# TEST REPORT

| | |
|---|---|
| Applicant Name: | FCC: SweatWorks LLC<br>IC: BB & NE Co Pty Ltd |
| Address: | FCC: 4532 Cherry Hill Rd Ste 543 Arlington, VA 22207 United States<br>IC: 106 Watt Road, Mornington, VIC 3931 Australia |
| Report Number: | 2501R30997E-RFC |
| FCC ID: | 2BFH9-SW01A |
| IC: | 33730-SW01A |

**Test Standard (s)**

FCC PART 15.247; RSS-GEN ISSUE 5, FEBRUARY 2021 AMENDMENT 2;
RSS-247 ISSUE 3, AUGUST 2023

**Sample Description**

| | |
|---|---|
| Product Type: | 21.5" CONSOLE |
| Model No.: | SW01A |
| Multiple Model(s) No.: | N/A |
| Trade Mark: | YOUR REFORMER |
| Date Received: | 2025-04-01 |
| Issue Date: | 2025-05-16 |
| Test Result: | Pass▲ |

▲ In the configuration tested, the EUT complied with the standards above.

**Prepared and Checked By:**

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Allen Bai
RF Engineer

**Approved By:**

Nancy Wang

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RF Supervisor

Note: The information marked# is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.
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# DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|---|---|---|---|
| 0 | 2501R30997E-RF-00C | Original Report | 2025-05-16 |

# GENERAL INFORMATION

## Product Description for Equipment under Test (EUT)

| | |
|---|---|
| **HVIN** | SW01A |
| **FVIN** | SW01A |
| **Frequency Range** | 2412~2462MHz |
| **Maximum Conducted Output Peak Power** | 20.34dBm |
| **Modulation Technique** | DSSS, OFDM |
| **Antenna Specification#** | 4.47dBi (provided by the applicant) |
| **Voltage Range** | DC 12V from adapter |
| **Sample serial number** | 30PG-2 for Conducted and Radiated Emissions Test<br>30PG-1 for RF Conducted Test (Assigned by BACL, Shenzhen) |
| **Sample/EUT Status** | Good condition |
| **Adapter Information** | Model:J652-1205000DI<br>Input:100-240V~50/60Hz 1.7A<br>Output:12.0V ⎓5.0A 60.0W |
| | |

## Objective

This report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission's rules and RSS-GEN Issue 5, February 2021 Amendment 2 and RSS-247 Issue 3, August 2023 of the Innovation, Science and Economic Development Canada rules.

## Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and RSS-GEN Issue 5, February 2021 Amendment 2 and RSS-247 Issue 3, August 2023.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

## Measurement Uncertainty

| Parameter | | Uncertainty |
|---|---|---|
| Occupied Channel Bandwidth | | 109.2kHz(k=2, 95% level of confidence) |
| RF output power, conducted | | 0.86dB(k=2, 95% level of confidence) |
| Power Spectral Density | | 0.90dB(k=2, 95% level of confidence) |
| AC Power Lines Conducted Emissions | 9kHz~150 kHz | 3.63dB(k=2, 95% level of confidence) |
| | 150 kHz ~30MHz | 3.66dB(k=2, 95% level of confidence) |
| Radiated Emissions | 0.009MHz~30MHz | 3.60dB(k=2, 95% level of confidence) |
| | 30MHz~200MHz (Horizontal) | 5.32dB(k=2, 95% level of confidence) |
| | 30MHz~200MHz (Vertical) | 5.43dB(k=2, 95% level of confidence) |
| | 200MHz~1000MHz (Horizontal) | 5.77dB(k=2, 95% level of confidence) |
| | 200MHz~1000MHz (Vertical) | 5.73dB(k=2, 95% level of confidence) |
| | 1GHz - 6GHz | 5.34dB(k=2, 95% level of confidence) |
| | 6GHz - 18GHz | 5.40dB(k=2, 95% level of confidence) |
| | 18GHz - 40GHz | 5.64dB(k=2, 95% level of confidence) |
| Temperature | | ±1℃ |
| Humidity | | ±1% |
| Supply voltages | | ±0.4% |

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

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, 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. : 715558, the FCC Designation No. : CN5045.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0023.

# SYSTEM TEST CONFIGURATION

**Description of Test Configuration**

For 2.4GHz Wi-Fi mode, total 11 channels are provided to testing:

| 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 | / | / |

802.11b, 802.11g and 802.11n-HT20 mode was tested with Channel 1, 6 and 9.
802.11n-HT40 mode was tested with Channel 3, 6 and 9.

**EUT Exercise Software**

| Exercise Software# | | Engineering mode | | |
|---|---|---|---|---|
| Mode | Data rate | Power Level# | | |
| | | Low Channel | Middle Channel | High Channel |
| 802.11b | 1Mbps | 15 | 15 | 15 |
| 802.11g | 6Mbps | 15 | 15 | 15 |
| 802.11n20 | MCS0 | 15 | 15 | 15 |
| 802.11n40 | MCS0 | 12 | 12 | 12 |
| Note: The worst-case data rates are determined to be as follows for each mode based upon inverstigation by measuring the power and PSD across all data rates bandwidths, and modulations. | | | | |

**Special Accessories**

No special accessory.

**Equipment Modifications**

No modification was made to the EUT tested.

**Support Equipment List and Details**

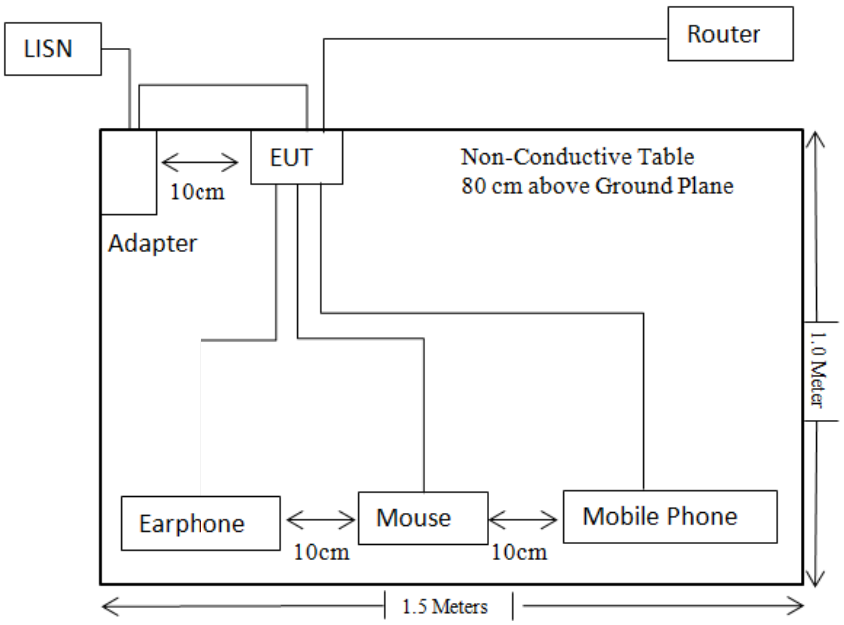
| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| OUPU | Receptacle | PDU-OP1606K | 6971041358020 |
| Honor | Mobilephone | CHL-AL00 | Unknown |
| TP-LINK | Router | TL-R406 | Unknown |
| Dell | Mouse | MS116T | Unknown |
| Vivo | Earphone | XE160 | Unknown |

**External I/O Cable**

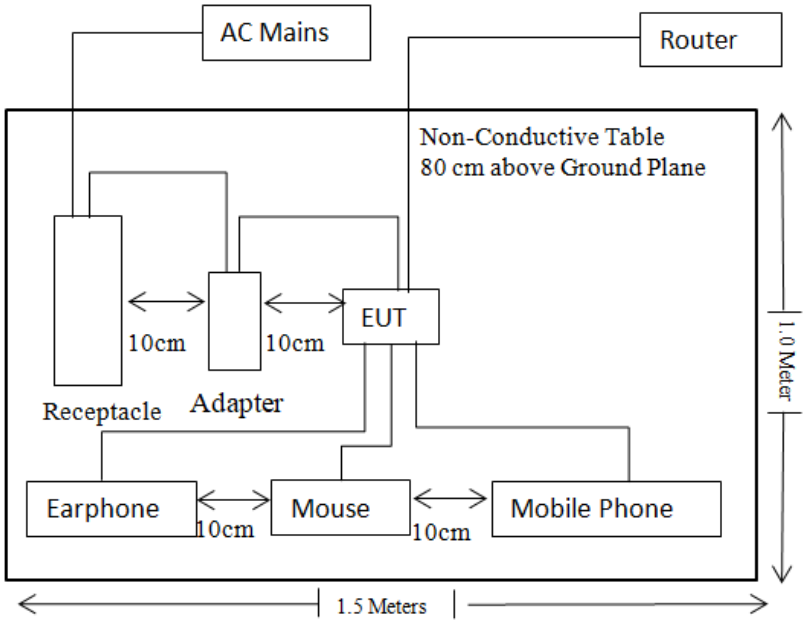
| Cable Description | Length (m) | From Port | To |
|---|---|---|---|
| Unshielded Un-detachable AC Cable | 1.2 | Receptacle | AC Mains |
| Shielded Un-detachable DC Cable | 1.2 | EUT | Adapter |
| Unshielded Detachable AC Cable | 1.5 | Adapter | LISN/Receptacle |
| Unshielded Detachable USB Cable | 1.2 | EUT | Mobile phone |
| Unshielded Un-detachable USB Cable | 1.5 | EUT | Mouse |
| Unshielded Un-detachable Audio Cable | 1.0 | EUT | Earphone |
| Unshielded Detachable RJ45 Cable | 10.0 | EUT | Router |

**Block Diagram of Test Setup**

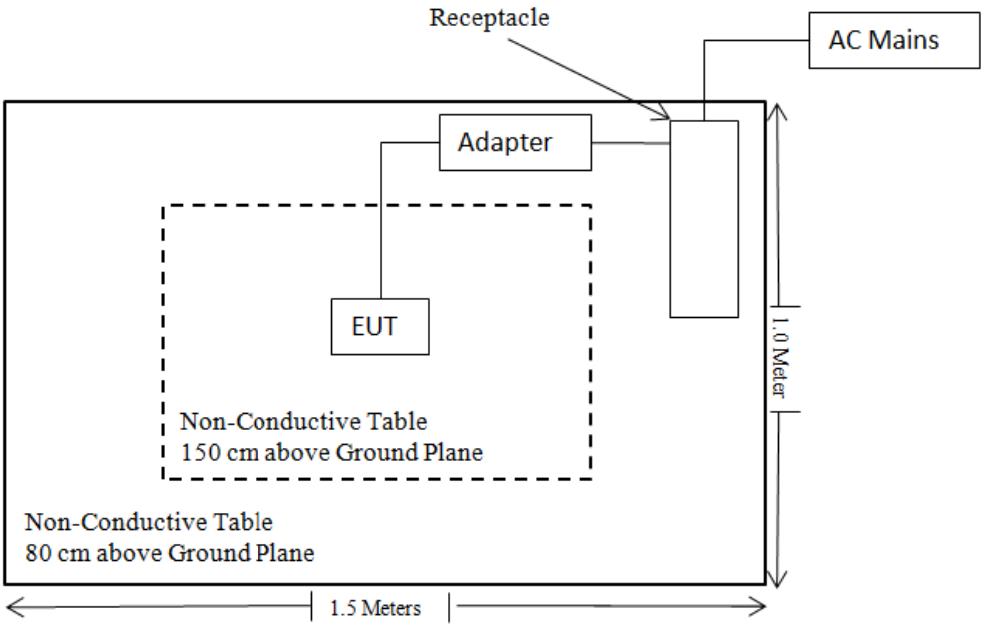
For Conducted Emissions:



For Radiated Emissions below 1GHz:




For Radiated Emissions above 1GHz:



# SUMMARY OF TEST RESULTS

| FCC Rules | RSS Rules | Description of Test | Result |
|---|---|---|---|
| FCC §1.1307(b) (3), §2.1091 | / | MPE-Based Exemption | Compliant |
| / | RSS-102 § 6.6 | Field reference level exposure exemption limits | Compliant |
| FCC §15.203 | RSS-Gen §6.8 | Antenna Requirement | Compliant |
| FCC §15.207 (a) | RSS-Gen §8.8 | AC Line Conducted Emissions | Compliant |
| FCC §15.205, §15.209, §15.247(d) | RSS-GEN § 8.10 & RSS-247 § 5.5 | Spurious Emissions | Compliant |
| FCC §15.247 (a)(2) | RSS- Gen§6.7 RSS-247 § 5.2 (a) | 99% Occupied Bandwidth & 6 dB Emission Bandwidth | Compliant |
| FCC §15.247(b)(3) | RSS-247 § 5.4(d) | Maximum Conducted Output Power | Compliant |
| FCC§15.247(d) | RSS-247 § 5.5 | 100 kHz Bandwidth of Frequency Band Edge | Compliant |
| FCC§15.247(e) | RSS-247 § 5.2 (b) | Power Spectral Density | Compliant |
| C63.10 §11.6 | C63.10 §11.6 | Duty Cycle | / |

# TEST EQUIPMENT LIST

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| **Conducted Emission Test** | | | | | |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 101120 | 2024/12/04 | 2025/12/03 |
| Rohde & Schwarz | LISN | ENV216 | 101613 | 2024/12/04 | 2025/12/03 |
| Rohde & Schwarz | Transient Limiter | ESH3Z2 | DE25985 | 2024/05/21 | 2025/05/20 |
| Unknown | CE Cable | Unknown | UF A210B-1-0720-504504 | 2024/05/21 | 2025/05/20 |
| Audix | EMI Test software | E3 | 191218(V9) | NCR | NCR |
| **Radiated Emission Test** | | | | | |
| Rohde & Schwarz | EMI Test Receiver | ESR3 | 102455 | 2024/12/04 | 2025/12/03 |
| Sonoma instrument | Pre-amplifier | 310N | 186238 | 2024/05/21 | 2025/05/20 |
| Sunol Sciences | Broadband Antenna | JB1 | A040904-1 | 2023/07/20 | 2026/07/19 |
| Unknown | Cable | XH500C | J-10M-A | 2024/06/18 | 2025/06/17 |
| BACL | Active Loop Antenna | 1313-1A | 4031911 | 2024/05/14 | 2027/05/13 |
| Unknown | Cable | 2Y194 | 0735 | 2024/12/04 | 2025/12/03 |
| Unknown | Cable | PNG214 | 1354 | 2024/12/04 | 2025/12/03 |
| Audix | EMI Test software | E3 | 19821b(V9) | NCR | NCR |
| Rohde&Schwarz | Spectrum Analyzer | FSV40 | 101605 | 2025/03/26 | 2026/03/25 |
| A.H.System | Preamplifier | PAM-0118P | 489 | 2024/11/15 | 2025/11/14 |
| Schwarzbeck | Horn Antenna | BBHA9120D (1201) | 1143 | 2023/07/26 | 2026/07/25 |
| Unknown | RF Cable | KMSE | 0735 | 2024/12/06 | 2025/12/05 |
| Unknown | RF Cable | UFA147 | 219661 | 2024/12/06 | 2025/12/05 |
| Unknown | RF Cable | XH750A-N | J-10M | 2024/12/06 | 2025/12/05 |
| JD | Multiplex Switch Test Control Set | DT7220FSU | DQ77926 | 2024/06/18 | 2025/06/17 |
| JD | Multiplex Switch Test Control Set | DT7220SCU | DS79903 | 2024/09/09 | 2025/09/08 |
| A.H.System | Pre-amplifier | PAM-1840VH | 190 | 2024/06/18 | 2025/06/17 |
| Electro-Mechanics Co | Horn Antenna | 3116 | 9510-2270 | 2023/09/18 | 2026/09/17 |
| UTIFLEX | RF Cable | NO. 13 | 232308-001 | 2024/12/18 | 2025/12/17 |
| Audix | EMI Test software | E3 | 191218(V9) | NCR | NCR |

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| **RF Conducted Test** | | | | | |
| Rohde&Schwarz | Spectrum Analyzer | FSV40-N | 102259 | 2024/12/04 | 2025/12/03 |
| ANRITSU | Microwave peak power sensor | MA24418A | 12622 | 2024/05/21 | 2025/05/20 |
| Unknown | 10dB Attenuator | Unknown | F-03-EM190 | 2024/06/27 | 2025/06/26 |

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

# REQUIREMENTS AND TEST PROCEDURES

## AC Line Conducted Emissions

### Applicable Standard

FCC § 15.207 (a) & RSS-GEN §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 Compliant 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 Lines Conducted Emission Limits | | |
|---|---|---|
| Frequency range (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 |

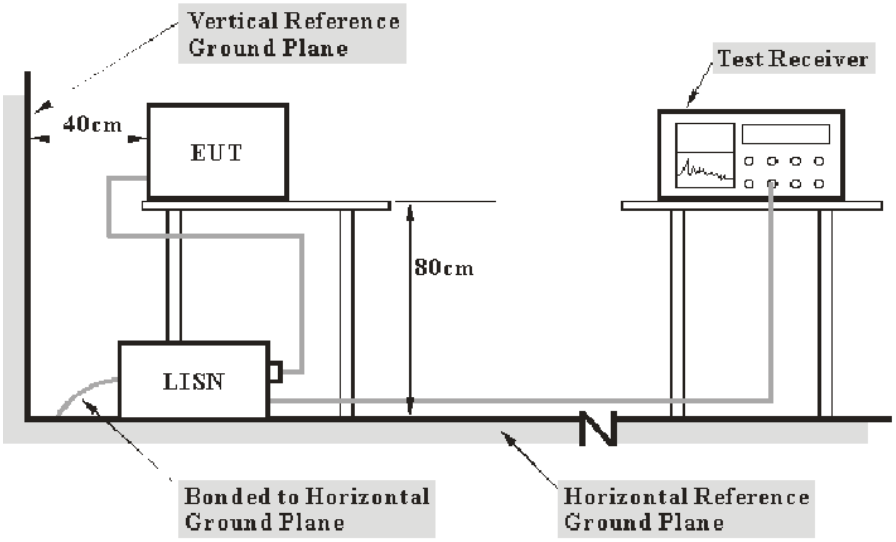
**Note 1:** The level decreases linearly with the logarithm of the frequency.

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 Compliant 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 Compliant 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.

**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 C63.10-2020 measurement procedure. The specification used was with the FCC Part 15.207 & RSS-247/RSS-Gen limits.

The spacing between the peripherals was 10 cm.

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

**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 | RBW |
|---|---|
| 150 kHz – 30 MHz | 9 kHz |

**Test Procedure**

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

**Factor & Over Limit Calculation**

The factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

Factor = LISN VDF + Cable Loss

The "**Over Limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Over Limit = level – Limit
Level= reading level+ Factor

Note: The term "cable loss" refers to the combination of a cable and a 10dB transient limiter (attenuator).

## Spurious Emissions

### Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

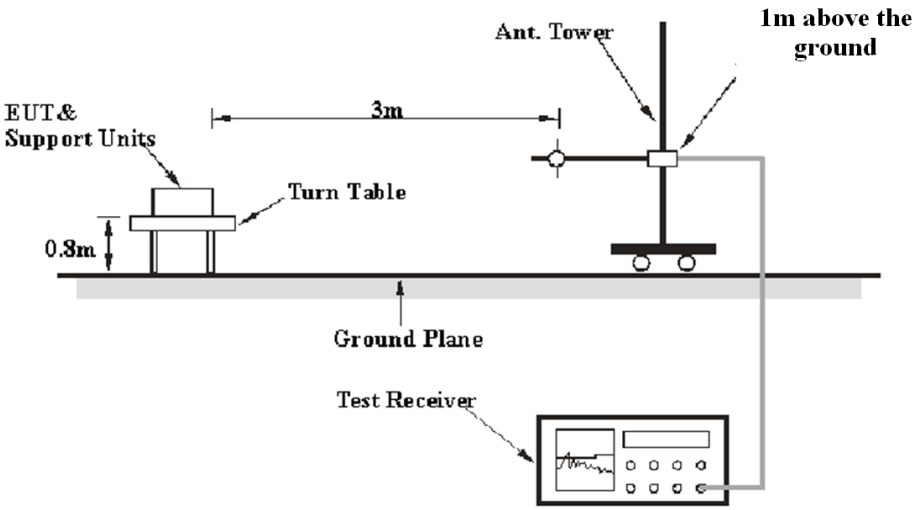
According to RSS-GEN § 8.10 & RSS-247 § 5.5

Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:(a) The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD).(b) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.(c) Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.

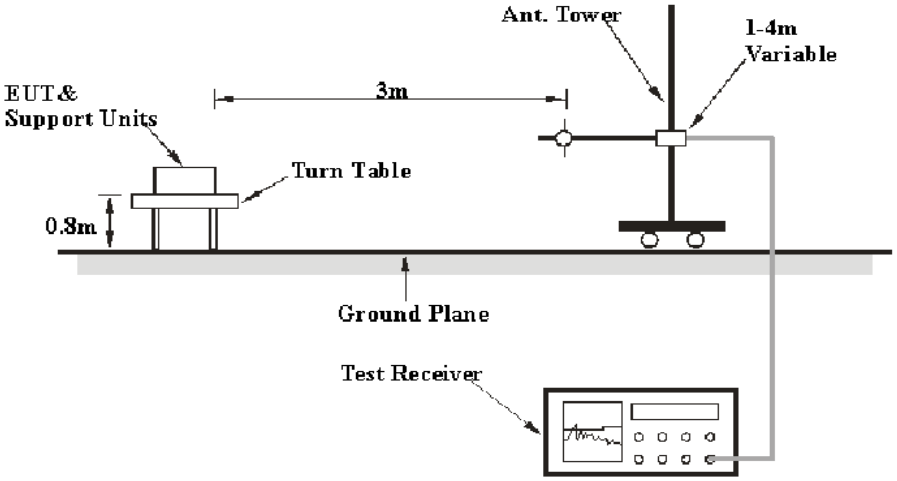
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates Compliant 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.

### EUT Setup

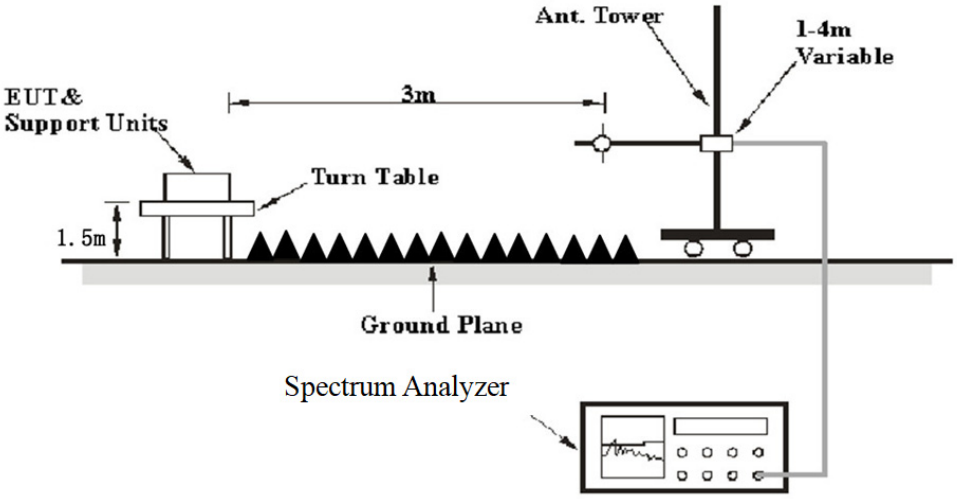
**9 kHz-30MHz:**



**30MHz-1GHz:**




**Above 1GHz:**




The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2020 & RSS-Gen. The specification used was the FCC 15.209, and FCC 15.247 & 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.

**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-1GHz:

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

1-25GHz:
Pre-scan

| Measurement | Duty cycle | RBW | Video B/W | Detector |
|---|---|---|---|---|
| PK | Any | 1MHz | 3 MHz | Peak |
| AV | >98% | 1MHz | 1 kHz | Peak |
| | <98% | 1MHz | ≥1/Ton | Peak |

Final measurement for emission identified during pre-scan

| Measurement | Duty cycle | RBW | Video B/W | Detector |
|---|---|---|---|---|
| PK | Any | 1MHz | 3 MHz | Peak |
| AV | >98% | 1MHz | 10 Hz | Peak |
| | <98% | 1MHz | ≥1/Ton | Peak |

Note: Ton 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.

**Test Procedure**

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

All final data was recorded in Quasi-peak detection mode except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz, average detection modes for frequency bands 9–90 kHz and 110–490 kHz, peak and average detection modes for frequencies above 1 GHz.

For 9 kHz-30MHz, the report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground-parallel) unless the margin is greater than 20 dB.

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

**Factor & Over Limit/Margin Calculation**

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

Factor = Antenna Factor + Cable Loss - Amplifier Gain

The "**Over Limit/Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

Over Limit/Margin = Level/Corrected Amplitude – Limit
Level / Corrected Amplitude = Read Level + Factor

## 99% Occupied Bandwidth & 6 dB Emission Bandwidth

### Applicable Standard

According to 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.

According to RSS-247 §5.2 a)
The minimum 6 dB bandwidth shall be 500 kHz.

According to RSS-Gen §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).

**Test Procedure**

Test Method: ANSI C63.10-2020 Clause 11.8.1 & Clause 6.9.3

The steps for the first option are as follows:

a) Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz.

b) Set the VBW ⩾ [3 × RBW].

c) Detector = peak.

d) Trace mode = max-hold.

e) Sweep = No faster than coupled (auto) time.

f) Allow the trace to stabilize.

g) Measure the maximum width of the emission by placing two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "−6 dB down amplitude". If a marker is below this "−6 dB down amplitude" value, then it shall be as close as possible to this value.

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 at least 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 4.1.6.2.

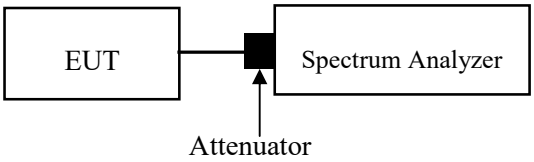
d) Step a) through step c) might require iteration to adjust within the specified range.

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 spectral 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).



## Maximum Conducted Output Power

## Applicable Standard

According to 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, Compliant 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.

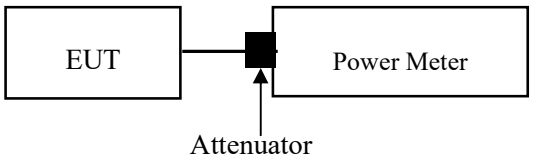
According to RSS-247§5.4 d), For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

As an alternative to a peak power measurement, Compliant can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling 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 transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

## Test Procedure

Test method: ANSI C63.10-2020 clause 11.9.1.2 for peak power method or clause 11.9.2.3.2 for average power method.

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.




Note: A short RF cable with low cable loss connected to the EUT antenna port,which was provided by client or lab, the cable loss was add with offset into test equipment, the total offset consists of attenuator and/or RF cable and/or power splitter loss

## 100 kHz Bandwidth of Frequency Band Edge

### Applicable Standard

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 Compliant 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)).

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

### Test Procedure

Test Method: ANSI C63.10-2020 Clause 11.11.3

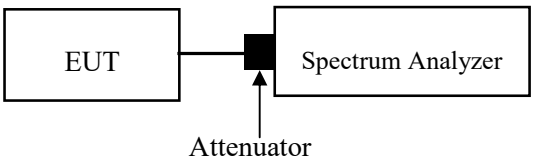
Establish an emission level by using the following procedure:

a) Set the center frequency and span to encompass frequency range to be measured. Note that the frequency range might need to be divided into multiple frequency ranges to retain frequency resolution.

NOTE—the number of points can also be increased for large spans to retain frequency resolution

b) Set the RBW = 100 kHz.
c) Set the VBW ⩾ [3 × RBW].
d) Detector = peak.
e) Sweep time = No faster than coupled (auto) time.
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.



## Power Spectral Density

### Applicable Standard

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.

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than8 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).

### Test Procedure

Test Method: ANSI C63.10-2020 Clause 11.10.2

The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:

a) Set analyzer center frequency to DTS channel center frequency.

b) Set the span >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.

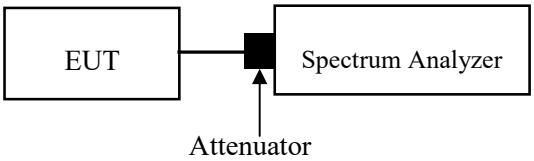
f) Sweep time = No faster than coupled (auto) time.

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.




Note: A short RF cable with low cable loss connected to the EUT antenna port,which was provided by client or lab, the cable loss was add with offset into test equipment, the total offset consists of attenuator and/or RF cable and/or power splitter loss

## Duty Cycle

### Test Procedure

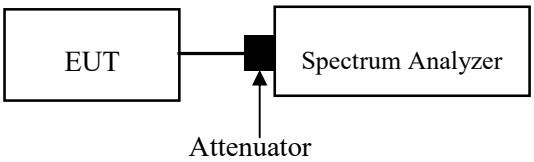
According to ANSI C63.10-2020 Section 11.6

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

a) A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.

b) 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.)



# ANTENNA REQUIREMENT

**Applicable Standard**

According to § 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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine Compliant with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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 Compliant 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.

**Antenna Connector Construction**

The EUT has one internal antenna arrangement which was permanently attached for Bluetooth and the maximum antenna gain# is 4.47dBi, fulfill the requirement of this section. Please refer to the EUT photos.

| Antenna Type | Antenna Gain# | Impedance | Frequency Range |
|---|---|---|---|
| PCB | 4.47dBi | 50Ω | 2.4~2.5GHz |

**Result: Compliant**

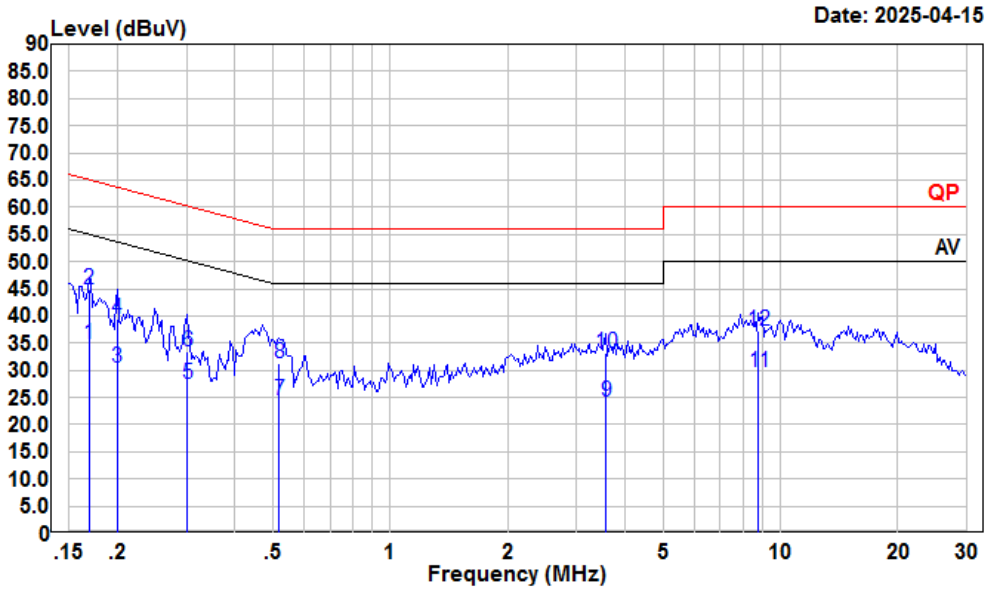
# TEST DATA AND RESULTS

## AC Line Conducted Emissions

### Environmental Conditions

| | | | |
|---|---|---|---|
| **Temperature (°C)** | 25.2 | **Relative Humidity (%)** | 47 |
| **ATM Pressure (kPa)** | 100.6 | **Test engineer** | Macy Shi |
| **Test date** | 2025/4/15 | | |
| **EUT operation mode** | Transmitting(Maximum output power mode,802.11g Middle Channel) | | |

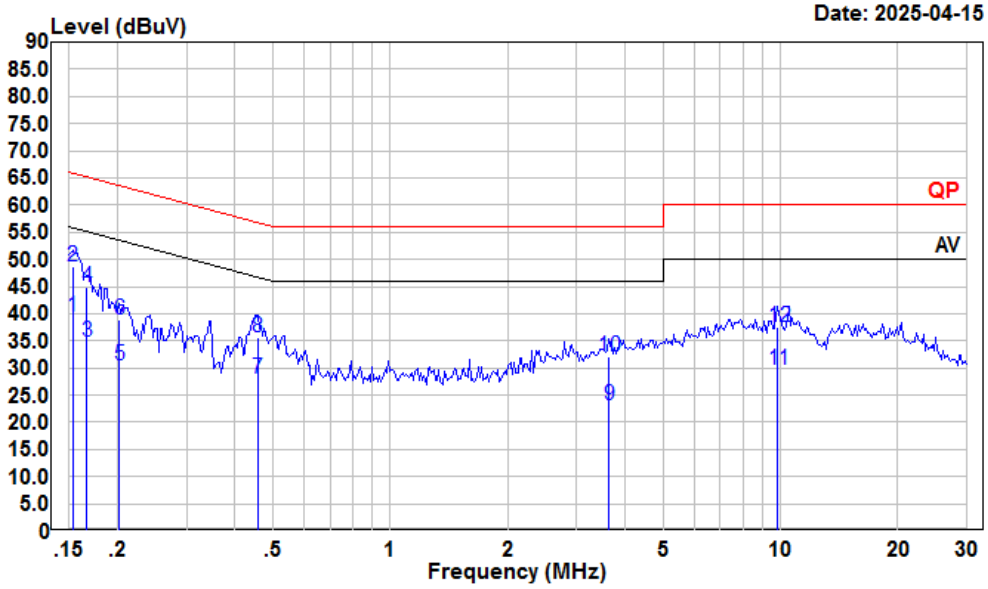
AC 120V 60 Hz, Line




Condition: Line
Project : 2501R30997E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz

| | Freq | Read Level | Level | LISN Factor | Cable Loss | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dB | dBuV | dB | |
| 1 | 0.169 | 14.75 | 34.93 | 10.08 | 10.10 | 55.03 | -20.10 | Average |
| 2 | 0.169 | 24.77 | 44.95 | 10.08 | 10.10 | 65.03 | -20.08 | QP |
| 3 | 0.200 | 10.59 | 30.58 | 9.90 | 10.09 | 53.62 | -23.04 | Average |
| 4 | 0.200 | 19.39 | 39.38 | 9.90 | 10.09 | 63.62 | -24.24 | QP |
| 5 | 0.302 | 7.07 | 27.35 | 10.17 | 10.11 | 50.19 | -22.84 | Average |
| 6 | 0.302 | 13.15 | 33.43 | 10.17 | 10.11 | 60.19 | -26.76 | QP |
| 7 | 0.518 | 3.88 | 24.54 | 10.52 | 10.14 | 46.00 | -21.46 | Average |
| 8 | 0.518 | 10.54 | 31.20 | 10.52 | 10.14 | 56.00 | -24.80 | QP |
| 9 | 3.565 | 4.03 | 24.28 | 10.05 | 10.20 | 46.00 | -21.72 | Average |
| 10 | 3.565 | 12.80 | 33.05 | 10.05 | 10.20 | 56.00 | -22.95 | QP |
| 11 | 8.776 | 9.05 | 29.66 | 10.41 | 10.20 | 50.00 | -20.34 | Average |
| 12 | 8.776 | 16.62 | 37.23 | 10.41 | 10.20 | 60.00 | -22.77 | QP |

AC 120V 60 Hz, Neutral




Condition: Neutral
Project : 2501R30997E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz

| | Freq | Read Level | Level | LISN Factor | Cable Loss | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dB | dBuV | dB | |
| 1 | 0.153 | 19.12 | 39.54 | 10.29 | 10.13 | 55.82 | -16.28 | Average |
| 2 | 0.153 | 28.15 | 48.57 | 10.29 | 10.13 | 65.82 | -17.25 | QP |
| 3 | 0.167 | 14.50 | 34.83 | 10.23 | 10.10 | 55.12 | -20.29 | Average |
| 4 | 0.167 | 24.60 | 44.93 | 10.23 | 10.10 | 65.12 | -20.19 | QP |
| 5 | 0.202 | 10.40 | 30.59 | 10.10 | 10.09 | 53.54 | -22.95 | Average |
| 6 | 0.202 | 18.68 | 38.87 | 10.10 | 10.09 | 63.54 | -24.67 | QP |
| 7 | 0.456 | 7.29 | 27.96 | 10.55 | 10.12 | 46.76 | -18.80 | Average |
| 8 | 0.456 | 15.07 | 35.74 | 10.55 | 10.12 | 56.76 | -21.02 | QP |
| 9 | 3.642 | 2.66 | 22.99 | 10.13 | 10.20 | 46.00 | -23.01 | Average |
| 10 | 3.642 | 11.76 | 32.09 | 10.13 | 10.20 | 56.00 | -23.91 | QP |
| 11 | 9.861 | 9.11 | 29.73 | 10.41 | 10.21 | 50.00 | -20.27 | Average |
| 12 | 9.861 | 16.95 | 37.57 | 10.41 | 10.21 | 60.00 | -22.43 | QP |

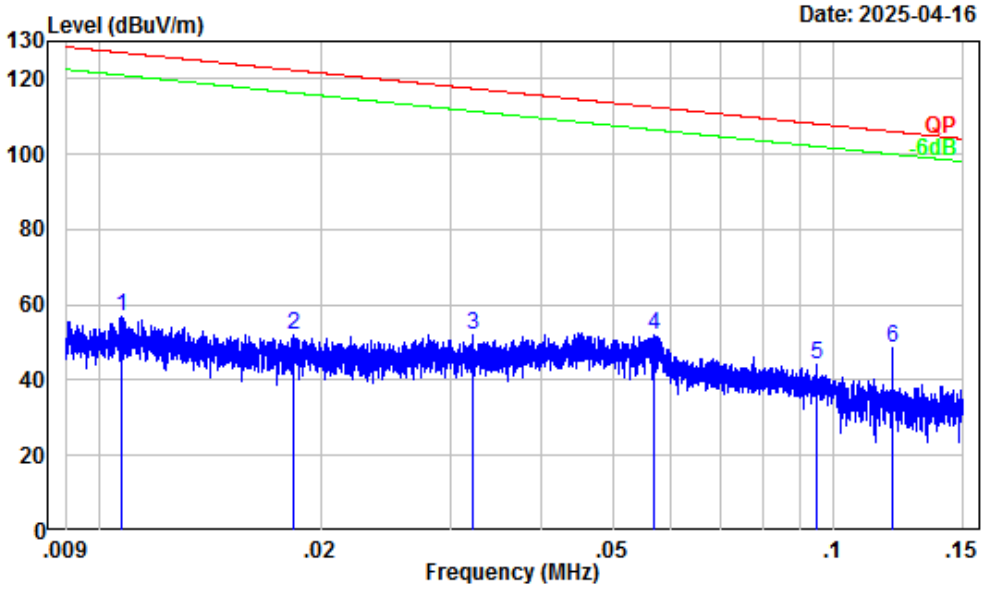
## Spurious Emissions

### Environmental Conditions

| | | | |
|---|---|---|---|
| **Temperature (°C)** | 22.5-23.1 | **Relative Humidity (%)** | 45-48 |
| **ATM Pressure (kPa):** | 101.1 | **Test engineer:** | Anson Su&Visen Wu |
| **Test date:** | 2025/04/15-2025/04/16 | | |
| **EUT operation mode:** | Below 1GHz: Transmitting(Maximum output power mode,802.11g Middle Channel)<br>Above 1GHz:Transmitting | | |
| **Note:** | 1. For the radiated spurious emission below 30MHz, only the worst case (parallel) was recorded.<br>2. The spurious emission from 9 kHz-30MHz of IC RSS-Gen standard, the unit of final result on the test plots are dBμV/m, so the limit should be added by 51,5 dB from dBμA/m to dBμV/m.<br>3. When the test result of peak was less than the limit of QP/Average more than 6dB, just peak value were recorded.<br>4. After pre-scan in the X, Y and Z axes of orientation, the worst case z-axis of orientation were recorded. | | |

**Below 1GHz:**

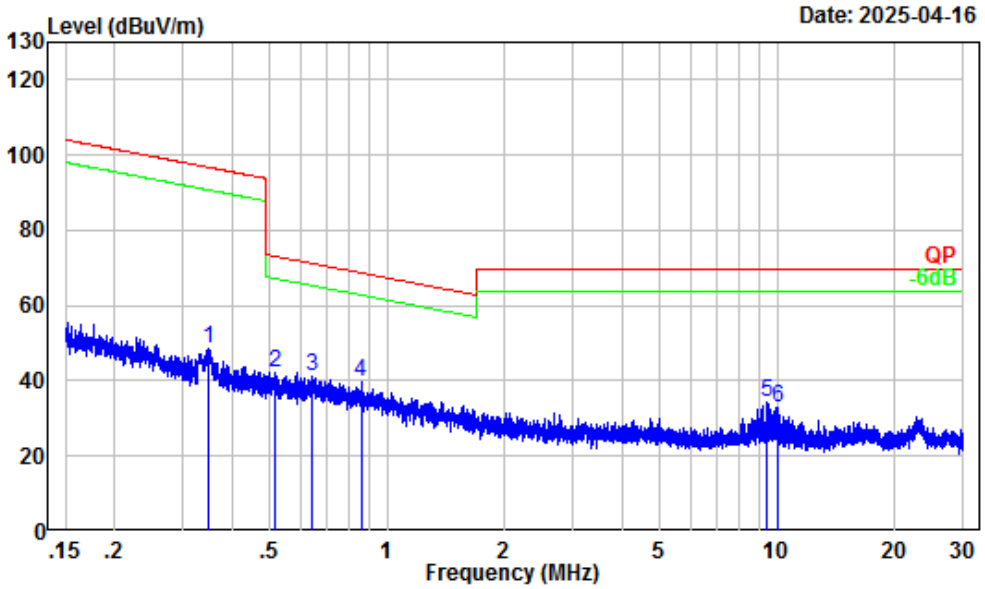
9kHz-150kHz




Site : Chamber A
Condition : 3m
Project Number : 2501R30997E-RF
Test Mode : 2.4G WIFI Transmitting
Detector: Peak RBW/VBW: 0.3/1kHz
Tester : Anson Su

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 0.01 | 32.16 | 24.72 | 56.88 | 126.97 | -70.09 | Peak |
| 2 | 0.02 | 30.71 | 21.33 | 52.04 | 122.33 | -70.29 | Peak |
| 3 | 0.03 | 28.27 | 23.54 | 51.81 | 117.44 | -65.63 | Peak |
| 4 | 0.06 | 25.70 | 26.49 | 52.19 | 112.48 | -60.29 | Peak |
| 5 | 0.09 | 22.35 | 21.62 | 43.97 | 108.05 | -64.08 | Peak |
| 6 | 0.12 | 20.81 | 27.83 | 48.64 | 106.01 | -57.37 | Peak |

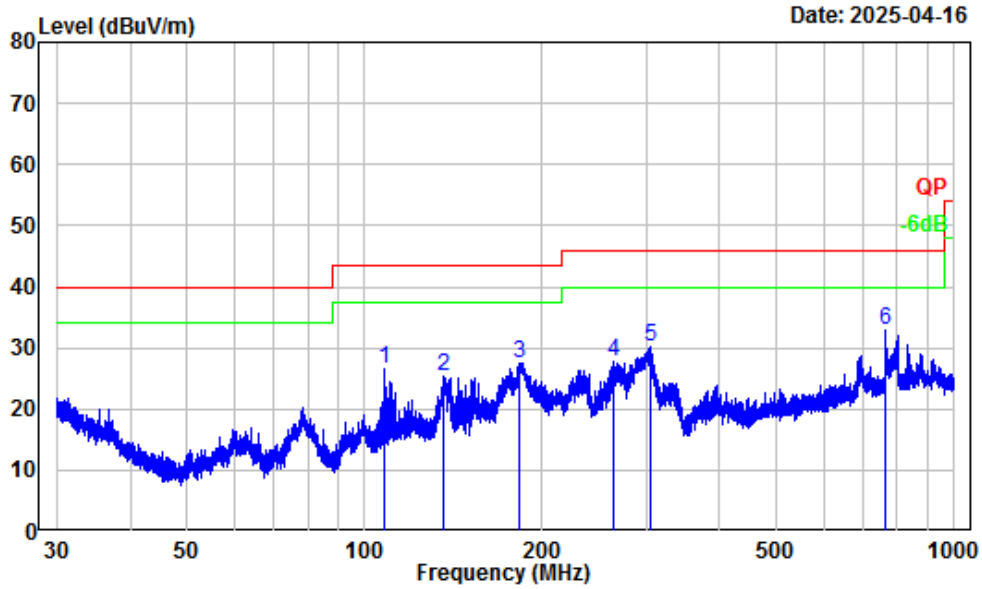
150kHz-30MHz




Site : Chamber A
Condition : 3m
Project Number : 2501R30997E-RF
Test Mode : 2.4G WIFI Transmitting
Detector: Peak RBW/VBW: 10/30kHz
Tester : Anson Su

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 0.35 | 9.26 | 39.37 | 48.63 | 96.73 | -48.10 | Peak |
| 2 | 0.52 | 6.20 | 36.19 | 42.39 | 73.33 | -30.94 | Peak |
| 3 | 0.64 | 4.63 | 36.72 | 41.35 | 71.38 | -30.03 | Peak |
| 4 | 0.86 | 2.27 | 37.32 | 39.59 | 68.83 | -29.24 | Peak |
| 5 | 9.36 | -2.86 | 37.18 | 34.32 | 69.54 | -35.22 | Peak |
| 6 | 10.09 | -2.80 | 35.84 | 33.04 | 69.54 | -36.50 | Peak |

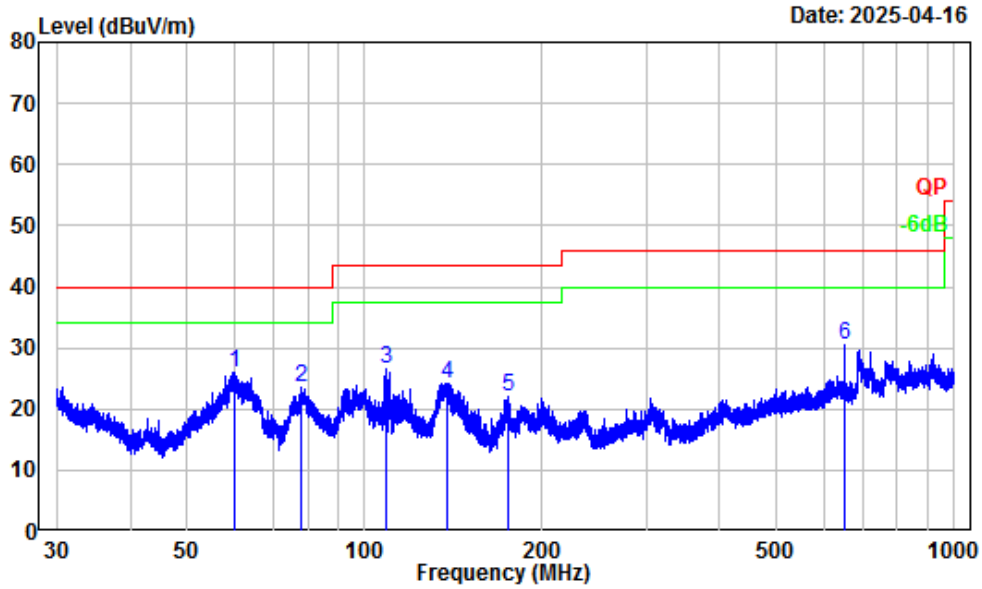
30MHz-1GHz_Horizontal




Site : Chamber A
Condition : 3m Horizontal
Project Number : 2501R30997E-RF
Test Mode : 2.4G WIFI Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Anson Su

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 108.08 | -13.59 | 40.04 | 26.45 | 43.50 | -17.05 | Peak |
| 2 | 136.22 | -11.60 | 36.95 | 25.35 | 43.50 | -18.15 | Peak |
| 3 | 182.48 | -13.87 | 41.44 | 27.57 | 43.50 | -15.93 | Peak |
| 4 | 264.28 | -12.33 | 39.96 | 27.63 | 46.00 | -18.37 | Peak |
| 5 | 305.28 | -11.07 | 41.19 | 30.12 | 46.00 | -15.88 | Peak |
| 6 | 763.38 | -2.60 | 35.58 | 32.98 | 46.00 | -13.02 | Peak |

30MHz-1GHz_Vertical




Site : Chamber A
Condition : 3m Vertical
Project Number : 2501R30997E-RF
Test Mode : 2.4G WIFI Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Anson Su

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 60.15 | -18.12 | 44.19 | 26.07 | 40.00 | -13.93 | Peak |
| 2 | 78.04 | -17.82 | 41.23 | 23.41 | 40.00 | -16.59 | Peak |
| 3 | 108.46 | -13.51 | 40.06 | 26.55 | 43.50 | -16.95 | Peak |
| 4 | 137.60 | -11.66 | 35.94 | 24.28 | 43.50 | -19.22 | Peak |
| 5 | 175.11 | -13.38 | 35.35 | 21.97 | 43.50 | -21.53 | Peak |
| 6 | 650.23 | -4.13 | 34.47 | 30.34 | 46.00 | -15.66 | Peak |

**Above 1GHz:**

| Frequency (MHz) | Reading (dBµV) | PK/Ave | Polar (H/V) | Factor (dB/m) | Corrected Amplitude (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| **802.11b** | | | | | | | |
| Low Channel | | | | | | | |
| 2390 | 63.38 | PK | H | -10.98 | 52.40 | 74 | -21.60 |
| 2390 | 50.50 | AV | H | -10.98 | 39.52 | 54 | -14.48 |
| 2390 | 64.44 | PK | V | -10.98 | 53.46 | 74 | -20.54 |
| 2390 | 51.17 | AV | V | -10.98 | 40.19 | 54 | -13.81 |
| 4824 | 62.06 | PK | H | -7.75 | 54.31 | 74 | -19.69 |
| 4824 | 59.72 | AV | H | -7.75 | 51.97 | 54 | -2.03 |
| 4824 | 58.38 | PK | V | -7.75 | 50.63 | 74 | -23.37 |
| 4824 | 54.62 | AV | V | -7.75 | 46.87 | 54 | -7.13 |
| Middle Channel | | | | | | | |
| 4874 | 56.11 | PK | H | -7.61 | 48.50 | 74 | -25.50 |
| 4874 | 53.24 | AV | H | -7.61 | 45.63 | 54 | -8.37 |
| 4874 | 55.11 | PK | V | -7.61 | 47.50 | 74 | -26.50 |
| 4874 | 51.98 | AV | V | -7.61 | 44.37 | 54 | -9.63 |
| High Channel | | | | | | | |
| 2483.5 | 63.03 | PK | H | -10.97 | 52.06 | 74 | -21.94 |
| 2483.5 | 50.02 | AV | H | -10.97 | 39.05 | 54 | -14.95 |
| 2483.5 | 64.17 | PK | V | -10.97 | 53.20 | 74 | -20.80 |
| 2483.5 | 51.86 | AV | V | -10.97 | 40.89 | 54 | -13.11 |
| 4924 | 61.77 | PK | H | -7.57 | 54.20 | 74 | -19.80 |
| 4924 | 58.98 | AV | H | -7.57 | 51.41 | 54 | -2.59 |
| 4924 | 59.19 | PK | V | -7.57 | 51.62 | 74 | -22.38 |
| 4924 | 56.15 | AV | V | -7.57 | 48.58 | 54 | -5.42 |

| Frequency (MHz) | Reading (dBµV) | PK/Ave | Polar (H/V) | Factor (dB/m) | Corrected Amplitude (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| **802.11g** | | | | | | | |
| Low Channel | | | | | | | |
| 2390 | 66.50 | PK | H | -10.98 | 55.52 | 74 | -18.48 |
| 2390 | 50.69 | AV | H | -10.98 | 39.71 | 54 | -14.29 |
| 2390 | 74.51 | PK | V | -10.98 | 63.53 | 74 | -10.47 |
| 2390 | 56.98 | AV | V | -10.98 | 46.00 | 54 | -8.00 |
| 4824 | 58.39 | PK | H | -7.75 | 50.64 | 74 | -23.36 |
| 4824 | 44.88 | AV | H | -7.75 | 37.13 | 54 | -16.87 |
| 4824 | 53.38 | PK | V | -7.75 | 45.63 | 74 | -28.37 |
| 4824 | 40.61 | AV | V | -7.75 | 32.86 | 54 | -21.14 |
| Middle Channel | | | | | | | |
| 4874 | 56.67 | PK | H | -7.61 | 49.06 | 74 | -24.94 |
| 4874 | 43.67 | AV | H | -7.61 | 36.06 | 54 | -17.94 |
| 4874 | 53.22 | PK | V | -7.61 | 45.61 | 74 | -28.39 |
| 4874 | 39.68 | AV | V | -7.61 | 32.07 | 54 | -21.93 |
| High Channel | | | | | | | |
| 2483.5 | 64.20 | PK | H | -10.97 | 53.23 | 74 | -20.77 |
| 2483.5 | 50.00 | AV | H | -10.97 | 39.03 | 54 | -14.97 |
| 2483.5 | 70.89 | PK | V | -10.97 | 59.92 | 74 | -14.08 |
| 2483.5 | 54.13 | AV | V | -10.97 | 43.16 | 54 | -10.84 |
| 4924 | 58.65 | PK | H | -7.57 | 51.08 | 74 | -22.92 |
| 4924 | 45.60 | AV | H | -7.57 | 38.03 | 54 | -15.97 |
| 4924 | 53.36 | PK | V | -7.57 | 45.79 | 74 | -28.21 |
| 4924 | 40.33 | AV | V | -7.57 | 32.76 | 54 | -21.24 |

| Frequency (MHz) | Reading (dBµV) | PK/Ave | Polar (H/V) | Factor (dB/m) | Corrected Amplitude (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| **802.11n20** | | | | | | | |
| Low Channel | | | | | | | |
| 2390 | 70.48 | PK | H | -10.98 | 59.50 | 74 | -14.50 |
| 2390 | 51.80 | AV | H | -10.98 | 40.82 | 54 | -13.18 |
| 2390 | 76.47 | PK | V | -10.98 | 65.49 | 74 | -8.51 |
| 2390 | 57.21 | AV | V | -10.98 | 46.23 | 54 | -7.77 |
| 4824 | 60.07 | PK | H | -7.75 | 52.32 | 74 | -21.68 |
| 4824 | 47.15 | AV | H | -7.75 | 39.40 | 54 | -14.60 |
| 4824 | 56.14 | PK | V | -7.75 | 48.39 | 74 | -25.61 |
| 4824 | 43.27 | AV | V | -7.75 | 35.52 | 54 | -18.48 |
| Middle Channel | | | | | | | |
| 4874 | 55.97 | PK | H | -7.61 | 48.36 | 74 | -25.64 |
| 4874 | 42.52 | AV | H | -7.61 | 34.91 | 54 | -19.09 |
| 4874 | 54.24 | PK | V | -7.61 | 46.63 | 74 | -27.37 |
| 4874 | 41.09 | AV | V | -7.61 | 33.48 | 54 | -20.52 |
| High Channel | | | | | | | |
| 2483.5 | 67.72 | PK | H | -10.97 | 56.75 | 74 | -17.25 |
| 2483.5 | 50.85 | AV | H | -10.97 | 39.88 | 54 | -14.12 |
| 2483.5 | 71.68 | PK | V | -10.97 | 60.71 | 74 | -13.29 |
| 2483.5 | 55.28 | AV | V | -10.97 | 44.31 | 54 | -9.69 |
| 4924 | 58.04 | PK | H | -7.57 | 50.47 | 74 | -23.53 |
| 4924 | 44.31 | AV | H | -7.57 | 36.74 | 54 | -17.26 |
| 4924 | 53.88 | PK | V | -7.57 | 46.31 | 74 | -27.69 |
| 4924 | 41.56 | AV | V | -7.57 | 33.99 | 54 | -20.01 |

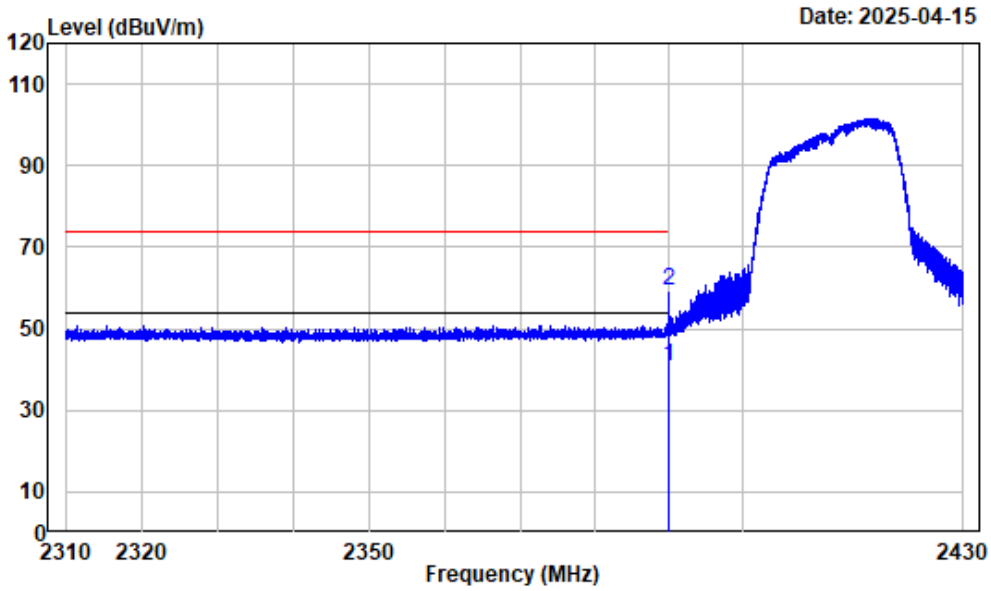
| Frequency (MHz) | Reading (dBµV) | PK/Ave | Polar (H/V) | Factor (dB/m) | Corrected Amplitude (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| **802.11n40** | | | | | | | |
| Low Channel | | | | | | | |
| 2390 | 66.39 | PK | H | -10.98 | 55.41 | 74 | -18.59 |
| 2390 | 50.85 | AV | H | -10.98 | 39.87 | 54 | -14.13 |
| 2390 | 68.62 | PK | V | -10.98 | 57.64 | 74 | -16.36 |
| 2390 | 53.44 | AV | V | -10.98 | 42.46 | 54 | -11.54 |
| 4844 | 54.99 | PK | H | -7.61 | 47.38 | 74 | -26.62 |
| 4844 | 41.52 | AV | H | -7.61 | 33.91 | 54 | -20.09 |
| 4844 | 55.75 | PK | V | -7.61 | 48.14 | 74 | -25.86 |
| 4844 | 42.46 | AV | V | -7.61 | 34.85 | 54 | -19.15 |
| Middle Channel | | | | | | | |
| 4874 | 53.60 | PK | H | -7.61 | 45.99 | 74 | -28.01 |
| 4874 | 40.94 | AV | H | -7.61 | 33.33 | 54 | -20.67 |
| 4874 | 53.53 | PK | V | -7.61 | 45.92 | 74 | -28.08 |
| 4874 | 40.96 | AV | V | -7.61 | 33.35 | 54 | -20.65 |
| High Channel | | | | | | | |
| 2483.5 | 67.20 | PK | H | -10.97 | 56.23 | 74 | -17.77 |
| 2483.5 | 52.58 | AV | H | -10.97 | 41.61 | 54 | -12.39 |
| 2483.5 | 72.74 | PK | V | -10.97 | 61.77 | 74 | -12.23 |
| 2483.5 | 55.71 | AV | V | -10.97 | 44.74 | 54 | -9.26 |
| 4904 | 54.45 | PK | H | -7.53 | 46.92 | 74 | -27.08 |
| 4904 | 41.81 | AV | H | -7.53 | 34.28 | 54 | -19.72 |
| 4904 | 54.19 | PK | V | -7.53 | 46.66 | 74 | -27.34 |
| 4904 | 40.37 | AV | V | -7.53 | 32.84 | 54 | -21.16 |

Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Corrected. Amplitude - Limit
The other spurious emission which is in the noise floor level was not recorded.

**Test plots**

**Band Edge (Listed with the worst margin test plots)**

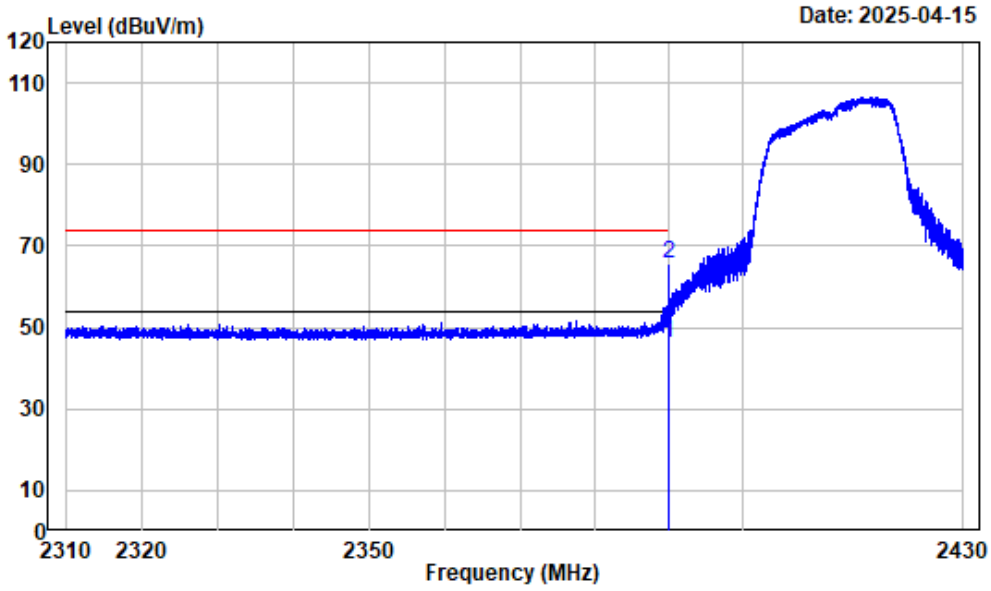
Left Band edge_Horizontal_802.11n HT20




```
Condition        : Horizontal
Project No.      : 2501R30997E-RF
Tester           : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
                 : Average reading: RBW:1MHz VBW:1kHz Detector:Peak
Note             : 2.4GWiFi_n20_2412
```

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2390.000 | -10.98 | 51.80 | 40.82 | 54.00 | -13.18 | Average |
| 2 | 2390.000 | -10.98 | 70.48 | 59.50 | 74.00 | -14.50 | Peak |

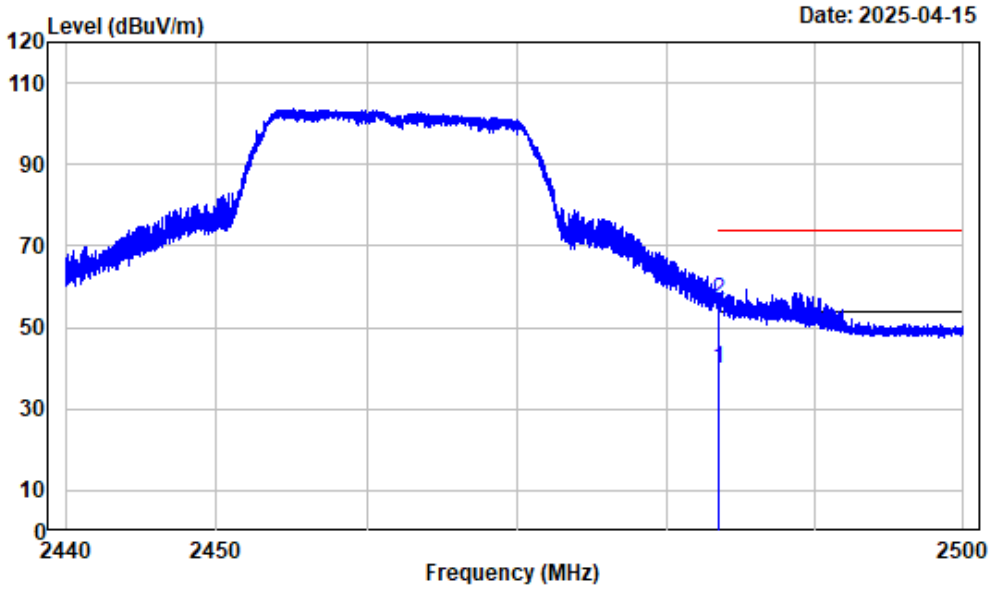
Left Band edge_Vertical_802.11n HT20




Condition : Vertical
Project No. : 2501R30997E-RF
Tester : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
: Average reading: RBW:1MHz VBW:1kHz Detector:Peak
Note : 2.4GWiFi_n20_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2390.000 | -10.98 | 57.21 | 46.23 | 54.00 | -7.77 | Average |
| 2 | 2390.000 | -10.98 | 76.47 | 65.49 | 74.00 | -8.51 | Peak |

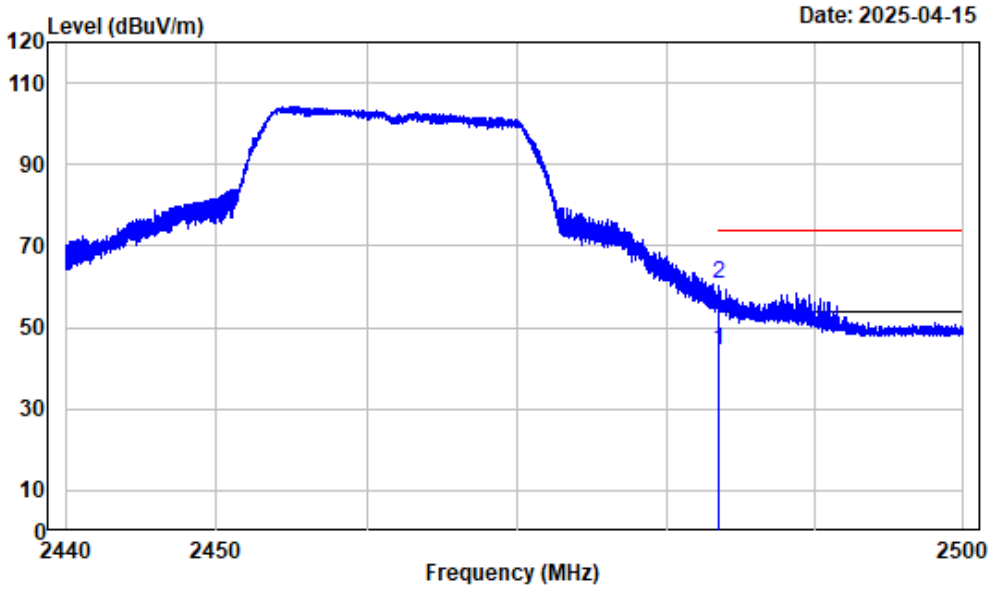
Right Band edge_Horizontal_802.11n HT20




Condition : Horizontal
Project No. : 2501R30997E-RF
Tester : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
: Average reading: RBW:1MHz VBW:1kHz Detector:Peak
Note : 2.4GWiFi_n20_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -10.97 | 50.85 | 39.88 | 54.00 | -14.12 | Average |
| 2 | 2483.500 | -10.97 | 67.72 | 56.75 | 74.00 | -17.25 | Peak |

Right Band edge_Vertical_802.11n HT20

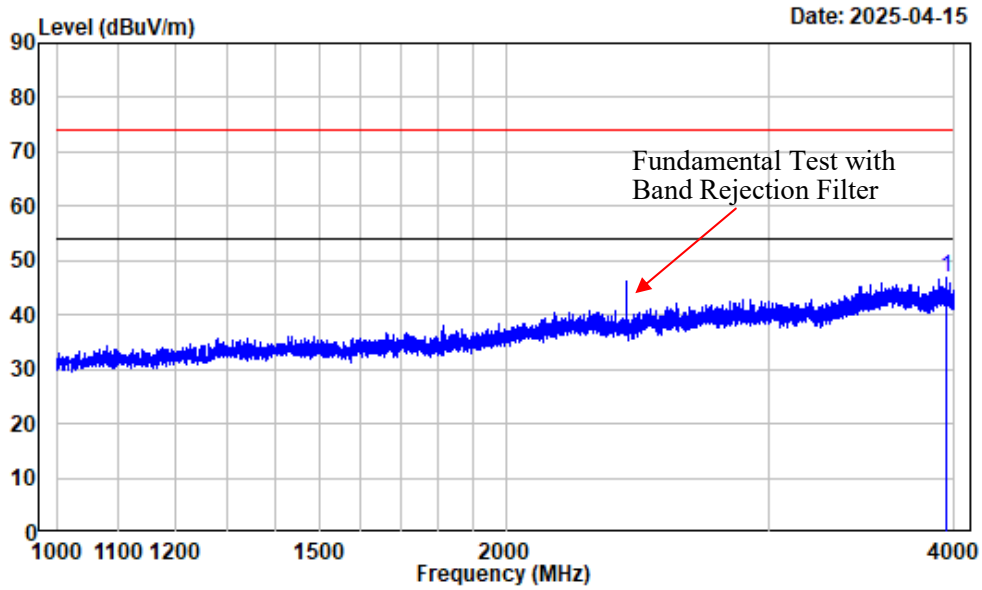



```
Condition        : Vertical
Project No.      : 2501R30997E-RF
Tester           : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
                 : Average reading: RBW:1MHz VBW:1kHz Detector:Peak
Note             : 2.4GWiFi_n20_2462
```

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -10.97 | 55.28 | 44.31 | 54.00 | -9.69 | Average |
| 2 | 2483.500 | -10.97 | 71.68 | 60.71 | 74.00 | -13.29 | Peak |

**1-18GHz (Listed with the worst harmonic margin test plot)**

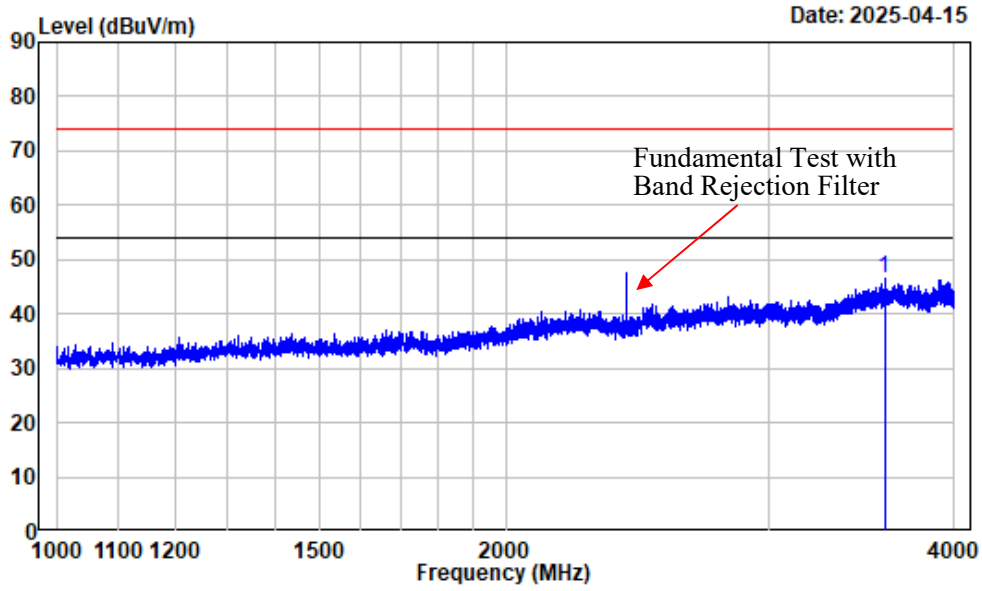
1-4GHz_Horizontal_802.11b




```
Condition        : Horizontal
Project No.      : 2501R30997E-RF
Tester           : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note             : 2.4GWiFi_b_2412
```

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 3953.869 | -9.32 | 56.18 | 46.86 | 74.00 | -27.14 | Peak |

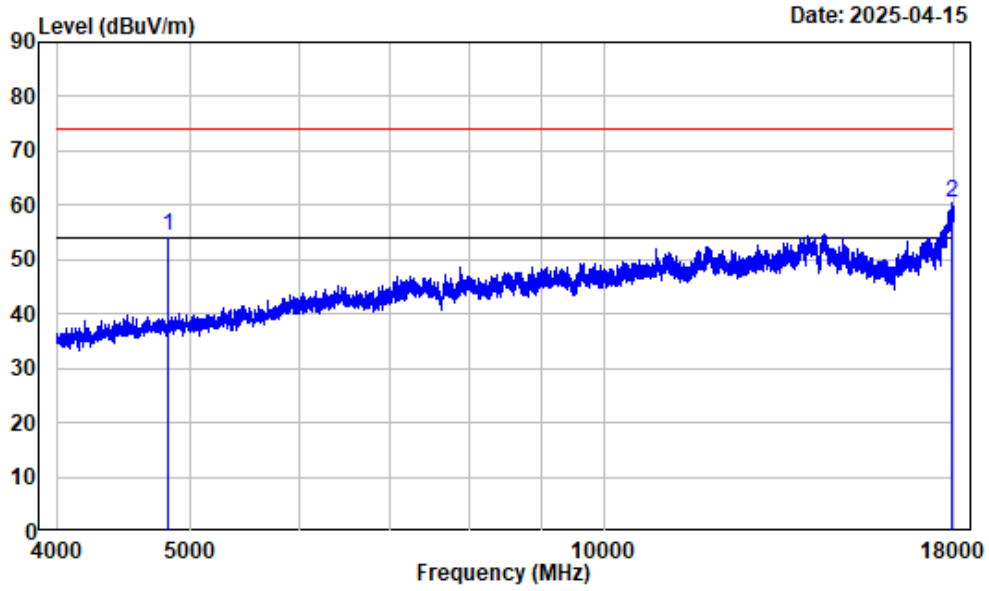
1-4GHz_Vertical_802.11b




Condition : Vertical
Project No. : 2501R30997E-RF
Tester : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 2.4GWiFi_b_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 3591.199 | -10.10 | 56.57 | 46.47 | 74.00 | -27.53 | Peak |

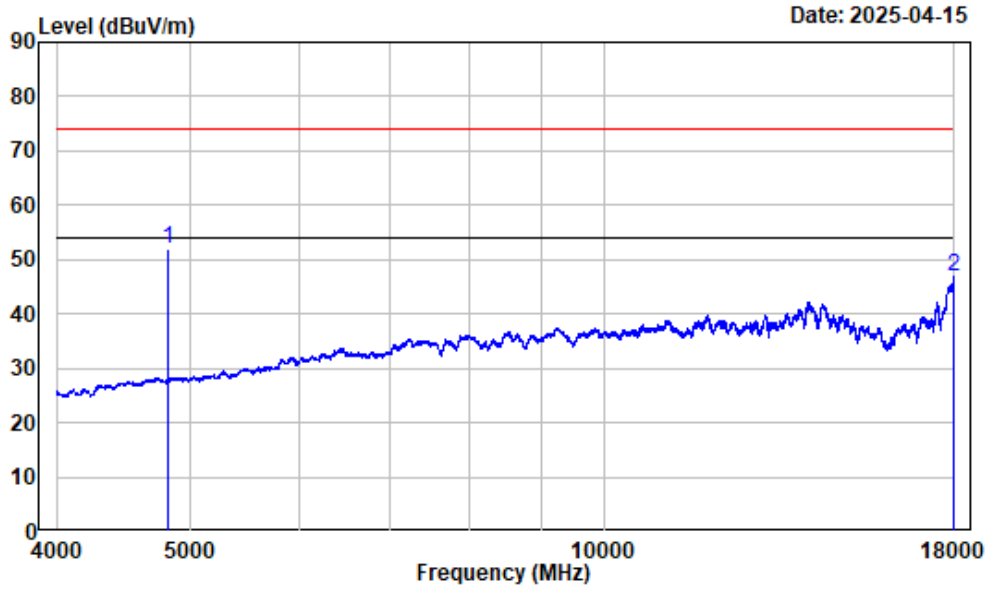
4-18GHz_Horizontal_Peak_802.11b




Condition : Horizontal
Project No. : 2501R30997E-RF
Tester : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 2.4GWiFi_b_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4824.000 | -7.75 | 62.06 | 54.31 | 74.00 | -19.69 | Peak |
| 2 | 17942.240 | 12.91 | 47.48 | 60.39 | 74.00 | -13.61 | Peak |

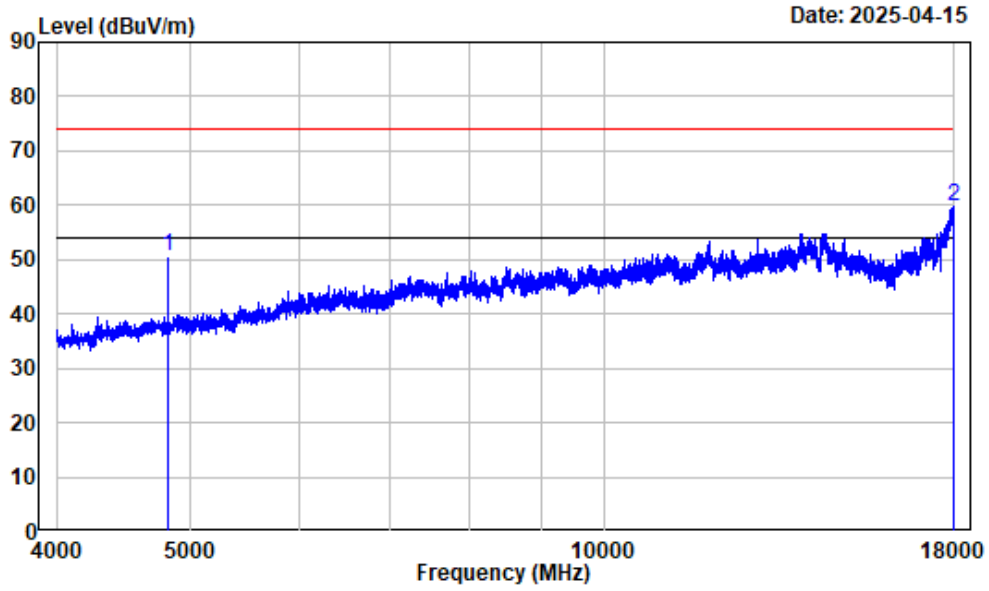
4-18GHz_Horizontal_Average_802.11b




Condition : Horizontal
Project No. : 2501R30997E-RF
Tester : Visen Wu
Spectrum setting: Average reading: RBW:1MHz VBW:1kHz Detector:Peak
Note : 2.4GWiFi_b_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4824.000 | -7.75 | 59.72 | 51.97 | 54.00 | -2.03 | Average |
| 2 | 17998.250 | 13.19 | 33.70 | 46.89 | 54.00 | -7.11 | Average |

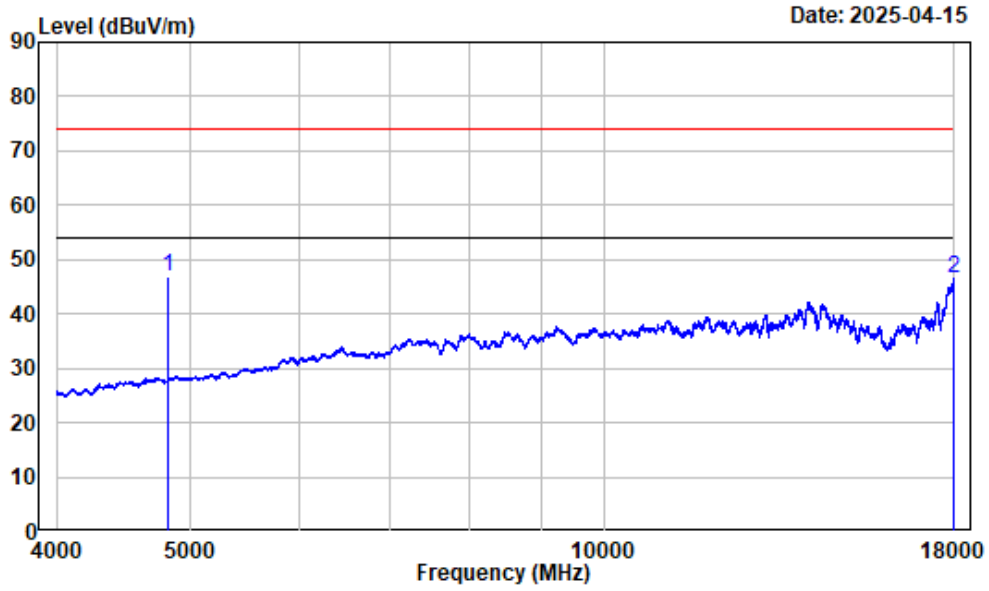
4-18GHz_Vertical_Peak_802.11b




Condition : Vertical
Project No. : 2501R30997E-RF
Tester : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 2.4GWiFi_b_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4824.000 | -7.75 | 58.38 | 50.63 | 74.00 | -23.37 | Peak |
| 2 | 17982.500 | 13.11 | 46.51 | 59.62 | 74.00 | -14.38 | Peak |

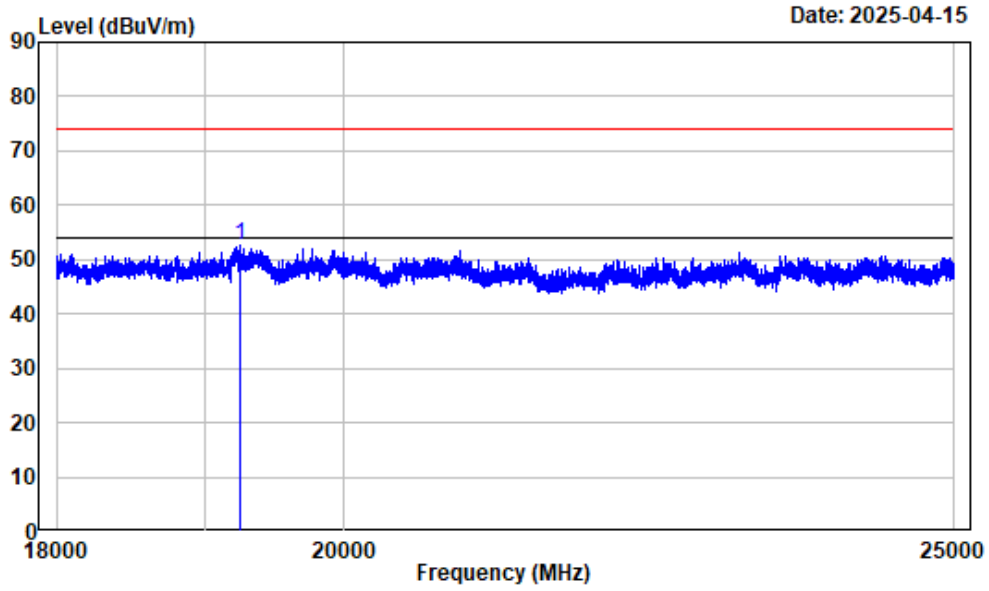
4-18GHz_Vertical_Average_802.11b




Condition : Vertical
Project No. : 2501R30997E-RF
Tester : Visen Wu
Spectrum setting: Average reading: RBW:1MHz VBW:1kHz Detector:Peak
Note : 2.4GWiFi_b_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4824.000 | -7.75 | 54.62 | 46.87 | 54.00 | -7.13 | Average |
| 2 | 17996.500 | 13.19 | 33.35 | 46.54 | 54.00 | -7.46 | Average |

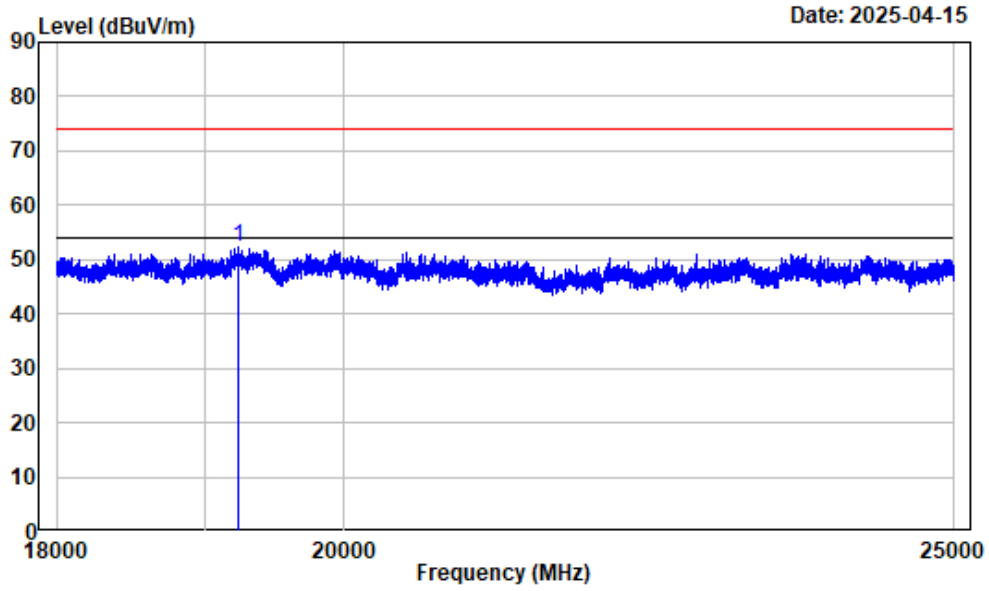
1-4GHz_Horizontal_802.11b




Condition : Horizontal
Project No. : 2501R30997E-RF
Tester : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 2.4GWiFi_b_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 19245.280 | 15.42 | 37.30 | 52.72 | 74.00 | -21.28 | peak |

1-4GHz_Vertical_802.11b




Condition : Vertical
Project No. : 2501R30997E-RF
Tester : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 2.4GWiFi_b_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 19232.150 | 15.42 | 36.73 | 52.15 | 74.00 | -21.85 | peak |

## 6dB Emission Bandwidth

### Test Information:

| | | | |
|---|---|---|---|
| **Sample No.:** | 30PG-1 | **Test Date:** | 2025/04/10 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Rainbow Zhu | **Test Result:** | Pass |

### Environmental Conditions:

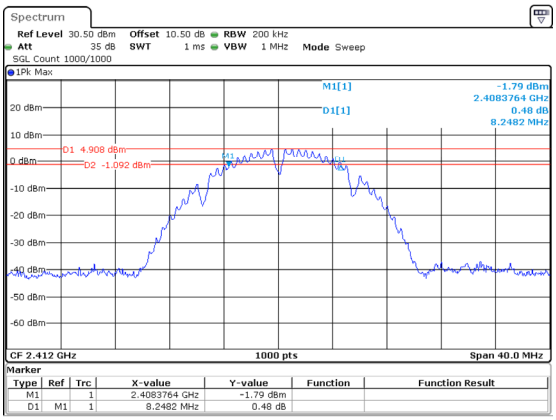
| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C)** | 24.3 | **Relative Humidity: (%)** | 47 | **ATM Pressure: (kPa)** | 100.2 |

**Test Data:**

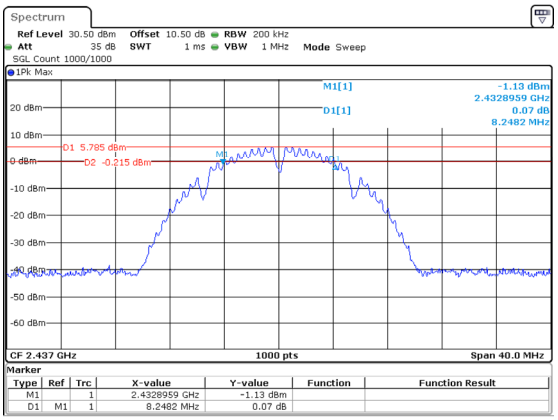
| Mode | Test Frequency (MHz) | Result (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 802.11b | 2412 | 8.248 | ≥0.5 | Pass |
| | 2437 | 8.248 | ≥0.5 | Pass |
| | 2462 | 8.649 | ≥0.5 | Pass |
| 802.11g | 2412 | 15.816 | ≥0.5 | Pass |
| | 2437 | 16.096 | ≥0.5 | Pass |
| | 2462 | 16.176 | ≥0.5 | Pass |
| 802.11n20 | 2412 | 16.416 | ≥0.5 | Pass |
| | 2437 | 17.257 | ≥0.5 | Pass |
| | 2462 | 17.257 | ≥0.5 | Pass |
| 802.11n40 | 2422 | 29.229 | ≥0.5 | Pass |
| | 2437 | **34.515** | ≥0.5 | Pass |
| | 2452 | 32.032 | ≥0.5 | Pass |

## 2412~2462

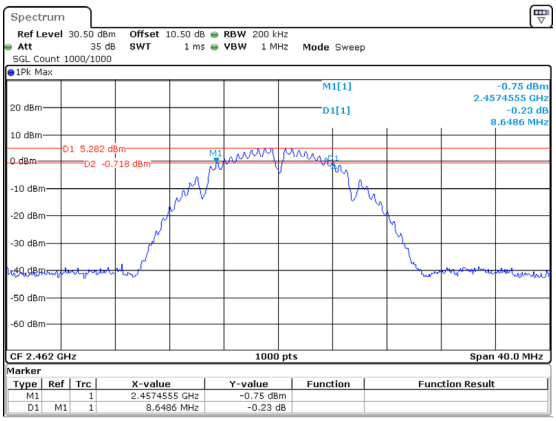
802.11b_2412MHz



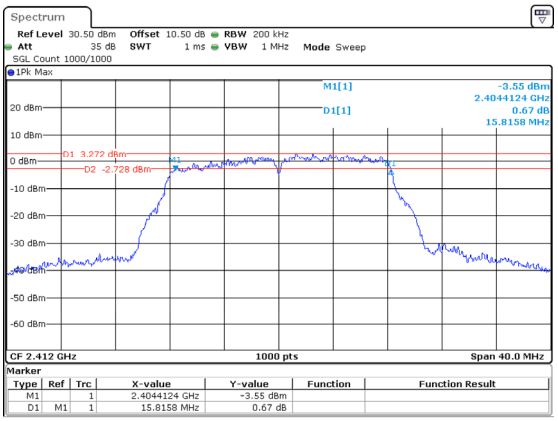

802.11b_2437MHz



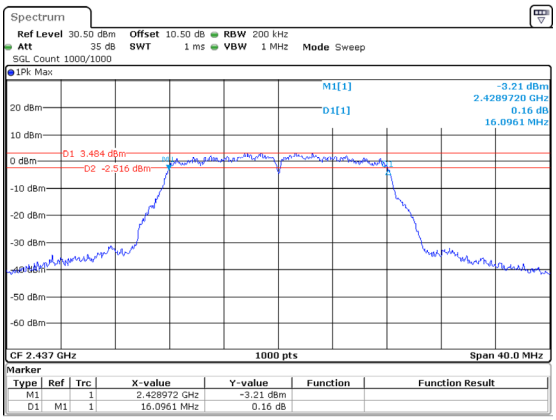

802.11b_2462MHz



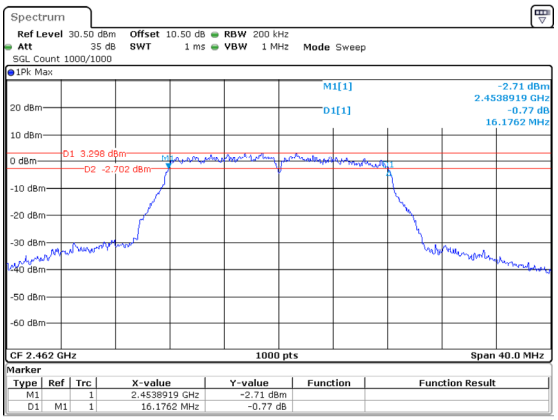

802.11g_2412MHz



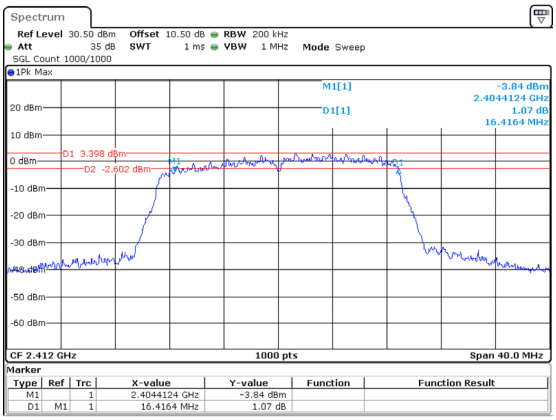

802.11g_2437MHz



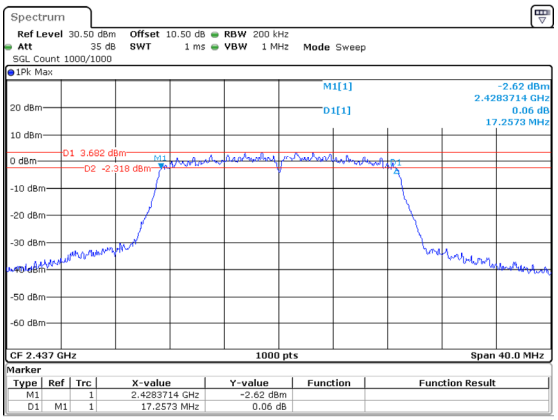

802.11g_2462MHz



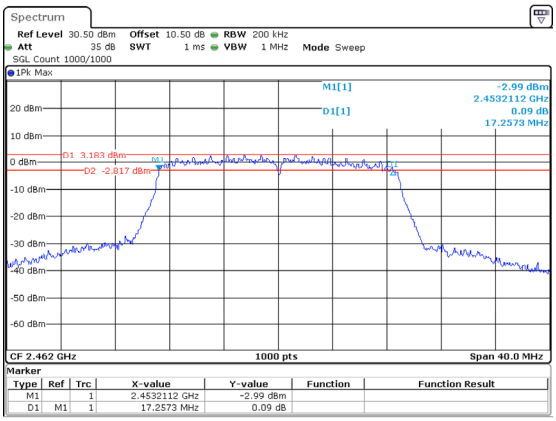
802.11n20_2412MHz



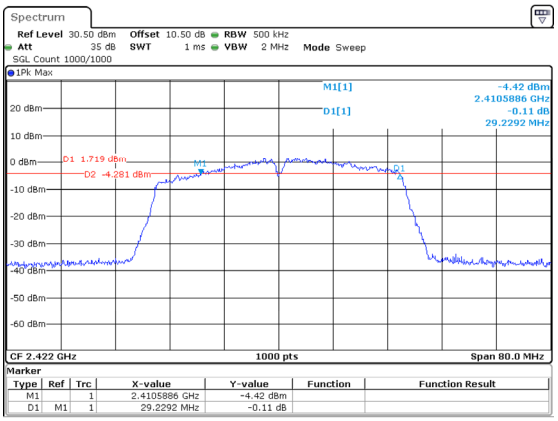

802.11n20_2437MHz



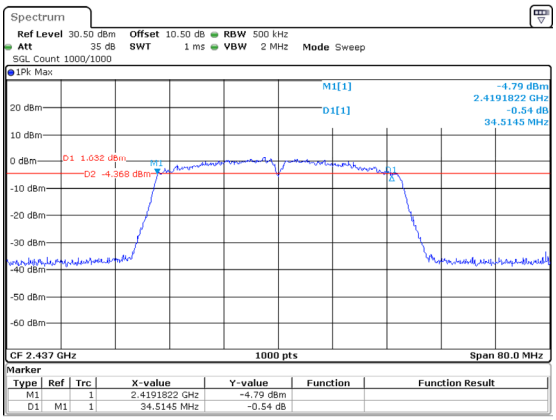

802.11n20_2462MHz



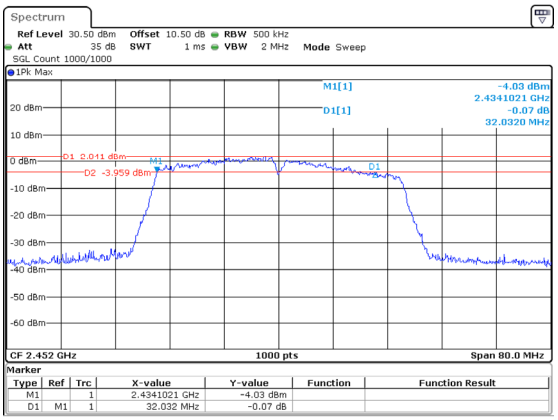

802.11n40_2422MHz




802.11n40_2437MHz




802.11n40_2452MHz



## 99% Occupied Bandwidth

### Test Information:

| | | | |
|---|---|---|---|
| **Sample No.:** | 30PG-1 | **Test Date:** | 2025/04/10 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Rainbow Zhu | **Test Result:** | N/A |

### Environmental Conditions:

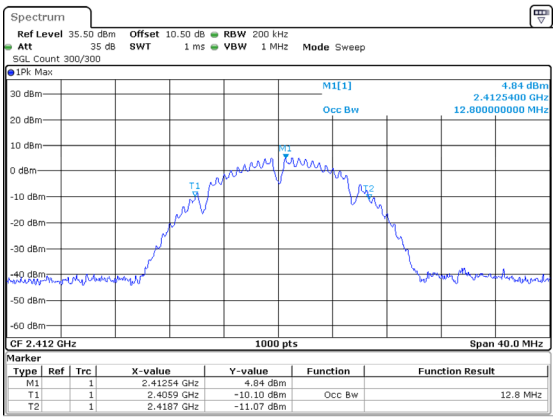
| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C)** | 24.3 | **Relative Humidity: (%)** | 47 | **ATM Pressure: (kPa)** | 100.2 |

**Test Data:**

| Mode | Test Frequency (MHz) | 99% OBW (MHz) |
|---|---|---|
| 802.11b | 2412 | 12.800 |
| | 2437 | 12.880 |
| | 2462 | 12.960 |
| 802.11g | 2412 | 16.520 |
| | 2437 | 16.480 |
| | 2462 | 16.640 |
| 802.11n20 | 2412 | 17.560 |
| | 2437 | 17.560 |
| | 2462 | 17.640 |
| 802.11n40 | 2422 | 35.760 |
| | 2437 | 35.840 |
| | 2452 | **35.920** |

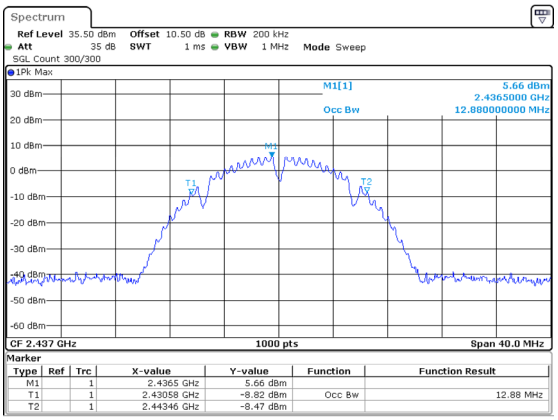
## 2412~2462

802.11b_2412MHz



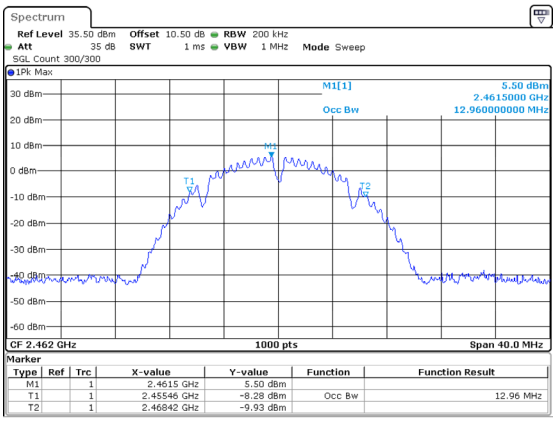

ProjectNo.:2501R30997E-RF Tester:Rainbow Zhu
Date: 10.APR.2025 11:49:12

802.11b_2437MHz



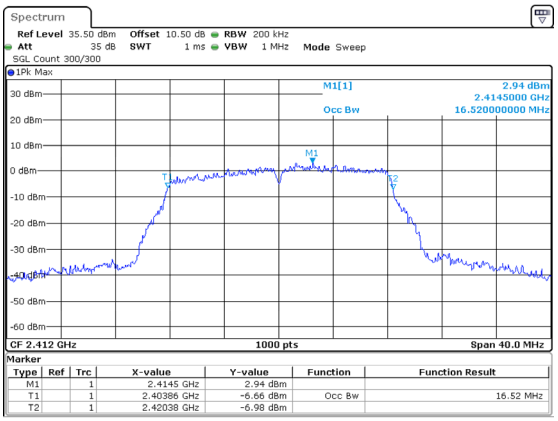

ProjectNo.:2501R30997E-RF Tester:Rainbow Zhu
Date: 10.APR.2025 11:52:03

802.11b_2462MHz



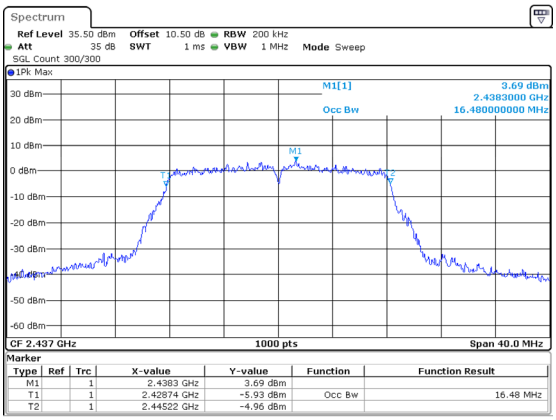

ProjectNo.:2501R30997E-RF Tester:Rainbow Zhu
Date: 10.APR.2025 11:54:22

802.11g_2412MHz



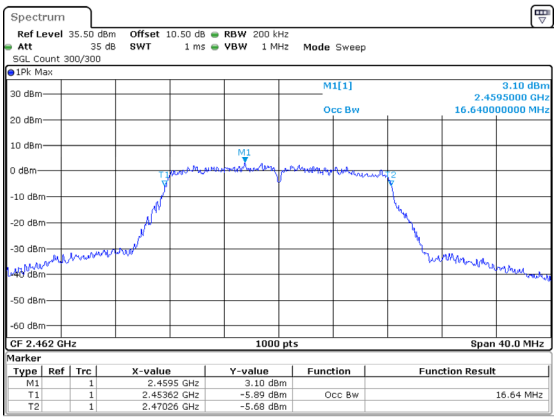

ProjectNo.:2501R30997E-RF Tester:Rainbow Zhu
Date: 10.APR.2025 11:57:09

802.11g_2437MHz



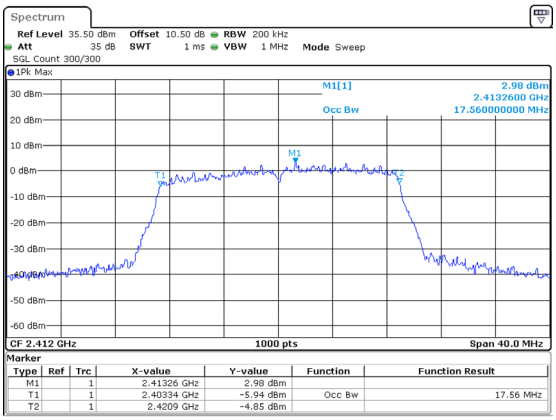

ProjectNo.:2501R30997E-RF Tester:Rainbow Zhu
Date: 10.APR.2025 12:00:04

802.11g_2462MHz

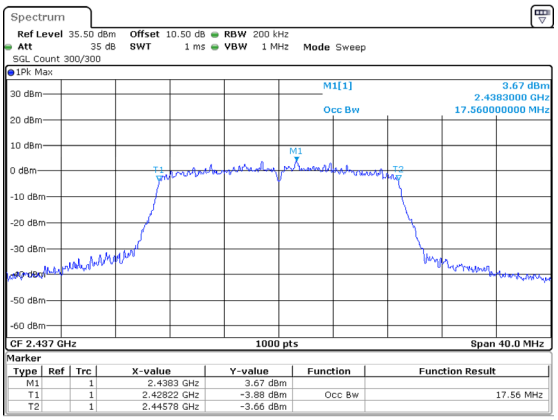



ProjectNo.:2501R30997E-RF Tester:Rainbow Zhu
Date: 10.APR.2025 12:02:48

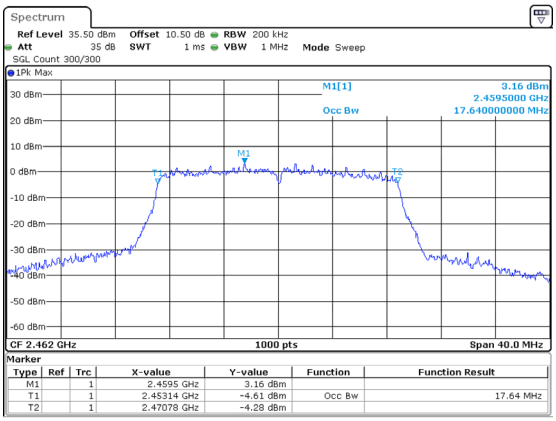
802.11n20_2412MHz



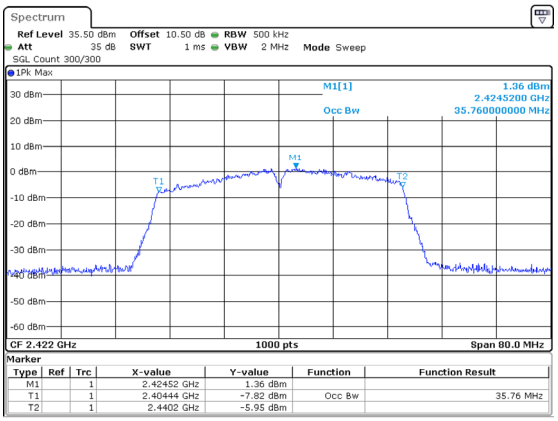

802.11n20_2437MHz



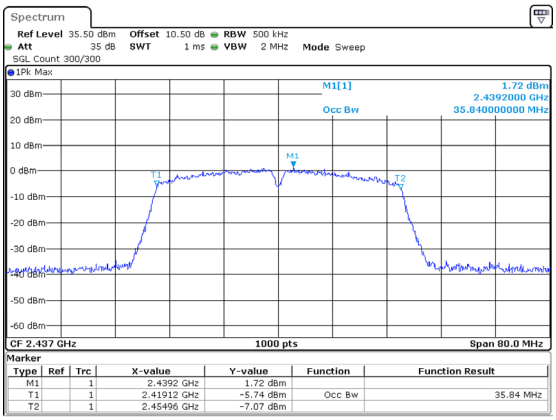

802.11n20_2462MHz



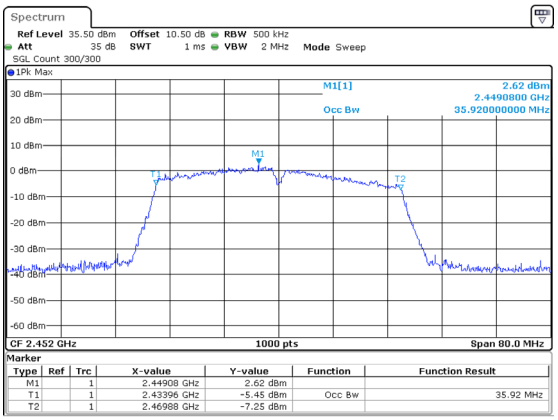

802.11n40_2422MHz




802.11n40_2437MHz




802.11n40_2452MHz



## Maximum Conducted Output Power

### Test Information:

| | | | |
|---|---|---|---|
| **Sample No.:** | 30PG-1 | **Test Date:** | 2025/04/10 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Rainbow Zhu | **Test Result:** | Pass |

### Environmental Conditions:

| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C)** | 24.3 | **Relative Humidity: (%)** | 47 | **ATM Pressure: (kPa)** | 100.2 |

**Test Data:**

| Mode | Test Frequency (MHz) | Peak Output Power(dBm) | Limit (dBm) | EIRP(dBm) | EIRP Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| 802.11b | 2412 | 15.87 | 30 | 20.34 | 36 | Pass |
| | 2437 | 16.66 | 30 | 21.13 | 36 | Pass |
| | 2462 | 16.19 | 30 | 20.66 | 36 | Pass |
| 802.11g | 2412 | 19.67 | 30 | 24.14 | 36 | Pass |
| | 2437 | **20.34** | 30 | 24.81 | 36 | Pass |
| | 2462 | 20.02 | 30 | 24.49 | 36 | Pass |
| 802.11n20 | 2412 | 20.03 | 30 | 24.50 | 36 | Pass |
| | 2437 | **20.34** | 30 | 24.81 | 36 | Pass |
| | 2462 | 20.30 | 30 | 24.77 | 36 | Pass |
| 802.11n40 | 2422 | 17.18 | 30 | 21.65 | 36 | Pass |
| | 2437 | 17.48 | 30 | 21.95 | 36 | Pass |
| | 2452 | 17.51 | 30 | 21.98 | 36 | Pass |

## Power Spectral Density

### Test Information:

| | | | |
|---|---|---|---|
| **Sample No.:** | 30PG-1 | **Test Date:** | 2025/04/10 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Rainbow Zhu | **Test Result:** | Pass |

### Environmental Conditions:

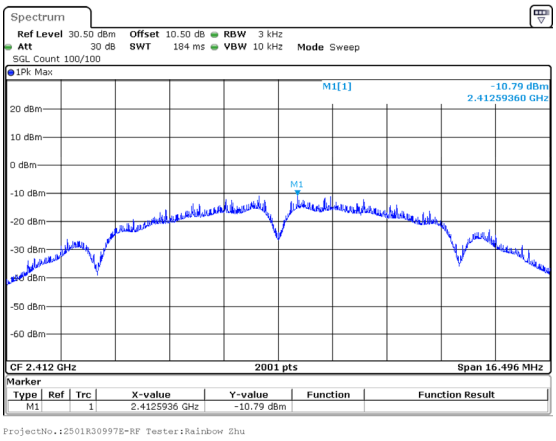
| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C)** | 24.3 | **Relative Humidity: (%)** | 47 | **ATM Pressure: (kPa)** | 100.2 |

**Test Data:**

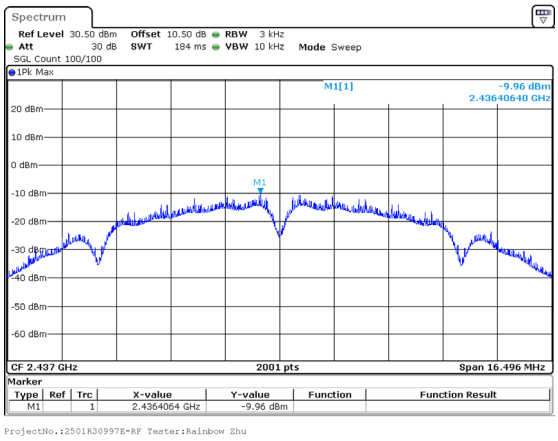
| Mode | Test Frequency (MHz) | Result (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|---|---|---|---|---|
| 802.11b | 2412 | -10.79 | 8 | Pass |
| | 2437 | **-9.96** | 8 | Pass |
| | 2462 | -10.11 | 8 | Pass |
| 802.11g | 2412 | -11.98 | 8 | Pass |
| | 2437 | -12.68 | 8 | Pass |
| | 2462 | -12.51 | 8 | Pass |
| 802.11n20 | 2412 | -12.90 | 8 | Pass |
| | 2437 | -12.78 | 8 | Pass |
| | 2462 | -12.91 | 8 | Pass |
| 802.11n40 | 2422 | -17.15 | 8 | Pass |
| | 2437 | -17.11 | 8 | Pass |
| | 2452 | -16.77 | 8 | Pass |

## 2412~2462

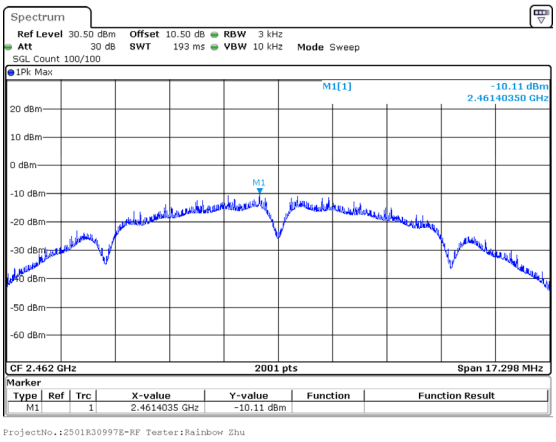
802.11b_2412MHz



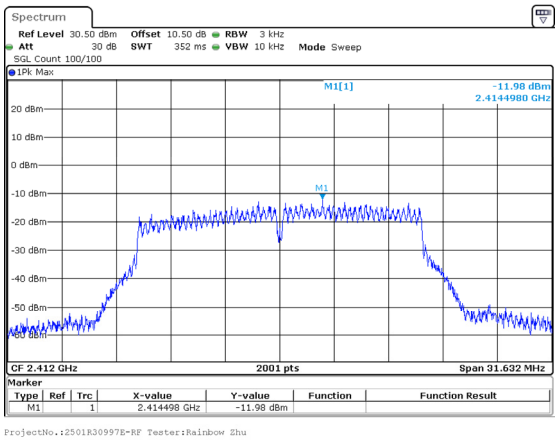

802.11b_2437MHz



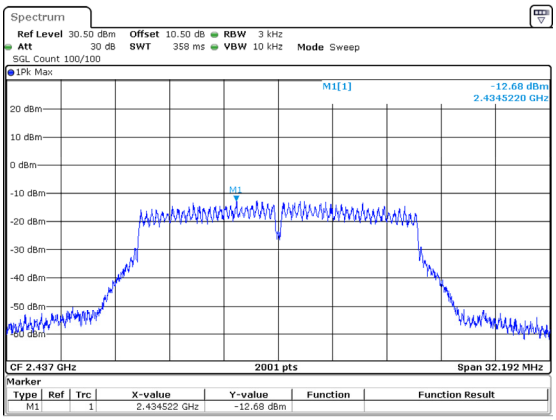

802.11b_2462MHz



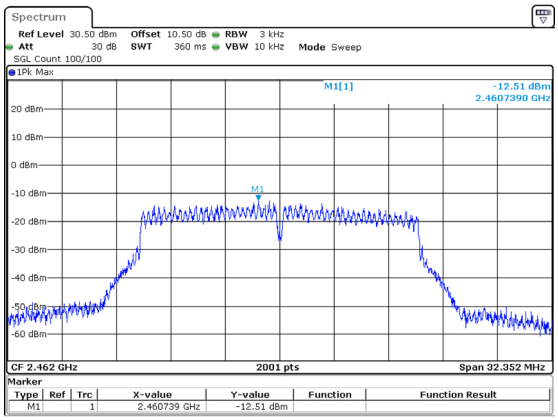

802.11g_2412MHz



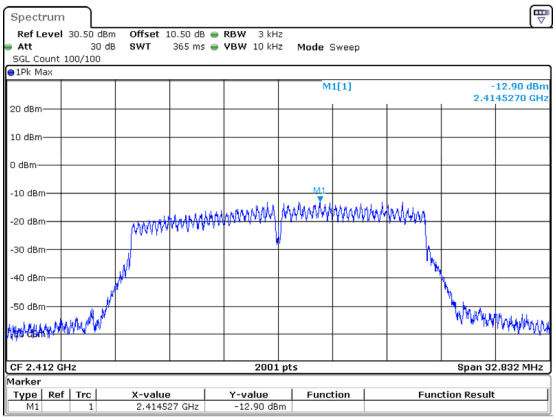

802.11g_2437MHz



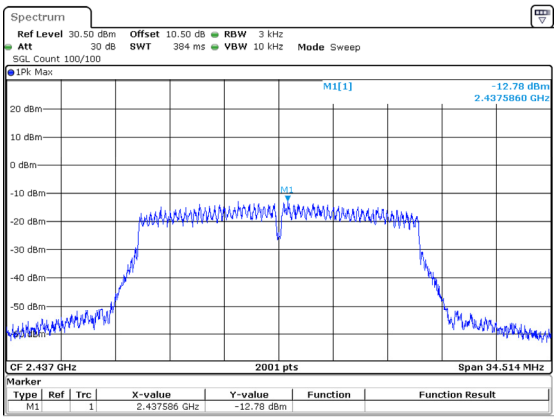

802.11g_2462MHz



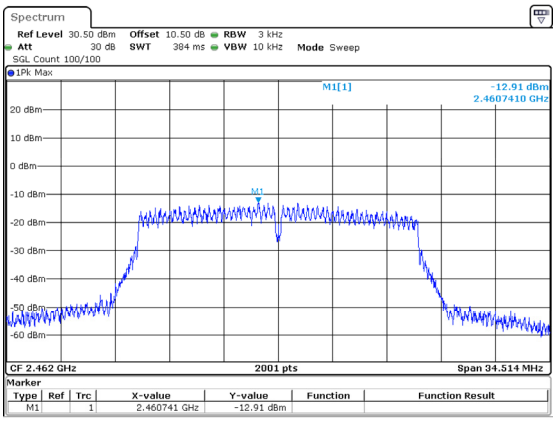
802.11n20_2412MHz



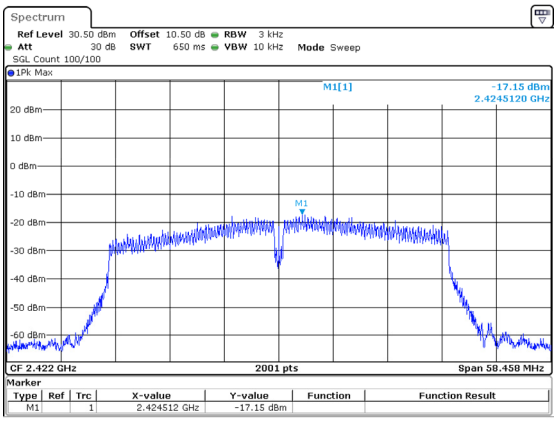

802.11n20_2437MHz



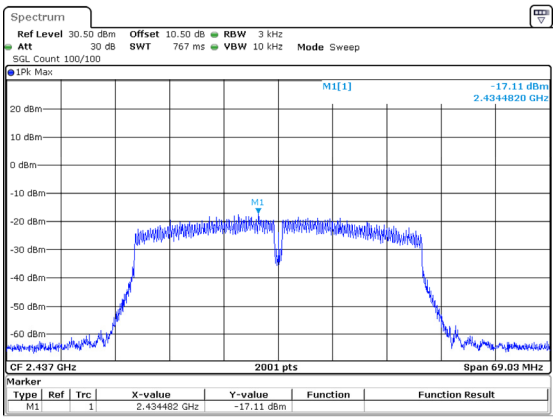

802.11n20_2462MHz



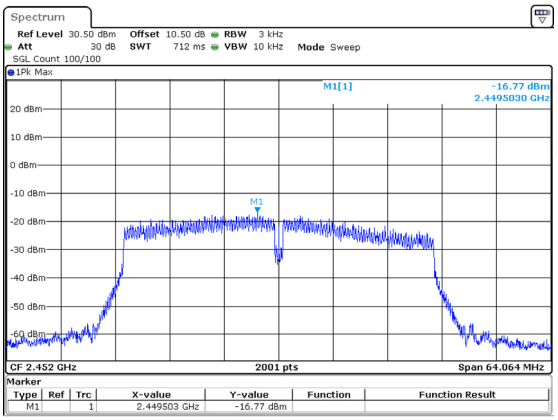

802.11n40_2422MHz




802.11n40_2437MHz




802.11n40_2452MHz



## 100 kHz Bandwidth of Frequency Band Edge

### Test Information:

| | | | |
|---|---|---|---|
| **Sample No.:** | 30PG-1 | **Test Date:** | 2025/04/10 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Rainbow Zhu | **Test Result:** | Pass |

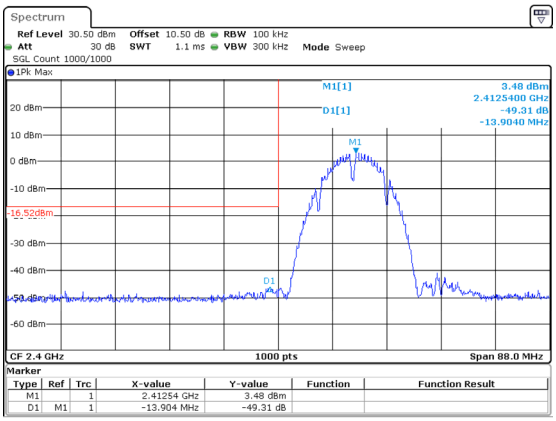
### Environmental Conditions:

| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C)** | 24.3 | **Relative Humidity: (%)** | 47 | **ATM Pressure: (kPa)** | 100.2 |

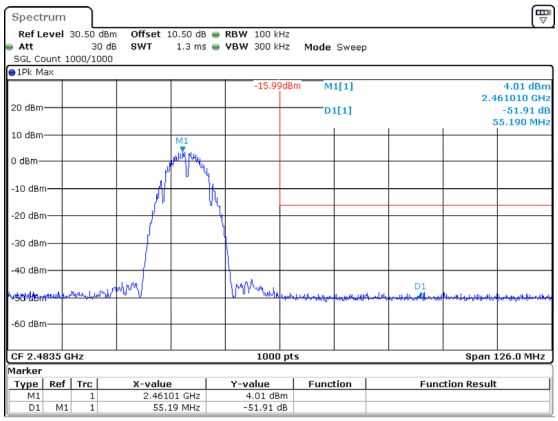
## Test Data:

## 2412~2462

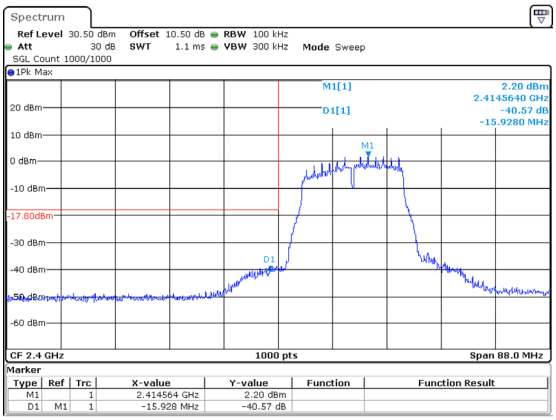
802.11b_2412MHz



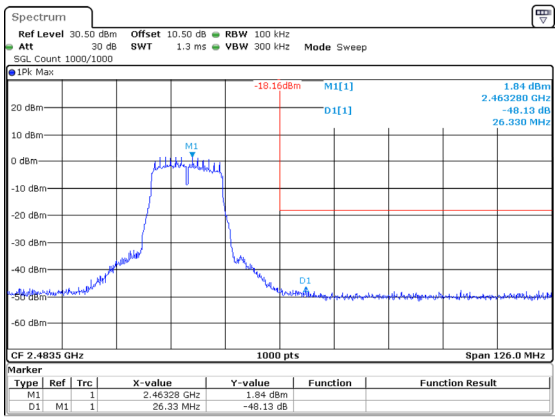

802.11b_2462MHz



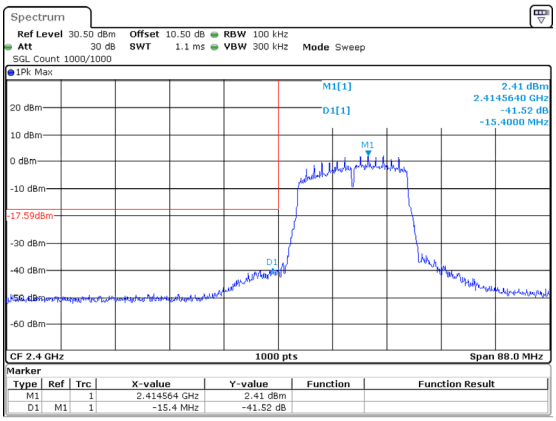

802.11g_2412MHz



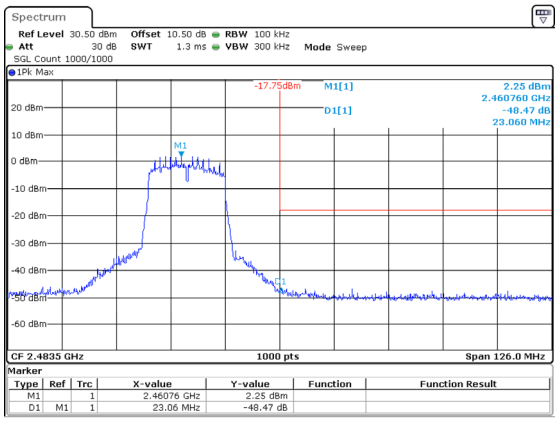

802.11g_2462MHz



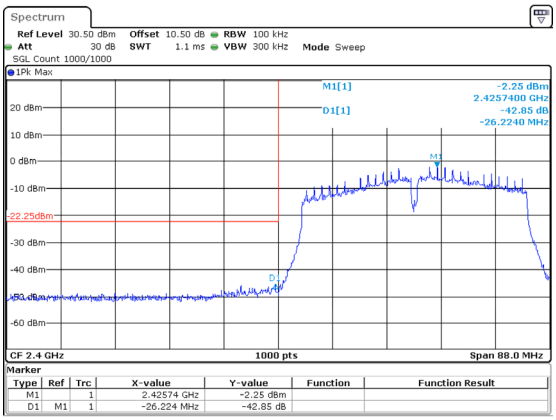

802.11n20_2412MHz



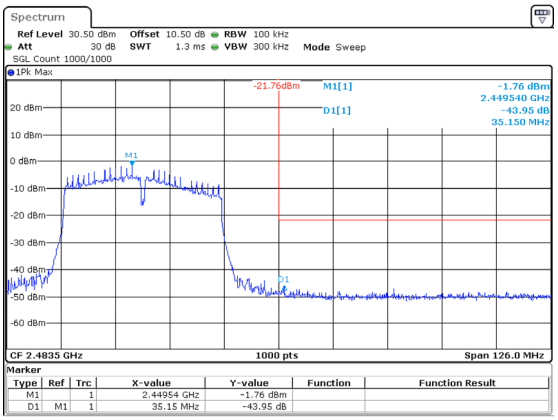

802.11n20_2462MHz



802.11n40_2422MHz




802.11n40_2452MHz



## Duty Cycle

### Test Information:

| | | | |
|---|---|---|---|
| **Sample No.:** | 30PG-1 | **Test Date:** | 2025/04/10 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Rainbow Zhu | **Test Result:** | N/A |

### Environmental Conditions:

| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C)** | 24.3 | **Relative Humidity: (%)** | 47 | **ATM Pressure: (kPa)** | 100.2 |

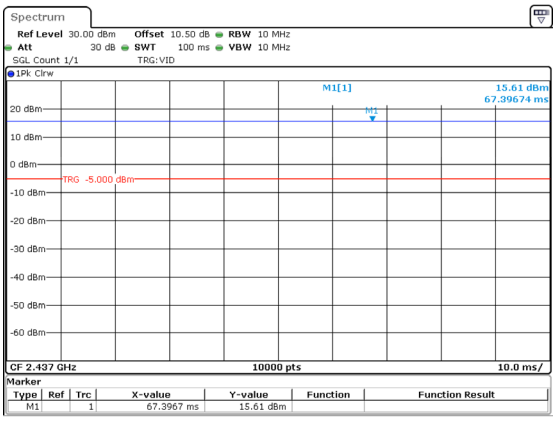
**Test Data:**

| Mode | Test Frequency (MHz) | Ton (ms) | Ton+Toff (ms) | Duty Cycle (%) | Duty Cycle Factor(dB) | 1/Ton (Hz) | VBW Setting (kHz) |
|---|---|---|---|---|---|---|---|
| 802.11b | 2437 | **100** | 100 | 100 | 0 | NA | 0.010 |
| 802.11g | 2437 | **100** | 100 | 100 | 0 | NA | 0.010 |
| 802.11n20 | 2437 | **100** | 100 | 100 | 0 | NA | 0.010 |
| 802.11n40 | 2437 | **100** | 100 | 100 | 0 | NA | 0.010 |

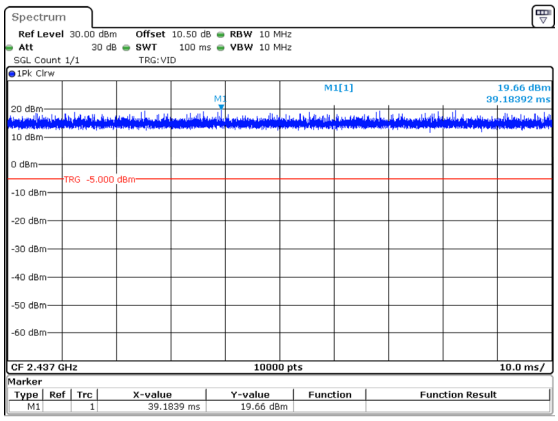
**Duty Cycle = Ton/(Ton+Toff)*100%**

## 2412~2462

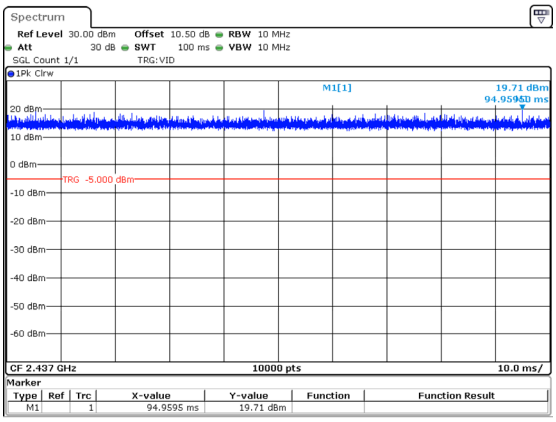
802.11b_2437MHz



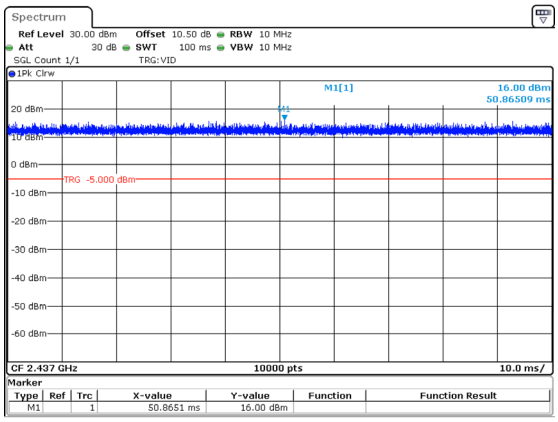

802.11g_2437MHz




802.11n20_2437MHz




802.11n40_2437MHz



# RF EXPOSURE EVALUATION

**MPE-Based Exemption**

**Applicable Standard**

According to subpart 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.

According to KDB 447498 D04 v01 Interim General RF Exposure Guidance

MPE-Based Exemption:
General frequency and separation-distance dependent MPE-based effective radiated power(ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(3)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

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

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

R is the minimum separation distance in meters
f = frequency in MHz

For multiple RF sources: Multiple RF sources are exempt if:

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

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

**Result**

| Mode | Frequency (MHz) | Tune up conducted power#(dBm) | Antenna Gain# | | ERP | | Evaluation Distance (m) | ERP Limit (mW) |
|---|---|---|---|---|---|---|---|---|
| | | | (dBi) | (dBd) | (dBm) | (mW) | | |
| BT | 2402-2480 | 12.5 | 4.47 | 2.32 | 14.82 | 30.34 | 0.2 | 768 |
| BLE | 2402-2480 | 7.5 | 4.47 | 2.32 | 9.82 | 9.59 | 0.2 | 768 |
| 2.4G Wi-Fi | 2412-2462 | 20.5 | 4.47 | 2.32 | 22.82 | 191.43 | 0.2 | 768 |
| 5.2G Wi-Fi | 5180-5240 | 13.5 | 1.67 | -0.48 | 13.02 | 20.04 | 0.2 | 768 |
| 5.8G Wi-Fi | 5745-5825 | 11.5 | 2.49 | 0.34 | 11.84 | 15.28 | 0.2 | 768 |

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
2. 0dBd=2.15dBi
3. BT, 2.4G and 5G Wi-Fi cannot transmit simultaneously.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

**Result: Compliant**

**Field reference level exposure exemption limits**

**Applicable Standard**

According to RSS-102 Issue 6§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 EIRP 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 EIRP 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 EIRP 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 EIRP 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 EIRP 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 EIRP was derived.

**Calculated Data:**

| Mode | Frequency (MHz) | Maximum tune-up conducted power# (dBm) | Antenna Gain# | Maximum tune-up EIRP | | Evaluation Distance (m) | Limit (mW) |
|---|---|---|---|---|---|---|---|
| | | | (dBi) | (dBm) | (mW) | | |
| BT | 2402-2480 | 12.5 | 4.47 | 16.97 | 49.77 | 0.2 | 2676 |
| BLE | 2402-2480 | 7.5 | 4.47 | 11.97 | 15.74 | 0.2 | 2676 |
| 2.4G Wi-Fi | 2412-2462 | 20.5 | 4.47 | 24.97 | 314.05 | 0.2 | 2684 |
| 5.2G Wi-Fi | 5180-5240 | 13.5 | 1.67 | 15.17 | 32.89 | 0.2 | 4525 |
| 5.8G Wi-Fi | 5745-5825 | 11.5 | 2.49 | 13.99 | 25.06 | 0.2 | 4857 |

Note: The tune up conducted power# and antenna gain# was declared by the applicant.
BT, 2.4G and 5G Wi-Fi cannot transmit simultaneously.

**Result: Compliant**

Note: To maintain compliance with the RF exposure guidelines, place the equipment at least 20cm from nearby persons.

# EUT PHOTOGRAPHS

Please refer to the attachment 2501R30997E-RF External photo and 2501R30997E-RF Internal photo.

# TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2501R30997E-RF-00A Test Setup photo.

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