



## Declaration of Conformity



**Type of equipment:** VARI FOCAL LENS  
**Brand Name /Trade Mark:** SAMSUNG  
**Type designation /model:** SLA-3180DN  
**Applicant:** SAMSUNG TECHWIN CO., LTD.

**In accordance with the following Directives:**

2004/108/EC The Electromagnetic Compatibility Directive

Including amendments by the CE Marking Directive 93/68/EEC

**The following harmonized European standards or technical specifications have been applied:**

|                                      |                                                                                                            |
|--------------------------------------|------------------------------------------------------------------------------------------------------------|
| EN 55022:2006                        | Limits and methods of measurement of radio disturbance characteristics of information technology equipment |
| EN 50130-4:1995 +A1:1998<br>+A2:2003 | Product family standard: Immunity requirements for components of fire, intruder and social alarm systems   |
| EN 61000-4-2:2009                    | Electrostatic discharge immunity test                                                                      |
| EN 61000-4-3:2006                    | Radiated, radio-frequency, electromagnetic field immunity test                                             |
| EN 61000-4-4:2004                    | Electrical fast transient/burst immunity test                                                              |
| EN 61000-4-5:2006                    | Surge immunity test                                                                                        |
| EN 61000-4-6:2007                    | Immunity to conducted disturbances, induced by radio-frequency fields                                      |

**The CE Marking on the products and/or their packaging signifies that SAMSUNG TECHWIN CO., LTD. holds the reference technical file available to the European Union authorities.**

**Place and date of issue:** #42 Seongju-Dong, Changwon-Shi, Kyungsangnam-Do, Korea  
/ March 22, 2011

**Authorized Signatory:** Name : Jei Soon, Kang  
Title : Principal Research Engineer  
Signature :

*Chang Suk Oh*  
SAMSUNG TECHWIN CO., LTD

## EMC TEST REPORT

**Test report No:** EMC-CE-2514

**Type of Equipment:** VARI FOCAL LENS

**Model Name:** SLA-3180DN

**Applicant:** SAMSUNG TECHWIN CO., LTD.  
#42 Seongju-Dong, Changwon-Si,  
Kyungsangnam-Do, Korea

**Manufacturer#1:** SAMSUNG TECHWIN CO., LTD.  
#42 Seongju-Dong, Changwon-Si,  
Kyungsangnam-Do, Korea

**Manufacturer#2:** TIANJIN SAMSUNG TECHWIN  
OPTO-ELECTRONIC CO., LTD  
No.11 Weiliu Road. Micro-Electronic Industrial  
Park Jingang Road Tianjin 300385, China

**Test standards:** EN 55022:2006, Class A  
EN 50130-4:1995+A1:1998+A2:2003

**Testing Laboratory:** EMC Compliance Ltd.

**Test result:** Complied

This product complies with the requirements of the EMC Directive 2004/108/EC.

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

This test report shall not be reproduced, except in full, without the written approval of EMC compliance Laboratory.

Date of receipt: 2011. 03. 14

Date of testing: 2011. 03. 15 ~ 03. 18

Issued date: 2011. 03. 22

Tested by:

SUNG, KI-MUN

Approved by:

YEOM, HAN-SEOK

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## 1. Applicant information

**Applicant:** SAMSUNG TECHWIN CO., LTD.  
**Address:** #42 Seongju-Dong, Changwon-Si,  
Kyungsangnam-Do, Korea  
**Telephone:** +82-31-277-3695  
**Fax:** +82-31-277-2784  
**E-mail:** js2002.kang@samsung.com  
**Contact name:** **Kang Jei Soon**

**Manufacturer#1:** SAMSUNG TECHWIN CO., LTD.  
**Address:** #42 Seongju-Dong, Changwon-Si,  
Kyungsangnam-Do, Korea  
**Telephone:** +82-31-277-3695  
**Fax:** +82-31-277-2784  
**E-mail:** js2002.kang@samsung.com  
**Contact name:** **Kang Jei Soon**

**Manufacturer#2:** TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC CO., LTD  
**Address:** No.11 Weiliu Road, Micro-Electronic Industrial Park  
Jingang Road Tianjin 300385, China

## 2. Laboratory information

### Address

#### **EMC compliance Ltd.**

480-5 Sin-dong, Yeongtong-gu, Suwon-city, Gyeonggi-do, 443-390, Korea

Telephone Number: 82 31 336 9919

Facsimile Number: 82 31 336 4767

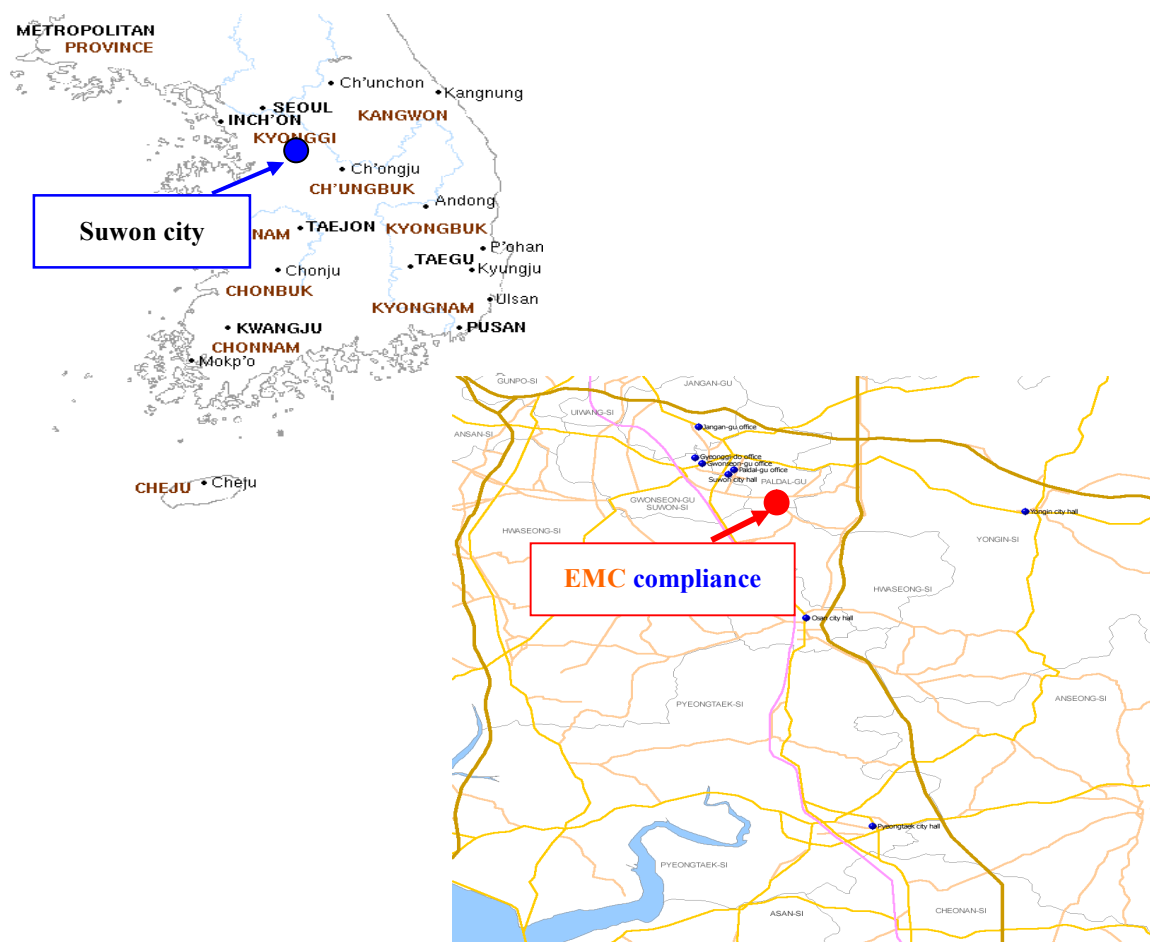
FCC CAB.: KR0040

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

Industry Canada Registration No.: 8035A

KOLAS NO.: 231

### **SITE MAP**



### 3. Test system configuration

#### 3.1 Operation environment

|                    | Temperature | Humidity  | Pressure  |
|--------------------|-------------|-----------|-----------|
| Chamber(10 m)      | : 21 °C     | 20 % R.H. | -         |
| Shielded room(ESD) | : 20 °C     | 34 % R.H. | 102.1 kPa |

#### Test site

These testing items were performed following locations;

Chamber (10 m) : Radiated Emission  
Shielded Room : ESD, EFT/Burst, Surge, CS  
Fully anechoic chamber (3 m) : RS

## 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.

Radiated Emission measurement : (  $k = 2$ , 95 % )

30 MHz ~ 300 MHz: 3 m:  $\pm 4.3$  [dB]

10 m:  $\pm 4.3$  [dB]

300 MHz ~ 1 000 MHz: 3 m:  $\pm 4.4$  [dB]

10 m:  $\pm 4.3$  [dB]

Radio Frequency Electromagnetic Fields : (  $k = 2$ , 95 % )

$\pm 1.82$  [dB]

## 4. Description of E.U.T.

### 4.1 General information

#### Optical Specifications

|     |                             |            |                                           |                  |                     |                  |
|-----|-----------------------------|------------|-------------------------------------------|------------------|---------------------|------------------|
| 1   | Focal Length                |            | 3.1 mm ~ 8 mm                             |                  |                     |                  |
| 2   | Max. Aperture Ratio         |            | 1:1.2                                     |                  |                     |                  |
| 3   | Iris Range                  | Wide       | F1.2 ~ F360C                              |                  |                     |                  |
| 4   | Max. Image Format           |            | 5.8mm x 3.2mm ( $\phi$ 6.6mm)             |                  |                     |                  |
| 5   | Angle of View               | Diagonal   | 1/2.7type<br>(16:9)                       | 123.1 ° ~ 48.3 ° | 1/2.7 type<br>(4:3) | 123.1 ° ~ 48.3 ° |
|     |                             | Horizontal |                                           | 105.4 ° ~ 42.2 ° |                     | 95.9 ° ~ 38.7 °  |
|     |                             | Vertical   |                                           | 57.9 ° ~ 23.8 °  |                     | 71.0 ° ~ 29.1 °  |
|     |                             | Diagonal   | *****                                     | *****            | 1/3 type<br>(4:3)   | 110.3 ° ~ 43.9 ° |
|     |                             | Horizontal |                                           | *****            |                     | 86.7 ° ~ 35.2 °  |
|     |                             | Vertical   |                                           | *****            |                     | 64.4 ° ~ 26.5 °  |
| 6   | Min. Objective Distance     |            | 30cm from front of Lens                   |                  |                     |                  |
| 7   | Back Focal Length           |            | 7.8mm                                     |                  |                     |                  |
| 8   | Flange Back Length          |            | 12.5mm                                    |                  |                     |                  |
| 9   | Effective Lens Aperture     |            | Front $\phi$ 20.9mm    Rear $\phi$ 10.5mm |                  |                     |                  |
| 1 0 | Optical compensation design |            | 2.0mm                                     |                  |                     |                  |
| 1 1 | Mount                       |            | CS                                        |                  |                     |                  |
| 1 2 | Dimension                   |            | As per the attached drawing               |                  |                     |                  |
| 1 3 | Weight                      |            | 59.0 g                                    |                  |                     |                  |

#### Mechanical

|   |       |            |                                            |  |  |
|---|-------|------------|--------------------------------------------|--|--|
| 1 | Focus | Control    | Manual Control                             |  |  |
|   |       | Indication | $\infty \rightleftharpoons N$ (Far : Near) |  |  |
|   |       | Torque     | Lock screw Torque : MAX 4cN·m              |  |  |
| 2 | Zoom  | Control    | Manual Control                             |  |  |
|   |       | Indication | $W \rightleftharpoons T$ (Wide : Tele)     |  |  |
|   |       | Torque     | Lock screw Torque : MAX 4cN·m              |  |  |
| 3 | Iris  | Control    | Auto-Iris by Galvanometer                  |  |  |

#### Electrical Specification of Iris

|   |                   |                          |                                |
|---|-------------------|--------------------------|--------------------------------|
| 1 | Galvanometer      | Driving Coil             | 190 $\Omega \pm 10\%$ at 20 °C |
|   |                   | Control Coil             | 855 $\Omega \pm 10\%$ at 20 °C |
| 2 | Operating Voltage | close $\rightarrow$ open | Less than 3.5V at 20 °C        |
|   |                   | open $\rightarrow$ close | More than 0.5V at 20 °C        |

#### Power Consumption

|   |                   |                            |                                                                                                      |
|---|-------------------|----------------------------|------------------------------------------------------------------------------------------------------|
| 1 | Power Consumption | Max.                       | Approx. 20mA at 190 $\Omega$ at 20 °C<br>( Driving Coil 190 $\Omega$ at -10% / Driving Voltage 3.5V) |
|   |                   | Normal                     | Approx. 11mA                                                                                         |
|   |                   | Coefficient of Temperature | +0.0039 %/°C                                                                                         |

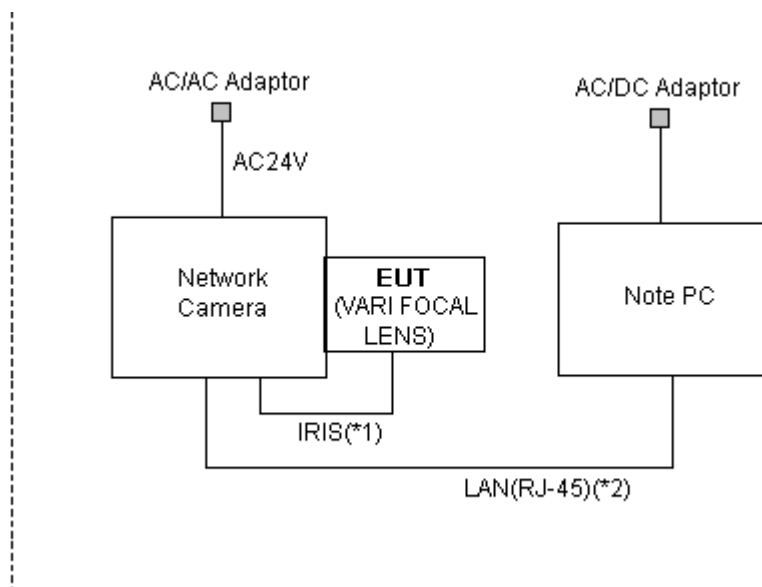
## 4.2 Product description

|                      |                                              |
|----------------------|----------------------------------------------|
| Type of product      | VARI FOCAL LENS                              |
| Model name (Basic)   | SLA-3180DN                                   |
| Model name (Variant) | N/A                                          |
| Difference           | -                                            |
| Trade name           | -                                            |
| Serial no            | Engineering Sample                           |
| Testing voltage      | AC 24 V                                      |
| Product rating       | AC 24 V (Power supplied from Network Camera) |
| Note                 | -                                            |

## 4.3 Auxiliary equipments

| Type           | Model / Part # | Serial number   | Manufacturer       |
|----------------|----------------|-----------------|--------------------|
| Note PC        | C1410          | 463680121002    | FUJITSU            |
| Network Camera | SNB-7000N      | C6916V2B100037A | SAMSUNG<br>TECHWIN |

## 4.4 Test configuration



| Note<br>* | Start                           |            | End            |            | Cable      |            |       |
|-----------|---------------------------------|------------|----------------|------------|------------|------------|-------|
|           | Name                            | I/O port   | Name           | I/O port   | Length (m) | Spec.      | Cable |
| 1         | <b>EUT</b><br>(VARI FOCAL LENS) | IRIS       | Network Camera | IRIS       | 0.2        | Non-Shield | -     |
| 2         | Network Camera                  | LAN(RJ-45) | Note PC        | LAN(RJ-45) | 2.0        | Non-Shield | -     |

## 4.5 Operating conditions

The EUT was configured as normal intended use.

| Test mode | Normal operation       |
|-----------|------------------------|
| 1         | Camera operating mode. |

## 5. Summary of test results

### 5.1 Modification to the E.U.T.

None

### 5.2 Summary of EMI emission test results

| Application                       | Test method               | Test result |
|-----------------------------------|---------------------------|-------------|
| Conducted emission                | EN 55022:2006, Class A    | N/A         |
| Radiated emission<br>AC 24 V      | EN 55022:2006, Class A    | Complied    |
| Harmonics current                 | EN 61000-3-2:2006+A2:2009 | N/A         |
| Voltage fluctuations and flickers | EN 61000-3-3:2008         | N/A         |

### 5.3 Summary of immunity test results

| Items                         | Application | Test method        | Test result |
|-------------------------------|-------------|--------------------|-------------|
| Electrostatic discharge       | Enclosure   | EN 61000-4-2:2009  | Complied    |
| Radiated RF immunity          | Enclosure   | EN 61000-4-3:2006  | Complied    |
| Electric Fast Transient/BURST | AC 24 V     | EN 61000-4-4:2004  | Complied    |
| Surge                         | AC 24 V     | EN 61000-4-5:2006  | Complied    |
| Conducted RF immunity         | AC 24 V     | EN 61000-4-6:2007  | Complied    |
| Magnetic field immunity       | Enclosure   | EN 61000-4-8:2010  | N/A         |
| Voltage dip/interruption      | AC 24 V     | EN 61000-4-11:2004 | N/A         |
| Voltage variation             | AC 24 V     | EN 50130-4:2003    | N/A         |

## 5.4 Performance criteria

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.

If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test. A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

### **Electrostatic discharge**

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change,

### **Radiated electromagnetic fields**

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such

Flickering of indicators occurs at a field strength of 3 V/m. For components of CCTV systems, where the picture is allowed at 10 V/m, providing.

- (a) there is no permanent damage or change to EUT (e.g. no corruption of memory or changes to programmable setting etc.)
- (b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and
- (c) there is no observable deterioration of the picture at 1 V/m.

### **Fast transient burst / slow high energy voltage surge**

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as

---

### **Conducted RF immunity**

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as

a change, and no such flickering of indicators oeuvres at  $U = 130 \text{ dB}(\mu V)$ .

For component of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at  $U = 140 \text{ dB}(\mu V)$ , providing:

- (a) there is no permanent damage or change to the EUT (e.g. no corruption of memory or changes to programmable settings etc.):
- (b) at  $U = 130 \text{ dB}(\mu V)$ , any deterioration of the picture is so minor that the system could still be used; and
- (c) there in no observable deterioration of the picture at  $U = 120 \text{ dB}(\mu V)$ .

### **Voltage dip/interruption / Voltage variation**

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test, after the conditioning.

## 6. Test results

### 6.1 Radiated Emission

|                    |                                                            |                   |           |
|--------------------|------------------------------------------------------------|-------------------|-----------|
| Test specification | EN 55022:2006 Sections 6, Class A                          |                   |           |
| Test mode          | Operating mode                                             |                   |           |
| Date               | 2011. 03. 15                                               |                   |           |
| Testing voltage    | AC 24 V                                                    |                   |           |
| Test facility      | 10 m Chamber                                               |                   |           |
| Temperature (°C)   | 21 °C                                                      | Humidity (% R.H.) | 20 % R.H. |
| Remarks            | Complied<br>Minimum limit margin is 3.1 dB at 482.626 MHz. |                   |           |

#### 6.1.1 Limits of radiated emission measurement

| Frequency<br>[MHz] | Class A (dB( $\mu$ V/m)) @ 10 m | Class B (dB( $\mu$ V/m)) @ 10 m |
|--------------------|---------------------------------|---------------------------------|
| 30-230             | 40                              | 30                              |
| 230-1 000          | 47                              | 37                              |

#### 6.1.2 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.

### 6.1.3 Used equipments

| Equipment       | Model no.  | Serial no. | Makers            | Next cal. date | Used                                |
|-----------------|------------|------------|-------------------|----------------|-------------------------------------|
| Test Receiver   | ESCI       | 100710     | R&S               | 11.12.01       | <input checked="" type="checkbox"/> |
| Bi-Log Antenna  | VULB 9160  | 3228       | SCHWARZBECK       | 12.09.13       | <input checked="" type="checkbox"/> |
| Amplifier       | 310N       | 293004     | SONOMA INSTRUMENT | 11.12.01       | <input checked="" type="checkbox"/> |
| 3 dB Attenuator | 8491A      | 27444      | HP                | 11.11.30       | <input checked="" type="checkbox"/> |
| Antenna Mast    | MA4000-EP  | 303        | Innco Systems     | -              | <input checked="" type="checkbox"/> |
| Turn Table      | DT2000S-1t | 079        | Innco Systems     | -              | <input checked="" type="checkbox"/> |

### 6.1.4 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:

$$\text{Result} = \text{M.R} + \text{C.F}(\text{A.F} + \text{C.L} + 3 \text{ dB Att} - \text{A.G})$$

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

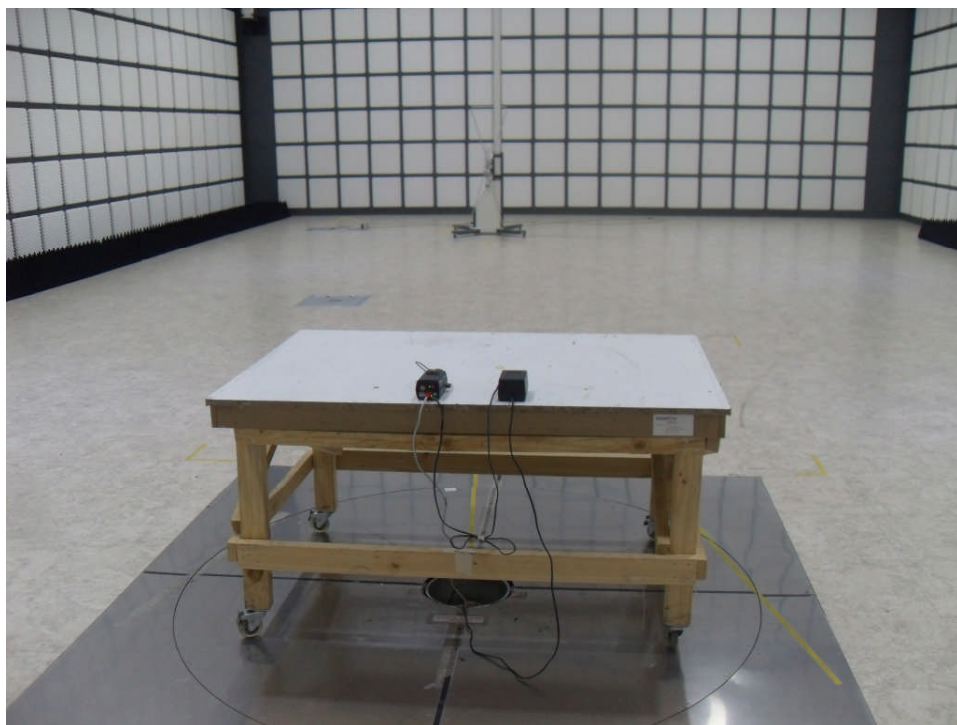
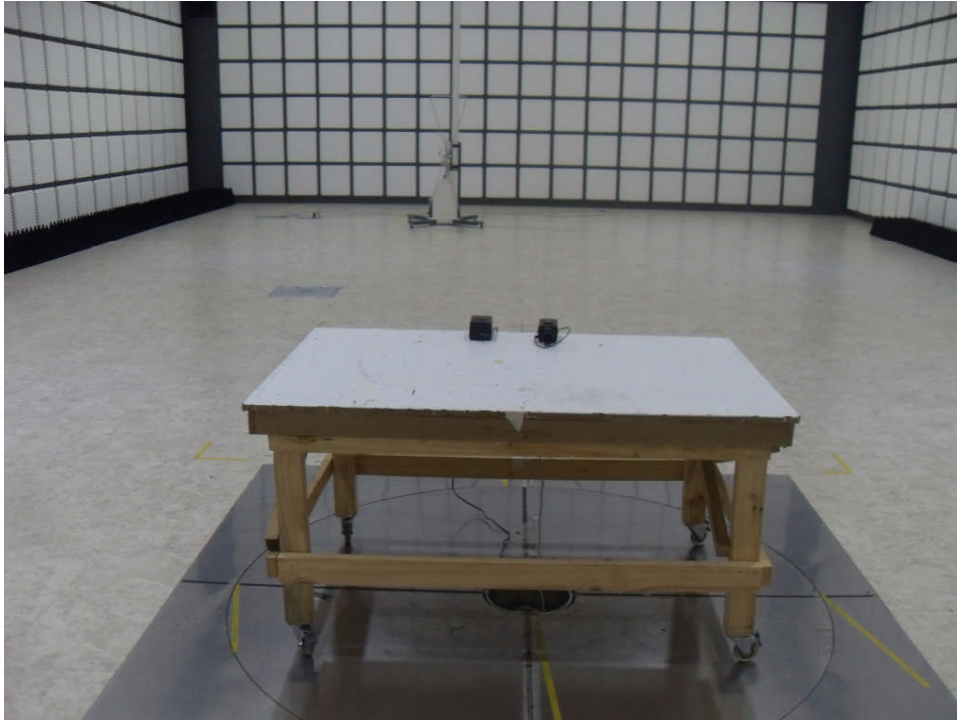
A.G= Amplifier Gain

3 dB Att = 3 dB Attenuator

If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

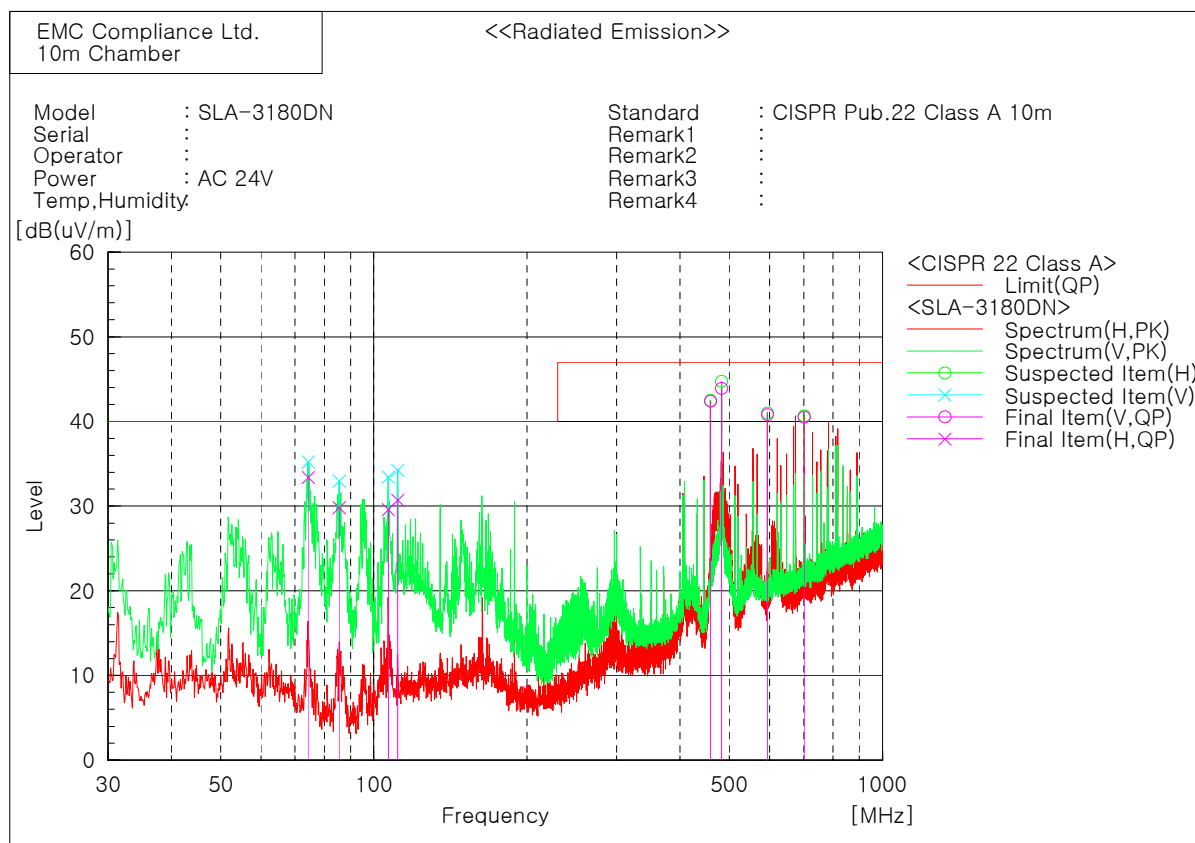
The result is  $30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$

#### 6.1.5 Photographs of test setup



## 6.1.6 Radiated emission measurement result

### \* Graph and Data



### Final Result

| No. | Frequency [MHz] | (P) | Reading QP [dB(uV)] | c.f [dB(1/m)] | Result QP [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] |
|-----|-----------------|-----|---------------------|---------------|----------------------|---------------------|----------------|-------------|-------------|
| 1   | 74.242          | V   | 51.9                | -18.5         | 33.4                 | 40.0                | 6.6            | 101.0       | 228.4       |
| 2   | 85.496          | V   | 49.6                | -19.8         | 29.8                 | 40.0                | 10.2           | 201.0       | 243.7       |
| 3   | 106.692         | V   | 46.6                | -17.0         | 29.6                 | 40.0                | 10.4           | 101.0       | 137.4       |
| 4   | 111.374         | V   | 47.1                | -16.4         | 30.7                 | 40.0                | 9.3            | 301.0       | 156.1       |
| 5   | 458.993         | H   | 52.0                | -9.6          | 42.4                 | 47.0                | 4.6            | 101.0       | 83.3        |
| 6   | 482.626         | H   | 52.3                | -8.4          | 43.9                 | 47.0                | 3.1            | 300.0       | 61.0        |
| 7   | 594.054         | H   | 46.6                | -5.8          | 40.8                 | 47.0                | 6.2            | 400.0       | 259.0       |
| 8   | 701.968         | H   | 44.6                | -4.1          | 40.5                 | 47.0                | 6.5            | 101.0       | 168.0       |

## 6.2 Electrostatic Discharge

|                                     |                                                                             |                   |           |                |           |
|-------------------------------------|-----------------------------------------------------------------------------|-------------------|-----------|----------------|-----------|
| Test specification                  | EN 61000-4-2:2009                                                           |                   |           |                |           |
| Test level                          | Air: $\pm 2, 4, 8$ kV<br>VCP: $\pm 2, 4, 6$ kV                              |                   |           |                |           |
| Discharge impedance                 | 330 $\Omega$ / 150 pF                                                       |                   |           |                |           |
| Date                                | 2011. 03. 16                                                                |                   |           |                |           |
| Testing voltage                     | AC 24 V                                                                     |                   |           |                |           |
| Number of discharge (Each polarity) | 10                                                                          |                   |           |                |           |
| Interval between discharges         | 1 s                                                                         |                   |           |                |           |
| Temperature(°C)                     | 20 °C                                                                       | Humidity (% R.H.) | 34 % R.H. | Pressure (kPa) | 102.1 kPa |
| Remarks                             | Complied<br>- There was no change of operation status during above testing. |                   |           |                |           |

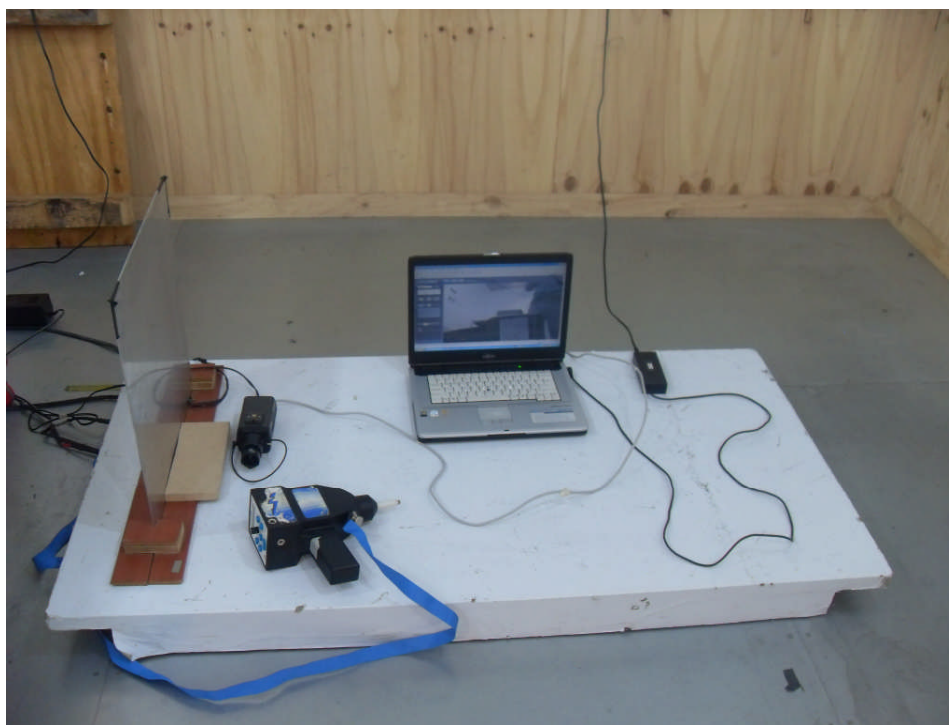
### 6.2.1 Measurement procedure

A ground reference plane was located on the floor, and connected to earth via a low Impedance connection. The return cable of the ESD generator was connected to the reference plane. In case of floor standing equipment, EUT was placed on the reference plane on 0.1 m of insulating Support. In case of table top equipment, EUT was placed on a wooden table 0.8 m above the reference grounded floor. A horizontal coupling plane (HCP) was placed on the table, and Connected to the reference plane via a 470 k $\Omega$  resistor located in each end (0.5 mm insulating support between EUT and HCP). In both cases a vertical coupling plane(VCP) OF 0.5 X 0.5 m was located 0.1 m from the EUT's sides. The VCP was connected to the reference plane in the same matter as the HCP.

### 6.2.2 Used equipments

| Equipment  | Model No. | Serial No. | Makers  | Next Cal. Date | Used                                |
|------------|-----------|------------|---------|----------------|-------------------------------------|
| ESD Tester | PESD 1600 | H011 309   | HAEFELY | 11.07.20       | <input checked="" type="checkbox"/> |
| HCP        | -         | -          | -       | -              | <input type="checkbox"/>            |
| VCP        | -         | -          | -       | -              | <input checked="" type="checkbox"/> |

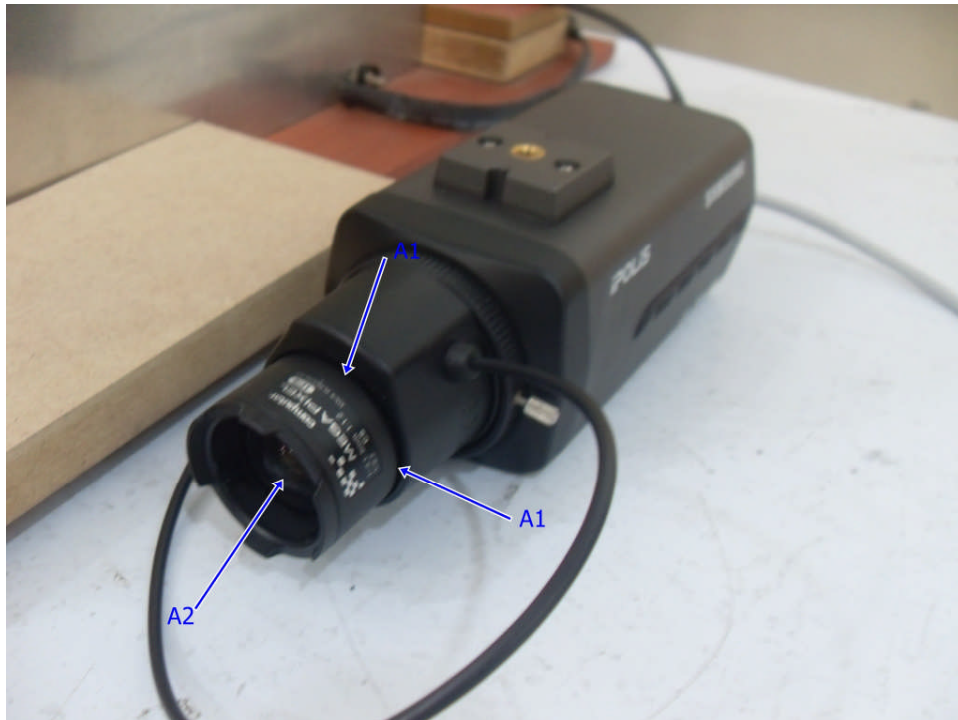
### 6.2.3 Photographs of test setup



#### 6.2.4 Measurement result

##### Electrostatic Discharge (Test Point)

|                   |                                                                                     |
|-------------------|-------------------------------------------------------------------------------------|
| Air discharge     |  |
| Contact discharge |  |



---

**Contact discharge**

| Location(EUT) |                   | Applied level (±) | Result   |
|---------------|-------------------|-------------------|----------|
|               | VCP (All 4 sides) | ± 2, 4, 6 kV      | Complied |

**Air discharge**

| Location(EUT) |                 | Applied level (±) | Result   |
|---------------|-----------------|-------------------|----------|
| A1            | Enclosure(Case) | ± 2, 4, 8 kV      | Complied |
| A2            | Lens            | ± 2, 4, 8 kV      | Complied |
| A3            | IRIS Port       | ± 2, 4, 8 kV      | Complied |

## 6.3 Radio Frequency Electromagnetic Fields

|                         |                                                                                                                |                   |           |                |           |
|-------------------------|----------------------------------------------------------------------------------------------------------------|-------------------|-----------|----------------|-----------|
| Test specification      | EN 61000-4-3:2006                                                                                              |                   |           |                |           |
| Tested frequency        | 80 MHz ~ 1 GHz, 1 GHz ~ 2 GHz<br>log 1 % step                                                                  |                   |           |                |           |
| Test level & Modulation | 1, 3, 10 V/m, 80 % Amplitude Modulation (1 kHz)<br>1, 3, 10 V/m, Pulse Modulation (1 Hz (0.5 s ON: 0.5 s OFF)) |                   |           |                |           |
| Distance                | 3 m from EUT to tip of antenna                                                                                 |                   |           |                |           |
| Dwell time              | 3 s                                                                                                            |                   |           |                |           |
| Step size               | log 1 % step                                                                                                   |                   |           |                |           |
| Testing voltage         | AC 24 V                                                                                                        |                   |           |                |           |
| Date                    | 2011. 03. 17                                                                                                   |                   |           |                |           |
| Temperature(°C)         | 20 °C                                                                                                          | Humidity (% R.H.) | 22 % R.H. | Pressure (kPa) | 102.0 kPa |
| Remarks                 | Complied<br>- There was no change of operation status during above testing.                                    |                   |           |                |           |

### 6.3.1 Measurement procedure

The test was performed at 3 m full anechoic chamber.

For floor standing equipment, the EUT was standing on the floor.

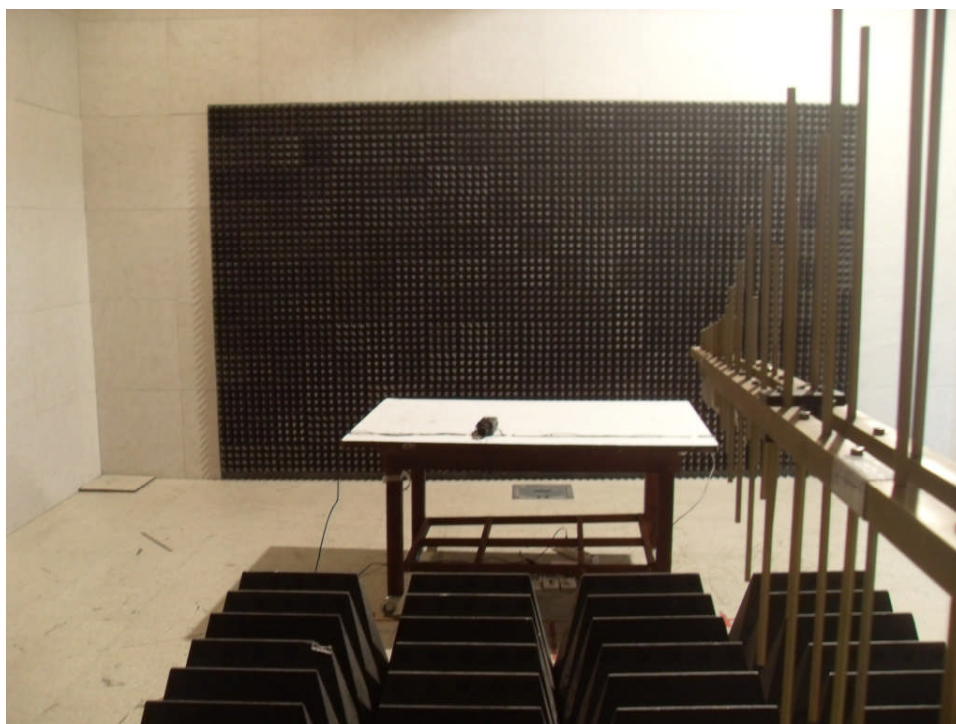
For tabletop equipment, the EUT was located on a wooden table 0.8 above the floor.

The EUT was tested all sides, horizontal and vertical polarization.

### 6.3.2 Used equipments

| Equipment           | Model no.  | Serial no. | Makers  | Next Cal. date | Used                                |
|---------------------|------------|------------|---------|----------------|-------------------------------------|
| Power meter         | PM2002     | 302852     | AR      | 11.04.19       | <input checked="" type="checkbox"/> |
| Power sensor        | PH2000     | 303224     | AR      | 11.04.16       | <input checked="" type="checkbox"/> |
| Power sensor        | PH2000     | 303222     | AR      | 11.04.16       | <input checked="" type="checkbox"/> |
| Directional coupler | DC6180     | 303976     | AR      | 11.04.16       | <input checked="" type="checkbox"/> |
| Directional coupler | DC7144M1   | 320279     | AR      | 12.02.23       | <input checked="" type="checkbox"/> |
| Signal generator    | E4421B     | GB40052295 | AGILENT | 11.10.25       | <input checked="" type="checkbox"/> |
| Amplifier           | 150W1000M2 | 303843     | AR      | 11.04.19       | <input checked="" type="checkbox"/> |
| Amplifier           | 60S1G3M2   | 320444     | AR      | 11.04.19       | <input checked="" type="checkbox"/> |
| Broadband Ant.      | LPDA-0803  | 130269     | ETS     | -              | <input checked="" type="checkbox"/> |
| Field monitor       | SI-300     | -          | TDK     | -              | <input checked="" type="checkbox"/> |
| Antenna master      | -          | -          | ETS     | -              | <input checked="" type="checkbox"/> |

### 6.3.3 Photographs of test setup



#### 6.3.4 Measurement result

| Location(EUT) | Antenna polarization | Result   |
|---------------|----------------------|----------|
| Front side    | Horizontal           | Complied |
|               | Vertical             | Complied |
| Rear side     | Horizontal           | Complied |
|               | Vertical             | Complied |
| Left side     | Horizontal           | Complied |
|               | Vertical             | Complied |
| Right side    | Horizontal           | Complied |
|               | Vertical             | Complied |

## 6.4 Electric Fast Transient/BURST

|                      |                                                                             |                   |           |                |           |
|----------------------|-----------------------------------------------------------------------------|-------------------|-----------|----------------|-----------|
| Test specification   | EN 61000-4-4:2004                                                           |                   |           |                |           |
| Coupling             | AC 24 V : Clamp                                                             |                   |           |                |           |
| Test level           | AC 24 V : $\pm 1$ kV                                                        |                   |           |                |           |
| Repetition frequency | 5 kHz, Tr/Th = 5 / 50 ns                                                    |                   |           |                |           |
| Coupling time        | 60 s                                                                        |                   |           |                |           |
| Testing voltage      | AC 24 V                                                                     |                   |           |                |           |
| Date                 | 2011. 03. 18                                                                |                   |           |                |           |
| Temperature(°C)      | 21 °C                                                                       | Humidity (% R.H.) | 20 % R.H. | Pressure (kPa) | 102.1 kPa |
| Remarks              | Complied<br>- There was no change of operation status during above testing. |                   |           |                |           |

### 6.4.1 Measurement procedure

A ground reference plane was located on the floor.

EFT generator was connected to reference ground plane via low impedance connection.

For floor standing equipment, EUT was placed on a 0.1 m wooden table.

For tabletop equipment, EUT was placed on a 0.1 m above the ground reference plane.

Test generator and coupling/decoupling network was placed on, and bounded to, the ground reference plane. When using the coupling clamp, the minimum distance between the coupling plates and all other conductive surfaces, except the ground reference plane beneath the coupling clamp, Shall be 0.5 m.

### 6.4.2 Used equipments

| Equipment                 | Model No.  | Serial No. | Makers  | Next Cal. date | Used                                |
|---------------------------|------------|------------|---------|----------------|-------------------------------------|
| Generator                 | UCS 500 M6 | 0701-03    | EM TEST | 11.06.16       | <input checked="" type="checkbox"/> |
| Capacitive Coupling Clamp | -          | -          | EM TEST | -              | <input checked="" type="checkbox"/> |

#### 6.4.3 Photographs of test setup



#### 6.4.4 Measurement result

\* AC Line

| EFT coupling point | (+)    | (-)    | Result   |
|--------------------|--------|--------|----------|
| AC 24 V            | + 1 kV | - 1 kV | Complied |

## 6.5 Surge

|                                 |                                                                             |                  |          |               |           |
|---------------------------------|-----------------------------------------------------------------------------|------------------|----------|---------------|-----------|
| Test specification              | EN 61000-4-5:2006                                                           |                  |          |               |           |
| Coupling                        | AC 24 V : CDN                                                               |                  |          |               |           |
| Test level                      | AC 24 V : $\pm 0.5, 1$ kV                                                   |                  |          |               |           |
| Surge pulse shape               | Tr/Th = 1.2 / 50 $\mu$ s                                                    |                  |          |               |           |
| Coupling Impedance              | AC 24 V : 40 $\Omega$                                                       |                  |          |               |           |
| Number of surge / Coupling time | 5 / 1 min                                                                   |                  |          |               |           |
| Testing voltage                 | AC 24 V                                                                     |                  |          |               |           |
| Date                            | 2011. 03. 18                                                                |                  |          |               |           |
| Temperature( $^{\circ}$ C)      | 20 $^{\circ}$ C                                                             | Humidity (% R.H) | 21 % R.H | Pressure(kPa) | 102.0 kPa |
| Remarks                         | Complied<br>- There was no change of operation status during above testing. |                  |          |               |           |

### 6.5.1 Measurement procedure

A ground reference plane was located on the floor. SURGE generator was connected to reference ground plane via low impedance connection. For floor standing equipment & table top equipment, EUT was placed on a wooden table.

### 6.5.2 Used equipments

| Equipment | Model No.  | Serial No. | Makers  | Next Cal. Date | Used                                |
|-----------|------------|------------|---------|----------------|-------------------------------------|
| Generator | UCS 500 M6 | 0701-03    | EM TEST | 11.06.16       | <input checked="" type="checkbox"/> |
| CDN       | CNV 508    | 1001-10    | EM TEST | -              | <input type="checkbox"/>            |

### 6.5.3 Photographs of test setup



### 6.5.4 Measurement result

\* AC Line

| Coupling point | (+)         | (-)         | Result   |
|----------------|-------------|-------------|----------|
| AC 24 V        | + 0.5, 1 kV | - 0.5, 1 kV | Complied |

## 6.6 Conducted Immunity

|                         |                                                                                                            |                  |          |               |           |
|-------------------------|------------------------------------------------------------------------------------------------------------|------------------|----------|---------------|-----------|
| Test specification      | EN 61000-4-6:2007                                                                                          |                  |          |               |           |
| Tested frequency        | 0.15 MHz ~ 100 MHz<br>log 1 % step                                                                         |                  |          |               |           |
| Test level & Modulation | 1, 3, 10 V, 80 % Amplitude Modulation (1 kHz)<br>1, 3, 10 V, Pulse Modulation (1 Hz (0.5 s ON: 0.5 s OFF)) |                  |          |               |           |
| Coupling method         | AC 24 V : CDN(M2)                                                                                          |                  |          |               |           |
| Testing voltage         | AC 24 V                                                                                                    |                  |          |               |           |
| Date                    | 2011. 03. 16                                                                                               |                  |          |               |           |
| Temperature(°C)         | 20 °C                                                                                                      | Humidity (% R.H) | 23 % R.H | Pressure(kPa) | 101.9 kPa |
| Remarks                 | Complied<br>- There was no change of operation status during above testing.                                |                  |          |               |           |

### 6.6.1 Measurement procedure

A ground reference plane was located on the floor.

The test was performed on a ground reference plane on a 0.1 m wooden table.

This test were performed using CDN for mains, clamp for signal and injection probe.

The frequency range was swept from 0.15 MHz to 100 MHz. This frequency range was modulated with 1 kHz sine wave at 80 %.The signal generators provided the modulated frequency at a 1 % step size.

The power and all network cable, I/O cables longer than 3 m length were tested.

### 6.6.2 Used equipments

| Equipment     | Model no.    | Serial no.           | Makers        | Next Cal. date | Used                                |
|---------------|--------------|----------------------|---------------|----------------|-------------------------------------|
| CS generator  | CWS 500 C S1 | V0635101750          | EM TEST       | 11.10.13       | <input checked="" type="checkbox"/> |
| CDN           | CDN M2/M3    | 0906-12              | EM TEST       | 11.10.13       | <input checked="" type="checkbox"/> |
| CDN           | CDN M3-32A   | 0506-29              | EM TEST       | 12.02.11       | <input checked="" type="checkbox"/> |
| Attenuator    | 73-6-34      | MU918                | MCE/WEINSCHEL | 11.10.13       | <input checked="" type="checkbox"/> |
| EM Clamp      | KEMZ 801     | 17643                | Schaffner     | 11.04.19       | <input type="checkbox"/>            |
| Current probe | MD720        | W1345167/M6/<br>0068 | Schaffner     | -              | <input type="checkbox"/>            |

### 6.6.3 Photographs of test setup



### 6.6.4 Measurement result

\* AC Line

| Coupling point | Coupling method | Result   |
|----------------|-----------------|----------|
| AC 24 V        | CDN (M2)        | Complied |

## 7. E.U.T. photographs

### Front View



### Rear View



Left View



Right View



Top View



Bottom View

