

CERTIFICATE of EMC Compliance

Report No : EMC-FCC-2426
Type of equipment : CCTV Camera
Model Name : SCO-5083RN
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 : FCC part 15 subpart B, Class A
Classification : Verification

The above equipment was tested by EMC compliance Testing Laboratory for with the requirements of FCC Rules and Regulations. The results of testing in this report apply to the product / system which was tested only.

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

Laboratory

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EMI TEST REPORT

Test report No : EMC-FCC-2426
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Park Jingang Road Tianjin 300385, China
Test standards : FCC part 15 subpart B, Class A
Classification : Verification
Test Procedure and Items
- Radiated Emissions Measurement : ANSI C63.4-2009
Testing Laboratory : EMC Compliance Ltd.
Test result : Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC 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.

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

Date of receipt: 2014. 08. 18

Date of testing: 2014. 08. 18 ~ 08. 19

Issued date: 2014. 08. 25

Tested by:

HWANG, SUN-BIN

Approved by:

YEOM, HAN-SEOK

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1. Applicant information

Applicant: Samsung Techwin Co., Ltd.
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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,
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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

3. Test system configuration

3.1 Operation environment

	Temperature	Humidity	Pressure
Chamber(10 m)	: 25.3 ~ 25.4 °C	47.3 ~ 48.1 % 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: ± 3.75 dB	
	150 kHz ~ 30 MHz: ± 3.36 dB	
Shielded Room (CE#2)	9 kHz ~ 150 kHz: ± 3.79 dB	
	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 10 m: + 4.86 dB, - 4.98 dB
	300 MHz ~ 1 000 MHz	3 m: + 5.04 dB, - 5.14 dB 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 10 m: + 4.93 dB, - 5.05 dB
	300 MHz ~ 1 000 MHz	3 m: + 4.97 dB, - 5.08 dB 10 m: + 4.84 dB, - 4.96 dB
	1 GHz ~ 6 GHz	3 m: + 6.03 dB, - 6.05 dB
10 m Chamber	6 GHz ~ 18 GHz	3 m: + 6.60 dB, - 6.78 dB

4. Description of E.U.T.

4.1 General information

	SCO-5083RN	SCO-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 B/W : 1000 TVL	
Min. Illumination	Color : 0.05Lux (F1.4, 50IRE), 0.001Lux (1sec, F1.4, 50IRE) 0.02Lux (F1.4, 30IRE), 0.0006Lux (1sec, F1.4, 30IRE) 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 (YTOT)	
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) English, Chinese, Korean, Japanese, German, Italian, French, Spanish, Russian, Czech, Polish, Romanian, Serbian, Swedish, Danish, Turkish, Portuguese	
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	
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), RS-485	
Protocol	Coax : Pelco-C (Coaxitron) RS-485: Samsung-T, Samsung-E, Pelco-D, Pelco-P, Panasonic, Bosch, Honeywell, Vicon, AD, GE	
IR Distance	50m	

Environmental	
Operating Temperature / Humidity	-10°C ~ +55°C (+14°F ~ +131°F) / Less than 90% RH
Ingress Protection	IP66
Vandal Resistance	IK10
Electrical	
Input Voltage/Current	Dual (24VAC±10% & 12VDC±10%)
Power Consumption	9.2W
Mechanical	
Color / Material	Dark Gray / ALDC
Dimension (WxHxD)	273 mm * Ø 80 mm
Weight	1.3Kg

4.2 Product description

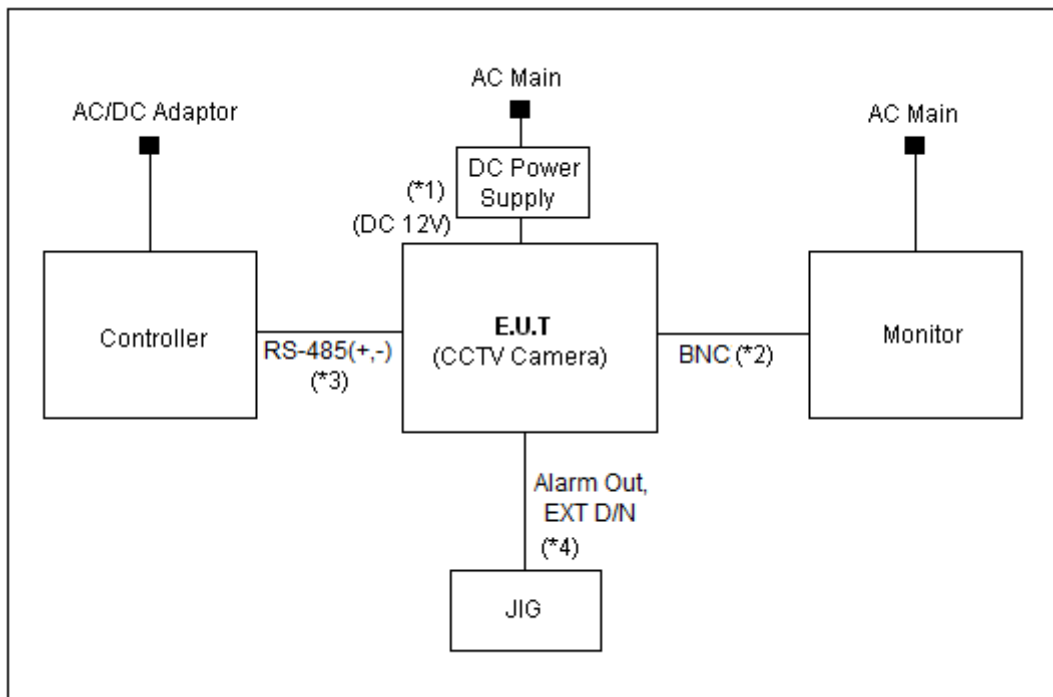
Type of product	CCTV Camera
Model name (Basic)	SCO-5083RN
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	DC 12 V, AC 24 V
Product rating	DC 12 V, AC 24 V
Internal clock frequency	Above 108 MHz
Note	* AC/AC adaptor was not provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Monitor	SMT-2231P	YDQ03VDBB02500H	SAMSUNG
Controller	SCC-1000	EW089028913	SAMSUNG
JIG	-	-	-
DC Power Supply	E3633A	MY40004392	Agilent
AC/AC Adaptor	STA-220	-	Dream Electronics

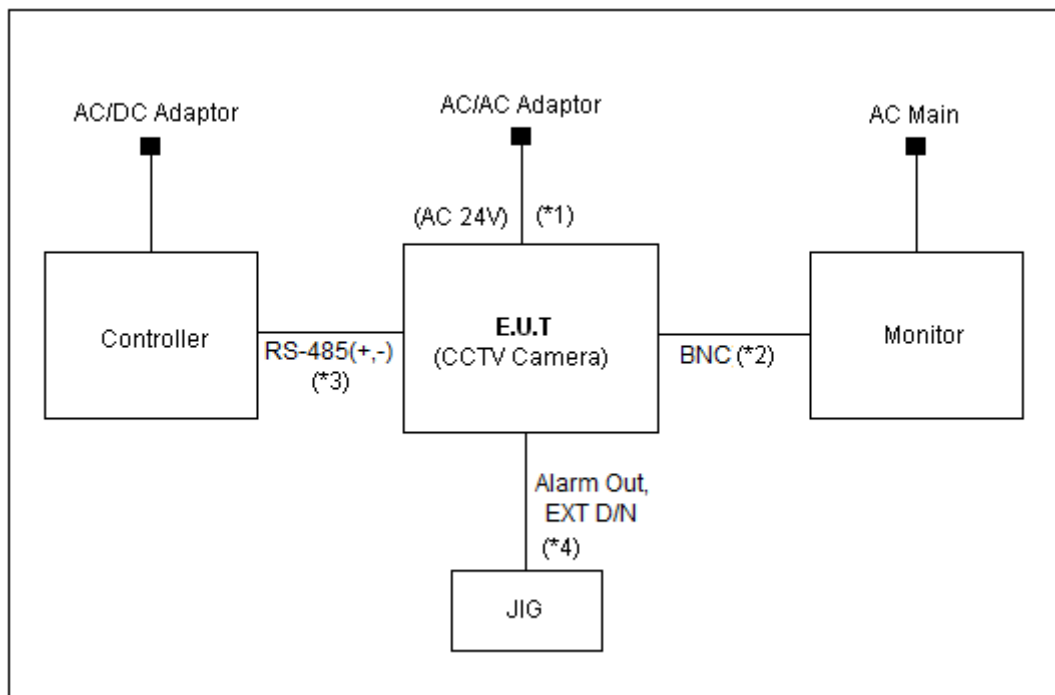
4.4 Test configuration

#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		RS-485(+,-)	Controller	RS-485(+,-)	3.0	Non-Shield
4		Alarm Out, EXT D/N	JIG	Alarm In, EXT D/N	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		RS-485(+,-)	Controller	RS-485(+,-)	3.0	Non-Shield
4		Alarm Out, EXT D/N	JIG	Alarm In, EXT D/N	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.
	RS-485 test.
	Alarm, EXT D/N 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

In the above configuration tested, The EUT complied with the requirement of the specification

5.1 Summary of EMI emission test results

FCC Part 15 Subpart B (Class A)

ANSI C63.4 – 2009

Applied	Test items	Test method	Result
<input type="checkbox"/>	Conducted Emission	ANSI C63.4 – 2009	N/A
<input checked="" type="checkbox"/>	Radiated Emission	ANSI C63.4 – 2009	Complied

6. Test results

6.1 Radiated Emission

Test specification	FCC Part 15, Section 15.109(g), Class A		
Testing voltage	DC 12 V, AC 24 V		
Test facility	10 m Chamber (#F2)		
Test distance	10 m, 3 m		
Date	2014. 08. 18 ~ 19		
Temperature (°C)	25.3 ~ 25.4 °C	Humidity (% R.H.)	47.3 ~ 48.1 % R.H.
Remarks	Complied		

6.1.1 Limits of radiated emission measurement

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

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

6.1.2 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	<input type="checkbox"/>
Test Receiver	ESCI	100001	R&S	2015.07.14	<input type="checkbox"/>
Test Receiver	ESCI	100710	R&S	2014.10.28	<input type="checkbox"/>
Test Receiver	ESR	101078	R&S	2015.02.24	<input checked="" type="checkbox"/>
Bi-Log Antenna	VULB9168	583	SCHWARZBECK	2016.06.19	<input checked="" type="checkbox"/>
Amplifier	310N	293004	SONOMA INSTRUMENT	2014.10.31	<input checked="" type="checkbox"/>
3 dB Attenuator	8491B	22981	HP	2015.03.04	<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"/>
Preamplifier	8449B	3008A02343	AGILENT	2014.10.31	<input checked="" type="checkbox"/>
Horn ANT	3115	00155772	ETS	2015.02.26	<input checked="" type="checkbox"/>
Spectrum Analyzer	E4407B	US39010142	AGILENT	2014.10.21	<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

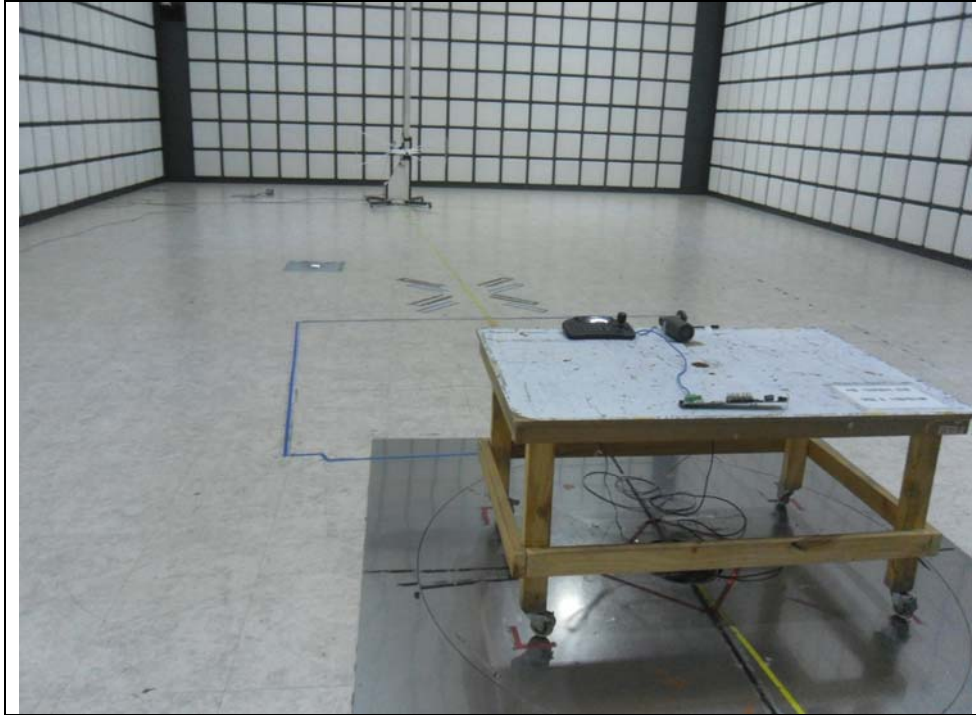
3 dB Att = 3 dB Attenuator

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

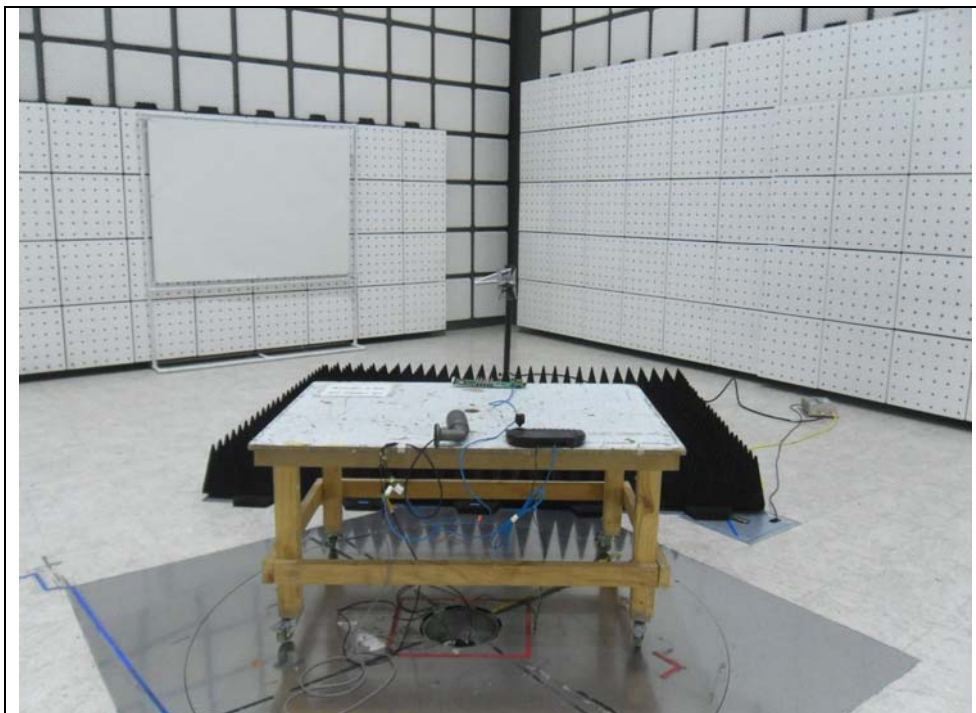
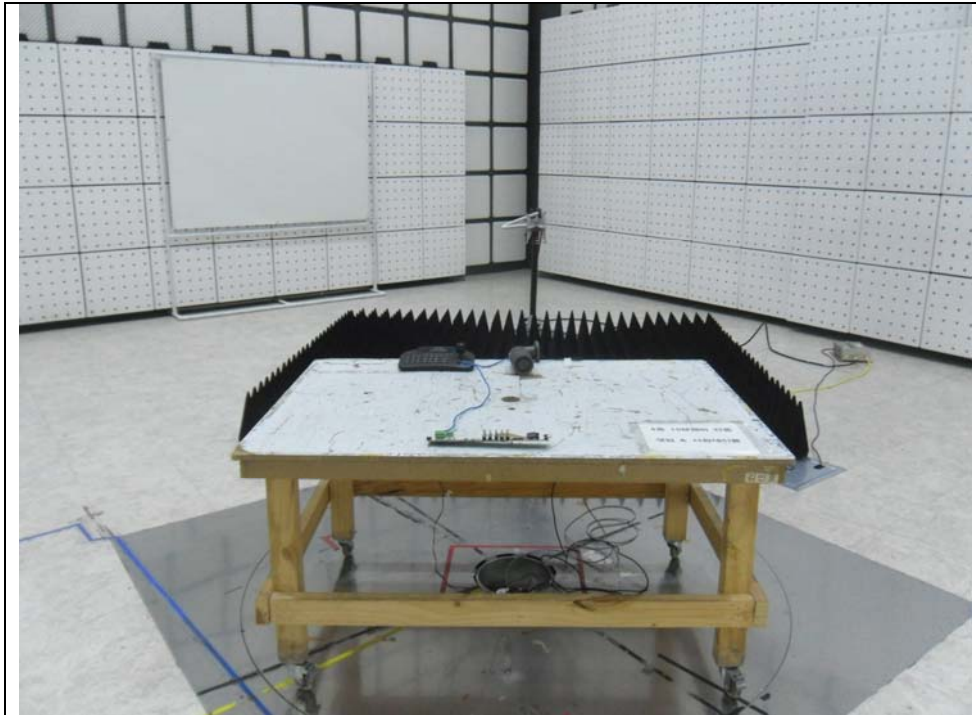
The result is $30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$

6.1.5 Photographs of test setup

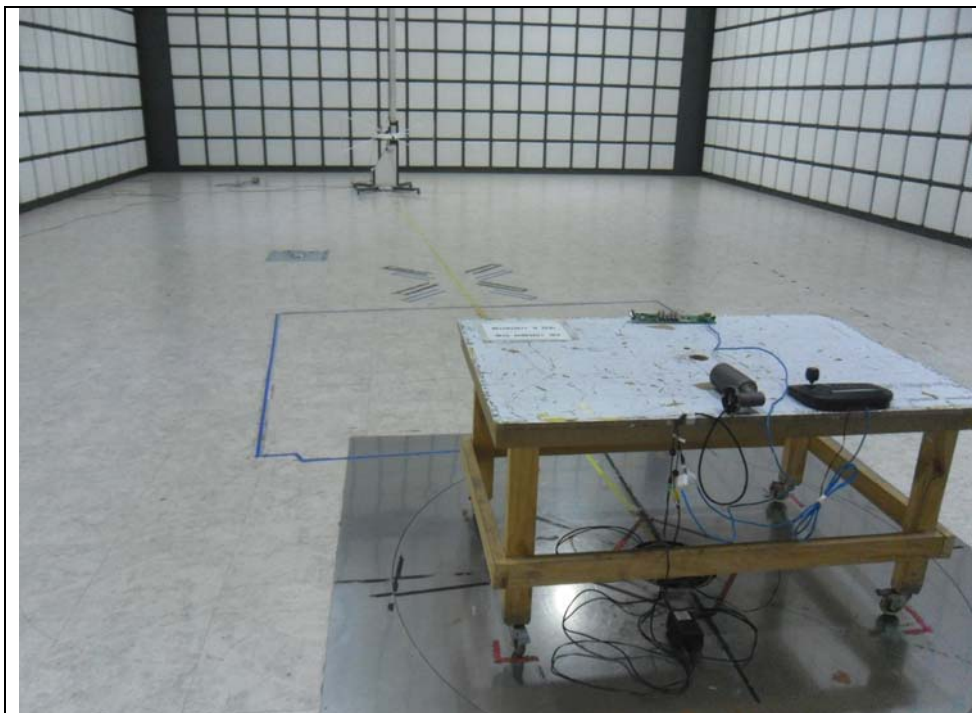
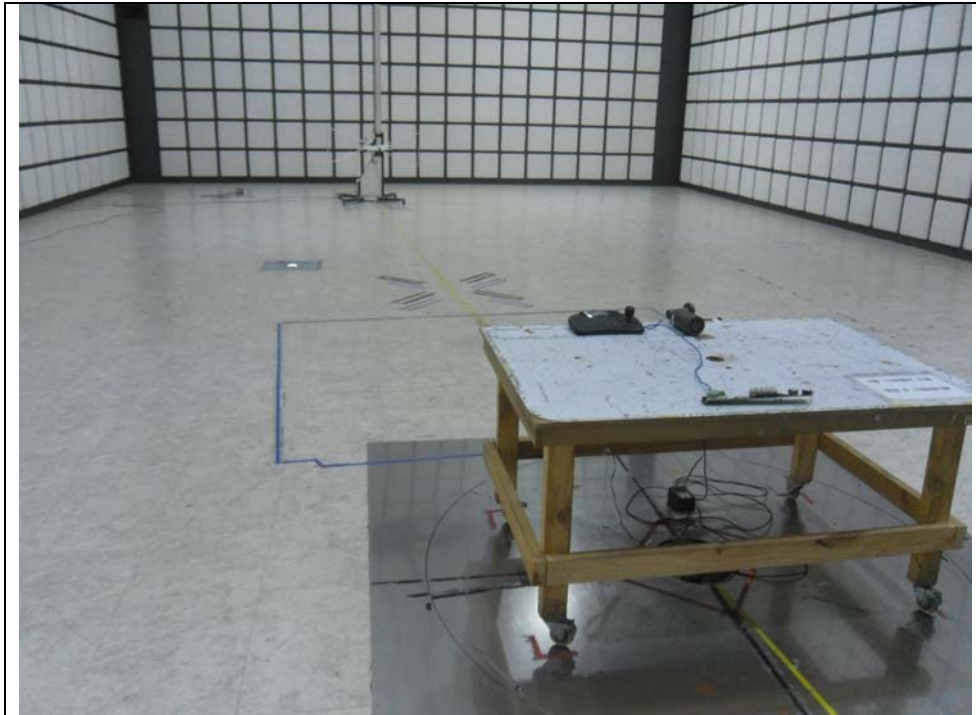
* 30 MHz ~ 1 GHz (#1-DC 12V)



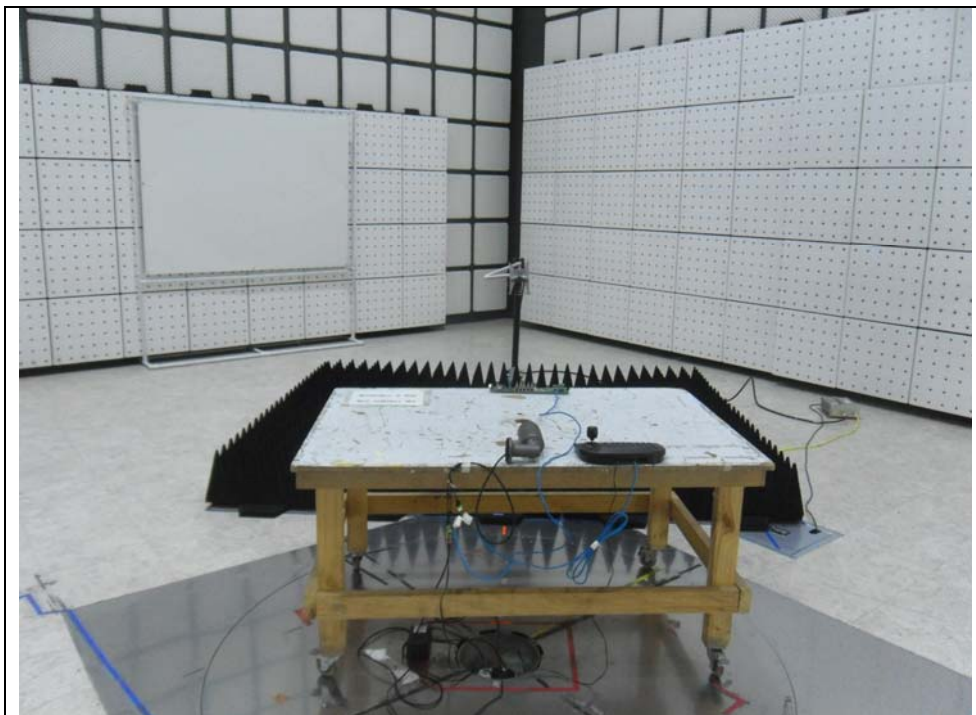
* 1 GHz ~ 6 GHz (#1-DC 12V)



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



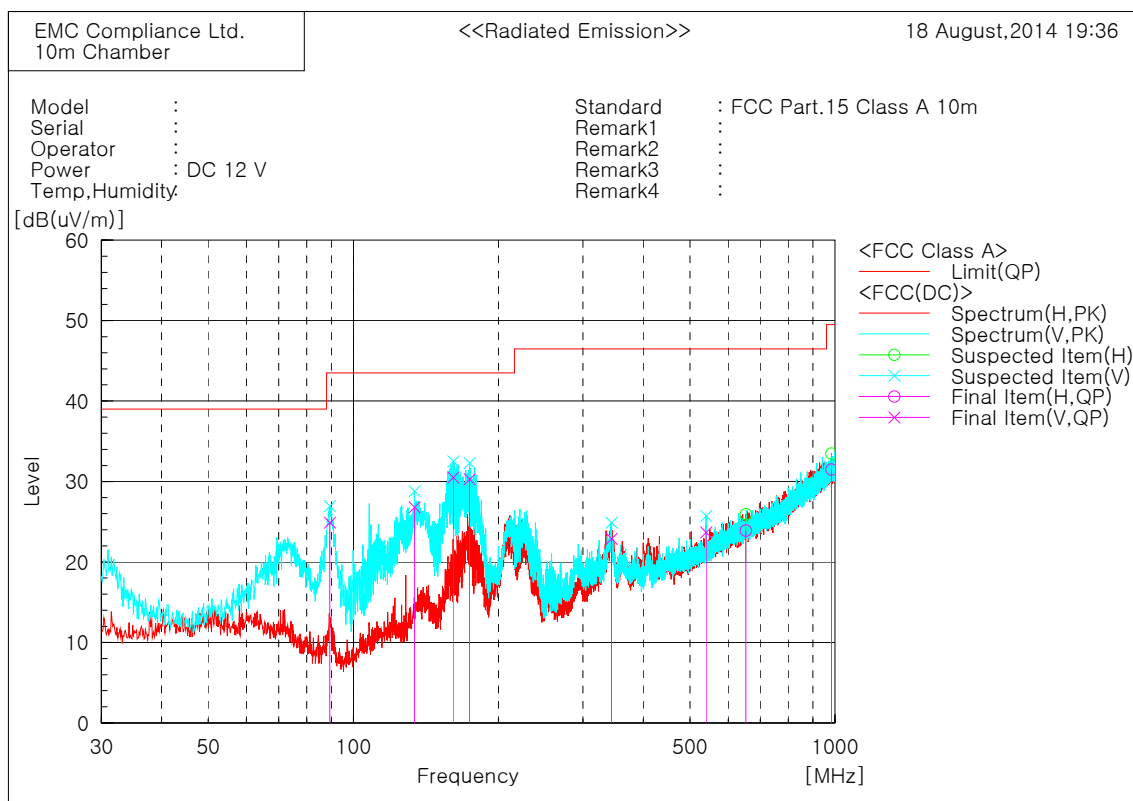
* 1 GHz ~ 6 GHz (#2-AC 24V)



6.1.6 Radiated emission measurement result

* Graph and Data

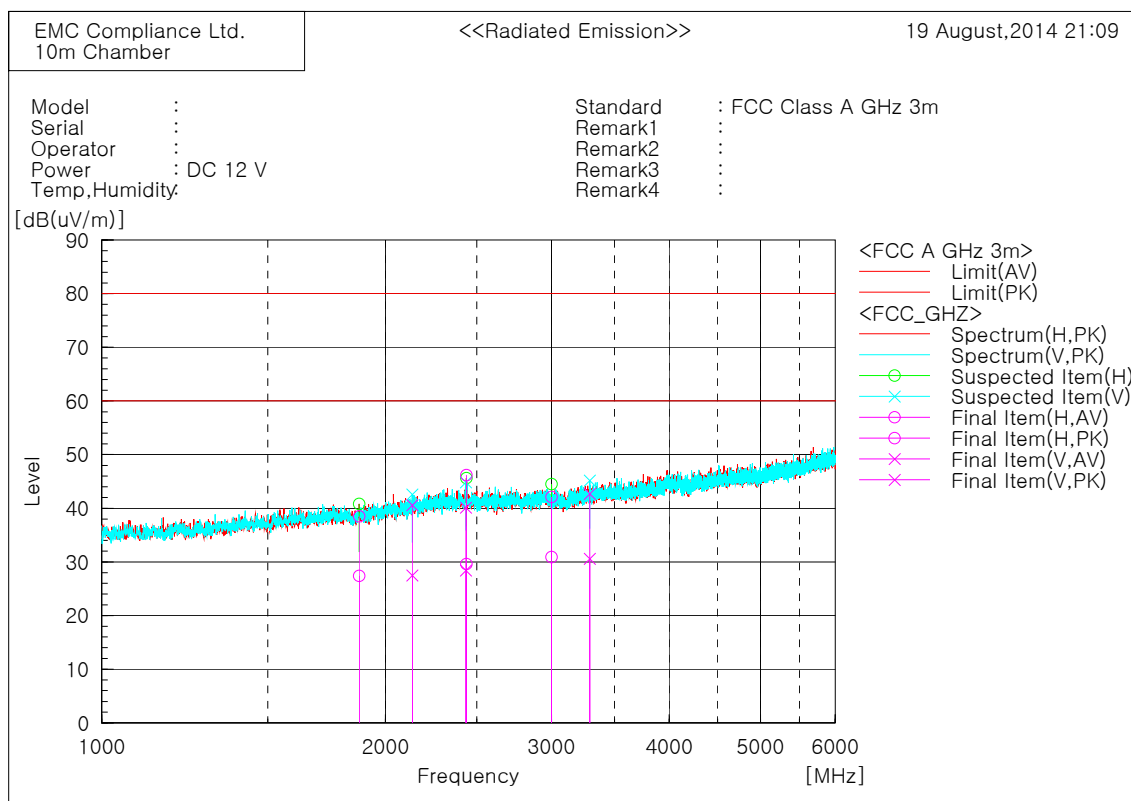
* 30 MHz ~ 1 GHz (SCO-5083RN)_#1- DC 12V



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	89.413	V	43.3	-18.4	24.9	43.5	18.6	100.0	357.7
2	134.033	V	40.5	-13.7	26.8	43.5	16.7	100.0	31.8
3	161.193	V	42.4	-11.9	30.5	43.5	13.0	100.0	319.5
4	174.288	V	44.6	-14.3	30.3	43.5	13.2	100.0	311.9
5	343.553	V	31.7	-8.8	22.9	46.5	23.6	100.0	116.1
6	539.978	V	26.9	-3.2	23.7	46.5	22.8	100.0	348.0
7	653.468	H	24.5	-0.6	23.9	46.5	22.6	400.0	200.4
8	983.510	H	25.3	6.2	31.5	49.5	18.0	400.0	12.1

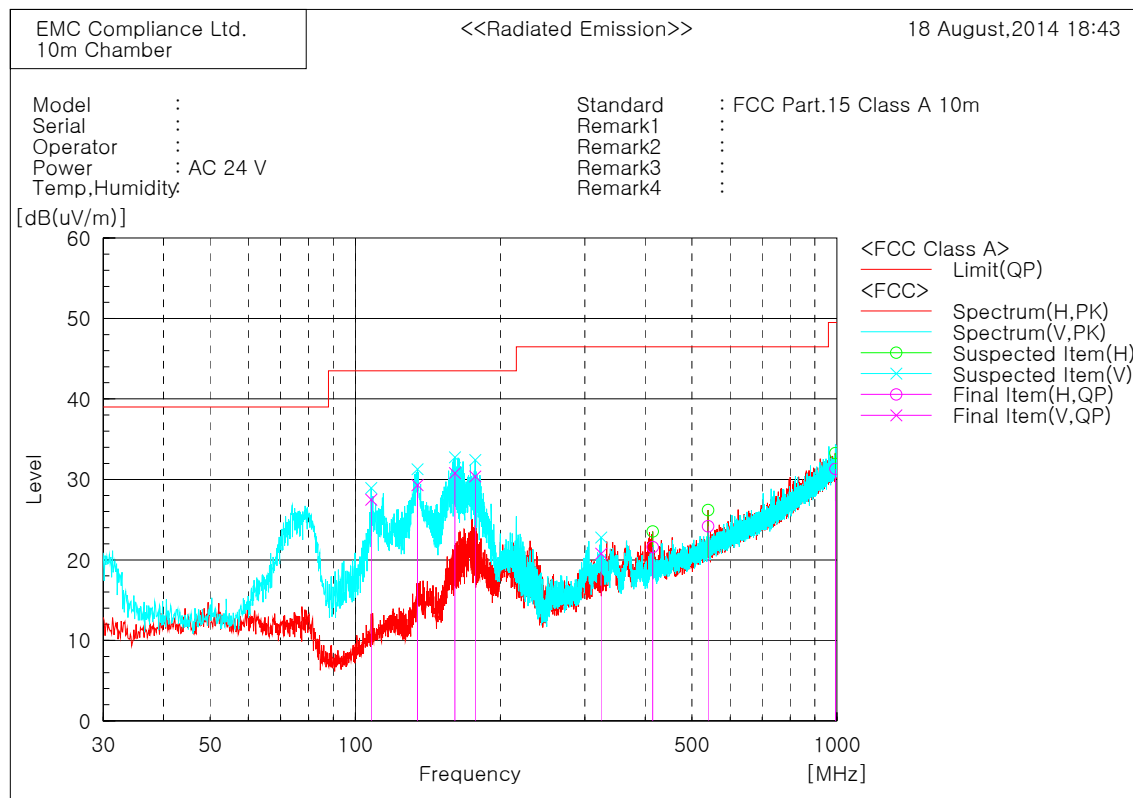
* 1 GHz ~ 6 GHz (SCO-5083RN)_#1- DC 12V



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	1875.625	H	28.9	40.0	-1.5	27.4	38.5	60.0	80.0	32.6	41.5	100.0	267.9
2	2135.000	V	27.5	40.6	0.0	27.5	40.6	60.0	80.0	32.5	39.4	100.0	351.5
3	2434.375	V	27.0	38.7	1.4	28.4	40.1	60.0	80.0	31.6	39.9	100.0	209.2
4	2437.000	H	28.2	44.8	1.4	29.6	46.2	60.0	80.0	30.4	33.8	100.0	2.5
5	3000.625	H	29.5	40.7	1.4	30.9	42.1	60.0	80.0	29.1	37.9	100.0	7.7
6	3293.125	V	28.2	40.3	2.4	30.6	42.7	60.0	80.0	29.4	37.3	100.0	249.7

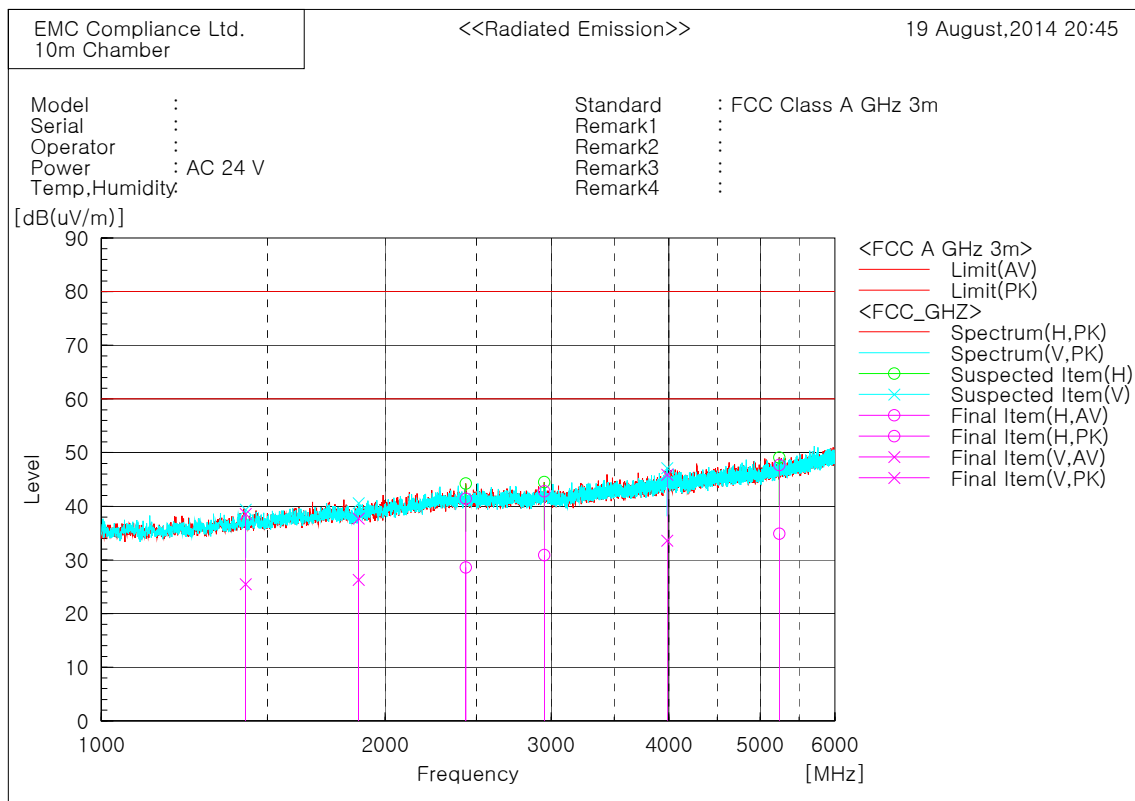
* 30 MHz ~ 1 GHz(SCO-5083RN)_#2-AC 24V



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	107.964	V	43.3	-15.8	27.5	43.5	16.0	100.0	66.3
2	134.639	V	42.8	-13.5	29.3	43.5	14.2	100.0	353.6
3	161.071	V	42.7	-11.9	30.8	43.5	12.7	100.0	349.4
4	177.440	V	44.3	-13.9	30.4	43.5	13.1	100.0	314.8
5	324.031	V	30.3	-9.5	20.8	46.5	25.7	400.0	167.4
6	414.484	H	28.4	-6.8	21.6	46.5	24.9	100.0	267.7
7	539.978	H	27.4	-3.2	24.2	46.5	22.3	100.0	293.4
8	993.089	H	24.9	6.4	31.3	49.5	18.2	400.0	293.1

* 1 GHz ~ 6 GHz (SCO-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	1422.500	V	29.8	42.9	-4.3	25.5	38.6	60.0	80.0	34.5	41.4	100.0	69.4
2	1873.750	V	27.8	39.2	-1.5	26.3	37.7	60.0	80.0	33.7	42.3	100.0	297.0
3	2435.625	H	27.2	40.0	1.4	28.6	41.4	60.0	80.0	31.4	38.6	100.0	174.4
4	2949.375	H	29.7	41.6	1.2	30.9	42.8	60.0	80.0	29.1	37.2	100.0	11.9
5	3983.125	V	28.3	40.6	5.3	33.6	45.9	60.0	80.0	26.4	34.1	100.0	32.0
6	5239.375	H	26.2	39.0	8.7	34.9	47.7	60.0	80.0	25.1	32.3	100.0	174.4

7. E.U.T. photographs

Front View



Rear View



Left View



Right View



Top View



Bottom View



Label



FCC Label Location

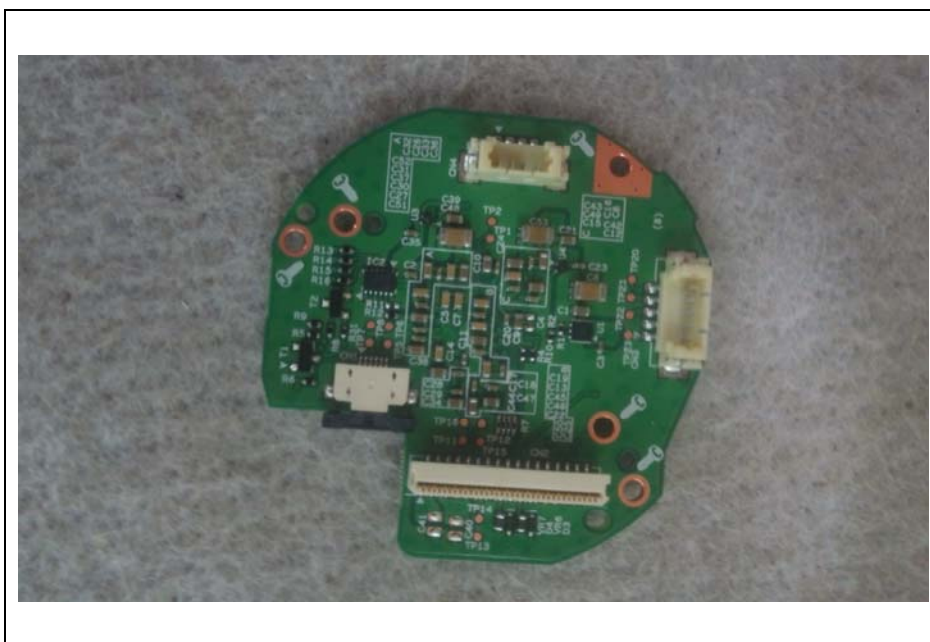
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Inside





CCD Board



IR Board



Control Board



SUB Board



SMPS Board

