

EMC TEST REPORT

Test report No : EMC-VCCI-0297
Type of Equipment : Network Camera
Model Name : SNB-5003N
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 : VCCI V-3 / 2012.04, Class A
Testing Laboratory : EMC Compliance Ltd.
Test result : Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of VCCI 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: 2013. 06. 10

Date of testing: 2013. 06. 17

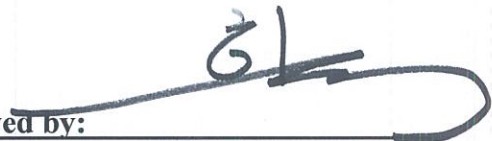
Issued date: 2013. 06. 26

Tested by:



AHN, DO-WON

Approved by:



YEOM, HAN-SEOK

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1. Applicant information

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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.

480-5 Sin-dong, Yeongtong-gu, Suwon-city, Gyeonggi-do, 443-390, Korea

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Facsimile Number: 82 505 299 8311

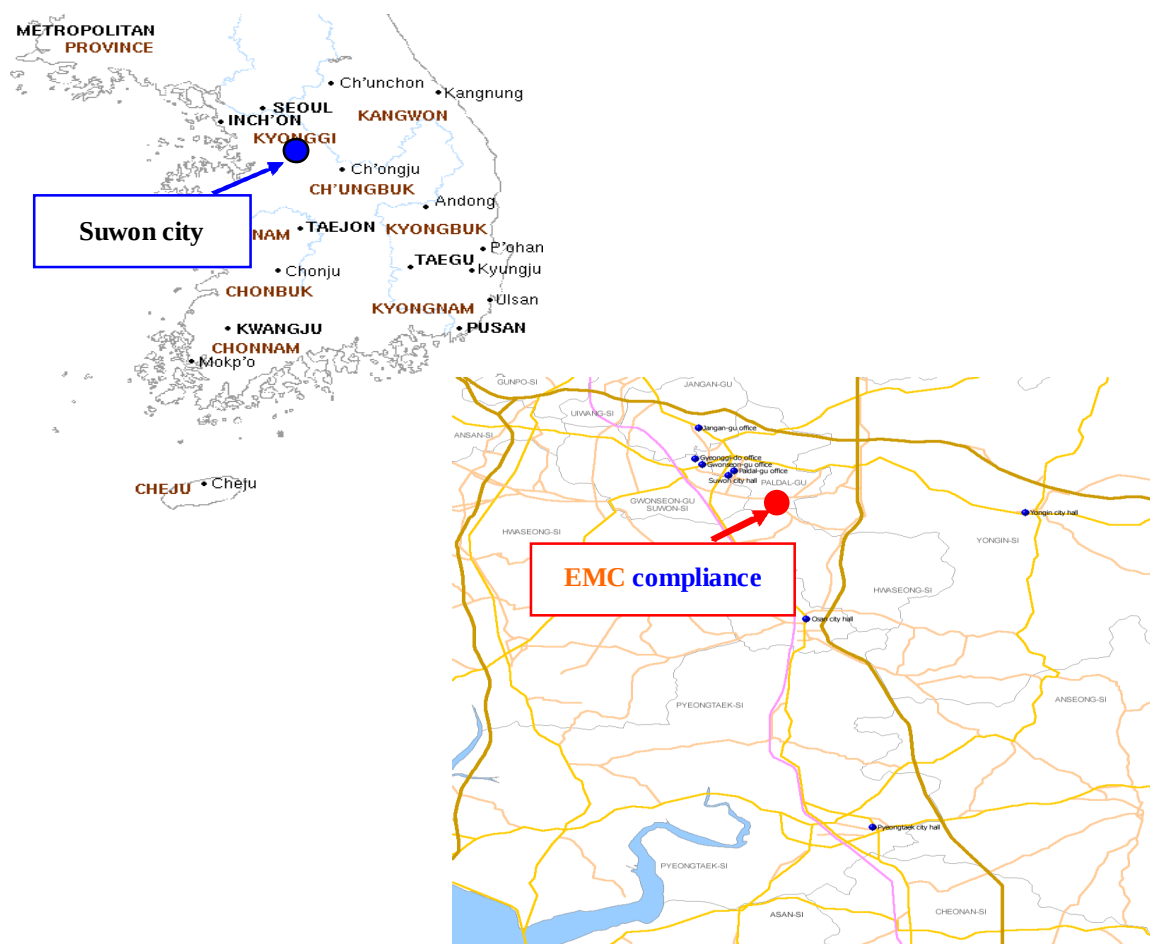
FCC CAB.: KR0040

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)	: 26 °C	39 % R.H.	-
Shielded room(CE)	: 28 °C	36 % 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	1/3" 1.3M PS CMOS
Total Pixels	1,384(H) x 1,076(V)
Effective Pixels	1,329(H) x 1,049(V)
Scanning System	Progressive
Min. Illumination	Color : 0.05 Lux (1/30sec, F1.2, 50IRE), 0.0008Lux (2sec, 50IRE) B/W : 0.05 Lux (1/30sec, F1.2, 50IRE)
S / N Ratio	50dB
Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation - DIP connector type
Lens	
Focus Control	Manual
Lens Type	Manual / DC Auto Iris, P-Iris
Mount Type	C/CS Mount
Operational	
Camera Title	Off / On (Displayed up to 40 characters)
Day & Night	Auto (SW) / Color / B/W / External / Schedule
Backlight Compensation	Off / BLC
Wide Dynamic Range	Off / On (130dB ↑) 1.3M Mode : 30fps
Contrast Enhancement	SSDR (Samsung Super Dynamic Range) (Off / On)
Digital Noise Reduction	SSNR III (2D+3D Noise Filter) (Off / On)
Digital Image Stabilization	Off / On
Defog	Auto/Manual/Off
Motion Detection	Off / On (4ea 4 Points Polygonal zones)
Privacy Masking	Off / On (32ea Rectangular zones)
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)
Digital Zoom	-
Flip / Mirror	Off / On
Intelligent Video Analytics	Tampering, Virtual Line, Enter/Exit, Appear / Disappear, Audio Detection, Face Detection
Alarm I/O	Input 1ea / Output 1ea
Audio In	Selectable (Mic IN/Line IN), Max output level: 1 Vrms Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm
Audio out	Line out (3.5mm stereo mini jack)
Serial Interface	RS-485 - Samsung-T/E, Pelco-D/P, Sungjin
Alarm Triggers	Motion detection, Tampering, Audio Detection, Face Detecton, Video Analytics, Alarm Input, Network Disconnection
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	1280x1024, 1280x720P(HD), 1024x768, 800x600, 640x480, 320x240

Max. Framerate	H.264 : Max 60fps at all resolutions Motion JPEG : 1280x1024 / 1280x720 / 1024x768 : Max. 15 fps 800x600 / 640x480 / 320x240 : Max. 30fps
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 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
ONVIF Conformance	Yes
Memory Slot	SD/SDHC/SDXC - motion Images recorded in the SD/SDHC/SDXC memory card can be downloaded.
Application Programming Interface	ONVIF Profile S HTTP API v2.0 SVNP 1.2
Web Language	English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatia, Hungary, Greek, Finnish, Norwegian
Web Viewer	Supported OS : Windows XP / VISTA / 7 / 8, MAC OS X 10.7 Supported Browser : Microsoft Internet Explorer (Ver. 7~10), Mozilla Firefox (Ver. 9~19), Google Chrome (Ver. 15~25), Apple Safari (Ver. 6.0.2(Mac OS X 10.8, 10.7 Only), 5.1.7)
Central Management Software	SmartViewer 4.0
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
Ingress Protection	-
Electrical	
Input Voltage	AC24V±10%, DC12V±10%,PoE(IEEE802.3af,Class3)
Power Consumption	Max. 12.5W (AC 24V, 50~60Hz) Max. 10.5W (DC 12V) Max. 12.0W (PoE, Class3)
Mechanical	
Color / Material	FRONT (BLACK) , BODY (IVORY) / FRONT(Aluminium), BODY(Plastic)
Dimension (WxHxD)	W73.1 x H66.6 x D147.8
Weight	395g

4.2 Product description

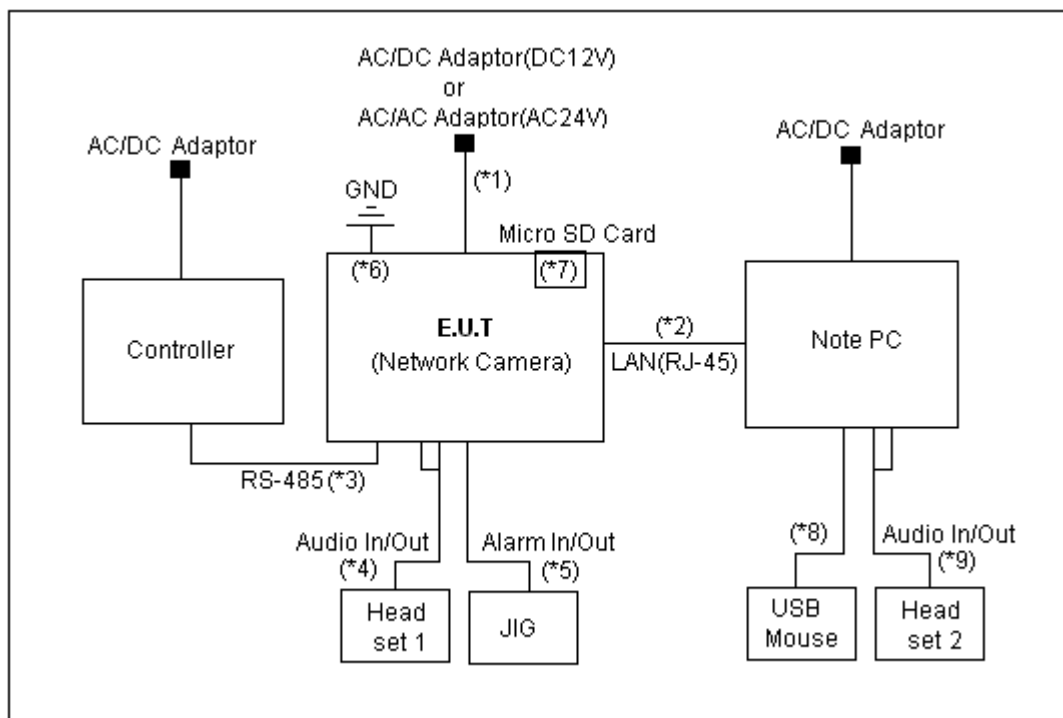
Type of product	Network Camera
Model name (Basic)	SNB-5003N
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	DC 12 V , AC 24 V , PoE
Product rating	DC 12 V , AC 24 V , PoE
Internal clock frequency	Above 108 MHz
Note	* AC/DC adaptor was not provided by the manufacturer. * AC/AC 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	SPARQ M53V	NKW255EL000.B00380	HanSung computer
JIG	-	-	-
Controller	SC-3000	-	CNB
Headset 1	SHS-250V	-	SAMSUNG
Headset 2	SHS-250V	-	SAMSUNG
USB Mouse	1088	8165906050949	Microsoft
Micro SD Card (4GB)	-	-	SanDisk
AC/DC Adaptor (DC 12V)	DAD 12050DKA	-	Dream Electronic
AC/AC Adaptor (AC 24V)	STA-220	-	Dream Electronic
PoE Switch	FS108P	1DL20C3K00541	NETGEAR

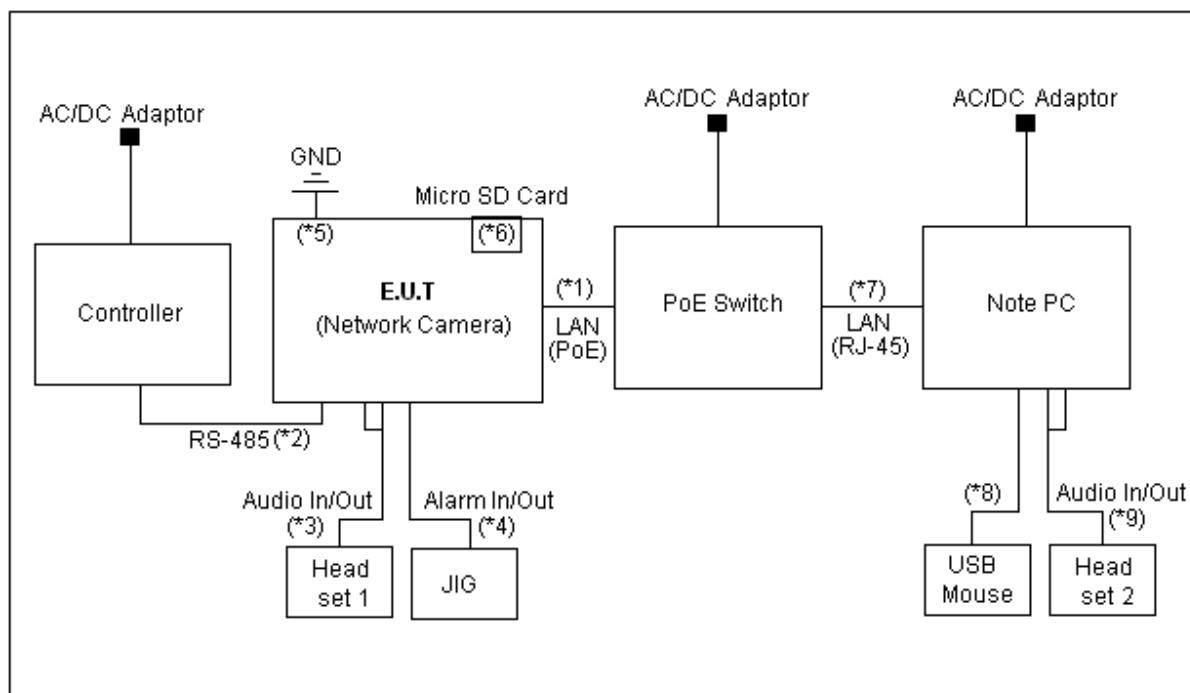
4.4 Test configuration

#1- DC 12V, #2- AC 24V



Note *	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT (Network Camera)	Power	AC/DC Adaptor or AC/AC Adaptor	Power	2.0	Non-Shield
2		LAN(RJ-45)	Note PC	LAN(RJ-45)	3.0	Non-Shield
3		RS-485	Controller	RS-485	3.0	Non-Shield
4		Audio In/Out	Headset 1	Audio In/Out	2.0	Non-Shield
5		Alarm In/Out	JIG	Alarm In/Out	3.0	Non-Shield
6		GND	GND	GND	2.0	-
7		Micro SD Card	Micro SD Card	Micro SD Card	Direct	-
8	Note PC	USB	USB Mouse	USB	1.8	Shield
9		Audio In/Out	Headset 2	Audio In/Out	2.0	Non-Shield

#3- 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		RS-485	Controller	RS-485	3.0	Non-Shield
3		Audio In/Out	Headset 1	Audio In/Out	2.0	Non-Shield
4		Alarm In/Out	JIG	Alarm In/Out	3.0	Non-Shield
5		GND	GND	GND	2.0	-
6		Micro SD Card	Micro SD Card	Micro SD Card	Direct	-
7	Note PC	LAN(RJ-45)	PoE Switch	LAN(RJ-45)	3.0	Non-Shield
8		USB	USB Mouse	USB	1.8	Shield
9		Audio In/Out	Headset 2	Audio In/Out	2.0	Non-Shield

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
1	Camera monitoring test. (Web view)

* Note: 3 types of powers are available for the product, that are DC 12 V, AC 24 V, PoE.

Therefore, tests were performed for 3 different types of powers.

5. Summary of test results

5.1 Summary of EMI emission test results

Applied	Test items	Test method	Result
☒	Conducted Emission	VCCI V-3 / 2012.04, Class A	Complied
☒	Radiated Emission	VCCI V-3 / 2012.04, Class A	Complied

6. Test results

6.1 Conducted Emission

Test specification	VCCI V-3 / 2012.04, Class A		
Testing voltage	DC 12 V, AC 24 V, PoE		
Test facility	Shielded room (CE#2)		
Date	2013. 06. 17		
Temperature (°C)	28 °C	Humidity (% R.H.)	36 % R.H.
Remarks	Complied		

6.1.1 Limits of conducted emission measurement

☐ AC main

Frequency [MHz]	Class A (dB μ V)		Class B (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	79	66	66 ~ 56*	56 ~ 46*
0.5 ~ 5	73	60	56	46
5 ~ 30	73	60	60	50

*The limit decreases linearly with the logarithm of frequency.

☒ Telecommunication

Frequency [MHz]	Class A Voltage Limits (dB(μ V))		Current Limits (dB(μ A))	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15 ~ 0.5	97 to 87	84 to 74	53 to 43	40 to 30
0.5 ~ 30	87	74	43	30
Frequency [MHz]	Class B Limits (dB(μ V))		Current Limits (dB(μ A))	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15 ~ 0.5	84 to 74	74 to 64	40 to 30	30 to 20
0.5 ~ 30	74	64	30	20

* The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz

* The current and voltage disturbance limits are derived for use with an impedance stabilization Network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test (conversion factor is $20 \log_{10} 150/I = 44$ dB).

6.1.2 Measurement procedure

The measurements were performed in a shielded room. EUT was setup as shown in photograph and placed on a non-metallic table height of 0.8 m above the reference ground plane. The rear of table was located 0.4 m to the vertical conducted plane. EUT was power through the LISN, which was bonded to the ground plane. The LISN power was filtered. Each EUT power lead, except ground (safety) lead was individually connected through a LISN to input power source. EUT signal cables that hung closer than 0.4 m to the Horizontal metal ground 0.3 m ~ 0.4 m long. The power cord was bundles in the center. All peripheral equipment was powered from a sub LISN. The LISN and ISN were positioned 0.8 m from the EUT. Peak and Average detection were used in preliminary testing and Quasi-peak and Average detections were used at final measurement. Both lines of power cord, hot and neutral, were measured.

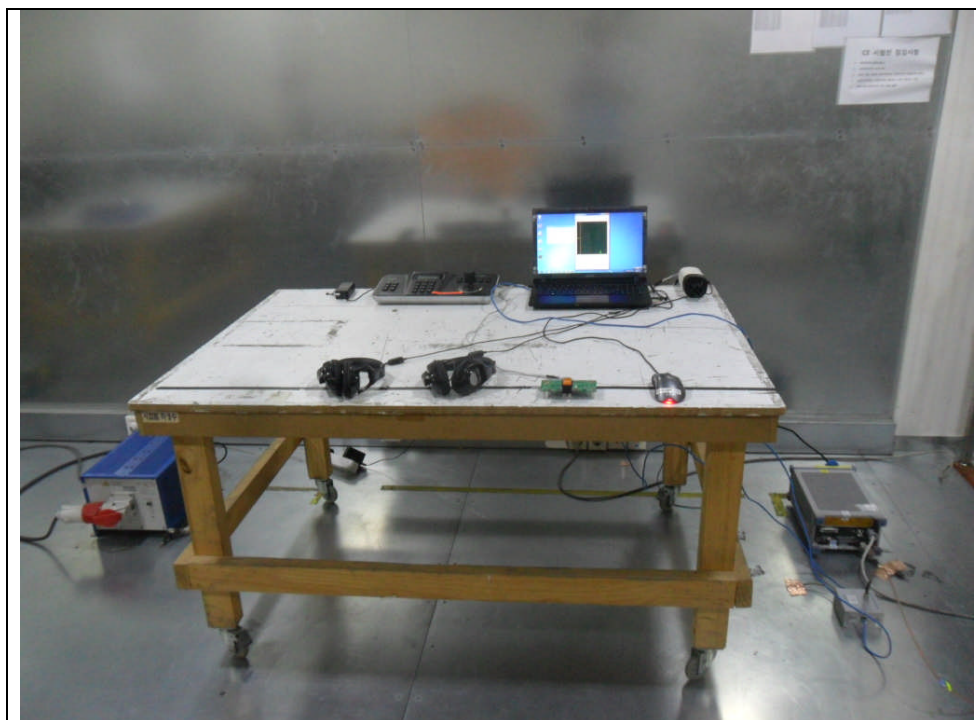
6.1.3 Used equipments

Equipment	Model	Serial No.	Makers	Next Cal. Date	Used
Test Receiver	ESHS30	844827/011	R&S	2013.08.06	☐
Test Receiver	ESCI7	100732	R&S	2014.02.18	☐
Test Receiver	ESCI	100001	R&S	2013.07.10	☐
Test Receiver	ESCI	100710	R&S	2013.11.06	☒
LISN	ENV216	101352	R&S	2014.01.07	☒
LISN	L3-32	0120J20305	PMM	-	☒
8-WIRE ISN	NTFM 8158 CAT5	CAT5-8158-0028	SCHWARZBECK	2014.04.13	☒
8-WIRE ISN	NTFM 8158 CAT3	CAT3-8158-0020	SCHWARZBECK	2014.04.13	☒
ISN	ST08	24342	TESEQ	2014.06.21	☐
ISN	ENY81	101545	R&S	2013.08.29	☐

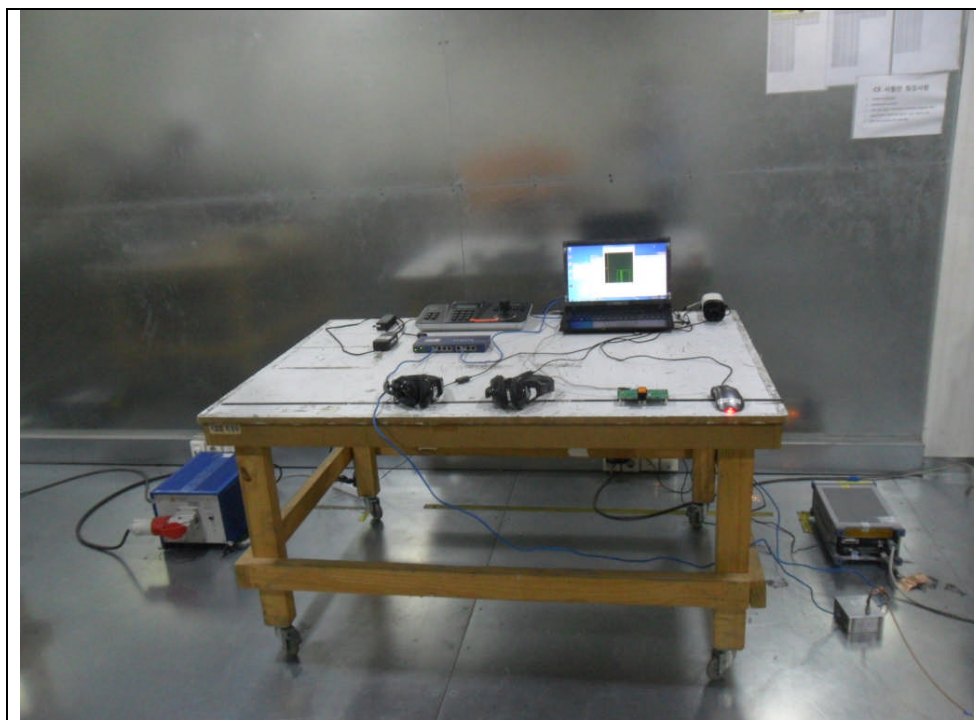
6.1.4 Photographs of test setup

* Telecommunication

#1- DC 12V, #2- AC 24V



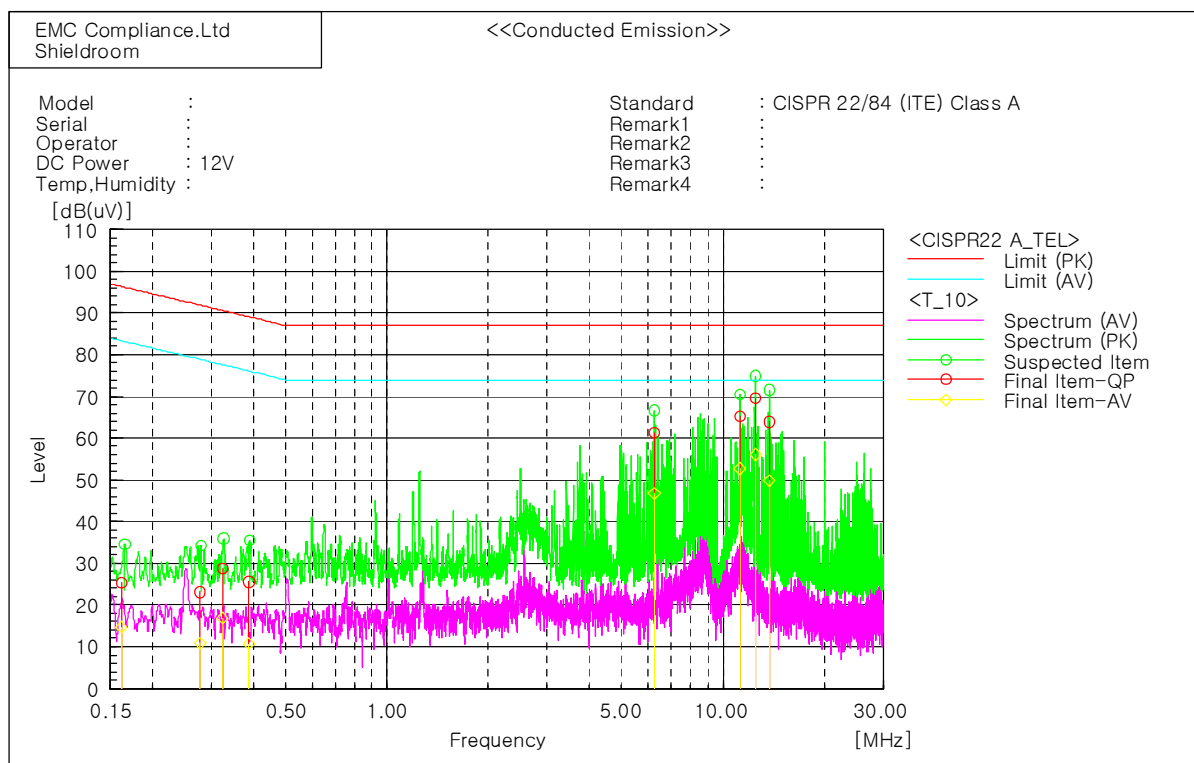
#3-PoE



6.1.5 Conducted emission measurement result

* Telecommunication port

#1- DC 12V _ LAN Port (LCL 55 dB)_10 Mbps (SNB-5003N)

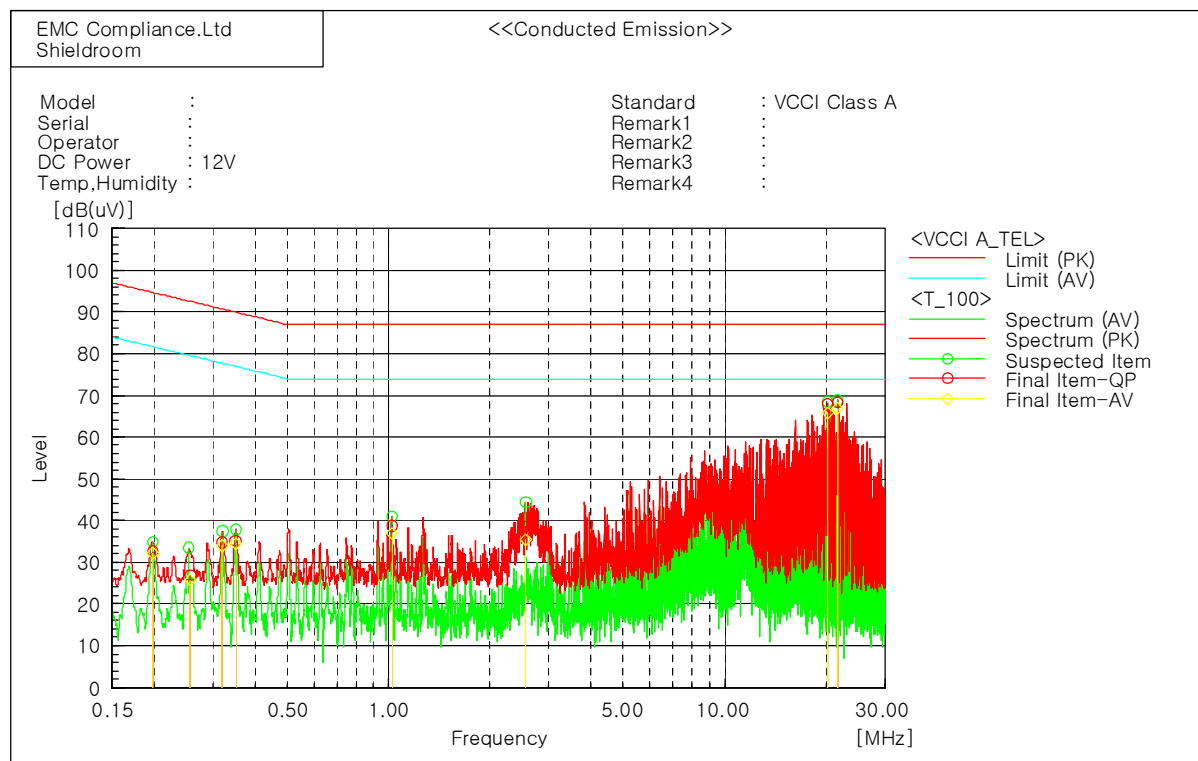


Final Result

--- ISN-CAT3 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.16198	14.8	4.2	10.5	25.3	14.7	96.4	83.4	71.1	68.7
2	0.27814	12.9	0.7	10.2	23.1	10.9	91.9	78.9	68.8	68.0
3	0.32404	18.7	6.8	10.1	28.8	16.9	90.6	77.6	61.8	60.7
4	0.38848	15.4	0.6	10.1	25.5	10.7	89.1	76.1	63.6	65.4
5	6.24986	51.6	37.1	9.7	61.3	46.8	87.0	74.0	25.7	27.2
6	11.24967	55.6	43.1	9.6	65.2	52.7	87.0	74.0	21.8	21.3
7	12.50029	60.1	46.4	9.6	69.7	56.0	87.0	74.0	17.3	18.0
8	13.75019	54.3	40.2	9.6	63.9	49.8	87.0	74.0	23.1	24.2

#1- DC 12V _ LAN Port (LCL 65 dB)_100 Mbps(SNB-5003N)

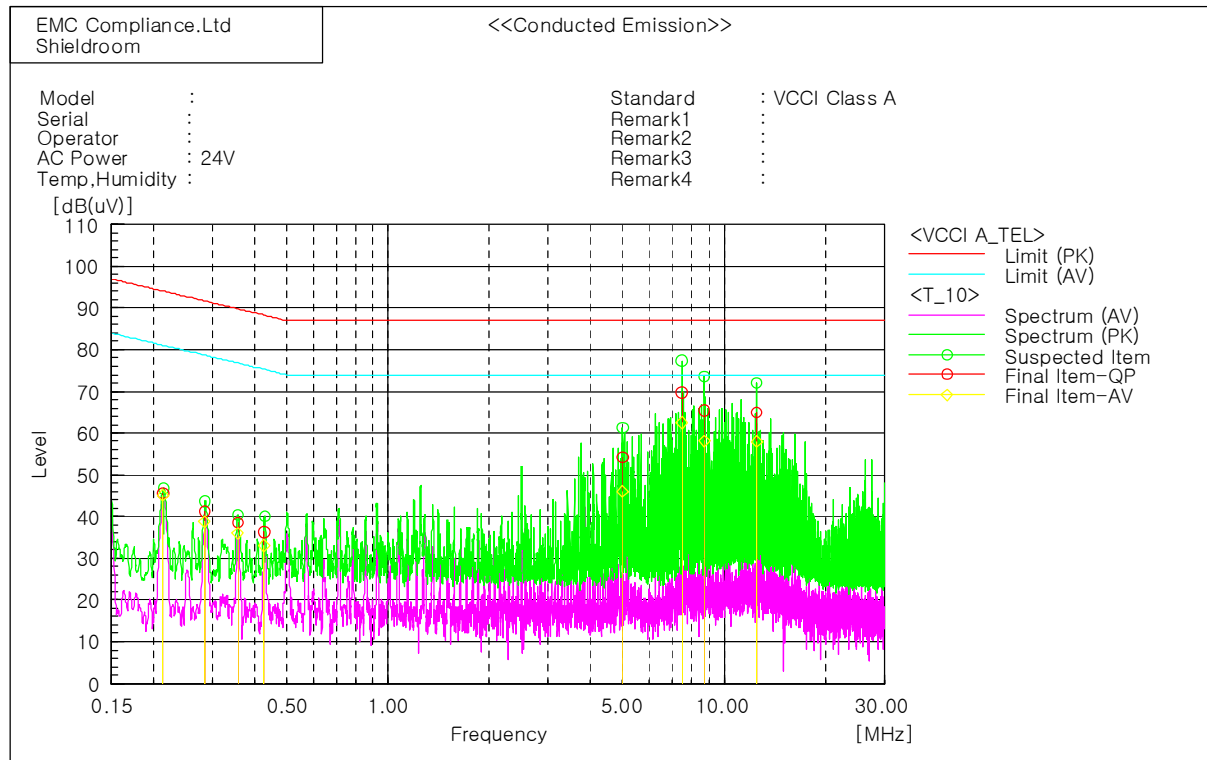


Final Result

--- ISN-CAT5 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.19855	22.3	22.0	10.2	32.5	32.2	94.7	81.7	62.2	49.5
2	0.25693	16.8	15.7	10.1	26.9	25.8	92.5	79.5	65.6	53.7
3	0.31976	24.6	23.8	10.1	34.7	33.9	90.7	77.7	56.0	43.8
4	0.35047	25.1	24.5	10.0	35.1	34.5	90.0	77.0	54.9	42.5
5	1.02278	28.9	27.1	9.9	38.8	37.0	87.0	74.0	48.2	37.0
6	2.56278	28.9	25.6	9.8	38.7	35.4	87.0	74.0	48.3	38.6
7	20.25841	58.2	56.0	9.7	67.9	65.7	87.0	74.0	19.1	8.3
8	21.66318	58.6	57.2	9.7	68.3	66.9	87.0	74.0	18.7	7.1

#2- AC 24V _ LAN Port (LCL 55 dB)_10 Mbps(SNB-5003N)

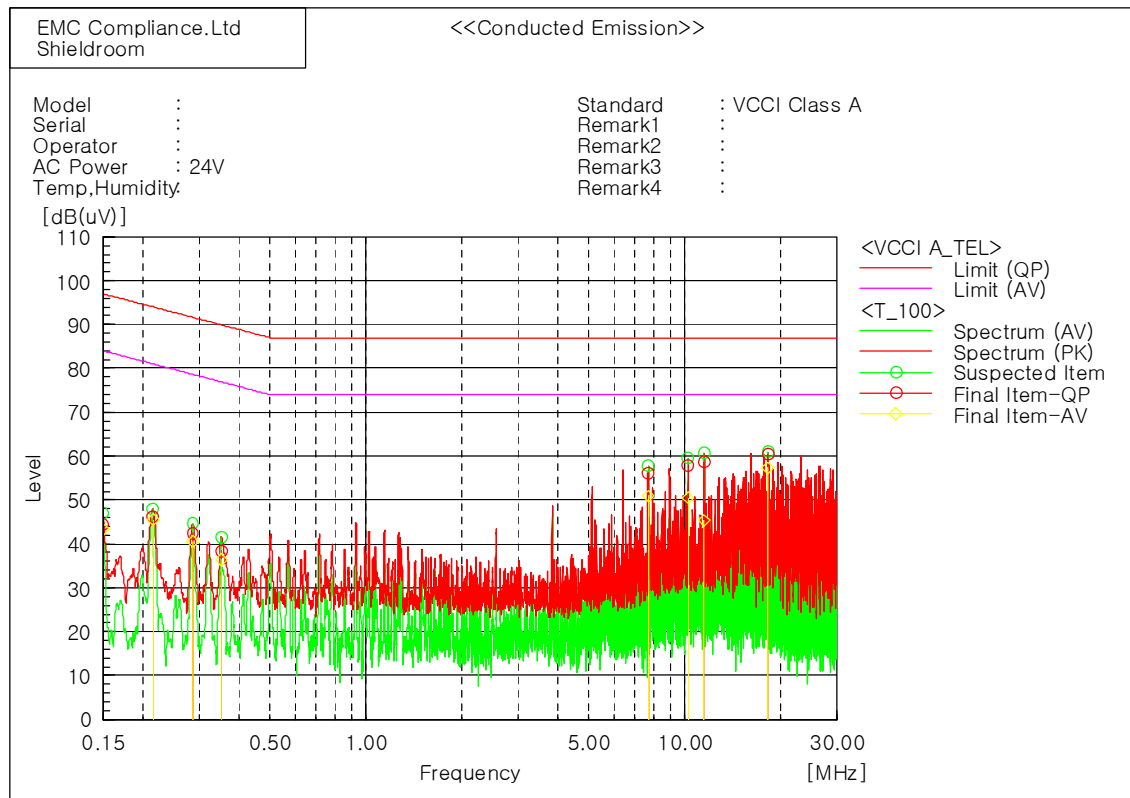


Final Result

--- ISN-CAT3 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.2142	35.2	34.7	10.3	45.5	45.0	94.0	81.0	48.5	36.0
2	0.28463	30.9	28.5	10.2	41.1	38.7	91.7	78.7	50.6	40.0
3	0.35765	28.4	26.0	10.1	38.5	36.1	89.8	76.8	51.3	40.7
4	0.42826	26.2	22.9	10.1	36.3	33.0	88.3	75.3	52.0	42.3
5	4.99953	44.5	36.3	9.7	54.2	46.0	87.0	74.0	32.8	28.0
6	7.49992	60.1	52.8	9.7	69.8	62.5	87.0	74.0	17.2	11.5
7	8.74997	55.7	48.5	9.7	65.4	58.2	87.0	74.0	21.6	15.8
8	12.50006	55.3	48.3	9.6	64.9	57.9	87.0	74.0	22.1	16.1

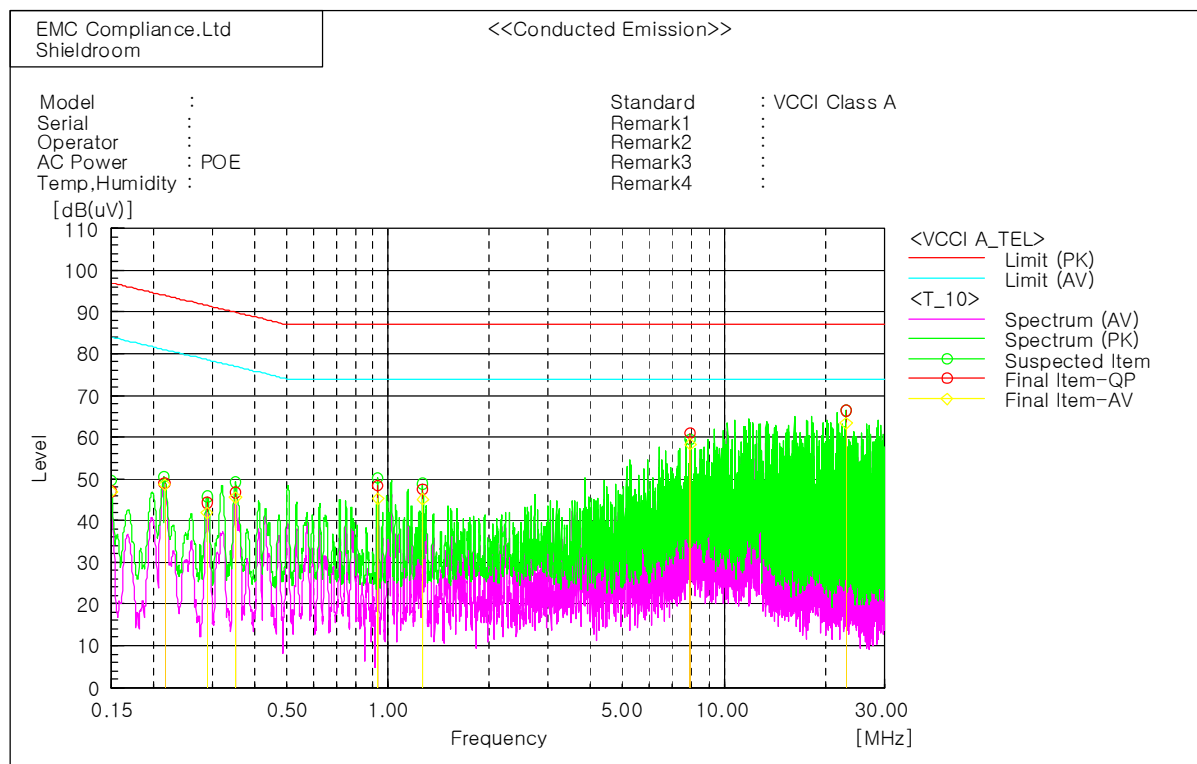
#2- AC 24V _ LAN Port (LCL 65 dB)_100 Mbps(SNB-5003N)



Final Result

--- No Title2 Phase ---									
No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	QP
1	0.15003	34.1	33.0	10.3	44.4	43.3	97.0	84.0	52.6
2	0.21502	36.0	35.3	10.2	46.2	45.5	94.0	81.0	47.8
3	0.28658	32.4	30.5	10.1	42.5	40.6	91.6	78.6	49.1
4	0.35252	28.3	26.4	10.0	38.3	36.4	89.9	76.9	51.6
5	7.69492	46.5	41.2	9.7	56.2	50.9	87.0	74.0	30.8
6	10.25543	48.2	40.7	9.7	57.9	50.4	87.0	74.0	29.1
7	11.52507	49.0	35.6	9.7	58.7	45.3	87.0	74.0	28.3
8	18.24318	50.6	47.6	9.7	60.3	57.3	87.0	74.0	26.7
									CAV
									[dB]

#3- PoE _ LAN Port (LCL 55 dB)_10 Mbps(SNB-5003N)

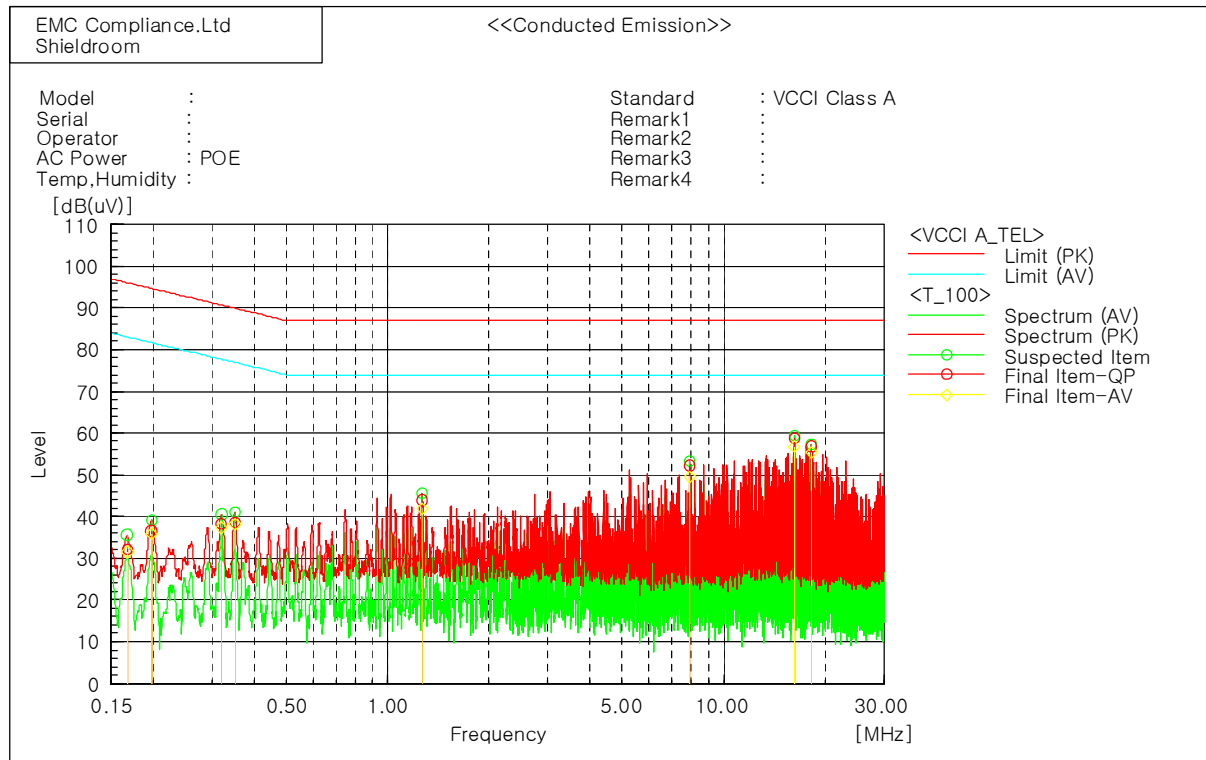


Final Result

--- ISN-CAT3 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.15006	36.5	36.4	10.5	47.0	46.9	97.0	84.0	50.0	37.1
2	0.21645	38.6	38.2	10.3	48.9	48.5	94.0	81.0	45.1	32.5
3	0.28977	34.0	31.5	10.2	44.2	41.7	91.5	78.5	47.3	36.8
4	0.35102	36.6	35.4	10.1	46.7	45.5	89.9	76.9	43.2	31.4
5	0.93164	38.4	35.3	9.9	48.3	45.2	87.0	74.0	38.7	28.8
6	1.26682	37.6	35.2	9.9	47.5	45.1	87.0	74.0	39.5	28.9
7	7.92336	51.3	48.6	9.7	61.0	58.3	87.0	74.0	26.0	15.7
8	23.1285	56.7	53.8	9.6	66.3	63.4	87.0	74.0	20.7	10.6

#3- PoE _ LAN Port (LCL 65 dB)_100 Mbps(SNB-5003N)



Final Result

--- ISN-CAT5 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.16835	21.7	21.2	10.3	32.0	31.5	96.0	83.0	64.0	51.5
2	0.19805	26.3	25.7	10.2	36.5	35.9	94.7	81.7	58.2	45.8
3	0.32004	28.2	27.3	10.1	38.3	37.4	90.7	77.7	52.4	40.3
4	0.35121	28.6	28.2	10.0	38.6	38.2	89.9	76.9	51.3	38.7
5	1.2673	34.1	32.0	9.8	43.9	41.8	87.0	74.0	43.1	32.2
6	7.92295	42.5	39.8	9.7	52.2	49.5	87.0	74.0	34.8	24.5
7	16.22827	49.1	47.1	9.7	58.8	56.8	87.0	74.0	28.2	17.2
8	18.24311	47.0	45.7	9.7	56.7	55.4	87.0	74.0	30.3	18.6

6.2 Radiated Emission

Test specification	VCCI V-3 / 2012.04, Class A		
Testing voltage	DC 12 V, AC 24 V, PoE		
Test facility	10 m Chamber (#F2)		
Test distance	10 m, 3 m		
Date	2013. 06. 17		
Temperature (°C)	26 °C	Humidity (% R.H.)	39 % R.H.
Remarks	Complied		

6.2.1 Limits of radiated emission measurement

☒ Limits below 1 GHz

Frequency [MHz]	Class A (dB(μV/m)) @10 m	Class B (dB(μV/m)) @10 m
30 ~ 230	40	30
230 ~ 1000	47	37

☒ Limits above 1 GHz

Frequency [GHz]	Class A @ 3 m		Class B @ 3 m	
	Average limit (dB(μV/m))	Peak limit (dB(μV/m))	Average limit (dB(μV/m))	Peak limit (dB(μV/m))
1 ~ 3	56	76	50	70
3 ~ 6	60	80	54	74

Note - The lower limit applies at the transition frequency.

6.2.2 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.

6.2.3 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
Test Receiver	ESCI7	100732	R&S	2014.02.18	☒
Test Receiver	ESCI	100001	R&S	2013.07.10	☐
Test Receiver	ESCI	100710	R&S	2013.11.06	☐
Bi-Log Antenna	VULB 9168	440	SCHWARZBECK	2013.10.04	☒
Amplifier	310N	293004	SONOMA INSTRUMENT	2013.11.06	☒
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	2013.11.06	☒
Horn ANT	3115	00086706	ETS	2013.11.21	☒
Spectrum Analyzer	FSP7	100289	R&S	2013.12.14	☐

6.2.4 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

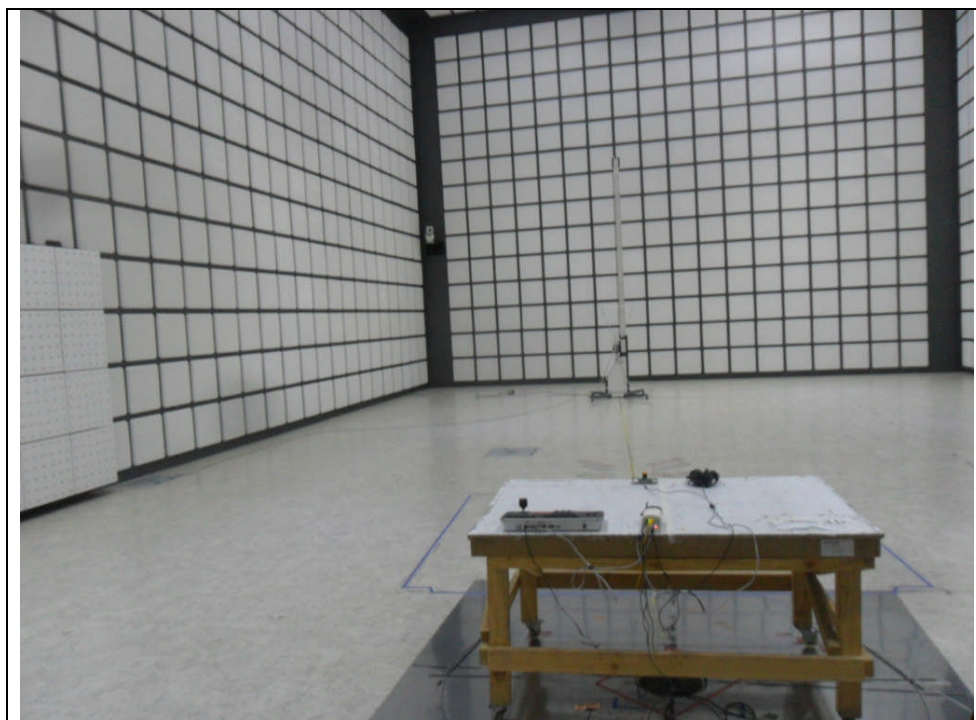
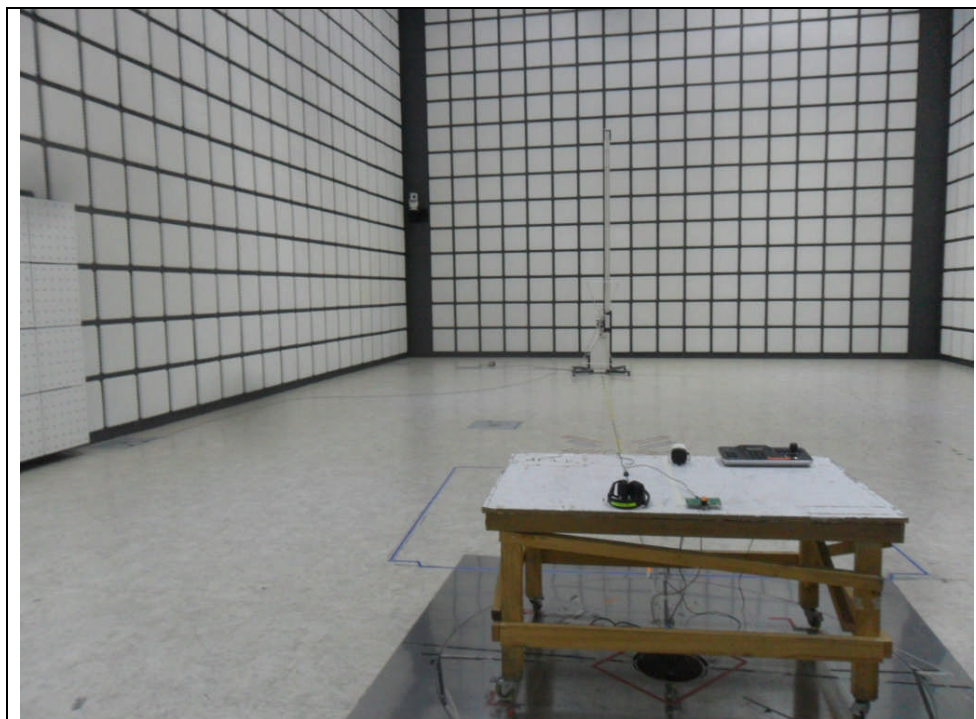
If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

The result is

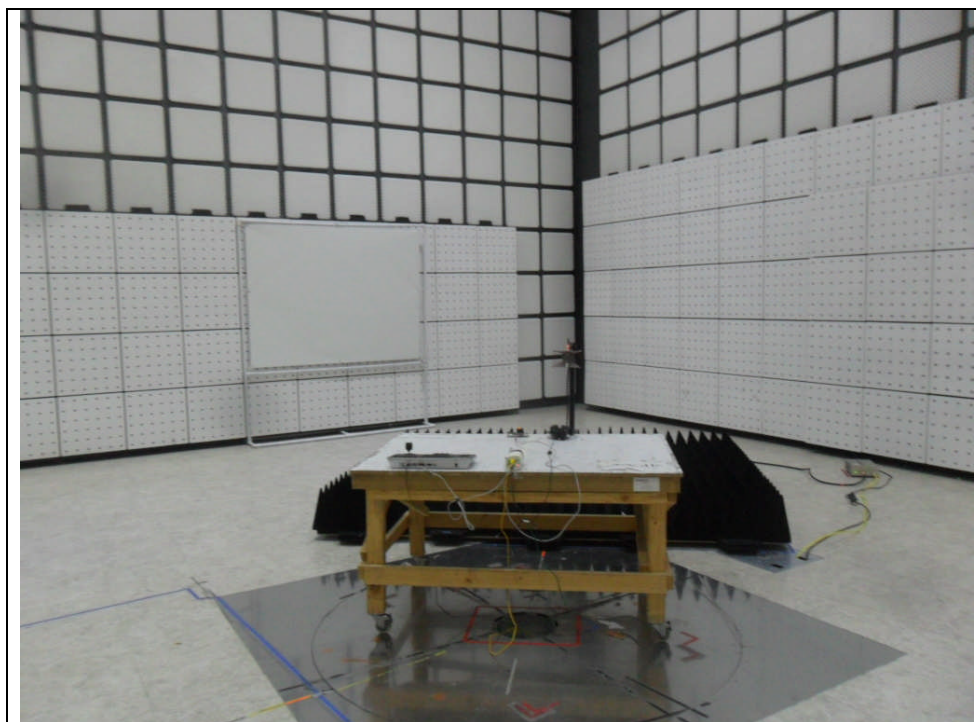
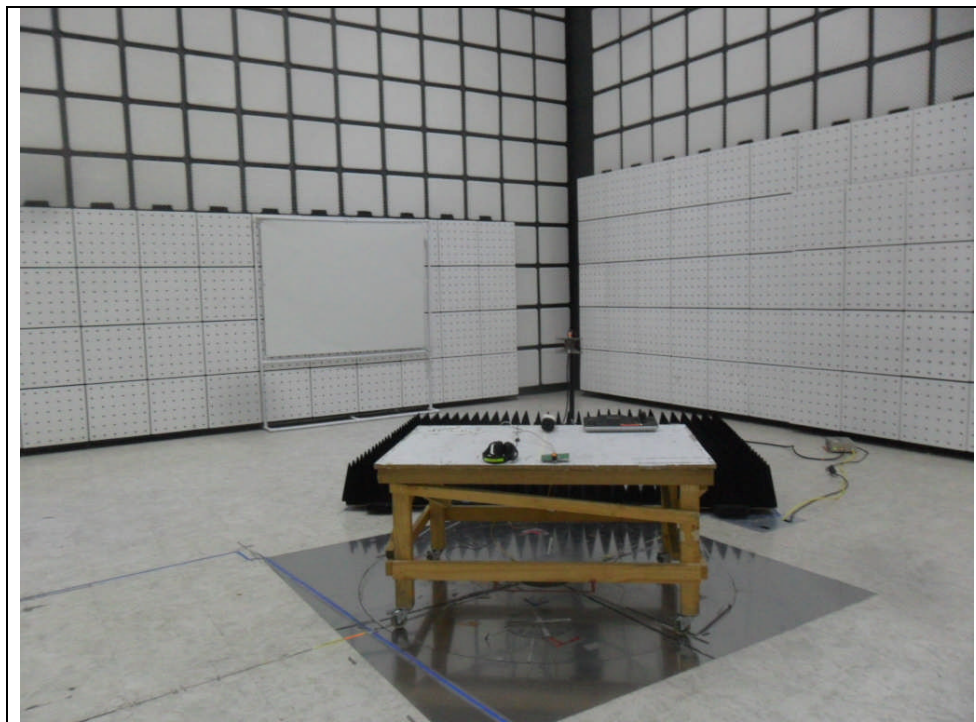
$$30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$$

6.2.5 Photographs of test setup

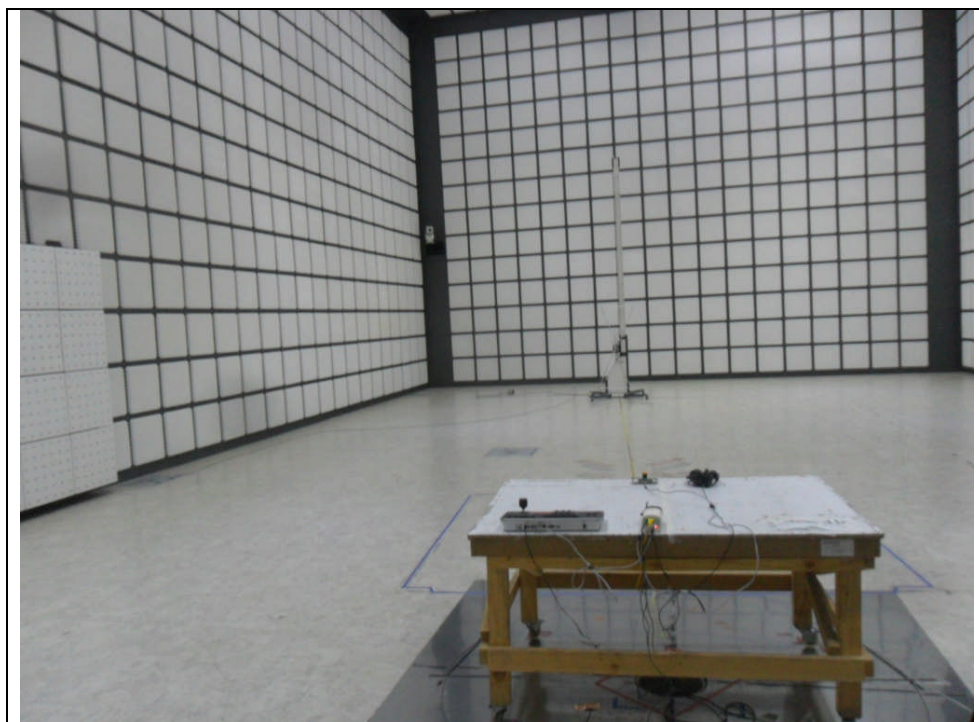
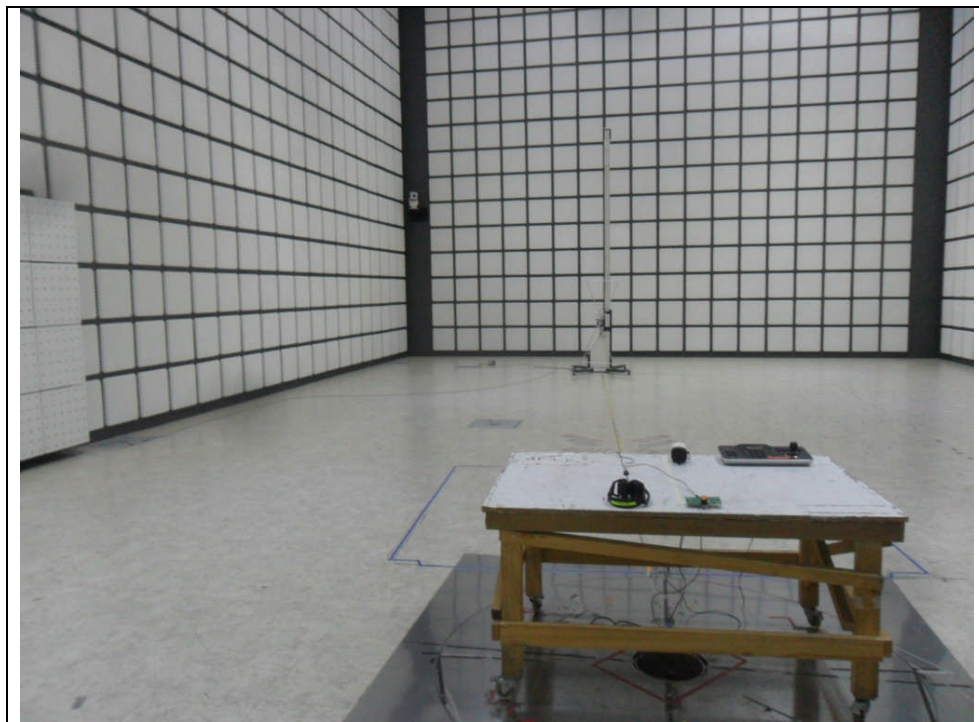
* 30 MHz ~ 1 GHz (#1- DC 12V, #2- AC 24V)



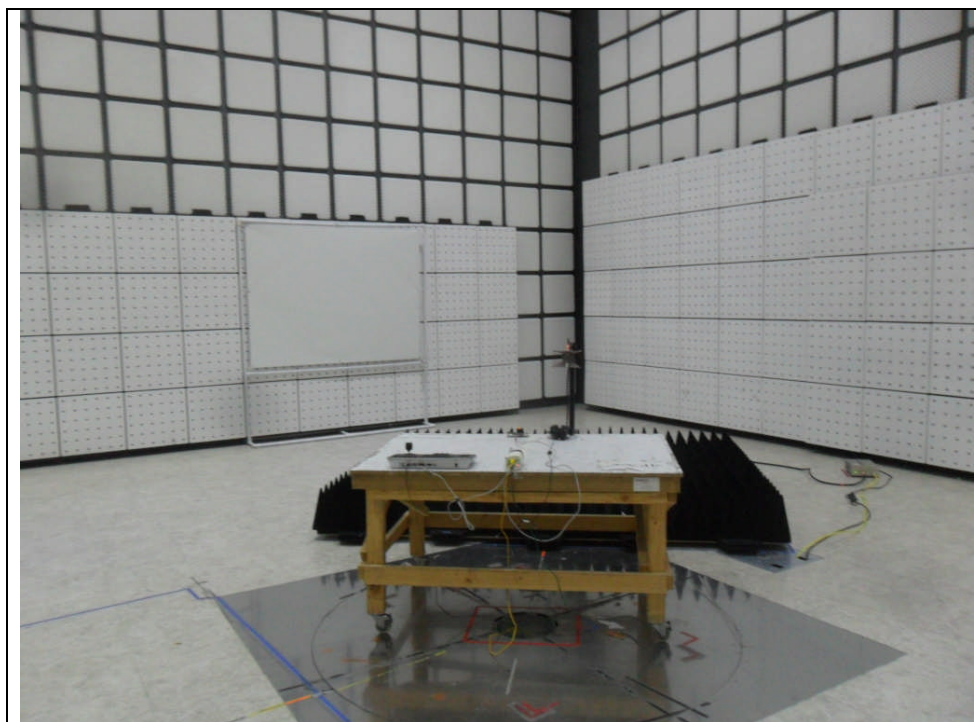
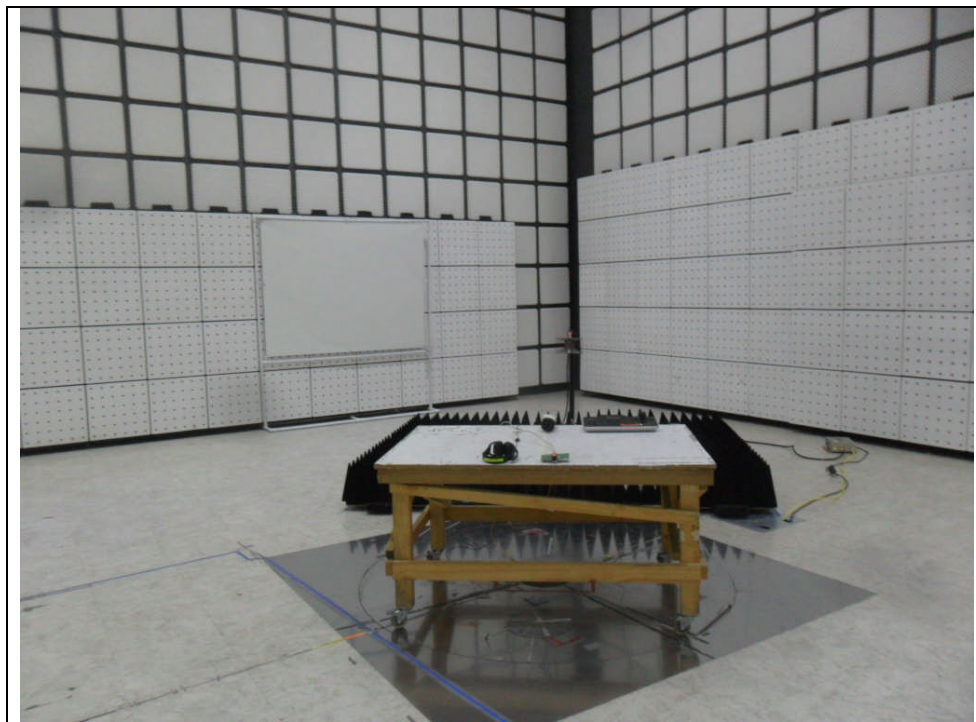
* 1 GHz ~ 6 GHz (#1- DC 12V, #2- AC 24V)



* 30 MHz ~ 1 GHz (#3-PoE)



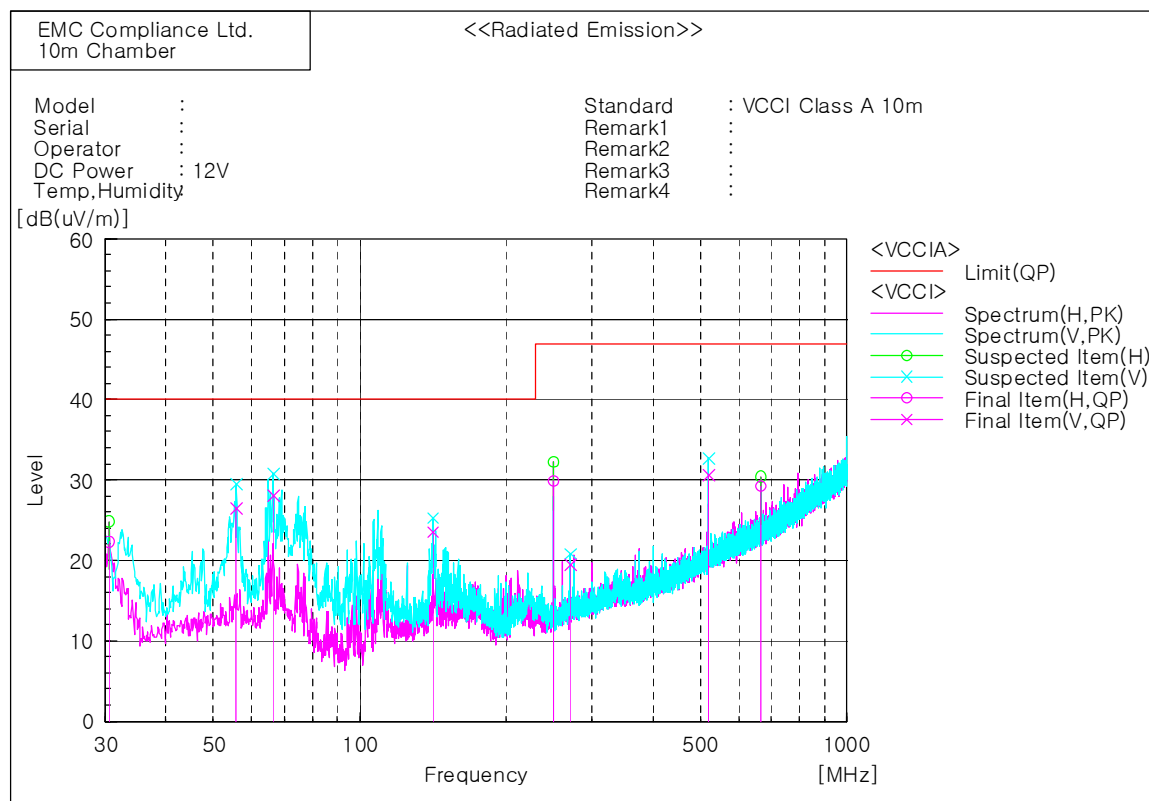
* 1 GHz ~ 6 GHz (#3-PoE)



6.2.6 Radiated emission measurement result

* Graph and Data

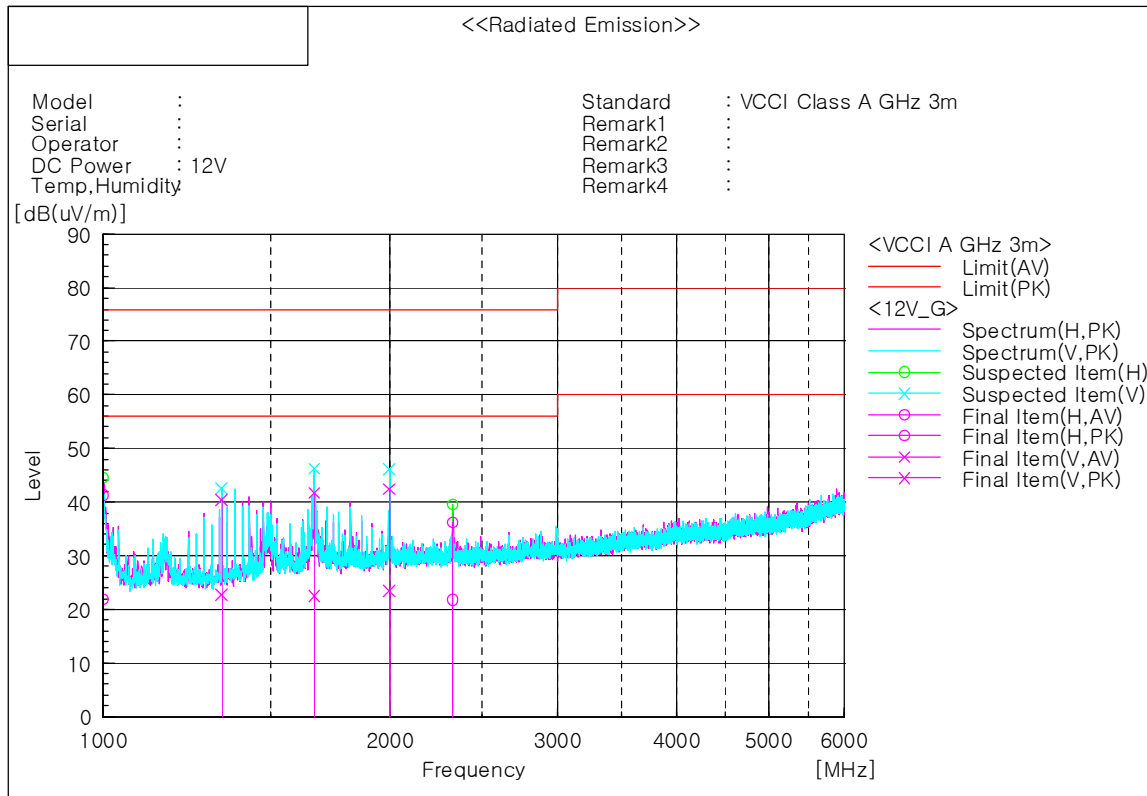
* 30 MHz ~ 1 GHz (#1- DC 12V)_SNB-5003N



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	30.485	H	37.5	-15.2	22.3	40.0	17.7	400.0	308.8	
2	55.826	V	39.8	-13.3	26.5	40.0	13.5	100.0	247.4	
3	66.254	V	42.3	-14.2	28.1	40.0	11.9	100.0	126.0	
4	141.186	V	36.4	-12.9	23.5	40.0	16.5	100.0	296.9	
5	249.947	H	42.4	-12.5	29.9	47.0	17.1	400.0	152.8	
6	270.318	V	31.0	-11.5	19.5	47.0	27.5	100.0	40.6	
7	519.729	V	34.5	-3.9	30.6	47.0	16.4	100.0	192.0	
8	666.078	H	30.0	-0.8	29.2	47.0	17.8	400.0	214.3	

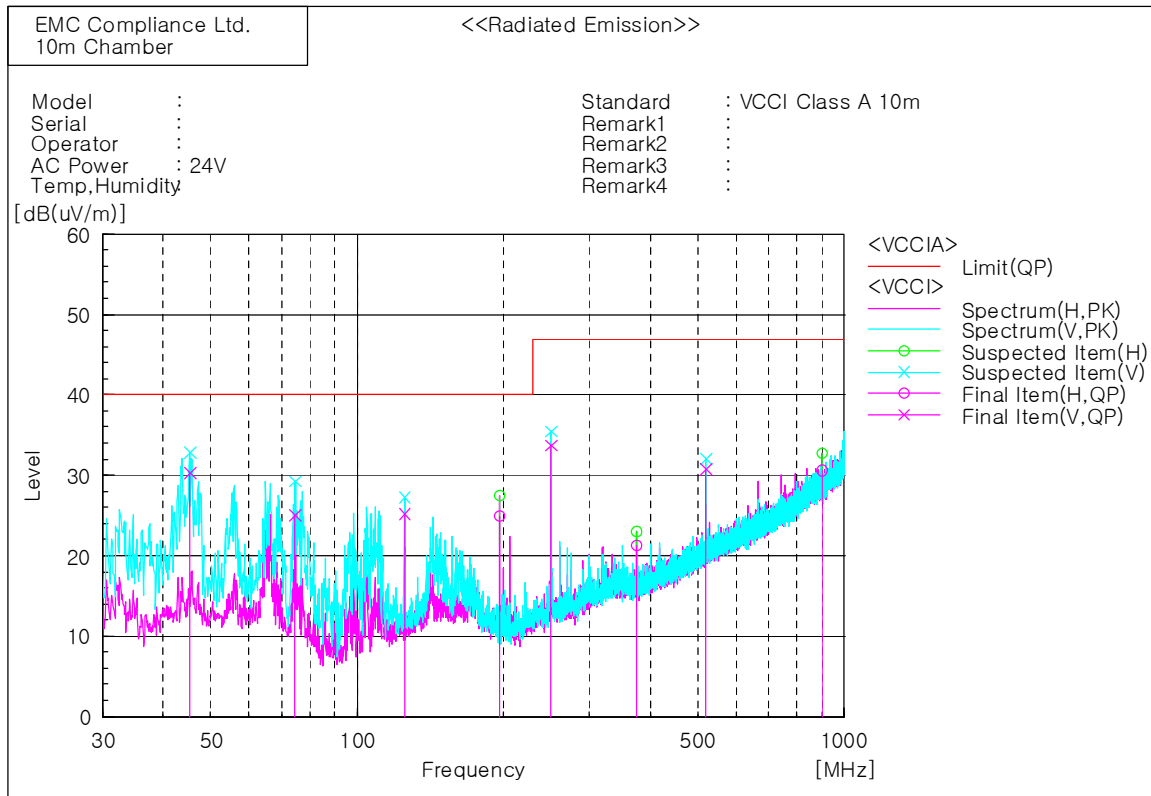
* 1 GHz ~ 6 GHz (#1- DC 12V) _ SNB-5003N



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	1000.634	H	28.9	48.3	-7.0	21.9	41.3	56.0	76.0	34.1	34.7	100.0	178.0	
2	1331.884	V	28.5	46.2	-5.7	22.8	40.5	56.0	76.0	33.2	35.5	100.0	315.7	
3	1666.046	V	26.0	45.2	-3.4	22.6	41.8	56.0	76.0	33.4	34.2	100.0	49.9	
4	1998.148	V	25.0	44.1	-1.6	23.4	42.5	56.0	76.0	32.6	33.5	100.0	87.4	
5	2330.633	H	22.6	37.0	-0.8	21.8	36.2	56.0	76.0	34.2	39.8	100.0	296.4	

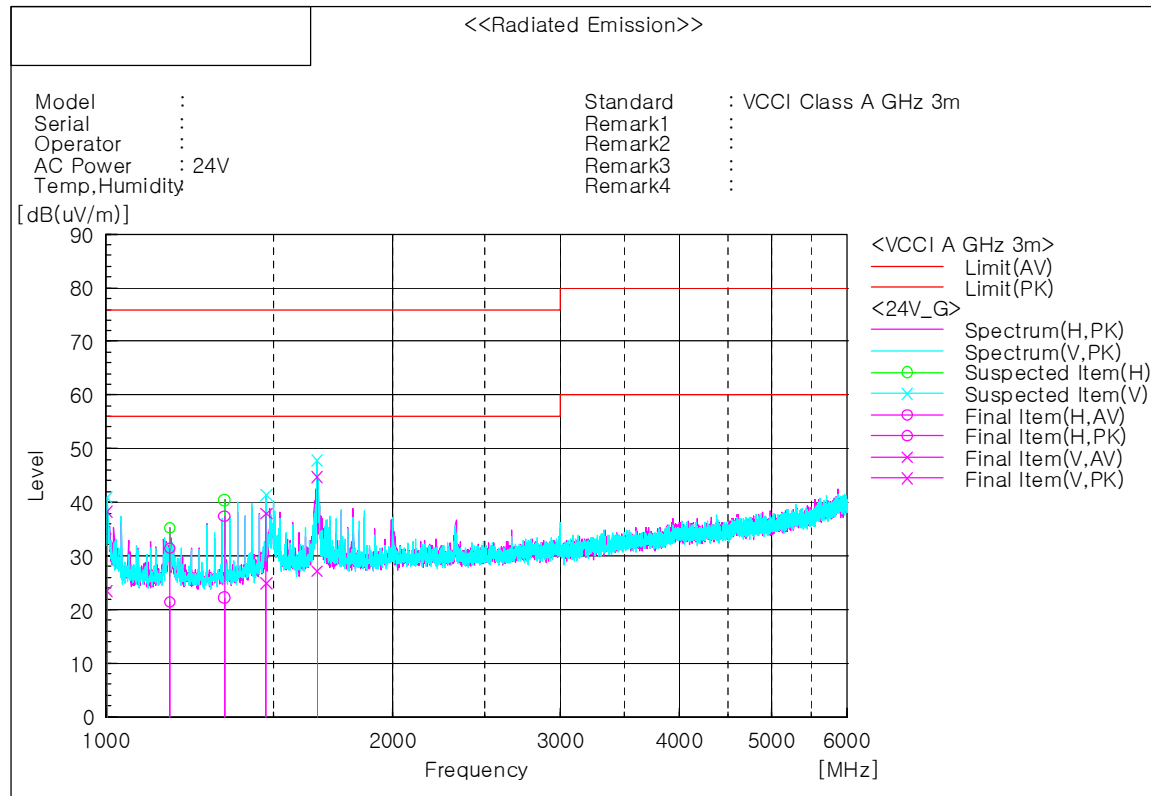
* 30 MHz ~ 1 GHz (#2- AC 24V) _ SNB-5003N



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	45.278	V	43.7	-13.4	30.3	40.0	9.7	100.0	178.0	
2	74.499	V	40.7	-15.7	25.0	40.0	15.0	100.0	266.4	
3	124.939	V	39.4	-14.2	25.2	40.0	14.8	100.0	38.7	
4	196.234	H	39.6	-14.7	24.9	40.0	15.1	400.0	31.4	
5	249.947	V	46.2	-12.5	33.7	47.0	13.3	100.0	65.6	
6	374.956	H	29.4	-8.1	21.3	47.0	25.7	400.0	10.5	
7	519.729	V	34.7	-3.9	30.8	47.0	16.2	100.0	178.0	
8	901.424	H	26.4	4.2	30.6	47.0	16.4	400.0	298.4	

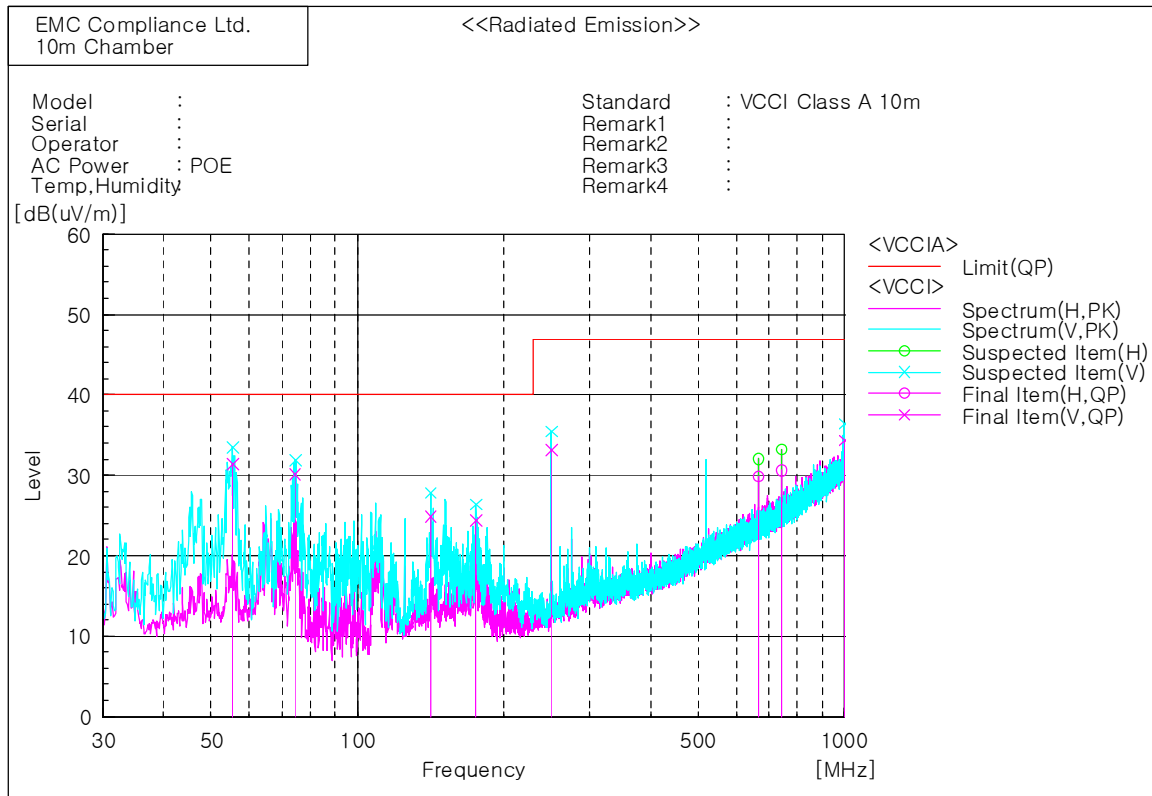
* 1 GHz ~ 6 GHz (#2- AC 24V) _ SNB-5003N



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	1002.531	V	30.4	45.3	-7.0	23.4	38.3	56.0	76.0	32.6	37.7	100.0	35.4	
2	1167.551	H	28.5	38.5	-7.1	21.4	31.4	56.0	76.0	34.6	44.6	100.0	323.9	
3	1331.875	H	27.9	43.1	-5.7	22.2	37.4	56.0	76.0	33.8	38.6	100.0	344.0	
4	1474.375	V	29.2	42.3	-4.4	24.8	37.9	56.0	76.0	31.2	38.1	100.0	300.5	
5	1665.046	V	30.6	48.1	-3.4	27.2	44.7	56.0	76.0	28.8	31.3	100.0	72.8	

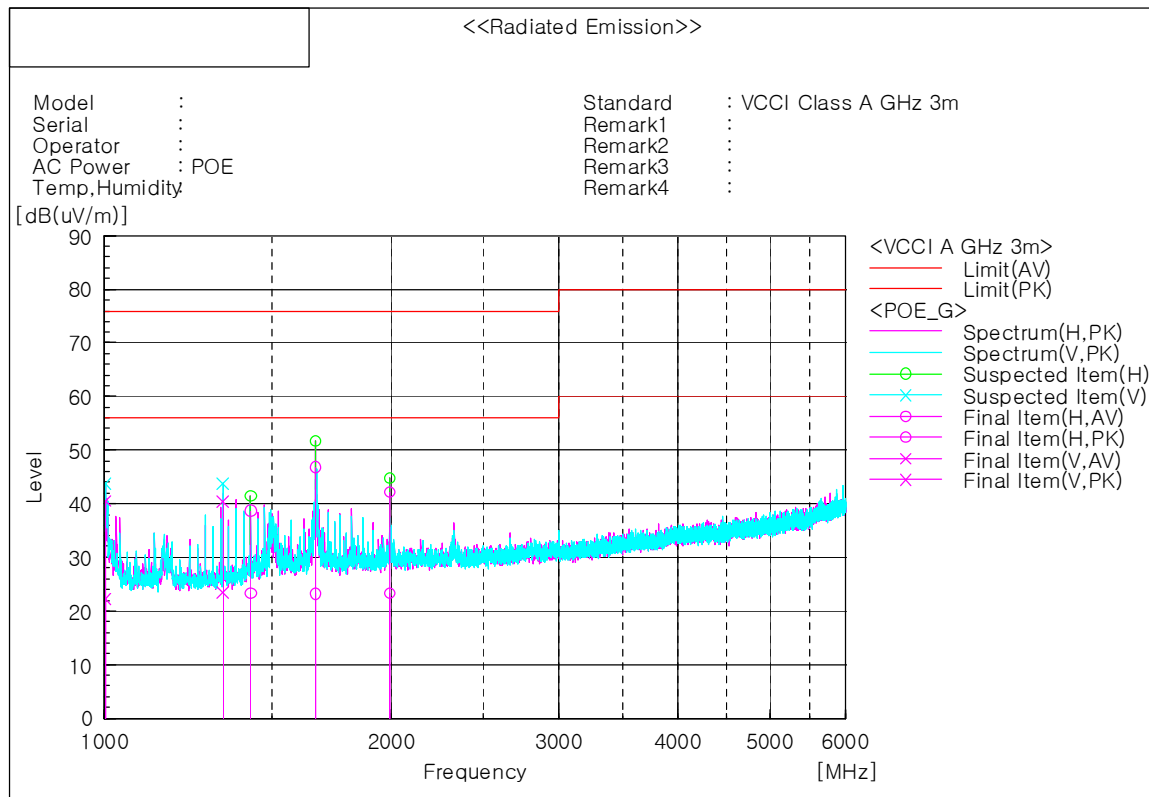
* 30 MHz ~ 1 GHz (#3- PoE) _ SNB-5003N



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	55.341	V	44.7	-13.3	31.4	40.0	8.6	100.0	12.3	
2	74.414	V	45.7	-15.6	30.1	40.0	9.9	100.0	292.7	
3	141.149	V	37.8	-12.9	24.9	40.0	15.1	100.0	310.8	
4	175.379	V	37.3	-12.9	24.4	40.0	15.6	100.0	12.3	
5	249.954	V	45.7	-12.5	33.2	47.0	13.8	100.0	223.7	
6	666.084	H	30.6	-0.8	29.8	47.0	17.2	400.0	253.4	
7	744.049	H	29.8	0.8	30.6	47.0	16.4	400.0	247.4	
8	999.037	V	28.1	6.3	34.4	47.0	12.6	100.0	104.9	

* 1 GHz ~ 6 GHz (#3- PoE) _ SNB-5003N

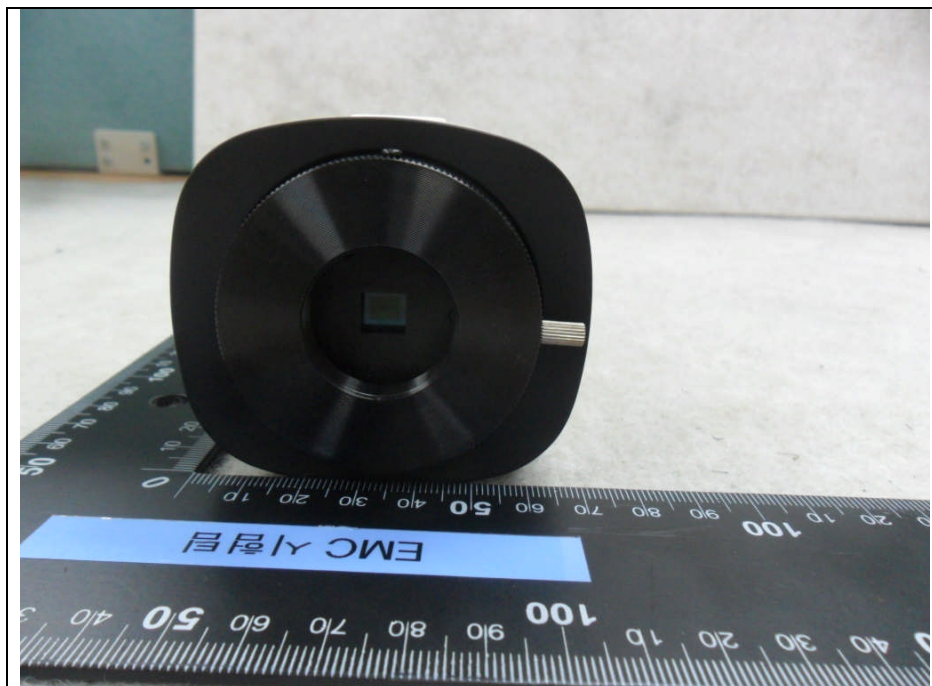


Final Result

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	1002.545	V	29.3	47.6	-7.0	22.3	40.6	56.0	76.0	33.7	35.4	100.0	96.0	
2	1331.847	V	29.1	46.2	-5.7	23.4	40.5	56.0	76.0	32.6	35.5	100.0	314.1	
3	1425.625	H	28.2	43.6	-4.9	23.3	38.7	56.0	76.0	32.7	37.3	100.0	117.3	
4	1665.046	H	26.6	50.2	-3.4	23.2	46.8	56.0	76.0	32.8	29.2	100.0	58.7	
5	1992.567	H	24.9	43.8	-1.6	23.3	42.2	56.0	76.0	32.7	33.8	100.0	130.8	

7. E.U.T. photographs

Front View



Rear View



Left View



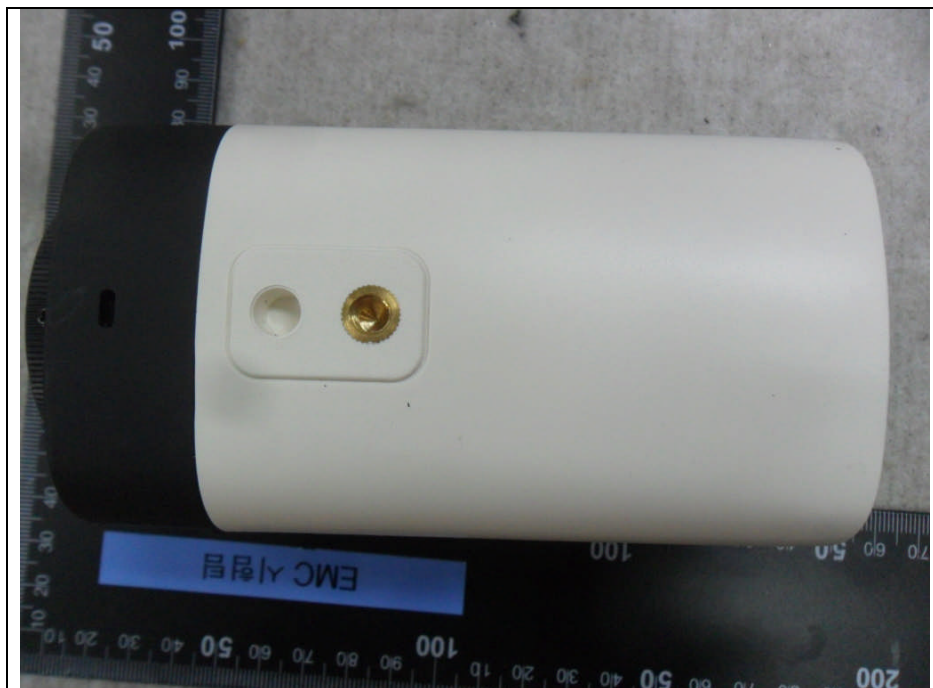
Right View



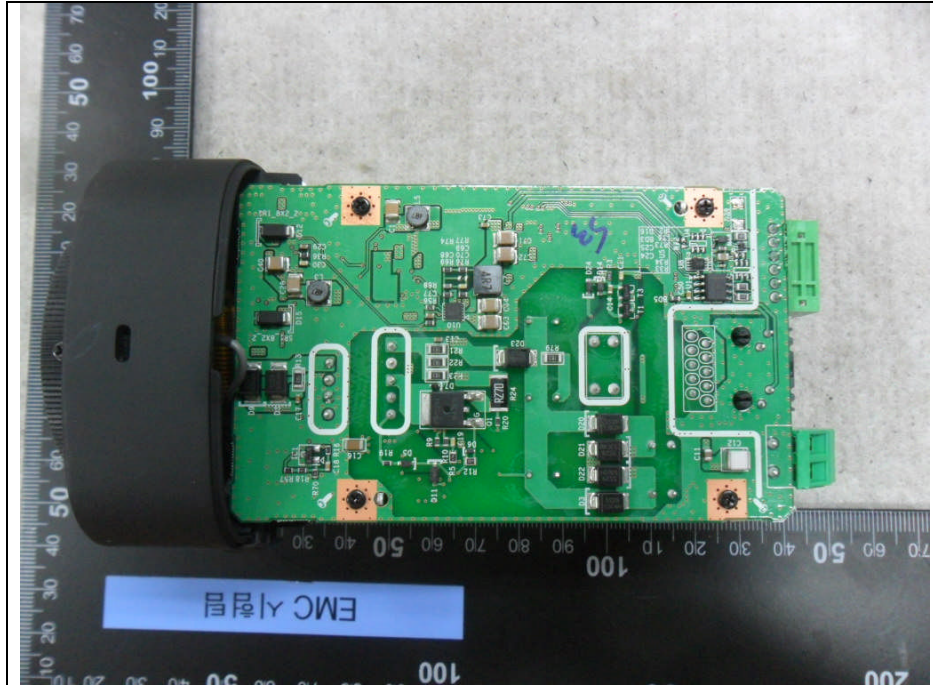
Top View



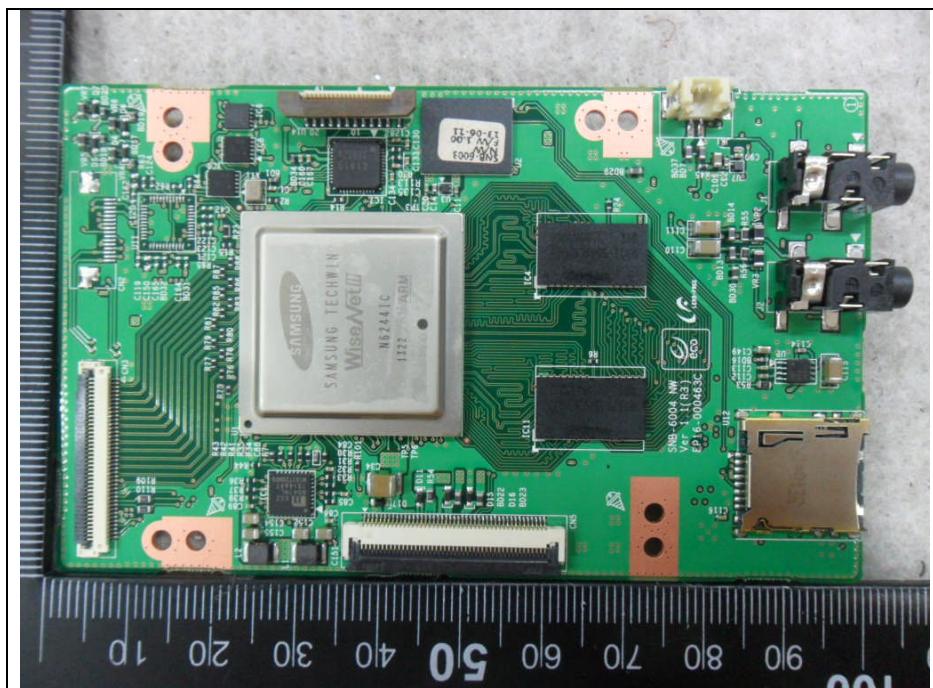
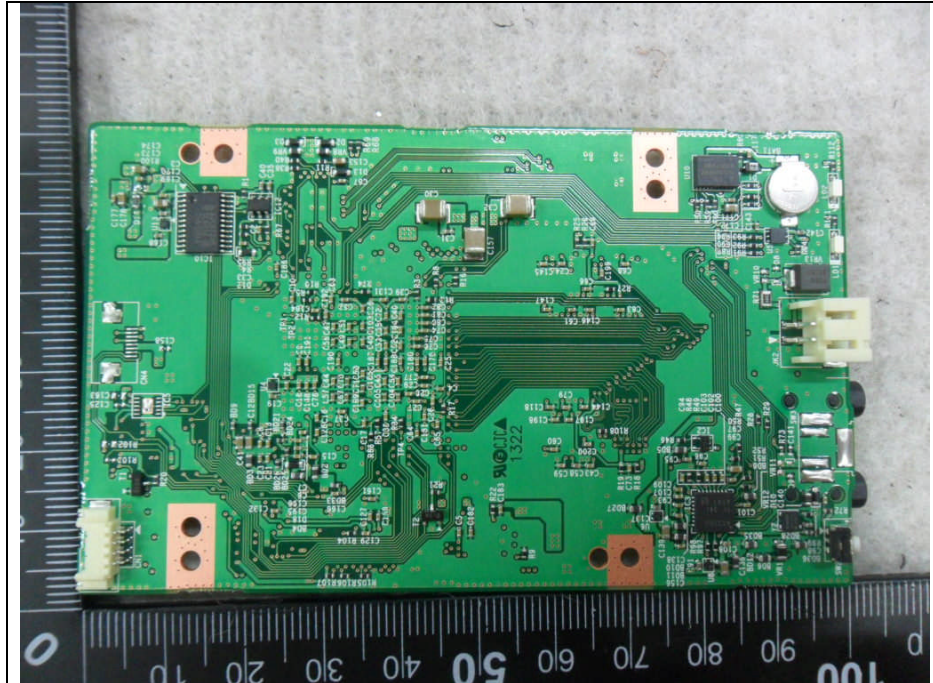
Bottom View



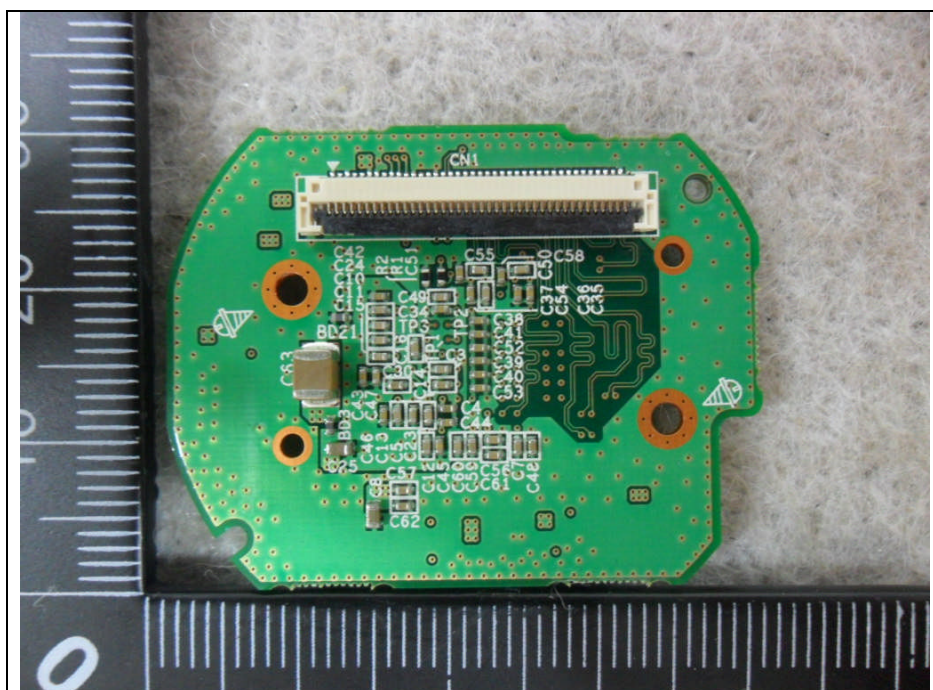
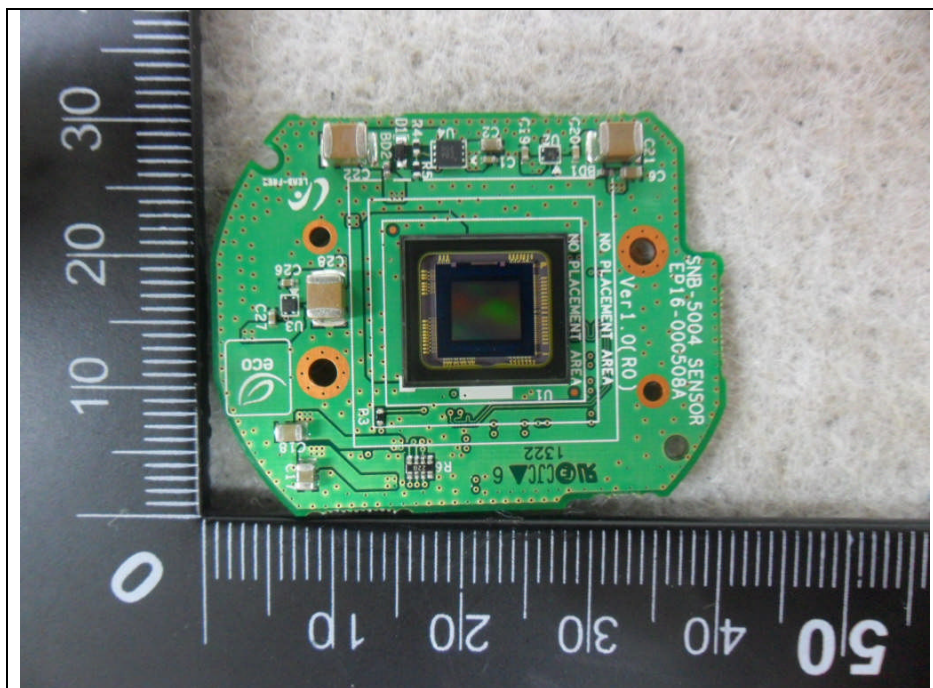
Inside



Main Board



CCD Board



Power Board

