

CERTIFICATE of EMC Compliance

Report No: EMC-FCC-1256
Type of equipment: NVR
Model Name: SRN-1670DN
Variant Model Name: SRN-1671N
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.

Laboratory

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

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Yeom, Han-Seok / Manager

EMI TEST REPORT

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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. 03. 14

Date of testing: 2011. 03. 15

Issued date: 2011. 03. 25

Tested by:

SUNG, KI-MUN

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	6
4. Description of E.U.T.	7
4.1 General information.....	7
4.2 Product description	9
4.3 Auxiliary equipments.....	9
4.4 Test configuration	10
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 Conducted Emission	13
6.2 Radiated Emission	19
7. E.U.T. photographs.....	25

1. Applicant information

Applicant: Samsung Techwin Co., Ltd.
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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 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

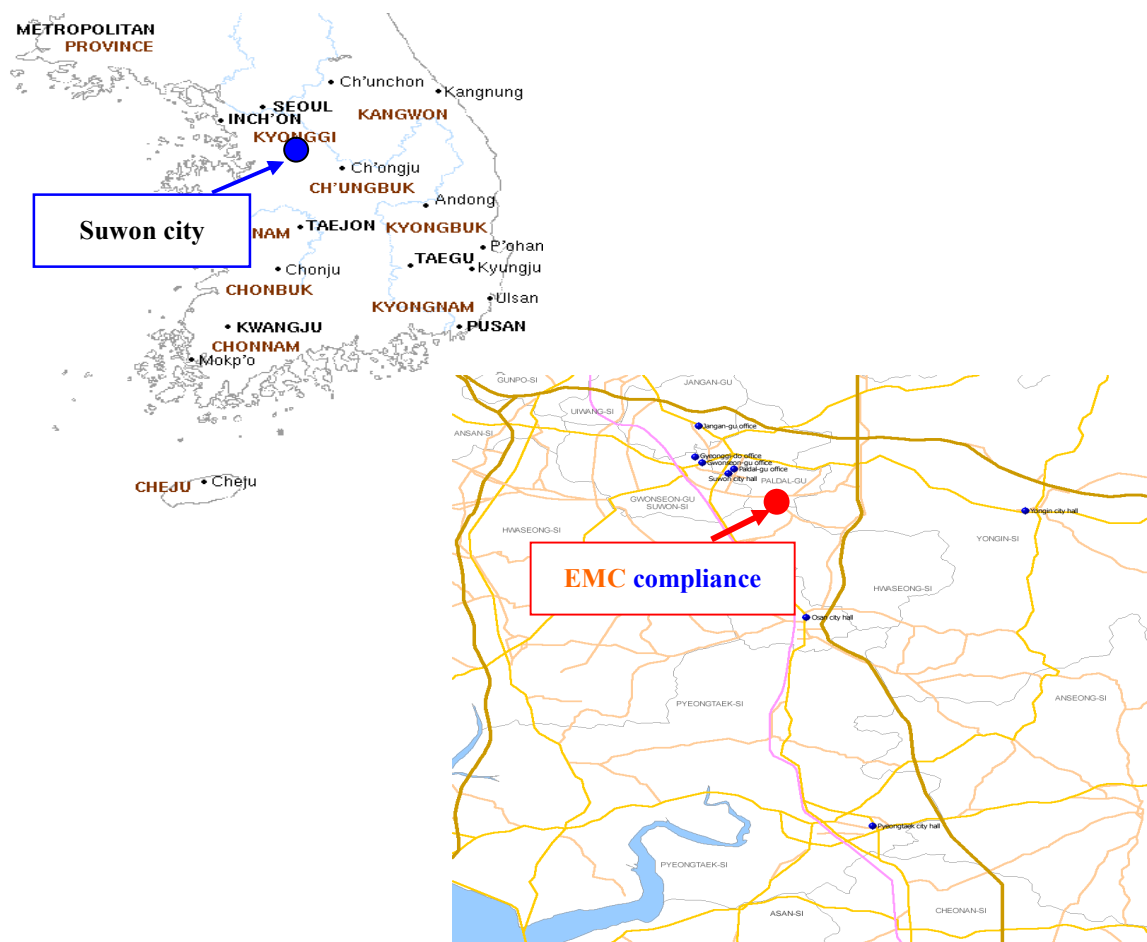
FCC CAB.: KR0040

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)	: 21 °C	22 % R.H.	-
Shielded room(CE)	: 20 °C	22 % R.H.	-

Test site

These testing items were performed following locations;

Shielded Room : Conducted Emission
Chamber (10 m) : Radiated Emission (Test distance: 3 m, 10 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: ± 3.95 [dB]

150 kHz ~ 30 MHz: ± 3.55 [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

SRN-1670DN		
N/W Camera	Inputs	Up to 16CH (4CIF 480/400fps)
	Resolution	VGA, 4CIF, 1.3M, 2M, 3M
	Protocols	Samsung
Live	Multi Screen display	1/4/8/9/13/16, Sequence
Performance		
Operating System	Embedded	Linux
Recording	Compression	H.264, MJPEG
	Recording bit rate	48Mbps
	Record Rate	NTSC: Up to 60fps @3M PAL: Up to 50fps @3M
		NTSC: Up to 120fps @1.3M, 2M PAL: Up to 100fps @1.3M, 2M
		NTSC: Up to 120fps @1280 x 720 (1M) PAL: Up to 100fps @1280 x 720 (1M)
		NTSC: Up to 480fps @704 x 480 (4CIF) PAL: Up to 400fps @704 x 576 (4CIF)
	Mode/NTSC	Manual, Schedule (Continuous/Event), Event(Pre/Post)
	Mode/PAL	Manual, Schedule (Continuous/Event), Event(Pre/Post)
	Overwrite modes	Continuous
	Pre-alarm	Up to 30 sec. (5,10,20,30 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 & Playback	Playback speed	NTSC: Up to 15fps @3M PAL: Up to 12.5fps @3M
		NTSC: Up to 30fps @1.3M, 2M PAL: Up to 25fps @1.3M, 2M
		NTSC: Up to 60fps @1280 x 720 (1M) PAL: Up to 50fps @1280 x 720 (1M)
		NTSC: Up to 120fps @704 x 480 (4CIF) PAL: Up to 100fps @704 x 576 (4CIF)
	Search mode	Date/time, Event, Back up (* All Search Included Preview Function)
Network	Playback function	Fast Forward/Backward, Slow Forward/Backward, Step Forward/Backward
	Ethernet	Gigabit Ethernet x 2
	Transmission speed	Up to 48Mbps, Unlimited(48M)/2/1.5/1 Mbps/800/600/500/400/300/200/100/50 kbps
	Bandwidth control	Automatic
	Remote users Maximum	Search(3)/Live Unicast(10)/Live Multicast(20)
	Protocol support	TCP/IP, DHCP, PPPoE, SMTP, NTP, HTTP, DDNS, RTP, RTSP
	Monitoring	Net-i Viewer, Webviewer
Storage	Internal HDD	Up to 5 SATA HDDs
	External HDD	e-SATA Interface
	DVD Writer (Back-up)	YES
	USB (Back-up)	3 USB Ports
	File Format (Back-up)	BU(NVR Player), EXE(Include Player)
Security	Password Protection	1 Admin, 10 Group, 20 User per 1 Group, User can be assigned authority for function
	Data Authentication	Watermark
Interface		
Monitors	VGA	Analog RGB 1280x1024(60Hz) resolution
	HDMI	720p/1080p(60Hz) resolution
	Main Composite	N/A
	Spot Composite	N/A
	Loop Outputs	N/A
Audio	Inputs	N/A (Network Audio support, up to 16CH)
	Output	RCA x1
	Compression	G.711/723/728
	Sampling rate	N/A
Alarm	Inputs	Terminal 16 inputs, NO/NC
	Outputs	Terminal 4 relay outputs, NO/NC
	Remote notification	Notification via e-mail
Connections	Ethernet	2 RJ45 10/100/1000 Base-T

	Serial interface	N/A
	PTZ control interface	N/A
	PTZ Keyboard	N/A
	USB	USB 2.0, 3 ports
	e-SATA	2 ports
	Application Support	Mouse, Remote Controller
Dome Protocols	Supported PTZ cameras	Samsung Network Products(Network PTZ)
General		
Electrical	Input Voltage/Current	100 to 240 VAC $\pm 10\%$; 50/60 Hz, Autoranging
	Power consumption	Max. 60 W (with 1x HDD)
Environmental	Operating Temperature/ Humidity	+0°C to +40°C (+32°F to +104°F) / 20% to 85% RH
Mechanical	Dimension (W x H x D)	440 x 88 x 430 mm (17.32" x 3.48" x 16.93")
	Weight (With hard disks)	Approx. 7.5 kg (16.53 lb)
	Rack mount kit	2 EA
Language		Korean, Japanese, Chinese, English, French, German, Spanish, Italian, Russian, Polish, Czech, Turkish, Netherlands, Portuguese, Swedish, Danish, Thai, Rumanian, Serbia, Croatia, Hungary, Greek (22 Language)

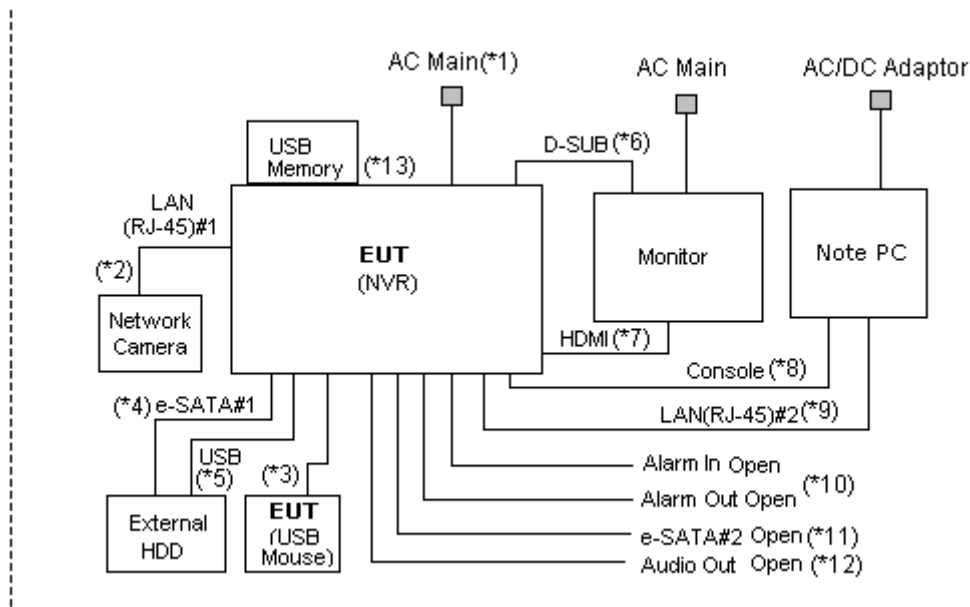
4.2 Product description

Type of product	NVR
Model name (Basic)	SRN-1670DN
Model name (Variant)	SRN-1671N
Difference	Buyer model names.
Serial no	Engineering Sample
Testing voltage	120 V , 60 Hz
Product rating	AC 100 - 240 V , 50 / 60 Hz
Internal clock frequency	800 MHz
Note	* This test was done with SRN-1670DN.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Note PC	C1410	463680121002	FUJITSU
Monitor	L245WPQ	711KCAS0A328	LG
Network Camera	SNB-5000	-	Samsung Techwin Co., Ltd.
External HDD(320GB)	MD1	001NMYSHX1354	LG
USB Memory(4GB)	KM4G	-	KINGMAX Digital INC

4.4 Test configuration



Note	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT (NVR)	Power	AC main	Power	1.6	Non-Shield
2		LAN(RJ-45)#1	Network Camera	LAN(RJ-45)	3.0	Non-Shield
3		USB	EUT (USB Mouse)	USB	1.7	Shield
4		e-SATA#1	External HDD	e-SATA	1.0	Shield
5		USB	External HDD	USB	1.5	Shield
6		D-SUB	Monitor	D-SUB	1.5	Shield
7		HDMI	Monitor	HDMI	2.0	Shield
8		Console	Note PC	RS-232	1.4	Non-Shield
9		LAN(RJ-45)#2	Note PC	LAN(RJ-45)	3.0	Non-Shield
10		Alarm In/Out	Open	-	3.0	Non-Shield
11		e-SATA#2	Open	-	1.0	Shield
12		Audio Out	Open	-	1.4	Shield
13		USB	USB Memory	USB	Direct	-

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 view test mode.
	REC 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

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. 03. 15		
Testing voltage	230 V, 50 Hz		
Test facility	Shielded room (CE#2)		
Temperature(°C)	20 °C	Humidity (% R.H.)	22 % R.H.
Remarks	Complied Minimum limit margin is 22.79 dB at 2.361 MHz. (Adaptor#2 _ Average)		

6.1.1 Limits of conducted emission measurement

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.

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	11.08.16	☒
LISN	ESH3-Z5	846125/024	R&S	11.08.04	☒
LISN	L3-32	0120J20305	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)]
0.210	0.09	0.02	H	79.00	41.71	41.82	66.00	33.73	33.84
0.213	0.07	0.02	N		40.55	40.64		34.16	34.25
0.318	0.07	0.03	N		23.59	23.69		18.07	18.17
0.423	0.08	0.02	H		19.15	19.25		13.42	13.52
6.870	0.24	0.06	H	73.00	45.92	46.22	60.00	37.80	38.10
7.280	0.23	0.06	N		45.89	46.18		37.99	38.28
7.850	0.27	0.07	N		45.41	45.75		38.16	38.50
8.360	0.26	0.07	H		44.29	44.62		36.88	37.21
22.030	0.56	0.10	N		45.82	46.48		27.12	27.78
26.043	0.84	0.11	H		45.92	46.87		26.39	27.34

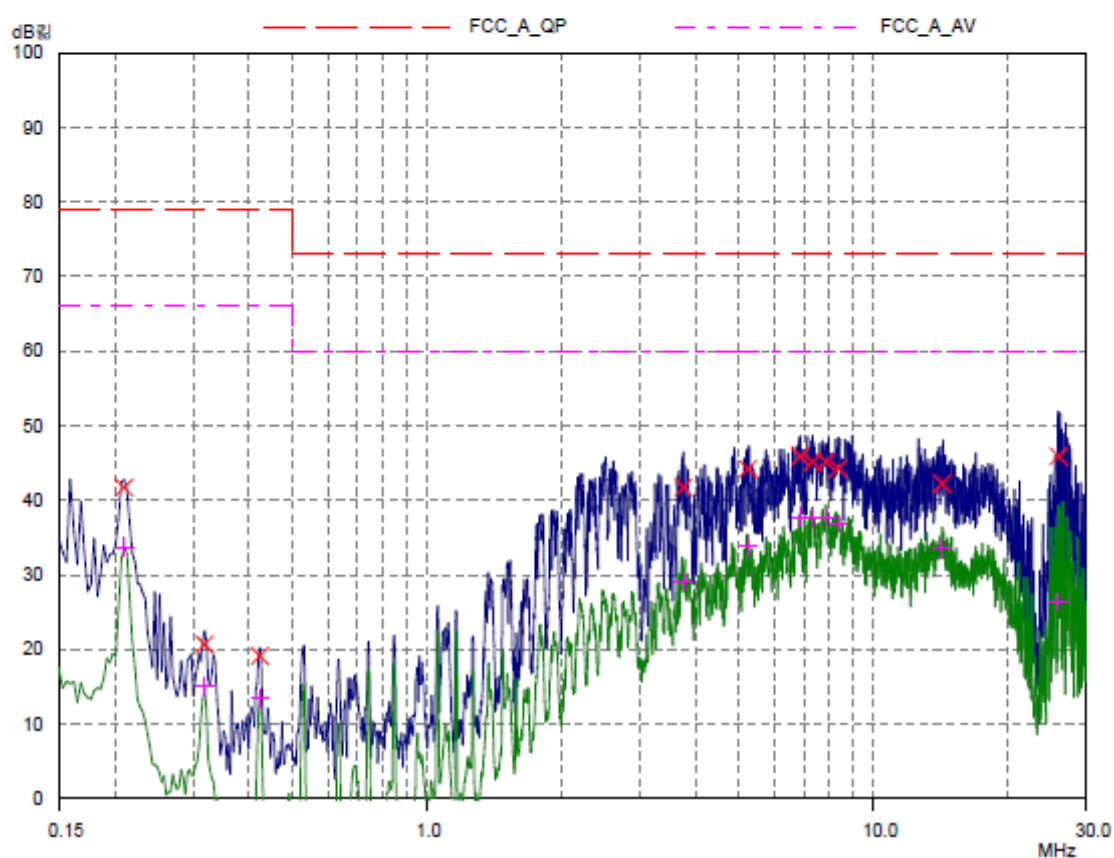
EUT: SRN-1670DN
Manuf:
Op Cond: H
Operator:
Test Spec: FCC Class A Conducted Emission
Comment:

Result File: sm_fh.dat : SRN-1670D

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	1msec	Auto	OFF	60dB

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



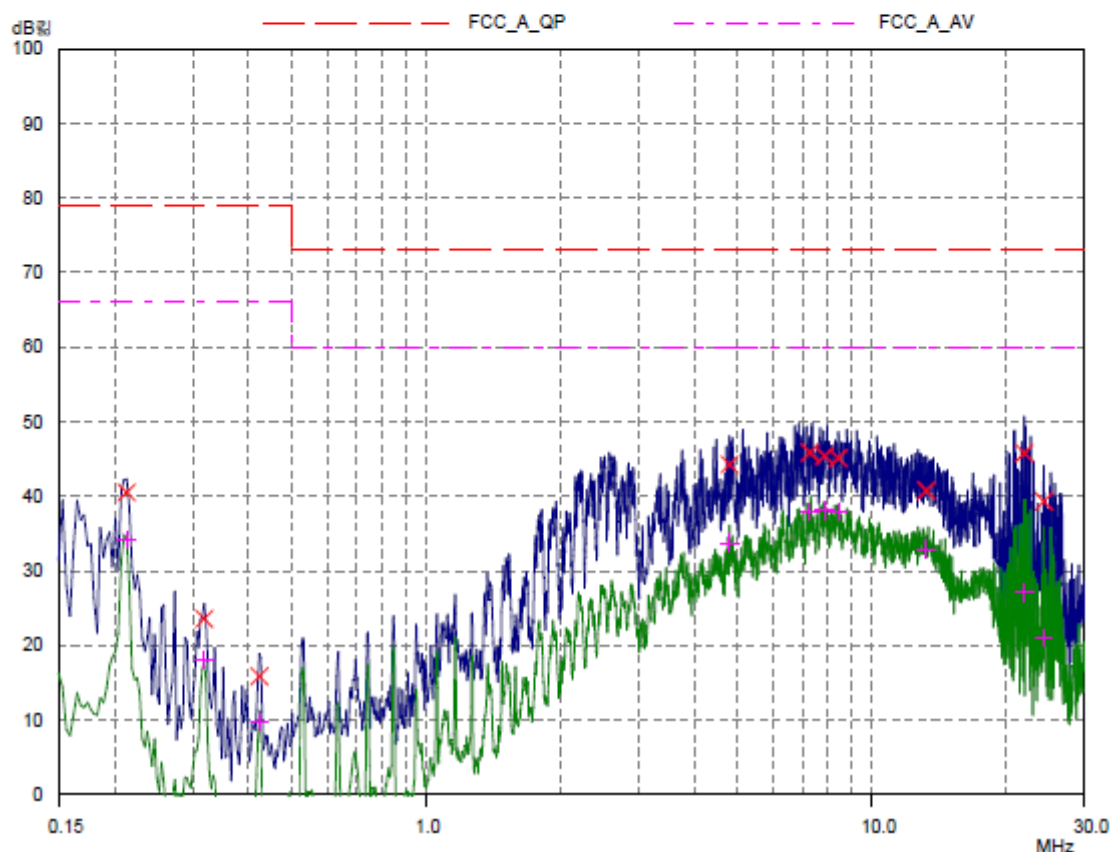
EUT: SRN-1670DN
Manuf:
Op Cond: N
Operator:
Test Spec: FCC Class A Conducted Emission
Comment:

Result File: sm_fn.dat : SRN-1670D

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	1msec	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. 03. 15		
Testing voltage	230 V, 50 Hz		
Test facility	10 m Chamber (Test distance: 3 m, 10 m)		
Temperature (°C)	21 °C	Humidity (% R.H.)	22 % R.H.
Remarks	Complied Minimum limit margin is 5.7 dB at 875.041 MHz. (30 MHz ~ 1 GHz) Minimum limit margin is 8.4 dB at 3000.039 MHz. (1 GHz ~ 4 GHz_Average)		

6.2.1 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 *

6.2.2 Measurement procedure

The test was done at a 3 m, 10 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	3008A02343	AGILENT	11.12.01	☒
Horn ANT	3115	00086706	ETS	11.12.22	☒

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

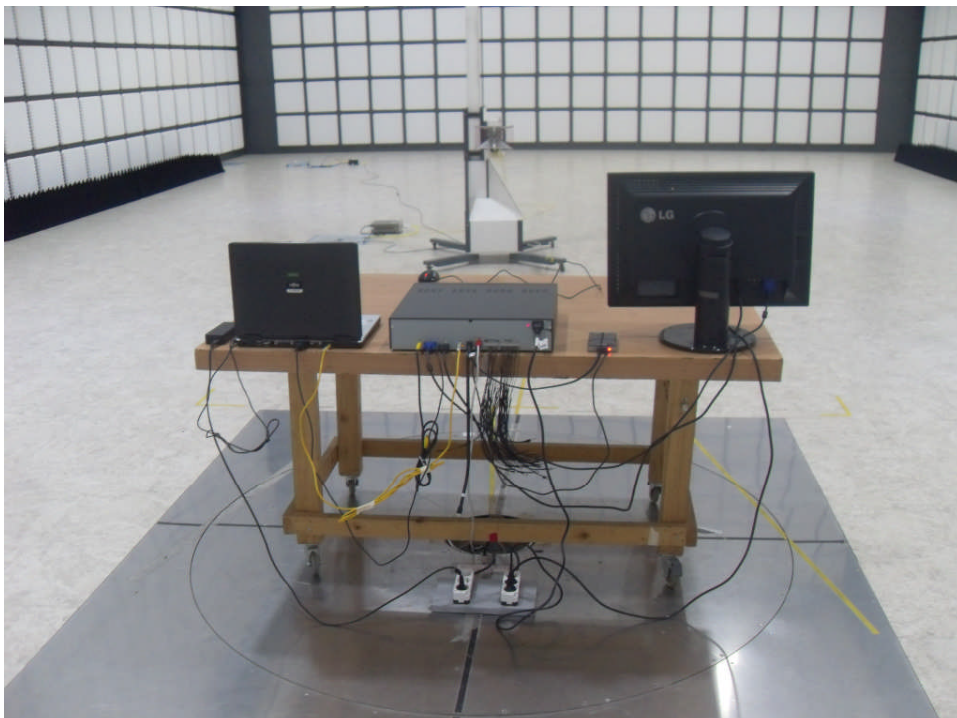
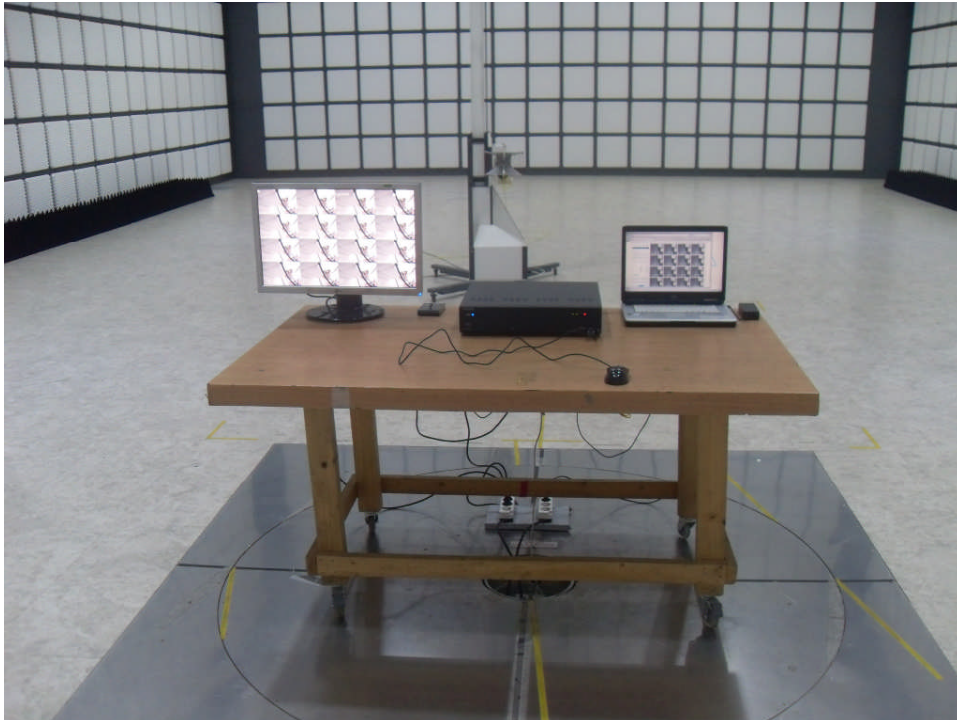
The result is $30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$

6.2.5 Photographs of test setup

* 30 MHz ~ 1 GHz



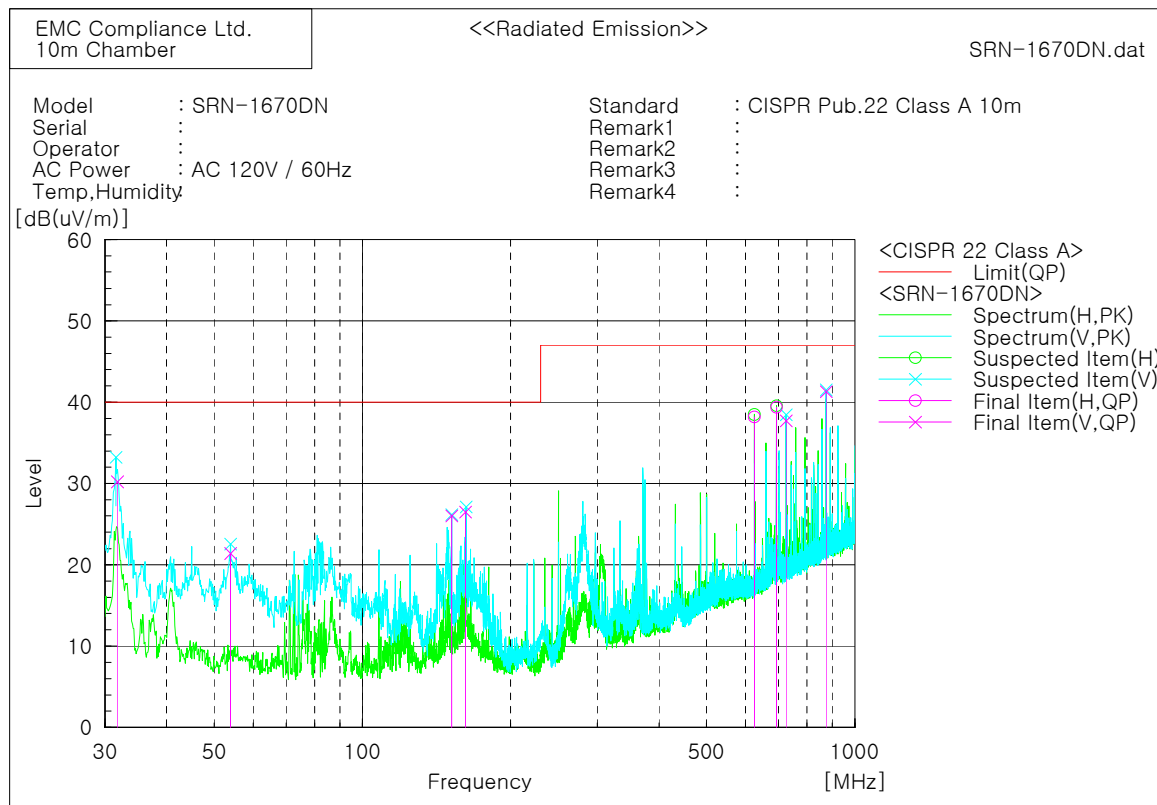
* 1 GHz ~ 4 GHz



6.2.6 Radiated emission measurement result

* Graph and Data

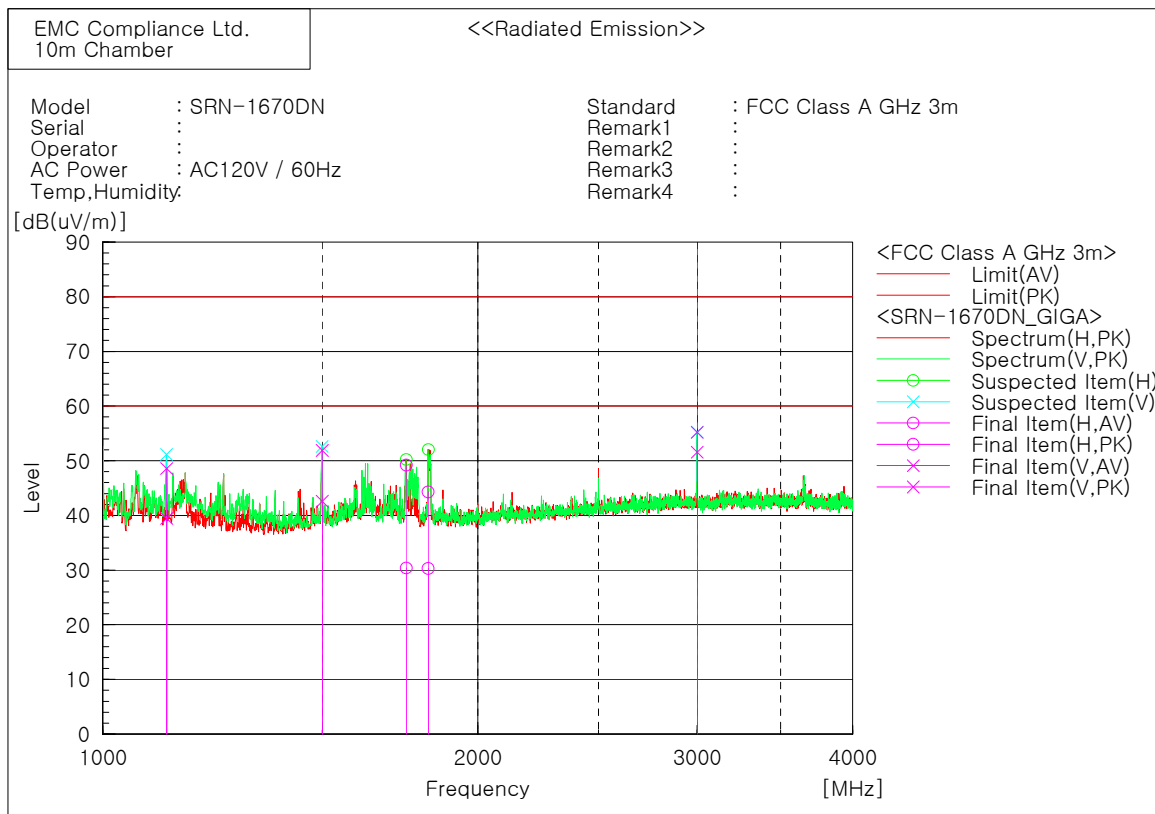
* 30 MHz ~ 1 GHz



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	31.792	V	49.8	-19.6	30.2	40.0	9.8	100.0	25.0
2	54.008	V	39.8	-18.4	21.4	40.0	18.6	301.0	58.7
3	151.856	V	42.9	-16.9	26.0	40.0	14.0	100.0	130.9
4	162.020	V	43.2	-16.7	26.5	40.0	13.5	100.0	127.9
5	625.033	H	46.5	-8.3	38.2	47.0	8.8	200.0	85.3
6	692.990	H	46.6	-7.2	39.4	47.0	7.6	200.0	137.5
7	726.004	V	44.5	-6.8	37.7	47.0	9.3	301.0	191.8
8	875.041	V	45.4	-4.1	41.3	47.0	5.7	201.0	351.6

* 1 GHz ~ 4 GHz

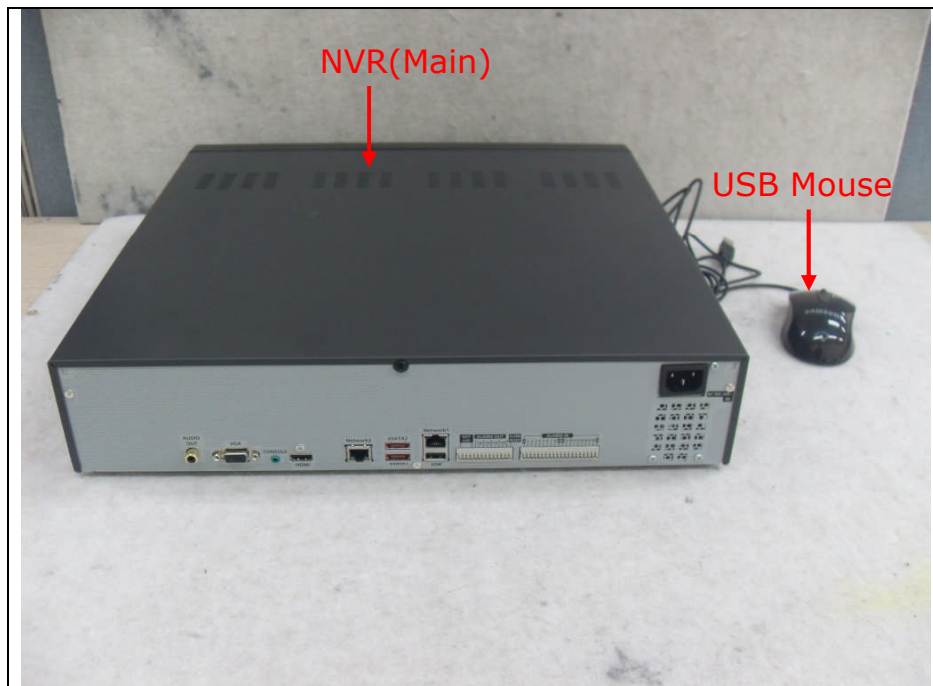
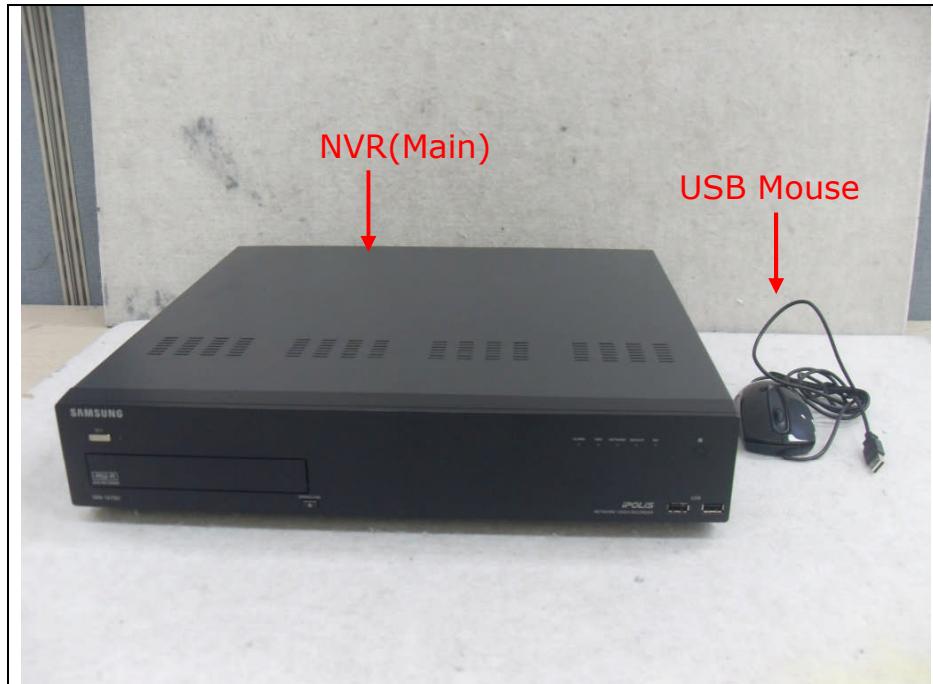


Final Result

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	1125.104	V	47.6	56.7	-8.1	39.5	48.6	60.0	80.0	20.5	31.4	100.0	203.2
2	1499.925	V	48.9	58.2	-6.3	42.6	51.9	60.0	80.0	17.4	28.1	100.0	349.5
3	1752.250	H	35.4	54.2	-5.0	30.4	49.2	60.0	80.0	29.6	30.8	100.0	105.1
4	1824.440	H	34.9	48.9	-4.6	30.3	44.3	60.0	80.0	29.7	35.7	100.0	187.0
5	3000.039	V	51.4	55.0	0.2	51.6	55.2	60.0	80.0	8.4	24.8	100.0	224.1

7. E.U.T. photographs

Whole



* NVR(Main)

Front View



Rear View



Left View



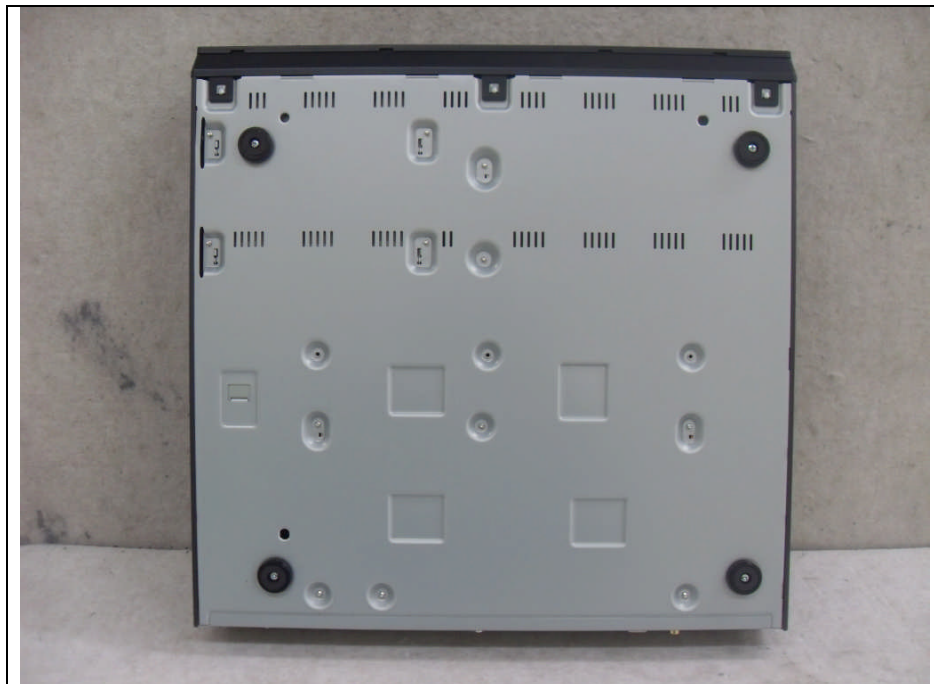
Right View



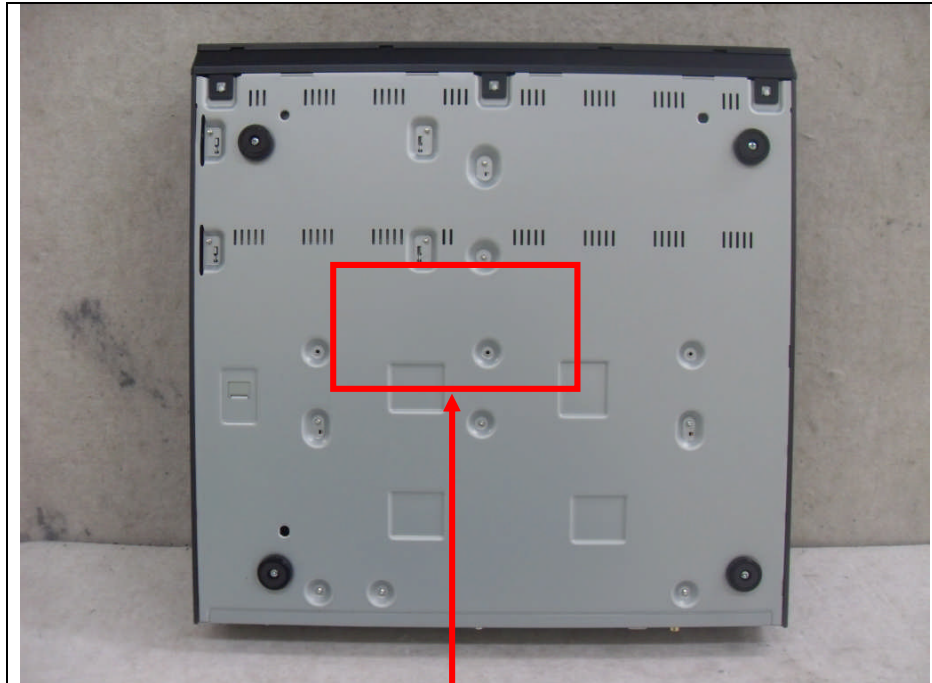
Top View



Bottom View



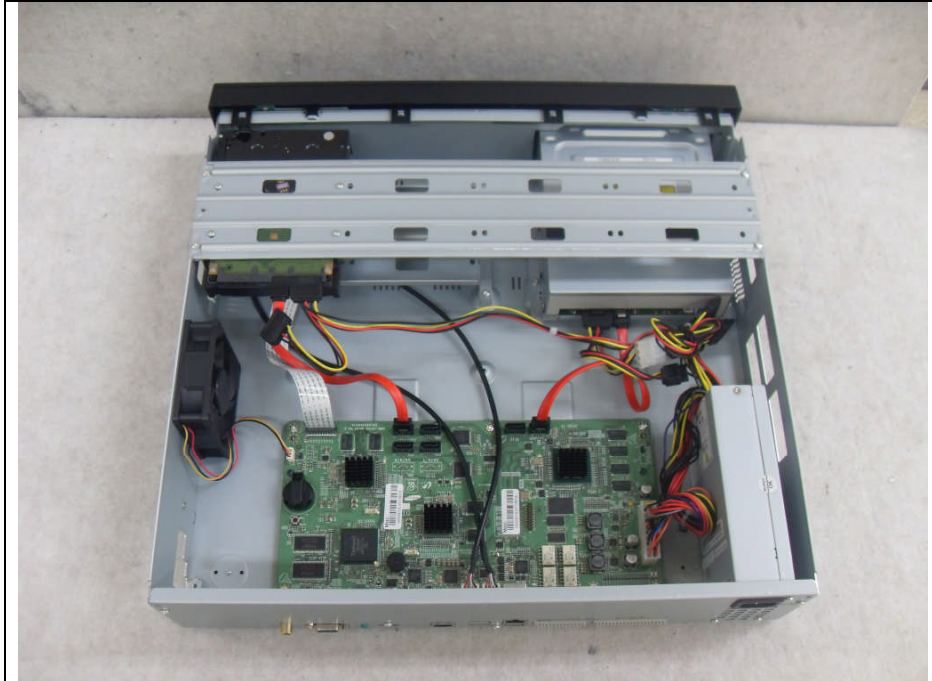
Label



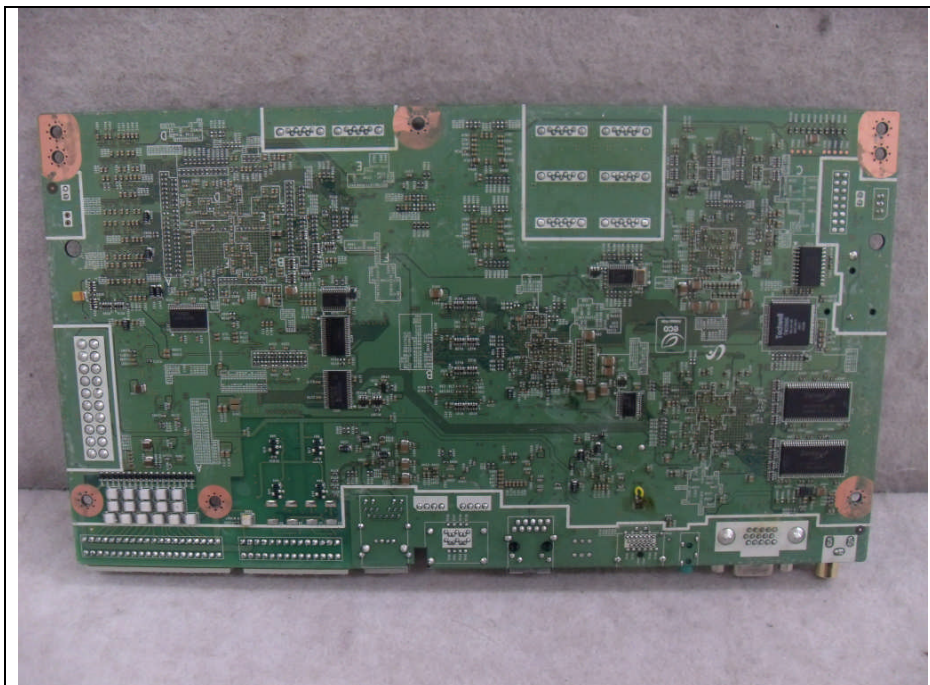
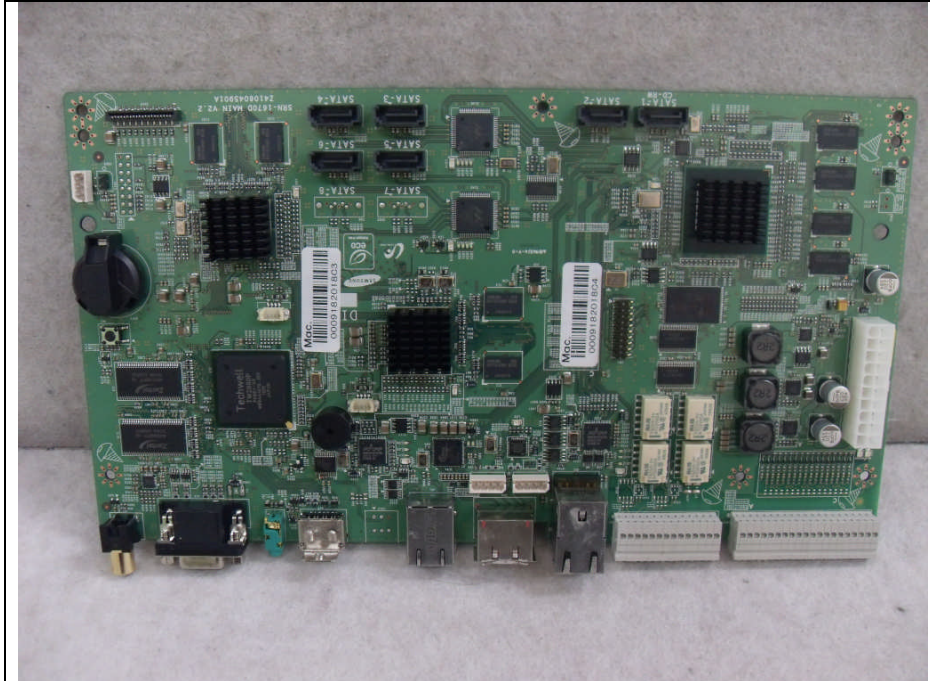
FCC Label Location

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.

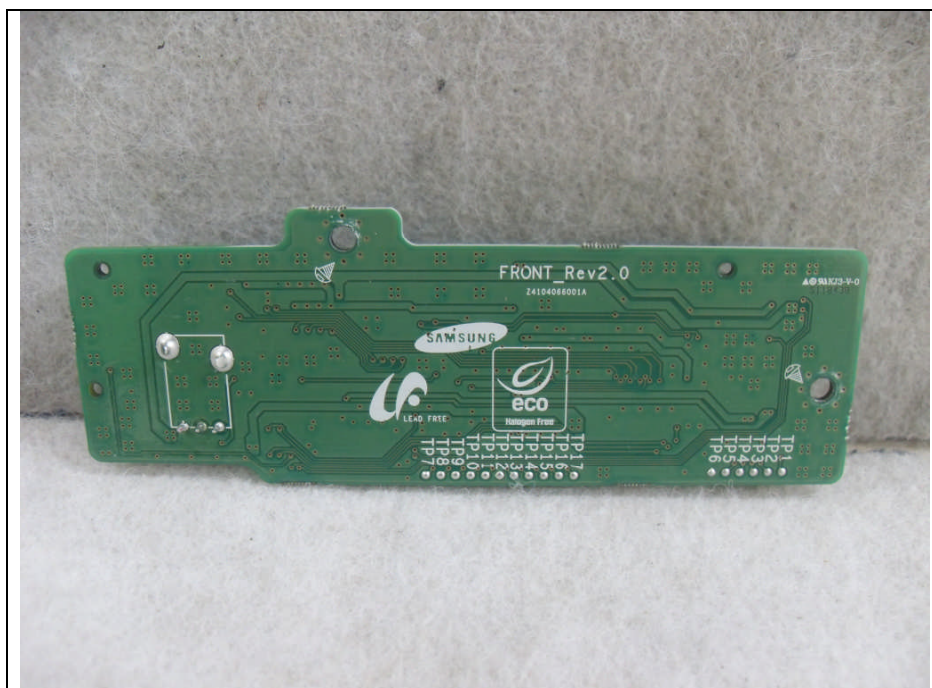
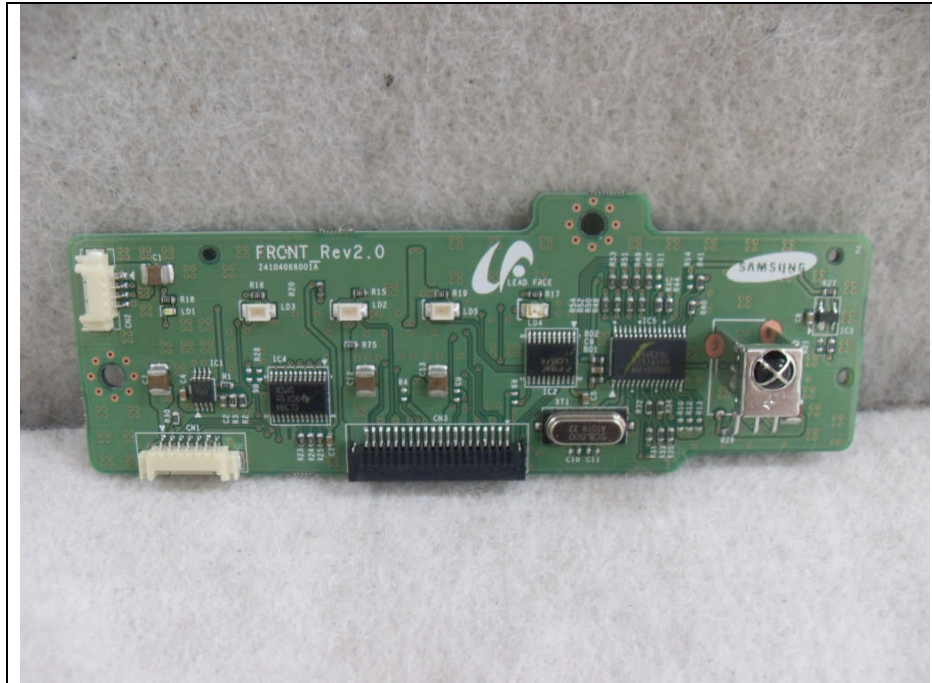
Inside



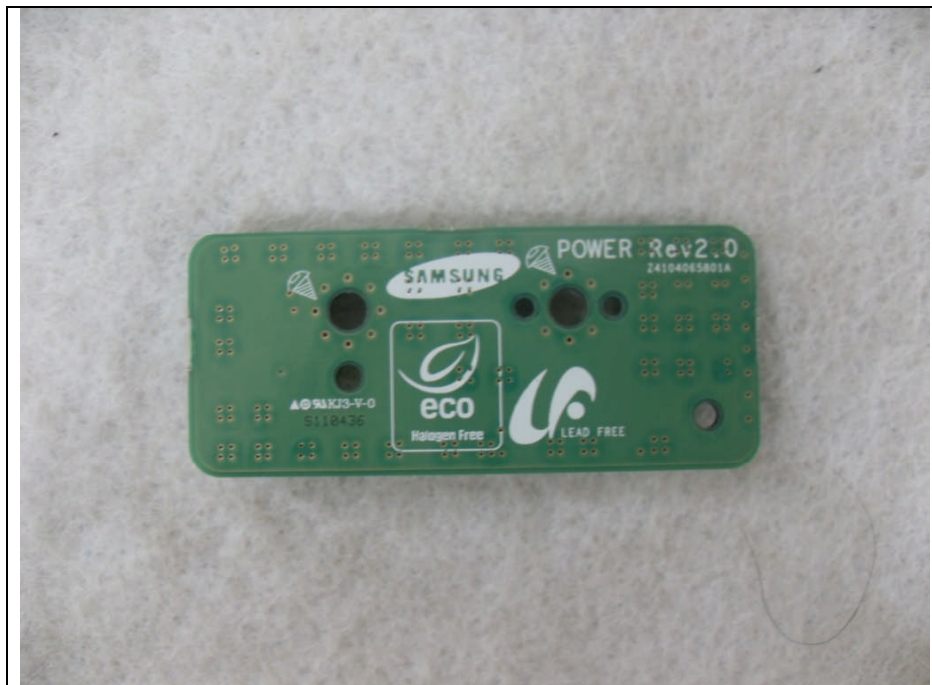
Main Board



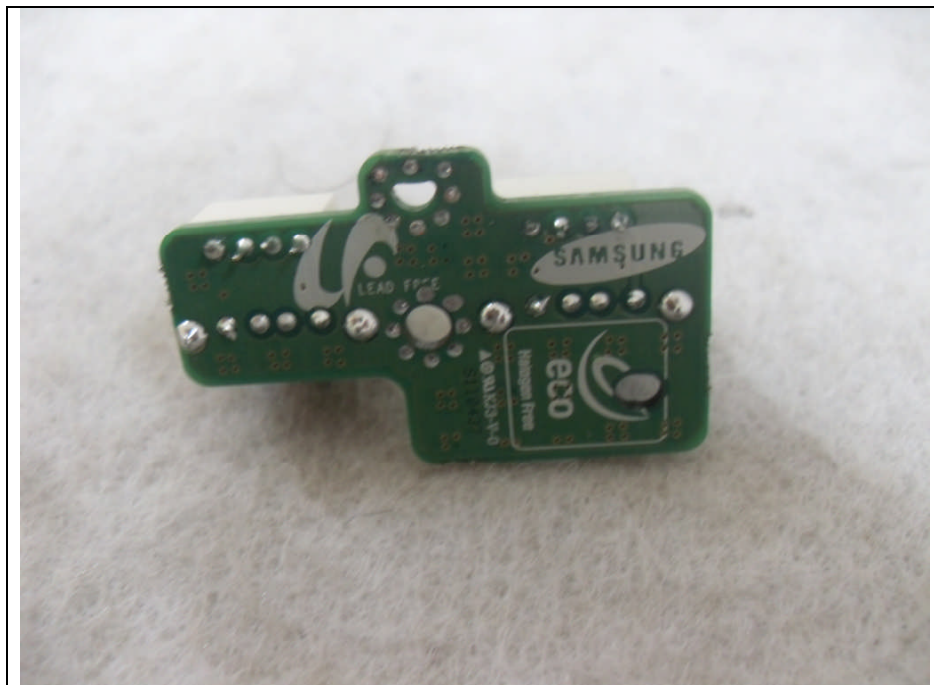
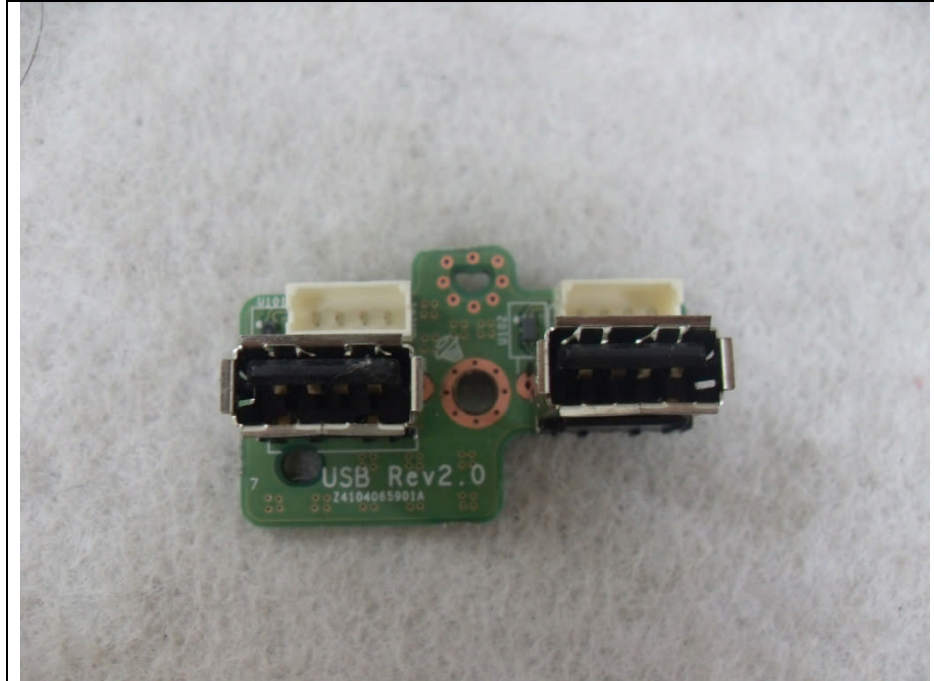
Front Board



USB Board

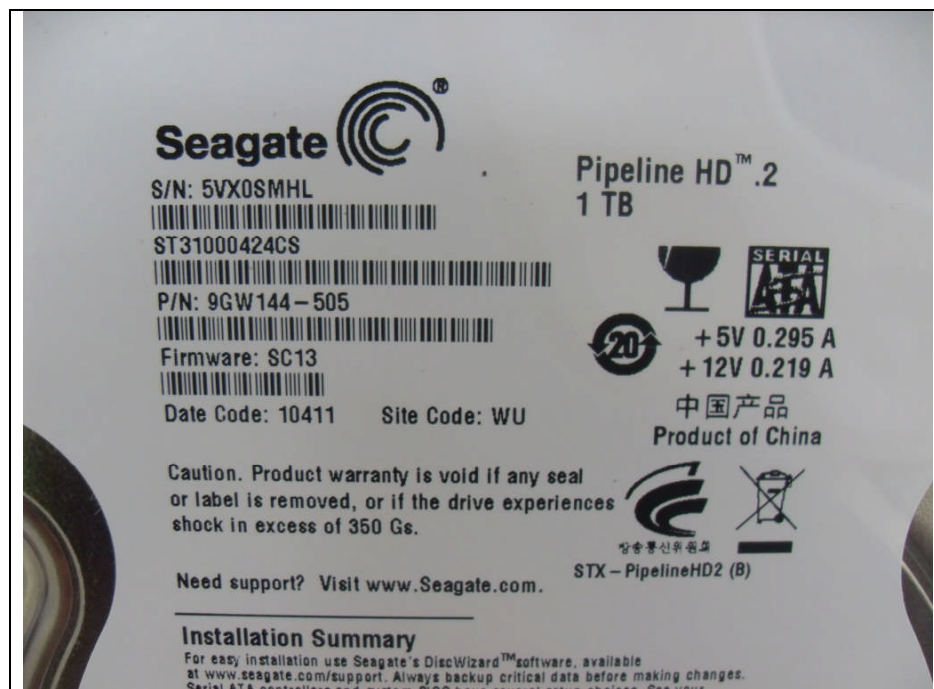


USB Board



HDD(1TB)



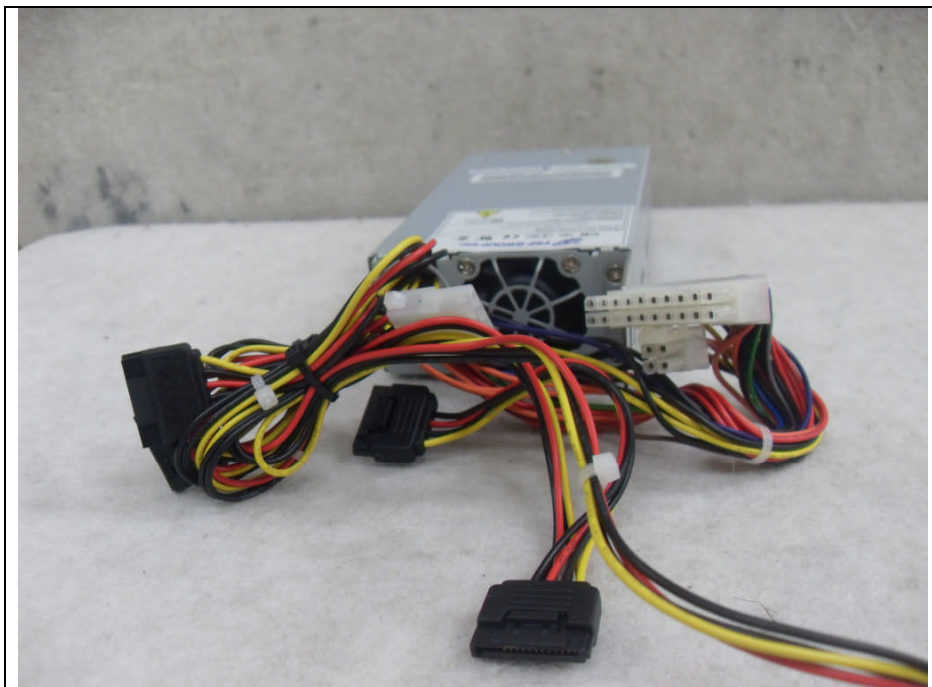


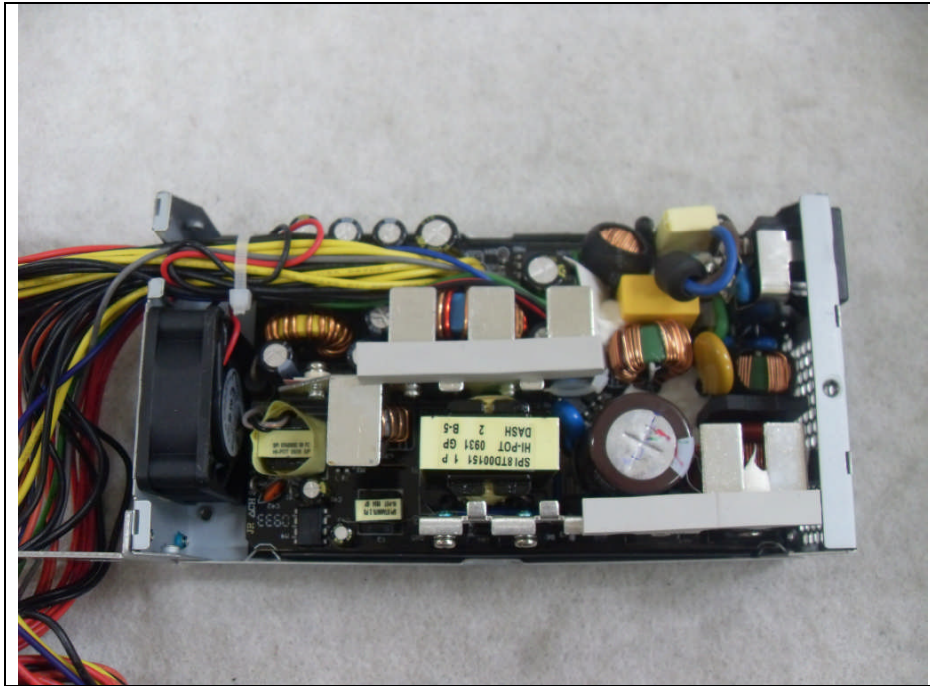
ODD

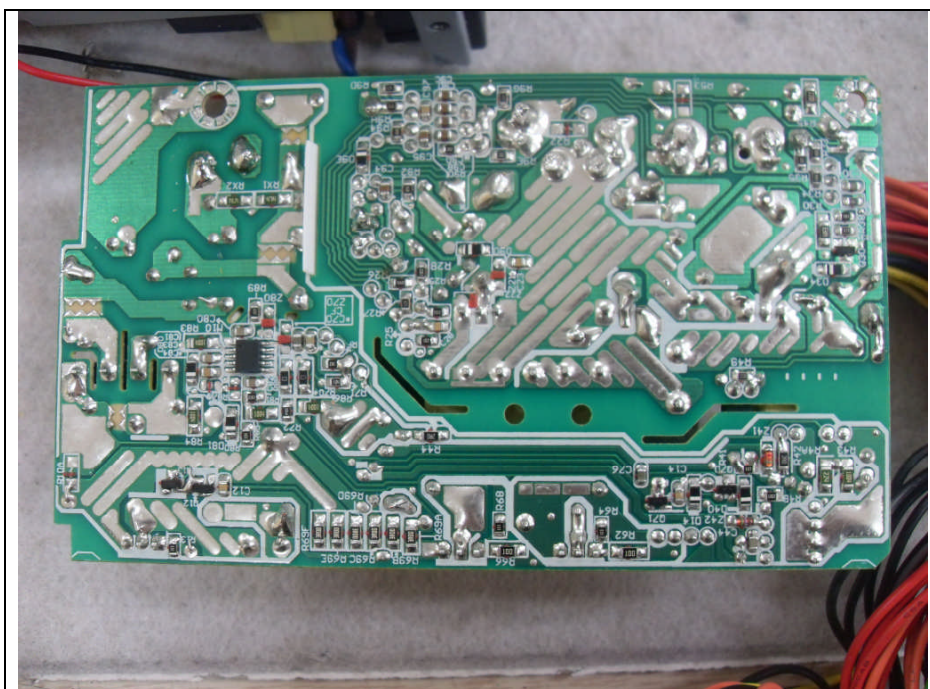
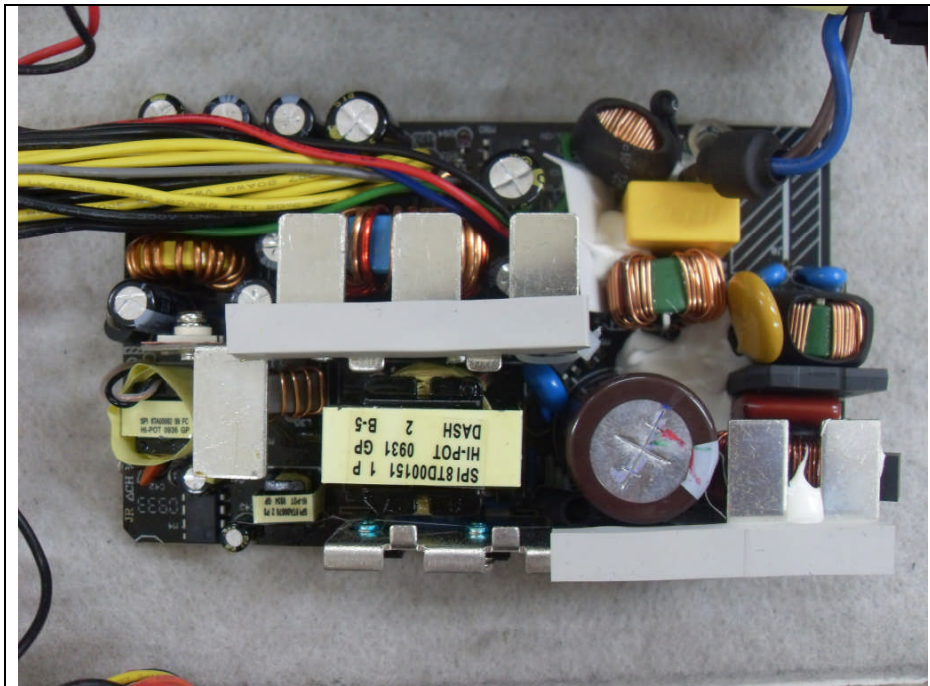




Power







*** USB Mouse**

Front View



Rear View



Left View



Right View



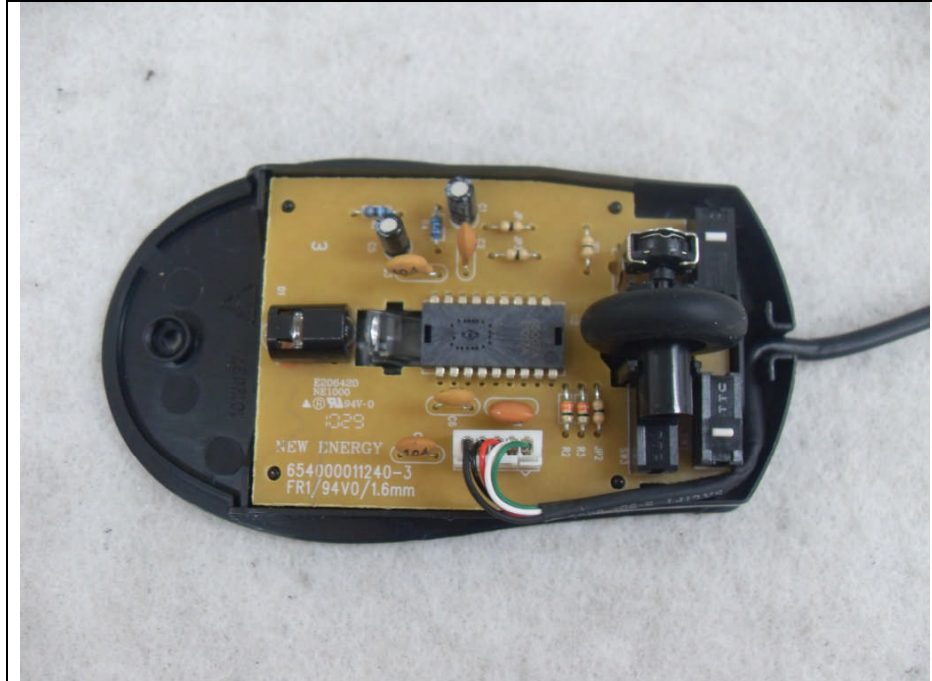
Top View



Bottom View



Inside



Main Board

