# TEST REPORT

| | |
|---|---|
| Applicant Name: | Shenzhen Xin Yuan Electronic Technology Co., Ltd. |
| Address: | Room 801-803, Yousuowei Building, No.2000 JiaXian Road, Bantian Street, Longgang District, Shenzhen, Guangdong China |
| Report Number: | 2401U21148E-RF-00C |
| FCC ID: | 2ASYE-T-WATCH-S3 |

**Test Standard (s)**

FCC PART 15.247

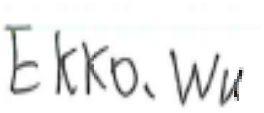
**Sample Description**

| | |
|---|---|
| Product Type: | T-WATCH S3 |
| Model No.: | T-WATCH S3 |
| Multiple Model(s) No.: | N/A |
| Trade Mark: | LILYGO |
| Date Received: | 2024/06/13 |
| Issue Date: | 2024/12/18 |

| | |
|---|---|
| Test Result: | Pass▲ |

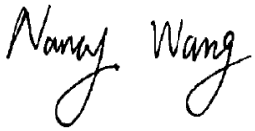
▲ In the configuration tested, the EUT complied with the standards above.

**Prepared and Checked By:**



Ekko Wu
RF Engineer

**Approved By:**



Nancy Wang
RF Supervisor

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# TABLE OF CONTENTS

# DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|---|---|---|---|
| 0 | 2401U21148E-RF-00C | Original Report | 2024/12/18 |

# GENERAL INFORMATION

## Product Description for Equipment under Test (EUT)

| | |
|---|---|
| **Frequency Range** | 2412~2462MHz |
| **Maximum Conducted Output Peak Power** | 20.29dBm |
| **Modulation Technique** | DSSS, OFDM |
| **Antenna Specification#** | 1.43dBi (provided by the applicant) |
| **Voltage Range** | DC 3.8V from battery or DC 5V from USB micro port |
| **Sample serial number** | 2MP7-2 for Conducted and Radiated Emissions Test<br>2MP7-1 for RF Conducted Test (Assigned by BACL, Shenzhen) |
| **Sample/EUT Status** | Good condition |
| **Adapter Information** | N/A |
| | |

## Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission's rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

## Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

And KDB 558074 D01 15.247 Meas Guidance v05r02.

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) |
| 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.

# 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 | 8 | 2447 |
| 2 | 2417 | 9 | 2452 |
| 3 | 2422 | 10 | 2457 |
| 4 | 2427 | 11 | 2462 |
| 5 | 2432 | / | / |
| 6 | 2437 | / | / |
| 7 | 2442 | / | / |

802.11b, 802.11g and 802.11n-HT20 mode was tested with Channel 1, 6 and 11.
802.11n-HT40 mode was tested with Channel 3, 6 and 9.

**EUT Exercise Software**

| Exercise Software# | | EspRFTestTool_v3.6_manual.exe | | |
|---|---|---|---|---|
| Mode | Data rate | Power Level# | | |
| | | Low Channel | Middle Channel | High Channel |
| 802.11b | 1Mbps | 16 | 16 | 16 |
| 802.11g | 6Mbps | 12 | 12 | 12 |
| 802.11n20 | MCS0 | 12 | 12 | 12 |
| 802.11n40 | MCS0 | 12 | 12 | 12 |

**Special Accessories**

No special accessory.

**Equipment Modifications**

No modification was made to the EUT tested.

**Support Equipment List and Details**

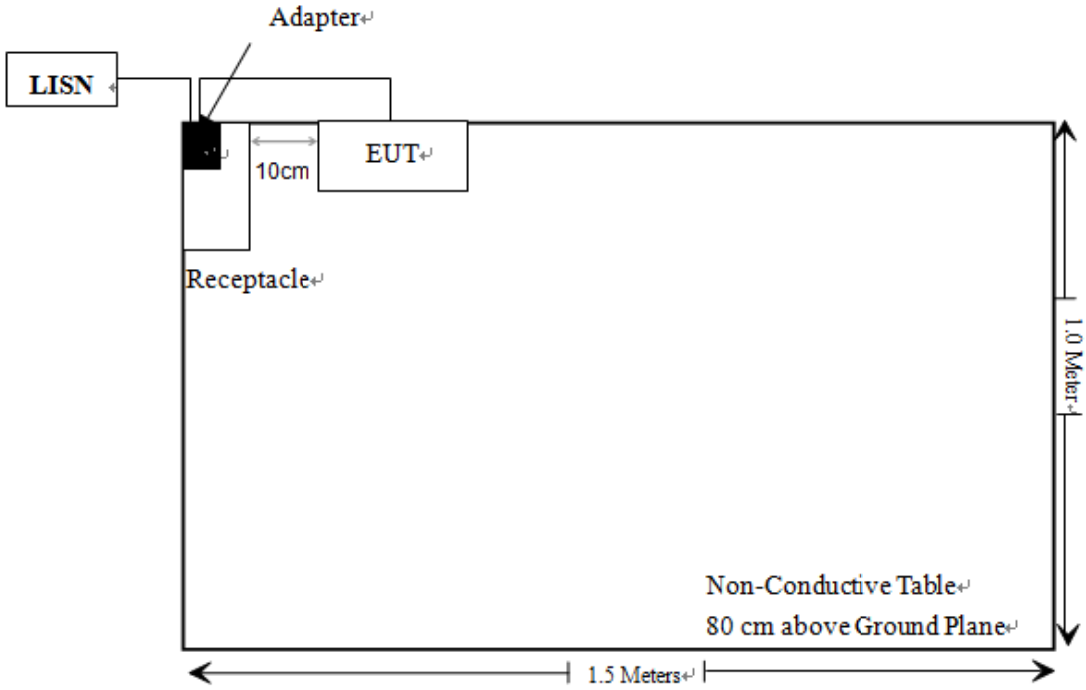
| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| BLU | Adapter | US-CR-2000 | Unknown |

**External I/O Cable**

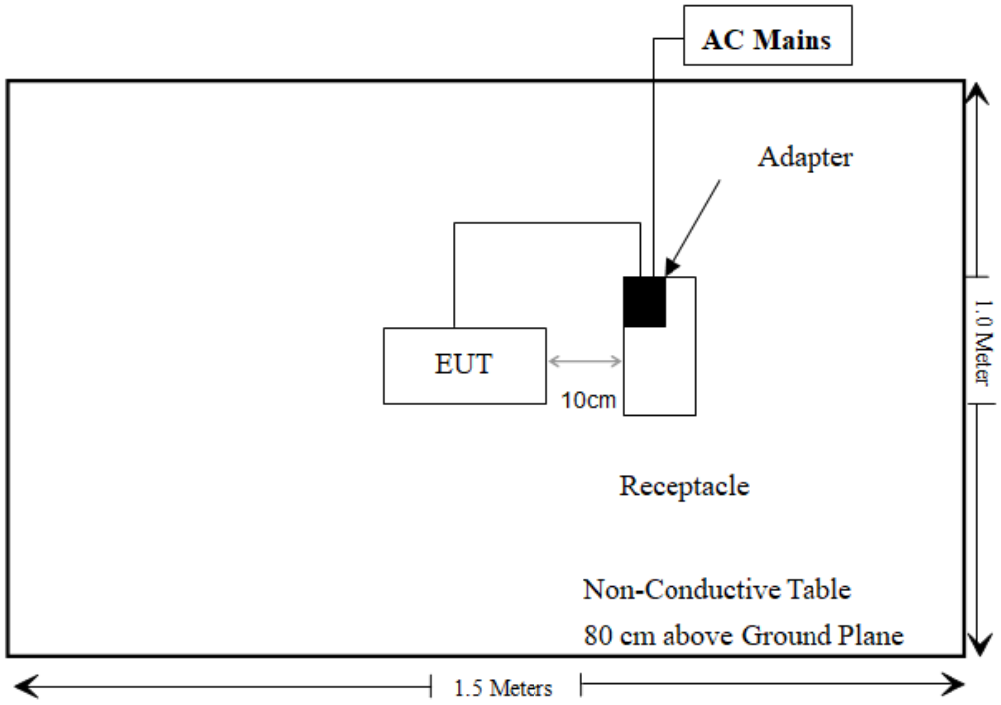
| Cable Description | Length (m) | From Port | To |
|---|---|---|---|
| Un-shielding Detachable USB Cable | 0.3 | EUT | Adapter |
| Un-shielding Un-Detachable AC Cable | 1.5 | Receptacle | AC Mains/LISN |

**Block Diagram of Test Setup**

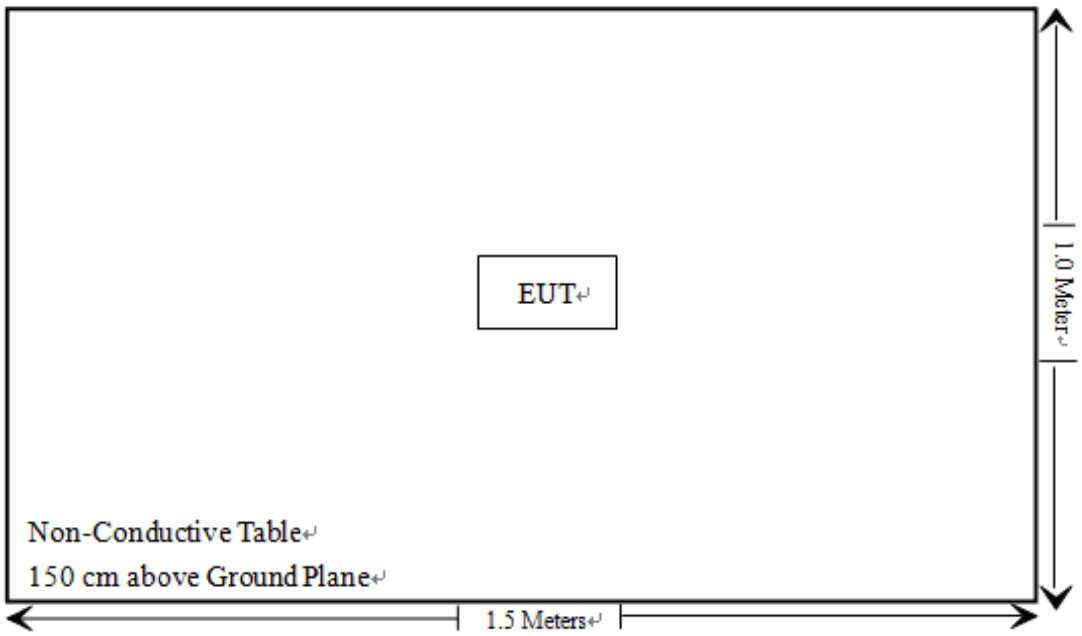
For Conducted Emissions:




For Radiated Emissions below 1GHz:



For Radiated Emissions above 1GHz:



# SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|---|---|---|
| §15.203 | Antenna Requirement | Compliant |
| FCC §15.207(a) | AC Line Conducted Emissions | Compliant |
| FCC §15.205,§15.209,§15.247(d) | Radiated Spurious Emission | Compliant |
| FCC §15.207(a)(2) | 6dB Emission Bandwidth | Compliant |
| FCC §15.247(b)(1) | Maximum Conducted Output Power | Compliant |
| FCC §15.247(d) | 100 kHz Bandwidth of Frequency Band Edge | Compliant |
| FCC §15.247(e) | Power Spectral Density | Compliant |
| ANSI C63.10-2013 §11.6 | Duty Cycle | / |
| §15.247 (i), §1.1307 (b) (1) & §2.1093 | RF Exposure | Compliant |

# TEST EQUIPMENT LIST

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| **Conducted Emission Test** | | | | | |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 101120 | 2024/01/16 | 2025/01/15 |
| Rohde & Schwarz | LISN | ENV216 | 101613 | 2024/01/16 | 2025/01/15 |
| Rohde & Schwarz | Transient Limiter | ESH3Z2 | DE25985 | 2024/05/21 | 2025/05/20 |
| Audix | EMI Test software | E3 | 191218(V9) | NCR | NCR |
| Unknown | CE Cable | Unknown | UF A210B-1-0720-504504 | 2024/05/21 | 2025/05/20 |
| **Radiated Emission Test** | | | | | |
| Rohde & Schwarz | EMI Test Receiver | ESR3 | 102455 | 2024/01/16 | 2025/01/15 |
| Sonoma instrument | Pre-amplifier | 310 N | 186238 | 2024/05/21 | 2025/05/20 |
| Sunol Sciences | Broadband Antenna | JB1 | A040904-1 | 2023/07/20 | 2026/07/19 |
| Unknown | Cable | Chamber A Cable 1 | N/A | 2024/06/18 | 2025/06/17 |
| 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 | 2024/05/21 | 2025/05/20 |
| Unknown | Cable | PNG214 | 1354 | 2024/05/21 | 2025/05/20 |
| Audix | EMI Test software | E3 | 19821b(V9) | NCR | NCR |
| Rohde & Schwarz | Spectrum Analyzer | FSV40 | 101605 | 2024/03/27 | 2025/03/26 |
| COM-POWER | Pre-amplifier | PA-122 | 181919 | 2024/06/18 | 2025/06/17 |
| The Electro-Mechanics Co. | Horn Antenna | 3115 | 9107-3694 | 2024/06/06 | 2027/06/05 |
| Unknown | RF Cable | KMSE | 735 | 2024/06/18 | 2025/06/17 |
| Unknown | RF Cable | UFA147 | 219661 | 2024/06/18 | 2025/06/17 |
| JD | Multiplex Switch Test Control Set | DT7220FSU | DQ77926 | 2024/06/18 | 2025/06/17 |
| A.H.System | Pre-amplifier | PAM-1840VH | 190 | 2024/06/18 | 2025/06/17 |
| Electro-Mechanics Co | Horn Antenna | 3116 | 2026 | 2023/09/18 | 2026/09/17 |
| UTIFLEX | RF Cable | NO. 13 | 232308-001 | 2024/06/18 | 2025/06/17 |
| Audix | EMI Test software | E3 | 191218(V9) | NCR | NCR |

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| **RF Conducted Test** | | | | | |
| ANRITSU | Microwave peak power sensor | MA24418A | 12622 | 2024/05/21 | 2025/05/20 |
| Rohde & Schwarz | Spectrum Analyzer | FSV40 | 101473 | 2024/01/16 | 2025/01/15 |
| 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).

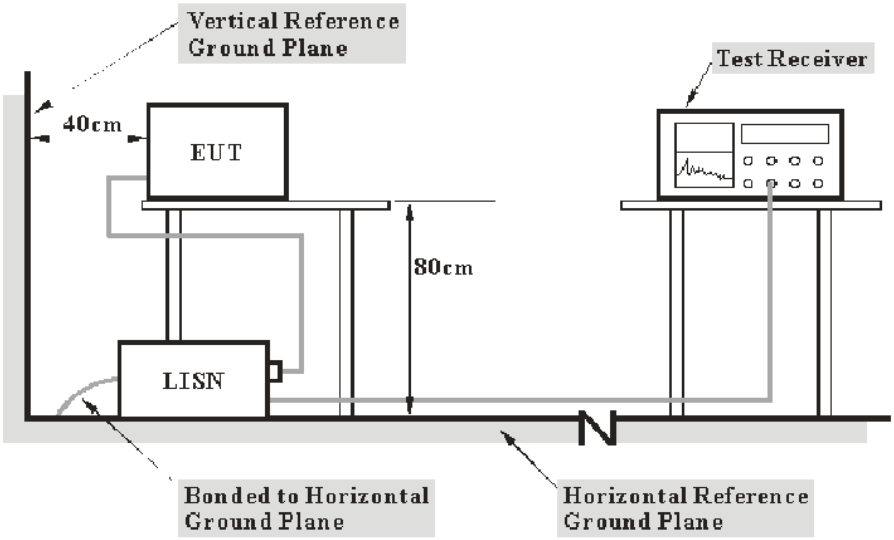
# REQUIREMENTS AND TEST PROCEDURES

## AC Line Conducted Emissions

### Applicable Standard

FCC§15.207

### EUT Setup




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

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

The spacing between the peripherals was 10 cm.

### 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 |

**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).

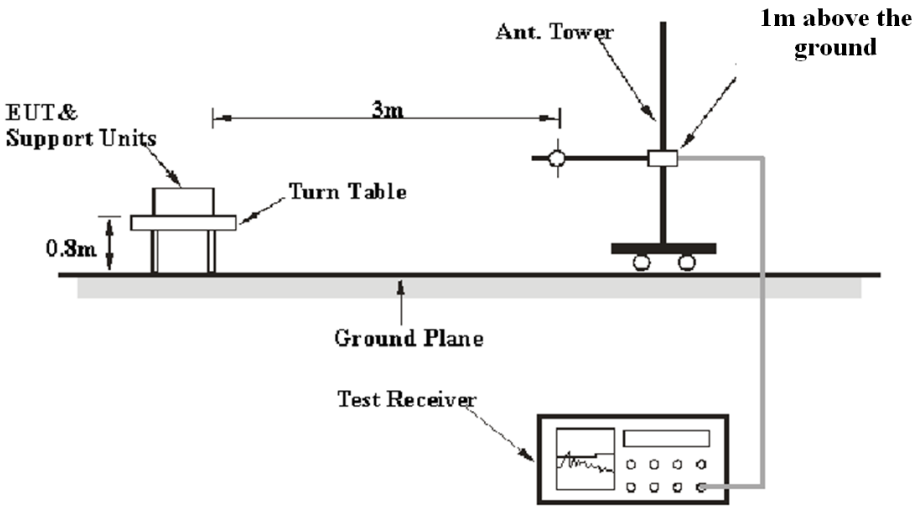
## Spurious Emissions

### Applicable Standard

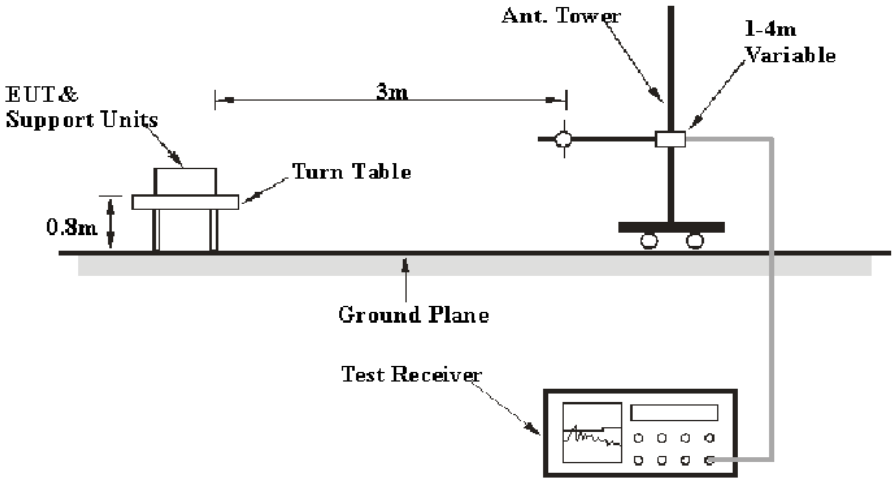
FCC §15.247 (d); §15.209; §15.205;

### EUT Setup

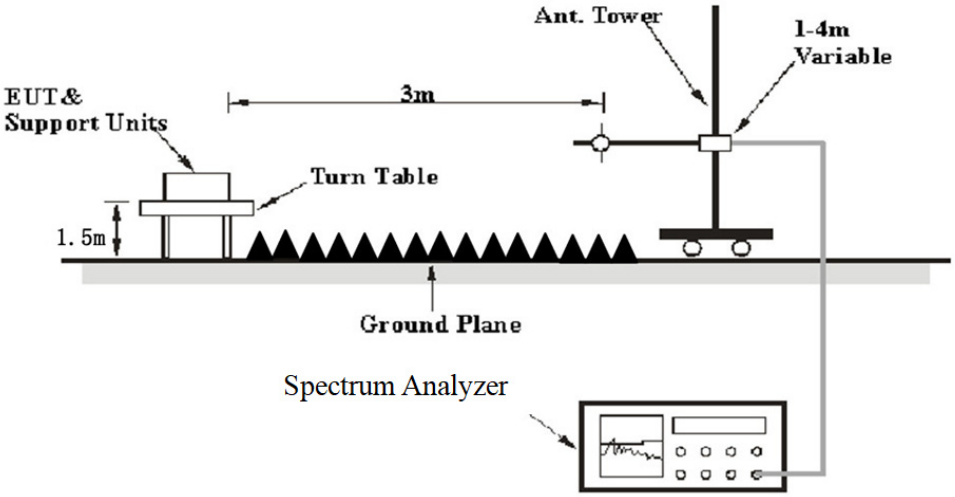
**9 kHz-30MHz:**




**30MHz-1GHz:**



**Above 1GHz:**




The radiated emission performed in the 3 meters, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, FCC 15.247 limits.

**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 |
|---|---|---|---|---|
| 9 kHz – 150 kHz | / | / | 200 Hz | QP |
| | 300 Hz | 1 kHz | / | PK |
| 150 kHz – 30 MHz | / | / | 9 kHz | QP |
| | 10 kHz | 30 kHz | / | PK |
| 30 MHz – 1000 MHz | / | / | 120 kHz | QP |
| | 100 kHz | 300 kHz | / | PK |

1-25GHz:

Pre-scan

| Measurement | Duty cycle | RBW | Video B/W |
|---|---|---|---|
| PK | Any | 1MHz | 3 MHz |
| AV | >98% | 1MHz | 5 kHz |
| | <98% | 1MHz | ≥1/Ton, not less than 5 kHz |

Final measurement for emission identified during pre-scan

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

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

## 6 dB Emission Bandwidth

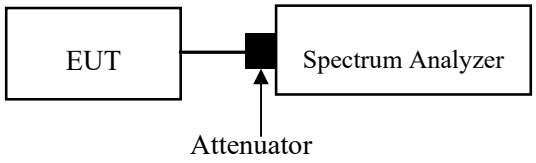
### Applicable Standard

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.

### Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.8.1

a) Set RBW = 100 kHz.
b) Set the VBW ≥ [3 × RBW].
c) Detector = peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by6 dB relative to the maximum level measured in the fundamental emission.



## Maximum Conducted Output Power

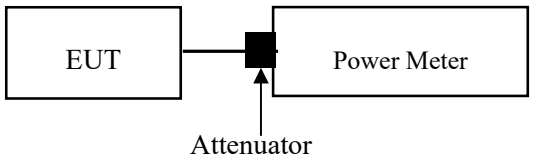
## Applicable Standard

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, 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.

## Test Procedure

Test method: ANSI C63.10-2013 clause 11.9.1.3 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.



## 100 kHz Bandwidth of Frequency Band Edge

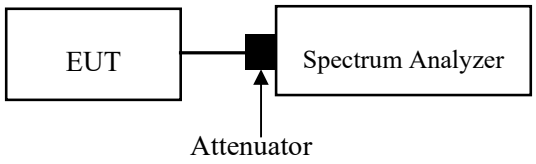
### Applicable Standard

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 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)).

### Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.11

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



## Power Spectral Density

### Applicable Standard

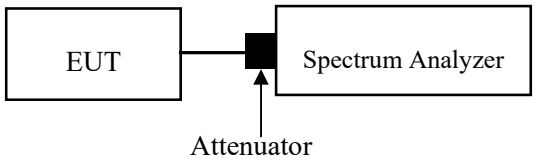
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of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

### Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.10.2

Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.

1. Set the RBW to: 3kHz≤ RBW≤100 kHz.
2. Set the VBW ≥ 3×RBW.
3. Set the span to 1.5 times the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level within the RBW.
9. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

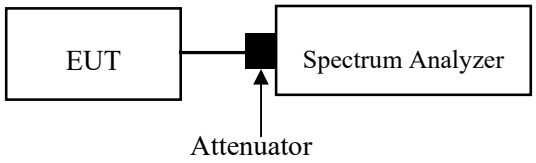


## Duty Cycle

### Test Procedure

According to ANSI C63.10-2013 Section 11.6

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



# ANTENNA REQUIREMENT

**Applicable Standard**

According to 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.

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.

**Antenna Connector Construction**

The EUT has one internal antenna arrangement which was permanently attached, the antenna gain[#] is 1.43dBi, fulfill the requirement of this section. Please refer to the EUT photos.

**Result: Compliant**

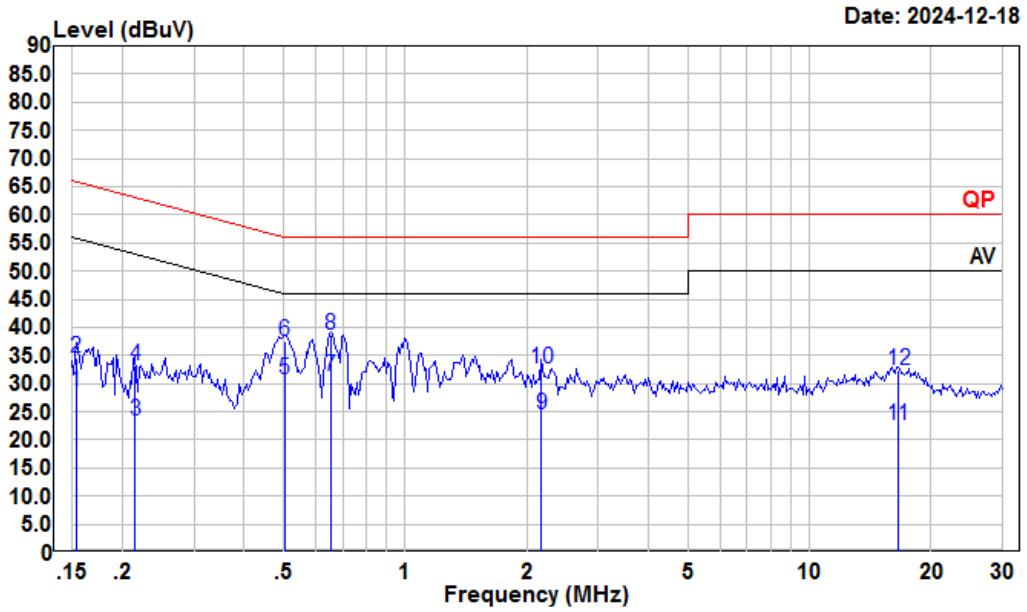
# TEST DATA AND RESULTS

## AC Line Conducted Emissions

### Environmental Conditions

| | | | |
|---|---|---|---|
| **Temperature (°C)** | 25 | **Relative Humidity (%)** | 60 |
| **ATM Pressure (kPa)** | 101 | **Test engineer** | Macy Shi |
| **Test date** | 2024/12/18 | | |
| **EUT operation mode** | Transmitting (Maximum output power mode, 802.11g High Channel) | | |

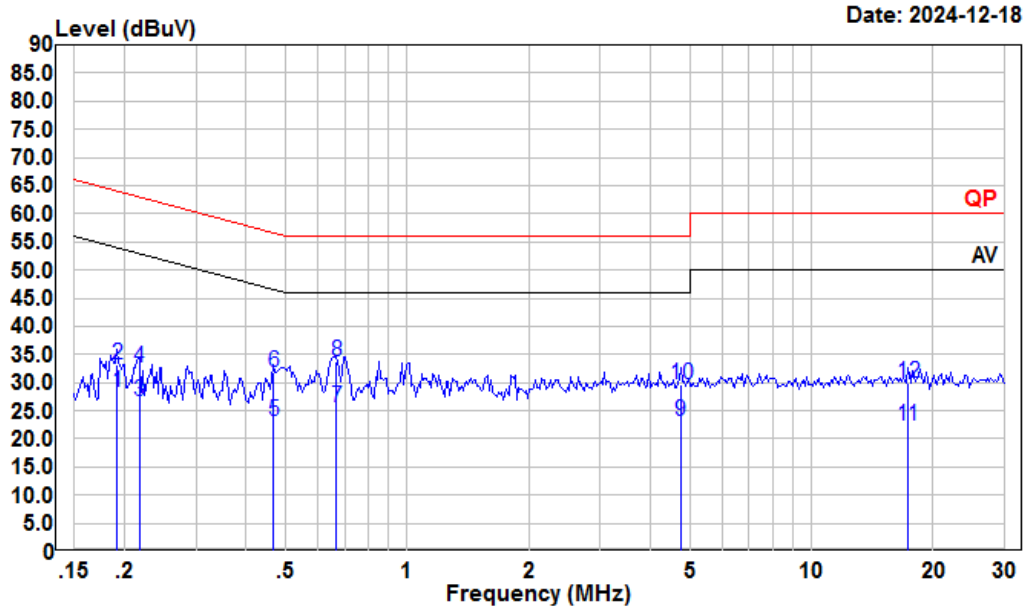
AC120V 60 Hz, Line




Condition: Line
Project : 2401U21148E-RF
tester : Macy.shi
Note : Transmitting
Detector : RBW:9KHz VBW:Auto SWT:Auto

| | Freq | Read Level | LISN Level | Cable Factor | Loss | limit\Climit\C | Over | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dB | | | |
| 1 | 0.153 | 7.41 | 28.43 | 10.89 | 10.13 | 55.82 | -27.39 | Average |
| 2 | 0.153 | 13.54 | 34.56 | 10.89 | 10.13 | 65.82 | -31.26 | QP |
| 3 | 0.215 | 2.61 | 23.48 | 10.78 | 10.09 | 53.01 | -29.53 | Average |
| 4 | 0.215 | 12.24 | 33.11 | 10.78 | 10.09 | 63.01 | -29.90 | QP |
| 5 | 0.502 | 10.12 | 30.76 | 10.50 | 10.14 | 46.00 | -15.24 | Average |
| 6 | 0.502 | 16.89 | 37.53 | 10.50 | 10.14 | 56.00 | -18.47 | QP |
| 7 | 0.654 | 10.62 | 31.26 | 10.50 | 10.14 | 46.00 | -14.74 | Average |
| 8 | 0.654 | 18.00 | 38.64 | 10.50 | 10.14 | 56.00 | -17.36 | QP |
| 9 | 2.167 | 3.68 | 24.43 | 10.57 | 10.18 | 46.00 | -21.57 | Average |
| 10 | 2.167 | 11.82 | 32.57 | 10.57 | 10.18 | 56.00 | -23.43 | QP |
| 11 | 16.573 | 1.73 | 22.63 | 10.70 | 10.20 | 50.00 | -27.37 | Average |
| 12 | 16.573 | 11.52 | 32.42 | 10.70 | 10.20 | 60.00 | -27.58 | QP |

AC120V 60 Hz, Neutral




Condition: Neutral
Project : 2401U21148E-RF
tester : Macy.shi
Note : Transmitting
Detector : RBW:9KHz VBW:Auto SWT:Auto

| | Freq | Read Level | LISN Level | Cable Factor | Loss | limit\C | limit\C | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dB | | | |
| 1 | 0.191 | 7.67 | 28.19 | 10.43 | 10.09 | 53.98 | -25.79 | Average |
| 2 | 0.191 | 12.58 | 33.10 | 10.43 | 10.09 | 63.98 | -30.88 | QP |
| 3 | 0.217 | 6.15 | 26.67 | 10.43 | 10.09 | 52.92 | -26.25 | Average |
| 4 | 0.217 | 12.06 | 32.58 | 10.43 | 10.09 | 62.92 | -30.34 | QP |
| 5 | 0.466 | 2.22 | 23.03 | 10.68 | 10.13 | 46.58 | -23.55 | Average |
| 6 | 0.466 | 11.09 | 31.90 | 10.68 | 10.13 | 56.58 | -24.68 | QP |
| 7 | 0.668 | 4.73 | 25.57 | 10.70 | 10.14 | 46.00 | -20.43 | Average |
| 8 | 0.668 | 13.00 | 33.84 | 10.70 | 10.14 | 56.00 | -22.16 | QP |
| 9 | 4.746 | 2.45 | 23.13 | 10.49 | 10.19 | 46.00 | -22.87 | Average |
| 10 | 4.746 | 9.05 | 29.73 | 10.49 | 10.19 | 56.00 | -26.27 | QP |
| 11 | 17.291 | 1.29 | 22.24 | 10.75 | 10.20 | 50.00 | -27.76 | Average |
| 12 | 17.291 | 8.86 | 29.81 | 10.75 | 10.20 | 60.00 | -30.19 | QP |

## Spurious Emissions

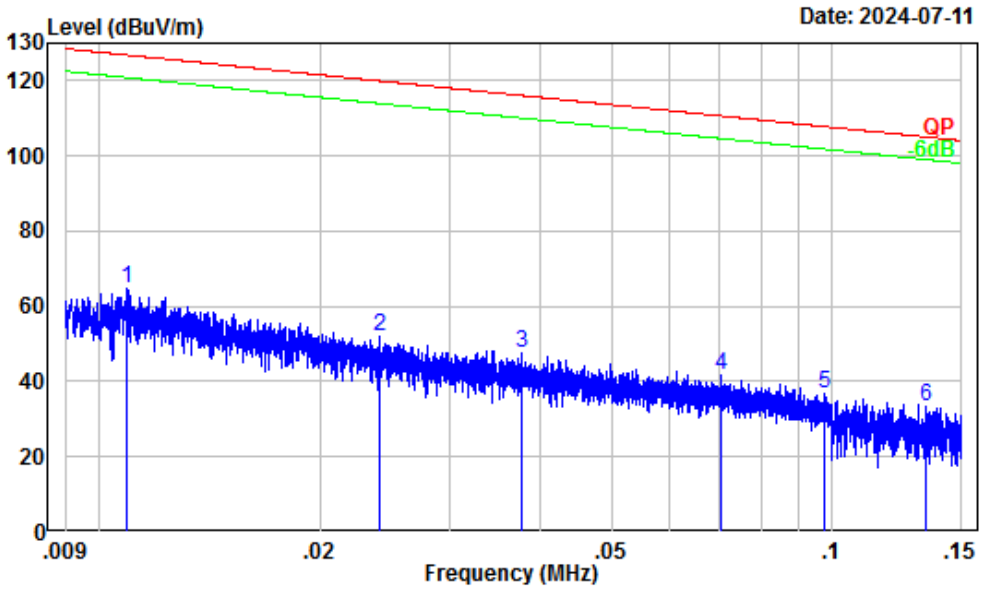
### Environmental Conditions

| | | | |
|---|---|---|---|
| **Temperature (℃)** | 25~28 | **Relative Humidity (%)** | 50~55 |
| **ATM Pressure (kPa):** | 101 | **Test engineer:** | Anson Su&Dylan Yang |
| **Test date:** | 2024/7/11-2024/11/28 | | |
| **EUT operation mode:** | Below 1GHz: Transmitting (Maximum output power mode, 802.11g High Channel)<br>Above 1GHz: Transmitting | | |
| **Note:** | After pre-scan in the X, Y and Z axes of orientation, the worst case y-axis of orientation were recorded.<br>For 9 kHz-30MHz, When the test result of peak was less than the limit of QP/Average more than 6dB, just peak value were recorded. | | |

**Below 1GHz:**

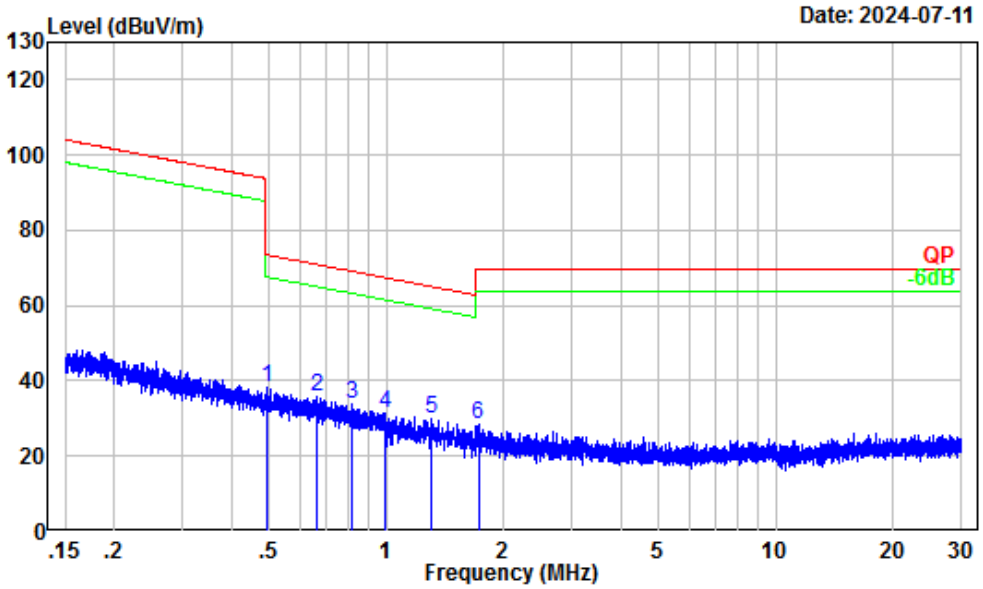
**9 kHz-30MHz:**

Parallel (worst case)




Site : Chamber A
Condition : 3m
Project Number: 2401U21148E-RF
Test Mode : 2.4G WIFI
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 | 37.22 | 27.30 | 64.52 | 126.84 | -62.32 | Peak |
| 2 | 0.02 | 30.47 | 21.30 | 51.77 | 119.95 | -68.18 | Peak |
| 3 | 0.04 | 25.77 | 21.82 | 47.59 | 116.07 | -68.48 | Peak |
| 4 | 0.07 | 20.29 | 21.63 | 41.92 | 110.63 | -68.71 | Peak |
| 5 | 0.10 | 17.30 | 19.62 | 36.92 | 107.82 | -70.90 | Peak |
| 6 | 0.13 | 15.45 | 17.88 | 33.33 | 105.04 | -71.71 | Peak |

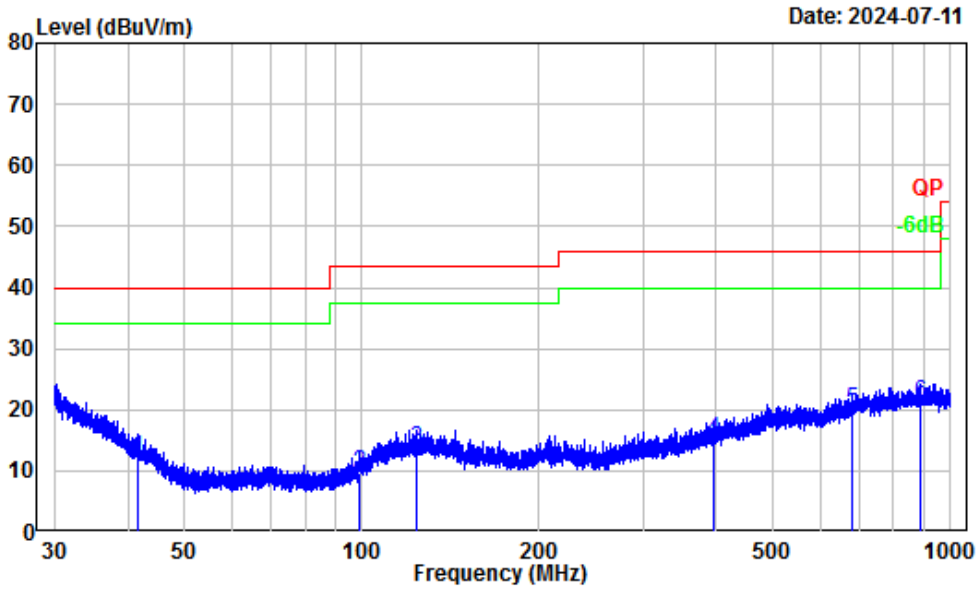



Site : Chamber A
Condition : 3m
Project Number: 2401U21148E-RF
Test Mode : 2.4G WIFI
Tester : Anson Su

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 0.50 | 3.58 | 34.55 | 38.13 | 73.70 | -35.57 | Peak |
| 2 | 0.67 | 1.49 | 34.10 | 35.59 | 71.08 | -35.49 | Peak |
| 3 | 0.82 | -0.26 | 33.87 | 33.61 | 69.23 | -35.62 | Peak |
| 4 | 1.00 | -1.56 | 33.16 | 31.60 | 67.51 | -35.91 | Peak |
| 5 | 1.30 | -2.64 | 32.60 | 29.96 | 65.13 | -35.17 | Peak |
| 6 | 1.72 | -4.11 | 32.37 | 28.26 | 69.54 | -41.28 | Peak |

**30MHz-1GHz:**

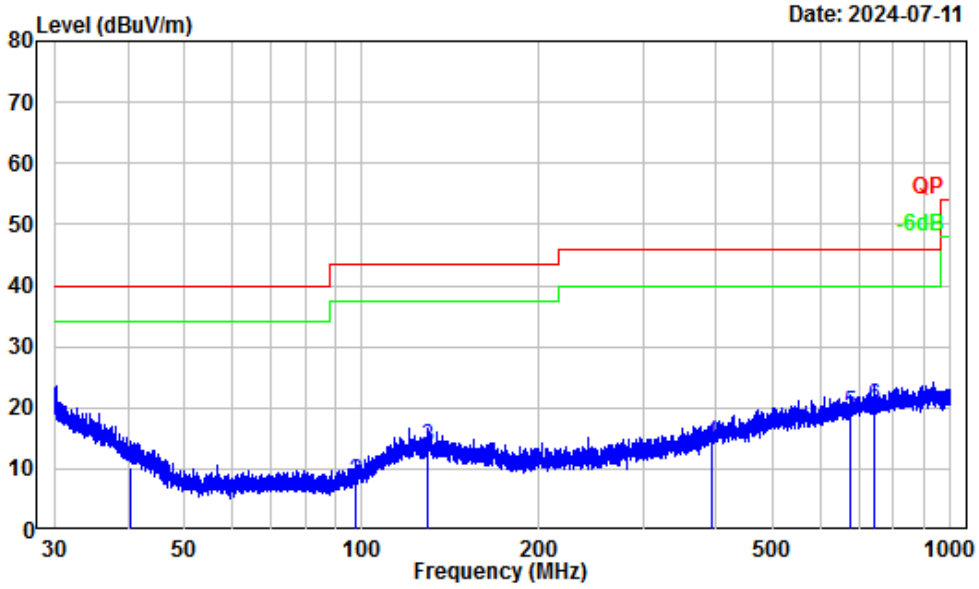
Horizontal




Site : Chamber A
Condition : 3m Horizontal
Project Number: 2401U21148E-RF
Test Mode : 2.4G WIFI
Tester : Anson Su

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 41.75 | -12.63 | 24.70 | 12.07 | 40.00 | -27.93 | QP |
| 2 | 98.70 | -15.78 | 25.58 | 9.80 | 43.50 | -33.70 | QP |
| 3 | 123.54 | -12.26 | 25.81 | 13.55 | 43.50 | -29.95 | QP |
| 4 | 397.29 | -10.67 | 25.82 | 15.15 | 46.00 | -30.85 | QP |
| 5 | 682.05 | -6.36 | 26.17 | 19.81 | 46.00 | -26.19 | QP |
| 6 | 888.00 | -4.52 | 25.56 | 21.04 | 46.00 | -24.96 | QP |

Vertical




Site : Chamber A
Condition : 3m Vertical
Project Number: 2401U21148E-RF
Test Mode : 2.4G WIFI
Tester : Anson Su

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 40.56 | -13.33 | 23.69 | 10.36 | 40.00 | -29.64 | QP |
| 2 | 97.33 | -17.45 | 25.27 | 7.82 | 43.50 | -35.68 | QP |
| 3 | 129.70 | -12.57 | 26.04 | 13.47 | 43.50 | -30.03 | QP |
| 4 | 394.51 | -10.95 | 25.24 | 14.29 | 46.00 | -31.71 | QP |
| 5 | 674.03 | -6.86 | 26.02 | 19.16 | 46.00 | -26.84 | QP |
| 6 | 744.54 | -6.10 | 26.45 | 20.35 | 46.00 | -25.65 | QP |

**Above 1GHz:**

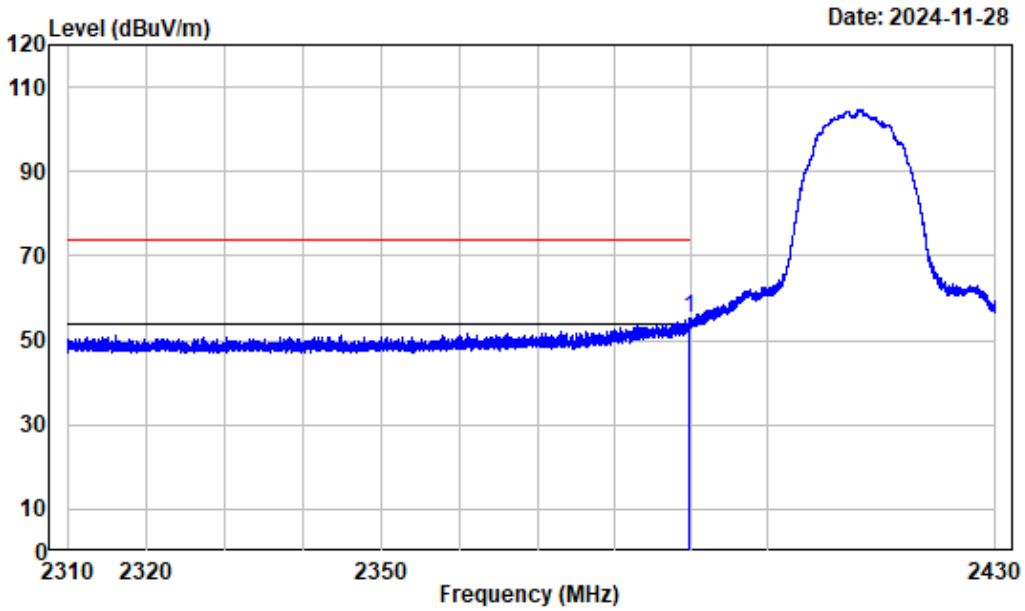
| Frequency (MHz) | Receiver | | Polar (H/V) | Factor (dB/m) | Corrected Amplitude (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| | Reading (dBµV) | PK/Ave | | | | | |
| **802.11b** | | | | | | | |
| Low Channel | | | | | | | |
| 4824 | 47.39 | PK | H | 2.45 | 49.84 | 74 | -24.16 |
| 4824 | 35.47 | AV | H | 2.45 | 37.92 | 54 | -16.08 |
| 4824 | 46.75 | PK | V | 2.45 | 49.2 | 74 | -24.8 |
| 4824 | 34.46 | AV | V | 2.45 | 36.91 | 54 | -17.09 |
| Middle Channel | | | | | | | |
| 4874 | 47.64 | PK | H | 2.56 | 50.2 | 74 | -23.8 |
| 4874 | 36.19 | AV | H | 2.56 | 38.75 | 54 | -15.25 |
| 4874 | 47.08 | PK | V | 2.56 | 49.64 | 74 | -24.36 |
| 4874 | 34.66 | AV | V | 2.56 | 37.22 | 54 | -16.78 |
| High Channel | | | | | | | |
| 4924 | 53.12 | PK | H | 2.63 | 55.75 | 74 | -18.25 |
| 4924 | 45.32 | AV | H | 2.63 | 47.95 | 54 | -6.05 |
| 4924 | 51.62 | PK | V | 2.63 | 54.25 | 74 | -19.75 |
| 4924 | 42.33 | AV | V | 2.63 | 44.96 | 54 | -9.04 |
| **802.11g** | | | | | | | |
| Low Channel | | | | | | | |
| 4824 | 54.92 | PK | H | 2.45 | 57.37 | 74 | -16.63 |
| 4824 | 38.87 | AV | H | 2.45 | 41.32 | 54 | -12.68 |
| 4824 | 52.86 | PK | V | 2.45 | 55.31 | 74 | -18.69 |
| 4824 | 37.86 | AV | V | 2.45 | 40.31 | 54 | -13.69 |
| Middle Channel | | | | | | | |
| 4874 | 53.85 | PK | H | 2.56 | 56.41 | 74 | -17.59 |
| 4874 | 37.46 | AV | H | 2.56 | 40.02 | 54 | -13.98 |
| 4874 | 51.27 | PK | V | 2.56 | 53.83 | 74 | -20.17 |
| 4874 | 36.91 | AV | V | 2.56 | 39.47 | 54 | -14.53 |
| High Channel | | | | | | | |
| 4924 | 52.96 | PK | H | 2.63 | 55.59 | 74 | -18.41 |
| 4924 | 37.33 | AV | H | 2.63 | 39.96 | 54 | -14.04 |
| 4924 | 50.84 | PK | V | 2.63 | 53.47 | 74 | -20.53 |
| 4924 | 36.12 | AV | V | 2.63 | 38.75 | 54 | -15.25 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **802.11n20** | | | | | | | |
| Low Channel | | | | | | | |
| 4824 | 50.55 | PK | H | 2.45 | 53 | 74 | -21 |
| 4824 | 36.33 | AV | H | 2.45 | 38.78 | 54 | -15.22 |
| 4824 | 49.65 | PK | V | 2.45 | 52.1 | 74 | -21.9 |
| 4824 | 35.81 | AV | V | 2.45 | 38.26 | 54 | -15.74 |
| Middle Channel | | | | | | | |
| 4874 | 51.03 | PK | H | 2.56 | 53.59 | 74 | -20.41 |
| 4874 | 36.45 | AV | H | 2.56 | 39.01 | 54 | -14.99 |
| 4874 | 50.31 | PK | V | 2.56 | 52.87 | 74 | -21.13 |
| 4874 | 36.58 | AV | V | 2.56 | 39.14 | 54 | -14.86 |
| High Channel | | | | | | | |
| 4924 | 60.91 | PK | H | 2.63 | 63.54 | 74 | -10.46 |
| 4924 | 46.48 | AV | H | 2.63 | 49.11 | 54 | -4.89 |
| 4924 | 59.32 | PK | V | 2.63 | 61.95 | 74 | -12.05 |
| 4924 | 46.21 | AV | V | 2.63 | 48.84 | 54 | -5.16 |
| **802.11n40** | | | | | | | |
| Low Channel | | | | | | | |
| 4844 | 49.79 | PK | H | 2.47 | 52.26 | 74 | -21.74 |
| 4844 | 36.59 | AV | H | 2.47 | 39.06 | 54 | -14.94 |
| 4844 | 48.76 | PK | V | 2.47 | 51.23 | 74 | -22.77 |
| 4844 | 35.42 | AV | V | 2.47 | 37.89 | 54 | -16.11 |
| Middle Channel | | | | | | | |
| 4874 | 50.13 | PK | H | 2.56 | 52.69 | 74 | -21.31 |
| 4874 | 36.65 | AV | H | 2.56 | 39.21 | 54 | -14.79 |
| 4874 | 48.95 | PK | V | 2.56 | 51.51 | 74 | -22.49 |
| 4874 | 35.73 | AV | V | 2.56 | 38.29 | 54 | -15.71 |
| High Channel | | | | | | | |
| 4904 | 55.85 | PK | H | 2.64 | 58.49 | 74 | -15.51 |
| 4904 | 42.96 | AV | H | 2.64 | 45.6 | 54 | -8.4 |
| 4904 | 54.82 | PK | V | 2.64 | 57.46 | 74 | -16.54 |
| 4904 | 41.78 | AV | V | 2.64 | 44.42 | 54 | -9.58 |

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.

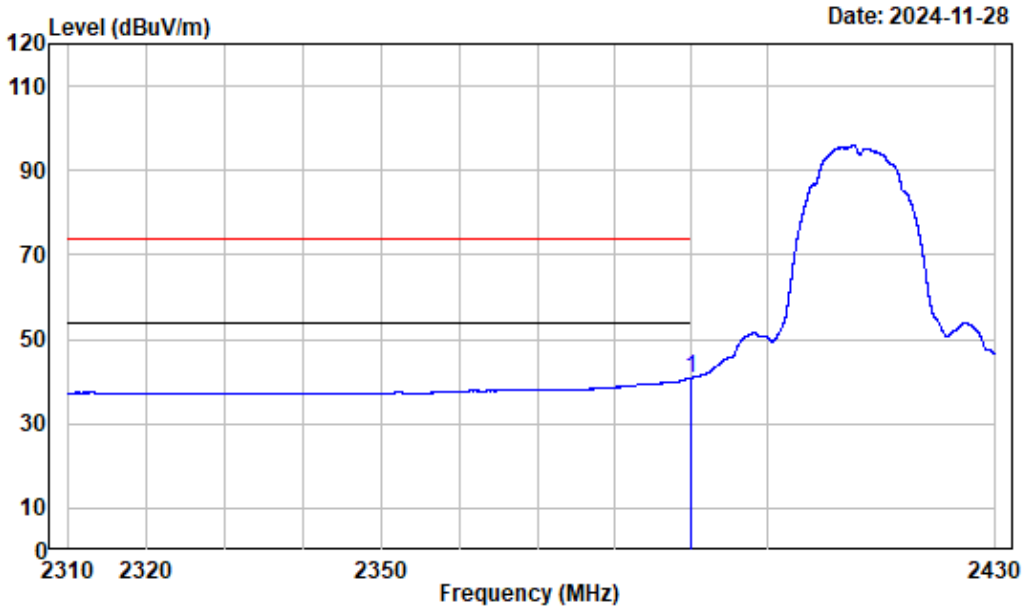
**Test plots**

802.11b



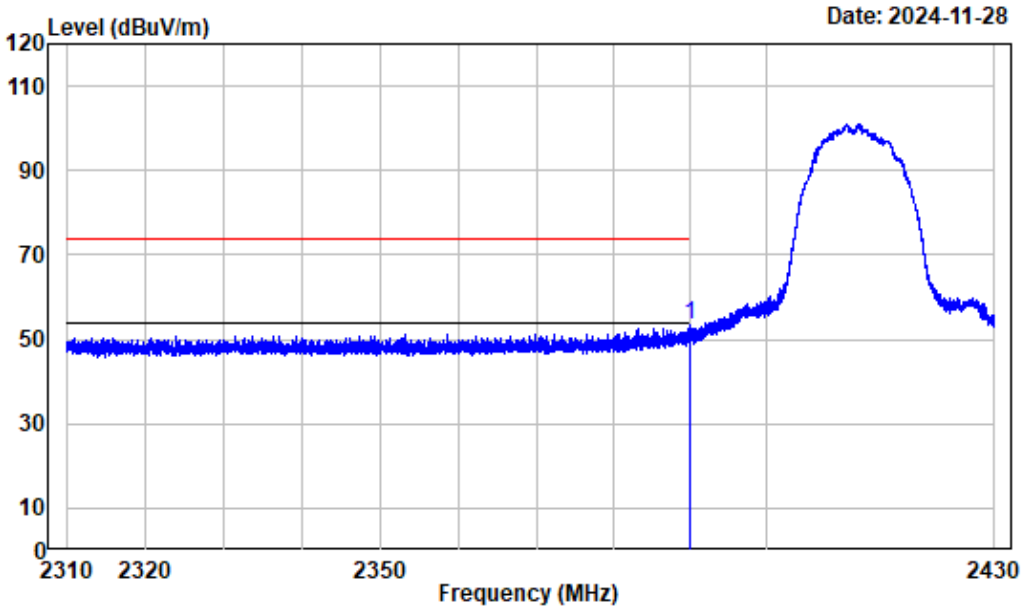

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11B_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2389.750 | -3.20 | 58.33 | 55.13 | 74.00 | -18.87 | peak |



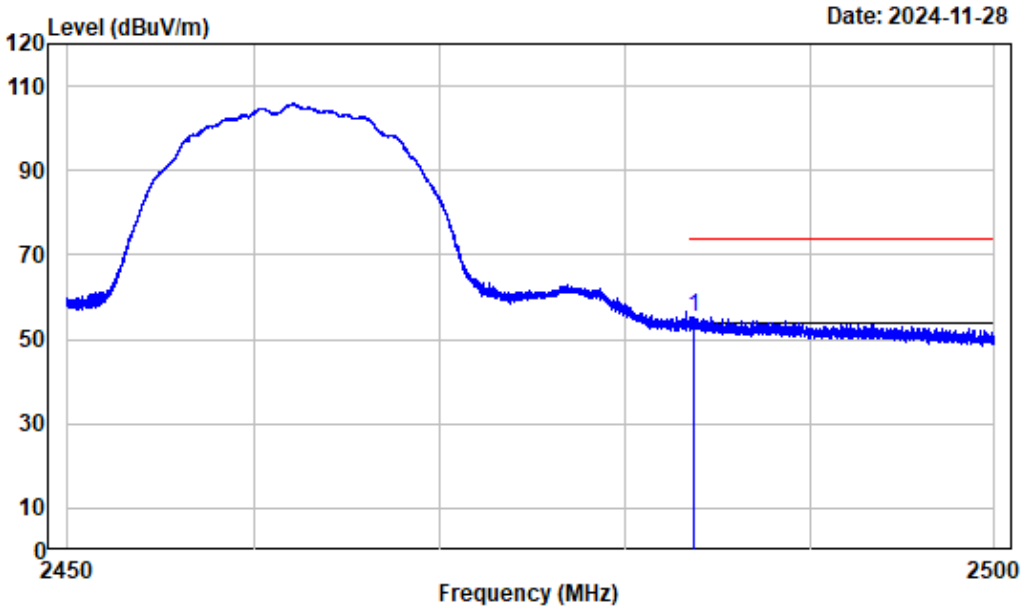

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:10Hz Detector:Peak
Note : 802.11B_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2390.000 | -3.20 | 44.11 | 40.91 | 54.00 | -13.09 | Average |



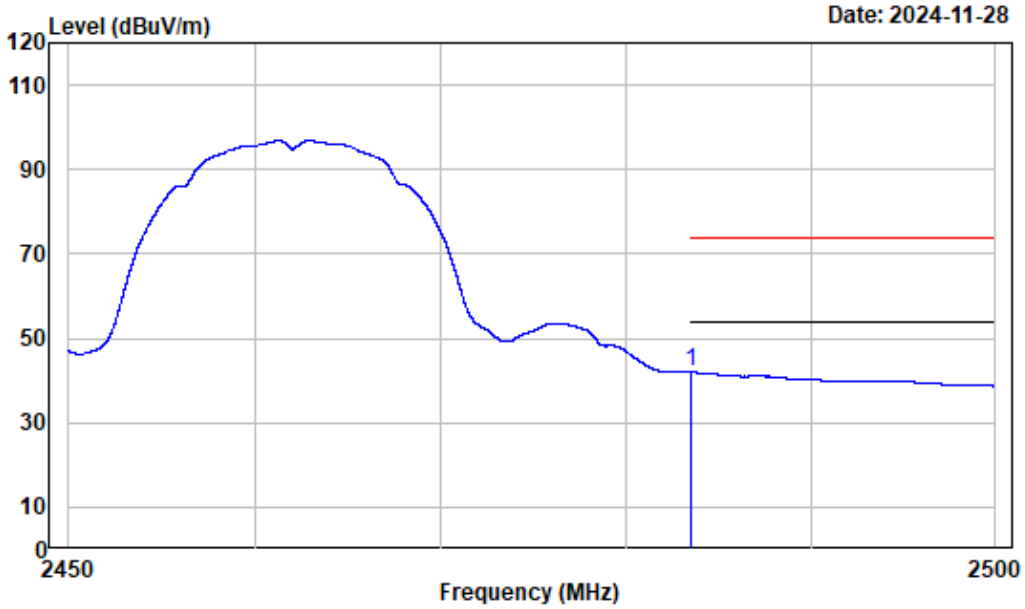

Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11B_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2390.000 | -3.20 | 56.53 | 53.33 | 74.00 | -20.67 | Peak |



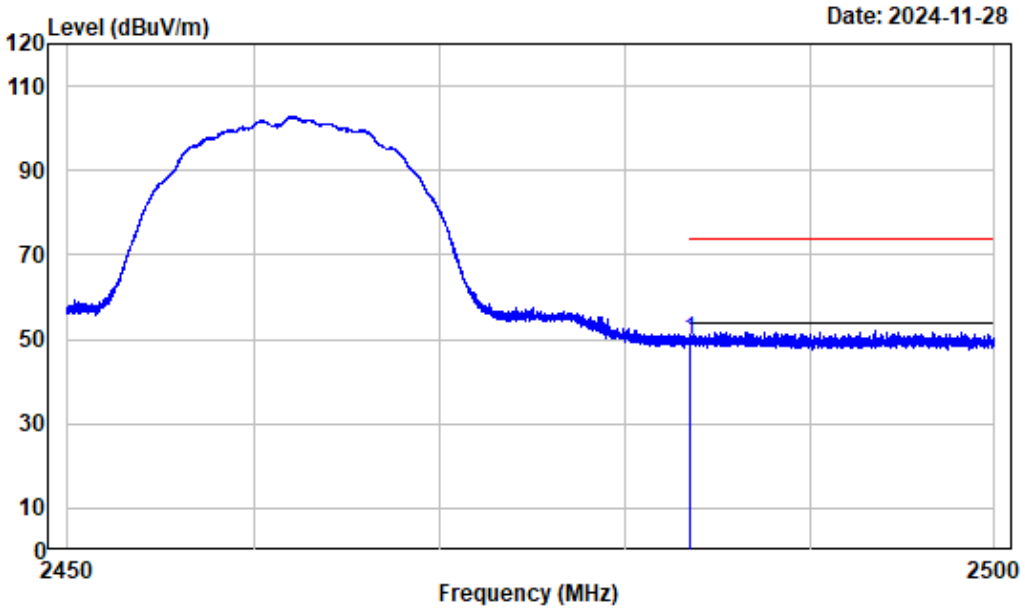

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11B_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.698 | -3.17 | 58.50 | 55.33 | 74.00 | -18.67 | peak |




Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:10Hz Detector:Peak
Note : 802.11B_2462

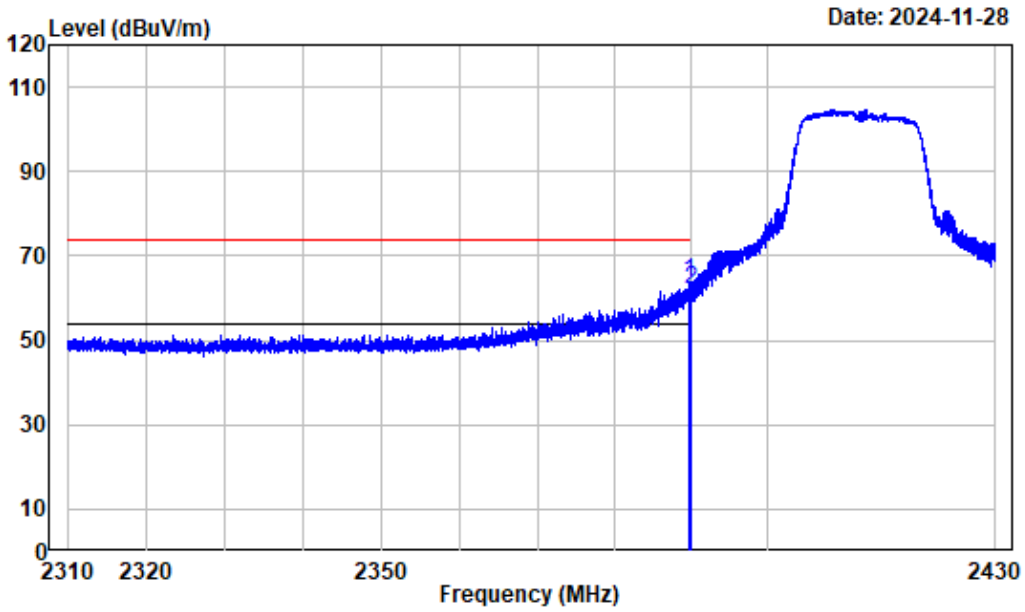
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 45.20 | 42.03 | 54.00 | -11.97 | Average |




Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11B_2462

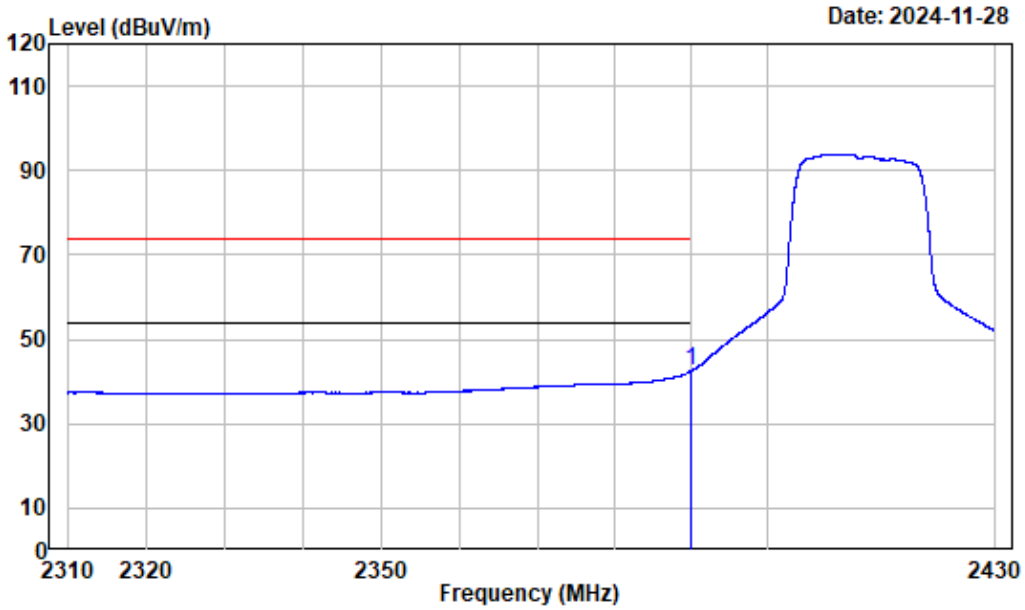
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 52.88 | 49.71 | 74.00 | -24.29 | Peak |

802.11g



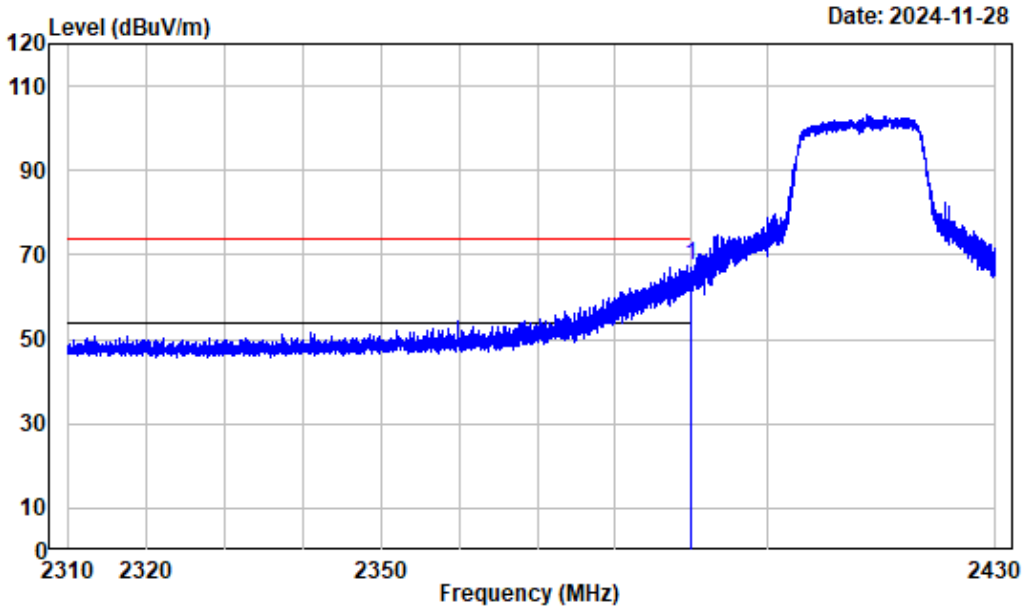

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11G_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2389.645 | -3.20 | 67.06 | 63.86 | 74.00 | -10.14 | peak |
| 2 | 2390.000 | -3.20 | 65.27 | 62.07 | 74.00 | -11.93 | Peak |



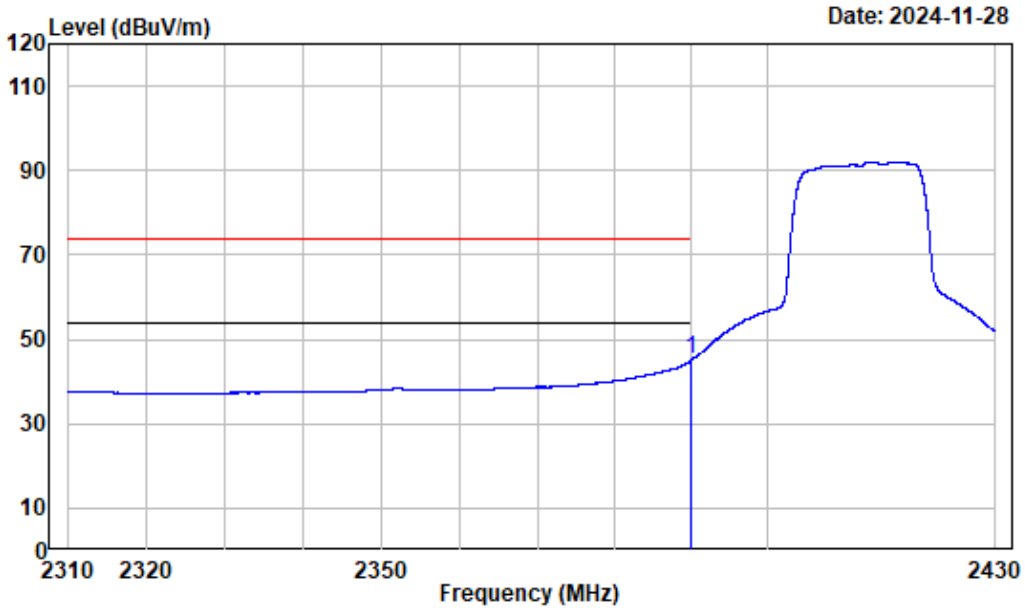

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:10Hz Detector:Peak
Note : 802.11G_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2390.000 | -3.20 | 45.70 | 42.50 | 54.00 | -11.50 | Average |



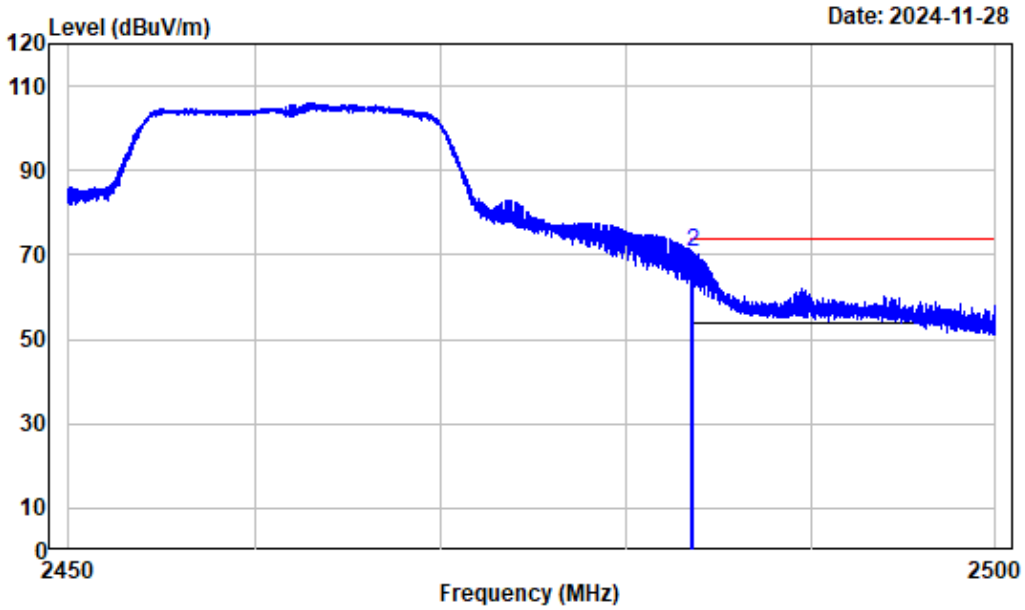

Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11G_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2390.000 | -3.20 | 70.65 | 67.45 | 74.00 | -6.55 | Peak |



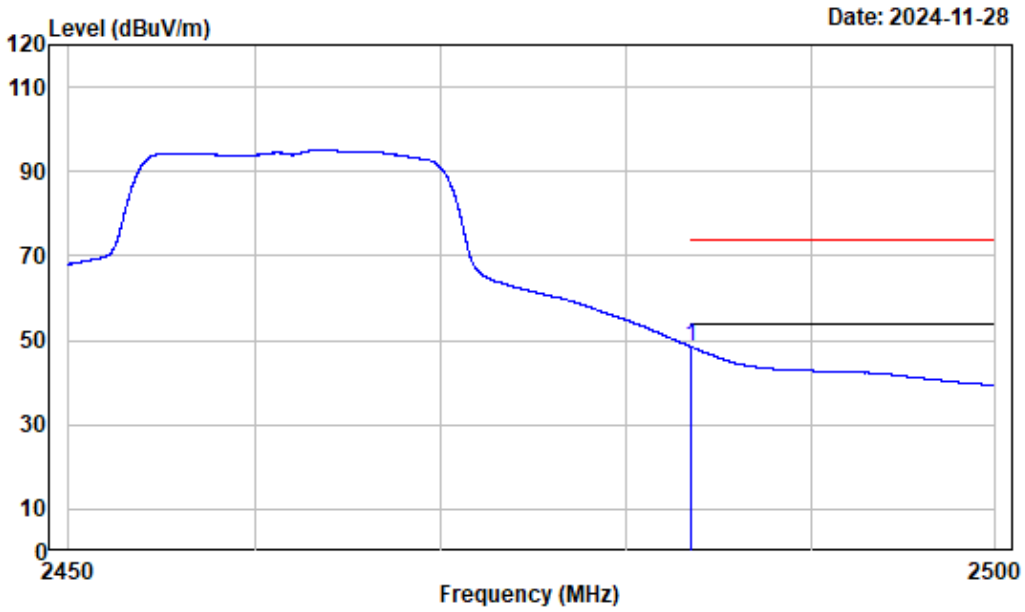

Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:10Hz Detector:Peak
Note : 802.11G_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2390.000 | -3.20 | 48.32 | 45.12 | 54.00 | -8.88 | Average |



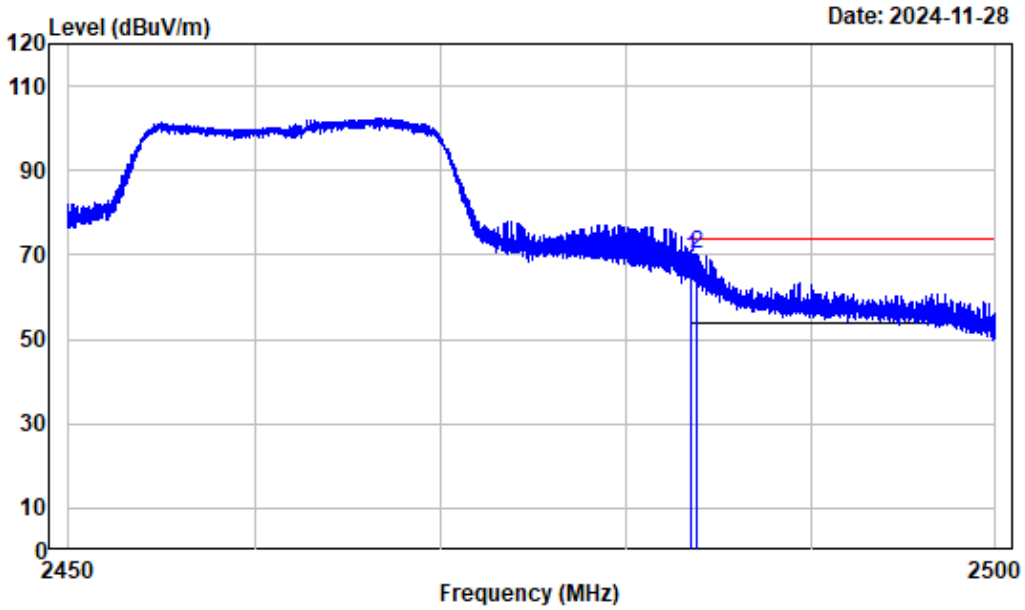

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11G_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 67.08 | 63.91 | 74.00 | -10.09 | Peak |
| 2 | 2483.579 | -3.17 | 73.63 | 70.46 | 74.00 | -3.54 | peak |



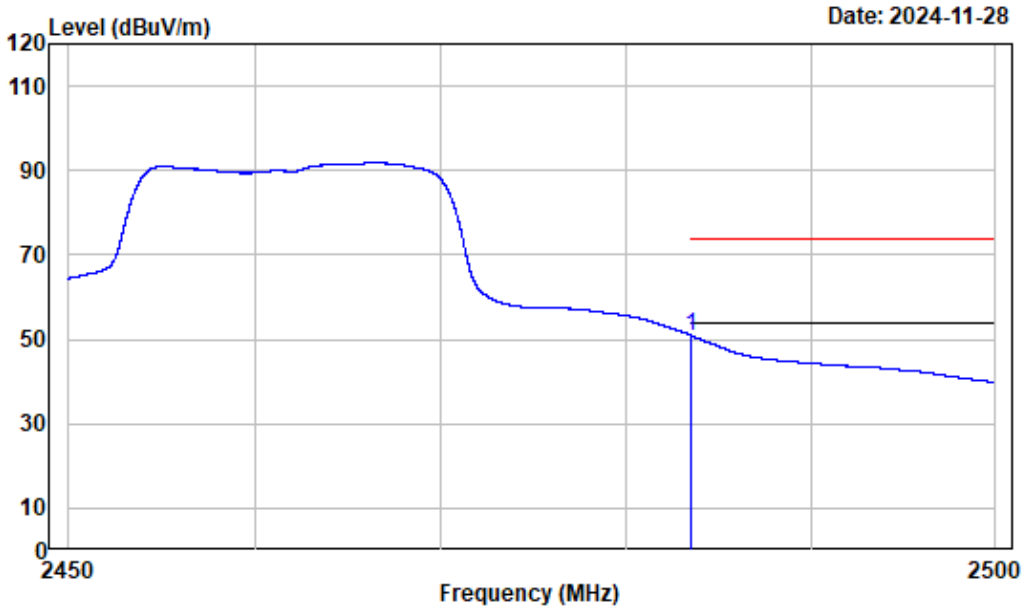

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:10Hz Detector:Peak
Note : 802.11G_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 51.64 | 48.47 | 54.00 | -5.53 | Average |




Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11G_2462

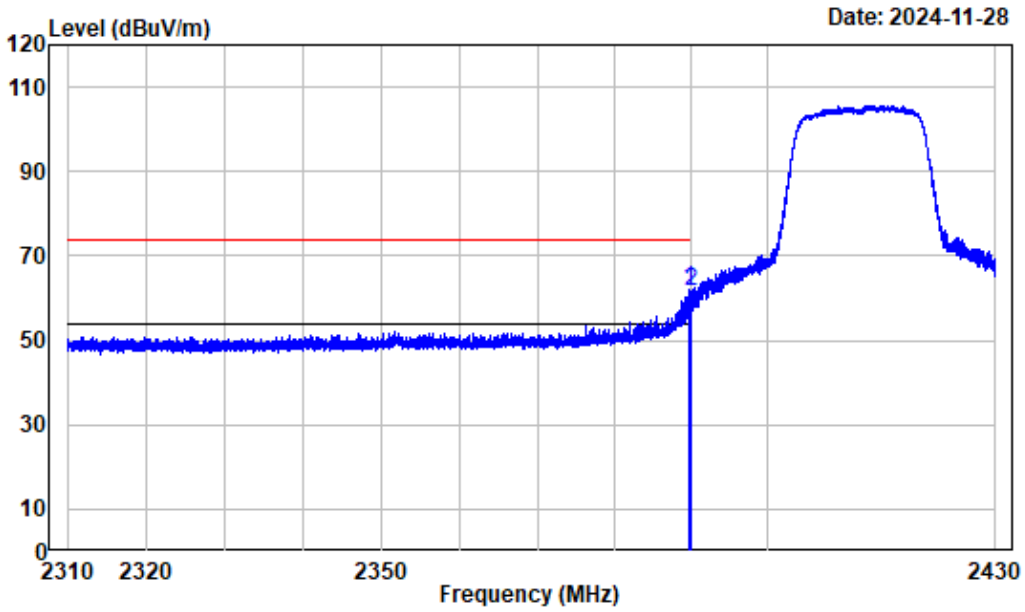
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 72.45 | 69.28 | 74.00 | -4.72 | Peak |
| 2 | 2483.811 | -3.17 | 73.57 | 70.40 | 74.00 | -3.60 | Peak |




Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:10Hz Detector:Peak
Note : 802.11G_2462

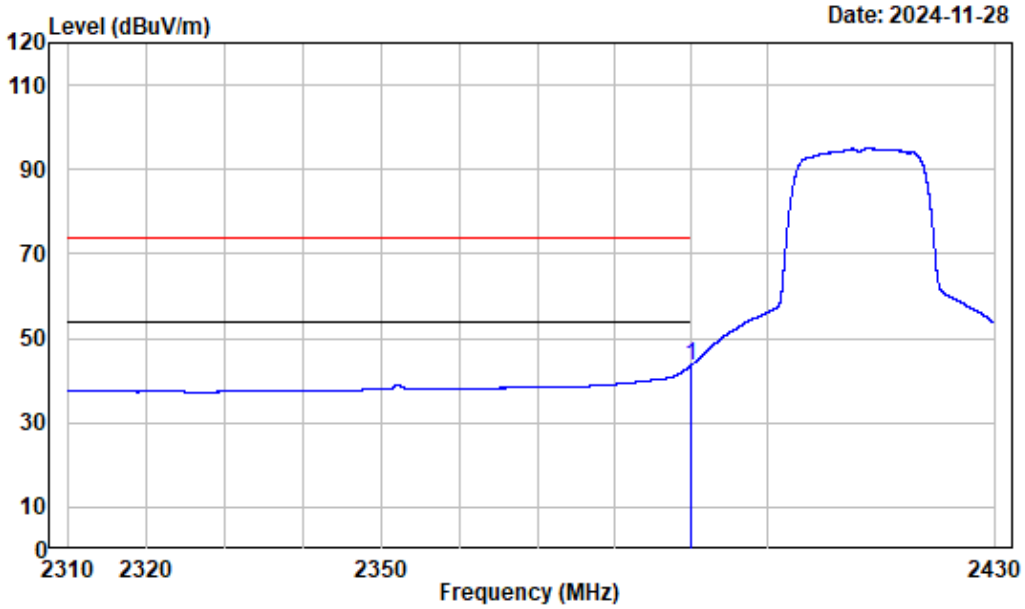
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 54.07 | 50.90 | 54.00 | -3.10 | Average |

802.11n20



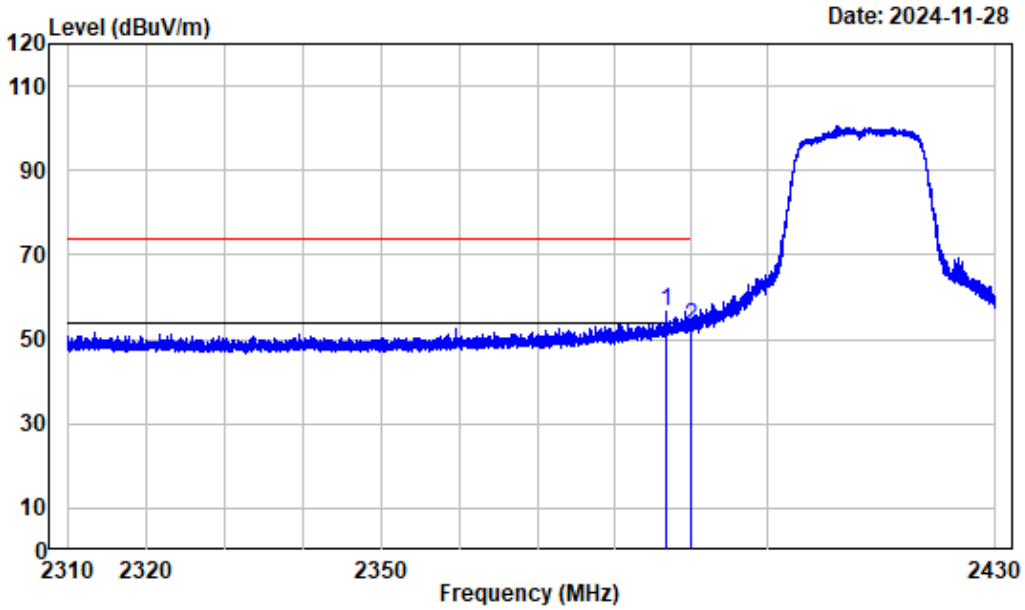

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11N20_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2389.810 | -3.20 | 65.25 | 62.05 | 74.00 | -11.95 | peak |
| 2 | 2390.000 | -3.20 | 64.78 | 61.58 | 74.00 | -12.42 | Peak |



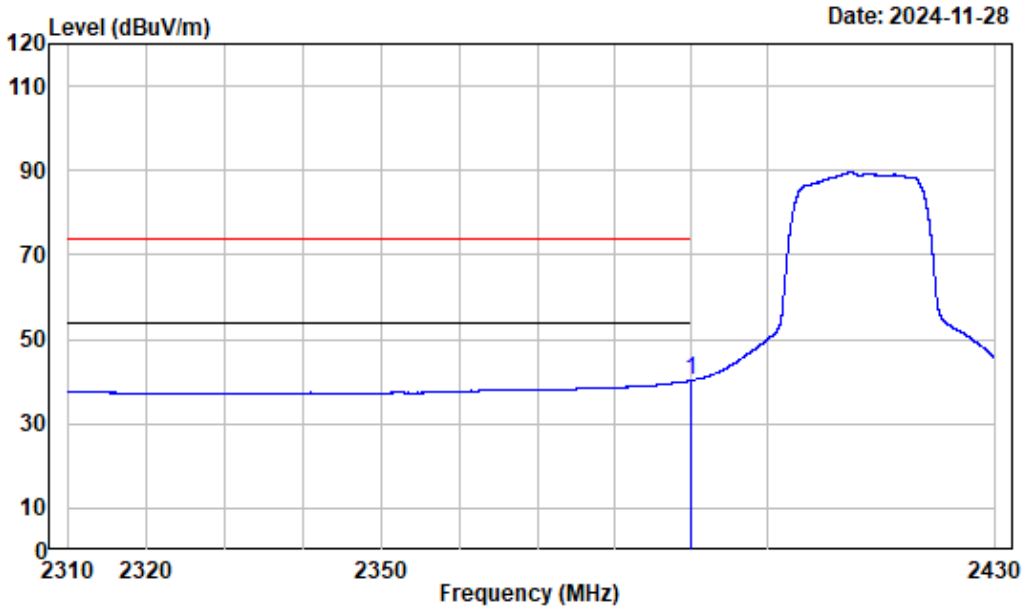

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:10Hz Detector:Peak
Note : 802.11N20_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2390.000 | -3.20 | 46.82 | 43.62 | 54.00 | -10.38 | Average |



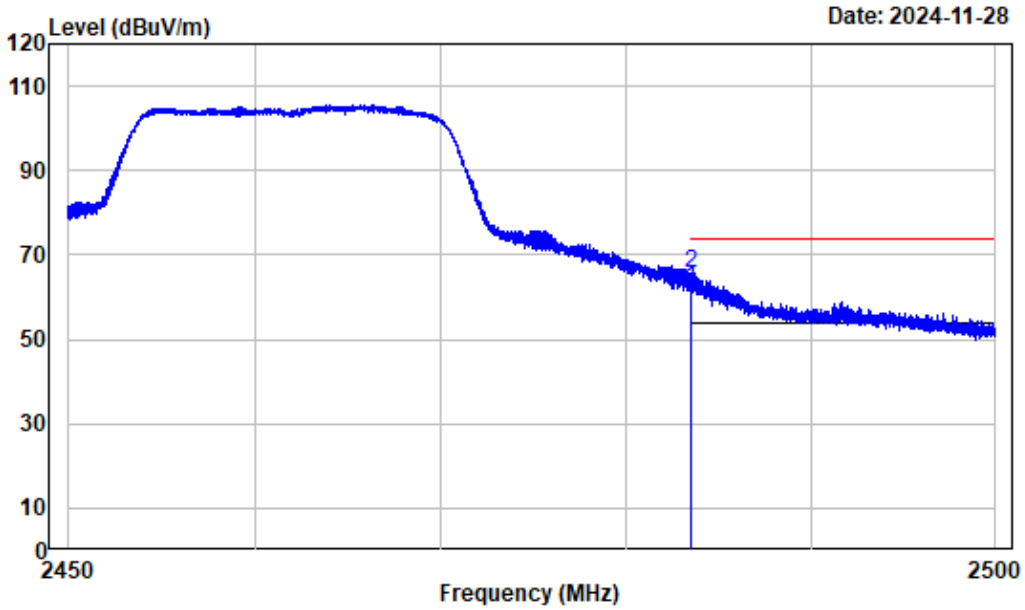

Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11N20_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2386.675 | -3.19 | 59.74 | 56.55 | 74.00 | -17.45 | peak |
| 2 | 2390.000 | -3.20 | 56.12 | 52.92 | 74.00 | -21.08 | Peak |



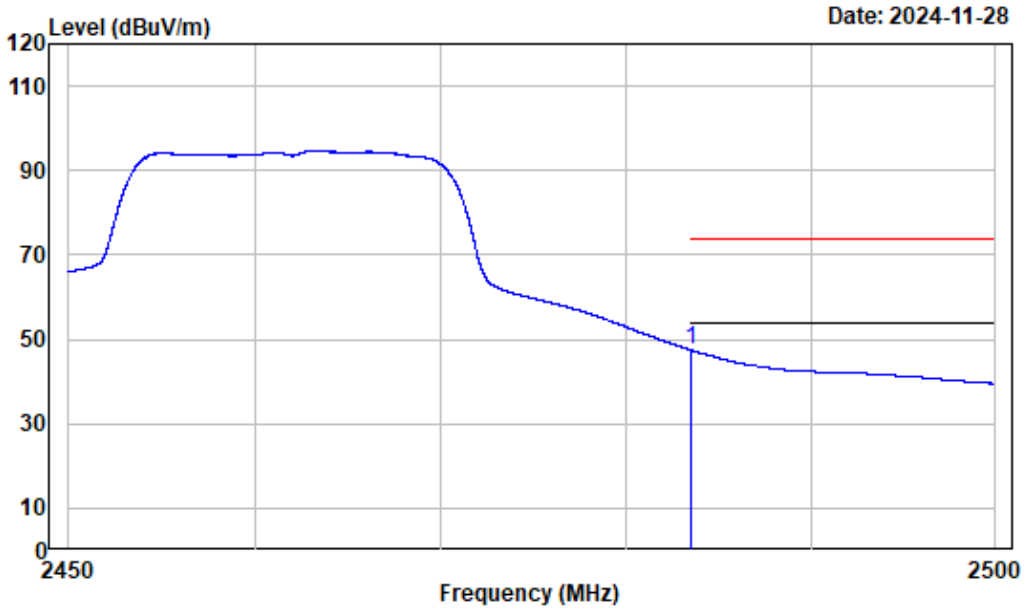

Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:10Hz Detector:Peak
Note : 802.11N20_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2390.000 | -3.20 | 43.50 | 40.30 | 54.00 | -13.70 | Average |



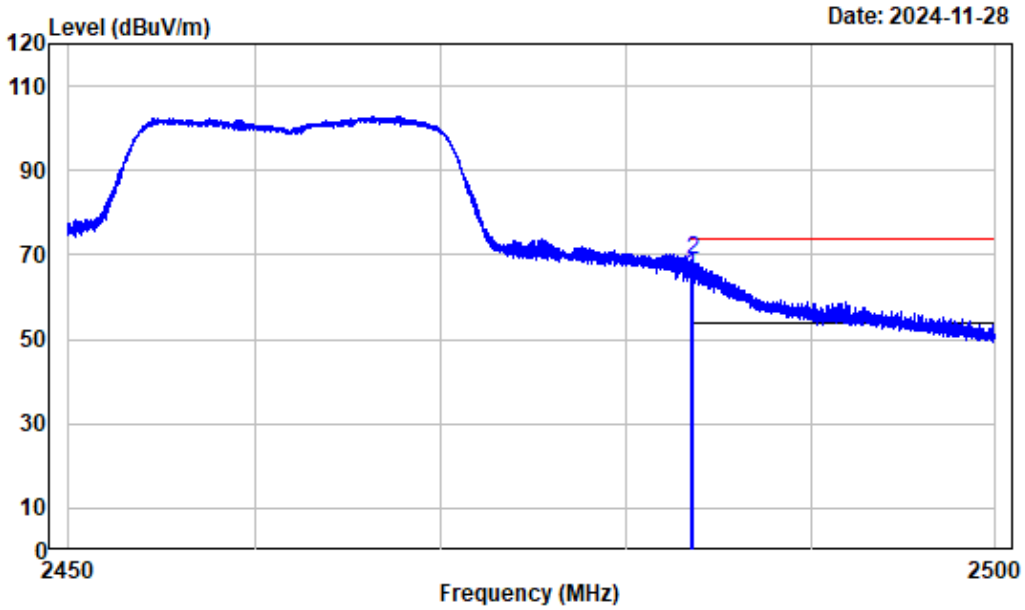

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11N20_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 64.99 | 61.82 | 74.00 | -12.18 | Peak |
| 2 | 2483.523 | -3.17 | 68.85 | 65.68 | 74.00 | -8.32 | peak |



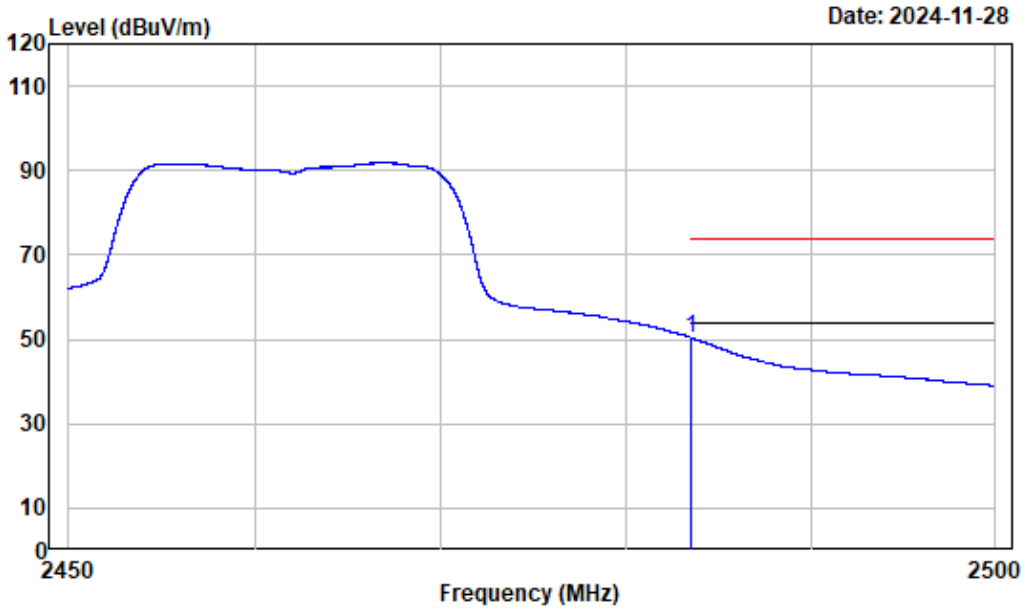

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:10Hz Detector:Peak
Note : 802.11N20_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 50.66 | 47.49 | 54.00 | -6.51 | Average |




Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11N20_2462

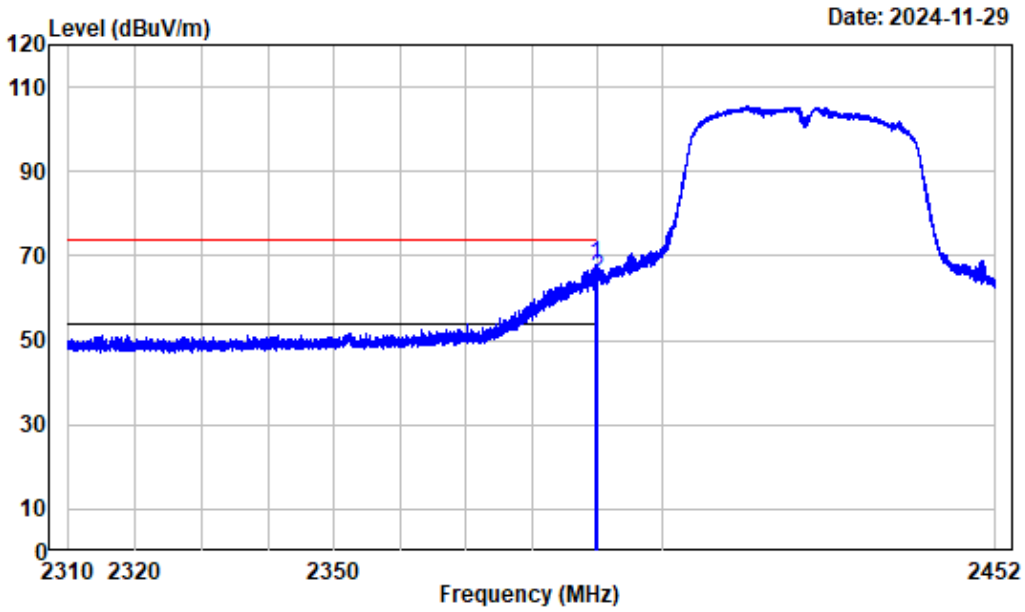
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 68.40 | 65.23 | 74.00 | -8.77 | Peak |
| 2 | 2483.548 | -3.17 | 72.08 | 68.91 | 74.00 | -5.09 | peak |




Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:10Hz Detector:Peak
Note : 802.11N20_2462

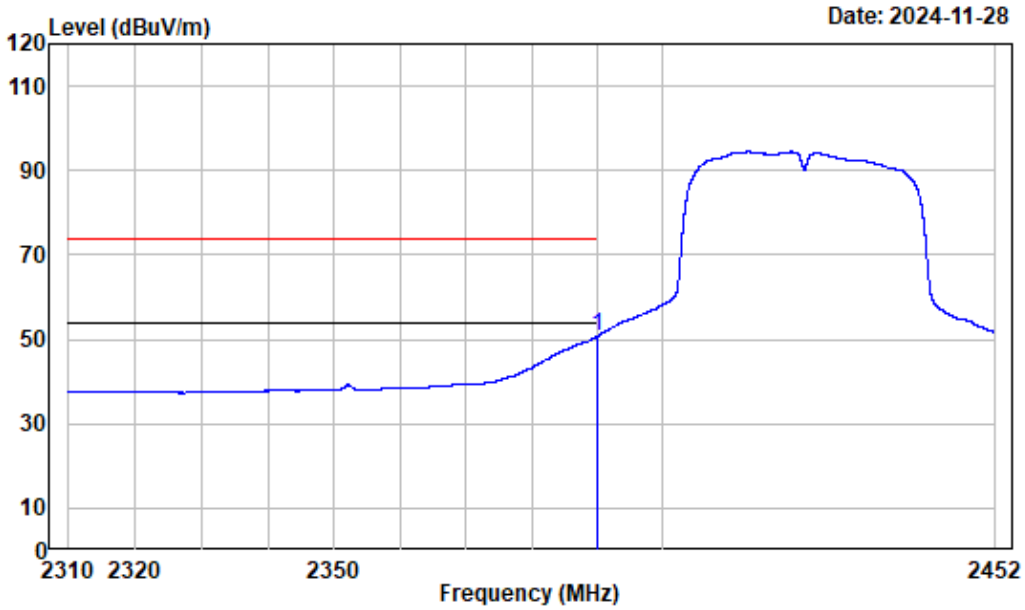
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 53.57 | 50.40 | 54.00 | -3.60 | Average |

802.11n40



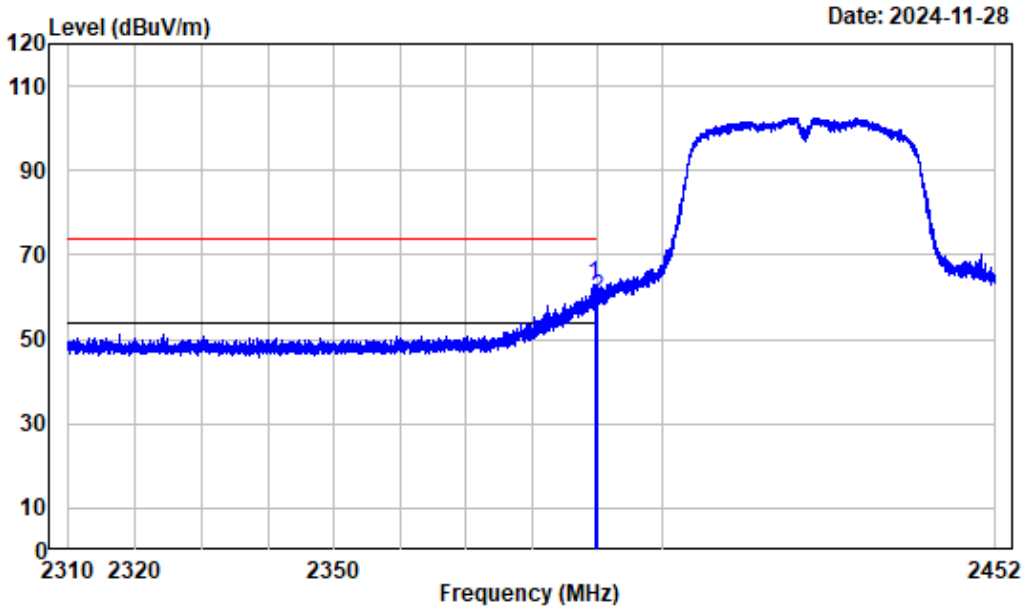

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11N40_2422

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2389.885 | -3.20 | 71.34 | 68.14 | 74.00 | -5.86 | peak |
| 2 | 2390.000 | -3.20 | 67.74 | 64.54 | 74.00 | -9.46 | Peak |



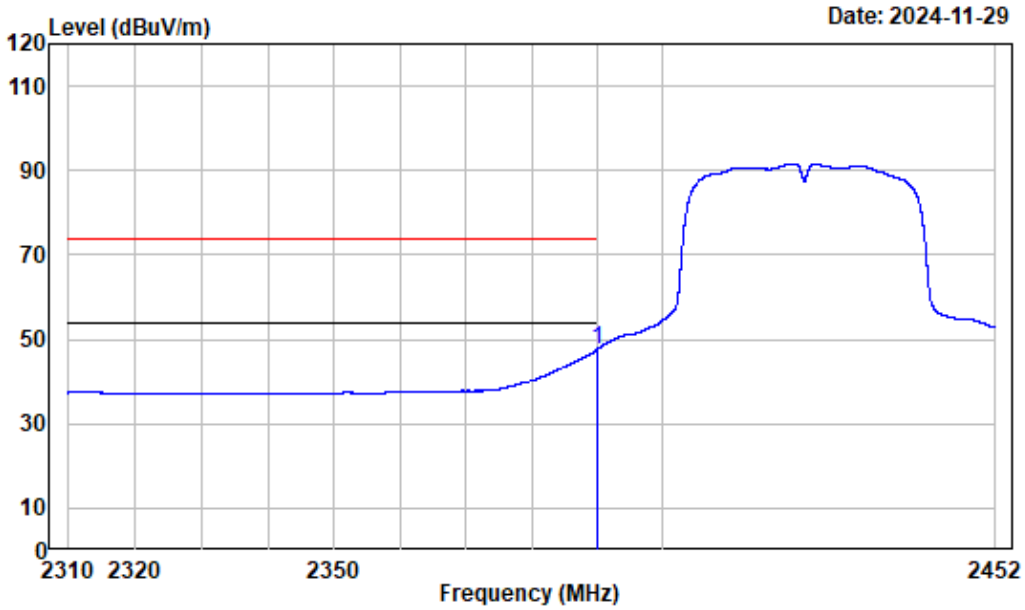

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:1KHz Detector:Peak
Note : 802.11N40_2422

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2390.000 | -3.20 | 53.88 | 50.68 | 54.00 | -3.32 | Average |



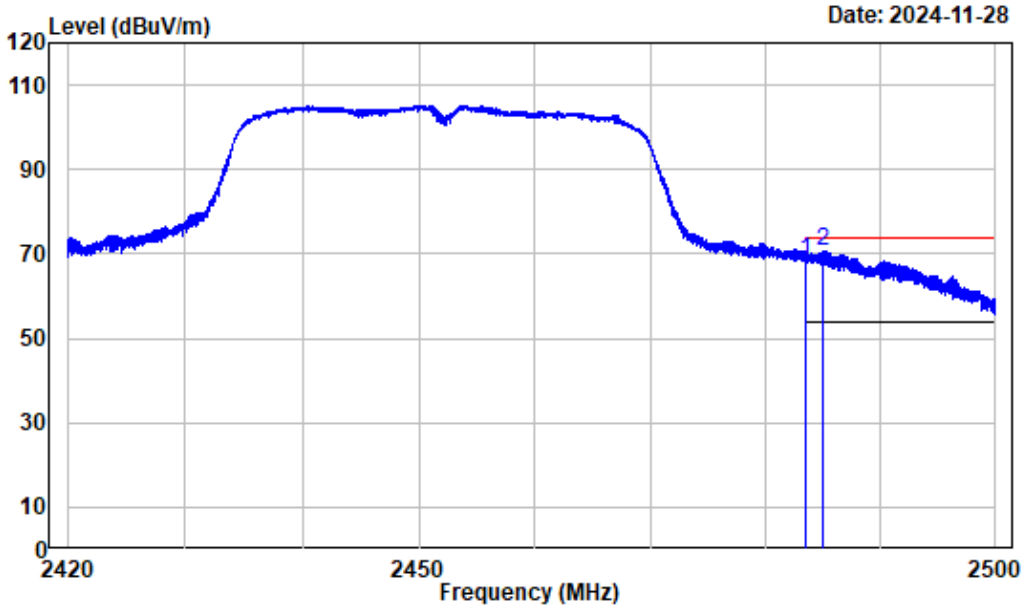

Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11N40_2422

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2389.619 | -3.20 | 66.30 | 63.10 | 74.00 | -10.90 | Peak |
| 2 | 2390.000 | -3.20 | 63.09 | 59.89 | 74.00 | -14.11 | Peak |



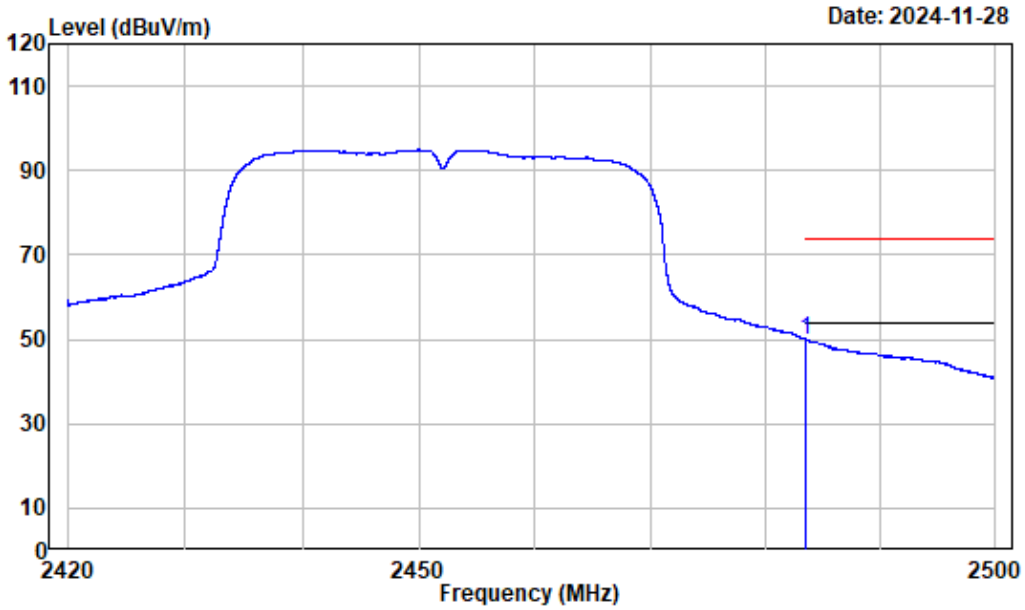

Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:1KHz Detector:Peak
Note : 802.11N40_2422

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2390.000 | -3.20 | 50.77 | 47.57 | 54.00 | -6.43 | Average |



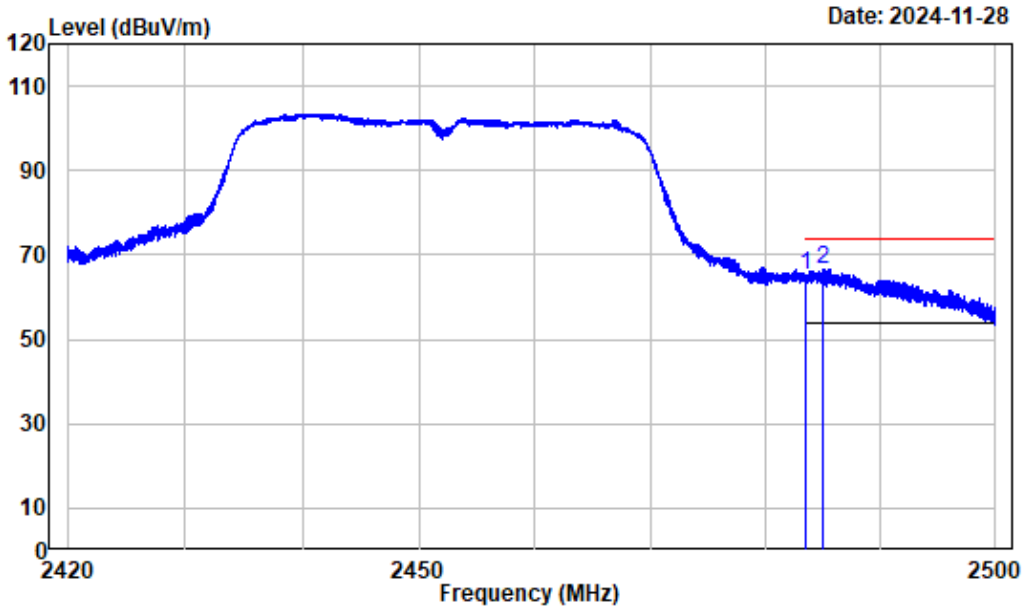

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11N40_2452

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 71.65 | 68.48 | 74.00 | -5.52 | Peak |
| 2 | 2484.968 | -3.17 | 73.89 | 70.72 | 74.00 | -3.28 | Peak |



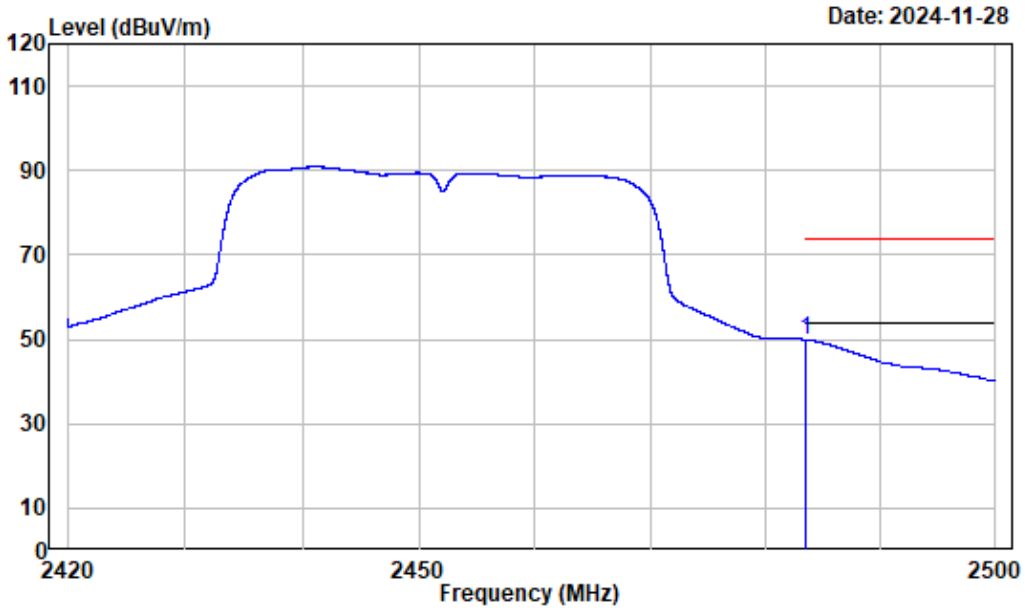

Condition : Horizontal
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:1KHz Detector:Peak
Note : 802.11N40_2452

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 53.15 | 49.98 | 54.00 | -4.02 | Average |




Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : 802.11N40_2452

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 68.35 | 65.18 | 74.00 | -8.82 | Peak |
| 2 | 2484.908 | -3.17 | 69.87 | 66.70 | 74.00 | -7.30 | peak |

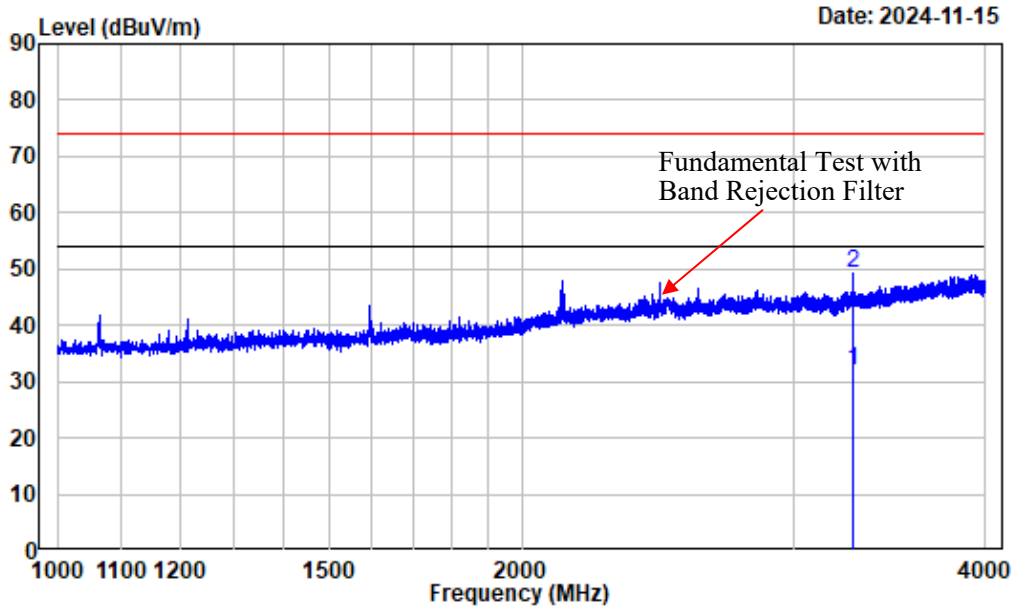



Condition : Vertical
Project No. : 2401U21148E-RF
Tester : Dylan.Yang
Spectrum setting: Average reading: RBW:1MHz VBW:1KHz Detector:Peak
Note : 802.11N40_2452

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2483.500 | -3.17 | 53.11 | 49.94 | 54.00 | -4.06 | Average |

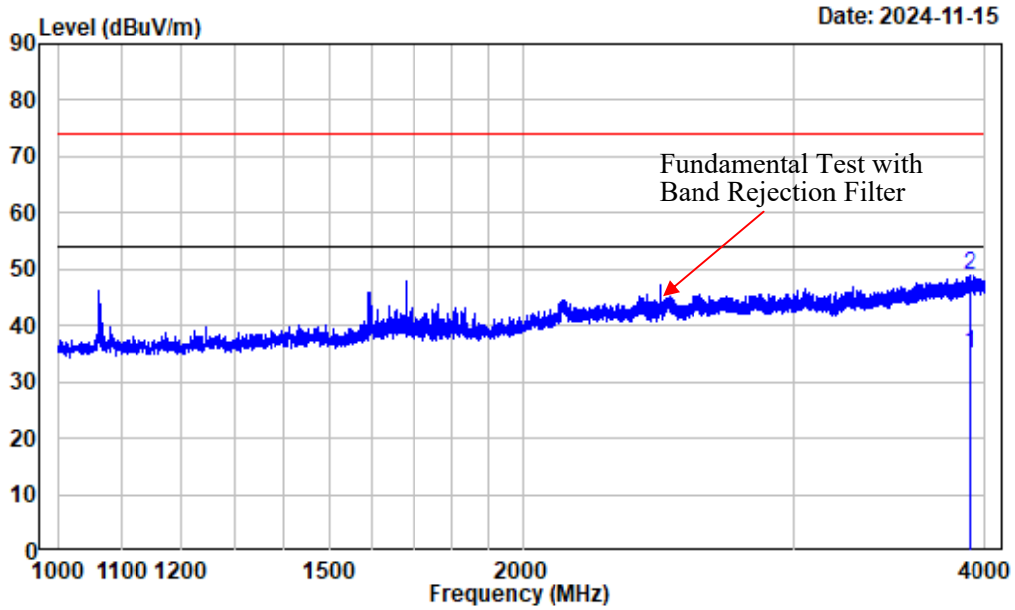
**1-18GHz (***Listed with the worst harmonic margin test plot***):**

802.11b



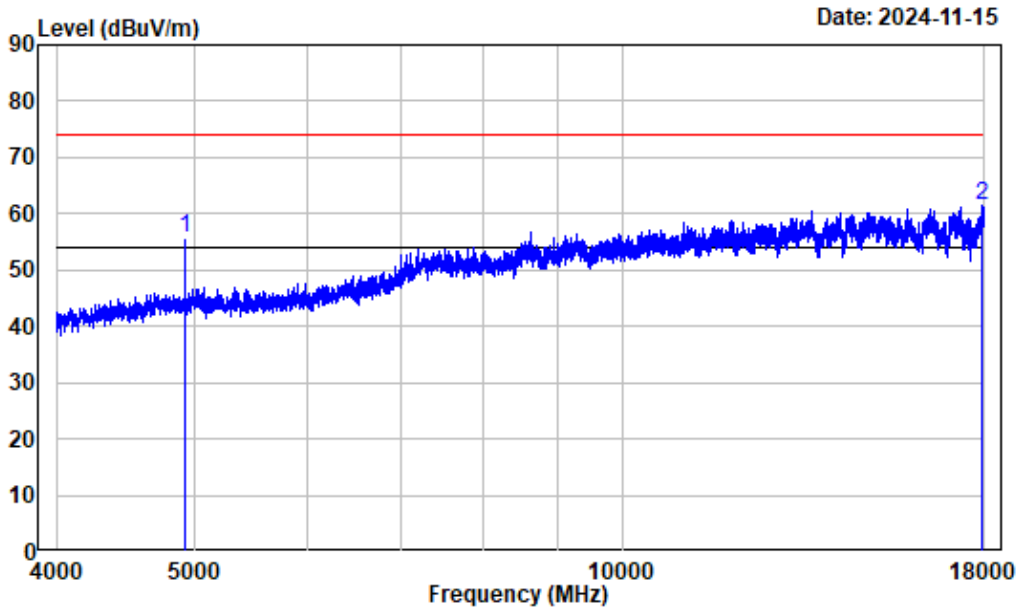

Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11B_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 3282.910 | -2.75 | 34.66 | 31.91 | 54.00 | -22.09 | Average |
| 2 | 3282.910 | -2.75 | 51.83 | 49.08 | 74.00 | -24.92 | Peak |



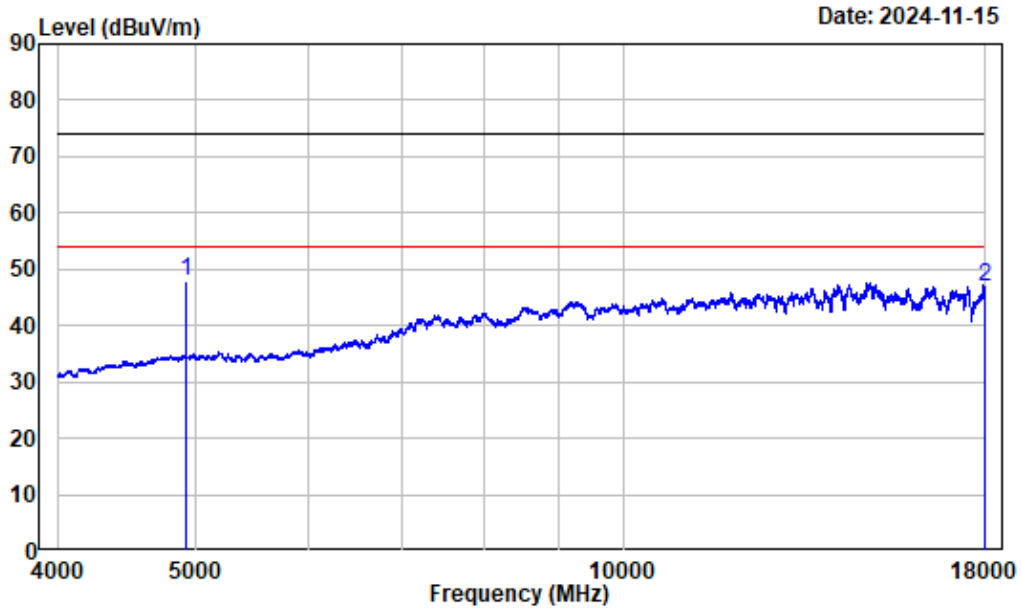

Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11B_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 3903.613 | -0.50 | 35.33 | 34.83 | 54.00 | -19.17 | Average |
| 2 | 3903.613 | -0.50 | 49.49 | 48.99 | 74.00 | -25.01 | Peak |




Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11B_2462

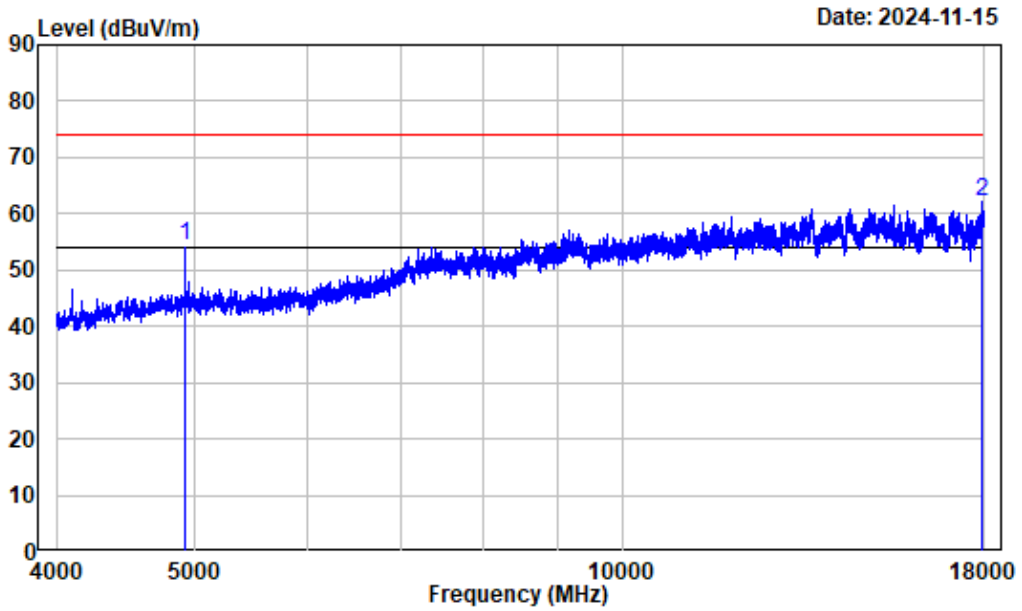
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4924.000 | 2.63 | 53.12 | 55.75 | 74.00 | -18.25 | Peak |
| 2 | 17942.240 | 24.21 | 37.30 | 61.51 | 74.00 | -12.49 | Peak |




Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11B_2462

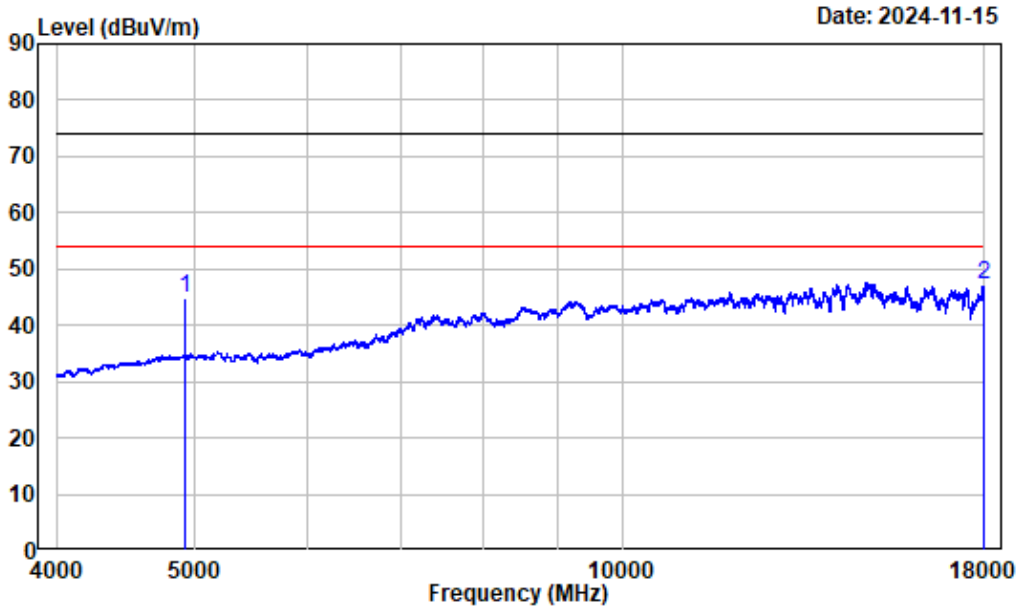
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4924.000 | 2.63 | 45.32 | 47.95 | 54.00 | -6.05 | Average |
| 2 | 17989.500 | 24.55 | 22.23 | 46.78 | 54.00 | -7.22 | Average |

Note: Spectrum analyzer setting: RBW=1 MHz, VBW=5 kHz




Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11B_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4924.000 | 2.63 | 51.62 | 54.25 | 74.00 | -19.75 | Peak |
| 2 | 17931.740 | 24.13 | 38.09 | 62.22 | 74.00 | -11.78 | Peak |

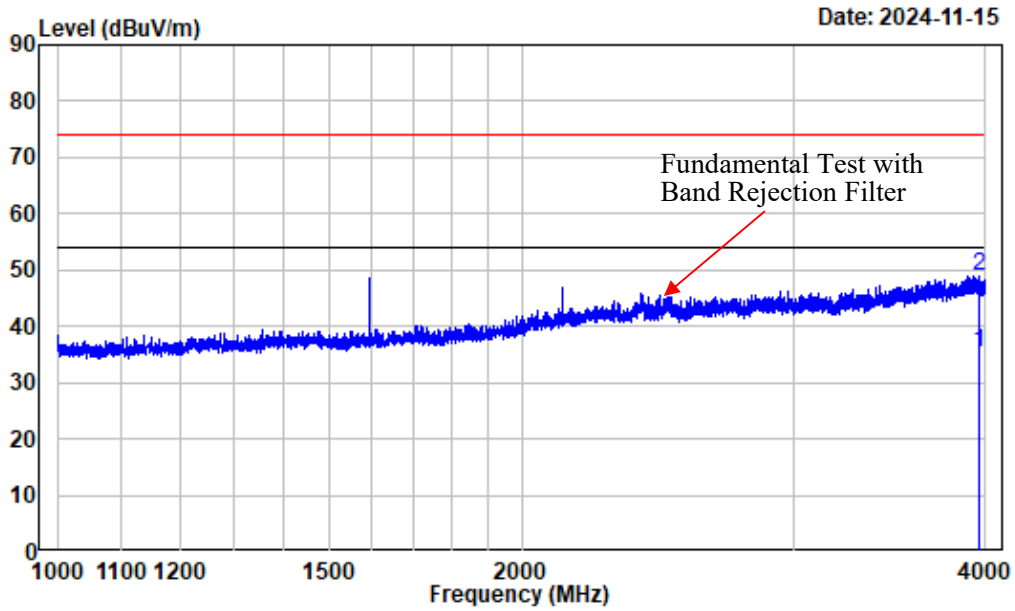



Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11B_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4924.000 | 2.63 | 42.33 | 44.96 | 54.00 | -9.04 | Average |
| 2 | 17998.250 | 24.61 | 22.43 | 47.04 | 54.00 | -6.96 | Average |

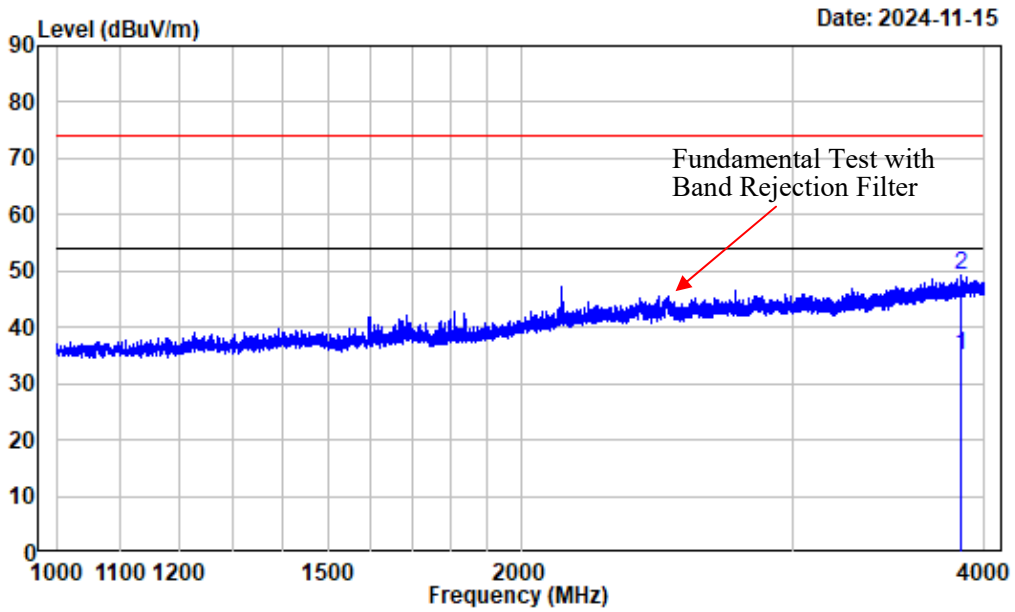
Note: Spectrum analyzer setting: RBW=1 MHz, VBW=5 kHz

802.11g



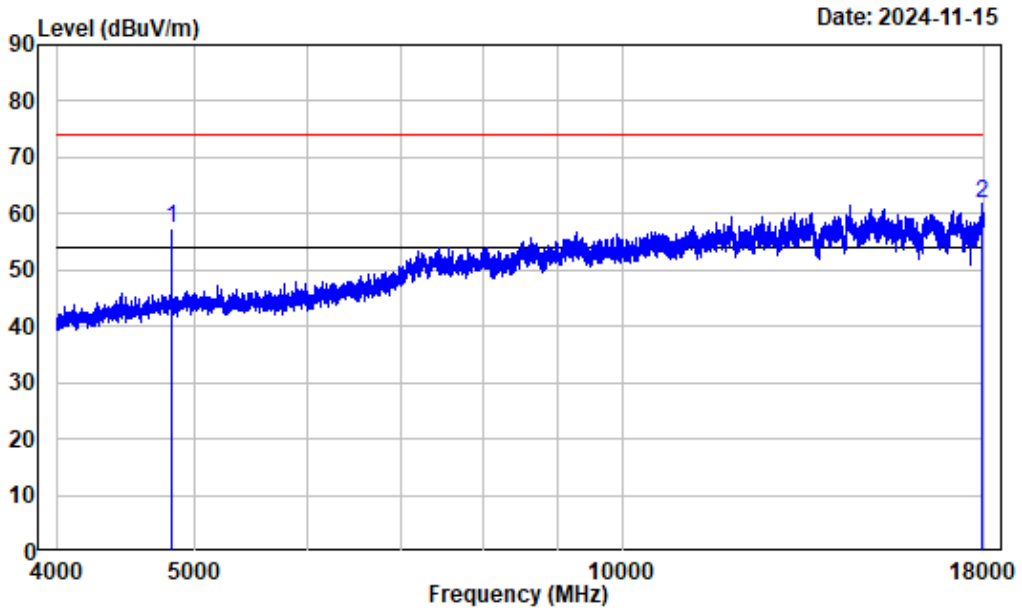

Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11G_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 3962.495 | -0.17 | 35.63 | 35.46 | 54.00 | -18.54 | Average |
| 2 | 3962.495 | -0.17 | 49.20 | 49.03 | 74.00 | -24.97 | Peak |



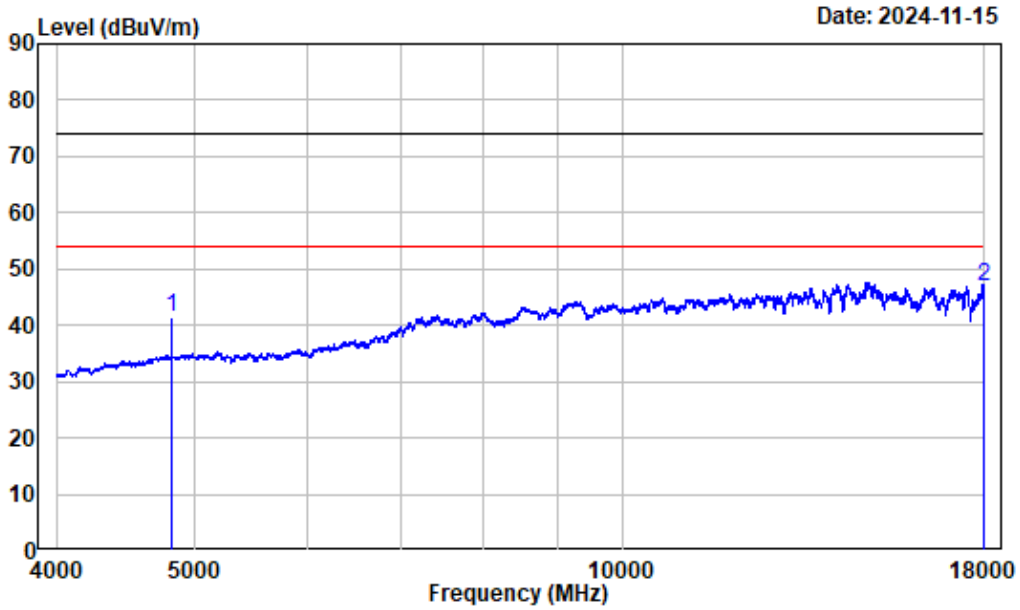

Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11G_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 3863.483 | -0.72 | 35.63 | 34.91 | 54.00 | -19.09 | Average |
| 2 | 3863.483 | -0.72 | 50.05 | 49.33 | 74.00 | -24.67 | Peak |




Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11G_2412

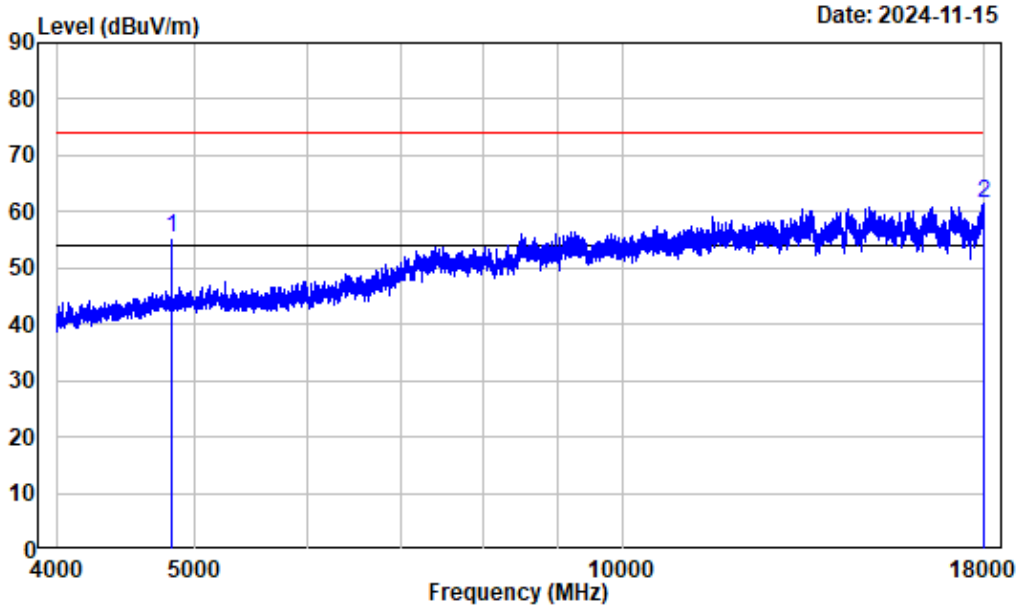
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4824.000 | 2.45 | 54.92 | 57.37 | 74.00 | -16.63 | Peak |
| 2 | 17922.990 | 24.08 | 37.63 | 61.71 | 74.00 | -12.29 | Peak |




Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11G_2412

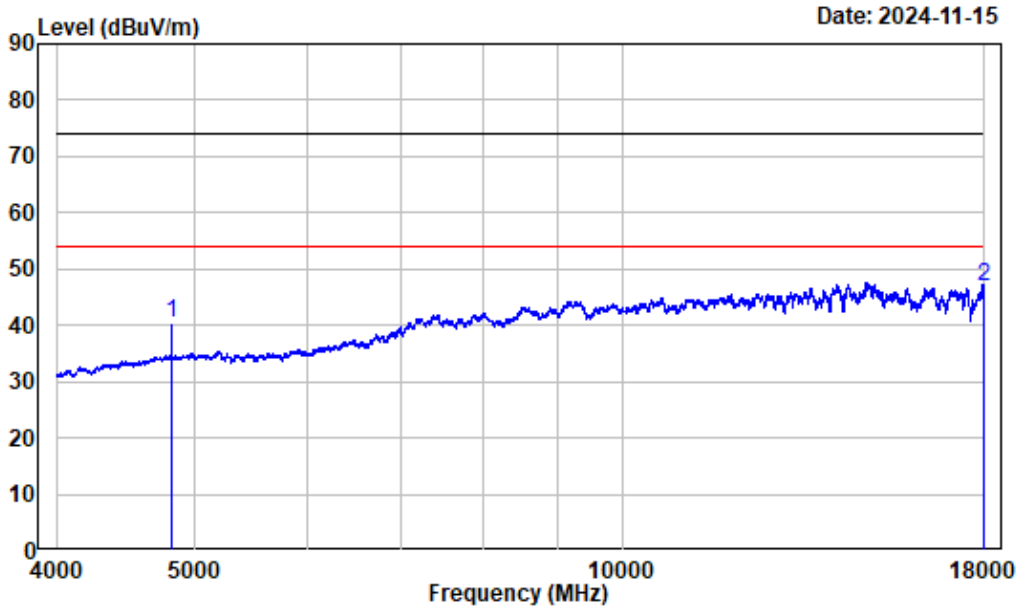
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4824.000 | 2.45 | 38.87 | 41.32 | 54.00 | -12.68 | Average |
| 2 | 17989.500 | 24.55 | 22.31 | 46.86 | 54.00 | -7.14 | Average |

Note: Spectrum analyzer setting: RBW=1 MHz, VBW=5 kHz




Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11G_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4824.000 | 2.45 | 52.86 | 55.31 | 74.00 | -18.69 | Peak |
| 2 | 17982.500 | 24.49 | 36.83 | 61.32 | 74.00 | -12.68 | Peak |

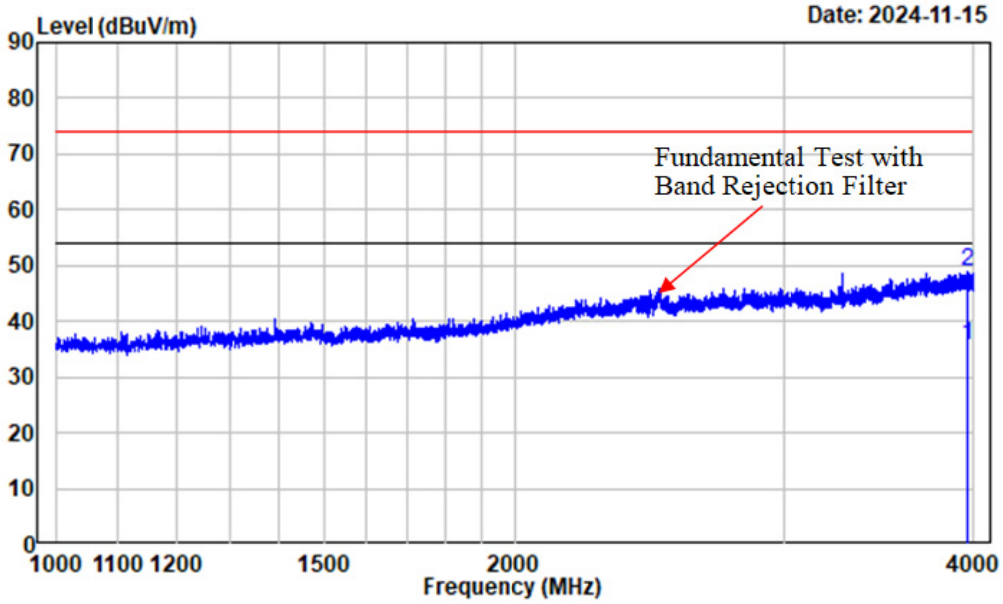



Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11G_2412

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4824.000 | 2.45 | 37.86 | 40.31 | 54.00 | -13.69 | Average |
| 2 | 17996.500 | 24.60 | 22.14 | 46.74 | 54.00 | -7.26 | Average |

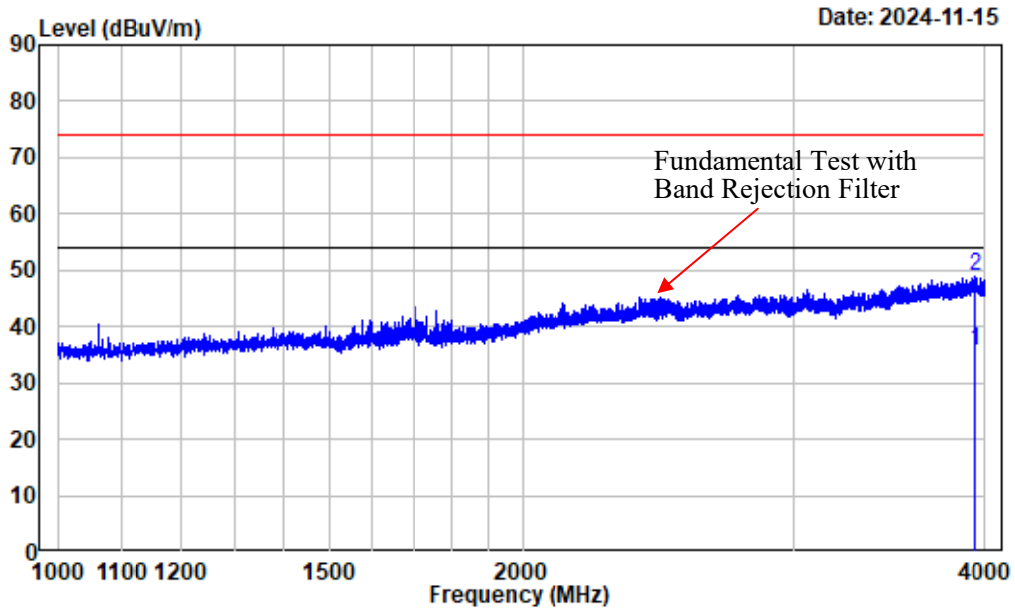
Note: Spectrum analyzer setting: RBW=1 MHz, VBW=5 kHz

802.11n20



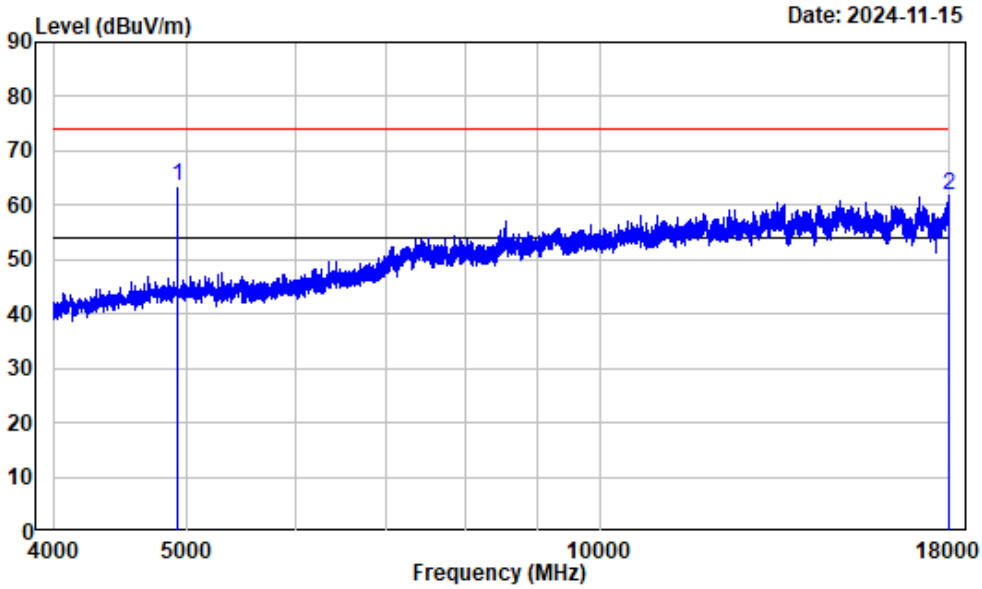

Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N20_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 3965.496 | -0.18 | 35.68 | 35.50 | 54.00 | -18.50 | Average |
| 2 | 3965.496 | -0.18 | 49.10 | 48.92 | 74.00 | -25.08 | Peak |



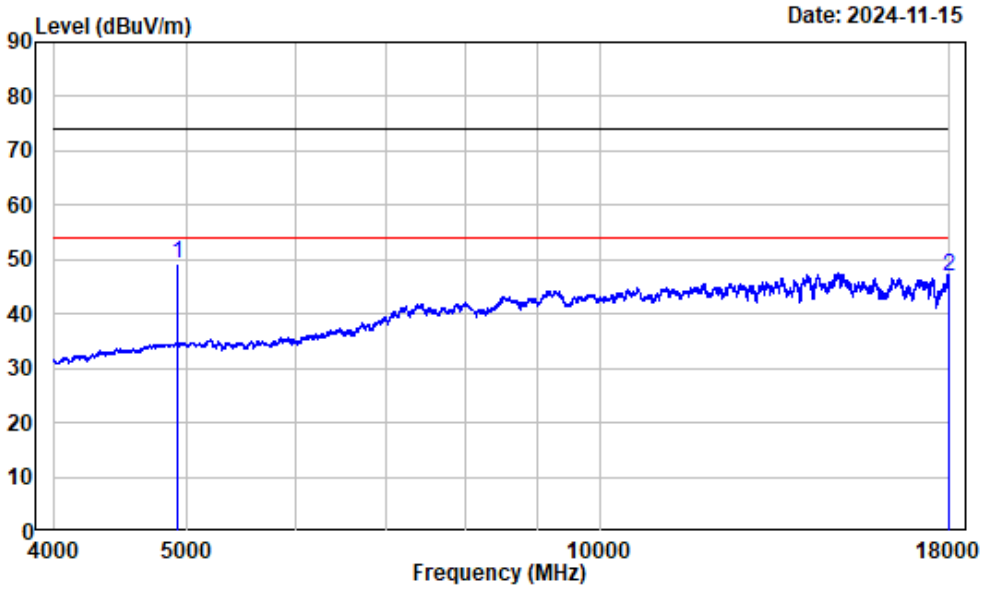

Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N20_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 3943.743 | -0.22 | 35.83 | 35.61 | 54.00 | -18.39 | Average |
| 2 | 3943.743 | -0.22 | 49.15 | 48.93 | 74.00 | -25.07 | Peak |




Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N20_2462

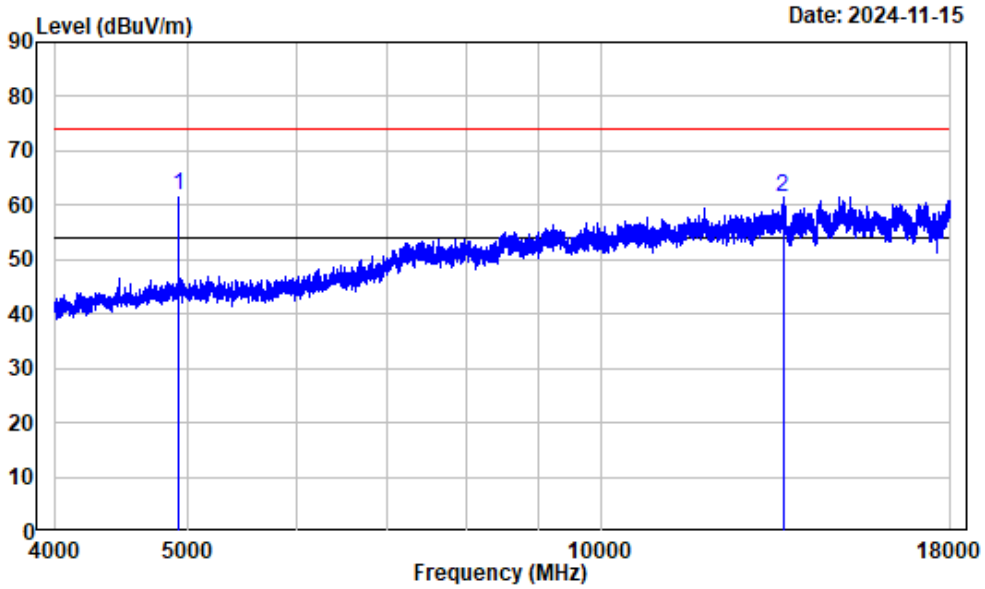
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4924.000 | 2.63 | 60.91 | 63.54 | 74.00 | -10.46 | Peak |
| 2 | 17975.500 | 24.44 | 37.31 | 61.75 | 74.00 | -12.25 | Peak |




Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N20_2462

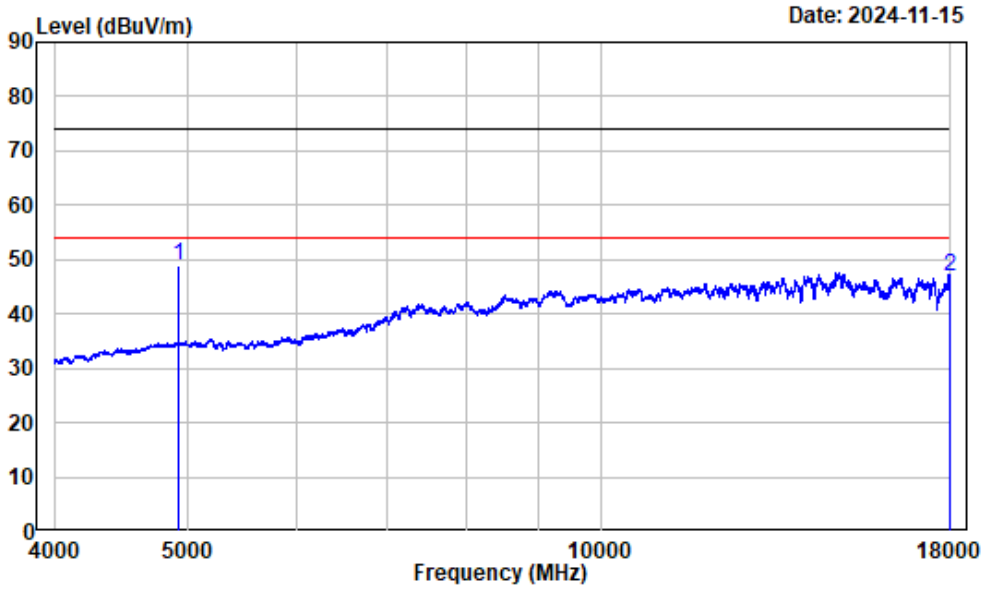
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4924.000 | 2.63 | 46.48 | 49.11 | 54.00 | -4.89 | Average |
| 2 | 17993.000 | 24.57 | 22.17 | 46.74 | 54.00 | -7.26 | Average |

Note: Spectrum analyzer setting: RBW=1 MHz, VBW=5 kHz




Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N20_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4924.000 | 2.63 | 59.32 | 61.95 | 74.00 | -12.05 | Peak |
| 2 | 13587.700 | 15.19 | 46.28 | 61.47 | 74.00 | -12.53 | Peak |

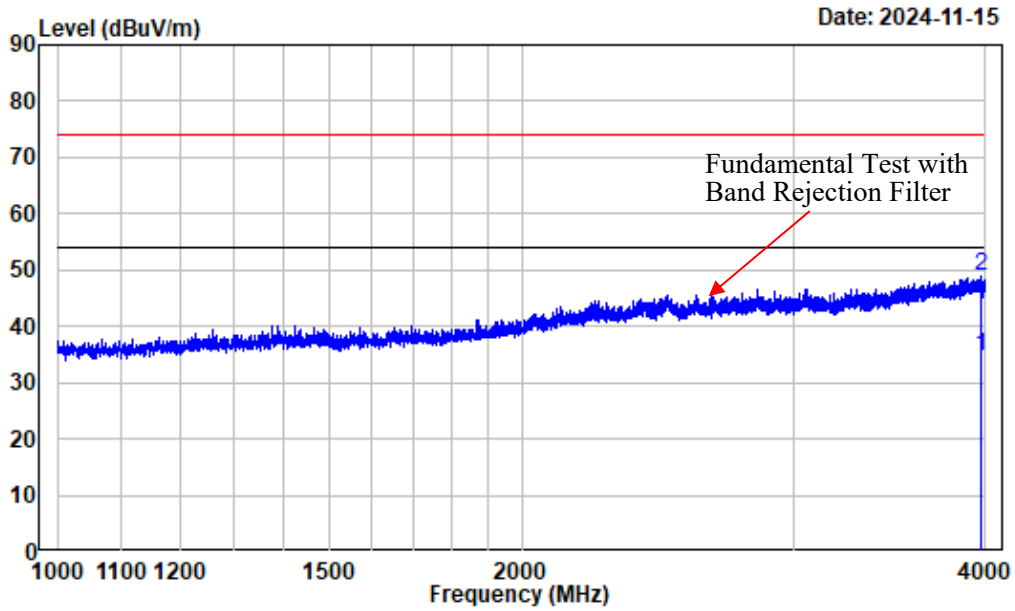



Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N20_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4924.000 | 2.63 | 46.21 | 48.84 | 54.00 | -5.16 | Average |
| 2 | 17998.250 | 24.61 | 22.26 | 46.87 | 54.00 | -7.13 | Average |

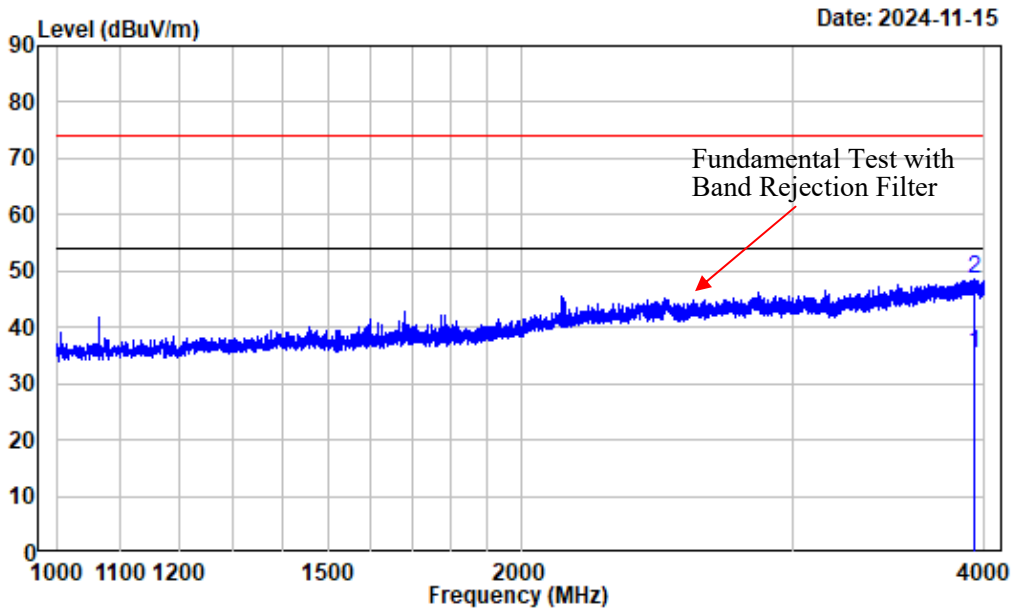
Note: Spectrum analyzer setting: RBW=1 MHz, VBW=5 kHz

802.11n40



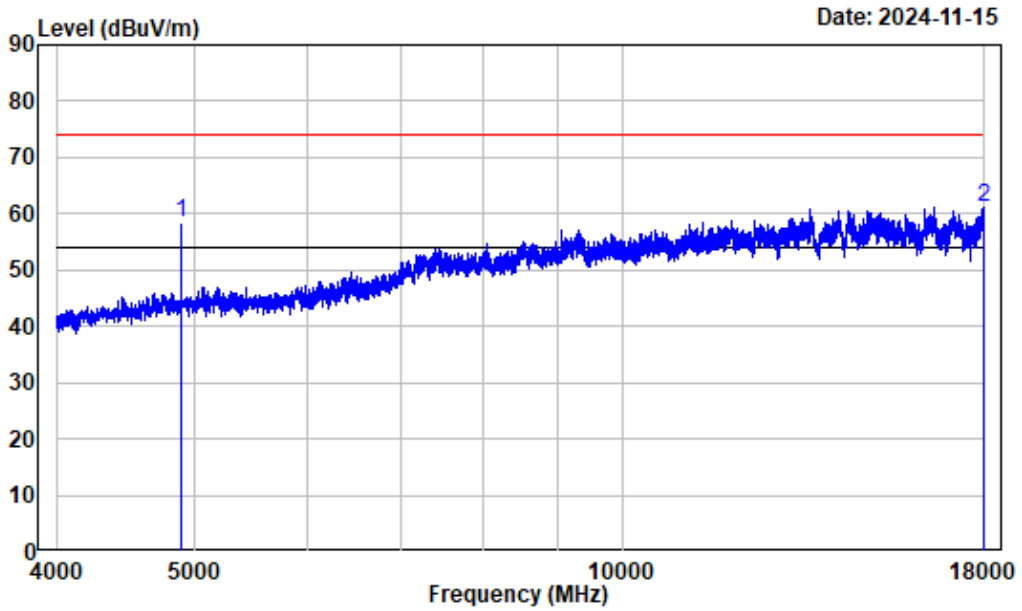

Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N40_2452

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 3976.747 | -0.19 | 34.69 | 34.50 | 54.00 | -19.50 | Average |
| 2 | 3976.747 | -0.19 | 49.05 | 48.86 | 74.00 | -25.14 | Peak |



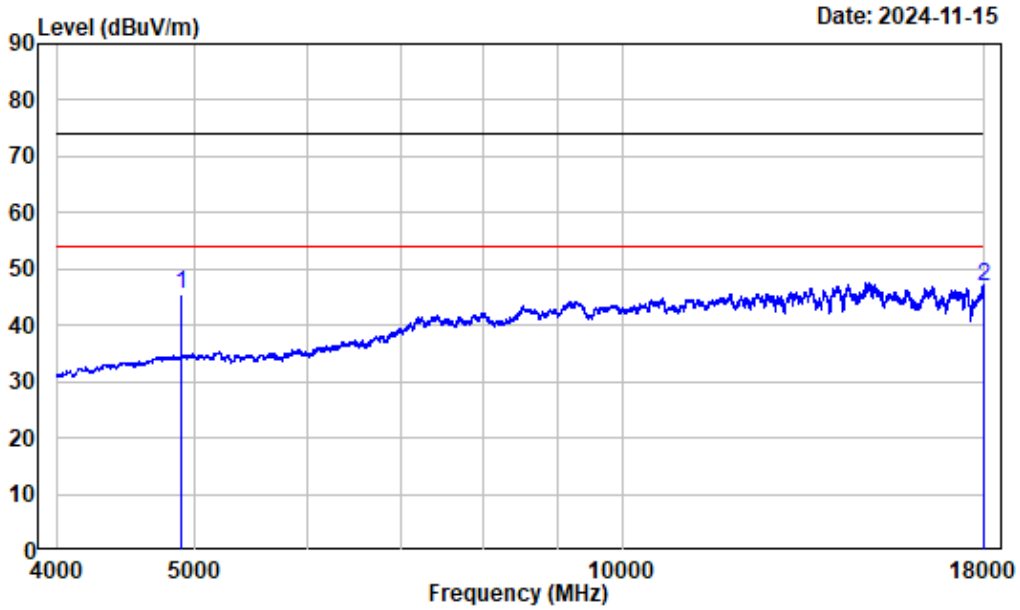

Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N40_2452

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 3942.993 | -0.22 | 35.69 | 35.47 | 54.00 | -18.53 | Average |
| 2 | 3942.993 | -0.22 | 48.72 | 48.50 | 74.00 | -25.50 | Peak |




Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N40_2452

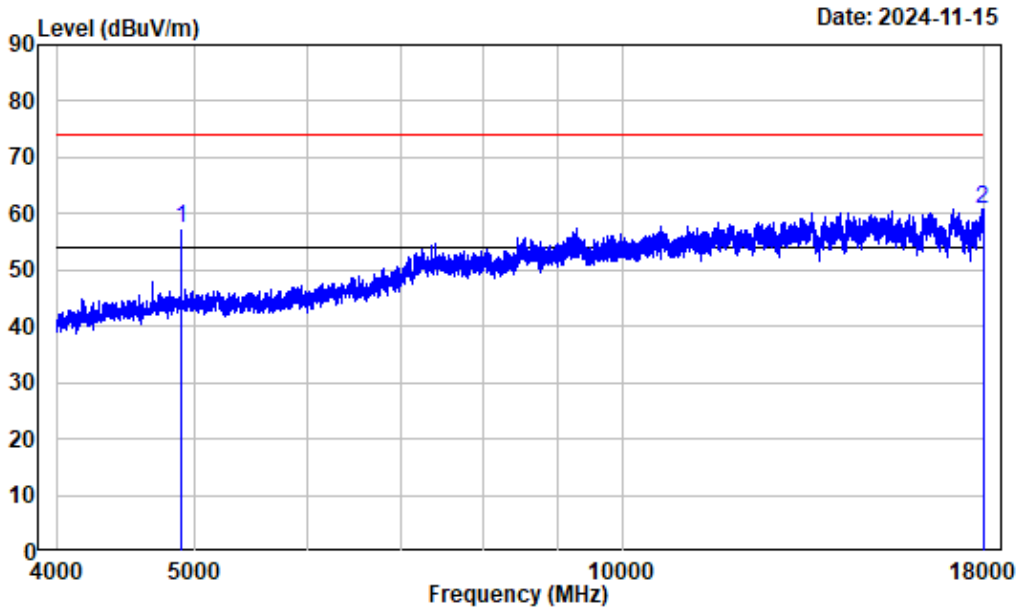
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4904.000 | 2.64 | 55.85 | 58.49 | 74.00 | -15.51 | Peak |
| 2 | 17975.500 | 24.44 | 36.62 | 61.06 | 74.00 | -12.94 | Peak |




Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N40_2452

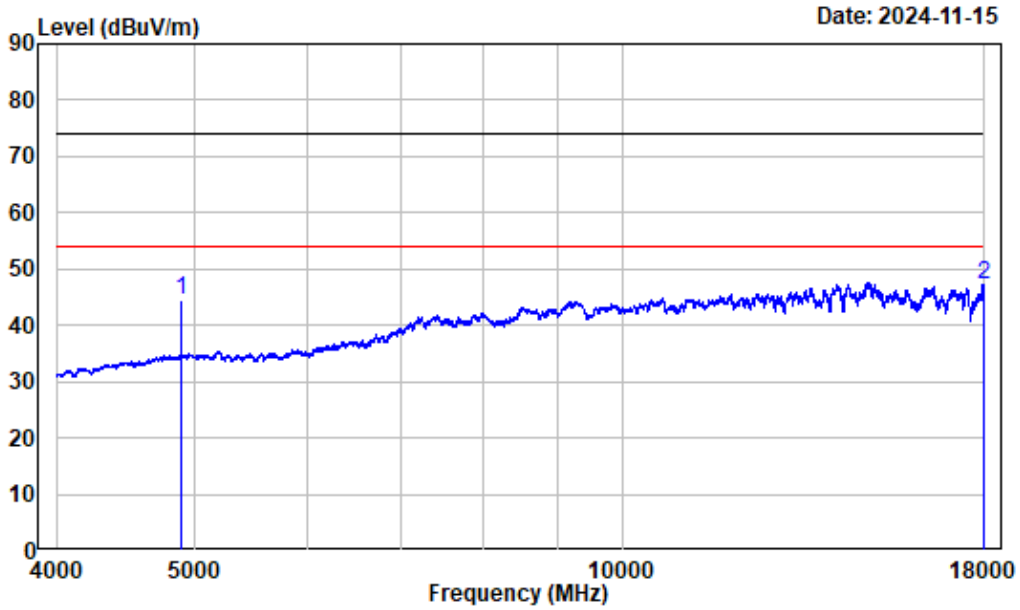
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4904.000 | 2.64 | 42.96 | 45.60 | 54.00 | -8.40 | Average |
| 2 | 18000.000 | 24.62 | 22.19 | 46.81 | 54.00 | -7.19 | Average |

Note: Spectrum analyzer setting: RBW=1 MHz, VBW=5 kHz




Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N40_2452

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4904.000 | 2.64 | 54.82 | 57.46 | 74.00 | -16.54 | Peak |
| 2 | 17957.990 | 24.33 | 36.55 | 60.88 | 74.00 | -13.12 | Peak |

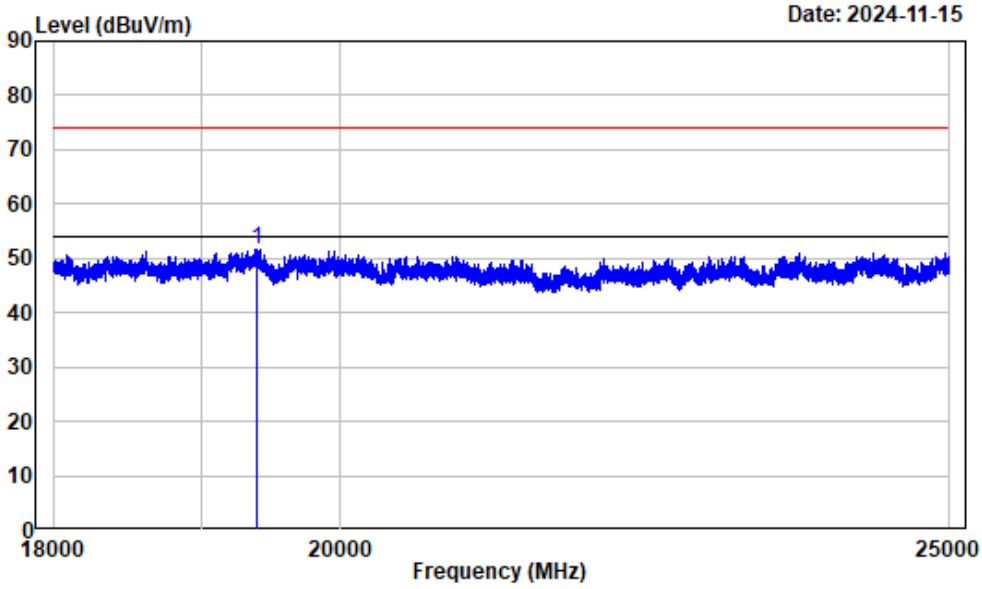



Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N40_2452

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 4904.000 | 2.64 | 41.78 | 44.42 | 54.00 | -9.58 | Average |
| 2 | 17989.500 | 24.55 | 22.66 | 47.21 | 54.00 | -6.79 | Average |

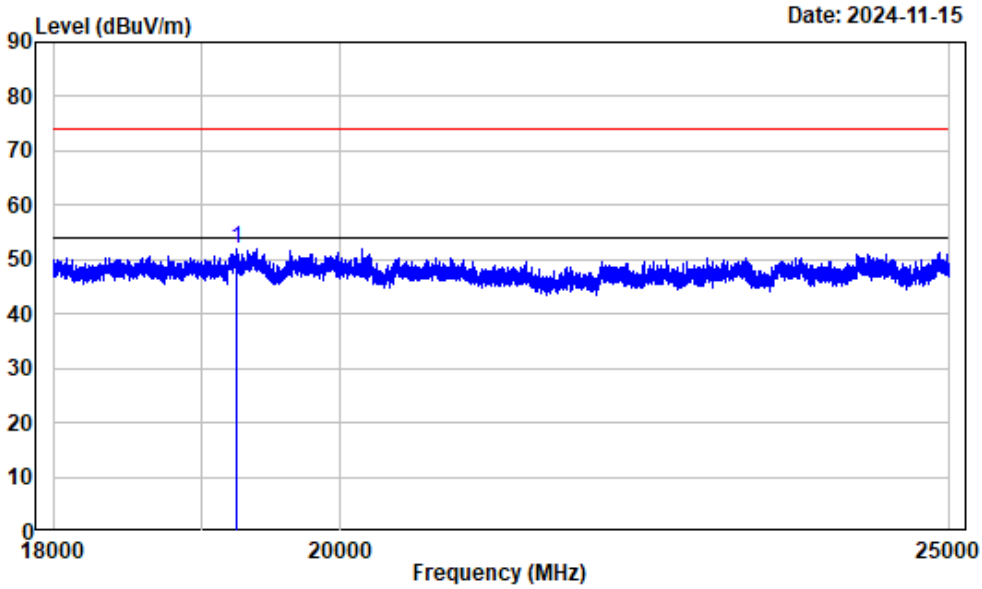
Note: Spectrum analyzer setting: RBW=1 MHz, VBW=5 kHz

**18-25GHz (***only test with the worst harmonic margin***):**




Condition : Horizontal
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N20_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 19399.300 | 15.08 | 36.69 | 51.77 | 74.00 | -22.23 | Peak |




Condition : Vertical
Project No.: 2401U21148E-RF
Tester : Dylan.Yang
Note : 802.11N20_2462

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 19245.280 | 15.27 | 36.82 | 52.09 | 74.00 | -21.91 | Peak |

## 6dB Emission Bandwidth

### Test Information:

| | | | |
|---|---|---|---|
| **Sample No.:** | 2MP7-1 | **Test Date:** | 2024/11/07 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Kungfumaster Liang | **Test Result:** | Pass |

### Environmental Conditions:

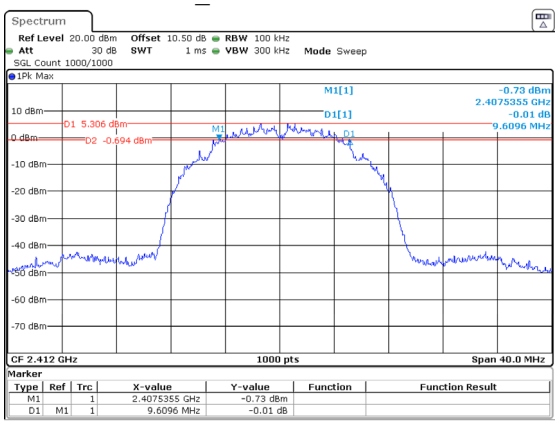
| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C):** | 25.4 | **Relative Humidity: (%)** | 55 | **ATM Pressure: (kPa)** | 101 |

**Test Data:**

| Mode | Test Frequency (MHz) | Result (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 802.11b | 2412 | 9.610 | ≥0.5 | Pass |
| | 2437 | 9.650 | ≥0.5 | Pass |
| | 2462 | 9.169 | ≥0.5 | Pass |
| 802.11g | 2412 | 16.376 | ≥0.5 | Pass |
| | 2437 | 16.376 | ≥0.5 | Pass |
| | 2462 | 16.376 | ≥0.5 | Pass |
| 802.11n20 | 2412 | 16.617 | ≥0.5 | Pass |
| | 2437 | 16.376 | ≥0.5 | Pass |
| | 2462 | 16.376 | ≥0.5 | Pass |
| 802.11n40 | 2422 | **35.235** | ≥0.5 | Pass |
| | 2437 | **35.235** | ≥0.5 | Pass |
| | 2452 | **35.235** | ≥0.5 | Pass |

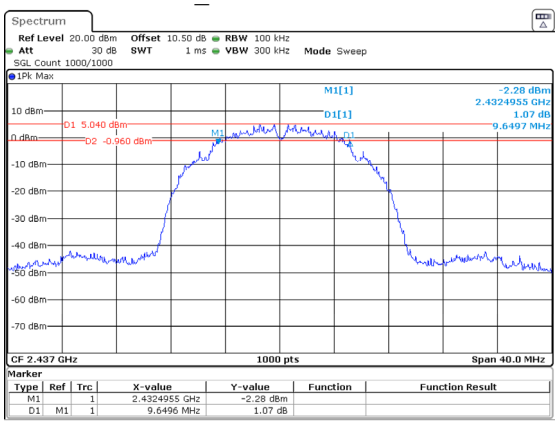
## 2.4G

802.11b_2412MHz 9.610MHz



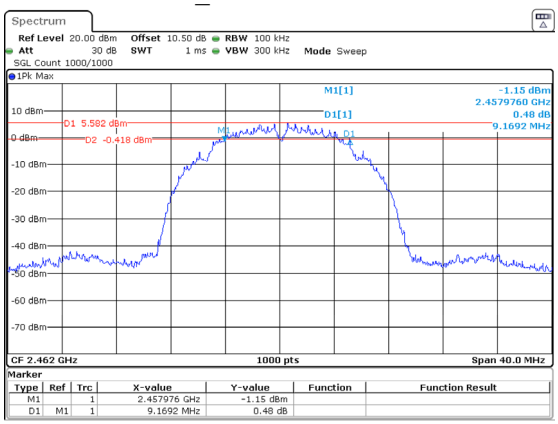

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 21:49:01

802.11b_2437MHz 9.650MHz



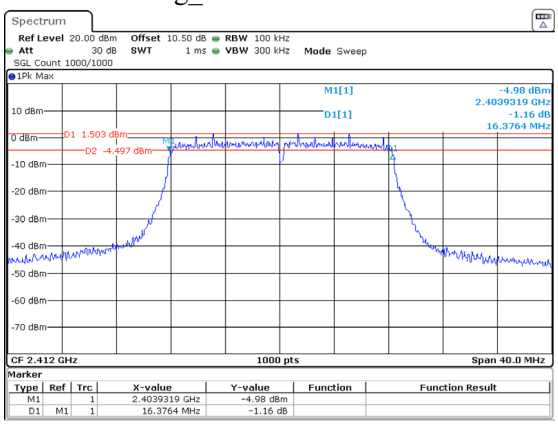

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 21:50:30

802.11b_2462MHz 9.169MHz



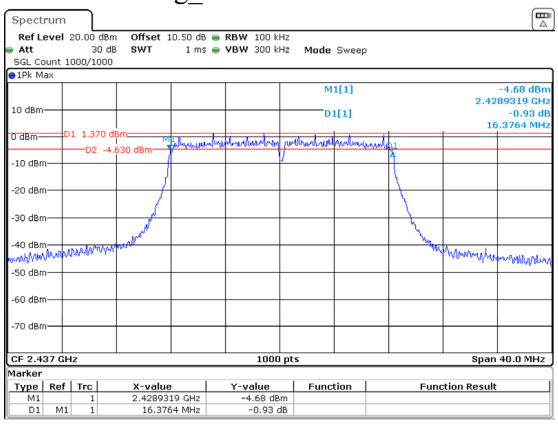

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 21:51:56

802.11g_2412MHz 16.376MHz



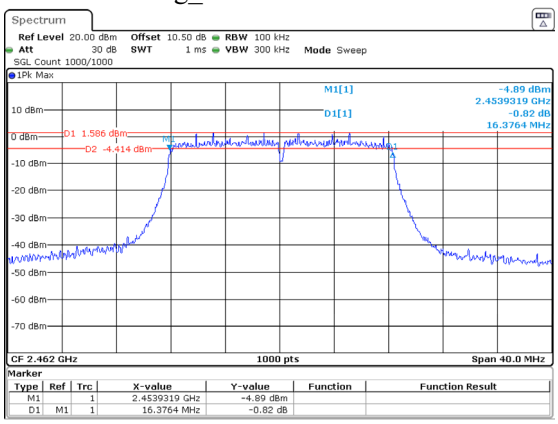

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 21:53:45

802.11g_2437MHz 16.376MHz



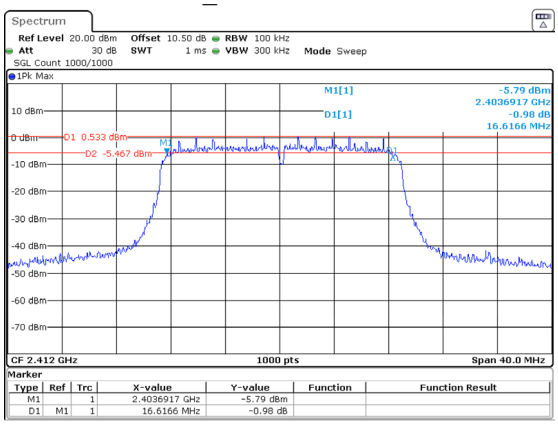

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 21:54:40

802.11g_2462MHz 16.376MHz



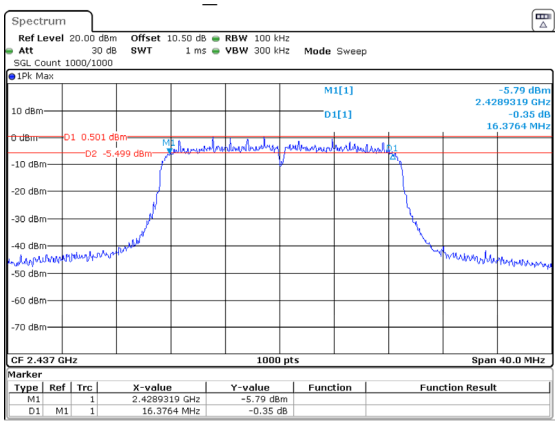

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 21:55:54

802.11n20_2412MHz 16.617MHz



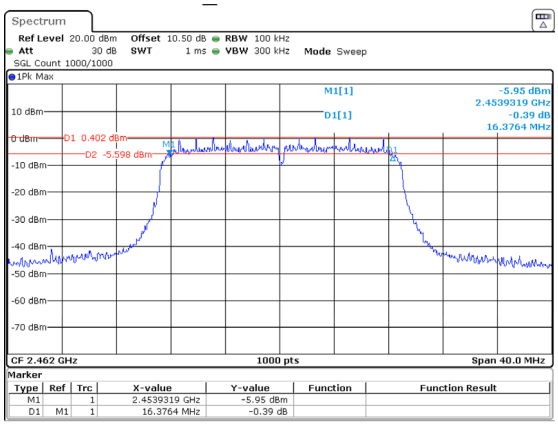

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 21:58:05

802.11n20_2437MHz 16.376MHz



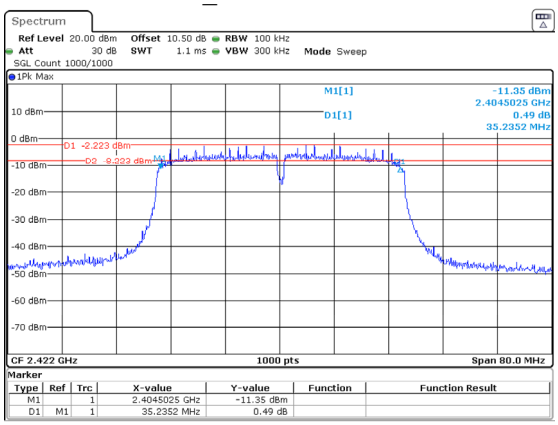

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 21:59:35

802.11n20_2462MHz 16.376MHz



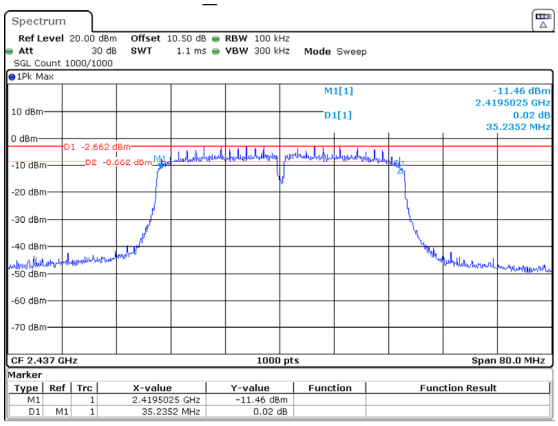

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:00:58

802.11n40_2422MHz 35.235MHz



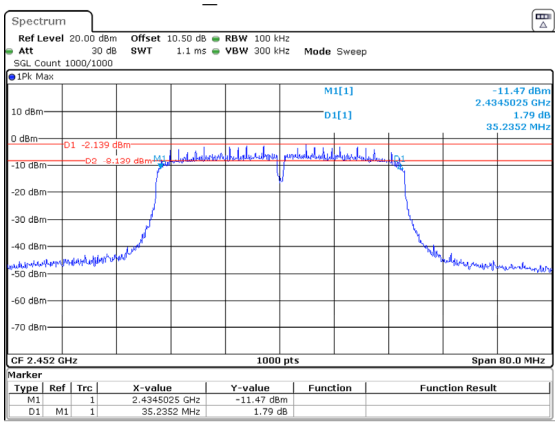

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:04:12

802.11n40_2437MHz 35.235MHz




ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:04:49

802.11n40_2452MHz 35.235MHz




ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:05:36

## 99% Occupied Bandwidth

### Test Information:

| | | | |
|---|---|---|---|
| **Sample No.:** | 2MP7-1 | **Test Date:** | 2024/11/07 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Kungfumaster Liang | **Test Result:** | N/A |

### Environmental Conditions:

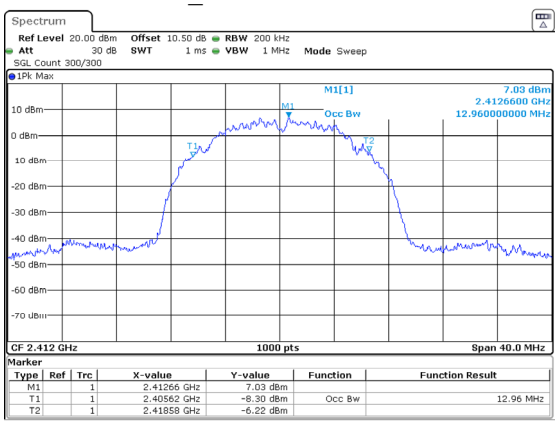
| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C):** | 25.4 | **Relative Humidity: (%)** | 55 | **ATM Pressure: (kPa)** | 101 |

**Test Data:**

| Mode | Test Frequency (MHz) | 99% OBW (MHz) |
|---|---|---|
| 802.11b | 2412 | 12.960 |
| | 2437 | 12.880 |
| | 2462 | 12.880 |
| 802.11g | 2412 | 16.360 |
| | 2437 | 16.360 |
| | 2462 | 16.360 |
| 802.11n20 | 2412 | 17.240 |
| | 2437 | 17.240 |
| | 2462 | 17.280 |
| 802.11n40 | 2422 | 35.680 |
| | 2437 | **35.760** |
| | 2452 | 35.600 |

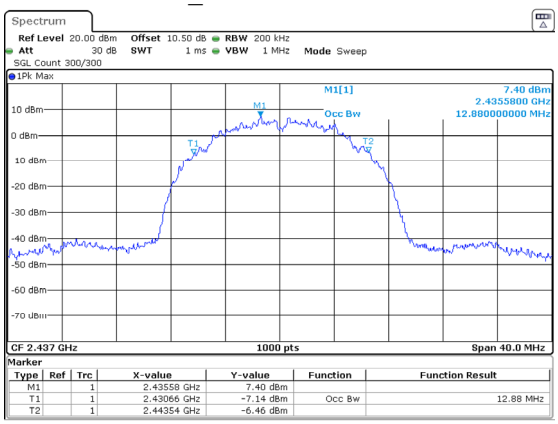
## 2.4G

802.11b_2412MHz 12.960MHz



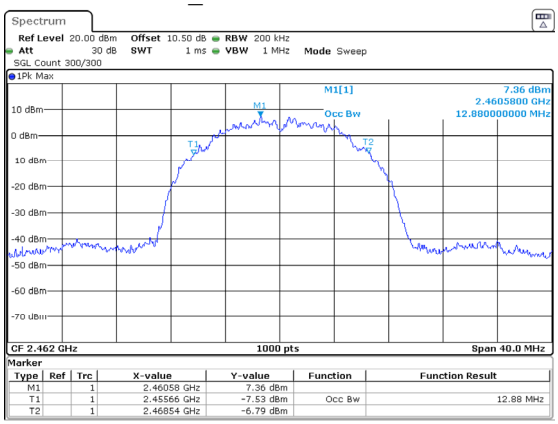

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:08:08

802.11b_2437MHz 12.880MHz



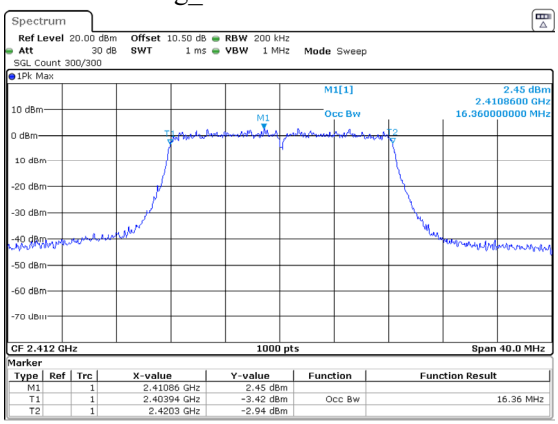

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:08:53

802.11b_2462MHz 12.880MHz



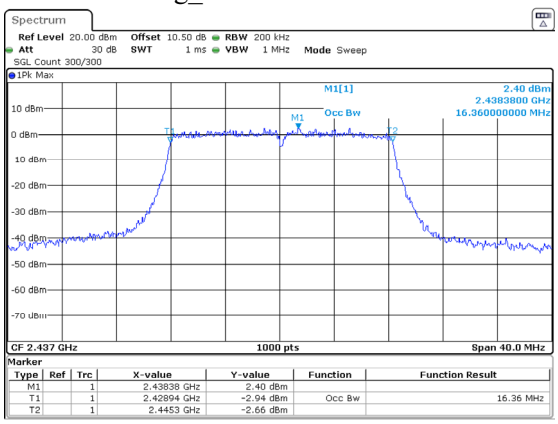

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:09:40

802.11g_2412MHz 16.360MHz



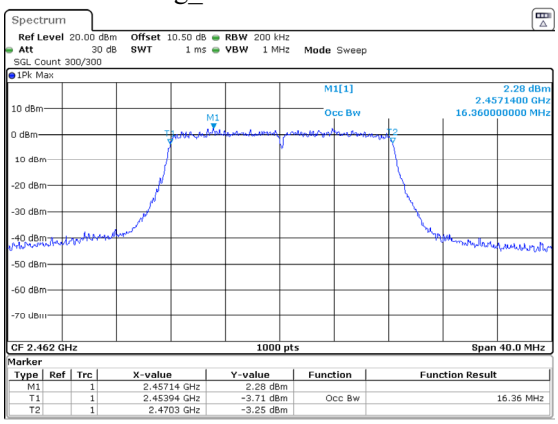

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:10:24

802.11g_2437MHz 16.360MHz



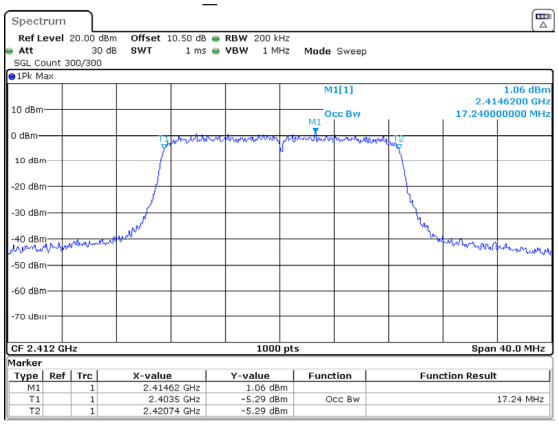

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:11:12

802.11g_2462MHz 16.360MHz



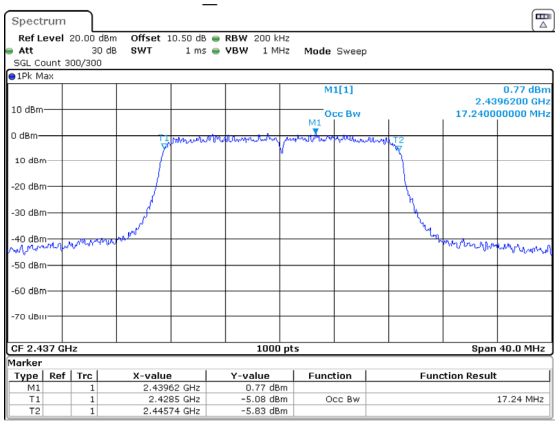

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:11:56

802.11n20_2412MHz 17.240MHz



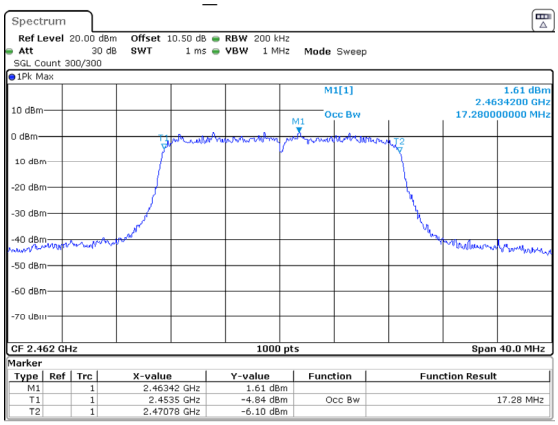

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:12:52

802.11n20_2437MHz 17.240MHz



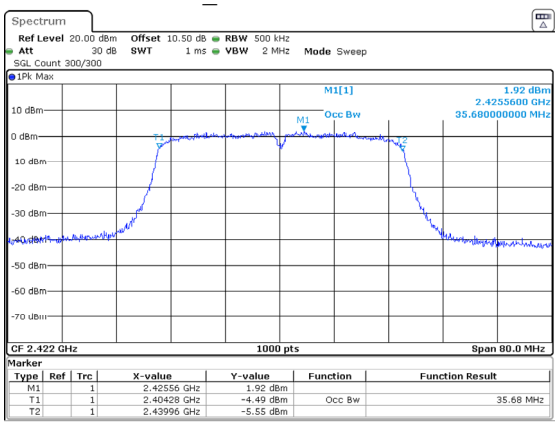

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:15:55

802.11n20_2462MHz 17.280MHz



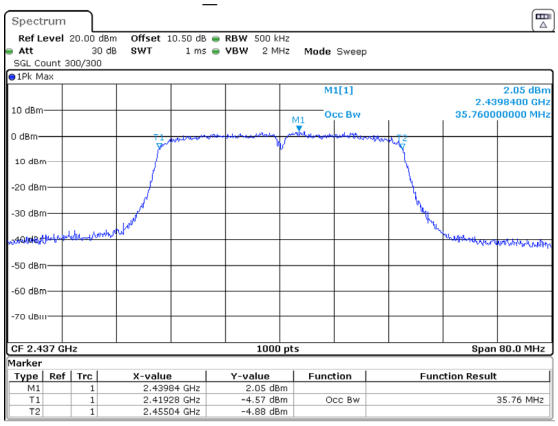

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:17:38

802.11n40_2422MHz 35.680MHz



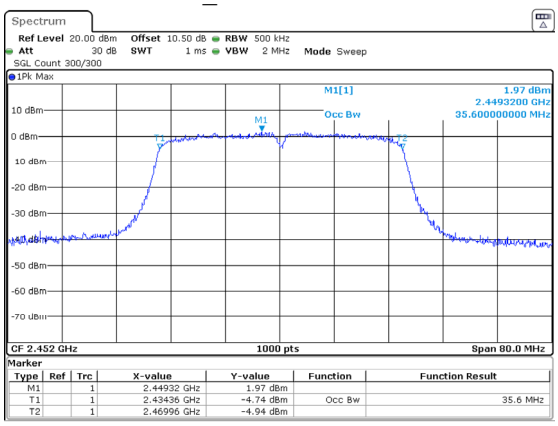

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:18:16

802.11n40_2437MHz 35.760MHz




ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:18:53

802.11n40_2452MHz 35.600MHz




ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 22:19:29

**Maximum Conducted Output Power**

**Test Information:**

| | | | |
|---|---|---|---|
| **Sample No.:** | 2MP7-1 | **Test Date:** | 2024/11/07 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Kungfumaster Liang | **Test Result:** | Pass |

**Environmental Conditions:**

| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C):** | 25.4 | **Relative Humidity: (%)** | 55 | **ATM Pressure: (kPa)** | 101 |

**Test Data:**

| Mode | Test Frequency (MHz) | Peak Output Power(dBm) | Average Output Power(dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|
| 802.11b | 2412 | 16.18 | 13.15 | 30 | Pass |
| | 2437 | 16.45 | 13.16 | 30 | Pass |
| | 2462 | 16.76 | 13.41 | 30 | Pass |
| 802.11g | 2412 | 20.07 | 12.82 | 30 | Pass |
| | 2437 | 20.15 | 12.64 | 30 | Pass |
| | 2462 | **20.29** | 13.06 | 30 | Pass |
| 802.11n20 | 2412 | 18.57 | 11.33 | 30 | Pass |
| | 2437 | 18.40 | 11.14 | 30 | Pass |
| | 2462 | 18.82 | 11.43 | 30 | Pass |
| 802.11n40 | 2422 | 18.97 | 10.58 | 30 | Pass |
| | 2437 | 18.79 | 10.54 | 30 | Pass |
| | 2452 | 18.63 | 10.51 | 30 | Pass |

**Power Spectral Density**

**Test Information:**

| | | | |
|---|---|---|---|
| **Sample No.:** | 2MP7-1 | **Test Date:** | 2024/11/07 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Kungfumaster Liang | **Test Result:** | Pass |

**Environmental Conditions:**

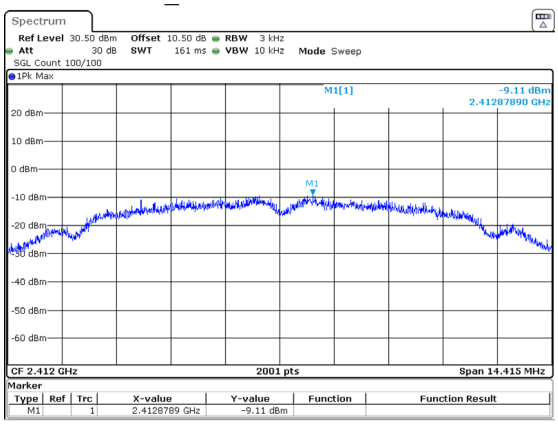
| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C):** | 25.4 | **Relative Humidity: (%)** | 55 | **ATM Pressure: (kPa)** | 101 |

**Test Data:**

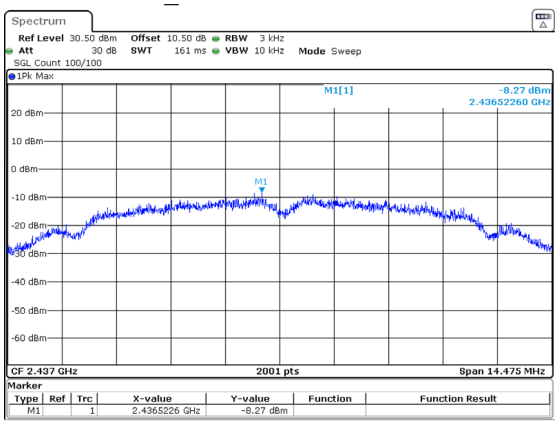
| Mode | Test Frequency (MHz) | Result (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|---|---|---|---|---|
| 802.11b | 2412 | -9.11 | 8 | Pass |
| | 2437 | -8.27 | 8 | Pass |
| | 2462 | **-7.88** | 8 | Pass |
| 802.11g | 2412 | -12.63 | 8 | Pass |
| | 2437 | -12.48 | 8 | Pass |
| | 2462 | -12.31 | 8 | Pass |
| 802.11n20 | 2412 | -12.71 | 8 | Pass |
| | 2437 | -12.78 | 8 | Pass |
| | 2462 | -12.57 | 8 | Pass |
| 802.11n40 | 2422 | -15.94 | 8 | Pass |
| | 2437 | -15.87 | 8 | Pass |
| | 2452 | -15.84 | 8 | Pass |

## 2.4G

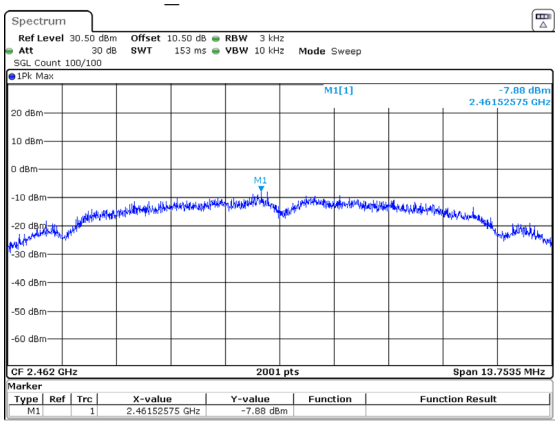
802.11b_2412MHz -9.11dBm/3kHz



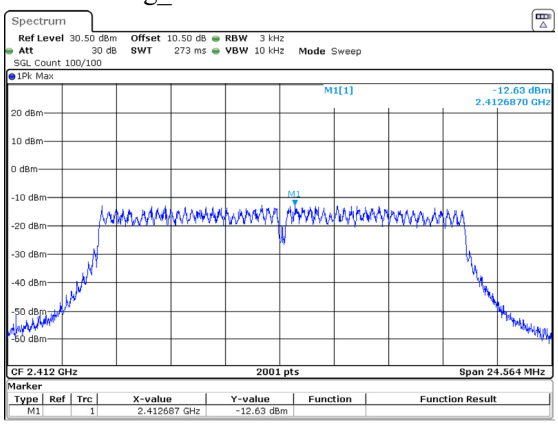

802.11b_2437MHz -8.27dBm/3kHz



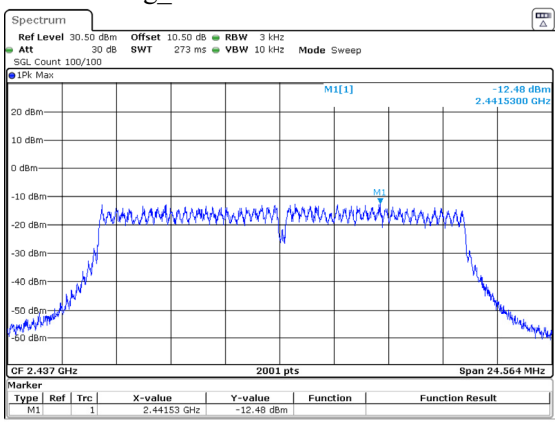

802.11b_2462MHz -7.88dBm/3kHz



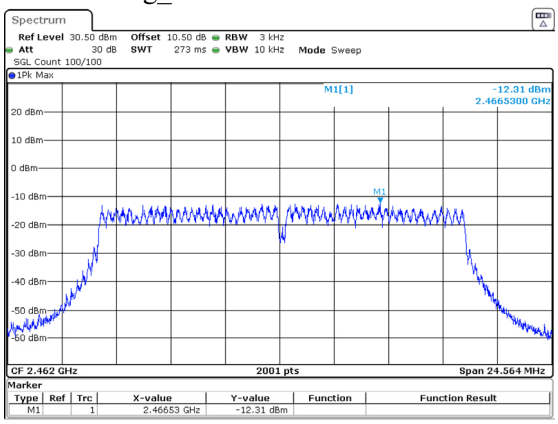

802.11g_2412MHz -12.63dBm/3kHz



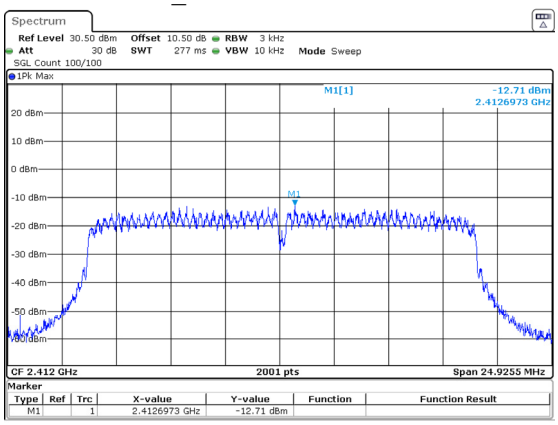

802.11g_2437MHz -12.48dBm/3kHz




802.11g_2462MHz -12.31dBm/3kHz

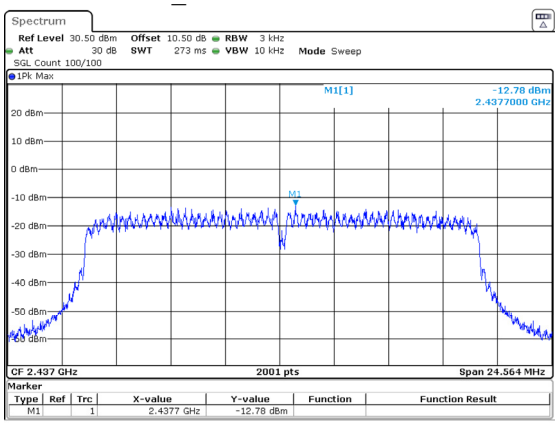


802.11n20_2412MHz -12.71dBm/3kHz



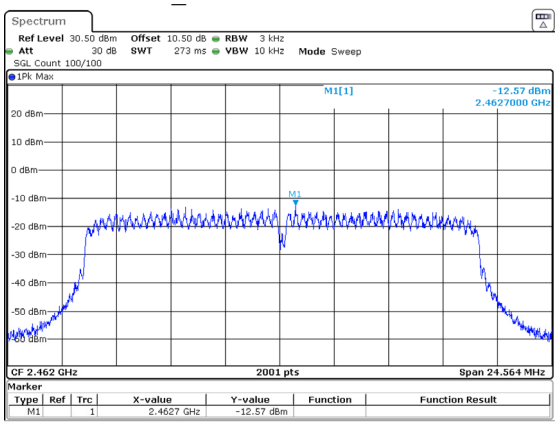

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:27:28

802.11n20_2437MHz -12.78dBm/3kHz



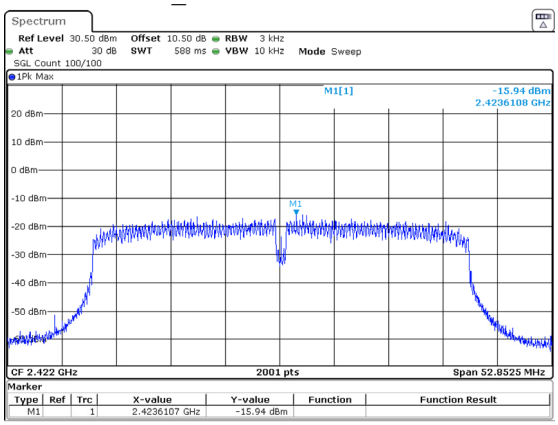

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:28:37

802.11n20_2462MHz -12.57dBm/3kHz



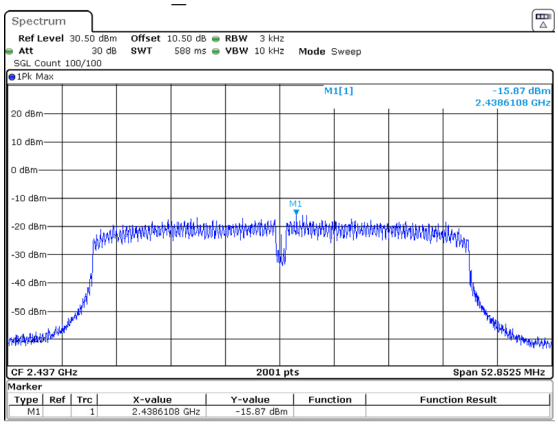

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:29:37

802.11n40_2422MHz -15.94dBm/3kHz



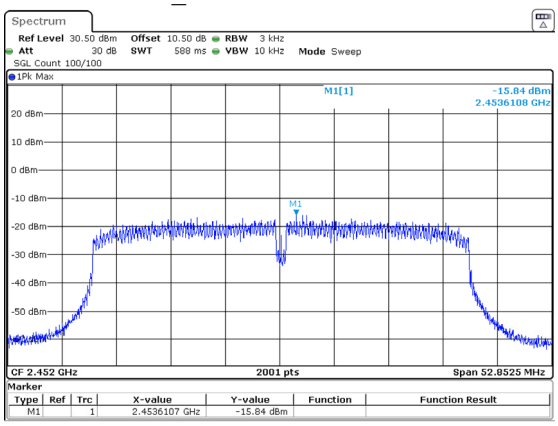

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:34:18

802.11n40_2437MHz -15.87dBm/3kHz




ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:36:10

802.11n40_2452MHz -15.84dBm/3kHz




ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:38:17

**100 kHz Bandwidth of Frequency Band Edge**

**Test Information:**

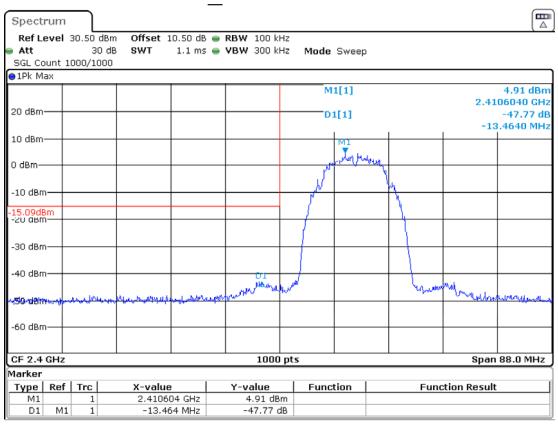
| | | | |
|---|---|---|---|
| **Sample No.:** | 2MP7-1 | **Test Date:** | 2024/11/07 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Kungfumaster Liang | **Test Result:** | Pass |

**Environmental Conditions:**

| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C):** | 25.4 | **Relative Humidity: (%)** | 55 | **ATM Pressure: (kPa)** | 101 |

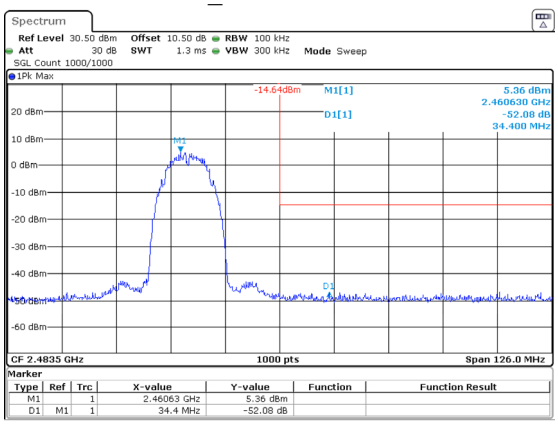
## 2.4G

802.11b_2412MHz 47.77dB



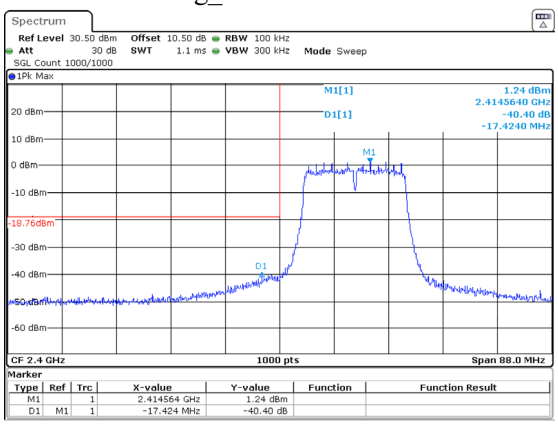

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:42:30

802.11b_2462MHz 52.08dB



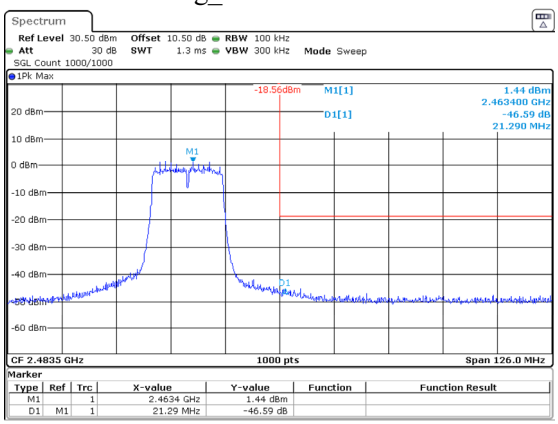

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:43:47

802.11g_2412MHz 40.40dB



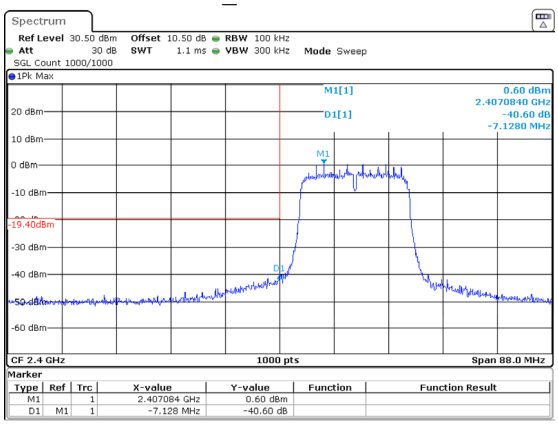

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:44:28

802.11g_2462MHz 46.59dB



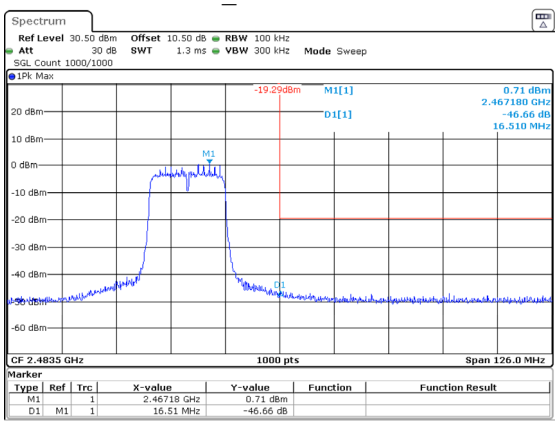

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:45:19

802.11n20_2412MHz 40.60dB



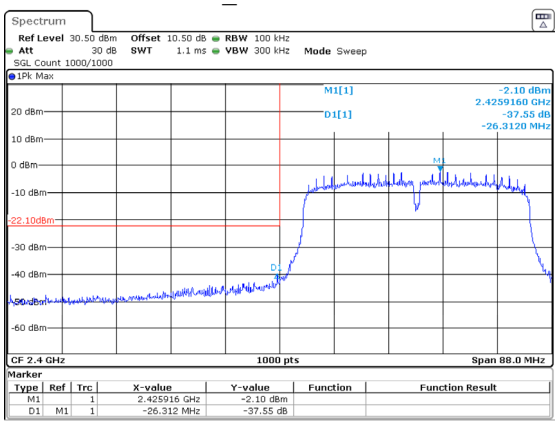

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:46:19

802.11n20_2462MHz 46.66dB



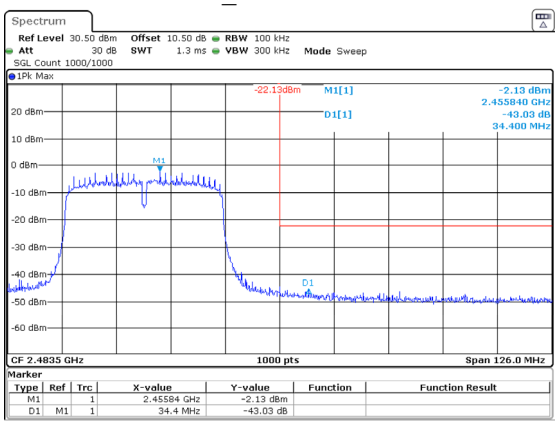

ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:47:45

802.11n40_2422MHz 37.55dB




ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:49:05

802.11n40_2452MHz 43.03dB




ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 23:49:52

**Duty Cycle**

**Test Information:**

| | | | |
|---|---|---|---|
| **Sample No.:** | 2MP7-1 | **Test Date:** | 2024/11/07 |
| **Test Site:** | RF | **Test Mode:** | Transmitting |
| **Tester:** | Kungfumaster Liang | **Test Result:** | N/A |

**Environmental Conditions:**

| | | | | | |
|---|---|---|---|---|---|
| **Temperature: (°C):** | 25.4 | **Relative Humidity: (%)** | 55 | **ATM Pressure: (kPa)** | 101 |

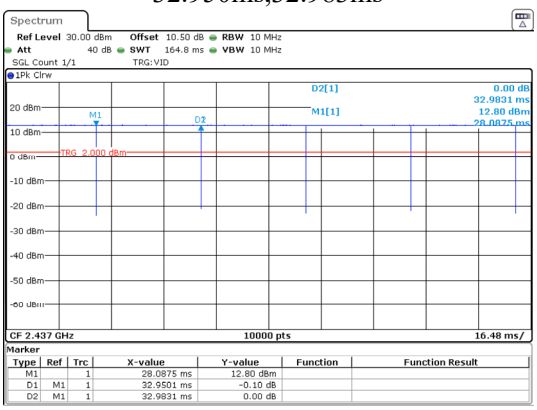
**Test Data:**

| Mode | Test Frequency (MHz) | Ton (ms) | Ton+Toff (ms) | Duty Cycle (%) | Duty Cycle Factor(dB) | 1/Ton (Hz) | VBW Setting (kHz) |
|---|---|---|---|---|---|---|---|
| 802.11b | 2437 | **32.950** | 32.983 | 99.90 | / | / | 0.010 |
| 802.11g | 2437 | 5.478 | 5.506 | 99.49 | / | / | 0.010 |
| 802.11n20 | 2437 | 5.065 | 5.098 | 99.35 | / | / | 0.010 |
| 802.11n40 | 2437 | 2.456 | 2.484 | 98.87 | / | / | 0.010 |

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

## 2.4G

802.11b_2437MHz
32.950ms,32.983ms

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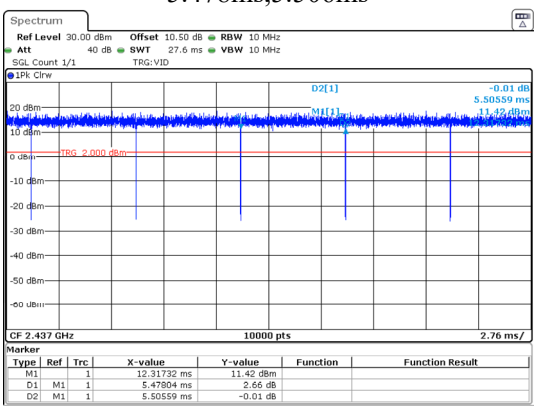
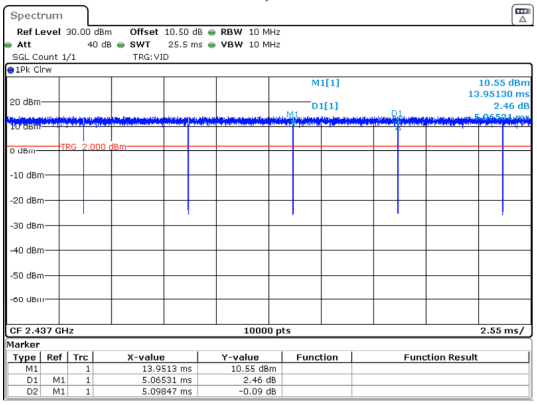
802.11g_2437MHz
5.478ms,5.506ms




ProjectNo.:2401U21148E-RF Tester:Kungfumaster Liang
Date: 7.NOV.2024 21:30:21

802.11n20_2437MHz
5.065ms,5.098ms

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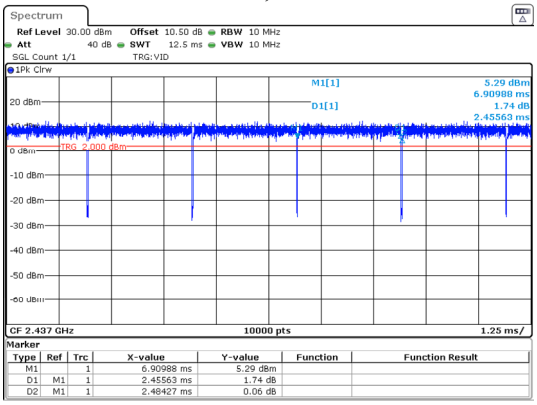
Date: 7.NOV.2024 21:32:02

802.11n40_2437MHz
2.456ms,2.484ms

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# RF EXPOSURE EVALUATION

**RF EXPOSURE**

## Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

**Measurement Result**

**For worst case:**

| Mode | Frequency (MHz) | Max tune-up conducted power[#](dBm) | Max tune-up conducted power[#](mW) | Distance (mm) | Calculated value | Threshold (10-g SAR) | SAR Test Exclusion |
|---|---|---|---|---|---|---|---|
| Wi-Fi | 2412-2462 | 13.5 | 22.39 | 5 | 7.0 | 7.5 | Yes |

Note: The EUT is a handheld device. Lora, Bluetooth and Wi-Fi cannot transmit simultaneously.

**Result: Compliant**

# EUT PHOTOGRAPHS

Please refer to the attachment 2401U21148E-RF External photo and 2401U21148E-RF Internal photo.

# TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2401U21148E-RFB Test Setup photo.

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