

CERTIFICATE of EMC Compliance

Report No: EMC-FCC-1332
Type of equipment: IR Camera
Model Name: SCO-2080RHN
Applicant: Samsung Techwin Co., Ltd.
Address: #42 Seongju-Dong, Changwon-Shi,
Kyungsangnam-Do, Korea
Manufacturer#1 : Samsung Techwin Co., Ltd.
Address: #42 Seongju-Dong, Changwon-Shi,
Kyungsangnam-Do, Korea
Manufacturer#2 : TIANJIN SAMSUNG TECHWIN
OPTO-ELECTRONIC CO., LTD
Address: 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.



Yeom, Han-Seok/ Manager

Laboratory

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EMI TEST REPORT

Test report No.: EMC-FCC-1332
Type of Equipment: IR Camera
Model Name: SCO-2080RHN
Applicant: Samsung Techwin Co., Ltd.
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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
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: 2011. 07. 12

Date of testing: 2011. 07. 20

Issued date: 2011. 07. 29

Tested by:

SUNG, KI-MUN

Approved by:

YEOM, HAN-SEOK

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1. Applicant information

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Manufacturer#1: Samsung Techwin Co., Ltd.
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Manufacturer#2: TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC CO., LTD
Address: No.11 Weiliu Road, Micro-Electronic Industrial Park
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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

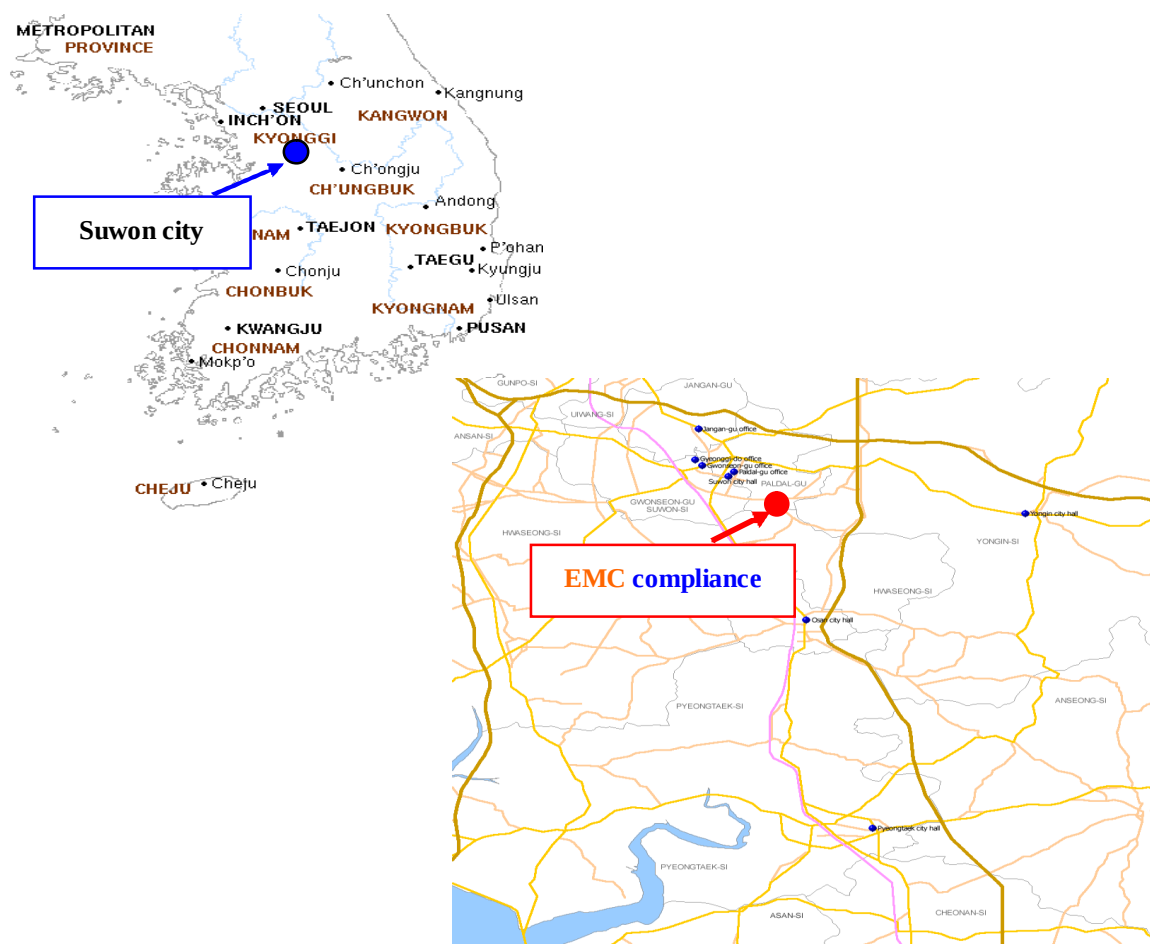
FCC CAB.: KR0040

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)	: 25 °C	52 % R.H.	-

Test site

These testing items were performed following locations;

Chamber (10 m) : Radiated Emission

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: ± 4.3 [dB]

10 m: ± 4.3 [dB]

300 MHz ~ 1 000 MHz: 3 m: ± 4.4 [dB]

10 m: ± 4.3 [dB]

4. Description of E.U.T.

4.1 General information

Video	SCO-2080RH,SCO-2080RHN	SCO-2080RHP
Imaging Device	1/3" Super HAD CCD II	
Total Pixels	811(H) x 508(V)	795(H) x 596(V)
Effective Pixels	768(H) x 494(V)	752(H) x 582(V)
Scanning System	2 : 1 Interlace	
Synchronization	Internal / Line Lock	Internal / Line Lock
Frequency	H : 15.734KHz / V : 59.94Hz	H : 15.625KHz / V : 50Hz
Horizontal Resolution	Color : 600 TV lines, B/W : 700 TV lines	
Min. Illumination	Color : 0.15Lux @ F1.2 (50IRE), 0.0003 Lux (Sens-up, 512x) B/W : 0 LUX (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)	2.8~10mm (V/F, 3.6x)	
Max. Aperture Ratio	1:1.2 (Wide) ~ 2.8 (Tele)	
Angular Field of View	H : 94.4°(Wide) ~ 28°(Tele) / V : 69.2°(Wide) ~ 21°(Tele)	
Min. Object Distance	0.2M	
Focus Control	Manual	
Lens Type	DC Auto Iris	
Operational		
On Screen Display	English, Japanese, Spanish, French, Portuguese, Taiwanese, Korean	English, French, German, Spanish, Italian, Chinese, Russian, Polish, Czech, Romanian, Serbian, Swedish, Danish, Turkish, Portuguese
Camera Title	Off / On (Displayed 15 characters)	
Day & Night	Auto (ICR) / Color / B/W	
Backlight Compensation	BLC / HLC / Off	
Contrast Enhancement	SSDR (Off/On)	
Digital Noise Reduction	SSNRⅢ (Off/On)	
Digital Image Stabilization	Off / On	
Motion Detection	Off / On (8 programmable zones)	
Privacy Masking	Off / On (12 programmable zones)	
Sens-up (Frame Integration)	2x ~ 512x	
Gain Control	Off / Low / High	
White Balance	ATW / Outdoor / Indoor / Manual / AWC (1,700K° ~ 11,000K°)	
Electronic Shutter Speed	1/60 ~ 1/120,000 sec	1/50 ~ 1/120,000 sec
Digital Zoom	Off / On (1x ~ 16x)	Off / On (1x ~ 16x)
Reverse	H-Rev (Off/On), V-Rev (Off/On)	
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	
Environmental		
Operating Temperature / Humidity	-50°C ~ +50°C (+14°F ~ +122°F) / Less than 90% RH	
Ingress Protection	IP66	
Electrical		
Input Voltage/Current	Dual (24VAC±10% & 12VDC±10%)	
Power Consumption	Not Fixed	
Mechanical		
Color / Material	Dark Gray / ALDC	
Dimension (WxHxD)	Φ103(W)x.114(H)x378mm (Bracket Angle 180°)	
Weight	Not Fixed	

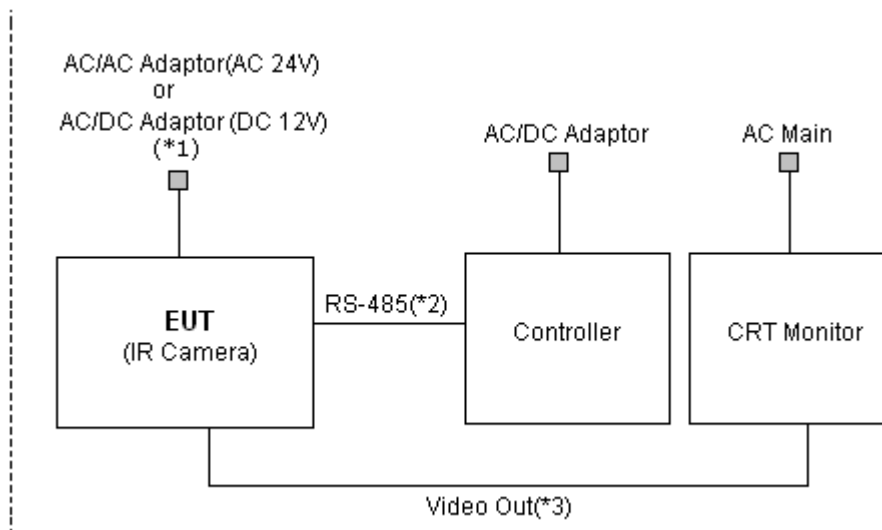
4.2 Product description

Type of product	IR Camera
Model name (Basic)	SCO-2080RHN
Model name (Variant)	N/A
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	AC 24 V , DC 12 V
Product rating	AC 24 V , DC 12 V
Internal clock frequency	28.6363 MHz
Note	AC/AC adaptor, AC/DC adaptor was not provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
CRT Monitor	GCM-1014SA-D	26090901007	Honeywell
Controller	SCC-2000	-	SAMSUNG
AC/AC Adaptor (AC 24 V)	STA-200	-	Dream Electronic
AC/DC Adaptor (DC 12 V)	DSA-60W-12 12048	-	Dee Van

4.4 Test configuration



Note	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT (IR Camera)	Power	AC/AC Adaptor or AC/DC Adaptor	Power	1.4	Non-Shield
2		RS-485	Controller	RS-485	3.0	Non-Shield
3		Video Out	CRT Monitor	Video In	3.0	Shield

4.5 Operating conditions

The EUT was configured as normal intended use.

This test was done at worst case.

Test mode	Normal operating
1	Camera video monitoring test mode.
	RS-485 test mode.

* Note: 2 types of powers are available for the product, that are AC/AC adaptor (AC 24 V),
AC/DC adaptor (DC 12 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 Modification to the E.U.T.

None

5.2 Summary of EMI emission test results

FCC Part 15 Subpart B (Class A)

ANSI C63.4 – 2009

Application	Test method	Test result
Conducted emission	ANSI C63.4 – 2009	N/A
Radiated emission - DC 12 V, AC 24 V	ANSI C63.4 – 2009	Complied

6. Test results

6.1 Radiated Emission

Test specification	FCC Part 15, Section 15.109(g), Class A		
Test mode	Operating mode.		
Date	2011. 07. 20		
Testing voltage	DC 12 V, AC 24 V		
Test facility	10 m Chamber		
Temperature (°C)	25 °C	Humidity (% R.H.)	52 % R.H.
Remarks	Complied Minimum limit margin is 13.9 dB at 515.485 MHz. (DC 12 V)		

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	ESCI	100710	R&S	11.12.01	☒
Bi-Log Antenna	VULB 9168	9168-440	SCHWARZBECK	13.07.08	☒
Amplifier	310N	293004	SONOMA INSTRUMENT	11.12.01	☒
3 dB Attenuator	8491A	27444	HP	11.11.30	☒
Antenna Mast	MA4000-EP	303	Innco Systems	-	☒
Turn Table	DT2000S-1t	079	Innco Systems	-	☒

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

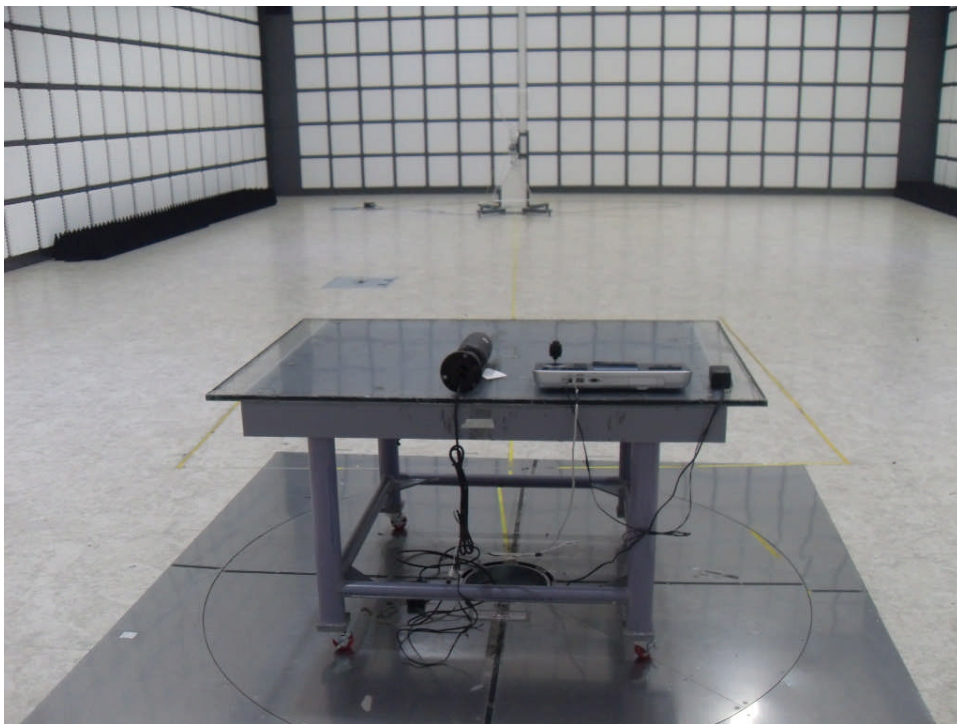
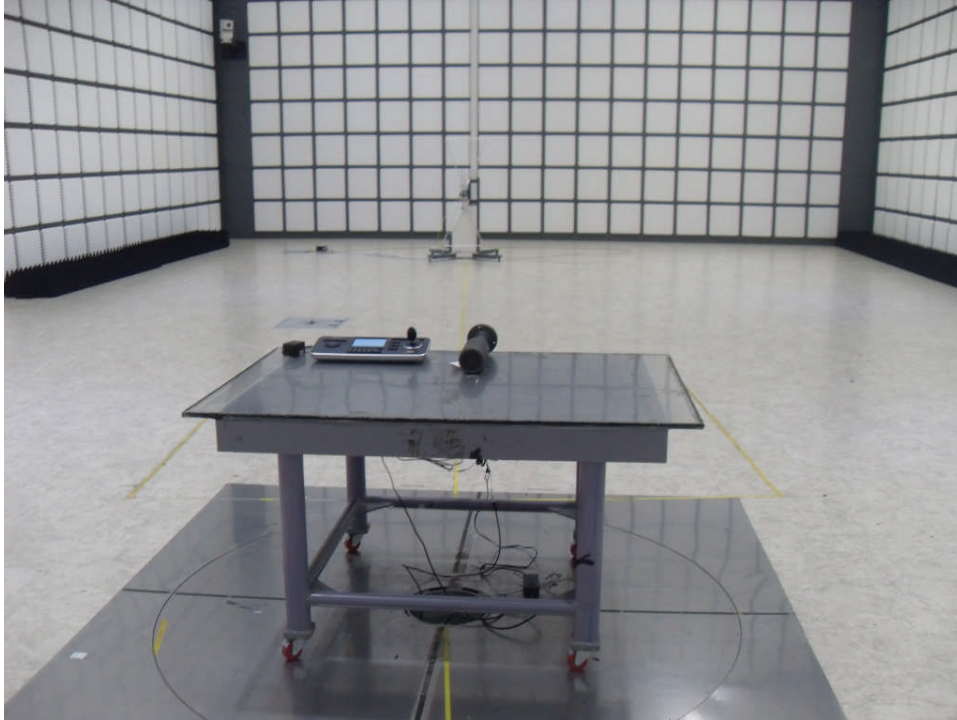
A.G= Amplifier Gain

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

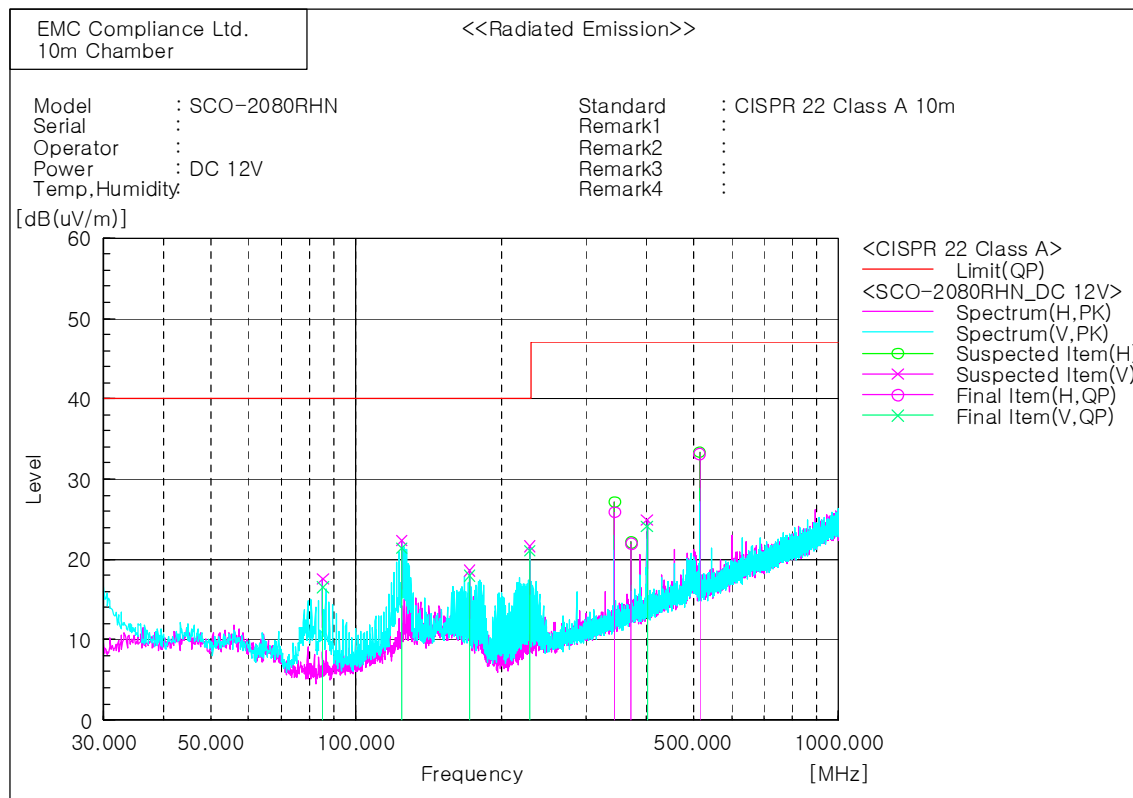
6.1.5 Photographs of test setup



6.1.6 Radiated emission measurement result

* Graph and Data

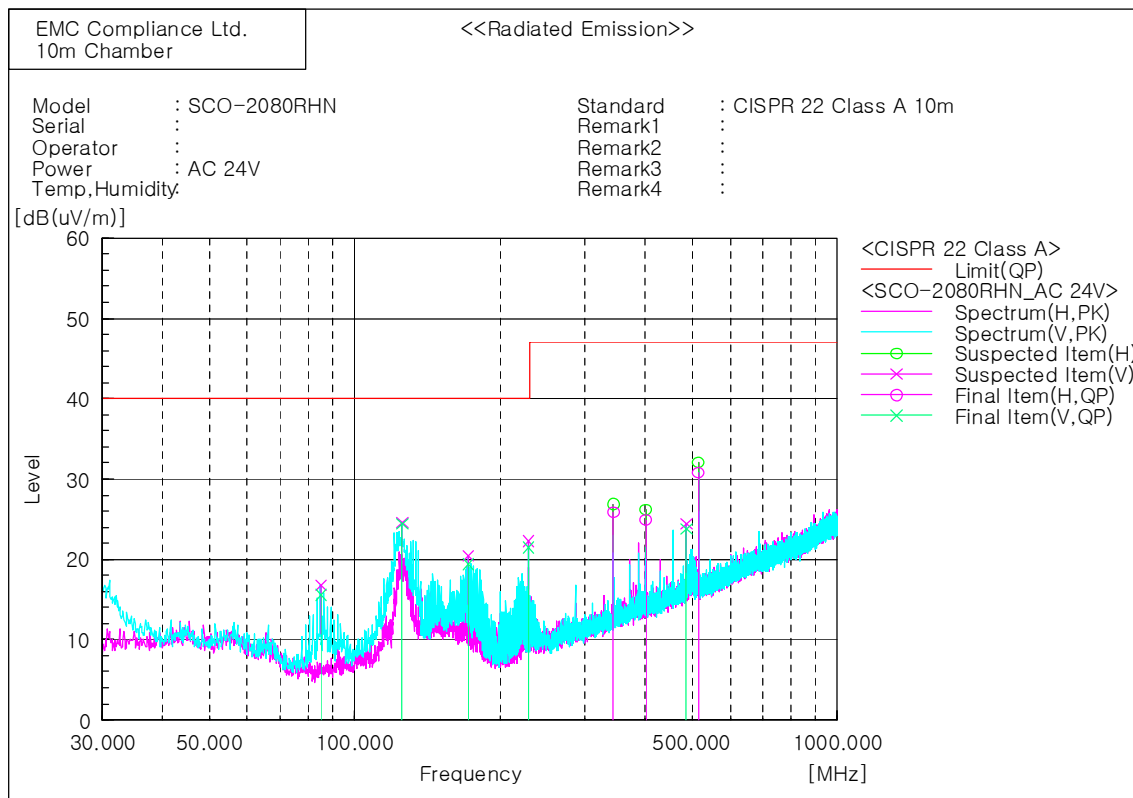
* DC 12 V



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	85.290	V	36.7	-20.2	16.5	40.0	23.5	299.0	239.1
2	124.333	V	38.1	-16.7	21.4	40.0	18.6	100.0	43.6
3	171.741	V	33.8	-15.9	17.9	40.0	22.1	299.0	352.2
4	229.093	V	38.1	-17.0	21.1	40.0	18.9	100.0	63.0
5	343.674	H	39.4	-13.5	25.9	47.0	21.1	301.0	292.9
6	372.289	H	34.6	-12.7	21.9	47.0	25.1	202.0	287.6
7	400.904	V	36.3	-12.2	24.1	47.0	22.9	400.0	292.4
8	515.485	H	42.8	-9.7	33.1	47.0	13.9	202.0	37.4

* AC 24 V



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	85.048	V	35.8	-20.2	15.6	40.0	24.4	199.0	298.4
2	125.303	V	41.0	-16.6	24.4	40.0	15.6	199.0	310.3
3	171.863	V	35.4	-16.0	19.4	40.0	20.6	100.0	280.9
4	229.093	V	38.5	-17.0	21.5	40.0	18.5	100.0	328.6
5	343.674	H	39.4	-13.5	25.9	47.0	21.1	300.0	311.8
6	400.904	H	37.1	-12.2	24.9	47.0	22.1	201.0	63.4
7	486.870	V	34.1	-10.3	23.8	47.0	23.2	100.0	127.4
8	515.485	H	40.5	-9.7	30.8	47.0	16.2	300.0	44.4

7. E.U.T. photographs

Front View



Rear View



Left View



Right View



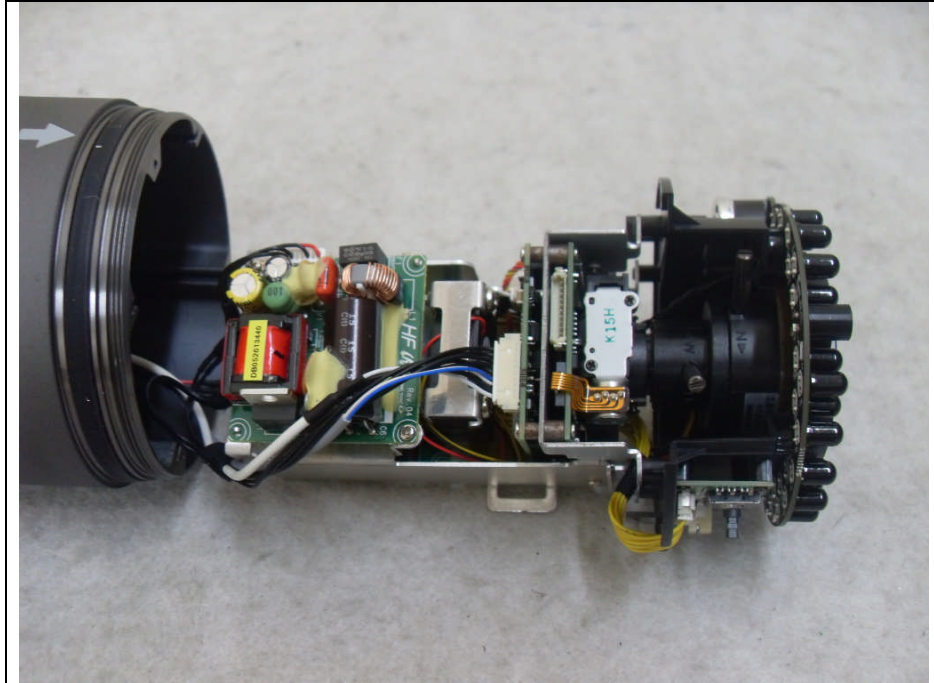
Label



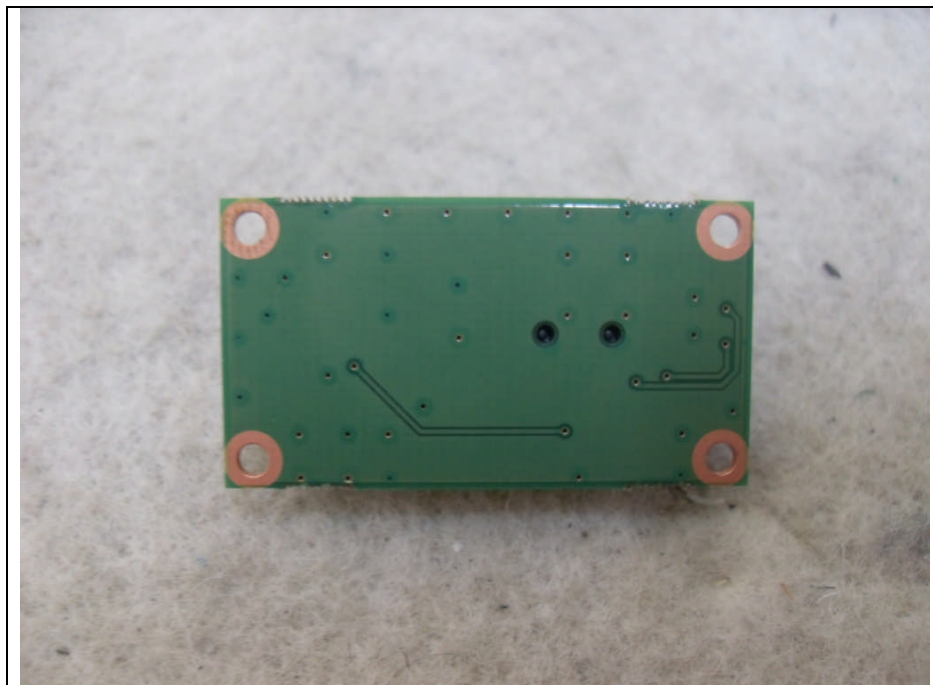
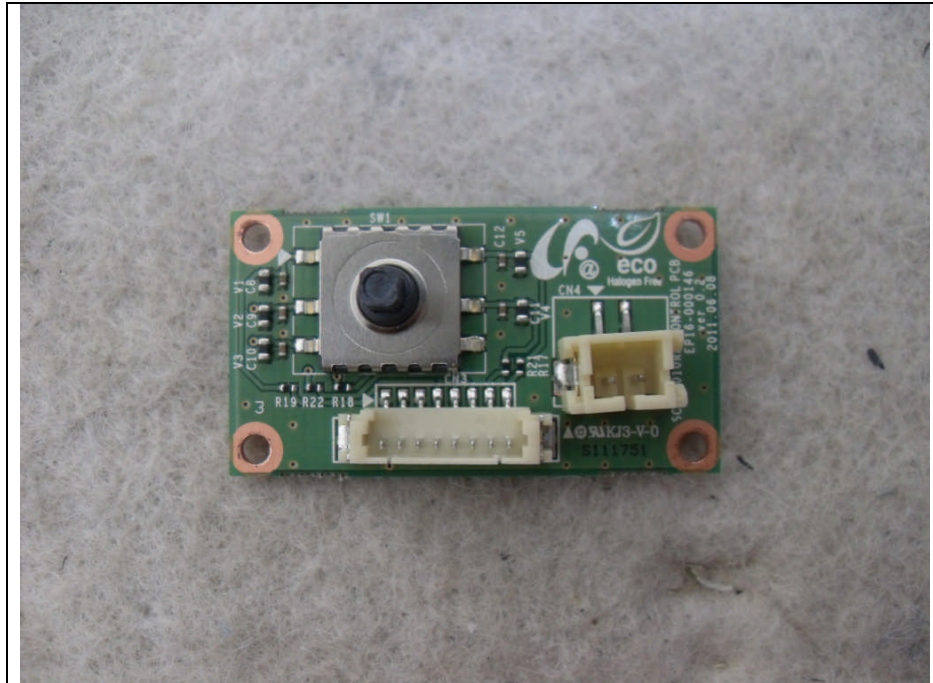
FCC Label Location

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.

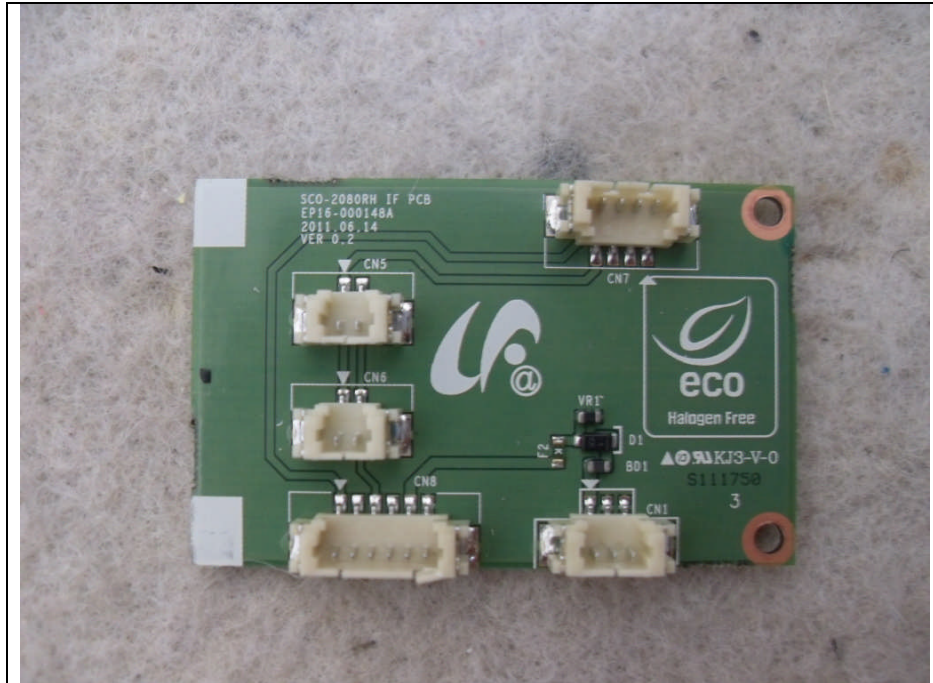
Inside



Control Board



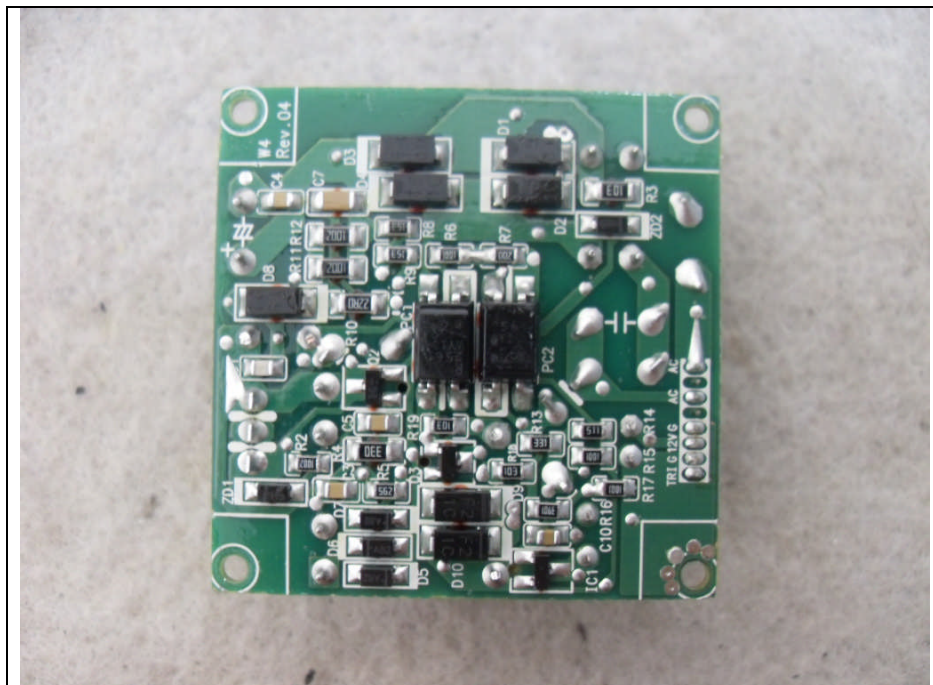
IF Board



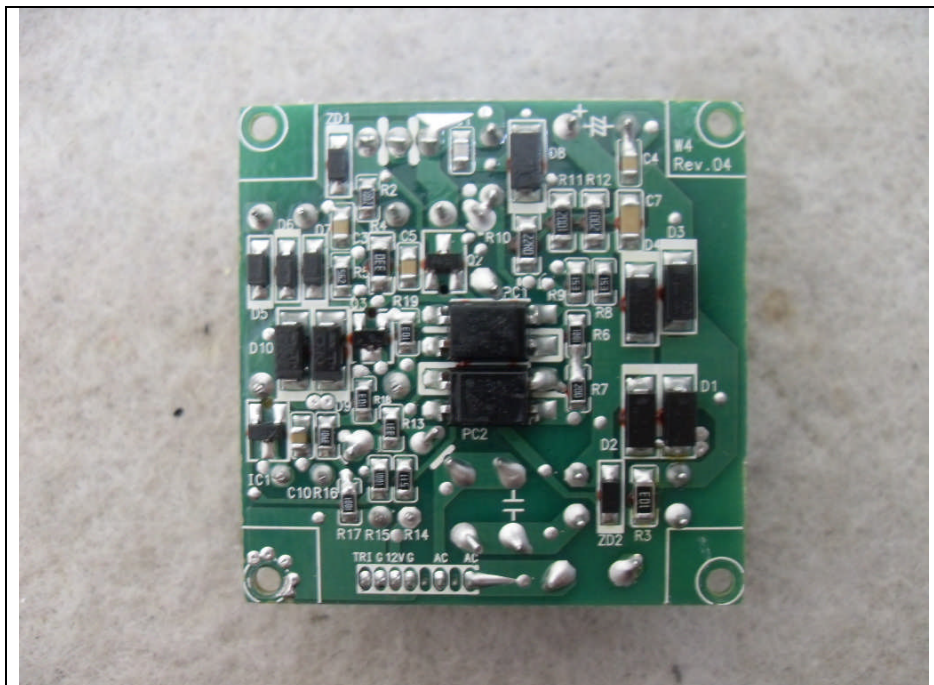
LED Board



SMPS Board #1



SMPS Board #2



SUB Board

