FCC PART 15 SUBPART C TEST REPORT

FCC PART 15 SUBPART E 15.407

Report Reference No.....:	**MAX250225011P02-R01**
FCC ID..... :	**2BN7W-LNN788**
Compiled by (position+printed name+signature)..:	Engineer/ Cindy Zheng Cindy zheng
Supervised by (position+printed name+signature)..:	Manager/Haley Wen Haley wen
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Date of issue.....:	March 14, 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.....:	**TIANZHI TRADING INC**
Address..... :	1624 Market St Ste 226, #30327 Denver CO 80202 US
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**

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Test item description.....:	**Dual Band Wireless Router**
Trade Mark.....:	LNN
Manufacturer.....:	TIANZHI TRADING INC
Model/Type reference.....:	LNN788
Listed Models .....:	N/A
Modulation Type..... :	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM for 802.11a/n/ac OFDMA with BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM for 802.11ax
Operation Frequency..... :	From 5180MHz-5240MHz, 5745MHz-5825MHz
Rating.....:	DC 12V powered by external adapter
Result.....:	**PASS**

TEST REPORT

Equipment under Test	:	**Dual Band Wireless Router**
Model /Type	:	LNN788
Series Model No.		N/A
Model Declaration	:	N/A
Applicant	:	**TIANZHI TRADING INC**
Address	:	1624 Market St Ste 226, #30327 Denver CO 80202 US
Manufacturer	:	**TIANZHI TRADING INC**
Address	:	1624 Market St Ste 226, #30327 Denver CO 80202 US

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.

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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	:	February 19, 2025
Testing commenced on	:	February 20, 2025
Testing concluded on	:	March 14, 2025

2.2 Product Description

Product Name:	Dual Band Wireless Router			
Model/Type reference:	LNN788			
Power supply:	DC 12V			
Adapter information	Model: RD1201000-225MG INPUT: 100-240V ~, 50/60Hz, 0.6A OUTPUT: 12V⎓ 1.0A			
Testing sample ID：	MAX250225011P02-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)/ax(HT20); 5190-5230MHz for 802.11n/ac(HT40)/ax(HT40); 5210MHz for 802.11 ac(HT80)/ax(HT80); 5745-5825 MHz for 802.11a/n/ac(HT20)/ax(HT20); 5755-5795 MHz for 802.11n/ac(HT40)/ax(HT40); 5775MHz 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/ax(VHT20): NSS1, MCS0-MCS8 802.11ac/ax(VHT40/VHT80):NSS1, MCS0-MCS			
WIFI :				
Supported type:	20MHz system	40MHz system	80MHz system	160MHz system
	802.11a 802.11n 802.11ac 802.11ax	802.11n 802.11ac 802.11ax	802.11ac 802.11ax	N/A
Modulation:	5180MHz-5240MHz 5745MHz-5825MHz	5190MHz-5230MHz 5755MHz-5795MHz	5210MHz 5775MHz	N/A
Operation frequency:	OFDM	OFDM	OFDM/OFDMA	N/A
Channel number:	9	4	2	N/A
Channel separation:	20MHz	40MHz	80MHz	N/A
Antenna type:	External antenna			
Antenna gain:	ANT 1: 6.0 dBi; ANT 2: 6.0 dBi; ANT 3: 6.0 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 =6+10log(3) dBi=10.77dBi			

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 LNN788 Dual Band Wireless Router.
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				
U-NII 3 (5725MHz-5850MHz)	149	5745	151	5755	155	5775
	153	5765				
	157	5785	159	5795		
	161	5805				
	165	5825	--	--	--	--

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

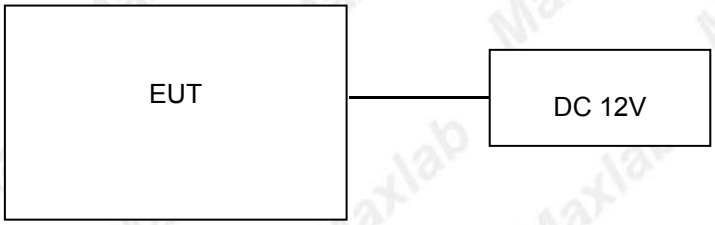
2.6 Test Mode

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.
AX mode tested all RU, only worst case mode (Full RU) recorded in report.

Pretest Mode	Description
Mode 1	802.11a / n/ ac 20/ ax 20 CH36/ CH40/ CH 48 802.11a /n/ ac 20/ ax 20 CH149/ CH157/ CH 165
Mode 2	802.11n/ac40/ ax 40 CH38/ CH 46 802.11n/ ac40/ ax 40 CH 151/ CH 159
Mode 3	802.11 ac80/ax80 CH 42/CH 155
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 1 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	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)

(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

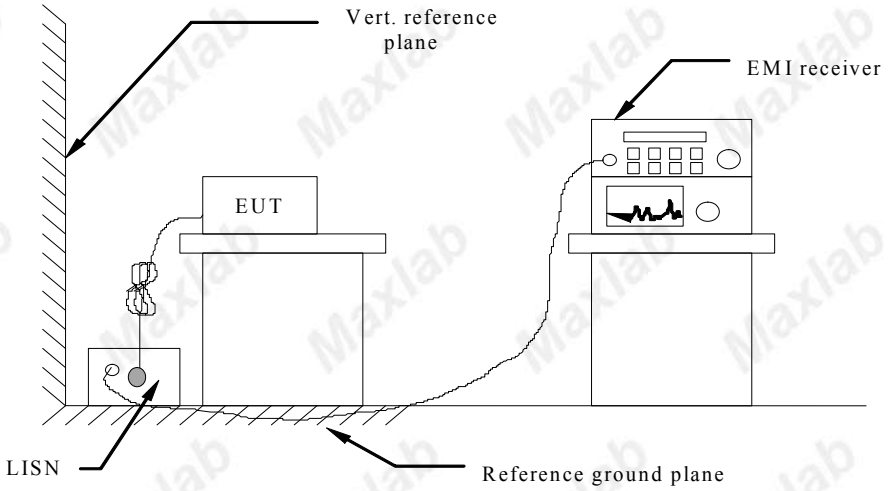
Power Meter	Anritsu	ML2495A	MAX540	2024-10-27	2025-10-26
Power Sensor	Anritsu	MA2411B	MAX541	2024-10-27	2025-10-26
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	MAX575	2024-10-27	2025-10-26
Splitter	Agilent	11636B	MAX237	2024-10-27	2025-10-26
Loop Antenna	ZHINAN	ZN30900A	MAX534	2024-10-27	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 C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
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

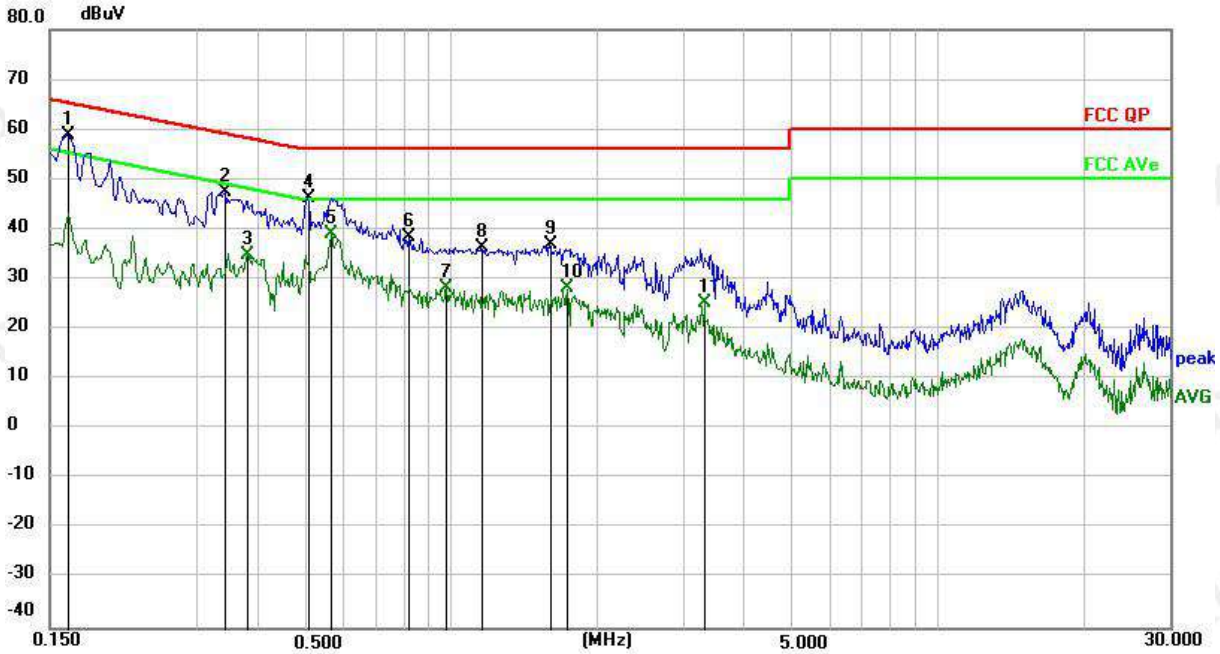
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

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 (ANT1+ANT2+ANT3).

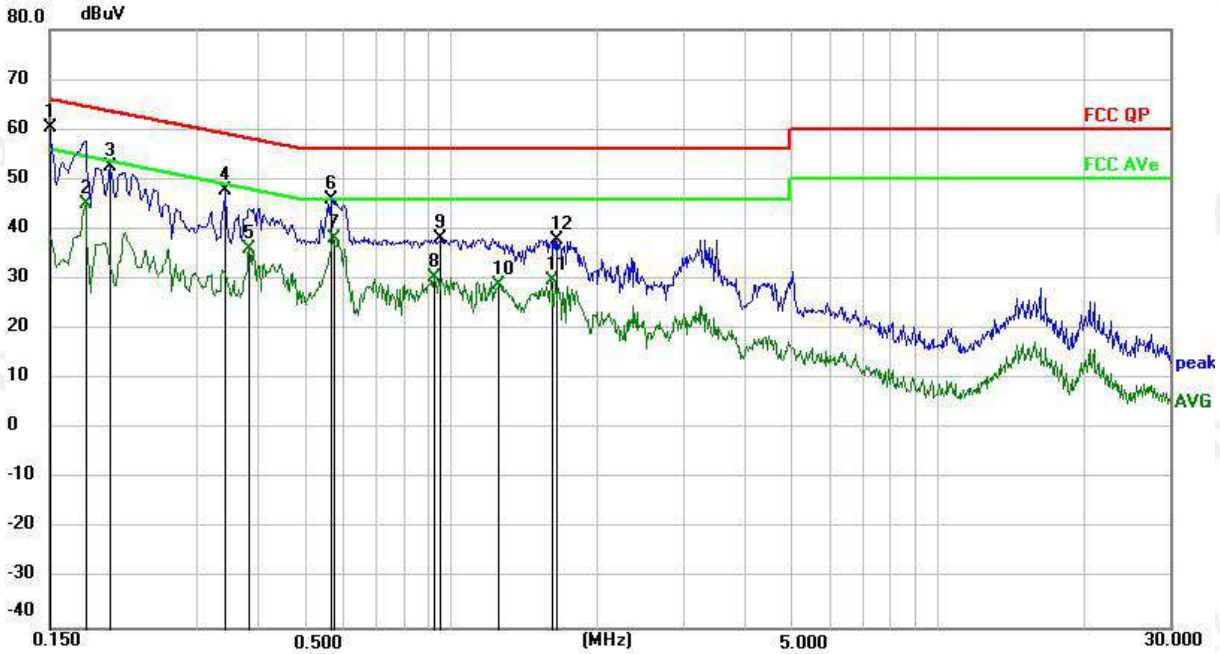
Power supply:	DC 12V by adapter AC120V/60Hz	Polarization	L
Test Mode:	U-NII-1/ 802.11a/ 5180MHz / ANT 1 + ANT 2 +ANT 3		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1 *	0.1635	48.95	10.03	58.98	65.28	-6.30	QP	P
2	0.3435	37.40	10.03	47.43	59.12	-11.69	QP	P
3	0.3795	24.72	10.03	34.75	48.29	-13.54	AVG	P
4	0.5072	36.10	10.03	46.13	56.00	-9.87	QP	P
5	0.5685	29.13	10.03	39.16	46.00	-6.84	AVG	P
6	0.8205	28.49	10.04	38.53	56.00	-17.47	QP	P
7	0.9825	18.12	10.04	28.16	46.00	-17.84	AVG	P
8	1.1578	26.34	10.04	36.38	56.00	-19.62	QP	P
9	1.5988	27.03	10.05	37.08	56.00	-18.92	QP	P
10	1.7430	18.05	10.05	28.10	46.00	-17.90	AVG	P
11	3.3134	15.17	10.05	25.22	46.00	-20.78	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:	DC 12V by adapter AC120V/60Hz	Polarization	N
Test Mode:	U-NII-1/ 802.11a/ 5180MHz / ANT 1 + ANT 2 +ANT 3		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1 *	0.1500	50.24	10.00	60.24	66.00	-5.76	QP	P
2	0.1768	35.05	10.00	45.05	54.63	-9.58	AVG	P
3	0.1995	42.56	10.00	52.56	63.63	-11.07	QP	P
4	0.3435	37.70	10.00	47.70	59.12	-11.42	QP	P
5	0.3840	26.03	10.00	36.03	48.19	-12.16	AVG	P
6	0.5685	36.02	10.00	46.02	56.00	-9.98	QP	P
7	0.5728	28.27	10.00	38.27	46.00	-7.73	AVG	P
8	0.9240	20.28	10.01	30.29	46.00	-15.71	AVG	P
9	0.9555	28.00	10.01	38.01	56.00	-17.99	QP	P
10	1.2615	18.71	10.01	28.72	46.00	-17.28	AVG	P
11	1.6033	19.78	10.02	29.80	46.00	-16.20	AVG	P
12	1.6393	27.98	10.02	38.00	56.00	-18.00	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)

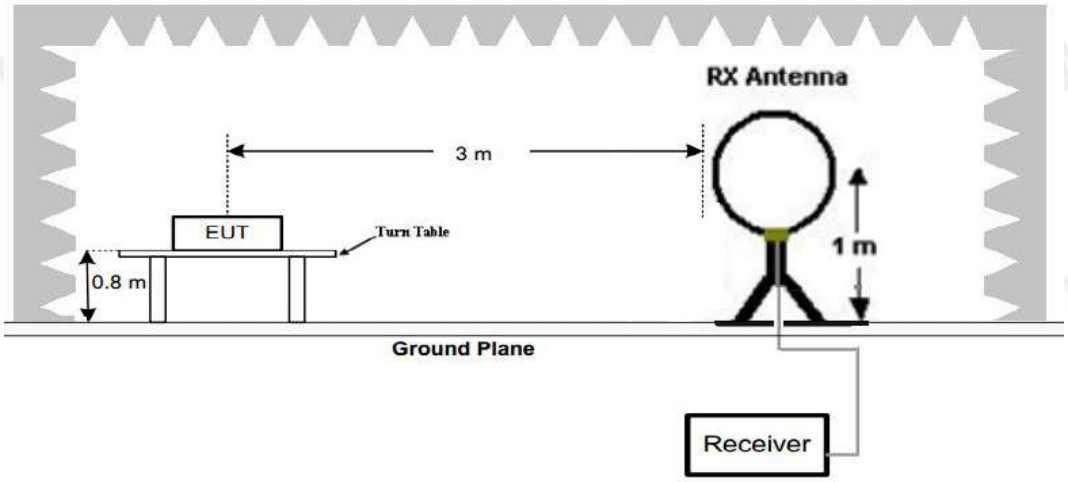
(5) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209
(6)In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

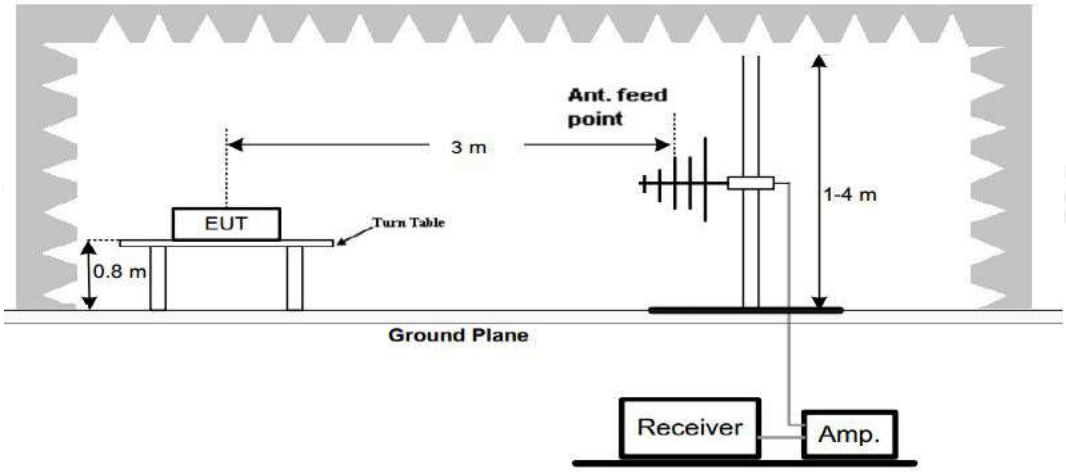
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

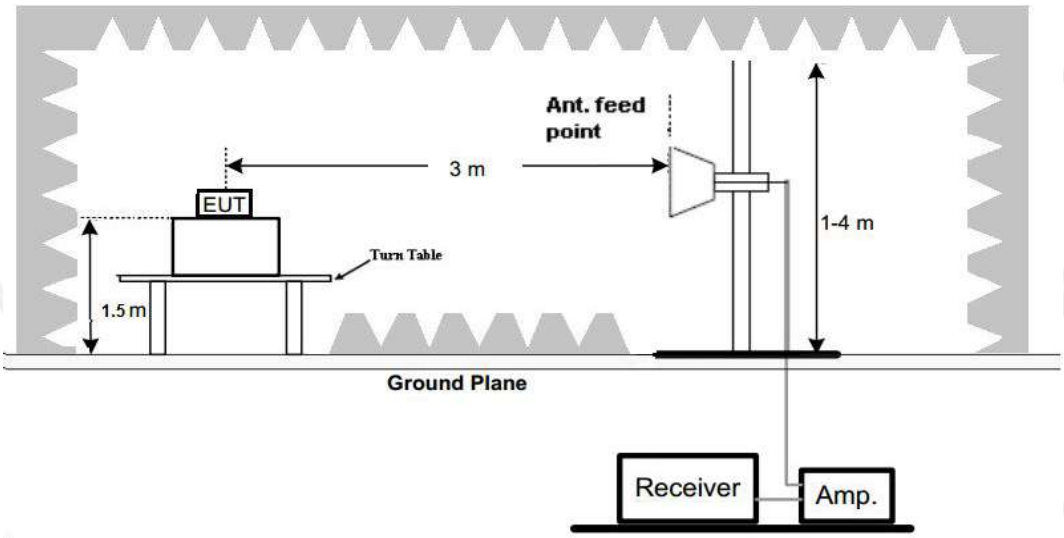
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(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:	DC 12V by adapter AC 120V/60Hz
Test Mode:	TX(5.2G) 802.11a/5180MHz/ ANT 1 + ANT 2 +ANT 3		

Note: Pre-scan all mode and recorded worst case at IEEE 802.11n HT20 MIMO modes (ANT1+ANT2+ANT3).

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	98.8324	53.20	-19.98	33.22	43.50	-10.28	QP
2	148.4410	52.12	-16.05	36.07	43.50	-7.43	QP
3	247.6818	57.10	-17.46	39.64	46.00	-6.36	QP
4 *	396.2414	53.87	-13.19	40.68	46.00	-5.32	QP
5	444.8514	51.86	-11.79	40.07	46.00	-5.93	QP
6	694.4174	46.69	-6.56	40.13	46.00	-5.87	QP

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
1 *	59.4405	53.22	-17.01	36.21	40.00	-3.79	QP
2	98.8324	58.28	-19.98	38.30	43.50	-5.20	QP
3	148.4410	54.45	-16.05	38.40	43.50	-5.10	QP
4	297.2238	56.54	-15.66	40.88	46.00	-5.12	QP
5	444.8514	53.65	-11.79	41.86	46.00	-4.14	QP
6	890.7277	45.86	-3.86	42.00	46.00	-4.00	QP

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 802.11ax HEW20 MIMO modes (ANT1+ANT2+ANT3).

U-NII 1 & 802.11ax20 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	58.64	PK	H	68.20	9.56	55.65	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	47.42	PK	H	68.20	20.78	40.26	36.51	5.86	35.21	7.16
	--	--	--	--	--	--	--	--	--	--	--
40 5200MHz	10400.00	42.74	PK	H	68.20	25.46	35.45	36.58	5.96	35.25	7.29
	--	--	--	--	--	--	--	--	--	--	--
48 5240MHz	5350.50	43.78	PK	H	68.20	24.42	40.74	32.45	5.22	34.63	3.04
	10480.00	42.78	PK	H	68.20	25.42	35.43	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	53.45	PK	V	68.20	14.75	50.46	32.40	5.11	34.52	2.99
	5150.00	43.25	AV	V	54.00	10.75	40.26	32.40	5.11	34.52	2.99
	10360.00	43.57	PK	V	68.20	24.63	36.41	36.51	5.86	35.21	7.16
	--	--	--	--	--	--	--	--	--	--	--
40 5200MHz	10400.00	37.85	PK	V	68.20	30.35	30.56	36.58	5.96	35.25	7.29
	--	--	--	--	--	--	--	--	--	--	--
48 5240MHz	5350.50	41.45	PK	V	68.20	26.75	38.41	32.45	5.22	34.63	3.04
	10480.00	40.98	PK	V	68.20	27.22	33.63	36.68	6.21	35.54	7.35
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U-NII 3 & 802.11ax 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)
149 5745MHz	5720.00	57.06	PK	H	68.20	11.14	52.26	34.21	5.11	34.52	4.80
	5720.00	47.45	AV	H	54.00	6.55	42.65	34.21	5.11	34.52	4.80
	11490.00	46.52	PK	H	68.20	21.68	37.52	38.35	5.86	35.21	9.00
	--	--	--	--	--	--	--	--	--	--	--
157 5785MHz	11570.00	41.73	PK	H	68.20	26.47	32.41	38.61	5.96	35.25	9.32
	--	--	--	--	--	--	--	--	--	--	--
165 5825MHz	5855.00	39.71	PK	H	68.20	28.49	34.56	34.56	5.22	34.63	5.15
	11650.00	39.57	PK	H	68.20	28.63	30.12	38.78	6.21	35.54	9.45
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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)
149 5745MHz	5720.00	50.45	PK	V	68.20	17.75	45.65	34.21	5.11	34.52	4.80
	5720.00	46.06	AV	V	54.00	7.94	41.26	34.21	5.11	34.52	4.80
	11490.00	44.42	PK	V	68.20	23.78	35.42	38.35	5.86	35.21	9.00
	--	--	--	--	--	--	--	--	--	--	--
157 5785MHz	11570.00	42.95	PK	V	68.20	25.25	33.63	38.61	5.96	35.25	9.32
	--	--	--	--	--	--	--	--	--	--	--
165 5825MHz	5855.00	37.27	PK	V	68.20	30.93	32.12	34.56	5.22	34.63	5.15
	11650.00	37.80	PK	V	68.20	30.40	28.35	38.78	6.21	35.54	9.45
	--	--	--	--	--	--	--	--	--	--	--

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 (ANT 1 + ANT 2 + ANT 3)

U-NII 1 & 802.11 ax20 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	59.44	PK	H	68.20	8.76	56.45	32.40	5.11	34.52	2.99
	5150.00	49.34	AV	H	54.00	4.66	46.35	32.40	5.11	34.52	2.99
	10360.00	48.41	PK	H	68.20	19.79	41.25	36.51	5.86	35.21	7.16
	--	--	--	--	--	--	--	--	--	--	--
40 5200MHz	10400.00	43.18	PK	H	68.20	25.02	35.89	36.58	5.96	35.25	7.29
	--	--	--	--	--	--	--	--	--	--	--
48 5240MHz	5350.50	44.30	PK	H	68.20	23.90	41.26	32.45	5.22	34.63	3.04
	10480.00	43.21	PK	H	68.20	24.99	35.86	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	55.44	PK	V	68.20	12.76	52.45	32.40	5.11	34.52	2.99
	5150.00	44.62	AV	V	54.00	9.38	41.63	32.40	5.11	34.52	2.99
	10360.00	43.02	PK	V	68.20	25.18	35.86	36.51	5.86	35.21	7.16
	--	--	--	--	--	--	--	--	--	--	--
40 5200MHz	10400.00	38.71	PK	V	68.20	29.49	31.42	36.58	5.96	35.25	7.29
	--	--	--	--	--	--	--	--	--	--	--
48 5240MHz	5350.50	40.60	PK	V	68.20	27.60	37.56	32.45	5.22	34.63	3.04
	10480.00	39.91	PK	V	68.20	28.29	32.56	36.68	6.21	35.54	7.35
	--	--	--	--	--	--	--	--	--	--	--

U-NII 3 & 802.11 ax20 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)
149 5745MHz	5720.00	58.25	PK	H	68.20	9.95	53.45	34.21	5.11	34.52	4.80
	5720.00	48.66	AV	H	54.00	5.34	43.86	34.21	5.11	34.52	4.80
	11490.00	47.52	PK	H	68.20	20.68	38.52	38.35	5.86	35.21	9.00
	--	--	--	--	--	--	--	--	--	--	--
157 5785MHz	11570.00	42.88	PK	H	68.20	25.32	33.56	38.61	5.96	35.25	9.32
	--	--	--	--	--	--	--	--	--	--	--
165 5825MHz	5855.00	37.80	PK	H	68.20	30.40	32.65	34.56	5.22	34.63	5.15
	11650.00	39.01	PK	H	68.20	29.19	29.56	38.78	6.21	35.54	9.45
	--	--	--	--	--	--	--	--	--	--	--

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)
149 5745MHz	5720.00	51.65	PK	V	68.20	16.55	46.85	34.21	5.11	34.52	4.80
	5720.00	47.43	AV	V	54.00	6.57	42.63	34.21	5.11	34.52	4.80
	11490.00	44.74	PK	V	68.20	23.46	35.74	38.35	5.86	35.21	9.00
	--	--	--	--	--	--	--	--	--	--	--
157 5785MHz	11570.00	43.18	PK	V	68.20	25.02	33.86	38.61	5.96	35.25	9.32
	--	--	--	--	--	--	--	--	--	--	--

165 5825MHz	5855.00	36.71	PK	V	68.20	31.49	31.56	34.56	5.22	34.63	5.15
	11650.00	38.41	PK	V	68.20	29.79	28.96	38.78	6.21	35.54	9.45
	--	--	--	--	--	--	--	--	--	--	--

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. Test Mode is MIMO (ANT 1 + ANT 2 + ANT 3)

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 (dBm)				Limit (dBm)	Result
		ANT 1	ANT 2	ANT 3	ANT 1+2+3		
802.11a	36	10.895	8.462	5.631	/	26.00	Pass
	40	10.632	8.241	5.264	/		
	48	10.254	8.124	5.212	/		
802.11n (HT20)	36	9.563	7.563	4.231	12.405	19.23	Pass
	40	9.345	7.342	4.124	12.203		
	48	9.124	7.241	4.024	12.040		
802.11n (HT40)	38	7.895	5.265	3.241	10.656		
	46	7.265	5.124	3.124	10.267		
802.11ac (HT20)	36	8.241	6.124	3.241	11.098		
	40	8.124	6.024	3.121	10.985		
	48	8.243	6.245	3.024	11.103		
802.11ac (HT40)	38	6.421	4.265	2.212	9.405		
	46	6.241	4.241	2.124	9.291		
802.11ac (HT80)	42	5.234	3.865	1.652	8.595		
802.11ax (HT20)	36	7.124	5.241	1.162	9.915		
	40	6.865	5.124	1.523	9.792		
	48	6.421	4.935	2.412	9.659		
802.11ax (HT40)	38	5.421	3.562	1.214	8.499		
	46	5.632	3.242	1.021	8.471		
802.11ax (HT80)	42	4.635	2.121	0.865	7.602		

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 =6+10log(3) dBi=10.77dBi>6dBi
   Limit=24-(10.77-6)=19.23 dBi

U-NII 3

Type	Channel	Output power (dBm)				Limit (dBm)	Result
		ANT 1	ANT 2	ANT 3	ANT 1+2+3		
802.11a	149	10.124	8.135	5.236	/	30.00	Pass
	157	10.056	7.865	5.124	/		
	165	10.241	7.425	5.024	/		
802.11n (HT20)	149	9.234	7.425	5.212	12.363	25.23	Pass
	157	9.124	7.124	5.124	12.197		
	165	9.015	6.982	4.635	12.006		
802.11n (HT40)	151	7.635	5.654	3.452	10.679		
	159	7.215	5.242	3.652	10.385		
802.11ac (HT20)	149	8.634	6.595	3.242	11.454		
	157	8.424	6.423	3.241	11.289		
	165	8.234	6.124	3.321	11.107		
802.11ac (HT40)	151	6.542	4.562	2.652	9.643		
	159	6.354	4.241	2.242	9.370		
802.11ac (HT80)	155	4.524	2.632	0.865	7.699		
802.11ax (HT20)	149	6.658	4.562	2.426	9.656		
	157	6.542	4.212	2.362	9.479		
	165	6.342	4.214	2.456	9.398		
802.11ax (HT40)	151	5.421	3.245	1.124	8.383		
	159	5.241	3.124	1.241	8.278		
802.11ax (HT80)	155	3.654	1.635	0.068	6.806		

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 =6+10log(3) dBi=10.77dBi>6dBi
   Limit=30-(10.77-6)=25.23 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 1	ANT 2	ANT 3	Total ANT 1+2+3		
802.11a	U-NII 1	36	3.514	1.284	-1.091	/	11	Pass
		40	3.818	1.437	-0.252	/		
		48	3.529	1.629	-0.713	/		
802.11n (HT20)	U-NII 1	36	1.274	-1.300	-3.818	3.975	6.23	
		40	2.498	-0.933	-3.201	4.861		
		48	2.017	-0.982	-3.284	4.561		
802.11n (HT40)	U-NII 1	38	-0.933	-3.908	-6.210	1.622		
		46	-0.473	-2.904	-5.798	2.233		
802.11ac (HT20)	U-NII 1	36	2.074	-0.426	-2.916	4.814		
		40	2.482	-1.039	-2.935	4.867		
		48	2.701	-0.256	-2.799	5.225		
802.11ac (HT40)	U-NII 1	38	-2.898	-5.227	-7.631	-0.062		
		46	-1.447	-4.054	-6.334	1.279		
802.11ac (HT80)	U-NII 1	42	-2.603	-5.076	-7.134	0.226		
802.11ax (HT20)	U-NII 1	36	-0.170	-2.674	-4.923	2.610		
		40	0.396	-2.416	-4.782	3.013		
		48	0.639	-1.751	-4.540	3.381		
802.11ax (HT40)	U-NII 1	38	-0.717	-3.271	-4.266	2.287		
		46	0.498	-2.097	-4.167	3.267		
802.11ax (HT80)	U-NII 1	42	-3.890	-6.041	-8.045	-0.894		

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 =6+10log(3) dBi=10.77dBi>6dBi
   Limit=11-(10.77-6)=6.23 dBi

Type	Bands	Channel	Power Spectral Density (dBm/500KHz)				Limit (dBm/500KHz)	Result
			ANT 1	ANT 2	ANT 3	Total ANT 1+2+3		
802.11a	U-NII 3	149	0.685	-1.506	-6.001	/	30	Pass
		157	0.862	-1.515	3.760	/		
		165	0.104	-2.206	-4.381	/		
802.11n (HT20)	U-NII 3	149	1.558	-1.163	-2.913	4.326	25.23	Pass
		157	1.187	-1.063	-3.014	4.144		
		165	0.916	-1.209	-3.725	3.831		
802.11n (HT40)	U-NII 3	151	-0.934	-4.099	-6.643	1.499		
		159	-2.130	-4.156	-6.903	0.793		
802.11ac (HT20)	U-NII 3	149	1.019	-2.486	-4.862	3.335		
		157	1.567	-2.814	-4.506	3.640		
		165	1.270	-2.985	-5.614	3.257		
802.11ac (HT40)	U-NII 3	151	-1.279	-3.712	-6.550	1.435		
		159	-2.297	-4.184	-6.629	0.749		
802.11ac (HT80)	U-NII 3	155	-2.517	-5.002	-6.897	0.336		
802.11ax (HT20)	U-NII 1	149	0.039	-2.283	-3.818	3.043		
		157	-0.084	-2.020	-4.829	2.873		
		165	-0.437	-3.484	-5.301	2.169		
802.11ax (HT40)	U-NII 1	151	-1.403	-3.889	-6.438	1.334		
		159	-1.618	-3.984	-6.607	1.163		
802.11ax (HT80)	U-NII 1	155	-1.229	-3.336	-5.620	1.736		

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 =6+10log(3) dBi=10.77dBi>6dBi
   Limit=30-(10.77-6)=25.23 dBi

Test plot as follows:
ANT 1

802.11a	
U-NII 1	U-NII 3
CH36	CH149
CH40	CH157
CH48	CH165

802.11n(HT20)

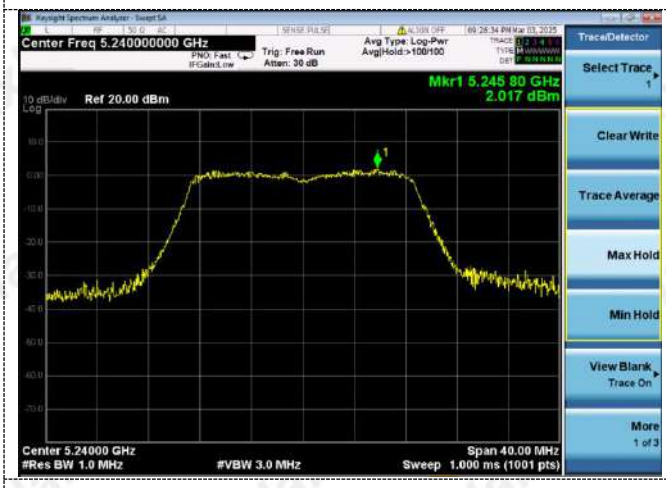
U-NII 1

U-NII 3

CH36

CH149

CH40



CH157

CH48

CH165

802.11n(HT40)	
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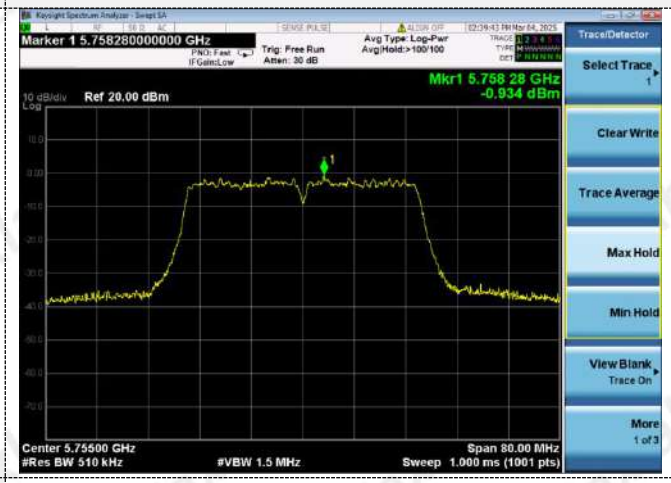
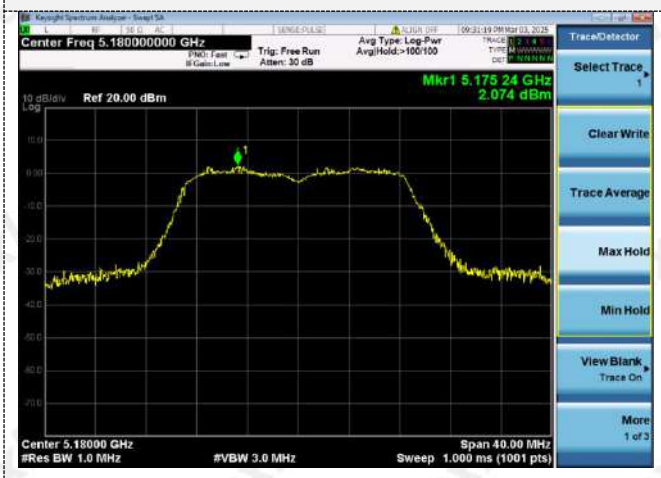
	
CH38	CH151
CH46	CH159

802.11ac(HT20)

U-NII 1



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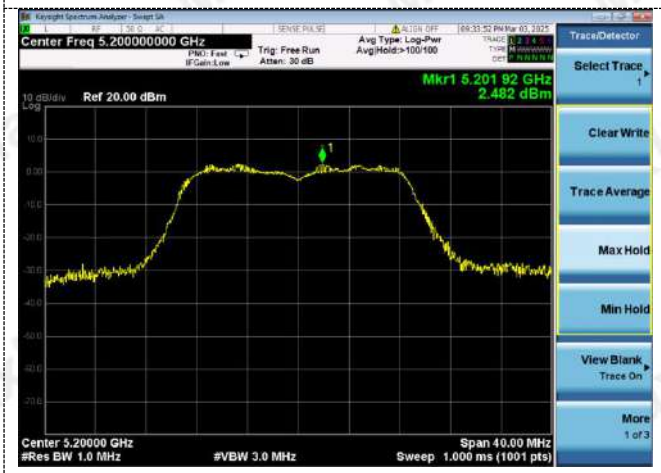


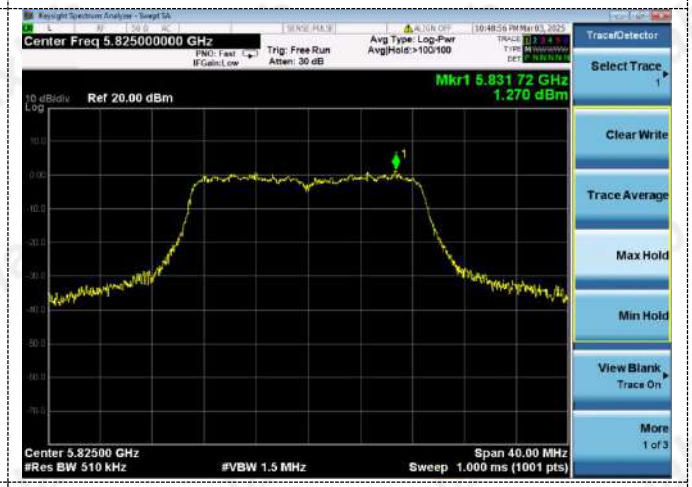
CH40

CH48

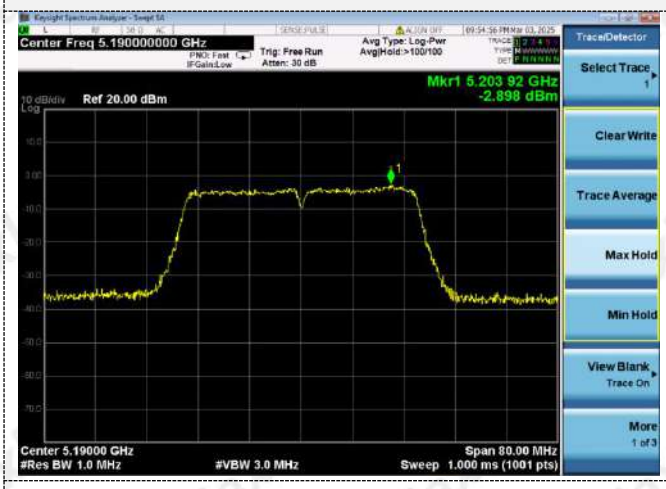
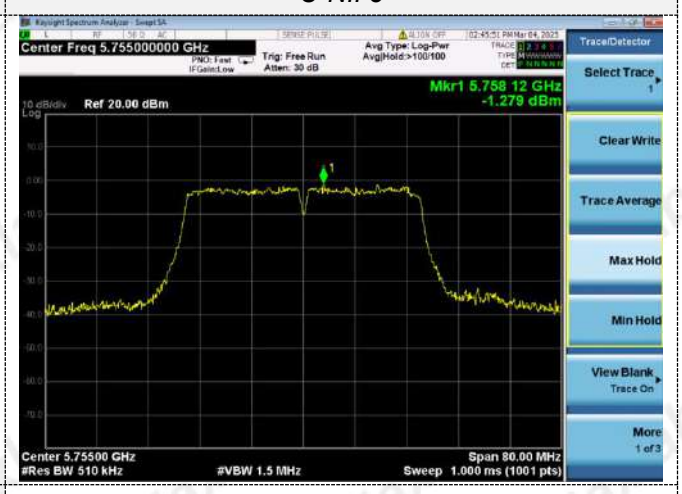
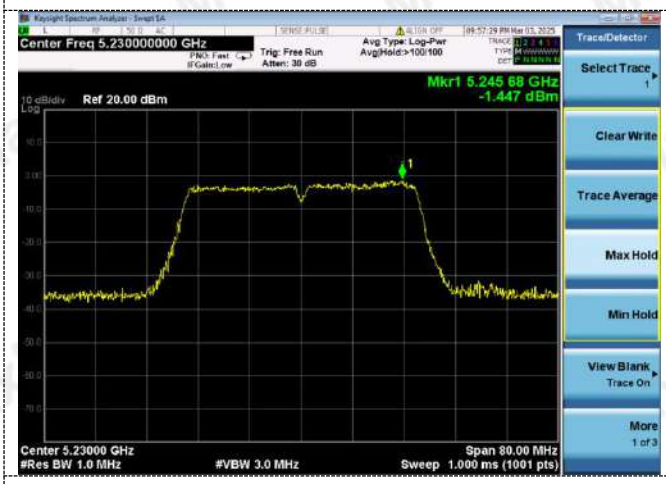
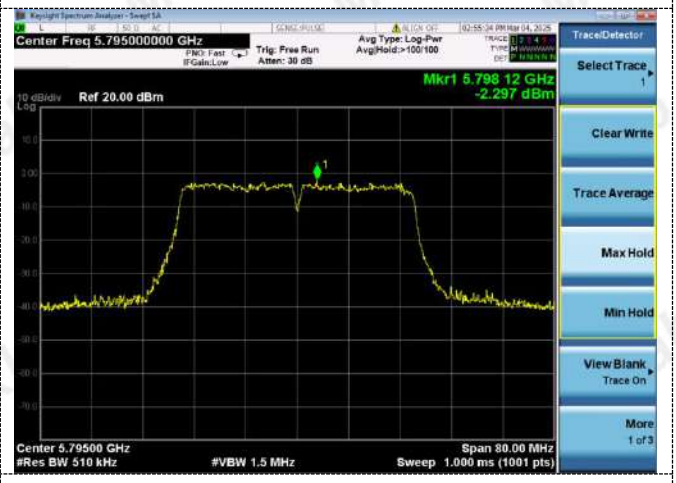
U-NII 3

CH149

CH157



CH165

802.11ac(HT40)	
U-NII 1	U-NII 3
	
CH38	CH151
	
CH46	CH159

802.11ac(HT80)	
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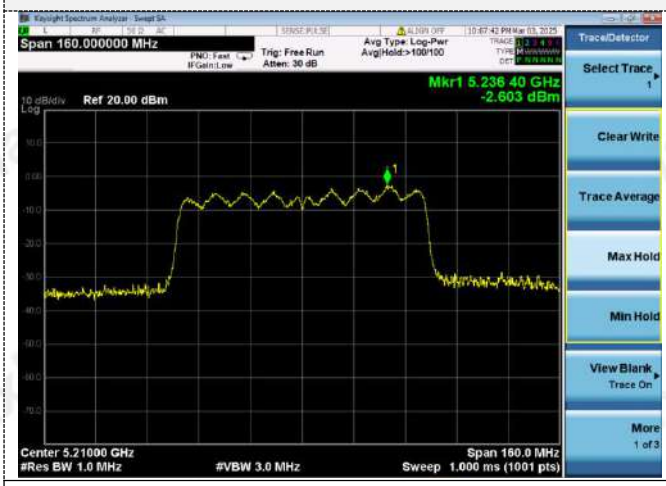
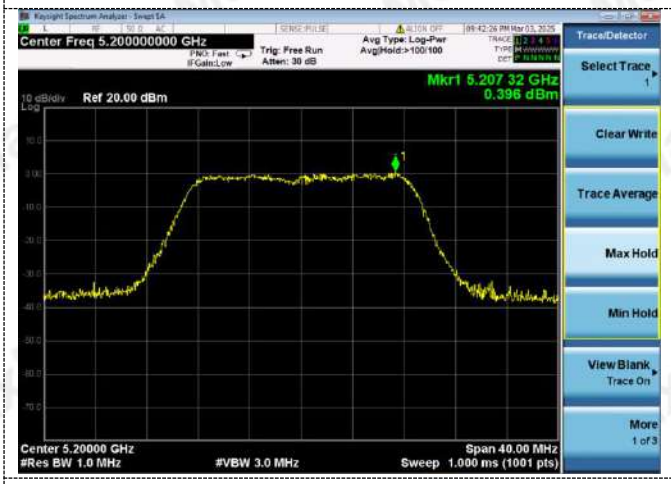
	
CH42	CH155

802.11ax(HT20)

U-NII 1

CH36



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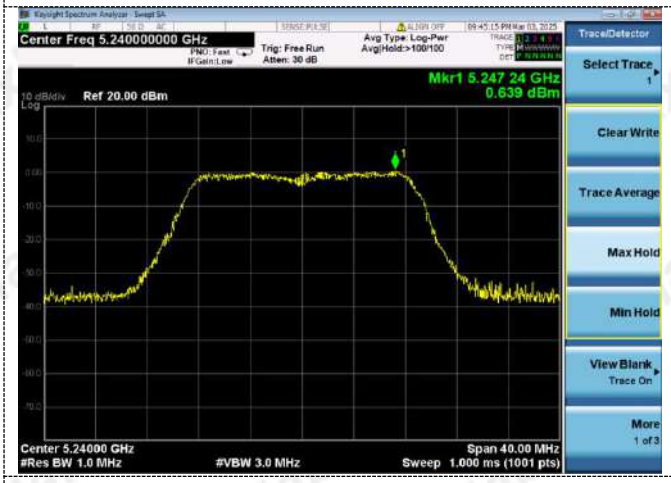
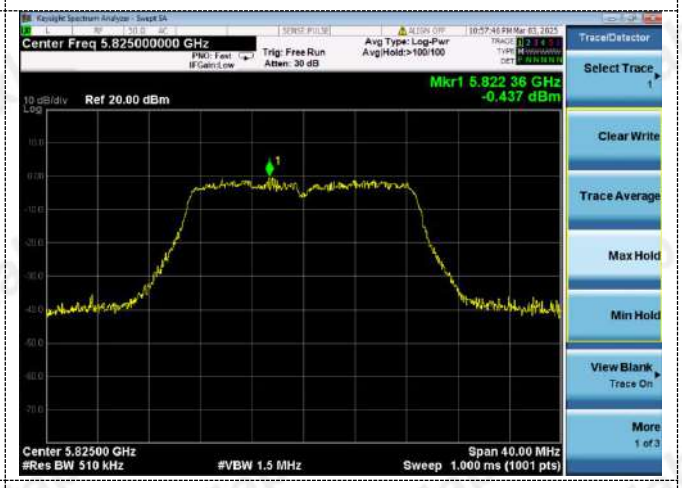


CH48

U-NII 3

CH149

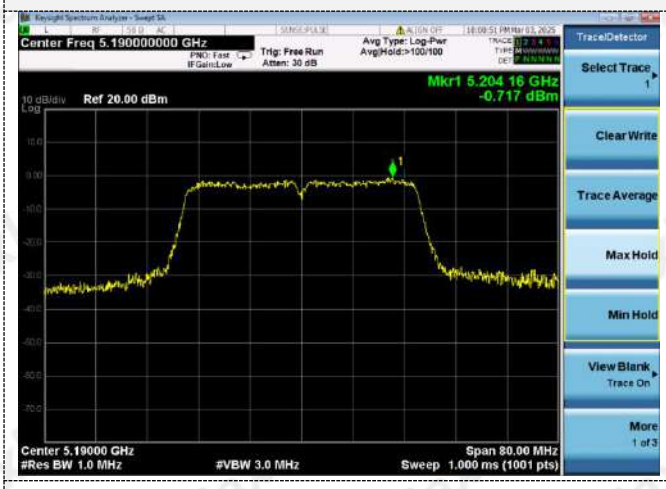
CH157



CH165

802.11ax(HT40)

U-NII 1

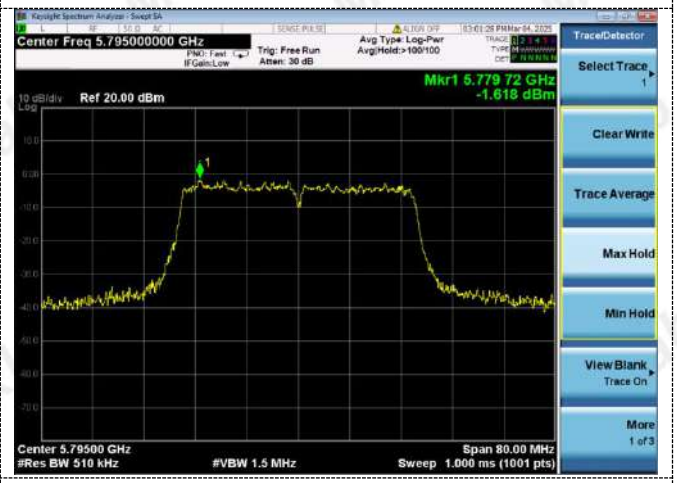


CH38

U-NII 3

CH151

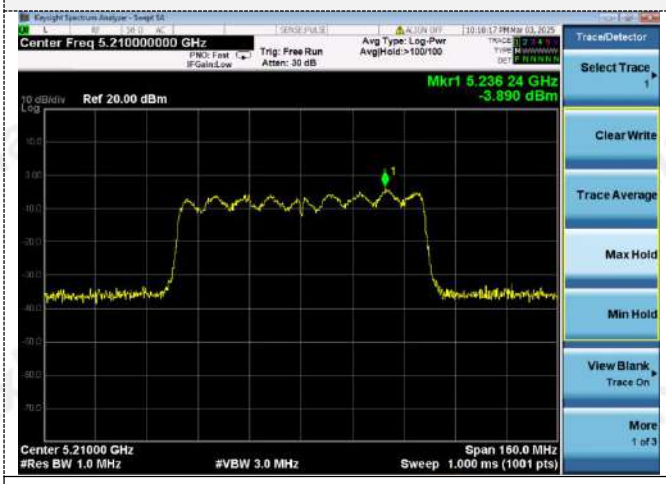
CH46



CH159

802.11ax(HT80)

U-NII 1



CH42

U-NII 3

CH155

ANT 2

802.11a	
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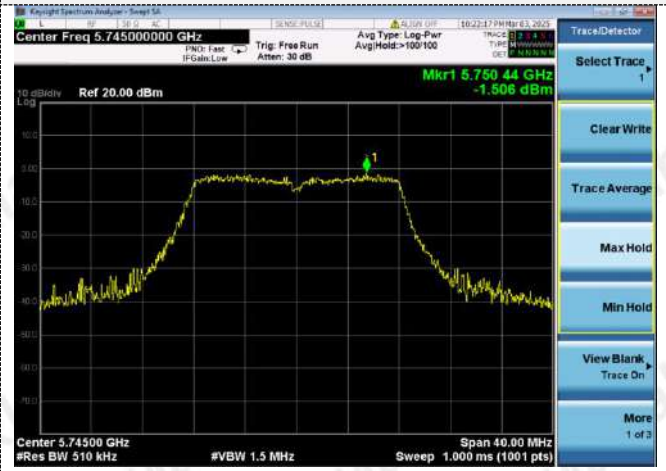
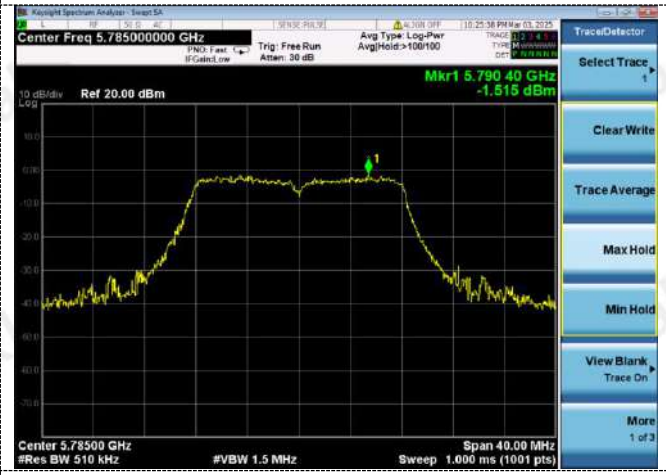
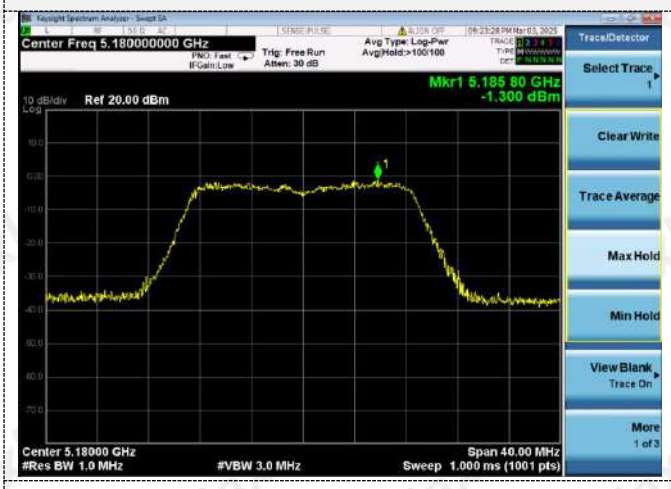
	
CH36	CH149
	
CH40	CH157
CH48	CH165

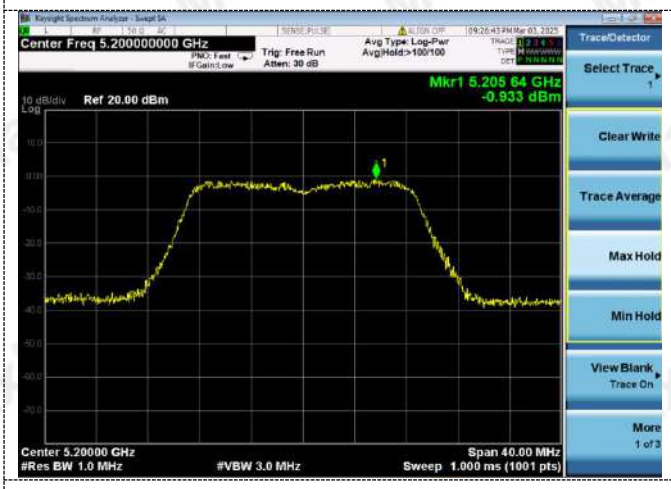
802.11n(HT20)

U-NII 1



U-NII 3

CH36



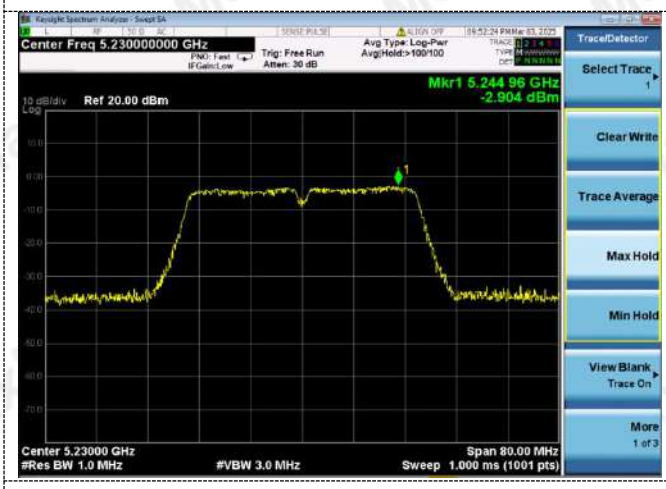
CH149

CH40

CH157

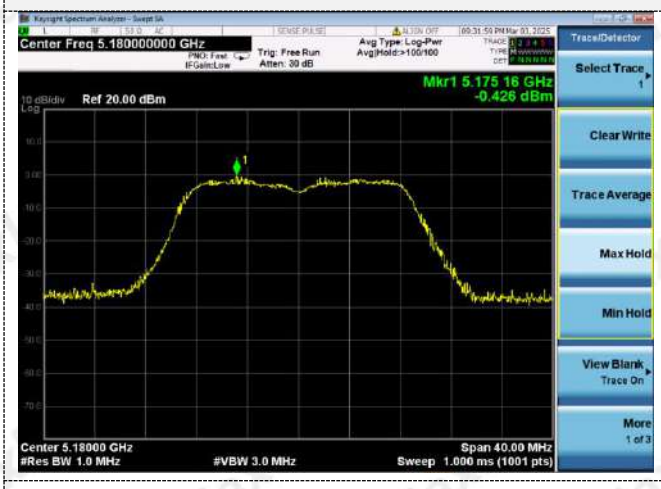
CH48

CH165

802.11n(HT40)	
U-NII 1	U-NII 3
CH38	CH151
	
CH46	CH159

802.11ac(HT20)

U-NII 1



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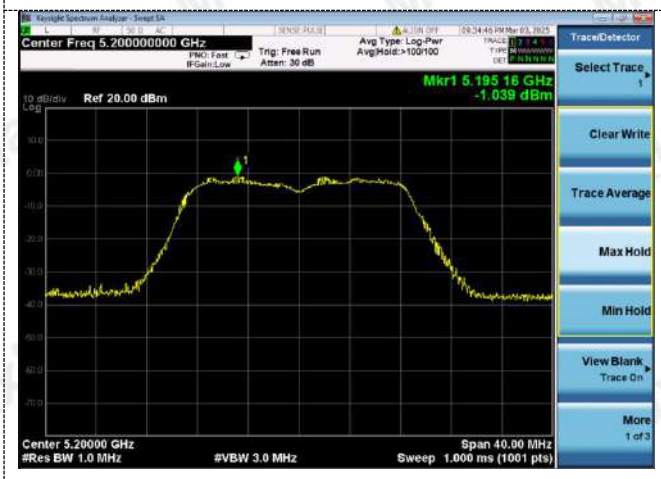
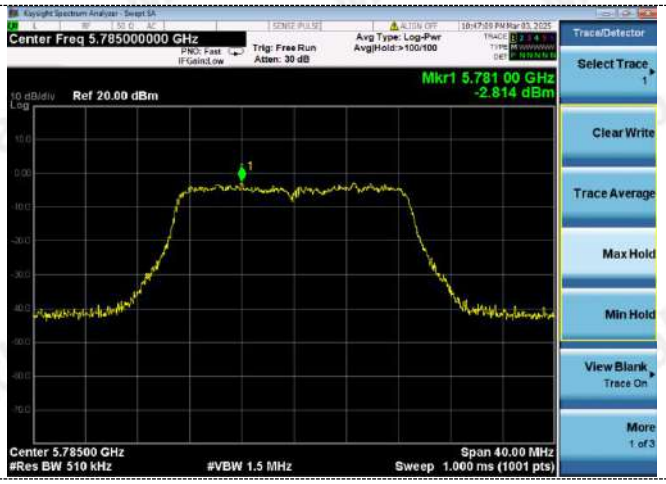


CH40

CH48

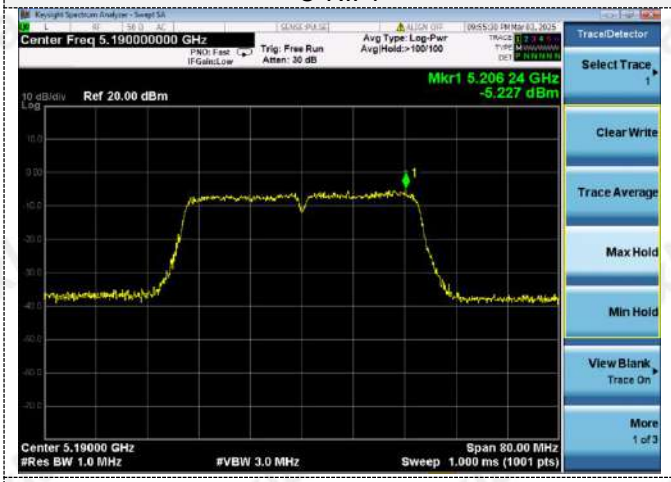
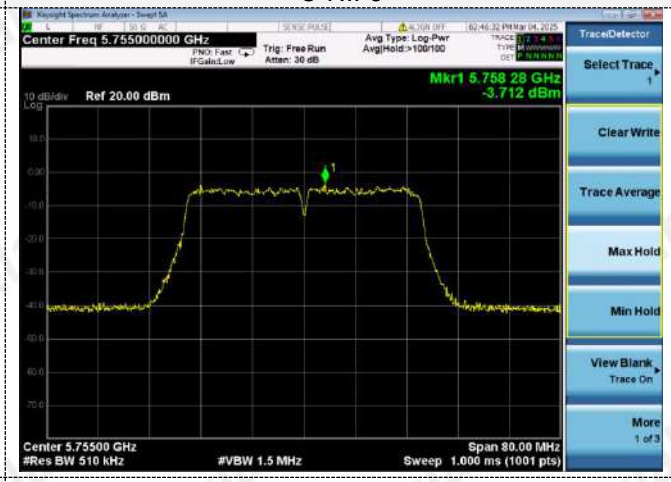
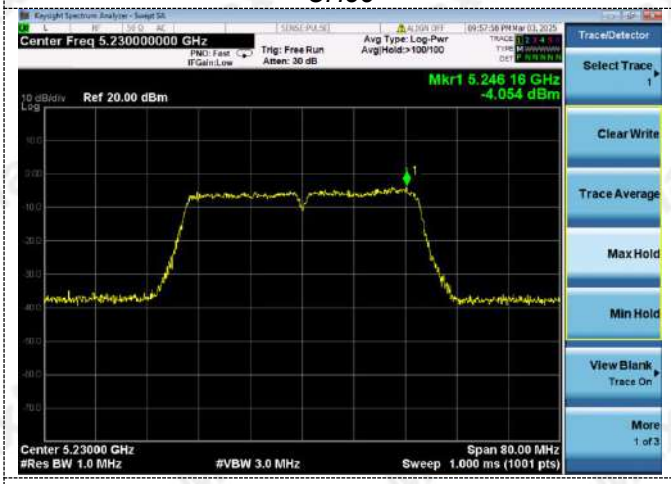
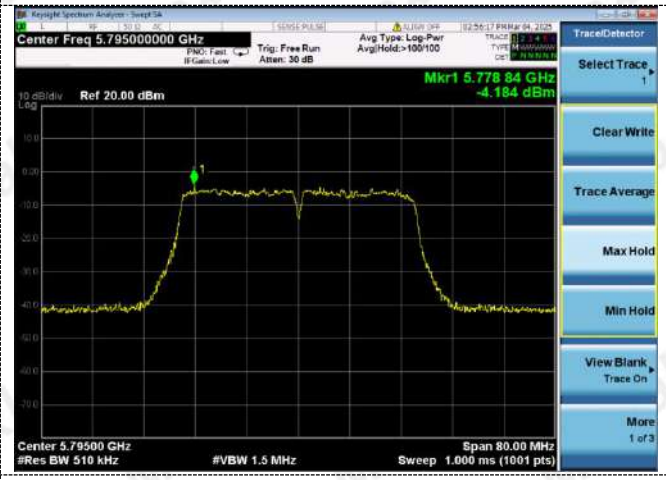
U-NII 3

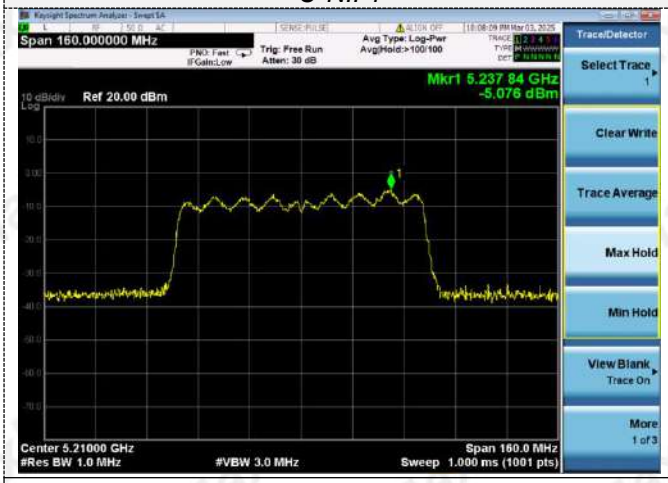
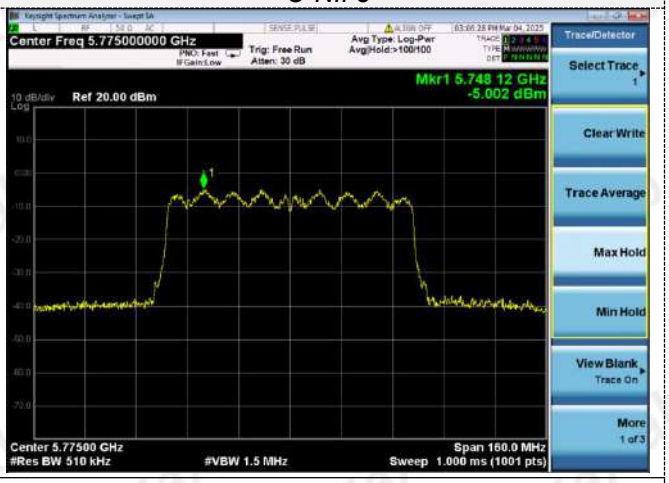
CH149



CH157

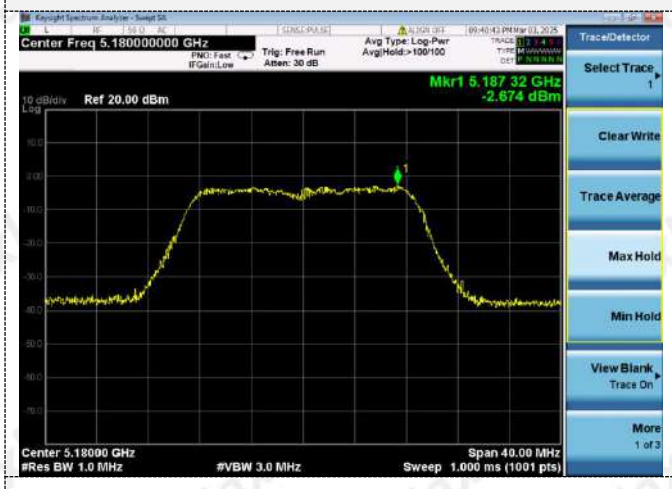
CH165

802.11ac(HT40)	
U-NII 1	U-NII 3
	
CH38	CH151
	
CH46	CH159

802.11ac(HT80)	
U-NII 1	U-NII 3
	
CH42	CH155

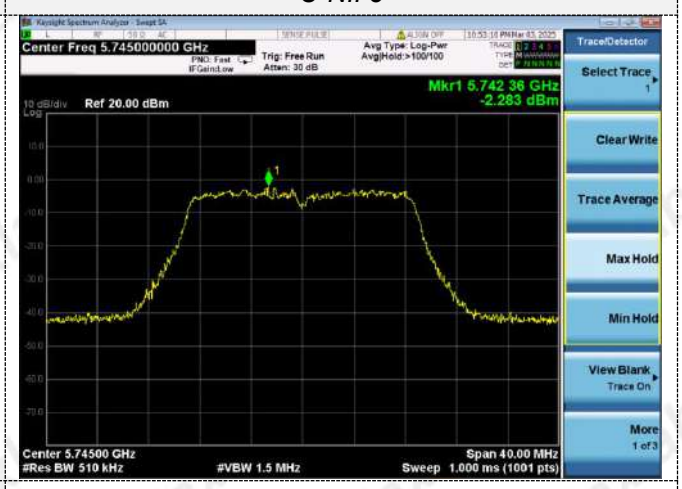
802.11ax(HT20)

U-NII 1



CH36

U-NII 3

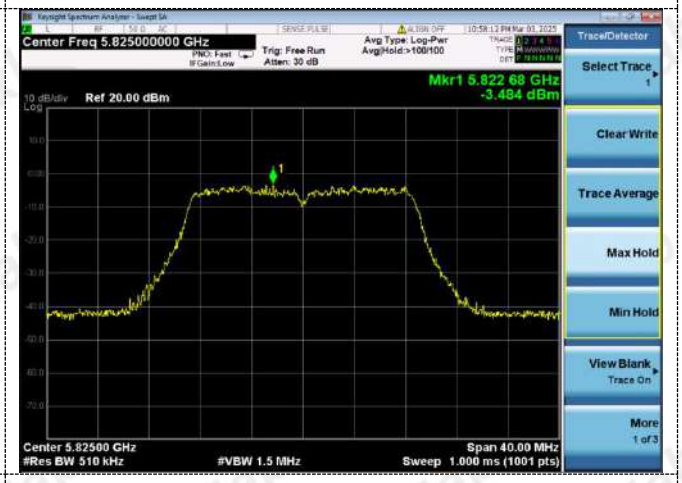


CH149

CH40

CH157

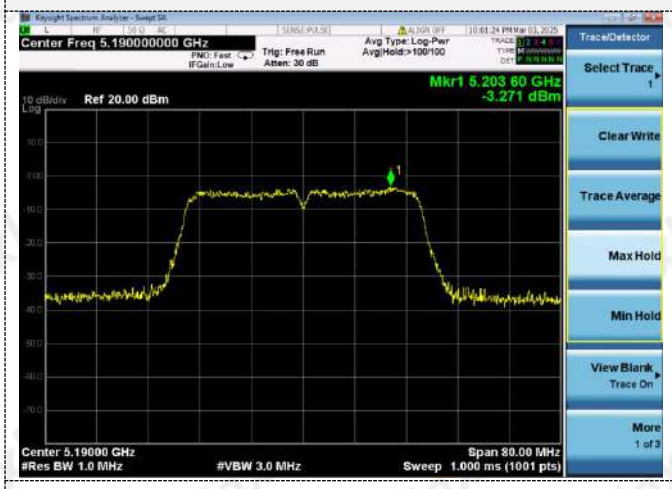
CH48



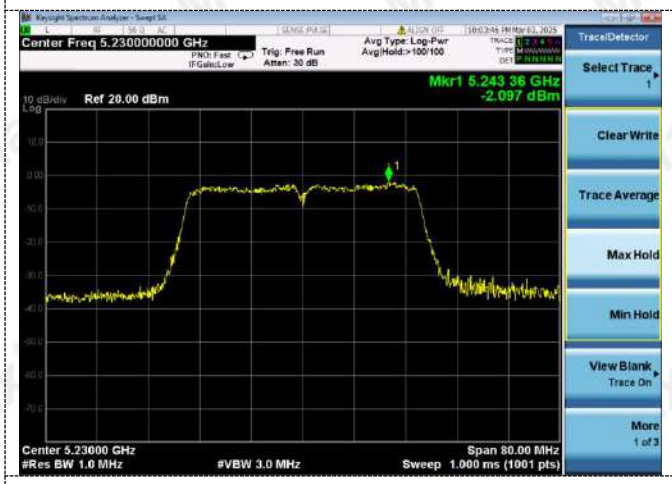
CH165

802.11ax(HT40)

U-NII 1

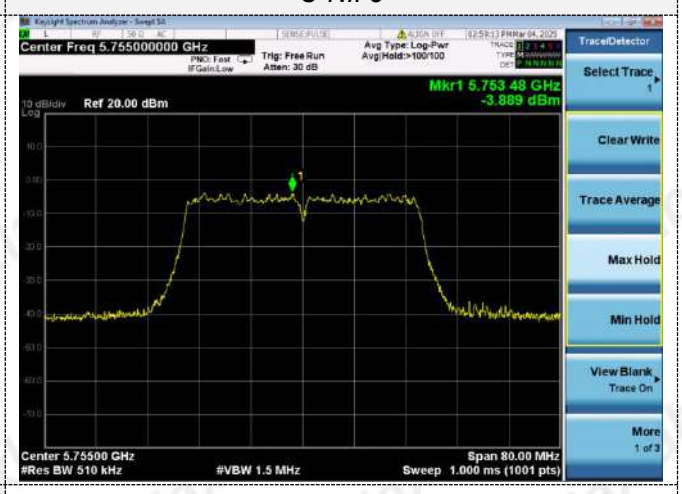


CH38

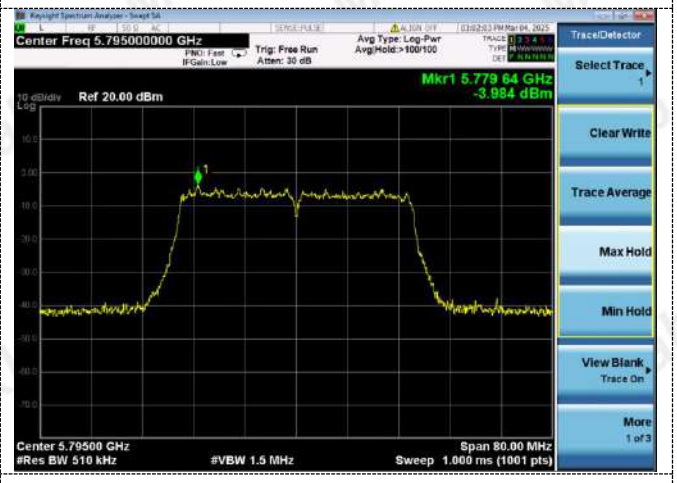


CH46

U-NII 3



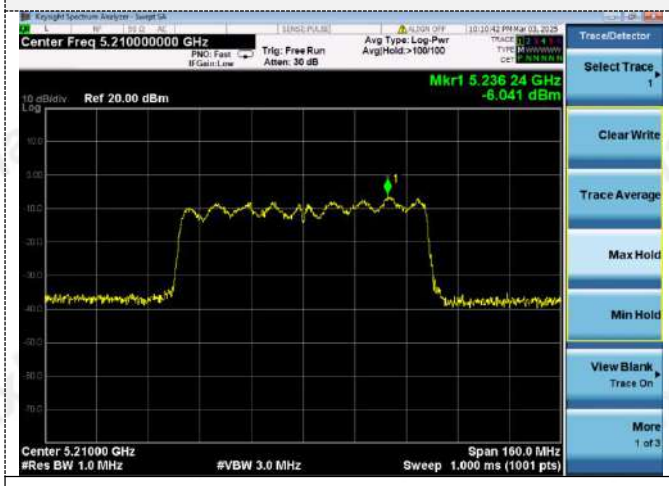
CH151



CH159

802.11ax(HT80)

U-NII 1

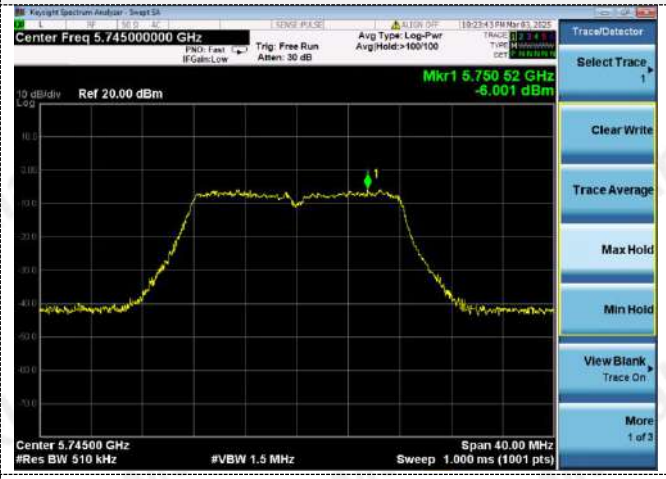
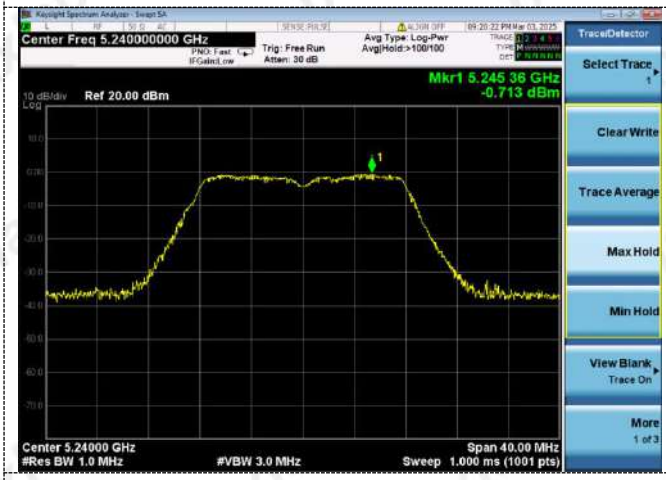
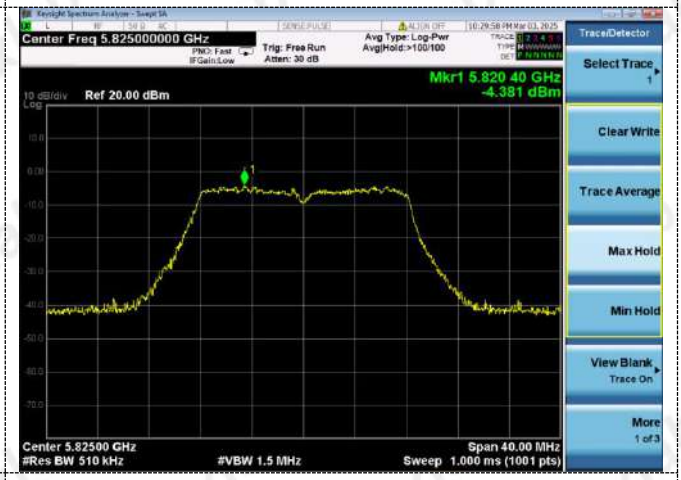


CH42

U-NII 3

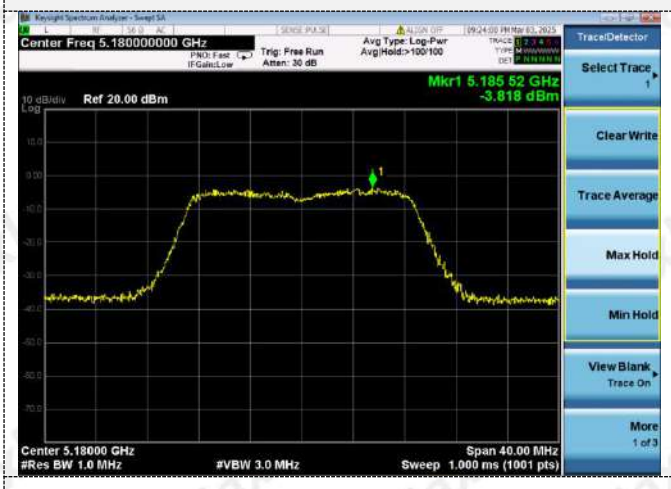
CH155

ANT 3

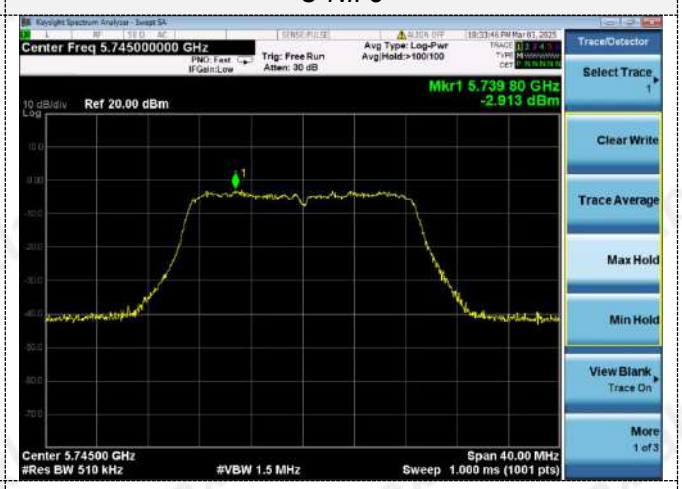
802.11a	
U-NII 1	U-NII 3
	
CH36	CH149
CH40	CH157
	
CH48	CH165

802.11n(HT20)

U-NII 1



U-NII 3

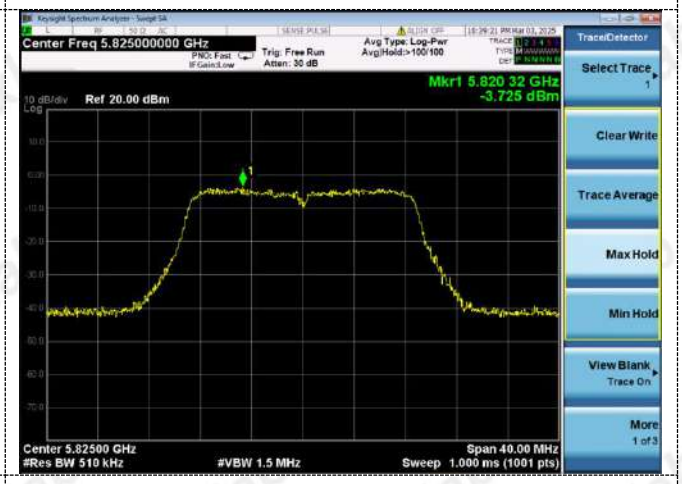


CH36

CH149

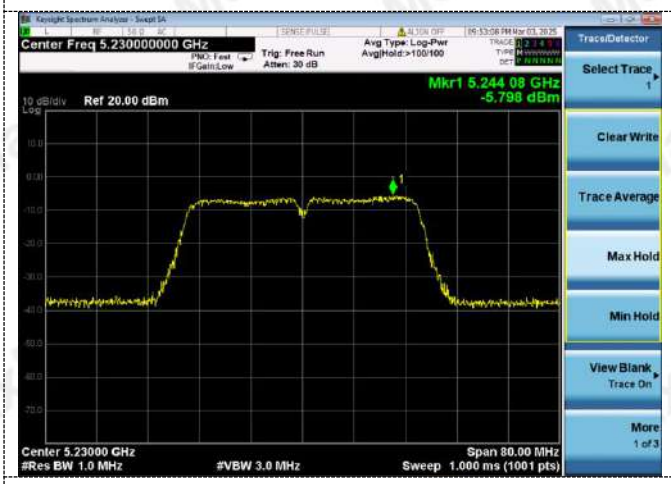
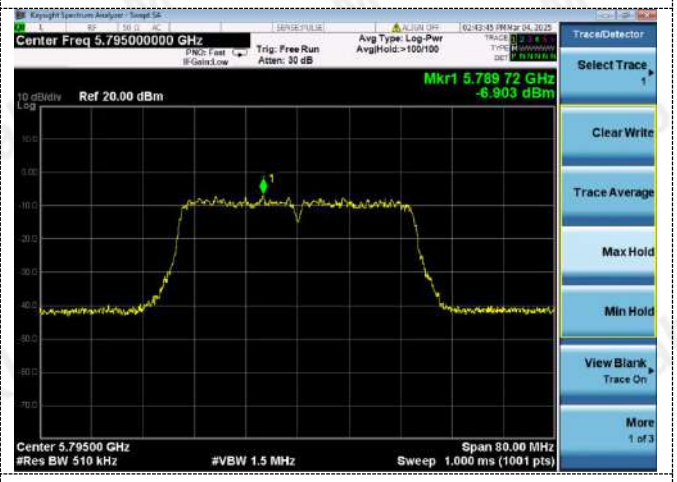
CH40

CH157



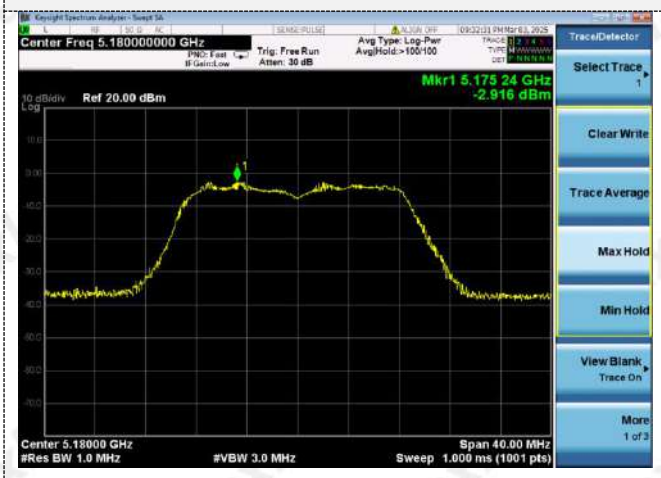
CH48

CH165

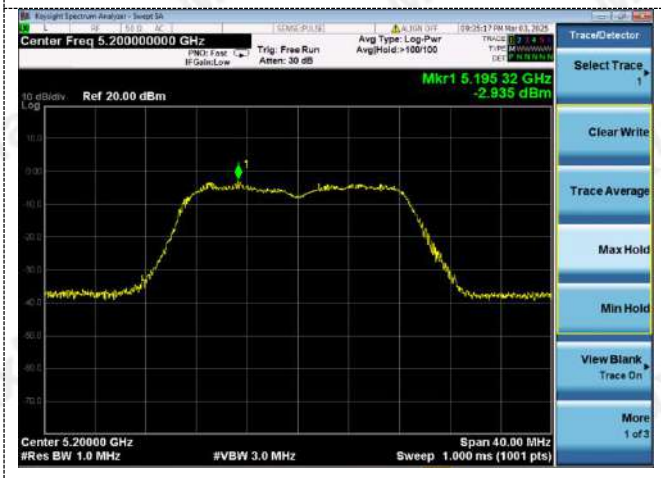
802.11n(HT40)	
U-NII 1	U-NII 3
CH38	CH151
	
CH46	CH159

802.11ac(HT20)

U-NII 1



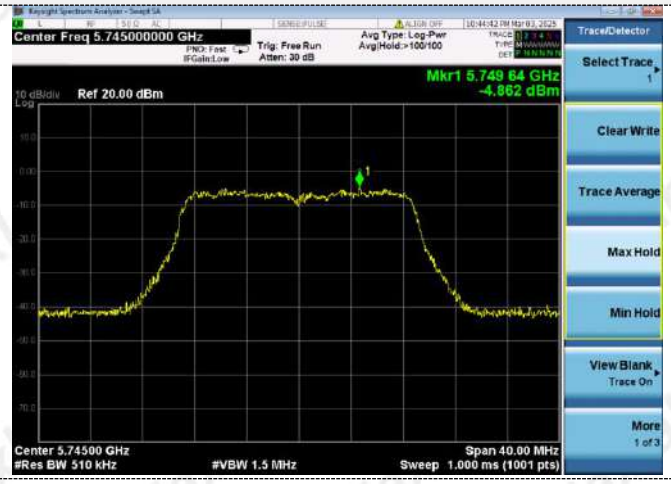
CH36



CH40

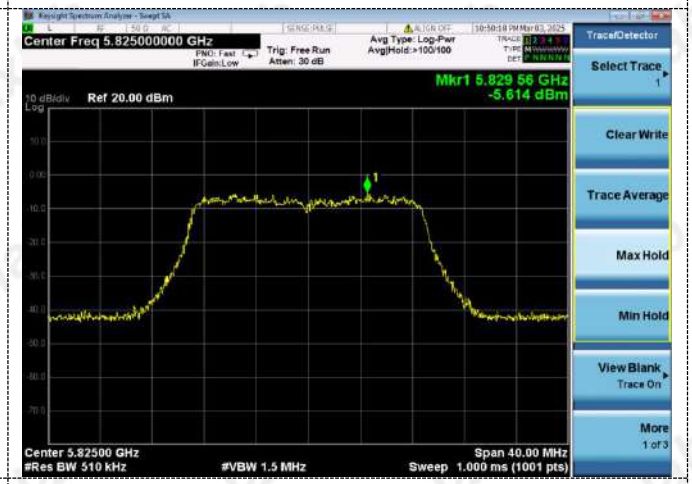
CH48

U-NII 3



CH149

CH157



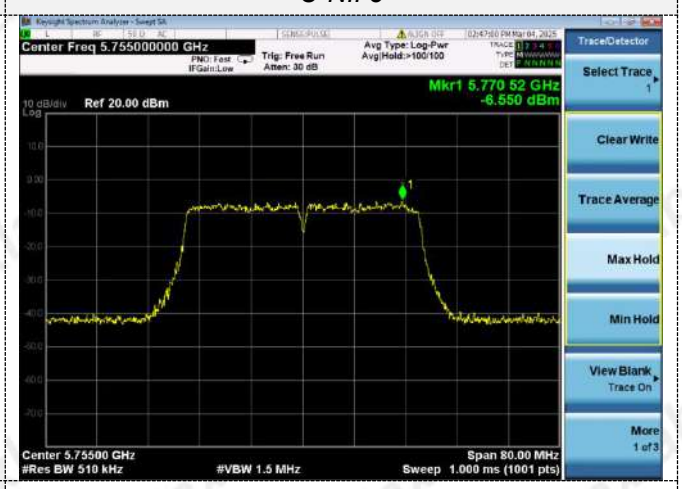
CH165

802.11ac(HT40)

U-NII 1

CH38

U-NII 3



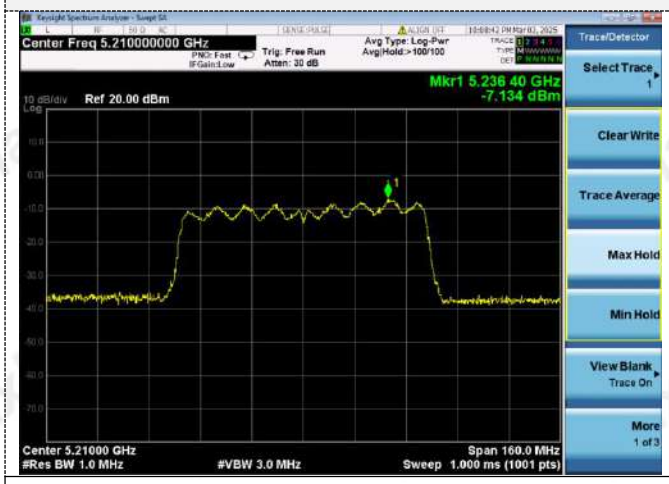
CH151

CH46

CH159

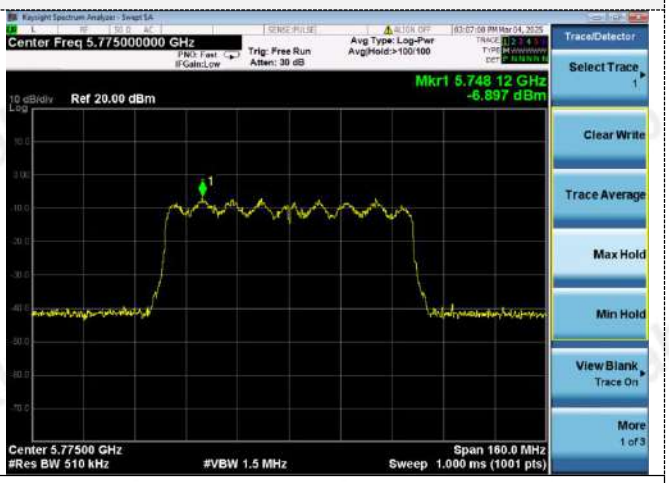
802.11ac(HT80)

U-NII 1



CH42

U-NII 3



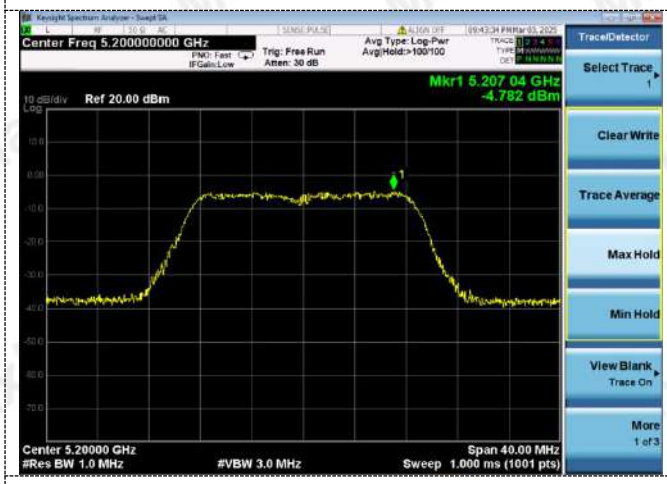
CH155

802.11ax(HT20)

U-NII 1

U-NII 3

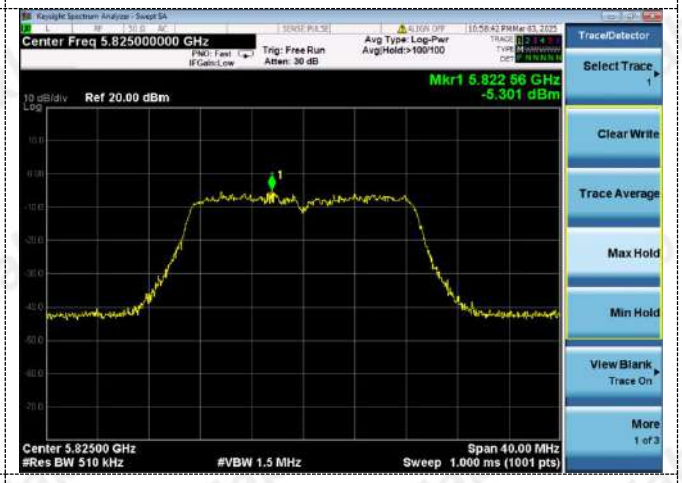
CH36



CH149

CH40

CH157

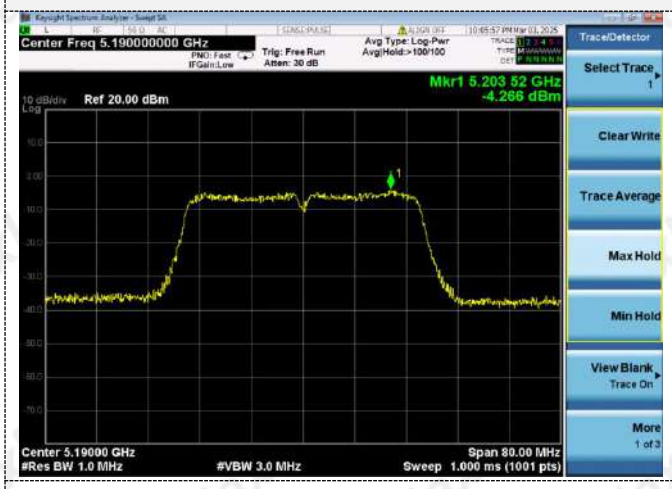


CH48

CH165

802.11ax(HT40)

U-NII 1



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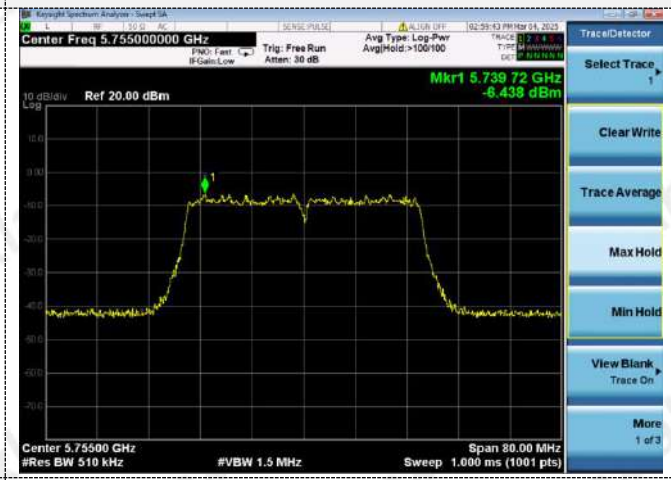
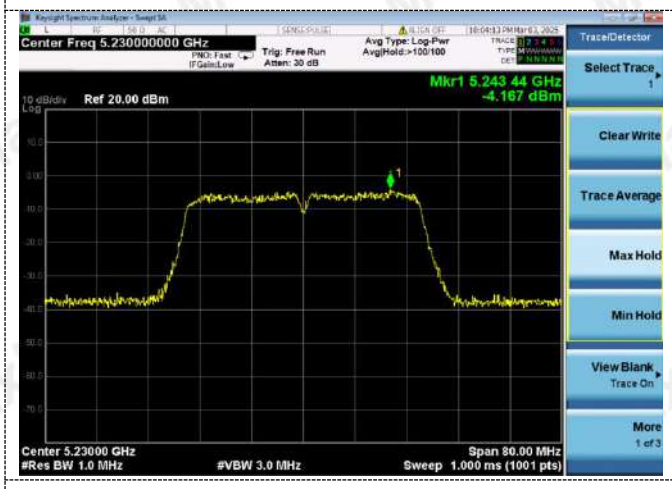
U-NII 3



CH151



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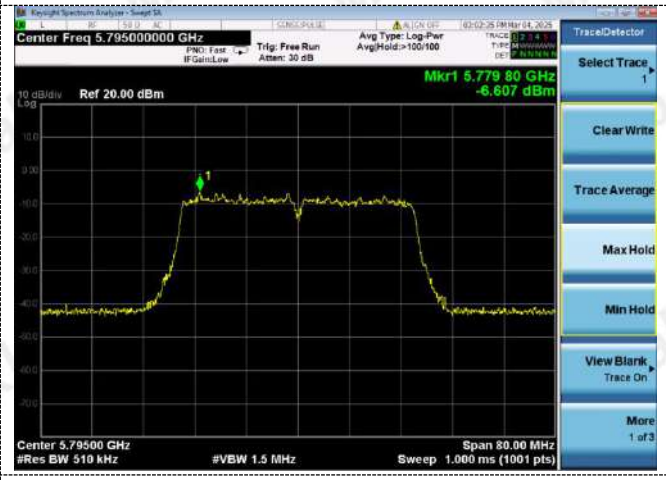
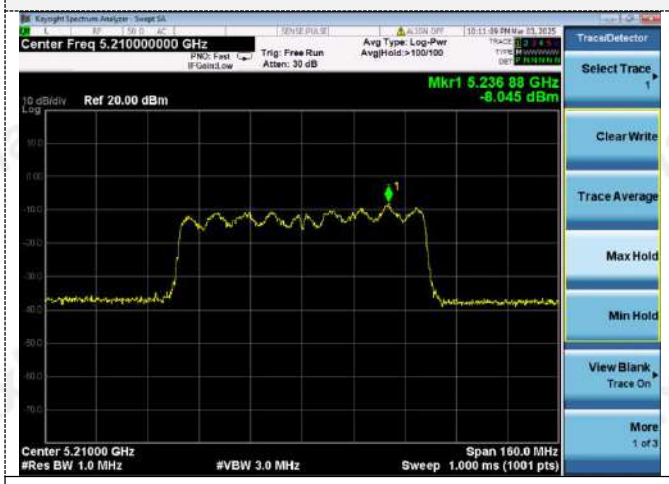


CH159

802.11ax(HT80)

U-NII 1



CH42

U-NII 3

CH155

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

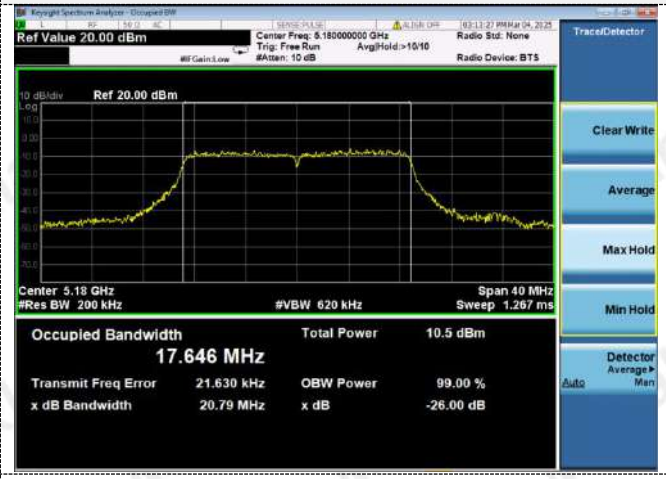
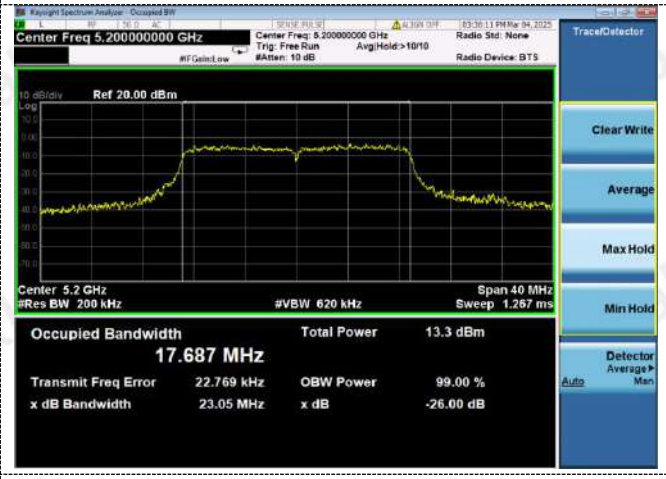
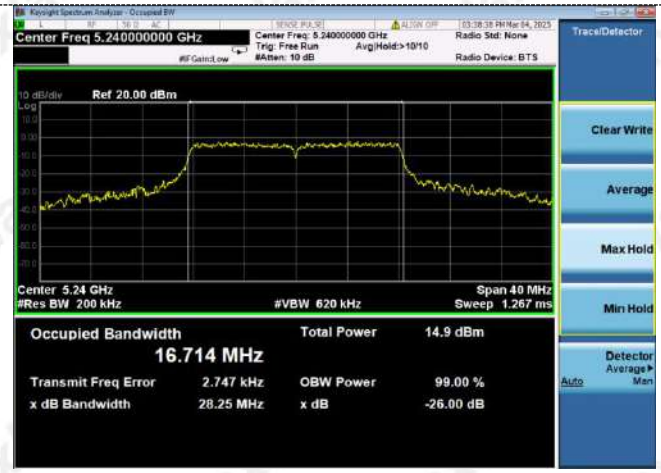
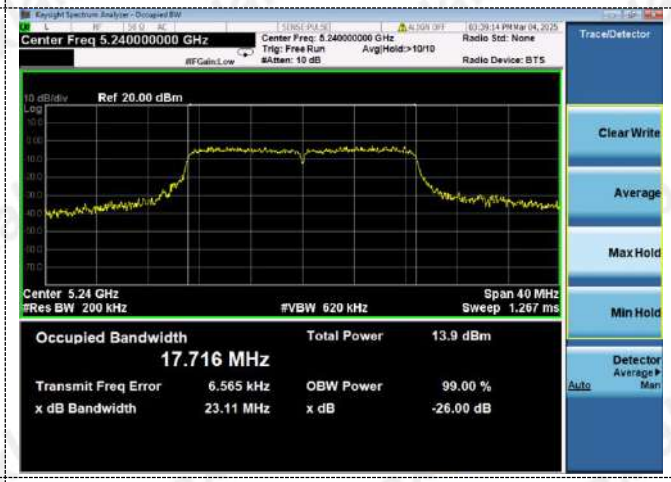
Test Results

Type	Bands	Channel	26dB Bandwidth (MHz)			Limit (MHz)	Result
			ANT 1	ANT 2	ANT 3		
802.11a	U-NII 1	36	26.71	26.52	25.86	N/A	Pass
		40	26.07	25.94	25.42		
		48	28.25	27.56	26.65		
802.11n(HT20)	U-NII 1	36	20.79	20.42	20.24		
		40	23.05	22.52	21.93		
		48	23.11	22.65	21.45		
802.11n(HT40)	U-NII 1	38	41.34	40.95	40.56		
		46	40.16	40.05	40.02		
802.11ac(HT20)	U-NII 1	36	21.21	20.86	20.42		
		40	22.70	21.24	20.86		
		48	22.47	21.26	20.74		
802.11ac(HT40)	U-NII 1	38	41.20	40.63	40.52		
		46	41.03	40.56	40.24		
802.11ac(HT80)	U-NII 1	42	82.00	81.63	80.89		
802.11ax(HT20)	U-NII 1	36	21.02	20.87	20.67		
		40	21.12	20.74	20.45		
		48	20.79	20.45	20.26		
802.11ax(HT40)	U-NII 1	38	40.52	40.24	40.12		
		46	41.76	40.85	40.53		
802.11ax(HT80)	U-NII 1	42	82.69	81.67	80.67		

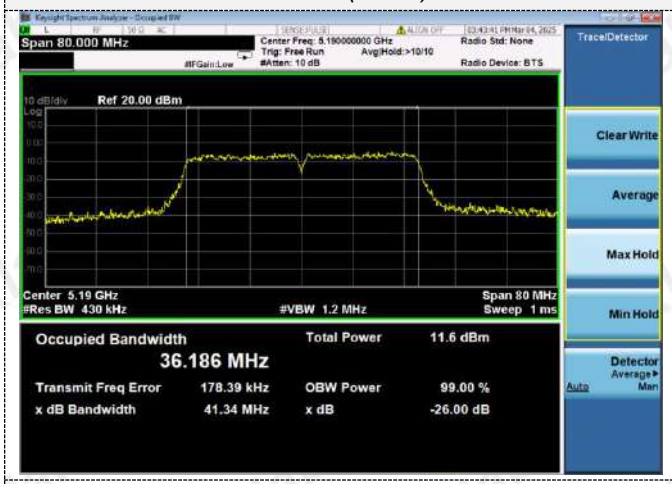
Type	Bands	Channel	26dB Bandwidth (MHz)			Limit (MHz)	Result
			ANT 1	ANT 2	ANT 3		
802.11a	U-NII 3	149	26.00	25.64	25.32	N/A	Pass
		157	26.12	25.89	25.45		
		165	27.82	26.45	25.65		
802.11n(HT20)	U-NII 3	149	26.57	26.24	25.89		
		157	26.55	25.93	25.45		
		165	26.09	25.65	25.42		
802.11n(HT40)	U-NII 3	151	41.75	40.89	40.52		
		159	41.48	40.52	40.12		
802.11ac(HT20)	U-NII 3	149	23.11	22.96	22.56		
		157	23.78	23.42	22.82		
		165	23.08	22.85	22.45		
802.11ac(HT40)	U-NII 3	151	41.70	40.86	40.26		
		159	41.78	40.25	40.12		
802.11ac(HT80)	U-NII 3	155	81.51	80.86	80.45		
802.11ax(HT20)	U-NII 3	149	21.20	20.86	20.42		
		157	20.95	20.74	20.25		
		165	21.33	20.76	20.42		
802.11ax(HT40)	U-NII 3	151	41.38	40.86	40.23		
		159	40.94	40.56	40.25		
802.11ax(HT80)	U-NII 3	155	79.94	79.56	79.21		

Test plot as follows: Note: Both ANT 1/2/3 have been test, The worst data is Antenna 1, only shown Antenna 1 Plot.

U-NII 1 /5.2G

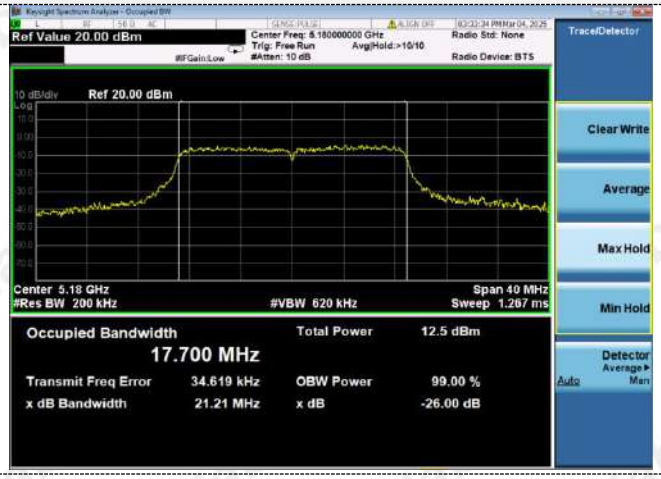
802.11a	802.11n(HT20)
	
CH36	CH36
	
CH40	CH40
	
CH48	CH48

802.11n(HT40)

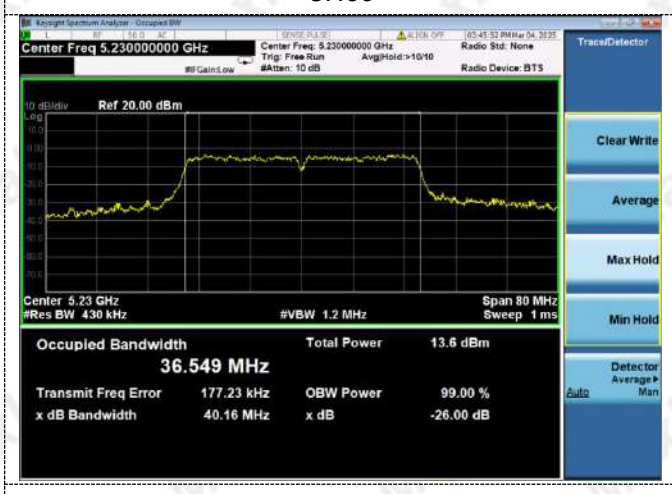


CH38

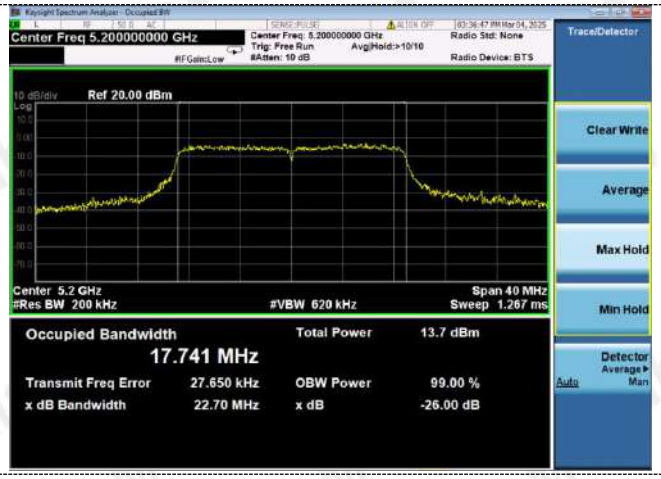
802.11ac(HT20)



CH36



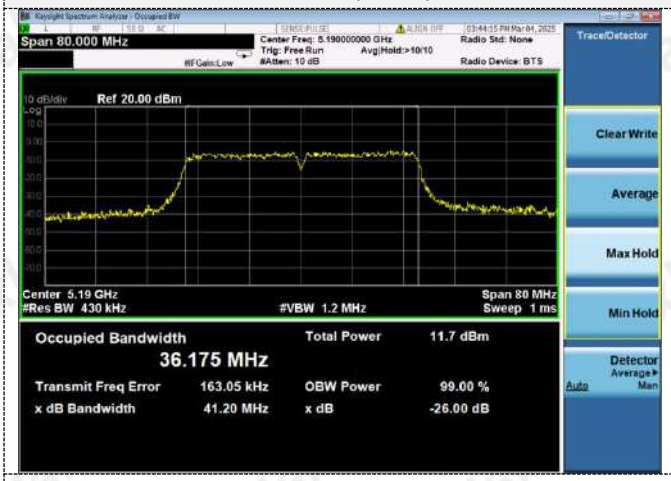
CH46



CH40

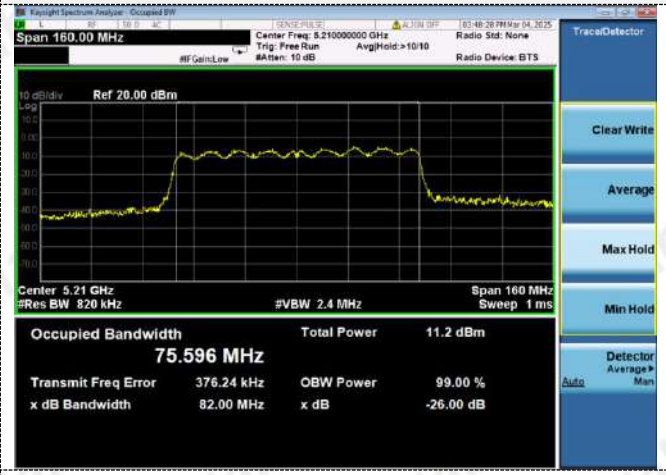
CH48

802.11ac(HT40)

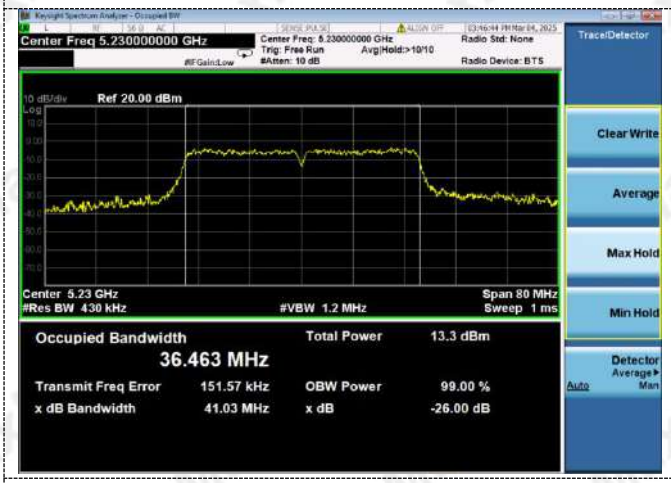


CH38

802.11ac(HT80)



CH42

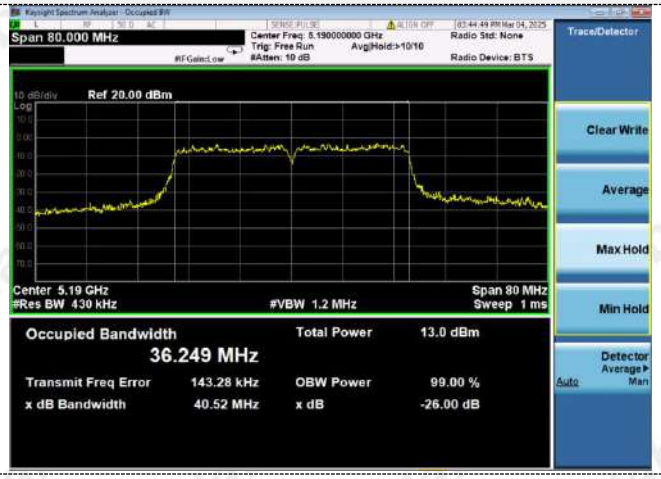


CH46

802.11ax(HT20)

CH36

802.11ax(HT40)



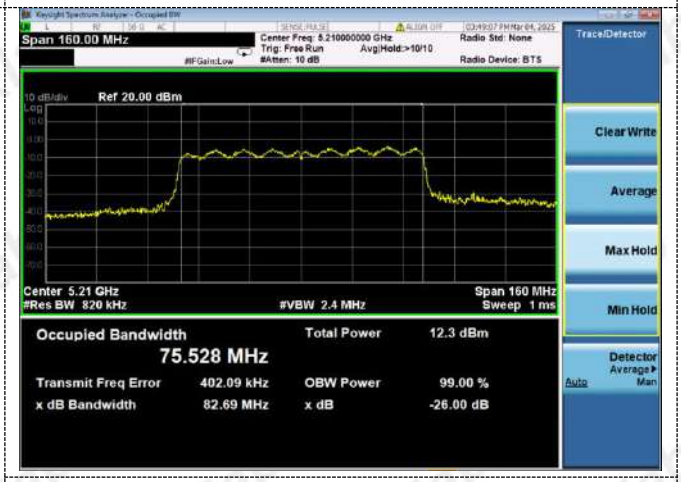
CH38

CH40

CH46

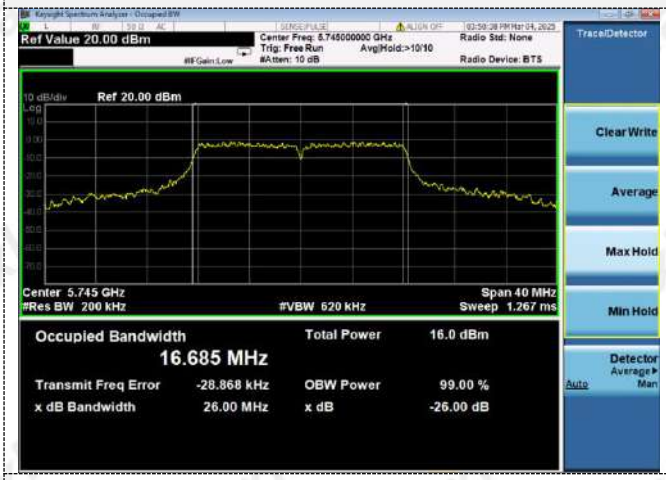
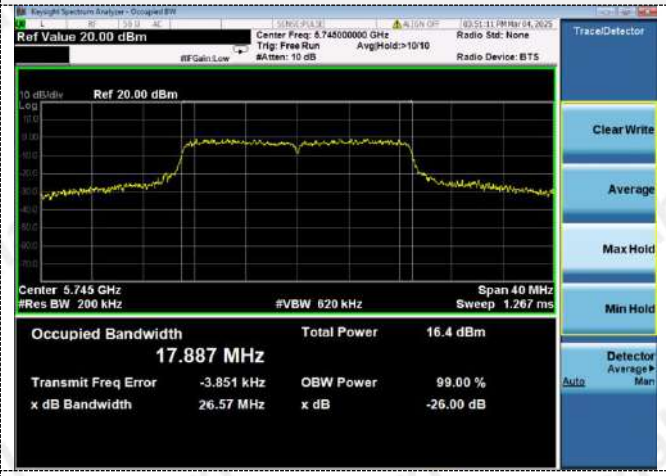
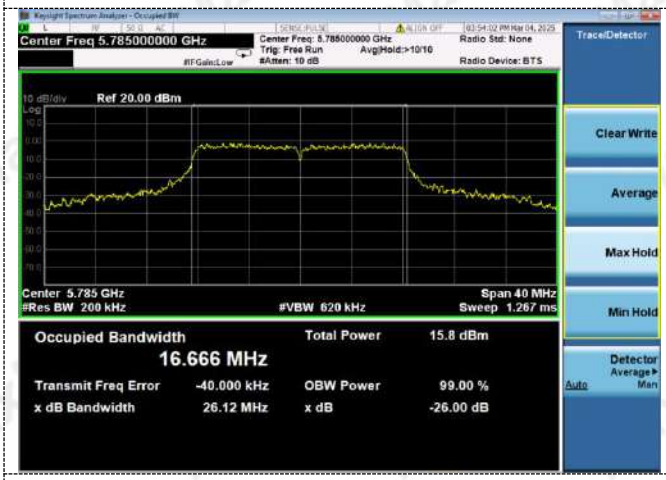
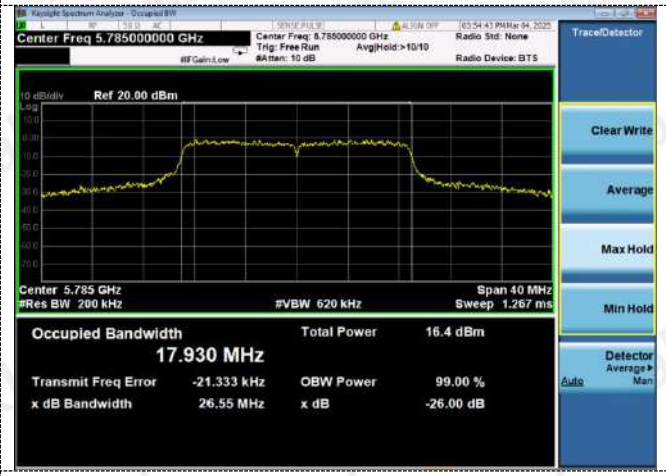
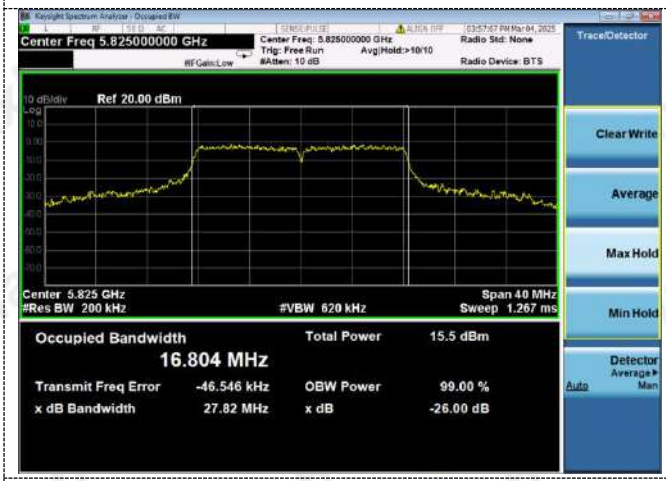
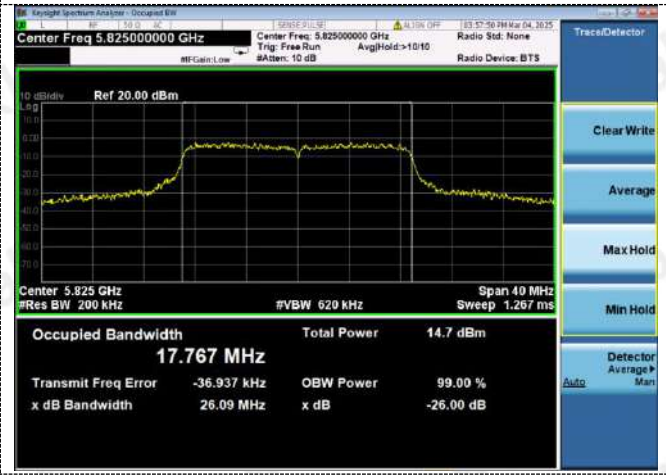
802.11ax(HT80)

CH48

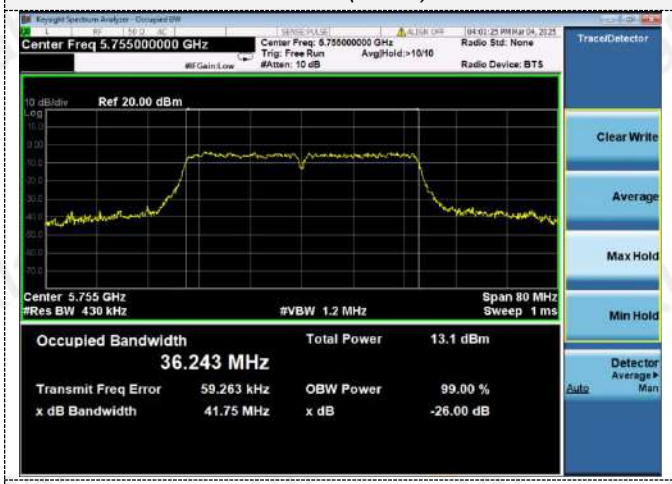


CH42

U-NII 3/ 5.8G

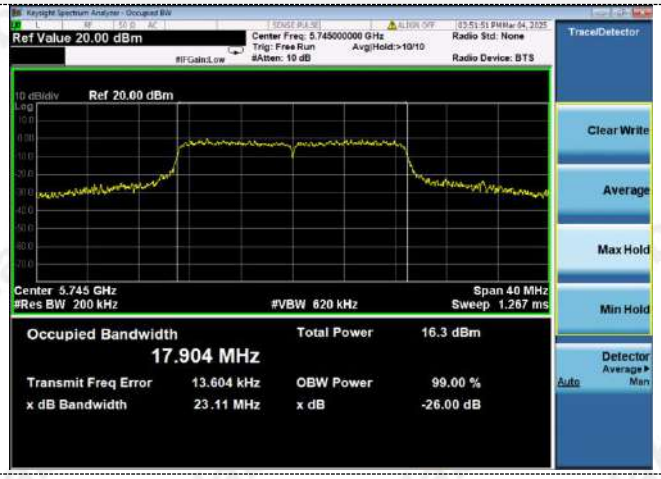
802.11a	802.11n(HT20)
	
CH149	CH149
	
CH157	CH157
	
CH165	CH165

802.11n(HT40)

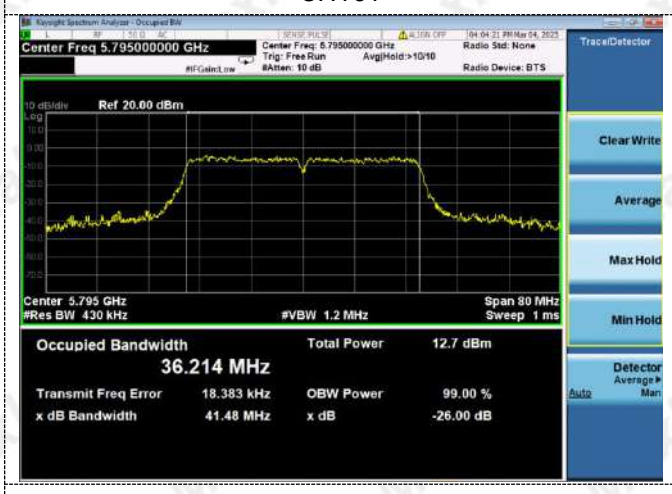


CH151

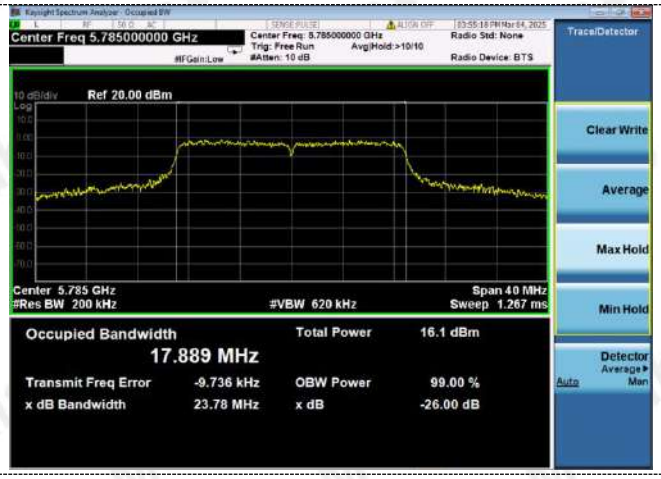
802.11ac(HT20)



CH149



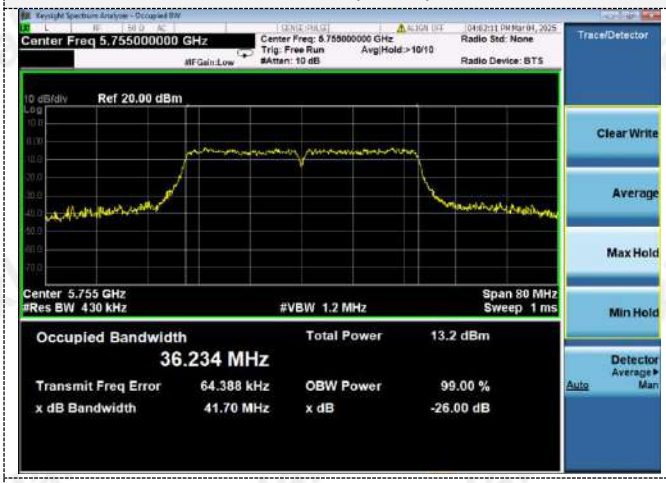
CH159



CH157

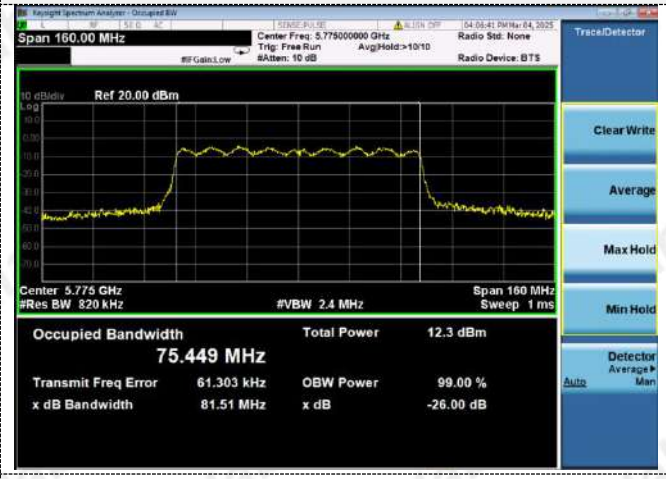
CH165

802.11ac(HT40)

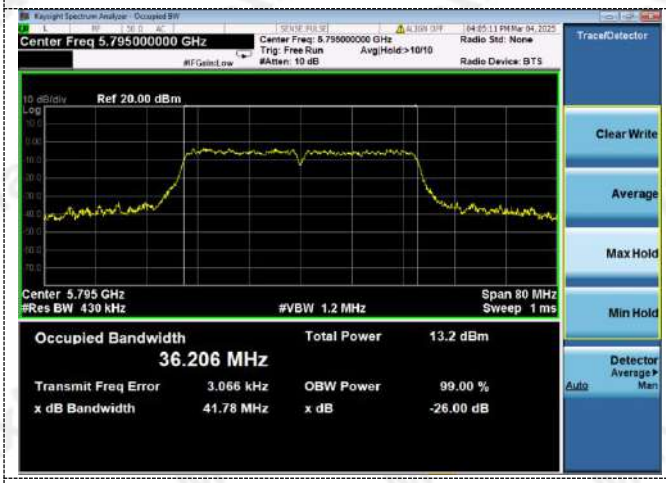


CH151

802.11ac(HT80)

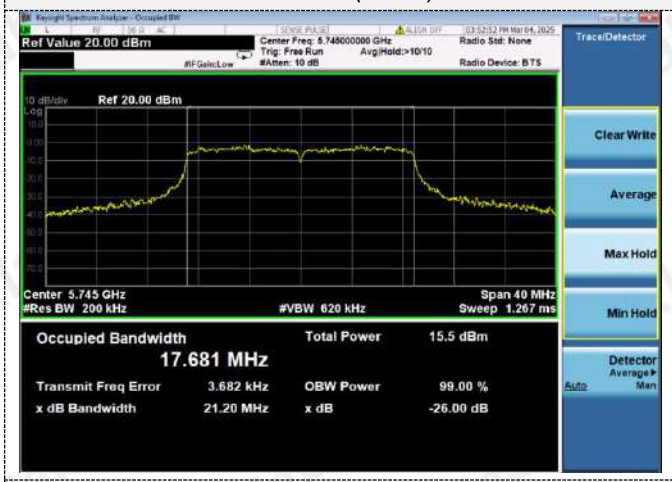


CH155



CH159

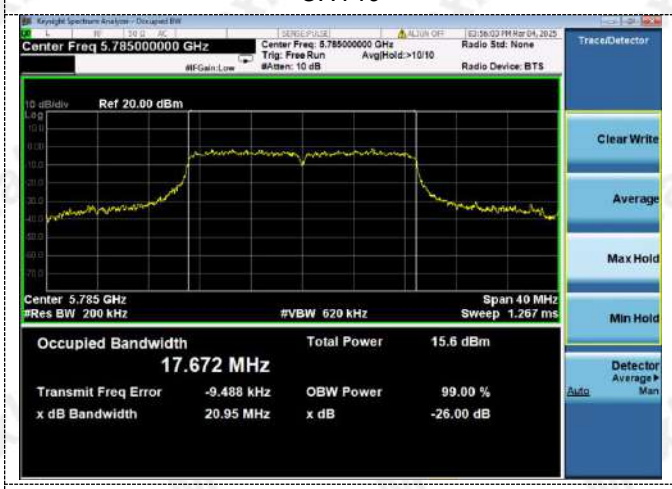
802.11ax(HT20)



CH149

802.11ax(HT40)

CH151

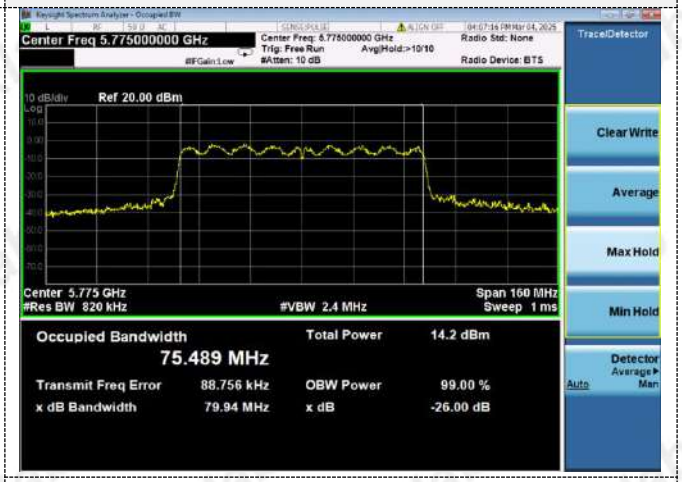


CH157

CH159

CH165

802.11ax(HT80)



CH155

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

Type	Bands	Channel	6dB Bandwidth (MHz)			Limit (KHz)	Result
			ANT 1	ANT 2	ANT 3		
802.11a	U-NII 3	149	16.54	16.45	16.21	≥500KHz	Pass
		157	16.53	16.43	16.23		
		165	16.54	16.24	16.13		
802.11n(HT20)	U-NII 3	149	17.67	17.56	17.25		
		157	17.66	17.52	17.26		
		165	17.66	17.52	17.27		
802.11n(HT40)	U-NII 3	151	36.44	36.21	36.15		
		159	36.42	36.12	36.05		
802.11ac(HT20)	U-NII 3	149	17.67	17.42	17.26		
		157	17.62	17.52	17.24		
		165	17.67	17.51	17.31		
802.11ac(HT40)	U-NII 3	151	36.45	36.26	36.12		
		159	36.44	36.25	36.14		
802.11ac(HT80)	U-NII 3	155	76.40	76.23	36.13		
802.11ax(HT20)	U-NII 3	149	17.67	17.52	17.42		
		157	17.69	17.54	17.34		
		165	17.72	17.63	17.35		
802.11ax(HT40)	U-NII 3	151	36.38	36.27	36.12		
		159	36.44	36.25	36.14		
802.11ax(HT80)	U-NII 3	155	76.27	76.12	75.96		