

CERTIFICATE of EMC Compliance

Report No: EMC-FCC-0985
Type of equipment: CCD DOME CAMERA
Model Name: SCP-2120N
Applicant: SAMSUNG TECHWIN CO., LTD
Address: 42, Seongju-dong Changwon-si,
Gyeongsangnam-do, Korea
Manufacturer #1: SAMSUNG TECHWIN CO., LTD
Address: 42, Seongju-dong Changwon-si,
Gyeongsangnam-do, Korea
Manufacturer #2: TIANJIN SAMSUNG TECHWIN
OPTO-ELECTRONIC CO., LTD
Address: NO.11 WEILIU RD MICRO-ELECTRONIC
INDUSTRIAL PARK TEDA 300385
TIANJIN 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.



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Laboratory

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EMI TEST REPORT

Test report No.: EMC-FCC-0985
Type of Equipment: CCD DOME CAMERA
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INDUSTRIAL PARK TEDA 300385
TIANJIN CHINA
Test standards : FCC part 15 subpart B, Class A

Test Procedure and Items

- Radiated Emissions Measurement : ANSI C63.4-2003

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.

Date of receipt: 2009. 12. 21

Date of testing: 2009. 12. 29

Issued date: 2010. 01. 08

Tested by:

SUNG, KI-MUN

Approved by:

YU, SANG-HOON

EMC Compliance Ltd.

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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

Facsimile Number: 82 31 336 4767

FCC CAB.: KR0040

VCCI Registration No. : C-1713, R-2710

Industry Canada Registration No. : 8035

KOLAS NO.: 231

SITE MAP



EMC Compliance Ltd.

82-1 Jeil-ri, Yangji-myun, Churin-gu, Yongin-city, Kyunggi-do 449-825, Korea

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3. Test system configuration

3.1 Operation environment

	Temperature	Humidity	Pressure
OATS	4 °C	44 % R.H.	-

Test site

These testing items were performed following locations;

OATS (10 m) : Radiated Emission
Anechoic chamber (3 m): Radiated Emission (#4)

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 ~ 300 MHz: 3 m: +4.914 [dB μ V/m], -4.930 [dB μ V/m]
10 m: +4.904 [dB μ V/m], -4.920 [dB μ V/m]
300 ~ 1000 MHz: 3 m: +5.038 [dB μ V/m], -5.054 [dB μ V/m]
10 m: +5.026 [dB μ V/m], -5.042 [dB μ V/m]

4. Description of E.U.T.

4.1 General information

Imaging Device	1/4 inch, Super HAD color CCD
TV Standard	NTSC/PAL
Total Pixels	NTSC : 811(H) × 508(V) / PAL: 795(H) × 596(V)
Effective Pixels	NTSC : 768(H) × 494(V) / PAL: 752(H) × 582(V)
Scanning System	2:1 Interlace
Synchronization	Internal / External (AC Line Lock)
Horizontal Scan Rate	NTSC : 15.734 KHz / PAL: 15.625 KHz
Vertical Scan Rate	NTSC : 59.94 Hz / PAL: 50Hz
Horizontal Resolution	580 TV Line(Color) / 680 TV Line(B/W)
Min. Illumination	0.2Lux (50 IRE @ F1.67), 0.0004Lux (50 IRE, Color, Sens-up, 512x) 0.004Lux (50 IRE, B/W), 0.000008Lux (50 IRE, B/W, Sens-up, 512x)
S/N (Y Signal)	More than 50dB
Video Output	CVBS : 1.0Vp-p/75Ω
Zoom Ratio	12X (Optical), 16X (Digital)
Focal Length	3.94~46.05mm (F1.67~1.88)
Min. Object Distance	1.0m
Angular Field of view	25.77°(Wide) ~ 2.25°(Tele) 19.64°(Wide) to 1.69°(Tele)
Focus	AUTO / MANUAL / ONE-SHOT
Zoom Speed	1.9sec
IRIS	AUTO / MANUAL
Lens Initialization	Built-In
Auto Tracking	Built-In
Horizontal Rotation Angle	360° Endless
Horizontal Rotation Speed	Manual : 0.01~120°/sec (Turbo: 200°/sec), Preset : 500°/sec
Vertical Rotation Angle	-5° ~ 185°
Vertical Rotation Speed	Manual : 0.01~120°/sec, Preset : 500°/sec
Preset Position	255
Preset Accuracy	±0.1°
Camera ID	255
Day & Night	AUTO / COLOR / BW
Backlight	BLC / HLC / OFF
Motion Detection	ON / OFF
Privacy Mask	ON / OFF (8 Areas)
SSNR	LOW / MEDIUM / HIGH / OFF
Sens-up	Auto / Off (Selectable limit X2~ 512X)
Gain Control	Auto / Off (Selectable limit X2~ 512X)
White Balance	ATW / ATW(IN) / ATW(OUT) / AWC / MANUAL
Electronic Shutter	AUTO(NTSC: 1/60~120,000sec, PAL: 1/50~120,000sec) / MANUAL / A.FLK
Serial Com.	RS485, Coaxial Communication

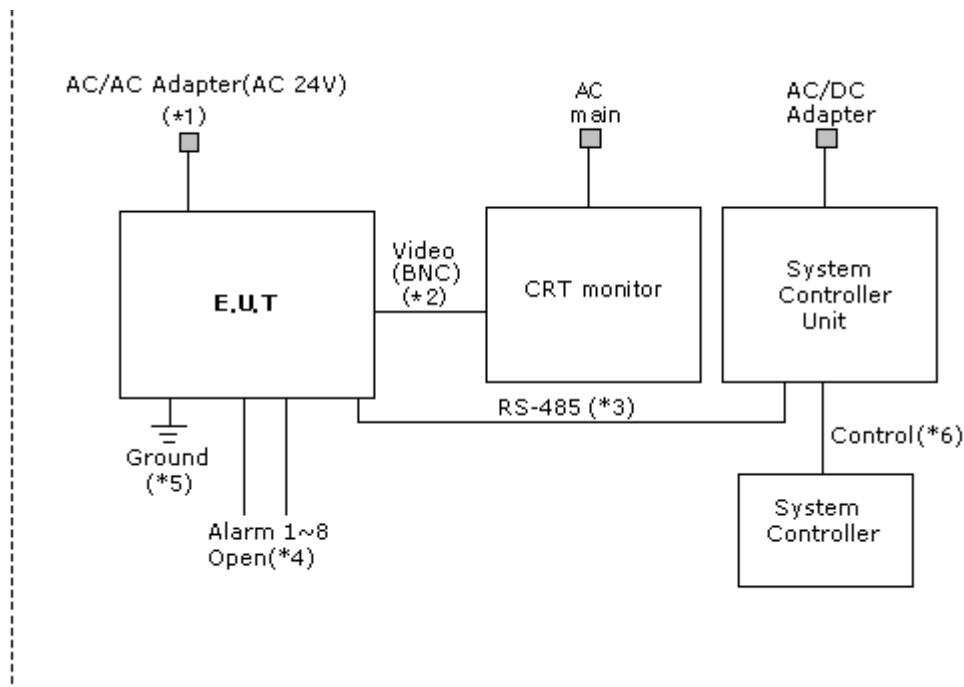
4.2 Product description

Type of product	CCD DOME CAMERA
Model name (Basic)	SCP-2120N
Model name (Variant)	-
Difference	-
Serial no	Engineering Sample
Trade name	-
Testing Voltage	AC 24 V
Product rating	AC 24 V
Internal Clock Ferquence	72 MHz
Note	AC/AC adapter was not provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
CRT Monitor	GCM-1014SA-D	90310009	Honeywell
System Controller Unit	-	-	-
System Controller	SCC-3100A	-	Samsung Techwin
AC/AC Adapter	STA-230	-	Samsung Techwin

4.4 Test configuration



Note	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length(m)	Spec.
1	EUT	Power	AC/AC Adapter	Power	1.6	Non-Shield
2		Video(BNC)	CRT Monitor	Video(BNC)	3.0	Shield
3		RS-485	System Controller Unit	RS-485	3.0	Non-Shield
4		Alarm 1~8	Open	-	3.0	Non-Shield
5		Ground	Ground	Ground	1.8	Non-Shield
6	System Controller Unit	Control	System Controller	Control	2.2	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 operating mode.

5. Summary of test results

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 – 2003

Application	Test method	Test result
Conducted emission	ANSI C63.4 – 2003	N/A
Radiated emission - AC 24 V	ANSI C63.4 – 2003	Complied

6. Test results

6.1 Radiated Emission

Test specification	FCC Part 15, Section 15.109, Class A		
Test mode	Camera operating mode.		
Date	2009. 12. 29		
Testing Voltage	AC 24 V		
Test facility	10 m OATS		
Temperature(°C)	4 °C	Humidity (%)	44 % R.H.
Remarks	Complied Minimum limit margin is 4.68 dB μ V/m at 216.00 MHz.		

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

A pretest was performed at 3 m distance in a semi-anechoic chamber for searching correct frequency. The final test was done at a 10 m open area test site 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	100001	R&S	10.08.19	☒
Bi-Log Antenna	VULB9160	3228	Schwarz beck	10.09.30	☒
Antenna Mast	A109	N/A	DAEIL	-	☒
Turn Table	TS25	N/A	DAEIL	-	☒
Amplifier	310N	293004	SONOMA INSTRUMENT	10.12.14	☒
3 dB Attenuator	8491A	16861	HP	10.01.09	☐
10 m OATS	-	-	EMC Compliance	-	☒

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:

$$FS = MR + AF + CL + 3 \text{ dB Att} - AG$$

MR = Meter Reading

AF = Antenna Factor

CL = Cable Loss

AG= Amplifier Gain

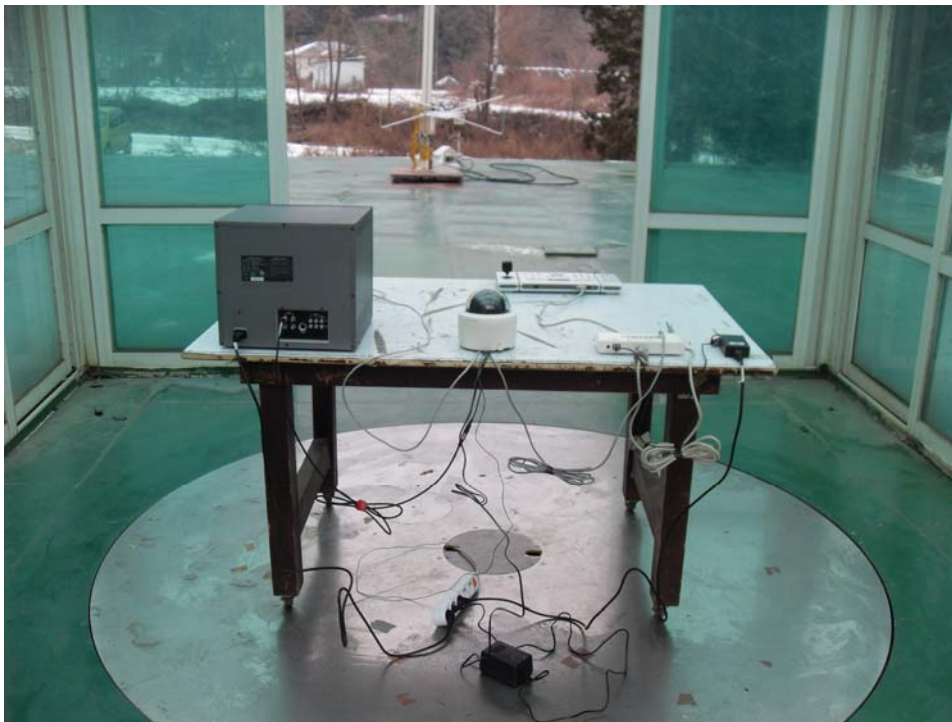
3 dB Att = 3 dB Attenuator

If MR is 30 dB, AF 12 dB, CL 5 dB, 3 dB Att, AG 35 dB

The result (MR) is

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

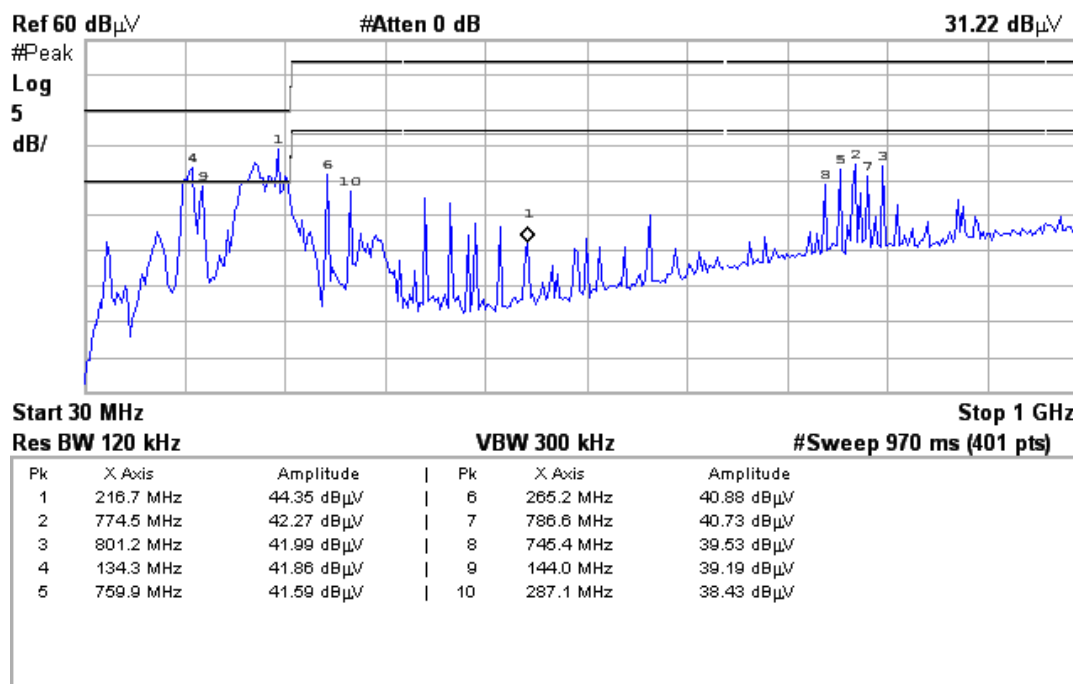
6.1.5 Photographs of test setup



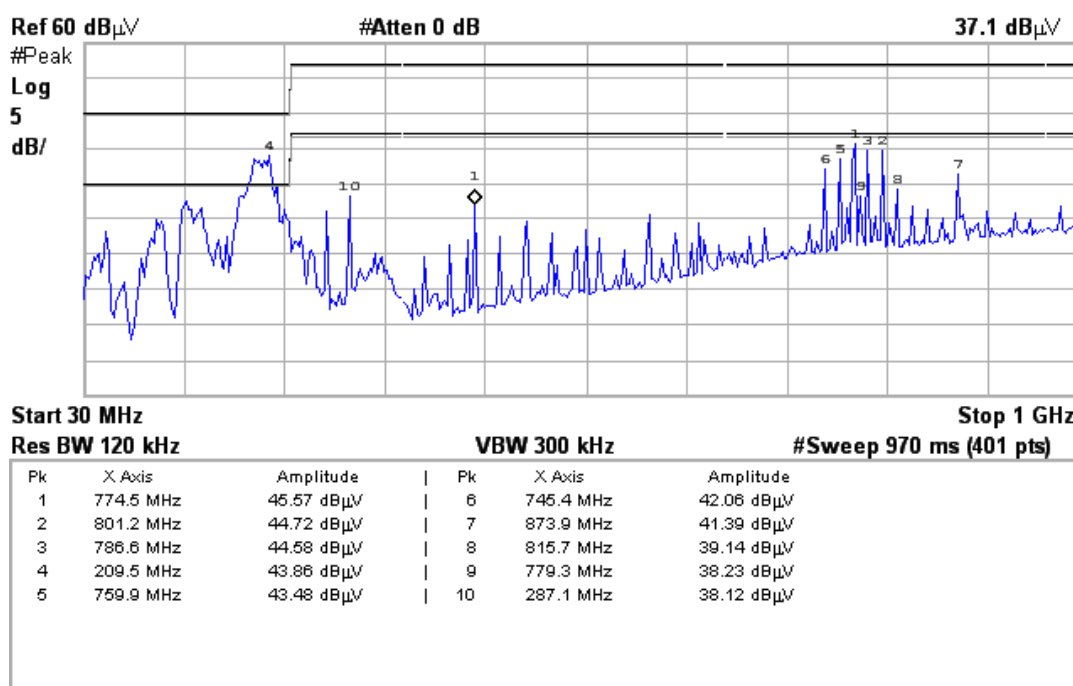
6.1.6 Radiated emission measurement result

* Semi-anechoic chamber Pre-scan Data

-Horizontal



-Vertical



*** 10 m OATS measurement data**

Frequency [MHz]	Reading [dB μ V/m]	Pol.	Height [m]	angle	Correction Factor			Limits [dB μ V/m]	Result [dB μ V/m]	Margin [dB μ V/m]
					Amp Gain	Antenna	Cable			
138.01	46.9	H	4.0	224	32.48	12.51	4.22	43.5	31.15	12.35
216.00	54.6	H	4.0	292	32.42	11.50	5.14	43.5	38.82	4.68
263.25	51.3	H	3.4	104	32.39	12.88	5.62	46.4	37.41	8.99
758.86	34.2	V	1.0	49	32.32	20.77	9.94	46.4	32.59	13.81
773.99	36.0	H	2.0	357	32.28	20.98	10.03	46.4	34.73	11.67
787.49	32.9	V	1.0	155	32.34	21.18	10.14	46.4	31.88	14.52
801.82	33.1	V	2.3	229	32.40	21.38	10.25	46.4	32.33	14.07

* Note: Reading = Test Receiver value,

7. E.U.T. photographs

Front View



Rear View



Left View



Right View



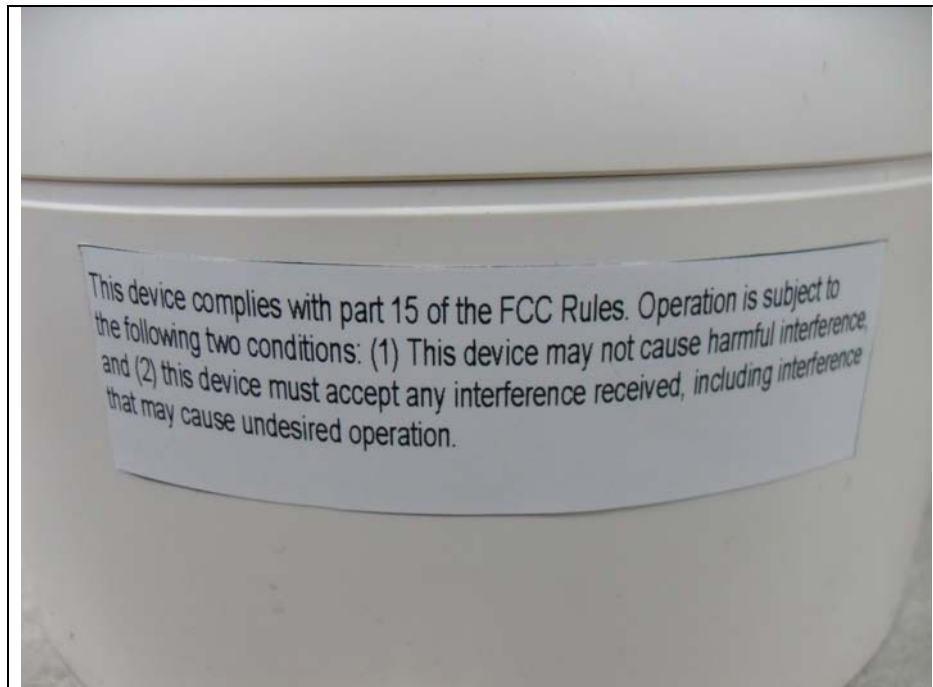
Top View



Bottom View



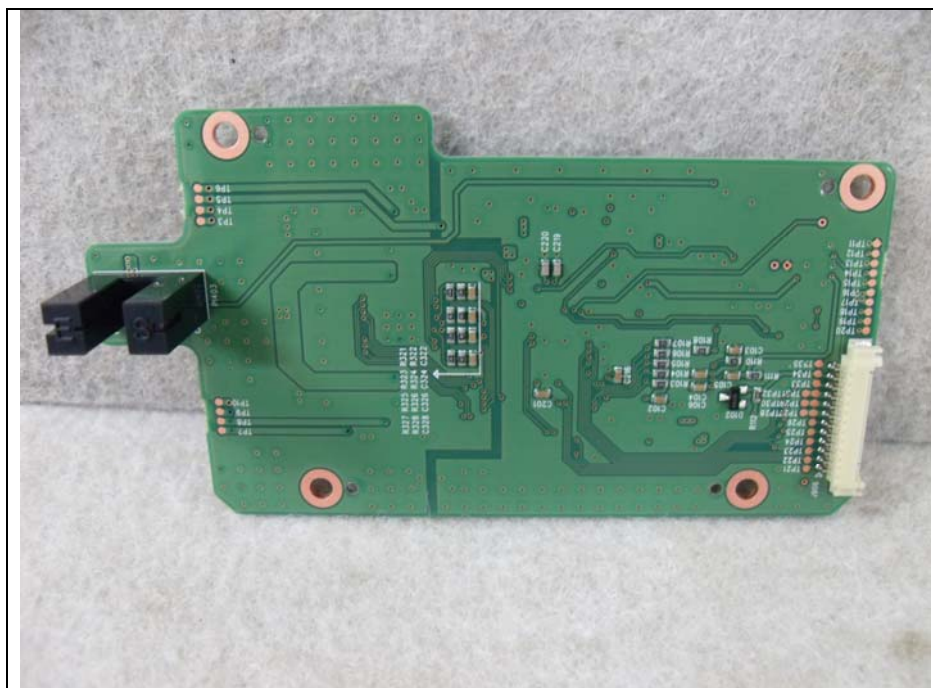
Label



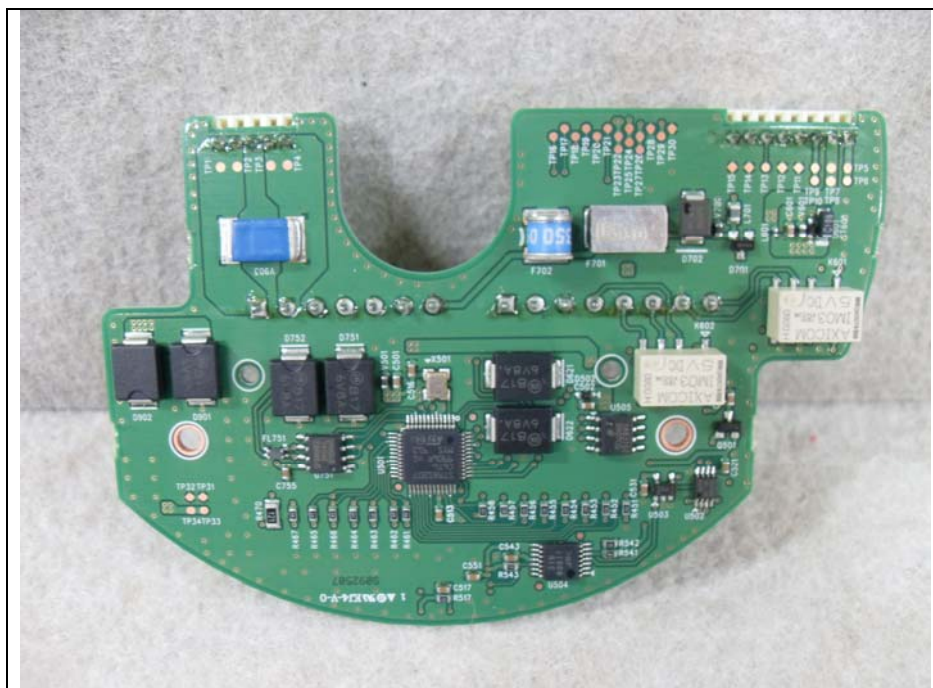
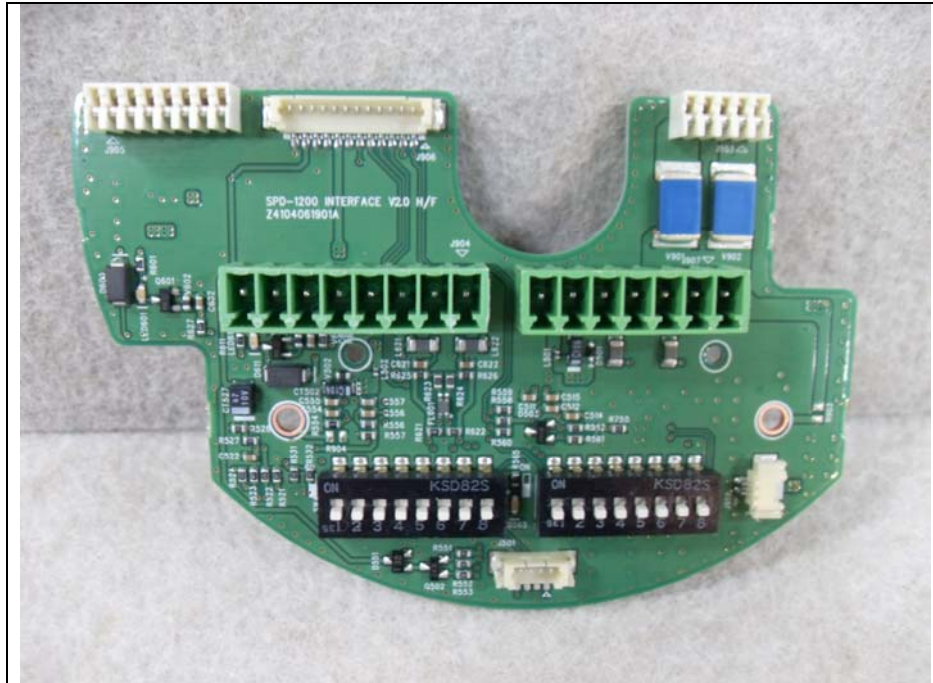
Inside



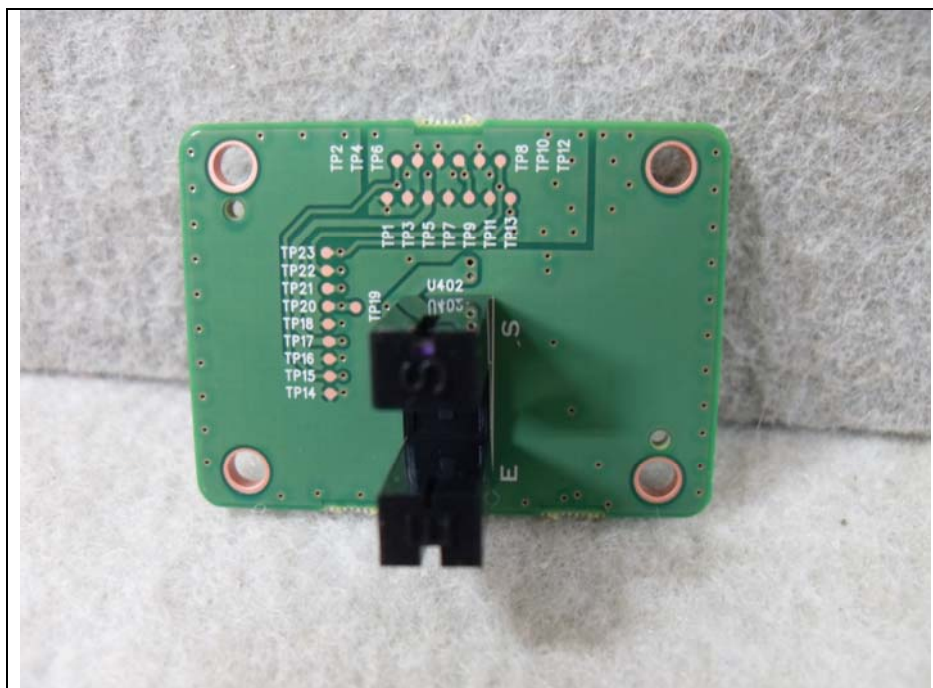
Main Board



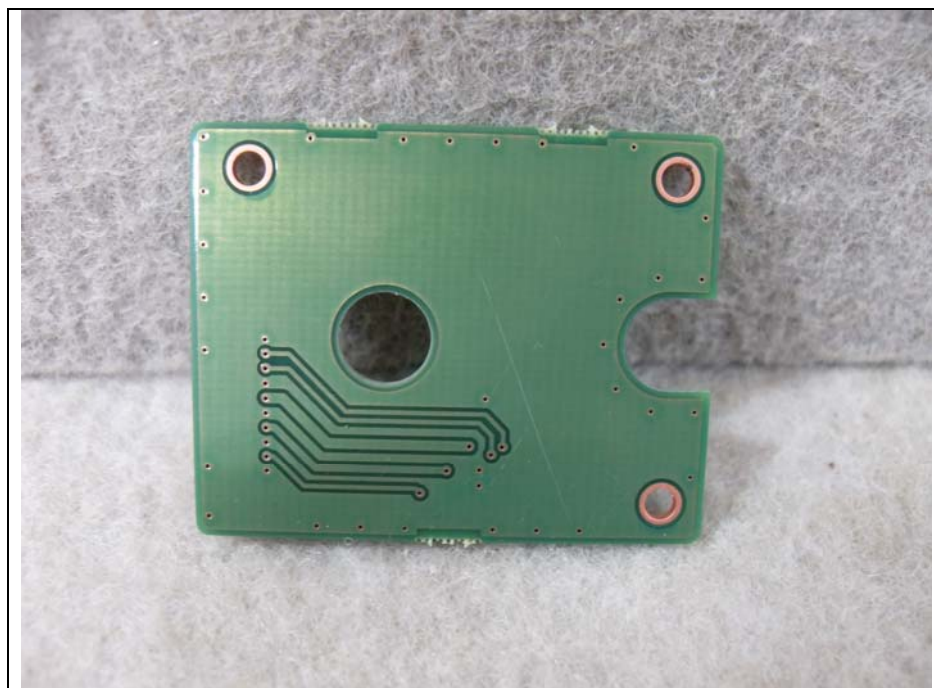
Interface Board



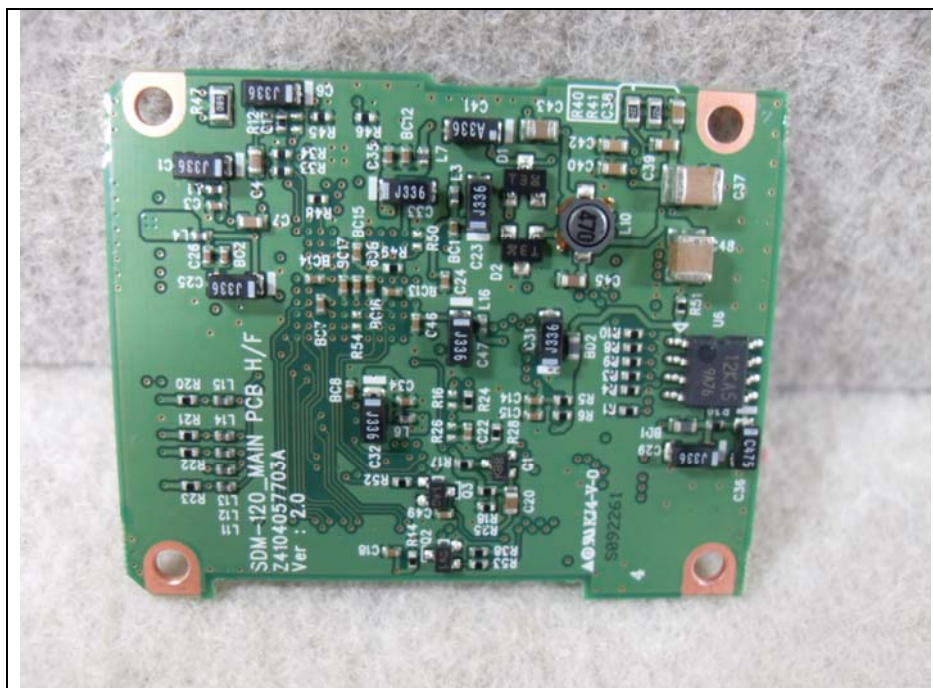
Sensor Board



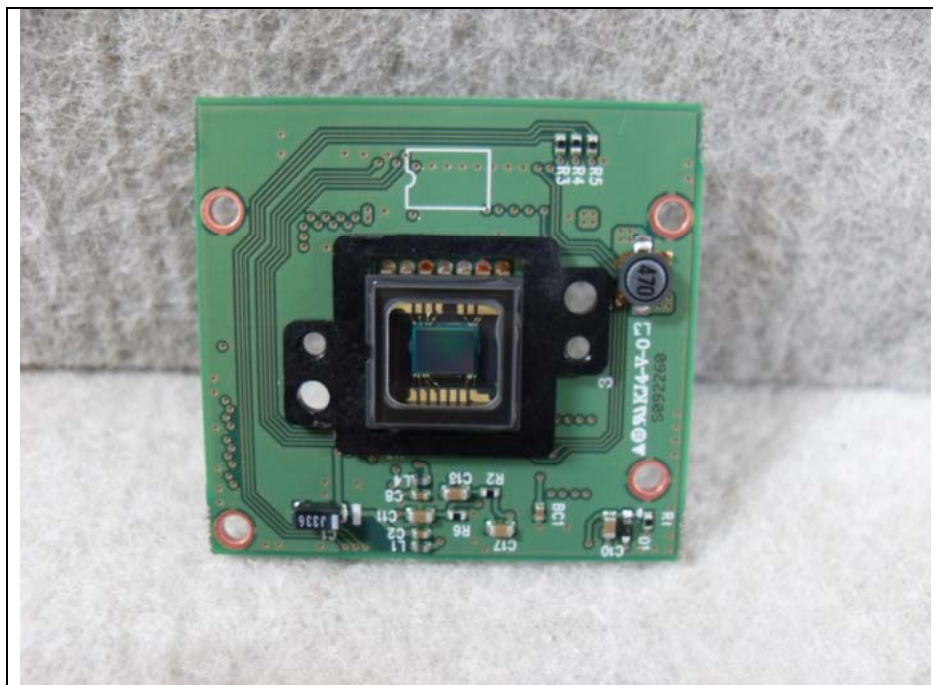
Sub Board



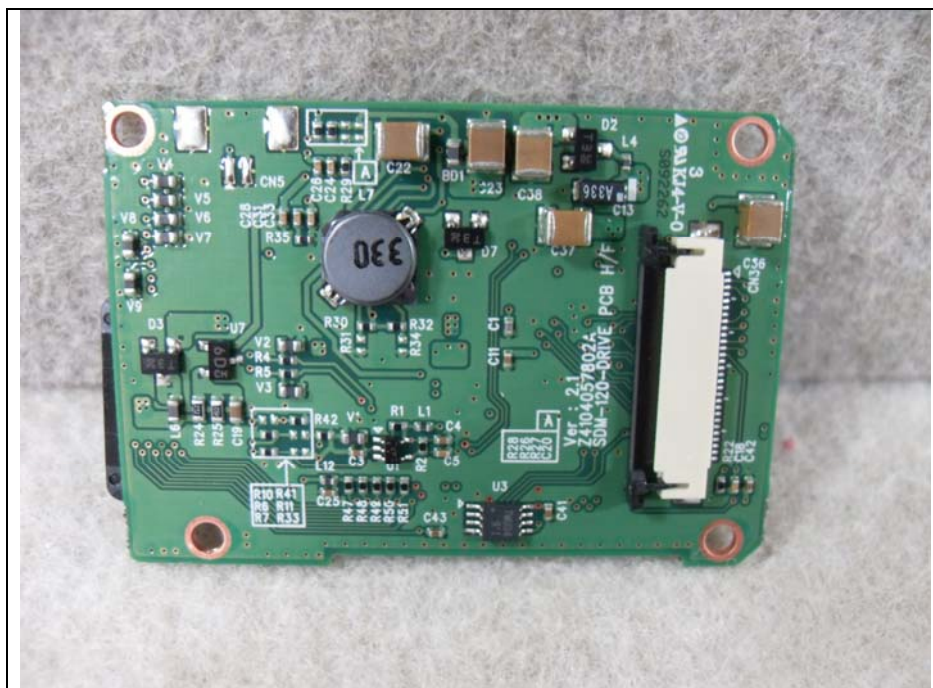
Camera Main Board



Camera CCD Board



Camera Drive Board



Power Board

