CERTIFICATE of EMC Compliance

CERTIFICATE
of EMC Compliance

Report No:	**EMC-FCC-1619**
Type of equipment:	**NETWORK VIDEO RECORDER**
Model Name:	**SRN-1000**
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.

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: 82 505 299 8311

EMI TEST REPORT

Test report No.:	**EMC-FCC-1619**
Type of Equipment:	**NETWORK VIDEO RECORDER**
Model Name:	**SRN-1000**
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

- AC Power Line Conducted Emissions Measurement: ANSI C63.4-2009

- 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. 06. 22
Date of testing: 2012. 07. 11

Issued date: 2012. 07. 16

Tested by: CHO, MOON-SUP

Approved by: YEOM, HAN-SEOK

Contents

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

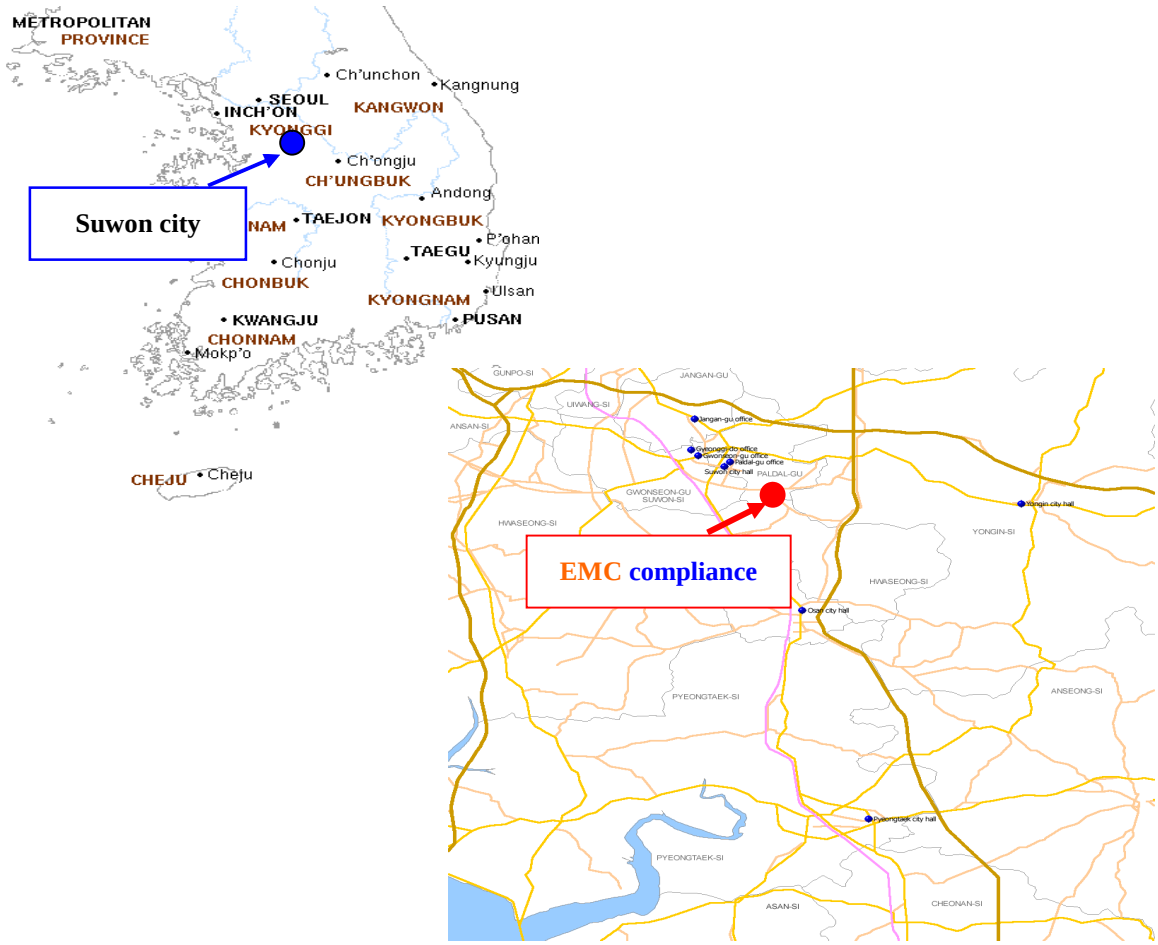
2. Laboratory information

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: 82 505 299 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)	:	25 °C	45 % R.H.	-
Shielded room(CE)	:	26 °C	47 % 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 ㎑ ~ 150 ㎑: ± 3.82 dB 150 ㎑ ~ 30 ㎒: ± 3.43 dB	
Shielded Room (CE#2)	9 ㎑ ~ 150 ㎑: ± 3.82 dB 150 ㎑ ~ 30 ㎒: ± 3.43 dB	
Shielded Room (CE#3)	9 ㎑ ~ 150 ㎑: ± 4.00 dB 150 ㎑ ~ 30 ㎒: ± 3.63 dB	
Radiated Emission measurement (C.L: Approx 95 %, k = 2)		
10 m Chamber (#F4)	30 ㎒ ~ 300 ㎒	3 m: + 4.56 dB, - 4.58 dB 10 m: + 4.56 dB, - 4.56 dB
	300 ㎒ ~ 1 000 ㎒	3 m: + 4.84 dB, - 4.85 dB 10 m: + 4.71 dB, - 4.72 dB
	1 ㎓ ~ 6 ㎓	3 m: + 6.19 dB, - 6.20 dB
	6 ㎓ ~ 18 ㎓	3 m: + 6.41 dB, - 6.53 dB
10 m Chamber (#F2)	30 ㎒ ~ 300 ㎒	3 m: + 4.86 dB, - 4.88 dB 10 m: + 4.86 dB, - 4.86 dB
	300 ㎒ ~ 1 000 ㎒	3 m: + 4.98 dB, - 4.99 dB 10 m: + 4.85 dB, - 4.87 dB
	1 ㎓ ~ 6 ㎓	3 m: + 6.19 dB, - 6.20 dB
	6 ㎓ ~ 18 ㎓	3 m: + 6.41 dB, - 6.53 dB

4. Description of E.U.T.

4.1 General information

Item		Details
Display		
Network Camera	Input Channels	Max. 64CH
	Input Bandwidth	100Mbps
	Resolution	CIF ~ 5M
	Protocols	Onvif(Samsung, Axis, Sony, Panasonic), Samsung(SVNP)
Live	Local Display	N/A
	Web	1 / 4 / 9 / 16 / Sequence
Performance		
Operating System	Embedded	Linux
Recording	Compression	H.264
	Recording Bandwidth	100Mbps
	Resolution	CIF ~ 5M
	Type	Normal, Scheduled, Event (Pre/Post)
	Event Trigger	Motion Detection, Alarm Input, Video Loss, Audio Detection, Pass, Exit, Appear, Disappear, Face Detection
	Event Action	e-Mail, PTZ Preset, Alarm, Buzzer
Play	Search mode	4 channels
	Playback function	CIF ~ 5M
	Playback Control	Fast Forward/Fast Backward, Move one step up/Move one step down
Storage	Built-In	MAX 8EA
	External	e-SATA(2 Port)
Backup	File backup(Via Web)	JPG, AVI
	Function	Singlei channel Play, Date-Time/Title display
Sensor	I/O	input 16 / output 4
Audio	Input	64 channels (network)
	Compression	G.711, G.726

Item		Details
Network		
Interface		RJ-45, Gigabit Ethernet x2
Protocol		TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTSP, NTP, HTTP, DHCP, PPPoE, SMTP, ICMP, IGMP, ARP, DNS, DDNS, uPnP, ONVIF NVC
DDNS		Samsung iPolis DDNS
Transmission Bandwidth		64Mbps
Max Remote Users		Search(3) / Live unicast(10) / Live multicast(20)
Max Remote Channel		Max 160CH
IP		IPv4
Security		User access Log IP Filtering
Web Viewer	Language (24ea)	English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Denish, Portuguese, Czech, Polish, Turkish, Rumanian, Serbian, Dutch, Croatian, Hungarian, Greek, Finnish, Norwegian, Thai
	OS	Supported OS : Window XP(service pack 2 or above), Vista, 7 Supported Browser : MS IE 7.x, 8.x, 9.x
Viewer Software	Type	NET-i viewer, Webviewer
	Related Function	Live, Search, Setup
Functions		
Camera Setup	Register	Auto, Manual
	Setup Items	IP Address, Profile select
PTZ	Control	Via Webviewer
	Preset	256 Presets
System		
Log	Log List	System log, Event log Max. 20,000 each
Environmental		
Operating Temperature / Humidity		'+0°C to +40°C
Power Consumption		20% ~ 85%
Electrical		
Power		100 to 240 VAC ±10%; 50/60 Hz, 4~1.5A
Power Consumption		45W
Mechanical		
Color / Material		Black / Metal
Dimension (WxHxD)		W440.0 x H88.0 x D426.8 mm (W17.32 x H3.46 x D16.80 inch)
Weight		6.18 Kg (HDDx1)
Standards		
Approvals	Safety	UL
Power Consumption	EMC	CE, FCC, Gost-R, CCC, KCC

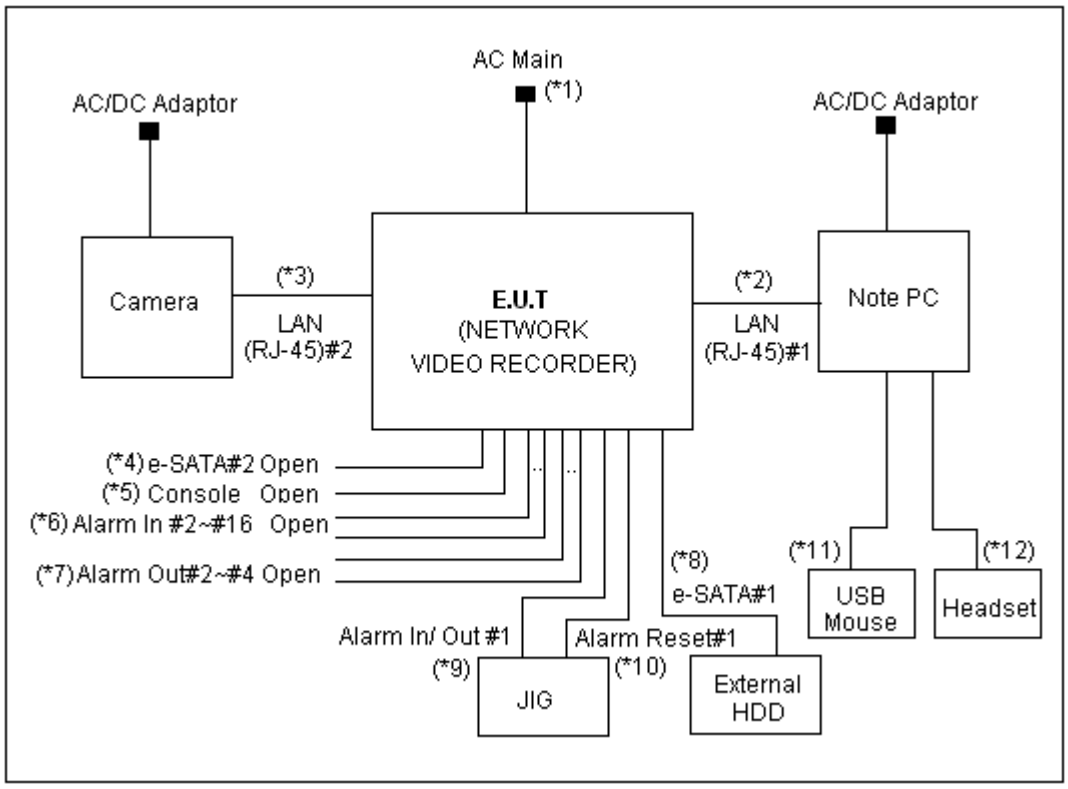
4.2 Product description

Type of product	NETWORK VIDEO RECORDER
Model name (Basic)	SRN-1000
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	120 Ⅴ, 60 ㎐
Product rating	AC100-240V, 50/60Hz
Internal clock frequency	400 ㎒
Note	-

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Camera	SNZ-5200	C62E6V3BCO1234V	Samsung Techwin
Note PC	PSLQ0K-02N005	2A058417Q	TOSHIBA
External HDD(320GB)	XD1	001NMYSHX1354	LG Electronics
JIG	-	-	-
USB Mouse	1088	8165900112700	Microsoft
Headset	SHS-250V	-	SAMSUNG

4.4 Test configuration



Note	Start		End		Cable	
*	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	**EUT** (NETWORK VIDEO RECORDER)	Power	AC main	Power	1.6	Non-Shield
2		LAN (RJ-45)#1	Note PC	Network	3.0	Non-Shield
3		e-SATA#2	Open	-	0.5	Non-Shield
4		Console	Open	-	1.0	Non-Shield
5		Alarm In #2~#16	Open	-	3.0	Non-Shield
6		Alarm Out#2~#4	Open	-	3.0	Non-Shield
7		LAN (RJ-45)#2	Camera	Network	3.0	Non-Shield
8		e-SATA#1	External HDD	e-SATA#1	0.5	Non-Shield
9		Alarm In/ Out #1	JIG	Alarm In/ Out	3.0	Non-Shield
10		Alarm Reset	JIG	Alarm Reset	3.0	Non-Shield
11	Note PC	USB	USB Mouse	USB	1.8	Shield
12		Headset	Headset	Headset	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	Web video monitoring test mode.

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

Applied	Test items	Test method	Result
☒	Conducted Emission	ANSI C63.4 – 2009	Complied
☒	Radiated Emission	ANSI C63.4 – 2009	Complied

6. Test results

6.1 Conducted Emission

Test specification	FCC Part 15, Section 15.107(b), Class A		
Testing voltage	120 Ⅴ, 60 ㎐		
Test facility	Shielded room (CE#2)		
Date	2012. 07. 11		
Temperature (°C)	26 °C	Humidity (% R.H.)	47 % R.H.
Remarks	Complied		

6.1.1 Limits of conducted emission measurement

Frequency [㎒]	Class A (㏈(㎶))		Class B (㏈(㎶))	
	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.

6.1.2 Measurement procedure

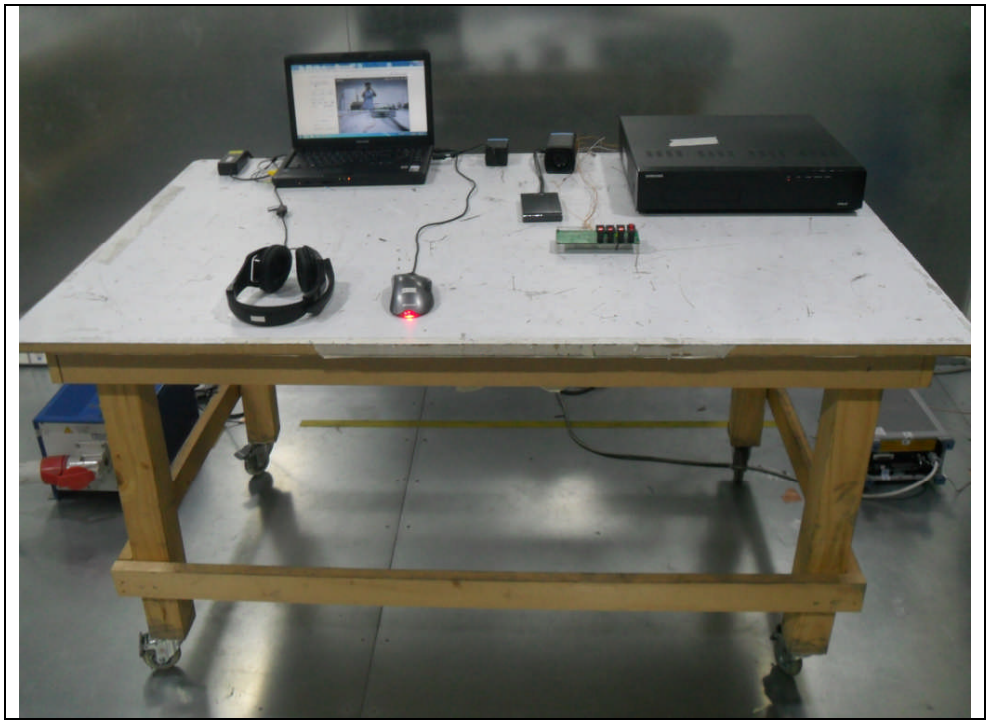
The measurements were performed in a shielded room. EUT was setup as shown in photograph and placed on a non-metallic table height of 0.8 m above the reference ground plane. The rear of table was located 0.4 m to the vertical conducted plane. EUT was power through the LISN, which was bonded to the ground 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.

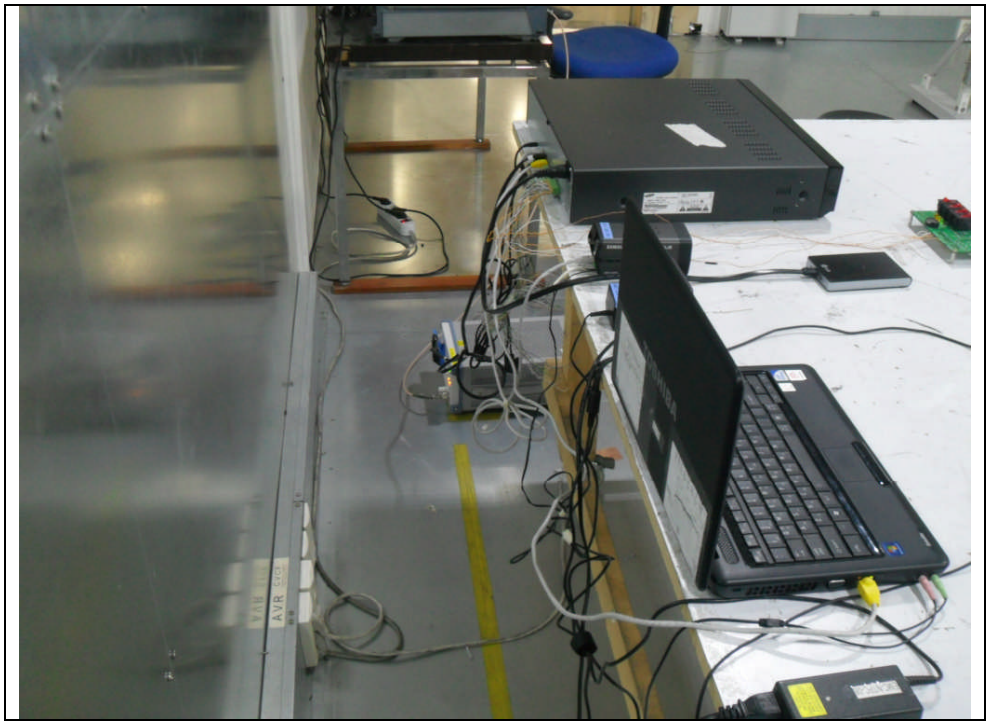
6.1.3 Used equipments

Equipment	Model	Serial No.	Makers	Next Cal. Date	Used
Test Receiver	ESHS30	844827/011	R&S	2012.08.16	☒
LISN	ENV216	101352	R&S	2013.01.10	☒
LISN	L3-32	0120J20305	PMM	-	☒

6.1.4 Photographs of test setup

* AC Main



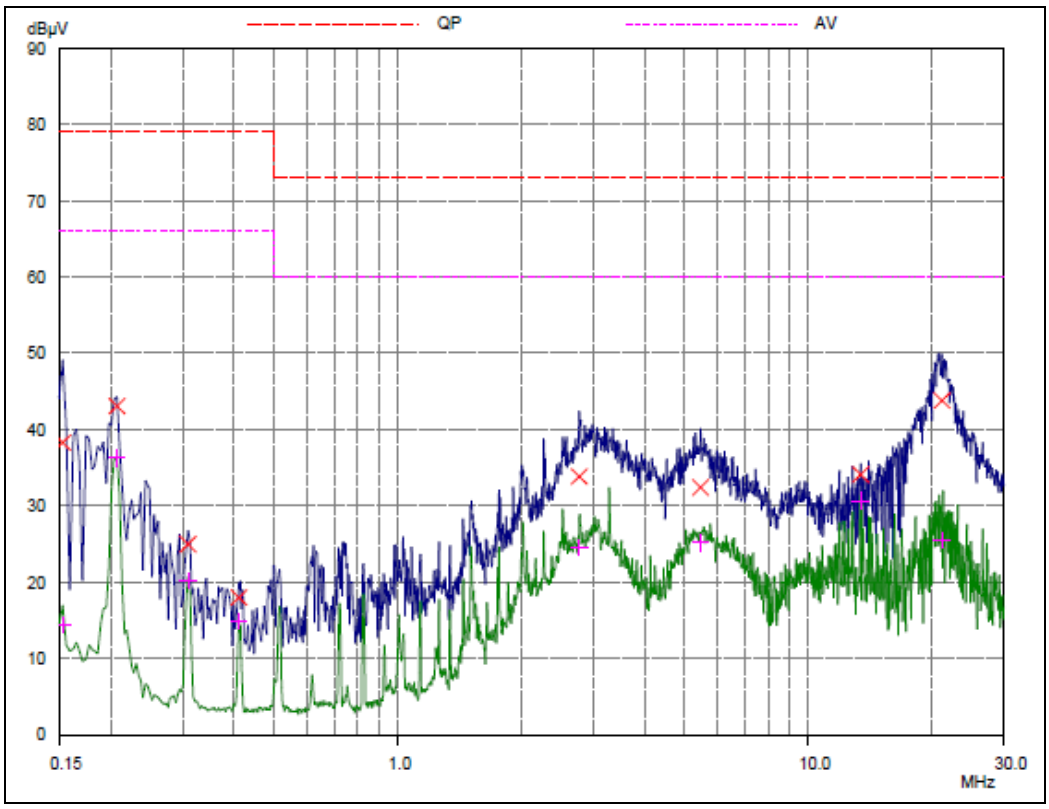


6.1.5 Conducted emission measurement result

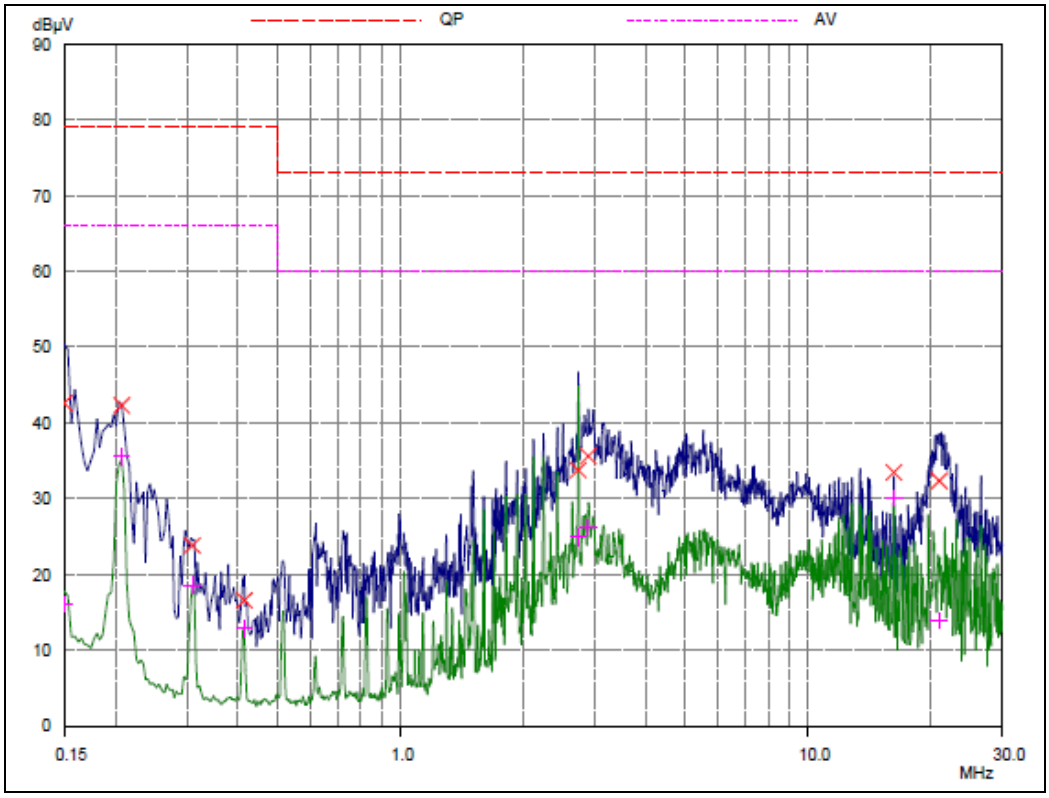
* AC Main

Frequency	Correction Factor		Line	Quasi-peak				Average			
				Limit	Reading	Result	Margin	Limit	Reading	Result	Margin
[㎒]	LISN	Cable		[dB(㎶)]	[dB(㎶)]	[dB(㎶)]	[dB]	[dB(㎶)]	[dB(㎶)]	[dB(㎶)]	[dB]
0.150	9.81	0.03	N	79.00	32.79	42.63	36.37	66.00	6.28	16.12	49.88
0.153	9.81	0.03	H		28.46	38.30	40.70		4.55	14.39	51.61
0.207	9.84	0.03	H		33.24	43.11	35.89		26.45	36.32	29.68
0.309	9.89	0.03	H		15.07	24.99	54.01		10.32	20.24	45.76
0.411	9.95	0.04	H		8.02	18.01	60.99		4.87	14.86	51.14
2.733	9.76	0.07	N	73.00	24.00	33.83	39.17	60.00	15.17	25.00	35.00
2.769	9.76	0.07	H		24.05	33.88	39.12		14.70	24.53	35.47
2.892	9.76	0.07	N		25.83	35.66	37.34		16.44	26.27	33.73
13.420	9.66	0.12	H		24.42	34.20	38.80		21.01	30.79	29.21
16.230	9.66	0.12	N		23.80	33.58	39.42		20.40	30.18	29.82
21.180	9.67	0.13	H		34.12	43.92	29.08		15.84	25.64	34.36

[Hot-Line]



[Neutral-Line]



6.2 Radiated Emission

Test specification	FCC Part 15, Section 15.109(g), Class A		
Testing voltage	120 V, 60 Hz		
Test facility	10 m Chamber (#F2)		
Test distance	10 m, 3 m		
Date	2012. 07. 11		
Temperature (°C)	25 °C	Humidity (% R.H.)	45 % R.H.
Remarks	Complied		

6.2.1 Limits of radiated emission measurement

Frequency [㎒]	Class A (dB(㎶/m)) @ 10 m	Class B (dB(㎶/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 ***

6.2.2 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	ESCI	100710	R&S	2012.11.28	☒
Bi-Log Antenna	VULB 9168	9168-440	SCHWARZBECK	2013.10.04	☒
Amplifier	310N	293004	SONOMA INSTRUMENT	2012.11.28	☒
3 dB Attenuator	8491A	27444	HP	2012.11.28	☒
Antenna Mast	MA4000-EP	303	Innco Systems	-	☒
Turn Table	DT2000S-1t	079	Innco Systems	-	☒
Horn ANT	3115	00086706	ETS	2013.11.21	☒
Amplifier	8449B	3008A02343	AGILENT	2012.11.28	☒
Spectrum Analyzer	FSP7	100289	R&S	2012.12.19	☒

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:

Result = M.R + C.F(A.F + C.L +3 dB Att – A.G)

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

A.G= Amplifier Gain

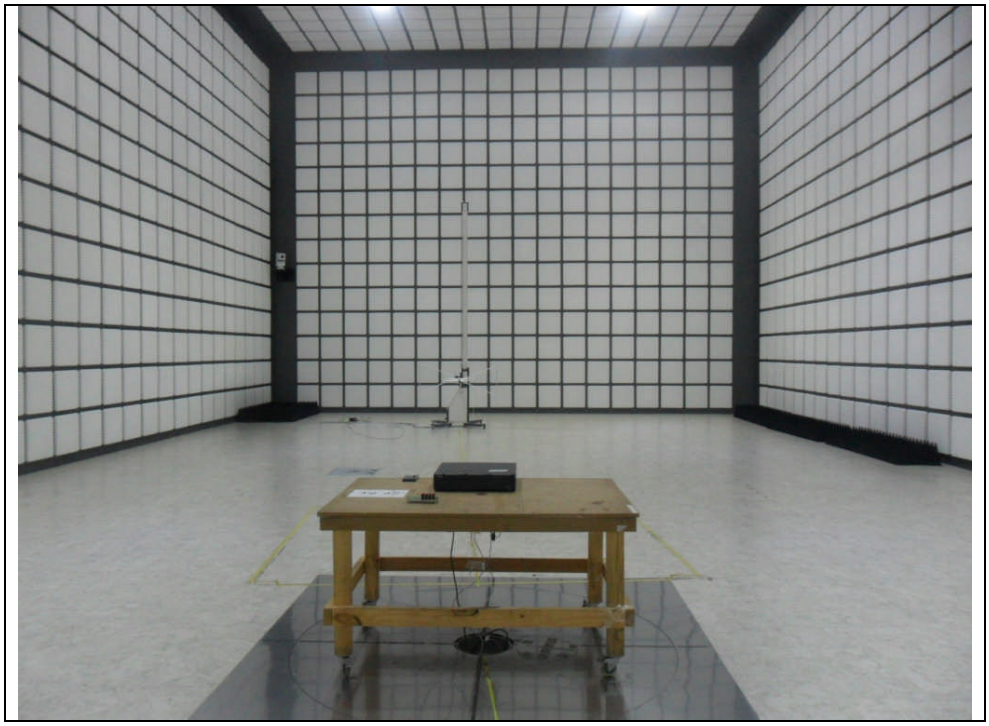
3 dB Att = 3 dB Attenuator

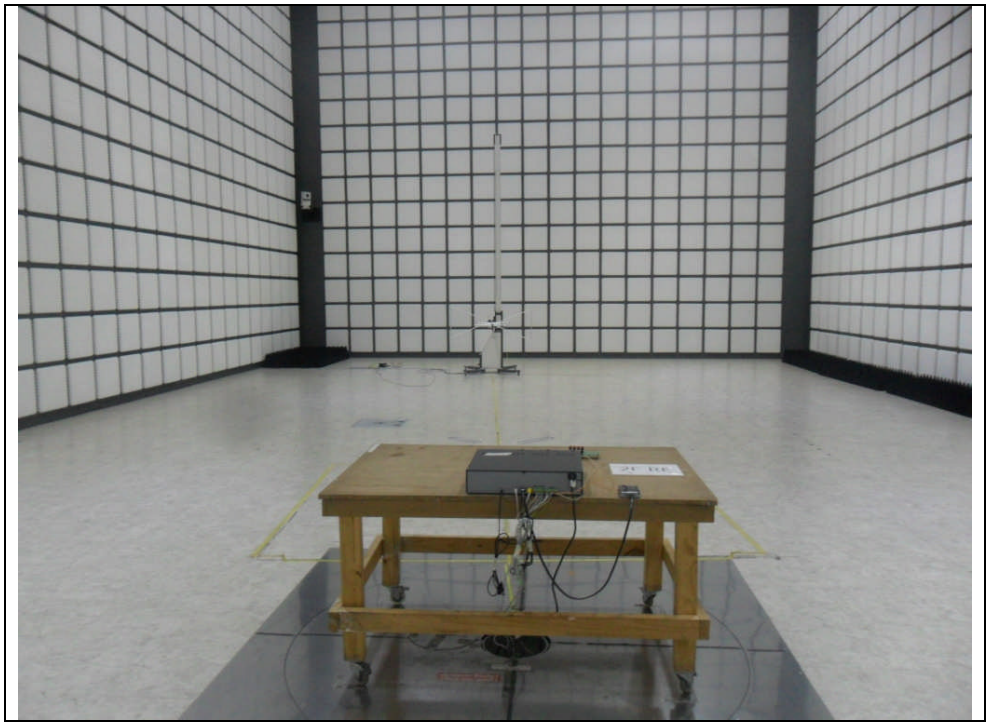
If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

The result is 30 + 12 + 5 + 3 – 35 = 15 dB(μV/m)

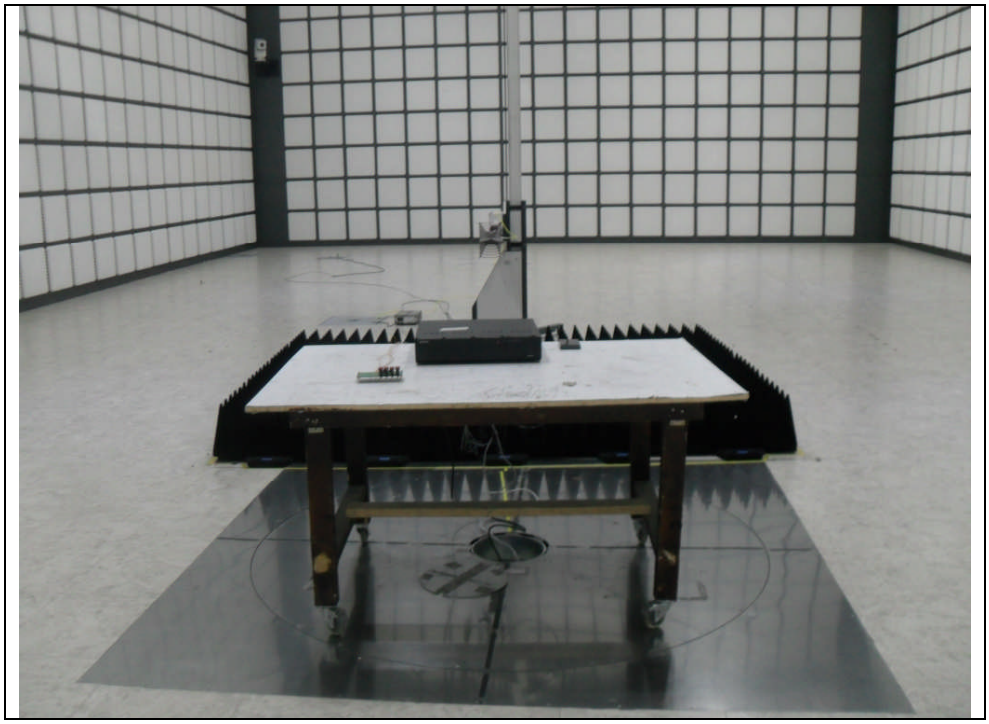
6.2.5 Photographs of test setup

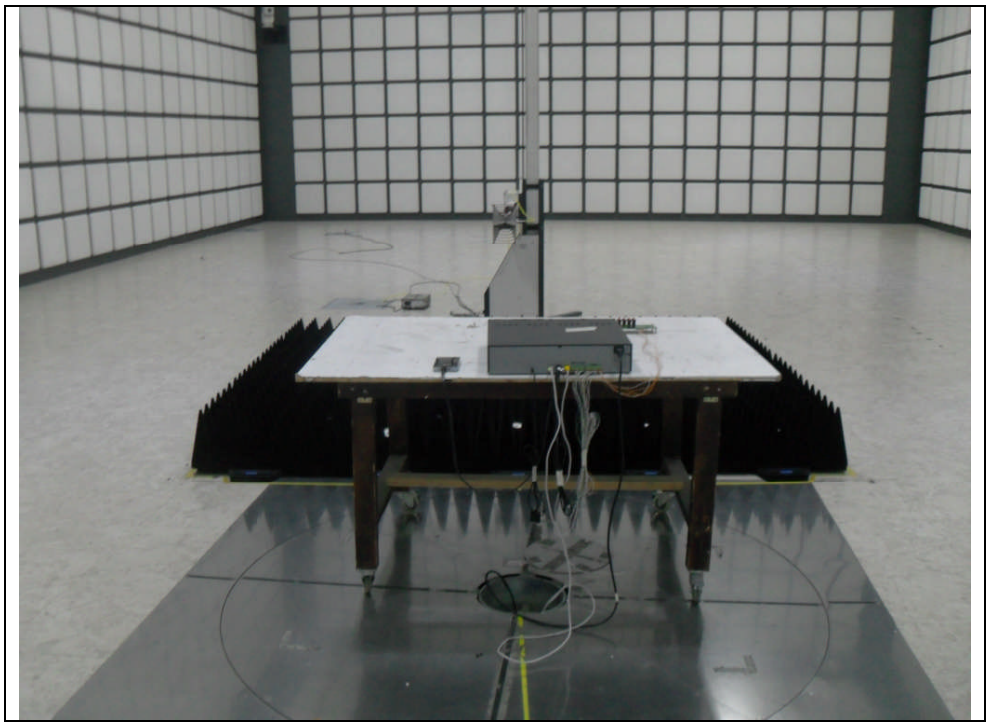
* 30 ㎒ ~ 1 ㎓





* 1 ㎓ ~ 5 ㎓

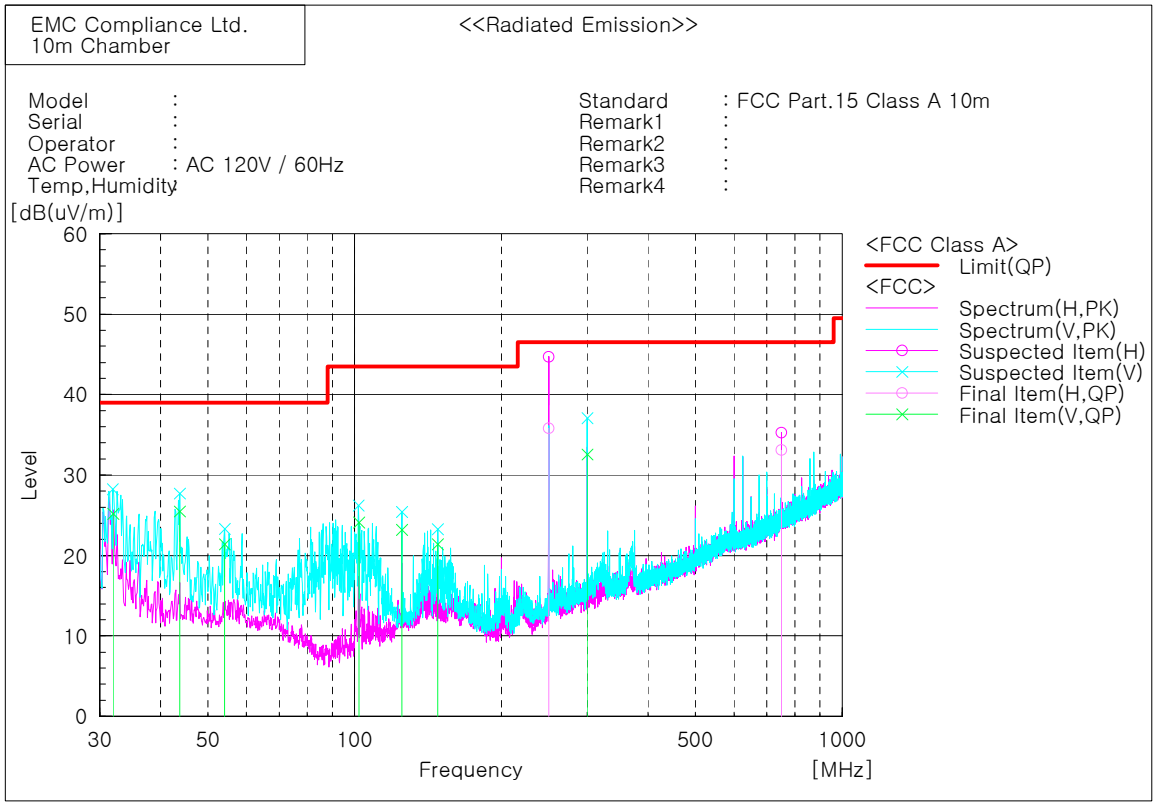




6.2.6 Radiated emission measurement result

*** Graph and Data**

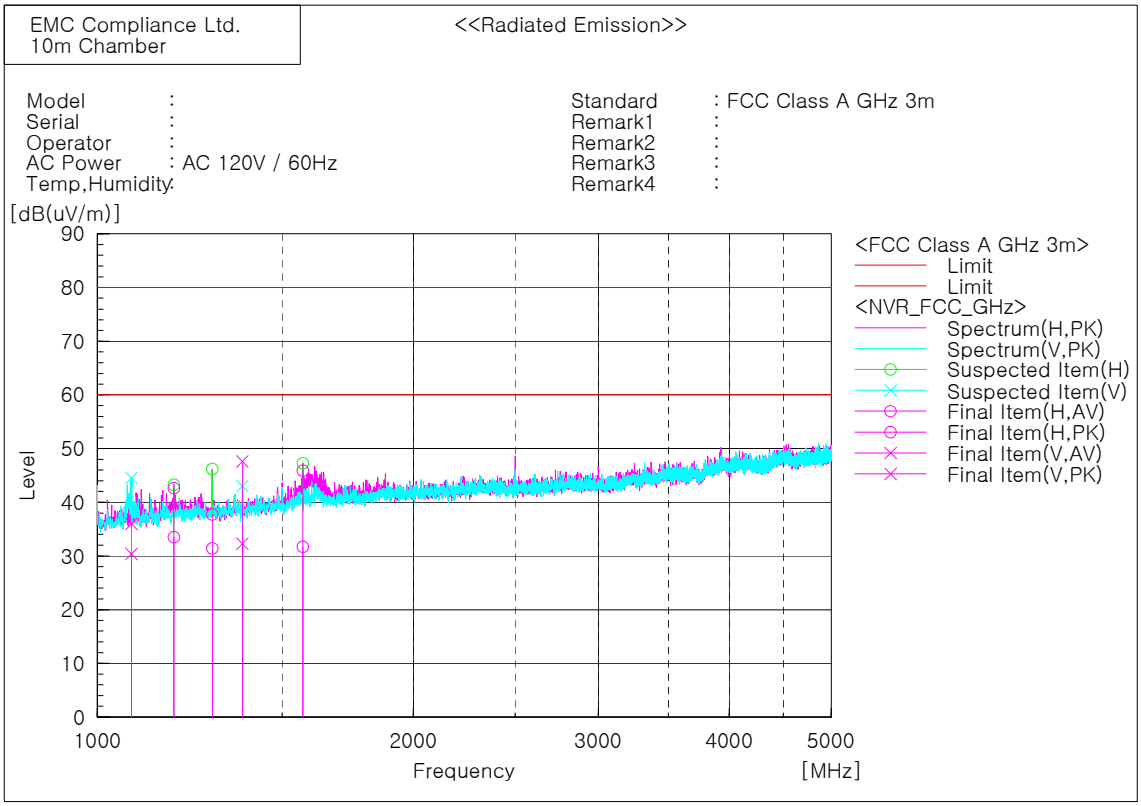
* 30 ㎒ ~ 1 ㎓



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	31.949	V	40.4	-15.2	25.2	39.0	13.8	100.0	80.5
2	43.841	V	39.3	-13.8	25.5	39.0	13.5	100.0	143.8
3	54.135	V	35.0	-13.6	21.4	39.0	17.6	298.0	144.6
4	101.951	V	41.8	-17.7	24.1	43.5	19.4	100.0	196.3
5	125.031	V	38.0	-14.8	23.2	43.5	20.3	100.0	251.9
6	148.112	V	34.6	-13.2	21.4	43.5	22.1	100.0	191.8
7	250.009	H	49.2	-13.4	35.8	46.5	10.7	400.0	117.5
8	300.045	V	43.9	-11.3	32.6	46.5	13.9	200.0	161.3
9	750.059	H	34.2	-1.1	33.1	46.5	13.4	202.0	101.6

* 1 ㎓ ~ 5 ㎓



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	1077.554	V	37.6	43.2	-7.2	30.4	36.0	60.0	80.0	29.6	44.0	100.0	21.6
2	1182.545	H	39.7	48.8	-6.2	33.5	42.6	60.0	80.0	26.5	37.4	100.0	209.5
3	1286.859	H	36.4	42.7	-5.0	31.4	37.7	60.0	80.0	28.6	42.3	100.0	15.2
4	1374.540	V	36.6	51.9	-4.3	32.3	47.6	60.0	80.0	27.7	32.4	100.0	294.2
5	1570.033	H	34.6	48.8	-2.9	31.7	45.9	60.0	80.0	28.3	34.1	100.0	229.7

7. E.U.T. photographs

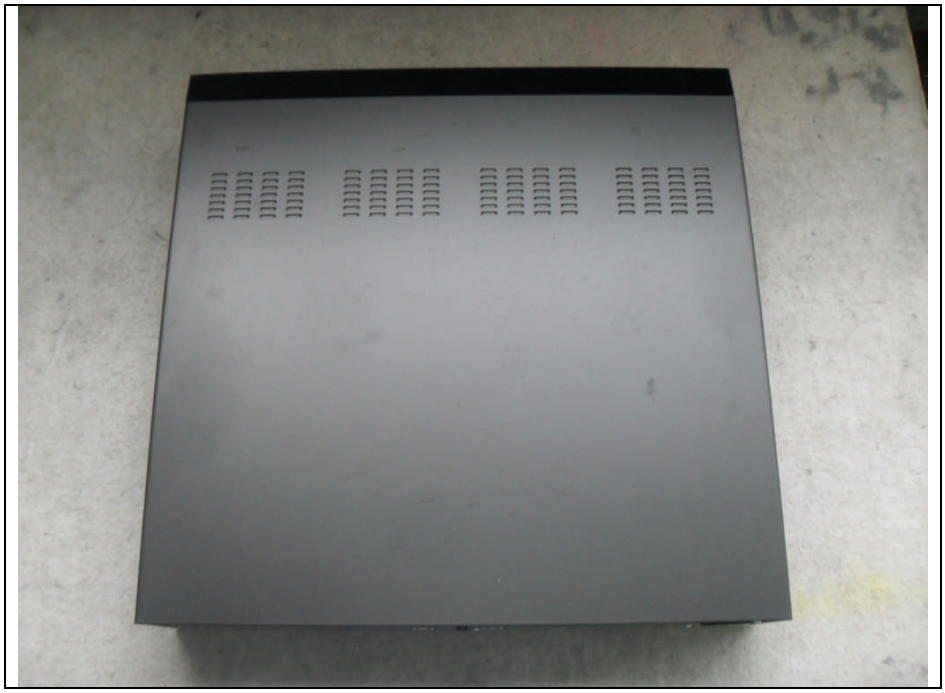
Front View

Rear View

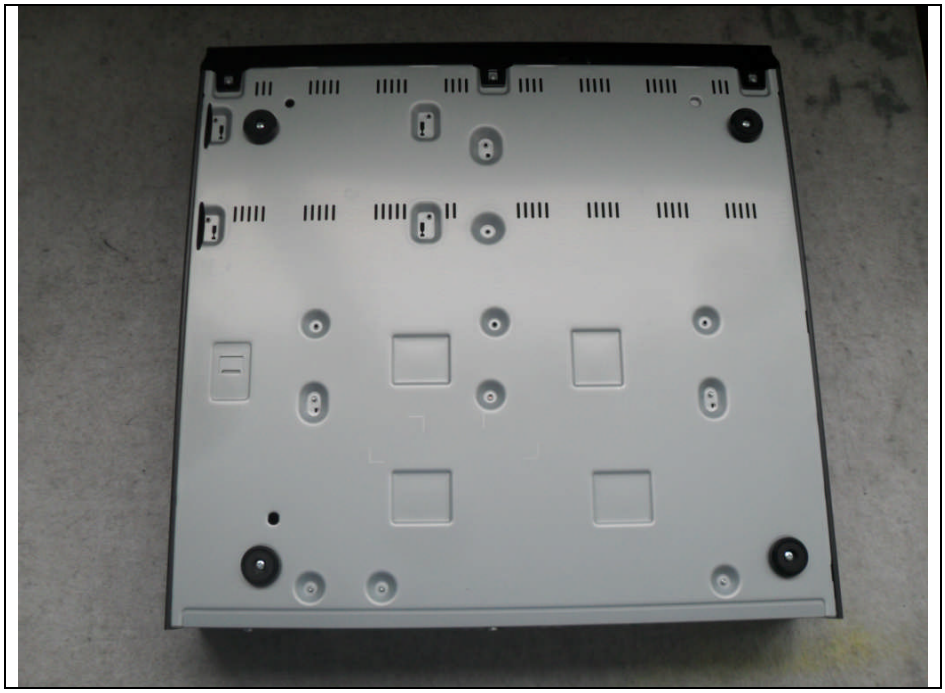
Left View

Right View

Top View



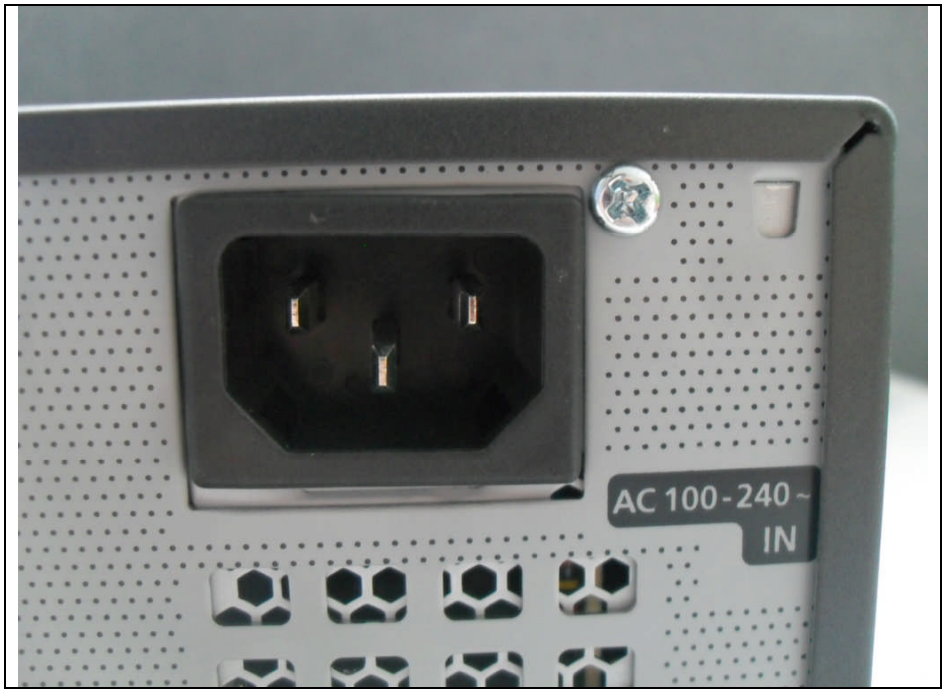
Bottom View

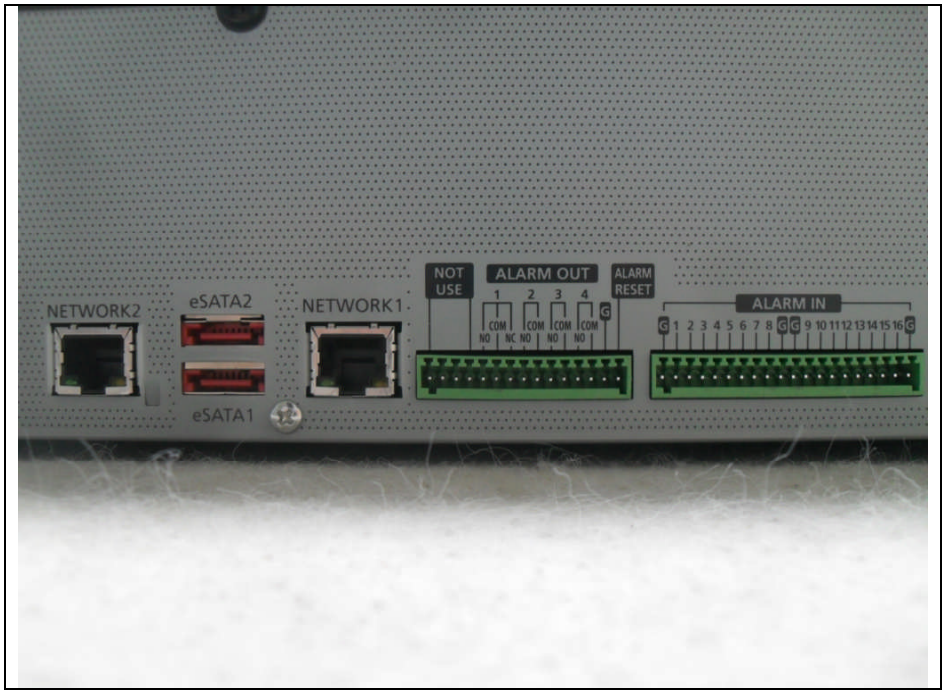


Label

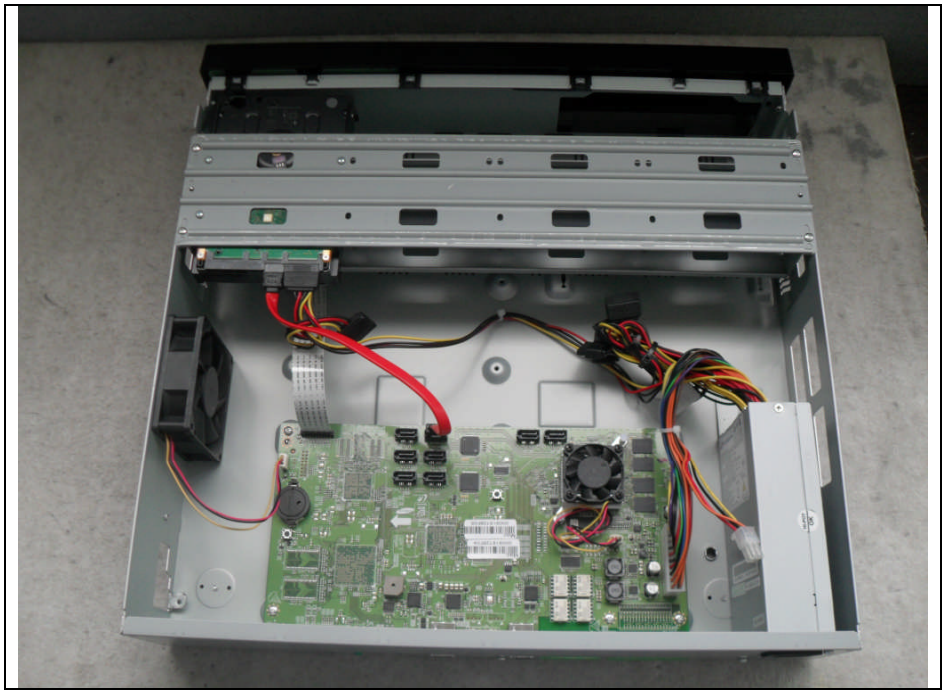
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Port

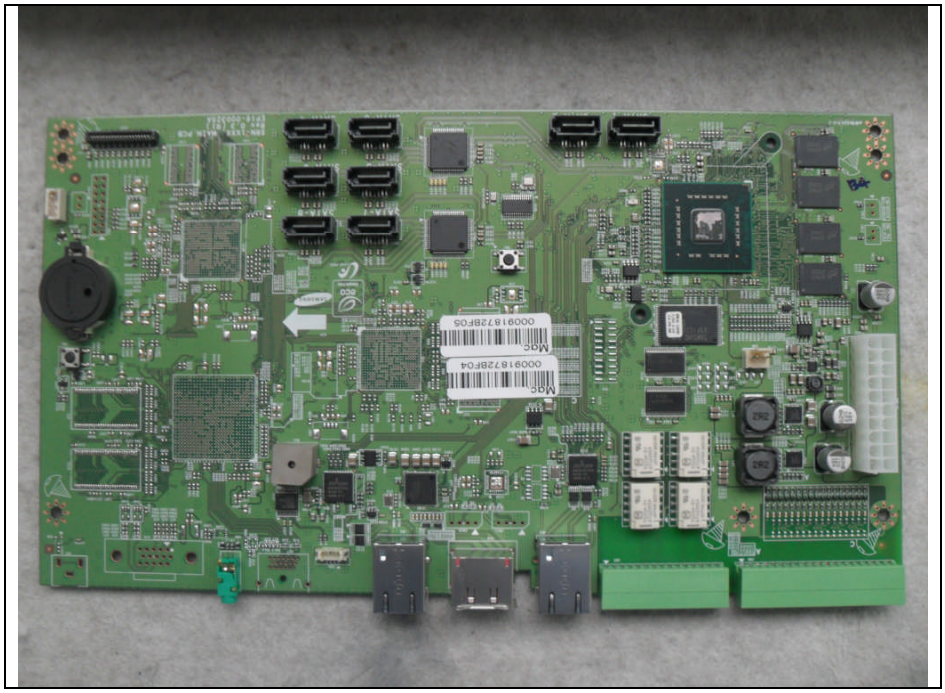


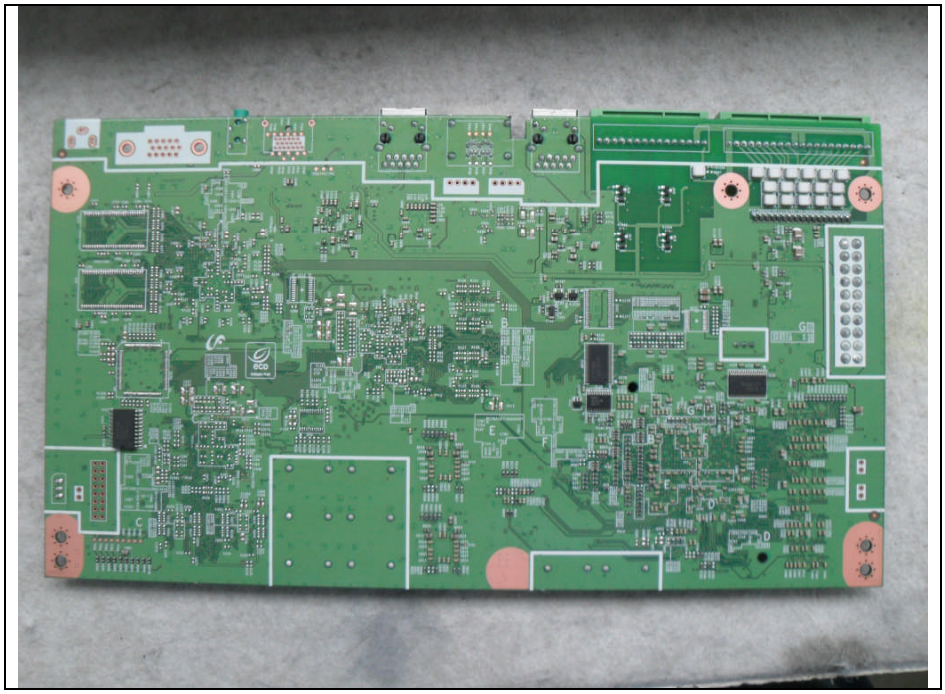


Inside

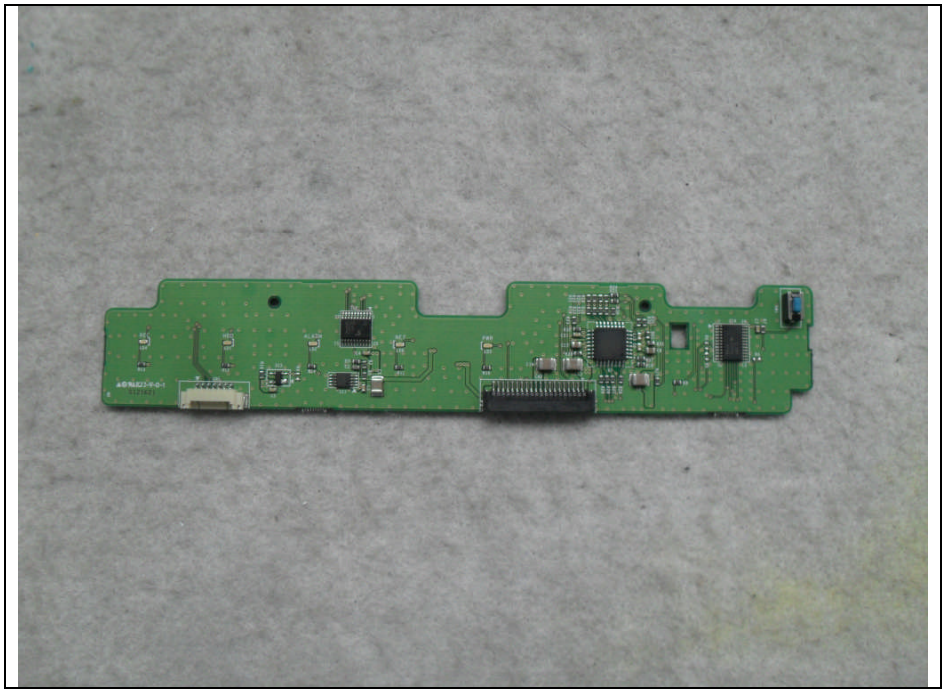


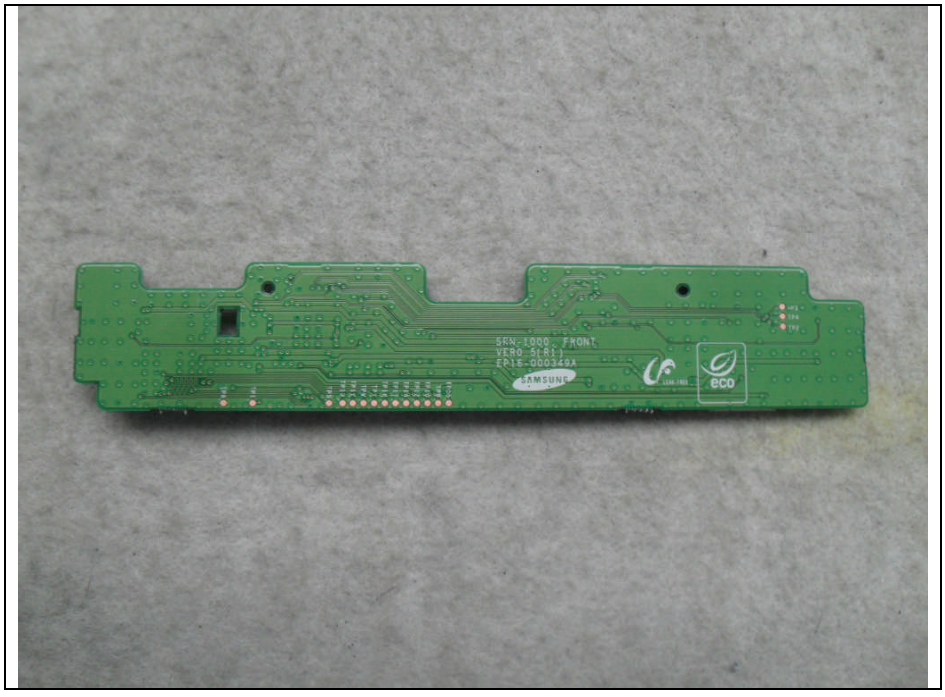
Main Board





FRONT Board





HDD(1TB)

POWER