

# RADIO PERFORMANCE TEST REPORT

Test Report No. : OT-244-RWD-032

Reception No. : 2404001339

Applicant : LG Electronics USA

Address : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, 07632, United States

Manufacturer : LG Electronics Inc.

Address : 222, LG-ro, Jinwi-myeon, Pyeontaek-si, Gyeonggi-do 17709, Republic of Korea

Type of Equipment : Electric Vehicle Charger

FCC ID : BEJ-EVD175SK

Model Name : EVD175SK-PN

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 19 pages (including this page)

Date of Incoming : April 12, 2024

Date of Issuing : April 28, 2024

## SUMMARY

The equipment complies with the requirements of **FCC CFR 47 PART 15 SUBPART C Section 15.225**

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a general valid assessment of the features of the respective products of the mass-production.

This report is not correlated with the "KS Q ISO/IEC 17025 and KOLAS accreditation" of Korean Laboratory Accreditation Scheme.

한동연



Tested by  
Dong-Yeon, Han / Prj. Engineer  
ONETECH Corp.

Reviewed by  
Tae-Ho, Kim / Chief Engineer  
ONETECH Corp.

Approved by  
Jae-Ho, Lee / Chief Engineer  
ONETECH Corp.

# CONTENTS

Page

|                                                                            |           |
|----------------------------------------------------------------------------|-----------|
| <b>1. VERIFICATION OF COMPLIANCE .....</b>                                 | <b>5</b>  |
| <b>2. GENERAL INFORMATION .....</b>                                        | <b>6</b>  |
| 2.1 TEST ITEMS AND RESULTS .....                                           | 6         |
| 2.2 PRODUCT DESCRIPTION.....                                               | 6         |
| 2.3 MODEL DIFFERENCES.....                                                 | 6         |
| 2.4 RELATED SUBMITTAL(S) / GRANT(S) .....                                  | 6         |
| 2.5 PURPOSE OF THE TEST .....                                              | 6         |
| 2.6 TEST METHODOLOGY.....                                                  | 6         |
| 2.7 TEST FACILITY.....                                                     | 7         |
| <b>3. SYSTEM TEST CONFIGURATION .....</b>                                  | <b>8</b>  |
| 3.1 JUSTIFICATION.....                                                     | 8         |
| 3.2 PERIPHERAL EQUIPMENT .....                                             | 8         |
| 3.3 MODE OF OPERATION DURING THE TEST .....                                | 8         |
| 3.4 EQUIPMENT MODIFICATIONS.....                                           | 8         |
| 3.5 CONFIGURATION OF TEST SYSTEM.....                                      | 9         |
| 3.6 ANTENNA REQUIREMENT .....                                              | 9         |
| <b>4. PRELIMINARY TEST .....</b>                                           | <b>9</b>  |
| 4.1 AC POWER LINE CONDUCTED EMISSIONS TESTS.....                           | 9         |
| 4.2 RADIATED EMISSIONS TESTS.....                                          | 9         |
| <b>5. FINAL RESULT OF MEASUREMENT.....</b>                                 | <b>10</b> |
| 5.1 ADIATED EMISSION TEST.....                                             | 10        |
| 5.1.1 Operation frequency band: (13.553 ~ 13.567) MHz.....                 | 10        |
| 5.1.2 Operation frequency band: Below 13.553 MHz and above 13.567 MHz..... | 11        |
| 5.2 SPURIOUS EMISSION TEST.....                                            | 12        |
| 5.2.1 Spurious Radiated Emission Below 30 MHz .....                        | 12        |
| 5.2.2 Spurious Radiated Emission below 1 GHz.....                          | 13        |
| 5.3 20 dB BANDWIDTH .....                                                  | 14        |
| 5.3.1 Operating environment.....                                           | 14        |
| 5.3.2 Test set-up .....                                                    | 14        |
| 5.3.3 Test date .....                                                      | 14        |
| 5.3.4 Test data .....                                                      | 15        |

---

|                                                                |           |
|----------------------------------------------------------------|-----------|
| <b>5.4 FREQUENCY STABILITY WITH TEMPERATURE VARIATION.....</b> | <b>16</b> |
| 5.4.1 <i>Operating environment</i> .....                       | 16        |
| 5.4.2 <i>Test set-up</i> .....                                 | 16        |
| 5.4.3 <i>Test date</i> .....                                   | 16        |
| 5.4.4 <i>Test data</i> .....                                   | 16        |
| <b>5.5 FREQUENCY STABILITY WITH VOLTAGE VARIATION.....</b>     | <b>17</b> |
| 5.5.1 <i>Operating environment</i> .....                       | 17        |
| 5.5.2 <i>Test set-up</i> .....                                 | 17        |
| 5.5.3 <i>Test date</i> .....                                   | 17        |
| 5.5.4 <i>Test data</i> .....                                   | 17        |
| <b>6. FIELD STRENGTH CALCULATION .....</b>                     | <b>18</b> |
| <b>7. LIST OF TEST EQUIPMENT .....</b>                         | <b>19</b> |

**Revision History**

| Rev. No. | Issue Report No. | Issued Date    | Revisions       | Section Affected |
|----------|------------------|----------------|-----------------|------------------|
| 0        | OT-244-RWD-032   | April 28, 2024 | Initial Release | All              |
|          |                  |                |                 |                  |
|          |                  |                |                 |                  |

## 1. VERIFICATION OF COMPLIANCE

Applicant : LG Electronics USA

Address : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, 07632, United States

Contact Person : David, Kim / Team leader, LGEUS NA Policy & Regulatory Affairs

Telephone No. : +201-470-2696

FCC ID : BEJ-EVD175SK

Model Name : EVD175SK-PN

Brand Name : -

Serial Number : N/A

Date : April 28, 2024

|                                                         |                                                  |
|---------------------------------------------------------|--------------------------------------------------|
| DEVICE TYPE                                             | DXX – Low Power Communication Device Transmitter |
| E.U.T. DESCRIPTION                                      | Electric Vehicle Charger                         |
| THIS REPORT CONCERNS                                    | Original Grant                                   |
| MEASUREMENT PROCEDURES                                  | ANSI C63.10: 2013                                |
| TYPE OF EQUIPMENT TESTED                                | Pre-Production                                   |
| KIND OF EQUIPMENT<br>AUTHORIZATION REQUESTED            | Certification                                    |
| EQUIPMENT WILL BE OPERATED<br>UNDER FCC RULES PART(S)   | FCC CFR47 Part 15 Subpart C Section 15.225       |
| MODIFICATIONS ON THE EQUIPMENT<br>TO ACHIEVE COMPLIANCE | None                                             |
| FINAL TEST WAS CONDUCTED ON                             | 3 m Semi Anechoic Chamber                        |

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. GENERAL INFORMATION

### 2.1 Test items and results

| SECTION             | TEST ITEMS                                                                                     | RESULTS                |
|---------------------|------------------------------------------------------------------------------------------------|------------------------|
| 15.225 (a) (b) (c)  | Field Strength of Fundamental Emissions                                                        | Met the Limit / PASS   |
| 15.225 (d) & 15.209 | Radiated Emission Limits                                                                       | Met the Limit / PASS   |
| 2.1049              | 20dB Bandwidth                                                                                 | Met the Limit / PASS   |
| 15.225(e)           | FREQUENCY STABILITY WITH TEMPERATURE VARIATION /<br>FREQUENCY STABILITY WITH VOLTAGE VARIATION | Met the Limit / PASS   |
| 15.207              | Conducted Limits                                                                               | N/A (See Note)         |
| 15.203              | Antenna Requirement                                                                            | Met requirement / PASS |

Note: AC conducted emissions testing has been replaced by the FCC Part 15 Subpart B report (Raport No.: GT2024-03938).

### 2.2 Product Description

The LG Electronics USA, Model EVD175SK-PN (referred to as the EUT in this report) is a Electric Vehicle Charger. The product specification described herein was obtained from product data sheet or user's manual.

|                                                    |                          |
|----------------------------------------------------|--------------------------|
| DEVICE TYPE                                        | Electric Vehicle Charger |
| TRANSMITTING FREQUENCY                             | 13.560 3 MHz             |
| MODULATION                                         | ASK                      |
| ANTENNA TYPE                                       | PCB Antenna              |
| LIST OF EACH OSC. or CRY.<br>FREQ.(FREQ. >= 1 MHz) | 8 MHz                    |

### 2.3 Model Differences

-. None

### 2.4 Related Submittal(s) / Grant(s)

Original submittal only

### 2.5 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART C Section 15.225.

### 2.6 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013.

Radiated testing was performed at a distance of 3 m from EUT to the antenna.

## 2.7 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-20122/ C-14617/ G-10666/ T-11842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

### 3. SYSTEM TEST CONFIGURATION

#### 3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

| DEVICE TYPE        | MANUFACTURER               | MODEL/PART NUMBER      | FCC ID      |
|--------------------|----------------------------|------------------------|-------------|
| HMI Board          | LG Electronics Inc.        | N/A                    | -           |
| Bridge Board       | LG Electronics Inc.        | N/A                    | -           |
| LED Board          | LG Electronics Inc.        | N/A                    | -           |
| PLC Board          | N/A                        | N/A                    | -           |
| RFID Reader module | Advanced Card Systems Ltd. | ACM1281S-C7            | -           |
| Wireless Modules   | Sierra Wireless Inc.       | MC7455                 | N7NMC7455   |
| VPOS Touch         | NAYAX LTD                  | Nayax VPOS Touch, VPOS | 2AK6L-VPOST |

#### 3.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested: None

| Model       | Manufacturer        | Description                    | Connected to |
|-------------|---------------------|--------------------------------|--------------|
| EVD175SK-PN | LG Electronics USA  | Electric Vehicle Charger (EUT) | -            |
| EVP175NK-NN | LG ELECTRONICS INC. | Electric Vehicle Charger       | EUT          |

#### 3.3 Mode of operation during the test

The EUT has 13.560 3 MHz RF boards for reading Card and program was used for making continuous transmission mode during the test.

#### 3.4 Equipment Modifications

-. None

### 3.5 Configuration of Test System

**Radiated Emission Test :** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. The radiated emissions measurements were performed on the 10 m Semi Anechoic Chamber.

For frequencies from 150 kHz to 30 MHz measurements were made of the magnetic H field. The measuring antenna is an electrically screened loop antenna.

The frequency spectrum from 30 MHz to 1 000 MHz was scanned and maximum emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

### 3.6 Antenna Requirement

For intentional device, according to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

**Antenna Construction:**

The transmitter antenna of the EUT is a PCB Antenna so there is no consideration of replacement by the user.

## 4. PRELIMINARY TEST

### 4.1 AC Power line Conducted Emissions Tests

As this product is only using DC power, AC conducted emission test has not been performed.

### 4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

| Operation Mode    | The Worse operating condition (Please check one only) |
|-------------------|-------------------------------------------------------|
| Transmitting Mode | X                                                     |

## 5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

### 5.1 ADIATED EMISSION TEST

#### 5.1.1 Operation frequency band: (13.553 ~ 13.567) MHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 46.4 % R.H. Temperature: 22.5 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.225  
 Type of Test : Low Power Communication Device Transmitter  
 Result : PASSED

EUT : Electric Vehicle Charger Date: April 15, 2024 ~ April 16, 2024  
 Operating Condition : Transmitting Mode  
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)  
 Distance : 3 m

| Frequency (MHz) | Reading (dBμV) | Ant. Pol. (H/V) | Ant. Height (m) | Ant. Factor (dB/m) | Cable Loss | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|-----------------|----------------|-----------------|-----------------|--------------------|------------|-------------------------|-----------------|-------------|
| 13.56           | 23.47          | H               | 1               | 19                 | 2.5        | 44.97                   | 124             | 79.03       |
| 13.56           | 32.3           | V               | 1               | 19                 | 2.5        | 53.8                    | 124             | 70.2        |

Remark. The EUT was tested at 3 m, so conversation factor was included at above limit.

### 5.1.2 Operation frequency band: Below 13.553 MHz and above 13.567 MHz

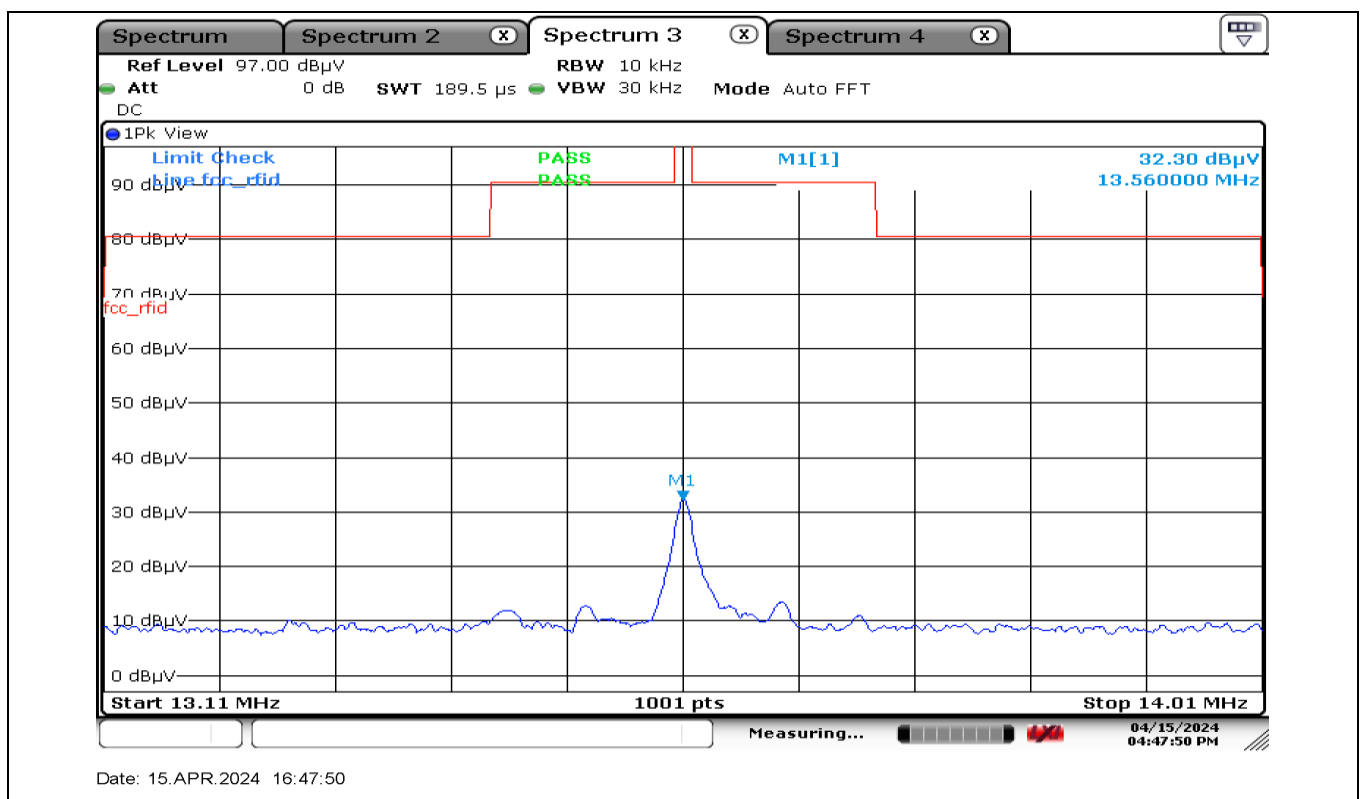
The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 46.4 % R.H. Temperature: 22.5 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.225  
 Type of Test : Low Power Communication Device Transmitter  
 Result : PASSED

EUT : Electric Vehicle Charger

Date: April 15, 2024 ~ April 16, 2024

Operating Condition : Transmitting Mode



cc. to above test data, the field strength level of 13.56 MHz is 32.30 dBuV/m and the worst limit subject to 15.225 (b) and (c) is 80.5 dBuV/m, so the EUT meets the requirement.

## 5.2 SPURIOUS EMISSION TEST

### 5.2.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 46.4 % R.H. Temperature: 22.5 °C  
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209  
Type of Test : Low Power Communication Device Transmitter  
Frequency Range : 9 kHz ~ 30 MHz  
Result : PASSED

EUT : Electric Vehicle Charger Date: April 15, 2024 ~ April 16, 2024  
Operating Condition : Transmitting Mode  
Distance : 3 m

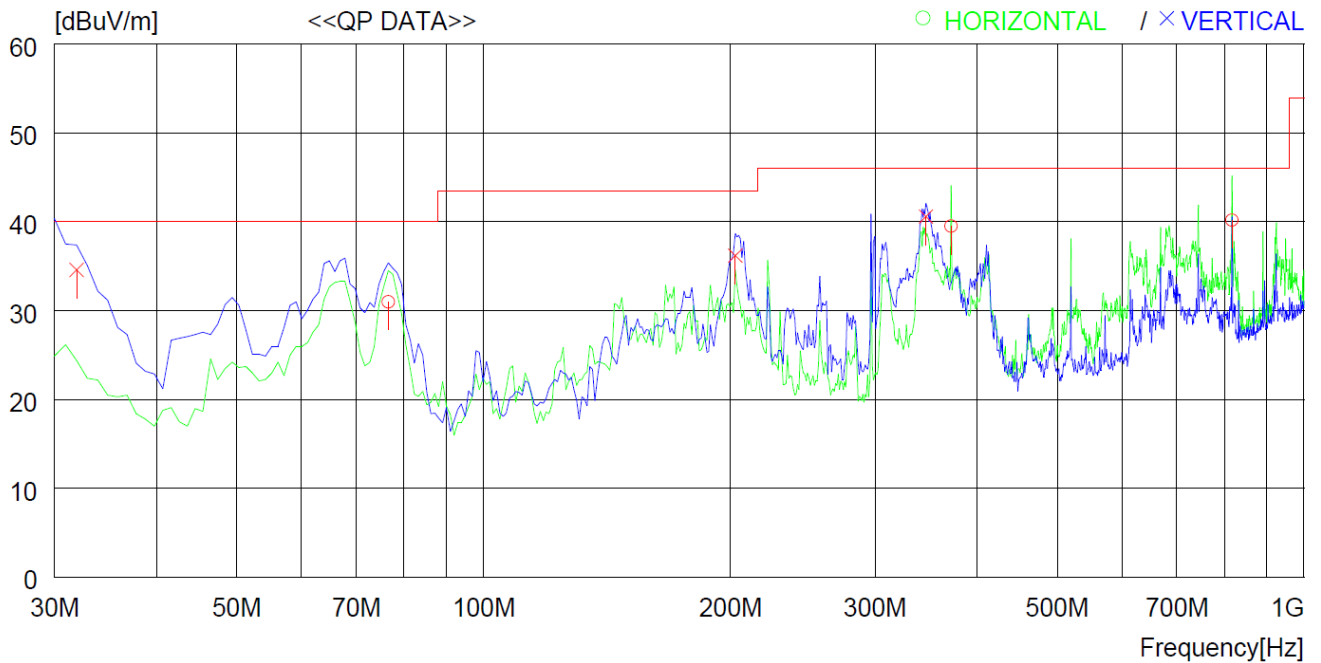
| Frequency<br>(MHz)                              | Reading<br>(dBμV) | Ant. Pol.<br>(H/V) | Ant.<br>Height (m) | Angle<br>(°) | Ant. Factor<br>(dB/m) | Cable<br>Loss | Emission<br>Level(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) |
|-------------------------------------------------|-------------------|--------------------|--------------------|--------------|-----------------------|---------------|---------------------------|--------------------|----------------|
| It was not observed any emissions from the EUT. |                   |                    |                    |              |                       |               |                           |                    |                |

## 5.2.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 46.4 % R.H. Temperature: 22.5 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209  
 Type of Test : Low Power Communication Device Transmitter  
 Result : PASSED

EUT : Electric Vehicle Charger Date: April 15, 2024 ~ April 16, 2024  
 Operating Condition : Transmitting Mode  
 Distance : 3 m



| No.                    | FREQ    | READING | ANT    | LOSS | GAIN | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|---------|---------|--------|------|------|----------|----------|--------|---------|-------|
|                        | [MHz]   | [dBuV]  | FACTOR | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |         |         |        |      |      |          |          |        |         |       |
| 1                      | 76.560  | 47.4    | 8.4    | 3.3  | 28.1 | 31.0     | 40.0     | 9.0    | 400     | 359   |
| 2                      | 371.440 | 44.2    | 15.3   | 7.8  | 27.8 | 39.5     | 46.0     | 6.5    | 200     | 19    |
| 3                      | 816.661 | 34.6    | 20.8   | 12.7 | 27.9 | 40.2     | 46.0     | 5.8    | 100     | 57    |
| ----- Vertical -----   |         |         |        |      |      |          |          |        |         |       |
| 4                      | 31.940  | 48.3    | 12.4   | 2.2  | 28.3 | 34.6     | 40.0     | 5.4    | 100     | 359   |
| 5                      | 202.660 | 47.5    | 10.8   | 5.4  | 27.5 | 36.2     | 43.5     | 7.3    | 100     | 359   |
| 6                      | 346.220 | 46.1    | 14.7   | 7.5  | 27.7 | 40.6     | 46.0     | 5.4    | 100     | 359   |

### 5.3 20 dB BANDWIDTH

#### 5.3.1 Operating environment

Temperature : 25 °C  
Relative humidity : 56 % R.H.

#### 5.3.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 % to 5 % of the OBW and video bandwidth (VBW) shall be approximately three times RBW. The 20 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 20 dB.



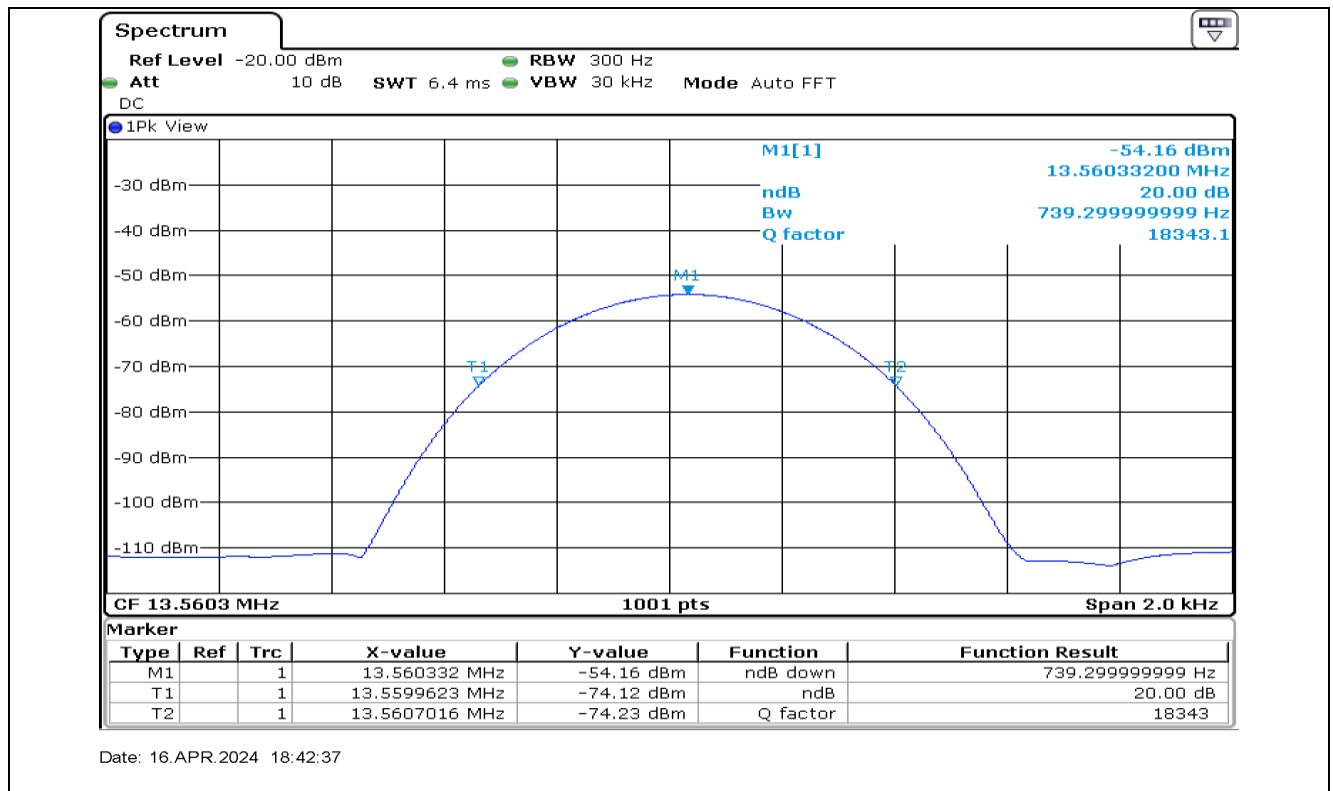
#### 5.3.3 Test date

April 15, 2024 ~ April 16, 2024

### 5.3.4 Test data

-. Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.215

| FREQUENCY (MHz) | MEASURED VALUE (kHz) | Result |
|-----------------|----------------------|--------|
| 13.560 3        | 0.739 3              | PASS   |



## 5.4 FREQUENCY STABILITY WITH TEMPERATURE VARIATION

### 5.4.1 Operating environment

Temperature : 25 °C  
Relative humidity : 56 % R.H.

### 5.4.2 Test set-up

Turn EUT off and set chamber temperature to -20 °C and then allow sufficient time (approximately 20 to 30 minutes after chamber reach the assigned temperature) for EUT to stabilize. Turn ON EUT and measure the EUT operating frequency and then turn off the EUT after the measurement. The temperature in the chamber was raised 10 °C step from -20 °C to +50°C. Repeat above method for frequency measurements every 10 °C step and then record all measured frequencies on each temperature step.

### 5.4.3 Test date

April 15, 2024 ~ April 16, 2024

### 5.4.4 Test data

-. Result : PASSED

| Temperature (°C) | Carrier Freq. (Hz) | Measured Freq. (Hz) | Margin (Hz) | Limit (Hz) |
|------------------|--------------------|---------------------|-------------|------------|
| -20              | 13,560,300         | 13,560,495          | -195        | ± 1 356.03 |
| -10              |                    | 13,560,509          | 209         |            |
| 0                |                    | 13,560,494          | 194         |            |
| 10               |                    | 13,560,430          | 130         |            |
| 20               |                    | 13,560,350          | 50          |            |
| 30               |                    | 13,560,329          | 29          |            |
| 40               |                    | 13,560,248          | -52         |            |
| 50               |                    | 13,560,234          | -66         |            |

## 5.5 FREQUENCY STABILITY WITH VOLTAGE VARIATION

### 5.5.1 Operating environment

Temperature : 25 °C  
Relative humidity : 56 % R.H.

### 5.5.2 Test set-up

An external AC power supply was connected to the input of the EUT. The voltage of EUT set to 115 % of the nominal value and then was reduced to 85 % of nominal voltage. The output frequency was recorded at each step.

### 5.5.3 Test date

April 15, 2024 ~ April 16, 2024

### 5.5.4 Test data

-. Result : PASSED

| Voltage (Vac) | Carrier Freq. (Hz) | Measured Freq. (Hz) | Margin (Hz) | Limit (Hz) |
|---------------|--------------------|---------------------|-------------|------------|
| 460.0(115 %)  | 13,560,300         | 13,560,233          | 67          | ± 1 356.03 |
| 400.0(100 %)  |                    | 13,560,299          | 1           |            |
| 340.0(85 %)   |                    | 13,560,138          | 162         |            |

## 6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses.

|             |                     |                |
|-------------|---------------------|----------------|
| +           | Meter reading       | (dB $\mu$ V)   |
| +           | Cable Loss          | (dB)           |
| +           | Antenna Factor      | (dB/m)         |
|             |                     | <hr/>          |
| =           | Corrected Result    | (dB $\mu$ V/m) |
|             |                     |                |
| Margin (dB) |                     |                |
|             | Specification Limit | (dB $\mu$ V/m) |
| -           | Corrected Result    | (dB $\mu$ V/m) |
|             |                     | <hr/>          |
| =           | dB Relative to Spec | ( $\pm$ dB)    |

## 7. LIST OF TEST EQUIPMENT

| Model Number | Manufacturer            | Description                | Serial Number   | Last Cal. (Interval) |
|--------------|-------------------------|----------------------------|-----------------|----------------------|
| FSV30        | Rohde & Schwarz         | SIGNAL ANALYZER            | 101372          | Jul. 10, 2023 (1Y)   |
| ESCI         | Rohde & Schwarz         | Test Receiver              | 101013          | Mar. 12, 2024 (1Y)   |
| 310N         | Sonoma Instrument       | AMPLIFIER                  | 312544          | Mar. 11, 2024 (1Y)   |
| HLP-2008     | TDK                     | Hybrid Antenna             | 131313          | Apr. 05, 2023 (2Y)   |
| DT3000       | Innco System            | Turn Table                 | DT3000/093      | N/A                  |
| CO3000       | Innco Systems GmbH      | Controller                 | CO3000/904      | N/A                  |
| MA4000-EP    | Innco Systems GmbH      | Antenna Master             | MA4000/332      | N/A                  |
| AFC-3030     | AC POWER KOREA CO., LTD | AC POWER SOURCE            | 150121          | N/A                  |
| FMZB 1513    | Schwarzbeck             | Loop Antenna               | 1513-235        | Apr. 15, 2024 (2Y)   |
| ESCI         | Rohde & Schwarz         | Test Receiver              | 101012          | Sep. 26, 2023 (1Y)   |
| NSLK8128     | Schwarzbeck             | V - LISN ( 4*32/50A)       | 8128216         | Mar. 12, 2024 (1Y)   |
| ESH3-Z2      | Rohde & Schwarz         | Pulse Limiter              | 100655          | Mar. 12, 2024 (1Y)   |
| SSE-43CI-A   | Samkun Tech             | Environmental Test chamber | 60712           | Jan. 16, 2024 (1Y)   |
| ZUP36-6      | TDK-Lambda              | DC Power Supply            | 6MJ-850Z16-0014 | Jan. 16, 2024 (1Y)   |