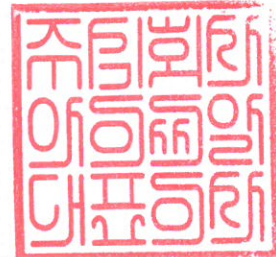




# 시험 성적서 TEST REPORT

페이지(page) : ( 1 ) / ( 총(Total) 25 )

|   |                  |  |                            |
|---|------------------|--|----------------------------|
| 성적서 번호<br>Report No.  |                  | ICRT-TR-E231016-0A   |                            |
| 신청자<br>Client   | 기관명<br>Name      | CanTops Co., Ltd.  |                            |
|   | 주소<br>Address    | A 1002-1008, Digital Empire BLDG, 16, Deogyong-daero 1556beon-gil, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16690, South Korea   |                            |
| 시험대상품목<br>Sample description  |                  | RFID Reader  |                            |
| 모델명<br>Type designation   |                  | CTS-RFID-LM24  |                            |
| 정격<br>Ratings   |                  | DC 24 V  |                            |
| 시험장소<br>Place of test   |                  | <input checked="" type="checkbox"/> 고정시험(Inside test) <input type="checkbox"/> 현장시험(Field test)<br>주소지(Address): 112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea |                            |
| 시험기간<br>Date of test  |                  | 07. May. 2023 ~ 08. May. 2023  |                            |
| 시험방법/항목<br>Test Method/Item   |                  | FCC Part 15 Subpart C §15.209  |                            |
| 시험결과<br>Test Results  |                  | Refer to 3. Test Summary   |                            |
| 확인<br>Affirmation   | 작성자<br>Tested by | 기술책임자<br>Technical Manager   |                            |
|   | 성명<br>Name       | Seong-Hun, Jeong (Signature)   | Tae-Yang, Yoon (Signature) |
| <input type="checkbox"/> 위 성적서는 고객이 제공한 시료에 대한 시험결과 입니다.<br>The above test report is certified that the above mentioned products have been tested for the sample.   |                  |  |                            |
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## Revision History

| Issued Report No.  | Issued Date  | Revisions     | Effect Section |
|--------------------|--------------|---------------|----------------|
| ICRT-TR-E231016-0A | 2023. 05. 09 | Initial Issue | All            |
|                    |              |               |                |
|                    |              |               |                |



# **1. Applicant & Manufacturer & Test Laboratory Information**

## **1.1 Applicant information**

|                |  |
|----------------|--|
| Applicant      | CanTops Co., Ltd.  |
| Address        | A 1002-1008, Digital Empire BLDG, 16, Deogyong-daero 1556beon-gil, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16690, South Korea |
| Contact Person | Sang-Gyu, Han  |
| Telephone No.  | 82-10-4607-6910  |
| E-mail         | sghan@cantops.biz  |

## **1.2 Manufacturer Information**

|              |  |
|--------------|--|
| Manufacturer | CanTops Co., Ltd.  |
| Address      | A 1002-1008, Digital Empire BLDG, 16, Deogyong-daero 1556beon-gil, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16690, South Korea |

## **1.3 Test Laboratory Information**

|                                   |  |
|-----------------------------------|--|
| Conducted tests were performed at |  |
| Laboratory                        | ICR Co., Ltd.  |
| Address                           | 112, 113, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea |
| Telephone No.                     | +82-2-6351-9002  |
| Fax No.                           | +82-2-6351-9007  |
| RRA No.                           | KR0165   |
| KOLAS No.                         | KT652  |



## 2. Equipment under Test(EUT) Information

### 2.1 General Information

|                       |                   |
|-----------------------|-------------------|
| Product Name          | RFID Reader       |
| Brand Name            | CanTops           |
| Model Name            | CTS-RFID-LM24     |
| Additional Model Name | CTS-RFID-LM21     |
| FCC ID                | RMN-CTS-RFID-LM24 |
| Power Supply          | DC 24 V           |
| Antenna Port          | 4                 |

### 2.2 Additional Information

|                      |  |                                 |
|----------------------|--|---------------------------------|
| Equipment Class      | DCD - Part 15 Low Power Transmitter Below 1705 kHz |                                 |
| Operating Frequency  | 134.2 kHz  |                                 |
| Channel Number       | 1  |                                 |
| Modulation Type      | ASK  |                                 |
| Maximum output power | 91.42 dB $\mu$ V/m                                 |                                 |
| Antenna Type         | CTS-STBA-EC-1-0400                                 | Coil Antenna (Rectangular Type) |
|                      | CTS-RFID-AO01-0400                                 | Coil Antenna (Stick Type)       |
|                      | CTS-RFID-AB01-0400                                 | Coil Antenna (Stick Type)       |
|                      | CTS-RFID-AC01-0400                                 | Coil Antenna (Stick Type)       |

### 2.3 Operation Description

- The product has 4 antenna ports, and they do not operate simultaneously. Consumers connect and use one of the four types of antennas provided by the manufacturer.

The test was conducted by connecting 4 types of antennas to each of the 4 ports.

### 2.4 Additional model information

- CTS-RFID-LM21 is a simple structure change model in which the antenna port is blocked by a wall from the CTS-RFID-LM24 model. It is the same as using only the first PORT of the CTS-RFID-LM24 model.

### 2.5 Mode of operation during the test

- The EUT is continuous transmission mode during the test. To get a maximum radiated emission levels from the EUT, the EUT was moved throughout the XY, YZ, XZ planes.

### 2.6 Modifications of EUT

- None



### 3. Test Summary

#### 3.1 Test standards and results

| FCC Part 15 Subpart C |  |                                     |         |
|-----------------------|--|-------------------------------------|---------|
| Clause                | Test items                               | Applied                             | Results |
| §15.215 (c)           | 20 dB Bandwidth                          | <input checked="" type="checkbox"/> | PASS    |
| §15.209               | Field Strength of the Fundamental Signal | <input checked="" type="checkbox"/> | PASS    |
| §15.209               | Radiated Emissions                       | <input checked="" type="checkbox"/> | PASS    |

#### 3.2 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the standards stated in FCC Part 15 Subpart C Section 15.209.

#### 3.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013, FCC CFR 47 PART 15.

#### 3.4 Configuration of Test System

##### 3.4.1 Radiated emission test

Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

#### 3.5 Antenna requirement

According to §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.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

##### 3.5.1 Result: Pass

The transmitter can use 4 types of antennas, Each antenna complies with clause 15.203.



#### 4. Used equipment on test

|                                     | Description              | Model Name | Manufacturer    | Serial Number | Next Cal       |
|-------------------------------------|--------------------------|------------|-----------------|---------------|----------------|
| <input checked="" type="checkbox"/> | SIGNAL ANALYZER          | FSV40      | ROHDE & SCHWARZ | 101455        | 10 Hz ~ 40 GHz |
| <input checked="" type="checkbox"/> | LOOP ANTENNA             | HFH2-Z2    | ROHDE & SCHWARZ | 100271        | 9 kHz ~ 30 MHz |
| <input checked="" type="checkbox"/> | BI-Log ANTENNA           | VULB 9162  | SCHWARZBECK     | 120           | 30 MHz ~ 1 GHz |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVE         | ESR7       | ROHDE & SCHWARZ | 101462        | 9 kHz ~ 7 GHz  |
| <input checked="" type="checkbox"/> | SIGNAL CONDITIONING UNIT | SCU08      | ROHDE & SCHWARZ | 100746        | 10 MHz ~ 8 GHz |
| <input checked="" type="checkbox"/> | DC POWER SUPPLY          | E3632A     | AGILANT         | MY51250107    | DC 30 V / 4 A  |

※ All test equipment used is calibration on a regular basis.



## 5. 20 dB Bandwidth

### 5.1 Operating environment

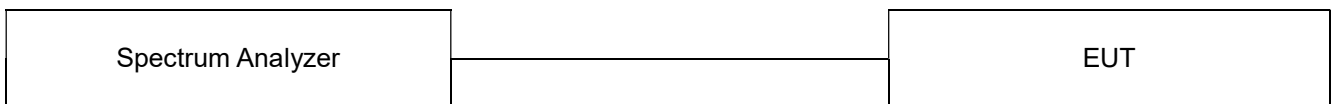
Temperature : 21 °C  
Relative humidity : 45 %

### 5.2 Measurement method

Standard : §15.215

### 5.3 Test setup

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth(RBW) is set to 1% to 5% of the OBW. The Video bandwidth is set to 3 times the RBW. The 20 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 20 dB.



### 5.4 Test data

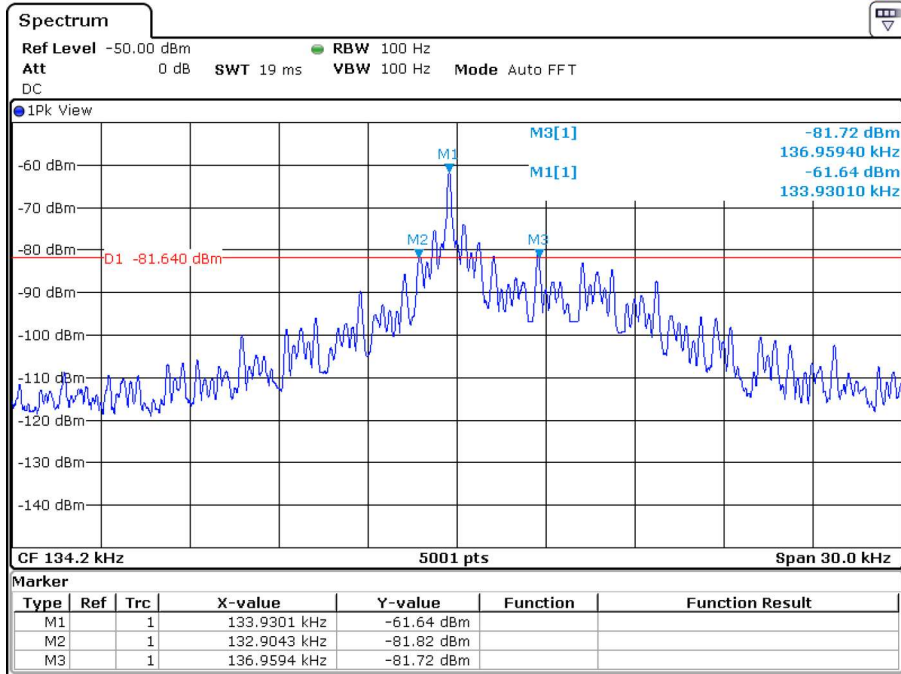
Operating mode : Transmit mode  
Test Result : Pass

#### 5.4.1 Measured Result

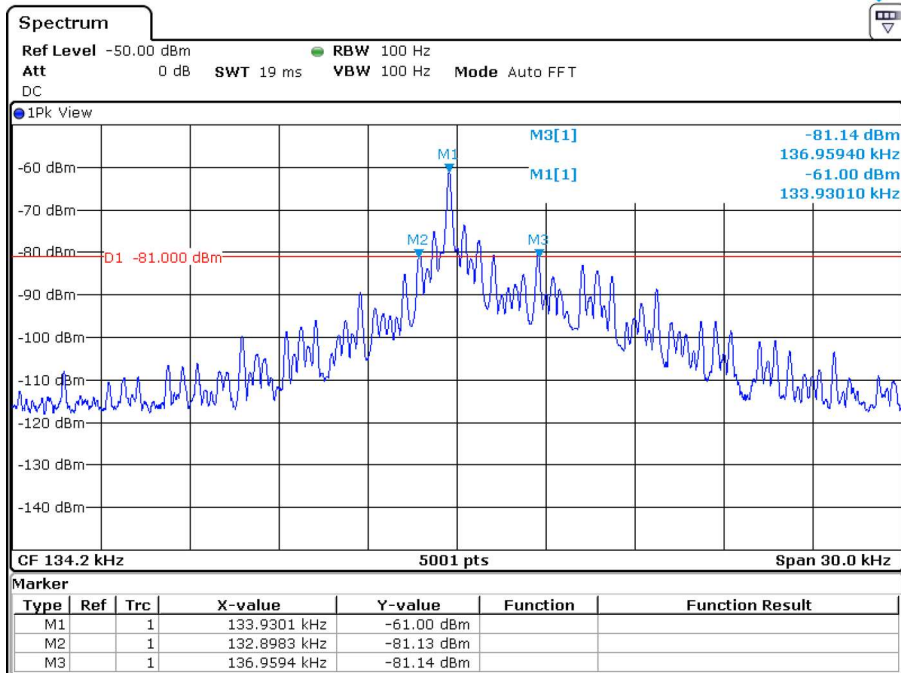
| Modulation Type | Port | Frequency (kHz) | Measured Value (kHz) | Limit (kHz) |
|-----------------|------|-----------------|----------------------|-------------|
| ASK             | 1    | 134.2 kHz       | 4.06                 | -           |
|                 | 2    | 134.2 kHz       | 4.06                 |             |
|                 | 3    | 134.2 kHz       | 4.04                 |             |
|                 | 4    | 134.2 kHz       | 4.02                 |             |



### 5.4.2 Measured Graph 20 dB Bandwidth

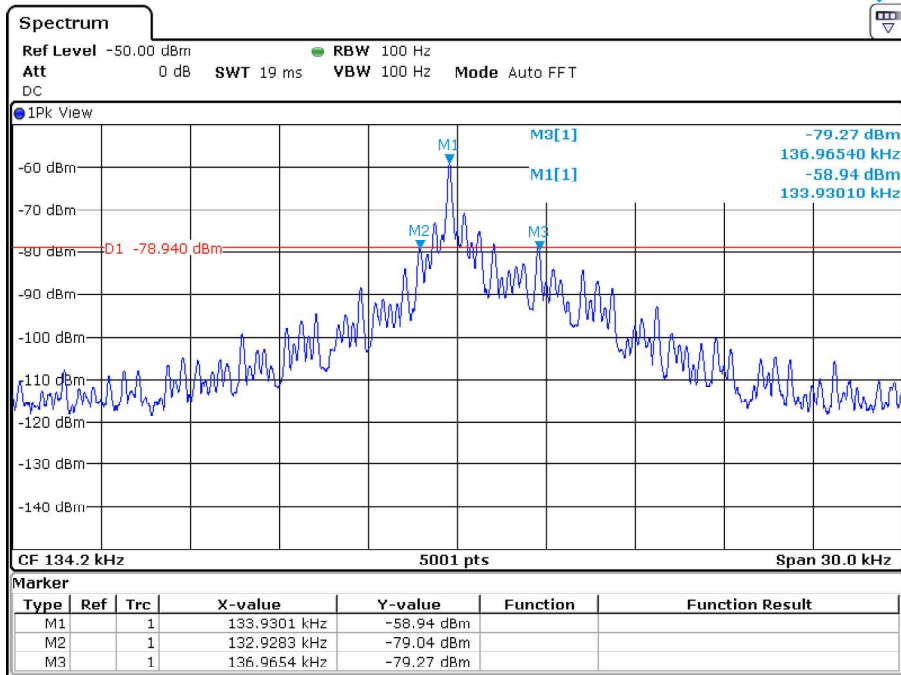


PORT1

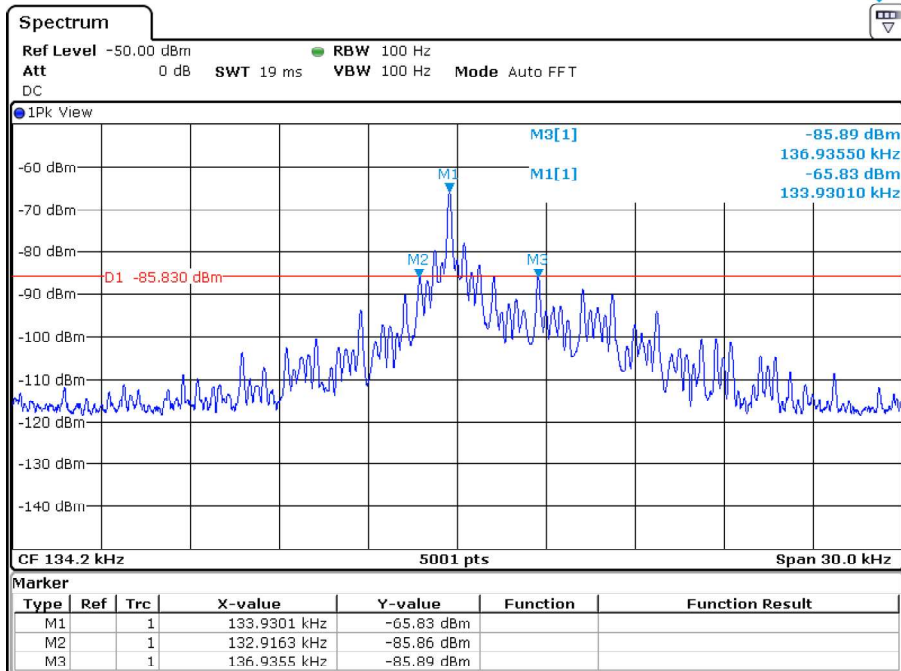


PORT2





PORT3



PORT4



## 6. Field Strength of the Fundamental Signal

### 6.1 Operating environment

Temperature : 23 °C  
 Relative humidity : 44 %

### 6.2 Measurement method

Standard : §15.209

### 6.3 Test setup

The radiated emissions measurements were performed on the 3 m, Semi-Anechoic Chamber. The EUT was placed on a non-conductive turntable above the ground plane.

The frequency spectrum from 9 kHz to 30 MHz was scanned and maximum emission levels 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 horizontal and vertical polarization of the receiving antenna, and the higher of the two was entered.

### 6.4 Test data for Fundamental Signal

Operating mode : Transmit mode  
 Test Result : Pass

#### 6.4.1 Measurement Results

| Port | Frequency (MHz) | Reading (dBμV) | Detector | Ant. Pol. (H/V) | Corr. Factor (dB) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|------|-----------------|----------------|----------|-----------------|-------------------|-----------------|----------------|-------------|
| 1    | 0.133 9         | 61.32          | Average  | H               | 19.30             | 80.62           | 105.07         | 24.45       |
| 2    | 0.133 9         | 70.46          | Average  | H               | 19.30             | 89.76           | 105.07         | 15.31       |
| 3    | 0.133 9         | 72.12          | Average  | H               | 19.30             | 91.42           | 105.07         | 13.65       |
| 4    | 0.133 9         | 46.80          | Average  | H               | 19.30             | 66.10           | 105.07         | 38.97       |

- ※ Ant. Pol. = Antenna Polarization
- ※ Corr. Factor. = Antenna Factor + Cable Loss - Amplifier Gain
- ※ Result = Reading + Corr. Factor
- ※ Margin = Limit – Result
- ※ Detector = Average for 9-90 kHz, 110-490 kHz, Quasi Peak for the others
- ※ Limit =at 0.009-0.490MHz and 3m distance,  $20\log(2400/F(kHz)) + 40\log(300m/3m)$



## **7. Radiated Emissions**

### **7.1 Operating environment**

Temperature : 23 °C  
Relative humidity : 44 %

### **7.2 Measurement method**

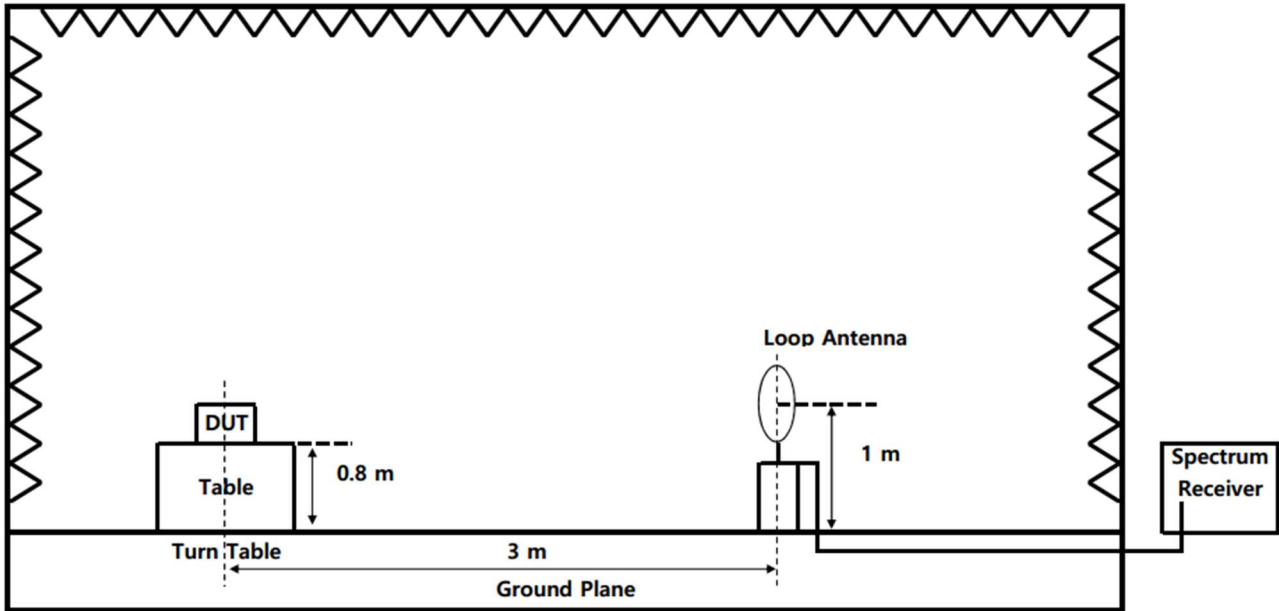
Standard : §15.209

### **7.3 Test setup**

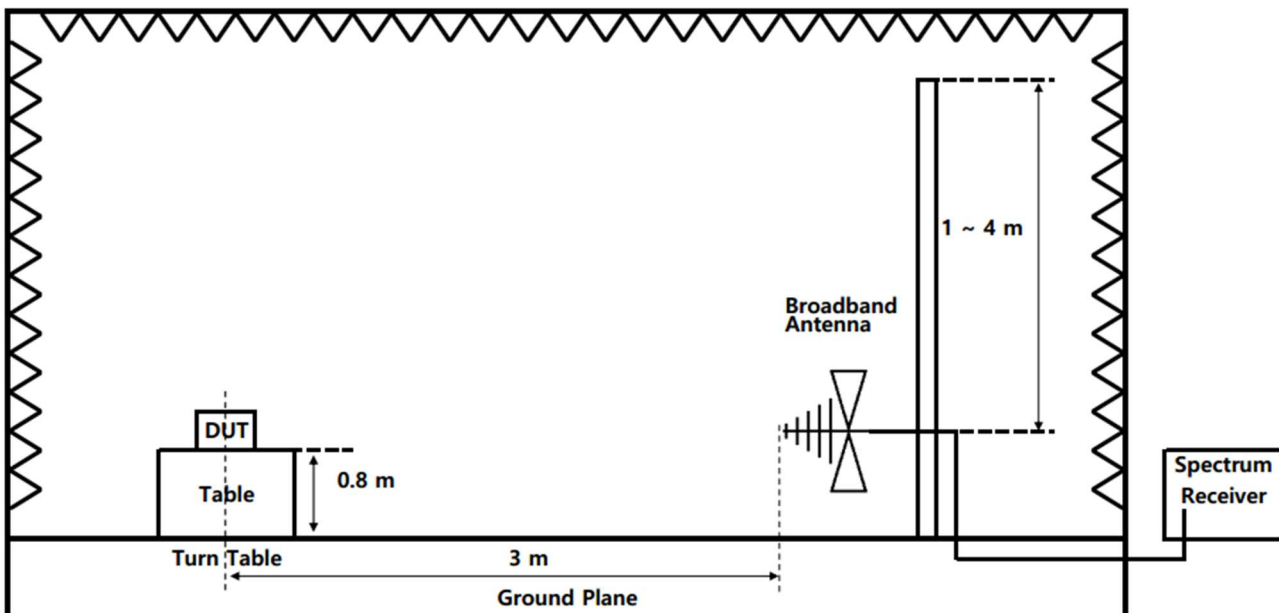
The radiated emissions measurements were performed on the 3 m, Semi-Anechoic Chamber. The EUT was placed on a non-conductive turntable above the ground plane.

The frequency spectrum from 9 kHz to 1 GHz was scanned and maximum emission levels 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 horizontal and vertical polarization of the receiving antenna, and the higher of the two was entered

### 7.3.1 Test setup layout Below 30 MHz



### 7.3.2 Test setup layout 30 MHz to 1 GHz





## 7.4 Regulation

According to §15.209(a), for an intentional device, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values:

| Frequency (MHz) | Field strength ( $\mu V/m$ ) | Field strength ( $dB\mu V/m$ ) | Measurement distance (m) |
|-----------------|------------------------------|--------------------------------|--------------------------|
| 0.009 ~ 0.490   | 2 400 / F (kHz)              | -                              | 300                      |
| 0.490 ~ 1.705   | 24 000 / F (kHz)             | -                              | 30                       |
| 1.705 ~ 30      | 30                           | 29.54                          | 30                       |
| 30 ~ 88         | 100                          | 40.00                          | 3                        |
| 88 ~ 216        | 150                          | 43.52                          | 3                        |
| 216 ~ 960       | 200                          | 46.02                          | 3                        |
| Above 960       | 500                          | 53.98                          | 3                        |

- The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector and 9-90 kHz, 110-490 kHz and above 1000 MHz are based on the average value of measured emissions.
- If field strength is measured at only a single point, then that point shall be at the radial from the EUT that produces the maximum emission at the frequency being measured, as described in 5.4. If that point is closer to the EUT than  $\lambda/2\pi$  and the limit distance is greater than  $\lambda/2\pi$ , the measurement shall be extrapolated to the limit distance by conservatively presuming that the field strength decreases at a 40 dB/decade of distance rate to the  $\lambda/2\pi$  distance, and at a 20 dB/decade of distance rate beyond  $\lambda/2\pi$ . This shall be accomplished using Equation

$$FS(limit) = FS(max) - 40\log\{d(near\ field)/d(measure)\} - 20\log\{d(limit)/d(near\ field)\}$$

$$d(near\ field) = 47.77 / f(MHz)$$

If the single point measured is at a distance greater than  $\lambda/2\pi$ , then extrapolation to the limit distance shall be calculated using Equation

$$FS(limit) = FS(max) - 20\log\{d(limit)/d(measure)\}$$

If both the single point and the limit distance are equal to or closer to the EUT than  $\lambda/2\pi$ , then extrapolation to the limit distance shall be calculated using Equation

$$FS(limit) = FS(max) - 40\log\{d(limit)/d(measure)\}$$

Example, The radiation limit value at 3 m of a 0.150 MHz frequency signal is :

$$20\log(2400/150) + 40\log(300/3) = 104.08\ dBuV/m$$



### 7.5 Test data for Radiated Emissions

Operating mode : Transmit mode

Test Result : Pass

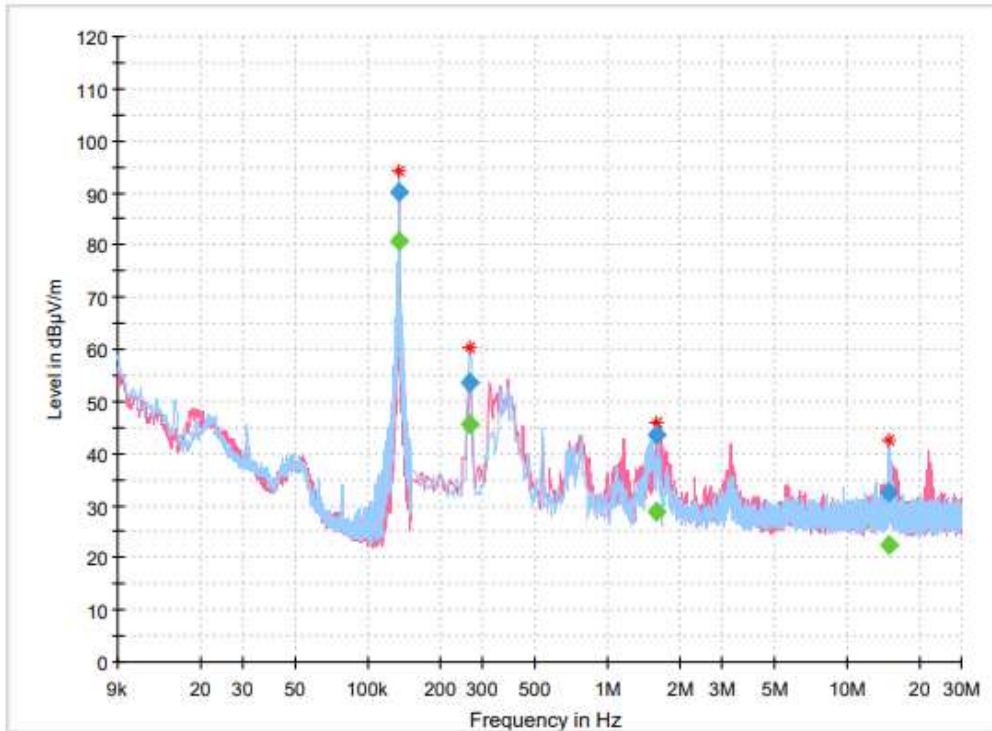
#### 7.5.1 Measurement Results Below 30 MHz – Port 1

| Frequency (MHz) | Reading (dB $\mu$ V) | Detector  | Ant. Pol. (H/V) | Corr. Factor (dB) | Result (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
|-----------------|----------------------|-----------|-----------------|-------------------|-----------------------|----------------------|-------------|
| 0.266           | 26.16                | Average   | H               | 19.30             | 45.46                 | 99.09                | 53.63       |
| 1.613           | 24.33                | QuasiPeak | V               | 19.40             | 43.73                 | 63.45                | 19.72       |
| 15.000          | 12.78                | QuasiPeak | H               | 19.70             | 32.48                 | 69.54                | 37.06       |

- ※ Ant. Pol. : Antenna Polarization
- ※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain
- ※ Result = Reading + Corr. Factor
- ※ Margin = Limit – Result
- ※ Detector = Average for 9-90 kHz, 110-490 kHz, Quasi Peak for the others
- ※ Limit = at 0.009-0.490MHz and 3m distance,  $20\log(2400/F(\text{kHz})) + 40\log(300\text{m}/3\text{m})$   
at 0.490-1.705MHz and 3m distance,  $20\log(24000/F(\text{kHz})) + 40\log(30\text{m}/3\text{m})$   
at 1.705-30.0MHz and 3m distance,  $20\log(30) + 40\log(30\text{m}/3\text{m})$



### 7.5.1.1 Measured Graph (Below 30 MHz)

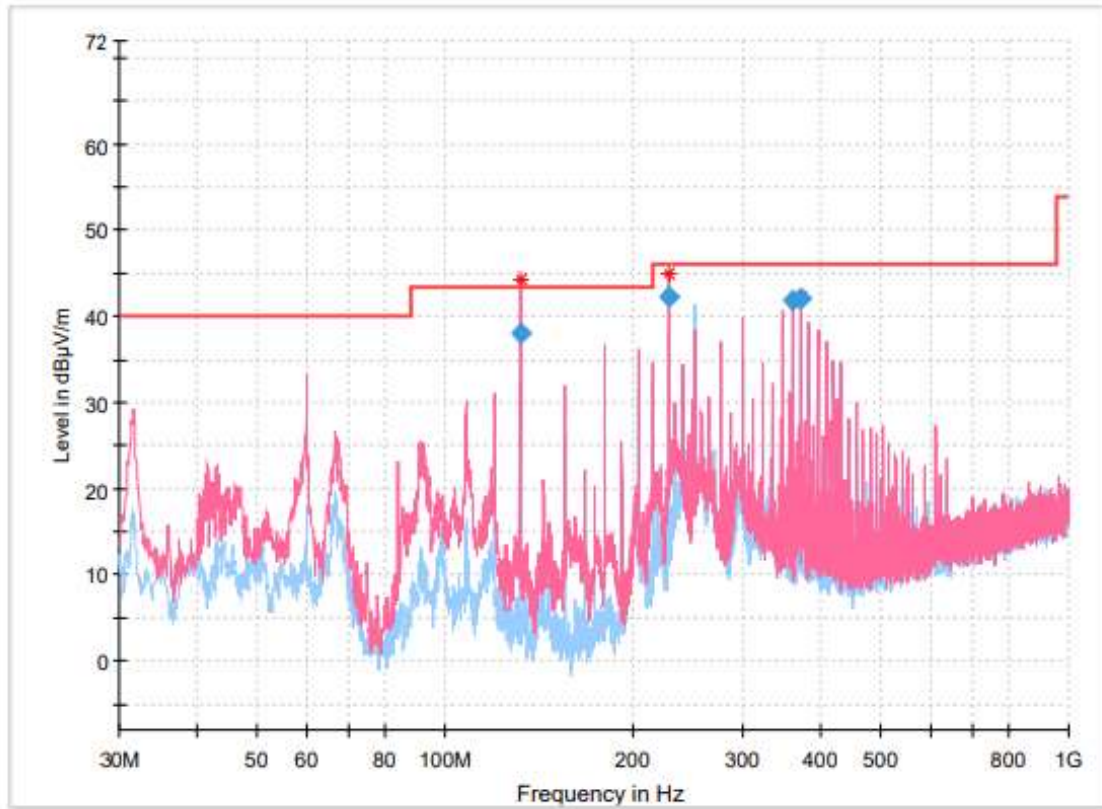


### Final Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|-------------------|----------------|-------------|-----------------|-----------------|-----|---------------|------------|
| 0.133940        | 90.11              | ---               | ---            | ---         | 5000.0          | 0.200           | H   | 95.0          | 19.3       |
| 0.133940        | ---                | 80.62             | ---            | ---         | 5000.0          | 0.200           | H   | 95.0          | 19.3       |
| 0.266415        | 53.63              | ---               | ---            | ---         | 5000.0          | 9.000           | H   | 280.0         | 19.3       |
| 0.266415        | ---                | 45.46             | ---            | ---         | 5000.0          | 9.000           | H   | 280.0         | 19.3       |
| 1.612650        | ---                | 28.86             | ---            | ---         | 5000.0          | 9.000           | V   | 38.0          | 19.4       |
| 1.612650        | 43.73              | ---               | ---            | ---         | 5000.0          | 9.000           | V   | 38.0          | 19.4       |
| 15.000375       | ---                | 22.56             | ---            | ---         | 5000.0          | 9.000           | H   | 338.0         | 19.7       |
| 15.000375       | 32.48              | ---               | ---            | ---         | 5000.0          | 9.000           | H   | 338.0         | 19.7       |



### 7.5.1.2 Measured Graph (Below 1 GHz)



### Final Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 131.947000      | 37.98              | 43.50          | 5.52        | 1000.0          | 120.000         | 99.8        | V   | 150.0         | -27.9      |
| 227.977000      | 42.35              | 46.00          | 3.65        | 1000.0          | 120.000         | 99.8        | V   | 28.0          | -23.8      |
| 359.994000      | 41.78              | 46.00          | 4.22        | 1000.0          | 120.000         | 99.8        | V   | 109.0         | -20.1      |
| 372.022000      | 42.04              | 46.00          | 3.96        | 1000.0          | 120.000         | 99.8        | V   | 109.0         | -19.5      |





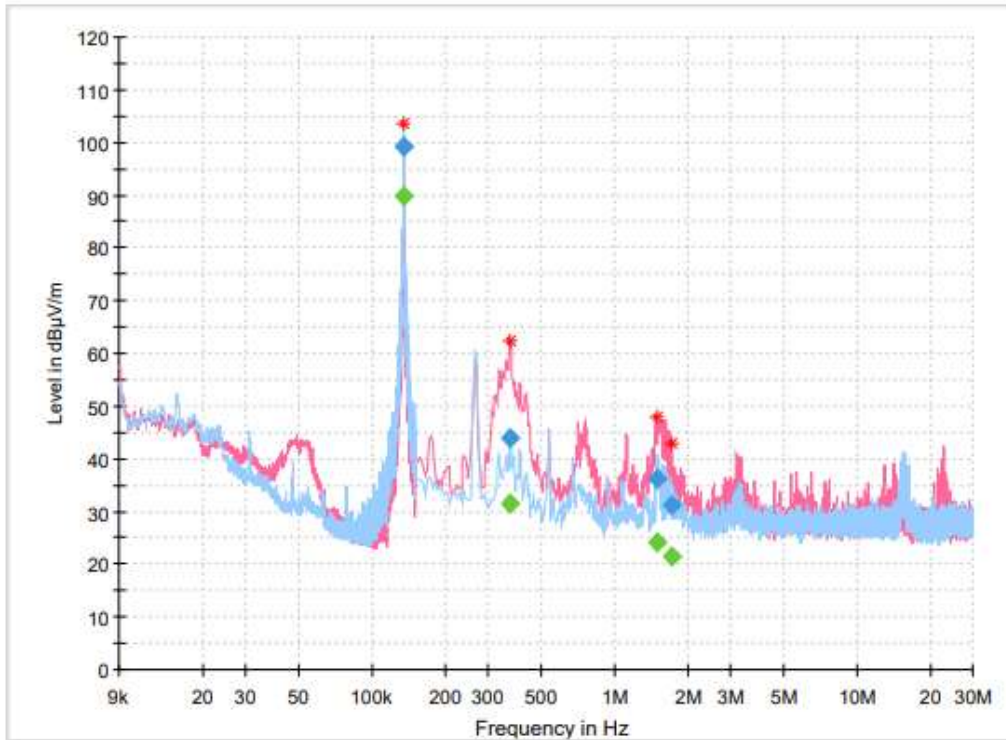
**7.5.2 Measurement Results Below 30 MHz – Port 2**

| Frequency (MHz) | Reading (dBμV) | Detector  | Ant. Pol. (H/V) | Corr. Factor (dB) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|----------------|-----------|-----------------|-------------------|-----------------|----------------|-------------|
| 0.371           | 12.11          | Average   | V               | 19.30             | 31.41           | 96.22          | 64.81       |
| 1.481           | 16.71          | QuasiPeak | V               | 19.40             | 36.11           | 64.19          | 28.08       |
| 1.723           | 11.79          | QuasiPeak | V               | 19.40             | 31.19           | 69.54          | 38.35       |

- ※ Ant. Pol. : Antenna Polarization
- ※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain
- ※ Result = Reading + Corr. Factor
- ※ Margin = Limit – Result
- ※ Detector = Average for 9-90 kHz, 110-490 kHz, Quasi Peak for the others
- ※ Limit = at 0.009-0.490MHz and 3m distance,  $20\log(2400/F(\text{kHz})) + 40\log(300\text{m}/3\text{m})$   
 at 0.490-1.705MHz and 3m distance,  $20\log(24000/F(\text{kHz})) + 40\log(30\text{m}/3\text{m})$   
 at 1.705-30.0MHz and 3m distance,  $20\log(30) + 40\log(30\text{m}/3\text{m})$



### 7.5.2.1 Measured Graph (Below 30 MHz)

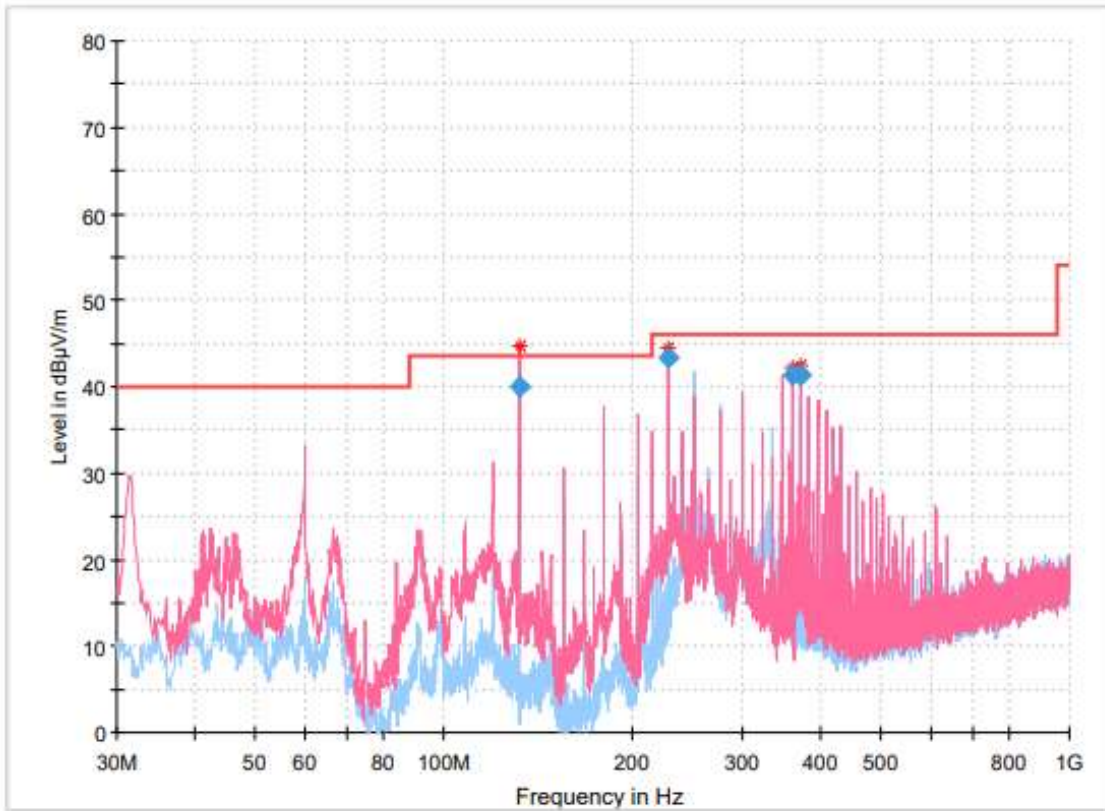


### Final Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Poi | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|-------------------|----------------|-------------|-----------------|-----------------|-----|---------------|------------|
| 0.133940        | ---                | 89.76             | ---            | ---         | 5000.0          | 0.200           | H   | 85.0          | 19.3       |
| 0.133940        | 99.34              | ---               | ---            | ---         | 5000.0          | 0.200           | H   | 85.0          | 19.3       |
| 0.370890        | 43.88              | ---               | ---            | ---         | 5000.0          | 9.000           | V   | 317.0         | 19.3       |
| 0.370890        | ---                | 31.41             | ---            | ---         | 5000.0          | 9.000           | V   | 317.0         | 19.3       |
| 1.481310        | ---                | 24.01             | ---            | ---         | 5000.0          | 9.000           | V   | 231.0         | 19.4       |
| 1.481310        | 36.11              | ---               | ---            | ---         | 5000.0          | 9.000           | V   | 231.0         | 19.4       |
| 1.723095        | 31.19              | ---               | ---            | ---         | 5000.0          | 9.000           | V   | 128.0         | 19.4       |
| 1.723095        | ---                | 21.51             | ---            | ---         | 5000.0          | 9.000           | V   | 128.0         | 19.4       |



### 7.5.2.2 Measured Graph (Below 1 GHz)



### Final Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 131.947000      | 39.93              | 43.50          | 3.57        | 1000.0          | 120.000         | 99.8        | V   | 117.0         | -27.9      |
| 227.977000      | 43.46              | 46.00          | 2.54        | 1000.0          | 120.000         | 99.8        | V   | 353.0         | -23.8      |
| 359.994000      | 41.41              | 46.00          | 4.59        | 1000.0          | 120.000         | 99.8        | V   | 86.0          | -20.1      |
| 372.022000      | 41.37              | 46.00          | 4.63        | 1000.0          | 120.000         | 99.8        | V   | 86.0          | -19.5      |



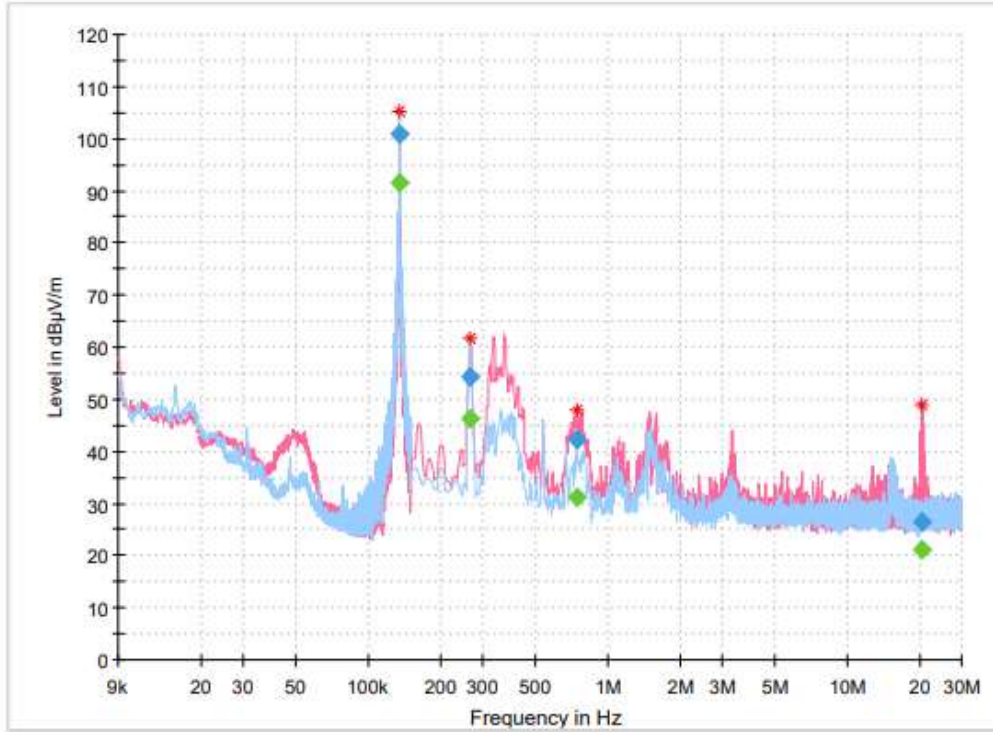
**7.5.3 Measurement Results Below 30 MHz – Port 3**

| Frequency (MHz) | Reading (dBμV) | Detector  | Ant. Pol. (H/V) | Corr. Factor (dB) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|----------------|-----------|-----------------|-------------------|-----------------|----------------|-------------|
| 0.266           | 26.97          | Average   | H               | 19.30             | 46.27           | 99.09          | 52.82       |
| 0.741           | 23.05          | QuasiPeak | V               | 19.30             | 42.35           | 70.21          | 27.86       |
| 20.358          | 6.67           | QuasiPeak | V               | 19.90             | 26.57           | 69.54          | 42.97       |

- ※ Ant. Pol. : Antenna Polarization
- ※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain
- ※ Result = Reading + Corr. Factor
- ※ Margin = Limit – Result
- ※ Detector = Average for 9-90 kHz, 110-490 kHz, Quasi Peak for the others
- ※ Limit = at 0.009-0.490MHz and 3m distance,  $20\log(2400/F(\text{kHz})) + 40\log(300\text{m}/3\text{m})$   
 at 0.490-1.705MHz and 3m distance,  $20\log(24000/F(\text{kHz})) + 40\log(30\text{m}/3\text{m})$   
 at 1.705-30.0MHz and 3m distance,  $20\log(30) + 40\log(30\text{m}/3\text{m})$



### 7.5.3.1 Measured Graph (Below 30 MHz)

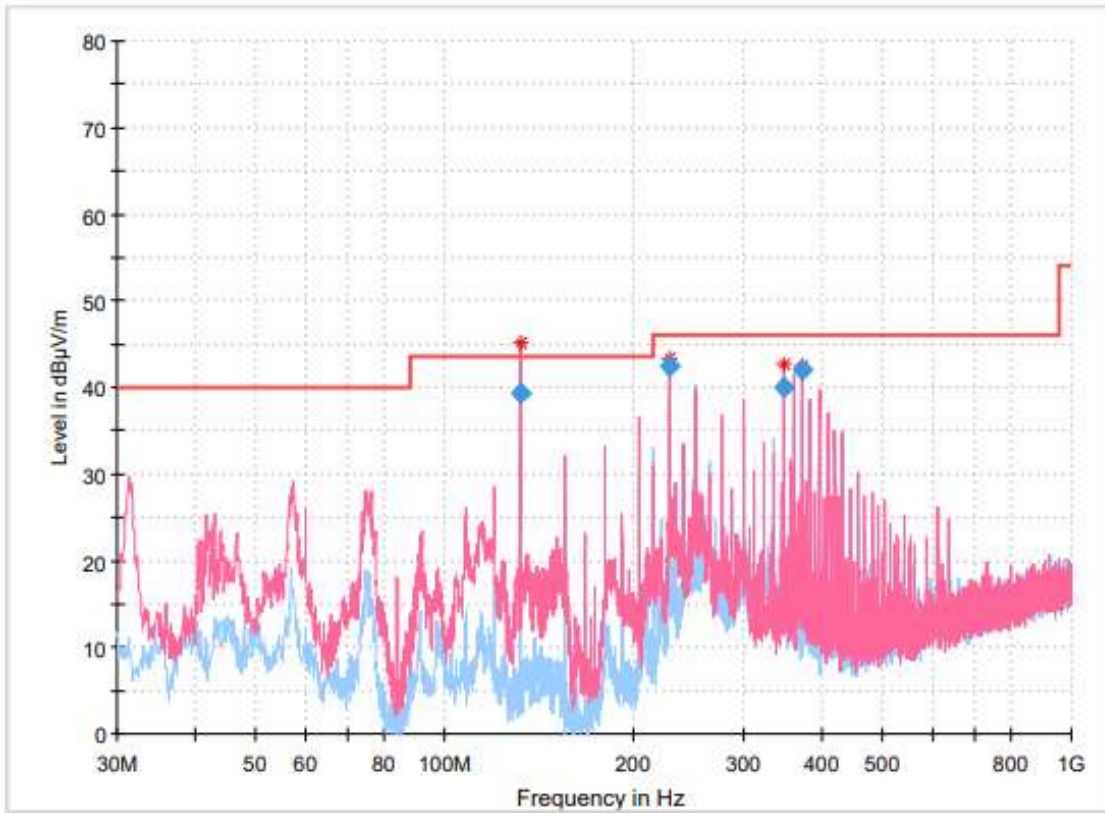


### Final Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Poi | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|-------------------|----------------|-------------|-----------------|-----------------|-----|---------------|------------|
| 0.133940        | 101.00             | ---               | ---            | ---         | 5000.0          | 0.200           | H   | 280.0         | 19.3       |
| 0.133940        | ---                | 91.42             | ---            | ---         | 5000.0          | 0.200           | H   | 280.0         | 19.3       |
| 0.266415        | ---                | 46.27             | ---            | ---         | 5000.0          | 9.000           | H   | 226.0         | 19.3       |
| 0.266415        | 54.42              | ---               | ---            | ---         | 5000.0          | 9.000           | H   | 226.0         | 19.3       |
| 0.741030        | 42.35              | ---               | ---            | ---         | 5000.0          | 9.000           | V   | 44.0          | 19.3       |
| 0.741030        | ---                | 31.07             | ---            | ---         | 5000.0          | 9.000           | V   | 44.0          | 19.3       |
| 20.358450       | ---                | 20.99             | ---            | ---         | 5000.0          | 9.000           | V   | 318.0         | 19.9       |
| 20.358450       | 26.57              | ---               | ---            | ---         | 5000.0          | 9.000           | V   | 318.0         | 19.9       |



### 7.5.3.2 Measured Graph (Below 1 GHz)



### Final Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 131.947000      | 39.39              | 43.50          | 4.11        | 1000.0          | 120.000         | 99.8        | V   | 148.0         | -27.9      |
| 227.977000      | 42.37              | 46.00          | 3.63        | 1000.0          | 120.000         | 99.8        | V   | 0.0           | -23.8      |
| 347.966000      | 40.07              | 46.00          | 5.93        | 1000.0          | 120.000         | 99.8        | V   | 41.0          | -19.8      |
| 372.022000      | 41.98              | 46.00          | 4.02        | 1000.0          | 120.000         | 99.8        | V   | 120.0         | -19.5      |



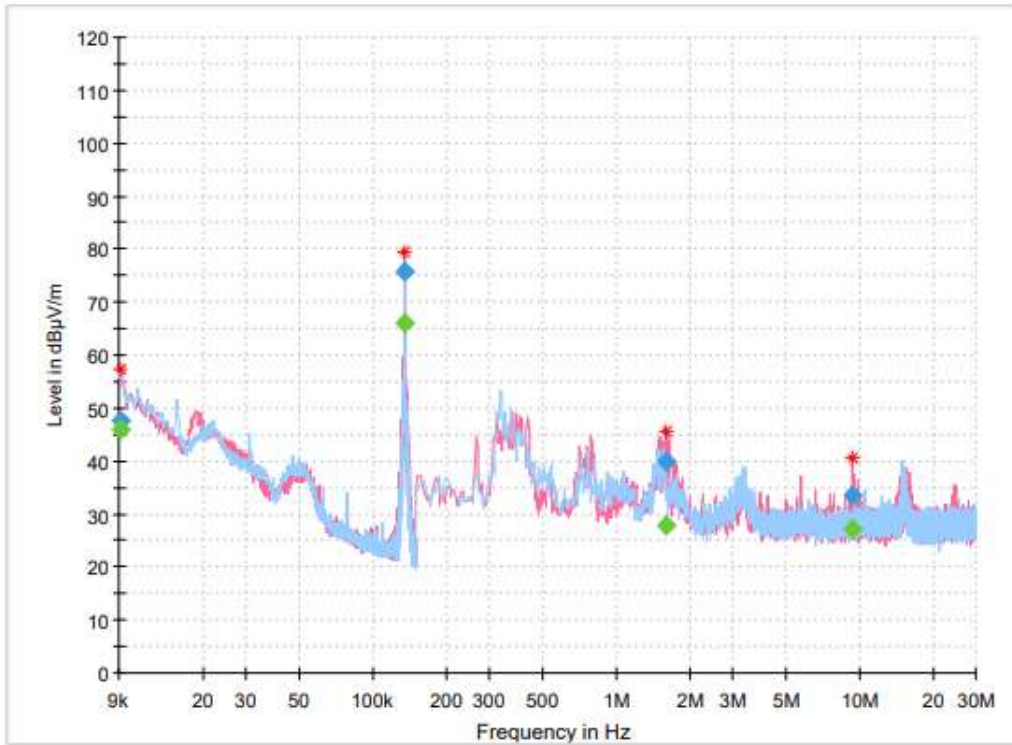
**7.5.4 Measurement Results Below 30 MHz – Port 4**

| Frequency (MHz) | Reading (dBμV) | Detector  | Ant. Pol. (H/V) | Corr. Factor (dB) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|----------------|-----------|-----------------|-------------------|-----------------|----------------|-------------|
| 0.009           | 25.82          | Average   | H               | 20.20             | 46.02           | 128.33         | 82.31       |
| 1.607           | 20.41          | QuasiPeak | V               | 19.40             | 39.81           | 63.49          | 23.68       |
| 9.374           | 14.01          | QuasiPeak | V               | 19.60             | 33.61           | 69.54          | 35.93       |

- ※ Ant. Pol. : Antenna Polarization
- ※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain
- ※ Result = Reading + Corr. Factor
- ※ Margin = Limit – Result
- ※ Detector = Average for 9-90 kHz, 110-490 kHz, Quasi Peak for the others
- ※ Limit = at 0.009-0.490MHz and 3m distance,  $20\log(2400/F(\text{kHz})) + 40\log(300\text{m}/3\text{m})$   
 at 0.490-1.705MHz and 3m distance,  $20\log(24000/F(\text{kHz})) + 40\log(30\text{m}/3\text{m})$   
 at 1.705-30.0MHz and 3m distance,  $20\log(30) + 40\log(30\text{m}/3\text{m})$



### 7.5.4.1 Measured Graph (Below 30 MHz)



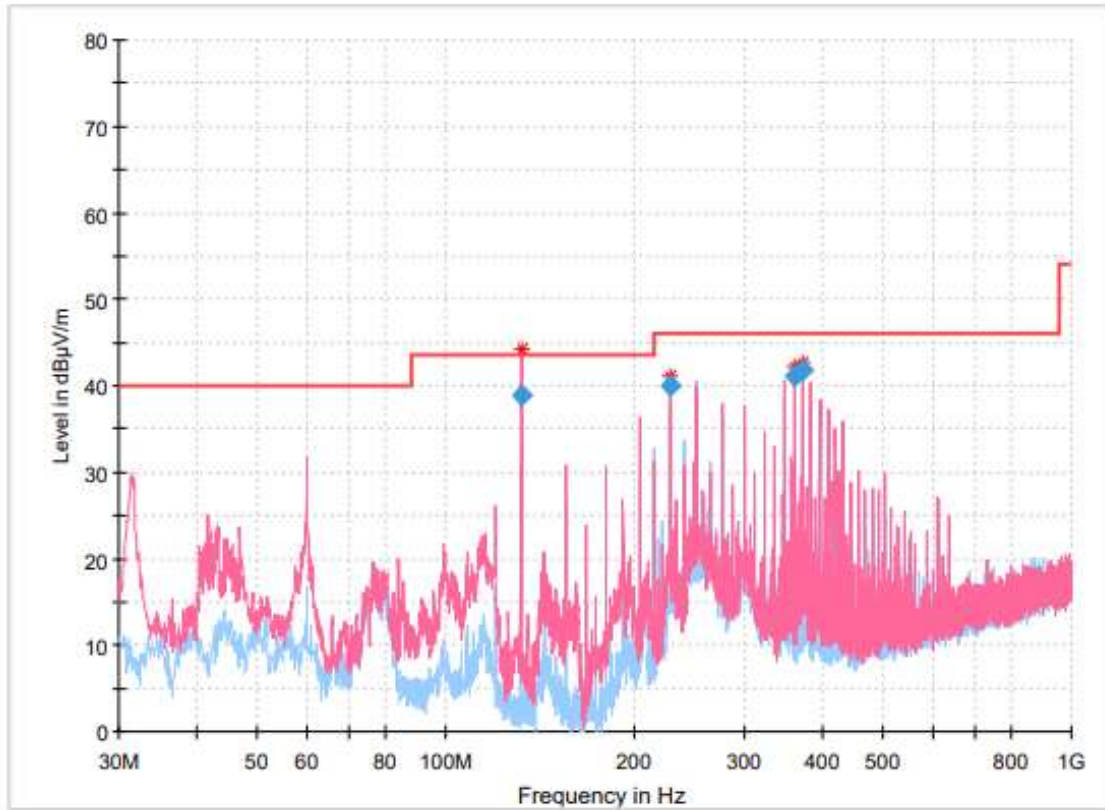
### Final Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|-------------------|----------------|-------------|-----------------|-----------------|-----|---------------|------------|
| 0.009197        | ---                | 46.02             | ---            | ---         | 5000.0          | 0.200           | H   | 249.0         | 20.2       |
| 0.009197        | 47.63              | ---               | ---            | ---         | 5000.0          | 0.200           | H   | 249.0         | 20.2       |
| 0.133940        | 75.65              | ---               | ---            | ---         | 5000.0          | 0.200           | V   | 0.0           | 19.3       |
| 0.133940        | ---                | 66.10             | ---            | ---         | 5000.0          | 0.200           | V   | 0.0           | 19.3       |
| 1.606680        | ---                | 27.90             | ---            | ---         | 5000.0          | 9.000           | V   | 295.0         | 19.4       |
| 1.606680        | 39.81              | ---               | ---            | ---         | 5000.0          | 9.000           | V   | 295.0         | 19.4       |
| 9.373650        | 33.61              | ---               | ---            | ---         | 5000.0          | 9.000           | V   | 192.0         | 19.6       |
| 9.373650        | ---                | 27.06             | ---            | ---         | 5000.0          | 9.000           | V   | 192.0         | 19.6       |





### 7.5.4.2 Measured Graph (Below 1 GHz)



### Final Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 131.947000      | 38.93              | 43.50          | 4.57        | 1000.0          | 120.000         | 99.8        | V   | 233.0         | -27.9      |
| 227.977000      | 40.10              | 46.00          | 5.90        | 1000.0          | 120.000         | 99.8        | V   | 0.0           | -23.8      |
| 359.994000      | 41.19              | 46.00          | 4.81        | 1000.0          | 120.000         | 99.8        | V   | 126.0         | -20.1      |
| 372.022000      | 41.70              | 46.00          | 4.30        | 1000.0          | 120.000         | 99.8        | V   | 126.0         | -19.5      |

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