中认信通
CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

TEST REPORT

Applicant: **Phonex Broadband Corporation dba ReadyNet**

Address: 6952 S High Tech Drive, Suite B, Midvale, Utah,United States 84047

FCC ID: **Y2P-AX1500**

Product Name: **Dual band 11AX Gigabit Wireless Router**

Model Number: **AX1500MS , AX1500M**

Standard(s): **47 CFR Part 15, Subpart E(15.407)**
ANSI C63.10-2013
KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

The above equipment has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: **CR221050457-00B**

Date Of Issue: **2023/1/10**

Reviewed By: **Sun Zhong**

Sun Zhong

Title: Manager

Test Laboratory: **China Certification ICT Co., Ltd (Dongguan)**
No. 113, Pingkang Road, Dalang Town, Dongguan,
Guangdong, China
Tel: +86-769-82016888

Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0123.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

This report cannot be reproduced except in full, without prior written approval of the Company.

This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk "★".

CONTENTS

TEST FACILITY 2
DECLARATIONS 2
DOCUMENT REVISION HISTORY 5
1. GENERAL INFORMATION 6
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 6
1.2 DESCRIPTION OF TEST CONFIGURATION 8
1.2.2 Support Equipment List and Details 10
1.2.3 Support Cable List and Details 10
1.2.4 Block Diagram of Test Setup 10
1.3 MEASUREMENT UNCERTAINTY 12
2. SUMMARY OF TEST RESULTS 13
3. REQUIREMENTS AND TEST PROCEDURES 14
3.1 AC LINE CONDUCTED EMISSIONS 14
3.1.1 Applicable Standard 14
3.1.2 EUT Setup 15
3.1.3 EMI Test Receiver Setup 15
3.1.4 Test Procedure 16
3.1.5 Corrected Amplitude & Margin Calculation 16
3.2 RADIATION SPURIOUS EMISSIONS 17
3.2.1 Applicable Standard 17
3.2.2 EUT Setup 18
3.2.3 EMI Test Receiver & Spectrum Analyzer Setup 18
3.2.4 Test Procedure 19
3.2.5 Corrected Amplitude & Margin Calculation 19
3.3 EMISSION BANDWIDTH: 20
3.3.1 Applicable Standard 20
3.3.2 EUT Setup 20
3.3.3Test Procedure 20
3.4 MAXIMUM CONDUCTED OUTPUT POWER: 22
3.4.1 Applicable Standard 22
3.4.2 EUT Setup 22
3.4.3Test Procedure 23
3.5 MAXIMUM POWER SPECTRAL DENSITY: 24
3.5.1 Applicable Standard 24
3.5.2 EUT Setup 24
3.5.3Test Procedure 25
3.7 DUTY CYCLE: 25
3.7.1 EUT Setup 25
3.7.2Test Procedure 25
3.8 ANTENNA REQUIREMENT 26
3.8.1 Applicable Standard 26

3.8.2 Judgment 26
4. Test DATA AND RESULTS 27
4.1 AC LINE CONDUCTED EMISSIONS 27
4.2 RADIATION SPURIOUS EMISSIONS 30
4.3 EMISSION BANDWIDTH: 49
4.4 MAXIMUM CONDUCTED OUTPUT POWER: 72
4.5 MAXIMUM POWER SPECTRAL DENSITY: 77
4.6 DUTY CYCLE: 104
5. RF EXPOSURE EVALUATION 108
5.1 APPLICABLE STANDARD 108
5.2 MEASUREMENT RESULT 109

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR221050457-00B	Original Report	2023/1/10

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

1.1.1 General:

EUT Name:	Dual band 11AX Gigabit Wireless Router
EUT Model:	AX1500MS
Multiple Model:	AX1500M
Operation Frequency:	5180-5240 MHz (802.11a/n ht20/ac vht20/ax hew20) 5190-5230 MHz(802.11n ht40/ac vht40/ax hew40) 5210 MHz(802.11ac vht80/ax hew80) 5745-5825 MHz (802.11a/n ht20/ac vht20/ax hew20) 5755-5795 MHz(802.11n ht40/ac vht40/ax hew40) 5775 MHz(802.11ac vht80/ax hew80)
Maximum Average Output Power (Conducted):	18.40 dBm (5150-5250 MHz) 22.07 dBm (5725-5850 MHz)
Modulation Type:	802.11a/n/ac: OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM 802.11ax: OFDMA- BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Rated Input Voltage:	DC 12V from adapter
Serial Number:	1O7R(AX1500MS), 1O8A(AX1500M)
EUT Received Date:	2022/11/2
EUT Received Status:	Good
Note: The Multiple model and test model are with the same electromagnetic emissions and electromagnetic compatibility characteristics. Please refer to the declaration letter for more detail, which was provided by manufacturer. Test only performed at AX1500MS model since the worst is model: AX1500MS per test for DTS report.	

1.1.2 Operation Frequency Detail:

For 802.11a/n ht20/ac vht20/ax hew20:

5150-5250MHz Band		5725-5850MHz Band	
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
36	5180	149	5745
40	5200	153	5765
44	5220	157	5785
48	5240	161	5805
/	/	165	5825
Per section 15.31(m), the below frequencies were performed the test as below:			
36	5180	149	5745
40	5200	157	5785
48	5240	165	5825

For 802.11n ht40/ac vht40/ax hew40:

5150-5250MHz Band		5725-5850MHz Band	
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
38	5190	151	5755
46	5230	159	5795
Per section 15.31(m), the below frequencies were performed the test as below:			
38	5190	151	5755

46	5230	159	5795

For 802.11ac vht80/ax hew80:

5150-5250MHz Band		5725-5850MHz Band	
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
42	5210	155	5775
Per section 15.31(m), the below frequencies were performed the test as below:			
42	5210	155	5775

1.1.3 Antenna Information Detail▲:

Antenna Chain	Antenna Type	input impedance (Ohm)	Frequency Range	Antenna Gain
Chain 0	Dipole	50	5150-5250 MHz	5.47 dBi
			5725-5850 MHz	5.12 dBi
Chain 1	Dipole	50	5150-5250 MHz	5.55 dBi
			5725-5850 MHz	4.82 dBi
The Method of §15.203 Compliance: ☒Antenna must be permanently attached to the unit. ☐Antenna must use a unique type of connector to attach to the EUT. ☐Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.				

1.1.4 Accessory Information:

Accessory Description	Manufacturer	Model	Parameters
Adapter	LISTRD	DZ01G-1201000U	Input:100-240V, 50~60Hz,0.5A Output:12V,1A

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

EUT Operation Mode:	The system was configured for testing in Engineering Mode, which was provided by the manufacturer.
Equipment Modifications:	No
EUT Exercise Software:	MP_AX
The software was provided by manufacturer. The maximum power was configured as below, that was provided by the manufacturer▲:	

5150-5250 MHz Band:					
Test Modes	**Test Channels**	**Test Frequency**	**Data rate**	**Power Level Setting**	
				Chain 0	**Chain 1**
802.11a	Lowest	5180	6Mbps	14	14
	Middle	5200	6Mbps	14	14
	Highest	5240	6Mbps	14	14
802.11n ht20	Lowest	5180	MCS8	14	14
	Middle	5200	MCS8	14	14
	Highest	5240	MCS8	14	14
802.11n ht40	Lowest	5190	MCS8	13	13
	Highest	5230	MCS8	13	13
802.11ac vht80	Middle	5210	MCS8	14	14
802.11ax hew20	Lowest	5180	MCS8	20	20
	Middle	5200	MCS8	20	20
	Highest	5240	MCS8	20	20
802.11ax hew40	Lowest	5190	MCS8	16	16
	Highest	5230	MCS8	16	16
802.11ax hew80	Middle	5210	MCS8	17	17

5725-5850 MHz Band:					
Test Modes	**Test Channels**	**Test Frequency**	**Data rate**	**Power Level Setting**	
				Chain 0	**Chain 1**
802.11a	Lowest	5745	6Mbps	21	21
	Middle	5785	6Mbps	21	21
	Highest	5825	6Mbps	21	21
802.11n ht20	Lowest	5745	MCS8	20	20
	Middle	5785	MCS8	20	20
	Highest	5825	MCS8	20	20
802.11n ht40	Lowest	5755	MCS8	20	20
	Highest	5795	MCS8	20	20
802.11ac vht80	Middle	5775	MCS8	20	20
802.11ax hew20	Lowest	5745	MCS8	22	30
	Middle	5785	MCS8	22	30
	Highest	5825	MCS8	22	30
802.11ax hew40	Lowest	5755	MCS8	22	30
	Highest	5795	MCS8	22	30
802.11ax hew80	Middle	5775	MCS8	20	30

Note:
1. The system support 802.11a/n ht20/n ht40/ac vht20/vht40/vht80/ax hew20/hew40/hew80, the vht20/vht40 were reduced since the identical parameters with 802.11n ht20 and ht40.
2. The above are the worst-case data rates, which are determined for each mode based upon investigations by measuring the average power and PSD across all data rates, bandwidths, and modulations.
3. The device supports SISO in all modes, and MIMO 2T2R in 802.11n/ac/ax modes, per pretest, 2T2R mode was the worst mode and reported for 802.11n/ac/ax modes.
4. For 802.11 ax testing, all different tone and RU index configurations was performed for output power, the maximum result is in Full RU Configuration, so the other test was only performed at Full RU configuration(802.11ax hew20:242/61, 802.11ax hew40: 484/65, 802.11ax hew80: 996/67).

1.2.2 Support Equipment List and Details

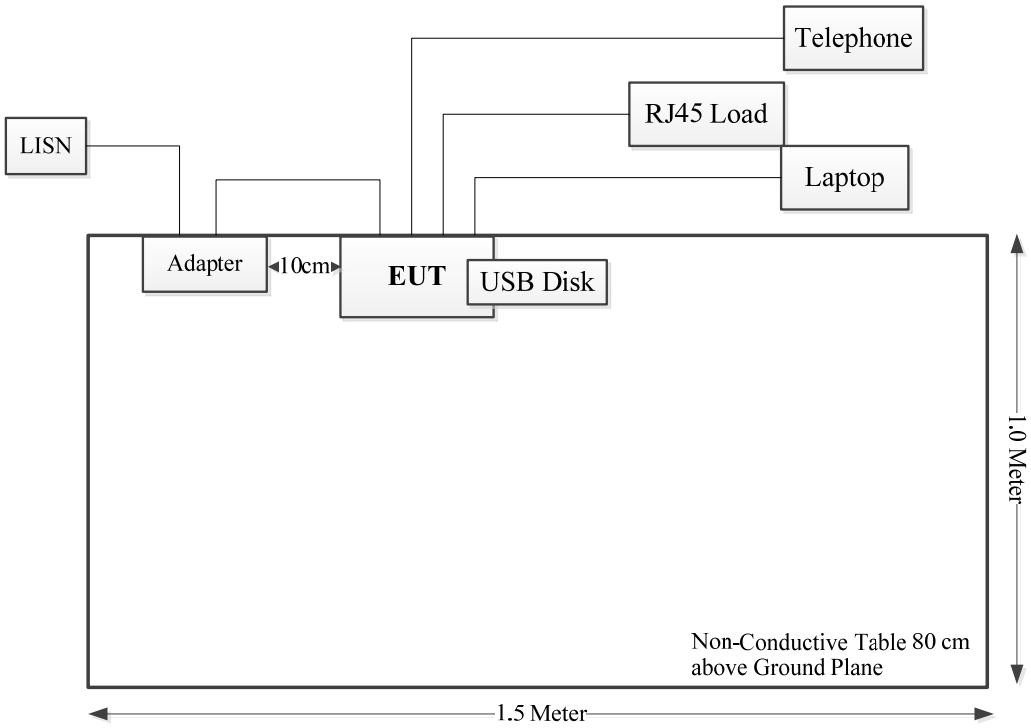
Manufacturer	Description	Model	Serial Number
HP	USB Disk	HPFD206W-32	PAA6918477
OneKe	Telephone	TC-108H	DJ21103005
Unknown	RJ45 Load	RJ45X9	F-EM-PHRJ45X8001
DELL	Laptop	E6410	GYXJ3 A00 JSD2

1.2.3 Support Cable List and Details

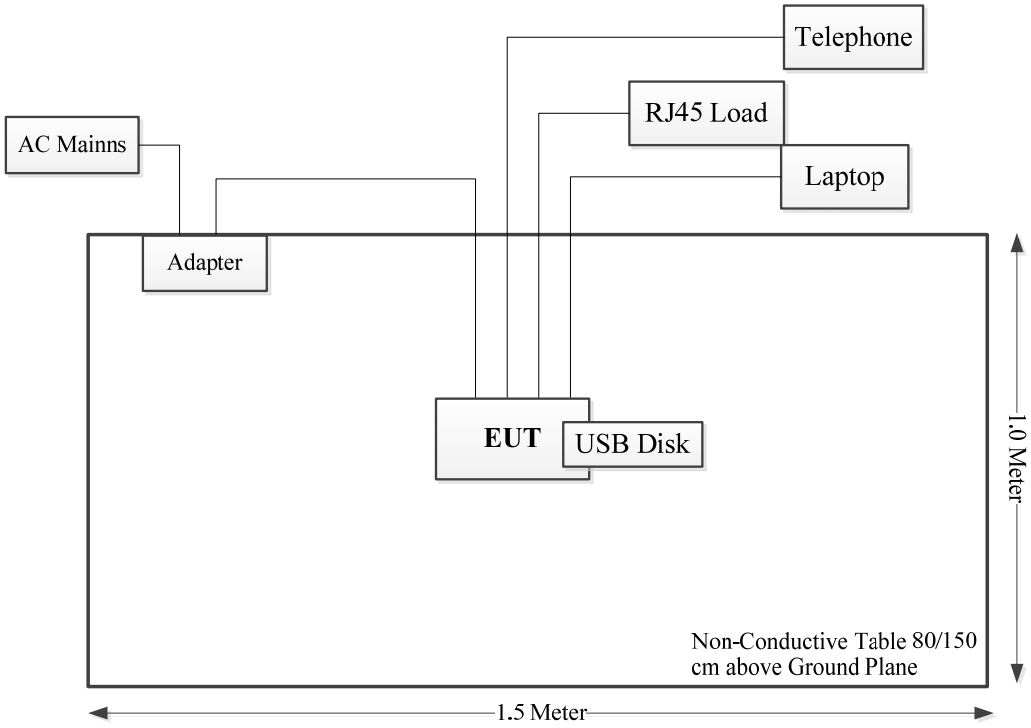
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	Yes	Yes	10	EUT	Laptop
RJ45 Cable*3	Yes	Yes	10	EUT	RJ45 Load
RJ11 Cable	No	No	10	EUT	Telephone
Power Cable	Yes	No	1	EUT	Adapter

1.2.4 Block Diagram of Test Setup

AC line conducted emissions:
AX1500MS:



Spurious Emissions:
AX1500MS:



1.3 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.15 dB,200M~1GHz: 5.61 dB,1G~6GHz: 5.14 dB, 6G~18GHz: 5.93 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB
Unwanted Emissions, conducted	±1.26 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	2.8 dB (150 kHz to 30 MHz)

2. SUMMARY OF TEST RESULTS

Standard(s) Section	Test Items	Result
FCC§15.207(a)	AC line conducted emissions	Compliant
FCC§15.205& §15.209 &§15.407(b)	Undesirable Emission& Restricted Bands	Compliant
FCC§15.407(a) (e)	Emission Bandwidth	Compliant
FCC§15.407(a)	Conducted Transmitter Output Power	Compliant
FCC§15.407 (a)	Power Spectral Density	Compliant
FCC§15.203	Antenna Requirement	Compliant
FCC§15.407(f) & §1.1307	RF Exposure Evaluation	Compliant

3. REQUIREMENTS AND TEST PROCEDURES

3.1 AC Line Conducted Emissions

3.1.1 Applicable Standard

FCC§15.207(a).

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

	Conducted limit (dBµV)	
Frequency of emission (MHz)	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.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

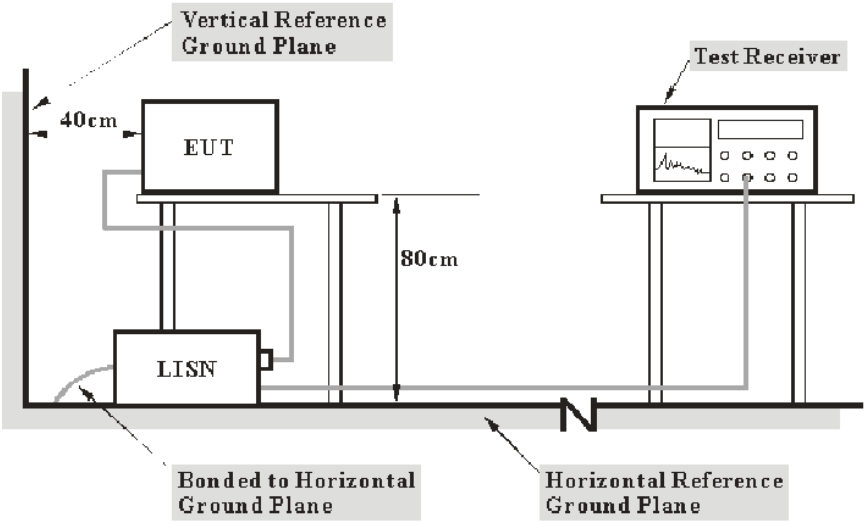
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 µV within the frequency band 535-1705 kHz, as measured using a 50 µH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtainig their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

3.1.2 EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter or EUT was connected to the main LISN with a 120 V/60 Hz AC power source.

3.1.3 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

3.1.4 Test Procedure

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase ("hot") line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

3.1.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = attenuation caused by cable loss + voltage division factor of AMN

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

3.2 Radiation Spurious Emissions

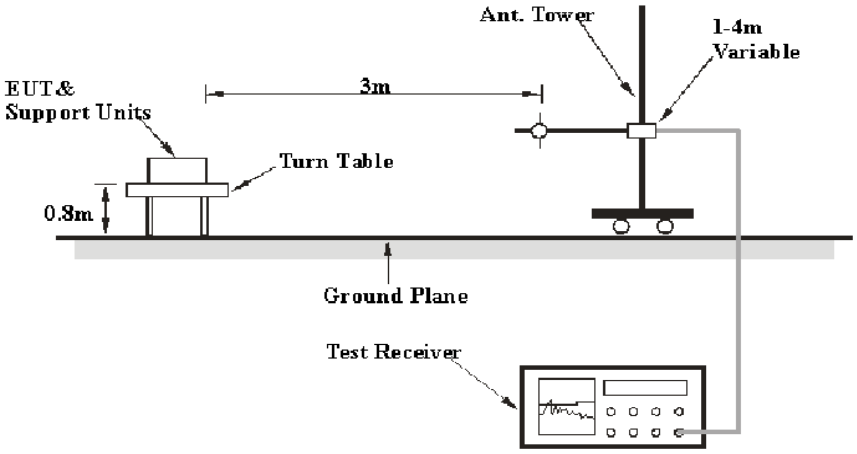
3.2.1 Applicable Standard

FCC §15.407 (b);

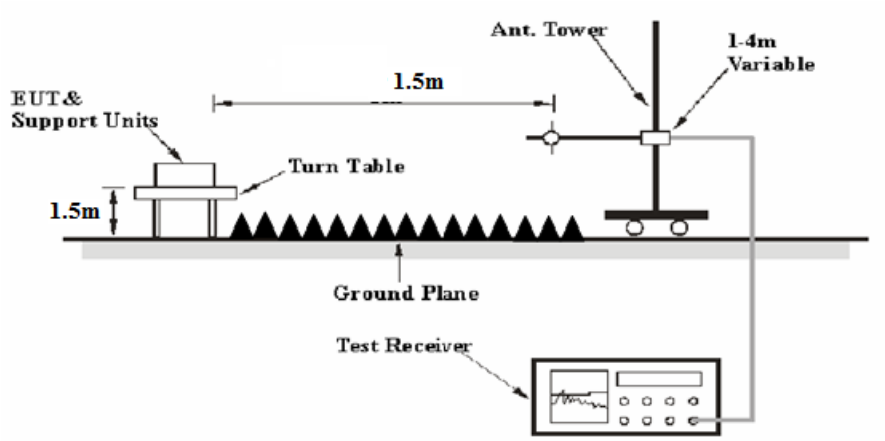
Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of – 27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of – 27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of – 27 dBm/MHz.
(4) For transmitters operating solely in the 5.725-5.850 GHz band:
(i) All emissions shall be limited to a level of – 27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.
(8) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
(9) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in § 15.207.
(10) The provisions of § 15.205 apply to intentional radiators operating under this section.
(11) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.
(c) The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

3.2.2 EUT Setup

Below 1GHz:



1-40 GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was FCC 15.209, FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

3.2.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

30-1000MHz:

Detector	RBW	Video B/W	IF B/W
QP	120 kHz	300 kHz	120kHz

1GHz- 40GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
AV	>98%	1MHz	10 Hz
	<98%	1MHz	1/T

Note: T is minimum transmission duration

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

3.2.4 Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Average detection modes for frequencies above 1GHz.

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: E [dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

According to C63.10, the above 1G test result shall be extrapolated to the specified distance using an extrapolation Factor of 20dB/decade from 3m to 1.5m

Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB

All emissions under the average limit and under the noise floor have not recorded in the report.

3.2.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Factor = Antenna Factor + Cable Loss- Amplifier Gain

For 30MHz-1GHz:
Result = Reading + Factor

For 1GHz-40GHz
Result = Reading + Factor-Distance extrapolation Factor

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

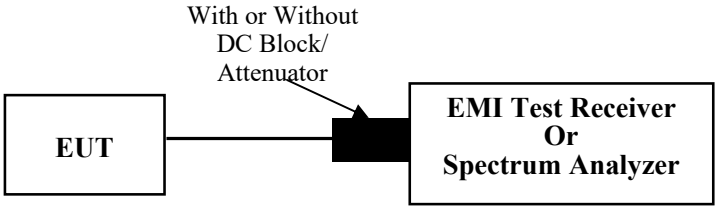
3.3 Emission Bandwidth:

3.3.1 Applicable Standard

FCC §15.407 (a),(h)
(h)(2) Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating with any part of its 26 dB emission bandwidth in the 5.25-5.35 GHz and 5.47-5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems.

FCC §15.407 (e)
Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

3.3.2 EUT Setup



3.3.3Test Procedure

26dB Emission Bandwidth:

According to ANSI C63.10-2013 Section 12.4.1

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

6 dB emission bandwidth:

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described in this section. For devices that use channel aggregation refer to III.A and III.C for determining emission bandwidth.

99% Occupied Bandwidth:

According to ANSI C63.10-2013 Section 12.4.2&6.9.3

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.
The following procedure shall be used for measuring 99% power bandwidth:
a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
d) Step a) through step c) might require iteration to adjust within the specified range.
e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

3.4 Maximum conducted output power:

3.4.1 Applicable Standard

FCC §15.407(a) (1)

(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. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

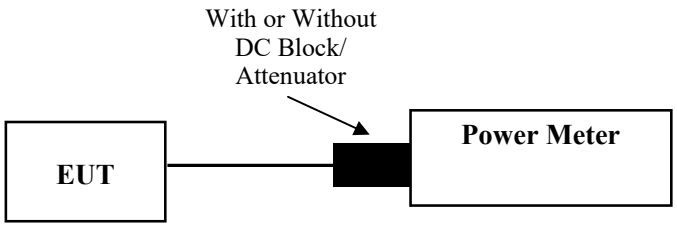
(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

FCC §15.407(a) (3)(i)

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

3.4.2 EUT Setup



3.4.3Test Procedure

According to ANSI C63.10-2013 Section 12.3.3.2

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

3.5 Maximum power spectral density:

3.5.1 Applicable Standard

FCC §15.407(a) (1)

(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. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

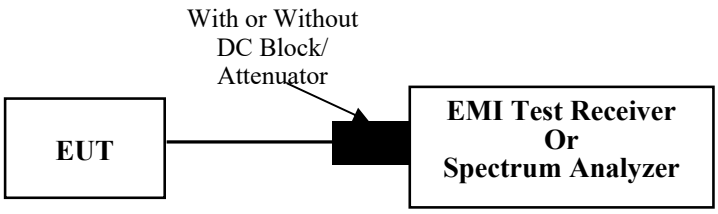
(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

FCC §15.407(a) (3)(i)

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

3.5.2 EUT Setup



3.5.3Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Method SA-3 (power averaging (rms) detection with max hold):
(i) Set span to encompass the entire EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set sweep trigger to "free run."

(iii) Set RBW = 1 MHz.

(iv) Set VBW ≥ 3 MHz

(v) Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(vi) Sweep time ≤ (number of points in sweep) × *T*, where *T* is defined in II.B.1.a).
Note: If this results in a sweep time less than the auto sweep time of the analyzer, Method SA-3 Alternative shall not be used. (The purpose of this step is to ensure that averaging time in each bin is less than or equal to the minimum time of a transmission.)

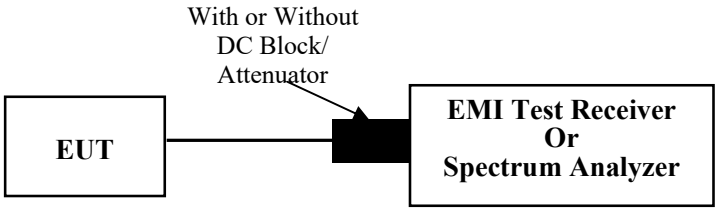
(vii) Detector = power averaging (rms).

(viii) Trace mode = max hold.
(ix) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

For devices operating in the band 5.725−5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used.

3.7 Duty Cycle:

3.7.1 EUT Setup



3.7.2Test Procedure

According to ANSI C63.10-2013 Section 12.2

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:
1) Set the center frequency of the instrument to the center frequency of the transmission.
2) Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.
3) Set VBW ≥ RBW. Set detector = peak or average.
4) The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if T ≤ 16.7 μs.)

3.8 Antenna Requirement

3.8.1 Applicable Standard

FCC §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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

3.8.2 Judgment

Result: Compliant. Please refer to the Antenna Information detail in Section 1.

4. Test DATA AND RESULTS

4.1 AC Line Conducted Emissions

Serial Number:	1O7R	Test Date:	2022/11/16
Test Site:	CE	Test Mode:	Transmitting(802.11n ht20 5745MHz was the worst)
Tester:	Vic Du	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.4	Relative Humidity: (%)	67	ATM Pressure: (kPa)	100.9

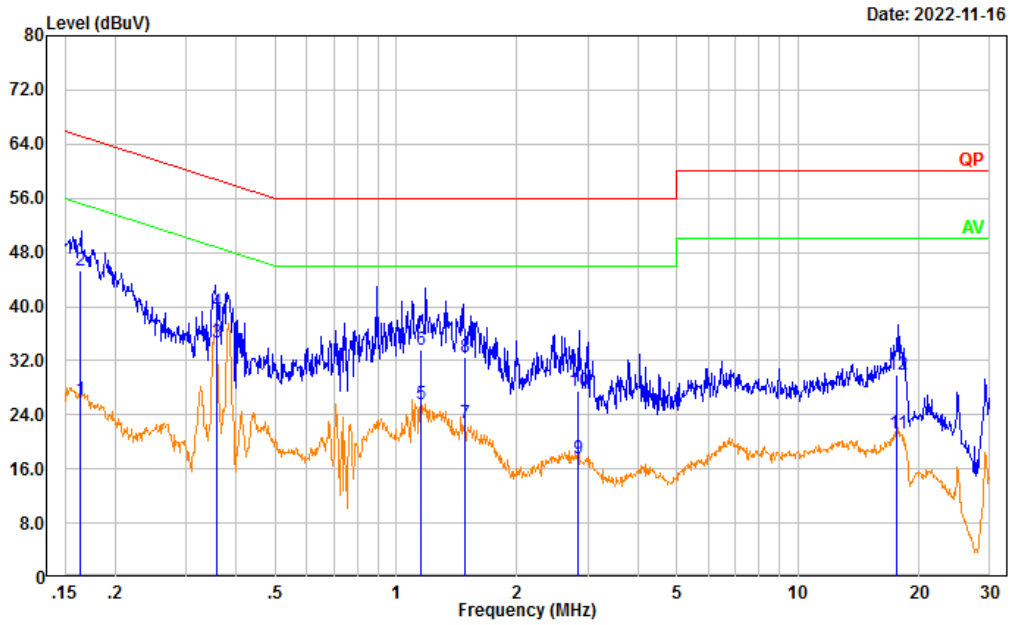
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101134	2022/04/01	2023/03/31
R&S	EMI Test Receiver	ESR3	102726	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2022/08/07	2023/08/06
Audix	Test Software	E3	190306 (V9)	N/A	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

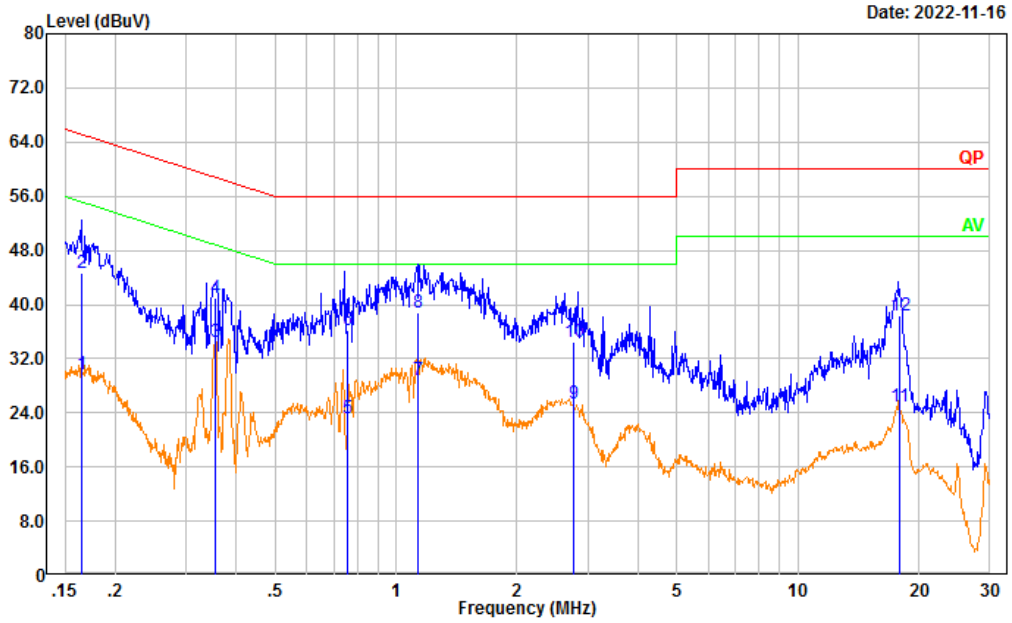
AX1500MS:

Test Mode: Transmitting
Port: Line
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.163	16.59	9.61	26.20	55.30	29.10	Average
2	0.163	35.77	9.61	45.38	65.30	19.92	QP
3	0.358	25.06	9.61	34.67	48.78	14.11	Average
4	0.358	29.61	9.61	39.22	58.78	19.56	QP
5	1.157	16.05	9.62	25.67	46.00	20.33	Average
6	1.157	23.93	9.62	33.55	56.00	22.45	QP
7	1.482	13.15	9.62	22.77	46.00	23.23	Average
8	1.482	22.82	9.62	32.44	56.00	23.56	QP
9	2.827	8.01	9.65	17.66	46.00	28.34	Average
10	2.827	17.92	9.65	27.57	56.00	28.43	QP
11	17.636	11.57	9.74	21.31	50.00	28.69	Average
12	17.636	20.14	9.74	29.88	60.00	30.12	QP

Test Mode: Transmitting
Port: neutral
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.165	20.06	9.61	29.67	55.20	25.53	Average
2	0.165	35.12	9.61	44.73	65.20	20.47	QP
3	0.356	24.93	9.61	34.54	48.83	14.29	Average
4	0.356	31.28	9.61	40.89	58.83	17.94	QP
5	0.757	13.67	9.62	23.29	46.00	22.71	Average
6	0.757	26.58	9.62	36.20	56.00	19.80	QP
7	1.134	19.16	9.62	28.78	46.00	17.22	Average
8	1.134	29.19	9.62	38.81	56.00	17.19	QP
9	2.756	15.62	9.65	25.27	46.00	20.73	Average
10	2.756	24.84	9.65	34.49	56.00	21.51	QP
11	17.897	15.32	9.69	25.01	50.00	24.99	Average
12	17.897	28.64	9.69	38.33	60.00	21.67	QP

4.2 Radiation Spurious Emissions

Serial Number:	1O7R	Test Date:	2022/11/23~2022/11/26
Test Site:	966-1, 966-2	Test Mode:	Transmitting
Tester:	Carl Xue, Mack Huang	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	24.5~26.6	Relative Humidity: (%)	64~68	ATM Pressure: (kPa)	100.2~101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2020/10/19	2023/10/18
R&S	EMI Test Receiver	ESR3	102724	2022/07/15	2023/07/14
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2022/07/17	2023/07/16
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2022/07/17	2023/07/16
Sonoma	Amplifier	310N	186165	2022/07/17	2023/07/16
Audix	Test Software	E3	201021 (V9)	N/A	N/A
ETS-Lindgren	Horn Antenna	3115	9912-5985	2020/10/13	2023/10/12
R&S	Spectrum Analyzer	FSV40	101591	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UFA210A-1-1200-70U300	217423-008	2022/08/07	2023/08/06
MICRO-COAX	Coaxial Cable	UFA210A-1-2362-300300	235780-001	2022/08/07	2023/08/06
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2022/11/09	2023/11/08
PASTERNACK	Horn Antenna	PE9852/2F-20	112002	2021/02/05	2024/02/04
AH	Preamplifier	PAM-1840VH	190	2022/11/09	2023/11/08
MICRO-COAX	Coaxial Cable	UFB142A-1-2362-200200	235772-001	2022/08/07	2023/08/06
E-Microwave	Band Rejection Filter	5150-5850MHz	OE01902423	2022/08/07	2023/08/06
Mini Circuits	High Pass Filter	VHF-6010+	31119	2022/08/07	2023/08/06
PASTERNACK	Horn Antenna	PE9850/2F-20	072001	2021/02/05	2024/02/04

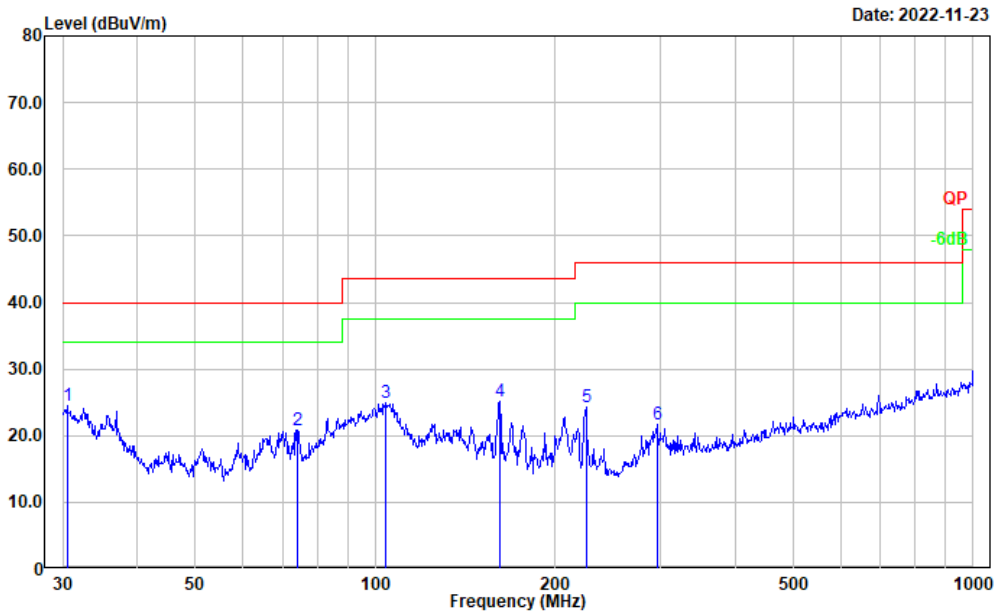
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Please refer to the below table and plots.

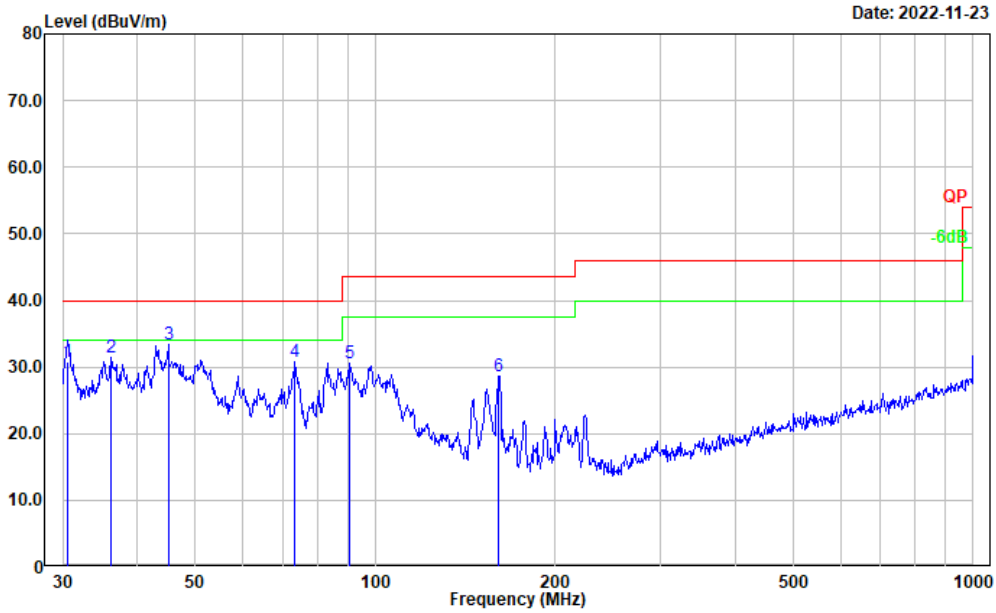
1) 30MHz-1GHz(802.11n ht20 5745MHz was the worst)
AX1500MS:

Test Mode: Transmitting
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	30.531	28.44	-4.00	24.44	40.00	15.56	Peak
2	74.135	37.79	-16.90	20.89	40.00	19.11	Peak
3	103.806	38.41	-13.58	24.83	43.50	18.67	Peak
4	161.474	37.42	-12.21	25.21	43.50	18.29	Peak
5	225.308	37.06	-12.87	24.19	46.00	21.81	Peak
6	296.184	32.50	-10.73	21.77	46.00	24.23	Peak

Test Mode: Transmitting
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.633	34.88	-4.08	30.80	40.00	9.20	QP
2	36.127	39.81	-8.34	31.47	40.00	8.53	Peak
3	45.058	47.72	-14.25	33.47	40.00	6.53	Peak
4	73.359	47.66	-16.80	30.86	40.00	9.14	Peak
5	90.537	47.47	-16.80	30.67	43.50	12.83	Peak
6	160.909	40.86	-12.15	28.71	43.50	14.79	Peak

2) 1GHz-40GHz:
5150-5250MHz
802.11a, Chain 0:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5180MHz							
5180.000	51.90	PK	H	38.68	84.56	N/A	N/A
5180.000	41.82	AV	H	38.68	74.48	N/A	N/A
5180.000	66.60	PK	V	38.68	99.26	N/A	N/A
5180.000	56.73	AV	V	38.68	89.39	N/A	N/A
5150.000	27.69	PK	V	38.64	60.31	74.00	13.69
5150.000	14.09	AV	V	38.64	46.71	54.00	7.29
10360.000	34.30	PK	V	19.18	47.46	68.20	20.74
15540.000	36.87	PK	V	22.44	53.29	74.00	20.71
15540.000	24.75	AV	V	22.44	41.17	54.00	12.83
Middle Channel: 5200 MHz							
5200.000	52.35	PK	H	38.70	85.03	N/A	N/A
5200.000	42.45	AV	H	38.70	75.13	N/A	N/A
5200.000	68.33	PK	V	38.70	101.01	N/A	N/A
5200.000	58.16	AV	V	38.70	90.84	N/A	N/A
10400.000	36.31	PK	V	19.16	49.45	68.20	18.75
15600.000	36.30	PK	V	22.41	52.69	74.00	21.31
15600.000	24.15	AV	V	22.41	40.54	54.00	13.46
High Channel: 5240 MHz							
5240.000	52.65	PK	H	38.85	85.48	N/A	N/A
5240.000	42.87	AV	H	38.85	75.70	N/A	N/A
5240.000	65.55	PK	V	38.85	98.38	N/A	N/A
5240.000	55.13	AV	V	38.85	87.96	N/A	N/A
5350.000	25.76	PK	V	39.03	58.77	74.00	15.23
5350.000	13.75	AV	V	39.03	46.76	54.00	7.24
10480.000	31.04	PK	V	18.86	43.88	68.20	24.32
15720.000	35.45	PK	V	22.28	51.71	74.00	22.29
15720.000	22.91	AV	V	22.28	39.17	54.00	14.83

802.11a, Chain 1:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5180MHz							
5180.000	55.76	PK	H	38.68	88.42	N/A	N/A
5180.000	45.38	AV	H	38.68	78.04	N/A	N/A
5180.000	68.56	PK	V	38.68	101.22	N/A	N/A
5180.000	58.89	AV	V	38.68	91.55	N/A	N/A
5150.000	29.83	PK	V	38.64	62.45	74.00	11.55
5150.000	16.79	AV	V	38.64	49.41	54.00	4.59
10360.000	34.37	PK	V	19.18	47.53	68.20	20.67
15540.000	34.57	PK	V	22.44	50.99	74.00	23.01
15540.000	22.29	AV	V	22.44	38.71	54.00	15.29
Middle Channel: 5200 MHz							
5200.000	55.76	PK	H	38.70	88.44	N/A	N/A
5200.000	45.32	AV	H	38.70	78.00	N/A	N/A
5200.000	69.66	PK	V	38.70	102.34	N/A	N/A
5200.000	59.41	AV	V	38.70	92.09	N/A	N/A
10400.000	34.04	PK	V	19.16	47.18	68.20	21.02
15600.000	36.72	PK	V	22.41	53.11	74.00	20.89
15600.000	24.36	AV	V	22.41	40.75	54.00	13.25
High Channel: 5240 MHz							
5240.000	54.56	PK	H	38.85	87.39	N/A	N/A
5240.000	44.28	AV	H	38.85	77.11	N/A	N/A
5240.000	69.68	PK	V	38.85	102.51	N/A	N/A
5240.000	59.61	AV	V	38.85	92.44	N/A	N/A
5350.000	29.79	PK	V	39.03	62.80	74.00	11.20
5350.000	16.51	AV	V	39.03	49.52	54.00	4.48
10480.000	32.51	PK	V	18.86	45.35	68.20	22.85
15720.000	38.38	PK	V	22.28	54.64	74.00	19.36
15720.000	26.19	AV	V	22.28	42.45	54.00	11.55

802.11n ht20(2TX mode was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5180MHz							
5180.000	58.64	PK	H	38.68	91.30	N/A	N/A
5180.000	47.25	AV	H	38.68	79.91	N/A	N/A
5180.000	72.71	PK	V	38.68	105.37	N/A	N/A
5180.000	61.72	AV	V	38.68	94.38	N/A	N/A
5150.000	29.67	PK	V	38.64	62.29	74.00	11.71
5150.000	16.91	AV	V	38.64	49.53	54.00	4.47
10360.000	34.34	PK	V	19.18	47.50	68.20	20.70
15540.000	35.43	PK	V	22.44	51.85	74.00	22.15
15540.000	23.22	AV	V	22.44	39.64	54.00	14.36
Middle Channel: 5200 MHz							
5200.000	59.25	PK	H	38.70	91.93	N/A	N/A
5200.000	48.47	AV	H	38.70	81.15	N/A	N/A
5200.000	72.16	PK	V	38.70	104.84	N/A	N/A
5200.000	61.74	AV	V	38.70	94.42	N/A	N/A
10400.000	33.49	PK	V	19.16	46.63	68.20	21.57
15600.000	36.86	PK	V	22.41	53.25	74.00	20.75
15600.000	24.43	AV	V	22.41	40.82	54.00	13.18
High Channel: 5240 MHz							
5240.000	58.36	PK	H	38.85	91.19	N/A	N/A
5240.000	47.65	AV	H	38.85	80.48	N/A	N/A
5240.000	72.50	PK	V	38.85	105.33	N/A	N/A
5240.000	61.42	AV	V	38.85	94.25	N/A	N/A
5350.000	29.60	PK	V	39.03	62.61	74.00	11.39
5350.000	16.54	AV	V	39.03	49.55	54.00	4.45
10480.000	37.51	PK	V	18.86	50.35	68.20	17.85
15720.000	37.58	PK	V	22.28	53.84	74.00	20.16
15720.000	25.26	AV	V	22.28	41.52	54.00	12.48

802.11n ht40(2TX mode was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5190MHz							
5190.000	55.40	PK	H	38.69	88.07	N/A	N/A
5190.000	43.74	AV	H	38.69	76.41	N/A	N/A
5190.000	69.00	PK	V	38.69	101.67	N/A	N/A
5190.000	57.42	AV	V	38.69	90.09	N/A	N/A
5150.000	29.80	PK	V	38.64	62.42	74.00	11.58
5150.000	16.96	AV	V	38.64	49.58	54.00	4.42
10380.000	33.17	PK	V	19.17	46.32	68.20	21.88
15570.000	34.47	PK	V	22.43	50.88	74.00	23.12
15570.000	22.24	AV	V	22.43	38.65	54.00	15.35
High Channel: 5230 MHz							
5230.000	55.09	PK	H	38.81	87.88	N/A	N/A
5230.000	43.23	AV	H	38.81	76.02	N/A	N/A
5230.000	68.50	PK	V	38.81	101.29	N/A	N/A
5230.000	56.12	AV	V	38.81	88.91	N/A	N/A
5350.000	29.98	PK	V	39.03	62.99	74.00	11.01
5350.000	16.53	AV	V	39.03	49.54	54.00	4.46
10460.000	35.84	PK	V	18.94	48.76	68.20	19.44
15690.000	38.95	PK	V	22.29	55.22	74.00	18.78
15690.000	26.48	AV	V	22.29	42.75	54.00	11.25

802.11ac vht80(2TX mode was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Middle Channel: 5210 MHz							
5210.000	53.25	PK	H	38.74	85.97	N/A	N/A
5210.000	42.34	AV	H	38.74	75.06	N/A	N/A
5210.000	66.87	PK	V	38.74	99.59	N/A	N/A
5210.000	55.56	AV	V	38.74	88.28	N/A	N/A
5150.000	30.25	PK	V	38.64	62.87	74.00	11.13
5150.000	17.00	AV	V	38.64	49.62	54.00	4.38
5350.000	30.05	PK	V	39.03	63.06	74.00	10.94
5350.000	16.53	AV	V	39.03	49.54	54.00	4.46
10420.000	33.20	PK	V	19.09	46.27	68.20	21.93
15630.000	37.25	PK	V	22.37	53.60	74.00	20.40
15630.000	25.13	AV	V	22.37	41.48	54.00	12.52

802.11ax hew20(2TX mode was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5180MHz							
5180.000	66.05	PK	H	38.68	98.71	N/A	N/A
5180.000	54.17	AV	H	38.68	86.83	N/A	N/A
5180.000	80.16	PK	V	38.68	112.82	N/A	N/A
5180.000	68.46	AV	V	38.68	101.12	N/A	N/A
5150.000	31.46	PK	V	38.64	64.08	74.00	9.92
5150.000	17.60	AV	V	38.64	50.22	54.00	3.78
10360.000	38.57	PK	V	19.18	51.73	68.20	16.47
15540.000	36.05	PK	V	22.44	52.47	74.00	21.53
15540.000	24.03	AV	V	22.44	40.45	54.00	13.55
Middle Channel: 5200 MHz							
5200.000	66.52	PK	H	38.70	99.20	N/A	N/A
5200.000	54.78	AV	H	38.70	87.46	N/A	N/A
5200.000	79.58	PK	V	38.70	112.26	N/A	N/A
5200.000	67.43	AV	V	38.70	100.11	N/A	N/A
10400.000	38.21	PK	V	19.16	51.35	68.20	16.85
15600.000	37.23	PK	V	22.41	53.62	74.00	20.38
15600.000	25.12	AV	V	22.41	41.51	54.00	12.49
High Channel: 5240 MHz							
5240.000	65.13	PK	H	38.85	97.96	N/A	N/A
5240.000	53.28	AV	H	38.85	86.11	N/A	N/A
5240.000	78.56	PK	V	38.85	111.39	N/A	N/A
5240.000	66.27	AV	V	38.85	99.10	N/A	N/A
5350.000	29.69	PK	V	39.03	62.70	74.00	11.30
5350.000	16.59	AV	V	39.03	49.60	54.00	4.40
10480.000	48.54	PK	V	18.86	61.38	68.20	6.82
15720.000	38.63	PK	V	22.28	54.89	74.00	19.11
15720.000	26.32	AV	V	22.28	42.58	54.00	11.42

802.11ax hew40((2TX mode was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5190 MHz							
5190.000	58.61	PK	H	38.69	91.28	N/A	N/A
5190.000	47.32	AV	H	38.69	79.99	N/A	N/A
5190.000	74.06	PK	V	38.69	106.73	N/A	N/A
5190.000	63.61	AV	V	38.69	96.28	N/A	N/A
5150.000	32.72	PK	V	38.64	65.34	74.00	8.66
5150.000	17.43	AV	V	38.64	50.05	54.00	3.95
10380.000	34.07	PK	V	19.17	47.22	68.20	20.98
15570.000	36.21	PK	V	22.43	52.62	74.00	21.38
15570.000	24.11	AV	V	22.43	40.52	54.00	13.48
High Channel: 5230 MHz							
5230.000	58.49	PK	H	38.81	91.28	N/A	N/A
5230.000	46.37	AV	H	38.81	79.16	N/A	N/A
5230.000	73.02	PK	V	38.81	105.81	N/A	N/A
5230.000	61.44	AV	V	38.81	94.23	N/A	N/A
5350.000	29.60	PK	V	39.03	62.61	74.00	11.39
5350.000	16.63	AV	V	39.03	49.64	54.00	4.36
10460.000	42.63	PK	V	18.94	55.55	68.20	12.65
15690.000	38.90	PK	V	22.29	55.17	74.00	18.83
15690.000	26.45	AV	V	22.29	42.72	54.00	11.28

802.11ax hew80(2TX mode was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Middle Channel: 5210 MHz							
5210.000	57.83	PK	H	38.74	90.55	N/A	N/A
5210.000	46.57	AV	H	38.74	79.29	N/A	N/A
5210.000	73.21	PK	V	38.74	105.93	N/A	N/A
5210.000	62.62	AV	V	38.74	95.34	N/A	N/A
5150.000	31.17	PK	V	38.64	63.79	74.00	10.21
5150.000	17.58	AV	V	38.64	50.20	54.00	3.80
5350.000	30.08	PK	V	39.03	63.09	74.00	10.91
5350.000	16.68	AV	V	39.03	49.69	54.00	4.31
10420.000	39.36	PK	V	19.09	52.43	68.20	15.77
15630.000	37.49	PK	V	22.37	53.84	74.00	20.16
15630.000	25.25	AV	V	22.37	41.60	54.00	12.40

Note:
Result = Reading + Factor- Distance extrapolation Factor
For 1-40GHz:
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB

5725-5850MHz:
802.11a, Chain 0:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5745MHz							
5745.000	65.03	PK	H	39.46	98.47	N/A	N/A
5745.000	56.35	AV	H	39.46	89.79	N/A	N/A
5745.000	76.85	PK	V	39.46	110.29	N/A	N/A
5745.000	67.28	AV	V	39.46	100.72	N/A	N/A
5725.000	45.60	PK	V	39.48	79.06	122.20	43.14
5720.000	34.64	PK	V	39.49	68.11	110.80	42.69
5700.000	30.86	PK	V	39.51	64.35	105.20	40.85
5650.000	30.35	PK	V	39.49	63.82	68.20	4.38
11490.000	50.89	PK	V	20.67	65.54	74.00	8.46
11490.000	37.29	AV	V	20.67	51.94	54.00	2.06
17235.000	35.70	PK	V	26.76	56.44	68.20	11.76
Middle Channel: 5785 MHz							
5785.000	67.44	PK	H	39.44	100.86	N/A	N/A
5785.000	58.23	AV	H	39.44	91.65	N/A	N/A
5785.000	77.01	PK	V	39.44	110.43	N/A	N/A
5785.000	68.38	AV	V	39.44	101.80	N/A	N/A
11570.000	49.91	PK	V	20.83	64.72	74.00	9.28
11570.000	36.13	AV	V	20.83	50.94	54.00	3.06
17355.000	38.22	PK	V	27.74	59.94	68.20	8.26
High Channel: 5825 MHz							
5825.000	68.01	PK	H	39.46	101.45	N/A	N/A
5825.000	59.42	AV	H	39.46	92.86	N/A	N/A
5825.000	76.77	PK	V	39.46	110.21	N/A	N/A
5825.000	67.07	AV	V	39.46	100.51	N/A	N/A
5850.000	35.22	PK	V	39.49	68.69	122.20	53.51
5855.000	33.96	PK	V	39.51	67.45	110.80	43.35
5875.000	31.39	PK	V	39.60	64.97	105.20	40.23
5925.000	31.61	PK	V	39.68	65.27	68.20	2.93
11650.000	49.64	PK	V	21.07	64.69	74.00	9.31
11650.000	36.45	AV	V	21.07	51.50	54.00	2.50
17475.000	33.88	PK	V	28.61	56.47	68.20	11.73

802.11a,Chain 1:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5745MHz							
5745.000	65.25	PK	H	39.46	98.69	N/A	N/A
5745.000	55.47	AV	H	39.46	88.91	N/A	N/A
5745.000	76.97	PK	V	39.46	110.41	N/A	N/A
5745.000	66.85	AV	V	39.46	100.29	N/A	N/A
5725.000	38.83	PK	V	39.48	72.29	122.20	49.91
5720.000	33.30	PK	V	39.49	66.77	110.80	44.03
5700.000	30.79	PK	V	39.51	64.28	105.20	40.92
5650.000	29.96	PK	V	39.49	63.43	68.20	4.77
11490.000	33.74	PK	V	20.67	48.39	74.00	25.61
11490.000	21.37	AV	V	20.67	36.02	54.00	17.98
17235.000	33.76	PK	V	26.76	54.50	68.20	13.70
Middle Channel: 5785 MHz							
5785.000	65.65	PK	H	39.44	99.07	N/A	N/A
5785.000	55.28	AV	H	39.44	88.70	N/A	N/A
5785.000	76.62	PK	V	39.44	110.04	N/A	N/A
5785.000	66.43	AV	V	39.44	99.85	N/A	N/A
11570.000	34.55	PK	V	20.83	49.36	74.00	24.64
11570.000	22.28	AV	V	20.83	37.09	54.00	16.91
17355.000	33.98	PK	V	27.74	55.70	68.20	12.50
High Channel: 5825 MHz							
5825.000	64.84	PK	H	39.46	98.28	N/A	N/A
5825.000	54.38	AV	H	39.46	87.82	N/A	N/A
5825.000	75.31	PK	V	39.46	108.75	N/A	N/A
5825.000	65.58	AV	V	39.46	99.02	N/A	N/A
5850.000	33.93	PK	V	39.49	67.40	122.20	54.80
5855.000	32.12	PK	V	39.51	65.61	110.80	45.19
5875.000	30.88	PK	V	39.60	64.46	105.20	40.74
5925.000	31.26	PK	V	39.68	64.92	68.20	3.28
11650.000	35.54	PK	V	21.07	50.59	74.00	23.41
11650.000	23.27	AV	V	21.07	38.32	54.00	15.68
17475.000	34.25	PK	V	28.61	56.84	68.20	11.36

802.11n ht20(2TX mode was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5745MHz							
5745.000	68.34	PK	H	39.46	101.78	N/A	N/A
5745.000	58.56	AV	H	39.46	92.00	N/A	N/A
5745.000	78.75	PK	V	39.46	112.19	N/A	N/A
5745.000	68.12	AV	V	39.46	101.56	N/A	N/A
5725.000	38.06	PK	V	39.48	71.52	122.20	50.68
5720.000	33.90	PK	V	39.49	67.37	110.80	43.43
5700.000	30.96	PK	V	39.51	64.45	105.20	40.75
5650.000	30.57	PK	V	39.49	64.04	68.20	4.16
11490.000	49.10	PK	V	20.67	63.75	74.00	10.25
11490.000	36.71	AV	V	20.67	51.36	54.00	2.64
17235.000	35.36	PK	V	26.76	56.10	68.20	12.10
Middle Channel: 5785 MHz							
5785.000	66.86	PK	H	39.44	100.28	N/A	N/A
5785.000	56.69	AV	H	39.44	90.11	N/A	N/A
5785.000	80.05	PK	V	39.44	113.47	N/A	N/A
5785.000	70.17	AV	V	39.44	103.59	N/A	N/A
11570.000	46.15	PK	V	20.83	60.96	74.00	13.04
11570.000	33.08	AV	V	20.83	47.89	54.00	6.11
17355.000	34.02	PK	V	27.74	55.74	68.20	12.46
High Channel: 5825 MHz							
5825.000	66.86	PK	H	39.46	100.30	N/A	N/A
5825.000	56.41	AV	H	39.46	89.85	N/A	N/A
5825.000	78.79	PK	V	39.46	112.23	N/A	N/A
5825.000	68.35	AV	V	39.46	101.79	N/A	N/A
5850.000	35.66	PK	V	39.49	69.13	122.20	53.07
5855.000	33.97	PK	V	39.51	67.46	110.80	43.34
5875.000	32.38	PK	V	39.60	65.96	105.20	39.24
5925.000	31.92	PK	V	39.68	65.58	68.20	2.62
11650.000	46.51	PK	V	21.07	61.56	74.00	12.44
11650.000	33.43	AV	V	21.07	48.48	54.00	5.52
17475.000	34.23	PK	V	28.61	56.82	68.20	11.38

802.11n ht40(2TX mode was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5755 MHz							
5755.000	63.87	PK	H	39.45	97.30	N/A	N/A
5755.000	53.69	AV	H	39.45	87.12	N/A	N/A
5755.000	77.11	PK	V	39.45	110.54	N/A	N/A
5755.000	67.74	AV	V	39.45	101.17	N/A	N/A
5725.000	42.04	PK	V	39.48	75.50	122.20	46.70
5720.000	45.44	PK	V	39.49	78.91	110.80	31.89
5700.000	34.12	PK	V	39.51	67.61	105.20	37.59
5650.000	30.35	PK	V	39.49	63.82	68.20	4.38
11510.000	42.23	PK	V	20.67	56.88	74.00	17.12
11510.000	30.12	AV	V	20.67	44.77	54.00	9.23
17265.000	33.59	PK	V	26.94	54.51	68.20	13.69
High Channel: 5795 MHz							
5795.000	63.61	PK	H	39.43	97.02	N/A	N/A
5795.000	53.47	AV	H	39.43	86.88	N/A	N/A
5795.000	76.33	PK	V	39.43	109.74	N/A	N/A
5795.000	66.73	AV	V	39.43	100.14	N/A	N/A
5850.000	35.16	PK	V	39.49	68.63	122.20	53.57
5855.000	32.24	PK	V	39.51	65.73	110.80	45.07
5875.000	32.03	PK	V	39.60	65.61	105.20	39.59
5925.000	31.96	PK	V	39.68	65.62	68.20	2.58
11590.000	38.92	PK	V	20.88	53.78	74.00	20.22
11590.000	26.46	AV	V	20.88	41.32	54.00	12.68
17385.000	32.81	PK	V	28.07	54.86	68.20	13.34

802.11ac vht80(2TX mode was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Middle Channel: 5775 MHz							
5775.000	61.67	PK	H	39.44	95.09	N/A	N/A
5775.000	51.45	AV	H	39.44	84.87	N/A	N/A
5775.000	74.55	PK	V	39.44	107.97	N/A	N/A
5775.000	54.15	AV	V	39.44	87.57	N/A	N/A
5725.000	35.67	PK	V	39.48	69.13	122.20	53.07
5720.000	35.95	PK	V	39.49	69.42	110.80	41.38
5700.000	38.54	PK	V	39.51	72.03	105.20	33.17
5650.000	30.77	PK	V	39.49	64.24	68.20	3.96
5850.000	38.40	PK	V	39.49	71.87	122.20	50.33
5855.000	32.76	PK	V	39.51	66.25	110.80	44.55
5875.000	37.56	PK	V	39.60	71.14	105.20	34.06
5925.000	31.50	PK	V	39.68	65.16	68.20	3.04
11550.000	40.64	PK	V	20.78	55.40	74.00	18.60
11550.000	28.32	AV	V	20.78	43.08	54.00	10.92
17325.000	33.39	PK	V	27.41	54.78	68.20	13.42

802.11ax hew20(2TX mode was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5745MHz							
5745.000	70.73	PK	H	39.46	104.17	N/A	N/A
5745.000	58.47	AV	H	39.46	91.91	N/A	N/A
5745.000	82.53	PK	V	39.46	115.97	N/A	N/A
5745.000	70.37	AV	V	39.46	103.81	N/A	N/A
5725.000	41.41	PK	V	39.48	74.87	122.20	47.33
5720.000	38.57	PK	V	39.49	72.04	110.80	38.76
5700.000	31.56	PK	V	39.51	65.05	105.20	40.15
5650.000	30.42	PK	V	39.49	63.89	68.20	4.31
11490.000	51.10	PK	V	20.67	65.75	74.00	8.25
11490.000	38.23	AV	V	20.67	52.88	54.00	1.12
17235.000	37.35	PK	V	26.76	58.09	68.20	10.11
Middle Channel: 5785 MHz							
5785.000	72.47	PK	H	39.44	105.89	N/A	N/A
5785.000	60.44	AV	H	39.44	93.86	N/A	N/A
5785.000	85.05	PK	V	39.44	118.47	N/A	N/A
5785.000	73.23	AV	V	39.44	106.65	N/A	N/A
11570.000	50.06	PK	V	20.83	64.87	74.00	9.13
11570.000	37.11	AV	V	20.83	51.92	54.00	2.08
17355.000	35.78	PK	V	27.74	57.50	68.20	10.70
High Channel: 5825 MHz							
5825.000	72.14	PK	H	39.46	105.58	N/A	N/A
5825.000	60.62	AV	H	39.46	94.06	N/A	N/A
5825.000	83.62	PK	V	39.46	117.06	N/A	N/A
5825.000	71.23	AV	V	39.46	104.67	N/A	N/A
5850.000	46.20	PK	V	39.49	79.67	122.20	42.53
5855.000	39.22	PK	V	39.51	72.71	110.80	38.09
5875.000	31.55	PK	V	39.60	65.13	105.20	40.07
5925.000	32.43	PK	V	39.68	66.09	68.20	2.11
11650.000	50.74	PK	V	21.07	65.79	74.00	8.21
11650.000	37.02	AV	V	21.07	52.07	54.00	1.93
17475.000	36.75	PK	V	28.61	59.34	68.20	8.86

802.11ax hew40((2TX mode was the worst):

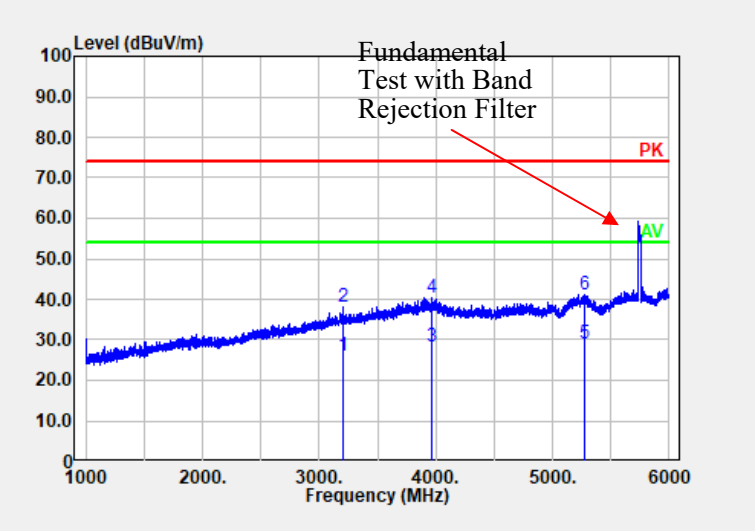
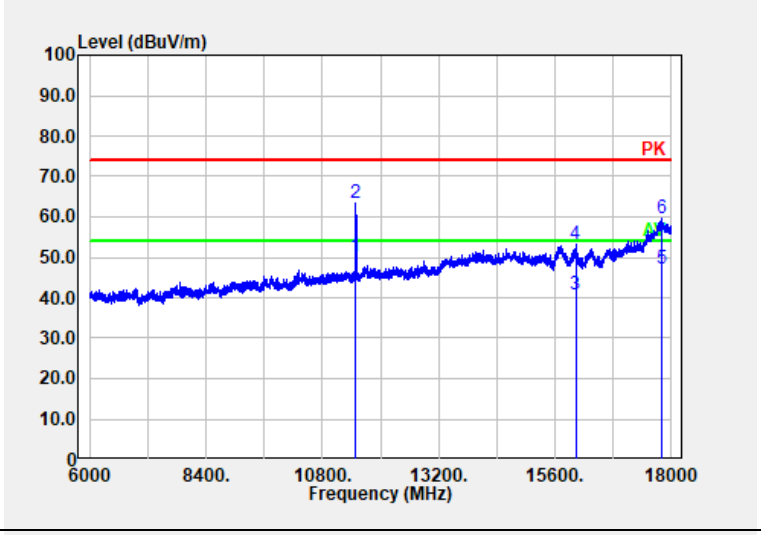
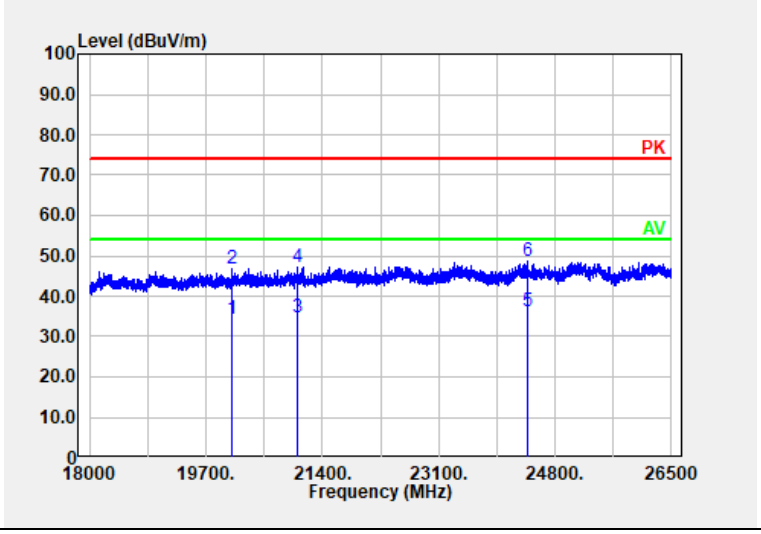
Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5755 MHz							
5755.000	52.26	PK	H	39.45	85.69	N/A	N/A
5755.000	42.62	AV	H	39.45	76.05	N/A	N/A
5755.000	63.71	PK	V	39.45	97.14	N/A	N/A
5755.000	53.80	AV	V	39.45	87.23	N/A	N/A
5725.000	32.86	PK	V	39.48	66.32	122.20	55.88
5720.000	31.60	PK	V	39.49	65.07	110.80	45.73
5700.000	31.06	PK	V	39.51	64.55	105.20	40.65
5650.000	30.80	PK	V	39.49	64.27	68.20	3.93
11510.000	46.84	PK	V	20.67	61.49	74.00	12.51
11510.000	34.42	AV	V	20.67	49.07	54.00	4.93
17265.000	32.00	PK	V	26.94	52.92	68.20	15.28
High Channel: 5795 MHz							
5795.000	52.05	PK	H	39.43	85.46	N/A	N/A
5795.000	42.98	AV	H	39.43	76.39	N/A	N/A
5795.000	65.15	PK	V	39.43	98.56	N/A	N/A
5795.000	55.53	AV	V	39.43	88.94	N/A	N/A
5850.000	32.36	PK	V	39.49	65.83	122.20	56.37
5855.000	31.28	PK	V	39.51	64.77	110.80	46.03
5875.000	31.12	PK	V	39.60	64.70	105.20	40.50
5925.000	30.56	PK	V	39.68	64.22	68.20	3.98
11590.000	37.20	PK	V	20.88	52.06	74.00	21.94
11590.000	25.10	AV	V	20.88	39.96	54.00	14.04
17385.000	36.53	PK	V	28.07	58.58	68.20	9.62

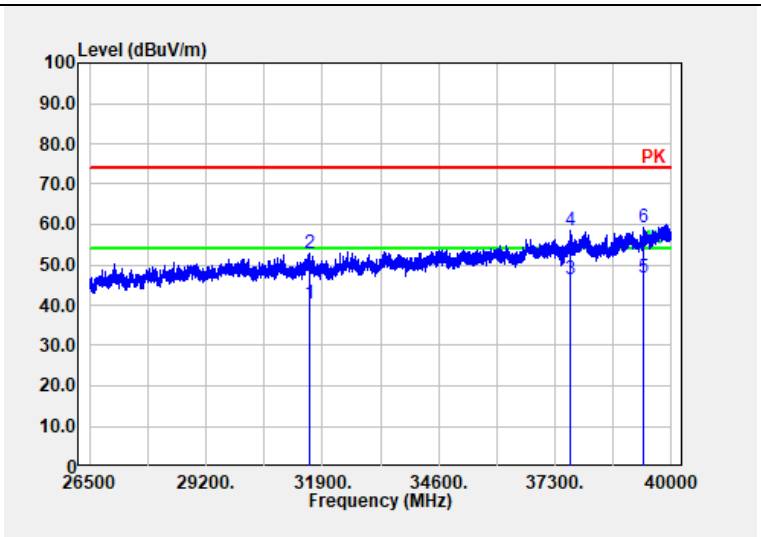
802.11ax hew80(2TX mode was the worst):

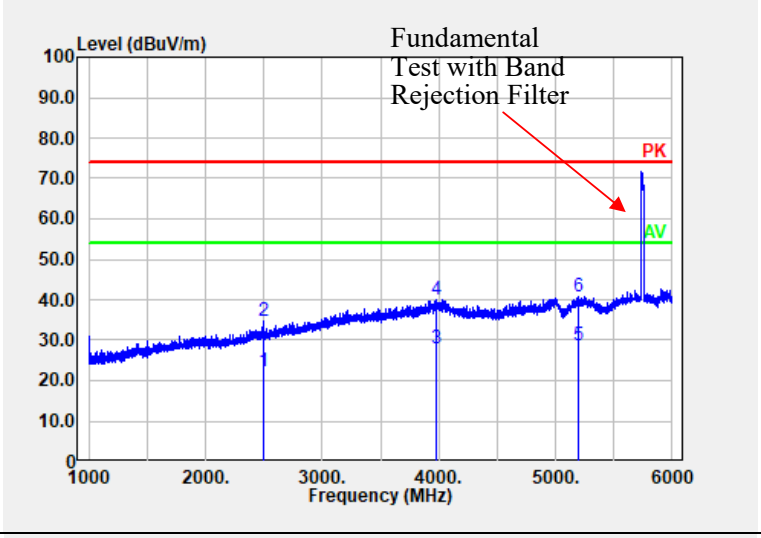
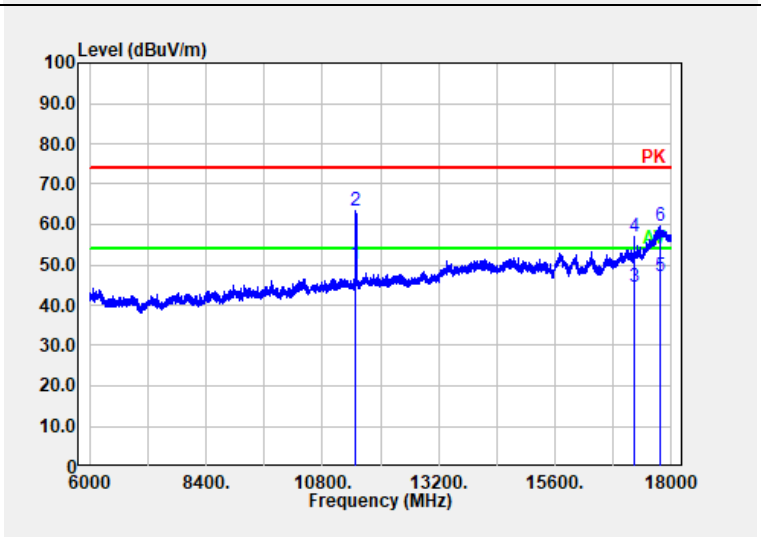
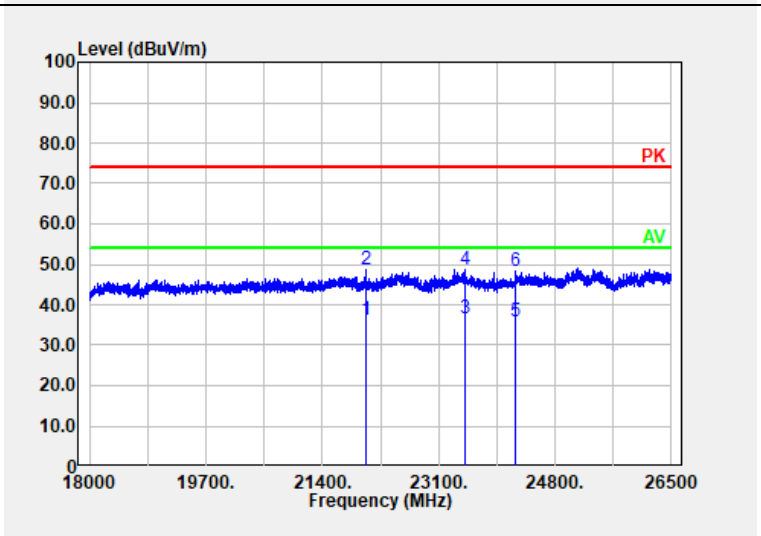
Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Middle Channel: 5775 MHz							
5775.000	48.04	PK	H	39.44	81.46	N/A	N/A
5775.000	38.07	AV	H	39.44	71.49	N/A	N/A
5775.000	61.35	PK	V	39.44	94.77	N/A	N/A
5775.000	51.71	AV	V	39.44	85.13	N/A	N/A
5725.000	37.10	PK	V	39.48	70.56	122.20	51.64
5720.000	34.35	PK	V	39.49	67.82	110.80	42.98
5700.000	31.44	PK	V	39.51	64.93	105.20	40.27
5650.000	30.53	PK	V	39.49	64.00	68.20	4.20
5850.000	33.64	PK	V	39.49	67.11	122.20	55.09
5855.000	32.24	PK	V	39.51	65.73	110.80	45.07
5875.000	31.81	PK	V	39.60	65.39	105.20	39.81
5925.000	30.24	PK	V	39.68	63.90	68.20	4.30
11550.000	37.44	PK	V	20.78	52.20	74.00	21.80
11550.000	25.22	AV	V	20.78	39.98	54.00	14.02
17325.000	32.36	PK	V	27.41	53.75	68.20	14.45

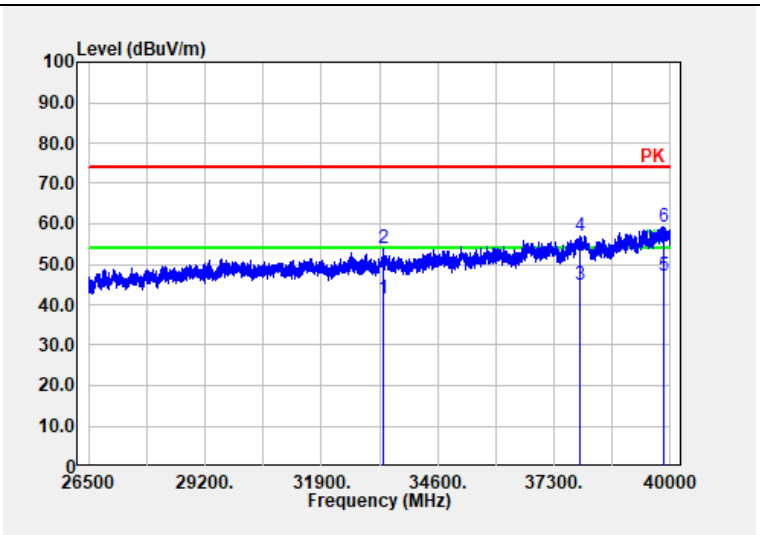
Note:
Result = Reading + Factor- Distance extrapolation Factor
For 1-40GHz:
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB

Worst Test plots(802.11ax 5745MHz was the worst)

Horizontal		
1-6GHz		
6-18GHz		
18-26.5GHz		

26.5-40GHz	 Level (dBuV/m) 100 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 PK 1 2 3 4 5 6 26500 29200. 31900. 34600. 37300. 40000 Frequency (MHz)

Vertical		
1-6GHz		
6-18GHz		
18-26.5GHz		

26.5-40GHz		 Level (dBuV/m) 100 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 PK 1 2 3 4 5 6 26500 29200. 31900. 34600. 37300. 40000 Frequency (MHz)

4.3 Emission Bandwidth:

Serial Number:	1O7R	Test Date:	2022/11/23~2022/11/26
Test Site:	RF	Test Mode:	Transmitting
Tester:	Julie Tan	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	23.4~24.8	Relative Humidity: (%)	67~69	ATM Pressure: (kPa)	100.2~101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2022/07/25	2023/07/24
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

5150-5250 MHz:

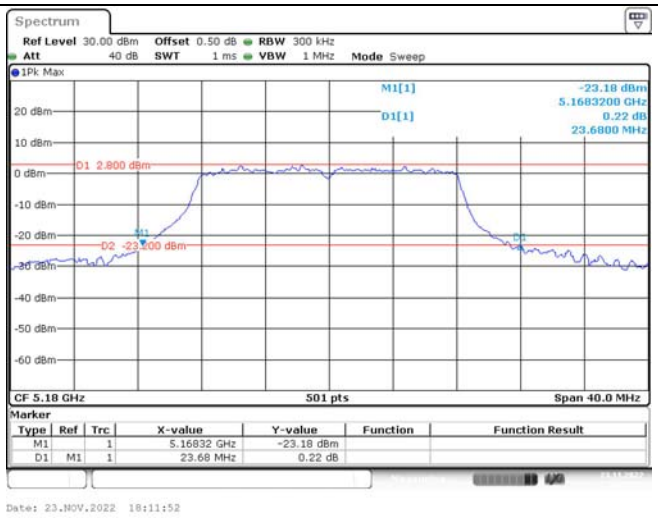
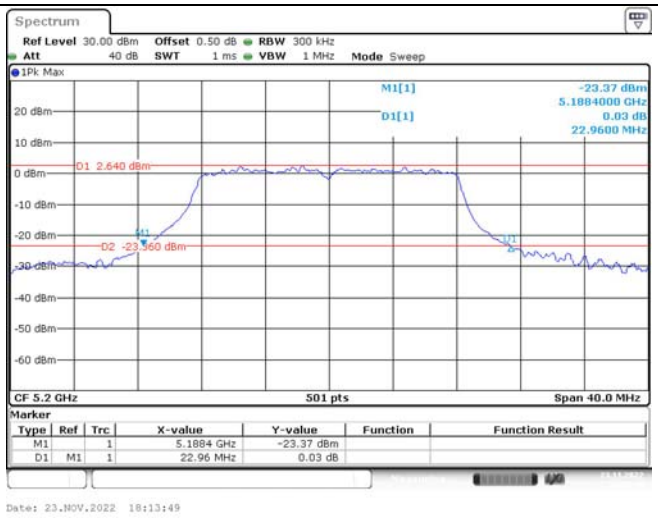
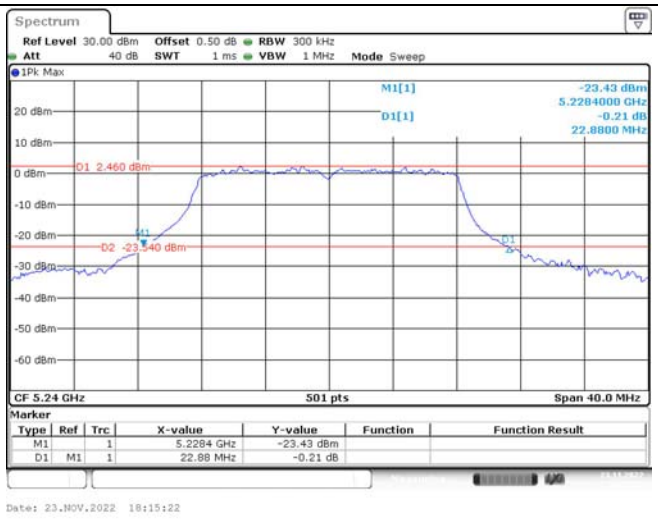
Test Modes	Test Frequency (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180	23.68	17.086
	5200	22.96	17.006
	5240	22.88	17.006
802.11n ht20	5180	23.84	18.363
	5200	23.84	18.124
	5240	23.84	18.124
802.11n ht40	5190	42.88	37.685
	5230	42.72	37.525
802.11ac vht80	5210	87.36	76.647
802.11ax hew20	5180	22.72	19.242
	5200	22.96	19.242
	5240	23.04	19.242
802.11ax hew40	5190	43.04	38.483
	5230	43.04	38.643
802.11ax hew80	5210	84.80	77.605
Note: Test only was performed at Chain 0. The 99% Occupied Bandwidth have not fall into the band 5250-5350MHz, please refer to the test plots of 99% Occupied Bandwidth.			

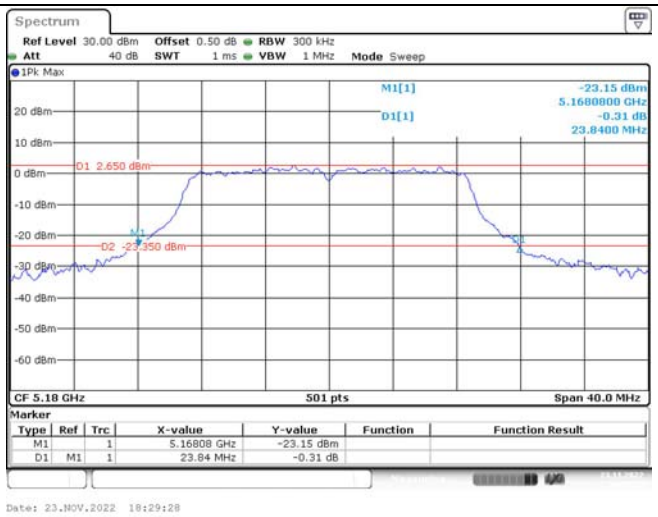
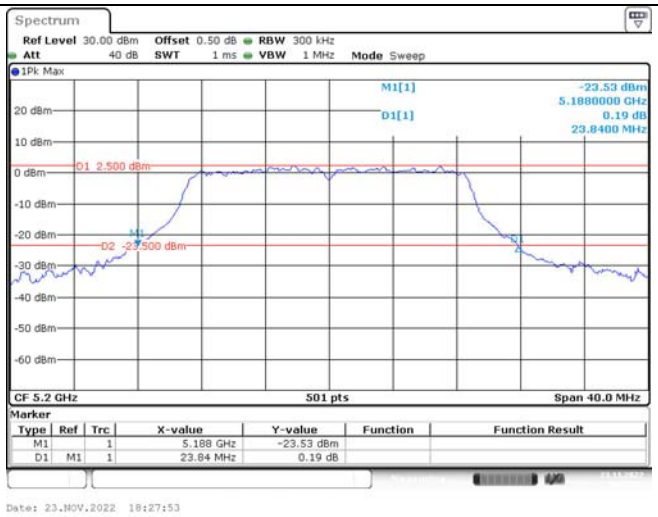
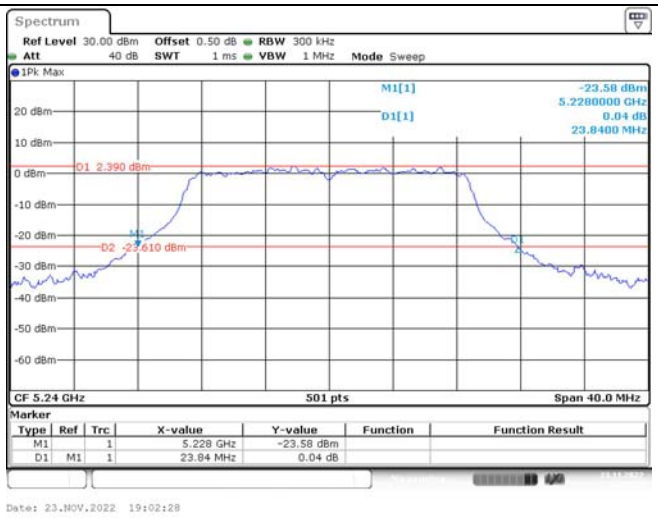
5725-5850 MHz:

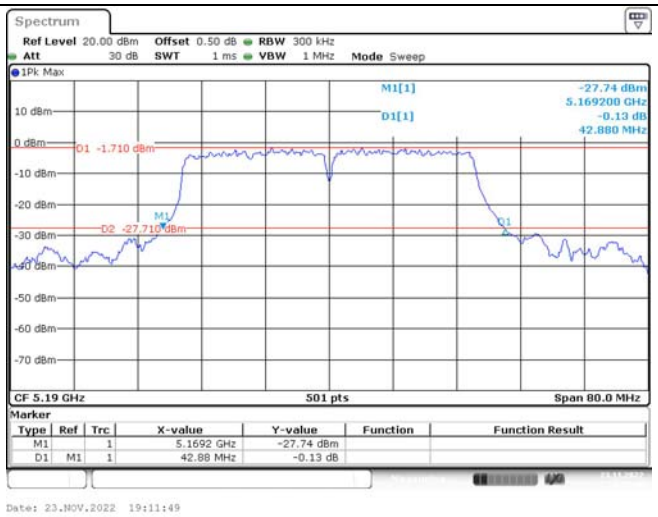
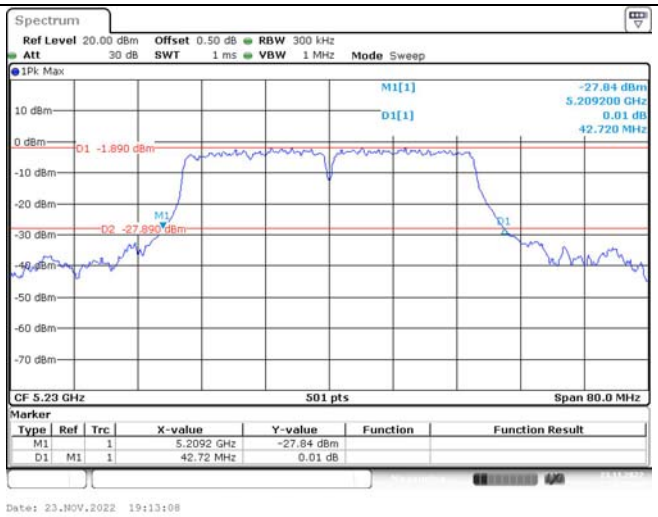
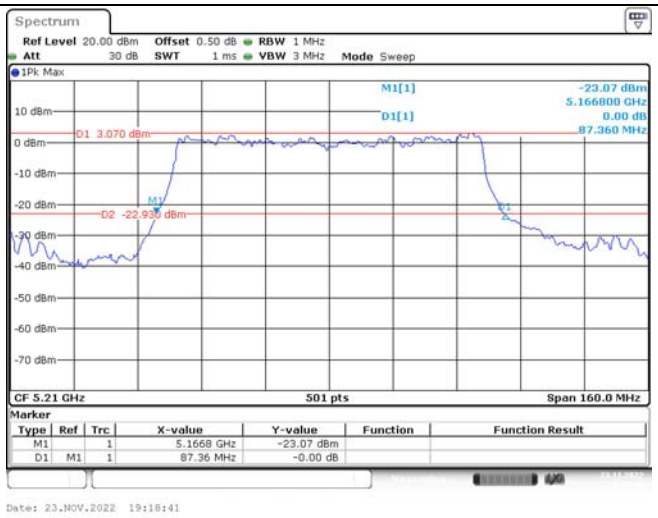
Test Modes	Test Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745	16.24	17.485
	5785	16.24	17.645
	5825	16.24	17.884
802.11n ht20	5745	17.52	18.283
	5785	17.44	18.363
	5825	17.60	18.443
802.11n ht40	5755	35.84	38.643
	5795	35.68	38.962
802.11ac vht80	5775	76.48	76.647
802.11ax hew20	5745	18.40	19.242
	5785	18.32	19.242
	5825	18.40	19.242
802.11ax hew40	5755	38.24	39.122
	5795	38.24	39.122
802.11ax hew80	5775	77.44	77.605

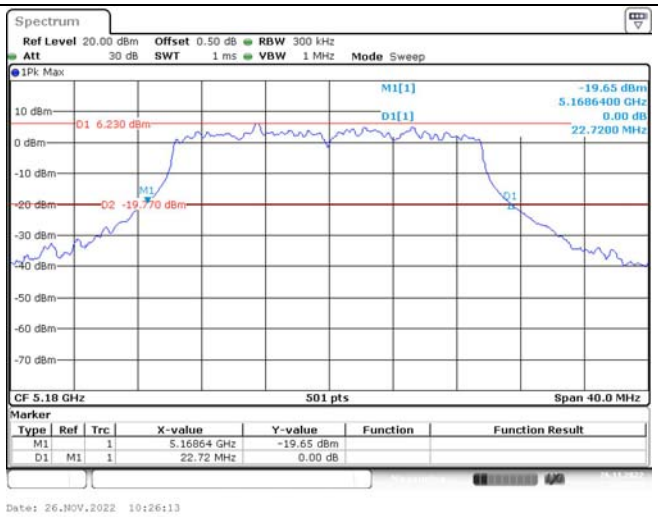
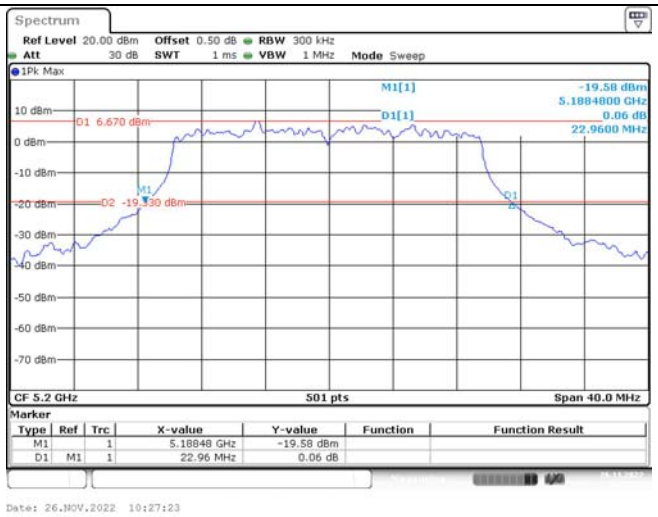
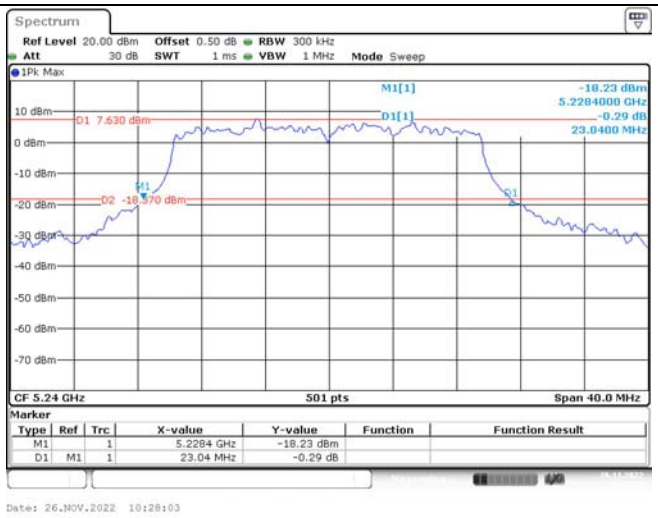
Note:
6dB Emission Bandwidth Limit: ⩾0.5 MHz
Test only was performed at Chain 0.
The 99% Occupied Bandwidth have not fall into the band 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.

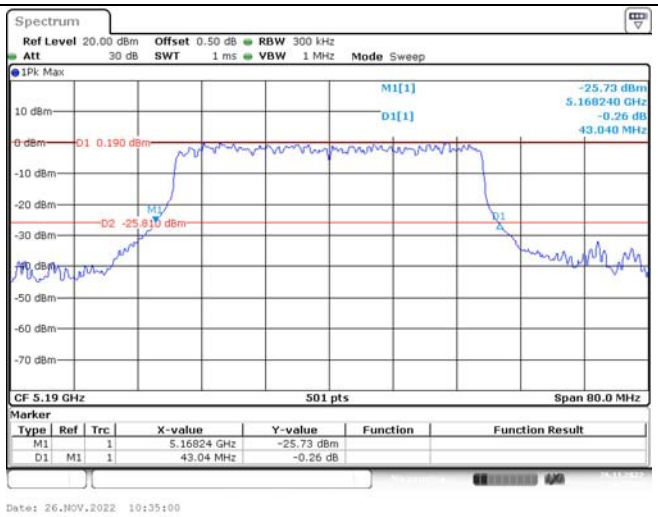
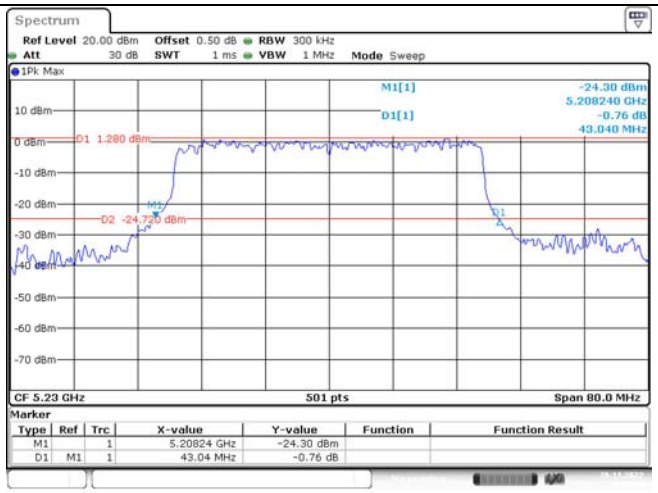
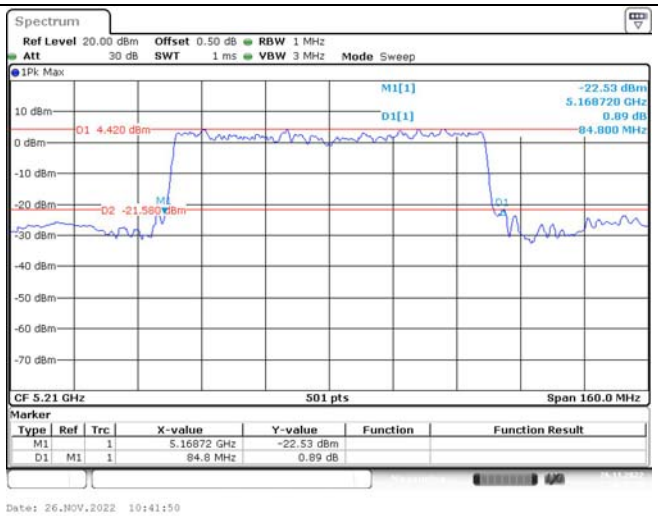
5150-5250MHz:

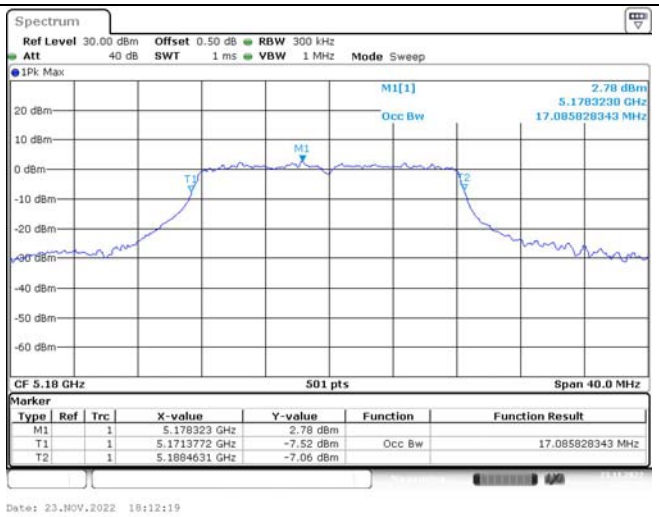
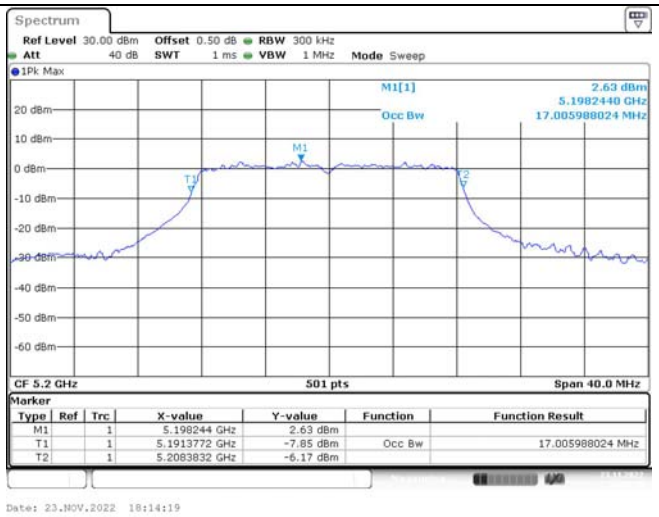
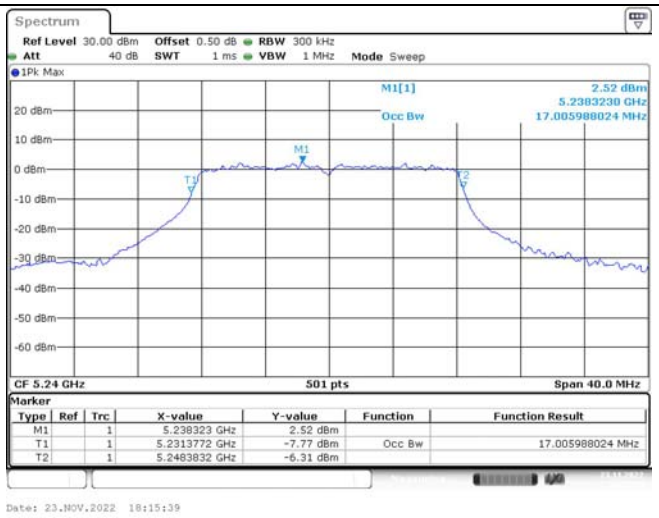
26dB Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

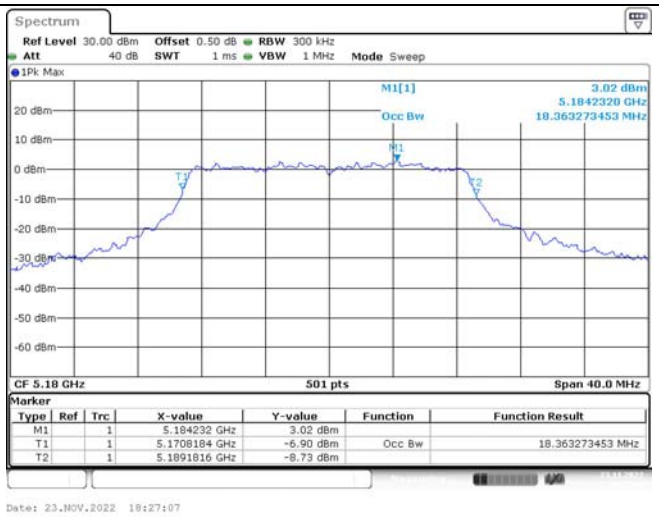
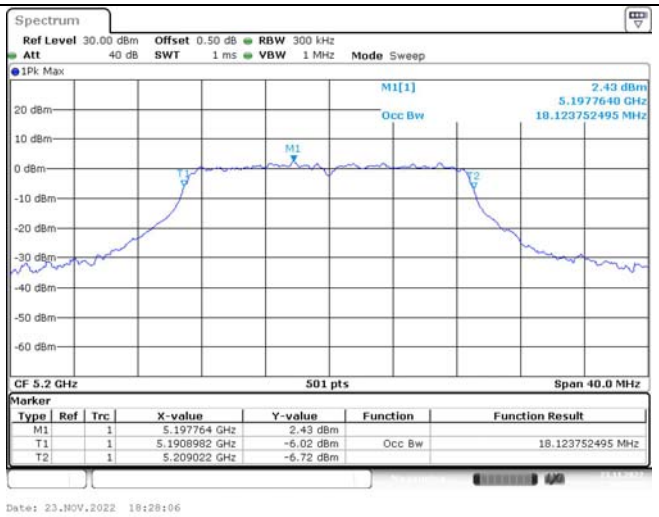
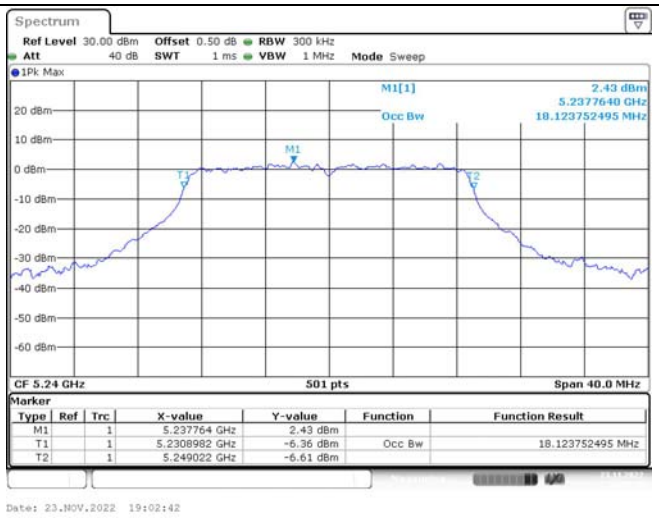
26dB Emission Bandwidth	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

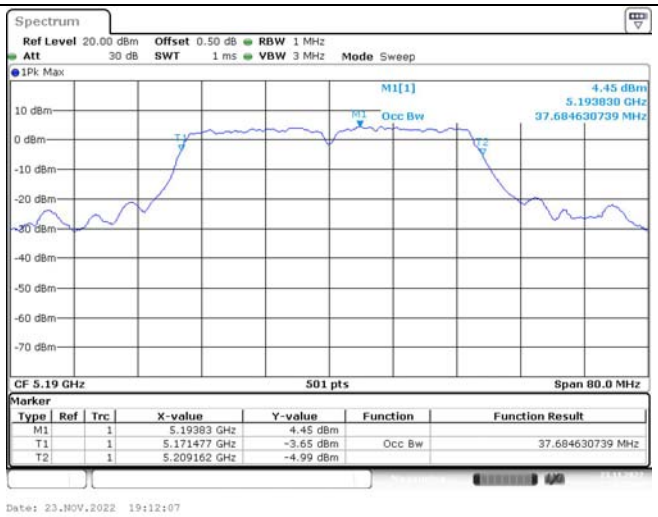
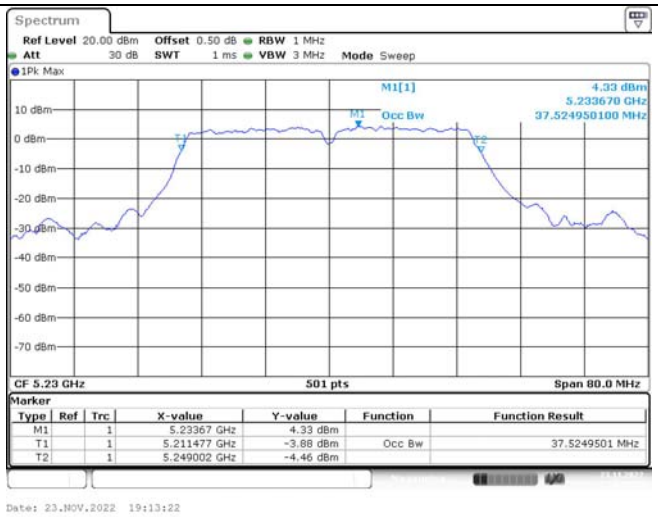
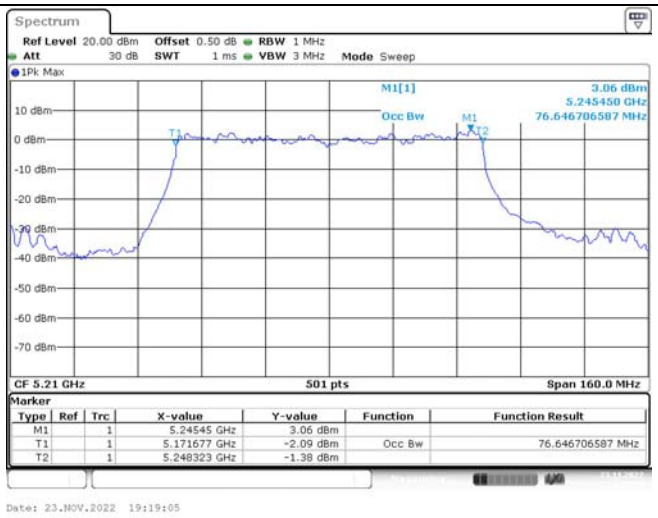
26dB Emission Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	
802.11ac vht80 Middle Channel	

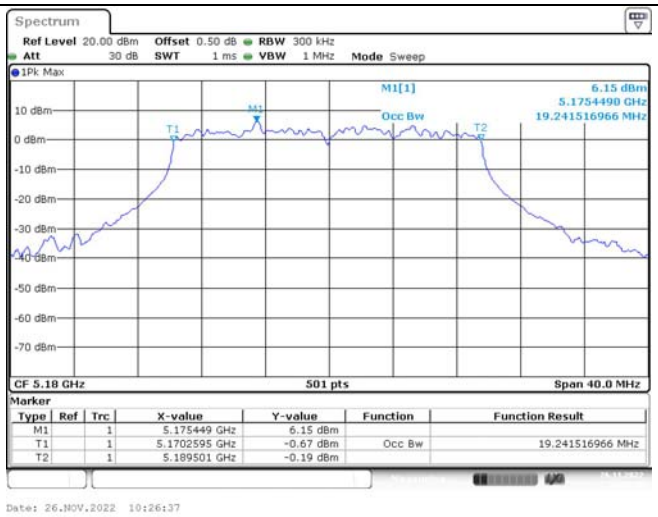
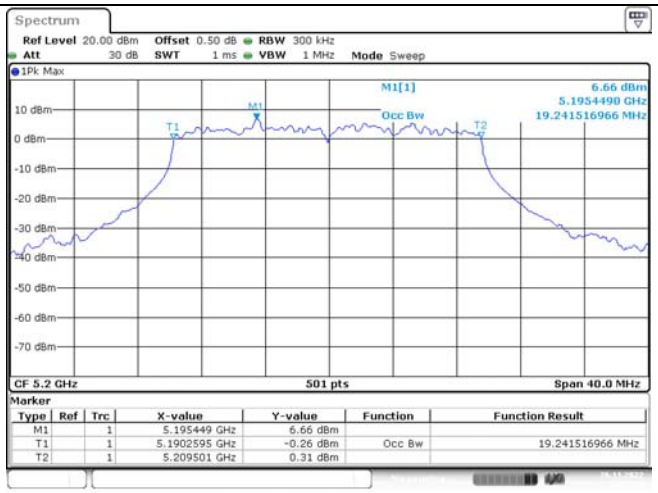
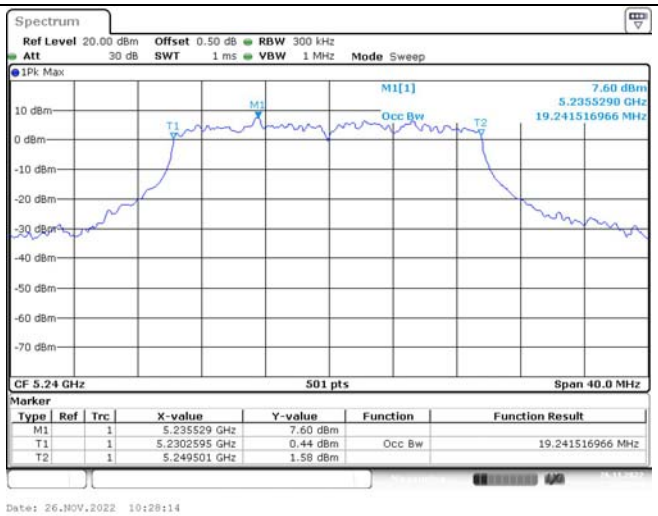
26dB Emission Bandwidth	
802.11ax hew20 Lowest Channel	
802.11ax hew20 Middle Channel	
802.11ax hew20 Highest Channel	

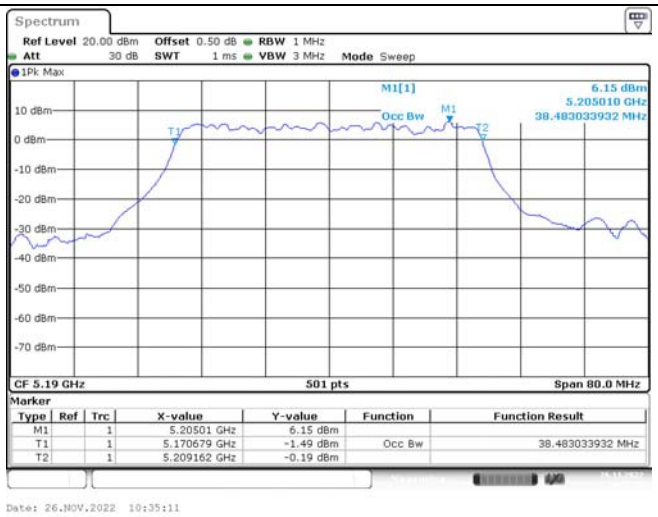
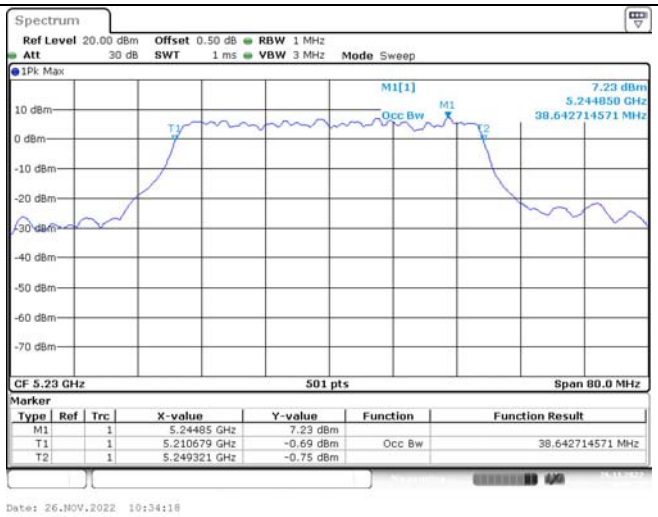
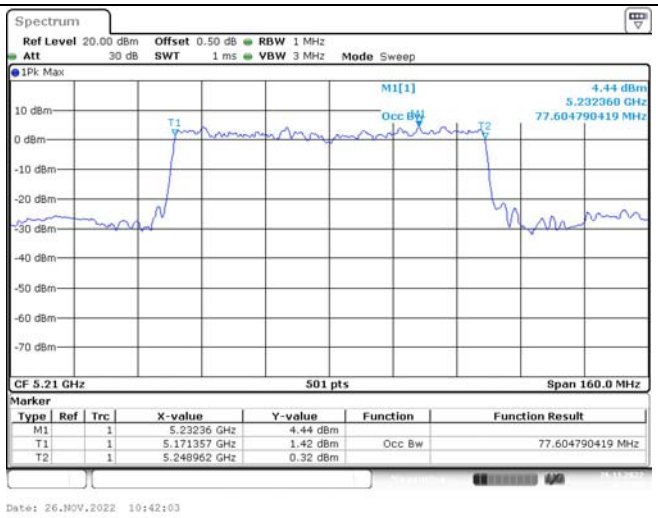
26dB Emission Bandwidth	
802.11ax hew40 Lowest Channel	
802.11ax hew40 Highest Channel	
802.11ax hew80 Middle Channel	

99% Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

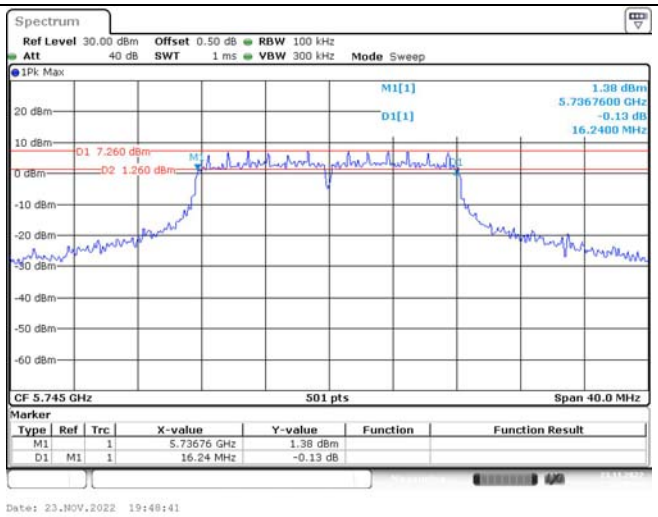
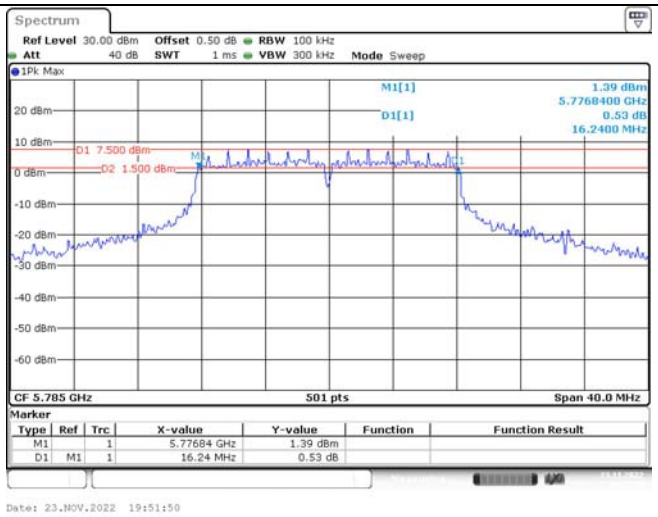
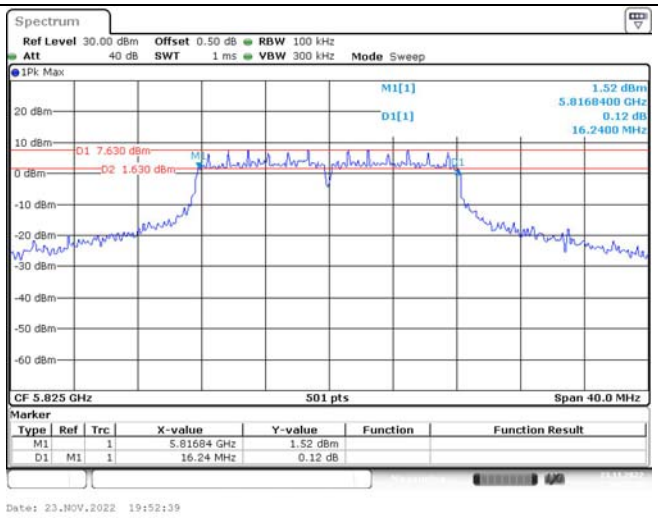
99% Emission Bandwidth	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

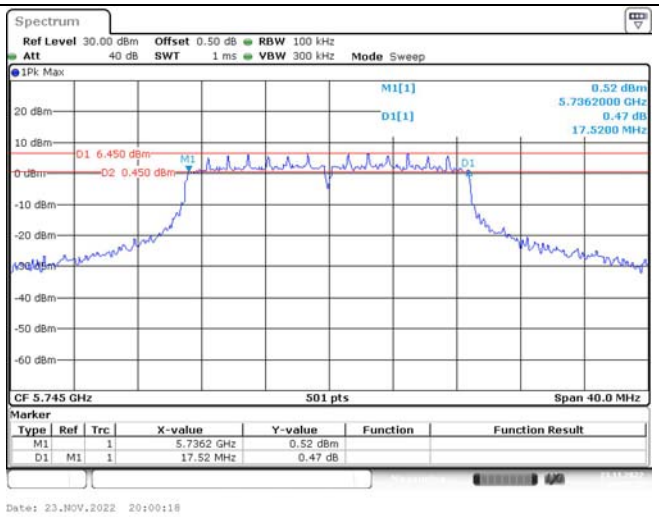
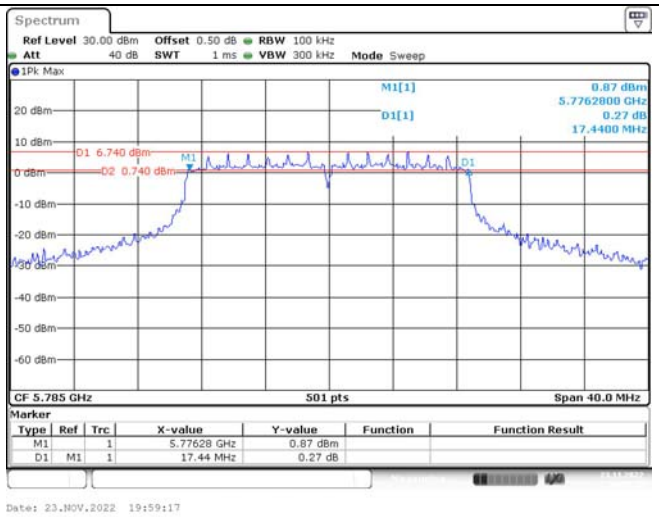
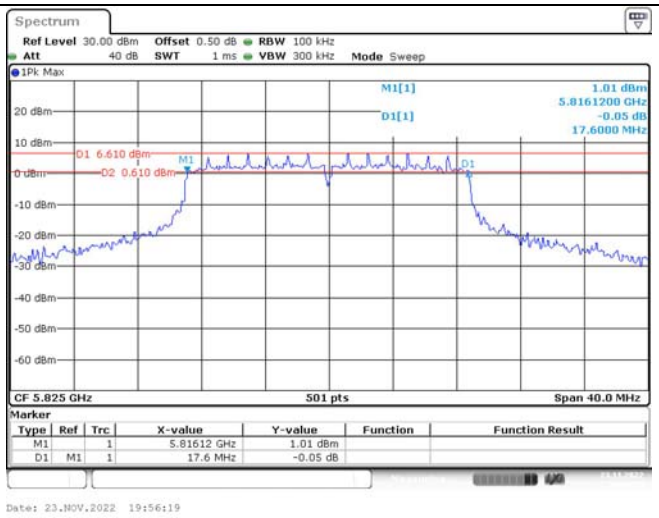
99% Emission Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	
802.11ac vht80 Middle Channel	

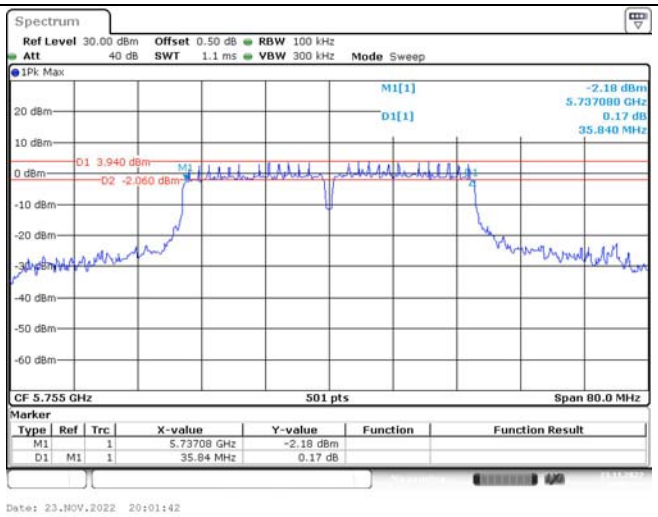
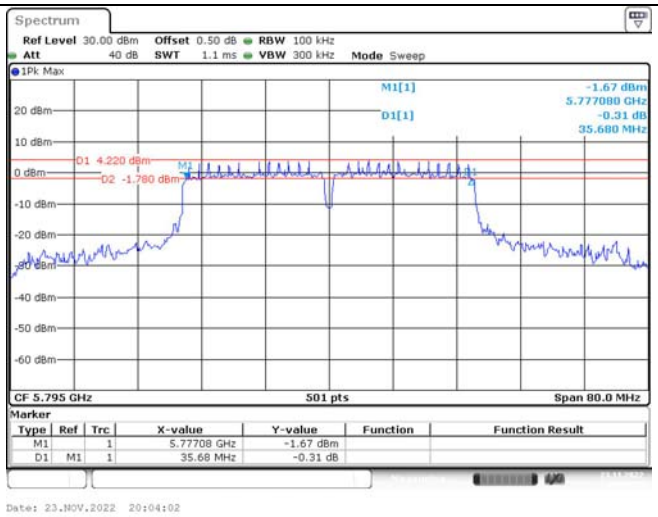
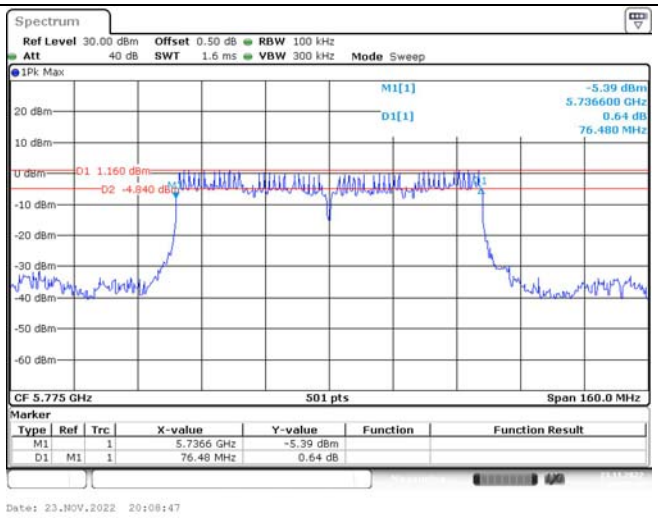
99% Emission Bandwidth	
802.11ax hew20 Lowest Channel	
802.11ax hew20 Middle Channel	
802.11ax hew20 Highest Channel	

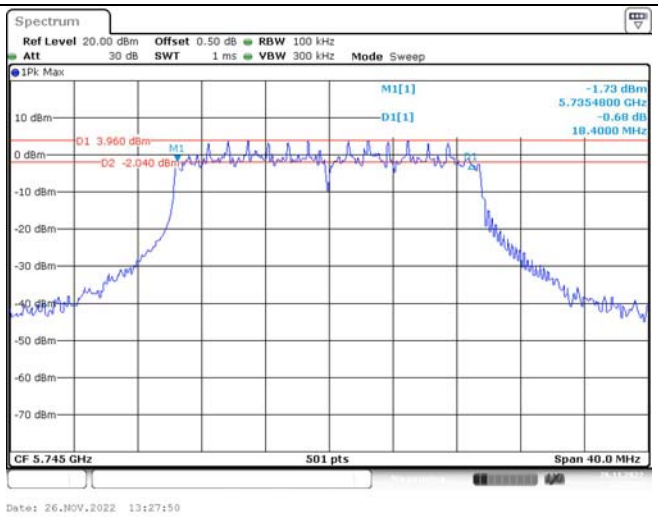
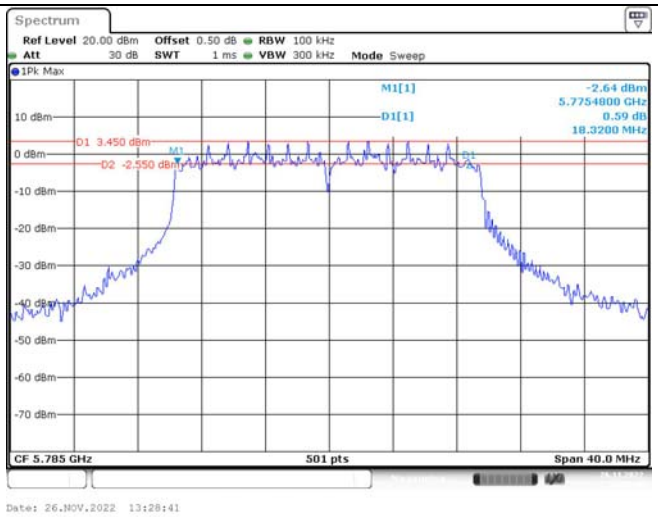
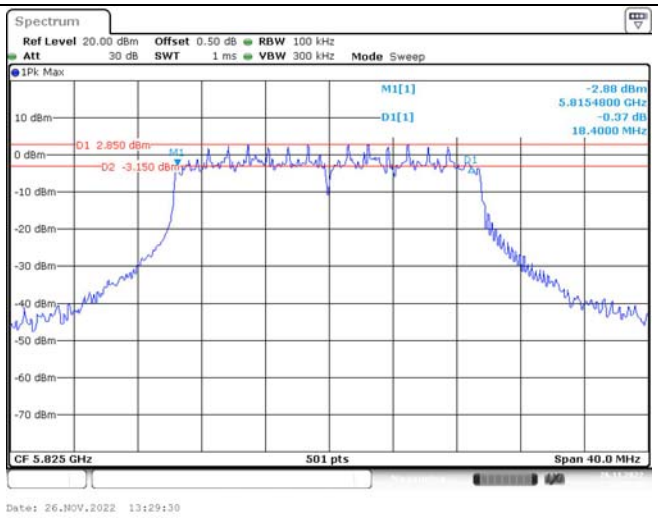
99% Emission Bandwidth	
802.11ax hew40 Lowest Channel	
802.11ax hew40 Highest Channel	
802.11ax hew80 Middle Channel	

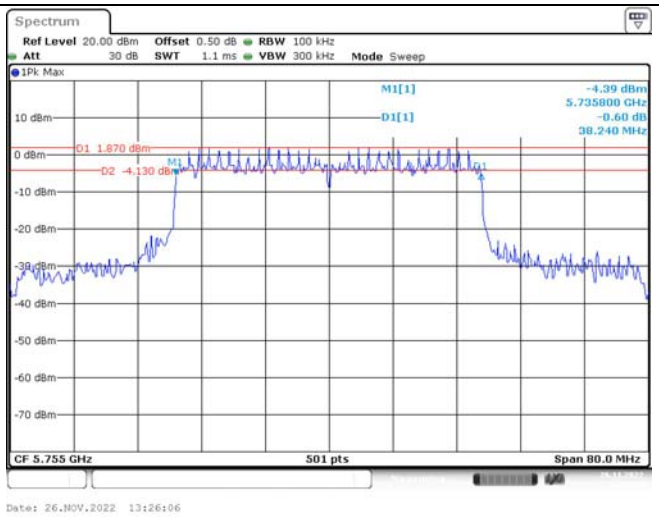
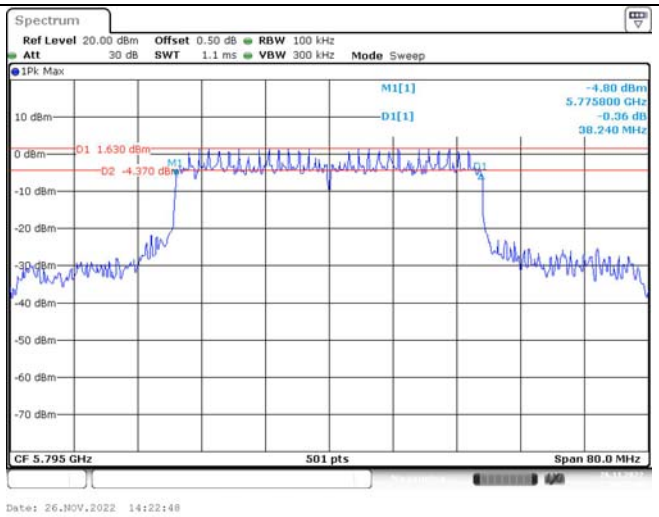
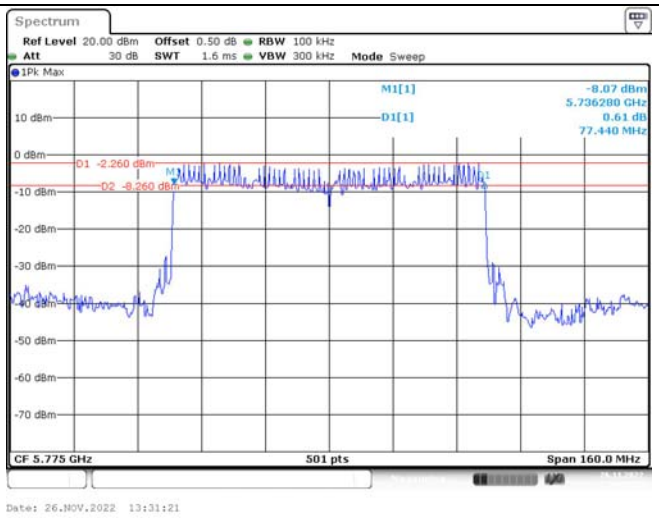
5725-5850MHz:

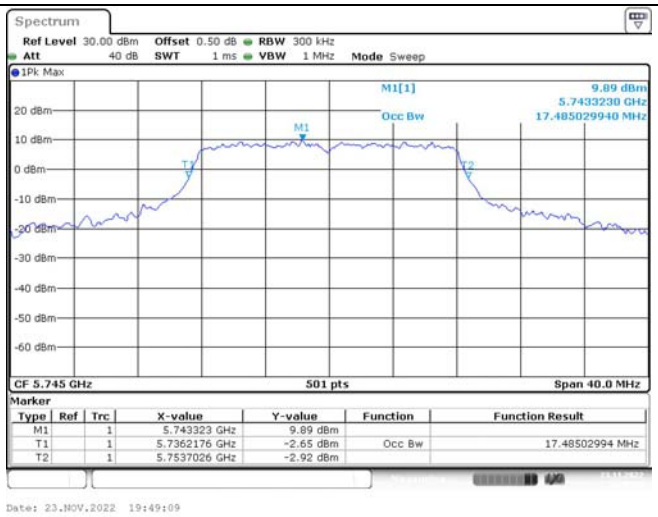
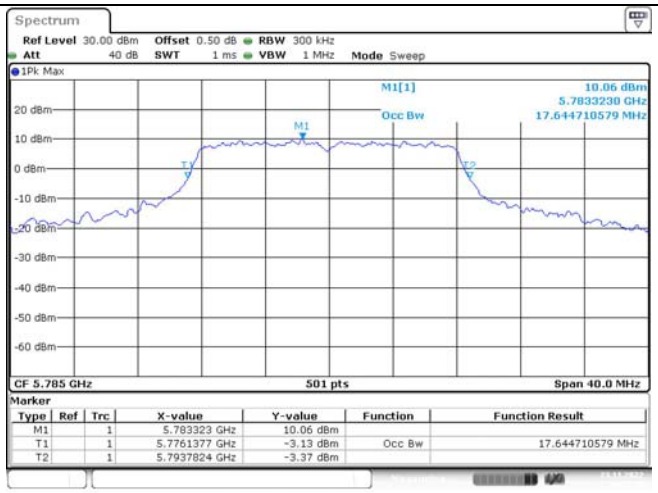
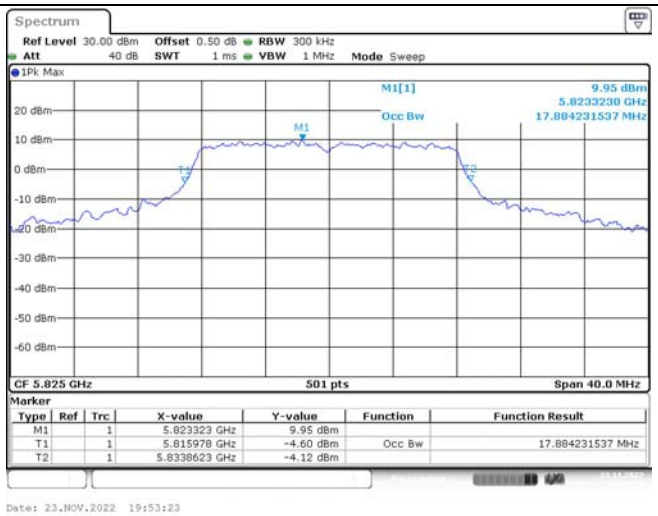
6dB Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

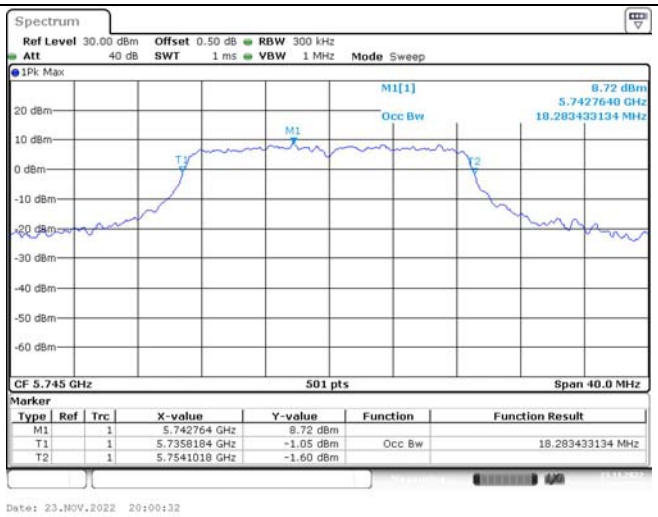
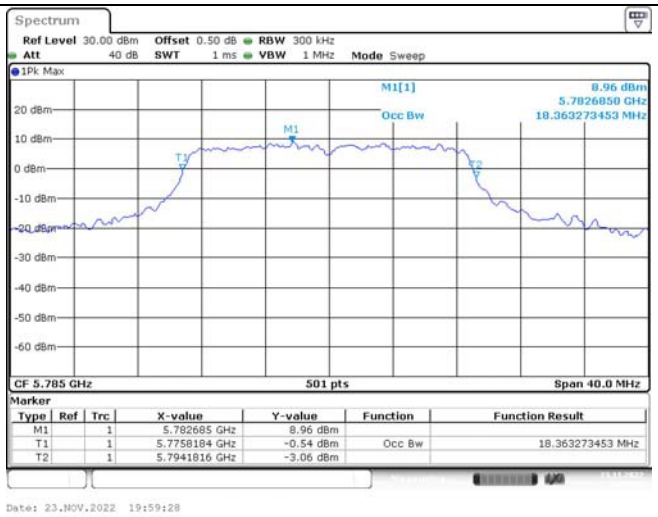
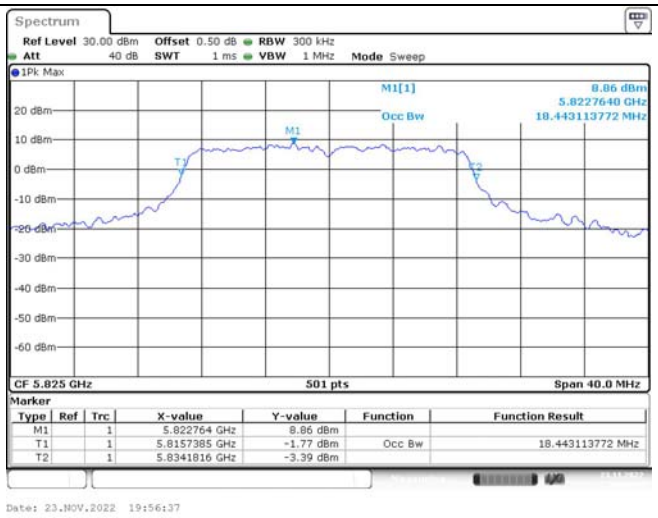
6dB Emission Bandwidth	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

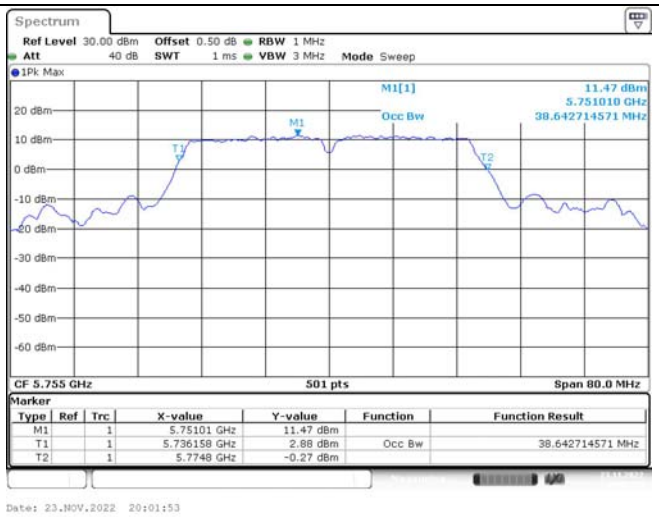
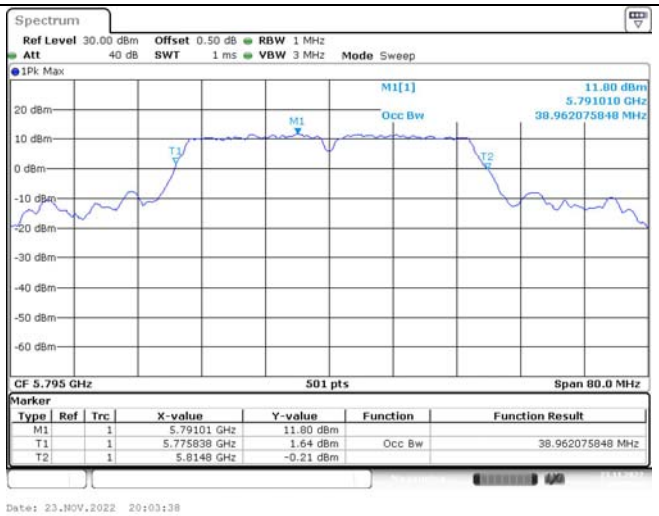
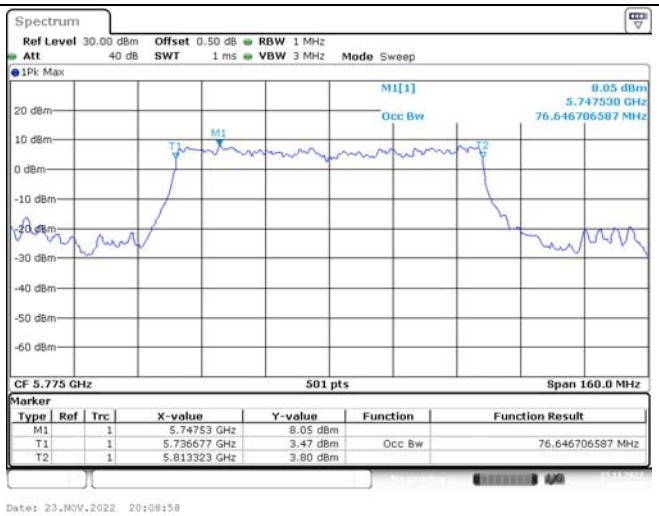
6dB Emission Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	
802.11ac vht80 Middle Channel	

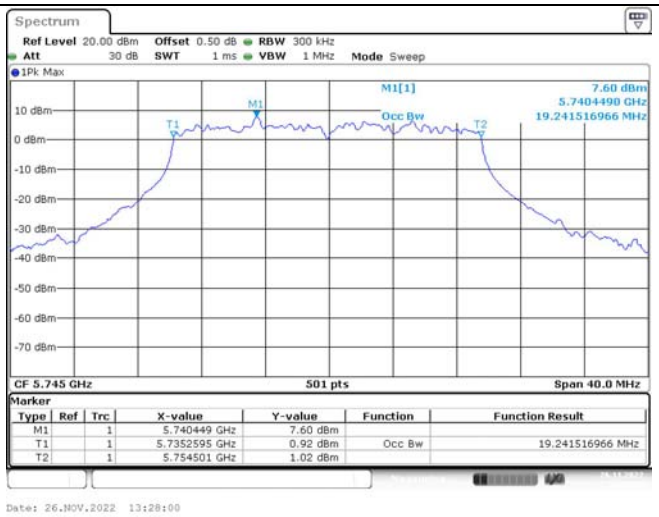
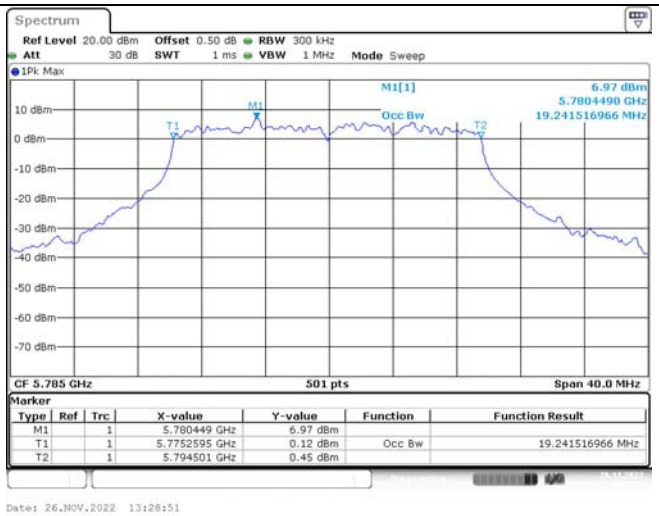
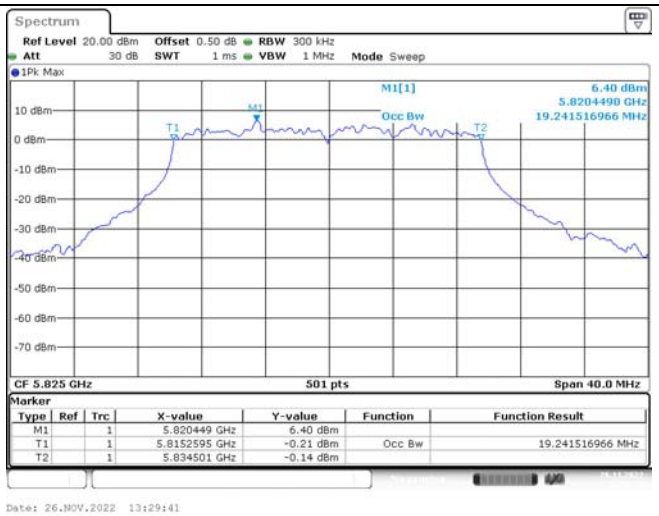
6dB Emission Bandwidth	
802.11ax hew20 Lowest Channel	
802.11ax hew20 Middle Channel	
802.11ax hew20 Highest Channel	

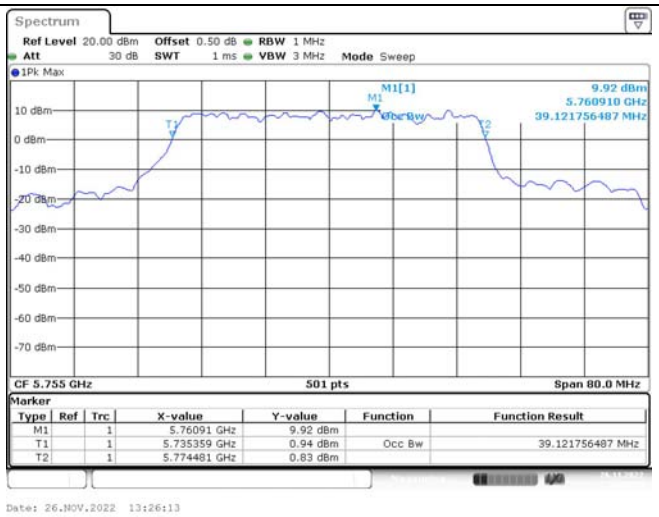
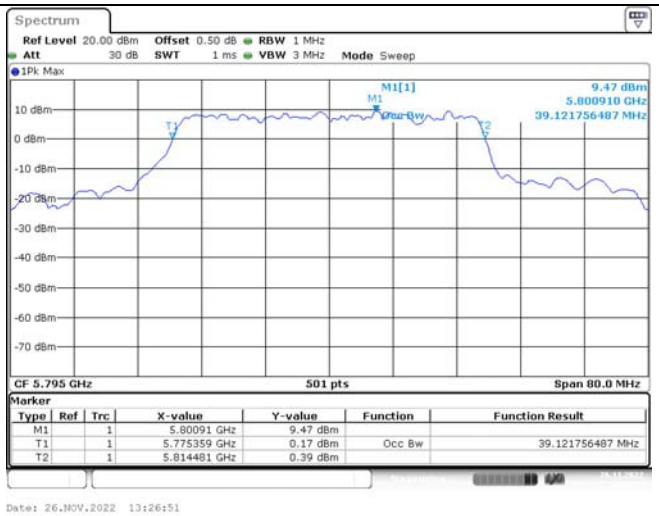
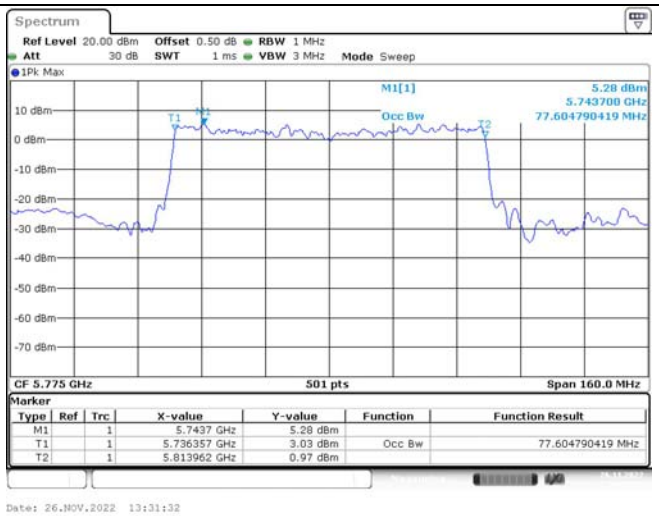
6dB Emission Bandwidth	
802.11ax hew40 Lowest Channel	
802.11ax hew40 Highest Channel	
802.11ax hew80 Middle Channel	

99% Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

99% Emission Bandwidth	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

99% Emission Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	
802.11ac vht80 Middle Channel	

99% Emission Bandwidth	
802.11ax hew20 Lowest Channel	
802.11ax hew20 Middle Channel	
802.11ax hew20 Highest Channel	

99% Emission Bandwidth	
802.11ax hew40 Lowest Channel	
802.11ax hew40 Highest Channel	
802.11ax hew80 Middle Channel	

4.4 Maximum Conducted Output Power:

Serial Number:	1O7R	Test Date:	2022/11/23~2022/11/26
Test Site:	RF	Test Mode:	Transmitting
Tester:	Julie Tan	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	23.4~24.8	Relative Humidity: (%)	67~69	ATM Pressure: (kPa)	100.2~101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	USB Wideband Power Sensor	U2021XA	MY54080015	2022/07/15	2023/07/14
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060302	Each time	N/A
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

5150-5250 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)			
		Chain 0	Chain 1	Total	Limit
802.11a	5180	13.32	12.54	/	30
	5200	13.2	12.55	/	30
	5240	12.97	12.51	/	30
802.11n ht20	5180	13.44	12.78	16.13	30
	5200	13.26	12.75	16.02	30
	5240	13.05	12.66	15.87	30
802.11n ht40	5190	12.32	11.5	14.94	30
	5230	12.17	11.4	14.81	30
802.11ac vht80	5210	11.12	9.78	13.51	30

802.11ax mode:

Test Modes	Test Frequency (MHz)	RU Config.	Max. Conducted Average Output Power (dBm)			
			Chain 0	Chain 1	Total	Limit
802.11ax hew20	5180	26/0	7.03	7.2	10.13	30
		52/37	10.16	10.22	13.20	30
		106/53	13.11	13.32	16.23	30
		242/61	14.99	13.17	17.18	30
	5200	26/0	5.96	4.82	8.44	30
		52/37	8.87	7.76	11.36	30
		106/53	12.05	10.85	14.5	30
		242/61	15.07	13.76	17.47	30
	5240	26/0	6.86	5.53	9.26	30
		52/40	9.87	8.50	12.25	30
		106/54	12.91	11.56	15.30	30
		242/61	15.99	14.69	18.40	30
802.11ax hew40	5190	26/0	-1.61	-1.69	1.36	30
		52/37	1.54	1.38	4.47	30
		106/53	4.61	4.48	7.56	30
		242/61	7.77	7.52	10.66	30
		484/65	10.97	10.66	13.83	30
	5230	26/0	0.28	-0.72	2.82	30
		52/37	3.2	2.43	5.84	30
		106/53	6.21	5.46	8.86	30
		242/61	9.18	8.53	11.88	30
		484/65	12.22	11.45	14.86	30
802.11ax hew80	5210	26/0	-2.30	-4.20	-0.14	30
		52/37	0.88	-1.22	2.97	30
		106/53	3.87	1.83	5.98	30
		242/61	6.77	4.97	8.97	30
		484/65	9.72	8.04	11.97	30
		996/67	12.64	11.17	14.98	30

Note:
The duty cycle factor has been calculated into the result.
The device is an indoor AP. The maximum antenna gain is 5.55dBi in 5GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

So:
Directional gain =5.55dBi

5725-5850 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)			
		Chain 0	Chain 1	Total	Limit
802.11a	5745	19.25	20.23	/	30
	5785	19.35	19.88	/	30
	5825	19.48	19.77	/	30
802.11n ht20	5745	18.22	19.77	22.07	30
	5785	18.29	19.42	21.90	30
	5825	18.47	19.06	21.79	30
802.11n ht40	5755	18.34	19.18	21.79	30
	5795	18.57	18.86	21.73	30
802.11ac vht80	5775	15.42	16.15	18.81	30

802.11ax mode:

Test Modes	Test Frequency (MHz)	RU Config.	Max. Conducted Average Output Power (dBm)			
			Chain 0	Chain 1	Total	Limit
802.11ax hew20	5745	26/0	7.03	7.2	10.13	30
		52/37	10.16	10.22	13.2	30
		106/53	13.11	13.32	16.23	30
		242/61	16.20	16.25	19.24	30
	5785	26/0	6.62	6.99	9.82	30
		52/37	9.74	9.89	12.83	30
		106/53	12.87	13.08	15.99	30
		242/61	16.07	16.14	19.12	30
	5825	26/0	7.32	6.41	9.90	30
		52/40	10.22	9.61	12.94	30
		106/54	13.28	12.73	16.02	30
		242/61	16.24	15.84	19.05	30
802.11ax hew40	5755	26/0	3.32	3.45	6.40	30
		52/37	6.42	6.55	9.50	30
		106/53	9.57	9.48	12.54	30
		242/61	12.59	12.46	15.54	30
		484/65	15.75	15.62	18.7	30
	5795	26/0	3.52	3.11	6.33	30
		52/37	6.67	6.01	9.36	30
		106/53	9.71	9.01	12.38	30
		242/61	12.80	12.03	15.44	30
		484/65	15.88	15.20	18.56	30
802.11ax hew80	5775	26/0	-1.39	-1.74	1.45	30
		52/37	1.79	1.18	4.51	30
		106/53	4.79	4.13	7.48	30
		242/61	7.72	7.09	10.43	30
		484/65	10.62	10.20	13.43	30
		996/67	13.67	13.26	16.48	30

Note:
The duty cycle factor has been calculated into the result.
The device is an indoor AP. The maximum antenna gain is 5.12dBi in 5GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

So:

Directional gain =5.12dBi

4.5 Maximum power spectral density:

Serial Number:	1O7R	Test Date:	2022/11/23~2022/11/26
Test Site:	RF	Test Mode:	Transmitting
Tester:	Julie Tan	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	23.4~24.8	Relative Humidity: (%)	67~69	ATM Pressure: (kPa)	100.2~101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2022/7/25	2023/7/24
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

5150-5250 MHz:

Test Modes	Test Frequency (MHz)	Maximum Power Spectral Density (dBm/MHz)			
		Chain 0	Chain 1	Total	Limit
802.11a	5180	4.47	4.47	/	17
	5200	4.17	4.15	/	17
	5240	4.27	4.01	/	17
802.11n ht20	5180	4.96	5.09	8.04	14.45
	5200	4.57	4.81	7.70	14.45
	5240	4.83	4.71	7.78	14.45
802.11n ht40	5190	0.73	0.53	3.64	14.45
	5230	0.53	0.09	3.33	14.45
802.11ac vht80	5210	-0.9	-0.63	2.25	14.45
802.11ax hew20	5180	8.06	6.72	10.45	14.45
	5200	8.61	7	10.89	14.45
	5240	9.61	8.16	11.96	14.45
802.11ax hew40	5190	2.45	1.74	5.12	14.45
	5230	3.87	2.4	6.21	14.45
802.11ax hew80	5210	0.88	-0.1	3.43	14.45
Note: The device is a indoor AP. Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01was used for PSD test. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB					
Antenna Gain:	5.55	dBi	Directional gain:	8.55	dBi

5725-5850 MHz:

Test Modes	Test Frequency (MHz)	Reading (dBm/300kHz)		Maximum Power Spectral Density (dBm/500kHz)			
		Chain 0	Chain 1	Chain 0	Chain 1	Total	Limit
802.11a	5745	9.12	9.65	11.34	11.87	/	30
	5785	9.31	9.6	11.53	11.82	/	30
	5825	9.08	9.38	11.30	11.60	/	30
802.11n ht20	5745	7.76	8.26	9.98	10.48	13.25	27.88
	5785	7.97	8.46	10.19	10.68	13.45	27.88
	5825	7.77	8.44	9.99	10.66	13.35	27.88
802.11n ht40	5755	4.68	5.23	6.90	7.45	10.19	27.88
	5795	4.91	5.14	7.13	7.36	10.26	27.88
802.11ac vht80	5775	0.96	2.61	3.18	4.83	7.09	27.88
802.11ax hew20	5745	6.53	5.92	8.75	8.14	11.47	27.88
	5785	6.03	5.7	8.25	7.92	11.10	27.88
	5825	5.4	4.96	7.62	7.18	10.42	27.88
802.11ax hew40	5755	3.03	3.07	5.25	5.29	8.28	27.88
	5795	2.51	2.23	4.73	4.45	7.60	27.88
802.11ax hew80	5775	-2.01	-3.83	0.21	-1.61	2.40	27.88

Note:
The maximum antenna gain is 5.12 dBi. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

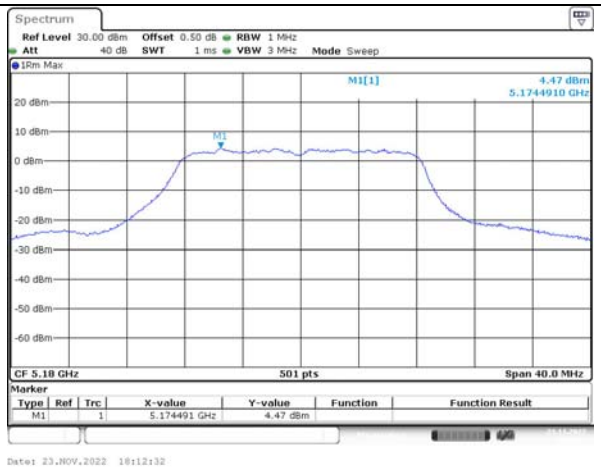
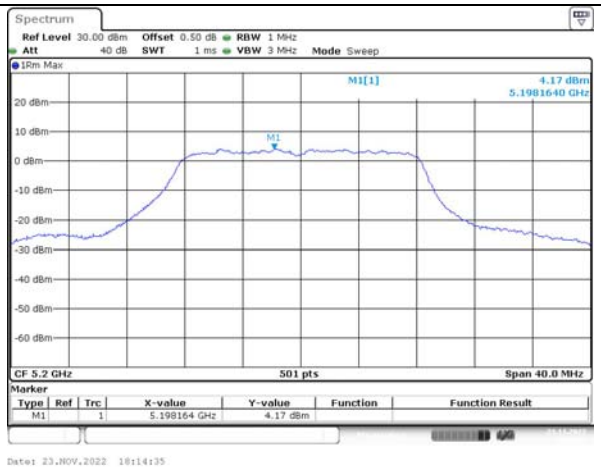
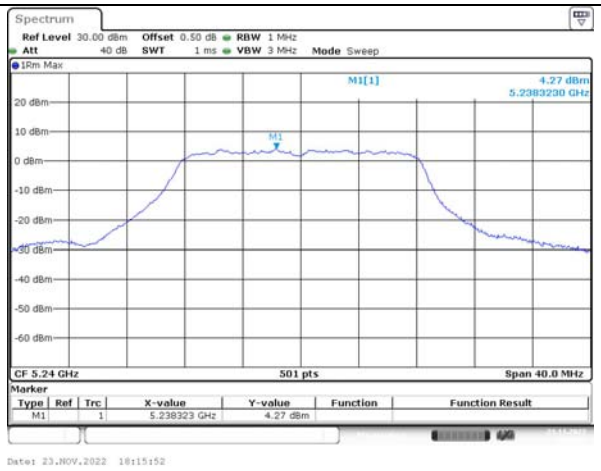
$$\text{Array Gain} = 10 \log(N_{ANT}/N_{SS}) \text{ dB.}$$

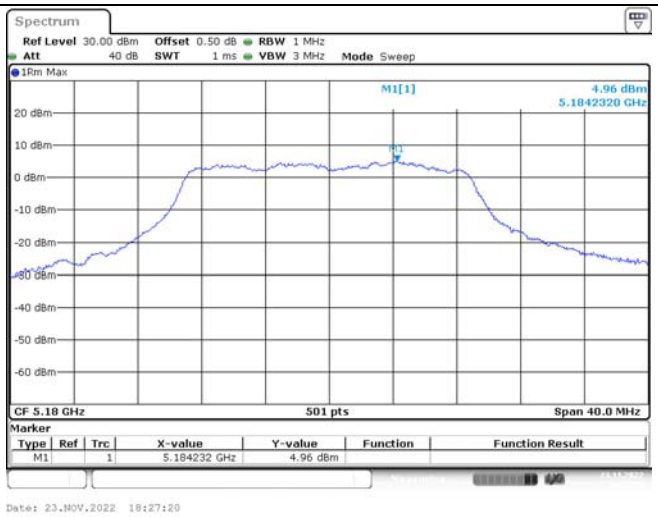
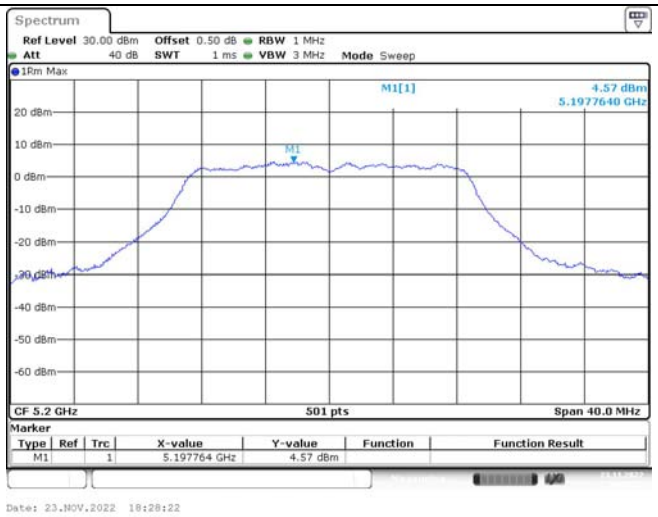
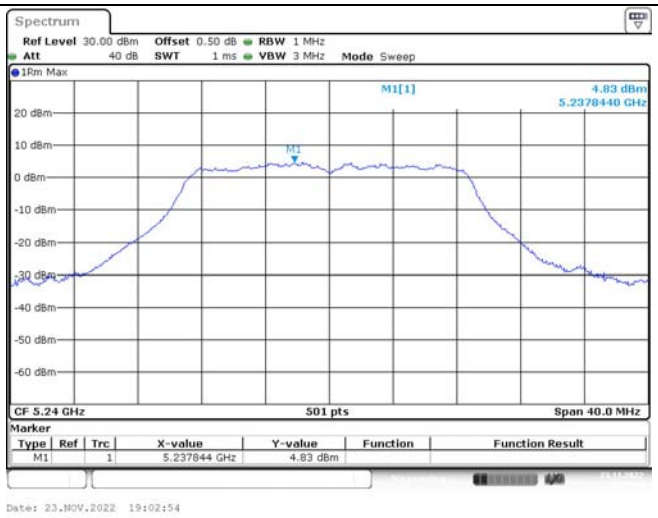
So:

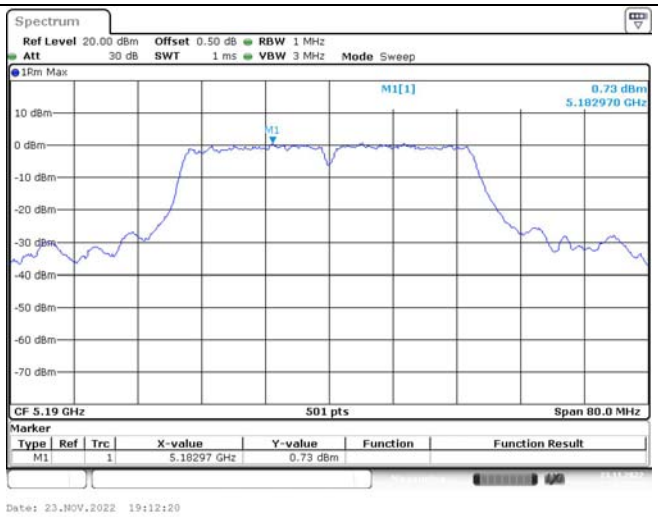
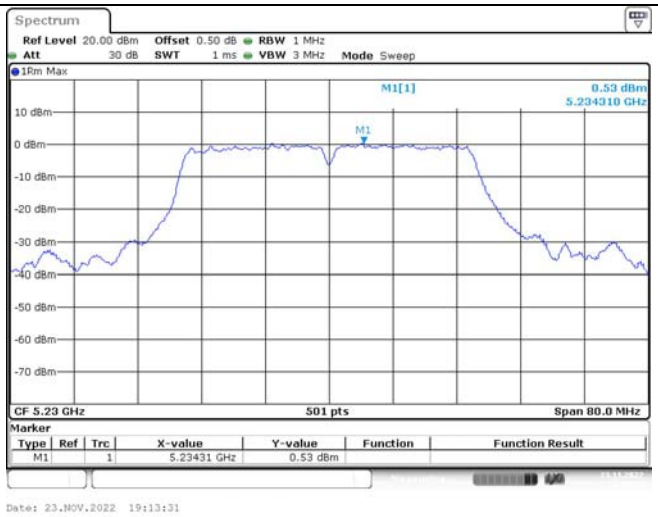
$$\text{Directional gain} = G_{ANT} + \text{Array Gain} = 5.12+10*\log(2/1)=8.12 \text{ dBi}$$

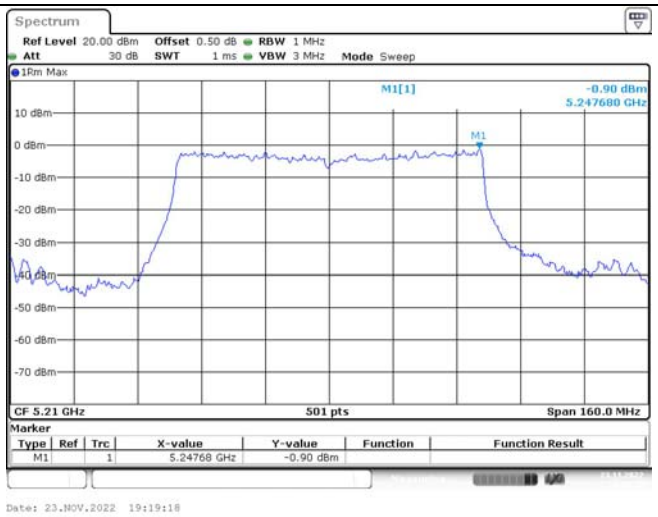
Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01was used for PSD test.
If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW)to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement

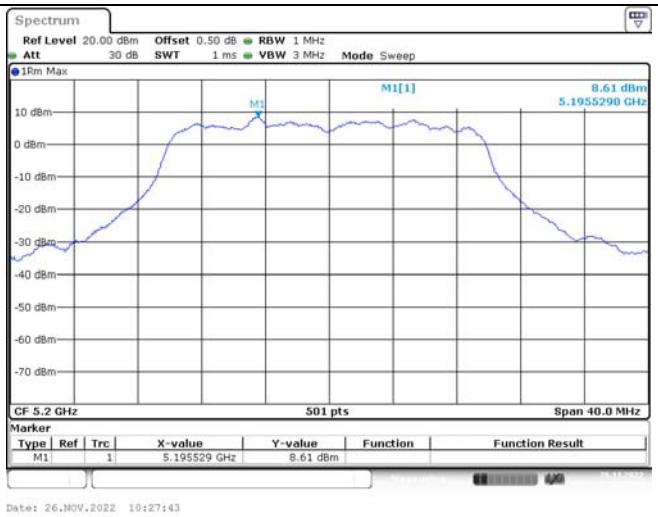
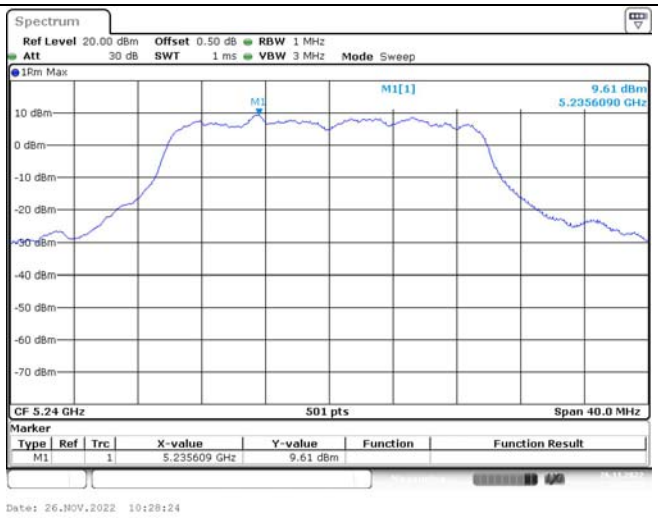
5150-5250MHz:
Chain0:

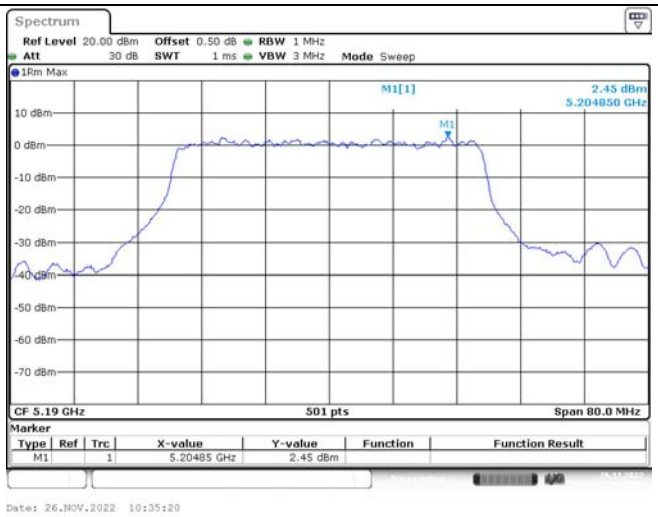
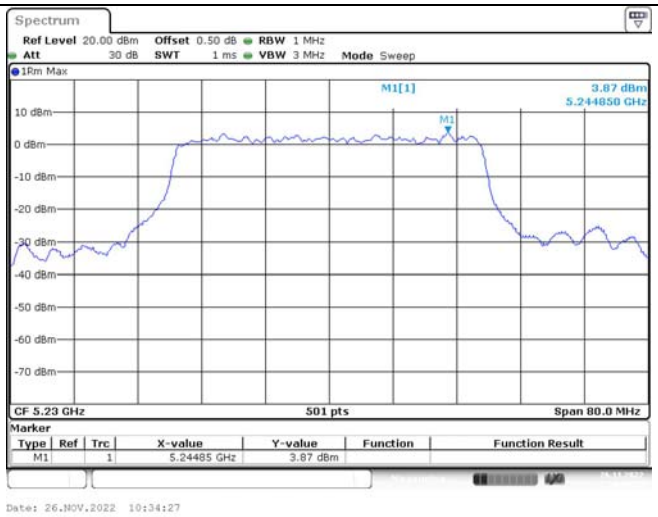
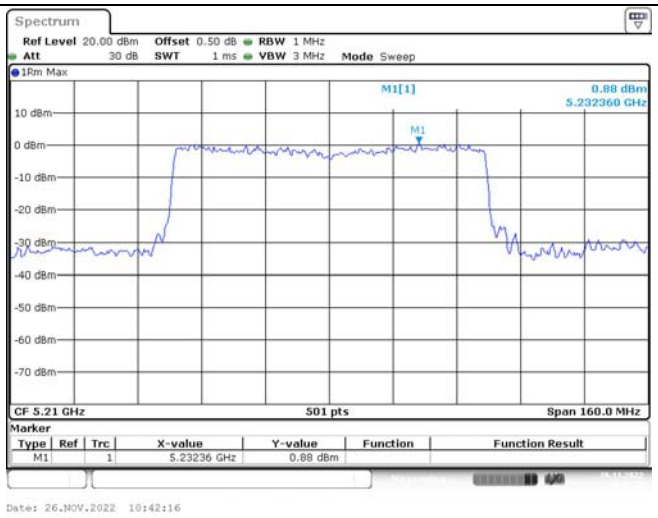
Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

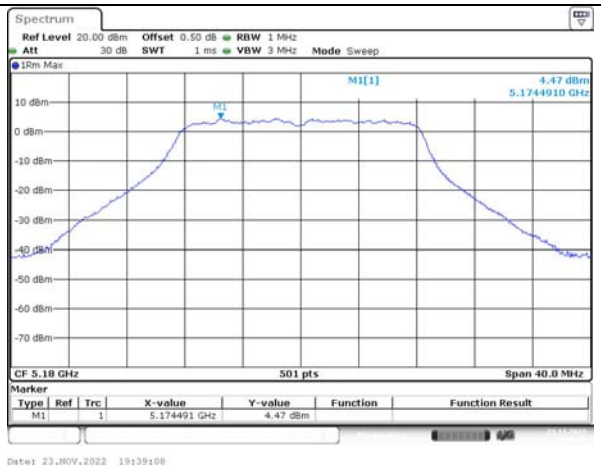
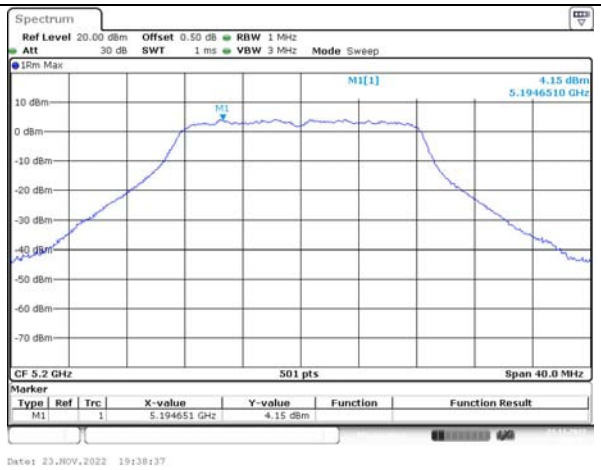
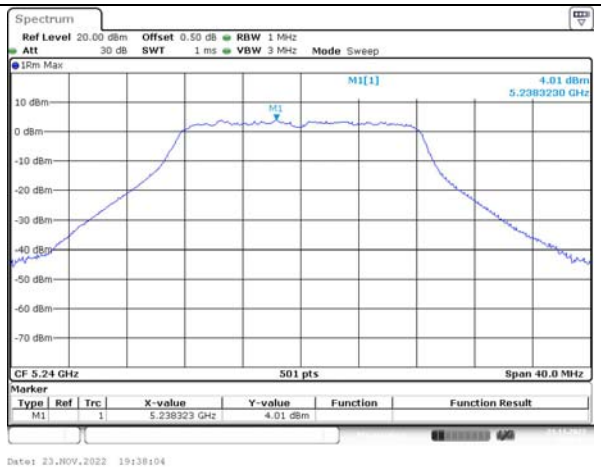
Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

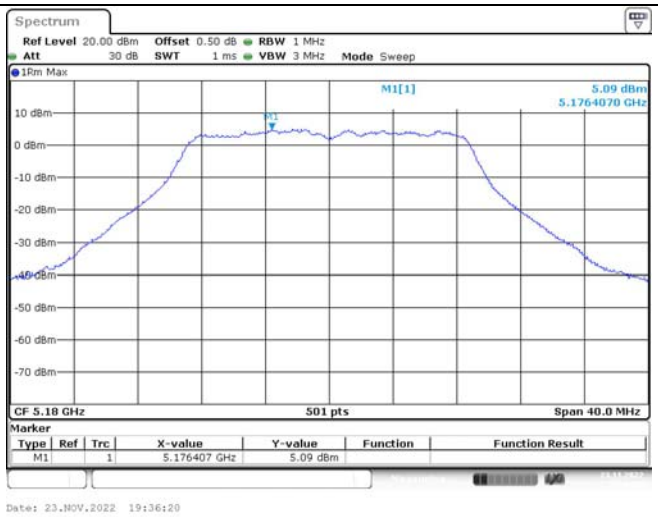
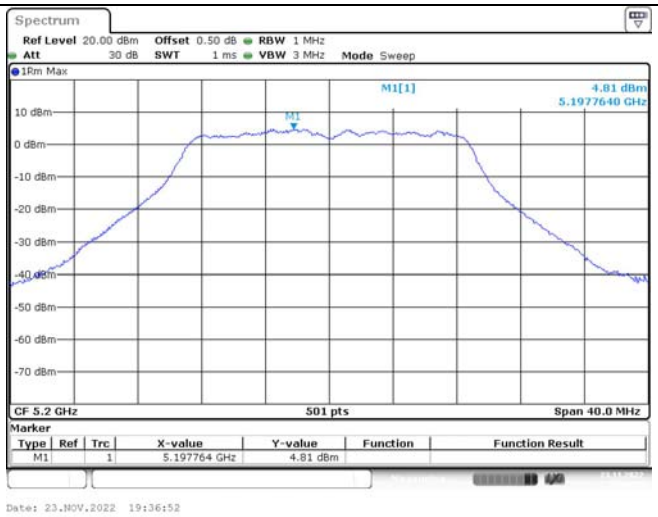
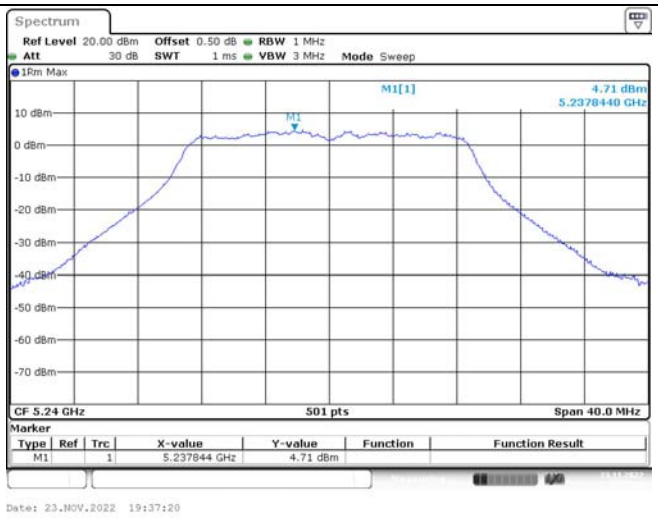
Maximum power spectral density	
802.11ac vht80 Middle Channel	

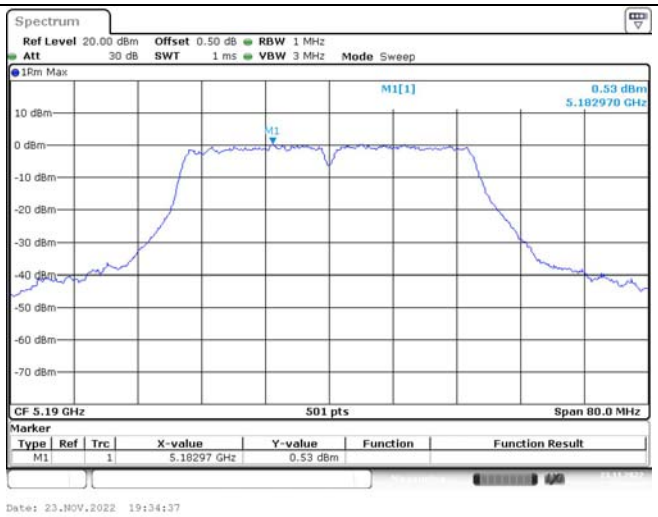
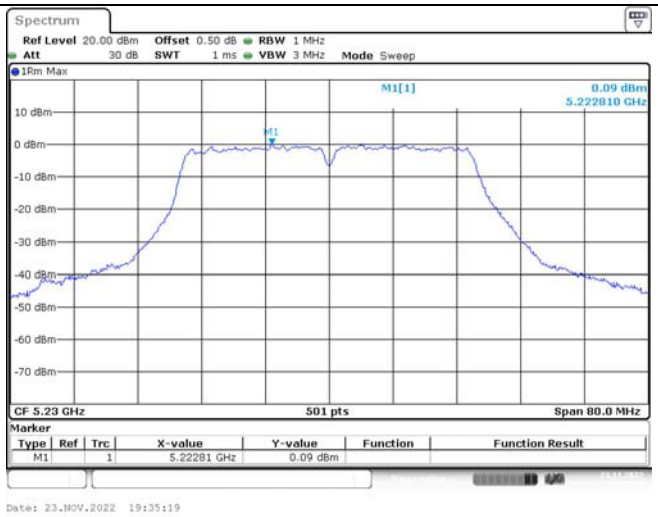
Maximum power spectral density	
802.11ax hew20 Lowest Channel	
802.11ax hew20 Middle Channel	
802.11ax hew20 Highest Channel	

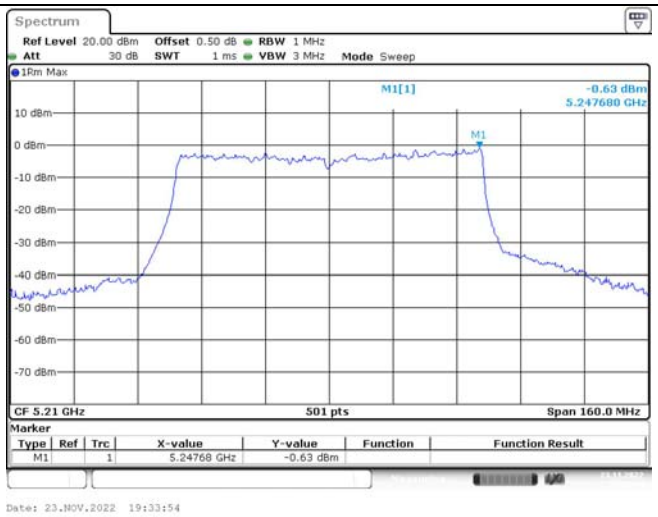
Maximum power spectral density	
802.11ax hew40 Lowest Channel	
802.11ax hew40 Highest Channel	
802.11ax hew80 Middle Channel	

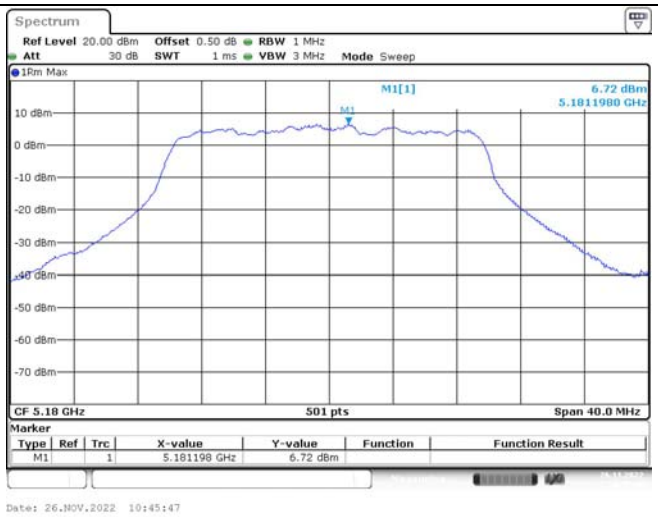
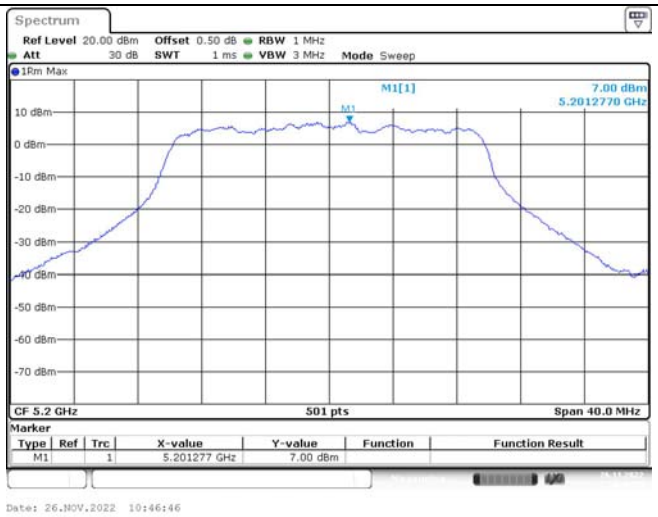
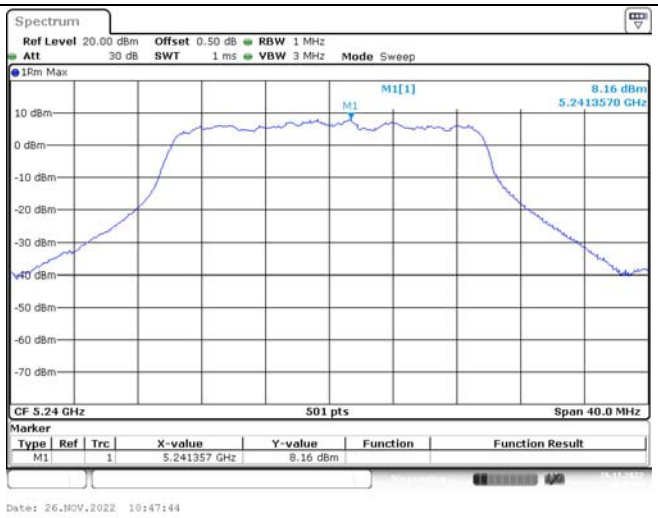
Chain1:

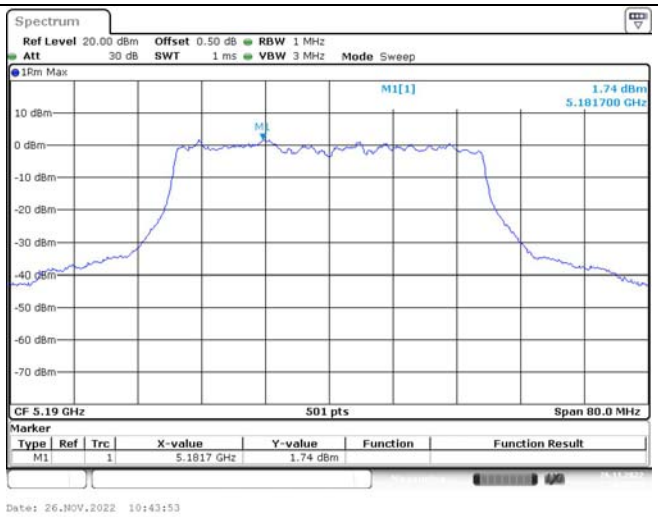
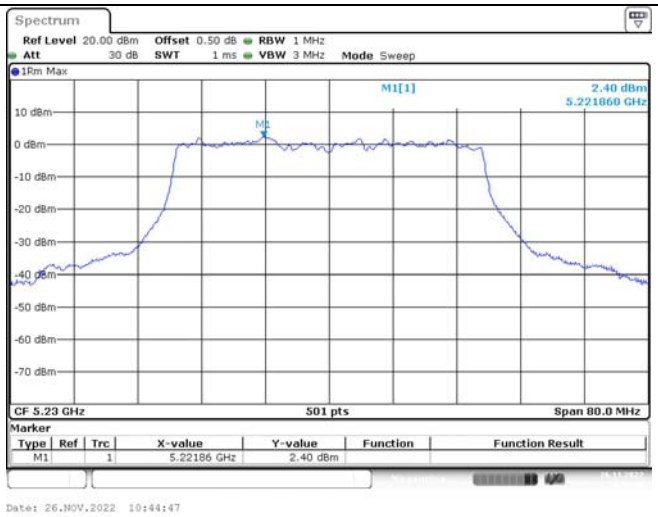
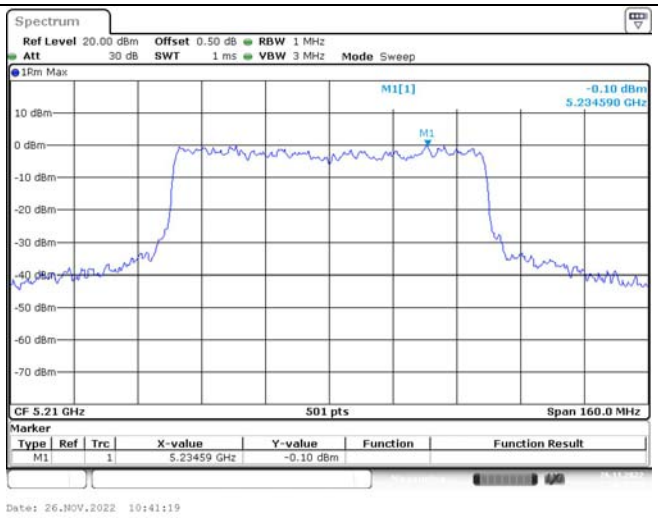
Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

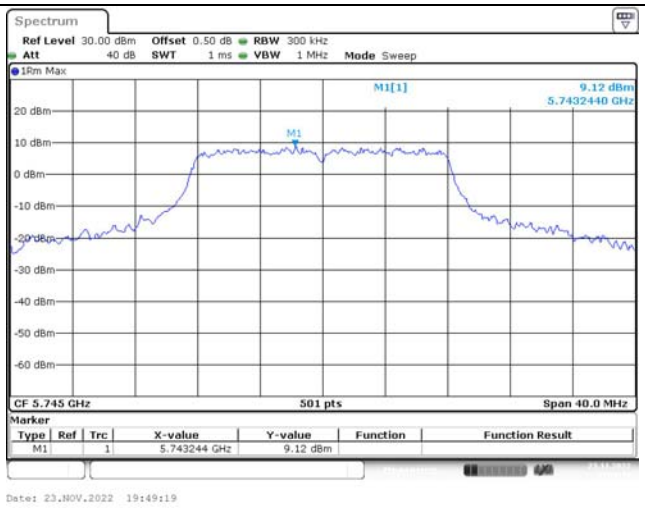
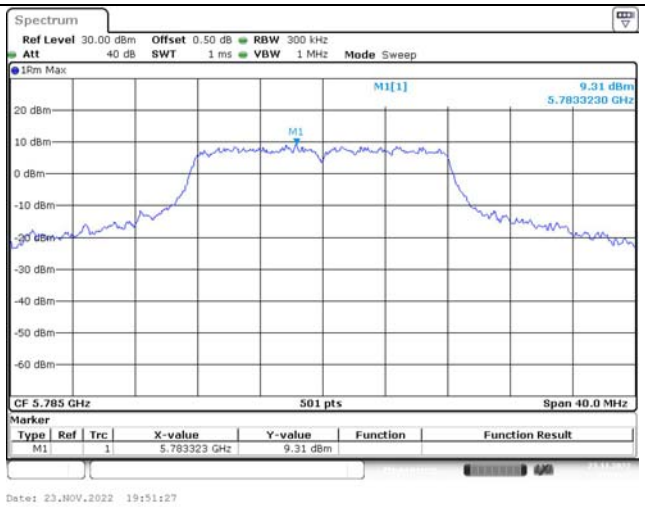
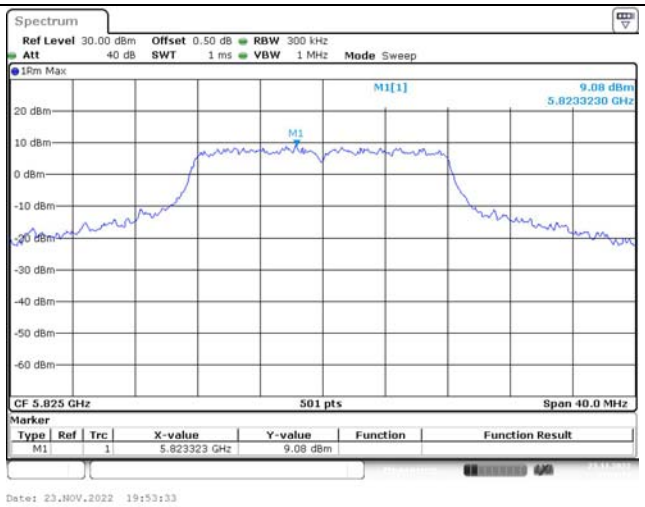
Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

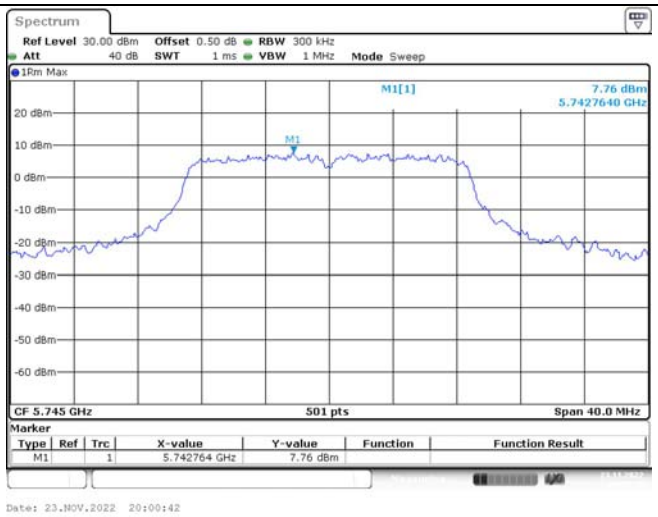
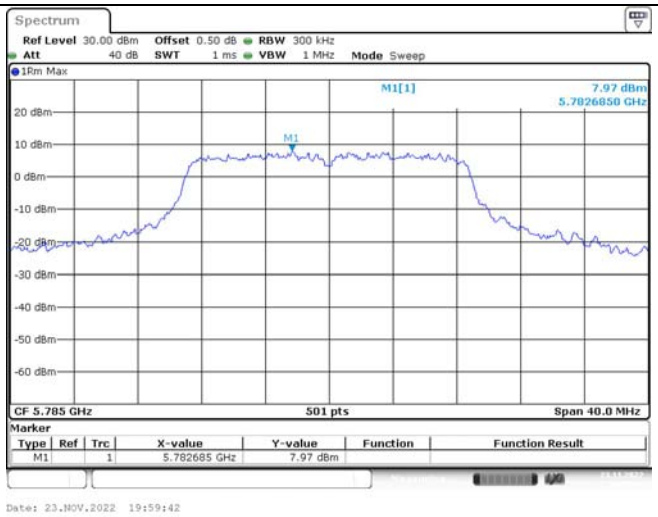
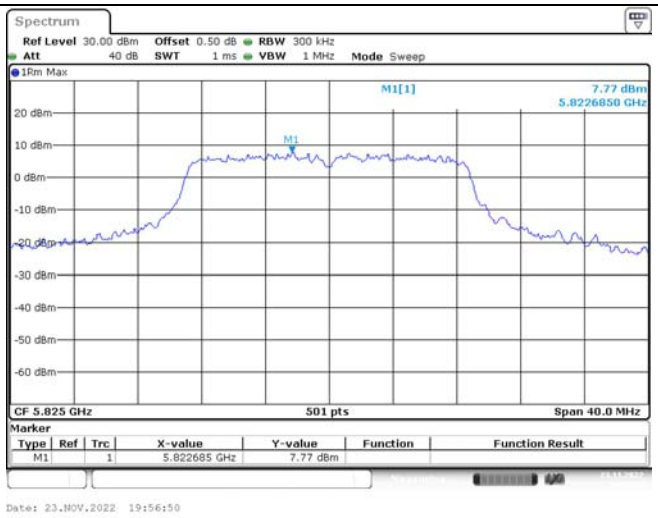
Maximum power spectral density	
802.11ac vht80 Middle Channel	

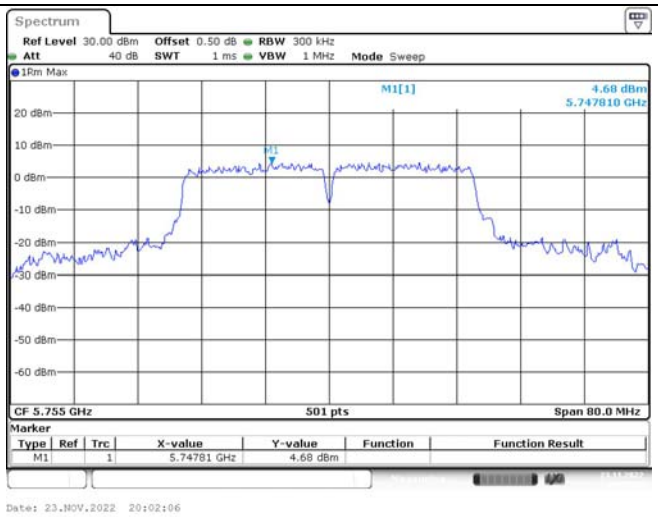
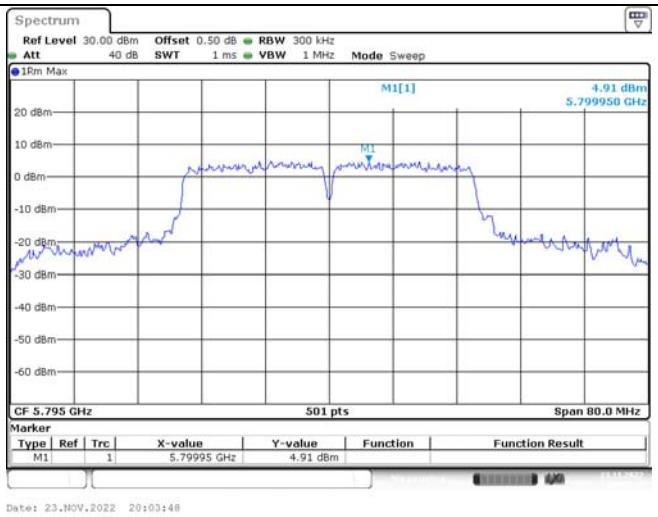
Maximum power spectral density	
802.11ax hew20 Lowest Channel	
802.11ax hew20 Middle Channel	
802.11ax hew20 Highest Channel	

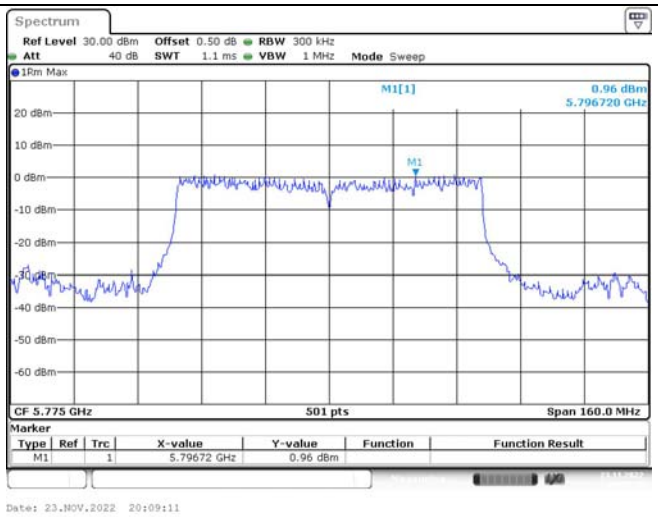
Maximum power spectral density	
802.11ax hew40 Lowest Channel	
802.11ax hew40 Highest Channel	
802.11ax hew80 Middle Channel	

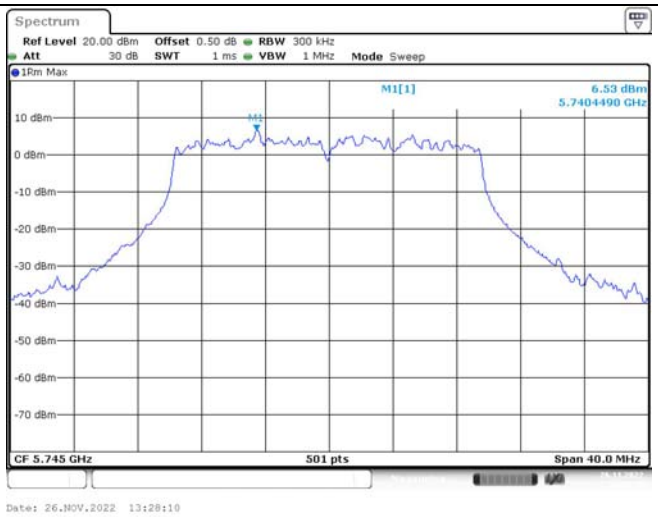
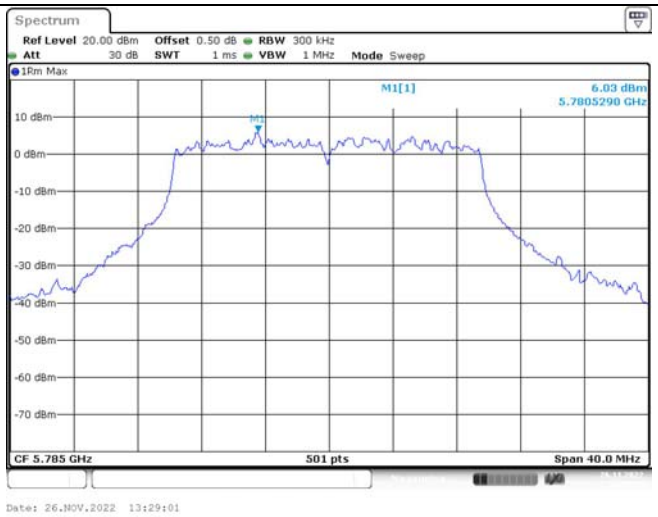
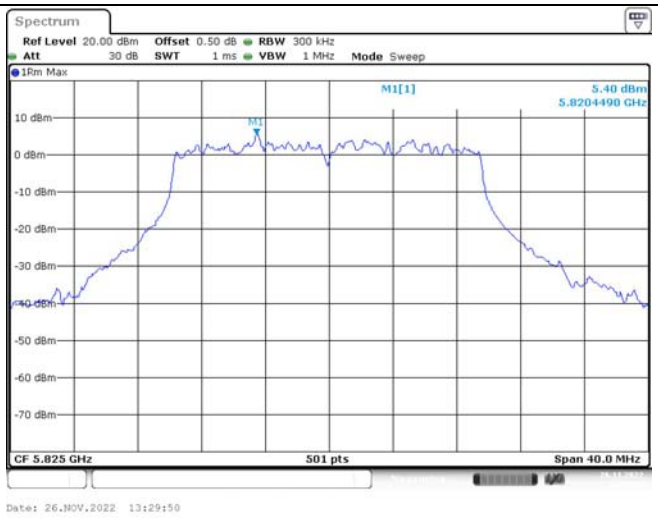
5725-5850MHz
Chain0：

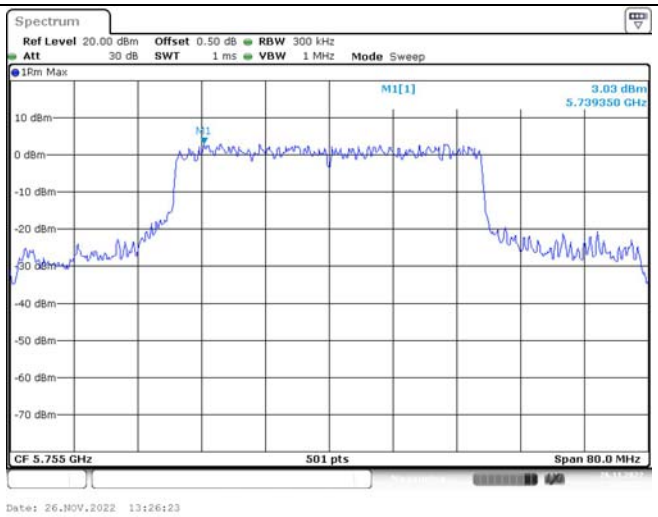
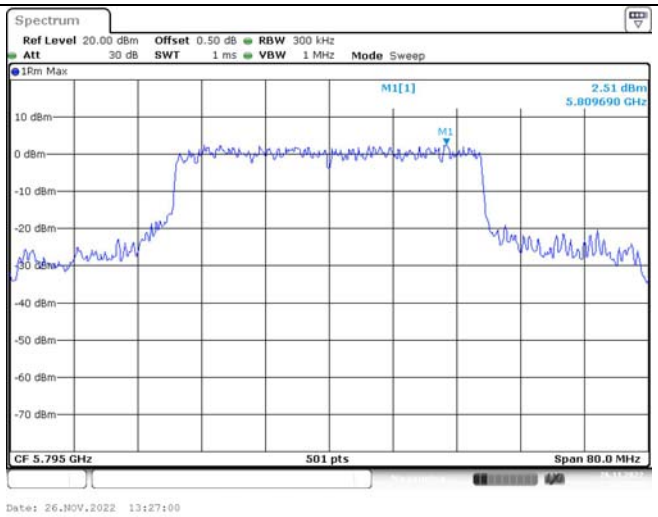
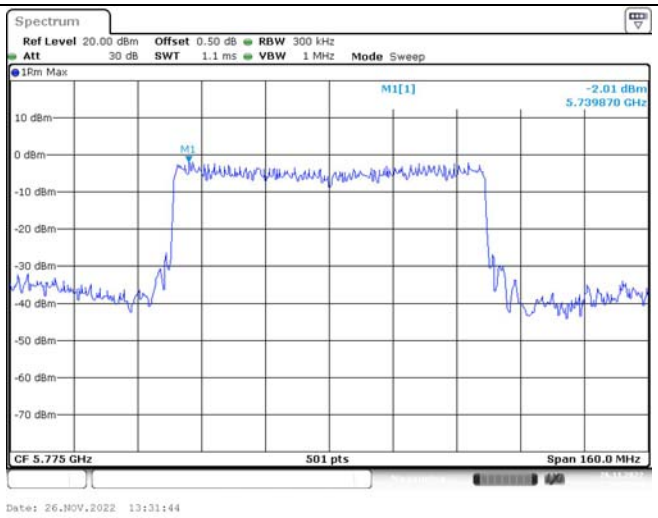
Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

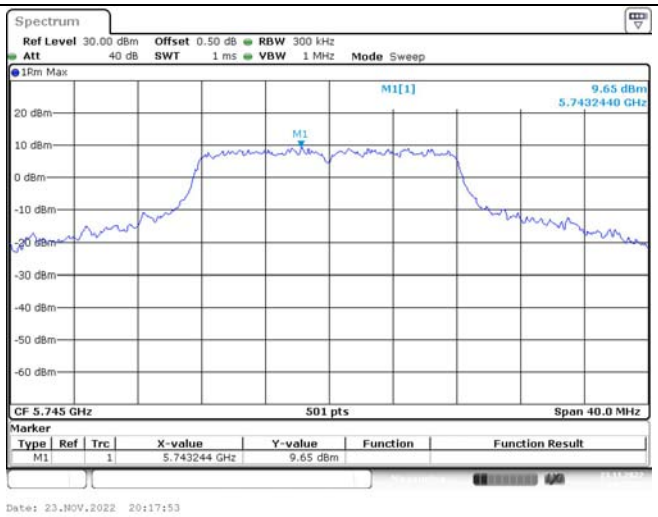
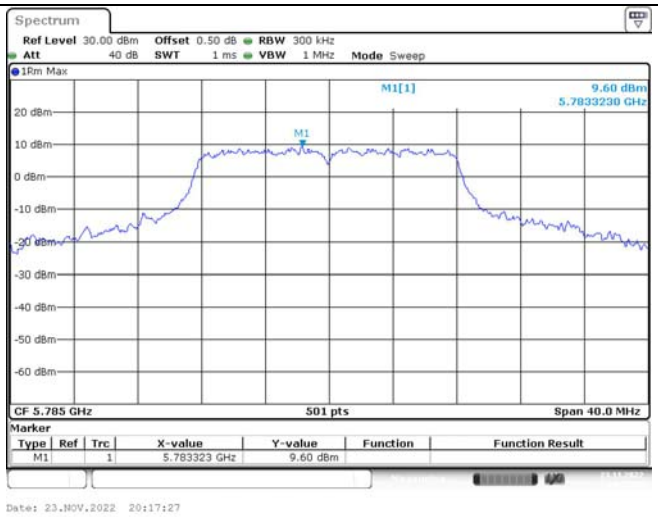
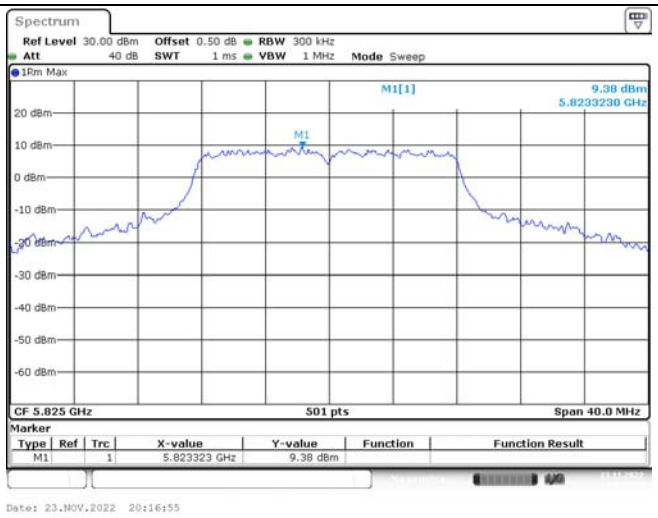
Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

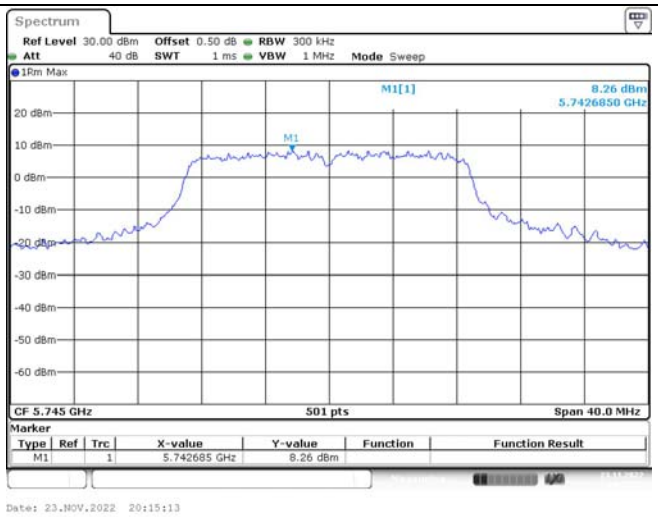
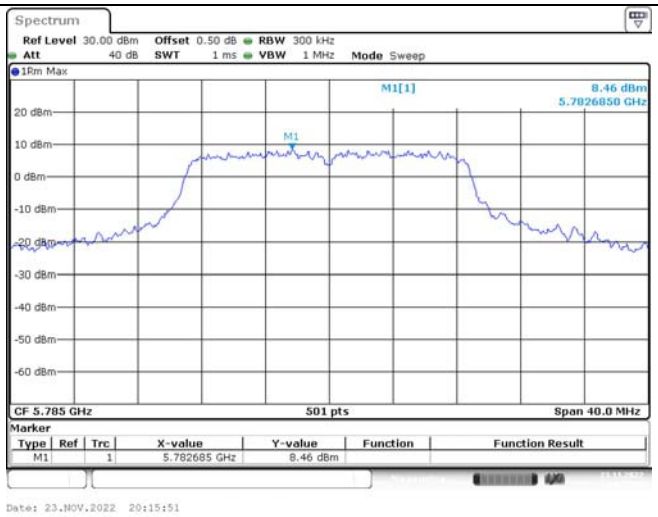
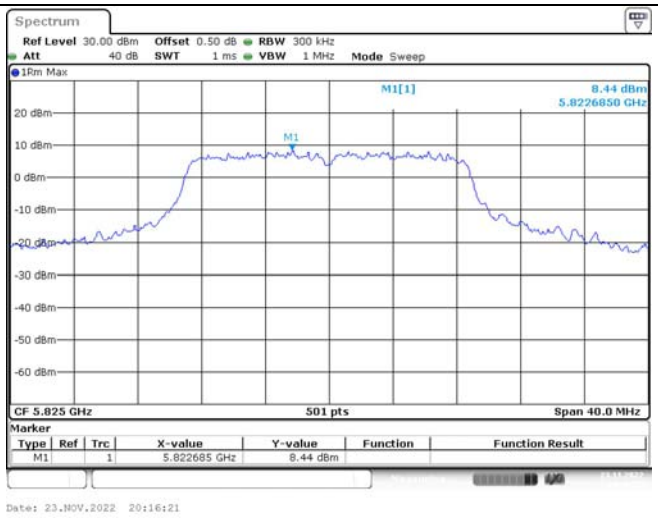
Maximum power spectral density	
802.11ac vht80 Middle Channel	

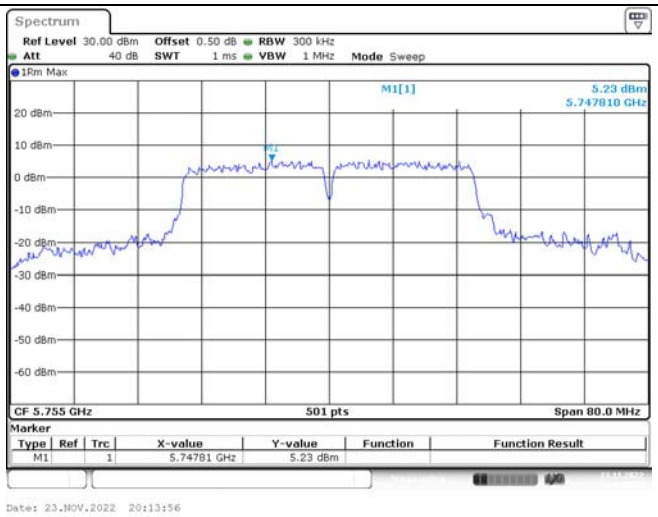
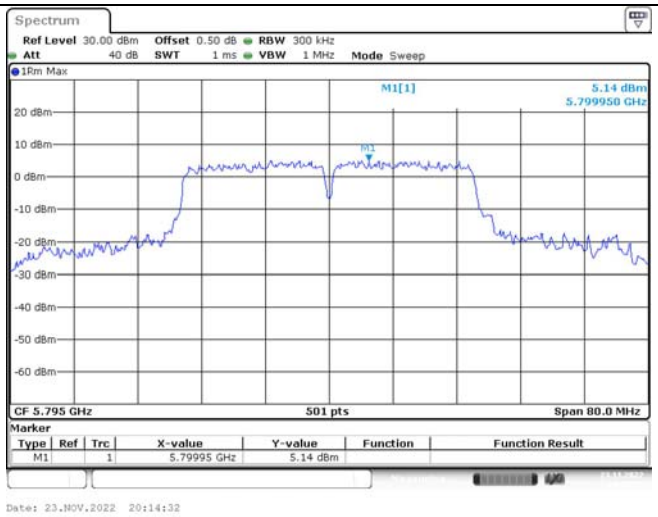
Maximum power spectral density	
802.11ax hew20 Lowest Channel	
802.11ax hew20 Middle Channel	
802.11ax hew20 Highest Channel	

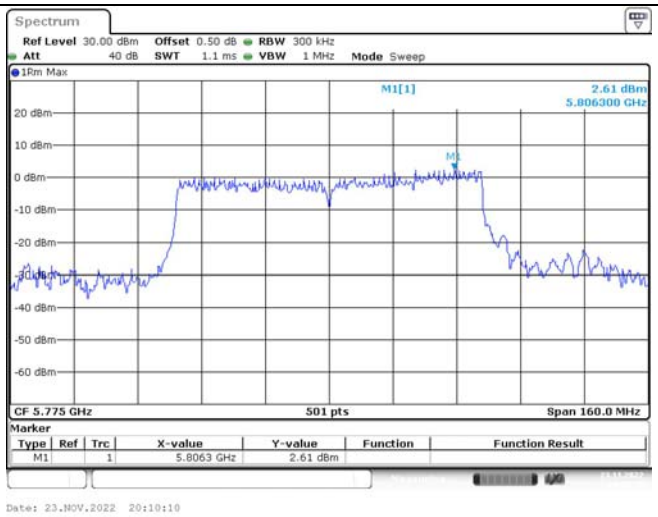
Maximum power spectral density	
802.11ax hew40 Lowest Channel	
802.11ax hew40 Highest Channel	
802.11ax hew80 Middle Channel	

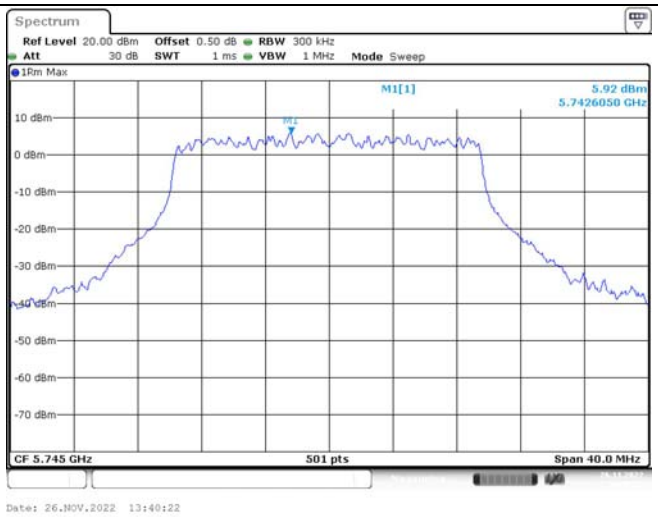
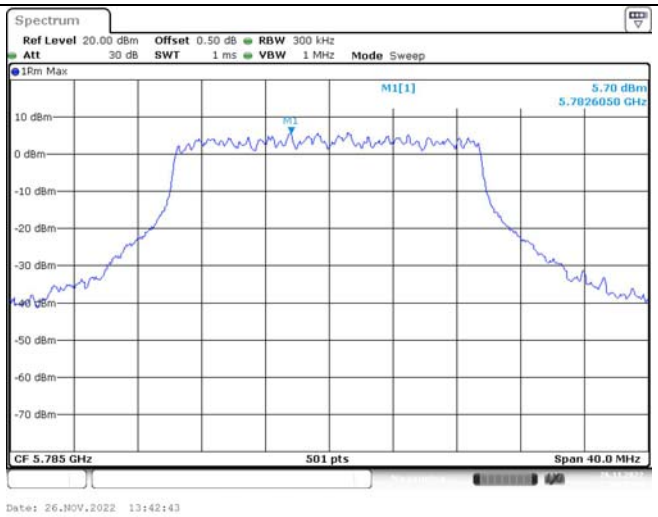
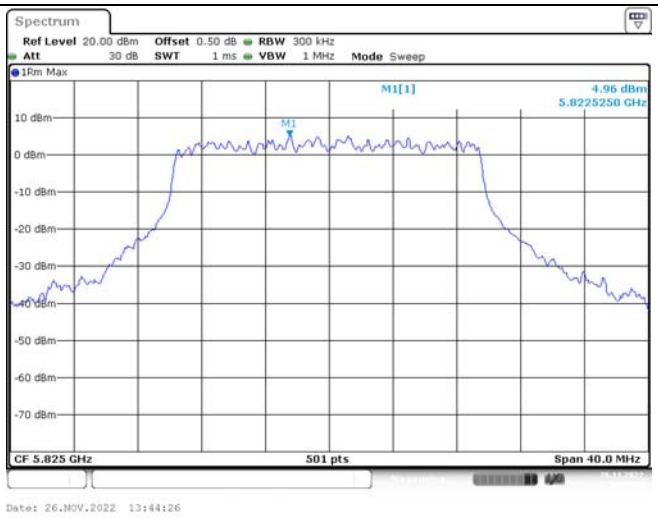
Chain1：

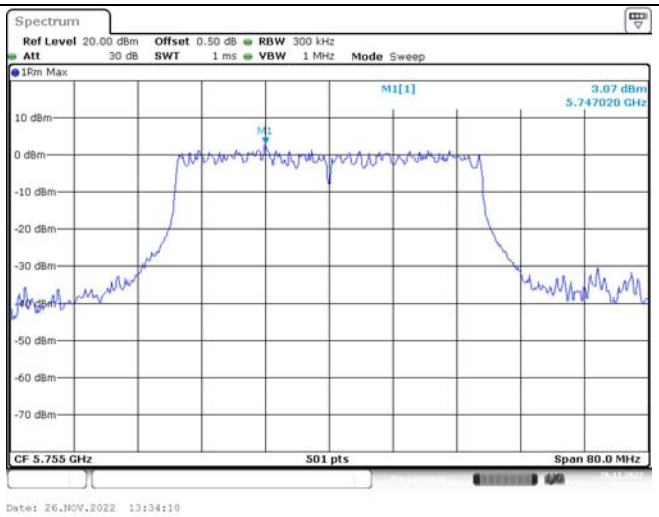
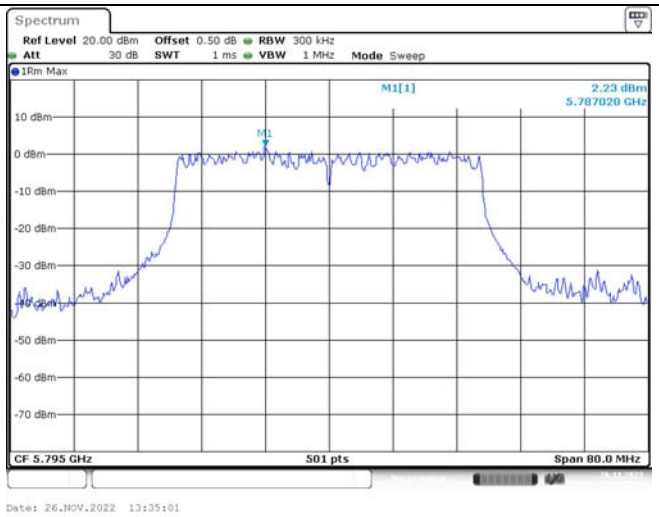
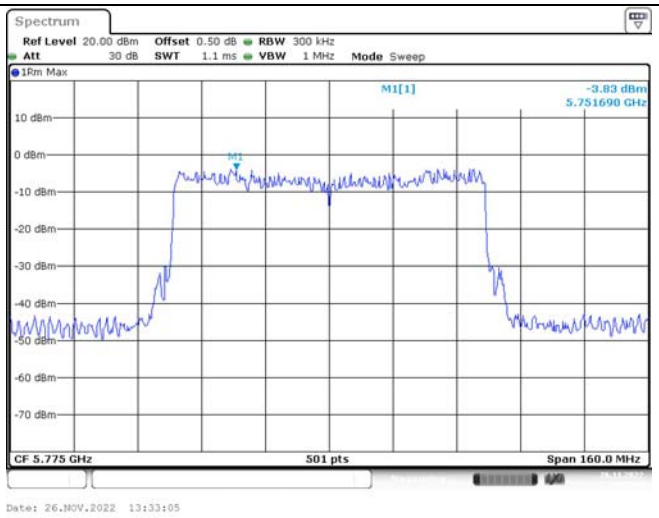
Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

Maximum power spectral density	
802.11ac vht80 Middle Channel	

Maximum power spectral density	
802.11ax hew20 Lowest Channel	
802.11ax hew20 Middle Channel	
802.11ax hew20 Highest Channel	

Maximum power spectral density	
802.11ax hew40 Lowest Channel	
802.11ax hew40 Highest Channel	
802.11ax hew80 Middle Channel	

4.6 Duty Cycle:

Serial Number:	1O7R	Test Date:	2022/11/23~2022/11/26
Test Site:	RF	Test Mode:	Transmitting
Tester:	Julie Tan	Test Result:	N/A

Environmental Conditions:					
Temperature: (℃)	23.4~24.8	Relative Humidity: (%)	67~69	ATM Pressure: (kPa)	100.2~101

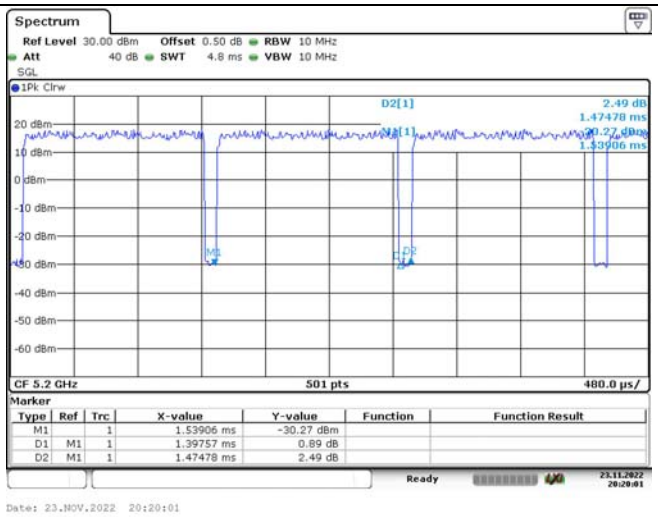
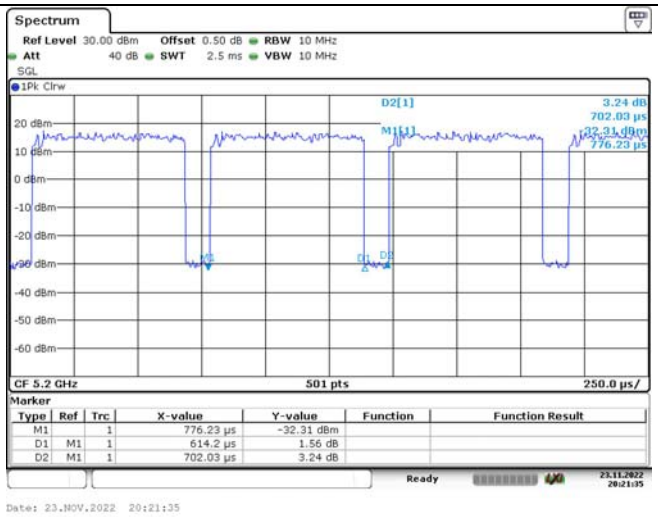
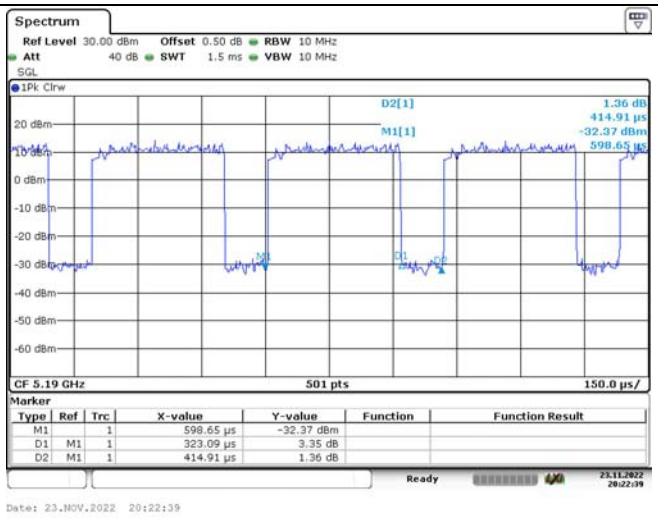
Test Equipment List and Details:

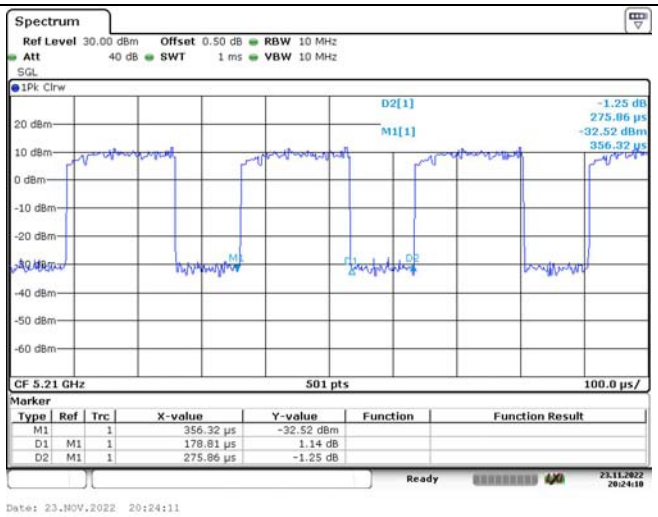
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2022-07-25	2023-07-24
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A

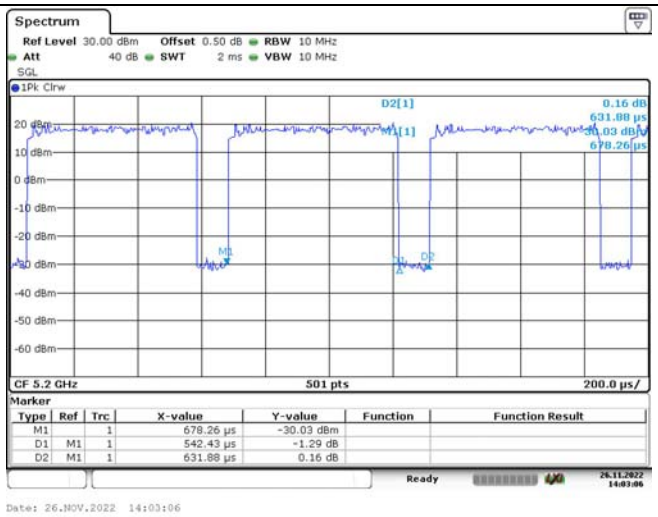
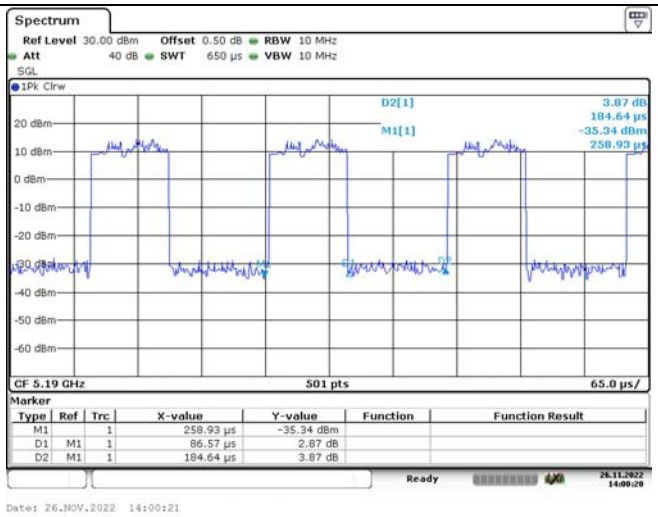
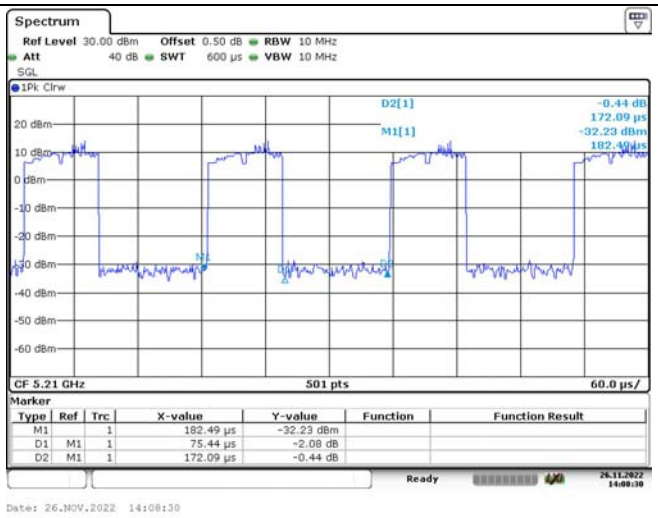
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Test Modes	Ton (ms)	Ton+off (ms)	Duty cycle (%)
802.11a	1.398	1.475	94.78
802.11n ht20	0.614	0.702	87.46
802.11n ht40	0.323	0.415	77.83
802.11ac vht80	0.179	0.276	64.86
802.11ax hew20	0.542	0.632	85.76
802.11ax hew40	0.087	0.185	47.03
802.11ax hew80	0.075	0.172	43.60

Duty Cycle	
802.11a	
802.11n ht20	
802.11n ht40	

Duty Cycle	
802.11ac vht80	

Duty Cycle	
802.11ax hew20	
802.11 ax hew40	
802.11ax hew80	

5. RF EXPOSURE EVALUATION

5.1 Applicable Standard

According to §1.1307(b)(3)(i)

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\,cm}(d/20\text{ cm})^x & d \le 20\text{ cm} \\ ERP_{20\,cm} & 20\text{ cm} < d \le 40\text{ cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\,cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\text{ GHz} \le f < 1.5\text{ GHz} \\ 3060 & 1.5\text{ GHz} \le f \le 6\text{ GHz} \end{cases}$$

d = the separation distance (cm);

According to KDB 447498 D04 Interim General RF Exposure Guidance v01:

2.2.2 Simultaneous Transmission with both SAR-based and MPE-Based Test Exemptions

This case is described in detail in § 1.1307(b)(3)(ii)(B) and covers the situations where both SAR-based and MPE-based exemption may be considered for test exemption in fixed, mobile, or portable device exposure conditions. For these cases, a device with multiple RF sources transmitting simultaneously will be considered an RF exempt device if the condition of Formula (1) is satisfied.

$$\sum_{i=1}^{a}\frac{P_i}{P_{th,i}} + \sum_{j=1}^{b}\frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k} \le 1$$

5.2 Measurement Result

Operation Modes	Frequency (MHz)	Distance (mm)	P_{th}		Maximum Conducted Power including Tune-up Tolerance (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Exemption
			(mW)	(dBm)					
WLAN 2.4G	2412-2462	200	3060	**34.86**	16	5.59	19.44	87.9	Compliant
WLAN 5.2G	5150-5250	200	3060	**34.86**	19	5.55	22.4	173.78	Compliant
WLAN 5.8G	5725-5850	200	3060	**34.86**	23	5.12	25.97	395.37	Compliant

Note: Maximum Conducted Power including Tune-up Tolerance(dBm) was declared by customer.

WLAN 2.4G and 5G can transmit simultaneously:

$$\sum_{i=1}^{a}\left(\frac{P_i}{P_{th_i}}\right)+\sum_{j=1}^{b}\left(\frac{ERP_j}{ERP_{th_j}}\right)+\sum_{k=1}^{c}\left(\frac{Evaluated_k}{Exposure\ Limit_k}\right)$$

= $EPR_{-2.4G}/P_{th-2.4G}+EPR_{-5G}/P_{th-5G}$
=87.9/3060+395.37/3060
=0.16
Result: The device compliant the Exemption at 20cm distances.

===== END OF REPORT =====