



# Electromagnetic Emission FCC MEASUREMENT REPORT

PRODUCT : Binary-CDMA Wireless Network  
MODEL/TYPE NO. : SKYBRIDGE SB-200  
FCC ID : 2AOJB SKYBRIDGESB200  
TRADE NAME : N/A  
APPLICANT : Globalbridge Co., Ltd.  
#1710, 17F, Songdo Smart valley-A,  
Songdomirae-ro 30 beon-gil, Yeonsu-gu, Incheon, South Korea  
Kyunghwan Jang / Manager  
FCC CLASSIFICATION : All other devices Class B  
FCC RULE PART(S) : FCC Part 15 Subpart B  
FCC PROCEDURE : sDoC  
DATES OF TEST : July 19, 2019  
DATES OF ISSUE : July 24, 2019  
TEST REPORT No. : BWS-19-EF-0020  
TEST LAB. : BWS TECH Inc. (Designation Number : KR0017)

This SKYBRIDGE SB-200 has been tested in accordance with the measurement procedures specified in ANSI C63.4-2014 at the BWS TECH/EMC Test Laboratory and has been shown to be complied with the electromagnetic emission limits specified in FCC Rule Part15 Subpart B Section15.107 and 15.109  
I attest to the accuracy of data. All measurement herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

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This test report is not related to KS Q ISO/IEC 17025 and KOLAS accreditation.

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## Description of Version

| Edition No. | Data of Revision | Revision Summary | Report No.     |
|-------------|------------------|------------------|----------------|
| 0           | July 24, 2019    | Original Report  | BWS-19-EF-0020 |
|             |                  |                  |                |
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|             |                  |                  |                |

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# FCC TEST REPORT

**Scope** – Measurement and determination of electromagnetic emission (EME) of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of the U.S Federal Communications Commission (FCC)

## 1. General Information

### 1.1 Applicant Information

Company Name : Globalbridge Co., Ltd.  
Company Address : #1710, 17F, Songdo Smart valley-A, Songdomirae-ro 30 beon-gil,  
Yeonsu-gu, Incheon, South Korea  
Tel / Fax : Tel) +821031588991 Fax) -

### 1.2 Manufacturer Information

Company Name : Globalbridge Co., Ltd.  
Company Address : #1710, 17F, Songdo Smart valley-A, Songdomirae-ro 30 beon-gil,  
Yeonsu-gu, Incheon, South Korea

- **EUT Type** : Binary-CDMA Wireless Network
- **Model Number** : SKYBRIDGE SB-200
- **Test Voltage** : AC 110 V, 60 Hz
- **FCC Identifier** : 2AOJBSKYBRIDGESB200
- **S/N** : Prototype
- **FCC Rule Part(s)** : CFR Title 47 Part 15 Subpart B Class B
- **Test Procedure** : ANSI C63.4-2014
- **Dates of Tests** : July 19, 2019
- **Place of Tests :** : BWS TECH Inc.  
EMC Testing Lab (NRRRA Designation Number : [KR0017](#))  
23, Gokhyeon-ro 480 Beon-gil, Mohyeon-eup, Cheoin-gu, Yongin-si,  
Gyeonggi-do 17031, Korea  
TEL: +82 31 333 5997 FAX: +82 31 333 0017
- **Test Report No.** : BWS-19-EF-0020

## 2. Description of Test Facility

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The measurement for radiated emission test were practiced at the 3 m Semi-Anechoic Chamber of BWS TECH Inc. Measurement for conducted emission test were practiced at the EMC shielded room of BWS TECH Inc. facility located at **23, Gokhyeon-ro 480 Beon-gil, Mohyeon-eup, Cheoin-gu, Yongin-si, Gyeonggi-do 17031, Korea.**

The site is constructed in conformance with the requirements of the ANSI C63.4-2014 and CISPR Publication 16. The BWS TECH measurement facility has been filed to the Commission with the FCC for 3 and 10 meter site configurations. Detailed description of test facility was found to be in compliance with the requirements of Section 2.948 FCC Rules according to the ANSI C63.4-2014 and registered to the Federal Communications Commission.

Accredited by MRA(National Radio Research Agency), Jul 18,2017 The Designation Number is KR0017.

The measurement procedure described in American National Standard for Method of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2014) was used in determining radiated and conducted emissions from the Globalbridge Co., Ltd. Binary-CDMA Wireless Network Model: SKYBRIDGE SB-200.

### 3. MEASUREMENT UNCERTAINTY

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The measurement uncertainties show below were calculated in accordance with the requirements Of ANSI C63.4-2014.

All measurement uncertainty vales are shown with a coverage factor of  $k = 2$  to indicate a 95 % Level of confidence. The measurement data shown herein meets or exceeds the U cispr measurement Uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits To determine compliance.

| Parameter                               | Expanded Uncertainty (dB) |
|-----------------------------------------|---------------------------|
| Conducted Emission (0.15 MHz to 30 MHz) | $\pm 1.88$ dB ( $k = 2$ ) |
| Radiated Emission (30 MHz to 1 GHz)     | $\pm 5.26$ dB ( $k = 2$ ) |
| Radiated Emission (1 GHz to 6 GHz)      | $\pm 4.26$ dB ( $k = 2$ ) |

## **4. Product Information**

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### **4.1 Variations covered by this report**

- N/A

### **4.2 Additional Information Related to Testing**

Test results apply only to the particular sample tested and functionality described in this test report. This report may be reproduced in full. Partial reproduction may only be made with the written permission of the BWS TECH Inc.

### **4.3 Derived Models**

- N/A

## 5. Description of Tests

### 5.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2014

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN).  
If the EUT is connected to the PC through USB, the AC power-line adapter of the PC is directly connected to a line impedance stabilization network (LISN).  
Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/50uH of coupling impedance for the measuring instrument.
- b. Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.
- c. The Frequency range from 150 kHz to 30 MHz was searched.

#### 5.1.1 Conducted Limits [§15.107 (a)\_CLASS B]

| Frequency of emission (MHz) | Resolution Bandwidth (kHz) | Conducted limit (dB $\mu$ V) |           |
|-----------------------------|----------------------------|------------------------------|-----------|
|                             |                            | Quasi-Peak                   | Average   |
| 0.15 to 0.5                 | 9                          | 66 to 56*                    | 56 to 46* |
| 0.5 to 5                    | 9                          | 56                           | 46        |
| 5 to 30                     | 9                          | 60                           | 50        |

#### 5.1.2 Conducted Limits [§15.107 (b)\_CLASS A]

| Frequency of emission (MHz) | Resolution Bandwidth (kHz) | Conducted limit (dB $\mu$ V) |         |
|-----------------------------|----------------------------|------------------------------|---------|
|                             |                            | Quasi-Peak                   | Average |
| 0.15 to 0.5                 | 9                          | 79                           | 66      |
| 0.5 to 30                   | 9                          | 73                           | 60      |

\* Decreases with the logarithm of the frequency.

## **5.2 §15.109 Measurement of Radiated Emission**

The test procedure was in accordance with ANSI C63.4-2014

- a. The EUT was placed on the top of a turn table 0.8 meters above the ground at a semi anechoic chamber. The Table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 m to 4 m and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to Peak and Average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- g. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.  
(1 GHz to 40 GHz)

### 5.2.1 Radiated Emission Limits [§15.109 (a)\_CLASS B]

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

| Frequency of emission (MHz) | Antenna Distance (m) | Field Strength ( $\mu\text{V/m}$ ) | Quasi-Peak ( $\text{dB}\mu\text{V/m}$ ) |
|-----------------------------|----------------------|------------------------------------|-----------------------------------------|
| 30 to 88                    | 3                    | 100                                | 40.00                                   |
| 88 to 216                   | 3                    | 150                                | 43.52                                   |
| 216 to 960                  | 3                    | 200                                | 46.02                                   |
| Above 960                   | 3                    | 500                                | 53.98                                   |
| Frequency of emission (MHz) | Antenna Distance (m) | Peak ( $\text{dB}\mu\text{V/m}$ )  | Average ( $\text{dB}\mu\text{V/m}$ )    |
| Above 1000                  | 3                    | 74                                 | 54                                      |

### 5.2.2 Radiated Emission Limits [§15.109 (b)\_CLASS A]

The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

| Frequency of emission (MHz) | Antenna Distance (m) | Field Strength ( $\mu\text{V/m}$ ) | Quasi-Peak ( $\text{dB}\mu\text{V/m}$ ) |
|-----------------------------|----------------------|------------------------------------|-----------------------------------------|
| 30 to 88                    | 10                   | 90                                 | 39.08                                   |
| 88 to 216                   | 10                   | 150                                | 43.52                                   |
| 216 to 960                  | 10                   | 210                                | 46.44                                   |
| Above 960                   | 10                   | 300                                | 49.54                                   |
| Frequency of emission (MHz) | Antenna Distance (m) | Peak ( $\text{dB}\mu\text{V/m}$ )  | Average ( $\text{dB}\mu\text{V/m}$ )    |
| Above 1000                  | 3                    | 80                                 | 60                                      |

### 5.2.3 Frequency Range of Radiated Measurements [§15.33]

An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table.

| Highest frequency generated or used in the device or on which the device operates or tunes (MHz) | Upper frequency of measurement range (MHz)                          | Test frequency marking              |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------|
| Below 1.705                                                                                      | 30                                                                  | <input type="checkbox"/>            |
| 1.705 to 108                                                                                     | 1 000                                                               | <input type="checkbox"/>            |
| 108 to 500                                                                                       | 2 000                                                               | <input type="checkbox"/>            |
| 500 to 1 000                                                                                     | 5 000                                                               | <input checked="" type="checkbox"/> |
| Above 1 000                                                                                      | 5th harmonic of the highest frequency or 40 GHz, whichever is lower | <input type="checkbox"/>            |

## 6. Test Condition

### 6.1 Test Configuration

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the EUT and the supported equipments were installed to meet FCC requirement and operated in a manner which tends to maximize its emission level in a typical application.

#### Radiated Emission Test

Preliminary radiated emission tests were conducted using the procedure in ANSI C63.4/2014 Clause 8.3.1.1 to determine the worst operating condition. Final radiated emission tests were conducted at 3 m Semi-Anechoic Chamber.

### 6.2 EUT operation

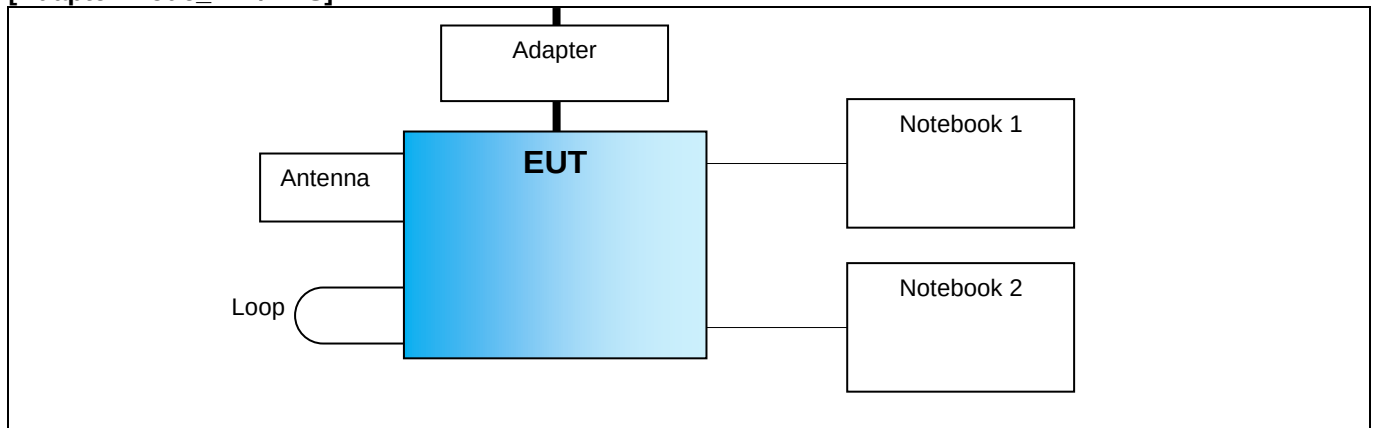
EUT was tested according to the following operation modes provided by the specifications given by the manufacturer.

| Operation Modes | The environment(s) in which the equipment is intended to be used. |
|-----------------|-------------------------------------------------------------------|
| Adapter mode    | This EUT verifies and tests each IP through the Laptop.           |
| PoE mode        |                                                                   |

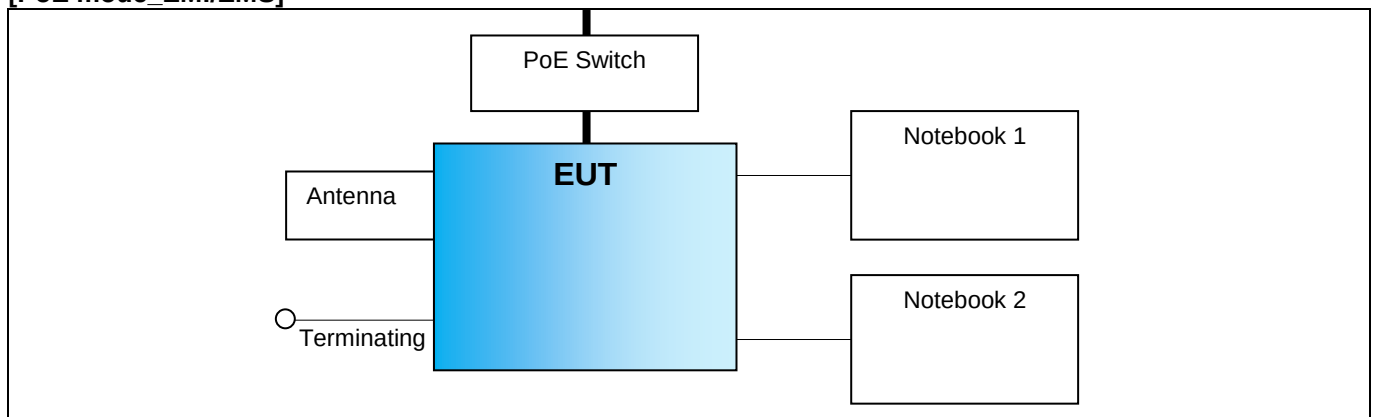
### 6.3 Test System layout on EUT and peripherals

—— Interface cable    ——— Power cable

#### [Adapter mode\_EMI/EMS]



#### [PoE mode\_EMI/EMS]



## 6.4 Peripherals / Support Equipment Used

Following peripheral devices and interface cables were connected during the measurement:

### 6.4.1 Type of Peripheral Equipment Used

| Description | Model Name       | Serial No.     | Manufacturer                                                | FCC ID                  |
|-------------|------------------|----------------|-------------------------------------------------------------|-------------------------|
| EUT         | SKYBRIDGE SB-200 | N/A            | Globalbridge Co., Ltd.                                      | 2AOJBskyBRID<br>GESB200 |
| Adapter     | AEB70US48        | 70480-0008909  | Dongguan Dongcheng<br>zhushan Cincon<br>Electronics Factory | N/A                     |
| PoE Switch  | SFC508HP         | 16098180000459 | N/A                                                         | N/A                     |
| Notebook 1  | LGR58            | 003QTKV034038  | LG                                                          | N/A                     |
| Notebook 2  | R570-K.ARA3L     | 004QTJG048668  | LG                                                          | N/A                     |
| Antenna     | N/A              | N/A            | N/A                                                         | N/A                     |
| Modular     | SKYBRIDGE RF-100 | N/A            | Globalbridge Co., Ltd.                                      | 2AOJBskyBRID<br>GERF100 |

### 6.4.2 Type of Cables Used

#### [Adapter mode]

| Device from | I/O Port | Device to       | I/O Port | Length(m) | Type of Shield |
|-------------|----------|-----------------|----------|-----------|----------------|
| EUT         | DC IN    | Adapter         | DC OUT   | 1.0       | Unshielded     |
|             | LAN      | Notebook 1      | LAN      | 3.0       | Unshielded     |
|             | LAN      | Notebook 2      | LAN      | 3.0       | Unshielded     |
|             | LAN      | Loop            | -        | 3.0       | Unshielded     |
|             | -        | Antenna         | -        | Direct    | -              |
| Adapter     | AC IN    | AC Power Socket | AC OUT   | 1.2       | Unshielded     |

#### [PoE mode]

| Device from | I/O Port | Device to       | I/O Port | Length(m) | Type of Shield |
|-------------|----------|-----------------|----------|-----------|----------------|
| EUT         | LAN      | PoE Switch      | LAN      | 3.0       | Unshielded     |
|             | LAN      | Notebook 1      | LAN      | 3.0       | Unshielded     |
|             | LAN      | Notebook 2      | LAN      | 3.0       | Unshielded     |
|             | LAN      | Terminating     | -        | 3.0       | Unshielded     |
|             | -        | Antenna         | -        | Direct    | -              |
| PoE Switch  | AC IN    | AC Power Socket | AC OUT   | 1.5       | Unshielded     |

### 6.4.3 System configuration

| Description | Model Name | Serial No. | Manufacturer |
|-------------|------------|------------|--------------|
| -           | -          | -          | -            |

## 7. TEST RESULTS

### 7.1 Summary of Test Results

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and photos showing the maximum emission of the EUT are reported.

| Mode    | FCC Rule Parts | Measurement Required           | Result                                                                           |
|---------|----------------|--------------------------------|----------------------------------------------------------------------------------|
| Adapter | 15.107 (a)     | Conducted Emissions            | Passed by – 19.75 dB (Quasi-Peak)                                                |
|         | 15.109 (a)     | Radiated Emissions Below 1 GHz | Passed by – 5.00dB (Quasi-Peak)                                                  |
|         | 15.109 (a)     | Radiated Emissions Above 1 GHz | Passed by – 19.33 dB (MAX-Peak)                                                  |
| PoE     | 15.107 (a)     | Conducted Emissions            | <i>* PoE is considered a wired network port and excludes power port testing.</i> |
|         | 15.109 (a)     | Radiated Emissions Below 1 GHz | Passed by – 7.55 dB (Quasi-Peak)                                                 |
|         | 15.109 (a)     | Radiated Emissions Above 1 GHz | Passed by – 1.63 dB (MAX-Peak)                                                   |

The data collected shows that the Globalbridge Co., Ltd. Binary-CDMA Wireless Network Model: SKYBRIDGE SB-200 complies with technical requirements of the Part 15.107 and 15.109 of the FCC Rules.

## 7.2 Conducted Emissions

The Test results of conducted emission at mains ports provide the following information:

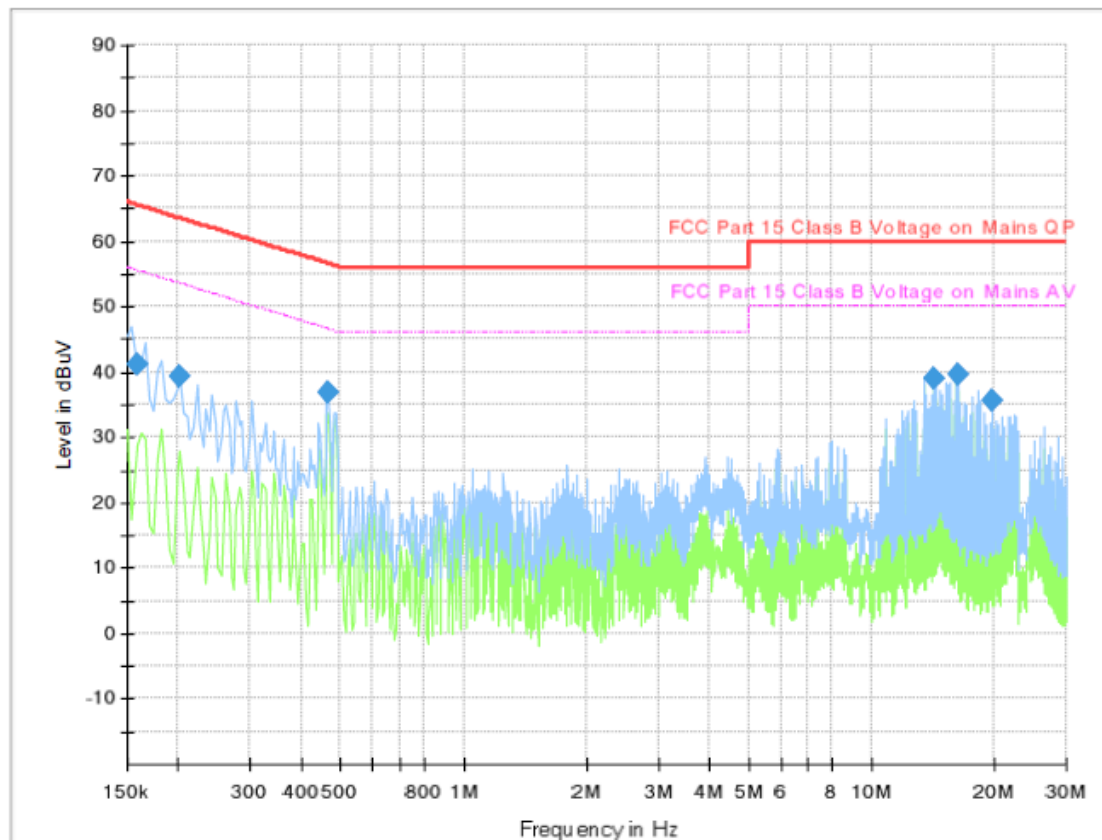
|                      |                             |
|----------------------|-----------------------------|
| Rule Part / Standard | : 15.107 (a)                |
| Detector             | : Quasi-Peak, CISPR-Average |
| Bandwidth            | : 9 kHz (6 dB)              |
| Operation Mode       | : Normal operation mode     |
| Kind of Test Site    | : EMI Shielded Room         |
| Temperature          | : 28 °C                     |
| Relative Humidity    | : 48 %                      |
| Atmospheric pressure | : 100.0 kPa                 |
| Test Date            | : July 19, 2019             |

### ✳ **Calculation Formula:**

1. Conductor L1 = Hot, Conductor N = Neutral
2. Corr. = LISN Factor + Cable Loss
3. Quasi Peak or CAverage = Receiver Reading + Corr.
4. Margin = Limit – Quasi Peak of CAverage

## Conducted Emission Test Data

Adapter mode\_L1

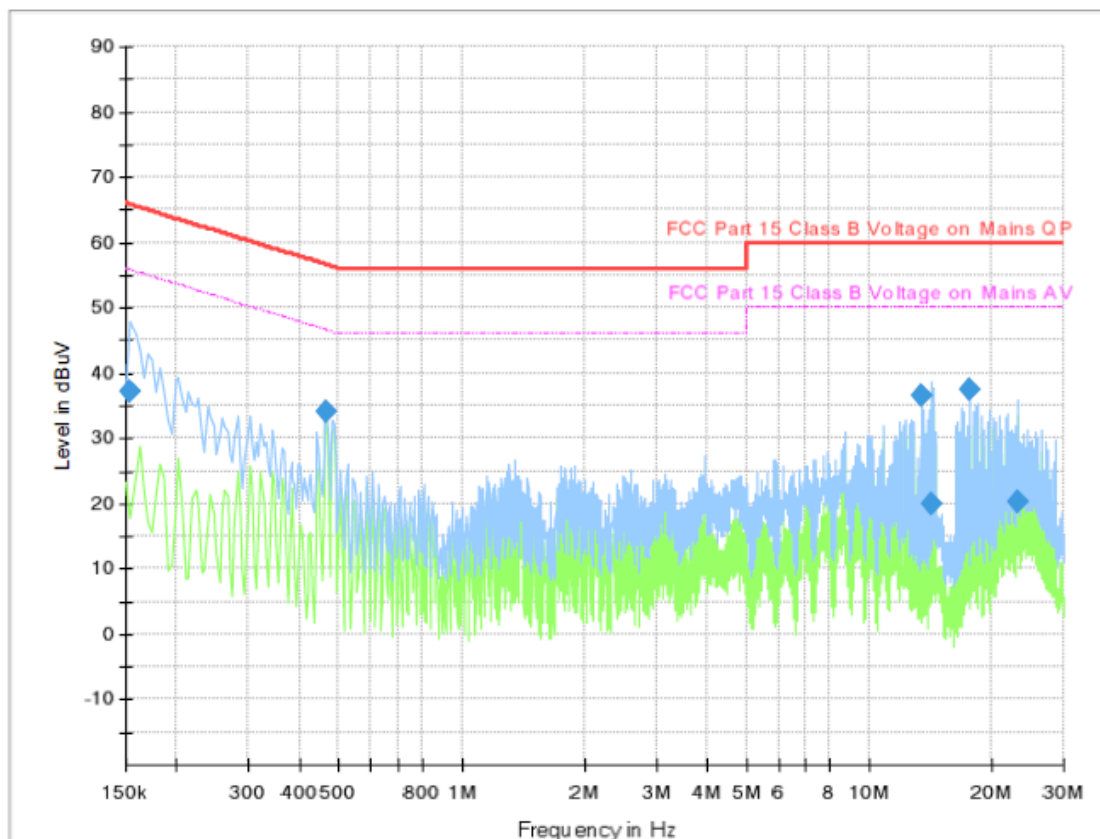


## Final Result

| Frequency (MHz) | QuasiPeak (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | PE  | Corr. (dB) |
|-----------------|------------------|--------------|-------------|-----------------|-----------------|------|-----|------------|
| 0.158500        | 41.21            | 65.54        | 24.33       | 3000.0          | 9.000           | L1   | FLO | 8.1        |
| 0.201500        | 39.29            | 63.55        | 24.26       | 3000.0          | 9.000           | L1   | FLO | 8.2        |
| 0.465500        | 36.84            | 56.59        | 19.75       | 3000.0          | 9.000           | L1   | FLO | 8.1        |
| 14.150930       | 38.94            | 60.00        | 21.06       | 3000.0          | 9.000           | L1   | FLO | 8.9        |
| 16.229170       | 39.58            | 60.00        | 20.42       | 3000.0          | 9.000           | L1   | FLO | 9.0        |
| 19.707450       | 35.48            | 60.00        | 24.52       | 3000.0          | 9.000           | L1   | FLO | 9.1        |

## Conducted Emission Test Data

Adapter mode\_N



## Final Result

| Frequency (MHz) | QuasiPeak (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | PE  | Corr. (dB) |
|-----------------|------------------|--------------|-------------|-----------------|-----------------|------|-----|------------|
| 0.154000        | 37.30            | 65.78        | 28.48       | 3000.0          | 9.000           | N    | GND | 8.2        |
| 0.466500        | 34.04            | 56.58        | 22.54       | 3000.0          | 9.000           | N    | GND | 8.1        |
| 13.419210       | 36.63            | 60.00        | 23.37       | 3000.0          | 9.000           | N    | GND | 8.8        |
| 14.214630       | 20.07            | 60.00        | 39.93       | 3000.0          | 9.000           | N    | GND | 8.8        |
| 17.693530       | 37.44            | 60.00        | 22.56       | 3000.0          | 9.000           | N    | GND | 9.1        |
| 23.130370       | 20.29            | 60.00        | 39.71       | 3000.0          | 9.000           | N    | GND | 9.6        |

## 7.3 Radiated Emissions

The Test results of radiated emission provide the following information:

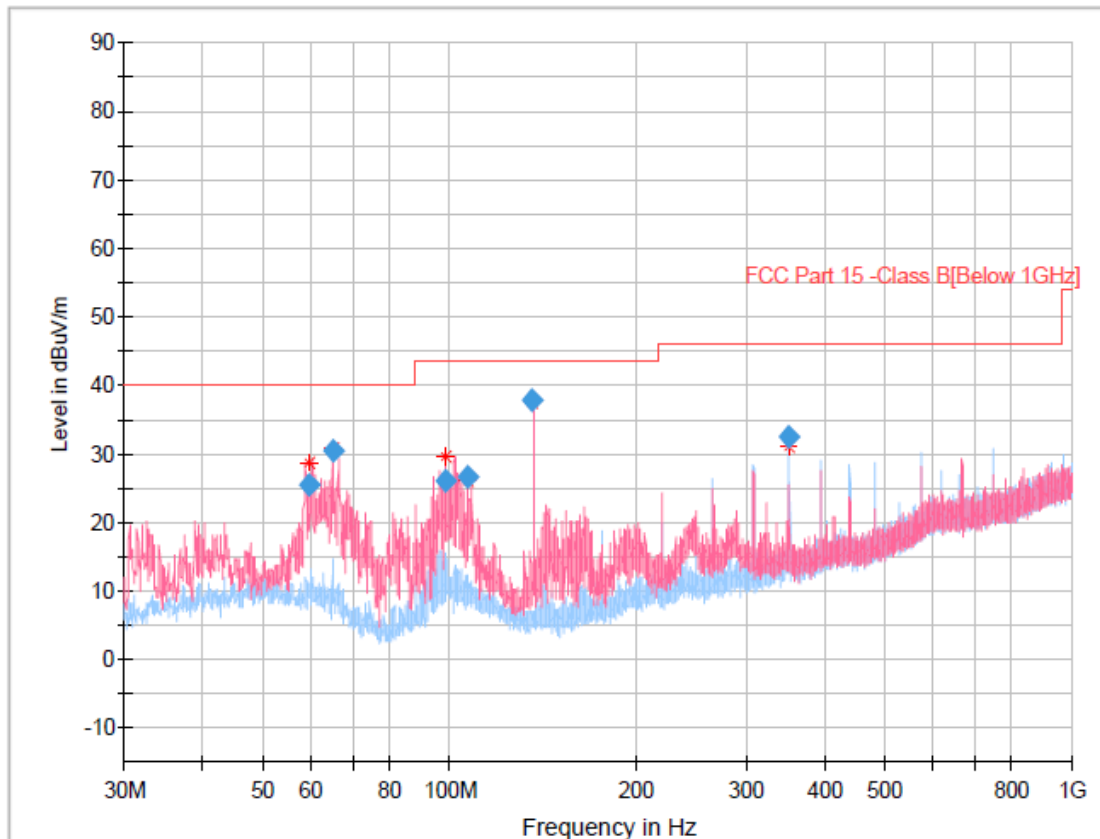
|                      |   |                       |
|----------------------|---|-----------------------|
| Rule Part / Standard | : | 15.109 (a)            |
| Detector             | : | Quasi-Peak            |
| Bandwidth            | : | 120 kHz (6 dB)        |
| Operation Mode       | : | Normal operation mode |
| Kind of Test Site    | : | 10 m chamber          |
| Measurement Distance | : | 3 meters              |
| Temperature          | : | 29 °C                 |
| Relative Humidity    | : | 49 %                  |
| Atmospheric pressure | : | 100.1 kPa             |
| Test Date            | : | July 19, 2019         |

### ※ Calculation Formula:

1. POL. H: Horizontal, POL. V: Vertical
2. Quasi Peak = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor + Cable Loss
4. Margin = Limit – Quasi Peak

## Radiated Emission Test Data

Adapter mode\_Below 1 GHz

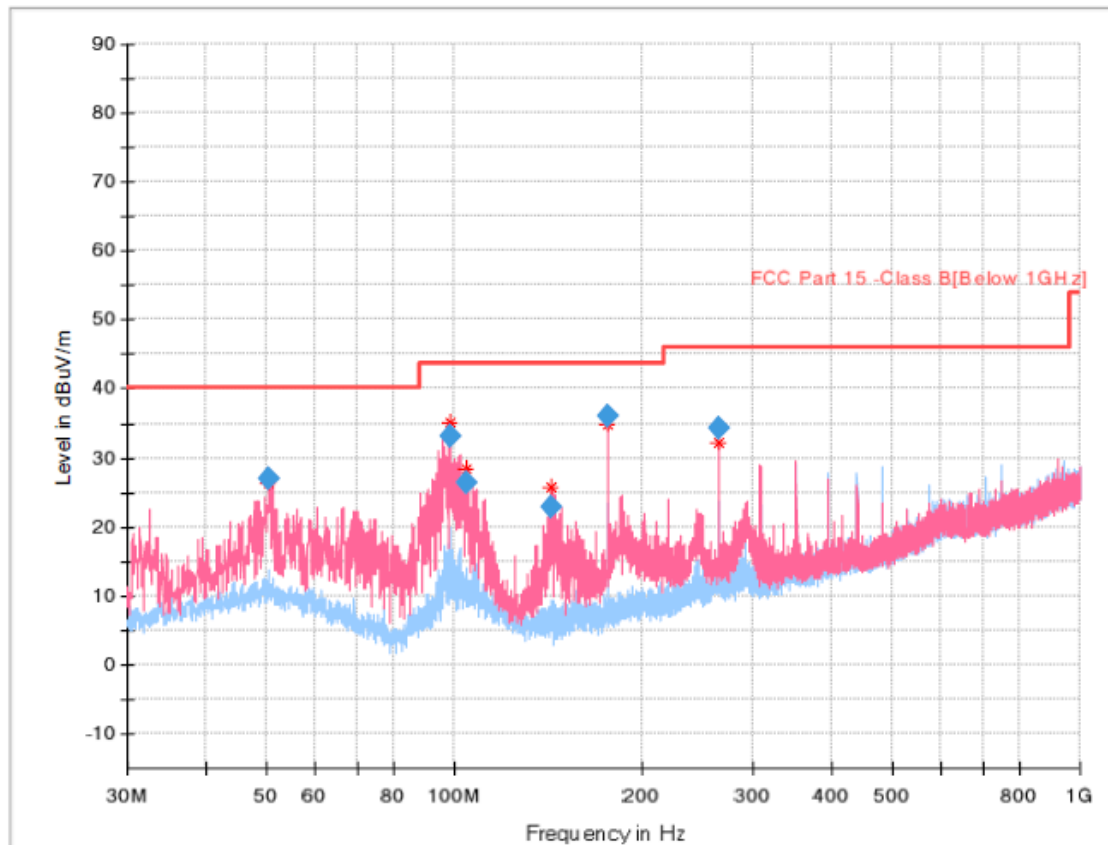


## Final\_Result

| Frequency (MHz) | QuasiPeak (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 59.312000       | 25.42              | 40.00          | 14.58       | 15000.0         | 120.000         | 100.0       | V   | 268.0         | -26.2      |
| 64.774500       | 30.49              | 40.00          | 9.51        | 15000.0         | 120.000         | 261.0       | V   | 174.0         | -27.7      |
| 98.463500       | 26.20              | 43.52          | 17.32       | 15000.0         | 120.000         | 161.0       | V   | 10.0          | -26.7      |
| 106.697000      | 26.55              | 43.52          | 16.97       | 15000.0         | 120.000         | 119.0       | V   | 10.0          | -26.4      |
| 135.063500      | 38.52              | 43.52          | 5.00        | 15000.0         | 120.000         | 131.0       | V   | 79.0          | -29.6      |
| 351.991500      | 32.44              | 46.02          | 13.58       | 15000.0         | 120.000         | 300.0       | H   | 106.0         | -20.9      |

## Radiated Emission Test Data

PoE mode\_Below 1 GHz



## Final Result

| Frequency (MHz) | QuasiPeak (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 50.448500       | 27.06              | 40.00          | 12.94       | 15000.0         | 120.000         | 158.0       | V   | 319.0         | -24.9      |
| 98.433500       | 33.21              | 43.52          | 10.31       | 15000.0         | 120.000         | 200.0       | V   | 158.0         | -26.7      |
| 104.757000      | 26.46              | 43.52          | 17.06       | 15000.0         | 120.000         | 122.0       | V   | 236.0         | -26.4      |
| 143.277500      | 22.87              | 43.52          | 20.65       | 15000.0         | 120.000         | 109.0       | V   | 230.0         | -29.9      |
| 176.015000      | 35.97              | 43.52          | 7.55        | 15000.0         | 120.000         | 100.0       | V   | 171.0         | -28.3      |
| 264.012500      | 34.13              | 46.02          | 11.89       | 15000.0         | 120.000         | 100.0       | V   | 62.0          | -24.2      |

## 7.4 Radiated Emissions (Above 1 GHz)

The Test results of radiated emission provide the following information:

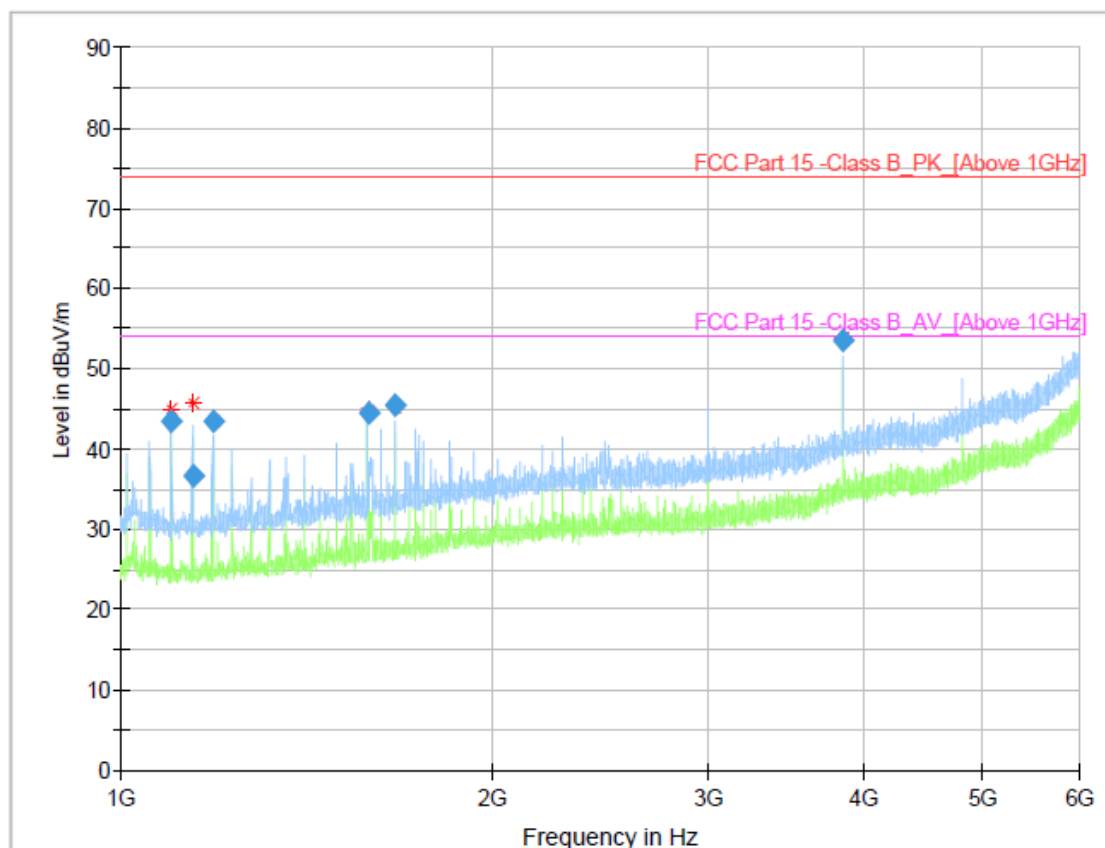
|                                      |                                                                                             |
|--------------------------------------|---------------------------------------------------------------------------------------------|
| Rule Part / Standard                 | : 15.109 (a)                                                                                |
| Detector                             | : Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz)<br>CISPR-Average mode: (RBW: 1 MHz, VBW: 10 MHz) |
| Highest Operating Frequency          | : N/A                                                                                       |
| Upper Frequency of Measurement Range | : 5 000 MHz                                                                                 |
| Operation Mode                       | : Normal operation mode                                                                     |
| Kind of Test Site                    | : 10 m chamber                                                                              |
| Measurement Distance                 | : 3 meters                                                                                  |
| Temperature                          | : 28 °C                                                                                     |
| Relative Humidity                    | : 48 %                                                                                      |
| Atmospheric pressure                 | : 100.0 kPa                                                                                 |
| Test Date                            | : July 19, 2019                                                                             |

### ✳ **Calculation Formula:**

1. POL. H: Horizontal, POL. V: Vertical
2. Quasi Peak = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor + Cable Loss – Amplifier Gain
4. Margin = Limit – Quasi Peak

## Radiated Emission Test Data

Adapter mode\_Above 1 GHz Horizontal

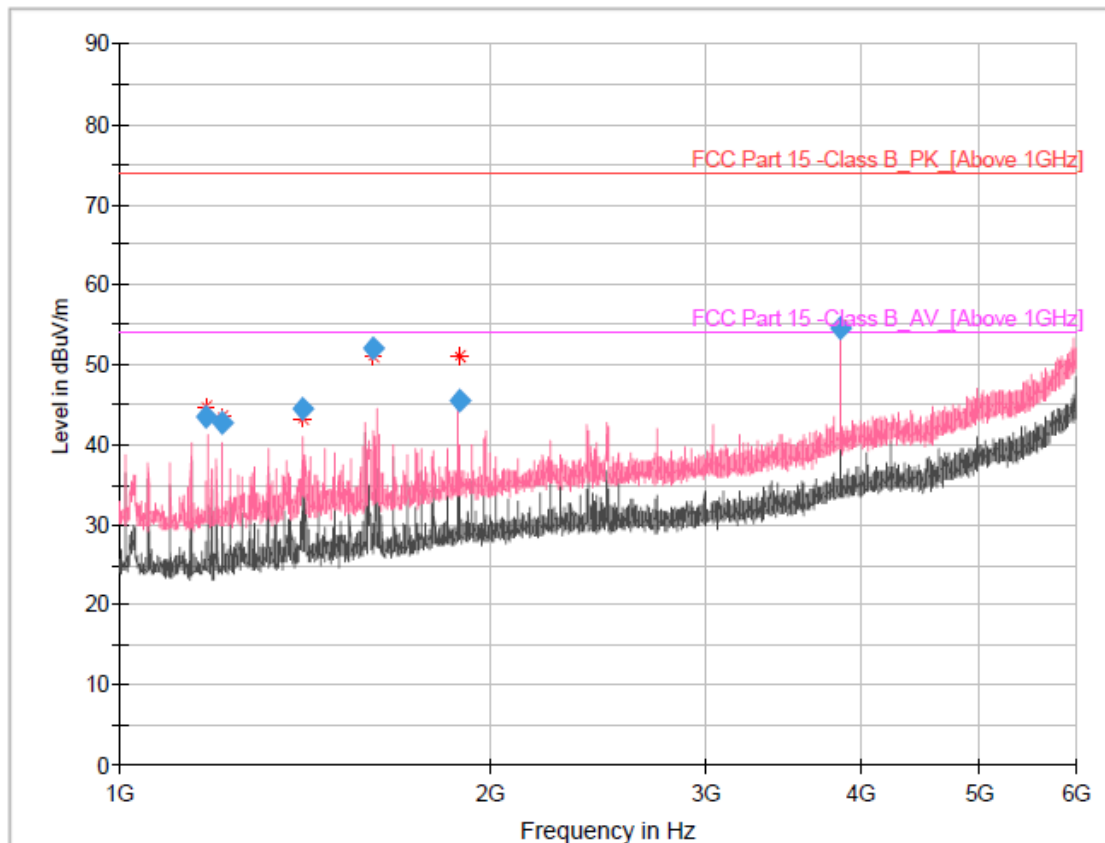


## Final\_Result

| Frequency (MHz) | MaxPeak (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 1100.000000     | 43.58            | 74.00          | 30.42       | 1000.0          | 1000.000        | 100.0       | H   | 213.0         | -10.6      |
| 1144.000000     | 36.78            | 74.00          | 37.22       | 1000.0          | 1000.000        | 100.0       | H   | 202.0         | -10.4      |
| 1188.000000     | 43.41            | 74.00          | 30.59       | 1000.0          | 1000.000        | 100.0       | H   | 272.0         | -10.2      |
| 1592.750000     | 44.45            | 74.00          | 29.55       | 1000.0          | 1000.000        | 100.0       | H   | 61.0          | -8.1       |
| 1672.000000     | 45.53            | 74.00          | 28.47       | 1000.0          | 1000.000        | 100.0       | H   | 308.0         | -7.5       |
| 3854.000000     | 53.47            | 74.00          | 20.53       | 1000.0          | 1000.000        | 100.0       | H   | 102.0         | -0.1       |

## Radiated Emission Test Data

Adapter mode\_Above 1 GHz Vertical

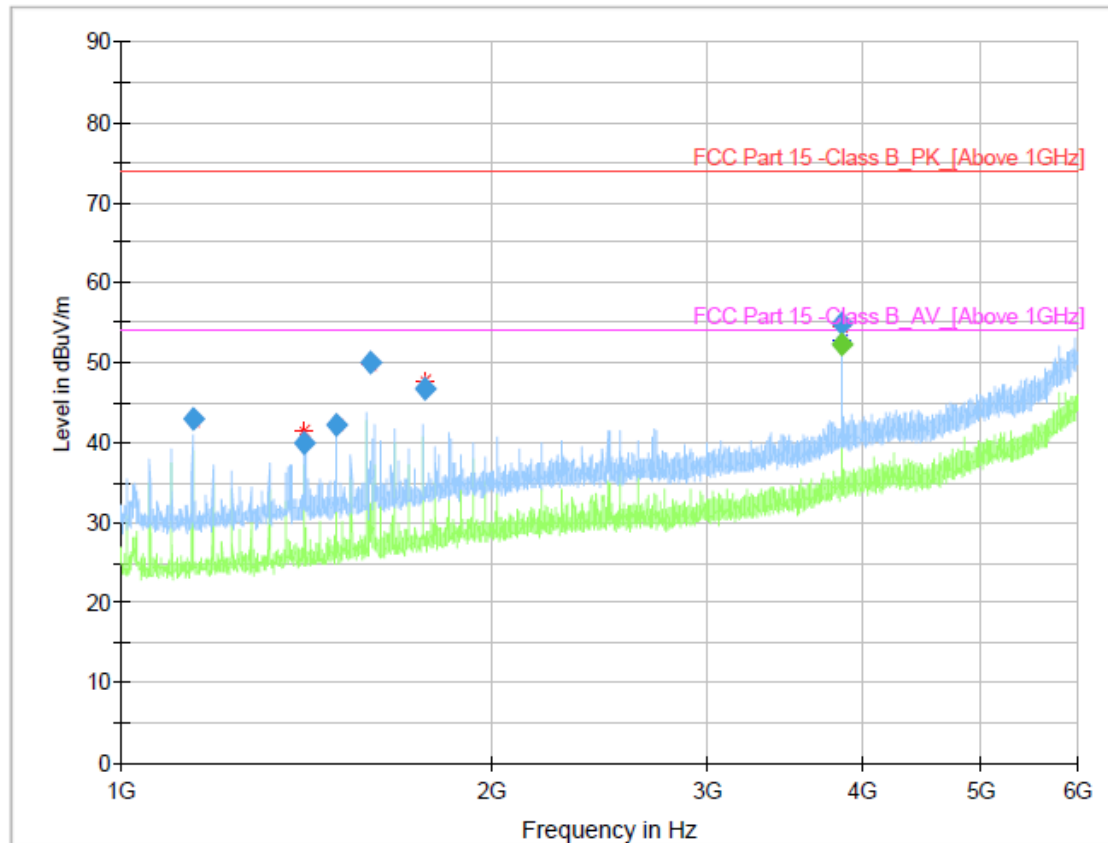


## Final\_Result

| Frequency (MHz) | MaxPeak (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 1174.250000     | 43.60            | 74.00          | 30.40       | 1000.0          | 1000.000        | 100.0       | V   | 68.0          | -10.3      |
| 1212.250000     | 42.67            | 74.00          | 31.33       | 1000.0          | 1000.000        | 100.0       | V   | 37.0          | -10.1      |
| 1408.000000     | 44.43            | 74.00          | 29.57       | 1000.0          | 1000.000        | 100.0       | V   | 33.0          | -9.2       |
| 1610.750000     | 52.04            | 74.00          | 21.96       | 1000.0          | 1000.000        | 100.0       | V   | 232.0         | -8.0       |
| 1888.750000     | 45.50            | 74.00          | 28.50       | 1000.0          | 1000.000        | 100.0       | V   | 250.0         | -5.9       |
| 3854.000000     | 54.67            | 74.00          | 19.33       | 1000.0          | 1000.000        | 100.0       | V   | 88.0          | -0.1       |

## Radiated Emission Test Data

PoE mode\_Above 1 GHz Horizontal

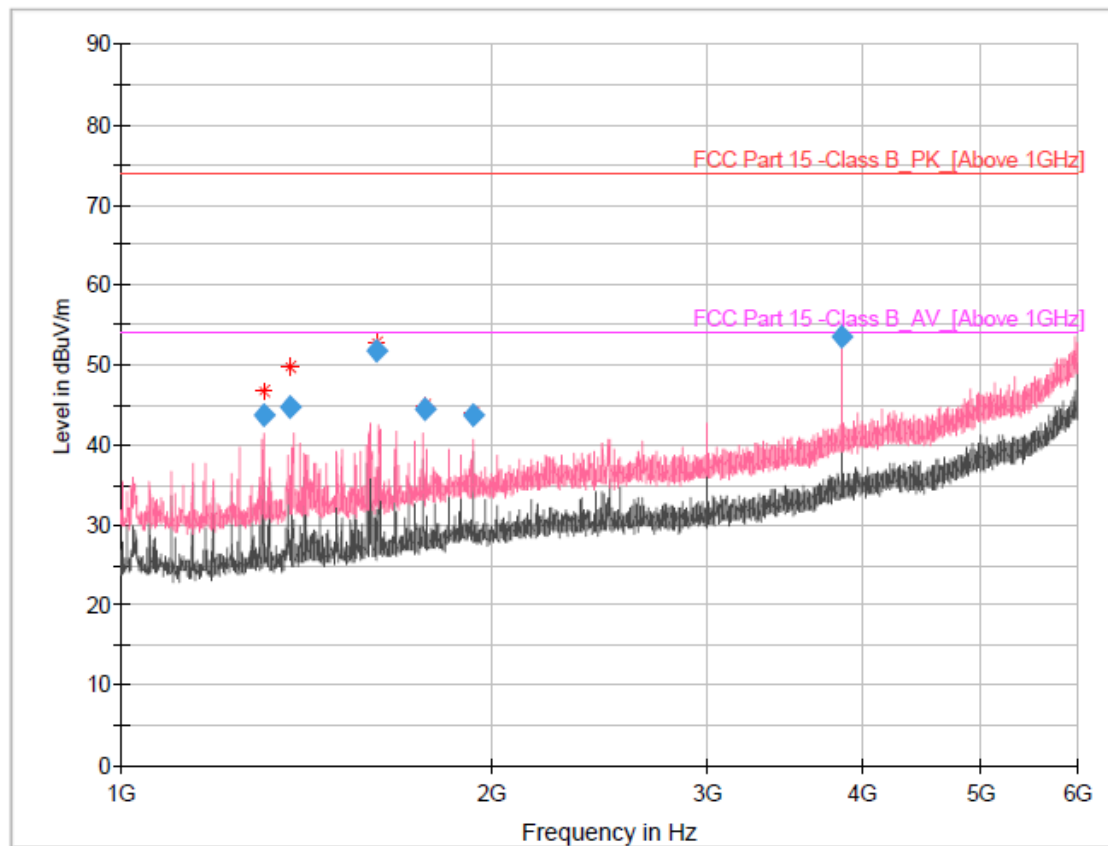


## Final Result

| Frequency (MHz) | MaxPeak (dBuV/m) | CAverage (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 1144.000000     | 43.10            | ---               | 74.00          | 30.90       | 1000.0          | 1000.000        | 100.0       | H   | 96.0          |
| 1410.750000     | 39.91            | ---               | 74.00          | 34.09       | 1000.0          | 1000.000        | 100.0       | H   | 227.0         |
| 1496.000000     | 42.32            | ---               | 74.00          | 31.68       | 1000.0          | 1000.000        | 100.0       | H   | 133.0         |
| 1593.500000     | 49.91            | ---               | 74.00          | 24.09       | 1000.0          | 1000.000        | 100.0       | H   | 81.0          |
| 1766.500000     | 46.80            | ---               | 74.00          | 27.20       | 1000.0          | 1000.000        | 100.0       | H   | 265.0         |
| 3854.000000     | ---              | 52.37             | 54.00          | 1.63        | 1000.0          | 1000.000        | 100.0       | H   | 153.0         |
| 3854.000000     | 54.92            | ---               | 74.00          | 19.08       | 1000.0          | 1000.000        | 100.0       | H   | 153.0         |

## Radiated Emission Test Data

PoE mode\_Above 1 GHz Vertical



## Final Result

| Frequency (MHz) | MaxPeak (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 1309.000000     | 43.70            | 74.00          | 30.30       | 1000.0          | 1000.000        | 100.0       | V   | 242.0         | -9.7       |
| 1374.500000     | 44.84            | 74.00          | 29.16       | 1000.0          | 1000.000        | 100.0       | V   | 52.0          | -9.4       |
| 1615.000000     | 51.84            | 74.00          | 22.16       | 1000.0          | 1000.000        | 100.0       | V   | 57.0          | -7.9       |
| 1766.500000     | 44.58            | 74.00          | 29.42       | 1000.0          | 1000.000        | 100.0       | V   | 234.0         | -6.8       |
| 1936.000000     | 43.77            | 74.00          | 30.23       | 1000.0          | 1000.000        | 100.0       | V   | 197.0         | -5.6       |
| 3854.000000     | 53.53            | 74.00          | 20.47       | 1000.0          | 1000.000        | 100.0       | V   | 116.0         | -0.1       |

## 8. TEST EQUIPMENTS LIST

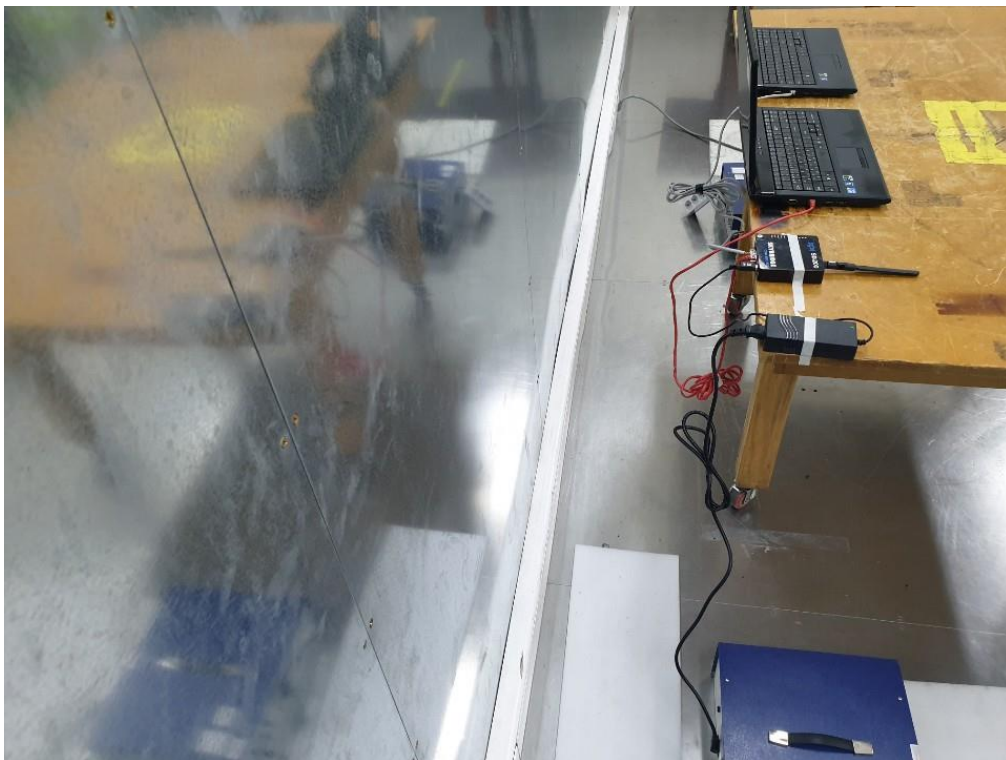
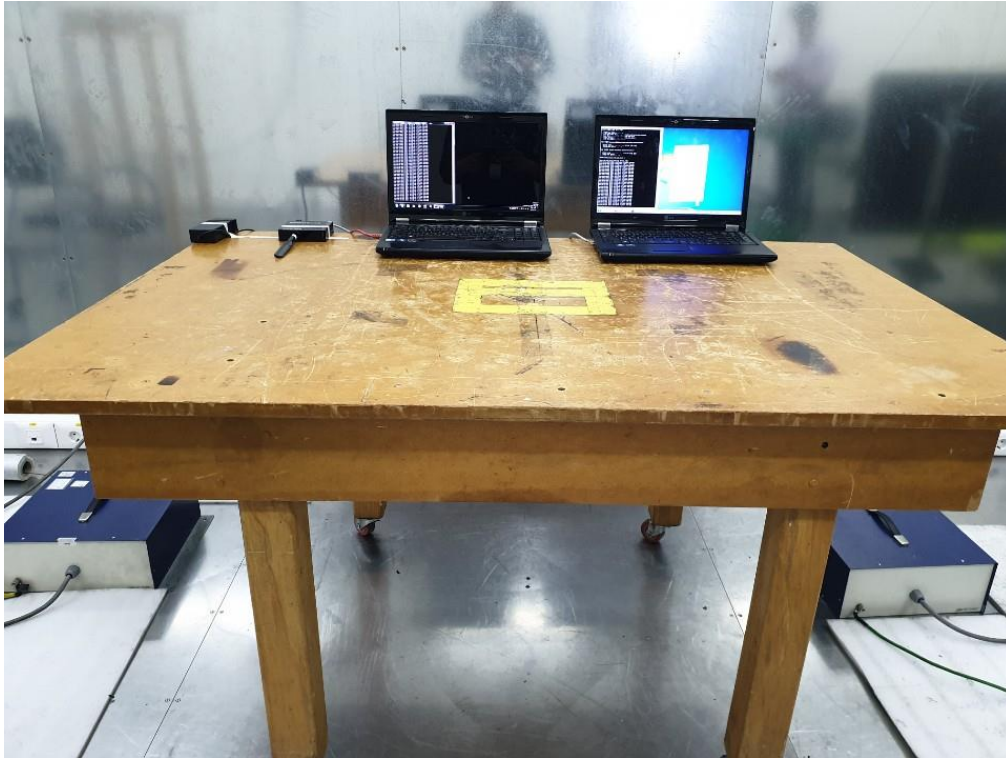
The listing below denotes the test equipments utilized for the test(s).

| Equipment Type                     | Model     | Manufacturer    | Serial No              | Cal Due Date | Use                                 |
|------------------------------------|-----------|-----------------|------------------------|--------------|-------------------------------------|
| EMI Test Receiver                  | ESPI      | ROHDE & SCHWARZ | 1164.6407.03           | 2020-01-02   | <input checked="" type="checkbox"/> |
| Impulse-Begrenzer<br>Pulse Limiter | ESH3-Z2   | ROHDE & SCHWARZ | 100092                 | 2020-01-02   | <input checked="" type="checkbox"/> |
| LISN                               | LN2-16N   | EMCIS           | LN16005                | 2019-11-16   | <input checked="" type="checkbox"/> |
| EMI Test Receiver                  | ESR       | ROHDE & SCHWARZ | 101450                 | 2020-01-02   | <input checked="" type="checkbox"/> |
| Bilog Antenna                      | VULB9163  | SCHWARZBECK     | 01063                  | 2020-11-14   | <input checked="" type="checkbox"/> |
| RF Amplifier                       | MPA-10-40 | RF Bay          | 21163921               | 2020-06-07   | <input checked="" type="checkbox"/> |
| Horn Antenna                       | AHA-118   | COM-POWER CORP. | 701064                 | 2020-11-20   | <input checked="" type="checkbox"/> |
| Antenna Mast (4 m)                 | AM 4.0    | MATURO          | AM4.0/225<br>/17240915 | N/A          | <input checked="" type="checkbox"/> |
| Positioner Controller              | CO2000    | MATURO          | NCU/459/17240915       | N/A          | <input checked="" type="checkbox"/> |
| Antenna Mast (2 m)                 | AM 2.5    | MATURO          | AM2.5/226<br>/17240915 | N/A          | <input checked="" type="checkbox"/> |

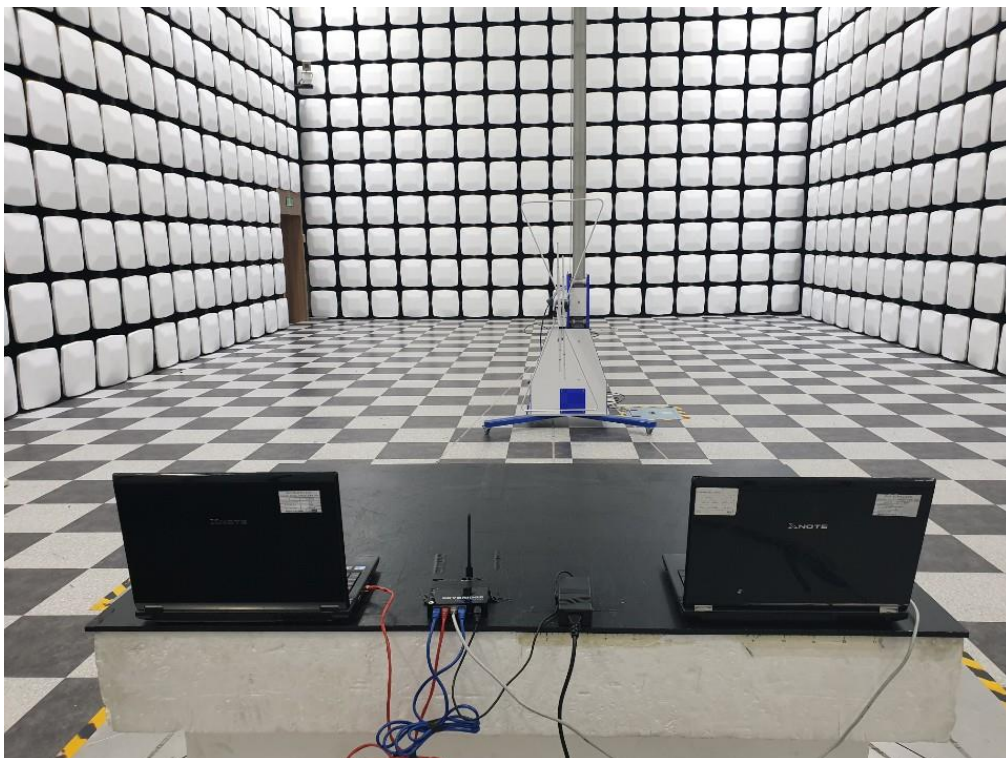
## ***Appendix 1. Test Setup Photographs***

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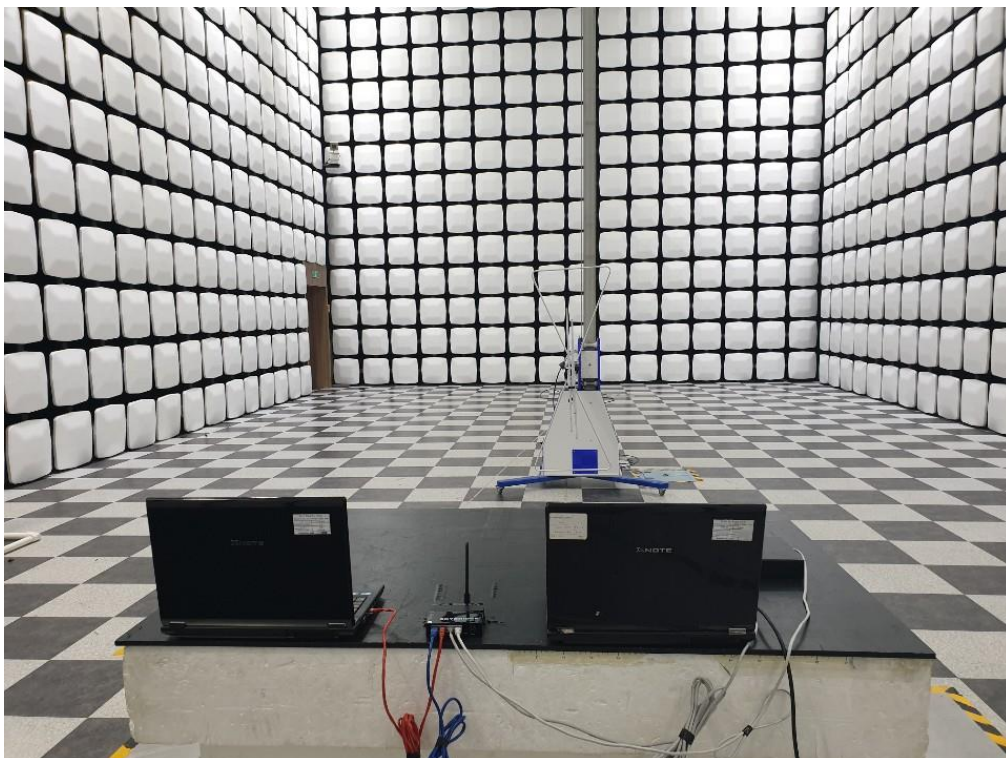
### **Conducted Emission Test Setup Adapter mode**



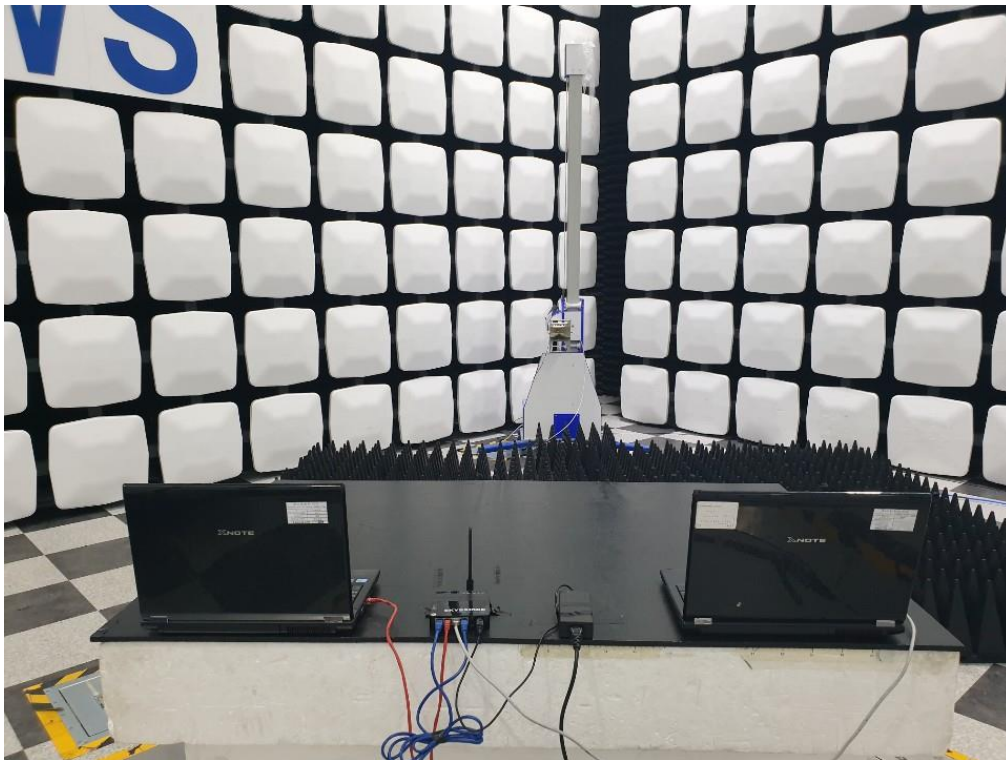
**Radiated Emission Test Setup – Below 1 GHz  
Adapter mode**



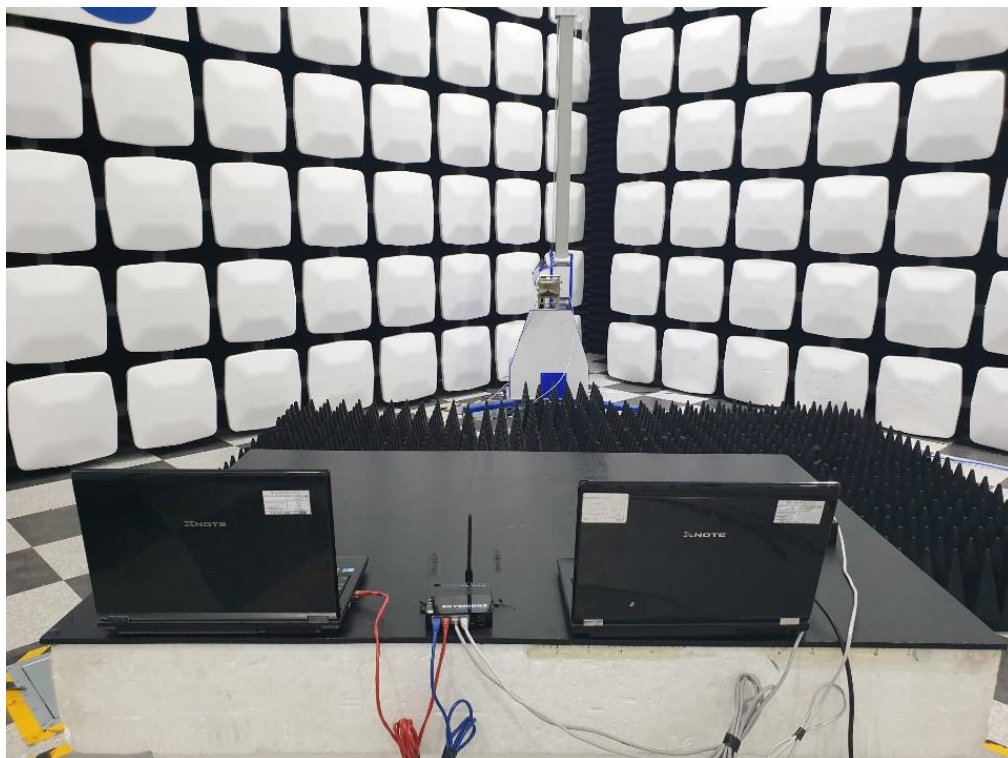
**Radiated Emission Test Setup – Below 1 GHz  
PoE mode**



**Radiated Emission Test Setup – Above 1 GHz  
Adapter mode**



**Radiated Emission Test Setup – Above 1 GHz  
PoE mode**



## **Appendix 2. FCC ID Label and location**

### **Product Label Sample with FCC ID Label information**

Following is a sample copy of the label that will be placed on the rear cabinet of the product.

The FCC identifier is marked in the product label.

The warning statement and Information to the User are described in the user manual.



### **Label Location**

The label shown above shall be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time purchase. (Labeling requirements per 2.925)

### **Appendix 3. External Photographs of EUT**

**[Front of EUT]**



**[Rear of EUT]**

