

# EMC TEST REPORT

**Applicant** TFH Worcestershire Ltd.

**FCC ID** 2BOU5CRTM

**Product** CHROMATHEME

**Product Code** 9CRTM

**Brand** TFH

**Model** 9CRTM

**Report No.** R2406A0762-E1V1

**Issue Date** July 10, 2025

Eurofins TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2023)/ ANSI C63.4-2014**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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*Prepared by: Liu Wei*

*Approved by: Xu Kai*

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**Eurofins TA Technology (Shanghai) Co., Ltd.**

*Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China*

*TEL: +86-021-50791141/2/3*

*FAX: +86-021-50791141/2/3-8000*

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| Version | Revision Description          | Issue Date    |
|---------|-------------------------------|---------------|
| Rev.0   | Initial issue of report.      | June 26, 2025 |
| Rev.1   | Updated information and data. | July 10, 2025 |

Note: This revised report (Report No.: R2406A0762-E1V1) supersedes and replaces the previously issued report (Report No.: R2406A0762-E1). Please discard or destroy the previously issued report and dispose of it accordingly.

## Summary of measurement results

| Number   | Test Case          | Clause in FCC Rules             | Conclusion |
|--|--------------------|---------------------------------|------------|
| 1  | Radiated Emission  | FCC Part15.109, ANSI C63.4-2014 | PASS       |
| 2  | Conducted Emission | FCC Part15.107, ANSI C63.4-2014 | PASS       |
| Date of Testing: October 16, 2024 ~ October 17, 2024 and July 7, 2025  |                    |                                 |            |
| Date of Sample Received: July 1, 2024  |                    |                                 |            |
| <p>Note:</p> <p>1. All indications of Pass/Fail in this report are opinions expressed by Eurofins TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results.</p> <p>Measurement Uncertainties were not taken into account and are published for informational purposes only.</p> |                    |                                 |            |

## 1 Test Laboratory

### 1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **Eurofins TA Technology (Shanghai) Co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

### 1.2 Test Facility

#### **FCC (Designation number: CN1179, Test Firm Registration Number: 446626)**

Eurofins TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

#### **A2LA (Certificate Number: 3857.01)**

Eurofins TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

### 1.3 Testing Location

Company: Eurofins TA Technology (Shanghai) Co., Ltd.  
Address: Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China  
City: Shanghai  
Post code: 201201  
Country: P. R. China  
Contact: Xu Kai  
Telephone: +86-021-50791141/2/3  
Fax: +86-021-50791141/2/3-8000  
Website: <https://www.eurofins.com/electrical-and-electronics>  
E-mail: Kain.Xu@cpt.eurofinscn.com

## 2 General Description of Equipment Under Test

### 2.1 Applicant and Manufacturer Information

|                             |   |
|-----------------------------|---|
| <b>Applicant</b>            | TFH Worcestershire Ltd.   |
| <b>Applicant address</b>    | Unit 10 Oldington Trading Estate, Kidderminster, Worcestershire |
| <b>Manufacturer</b>         | TFH Worcestershire Ltd.   |
| <b>Manufacturer address</b> | Unit 10 Oldington Trading Estate, Kidderminster, Worcestershire |

### 2.2 General Information

| EUT Description   |   |               |               |  |  |  |
|---|---|---------------|---------------|--|--|--|
| Product Code  | 9CRTM   |               |               |  |  |  |
| Device Type   | Fixed Device  |               |               |  |  |  |
| Model   | 9CRTM   |               |               |  |  |  |
| Lab internal SN   | R2406A0762/S01  |               |               |  |  |  |
| HW Version  | V1.0  |               |               |  |  |  |
| SW Version  | V1.0  |               |               |  |  |  |
| Power Rating  | DC 5V   |               |               |  |  |  |
| Connecting I/O Port(s)  | Please refer to the User's Manual.  |               |               |  |  |  |
| Antenna Type  | Internal Antenna  |               |               |  |  |  |
| Frequency   | Band  | Tx (MHz)      | Rx (MHz)      |  |  |  |
|   | Bluetooth   | 2400 ~ 2483.5 | 2400 ~ 2483.5 |  |  |  |
|   | Bluetooth LE  | 2400 ~ 2483.5 | 2400 ~ 2483.5 |  |  |  |
| EUT Accessory   |   |               |               |  |  |  |
| USB Cable   | Manufacturer: TFH(Worcestershire) Ltd. DY13 9HT UK<br>Manufacturer Address: Unit 10 Oldington Trading Estate, Kidderminster, Worcestershire<br>Model: /<br>60cm Cable, Shielded |               |               |  |  |  |
| Auxiliary Test Equipment  |   |               |               |  |  |  |
| Display   | Model: HSN-CAA  |               |               |  |  |  |
| Note:   |   |               |               |  |  |  |
| 1. The EUT is sent from the applicant to Eurofins TA and the information of the EUT is declared by the applicant. |   |               |               |  |  |  |

## 2.3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

### Test standards

**FCC Code CFR47 Part15B (2023)**

**ANSI C63.4-2014**

## 2.4 Test Mode

| Test Mode |                         |
|-----------|-------------------------|
| Mode 1    | EUT with Display + play |

| Test Type          | Test Mode | Worst Mode |
|--------------------|-----------|------------|
| Radiated Emission  | Mode 1    | Mode 1     |
| Conducted Emission | Mode 1    | Mode 1     |

After technical evaluation or/and preliminary test, the test data of the worst-case condition was recorded in this report.

## 3 Test Case Results

### 3.1 Radiated Emission

#### Ambient Condition

| Temperature | Relative humidity |
|-------------|-------------------|
| 15°C ~ 35°C | 30% ~ 60%         |

#### Methods of Measurement

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 3 meters. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.

Set the spectrum analyzer in the following:

Below 1GHz:

RBW=100 kHz / VBW=300 kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK Detector: RBW=1MHz / VBW=3MHz/ Sweep=AUTO

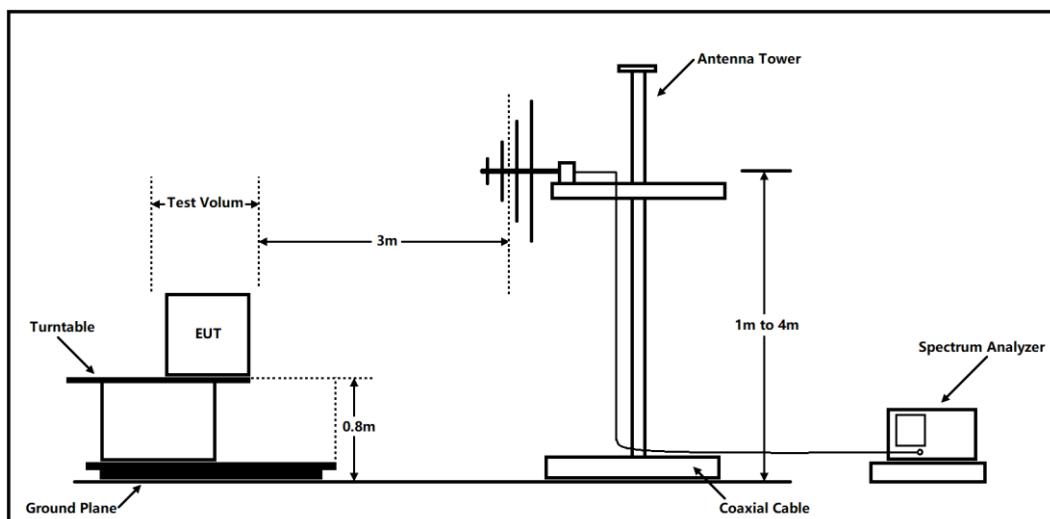
(b) AVERAGE Detector: RBW=1MHz / VBW=3MHz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

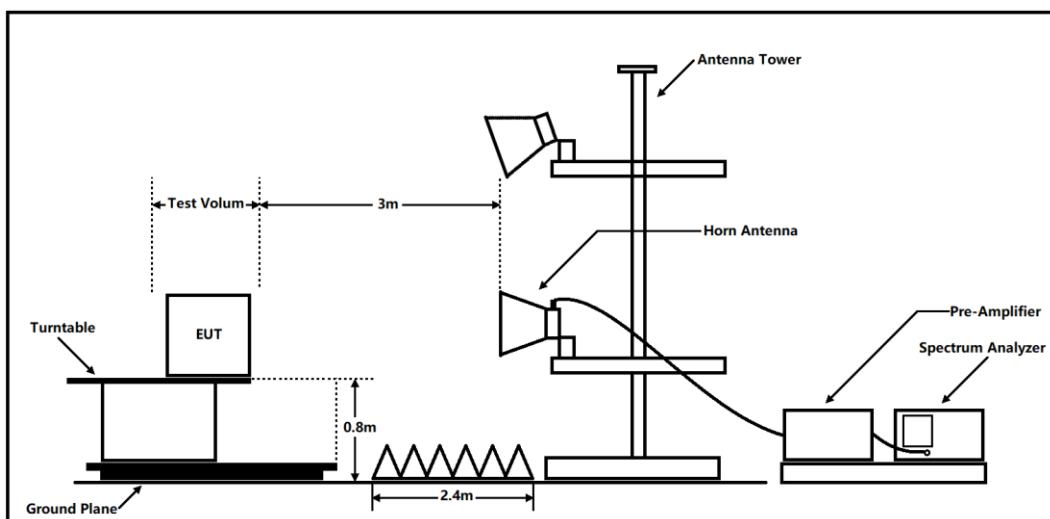
During the test, EUT is connected to a Display via a USB port in the case of power supply.

## Test Setup

### Below 1GHz



### Above 1GHz



Note: Area side: 2.4mX3.6m

Antenna Tower meets ANSI C63.4 requirements for measurements above 1 GHz by keeping the antenna aimed at the EUT during the antenna's ascent/ descent along the antenna mast.

**Limits**

| Frequency (MHz)   | Field Strength (dB $\mu$ V/m) | Detector        |
|---|-------------------------------|-----------------|
| 30 -88  | 40.0                          | Quasi-peak      |
| 88-216  | 43.5                          | Quasi-peak      |
| 216 – 960   | 46.0                          | Quasi-peak      |
| 960-1000  | 54.0                          | Quasi-peak      |
| 1000-5 <sup>th</sup> harmonic of the highest frequency or 40GHz, which is lower | 54<br>74                      | Average<br>Peak |

**Frequency range of radiated measurements**

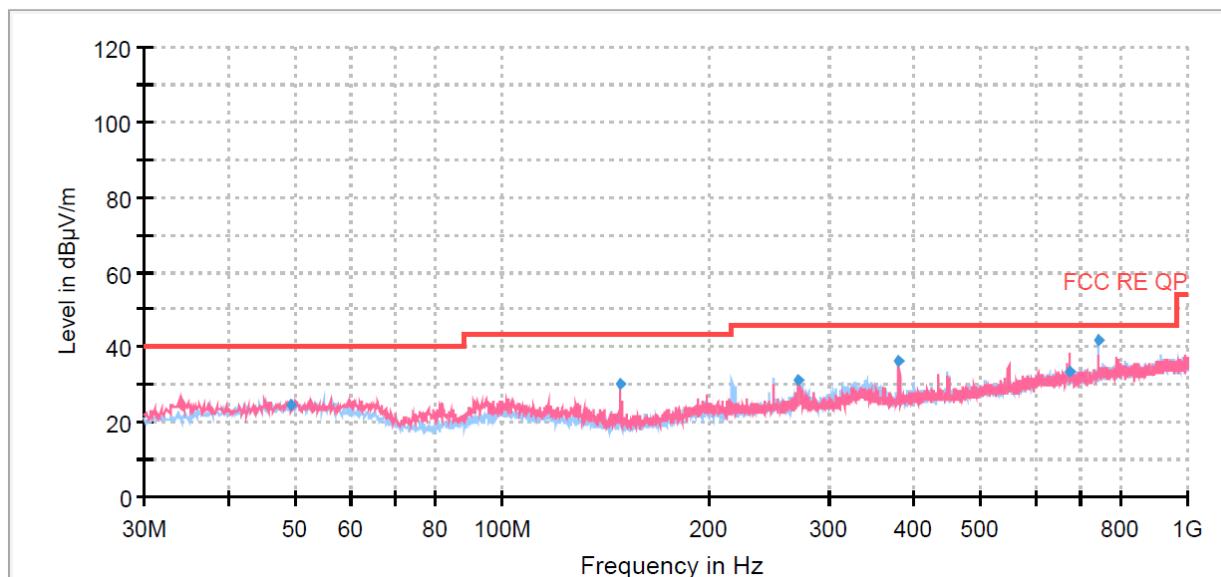
| Highest frequency generated or used in the device or on which the device operates or tunes (MHz) | Upper frequency of measurement range (MHz)                           |
|--|--|
| Below 1.705  | 30   |
| 1.705-108  | 1000   |
| 108-500  | 2000   |
| 500-1000   | 5000   |
| Above 1000   | 5th harmonic of the highest frequency or 40 GHz, whichever is lower. |

## Test Results

Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier.

The following graphs display the maximum values of horizontal and vertical by software.

For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

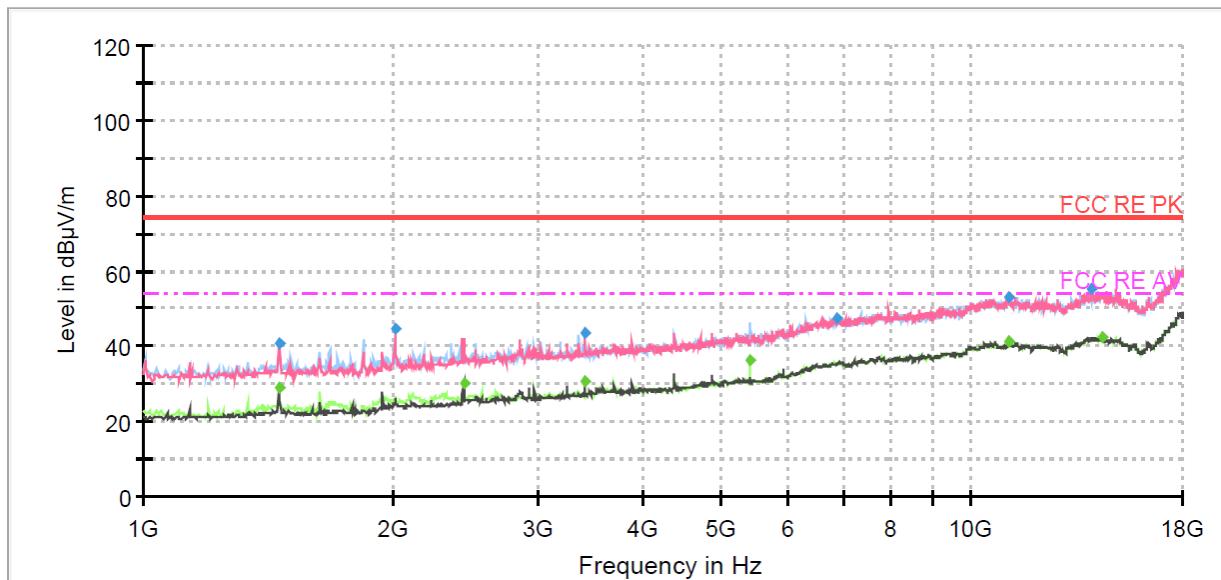


Radiated Emission from 30MHz to 1GHz

| Frequency (MHz) | Quasi-Peak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) |
|-----------------|---------------------|----------------|-------------|-------------|--------------|---------------|---------------------|
| 49.29           | 24.32               | 40.00          | 15.68       | 101.0       | V            | 0.00          | 20                  |
| 148.48          | 29.93               | 43.50          | 13.57       | 101.0       | V            | 66.00         | 15                  |
| 271.03          | 31.11               | 46.00          | 14.89       | 180.0       | V            | 98.00         | 20                  |
| 379.53          | 36.49               | 46.00          | 9.51        | 201.0       | V            | 84.00         | 23                  |
| 670.89          | 33.39               | 46.00          | 12.61       | 103.0       | V            | 82.00         | 28                  |
| 742.48          | 41.86               | 46.00          | 4.14        | 100.0       | H            | 224.00        | 29                  |

Remark: 1. Correction Factor = Antenna factor + Insertion loss(cable loss)

2. Margin = Limit – Quasi-Peak



| Frequency (MHz) | MaxPeak (dB $\mu$ V/m) | Average (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------------|------------------------|----------------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1459.00         | ---                    | 28.87                  | 54.00                | 25.13       | 500.00          | 100.0       | V   | 222.00        | -13          |
| 1459.00         | 40.62                  | ---                    | 74.00                | 33.38       | 500.00          | 100.0       | V   | 222.00        | -13          |
| 2015.75         | 44.75                  | ---                    | 74.00                | 29.25       | 500.00          | 100.0       | V   | 300.00        | -11          |
| 2436.50         | ---                    | 30.14                  | 54.00                | 23.86       | 500.00          | 100.0       | V   | 246.00        | -9           |
| 3409.75         | 43.45                  | ---                    | 74.00                | 30.55       | 500.00          | 100.0       | V   | 246.00        | -7           |
| 3409.75         | ---                    | 30.48                  | 54.00                | 23.52       | 500.00          | 100.0       | V   | 246.00        | -7           |
| 5398.75         | ---                    | 36.28                  | 54.00                | 17.72       | 500.00          | 100.0       | H   | 328.00        | -1           |
| 6865.00         | 47.47                  | ---                    | 74.00                | 26.53       | 500.00          | 100.0       | H   | 72.00         | 4            |
| 11068.25        | 53.21                  | ---                    | 74.00                | 20.79       | 500.00          | 100.0       | V   | 202.00        | 9            |
| 11115.00        | ---                    | 41.09                  | 54.00                | 12.91       | 500.00          | 200.0       | V   | 257.00        | 9            |
| 13983.75        | 55.38                  | ---                    | 74.00                | 18.62       | 500.00          | 100.0       | V   | 21.00         | 10           |
| 14413.00        | ---                    | 42.58                  | 54.00                | 11.42       | 500.00          | 200.0       | H   | 51.00         | 10           |

**Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**

**2. Margin = Limit – MaxPeak / Average**

## 3.2 Conducted Emission

### Ambient Condition

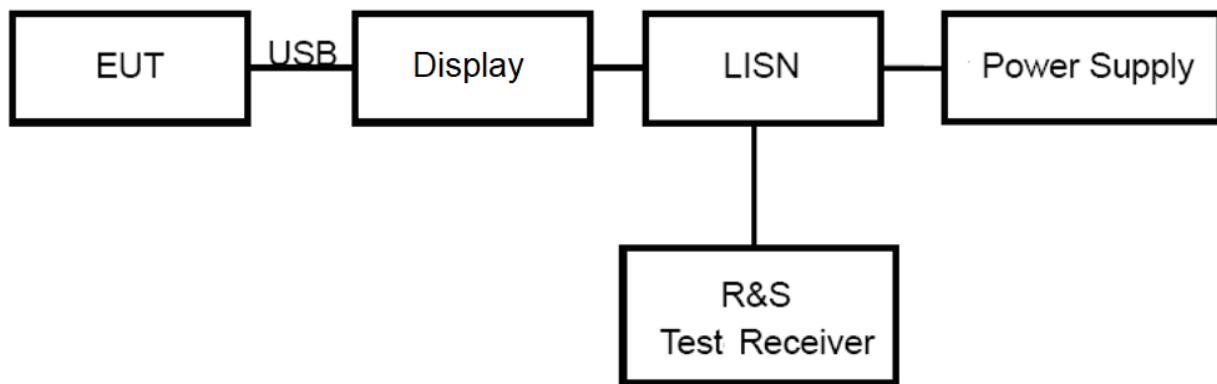
| Temperature | Relative humidity |
|-------------|-------------------|
| 15°C ~ 35°C | 30% ~ 60%         |

### Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.

During the test, EUT is connected to a Display via a USB port in the case of power supply.

### Test Setup



Note: Power Supply is AC Power source and it is used to change the voltage 120V/60Hz.

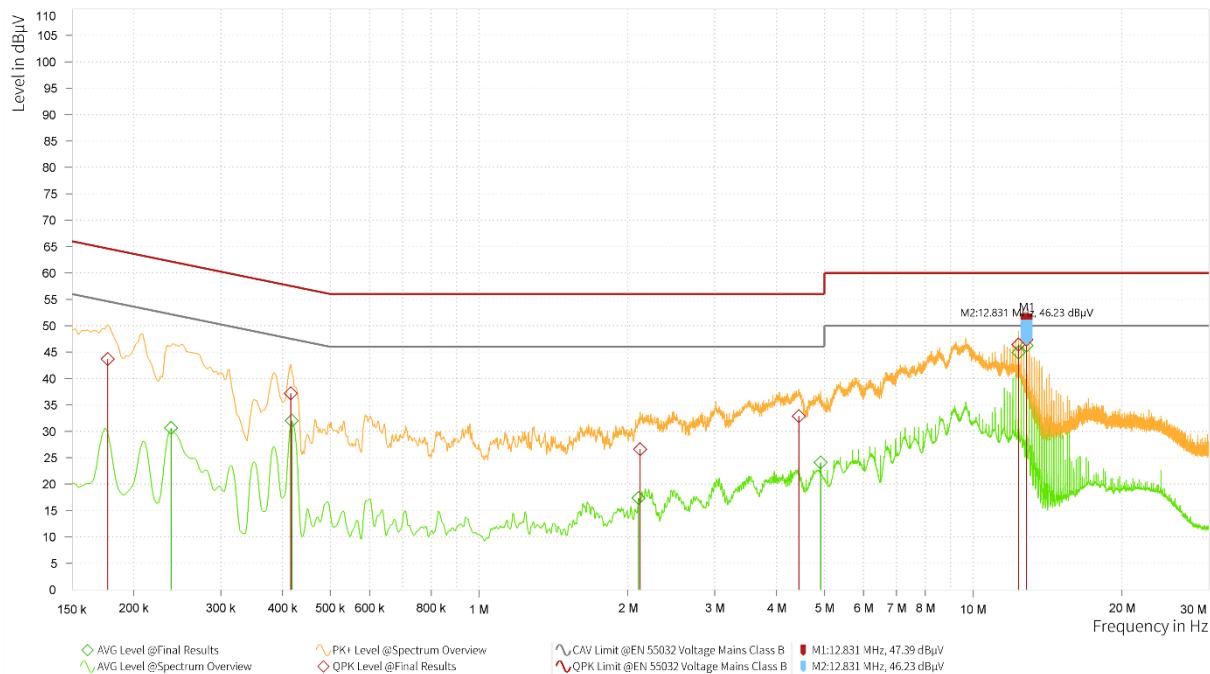
### Limits

| Frequency<br>(MHz) | Class A (dB $\mu$ V) |         | Class B (dB $\mu$ V) |           |
|--------------------|----------------------|---------|----------------------|-----------|
|                    | Quasi-peak           | Average | Quasi-peak           | Average   |
| 0.15 - 0.5         | 79                   | 66      | 66 to 56 *           | 56 to 46* |
| 0.5 - 5            | 73                   | 60      | 56                   | 46        |
| 5 - 30             | 73                   | 60      | 60                   | 50        |

\*: Decreases with the logarithm of the frequency.

Note: The EUT should meet CLASS B limit.

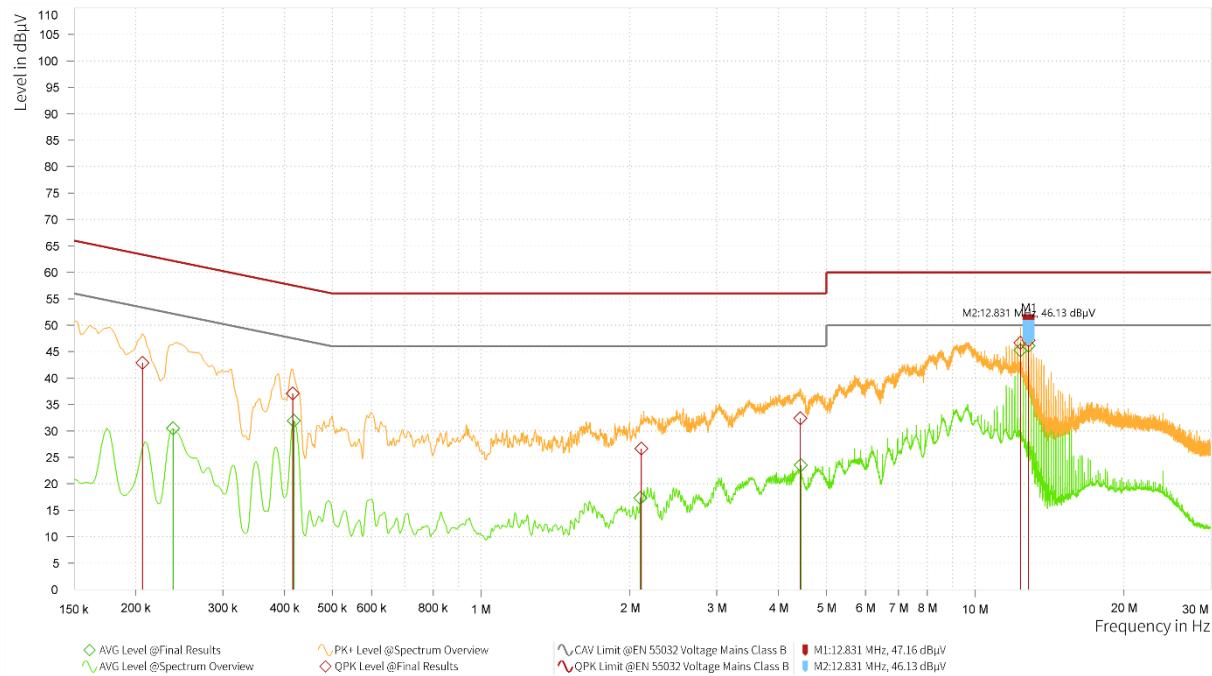
## Test Results



| Frequency [MHz] | QPK Level [dB $\mu$ V] | QPK Limit [dB $\mu$ V] | QPK Margin [dB] | AVG Level [dB $\mu$ V] | AVG: CAV Limit [dB $\mu$ V] | AVG Margin [dB] | Correction [dB] | Line | Meas. BW [kHz] | Meas. Time [s] |
|-----------------|------------------------|------------------------|-----------------|------------------------|-----------------------------|-----------------|-----------------|------|----------------|----------------|
| 0.177           | 43.69                  | 64.63                  | 20.93           |                        |                             |                 | 21.03           | L1   | 9.000          | 1.000          |
| 0.238           |                        |                        |                 | 30.62                  | 52.17                       | 21.55           | 20.99           | L1   | 9.000          | 1.000          |
| 0.416           | 37.21                  | 57.54                  | 20.33           |                        |                             |                 | 20.86           | L1   | 9.000          | 1.000          |
| 0.418           |                        |                        |                 | 32.03                  | 47.49                       | 15.47           | 20.86           | L1   | 9.000          | 1.000          |
| 2.103           |                        |                        |                 | 17.36                  | 46.00                       | 28.64           | 19.62           | L1   | 9.000          | 1.000          |
| 2.119           | 26.62                  | 56.00                  | 29.38           |                        |                             |                 | 19.62           | L1   | 9.000          | 1.000          |
| 4.436           | 32.88                  | 56.00                  | 23.12           |                        |                             |                 | 19.41           | L1   | 9.000          | 1.000          |
| 4.911           |                        |                        |                 | 24.10                  | 46.00                       | 21.90           | 19.40           | L1   | 9.000          | 1.000          |
| 12.356          | 46.45                  | 60.00                  | 13.55           | 44.93                  | 50.00                       | 5.07            | 19.43           | L1   | 9.000          | 1.000          |
| 12.831          | 47.39                  | 60.00                  | 12.61           | 46.23                  | 50.00                       | 3.77            | 19.45           | L1   | 9.000          | 1.000          |

L line

Conducted Emission from 150 kHz to 30 MHz



| Frequency [MHz] | QPK Level [dB $\mu$ V] | QPK Limit [dB $\mu$ V] | QPK Margin [dB] | AVG Level [dB $\mu$ V] | AVG: CAV Limit [dB $\mu$ V] | AVG Margin [dB] | Correction [dB] | Line | Meas. BW [kHz] | Meas. Time [s] |
|-----------------|------------------------|------------------------|-----------------|------------------------|-----------------------------|-----------------|-----------------|------|----------------|----------------|
| 0.206           | 42.90                  | 63.35                  | 20.45           |                        |                             |                 | 21.01           | L1   | 9.000          | 1.000          |
| 0.238           |                        |                        |                 | 30.51                  | 52.17                       | 21.66           | 20.99           | L1   | 9.000          | 1.000          |
| 0.416           | 37.08                  | 57.54                  | 20.46           |                        |                             |                 | 20.86           | L1   | 9.000          | 1.000          |
| 0.418           |                        |                        |                 | 31.92                  | 47.49                       | 15.57           | 20.86           | L1   | 9.000          | 1.000          |
| 2.101           |                        |                        |                 | 17.33                  | 46.00                       | 28.67           | 19.62           | L1   | 9.000          | 1.000          |
| 2.110           | 26.68                  | 56.00                  | 29.32           |                        |                             |                 | 19.62           | L1   | 9.000          | 1.000          |
| 4.427           | 32.41                  | 56.00                  | 23.59           |                        |                             |                 | 19.41           | L1   | 9.000          | 1.000          |
| 4.436           |                        |                        |                 | 23.53                  | 46.00                       | 22.47           | 19.41           | L1   | 9.000          | 1.000          |
| 12.356          | 46.68                  | 60.00                  | 13.32           | 45.23                  | 50.00                       | 4.77            | 19.43           | L1   | 9.000          | 1.000          |
| 12.831          | 47.16                  | 60.00                  | 12.84           | 46.13                  | 50.00                       | 3.87            | 19.45           | L1   | 9.000          | 1.000          |

**N line**  
Conducted Emission from 150 kHz to 30 MHz

## 4 Uncertainty Measurement

| Case                             | Uncertainty | Factor k |
|----------------------------------|-------------|----------|
| Radiated Emission 30MHz – 200MHz | 4.17 dB     | 1.96     |
| Radiated Emission 200MHz – 1GHz  | 4.84 dB     | 1.96     |
| Radiated Emission 1GHz – 18GHz   | 4.35 dB     | 1.96     |
| Conducted Emission               | 2.57 dB     | 2        |

## 5 Main Test Instruments

Date of Testing: October 16, 2024 ~ October 17, 2024

| Name of Equipment        | Manufacturer | Type/Model | Serial Number | Calibration Date | Expiration Time |
|--------------------------|--------------|------------|---------------|------------------|-----------------|
| Radiated Emission        |              |            |               |                  |                 |
| EMI Test Receiver        | R&S          | ESCI3      | 100948        | 2024-05-07       | 2025-05-06      |
| Signal Analyzer          | R&S          | FSV40      | 101186        | 2024-05-07       | 2025-05-06      |
| TRILOG Broadband Antenna | SCHWARZBECK  | VULB 9163  | 01111         | 2022-10-25       | 2025-10-24      |
| Horn Antenna             | SCHWARZBECK  | BBHA 9120D | 430           | 2024-07-18       | 2027-07-17      |
| Software                 | R&S          | EMC32      | 9.26.01       | /                | /               |

Date of Testing: July 7, 2025

| Name of Equipment       | Manufacturer | Type/Model | Serial Number | Calibration Date | Expiration Time |
|-------------------------|--------------|------------|---------------|------------------|-----------------|
| Conducted Emission      |              |            |               |                  |                 |
| Artificial main network | R&S          | ENV216     | 101171        | 2024-12-02       | 2026-12-01      |
| EMI Test Receiver       | R&S          | ESR        | 101667        | 2025-05-06       | 2026-05-05      |
| Software                | R&S          | EMC32      | 10.35.10      | /                | /               |

## ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.

## ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.

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