

TEST REPORT

Applicant: 8devices

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IC: Antakalnio g. 17-6 Vilnius Vilnius County LT-10312 Lithuania

Product Name: Mango

FCC ID: Z9WMAN

IC: 11468A-MAN

HVIN: Mango-I

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ANSI C63.10-2013

KDB 558074 D01 15.247 Meas Guidance v05r02

Report Number: 2402A54840E-RF-00AA1

Report Date: 2025/5/13

The above device has been tested and found compliant with the requirement of the relative standards by Bay Area Compliance Laboratories Corp. (Dongguan).

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2402A54840E-RF-00AA1	Original Report	2025/5/13

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	Mango
EUT Model:	Mango
Operation Frequency:	2412-2462MHz (802.11b/g/n ht20/ax he20) 2422-2452MHz(802.11n ht40/ax he40)
Maximum Peak Output Power (Conducted):	29.35 dBm
Modulation Type:	802.11b:DSSS-DBPSK, DQPSK, CCK 802.11g/n: OFDM-BPSK, QPSK, 16QAM, 64QAM 802.11ax: OFDMA-BPSK, QPSK, 16QAM, 64QAM,256QAM,1024QAM
Rated Input Voltage:	DC 3.3V
Serial Number:	2VQP-1
EUT Received Date:	2024/12/10
EUT Received Status:	Good

1.2 Accessory Information

Accessory Description	Manufacturer	Model	Parameters
/	/	/	/

1.3 Antenna Information Detail ▲

Antenna	Antenna Manufacturer	Antenna Type	input impedance (Ohm)	Frequency Range	Antenna Gain
Chain 0	Pulse Worldwide Headquarters	Chip	50	2.4~2.5GHz	2.09dBi
Chain 1	Pulse Worldwide Headquarters	Chip	50	2.4~2.5GHz	2.09dBi

Note:

The system supports 2T2R modes at 802.11n /ax modes.
Per KDB 662911 D01 Multiple Transmitter Output v02r01:

For power measurements:

CDD Mode:

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$
directional gain=2.09dBi

For power spectral density (PSD) measurements:

Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.
directional gain=2.09dBi+3dB=5.09dBi

The design of compliance with §15.203:

The antenna should be permanently attached to the board or use a unique connection interface.

1.4 Equipment Modifications

No modifications are made to the EUT during all test items.

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)	Minimum 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	Reporting
§15.247(d) RSS-247 Clause 5.5	100 kHz Bandwidth Of Frequency Band Edge	Compliant*
§15.247(e) RSS-247 Clause 5.2 b)	Power Spectral Density	Compliant*
FCC §15.203 RSS-Gen Clause 6.8	Antenna Requirement	Compliant
FCC §15.247 (i) & §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliant
RSS-102 Clause 6.6	Exemption Limits For Routine Evaluation-RF Exposure Evaluation	Compliant

Note 1: For AC line conducted emissions, the maximum output power mode and channel was tested.
 Note 2: For Radiated Spurious Emissions 9kHz~1GHz and 18~25GHz, the maximum output power mode and channel was tested.
 Compliant*: Base on the Description of change, the change do not affect the test results, the test results please refer to report No.: CR22010029-00A that was issued by China Certification ICT Co., Ltd (Dongguan) on 2022/12/26.

Description of change:

The change between the previous equipment and the current equipment is stated and guaranteed by the applicant. The original report CR22010029-00A[▲] that was issued by China Certification ICT Co., Ltd (Dongguan) on 2022/12/26, which was provided by the applicant. The difference as following:

1. Add two frequency bands 5250-5350MHz and 5470-5725MHz.
2. Remove the whip antenna.
3. Change the RF Chip model to QCN5152 (RF characteristics don't affect).
4. Changed the HVIN to Mango-I.
5. Changed the FVIN to V1.12.1.

The Bay Area Compliance Laboratories Corp. (Dongguan) is responsible for all the information provided in this report, except when information is provided by the customer as identified in this report.

3. DESCRIPTION OF TEST CONFIGURATION

3.1 Operation Frequency Detail

For 802.11b/g/n ht20/ax he20:

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	/	/

For 802.11n ht40/ax he40:

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

Note: The above frequencies in bold were performed the test.

3.2 EUT Operation Condition

The EUT was configured for testing in Engineering Mode, which was provided by the manufacturer. The EUT configuration as below:

EUT Exercise Software:		QRCT4					
The software was provided by manufacturer. The maximum power was configured as below, that was provided by the manufacturer ▲ :							
Test Modes	Data Rate	Power Level Setting					
		Lowest Channel	Middle Channel	Highest Channel	Chain 0	Chain 1	Chain 0
802.11b	1Mbps	18	18	18	18	18	18
802.11g	6Mbps	21	21	22	22	22	22
802.11n ht20	MCS0	21	21	22	22	22	22
802.11n ht40	MCS0	21	21	22	22	22	22
802.11ax he20	MCS0	22	22	20	20	20	20
802.11ax he40	MCS0	18	18	18	18	18	18

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 not supports Part of RU, software blocks Part of RU.

3.3 Support Equipment List and Details

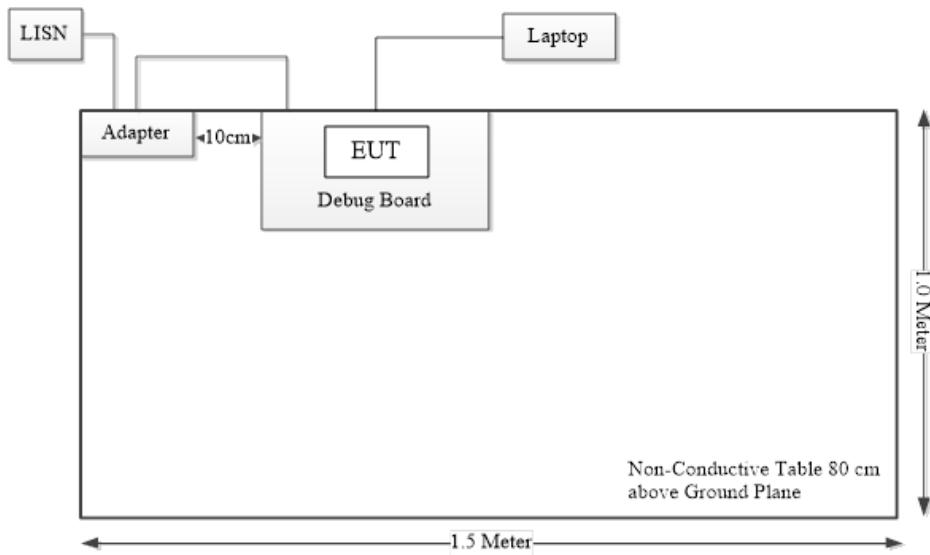
Manufacturer	Description	Model	Serial Number
8devices	Debug Board	LMI_100_02_2_I	2VQP-2
GlobTek	Adapter	GT-46240-2412-T2	SAA-210577-EA
DELL	Laptop	E6410	GMLGPM1

3.4 Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
DC Cable	No	No	1	Adapter	Debug Board
RJ45 Cable	No	No	10	Laptop	Debug Board

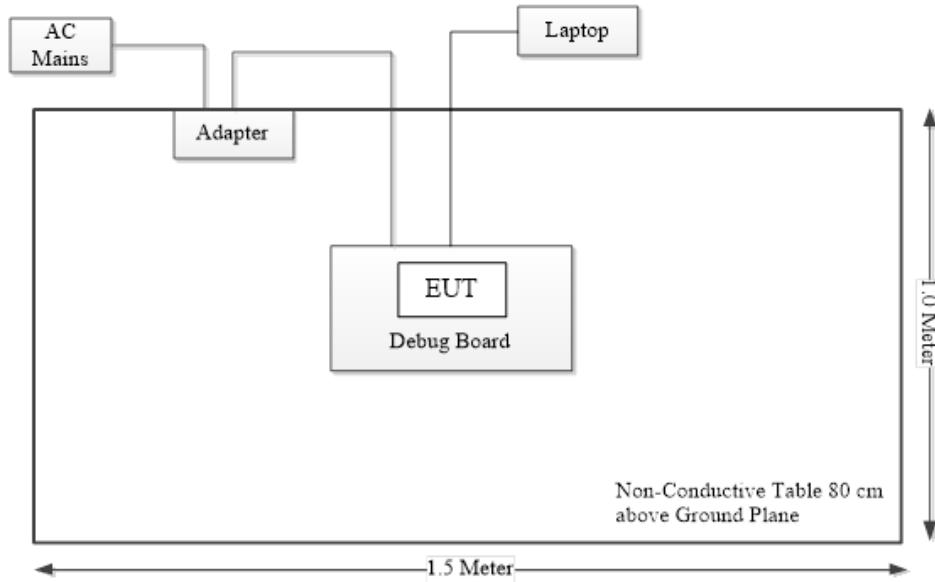
3.5 Block Diagram of Test Setup

AC line conducted emissions:

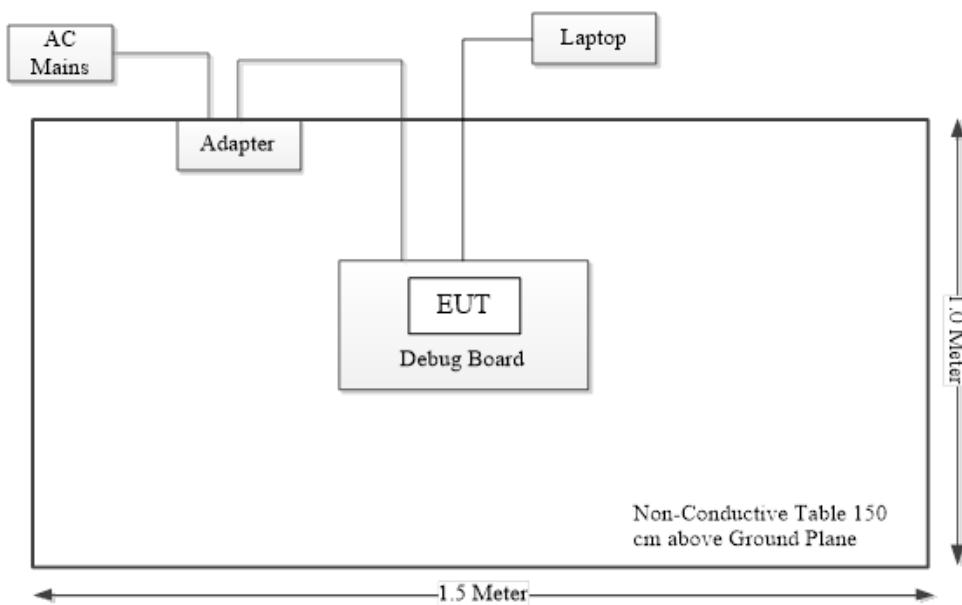


Spurious Emissions:

Below 1GHz:



Above 1GHz:



3.6 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1st Road, Tangxia 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. : 829273, the FCC Designation No. : CN5044.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

3.7 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	9kHz~30MHz: 3.3dB, 30MHz~200MHz: 4.55 dB, 200MHz~1GHz: 5.92 dB, 1GHz~6GHz: 4.98 dB, 6GHz~18GHz: 5.89 dB, 18GHz~26.5GHz: 5.47 dB, 26.5GHz~40GHz: 5.63 dB
Unwanted Emissions, conducted	±2.47 dB
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.11 dB (150 kHz to 30 MHz)

4. REQUIREMENTS AND TEST PROCEDURES

4.1 AC Line Conducted Emissions

4.1.1 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 μ H/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.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	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 μ V within the frequency band 535-1705 kHz, as measured using a 50 μ H/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 μ H / 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

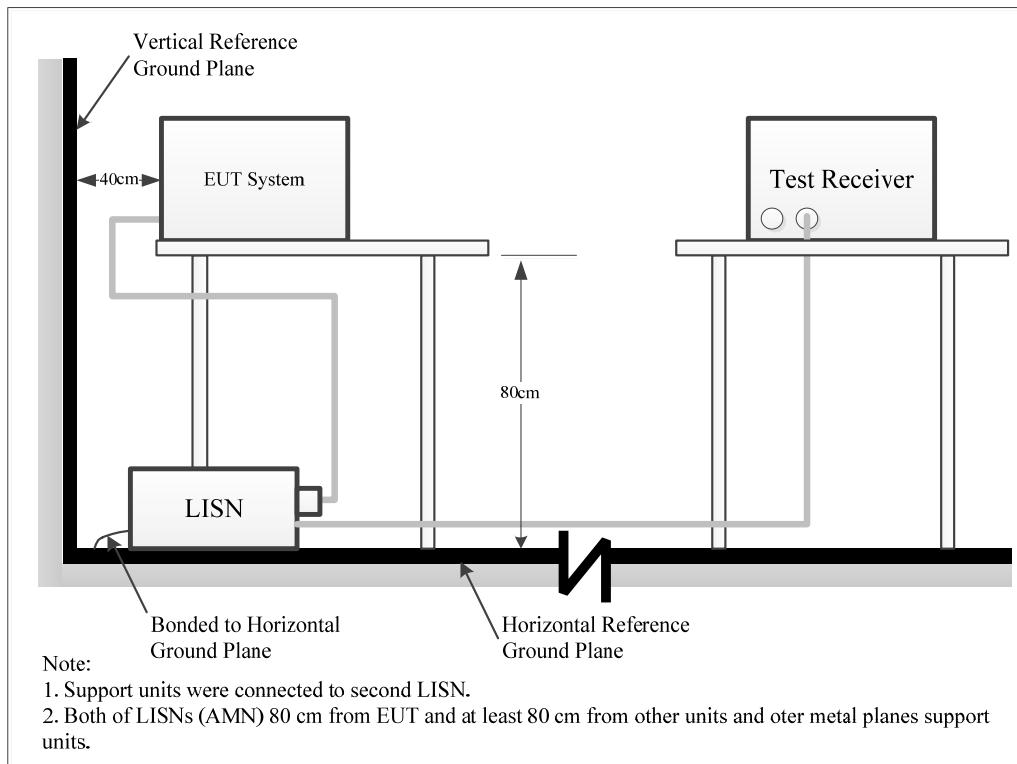
Frequency (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 ¹	56 to 46 ¹
0.5 – 5	56	46
5 – 30	60	50

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.

4.1.2 EUT Setup



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.

4.1.3 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

4.1.4 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.

4.1.5 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

4.1.6 Test Result

Please refer to section 5.1.

4.2 Radiation Spurious Emissions

4.2.1 Applicable Standard

FCC §15.247 (d);

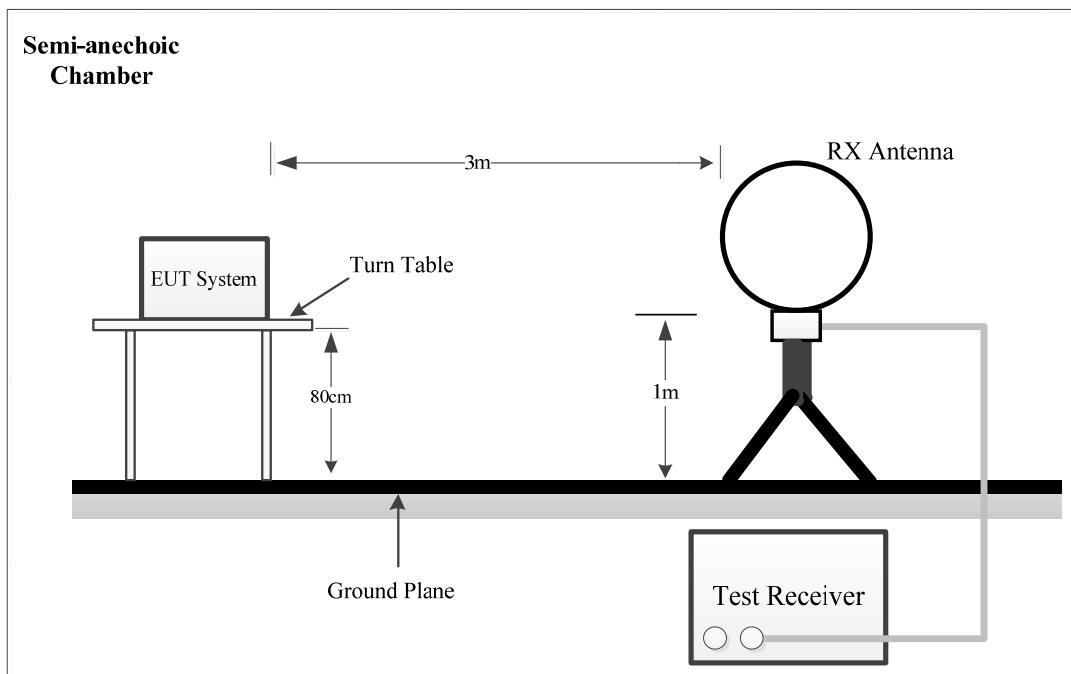
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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)).

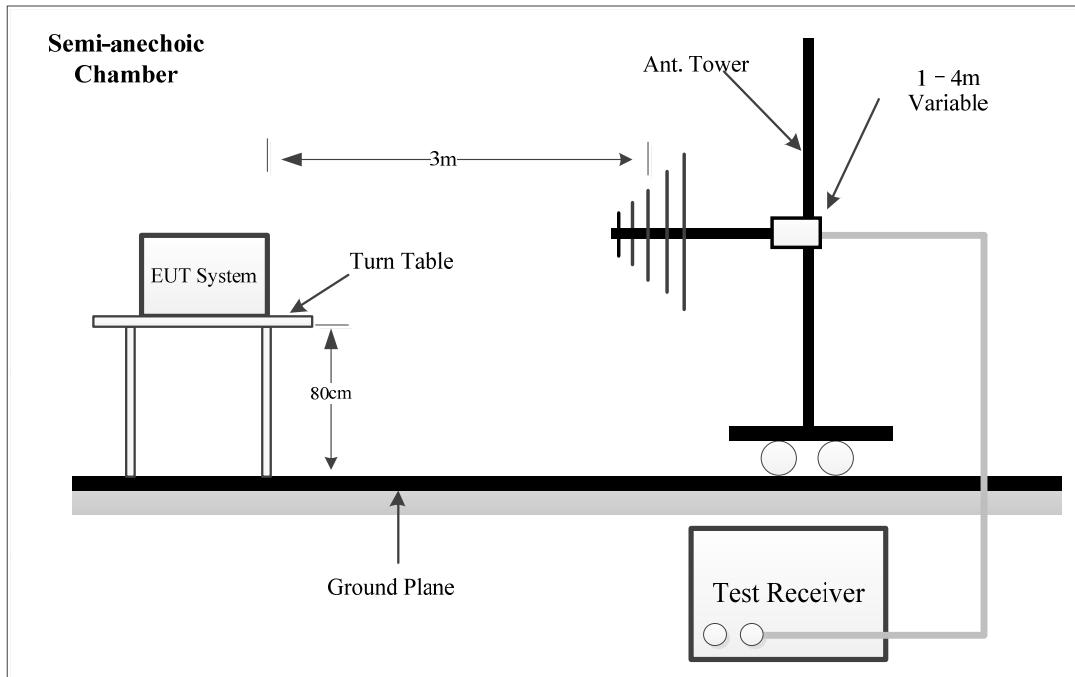
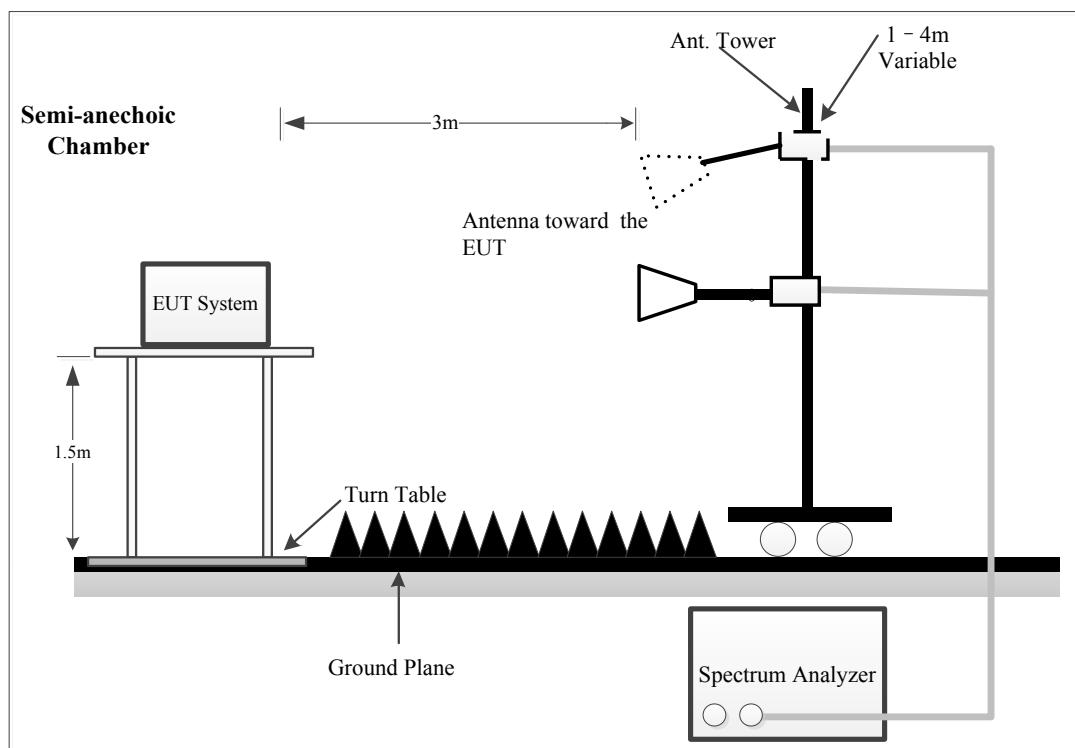
RSS-247 Clause 5.5

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

4.2.2 EUT Setup

9kHz~30MHz:



30MHz~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.

For 9kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

4.2.3 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:

9kHz-1000MHz:

Frequency Range	Measurement	RBW	Video B/W	IF B/W	Detector
9 kHz – 150 kHz	QP/AV	300Hz	1 kHz	200 Hz	QP/AV
150 kHz – 30 MHz	QP/AV	10 kHz	30 kHz	9 kHz	QP/AV
	PK	100 kHz	300 kHz	/	PK
30MHz – 1000 MHz	QP	/	/	120kHz	QP

1GHz- 25GHz:

Pre-scan:

Measurement	Detector	Duty cycle	RBW	Video B/W
PK	PK	Any	1MHz	3 MHz
Ave.	PK	>98%	1MHz	5kHz
		<98%	1MHz	1/T, not less than 5kHz

Final measurement for emission identified during the pre-scan:

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

Note: T is minimum transmission duration

4.2.4 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 9 kHz-1 GHz except 9 – 90 kHz, 110 – 490 kHz, employing an average detector, peak and Average detection modes for frequencies above 1 GHz.

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

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

4.2.5 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

For the spurious emission below 30MHz, the limit was convert from dB μ A/m to dB μ V/m by adding 51.5 dB.

4.2.6 Test Result

Please refer to section 5.2.

4.3 Maximum Conducted Output Power

4.3.1 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).

4.3.2 EUT Setup



A short RF cable with low cable loss connected to the EUT antenna port, which was provided by manufacturer. The insert loss of this RF cable/attenuator was offset into the setting of test equipment.

4.3.3 Test Procedure

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.

- a) Set the EUT in transmitting mode.
- b) Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to test equipment.
- c) Add a correction factor to the display.
- d) Set the power meter to test peak output power, record the result.

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.

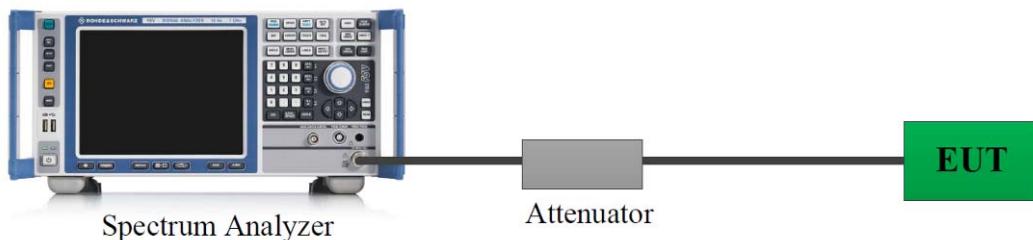
Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter,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

4.3.4 Test Result

Please refer to section 5.5.

4.4 Duty Cycle

4.4.1 EUT Setup



A short RF cable with low cable loss connected to the EUT antenna port, which was provided by manufacturer. The insert loss of this RF cable/attenuator was offset into the setting of test equipment.

4.4.2 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 $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.
- 3) Set $VBW \geq RBW$. 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 $T \leq 16.7 \mu s$.)

4.4.3 Judgment

Report Only. Please refer to section 5.8.

4.5 Antenna Requirement

4.5.1 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 dB) 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 dB) and the required impedance for each antenna type.

4.5.2 Judgment

Compliant. Please refer to the Antenna Information detail in Section 1.3.

5. Test DATA AND RESULTS

5.1 AC Line Conducted Emissions

Serial Number:	2VQP-1	Test Date:	2025/05/09
Test Site:	CE	Test Mode:	Transmitting
Tester:	Yukin Qiu	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	25.4	Relative Humidity: (%)	69	ATM Pressure: (kPa)	100.8
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101614	2024/9/5	2025/9/4
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2024/9/5	2025/9/4
R&S	EMI Test Receiver	ESCI	100035	2024/8/26	2025/8/25
Audix	Test Software	E3	191218 V9	N/A	N/A

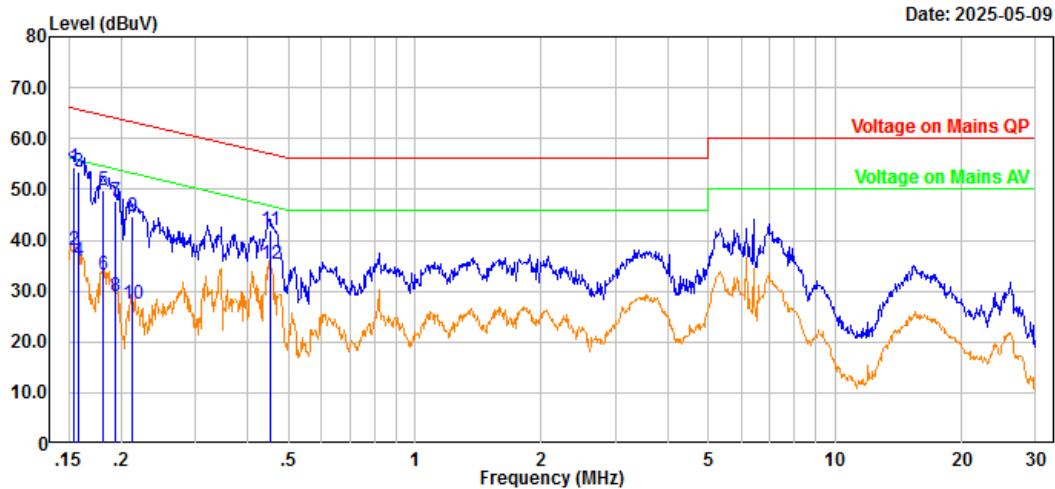
* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data:

Note: 802.11n40 High channel was tested.

Project No.: 2402A54840E-RF-A1
 Port: Line
 Test Mode: Transmitting
 Note: IF B/W 9KHz PK/AV

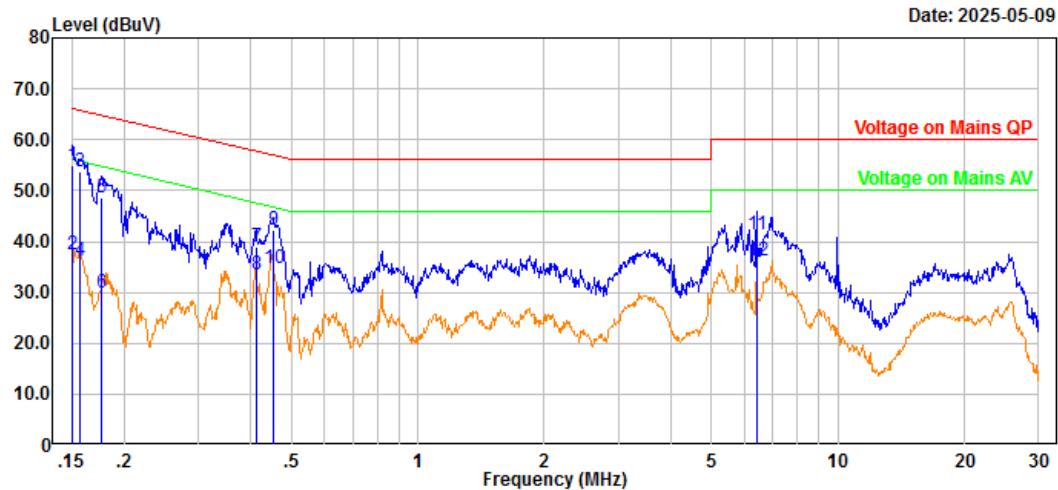
Serial No.: 2VQP-1
 Tester: Yukin Qiu



No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)	Measurement
1	0.154	43.60	10.76	54.36	65.78	11.42	QP
2	0.154	27.25	10.76	38.01	55.78	17.77	Average
3	0.159	42.80	10.77	53.57	65.54	11.97	QP
4	0.159	25.29	10.77	36.06	55.54	19.48	Average
5	0.181	39.01	10.81	49.82	64.43	14.61	QP
6	0.181	22.29	10.81	33.10	54.43	21.33	Average
7	0.193	36.83	10.84	47.67	63.90	16.23	QP
8	0.193	18.02	10.84	28.86	53.90	25.04	Average
9	0.212	33.69	10.85	44.54	63.14	18.60	QP
10	0.212	16.60	10.85	27.45	53.14	25.69	Average
11	0.453	31.08	10.84	41.92	56.83	14.91	QP
12	0.453	24.41	10.84	35.25	46.83	11.58	Average

Project No.: 2402A54840E-RF-A1
 Port: neutral
 Test Mode: Transmitting
 Note: IF B/W 9KHz PK/AV

Serial No.: 2VQP-1
 Tester: Yukin Qiu



No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)	Measurement
1	0.151	44.10	10.85	54.95	65.96	11.01	QP
2	0.151	26.45	10.85	37.30	55.96	18.66	Average
3	0.157	42.78	10.85	53.63	65.64	12.01	QP
4	0.157	25.29	10.85	36.14	55.64	19.50	Average
5	0.176	37.72	10.85	48.57	64.65	16.08	QP
6	0.176	19.09	10.85	29.94	54.65	24.71	Average
7	0.413	28.12	10.77	38.89	57.59	18.70	QP
8	0.413	22.80	10.77	33.57	47.59	14.02	Average
9	0.453	31.36	10.76	42.12	56.81	14.69	QP
10	0.453	24.01	10.76	34.77	46.81	12.04	Average
11	6.408	30.65	10.86	41.51	60.00	18.49	QP
12	6.408	25.46	10.86	36.32	50.00	13.68	Average

5.2 Radiation Spurious Emissions

1) 9kHz - 1GHz

Serial Number:	2VQP-1	Test Date:	2025/5/9
Test Site:	Chamber A	Test Mode:	Transmitting
Tester:	Jayce Wang	Test Result:	Pass

Environmental Conditions:					
Temperature: (°C)	26.5	Relative Humidity: (%)	50	ATM Pressure: (kPa)	100.8

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop Antenna	6512	9706-1206	2023/10/25	2026/10/24
Sunol Sciences	Hybrid Antenna	JB3	A060611-2	2024/4/16	2027/4/15
Narda	Coaxial Attenuator	757C-6dB	34010	2024/4/16	2027/4/15
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2024/7/1	2025/6/30
Sonoma	Amplifier	310N	372193	2024/8/16	2025/8/15
R&S	EMI Test Receiver	ESR3	102453	2024/8/26	2025/8/25
Audix	Test Software	E3	191218 V9	N/A	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data:

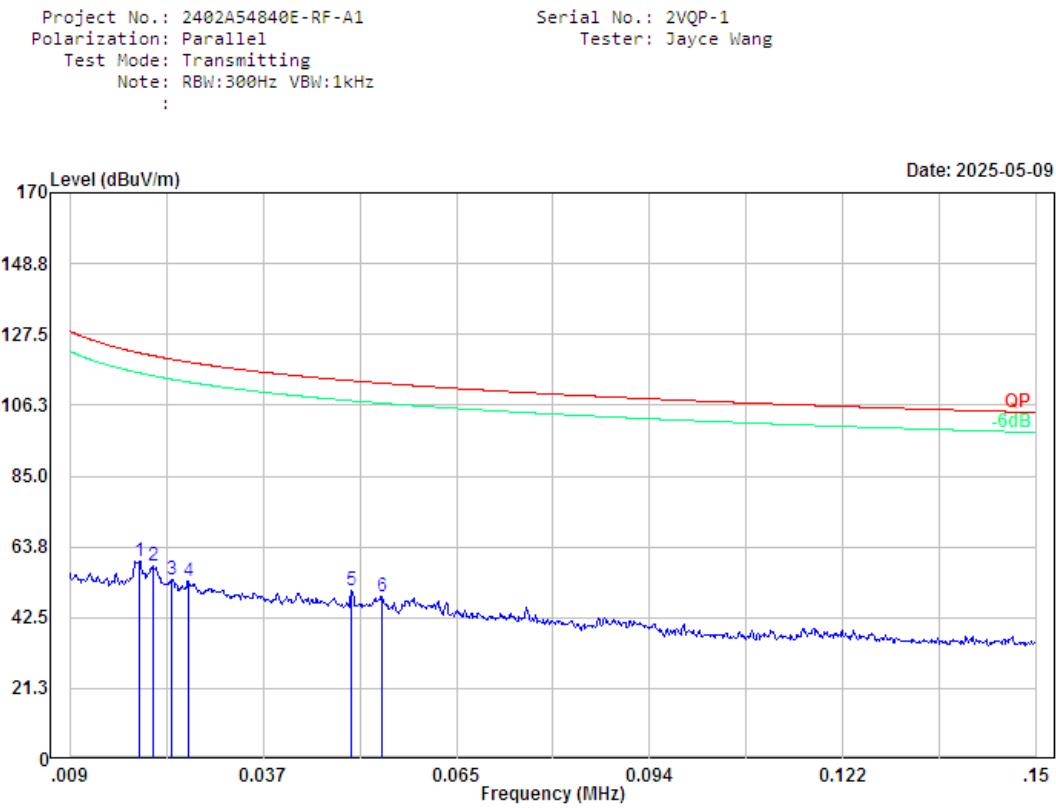
Please refer to the below table and plots.

After pre-scan in the X, Y and Z axes of orientation, the worst case is refer to table and plots.

Note: 802.11n40 High channel was tested.

9kHz~30MHz

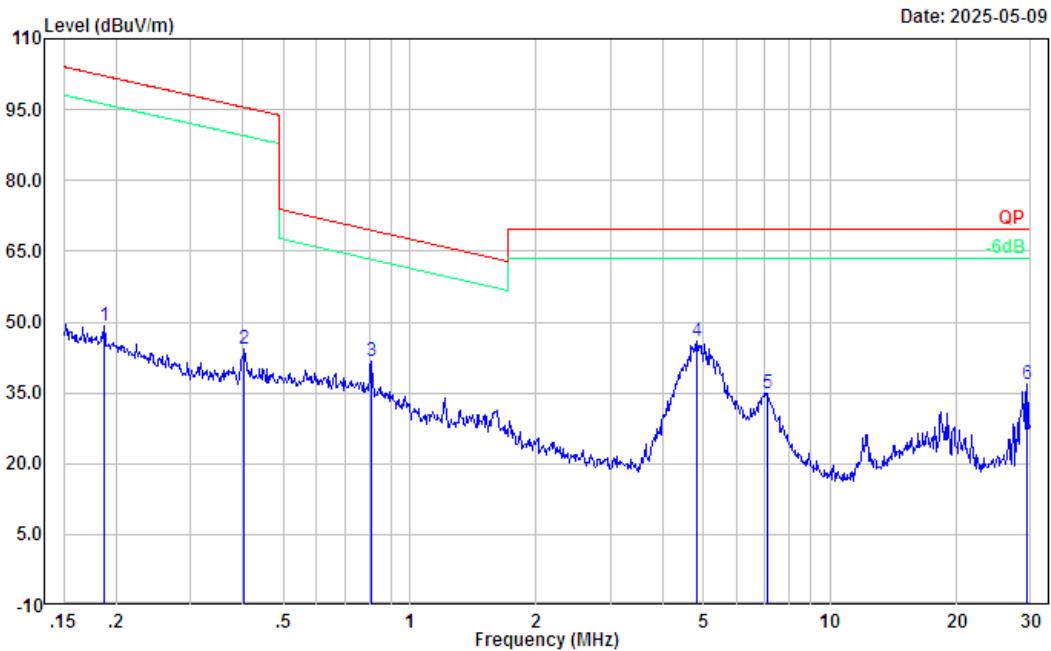
Three antenna orientations (parallel, perpendicular, and ground-parallel) was measured, the worst orientations was below:



No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Measurement
1	0.019	10.10	49.22	59.32	121.96	62.64	Peak
2	0.021	9.22	48.75	57.97	121.11	63.14	Peak
3	0.024	6.01	48.11	54.12	120.02	65.90	Peak
4	0.026	5.95	47.56	53.51	119.19	65.68	Peak
5	0.050	7.23	43.41	50.64	113.60	62.96	Peak
6	0.055	6.14	42.71	48.85	112.87	64.02	Peak

Project No.: 2402A54840E-RF-A1
Polarization: Parallel
Test Mode: Transmitting
Note: RBW:10kHz VBW:30kHz
:

Serial No.: 2VQP-1
Tester: Jayce Wang

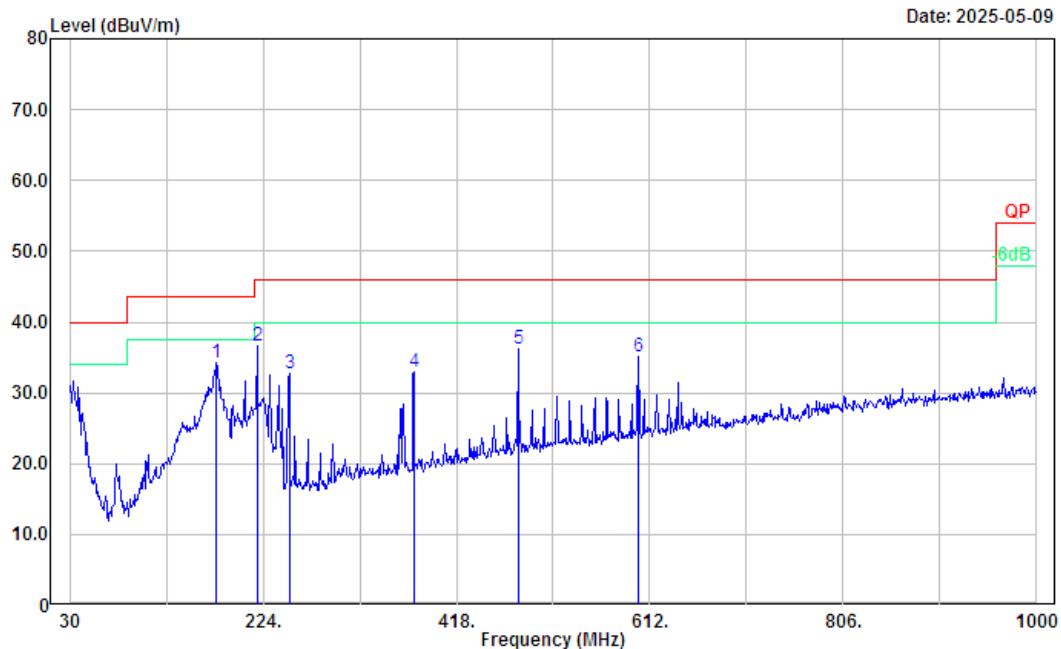


No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Measurement
1	0.187	19.15	29.93	49.08	102.15	53.07	Peak
2	0.404	21.43	22.89	44.32	95.48	51.16	Peak
3	0.809	22.14	19.54	41.68	69.36	27.68	Peak
4	4.822	39.88	5.93	45.81	69.54	23.73	Peak
5	7.100	30.00	4.96	34.96	69.54	34.58	Peak
6	29.371	33.55	3.39	36.94	69.54	32.60	Peak

30MHz-1GHz

Project No.: 2402A54840E-RF-A1
Polarization: Horizontal
Test Mode: Transmitting
Note: RBW:100kHz VBW:300kHz
:

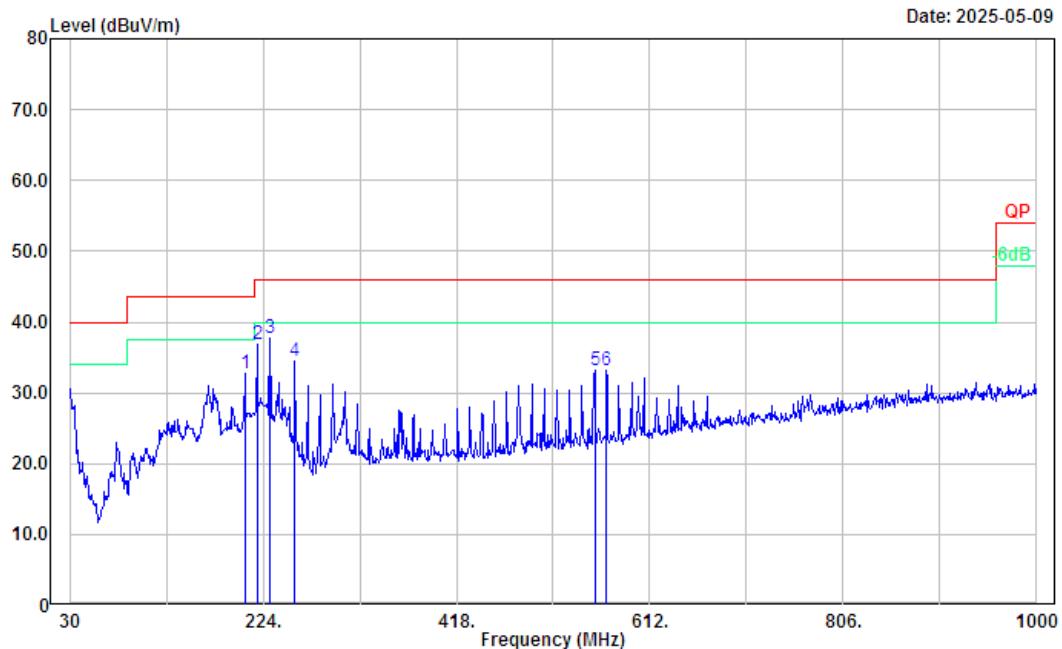
Serial No.: 2VQP-1
Tester: Jayce Wang



No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Measurement
1	177.44	46.24	-12.05	34.19	43.50	9.31	Peak
2	218.18	47.66	-10.95	36.71	46.00	9.29	Peak
3	250.19	44.09	-11.27	32.82	46.00	13.18	Peak
4	375.32	40.39	-7.36	33.03	46.00	12.97	Peak
5	480.08	40.82	-4.69	36.13	46.00	9.87	Peak
6	600.36	37.74	-2.54	35.20	46.00	10.80	Peak

Project No.: 2402A54840E-RF-A1
Polarization: Vertical
Test Mode: Transmitting
Note: RBW:100kHz VBW:300kHz
:

Serial No.: 2VQP-1
Tester: Jayce Wang



No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Measurement
1	205.57	43.83	-11.11	32.72	43.50	10.78	Peak
2	218.18	47.70	-10.95	36.75	46.00	9.25	Peak
3	230.79	48.91	-11.12	37.79	46.00	8.21	Peak
4	256.01	45.48	-10.96	34.52	46.00	11.48	Peak
5	556.71	36.63	-3.38	33.25	46.00	12.75	Peak
6	568.35	36.41	-3.16	33.25	46.00	12.75	Peak

2) 1-25GHz:

Serial Number:	2VQP-1	Test Date:	2025/5/12
Test Site:	Chamber B	Test Mode:	Transmitting
Tester:	Ted Wang	Test Result:	Pass

Environmental Conditions:					
Temperature: (°C)	25.1	Relative Humidity: (%)	42	ATM Pressure: (kPa)	100.6

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
ETS-Lindgren	Horn Antenna	3115	000 527 35	2023/9/7	2026/9/6
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2023/2/22	2026/2/21
Xinhang Macrowave	Coaxial Cable	XH750A-N/J-SMA/J-10M	20231117004 #0001	2024/11/17	2025/11/16
Xinhang Macrowave	Coaxial Cable	XH360A-2.92/J-2.92/J-6M-A	20231208001 #0001	2024/12/9	2025/12/8
AH	Preamplifier	PAM-0118P	469	2025/4/11	2026/4/10
AH	Preamplifier	PAM-1840VH	191	2024/9/5	2025/9/4
R&S	Spectrum Analyzer	FSV40	101944	2024/9/6	2025/9/5
Audix	Test Software	E3	191218 V9	N/A	N/A
Decentest	Multiplex Switch Test Control Set & Filter Switch Unit	DT7220SCU & DT7220FCU	DC79902 & DC79905	2024/8/27	2025/8/26

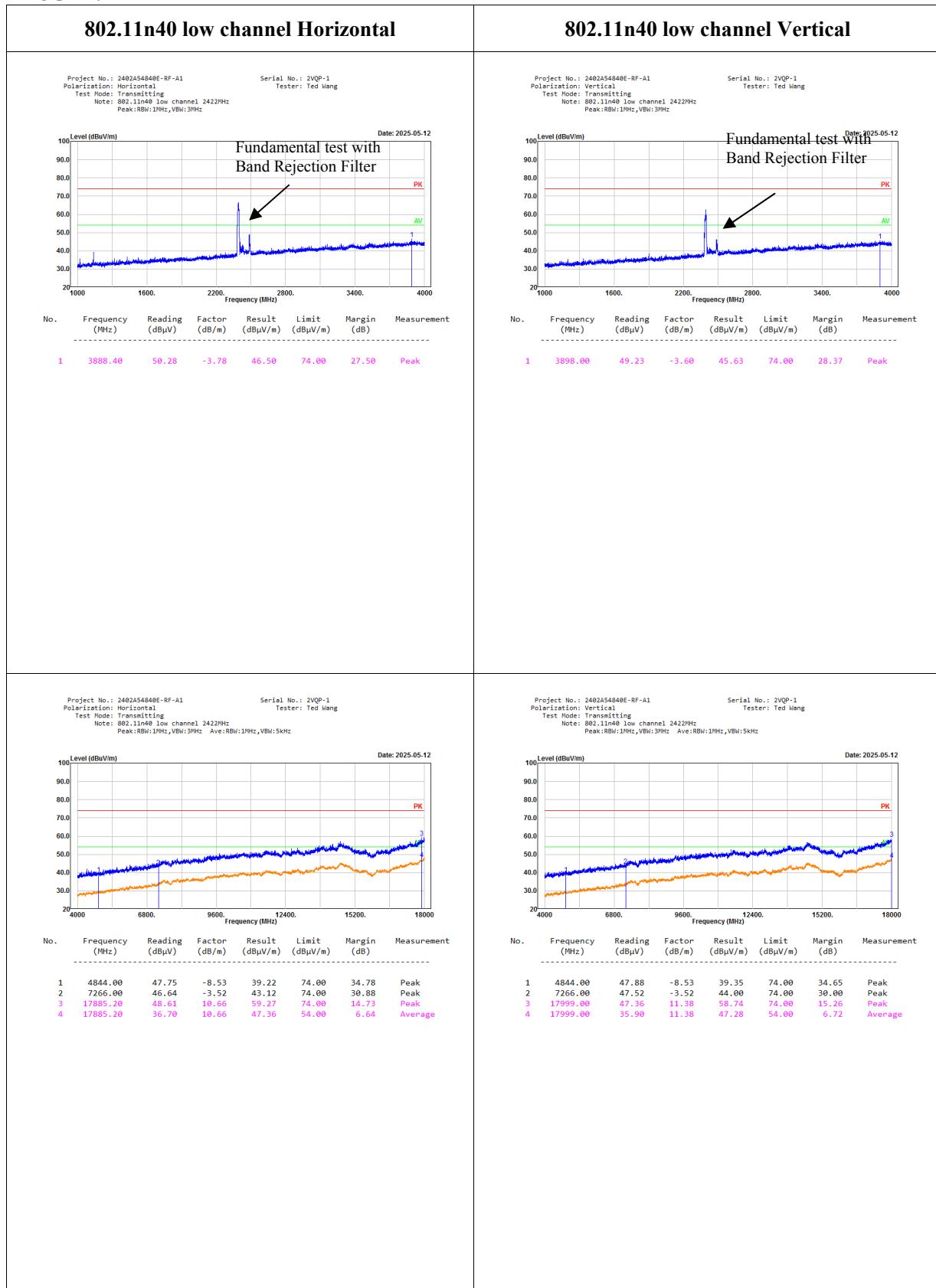
* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

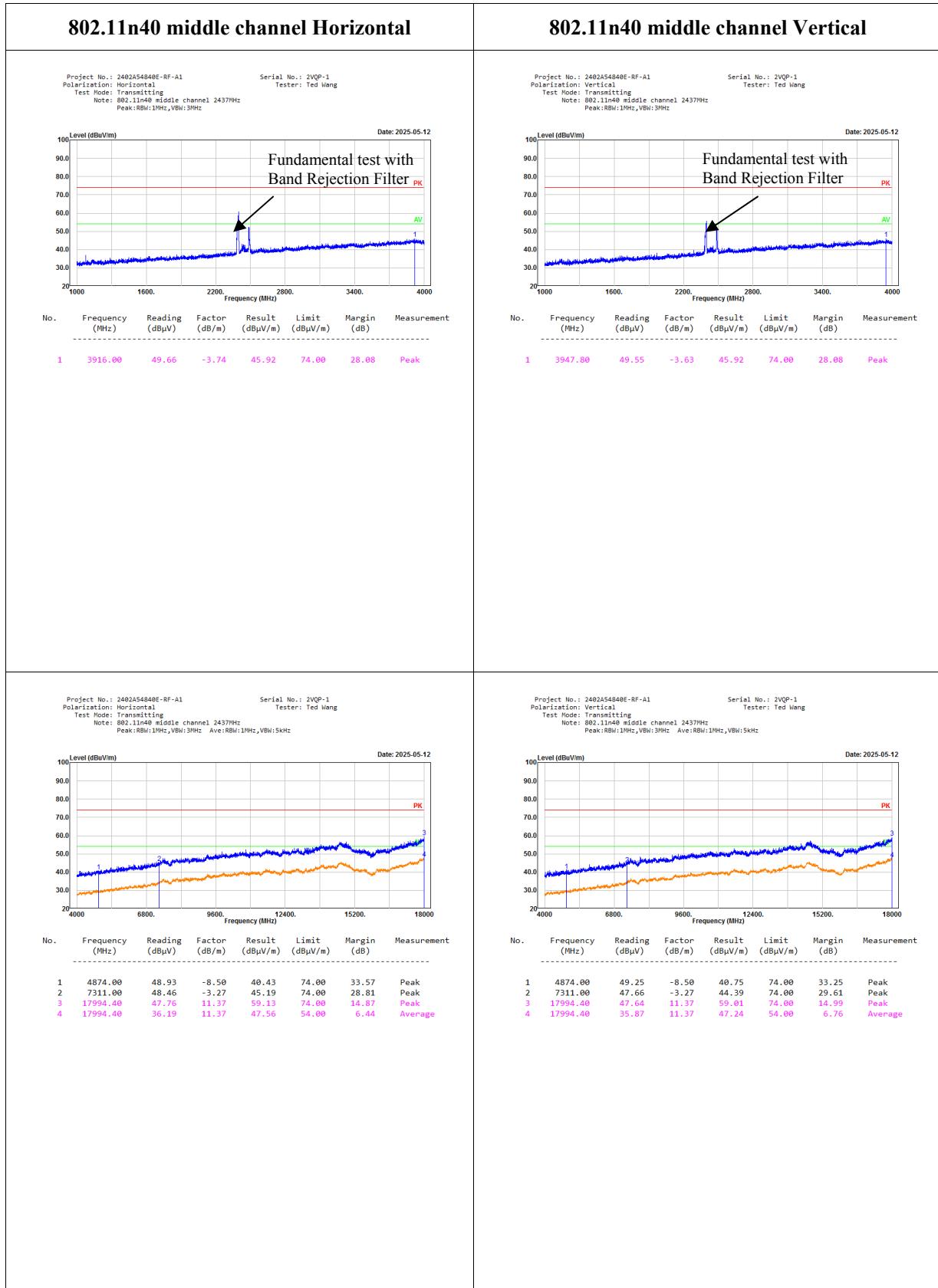
Test Data:

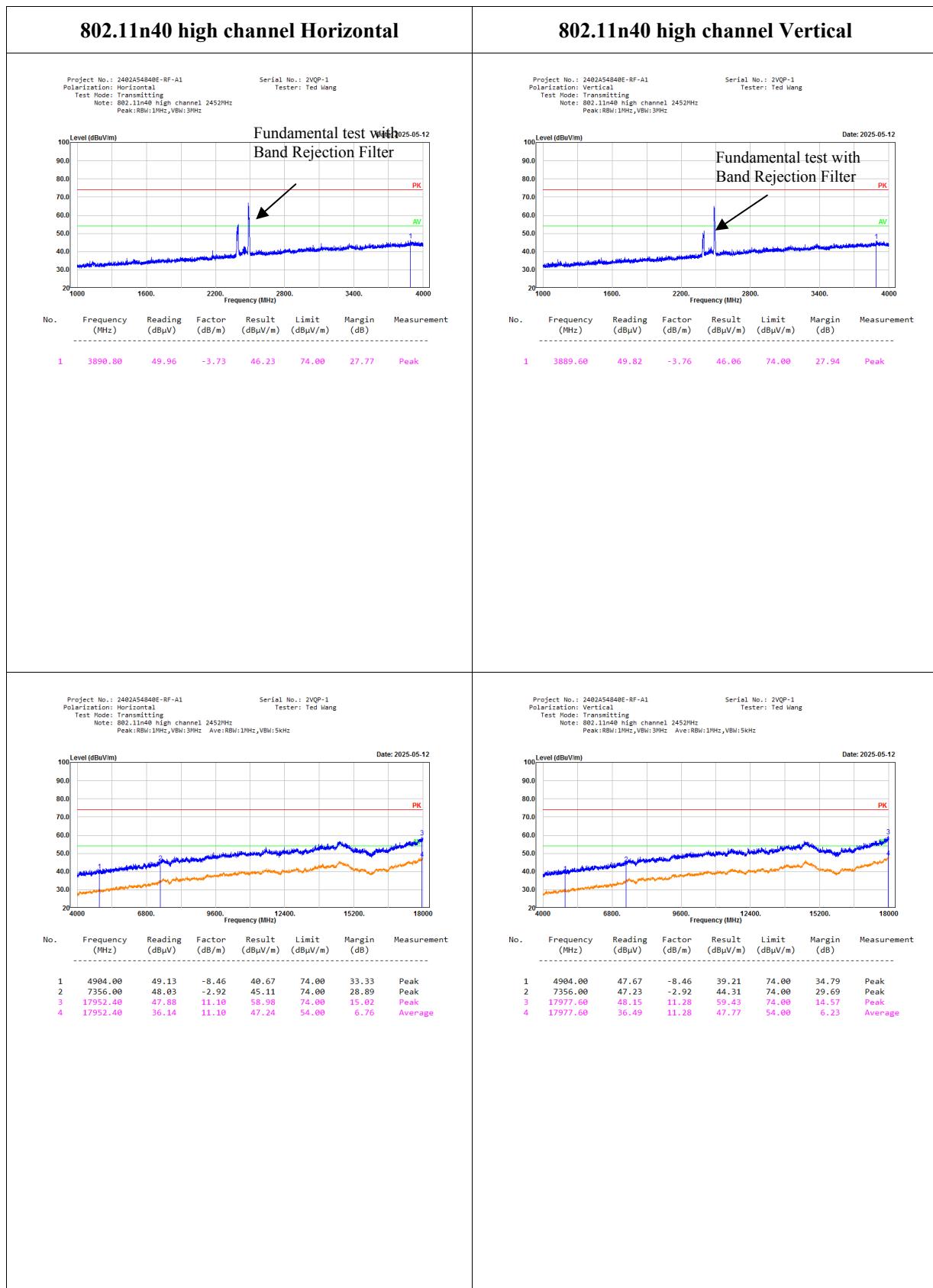
Please refer to the below table and plots.

After pre-scan in the X, Y and Z axes of orientation, the worst case is refer to table and plots.

Spot Check 1-18GHz:

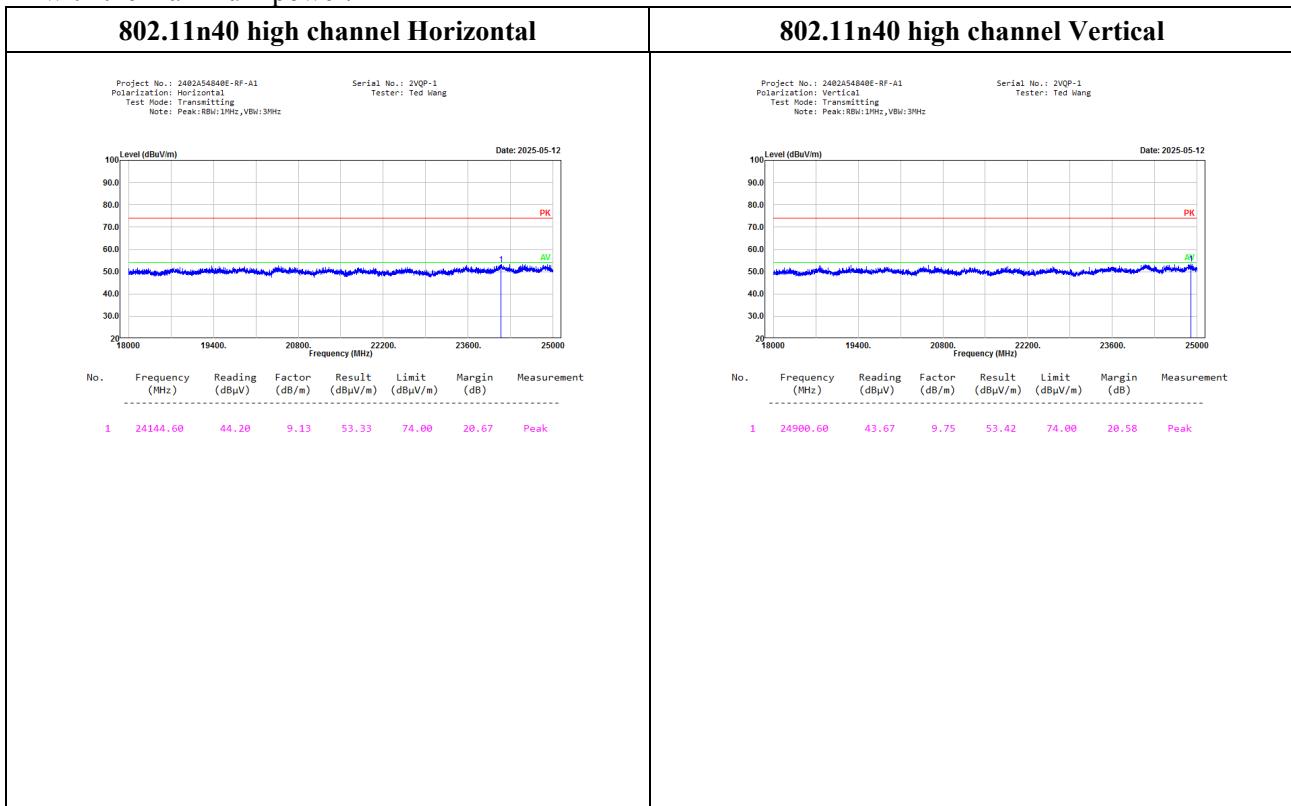






18-25GHz:

No Emission was detected in the range 18-25GHz, test was performed on the mode and channel which with the maximum power.



5.3 Spot Check With Maximum Conducted Output Power

Test Information:

Serial No.:	2VQP-1	Test Date:	2025/5/13
Test Site:	RF	Test Mode:	Transmitting
Tester:	Bill Yang	Test Result:	Pass

Environmental Conditions:

Temperature: (°C):	26.8	Relative Humidity: (%)	50	ATM Pressure: (kPa)	101.2
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Anritsu	Microwave Peak Power Sensor	MA24418A	12618	2024/8/27	2025/8/26
Narda	Coaxial Attenuator	773-10	F-08-EM511	2024/6/7	2025/6/6

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (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 Peak Output Power (dBm)			Limit (dBm)
		Chain 0	Chain 1	Total	
802.11b	2412	18.34	18.96	/	30
	2437	18.41	19.04	/	30
	2462	18.34	19.24	/	30
802.11g	2412	26.01	26.12	/	30
	2437	26.11	26.18	/	30
	2462	26.04	26.13	/	30
802.11n ht20	2412	26.03	25.98	29.02	30
	2437	25.94	25.89	28.93	30
	2462	25.97	26.07	29.03	30
802.11n ht40	2422	26.14	26.16	29.16	30
	2437	26.21	26.18	29.21	30
	2452	26.22	26.21	29.23	30
802.11ax he20	2412	24.08	23.86	26.98	30
	2437	24.15	24.06	27.12	30
	2462	23.97	23.87	26.93	30
802.11ax he40	2422	23.74	23.71	26.74	30
	2437	23.78	23.67	26.74	30
	2452	23.57	23.49	26.54	30
Maximum EIRP	31.32	dBm	EIRP Limit for RSS-247	36	dBm

5.4 Duty Cycle

Test Information:

Serial No.:	2VQP-1	Test Date:	2025/5/13
Test Site:	RF	Test Mode:	Transmitting
Tester:	Bill Yang	Test Result:	/

Environmental Conditions:

Temperature: (°C):	26.8	Relative Humidity: (%)	50	ATM Pressure: (kPa)	101.2
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Narda	Coaxial Attenuator	773-10	F-08-EM511	2024/6/7	2025/6/6
R&S	Spectrum Analyzer	FSP 38	100478	2024/9/5	2025/9/4

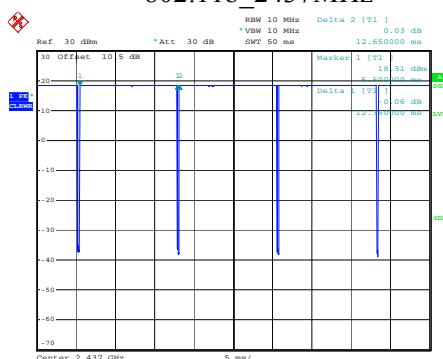
* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data:

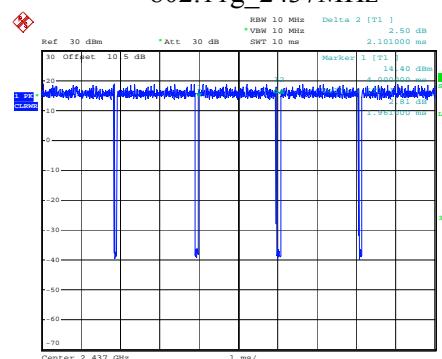
Test Modes	Ton (ms)	Ton+off (ms)	Duty cycle (%)	1/T (Hz)	VBW Setting (kHz)
802.11b	12.35	12.65	97.63	81	0.1
802.11g	1.961	2.101	93.34	510	1
802.11n ht20	5.4	5.68	95.07	185	0.2
802.11n ht40	5.36	5.68	94.37	187	0.2
802.11ax he20	5.42	5.74	94.43	185	0.2
802.11ax he40	5.41	5.821	92.94	185	0.2

Duty Cycle = Ton/(Ton+Toff)*100%

802.11b_2437MHz

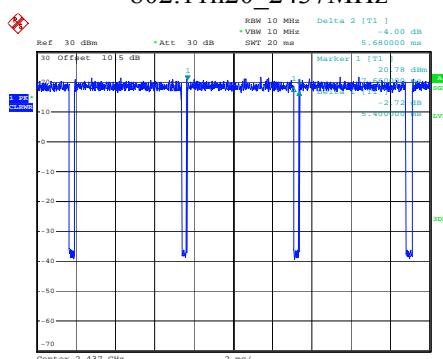


802.11g_2437MHz

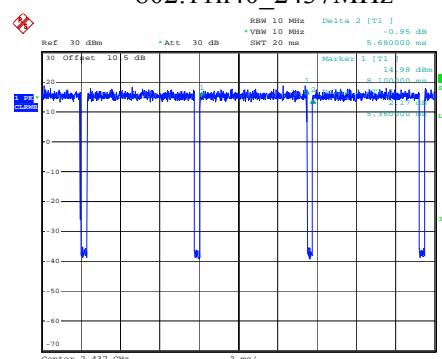


ProjectNo.:2402A54840E-RF-A1 Tester:Bill Yang
Date: 13.MAY.2025 17:53:33

802.11n20_2437MHz

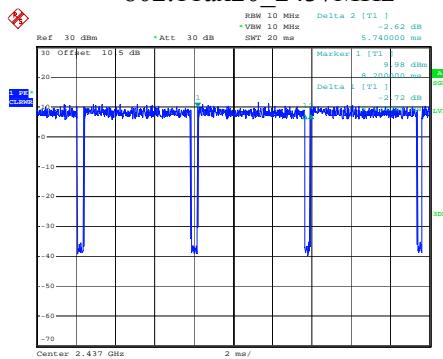


802.11n40_2437MHz

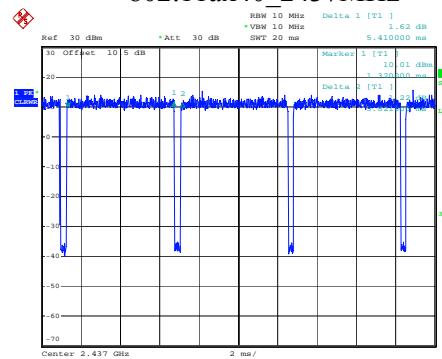


ProjectNo.:2402A54840E-RF-A1 Tester:Bill Yang
Date: 13.MAY.2025 18:08:35

802.11ax20_2437MHz



802.11ax40_2437MHz



ProjectNo.:2402A54840E-RF-A1 Tester:Bill Yang
Date: 13.MAY.2025 18:15:03

ProjectNo.:2402A54840E-RF-A1 Tester:Bill Yang
Date: 13.MAY.2025 18:06:30

EXHIBIT A - EUT PHOTOGRAPHS

Please refer to the attachment 2402A54840E-RF-A1-EXP EUT EXTERNAL PHOTOGRAPHS and 2402A54840E-RF-A1-INP EUT INTERNAL PHOTOGRAPHS.

EXHIBIT B - TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2402A54840E-RF-00AA1-TSP TEST SETUP PHOTOGRAPHS.

EXHIBIT C - RF EXPOSURE EVALUATION

Maximum Permissible Exposure (MPE)

Applicable Standard

According to subpart §1.1310, 15.247(i) systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) 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;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculation formula:

Prediction of power density at the distance of the applicable MPE limit

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

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);

Calculated Data:

Mode	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance▲		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
2.4G Wifi	2412-2462	2.09	1.62	30	1000.00	20.00	0.322	1.0
5G Wifi	5150-5250	4.32	2.70	18.5	70.79	20.00	0.038	1.0
	5250-5350	4.32	2.70	18	63.10	20.00	0.034	1.0
	5470-5725	4.32	2.70	17	50.12	20.00	0.027	1.0
	5725-5850	4.32	2.70	18.5	70.79	20.00	0.038	1.0

Note:

The Conducted output power including Tune-up Tolerance provided by manufacturer.
2.4G Wifi and 5G Wifi can't transmit simultaneously.

Result: The device meet FCC MPE at 20 cm distance

Exemption Limits For Routine Evaluation-RF Exposure Evaluation

Applicable Standard

RSS-102, Issue 6, Clause 6.6:

Field reference level (FRL) exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm (i.e. mobile devices), except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

Calculated Data:

Mode	Frequency (MHz)	Antenna Gain	Conducted output power including Tune-up Tolerance ▲	EIRP		Exemption limits (mW)
				(dBi)	(dBm)	
2.4G Wifi	2412-2462	2.09	30	32.09	1618.08	2684
	5150-5250	4.32	18.5	22.82	191.43	4507
	5250-5350	4.32	18	22.32	170.61	4567
	5470-5725	4.32	17	21.32	135.52	4697
	5725-5850	4.32	18.5	22.82	191.43	4845

Note:

The Conducted output power including Tune-up Tolerance was provided by manufacturer.
2.4G Wifi and 5G Wifi can't transmit simultaneously.

Result: So the device is compliance with the exemption from Routine Evaluation Limits –RF exposure Evaluation.

***** END OF REPORT *****