

CERTIFICATE of EMC Compliance

Report No : EMC-FCC-2193
Type of equipment : Network Camera
Model Name : SND-7084RN
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.



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Laboratory

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EMI TEST REPORT

Test report No : EMC-FCC-2193
Type of Equipment : Network Camera
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No.11 Weiliu Road. Micro-Electronic Industrial
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

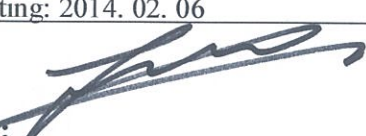
The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to 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. 01. 15

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Tested by: 
JUNG, YOUNG-JUN

Approved by: 
YEOM, HAN-SEOK

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1. Applicant information

Applicant: Samsung Techwin Co., Ltd.
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Manufacturer#1: 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
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2. Laboratory information

Address

EMC compliance Ltd.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-390, Korea

Telephone Number: 82 31 336 9919

Facsimile Number: 82 505 299 8311

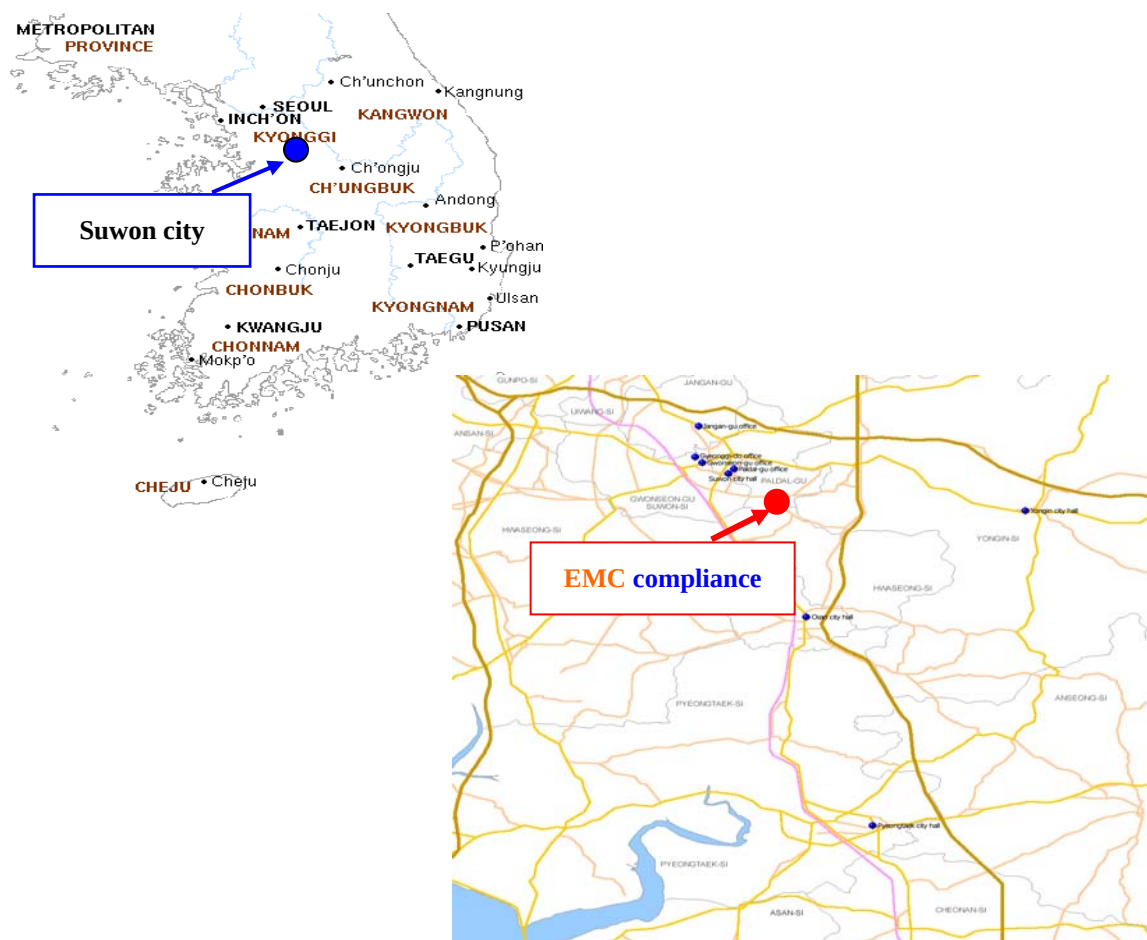
FCC CAB.: KR0040

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)	: 16.8 °C	22.9 % 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

Video	
Imaging Device	1/2.8" PS Exmor 3.20M CMOS (IMX124)
Total Pixels	2,065(H) X 1,565(V)
Effective Pixels	2,065(H) X 1,553(V)
Scanning System	Progressive
Min. Illumination	Color : 0.1 Lux (F1.2, 50IRE), 0.01Lux (Sens-up 60x, 50IRE) B/W : 0 Lux(IR LED on)
S / N Ratio	50dB
Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation - connector type
Lens	
Focal Length (Zoom Ratio)	3 ~ 8.5mm (2.8x) Motorized Varifocal
Max. Aperture Ratio	F1.2
Angular Field of View	H : 100.12°(Wide) ~ 35.38°(Tele) / V : 73.76°(Wide) ~ 26.58°(Tele)
Min. Object Distance	0.5m(1.64ft)
Focus Control	Simple Focus (Motorized V/F) / Manual - Remote control via network (Manual, Simple Focus)
Lens Type	DC Auto Iris
Mount Type	Board-in type
Pan / Tilt / Rotate	
Pan Range	0° ~ +355°
Tilt Range	0° ~ +67°
Rotate Range	0° ~ +355°
Operational	
IR LED	12ea
Viewable Length	25m(82.02ft)
Camera Title	Off / On (Displayed up to 45 characters)
Day & Night	Auto (ICR) / Color / B/W / External / Schedule
Backlight Compensation	Off / BLC
Wide Dynamic Range	Max. 120dB
Contrast Enhancement	SSDR (Samsung Super Dynamic Range) (Off / On)
Digital Noise Reduction	SSNRIII (2D+3D Noise Filter) (Off / On)
Digital Image Stabilization	Off / On
Defog	Auto/Manual/Off
Motion Detection	Off / On (4 zones with 4 points Polygon)
Privacy Masking	Off / On (32 zones with 4 points of polygon)
Sens-up (Frame Integration)	-
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1 ~ 1/12,000sec)
Digital PTZ	-
Flip / Mirror	Off / On
Intelligent Video Analytics	Tampering, Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection, Face Detection with Metadata
Alarm I/O	Input 1ea / Output 1ea
Alarm Triggers	Motion detection, Tampering Detection, Audio Detection, Face Detector, Video Loss, Video Analytics, Alarm Input
Alarm events	File upload via FTP and E-Mail Notification via E-Mail, TCP and HTTP local storage(SD/SDHC/SDXC) recording at Network disconnected & Event (Alarm Triggers) External output

Network	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Format	H.264 (MPEG-4 Part 10/AVC), Motion JPEG
Resolution	2048x1536 / 1920x1080 / 1600x1200 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 / 800x600 / 800x450 / 640x480 / 640x360 / 320x240 / 320x180
Max. Framerate	H.264 : 3M Mode Max 30fps@2048x1536 / 1920x1080 / 1600x1200 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 / 800x600 / 800x450 / 640x480 / 640x360 / 320x240 / 320x180 2M Mode Max 60fps @1920x1080 / 1600x1200 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 / 800x600 / 800x450 / 640x480 / 640x360 / 320x240 / 320x180 MJPEG : Max 10fps@2048x 1536 / 1920x1080 / 1600x1200 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 Max 30fps@ 800x600 / 800x450 / 640x480 / 640x360 / 320x240 / 320x180
Smart Codec	Built-in Area-Based : SEA Face detection Mode
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 10 Profiles)
Audio I/O	Mic(Line)-in/Built-in Mic Selectable via UI, Line-out (Mono, 1Vrms) 2.5VDC(4mA) powered 2K Ohm
Audio Compression Format	G.711 u-law /G.726 Selectable G.726 (ADPCM) 8KHz, G.711 8KHz G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps
Audio Communication	Bi-directional
IP	IPv4, IPv6
Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour
Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1x Authentication
Streaming Method	Unicast / Multicast
Max. User Access	15 users at Unicast Mode
Memory Slot	micro SD/SDHC/SDXC - motion Images recorded in the SDX/SDHC/SD memory card can be downloaded.
Application Programming Interface	ONVIF Profile S SUNAPI(HTTP API) v2.0 SVNP 1.2
Webpage Language	English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatian, Hungarian, Greek, Norwegian, Finnish
Web Viewer	Supported OS : Windows XP / VISTA / 7 / 8, MAC OS X 10.7 Supported Browser : Microsoft Internet Explorer (Ver. 10, 9, 8, 7), Mozilla Firefox (Ver. 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9), Google Chrome (Ver. 25, 24, 23, 22, 21, 20, 19, 18, 17,16, 15), Apple Safari (Ver. 6.0.2(Mac OS X 10.8, 10.7 only), 5.1.7) * Mac OS X only
Central Management Software	SmartViewer 4.x

Environmental	
Operating Temperature / Humidity	-10°C ~ +55°C(+14°F ~ +131°F) / Less than 90% RH
Storage Temperature / Humidity	-30°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH
Electrical	
Input Voltage / Current	DC 12V, PoE (IEEE802.3af class 3)
Power Consumption	Max. 10.0W (DC 12V) Max. 11.0W (PoE)
Mechanical	
Color / Material	IVORY / Aluminum
Dimension (WxHxD)	Ø132.1 x 107.6mm (Ø5.2" x 4.24")
Weight	1000g (2.20 lb)

4.2 Product description

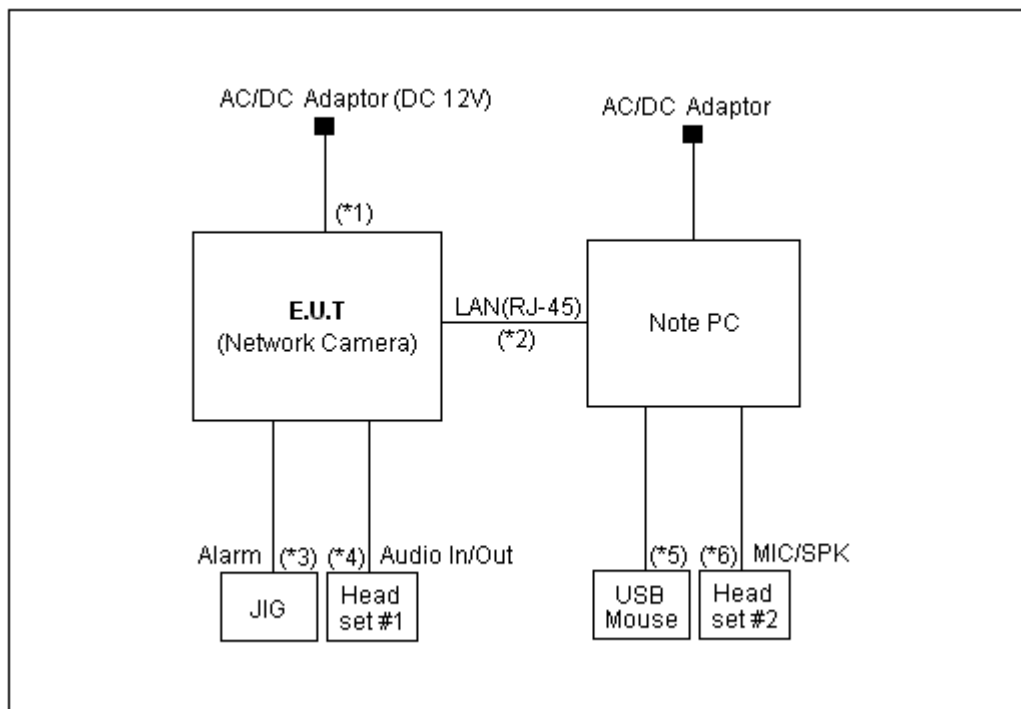
Type of product	Network Camera
Model name (Basic)	SND-7084RN
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	DC 12 V, PoE
Product rating	DC 12 V, PoE
Internal clock frequency	Above 108 MHz
Note	* AC/DC adaptor was not provided by the manufacturer. * PoE Switch was not provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Note PC	C1321	472680432038	FUJITSU
USB Mouse	1088	8165906051248	Microsoft
Headset #1	SHS-250V	-	SAMSUNG
Headset #2	SHS-250V	-	SAMSUNG
JIG	-	-	-
AC/DC Adaptor (DC 12V)	ADS-30S1-12-2	-	-
PoE Switch	FS108P	1DL20C3N00544	NETGEAR

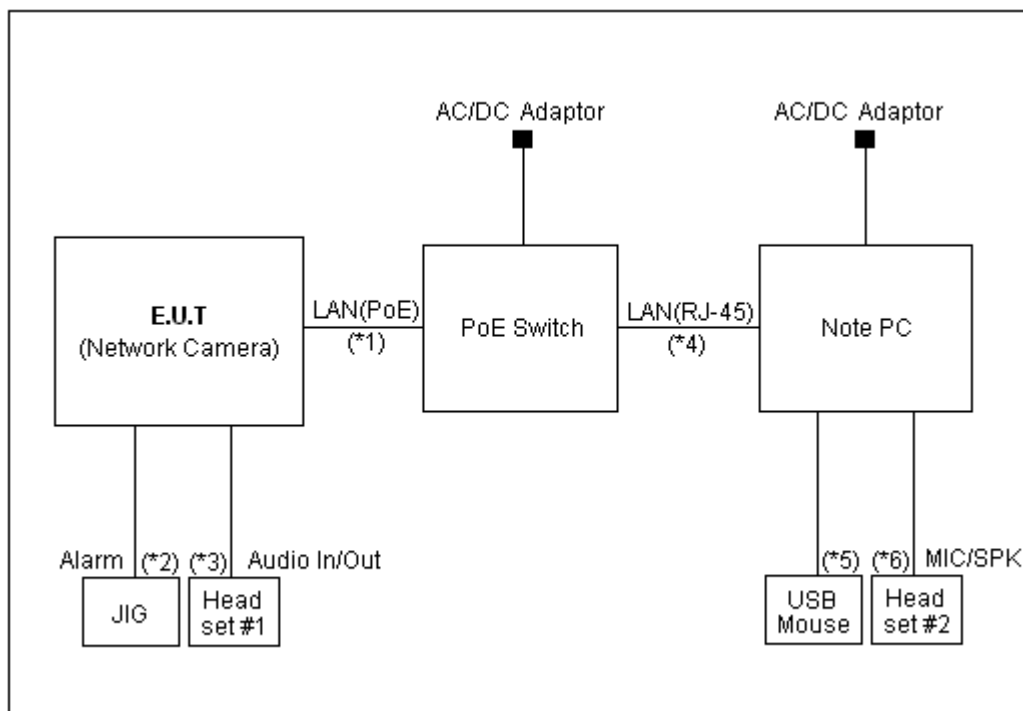
4.4 Test configuration

#1- DC 12V



Note *	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT (Network Camera)	Power	AC/DC Adaptor	Power	1.2	Non-Shield
2		LAN(RJ-45)	Note PC	LAN(RJ-45)	3.0	Non-Shield
3		Alarm	JIG	Alarm	3.0	Non-Shield
4		Audio In/Out	Headset #1	Audio In/Out	3.0	Non-Shield
5	Note PC	USB	USB Mouse	USB	1.8	Shield
6		MIC/SPK	Headset #2	MIC/SPK	2.0	Non-Shield

#2- 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)	PoE Switch	LAN(PoE)	3.0	Non-Shield
2		Alarm	JIG	Alarm	3.0	Non-Shield
3		Audio In/Out	Headset #1	Audio In/Out	3.0	Non-Shield
4	Note PC	LAN(RJ-45)	PoE Switch	LAN(RJ-45)	3.0	Non-Shield
5		USB	USB Mouse	USB	1.8	Shield
6		MIC/SPK	Headset #2	MIC/SPK	2.0	Non-Shield

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
1	Alarm test.
	Audio In/Out test.
	Web view monitoring test.
	Ping test.

* Note: 3 types of powers are available for the product, that are DC 12 V , PoE.

Therefore, tests were performed for 3 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)		
Test distance	10 m, 3 m		
Date	2014. 02. 06		
Temperature (°C)	16.8 °C	Humidity (% R.H.)	22.9 % 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	☒
Test Receiver	ESCI	100001	R&S	2014.07.25	☐
Test Receiver	ESCI	100710	R&S	2014.10.28	☐
Test Receiver	ESR	101078	R&S	2014.10.17	☐
Bi-Log Antenna	VULB 9168	440	SCHWARZBECK	2015.10.16	☒
Amplifier	310N	293004	SONOMA INSTRUMENT	2014.10.31	☒
3 dB Attenuator	8491B	22981	HP	2014.03.19	☒
Antenna Mast	MA4000-EP	303	Innco Systems	-	☒
Turn Table	DT2000S-1t	079	Innco Systems	-	☒
Amplifier	8449B	3008A02343	AGILENT	2014.10.31	☒
Horn ANT	3115	00086706	ETS	2014.09.05	☒
Spectrum Analyzer	FSP7	100289	R&S	2014.11.25	☐

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

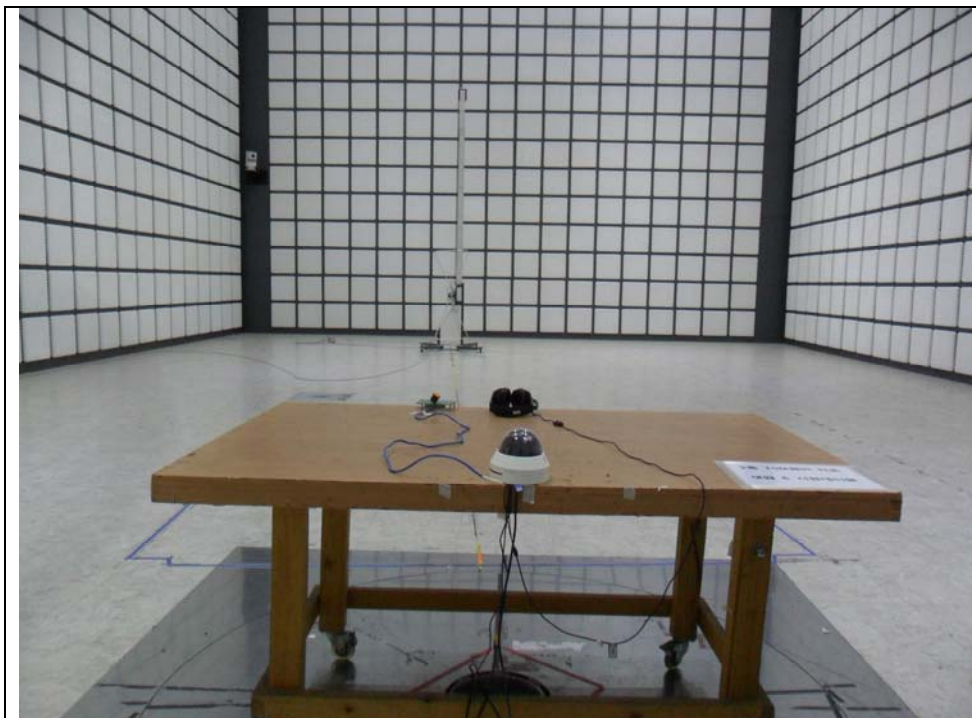
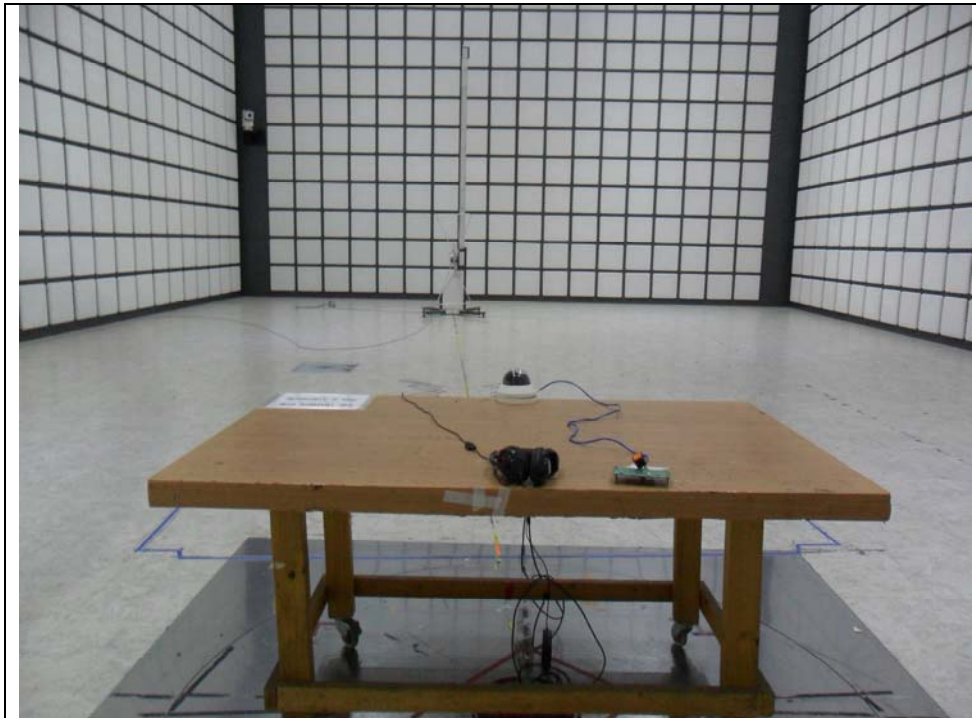
3 dB Att = 3 dB Attenuator

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

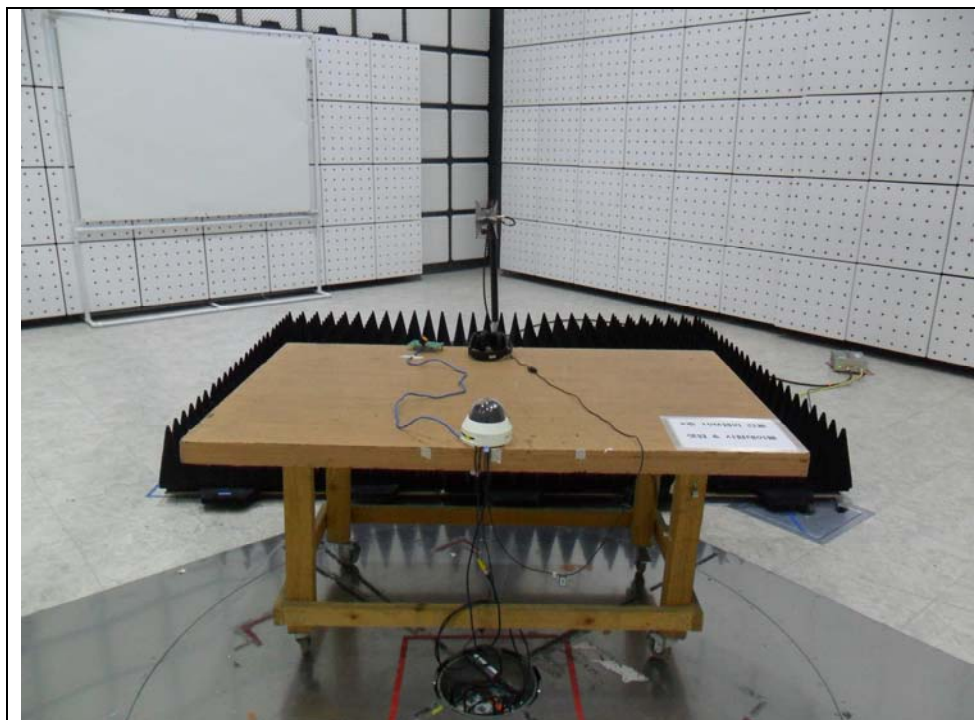
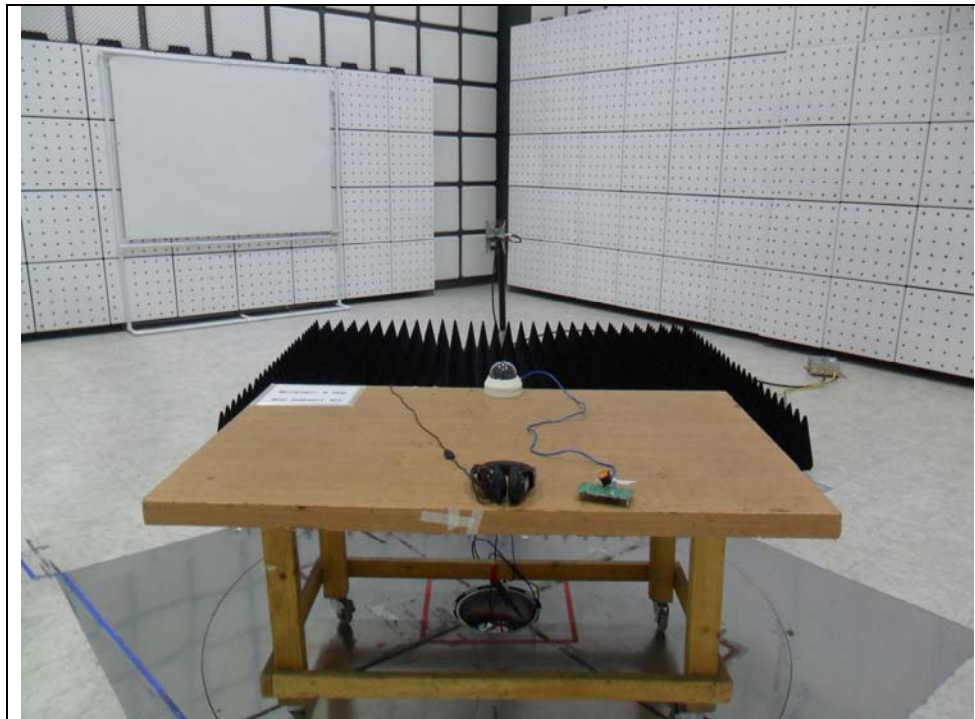
The result is $30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$

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-PoE)



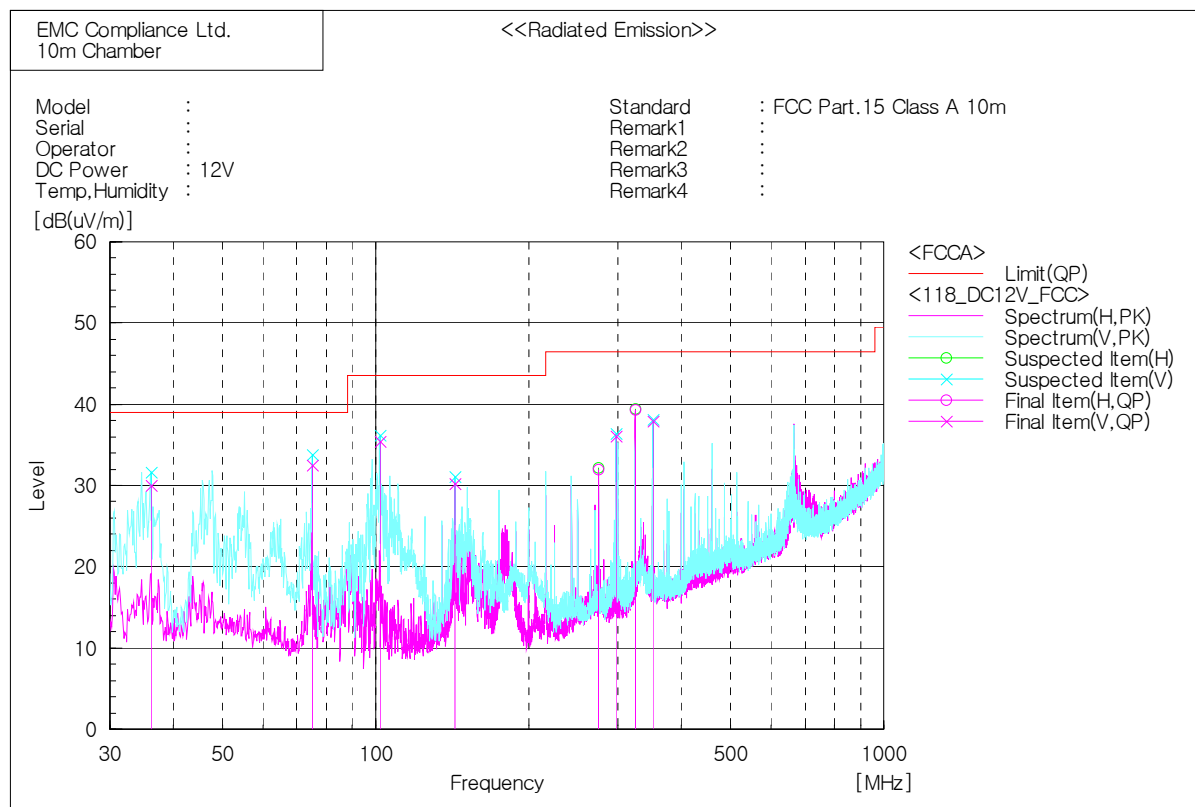
* 1 GHz ~ 6 GHz (#2-PoE)



6.1.6 Radiated emission measurement result

* Graph and Data

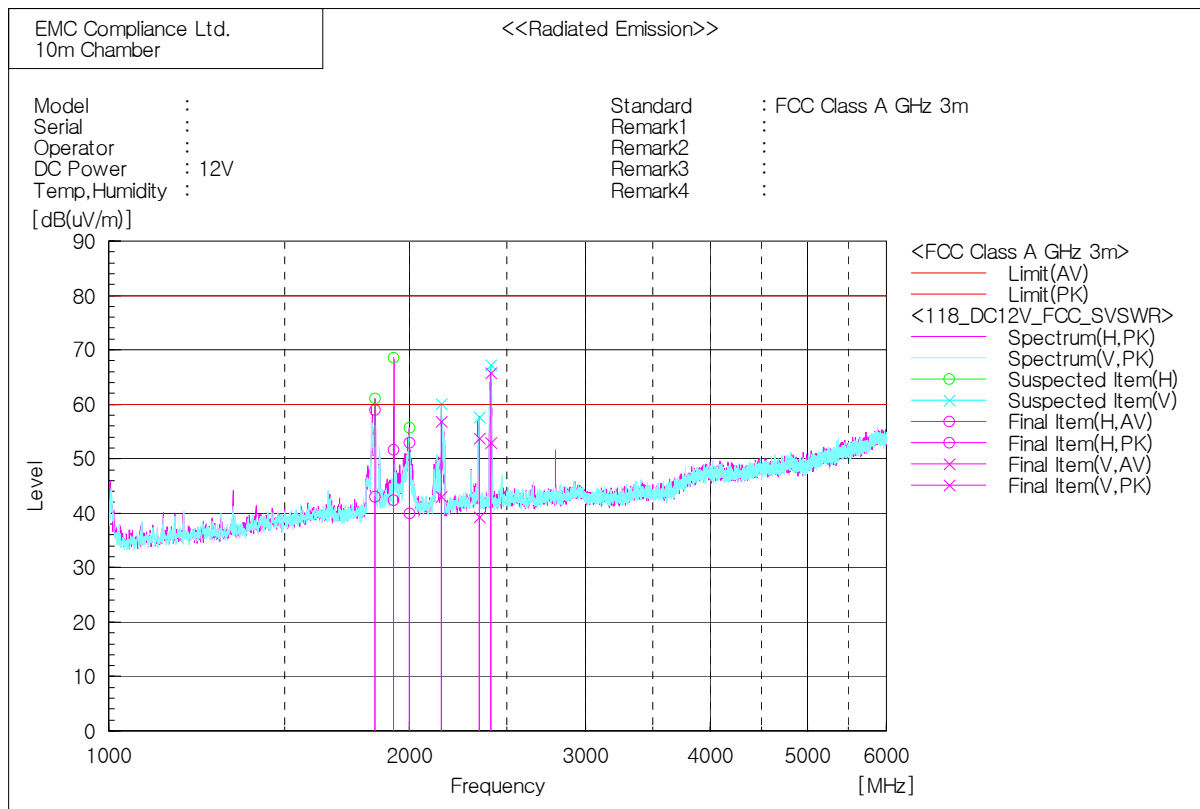
* 30 MHz ~ 1 GHz (SND-7084RN) _#1- DC 12V



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	36.184	V	44.5	-14.5	30.0	39.0	9.0	400.0	150.7
2	74.984	V	49.1	-16.6	32.5	39.0	6.5	100.0	64.0
3	101.901	V	52.6	-17.2	35.4	43.5	8.1	100.0	357.4
4	143.248	V	43.4	-13.2	30.2	43.5	13.3	100.0	101.9
5	275.046	H	43.0	-11.0	32.0	46.5	14.5	400.0	94.7
6	296.993	V	46.5	-10.4	36.1	46.5	10.4	100.0	168.5
7	324.031	H	48.8	-9.5	39.3	46.5	7.2	400.0	241.3
8	350.949	V	46.5	-8.6	37.9	46.5	8.6	100.0	248.6

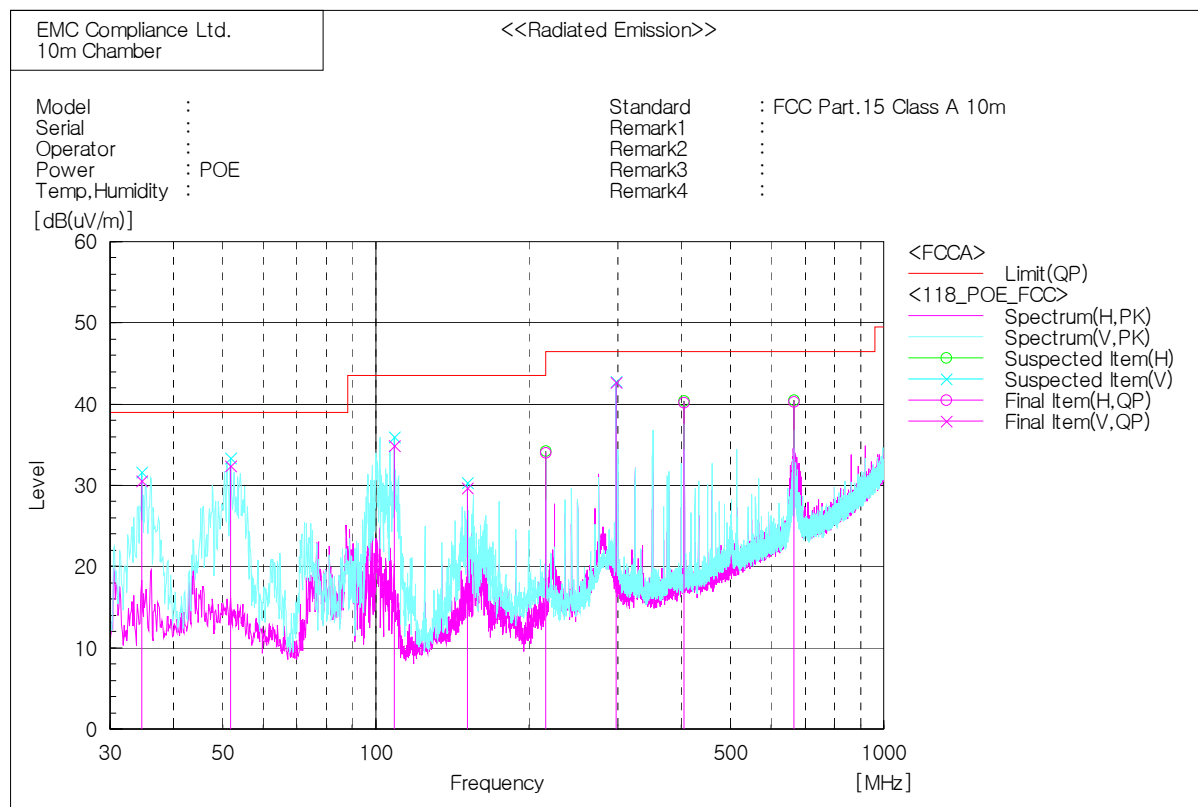
* 1 GHz ~ 6 GHz (SND-7084RN) _#1- DC 12V



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	1848.750	H	42.5	58.5	0.5	43.0	59.0	60.0	80.0	17.0	21.0	100.0	43.3
2	1929.375	H	41.5	50.8	0.9	42.4	51.7	60.0	80.0	17.6	28.3	100.0	228.0
3	1999.375	H	38.7	51.6	1.3	40.0	52.9	60.0	80.0	20.0	27.1	100.0	141.8
4	2153.125	V	41.3	55.1	1.8	43.1	56.9	60.0	80.0	16.9	23.1	100.0	319.0
5	2348.750	V	36.8	51.2	2.5	39.3	53.7	60.0	80.0	20.7	26.3	100.0	133.1
6	2410.625	V	50.4	63.2	2.6	53.0	65.8	60.0	80.0	7.0	14.2	100.0	101.4

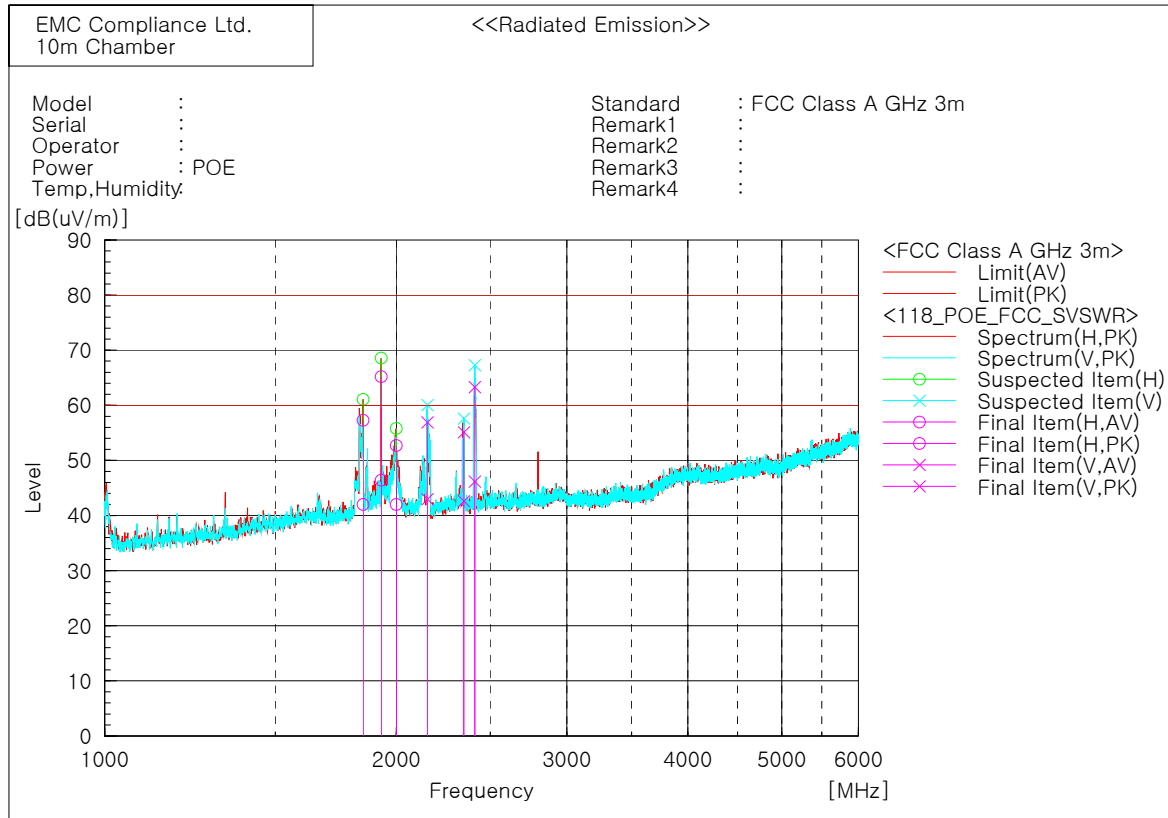
* 30 MHz ~ 1 GHz (SND-7084RN) _#2- PoE



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]
1	34.608	V	45.2	-14.7	30.5	39.0	8.5	400.0	350.0
2	51.825	V	45.6	-13.2	32.4	39.0	6.6	100.0	58.5
3	108.813	V	51.3	-16.4	34.9	43.5	8.6	100.0	342.7
4	151.493	V	42.7	-13.0	29.7	43.5	13.8	100.0	99.4
5	215.998	H	48.2	-14.2	34.0	43.5	9.5	400.0	118.6
6	296.993	V	53.1	-10.4	42.7	46.5	3.8	100.0	339.7
7	405.026	H	47.2	-7.0	40.2	46.5	6.3	400.0	262.1
8	666.078	H	41.2	-0.9	40.3	46.5	6.2	400.0	41.3

* 1 GHz ~ 6 GHz (SND-7084RN) _#2- 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]
1	1848.750	H	41.5	56.8	0.5	42.0	57.3	60.0	80.0	18.0	22.7	100.0	43.3
2	1929.375	H	45.5	64.3	0.9	46.4	65.2	60.0	80.0	13.6	14.8	100.0	228.0
3	1999.375	H	40.7	51.4	1.3	42.0	52.7	60.0	80.0	18.0	27.3	100.0	141.8
4	2153.125	V	41.2	55.1	1.8	43.0	56.9	60.0	80.0	17.0	23.1	100.0	319.0
5	2348.750	V	40.1	52.6	2.5	42.6	55.1	60.0	80.0	17.4	24.9	100.0	133.1
6	2410.625	V	43.6	60.7	2.6	46.2	63.3	60.0	80.0	13.8	16.7	100.0	101.4

7. E.U.T. photographs

Front View



Rear View



Left View



Right View



Top View



Bottom View



Label



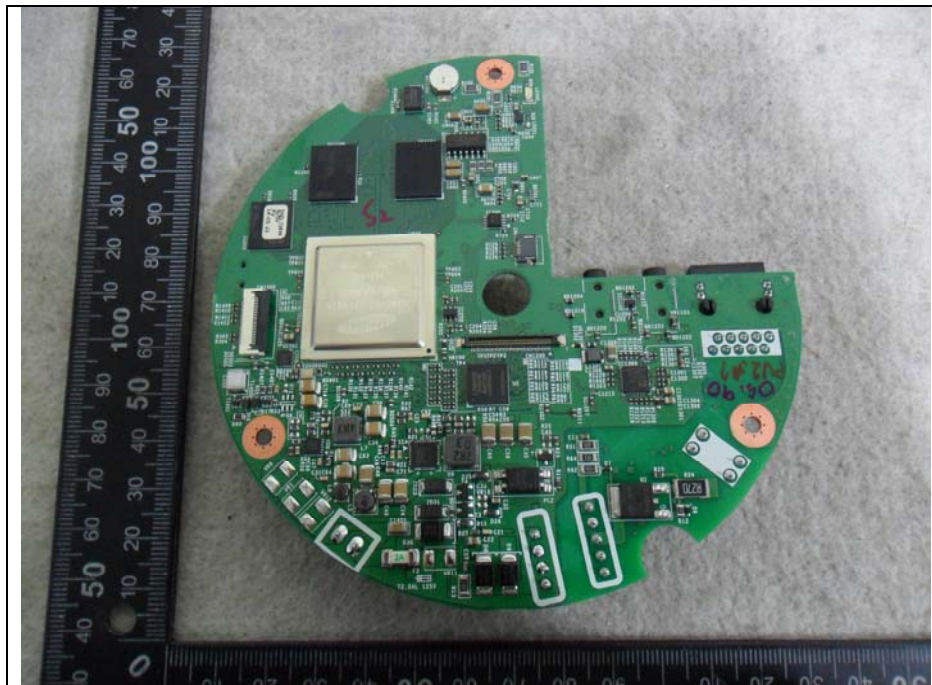
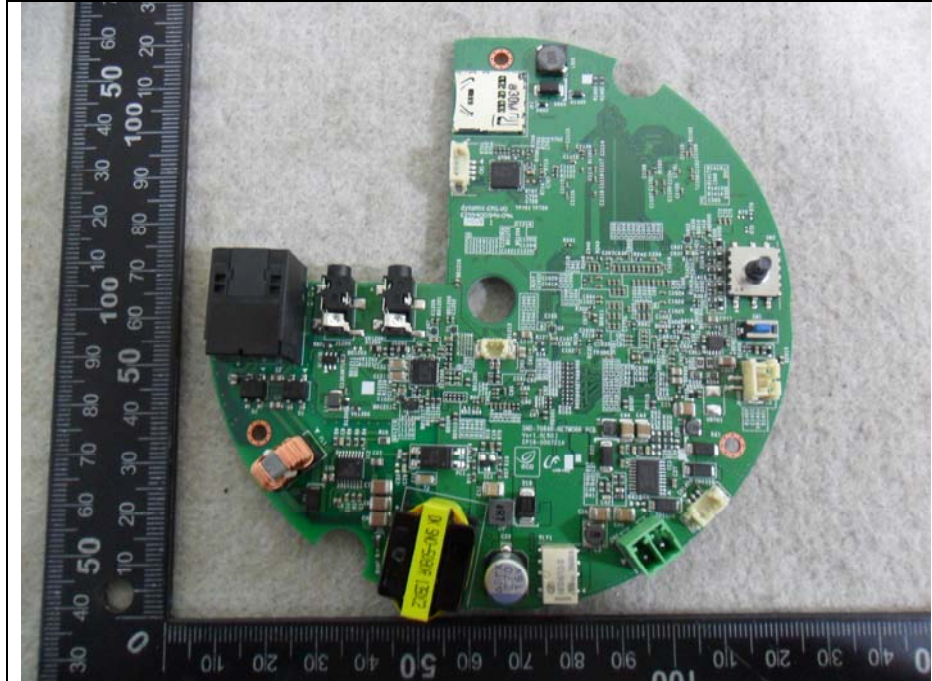
FCC Label Location

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.

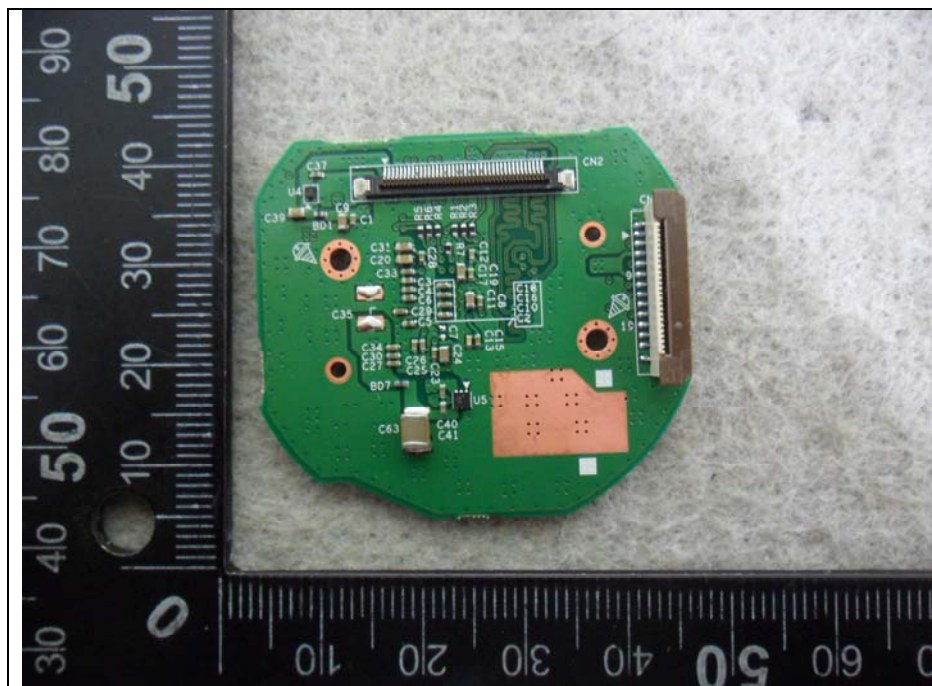
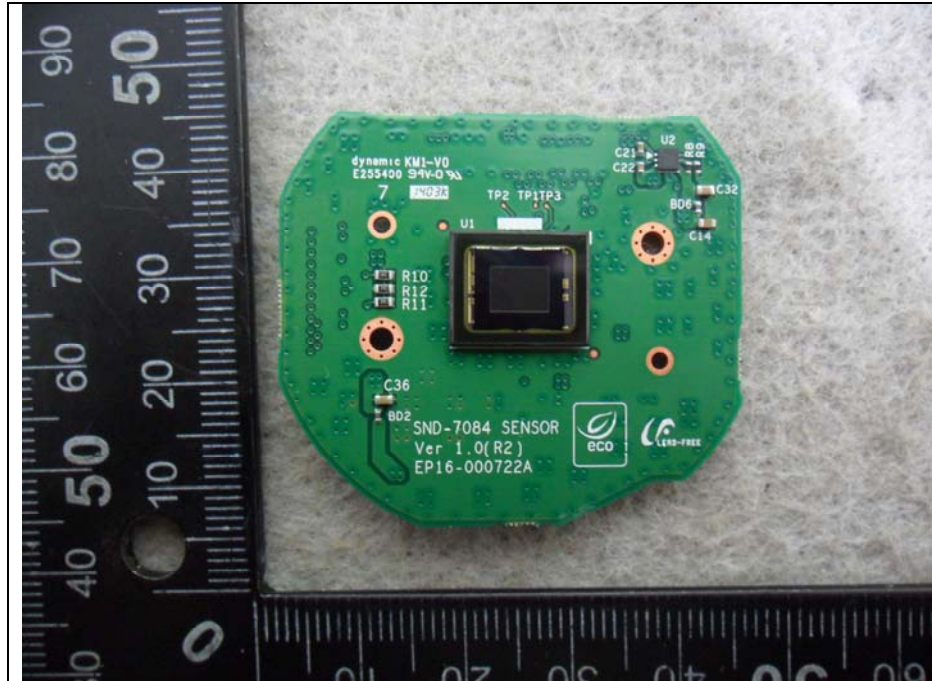
Inside



Main Board



CCD Board



IR Board

