# TEST REPORT

**This laboratory is accredited by National Radio Research Agency Laboratory and National Voluntary Laboratory Accreditation Program.**
The tests reported herein have been performed in accordance with its terms of accreditation.

| | | |
|---|---|---|
| **Test Report No.** | **:** | **LR500122411U** |
| **Issue Date** | **:** | **November 28, 2024** |
| **Applied Standard** | **:** | **FCC Part 15, Subpart B** |
| **Trade Name** | **:** | **Dot Incorporation** |
| **Equipment Name** | **:** | **Dot 12-cell Braille Module** |
| **Model Name** | **:** | **KM3-12A** |
| **Additional Model name** | **:** | **-** |
| **Serial Number** | **:** | **Identification** |

# Revision history

| Revision | Date of issue | Test report No. | Description |
|---|---|---|---|
| 0 | 28.11.2024 | LR500122411U | Initial |

## >>TABLE OF CONTENTS<<

**LTA Certification**

## Applicant / Manufacturer

| | | |
|---|---|---|
| Company name | : | Dot Incorporation |
| Address | : | 401~405, 146, Gasan digital 1-ro, Geumcheon-gu, Seoul, Republic of Korea |
| Telephone / Facsimile | : | +82-2-864-1113 / +82-2-864-1989 |

## Factory

| | | |
|---|---|---|
| Company name | : | Dot Incorporation |
| Address | : | 401~405, 146, Gasan digital 1-ro, Geumcheon-gu, Seoul, Republic of Korea |

## Equipment Under Test (EUT)

| | | |
|---|---|---|
| Equipment Name | : | Dot 12-cell Braille Module |
| Model name | : | KM3-12A |
| Additional Model name | : | - |
| Serial number | : | Identification |
| Intended environment | : | Industrial area |
| Date of receipt | : | November 20, 2024 |
| EUT condition | : | Pre-production, not damaged |
| Test Mode | : | Operating mode |
| Interface ports | : | DC IN, DATA IN |
| Power rating | : | DC 5 V |
| Test Voltage | : | AC 120 V / 60 Hz |

## Model Description

- NONE

## Model Specification

- NONE

*** To be continued next page ***

# LTA Certification –cont.-

## Test Performed

| | | |
|---|---|---|
| Test started & completed | : | November 21 - 23, 2024 |
| Location | : | LTA Co., Ltd. |

## Test Specification

| | | |
|---|---|---|
| Purpose of the test | : | Compliance test to the following standard |
| Applied standard | : | FCC Part 15, Subpart B |
| Classification | : | Class B |
| Deviations from Standard Test Method | : | N/A |

## Test Results

| Measurement | Results* | Test method |
|---|---|---|
| Conducted Emissions | Complies | ANSI C 63.4-2014 |
| Radiated Emissions | Complies | ANSI C 63.4-2014 |

* : The compliance statement is based on nominal value only.

## Modification performed by the lab.:

- N/A

## Laboratory's Certificate

| | | |
|---|---|---|
| Project number | : | 241120-1710 |
| Issue date | : | November 28, 2024 |

This test report is issued under the authority of:

Young Kyu Shin, Technical Manager

The test was supervised by:

Han Min Su

Min Su Han, Test Engineer

The results in this report apply only to the sample(s) tested.

It is not allowed to copy this report even partly without the allowance of the test laboratory.

# General information's

## Purpose

This document is based on the Electromagnetic Interference (EMI) tests performed on the **"KM3-12A"**. The measurements were performed according to the measurement procedure described in ANSI C 63.4-2014.The tests were carried out in order to confirm whether the electromagnetic emissions from the EUT( Equipment Under Test), are within the Class A limits defined in FCC Part 15, Subpart B- "Section 15.107- Conducted limits" and "Section 15.109-Radiated emission limits".

## Test Performed


| | | |
|---|---|---|
| Company name | : | **LTA Co., Ltd.** |
| Address | : | 34, Songju-ro 236Beon-gil, Yangji-myeon, Cheoin-gu Yongin-si, Gyeonggi-do 449-822, Korea |
| Telephone | : | +82-31-323-6008 |
| Facsimile | | +82-31-323-6010 |


## Measurement uncertainty

| | | | |
|---|---|---|---|
| Conducted Emissions | (0.15 to 30 MHz) : | ±2.81 [dB] (k=2) | |
| Radiated Emissions | (30 to 1,000 MHz) : | H : ±4.65 [dB] (k=2) | V : ±4.85 [dB] (k=2) |
| | (1 GHz to 6 GHz) : | H : ±5.78 [dB] (k=2) | V : ±5.67 [dB] (k=2) |
| | (6 GHz to 18 GHz) : | H : ±5.72 [dB] (k=2) | V : ±5.73 [dB] (k=2) |

The coverage factor k=2 yields approx. a 95% level of confidence for near-normal distribution typical of most measurement results.

## Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

| Agency | Country | Accreditation No. | Validity | Reference |
|---|---|---|---|---|
| RRA | KOREA | KR0049 | - | RRA accredited Lab. |
| | U.S.A | | 2025-03-29 | |
| | CANADA | | 2026-08-05 | |
| VCCI | JAPAN | C-14948 | 2026-09-10 | VCCI registration |
| | | T-12416 | 2026-09-10 | |
| | | R-14483 | 2026-10-15 | |
| | | G-10847 | 2024-12-13 | |
| KOLAS | KOREA | KT551 | 2025-10-12 | KOLAS accredited Lab. |

# 1- Brief Information

## 1-1 Test Summary

| Parameter | Applied Standard | Status (note 1) |
|---|---|---|
| **I. Emission** | | |
| Conducted Emissions | FCC Part 15.107 | C |
| Radiated Emissions | FCC Part 15.109 | C |
| Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable<br>* The data in this test report are traceable to the national or international standards. | | |

Frequency range to be scanned:

0.15 MHz - 30 MHz as conducted measurement

30 MHz to 5$^{th}$ harmonic of the highest frequency or 40 GHz, whichever is lower as radiated measurement.

Bandwidth:

Measured by the CISPR quasi-peak function Bandwidth is 9 kHz in the frequency 0.15 MHz to 30 MHz and 120 kHz in the frequency 30 MHz to 1,000 MHz.

Measured by the Peak function Bandwidth is 1 MHz in the frequency 1 GHz to 40 GHz.

## 1-2 Test mode of the EUT

The tests have been conducted with the following operational mode(s) of the EUT.

Operating mode

## 1-3 Modification

- NONE

## 1-4 List of EUT and ACCESSORY

| EUT | | | | |
|---|---|---|---|---|
| **Equipment Name** | **Model Name** | **Serial No.** | **Manufacturer** | **Remarks** |
| **Dot 12-cell Braille Module** | **KM3-12A** | **N/A** | **Dot Incorporation** | - |
| **ACCESSORY** | | | | |
| **Equipment Name** | **Model Name** | **Serial No.** | **Manufacturer** | **Remarks** |
| Adapter | EP-T4510 001 | N/A | SOLUM VINA COMPANY LIMITED | - |
| Notebook | Lenovo V15 G3 IAP | N/A | Lenovo Information Products (ShenZhen) Co., Ltd. | - |

## 1-5 Cable List

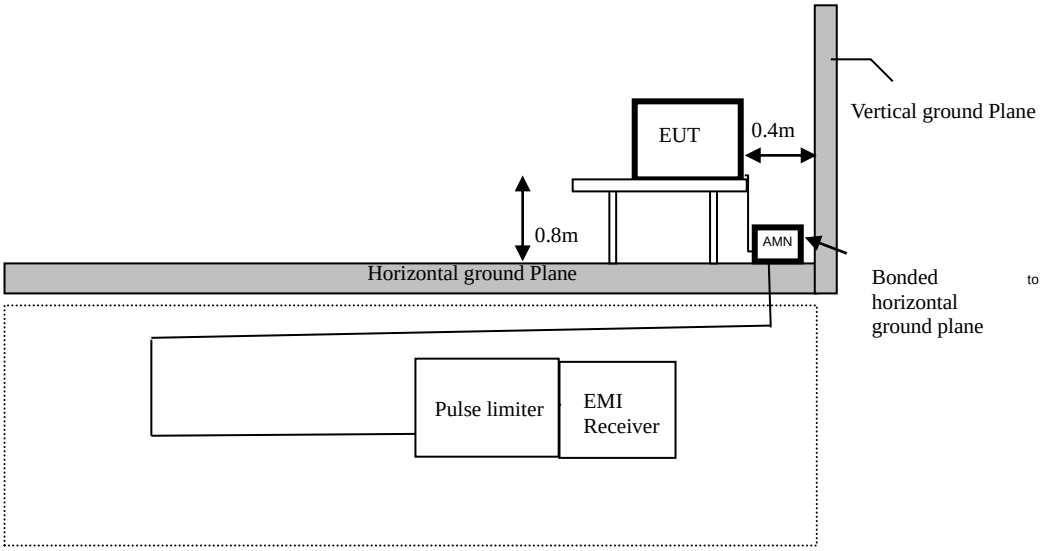
| Cable List | | | | | |
|---|---|---|---|---|---|
| **From** | | **To** | | **Length (m)** | **Shied** |
| **Type** | **I/O Port** | **Type** | **I/O Port** | | |
| EUT | DC IN | Adapter | DC OUT | 1.6 | NO |
| | DATA IN | Notebook | DATA OUT | 1.6 | NO |

# 2- Test Site Description

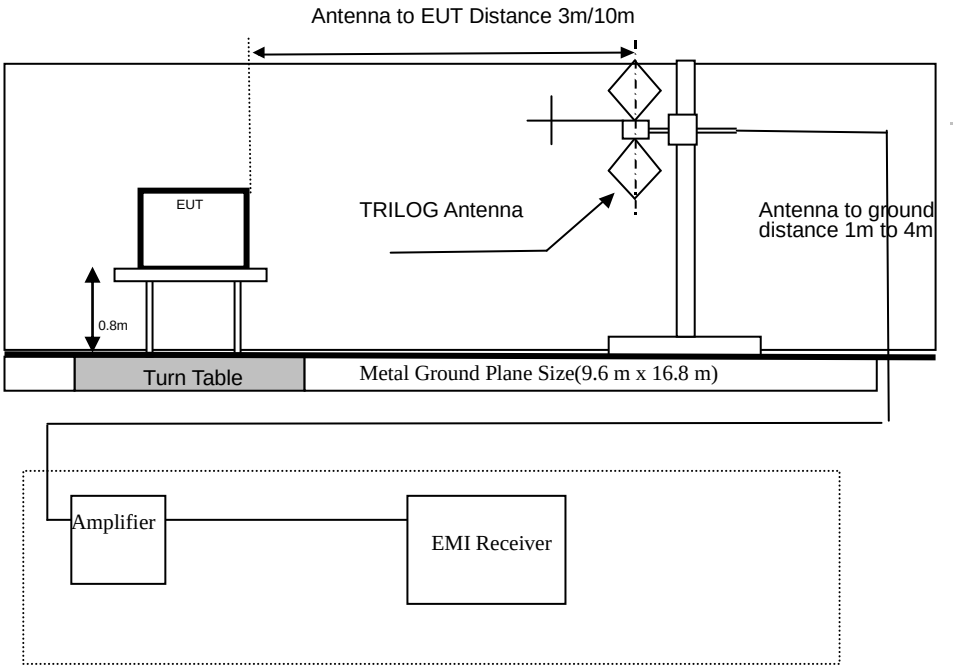
## 1-Facility

All the testing facilities are periodically serviced as a daily check for equipment and cables systems, an every 1 year facility check for the facilities and annual calibration for testing equipment according to ISO/IEC 17025. All the testing facilities are used as the same specifications shown below. There are descriptions both for radiated disturbance measurement and conducted disturbance measurement conformed by ANSI C 63.4.
The NSA measurement of the 10 m chamber was performed on January 13, 2024 according to ANSI C 63.4.
The SVSWR measurement of the 10 m chamber was performed on October 16, 2024 according to ANSI C 63.4.

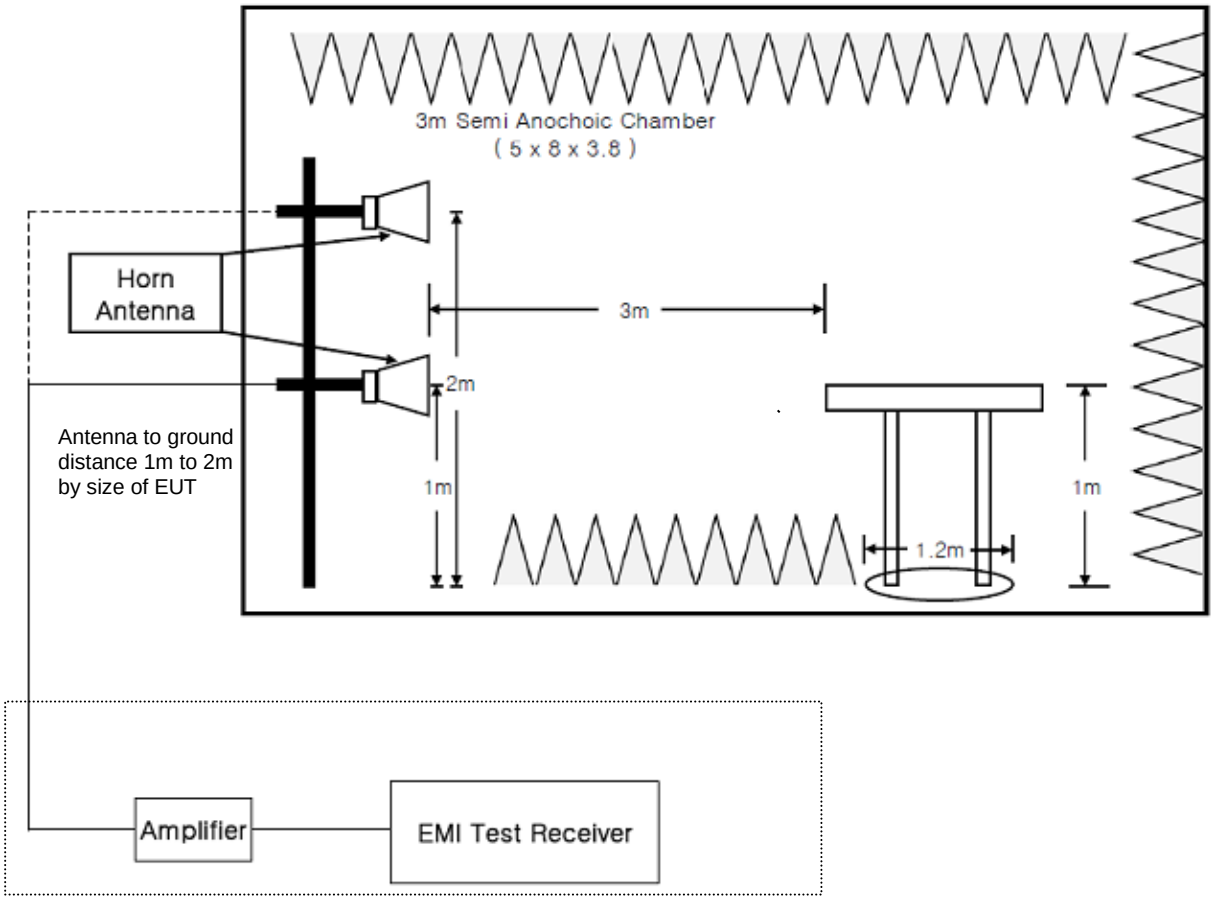
## 2-1 Conducted Emissions




## 2-2 Radiated Emissions – Below 1 GHz



## 2-3 Radiated Emissions – Above 1 GHz



# 3- Test Procedure

## 3-1 Conducted Emissions

- The measurement is carried out on an open site with horizontal and metallic ground plane.
- An AMN(Artificial Mains Network) with a nominal impedance (50 Ω / 50 μH) as defined in ANSI C 63.4, shall be utilized.
- The AMN is grounded on a horizontal metal ground plane.
- Measurement is carried out using an EMI receiver with quasi-peak detectors and average detector. (Refer to the List of test equipment used for the test.)
- The shortest distance between the EUT and the AMN is 0.8 m.
- The EUT is placed on the non-conducting table with 0.8 m height.
- Refer to "Brief Information"(page 7-8) about details of the EUT and configuration of the cables.
- Measurement is carried out as manual operation.

–searching the maximum frequency point of the disturbance wave in each frequency range.

–reading the disturbance level of quasi-peak, average and Line (L) and Neutral (N) in 9 kHz bandwidth by the EMI receiver.

–calculating the measurement result with the following formula or equation.

(Result = Reading + Cor.F.(LISN Factor + Cable Loss + Pulse Limiter)

(ex) = 13.23 dBμV + (9.63 dB + 0.01 dB + 9.86 dB)

= 32.73 dBμV

### 3-2 Radiated Emissions – Below 1 GHz

- Test site is met the requirements of ANSI C 63.4 and the distance between the EUT and the antenna is adjusted 3 m or 10 m.
- The turntable can be rotated 360 degrees.
- The antenna can be adjusted between 1 m and 4 m in height above the ground.
- The EUT is placed on the non-conducting table with 0.8 m height on the turntable.
- Measurements are carried out using an EMI receiver with quasi-peak detectors (120 kHz bandwidth).
- Refer to the list of test equipment used for the test.
- The TRILOG antenna are used as wideband antenna.
- The TRILOG antenna is used in the frequency range of 30 MHz to 1 000 MHz.
- A variable attenuator is used for verifying amplifier's linearity.
- Rotating the turntable and adjusting the height of the antenna are carried out by control buttons on the console.
- Refer to "Brief Information"(page 7-8) about details of the EUT and configuration of the cables.
- Measurement is carried out by a LTA operator as manual operation.

–searching the worst direction with the maximum level of the disturbance wave in rotating the turntable 360 degrees at each searched frequency point.

–setting the height of the antenna with the maximum level of the disturbance wave from 1 m to 4 m.

–reading the disturbance level by the EMI receiver with quasi-peak detectors (120 kHz bandwidth) according to ANSI C 63.4.

–measuring to vertical and horizontal polarization.

–calculating the measurement result with the following formula or equation:

(Result = Reading + Cor.F (antenna factor + cable loss - PreAmp Gain)

(ex) = 50.6 dBμV/m + (11.08 dB(1/m) + 1.31 dB - 27.32 dB)

= 35.67 dBμV/m

### 3-3 Radiated Emissions – Above 1 GHz

- Test site is met the requirements of ANSI C 63.4 and the distance between the EUT and the antenna is adjusted 3 m.
- The turntable can be rotated 360 degrees.
- The antenna can be adjusted between 1 m and 4 m in height above the ground.
- The EUT is placed on the non-conducting table with 1 m height on the turntable.
- Measurements are carried out using an EMI receiver with peak and average detectors(1 MHz bandwidth).
- Refer to the list of test equipment used for the test.
- The HORN antenna are used as wideband antenna.
- The HORN antenna is used in the frequency range of 1 GHz to 18 GHz.
- A variable attenuator is used for verifying amplifier's linearity.
- Rotating the turntable and adjusting the height of the antenna are carried out by control buttons on the console.
- Refer to "Brief Information"(page 7-8) about details of the EUT and configuration of the cables.
- Measurement is carried out by a LTA operator as manual operation.

–searching the worst direction with the maximum level of the disturbance wave in rotating the turntable 360 degrees at each searched frequency point.

–setting the height of the antenna with the maximum level of the disturbance wave from 1 m to 4 m

–reading the disturbance level by the EMI receiver with peak and average detectors (1 MHz bandwidth) according to ANSI C 63.4.

–measuring to vertical and horizontal polarization.

–calculating the measurement result with the following formula or equation:

(Result = Reading + Cor.F (antenna factor + cable loss + Measure distance – PreAmp Gain)

(ex) = 35.9 dBμV/m + (23.92 dB(1/m) + 7.01 dB + 1.50 dB - 28.33 dB)

= 40.0 dBμV/m

# 4- List of Equipment Used For the Tests

**Conducted Emissions**

| | Item | Model Name | Manufacturer | Serial No. | Next Cal. | Interval |
|---|---|---|---|---|---|---|
| ☒ | EMI TEST Receiver | ESR | Rohde & Schwarz | 101499 | 2025.03.08 | 1 year |
| ☒ | Pulse Limiter | ESH3-Z2 | Rohde & Schwarz | 100710 | 2025.03.08 | 1 year |
| ☐ | LISN | ESH3-Z6 | Rohde & Schwarz | 100378 | 2025.08.19 | 1 year |
| ☐ | LISN | ESH3-Z6 | Rohde & Schwarz | 101468 | 2025.08.19 | 1 year |
| ☒ | LISN(main) | ENV216 | Rohde & Schwarz | 102872 | 2025.08.19 | 1 year |
| ☐ | LISN(sub) | LT32C/10 | AFJ | 32031518210 | 2025.08.19 | 1 year |
| ☒ | TEST PROGRAM | e3_ce 20181212a (V9) | AUDIX | - | - | - |

**Radiated Emissions – Below 1 GHz**

| | Item | Model Name | Manufacturer | Serial No. | Next Cal. | Interval |
|---|---|---|---|---|---|---|
| ☒ | EMI TEST Receiver | ESCI7 | Rohde & Schwarz | 100772 | 2025.08.19 | 1 year |
| ☒ | Amplifier | 8447D | HP | 1937A03453 | 2025.08.19 | 1 year |
| ☒ | BILOG Antenna | VULB 9168 | SCHWARZBECK | 749 | 2025.03.29 | 2 year |
| ☒ | TEST PROGRAM | e3 20181212a (V9) | AUDIX | - | - | - |

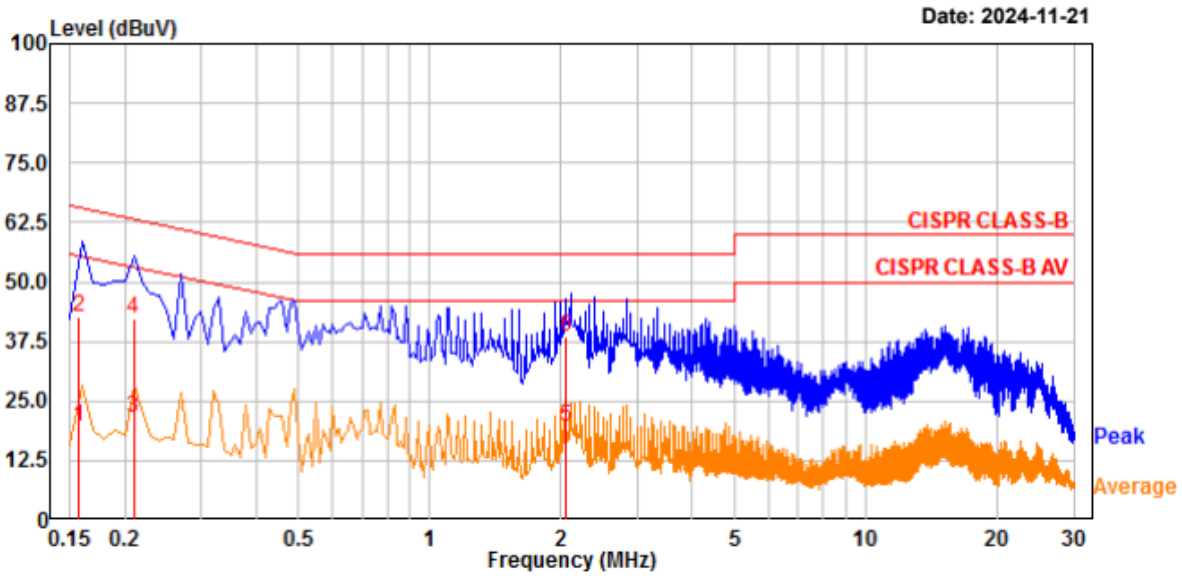
# 5- EMISSION

## 5-1 Conducted Emissions

**(LINE)**

4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

| | | | |
|---|---|---|---|
| Project No. | : 241120-1710 | Phase | : Line |
| Test Mode | : Operating | Test Power | : AC 120 V / 60 Hz |
| Temp./ Humi. | : 21 'C / 42 % R.H. | Test Engineer | : HAN M S |



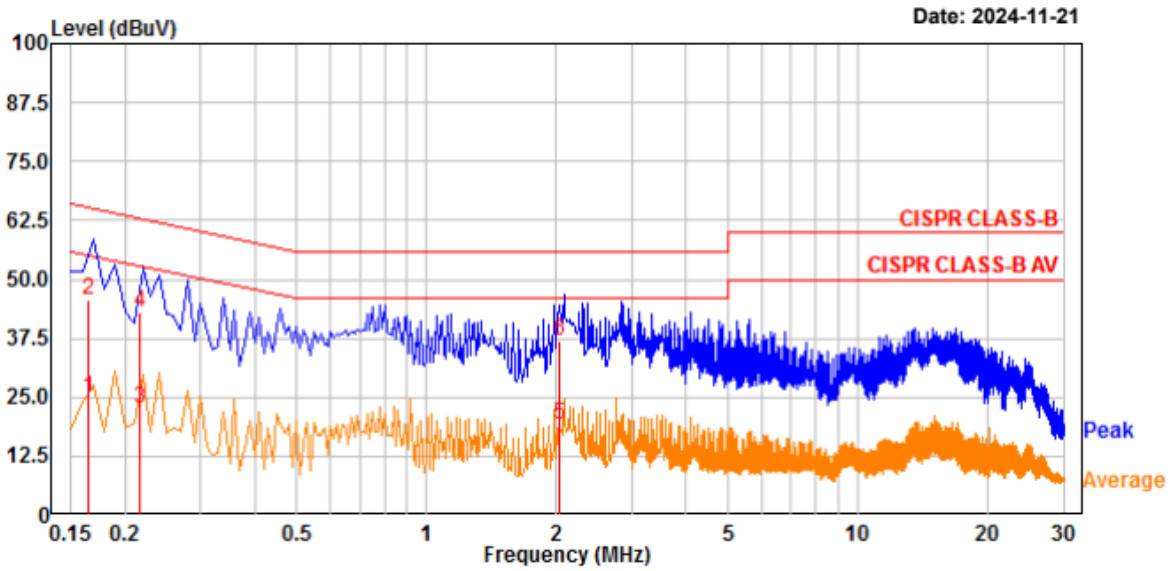

| No. | Freq | RD QP | RD AV | C.F | Result QP | Result AV | Limit QP | Limit AV | Margin QP | Margin AV | Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBµV | dBµV | dB | dBµV | dBµV | dBµV | dBµV | dB | dB | |
| 2. | 0.157 | 23.04 | -0.03 | 19.56 | 42.60 | 19.53 | 65.63 | 55.63 | 23.03 | 36.10 | Line |
| 4. | 0.210 | 22.77 | 2.12 | 19.56 | 42.33 | 21.68 | 63.22 | 53.22 | 20.89 | 31.54 | Line |
| 6. | 2.048 | 18.74 | 0.01 | 19.67 | 38.41 | 19.68 | 56.00 | 46.00 | 17.59 | 26.32 | Line |

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

**(NEUTRAL)**

4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

| | | | |
|---|---|---|---|
| Project No. | : 241120-1710 | Phase | : Neutral |
| Test Mode | : Operating | Test Power | : AC 120 V / 60 Hz |
| Temp./ Humi. | : 21 'C / 42 % R.H. | Test Engineer | : HAN M S |




| No. | Freq | RD QP | RD AV | C.F | Result QP | Result AV | Limit QP | Limit AV | Margin QP | Margin AV | Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBµV | dBµV | dB | dBµV | dBµV | dBµV | dBµV | dB | dB | |
| 2. | 0.165 | 26.16 | 5.49 | 19.54 | 45.70 | 25.03 | 65.21 | 55.21 | 19.51 | 30.18 | neutral |
| 4. | 0.217 | 23.61 | 2.93 | 19.54 | 43.15 | 22.47 | 62.92 | 52.92 | 19.77 | 30.45 | neutral |
| 6. | 2.036 | 17.27 | -0.24 | 19.66 | 36.93 | 19.42 | 56.00 | 46.00 | 19.07 | 26.58 | neutral |

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

## 5-2 Radiated Emissions

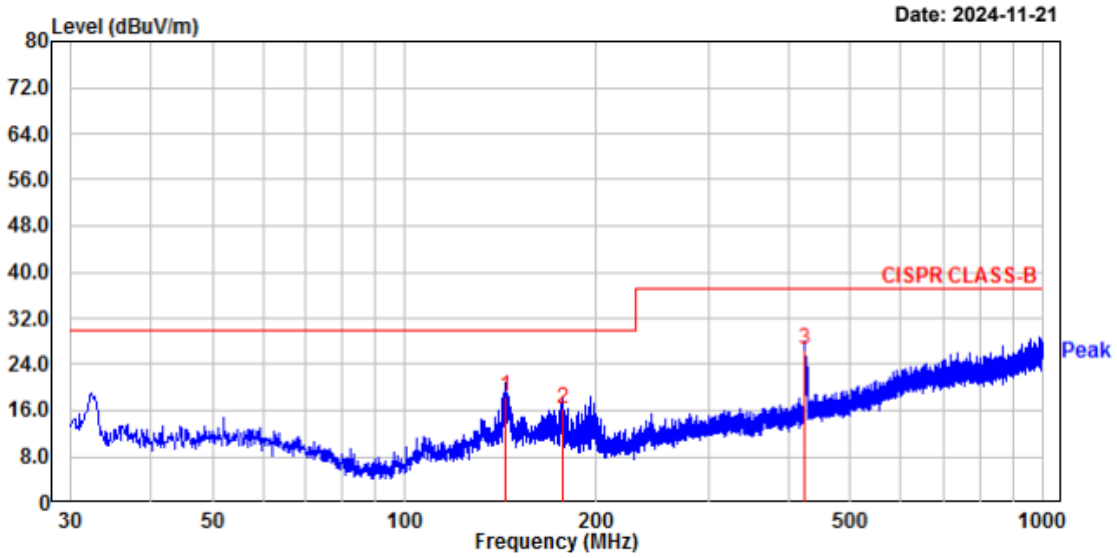
**(Below 1 GHz) / H**

4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

Project No. : 241120-1710 Temp/Humi: 21 'C / 40 % R.H.

Test Mode : Operating Tested by: HAN M S

Power : AC 120 V / 60 Hz




| No. | Freq | Reading | C.F | Result QP | Limit | Margin | Height | Angle | Polarity |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBµV | dB | dBµV/m | dBµV/m | dB | cm | deg | |
| 1. | 143.98 | 29.20 | -10.88 | 18.32 | 30.00 | 11.68 | 315 | 23 | horizontal |
| 2. | 176.83 | 28.01 | -11.77 | 16.24 | 30.00 | 13.76 | 104 | 221 | horizontal |
| 3. | 424.43 | 33.19 | -6.62 | 26.57 | 37.00 | 10.43 | 225 | 83 | horizontal |

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

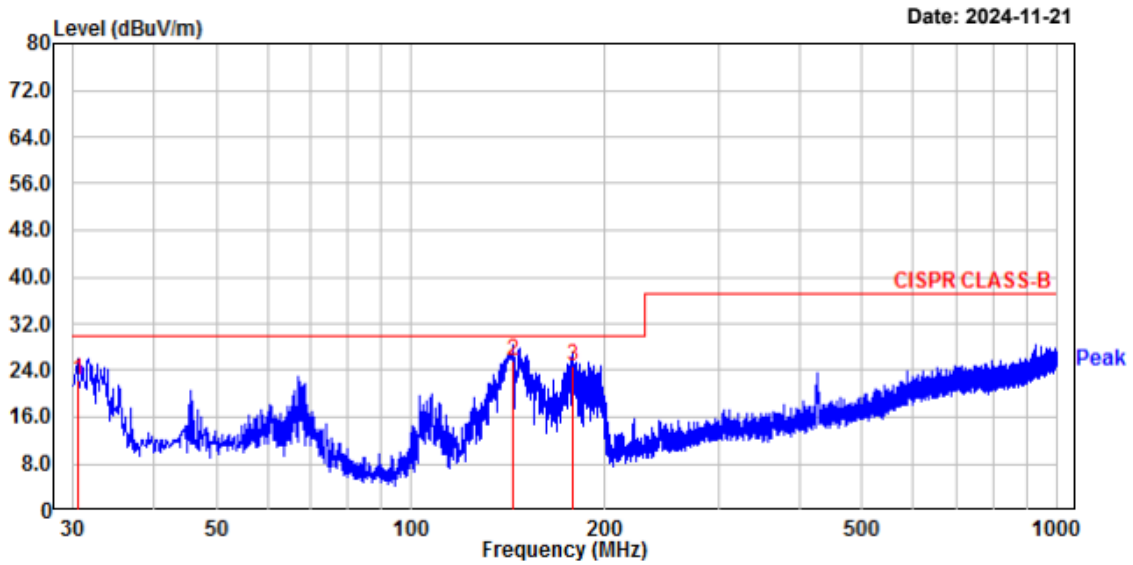
**(Below 1 GHz) / V**

4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

Project No. : 241120-1710 Temp/Humi: 21 'C / 40 % R.H.

Test Mode : Operating Tested by: HAN M S

Power : AC 120 V / 60 Hz




| No. | Freq | Reading | C.F | Result QP | Limit | Margin | Height | Angle | Polarity |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBµV | dB | dBµV/m | dBµV/m | dB | cm | deg | |
| 1. | 30.49 | 35.80 | -13.40 | 22.40 | 30.00 | 7.60 | 101 | 145 | vertical |
| 2. | 144.10 | 36.50 | -10.87 | 25.63 | 30.00 | 4.37 | 120 | 178 | vertical |
| 3. | 178.05 | 36.50 | -11.86 | 24.64 | 30.00 | 5.36 | 130 | 217 | vertical |

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain