TEST REPORT

Reference No.	:	WTF22D04070741W002 V1
FCC ID	:	2A6J9C100-0200
Applicant	:	Bkav Corporation
Address	:	2nd Floor, HH1 Building, Yen Hoa Ward, Cau Giay District, Ha Noi, 100000 Vietnam
Manufacturer	:	Bkav Corporation
Address	:	2nd Floor, HH1 Building, Yen Hoa Ward, Cau Giay District, Ha Noi, 100000 Vietnam
Brand Name	:	N/A
Product	:	IP Camera
Model(s)	:	C100-0200
Standards	:	FCC CFR47 Part 15 E Section 15.407
Date of Receipt sample	:	2022-04-15
Date of Test	:	2022-04-15 to 2022-08-02
Date of Issue	:	2022-08-05
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:
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Compiled by: Approved by:

Estel Qian / Project Engineer

Deval Qin / Designated Reviewer

2 Contents

3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTF22D04070741 W002	2022-04-15	2022-04-15 to 2022-08-02	2022-08-03	Original	-	Replaced
WTF22D04070741 W002 V1	2022-04-15	2022-04-15 to 2022-08-04	2022-08-05	Version 1	Updated	Valid

4 General Information

4.1 General Description of E.U.T.

Product:	IP Camera
Model(s):	C100-0200
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40 5G-802.11a/n HT20/n HT40
Hardware Version:	V2.1.1
Software Version:	1.2.3.6

4.2 Details of E.U.T.

Operation Frequency:	U-NII-1 802.11a/n(HT20), 5180-5240MHz 4CH 802.11n(HT40), 5190-5230MHz 2CH U-NII-3 802.11a/n(HT20), 5745-5825MHz 5CH 802.11n(HT40), 5755-5795MHz 2CH
Max. RF output power:	U-NII-1: 19.37dBm EIRP U-NII-3: 18.70dBm EIRP
Type of Modulation:	802.11a: OFDM(BPSK, QPSK, 16QAM, 64QAM) 802.11n: OFDM(BPSK, QPSK, 16QAM, 64QAM)
Antenna installation:	External antenna with RP-SMA connector
Antenna Gain:	3.0dBi
Ratings:	DC 12V from adapter
Adapter:	Manufacturer XING YUAN ELECTRONICS CO., LTD Model No.: XY12J-1201000Q-UW Input: 100-240VAC, 0.5A Max 50/60Hz Output: 12V ⎓ 1.0A

4.3 Channel List

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

U-NII-3 (5.725-5.85GHz)			
channel	**Frequency(MHz)**	**channel**	**Frequency(MHz)**
149	5745	151	5755
153	5765	159	5795
157	5785	-	-
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):

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)

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

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

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.
Transmitting duty cycle is no less 98%.
The software is installed in operation system, named “QRCT4.exe” Version 4

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

6 Equipment Used during Test

6.1 Equipments List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date	Valid
Conducted Emissions 1#						
1	EMI Test Receiver	R&S	ESCI	100947	2021-07-26 2022-07-22	1Year
2	LISN	R&S	ENV216	100115	2021-07-26 2022-07-22	1Year
3	Cable	Top	TYPE16(3.5M)	-	2021-07-26 2022-07-22	1Year
4	Test software	EZ-EMC	RA-03A1-1	-	N/A	N/A
3m Semi-anechoic Chamber for Radiation Emissions (SAEMC)						
1	Spectrum Analyzer	R&S	FSP30	100091	2021-04-27 2022-04-26	1Year
2	Amplifier	Agilent	8447D	2944A10178	2021-07-26 2022-07-22	1Year
3	Tri-log Broadband Antenna	SCHWARZBECK	VULB9163	336	2021-08-23	1Year
4	Coaxial Cable	Top	TYPE16(13M)	-	2021-04-27 2022-04-26	1Year
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120D	667	2021-05-10 2022-04-30	1Year
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2021-07-30 2022-07-22	1Year
7	Broadband Preamplifier	COMPLIANCE	PAP-1G18	2004	2021-07-26 2022-07-22	1Year
8	Coaxial Cable	Top	ZT26-NJ-NJ-8M/FA	-	2021-04-27 2022-04-26	1Year
9	Microwave Amplifier	SCHWARZBECK	BBV 9721	100472	2021-07-26 2022-07-22	1Year
10	Coaxial Cable	Top	ZT40-2.92J-2.92J-2.0M	17100919	2021-04-27 2022-04-26	1Year
11	Test software	EZ-EMC	RA-03A1-1	-	N/A	N/A
3m Semi-anechoic Chamber for Radiation Emissions (TDK)						
1	Test Receiver	R&S	ESCI	101296	2021-04-27 2022-04-26	1Year
2	Tri-log Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2021-10-30	1Year
3	Active Loop Antenna	Com-Power	AL-130R	10160007	2021-04-30 2022-04-29	1Year
4	Amplifier	ANRITSU	MH648A	M43381	2021-04-27 2022-04-26	1Year
5	Cable	HUBER+SUHNER	CBL2	525178	2021-04-27 2022-04-26	1Year
6	Test software	EZ-EMC	RA-03A1-1	-	N/A	N/A
RF Conducting						
1	Spectrum Analyzer	R&S	FSP40	100501	2021-07-26 2022-07-22	1Year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2021-07-26 2022-07-22	1Year

6.2 Description of Support Units

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

6.3 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 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)	PASS
Radiated Emissions	15.407(a) 15.205(a) 15.209(a)	PASS
Duty Cycle	KDB 789033	--
6dB Bandwidth	15.407(a)	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)	PASS
Unwanted Emissions that fall Outside of the Restricted Bands	15.407(a)	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 Conducted Emission

Test Requirement: 47CFR FCC Part15 Subpart C §15.207

Test Method: ANSI C63.10:2013

Test Result: PASS

Frequency Range: 150kHz to 30MHz

Limit:

Frequency (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5.0	56	46
5.0 to 30	60	50
* decreases with the logarithm of the frequency.		

8.1 E.U.T. Operation

Operating Environment:

Temperature: 21.4 °C

Humidity: 50.7 % RH

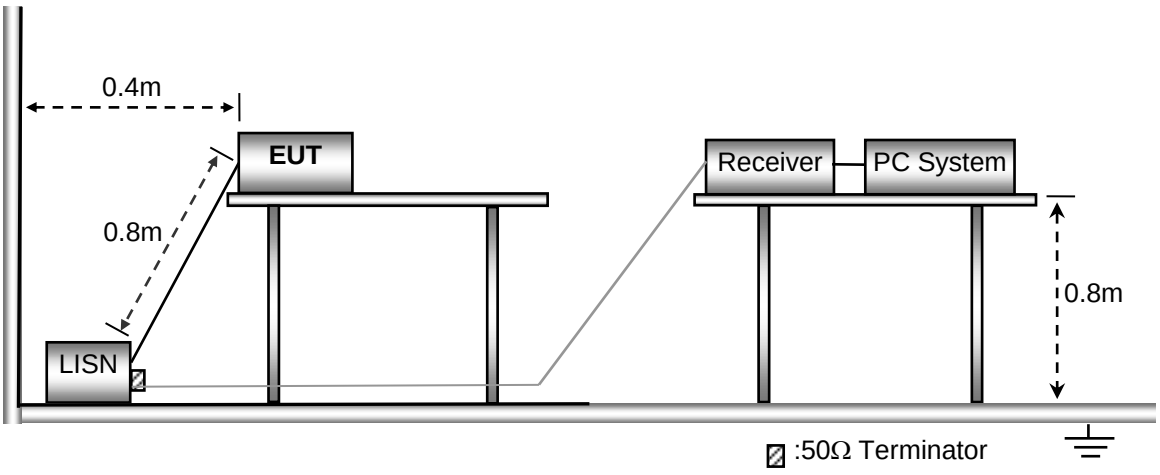
Atmospheric Pressure: 101.6kPa

Test Voltage: AC 120V, 60Hz

EUT Operation: Please refer to section 5.

8.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.



8.3 Measurement Description

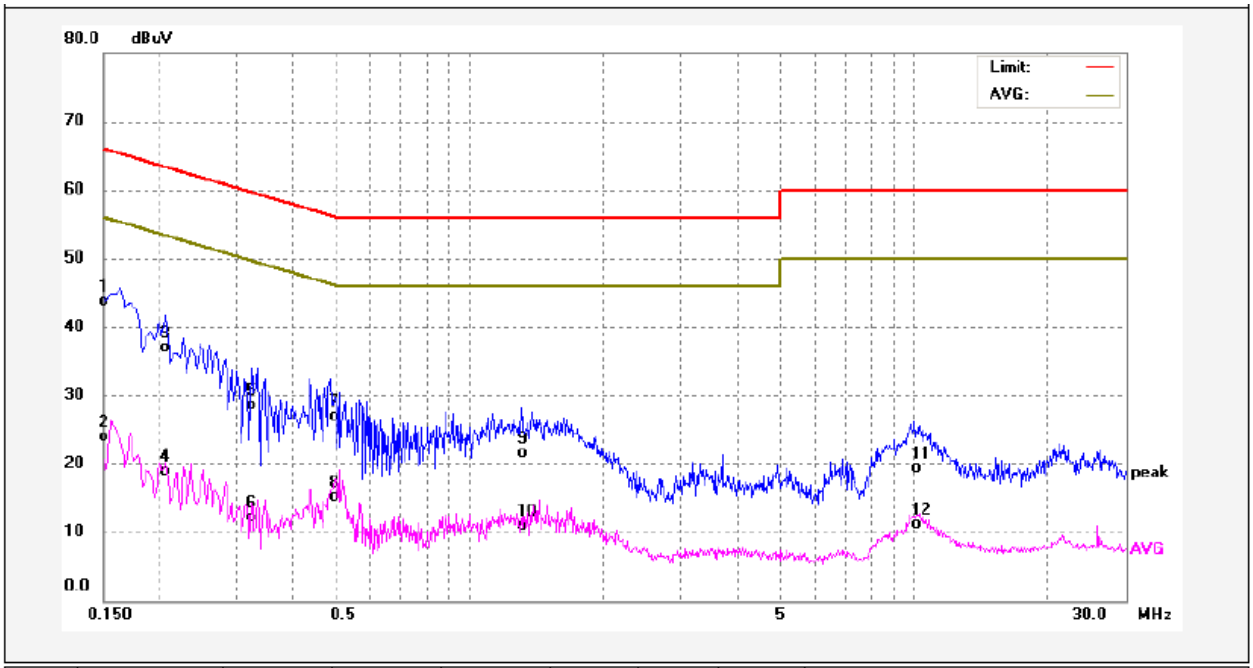
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

8.4 Conducted Emission Test Result

Remark: only the worst data (U-NII-1 11n HT40 mode Low channel mode) were reported

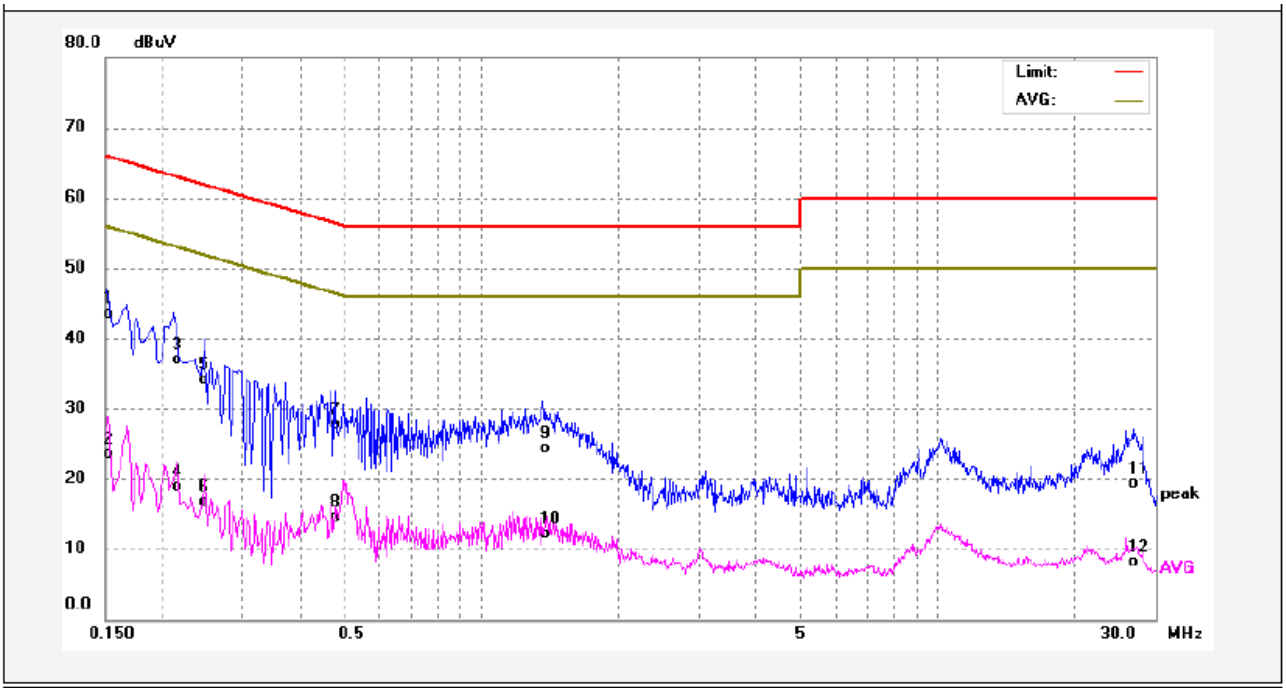
Live line:

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	33.44	10.26	43.70	65.99	-22.29	QP	
2	0.1500	13.64	10.26	23.90	55.99	-32.09	AVG	
3	0.2100	26.76	10.21	36.97	63.20	-26.23	QP	
4	0.2100	8.63	10.21	18.84	53.20	-34.36	AVG	
5	0.3260	18.33	10.21	28.54	59.55	-31.01	QP	
6	0.3260	1.89	10.21	12.10	49.55	-37.45	AVG	
7	0.4900	16.73	10.19	26.92	56.17	-29.25	QP	
8	0.4900	4.93	10.19	15.12	46.17	-31.05	AVG	
9	1.3099	11.21	10.30	21.51	56.00	-34.49	QP	
10	1.3099	0.63	10.30	10.93	46.00	-35.07	AVG	
11	9.9819	8.67	10.63	19.30	60.00	-40.70	QP	
12	9.9819	0.56	10.63	11.19	50.00	-38.81	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1539	33.25	10.26	43.51	65.78	-22.27	QP	
2	0.1539	13.29	10.26	23.55	55.78	-32.23	AVG	
3	0.2140	26.69	10.22	36.91	63.04	-26.13	QP	
4	0.2140	8.70	10.22	18.92	53.04	-34.12	AVG	
5	0.2500	23.83	10.21	34.04	61.75	-27.71	QP	
6	0.2500	6.51	10.21	16.72	51.75	-35.03	AVG	
7	0.4820	17.50	10.19	27.69	56.30	-28.61	QP	
8	0.4820	4.35	10.19	14.54	46.30	-31.76	AVG	
9	1.3700	14.02	10.30	24.32	56.00	-31.68	QP	
10	1.3700	1.75	10.30	12.05	46.00	-33.95	AVG	
11	26.6780	8.86	10.50	19.36	60.00	-40.64	QP	
12	26.6780	-2.33	10.50	8.17	50.00	-41.83	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 Summary of 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	0.6920	0.9000	0.77	76.89	1.14	-2.28
U-NII-1 802.11n(HT20)	0.6560	0.8680	0.76	75.58	1.22	-2.43
U-NII-1 802.11n(HT40)	0.3360	0.5390	0.62	62.34	2.05	-4.10
U-NII-3 802.11a	0.6920	0.8960	0.77	77.23	1.12	-2.24
U-NII-3 802. 11n(HT20)	0.6560	0.8640	0.76	75.93	1.20	-2.39
U-NII-3 802. 11n(HT40)	0.3370	0.5390	0.63	62.52	2.04	-4.08

Remark:

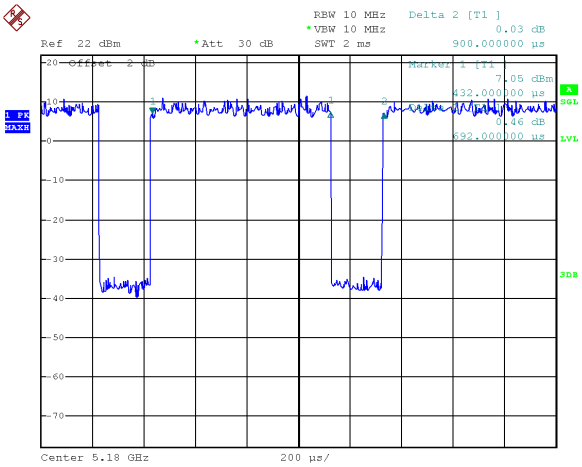
Duty cycle=On Time/period;

Duty cycle factor=10*log (1/Duty cycle);

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

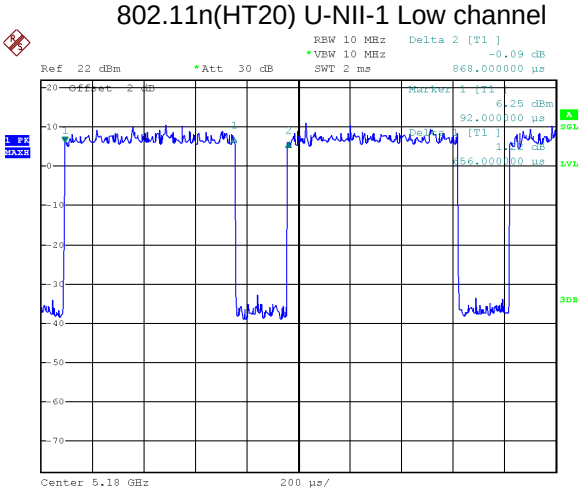
Test result plots shown as follows:

802.11a U-NII-1 Low channel



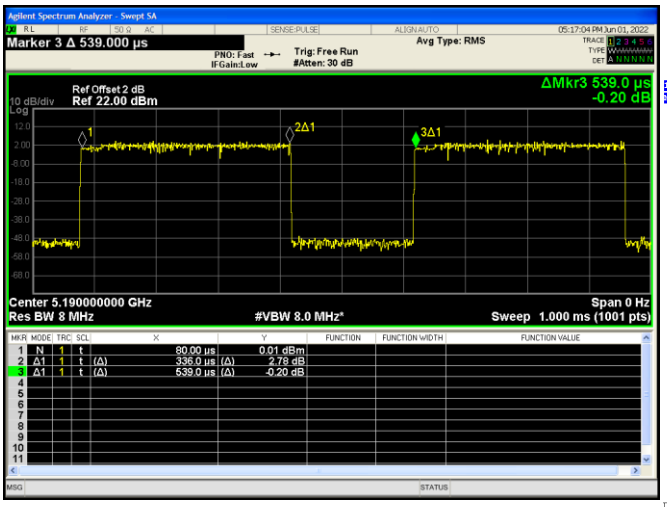
Date: 20.MAY.2022 16:53:15

802.11n(HT20) U-NII-1 Low channel

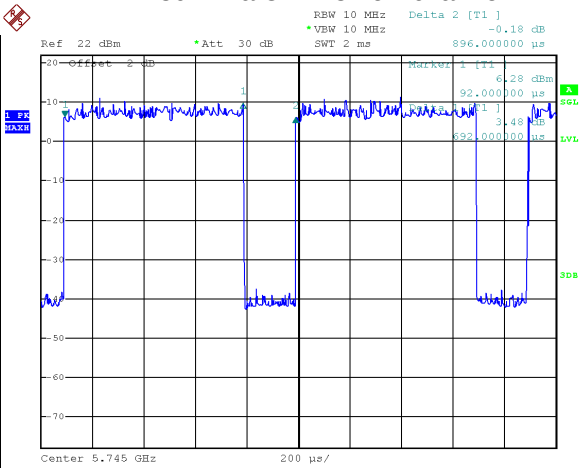


Date: 20.MAY.2022 16:52:14

802.11n(HT40) U-NII-1 Low channel



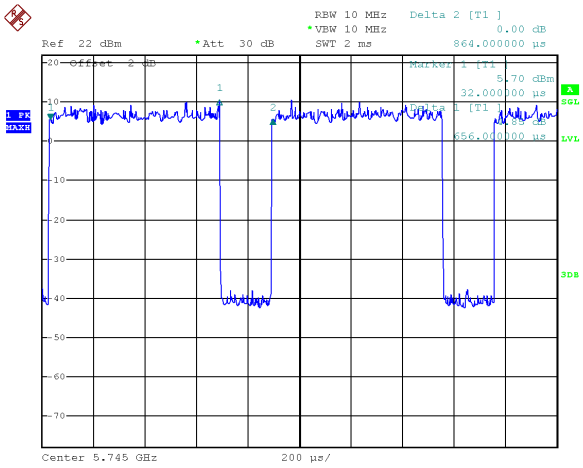
802.11a U-NII-3 Low channel

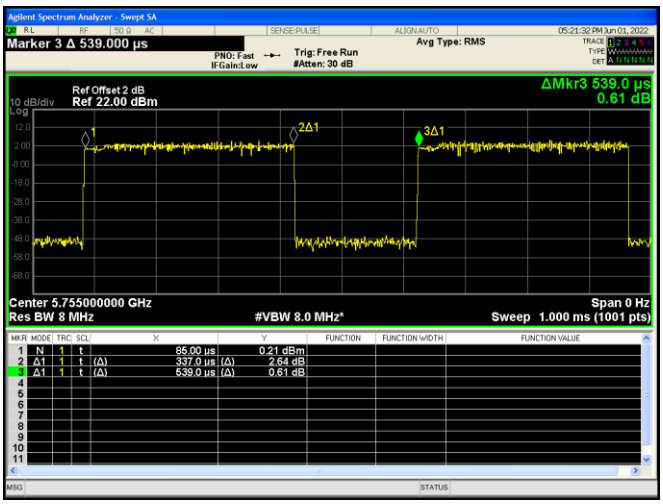


Date: 20.MAY.2022 17:00:44

802.11n(HT20) U-NII-3 Low channel

802.11n(HT40) U-NII-3 Low channel


RBW 10 MHz
VBW 10 MHz
SWT 2 ms
Delta 2 [T1]
0.00 dB
864.000000 µs
Ref 22 dBm
Att 30 dB
Offset 2 dB
Marker 1 [T1
5.70 dBm
32.000000 µs
Delta 1 [T1
0.61 dB
656.000000 µs
Center 5.745 GHz
200 µs/
Date: 20.MAY.2022 17:01:23


Agilent Spectrum Analyzer - Swept SA
Marker 3 Δ 539.000 µs
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Ref Offset 2 dB
10 dB/div
Ref 22.00 dBm
ΔMkr3 539.0 µs
0.61 dB
Center 5.755000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz*
Span 0 Hz
Sweep 1.000 ms (1001 pts)
1 N 1 t 86.00 µs 0.21 dBm
2 Δ1 1 t (Δ) 337.0 µs (Δ) 2.64 dB
3 Δ1 1 t (Δ) 539.0 µs (Δ) 0.61 dB

10 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.407

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(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
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: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

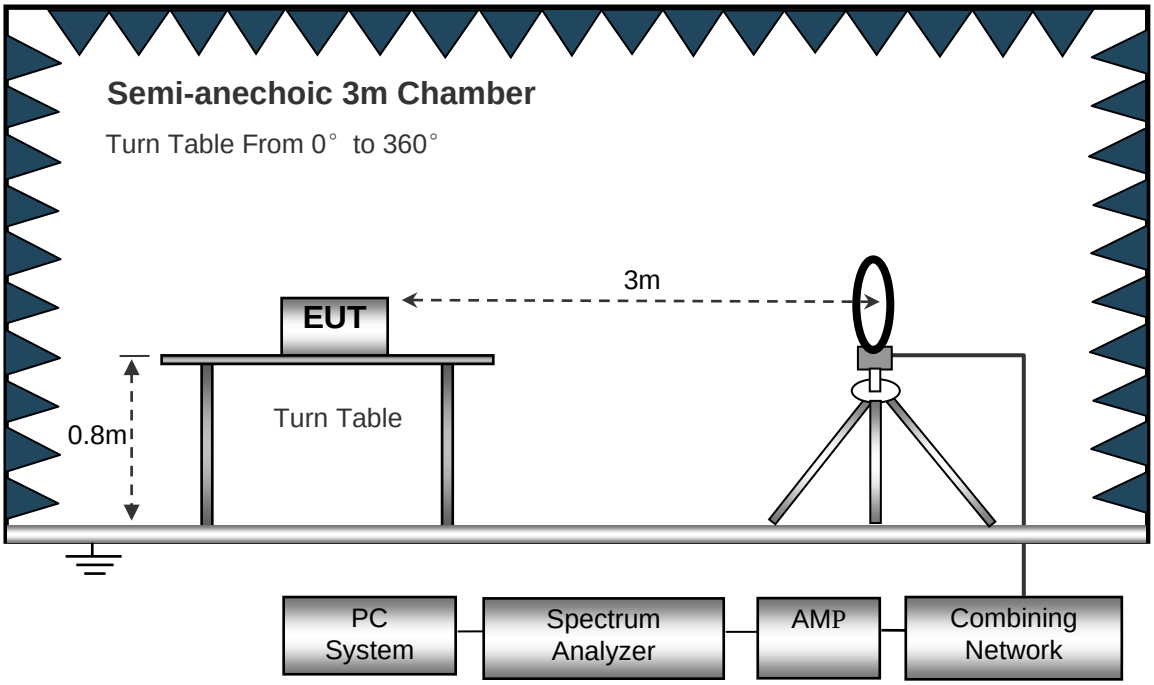
EUT Operation:

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

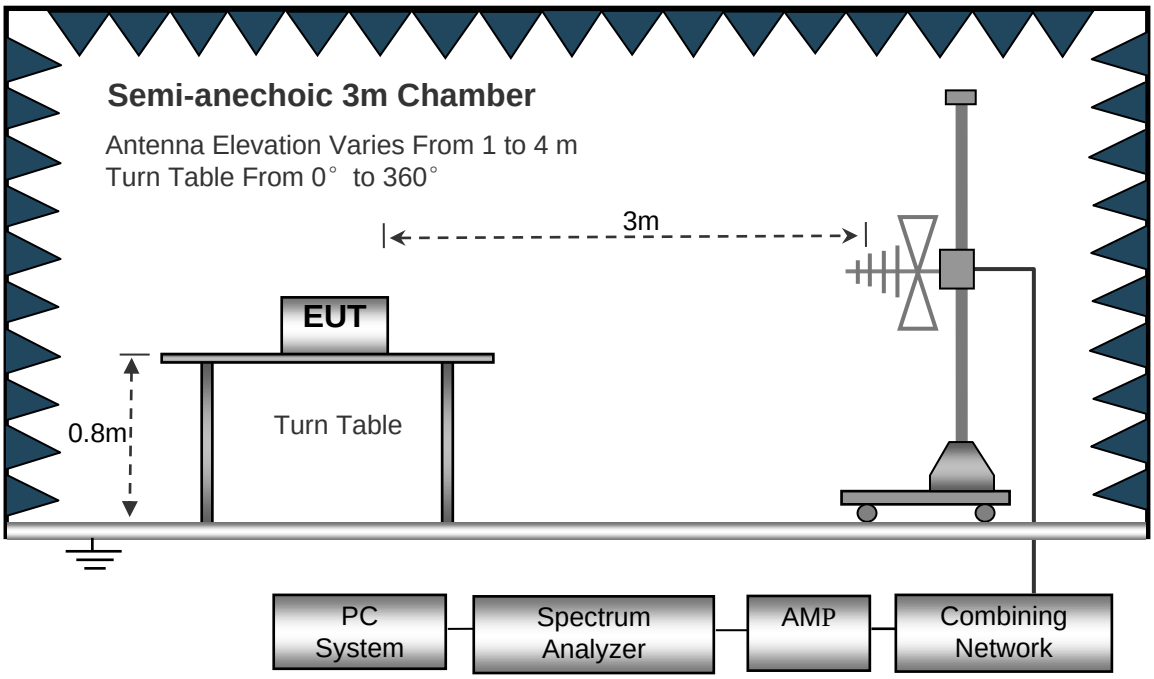
10.2 Test Setup

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

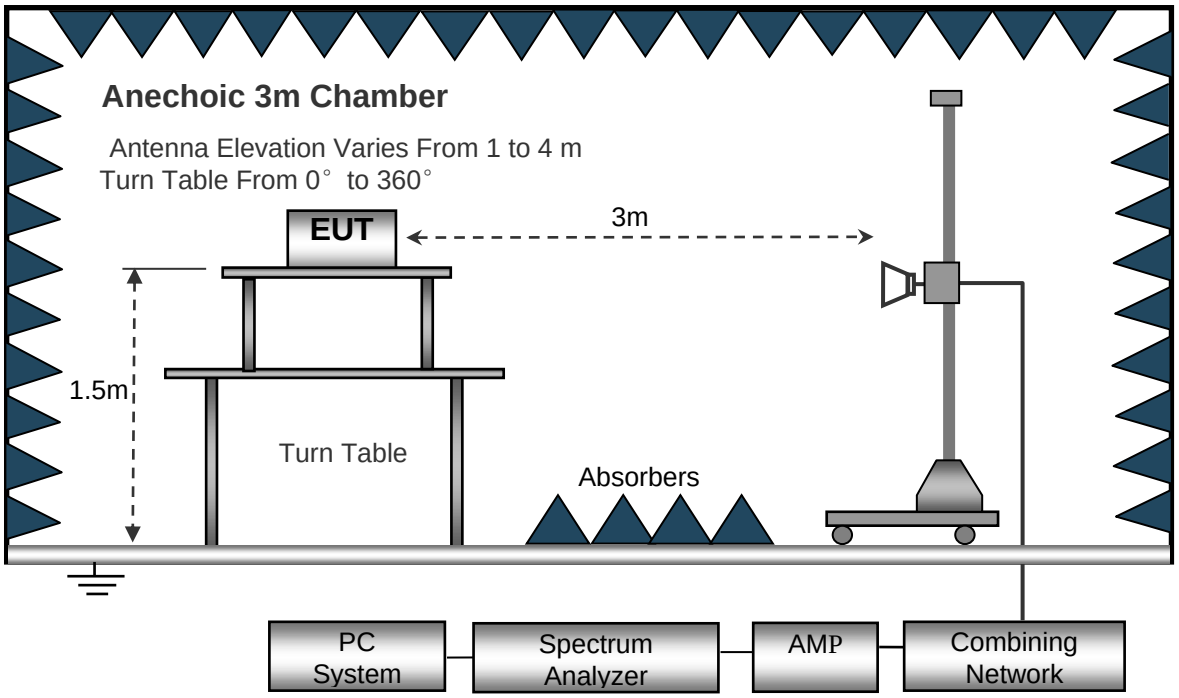
The test setup for emission measurement below 30MHz.



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:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - 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:

Margin = Corr. Ampl. – Limit

10.6 Summary of Test Results

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									
223.45	38.95	QP	52	1.6	H	-11.62	27.33	46.00	-18.67
223.45	45.15	QP	266	1.6	V	-11.62	33.53	46.00	-12.47
4505.91	44.29	PK	184	1.7	H	-2.03	42.26	74.00	-31.74
4505.91	33.98	Ave	184	1.7	H	-2.03	31.95	54.00	-22.05
5114.28	41.68	PK	83	1.2	H	-1.02	40.66	74.00	-33.34
5114.28	36.29	Ave	83	1.2	H	-1.02	35.27	54.00	-18.73
10360.00	46.02	PK	112	2.0	H	5.33	51.35	74.00	-22.65
10360.00	38.22	Ave	112	2.0	H	5.33	43.55	54.00	-10.45
802.11a U-NII-1 Middle channel 5200MHz									
223.45	38.85	QP	268	1.8	H	-11.62	27.23	46.00	-18.77
223.45	44.98	QP	291	1.2	V	-11.62	33.36	46.00	-12.64
4535.78	43.34	PK	277	1.1	H	-1.94	41.40	74.00	-32.60
4535.78	34.79	Ave	277	1.1	H	-1.94	32.85	54.00	-21.15
5117.66	40.69	PK	265	1.5	H	-1.06	39.63	74.00	-34.37
5117.66	36.14	Ave	265	1.5	H	-1.06	35.08	54.00	-18.92
10400.00	45.59	PK	151	1.1	H	5.21	50.80	74.00	-23.20
10400.00	37.14	Ave	151	1.1	H	5.21	42.35	54.00	-11.65
802.11a U-NII-1 High channel 5240MHz									
223.45	37.80	QP	309	2.0	H	-11.62	26.18	46.00	-19.82
223.45	43.62	QP	287	1.2	V	-11.62	32.00	46.00	-14.00
4509.32	43.72	PK	312	1.1	H	-2.24	41.48	74.00	-32.52
4509.32	35.49	Ave	312	1.1	H	-2.24	33.25	54.00	-20.75
5136.75	42.14	PK	143	1.9	H	-1.09	41.05	74.00	-32.95
5136.75	35.31	Ave	143	1.9	H	-1.09	34.22	54.00	-19.78
10480.00	46.63	PK	318	1.7	H	5.14	51.77	74.00	-22.23
10480.00	39.64	Ave	318	1.7	H	5.14	44.78	54.00	-9.22

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									
223.45	40.38	QP	229	2.0	H	-11.62	28.76	46.00	-17.24
223.45	45.30	QP	300	1.1	V	-11.62	33.68	46.00	-12.32
4535.96	44.39	PK	100	1.3	H	-2.14	42.25	74.00	-31.75
4535.96	34.82	Ave	100	1.3	H	-2.14	32.68	54.00	-21.32
5129.69	45.49	PK	109	1.1	H	-1.06	44.43	74.00	-29.57
5129.69	41.05	Ave	109	1.1	H	-1.06	39.99	54.00	-14.01
10360.00	44.67	PK	292	1.4	H	5.33	50.00	74.00	-24.00
10360.00	37.74	Ave	292	1.4	H	5.33	43.07	54.00	-10.93
802.11n HT20 U-NII-1 Middle channel 5200MHz									
223.45	39.59	QP	188	1.3	H	-11.62	27.97	46.00	-18.03
223.45	44.33	QP	337	2.0	V	-11.62	32.71	46.00	-13.29
4519.82	44.90	PK	301	1.4	H	-2.12	42.78	74.00	-31.22
4519.82	35.48	Ave	301	1.4	H	-2.12	33.36	54.00	-20.64
5140.05	45.63	PK	5	1.2	H	-1.06	44.57	74.00	-29.43
5140.05	41.20	Ave	5	1.2	H	-1.06	40.14	54.00	-13.86
10400.00	46.84	PK	54	1.1	H	5.21	52.05	74.00	-21.95
10400.00	38.60	Ave	54	1.1	H	5.21	43.81	54.00	-10.19
802.11n HT20 U-NII-1 High channel 5240MHz									
223.45	39.29	QP	70	1.2	H	-11.62	27.67	46.00	-18.33
223.45	45.77	QP	119	1.8	V	-11.62	34.15	46.00	-11.85
4512.52	43.47	PK	125	1.4	H	-1.96	41.51	74.00	-32.49
4512.52	36.90	Ave	125	1.4	H	-1.96	34.94	54.00	-19.06
5146.35	47.58	PK	210	1.4	H	-1.06	46.52	74.00	-27.48
5146.35	42.35	Ave	210	1.4	H	-1.06	41.29	54.00	-12.71
10480.00	46.96	PK	176	1.6	H	5.14	52.10	74.00	-21.90
10480.00	39.68	Ave	176	1.6	H	5.14	44.82	54.00	-9.18

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(HT40) U-NII-1 low Channel 5190MHz									
223.45	38.23	QP	243	1.3	H	-11.62	26.61	46.00	-19.39
223.45	47.28	QP	165	1.3	V	-11.62	35.66	46.00	-10.34
4528.64	42.93	PK	319	1.0	H	-1.89	41.04	74.00	-32.96
4528.64	34.80	Ave	319	1.0	H	-1.89	32.91	54.00	-21.09
5127.76	44.53	PK	68	1.5	H	-1.06	43.47	74.00	-30.53
5127.76	40.33	Ave	68	1.5	H	-1.06	39.27	54.00	-14.73
10380.00	38.13	PK	116	2.0	H	5.26	43.39	74.00	-30.61
10380.00	34.45	Ave	116	2.0	H	5.26	39.71	54.00	-14.29
5379.93	45.50	PK	252	1.2	H	-1.03	44.47	74.00	-29.53
5379.93	38.98	Ave	252	1.2	H	-1.03	37.95	54.00	-16.05
802.11n(HT40) U-NII-1 High channel 5230MHz									
223.45	37.31	QP	173	1.9	H	-11.62	25.69	46.00	-20.31
223.45	48.15	QP	142	1.5	V	-11.62	36.53	46.00	-9.47
4536.35	41.94	PK	8	1.1	H	-1.94	40.00	74.00	-34.00
4536.35	35.66	Ave	8	1.1	H	-1.94	33.72	54.00	-20.28
5118.97	46.09	PK	21	1.1	H	-1.06	45.03	74.00	-28.97
5118.97	39.45	Ave	21	1.1	H	-1.06	38.39	54.00	-15.61
10460.00	40.82	PK	53	1.6	H	5.28	46.10	74.00	-27.90
10480.00	37.81	Ave	53	1.6	H	5.28	43.09	54.00	-10.91
5377.60	45.93	PK	286	1.0	H	-1.05	44.88	74.00	-29.12
5377.60	39.43	Ave	286	1.0	H	-1.05	38.38	54.00	-15.62

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									
223.45	38.45	QP	238	1.6	H	-11.62	26.83	46.00	-19.17
223.45	47.29	QP	275	1.9	V	-11.62	35.67	46.00	-10.33
4529.97	43.87	PK	74	1.1	H	-2.06	41.81	74.00	-32.19
4529.97	35.36	Ave	74	1.1	H	-2.06	33.30	54.00	-20.70
11490.00	45.69	PK	351	1.5	H	5.93	51.62	68.20	-16.58
11490.00	37.86	Ave	351	1.5	H	5.93	43.79	54.00	-10.21
5387.76	46.73	PK	63	1.2	H	-1.25	45.48	74.00	-28.52
5387.76	38.39	Ave	63	1.2	H	-1.25	37.14	54.00	-16.86
802.11a U-NII-3 Middle channel 5785MHz									
223.45	39.09	QP	175	1.4	H	-11.62	27.47	46.00	-18.53
223.45	48.36	QP	255	1.9	V	-11.62	36.74	46.00	-9.26
4526.40	44.03	PK	206	1.0	H	-2.03	42.00	74.00	-32.00
4526.40	36.09	Ave	206	1.0	H	-2.03	34.06	54.00	-19.94
11570.00	45.39	PK	47	2.0	H	5.81	51.20	68.20	-17.00
11570.00	37.81	Ave	47	2.0	H	5.81	43.62	54.00	-10.38
5354.85	45.99	PK	152	1.5	H	-1.22	44.77	74.00	-29.23
5354.85	39.42	Ave	152	1.5	H	-1.22	38.20	54.00	-15.80
802.11a U-NII-3 High channel 5825MHz									
223.45	38.84	QP	307	1.7	H	-11.62	27.22	46.00	-18.78
223.45	47.00	QP	146	1.6	V	-11.62	35.38	46.00	-10.62
4539.38	42.82	PK	199	1.3	H	-1.84	40.98	74.00	-33.02
4539.38	35.88	Ave	199	1.3	H	-1.84	34.04	54.00	-19.96
11650.00	45.82	PK	225	1.8	H	5.84	51.66	68.20	-16.54
11650.00	39.16	Ave	225	1.8	H	5.84	45.00	54.00	-9.00
5360.63	46.02	PK	311	1.1	H	-1.30	44.72	74.00	-29.28
5360.63	37.73	Ave	311	1.1	H	-1.30	36.43	54.00	-17.57

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									
223.45	38.33	QP	260	1.8	H	-11.62	26.71	46.00	-19.29
223.45	47.32	QP	152	1.2	V	-11.62	35.70	46.00	-10.30
4530.42	48.71	PK	271	1.6	H	-2.06	46.65	74.00	-27.35
4530.42	33.59	Ave	271	1.6	H	-2.06	31.53	54.00	-22.47
11490.00	47.18	PK	264	1.7	H	5.93	53.11	68.20	-15.09
11490.00	37.51	Ave	264	1.7	H	5.93	43.44	54.00	-10.56
5386.99	46.33	PK	259	1.6	H	-1.25	45.08	74.00	-28.92
5386.99	41.37	Ave	259	1.6	H	-1.25	40.12	54.00	-13.88
802.11n HT20 U-NII-3 Middle channel 5785MHz									
223.45	36.90	QP	254	1.3	H	-11.62	25.28	46.00	-20.72
223.45	46.78	QP	22	1.8	V	-11.62	35.16	46.00	-10.84
4529.86	46.54	PK	360	1.8	H	-2.03	44.51	74.00	-29.49
4529.86	34.83	Ave	360	1.8	H	-2.03	32.80	54.00	-21.20
11570.00	45.22	PK	114	2.0	H	5.81	51.03	68.20	-17.17
11570.00	31.37	Ave	114	2.0	H	5.81	37.18	54.00	-16.82
5381.07	45.42	PK	172	1.2	H	-1.22	44.20	74.00	-29.80
5381.07	40.08	Ave	172	1.2	H	-1.22	38.86	54.00	-15.14
802.11n HT20 U-NII-3 High channel 5825MHz									
223.45	36.25	QP	139	1.6	H	-11.62	24.63	46.00	-21.37
223.45	47.13	QP	252	1.4	V	-11.62	35.51	46.00	-10.49
4500.94	48.01	PK	83	1.1	H	-1.84	46.17	74.00	-27.83
4500.94	34.41	Ave	83	1.1	H	-1.84	32.57	54.00	-21.43
11650.00	38.56	PK	256	1.7	H	5.84	44.40	68.20	-23.80
11650.00	31.37	Ave	256	1.7	H	5.84	37.21	54.00	-16.79
5370.98	46.80	PK	199	1.8	H	-1.30	45.50	74.00	-28.50
5370.98	39.70	Ave	199	1.8	H	-1.30	38.40	54.00	-15.60

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									
223.45	37.56	QP	47	1.6	H	-11.62	25.94	46.00	-20.06
223.45	49.39	QP	339	1.2	V	-11.62	37.77	46.00	-8.23
4515.29	36.19	PK	245	1.6	H	-1.92	34.27	74.00	-39.73
4515.29	30.59	Ave	245	1.6	H	-1.92	28.67	54.00	-25.33
11510.00	39.73	PK	99	1.9	H	5.88	45.61	68.20	-22.59
11510.00	34.73	Ave	99	1.9	H	5.88	40.61	54.00	-13.39
5363.53	46.82	PK	166	1.5	H	-1.07	45.75	74.00	-28.25
5363.53	38.23	Ave	166	1.5	H	-1.07	37.16	54.00	-16.84
5447.01	45.86	PK	141	1.6	H	-1.36	44.50	74.00	-29.50
5447.01	37.80	Ave	141	1.6	H	-1.36	36.44	54.00	-17.56
802.11n(HT40) U-NII-1 High channel 5230MHz									
223.45	37.32	QP	1	1.6	H	-11.62	25.70	46.00	-20.30
223.45	49.61	QP	336	1.0	V	-11.62	37.99	46.00	-8.01
4501.11	35.53	PK	224	1.6	H	-1.86	33.67	74.00	-40.33
4501.11	30.33	Ave	224	1.6	H	-1.86	28.47	54.00	-25.53
11590.00	41.00	PK	317	1.8	H	5.63	46.63	68.20	-21.57
11590.00	37.06	Ave	317	1.8	H	5.63	42.69	54.00	-11.31
5380.61	46.15	PK	313	1.7	H	-1.03	45.12	74.00	-28.88
5380.61	39.32	Ave	313	1.7	H	-1.03	38.29	54.00	-15.71
5445.88	45.09	PK	9	1.4	H	-1.36	43.73	74.00	-30.27
5445.88	39.56	Ave	9	1.4	H	-1.36	38.20	54.00	-15.80

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(b)

Test Method: ANSI C63.10 2013

Test Limit:

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

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

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating solely in the 5.725-5.850 GHz band:

(i) 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.

(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

Test Result: PASS

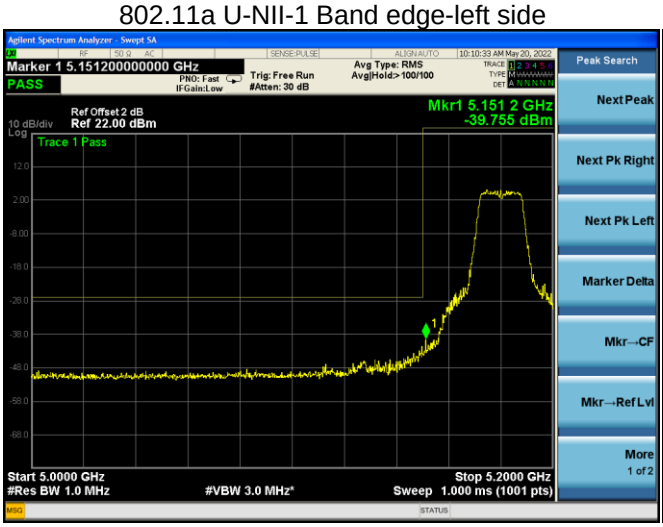
11.1 Test Produce

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.

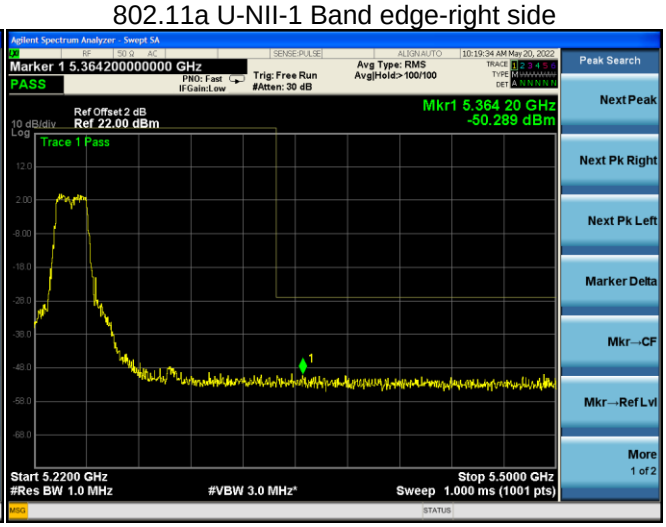
11.2 Test Result

Test plots shown as follows:

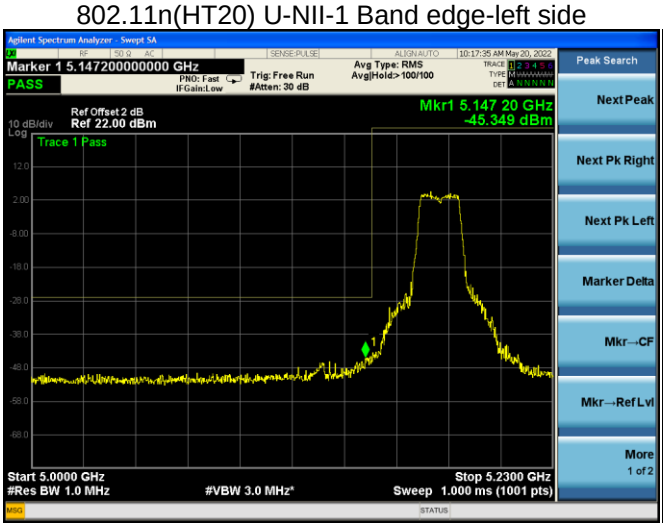
802.11a U-NII-1 Band edge-left side



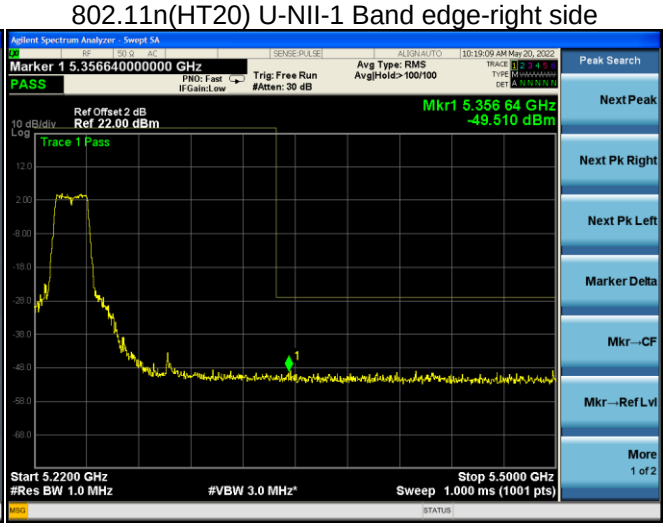
802.11a U-NII-1 Band edge-right side



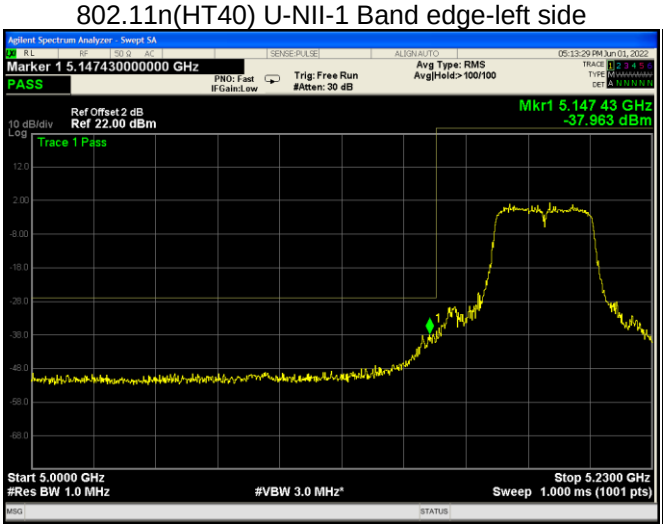
802.11n(HT20) U-NII-1 Band edge-left side



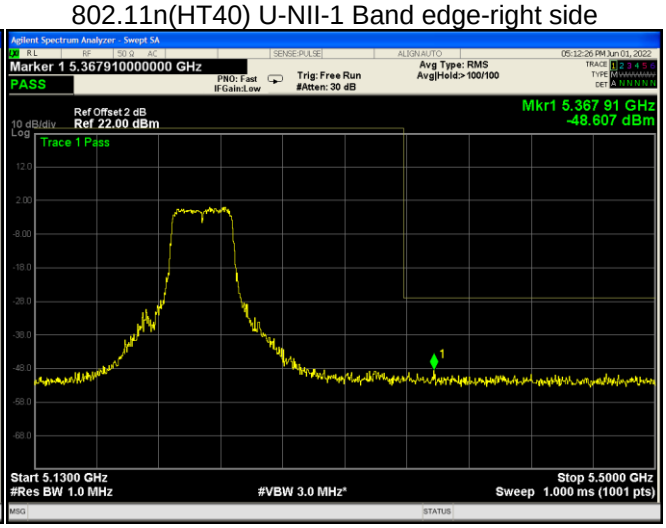
802.11n(HT20) U-NII-1 Band edge-right side



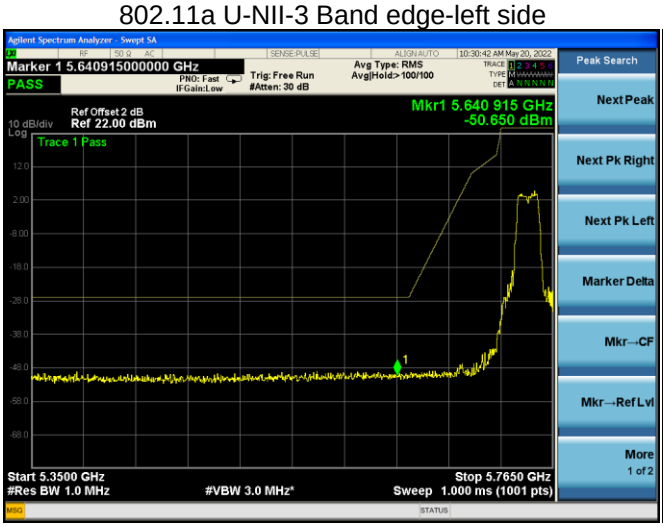
802.11n(HT40) U-NII-1 Band edge-left side



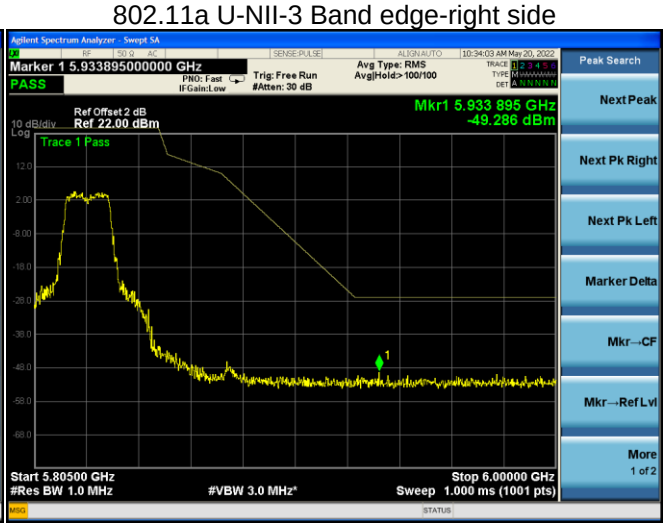
802.11n(HT40) U-NII-1 Band edge-right side



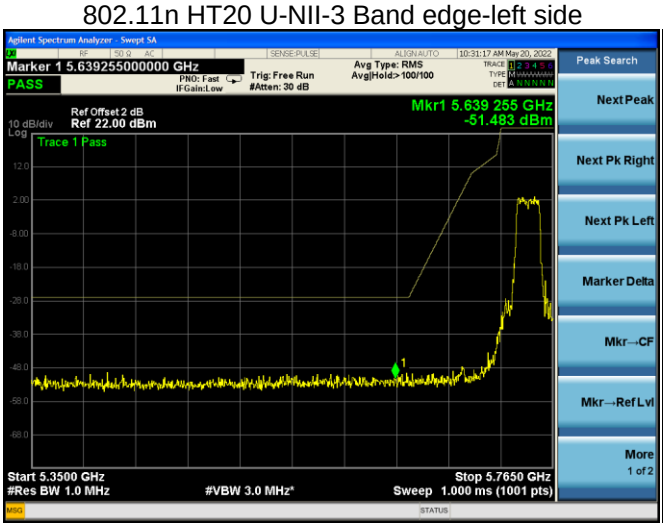
802.11a U-NII-3 Band edge-left side



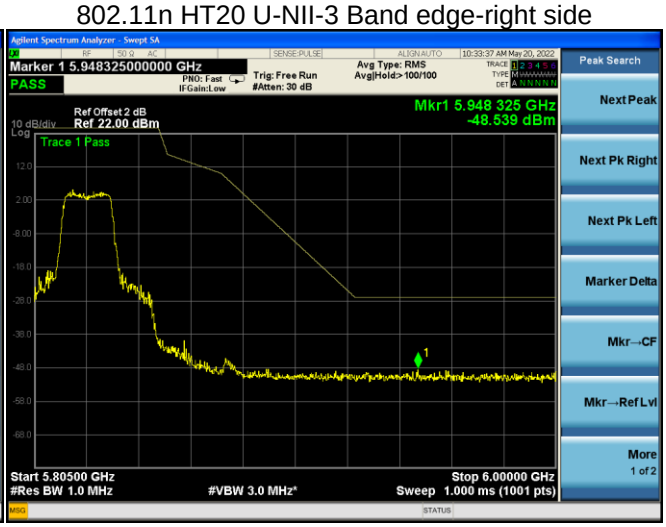
802.11a U-NII-3 Band edge-right side



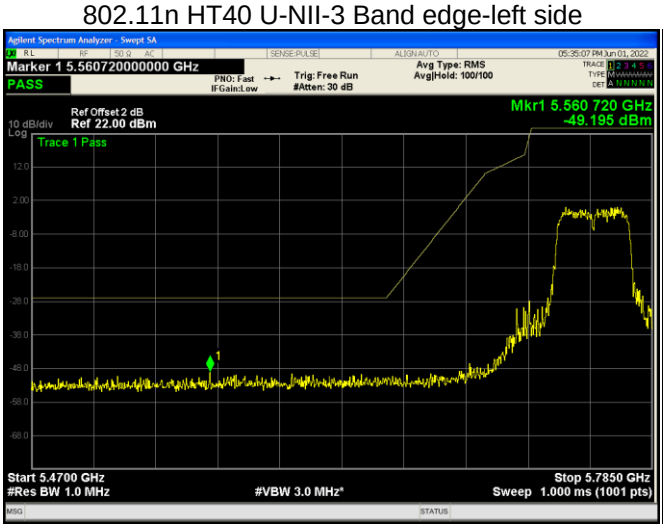
802.11n HT20 U-NII-3 Band edge-left side



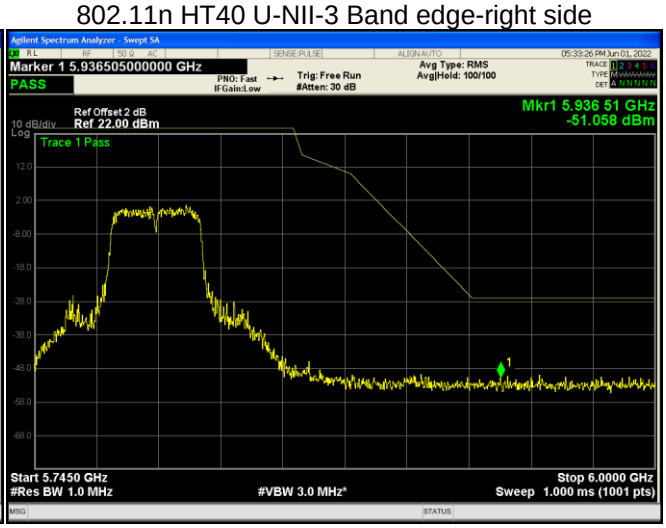
802.11n HT20 U-NII-3 Band edge-right side



802.11n HT40 U-NII-3 Band edge-left side



802.11n HT40 U-NII-3 Band edge-right side



12 6 dB Bandwidth

Test Requirement:	FCC CFR47 Part 15 Section 15.407(e)
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:

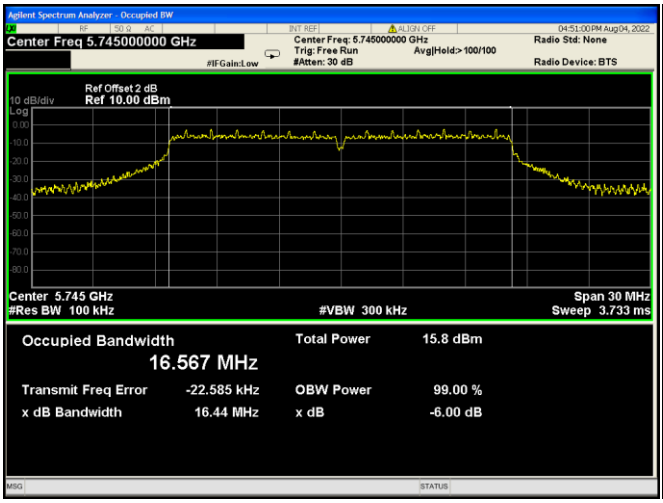
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. The following procedure shall be used for measuring this bandwidth:
   a) Set RBW = 100 kHz.
   b) Set the video bandwidth (VBW) ≥ 3 times RBW.
   c) Detector = Peak.
   d) Trace mode = max hold.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

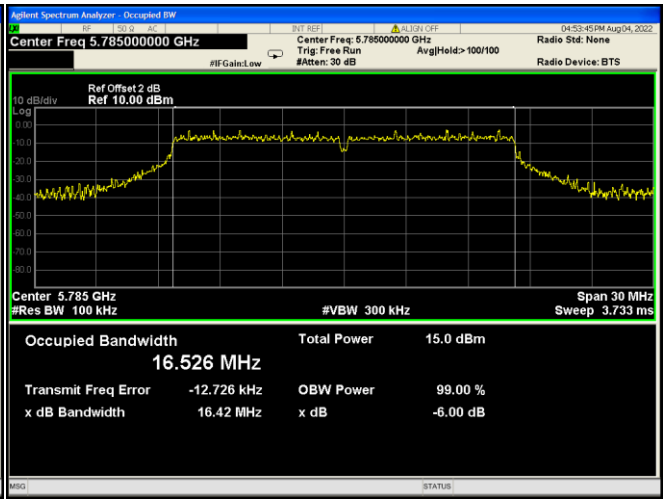
Band	Operation mode	6 dB Bandwidth (MHz)		
		Low	Middle	High
U-NII-3	802.11a	16.44	16.42	16.38
	802.11n(HT20)	17.61	17.59	17.59
	802.11n(HT40)	35.36	/	35.15

Test plots refer to next page:

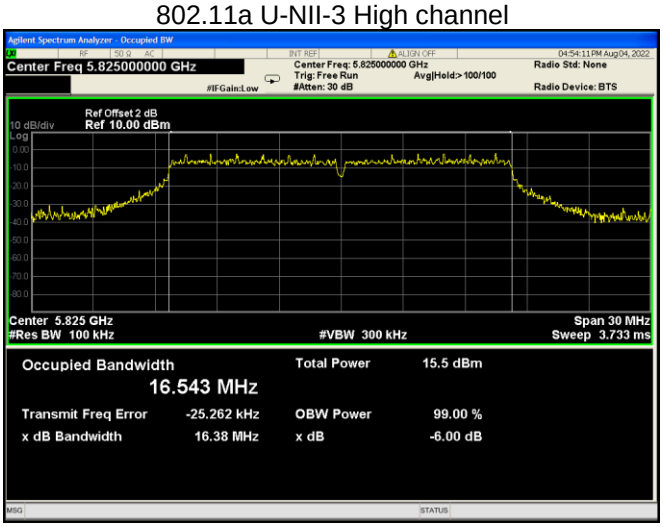
802.11a U-NII-3 Low channel



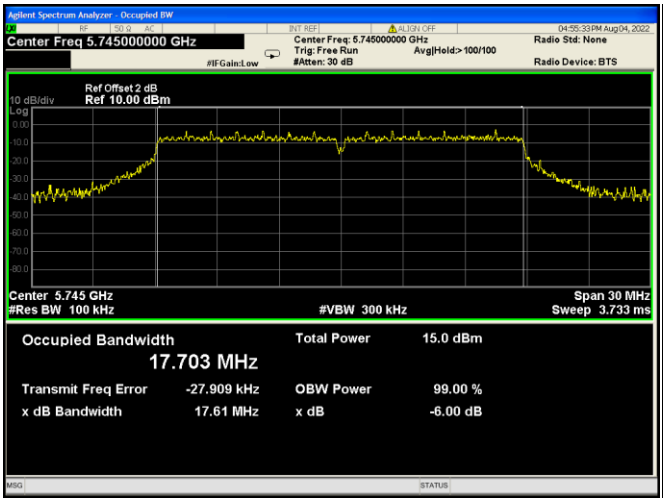
802.11a U-NII-3 Middle channel



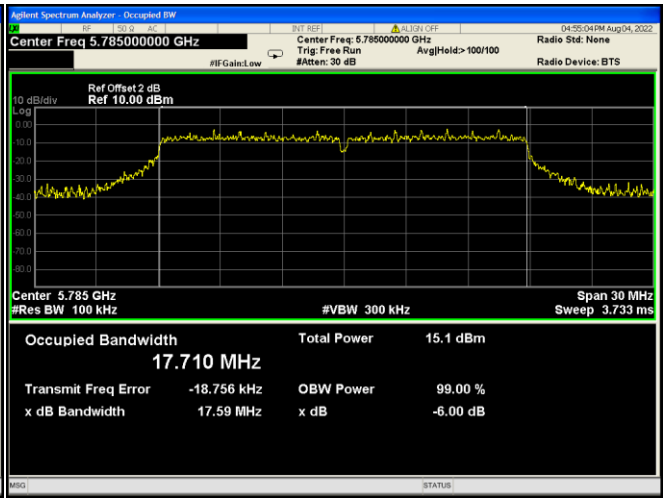
802.11a U-NII-3 High channel



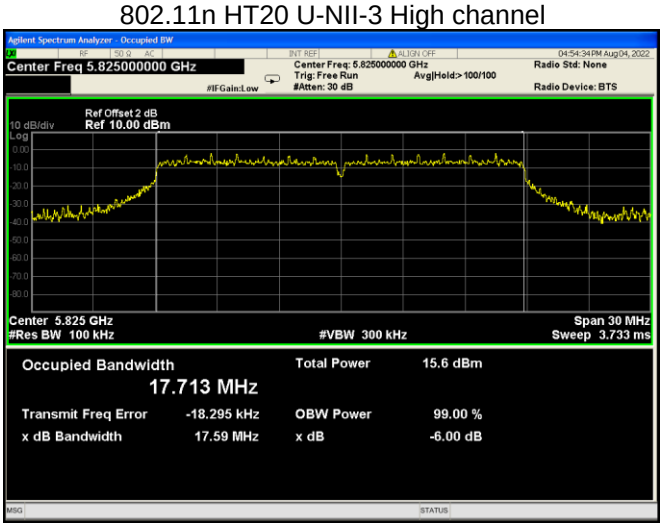
802.11n HT20 U-NII-3 Low channel



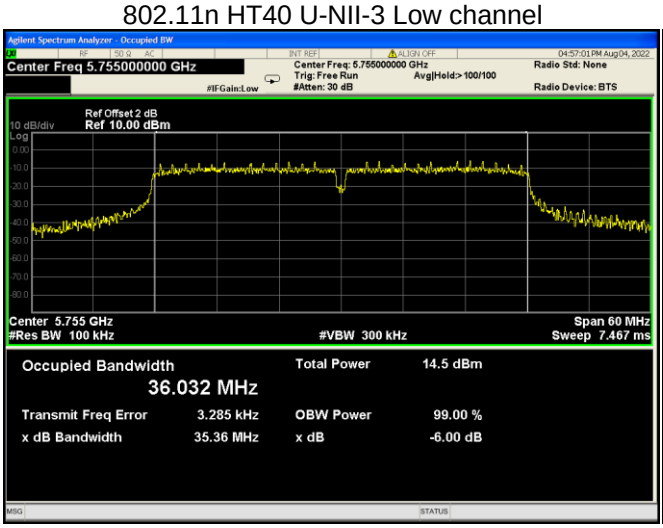
802.11n HT20 U-NII-3 Middle channel



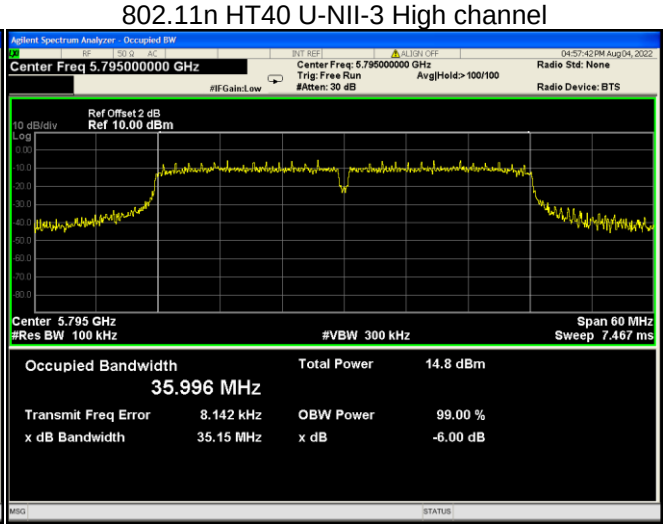
802.11n HT20 U-NII-3 High channel



802.11n HT40 U-NII-3 Low channel



802.11n HT40 U-NII-3 High channel



13 Emission Bandwidth (EBW) and 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.407
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)

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

99% Occupied Bandwidth

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

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1% to 5% of the OBW
4. Set VBW ≥ 3 times 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.

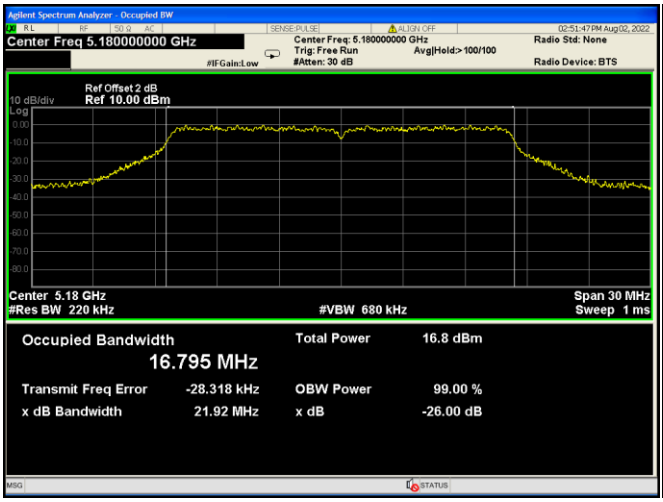
Note: For devices that use channel aggregation refer to III.A and III.C for determining 99% bandwidth.

13.2 Test Result:

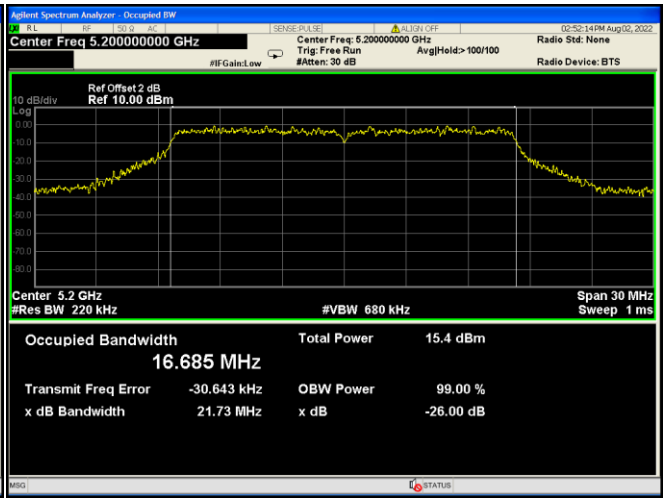
Band	Operation mode	26 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High
U-NII-1	802.11a	21.92	21.73	21.26	16.795	16.685	16.690
	802.11n(HT20)	21.94	22.21	21.61	17.811	17.808	17.829
	802.11n(HT40)	41.99	/	42.62	36.145	/	36.164
U-NII-3	802.11a	21.71	20.98	22.62	16.690	16.738	16.966
	802.11n(HT20)	24.39	21.78	23.71	17.803	17.806	17.872
	802.11n(HT40)	44.25	/	48.68	36.235	/	36.136

Test plots refer to next page:

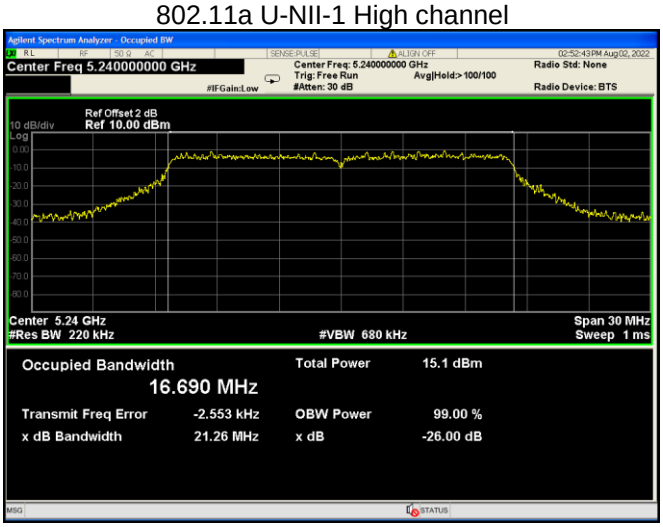
802.11a U-NII-1 Low channel



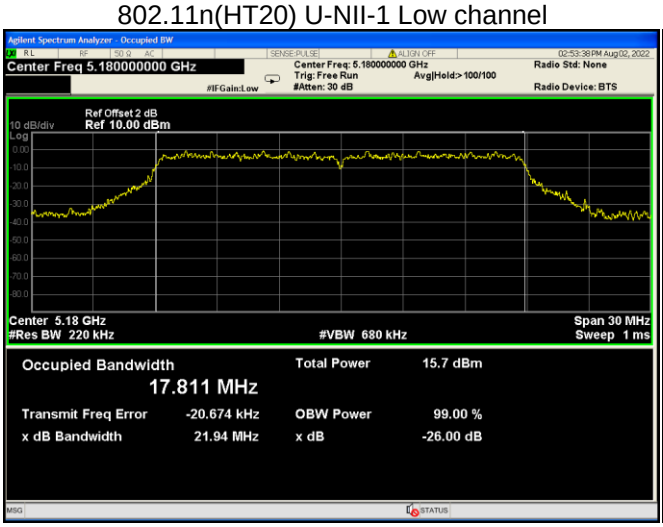
802.11a U-NII-1 Middle channel



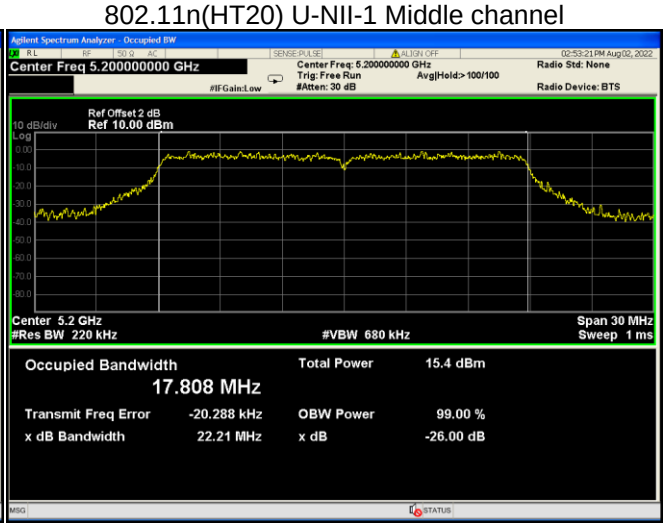
802.11a U-NII-1 High channel



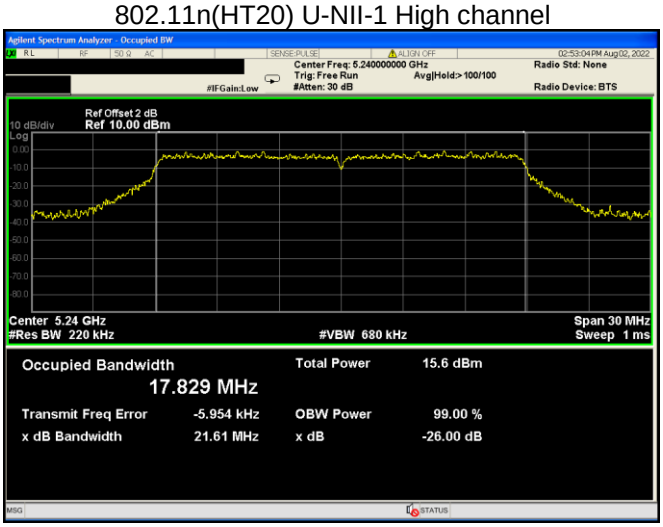
802.11n(HT20) U-NII-1 Low channel



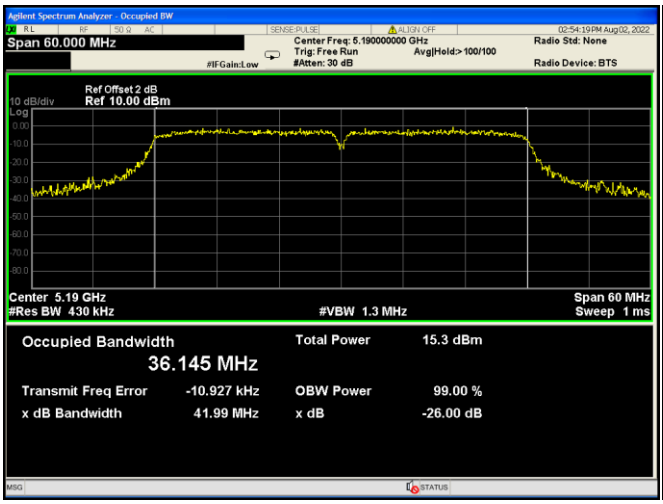
802.11n(HT20) U-NII-1 Middle channel



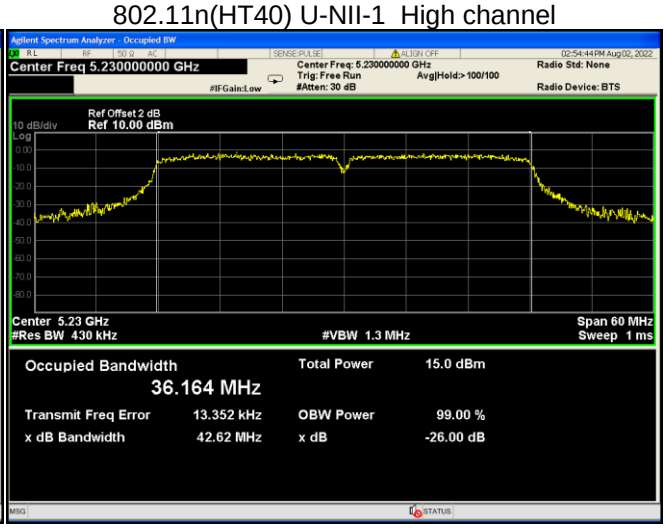
802.11n(HT20) U-NII-1 High channel



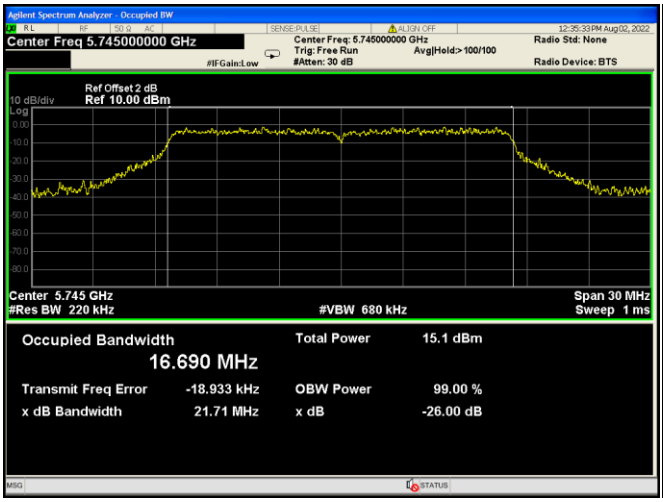
802.11n(HT40) U-NII-1 Low channel



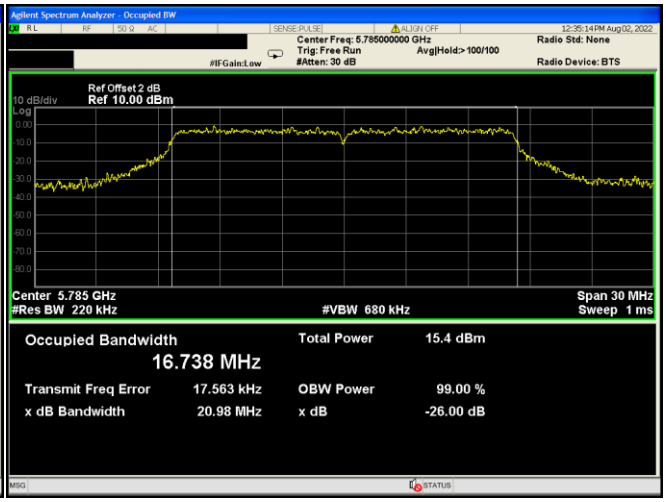
802.11n(HT40) U-NII-1 High channel



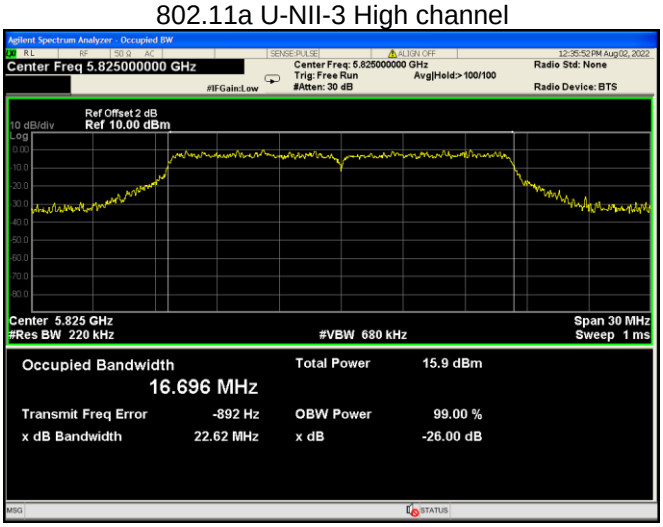
802.11a U-NII-3 Low channel



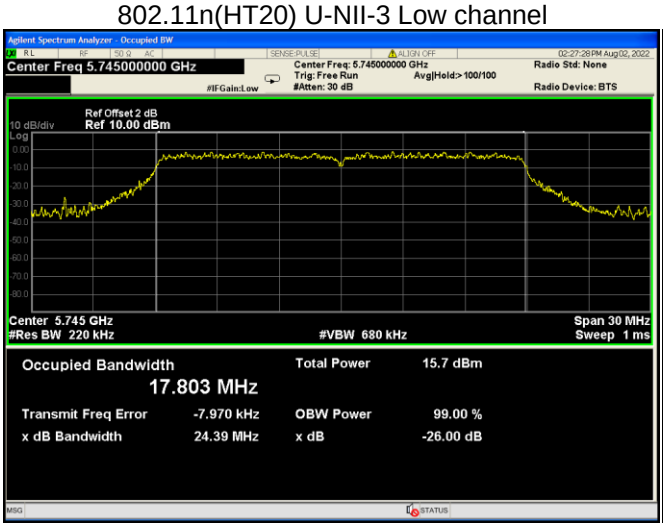
802.11a U-NII-3 Middle channel



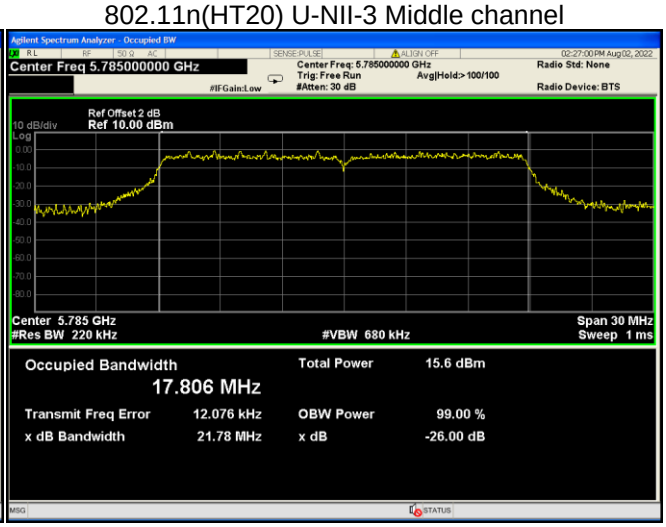
802.11a U-NII-3 High channel



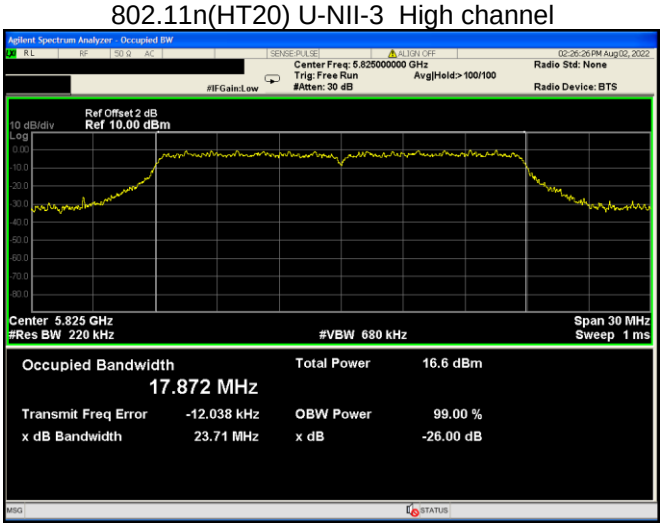
802.11n(HT20) U-NII-3 Low channel



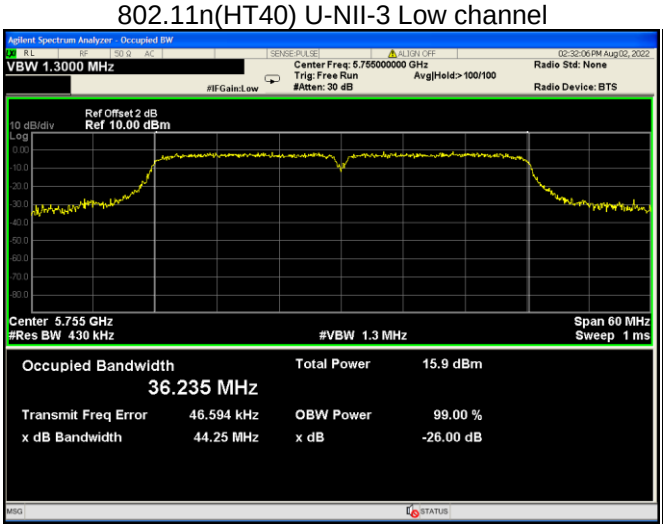
802.11n(HT20) U-NII-3 Middle channel



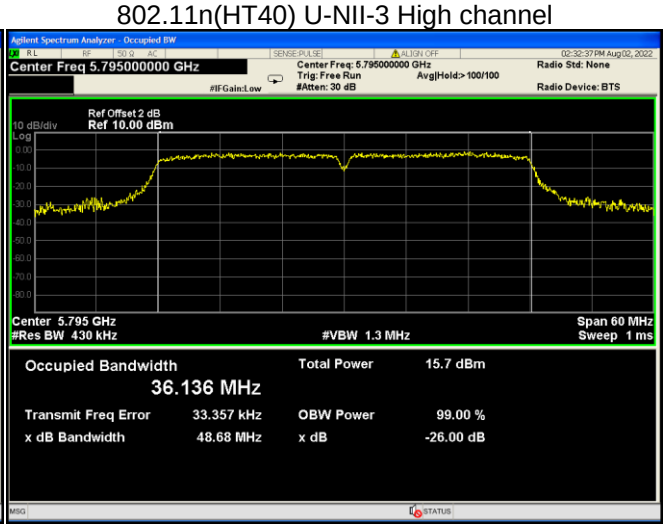
802.11n(HT20) U-NII-3 High channel



802.11n(HT40) U-NII-3 Low channel



802.11n(HT40) U-NII-3 High channel



14 Conducted Output Power and EIRP

Test Requirement: FCC CFR47 Part 15 Section 15.407(a)

Test Method: KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 Section E
ANSI C63.10:2013

Test Limit: **Frequency band 5.15-5.25 GHz**
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.
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.
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.
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.
Frequency band 5.25-5.35 GHz and 5.47-5.725 GHz
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.
Frequency band 5.725-5.85 GHz
For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

Test Result: PASS

14.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum annlyzer.
2. Refer to section 4 of this report, according to KDB 789033 and ANSI C63.10, select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each).
3. Record the test results and calculate the final test data.

14.2 Test Result:

Band	Operation mode	CH	Measurements (dBm)	Duty Cycle Factor (dB)	Conducted Output Power (dBm)	EIRP (dBm)
U-NII-1	802.11a	Low	14.28	1.14	15.42	18.42
		Middle	13.98		15.12	18.12
		High	13.66		14.8	17.80
	802.11n(HT20)	Low	14.25	1.22	15.47	18.47
		Middle	14.32		15.54	18.54
		High	13.89		15.11	18.11
	802.11n(HT40)	Low	14.32	2.05	16.37	**19.37**
		High	13.28		15.33	18.33
U-NII-3	802.11a	Low	13.73	1.12	14.85	17.85
		Middle	13.98		15.10	18.10
		High	14.58		15.70	**18.70**
	802.11n(HT20)	Low	14.23	1.20	15.43	18.43
		Middle	14.10		15.30	18.30
		High	14.14		15.34	18.34
	802.11n(HT40)	Low	13.21	2.04	15.25	18.25
		High	13.30		15.34	18.34

Note:

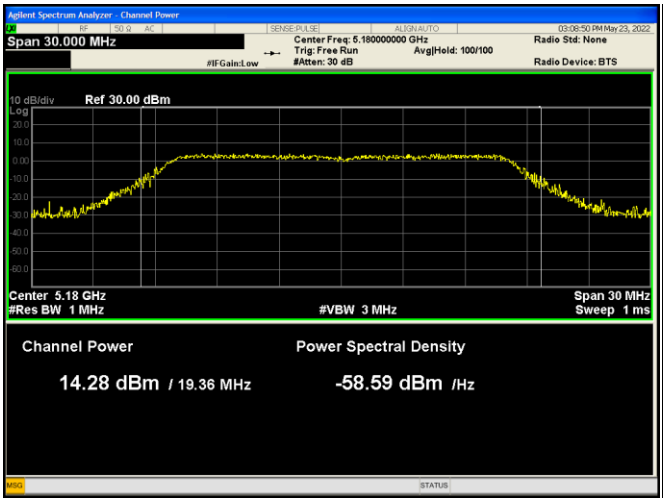
Conducted Output Power limit is 1W/30dBm.

EIRP= Conducted Output Power + Directional gain(3dBi)

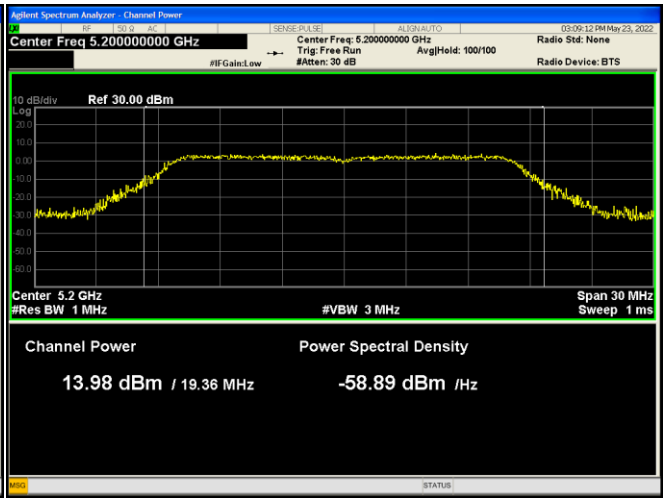
Conducted Output Power = Measurements + Duty Cycle Factor

Test plots refer to next page:

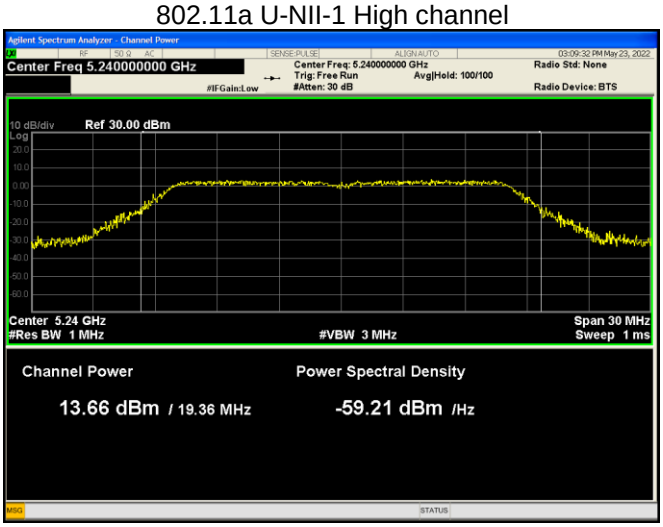
802.11a U-NII-1 Low channel



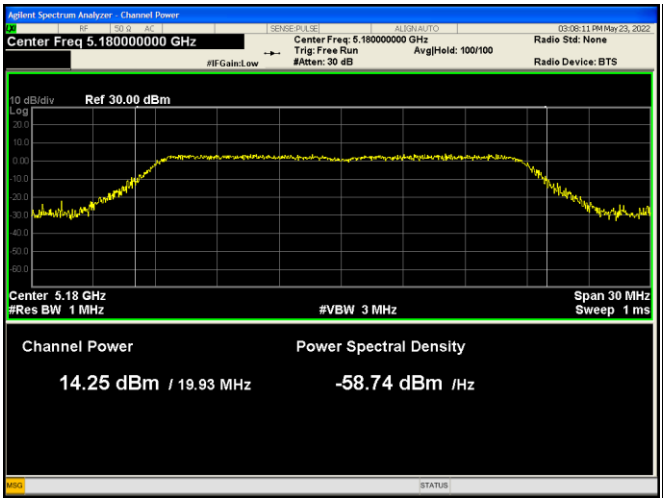
802.11a U-NII-1 Middle channel



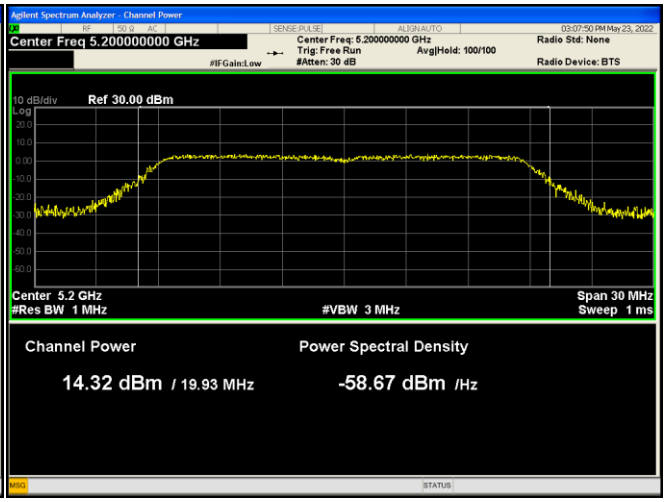
802.11a U-NII-1 High channel



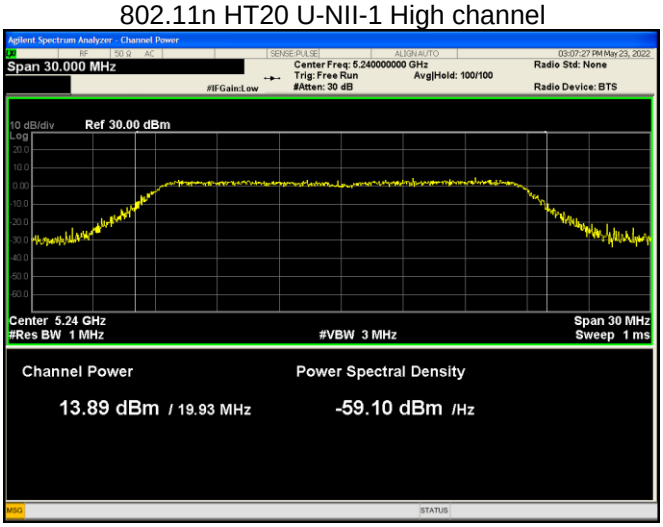
802.11n HT20 U-NII-1 Low channel



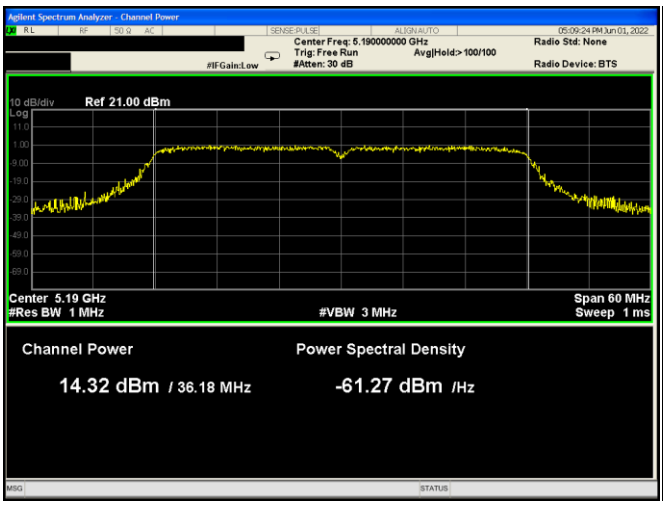
802.11n HT20 U-NII-1 Middle channel



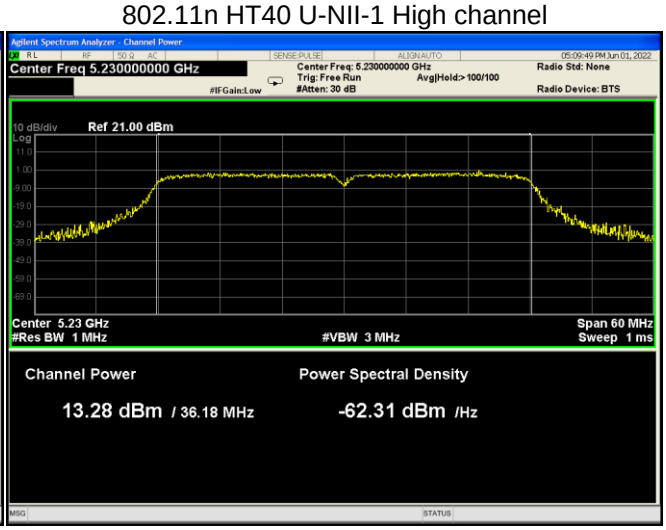
802.11n HT20 U-NII-1 High channel



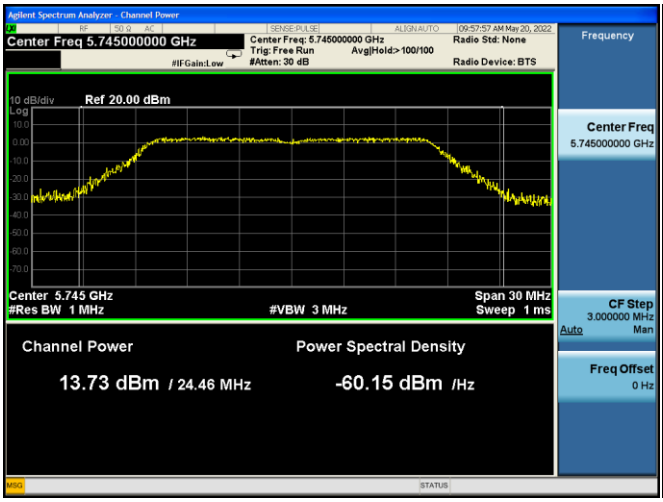
802.11n HT40 U-NII-1 Low channel



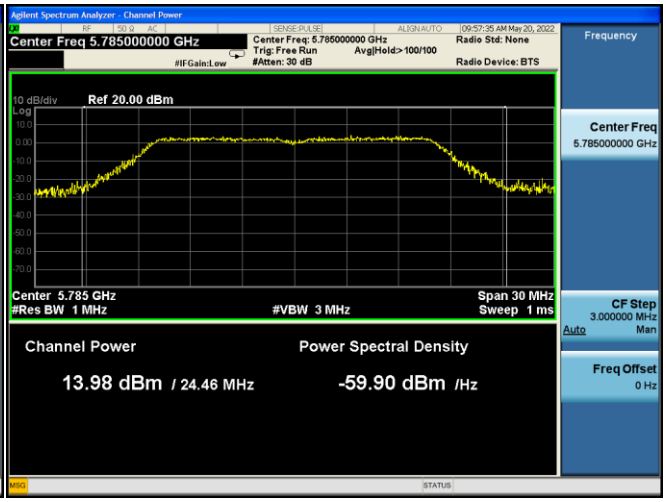
802.11n HT40 U-NII-1 High channel



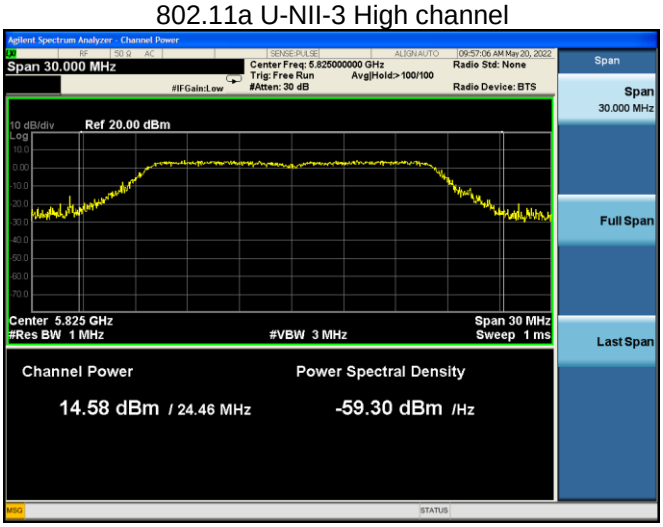
802.11a U-NII-3 Low channel



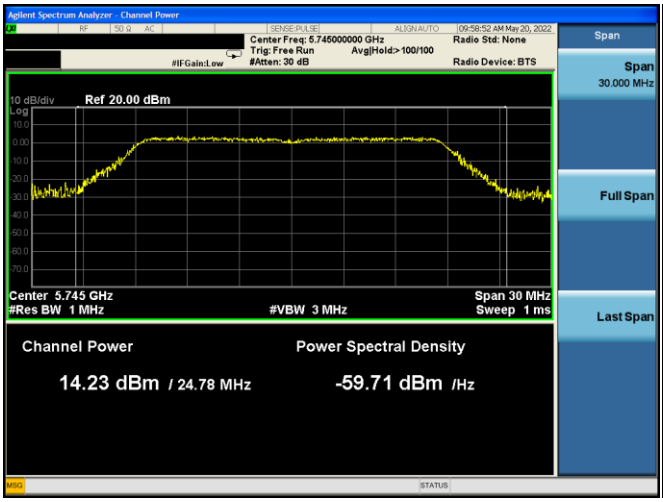
802.11a U-NII-3 Middle channel



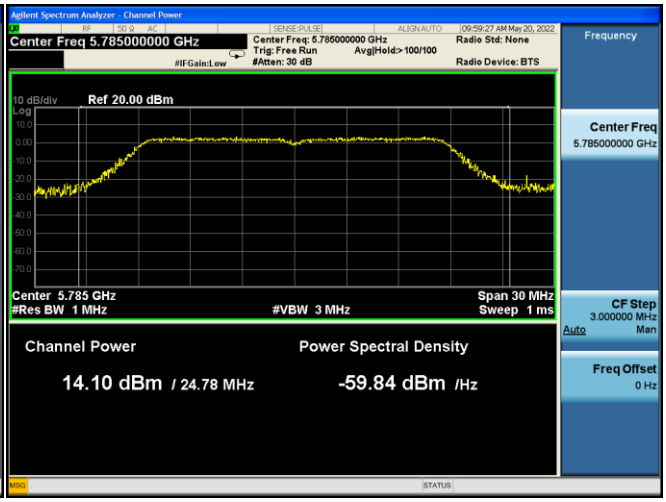
802.11a U-NII-3 High channel



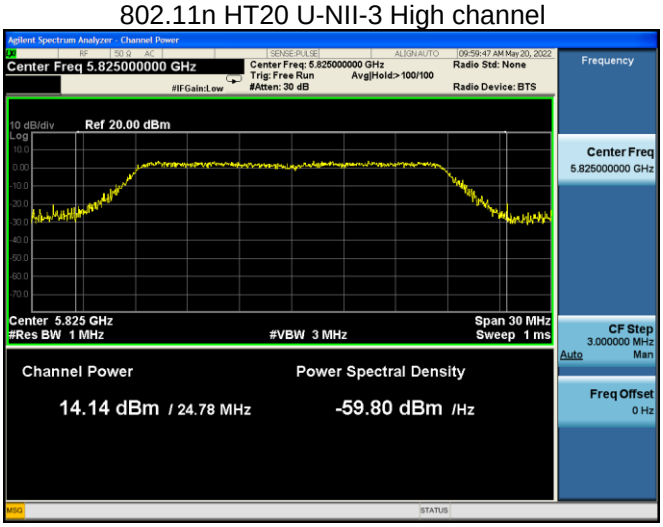
802.11n HT20 U-NII-3 Low channel



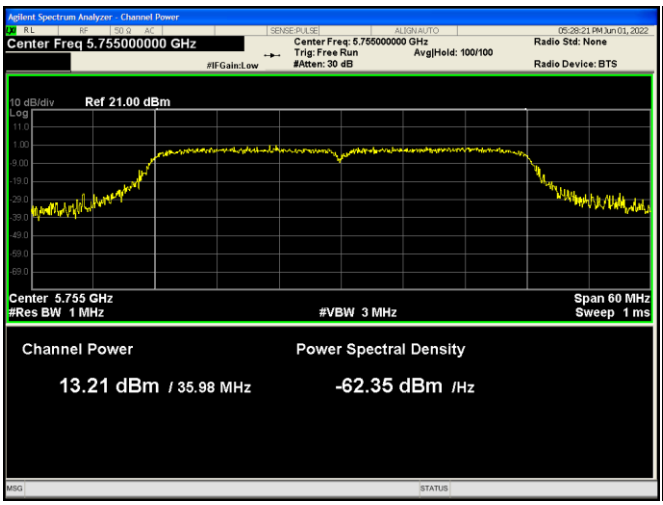
802.11n HT20 U-NII-3 Middle channel



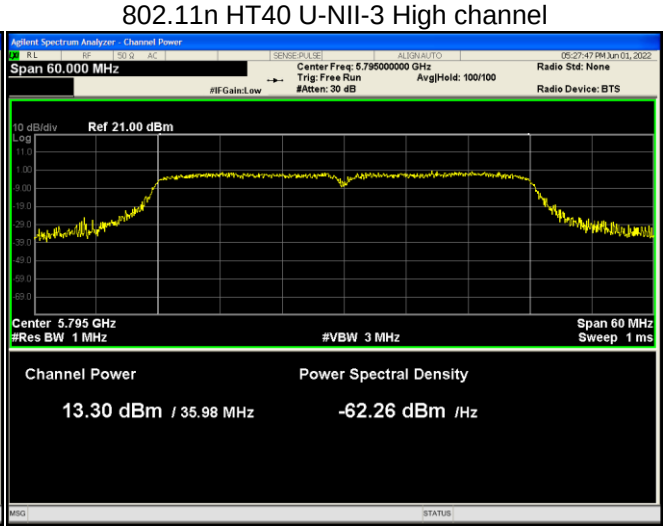
802.11n HT20 U-NII-3 High channel



802.11n HT40 U-NII-3 Low channel



802.11n HT40 U-NII-3 High channel



15 Power Spectral density

Test Requirement:	FCC CFR47 Part 15 Section 15.407(a) ANSI C63.10:2013
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01, Section F
Test Limit:	**Frequency band 5.15-5.25 GHz** 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. 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. 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. 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. **Frequency band 5.25-5.35 GHz and 5.47-5.725 GHz** The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. **Frequency band 5.725-5.85 GHz** The maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.
Test Result:	PASS

15.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum annlyzer.
2. Refer to section 4 of this report, according to KDB 789033 and ANSI C63.10, select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each).
3. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
4. Make the following adjustments to the peak value of the spectrum, if applicable:
   a) If Method SA-2 or SA-2 Alternative was used, add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum.
   b) If Method SA-3 Alternative was used and the linear mode was used in II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
5. The result is the Maximum PSD over 1 MHz reference bandwidth.
6. For devices operating in the band 5.725−5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz).

15.2 Test Result:

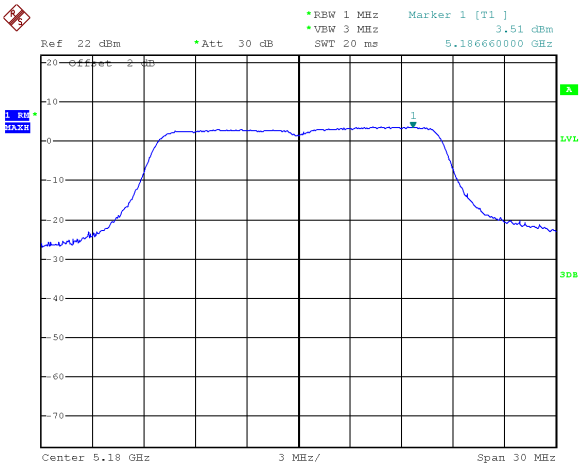
Band	Operation mode	CH	Measurements (dBm/MHz)	Duty Cycle Factor (dB)	Power Spectral Density (dBm/MHz)
U-NII-1	802.11a	Low	3.51	1.14	7.65
		Middle	3.79		7.93
		High	3.60		7.74
	802.11n(HT20)	Low	3.32	1.22	7.54
		Middle	3.64		7.86
		High	3.27		7.49
	802.11n(HT40)	Low	0.993	2.05	6.043
		High	0.997		6.047
U-NII-3	802.11a	Low	1.659	1.12	5.779
		Middle	1.732		5.852
		High	2.384		6.504
	802.11n(HT20)	Low	1.794	1.20	5.994
		Middle	1.419		5.619
		High	2.691		6.891
	802.11n(HT40)	Low	-1.908	2.04	3.132
		High	-0.741		4.299

Note:

PSD= Measurements + Duty Cycle Factor + Directional gain(3dBi)

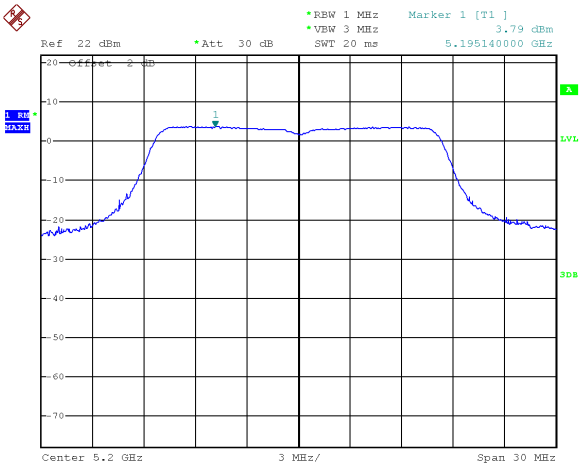
Test plots refer to next page:

802.11a U-NII-1 Low channel



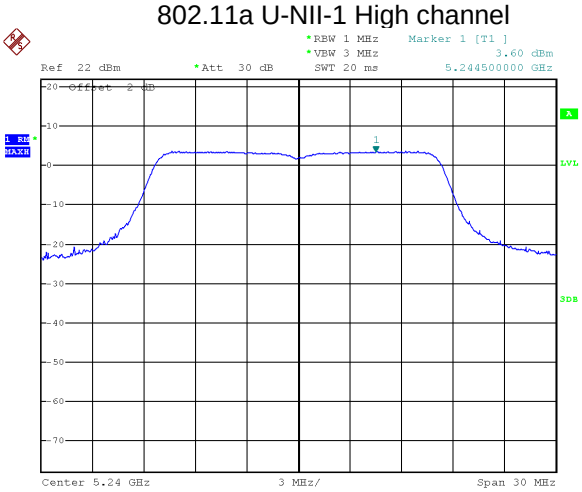
Date: 19.MAY.2022 18:28:11

802.11a U-NII-1 Middle channel



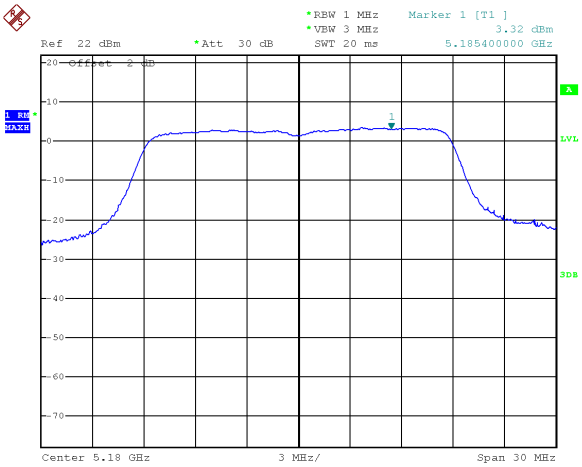
Date: 19.MAY.2022 18:32:10

802.11a U-NII-1 High channel



Date: 19.MAY.2022 18:32:46

802.11n HT20 U-NII-1 Low channel



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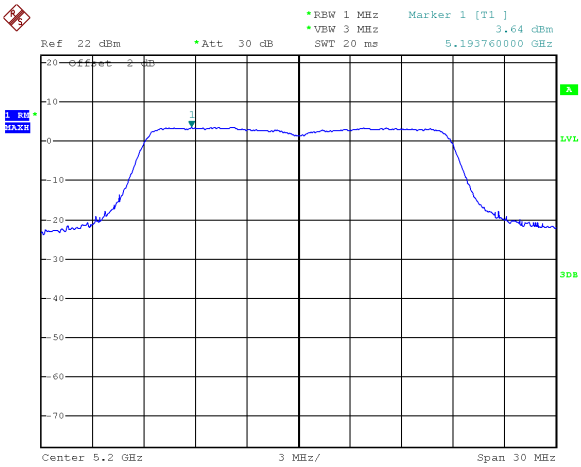
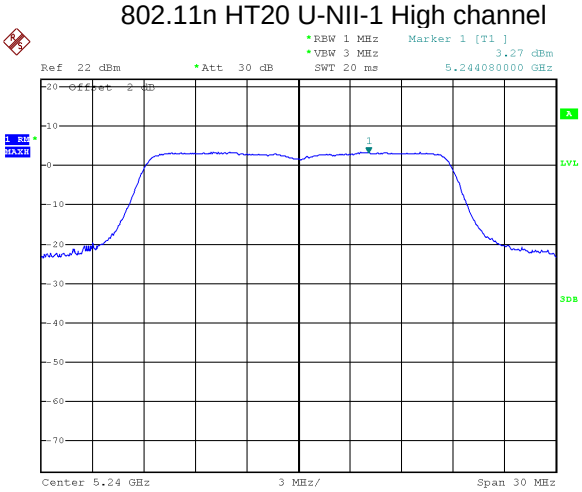
802.11n HT20 U-NII-1 Middle channel



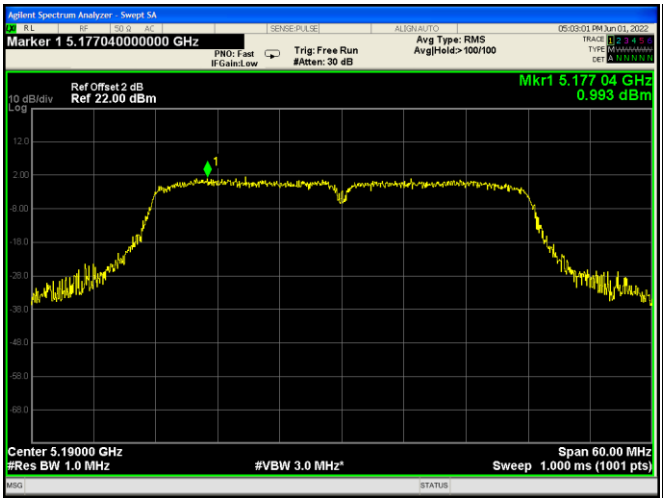
Date: 19.MAY.2022 19:42:24

802.11n HT20 U-NII-1 High channel

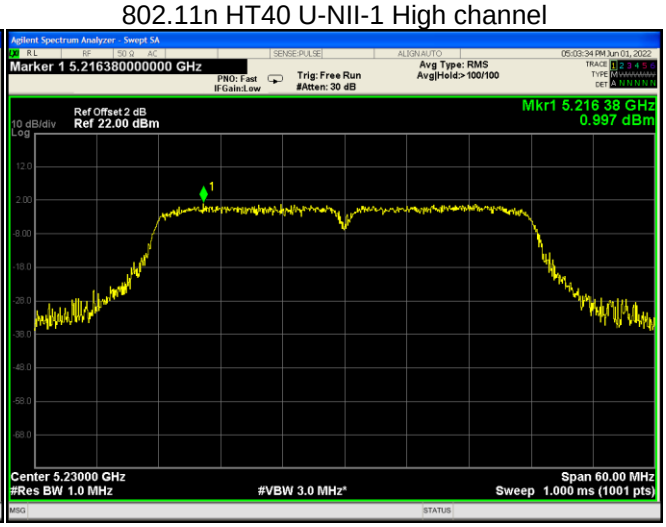


Date: 19.MAY.2022 18:33:19

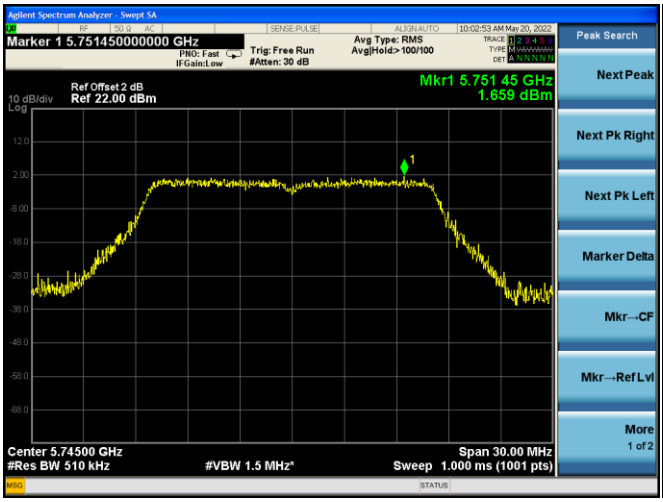
802.11n HT40 U-NII-1 Low channel



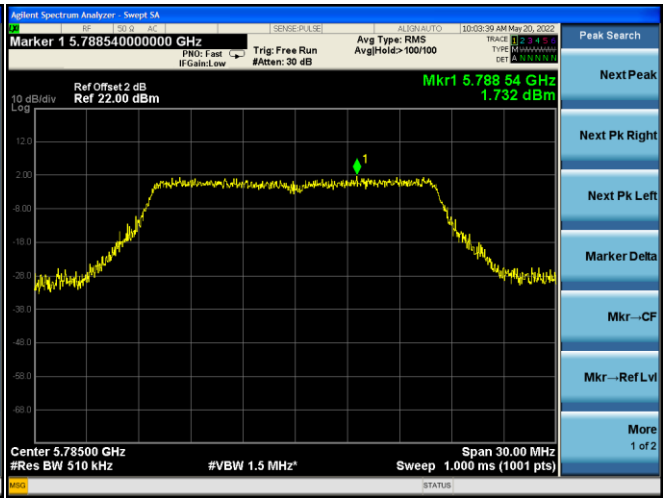
802.11n HT40 U-NII-1 High channel



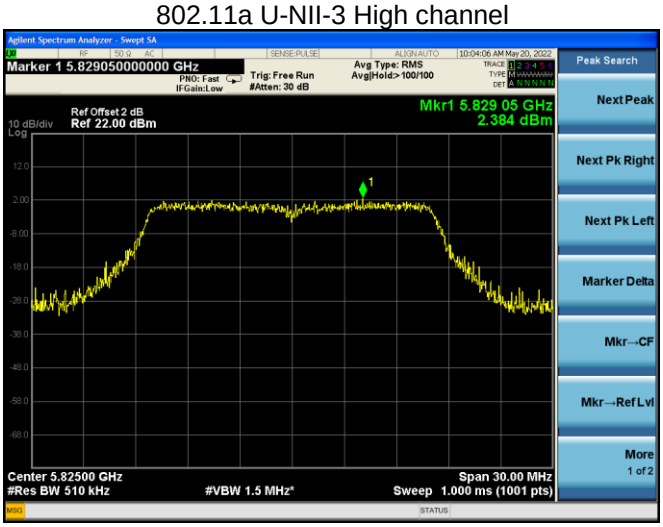
802.11a U-NII-3 Low channel



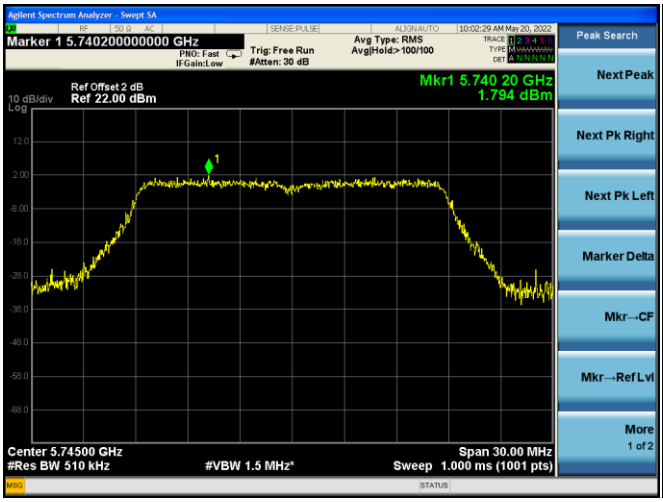
802.11a U-NII-3 Middle channel



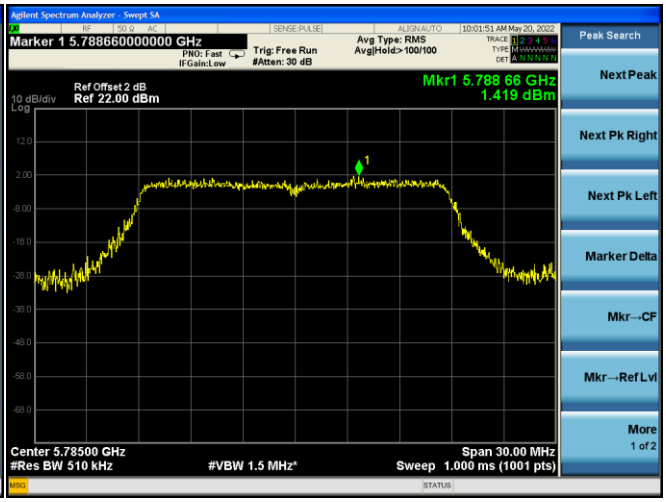
802.11a U-NII-3 High channel



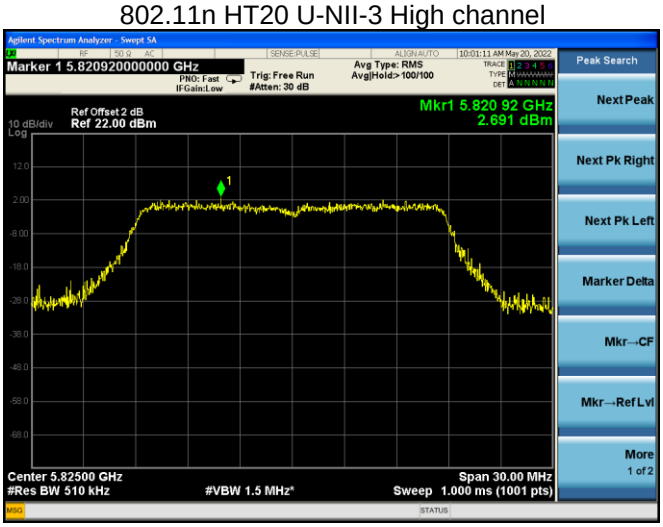
802.11n HT20 U-NII-3 Low channel



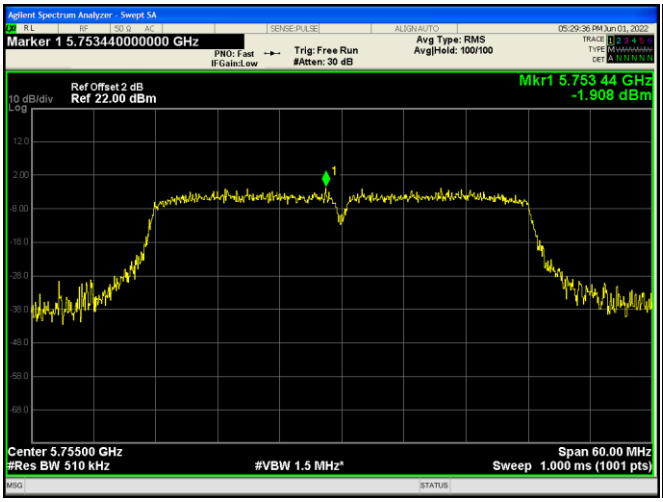
802.11n HT20 U-NII-3 Middle channel



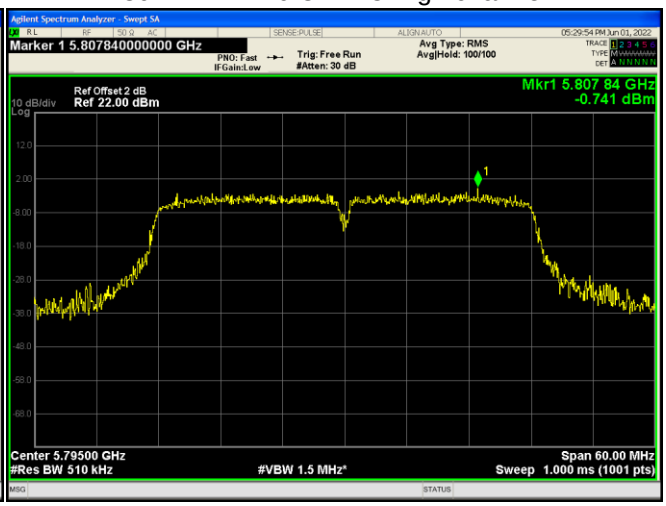
802.11n HT20 U-NII-3 High channel



802.11n HT40 U-NII-3 Low channel



802.11n HT40 U-NII-3 High channel



16 Frequency Stability

Test Requirement:	FCC CFR47 Part 15 Section 15.407(g)
Test Method:	ANSI C63.10:2013 KDB 789033 D02 General UNII Test Procedures New Rules v02r01
Test Limit:	According to 47CFR part 15 subpart E section 15.407(g): Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.
Test Result:	PASS

16.1 Test Procedure:

According to § 2.1055 Measurements required: Frequency stability, the following test procedure was performed.

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of unmodulation signal and fixed channelise.
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.
6. Then the frequency stability formula is $(f_C\text{-}f) / f_C \times 10^6$ ppm.
7. Extreme temperature rule is -30°C~ 50°C.
8. Extreme voltage is 85 to 115 percent of the nominal value.

16.2 Test Result:

Note: the manufacturer declared that the maximum frequency stability is below 20ppm.

U-NII-1 Test Frequency:5180MHz				
Temperature (℃)	**Power Supply (VAC)**	**Frequency deviation (MHz)**	**Frequency deviation (ppm)**	**Limit (ppm)**
50	12.0	0.0128	2.47	20
40		0.0202	3.89	20
30		0.0189	3.65	20
20		0.0165	3.19	20
10		0.0210	4.06	20
0		0.0112	2.17	20
-10		0.0118	2.27	20
-20		0.0200	3.87	20
-30		0.0201	3.89	20
20	10.2	0.0242	4.68	20
20	13.8	0.0216	4.16	20

U-NII-3 Test Frequency:5785MHz				
Temperature (℃)	**Power Supply (VAC)**	**Frequency deviation (MHz)**	**Frequency deviation (ppm)**	**Limit (ppm)**
50	120	0.0085	1.46	20
40		0.0212	3.66	20
30		0.0082	1.42	20
20		0.0155	2.68	20
10		0.0168	2.90	20
0		0.0180	3.10	20
-10		0.0129	2.23	20
-20		0.0077	1.33	20
-30		0.0119	2.06	20
20	102	0.0149	2.57	20
20	138	0.0221	3.82	20

17 Antenna Requirement

According to the FCC Part 15 Paragraph 15.203, 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. This product has an external antenna (Omni-directional with RP-SMA plug) and antenna gain is 3.0dBi fulfil the requirement of this section.

Note: Please refer to EUT photos for more details.

18 RF Exposure

Note: Please refer to RF Exposure Report: WTF22D04070741W003

19 Photographs of test setup and EUT.

Note: Please refer to appendix: Appendix-C100-0200-Photos.

======End of Report======