

EMC TEST REPORT

Test report No : EMC-VCCI-0385
Type of Equipment : CCTV Camera
Model Name : SCB-5003N
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 / 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. 03. 24

Date of testing: 2014. 04. 09 ~ 04. 11

Issued date: 2014. 05. 09

Tested by:

HWANG, SUN-BIN

Approved by:

YEOM, HAN-SEOK

Contents

1. Applicant information	3
2. Laboratory information	4
3. Test system configuration.....	5
3.1 Operation environment	5
3.2 Measurement Uncertainty	6
4. Description of E.U.T.	7
4.1 General information.....	7
4.2 Product description	8
4.3 Auxiliary equipments.....	8
4.4 Test configuration	9
4.5 Operating conditions.....	10
5. Summary of test results.....	11
5.1 Summary of EMI emission test results	11
6. Test results	12
6.1 Radiated Emission	12
7. E.U.T. photographs.....	22

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

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

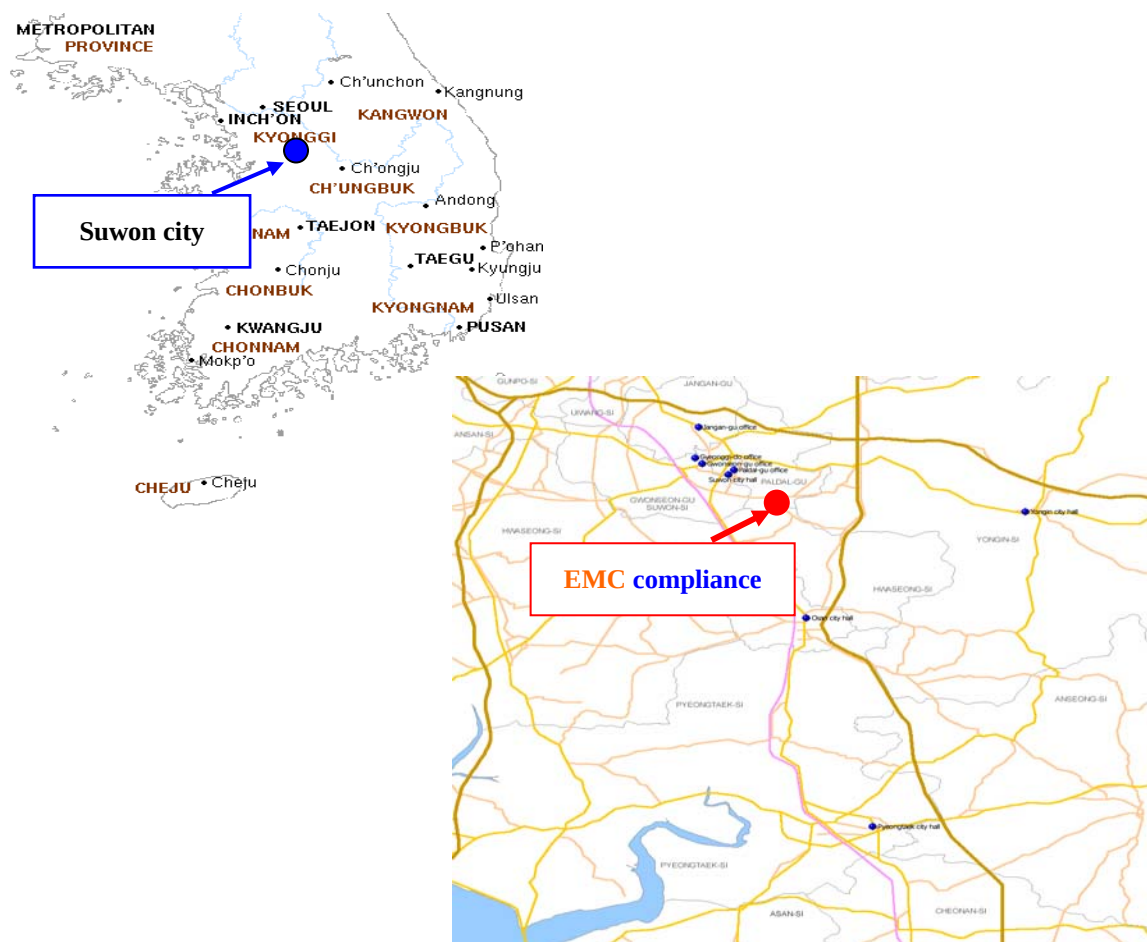
FCC CAB.: KR0040

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

Industry Canada Registration No.: 8035A

KOLAS NO.: 231

SITE MAP



3. Test system configuration

3.1 Operation environment

	Temperature	Humidity	Pressure
Chamber(10 m)	: 21.8 ~ 23.4 °C	30.8 ~ 31.6 % 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

	SCB-5003N	SCB-5003P
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 : 950 TVL B/W : 950 TVL	
Min. Illumination	Color : 0.05Lux (1/60sec, F1.2, 50IRE), 0.02Lux (1/60sec, F1.2, 30IRE) B/W : 0.005Lux (1/60sec, F1.2, 50IRE), 0.002Lux (1/60sec, F1.2, 30IRE)	
S / N Ratio	52dB (AGC off, Weight on)	
Video Output	CVBS : 1.0 Vp-p / 75Ω composite	
Lens Type		
Focal Length (Zoom Ratio)	-	
Max. Aperture Ratio	-	
Angular Field of View	-	
Min. Object Distance	-	
Focus Control	Manual	
Lens Type	Manual / DC Auto Iris / Video IRIS	
Mount Type	C/CS	
Operational		
On Screen Display	Multi-language Support(17) 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 / On)	
Digital Image Stabilization	Off / On	
Motion Detection	Off / On	
Privacy Masking	Off / On (24 programmable zones with 4points polygonal masking)	
Gain Control	Off / Low / Middle / High	
White Balance	ATW / Outdoor / Indoor / Manual / AWC (1,800K° ~ 10,500K°)	
Electronic Shutter Speed	1 sec ~ 1/12,000 sec	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, Indoor, User	
Intelligent Video	Fixed_Moved, Fence, Tracking, Detection, Counting, Tampering	
Alarm	-	
Communication	Coaxial Control (SPC-300 Compatible), RS-485	
Protocol	Coax : Pelco-C (Coaxitron) RS-485: Samsung-T, Samsung-E, Pelco-D, Pelco-P, Panasonic, Bosch, Honeywell, Vicon, AD, GE	
Environmental		
Starting Temperature / Humidity	-10°C ~ +55°C (+14°F ~ +131°F) / Less than 90% RH	
Operating Temperature / Humidity	-20°C ~ +55°C (-4°F ~ +131°F) / Less than 90% RH	
Ingress Protection	-	
Vandal Resistance	-	
Electrical		
Input Voltage/Current	Dual (24VAC±10% & 12VDC±10%)	
Power Consumption	Max. 4.6W	
Mechanical		
Color / Material	Black, Ivory / Plastic	
Dimension (WxHxD)	68.4 x 59.6 x 92.7mm	
Weight	220g	

4.2 Product description

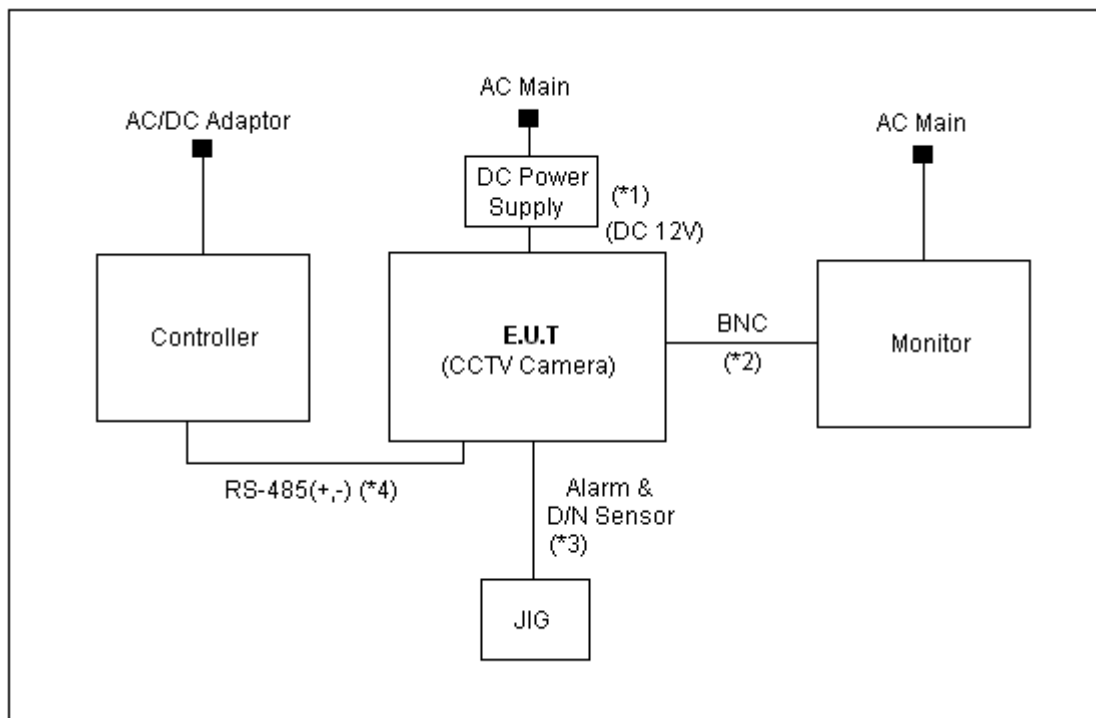
Type of product	CCTV Camera
Model name (Basic)	SCB-5003N
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	DC 12 V , AC 24 V
Product rating	DC 12 V , AC 24 V
Internal clock frequency	Above 108 MHz
Note	* AC/AC adaptor was not provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Monitor	CRT	GCM-1014SA-D	90309991
JIG	-	-	-
Controller	SCC-1000	EW089028913	SAMSUNG
DC Power Supply	E3633A	MY40004392	Agilent
AC/AC Adaptor	-	-	-

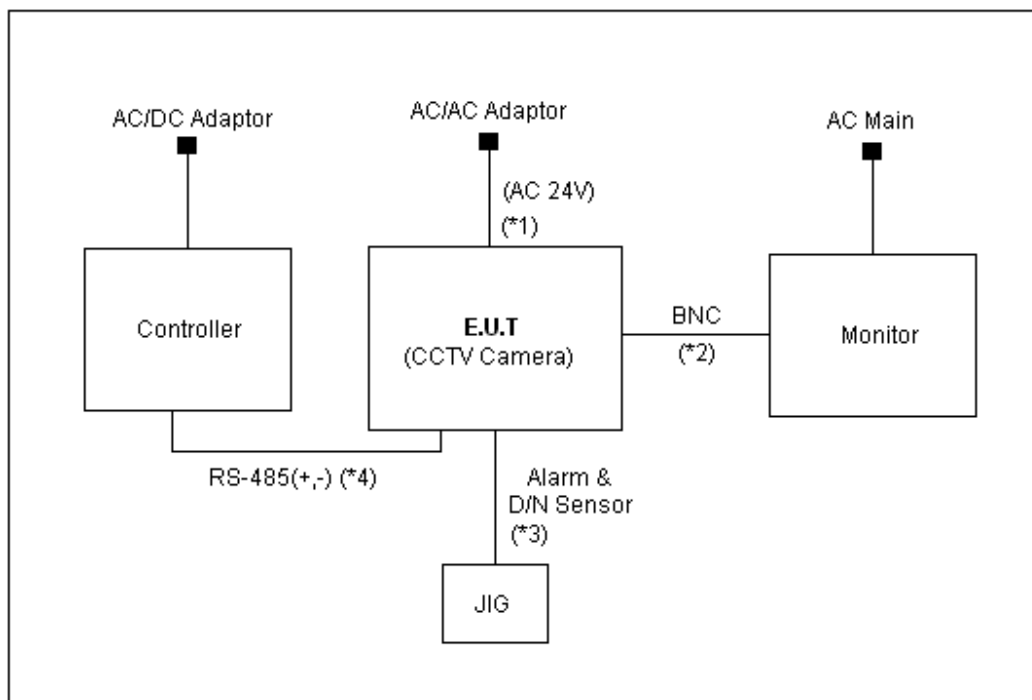
4.4 Test configuration

#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		BNC	Monitor	BNC	3.0	Shield
3		Alarm & D/N Sensor	JIG	Alarm & D/N Sensor	3.0	Non-Shield
4		RS-485(+,-)	Controller	RS-485(+,-)	3.0	Non-Shield

#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		BNC	Monitor	BNC	3.0	Shield
3		Alarm & D/N Sensor	JIG	Alarm & D/N Sensor	3.0	Non-Shield
4		RS-485(+,-)	JIG	RS-485(+,-)	3.0	Non-Shield

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
1	Video output monitoring test.
	Alarm test.
	Control 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.

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

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. 04. 09 ~ 04. 11		
Temperature (°C)	21.8 ~ 23.4 °C	Humidity (% R.H.)	30.8 ~ 31.6 % 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	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	FSP7	100289	R&S	2014.11.25	☐

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

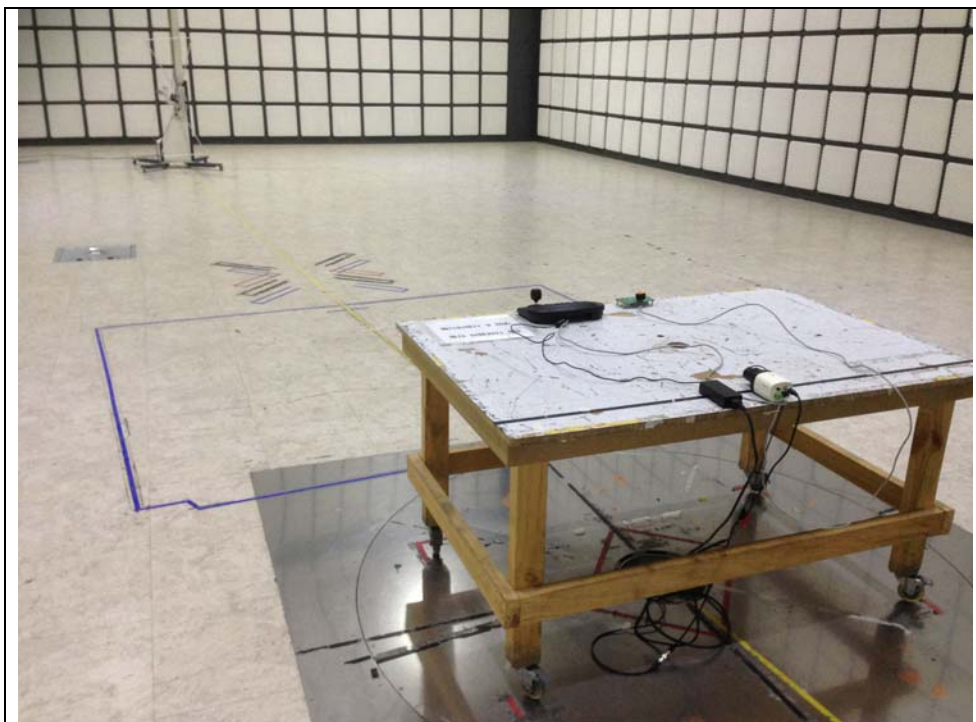
If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

The result is

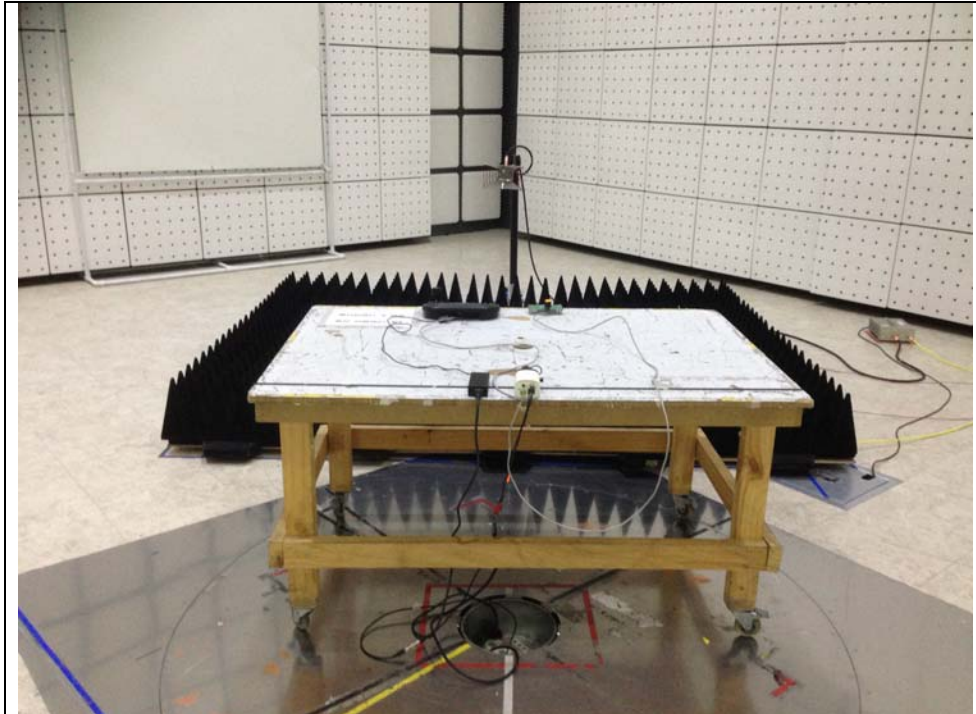
$$30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$$

6.1.5 Photographs of test setup

* 30 MHz ~ 1 GHz (#1- DC 12V)



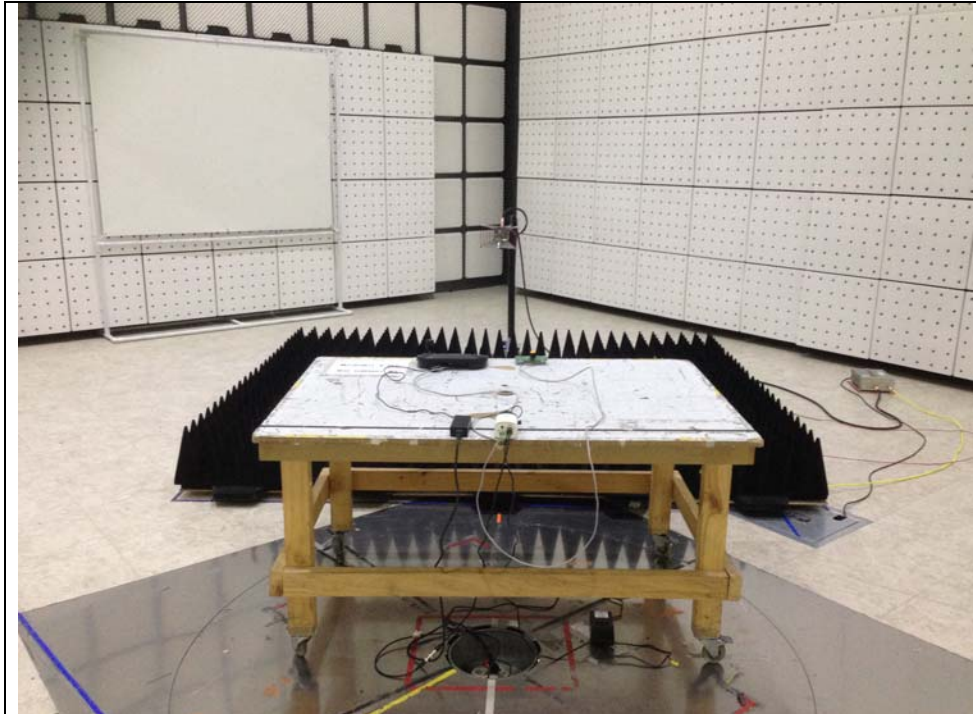
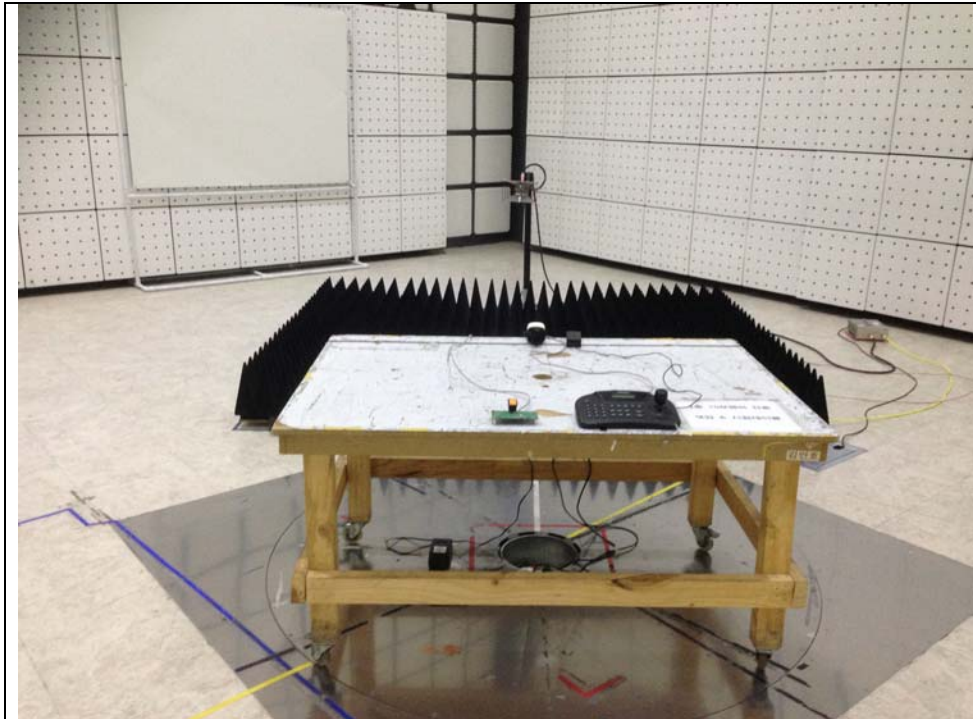
* 1 GHz ~ 6 GHz (#1- DC 12V)



* 30 MHz ~ 1 GHz (#2- AC 24V)



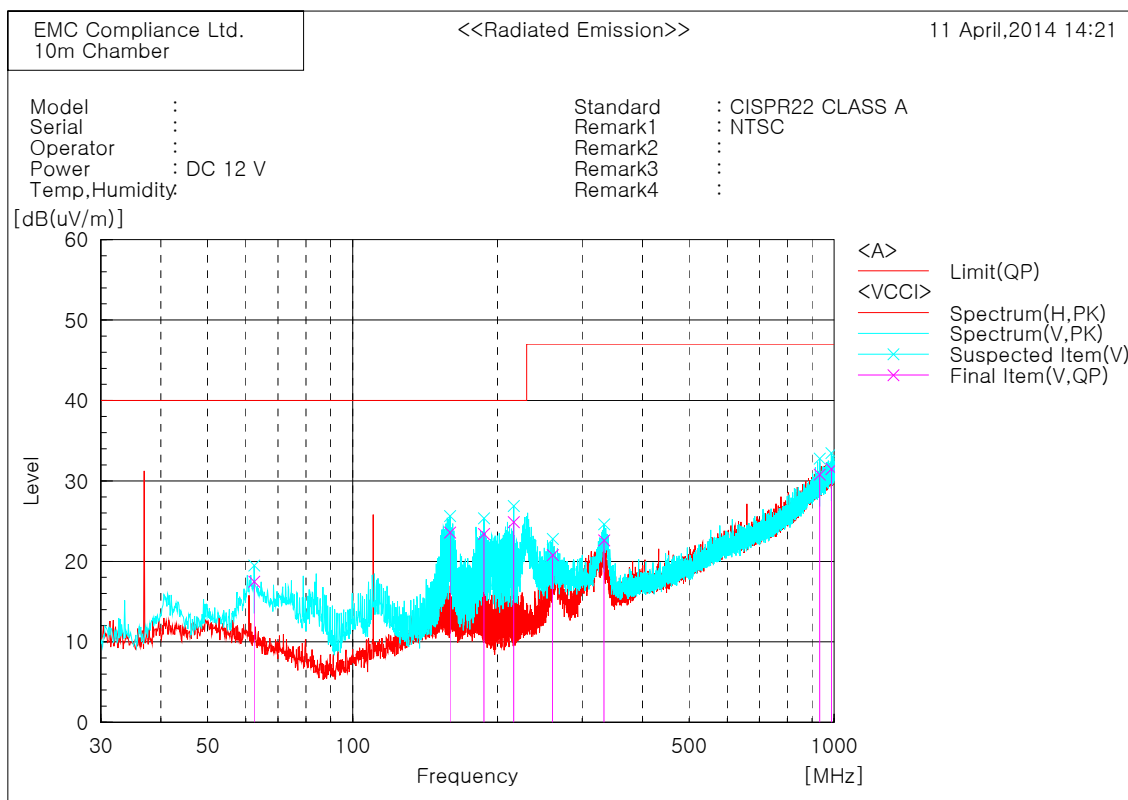
* 1 GHz ~ 6 GHz (#2- AC 24V)



6.1.6 Radiated emission measurement result

* Graph and Data

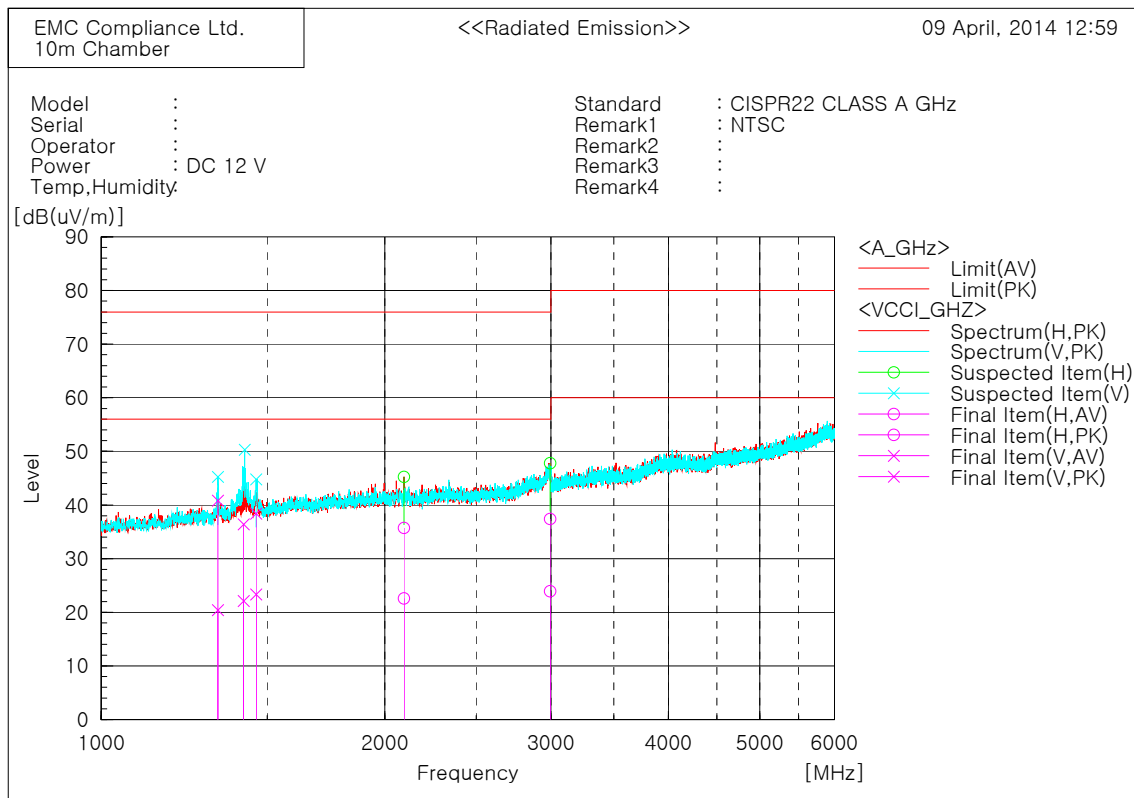
* 30 MHz ~ 1 GHz (SCB-5003N)_#1- DC 12V



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	62.495	V	32.1	-14.6	17.5	40.0	22.5	100.0	148.1
2	159.253	V	36.6	-13.0	23.6	40.0	16.4	100.0	148.1
3	187.504	V	37.4	-14.0	23.4	40.0	16.6	100.0	107.7
4	215.998	V	39.1	-14.2	24.9	40.0	15.1	100.0	228.9
5	260.254	V	32.4	-11.6	20.8	47.0	26.2	100.0	206.1
6	332.883	V	31.7	-9.1	22.6	47.0	24.4	100.0	24.0
7	933.555	V	25.6	5.2	30.8	47.0	16.2	400.0	348.6
8	987.147	V	24.8	6.7	31.5	47.0	15.5	193.0	101.7

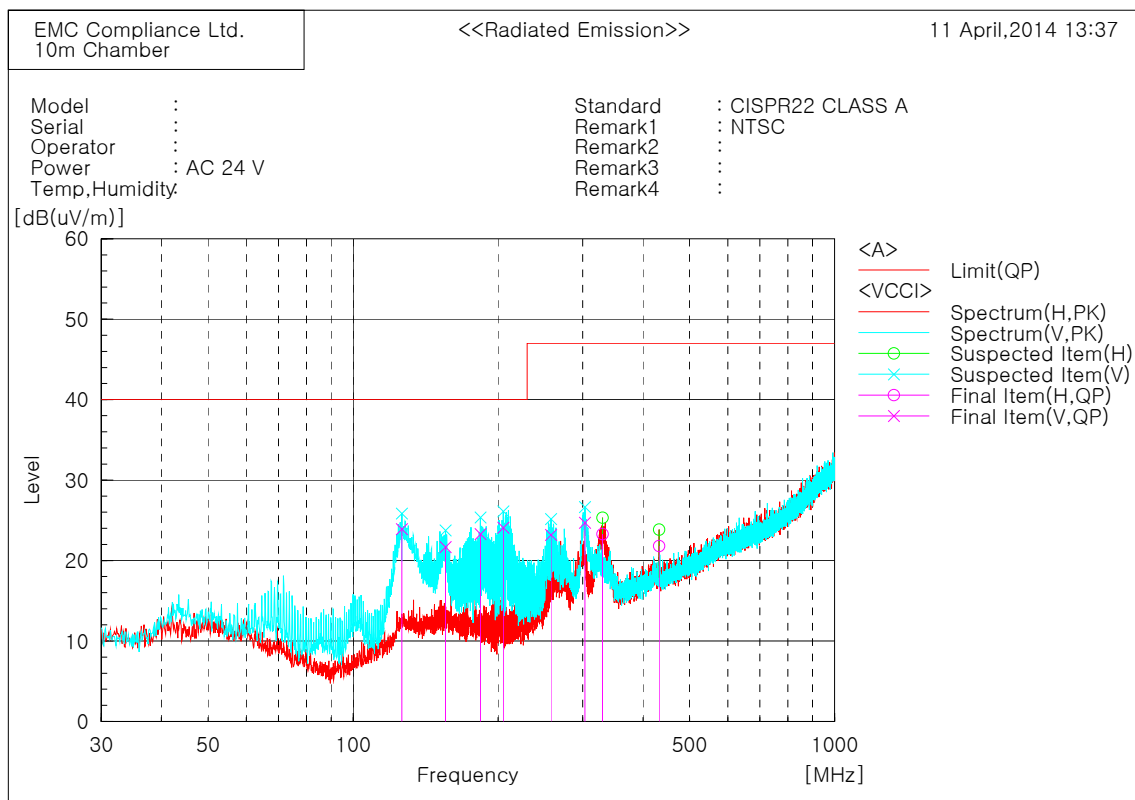
* 1 GHz ~ 6 GHz (SCB-5003N)_#1- DC 12V



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	1330.000	V	24.0	44.4	-3.6	20.4	40.8	56.0	76.0	35.6	35.2	100.0	326.1
2	1416.562	V	25.0	39.3	-2.9	22.1	36.4	56.0	76.0	33.9	39.6	100.0	80.6
3	1460.000	V	25.9	41.0	-2.6	23.3	38.4	56.0	76.0	32.7	37.6	100.0	80.6
4	2095.625	H	21.8	34.9	0.8	22.6	35.7	56.0	76.0	33.4	40.3	100.0	166.1
5	2995.000	H	20.4	33.9	3.5	23.9	37.4	56.0	76.0	32.1	38.6	100.0	337.5

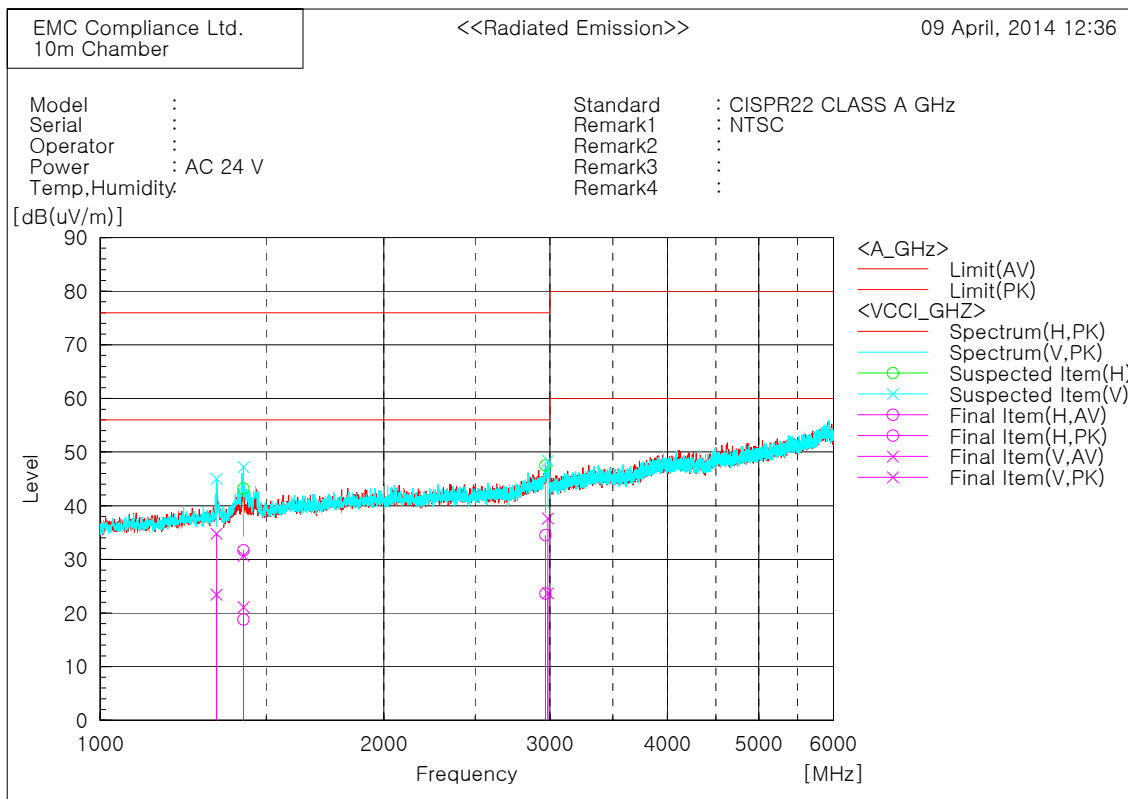
* 30 MHz ~ 1 GHz (SCB-5003N)_#2- AC 24V



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	126.273	V	38.7	-14.8	23.9	40.0	16.1	100.0	160.2
2	155.615	V	34.7	-13.0	21.7	40.0	18.3	100.0	58.9
3	183.866	V	36.9	-13.6	23.3	40.0	16.7	100.0	107.2
4	205.206	V	38.8	-14.7	24.1	40.0	15.9	191.0	227.9
5	257.707	V	34.9	-11.7	23.2	47.0	23.8	100.0	195.5
6	303.055	V	35.0	-10.3	24.7	47.0	22.3	100.0	263.7
7	329.609	H	32.6	-9.3	23.3	47.0	23.7	310.0	264.0
8	431.944	H	28.1	-6.3	21.8	47.0	25.2	310.0	228.7

* 1 GHz ~ 6 GHz (SCB-5003N)_#2- AC 24V



Final Result

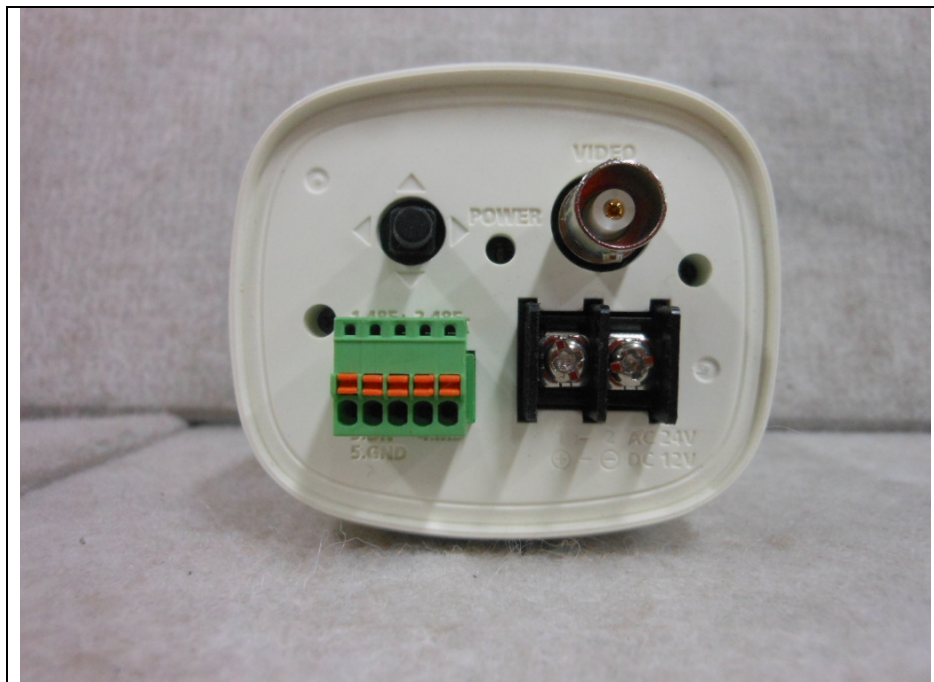
No.	Frequency [MHz]	(P)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	c.f [dB(1/m)]	Result AV [dB(uV/m)]	Result PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	1328.125	V	27.0	38.4	-3.6	23.4	34.8	56.0	76.0	32.6	41.2	100.0	325.4
2	1418.850	H	21.7	34.6	-2.9	18.8	31.7	56.0	76.0	37.2	44.3	100.0	170.3
3	1418.750	V	24.0	33.6	-2.9	21.1	30.7	56.0	76.0	34.9	45.3	100.0	89.0
4	2967.500	H	20.3	31.2	3.3	23.6	34.5	56.0	76.0	32.4	41.5	100.0	149.3
5	2986.250	V	20.3	34.2	3.4	23.7	37.6	56.0	76.0	32.3	38.4	100.0	167.4

7. E.U.T. photographs

Front View



Rear View



Left View



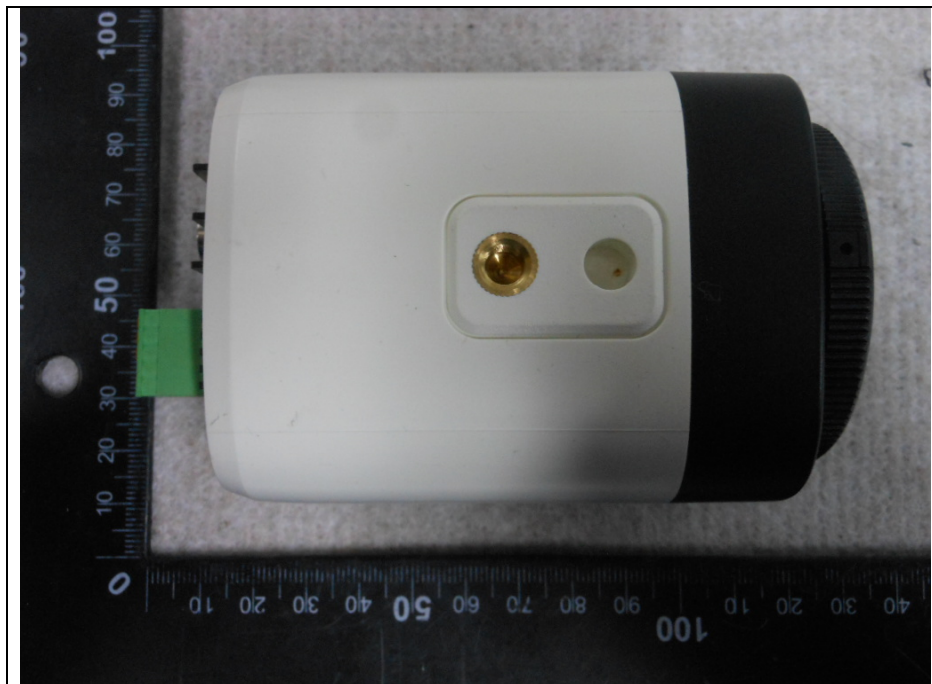
Right View



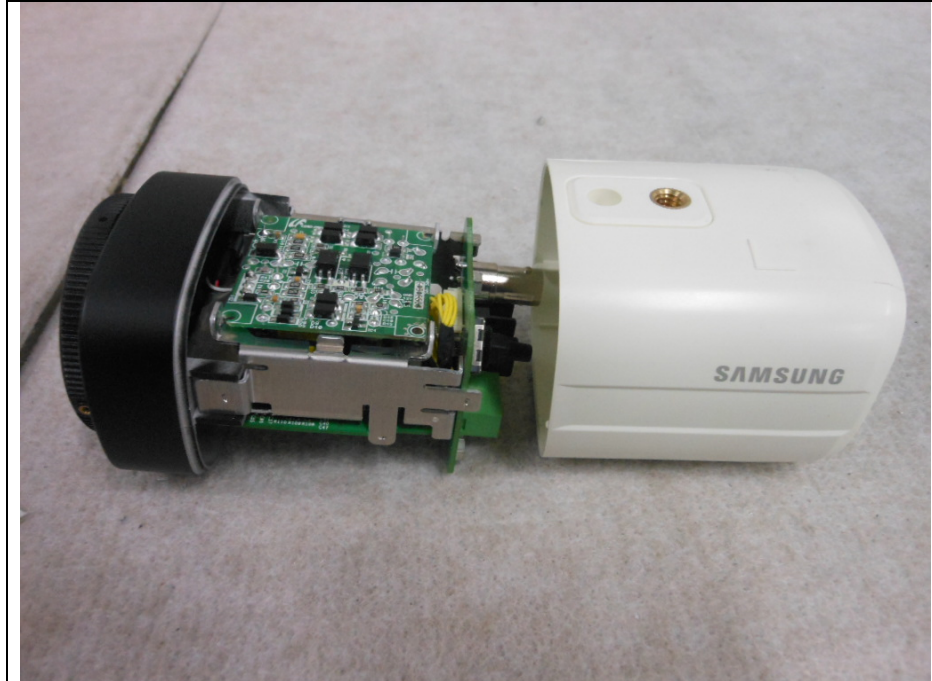
Top View



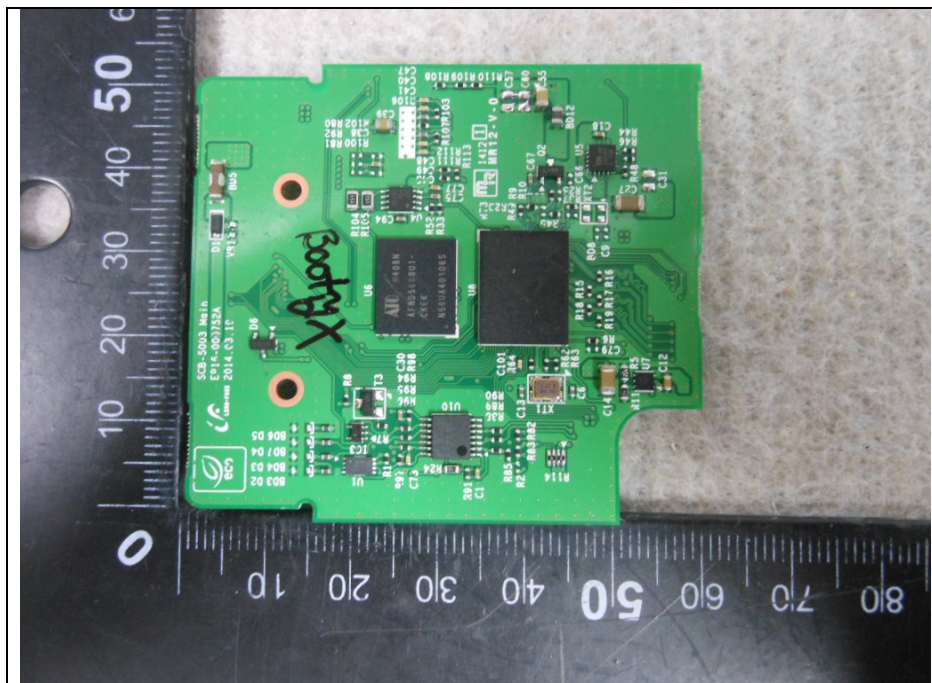
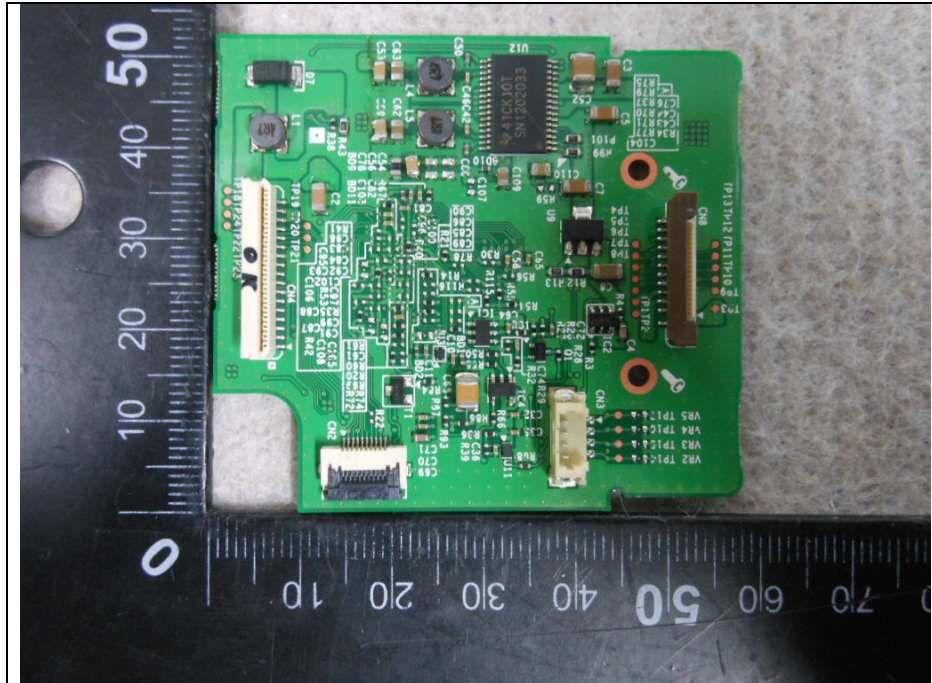
Bottom View



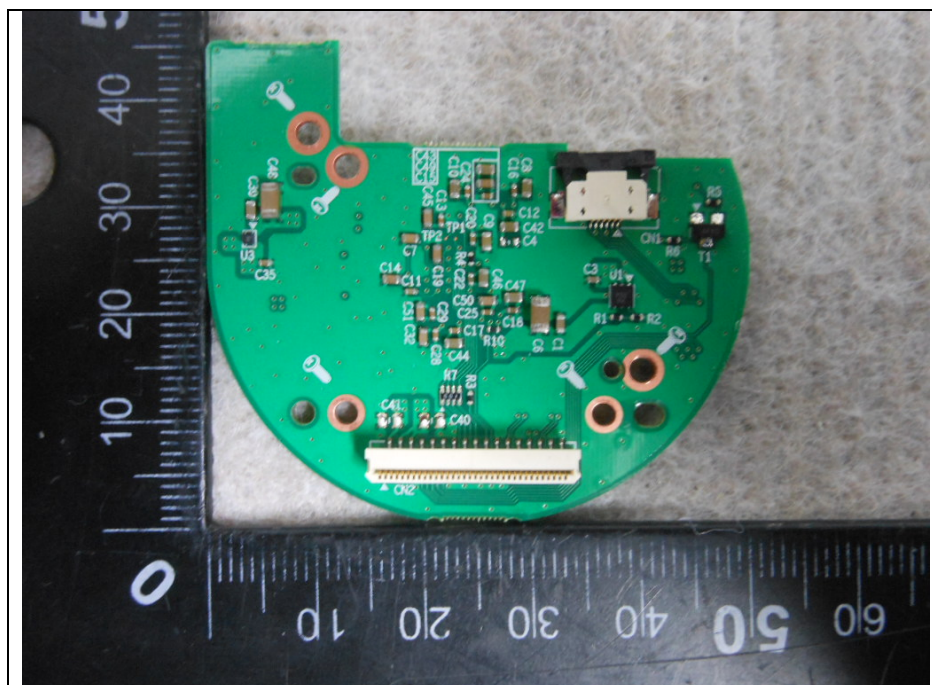
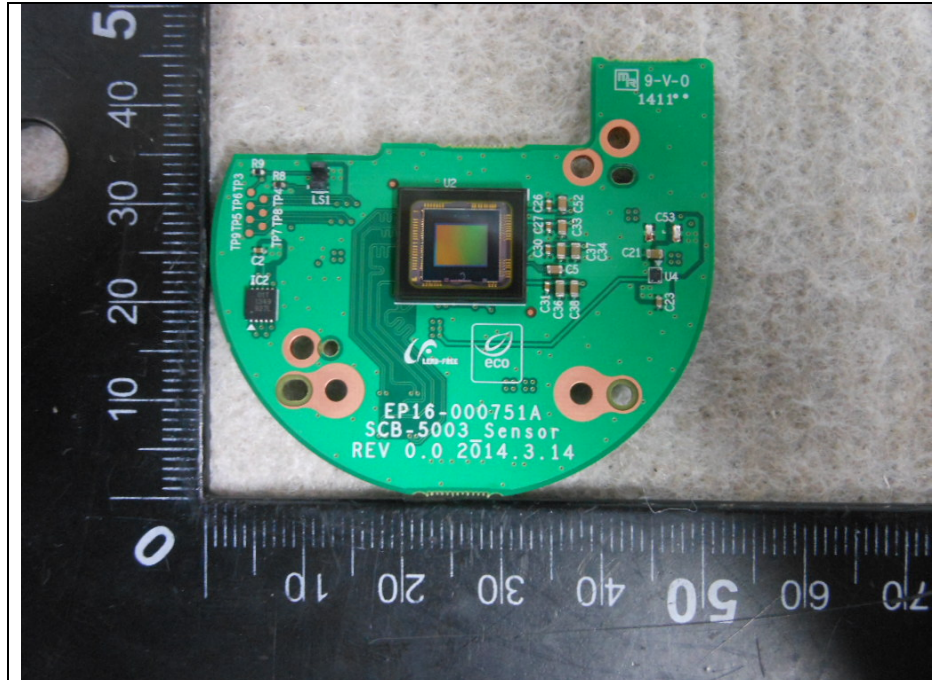
Inside



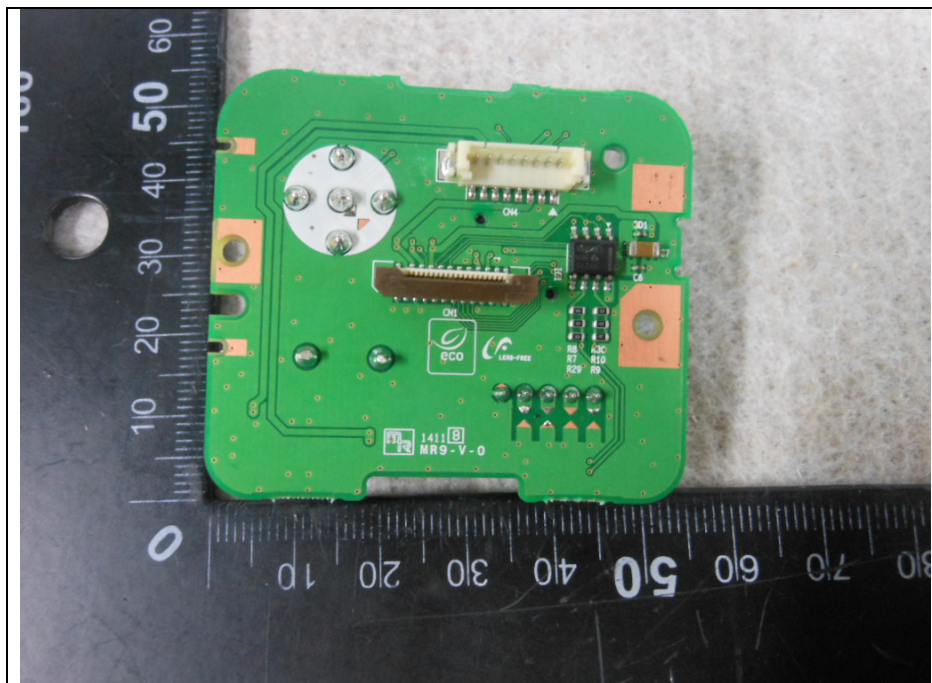
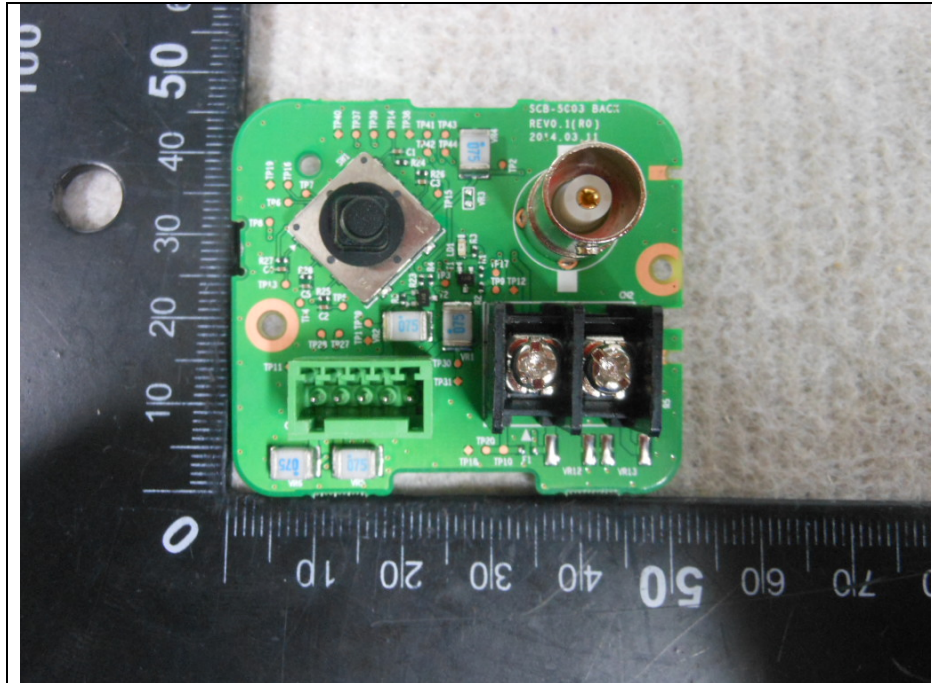
Main Board



CCD Board



Back Board



Power Board

