

CERTIFICATE of EMC Compliance

Report No : EMC-FCC-1705
Type of equipment : Network Camera
Model Name : SND-7082FN
Variant Model Name : SND-7082FVN
Applicant : Samsung Techwin Co., Ltd.
#42 Seongju-Dong, Changwon-Shi,
Kyungsangnam-Do, Korea
Manufacturer#1 : Samsung Techwin Co., Ltd.
#42 Seongju-Dong, Changwon-Shi,
Kyungsangnam-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

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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: 2012. 11. 05

Date of testing: 2012. 11. 12 ~ 11. 13

Issued date: 2012. 11. 20

Tested by:


BEAK, JEONG-SOO

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#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)	: 24 ~ 25 °C	36 ~ 38 % 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

Items		Description		
		SNB-7002	SND-7082(F)	SNV-7082
Video	Imaging Device	1/3" 3.1M PS CMOS		
	Total Pixels	2,064(H) X 1,578(V)		
	Effective Pixels	2,052(H) X 1,536(V)		
	Scanning System	Progressive		
	Min. Illumination	Color : 0.7 Lux (F1.2, 50IRE), 0.011 Lux (Sens up 60X) B/W : 0.07 Lux (F1.2, 50IRE), 0.001 Lux (Sens up 60X)		
	S / N Ratio	50dB		
	Video Out	CVBS : 1.0 Vp-p / 75Ω composite (DIP Connector type), 704x480(N), 704x576(P), for installation	CVBS : 1.0 Vp-p / 75Ω composite, 704x480(N), 704x576(P), for installation	
Lens	Focal Length (Zoom Ratio)	-	3~8.5mm (2.8X) Motorized Vari-focal	
	Max. Aperture Ratio	-	F1.2	
	Angular Field of View	-	H : 87.3°(Wide)~ 31.2°(Tele), V : 64.5°(Wide)~ 23.4°(Tele)	
	Min. Object Distance	-	0.5 m	
	Focus Control	Manual, Simple focus, Day&Night		
	Zoom Movement Speed	-		
	Lens Type	Manual / DC Auto Iris	DC Auto Iris	
	Mount Type	C/CS	Board-in type	
	Pan Range	-	0°~355°	
Pan / Tilt / Rotate	Pan Speed	-		
	Tilt Range	-	0°~90°	
	Tilt Speed	-		
	Rotate Range	-	0°~355°	

Items	Description		
	SNB-7002	SND-7082(F)	SNV-7082
Operational	Camera Title	Off / On (Displayed up to 15 characters)	
	Day & Night	Auto (ICR) / Color / B/W / External	
	Backlight Compensation	Off / BLC / HLC	
	Wide Dynamic Range	Off / On (96dB) 3M Mode : 20fps, 2M Mode : 30fps	
	Contrast Enhancement	SSDR (Samsung Super Dynamic Range) (Off / On)	
	Digital Noise Reduction	SSNRIII (2D+3D Noise Filter) (Off / On)	
	Digital Image Stabilization	-	
	Motion Detection	Off / On (4 Rectangular zones)	
	Privacy Masking	Off / On (1ea 4 Point Polygonal + 16ea Rectangular zones)	
Operational	Sens-up (Frame Integration)	Off / Auto (2X ~ 60X)	
	AGC (Auto Gain Control)	Off / Low / Middle / High	
	White Balance	ATW / AWC / Manual / Indoor / Outdoor	
	Electronic Shutter Speed	Auto / A.FLK / Manual (1/30 ~ 12,000sec)	
	Digital Zoom	-	
	Flip / Mirror	Off / On	
	Intelligent Video Analytics	Audio Detection, Face Detection, Tampering, Virtual Line, Enter / Exit, Appear / Disappear	
	Alarm I/O	Digital Input 1ea / Digital Output 1ea	
	Remote Control Interface	-	
	RS-485 Protocol	-	
	Alarm Triggers	Motion detection, Video Analytics, Sensor Input, Network Disconnect	
	Alarm events	• File upload via FTP, E-Mail • Notification via E-Mail, TCP • local storage(SD/SDHC) recording at Network disconnected	

Items	Description		
	SNB-7002	SND-7082(F)	SNV-7082
Network	Ethernet	RJ-45 (10/100BASE-T)	
	Video Compression Format	H.264(MPEG-4 Part 10/AVC), Motion JPEG	
	Resolution	<3M Mode> 2048x1536 / 1920x1080 / 1600x1200 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 / 800x600 / 800x450 / 640x480 / 640x360 / 320x240 / 320x180 <2M Mode> 1920x1080 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 / 800x600 / 800x450 / 640x480 / 640x360 / 320x240 / 320x180	
	Max. Framerate	<3M Mode> * H.264 : Max 20 fps at all resolutions * MJPEG : 800x600 ~ 320x180 - 20 fps, 1024x768 ~ 1920x1080 - 15 fps, 2048x1536 - 10 fps <2M Mode> * H.264 : Max 30 fps at all resolutions * MJPEG : 800x600 ~ 320x180 - 30 fps, 1024x768 ~ 1920x1080 : 15 fps	
	Smart Codec	Yes (Area Based Method)	
	Video Quality Adjustment	H.264 : Compression Level, Target Bitrate Level Control MJPEG : Quality Level Control	
	Bitrate Control Method	H.264 : CBR or VBR MJPEG : VBR	
	Streaming Capability	Multiple Streaming (Up to 6 Profiles)	
	Audio I/O	External Mic./Line in , Line out, Built-in Mic.	External Mic./Line in , Line out
	Audio Compression Format	G.711 μ -law, G.726 (16Kbps, 24Kbps, 32Kbps, 40Kbps)	
	Audio Communication	Bi-directional	
	IP	IPv4, IPv6	
	Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTSP, NTP, HTTP, HTTPS, SSL, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, UPnP, RTCP	
	Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1x Authentication	

Items		Description		
		SNB-7002	SND-7082(F)	SNV-7082
Network	Streaming Method	Unicast / Multicast		
	Max. User Access	10 users at Unicast Mode		
	Memory Slot	SD/SDHC Memory Slot		
	ONVIF Conformance	Yes		
	Web Viewer	Supported OS : Windows XP / VISTA / 7, MAC OS X 10.7 or Higher Supported Browser : Internet Explorer 7.0 or Higher, Firefox 9.0 or higher, Chrome 15.0 or higher, Safari 5.1 or higher		
	Central Management Software	NET-i viewer		
Environmental	Operating Temperature / Humidity	-10°C ~ +55°C (+14°F ~ +131°F) / 20% ~ 80% RH		PoE : -35°C ~ +55°C (-40°F ~ +131°F) / ~ 90% RH DC12V : -10°C ~ +55°C (+14°F ~ +131°F) / 20% ~ 80% RH * Heater works at PoE power input. * After Start up, working at -40° by PoE
	Ingress Protection	-		IP66 Grade
	Vandal Resistance	-		IK10
Electrical	Input Voltage	DC 12V, PoE(IEEE802.3af)		
	Power Consumption	Max. 9.0W (DC 12V, PoE(class3))		Max. 9.0W (DC 12V, PoE(class3) - Heater Off) Max. 12.95W (PoE(class3) - Heater On)
Mechanical	Color / Material	Body : Dark Gray / Aluminum	Body : Ivory / Plastic	Body : Ivory / Aluminum
	Dimension	W72.0 (2.83") x H60.0 (2.36") x D150.5 (5.93") excluding projections	SND-7082 : Ø133.0 x H129.4mm SND-7082F : Ø159.9 x H125.0mm (Flush Mounting Type)	Ø160.0 x H134.5mm
	Weight	468g	SND-7082 : 635g SND-7082F : 700g	1,420g

4.2 Product description

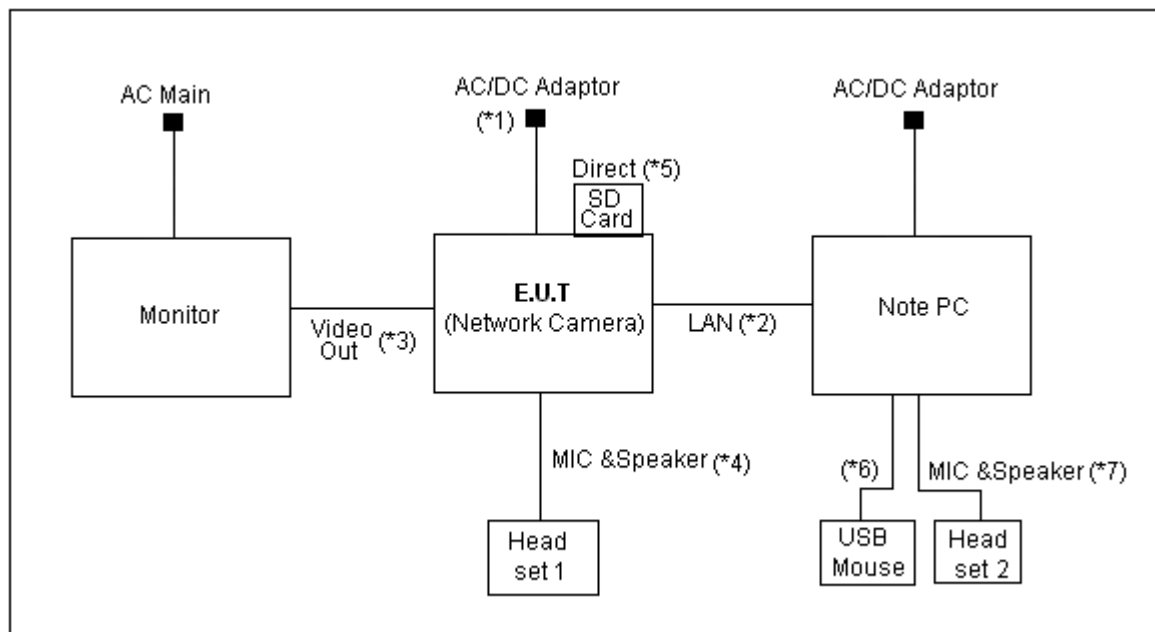
Type of product	Network Camera
Model name (Basic)	SND-7082FN
Model name (Variant)	SND-7082FVN
Difference	Buyer model name
Trade name	-
Serial no	Engineering Sample
Testing voltage	DC 12 V, PoE
Product rating	DC 12 V, PoE
Internal clock frequency	-
Note	* AC/DC adaptor was not provided by the manufacturer. * PoE Switch was not provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Note PC	C1410	463680121002	FUJITSU
Monitor	PM24KO	YER8HVDBA00057E	SAMSUNG
USB Mouse	1088	8165900112700	Microsoft
Headset 1	SHS-250V	-	SAMSUNG
Headset 2	SHS-250V	-	SAMSUNG
SD Card(2GB)	-	-	SANDISK
AC/DC Adaptor (DC 12V)	ADS-30S1-12-2	-	SAMSUNG
PoE Switch	-	-	SAMSUNG

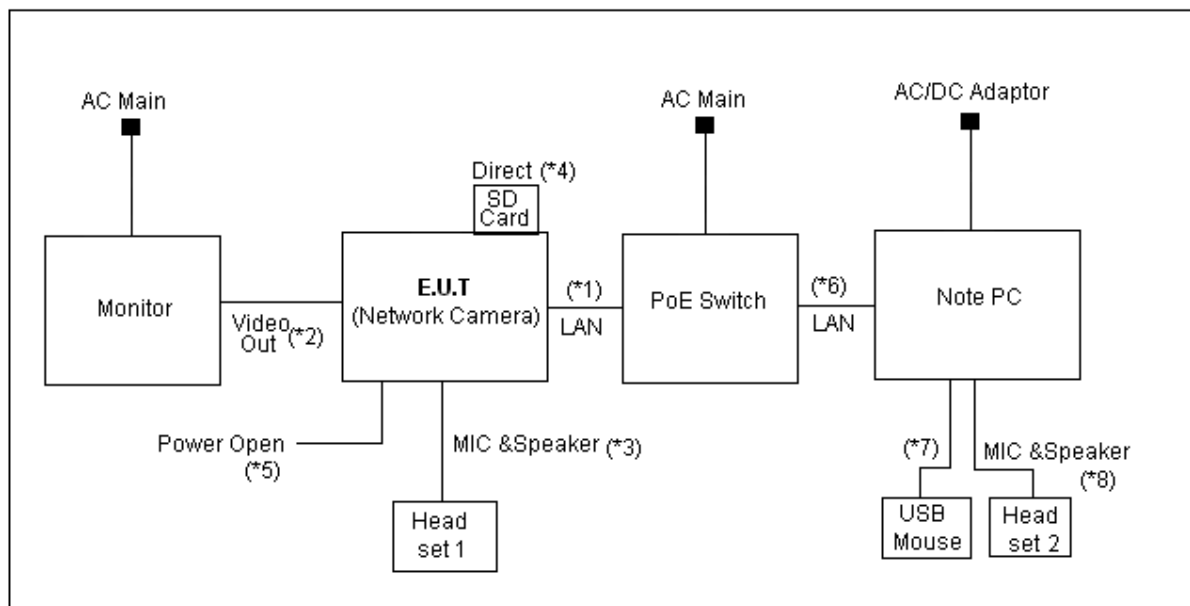
4.4 Test configuration

* DC 12 V



Note *	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT (Network Camera)	Power	AC/DC Adaptor	Power	2.5	Non-Shield
2		LAN	Note PC	LAN	3.0	Non-Shield
3		Video Out	Monitor	Video In	3.0	Non-Shield
4		MIC & Speaker	Headset 1	MIC & Speaker	2.0	Non-Shield
5		SD Card	SD Card	SD Card	Direct	-
6	Note PC	USB	USB Mouse	USB	1.8	Shield
7		MIC & Speaker	Headset 2	MIC & Speaker	2.0	Non-Shield

* PoE



* Power supplied from PoE Switch

Note *	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT (Network Camera)	LAN	PoE Switch	LAN	3.0	Non-Shield
2		Video Out	Monitor	Video In	3.0	Non-Shield
3		MIC & Speaker	Headset 1	MIC & Speaker	2.0	Non-Shield
4		SD Card	SD Card	SD Card	Direct	-
5		Power	Open	-	0.6	Non-Shield
6	Note PC	LAN	PoE Switch	LAN	1.0	Non-Shield
7		USB	USB Mouse	USB	1.8	Shield
8		MIC & Speaker	Headset 2	MIC & Speaker	2.0	Non-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.(Program: Web View)

* Note: 2 types of powers are available for the product, that are AC/DC adaptor (DC 12 V), PoE switch.

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
☐	Conducted Emission	ANSI C63.4 – 2009	N/A
☒	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, PoE		
Test facility	10 m Chamber (#F2, #4)		
Test distance	10 m, 3 m		
Date	2012. 11. 12 ~ 13		
Temperature (°C)	24 ~ 25 °C	Humidity (% R.H.)	36 ~ 38 % 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

* 30 MHz ~ 1 GHz

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
Test Receiver	ESCI	100710	R&S	2013.11.06	☒
Bi-Log Antenna	VULB 9168	9168-440	SCHWARZBECK	2013.10.04	☒
Amplifier	310N	293004	SONOMA INSTRUMENT	2013.11.06	☒
3 dB Attenuator	8491A	27444	HP	2013.11.06	☒
Antenna Mast	MA4000-EP	303	Innco Systems	-	☒
Turn Table	DT2000S-1t	079	Innco Systems	-	☒

* 1 GHz ~ 6 GHz

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
Antenna Mast	AM4.0	079/3440509	MATURO	-	☒
Turn Table	CO2000-SOFT	-	MATURO	-	☒
Horn ANT	3115	00086706	ETS	2013.11.21	☒
Amplifier	8449B	3008A01802	AGILENT	2013.05.04	☒
Spectrum Analyzer	FSP7	100289	R&S	2012.12.19	☒

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

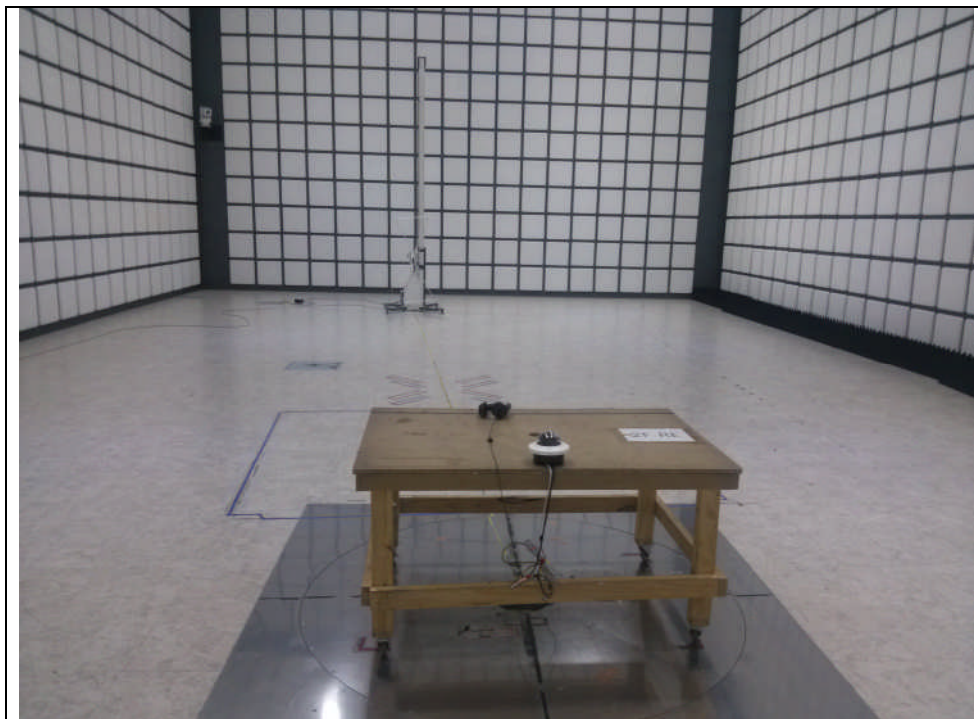
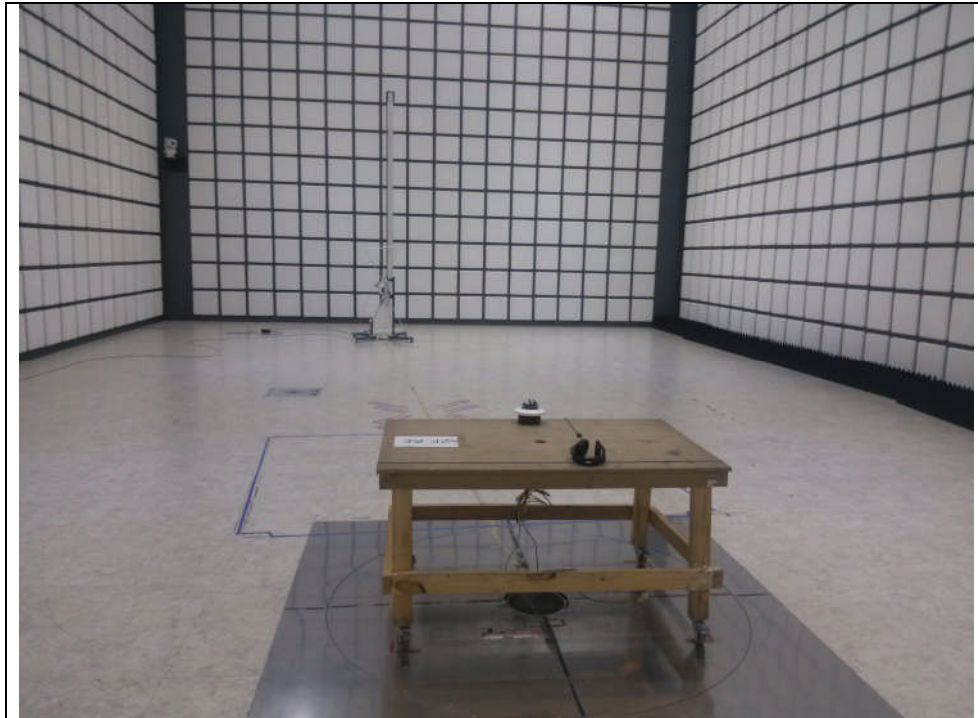
The result is

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

6.1.5 Photographs of test setup

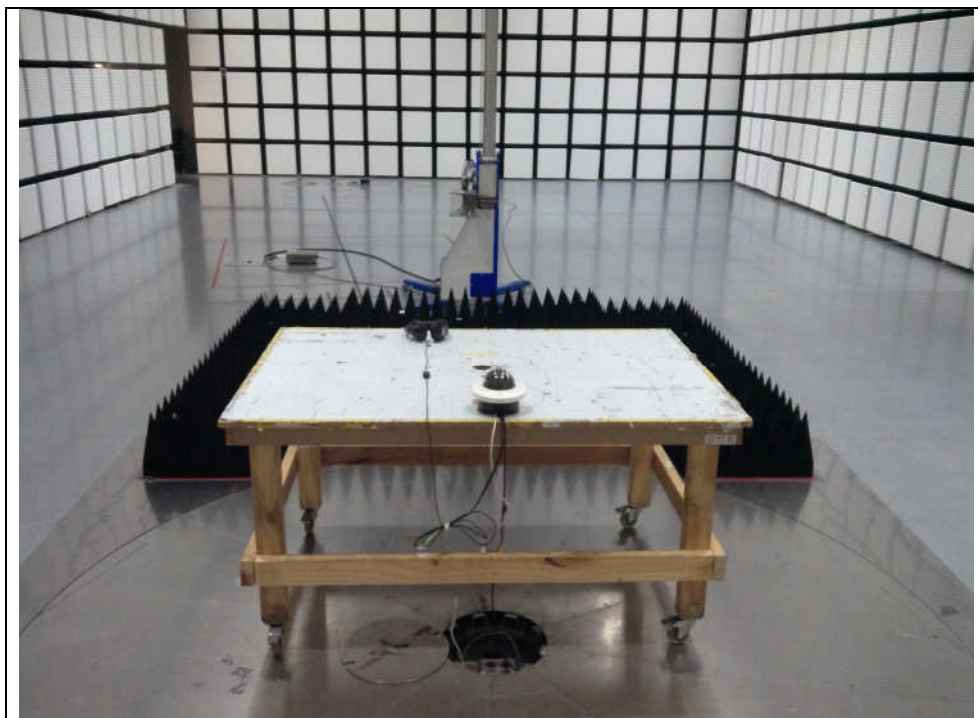
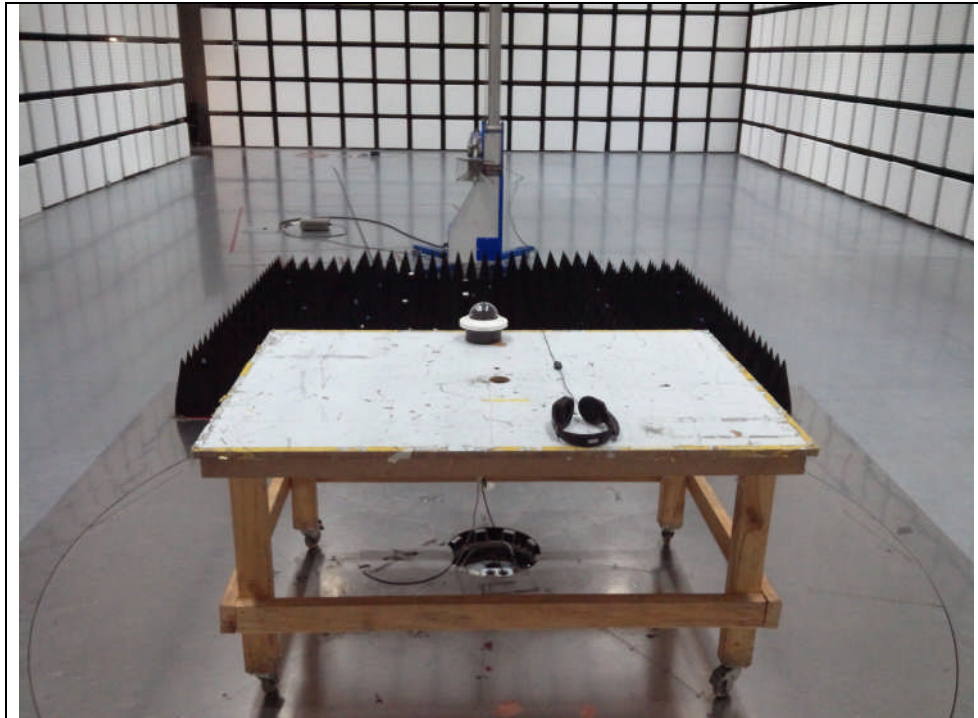
* 30 MHz ~ 1 GHz

* DC 12 V, PoE



* 1 GHz ~ 6 GHz

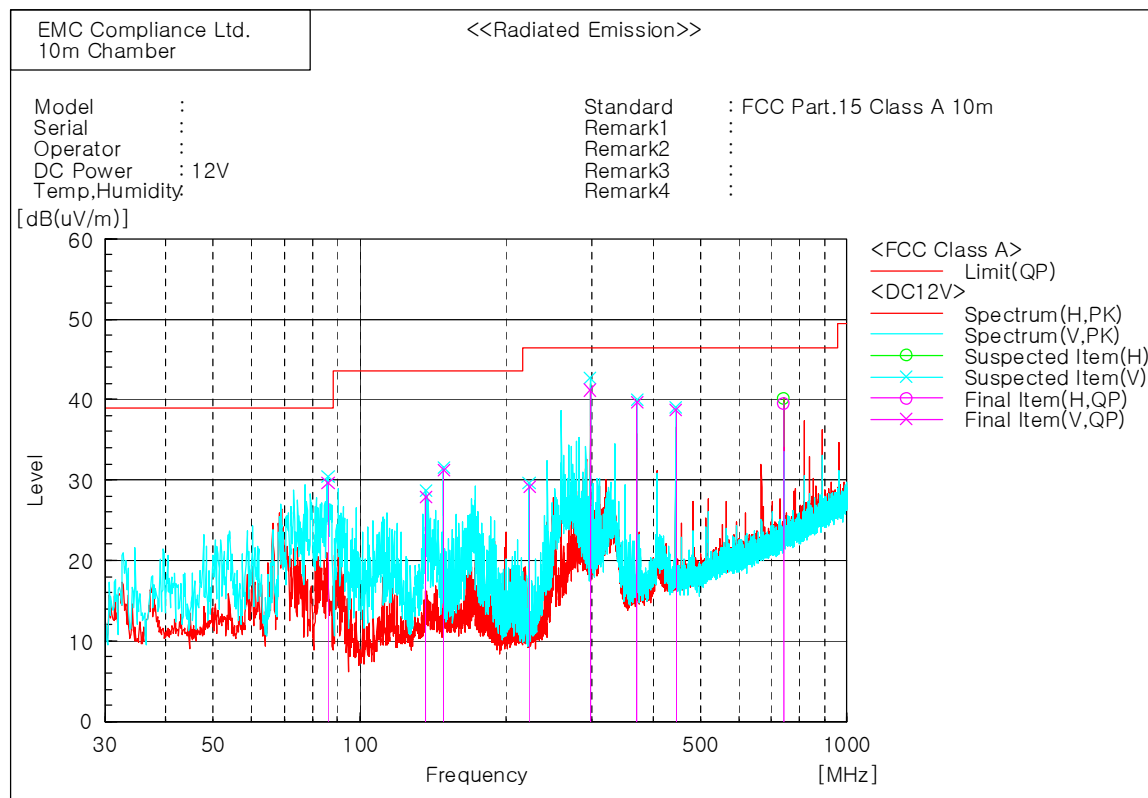
* DC 12 V, PoE



6.1.6 Radiated emission measurement result

* Graph and Data

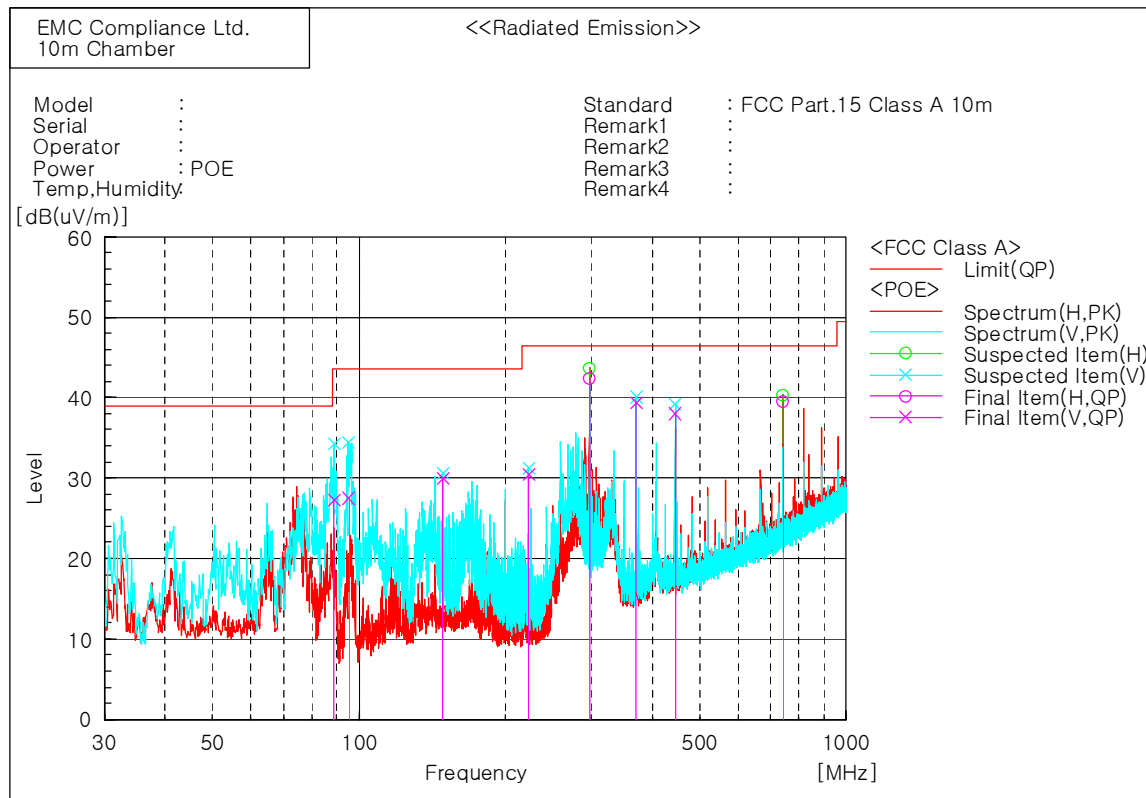
* 30 MHz ~ 1 GHz (SND-7082FN_DC 12V)



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]	Remark
1	86.047	V	48.5	-18.9	29.6	39.0	9.4	100.0	12.4	
2	136.710	V	42.1	-14.2	27.9	43.5	15.6	100.0	191.2	
3	148.500	V	44.8	-13.5	31.3	43.5	12.2	100.0	105.9	
4	222.753	V	44.5	-15.3	29.2	46.5	17.3	100.0	354.1	
5	297.000	V	53.1	-11.9	41.2	46.5	5.3	100.0	152.3	
6	371.249	V	49.6	-9.9	39.7	46.5	6.8	100.0	152.3	
7	445.501	V	46.6	-7.9	38.7	46.5	7.8	100.0	82.0	
8	742.555	H	41.2	-1.7	39.5	46.5	7.0	100.0	100.4	

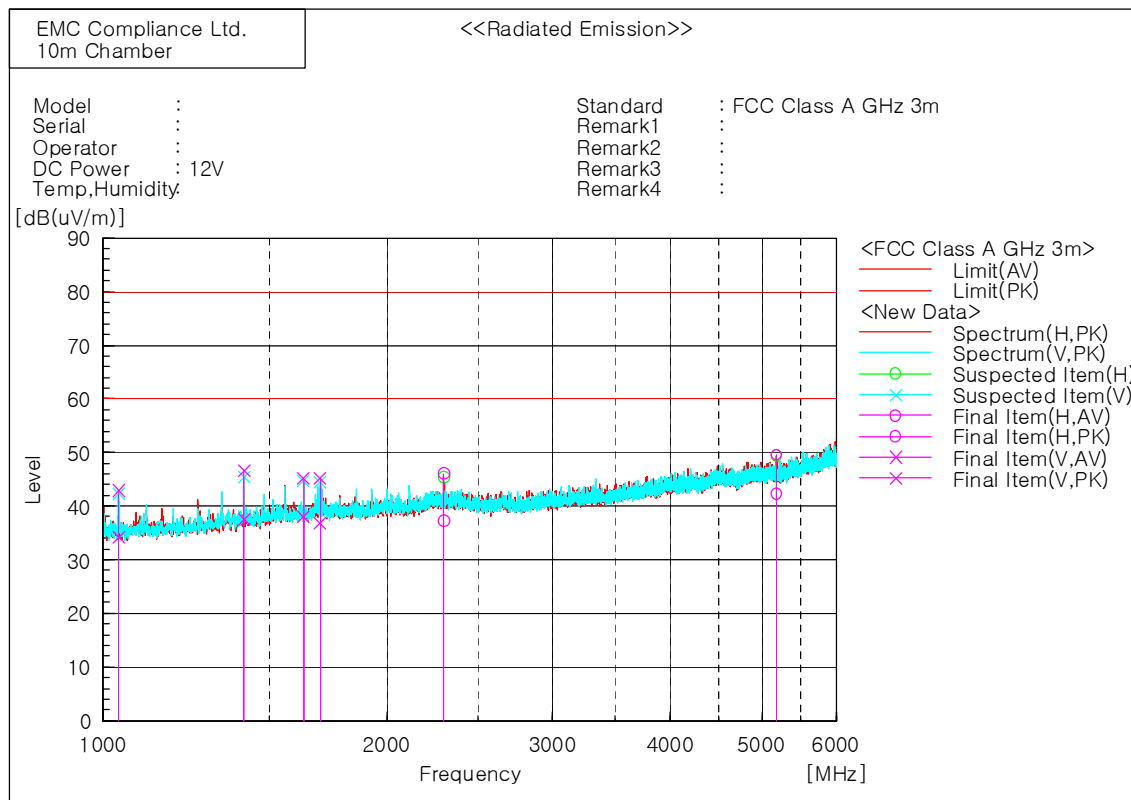
* 30 MHz ~ 1 GHz (SND-7082FN_PoE)



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]	Remark
1	88.810	V	46.4	-19.2	27.2	43.5	16.3	100.0	242.0	
2	95.210	V	46.4	-18.9	27.5	43.5	16.0	100.0	228.0	
3	148.512	V	43.4	-13.5	29.9	43.5	13.6	100.0	324.0	
4	222.810	V	45.7	-15.3	30.4	46.5	16.1	100.0	218.0	
5	297.001	H	54.3	-11.9	42.4	46.5	4.1	400.0	200.0	
6	371.200	V	49.2	-9.9	39.3	46.5	7.2	100.0	142.0	
7	445.443	V	45.9	-7.9	38.0	46.5	8.5	100.0	141.0	
8	742.415	H	41.2	-1.7	39.5	46.5	7.0	100.0	115.8	

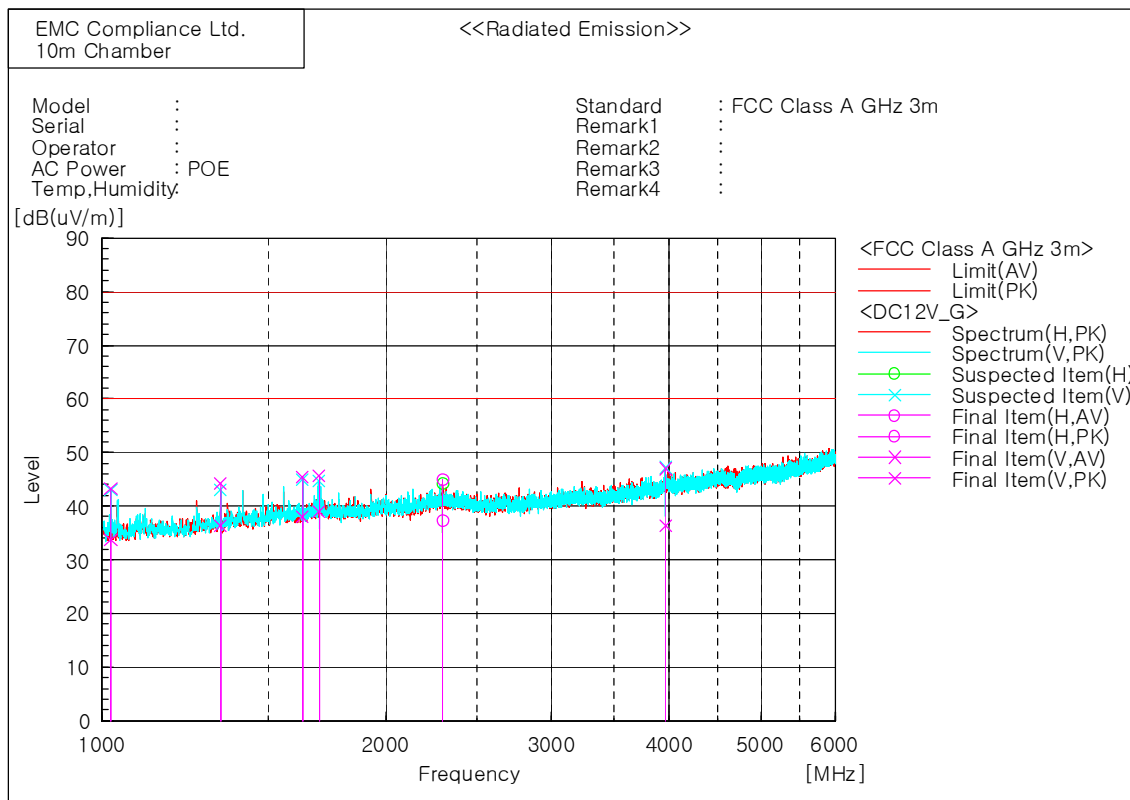
* 1 GHz ~ 6 GHz (SND-7082FN_DC 12V)



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1039.375	V	43.5	52.1	-9.2	34.3	42.9	60.0	80.0	25.7	37.1	100.0	354.4	
2	1410.025	V	43.2	52.2	-5.6	37.6	46.6	60.0	80.0	22.4	33.4	100.0	182.5	
3	1633.750	V	42.1	49.2	-4.1	36.0	45.1	60.0	80.0	22.0	34.9	100.0	194.5	
4	1700.000	V	40.4	48.8	-3.6	36.8	45.2	60.0	80.0	23.2	34.8	100.0	151.9	
5	2301.250	H	38.3	47.2	-1.1	37.2	46.1	60.0	80.0	22.8	33.9	100.0	358.1	
6	5184.375	H	35.4	42.7	6.9	42.3	49.6	60.0	80.0	17.7	30.4	100.0	334.6	

* 1 GHz ~ 6 GHz (SND-7082FN_PoE)



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]	Remark
1	1021.875	V	43.2	52.8	-9.4	33.8	43.4	60.0	80.0	26.2	36.6	100.0	291.0	
2	1336.250	V	42.7	50.6	-6.3	36.4	44.3	60.0	80.0	23.6	35.7	100.0	216.3	
3	1633.750	V	42.2	49.6	-4.1	38.1	45.5	60.0	80.0	21.9	34.5	100.0	194.9	
4	1700.000	V	42.5	49.2	-3.6	38.9	45.6	60.0	80.0	21.1	34.4	100.0	152.3	
5	2301.875	H	38.4	46.1	-1.1	37.3	45.0	60.0	80.0	22.7	35.0	100.0	7.6	
6	3964.375	V	32.5	43.2	3.8	36.3	47.0	60.0	80.0	23.7	33.0	100.0	25.7	

7. E.U.T. photographs

Whole



Front View



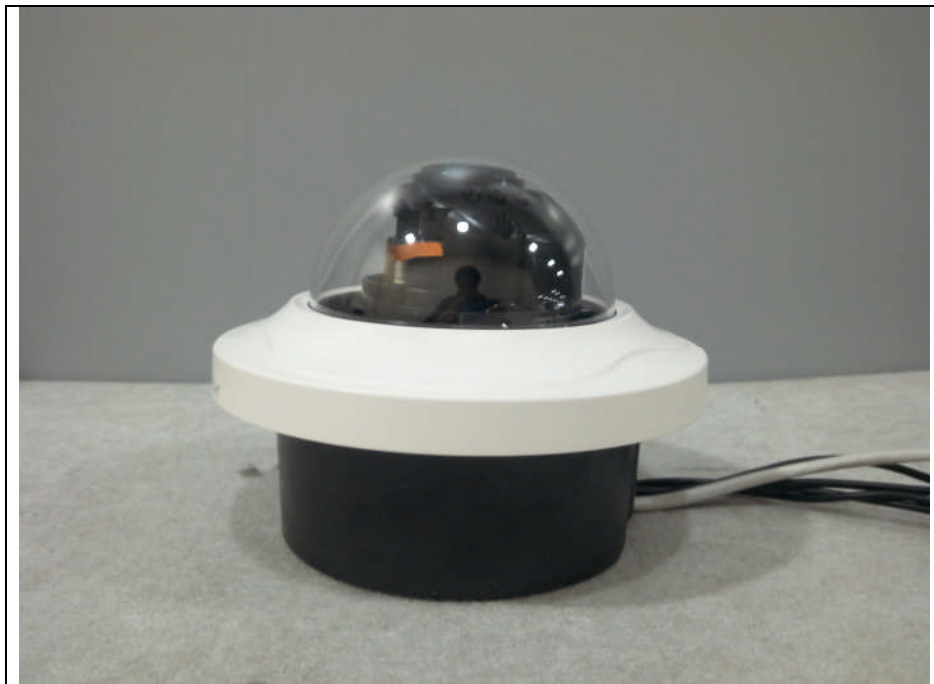
Rear View



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.

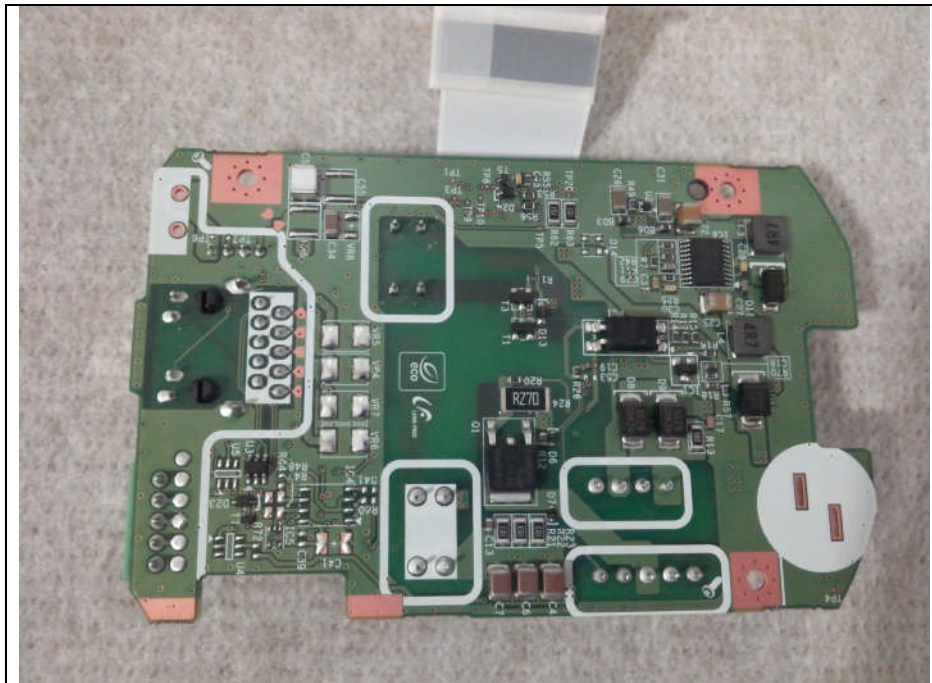
Inside



Main Board



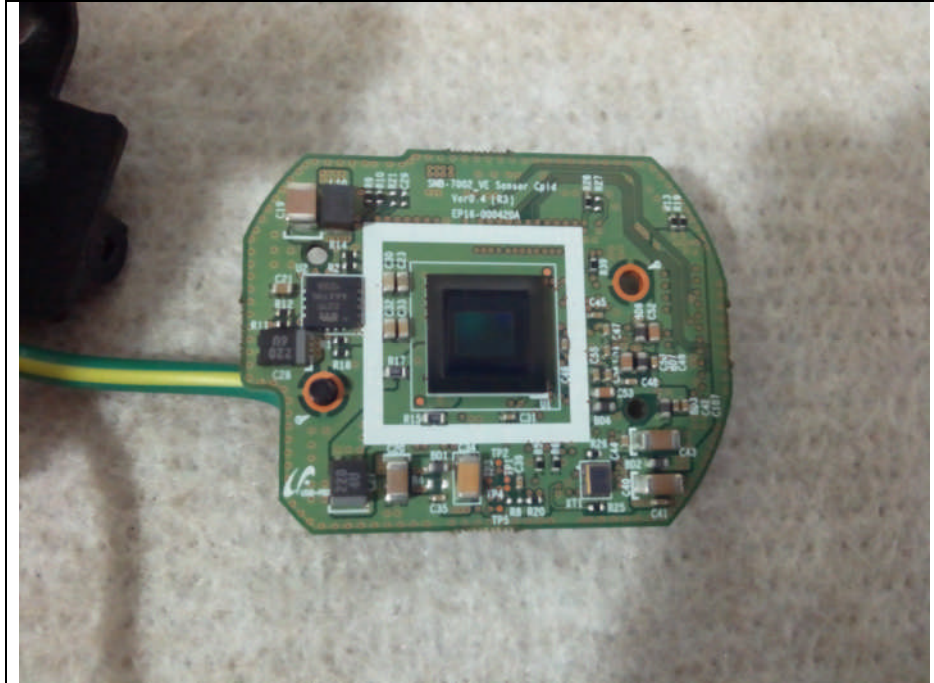
Power Board



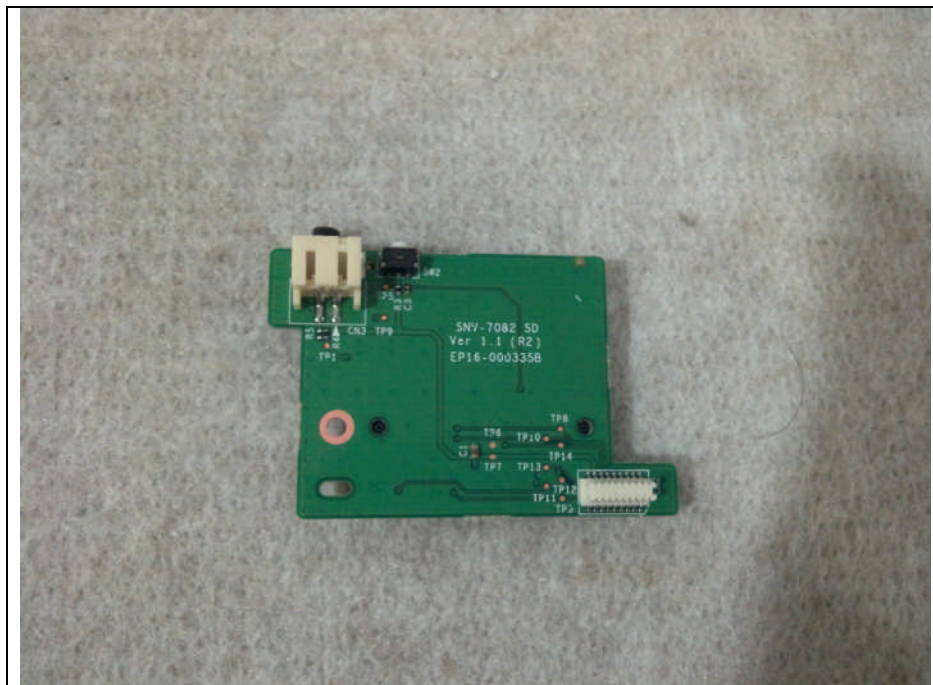
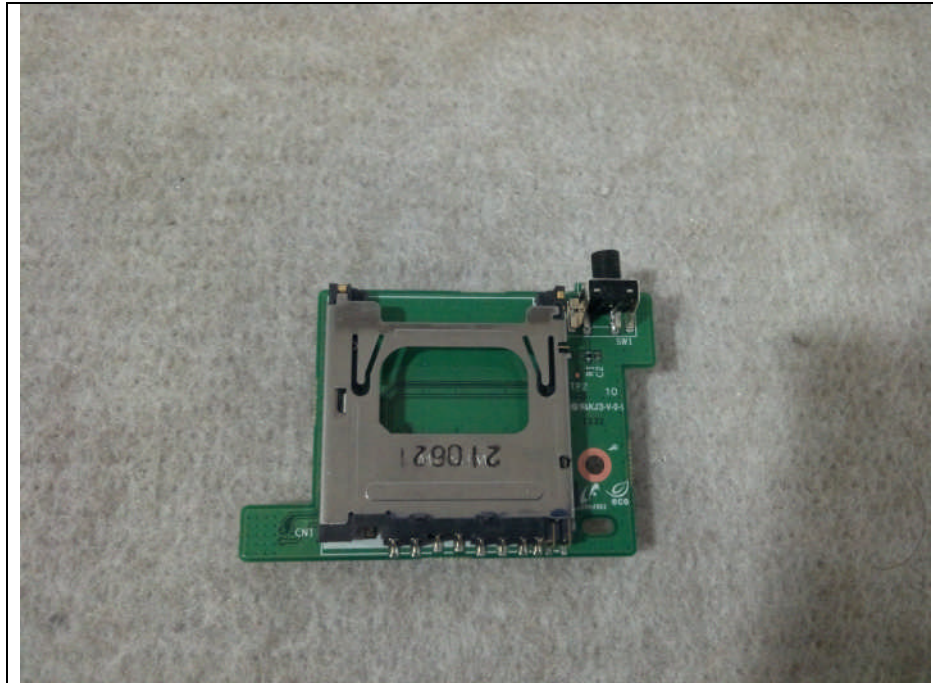
Lens



Lens Board



SD Card Board



Cable

