

# **TEST REPORT**

**Report Number:** 16148856-E2V2

**Applicant :** ENERGOUS CORPORATION  
3590 NORTH FIRST STREET,  
SUITE 330,  
SAN JOSE, CA 95134, U.S.A.

**Model :** YND-PBP+

**Brand :** Energous

**FCC ID :** 2ADNG-YND-GW

**EUT Description :** WIRELESS CHARGER

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C

**Date Of Issue:**

2026-07-02

**Prepared by:**

UL Verification Services Inc.  
47173 Benicia Street  
Fremont, CA 94538, U.S.A.  
TEL: (510) 319-4000



## REPORT REVISION HISTORY

| Rev. | Issue<br>Date | Revisions         | Revised By |
|------|---------------|-------------------|------------|
| V1   | 2026-01-28    | Initial Issue     | ---        |
| V2   | 2026-07-02    | Revised Section 3 | Tina Chu   |

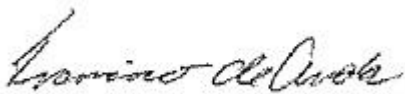
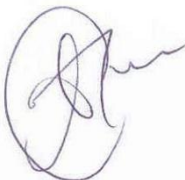
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## 1. ATTESTATION OF TEST RESULTS

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                              |                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Applicant Name and Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Energous Corporation<br>3590 North First Street,<br>Suite 330,<br>San Jose, CA 95134, U.S.A. |                                                                                       |
| Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | YND-PBP+                                                                                     |                                                                                       |
| Brand                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Energous                                                                                     |                                                                                       |
| FCC ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2ADNG-YND-GW                                                                                 |                                                                                       |
| EUT Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Wireless Charger                                                                             |                                                                                       |
| Serial Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Conducted: 4F4FE2DC042B<br>Radiated: 4F4FE2DC042B                                            |                                                                                       |
| Sample Receipt Date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2025-12-23                                                                                   |                                                                                       |
| Date Tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2025-12-23 to 2026-01-12                                                                     |                                                                                       |
| Applicable Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | FCC 47 CFR Part 15 Subpart C                                                                 |                                                                                       |
| Test Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | COMPLIES                                                                                     |                                                                                       |
| <p>UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p>The results documented in this report apply only to the sample tested, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to ensure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.</p> <p>This document may not be altered or revised in any way unless done so by UL Verification Services Inc., and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document.</p> |                                                                                              |                                                                                       |
| Approved & Released By:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Reviewed By:                                                                                 | Prepared By:                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |  |
| Francisco de Anda<br>Staff Engineer<br>UL Verification Services Inc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Tina Chu<br>Senior Project Engineer<br>UL Verification Services Inc..                        | Jasdeep Madar<br>Laboratory Engineer<br>UL Verification Services Inc.                 |

## 2. TEST RESULTS SUMMARY

This report contains data provided by the customer, which can impact on the validity of the results. UL Verification Services Inc. is only responsible for correctly integrating customer-provided data with measurements performed by UL Verification Services Inc.

Below is a list of the data provided by the customer:

1. Antenna gain (see section 6.3)
2. Cable loss (see section 6.3)

| Requirement Description      | Requirement Clause Number (FCC) | Result                  |
|------------------------------|---------------------------------|-------------------------|
| Duty Cycle                   | -                               | Reporting purposes only |
| 99% OBW                      | -                               | Reporting purposes only |
| 6dB BW                       | 15.247 (a) (2)                  | Complies                |
| Output Power                 | 15.247 (b) (3)                  | Complies                |
| PSD                          | 15.247 (e)                      | Complies                |
| Conducted Spurious Emissions | 15.247 (d)                      | Complies                |
| Radiated Emissions           | 15.209, 15.205                  | Complies                |
| AC Mains Conducted Emissions | 15.207                          | Complies                |

## 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with:

- ANSI/USEMCSC C63.10-2020/Cor 1-2023 (FCC)
- FCC 47 CFR Part 2
- FCC 47 CFR Part 15C
- KDB 558074 D01 15.247 Meas Guidance
- KDB 414788 D01 Radiated Test Site

## 4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, Certificate Number 0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

|                                     | Address                                                  | ISED CABID | ISED Company Number | FCC Registration |
|-------------------------------------|----------------------------------------------------------|------------|---------------------|------------------|
| <input checked="" type="checkbox"/> | Building 1: 47173 Benicia Street, Fremont, CA 94538, USA | US0104     | 2324A               | 550739           |
| <input type="checkbox"/>            | Building 2: 47266 Benicia Street, Fremont, CA 94538, USA |            |                     |                  |
| <input type="checkbox"/>            | Building 3: 843 Auburn Court, Fremont, CA 94538, USA     |            |                     |                  |
| <input checked="" type="checkbox"/> | Building 4: 47658 Kato Rd, Fremont, CA 94538, USA        |            |                     |                  |
| <input type="checkbox"/>            | Building 5: 47670 Kato Rd, Fremont, CA 94538, USA        |            |                     |                  |

## 5. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated regularly, with a maximum time between calibrations of one year or the manufacturer's recommendation, whichever is less, and where applicable, are traceable to recognized national standards.

### 5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

### 5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER                                              | U <sub>LAB</sub>             |
|--------------------------------------------------------|------------------------------|
| Conducted Antenna Port Emission Measurement            | 1.94 dB                      |
| Power Spectral Density                                 | 2.466 dB                     |
| Time Domain Measurements Using SA                      | 3.39 %                       |
| RF Power Measurement Direct Method Using a Power Meter | 0.45 dB (Ave), 1.30 dB Peak) |
| Radio Frequency (Spectrum Analyzer)                    | 141.16 Hz                    |
| Occupied Bandwidth                                     | 1.22 %                       |
| Worst Case Conducted Disturbance, 9KHz to 0.15 MHz     | 3.78 dB                      |
| Worst Case Conducted Disturbance, 0.15 to 30 MHz       | 3.40 dB                      |
| Worst Case Radiated Disturbance, 9KHz to 30 MHz        | 2.87 dB                      |
| Worst Case Radiated Disturbance, 30 to 1000 MHz        | 6.01 dB                      |
| Worst Case Radiated Disturbance, 1000 to 18000 MHz     | 4.73 dB                      |
| Worst Case Radiated Disturbance, 18000 to 26000 MHz    | 4.51 dB                      |

Uncertainty figures are valid to a confidence level of 95%.

### 5.4. SAMPLE CALCULATION

#### RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)  
 $36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$

#### MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.  
 $36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$

## 6. EQUIPMENT UNDER TEST

### 6.1. EUT DESCRIPTION

The EUT is an over-the-air, distance-charging transmitter with WPT, BLE, and 802.11bgn HT20/H40 SISO capabilities. The wireless charger transmits power via a 52-tone frequency hopping signal in the 907MHz-920MHz range and charges multiple receivers simultaneously. The EUT uses BLE to communicate with a client device and 2.4 GHz Wi-Fi for data transmission. The EUT can be powered via 12W USB-C or PoE.

### 6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

| Frequency Range (MHz) | Mode      | Output Power (dBm) | Output Power (mW) |
|-----------------------|-----------|--------------------|-------------------|
| 2402 - 2480           | BLE 1Mbps | 17.21              | 52.60             |

### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS AND CABLE LOSS

The antenna gain(s), type, and cable loss, as provided by the manufacturer, are as follows:

The radio utilizes a dual-polarized patch antenna with a maximum gain of 7.50 dBi per chain, and with a cable loss of 1.30dB.

The cables were used for RF antenna port tests that had been offset to the test equipment during testing.

### 6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was direct\_test\_mode\_pca10056.

## **6.5. WORST-CASE CONFIGURATION AND MODE**

EUT is a wall or ceiling-mounted device; the fundamental of the EUT was investigated in three orthogonal orientations, X, Y, Z. It was determined that Z-Portrait orientation was the worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z-Portrait orientation.

EUT supports 2 input power methods: Power over Ethernet (PoE) or USB. These modes were investigated to determine the worst case. It was determined that USB mode was the worst case. Therefore, all final radiated testing was performed with EUT powered via USB.

AC Line emissions were performed on Power over Ethernet (PoE) and USB input power methods, with the worst-case channel.

Radiated emissions below 1GHz, above 18GHz, and power line conducted emissions were performed with the EUT set to transmit at the channel with the highest output power as a worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle, and high channels.

BLE supports MIMO and SISO transmit; full testing was performed on MIMO to cover SISO.

Data rate provided by the client was BLE mode, 1Mbps

Plots included in the report are representative of the method and settings parameters used for the test.

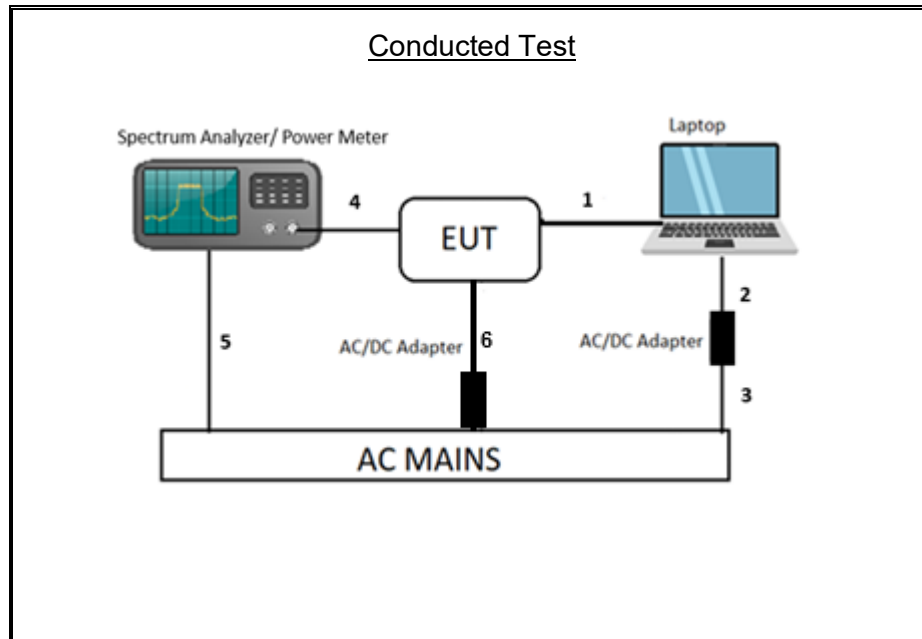
## 6.6. DESCRIPTION OF TEST SETUP

| SUPPORT TEST EQUIPMENT                              |          |                      |                           |             |                              |                           |
|-----------------------------------------------------|----------|----------------------|---------------------------|-------------|------------------------------|---------------------------|
| Description                                         |          | Manufacturer         | Model                     |             | Serial Number                | FCC ID/ DoC               |
| EUT AC/DC Adapter                                   |          | HDP                  | HDP12-MD05024U            |             | N/A                          | DoC                       |
| PoE Ethernet Switch                                 |          | Netgear              | GS305PP                   |             | N/A                          | DoC                       |
| PoE Ethernet Switch AC/DC Adapter                   |          | Netgear              | 2ABP090S                  |             | N/A                          | DoC                       |
| Laptop                                              |          | Dell                 | Precision 5520            |             | FK7QHM2                      | DoC                       |
| Laptop power supply                                 |          | Dell                 | HA130PM130                |             | CN-0V363H-CH200-84A-03QN-A01 | DoC                       |
| C and A Dual Flash Drive                            |          | MOSDART              | MOSTDART_FLASH_DRIVE_64GB |             | N/A                          | DoC                       |
| I/O CABLES (RF CONDUCTED TEST)                      |          |                      |                           |             |                              |                           |
| Cable No.                                           | Port     | # of Identical Ports | Connector Type            | Cable Type  | Cable Length (m)             | Remarks                   |
| 1                                                   | USB      | 1                    | UART                      | Shielded    | 1.5                          | EUT to Laptop             |
| 2                                                   | DC       | 1                    | barrel                    | Shielded    | 1.5                          | AC/DC Adapter to Laptop   |
| 3                                                   | AC       | 1                    | 2-Prong                   | Un-shielded | 1                            | AC Mains to AC/DC Adapter |
| 4                                                   | Antenna  | 1                    | SMA                       | Shielded    | 0.1                          | To spectrum analyzer      |
| 5                                                   | AC       | 1                    | 3-Prong                   | Un-shielded | 1.5                          | Spectrum to AC outlet     |
| 6                                                   | USB-C    | 1                    | USB-C                     | Shielded    | <3m                          | EUT to AC/DC adapter      |
| I/O CABLES (RF RADIATED AND AC LINE CONDUCTED TEST) |          |                      |                           |             |                              |                           |
| Cable No.                                           | Port     | # of Identical Ports | Connector Type            | Cable Type  | Cable Length (m)             | Remarks                   |
| 1                                                   | USB-C    | 1                    | USB-C                     | Shielded    | <3m                          | EUT to AC/DC adapter      |
| 2                                                   | Ethernet | 1                    | RJ45                      | Un-shielded | >3m                          | EUT to switch             |
| 3                                                   | AC       | 1                    | 3-Prong                   | Un-shielded | <3m                          |                           |
| 4                                                   | DC       | 1                    | barrel                    | Shielded    | >3m                          |                           |

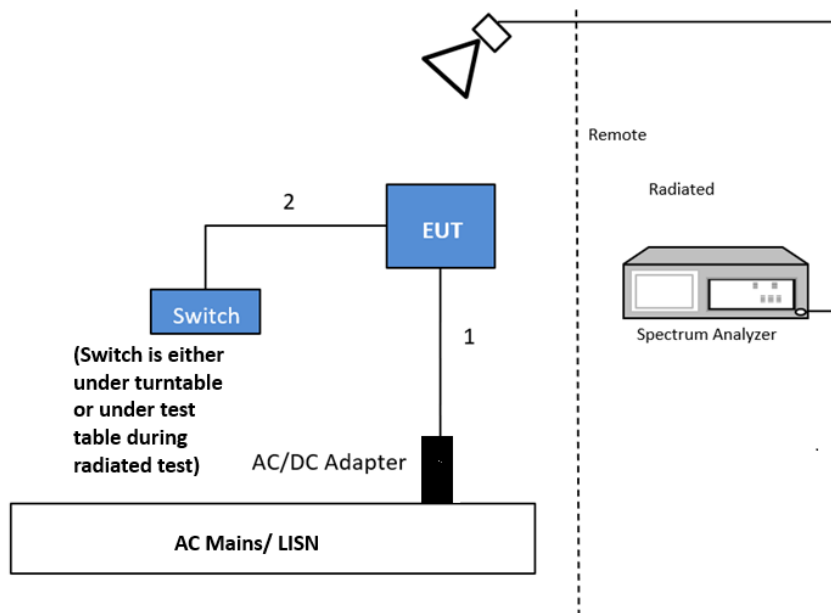
## **TEST SETUP**

The EUT was tested as below block diagram. Test software exercised the EUT. Laptop was removed from chamber during radiated test.

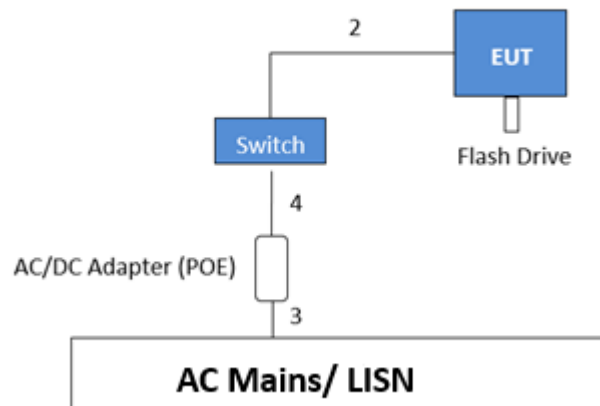
## **SETUP DIAGRAMS**



### Radiated/AC Power Line Test (USB-C)



### AC Power Line Test (POE)



## 7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment were utilized for the tests documented in this report:

| TEST EQUIPMENT LIST                                     |                                    |                              |                       |            |
|---------------------------------------------------------|------------------------------------|------------------------------|-----------------------|------------|
| Description                                             | Manufacturer                       | Model                        | ID Num                | Cal Due    |
| Antenna, Horn 18 to 26.5GHz                             | A.R.A.                             | MWH-1826/B                   | 81140                 | 2027-05-31 |
| Link File, RF Amplifier Assembly, 18-26.5GHz, 60dB Gain | UL-FR1                             | AMP18G26.5-60                | 215705                | 2026-10-31 |
| EMI Test Receiver                                       | Rohde & Schwarz                    | ESW44                        | 225688                | 2026-02-28 |
| Antenna, Horn 1-18GHz                                   | ETS-Lindgren                       | 3117                         | 80707                 | 2026-06-30 |
| RF Filter Box, 1-18GHz                                  | UL-FR1                             | Silver Box                   | PRE0181597            | 2026-03-31 |
| Antenna, Passive Loop 100kHz to 30MHz                   | ELECTRO-METRICS                    | EM-6872                      | 219910                | 2026-08-31 |
| Antenna, Passive Loop 30Hz - 1MHz                       | ELECTRO-METRICS                    | EM-6871                      | 219908                | 2026-08-31 |
| Antenna, Broadband Hybrid, 30MHz to 3GHz                | Sunol Sciences Corp.               | JB3                          | 203089                | 2027-04-30 |
| Link File, 9KHz-1GHz Port 0 Factors                     | UL-FR1                             | Port 0 Factors               | 211062                | 2026-03-31 |
| EMI TEST RECEIVER, with B8 option                       | Rohde & Schwarz                    | ESW44                        | 245268                | 2026-02-28 |
| 10dB Fixed Attenuator                                   | Pasternack Enterprises             | PE7087-10                    | 252765                | Verified   |
| P-Series Power Meter                                    | Keysight Technologies Inc          | N1912A-CFG003                | 259286                | 2026-03-31 |
| Power Sensor, P - series, 50MHz to 18GHz, Wideband      | Keysight Technologies Inc          | N1921A                       | 257703                | 2026-03-31 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz                    | N9030A                             | Keysight Technologies Inc    | 80396                 | 2026-01-31 |
| AC Line Conducted                                       |                                    |                              |                       |            |
| Description                                             | Manufacturer                       | Model                        | ID Num                | Cal Due    |
| LISN                                                    | Fischer Custom Communications, Inc | FCC-LISN-50/250-25-2-01-480V | 175765                | 2026-01-31 |
| EMI TEST RECEIVER                                       | Rohde & Schwarz                    | ESR3                         | 171646                | 2026-02-28 |
| Transient Limiter                                       | TE                                 | TBFL1                        | 207996                | 2026-12-30 |
| UL AUTOMATION SOFTWARE                                  |                                    |                              |                       |            |
| Radiated Software                                       | UL                                 | UL EMC                       | Rev 9.5, 25 Aug, 2025 |            |
| Conducted Software                                      | UL                                 | UL EMC                       | 2024.2.23             |            |
| AC Line Conducted Software                              | UL                                 | UL EMC                       | Rev 9.5, 25 Aug, 2025 |            |

## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME AND DUTY CYCLE

#### LIMITS

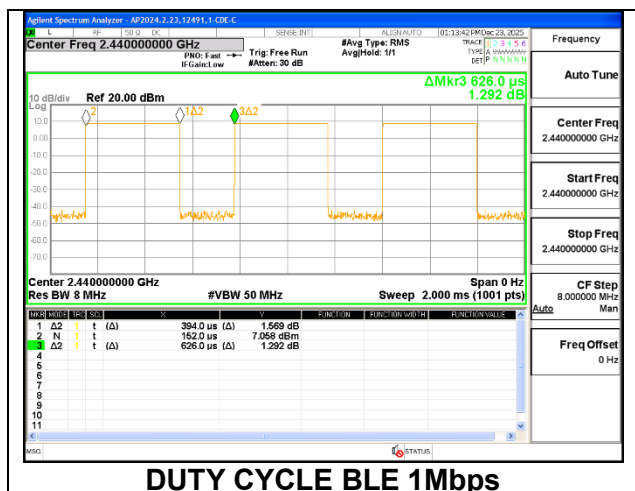
None; for reporting purposes only.

#### TEST PROCEDURE

ANSI C63.10, Subclause 11.6: Zero-Span Spectrum Analyzer Method.

#### ON TIME AND DUTY CYCLE RESULTS

| Mode      | ON Time<br>T<br>(msec) | Period<br>(msec) | Duty Cycle<br>x<br>(linear) | Duty<br>Cycle<br>(%) | Duty Cycle<br>Correction Factor<br>(dB) | 1/T<br>Minimum VBW<br>(kHz) |
|-----------|------------------------|------------------|-----------------------------|----------------------|-----------------------------------------|-----------------------------|
| BLE 1Mbps | 0.394                  | 0.626            | 0.629                       | 62.94                | 2.01                                    | 2.538                       |



## 8.2. 99% BANDWIDTH

### LIMITS

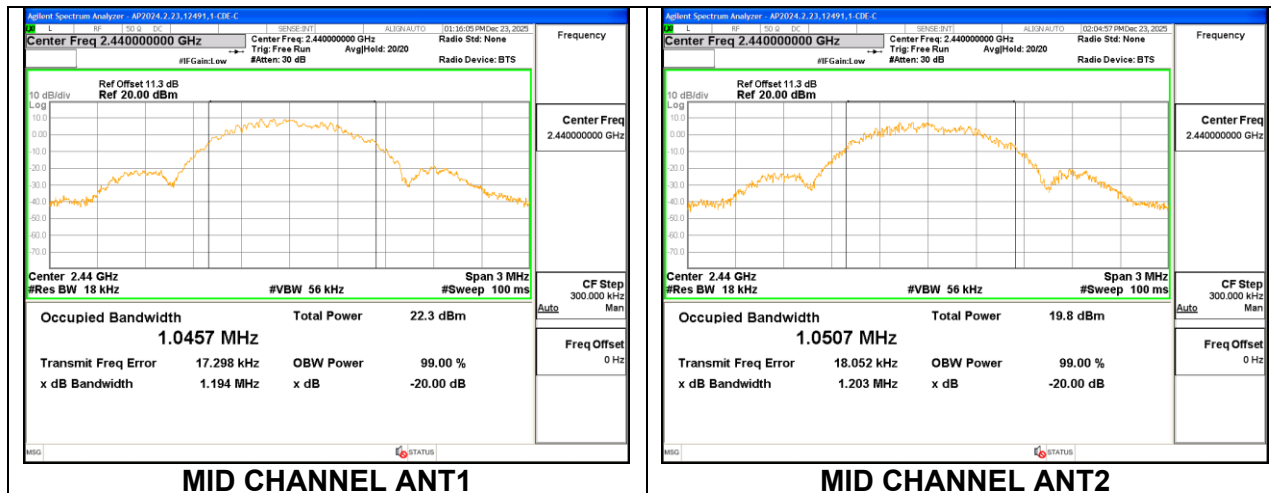
None; for reporting purposes only.

### TEST PROCEDURE

ANSI C63.10, Subclause - 6.9.3

### RESULTS

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |           |
|---------|-----------------|---------------------|-----------|
|         |                 | Antenna 1           | Antenna 2 |
| Low     | 2402            | 1.0480              | 1.0475    |
| Mid     | 2440            | 1.0457              | 1.0507    |
| High    | 2480            | 1.0495              | 1.0485    |



### 8.3. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

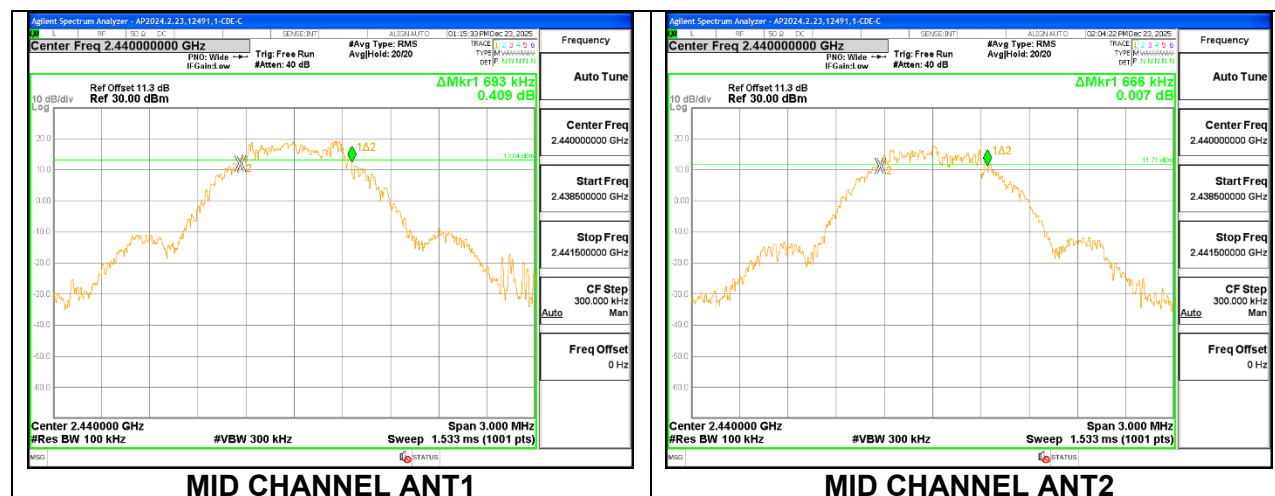
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### TEST PROCEDURE

ANSI C63.10 Subclause - 11.8.1 Option 1

#### RESULTS

| Channel | Frequency (MHz) | 6dB Bandwidth (MHz) |           | Minimum Limit (MHz) |
|---------|-----------------|---------------------|-----------|---------------------|
|         |                 | Antenna 1           | Antenna 2 |                     |
| Low     | 2402            | .666                | .687      | 0.5                 |
| Mid     | 2440            | .693                | .666      | 0.5                 |
| High    | 2480            | .714                | .675      | 0.5                 |



## 8.4. OUTPUT POWER AND POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (b) (3) & (e)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

The maximum antenna gain is 7.5 dBi, which is 1.5 dBi greater than the 6 dBi requirement; therefore, the output power limit is reduced from 30 dBm to 28.5dBm; PSD power limit is reduced from 8dBm/3kHz to 6.5dBm/3kHz.

### TEST PROCEDURE

Conducted Output Power: ANSI C63.10 Subclause - 11.9.1.2 Method PKPM1 (Peak-reading power meter)

Power Spectral Density: ANSI C63.10 Subclause - 11.10.2 Method PKPSD (peak PSD)

### DIRECTIONAL ANTENNA GAIN

For 2TX:

ANSI C63.10, section 14.6.3.2.2 Cross-polarized antennas with  $N_{ANT} = 2$

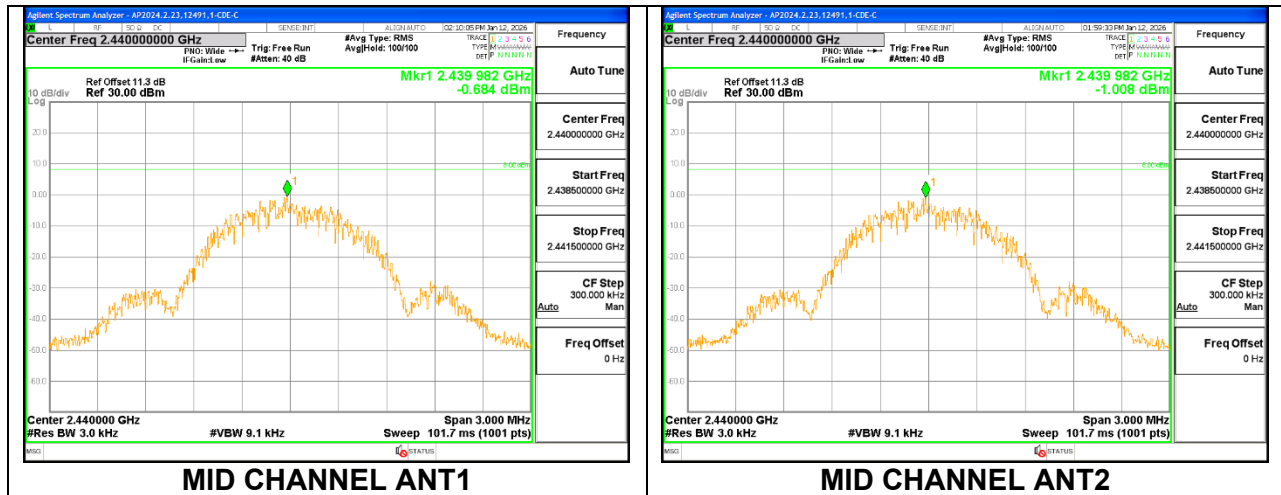
In the case of a transmitter with only two outputs driving antennas that are cross-polarized (e.g., vertical and horizontal, or left-circular and right-circular), directional gain is the gain of an individual antenna.

## RESULTS

| Mode      | No. of Tx | Channel | Freq (MHz) | Measured Conducted Peak Power (dBm), Ant 1 | Measured Conducted Peak Power (dBm), Ant 2 | Measured Total Conducted Peak Power (dBm) | Output Power Limit (dBm) | Output Power Margin (dB) | Measured PSD (dBm/3kHz), Ant 1 | Measured PSD (dBm/3kHz), Ant 2 | Corrected Total PSD (dBm/3kHz) | PSD Limit (dBm/3kHz) | PSD Margin (dB) |
|-----------|-----------|---------|------------|--------------------------------------------|--------------------------------------------|-------------------------------------------|--------------------------|--------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------|-----------------|
| BLE 1Mbps | 2Tx       | 0       | 2402       | 14.07                                      | 14.32                                      | 17.21                                     | 28.50                    | -11.29                   | -0.700                         | -0.957                         | 2.18                           | 6.50                 | -4.32           |
|           |           | 19      | 2440       | 14.22                                      | 14.17                                      | 17.21                                     | 28.50                    | -11.29                   | -0.684                         | -1.008                         | 2.17                           | 6.50                 | -4.33           |
|           |           | 39      | 2480       | 12.67                                      | 12.49                                      | 15.59                                     | 28.50                    | -12.91                   | -2.357                         | -2.874                         | 0.40                           | 6.50                 | -6.10           |

## Antenna 1 + Antenna 2

## PSD PLOT



## 8.5. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

Conducted Output Power: ANSI C63.10 Subclause - 11.9.2.3.2 Method AVGPM G (Measurement using an RF average-reading power meter)

### RESULTS

#### Antenna 1 + Antenna 2

| Mode      | No. of Tx | Channel | Freq (MHz) | Measured Conducted Avg Power (dBm), Ant 1 | Measured Conducted Avg Power (dBm), Ant 2 | Measured Total Conducted Avg Power (dBm) |
|-----------|-----------|---------|------------|-------------------------------------------|-------------------------------------------|------------------------------------------|
| BLE 1Mbps | 2Tx       | 0       | 2402       | 13.89                                     | 14.15                                     | <b>17.03</b>                             |
|           |           | 19      | 2440       | 13.99                                     | 14.00                                     | 17.01                                    |
|           |           | 39      | 2480       | 12.37                                     | 12.20                                     | 15.30                                    |

## **8.6. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

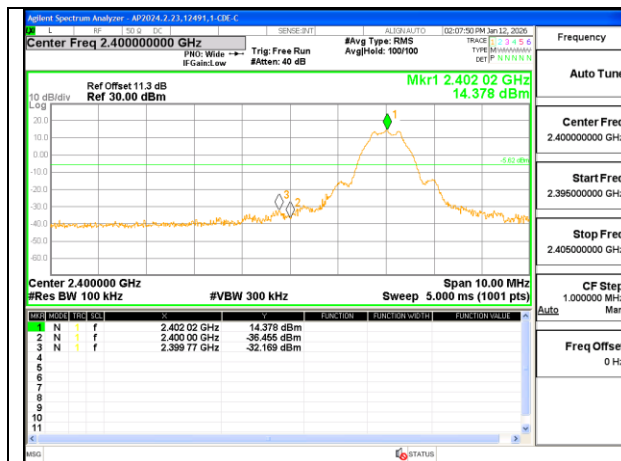
Output power was measured based on the use of a peak measurement; therefore, the required attenuation is 20 dBc.

### **TEST PROCEDURE**

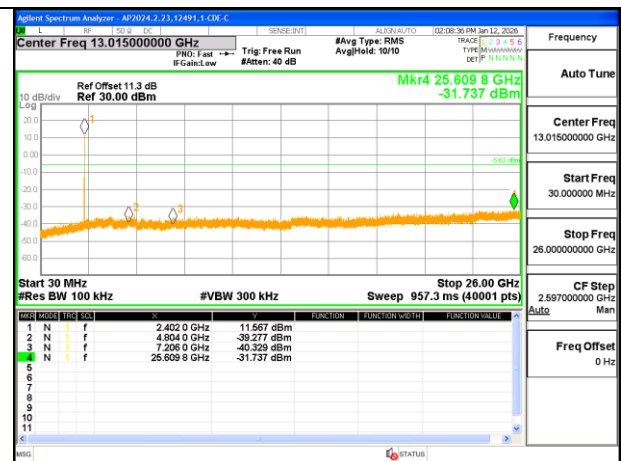
ANSI C63.10 Subclause - 11.12.2

### **RESULTS**

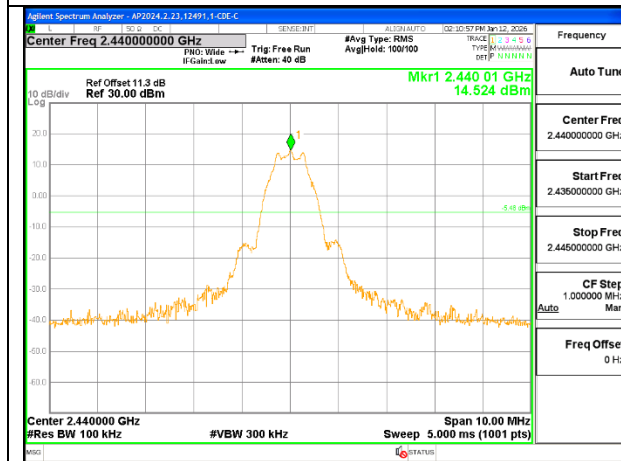
# Antenna 1



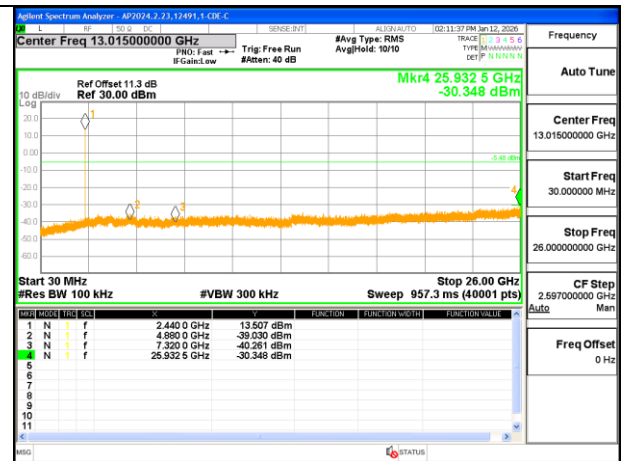
LOW CHANNEL BANDEDGE



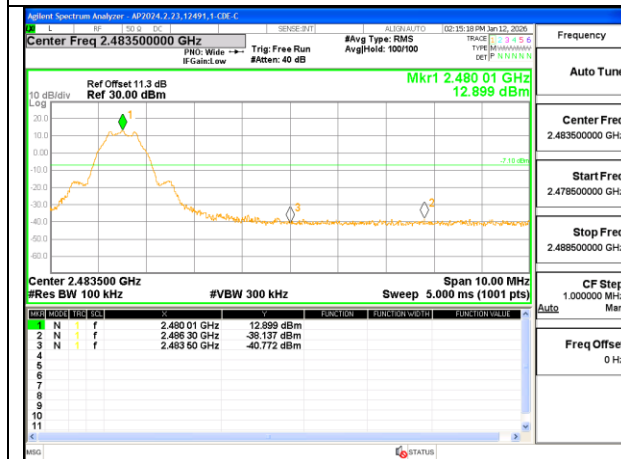
OUT-OF-BAND LOW CHANNEL



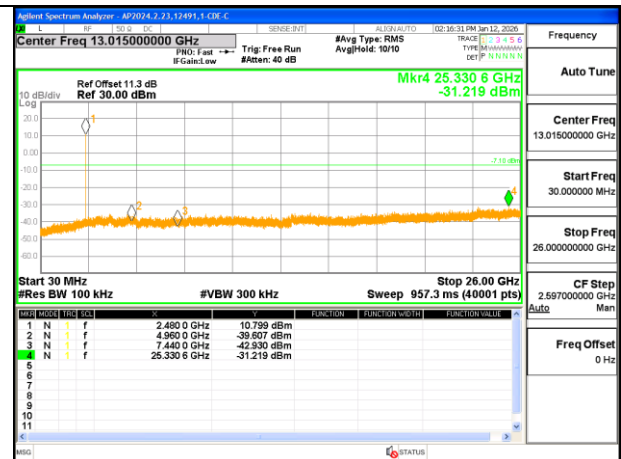
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL

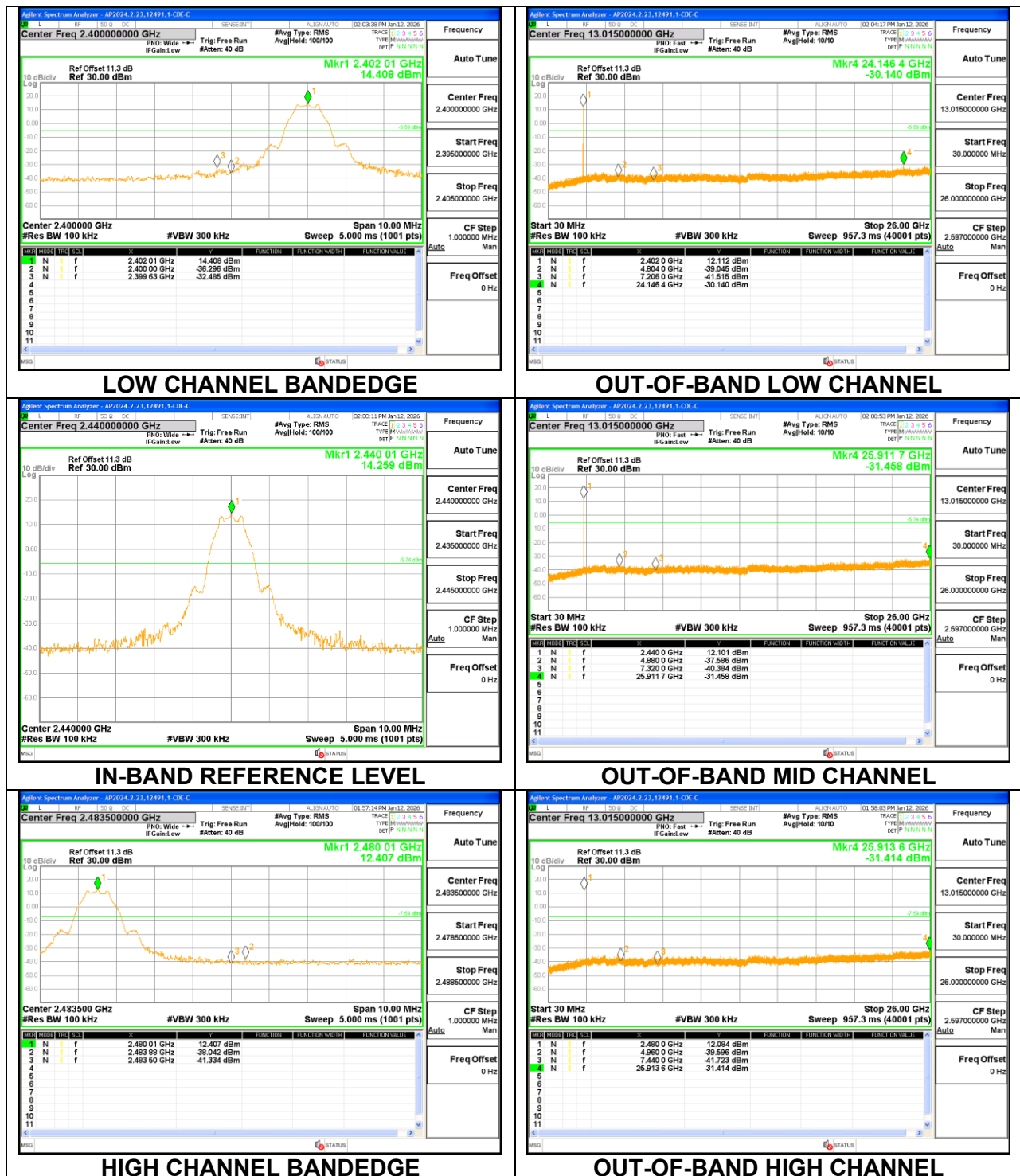


HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

## Antenna 2



## 9. RADIATED TEST RESULTS

### 9.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|-----------------------|------------------------------------|--------------------------------------|
| 0.009-0.490           | 2400/F(kHz) @ 300 m                | -                                    |
| 0.490-1.705           | 24000/F(kHz) @ 30 m                | -                                    |
| 1.705 - 30            | 30 @ 30m                           | -                                    |
| 30 - 88               | 100                                | 40                                   |
| 88 - 216              | 150                                | 43.5                                 |
| 216 - 960             | 200                                | 46                                   |
| Above 960             | 500                                | 54                                   |

#### TEST PROCEDURE

|                                                   |                                                       |
|---------------------------------------------------|-------------------------------------------------------|
| Radiated emissions non-restricted frequency bands | ANSI C63.10 Subclause -11.11                          |
| Radiated emissions restricted frequency bands     | ANSI C63.10 Subclause -11.12.1                        |
| Band-edge                                         | ANSI C63.10 Subclause -11.12.2.4: Peak Measurement    |
| Band-edge                                         | ANSI C63.10 Subclause -11.12.2.5: Average Measurement |
| Radiated Spurious Emissions Below 30MHz           | ANSI C63.10 Subclause 6.4                             |

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz: 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz, the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as a quasi-peak.

For pre-scans above 1 GHz, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.

For final measurements above 1 GHz, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

For below 30MHz testing, an investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel). Parallel and perpendicular are the worst orientations; therefore, testing was performed on these two orientations only. Blue color trace on plots: Parallel orientation. Green color trace on plots: Perpendicular orientation.

Note: The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table), using the free space impedance of 377 Ohms. For example, the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to  $Y - 51.5 = Z$  dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

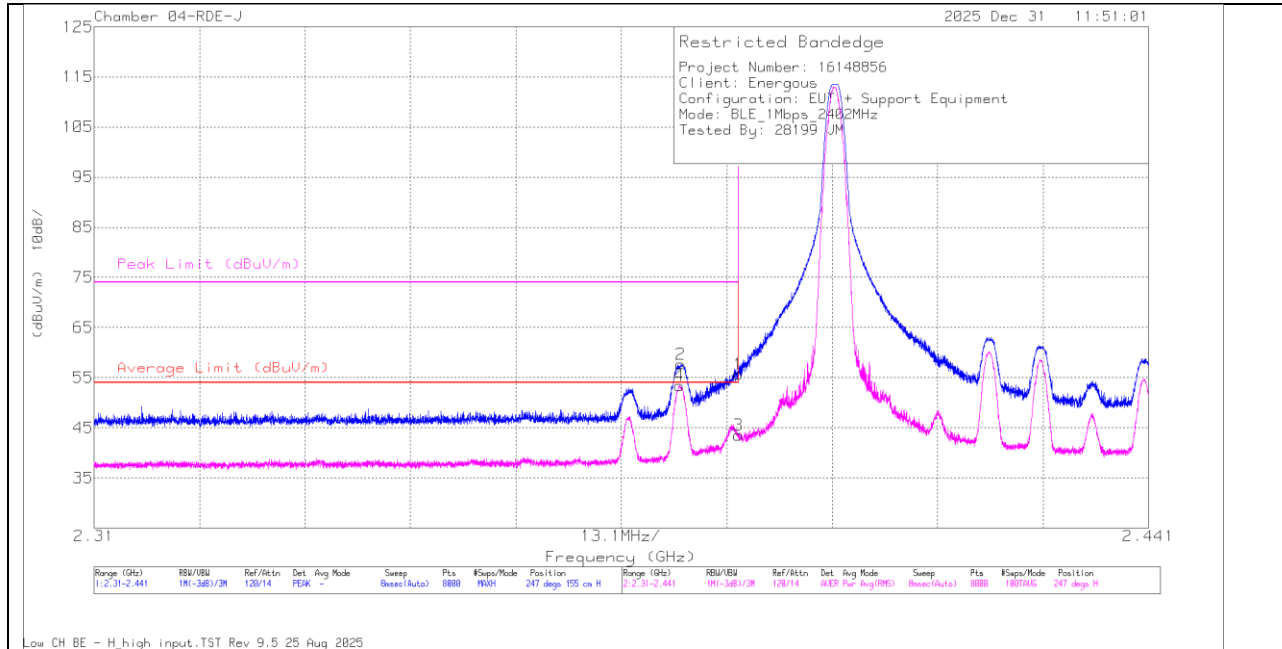
#### **KDB 414788 Open Field Site (OFS) and Chamber Correlation Justification**

OFS and chamber correlation testing had been performed and chamber measured test result is the worst-case test result.

## 9.2. TRANSMITTER ABOVE 1 GHz

### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT



#### Trace Markers

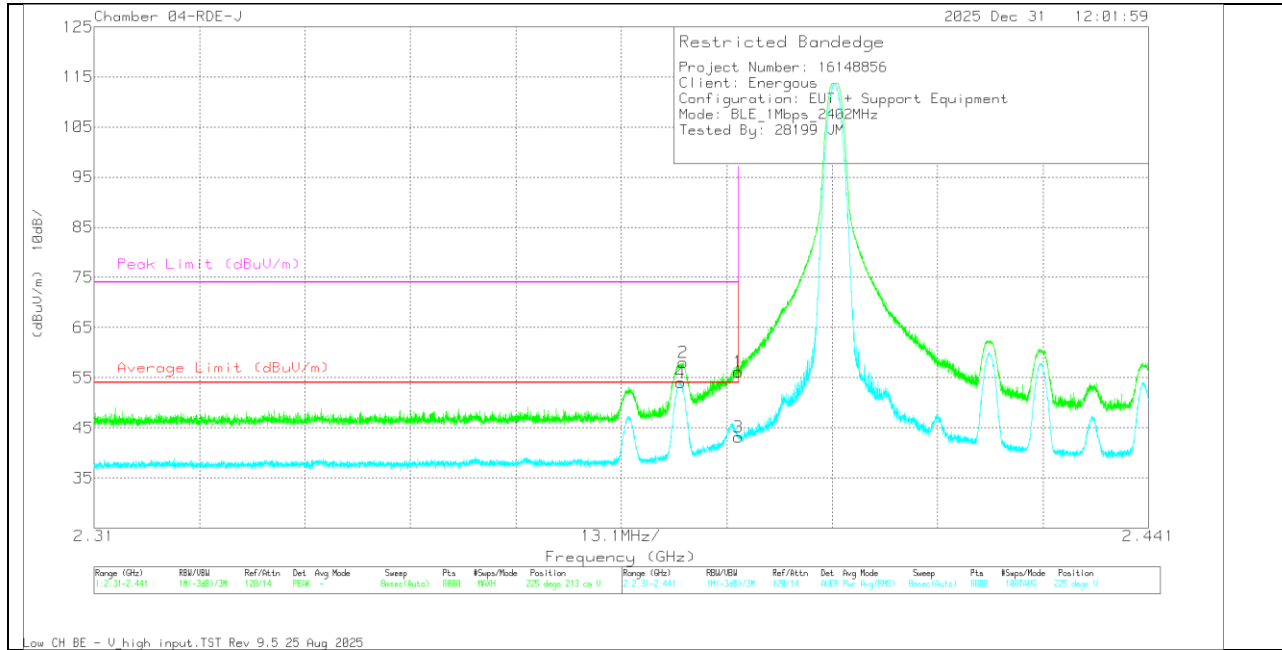
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 80707 ACF (dB/m) | Amp/Cbl (dB) | DCCF (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|------------------|--------------|-----------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 51.66                | Pk  | 32.2             | -28.2        | 0         | 55.66                      | -                      | -           | 74                  | -18.34         | 247            | 155         | H        |
| 2      | * 2.382         | 53.82                | Pk  | 32.2             | -28.3        | 0         | 57.72                      | -                      | -           | 74                  | -16.28         | 247            | 155         | H        |
| 3      | * 2.39          | 37.55                | RMS | 32.2             | -28.2        | 2.01      | 43.56                      | 54                     | -10.44      | -                   | -              | 247            | 155         | H        |
| 4      | * 2.382         | 47.48                | RMS | 32.2             | -28.3        | 2.01      | 53.39                      | 54                     | -61         | -                   | -              | 247            | 155         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

## VERTICAL RESULT



## Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 80707 ACF (dB/m) | Amp/Cbl (dB) | DCCF (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|------------------|--------------|-----------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 52.19                | Pk  | 32.2             | -28.2        | 0         | 56.19                      | -                      | -           | 74                  | -17.81         | 225            | 213         | V        |
| 2      | * 2.383         | 54.1                 | Pk  | 32.2             | -28.3        | 0         | 58                         | -                      | -           | 74                  | -16            | 225            | 213         | V        |
| 3      | * 2.39          | 37.14                | RMS | 32.2             | -28.2        | 2.01      | 43.15                      | 54                     | -10.85      | -                   | -              | 225            | 213         | V        |
| 4      | * 2.382         | 48.06                | RMS | 32.2             | -28.3        | 2.01      | 53.97                      | 54                     | -0.03       | -                   | -              | 225            | 213         | V        |

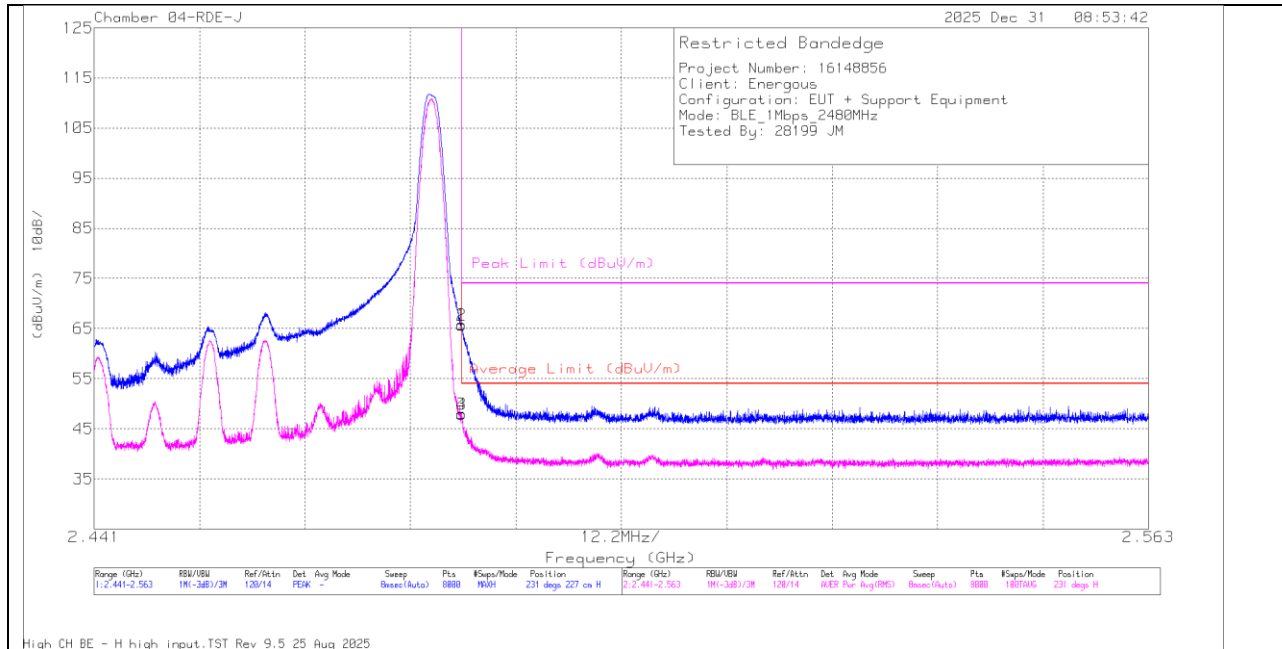
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

## BANDEDGE (HIGH CHANNEL)

### HORIZONTAL RESULT



### Trace Markers

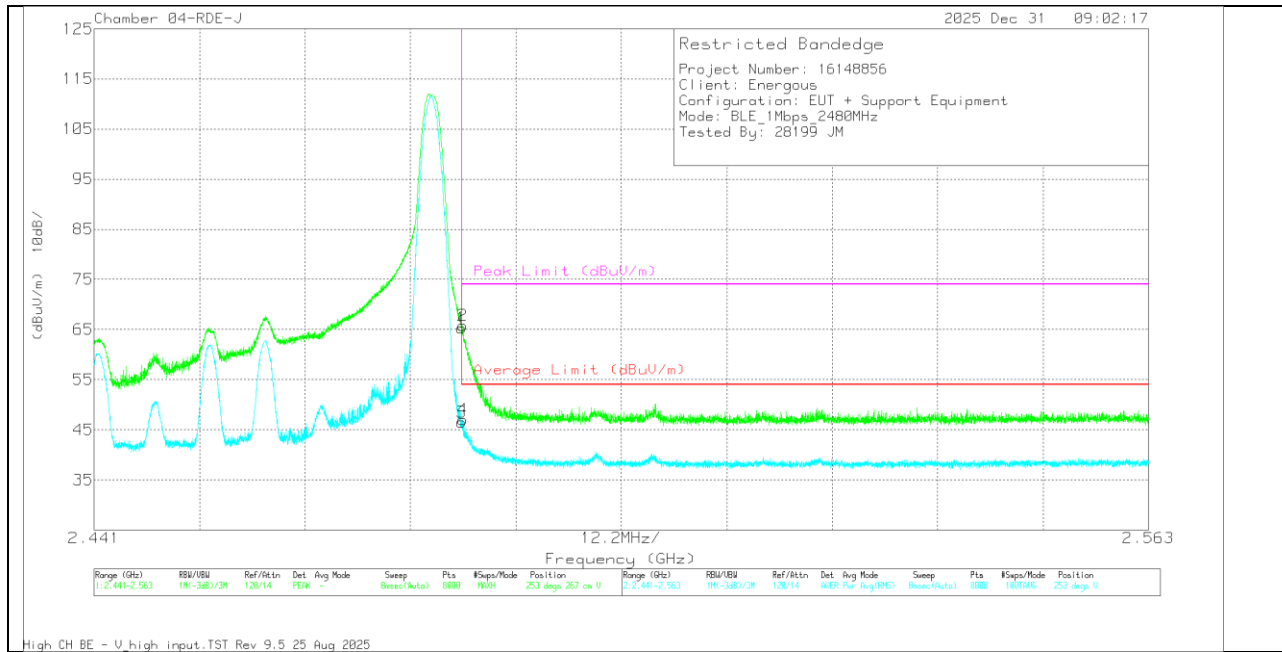
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 80707 ACF (dB/m) | Amp/Cbl (dB) | DCCF (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|------------------|--------------|-----------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.4835        | 61.54                | Pk  | 32.4             | -28.1        | 0         | 65.84                      | -                      | -           | 74                  | -8.16          | 231            | 227         | H        |
| 2      | * 2.4835        | 61.4                 | Pk  | 32.4             | -28.1        | 0         | 65.7                       | -                      | -           | 74                  | -8.3           | 231            | 227         | H        |
| 3      | * 2.4835        | 41.65                | RMS | 32.4             | -28.1        | 2.01      | 47.96                      | 54                     | -6.04       | -                   | -              | 231            | 227         | H        |
| 4      | * 2.4835        | 41.53                | RMS | 32.4             | -28.1        | 2.01      | 47.84                      | 54                     | -6.16       | -                   | -              | 231            | 227         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

## VERTICAL RESULT



### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 80707 ACF (dB/m) | Amp/Cbl (dB) | DCCF (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|------------------|--------------|-----------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.4835        | 60.98                | Pk  | 32.4             | -28.1        | 0         | 65.28                      | -                      | -           | 74                  | -8.72          | 253            | 267         | V        |
| 2      | * 2.4836        | 61.5                 | Pk  | 32.4             | -28.1        | 0         | 65.8                       | -                      | -           | 74                  | -8.2           | 253            | 267         | V        |
| 3      | * 2.4835        | 40.21                | RMS | 32.4             | -28.1        | 2.01      | 46.52                      | 54                     | -7.48       | -                   | -              | 253            | 267         | V        |
| 4      | * 2.4836        | 40.72                | RMS | 32.4             | -28.1        | 2.01      | 47.03                      | 54                     | -6.97       | -                   | -              | 253            | 267         | V        |

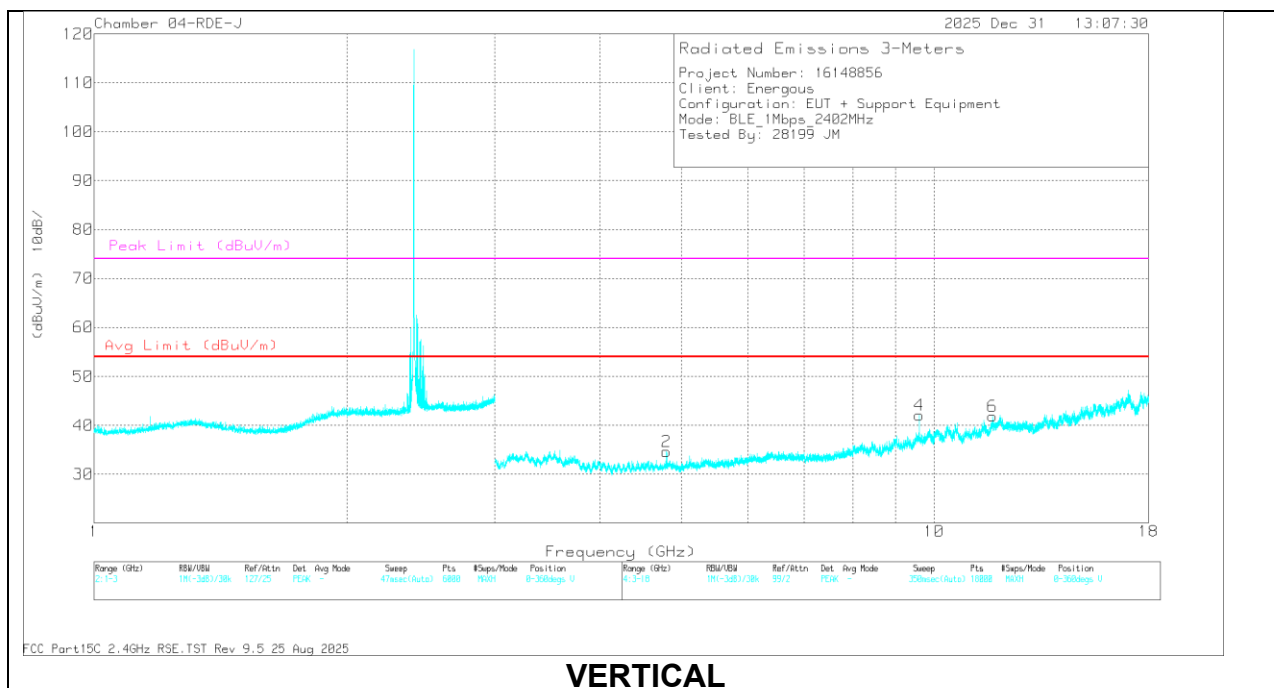
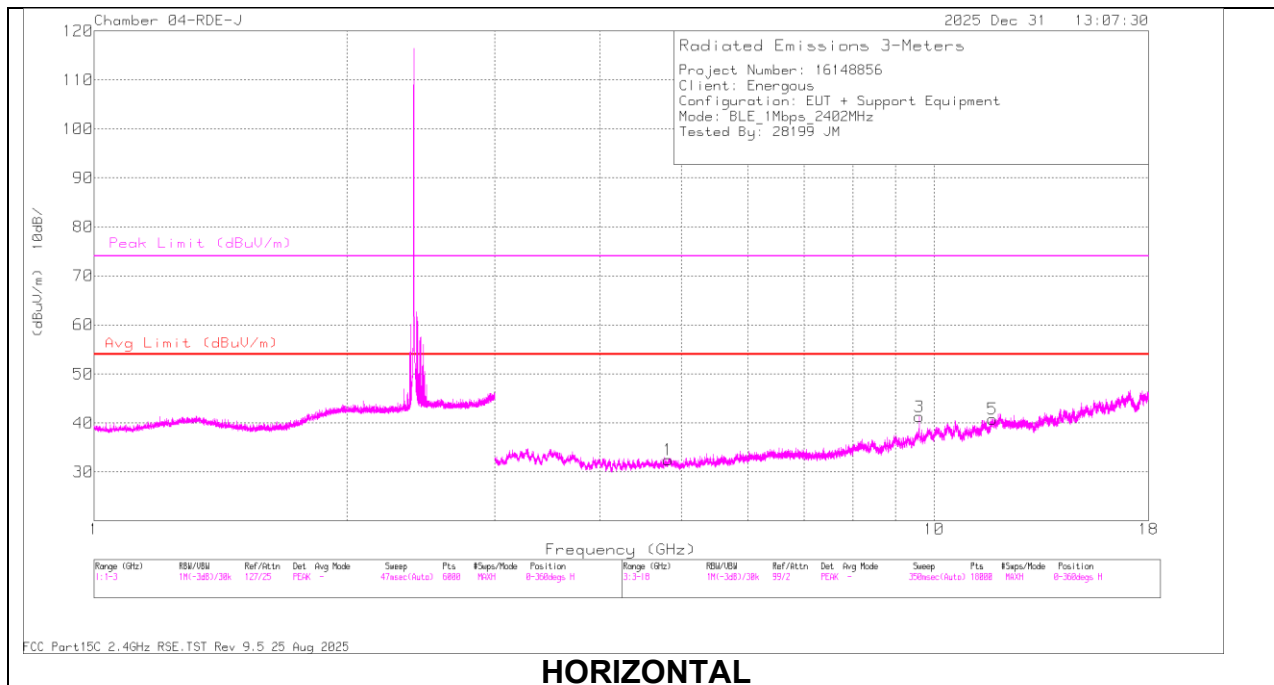
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL RESULTS



## RADIATED EMISSIONS

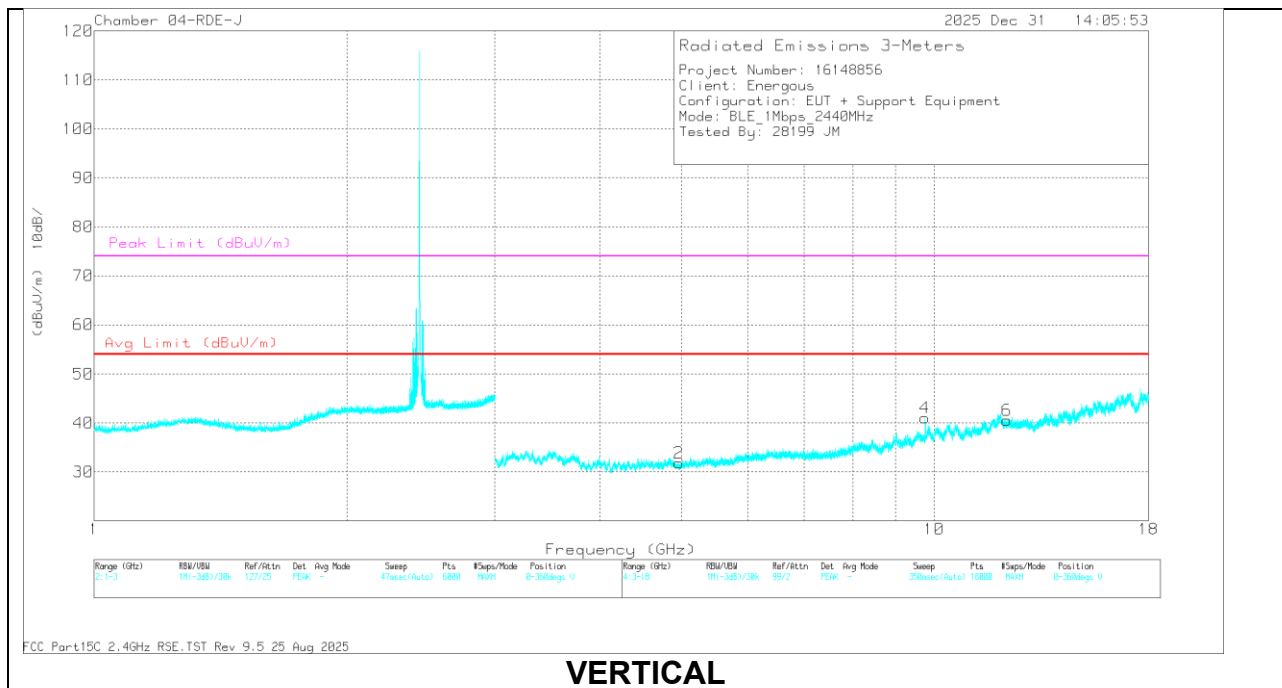
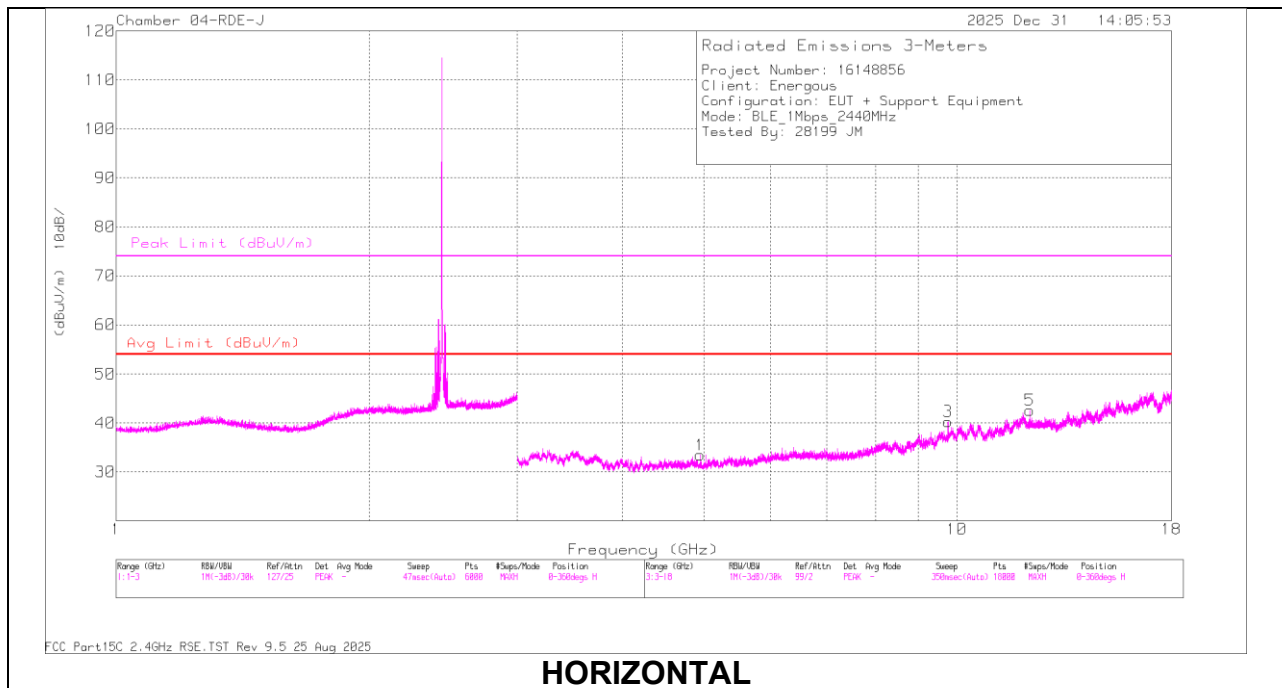
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | 80707 ACF (dB/m) | Amp/Cbl/Fitr (dB) | DCCF (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|-------------------|-----------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 4.8282        | 53.87                | PK2  | 34.3             | -45.3             | 0         | 42.87                      | -                  | -           | 74                  | -31.13         | 0              | 136         | H        |
|        | * 4.8413        | 41.38                | MAv1 | 34.3             | -45               | 2.01      | 32.69                      | 54                 | -21.31      | -                   | -              | 0              | 136         | H        |
| 2      | * 4.8035        | 54.52                | PK2  | 34.3             | -45.4             | 0         | 43.42                      | -                  | -           | 74                  | -30.58         | 284            | 107         | V        |
|        | * 4.8036        | 44.39                | MAv1 | 34.3             | -45.4             | 2.01      | 35.3                       | 54                 | -18.7       | -                   | -              | 284            | 107         | V        |
| 3      | 9.6074          | 55.93                | PK2  | 37               | -40.6             | 0         | 52.33                      | -                  | -           | -                   | -              | 239            | 190         | H        |
| 4      | 9.6091          | 54.11                | PK2  | 37               | -40.7             | 0         | 50.41                      | -                  | -           | -                   | -              | 265            | 183         | V        |
| 5      | * 11.755        | 50.9                 | PK2  | 39.3             | -39.4             | 0         | 50.8                       | -                  | -           | 74                  | -23.2          | 111            | 202         | H        |
|        | * 11.748        | 39.11                | MAv1 | 39.2             | -39.5             | 2.01      | 40.82                      | 54                 | -13.18      | -                   | -              | 111            | 202         | H        |
| 6      | * 11.756        | 51.2                 | PK2  | 39.3             | -39.4             | 0         | 51.1                       | -                  | -           | 74                  | -22.9          | 20             | 180         | V        |
|        | * 11.751        | 39.1                 | MAv1 | 39.3             | -39.5             | 2.01      | 40.91                      | 54                 | -13.09      | -                   | -              | 20             | 180         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

## MID CHANNEL RESULTS



## RADIATED EMISSIONS

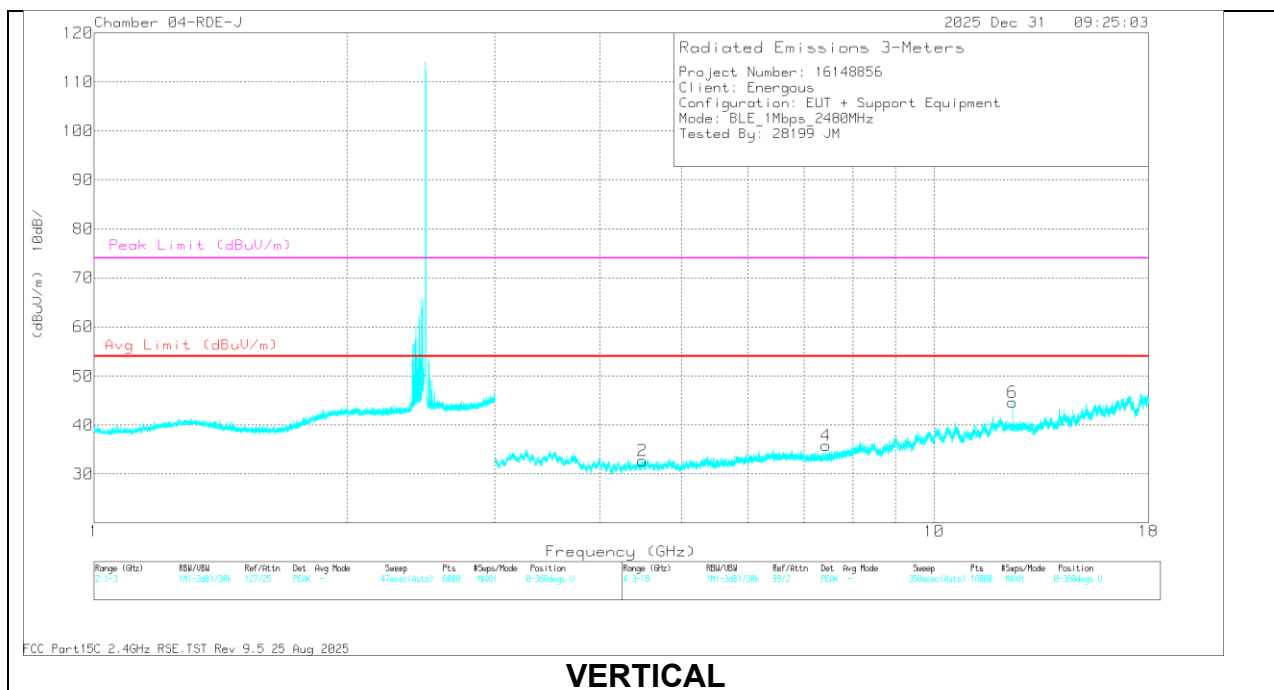
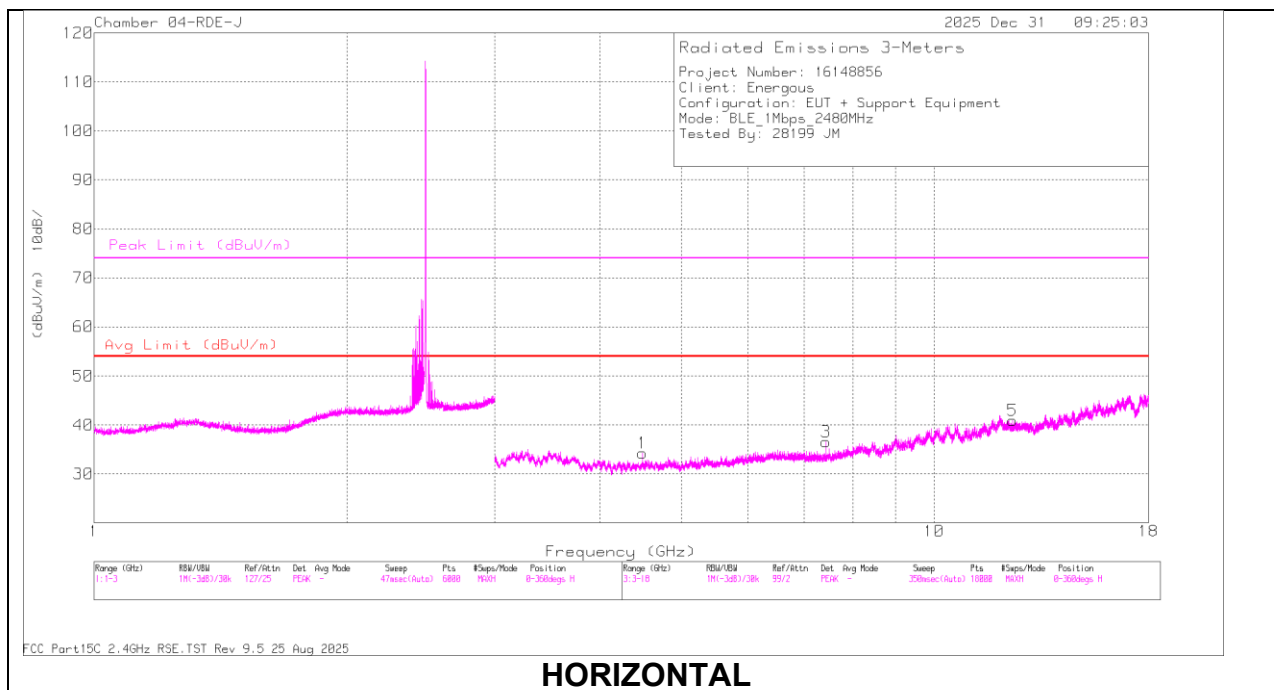
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | 80707 ACF (dB/m) | Amp/Cb/Fitr (dB) | DCCF (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|------------------|-----------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 4.9473        | 52.82                | PK2  | 34.2             | -44.9            | 0         | 42.12                      | -                  | -           | 74                  | -31.88         | 280            | 341         | H        |
|        | * 4.9480        | 41.54                | MAv1 | 34.2             | -44.9            | 2.01      | 32.85                      | 54                 | -21.15      | -                   | -              | 280            | 341         | H        |
| 2      | * 4.9584        | 54.12                | PK2  | 34.2             | -45              | 0         | 43.32                      | -                  | -           | 74                  | -30.68         | 20             | 400         | V        |
|        | * 4.9555        | 41.69                | MAv1 | 34.2             | -45              | 2.01      | 32.9                       | 54                 | -21.1       | -                   | -              | 20             | 400         | V        |
| 3      | 9.7589          | 54.05                | PK2  | 37.2             | -41.4            | 0         | 49.85                      | -                  | -           | -                   | -              | 245            | 109         | H        |
| 4      | 9.7591          | 54.01                | PK2  | 37.2             | -41.4            | 0         | 49.81                      | -                  | -           | -                   | -              | 256            | 197         | V        |
| 5      | * 12.2010       | 40.87                | MAv1 | 39.6             | -40.1            | 2.01      | 42.38                      | 54                 | -11.62      | -                   | -              | 230            | 184         | H        |
|        | * 12.2016       | 52.17                | PK2  | 39.6             | -40.1            | 0         | 51.67                      | -                  | -           | 74                  | -22.33         | 230            | 184         | H        |
| 6      | * 12.2021       | 51.37                | PK2  | 39.6             | -40.1            | 0         | 50.87                      | -                  | -           | 74                  | -23.13         | 254            | 146         | V        |
|        | * 12.1991       | 40.28                | MAv1 | 39.6             | -40.1            | 2.01      | 41.79                      | 54                 | -12.21      | -                   | -              | 254            | 146         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

## HIGH CHANNEL RESULTS



## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | 80707 ACF (dB/m) | Amp/Cb/Fitr (dB) | DCCF (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|------------------|-----------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 4.5101        | 53.54                | PK2  | 34.2             | -45.3            | 0         | 42.44                      | -                  | -           | 74                  | -31.56         | 216            | 114         | H        |
|        | * 4.5020        | 41.53                | MAv1 | 34.2             | -45.4            | 2.01      | 32.34                      | 54                 | -21.66      | -                   | -              | 216            | 114         | H        |
| 2      | 4.4873          | 53.82                | PK2  | 34.2             | -45.4            | 0         | 42.62                      | -                  | -           | -                   | -              | 25             | 178         | V        |
| 3      | * 7.4393        | 53.33                | PK2  | 35.5             | -42.3            | 0         | 46.53                      | -                  | -           | 74                  | -27.47         | 261            | 166         | H        |
|        | * 7.4393        | 41.61                | MAv1 | 35.5             | -42.3            | 2.01      | 36.82                      | 54                 | -17.18      | -                   | -              | 261            | 166         | H        |
| 4      | * 7.4393        | 52.21                | PK2  | 35.5             | -42.3            | 0         | 45.41                      | -                  | -           | 74                  | -28.59         | 254            | 103         | V        |
|        | * 7.4393        | 41.53                | MAv1 | 35.5             | -42.3            | 2.01      | 36.74                      | 54                 | -17.26      | -                   | -              | 254            | 103         | V        |
| 5      | * 12.4007       | 52.18                | PK2  | 39.3             | -40.1            | 0         | 51.38                      | -                  | -           | 74                  | -22.62         | 256            | 159         | H        |
|        | * 12.3992       | 40.94                | MAv1 | 39.3             | -40.1            | 2.01      | 42.15                      | 54                 | -11.85      | -                   | -              | 256            | 159         | H        |
| 6      | * 12.3985       | 55.05                | PK2  | 39.3             | -40.1            | 0         | 54.25                      | -                  | -           | 74                  | -19.75         | 247            | 157         | V        |
|        | * 12.3993       | 44.76                | MAv1 | 39.3             | -40.1            | 2.01      | 45.97                      | 54                 | -8.03       | -                   | -              | 247            | 157         | V        |

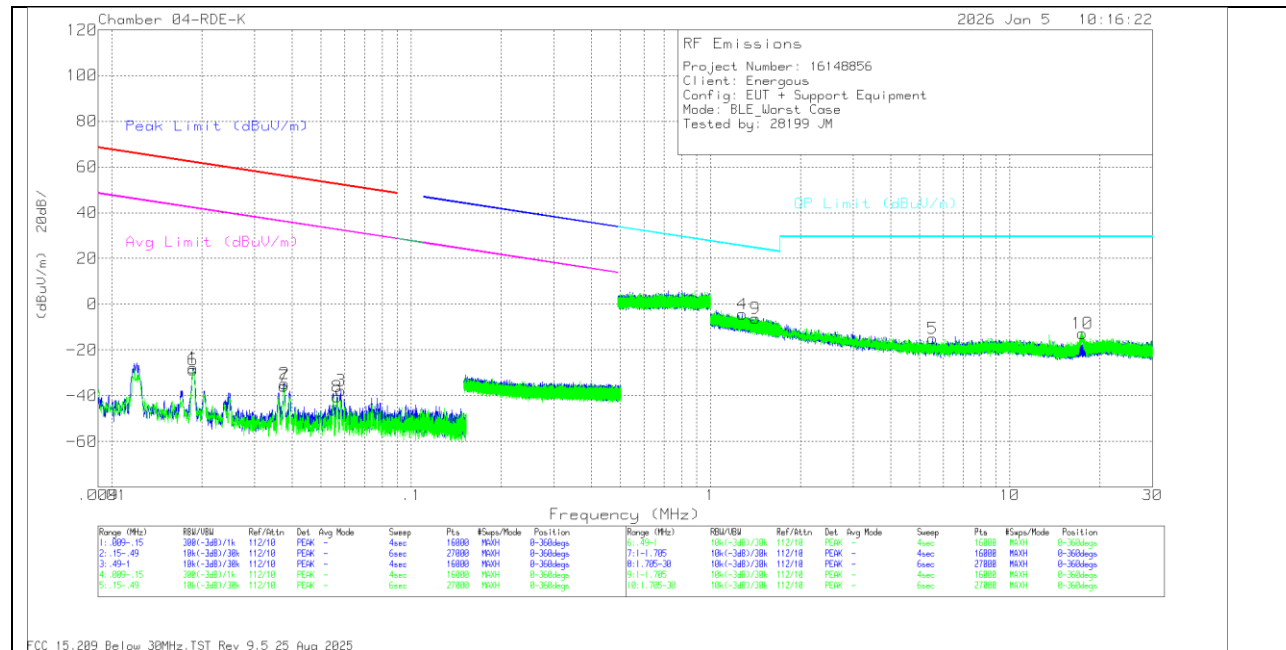
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### 9.3. TRANSMITTER WORST CASE BELOW 30MHz

#### SPURIOUS EMISSIONS BELOW 30MHz (WORST-CASE CONFIGURATION)



#### Below 30MHz Data

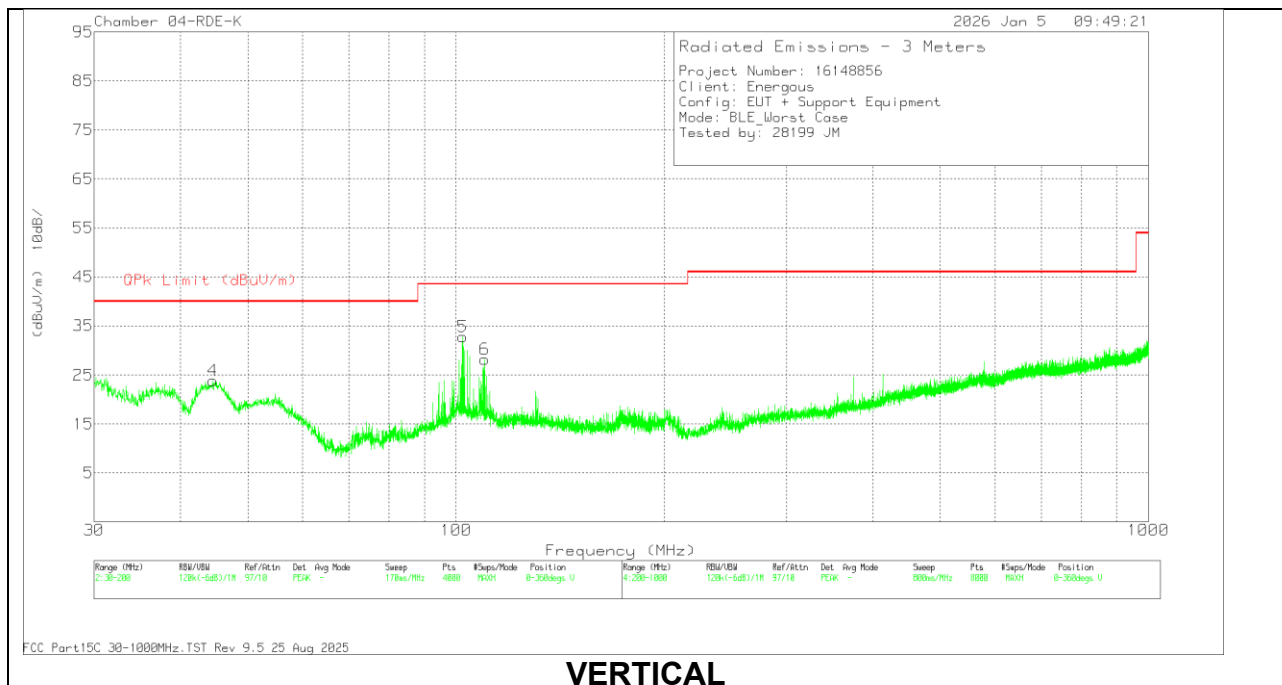
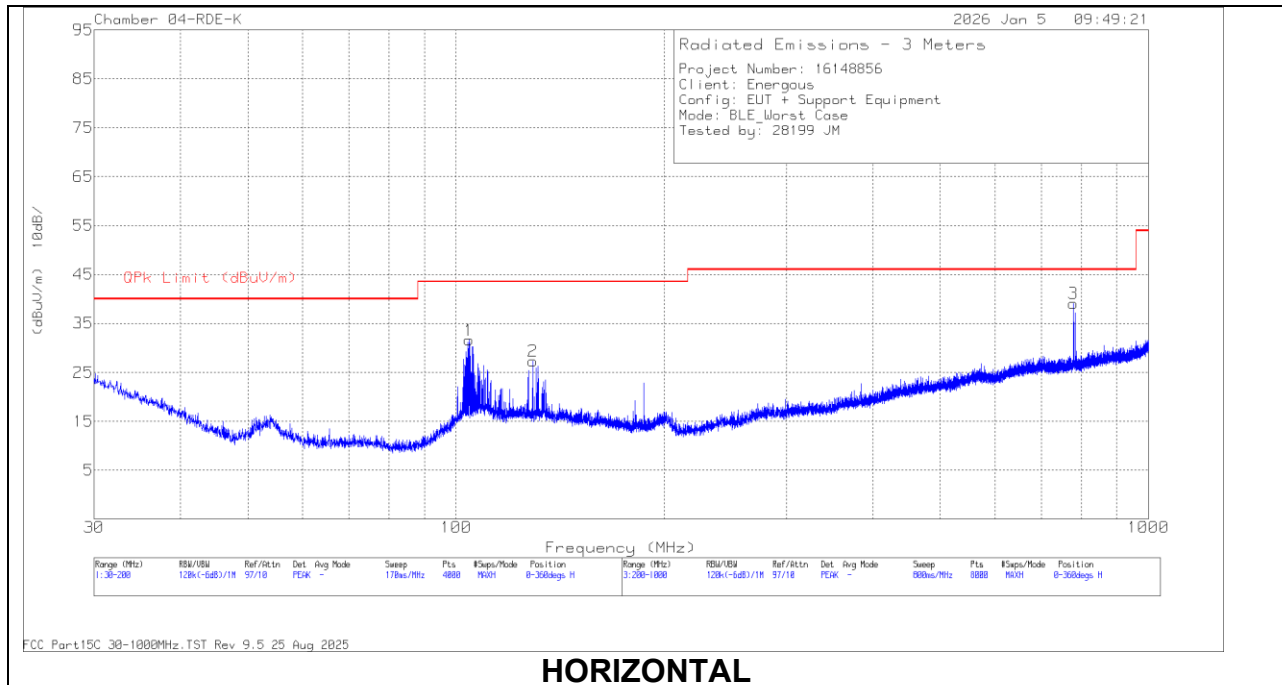
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Loop Antenna (dB/m) | Amp/Cbl (dB) | Dist Corr 300m (dB) | Corrected Reading (dBuV/m) | Peak Limit (dBuV/m) | Margin (dB) | Avg Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|---------------------|--------------|---------------------|----------------------------|---------------------|-------------|--------------------|-------------|----------------|
| 1      | .0187           | 24.34                | Pk  | 59.3                | -31.5        | -80                 | -27.86                     | 62.15               | -90.01      | 42.15              | -70.01      | 0-360          |
| 2      | .0377           | 20.28                | Pk  | 57.4                | -32.5        | -80                 | -34.82                     | 56.06               | -90.88      | 36.06              | -70.88      | 0-360          |
| 3      | .0583           | 17.63                | Pk  | 56.4                | -31.7        | -80                 | -37.67                     | 52.27               | -89.94      | 32.27              | -69.94      | 0-360          |
| 6      | .0187           | 23.49                | Pk  | 59.3                | -31.5        | -80                 | -28.71                     | 62.16               | -90.87      | 42.16              | -70.87      | 0-360          |
| 7      | .0376           | 19.37                | Pk  | 57.4                | -32.5        | -80                 | -35.73                     | 56.07               | -91.8       | 36.07              | -71.8       | 0-360          |
| 8      | .0566           | 14.7                 | Pk  | 56.5                | -31.8        | -80                 | -40.6                      | 52.53               | -93.13      | 32.53              | -73.13      | 0-360          |

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Loop Antenna (dB/m) | Amp/Cbl (dB) | Dist Corr 30m (dB) 40Log | Corrected Reading (dBuV/m) | QP Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|---------------------|--------------|--------------------------|----------------------------|-------------------|-------------|----------------|
| 4      | 1.2793          | 22.21                | Pk  | 45.3                | -31.9        | -40                      | -4.39                      | 25.49             | -29.88      | 0-360          |
| 5      | 5.5166          | 21.18                | Pk  | 35.5                | -31.6        | -40                      | -14.92                     | 29.5              | -44.42      | 0-360          |
| 9      | 1.4118          | 21.13                | Pk  | 44.6                | -32          | -40                      | -6.27                      | 24.63             | -30.9       | 0-360          |
| 10     | 17.4879         | 24.79                | Pk  | 33.9                | -31.4        | -40                      | -12.71                     | 29.5              | -42.21      | 0-360          |

Pk - Peak detector

TRANSMITTER WORST CASE BELOW 1 GHZ

**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)**



## Below 1GHz Data

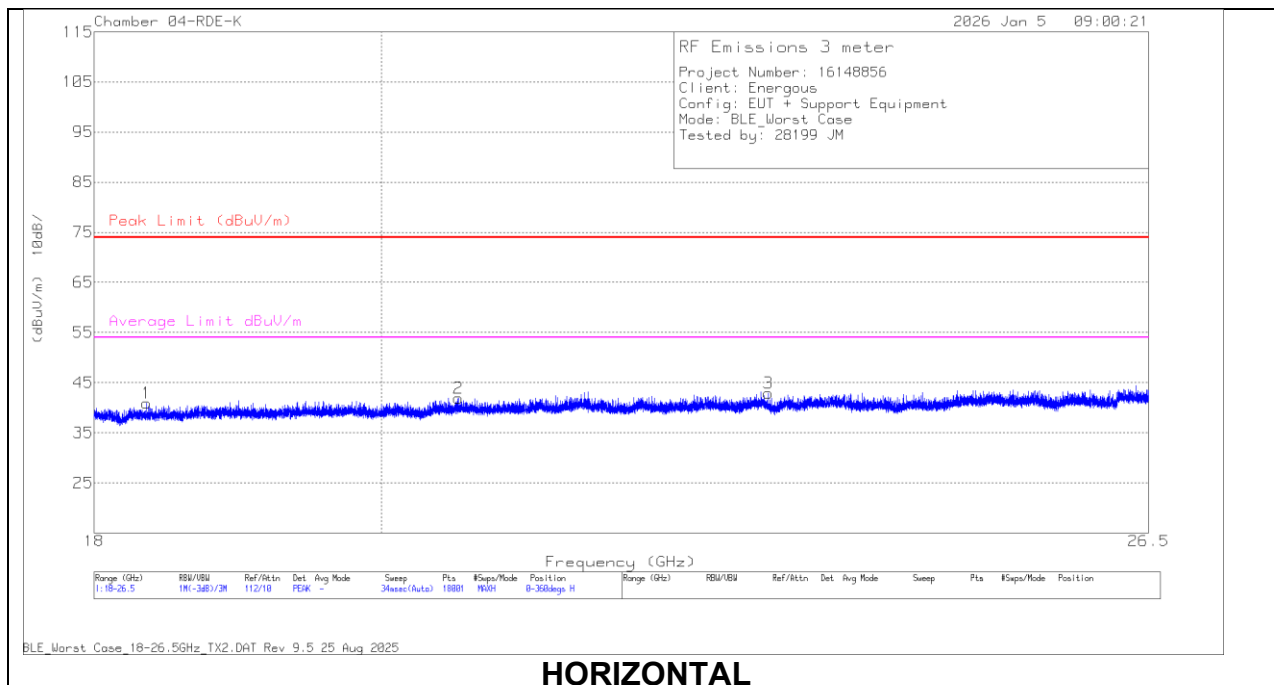
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | 203089 ACF (dB/m) | Amp/CbIs (dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------|---------------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 1      | 104.479         | 44.49                | Pk  | 17.7              | -30.6         | 31.59                      | 43.52              | -11.93      | 0-360          | 299         | H        |
| 2      | * 129.093       | 37.83                | Pk  | 19.9              | -30.4         | 27.33                      | 43.52              | -16.19      | 0-360          | 199         | H        |
| 3      | 778.375         | 39.39                | Pk  | 26.9              | -27.2         | 39.09                      | 46.02              | -6.93       | 0-360          | 101         | H        |
|        | 780.392         | 19.78                | Qp  | 26.9              | -27.2         | 19.48                      | 46.02              | -26.54      | 220            | 311         | H        |
| 4      | 44.5813         | 38.13                | Pk  | 16.8              | -31.1         | 23.83                      | 40                 | -16.17      | 0-360          | 101         | V        |
| 5      | 102.226         | 46.33                | Pk  | 17.2              | -30.7         | 32.83                      | 43.52              | -10.69      | 0-360          | 101         | V        |
| 6      | * 109.963       | 40.08                | Pk  | 18.7              | -30.6         | 28.18                      | 43.52              | -15.34      | 0-360          | 101         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

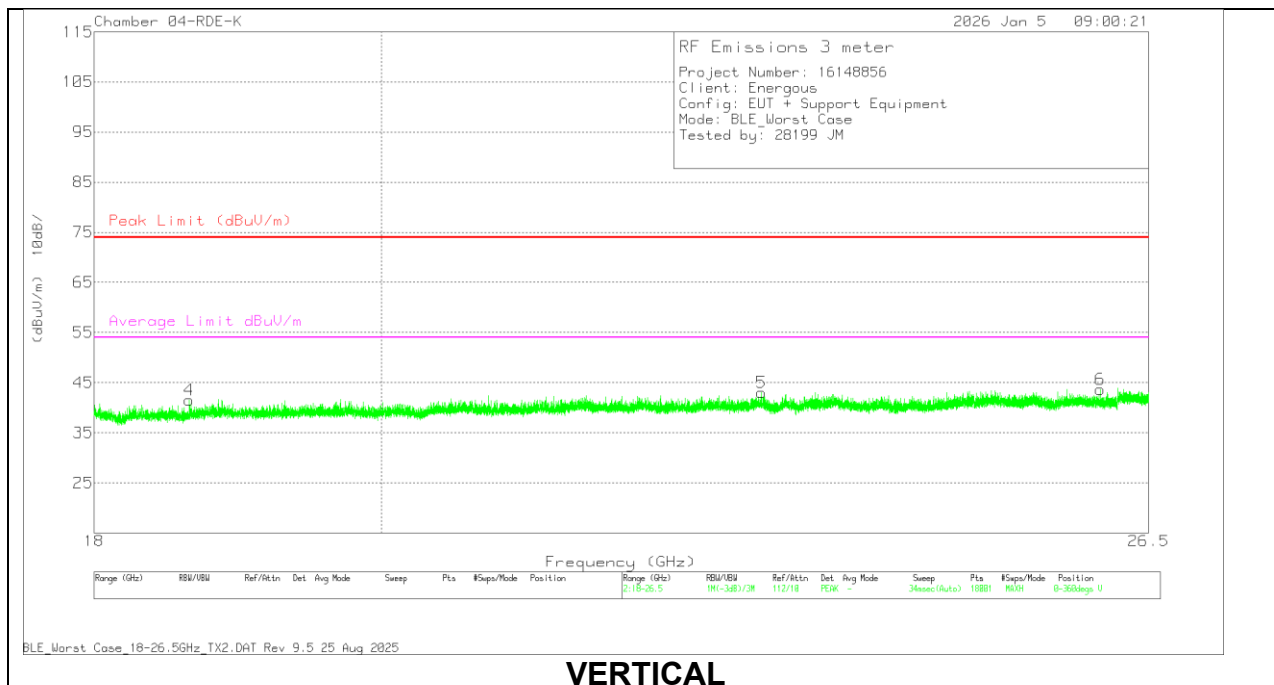
Pk - Peak detector Qp - Quasi-Peak detector

## 9.4. TRANSMITTER WORST CASE 18-26.5GHz

### SPURIOUS EMISSIONS 18 TO 26.5 GHz (WORST-CASE CONFIGURATION)



**HORIZONTAL**



**VERTICAL**

## 18-26.5 GHz Data

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 81140 ACF (dB/m) | CBL/AMP (dB) | CBL (dB) | Corrected Reading (dBuV/m) | Peak Limit (dBuV/m) | PK Margin (dB) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|------------------|--------------|----------|----------------------------|---------------------|----------------|-------------|----------------|-------------|----------|
| 1      | * 18.3499       | 52.85                | Pk  | 32               | -63.3        | 19.4     | 40.95                      | 74                  | -33.05         | -           | 0-360          | 200         | H        |
| 2      | * 20.5726       | 50.15                | Pk  | 32.7             | -61.2        | 20.3     | 41.95                      | 74                  | -32.05         | -           | 0-360          | 200         | H        |
| 3      | * 23.0513       | 50.92                | Pk  | 33.1             | -62.6        | 21.5     | 42.92                      | 74                  | -31.08         | -           | 0-360          | 200         | H        |
| 4      | * 18.6370       | 52.68                | Pk  | 32.2             | -62.8        | 19.5     | 41.58                      | 74                  | -32.42         | -           | 0-360          | 199         | V        |
| 5      | * 22.9918       | 50.4                 | Pk  | 33.2             | -62.1        | 21.5     | 43                         | 74                  | -31            | -           | 0-360          | 199         | V        |
| 6      | 26.0348         | 48.95                | Pk  | 34               | -62.2        | 22.9     | 43.65                      | 74                  | -30.35         | -           | 0-360          | 199         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

## 10. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

| Frequency of Emission (MHz) | Conducted Limit (dBµV) |            |
|-----------------------------|------------------------|------------|
|                             | Quasi-peak             | Average    |
| 0.15-0.5                    | 66 to 56 *             | 56 to 46 * |
| 0.5-5                       | 56                     | 46         |
| 5-30                        | 60                     | 50         |

\*Decreases with the logarithm of the frequency.

### TEST PROCEDURE

ANSI C63.10, Subclause 6.2

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

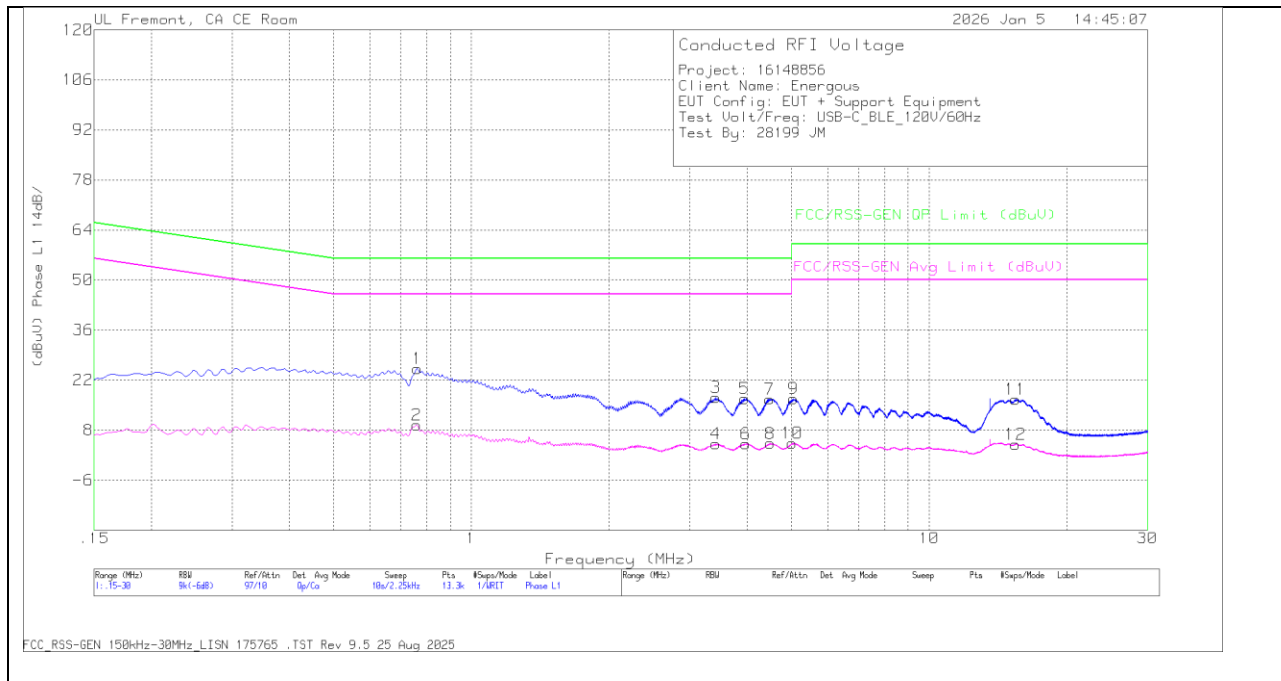
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

## 10.1. AC/DC Adapter via USB Cable

### LINE 1 RESULTS



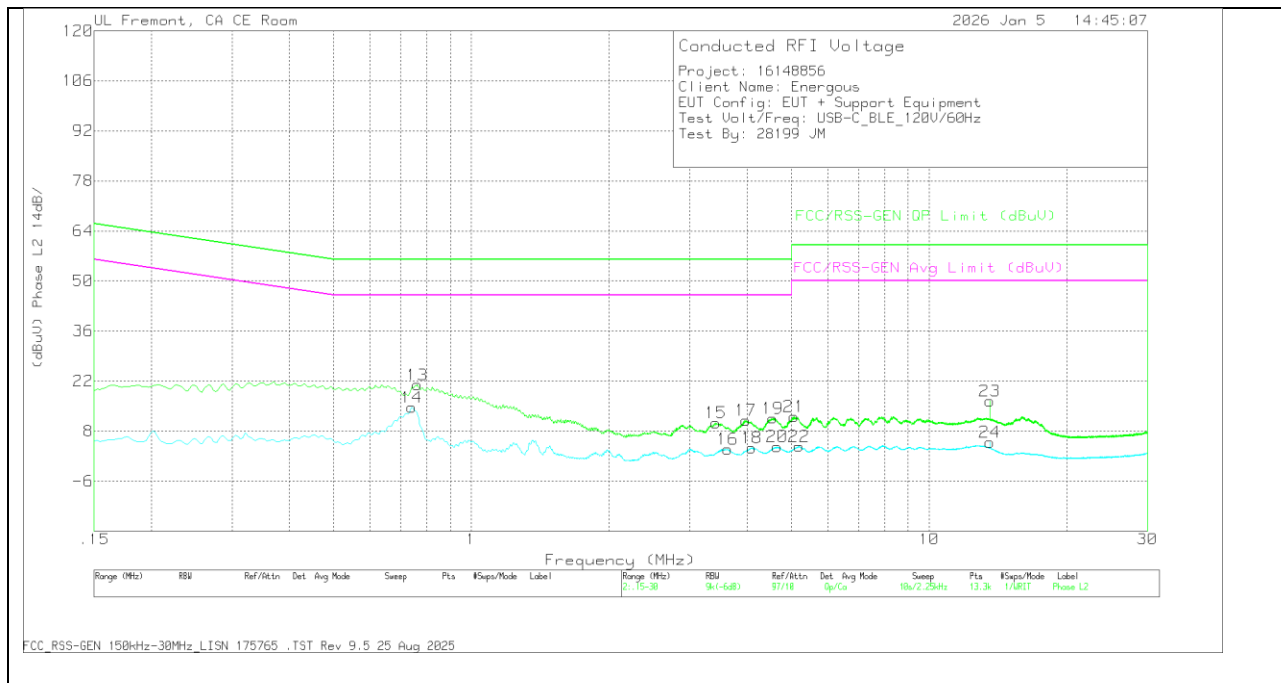
#### Trace Markers

| Range 1: Phase L1 .15 - 30MHz |                 |                      |     |          |           |                 |                          |                              |                         |                             |                |
|-------------------------------|-----------------|----------------------|-----|----------|-----------|-----------------|--------------------------|------------------------------|-------------------------|-----------------------------|----------------|
| Marker                        | Frequency (MHz) | Meter Reading (dBuV) | Det | Cbl (dB) | LISN (dB) | 10dB Atten (dB) | Corrected Reading (dBuV) | FCC/RSS-GEN Avg Limit (dBuV) | Avg (CISPR) Margin (dB) | FCC/RSS-GEN QP Limit (dBuV) | QP Margin (dB) |
| 2                             | .7598           | -6.2                 | Ca  | .1       | 0         | 10              | 9.48                     | 46                           | -36.52                  | -                           | -              |
| 4                             | 3.4215          | -5.98                | Ca  | .1       | 0         | 10              | 4.12                     | 46                           | -41.88                  | -                           | -              |
| 6                             | 3.975           | -5.9                 | Ca  | .1       | 0         | 10              | 4.2                      | 46                           | -41.8                   | -                           | -              |
| 8                             | 4.4925          | -5.84                | Ca  | .1       | 0         | 10              | 4.26                     | 46                           | -41.74                  | -                           | -              |
| 10                            | 5.028           | -5.84                | Ca  | .2       | 0         | 10              | 4.36                     | 50                           | -45.64                  | -                           | -              |
| 12                            | 15.4275         | -6.34                | Ca  | .3       | .1        | 10              | 4.06                     | 50                           | -45.94                  | -                           | -              |
| 1                             | .762            | 15.17                | Qp  | .1       | 0         | 10              | 25.27                    | -                            | -                       | 56                          | -30.73         |
| 3                             | 3.4215          | 7                    | Qp  | .1       | 0         | 10              | 17.1                     | -                            | -                       | 56                          | -38.9          |
| 5                             | 3.957           | 6.74                 | Qp  | .1       | 0         | 10              | 16.84                    | -                            | -                       | 56                          | -39.16         |
| 7                             | 4.4903          | 6.59                 | Qp  | .1       | 0         | 10              | 16.69                    | -                            | -                       | 56                          | -39.31         |
| 9                             | 5.0483          | 6.56                 | Qp  | .2       | 0         | 10              | 16.76                    | -                            | -                       | 60                          | -43.24         |
| 11                            | 15.4275         | 6.26                 | Qp  | .3       | .1        | 10              | 16.66                    | -                            | -                       | 60                          | -43.34         |

Qp - Quasi-Peak detector

Ca - CISPR average detection

## LINE 2 RESULTS



### Trace Markers

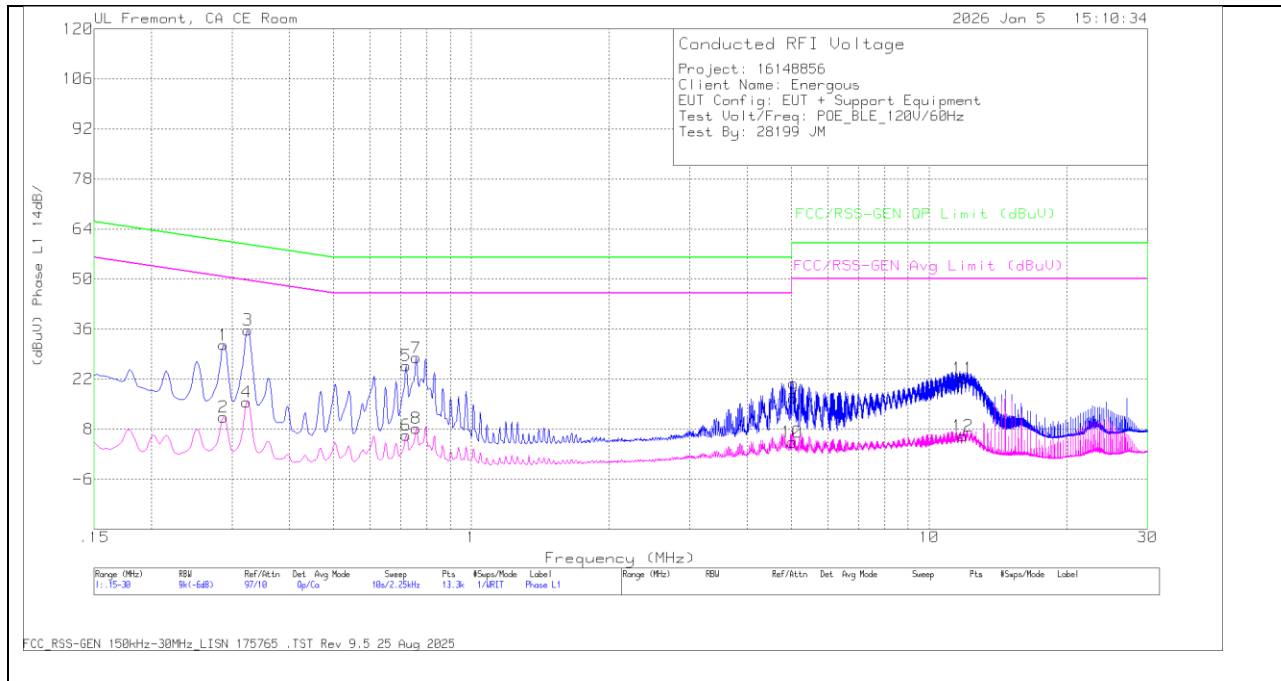
| Range2: Phase L2 .15 - 30MHz |                 |                      |     |          |           |                 |                          |                              |                         |                             |                |
|------------------------------|-----------------|----------------------|-----|----------|-----------|-----------------|--------------------------|------------------------------|-------------------------|-----------------------------|----------------|
| Marker                       | Frequency (MHz) | Meter Reading (dBuV) | Det | Cbl (dB) | LISN (dB) | 10dB Atten (dB) | Corrected Reading (dBuV) | FCC/RSS-GEN Avg Limit (dBuV) | Avg (CISPR) Margin (dB) | FCC/RSS-GEN QP Limit (dBuV) | QP Margin (dB) |
| 2                            | .7418           | 4.51                 | Ca  | .1       | 0         | 10              | 14.61                    | 46                           | -31.39                  | -                           | -              |
| 4                            | 3.6285          | -7.17                | Ca  | .1       | 0         | 10              | 2.93                     | 46                           | -43.07                  | -                           | -              |
| 6                            | 4.0988          | -6.78                | Ca  | .1       | 0         | 10              | 3.32                     | 46                           | -42.68                  | -                           | -              |
| 8                            | 4.6568          | -6.42                | Ca  | .1       | 0         | 10              | 3.68                     | 46                           | -42.32                  | -                           | -              |
| 10                           | 5.1923          | -6.47                | Ca  | .2       | 0         | 10              | 3.73                     | 50                           | -46.27                  | -                           | -              |
| 12                           | 13.56           | -5.45                | Ca  | .2       | .1        | 10              | 4.85                     | 50                           | -45.15                  | -                           | -              |
| 1                            | .762            | 10.81                | Qp  | .1       | 0         | 10              | 20.91                    | -                            | -                       | 56                          | -35.09         |
| 3                            | 3.417           | .18                  | Qp  | .1       | 0         | 10              | 10.28                    | -                            | -                       | 56                          | -45.72         |
| 5                            | 3.9773          | .87                  | Qp  | .1       | 0         | 10              | 10.97                    | -                            | -                       | 56                          | -45.03         |
| 7                            | 4.5555          | 1.51                 | Qp  | .1       | 0         | 10              | 11.61                    | -                            | -                       | 56                          | -44.39         |
| 9                            | 5.0708          | 1.81                 | Qp  | .2       | 0         | 10              | 12.01                    | -                            | -                       | 60                          | -47.99         |
| 11                           | 13.56           | 6.07                 | Qp  | .2       | .1        | 10              | 16.37                    | -                            | -                       | 60                          | -43.63         |

Qp - Quasi-Peak detector

Ca - CISPR average detection

## 10.2. POE

### LINE 1 RESULTS

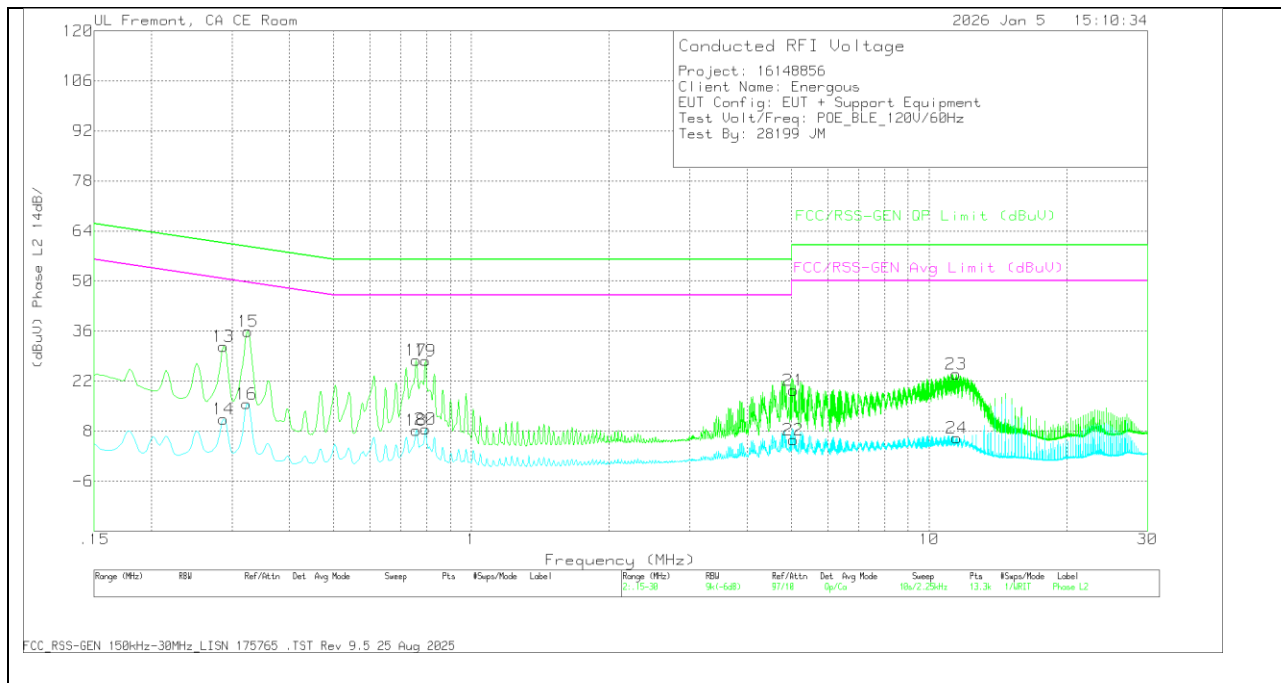


### Trace Markers

| Range 1: Phase L1 .15 - 30MHz |                 |                      |     |          |           |                 |                          |                              |                         |                             |                |
|-------------------------------|-----------------|----------------------|-----|----------|-----------|-----------------|--------------------------|------------------------------|-------------------------|-----------------------------|----------------|
| Marker                        | Frequency (MHz) | Meter Reading (dBuV) | Det | Cbl (dB) | LISN (dB) | 10dB Atten (dB) | Corrected Reading (dBuV) | FCC/RSS-GEN Avg Limit (dBuV) | Avg (CISPR) Margin (dB) | FCC/RSS-GEN QP Limit (dBuV) | QP Margin (dB) |
| 2                             | .2873           | 1.42                 | Ca  | 0        | 0         | 10              | 11.42                    | 50.6                         | -39.18                  | -                           | -              |
| 4                             | .3233           | 5.56                 | Ca  | 0        | 0         | 10              | 15.56                    | 49.62                        | -34.06                  | -                           | -              |
| 6                             | .7215           | -3.78                | Ca  | .1       | 0         | 10              | 6.32                     | 46                           | -39.68                  | -                           | -              |
| 8                             | .7586           | -1.86                | Ca  | .1       | 0         | 10              | 8.24                     | 46                           | -37.76                  | -                           | -              |
| 10                            | 5.028           | -5.89                | Ca  | .2       | 0         | 10              | 4.31                     | 50                           | -45.69                  | -                           | -              |
| 12                            | 11.8568         | -4.16                | Ca  | .2       | .1        | 10              | 6.14                     | 50                           | -43.86                  | -                           | -              |
| 1                             | .2873           | 21.59                | Qp  | 0        | 0         | 10              | 31.59                    | -                            | -                       | 60.6                        | -29.01         |
| 3                             | .3255           | 25.67                | Qp  | 0        | 0         | 10              | 35.67                    | -                            | -                       | 59.57                       | -23.9          |
| 5                             | .7215           | 15.67                | Qp  | .1       | 0         | 10              | 25.77                    | -                            | -                       | 56                          | -30.23         |
| 7                             | .7575           | 17.83                | Qp  | .1       | 0         | 10              | 27.93                    | -                            | -                       | 56                          | -28.07         |
| 9                             | 5.046           | 6.49                 | Qp  | .2       | 0         | 10              | 16.69                    | -                            | -                       | 60                          | -43.31         |
| 11                            | 11.8568         | 12.01                | Qp  | .2       | .1        | 10              | 22.31                    | -                            | -                       | 60                          | -37.69         |

Qp - Quasi-Peak detector  
Ca - CISPR average detection

## LINE 2 RESULTS



### Trace Markers

| Range 2: Phase L2 .15 - 30MHz |                 |                      |     |          |           |                 |                          |                              |                         |                             |                |
|-------------------------------|-----------------|----------------------|-----|----------|-----------|-----------------|--------------------------|------------------------------|-------------------------|-----------------------------|----------------|
| Marker                        | Frequency (MHz) | Meter Reading (dBuV) | Det | Cbl (dB) | LISN (dB) | 10dB Atten (dB) | Corrected Reading (dBuV) | FCC/RSS-GEN Avg Limit (dBuV) | Avg (CISPR) Margin (dB) | FCC/RSS-GEN QP Limit (dBuV) | QP Margin (dB) |
| 14                            | .2873           | 1.4                  | Ca  | 0        | 0         | 10              | 11.4                     | 50.6                         | -39.2                   | -                           | -              |
| 16                            | .3233           | 5.64                 | Ca  | 0        | 0         | 10              | 15.64                    | 49.62                        | -33.98                  | -                           | -              |
| 18                            | .7575           | -1.87                | Ca  | .1       | 0         | 10              | 8.23                     | 46                           | -37.77                  | -                           | -              |
| 20                            | .7935           | -1.51                | Ca  | .1       | 0         | 10              | 8.59                     | 46                           | -37.41                  | -                           | -              |
| 22                            | 5.046           | -4.69                | Ca  | .2       | 0         | 10              | 5.51                     | 50                           | -44.49                  | -                           | -              |
| 24                            | 11.4765         | -4.14                | Ca  | .2       | .1        | 10              | 6.16                     | 50                           | -43.84                  | -                           | -              |
| 13                            | .2873           | 21.69                | Qp  | 0        | 0         | 10              | 31.69                    | -                            | -                       | 60.6                        | -28.91         |
| 15                            | .3255           | 25.9                 | Qp  | 0        | 0         | 10              | 35.9                     | -                            | -                       | 59.57                       | -23.67         |
| 17                            | .7575           | 17.74                | Qp  | .1       | 0         | 10              | 27.84                    | -                            | -                       | 56                          | -28.16         |
| 19                            | .7935           | 17.63                | Qp  | .1       | 0         | 10              | 27.73                    | -                            | -                       | 56                          | -28.27         |
| 21                            | 5.046           | 9.29                 | Qp  | .2       | 0         | 10              | 19.49                    | -                            | -                       | 60                          | -40.51         |
| 23                            | 11.4383         | 13.63                | Qp  | .2       | .1        | 10              | 23.93                    | -                            | -                       | 60                          | -36.07         |

Qp - Quasi-Peak detector  
Ca - CISPR average detection

## **11. SETUP PHOTOS**

Please refer to 16148856-EP1 for setup photos.

# **END OF REPORT**