

**KCTL**

## REPORT REVISION HISTORY

| Date       | Revision                                | Page No |
|------------|-----------------------------------------|---------|
| 2019-03-22 | Originally issued(KR19-SEF0047)         | -       |
| 2019-03-26 | FCC ID and Class revise(KR19-SEF0047-A) | -       |
| 2019-03-27 | Limit revise(KR19-SEF0047-B)            | -       |
|            |                                         |         |
|            |                                         |         |
|            |                                         |         |
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|            |                                         |         |
|            |                                         |         |
|            |                                         |         |

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| <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><b>KR19-SEF0047-B</b><br>Page (4) of (18) |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------|

## 1. Applicant information

**Applicant:** DASAN ELECTRON CO., LTD  
**Address:** #307, Plant 1 Dong, Kyunggitechno Park, 705, Haeon-ro,  
 Sangnok-gu, Ansan-si, Gyeonggi-do, Republic of Korea  
**Telephone:** +82-31-500-4641  
**Fax:** +82-31-500-4640  
**E-mail:** mickey@headsetkorea.co.kr  
**Contact name:** Minsoo Jang

**Manufacturer:** DASAN ELECTRON CO., LTD  
**Address:** #307, Plant 1 Dong, Kyunggitechno Park, 705, Haeon-ro,  
 Sangnok-gu, Ansan-si, Gyeonggi-do, Republic of Korea  
**Telephone:** +82-31-500-4641  
**Fax:** +82-31-500-4640  
**E-mail:** mickey@headsetkorea.co.kr  
**Contact name:** Minsoo Jang

## 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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## 2. Laboratory information

### Address

#### KCTL Inc. (Suwon Lab.)

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea

Telephone Number: 82 31 285 0894

Facsimile Number: 82 505 299 8311

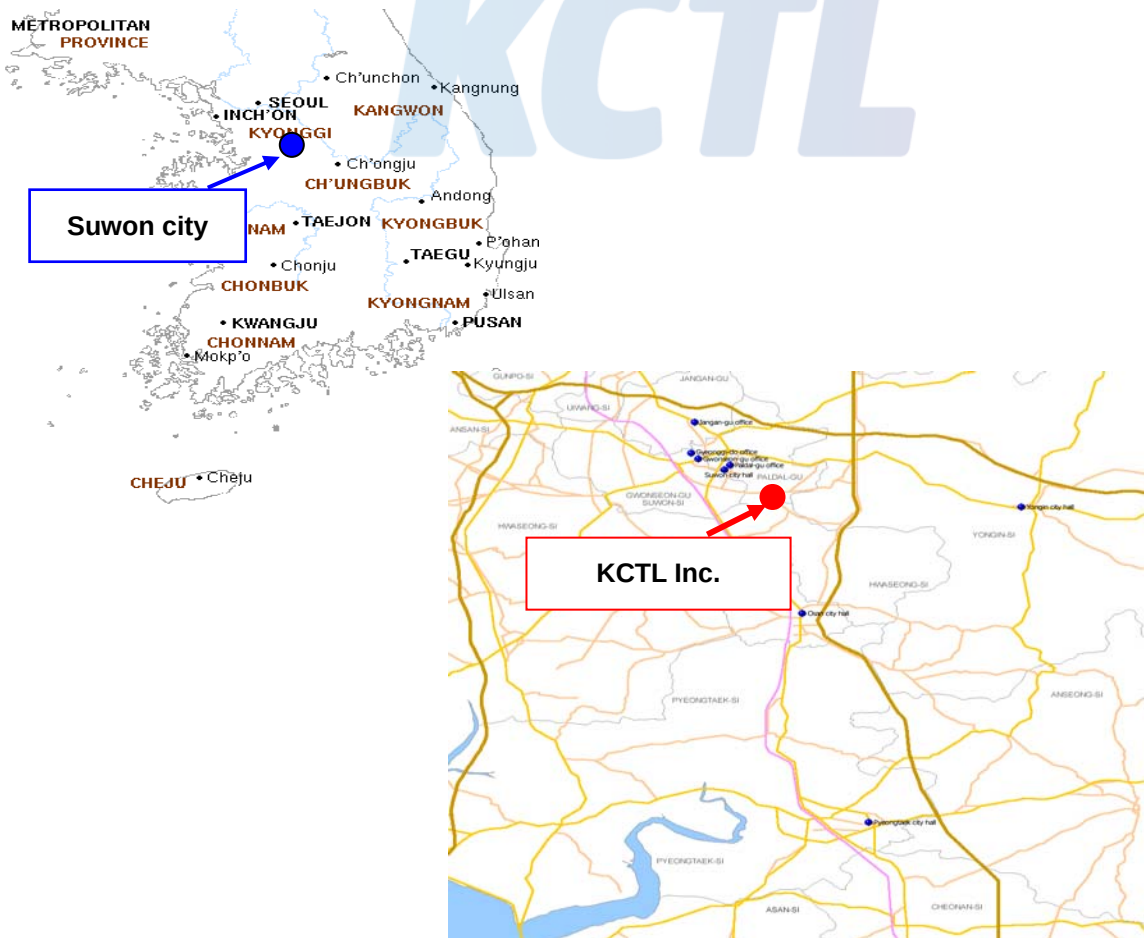
FCC Site Designation No: KR0040

VCCI Registration No. : R-3327, G-198, C-3706, T-1849

Industry Canada Registration No. : 8035A

KOLAS NO.: KT231

### SITE MAP



### 3. Test system configuration

#### 3.1 Operation environment

|                   | Temperature | Humidity    | Pressure |
|-------------------|-------------|-------------|----------|
| Chamber 10 m (RE) | 22.3 °C     | 22.9 % R.H. | -        |
| Shielded room(CE) | 21.5 °C     | 23.8 % R.H. | -        |

#### Test site

These testing items were performed following locations;

| Test item          | Test site     |
|--------------------|---------------|
| Conducted Emission | Shielded Room |
| Radiated Emission  | 10 m Chamber  |

## 3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC.

The factors contributing to uncertainties are test receiver, cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability. Based on CISPR 16-4-2, the measurement uncertainty level with a 95 % confidence level was applied.

| Conducted Emission measurement (Confidence level about 95 %, $k = 2$ ) |                           |               |
|------------------------------------------------------------------------|---------------------------|---------------|
| Shielded Room (CE#1)                                                   | 9 kHz ~ 150 kHz: 3.66 dB  |               |
|                                                                        | 150 kHz ~ 30 MHz: 3.26 dB |               |
| Shielded Room (CE#2)                                                   | 9 kHz ~ 150 kHz: 3.48 dB  |               |
|                                                                        | 150 kHz ~ 30 MHz: 3.06 dB |               |
| Radiated Emission measurement (Confidence level about 95 %, $k = 2$ )  |                           |               |
| 10 m Chamber (4F)                                                      | 30 MHz ~ 300 MHz          | 3 m: 5.32 dB  |
|                                                                        |                           | 10 m: 5.32 dB |
|                                                                        | 300 MHz ~ 1 000 MHz       | 3 m: 5.46 dB  |
|                                                                        |                           | 10 m: 5.34 dB |
|                                                                        | 1 GHz ~ 6 GHz             | 3 m: 6.32 dB  |
|                                                                        | 6 GHz ~ 18 GHz            | 3 m: 6.66 dB  |
| 10 m Chamber (2F)                                                      | 30 MHz ~ 300 MHz          | 3 m: 4.98 dB  |
|                                                                        |                           | 10 m: 4.96 dB |
|                                                                        | 300 MHz ~ 1 000 MHz       | 3 m: 5.14 dB  |
|                                                                        |                           | 10 m: 5.00 dB |
|                                                                        | 1 GHz ~ 6 GHz             | 3 m: 6.34 dB  |
|                                                                        | 6 GHz ~ 18 GHz            | 3 m: 6.68 dB  |
| 3 m Chamber (3F)                                                       | 30 MHz ~ 300 MHz          | 3 m: 4.90 dB  |
|                                                                        | 300 MHz ~ 1 000 MHz       | 3 m: 5.06 dB  |
|                                                                        | 1 GHz ~ 6 GHz             | 3 m: 6.70 dB  |
|                                                                        | 6 GHz ~ 18 GHz            | 3 m: 6.60 dB  |

### 3.3 Measurement Program

These test items were performed by software programs;

| Test item          | Measurement Program |                       | Used                                |
|--------------------|---------------------|-----------------------|-------------------------------------|
| Conducted Emission | EP5CE_V 5.4.0(TOYO) |                       | <input checked="" type="checkbox"/> |
| Radiated Emission  | 2F                  | EP5RE_V 4.6.0(TOYO)   | <input checked="" type="checkbox"/> |
|                    | 4F                  | EP5RE_V 5.11.10(TOYO) |                                     |

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## 4. Description of EUT

### 4.1 General information

| Name                | Specification                                                                                                                                                                                                                                                                                  |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System requirements | <ul style="list-style-type: none"> <li>• Microsoft Lync Server 2010 or Microsoft Lync Online 2010</li> <li>• Windows XP SP3, Windows Vista or Windows 7</li> </ul>                                                                                                                             |
| Driver software     | <p>1. Mass deployment:<br/> The driver software can be mass deployed using the .msi-file.</p> <p>2. Single user:<br/> A single user can also install the driver on his/her PC.<br/> Download driver on <a href="http://www.busylight.com/support/lync">www.busylight.com/support/lync</a>.</p> |
| Lamp colours        | <p>Busylight UC™ supports the colours of Microsoft Lync</p> <ul style="list-style-type: none"> <li>• Red: Busy/Do Not Disturb</li> <li>• Yellow: Off Work/Be Right Back</li> <li>• Green: Available</li> </ul>                                                                                 |
| Ringtones           | <p>Busylight UC™ has 8 different ringtones. These include traditional telephone ringing as well as melodies tailored for the office. Speaker and ringtones are built into the device to avoid conflicts with the PC's audio settings.</p>                                                      |
| Power               | <p>Powered via the USB data cable. No need for external power supply.</p>                                                                                                                                                                                                                      |

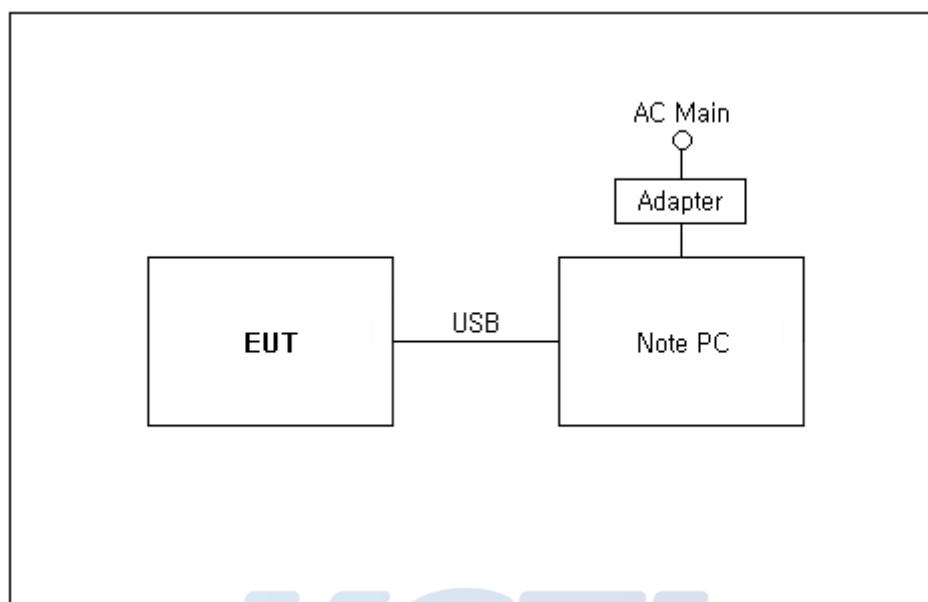
## 4.2 Product description

|                          |                           |
|--------------------------|---------------------------|
| Type of product          | Busylight                 |
| Model name (Basic)       | Kuando Busylight UC Omega |
| Model name (Variant)     | -                         |
| Difference               | -                         |
| Serial no                | -                         |
| Testing voltage          | 120 V, 60 Hz              |
| Input rating             | DC 5 V                    |
| Internal clock frequency | 12 MHz                    |
| FCC ID                   | WF2-BUSYLIGHTLYNC         |
| Note                     | -                         |

## 4.3 Auxiliary equipments

| Type    | Model / Part # | S/N             | Manufacturer |
|---------|----------------|-----------------|--------------|
| Note PC | NT271B5E-K301S | JGFE919DB00025Z | SAMSUNG      |
| Adapter | CPA09-026A     | -               | SAMSUNG      |

## 4.4 Test configuration



|   | Start      |          | End     |          | Cable      |          |
|---|------------|----------|---------|----------|------------|----------|
|   | Name       | I/O port | Name    | I/O port | Length (m) | Spec.    |
| 1 | <b>EUT</b> | -        | Note PC | USB      | 2.5        | Shield   |
| 2 | Note PC    | Power    | Adapter | -        | 1.5        | Unshield |

## 4.5 Operating conditions

The EUT was configured as normal intended use.

| Test Mode | Normal operating                                                                           |
|-----------|--------------------------------------------------------------------------------------------|
| Test #1   | Note PC's use the lighting program and keyboard macros to verify the operation of the EUT. |

## 5. Summary of test results

### 5.1 Summary of EMI emission test results

| Applied                             | Test items         | Test method                                                           | Result |
|-------------------------------------|--------------------|-----------------------------------------------------------------------|--------|
| <input checked="" type="checkbox"/> | Conducted Emission | ANSI C63.4:2014, Class B<br>FCC Part 15 Subpart B<br>ICES-003 Issue 6 | Pass   |
| <input checked="" type="checkbox"/> | Radiated Emission  | ANSI C63.4:2014, Class B<br>FCC Part 15 Subpart B<br>ICES-003 Issue 6 | Pass   |

These results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations.

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## 6. Test results

### 6.1 Conducted Emissions

|                    |                                                                       |                   |             |
|--------------------|-----------------------------------------------------------------------|-------------------|-------------|
| Test specification | ANSI C63.4:2014, Class B<br>FCC Part 15 Subpart B<br>ICES-003 Issue 6 |                   |             |
| Testing voltage    | 120 V, 60 Hz                                                          |                   |             |
| Test facility      | Shielded room (CE#2)                                                  |                   |             |
| Date               | 2019-03-07                                                            |                   |             |
| Temperature (°C)   | 21.5 °C                                                               | Humidity (% R.H.) | 23.8 % R.H. |
| Remarks            | Pass                                                                  |                   |             |

#### 6.1.1 Limits of conducted emissions measurement

| Frequency<br>[MHz] | Class A (dB( $\mu$ V)) |         | Class B (dB( $\mu$ V)) |                       |
|--------------------|------------------------|---------|------------------------|-----------------------|
|                    | Quasi-peak             | Average | Quasi-peak             | Average               |
| 0.15 ~ 0.5         | 79                     | 66      | 66 ~ 56 <sup>1)</sup>  | 56 ~ 46 <sup>1)</sup> |
| 0.5 ~ 5            | 73                     | 60      | 56                     | 46                    |
| 5 ~ 30             | 73                     | 60      | 60                     | 50                    |

<sup>1)</sup> The limit decreases linearly with the logarithm of frequency

### 6.1.2 Measurement procedure

The measurements were performed in a shielded room. EUT was setup as shown in photograph and placed on a non-metallic table height of 0.8 m above the reference ground plane. The rear of table was located 0.4 m to the vertical conducted plane. EUT was power through the LISN, which was bonded to the ground plane. The LISN power was filtered. Each EUT power lead, except ground (safety) lead was individually connected through a LISN to input power source. EUT signal cables that hung closer than 0.4 m to the Horizontal metal ground 0.3 m ~ 0.4 m long. The power cord was bundles in the center. All peripheral equipment was powered from a sub LISN. The LISN and ISN were positioned 0.8 m from the EUT. Peak and Average detection were used in preliminary testing and Quasi-peak and Average detections were used at final measurement.

### 6.1.3 Used equipments

| Equipment             | Model no. | Serial no. | Makers      | Next Cal. Date | Used |
|-----------------------|-----------|------------|-------------|----------------|------|
| EMI TEST RECEIVER     | ESCI 3    | 101408     | R&S         | 2019.08.23     | ☒    |
| TWO-LINE<br>V-NETWORK | ENV216    | 101584     | R&S         | 2019.04.05     | ☒    |
| TWO-LINE<br>V-NETWORK | NNLK8121  | 8121-472   | SCHWARZBECK | 2019.08.24     | ☒    |

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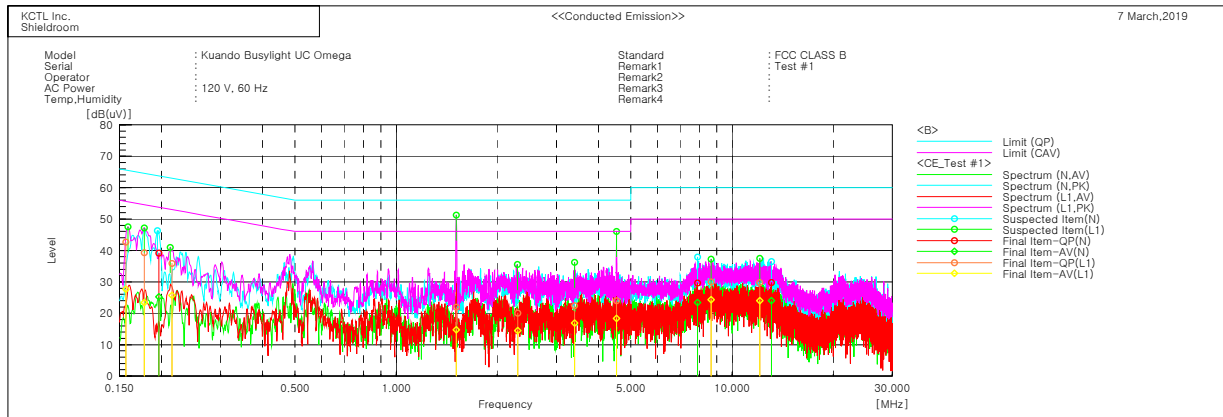
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## 6.1.4 Conducted emissions measurement result

### AC Main



#### Final Result

| --- N Phase --- |                 |                     |                      |          |                    |                     |                   |                   |                |                 |
|-----------------|-----------------|---------------------|----------------------|----------|--------------------|---------------------|-------------------|-------------------|----------------|-----------------|
| No.             | Frequency [MHz] | Reading QP [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB] | Result QP [dB(uV)] | Result CAV [dB(uV)] | Limit QP [dB(uV)] | Limit AV [dB(uV)] | Margin QP [dB] | Margin CAV [dB] |
| 1               | 0.19663         | 29.3                | 15.4                 | 9.8      | 39.1               | 25.2                | 63.8              | 53.8              | 24.7           | 28.6            |
| 2               | 7.89233         | 19.8                | 13.6                 | 9.9      | 29.7               | 23.5                | 60.0              | 50.0              | 30.3           | 26.5            |
| 3               | 13.11496        | 19.7                | 14.0                 | 10.0     | 29.7               | 24.0                | 60.0              | 50.0              | 30.3           | 26.0            |

| --- L1 Phase --- |                 |                     |                      |          |                    |                     |                   |                   |                |                 |
|------------------|-----------------|---------------------|----------------------|----------|--------------------|---------------------|-------------------|-------------------|----------------|-----------------|
| No.              | Frequency [MHz] | Reading QP [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB] | Result QP [dB(uV)] | Result CAV [dB(uV)] | Limit QP [dB(uV)] | Limit AV [dB(uV)] | Margin QP [dB] | Margin CAV [dB] |
| 1                | 0.1567          | 32.8                | 17.8                 | 9.8      | 42.6               | 27.6                | 65.6              | 55.6              | 23.0           | 28.0            |
| 2                | 0.1778          | 29.4                | 13.6                 | 9.9      | 39.3               | 23.5                | 64.6              | 54.6              | 25.3           | 31.1            |
| 3                | 0.21492         | 26.2                | 16.0                 | 9.7      | 35.9               | 25.7                | 63.0              | 53.0              | 27.1           | 27.3            |
| 4                | 1.51064         | 12.2                | 5.0                  | 9.7      | 21.9               | 14.7                | 56.0              | 46.0              | 34.1           | 31.3            |
| 5                | 2.29911         | 10.3                | 4.8                  | 9.7      | 20.0               | 14.5                | 56.0              | 46.0              | 36.0           | 31.5            |
| 6                | 3.39971         | 12.8                | 7.1                  | 9.7      | 22.5               | 16.8                | 56.0              | 46.0              | 33.5           | 29.2            |
| 7                | 4.53269         | 14.2                | 8.6                  | 9.8      | 24.0               | 18.4                | 56.0              | 46.0              | 32.0           | 27.6            |
| 8                | 8.66627         | 19.9                | 14.4                 | 10.0     | 29.9               | 24.4                | 60.0              | 50.0              | 30.1           | 25.6            |
| 9                | 12.09814        | 19.6                | 13.8                 | 10.1     | 29.7               | 23.9                | 60.0              | 50.0              | 30.3           | 26.1            |

## 6.2 Radiated Emission

|                    |                                                                       |                   |             |
|--------------------|-----------------------------------------------------------------------|-------------------|-------------|
| Test specification | ANSI C63.4:2014, Class B<br>FCC Part 15 Subpart B<br>ICES-003 Issue 6 |                   |             |
| Testing voltage    | 120 V, 60 Hz                                                          |                   |             |
| Test facility      | 10 m Chamber (4F)                                                     |                   |             |
| Test distance      | 3 m                                                                   |                   |             |
| Date               | 2019-03-07                                                            |                   |             |
| Temperature (°C)   | 22.3 °C                                                               | Humidity (% R.H.) | 22.9 % R.H. |
| Remarks            | Pass                                                                  |                   |             |

### 6.2.1 Limits of radiated emission measurement

| Frequency [MHz] | Class A (dB( $\mu$ V/m)) @ 10 m | Class B (dB( $\mu$ V/m)) @ 3 m |
|-----------------|---------------------------------|--------------------------------|
| 30-88           | 39                              | 40                             |
| 88-216          | 43.5                            | 43.5                           |
| 216-960         | 46.4                            | 46                             |
| Above 960       | 49.5                            | 54                             |

**Note- Alternative standard: CISPR, Pub. 22**

### 6.2.2 Measurement procedure

The test was done at a 10 m chamber with a quasi-peak detector. EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane. Cables were folded back and forth forming a bundle 0.3 m to 0.4 m long and were hanged at a 0.4 m height to the ground plane.

Cables connected to EUT were fixed to cause maximum emission. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

### 6.2.3 Used equipments

| Equipment                  | Model no.    | Serial no. | Makers        | Next Cal. Date | Used                                |
|----------------------------|--------------|------------|---------------|----------------|-------------------------------------|
| EMI TEST RECEIVER          | ESR7         | 101078     | R&S           | 2019.08.23     | <input checked="" type="checkbox"/> |
| Bilog Antenna              | CBL 6112D    | 37876      | TESEQ         | 2020.07.20     | <input checked="" type="checkbox"/> |
| AMPLIFIER                  | 310N         | 293004     | SONOMA        | 2019.08.24     | <input checked="" type="checkbox"/> |
| ATTENUATOR                 | 8491B        | MY39270292 | AGILENT       | -              | <input checked="" type="checkbox"/> |
| Antenna Mast               | MA4640-XP-ET | -          | Innco Systems | -              | <input checked="" type="checkbox"/> |
| Turn Table                 | TT 3.0-3t    | -          | MATURO        | -              | <input checked="" type="checkbox"/> |
| PREAMPLIFIER               | 8449B        | 3008A01802 | AGILENT       | 2019.04.05     | <input type="checkbox"/>            |
| DOUBLE RIDGED HORN ANTENNA | 3115         | 00086706   | ETS-LINDGREN  | 2019.08.30     | <input type="checkbox"/>            |
| Spectrum Analyzer          | FSV40        | 100988     | R&S           | 2020.01.04     | <input type="checkbox"/>            |

### 6.2.4 Sample calculation

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.

The sample calculation is as follow:

$$\text{Result} = \text{M.R} + \text{C.F}(\text{A.F} + \text{C.L} + 6 \text{ dB Att} - \text{A.G})$$

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

A.G = Amplifier Gain

6 dB Att = 6 dB Attenuator

If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 6 dB, A.G 35 dB

The result is  $30 + 12 + 5 + 6 - 35 = 18 \text{ dB } (\mu\text{V/m})$

Bilog Antenna and ATTENUATOR (6 dB) were calibrated together.

AV = CAV : Abbreviation of CISPR Average

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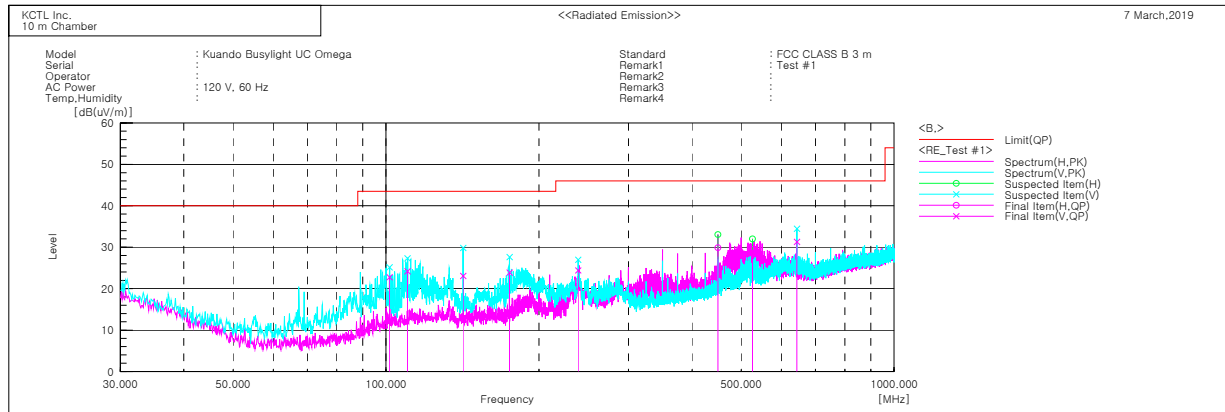
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Suwon-si, Gyeonggi-do, 16677, Korea  
TEL: 82-31-285-0894 FAX: 82-505-299-8311  
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### 6.2.5 Radiated emission measurement result

30 MHz ~ 1 GHz



#### Final Result

| No. | Frequency [MHz] | (P) | Reading QP [dB(μV)] | c.f [dB(1/m)] | Result QP [dB(μV/m)] | Limit QP [dB(μV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] |
|-----|-----------------|-----|---------------------|---------------|----------------------|---------------------|----------------|-------------|-------------|
| 1   | 101.673         | V   | 33.7                | -10.9         | 22.8                 | 43.5                | 20.7           | 130.0       | 250.0       |
| 2   | 110.261         | V   | 34.1                | -9.9          | 24.2                 | 43.5                | 19.3           | 127.0       | 26.0        |
| 3   | 141.796         | V   | 32.9                | -9.8          | 23.1                 | 43.5                | 20.4           | 154.0       | 200.0       |
| 4   | 175.017         | V   | 34.9                | -11.0         | 23.9                 | 43.5                | 19.6           | 340.0       | 25.0        |
| 5   | 238.919         | V   | 32.5                | -8.1          | 24.4                 | 46.0                | 21.6           | 290.0       | 160.0       |
| 6   | 450.018         | H   | 30.1                | -0.2          | 29.9                 | 46.0                | 16.1           | 305.0       | 70.0        |
| 7   | 526.392         | H   | 27.8                | 1.6           | 29.4                 | 46.0                | 16.6           | 288.0       | 300.0       |
| 8   | 643.771         | V   | 27.2                | 4.1           | 31.3                 | 46.0                | 14.7           | 311.0       | 90.0        |