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

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

TEST REPORT

Applicant: **Winner Wave Limited**

Address: Unit 1615 Peninsula Tower,538 Castle Peak Road Lai Chi Kok Kowloon Hong Kong

FCC ID: **2ADFSTYWPR1**

Product Name: **Wireless Presentation System**

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: **CR230206453-00B**

Date Of Issue: **2023/5/4**

Reviewed By: **Sun Zhong**

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Title: Manager

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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.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR230206453-00B	Original Report	2023/5/4

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

1.1.1 General:

EUT Name:	Wireless Presentation System
EUT Model:	TY-WPR1
Operation Frequency:	5260-5320 MHz (802.11a/n ht20/ac vht20) 5270-5310 MHz(802.11n ht40/ac vht40) 5290 MHz(802.11ac vht80) 5500-5720 MHz (802.11a/n ht20/ac vht20) 5510-5710 MHz(802.11n ht40/ac vht40) 5530-5690 MHz(802.11ac vht80)
Maximum Average Output Power (Conducted):	15.54 dBm (5250-5350 MHz) 15.62 dBm (5470-5725 MHz)
Modulation Type:	OFDM-BPSK, QPSK, 16QAM, 64QAM,256QAM
Rated Input Voltage:	DC 5V From Adapter
Serial Number:	21GI-4
EUT Received Date:	2023/2/17
EUT Received Status:	Good
Test Purpose:	
This is Class II permissive Change Test for FCC ID: 2ADFSTYWPR1, the changes was below, which was provided by manufacturer▲: 1. Enabled 2.4G WiFi by software. 2. Enabled 5G WiFi 5250-5350MHz and 5470-5725 MHz band by software. The changes were not effect the original function and bands. This report is only for the new enabled 5250-5350MHz and 5470-5725 MHz band.	

1.1.2 Operation Frequency Detail:

For 802.11a/n ht20/ac vht20:

5250-5350 MHz Band		**5470-5725 MHz Band**	
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
52	**5260**	**100**	**5500**
56	**5280**	104	5520
60	5300	108	5540
64	**5320**	112	5560
		116	**5580**
/	/	120	5600
/	/	124	5620
/	/	128	5640
/	/	132	5660
/	/	136	5680
/	/	**140**	**5700**
/	/	**144**	**5720**
Per section 15.31(m), the above in bold frequencies were performed the test.			

Note: Additional channels 5720MHzcross the band 5470-5725MHz and 5725-5850 MHz, Conducted output power/ Power Spectral Density/bandwidth test with the additional channel to compliance with stricter limit of the two bands(5470-5725MHz more stricter).

For 802.11n ht40/ac vht40:

5250-5350 MHz Band		5470-5725 MHz Band	
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
54	**5270**	**102**	**5510**
62	**5310**	**110**	**5550**
/	/	118	5590
/	/	126	5630
/	/	**134**	**5670**
/	/	**142**	**5710**
Per section 15.31(m), the above in bold frequencies were performed the test.			

Note: Additional channels 5710MHzcross the band 5470-5725MHz and 5725-5850 MHz, Conducted output power/ Power Spectral Density/bandwidth test with the additional channel to compliance with stricter limit of the two bands(5470-5725MHz more stricter).

For 802.11ac vht80:

5250-5350 MHz Band		5470-5725 MHz Band	
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
58	**5290**	**106**	**5530**
/	/	**122**	**5610**
/	/	**138**	**5690**
Per section 15.31(m), the above in bold frequencies were performed the test.			

Note: Additional channels 5710MHzcross the band 5470-5725MHz and 5725-5850 MHz, Conducted output power/ Power Spectral Density/bandwidth test with the additional channel to compliance with stricter limit of the two bands(5470-5725MHz more stricter).

1.1.3 Antenna Information Detail▲:

Antenna Chain	Manufacturer	Antenna Type	input impedance (Ohm)	Frequency Range	Antenna Gain
0 (ANT 1)	Winner Wave Limited	PIFA	50	5.25-5.35 GHz	1.07 dBi
				5.47-5.725 GHz	3.05 dBi
1 (ANT 2)		PIFA	50	5.25-5.35 GHz	1.07 dBi
				5.47-5.725 GHz	3.05 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
Adapter	Shenzhen Shi Ying Yuan Electronics Co., Ltd.	ICP12-050-2000B

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_Kit_RTL11ac_8822BU_USB_v0.45_20161114(BETA)

The software was provided by manufacturer. The maximum power was configured as below, that was provided by the manufacturer▲:

5250-5350 MHz Band:

Test Modes	Test Channels	Test Frequency (MHz)	Data rate	Power Level Setting	
				Chain 0	Chain 1
802.11a	Lowest	5260	6Mbps	46	48
	Middle	5280	6Mbps	46	48
	Highest	5320	6Mbps	46	46
802.11n ht20	Lowest	5260	MCS0	48	48
	Middle	5280	MCS0	48	48
	Highest	5320	MCS0	46	46
802.11n ht40	Lowest	5270	MCS0	48	48
	Highest	5310	MCS0	39	39
802.11ac vht20	Lowest	5260	MCS8	46	46
	Middle	5280	MCS8	46	46
	Highest	5320	MCS8	45	45
802.11ac vht40	Lowest	5270	MCS8	48	48
	Highest	5310	MCS8	39	39
802.11ac vht80	Middle	5290	MCS8	42	42

5470-5725 MHz Band:

Test Modes	Test Channels	Test Frequency (MHz)	Data rate	Power Level Setting	
				Chain 0	Chain 1
802.11a	Lowest	5500	6Mbps	41	44
	Middle	5580	6Mbps	42	44
	Highest	5700	6Mbps	42	44
	Cross	5720	6Mbps	42	44
802.11n ht20	Lowest	5500	MCS8	40	40
	Middle	5580	MCS8	40	40
	Highest	5700	MCS8	40	40
	Cross	5720	MCS8	40	40
802.11n ht40	Lowest	5510	MCS8	38	38
	Middle	5550	MCS8	38	38
	Highest	5670	MCS8	38	38
	Cross	5710	MCS8	38	38
802.11ac vht20	Lowest	5500	MCS8	40	40
	Middle	5580	MCS8	40	40
	Highest	5700	MCS8	40	40
	Cross	5720	MCS8	40	40

Test Modes	Test Channels	Test Frequency (MHz)	Data rate	Power Level Setting	
				Chain 0	Chain 1
802.11ac vht40	Lowest	5510	MCS8	40	40
	Middle	5550	MCS8	40	40
	Highest	5670	MCS8	40	40
	Cross	5710	MCS8	40	40
802.11ac vht80	Lowest	5530	MCS8	38	38
	Highest	5610	MCS8	38	38
	Cross	5690	MCS8	38	38
Note: 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. The device supports SISO in all modes, and MIMO in all modes, per pretest, 2T2R mode was the worst mode and reported for those modes.					

1.2.2 Support Equipment List and Details

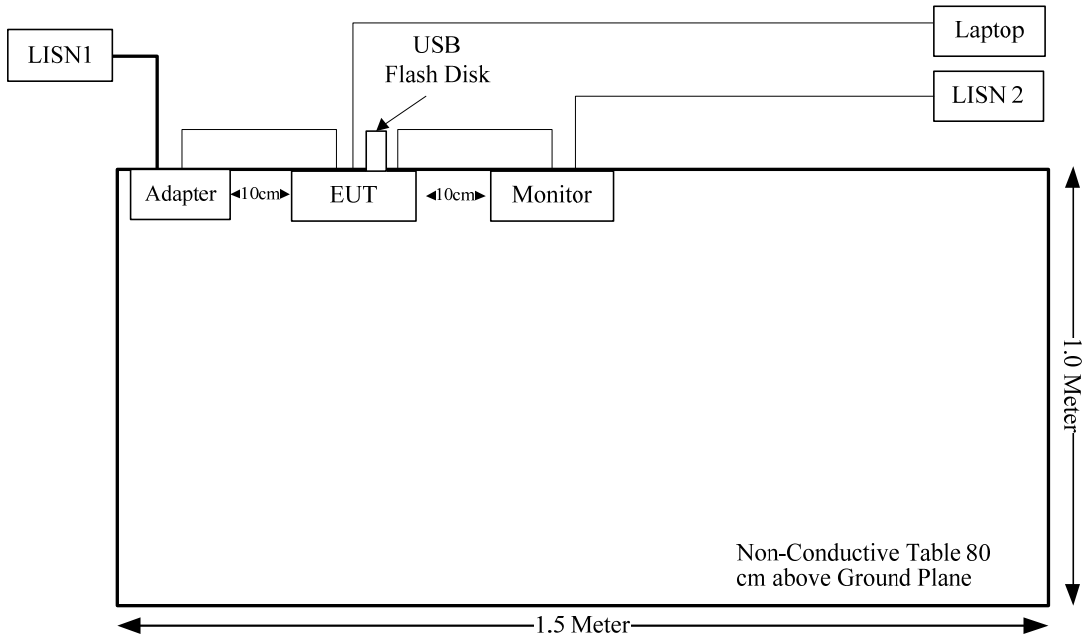
Manufacturer	Description	Model	Serial Number
Lenovo	Laptop	E450	PF-OMRADG
DELL	Monitor	P2721Q	CN-0XJ46C-FCC00-135-AA8L-A03

1.2.3 Support Cable List and Details

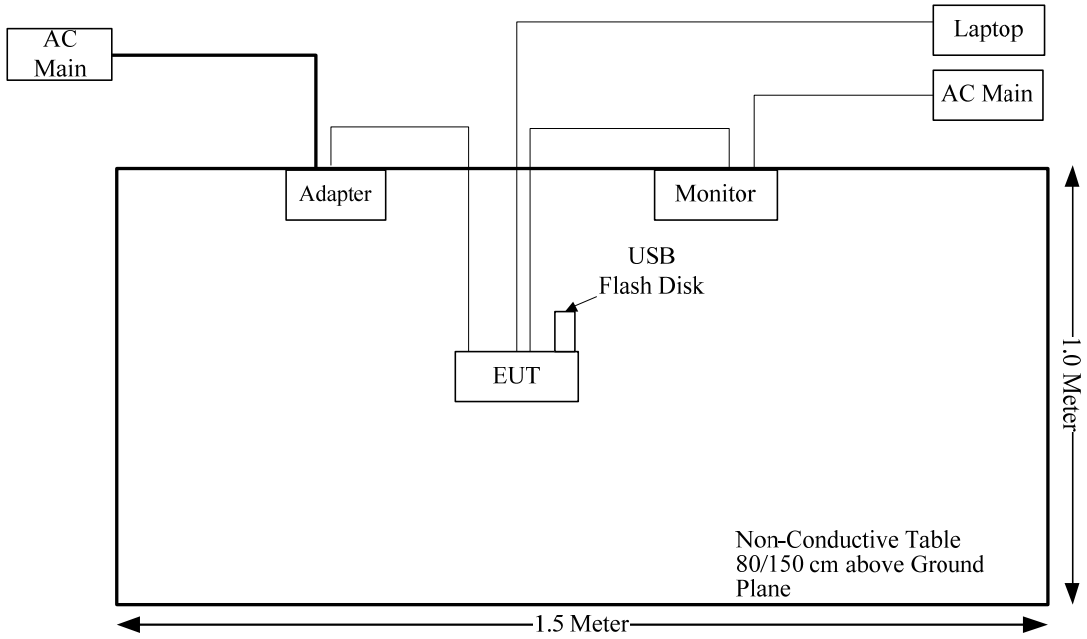
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
HDMI Cable	Yes	No	1	Monitor	EUT
RJ45 Cable	No	No	10	Laptop	EUT
DC Cable	Yes	No	0.8	Adapter	EUT

1.2.4 Block Diagram of Test Setup

AC line conducted emissions:



Spurious Emissions:



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
§1.1307 & §2.1091	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:

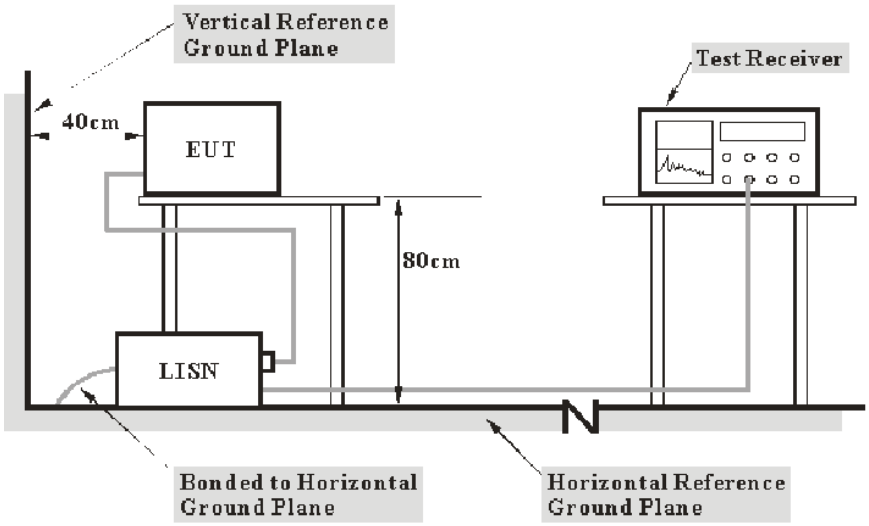
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(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

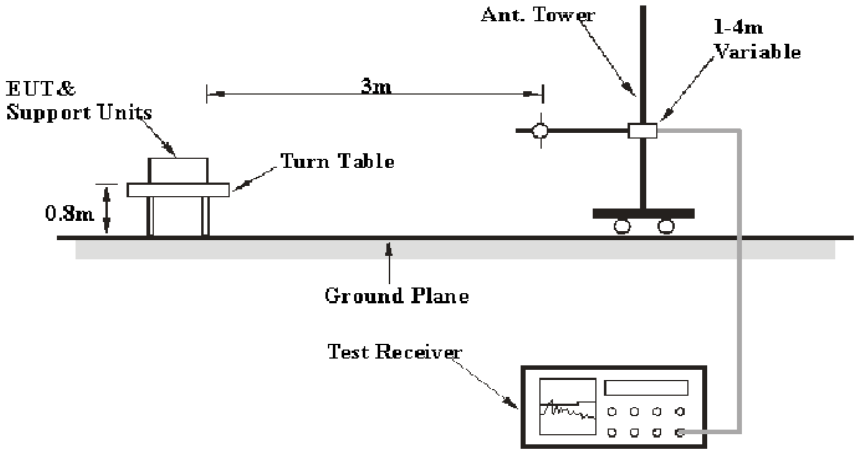
3.2.1 Applicable Standard

FCC §15.407 (b);

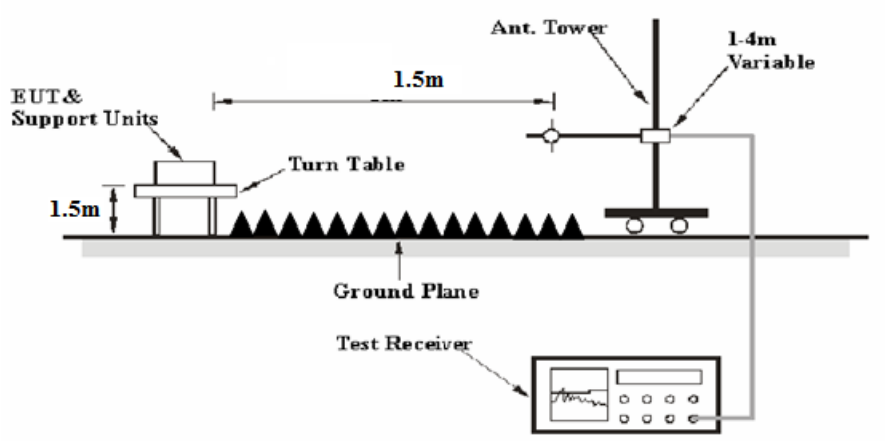
Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 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:

30MHz-1000MHz:

Measurement	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

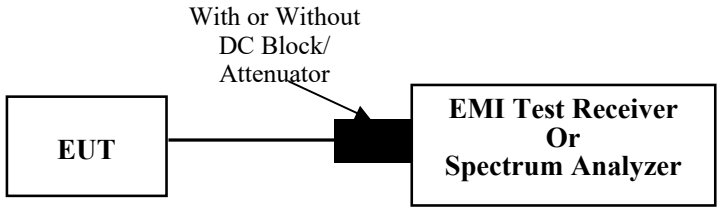
3.3 Emission Bandwidth:

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



3.3.3 Test 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:

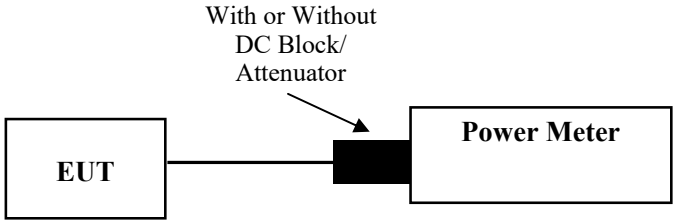
3.4.1 Applicable Standard

FCC §15.407(a) (1)(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) (2)
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. 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



3.4.3 Test 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:

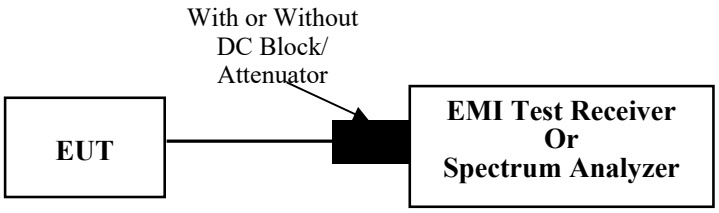
3.5.1 Applicable Standard

FCC §15.407(a) (1)(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) (2)
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. 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



3.5.3 Test Procedure

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

Duty cycle ≥98%

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method SA-1 **Alternative** should be applied.

Duty cycle <98%, duty cycle variations are less than ±2%

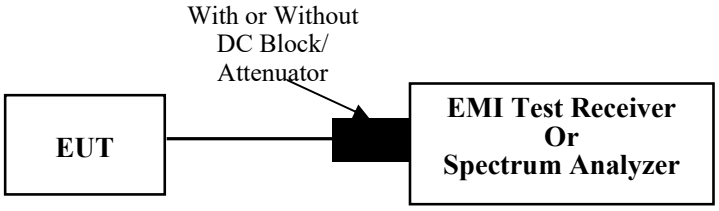
KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method SA-2 **Alternative** should be applied.

Duty cycle <98%, duty cycle variations exceed ±2%

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method SA-3 should be applied.

3.7 Duty Cycle:

3.7.1 EUT Setup



3.7.2 Test 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:	21GI-4	Test Date:	2023/03/14
Test Site:	CE	Test Mode:	Transmitting (802.11a 5500MHz 2Tx was the worst)
Tester:	Bob Yang	Test Result:	Pass

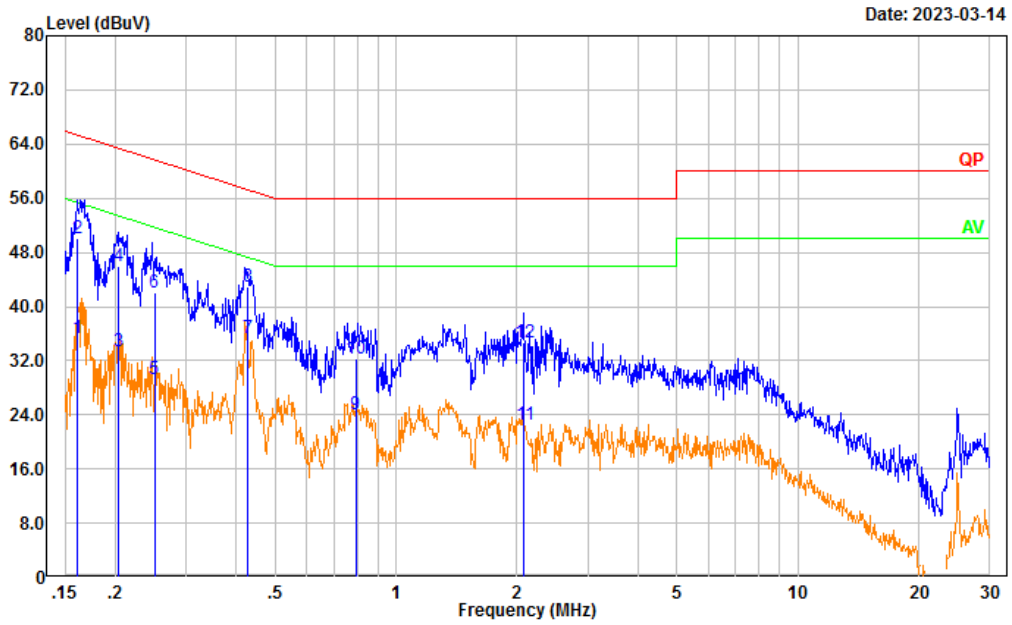
Environmental Conditions:					
Temperature: (℃)	24	Relative Humidity: (%)	46	ATM Pressure: (kPa)	101.7

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

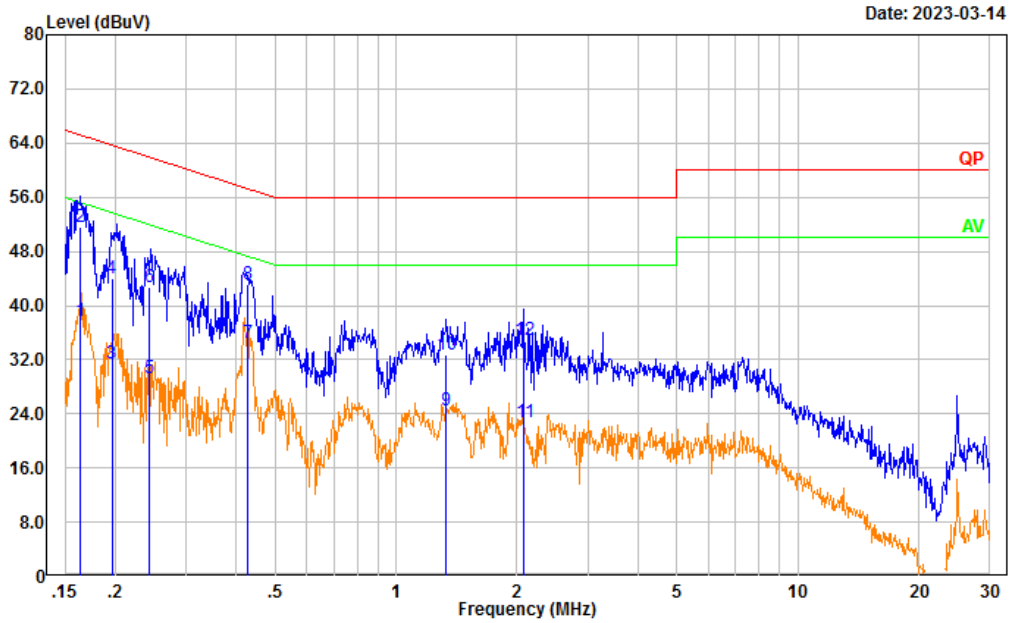
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Mode: Transmitting
Port: Line
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.161	25.72	9.61	35.33	55.43	20.10	Average
2	0.161	40.52	9.61	50.13	65.43	15.30	QP
3	0.204	23.72	9.61	33.33	53.46	20.13	Average
4	0.204	36.29	9.61	45.90	63.46	17.56	QP
5	0.250	19.71	9.61	29.32	51.74	22.42	Average
6	0.250	32.50	9.61	42.11	61.74	19.63	QP
7	0.429	25.74	9.61	35.35	47.28	11.93	Average
8	0.429	33.32	9.61	42.93	57.28	14.35	QP
9	0.793	14.52	9.62	24.14	46.00	21.86	Average
10	0.793	22.79	9.62	32.41	56.00	23.59	QP
11	2.081	13.00	9.63	22.63	46.00	23.37	Average
12	2.081	25.06	9.63	34.69	56.00	21.31	QP

Test Mode: Transmitting
Port: neutral
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.163	28.18	9.61	37.79	55.29	17.50	Average
2	0.163	41.91	9.61	51.52	65.29	13.77	QP
3	0.196	21.81	9.61	31.42	53.77	22.35	Average
4	0.196	34.34	9.61	43.95	63.77	19.82	QP
5	0.242	19.66	9.61	29.27	52.01	22.74	Average
6	0.242	33.04	9.61	42.65	62.01	19.36	QP
7	0.426	24.93	9.61	34.54	47.34	12.80	Average
8	0.426	33.54	9.61	43.15	57.34	14.19	QP
9	1.335	14.86	9.62	24.48	46.00	21.52	Average
10	1.335	23.01	9.62	32.63	56.00	23.37	QP
11	2.083	13.07	9.63	22.70	46.00	23.30	Average
12	2.083	25.24	9.63	34.87	56.00	21.13	QP

4.2 Radiation Spurious Emissions

Serial Number:	21GH-4	Test Date:	2023/03/27~2023/04/25
Test Site:	966-1/966-2	Test Mode:	Transmitting
Tester:	Vic Du, coco Tian	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	21.4~26.9	Relative Humidity: (%)	62~63	ATM Pressure: (kPa)	100.9~101.6

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
Quinstar	Preamplifier	QLW-18405536-JO	15964001005	2022/9/16	2023/9/15
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).*

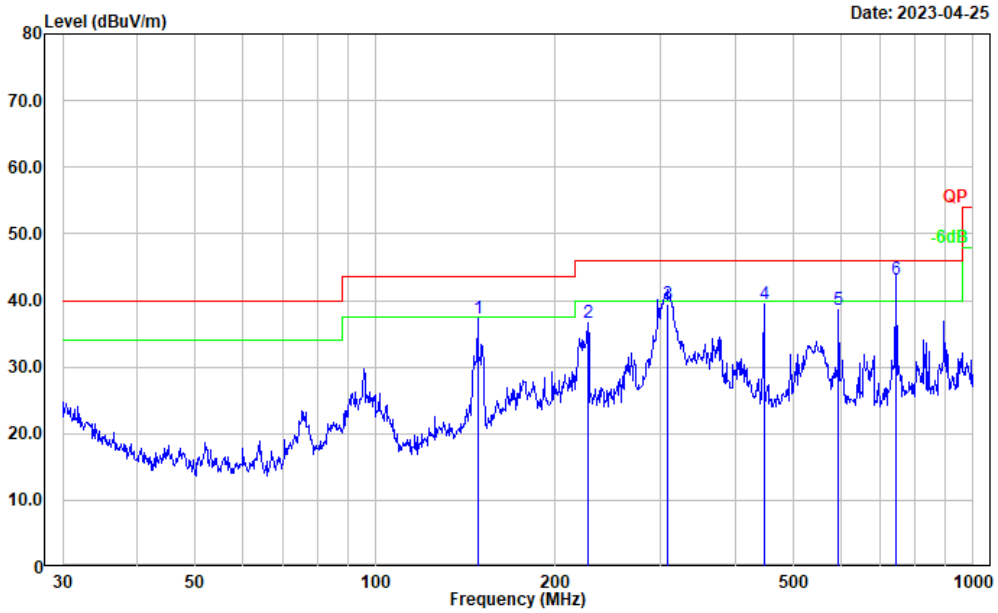
Test Data:

Please refer to the below table and plots.

Note: The device can be mounted in multiple orientations, test was performed with X,Y, Z Axis according to C63.10 Figure 8, the worst orientation was photographed and it`s data was recorded.

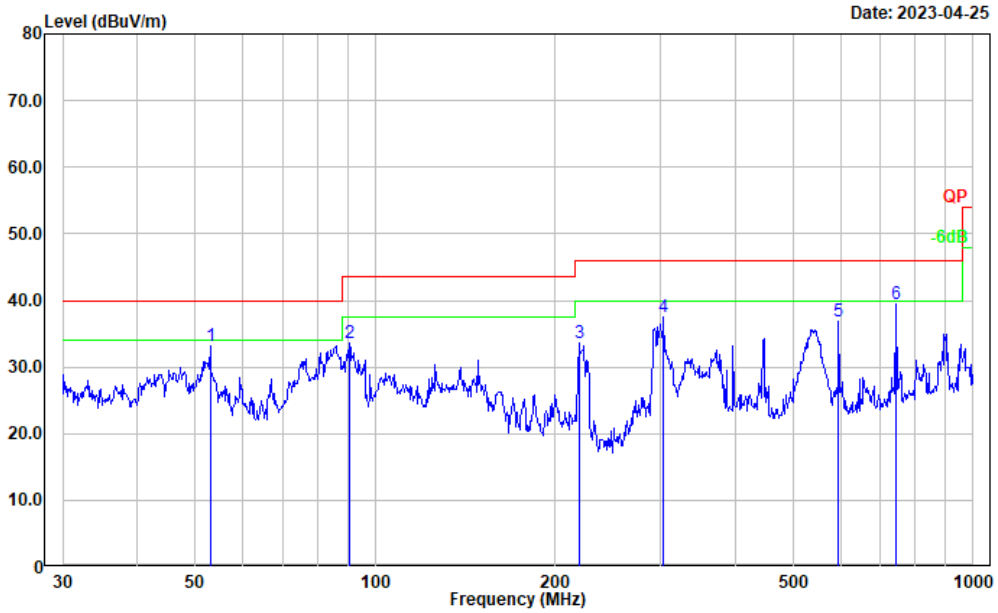
1) 30MHz-1GHz(802.11a 2Tx 5500MHz was the worst)

Test Mode: Transmitting
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	148.441	49.34	-12.00	37.34	43.50	6.16	Peak
2	226.894	49.57	-12.91	36.66	46.00	9.34	Peak
3	307.831	50.13	-10.59	39.54	46.00	6.46	QP
4	446.414	46.44	-7.08	39.36	46.00	6.64	Peak
5	595.133	43.78	-5.15	38.63	46.00	7.37	Peak
6	744.866	46.00	-2.91	43.09	46.00	2.91	QP

Test Mode: Transmitting
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	52.945	50.33	-17.23	33.10	40.00	6.90	Peak
2	90.537	50.30	-16.80	33.50	43.50	10.00	Peak
3	219.075	46.49	-12.78	33.71	46.00	12.29	Peak
4	303.544	48.07	-10.59	37.48	46.00	8.52	Peak
5	595.133	42.05	-5.15	36.90	46.00	9.10	Peak
6	744.866	42.34	-2.91	39.43	46.00	6.57	Peak

2) 1GHz-40GHz:
5250-5350MHz
802.11a(2Tx 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: 5260MHz							
5260.000	71.43	PK	H	38.90	104.31	N/A	N/A
5260.000	62.31	AV	H	38.90	95.19	N/A	N/A
5260.000	75.01	PK	V	38.90	107.89	N/A	N/A
5260.000	66.53	AV	V	38.90	99.41	N/A	N/A
5150.000	30.01	PK	V	38.64	62.63	74.00	11.37
5150.000	16.09	AV	V	38.64	48.71	54.00	5.29
10520.000	43.62	PK	V	18.93	56.53	68.20	11.67
15780.000	38.76	PK	V	22.26	55.00	74.00	19.00
15780.000	25.46	AV	V	22.26	41.70	54.00	12.30
Middle Channel: 5280 MHz							
5280.000	71.35	PK	H	38.91	104.24	N/A	N/A
5280.000	62.45	AV	H	38.91	95.34	N/A	N/A
5280.000	74.98	PK	V	38.91	107.87	N/A	N/A
5280.000	66.24	AV	V	38.91	99.13	N/A	N/A
10560.000	42.78	PK	V	19.20	55.96	68.20	12.24
15840.000	36.45	PK	V	22.34	52.77	74.00	21.23
15840.000	23.51	AV	V	22.34	39.83	54.00	14.17
High Channel: 5320 MHz							
5320.000	69.93	PK	H	38.97	102.88	N/A	N/A
5320.000	60.11	AV	H	38.97	93.06	N/A	N/A
5320.000	73.86	PK	V	38.97	106.81	N/A	N/A
5320.000	65.01	AV	V	38.97	97.96	N/A	N/A
5350.000	31.30	PK	V	39.03	64.31	74.00	9.69
5350.000	17.98	AV	V	39.03	50.99	54.00	3.01
10640.000	42.86	PK	V	19.50	56.34	74.00	17.66
10640.000	30.01	AV	V	19.50	43.49	54.00	10.51
15960.000	37.53	PK	V	22.22	53.73	74.00	20.27
15960.000	24.35	AV	V	22.22	40.55	54.00	13.45

802.11n ht20(2Tx 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: 5260MHz							
5260.000	70.39	PK	H	38.90	103.27	N/A	N/A
5260.000	61.77	AV	H	38.90	94.65	N/A	N/A
5260.000	75.65	PK	V	38.90	108.53	N/A	N/A
5260.000	67.04	AV	V	38.90	99.92	N/A	N/A
5150.000	30.24	PK	V	38.64	62.86	74.00	11.14
5150.000	16.82	AV	V	38.64	49.44	54.00	4.56
10520.000	39.76	PK	V	18.93	52.67	68.20	15.53
15780.000	43.15	PK	V	22.26	59.39	74.00	14.61
15780.000	30.64	AV	V	22.26	46.88	54.00	**7.12**
Middle Channel: 5280 MHz							
5280.000	70.34	PK	H	38.91	103.23	N/A	N/A
5280.000	61.53	AV	H	38.91	94.42	N/A	N/A
5280.000	75.43	PK	V	38.91	108.32	N/A	N/A
5280.000	66.98	AV	V	38.91	99.87	N/A	N/A
10560.000	41.35	PK	V	19.20	54.53	68.20	13.67
15840.000	36.42	PK	V	22.34	52.74	74.00	21.26
15840.000	23.42	AV	V	22.34	39.74	54.00	14.26
High Channel: 5320 MHz							
5320.000	69.24	PK	H	38.97	102.19	N/A	N/A
5320.000	60.43	AV	H	38.97	93.38	N/A	N/A
5320.000	73.74	PK	V	38.97	106.69	N/A	N/A
5320.000	64.49	AV	V	38.97	97.44	N/A	N/A
5350.000	31.81	PK	V	39.03	64.82	74.00	9.18
5350.000	18.20	AV	V	39.03	51.21	54.00	2.79
10640.000	40.31	PK	V	19.50	53.79	74.00	20.21
10640.000	27.44	AV	V	19.50	40.92	54.00	13.08
15960.000	36.47	PK	V	22.22	52.67	74.00	21.33
15960.000	23.51	AV	V	22.22	39.71	54.00	14.29

802.11ac vht20(2Tx 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: 5260MHz							
5260.000	70.82	PK	H	38.90	103.70	N/A	N/A
5260.000	60.84	AV	H	38.90	93.72	N/A	N/A
5260.000	77.97	PK	V	38.90	110.85	N/A	N/A
5260.000	67.94	AV	V	38.90	100.82	N/A	N/A
5150.000	29.68	PK	V	38.64	62.30	74.00	11.70
5150.000	16.80	AV	V	38.64	49.42	54.00	4.58
10520.000	39.76	PK	V	18.93	52.67	68.20	15.53
15780.000	35.73	PK	V	22.26	51.97	74.00	22.03
15780.000	22.48	AV	V	22.26	38.72	54.00	15.28
Middle Channel: 5280 MHz							
5280.000	70.42	PK	H	38.91	103.31	N/A	N/A
5280.000	60.16	AV	H	38.91	93.05	N/A	N/A
5280.000	77.69	PK	V	38.91	110.58	N/A	N/A
5280.000	67.57	AV	V	38.91	100.46	N/A	N/A
10560.000	40.06	PK	V	19.20	53.24	68.20	14.96
15840.000	36.15	PK	V	22.34	52.47	74.00	21.53
15840.000	23.07	AV	V	22.34	39.39	54.00	14.61
High Channel: 5320 MHz							
5320.000	69.59	PK	H	38.97	102.54	N/A	N/A
5320.000	59.52	AV	H	38.97	92.47	N/A	N/A
5320.000	76.67	PK	V	38.97	109.62	N/A	N/A
5320.000	66.62	AV	V	38.97	99.57	N/A	N/A
5350.000	31.45	PK	V	39.03	64.46	74.00	9.54
5350.000	18.73	AV	V	39.03	51.74	54.00	2.26
10640.000	38.79	PK	V	19.50	52.27	74.00	21.73
10640.000	25.91	AV	V	19.50	39.39	54.00	14.61
15960.000	35.49	PK	V	22.22	51.69	74.00	22.31
15960.000	22.58	AV	V	22.22	38.78	54.00	15.22

802.11n ht40(2Tx 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: 5270 MHz							
5270.000	69.48	PK	H	38.91	102.37	N/A	N/A
5270.000	58.78	AV	H	38.91	91.67	N/A	N/A
5270.000	73.01	PK	V	38.91	105.90	N/A	N/A
5270.000	62.78	AV	V	38.91	95.67	N/A	N/A
5150.000	30.08	PK	V	38.64	62.70	74.00	11.30
5150.000	16.76	AV	V	38.64	49.38	54.00	4.62
10540.000	36.75	PK	V	19.07	49.80	68.20	18.40
15810.000	36.45	PK	V	22.28	52.71	74.00	21.29
15810.000	23.42	AV	V	22.28	39.68	54.00	14.32
High Channel: 5310 MHz							
5310.000	65.75	PK	H	38.95	98.68	N/A	N/A
5310.000	54.64	AV	H	38.95	87.57	N/A	N/A
5310.000	69.47	PK	V	38.95	102.40	N/A	N/A
5310.000	58.75	AV	V	38.95	91.68	N/A	N/A
5350.000	32.73	PK	V	39.03	65.74	74.00	8.26
5350.000	19.78	AV	V	39.03	52.79	54.00	1.21
10620.000	38.46	PK	V	19.49	51.93	74.00	22.07
10620.000	25.53	AV	V	19.49	39.00	54.00	15.00
15930.000	35.61	PK	V	22.33	51.92	74.00	22.08
15930.000	22.57	AV	V	22.33	38.88	54.00	15.12

802.11ac vht40(2Tx 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: 5270 MHz							
5270.000	70.71	PK	H	38.91	103.60	N/A	N/A
5270.000	59.28	AV	H	38.91	92.17	N/A	N/A
5270.000	77.81	PK	V	38.91	110.70	N/A	N/A
5270.000	66.48	AV	V	38.91	99.37	N/A	N/A
5150.000	29.58	PK	V	38.64	62.20	74.00	11.80
5150.000	16.84	AV	V	38.64	49.46	54.00	4.54
10540.000	39.42	PK	V	19.07	52.47	68.20	15.73
15810.000	26.43	PK	V	22.28	42.69	74.00	31.31
15810.000	23.77	AV	V	22.28	40.03	54.00	13.97
High Channel: 5310 MHz							
5310.000	65.73	PK	H	38.95	98.66	N/A	N/A
5310.000	54.84	AV	H	38.95	87.77	N/A	N/A
5310.000	71.60	PK	V	38.95	104.53	N/A	N/A
5310.000	60.22	AV	V	38.95	93.15	N/A	N/A
5350.000	33.46	PK	V	39.03	66.47	74.00	7.53
5350.000	20.00	AV	V	39.03	53.01	54.00	0.99
10620.000	38.64	PK	V	19.49	52.11	74.00	21.89
10620.000	25.34	AV	V	19.49	38.81	54.00	15.19
15930.000	35.42	PK	V	22.33	51.73	74.00	22.27
15930.000	22.53	AV	V	22.33	38.84	54.00	15.16

802.11ac vht80(2Tx was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
5290.000	58.46	PK	H	38.92	91.36	N/A	N/A
5290.000	48.57	AV	H	38.92	81.47	N/A	N/A
5290.000	64.25	PK	V	38.92	97.15	N/A	N/A
5290.000	54.12	AV	V	38.92	87.02	N/A	N/A
5150.000	29.78	PK	V	38.64	62.40	74.00	11.60
5150.000	16.45	AV	V	38.64	49.07	54.00	4.93
5350.000	33.31	PK	V	39.03	66.32	74.00	7.68
5350.000	20.00	AV	V	39.03	53.01	54.00	0.99
10580.000	39.76	PK	V	19.34	53.08	68.20	15.12
15870.000	35.47	PK	V	22.39	51.84	74.00	22.16
15870.000	22.46	AV	V	22.39	38.83	54.00	15.17

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

5470-5725MHz:
802.11a(2Tx 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: 5500MHz							
5500.000	70.42	PK	H	39.32	103.72	N/A	N/A
5500.000	62.34	AV	H	39.32	95.64	N/A	N/A
5500.000	74.84	PK	V	39.32	108.14	N/A	N/A
5500.000	66.32	AV	V	39.32	99.62	N/A	N/A
5470.000	33.56	PK	V	39.27	66.81	68.20	1.39
11000.000	34.62	PK	V	19.83	48.43	74.00	25.57
11000.000	21.75	AV	V	19.83	35.56	54.00	18.44
16500.000	33.67	PK	V	22.73	50.38	68.20	17.82
Middle Channel: 5580 MHz							
5580.000	70.03	PK	H	39.43	103.44	N/A	N/A
5580.000	61.98	AV	H	39.43	95.39	N/A	N/A
5580.000	73.76	PK	V	39.43	107.17	N/A	N/A
5580.000	64.95	AV	V	39.43	98.36	N/A	N/A
11160.000	34.36	PK	V	19.97	48.31	74.00	25.69
11160.000	21.41	AV	V	19.97	35.36	54.00	18.64
16740.000	33.48	PK	V	23.68	51.14	68.20	17.06
High Channel: 5700 MHz							
5700.000	69.57	PK	H	39.51	103.06	N/A	N/A
5700.000	61.75	AV	H	39.51	95.24	N/A	N/A
5700.000	73.38	PK	V	39.51	106.87	N/A	N/A
5700.000	64.88	AV	V	39.51	98.37	N/A	N/A
5725.000	33.19	PK	V	39.48	66.65	122.20	55.55
11400.000	34.16	PK	V	20.93	49.07	74.00	24.93
11400.000	21.32	AV	V	20.93	36.23	54.00	17.77
17100.000	33.65	PK	V	26.19	53.82	68.20	14.38

802.11n ht20(2Tx 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: 5500MHz							
5500.000	69.45	PK	H	39.32	102.75	N/A	N/A
5500.000	58.64	AV	H	39.32	91.94	N/A	N/A
5500.000	74.52	PK	V	39.32	107.82	N/A	N/A
5500.000	64.81	AV	V	39.32	98.11	N/A	N/A
5470.000	31.47	PK	V	39.27	64.72	68.20	3.48
11000.000	33.42	PK	V	19.83	47.23	74.00	26.77
11000.000	20.51	AV	V	19.83	34.32	54.00	19.68
16500.000	33.48	PK	V	22.73	50.19	68.20	18.01
Middle Channel: 5580 MHz							
5580.000	69.61	PK	H	39.43	103.02	N/A	N/A
5580.000	58.35	AV	H	39.43	91.76	N/A	N/A
5580.000	74.44	PK	V	39.43	107.85	N/A	N/A
5580.000	64.23	AV	V	39.43	97.64	N/A	N/A
11160.000	33.06	PK	V	19.97	47.01	74.00	26.99
11160.000	20.35	AV	V	19.97	34.30	54.00	19.70
16740.000	33.19	PK	V	23.68	50.85	68.20	17.35
High Channel: 5700 MHz							
5700.000	69.76	PK	H	39.51	103.25	N/A	N/A
5700.000	58.69	AV	H	39.51	92.18	N/A	N/A
5700.000	74.92	PK	V	39.51	108.41	N/A	N/A
5700.000	63.93	AV	V	39.51	97.42	N/A	N/A
5725.000	31.81	PK	V	39.48	65.27	68.20	2.93
11400.000	32.75	PK	V	20.93	47.66	74.00	26.34
11400.000	19.64	AV	V	20.93	34.55	54.00	19.45
17100.000	33.49	PK	V	26.19	53.66	68.20	14.54

802.11ac vht20(2Tx 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: 5500MHz							
5500.000	68.47	PK	H	39.32	101.77	N/A	N/A
5500.000	58.73	AV	H	39.32	92.03	N/A	N/A
5500.000	75.28	PK	V	39.32	108.58	N/A	N/A
5500.000	65.14	AV	V	39.32	98.44	N/A	N/A
5470.000	32.54	PK	V	39.27	65.79	68.20	2.41
11000.000	32.46	PK	V	19.83	46.27	74.00	27.73
11000.000	19.35	AV	V	19.83	33.16	54.00	20.84
16500.000	33.77	PK	V	22.73	50.48	68.20	17.72
Middle Channel: 5580 MHz							
5580.000	67.62	PK	H	39.43	101.03	N/A	N/A
5580.000	57.43	AV	H	39.43	90.84	N/A	N/A
5580.000	73.59	PK	V	39.43	107.00	N/A	N/A
5580.000	63.46	AV	V	39.43	96.87	N/A	N/A
11160.000	32.65	PK	V	19.97	46.60	74.00	27.40
11160.000	19.24	AV	V	19.97	33.19	54.00	20.81
16740.000	33.28	PK	V	23.68	50.94	68.20	17.26
High Channel: 5700 MHz							
5700.000	66.43	PK	H	39.51	99.92	N/A	N/A
5700.000	56.64	AV	H	39.51	90.13	N/A	N/A
5700.000	72.70	PK	V	39.51	106.19	N/A	N/A
5700.000	62.67	AV	V	39.51	96.16	N/A	N/A
5725.000	31.15	PK	V	39.48	64.61	68.20	3.59
11400.000	32.46	PK	V	20.93	47.37	74.00	26.63
11400.000	18.97	AV	V	20.93	33.88	54.00	20.12
17100.000	33.76	PK	V	26.19	53.93	68.20	14.27

802.11n ht40(2Tx 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: 5510 MHz							
5510.000	66.42	PK	H	39.35	99.75	N/A	N/A
5510.000	56.64	AV	H	39.35	89.97	N/A	N/A
5510.000	70.76	PK	V	39.35	104.09	N/A	N/A
5510.000	60.38	AV	V	39.35	93.71	N/A	N/A
5470.000	33.78	PK	V	39.27	67.03	68.20	1.17
11020.000	32.13	PK	V	19.85	45.96	74.00	28.04
11020.000	18.99	AV	V	19.85	32.82	54.00	21.18
16530.000	33.49	PK	V	23.02	50.49	68.20	17.71
Middle Channel: 5550 MHz							
5550.000	68.25	PK	H	39.46	101.69	N/A	N/A
5550.000	58.04	AV	H	39.46	91.48	N/A	N/A
5550.000	71.99	PK	V	39.46	105.43	N/A	N/A
5550.000	61.74	AV	V	39.46	95.18	N/A	N/A
11100.000	32.01	PK	V	19.95	45.94	74.00	28.06
11100.000	18.79	AV	V	19.95	32.72	54.00	21.28
16650.000	33.57	PK	V	23.65	51.20	68.20	17.00
High Channel: 5670 MHz							
5670.000	68.55	PK	H	39.50	102.03	N/A	N/A
5670.000	58.37	AV	H	39.50	91.85	N/A	N/A
5670.000	72.33	PK	V	39.50	105.81	N/A	N/A
5670.000	62.08	AV	V	39.50	95.56	N/A	N/A
5725.000	31.40	PK	V	39.48	64.86	68.20	3.34
11340.000	31.46	PK	V	20.77	46.21	74.00	27.79
11340.000	18.35	AV	V	20.77	33.10	54.00	20.90
17010.000	33.46	PK	V	25.56	53.00	68.20	15.20

802.11ac vht40(2Tx was the worst):

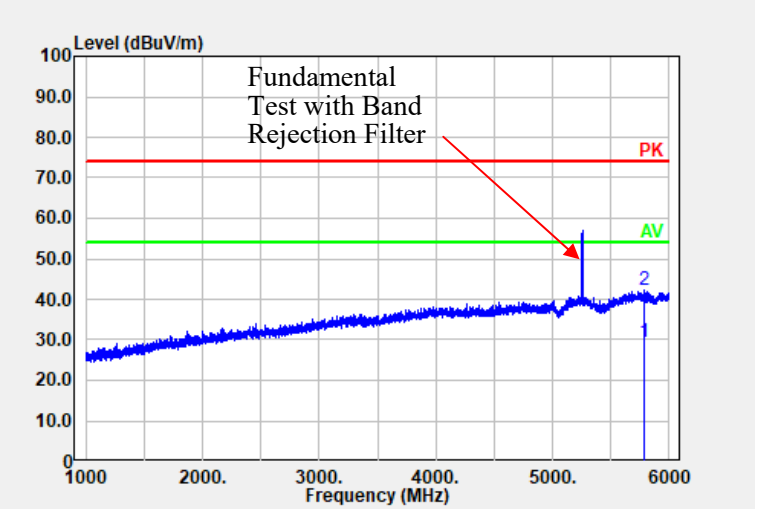
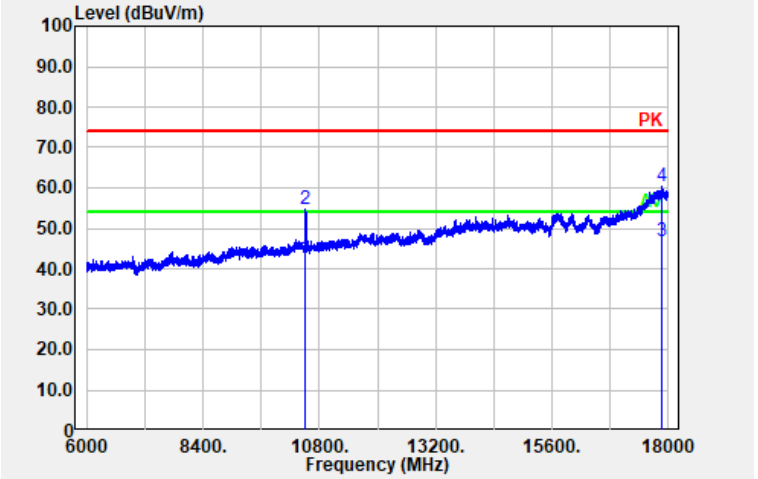
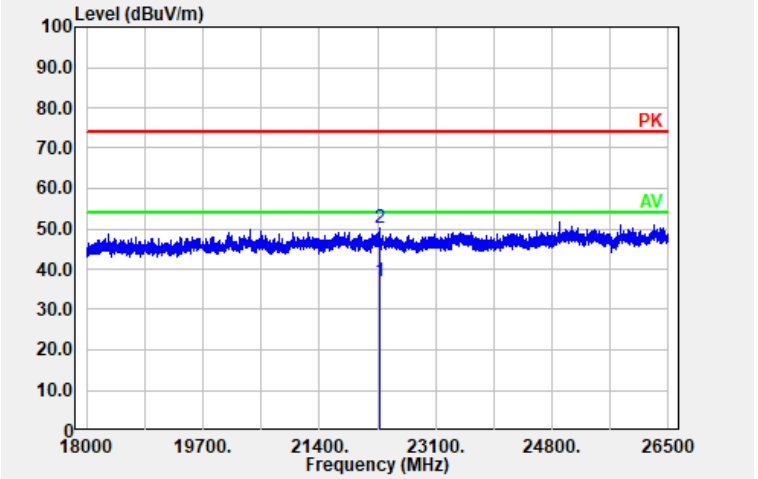
Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5510 MHz							
5510.000	63.76	PK	H	39.35	97.09	N/A	N/A
5510.000	53.99	AV	H	39.35	87.32	N/A	N/A
5510.000	70.88	PK	V	39.35	104.21	N/A	N/A
5510.000	59.43	AV	V	39.35	92.76	N/A	N/A
5470.000	32.16	PK	V	39.27	65.41	68.20	2.79
11020.000	31.20	PK	V	19.85	45.03	74.00	28.97
11020.000	18.34	AV	V	19.85	32.17	54.00	21.83
16530.000	33.51	PK	V	23.02	50.51	68.20	17.69
Middle Channel: 5550 MHz							
5550.000	64.16	PK	H	39.46	97.60	N/A	N/A
5550.000	54.36	AV	H	39.46	87.80	N/A	N/A
5550.000	71.27	PK	V	39.46	104.71	N/A	N/A
5550.000	59.80	AV	V	39.46	93.24	N/A	N/A
11100.000	31.25	PK	V	19.95	45.18	74.00	28.82
11100.000	18.23	AV	V	19.95	32.16	54.00	21.84
16650.000	33.47	PK	V	23.65	51.10	68.20	17.10
High Channel: 5670 MHz							
5670.000	65.88	PK	H	39.50	99.36	N/A	N/A
5670.000	55.79	AV	H	39.50	89.27	N/A	N/A
5670.000	73.77	PK	V	39.50	107.25	N/A	N/A
5670.000	63.59	AV	V	39.50	97.07	N/A	N/A
5725.000	30.83	PK	V	39.48	64.29	68.20	3.91
11340.000	30.46	PK	V	20.77	45.21	74.00	28.79
11340.000	17.84	AV	V	20.77	32.59	54.00	21.41
17010.000	33.82	PK	V	25.56	53.36	68.20	14.84

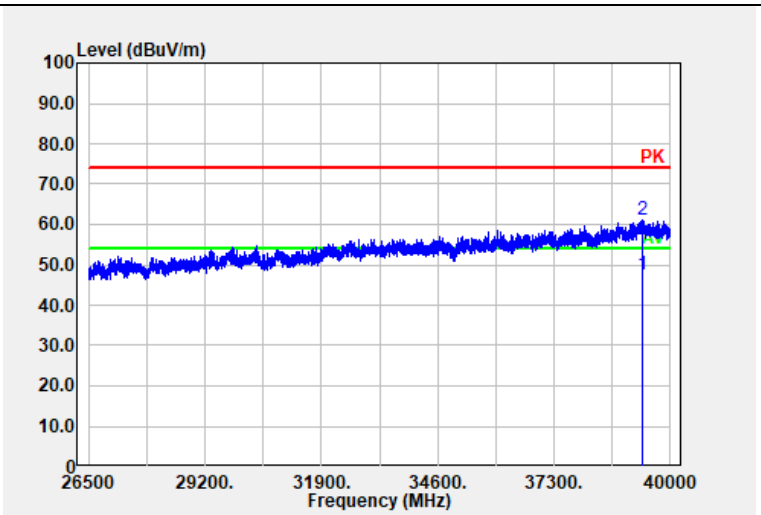
802.11ac vht80(2Tx was the worst):

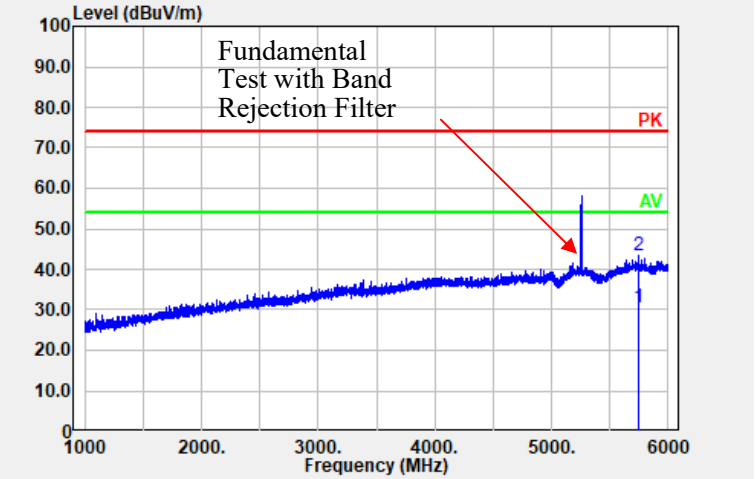
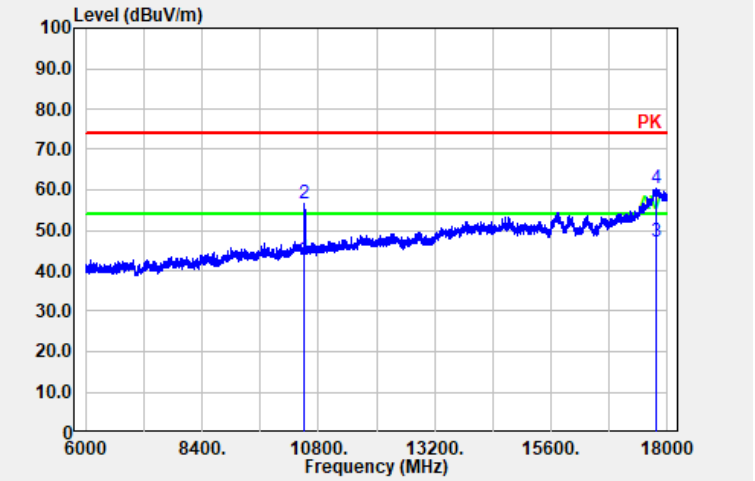
Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5530 MHz							
5530.000	64.48	PK	H	39.40	97.86	N/A	N/A
5530.000	54.18	AV	H	39.40	87.56	N/A	N/A
5530.000	71.54	PK	V	39.40	104.92	N/A	N/A
5530.000	61.04	AV	V	39.40	94.42	N/A	N/A
5470.000	30.35	PK	V	39.27	63.60	68.20	4.60
11060.000	31.20	PK	V	19.90	45.08	74.00	28.92
11060.000	18.34	AV	V	19.90	32.22	54.00	21.78
16590.000	33.41	PK	V	23.59	50.98	68.20	17.22
High Channel: 5610 MHz							
5610.000	61.35	PK	H	39.43	94.76	N/A	N/A
5610.000	51.43	AV	H	39.43	84.84	N/A	N/A
5610.000	68.93	PK	V	39.43	102.34	N/A	N/A
5610.000	58.74	AV	V	39.43	92.15	N/A	N/A
5725.000	30.73	PK	V	39.48	64.19	68.20	4.01
11220.000	30.42	PK	V	20.13	44.53	74.00	29.47
11220.000	17.64	AV	V	20.13	31.75	54.00	22.25
16830.000	33.84	PK	V	24.13	51.95	68.20	16.25

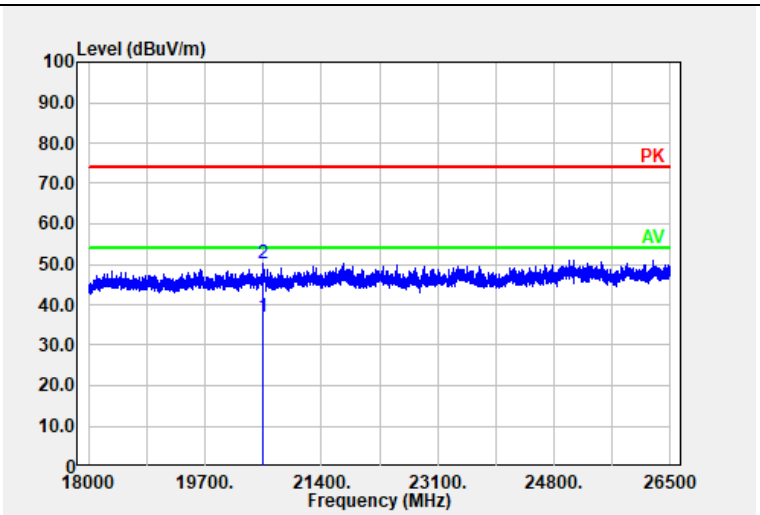
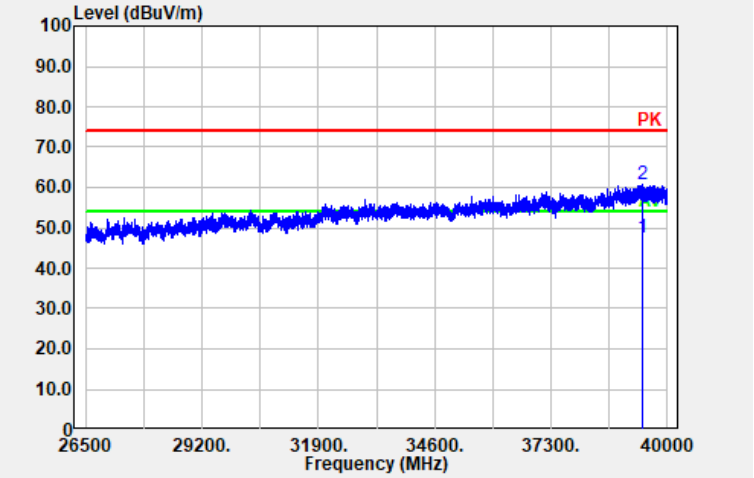
Note:
Result = Reading + Factor- Distance extrapolation Factor
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB

Worst Test plots(802.11n ht20 5260 MHz was the worst)

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

26.5-40GHz	

Vertical	
1-6GHz	
6-18GHz	

18-26.5GHz	
26.5-40GHz	

4.3 Emission Bandwidth:

Serial Number:	21GI-4	Test Date:	2023/04/14~2023/04/15
Test Site:	RF	Test Mode:	Transmitting
Tester:	panda.Sun	Test Result:	pass

Environmental Conditions:					
Temperature: (℃)	25.1~27	Relative Humidity: (%)	61~66	ATM Pressure: (kPa)	100.2~100.5

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	100147	2023/03/31	2024/03/30
zhuoxiang	Coaxial Cable	SMA-178	211001	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:

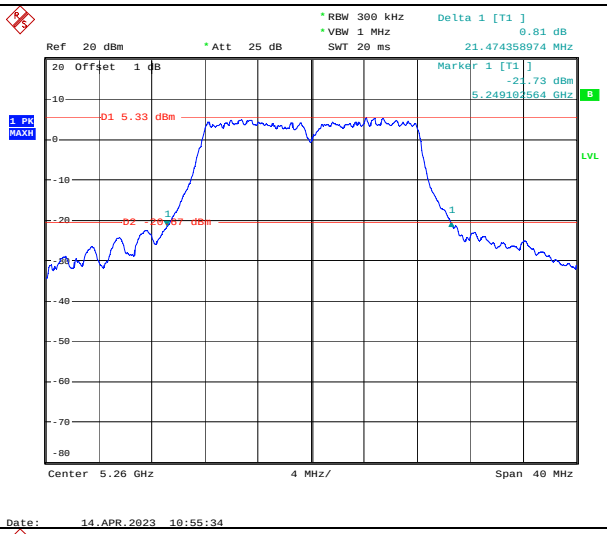
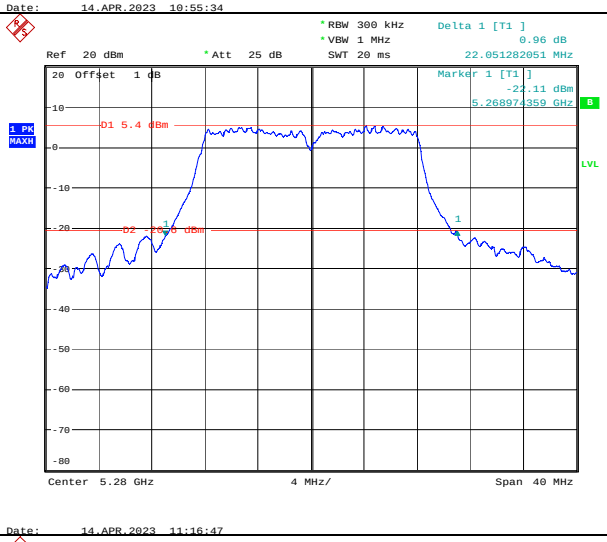
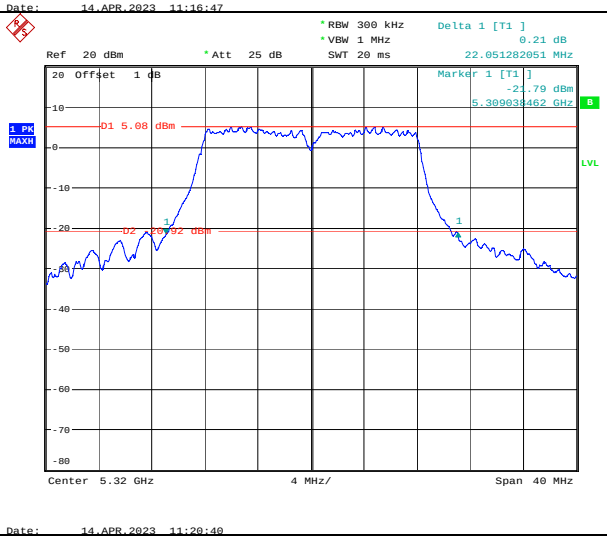
5250-5350 MHz:

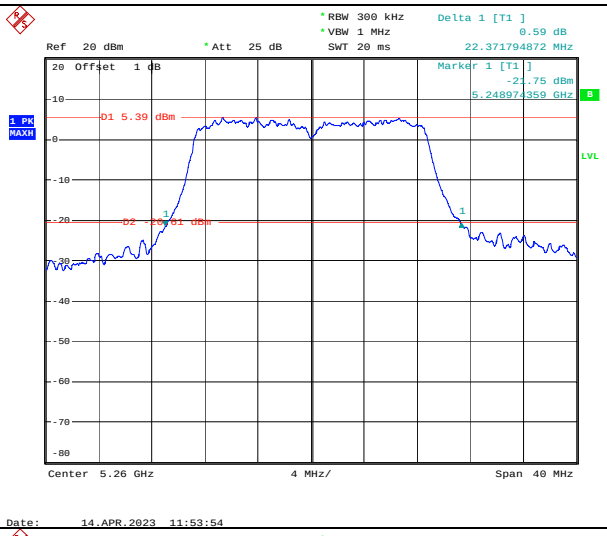
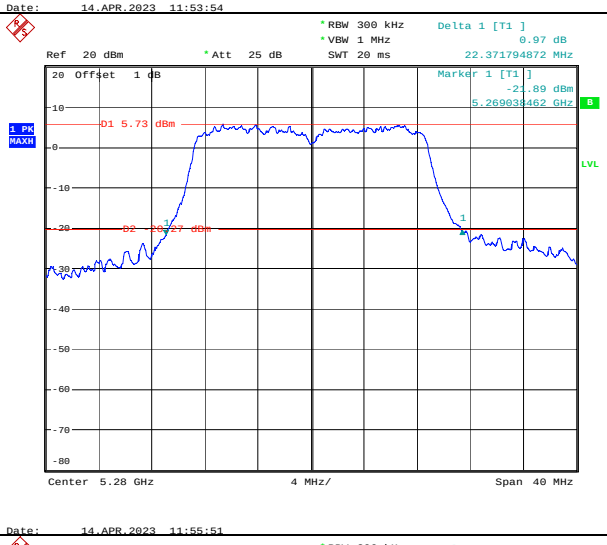
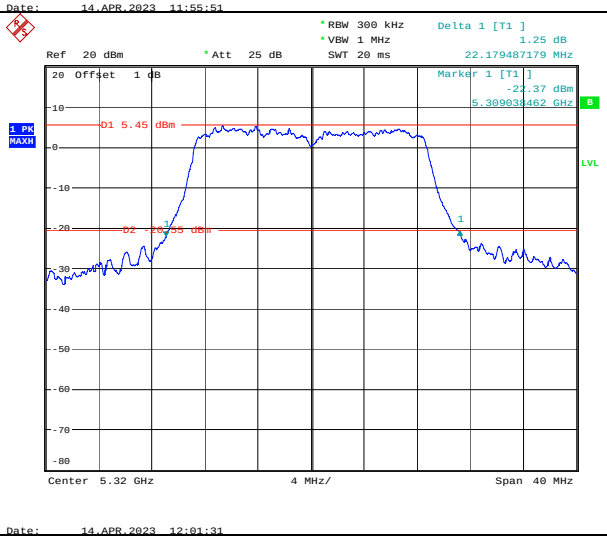
Test Modes	Test Frequency (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5260	21.47	16.923
	5280	22.05	16.987
	5320	22.05	16.987
802.11n ht20	5260	22.37	17.949
	5280	22.37	17.949
	5320	22.18	17.885
802.11n ht40	5270	42.95	37.051
	5310	43.08	36.923
802.11ac vht20	5260	22.12	17.949
	5280	22.12	17.885
	5320	22.05	17.949
802.11ac vht40	5270	43.08	36.667
	5310	41.79	36.538
802.11ac vht80	5290	83.85	76.154
Note: Test only was performed at Chain 0.			

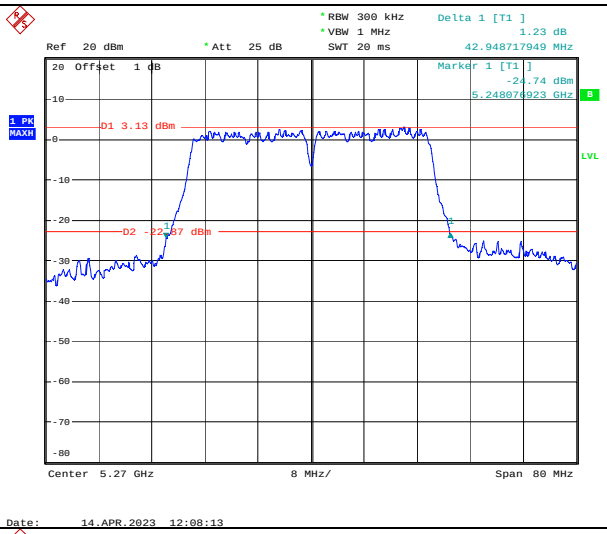
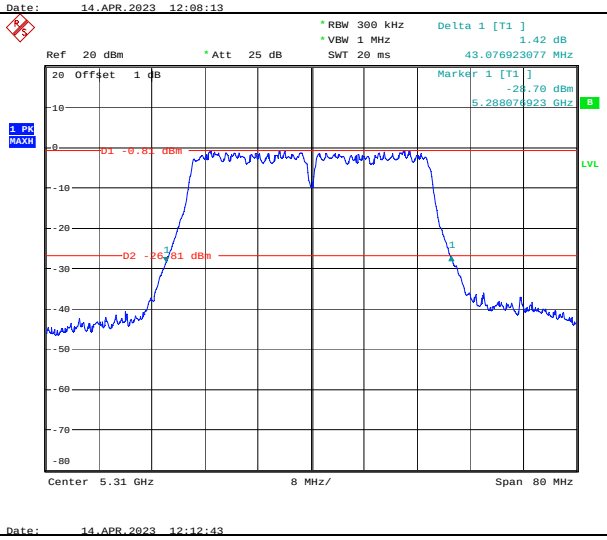
5470-5725MHz:

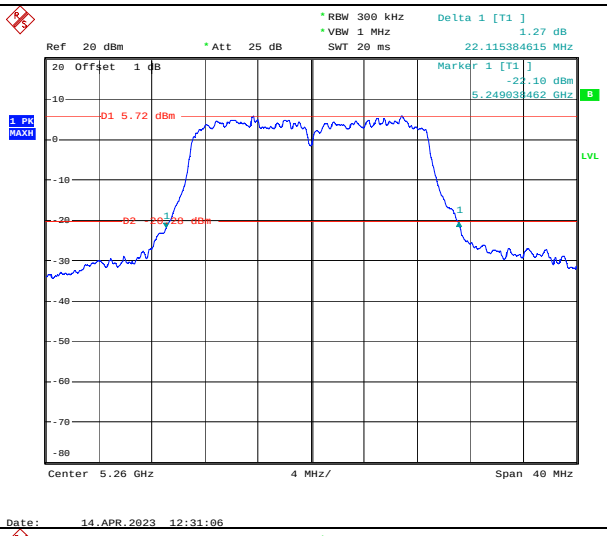
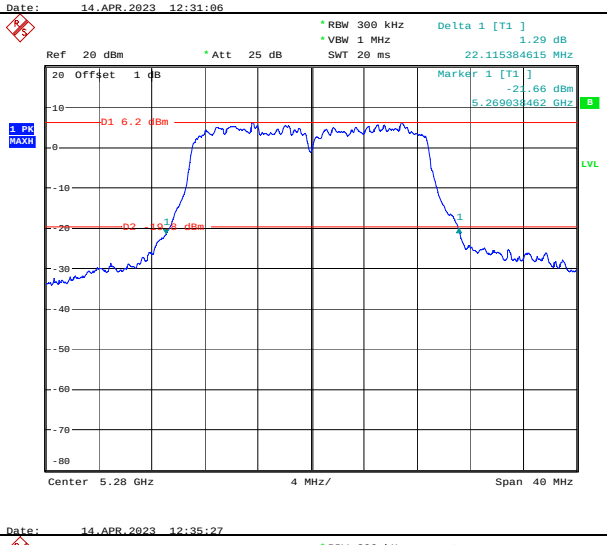
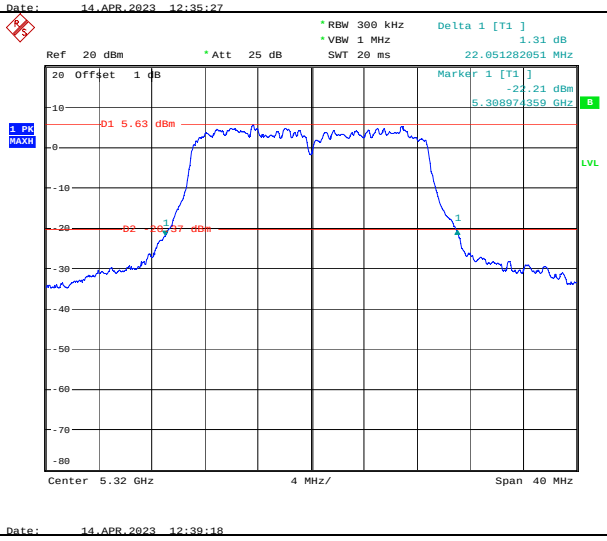
Test Modes	Test Frequency(MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5500	31.74	17.179
	5580	21.63	16.987
	5700	25.58	17.115
	5720	25.38	17.05
802.11n ht20	5500	23.94	17.949
	5580	21.92	17.885
	5700	21.92	17.885
	5720	21.83	17.88
802.11n ht40	5510	43.11	37.051
	5550	43.27	36.923
	5670	42.63	36.923
	5710	42.79	37.05
802.11ac vht20	5500	22.02	17.949
	5580	21.93	17.885
	5700	21.83	17.885
	5720	21.83	17.95
802.11ac vht40	5510	41.67	36.667
	5550	41.83	36.667
	5670	41.51	36.538
	5710	41.83	36.54
802.11ac vht80	5530	83.65	75.897
	5610	84.29	76.15
	5690	83.97	76.15
Note: Test only was performed at Chain 0.			

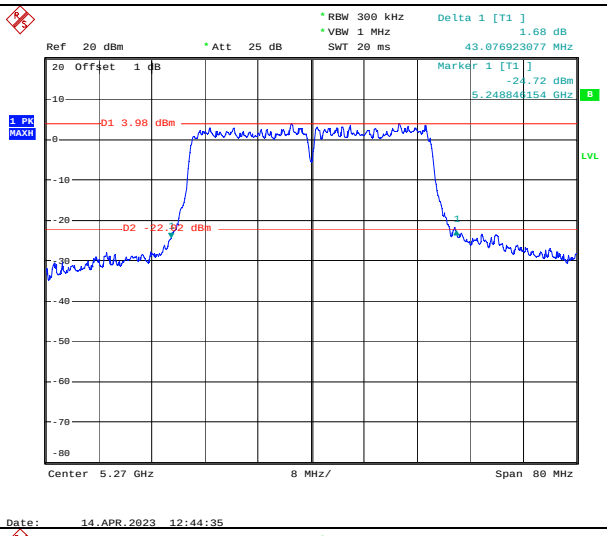
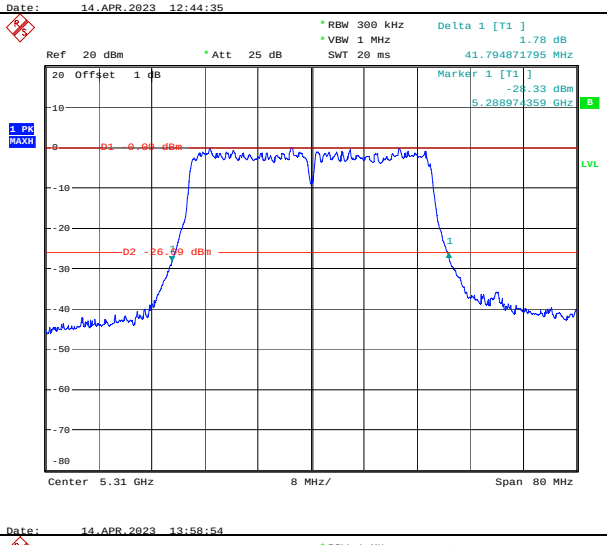
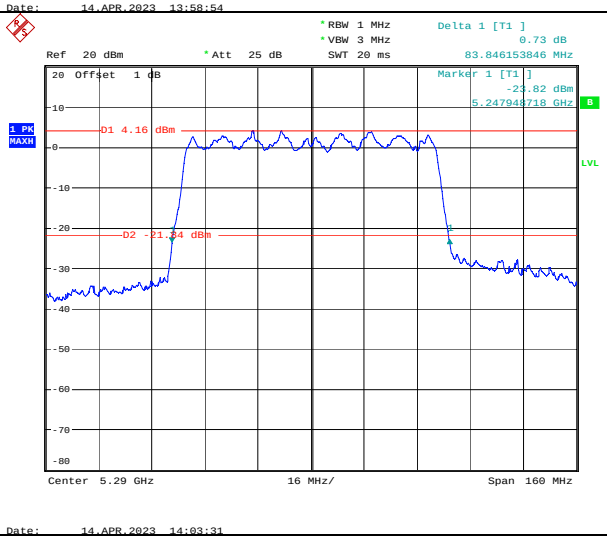
5250-5350MHz:

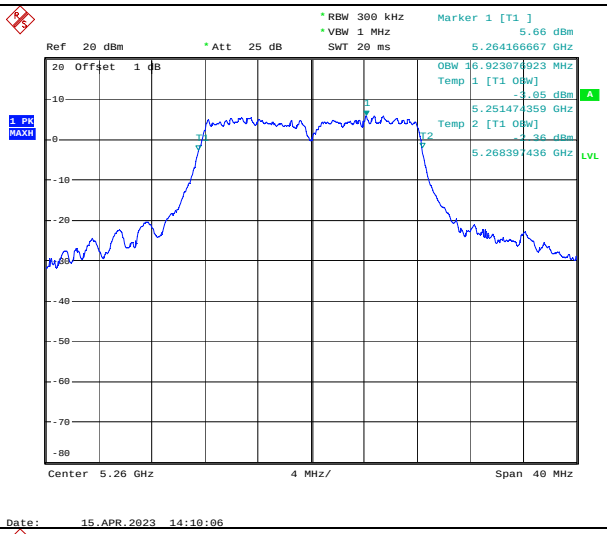
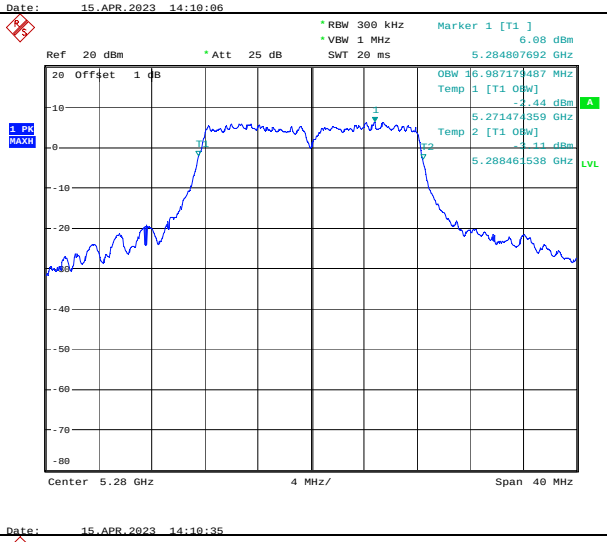
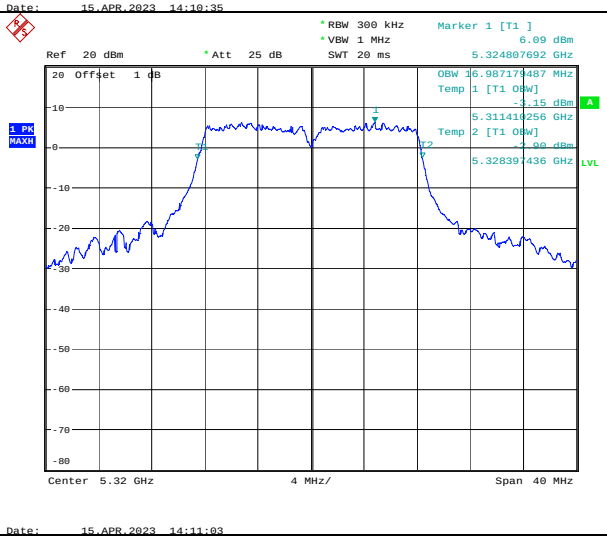
26dB Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

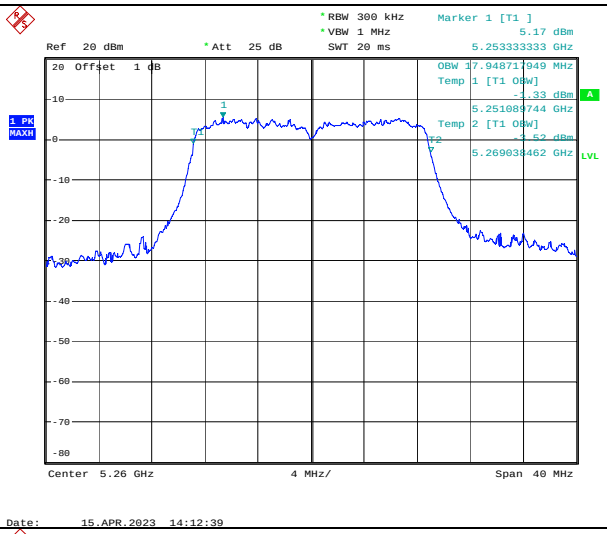
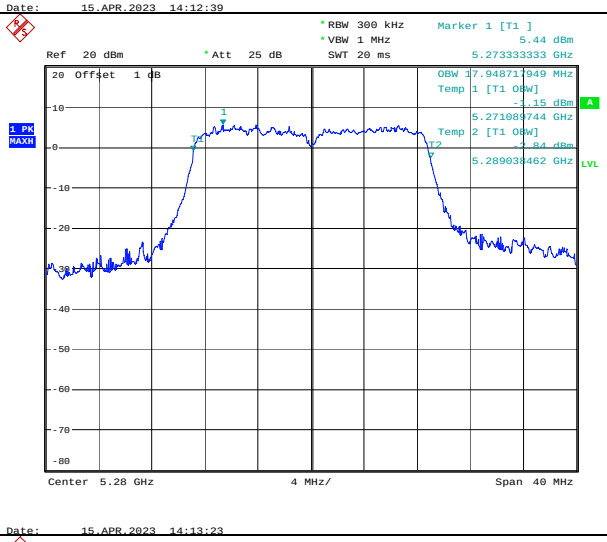
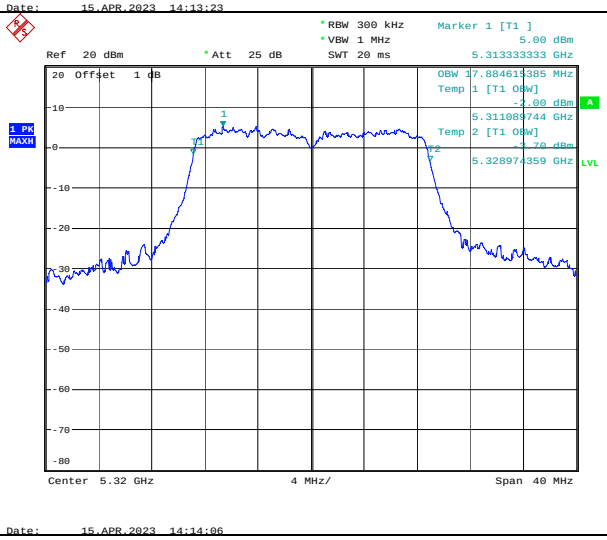
26dB Emission Bandwidth	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

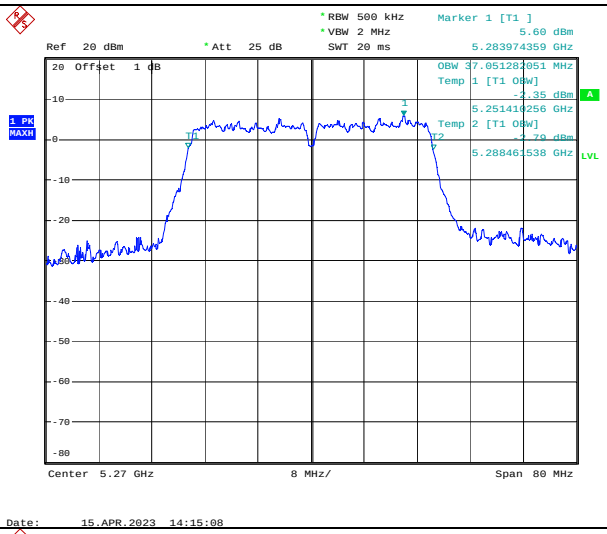
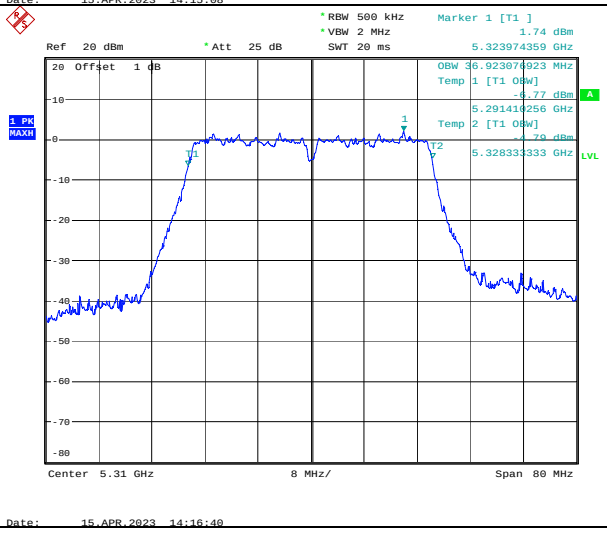
26dB Emission Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

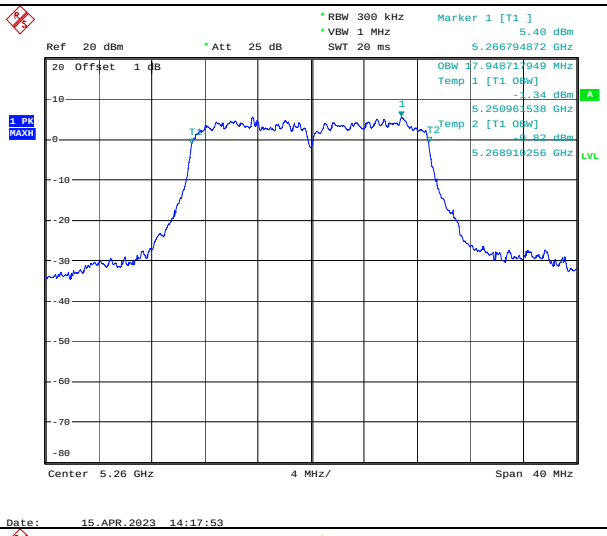
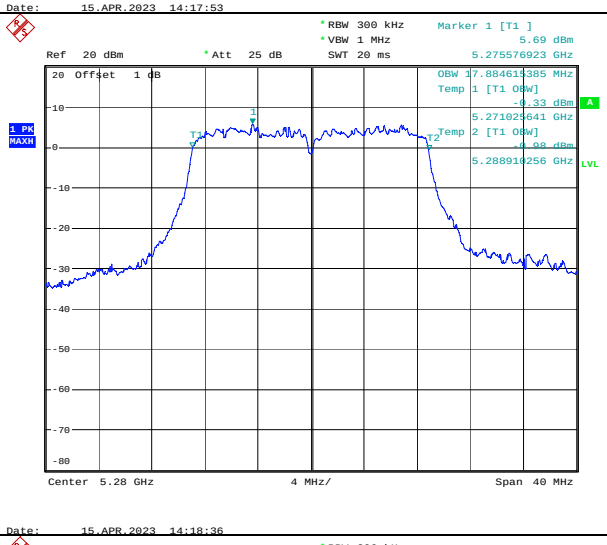
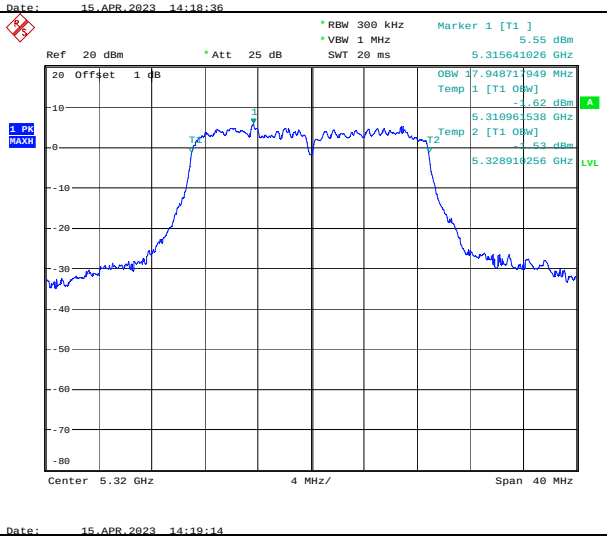
26dB Emission Bandwidth	
802.11ac ht20 Lowest Channel	
802.11ac ht20 Middle Channel	
802.11ac ht20 Highest Channel	

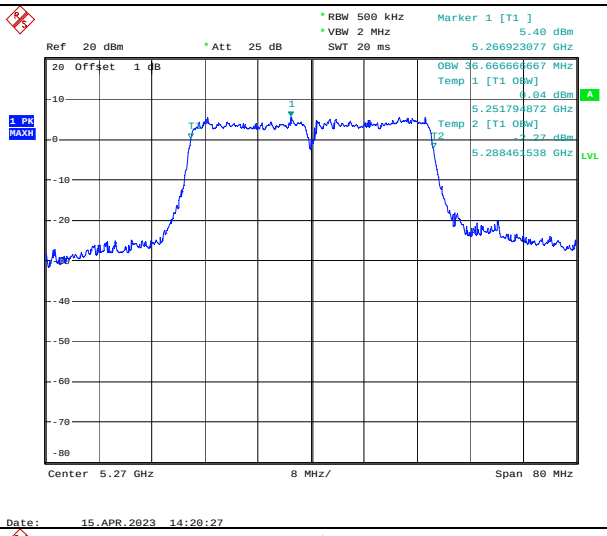
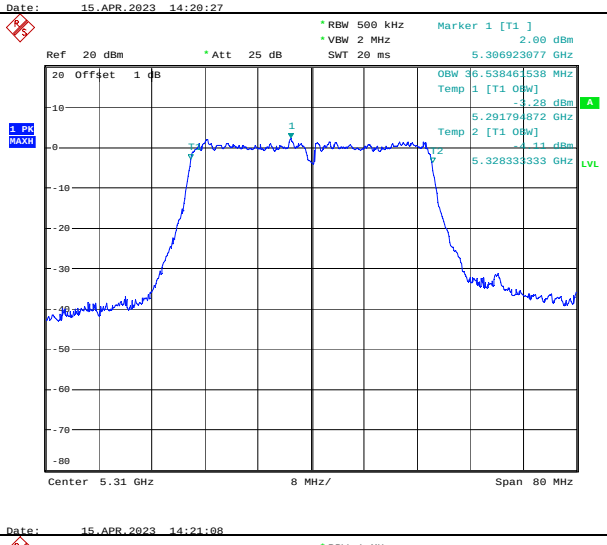
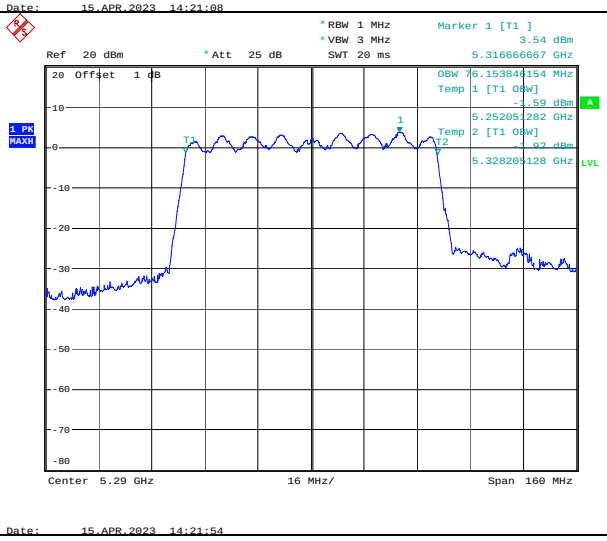
26dB Emission Bandwidth	
802.11ac ht40 Lowest Channel	
802.11ac ht40 Highest Channel	
802.11ac ht80 Middle Channel	

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

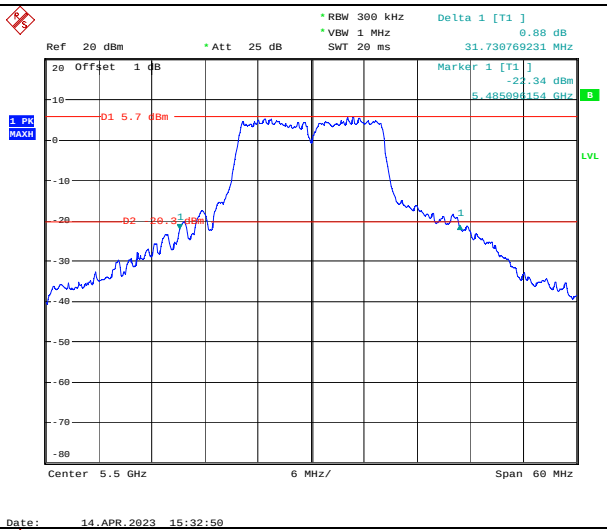
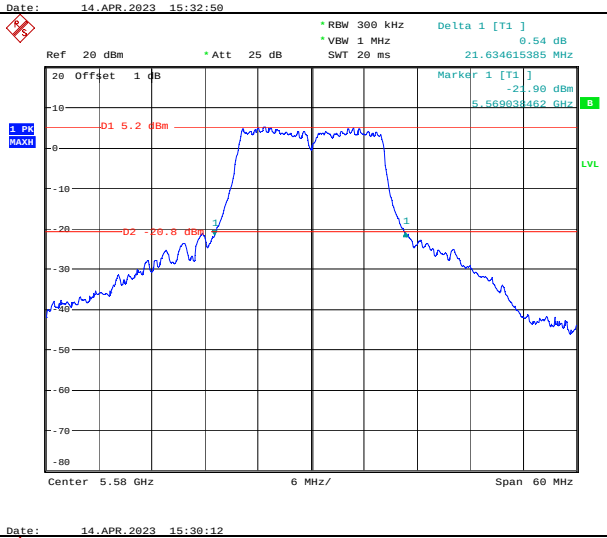
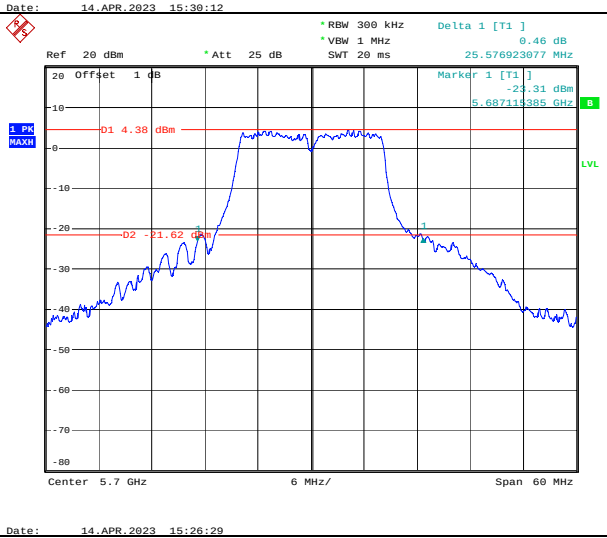
99% Emission Bandwidth	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

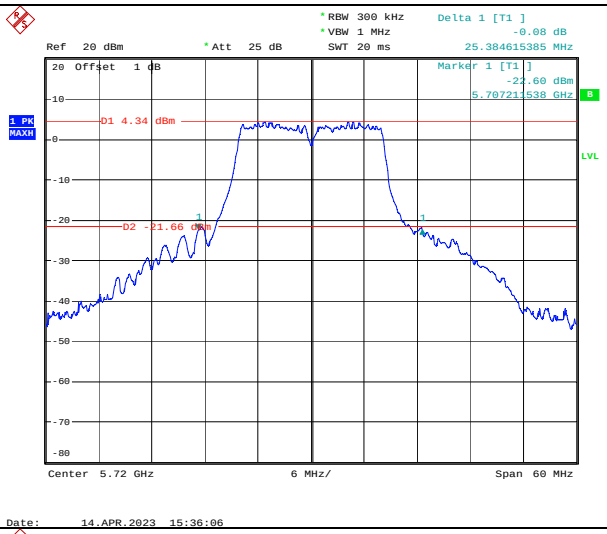
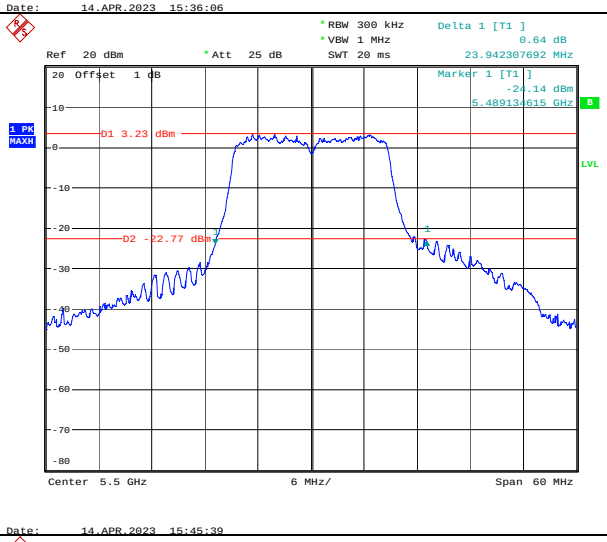
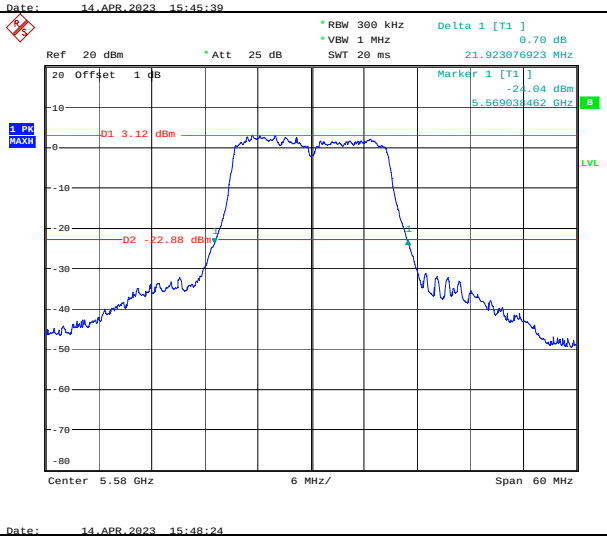
99% Emission Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

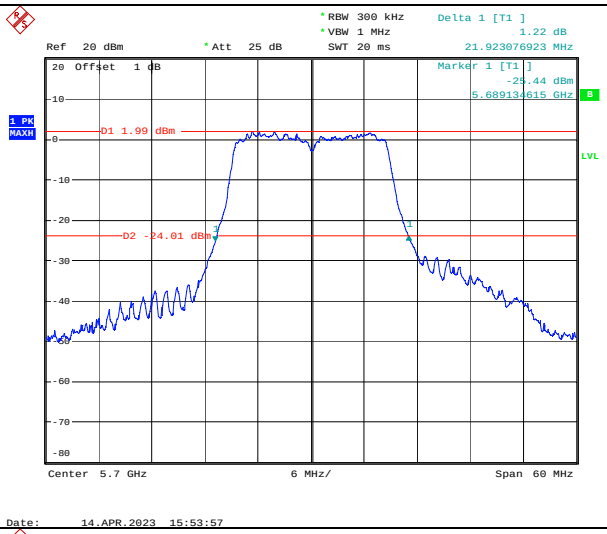
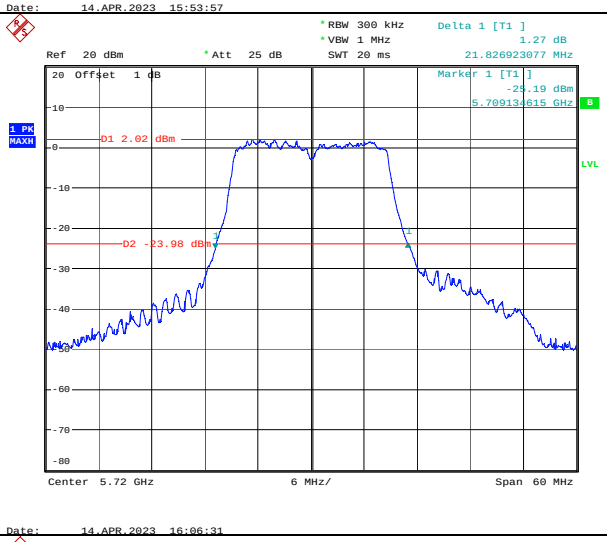
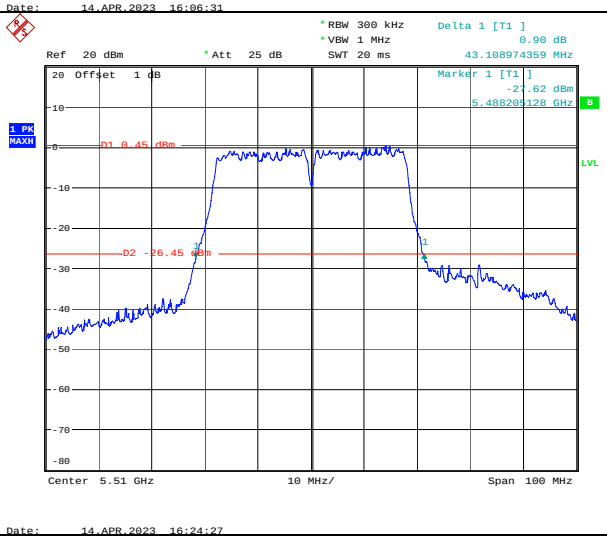
99% Emission Bandwidth	
802.11ac ht20 Lowest Channel	
802.11ac ht20 Middle Channel	
802.11ac ht20 Highest Channel	

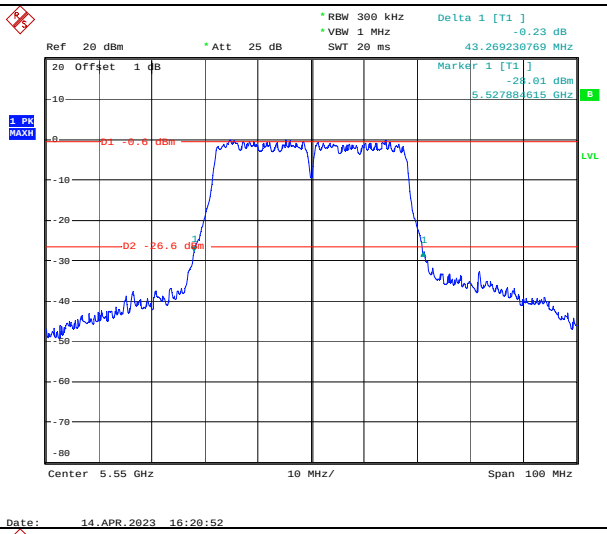
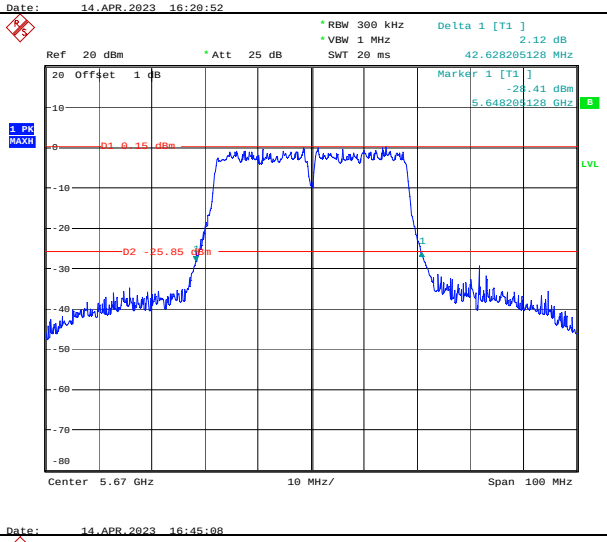
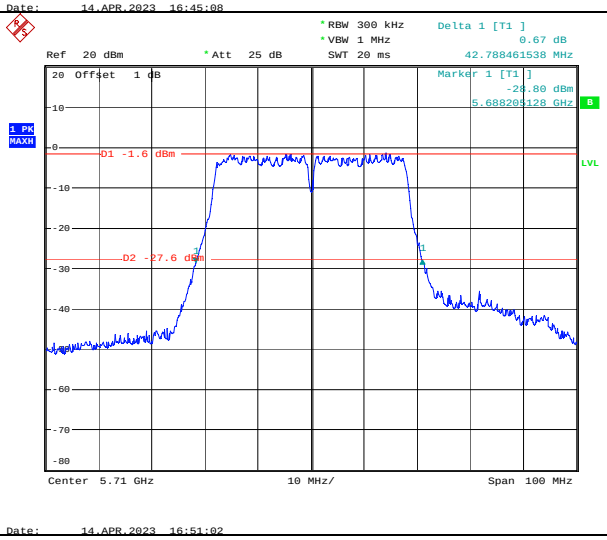
99% Emission Bandwidth	
802.11ac ht40 Lowest Channel	
802.11ac ht40 Highest Channel	
802.11ac ht80 Middle Channel	

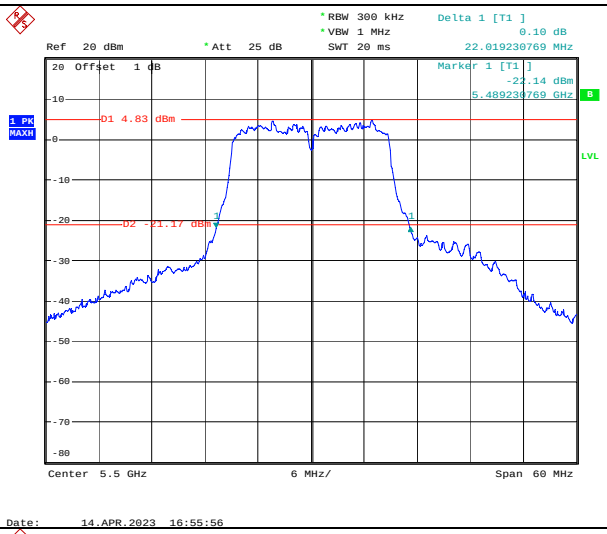
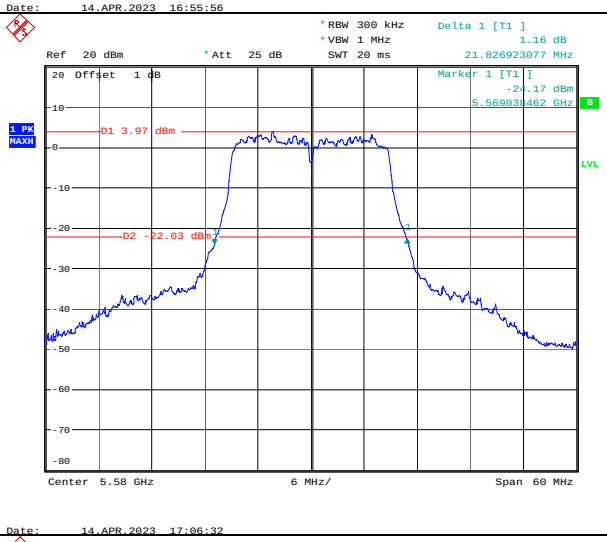
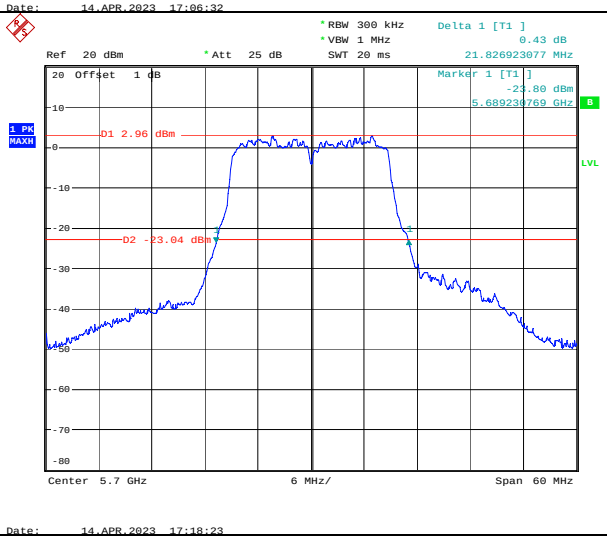
5470-5725 MHz:

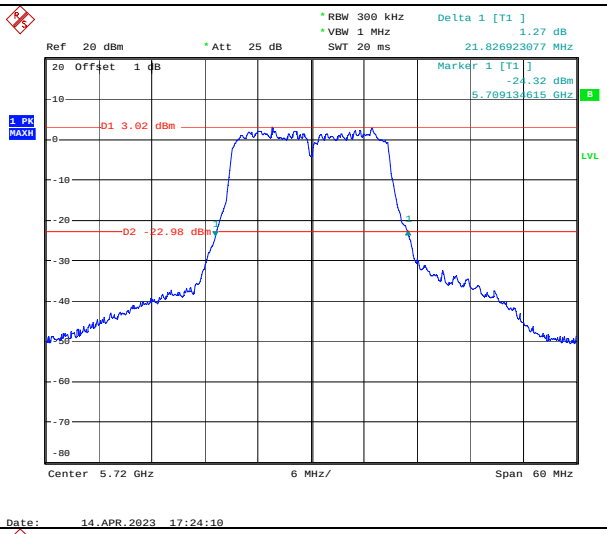
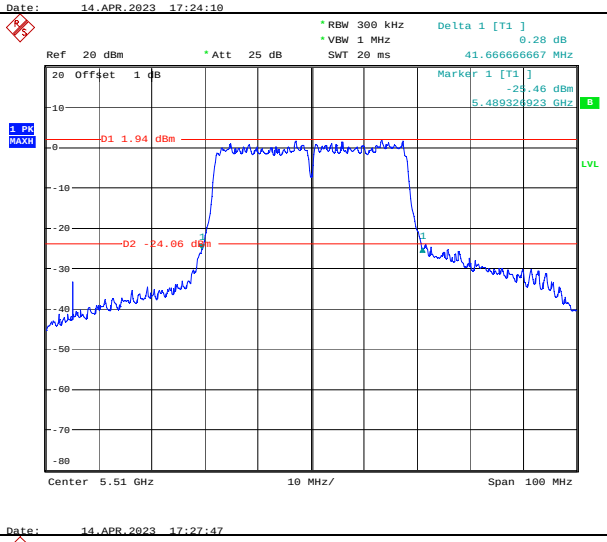
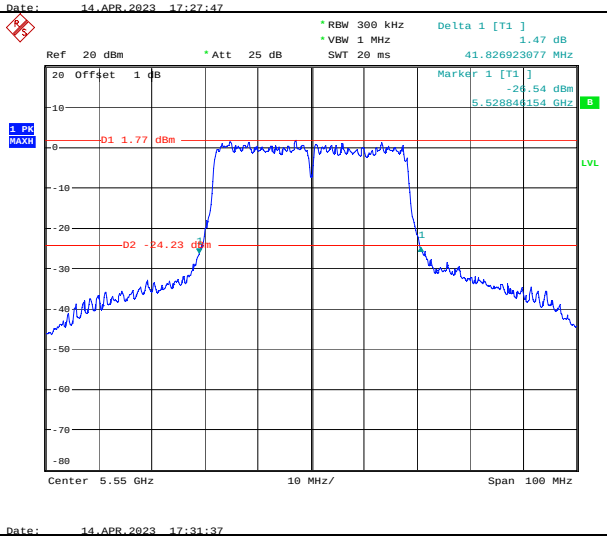
26dB Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

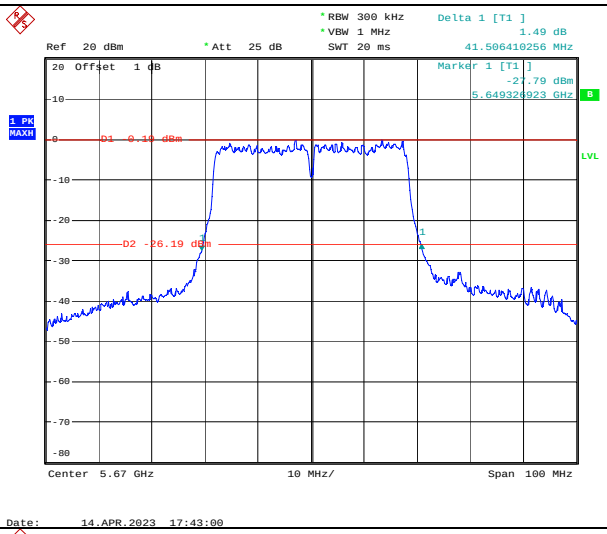
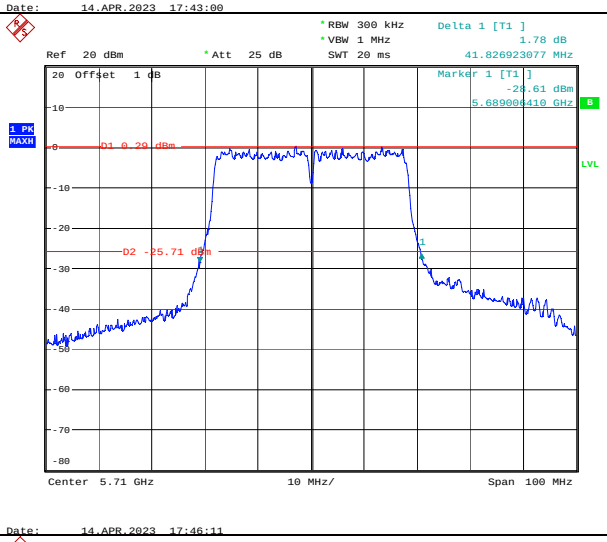
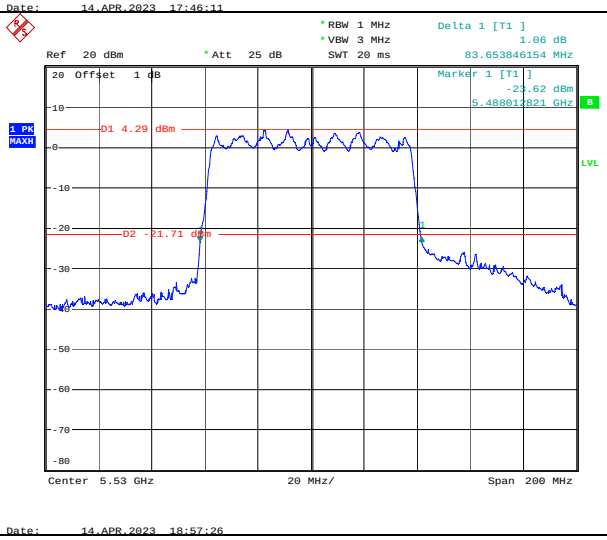
26dB Emission Bandwidth	
802.11a 5720MHz	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	

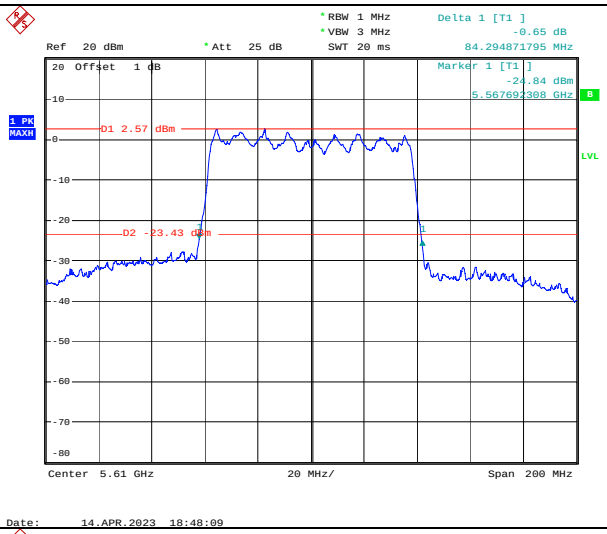
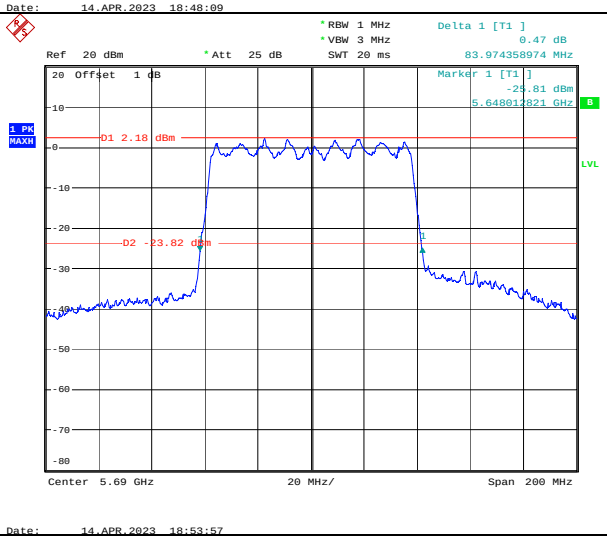
26dB Emission Bandwidth	
802.11n ht20 Highest Channel	
802.11n ht20 5720MHz	
802.11n ht40 Lowest Channel	

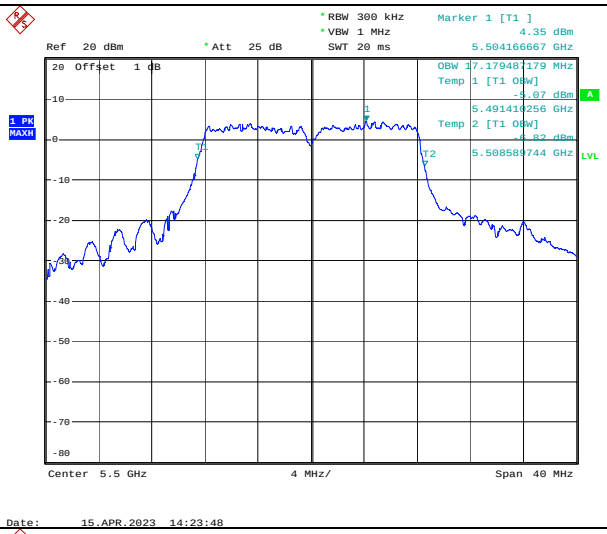
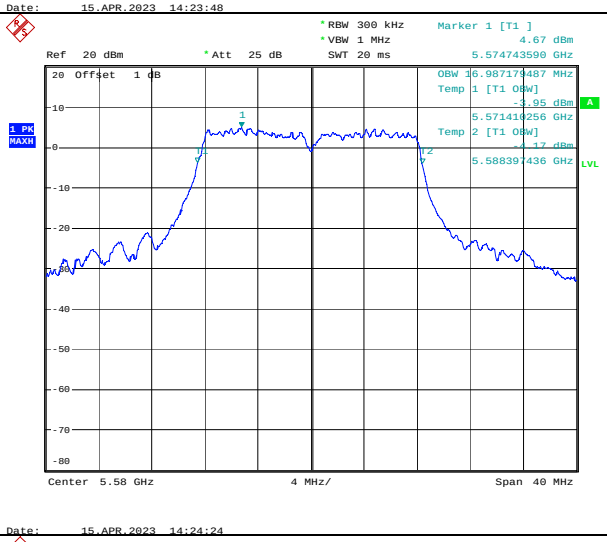
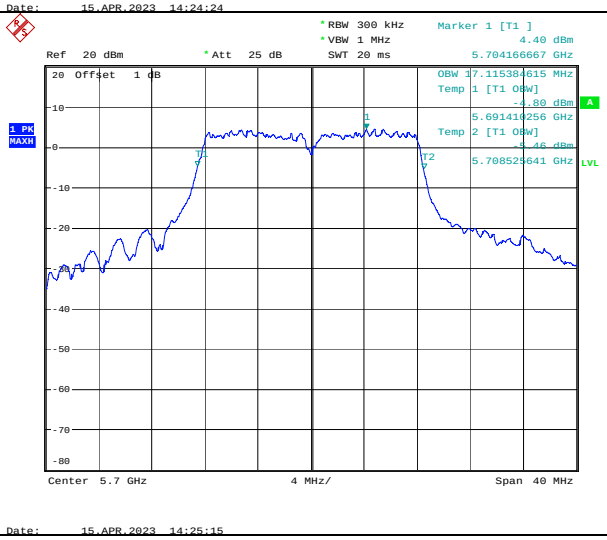
26dB Emission Bandwidth	
802.11n ht40 Middle Channel	
802.11n ht40 Highest Channel	
802.11n ht40 5710MHz	

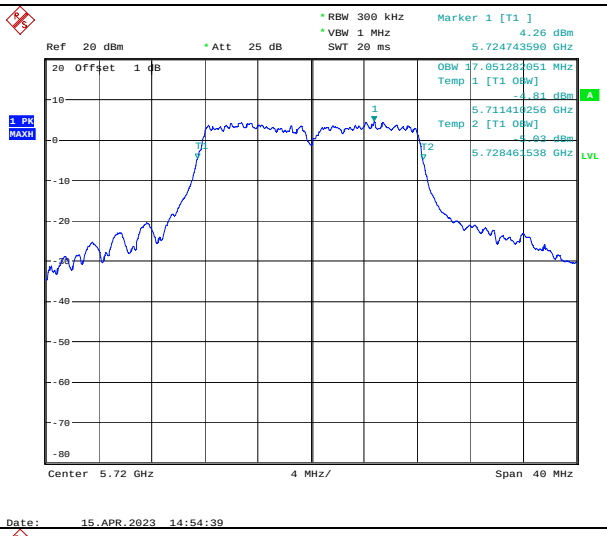
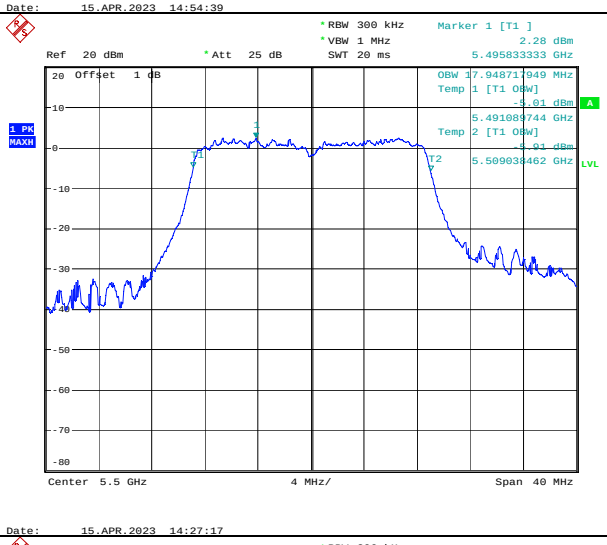
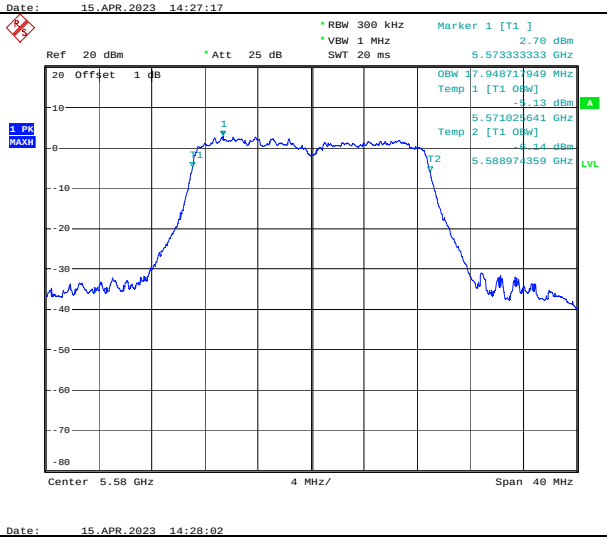
26dB Emission Bandwidth	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac ht20 Highest Channel	

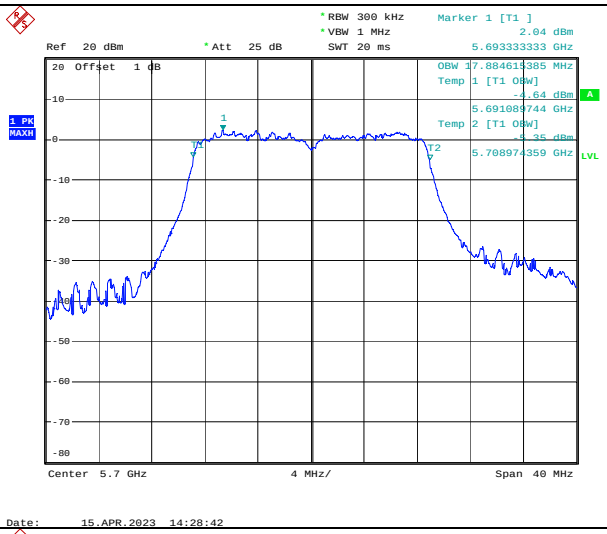
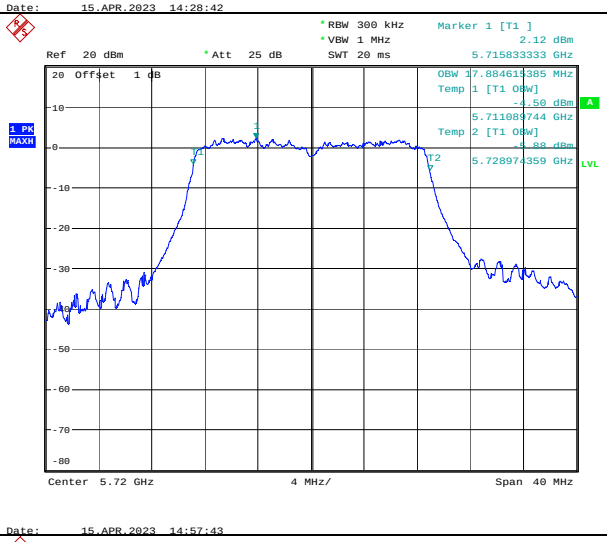
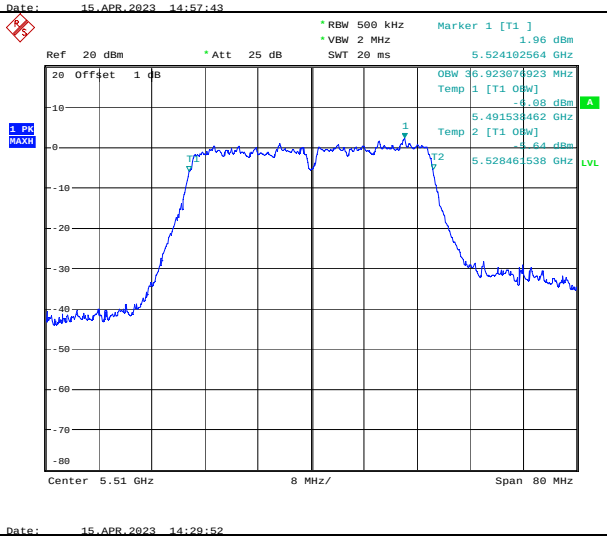
26dB Emission Bandwidth	
802.11ac vht20 5720MHz	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Middle Channel	

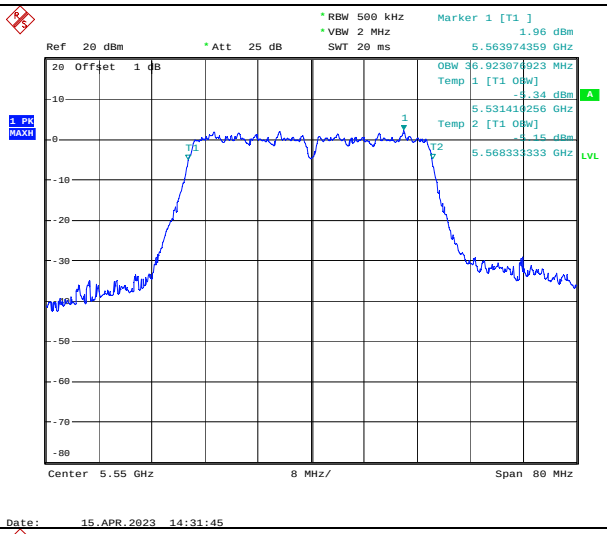
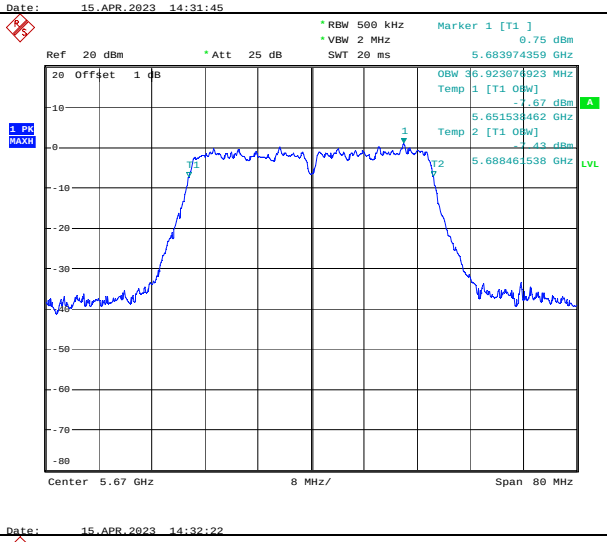
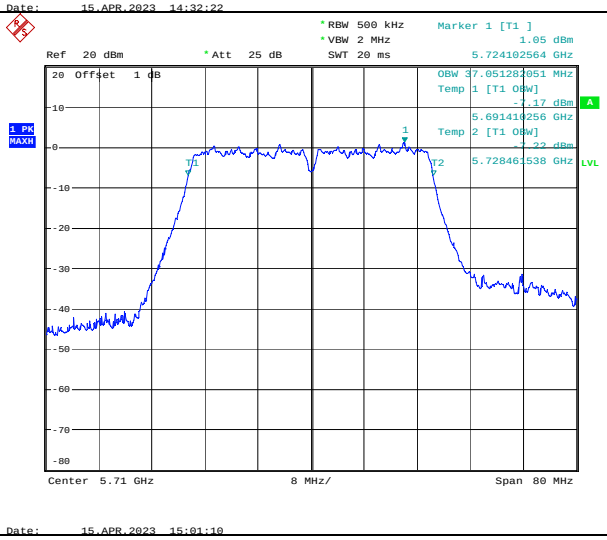
26dB Emission Bandwidth	
802.11ac vht40 Highest Channel	
802.11ac vht40 5710MHz	
802.11ac vht80 Lowest Channel	

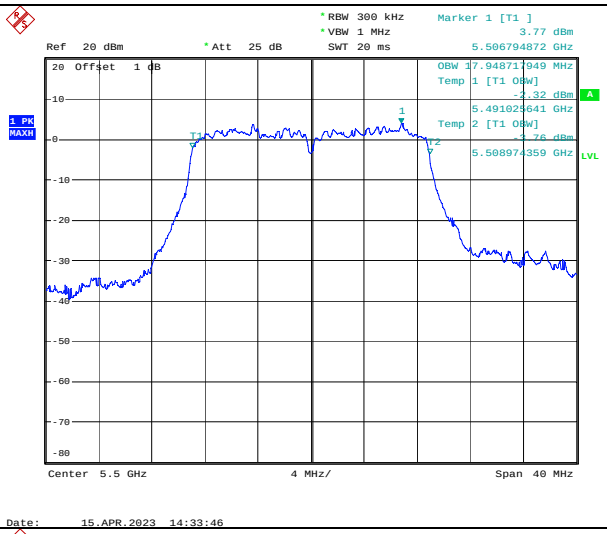
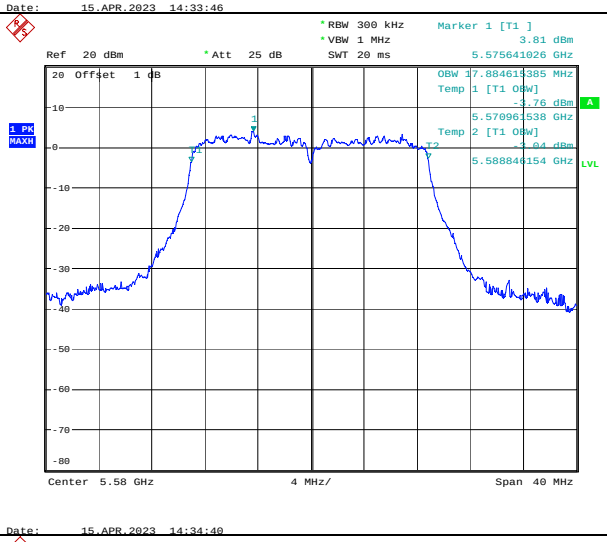
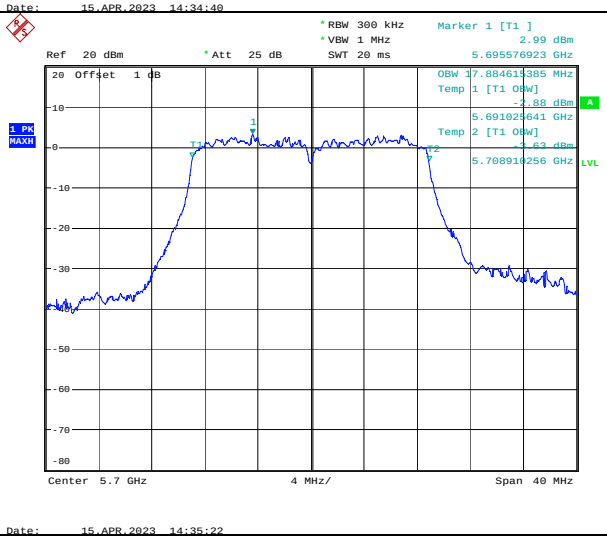
26dB Emission Bandwidth	
802.11ac vht80 Highest Channel	
802.11ac vht80 5690 MHz	

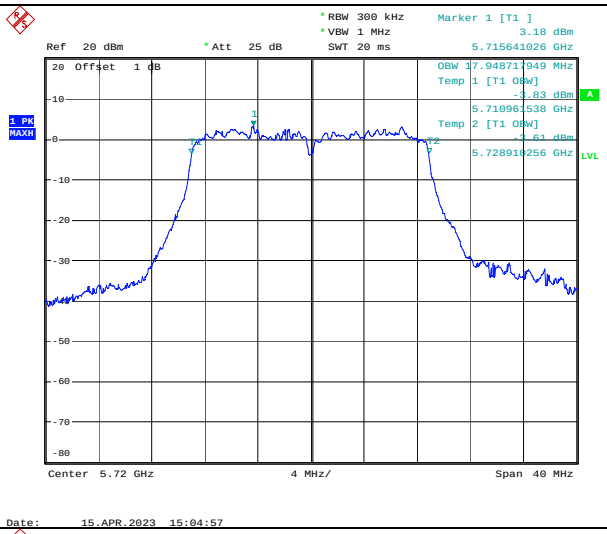
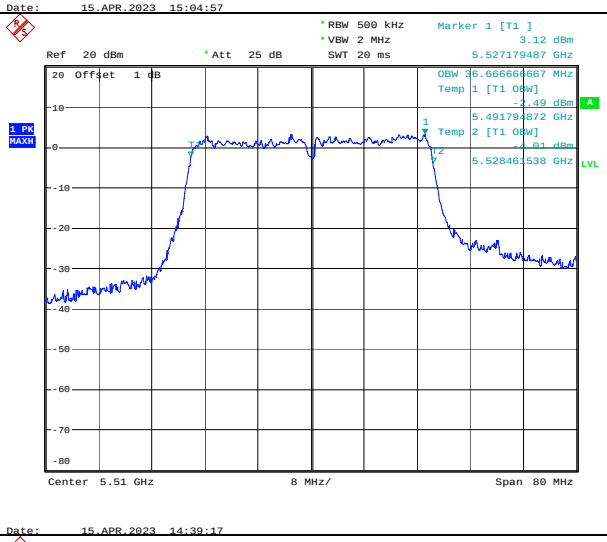
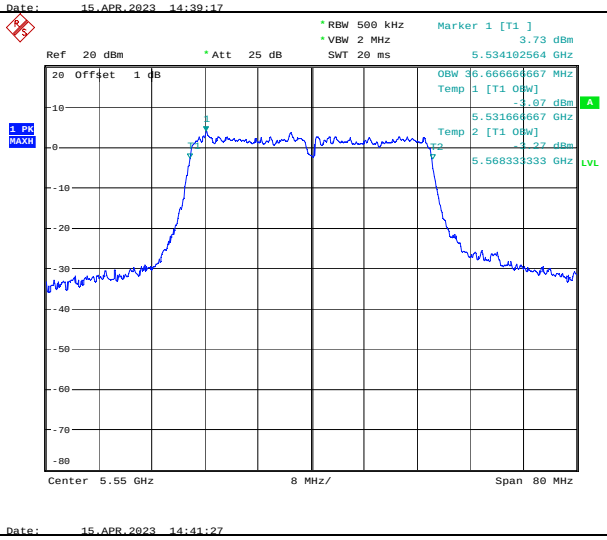
99% Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

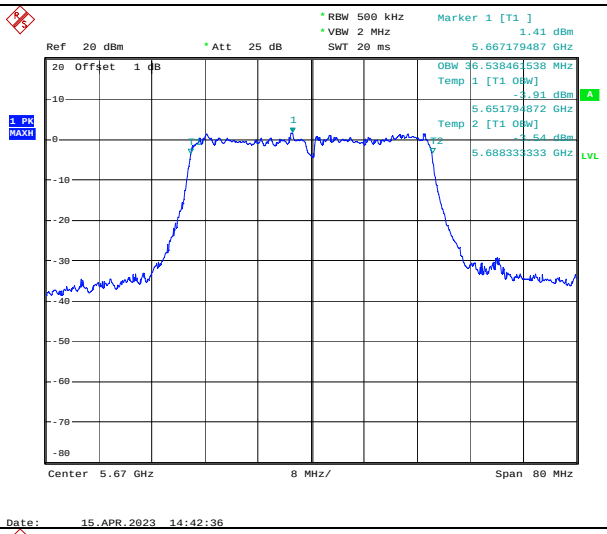
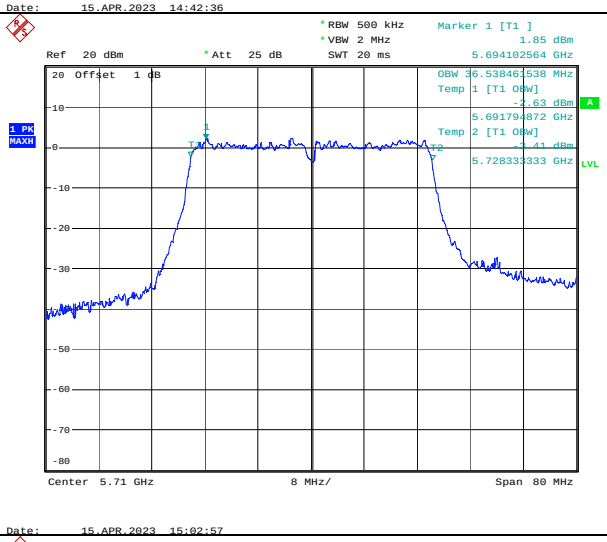
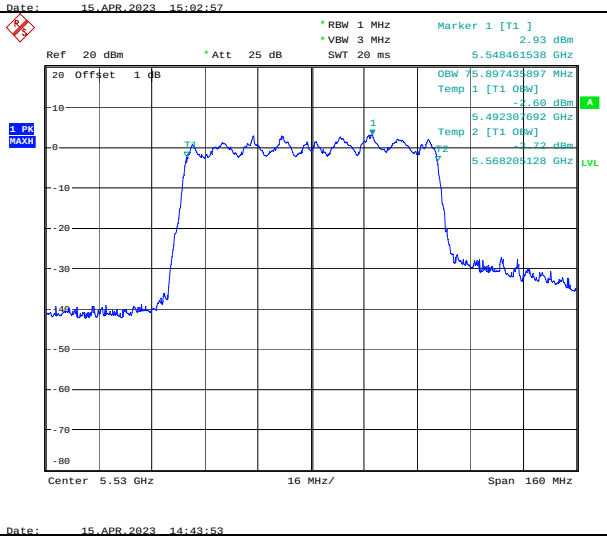
99% Emission Bandwidth	
802.11a 5720MHz	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	

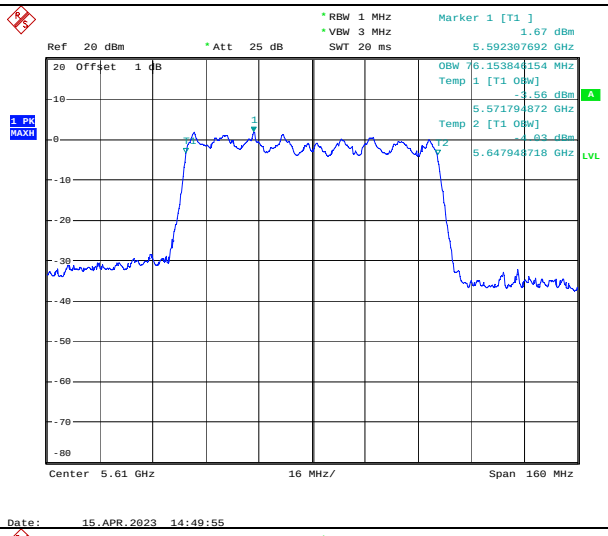
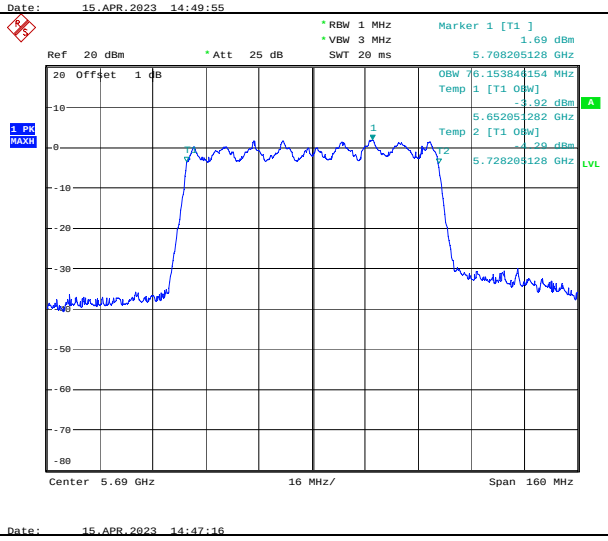
99% Emission Bandwidth	
802.11n ht20 Highest Channel	
802.11n ht20 5720MHz	
802.11n ht40 Lowest Channel	

99% Emission Bandwidth	
802.11n ht40 Middle Channel	
802.11n ht40 Highest Channel	
802.11n ht40 5710MHz	

99% Emission Bandwidth	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac ht20 Highest Channel	

99% Emission Bandwidth	
802.11ac vht20 5720MHz	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Middle Channel	

99% Emission Bandwidth	
802.11ac vht40 Highest Channel	
802.11ac vht40 5710MHz	
802.11ac vht80 Lowest Channel	

99% Emission Bandwidth	
802.11ac vht80 Middle Channel	
802.11ac vht80 Highest Channel	

4.4 Maximum Conducted Output Power:

Serial Number:	21GI-4	Test Date:	2023/04/13
Test Site:	RF	Test Mode:	Transmitting
Tester:	panda.sun	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.4	Relative Humidity: (%)	64	ATM Pressure: (kPa)	100.2

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

** 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:

5250-5350 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)			
		Chain 0	Chain 1	Total	Limit
802.11a	5260	12.6	12.45	15.54	24
	5280	12.54	12.43	15.50	24
	5320	12.55	12.15	15.36	24
802.11n ht20	5260	12.45	12.14	15.31	24
	5280	12.31	12.12	15.23	24
	5320	11.43	11.54	14.50	24
802.11n ht40	5270	12.57	12.05	15.33	24
	5310	9	8.47	11.75	24
802.11ac vht20	5260	11.2	10.54	13.89	24
	5280	11.34	11.15	14.26	24
	5320	11	10.85	13.94	24
802.11ac vht40	5270	12.45	12	15.24	24
	5310	9.01	8.25	11.66	24
802.11ac vht80	5290	9.85	9.21	12.55	24
Note: 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 $N_{ANT} \leqslant 4$					
Antenna Gain:	1.07	dBi	Directional gain:	1.07	dBi

5470-5725 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)			
		Chain 0	Chain 1	Total	Limit
802.11a	5500	12.73	12.45	15.60	24
	5580	12.95	12.23	15.62	24
	5700	12.03	11.03	14.57	24
	5720	12.02	11.38	14.72	24
802.11n ht20	5500	11.02	9.25	13.23	24
	5580	11.08	9.21	13.26	24
	5700	9.43	9.15	12.30	24
	5720	9.83	8.35	12.16	24
802.11n ht40	5510	10.88	8.63	12.91	24
	5550	10.52	9.12	12.89	24
	5670	7.97	6.23	10.20	24
	5710	8.67	6.72	10.81	24
802.11ac vht20	5500	10.85	8.62	12.89	24
	5580	10.45	8.63	12.64	24
	5700	9.6	8.21	11.97	24
	5720	9.65	8.25	12.02	24
802.11ac vht40	5510	11.46	9.17	13.47	24
	5550	11.52	9.52	13.64	24
	5670	9.52	8	11.84	24
	5710	9.73	8.01	11.96	24
802.11ac vht80	5530	10.75	8.34	12.72	24
	5610	9.21	7.15	11.31	24
	5690	8.66	7.01	10.92	24
Note: 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 $N_{ANT} \leqslant 4$ The device is a client unit.					
Antenna Gain:	3.05	dBi	Directional gain:	3.05	dBi

4.5 Maximum power spectral density:

Serial Number:	21GI-4	Test Date:	2023/04/14~2023/04/15
Test Site:	RF	Test Mode:	Transmitting
Tester:	panda.Sun	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.1~27	Relative Humidity: (%)	61~66	ATM Pressure: (kPa)	100.2~100.5

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	100147	2023/03/31	2024/03/30
zhuoxiang	Coaxial Cable	SMA-178	211001	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:

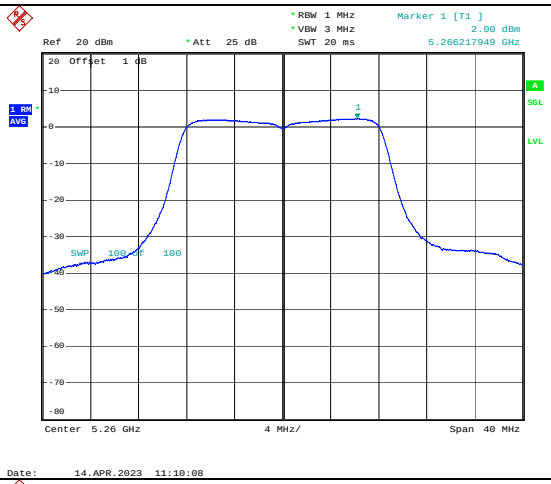
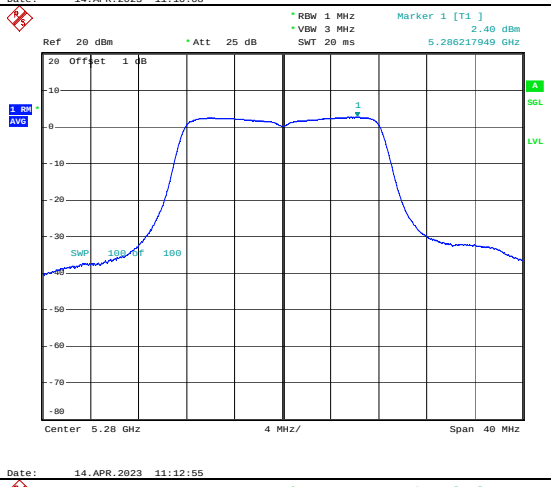
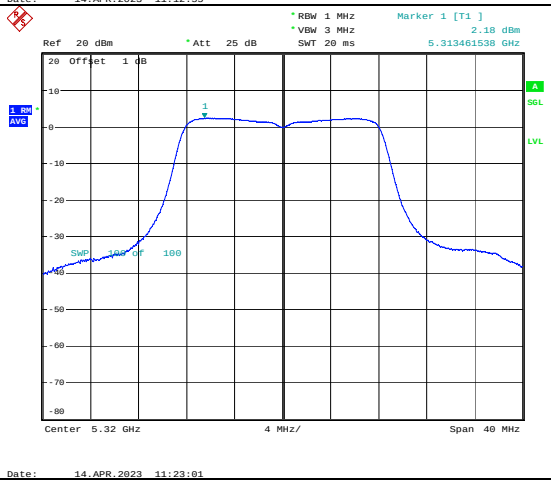
5250-5350 MHz:

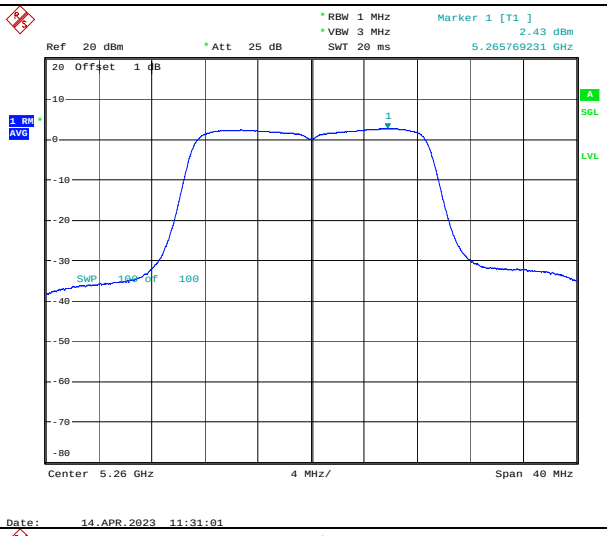
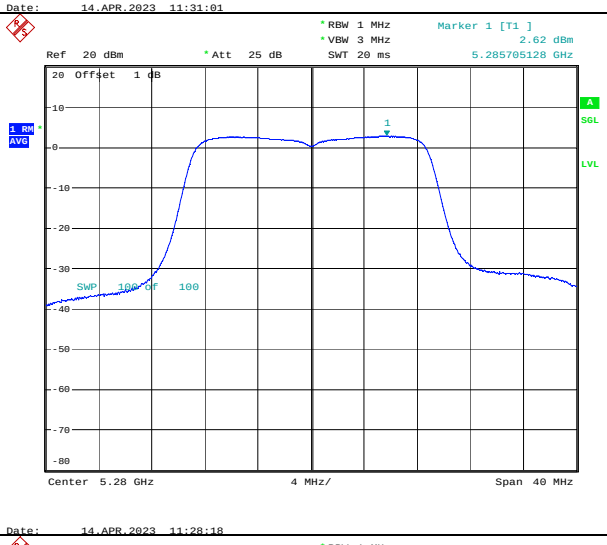
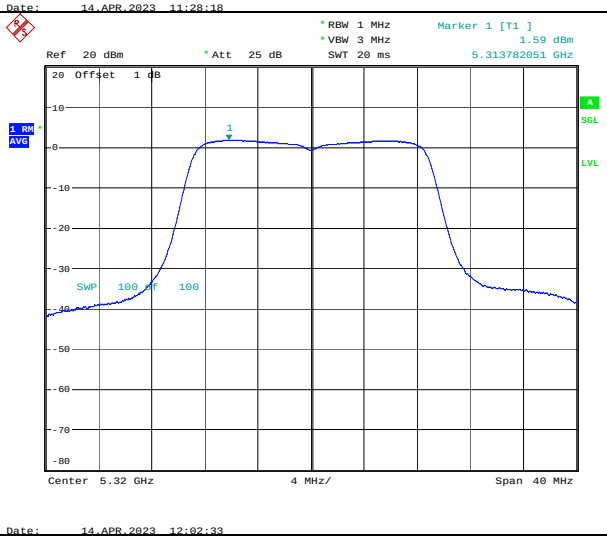
Test Modes	Test Frequency (MHz)	Maximum Power Spectral Density (dBm/MHz)			
		Chain 0	Chain 1	Total	Limit
802.11a	5260	2	1.69	4.86	11
	5280	2.4	2.11	5.27	11
	5320	2.18	1.56	4.89	11
802.11n ht20	5260	2.43	0.68	4.65	11
	5280	2.62	1.38	5.05	11
	5320	1.59	0.88	4.26	11
802.11n ht40	5270	-0.45	-1.51	2.06	11
	5310	-4.33	-5.3	-1.78	11
802.11ac vht20	5260	1.51	-0.03	3.82	11
	5280	1.69	0.54	4.16	11
	5320	1.38	0.31	3.89	11
802.11ac vht40	5270	-0.65	-1.47	1.97	11
	5310	-4.09	-5.49	-1.72	11
802.11ac vht80	5290	-5.08	-6.28	-2.63	11
Note: 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:	1.07	dBi	Directional gain:	4.07	dBi

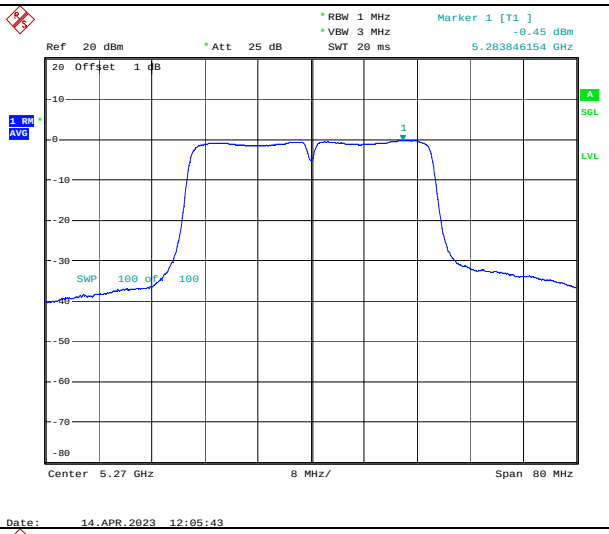
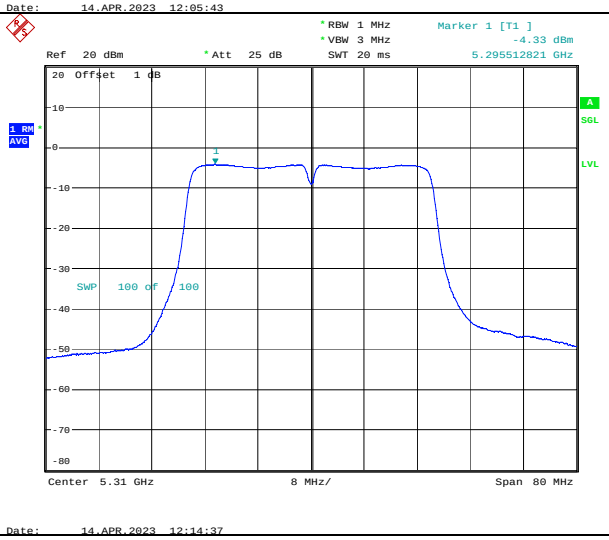
5500-5725 MHz:

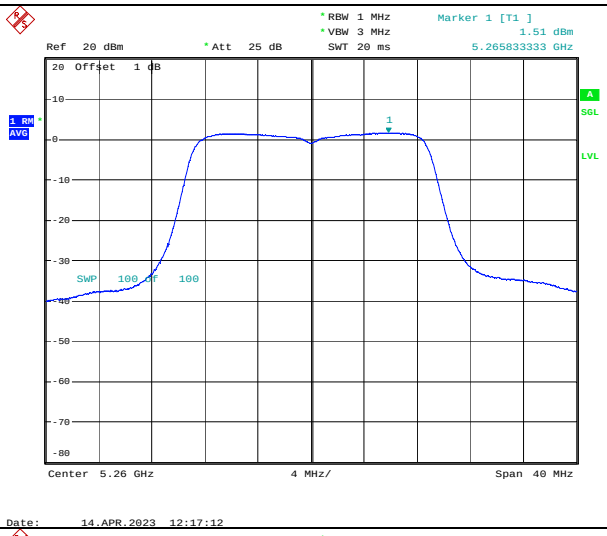
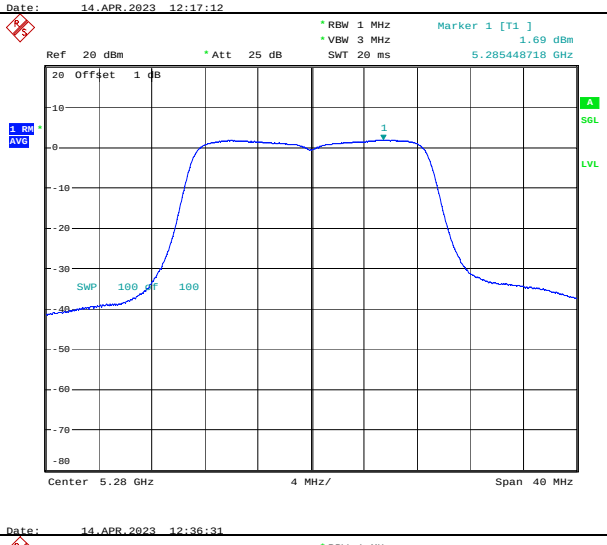
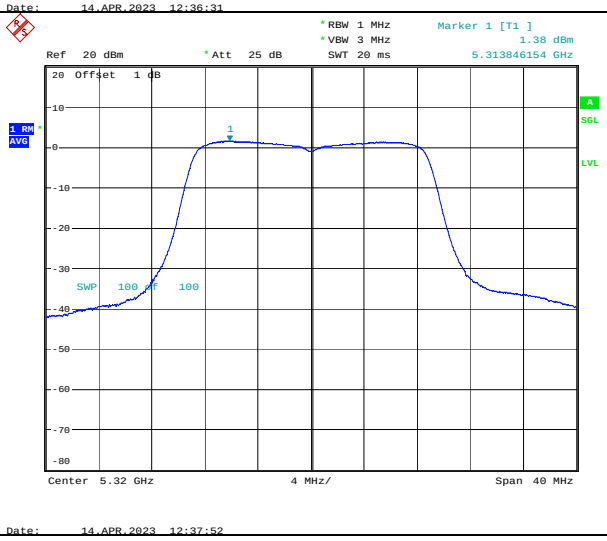
Test Modes	Test Frequency (MHz)	Maximum Power Spectral Density (dBm/MHz)			
		Chain 0	Chain 1	Total	Limit
802.11a	5500	2.4	0.83	4.70	10.95
	5580	2.31	0.91	4.68	10.95
	5700	1.45	0.62	4.07	10.95
	5720	1.33	0.75	4.06	10.95
802.11n ht20	5500	0.65	-2.85	2.25	10.95
	5580	-0.21	-2.84	1.68	10.95
	5700	-0.99	-3.08	1.10	10.95
	5720	-1.2	-2.87	1.06	10.95
802.11n ht40	5510	-3.28	-6.39	-1.55	10.95
	5550	-3.36	-6.23	-1.55	10.95
	5670	-5.16	-7.61	-3.20	10.95
	5710	-4.96	-6.59	-2.69	10.95
802.11ac vht20	5500	0.1	-2.73	1.92	10.95
	5580	-0.11	-2.81	1.76	10.95
	5700	-1.1	-2.91	1.10	10.95
	5720	-1.23	-2.73	1.09	10.95
802.11ac vht40	5510	-2.36	-5.09	-0.50	10.95
	5550	-2.34	-5	-0.46	10.95
	5670	-4.26	-6.48	-2.22	10.95
	5710	-4.24	-5.79	-1.94	10.95
802.11ac vht80	5530	-5.04	-8.32	-3.37	10.95
	5610	-7.07	-10.13	-5.33	10.95
	5690	-6.8	-9.6	-4.97	10.95
Note: 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:	3.05	dBi	Directional gain:	6.05	dBi

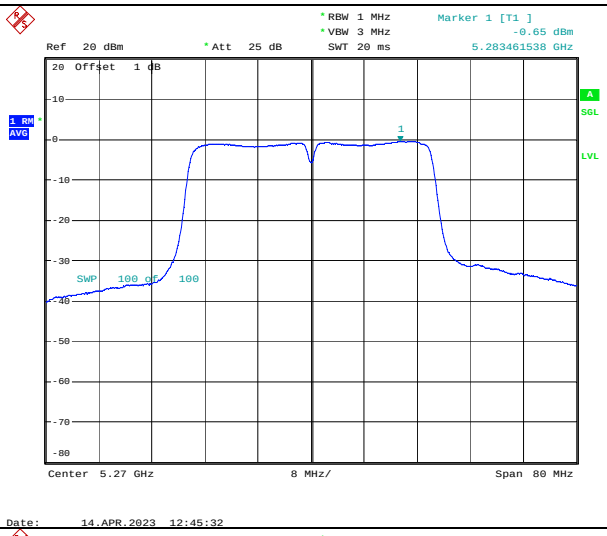
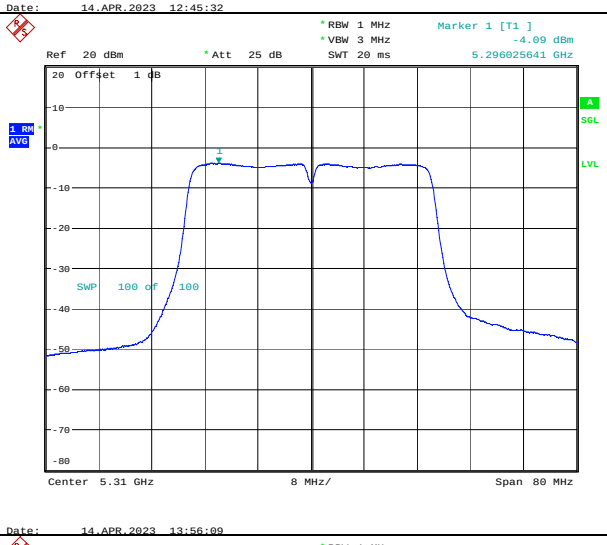
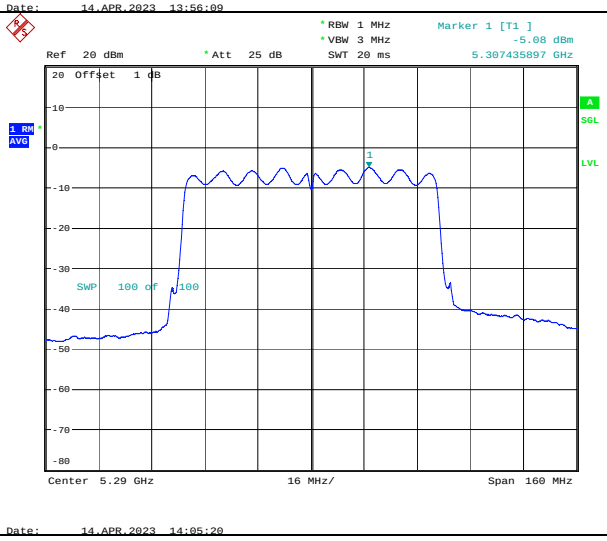
Chain 0
5250-5350 MHz:

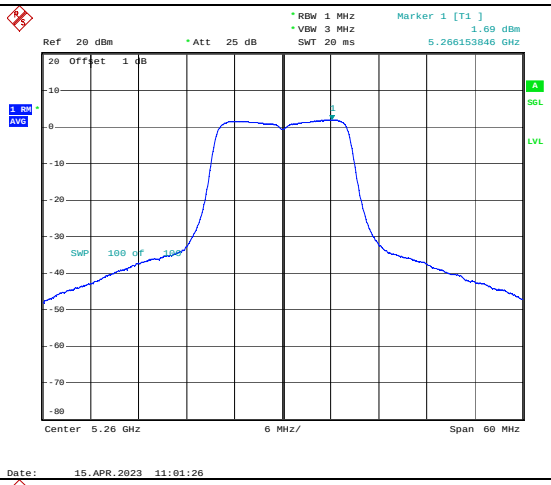
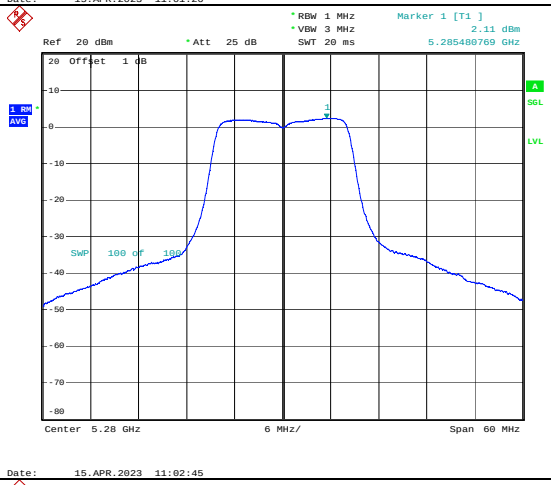
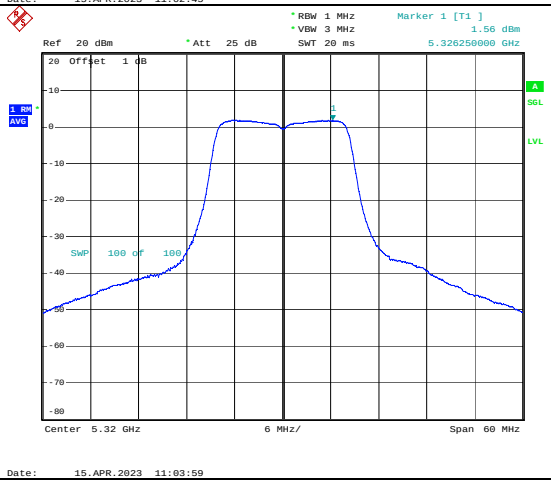
Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

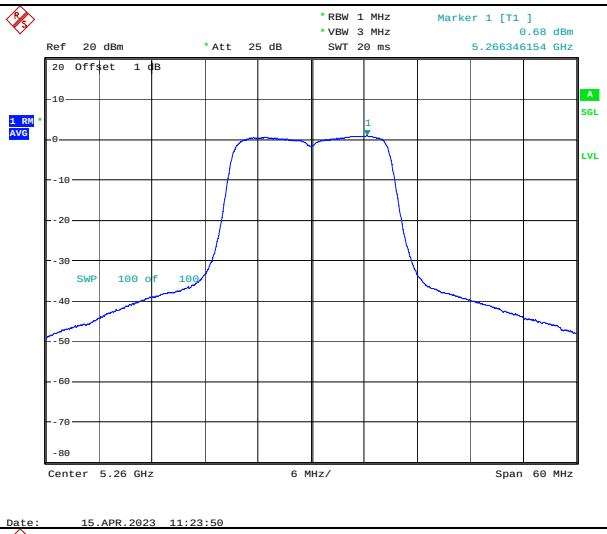
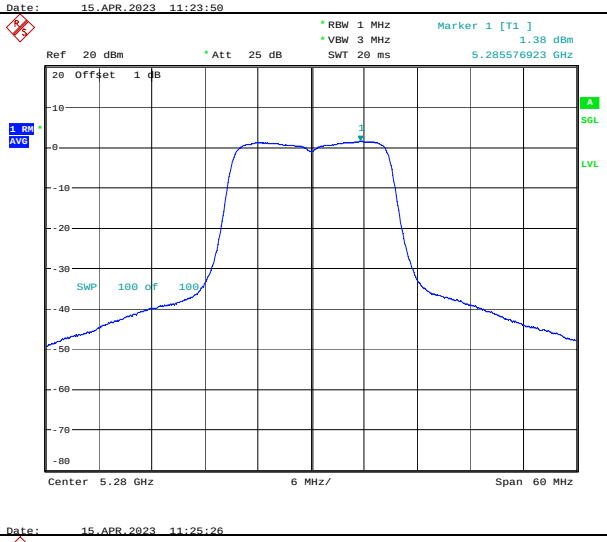
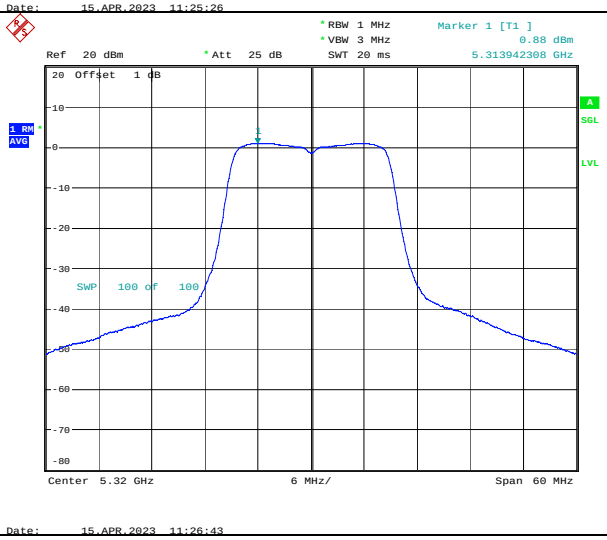
Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

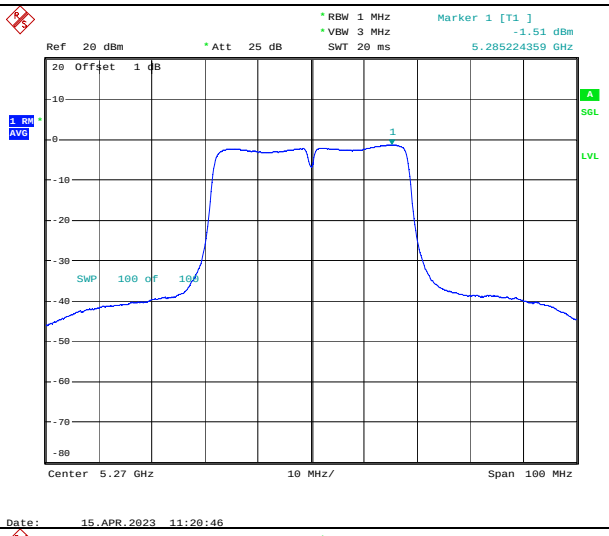
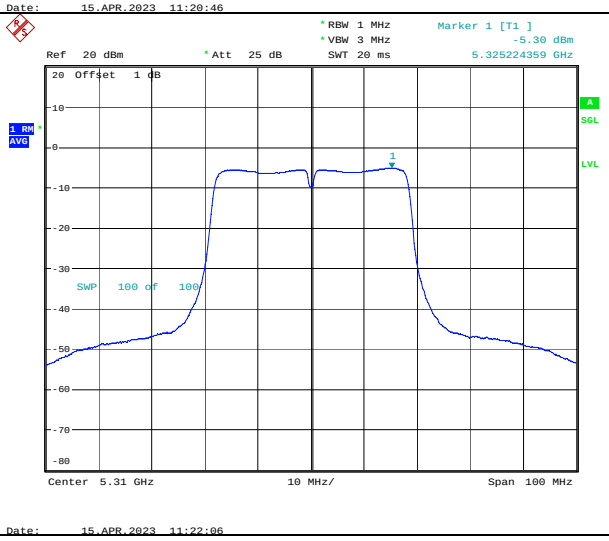
Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

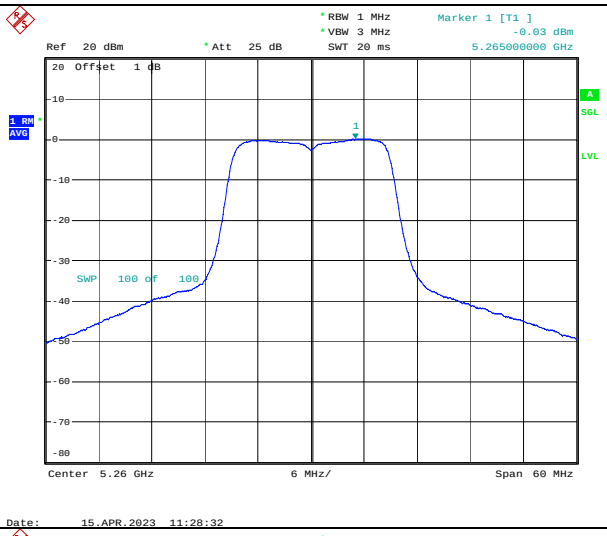
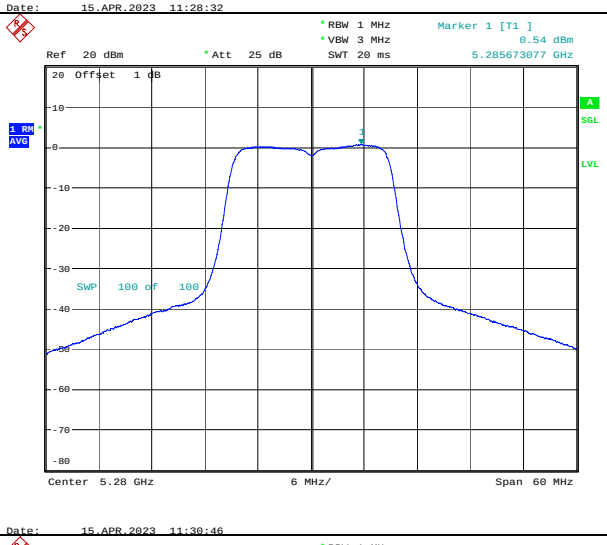
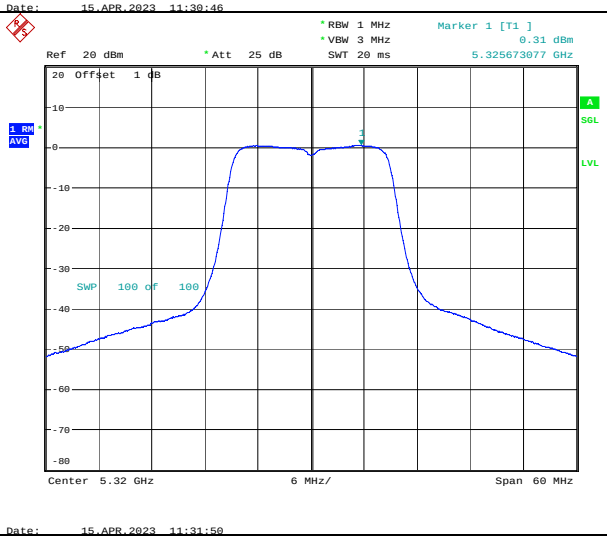
Maximum power spectral density	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

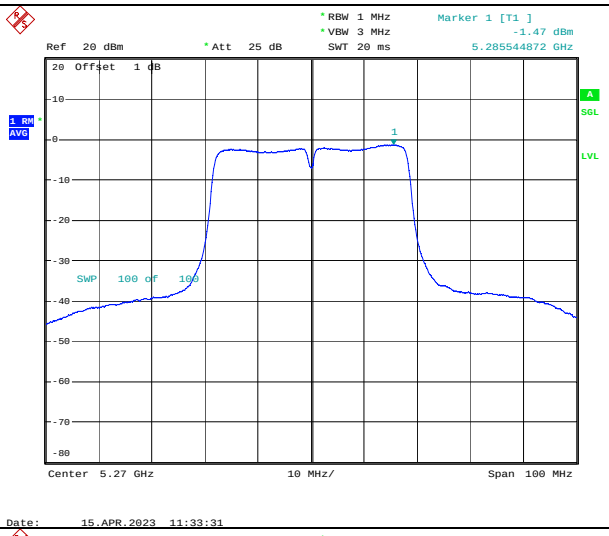
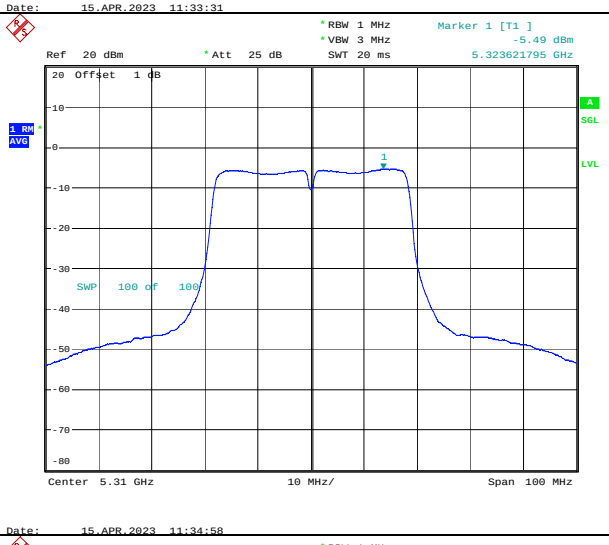
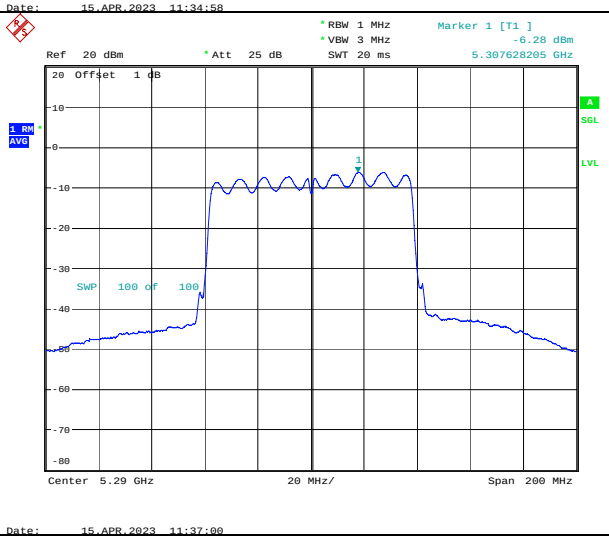
Maximum power spectral density	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

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

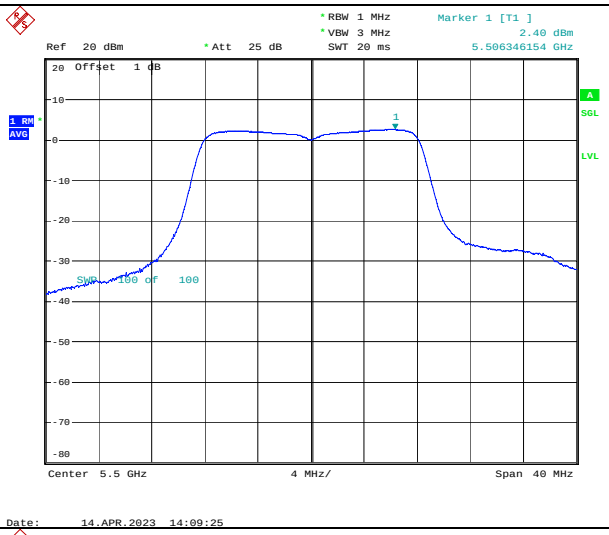
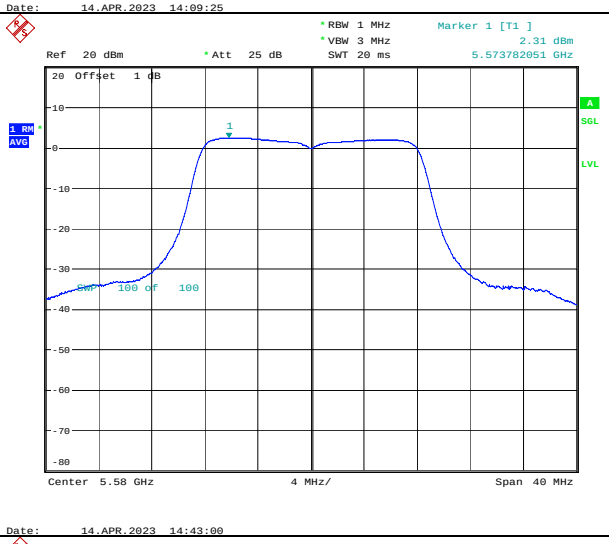
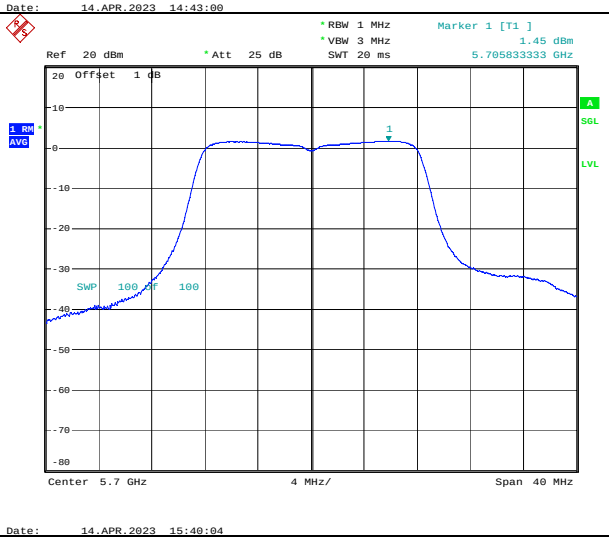
Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

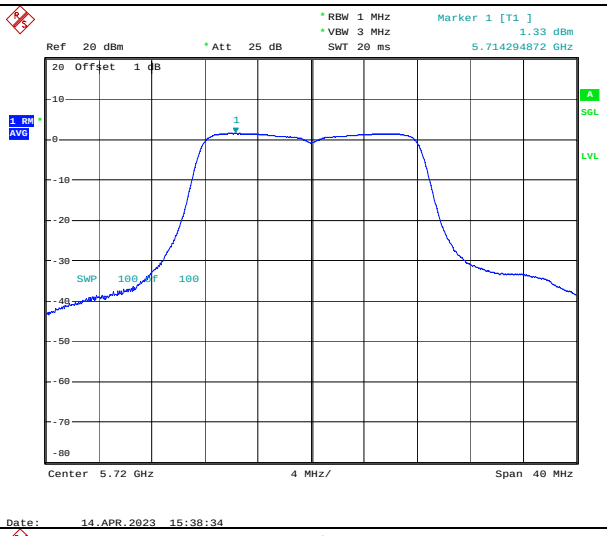
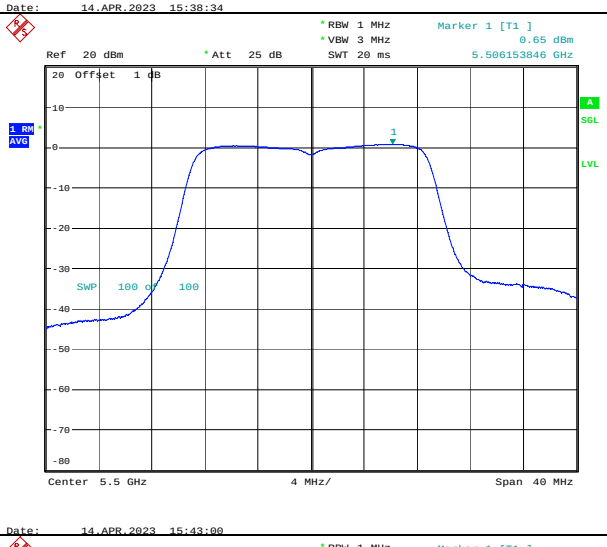
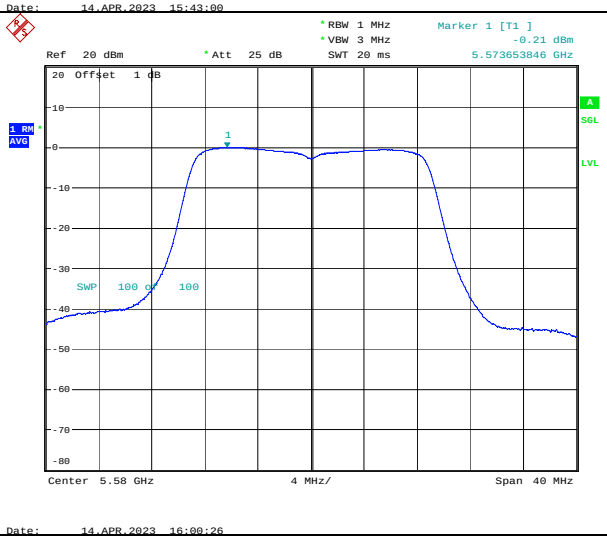
Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

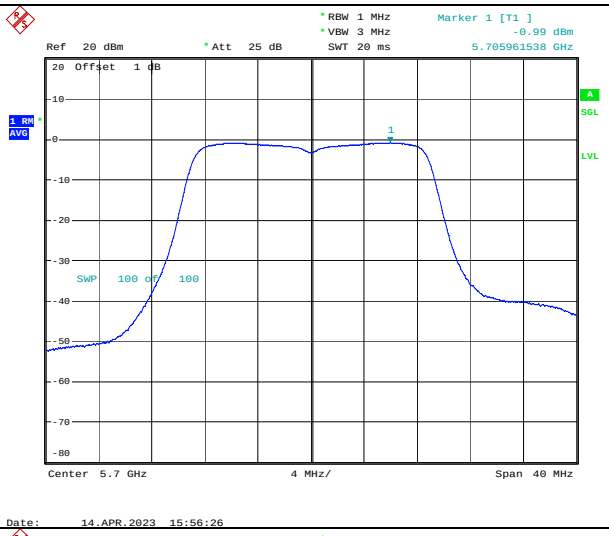
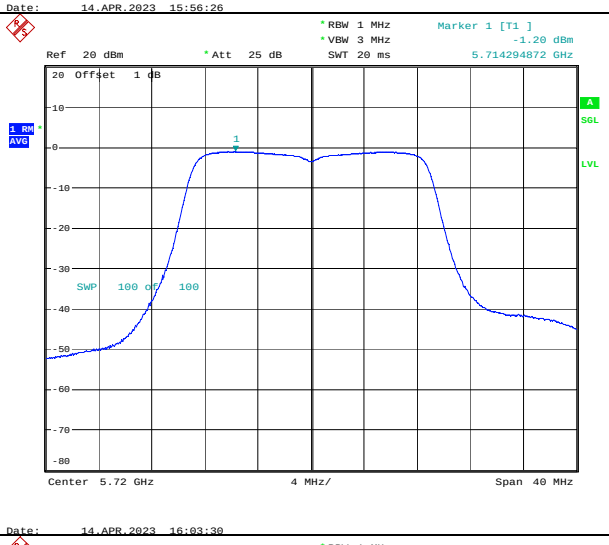
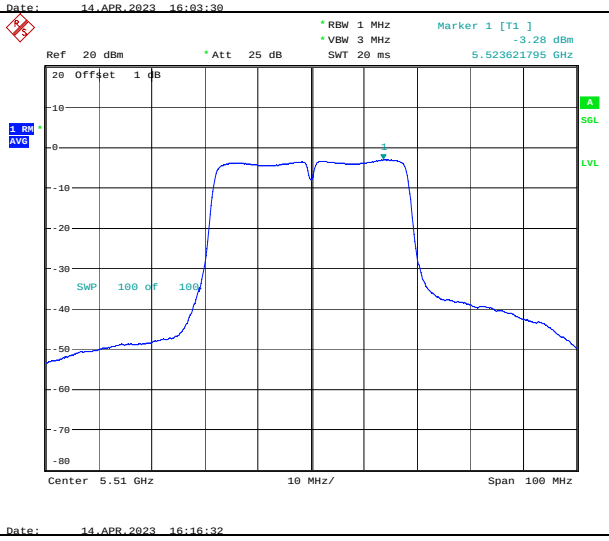
Maximum power spectral density	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac vht20 Highest Channel	

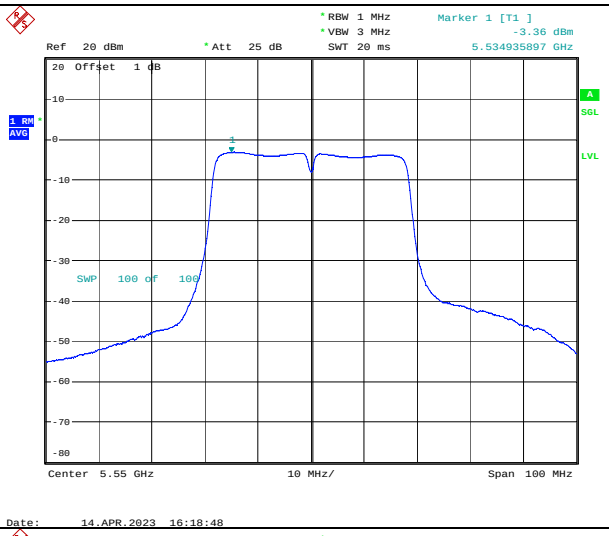
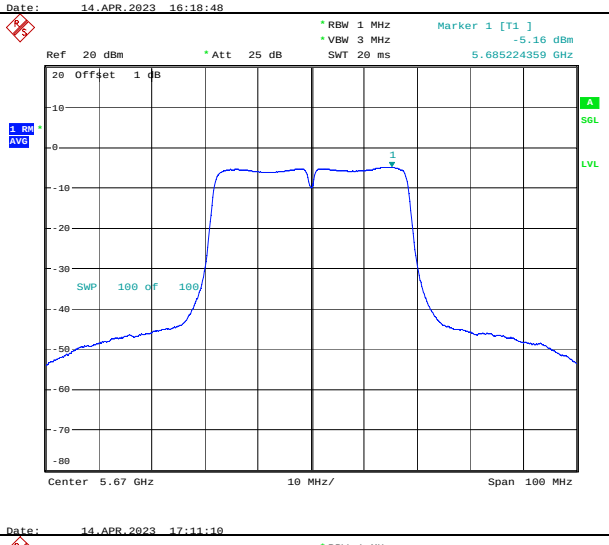
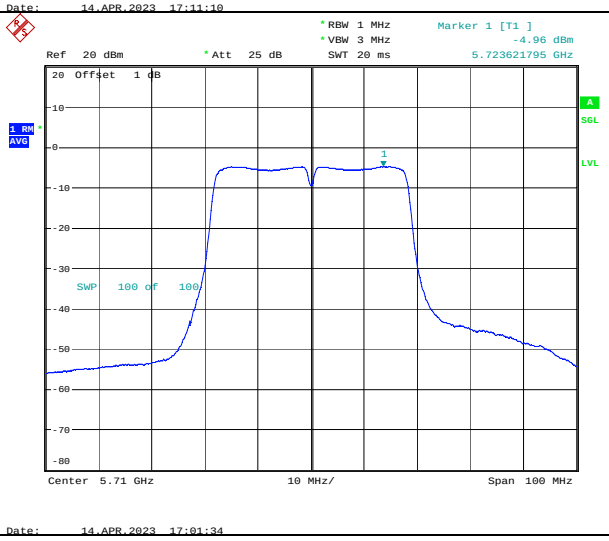
Maximum power spectral density	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Highest Channel	
802.11ac vht80 Middle Channel	

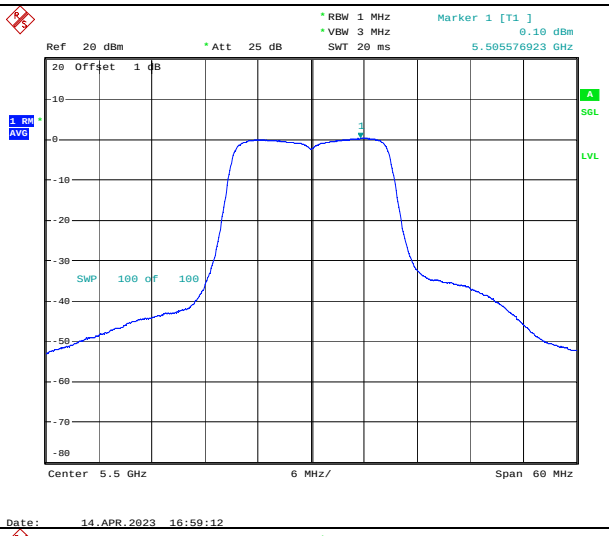
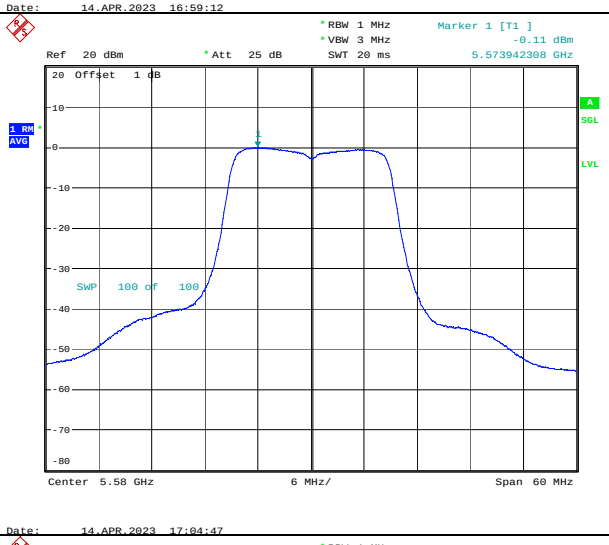
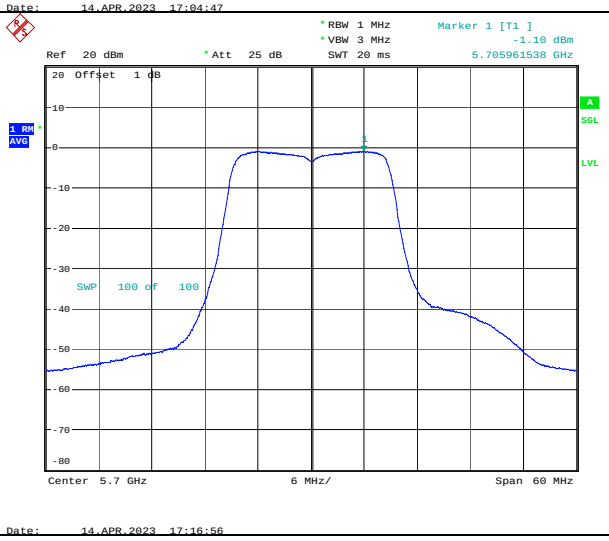
5500-5725 MHz
Chain 0:

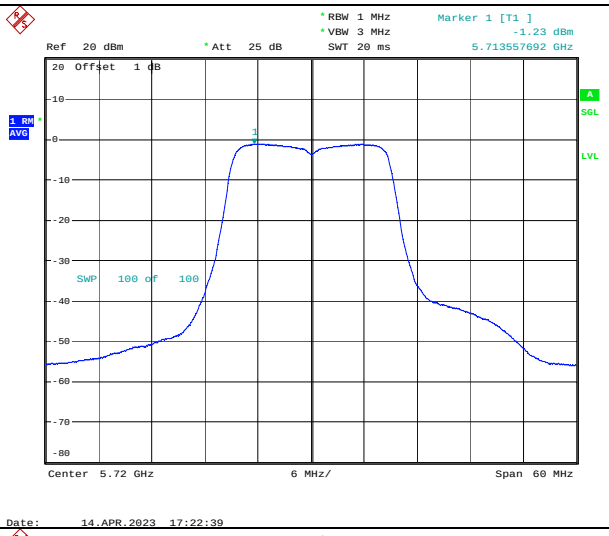
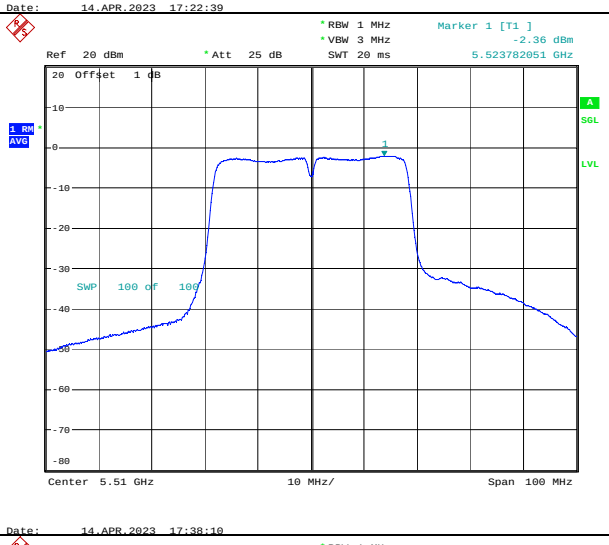
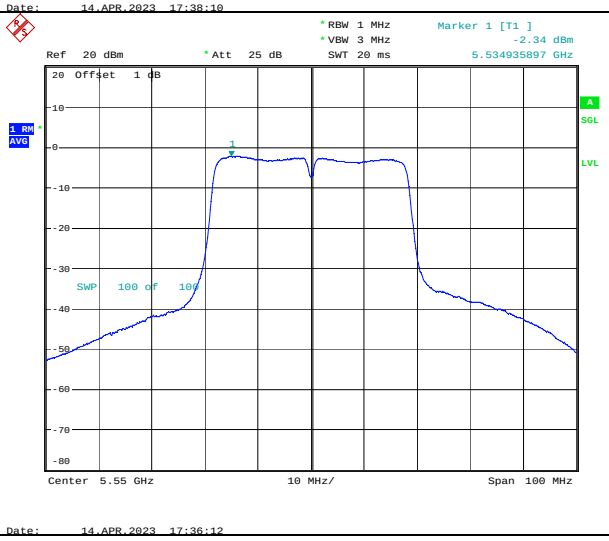
Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

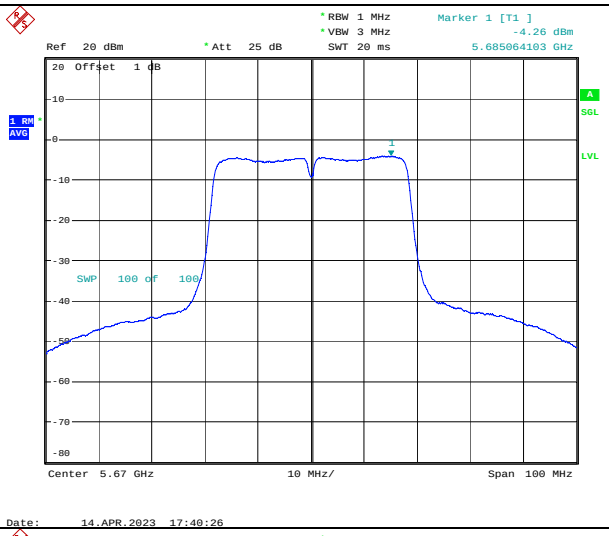
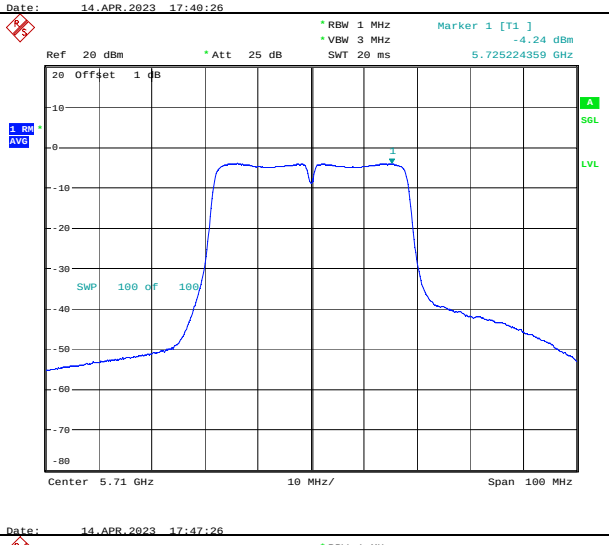
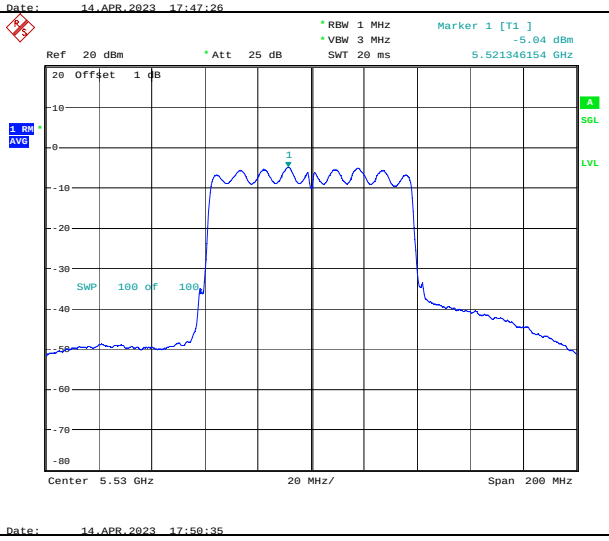
Maximum power spectral density	
802.11a Highest Channel 5720MHz	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	

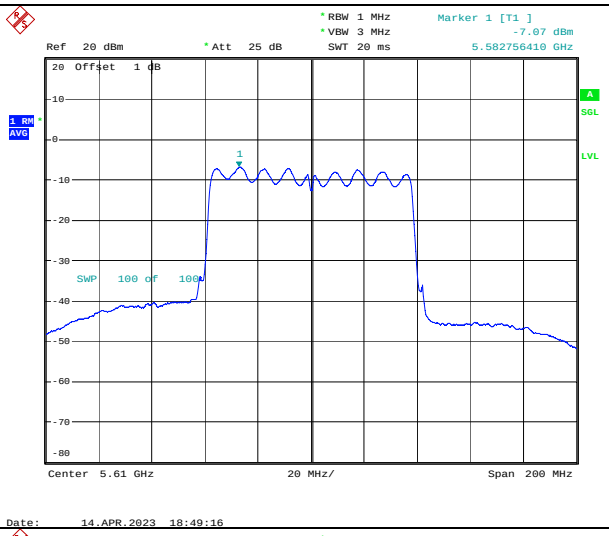
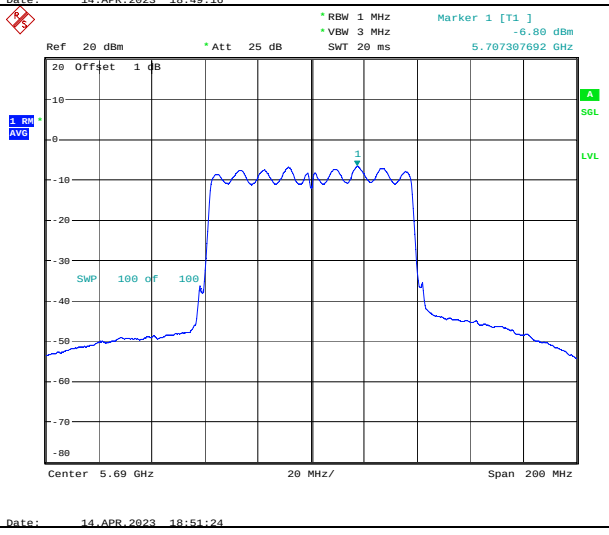
Maximum power spectral density	
802.11n ht20 Highest Channel	
802.11n ht20 Highest Channel 5720MHz	
802.11n ht40 Lowest Channel	

Maximum power spectral density	
802.11n ht40 Middle Channel	
802.11n ht40 Highest Channel	
802.11n ht40 Highest Channel 5710MHz	

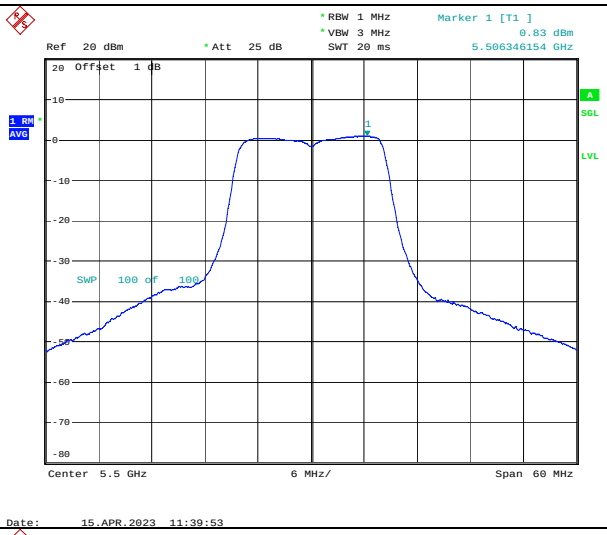
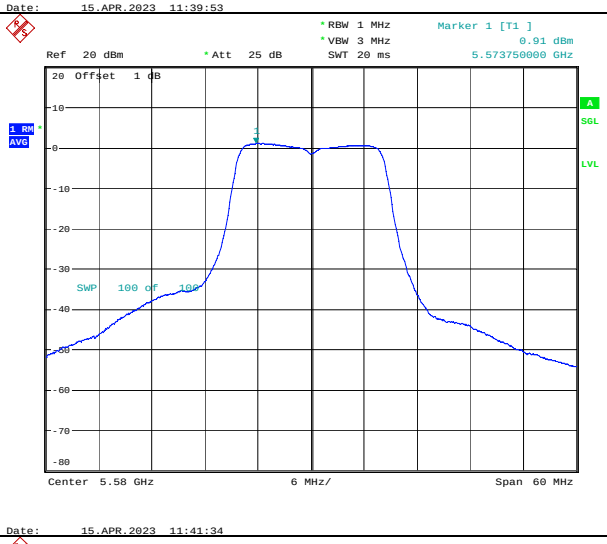
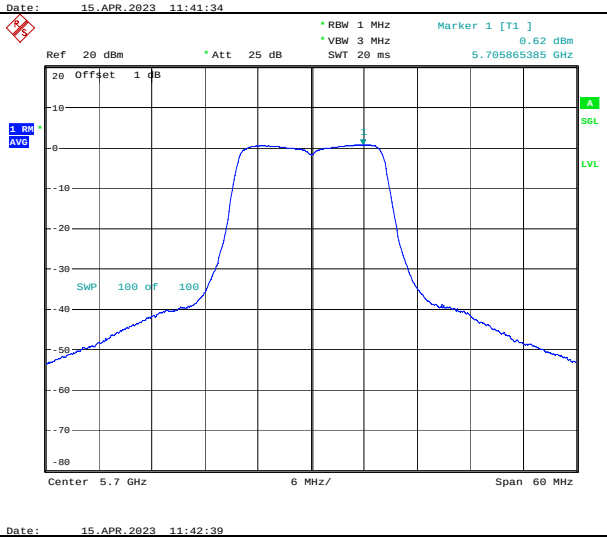
Maximum power spectral density	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac ht20 Highest Channel	

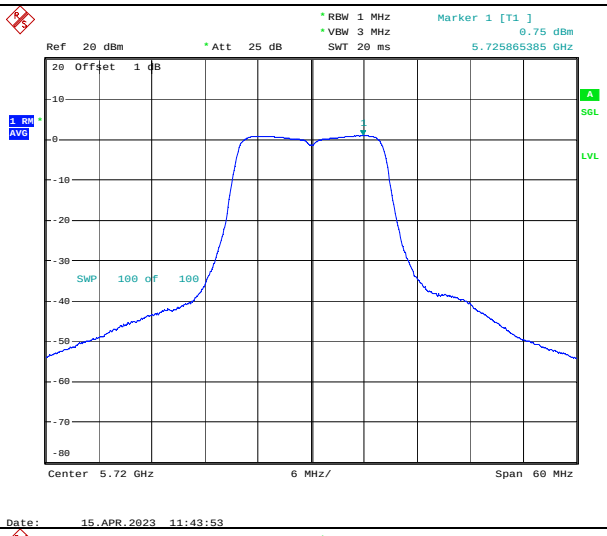
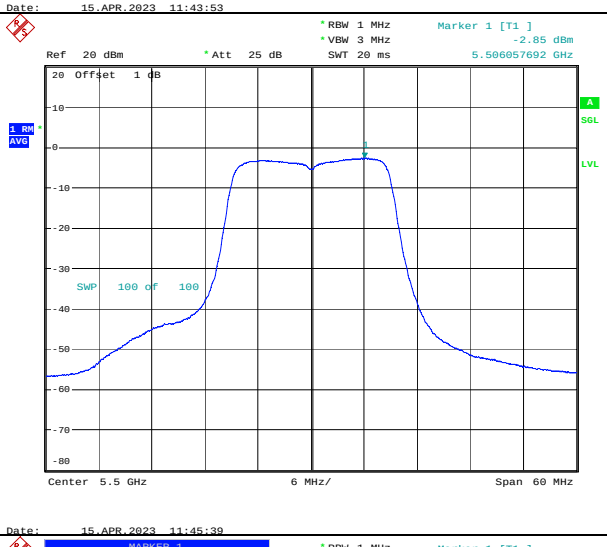
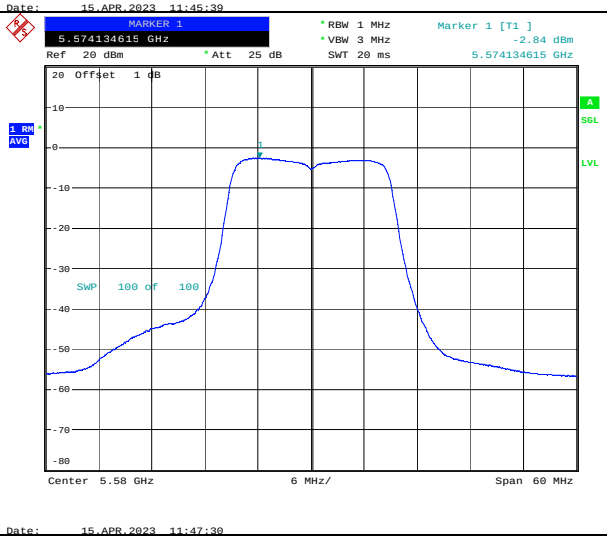
Maximum power spectral density	
802.11ac vht20 Highest Channel 5720MHz	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Middle Channel	

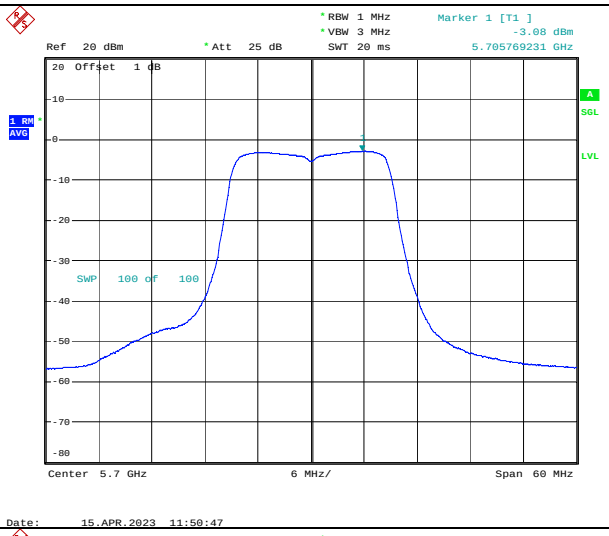
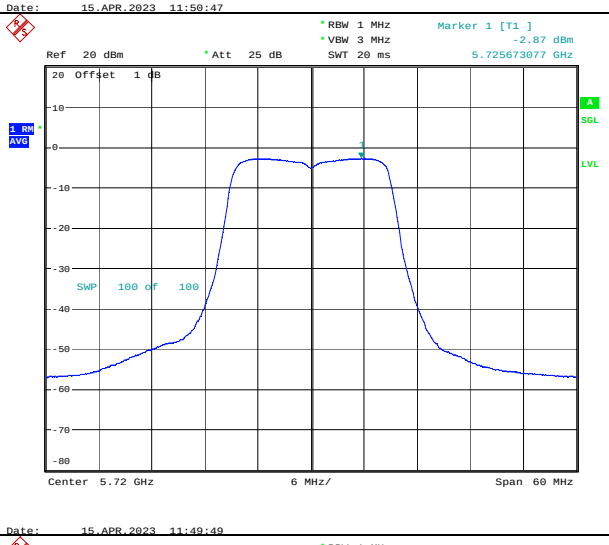
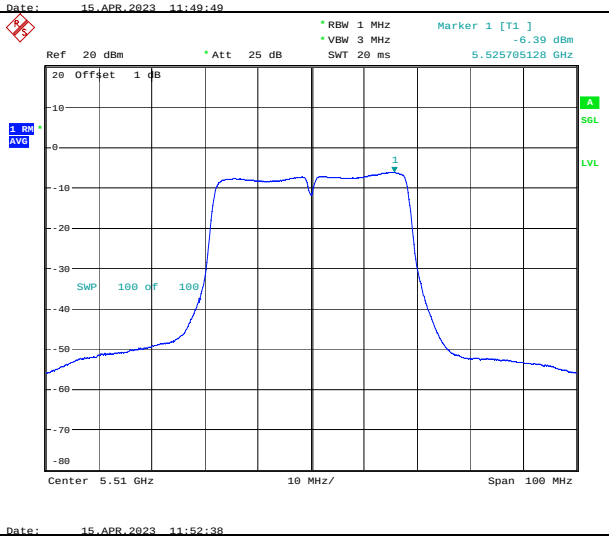
Maximum power spectral density	
802.11ac vht40 Highest Channel	
802.11ac vht40 Highest Channel 5710MHz	
802.11ac vht80 Lowest Channel	

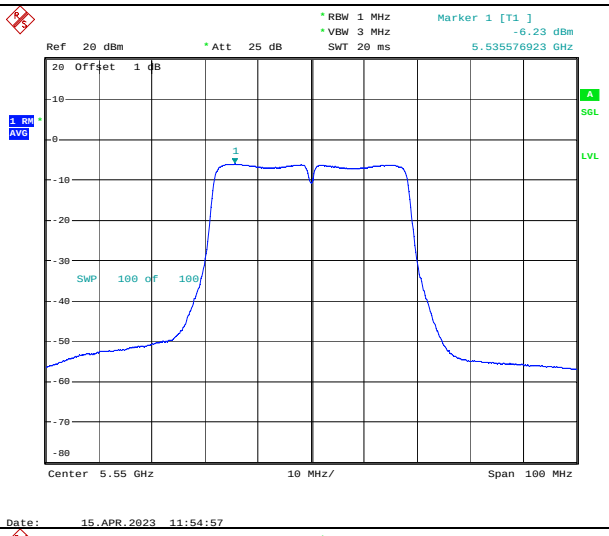
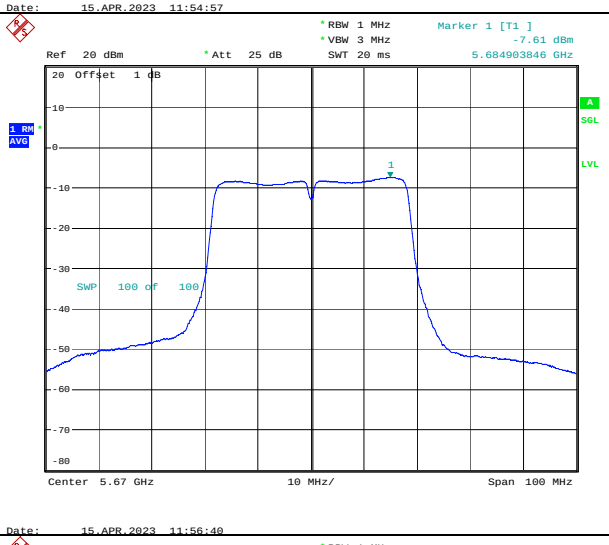
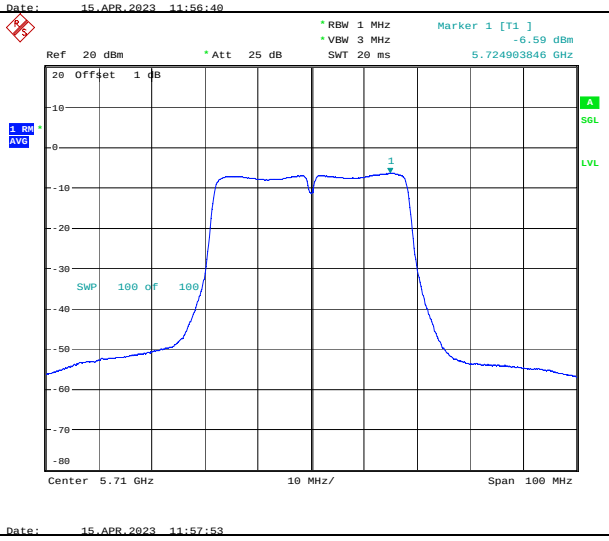
Maximum power spectral density	
802.11ac vht80 Middle Channel	
802.11ac vht80 Highest Channel	

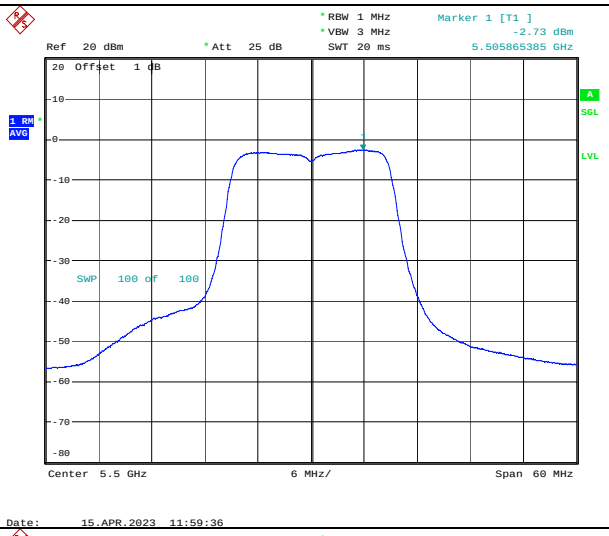
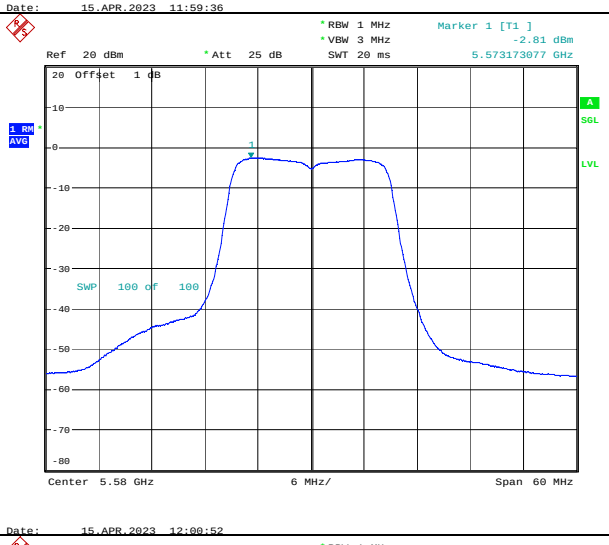
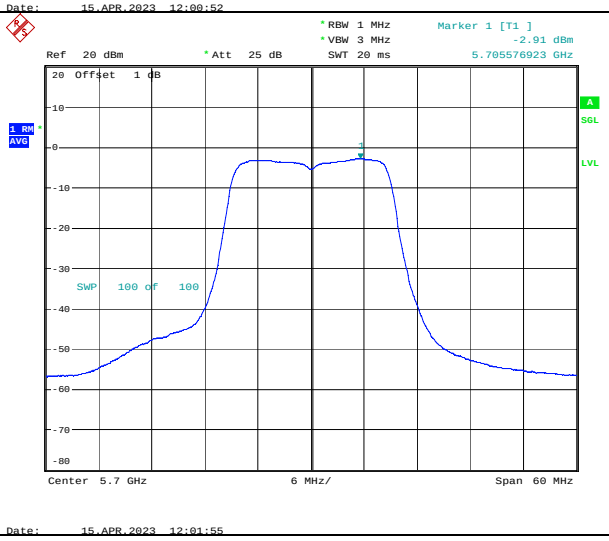
Chain 1:

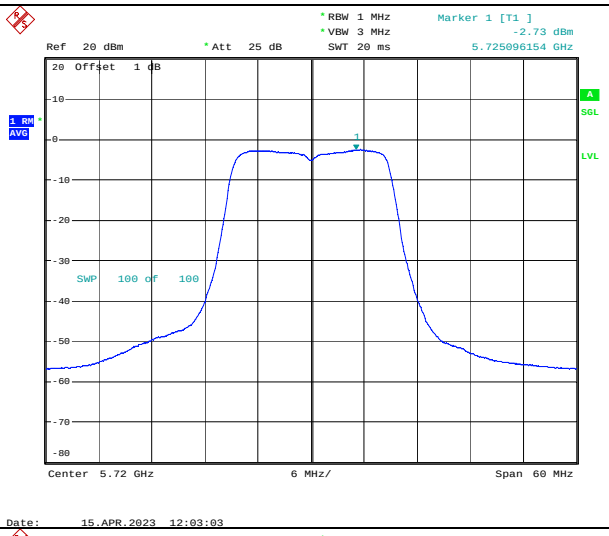
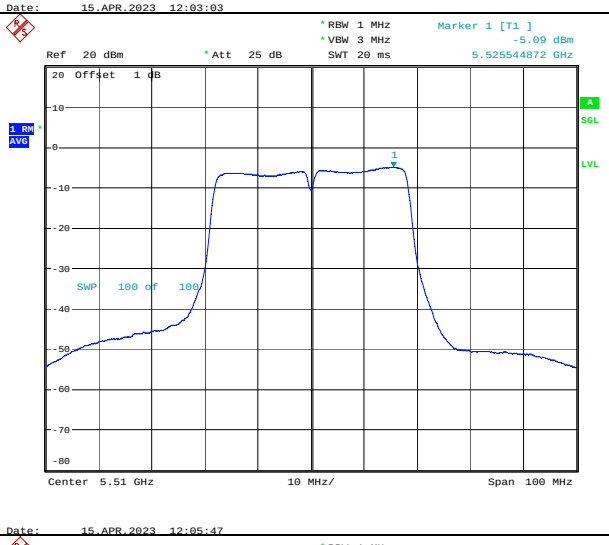
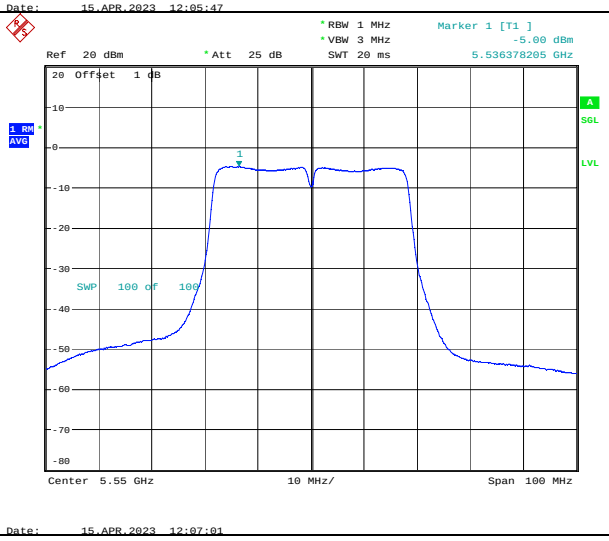
Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

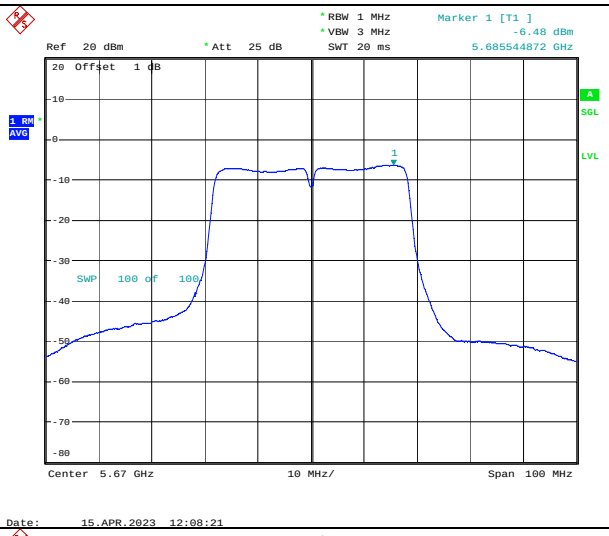
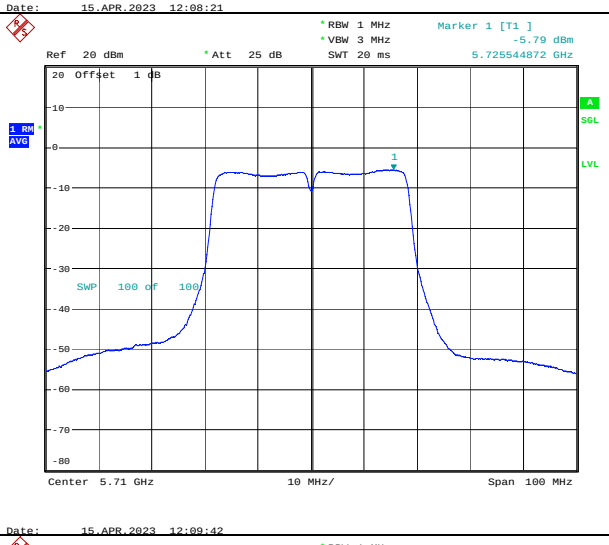
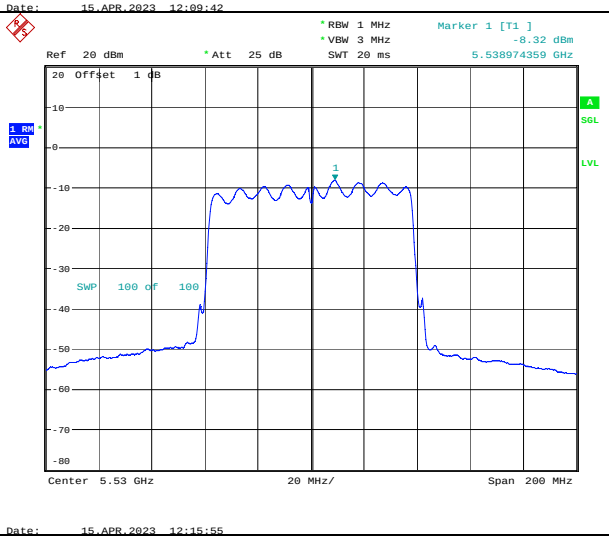
Maximum power spectral density	
802.11a Highest Channel 5720MHz	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	

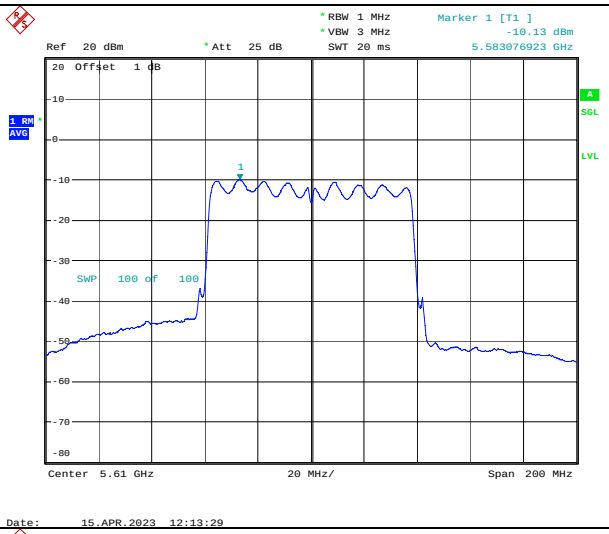
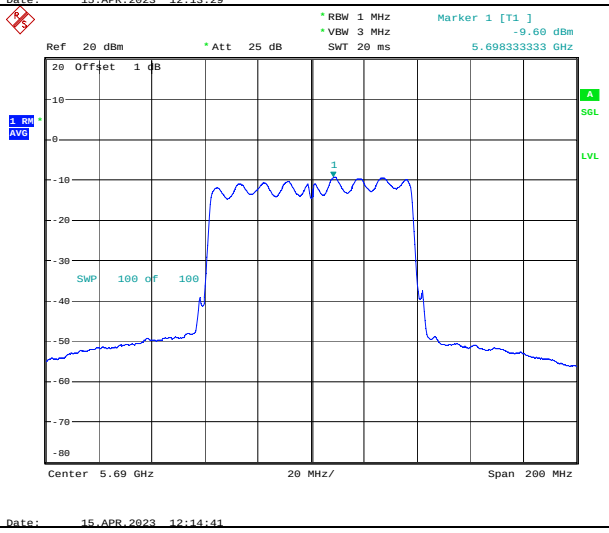
Maximum power spectral density	
802.11n ht20 Highest Channel	
802.11n ht20 Highest Channel 5720MHz	
802.11n ht40 Lowest Channel	

Maximum power spectral density	
802.11n ht40 Middle Channel	
802.11n ht40 Highest Channel	
802.11n ht40 Highest Channel 5710MHz	

Maximum power spectral density	
802.11ac vht20 Lowest Channel	
802.11ac vht20 Middle Channel	
802.11ac ht20 Highest Channel	

Maximum power spectral density	
802.11ac vht20 Highest Channel 5720MHz	
802.11ac vht40 Lowest Channel	
802.11ac vht40 Middle Channel	

Maximum power spectral density	
802.11ac vht40 Highest Channel	
802.11ac vht40 Highest Channel 5710MHz	
802.11ac vht80 Lowest Channel	

Maximum power spectral density	
802.11ac vht80 Middle Channel	
802.11ac vht80 Highest Channel	

4.6 Duty Cycle:

Serial Number:	21GI-4	Test Date:	2023/04/13
Test Site:	RF	Test Mode:	Transmitting
Tester:	panda.Sun	Test Result:	N/A

Environmental Conditions:					
Temperature: (℃)	25.4	Relative Humidity: (%)	64	ATM Pressure: (kPa)	100.2

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	100147	2023/03/31	2024/03/30
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A

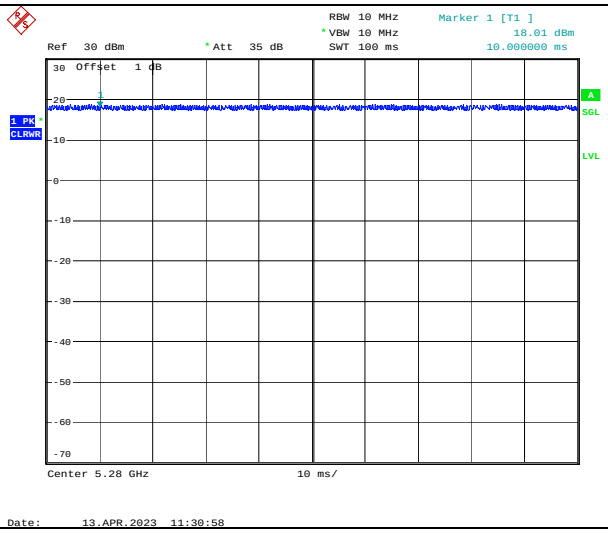
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

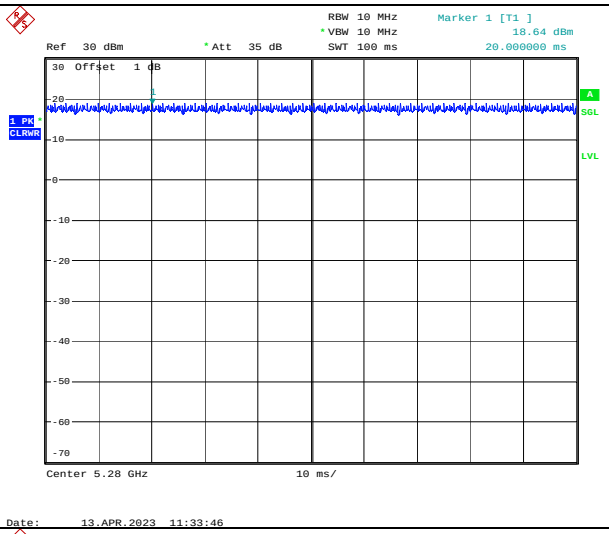
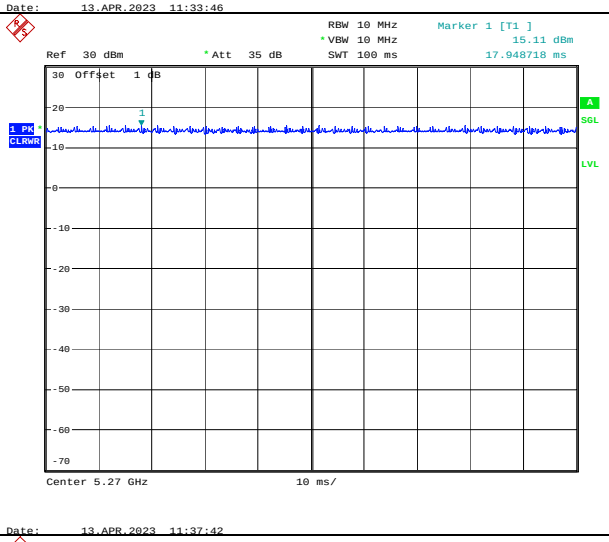
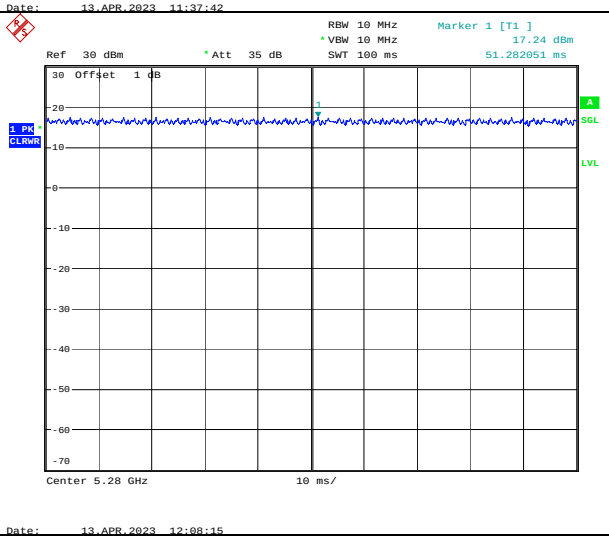
Test Data:

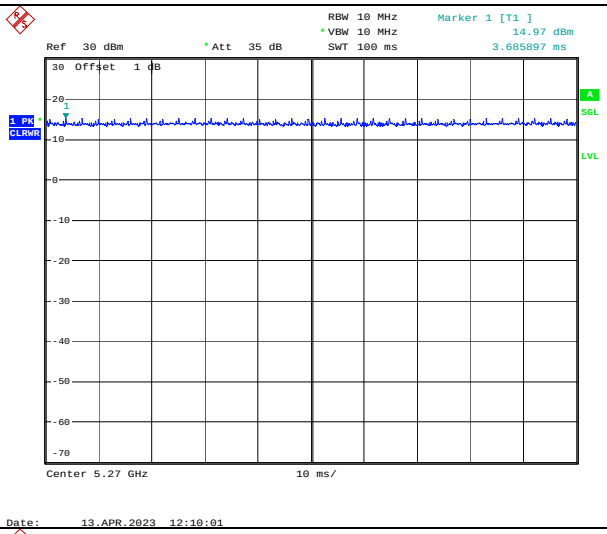
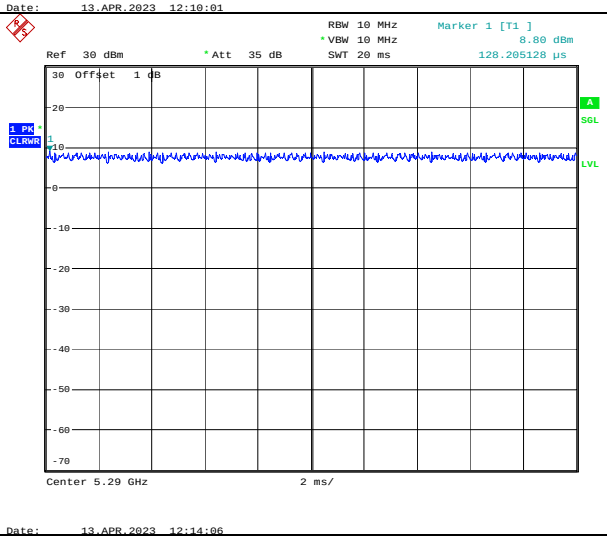
Test Modes	Ton (ms)	Ton+off (ms)	Duty cycle (%)	1/T (Hz)	Duty Factor (dB)
802.11a	100	100	100.00	/	/
802.11n ht20	100	100	100.00	/	/
802.11n ht40	100	100	100.00	/	/
802.11ac vht20	100	100	100.00	/	/
802.11ac vht40	100	100	100.00	/	/
802.11ac vht80	100	100	100.00	/	/

Duty Cycle

802.11a



Duty Cycle	
802.11n ht20	
802.11n ht40	
802.11ac vht20	

Duty Cycle	
802.11ac vht40	
802.11ac vht80	

5. RF EXPOSURE EVALUATION

5.1 Applicable Standard

FCC §15.247 (i)

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See §1.1307(b)(1) of this chapter.

5.2 Procedure

According to §1.1307(b)(3)(i)

(C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

5.3 Measurement Result

Operation Modes	Frequency (MHz)	λ/2π (mm)	Distance (mm)	Exemption ERP		Maximum Conducted Power including Tune-up Tolerance (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	MPE-Based Exemption
				(mW)	(dBm)					
WLAN 2.4G	2412-2462	19.80	200	768	28.85	15.0	3.29	16.14	41.11	Compliant
WLAN 5.2G	5150-5250	9.22	200	768	28.85	12.0	4.42	14.27	26.73	Compliant
WLAN 5.3G	5250-5350	9.08	200	768	28.85	16.0	1.07	14.92	31.05	Compliant
WLAN 5.6G	5470-5725	8.69	200	768	28.85	16.0	3.05	16.9	48.98	Compliant
WLAN 5.8G	5725-5850	8.321	200	768	28.85	12.5	4.42	14.77	29.99	Compliant
Bluetooth BDR/EDR	2402-2480	19.89	200	768	28.85	6.5	3.05	7.4	5.50	Compliant
Bluetooth LE	2402-2480	19.89	200	768	28.85	4.5	3.05	5.4	3.47	Compliant

Result: The device compliant the MPE-Based Exemption at 20cm distances.

WLAN 2.4G and 5G can`t transmit simultaneously, Bluetooth and WLAN can transmission simultaneously.

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

= ERP $_{-BT}$/ ERP $_{th-BT}$ + ERP $_{-WLAN}$/ ERP $_{th-WLAN}$

=5.50/768+48.98/768

=0.07

Result: The device compliant the Exemption at 20cm distances.

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