# EMC TEST REPORT

| | | |
|---|---|---|
| **Test report No** | : | **EMC-VCCI-0393** |
| **Type of Equipment** | : | **CCTV Camera** |
| **Model Name** | : | **SCD-5083RN** |
| **Applicant** | : | **Samsung Techwin Co., Ltd.**<br>**84, Jeongdong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea** |
| **Manufacturer#1** | : | **Samsung Techwin Co., Ltd.**<br>**84, Jeongdong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea** |
| **Manufacturer#2** | : | **TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC CO., LTD**<br>**No.11 Weiliu Road. Micro-Electronic Industrial Park Jingang Road Tianjin 300385, China** |
| **Test standards** | : | **VCCI V-3 / 2013.04, Class A** |
| **Testing Laboratory** | : | **EMC Compliance Ltd.** |
| **Test result** | : | **Complied** |

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of VCCI Rules and Regulations.
The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of receipt: 2014. 06. 13

Date of testing: 2014. 07. 03 ~ 07. 06

Issued date: 2014. 07. 14

**Tested by:** LYU, JUNG-GIL

**Approved by:** YEOM, HAN-SEOK


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# 1. Applicant information

| | |
|---|---|
| **Applicant:** | Samsung Techwin Co., Ltd. |
| **Address:** | 84, Jeongdong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea |
| **Telephone:** | +82-70-7147-8361 |
| **Fax:** | +82-31-277-2784 |
| **E-mail:** | js2002.kang@samsung.com |
| **Contact name:** | **Kang Jei Soon** |

| | |
|---|---|
| **Manufacturer#1:** | Samsung Techwin Co., Ltd. |
| **Address:** | 84, Jeongdong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea |
| **Telephone:** | +82-70-7147-8361 |
| **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 |


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# 2. Laboratory information

**Address**

**EMC compliance Ltd.**

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-390, Korea

Telephone Number: 82 31 336 9919

Facsimile Number: 82 505 299 8311

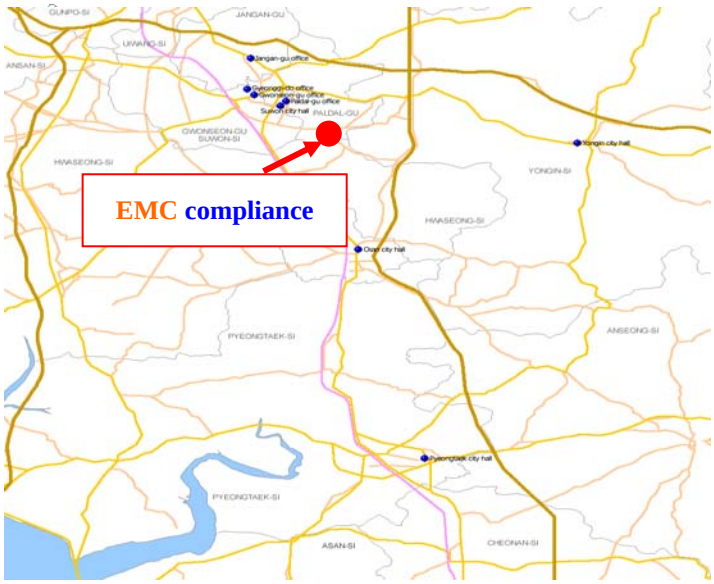
FCC CAB.: KR0040

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

Industry Canada Registration No.: 8035A

KOLAS NO.: 231

SITE MAP





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# 3. Test system configuration

## 3.1 Operation environment

| | | Temperature | Humidity | Pressure |
|---|---|---|---|---|
| Chamber(10 m) | : | 19.6 ~ 21.2 °C | 48.8 ~ 55.4 % R.H. | - |

Test site

These testing items were performed following locations;

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


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## 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 (C.L: Approx 95 %, k = 2) | | |
|---|---|---|
| Shielded Room (CE#1) | 9 kHz ~ 150 kHz: ± 3.75 dB<br>150 kHz ~ 30 MHz: ± 3.36 dB | |
| Shielded Room (CE#2) | 9 kHz ~ 150 kHz: ± 3.79 dB<br>150 kHz ~ 30 MHz: ± 3.42 dB | |
| Radiated Emission measurement (C.L: Approx 95 %, k = 2) | | |
| 10 m Chamber (#F4) | 30 MHz ~ 300 MHz | 3 m: + 4.87 dB, - 4.99 dB<br>10 m: + 4.86 dB, - 4.98 dB |
| | 300 MHz ~ 1 000 MHz | 3 m: + 5.04 dB, - 5.14 dB<br>10 m: + 4.91 dB, - 5.02 dB |
| | 1 GHz ~ 6 GHz | 3 m: + 6.03 dB, - 6.06 dB |
| 10 m Chamber (#F2) | 30 MHz ~ 300 MHz | 3 m: + 4.94 dB, - 5.06 dB<br>10 m: + 4.93 dB, - 5.05 dB |
| | 300 MHz ~ 1 000 MHz | 3 m: + 4.97 dB, - 5.08 dB<br>10 m: + 4.84 dB, - 4.96 dB |
| | 1 GHz ~ 6 GHz | 3 m: + 6.03 dB, - 6.05 dB |


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# 4. Description of E.U.T.

## 4.1 General information

| | SCD-5083RN | SCD-5083RP |
|---|---|---|
| **Video** | | |
| Imaging Device | 1/3" 1.3M CMOS | |
| Total Pixels | 1312(H) x 1069(V) | |
| Effective Pixels | 1305(H) x 1049(V) | |
| Scanning System | Progressive Scan | |
| Synchronization | Internal | |
| Frequency | H : 15.734KHz / V : 59.94Hz | H : 15.625KHz / V : 50Hz |
| Horizontal Resolution | Color : 1000 TVL<br>B/W : 1000 TVL | |
| Min. Illumination | Color : 0.05Lux (F1.4, 50IRE), 0.001Lux (1sec, F1.4, 50IRE)<br>0.02Lux (F1.4, 30IRE), 0.0006Lux (1sec, F1.4, 30IRE)<br>B/W : 0Lux (IR LED On) | |
| S / N Ratio | 52dB (AGC off, Weight on) | |
| Video Output | CVBS : 1.0 Vp-p / 75Ω composite | |
| **Lens Type** | | |
| Focal Length (Zoom Ratio) | 3~10mm | |
| Max. Aperture Ratio | F1.4 | |
| Angular Field of View | H: 82.0°(Wide)~26.5°(Tele), V: 59.7°(Wide)~19.9°(Tele) | |
| Min. Object Distance | 0.5m | |
| Focus Control | Manual | |
| Lens Type | DC Auto Iris | |
| Mount Type | Board Type | |
| **Operational** | | |
| On Screen Display | Multi-language Support(17)<br>English, Japanese, Spanish, French, Portuguese, Korean, German, Italian, Chinese, Russian, Polish, Czech, Romanian, Serbian, Swedish, Danish, Turkish | |
| Camera Title | Off / On (Displayed 15 characters) | |
| Day & Night | Auto (ICR) / External / Color / B/W | |
| Backlight Compensation | Off / User BLC / HLC / WDR | |
| Wide Dynamic Range | 120dB | |
| Contrast Enhancement | SSDR ( Off / On ) | |
| Digital Noise Reduction | SSNR4 ( Off / On ) | |
| Defog | AUTO / MANUAL / OFF | |
| Purple Fringe Reduction | Purple Fringe Reduction ( Off / Low / Middle / High) | |
| Digital Image Stabilization | Off / On | |
| Tampering | Off / On | |
| Motion Detection | Off / On | |
| Intelligent Video | Fence, Apear_Disappear, Counting ( Off / On ) | |
| Privacy Masking | Off / On (24 programmable zones with 4points polygonal masking) | |
| Gain Control | Off / Low / Middle / High | |


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| | |
|---|---|
| White Balance | ATW / Outdoor / Indoor / Manual / AWC / Mercury (1,800K° ~ 10,500K°) |
| Electronic Shutter Speed | 1 sec ~ 1/12,000 sec |
| Digital Zoom | Off / On (1x ~ 16x) |
| Reverse | Off / H-Rev / V-Rev / HV-Rev |
| Profile | Basic, Day & Night, Backlight, ITS, Indoor, User |
| Alarm | 1 Out |
| Communication | Coaxial Control ( SPC-300 Compatible ) |
| Protocol | Coax : Pelco-C (Coaxitron) |
| IR Distance | 20m |
| **Environmental** | |
| Operating Temperature / Humidity | -10°C ~ +55°C (+14°F ~ +131°F) / Less than 90% RH |
| Ingress Protection | - |
| Vandal Resistance | - |
| **Electrical** | |
| Input Voltage/Current | Dual ( 24VAC±10% & 12VDC±10% ) |
| Power Consumption | max 5.6w |
| **Mechanical** | |
| Color / Material | Ivory / Aluminum, Plastic |
| Dimension (WxHxD) | Ø 119.8 x 101.8mm |
| Weight | 490g |


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## 4.2 Product description

| | |
|---|---|
| Type of product | CCTV Camera |
| Model name (Basic) | SCD-5083RN |
| Model name (Variant) | - |
| Difference | - |
| Trade name | - |
| Serial no | Engineering Sample |
| Testing voltage | DC 12 V, AC 24 V |
| Product rating | DC 12 V, AC 24 V |
| Internal clock frequency | Above 108 ㎒ |
| Note | * AC/AC adaptor was not provided by the manufacturer. |

## 4.3 Auxiliary equipments

| Type | Model / Part # | Serial number | Manufacturer |
|---|---|---|---|
| Monitor | PM24KO | YER8HVDBA00052A | SAMSUNG |
| JIG | - | - | - |
| DC Power Supply | E3632A | KR01009281 | Agilent |
| AC/AC Adaptor | EO-2460 | - | EO Eletronics |


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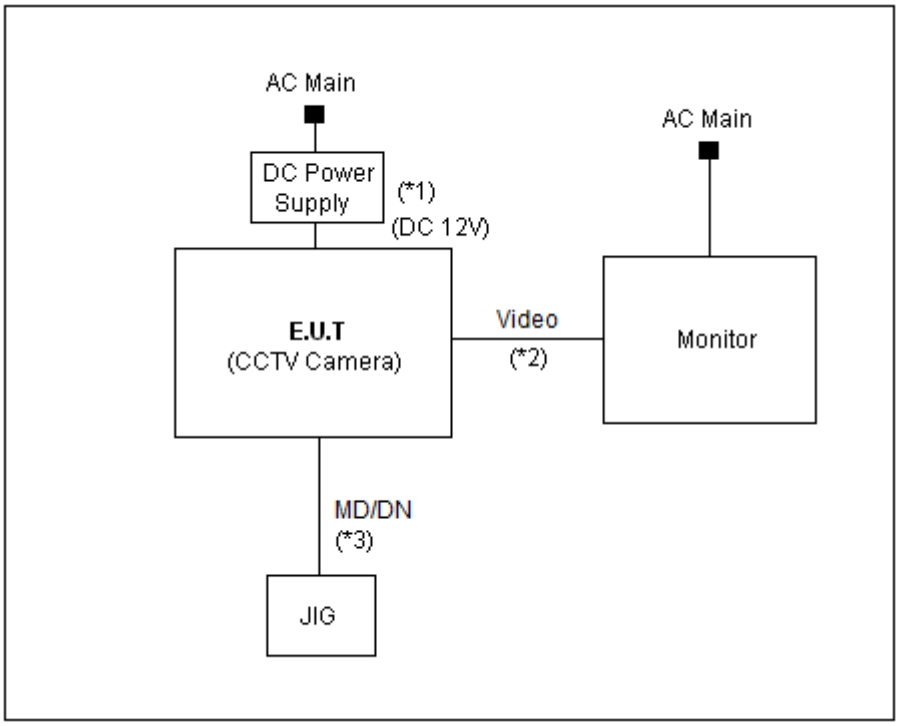
## 4.4 Test configuration

#1- DC 12V




| Note | Start | | End | | Cable | |
|---|---|---|---|---|---|---|
| * | Name | I/O port | Name | I/O port | Length (m) | Spec. |
| 1 | **EUT** (CCTV Camera) | Power | DC Power Supply | Power | 1.5 | Non-Shield |
| 2 | | Video | Monitor | Video | 3.0 | Shield |
| 3 | | MD/DN | JIG | MD/DN | 3.0 | Non-Shield |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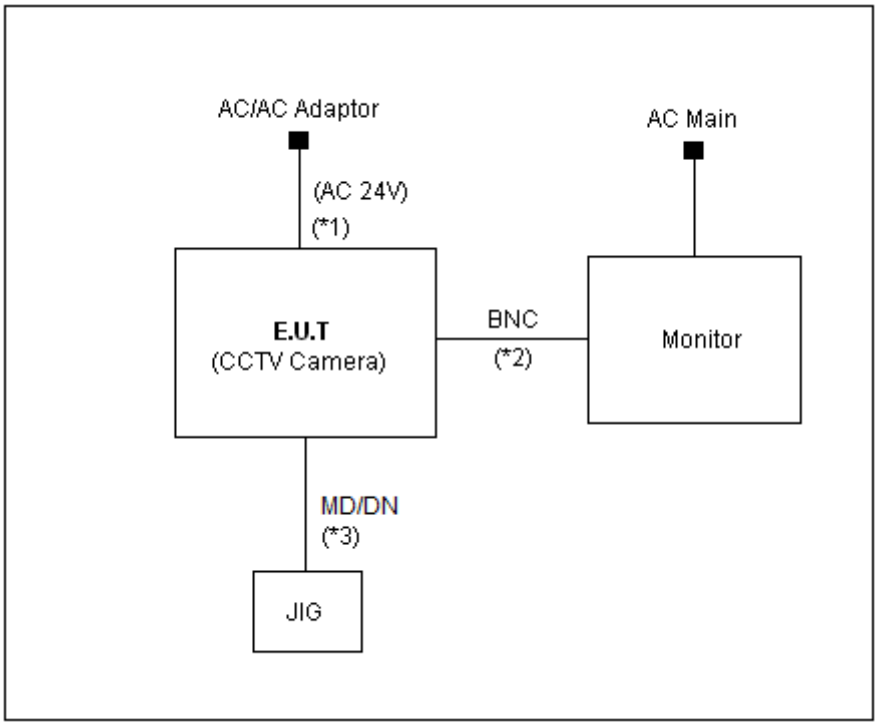
#2- AC 24V




| Note | Start | | End | | Cable | |
|---|---|---|---|---|---|---|
| * | Name | I/O port | Name | I/O port | Length (m) | Spec. |
| 1 | **EUT** (CCTV Camera) | Power | AC/AC Adaptor | Power | 1.5 | Non-Shield |
| 2 | | Video | Monitor | Video | 3.0 | Shield |
| 3 | | MD/DN | JIG | MD/DN | 3.0 | Non-Shield |

## 4.5 Operating conditions

The EUT was configured as normal intended use.

| Test mode | Normal operating |
|---|---|
| 1 | Check the video output monitoring test. |
| | MD/DN test. |

* Note: 2 types of powers are available for the product, that are DC 12 V, AC 24 V.

Therefore, tests were performed for 2 different types of powers.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# 5. Summary of test results

## 5.1 Summary of EMI emission test results

| Applied | Test items | Test method | Result |
|---|---|---|---|
| ☐ | Conducted Emission | VCCI V-3 / 2013.04, Class A | N/A |
| ☒ | Radiated Emission | VCCI V-3 / 2013.04, Class A | Complied |


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# 6. Test results

## 6.1 Radiated Emission

| | | | |
|---|---|---|---|
| Test specification | VCCI V-3 / 2013.04, Class A | | |
| Testing voltage | DC 12 V, AC 24 V | | |
| Test facility | 10 m Chamber (#F2) | | |
| Test distance | 10 m, 3 m | | |
| Date | 2014. 07. 03 ~ 07. 06 | | |
| Temperature (°C) | 19.6 ~ 21.2 °C | Humidity (% R.H.) | 48.8 ~ 55.4 % R.H. |
| Remarks | Complied | | |

### 6.1.1 Limits of radiated emission measurement

☒ Limits below 1 GHz

| Frequency [MHz] | Class A (dB(μV/m)) @10 m | Class B (dB(μV/m)) @10 m |
|---|---|---|
| 30 ~ 230 | 40 | 30 |
| 230 ~ 1000 | 47 | 37 |

☒ Limits above 1 GHz

| Frequency [GHz] | Class A @ 3 m | | Class B @ 3 m | |
|---|---|---|---|---|
| | Average limit (dB(μV/m)) | Peak limit (dB(μV/m)) | Average limit (dB(μV/m)) | Peak limit (dB(μV/m)) |
| 1 ~ 3 | 56 | 76 | 50 | 70 |
| 3 ~ 6 | 60 | 80 | 54 | 74 |
| Note - The lower limit applies at the transition frequency. | | | | |

### 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.


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### 6.1.3 Used equipments

| Equipment | Model no. | Serial no. | Makers | Next Cal. Date | Used |
|---|---|---|---|---|---|
| Test Receiver | ESCI7 | 100732 | R&S | 2015.01.27 | ☐ |
| Test Receiver | ESCI | 100710 | R&S | 2014.10.28 | ☐ |
| Test Receiver | ESR | 101078 | R&S | 2015.02.24 | ☒ |
| Bi-Log Antenna | VULB 9168 | 440 | SCHWARZBECK | 2015.10.16 | ☒ |
| Amplifier | 310N | 293004 | SONOMA INSTRUMENT | 2014.10.31 | ☒ |
| 3 dB Attenuator | 8491B | 22981 | HP | 2015.03.04 | ☒ |
| Antenna Mast | MA4000-EP | 303 | Innco Systems | - | ☒ |
| Turn Table | DT2000S-1t | 079 | Innco Systems | - | ☒ |
| Amplifier | 8449B | 3008A02343 | AGILENT | 2014.10.31 | ☒ |
| Horn ANT | 3115 | 00155772 | ETS | 2015.02.26 | ☒ |
| Spectrum Analyzer | E4407B | US39010142 | AGILENT | 2014.10.21 | ☐ |

### 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:

Result = M.R + C.F(A.F + C.L +3 dB Att – 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 dB(μV/m)


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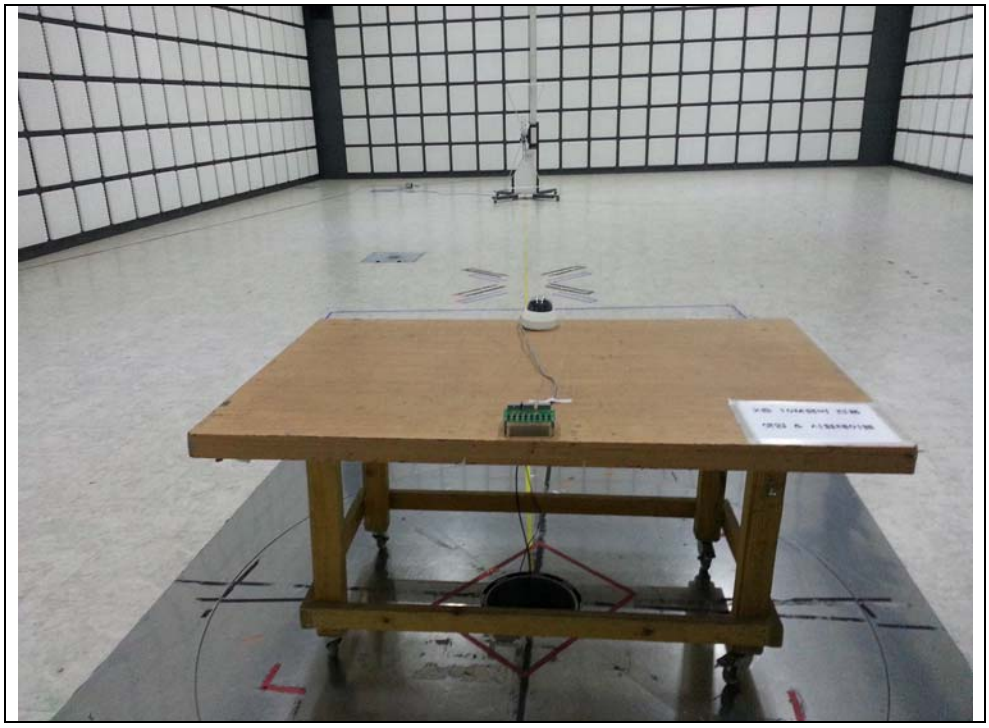
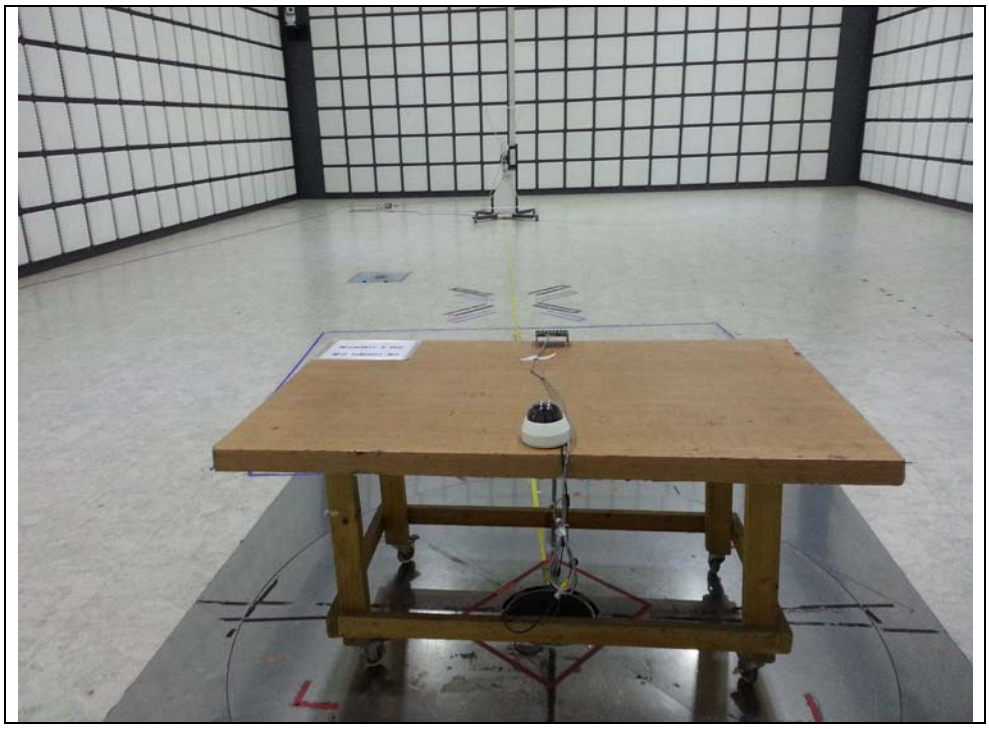
6.1.5 Photographs of test setup

* 30 ㎒ ~ 1 ㎓ (#1-DC 12V)



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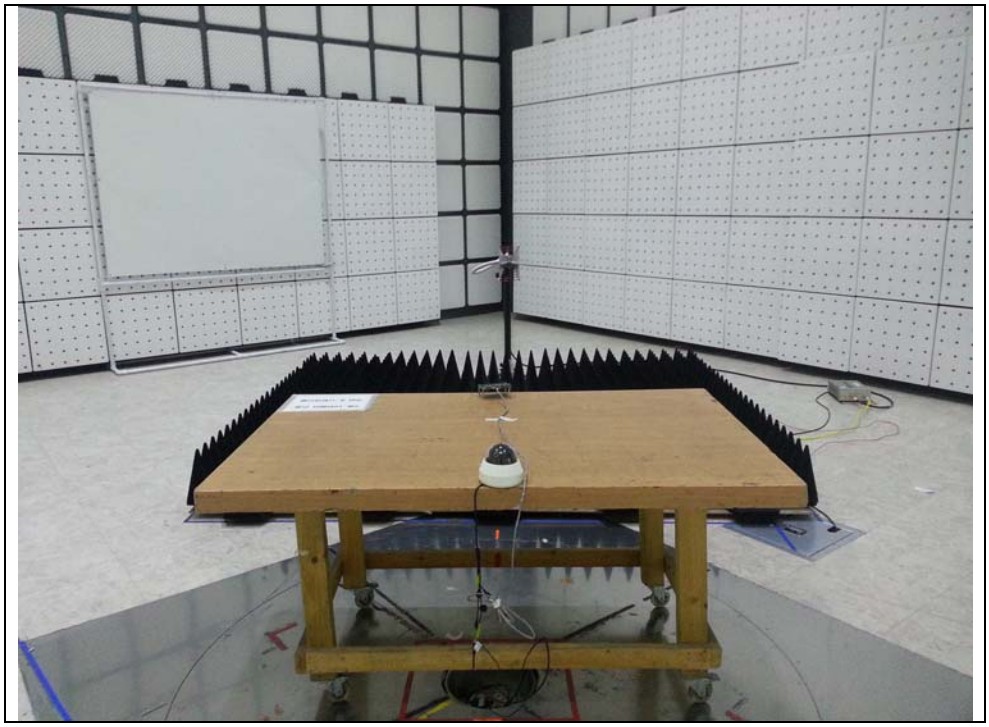
* 1 ㎓ ~ 6 ㎓ (#1-DC 12V)

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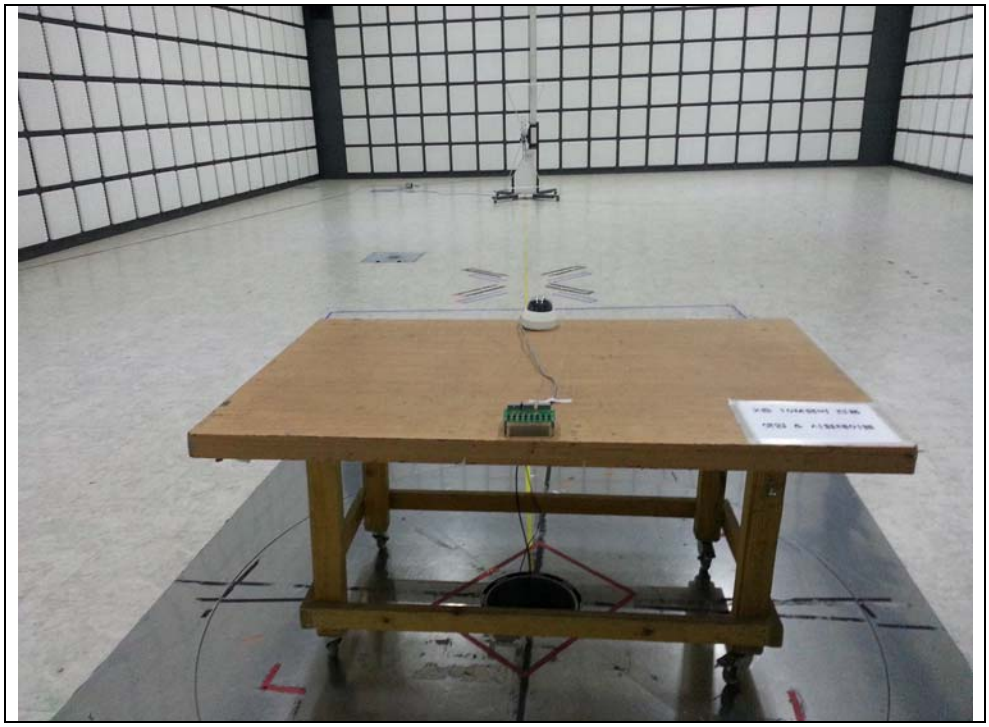
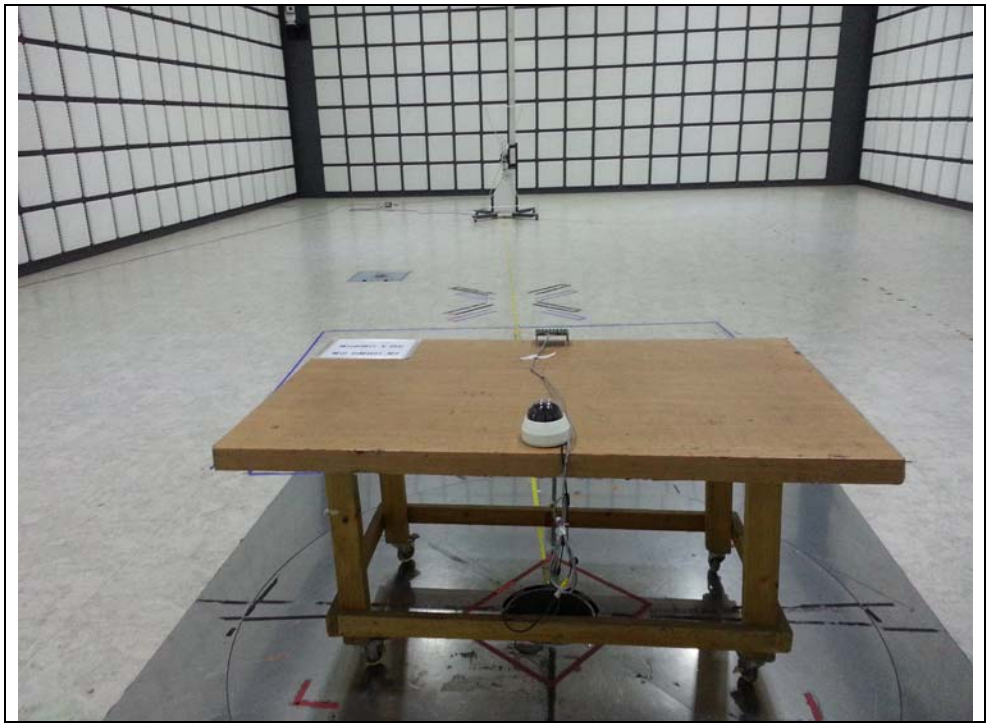
* 30 ㎒ ~ 1 ㎓ (#2-AC 24V)



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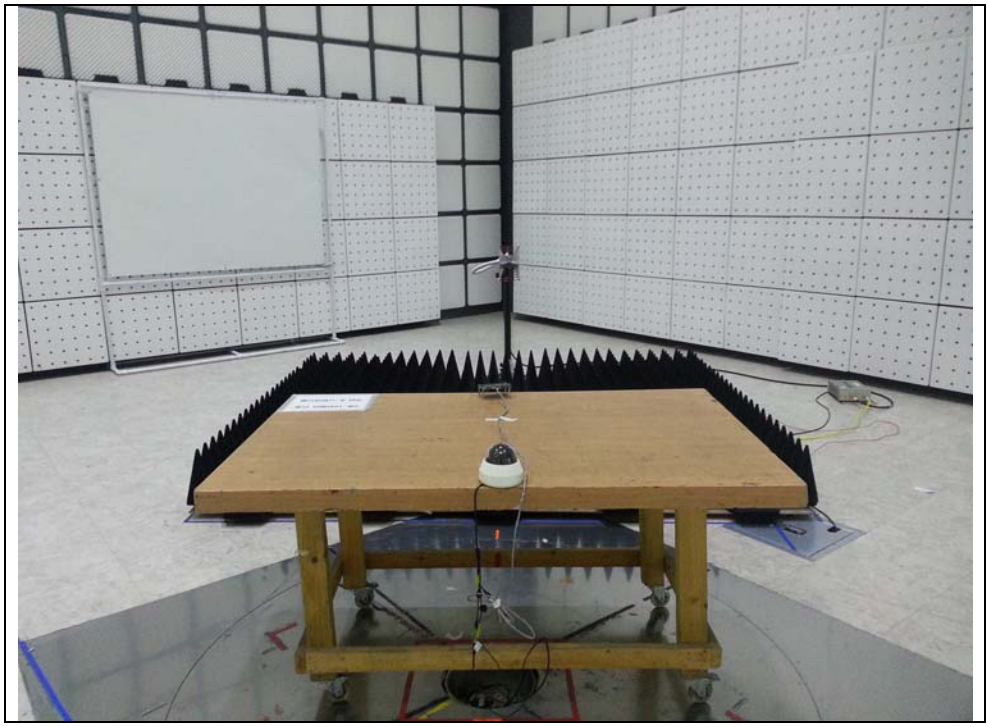
* 1 ㎓ ~ 6 ㎓ (#2-AC 24V)

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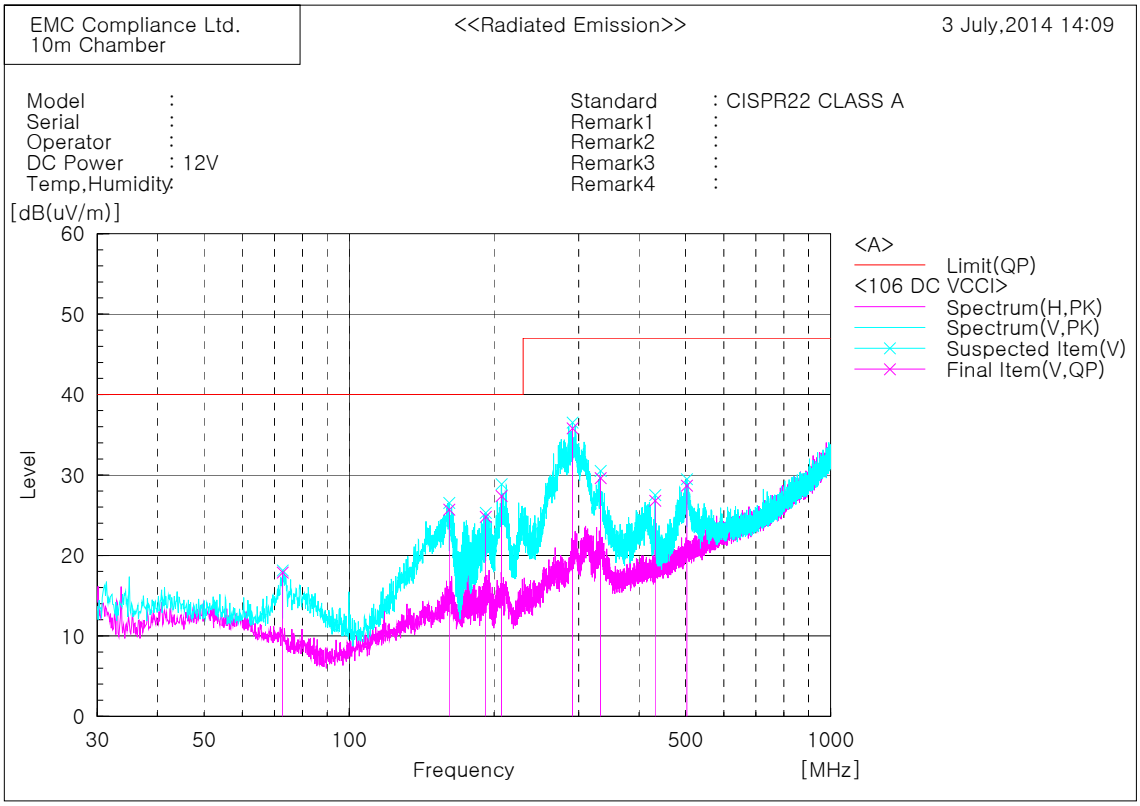
6.1.6 Radiated emission measurement result

*** Graph and Data**

* 30 ㎒ ~ 1 ㎓(SCD-5083RN)_#1- DC 12V




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 | 72.801 | V | 34.3 | -16.4 | 17.9 | 40.0 | 22.1 | 100.0 | 208.2 |
| 2 | 161.314 | V | 38.8 | -13.1 | 25.7 | 40.0 | 14.3 | 100.0 | 341.8 |
| 3 | 192.233 | V | 39.4 | -14.6 | 24.8 | 40.0 | 15.2 | 100.0 | 313.3 |
| 4 | 207.268 | V | 42.2 | -14.8 | 27.4 | 40.0 | 12.6 | 100.0 | 226.2 |
| 5 | 290.930 | V | 46.5 | -10.7 | 35.8 | 47.0 | 11.2 | 100.0 | 358.1 |
| 6 | 332.761 | V | 39.0 | -9.4 | 29.6 | 47.0 | 17.4 | 100.0 | 334.3 |
| 7 | 431.944 | V | 33.2 | -6.4 | 26.8 | 47.0 | 20.2 | 100.0 | 257.7 |
| 8 | 502.996 | V | 33.4 | -4.7 | 28.7 | 47.0 | 18.3 | 100.0 | 48.7 |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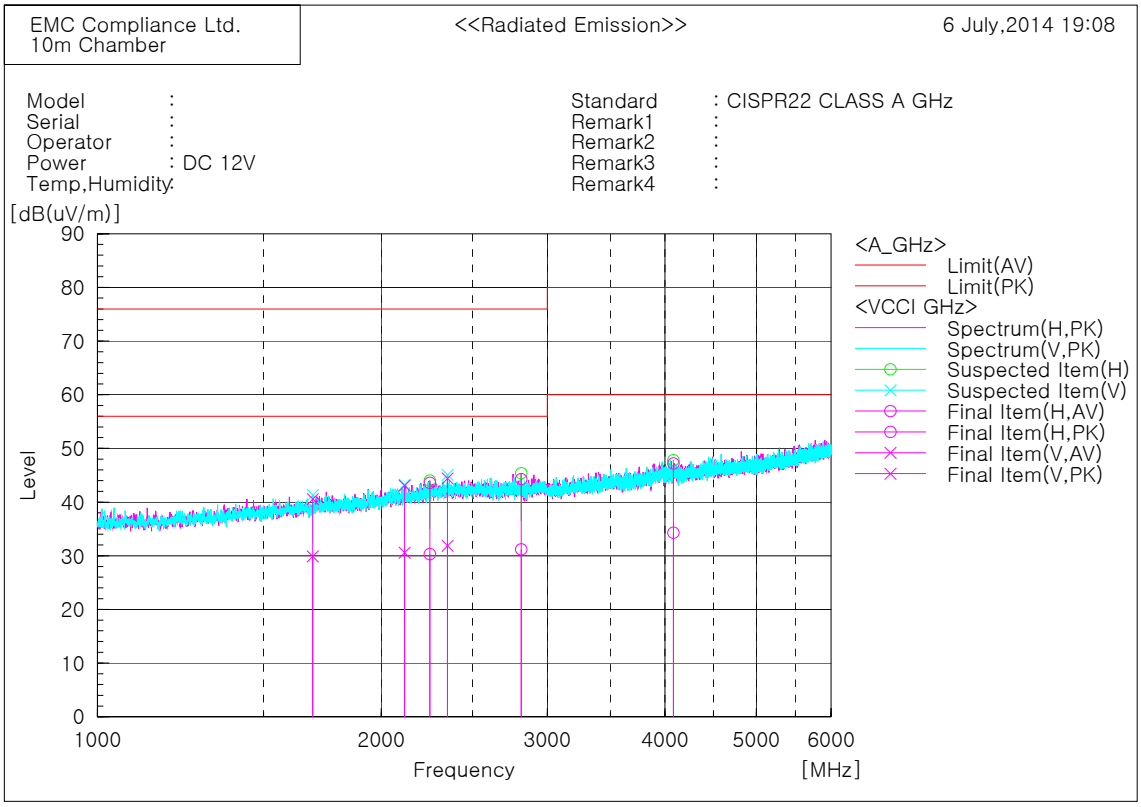
* 1 ㎓ ~ 6 ㎓ (SCD-5083RN)_#1- DC 12V




Final Result

| No. | Frequency [MHz] | (P) | Reading AV [dB(uV)] | Reading PK [dB(uV)] | c.f [dB(1/m)] | Result AV [dB(uV/m)] | Result PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Limit PK [dB(uV/m)] | Margin AV [dB] | Margin PK [dB] | Height [cm] | Angle [deg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1691.250 | V | 32.5 | 43.2 | -2.6 | 29.9 | 40.6 | 56.0 | 76.0 | 26.1 | 35.4 | 100.0 | 124.5 |
| 2 | 2116.875 | V | 30.7 | 43.2 | -0.1 | 30.6 | 43.1 | 56.0 | 76.0 | 25.4 | 32.9 | 100.0 | 113.9 |
| 3 | 2251.875 | H | 29.6 | 42.9 | 0.7 | 30.3 | 43.6 | 56.0 | 76.0 | 25.7 | 32.4 | 100.0 | 46.4 |
| 4 | 2351.250 | V | 30.7 | 43.2 | 1.2 | 31.9 | 44.4 | 56.0 | 76.0 | 24.1 | 31.6 | 100.0 | 201.3 |
| 5 | 2814.375 | H | 30.1 | 43.2 | 1.1 | 31.2 | 44.3 | 56.0 | 76.0 | 24.8 | 31.7 | 100.0 | 304.2 |
| 6 | 4083.750 | H | 28.7 | 41.6 | 5.6 | 34.3 | 47.2 | 60.0 | 80.0 | 25.7 | 32.8 | 100.0 | 198.7 |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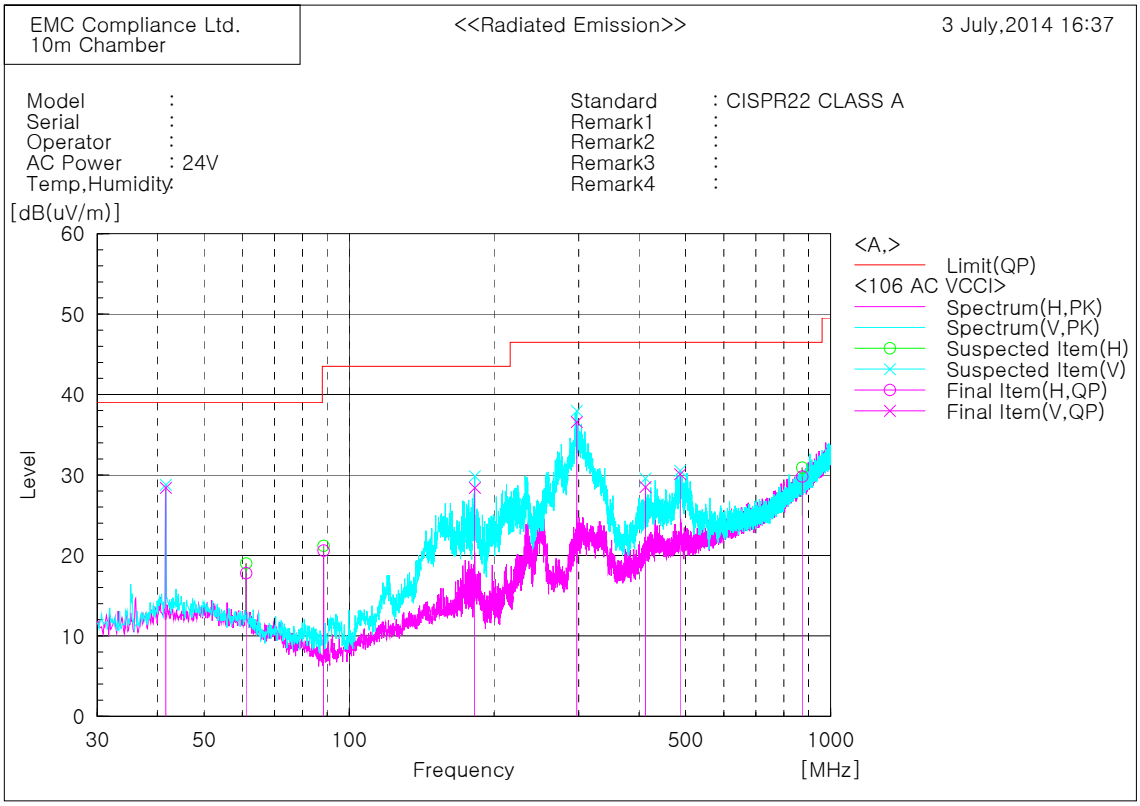
* 30 ㎒ ~ 1 ㎓(SCD-5083RN)_#2-AC 24V




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 | 41.640 | V | 42.1 | -13.7 | 28.4 | 39.0 | 10.6 | 199.0 | 73.5 |
| 2 | 61.161 | H | 32.3 | -14.5 | 17.8 | 39.0 | 21.2 | 201.0 | 175.5 |
| 3 | 88.564 | H | 39.1 | -18.5 | 20.6 | 43.5 | 22.9 | 201.0 | 175.5 |
| 4 | 182.290 | V | 41.9 | -13.5 | 28.4 | 43.5 | 15.1 | 100.0 | 318.4 |
| 5 | 296.871 | V | 47.1 | -10.5 | 36.6 | 46.5 | 9.9 | 100.0 | 342.4 |
| 6 | 412.786 | V | 35.4 | -6.9 | 28.5 | 46.5 | 18.0 | 100.0 | 178.9 |
| 7 | 487.355 | V | 35.2 | -5.1 | 30.1 | 46.5 | 16.4 | 400.0 | 166.5 |
| 8 | 873.779 | H | 26.3 | 3.5 | 29.8 | 46.5 | 16.7 | 301.0 | 8.2 |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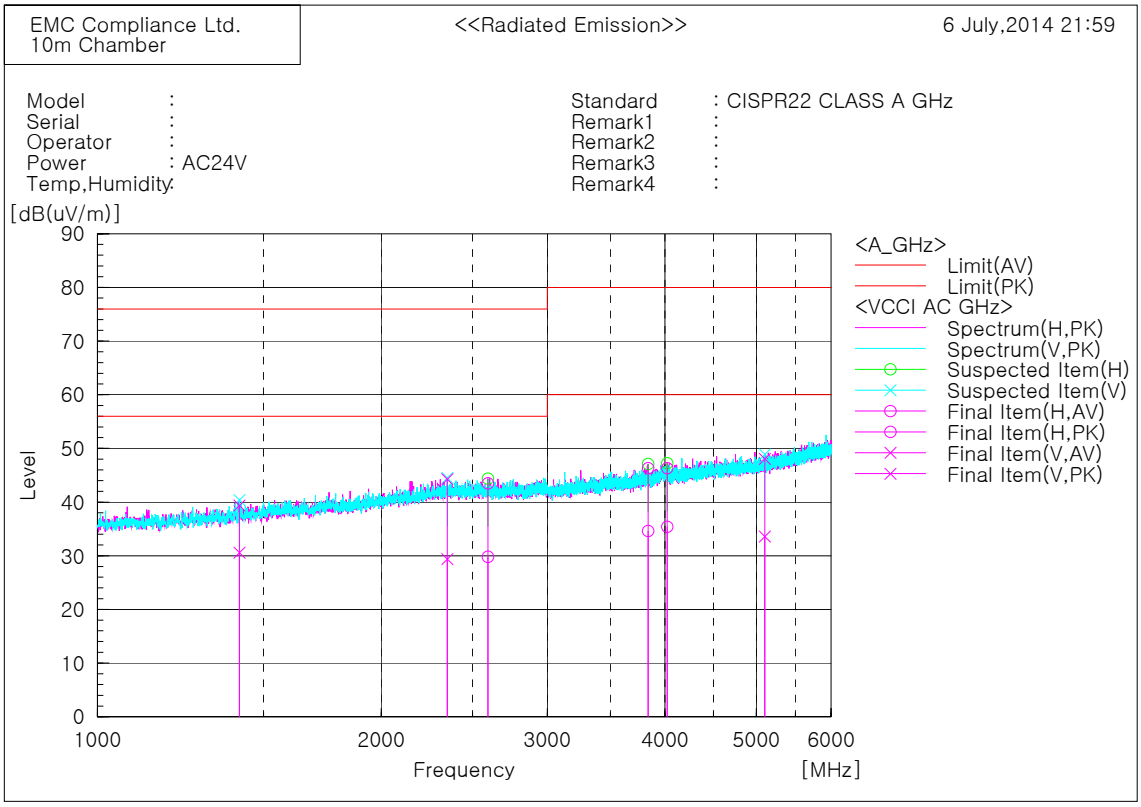
* 1 ㎓ ~ 6 ㎓ (SCD-5083RN)_#2-AC 24V




Final Result

| No. | Frequency [MHz] | (P) | Reading AV [dB(uV)] | Reading PK [dB(uV)] | c.f [dB(1/m)] | Result AV [dB(uV/m)] | Result PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Limit PK [dB(uV/m)] | Margin AV [dB] | Margin PK [dB] | Height [cm] | Angle [deg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1414.375 | V | 35.0 | 43.8 | -4.4 | 30.6 | 39.4 | 56.0 | 76.0 | 25.4 | 36.6 | 100.0 | 339.8 |
| 2 | 2349.375 | V | 28.2 | 43.1 | 1.2 | 29.4 | 44.3 | 56.0 | 76.0 | 26.6 | 31.7 | 100.0 | 339.8 |
| 3 | 2596.250 | H | 28.4 | 42.1 | 1.4 | 29.8 | 43.5 | 56.0 | 76.0 | 26.2 | 32.5 | 100.0 | 38.3 |
| 4 | 3838.125 | H | 29.9 | 41.6 | 4.7 | 34.6 | 46.3 | 60.0 | 80.0 | 25.4 | 33.7 | 100.0 | 57.9 |
| 5 | 4021.250 | H | 30.0 | 40.9 | 5.4 | 35.4 | 46.3 | 60.0 | 80.0 | 24.6 | 33.7 | 100.0 | 30.8 |
| 6 | 5103.125 | V | 25.4 | 39.9 | 8.2 | 33.6 | 48.1 | 60.0 | 80.0 | 26.4 | 31.9 | 100.0 | 61.4 |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# 7. E.U.T. photographs

Front View

Rear View

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Left View

Right View

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Top View

Bottom View

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Inside

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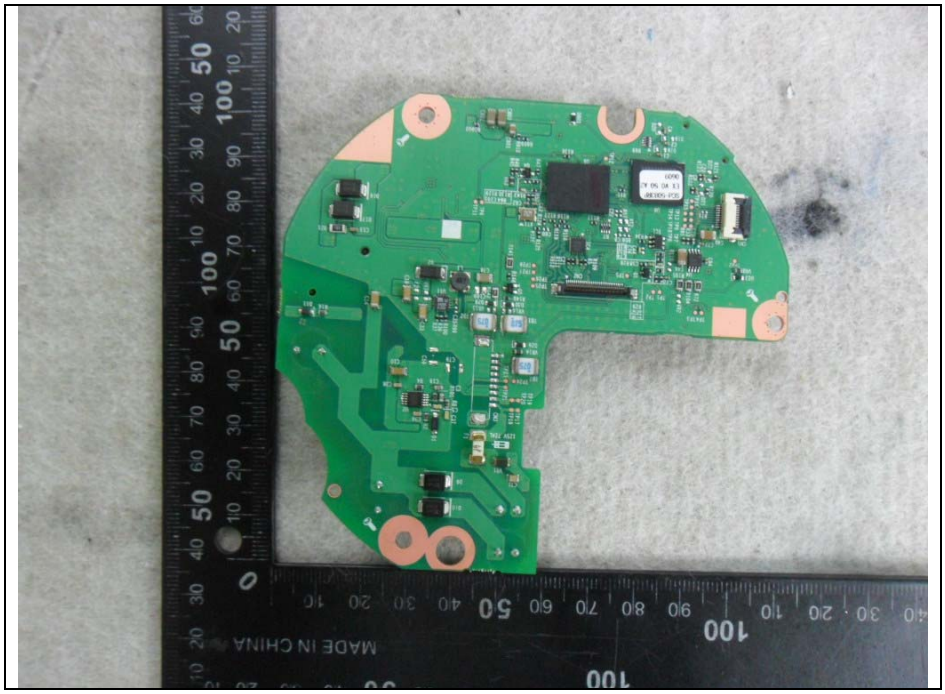
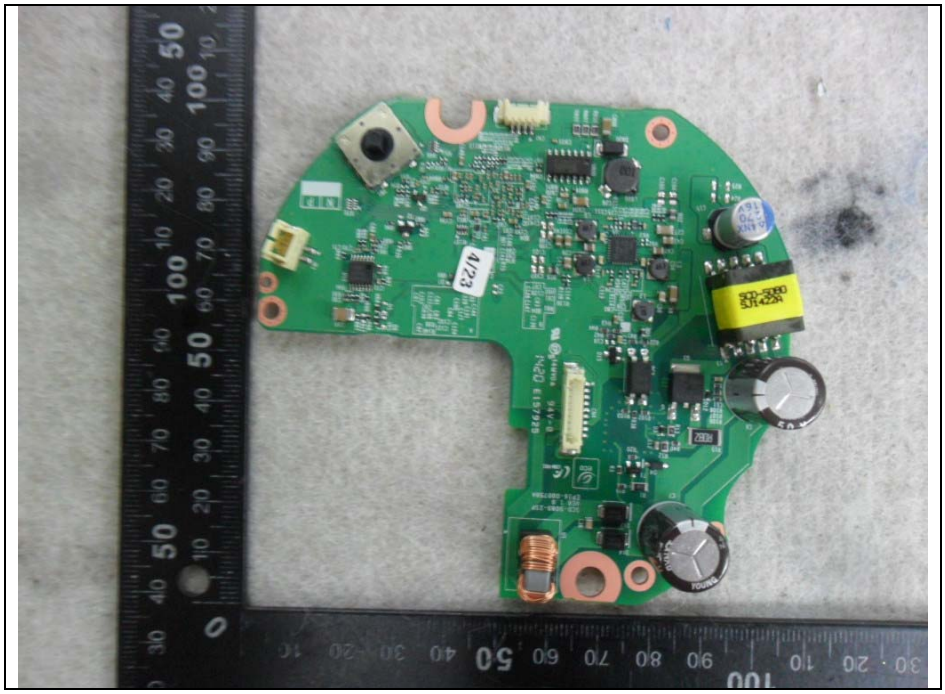
Main Board



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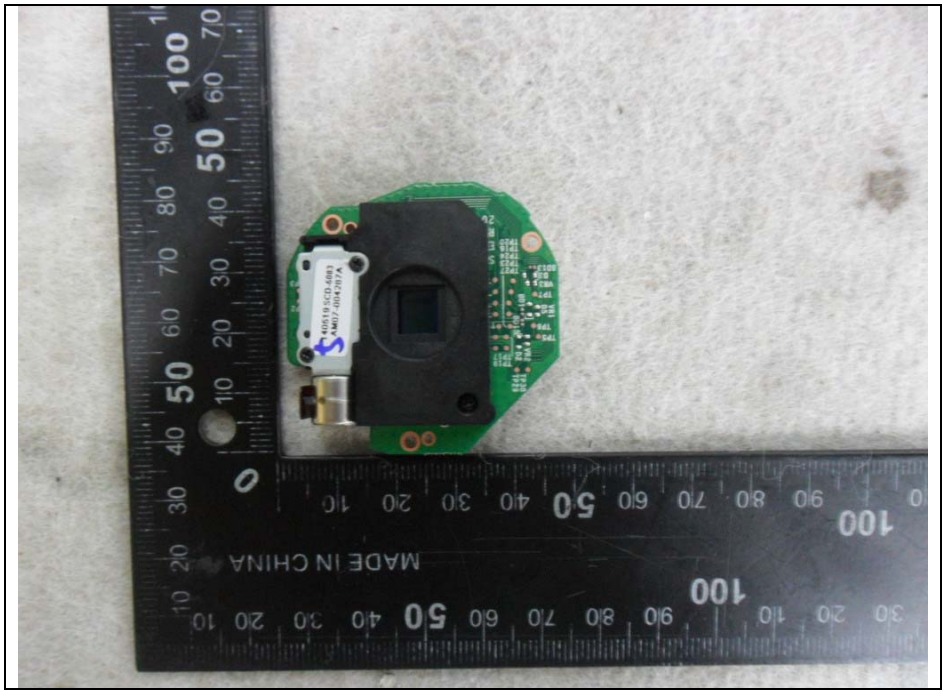
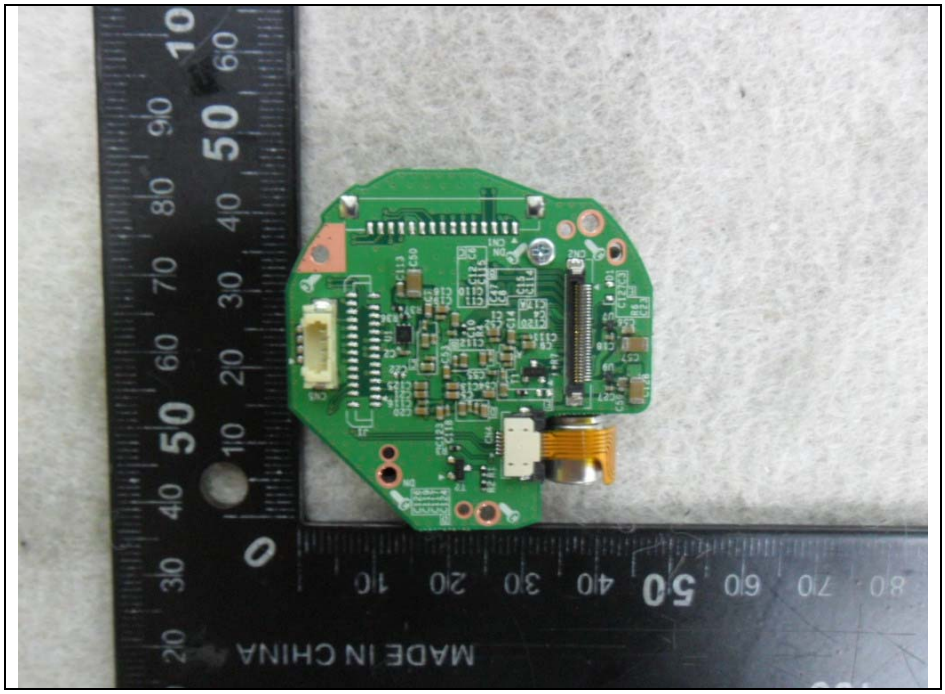
CCD Board





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SUB Board

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