

TEST REPORT

Reference No. : WTD22D09190663W002 V1
FCC ID : NZ3-WN0003
Applicant : Winstars Technology Limited
Address : Block 4, Taisong Industrial Park, Dalang Street, Longhua Town,
Bao'an District, Shenzhen, China
Manufacturer : Winstars Technology Limited
Address : Block 4, Taisong Industrial Park, Dalang Street, Longhua Town,
Bao'an District, Shenzhen, China
Product : High Power Wireless Repeater
Model(s) : WN572HP3, WN572HG3, WN570HA1, WN570HN2, WING 12M,
AERIAL HD2
Standards : CFR47 FCC Part 15 E Section 15.407
Date of Receipt sample : 2022-09-21
Date of Test : 2022-09-21 to 2022-11-10
Date of Issue : 2022-11-10
Test Result : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.
The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

Waltek Testing Group Co., Ltd.

Address: No. 77, Houjie Section, Guantai Road, Houjie Town, Dongguan City, Guangdong, China

Tel: +86-769-2267 6998

Fax: +86-769-2267 6828

Compiled by:

Approved by:

Estel Qian

Estel Qian / Project Engineer



Deval Qian
Deval Qian / Designated Reviewer

2 Contents

	Page
1 COVER PAGE.....	1
2 CONTENTS	2
3 REVISION HISTORY.....	4
4 GENERAL INFORMATION.....	5
4.1 General Description of E.U.T.....	5
4.2 Details of E.U.T.....	5
4.3 Channel List.....	6
5 TEST MODE DESCRIPTION	7
5.1 Test Facility.....	8
5.2 Subcontracted.....	8
5.3 Abnormalities from Standard Conditions	8
6 EQUIPMENT USED DURING TEST	9
6.1 Equipments List	9
6.2 Description of Support Units.....	10
6.3 Measurement Uncertainty	10
6.4 Test Equipment Calibration	10
7 TEST SUMMARY	11
8 CONDUCTED EMISSION	12
8.1 E.U.T. Operation.....	12
8.2 EUT Setup	12
8.3 Measurement Description.....	12
8.4 Conducted Emission Test Result	13
9 DUTY CYCLE	15
9.1 Test Results.....	15
10 RADIATED EMISSIONS	18
10.1 EUT Operation.....	18
10.2 Test Setup	19
10.3 Spectrum Analyzer Setup.....	20
10.4 Test Procedure	21
10.5 Corrected Amplitude & Margin Calculation	21
10.6 Summary of Test Results	21
11 BAND EDGE	34
11.1 Test Produce	34
11.2 Test Result.....	34
12 6 DB BANDWIDTH	39
12.1 Test Procedure:	39
12.2 Test Result:.....	39
13 EMISSION BANDWIDTH (EBW) AND 99% OCCUPIED BANDWIDTH	43
13.1 Test Procedure:	43
13.2 Test Result:.....	44
14 CONDUCTED OUTPUT POWER	51
14.1 Test Procedure:	51
14.2 Test Result:.....	51

15 POWER SPECTRAL DENSITY65
 15.1 Test Procedure: 65
 15.2 Test Result:..... 66

16 FREQUENCY STABILITY80
 16.1 Test Procedure: 80
 16.2 Test Result:..... 80

17 ANTENNA REQUIREMENT82

18 RF EXPOSURE82

19 PHOTOGRAPHS OF TEST SETUP AND EUT.82

3 Revision History

Test Report No.	Date of Receipt Sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTD22D09190663W002	2022-09-21	2022-09-21 to 2022-10-19	2022-11-04	Original	-	Replaced
WTD22D09190663W002 V1	2022-09-21	2022-09-21 to 2022-11-10	2022-11-10	Version 1	Updated	Valid

4 General Information

4.1 General Description of E.U.T.

Product:	High Power Wireless Repeater
Model(s):	WN572HP3, WN572HG3, WN570HA1, WN570HN2, WING 12M, AERIAL HD2
Model Description:	The models are same in all respects. Only the model names are different for different market requirement.
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40 5G-802.11a/n(HT20/40)/ac(VHT20/40/80)
Hardware Version:	WS-WN572HP3-A1
Software Version:	M72HP3_V210414

4.2 Details of E.U.T.

Operation Frequency:	U-NII-1 802.11a/n(HT20)/ac(VHT20), 5180-5240MHz 4CH 802.11n(HT40)/ac(VHT40), 5190-5230MHz 2CH 802.11ac(VHT80), 5210MHz 1CH U-NII-3 802.11a/n(HT20)/ac(VHT20), 5745-5825MHz 5CH 802.11n(HT40)/ac(VHT40), 5755-5795MHz 2CH 802.11ac(VHT80), 5775MHz 1CH
Conducted output power:	U-NII-1: Ant. 1 9.12dBm Ant.2 9.12dBm Total: 12.13dBm Max. U-NII-3: Ant. 1 13.20dBm Ant.2 13.30dBm Total: 16.22dBm Max.
Type of Modulation:	802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Antenna installation:	External antenna with RP-SMA connector
Antenna Gain:	U-NII-1: 4.69dBi U-NII-3: 4.82dBi
Ratings:	DC24V 0.6A 14.4W
Adapter:	Manufacturer: PANFORE Model No.: PS240W0600U Input: 100-240V~, 50/60Hz, 0.5A Max Output: 24.0V==0.6A 14.4W
DFS Function:	Not support
TPC Function:	Not support

4.3 Channel List

U-NII-1 (5.15-5.25GHz)			
channel	Frequency(MHz)	channel	Frequency(MHz)
36	5180	38	5190
40	5200	42	5210
44	5220	46	5230
48	5240		

U-NII-3 (5.725-5.85GHz)			
channel	Frequency(MHz)	channel	Frequency(MHz)
149	5745	151	5755
153	5765	155	5775
157	5785	159	5795
161	5805	165	5825

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

For 802.11a/n(HT20)/ac(VHT20):

channel	Frequency(MHz)	channel	Frequency(MHz)
36	5180	40	5200
48	5240		

channel	Frequency(MHz)	channel	Frequency(MHz)
149	5745	157	5785
165	5825		

For 802.11n(HT40)/ac(VHT40):

channel	Frequency(MHz)	channel	Frequency(MHz)
38	5190	46	5230

channel	Frequency(MHz)	channel	Frequency(MHz)
151	5755	159	5795

For 802.11ac(VHT80):

channel	Frequency(MHz)	channel	Frequency(MHz)
42	5210		

channel	Frequency(MHz)	channel	Frequency(MHz)
155	5775		

5 Test Mode Description

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final-end product.

Test Items	Mode	Data Rate	TX/RX
Radiated Emissions	802.11a (HT20)	6 Mbps	TX
	802.11n (HT20/40)	MCS0	TX
	802.11ac(VHT20/40/80)	MCS0	TX
Duty Cycle	802.11a (HT20)	6 Mbps	TX
	802.11n (HT20/40)	MCS0	TX
	802.11ac(VHT20/40/80)	MCS0	TX
Band Edge	802.11a (HT20)	6 Mbps	TX
	802.11n (HT20/40)	MCS0	TX
	802.11ac(VHT20/40/80)	MCS0	TX
6dB Bandwidth	802.11a (HT20)	6 Mbps	TX
	802.11n (HT20/40)	MCS0	TX
	802.11ac(VHT20/40/80)	MCS0	TX
26dB Bandwidth and 99% Occupied Bandwidth	802.11a (HT20)	6 Mbps	TX
	802.11n (HT20/40)	MCS0	TX
	802.11ac(VHT20/40/80)	MCS0	TX
Conducted Output Power	802.11a (HT20)	6 Mbps	TX
	802.11n (HT20/40)	MCS0	TX
	802.11ac(VHT20/40/80)	MCS0	TX
Power Spectral Density	802.11a (HT20)	6 Mbps	TX
	802.11n (HT20/40)	MCS0	TX
	802.11ac(VHT20/40/80)	MCS0	TX
Frequency Stability	Un-modulation	/	TX

5.1 Test Facility

The test facility has a test site registered with the following organizations:

ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.

Waltek Testing Group Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A, October 15, 2016.

FCC Designation No.: CN1201. Test Firm Registration No.: 523476.

Waltek Testing Group Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration number 523476, September 10, 2019.

5.2 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

5.3 Abnormalities from Standard Conditions

None.

6 Equipment Used during Test

6.1 Equipments List

Conducted Emissions (Test site 1#)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date	Valid
1	EMI Test Receiver	R&S	ESCI	100947	2022-08-01	1Year
2	LISN	R&S	ENV216	100115	2022-08-01	1Year
3	Cable	Top	TYPE16(3.5M)	-	2022-08-01	1Year
4	Test software	EZ-EMC	RA-03A1-1	-	N/A	N/A
Conducted Emissions (Test site 2#)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date	Valid
1	EMI Test Receiver	R&S	ESCI	101155	2022-08-01	1Year
2	LISN	SCHWARZBECK	NSLK 8128	8128-259	2022-08-01	1Year
3	Limiter	CYBERTEK	EM5010	261115-001-0024	2022-08-01	1Year
4	Cable	Laplace	RF300	-	2022-08-01	1Year
5	Test software	EZ-EMC	RA-03A1-1	-	N/A	N/A
3m Semi-anechoic Chamber for Radiation Emissions (Test site 1#)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date	Valid
1	Spectrum Analyzer	R&S	FSP30	100091	2022-04-28	1Year
2	Amplifier	Agilent	8447D	2944A10178	2022-08-01	1Year
3	Tri-log Broadband Antenna	SCHWARZBECK	VULB9163	336	2022-08-07	1Year
4	Coaxial Cable	Top	TYPE16(13M)	-	2022-04-28	1Year
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120D	667	2022-04-28	1Year
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2022-07-29	1Year
7	Broadband Preamplifier	COMPLIANCE	PAP-1G18	2004	2022-04-28	1Year
8	Coaxial Cable	Top	ZT26-NJ-NJ-8M/FA	-	2022-08-01	1Year
9	Microwave Broadband Preamplifier	SCHWARZBECK	BBV 9721	100472	2022-08-01	1Year
10	Spectrum Analyzer	R&S	FSP40	100501	2022-08-01	1Year
11	Coaxial Cable	Top	ZT40-2.92J-2.92J-2.0M	17100919	2022-08-01	1Year
12	Test software	EZ-EMC	RA-03A1-1	-	N/A	N/A
3m Semi-anechoic Chamber for Radiation Emissions (Test site 2#)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date	Valid
1	Test Receiver	R&S	ESCI	101296	2022-04-28	1Year
2	Tri-log Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2021-10-31	1Year
3	Active Loop Antenna	Com-Power	AL-130R	10160007	2022-05-02	1Year
4	Amplifier	ANRITSU	MH648A	M43381	2022-04-28	1Year
5	Cable	HUBER+SUHNER	CBL2	525178	2022-04-28	1Year
6	Test software	EZ-EMC	RA-03A1-1	-	N/A	N/A

RF Conducting Testing						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Cal. Date	Valid
1	EXA Signal Analyzer	Keysight	N9010A	MY50520207	2022-04-28	1Year
2	Spectrum Analyzer	R&S	FSP40	100501	2022-08-01	1Year

6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

6.3 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

6.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R. China.

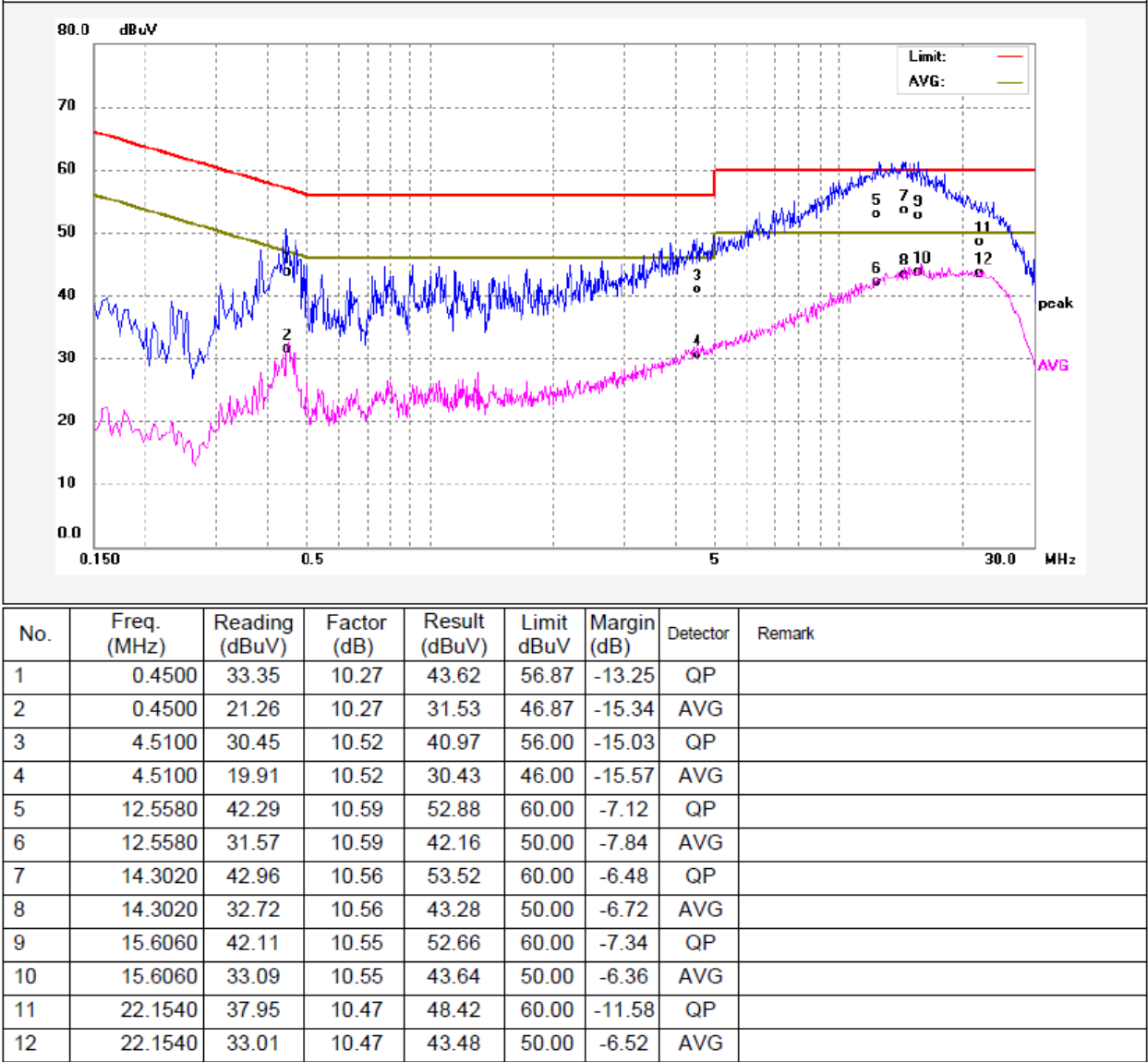
7 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207(a) 15.407(b)(9)	PASS
Radiated Emissions	15.407(b) (9) 15.205(a) 15.209(a)	PASS
Duty Cycle	KDB 789033	PASS
6dB Bandwidth	15.407(e)	PASS
26 dB Emission Bandwidth & 99% Occupied Bandwidth	15.407(a)	PASS
Maximum Conducted Output Power	15.407(a)	PASS
Power Spectral Density	15.407(a)(l)	PASS
Restricted bands around fundamental frequency	15.407(b)	PASS
Frequency stability	15.407(g)	PASS
Antenna Requirement	15.203	PASS
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

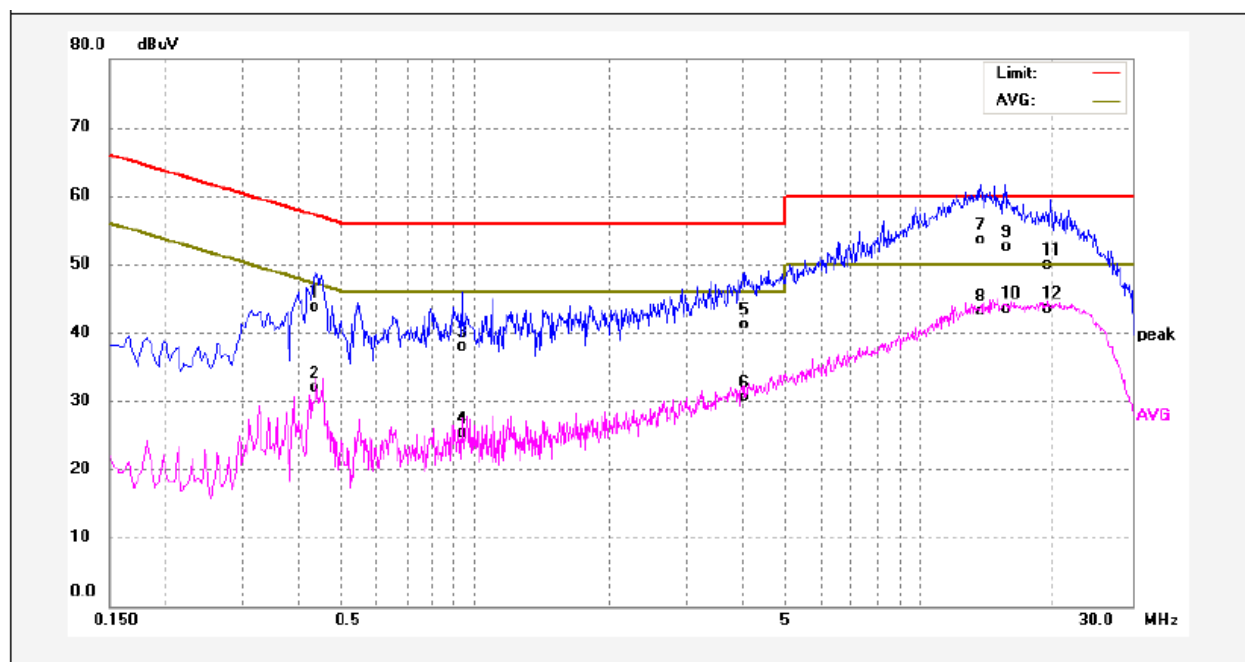
8.4 Conducted Emission Test Result

Remark: An initial pre-scan was performed on the live and neutral lines, only the worst data (U-NII-1 802.11n(HT20) mode High channel mode) were reported.

Live line:



Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.4380	33.43	10.27	43.70	57.10	-13.40	QP	
2	0.4380	21.63	10.27	31.90	47.10	-15.20	AVG	
3	0.9300	27.50	10.36	37.86	56.00	-18.14	QP	
4	0.9300	14.94	10.36	25.30	46.00	-20.70	AVG	
5	4.0459	30.62	10.52	41.14	56.00	-14.86	QP	
6	4.0459	19.98	10.52	30.50	46.00	-15.50	AVG	
7	13.6819	42.83	10.58	53.41	60.00	-6.59	QP	
8	13.6819	32.62	10.58	43.20	50.00	-6.80	AVG	
9	15.5139	42.06	10.54	52.60	60.00	-7.40	QP	
10	15.5139	32.96	10.54	43.50	50.00	-6.50	AVG	
11	19.6299	39.50	10.44	49.94	60.00	-10.06	QP	
12	19.6299	33.07	10.44	43.51	50.00	-6.49	AVG	

9 Duty Cycle

Test Requirement: FCC part 15 section15.407
 Test Method: ANSI C63.10:2013
 KDB 789033 D02 General UNII Test Procedures New Rules v02r01
 Section B
 Test Limit: N/A
 Test Result: PASS
 Remark: Through Pre-scan, the duty cycle set for channel low, middle and high are same, and the duty cycle test is performed at channel low only.

9.1 Test Results

Type of Modulation	On time ms	Period ms	Duty Cycle linear	Duty Cycle %	Duty Cycle Factor(dB)	Average Factor(dB)
U-NII-1 802.11a	1.390	1.460	0.95	95.21	0.21	-0.43
U-NII-1 802.11n(HT20)	1.304	1.371	0.95	95.11	0.22	-0.44
U-NII-1 802.11n(HT40)	0.644	0.705	0.91	91.35	0.39	-0.79
U-NII-1 802.11ac (VHT20)	0.680	0.744	0.91	91.40	0.39	-0.78
U-NII-1 802.11ac (VHT40)	0.350	0.412	0.85	84.95	0.71	-1.42
U-NII-1 802.11ac (VHT80)	0.186	0.246	0.76	75.61	1.21	-2.43
U-NII-3 802.11a	1.390	1.460	0.95	95.21	0.21	-0.43
U-NII-3 802.11n(HT20)	1.295	1.367	0.95	94.73	0.23	-0.47
U-NII-3 802.11n(HT40)	0.645	0.709	0.91	90.97	0.41	-0.82
U-NII-3 802.11ac (VHT20)	0.677	0.743	0.91	91.12	0.40	-0.81
U-NII-3 802.11ac (VHT40)	0.350	0.412	0.85	84.95	0.71	-1.42
U-NII-3 802.11ac (VHT80)	0.185	0.247	0.75	74.90	1.26	-2.51

Remark:

Duty cycle=On Time/period;

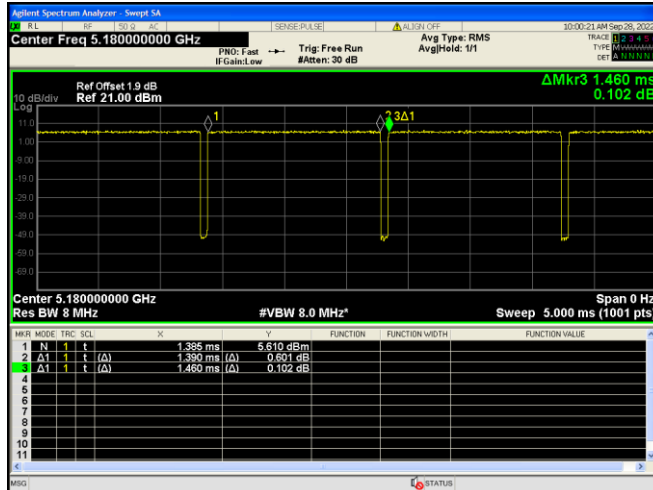
Duty cycle factor= $10 \cdot \log(1/\text{Duty cycle})$;

Average factor= $20 \log_{10} \text{Duty cycle}$

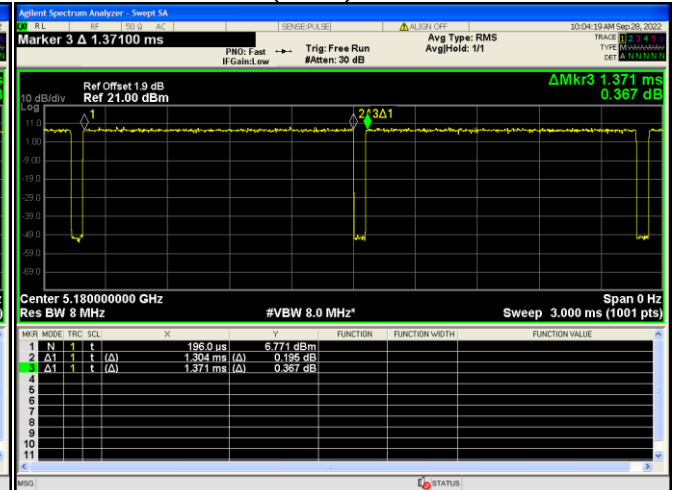
Test result plots shown as follows:

U-NII-1

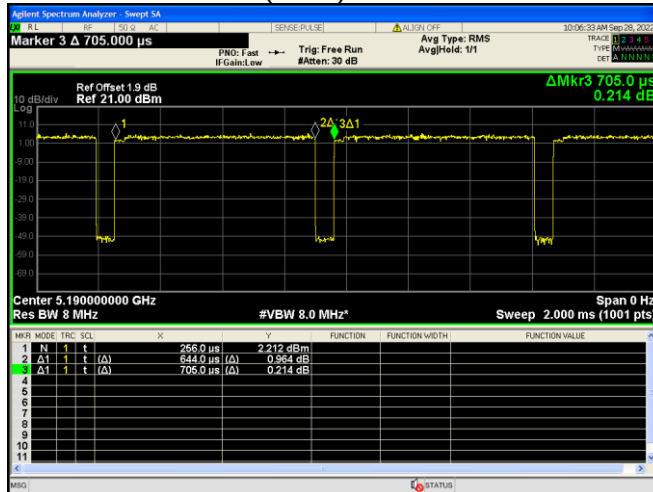
802.11a Low channel



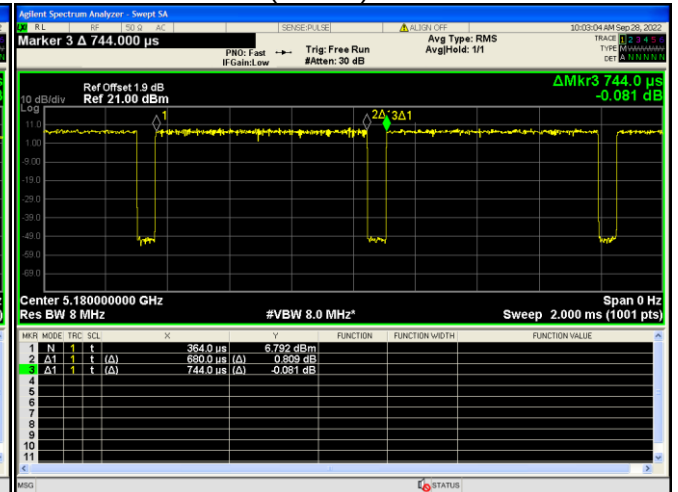
802.11n(HT20) Low channel



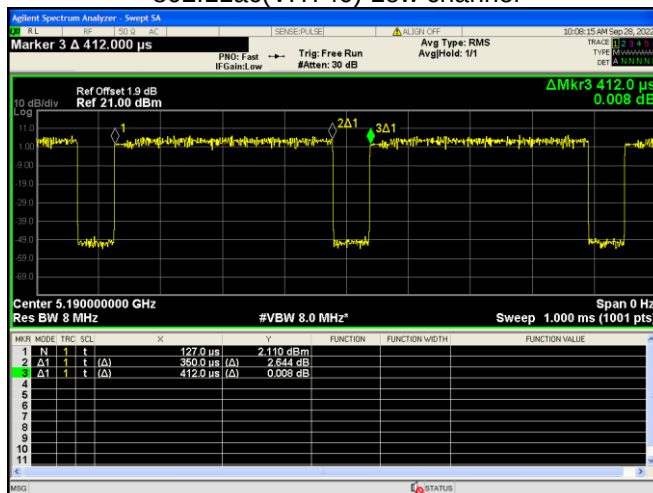
802.11n(HT40) Low channel



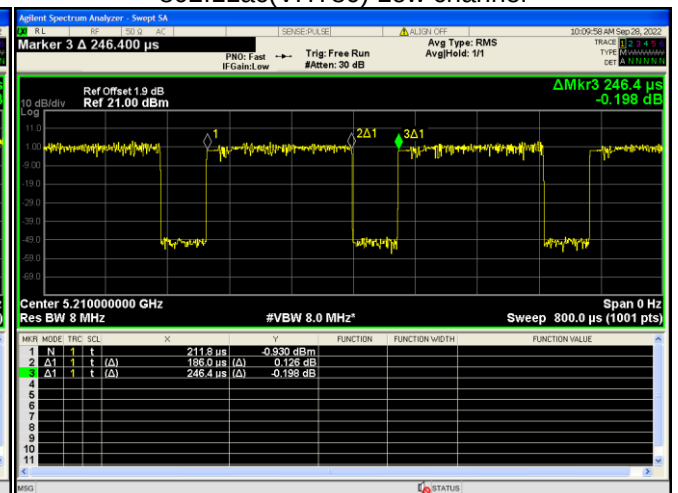
802.11ac(VHT20) Low channel



802.11ac(VHT40) Low channel

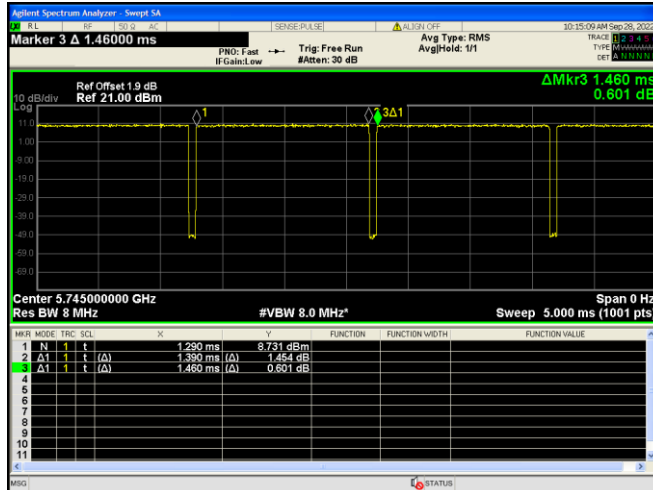


802.11ac(VHT80) Low channel

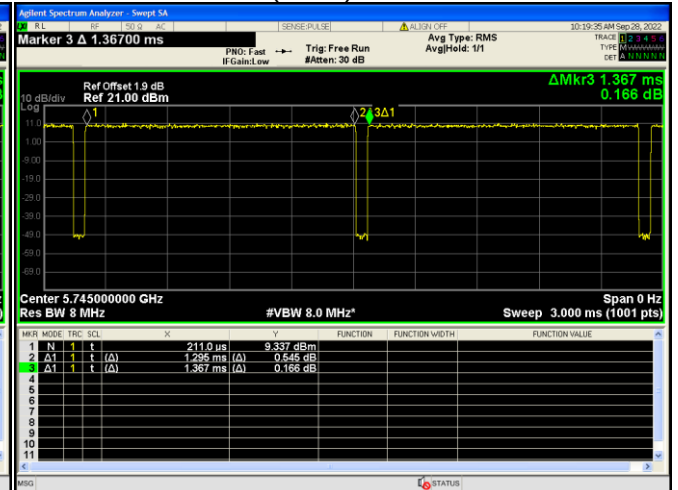


U-NII-3

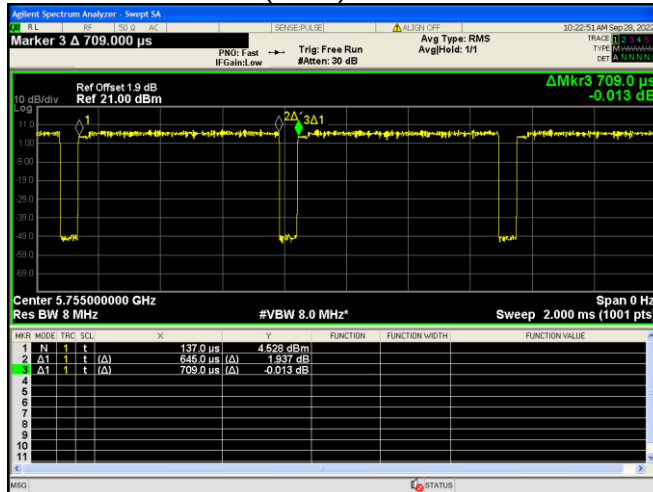
802.11a Low channel



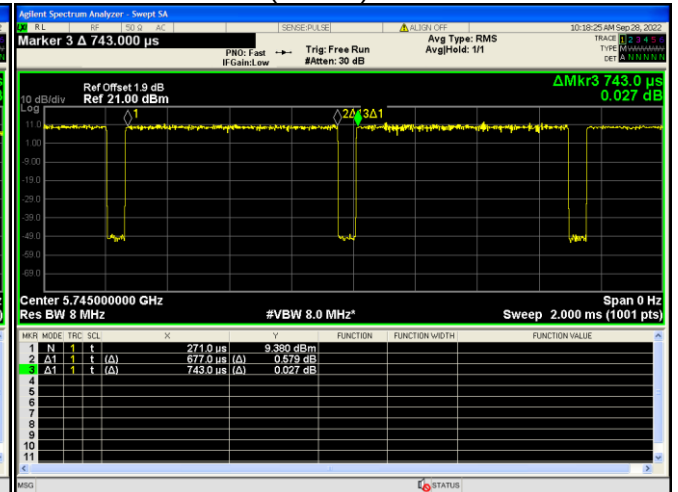
802.11n(HT20) Low channel



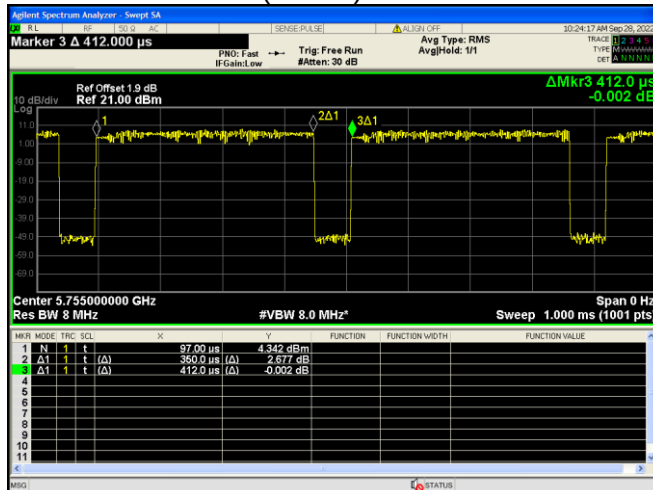
802.11n(HT40) Low channel



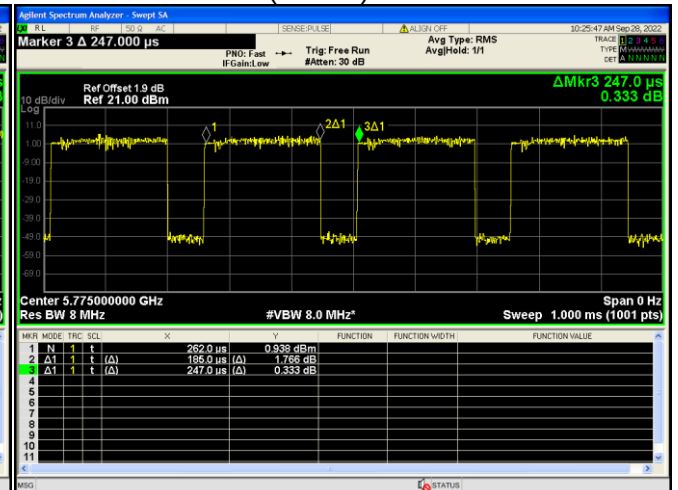
802.11ac(VHT20) Low channel



802.11ac(VHT40) Low channel



802.11ac(VHT80) Low channel



10 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.407
KDB 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Distance	
	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	$20\log^{(500)}$

10.1 EUT Operation

Operating Environment:

Temperature: 23.8 °C

Humidity: 52.5 % RH

Atmospheric Pressure: 101.3kPa

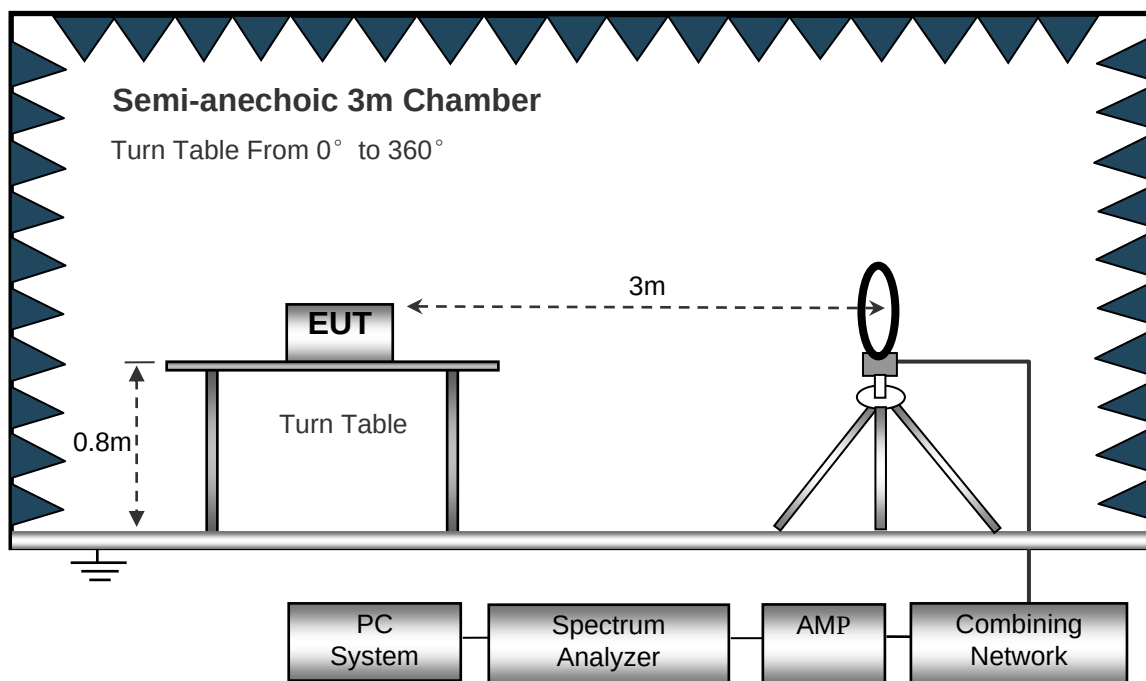
EUT Operation:

The test was performed in transmitting mode, the test data were shown in the report.

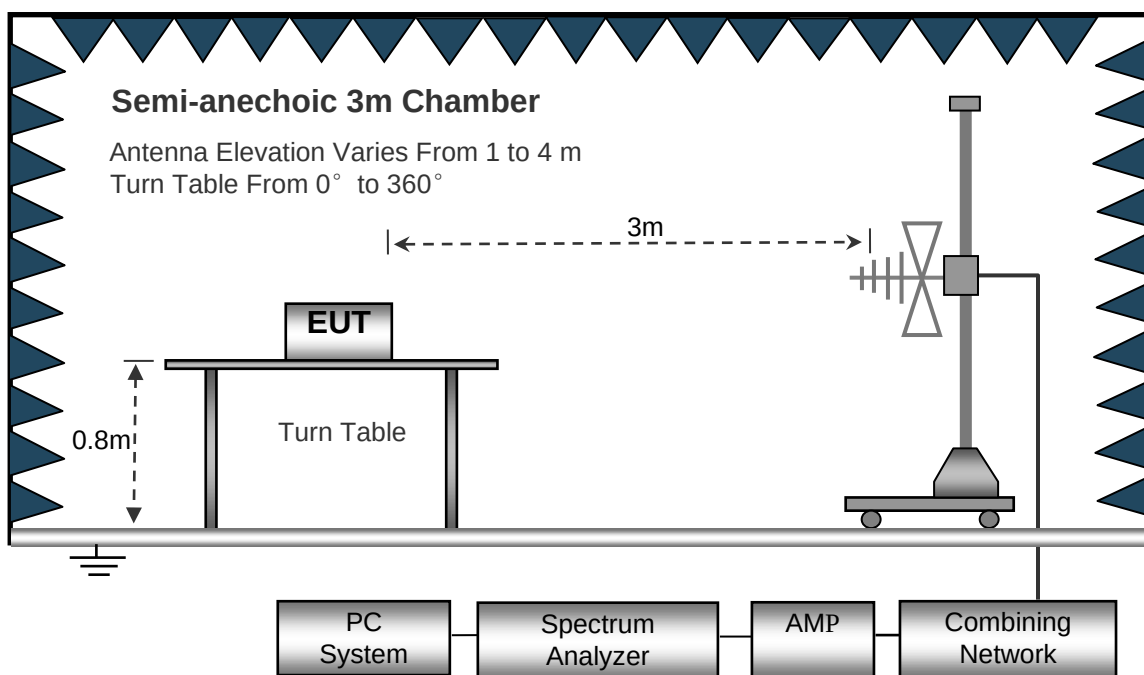
10.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10: 2013.

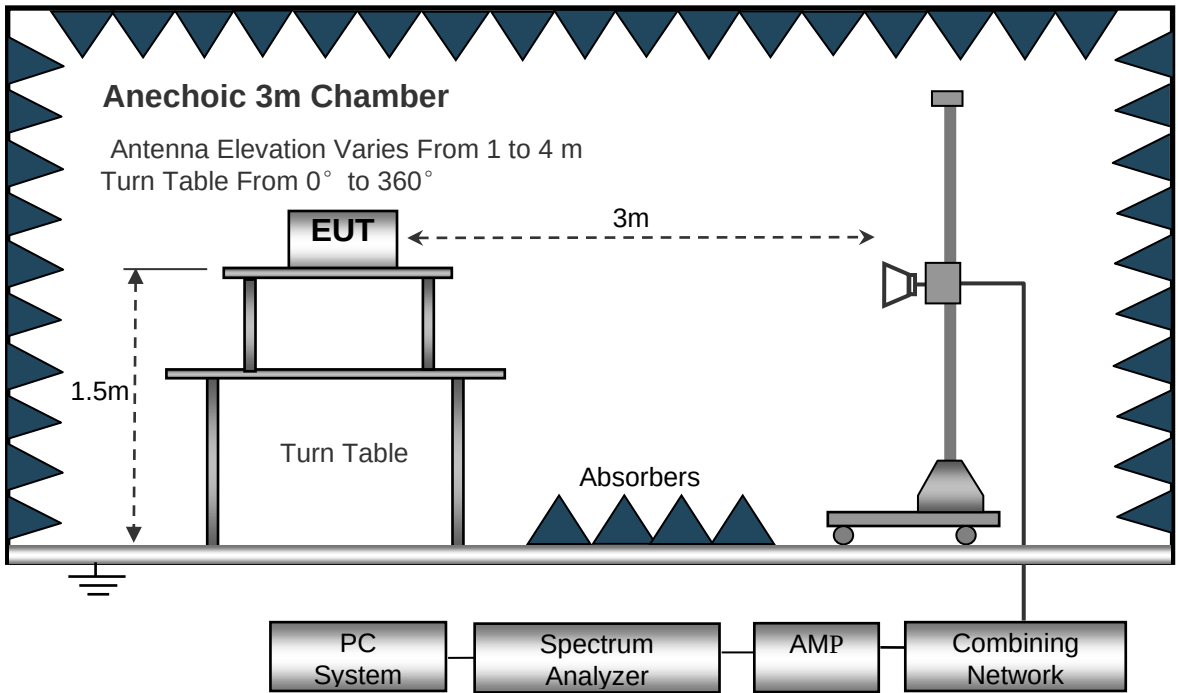
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



10.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed Auto
IF Bandwidth.....10kHz
Video Bandwidth.....10kHz
Resolution Bandwidth.....10kHz

30MHz ~ 1GHz

Sweep Speed Auto
Detector PK
Resolution Bandwidth.....100kHz
Video Bandwidth.....300kHz

Above 1GHz

Sweep Speed Auto
Detector PK
Resolution Bandwidth.....1MHz
Video Bandwidth.....3MHz
Detector Ave.
Resolution Bandwidth.....1MHz
Video Bandwidth.....10Hz

10.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X, Y and Z axis positioning (X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used during radiated emissions above 1GHz measurement.

10.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

10.6 Summary of Test Results

Note:

All test mode were tested, and only the worst-case were record in the report.

Test Mode: TX (Ant. 1+ Ant. 2)

Test Frequency: 9KHz~30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency: 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11a U-NII-1 Low Channel 5180MHz									
285.49	41.79	QP	217	1.6	H	-11.62	30.17	46.00	-15.83
285.49	38.76	QP	343	1.4	V	-11.62	27.14	46.00	-18.86
4539.92	53.51	PK	108	1.7	H	-2.03	51.48	74.00	-22.52
4539.92	43.74	Ave	108	1.7	H	-2.03	41.71	54.00	-12.29
5125.64	53.12	PK	214	1.8	H	-1.02	52.10	74.00	-21.90
5125.64	44.60	Ave	214	1.8	H	-1.02	43.58	54.00	-10.42
10360.00	41.79	PK	285	1.8	H	5.33	47.12	74.00	-26.88
10360.00	37.42	Ave	285	1.8	H	5.33	42.75	54.00	-11.25
802.11a U-NII-1 Middle channel 5200MHz									
285.49	41.56	QP	336	1.4	H	-11.62	29.94	46.00	-16.06
285.49	37.85	QP	94	1.3	V	-11.62	26.23	46.00	-19.77
4537.00	54.47	PK	188	1.6	H	-1.94	52.53	74.00	-21.47
4537.00	43.18	Ave	188	1.6	H	-1.94	41.24	54.00	-12.76
5128.61	54.15	PK	68	1.0	H	-1.06	53.09	74.00	-20.91
5128.61	46.38	Ave	68	1.0	H	-1.06	45.32	54.00	-8.68
10400.00	40.72	PK	326	1.3	H	5.21	45.93	74.00	-28.07
10400.00	36.40	Ave	326	1.3	H	5.21	41.61	54.00	-12.39
802.11a U-NII-1 High channel 5240MHz									
285.49	42.24	QP	93	1.6	H	-11.62	30.62	46.00	-15.38
285.49	37.54	QP	349	1.9	V	-11.62	25.92	46.00	-20.08
4502.26	52.77	PK	210	1.1	H	-2.24	50.53	74.00	-23.47
4502.26	43.41	Ave	210	1.1	H	-2.24	41.17	54.00	-12.83
5111.55	55.98	PK	89	1.9	H	-1.09	54.89	74.00	-19.11
5111.55	45.67	Ave	89	1.9	H	-1.09	44.58	54.00	-9.42
10480.00	40.69	PK	115	1.4	H	5.14	45.83	74.00	-28.17
10480.00	36.68	Ave	115	1.4	H	5.14	41.82	54.00	-12.18

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n HT20 U-NII-1 Low Channel 5180MHz									
285.49	44.08	QP	114	1.2	H	-11.62	32.46	46.00	-13.54
285.49	40.48	QP	286	1.2	V	-11.62	28.86	46.00	-17.14
4524.95	54.41	PK	137	1.9	H	-2.14	52.27	74.00	-21.73
4524.95	45.06	Ave	137	1.9	H	-2.14	42.92	54.00	-11.08
5119.36	44.95	PK	264	1.9	H	-1.06	43.89	74.00	-30.11
5119.36	37.69	Ave	264	1.9	H	-1.06	36.63	54.00	-17.37
10360.00	42.07	PK	313	1.7	H	5.33	47.40	74.00	-26.60
10360.00	36.98	Ave	313	1.7	H	5.33	42.31	54.00	-11.69
802.11n HT20 U-NII-1 Middle channel 5200MHz									
285.49	42.98	QP	191	1.5	H	-11.62	31.36	46.00	-14.64
285.49	41.01	QP	127	1.1	V	-11.62	29.39	46.00	-16.61
4521.80	54.22	PK	290	1.5	H	-2.12	52.10	74.00	-21.90
4521.80	44.14	Ave	290	1.5	H	-2.12	42.02	54.00	-11.98
5132.71	45.32	PK	1	1.2	H	-1.06	44.26	74.00	-29.74
5132.71	36.87	Ave	1	1.2	H	-1.06	35.81	54.00	-18.19
10400.00	40.84	PK	354	1.2	H	5.21	46.05	74.00	-27.95
10400.00	36.50	Ave	354	1.2	H	5.21	41.71	54.00	-12.29
802.11n HT20 U-NII-1 High channel 5240MHz									
285.49	43.86	QP	169	1.3	H	-11.62	32.24	46.00	-13.76
285.49	40.33	QP	212	1.8	V	-11.62	28.71	46.00	-17.29
4517.37	53.92	PK	256	1.5	H	-1.96	51.96	74.00	-22.04
4517.37	44.11	Ave	256	1.5	H	-1.96	42.15	54.00	-11.85
5132.41	46.19	PK	290	1.6	H	-1.06	45.13	74.00	-28.87
5132.41	37.38	Ave	290	1.6	H	-1.06	36.32	54.00	-17.68
10480.00	42.38	PK	269	1.6	H	5.14	47.52	74.00	-26.48
10480.00	38.59	Ave	269	1.6	H	5.14	43.73	54.00	-10.27

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n HT40 U-NII-1 Low Channel 5190MHz									
285.49	35.32	QP	101	1.3	H	-11.62	23.70	46.00	-22.30
285.49	40.64	QP	215	1.9	V	-11.62	29.02	46.00	-16.98
4512.09	42.49	PK	62	1.2	H	-1.89	40.60	74.00	-33.40
4512.09	37.73	Ave	62	1.2	H	-1.89	35.84	54.00	-18.16
5128.52	47.50	PK	159	1.8	H	-1.06	46.44	74.00	-27.56
5128.52	38.68	Ave	159	1.8	H	-1.06	37.62	54.00	-16.38
10380.00	40.58	PK	314	1.2	H	5.26	45.84	74.00	-28.16
10380.00	35.46	Ave	314	1.2	H	5.26	40.72	54.00	-13.28
802.11n HT40 U-NII-1 High channel 5230MHz									
285.49	35.39	QP	86	1.5	H	-11.62	23.77	46.00	-22.23
285.49	39.95	QP	320	1.7	V	-11.62	28.33	46.00	-17.67
4534.18	42.39	PK	342	1.2	H	-1.94	40.45	74.00	-33.55
4534.18	36.92	Ave	342	1.2	H	-1.94	34.98	54.00	-19.02
5138.20	48.69	PK	117	1.3	H	-1.06	47.63	74.00	-26.37
5138.20	39.88	Ave	117	1.3	H	-1.06	38.82	54.00	-15.18
10460.00	41.44	PK	270	1.8	H	5.28	46.72	74.00	-27.28
10460.00	37.09	Ave	270	1.8	H	5.28	42.37	54.00	-11.63

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac VHT20 U-NII-1 Low Channel 5180MHz									
285.49	40.03	QP	71	1.5	H	-11.62	28.41	46.00	-17.59
285.49	38.66	QP	324	1.6	V	-11.62	27.04	46.00	-18.96
4517.63	44.79	PK	314	2.0	H	-1.86	42.93	74.00	-31.07
4517.63	40.04	Ave	314	2.0	H	-1.86	38.18	54.00	-15.82
5133.38	47.80	PK	0	1.4	H	-1.06	46.74	74.00	-27.26
5133.38	40.43	Ave	0	1.4	H	-1.06	39.37	54.00	-14.63
10360.00	46.75	PK	85	1.1	H	5.33	52.08	74.00	-21.92
10360.00	38.81	Ave	85	1.1	H	5.33	44.14	54.00	-9.86
802.11ac VHT20 U-NII-1 Middle channel 5200MHz									
285.49	41.02	QP	68	1.4	H	-11.62	29.40	46.00	-16.60
285.49	37.87	QP	337	1.8	V	-11.62	26.25	46.00	-19.75
4516.57	44.21	PK	200	2.0	H	-1.82	42.39	74.00	-31.61
4516.57	40.22	Ave	200	2.0	H	-1.82	38.40	54.00	-15.60
5122.00	46.85	PK	98	1.1	H	-1.06	45.79	74.00	-28.21
5122.00	40.18	Ave	98	1.1	H	-1.06	39.12	54.00	-14.88
10400.00	42.74	PK	162	1.9	H	5.21	47.95	74.00	-26.05
10400.00	36.44	Ave	162	1.9	H	5.21	41.65	54.00	-12.35
802.11ac VHT20 U-NII-1 High channel 5240MHz									
285.49	38.96	QP	52	1.4	H	-11.62	27.34	46.00	-18.66
285.49	38.84	QP	89	1.4	V	-11.62	27.22	46.00	-18.78
4509.68	47.16	PK	253	1.8	H	-1.81	45.35	74.00	-28.65
4509.68	39.15	Ave	253	1.8	H	-1.81	37.34	54.00	-16.66
5125.91	41.50	PK	137	1.3	H	-1.06	40.44	74.00	-33.56
5125.91	39.23	Ave	137	1.3	H	-1.06	38.17	54.00	-15.83
10480.00	40.91	PK	277	1.9	H	5.14	46.05	74.00	-27.95
10480.00	38.14	Ave	277	1.9	H	5.14	43.28	54.00	-10.72

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac VHT40 U-NII-1 Low Channel 5190MHz									
285.49	41.40	QP	315	1.8	H	-11.62	29.78	46.00	-16.22
285.49	39.65	QP	274	1.5	V	-11.62	28.03	46.00	-17.97
4531.95	39.74	PK	103	1.6	H	-1.91	37.83	74.00	-36.17
4531.95	27.24	Ave	103	1.6	H	-1.91	25.33	54.00	-28.67
5119.27	46.77	PK	85	1.2	H	-1.06	45.71	74.00	-28.29
5119.27	36.53	Ave	85	1.2	H	-1.06	35.47	54.00	-18.53
10380.00	40.21	PK	331	1.8	H	5.26	45.47	74.00	-28.53
10380.00	34.98	Ave	331	1.8	H	5.26	40.24	54.00	-13.76
802.11ac VHT40 U-NII-1 High channel 5230MHz									
285.49	43.08	QP	56	1.6	H	-11.62	31.46	46.00	-14.54
285.49	36.43	QP	309	1.2	V	-11.62	24.81	46.00	-21.19
4512.71	34.56	PK	319	1.7	H	-1.93	32.63	74.00	-41.37
4512.71	31.57	Ave	319	1.7	H	-1.93	29.64	54.00	-24.36
5149.77	46.41	PK	2	1.6	H	-1.06	45.35	74.00	-28.65
5149.77	37.60	Ave	2	1.6	H	-1.06	36.54	54.00	-17.46
10460.00	41.09	PK	329	1.5	H	5.28	46.37	74.00	-27.63
10460.00	37.05	Ave	329	1.5	H	5.28	42.33	54.00	-11.67

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac VHT80 U-NII-1 Middle channel 5210MHz									
285.49	42.36	QP	256	1.3	H	-11.62	30.74	46.00	-15.26
4500.84	41.30	QP	98	1.3	V	-11.62	29.68	46.00	-16.32
4507.58	31.41	PK	101	1.6	H	-1.88	29.53	74.00	-44.47
4507.58	40.69	Ave	101	1.6	H	-1.88	38.81	54.00	-15.19
5129.44	36.13	PK	140	1.2	H	-1.06	35.07	74.00	-38.93
5129.44	46.85	Ave	140	1.2	H	-1.06	45.79	54.00	-8.21
10420.00	42.99	PK	91	1.5	H	4.65	47.64	74.00	-26.36
10420.00	37.77	Ave	91	1.5	H	4.65	42.42	54.00	-11.58

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11a U-NII-3 Low Channel 5745MHz									
285.49	43.60	QP	151	1.7	H	-11.62	31.98	46.00	-14.02
285.49	39.55	QP	312	2.0	V	-11.62	27.93	46.00	-18.07
4529.30	53.17	PK	128	1.8	H	-2.06	51.11	74.00	-22.89
4529.30	45.79	Ave	128	1.8	H	-2.06	43.73	54.00	-10.27
5366.63	46.20	PK	98	1.3	H	-1.25	44.95	74.00	-29.05
5366.63	39.04	Ave	98	1.3	H	-1.25	37.79	54.00	-16.21
11490.00	49.51	PK	166	1.6	H	5.93	55.44	74.00	-18.56
11490.00	38.43	Ave	166	1.6	H	5.93	44.36	54.00	-9.64
802.11a U-NII-3 Middle channel 5785MHz									
285.49	44.19	QP	316	2.0	H	-11.62	32.57	46.00	-13.43
285.49	39.27	QP	289	1.6	V	-11.62	27.65	46.00	-18.35
4537.07	52.52	PK	188	2.0	H	-2.03	50.49	74.00	-23.51
4537.07	46.03	Ave	188	2.0	H	-2.03	44.00	54.00	-10.00
5380.42	45.36	PK	30	1.5	H	-1.22	44.14	74.00	-29.86
5380.42	37.84	Ave	30	1.5	H	-1.22	36.62	54.00	-17.38
11570.00	49.75	PK	186	1.9	H	5.81	55.56	74.00	-18.44
11570.00	38.61	Ave	186	1.9	H	5.81	44.42	54.00	-9.58
802.11a U-NII-3 High channel 5825MHz									
285.49	44.92	QP	140	1.4	H	-11.62	33.30	46.00	-12.70
285.49	39.96	QP	30	2.0	V	-11.62	28.34	46.00	-17.66
4501.60	53.25	PK	252	1.2	H	-1.84	51.41	74.00	-22.59
4501.60	44.80	Ave	252	1.2	H	-1.84	42.96	54.00	-11.04
5350.25	45.24	PK	330	1.5	H	-1.30	43.94	74.00	-30.06
5350.25	39.32	Ave	330	1.5	H	-1.30	38.02	54.00	-15.98
11650.00	52.82	PK	289	1.3	H	5.84	58.66	74.00	-15.34
11650.00	38.60	Ave	289	1.3	H	5.84	44.44	54.00	-9.56

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n HT20 U-NII-3 Low Channel 5745MHz									
285.49	41.89	QP	71	1.3	H	-11.62	30.27	46.00	-15.73
285.49	49.27	QP	265	1.4	V	-11.62	37.65	46.00	-8.35
4534.66	46.23	PK	304	2.0	H	-2.06	44.17	74.00	-29.83
4534.66	47.34	Ave	304	2.0	H	-2.06	45.28	54.00	-8.72
5385.86	45.25	PK	187	1.0	H	-1.25	44.00	74.00	-30.00
5385.86	38.45	Ave	187	1.0	H	-1.25	37.20	54.00	-16.80
11490.00	46.99	PK	136	1.3	H	5.93	52.92	74.00	-21.08
11490.00	38.99	Ave	136	1.3	H	5.93	44.92	54.00	-9.08
802.11n HT20 U-NII-3 Middle channel 5785MHz									
285.49	39.02	QP	318	1.6	H	-11.62	27.40	46.00	-18.60
285.49	43.98	QP	103	1.6	V	-11.62	32.36	46.00	-13.64
4506.67	43.18	PK	126	1.7	H	-2.03	41.15	74.00	-32.85
4506.67	44.79	Ave	126	1.7	H	-2.03	42.76	54.00	-11.24
5378.26	45.72	PK	173	1.7	H	-1.22	44.50	74.00	-29.50
5378.26	37.95	Ave	173	1.7	H	-1.22	36.73	54.00	-17.27
11570.00	47.99	PK	119	1.3	H	5.81	53.80	74.00	-20.20
11570.00	39.96	Ave	119	1.3	H	5.81	45.77	54.00	-8.23
802.11n HT20 U-NII-3 High channel 5825MHz									
285.49	38.25	QP	181	1.2	H	-11.62	26.63	46.00	-19.37
285.49	44.57	QP	292	1.2	V	-11.62	32.95	46.00	-13.05
4533.35	41.84	PK	214	1.1	H	-1.84	40.00	74.00	-34.00
4533.35	45.49	Ave	214	1.1	H	-1.84	43.65	54.00	-10.35
5359.66	46.60	PK	150	1.2	H	-1.30	45.30	74.00	-28.70
5359.66	39.97	Ave	150	1.2	H	-1.30	38.67	54.00	-15.33
11650.00	48.96	PK	41	1.3	H	5.84	54.80	74.00	-19.20
11650.00	38.49	Ave	41	1.3	H	5.84	44.33	54.00	-9.67

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n HT40 U-NII-3 Low Channel 5755MHz									
285.49	42.85	QP	91	1.3	H	-11.62	31.23	46.00	-14.77
285.49	37.55	QP	318	1.1	V	-11.62	25.93	46.00	-20.07
4502.04	38.18	PK	75	1.5	H	-1.96	36.22	74.00	-37.78
4502.04	33.83	Ave	75	1.5	H	-1.96	31.87	54.00	-22.13
5369.06	46.78	PK	295	2.0	H	-1.01	45.77	74.00	-28.23
5369.06	37.70	Ave	295	2.0	H	-1.01	36.69	54.00	-17.31
11510.00	39.39	PK	284	1.8	H	5.88	45.27	74.00	-28.73
11510.00	35.92	Ave	284	1.8	H	5.88	41.80	54.00	-12.20
802.11n HT40 U-NII-3 High channel 5795MHz									
285.49	41.34	QP	140	1.1	H	-11.62	29.72	46.00	-16.28
285.49	39.07	QP	324	1.3	V	-11.62	27.45	46.00	-18.55
4533.05	41.74	PK	259	1.0	H	-1.92	39.82	74.00	-34.18
4533.05	29.70	Ave	259	1.0	H	-1.92	27.78	54.00	-26.22
5350.53	45.44	PK	15	1.2	H	-1.04	44.40	74.00	-29.60
5350.53	37.70	Ave	15	1.2	H	-1.04	36.66	54.00	-17.34
11590.00	40.78	PK	326	1.5	H	5.63	46.41	74.00	-27.59
11590.00	38.07	Ave	326	1.5	H	5.63	43.70	54.00	-10.30

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac VHT20 U-NII-3 Low Channel 5745MHz									
285.49	40.77	QP	117	1.9	H	-11.62	29.15	46.00	-16.85
285.49	38.20	QP	45	1.3	V	-11.62	26.58	46.00	-19.42
4520.97	46.15	PK	56	1.9	H	-1.92	44.23	74.00	-29.77
4520.97	36.27	Ave	56	1.9	H	-1.92	34.35	54.00	-19.65
5367.58	45.26	PK	356	1.1	H	-1.03	44.23	74.00	-29.77
5367.58	38.57	Ave	356	1.1	H	-1.03	37.54	54.00	-16.46
11490.00	38.82	PK	128	1.0	H	5.93	44.75	74.00	-29.25
11490.00	34.43	Ave	128	1.0	H	5.93	40.36	54.00	-13.64
802.11ac VHT20 U-NII-3 Middle channel 5785MHz									
285.49	41.40	QP	292	1.4	H	-11.62	29.78	46.00	-16.22
285.49	37.50	QP	330	1.1	V	-11.62	25.88	46.00	-20.12
4516.84	44.05	PK	298	1.1	H	-1.97	42.08	74.00	-31.92
4516.84	37.80	Ave	298	1.1	H	-1.97	35.83	54.00	-18.17
5389.76	45.76	PK	313	1.8	H	-1.05	44.71	74.00	-29.29
5389.76	38.66	Ave	313	1.8	H	-1.05	37.61	54.00	-16.39
11570.00	42.33	PK	277	1.0	H	5.81	48.14	74.00	-25.86
11570.00	38.23	Ave	277	1.0	H	5.81	44.04	54.00	-9.96
802.11ac VHT20 U-NII-3 High channel 5825MHz									
285.49	42.03	QP	195	1.3	H	-11.62	30.41	46.00	-15.59
285.49	37.33	QP	37	1.2	V	-11.62	25.71	46.00	-20.29
4538.31	44.63	PK	126	1.8	H	-1.88	42.75	74.00	-31.25
4538.31	37.00	Ave	126	1.8	H	-1.88	35.12	54.00	-18.88
5369.71	46.06	PK	14	2.0	H	-1.06	45.00	74.00	-29.00
5369.71	38.77	Ave	14	2.0	H	-1.06	37.71	54.00	-16.29
11650.00	42.24	PK	47	1.3	H	5.84	48.08	74.00	-25.92
11650.00	37.27	Ave	47	1.3	H	5.84	43.11	54.00	-10.89

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac VHT40 U-NII-3 Low Channel 5755MHz									
285.49	42.59	QP	37	1.4	H	-11.62	30.97	46.00	-15.03
285.49	36.94	QP	1	1.4	V	-11.62	25.32	46.00	-20.68
4520.37	36.28	PK	215	1.4	H	-1.92	34.36	74.00	-39.64
4520.37	24.39	Ave	215	1.4	H	-1.92	22.47	54.00	-31.53
5363.62	45.88	PK	213	1.1	H	-1.07	44.81	74.00	-29.19
5363.62	37.49	Ave	213	1.1	H	-1.07	36.42	54.00	-17.58
11510.00	39.48	PK	196	1.8	H	5.88	45.36	74.00	-28.64
11510.00	36.24	Ave	196	1.8	H	5.88	42.12	54.00	-11.88
802.11ac VHT40 U-NII-3 High channel 5795MHz									
285.49	41.92	QP	26	1.7	H	-11.62	30.30	46.00	-15.70
285.49	37.55	QP	271	1.7	V	-11.62	25.93	46.00	-20.07
4532.44	37.14	PK	177	1.5	H	-1.86	35.28	74.00	-38.72
4532.44	23.85	Ave	177	1.5	H	-1.86	21.99	54.00	-32.01
5384.12	45.80	PK	242	1.9	H	-1.03	44.77	74.00	-29.23
5384.12	39.56	Ave	242	1.9	H	-1.03	38.53	54.00	-15.47
11590.00	40.81	PK	133	1.4	H	5.63	46.44	74.00	-27.56
11590.00	38.13	Ave	133	1.4	H	5.63	43.76	54.00	-10.24

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac VHT80 U-NII-3 Middle channel 5775MHz									
285.49	42.05	QP	109	2.0	H	-11.62	30.43	46.00	-15.57
285.49	29.91	QP	123	1.6	V	-11.62	18.29	46.00	-27.71
4504.13	41.73	PK	197	1.3	H	-1.85	39.88	74.00	-34.12
4504.13	42.01	Ave	197	1.3	H	-1.85	40.16	54.00	-13.84
5375.49	45.87	PK	172	1.1	H	-1.14	44.73	74.00	-29.27
5375.49	39.19	Ave	172	1.1	H	-1.14	38.05	54.00	-15.95
11550.00	42.51	PK	26	1.5	H	4.83	47.34	74.00	-26.66
11550.00	37.96	Ave	26	1.5	H	4.83	42.79	54.00	-11.21

Test Frequency: 18GHz~40GHz

The measurements were more than 20 dB below the limit and not reported.

11 Band Edge

Test Requirement:	FCC CFR47 Part 15 Section 15.407 KDB 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013
Test Method:	ANSI C63.10 2013
Test Limit:	For transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.

All emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.; or

All emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.

Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of -27 dBm/MHz e.i.r.p. at 5850 MHz instead of 5725 MHz.

Devices operating in the band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

- a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;
- b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
- c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
- d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

Test Result: PASS

11.1 Test Produce

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 to 1000 kHz and VBW of spectrum analyzer to 3000 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
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.

11.2 Test Result

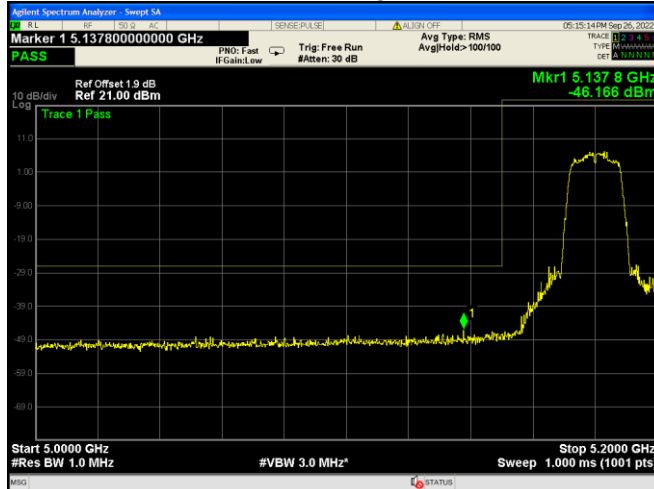
Note: Both Ant. 1 and Ant. 2 have been tested separately, and the report only shows the worst case.

Test plots shown as follows:

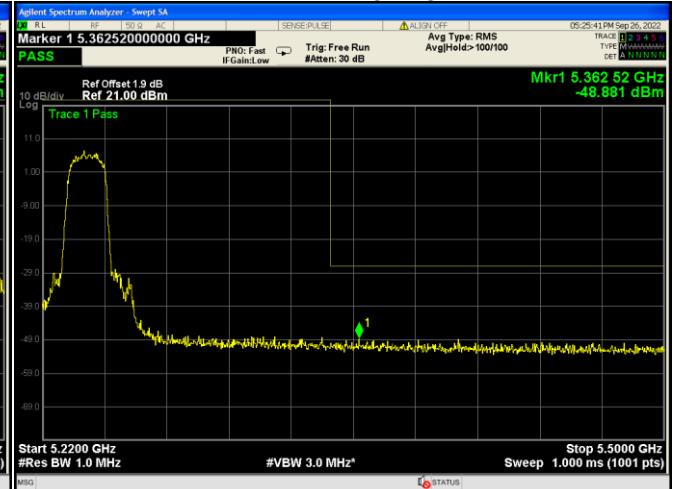
Ant. 1

U-NII-1

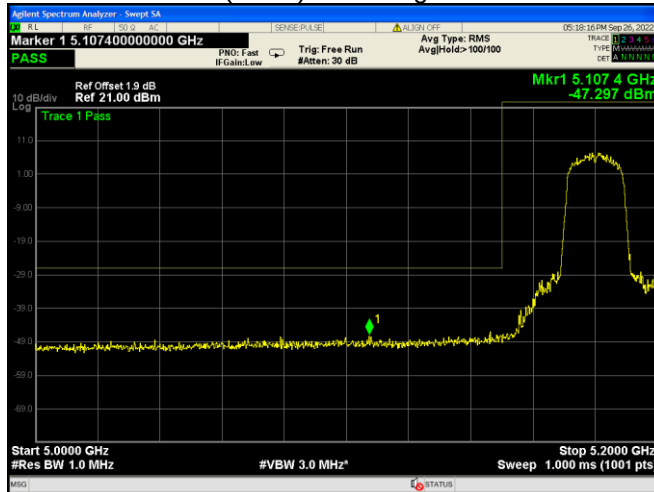
802.11a Band edge-left side



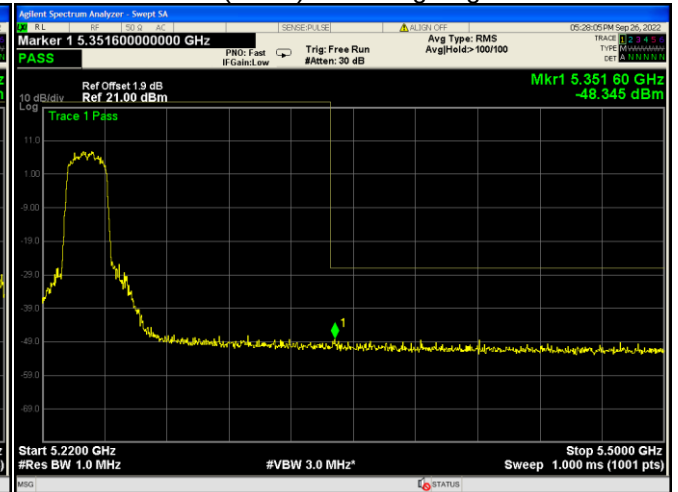
802.11a Band edge-right side



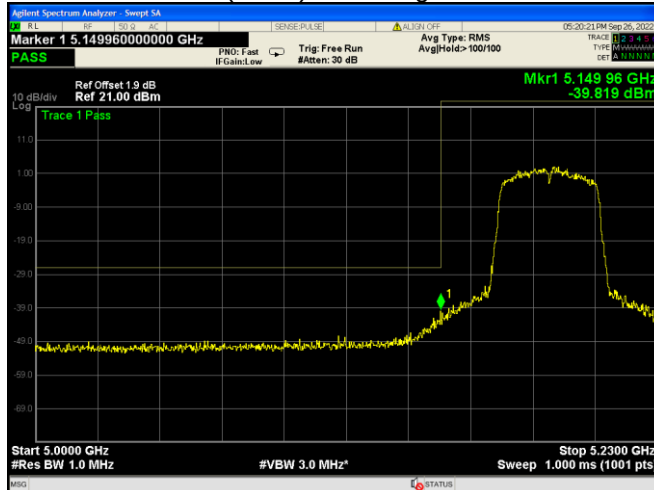
802.11n(HT20) Band edge-left side



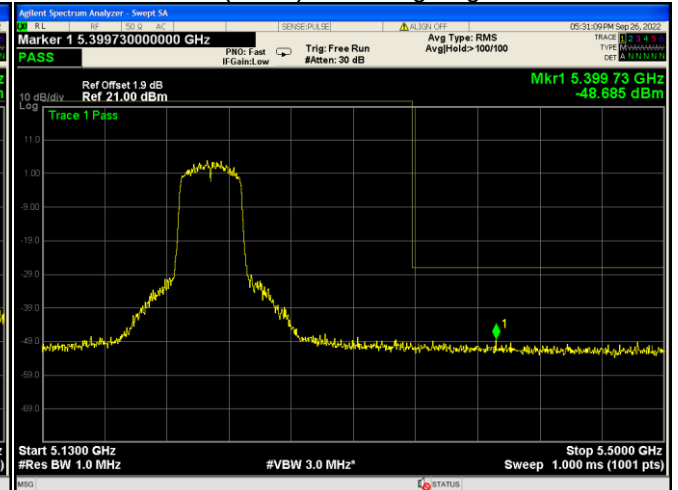
802.11n(HT20) Band edge-right side



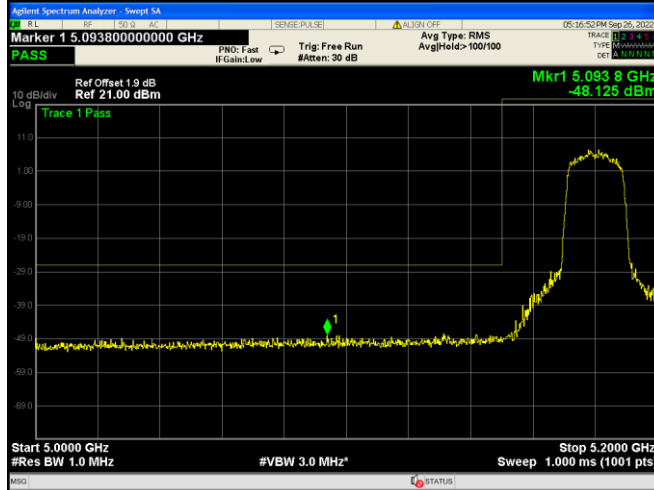
802.11n(HT40) Band edge-left side



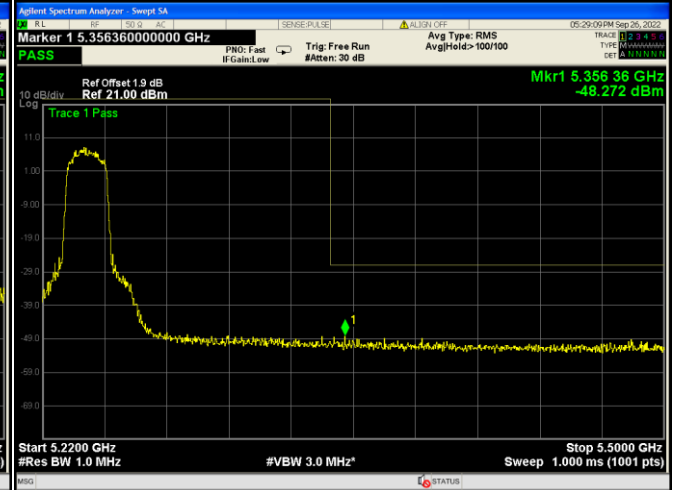
802.11n(HT40) Band edge-right side



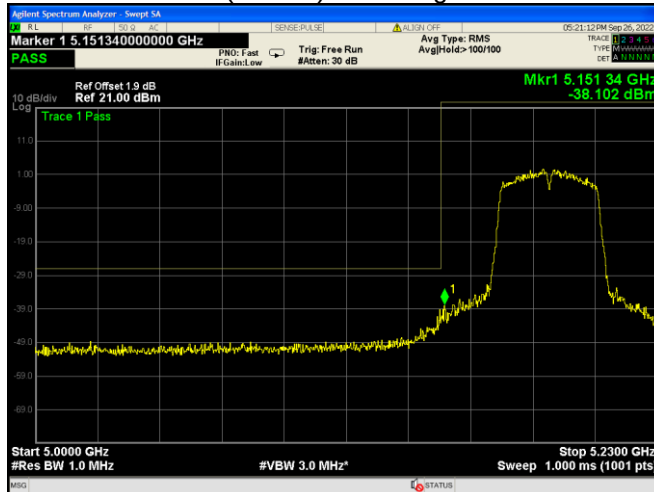
802.11ac (VHT20) Band edge-left side



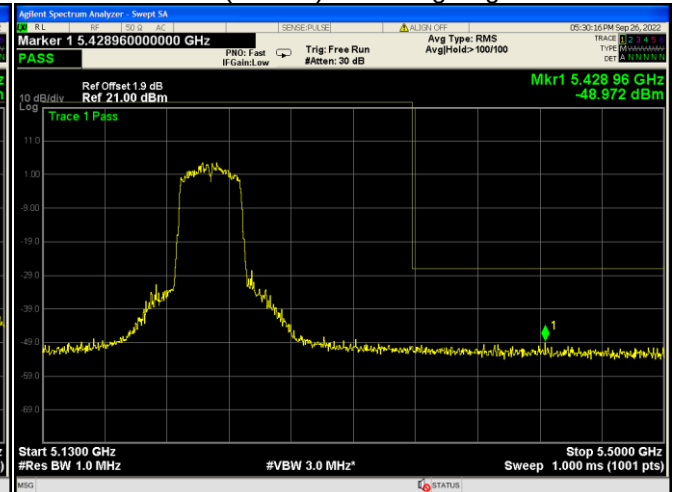
802.11ac (VHT20) Band edge-right side



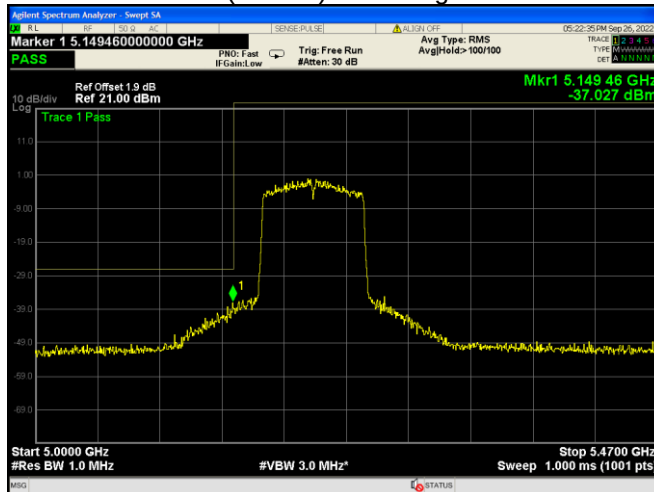
802.11ac (VHT40) Band edge-left side



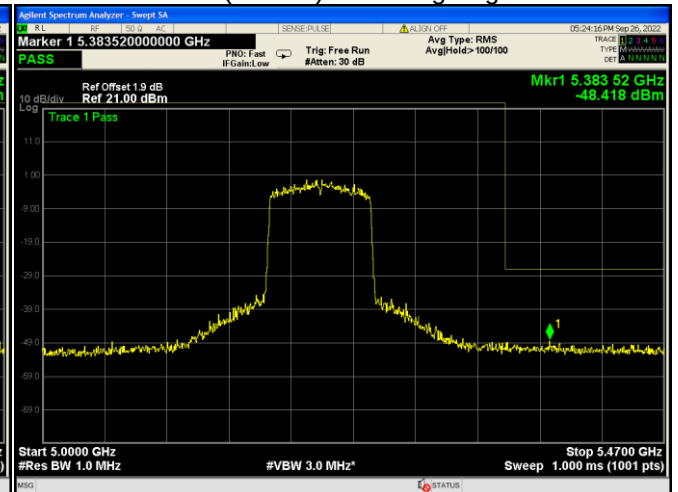
802.11ac (VHT40) Band edge-right side



802.11ac (VHT80) Band edge-left side

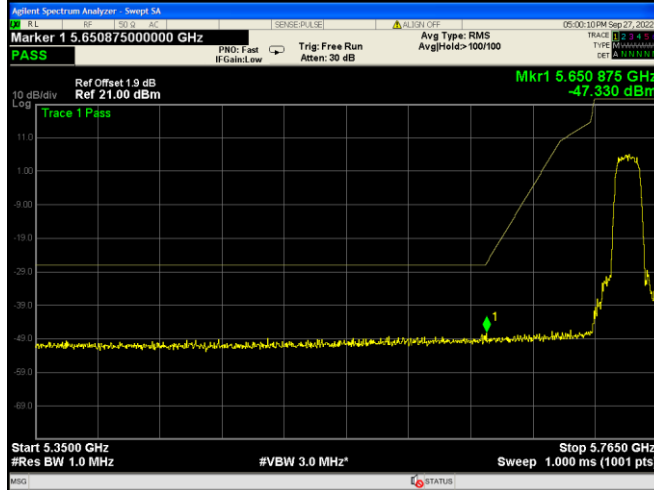


802.11ac (VHT80) Band edge-right side

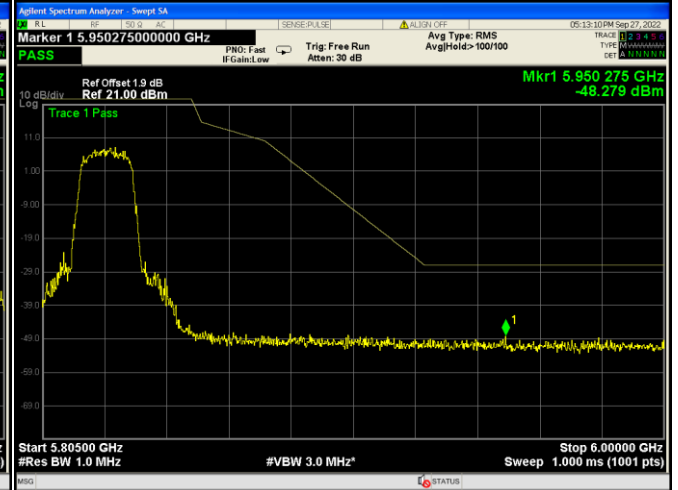


U-NII-3

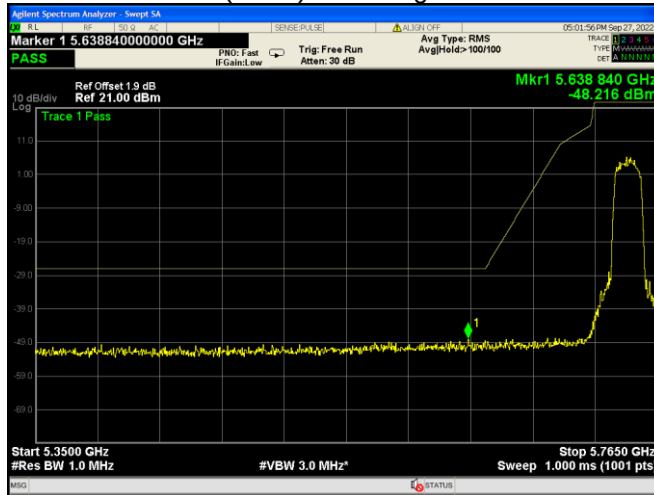
802.11a Band edge-left side



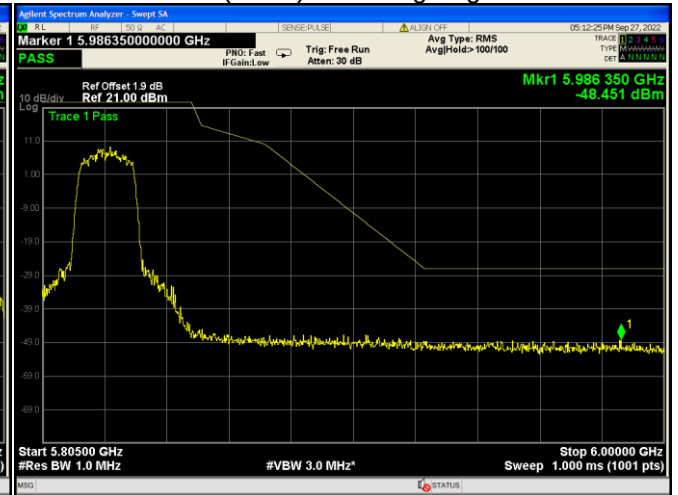
802.11a Band edge-right side



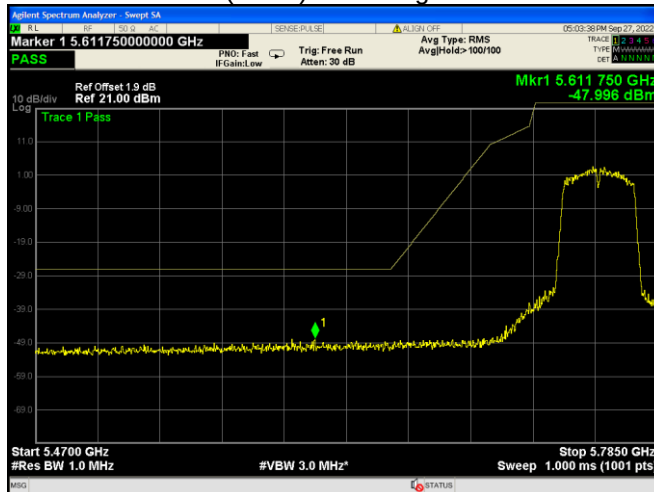
802.11n(HT20) Band edge-left side



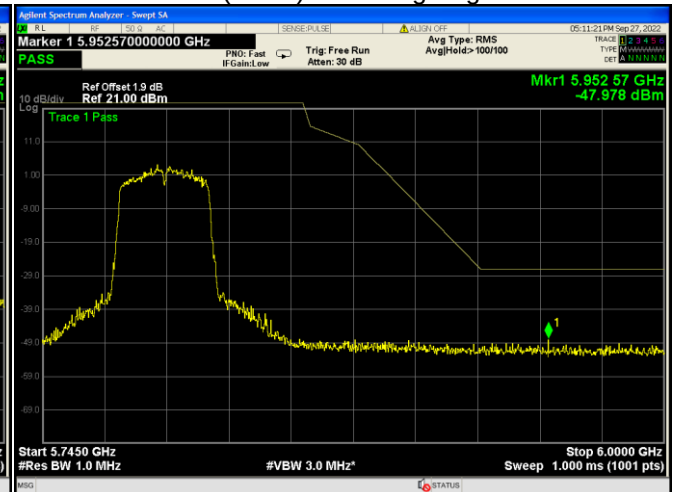
802.11n(HT20) Band edge-right side



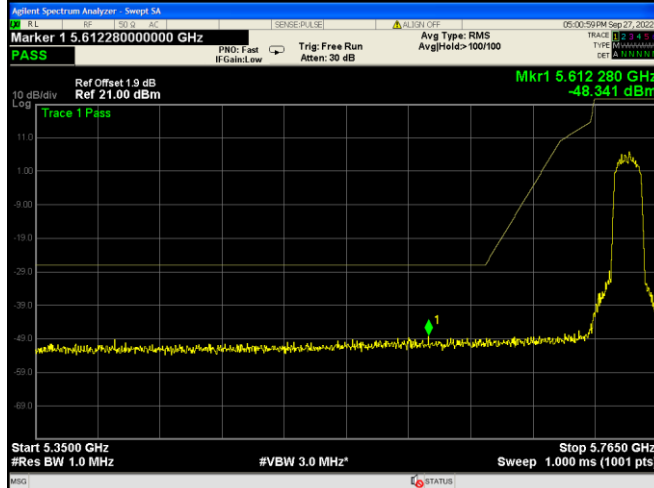
802.11n(HT40) Band edge-left side



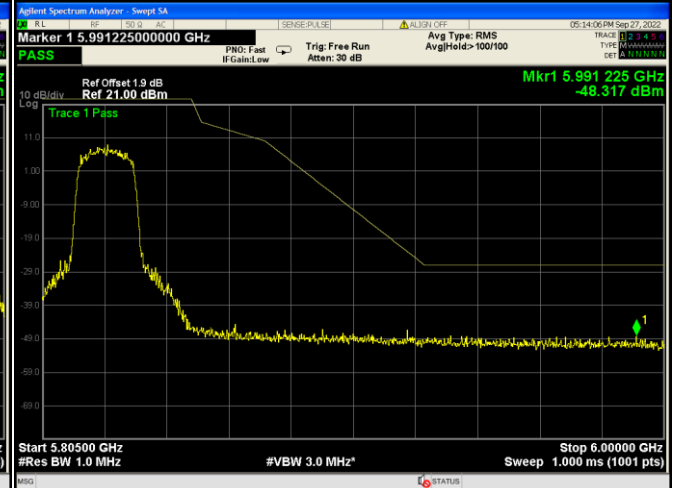
802.11n(HT40) Band edge-right side



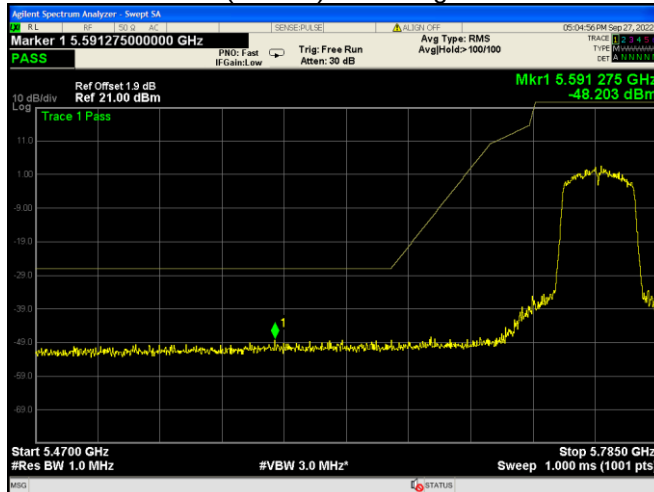
802.11ac (VHT20) Band edge-left side



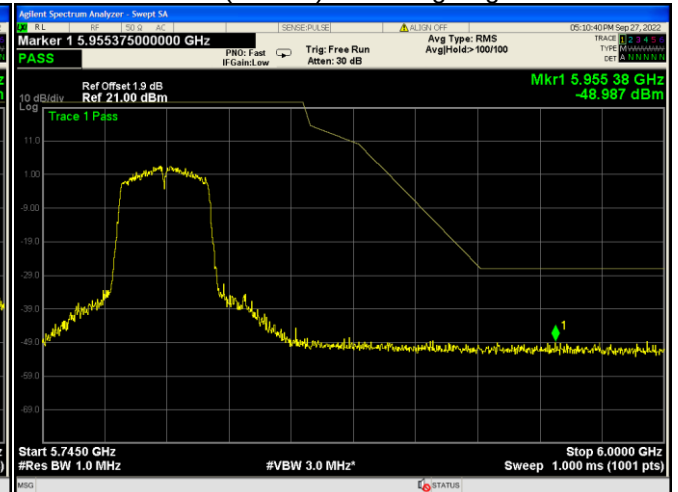
802.11ac (VHT20) Band edge-right side



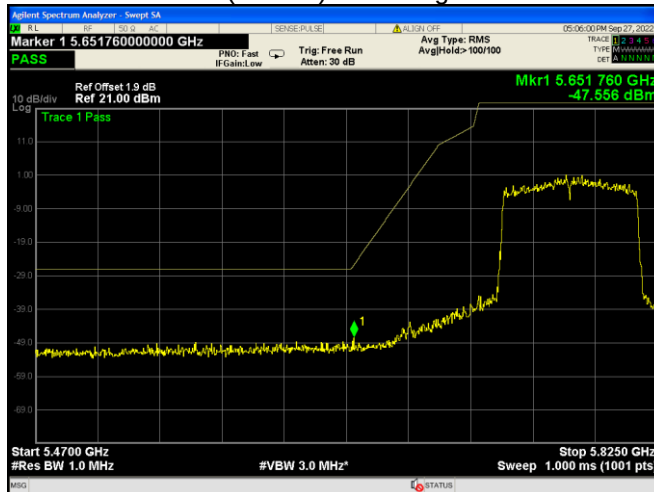
802.11ac (VHT40) Band edge-left side



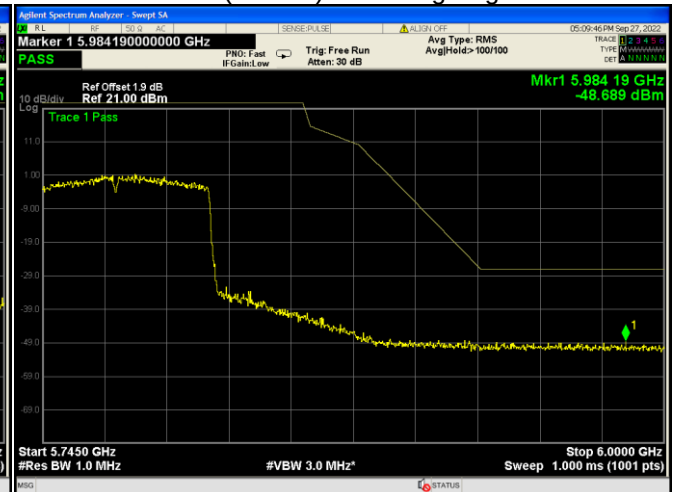
802.11ac (VHT40) Band edge-right side



802.11ac (VHT80) Band edge-left side



802.11ac (VHT80) Band edge-right side



12 6 dB Bandwidth

Test Requirement:	FCC CFR47 Part 15 Section 15.407(e) KDB 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013
Test Method:	KDB789033 D02 General U-NII Test Procedures New Rules v02r01 Section C
Test Limit:	≥ 500 kHz
Test Result:	PASS

12.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. The following procedure shall be used for measuring this bandwidth:
 - a) Set RBW = 100 kHz.
 - b) Set the video bandwidth (VBW) ≥ 3 times 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.

12.2 Test Result:

Ant. 1

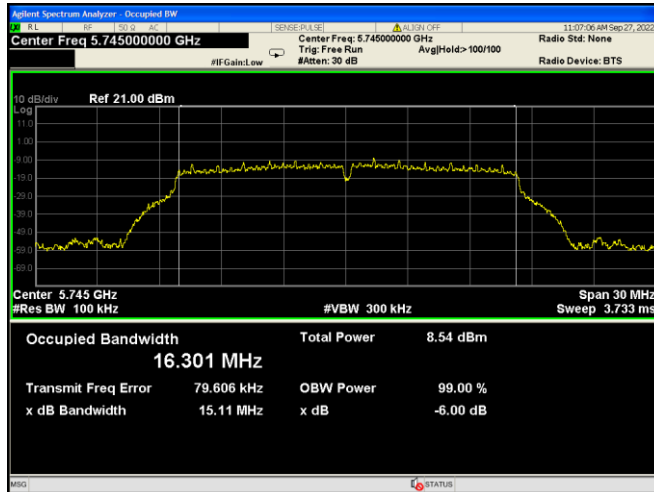
Band	Operation mode	6 dB Bandwidth (MHz)		
		Low	Middle	High
U-NII-3	802.11a	15.11	15.69	16.05
	802.11n(HT20)	15.70	15.65	15.95
	802.11n(HT40)	35.09	/	35.07
	802.11ac (VHT20)	15.68	15.65	15.13
	802.11ac (VHT40)	35.10	/	35.06
	802.11ac (VHT80)	/	75.70	/

Note: Both Ant. 1 and Ant. 2 have been tested separately, and the report only shows the worst case.

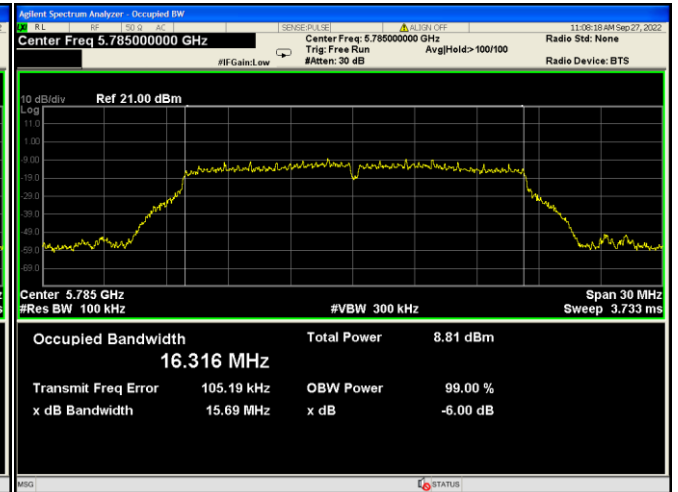
Test plots refer to next page:

Test result plot:

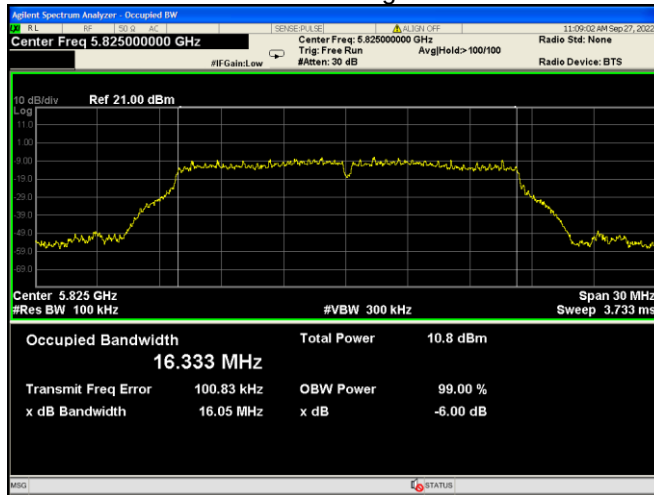
802.11a U-NII-3 Low channel



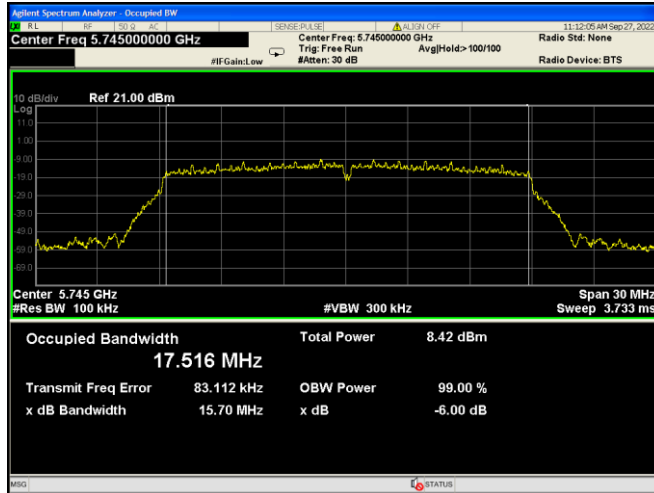
802.11a U-NII-3 Middle channel



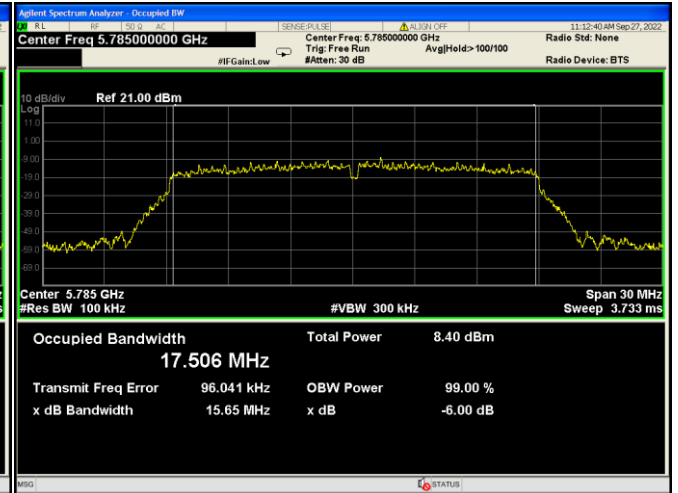
802.11a U-NII-3 High channel



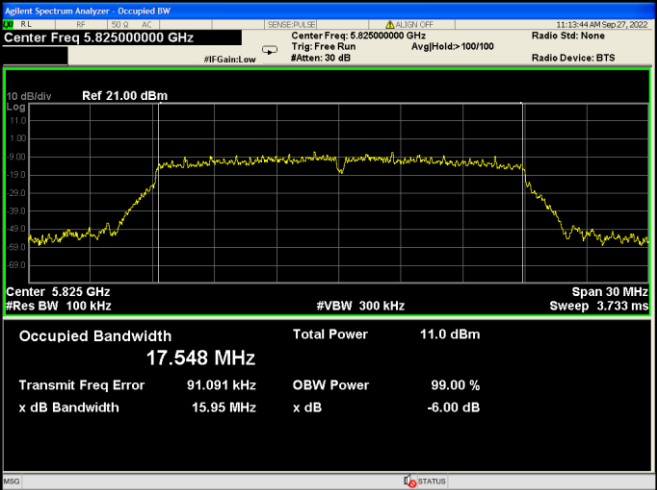
802.11n HT20 U-NII-3 Low channel



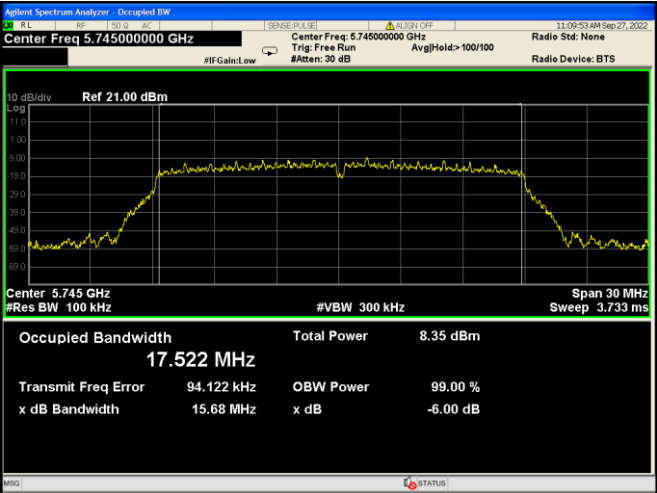
802.11n HT20 U-NII-3 Middle channel



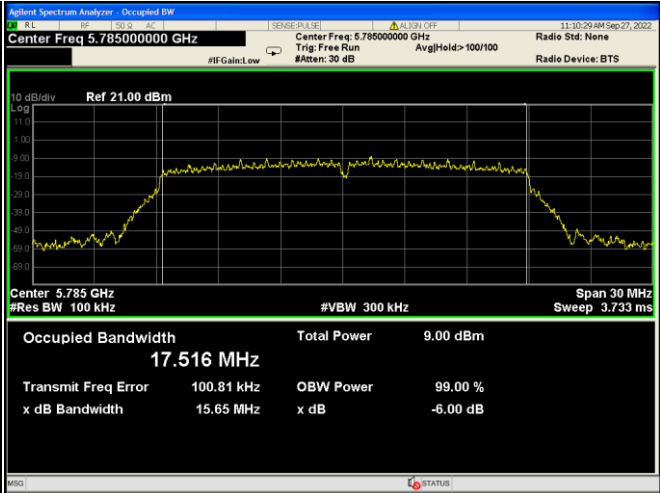
802.11n HT20 U-NII-3 High channel



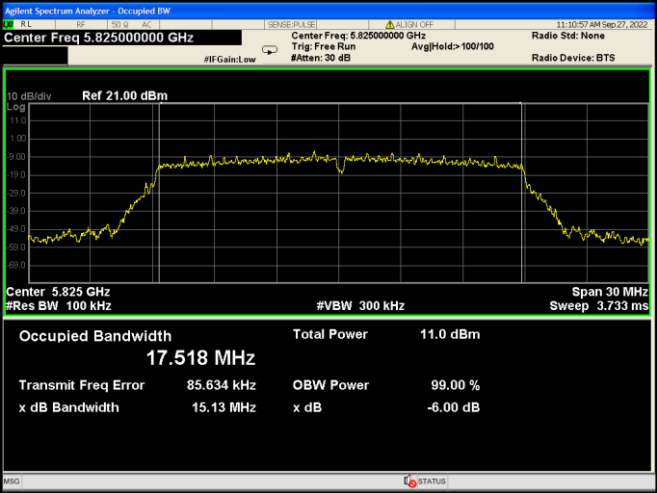
802.11ac VHT20 U-NII-3 Low channel



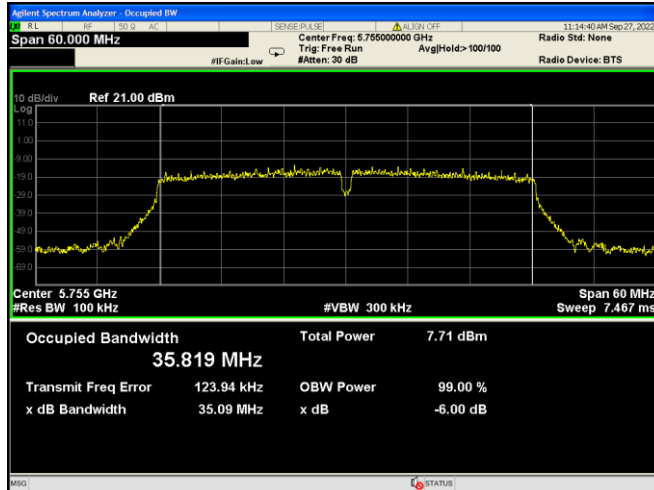
802.11ac VHT20 U-NII-3 Middle channel



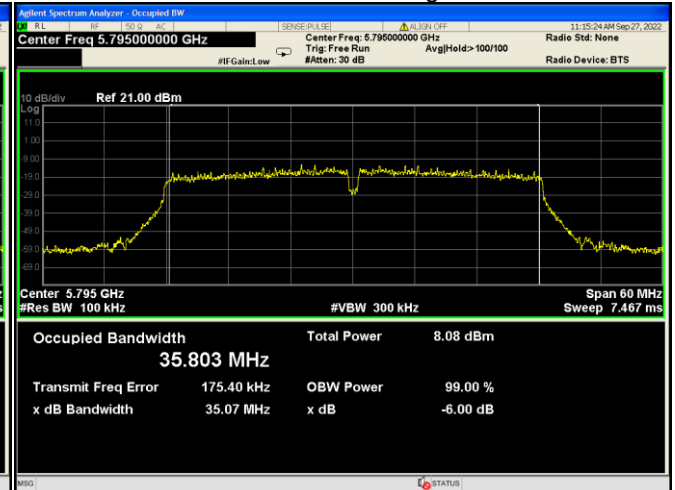
802.11ac VHT20 U-NII-3 High channel



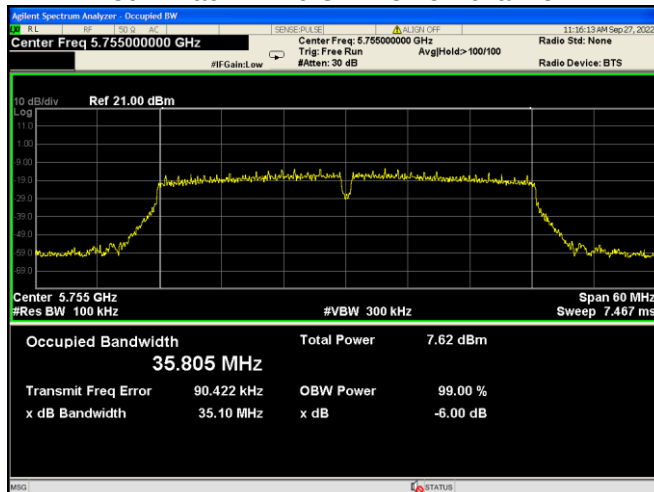
802.11n HT40 U-NII-3 Low channel



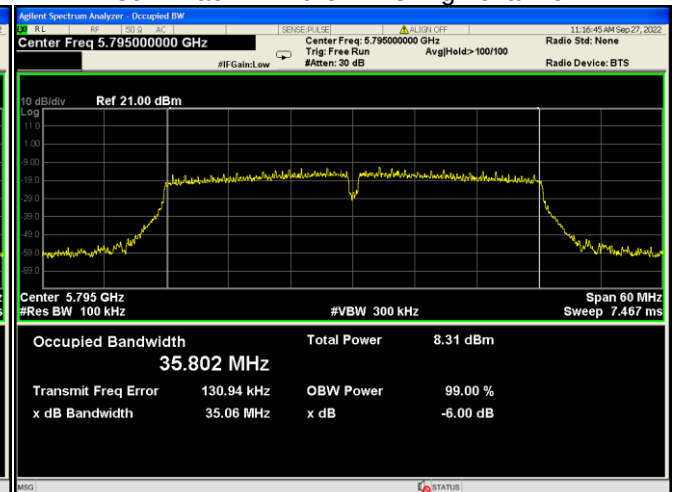
802.11n HT40 U-NII-3 High channel



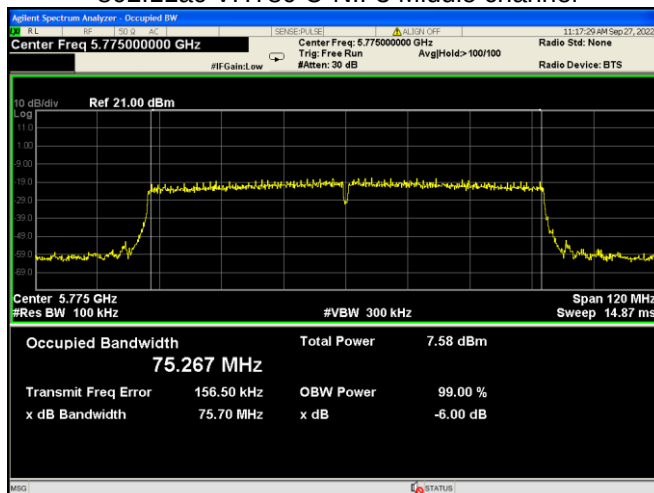
802.11ac VHT40 U-NII-3 Low channel



802.11ac VHT40 U-NII-3 High channel



802.11ac VHT80 U-NII-3 Middle channel



13 Emission Bandwidth (EBW) and 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.407 (a) KDB 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section C&D
Test Limit:	No restriction limits
Test Result:	PASS

13.1 Test Procedure:

Emission Bandwidth (EBW)

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the 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%.

99% Occupied Bandwidth

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

- Set center frequency to the nominal EUT channel center frequency.
- Set span = 1.5 times to 5.0 times the OBW.
- Set RBW = 1% to 5% of the OBW
- Set VBW $\geq$ 3 times RBW
- 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.
- Use the 99% power bandwidth function of the instrument (if available).
- 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.

Note: For devices that use channel aggregation refer to III.A and III.C for determining 99% bandwidth.

13.2 Test Result:**Ant. 1**

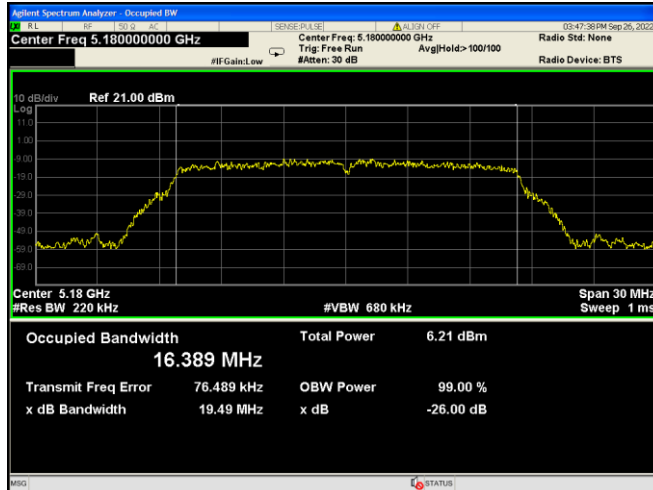
Band	Operation mode	26 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High
U-NII-1	802.11a	19.49	19.71	19.73	16.389	16.409	16.407
	802.11n(HT20)	19.65	20.08	19.78	17.552	17.577	17.575
	802.11n(HT40)	39.59	/	39.53	35.936	/	35.948
	802.11ac (VHT20)	19.53	19.90	19.86	17.608	17.534	17.551
	802.11ac (VHT40)	40.24	/	39.57	35.934	/	35.985
	802.11ac (VHT80)	/	80.61	/	/	75.413	/
U-NII-3	802.11a	19.58	19.46	19.57	16.373	16.367	16.338
	802.11n(HT20)	20.01	20.09	19.85	17.534	17.559	17.518
	802.11n(HT40)	39.83	/	39.15	35.964	/	36.001
	802.11ac (VHT20)	19.70	19.90	20.15	17.543	17.547	17.541
	802.11ac (VHT40)	39.71	/	39.57	35.970	/	35.911
	802.11ac (VHT80)	/	79.29	/	/	75.346	/

Note: Both Ant. 1 and Ant. 2 have been tested separately, and the report only shows the worst case.

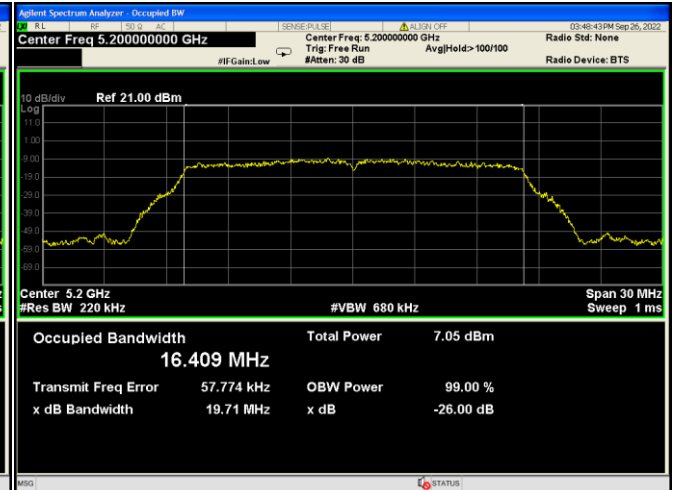
Test plots refer to next page:

U-NII-1

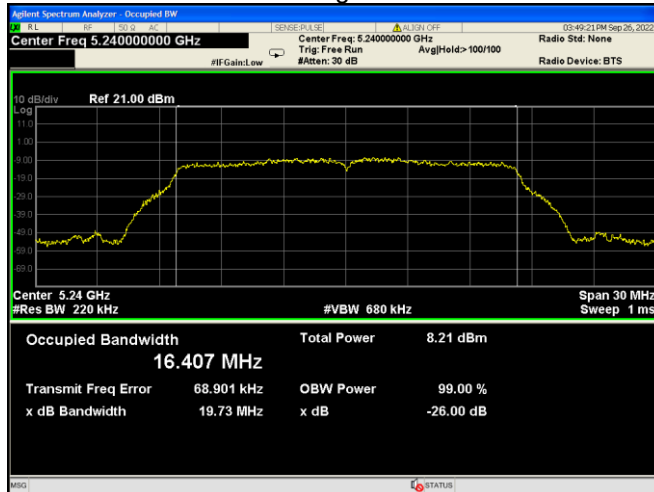
802.11a Low channel



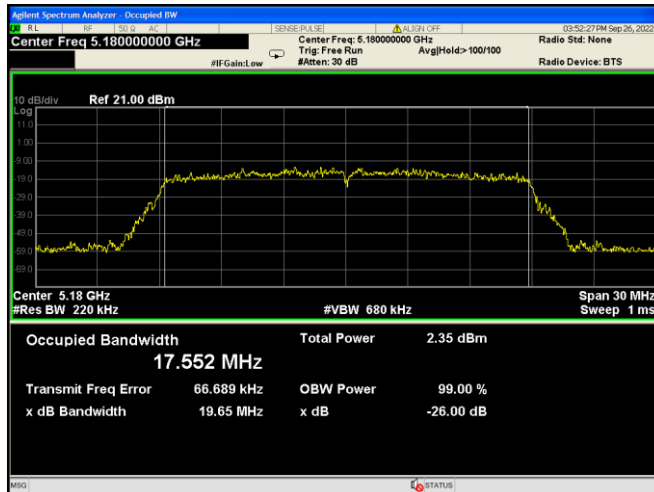
802.11a Middle channel



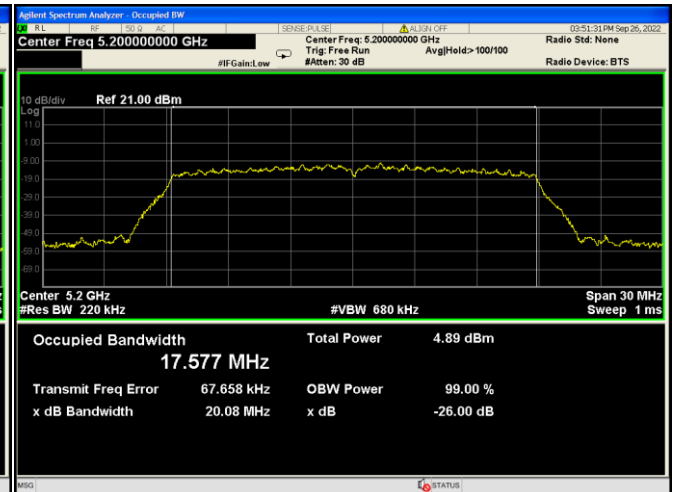
802.11a High channel



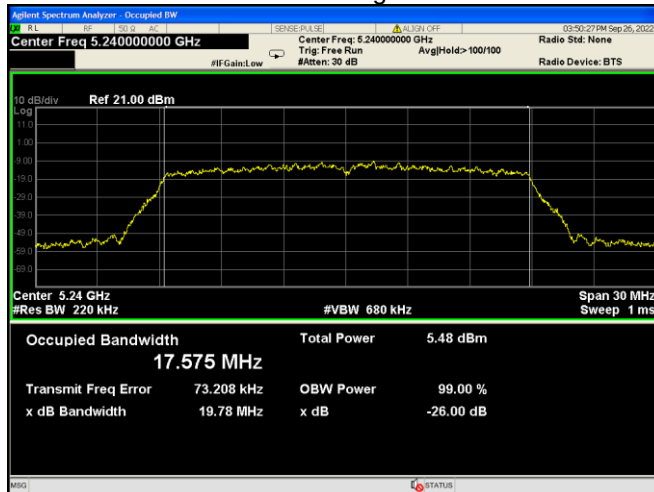
802.11n HT20 Low channel



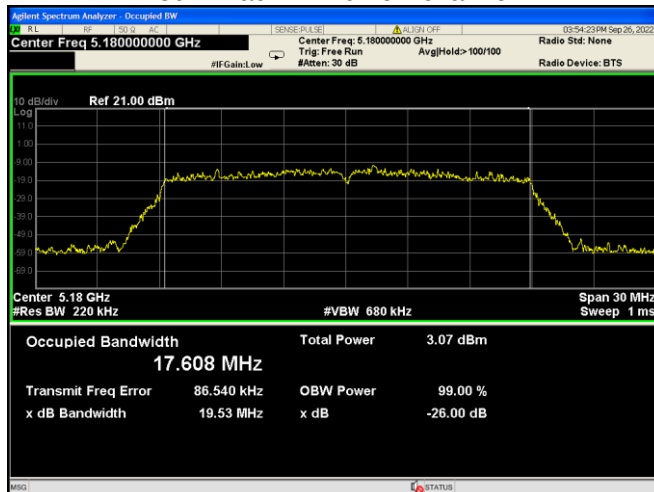
802.11n HT20 Middle channel



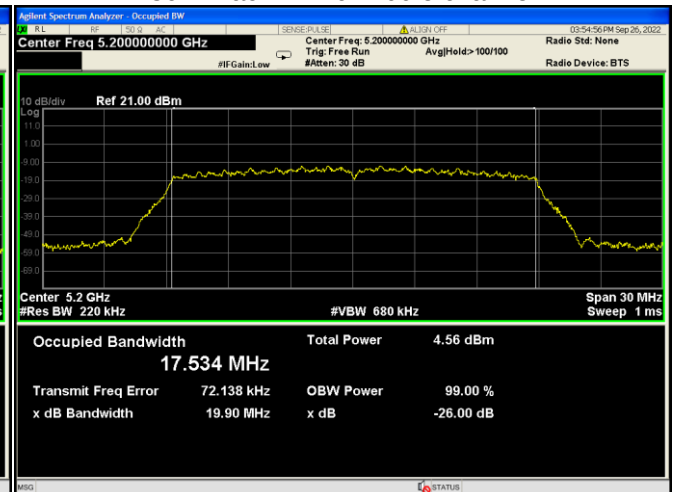
802.11n HT20 High channel



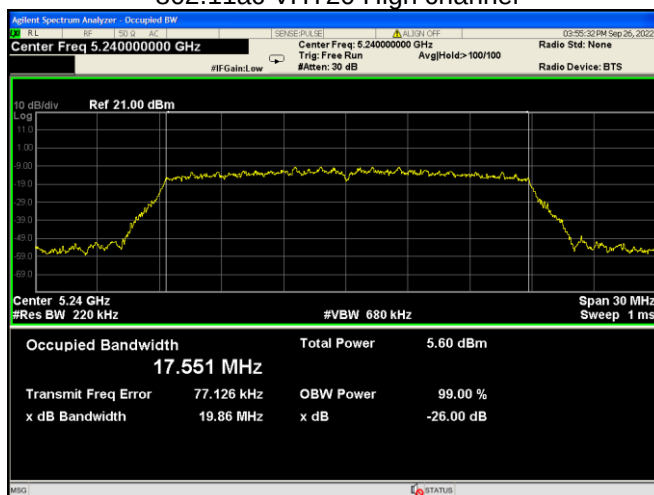
802.11ac VHT20 Low channel



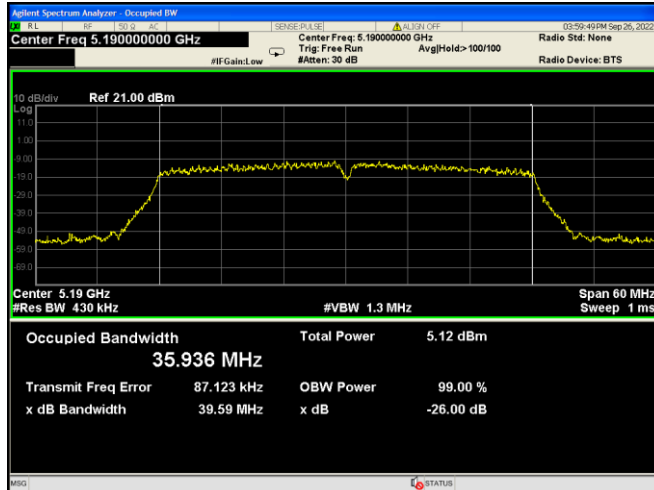
802.11ac VHT20 Middle channel



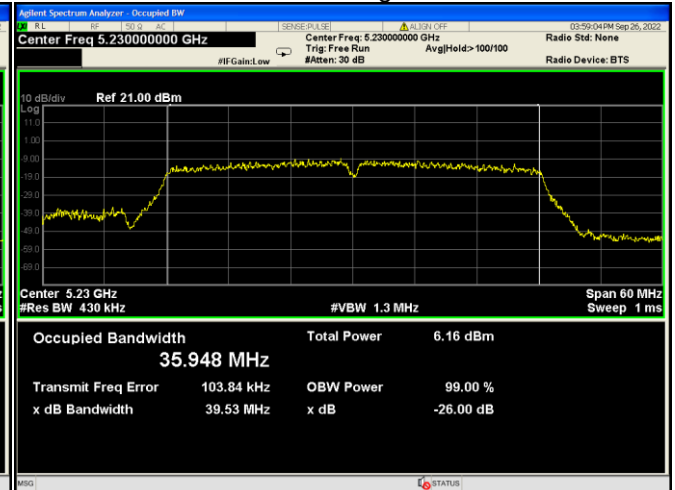
802.11ac VHT20 High channel



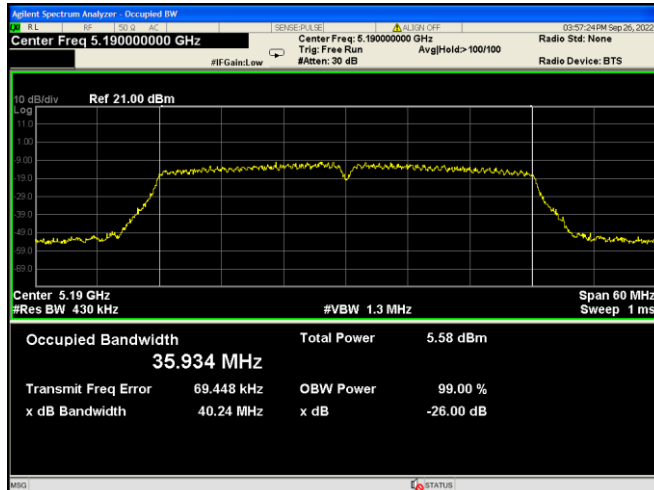
802.11n HT40 Low channel



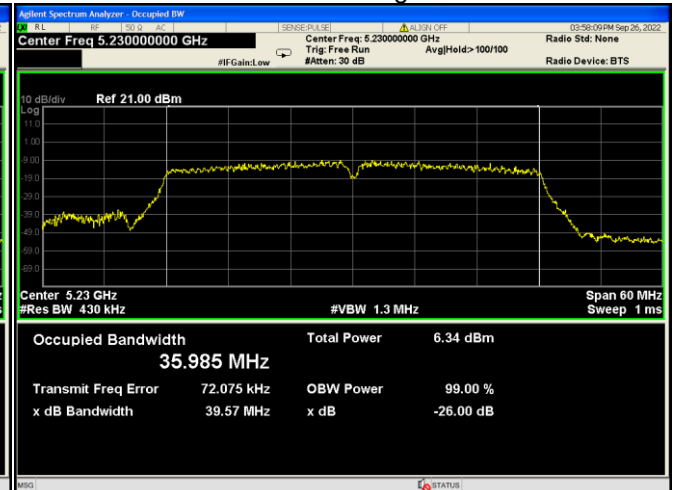
802.11n HT40 High channel



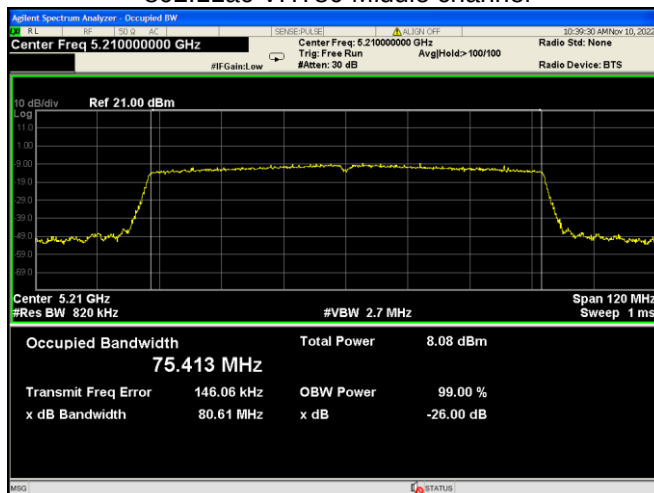
802.11ac VHT40 Low channel



802.11ac VHT40 High channel

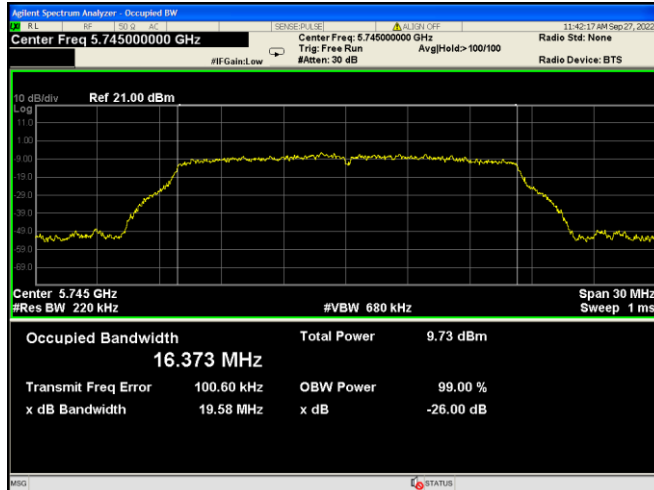


802.11ac VHT80 Middle channel

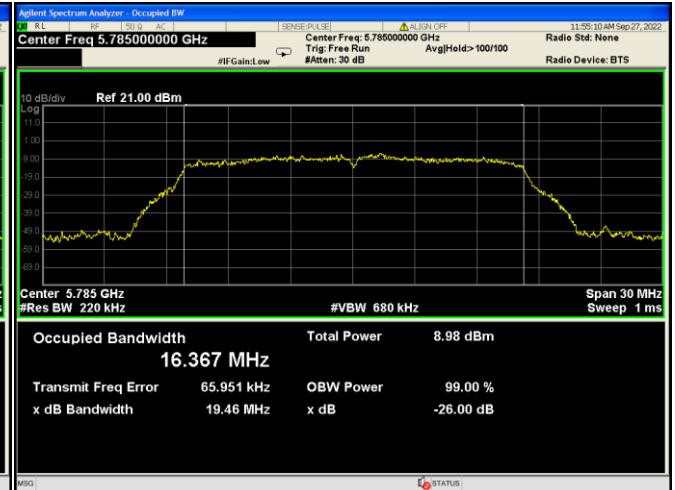


U-NII-3

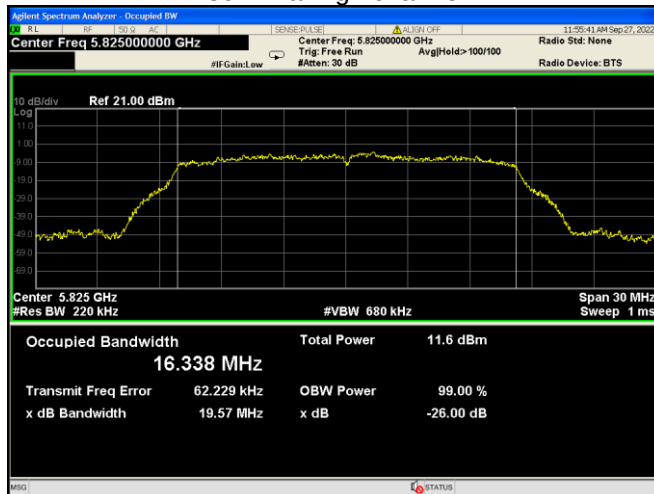
802.11a Low channel



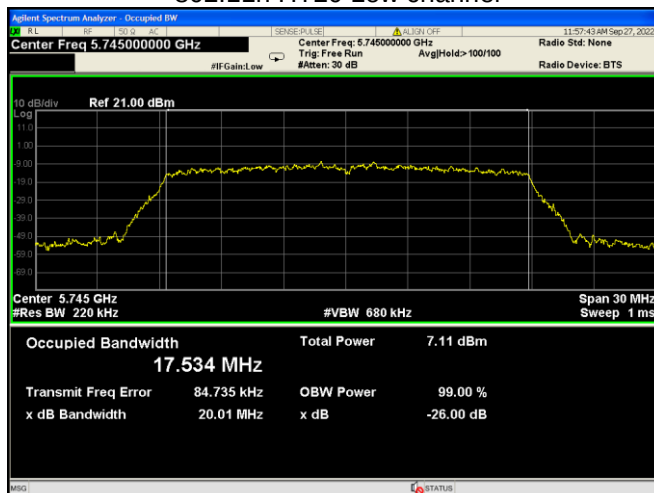
802.11a Middle channel



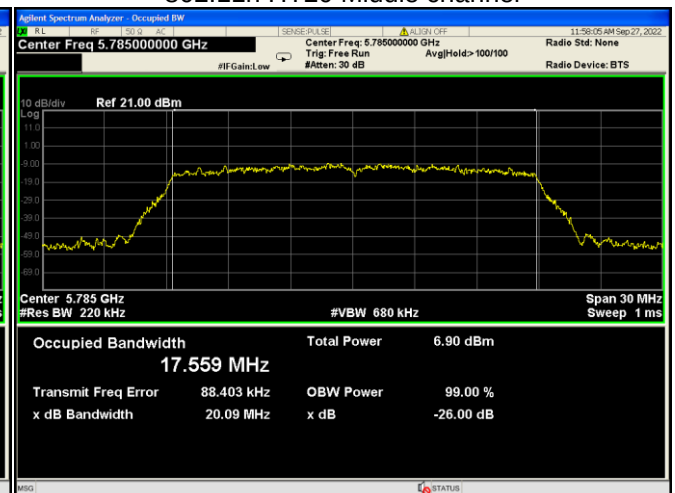
802.11a High channel



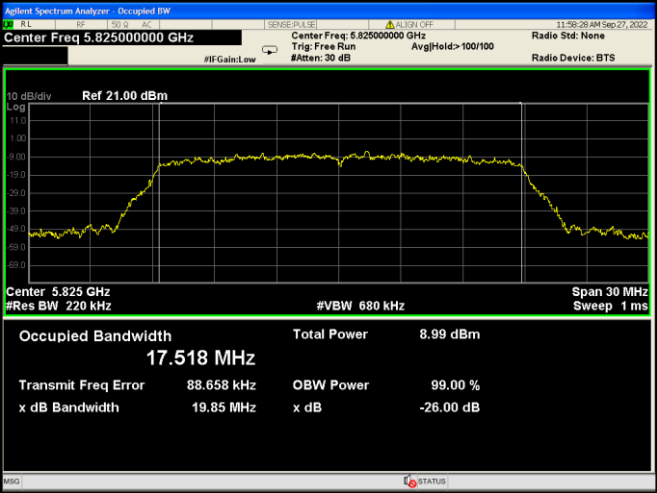
802.11n HT20 Low channel



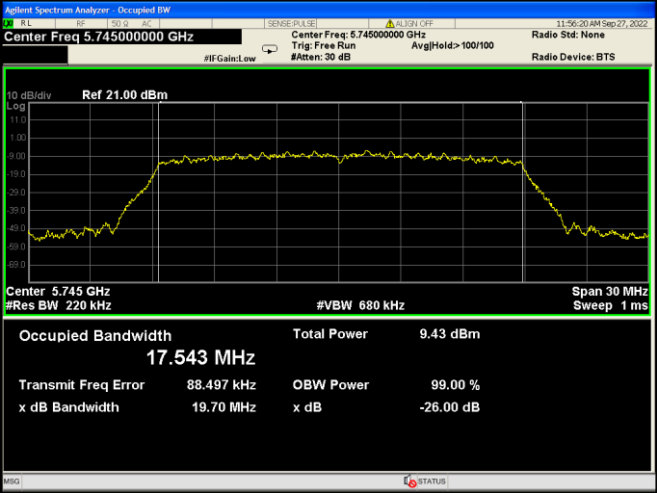
802.11n HT20 Middle channel



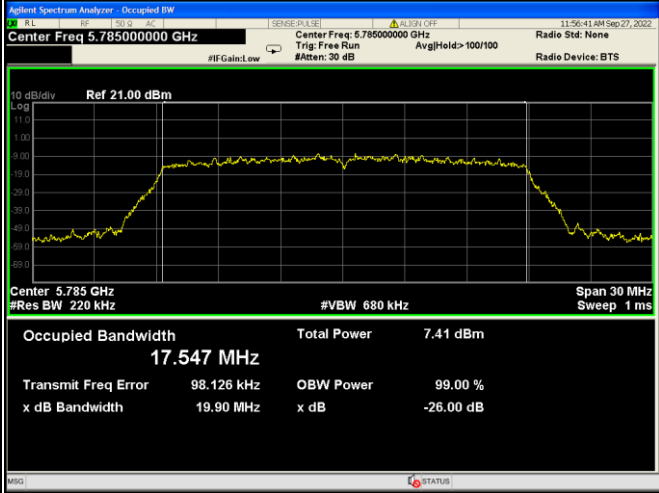
802.11n HT20 High channel



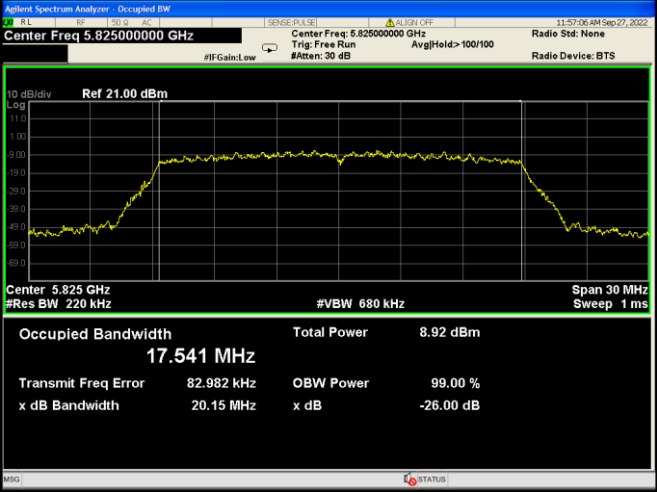
802.11ac VHT20 Low channel



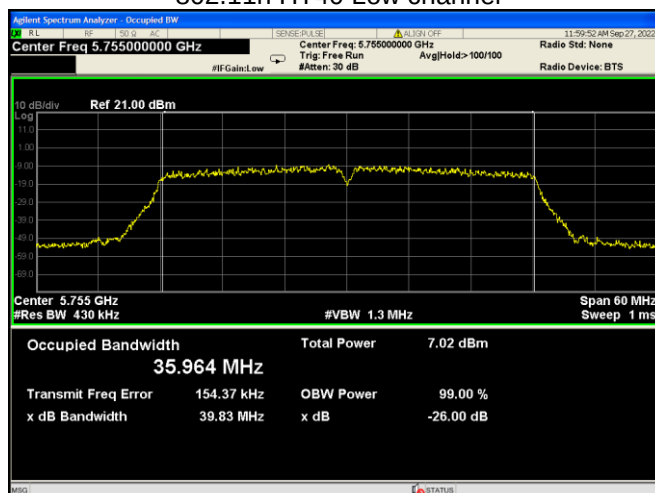
802.11ac VHT20 Middle channel



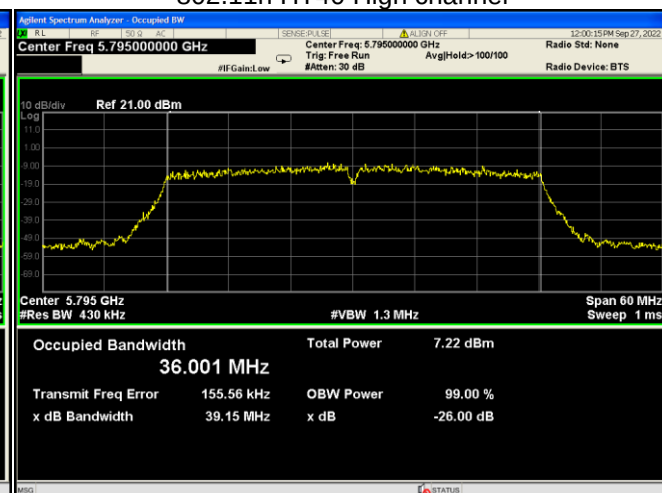
802.11ac VHT20 High channel



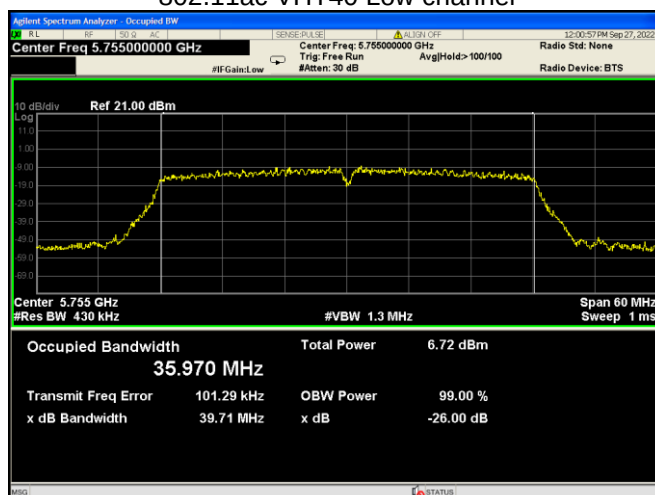
802.11n HT40 Low channel



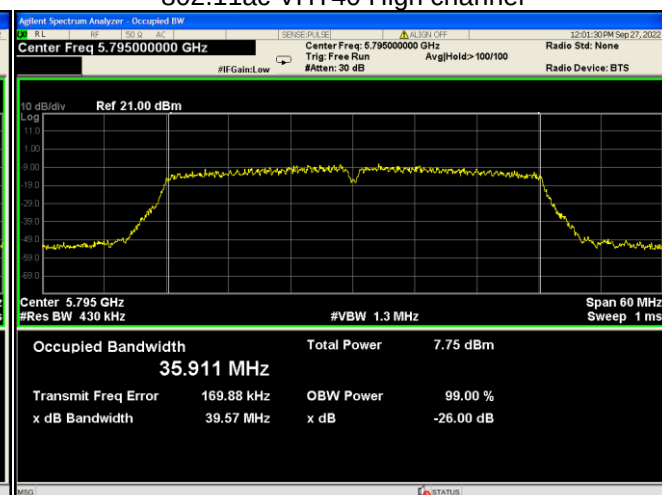
802.11n HT40 High channel



802.11ac VHT40 Low channel



802.11ac VHT40 High channel



802.11ac VHT80 Middle channel

