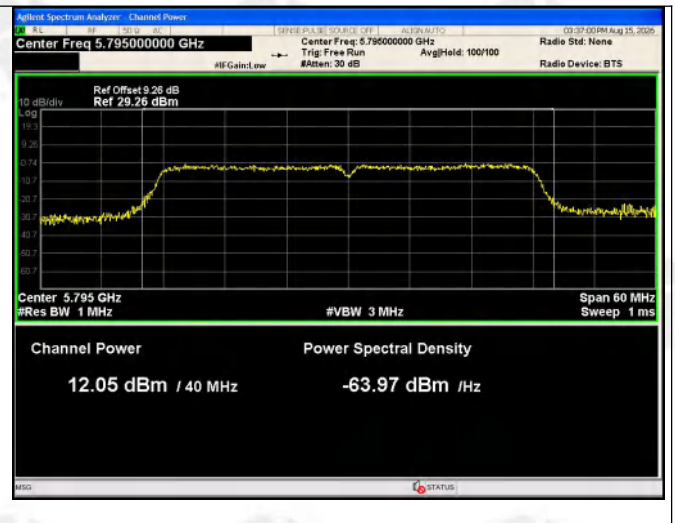
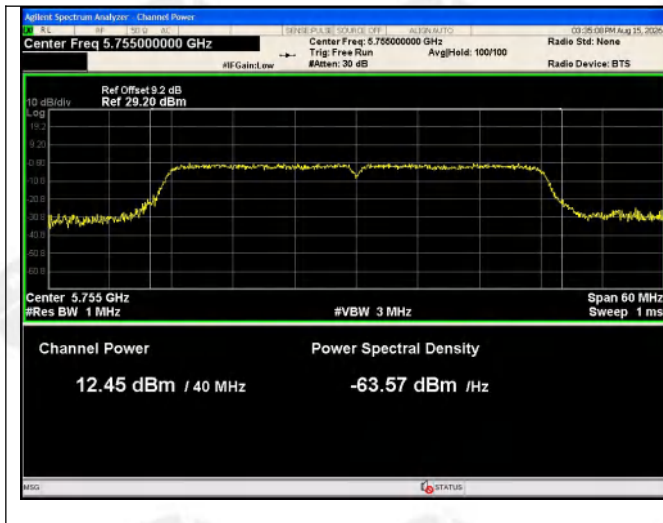
802.11n(HT20)-5825



5802.11n(HT40)-5755



802.11n(HT40)-5795





12 Out of Band Emissions and Spurious Emission

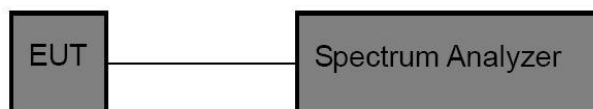
12.1 Test Standard and Limit

According to FCC §15.407(b)

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

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.725-5.85 GHz band: 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.

12.2 Test Setup



12.3 Test Procedure

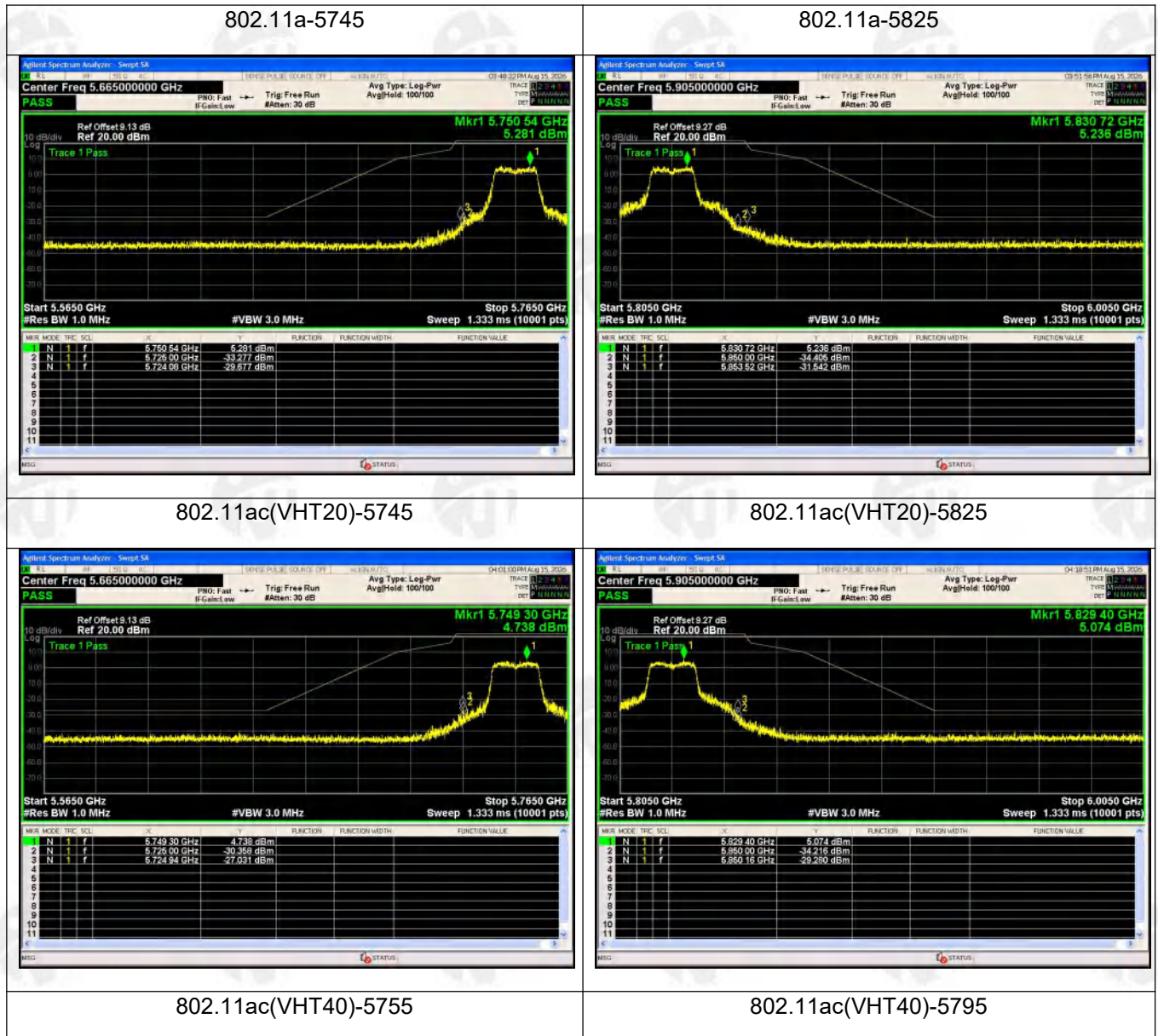
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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.

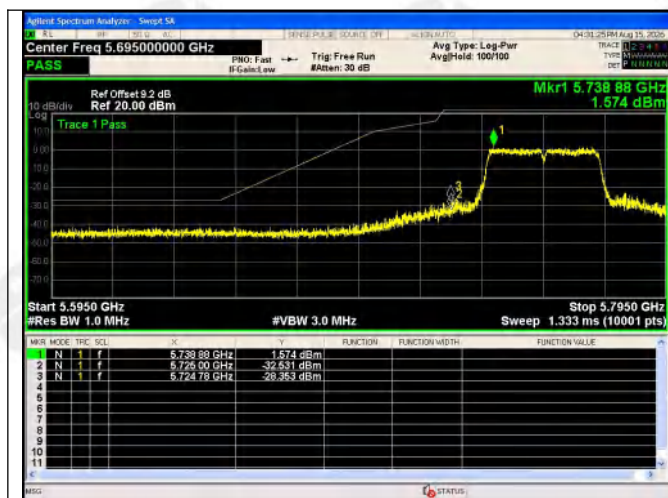


12.4 Test Data

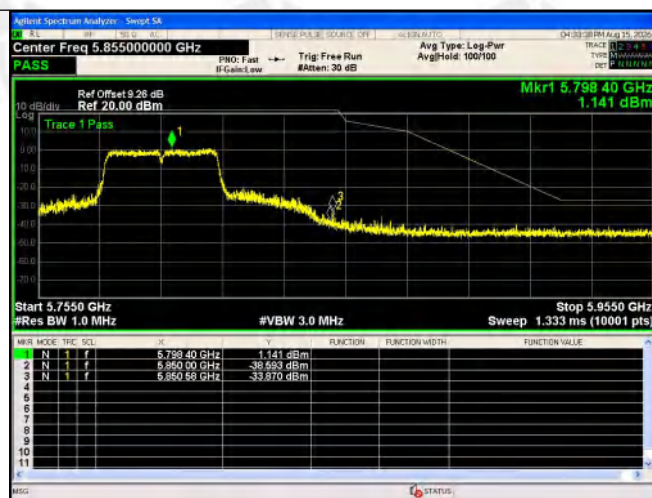
Test Graph

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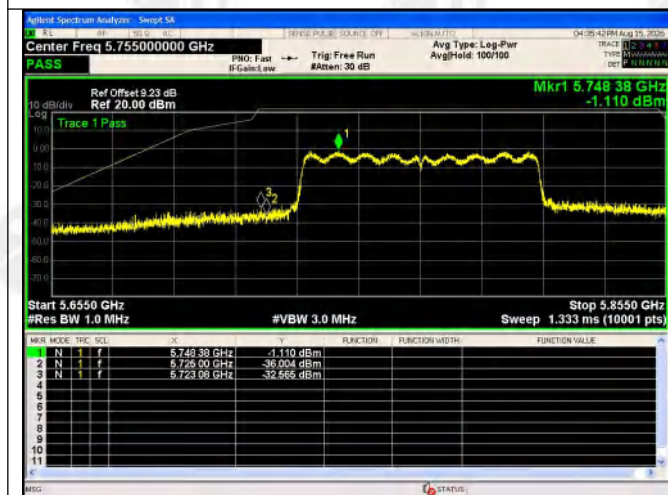




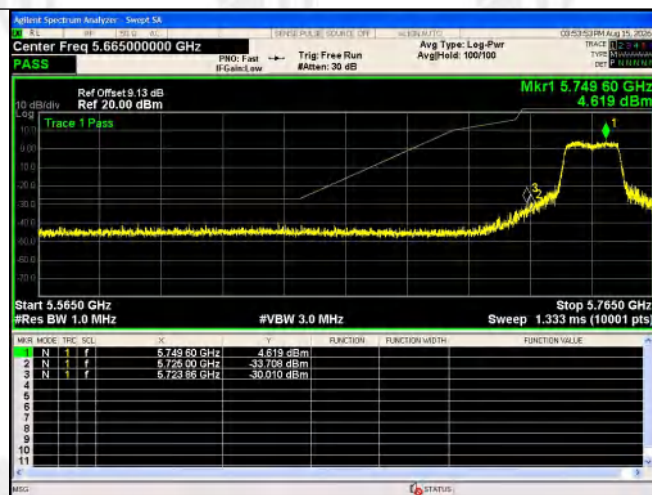
802.11ac(VHT80)-5775



802.11(n20)-5745



802.11(n20)-5825



802.11(n40)-5755



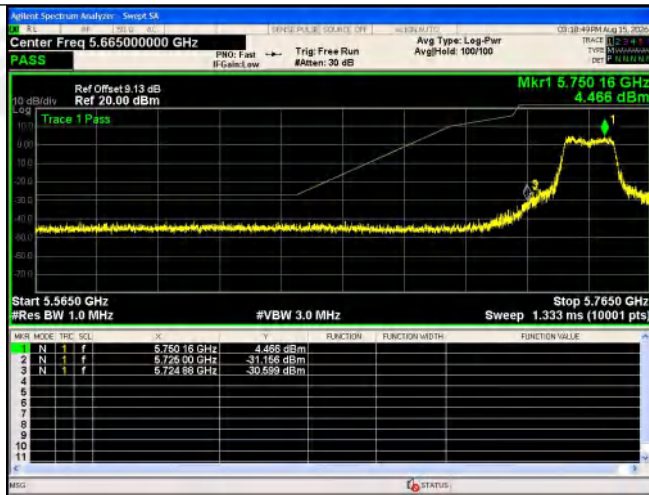
802.11(n40)-5795





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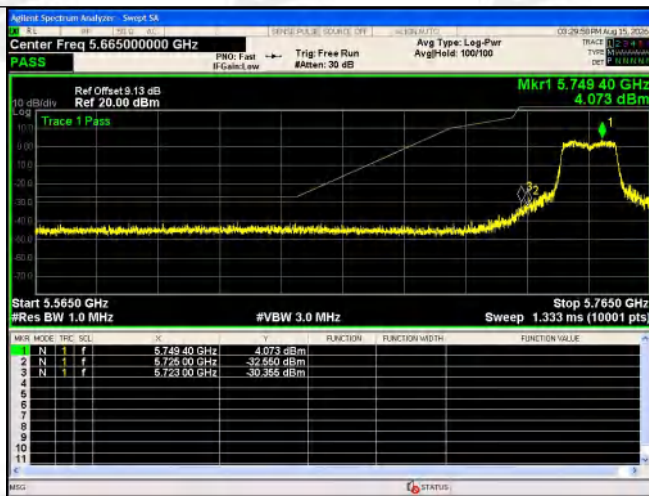
802.11a-5745



802.11a-5825



802.11ac(VHT20)-5745

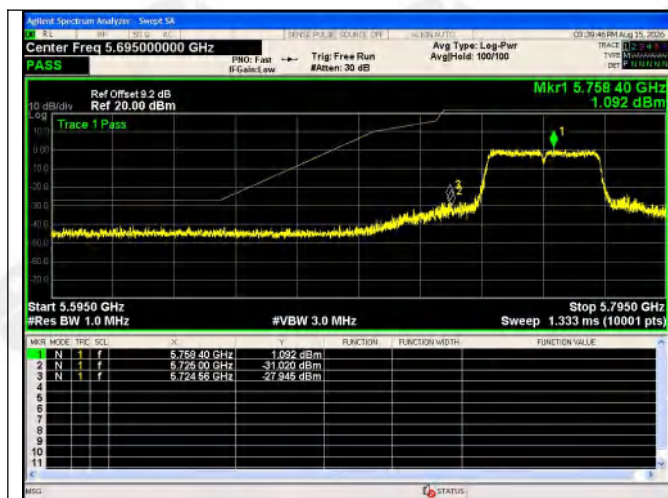


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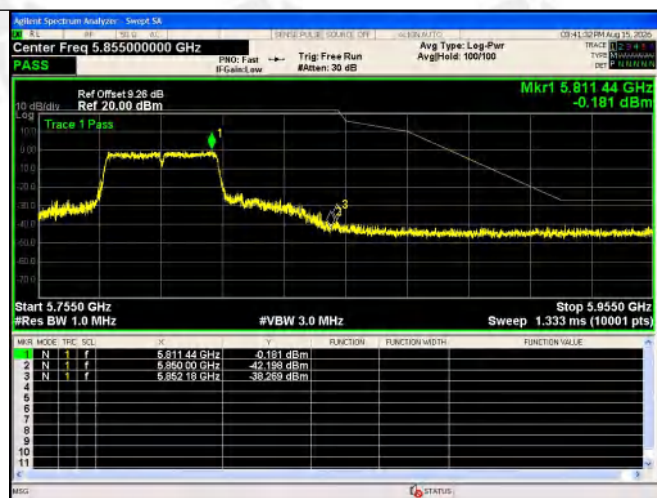


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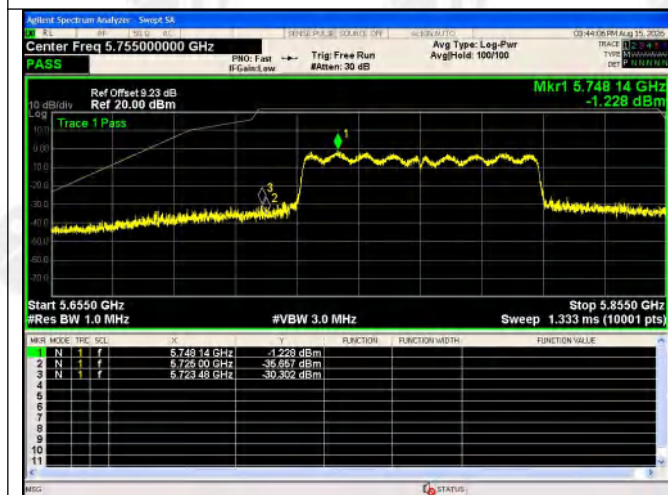
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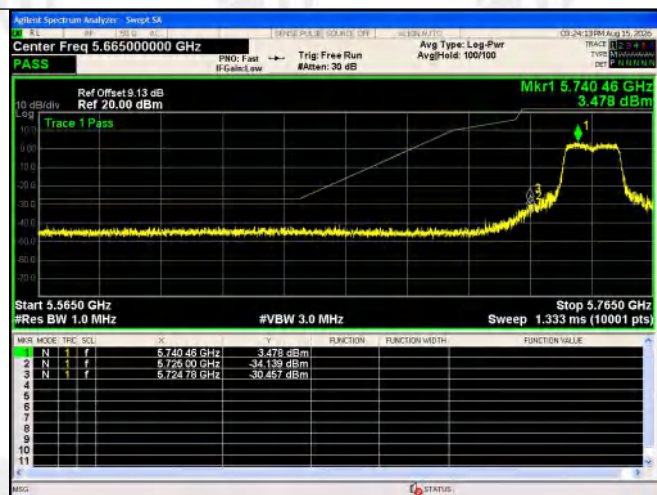
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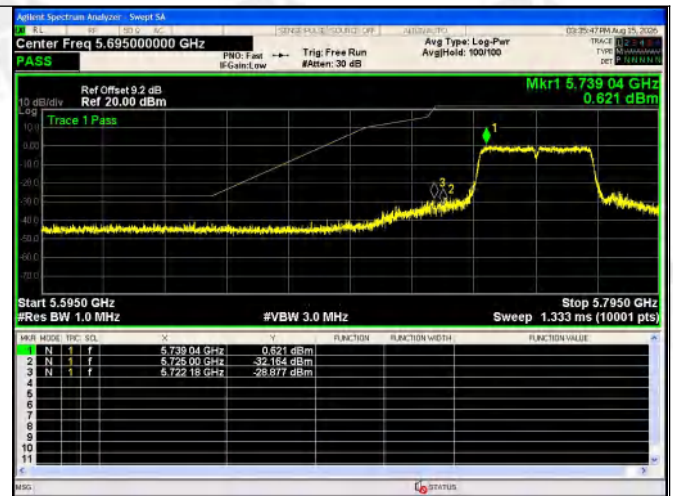
802.11(n20)-5745



802.11(n20)-5825



802.11(n40)-5755



802.11(n40)-5795





13 Frequency Stability Measurement

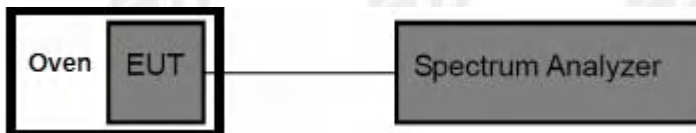
13.1 Test Standard and Limit

FCC

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

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

13.2 Test Setup



13.3 Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f) / f_c \times 10^6$ ppm and the limit is less than ± 20 ppm (IEEE 802.11n specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is $-20^\circ\text{C} \sim 50^\circ\text{C}$.



13.4 Test Data

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)	12.0	5745.0057	5745	0.0057	1.0005
		V max (V)	13.2	5745.0372	5745	0.0372	6.4761
		V min (V)	10.8	5745.0057	5745	0.0057	1.0005
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5745.0391	5745	0.0391	6.7994
		T (°C)	10	5745.0112	5745	0.0112	1.9520
		T (°C)	20	5745.0318	5745	0.0318	5.5330
		T (°C)	30	5745.0507	5745	0.0507	8.8187
		T (°C)	40	5745.0105	5745	0.0105	1.8292
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)	12.0	5785.0185	5785	0.0185	3.2052
		V max (V)	13.2	5785.0328	5785	0.0328	5.6711
		V min (V)	10.8	5785.0771	5785	0.0771	13.3224
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5785.0830	5785	0.0830	14.3418
		T (°C)	10	5785.0084	5785	0.0084	1.4442
		T (°C)	20	5785.0817	5785	0.0817	14.1280
		T (°C)	30	5785.0122	5785	0.0122	2.1145
		T (°C)	40	5785.0019	5785	0.0019	0.3221
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)	12.0	5825.0228	5825	0.0228	3.9214
		V max (V)	13.2	5825.0110	5825	0.0110	1.8963
		V min (V)	10.8	5825.0222	5825	0.0222	3.8138
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5825.0562	5825	0.0562	9.6433
		T (°C)	10	5825.0125	5825	0.0125	2.1430
		T (°C)	20	5825.0441	5825	0.0441	7.5734
		T (°C)	30	5825.0111	5825	0.0111	1.9054
		T (°C)	40	5825.0235	5825	0.0235	4.0393
Limits				±20ppm			
Result				Complies			



诺检标准

NTT STANDARD

Report No.: SZNTT26040492E1-4



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)	12.0	5745.0900	5745	0.0900	15.6618
		V max (V)	13.2	5745.0123	5745	0.0123	2.1380
		V min (V)	10.8	5745.0228	5745	0.0228	3.9733
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5745.0888	5745	0.0888	15.4583
		T (°C)	10	5745.0012	5745	0.0012	0.2126
		T (°C)	20	5745.0617	5745	0.0617	10.7457
		T (°C)	30	5745.0509	5745	0.0509	8.8657
		T (°C)	40	5745.0399	5745	0.0399	6.9470
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)	12.0	5785.0496	5785	0.0496	8.5702
		V max (V)	13.2	5785.0542	5785	0.0542	9.3758
		V min (V)	10.8	5785.0509	5785	0.0509	8.8006
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5785.0240	5785	0.0240	4.1476
		T (°C)	10	5785.0222	5785	0.0222	3.8322
		T (°C)	20	5785.0156	5785	0.0156	2.6959
		T (°C)	30	5785.0122	5785	0.0122	2.1010
		T (°C)	40	5785.0733	5785	0.0733	12.6744
		T (°C)	50	5785.0665	5785	0.0665	11.4940
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)	12.0	5825.0358	5825	0.0358	6.1514
		V max (V)	13.2	5825.0534	5825	0.0534	9.1685
		V min (V)	10.8	5825.0560	5825	0.0560	9.6162
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5825.0596	5825	0.0596	10.2385
		T (°C)	10	5825.0483	5825	0.0483	8.2960
		T (°C)	20	5825.0309	5825	0.0309	5.3039
		T (°C)	30	5825.0353	5825	0.0353	6.0576
		T (°C)	40	5825.0266	5825	0.0266	4.5637
Limits				±20ppm			
Result				Complies			



14 Antenna Requirement

14.1 Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	1) 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.

14.2 Antenna Connected Construction

The antenna is FPC antenna which permanently attached, and the best case gain of the antenna is WIFI 5.8G: ANT 1: 2.51dBi; ANT 2: 2.51dBi. It complies with the standard requirement.



15 TEST SETUP & EUT PHOTOGRAPH

Reference to EUT photo attachment for details.

----- End of Report -----