# 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: | 2501R04077E-RF-00C |
| FCC ID: | 2ASYE-T-DECK-PLUS |

**Test Standard (s)**

FCC PART 15.247

**Sample Description**

| | |
|---|---|
| Product Type: | T-Deck Plus |
| Model No.: | T-Deck Plus |
| Multiple Model(s) No.: | N/A |
| Trade Mark: | LILYGO |
| Date Received: | 2025-03-05 |
| Issue Date: | 2025-08-04 |

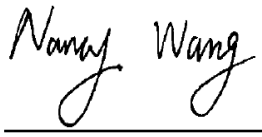
| | |
|---|---|
| Test Result: | Pass▲ |

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

**Prepared and Checked By:**

Wills Yu
RF Engineer

**Approved By:**



Nancy Wang
RF Supervisor

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

# DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|---|---|---|---|
| 0 | 2501R04077E-RF-00C | Original Report | 2025-08-04 |

# GENERAL INFORMATION

## Product Description for Equipment under Test (EUT)

| | |
|---|---|
| Product | T-Deck Plus |
| Tested Model | T-Deck Plus |
| Multiple Model(s) | N/A |
| Frequency Range | 915MHz |
| Maximum Conducted Peak Output Power | 4.83dBm |
| Modulation Technique | LoRa |
| Antenna Specification# | 0.99dBi (provided by the applicant) |
| Voltage Range | DC 5V from USB Port or DC 3.7V from Battery |
| Sample serial number | 2Z5D-2 for Conducted and Radiated Emissions Test<br>2Z5D-3 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.

## Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

And 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 Frequency | | 56.6Hz(k=2, 95% level of confidence) |
| RF output power, conducted | | 0.86dB(k=2, 95% level of confidence) |
| Unwanted Emission, conducted | | 1.60dB(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

The system was configured for testing in engineering mode.

**Channel List**

| Channel | Freq. (MHz) |
|---|---|
| 1 | 915 |

## Equipment Modifications

No modification was made to the EUT tested.

## EUT Exercise Software

"EspRFTestTool_v3.6_Manual #" exercise software was used and the power level is 5#. The software and power level was provided by the manufacturer.

## Support Equipment List and Details

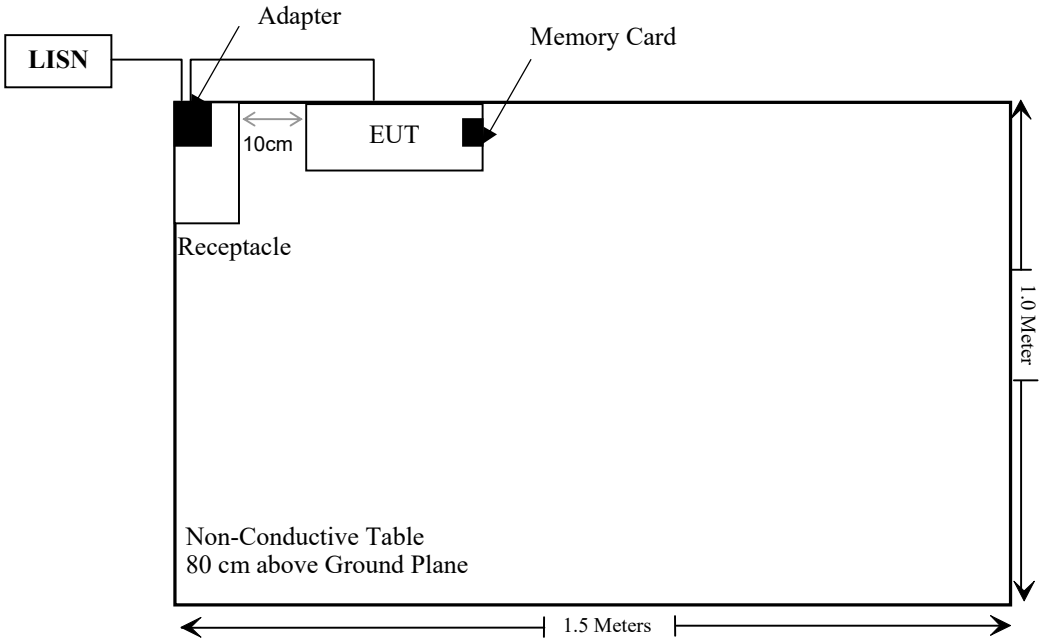
| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| HUAJIN | Adapter | HJ-0503000-US | Unknown |
| Kingston | Memory card | SDCS2 | Unknown |

## External I/O Cable

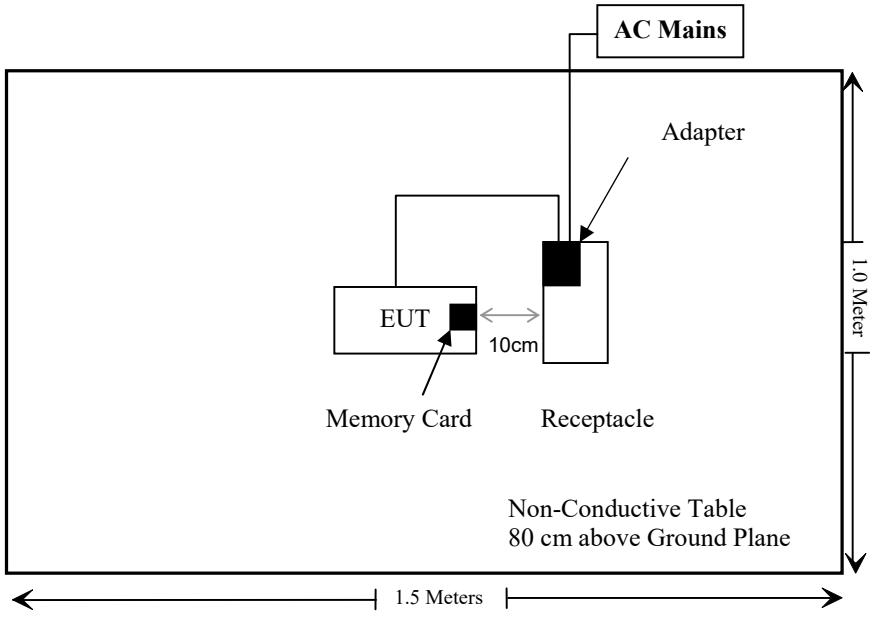
| Cable Description | Length (m) | From Port | To |
|---|---|---|---|
| Un-shielding Detachable USB Cable | 1.0 | EUT | Adapter |
| Unshielded Un-detachable AC cable | 1.2 | Receptacle | LISN/AC Mains |

## Block Diagram of Test Setup

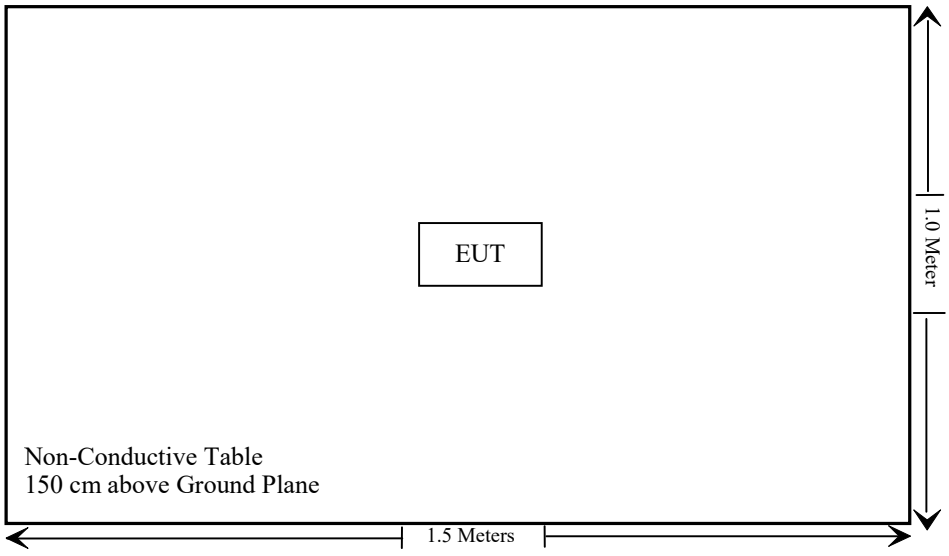
For Conducted Emissions:




For Radiated Emissions below 1GHz:



For Radiated Emissions above 1GHz:



# SUMMARY OF TEST RESULTS

| Test Rules | Description of Test | Result |
|---|---|---|
| FCC §1.1307&§2.1093&§15.247 (i) | RF Exposure | Compliant |
| FCC §15.203 | Antenna Requirement | Compliant |
| FCC §15.207(a) | AC Line Conducted Emissions | Compliant |
| FCC §15.205, §15.209, §15.247(d) | Spurious Emissions | Compliant |
| FCC §15.247 (a)(2) | 6 dB Emission Bandwidth | Compliant |
| FCC §15.247(b)(3) | 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 |
| C63.10 §11.6 | Duty Cycle | / |

# TEST EQUIPMENT LIST

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| **Conducted Emission Test** | | | | | |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 101120 | 2024/12/04 | 2025/12/03 |
| Rohde & Schwarz | LISN | ENV216 | 101613 | 2024/12/04 | 2025/12/03 |
| Rohde & Schwarz | Transient Limiter | ESH3Z2 | DE25985 | 2024/05/21 | 2025/05/20 |
| Unknown | CE Cable | Unknown | UF A210B-1-0720-504504 | 2024/05/21 | 2025/05/20 |
| Audix | EMI Test software | E3 | 191218(V9) | NCR | NCR |
| **Radiated Emission Test_ Below 1GHz** | | | | | |
| Rohde & Schwarz | EMI Test Receiver | ESR3 | 102455 | 2024/12/04 | 2025/12/03 |
| Sonoma instrument | Pre-amplifier | 310 N | 186238 | 2025/04/29 | 2026/04/28 |
| Sunol Sciences | Broadband Antenna | JB1 | A040904-1 | 2023/07/20 | 2026/07/19 |
| Unknown | Cable | Chamber A Cable 1 | N/A | 2025/04/29 | 2026/04/28 |
| Unknown | Cable | XH500C | J-10M-A | 2025/04/29 | 2026/04/28 |
| BACL | Active Loop Antenna | 1313-1A | 4031911 | 2024/05/14 | 2027/05/13 |
| Unknown | Cable | 2Y194 | 0735 | 2024/12/04 | 2025/12/03 |
| Unknown | Cable | PNG214 | 1354 | 2024/12/04 | 2025/12/03 |
| Audix | EMI Test software | E3 | 19821b(V9) | NCR | NCR |
| JD | Filter Switch Unit | DT7220FSU | DS79906 | 2024/09/09 | 2025/09/08 |
| JD | Multiplex Switch Test Control Set | DT7220SCU | DS79903 | 2024/09/09 | 2025/09/08 |
| **Radiated Emission Test_ Above 1GHz** | | | | | |
| Rohde & Schwarz | Spectrum Analyzer | FSV40 | 101605 | 2025/03/26 | 2026/03/25 |
| A.H.System | Preamplifier | PAM-0118P | 489 | 2024/11/15 | 2025/11/14 |
| Schwarzbeck | Horn Antenna | BBHA9120D(1201) | 1143 | 2023/07/26 | 2026/07/25 |
| Unknown | RF Cable | KMSE | 735 | 2024/12/06 | 2025/12/05 |
| Unknown | RF Cable | UFA147 | 219661 | 2024/12/06 | 2025/12/05 |
| JD | Filter Switch Unit | DT7220FSU | DS79906 | 2024/09/09 | 2025/09/08 |
| JD | Multiplex Switch Test Control Set | DT7220SCU | DS79903 | 2024/09/09 | 2025/09/08 |
| Audix | EMI Test software | E3 | 191218(V9) | NCR | NCR |

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| RF Conducted Test | | | | | |
| Rohde & Schwarz | Spectrum Analyzer | FSU26 | 200982 | 2024/09/20 | 2025/09/19 |
| Rohde & Schwarz | Spectrum Analyzer | FSV40-N | 102259 | 2024/12/04 | 2025/12/03 |
| Unknown | 10dB Attenuator | Unknown | F-03-EM065 | 2024/06/27 | 2025/06/26 |
| Unknown | 10dB Attenuator | Unknown | F-03-EM065 | 2025/06/26 | 2026/06/25 |

*** 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).

# FCC§15.247 (i), §1.1307 (b) (1) & §2.1093 - 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 v06.

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 (1-g SAR) | SAR Test Exclusion |
|---|---|---|---|---|---|---|---|
| BLE | 2402-2480 | 4.5 | 2.82 | 5 | 0.9 | 3.0 | Yes |
| 2.4G Wi-Fi | 2412-2462 | 9.8 | 9.55 | 5 | 3.0 | 3.0 | Yes |
| LoRa | 915 | 5.5 | 3.55 | 5 | 0.7 | 3.0 | Yes |

Note: The Lora, BLE and Wi-Fi cannot transmit at same time.

**Result: Compliant**

# FCC §15.203 - 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, and the maximum antenna gain[#] is 0.99dBi, fulfill the requirement of this section. Please refer to the EUT photos.

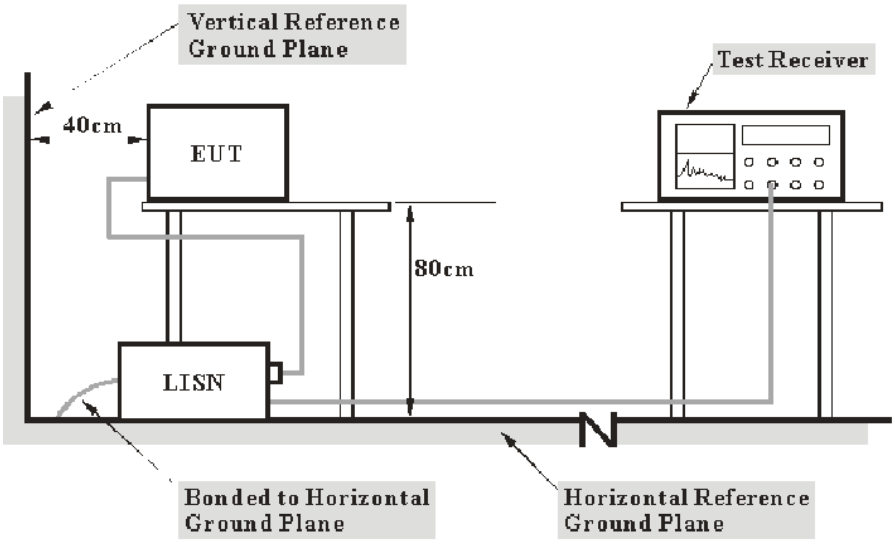
**Result:** Compliant.

# FCC §15.207 (a) - 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 C63.10-2020 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 | RBW |
|---|---|
| 150 kHz – 30 MHz | 9 kHz |

## Test Procedure

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

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

## Factor & Over Limit Calculation

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

Factor = LISN VDF + Cable Loss

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

Over Limit = Level – Limit
Level = Read Level + Factor

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

## Test Data

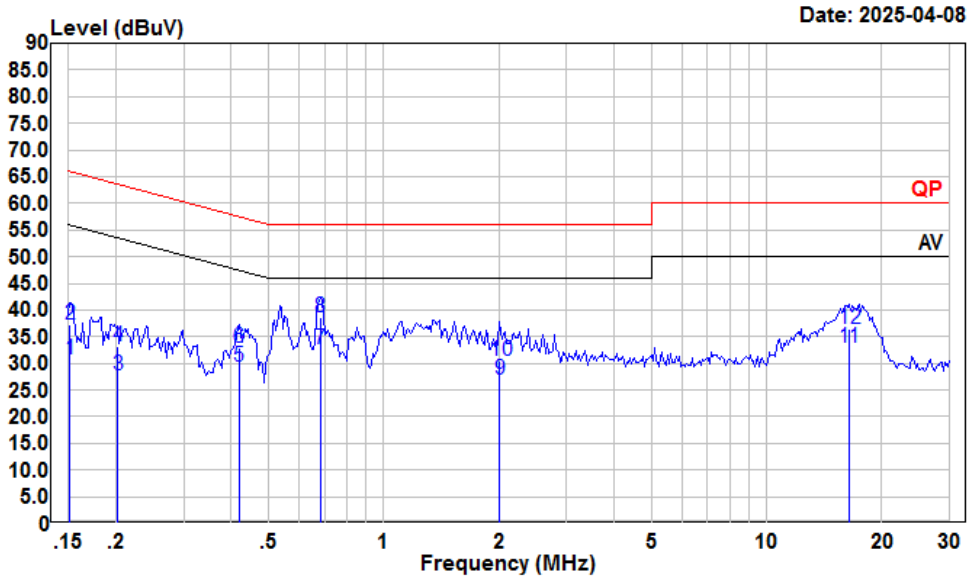
### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 23.7 ℃ |
| **Relative Humidity:** | 53 % |
| **ATM Pressure:** | 101 kPa |

*The testing was performed by Macy Shi on 2025-04-08.*

*EUT operation mode: Transmitting*

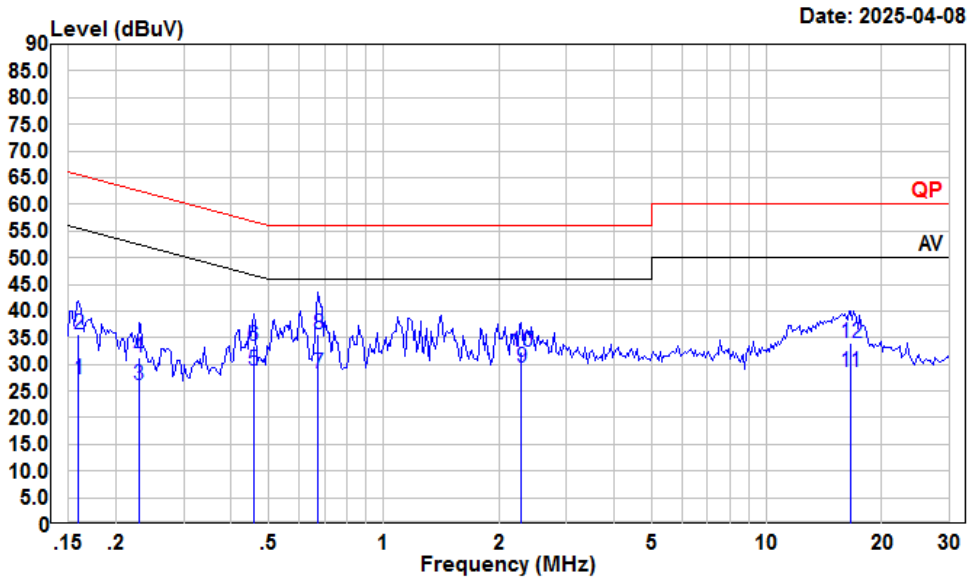
**AC 120V/60 Hz, Line**




Condition: Line
Project : 2501R04077E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz

| | Freq | Read Level | LISN Level | Factor | Cable Loss | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dB | dBuV | dB | |
| 1 | 0.152 | 10.20 | 30.77 | 10.41 | 10.16 | 55.91 | -25.14 | Average |
| 2 | 0.152 | 16.76 | 37.33 | 10.41 | 10.16 | 65.91 | -28.58 | QP |
| 3 | 0.202 | 6.90 | 27.79 | 10.70 | 10.19 | 53.54 | -25.75 | Average |
| 4 | 0.202 | 12.28 | 33.17 | 10.70 | 10.19 | 63.54 | -30.37 | QP |
| 5 | 0.419 | 8.60 | 29.35 | 10.54 | 10.21 | 47.46 | -18.11 | Average |
| 6 | 0.419 | 12.12 | 32.87 | 10.54 | 10.21 | 57.46 | -24.59 | QP |
| 7 | 0.683 | 11.50 | 32.60 | 10.87 | 10.23 | 46.00 | -13.40 | Average |
| 8 | 0.683 | 17.61 | 38.71 | 10.87 | 10.23 | 56.00 | -17.29 | QP |
| 9 | 2.012 | 5.60 | 26.93 | 11.10 | 10.23 | 46.00 | -19.07 | Average |
| 10 | 2.012 | 9.11 | 30.44 | 11.10 | 10.23 | 56.00 | -25.56 | QP |
| 11 | 16.398 | 12.04 | 32.82 | 10.52 | 10.26 | 50.00 | -17.18 | Average |
| 12 | 16.398 | 15.58 | 36.36 | 10.52 | 10.26 | 60.00 | -23.64 | QP |

**AC 120V/60 Hz, Neutral**




Condition: Neutral
Project : 2501R04077E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz

| | Freq | Read Level | LISN Level | Factor | Cable Loss | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dB | dBuV | dB | |
| 1 | 0.160 | 6.50 | 27.16 | 10.49 | 10.17 | 55.47 | -28.31 | Average |
| 2 | 0.160 | 14.84 | 35.50 | 10.49 | 10.17 | 65.47 | -29.97 | QP |
| 3 | 0.229 | 5.19 | 26.15 | 10.76 | 10.20 | 52.48 | -26.33 | Average |
| 4 | 0.229 | 10.29 | 31.25 | 10.76 | 10.20 | 62.48 | -31.23 | QP |
| 5 | 0.456 | 8.20 | 28.93 | 10.53 | 10.20 | 46.76 | -17.83 | Average |
| 6 | 0.456 | 12.64 | 33.37 | 10.53 | 10.20 | 56.76 | -23.39 | QP |
| 7 | 0.675 | 7.50 | 28.32 | 10.59 | 10.23 | 46.00 | -17.68 | Average |
| 8 | 0.675 | 14.81 | 35.63 | 10.59 | 10.23 | 56.00 | -20.37 | QP |
| 9 | 2.285 | 8.40 | 29.40 | 10.76 | 10.24 | 46.00 | -16.60 | Average |
| 10 | 2.285 | 11.29 | 32.29 | 10.76 | 10.24 | 56.00 | -23.71 | QP |
| 11 | 16.573 | 7.60 | 28.44 | 10.58 | 10.26 | 50.00 | -21.56 | Average |
| 12 | 16.573 | 13.12 | 33.96 | 10.58 | 10.26 | 60.00 | -26.04 | QP |

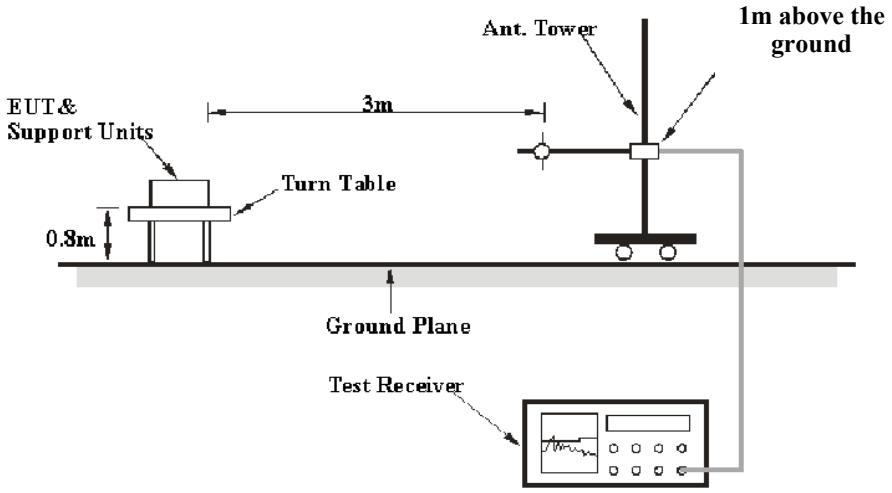
# FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

## Applicable Standard

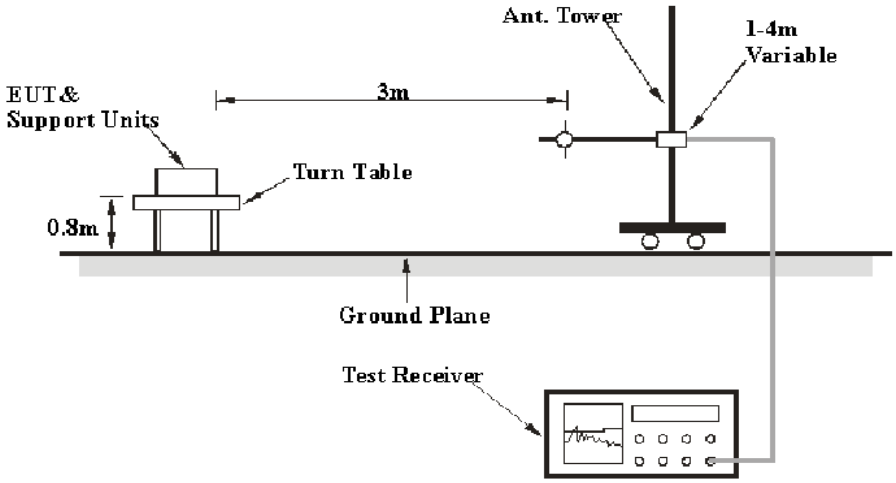
FCC §15.247 (d); §15.209; §15.205;

## EUT Setup

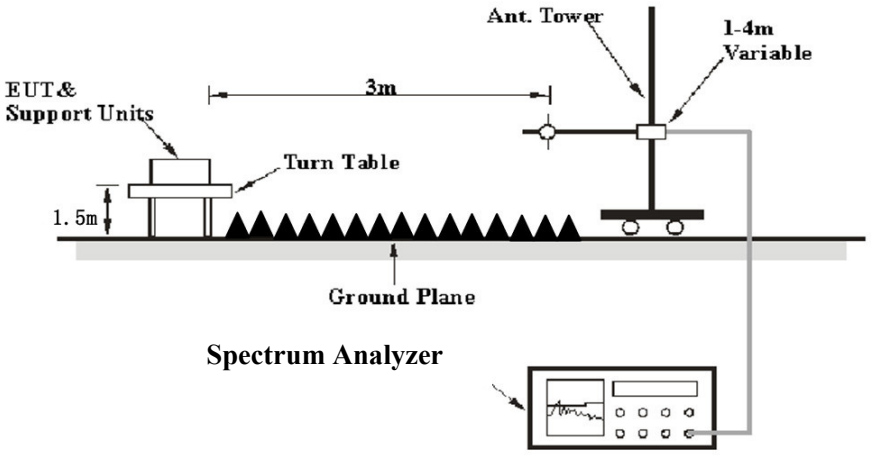
**9 kHz-30MHz:**




**30MHz-1GHz:**



**Above 1GHz:**




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

## EMI Test Receiver & Spectrum Analyzer Setup

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

Above 1 GHz:
Pre-scan

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

Final measurement for emission identified during pre-scan

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

Note: Ton is minimum transmission duration

## 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.

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.

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

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 21.6~25.3 ℃ |
| **Relative Humidity:** | 49~55 % |
| **ATM Pressure:** | 100.3~101.5 kPa |

*The testing was performed by Alex Yan on 2025-07-08 for below 1GHz and Visen Wu on 2025-03-29 for above 1GHz.*

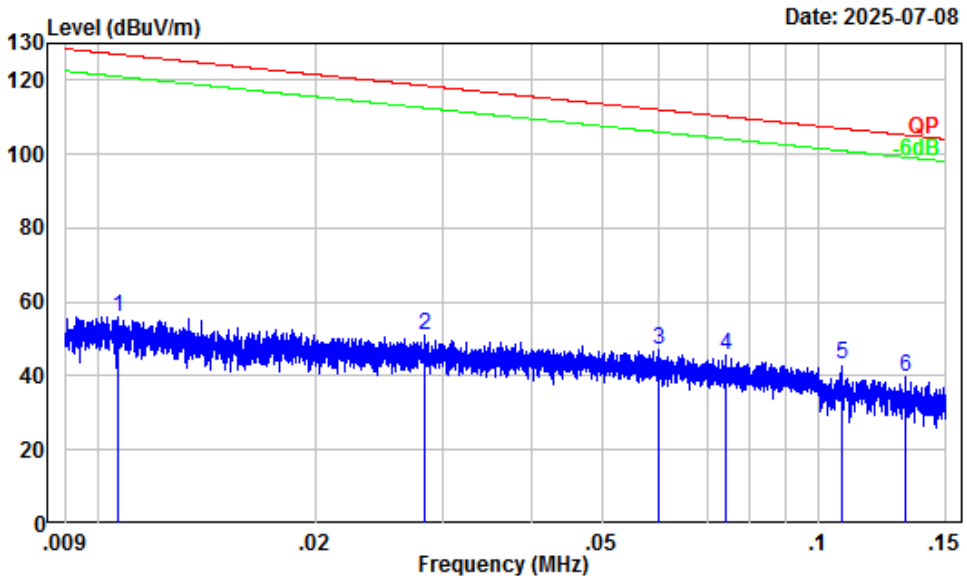
*EUT operation mode: Transmitting*

*Note: Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded.*

**9 kHz-30MHz:**

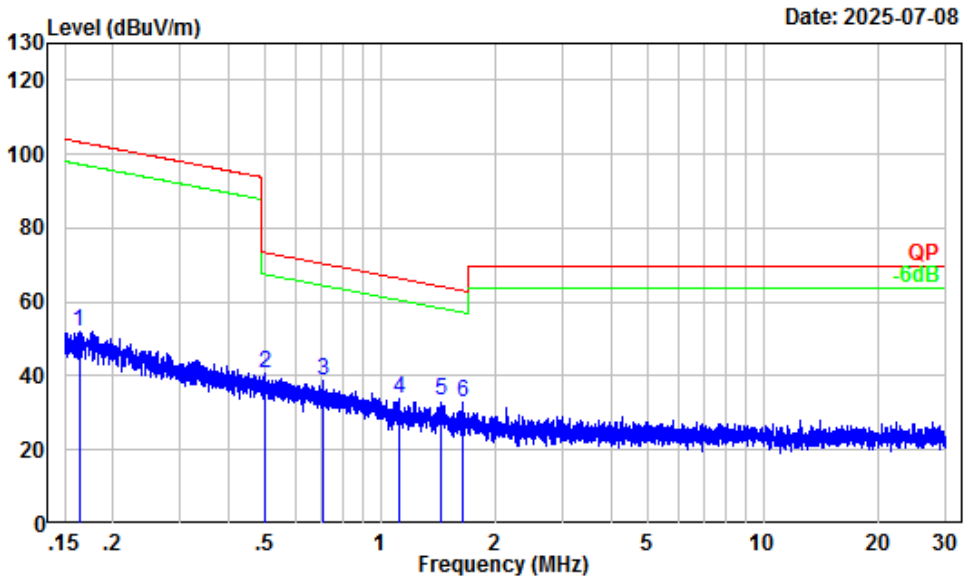
Note: When the test result of peak was less than the limit of QP/Average more than 6dB, just peak value were recorded.

Parallel (worst case)




Site : Chamber A
Condition : 3m
Project Number : 2501R04077E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 0.3/1kHz
Tester : Alex Yan

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 0.011 | 32.18 | 23.93 | 56.11 | 127.07 | -70.96 | Peak |
| 2 | 0.028 | 28.81 | 22.35 | 51.16 | 118.55 | -67.39 | Peak |
| 3 | 0.060 | 25.41 | 21.69 | 47.10 | 112.06 | -64.96 | Peak |
| 4 | 0.074 | 23.96 | 21.47 | 45.43 | 110.17 | -64.74 | Peak |
| 5 | 0.108 | 21.56 | 21.39 | 42.95 | 106.98 | -64.03 | Peak |
| 6 | 0.132 | 20.12 | 19.49 | 39.61 | 105.21 | -65.60 | Peak |



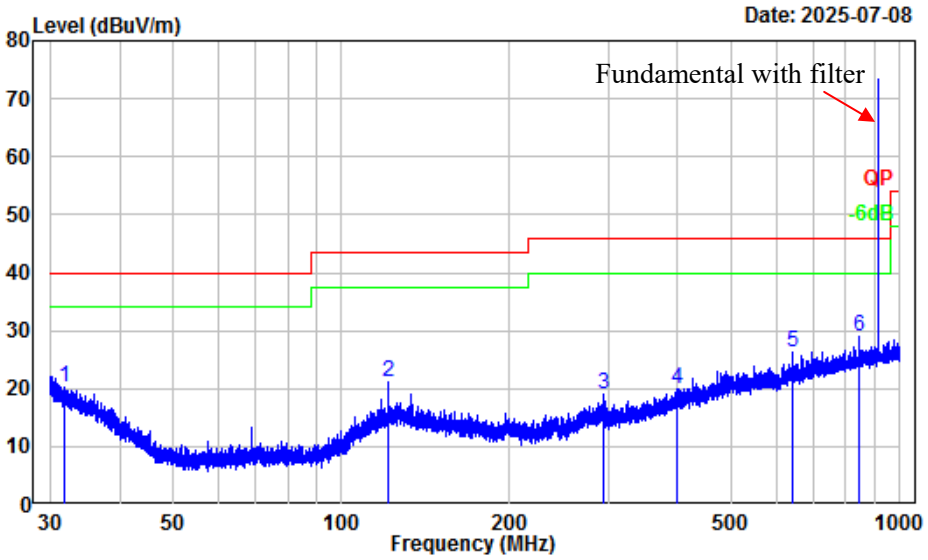

Site : Chamber A
Condition : 3m
Project Number : 2501R04077E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 10/30kHz
Tester : Alex Yan

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 0.163 | 18.26 | 33.97 | 52.23 | 103.34 | -51.11 | Peak |
| 2 | 0.498 | 6.44 | 34.45 | 40.89 | 73.66 | -32.77 | Peak |
| 3 | 0.707 | 3.84 | 34.74 | 38.58 | 70.54 | -31.96 | Peak |
| 4 | 1.124 | 0.85 | 32.81 | 33.66 | 66.44 | -32.78 | Peak |
| 5 | 1.434 | -0.01 | 33.56 | 33.55 | 64.28 | -30.73 | Peak |
| 6 | 1.644 | -0.60 | 33.56 | 32.96 | 63.06 | -30.10 | Peak |

**30 MHz~1 GHz:**

Note: When the test result of peak was less than the limit of QP/Average more than 6dB, just peak value were recorded.

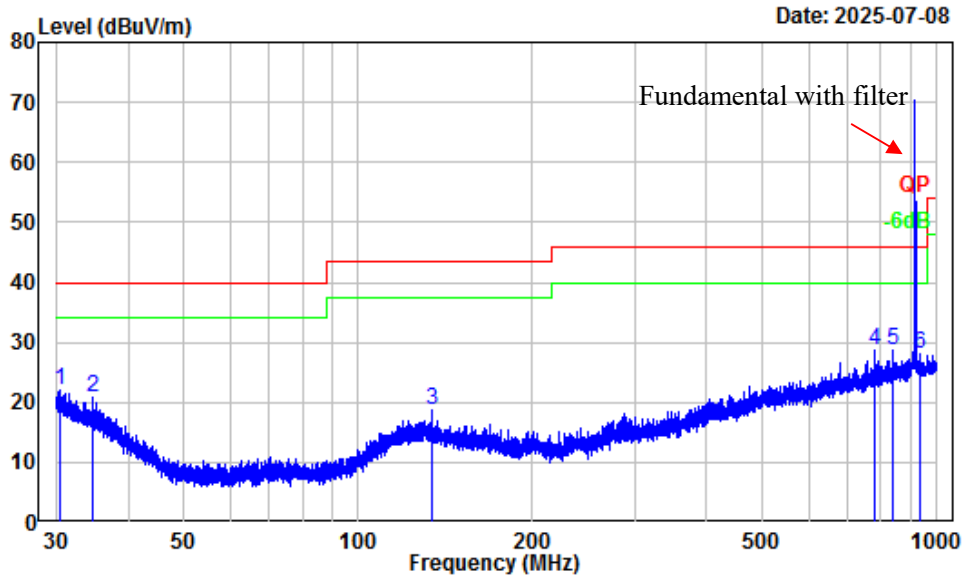
**Horizontal**




Site : Chamber A
Condition : 3m Horizontal
Project Number : 2501R04077E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Alex Yan

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 31.95 | -7.04 | 27.34 | 20.30 | 40.00 | -19.70 | Peak |
| 2 | 121.02 | -11.35 | 32.35 | 21.00 | 43.50 | -22.50 | Peak |
| 3 | 293.60 | -11.21 | 30.16 | 18.95 | 46.00 | -27.05 | Peak |
| 4 | 397.63 | -8.51 | 28.29 | 19.78 | 46.00 | -26.22 | Peak |
| 5 | 640.89 | -4.24 | 30.65 | 26.41 | 46.00 | -19.59 | Peak |
| 6 | 848.06 | -1.73 | 30.85 | 29.12 | 46.00 | -16.88 | Peak |

**Vertical**




Site : Chamber A
Condition : 3m Vertical
Project Number : 2501R04077E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Alex Yan

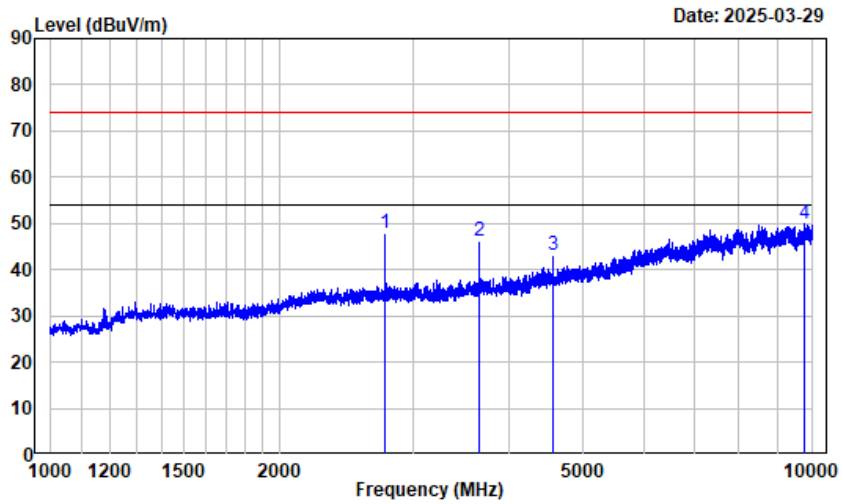
| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 30.60 | -6.27 | 28.21 | 21.94 | 40.00 | -18.06 | Peak |
| 2 | 34.78 | -8.76 | 29.47 | 20.71 | 40.00 | -19.29 | Peak |
| 3 | 134.21 | -11.42 | 30.22 | 18.80 | 43.50 | -24.70 | Peak |
| 4 | 778.24 | -2.40 | 31.18 | 28.78 | 46.00 | -17.22 | Peak |
| 5 | 841.39 | -1.80 | 30.34 | 28.54 | 46.00 | -17.46 | Peak |
| 6 | 938.42 | -1.05 | 29.00 | 27.95 | 46.00 | -18.05 | Peak |

**Above 1 GHz:**

| Frequency (MHz) | Reading (dBµV) | PK/Ave | Polar (H/V) | Factor (dB/m) | Absolute Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 915MHz | | | | | | | |
| 2745.00 | 58.65 | PK | H | -10.64 | 48.01 | 74 | -25.99 |
| 2745.00 | 55.46 | AV | H | -10.64 | 44.82 | 54 | -9.18 |
| 2745.00 | 58.18 | PK | V | -10.64 | 47.54 | 74 | -26.46 |
| 2745.00 | 54.23 | AV | V | -10.64 | 43.59 | 54 | -10.41 |
| 3660.00 | 55.77 | PK | H | -9.72 | 46.05 | 74 | -27.95 |
| 3660.00 | 51.50 | AV | H | -9.72 | 41.78 | 54 | -12.22 |
| 3660.00 | 57.30 | PK | V | -9.72 | 47.58 | 74 | -26.42 |
| 3660.00 | 51.01 | AV | V | -9.72 | 41.29 | 54 | -12.71 |
| 4575.00 | 51.45 | PK | H | -8.18 | 43.27 | 74 | -30.73 |
| 4575.00 | 38.05 | AV | H | -8.18 | 29.87 | 54 | -24.13 |
| 4575.00 | 51.24 | PK | V | -8.18 | 43.06 | 74 | -30.94 |
| 4575.00 | 37.47 | AV | V | -8.18 | 29.29 | 54 | -24.71 |

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

**1-10GHz :**

| Horizontal_Peak | |
|---|---|
| 1-10GHz |  |

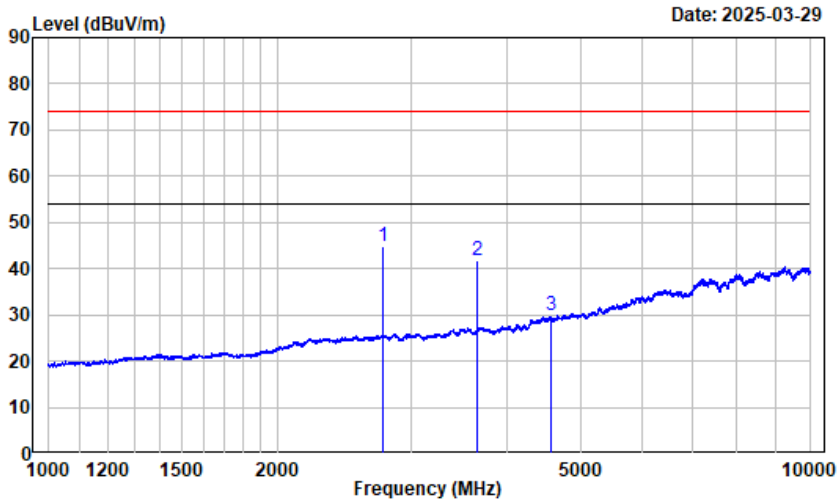


```
Condition       : Horizontal
Project No.     : 2501R04077E-RF
Tester          : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note            : Lora_915_500K
```

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2745.000 | -10.64 | 58.65 | 48.01 | 74.00 | -25.99 | Peak |
| 2 | 3660.000 | -9.72 | 55.77 | 46.05 | 74.00 | -27.95 | Peak |
| 3 | 4575.000 | -8.18 | 51.45 | 43.27 | 74.00 | -30.73 | Peak |
| 4 | 9750.219 | 1.19 | 48.90 | 50.09 | 74.00 | -23.91 | Peak |

**Horizontal_Average**

1-10GHz

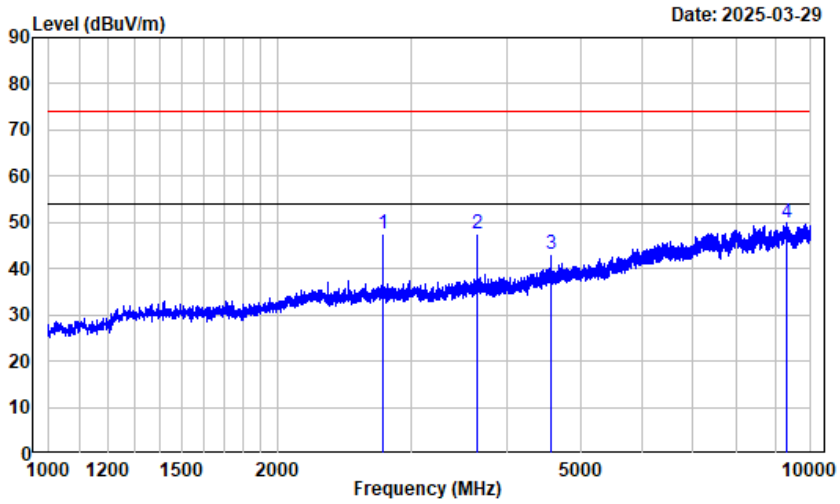



Condition : Horizontal
Project No. : 2501R04077E-RF
Tester : Visen Wu
Spectrum setting: Average reading: RBW:1MHz VBW:100Hz Detector:Peak
Note : Lora_915_500K

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2745.000 | -10.64 | 55.46 | 44.82 | 54.00 | -9.18 | Average |
| 2 | 3660.000 | -9.72 | 51.50 | 41.78 | 54.00 | -12.22 | Average |
| 3 | 4575.000 | -8.18 | 38.05 | 29.87 | 54.00 | -24.13 | Average |

**Vertical_Peak**

1-10GHz

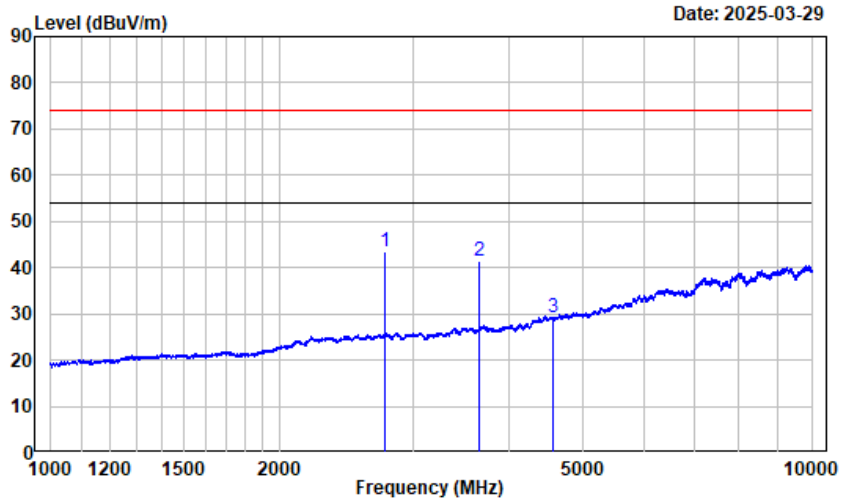



Condition : Vertical
Project No. : 2501R04077E-RF
Tester : Visen Wu
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : Lora_915_500K

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2745.000 | -10.64 | 58.18 | 47.54 | 74.00 | -26.46 | Peak |
| 2 | 3660.000 | -9.72 | 57.30 | 47.58 | 74.00 | -26.42 | Peak |
| 3 | 4575.000 | -8.18 | 51.24 | 43.06 | 74.00 | -30.94 | Peak |
| 4 | 9305.788 | 1.07 | 48.78 | 49.85 | 74.00 | -24.15 | Peak |

**Vertical_Average**

1-10GHz




Condition : Vertical
Project No. : 2501R04077E-RF
Tester : Visen Wu
Spectrum setting: Average reading: RBW:1MHz VBW:100Hz Detector:Peak
Note : Lora_915_500K

| | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 2745.000 | -10.64 | 54.23 | 43.59 | 54.00 | -10.41 | Average |
| 2 | 3660.000 | -9.72 | 51.01 | 41.29 | 54.00 | -12.71 | Average |
| 3 | 4575.000 | -8.18 | 37.47 | 29.29 | 54.00 | -24.71 | Average |

# FCC §15.247(a) (2) - 6 dB EMISSION BANDWIDTH

## Applicable Standard

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 C63.10-2020 Clause 11.8.1 & Clause 6.9.3
The steps for the first option are as follows:

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

b) Set the VBW ≥ [3 × RBW].

c) Detector = peak.

d) Trace mode = max-hold.

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

f) Allow the trace to stabilize.

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

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be at least three times the RBW, unless otherwise specified by the applicable requirement.

c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.6.2.

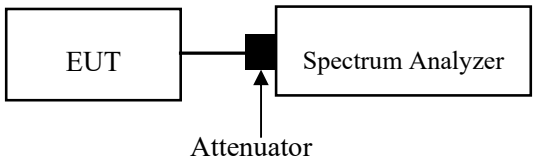
d) Step a) through step c) might require iteration to adjust within the specified range.

e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max-hold mode (until the trace stabilizes) shall be used.

f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.

g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.

h) The occupied bandwidth shall be reported by providing spectral plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).




## Test Data

### Environmental Conditions

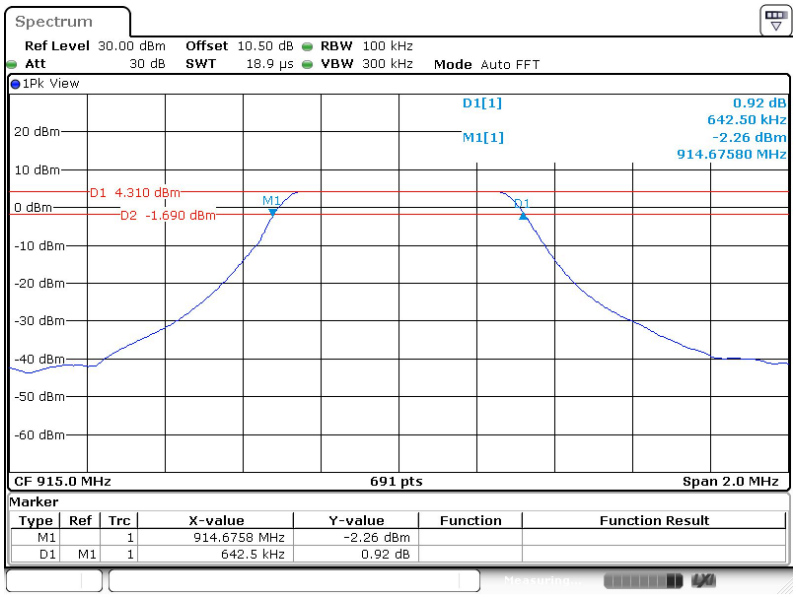
| | |
|---|---|
| **Temperature:** | 26.3 ℃ |
| **Relative Humidity:** | 49 % |
| **ATM Pressure:** | 101.6 kPa |

*The testing was performed by Rainbow Zhu on 2025-07-07.*

*EUT operation mode: Transmitting*

Test Result: Compliant. Please refer to the following table and plots.

| Test Frequency (MHz) | 6 dB Bandwidth (MHz) | Limit (MHz) |
|---|---|---|
| 915 | 0.643 | 0.5 |




ProjectNo.:2501R04077E-RF Tester:Rainbow Zhu

Date: 7.JUL.2025 09:35:05

# FCC §15.247(b) (3) - 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 C63.10-2020 Clause 11.9.1.1

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

a) Set the RBW ≥ DTS bandwidth.

b) Set VBW ≥ [3 × RBW].

c) Set span ≥ [3 × RBW].

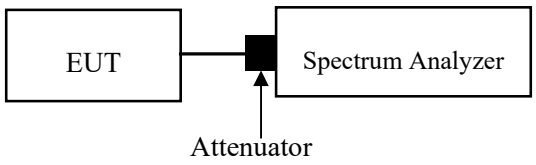
d) Sweep time = No faster than coupled (auto) time.

e) Detector = peak.

f) Trace mode = max-hold.

g) Allow trace to fully stabilize.

h) Use peak marker function to determine the peak amplitude level.




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

## Test Data

### Environmental Conditions

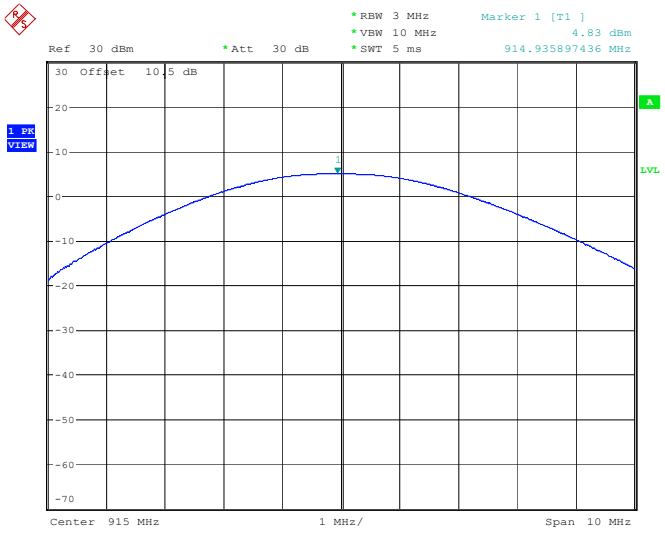
| | |
|---|---|
| **Temperature:** | 24.9 ℃ |
| **Relative Humidity:** | 45 % |
| **ATM Pressure:** | 101.6 kPa |

*The testing was performed by Rainbow Zhu on 2025-03-18.*

*EUT operation mode: Transmitting*

Test Result: Compliant. Please refer to the following table and plots.

| Test Frequency (MHz) | Maximum Peak Conducted Output Power (dBm) | Limit (dBm) |
|---|---|---|
| 915 | 4.83 | ≤30 |




ProjectNo.:2501R04077E-RF Tester:Rainbow Zhu
Date: 18.MAR.2025 05:22:09

# FCC §15.247(d) - 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 C63.10-2020 Clause 11.11.3

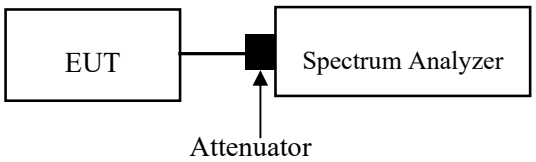
Establish an emission level by using the following procedure:

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

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

b) Set the RBW = 100 kHz.
c) Set the VBW $\geqslant$ [3 $\times$ RBW].
d) Detector = peak.
e) Sweep time = No faster than coupled (auto) time.
f) Trace mode = max-hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.



## Test Data

### Environmental Conditions

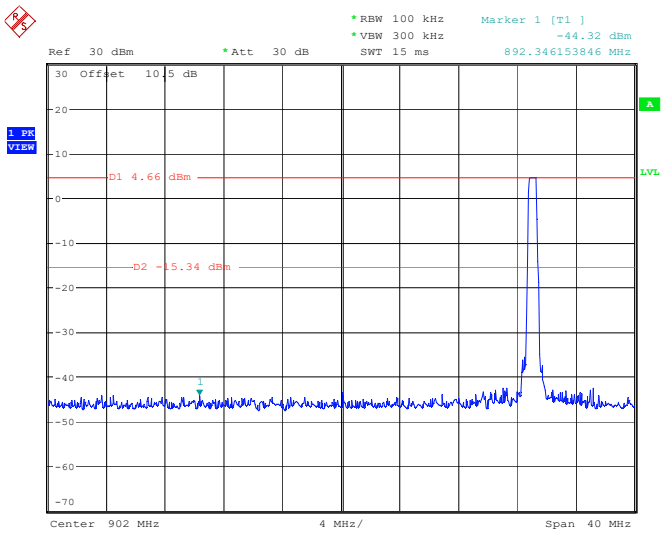
| | |
|---|---|
| **Temperature:** | 24.9 ℃ |
| **Relative Humidity:** | 45 % |
| **ATM Pressure:** | 101.6 kPa |

*The testing was performed by Rainbow Zhu on 2025-03-18.*

*EUT operation mode: Transmitting*

Test Result: Compliant. Please refer to the following plots.

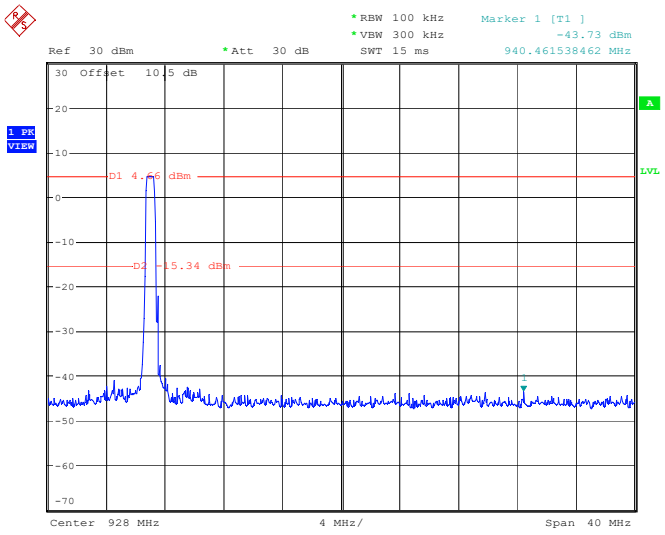
## Band edge, Left side




ProjectNo.:2501R04077E-RF Tester:Rainbow Zhu

Date: 18.MAR.2025 06:16:52

## Band edge, Right side




ProjectNo.:2501R04077E-RF Tester:Rainbow Zhu

Date: 18.MAR.2025 06:21:12

# FCC §15.247(e) - 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 C63.10-2020 Clause 11.10.2

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

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

b) Set the span >1.5 times the DTS bandwidth.

c) Set the RBW to 3 kHz ≤ RBW ≤ 100 kHz.

d) Set the VBW ≥ [3 × RBW].

e) Detector = peak.

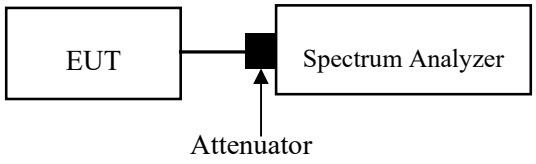
f) Sweep time = No faster than coupled (auto) time.

g) Trace mode = max-hold.

h) Allow trace to fully stabilize.

i) Use the peak marker function to determine the maximum amplitude level within the RBW.

j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.




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

## Test Data

### Environmental Conditions

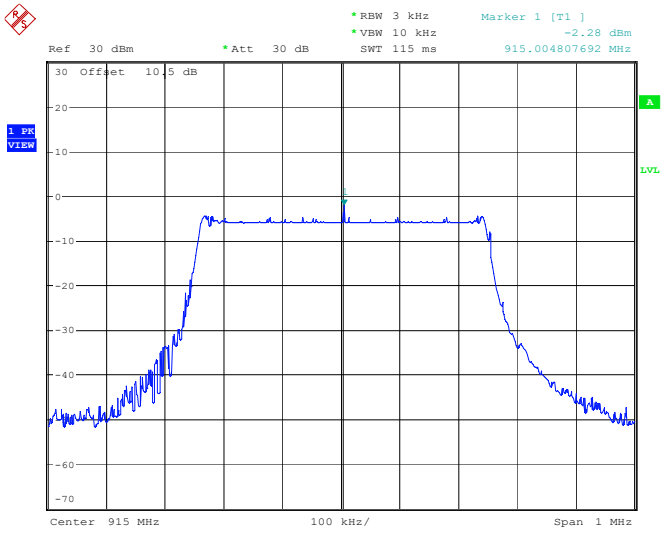
| | |
|---|---|
| **Temperature:** | 24.9 ℃ |
| **Relative Humidity:** | 45 % |
| **ATM Pressure:** | 101.6 kPa |

*The testing was performed by Rainbow Zhu on 2025-03-18.*

*EUT operation mode: Transmitting*

Test Result: Compliant. Please refer to the following table and plots.

| Test Frequency (MHz) | Power Spectral Density (dBm/3kHz) | Limit (dBm/3kHz) |
|---|---|---|
| 915 | -2.28 | ≤8.00 |



# C63.10 §11.6- DUTY CYCLE

## Test Procedure

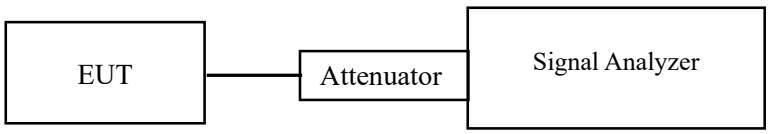
According to ANSI C63.10-2020 Section 11.6

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

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

b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

1) Set the center frequency of the instrument to the center frequency of the transmission.
2) Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.
3) Set VBW ≥ RBW. Set detector = peak or average.
4) The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if T ≤ 16.7 μs.)




## Test Data

### Environmental Conditions

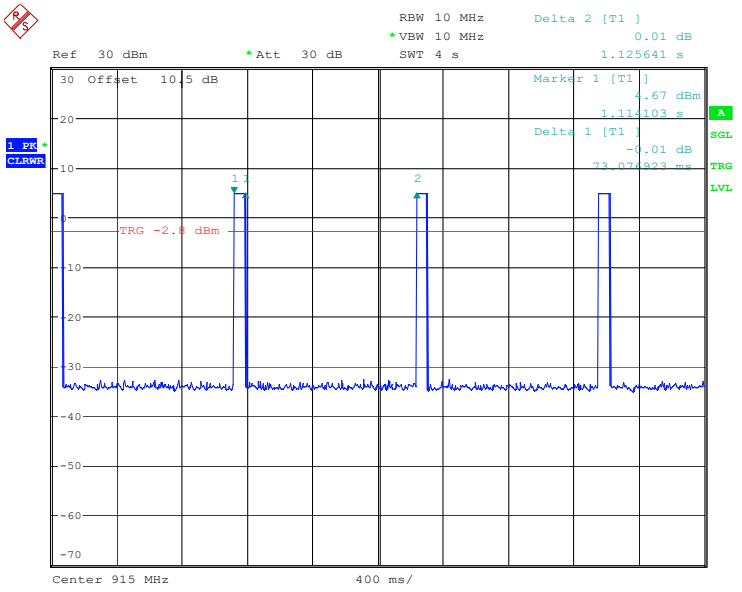
| | |
|---|---|
| **Temperature:** | 24.9 ℃ |
| **Relative Humidity:** | 45 % |
| **ATM Pressure:** | 101.6 kPa |

*The testing was performed by Rainbow Zhu on 2025-03-18.*

*EUT operation mode: Transmitting*

***Test Result: Compliant.***

| Test Frequency (MHz) | $T_{on}$ (ms) | $T_{on+off}$ (ms) | Duty Cycle (%) | $1/T_{on}$ (Hz) | VBW Setting (Hz) |
|---|---|---|---|---|---|
| 915 | 73.077 | 1125.641 | 6.49 | 14 | 100 |




ProjectNo.:2501R04077E-RF Tester:Rainbow Zhu
Date: 18.MAR.2025 03:55:20

# EUT PHOTOGRAPHS

Please refer to the attachment 2501R04077E-RF External photo and 2501R04077E-RF Internal photo.

# TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2501R04077E-RFB Test Setup photo.

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