

CERTIFICATE of EMC Compliance

Report No: EMC-FCC-1409
Type of equipment: IR NETWORK CAMERA
Model Name: SNO-1080RN
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

EMC compliance Ltd.
480-5 Sin-dong, Yeongtong-gu,
Suwon-city, Gyeonggi-do, 443-390, Korea

Tel : 82 31 336 9919
Fax : 82 31 336 4767

EMI TEST REPORT

Test report No.: EMC-FCC-1409
Type of Equipment: IR NETWORK CAMERA
Model Name: SNO-1080RN
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
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. 10. 17

Date of testing: 2011. 10. 24

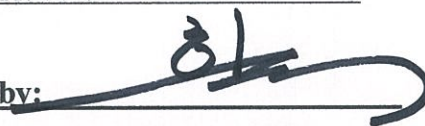
Issued date: 2011. 11. 01

Tested by:



AHN, DO-WON

Approved by:



YEOM, HAN-SEOK

Contents

1. Applicant information	3
2. Laboratory information	4
3. Test system configuration.....	5
3.1 Operation environment	5
3.2 Measurement Uncertainty	5
4. Description of E.U.T.	6
4.1 General information.....	6
4.2 Product description	8
4.3 Auxiliary equipments.....	8
4.4 Test configuration	9
4.5 Operating conditions.....	11
5. Summary of test results.....	12
5.1 Modification to the E.U.T.	12
5.2 Summary of EMI emission test results	12
6. Test results	13
6.1 Radiated Emission	13
7. E.U.T. photographs.....	23

1. Applicant information

Applicant: Samsung Techwin Co., Ltd.
Address: #42 Seongju-Dong, Changwon-Shi,
Kyungsangnam-Do, Korea
Telephone: +82-70-7147-8361
Fax: +82-31-277-2784
E-mail: js2002.kang@samsung.com
Contact name: **Kang Jei Soon**

Manufacturer#1: Samsung Techwin Co., Ltd.
Address: #42 Seongju-Dong, Changwon-Shi,
Kyungsangnam-Do, Korea
Telephone: +82-70-7147-8361
Fax: +82-31-277-2784
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

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

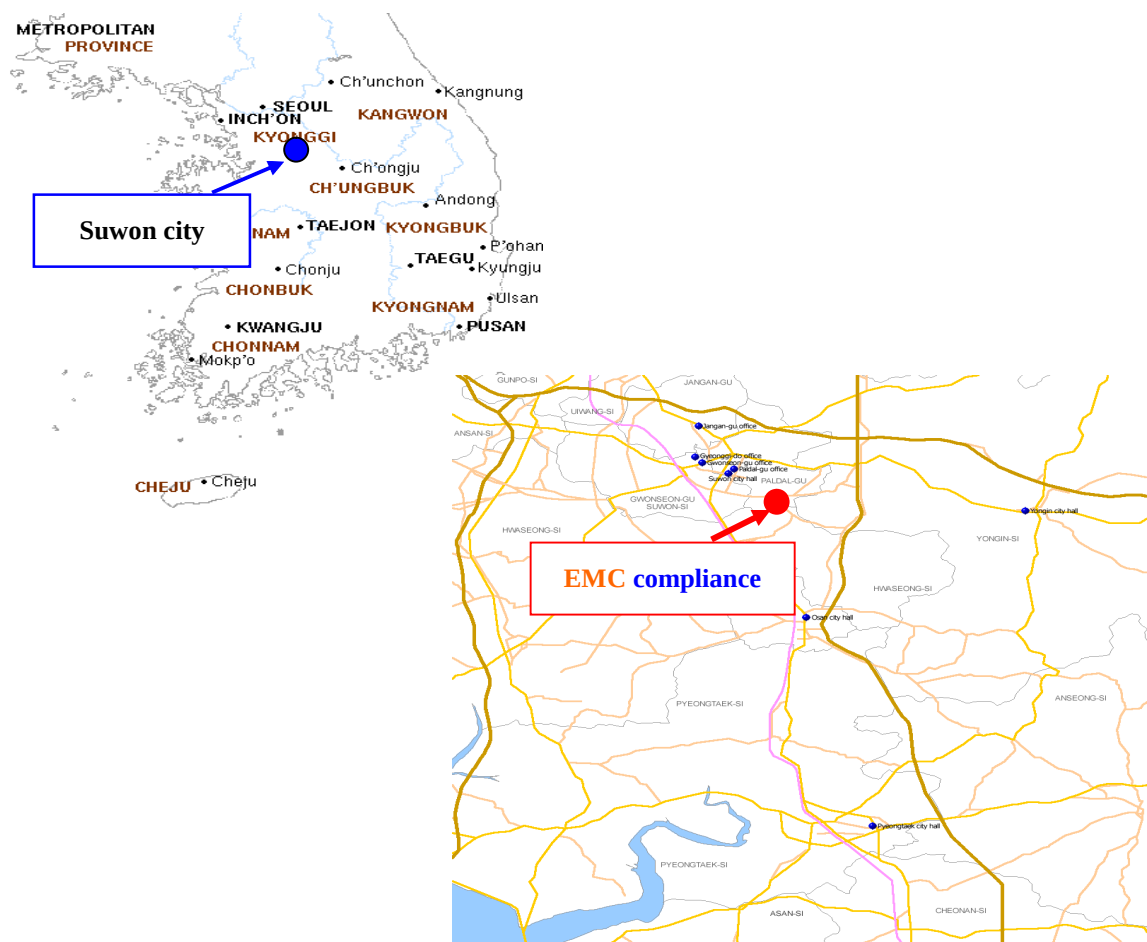
FCC CAB.: KR0040

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)	: 20 °C	36 % R.H.	-

Test site

These testing items were performed following locations;

Chamber (10 m) : Radiated Emission (Test distance: 10 m, 3m)

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: + 4.28 [dB], - 4.30 [dB]

10 m: + 4.27 [dB], - 4.28 [dB]

300 MHz ~ 1 000 MHz: 3 m: + 4.56 [dB], - 4.57 [dB]

10 m: + 4.41 [dB], - 4.43 [dB]

4. Description of E.U.T.

4.1 General information

	SNO-1080RN/P
Video	
Imaging Device	1/4" PS CMOS
Total Pixels	680(H) x 512(V)
Effective Pixels	640(H) x 480(V)
Scanning System	Progressive
Min. Illumination	0 lux
S / N Ratio	50dB
Video Out	SMD Connector, for installation
Lens	
Focal Length (Zoom Ratio)	2.2~7.7mm (3.5x) Vari-focal
Max. Aperture Ratio	F1.2
Angular Field of View	H : 94° (W) ~ 26.5° (T) , V : 70° (W) ~ 20° (T)
Min. Object Distance	500 mm
Focus Control	-
Zoom Movement Speed	-
Lens Type	DC Auto Iris
Mount Type	Board type(Ø14)
Pan / Tilt / Rotate	
Pan Range	0°~355°
Pan Speed	-
Tilt Range	0°~90°
Tilt Speed	-
Rotate Range	0°~355°
Preset	-
Preset Accuracy	-
Auto Tracking	-
Operational	
IR LED	15 ea
Viewable Length	15m
Camera Title	Off / On (Displayed up to 15 characters)
Day & Night	Auto (ICR) / Color / B/W
Backlight Compensation	Off / BLC
Wide Dynamic Range	-
Contrast Enhancement	SSDR (Samsung Super Dynamic Range) (Off / On)
Digital Noise Reduction	SSNR III (2D+3D Noise Filter) (Off / On)
Digital Image Stabilization	-
Motion Detection	Off / On (4 programmable zones)
Privacy Masking	Off / On (32ea 4 Points Polygonal)
Sens-up (Frame Integration)	Off / Auto (x2~x60)
Gain Control	Off / Low / Medium / High

White Balance	ATW / AWC / Manual / Indoor / Outdoor
Electronic Shutter Speed	Auto / A.FLK / Manual (x60~1/12000sec)
Digital Zoom	-
Flip / Mirror	Off / On
Intelligent Video Analytics	Face Detection
Alarm I/O	Input 1ea
Remote Control Interface	-
RS-485 Protocol	-
Network	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Format	H.264, MJPEG
Resolution	<H.264> 4:3 Mode : 640x480 / 320x240 / 160x120 <MJPEG> 4:3 Mode : 640x480 / 320x240 / 160x120
Max. Framerate	Max. 30fps at all resolutions
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	-
Audio Compression Format	-
Audio Communication	-
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
Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1X Authentication
Streaming Method	Unicast / Multicast
Max. User Access	10 users at Unicast Mode
Memory Slot	-
ONVIF Conformance	Yes
Webpage Language	English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatia, Hungary, Greek
Web Viewer	Supported OS : Windows XP / VISTA / 7, MAC OS Supported Browser : Internet Explorer 7.0 or Higher, Firefox Google Chrome, Apple Safari
Central Management Software	NET-i viewer
Environmental	
Operating Temperature / Humidity	-10°C ~ +50°C (+14°F ~ +122°F) / 20% ~80 RH
Ingress Protection	-
Electrical	
Input Voltage / Current	12V DC, PoE(IEEE802.3af)
Power Consumption	TBD
Mechanical	
Color / Material	Dark gray, Aluminum
Dimension (WxHxD)	86 * 86.8 * 304.6
Weight	990g

4.2 Product description

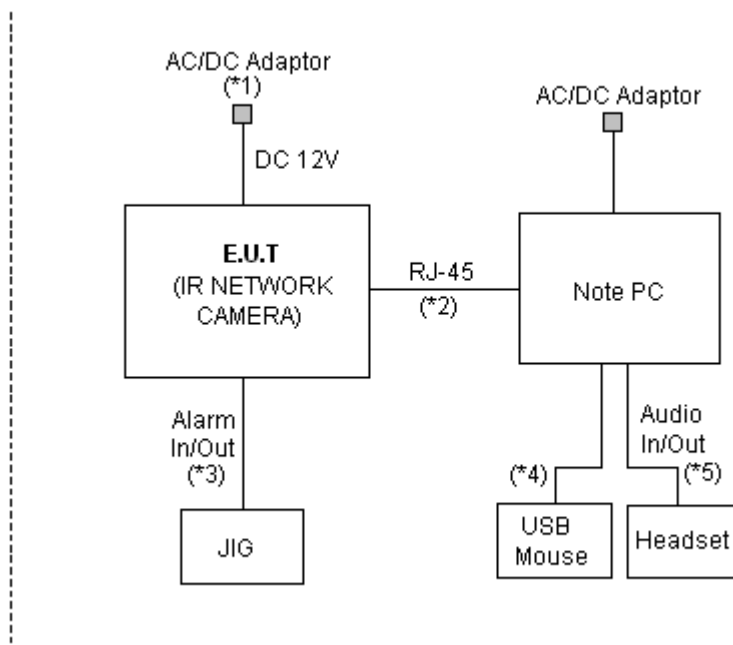
Type of product	IR NETWORK CAMERA
Model name (Basic)	SNO-1080RN
Model name (Variant)	N/A
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	DC 12 V / PoE
Product rating	DC 12 V / PoE
Internal clock frequency	27 MHz
Note	* AC/DC adaptor was not provided by the manufacturer. * PoE Switch was not provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Note PC	C1321	472680432036	FUJITSU
USB Mouse	M-UV69a	HCA51201503	LG
Headset	ES-303	-	inkel
JIG	-	-	-
PoE Switch	FS108P	1DL2093R00C1C	NETGEAR
AC/DC Adaptor(DC 12 V)	ADP-1312	G900046TA	SAMSUNG

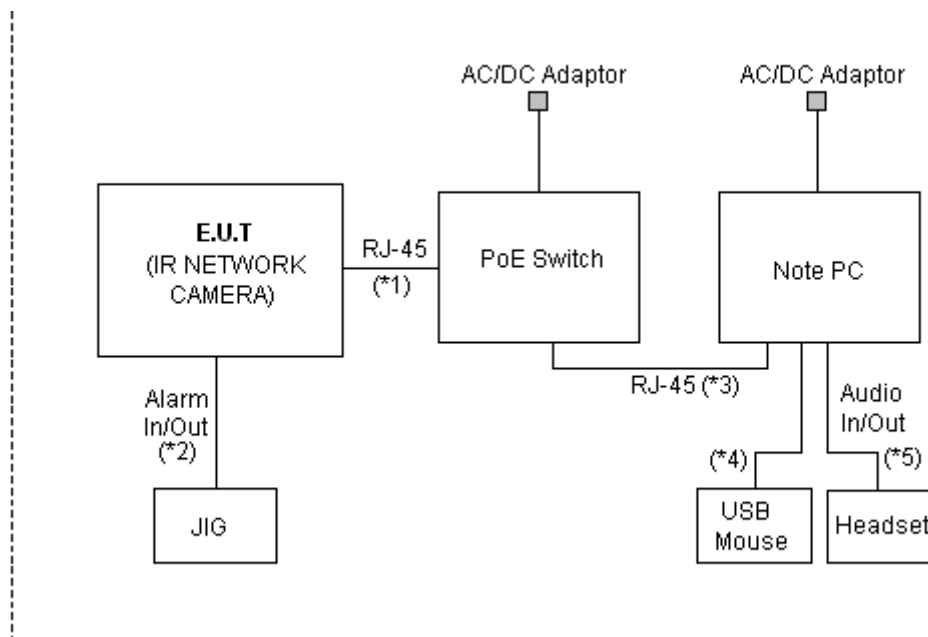
4.4 Test configuration

* DC 12 V



Note	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT (IR NETWORK CAMERA)	Power	AC/DC Adaptor	Power	1.5	Non-Shield
2		RJ-45	Note PC	RJ-45	3.0	Non-Shield
3		Alarm In/Out	JIG	Alarm In/Out	3.0	Non-Shield
4	Note PC	USB	USB Mouse	USB	1.8	Shield
5		Audio In/Out	Headset	Audio In/Out	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 (IR NETWORK CAMERA)	RJ-45	PoE Switch	RJ-45	3.0	Non-Shield
2		Alarm In/Out	JIG	Alarm In/Out	3.0	Non-Shield
3	Note PC	RJ-45	PoE Switch	RJ-45	3.0	Shield
4		USB	USB Mouse	USB	1.8	Shield
5		Audio In/Out	Headset	Audio In/Out	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 operation
1	Camera operating mode

* 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 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, PoE	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	Camera operating mode		
Date	2011. 10. 24		
Testing voltage	DC 12 V / PoE		
Test facility	10 m Chamber (Test distance: 10 m, 3m)		
Temperature (°C)	20 °C	Humidity (% R.H.)	36 % R.H.
Remarks	Complied 30 MHz ~ 1 GHz Minimum limit margin is 6.2 dB at 36.184 MHz. (PoE) 1 GHz ~ 5 GHz Minimum limit margin is 9.6 dB at 4934.375 MHz. (DC 12 V _Average)		

6.1.1 Limits of radiated emission measurement

Frequency [MHz]	Class A (dB(μV/m)) @ 10 m	Class B (dB(μV/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, 3 m distance at 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	13.10.04	☒
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	-	☒
Amplifier	8449B	3008A01802	AGILENT	12.05.11	☒
Horn ANT	3115	62589	ETS	13.09.06	☒
Spectrum Analyzer	FSP7	100289	R&S	11.12.17	☒

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

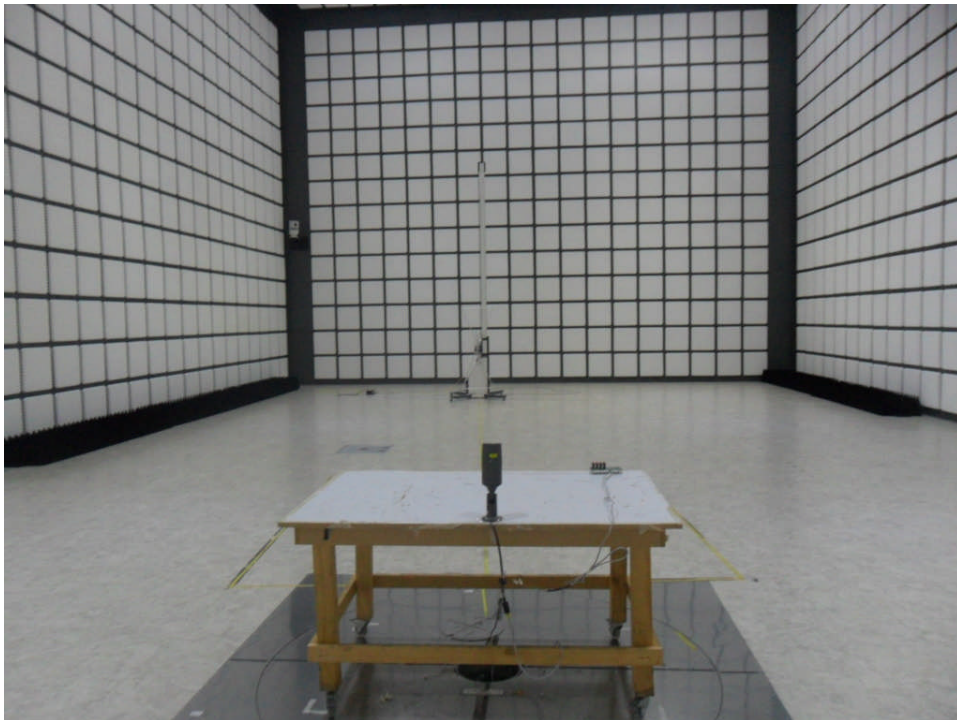
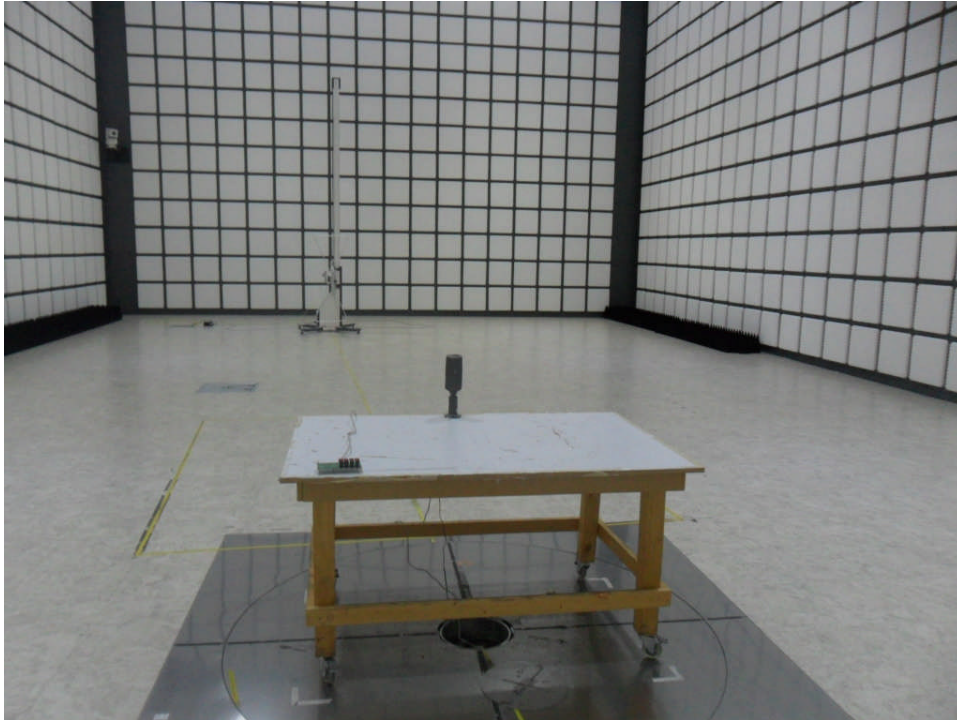
If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

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

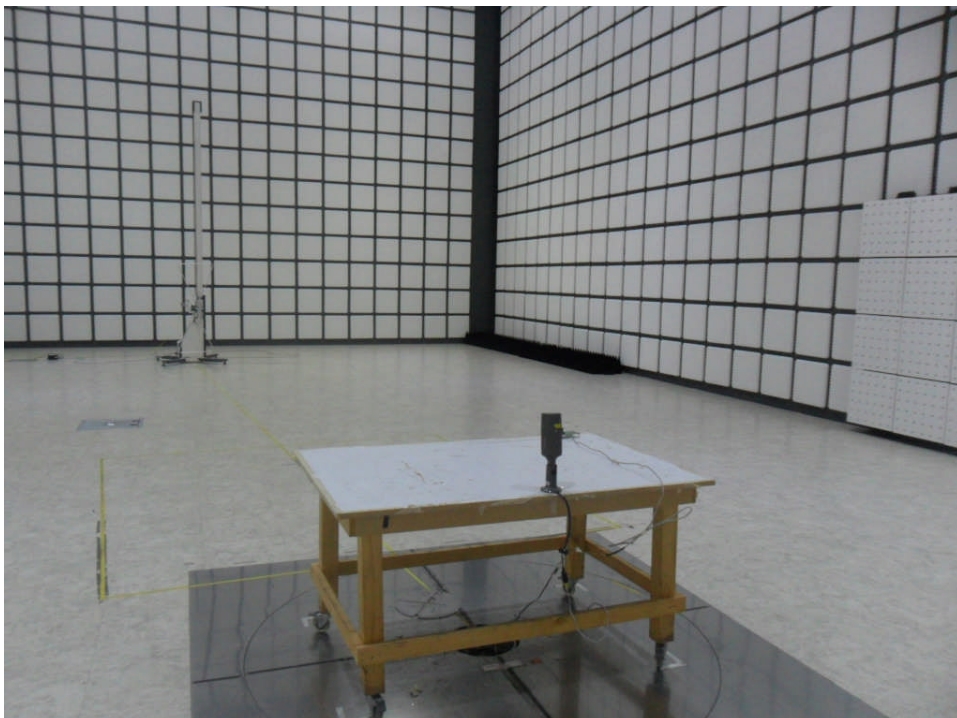
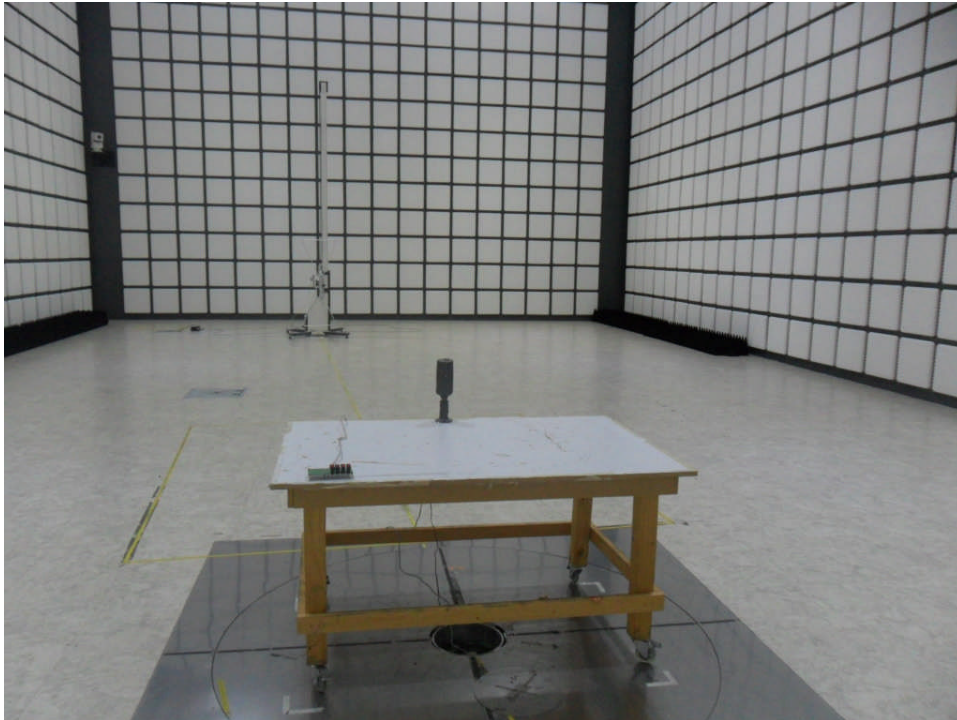
6.1.5 Photographs of test setup

* 30 MHz ~ 1 GHz

* DC 12 V

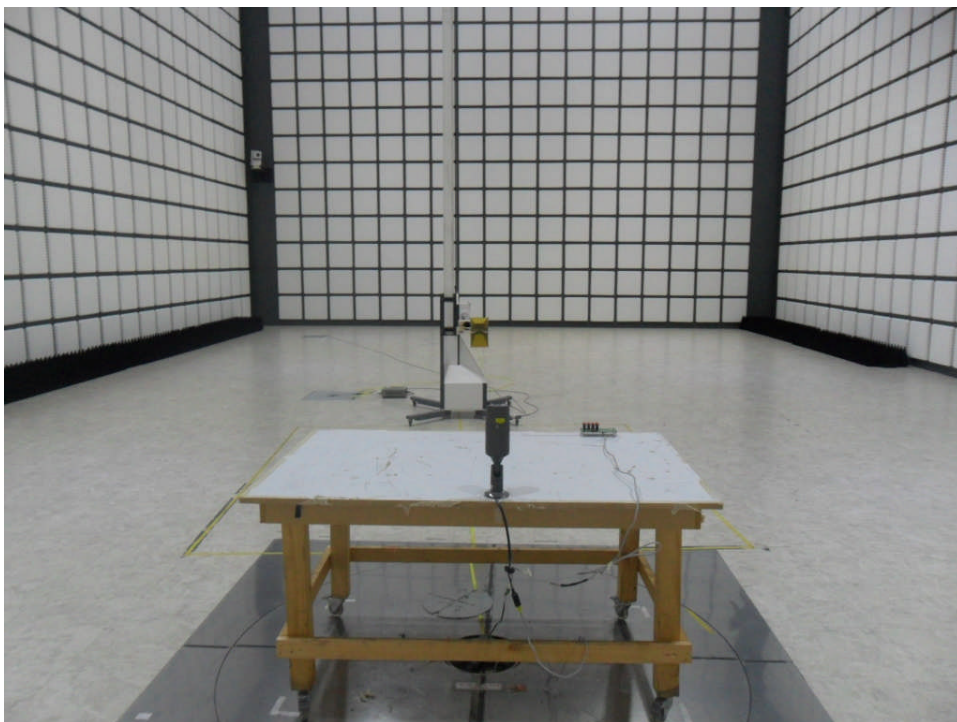
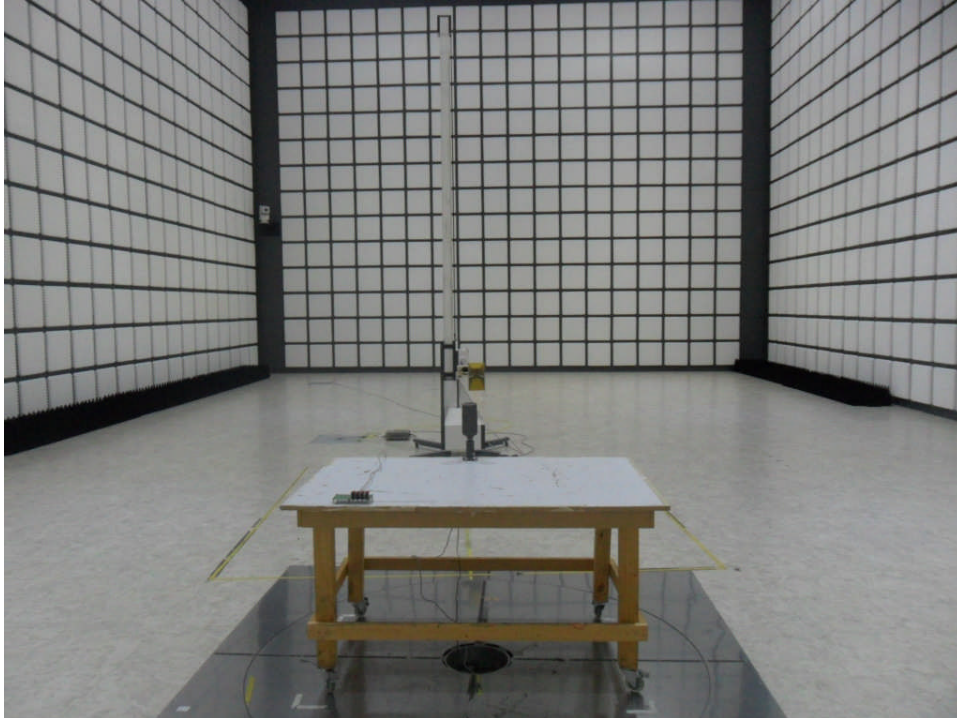


* PoE

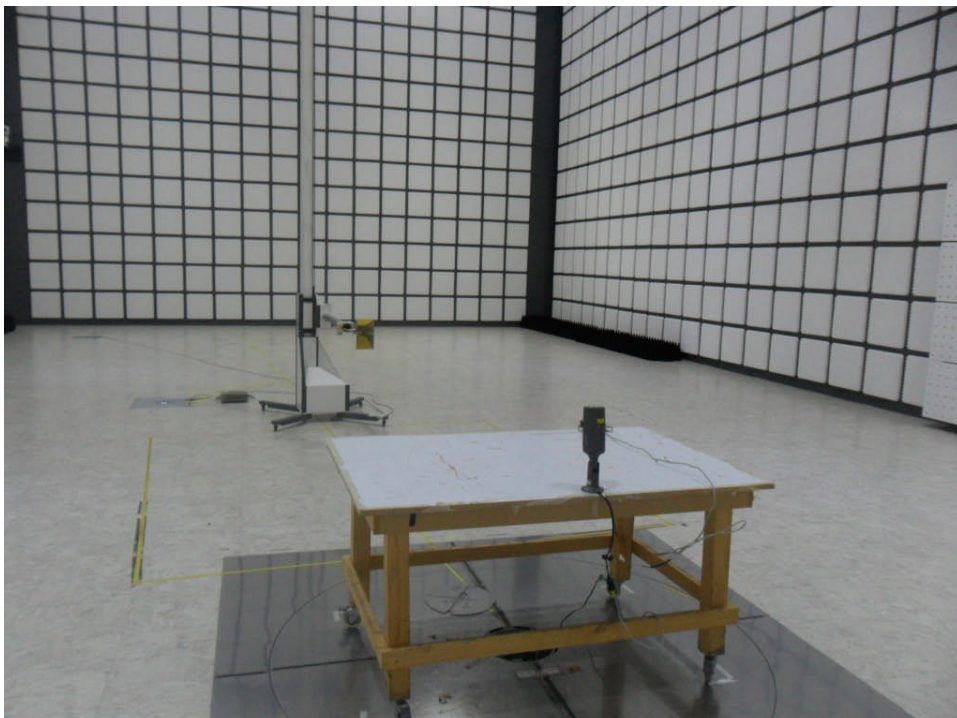
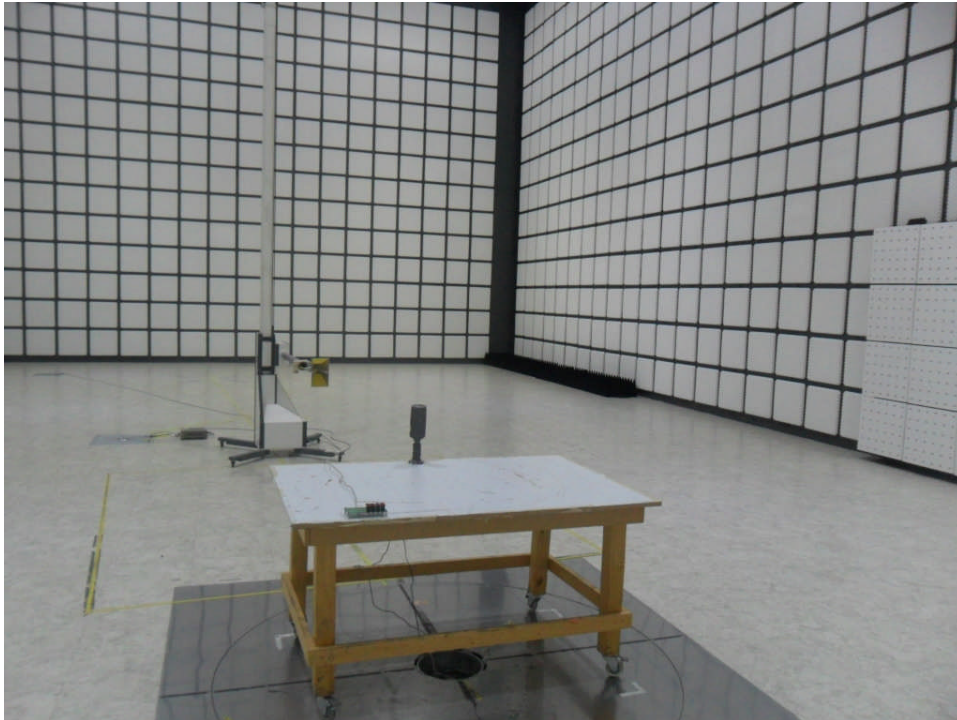


* 1 GHz ~ 5 GHz

* DC 12 V



* PoE

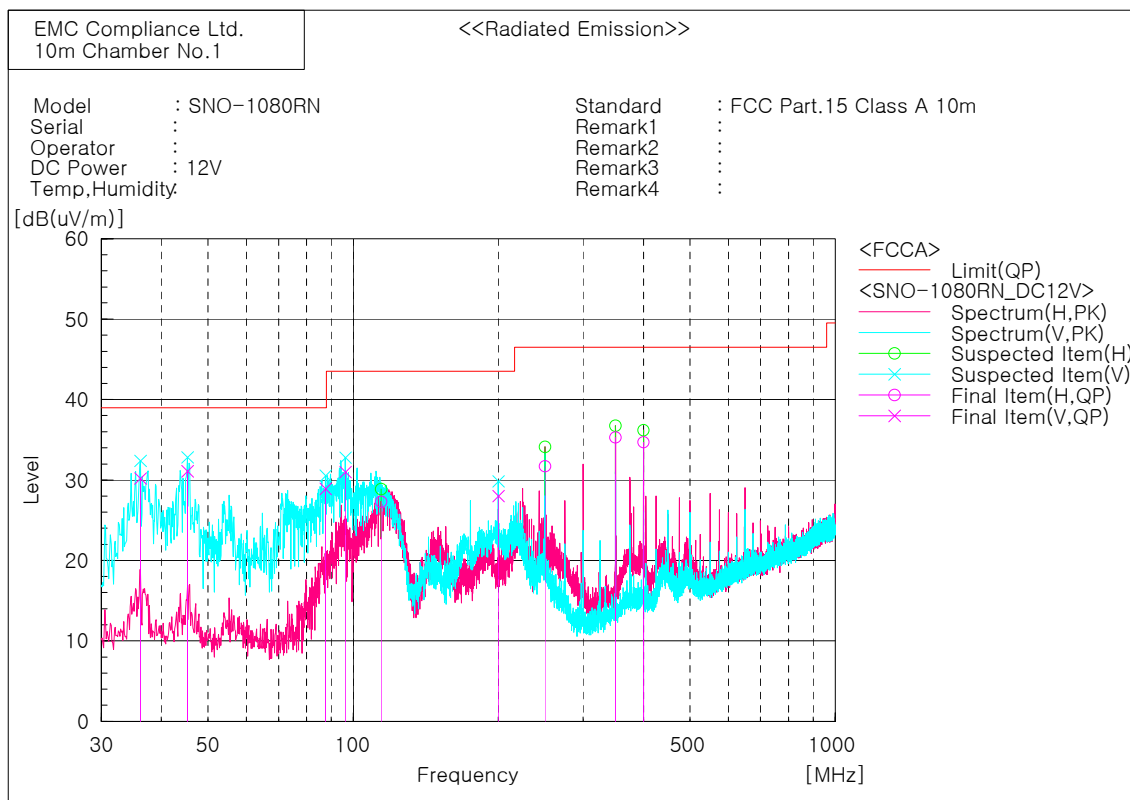


6.2.6 Radiated emission measurement result

* Graph and Data

* 30 MHz ~ 1 GHz

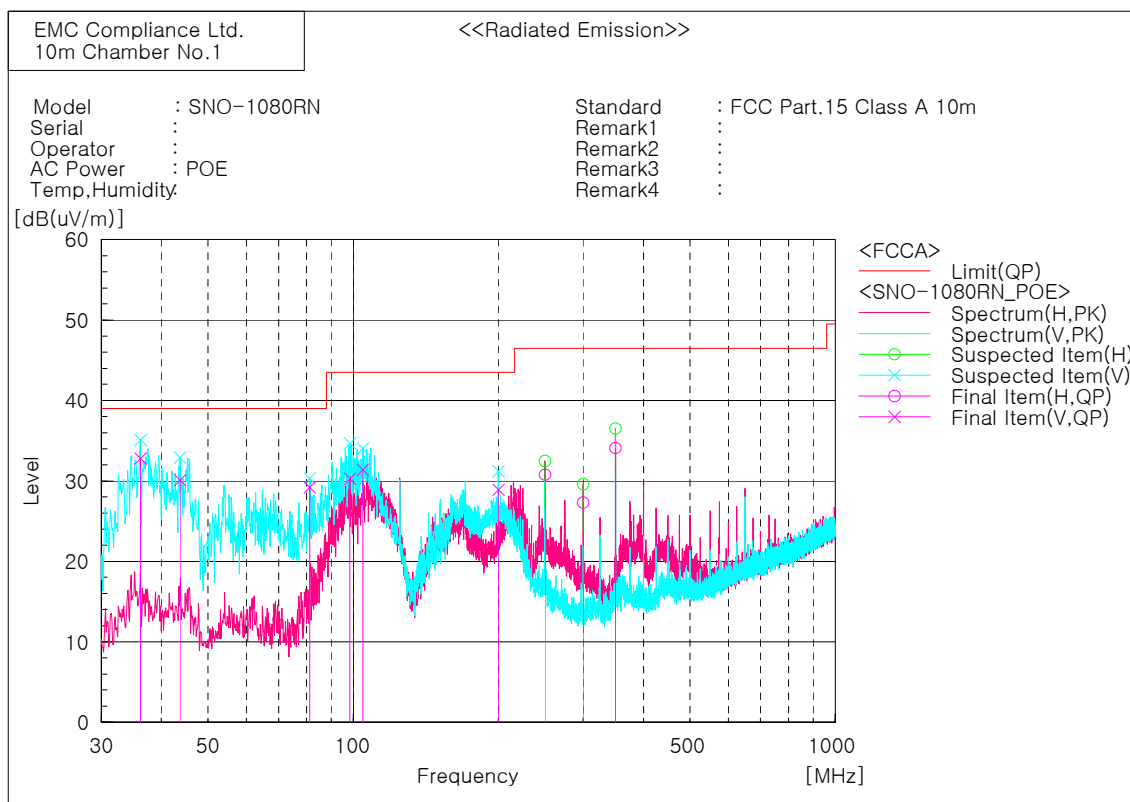
* DC 12 V



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	36.184	V	46.7	-16.5	30.2	39.0	8.8	100.0	286.1
2	45.278	V	47.4	-16.3	31.1	39.0	7.9	100.0	65.0
3	87.594	V	49.0	-20.1	28.9	39.0	10.1	100.0	331.1
4	96.324	V	50.5	-19.5	31.0	43.5	12.5	195.0	329.5
5	114.269	H	44.9	-17.6	27.3	43.5	16.2	400.0	62.0
6	199.993	V	46.8	-18.8	28.0	43.5	15.5	195.0	16.8
7	249.947	H	48.2	-16.5	31.7	46.5	14.8	400.0	68.0
8	349.979	H	48.6	-13.3	35.3	46.5	11.2	306.0	74.0
9	400.055	H	46.9	-12.2	34.7	46.5	11.8	206.0	59.0

* PoE

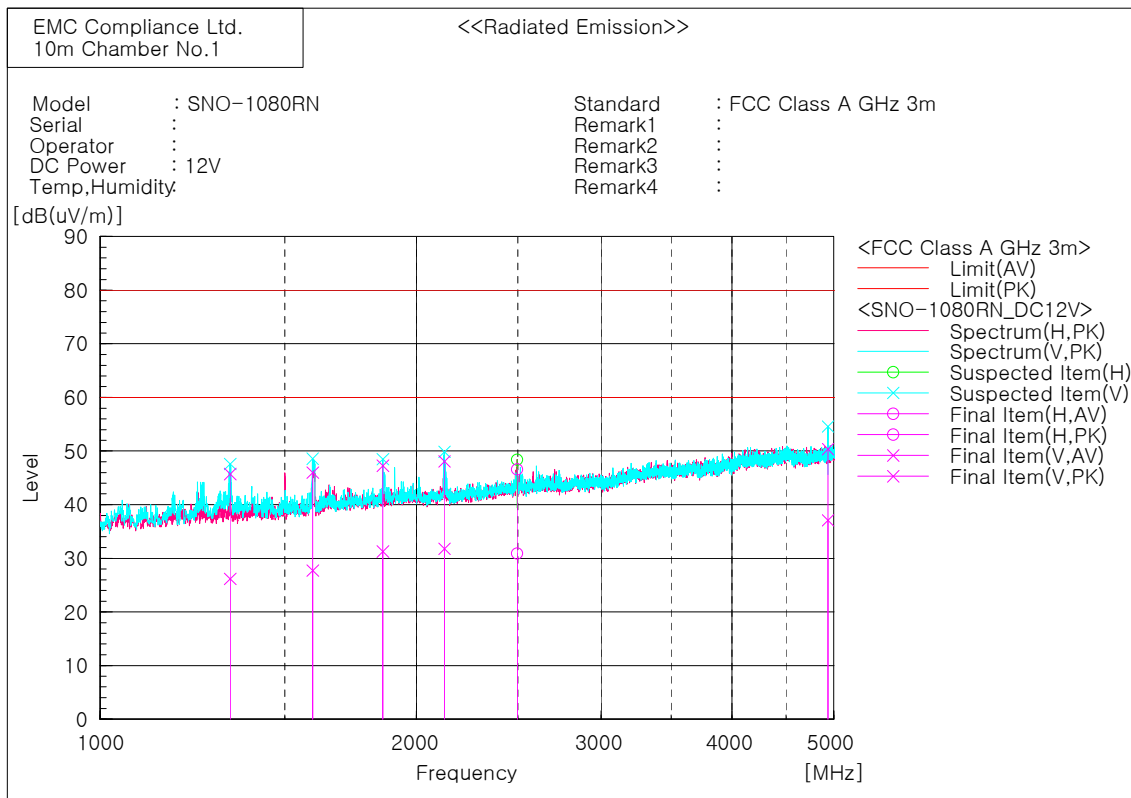


Final Result

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	36.184	V	49.3	-16.5	32.8	39.0	6.2	296.0	272.9
2	43.701	V	46.3	-16.2	30.1	39.0	8.9	400.0	304.9
3	81.168	V	49.5	-20.3	29.2	39.0	9.8	100.0	265.9
4	98.385	V	49.7	-19.4	30.3	43.5	13.2	194.0	255.9
5	104.690	V	50.1	-18.7	31.4	43.5	12.1	194.0	283.0
6	199.993	V	47.7	-18.8	28.9	43.5	14.6	100.0	308.0
7	249.947	H	47.3	-16.5	30.8	46.5	15.7	400.0	308.2
8	300.024	H	42.1	-14.8	27.3	46.5	19.2	307.0	84.2
9	349.979	H	47.4	-13.3	34.1	46.5	12.4	307.0	275.2

* 1 GHz ~ 5 GHz

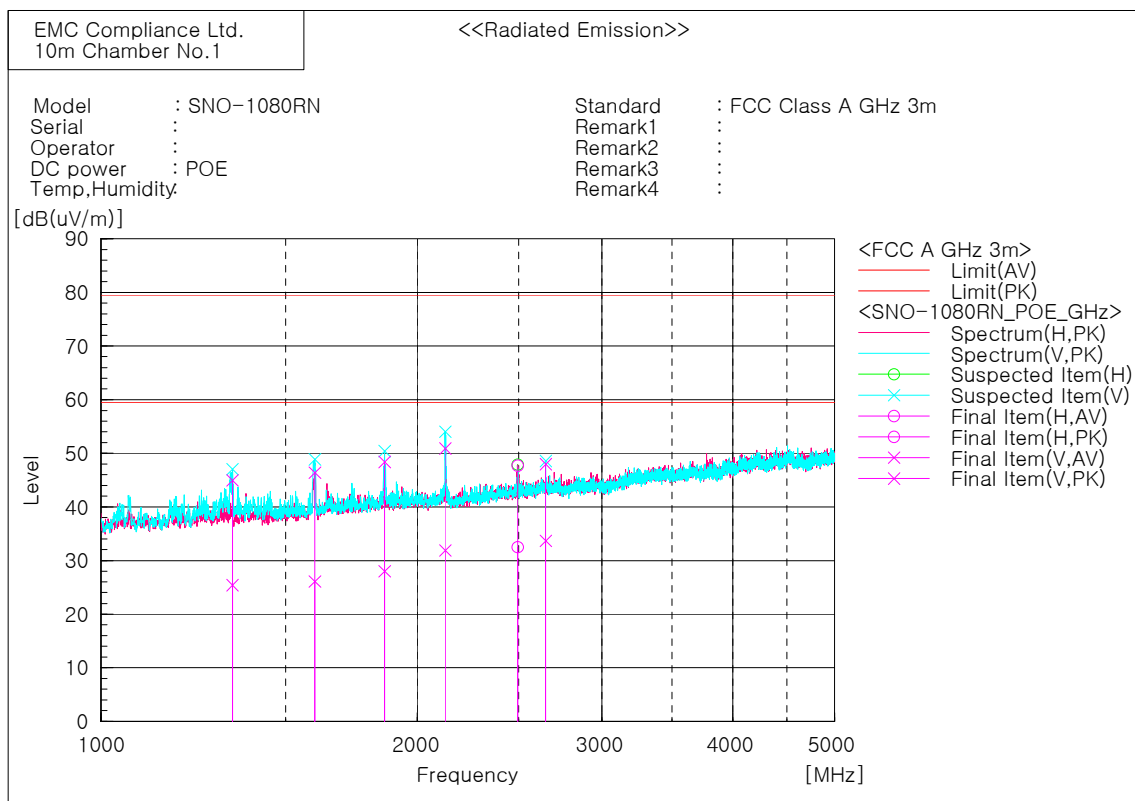
* DC 12 V



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	1329.355	V	54.6	35.1	-8.9	45.7	26.2	60.0	80.0	14.3	53.8	100.0	346.4
2	1593.676	V	52.9	34.6	-6.9	46.0	27.7	60.0	80.0	14.0	52.3	100.0	151.6
3	1858.755	V	52.4	36.4	-5.1	47.3	31.3	60.0	80.0	12.7	48.7	100.0	130.6
4	2127.587	V	51.7	35.4	-3.6	48.1	31.8	60.0	80.0	11.9	48.2	100.0	151.6
5	2495.625	H	48.6	32.9	-2.0	46.6	30.9	60.0	80.0	13.4	49.1	100.0	241.4
6	4934.375	V	44.0	30.7	6.4	50.4	37.1	60.0	80.0	9.6	42.9	201.0	310.7

* 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	1333.746	V	53.8	34.2	-8.8	45.0	25.4	59.5	79.5	14.5	54.1	100.0	348.0
2	1598.164	V	53.2	32.9	-6.8	46.4	26.1	59.5	79.5	13.1	53.4	100.0	158.6
3	1862.599	V	53.5	33.1	-5.1	48.4	28.0	59.5	79.5	11.1	51.5	100.0	274.0
4	2127.500	V	35.5	54.5	-3.6	31.9	50.9	59.5	79.5	27.6	28.6	100.0	274.0
5	2494.366	H	49.8	34.6	-2.1	47.7	32.5	59.5	79.5	11.8	47.0	201.0	203.0
6	2652.500	V	49.5	35.2	-1.5	48.0	33.7	59.5	79.5	11.5	45.8	100.0	274.0

7. E.U.T. photographs

Front View



Rear View



Left View



Right View



Top View



Bottom View



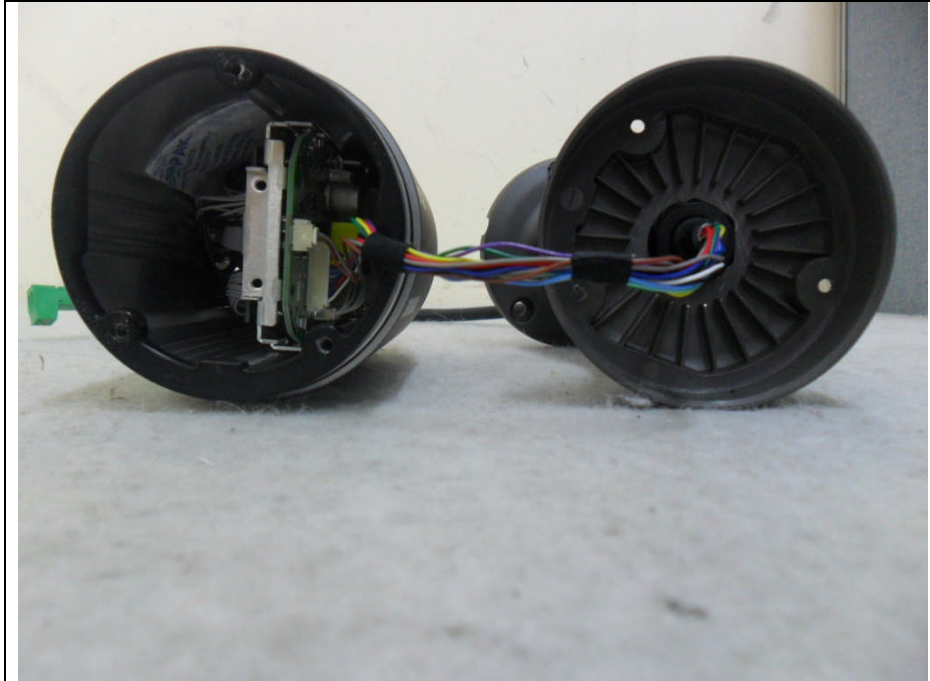
Label



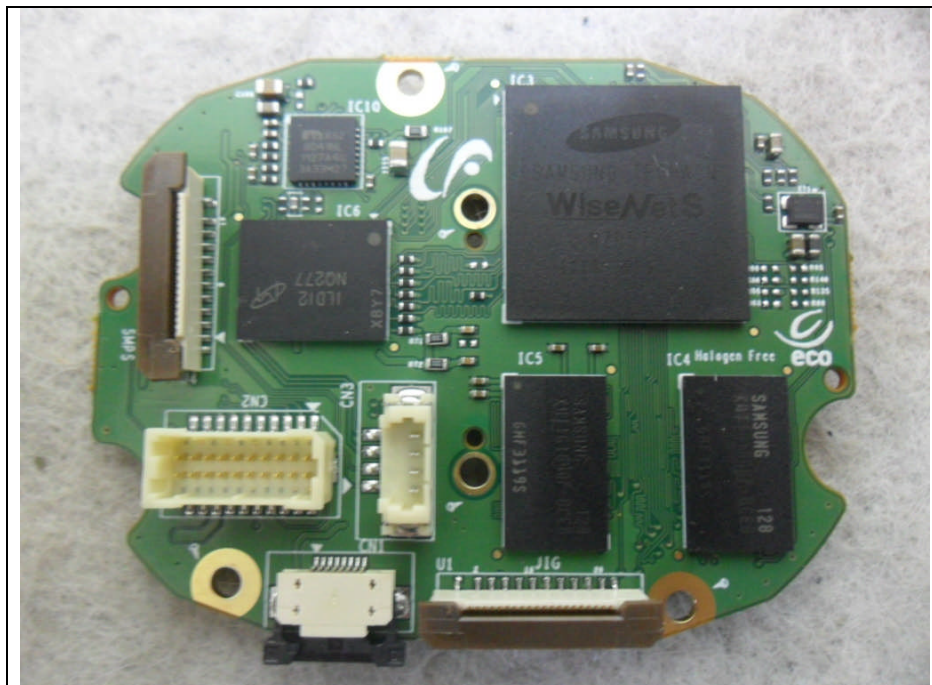
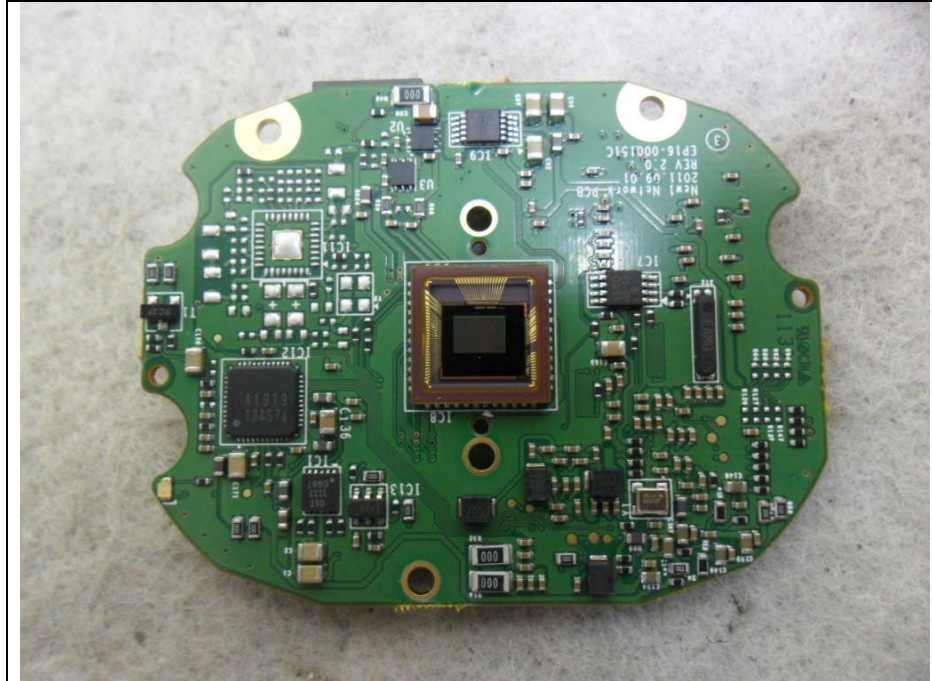
FCC Label Location

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.

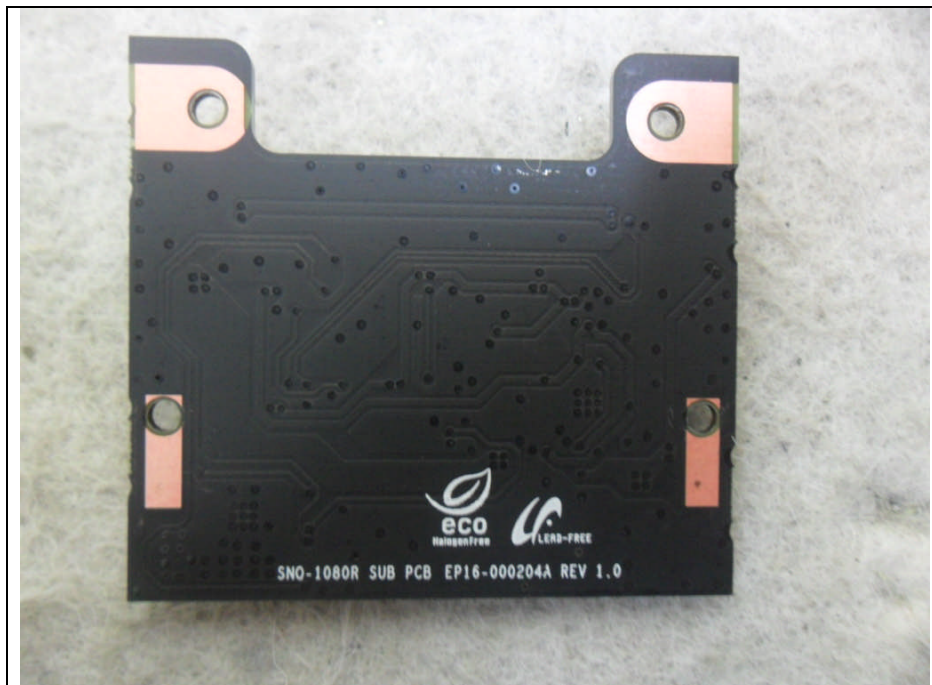
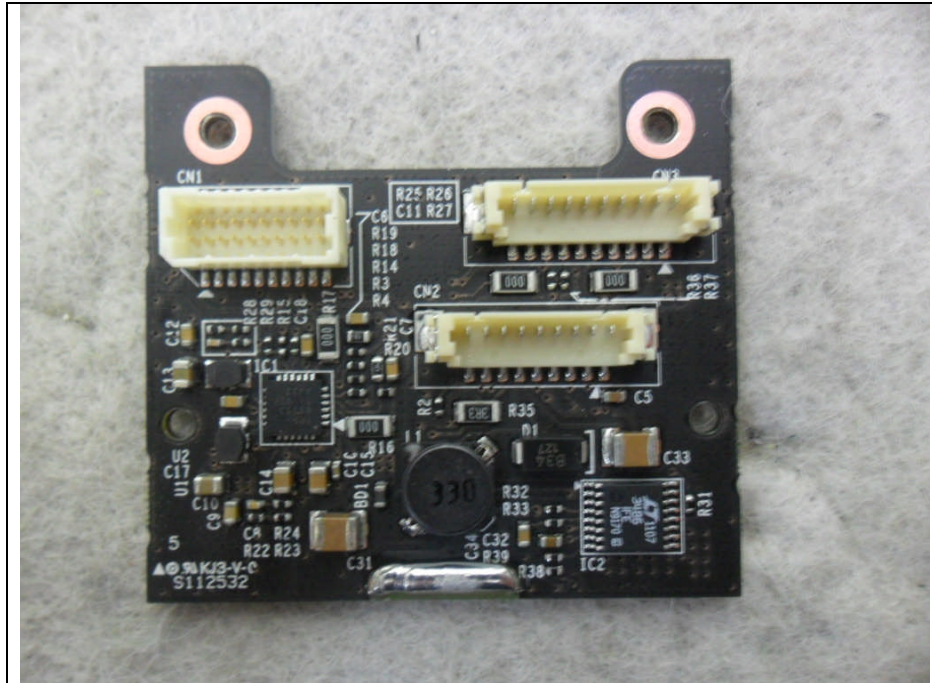
Inside



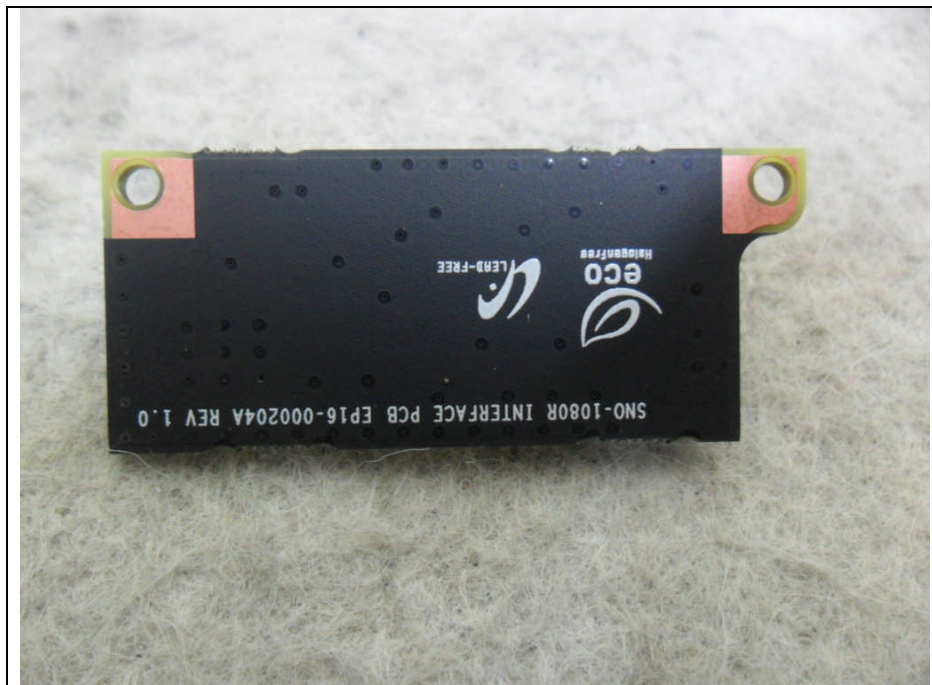
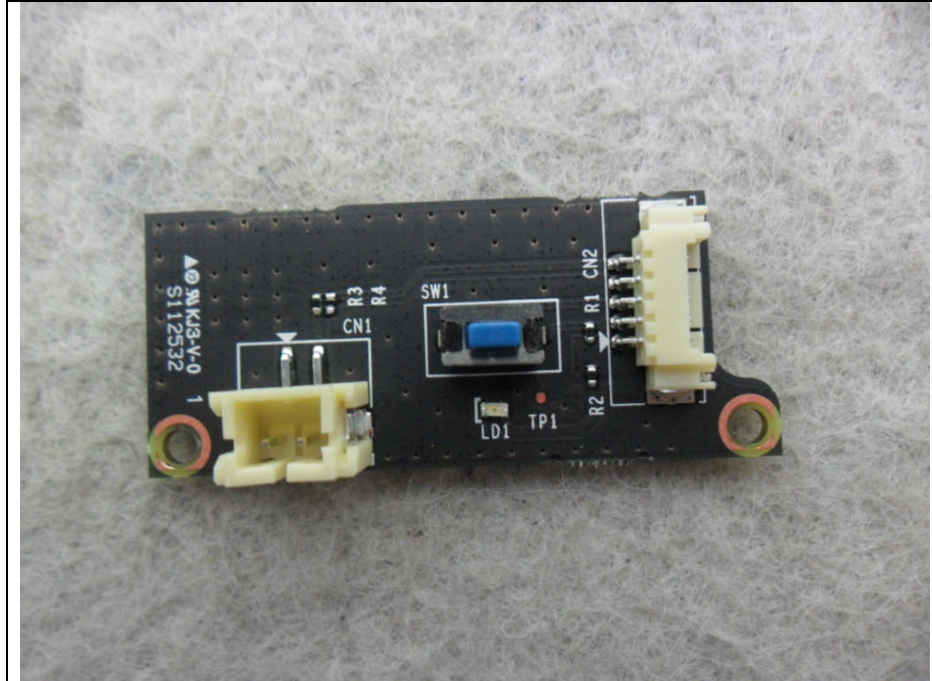
CCD Board



Camera SUB Board



Interface Board



LED Board



