

CERTIFICATE of EMC Compliance

Report No: EMC-FCC-1321
Type of equipment: DIGITAL VIDEO RECORDER
Model Name: SRD-440N
Applicant: SAMSUNG TECHWIN CO., LTD.
Address: #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,
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EMI TEST REPORT

Test report No.: EMC-FCC-1321
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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: 2011. 06. 23

Date of testing: 2011. 07. 01 ~ 07. 01

Issued date: 2011. 07. 15

Tested by:

SUNG, KI-MUN

Approved by:

YEOM, HAN-SEOK

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1. Applicant information

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Contact name: **Kang Jei Soon**

Manufacturer#1: SAMSUNG TECHWIN CO., LTD.
Address: #42 Seongju-Dong, Changwon-Shi,
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Telephone: +82-70-7147-8361
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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.

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

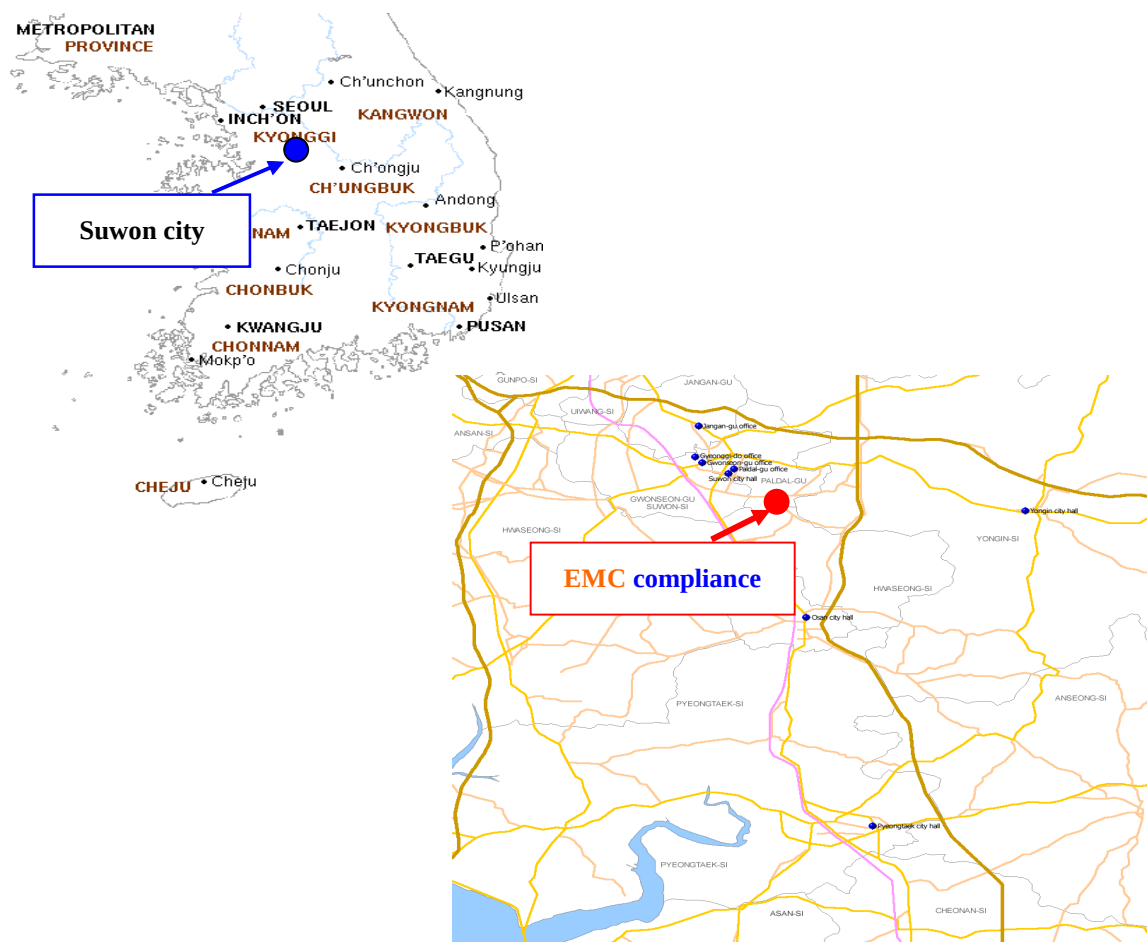
FCC CAB.: KR0040

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)	:	25~26 °C	60~63 % R.H.	-
Shielded room(CE)	:	24 °C	52 % R.H.	-

Test site

These testing items were performed following locations;

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

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 : ($k = 2$, 95 %)

9 kHz ~ 150 kHz: ± 3.77 [dB]

150 kHz ~ 30 MHz: ± 3.35 [dB]

Radiated Emission measurement : ($k = 2$, 95 %)

30 MHz ~ 300 MHz: 3 m: ± 4.3 [dB]

10 m: ± 4.3 [dB]

300 MHz ~ 1 000 MHz: 3 m: ± 4.4 [dB]

10 m: ± 4.3 [dB]

4. Description of E.U.T.

4.1 General information

SRD-440 N		
Video	Inputs	4 composite video 0.5~1 Vpp, 75 ohm
	Resolution	704x480 NTSC, 704x576 PAL
Live	Frame rate	120fps NTSC, 100fps PAL
	Resolution	704x480 NTSC, 704x576 PAL
	Multi Screen display	1/4/SEQUENCE/PIP
Performance		
Operating System	Embedded	Linux
	Compression	H.264
Recording	Record Rate	NTSC: Up to 30fps @ 704x480 / PAL: Up to 25fps @ 704x576 NTSC: Up to 60fps @ 704x240 / PAL: Up to 50fps @ 704x288 NTSC: Up to 120fps @ 352x240 / PAL: Up to 100fps @ 352x288
	Mode	NTSC: Manual, Schedule (Continuous/Event), Event(Pre/Post) PAL: Manual, Schedule (Continuous/Event), Event(Pre/Post)
	Overwrite modes	Continuous
	Pre-alarm	Up to 5 sec.
	Post-Alarm	Up to 6 hour. (5, 10, 20, 30 sec, 1, 3, 5, 10, 20 min, 1, 2, 3, 4, 5, 6 hour)
	Search mode	Date/time, Event, Back up, Motion
Search & Playback	Playback function	Fast Forward/Backward (x2, x4, x8, x16, x32, x64) ※ Backward Play with I-frame Only, Slow Forward/Backward (x1/2, x1/4, x1/8) Step Forward/Backward (x2, x4, x8, x16, x32, x64) ※ Backward Play with I-frame Only
Network (IPv4)	Transmission speed	100/120fps
	Bandwidth	Up to (4)Mbps, Unlimited(4M)/2/1.5/1 Mbps/800/600/500/400/300/200/100/50 kbps
	Bandwidth control	Automatic
	Stream	CIF (H.264)
	Remote users Maximum	4 Persons (Search up to (2), Live Unicast/Live Multicast available)
	Protocol support	TCP/IP, DHCP, PPPoE, SMTP, NTP, HTTP, DDNS, RTP, RTSP
	Monitoring	Webviewer, CMS(Smart viewer, Net-I)
Smart phone	Smart Phone	Android, I-phone (iPad included)
	Protocol support	RTP, RTSP, HTTP, CGI
	Transmission speed	CIF Max 15fps(Single Channel)/ CIF Max 2fps(Quad Channel)
	Remote users Maximum	Live(1)
Storage	Internal HDD	Up to 1 SATA HDDs
	External HDD/DVD Writer	Not Support
	DVD Writer (Back-up)	Not Support
	USB (Back-up)	2 USB Ports
	File Format (Back-up)	BU(DVR Player), EXE(Include Player)
Security	Password Protection	1 Admin, 10 Group, 10 User per 1 Group
	Data Authentication	Watermark
Interface		
Monitors	VGA	1 VGA (1024x768) ※ Main Composite Selectable
	HDMI	Not Support
	Main/Spot Composite	1 BNC (1 Vp-p, 75 ohm)/Analog Spot (1 BNC, 1 Vp-p, 75 ohm) Selectable
	Spot Composite	Not Support
	Loop Outputs	Not Support
Audio	Inputs/Output	1 line in / 1 line out
	Compression	G.711 ULAW(8KHz, 16Bit)
	Sampling rate	8KHz
Alarm	Inputs/Outputs	Terminal 4 inputs (NO/NC) / Terminal 1 relay outputs (NO/NC), Rating : 24VDC/1A, 125V AC/0.5A
	Remote notification	Notification via e-mail
Connections	Ethernet	1 RJ45 10/100 Base-T
	Serial interface	RS-485(Half) for PTZ, System Keyboard ※ Support for POS Interface (VSI-Pro)
	USB	USB 2.0, 2 ports (Front/Rear)
	e-SATA	Not Support
	Application Support	Mouse(Not Include), Remote Controller
	Protocol support	Samsung-E/ Samsung-T/ Pelco-D/ Pelco-p/Panasonic/ Phillips/ AD/ DIAMOND/ ERNA/ GE/ VCL TP/ICON/ELMO
General		
Electrical	Input Voltage/Current	DC12V Adaptor, 1.2A, 100~240VAC, 50~60Hz, 48watt
	Power consumption	Max.36 W (with 1x HDD)
Environmental	Operating Temperature/Humidity	+0°C to +40°C (+32°F to +104°F)/ 20%RH to 85%RH
Mechanical	Dimension (W x H x D)	255 x 44 x 204mm
	Weight (With hard disks)	T.B.D
	Rack mount kit	Not Support
Language		Korean, Japanese, Chinese, English, French, German, Spanish, Italian, Russian, Netherlands, Portuguese, Swedish, Danish, Thailandais, Rumania, Serbia, Polish, Czech, Turkish, Croatia, Hungary, Greek (22 Language)

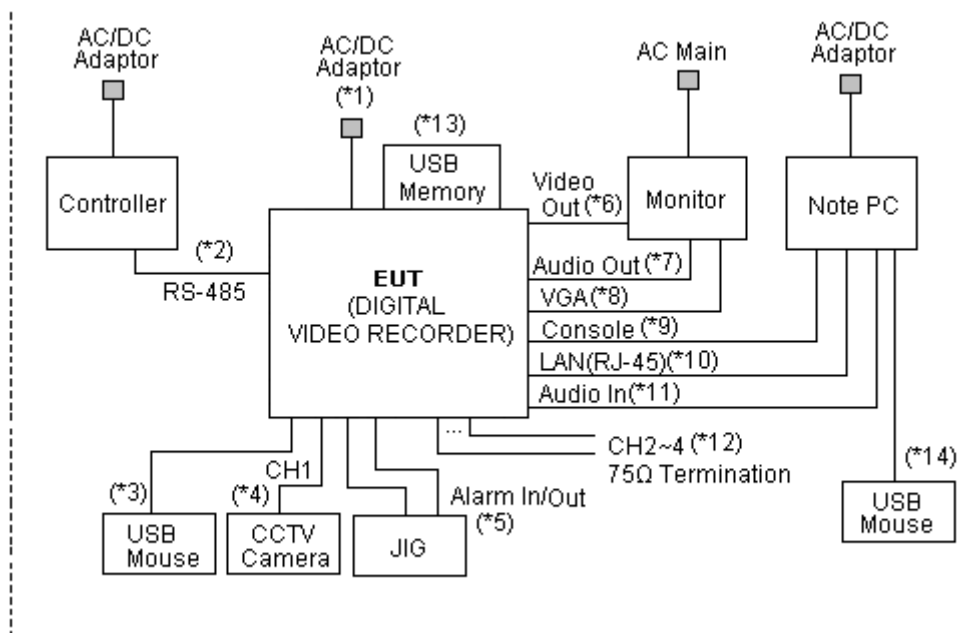
4.2 Product description

Type of product	DIGITAL VIDEO RECORDER
Model name (Basic)	SRD-440N
Model name (Variant)	N/A
Difference	-
Serial no	Engineering Sample
Testing voltage	120 V , 60 Hz
Product rating	AC 100 - 240 V , 50 / 60 Hz, 1.2 A
Internal clock frequency	440 MHz
Note	* AC/DC adaptor was provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Monitor	GH19PS	N727HVZLC04632H	SAMSUNG
Note PC	C1321	472680432036	FUJITSU
USB Memory(8GB)	-	-	-
Controller	SCC-2000	-	SAMSUNG
USB Mouse	1088	8165900241827	Microsoft
CCTV Camera	SDC-435P	C08C6V3Z245129	SAMSUNGTECHWIN
JIG	-	-	-
USB Memory(8GB)	-	-	Transcend

4.4 Test configuration



Note	Start		End		Cable		
	Name	I/O port	Name	I/O port	Length (m)	Spec.	Cable
1	EUT (DIGITAL VIDEO RECORDER)	Power	AC/DC Adaptor	Power	1.0	Non-Shield	-
2		RS-485	Controller	RS-485	3.0	Non-Shield	Out-door
3		USB	USB Mouse	USB	1.7	Shield	-
4		CH1	CCTV Camera	CH1	3.0	Shield	Out-door
5		Alarm In/Out	JIG	Alarm In/Out	3.0	Non-Shield	-
6		Video Out	Monitor	Video In	3.0	Shield	
7		Audio Out	Monitor	Audio In	1.4	Shield	-
8		VGA	Monitor	VGA	1.5	Shield	-
9		Console	Note PC	Console	1.6	Non-Shield	-
10		LAN(RJ-45)	Note PC	LAN(RJ-45)	3.0	Non-Shield	-
11		Audio In	Note PC	Audio Out	1.4	Shield	-
12		CH2~4	75Ω Termination	CH2~4	1.0	Shield	Out-door
13		USB	USB Memory	USB	Direct	-	-
14	Note PC	USB	USB Mouse	USB	2.0	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	Monitoring REC Test Mode
	Web View Test Mode
	Alarm/RS-485 operating 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

Application	Test method	Test result
Conducted emission - AC main port	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		
Test mode	Operating mode.		
Date	2011. 07. 01		
Testing voltage	120 V, 60 Hz		
Test facility	Shielded room (CE#1)		
Temperature(°C)	24 °C	Humidity (% R.H.)	52 % R.H.
Remarks	Complied Minimum limit margin is 25.16 dB at 0.354 MHz. (Average)		

6.1.1 Limits of conducted emission measurement

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

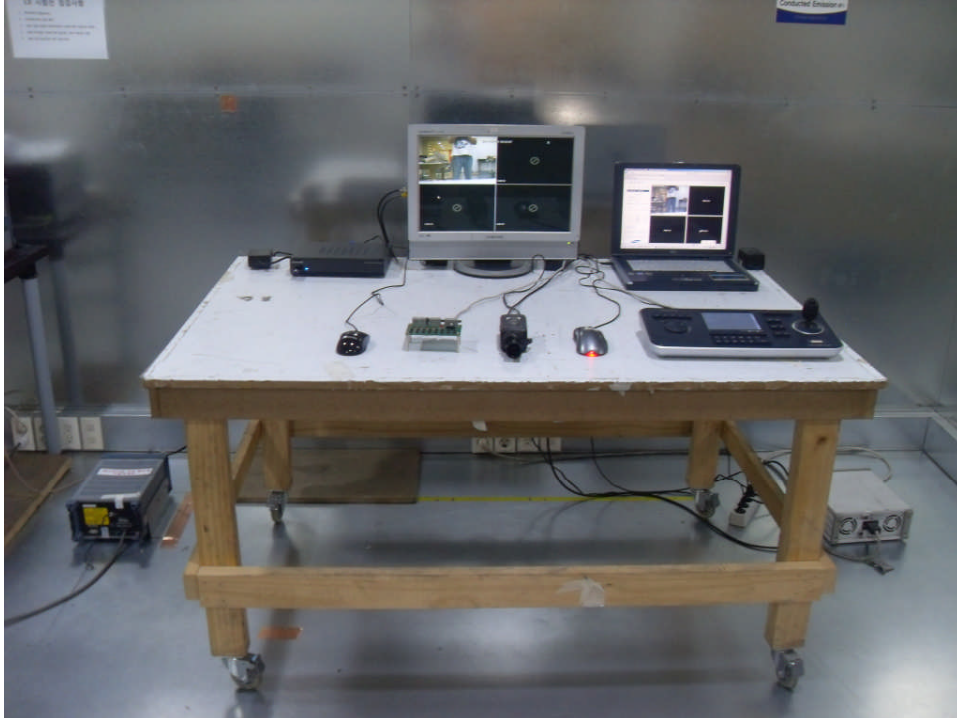
6.1.2 Measurement procedure

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	ESHS10	843276/003	R&S	12.06.14	☒
LISN	ESH3-Z5	100267	R&S	11.07.05	☒
LISN	L2-16A	0000J10705	PMM	-	☒

6.1.4 Photographs of test setup



6.1.5 Conducted emission measurement result

Frequency [MHz]	Correction Factor		Line	Quasi-peak			Average		
				Limit	Reading	Result	Limit	Reading	Result
	LISN	Cable		[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]
0.165	0.07	0.03	H	79.00	45.19	45.29	66.00	35.88	35.98
0.174	0.08	0.03	N		41.86	41.97		31.83	31.94
0.198	0.08	0.01	H		40.29	40.38		31.09	31.18
0.354	0.08	0.01	H		47.56	47.65		40.75	40.84
0.360	0.07	0.01	N		47.19	47.27		40.75	40.83
0.396	0.07	0.01	N		44.40	44.48		37.73	37.81
0.687	0.08	0.02	H	73.00	40.23	40.33	60.00	34.02	34.12
0.693	0.08	0.02	N		39.19	39.29		32.73	32.83
1.215	0.09	0.03	H		39.25	39.37		33.54	33.66
1.491	0.09	0.03	H		39.34	39.46		33.78	33.90
1.761	0.10	0.06	H		39.01	39.17		33.44	33.60
4.380	0.11	0.08	H		38.49	38.68		32.18	32.37

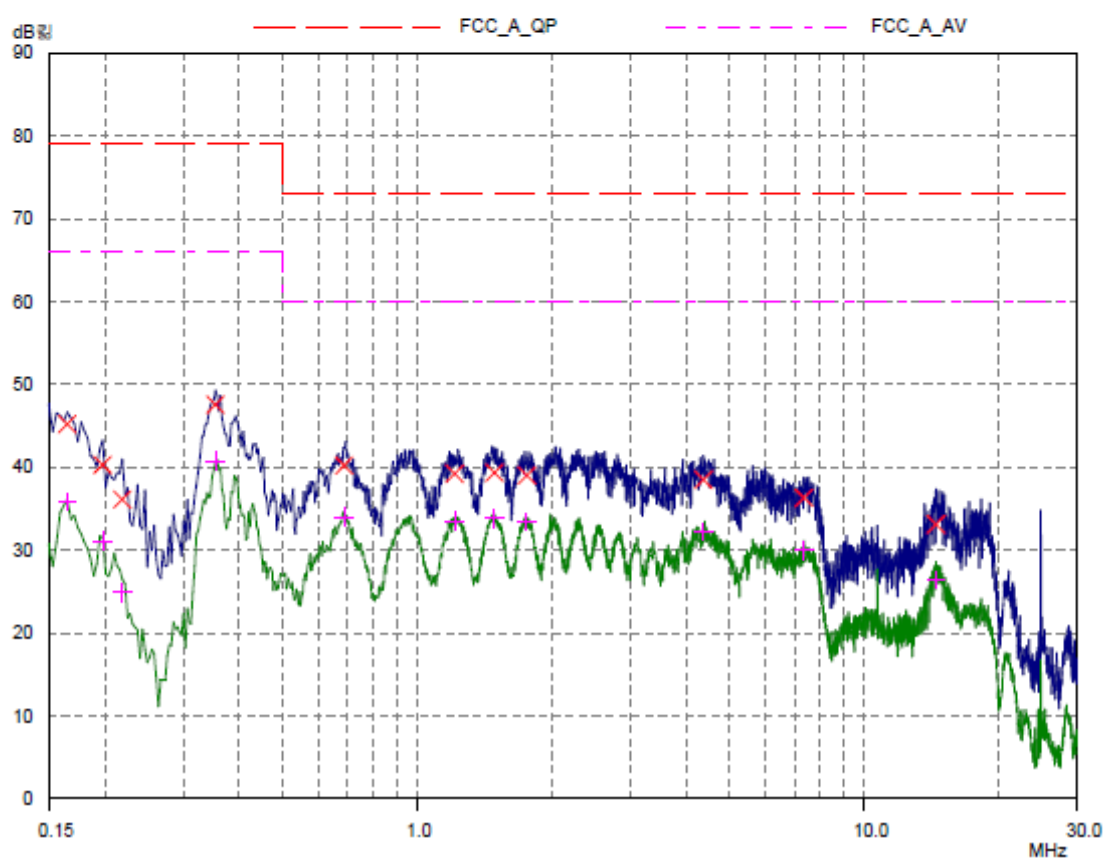
EUT: SRD-440N
Manuf:
Op Cond: H
Operator:
Test Spec: FCC Class A Conducted Emission
Comment:

Result File: 440_h.dat :

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	2msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



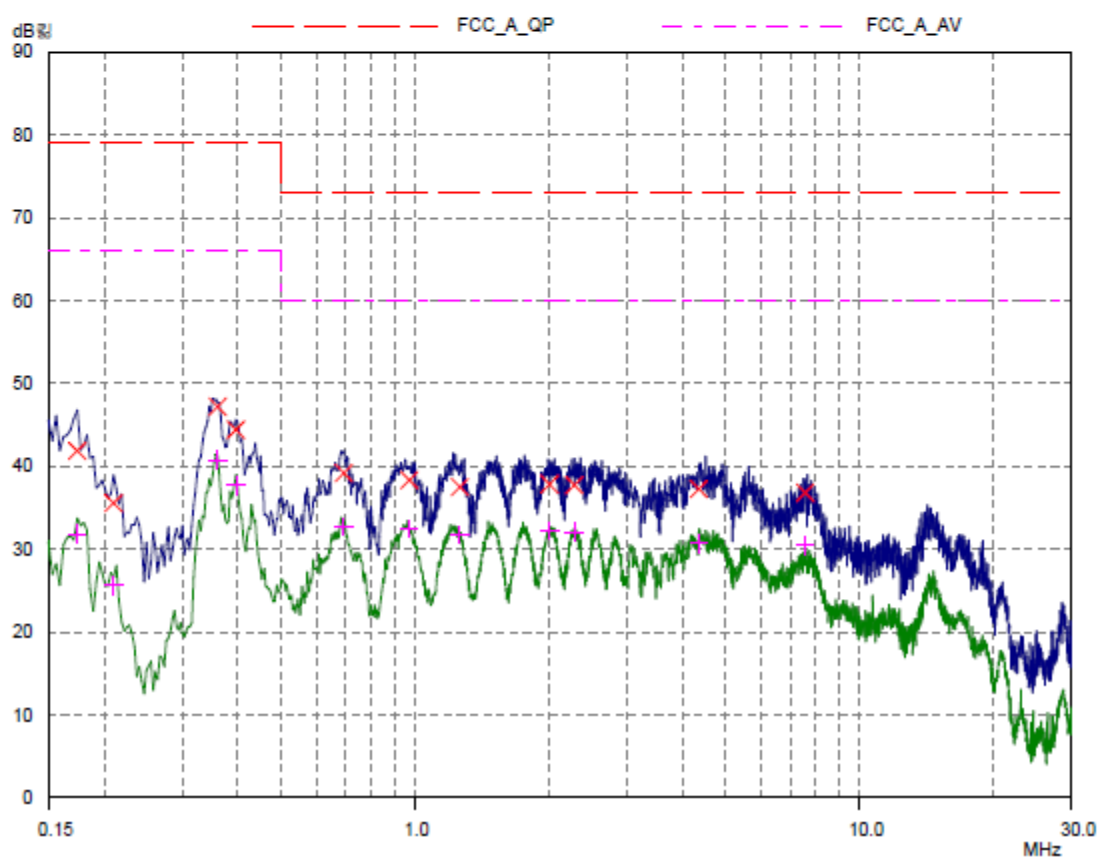
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Manuf:
Op Cond: N
Operator:
Test Spec: FCC Class A Conducted Emission
Comment:

Result File: 440_n.dat :

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	2msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



6.2 Radiated Emission

Test specification	FCC Part 15, Section 15.109(g), Class A		
Test mode	Operating mode.		
Date	2011. 07. 01		
Testing voltage	120 V, 60 Hz		
Test facility	10 m Chamber (Test distance: 10 m, 3 m)		
Temperature (°C)	25~26 °C	Humidity (% R.H.)	60~63 % R.H.
Remarks	Complied Minimum limit margin is 3.8 dB at 749.983 MHz. (30 MHz ~ 1 GHz) Minimum limit margin is 33.0 dB at 1795.000 MHz. (1 GHz ~ 2 GHz_Average)		

6.2.1 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 ***

6.2.2 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.

6.2.3 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 9160	3228	SCHWARZBECK	12.09.13	☒
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	00086706	ETS	11.12.22	☒
Spectrum Analyzer	FSP7	100289	R&S	11.12.17	☒

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

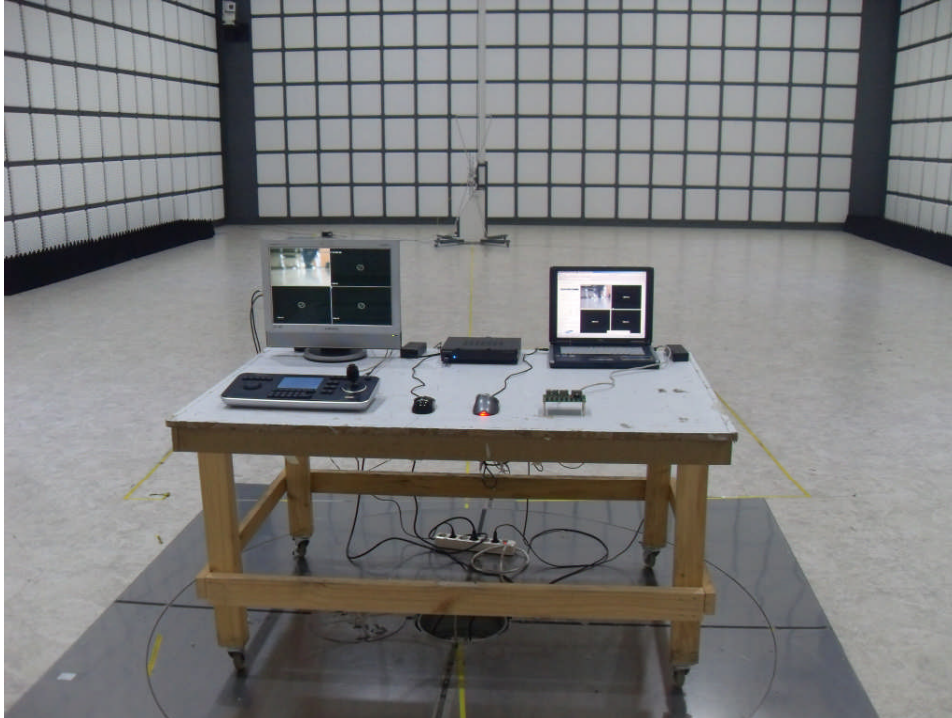
3 dB Att = 3 dB Attenuator

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

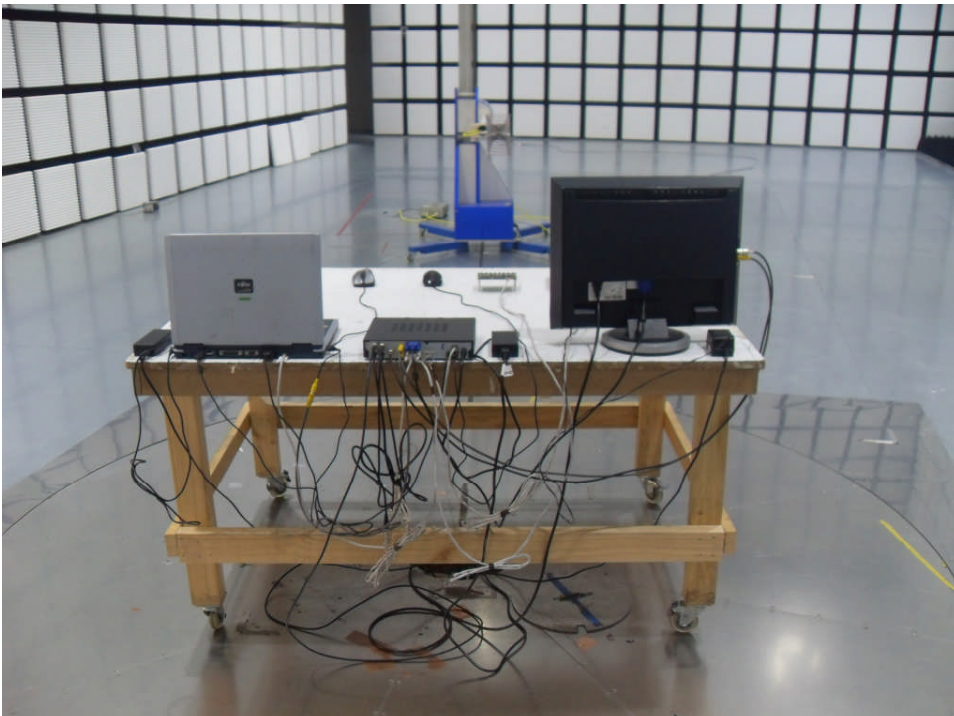
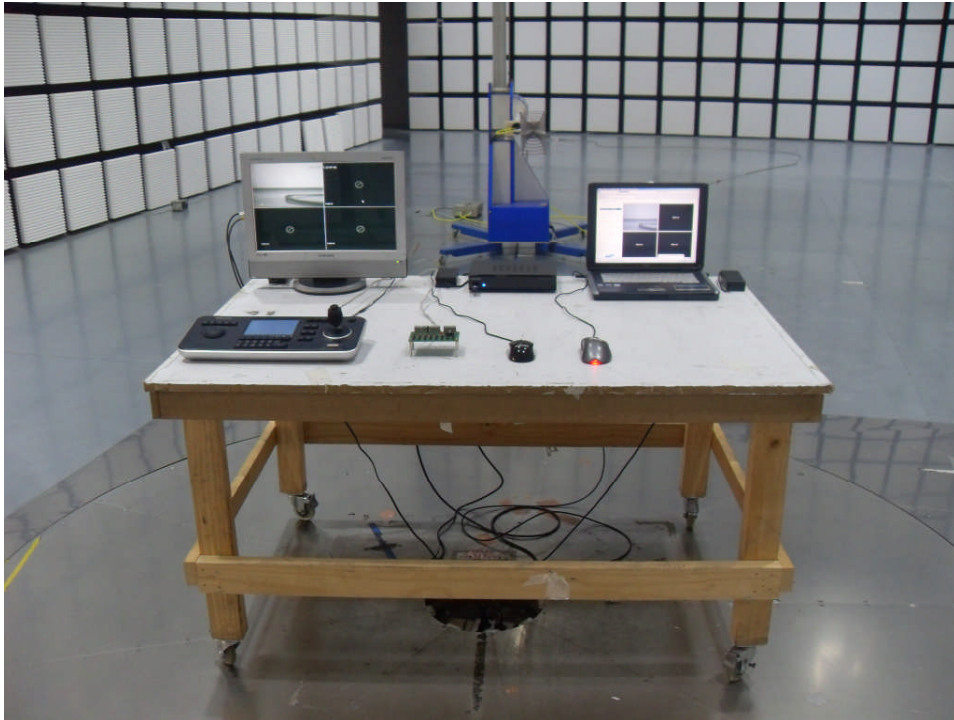
The result is $30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$

6.2.5 Photographs of test setup

* 30 MHz ~ 1 GHz



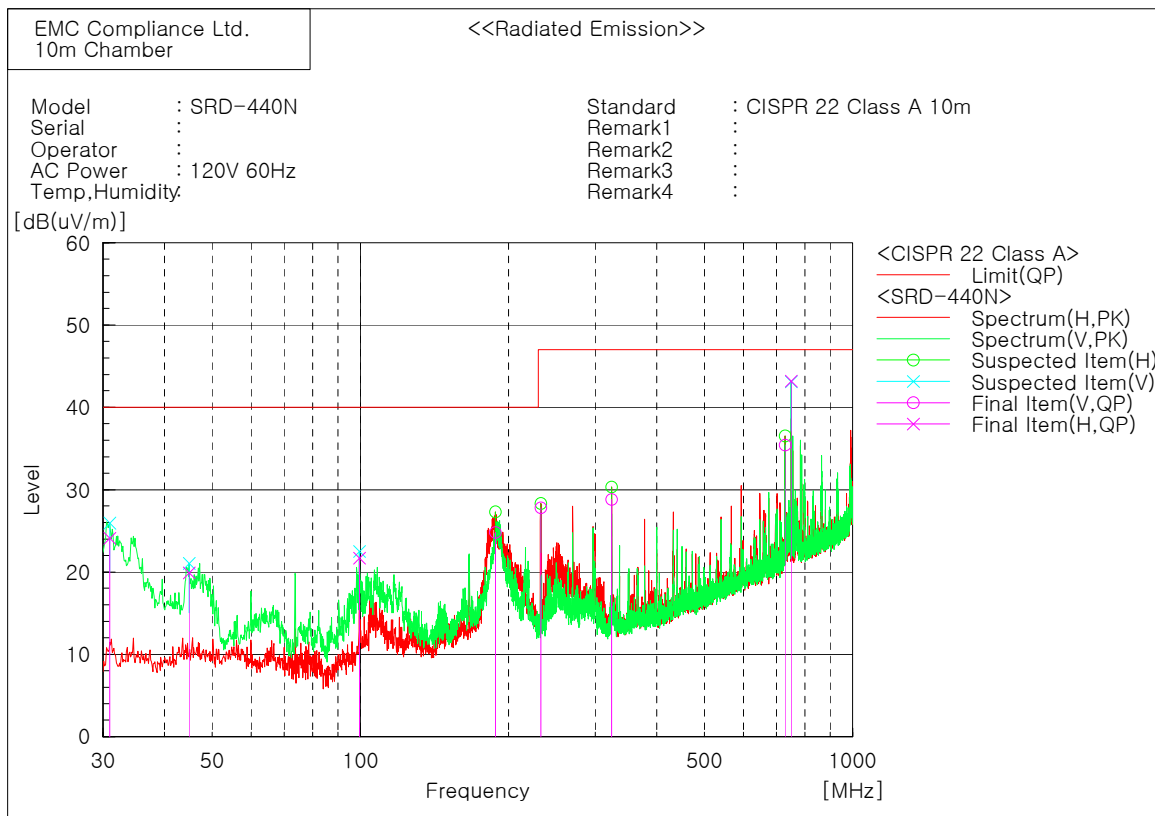
* 1 GHz ~ 2 GHz



6.2.6 Radiated emission measurement result

* Graph and Data

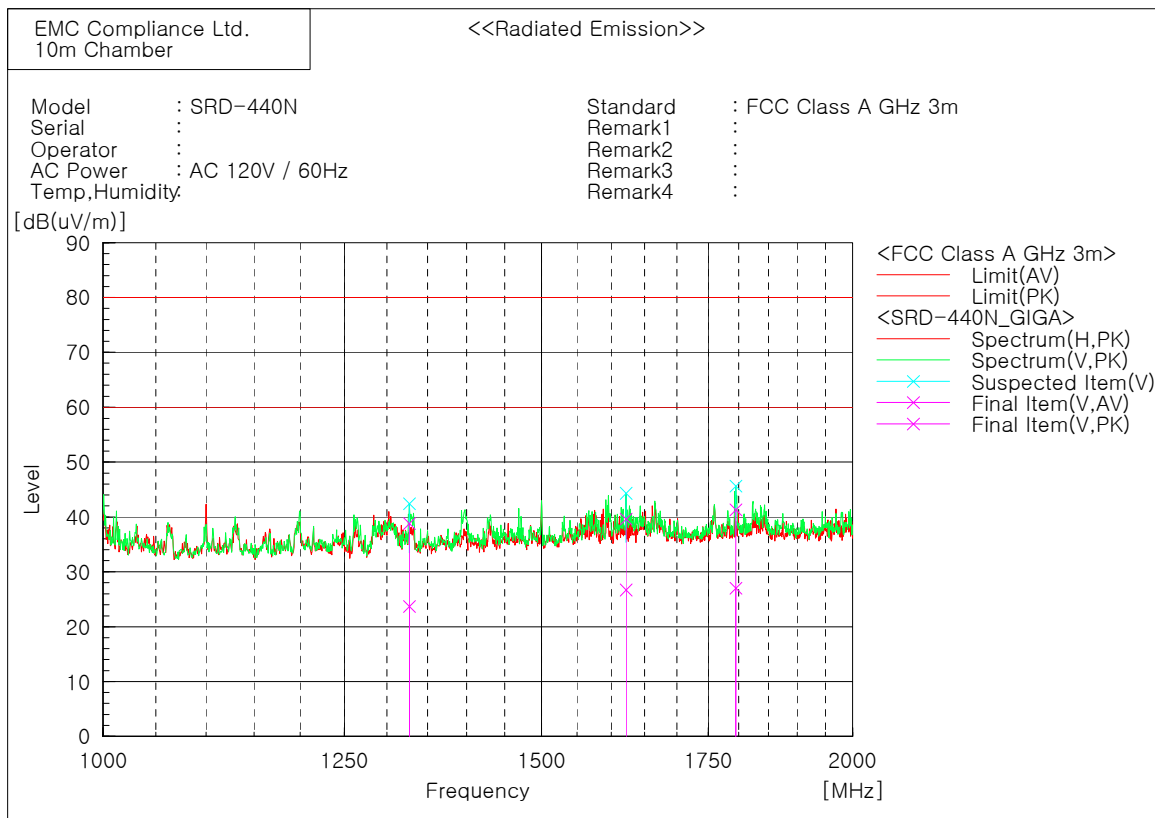
* 30 MHz ~ 1 GHz



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	30.970	V	42.0	-17.9	24.1	40.0	15.9	199.0	282.4
2	44.914	V	36.4	-16.5	19.9	40.0	20.1	400.0	102.0
3	99.598	V	41.0	-19.3	21.7	40.0	18.3	100.0	116.4
4	187.989	H	42.0	-17.2	24.8	40.0	15.2	400.0	72.6
5	232.609	H	44.6	-16.8	27.8	47.0	19.2	400.0	32.3
6	324.031	H	42.2	-13.4	28.8	47.0	18.2	400.0	225.0
7	729.128	H	40.1	-4.7	35.4	47.0	11.6	201.0	69.9
8	749.983	V	47.5	-4.3	43.2	47.0	3.8	199.0	328.7

* 1 GHz ~ 2 GHz



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	1327.500	V	36.3	51.4	-12.6	23.7	38.8	60.0	80.0	36.3	41.2	100.0	177.5
2	1621.875	V	37.2	50.1	-10.5	26.7	39.6	60.0	80.0	33.3	40.4	100.0	34.7
3	1795.000	V	36.5	50.8	-9.5	27.0	41.3	60.0	80.0	33.0	38.7	100.0	311.7

7. E.U.T. photographs

Front View



Rear View



Left View



Right View



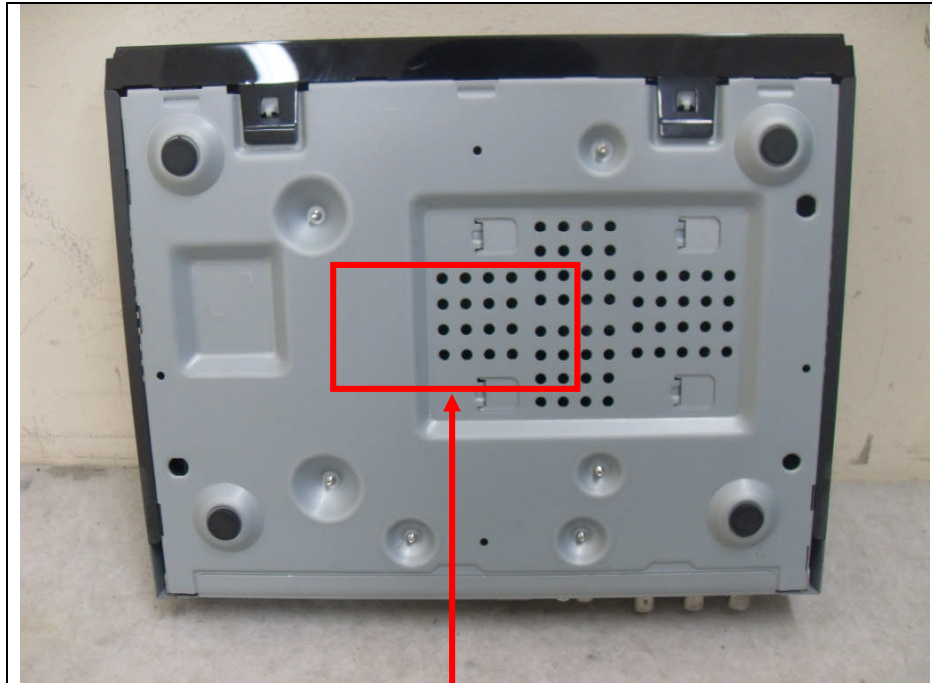
Top View



Bottom View



Label



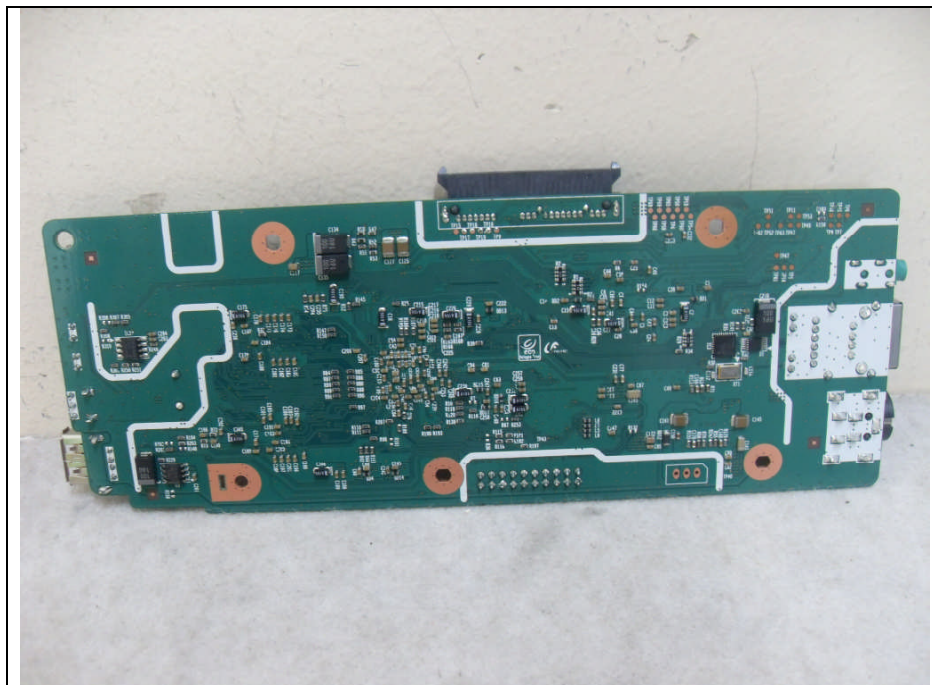
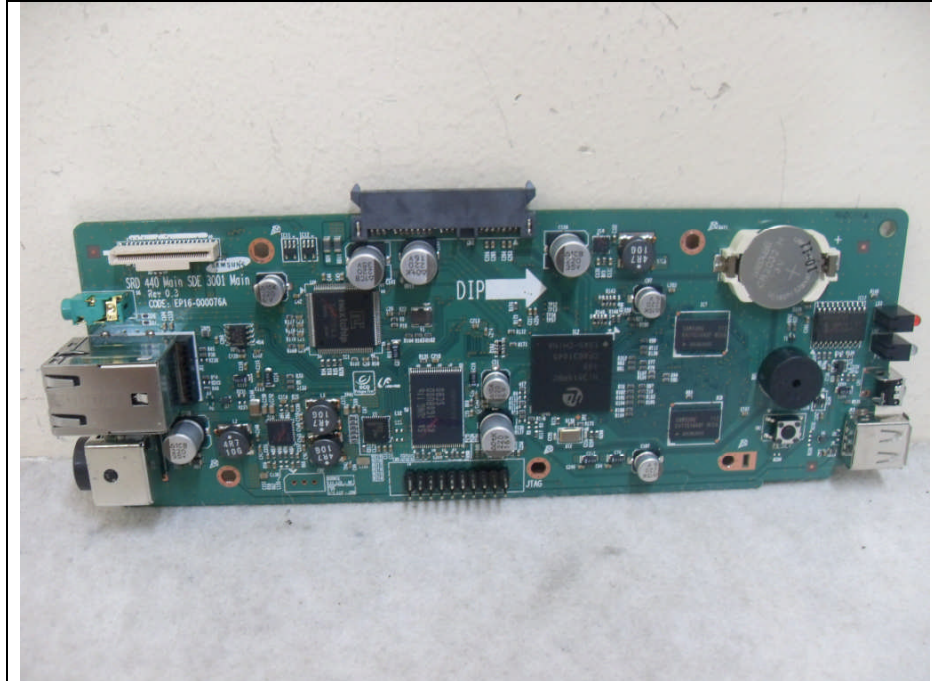
FCC Label Location

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.

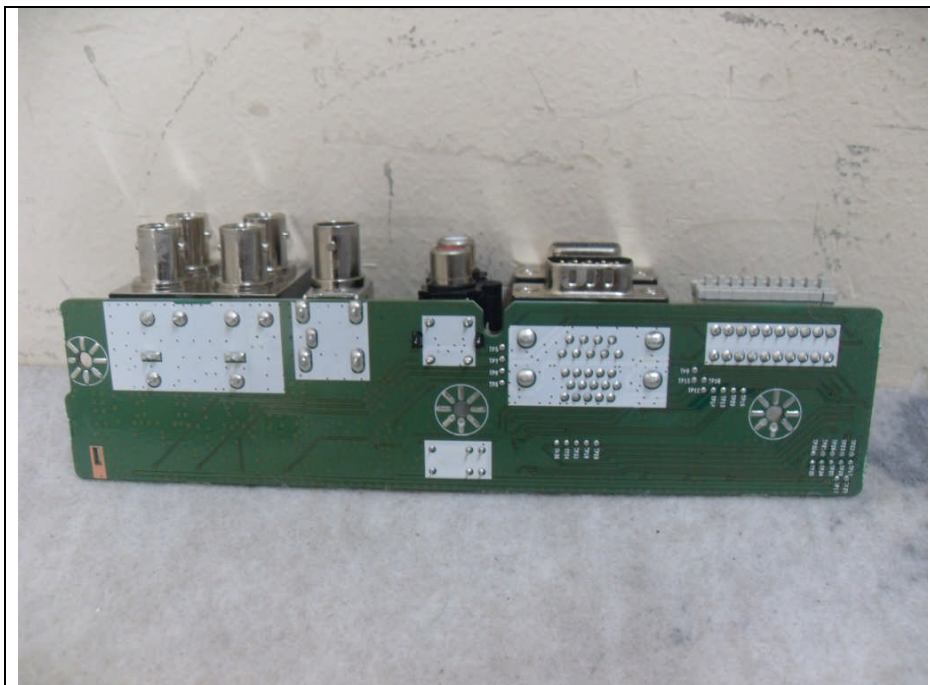
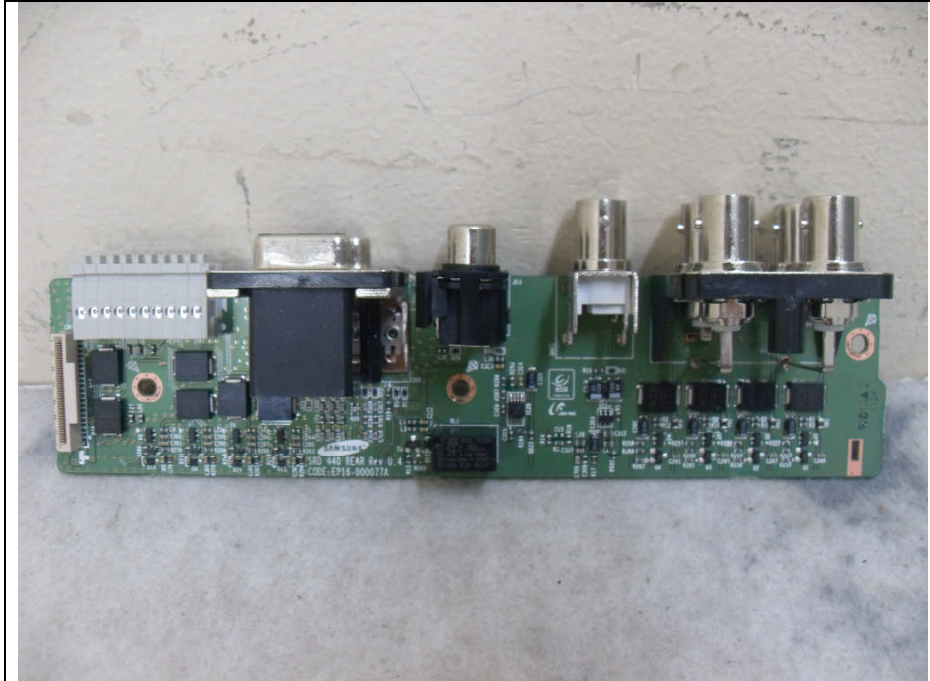
Inside



Main Board



Rear Board



HDD(500GB)



Adaptor

