



# TEST REPORT

|                                                                                                                                                                                           |                                                 |                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------|
| <b>KCTL Inc.</b><br>65, Sinwon-ro, Yeongtong-gu,<br>Suwon-si, Gyeonggi-do, 16677, Korea<br>TEL: 82-31-285-0894 FAX: 82-505-299-8311<br><a href="http://www.kctl.co.kr">www.kctl.co.kr</a> | Report No.:<br>KR22-SRF0011<br>Page (1) of (18) | <div style="float: right; text-align: right;"> <b>KCTL</b> </div> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------|

- 1. Client**
  - Name : ISTCONTROL Co., Ltd
  - Address : 1203, 37, Maebongsan-ro Mapo-gu, Seoul, Republic of Korea
  - Date of Receipt : 2021-08-13
- 2. Use of Report** : Certification
- 3. Name of Product / Model** : Smart RFID Card Reader / IRD2M
- 4. Manufacturer / Country of Origin** : ISTCONTROL Co., Ltd / Korea
- 5. FCC ID** : 2AZS5IRD2M
- 6. Date of Test** : 2021-10-05 to 2021-10-19
- 7. Location of Test** : ☒ Permanent Testing Lab ☐ On Site Testing  
 (Address: 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)
- 8. Test method used** : FCC Part 15 Subpart C, 15.225
- 9. Test Result** : Refer to the test result in the test report

|             |                                                                                           |                                                                                                |
|-------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Affirmation | Tested by<br><br><div style="text-align: center;"> </div> Name : Eunseong Lim (Signature) | Technical Manager<br><br><div style="text-align: center;"> </div> Name : Heesu Ahn (Signature) |
|-------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|

2022-02-09

## KCTL Inc.

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|                                                                                                                                                                                           |                                                 |                                                                                     |
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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|

## REPORT REVISION HISTORY

| Date       | Revision          | Page No |
|------------|-------------------|---------|
| 2022-02-09 | Originally issued | -       |
|            |                   |         |
|            |                   |         |
|            |                   |         |
|            |                   |         |

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## General remarks for test reports

### Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

#### Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ Statement not required by the standard or client used for type testing

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## 1. General information

Client : ISTCONTROL Co., Ltd  
 Address : 1203, 37, Maebongsan-ro Mapo-gu, Seoul, Republic of Korea  
 Manufacturer : ISTCONTROL Co., Ltd  
 Address : 1203, 37, Maebongsan-ro Mapo-gu, Seoul, Republic of Korea  
 Laboratory : KCTL Inc.  
 Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea  
 Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132  
                           VCCI Registration No. : R-20080, G-20078, C-20059, T-20056  
                           CAB Identifier: KR0040, ISED Number: 8035A  
                           KOLAS No.: KT231

## 2. Device information

Equipment under test : Smart RFID Card Reader  
 Model : IRD2M  
 Modulation technique : GFSK(Bluetooth Low Energy)  
                               ASK (RFID)  
 Number of channels : 40 ch (Bluetooth Low Energy), 1 ch (RFID)  
 Frequency range : 2 402 MHz ~ 2 480 MHz (Bluetooth Low Energy)  
                           13.56 MHz (RFID)  
 Power source : DC 12 V  
 Antenna specification : Multilayer Chip Antenna (Bluetooth Low Energy)  
                               PCB Loop antenna (RFID)  
 Antenna gain : 3.50 dBi (Bluetooth Low Energy)  
 Software version : V2.00  
 Hardware version : V1.01  
 Test device serial No. : N/A  
 Operation temperature : -20 °C ~ 50 °C

|                                                                                                                                                                                           |                                                 |                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|
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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|

## 2.1. Accessory information

| Equipment | Manufacturer | Model | Serial No. | Power source | Note. |
|-----------|--------------|-------|------------|--------------|-------|
| N/A       | -            | -     | -          | -            | -     |

## 2.2. Frequency/channel operations

This device contains the following capabilities:

Bluetooth Low Energy, RFID(13.56 MHz)

| Ch. | Frequency (MHz) |
|-----|-----------------|
| 01  | 13.56           |

Table 2.2.1. RFID

## 3. Antenna requirement

Requirement of FCC part section 15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 transmitter has permanently attached PCB Loop antenna (Internal antenna) on board.

#### 4. Summary of tests

| FCC Part section(s) | Parameter                     | Test Condition | Test results      |
|---------------------|-------------------------------|----------------|-------------------|
| 15.225(a)           | In-band Fundamental Emission  | Radiated       | Pass              |
| 15.225(b)(c)        | In-band Spurious Emission     |                | Pass              |
| 15.225(d)<br>15.209 | Out-of-band Spurious Emission |                | Pass              |
| 15.225(e)           | Frequency Stability Tolerance | Conducted      | Pass              |
| 15.215(c)           | 20 dB Bandwidth               |                | Pass              |
| 15.207(a)           | Conducted emissions           |                | N/A <sup>1)</sup> |

#### Notes:

1. This test is not applicable because the EUT only connects DC power line.
2. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
3. These tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
4. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that **Y** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **Y** orientation
5. The radiated test was performed with and without passive tag. The test results shown in the following sections represent the worst case emissions.
  - ♦ Worst Case : Without passive tag
6. The test procedure(s) in this report were performed in accordance as following.
  - ♦ ANSI C63.10-2013

## 5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of  $k=2$  to indicated a 95 % level of confidence. The measurement data shown herein meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

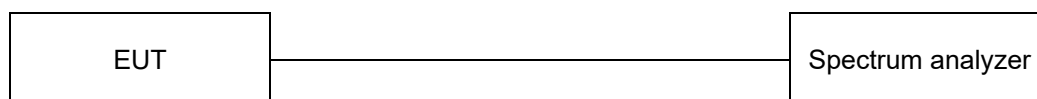
| Parameter                   | Expanded uncertainty ( $\pm$ ) |        |
|-----------------------------|--------------------------------|--------|
| Radiated spurious emissions | 9 kHz ~ 30 MHz                 | 2.3 dB |
|                             | 30 MHz ~ 1 000 MHz             | 2.2 dB |
| Conducted emissions         | 9 kHz ~ 150 kHz                | 3.7 dB |
|                             | 150 kHz ~ 30 MHz               | 3.3 dB |



## 6. Test results

### 6.1. 20 dB Bandwidth

#### Test setup



#### Limit

According to §15.215(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

#### Test procedure

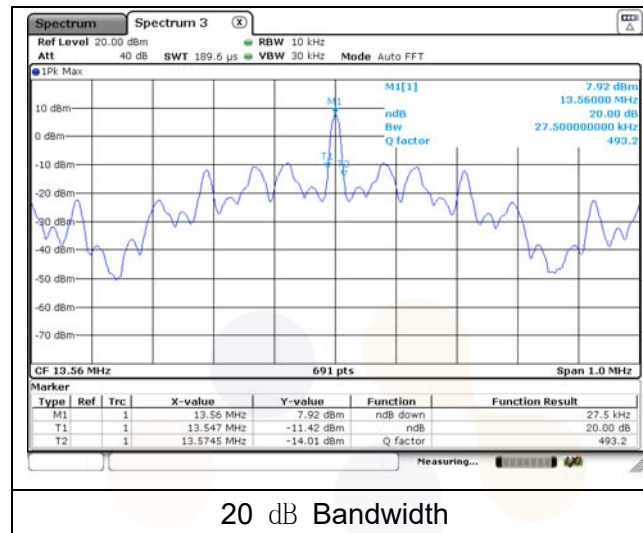
ANSI C63.10 - Section 6.9.2

#### Test settings

The spectrum analyzer connected receive antenna and the EUT placed on near the receive antenna. The RBW is set to 10 kHz. The VBW is set to 3 times the RBW. The sweep time is coupled.

## Test results

| Frequency [MHz] | 20 dB Bandwidth [MHz] |          | Limit [MHz] | 20 dB Bandwidth [kHz] |
|-----------------|-----------------------|----------|-------------|-----------------------|
| 13.56           | Lowest Frequency      | 13.547 0 | 13.110 000  | 27.5                  |
|                 | Highest Frequency     | 13.574 5 | 14.010 000  |                       |

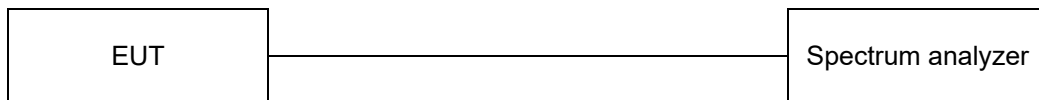


### Note:

Because the measured signal is CW/CW-like, adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW

## 6.2. Frequency tolerance

### Test setup



### Limit

15.225 (e) The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01$  % of the operating frequency over a temperature variation of  $-20$  degrees to  $+50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115 % of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

### Test procedure

ANSI C63.10-2013 - Section 6.8.1



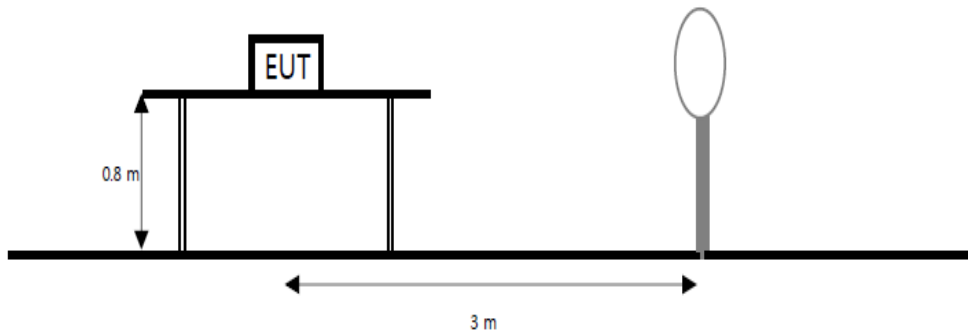
## Test results

| Voltage | Voltage | TEMP     | Maintaining | Measure    | Frequency | Deviation |
|---------|---------|----------|-------------|------------|-----------|-----------|
| [%]     | [V]     | [°C]     | time        | frequency  | deviation | [%]       |
| 100     | 12.00   | 20(Ref.) | Startup     | 13 560 263 | -263.0    | 0.001 94  |
|         |         |          | 2 minutes   | 13 560 230 | -230.0    | 0.001 70  |
|         |         |          | 5 minutes   | 13 560 242 | -242.0    | 0.001 79  |
|         |         |          | 10 minutes  | 13 560 274 | -274.0    | 0.002 02  |
|         |         | -20      | Startup     | 13 560 305 | -305.0    | 0.002 25  |
|         |         |          | 2 minutes   | 13 560 567 | -567.0    | 0.004 18  |
|         |         |          | 5 minutes   | 13 560 688 | -688.0    | 0.005 07  |
|         |         |          | 10 minutes  | 13 560 801 | -801.0    | 0.005 91  |
|         |         | -10      | Startup     | 13 560 231 | -231.0    | 0.001 70  |
|         |         |          | 2 minutes   | 13 560 316 | -316.0    | 0.002 33  |
|         |         |          | 5 minutes   | 13 560 390 | -390.0    | 0.002 88  |
|         |         |          | 10 minutes  | 13 560 385 | -385.0    | 0.002 84  |
|         |         | 0        | Startup     | 13 560 125 | -125.0    | 0.000 92  |
|         |         |          | 2 minutes   | 13 560 216 | -216.0    | 0.001 59  |
|         |         |          | 5 minutes   | 13 560 224 | -224.0    | 0.001 65  |
|         |         |          | 10 minutes  | 13 560 239 | -239.0    | 0.001 76  |
|         |         | 10       | Startup     | 13 560 214 | -214.0    | 0.001 58  |
|         |         |          | 2 minutes   | 13 560 253 | -253.0    | 0.001 87  |
|         |         |          | 5 minutes   | 13 560 228 | -228.0    | 0.001 68  |
|         |         |          | 10 minutes  | 13 560 227 | -227.0    | 0.001 67  |
|         |         | 25       | Startup     | 13 560 189 | -189.0    | 0.001 39  |
|         |         |          | 2 minutes   | 13 560 232 | -232.0    | 0.001 71  |
|         |         |          | 5 minutes   | 13 560 148 | -148.0    | 0.001 09  |
|         |         |          | 10 minutes  | 13 560 224 | -224.0    | 0.001 65  |
|         |         | 30       | Startup     | 13 560 196 | -196.0    | 0.001 45  |
|         |         |          | 2 minutes   | 13 559 892 | 108.0     | -0.000 80 |
|         |         |          | 5 minutes   | 13 559 936 | 64.0      | -0.000 47 |
|         |         |          | 10 minutes  | 13 559 898 | 102.0     | -0.000 75 |
|         |         | 40       | Startup     | 13 559 886 | 114.0     | -0.000 84 |
|         |         |          | 2 minutes   | 13 559 823 | 177.0     | -0.001 31 |
|         |         |          | 5 minutes   | 13 559 784 | 216.0     | -0.001 59 |
|         |         |          | 10 minutes  | 13 559 796 | 204.0     | -0.001 50 |
|         |         | 50       | Startup     | 13 559 112 | 888.0     | -0.006 55 |
|         |         |          | 2 minutes   | 13 559 087 | 913.0     | -0.006 73 |
|         |         |          | 5 minutes   | 13 559 335 | 665.0     | -0.004 90 |
|         |         |          | 10 minutes  | 13 560 138 | -138.0    | 0.001 02  |
| 85      | 10.20   | 20       | Startup     | 13 560 222 | -222.0    | 0.001 64  |
|         |         |          | 2 minutes   | 13 560 247 | -247.0    | 0.001 82  |
|         |         |          | 5 minutes   | 13 560 235 | -235.0    | 0.001 73  |
|         |         |          | 10 minutes  | 13 560 255 | -255.0    | 0.001 88  |
| 115     | 13.80   | 20       | Startup     | 13 560 236 | -236.0    | 0.001 74  |
|         |         |          | 2 minutes   | 13 560 239 | -239.0    | 0.001 76  |
|         |         |          | 5 minutes   | 13 560 259 | -259.0    | 0.001 91  |
|         |         |          | 10 minutes  | 13 560 263 | -263.0    | 0.001 94  |

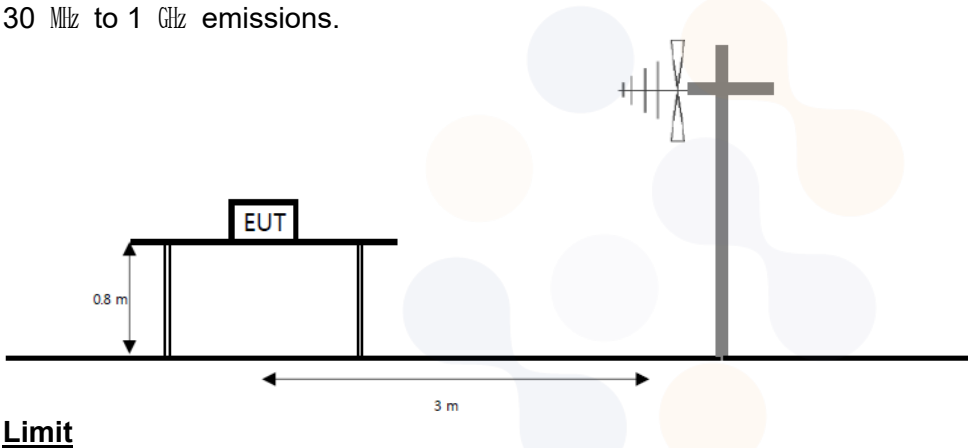
### 6.3. Radiated spurious emissions

#### Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



#### Limit

15.225 (a) The field strength of any emission within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

15.225 (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

15.225 (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz, the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

15.225 (d) The Field Strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in 15.209.

| Frequency<br>(MHz) | Field Strength<br>( $\mu V/m$ ) | Measurement distance<br>(meters) |
|--------------------|---------------------------------|----------------------------------|
| 0.009-0.490        | 2400/F(kHz)                     | 300                              |
| 0.490-1.705        | 24000/F(kHz)                    | 30                               |
| 1.705-30.0         | 30(29.54 dB $\mu V/m$ )         | 30                               |
| 30.0-88.0          | 100(40 dB $\mu V/m$ )           | 3                                |
| 88-216             | 150(43.5 dB $\mu V/m$ )         | 3                                |
| 216-960            | 200 (46 dB $\mu V/m$ )          | 3                                |
| Above 960          | 500 (53.98 dB $\mu V/m$ )       | 3                                |

### Test procedure

ANSI C63.10-2013 - Section 6.4, 6.5

### Test settings

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW  $\geq 3 \times$  RBW
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

**Table. RBW as a function of frequency**

| Frequency           | RBW                |
|---------------------|--------------------|
| 9 kHz to 150 kHz    | 200 Hz to 300 Hz   |
| 0.15 MHz to 30 MHz  | 9 kHz to 10 kHz    |
| 30 MHz to 1 000 MHz | 100 kHz to 120 kHz |
| > 1 000 MHz         | 1 MHz              |

### Notes:

1.  $f < 30$  MHz, extrapolation factor of 40 dB/decade of distance.  $F_d = 40 \log(D_m/D_s)$   
 $f \geq 30$  MHz, extrapolation factor of 20 dB/decade of distance.  $F_d = 20 \log(D_m/D_s)$   
 Where:  
 $F_d$  = Distance factor in dB  
 $D_m$  = Measurement distance in meters  
 $D_s$  = Specification distance in meters
2. Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in § 15.31(f)(2). Extrapolation Factor =  $40 \log_{10}(30/3) = 40$  dB.
3. Factors(dB) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or  $F_d$ (dB)
4. Result = Reading + Cable loss + Amp gain + Ant. factor - Distance factor
5. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
6. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector.
7. Below 30 MHz frequency range, all orientations about parallel, perpendicular, and ground-parallel were investigated then reported and the worse orientations of Face-on and Face-off were set for final test.
8. Face-on = Parallel, Face-off = Perpendicular
9. <sup>1)</sup> means restricted band

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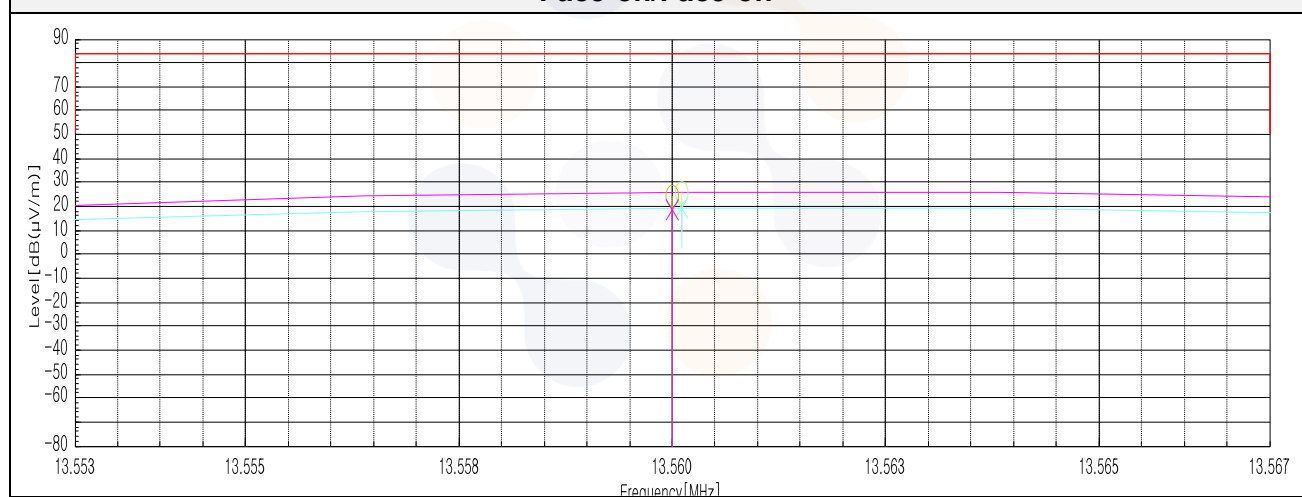
**Test results for fundamental****15.225 (a) 13.553-13.567 MHz**

[Face-on]

| Frequency       | Reading  | Antenna Factor | Amp. + Cable | Distance Factor | Result     | Limit      | Margin |
|-----------------|----------|----------------|--------------|-----------------|------------|------------|--------|
| (MHz)           | (dB(μV)) | (dB)           | (dB)         | (dB)            | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| Quasi peak data |          |                |              |                 |            |            |        |
| 13.56           | 75.10    | 20.2           | -31.04       | 40.00           | 24.26      | 84.00      | 59.74  |

[Face-off]

| Frequency       | Reading  | Antenna Factor | Amp. + Cable | Distance Factor | Result     | Limit      | Margin |
|-----------------|----------|----------------|--------------|-----------------|------------|------------|--------|
| (MHz)           | (dB(μV)) | (dB)           | (dB)         | (dB)            | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| Quasi peak data |          |                |              |                 |            |            |        |
| 13.56           | 68.90    | 20.2           | -31.04       | 40.00           | 18.06      | 84.00      | 65.94  |

**Face-on/Face-off**

**KCTL Inc.**

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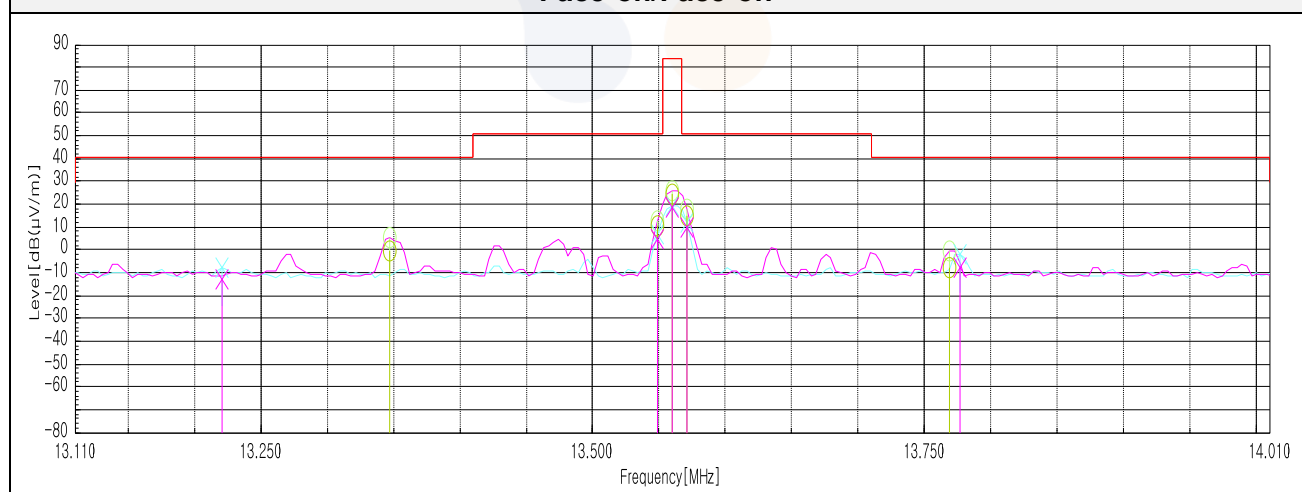
**Test results for in-band & out-band (9 kHz to 30 MHz)****15.225 (b,c) 13.110-14.010 MHz**

[Face-on]

| Frequency              | Reading  | Antenna Factor | Amp. + Cable | Distance Factor | Result     | Limit      | Margin |
|------------------------|----------|----------------|--------------|-----------------|------------|------------|--------|
| (MHz)                  | (dB(μV)) | (dB)           | (dB)         | (dB)            | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Quasi peak data</b> |          |                |              |                 |            |            |        |
| 13.35                  | 50.20    | 20.20          | -31.05       | 40.00           | -0.65      | 40.50      | 41.15  |
| 13.55                  | 61.50    | 20.20          | -31.04       | 40.00           | 10.66      | 50.50      | 39.84  |
| 13.57                  | 65.80    | 20.20          | -31.04       | 40.00           | 14.96      | 50.50      | 35.54  |
| 13.77                  | 43.20    | 20.20          | -31.02       | 40.00           | -7.62      | 40.50      | 48.12  |

[Face-off]

| Frequency              | Reading  | Antenna Factor | Amp. + Cable | Distance Factor | Result     | Limit      | Margin |
|------------------------|----------|----------------|--------------|-----------------|------------|------------|--------|
| (MHz)                  | (dB(μV)) | (dB)           | (dB)         | (dB)            | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Quasi peak data</b> |          |                |              |                 |            |            |        |
| 13.22                  | 37.50    | 20.20          | -31.06       | 40.00           | -13.36     | 40.50      | 53.86  |
| 13.55                  | 55.20    | 20.20          | -31.04       | 40.00           | 4.36       | 50.50      | 46.14  |
| 13.57                  | 60.10    | 20.20          | -31.04       | 40.00           | 9.26       | 50.50      | 41.24  |
| 13.78                  | 42.80    | 20.20          | -31.02       | 40.00           | -8.02      | 40.50      | 48.52  |

**Face-on/Face-off**

### Test results (9 kHz to 30 MHz)

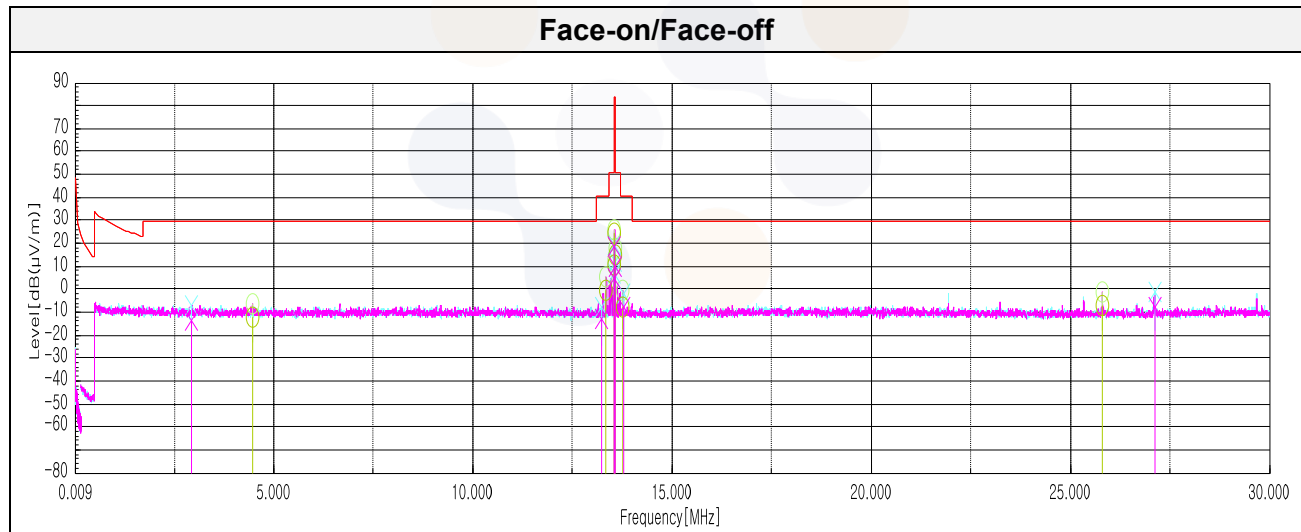
#### 15.225 (d) 0.009-30 MHz

[Face-on]

| Frequency       | Reading  | Antenna Factor | Amp. + Cable | Distance Factor | Result     | Limit      | Margin |
|-----------------|----------|----------------|--------------|-----------------|------------|------------|--------|
| (MHz)           | (dB(μV)) | (dB)           | (dB)         | (dB)            | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| Quasi peak data |          |                |              |                 |            |            |        |
| 4.46            | 39.20    | 20.10          | -31.66       | 40.00           | -12.36     | 29.54      | 41.90  |
| 27.12           | 42.10    | 20.50          | -30.56       | 40.00           | -7.96      | 29.54      | 37.50  |

[Face-off]

| Frequency       | Reading  | Antenna Factor | Amp. + Cable | Distance Factor | Result     | Limit      | Margin |
|-----------------|----------|----------------|--------------|-----------------|------------|------------|--------|
| (MHz)           | (dB(μV)) | (dB)           | (dB)         | (dB)            | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| Quasi peak data |          |                |              |                 |            |            |        |
| 2.94            | 38.10    | 20.09          | -31.73       | 40.00           | -13.54     | 29.54      | 43.08  |
| 25.81           | 39.60    | 20.69          | -30.54       | 40.00           | -10.25     | 29.54      | 39.79  |



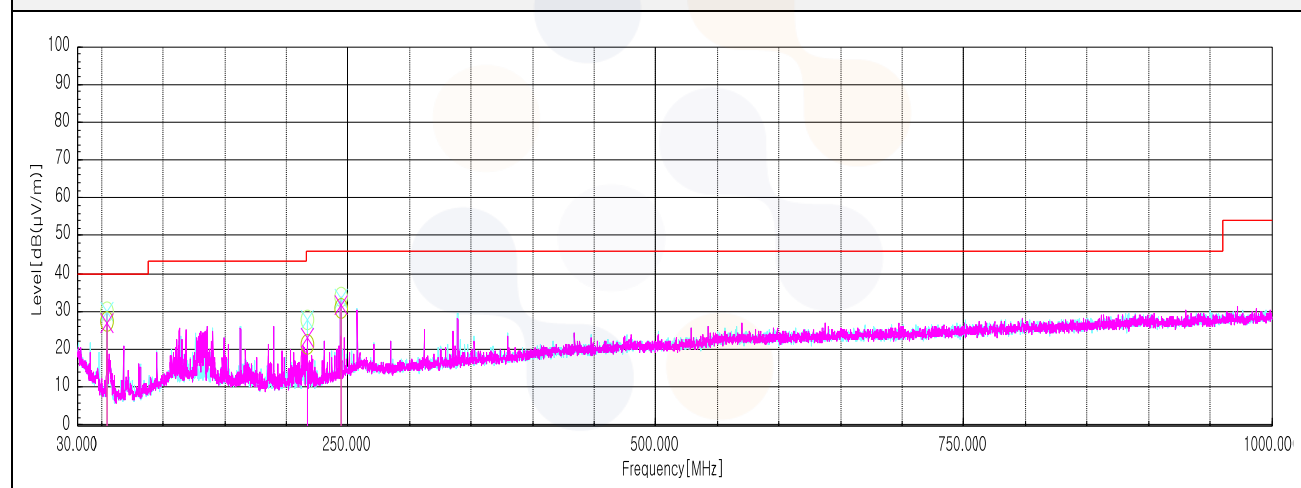
**KCTL Inc.**

65, Sinwon-ro, Yeongtong-gu,  
Suwon-si, Gyeonggi-do, 16677, Korea  
TEL: 82-31-285-0894 FAX: 82-505-299-8311  
[www.kctl.co.kr](http://www.kctl.co.kr)

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**Test results (Below 1 000 MHz)****15.225 (d) 30-1000 MHz**

| Frequency            | Pol.  | Reading  | Antenna Factor | Amp. + Cable | Distance Factor | Result     | Limit      | Margin |
|----------------------|-------|----------|----------------|--------------|-----------------|------------|------------|--------|
| (MHz)                | (V/H) | (dB(μV)) | (dB)           | (dB)         | (dB)            | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| Quasi peak data      |       |          |                |              |                 |            |            |        |
| 54.25                | V     | 44.10    | 12.78          | -29.82       | -               | 27.06      | 40.00      | 12.94  |
| 54.25                | H     | 44.50    | 12.78          | -29.82       | -               | 27.46      | 40.00      | 12.54  |
| 216.97               | V     | 35.20    | 14.92          | -26.92       | -               | 23.20      | 46.00      | 22.80  |
| 216.97               | H     | 33.40    | 14.92          | -26.92       | -               | 21.40      | 46.00      | 24.60  |
| 244.13 <sup>1)</sup> | V     | 40.50    | 17.68          | -26.49       | -               | 31.69      | 46.00      | 14.31  |
| 244.13 <sup>1)</sup> | H     | 39.60    | 17.68          | -26.49       | -               | 30.79      | 46.00      | 15.21  |

**Horizontal/Vertical**

|                                                                                                                                                                                           |                                                  |                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>KCTL Inc.</b><br>65, Sinwon-ro, Yeongtong-gu,<br>Suwon-si, Gyeonggi-do, 16677, Korea<br>TEL: 82-31-285-0894 FAX: 82-505-299-8311<br><a href="http://www.kctl.co.kr">www.kctl.co.kr</a> | Report No.:<br>KR22-SRF0011<br>Page (18) of (18) |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------|

## 7. Measurement equipment

| Equipment Name        | Manufacturer     | Model No.   | Serial No. | Next Cal. Date |
|-----------------------|------------------|-------------|------------|----------------|
| Signal Generator      | R&S              | SMB100A     | 176206     | 22.01.20       |
| Spectrum Analyzer     | R&S              | FSV30       | 100732     | 22.01.20       |
| DC Power Supply       | AGILENT          | E3632A      | KR94907664 | 22.05.10       |
| Temp & Humid Chamber  | Myeongseong R&P  | CTHC-50P-DT | 20150824-2 | 22.07.27       |
| Bi-Log Antenna        | TESEQ            | CBL 6112D   | 55545      | 22.04.24       |
| ATTENUATOR            | KEYSIGHT         | 8491B-6dB   | MY39271060 | 21.12.24       |
| LOOP Antenna          | R&S              | HFH2-Z2     | 100355     | 22.08.21       |
| AMPLIFIER             | SONOMA           | 310N        | 186280     | 22.04.03       |
| Antenna Mast          | Innco Systems    | MA4000-EP   | 303        | N/A            |
| Turn Table            | Innco Systems    | DT2000      | 79         | N/A            |
| ISOLATION TRANSFORMER | ONETECH CO., LTD | OT-IT500VA  | OTR1-16026 | 22.04.02       |
| EMI TEST RECEIVER     | R&S              | ESCI7       | 100732     | 22.03.05       |

**End of test report**