FCC PART 15 SUBPART C TEST REPORT

FCC PART 15 SUBPART E 15.407

Report Reference No..... :	**MAX250425011P02-R01**
FCC ID..... :	**2A2F4-AX3000-U21**
Compiled by (position+printed name+signature).. :	Engineer/ Cindy Zheng
Supervised by (position+printed name+signature).. :	Manager/Haley Wen
Approved by (position+printed name+signature).. :	RF Manager/ Vivian Jiang
Date of issue..... :	May 6, 2025
Testing Laboratory Name..... :	**MAXLAB Testing Co.,Ltd.**
Address..... :	1/F, Building B, Xinshidai GR Park,Shiyan Street, Bao'an District, Shenzhen,Guangdong, 518052, People's Republic of China
Applicant's name..... :	**Shenzhen Urant Technology Co., Ltd**
Address..... :	4th Floor, Building 63, Fumin Industrial Zone, Pinghu Community, Pinghu Street, Longgang District, Shenzhen
Test specification..... **:**	
Standard..... :	**FCC CFR Title 47 Part 15 Subpart C Section 15.407** **ANSI C63.10:2020** **KDB 789033 D02 v02r01** **KDB353028 D01v01r01** **KDB662911 D01 v02r01**

Test item description.....:	**repeater**
Trade Mark..... :	N/A
Manufacturer..... :	Shenzhen Urant Technology Co., Ltd
Model/Type reference..... :	AX3000-U21
Listed Models ..... :	N/A
Modulation Type..... :	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM for 802.11a/n/ac
Operation Frequency..... :	From 5180MHz-5240MHz
Rating..... :	AC 110~240V 50/60z 0.01~0.05A 6W
Result..... :	**PASS**

TEST REPORT

Equipment under Test	:	**repeater**
Model /Type	:	AX3000-U21
Series Model No.		N/A
Model Declaration	:	N/A
Applicant	:	**Shenzhen Urant Technology Co., Ltd**
Address	:	4th Floor, Building 63, Fumin Industrial Zone, Pinghu Community, Pinghu Street, Longgang District, Shenzhen
Manufacturer	:	**Shenzhen Urant Technology Co., Ltd**
Address	:	4th Floor, Building 63, Fumin Industrial Zone, Pinghu Community, Pinghu Street, Longgang District, Shenzhen

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1 TEST STANDARDS

The tests were performed according to following standards:

CC Rules Part 15 Subpart E—Unlicensed National Information Infrastructure Devices
ANSI C63.10-2020: American National Standard for Testing Unlicensed Wireless Devices
KDB789033 D02: General UNII Test Procedures New Rules v02r01
KDB353028 D01v01r01 : BASIC EQUIPMENT AUTHORIZATION GUIDANCE FOR ANTENNAS USED WITH PART 15 INTENTIONAL RADIATORS
KDB662911 D01v02r01 : Multiple Transmitter Output v02r01

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	April 21, 2025
Testing commenced on	:	April 21, 2025
Testing concluded on	:	May 6, 2025

2.2 Product Description

Product Name:	repeater			
Model/Type reference:	AX3000-U21			
Power supply:	AC110~240V 50/60z 0.01~0.05A 6W			
Adapter information	N/A			
Testing sample ID：	MAX250425011P02-R01-1# (Engineer sample), MAX25010076P01-R02-2# (Normal sample)			
Hardware version:	V1.0			
Software version:	V1.0			
Operation Frequency:	5180-5240MHz for 802.11a/n/ac(HT20); 5190-5230MHz for 802.11n/ac(HT40); 5210MHz for 802.11 ac(HT80)/ax(HT80);			
Data Rate	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40):MCS0-MCS15; 802.11ac(VHT20): NSS1, MCS0-MCS8 802.11ac(VHT40/VHT80):NSS1, MCS0-MCS			
WIFI :				
Supported type:	20MHz system	40MHz system	80MHz system	160MHz system
	802.11a 802.11n 802.11ac	802.11n 802.11ac	802.11ac	N/A
Modulation:	5180MHz-5240MHz	5190MHz-5230MHz	5210MHz	N/A
Operation frequency:	OFDM	OFDM	OFDM	N/A
Channel number:	4	2	1	N/A
Channel separation:	20MHz	40MHz	80MHz	N/A
Antenna type:	External antenna			
Antenna gain:	ANT 2: 3.70 dBi; ANT 3: 3.70 dBi; ANT 4: 3.70 dBi;			
Note:	The 5GHz WIFI has 3 antennas and support Multiple Outputs for 802.11n mode for this report; According to KDB 662911 D01 v02r01, Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi =3.70+10log(3) dBi=8.47dBi			

2.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	●	120V / 60Hz
		○	12 V DC	○	24 V DC
		○	Other (specified in blank below)		

2.4 Short description of the Equipment under Test (EUT)

This is AX3000-U21 repeater.
For more details, refer to the user's manual of the EUT.
This EUT support 2.4 GHz WLAN, 5 GHz WLAN, this report only for 5 GHz WLAN.
For more details, refer to the user's manual of the EUT.

2.5 Channel List

The Applicant provides communication tools software (AT command) to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing.
All test performed at the low, middle and high of operational frequency range of each mode.

Operation Frequency List WIFI on 5G Band：

Operating band	20MHz		40MHz		80MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
U-NII 1 (5150MHz-5250MHz)	36	5180	38	5190	42	5210
	40	5200				
	44	5220	46	5230		
	48	5240				

Note: The line display in grey is those Channels/Frequencies select to test in this report for each operation mode.

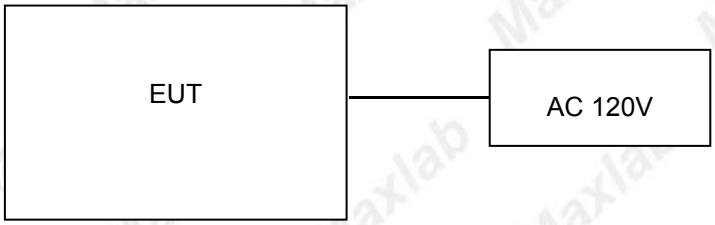
2.6 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	802.11a / n/ ac 20 CH36/ CH40/ CH 48
Mode 2	802.11n/ac40 CH38/ CH 46
Mode 3	802.11 ac80 CH 42
Mode 4	Link mode (Conducted emission &Radiated emission)

Note:
(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.
(2) We're testing antenna 3 data.

2.7 Block Diagram of Test Setup



2.8 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.

2.9 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

MAXLAB Testing Co.,Ltd.
1/F, Building B, Xinshidai GR Park,Shiyan Street, Bao'an District, Shenzhen,Guangdong, 518052, People's Republic of China

3.2 Test Facility

FCC-Registration No.: 562200 Designation Number: CN1338
MAX Testing Co.,Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

Industry Canada Registration Number. Is: 11093A CAB identifier: CN0019
The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

A2LA-Lab Cert. No.: 4707.01
MAX Testing Co.,Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:
Radiated Emission:

Temperature:	25 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	25 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

AC Power Conducted Emission

Temperature:	24 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

3.4 Test Description

FCC Requirement		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.407(a)	Emission Bandwidth(26dBm Bandwidth)	PASS Note1
FCC Part 15.407(e)	Minimum Emission Bandwidth(6dBm Bandwidth)	PASS Note2
FCC Part 15.407(a)	Maximum Conducted Output Power	PASS
FCC Part 15.407(a)	Peak Power Spectral Density	PASS
FCC Part 15.407(g)	Frequency Stability	PASS
FCC Part 15.407(b)	Undesirable emission	PASS
FCC Part 15.407(b)/15.205/15.209	Radiated Emissions	PASS
15.407(b)(1)/ 15.407(b)(2) 15.407(b)(3)/ 15.407(b)(4)	Band Edge	PASS
15.407(b)	Spurious Emissions at Antenna Terminals	PASS
FCC Part 15.407(h)	Dynamic Frequency Selection	N/A Note 3
FCC Part 15.203/15.247(b)	Antenna Requirement	PASS
FCC Part 15.407(c)	Automatically discontinue transmission	PASS Note4

Note 1: Apply to U-NII 1, U-NII 2A, and U-NII 2C band.
Note 2: Apply to U-NII 3 band only.
Note 3: This device not work in DFS band.
Note 4: While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ASK message transmitting from remote device and verify whether it shall resend or discontinue transmission. (Manufacturer declare)

Data Rate Used:

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate
MMaximum Conducted Output Power Power Spectral Density Emission Bandwidth(26dBm Bandwidth) Minimum Emission Bandwidth(6dBm Bandwidth) Undesirable emission Frequency Stability	11a/OFDM	6 Mbps
	11n(20MHz),11ac(20MHz)/OFDM	7.2 Mbps
	11n(40MHz),11ac(40MHz)/OFDM	15.0Mbps
	11ac(80MHz)/OFDM	65.0Mbps

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the MAXLAB Testing Co.,Ltd.quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for MAXLAB Testing Co.,Ltd.

Test item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB(10 MHz ≤f<3.6 GHz);
	1.38 dB(3.6 GHz ≤f<8 GHz)
Peak Output Power (Conducted)(Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB(10 MHz ≤f< 3.6 GHz);
	1.38 dB(3.6 GHz ≤f<8 GHz)
Frequencies Stability	6.7 x 10-8 (Antenna couple method)
	5.5x 10-8(Conducted method)
Conducted spurious emissions	0.86 dB(10 MHz ≤f<3.6 GHz);
	1.40 dB(3.6 GHz ≤f<8 GHz)
	1.66 dB (8 GHz ≤f < 26.5 GHz)
Uncertainty for radio frequency (RBW <20 kHz)	$3x10^{-8}$
Temperature	0.4℃
Humidity	2%
Uncertainty for Radiation Emission test (9 kHz-30 MHz)	3.44 dB
Uncertainty for Radiation Emission test (30 MHz-1GHz)	4.70 dB (Antenna Polarize:V)
	4.84 dB(Antenna Polarize:H)
Uncertainty for Radiation Emission test (1GHz-40GHz)	4.10 dB(1-6 GHz)
	4.40 dB(6 GHz- 18 GHz)
	3.54 dB(18 GHz- 26 GHz)
	4.30 dB(26 GHz-40 GHz)
Uncertainty for Power line conduction emission test	3.34dB(150KHz-30MHz)
	3.72dB(9KHz-150KHz)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6 Equipments Used during the Test

Conducted Emission					
Test Equipment	**Manufacturer**	**Model**	**Serial No.**	**Date of Cal.**	**Due Date**
Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	MAX252	2024-10-27	2025-10-26
EMI Test Receiver	R&S	ESCI 7	MAX552	2024-10-27	2025-10-26
Coaxial Switch	ANRITSU CORP	MP59B	MAX225	2024-10-27	2025-10-26
ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	MAX226	2024-10-27	2025-10-26
Coaxial Cable	MAX	N/A	MAX227	N/A	N/A
EMI Test Software	AUDIX	E3	N/A	N/A	N/A
Thermo meter	KTJ	TA328	MAX233	2024-10-27	2025-10-26
Absorbing clamp	Elektronik-Feinmechanik	MDS21	MAX229	2024-10-27	2025-10-26
LISN	R&S	ENV216	308	2024-10-27	2025-10-26
LISN	R&S	ENV216	314	2024-10-27	2025-10-26

Radiation Test equipment					
Test Equipment	**Manufacturer**	**Model**	**Serial No.**	**Date of Cal.**	**Due Date**
3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	MAX250	2024-10-27	2025-10-26
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	MAX251	N/A	N/A
EMI Test Receiver	Rohde & Schwarz	ESU26	MAX203	2024-10-27	2025-10-26

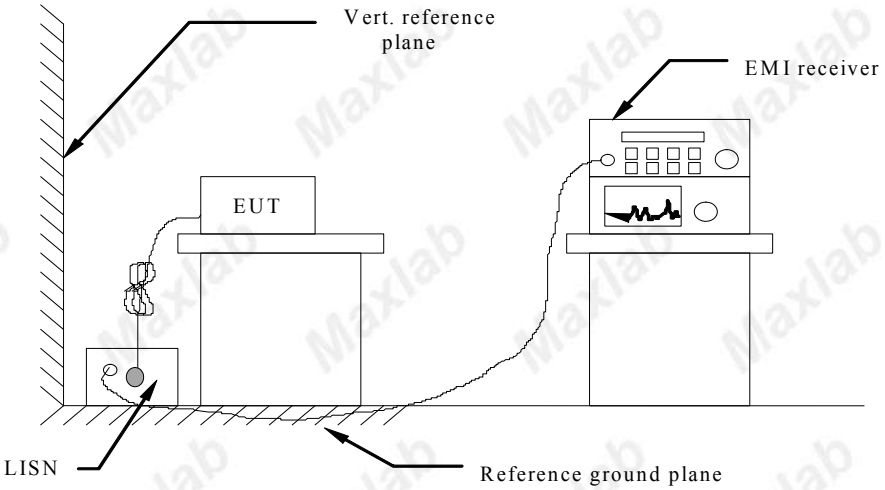
BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	MAX214	2024-10-27	2025-10-26
Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	MAX208	2024-10-27	2025-10-26
Horn Antenna	ETS-LINDGREN	3160	MAX217	2024-10-27	2025-10-26
EMI Test Software	AUDIX	E3	N/A	N/A	N/A
Amplifier (100kHz-1GHz)	HP	8347A	MAX204	2024-10-27	2025-10-26
Amplifier (1GHz-40GHz)	HP	84722A	MAX206	2024-10-27	2025-10-26
RF cables1 (9kHz-30MHz)	MAX	9kHz-30MHz	MAX213	2024-10-27	2025-10-26
RF cables2 (30MHz-1GHz)	MAX	30MHz-1GHz	MAX211	2024-10-27	2025-10-26
RF cables3 (1GHz-40GHz)	MAX	1GHz-40GHz	MAX210	2024-10-27	2025-10-26
Band filter	Amindeon	82346	MAX219	2024-10-27	2025-10-26
Power Meter	Anritsu	ML2495A	MAX540	2024-10-27	2025-10-26
Power Sensor	Anritsu	MA2411B	MAX541	2024-10-27	2025-10-26
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	MAX575	2024-10-27	2025-10-26
Splitter	Agilent	11636B	MAX237	2024-10-27	2025-10-26
Loop Antenna	ZHINAN	ZN30900A	MAX534	2024-10-27	2025-10-26
Breitband hornantenne	SCHWARZBECK	BBHA 9170	MAX579	2024-10-27	2025-10-26
Amplifier	TDK	PA-02-02	MAX574	2024-10-27	2025-10-26
Amplifier	TDK	PA-02-03	MAX576	2024-10-27	2025-10-26
Spectrum Analyzer (9kHz-40GHz)	Rohde & Schwarz	FSP	MAX-CE013	2024-10-27	2025-10-26
Antenna tower	SKET	BK-4AT	MAX589	2024-10-27	2025-10-26

RF Conducted Test:					
Test Equipment	**Manufacturer**	**Model**	**Serial No.**	**Date of Cal.**	**Due Date**
MXA Signal Analyzer	Agilent	N9020A	MAX566	2024-10-27	2025-10-26
Spectrum Analyzer	Agilent	E4440A	MAX533	2024-10-27	2025-10-26
MXG vector Signal Generator	Agilent	N5182A	MAX567	2024-10-27	2025-10-26
ESG Analog Signal Generator	Agilent	E4428C	MAX568	2024-10-27	2025-10-26
USB RF Power Sensor	DARE	RPR3006W	MAX569	2024-10-27	2025-10-26
RF Switch Box	Shongyi	RFSW3003328	MAX571	2024-10-27	2025-10-26
Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	MAX572	2024-10-27	2025-10-26

4 TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2020.
2 Support equipment, if needed, was placed as per ANSI C63.10-2020
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2020
4 The EUT received power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT.The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

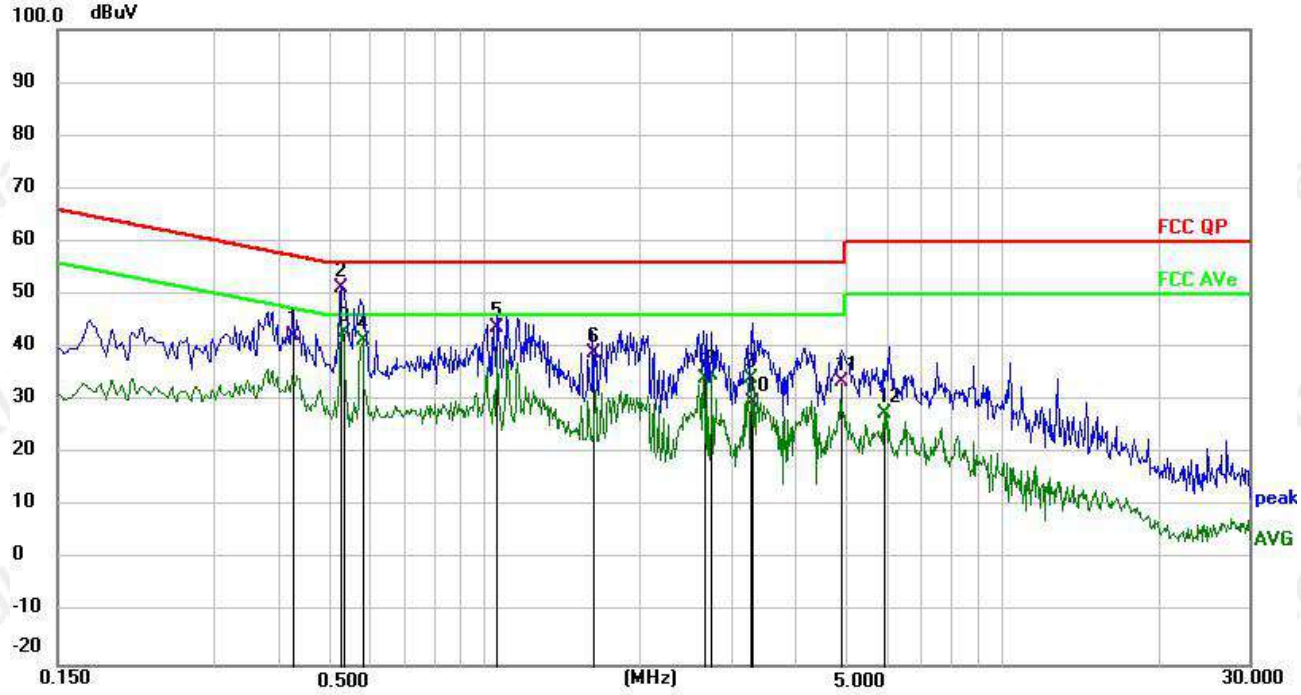
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

TEST RESULTS

Note: Pre-scan all mode and recorded worst case at IEEE 802.11n HT20 MIMO modes (ANT2+ANT3+ANT4).

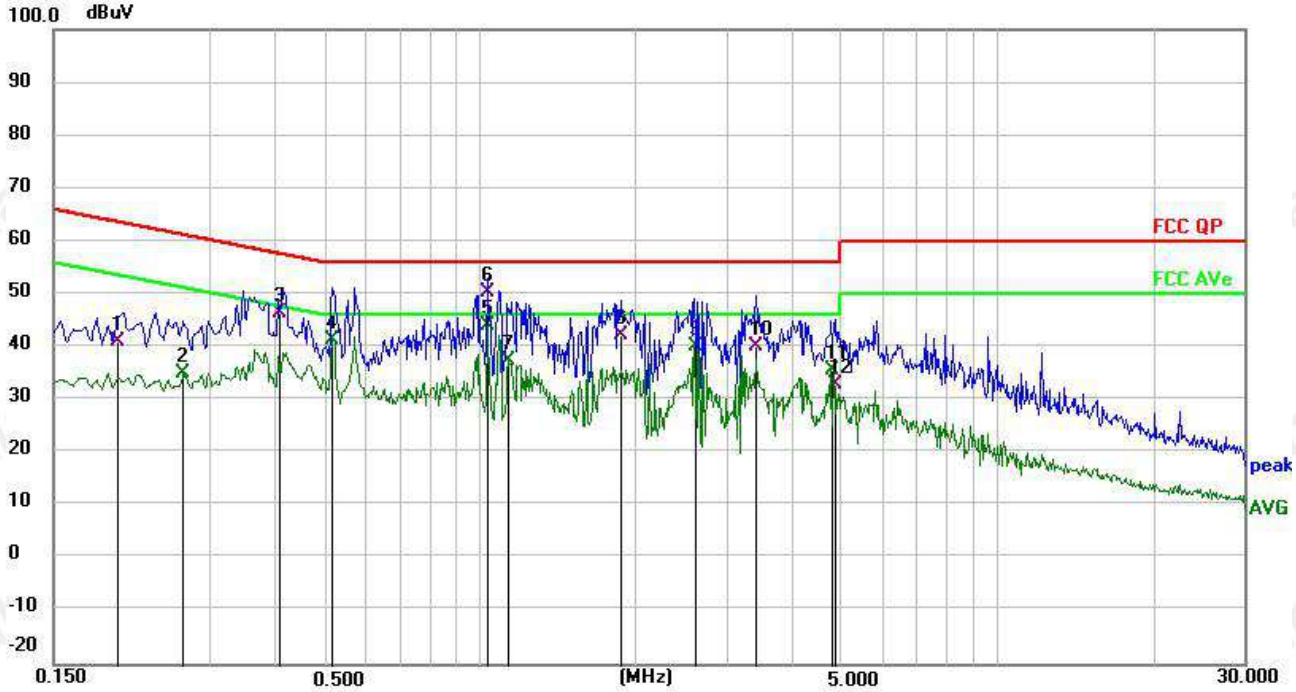
Power supply:	AC120V/60Hz	Polarization	L
Test Mode:	U-NII-1/ 802.11n20/ 5180MHz / ANT2+ANT3+ANT4		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.4254	25.70	16.69	42.39	57.34	-14.95	QP	P
2	0.5270	34.54	16.68	51.22	56.00	-4.78	QP	P
3 *	0.5325	26.30	16.68	42.98	46.00	-3.02	AVG	P
4	0.5820	24.55	16.67	41.22	46.00	-4.78	AVG	P
5	1.0540	27.21	16.61	43.82	56.00	-12.18	QP	P
6	1.6348	22.49	16.54	39.03	56.00	-16.97	QP	P
7	2.6565	17.70	16.39	34.09	46.00	-11.91	AVG	P
8	2.7554	18.30	16.38	34.68	46.00	-11.32	AVG	P
9	3.2820	17.70	16.31	34.01	46.00	-11.99	AVG	P
10	3.2889	13.35	16.31	29.66	56.00	-26.34	QP	P
11	4.9089	17.40	16.11	33.51	56.00	-22.49	QP	P
12	5.9325	11.77	15.92	27.69	50.00	-22.31	AVG	P

Note:1).Level (dBμV)= Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). Margin(dB) = Limit (dBμV) - Level (dBμV)

Power supply:	AC120V/60Hz	Polarization	N
Test Mode:	U-NII-1/ 802.11n20/ 5180MHz / ANT2+ANT3+ANT4		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1992	23.44	17.53	40.97	63.64	-22.67	QP	P
2	0.2670	17.64	17.53	35.17	51.21	-16.04	AVG	P
3	0.4084	29.05	17.52	46.57	57.68	-11.11	QP	P
4	0.5190	23.72	17.51	41.23	46.00	-4.77	AVG	P
5 *	1.0365	26.46	17.50	43.96	46.00	-2.04	AVG	P
6	1.0382	32.92	17.50	50.42	56.00	-5.58	QP	P
7	1.1400	20.06	17.50	37.56	46.00	-8.44	AVG	P
8	1.8651	24.86	17.48	42.34	56.00	-13.66	QP	P
9	2.5980	22.74	17.45	40.19	46.00	-5.81	AVG	P
10	3.4204	22.68	17.43	40.11	56.00	-15.89	QP	P
11	4.7805	18.37	17.41	35.78	46.00	-10.22	AVG	P
12	4.8629	15.46	17.41	32.87	56.00	-23.13	QP	P

Note:1).Level (dBμV)= Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). Margin(dB) = Limit (dBμV) - Level (dBμV)

4.2 Radiated Emission

Limit

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

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Undesirable emission limits

Requirement	Limit(EIRP)	Limit (Field strength at 3m) Note1
15.407(b)(1)	PK:-27(dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)		

Note1: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

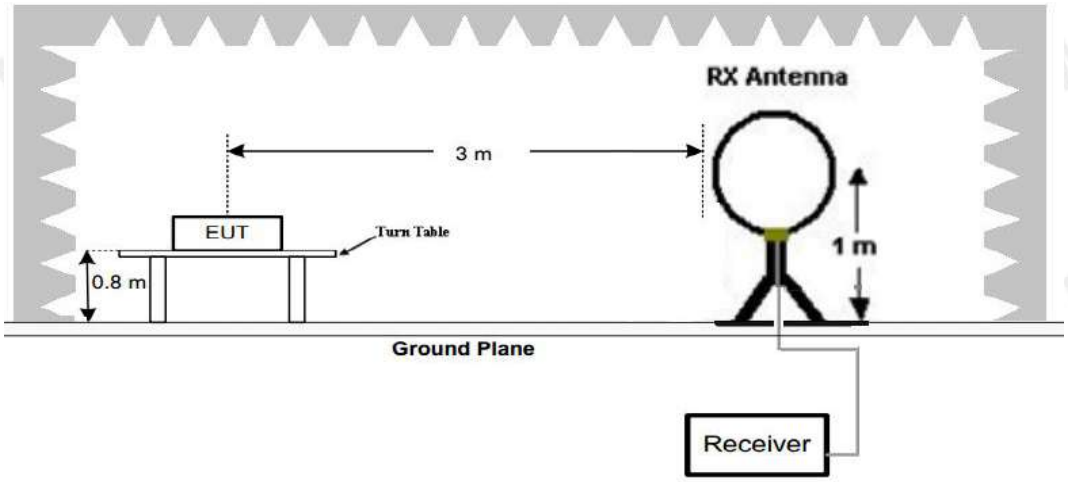
(5) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209
(6)In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

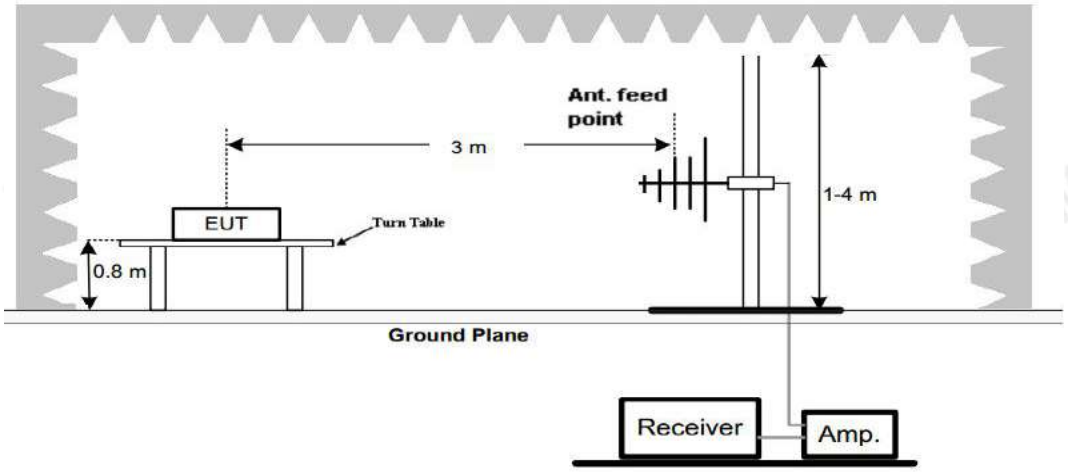
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

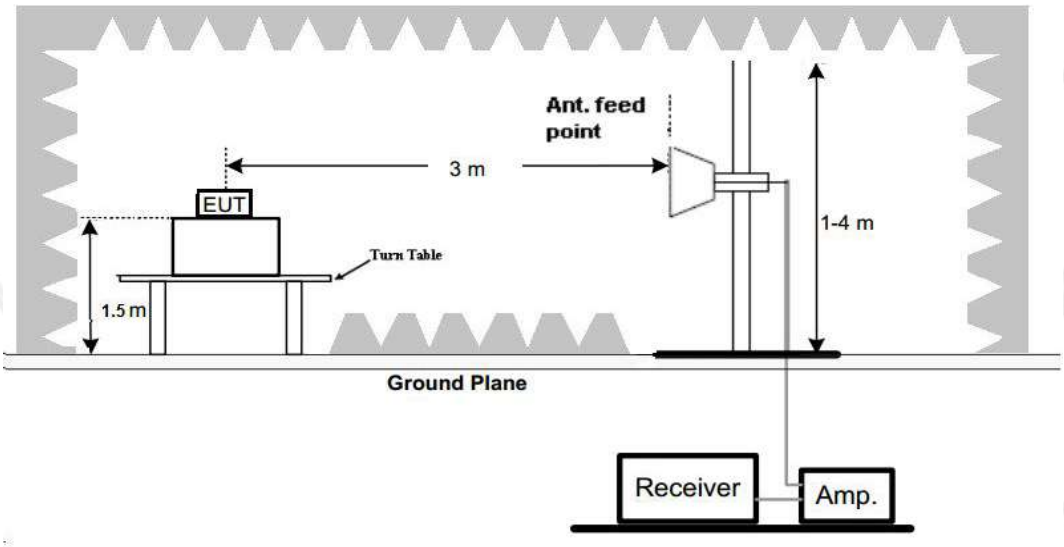
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



TEST PROCEDURE

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 40GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3
1GHz-18GHz	Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

TEST RESULTS

Between 9KHz – 30MHz
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

For 30MHz-1GHz

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Test Voltage:	AC 120V/60Hz
Test Mode:	TX(5.2G) 802.11n/5180MHz/ ANT2+ANT3+ANT4		

Note: Pre-scan all mode and recorded worst case at IEEE 802.11n HT20 MIMO modes (ANT2+ANT3+ANT4).

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F
1	57.9993	34.41	-16.95	17.46	40.00	-22.54	peak	100	0	P
2	96.0986	42.92	-20.19	22.73	43.50	-20.77	peak	100	0	P
3	161.4742	47.39	-15.98	31.41	43.50	-12.09	peak	100	0	P
4 *	189.0743	50.50	-18.65	31.85	43.50	-11.65	peak	100	0	P
5	234.9909	44.04	-18.15	25.89	46.00	-20.11	peak	100	0	P
6	305.6800	39.39	-15.43	23.96	46.00	-22.04	peak	100	0	P

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F
1	51.3005	48.75	-16.51	32.24	40.00	-7.76	peak	100	360	P
2	95.4270	54.92	-20.23	34.69	43.50	-8.81	peak	100	360	P
3 *	154.2786	53.51	-15.92	37.59	43.50	-5.91	peak	100	360	P
4	222.9502	51.18	-19.11	32.07	46.00	-13.93	peak	100	360	P
5	304.6099	34.38	-15.45	18.93	46.00	-27.07	peak	100	360	P
6	502.9395	35.46	-10.60	24.86	46.00	-21.14	peak	100	360	P

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

For 1GHz to 40GHz

Note: Note: Pre-scan all mode and recorded worst case at IEEE 802.11ac20 MIMO modes (ANT2+ANT3+ANT4).

U-NII 1 & 802.11 ac20 Mode (above 1GHz)

Tested Channel	Frequency (MHz)	Emission Limit (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
36 5158MHz	5150.00	59.40	PK	H	68.20	8.80	56.41	32.40	5.11	34.52	2.99
	5150.00	48.31	AV	H	54.00	5.69	45.32	32.40	5.11	34.52	2.99
	10360.00	48.45	PK	H	68.20	19.75	41.29	36.51	5.86	35.21	7.16
	--	--	--	--	--	--	--	--	--	--	--
40 5200MHz	10400.00	42.55	PK	H	68.20	25.65	35.26	36.58	5.96	35.25	7.29
	--	--	--	--	--	--	--	--	--	--	--
48 5240MHz	5350.50	43.55	PK	H	68.20	24.65	40.51	32.45	5.22	34.63	3.04
	10480.00	42.63	PK	H	68.20	25.57	35.28	36.68	6.21	35.54	7.35
	--	--	--	--	--	--	--	--	--	--	--

Tested Channel	Frequency (MHz)	Emission Limit (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
36 5158MHz	5150.00	53.62	PK	V	68.20	14.58	50.63	32.40	5.11	34.52	2.99
	5150.00	48.62	AV	V	54.00	5.38	45.63	32.40	5.11	34.52	2.99
	10360.00	47.41	PK	V	68.20	20.79	40.25	36.51	5.86	35.21	7.16
	--	--	--	--	--	--	--	--	--	--	--
40 5200MHz	10400.00	37.54	PK	V	68.20	30.66	30.25	36.58	5.96	35.25	7.29
	--	--	--	--	--	--	--	--	--	--	--
48 5240MHz	5350.50	37.67	PK	V	68.20	30.53	34.63	32.45	5.22	34.63	3.04
	10480.00	38.19	PK	V	68.20	30.01	30.84	36.68	6.21	35.54	7.35
	--	--	--	--	--	--	--	--	--	--	--

REMARKS:
1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the other emission levels were very low against the limit.
5. The worst case is MIMO (*ANT2+ANT3+ANT4*)

4.3 Maximum Peak Conducted Output Power

Limit

For the band 5.15-5.25 GHz.
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

(iv) 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.

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.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power sensor.

Test Configuration

Test Results

U-NII 1

Type	Channel	Output power PK (dBm)				Limit (dBm)	Result
		ANT 2	ANT 3	ANT 4	ANT 2+3+4		
802.11a	36	9.586	6.956	4.622	/	30.00	Pass
	40	9.854	6.845	4.265	/		
	48	9.421	6.856	4.241	/		
802.11n (HT20)	36	8.635	5.652	3.654	10.405	27.53	Pass
	40	8.421	5.562	3.254	10.233		
	48	8.241	5.241	3.415	10.005		
802.11n (HT40)	38	6.521	3.865	2.564	8.403		
	46	6.241	3.635	2.421	8.141		
802.11ac (HT20)	36	7.562	4.254	3.141	9.226		
	40	7.234	4.635	3.021	9.136		
	48	7.635	4.425	3.085	9.330		
802.11ac (HT40)	38	5.654	2.652	1.021	7.418		
	46	5.652	2.542	1.125	7.380		
802.11ac (HT80)	42	4.986	1.865	0.241	6.710		

Note:
1. Measured output power at difference data rate for each mode and recorded worst case for each mode.
2. Test results including cable loss.
3. Antenna Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi =3.70+10log(3) dBi=8.47dBi>6dBi
   Limit=30-(8.47-6)=27.53 dBi

4.4 Power Spectral Density

Limit

(1) For the band 5.15 - 5.25 GHz.

(i) For an outdoor access point operating in the band 5.15 - 5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 MHz band.note1

(ii) For an indoor access point operating in the band 5.15 - 5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 MHz band.note1

(iii) For fixed point-to-point access points operating in the band 5.15 - 5.25 GHz, transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.

(iv) For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 MHz band. note1

(2) For the 5.25 - 5.35 GHz and 5.47 - 5.725 GHz bands, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. note1

(3) For the band 5.725 - 5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band. note1, note2

Note1: If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note2: Fixed point - to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

transmission.

Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 1MHz for U-NII 1, U-NII 2A, U-NII C band and 510KHz for U-NII 3 band.
3. Set the VBW ≥ 3× RBW.
4. Set the span to encompass the entire EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.

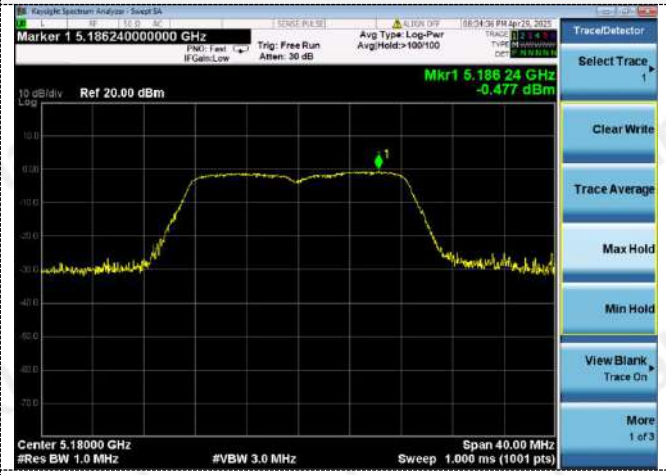
Test Configuration

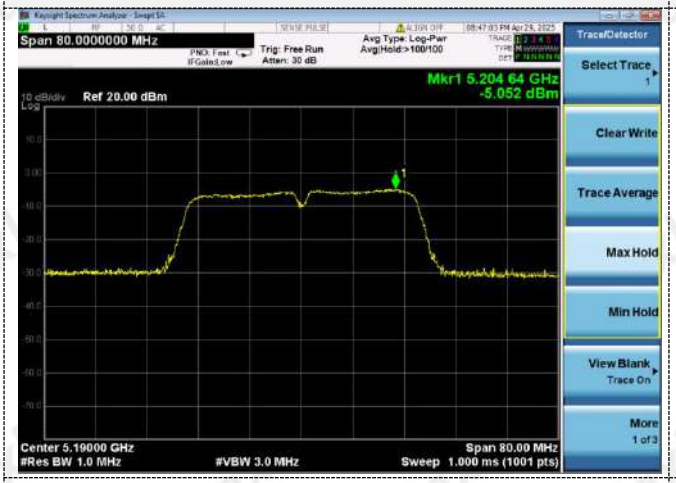
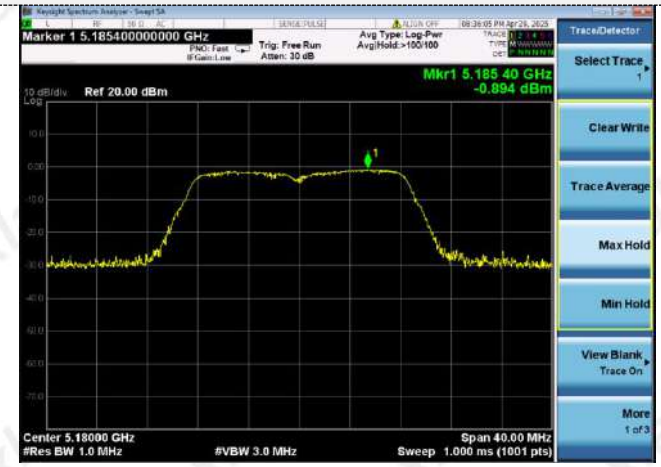
Test Results

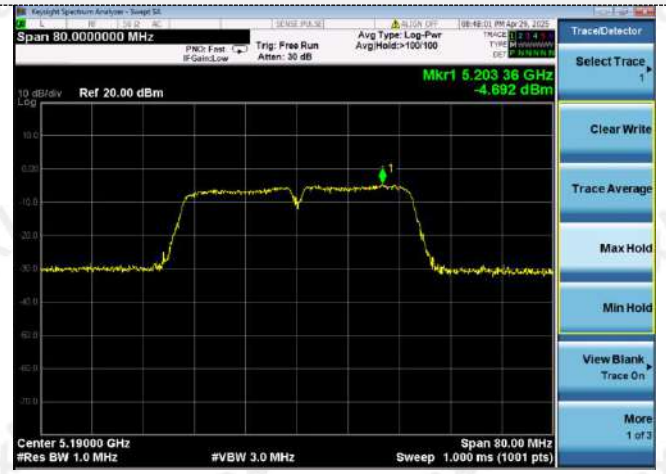
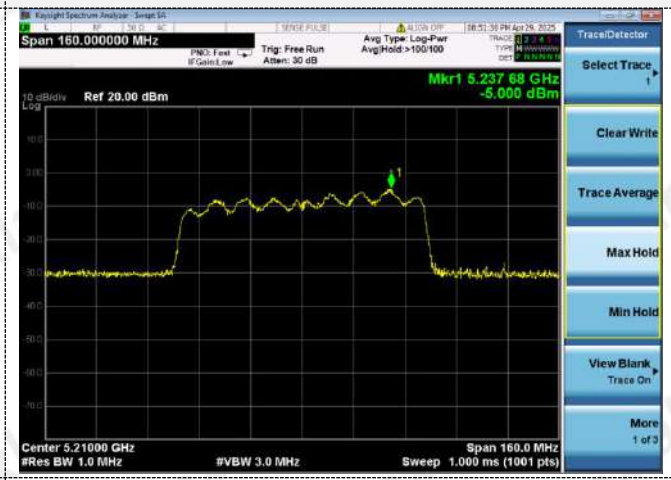
Type	Bands	Channel	Power Spectral Density (dBm/MHz)				Limit (dBm/MHz)	Result
			ANT 2	ANT 3	ANT 4	Total ANT 2+3+4		
802.11a	U-NII 1	36	0.370	-3.366	-4.627	/	17	Pass
		40	1.365	-2.641	-4.215	/		
		48	1.093	-1.259	-3.610	/		
802.11n (HT20)	U-NII 1	36	-0.477	-4.766	-5.789	1.742	14.53	
		40	1.205	-2.863	-4.627	3.388		
		48	0.654	-2.852	-4.571	3.075		
802.11n (HT40)	U-NII 1	38	-5.052	-9.308	-10.175	-2.792		
		46	-2.002	-6.289	-7.462	0.191		
802.11ac (HT20)	U-NII 1	36	-0.884	-4.852	-5.911	1.459		
		40	1.047	-3.005	-4.507	3.279		
		48	1.098	-3.629	-4.314	3.205		
802.11ac (HT40)	U-NII 1	38	-4.692	-9.188	-11.229	-2.713		
		46	-2.058	-5.715	-7.249	0.331		
802.11ac (HT80)	U-NII 1	42	-5.000	-10.236	-12.441	-3.298		

Note:
1. Measured output power at difference data rate for each mode and recorded worst case for each mode.
2. Test results including cable loss.
3. Antenna Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi =3.70+10log(3) dBi=8.47dBi>6dBi
   Limit=17-(8.47-6)=14.53 dBi

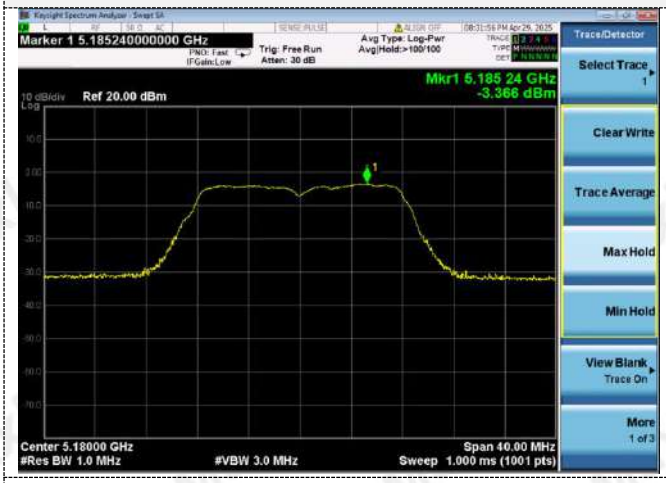
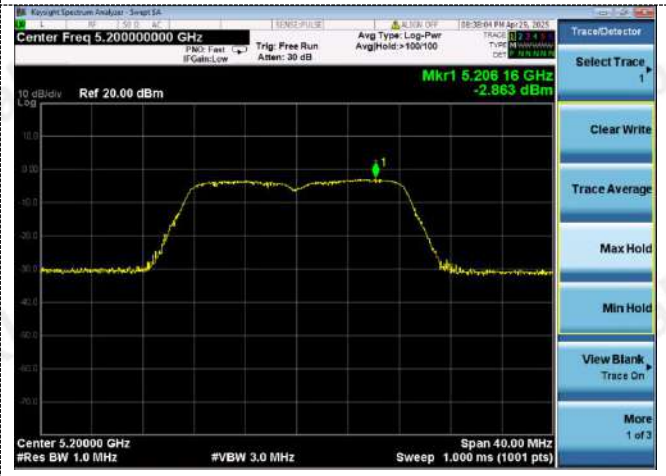
Test plot as follows:
ANT 2

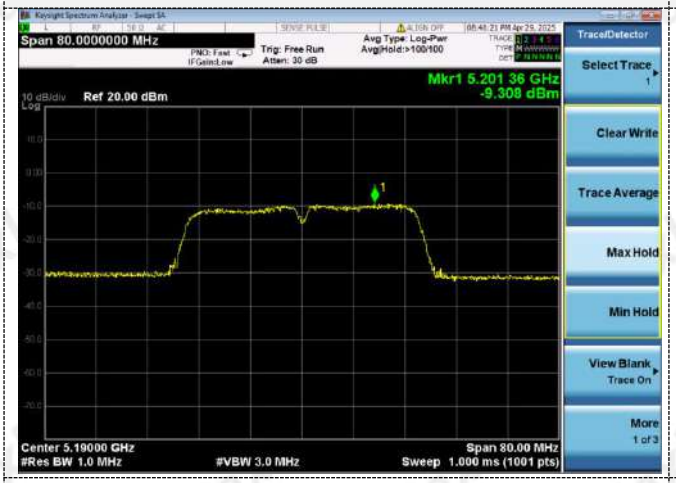
802.11a	802.11n(HT20)
U-NII 1	U-NII 1
	
CH36	CH36
	
CH40	CH40
	
CH48	CH48

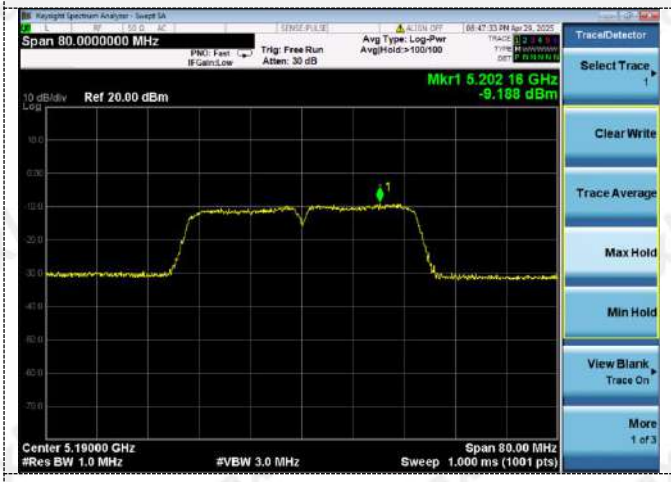
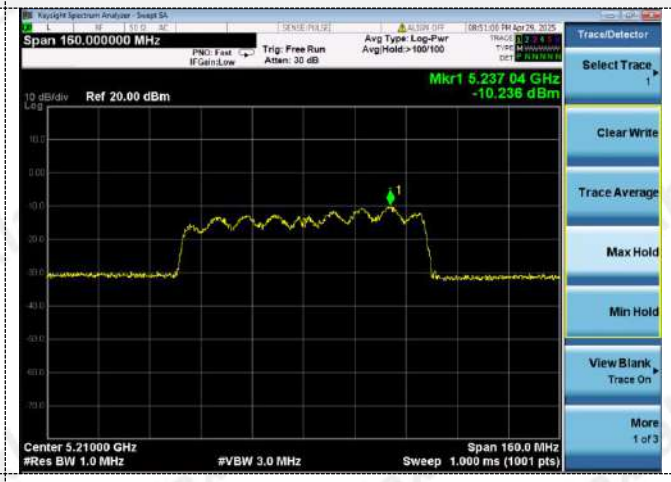
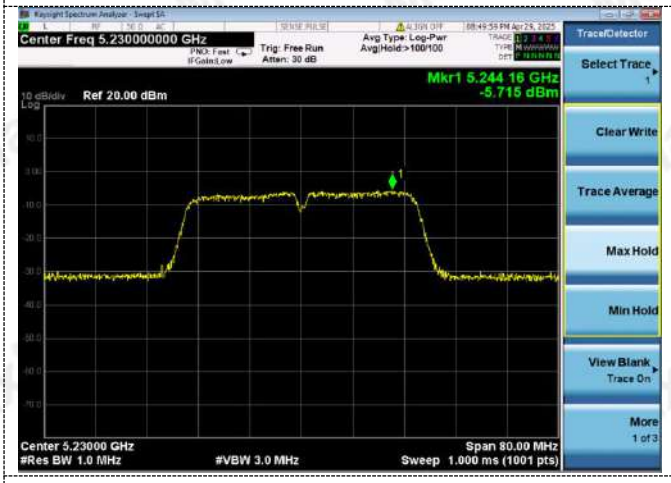
802.11n(HT40)	802.11ac(HT20)
U-NII 1	U-NII 1
	
CH38	CH36
	
CH46	CH40
	
	CH48

802.11ac(HT40)	802.11ac(HT80)
U-NII 1	U-NII 1
	
CH38	CH42
	
CH46	

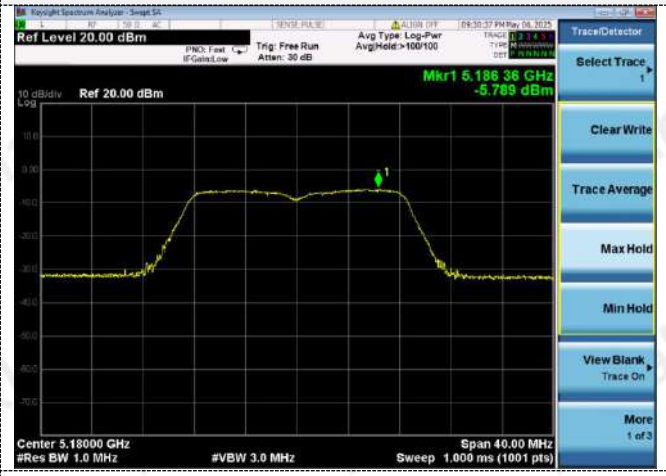
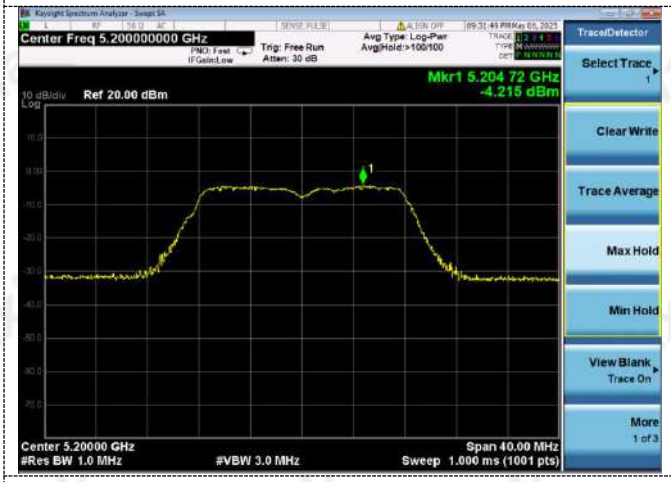
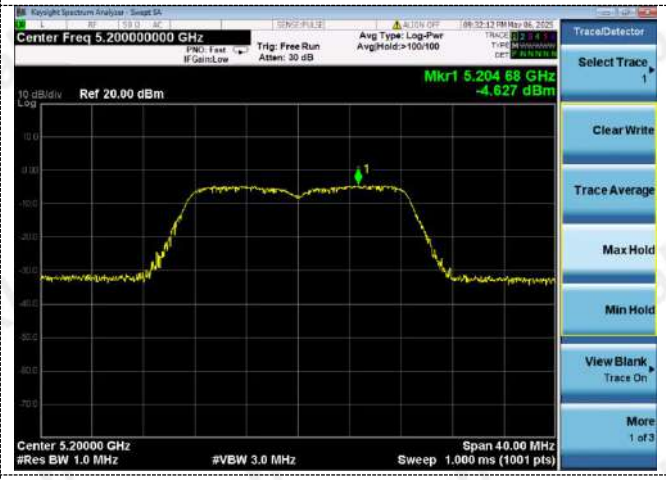
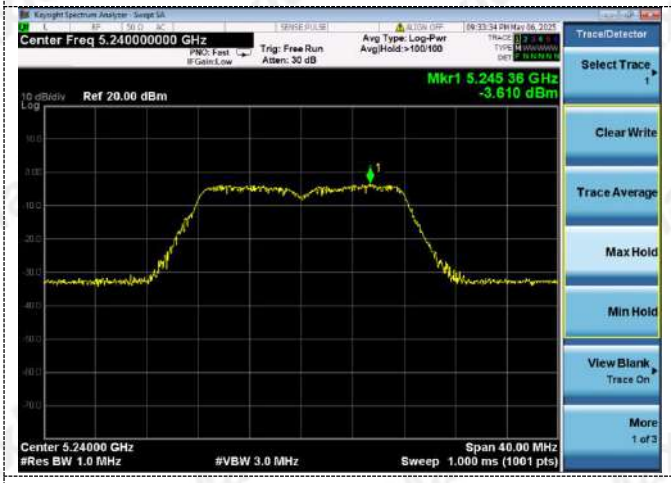
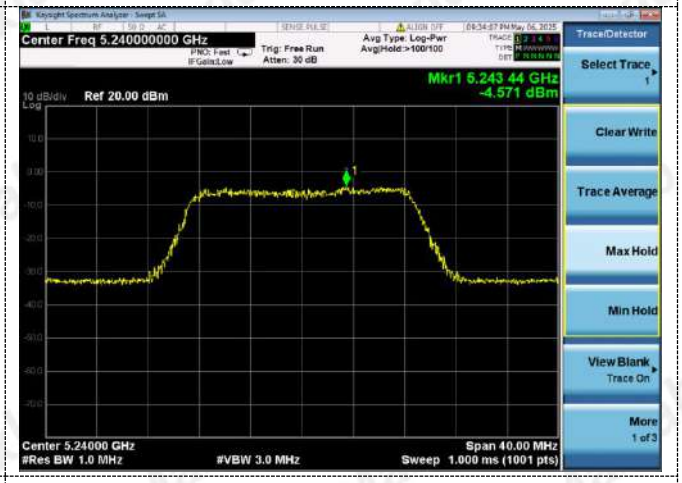
ANT 3

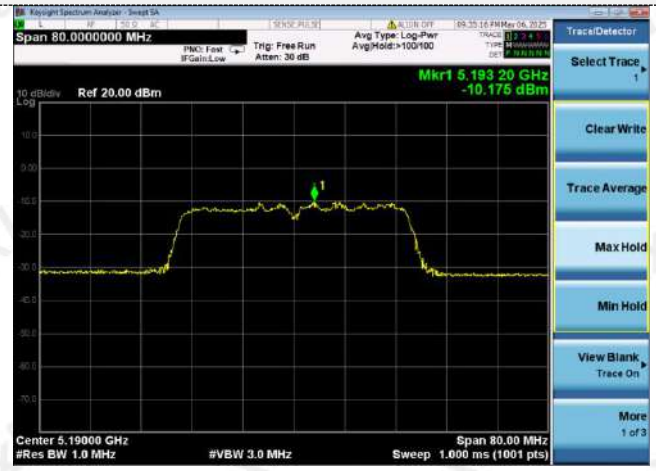
802.11a	802.11n(HT20)
U-NII 1	U-NII 1
	
CH36	CH36
	
CH40	CH40
	
CH48	CH48

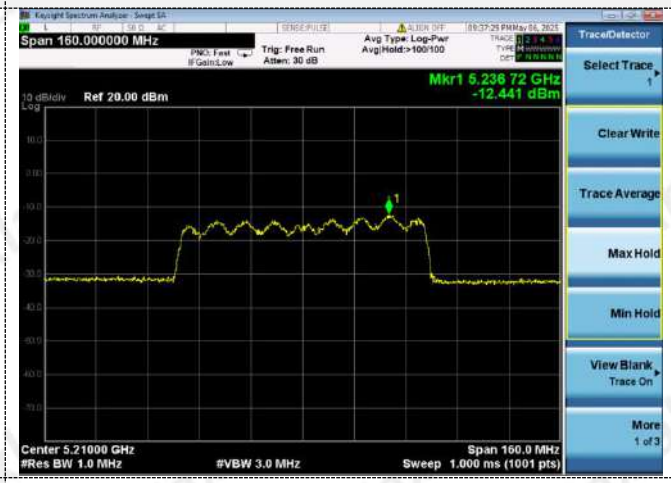
802.11n(HT40)	802.11ac(HT20)
U-NII 1	U-NII 1
	
CH38	CH36
	
CH46	CH40
	
	CH48

802.11ac(HT40)	802.11ac(HT80)
U-NII 1	U-NII 1
	
CH38	CH42
	
CH46	

ANT 4

802.11a	802.11n(HT20)
U-NII 1	U-NII 1
	
CH36	CH36
	
CH40	CH40
	
CH48	CH48

802.11n(HT40)	802.11ac(HT20)
U-NII 1	U-NII 1
	
CH38	CH36
	
CH46	CH40
	
	CH48

802.11ac(HT40)	802.11ac(HT80)
U-NII 1	U-NII 1
	
CH38	CH42
	
CH46	

4.5 Emission Bandwidth (26dBm Bandwidth)

Limit

N/A

Test Procedure

1. Set resolution bandwidth (RBW) = approximately 1% of the EBW.
2. Set the video bandwidth (VBW) > RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW / EBW ratio is approximately 1%.

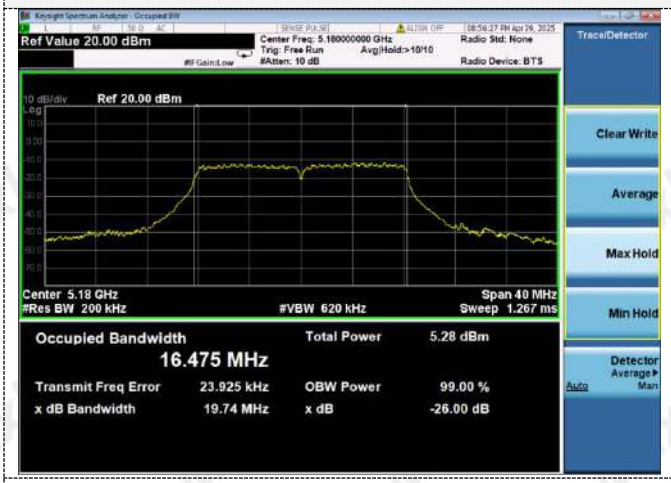
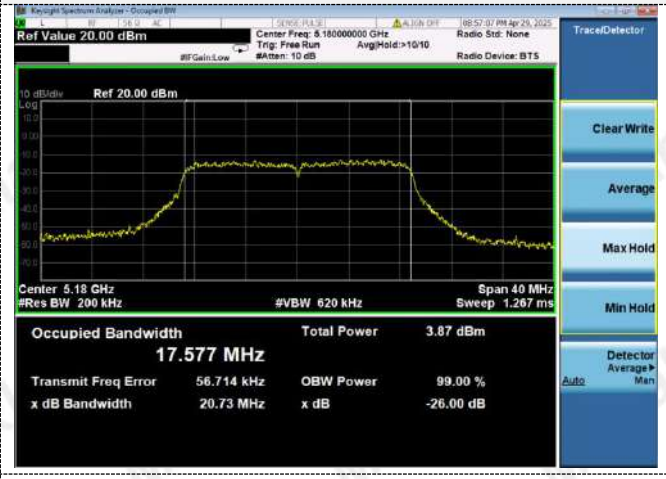
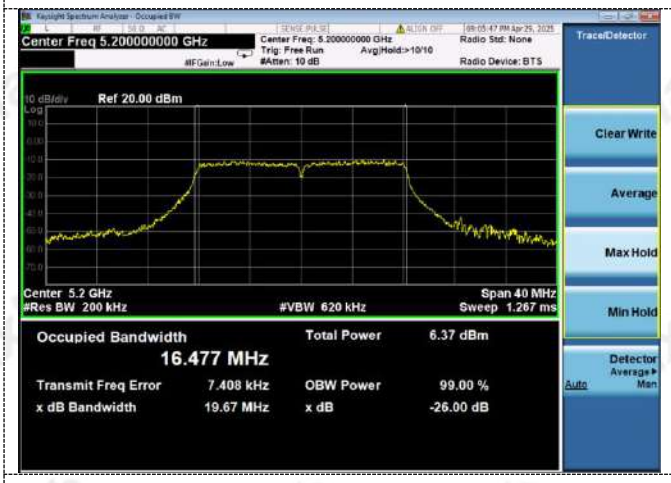
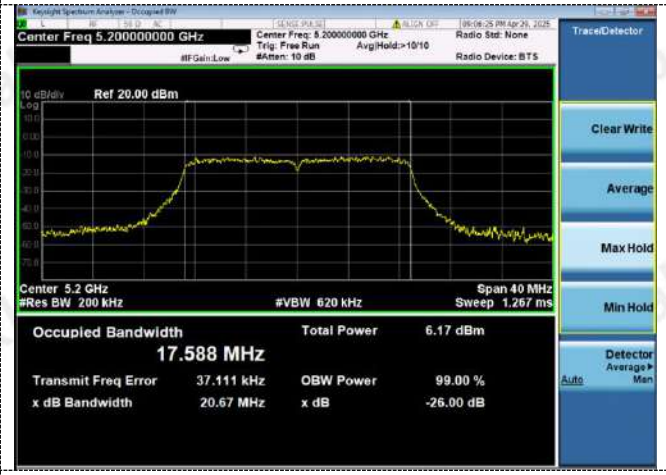
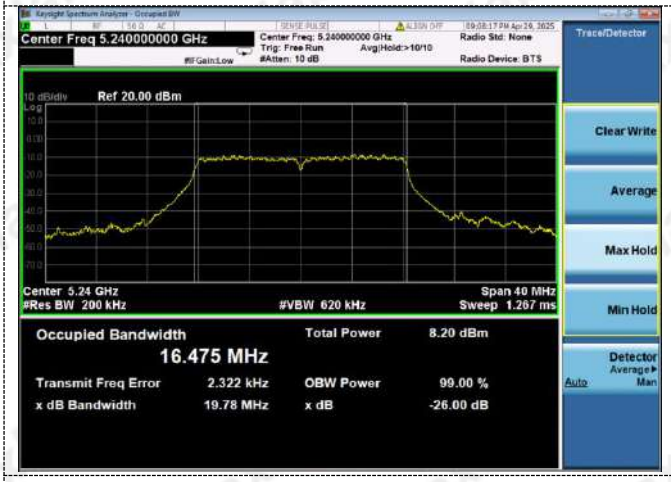
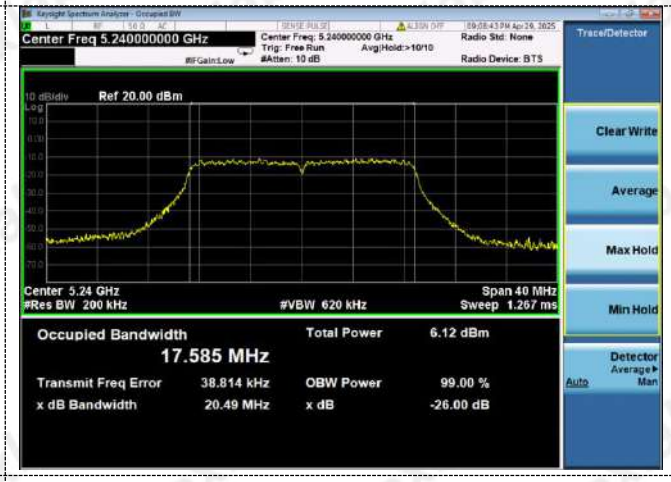
Test Configuration

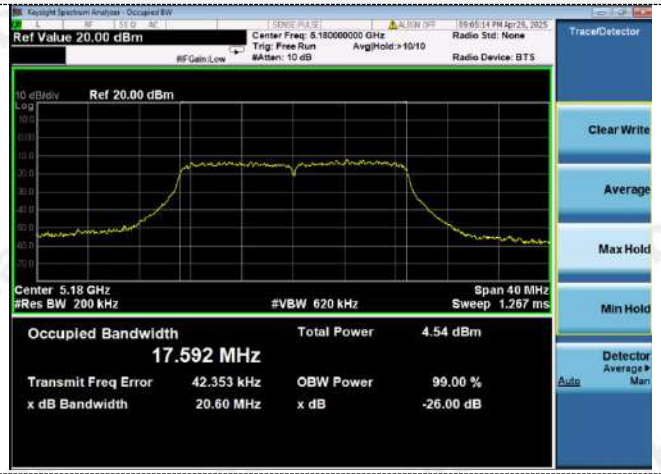
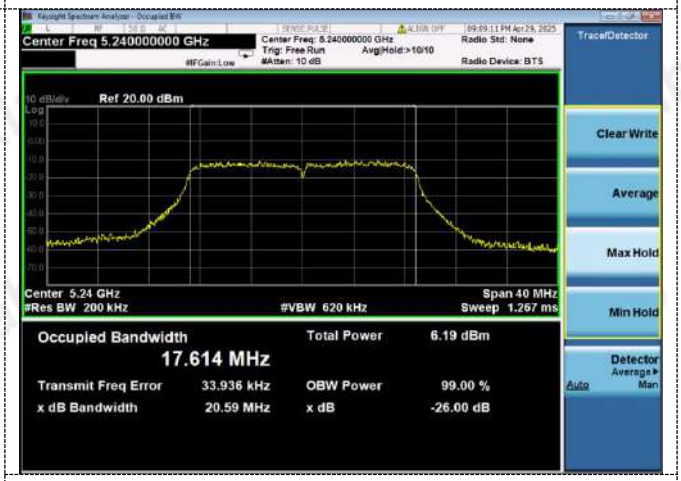
Test Results

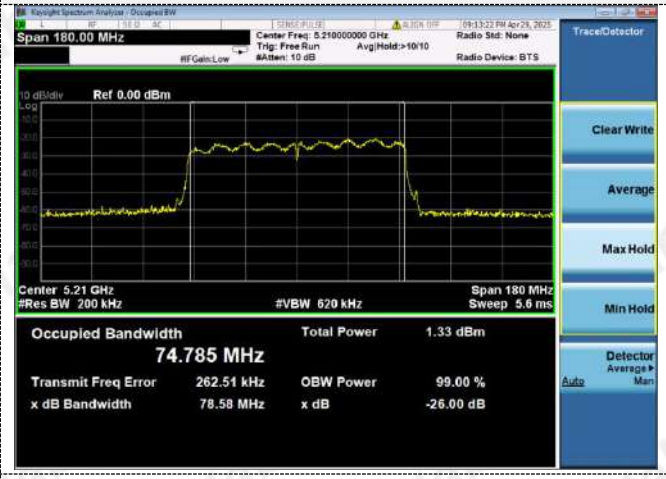
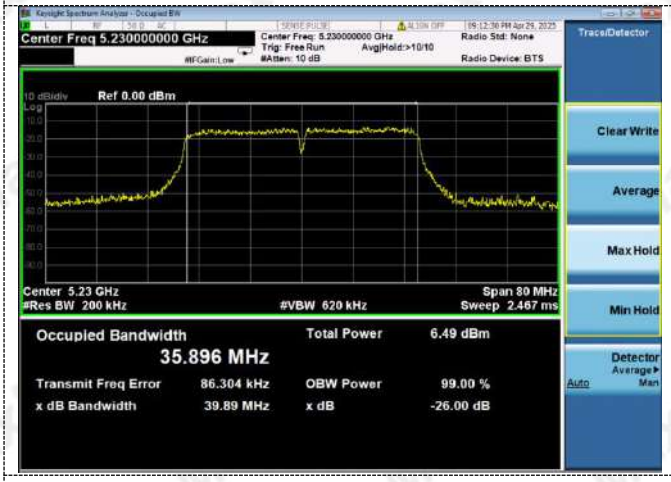
Type	Bands	Channel	26dB Bandwidth (MHz)			Limit (MHz)	Result
			ANT 2	ANT 3	ANT 4		
802.11a	U-NII 1	36	19.74	19.68	19.59	N/A	Pass
		40	19.67	19.59	19.51		
		48	19.78	19.72	19.68		
802.11n(HT20)	U-NII 1	36	20.73	20.68	20.62		
		40	20.67	20.64	20.57		
		48	20.49	20.43	20.37		
802.11n(HT40)	U-NII 1	38	39.75	39.68	39.62		
		46	39.80	39.75	39.68		
802.11ac(HT20)	U-NII 1	36	20.60	20.54	20.48		
		40	20.68	20.59	20.52		
		48	20.59	20.51	20.43		
802.11ac(HT40)	U-NII 1	38	39.49	39.42	39.37		
		46	39.89	39.82	39.76		
802.11ac(HT80)	U-NII 1	42	78.58	78.52	78.46		

Test plot as follows: Note: Both ANT 2/3/4 have been test, The worst data is Antenna 2, only shown Antenna 2 Plot.

U-NII 1 /5.2G

802.11a	802.11n(HT20)
	
CH36	CH36
	
CH40	CH40
	
CH48	CH48

802.11n(HT40)	802.11ac(HT20)
	
CH38	CH36
	
CH46	CH40
	
	CH48

802.11ac(HT40)	802.11ac(HT80)
	
CH38	CH42
	
CH46	

4.6 Minimum Emission Bandwidth (6dBm Bandwidth)

Limit

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth 3 x RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. 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.

Test Configuration

Test Results

N/A

4.7 Out of Band Emissions

4.7.1 Applicable Standard

According to FCC §15.407(b)
Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.725-5.850 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

4.7.2 Test Procedure

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

4.7.3 DEVIATION FROM STANDARD

No deviation.

4.7.4 TEST SETUP

4.7.5 EUT OPERATION CONDITIONS

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

4.7.6 TEST RESULTS

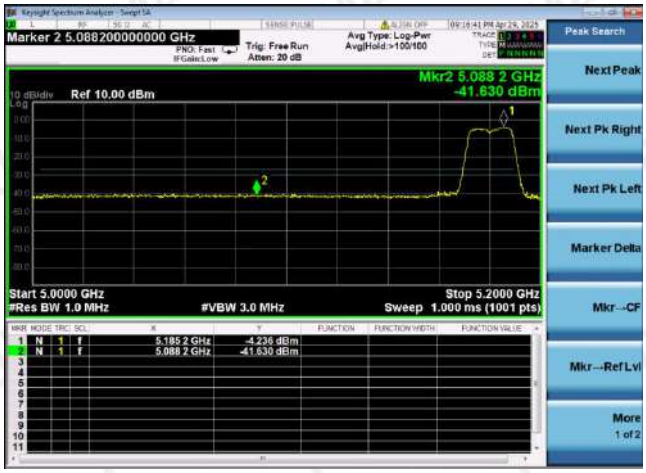
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage ：	AC 120V

Note: Both ANT 2/3/4 have been test, Only show the worst data of ANT 2

5.180~5.240 GHz

(802.11a) Band Edge, Left Side

(802.11n20) Band Edge, Left Side

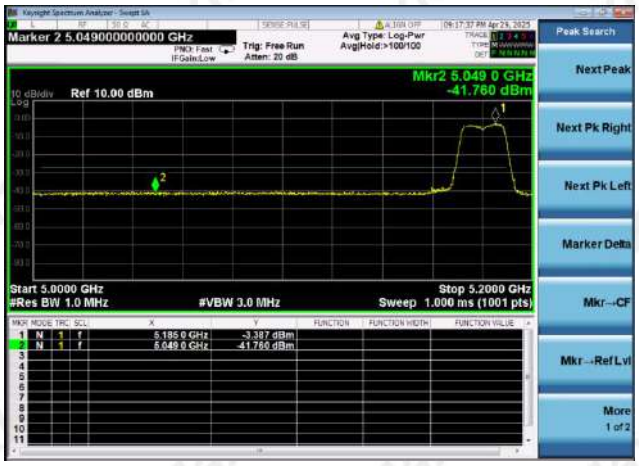


(802.11a) Band Edge, Right Side

(802.11n20) Band Edge, Right Side

5.180~5.240 GHz

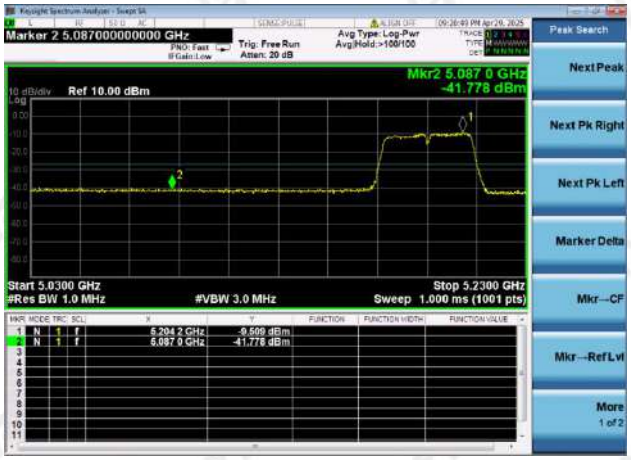
(802.11ac20) Band Edge, Left Side



(802.11ac20) Band Edge, Right Side

5.180~5.240 GHz

(802.11n40) Band Edge, Left Side



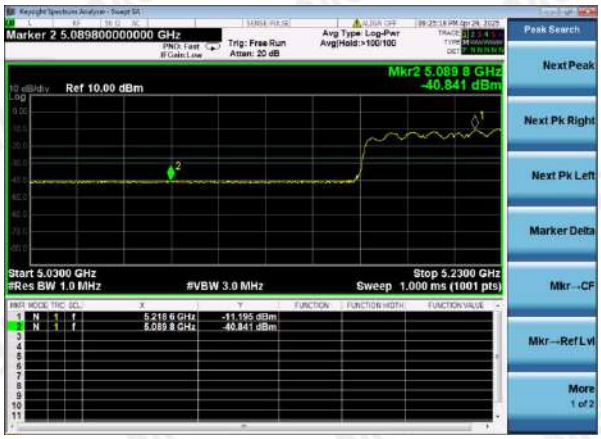
(802.11ac40) Band Edge, Left Side

(802.11n40) Band Edge, Right Side

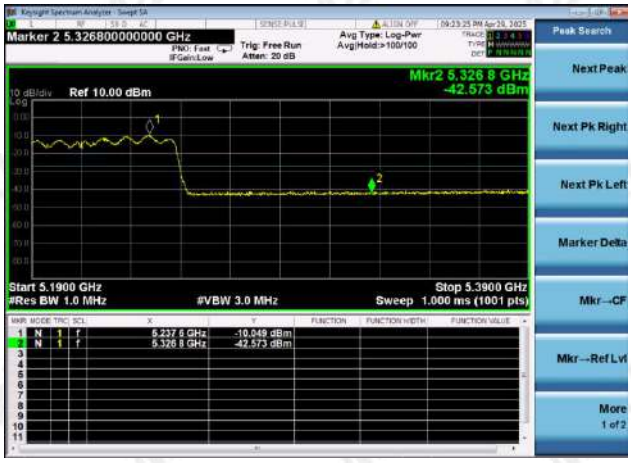
(802.11ac40) Band Edge, Right Side

5.180~5.240 GHz

(802.11ac80) Band Edge, Left Side



(802.11ac80) Band Edge, Right Side



4.8 SPURIOUS RF CONDUCTED EMISSIONS

4.8.1 Conformance Limit

Frequency Band (MHz)	Limit
5150 - 5250	Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm
5250 - 5350	Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm
5470 - 5725	Outside of the 5.47-5.725 GHz band: e.i.r.p. -27 dBm
5725 - 5850	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.

4.8.2 Measuring Instruments

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

4.8.3 Test Setup

4.8.4 Test Procedure

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2020 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=1MHz and VBW= 3MHz to measure the peak field strength, and measure frequency range from 30MHz to 40GHz.

4.8.5 Test Results

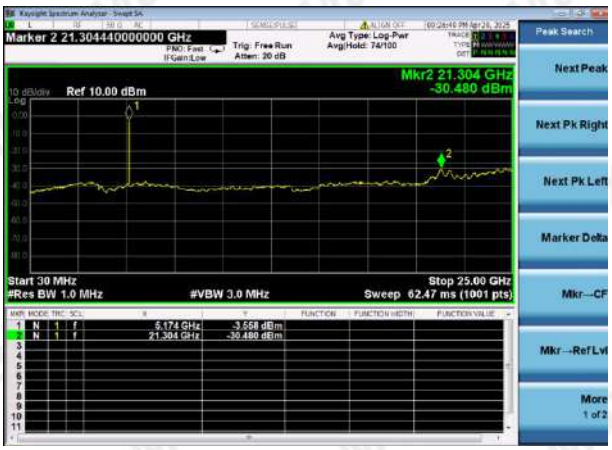
Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.

At 26.5GHz to 40GHz, the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

5.2G

Test Plot

802.11a on channel 36

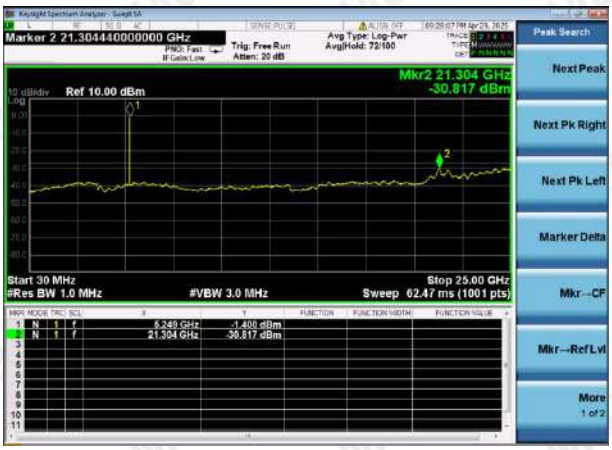


802.11n20 on channel 36

802.11a on channel 40

802.11n20 on channel 40

802.11a on channel 48

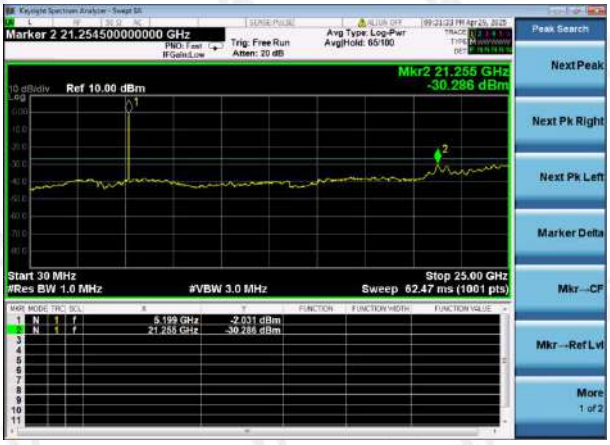


802.11n20 on channel 48

Test Plot

802.11ac20 on channel 36

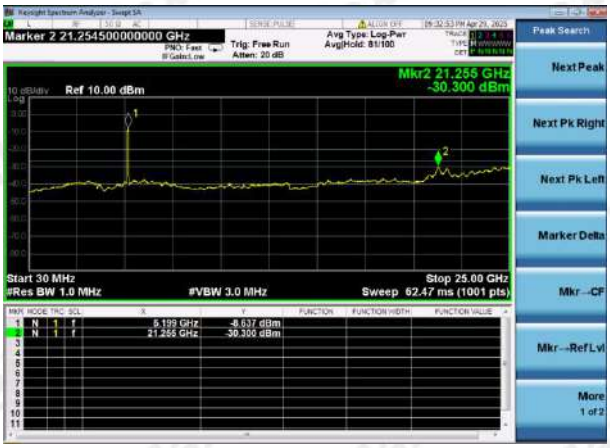
802.11ac20 on channel 40



802.11ac20 on channel 48

Test Plot

802.11n40 on channel 38

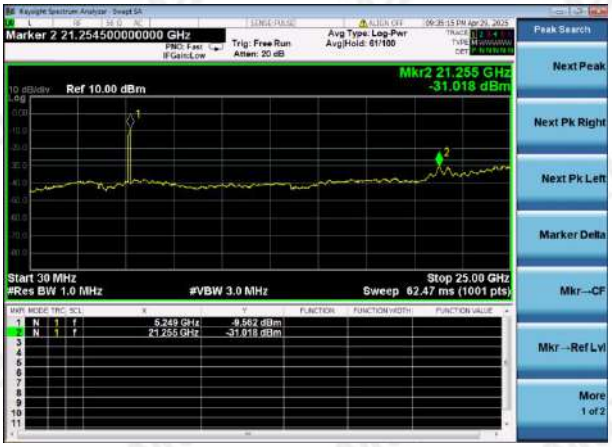


802.11n40 on channel 46

802.11 ac40 on channel 38

802.11 ac40 on channel 46

802.11ac80 on channel 42

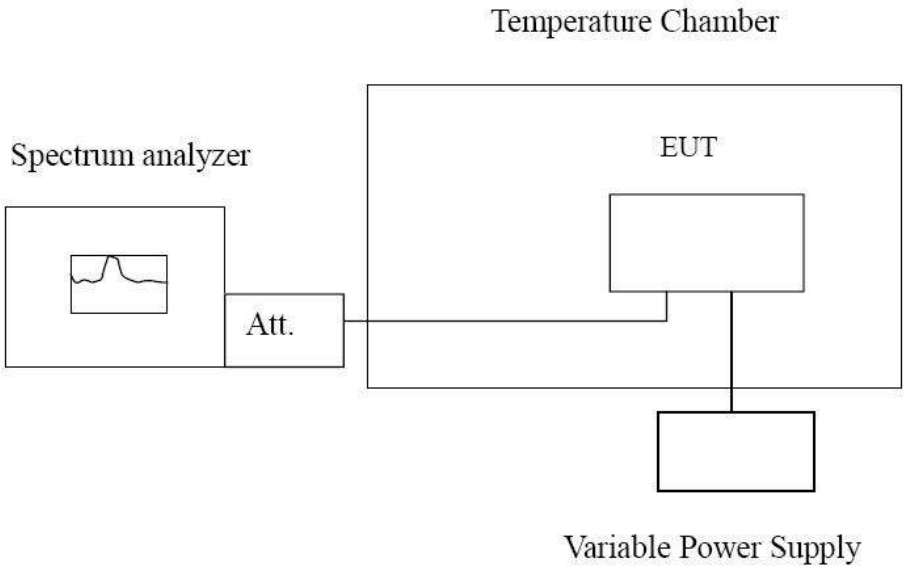


4.9 Frequency Stability

Limit

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

TEST CONFIGURATION



TEST PROCEDURE

Frequency Stability under Temperature Variations:
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

Frequency Stability under Voltage Variations:
Set chamber temperature to 25℃. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

Reference Frequency: 802.11ac channel=36 frequency=5180MHz					
Voltage (V)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
120	-30	67.71	0.013	Within the band of operation	Pass
	-20	81.35	0.016		
	-10	104.13	0.020		
	0	82.95	0.016		
	10	93.44	0.018		
	20	48.27	0.009		
	30	71.92	0.014		
	40	77.52	0.015		
	50	82.22	0.016		
138	25	97.84	0.019		
102	25	54.38	0.010		

4.10 Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

Test Result:

The EUT has three 5G WIFI external antenna (Antenna 2/3/4 gain: 3.70dBi) and R-SMA antenna connector. It comply with the standard requirement.

Remark:The antenna gain is provided by the customer, if the data provided by the customer is not accurate, MAXLAB Testing Co.,Ltd. does not assume any responsibility.

5 Test Setup Photos of the EUT

Reference to the appendix I for details.

6 Photos of the EUT

Reference to the appendix II for details.

********** End of Report **********