

EMC TEST REPORT

Test report No : EMC-VCCI-0347

Type of Equipment : CCTV Camera

Model Name : SCD-6021N

Applicant : Samsung Techwin Co., Ltd.
84, Jeongdong-ro, Seongsan-gu, Changwon-si,
Gyeongsangnam-do, Korea

Manufacturer#1 : Samsung Techwin Co., Ltd.
84, Jeongdong-ro, Seongsan-gu, Changwon-si,
Gyeongsangnam-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 : VCCI V-3 / 2012.04, 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: 2013. 12. 20

Date of testing: 2013. 12. 26

Issued date: 2014. 01. 08

Tested by:



KIM, JIN-WON

Approved by:



YEOM, HAN-SEOK

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1. Applicant information

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2. Laboratory information

Address

EMC compliance Ltd.

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Telephone Number: 82 31 336 9919

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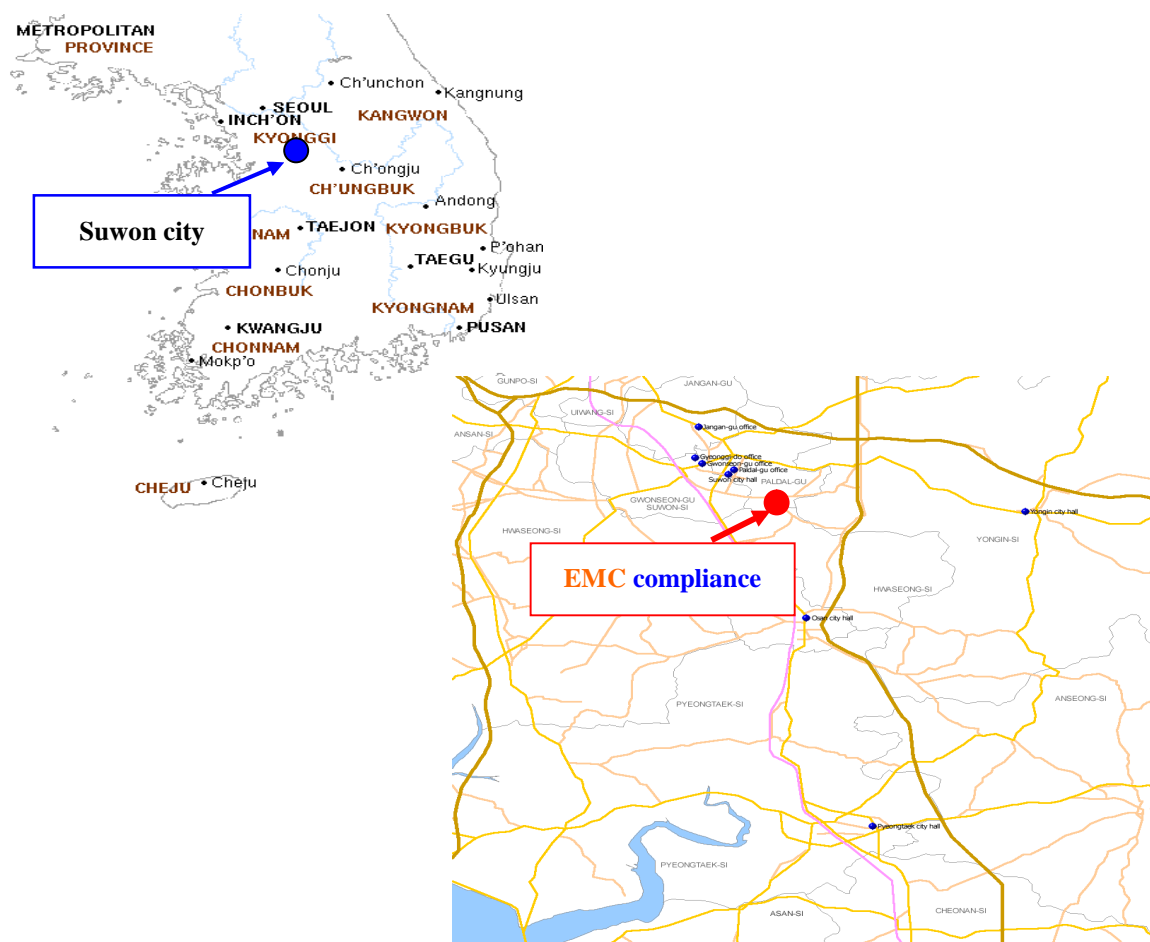
FCC CAB.: KR0040

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)	: 18.4 °C	16.5 % 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 (C.L: Approx 95 %, k = 2)		
Shielded Room (CE#1)	9 kHz ~ 150 kHz: ± 3.82 dB 150 kHz ~ 30 MHz: ± 3.43 dB	
Shielded Room (CE#2)	9 kHz ~ 150 kHz: ± 3.82 dB 150 kHz ~ 30 MHz: ± 3.43 dB	
Shielded Room (CE#3)	9 kHz ~ 150 kHz: ± 4.00 dB 150 kHz ~ 30 MHz: ± 3.63 dB	
Radiated Emission measurement (C.L: Approx 95 %, k = 2)		
10 m Chamber (#F4)	30 MHz ~ 300 MHz	3 m: + 4.56 dB, - 4.58 dB 10 m: + 4.56 dB, - 4.56 dB
	300 MHz ~ 1 000 MHz	3 m: + 4.84 dB, - 4.85 dB 10 m: + 4.71 dB, - 4.72 dB
	1 GHz ~ 6 GHz	3 m: + 6.19 dB, - 6.20 dB
	6 GHz ~ 18 GHz	3 m: + 6.41 dB, - 6.53 dB
10 m Chamber (#F2)	30 MHz ~ 300 MHz	3 m: + 4.86 dB, - 4.88 dB 10 m: + 4.86 dB, - 4.86 dB
	300 MHz ~ 1 000 MHz	3 m: + 4.98 dB, - 4.99 dB 10 m: + 4.85 dB, - 4.87 dB
	1 GHz ~ 6 GHz	3 m: + 6.19 dB, - 6.20 dB
	6 GHz ~ 18 GHz	3 m: + 6.41 dB, - 6.53 dB

4. Description of E.U.T.

4.1 General information

Items		Description
Video	Video	1/3" Progressive Scan CMOS
	Total Pixels	2,010(H) x 1,108(V), 2.2M Pixels
	Effective Pixels	1,944(H) x 1,092(V), 2.1M Pixels
	Scanning System	Progressiv Scan
	Min. Illumination	Color : 1Lux (F1.2, 50IRE), 0.01Lux (F1.2, 2sec, 50IRE)
	S / N Ratio	50dB (AGC off, Weight on)
	Video Output	SMPTE292M (HD-SDI)
Lens Type	Lens Type	Board-in type
	Mount Type	-
	Max. Aperture Ratio	F2.0
	Focal Length	3.8mm Fixed
	Focus Control	Fixed
	Angular Field of View	H: 84.5°, V: 45.8°, D: 98.8
pan / Tilt / Rotate	Pan Range	0° ~ 354°
	Tilt Range	0° ~ 67°
	Rotate Range	0° ~ 355°
Operational	On Screen Display	Multi-language Support English, Korean, Japanese, Spanish, French, Portuguese, Chinese, German, Italian, Russian, Czech, Polish, Rumanian, Serbian, Swedish, Danish, Turkish
	Camera Title	Off / On (Displayed 15 characters)
	Day & Night	Auto (ICR), Color, B/W, External
	Backlight Compensation	Off / BLC / HLC / WDR
	Contrast Enhancement	SSDR (Off / On)
	Digital Noise Reduction	SSNR III (Off / On)

Items		Description
Operational	Privacy Masking	Off / On (16 Rect-angle zones)
	Sens-up (Frame Integration)	2x ~ 60x
	Gain Control	Off / Low / Middle / High
	White Balance	ATW / Outdoor / Indoor / Manual / AWC (1,700K° ~ 11,000K°)
	Electronic Shutter Speed	Esc
	Digital Zoom	Off / On (1x ~ 16x)
	Reverse	Off / H-Rev / V-Rev / HV-Rev
	Intelligent Video	Tampering, Detection, Tracking, Fixed/Moved
	Communication	RS-485
	Protocol	RS-485 : SAMSUNG-T, SAMSUNG-E, Pelco-D, Pelco-P, Bosch, Honeywell, Vicon, Panasonic, GE, AD
Environmenta	Operating Temperature / Humidity	-10°C ~ +55°C (14°F ~ 131°F) / ~90% RH
Electrical	Input Voltage	12VDC
	Current	0.3A
Mechanica	Color / Material	Body : Ivory / Plastic
	Dimension (ØxH)	Ø120.0 x H102.0mm (Ø4.72" X H4.02")
	Weight	435g
HD-SDI Transmission Distance	5C2V (75ohm)	Max. 100~140m
	L-6CHD (75 ohm)	Max. 200m

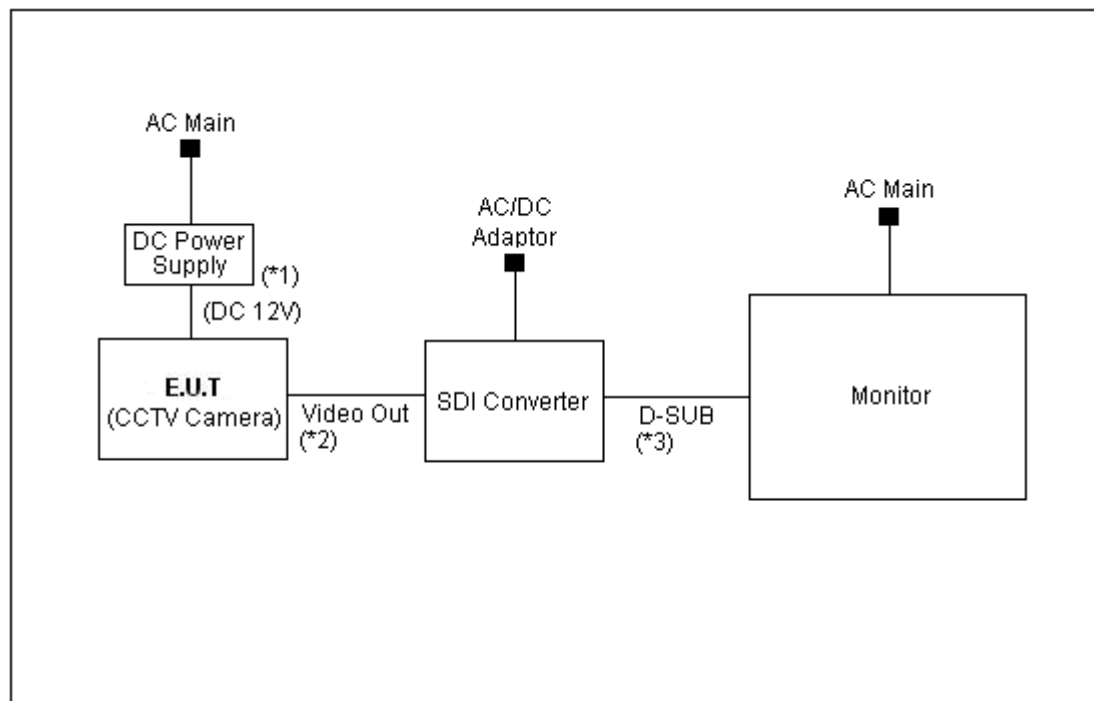
4.2 Product description

Type of product	CCTV Camera
Model name (Basic)	SCD-6021N
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	DC 12 V
Product rating	DC 12 V
Internal clock frequency	Above 108 MHz
Note	-

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Monitor	191G@N	N727HVZLC04632H	SAMSUNG
SDI Converter	HSC1200	21SCTS037RH	-
DC Power Supply	E3632A	KR01009281	Agilent

4.4 Test configuration



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 Out	SDI Converter	Video In	3.0	Shield
3	SDI Converter	D-SUB	Monitor	D-SUB	1.0	Shield

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
1	Check the video output with monitor.

5. Summary of test results

5.1 Summary of EMI emission test results

Applied	Test items	Test method	Result
<input type="checkbox"/>	Conducted Emission	VCCI V-3 / 2012.04, Class A	N/A
<input checked="" type="checkbox"/>	Radiated Emission	VCCI V-3 / 2012.04, Class A	Complied

6. Test results

6.1 Radiated Emission

Test specification	VCCI V-3 / 2012.04, Class A		
Testing voltage	DC 12 V		
Test facility	10 m Chamber (#F2)		
Test distance	10 m, 3 m		
Date	2013. 12. 26		
Temperature (°C)	18.4 °C	Humidity (% R.H.)	16.5 % 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.

6.1.3 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
Test Receiver	ESCI7	100732	R&S	2014.02.18	<input checked="" type="checkbox"/>
Test Receiver	ESCI	100001	R&S	2014.07.25	<input type="checkbox"/>
Test Receiver	ESCI	100710	R&S	2014.10.28	<input type="checkbox"/>
Test Receiver	ESR	101078	R&S	2014.10.17	<input type="checkbox"/>
Bi-Log Antenna	VULB 9168	440	SCHWARZBECK	2015.10.16	<input checked="" type="checkbox"/>
Amplifier	310N	293004	SONOMA INSTRUMENT	2014.10.31	<input checked="" type="checkbox"/>
3 dB Attenuator	8491B	22981	HP	2014.03.19	<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"/>
Amplifier	8449B	3008A02343	AGILENT	2014.10.31	<input checked="" type="checkbox"/>
Horn ANT	3115	00155772	ETS	2014.03.20	<input checked="" type="checkbox"/>
Spectrum Analyzer	FSP7	100289	R&S	2014.11.25	<input 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

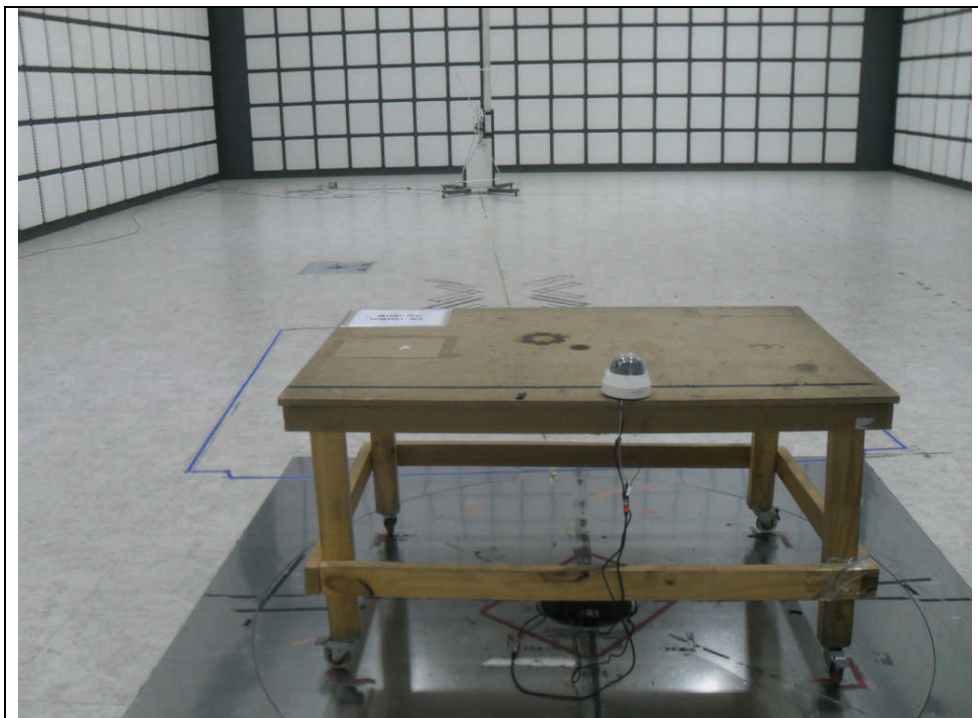
3 dB Att = 3 dB Attenuator

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

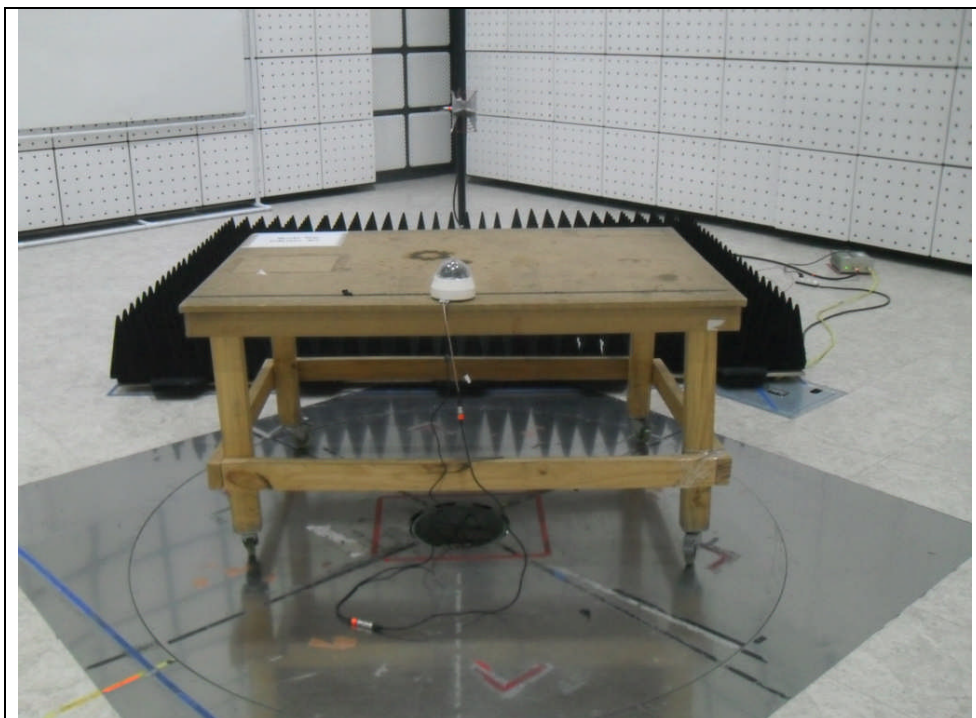
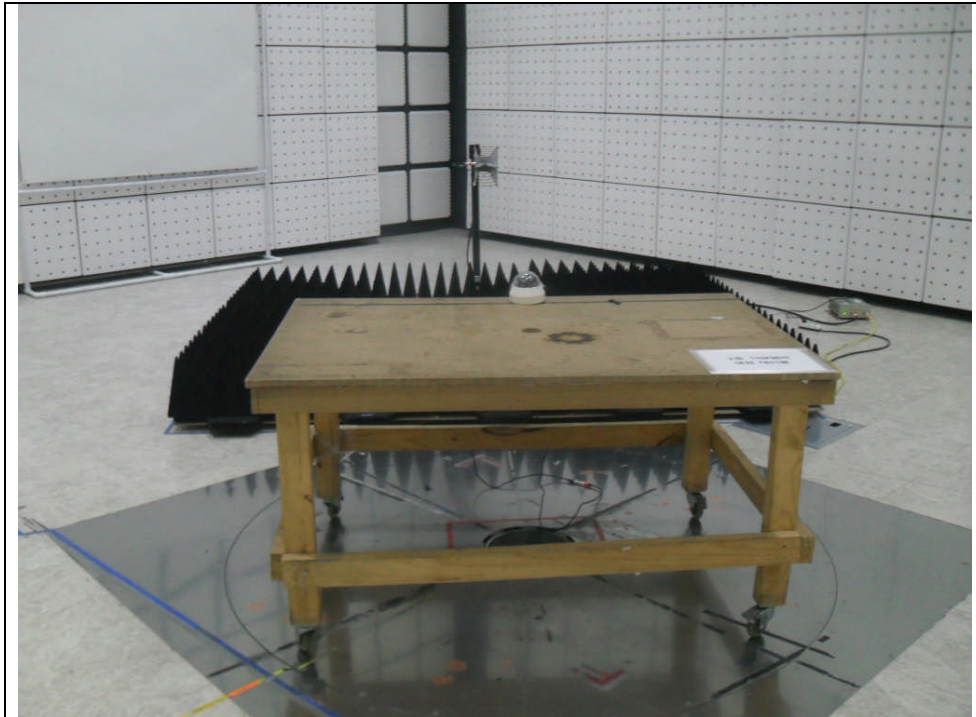
The result is $30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$

6.1.5 Photographs of test setup

* 30 MHz ~ 1 GHz



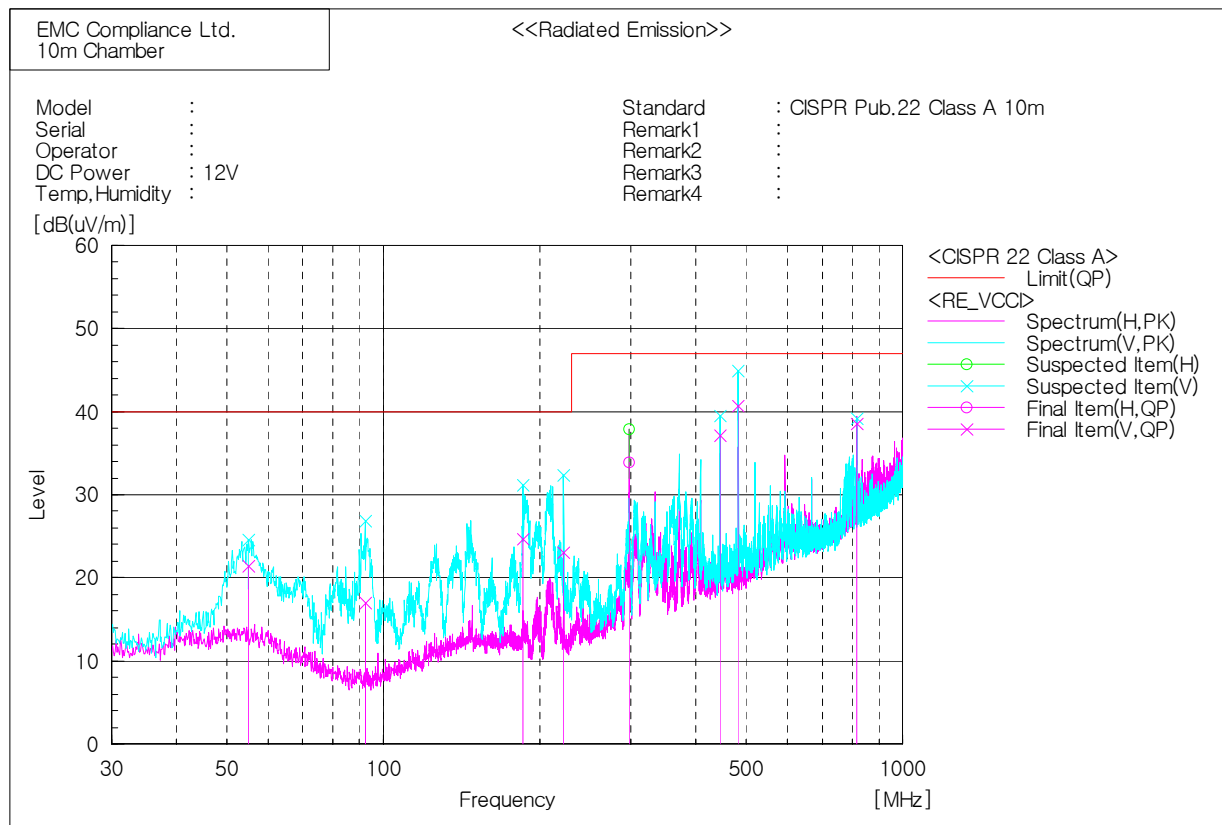
* 1 GHz ~ 6 GHz



6.1.6 Radiated emission measurement result

* Graph and Data

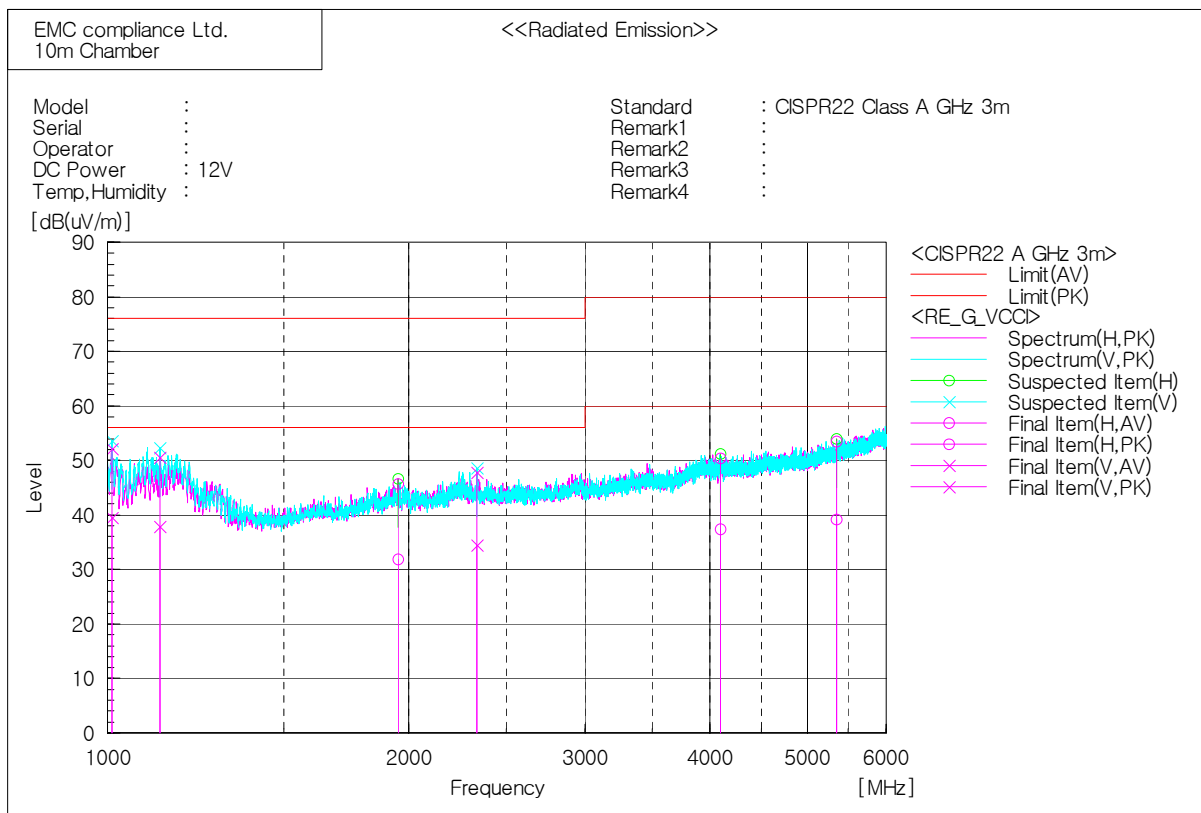
* 30 MHz ~ 1 GHz (SCD-6021N)



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	55.099	V	34.8	-13.4	21.4	40.0	18.6	100.0	35.7
2	92.323	V	35.3	-18.3	17.0	40.0	23.0	100.0	35.7
3	185.685	V	38.5	-13.8	24.7	40.0	15.3	100.0	48.3
4	222.666	V	37.0	-13.9	23.1	40.0	16.9	100.0	199.2
5	296.993	H	44.3	-10.4	33.9	47.0	13.1	301.0	253.7
6	445.524	V	43.2	-6.0	37.2	47.0	9.8	100.0	70.8
7	482.626	V	45.7	-5.0	40.7	47.0	6.3	100.0	346.2
8	816.791	V	36.4	2.2	38.6	47.0	8.4	100.0	136.4

* 1 GHz ~ 6 GHz (SCD-6021N)



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	1009.375	V	46.2	59.0	-6.8	39.4	52.2	56.0	76.0	16.6	23.8	100.0	31.7
2	1128.125	V	43.4	56.2	-5.6	37.8	50.6	56.0	76.0	18.2	25.4	100.0	109.6
3	1950.000	H	30.9	44.6	1.0	31.9	45.6	56.0	76.0	24.1	30.4	100.0	76.3
4	2341.875	V	32.0	45.3	2.5	34.5	47.8	56.0	76.0	21.5	28.2	100.0	35.2
5	4097.500	H	27.4	40.5	9.9	37.3	50.4	60.0	80.0	22.7	29.6	100.0	225.0
6	5355.000	H	25.7	40.0	13.5	39.2	53.5	60.0	80.0	20.8	26.5	100.0	225.0

7. E.U.T. photographs

Front View



Rear View



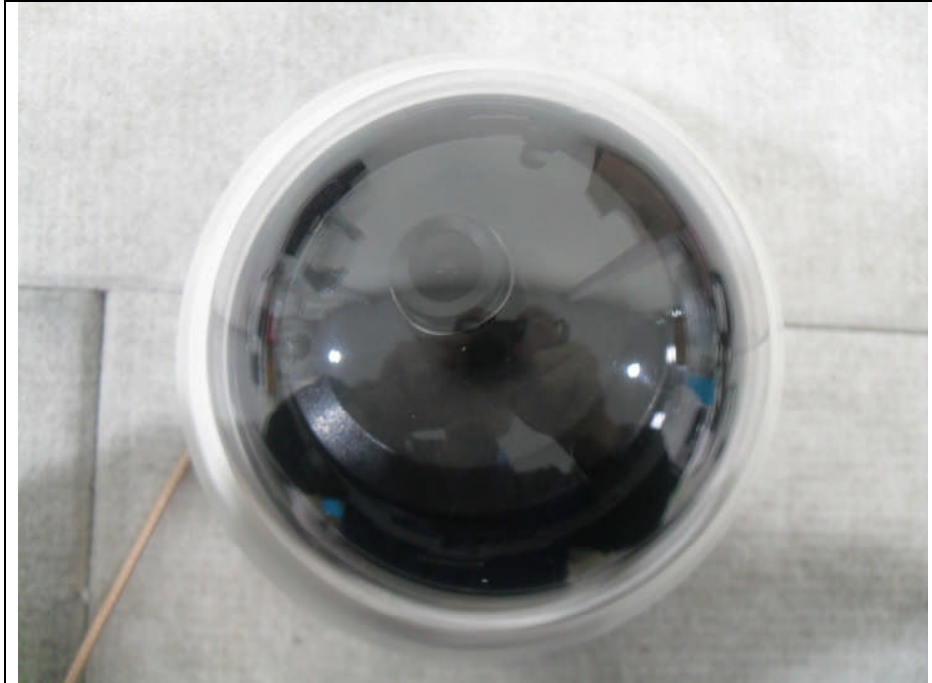
Left View



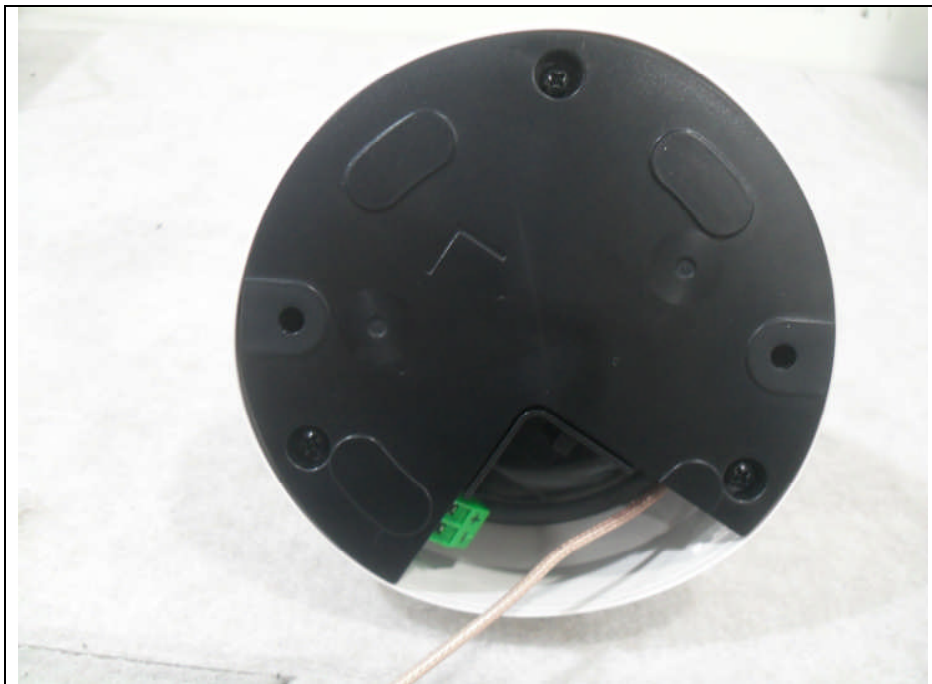
Right View



Top View



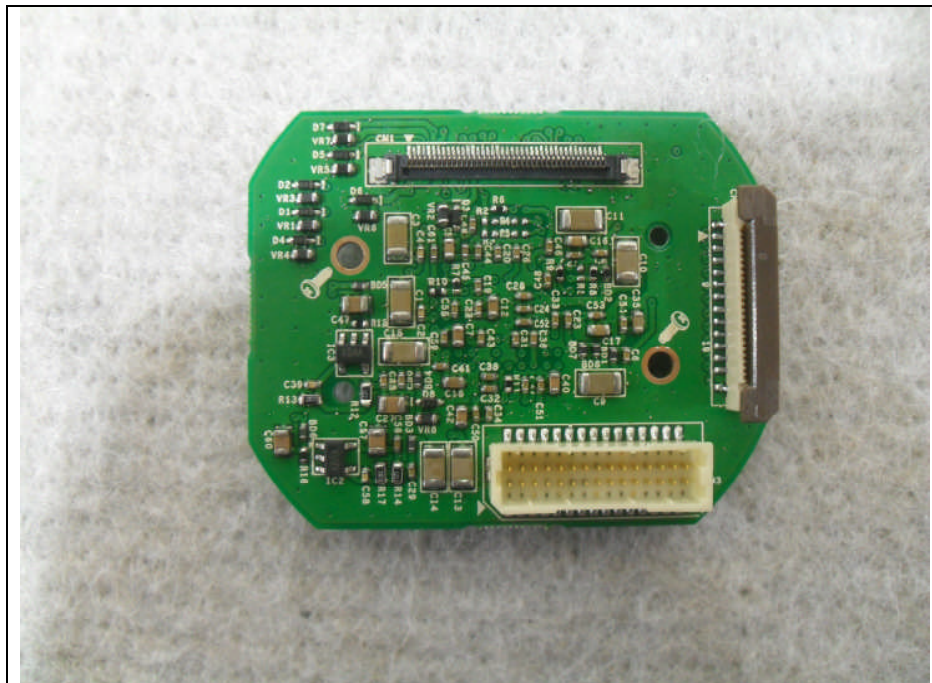
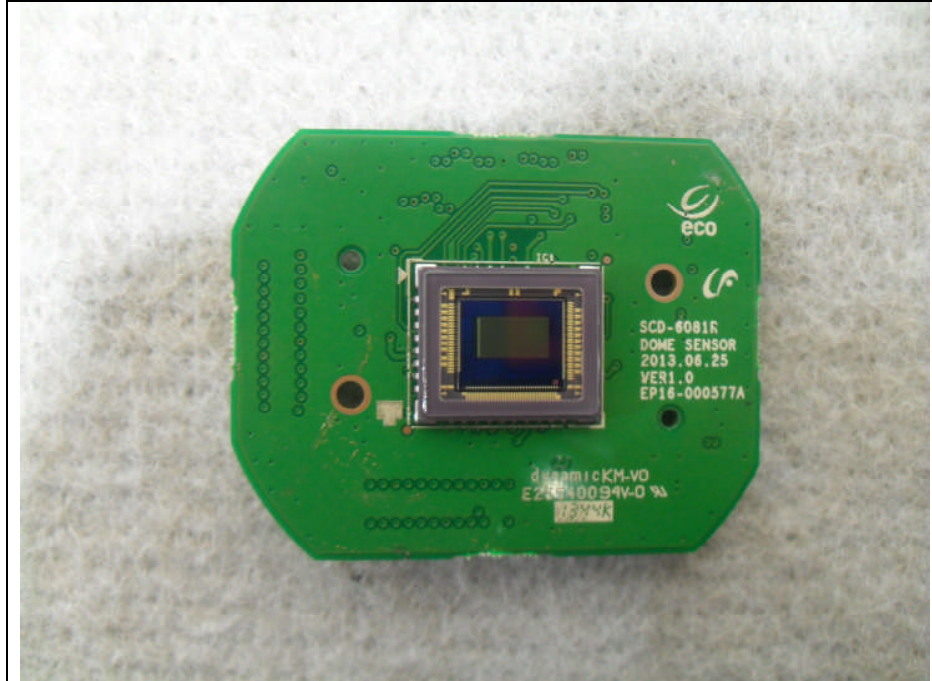
Bottom View



Inside



Main Board



CCD Board

