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

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

TEST REPORT

Applicant: **Grandstream Networks, Inc.**
Address: 126 Brookline Ave., 3rd Floor Boston, MA 02215, USA

FCC ID: **YZZGWN7665**
IC: **11964A-GWN7665**
HVIN: **GWN7665**

Product Name: **802.11ax Tri-Band Wi-Fi 6E Access Point**

Standard(s): **47 CFR Part 15, Subpart C(15.247)**
RSS-247 Issue 3, August 2023
RSS-Gen, Issue 5, February 2021 Amendment 2
ANSI C63.10-2013
KDB 558074 D01 15.247 Meas Guidance v05r02

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

Report Number: **CR230955399-00D**

Date Of Issue: **2023/12/01**

Reviewed By: **Calvin Chen**
Title: RF Engineer

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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.

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CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR230955399-00D	Original Report	2023/12/01

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	802.11ax Tri-Band Wi-Fi 6E Access Point
EUT Model:	GWN7665
Operation Frequency:	2412-2462 MHz(802.11b/g/n ht20/ax hew20) 2422-2452 MHz(802.11n ht40/ax hew40)
Maximum Average Output Power (Conducted):	24.53dBm
Modulation Type:	802.11b:DSSS-DBPSK, DQPSK, CCK 802.11g/n:OFDM-BPSK, QPSK, 16QAM, 64QAM 802.11ax:OFDMA-BPSK, QPSK, 16QAM, 64QAM
Rated Input Voltage:	POE 48V
Serial Number:	RE/CE:2BI1-1;RF: 2BI1-2
EUT Received Date:	2023/9/20
EUT Received Status:	Good

Operation Frequency Detail:

For 802.11b/g/n ht20/ax hew20:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

Per section 15.31(m)/RSS-Gen, the below frequencies were performed the test as below:

Test Channel	Frequency (MHz)
Lowest	2412
Middle	2437
Highest	2462

For 802.11n ht40/ax hew40:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442
4	2427	8	2447
5	2432	9	2452
6	2437	/	/

Per section 15.31(m), the below frequencies were performed the test as below:

Test Channel	Frequency (MHz)
Lowest	2422
Middle	2437
Highest	2452

Antenna Information Detail▲:

Antenna	Antenna Type	input impedance (Ohm)	Frequency Range (MHz)	Antenna Gain (dBi)
Chain 0	PIFA	50	2400-2500	4.15
Chain 1	PIFA	50	2400-2500	4.15

The Method of §15.203 Compliance:

☒Antenna was permanently attached to the unit.

☐Antenna use a unique type of connector to attach to the EUT.

☐Unit was professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Accessory Information:

Accessory Description	Manufacturer	Model	Parameters
/	/	/	/

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:	RTL8852A MP Toolkit.exe

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

Test Modes	Test Channels	Test Frequency	Data rate	Power Level Setting	
				Chain 0	Chain 1
802.11b	Lowest	2412	1Mbps	20	20
	Additional	2432	1Mbps	20	21
	Middle	2437	1Mbps	21	22
	Additional	2442	1Mbps	20	21
	Highest	2462	1Mbps	17	17
802.11g	Lowest	2412	6Mbps	19	19
	Additional	2432	6Mbps	19	20
	Middle	2437	6Mbps	20	21
	Additional	2442	6Mbps	19	20
	Highest	2462	6Mbps	16	16
802.11n ht20	Lowest	2412	MCS0	19	19
	Additional	2432	MCS0	19	19
	Middle	2437	MCS0	20	20
	Additional	2442	MCS0	19	19
	Highest	2462	MCS0	17	17
802.11n ht40	Lowest	2422	MCS0	17	17
	Additional	2432	MCS0	19	19
	Middle	2437	MCS0	20	20
	Additional	2442	MCS0	19	19
	Highest	2452	MCS0	16	16
802.11ax he20	Lowest	2412	MCS0	20	20
	Additional	2432	MCS0	19	19
	Middle	2437	MCS0	20	20
	Additional	2442	MCS0	19	19
	Highest	2462	MCS0	16	16
802.11ax he40	Lowest	2422	MCS0	19	19
	Additional	2432	MCS0	19	19
	Middle	2437	MCS0	20	20
	Additional	2442	MCS0	19	19
	Highest	2452	MCS0	16	16

Note:
1. 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.
2. The device supports SISO in all modes, and MIMO 2T2R in 802.11n/ax modes, per pretest, 2T2R mode was the worst mode and reported for 802.11n/ax modes.
3. The device support Beamforming and non-beamforming mode for MIMO, per pretest, Beamforming mode was the worst mode and reported for MIMO.
4. For 802.11ax mode, the device not support partial RU mode.

1.2.2 Support Equipment List and Details

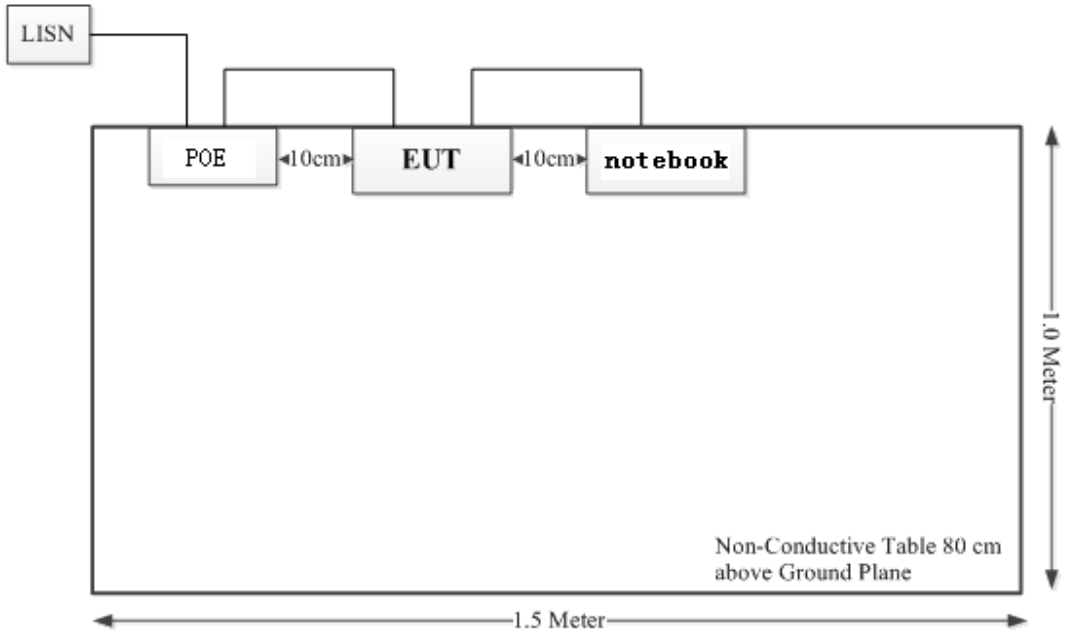
Manufacturer	Description	Model	Serial Number
DELL	Notebook	E6410	GYXJ3 A00 JSD2
DIGITAL	POE	G0720-480-050	3TV4E338182

1.2.3 Support Cable List and Details

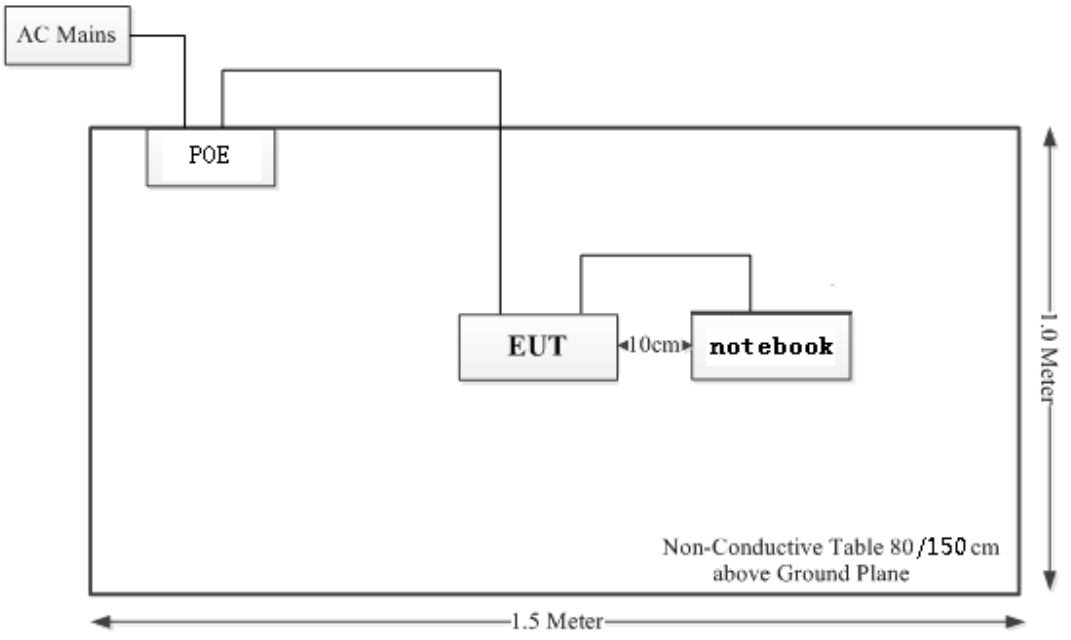
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	NO	NO	1	POE	EUT
RJ45 Cable	NO	NO	1	Notebook	EUT

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
§15.207(a) RSS-Gen Clause 8.8	AC line conducted emissions	Compliant
§15.205, §15.209, §15.247(d) RSS-Gen Clause 8.10	Spurious Emissions	Compliant
§15.247 (a)(2) RSS-247 Clause 5.2 a)	6 dB Bandwidth	Compliant
RSS-Gen Clause 6.7	99% Occupied Bandwidth	Compliant
§15.247(b)(3) RSS-247 Clause 5.4 d)	Maximum Conducted Output Power	Compliant
§15.247(d) RSS-247 Clause5.5	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e) RSS-247 Clause5.2 b)	Power Spectral Density	Compliant
§15.203 RSS-GEN Clause 6.8	Antenna Requirement	Compliant
FCC §2.1091	Maximum Permissible exposure	Compliant
RSS-102 §4	Exposure Limits	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.

RSS-Gen Clause 8.8

Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4, as measured using a 50 μH / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.
For an EUT that connects to the AC power lines indirectly, through another device, the requirement for compliance with the limits in table 4 shall apply at the terminals of the AC power-line mains cable of a representative support device, while it provides power to the EUT. The lower limit applies at the boundary between the frequency ranges. The device used to power the EUT shall be representative of typical applications.

Table 4 – AC power-line conducted emissions limits

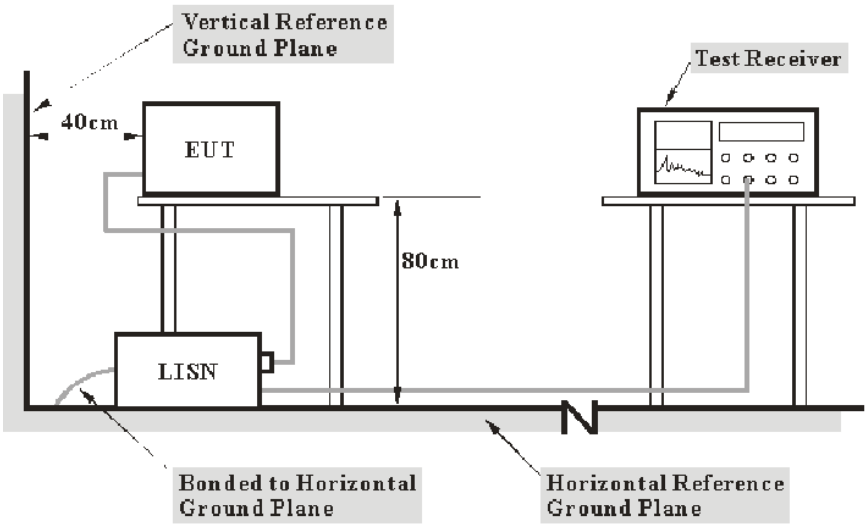
Frequency (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56[1]	56 to 46[1]
0.5 – 5	56	46
5 – 30	60	50

Note 1: The level decreases linearly with the logarithm of the frequency.

For an EUT with a permanent or detachable antenna operating between 150 kHz and 30 MHz, the AC power-line conducted emissions must be measured using the following configurations:
(a) Perform the AC power-line conducted emissions test with the antenna connected to determine compliance with the limits of table 4 outside the transmitter's fundamental emission band.

(b) Retest with a dummy load instead of the antenna to determine compliance with the limits of table 4 within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network that simulates the antenna in the fundamental frequency band.

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,RSS-Gen 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 §15.247 (d);

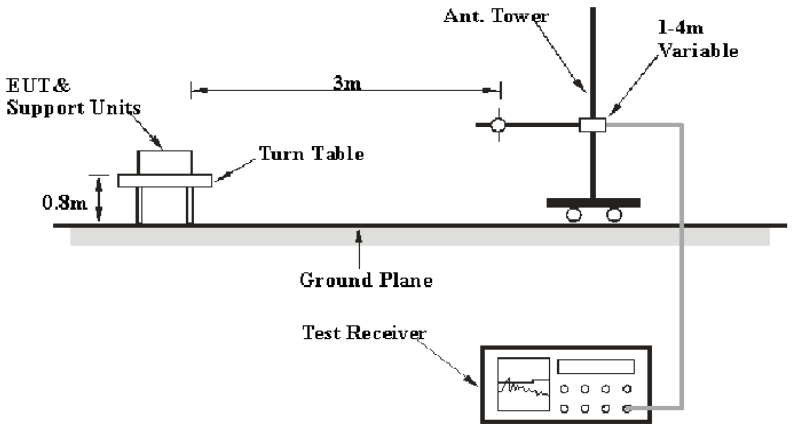
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

RSS-247 Clause 5.5

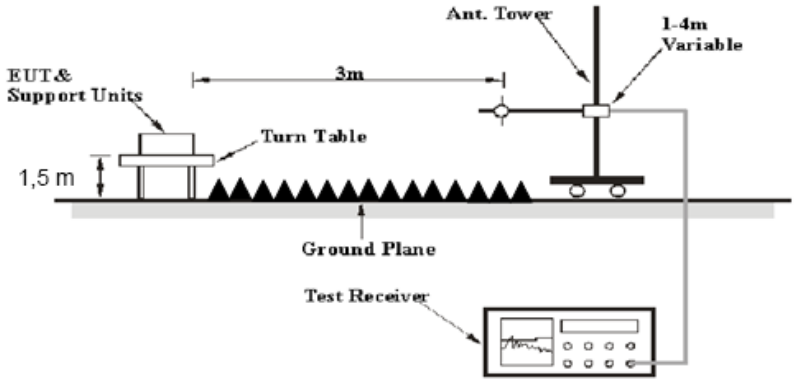
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required

3.2.2 EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emissions were performed in the 3 meters distance, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247,RSS-247,RSS-Gen 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 9 kHz to 25 GHz.

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

9 kHz-30MHz:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
9 kHz – 150 kHz	200 Hz	1 kHz	/	QP
150 kHz – 30 MHz	9 kHz	30 kHz	/	QP

30-1000MHz:

Detector	RBW	Video B/W	IF B/W
QP	100 kHz	300 kHz	120kHz

1GHz- 25GHz:

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

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

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

3.2.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = Antenna Factor + Cable Loss- Amplifier Gain

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 6 dB Emission Bandwidth:

3.3.1 Applicable Standard

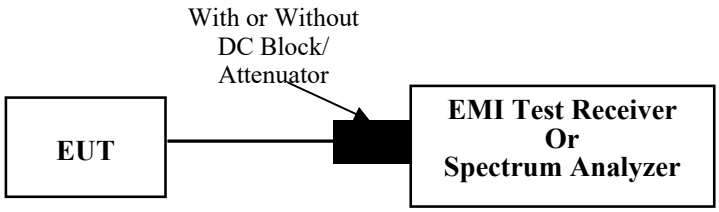
FCC §15.247 (a)(2)

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

RSS-247 Clause 5.2 a

The minimum 6 dB bandwidth shall be 500 kHz.

3.3.2 EUT Setup



3.3.3 Test Procedure

According to ANSI C63.10-2013 Section 11.8

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.

3.4 99% Occupied Bandwidth:

3.4.1 Applicable Standard

RSS-Gen Clause 6.7

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the "x dB bandwidth" is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

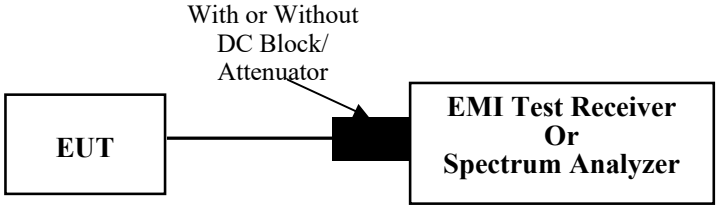
The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level 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, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

3.4.2 EUT Setup



3.4.3 Test Procedure

According to ANSI C63.10-2013 Section 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).

3.5 Maximum conducted output power:

3.5.1 Applicable Standard

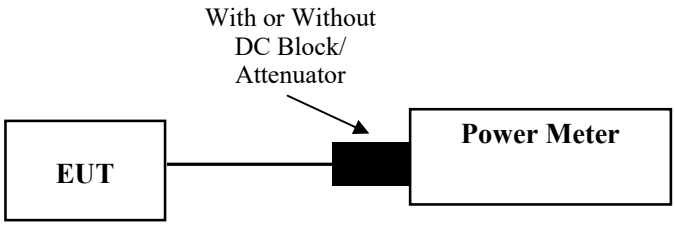
FCC §15.247 (b)(3)

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

RSS-247 Clause 5.4 d

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

3.5.2 EUT Setup



3.5.3 Test Procedure

For Peak output power:

According to ANSI C63.10-2013 Section 11.9.1.3

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

For Average output power:

According to ANSI C63.10-2013 Section 11.9.2.3.2

Method AVGPM-G is a measurement using a gated RF average power meter.

Alternatively, 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.

3.6 Maximum power spectral density:

3.6.1 Applicable Standard

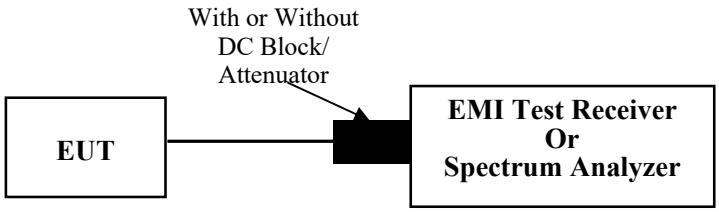
FCC §15.247 (e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

RSS-247 Clause5.2 b

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

3.6.2 EUT Setup



3.6.3 Test Procedure

According to ANSI C63.10-2013 Section 11.10.2

a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ [3 × RBW].
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

3.7 100 kHz Bandwidth of Frequency Band Edge:

3.7.1 Applicable Standard

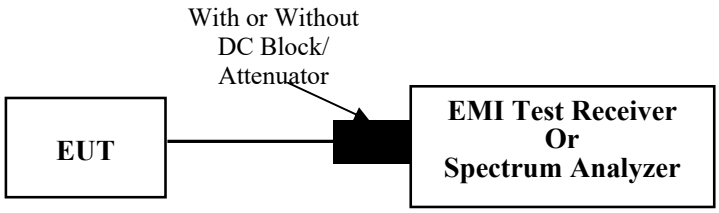
FCC §15.247 (d);

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

RSS-247 Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required

3.7.2 EUT Setup



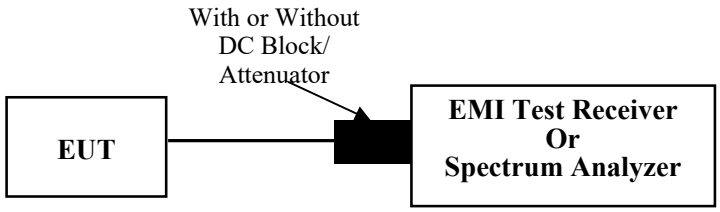
3.7.3 Test Procedure

According to ANSI C63.10-2013 Section 11.11

a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ [3 × RBW].
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

3.8 Duty Cycle:

3.8.1 EUT Setup



3.8.2 Test Procedure

According to ANSI C63.10-2013 Section 11.6

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.)

3.9 Antenna Requirement

3.9.1 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.

RSS-GEN Clause 6.8

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).
When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.
The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.
For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:
This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

3.9.2 Judgment

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

4. Test DATA AND RESULTS

4.1 AC Line Conducted Emissions

Serial Number:	2BI1-1	Test Date:	2023/09/23
Test Site:	CE	Test Mode:	Transmitting maximum output power mode(802.11 n40 low channel)
Tester:	David Huang	Test Result:	Pass

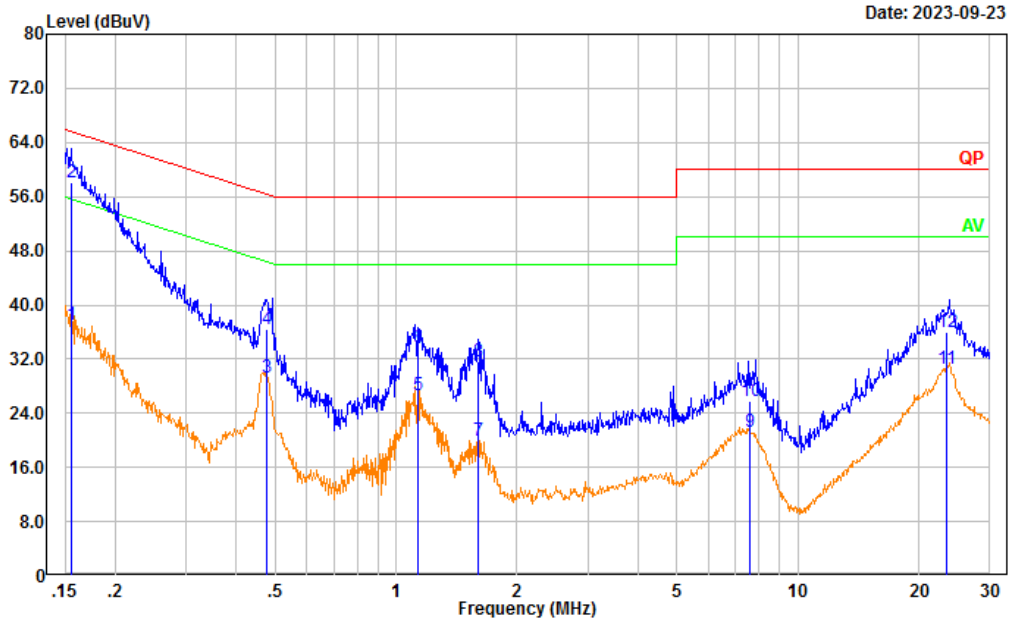
Environmental Conditions:					
Temperature: (℃)	26.4	Relative Humidity: (%)	58	ATM Pressure: (kPa)	100.2

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101134	2023/03/31	2024/03/30
R&S	EMI Test Receiver	ESR3	102726	2023/03/31	2024/03/30
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2023/08/06	2024/08/05
Audix	Test Software	E3	190306 (V9)	N/A	N/A

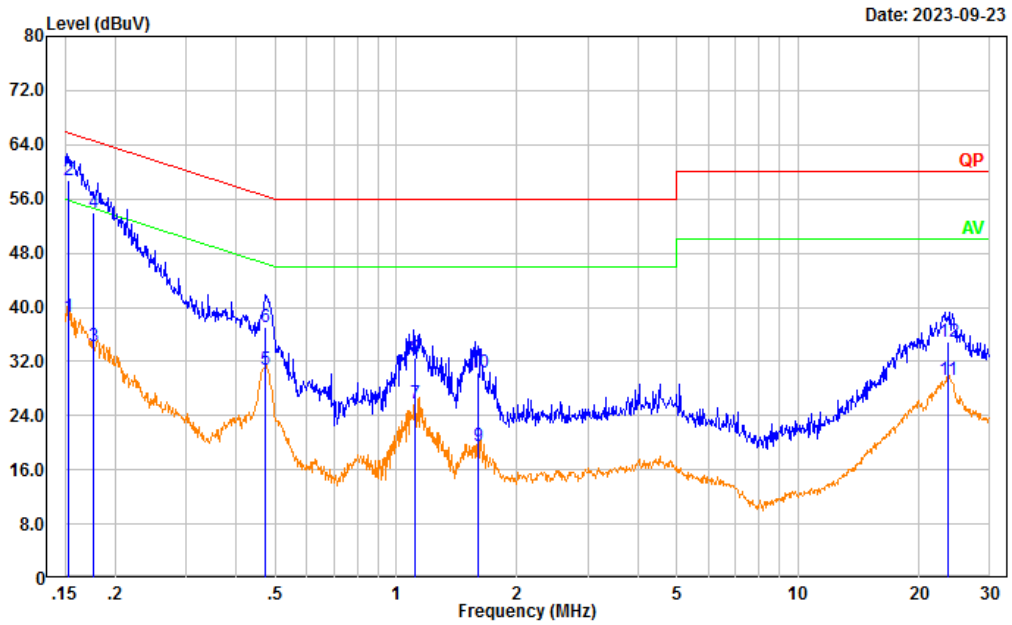
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Project No.: CR230955399-RF
Tester: David Huang
Port: Line
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.156	27.53	9.61	37.14	55.68	18.54	Average
2	0.156	48.56	9.61	58.17	65.68	7.51	QP
3	0.477	19.65	9.61	29.26	46.39	17.13	Average
4	0.477	26.89	9.61	36.50	56.39	19.89	QP
5	1.132	17.12	9.62	26.74	46.00	19.26	Average
6	1.132	23.96	9.62	33.58	56.00	22.42	QP
7	1.601	10.41	9.63	20.04	46.00	25.96	Average
8	1.601	21.91	9.63	31.54	56.00	24.46	QP
9	7.614	11.55	9.67	21.22	50.00	28.78	Average
10	7.614	16.16	9.67	25.83	60.00	34.17	QP
11	23.350	20.72	9.81	30.53	50.00	19.47	Average
12	23.350	26.12	9.81	35.93	60.00	24.07	QP

Project No.: CR230955399-RF
Tester: David Huang
Port: neutral
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.153	28.93	9.61	38.54	55.82	17.28	Average
2	0.153	49.24	9.61	58.85	65.82	6.97	QP
3	0.177	24.59	9.61	34.20	54.63	20.43	Average
4	0.177	44.42	9.61	54.03	64.63	10.60	QP
5	0.474	21.27	9.61	30.88	46.44	15.56	Average
6	0.474	27.54	9.61	37.15	56.44	19.29	QP
7	1.119	16.23	9.62	25.85	46.00	20.15	Average
8	1.119	22.88	9.62	32.50	56.00	23.50	QP
9	1.602	9.98	9.63	19.61	46.00	26.39	Average
10	1.602	20.73	9.63	30.36	56.00	25.64	QP
11	23.614	19.57	9.75	29.32	50.00	20.68	Average
12	23.614	25.07	9.75	34.82	60.00	25.18	QP

4.2 Radiation Spurious Emissions

Serial Number:	2BI1-1	Test Date:	Below 1G: 2023/11/27 Above 1G: 2023/11/4 to 2023/11/30
Test Site:	966-1, 966-2	Test Mode:	Transmitting
Tester:	Carl Xue, Mack Huang	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.4~25.5	Relative Humidity: (%)	45~55	ATM Pressure: (kPa)	100.9~101.3

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Below 1G					
Sunol Sciences	Antenna	JB6	A082520-6	2023/9/18	2026/9/17
BACL	Loop Antenna	1313-1P	3092721	2023/11/9	2026/11/8
R&S	EMI Test Receiver	ESR3	102724	2023/3/31	2024/3/30
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2023/7/16	2024/7/15
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2023/7/16	2024/7/15
Sonoma	Amplifier	310N	186165	2023/7/16	2024/7/15
Audix	Test Software	E3	201021 (V9)	N/A	N/A
Above 1G					
AH	Double Ridge Guide Horn Antenna	SAS-571	1394	2023/02/22	2026/02/21
R&S	Spectrum Analyzer	FSV40	101591	2023/03/31	2024/03/30
MICRO-COAX	Coaxial Cable	UFA210A-1-1200-70U300	217423-008	2023/08/06	2024/08/05
MICRO-COAX	Coaxial Cable	UFA210A-1-2362-300300	235780-001	2023/08/06	2024/08/05
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2022/11/07	2023/11/08
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2023/11/08	2024/11/07
Audix	Test Software	E3	201021 (V9)	N/A	N/A
PASTERNACK	Horn Antenna	PE9852/2F-20	112002	2021/02/05	2024/02/04
Quinstar	Preamplifier	QLW-18405536-JO	15964001005	2023/09/15	2024/09/14
MICRO-COAX	Coaxial Cable	UFB142A-1-2362-200200	235772-001	2023/08/06	2024/08/05
E-Microwave	Band Rejection Filter	2400-2483.5MHz	OE01902424	2023/08/06	2024/08/05
Mini Circuits	High Pass Filter	VHF-6010+	31119	2023/08/06	2024/08/05

** 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).*

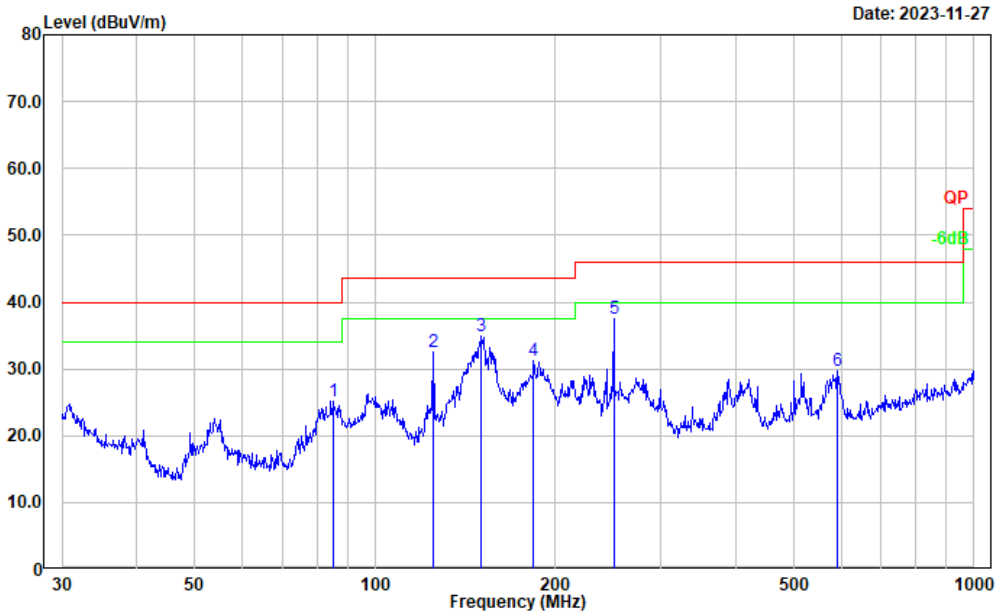
Test Data:

After pre-scan in the X, Y and Z axes of orientation, the worst case is refer to plots.
For 9kHz-30MHz, the amplitude of spurious emissions attenuated more than 20 dB below the limit was not be recorded.

1) 30MHz-1GHz (802.11g)

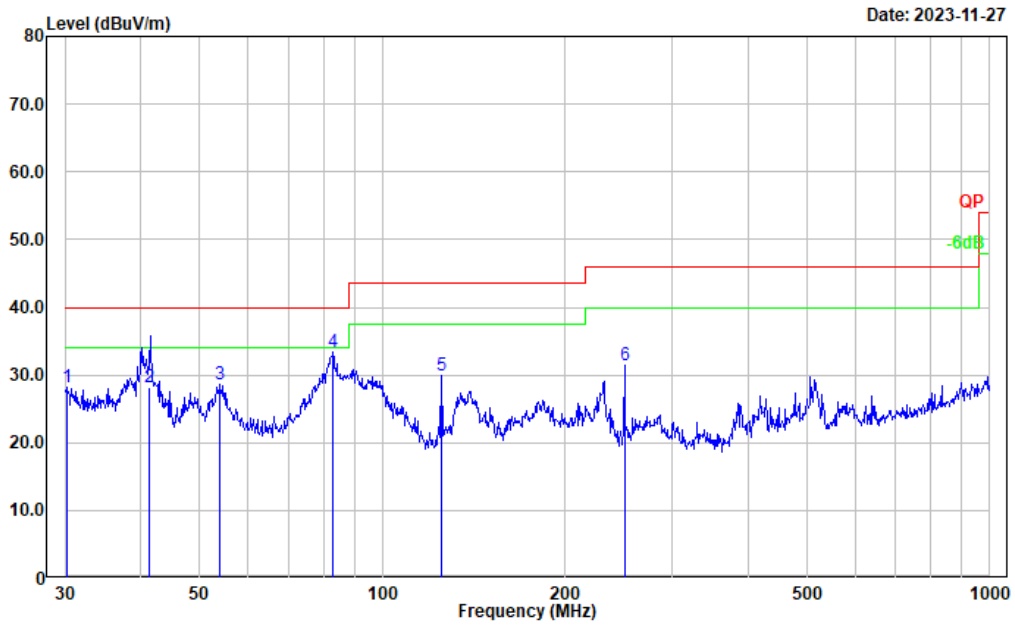
Low channel

Project No.: CR230955399-RF
Tester: Carl Xue
Polarization: horizontal
Note: Transmitting(802.11g Low Channel)



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	85.298	42.36	-17.19	25.17	40.00	14.83	Peak
2	125.007	43.75	-11.31	32.44	43.50	11.06	Peak
3	150.538	46.94	-11.93	35.01	43.50	8.49	Peak
4	183.844	44.65	-13.52	31.13	43.50	12.37	Peak
5	250.301	50.73	-13.18	37.55	46.00	8.45	Peak
6	590.974	35.06	-5.28	29.78	46.00	16.22	Peak

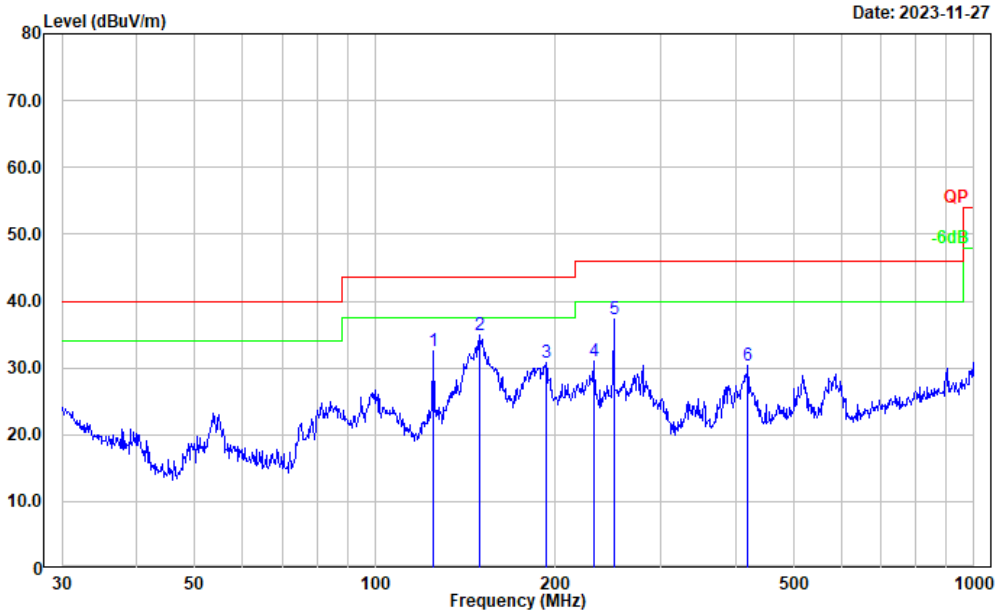
Project No.: CR230955399-RF
Tester: Carl Xue
Polarization: vertical
Note: Transmitting(802.11g Low Channel)



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.317	32.24	-4.04	28.20	40.00	11.80	Peak
2	41.251	40.21	-12.12	28.09	40.00	11.91	QP
3	54.071	45.88	-17.16	28.72	40.00	11.28	Peak
4	82.938	50.70	-17.23	33.47	40.00	6.53	Peak
5	125.007	41.14	-11.31	29.83	43.50	13.67	Peak
6	250.301	44.66	-13.18	31.48	46.00	14.52	Peak

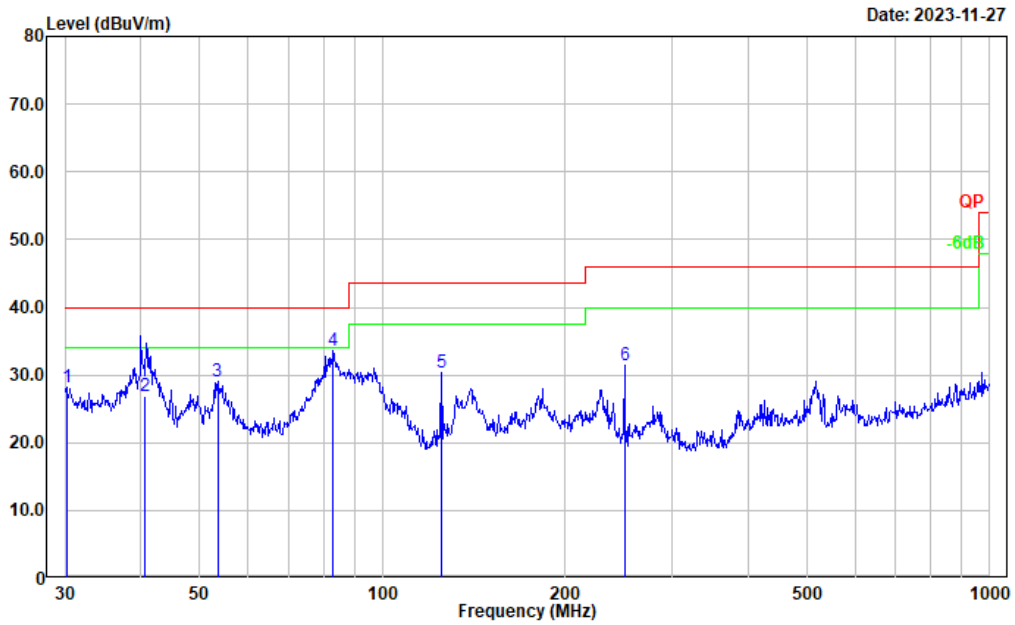
Middle channel

Project No.: CR230955399-RF
Tester: Carl Xue
Polarization: horizontal
Note: Transmitting(802.11g Middle Channel)



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	125.007	43.79	-11.31	32.48	43.50	11.02	Peak
2	149.486	46.91	-11.90	35.01	43.50	8.49	Peak
3	193.095	43.91	-13.04	30.87	43.50	12.63	Peak
4	231.718	44.07	-13.08	30.99	46.00	15.01	Peak
5	250.301	50.57	-13.18	37.39	46.00	8.61	Peak
6	419.108	38.30	-7.96	30.34	46.00	15.66	Peak

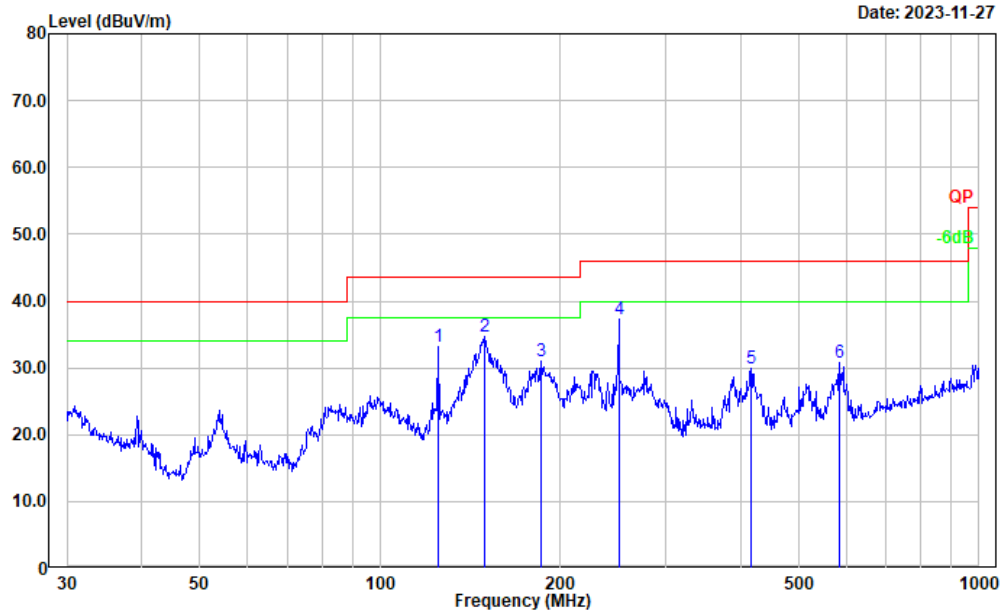
Project No.: CR230955399-RF
Tester: Carl Xue
Polarization: vertical
Note: Transmitting(802.11g Middle Channel)



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.211	32.10	-3.96	28.14	40.00	11.86	Peak
2	40.611	38.74	-11.77	26.97	40.00	13.03	QP
3	53.505	46.15	-17.15	29.00	40.00	11.00	Peak
4	82.938	50.86	-17.23	33.63	40.00	6.37	Peak
5	125.007	41.73	-11.31	30.42	43.50	13.08	Peak
6	250.301	44.59	-13.18	31.41	46.00	14.59	Peak

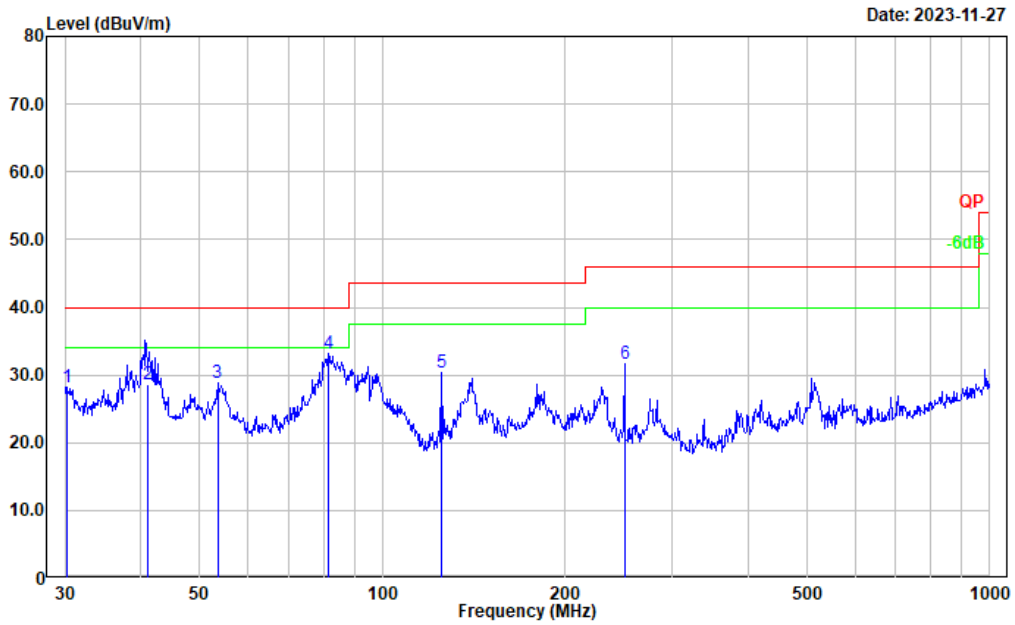
High channel

Project No.: CR230955399-RF
Tester: Carl Xue
Polarization: horizontal
Note: Transmitting(802.11g High Channel)



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	125.007	44.51	-11.31	33.20	43.50	10.30	Peak
2	149.486	46.60	-11.90	34.70	43.50	8.80	Peak
3	185.788	44.58	-13.52	31.06	43.50	12.44	Peak
4	250.301	50.49	-13.18	37.31	46.00	8.69	Peak
5	416.179	38.01	-8.10	29.91	46.00	16.09	Peak
6	584.790	36.19	-5.44	30.75	46.00	15.25	Peak

Project No.: CR230955399-RF
Tester: Carl Xue
Polarization: vertical
Note: Transmitting(802.11g High Channel)



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.211	32.14	-3.96	28.18	40.00	11.82	Peak
2	41.007	40.52	-11.99	28.53	40.00	11.47	QP
3	53.505	46.06	-17.15	28.91	40.00	11.09	Peak
4	81.497	50.63	-17.37	33.26	40.00	6.74	Peak
5	125.007	41.57	-11.31	30.26	43.50	13.24	Peak
6	250.301	44.82	-13.18	31.64	46.00	14.36	Peak

1) 1-25GHz:

802.11b Mode Chain 0:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 2412 MHz							
2390.000	26.53	PK	H	31.71	58.24	74.00	15.76
2390.000	15.75	AV	H	31.71	47.46	54.00	6.54
2390.000	26.71	PK	V	31.71	58.42	74.00	15.58
2390.000	16.89	AV	V	31.71	48.60	54.00	5.40
4824.000	38.58	PK	H	11.26	49.84	74.00	24.16
4824.000	31.69	AV	H	11.26	42.95	54.00	11.05
4824.000	39.12	PK	V	11.26	50.38	74.00	23.62
4824.000	32.06	AV	V	11.26	43.32	54.00	10.68
Additional Channel: 2432 MHz							
2390.000	26.51	PK	H	31.71	58.22	74.00	15.78
2390.000	14.41	AV	H	31.71	46.12	54.00	7.88
2390.000	26.05	PK	V	31.71	57.76	74.00	16.24
2390.000	14.59	AV	V	31.71	46.30	54.00	7.70
Middle Channel: 2437 MHz							
2390.000	26.74	PK	H	31.71	58.45	74.00	15.55
2390.000	14.63	AV	H	31.71	46.34	54.00	7.66
2390.000	26.08	PK	V	31.71	57.79	74.00	16.21
2390.000	15.03	AV	V	31.71	46.74	54.00	7.26
2483.500	26.83	PK	H	32.19	59.02	74.00	14.98
2483.500	14.75	AV	H	32.19	46.94	54.00	7.06
2483.500	26.20	PK	V	32.19	58.39	74.00	15.61
2483.500	15.27	AV	V	32.19	47.46	54.00	6.54
4874.000	36.49	PK	H	11.45	47.94	74.00	26.06
4874.000	27.70	AV	H	11.45	39.15	54.00	14.85
4874.000	37.16	PK	V	11.45	48.61	74.00	25.39
4874.000	28.12	AV	V	11.45	39.57	54.00	14.43
Additional Channel: 2442 MHz							
2483.500	26.58	PK	H	32.19	58.77	74.00	15.23
2483.500	14.95	AV	H	32.19	47.14	54.00	6.86
2483.500	26.99	PK	V	32.19	59.18	74.00	14.82
2483.500	14.42	AV	V	32.19	46.61	54.00	7.39
High Channel: 2462 MHz							
2483.500	26.60	PK	H	32.19	58.79	74.00	15.21
2483.500	14.92	AV	H	32.19	47.11	54.00	6.89
2483.500	26.52	PK	V	32.19	58.71	74.00	15.29
2483.500	14.20	AV	V	32.19	46.39	54.00	7.61

4924.000	35.84	PK	H	11.67	47.51	74.00	26.49
4924.000	23.18	AV	H	11.67	34.85	54.00	19.15
4924.000	36.15	PK	V	11.67	47.82	74.00	26.18
4924.000	24.96	AV	V	11.67	36.63	54.00	17.37

802.11b Mode Chain 1:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel:				2412	MHz		
2390.000	26.60	PK	H	31.71	58.31	74.00	15.69
2390.000	14.43	AV	H	31.71	46.14	54.00	7.86
2390.000	26.93	PK	V	31.71	58.64	74.00	15.36
2390.000	15.11	AV	V	31.71	46.82	54.00	7.18
4824.000	36.68	PK	H	11.26	47.94	74.00	26.06
4824.000	22.82	AV	H	11.26	34.08	54.00	19.92
4824.000	36.90	PK	V	11.26	48.16	74.00	25.84
4824.000	23.37	AV	V	11.26	34.63	54.00	19.37
Additional Channel:				2432	MHz		
2390.000	26.46	PK	H	31.71	58.17	74.00	15.83
2390.000	14.51	AV	H	31.71	46.22	54.00	7.78
2390.000	26.61	PK	V	31.71	58.32	74.00	15.68
2390.000	14.52	AV	V	31.71	46.23	54.00	7.77
Middle Channel:				2437	MHz		
2390.000	26.52	PK	H	31.71	58.23	74.00	15.77
2390.000	14.56	AV	H	31.71	46.27	54.00	7.73
2390.000	26.89	PK	V	31.71	58.60	74.00	15.40
2390.000	14.86	AV	V	31.71	46.57	54.00	7.43
2483.500	26.87	PK	H	32.19	59.06	74.00	14.94
2483.500	14.79	AV	H	32.19	46.98	54.00	7.02
2483.500	26.17	PK	V	32.19	58.36	74.00	15.64
2483.500	14.55	AV	V	32.19	46.74	54.00	7.26
4874.000	36.47	PK	H	11.45	47.92	74.00	26.08
4874.000	23.08	AV	H	11.45	34.53	54.00	19.47
4874.000	36.76	PK	V	11.45	48.21	74.00	25.79
4874.000	24.09	AV	V	11.45	35.54	54.00	18.46
Additional Channel:				2442	MHz		
2483.500	26.46	PK	H	32.19	58.65	74.00	15.35
2483.500	14.52	AV	H	32.19	46.71	54.00	7.29
2483.500	26.11	PK	V	32.19	58.30	74.00	15.70
2483.500	14.45	AV	V	32.19	46.64	54.00	7.36
High Channel:				2462	MHz		

2483.500	26.93	PK	H	32.19	59.12	74.00	14.88
2483.500	14.19	AV	H	32.19	46.38	54.00	7.62
2483.500	26.51	PK	V	32.19	58.70	74.00	15.30
2483.500	14.42	AV	V	32.19	46.61	54.00	7.39
4924.000	36.13	PK	H	11.67	47.80	74.00	26.20
4924.000	23.39	AV	H	11.67	35.06	54.00	18.94
4924.000	36.17	PK	V	11.67	47.84	74.00	26.16
4924.000	23.68	AV	V	11.67	35.35	54.00	18.65

802.11g Mode Chain 0:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 2412 MHz							
2390.000	26.68	PK	H	31.71	58.39	74.00	15.61
2390.000	14.71	AV	H	31.71	46.42	54.00	7.58
2390.000	27.84	PK	V	31.71	59.55	74.00	14.45
2390.000	15.08	AV	V	31.71	46.79	54.00	7.21
4824.000	37.55	PK	H	11.26	48.81	74.00	25.19
4824.000	22.91	AV	H	11.26	34.17	54.00	19.83
4824.000	38.08	PK	V	11.26	49.34	74.00	24.66
4824.000	23.10	AV	V	11.26	34.36	54.00	19.64
Additional Channel: 2432 MHz							
2390.000	26.58	PK	H	31.71	58.29	74.00	15.71
2390.000	14.52	AV	H	31.71	46.23	54.00	7.77
2390.000	26.56	PK	V	31.71	58.27	74.00	15.73
2390.000	14.59	AV	V	31.71	46.30	54.00	7.70
Middle Channel: 2437 MHz							
4874.000	26.85	PK	H	11.45	38.30	74.00	35.70
4874.000	15.63	AV	H	11.45	27.08	54.00	26.92
4874.000	27.33	PK	V	11.45	38.78	74.00	35.22
4874.000	14.69	AV	V	11.45	26.14	54.00	27.86
Additional Channel: 2442 MHz							
2483.500	26.44	PK	H	32.19	58.63	74.00	15.37
2483.500	14.42	AV	H	32.19	46.61	54.00	7.39
2483.500	26.53	PK	V	32.19	58.72	74.00	15.28
2483.500	14.52	AV	V	32.19	46.71	54.00	7.29
High Channel: 2462 MHz							
2483.500	26.94	PK	H	32.19	59.13	74.00	14.87
2483.500	14.53	AV	H	32.19	46.72	54.00	7.28
2483.500	26.49	PK	V	32.19	58.68	74.00	15.32
2483.500	14.46	AV	V	32.19	46.65	54.00	7.35

4924.000	36.15	PK	H	11.67	47.82	74.00	26.18
4924.000	22.26	AV	H	11.67	33.93	54.00	20.07
4924.000	36.27	PK	V	11.67	47.94	74.00	26.06
4924.000	22.51	AV	V	11.67	34.18	54.00	19.82

802.11g Mode Chain 1:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel:				2412	MHz		
2390.000	26.50	PK	H	31.71	58.21	74.00	15.79
2390.000	14.79	AV	H	31.71	46.50	54.00	7.50
2390.000	27.07	PK	V	31.71	58.78	74.00	15.22
2390.000	15.04	AV	V	31.71	46.75	54.00	7.25
4824.000	36.62	PK	H	11.26	47.88	74.00	26.12
4824.000	22.38	AV	H	11.26	33.64	54.00	20.36
4824.000	37.07	PK	V	11.26	48.33	74.00	25.67
4824.000	23.19	AV	V	11.26	34.45	54.00	19.55
Additional Channel:				2432	MHz		
2390.000	26.50	PK	H	31.71	58.21	74.00	15.79
2390.000	14.79	AV	H	31.71	46.50	54.00	7.50
2390.000	27.07	PK	V	31.71	58.78	74.00	15.22
2390.000	15.04	AV	V	31.71	46.75	54.00	7.25
Middle Channel:				2437	MHz		
4874.000	26.87	PK	H	11.45	38.32	74.00	35.68
4874.000	14.93	AV	H	11.45	26.38	54.00	27.62
4874.000	26.69	PK	V	11.45	38.14	74.00	35.86
4874.000	15.10	AV	V	11.45	26.55	54.00	27.45
Additional Channel:				2442	MHz		
2483.500	26.56	PK	H	32.19	58.75	74.00	15.25
2483.500	14.68	AV	H	32.19	46.87	54.00	7.13
2483.500	26.57	PK	V	32.19	58.76	74.00	15.24
2483.500	14.79	AV	V	32.19	46.98	54.00	7.02
High Channel:				2462	MHz		
2483.500	26.79	PK	H	32.19	58.98	74.00	15.02
2483.500	15.01	AV	H	32.19	47.20	54.00	6.80
2483.500	26.21	PK	V	32.19	58.40	74.00	15.60
2483.500	14.57	AV	V	32.19	46.76	54.00	7.24
4924.000	36.17	PK	H	11.67	47.84	74.00	26.16
4924.000	21.47	AV	H	11.67	33.14	54.00	20.86
4924.000	36.85	PK	V	11.67	48.52	74.00	25.48
4924.000	22.79	AV	V	11.67	34.46	54.00	19.54

802.11n ht20 Mode:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel:				2412	MHz		
2390.000	26.50	PK	H	31.71	58.21	74.00	15.79
2390.000	14.42	AV	H	31.71	46.13	54.00	7.87
2390.000	27.05	PK	V	31.71	58.76	74.00	15.24
2390.000	14.18	AV	V	31.71	45.89	54.00	8.11
4824.000	42.40	PK	H	11.26	53.66	74.00	20.34
4824.000	28.69	AV	H	11.26	39.95	54.00	14.05
4824.000	42.77	PK	V	11.26	54.03	74.00	19.97
4824.000	28.96	AV	V	11.26	40.22	54.00	13.78
Additional Channel:				2432	MHz		
2390.000	26.67	PK	H	31.71	58.38	74.00	15.62
2390.000	14.53	AV	H	31.71	46.24	54.00	7.76
2390.000	26.81	PK	V	31.71	58.52	74.00	15.48
2390.000	14.39	AV	V	31.71	46.10	54.00	7.90
Middle Channel:				2437	MHz		
4874.000	40.96	PK	H	11.45	52.41	74.00	21.59
4874.000	27.63	AV	H	11.45	39.08	54.00	14.92
4874.000	42.21	PK	V	11.45	53.66	74.00	20.34
4874.000	28.66	AV	V	11.45	40.11	54.00	13.89
Additional Channel:				2442	MHz		
2483.500	26.75	PK	H	32.19	58.94	74.00	15.06
2483.500	14.38	AV	H	32.19	46.57	54.00	7.43
2483.500	26.84	PK	V	32.19	59.03	74.00	14.97
2483.500	14.56	AV	V	32.19	46.75	54.00	7.25
High Channel:				2462	MHz		
2483.500	26.92	PK	H	32.19	59.11	74.00	14.89
2483.500	14.74	AV	H	32.19	46.93	54.00	7.07
2483.500	26.46	PK	V	32.19	58.65	74.00	15.35
2483.500	14.30	AV	V	32.19	46.49	54.00	7.51
4924.000	41.86	PK	H	11.67	53.53	74.00	20.47
4924.000	26.94	AV	H	11.67	38.61	54.00	15.39
4924.000	42.13	PK	V	11.67	53.80	74.00	20.20
4924.000	28.11	AV	V	11.67	39.78	54.00	14.22

802.11n ht40 Mode:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 2422 MHz							
2390.000	26.49	PK	H	31.71	58.20	74.00	15.80
2390.000	15.64	AV	H	31.71	47.35	54.00	6.65
2390.000	27.10	PK	V	31.71	58.81	74.00	15.19
2390.000	15.19	AV	V	31.71	46.90	54.00	7.10
4844.000	39.55	PK	H	11.31	50.86	74.00	23.14
4844.000	26.64	AV	H	11.31	37.95	54.00	16.05
4844.000	39.79	PK	V	11.31	51.10	74.00	22.90
4844.000	27.23	AV	V	11.31	38.54	54.00	15.46
Additional Channel: 2432 MHz							
2390.000	26.75	PK	H	31.71	58.46	74.00	15.54
2390.000	15.97	AV	H	31.71	47.68	54.00	6.32
2390.000	26.64	PK	V	31.71	58.35	74.00	15.65
2390.000	15.11	AV	V	31.71	46.82	54.00	7.18
Middle Channel: 2437 MHz							
4874.000	35.66	PK	H	11.45	47.11	74.00	26.89
4874.000	22.39	AV	H	11.45	33.84	54.00	20.16
4874.000	36.32	PK	V	11.45	47.77	74.00	26.23
4874.000	22.47	AV	V	11.45	33.92	54.00	20.08
Additional Channel: 2442 MHz							
2483.500	26.37	PK	H	32.19	58.56	74.00	15.44
2483.500	15.74	AV	H	32.19	47.93	54.00	6.07
2483.500	26.45	PK	V	32.19	58.64	74.00	15.36
2483.500	15.25	AV	V	32.19	47.44	54.00	6.56
High Channel: 2452 MHz							
2483.500	27.16	PK	H	32.19	59.35	74.00	14.65
2483.500	15.18	AV	H	32.19	47.37	54.00	6.63
2483.500	26.45	PK	V	32.19	58.64	74.00	15.36
2483.500	14.25	AV	V	32.19	46.44	54.00	7.56
4904.000	40.07	PK	H	11.58	51.65	74.00	22.35
4904.000	27.16	AV	H	11.58	38.74	54.00	15.26
4904.000	40.48	PK	V	11.58	52.06	74.00	21.94
4904.000	27.27	AV	V	11.58	38.85	54.00	15.15

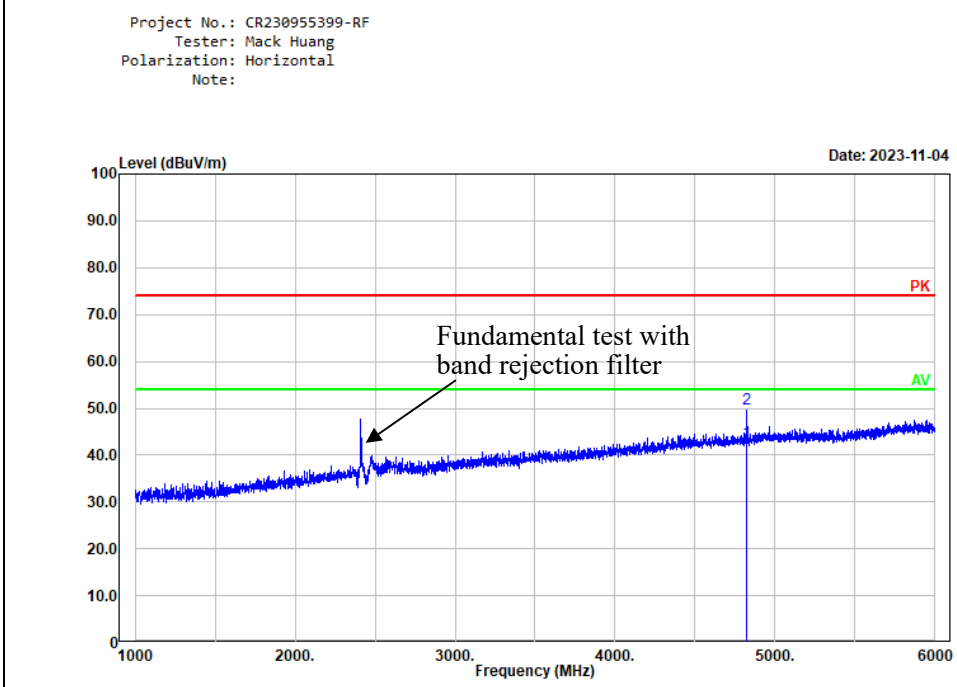
802.11ax he20 Mode:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel:				2412	MHz		
2390.000	27.48	PK	H	31.71	59.19	74.00	14.81
2390.000	14.47	AV	H	31.71	46.18	54.00	7.82
2390.000	29.15	PK	V	31.71	60.86	74.00	13.14
2390.000	15.22	AV	V	31.71	46.93	54.00	7.07
4824.000	46.16	PK	H	11.26	57.42	74.00	16.58
4824.000	30.69	AV	H	11.26	41.95	54.00	12.05
4824.000	47.41	PK	V	11.26	58.67	74.00	15.33
4824.000	31.84	AV	V	11.26	43.10	54.00	10.90
Additional Channel:				2432	MHz		
2390.000	26.59	PK	H	31.71	58.30	74.00	15.70
2390.000	14.78	AV	H	31.71	46.49	54.00	7.51
2390.000	26.94	PK	V	31.71	58.65	74.00	15.35
2390.000	15.46	AV	V	31.71	47.17	54.00	6.83
Middle Channel:				2437	MHz		
4874.000	43.80	PK	H	11.45	55.25	74.00	18.75
4874.000	29.26	AV	H	11.45	40.71	54.00	13.29
4874.000	44.49	PK	V	11.45	55.94	74.00	18.06
4874.000	29.95	AV	V	11.45	41.40	54.00	12.60
Additional Channel:				2442	MHz		
2483.500	27.54	PK	H	32.19	59.73	74.00	14.27
2483.500	14.66	AV	H	32.19	46.85	54.00	7.15
2483.500	27.31	PK	V	32.19	59.50	74.00	14.50
2483.500	15.57	AV	V	32.19	47.76	54.00	6.24
High Channel:				2462	MHz		
2483.500	27.04	PK	H	32.19	59.23	74.00	14.77
2483.500	14.97	AV	H	32.19	47.16	54.00	6.84
2483.500	27.15	PK	V	32.19	59.34	74.00	14.66
2483.500	15.31	AV	V	32.19	47.50	54.00	6.50
4924.000	42.15	PK	H	11.67	53.82	74.00	20.18
4924.000	27.49	AV	H	11.67	39.16	54.00	14.84
4924.000	42.97	PK	V	11.67	54.64	74.00	19.36
4924.000	28.21	AV	V	11.67	39.88	54.00	14.12

802.11ax he40 Mode:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel:				2422	MHz		
2390.000	29.85	PK	H	31.71	61.56	74.00	12.44
2390.000	14.63	AV	H	31.71	46.34	54.00	7.66
2390.000	30.91	PK	V	31.71	62.62	74.00	11.38
2390.000	15.81	AV	V	31.71	47.52	54.00	6.48
4844.000	41.66	PK	H	11.31	52.97	74.00	21.03
4844.000	28.00	AV	H	11.31	39.31	54.00	14.69
4844.000	42.11	PK	V	11.31	53.42	74.00	20.58
4844.000	29.33	AV	V	11.31	40.64	54.00	13.36
Additional Channel:				2432	MHz		
2390.000	27.54	PK	H	31.71	59.25	74.00	14.75
2390.000	15.12	AV	H	31.71	46.83	54.00	7.17
2390.000	26.87	PK	V	31.71	58.58	74.00	15.42
2390.000	15.27	AV	V	31.71	46.98	54.00	7.02
Middle Channel:				2437	MHz		
4874.000	36.37	PK	H	11.45	47.82	74.00	26.18
4874.000	22.48	AV	H	11.45	33.93	54.00	20.07
4874.000	36.59	PK	V	11.45	48.04	74.00	25.96
4874.000	22.72	AV	V	11.45	34.17	54.00	19.83
Additional Channel:				2442	MHz		
2483.500	27.78	PK	H	32.19	59.97	74.00	14.03
2483.500	14.98	AV	H	32.19	47.17	54.00	6.83
2483.500	27.34	PK	V	32.19	59.53	74.00	14.47
2483.500	15.45	AV	V	32.19	47.64	54.00	6.36
High Channel:				2452	MHz		
2483.500	26.96	PK	H	32.19	59.15	74.00	14.85
2483.500	16.93	AV	H	32.19	49.12	54.00	4.88
2483.500	27.49	PK	V	32.19	59.68	74.00	14.32
2483.500	17.24	AV	V	32.19	49.43	54.00	4.57
4904.000	39.36	PK	H	11.58	50.94	74.00	23.06
4904.000	26.44	AV	H	11.58	38.02	54.00	15.98
4904.000	40.15	PK	V	11.58	51.73	74.00	22.27
4904.000	27.27	AV	V	11.58	38.85	54.00	15.15

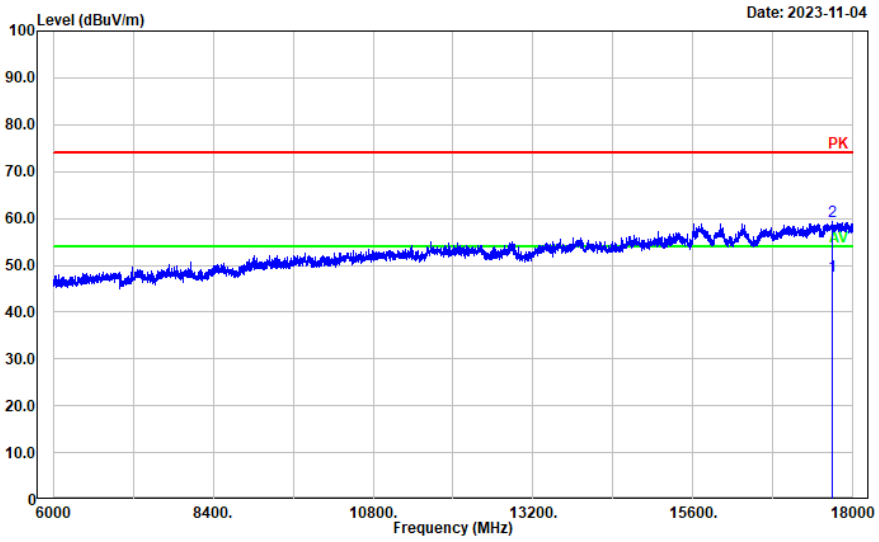
Worst Test plots: (802.11b chain 0 low channel was the worst)

Horizontal	
1-6GHz	

No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	4824.000	31.69	11.26	42.95	54.00	11.05	Average
2	4824.000	38.58	11.26	49.84	74.00	24.16	Peak

6-18GHz

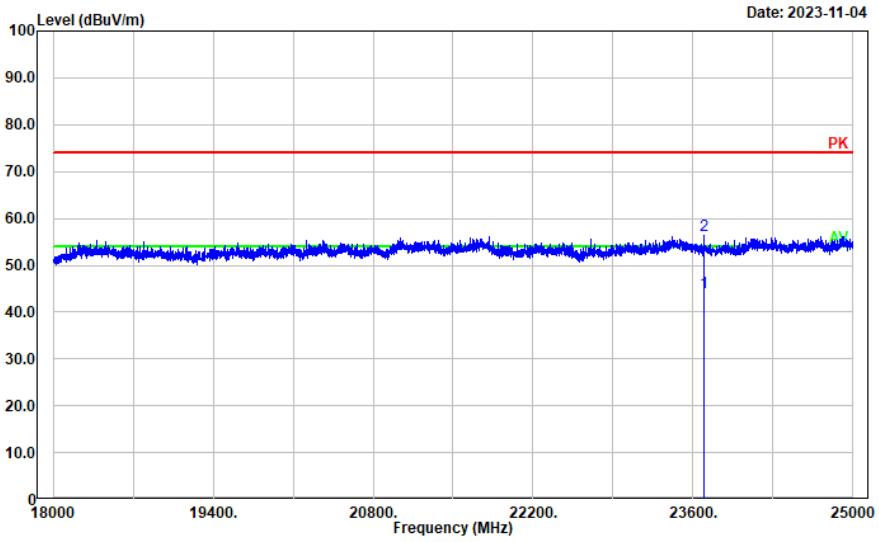
Project No.: CR230955399-RF
Tester: Mack Huang
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	17680.740	16.65	31.13	47.78	54.00	6.22	Average
2	17680.740	28.16	31.13	59.29	74.00	14.71	Peak

18-25GHz

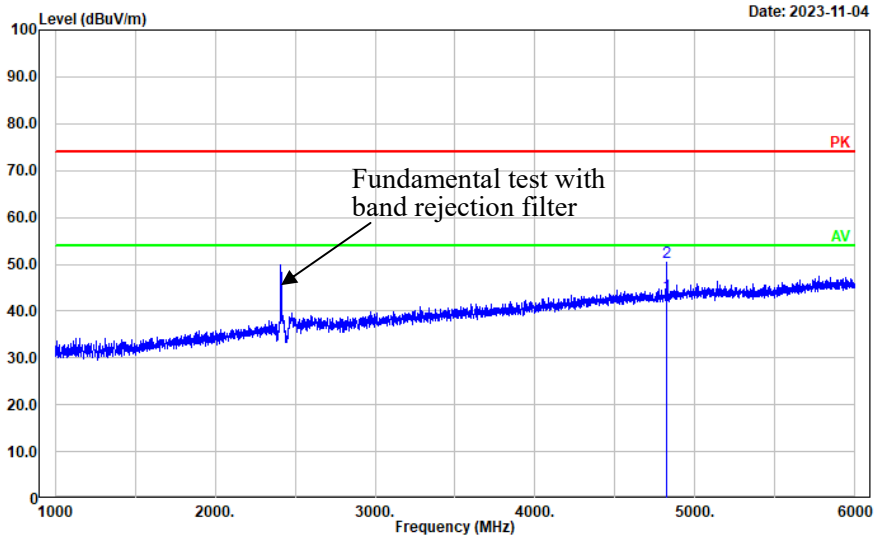
Project No.: CR230955399-RF
Tester: Mack Huang
Polarization: Horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	23693.540	39.38	4.74	44.12	54.00	9.88	Average
2	23693.540	51.51	4.74	56.25	74.00	17.75	Peak

Vertical	
1-6GHz	

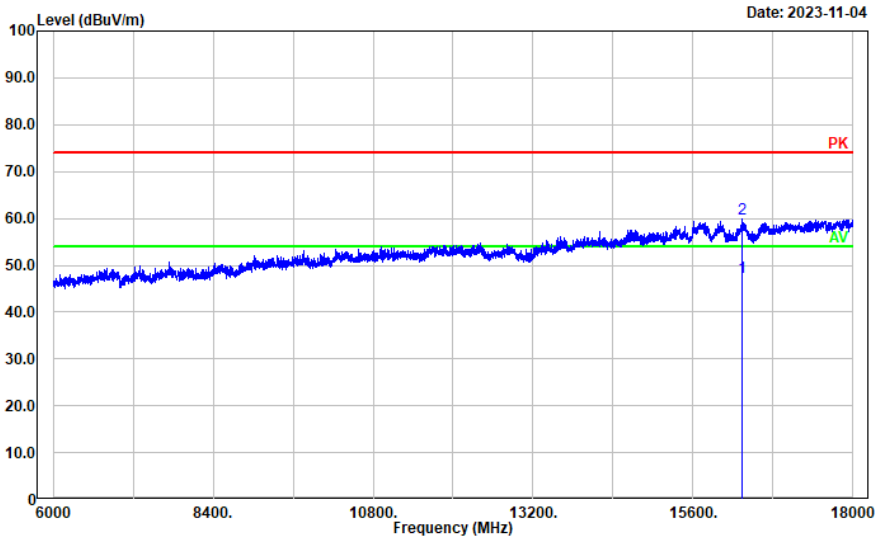
Project No.: CR230955399-RF
Tester: Mack Huang
Polarization: Vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	4824.000	32.06	11.26	43.32	54.00	10.68	Average
2	4824.000	39.12	11.26	50.38	74.00	23.62	Peak

6-18GHz

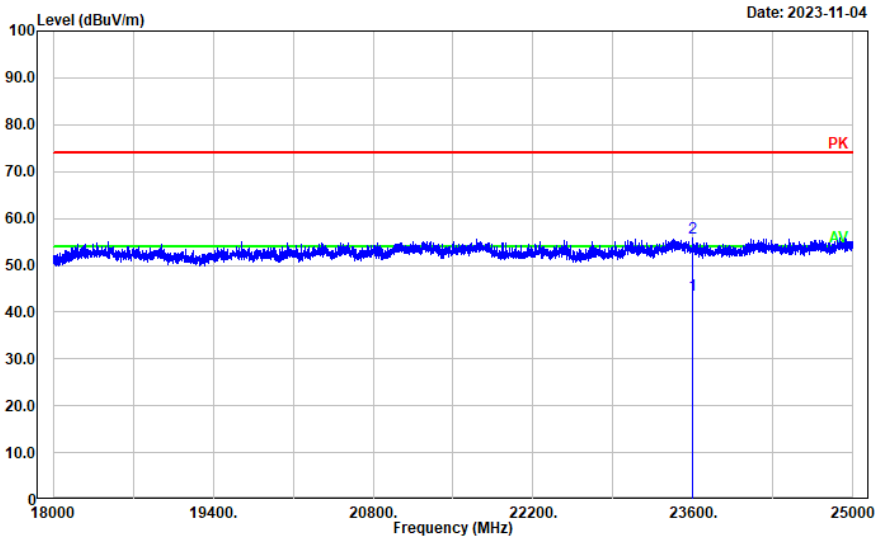
Project No.: CR230955399-RF
Tester: Mack Huang
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	16343.670	21.87	25.69	47.56	54.00	6.44	Average
2	16343.670	34.13	25.69	59.82	74.00	14.18	Peak

18-25GHz

Project No.: CR230955399-RF
Tester: Mack Huang
Polarization: Vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	23599.720	38.54	5.05	43.59	54.00	10.41	Average
2	23599.720	50.73	5.05	55.78	74.00	18.22	Peak

4.3 Minimum 6 dB Bandwidth:

Serial Number:	2BI1-2	Test Date:	2023/10/8-2023/10/12
Test Site:	RF	Test Mode:	Transmitting
Tester:	Len Huang	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	24.9-25.5	Relative Humidity: (%)	50-55	ATM Pressure: (kPa)	101

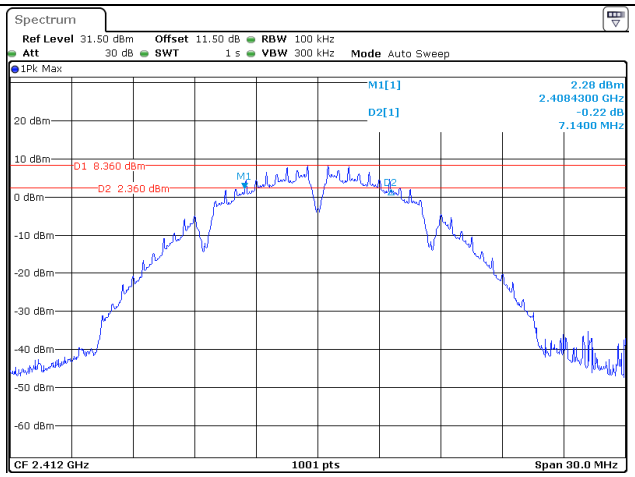
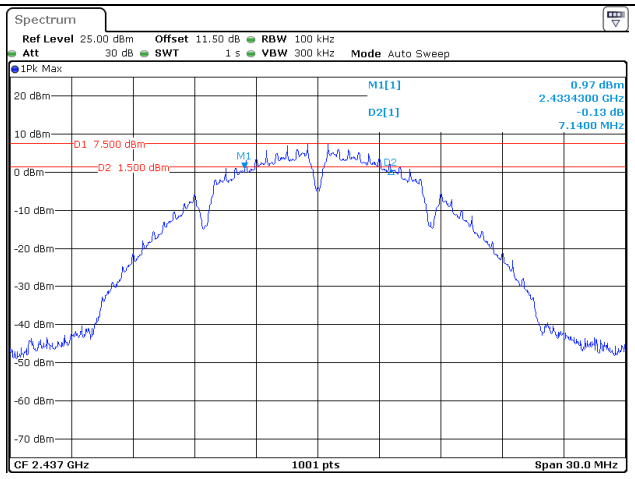
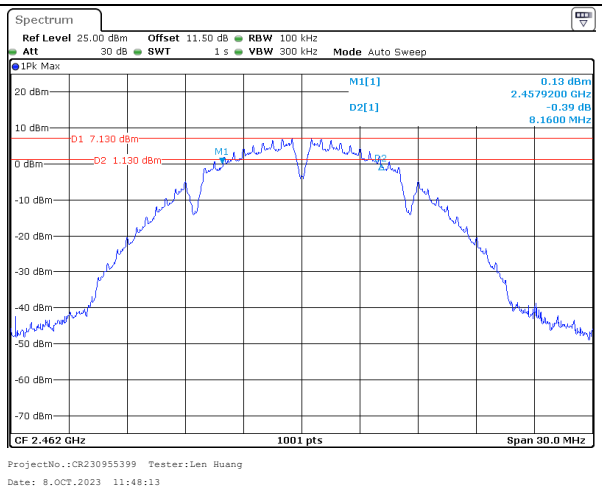
Test Equipment List and Details:

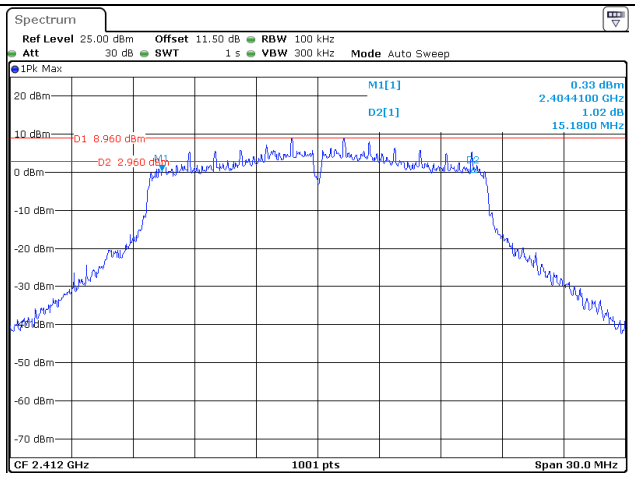
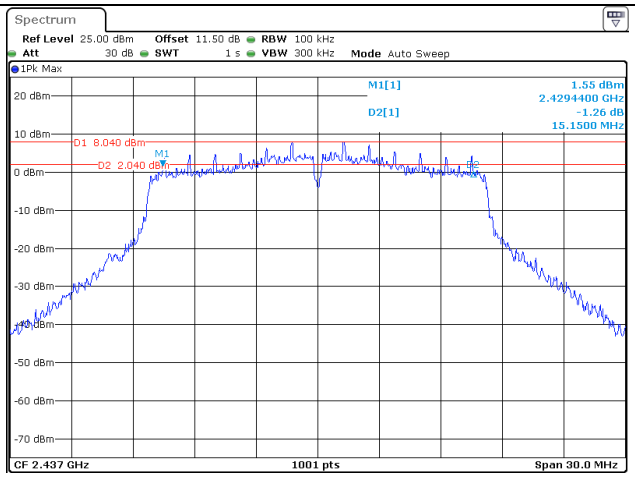
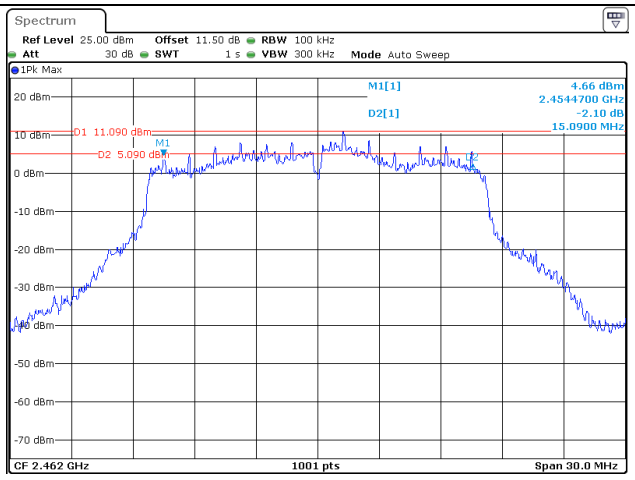
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	102259	2023/4/18	2024/4/17
zhuoxiang	Coaxial Cable	SMA-178	211003	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060302	Each time	N/A

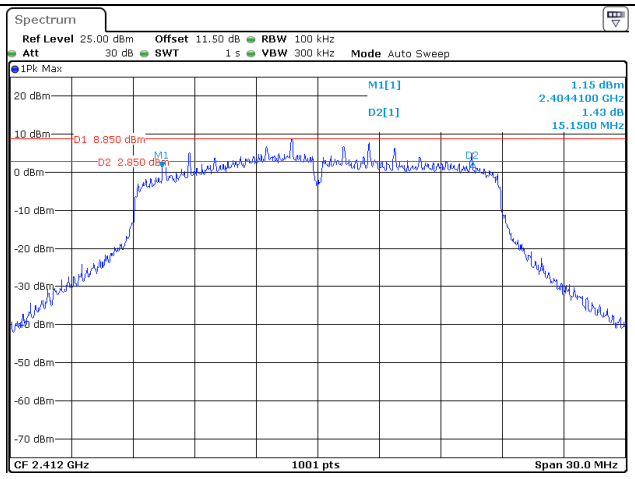
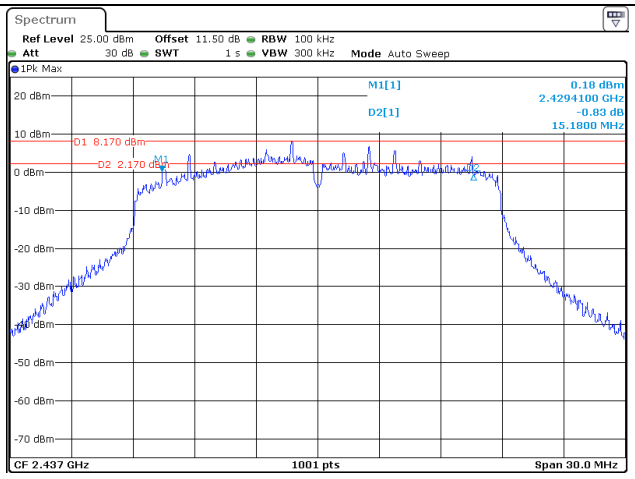
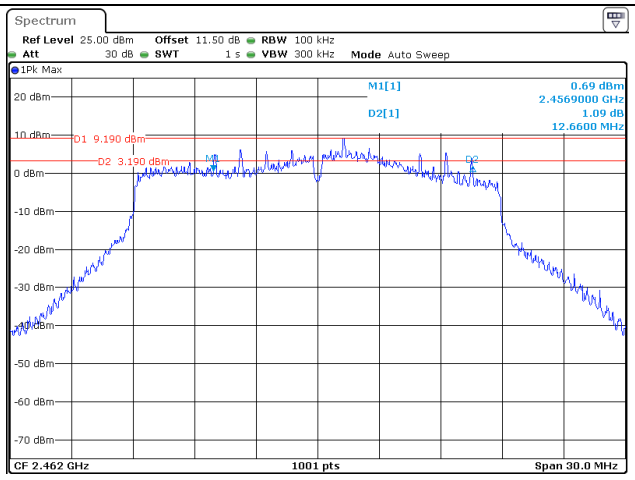
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

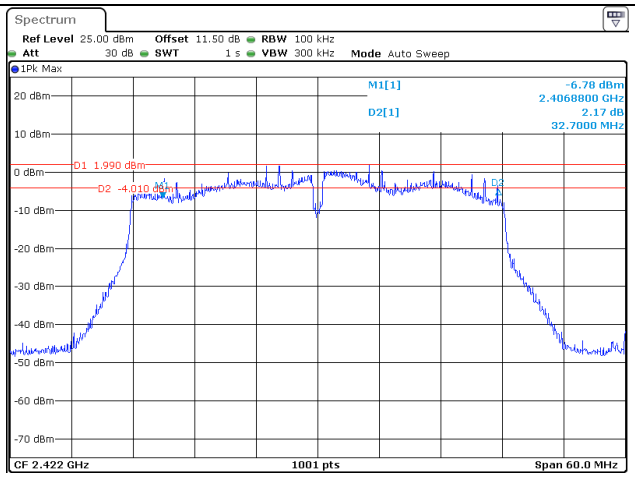
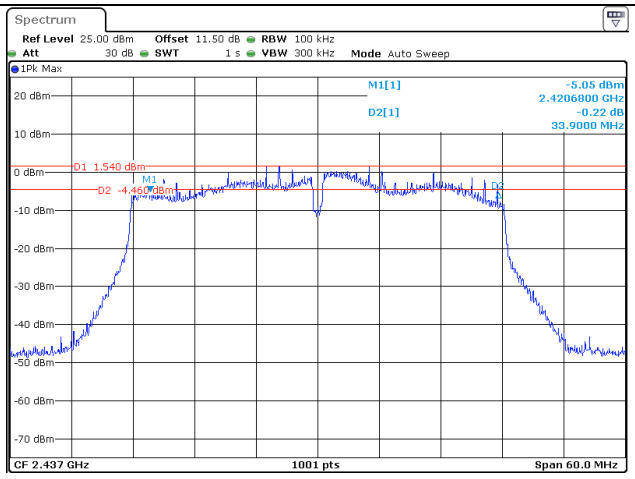
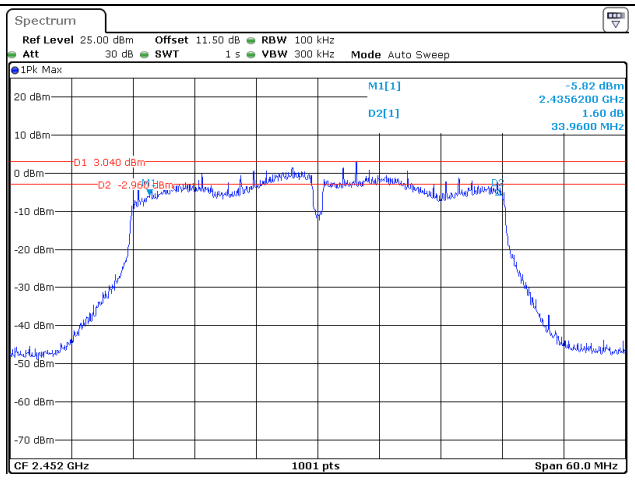
Test Data:

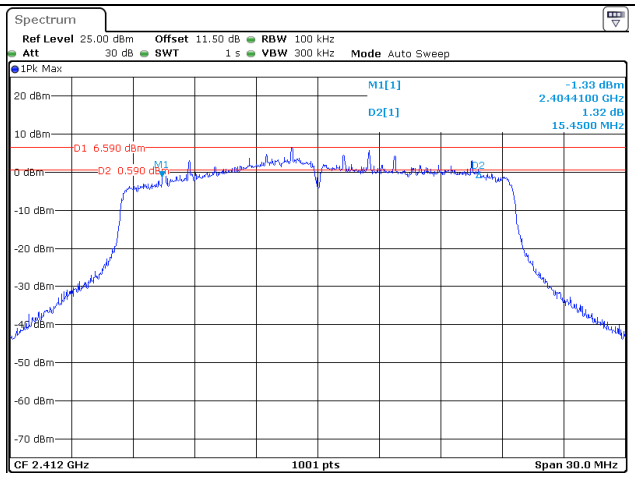
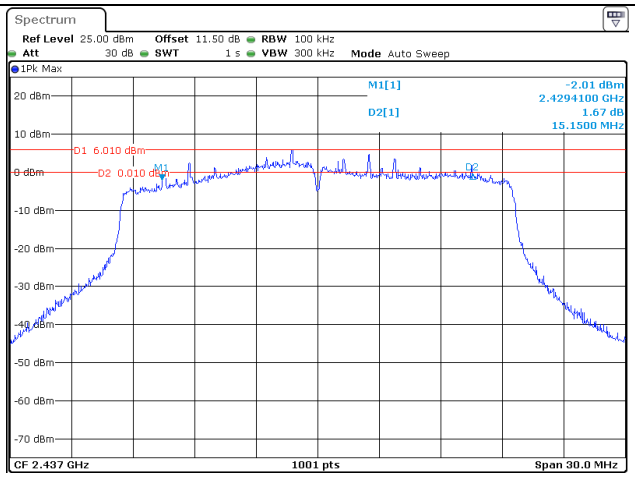
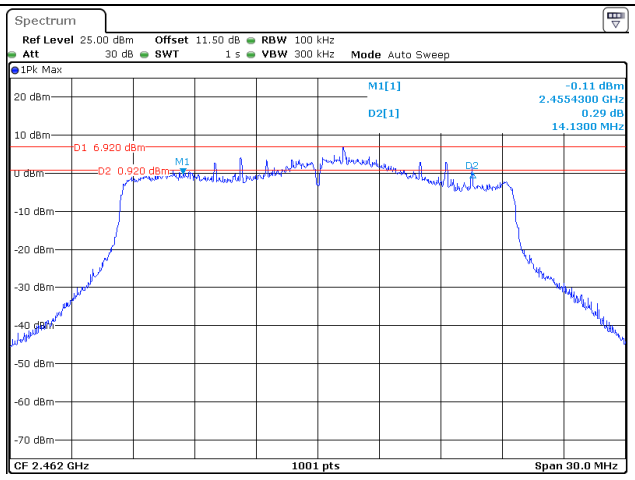
Test Modes	Test Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)
802.11b	2412	7.14	0.5
	2437	7.14	0.5
	2462	8.16	0.5
802.11g	2412	15.18	0.5
	2437	15.15	0.5
	2462	15.09	0.5
802.11n ht20	2412	15.15	0.5
	2437	15.18	0.5
	2462	12.66	0.5
802.11n ht40	2422	32.7	0.5
	2437	33.9	0.5
	2452	33.96	0.5
802.11ax he20	2412	15.45	0.5
	2437	15.15	0.5
	2462	14.13	0.5
802.11ax he40	2422	36.06	0.5
	2437	35.58	0.5
	2452	36.06	0.5
Note: Test only was performed at Chain 0.			

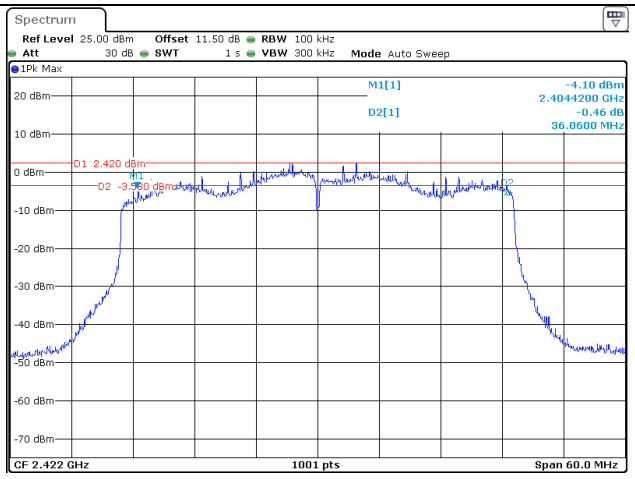
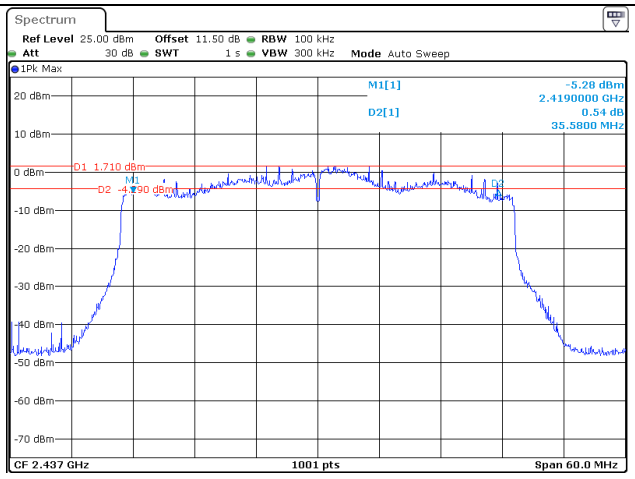
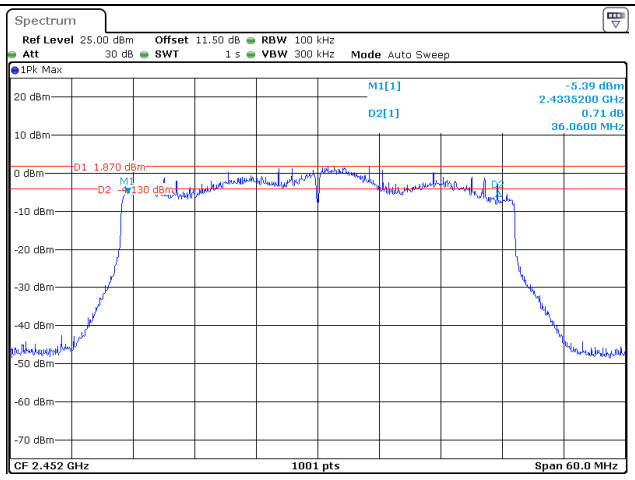
Minimum 6dB Emission Bandwidth	
802.11b Lowest Channel	
802.11b Middle Channel	
802.11b Highest Channel	

Minimum 6dB Emission Bandwidth	
802.11g Lowest Channel	
802.11g Middle Channel	
802.11g Highest Channel	

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

Minimum 6dB Emission Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Middle Channel	
802.11n ht40 Highest Channel	

Minimum 6dB Emission Bandwidth	
802.11ax he20 Lowest Channel	
802.11ax he20 Middle Channel	
802.11ax he20 Highest Channel	

Minimum 6dB Emission Bandwidth	
802.11ax he40 Lowest Channel	
802.11ax he40 Middle Channel	
802.11ax he40 Highest Channel	

4.4 99% Occupied Bandwidth:

Serial Number:	2BI1-2	Test Date:	2023/10/8-2023/10/12
Test Site:	RF	Test Mode:	Transmitting
Tester:	Len Huang	Test Result:	N/A

Environmental Conditions:					
Temperature: (℃)	24.9-25.5	Relative Humidity: (%)	50-55	ATM Pressure: (kPa)	101

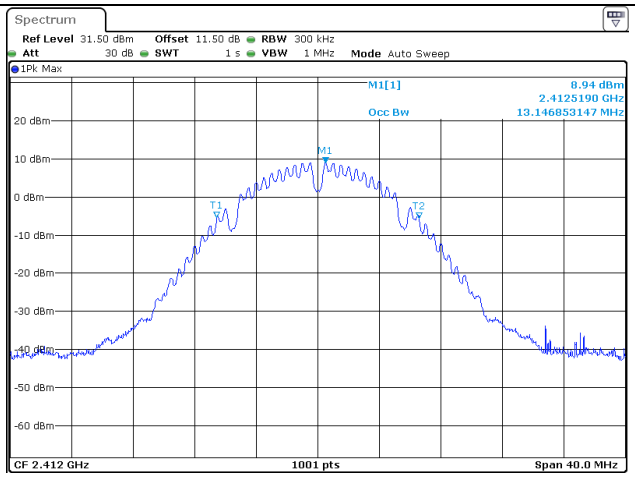
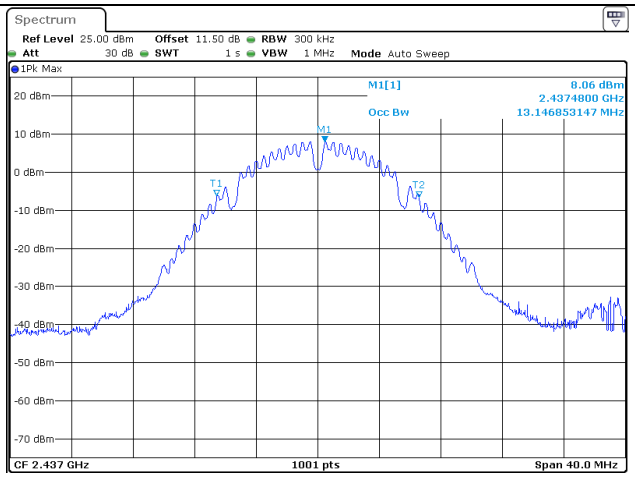
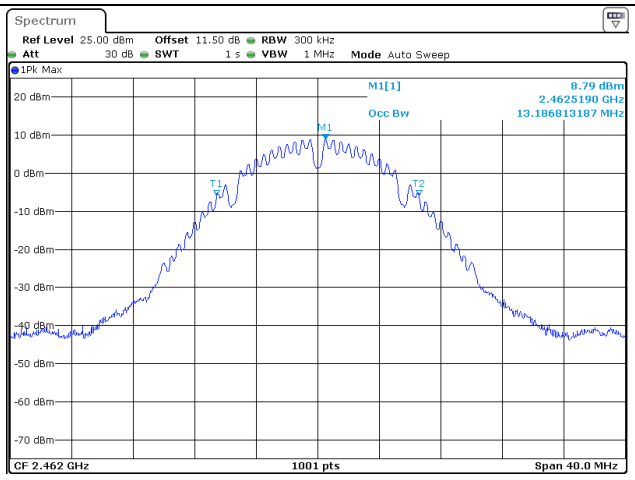
Test Equipment List and Details:

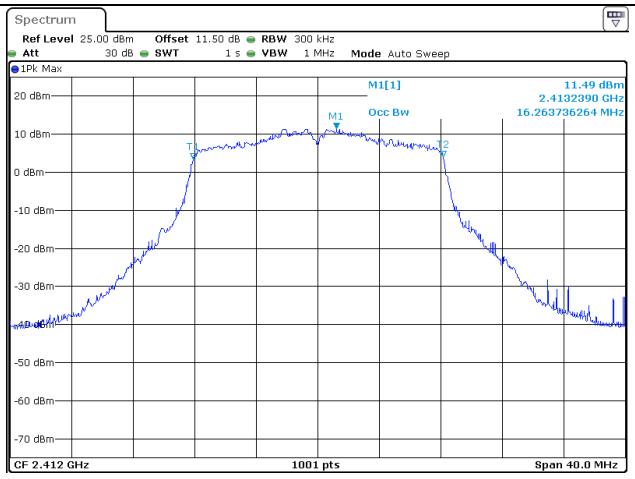
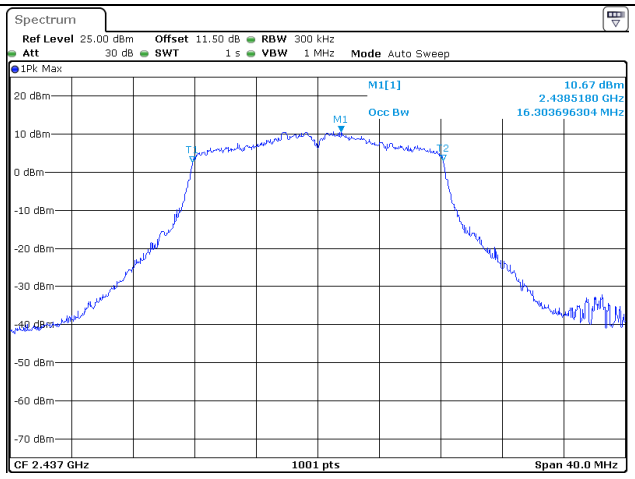
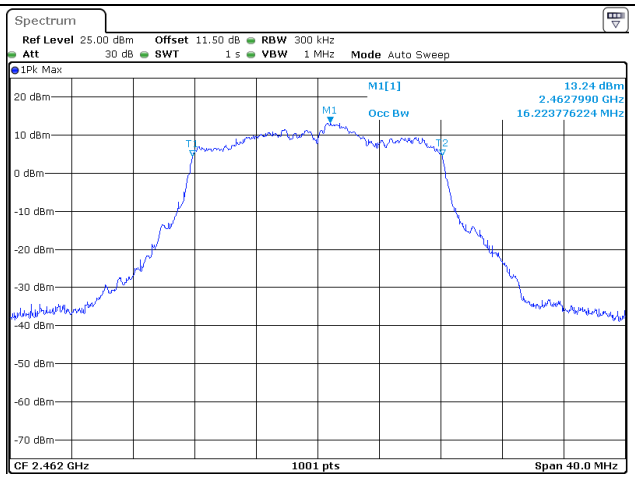
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	102259	2023/04/18	2024/04/17
zhuoxiang	Coaxial Cable	SMA-178	211003	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060302	Each time	N/A

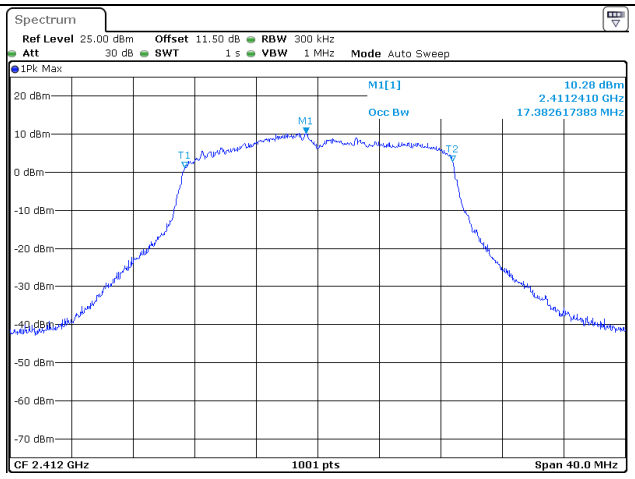
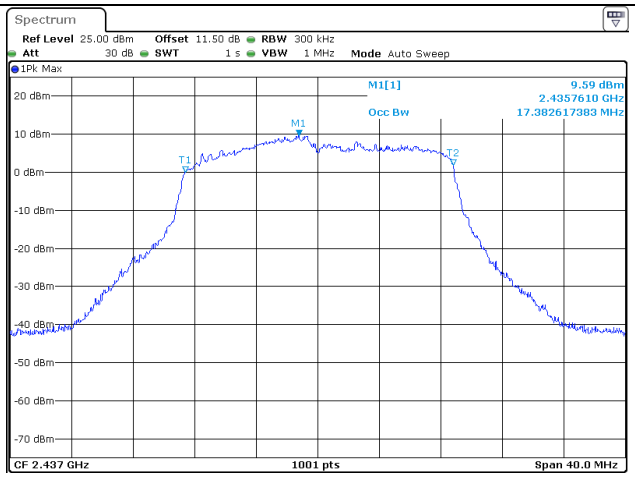
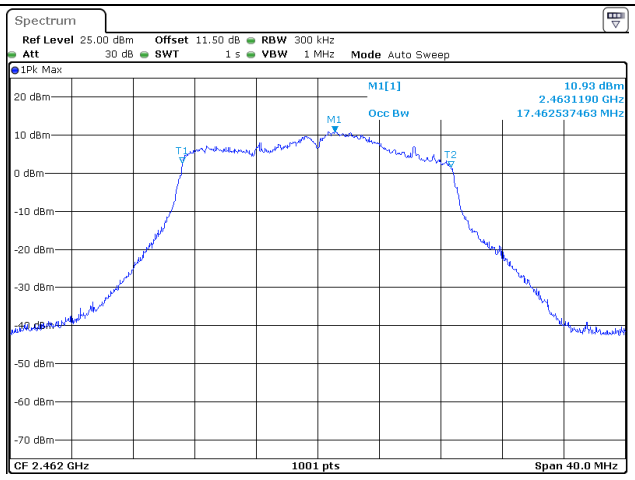
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

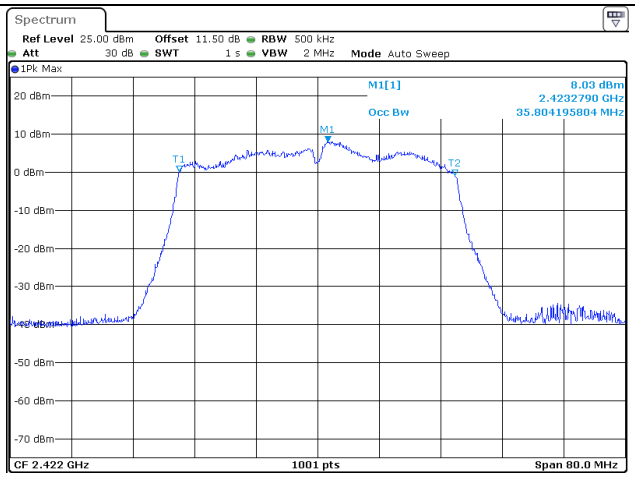
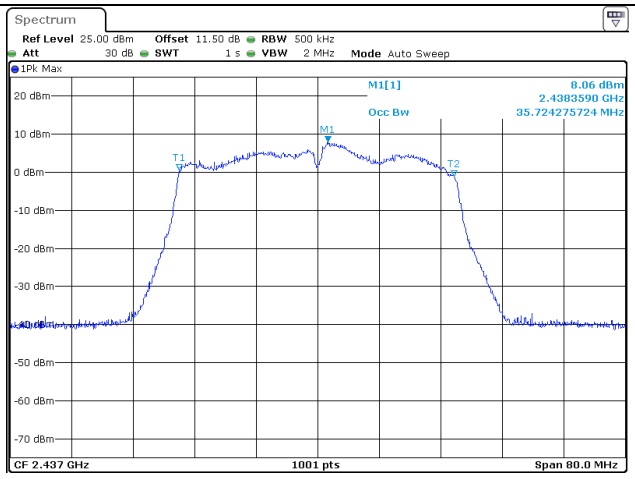
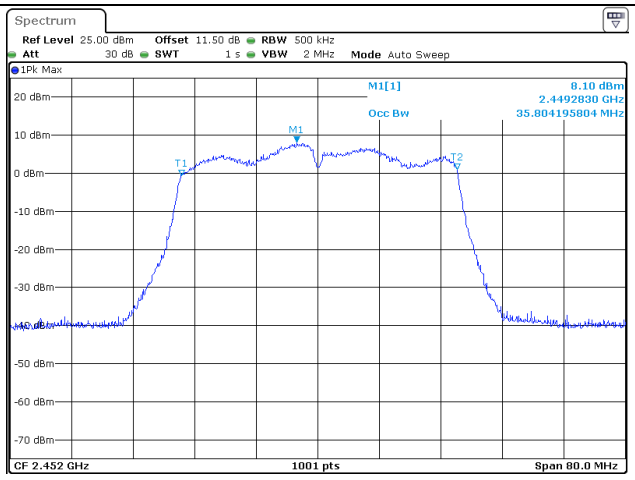
Test Data:

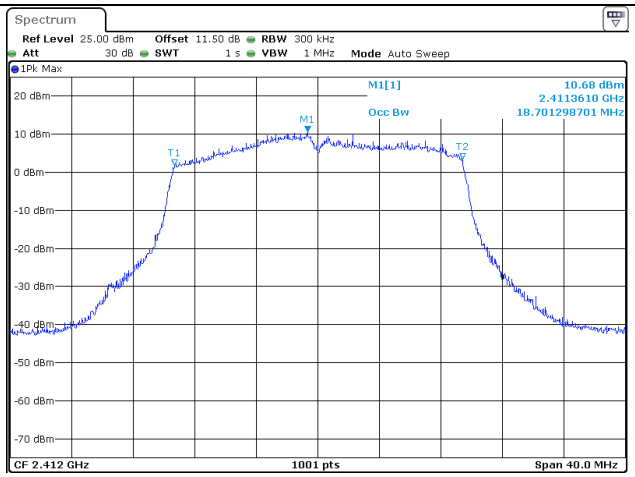
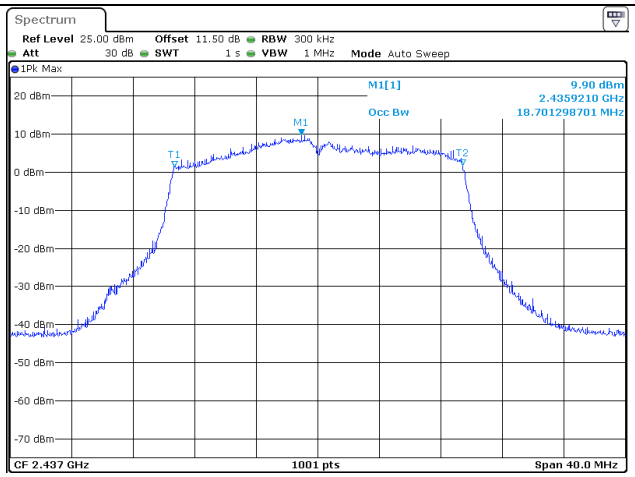
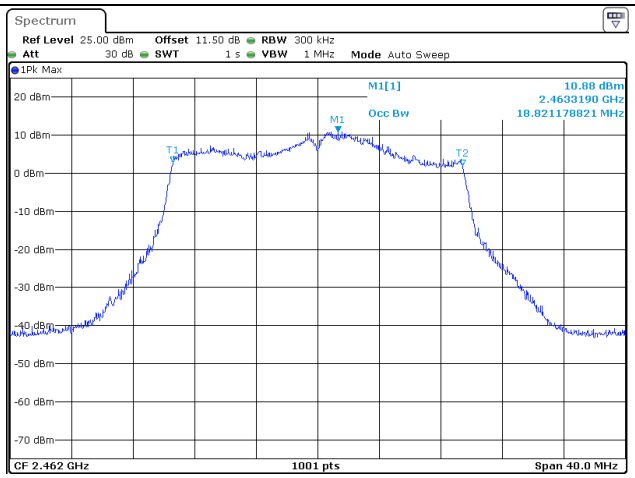
Test Modes	Test Channel	Test Frequency (MHz)	99% Occupied Bandwidth (MHz)
802.11b	Lowest	2412	13.15
	Middle	2437	13.15
	Highest	2462	13.19
802.11g	Lowest	2412	16.26
	Middle	2437	16.3
	Highest	2462	16.22
802.11n ht20	Lowest	2412	17.38
	Middle	2437	17.38
	Highest	2462	17.46
802.11n ht40	Lowest	2422	35.8
	Middle	2437	35.72
	Highest	2452	35.8
802.11ax he20	Lowest	2412	18.7
	Middle	2437	18.7
	Highest	2462	18.82
802.11ax he40	Lowest	2422	37.32
	Middle	2437	37.48
	Highest	2452	37.48
Note: Test only was performed at Chain 0.			

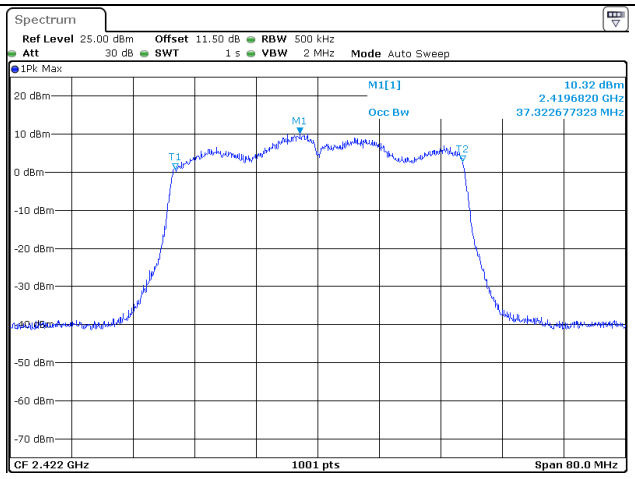
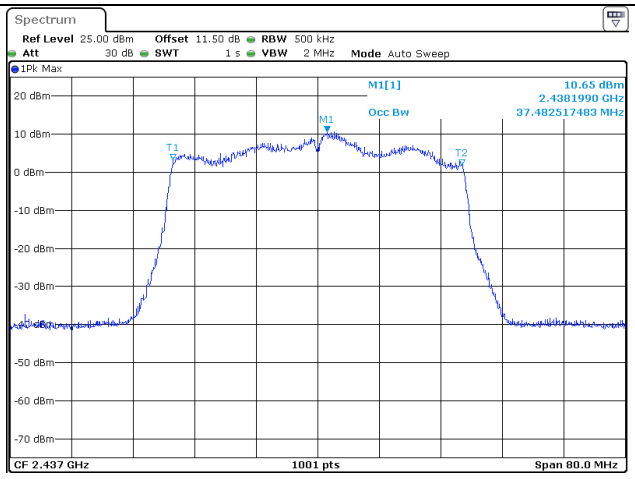
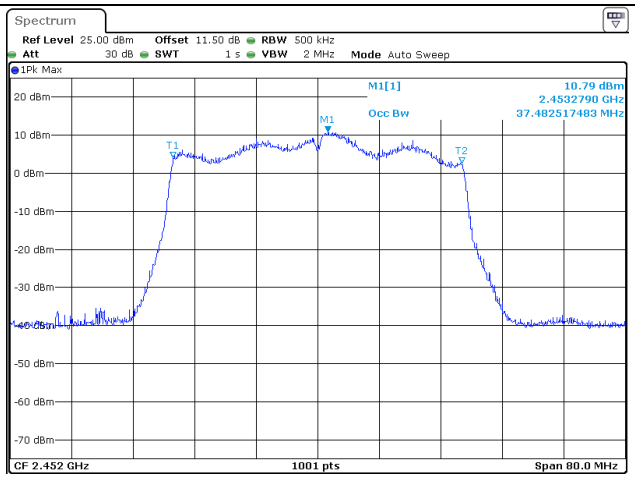
99% Occupied Bandwidth	
802.11b Lowest Channel	
802.11b Middle Channel	
802.11b Highest Channel	

99% Occupied Bandwidth	
802.11g Lowest Channel	
802.11g Middle Channel	
802.11g Highest Channel	

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

99% Occupied Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Middle Channel	
802.11n ht40 Highest Channel	

99% Occupied Bandwidth	
802.11ax he20 Lowest Channel	
802.11ax he20 Middle Channel	
802.11ax he20 Highest Channel	

99% Occupied Bandwidth	
802.11ax he40 Lowest Channel	
802.11ax he40 Middle Channel	
802.11ax he40 Highest Channel	

4.5 Maximum Conducted Output Power:

Serial Number:	2BI1-2	Test Date:	2023-11-30
Test Site:	RF	Test Mode:	Transmitting
Tester:	Len Huang	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.7	Relative Humidity: (%)	55	ATM Pressure: (kPa)	101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Anritsu	Pulse Power Sensor	MA2411A	10780	2023/8/4	2024/8/3
zhuoxiang	Coaxial Cable	SMA-178	211003	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060302	Each time	N/A
Anritsu	Power Meter	ML2495A	1106009	2023/8/4	2024/8/3

** 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	Test Frequency (MHz)	Maximum Conducted Average Output Power (dBm)			Limit (dBm)
		Chain 0	Chain 1	Total	
802.11b	2412	21.38	21.38	/	30
	2437	21.42	22.1	/	30
	2462	18.22	16.78	/	30
802.11g	2412	21.27	21.29	/	30
	2437	22.46	21.95	/	30
	2462	17.18	16.60	/	30
802.11n ht20	2412	20.68	20.38	23.54	28.85
	2437	20.82	20.88	23.86	28.85
	2462	18.27	17.66	20.99	28.85
802.11n ht40	2422	19.17	19.38	22.29	28.85
	2437	21.28	21.01	24.16	28.85
	2452	16.96	16.56	19.77	28.85
802.11ax he20	2412	21.61	21.42	24.53	28.85
	2437	20.95	20.98	23.98	28.85
	2462	16.45	16.21	19.34	28.85
802.11ax he40	2422	20.06	20.13	23.11	28.85
	2437	20.91	20.50	23.72	28.85
	2452	16.20	15.91	19.07	28.85
Note: The device employed Beam-forming for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB					

Antenna Gain:	4.15	dBi	Directional gain:	7.15	dBi
Maximum EIRP	31.68	dBm	EIRP Limit for RSS-247	36	dBm

4.6 Maximum Power Spectral Density:

Serial Number:	2BI1-2	Test Date:	2023-11-30
Test Site:	RF	Test Mode:	Transmitting
Tester:	Len Huang	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.7	Relative Humidity: (%)	55	ATM Pressure: (kPa)	101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	102259	2023/04/18	2024/04/17
zhuoxiang	Coaxial Cable	SMA-178	211003	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060302	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).*

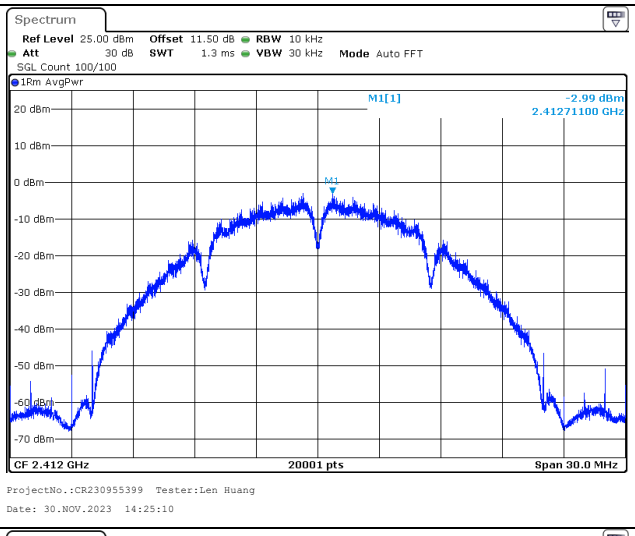
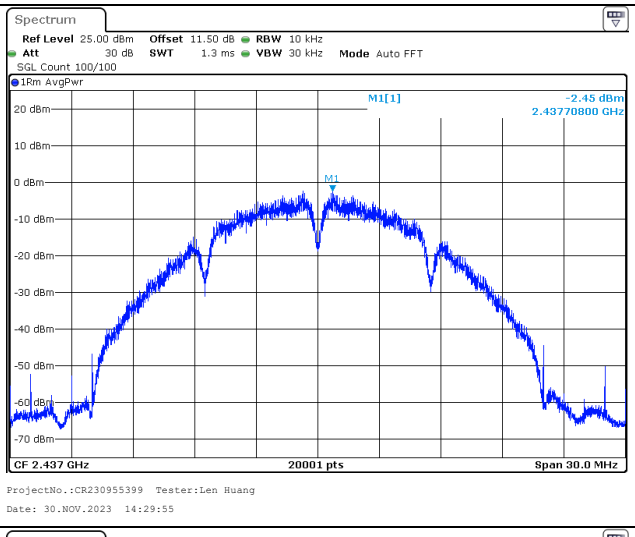
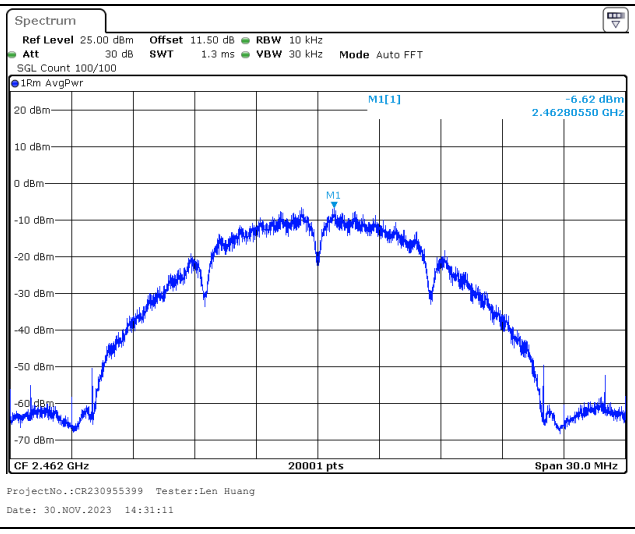
Test Data:

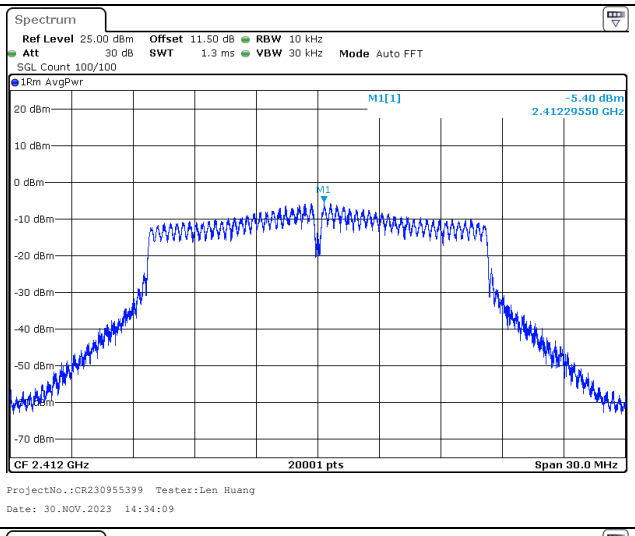
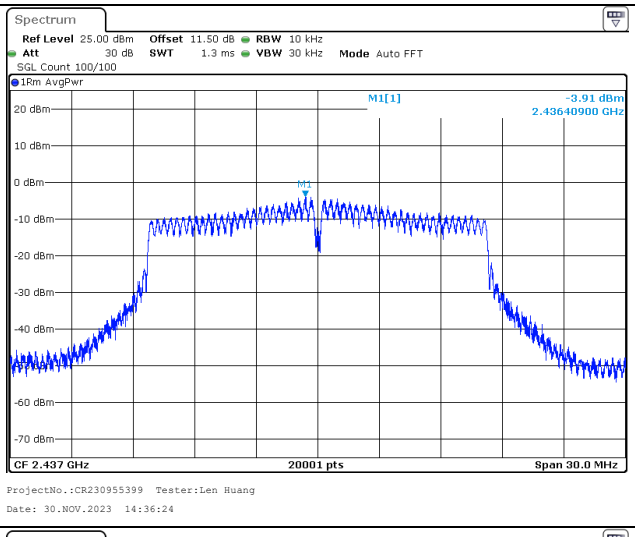
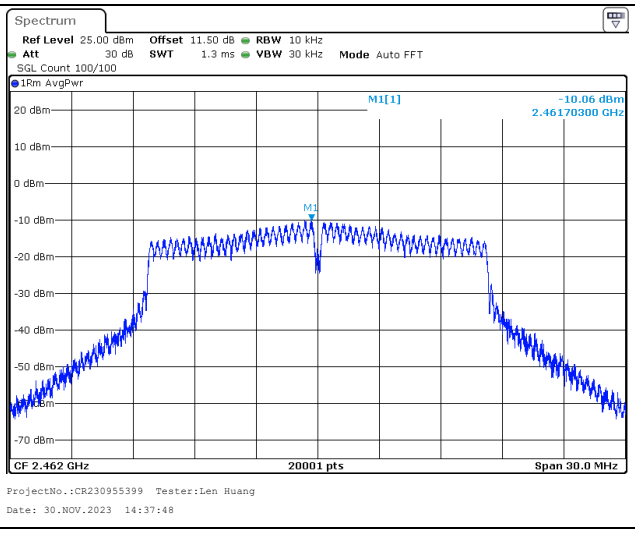
Test Modes	Test Frequency (MHz)	Reading(dBm/10kHz)		Maximum Power Spectral Density (dBm/10kHz)	Limit (dBm/3kHz)
		Chain 0	Chain 1		
802.11b	2412	-2.99	-3.64	-2.99	8.00
	2437	-2.45	-2.99	-2.45	8.00
	2462	-6.62	-8.71	-6.62	8.00
802.11g	2412	-5.4	-5.72	-5.40	8.00
	2437	-3.91	-4.68	-3.91	8.00
	2462	-10.06	-10.75	-10.06	8.00
802.11n ht20	2412	-5.7	-7.93	-3.66	6.85
	2437	-6.33	-5.52	-2.90	6.85
	2462	-8.45	-11.29	-6.63	6.85
802.11n ht40	2422	-9.74	-10.11	-6.91	6.85
	2437	-8.71	-8.27	-5.47	6.85
	2452	-12.63	-14.24	-10.35	6.85
802.11ax he20	2412	-7.28	-7.97	-4.60	6.85
	2437	-7.72	-6.57	-4.10	6.85
	2462	-11.35	-11.14	-8.23	6.85
802.11ax he40	2422	-9.91	-10.3	-7.09	6.85
	2437	-9.45	-10.54	-6.95	6.85
	2452	-14.5	-14.33	-11.40	6.85

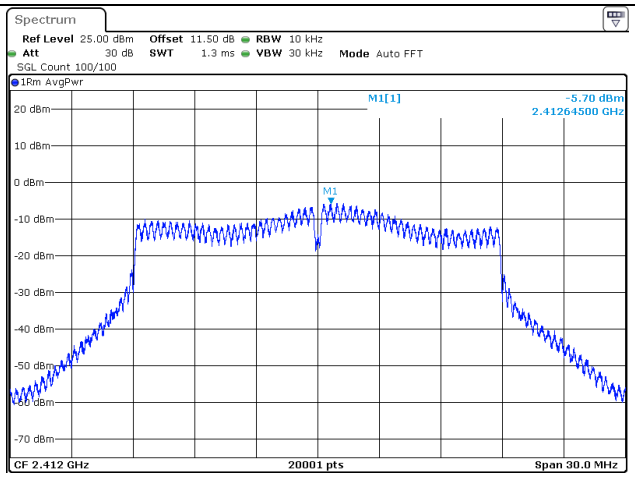
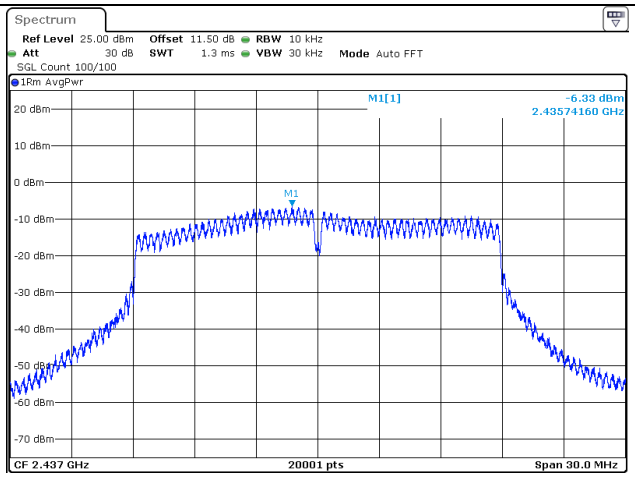
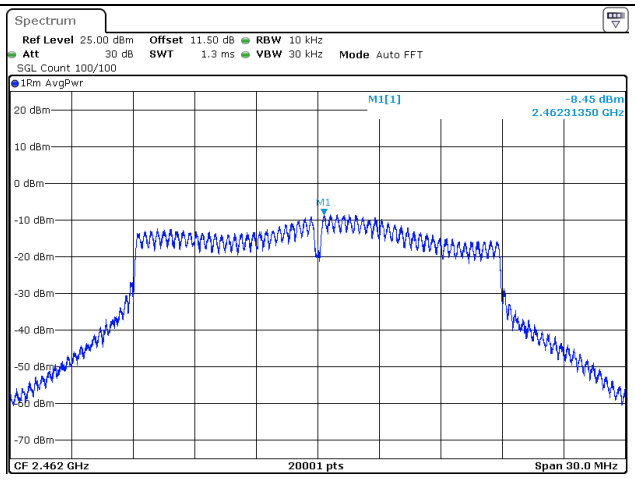
Note: The device employed Beam-forming for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB

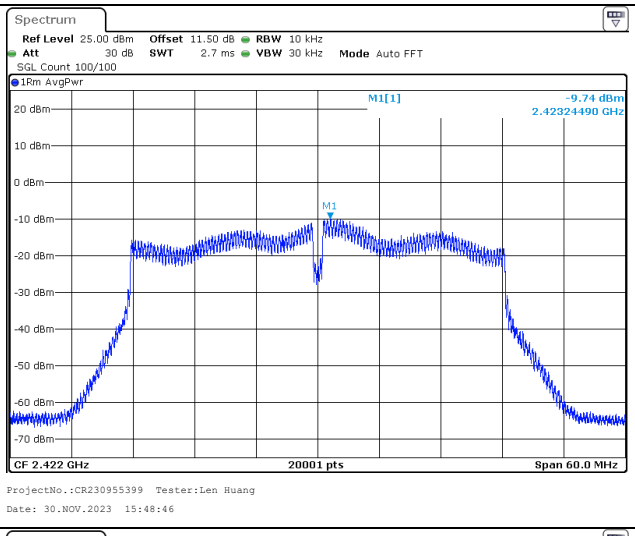
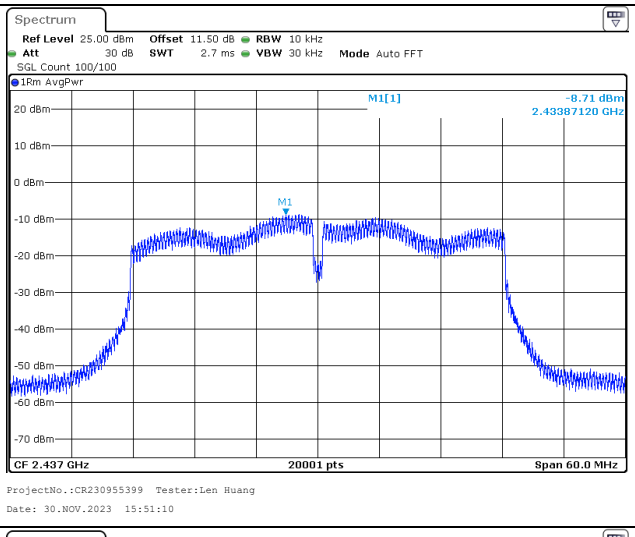
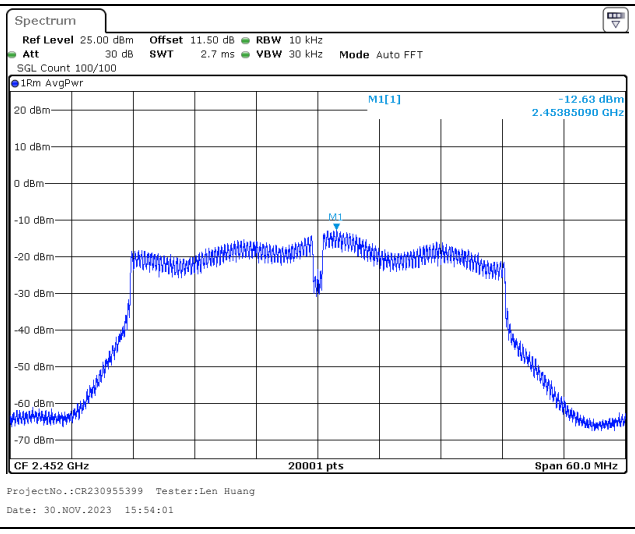
Antenna Gain:	4.15	dBi	Directional gain:	7.15	dBi

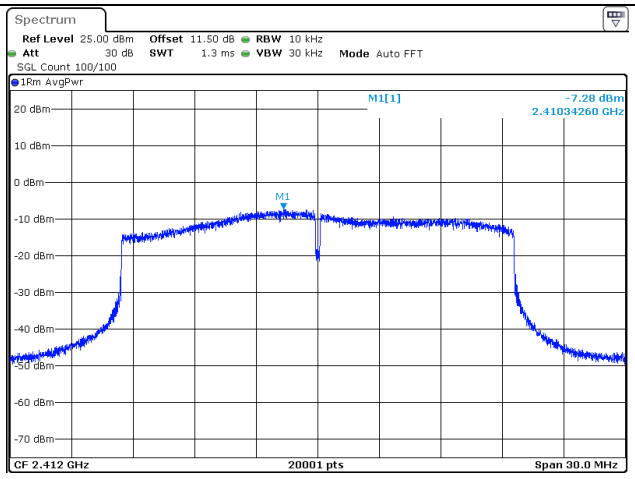
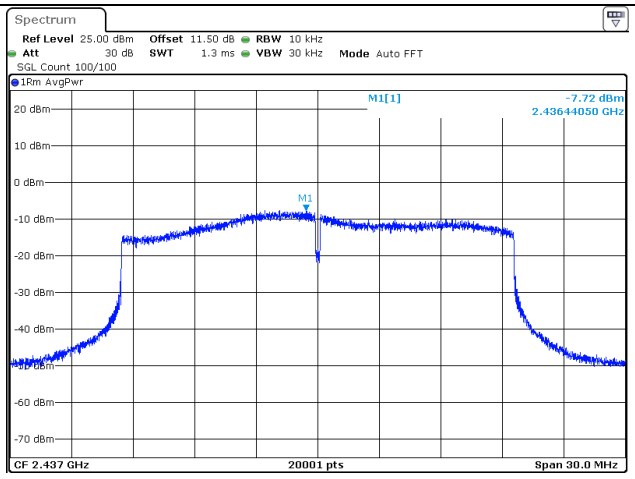
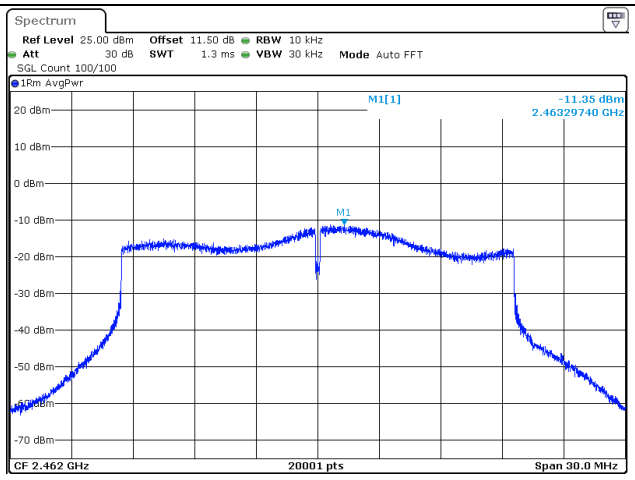
Chain 0:

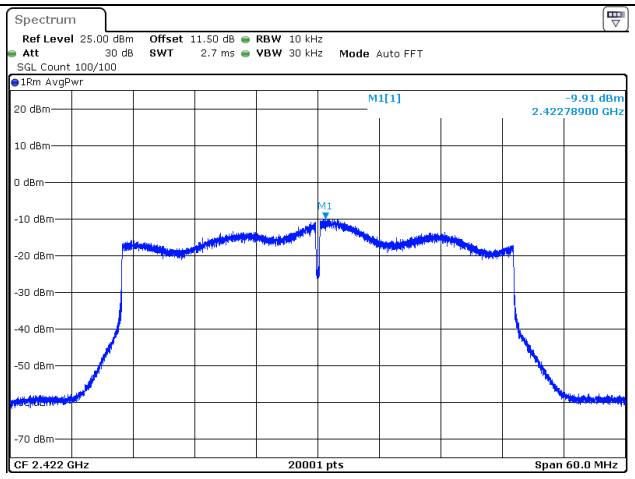
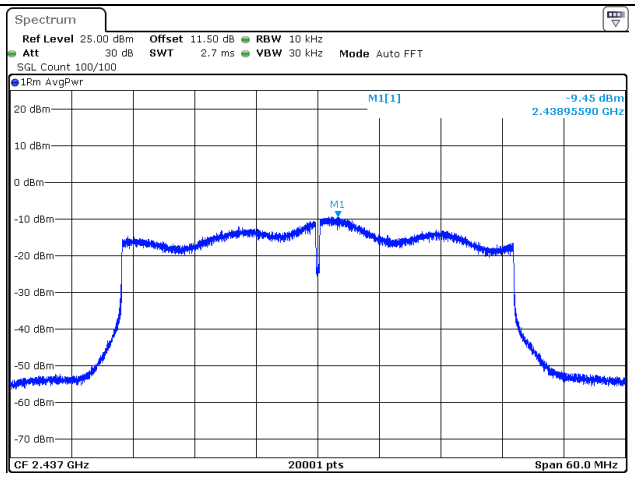
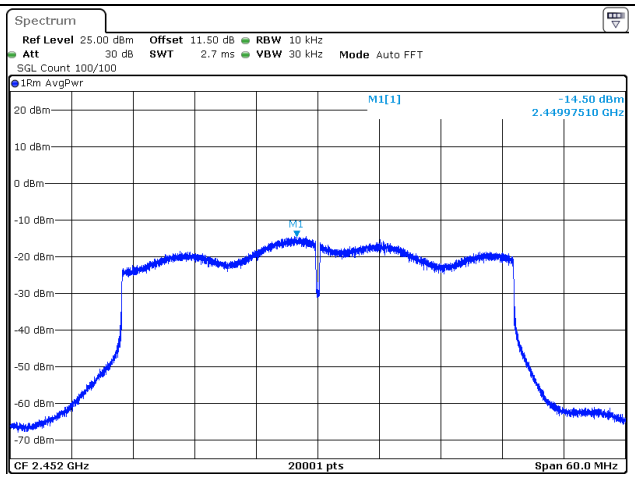
Maximum power spectral density	
802.11b Lowest Channel	
802.11b Middle Channel	
802.11b Highest Channel	

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

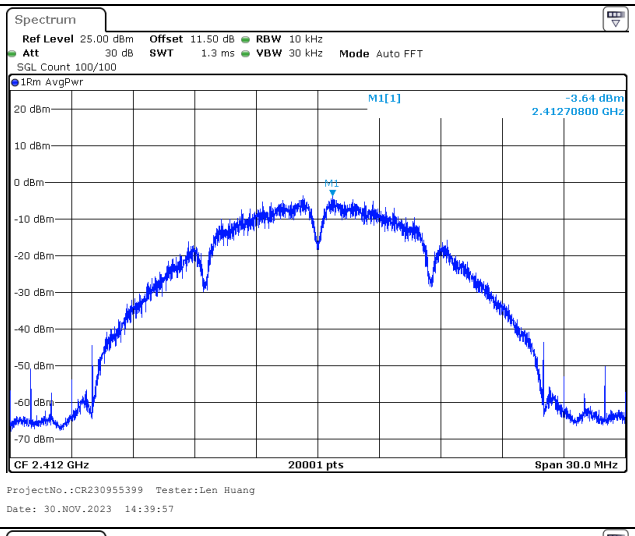
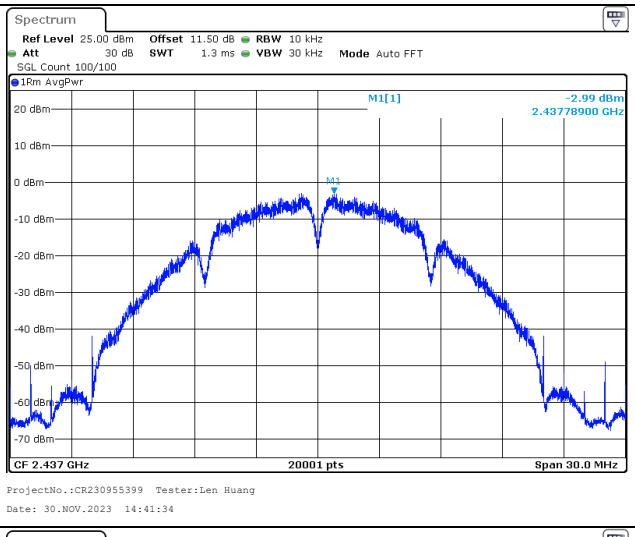
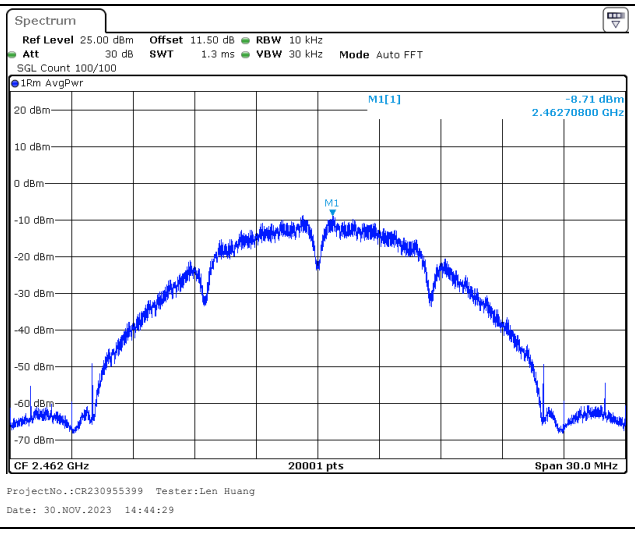
Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

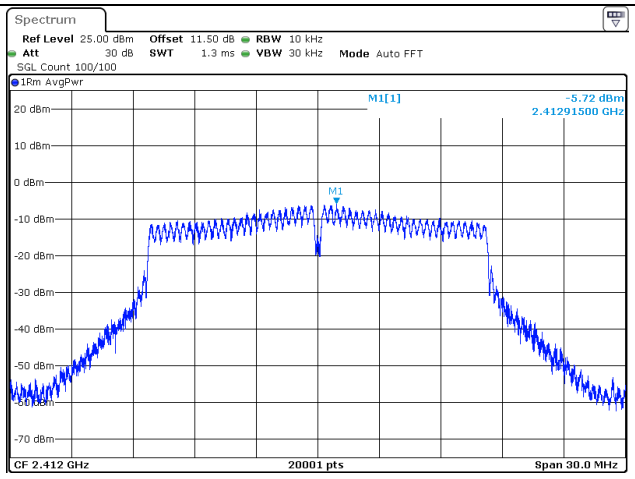
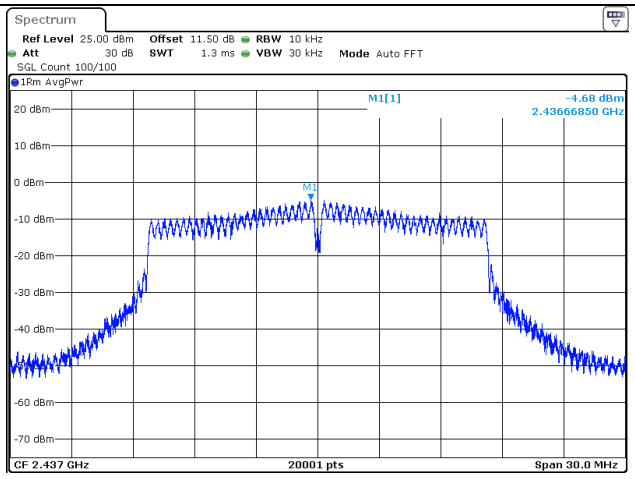
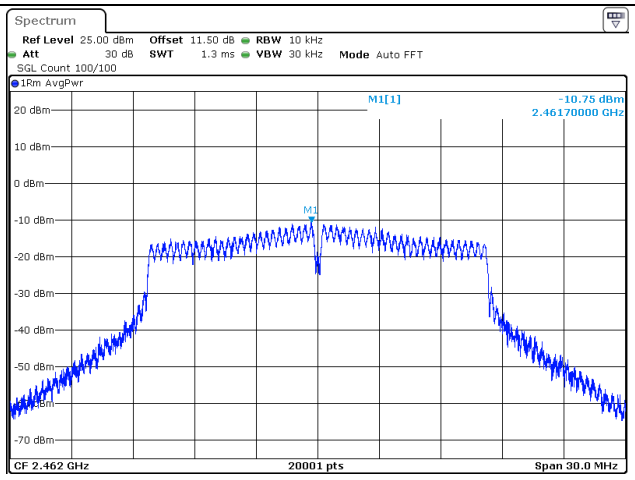
Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Middle Channel	
802.11n ht40 Highest Channel	

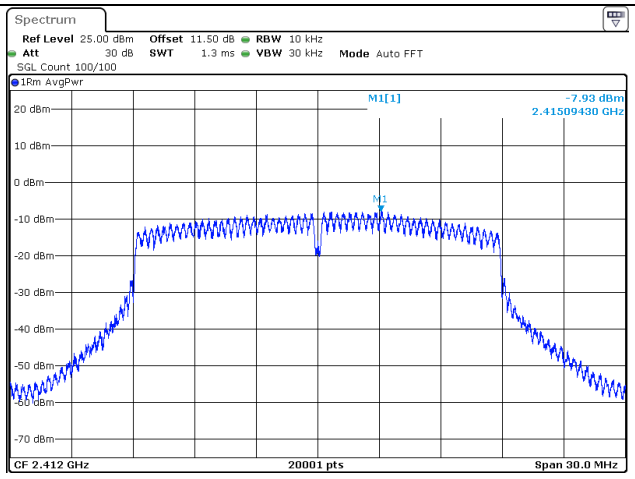
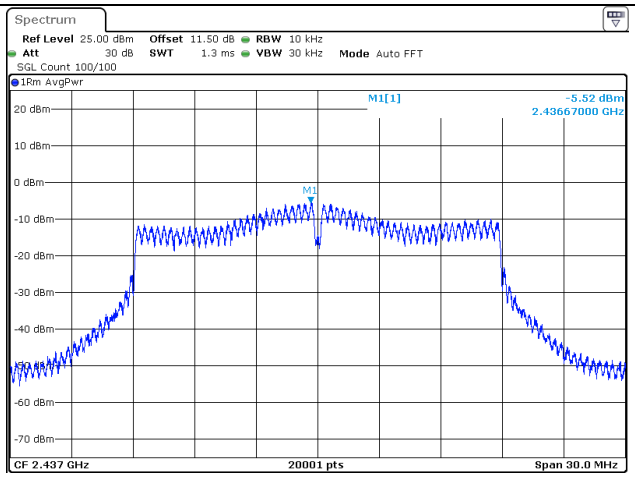
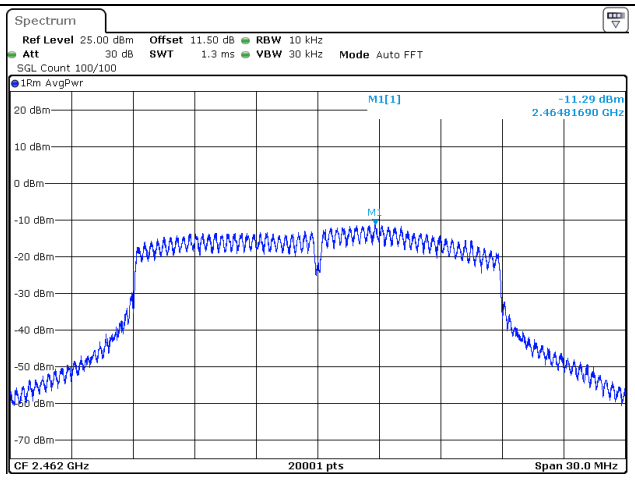
Maximum power spectral density	
802.11ax he20 Lowest Channel	
802.11ax he20 Middle Channel	
802.11ax he20 Highest Channel	

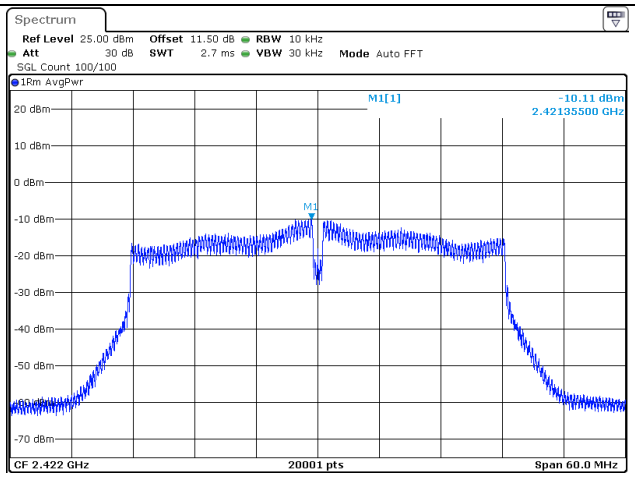
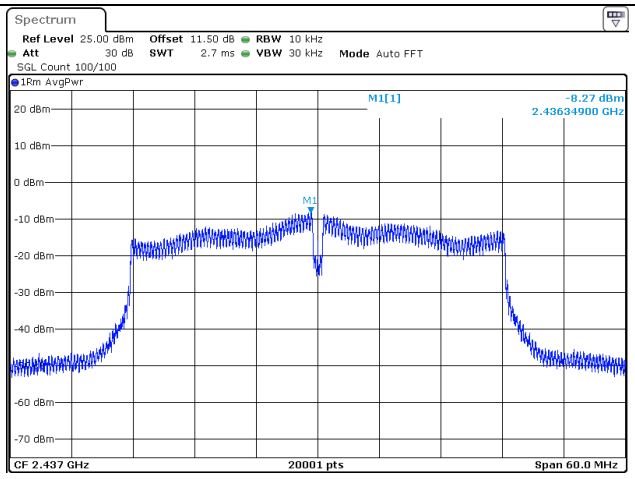
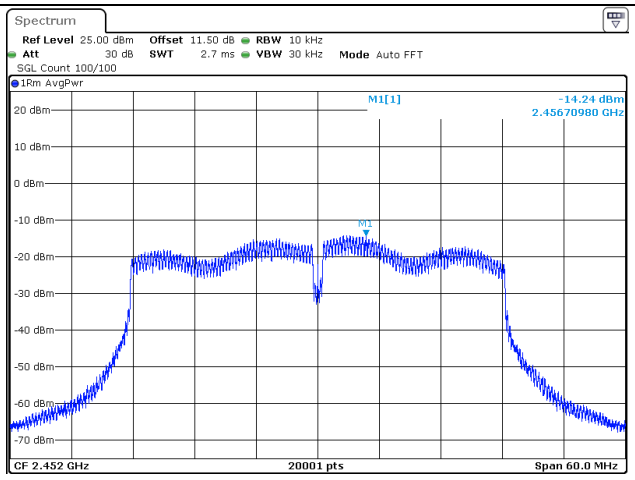
Maximum power spectral density	
802.11ax he40 Lowest Channel	
802.11ax he40 Middle Channel	
802.11ax he40 Highest Channel	

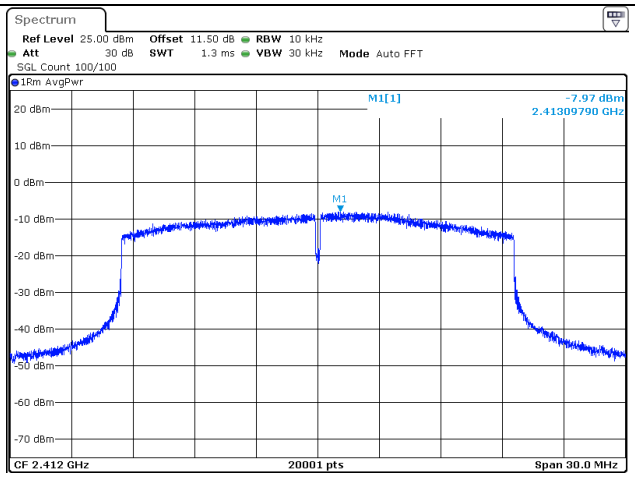
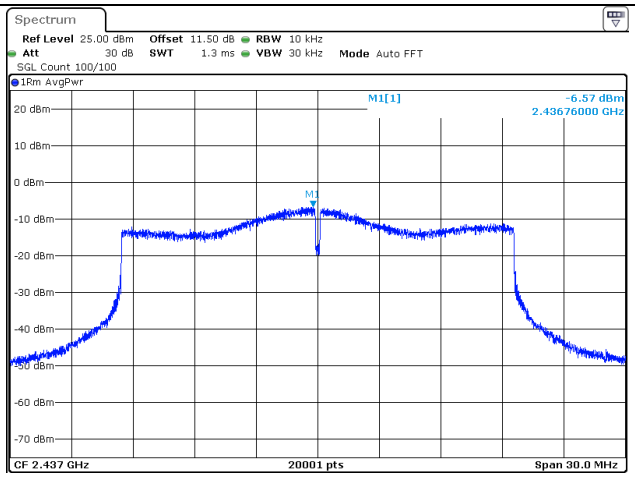
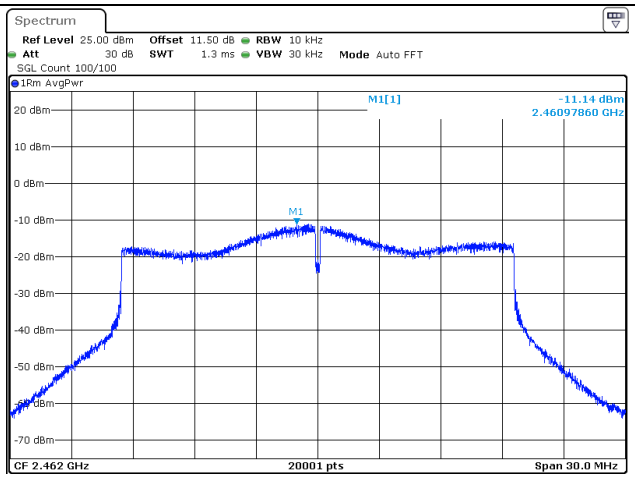
Chain 1:

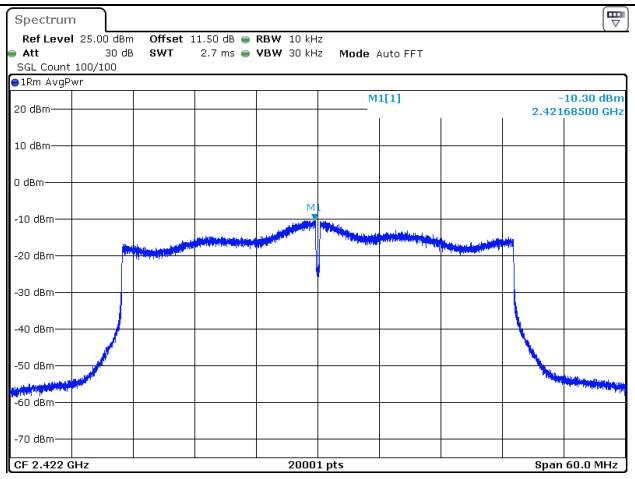
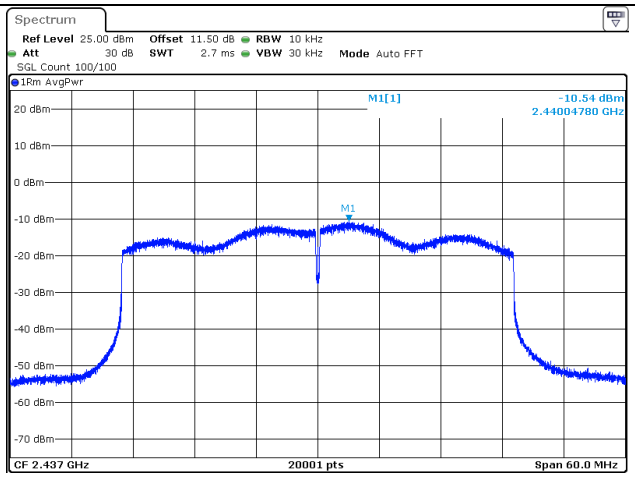
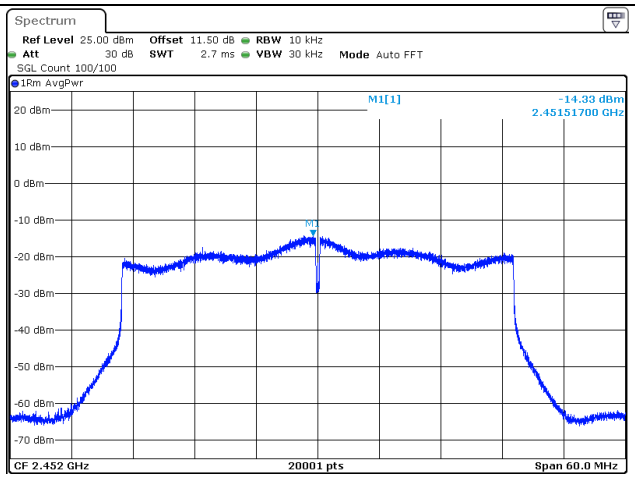
Maximum power spectral density	
802.11b Lowest Channel	
802.11b Middle Channel	
802.11b Highest Channel	

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

Maximum power spectral density	
802.11ax he20 Lowest Channel	
802.11ax he20 Middle Channel	
802.11ax he20 Highest Channel	

Maximum power spectral density	
802.11ax he40 Lowest Channel	
802.11ax he40 Middle Channel	
802.11ax he40 Highest Channel	

4.7 100 kHz Bandwidth of Frequency Band Edge:

Serial Number:	2BI1-2	Test Date:	2023-11-30
Test Site:	RF	Test Mode:	Transmitting
Tester:	Len Huang	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.7	Relative Humidity: (%)	55	ATM Pressure: (kPa)	101

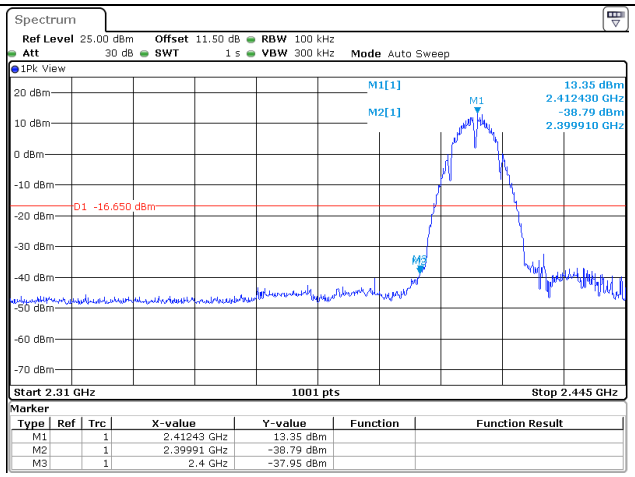
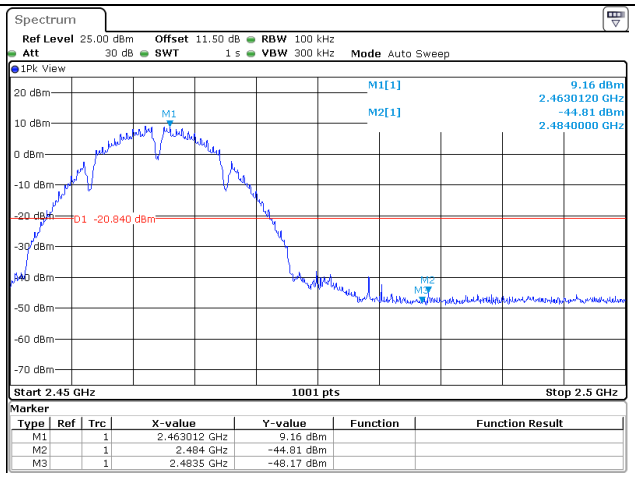
Test Equipment List and Details:

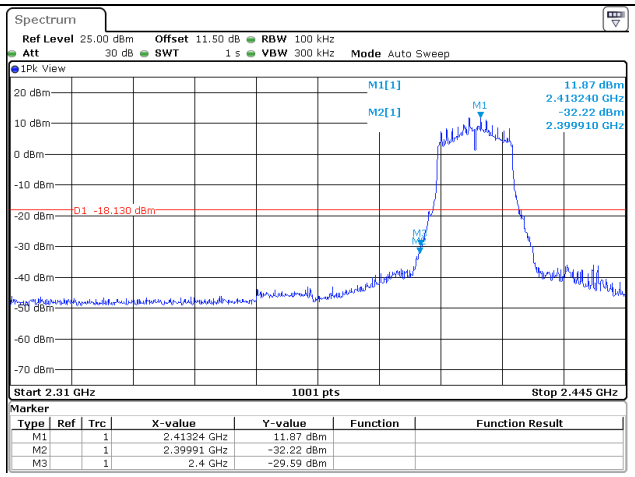
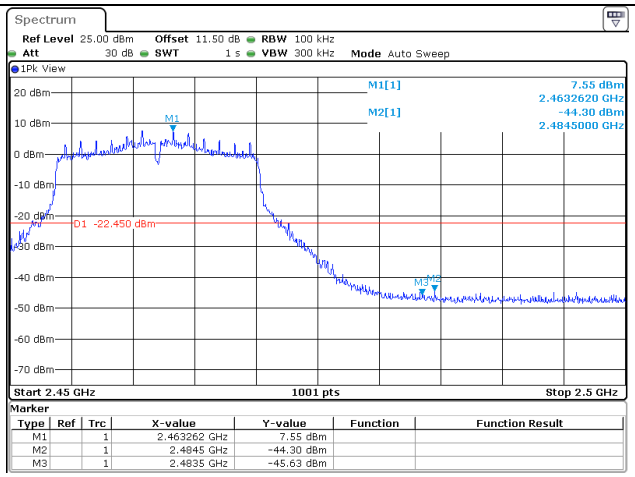
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	102259	2023/04/18	2024/04/17
zhuoxiang	Coaxial Cable	SMA-178	211003	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060302	Each time	N/A

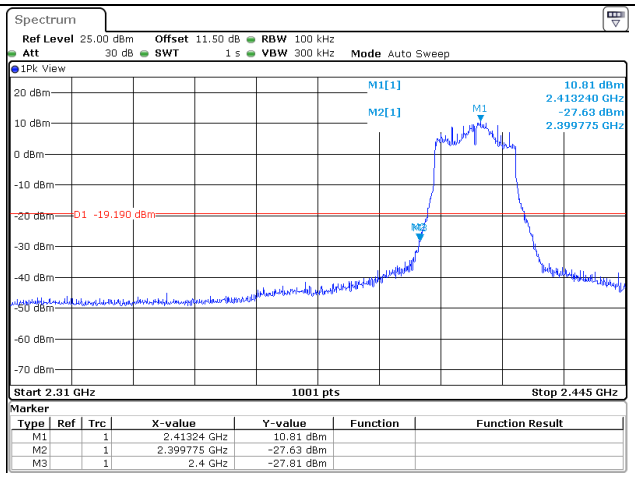
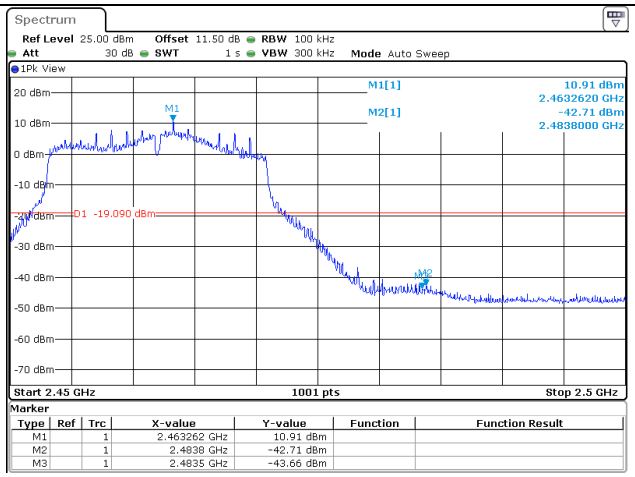
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

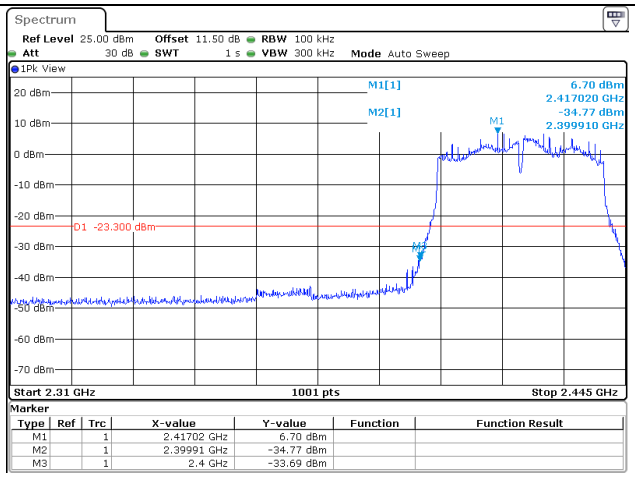
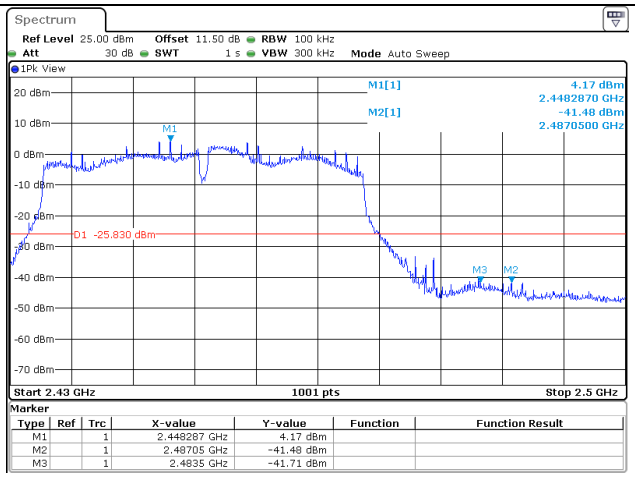
Test Data:

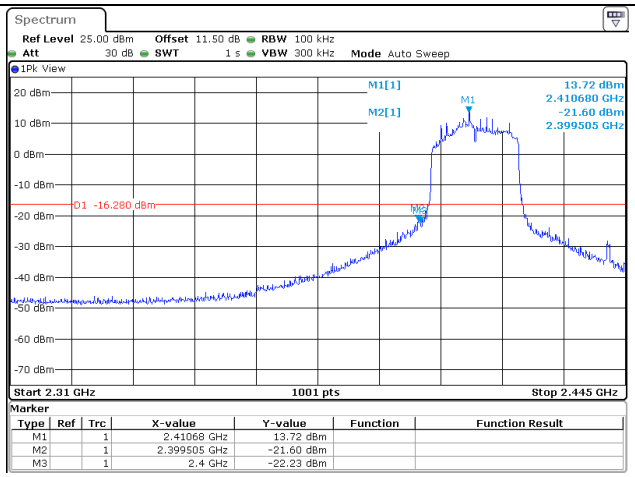
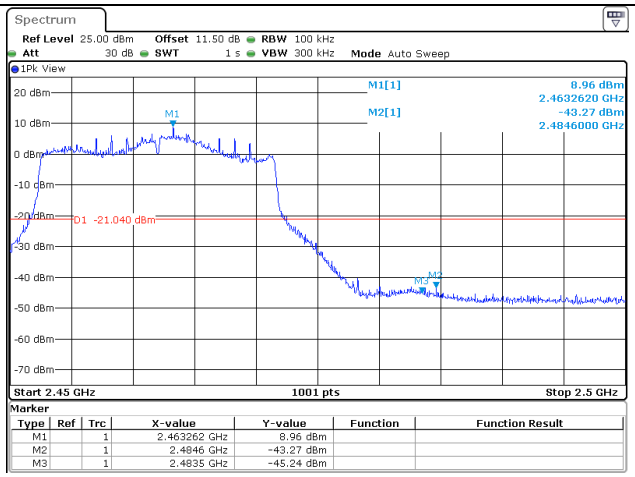
Chain 0:

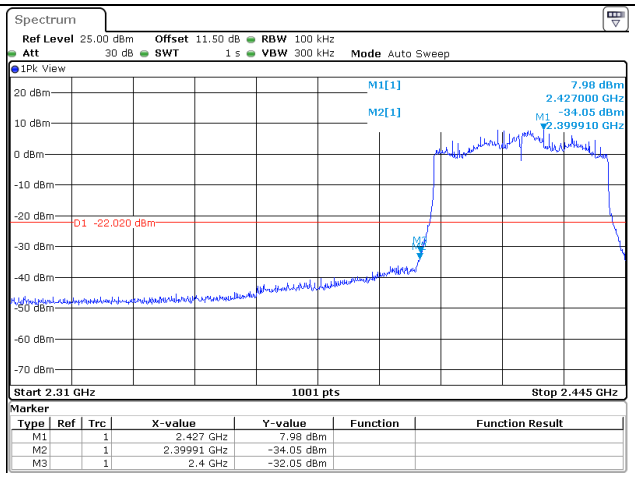
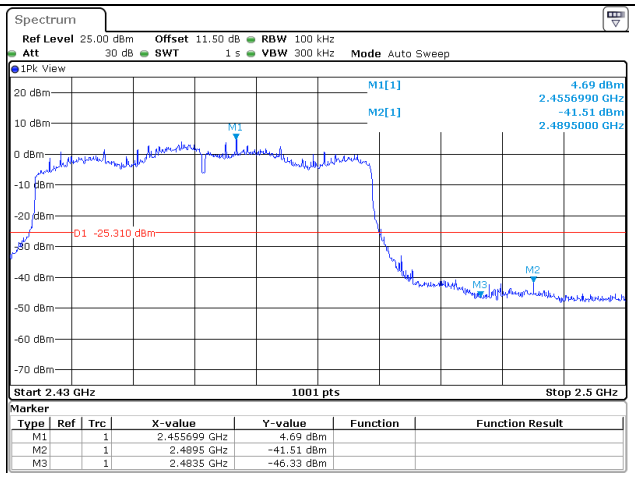
100 kHz Bandwidth of Frequency Band Edge	
802.11b Lowest Band edge	
802.11b Highest Band edge	

100 kHz Bandwidth of Frequency Band Edge	
802.11g Lowest Band edge	
802.11g Highest Band edge	

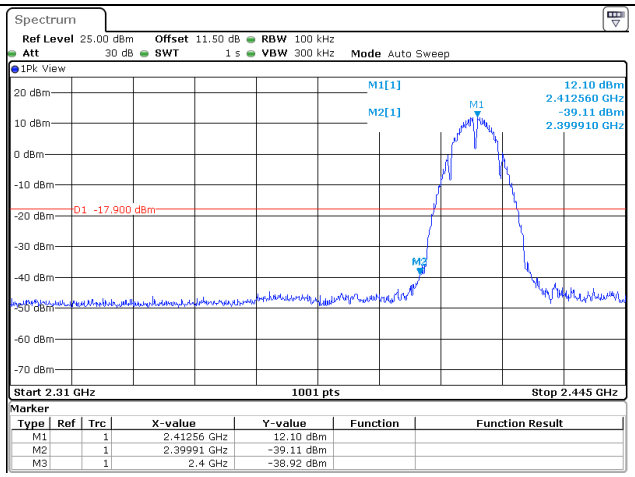
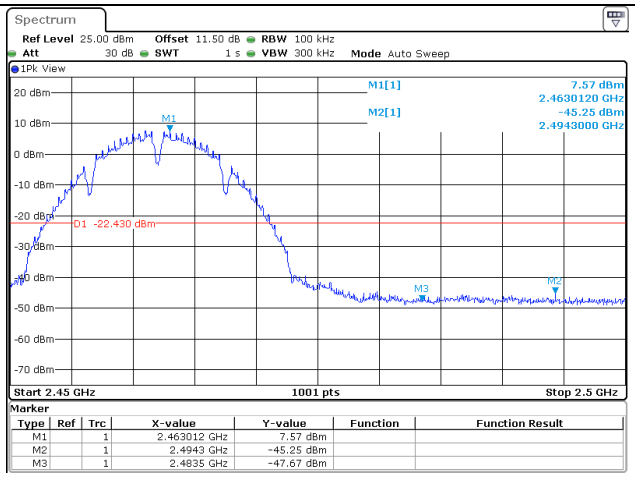
100 kHz Bandwidth of Frequency Band Edge	
802.11n ht20 Lowest Band edge	
802.11n ht20 Highest Band edge	

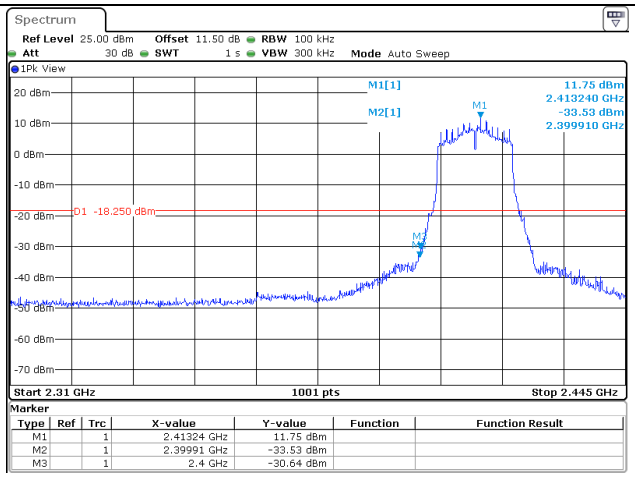
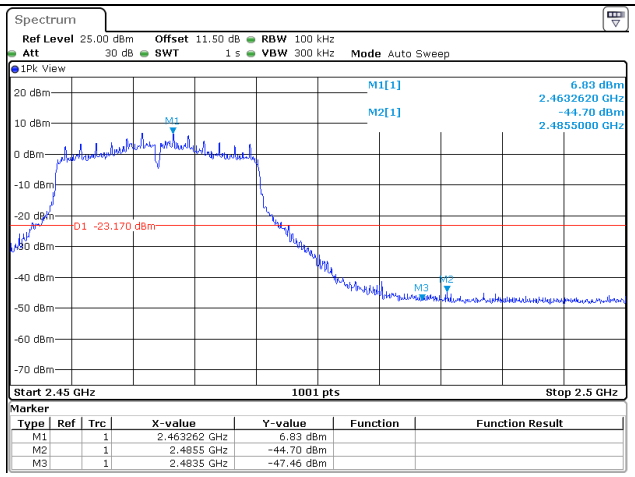
100 kHz Bandwidth of Frequency Band Edge	
802.11n ht40 Lowest Band edge	
802.11n ht40 Highest Band edge	

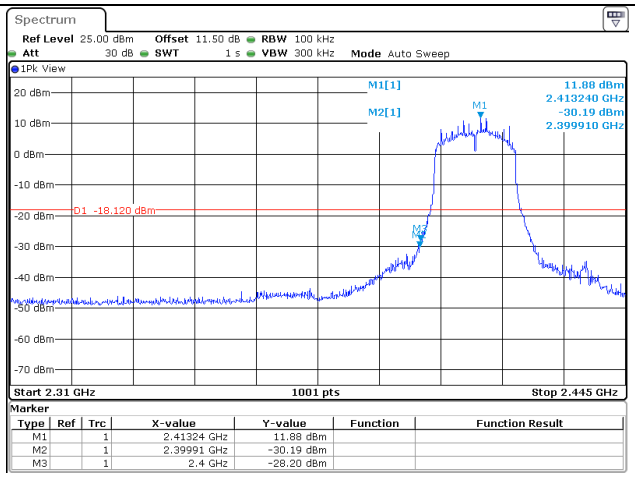
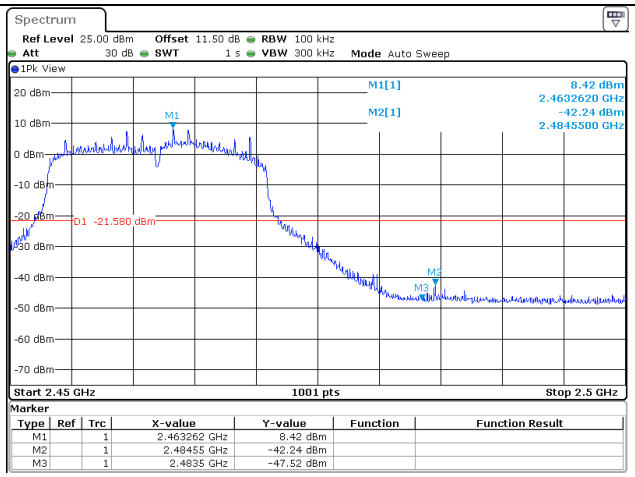
100 kHz Bandwidth of Frequency Band Edge	
802.11ax he20 Lowest Band edge	
802.11ax he20 Highest Band edge	

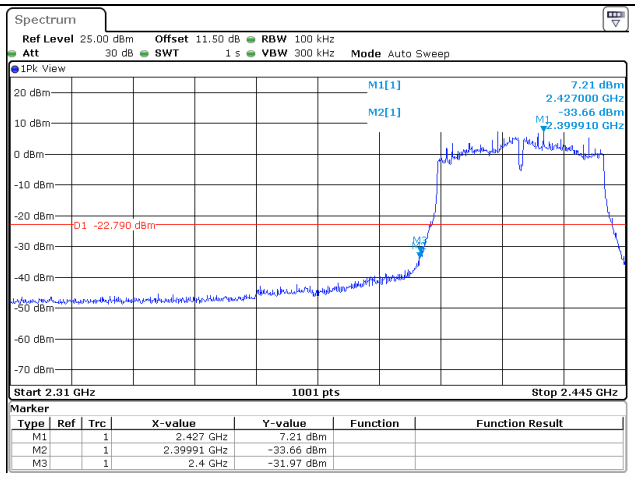
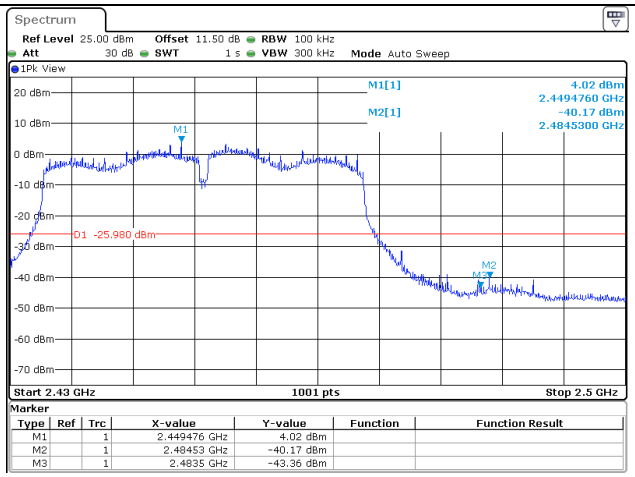
100 kHz Bandwidth of Frequency Band Edge	
802.11ax he40 Lowest Band edge	
802.11ax he40 Highest Band edge	

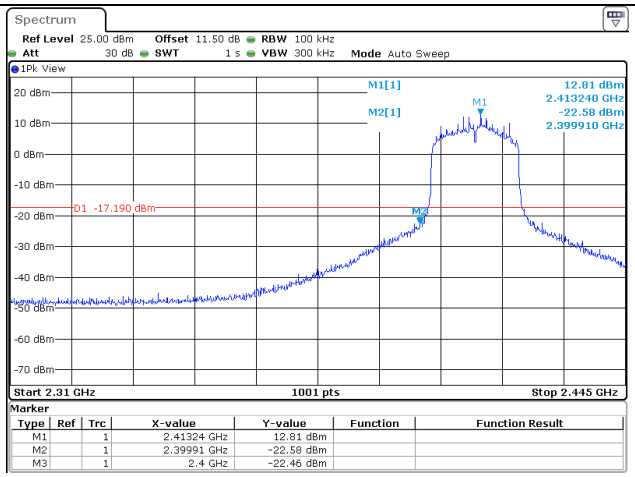
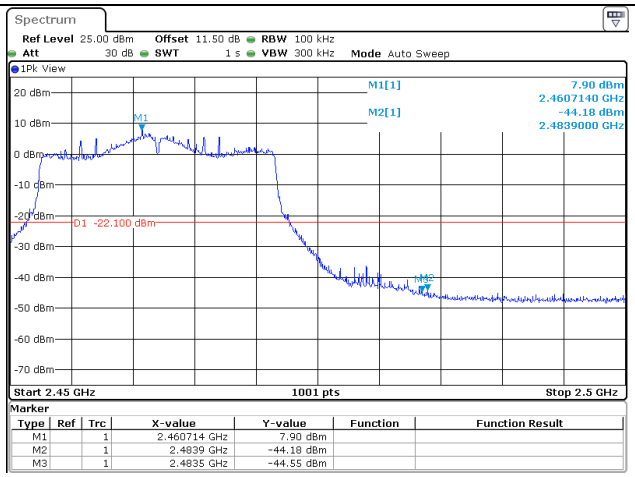
Chain 1:

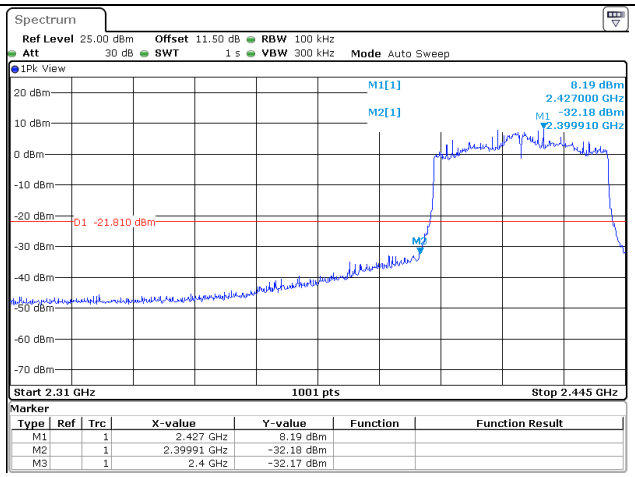
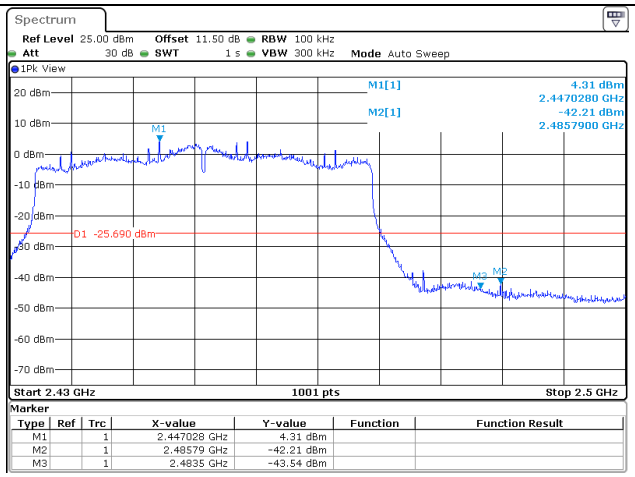
100 kHz Bandwidth of Frequency Band Edge	
802.11b Lowest Band edge	
802.11b Highest Band edge	

100 kHz Bandwidth of Frequency Band Edge	
802.11g Lowest Band edge	
802.11g Highest Band edge	

100 kHz Bandwidth of Frequency Band Edge	
802.11n ht20 Lowest Band edge	
802.11n ht20 Highest Band edge	

100 kHz Bandwidth of Frequency Band Edge	
802.11n ht40 Lowest Band edge	
802.11n ht40 Highest Band edge	

100 kHz Bandwidth of Frequency Band Edge	
802.11ax he20 Lowest Band edge	
802.11ax he20 Highest Band edge	

100 kHz Bandwidth of Frequency Band Edge	
802.11ax he40 Lowest Band edge	
802.11ax he40 Highest Band edge	

4.8 Duty Cycle:

Serial Number:	2BI1-2	Test Date:	2023/11/26
Test Site:	RF	Test Mode:	Transmitting
Tester:	Len Huang	Test Result:	N/A

Environmental Conditions:					
Temperature: (℃)	26.7	Relative Humidity: (%)	56	ATM Pressure: (kPa)	101

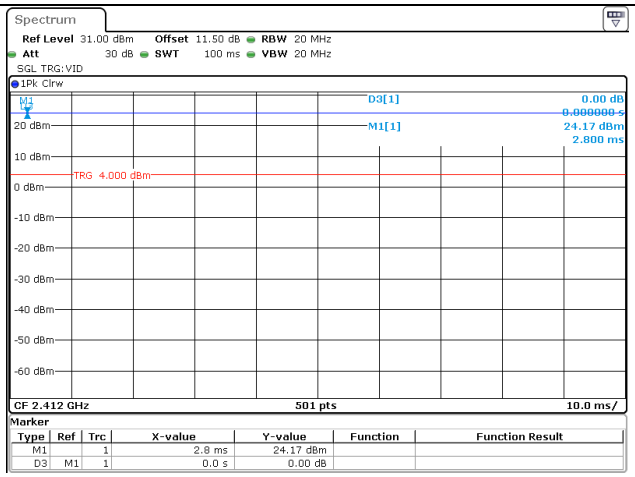
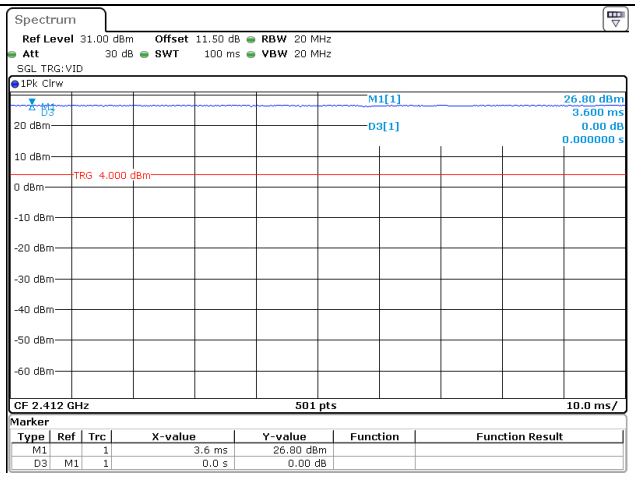
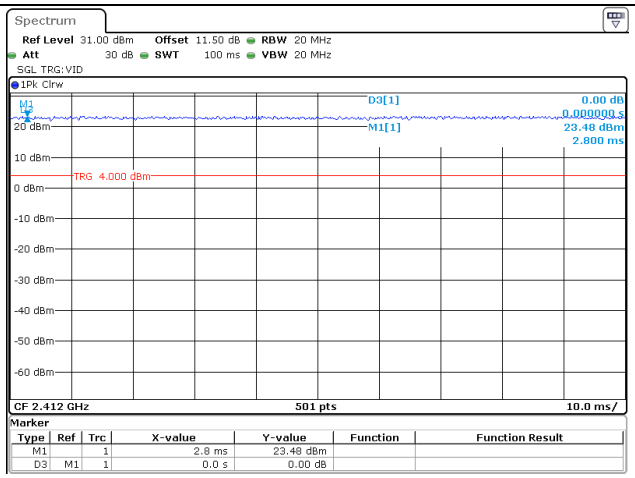
Test Equipment List and Details:

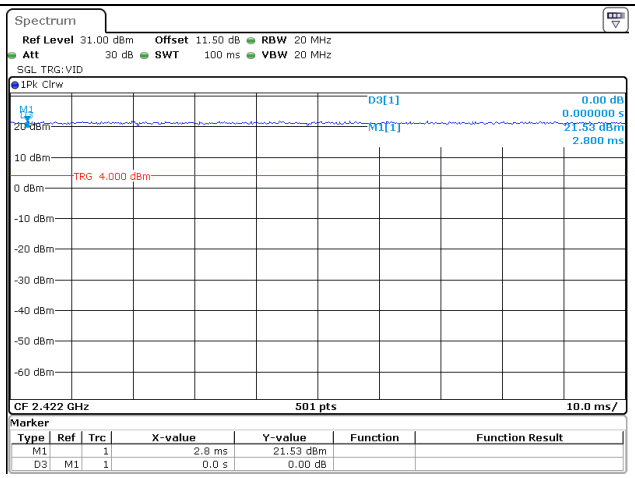
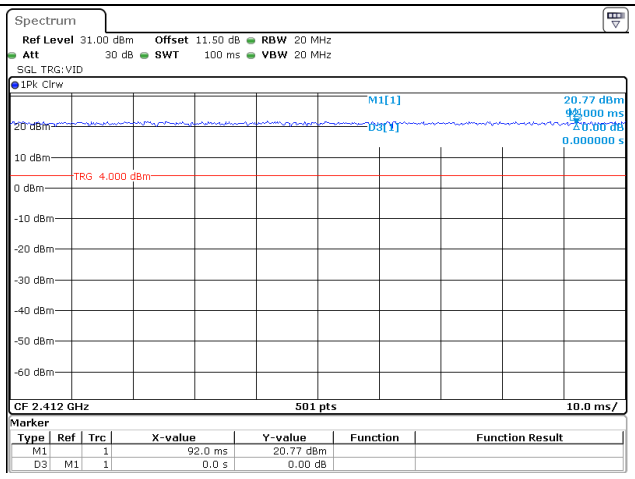
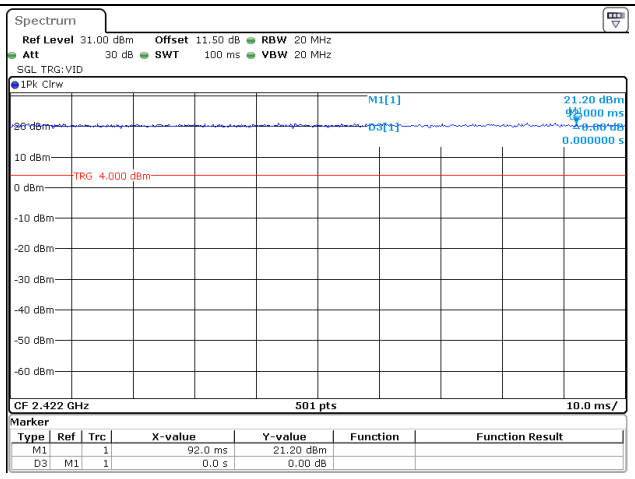
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	102259	2023/04/18	2024/04/17
zhuoxiang	Coaxial Cable	SMA-178	211003	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060302	Each time	N/A

** 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)	VBW setting (Hz)
802.11b	100	100	100	/	/	10
802.11g	100	100	100	/	/	10
802.11n ht20	100	100	100	/	/	10
802.11n ht40	100	100	100	/	/	10
802.11ax he20	100	100	100	/	/	10
802.11ax he40	100	100	100	/	/	10
Note: Test only was performed at Chain 0.						

Duty Cycle	
802.11b	
802.11g	
802.11n ht20	

Duty Cycle	
802.11n ht40	
802.11ax he20	
802.11ax he40	

5. RF EXPOSURE EVALUATION

5.1 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

5.1.1 Applicable Standard

According to subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (Minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

5.1.2 Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \le 1$$

Mode	Frequency (MHz)	Tune Up Conducted Power (dBm)	Antenna Gain (dBi) (Note 2)	Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
Bluetooth	2402-2480	14.5	4.45	32	0.006	1.0
BLE	2402-2480	14.0	4.45	32	0.005	1.0
2.4G Wi-Fi	2412-2462	25.0	7.15	32	0.128	1.0
5G Wi-Fi	5180-5240	27.6	8.26	32	0.300	1.0
	5260-5320	21.73	8.26	32	0.078	1.0
	5500-5700	21.73	8.26	32	0.078	1.0
	5745-5825	27.2	8.26	32	0.273	1.0
6G Wi-Fi	5955-6145	16.0	7.55	32	0.018	1.0
	6435-6515	16.0	7.55	32	0.018	1.0
	6535-6855	16.0	7.55	32	0.018	1.0
	6875-7115	16.0	7.55	32	0.018	1.0

Note:

1) The tune up conducted power was declared by the applicant.

2) For the Wi-Fi mode, the antenna gain would be the directional gain.

3) The Bluetooth, 2.4G Wi-Fi, 5G Wi-Fi and 6G Wi-Fi can transmit simultaneously.

The ratio=$MPE_{Bluetooth}$/limit+$MPE_{2.4G\ Wi\text{-}Fi}$/limit+$MPE_{5G\ Wi\text{-}Fi}$/limit +$MPE_{6G\ Wi\text{-}Fi}$/limit
=0.006+0.128+0.300+0.018=0.452＜1.0, simultaneous exposure is not required.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 32cm from nearby persons.

Result: Compliance

5.2 RSS-102 § 4 –Exposure Limits

5.2.1 Applicable Standard

According to RSS-102 § 4:

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
0.003-10[21]	83	90	-	Instantaneous˙
0.1-10	-	0.73/ f	-	6¨
1.1-10	87/ $f^{0.5}$	-	-	6¨
10-20	27.46	0.0728	-2	6
20-48	58.07/ $f^{0.25}$	0.1540/ $f^{0.25}$	8.944/ $f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 $f^{0.3417}$	0.008335 $f^{0.3417}$	0.02619 $f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ $f^{1.2}$
150000-300000	0.158 $f^{0.5}$	4.21 x 10^{-4} $f^{0.5}$	6.67 x 10^{-5} f	616000/f

Note: f is frequency in MHz.
˙ Based on nerve stimulation (NS).
¨ Based on specific absorption rate (SAR).

5.2.2 Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. W/m^2)
P = power input to the antenna (in appropriate units, e.g., W).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \le 1$$

Mode	Frequency (MHz)	Tune Up Conducted Power (dBm)	Antenna Gain (dBi) (Note 2)	Evaluation Distance (m)	Power Density (W/m^2)	MPE Limit (W/m^2)
Bluetooth	2402-2480	14.5	4.45	0.32	0.061	5.351
BLE	2402-2480	14.0	4.45	0.32	0.054	5.351
2.4G Wi-Fi	2412-2462	25.0	7.15	0.32	1.276	5.366
5G Wi-Fi	5180-5240	27.6	8.26	0.32	2.997	9.047
	5260-5320	21.73	8.26	0.32	0.776	9.142
	5500-5700	21.73	8.26	0.32	0.776	9.425
	5745-5825	27.2	8.26	0.32	2.733	9.710
6G Wi-Fi	5955-6145	16.0	7.55	0.32	0.176	9.952
	6435-6515	16.0	7.55	0.32	0.176	10.493
	6535-6855	16.0	7.55	0.32	0.176	10.604
	6875-7115	16.0	7.55	0.32	0.176	10.978

Note:

1) The tune up conducted power was declared by the applicant.

2) For the Wi-Fi mode, the antenna gain would be the directional gain.

3) The Bluetooth, 2.4G Wi-Fi, 5G Wi-Fi and 6G Wi-Fi can transmit simultaneously.

The ratio=$MPE_{Bluetooth}$/limit+$MPE_{2.4G\ Wi\text{-}Fi}$/limit+$MPE_{5G\ Wi\text{-}Fi}$/limit +$MPE_{6G\ Wi\text{-}Fi}$/limit =0.061/5.351+1.276/5.366+2.997/9.047+0.176/9.952=0.598＜1.0, simultaneous exposure is not required.

To maintain compliance with the ISEDC's RF exposure guidelines, place the equipment at least 32cm from nearby persons.

6. EUT PHOTOGRAPHS

Please refer to the attachment CR230955399-EXP EUT EXTERNAL PHOTOGRAPHS and CR230955399-INP EUT INTERNAL PHOTOGRAPHS.

7. TEST SETUP PHOTOGRAPHS

Please refer to the attachment CR230955399-00D-TSP TEST SETUP PHOTOGRAPHS.

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