

CERTIFICATE of EMC

Report No: LBE20133586

Type of equipment: CCTV CAMERA

Model name: SCO-2040RN

Applicant: Samsung Techwin co.,LTD

Address: #42 Seongju-Dong, Changwon-Shi,Kyungsangnam-Do,

Manufacturer: TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC
CO., LTD

Address: No.11 Weiliu Road. Micro-Electronic Industrial Park Jingang
Road Tianjin 300385, China

Test Standard: FCC part 15 subpart B, Class A

Classification: Verification

The test results in this report only apply to the tested sample. 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.

EMC TEST REPORT

Project No.	LBE20133586	Revision No.	None
Applicant	Name of organization	SAMSUNG TECHWIN Co., Ltd.	
	Address	#42 Seongju-Dong, Changwon-Shi, Kyungsangnam-Do, Korea	
	Date of application	June 21, 2013	
EUT Equipment Under Test	Equipment authorization	☐ Declaration of Conformity ☐ Certification ☒ Verification	
	Kind of product	CCTV camera	
	Model No.	SCO-2040RN	
	Variant Model	-	
	Manufacturer	SAMSUNG TECHWIN Co., Ltd. #42 Seongju-Dong, Changwon-Shi, Kyungsangnam-Do, Korea TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC CO., LTD No.11 Weiliu Road. Micro-Electronic Industrial Park Jingang Road Tianjin 300385, China	
Applied Standards		FCC Part 15, Subpart B, class A	
Test Period		June 24, 2013~ June 24, 2013	
Issued date		June 30, 2013	
Test result : Complied The equipment under test has found to be compliant with the applied standards. (Refer to the attached test result for more detail.)			
Tested by : Tong Gao 		Reviewed by : Zhongyuan Gao 	

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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.



CSQAL

TSEC Wei 4 Road, Microelectronics Industrial Park, Jingang High way, Tianjin, China
Tel: 86 22 23961234, Fax: 86 22 23961234-5214

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1. Summary of test results

1.1 Emission

The EUT has been tested according to the following specifications:

Test type	Applied standard	Result	Remarks
Conducted emission	FCC Part 15, Subpart B, class A	Complied	Minimum margin is 25.6dB at 7.97359MHz
Radiated emission		Complied	Minimum margin is 20.5 dB at 53.523 MHz

2. General Information

2.1 Test facility

CSQAL is LOCATED ON Block D, 17-19 ,MIP Fourth Road, Jingang Highway, Tianjin China
All testing are performed in Semi-anechoic chambers conforming to the site attenuation Characteristics defined by ANSI C63.4, CISPR 22, 16-1 and 16-2. and Shielded rooms.

CSQAL is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

2.2 Accreditation and listing

Laboratory Qualifications		Remarks
	FCC(Federal Communications Commission)	Number: 745469
	Korea Communications Commission Radio Research Agency	Accredited : KR0148
	KC (Korean Testing Laboratory)	KTL-002/SMT
	VCCI (Voluntary Control Council for Interference by Information Technology Equipment)	Member No: 271
	NVLAP(National Voluntary Laboratory Accreditation Program)	CODE: 500036-0
	CNAS(China National Accreditation Service for Conformity Assessment)	L5281

3. Test Setup configuration

3.1 Cable description & Peripherals

The type(s) of cables which were connected to the ports (of the EUT) are as follows:

No.	From the port of EUT	To	Length[m]	Shielded[Y/N]
1	DC in	DC adapter	2.0	No*)
2	Video in	PC	2.0	No*)

*) : Use the Ferrite Core

The peripherals which were interconnected to the EUT during the test are as follows:

Item	Model No.	Serial No.	Manufacturer	Note
DC adapter	STA-230	-	Samsung	-
Monitor	SMT-1930	ZTKWHVDB800023K	Samsung	-

3.2 EUT operating mode(s)

To achieve compliance applied standard specification, the following mode(s) were made during compliance testing:

Operating Mode 1	CCTV
-------------------------	------

3.3 EUT Description

The following features describe EUT represented by this report:

Test Power: 110V @60Hz

Internal highest frequency: 27MHz

System: NTSC

Item		Details	
		NTSC	PAL
Electrical			
Input Voltage		DC 12V	
Power Consumption		3W	
Video			
Imaging Device		1/3" CMOS	
Active Pixels		976x496	
Scanning System		Interlace	
Synchronization		Internal	
Frequency		H: 15,734 Hz	H: 15,625
		V: 59.94 Hz	V: 50 Hz
Horizontal Resolution		650TVL	
Min. Illumination		OLux (IR-LED)	
S/N Ratio (Y Signal)		48dB	
Lens			
SCO-2040R/2030R	Focus Length	8mm/6mm	
	Max.Aperture Ratio	2	
	Angular Field of View	D: 46	
SCD-2021R	Focus Length	3.6mm	
	Max.Aperture Ratio	2	
	Angular Field of View	D: 98	
		H: 80	
		V: 60	
Operational			
Shutter Mode		Auto(Rolling Shutter)	
Gain Control		Auto	
White Balance		Auto (3200°K~6500°K)	
Digital Noise Reduction		Auto	
Day & Night		MECHA IR CUT FILTER	
IR Distance			
SCO-2040R/2030R		25m	
SCD-2021R		20m	
Environmental			
Operating Temperature/Humidity		-10°C ~ +50°C (-4°F ~+122°F) / 20% ~ 85%RH (TEST SPEC : -30°C ~ +60°C)	
IP Grade		IP66	
Mechanical			
SCO-2040R/2030R	Dimension (W x H x D)	L180.7*W69*H62	
	Weight	249g	
SCD-2021R	Dimension (W x H x D)	L92*W92*H73	
	Weight	278g	
Storage Temperature/Humidity		-20°C ~ +60°C (-4°F ~+122°F) / 20% ~ 85%RH (TEST SPEC : -30°C ~ +60°C)	

3.4 Details of Sampling

Customer selected, single unit.

3.5 Measurement uncertainty

Test type		Measurement uncertainty (C.L. 95%, k = 2)
Conducted Disturbance	Main terminal	2.8 dB
Radiated Disturbance	Horizontal	30 to 1000 MHz 4.91 dB
	Vertical	30 to 1000 MHz 4.55 dB

4. Results of individual test

4.1 Conducted emission

The mains lead arranged to follow the shortest possible path between the receiver and artificial mains network on the ground. The EUT tuned to a standard test signal as defined in rules. A TV Signal generator is connected to the receiver for this purpose and to give a noise-free picture, the input signal was sufficiently strong.

Limits for conducted disturbance at mains ports of class A

Frequency range Limits MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60
Note 1: 1 μV is regarded as 0 dB. Note 2: If the average limit is met in the measurement with quasi-peak detector, the measurement with average detector at the same frequency is unnecessary. Note 3: The lower limit shall apply at the transition frequency.		

Limits for conducted disturbance at the mains ports of class B

Frequency range Limits MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50
Note 1: 1 μV is regarded as 0 dB. Note 2: The limits shall decreases linearly with the logarithm of the frequency in the range 150 - 500 kHz. Note 3: If the average limit is met in the measurement with quasi-peak detector, the measurement with average detector is unnecessary. Note 4: The lower limit shall apply at the transition frequency.		

4.1.1 Test instrumentation

Test instrumentations which were used in the Conducted disturbance test are as follows;

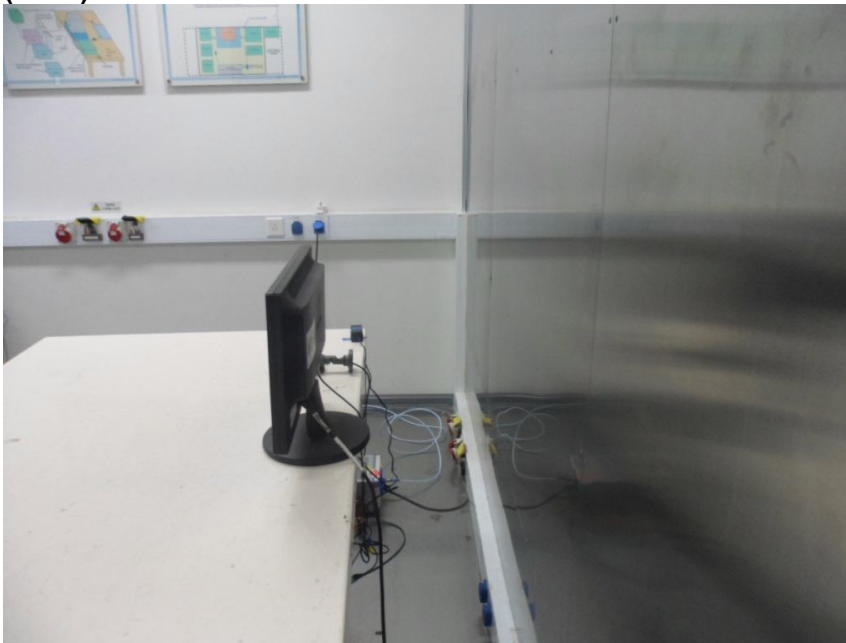
Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Test Software	EP5CE	TOYO	V 4.7.10	N/A	N/A
Measuring receiver	ESCI	R&S	101027	2013.03.02	12
Artificial mains network	ENV216	R&S	101122	2012.08.23	12
Artificial mains network	ENV216	R&S	101059	2012.08.23	12
ISN	ISN T800	TESEQ	28602	2012.08.23	12
ISN	ISN T8-CAT6	TESEQ	27286	2013.03.02	12

4.1.2 Photograph of the test Configuration

■ **Operating Mode: CCTV Operating**
(Front)



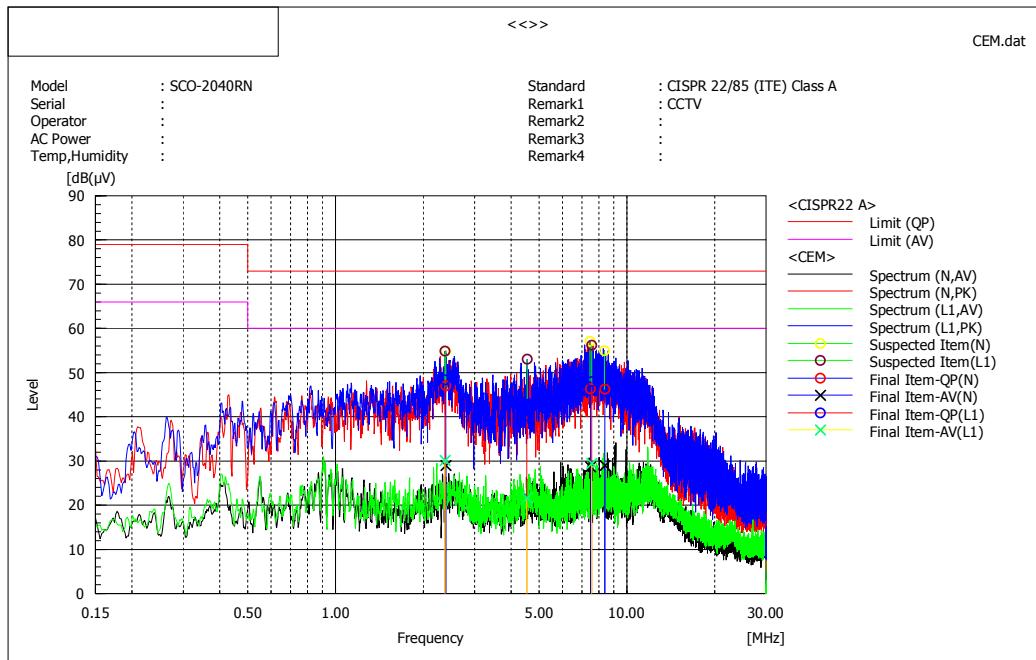
(Rear)



4.1.3 Test result

Operating condition	CCTV Monitoring					
Test date	2013-06-24		Test engineer		Tong Gao	
Climate condition	Ambient temperature	24 °C	Relative humidity	35 %	Atmospheric Pressure	100.4 KPa
	Test place	Shielded Room #2				

■ Operating Mode: CCTV Monitor



Final Result

--- N Phase ---											
No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB(μV)]	[dB(μV)]	[dB]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]	[dB]
1	7.48634	36.6	18.9	9.8	46.4	28.7	73.0	60.0	26.6	31.3	
2	2.39204	37.3	19.3	9.7	47.0	29.0	73.0	60.0	26.0	31.0	
3	8.39606	36.5	19.2	9.8	46.3	29.0	73.0	60.0	26.7	31.0	
--- L1 Phase ---											
No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB(μV)]	[dB(μV)]	[dB]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]	[dB]
1	7.57338	38.2	19.7	9.8	48.0	29.5	73.0	60.0	25.0	30.5	
2	2.3731	38.7	20.5	9.7	48.4	30.2	73.0	60.0	24.6	29.8	
3	4.52521	30.5	11.9	9.7	40.2	21.6	73.0	60.0	32.8	38.4	

Note) Result (Quasi-Peak and/or Average) = Reading (Quasi-Peak and/or Average) + c.f (LISN Insertion Loss + Cable Loss)

Margin = Limit – Level (Quasi-Peak and/or Average)

4.2 Radiated emission

Of those disturbances above ($L - 20\text{dB}$), where L is the limit level in logarithmic units, record at least the disturbance levels and the frequencies of the six highest disturbances.

The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin. All measurements were taken utilizing quasi-peak detection unless stated otherwise.

Measurements were performed at an antenna to EUT distance of 10 meters and elevated between 1 and 4 meters. Both vertical and horizontal antenna polarizations were measured.

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Limits for radiated emission of digital devices

Frequency range Limits (MHz)	Field strength ($\mu\text{V/m}$)	
	Class A (a distance of 10 meters)	Class B (a distance of 3 meters)
30 to 88	90	100
88 to 216	150	150
216 to 960	210	200
Above 960	300	500

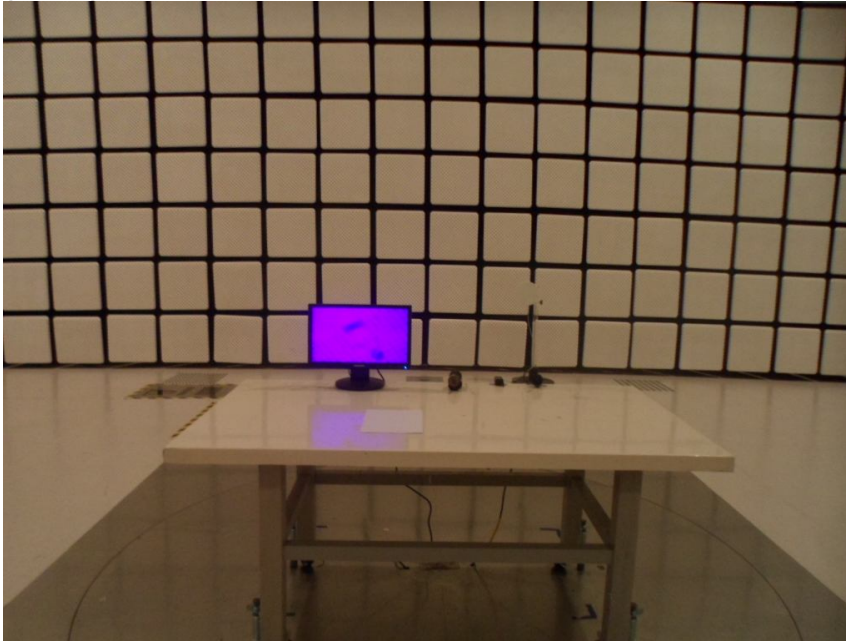
4.2.1 Test instrumentation

Test instrumentations which were used in the Radiated disturbance are as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Test Software	EP5/RE	TOYO	V 4.7.10	N/A	N/A
Bi-log Antenna	CBL6112D	TESEQ	30997	2013.04.03	24
Bi-log Antenna	CBL6112D	TESEQ	30999	2013.04.03	24
EMI Receiver	ESU26	R&S	100244	2013.03.02	12
EMI Receiver	ESCI	R&S	101024	2013.03.02	12
EMI Receiver	ESCI	R&S	101032	2013.03.02	12
AMPLIFIER	310N	SONOMA	300913	2012.08.23	12
AMPLIFIER	310N	SONOMA	300914	2012.08.23	12
Ant Mast	MA4000	INN CO	-	N/A	N/A
Ant Mast	MA4000	INN CO	-	N/A	N/A
Mast Controller	CO2000	INN CO	-	N/A	N/A
RF Selector	NS4900N	TOYO	-	N/A	N/A
RF Selector	NS4900N	TOYO	-	N/A	N/A

4.2.2 Photograph of the test Configuration

■ Operating Mode: CCTV (Front)



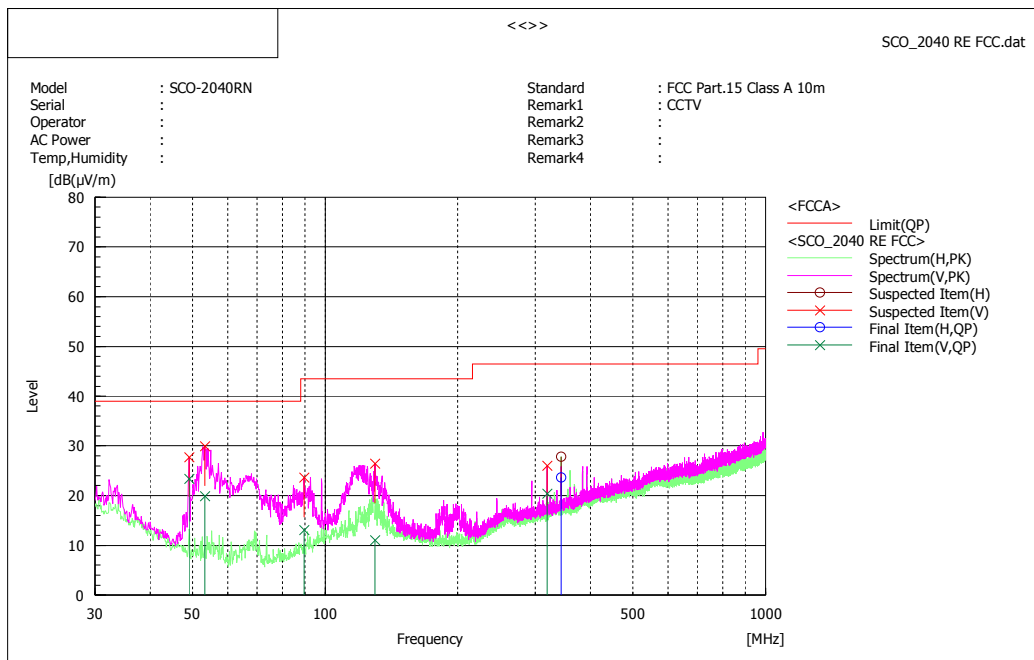
(Rear)



4.2.3 Test results

Operating condition	CCTV Monitoring					
Test date	2013-06-24		Test engineer		Tong Gao	
Climate condition	Ambient temperature	23℃	Relative humidity	36%	Atmospheric Pressure	100.5 kPa
Test place	10m Semi-Anechoic Chamber					
Note	* Test distance : 10 m * Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain) * Margin = Limit – Result					

■ Operating Mode: CCTV



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μ V)]	c. f [dB(1/m)]	Result QP [dB(μ V/m)]	Limit QP [dB(μ V/m)]	Margin QP [dB]	Height [cm]	Angle [°]	System
1	343.553	H	34.0	-10.3	23.7	46.5	22.8	400.0	332.9	1
2	53.280	V	39.3	-19.4	19.9	39.0	19.1	100.0	334.9	2
3	49.036	V	41.6	-18.2	23.4	39.0	15.6	100.0	12.2	2
4	129.789	V	24.8	-13.7	11.1	43.5	32.4	100.0	320.5	2
5	319.060	V	30.4	-10.0	20.4	46.5	26.1	100.0	0.0	2
6	89.534	V	30.5	-17.4	13.1	43.5	30.4	100.0	18.9	2

Note) Result (Quasi-Peak and/or Average) = Reading (Quasi-Peak and/or Average) + c.f (LISN Insertion Loss + Cable Loss)

Margin = Limit – Level (Quasi-Peak and/or Average)

Appendix A – EUT photography

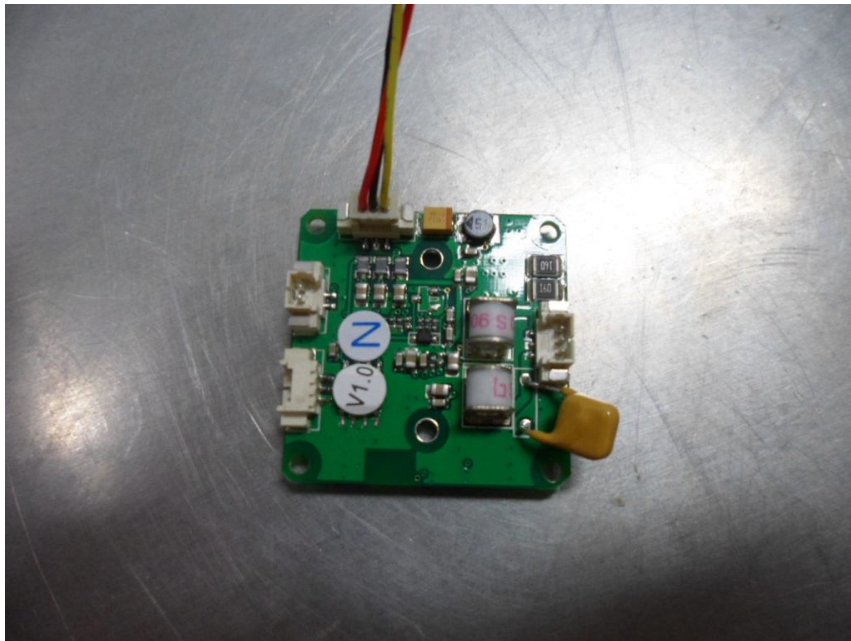
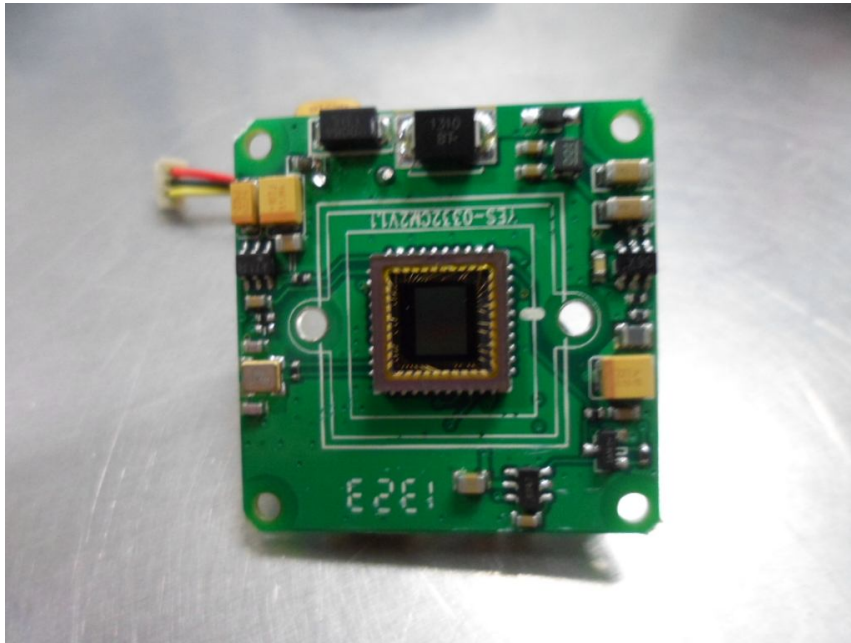
(Front)



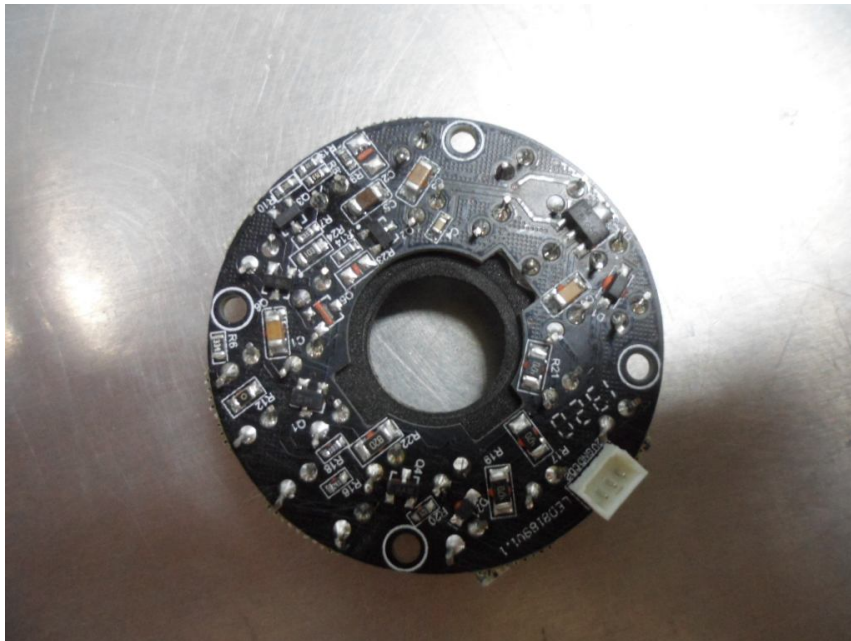
(Rear)



(Main Board)



(LED Board)



(CRYSTAL)

