

CERTIFICATE of EMC Compliance

Report No : EMC-FCC-2066
Type of equipment : Digital Video Recorder
Model Name : SRD-880DN
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.

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

Test report No : EMC-FCC-2066
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No.11 Weiliu Road. Micro-Electronic Industrial
Park Jingang Road Tianjin 300385, China
Test standards : FCC part 15 subpart B, Class A
Classification : Verification
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: 2013. 07. 03

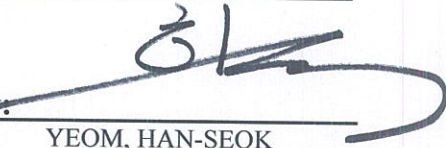
Date of testing: 2013. 10. 08

Issued date: 2013. 10. 15

Tested by:


KIM, JIN-WON

Approved by:


YEOM, HAN-SEOK

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1. Applicant information

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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: 82 505 299 8311

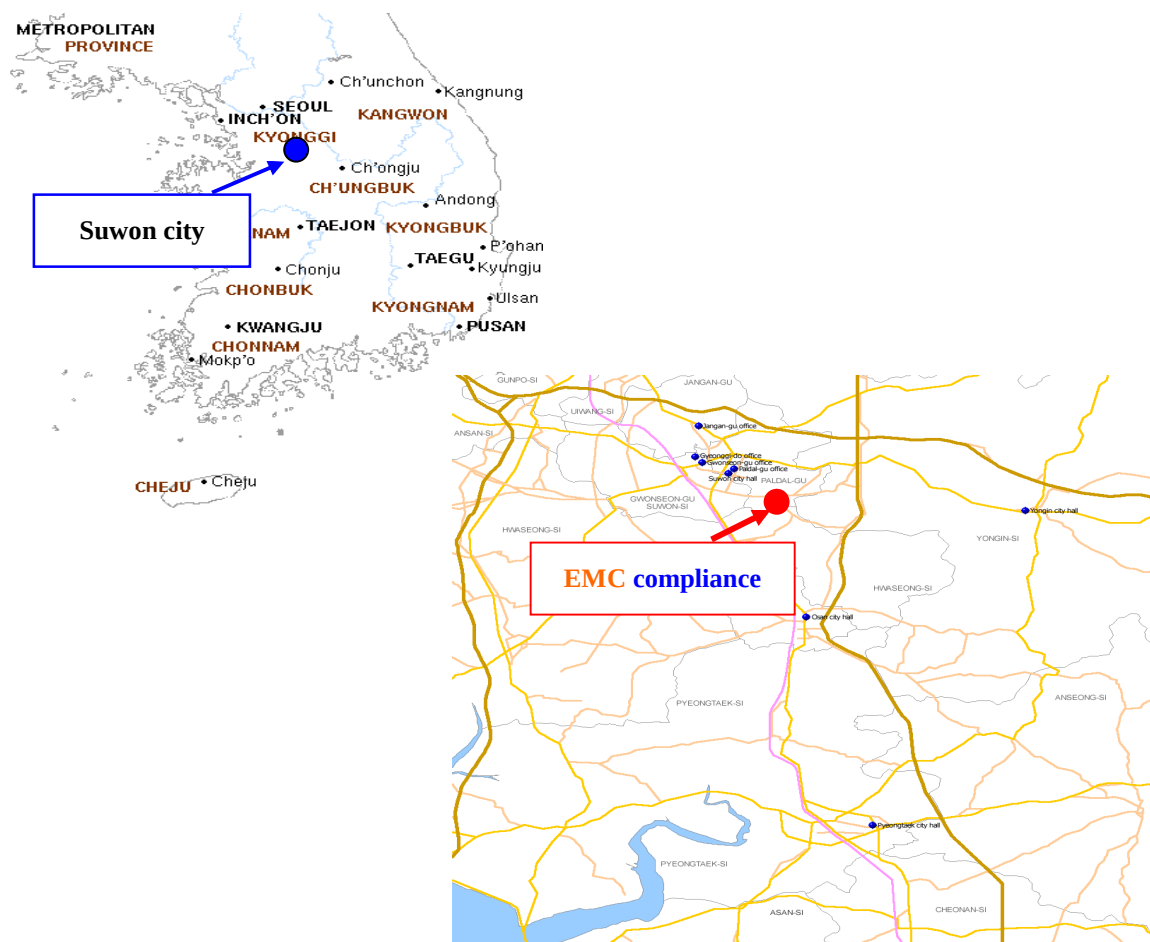
FCC CAB.: KR0040

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)	: 23 °C	61 % R.H.	-
Shielded room(CE)	: 26 °C	38 % 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

Model		SRD-880D
Platform		8CH
CPU	CPU	Hisilicon(1EA Hi3531 + 2EA Hi3532)
	Codec	
Design		New
Operation System		Embedded LINUX
Video Format		HD 1080P/720P/4CIF
Operation Model		Live/REC/PB/NW
Video In	Channel	8CH HD
	Connector Type	BNC 8 (HD)
	Loop Through	X
Video Out	Composite	X
	S-Video	X
	VGA	MAX. 1080P(60Hz)
	HDMI	MAX. 1080P(60Hz)
	Simultaneous Out	VGA and HDMI
Spot Out	Number	2
	Split Mode	SPOT1 : 1/4/9 SPOT2 : 1
	OSG	0
Audio In	Channel	8
	Connector Type	4CH RCA, 4CH D-sub
Audio Out	Channel	1
	Connector Type	RCA
Compression	Video	H.264
	Audio	G.711
	Codec Type	H/W
	Dual Codec	0
	Multi Stream	0
Live	Resolution	1080P/720P
	Frame Rate	240fps
	Split Mode	1/4/7/9/13/PIP
Recording	Resolution & Frame Rate	HD : 1080p (240fps) [720p (240fps)]
	Quality Level	8Level(LV1~LV8)
	REC Mode	1.Normal REC 2.Schedule REC 3.Event REC - Motion/Alarm/Video Loss 4.Pre REC - Off/5/10/20/30sec 5.Post REC - 5/10/20/30sec - 1/2/3/5/60min 6.Time Laps REC - 1,2,3,...,29,30 fps
		1.各Channel 可以分别设定 - Resolution - Frame Rate
	Function	

PLAY BACK	Resolution & Frame Rate	HD : 1080p (120fps)
	Search Mode	1. Time Search - Date/Time - Go to First/Go to Last - Calendar - Time Bar 2. Event Search - Motion/Alarm/Video Loss 3. Backup Search - USB Memory - USB External HDD
	Tric Mode	1. Play/Pause/Stop 2. Fast Forward/Backward - x2/x4/x8/x16/x32/x64 3. Slow Forward/Backward - x1/2, x1/4, x1/8 4. Step Play - Forward : I+P frame - Backward : I frame
Storage	Internal	1. Max Capacity : 2TB 2. Install HDD : 4EA (中国向8EA) 3. Packing : No HDD (中国向1EA 1T)
	External	1. USB 2.0 I/F 2. E-SATA 3. Max Capacity : 2TB
Backup	USB	1. USB 2.0 2. Memory : Max 32G 3. External HDD : Max 1TB
	Format	1. SEC 2. DVR 3. AVI
Remote Viewer	Network	10/100/1000 Mbps Ethernet
	Transmit Speed	MAX 1080p 240fps and 4CIF 240fps
	Connection No	10 (Admin 1 + User 9)
	Connection Mode	1. Static IP 2. Dynamic IP 3. ADSL
	Protocol	TCP/IP, DHCP, PPPoE, SMTP, NTP, HTTP, DDNS, RTP, RTSP, UPnP
	Webviewer	IE, Safari, Chrome, Firefox
	Mobile	iPOLIS Mobile
	Smart TV	TBD
	Function	1. Quality 2. Bandwidth - Unlimited/2/1.5/1M - 800/600/500/400/300Kbps - 128Kbps 3. TCP/UDP Port 4. Unicast/Multicast 5. Webviewer Port 6. DDNS - Samsung iPOLIS DDNS - dyndns.com - no-ip.com - changeip.com 7. Mailing Service
PTZ Control	I/F	RS-485
	Protocol	Samsung/Vicon/Panasonic/AD/Philips/ Erna./Pelco D/Pelco P/citp/Diamond/ Kalatel/Samsung Techwin

External Device	POS	0
	ATM	0
Intelligent Video		0
Camera	I/F	I2C
	Protocol	Not Defiend
In/Out	USB	2
	RS-485	1
	RS-232C	1
	E-SATA	2
	Alarm In	8
	Alarm Out	4
The Other Function		1.Tool Bar 2.Pop Menu 3.S/W Upgrade - USB 4.Live & Network Monitoring without HDD
Electrical	Power Type	100 ~ 240VAC ATX inside
	Power	TBD
	Input Voltage	100 ~ 240VAC
	Operation Condition	Temperature 0~40℃ Humidity 20~85%RH
Mechanical	Dimensions (WxHxD)	TBD
	Net Weight	TBD
	Packing List	1.LAN Cable 2.Power Cord 3.Remocon 4.Mouse(Included Camera)
		5.Quick Guide 6.CD(User Manual, Quick Guide, Router Guide) 7.Cushion 8.PE Back

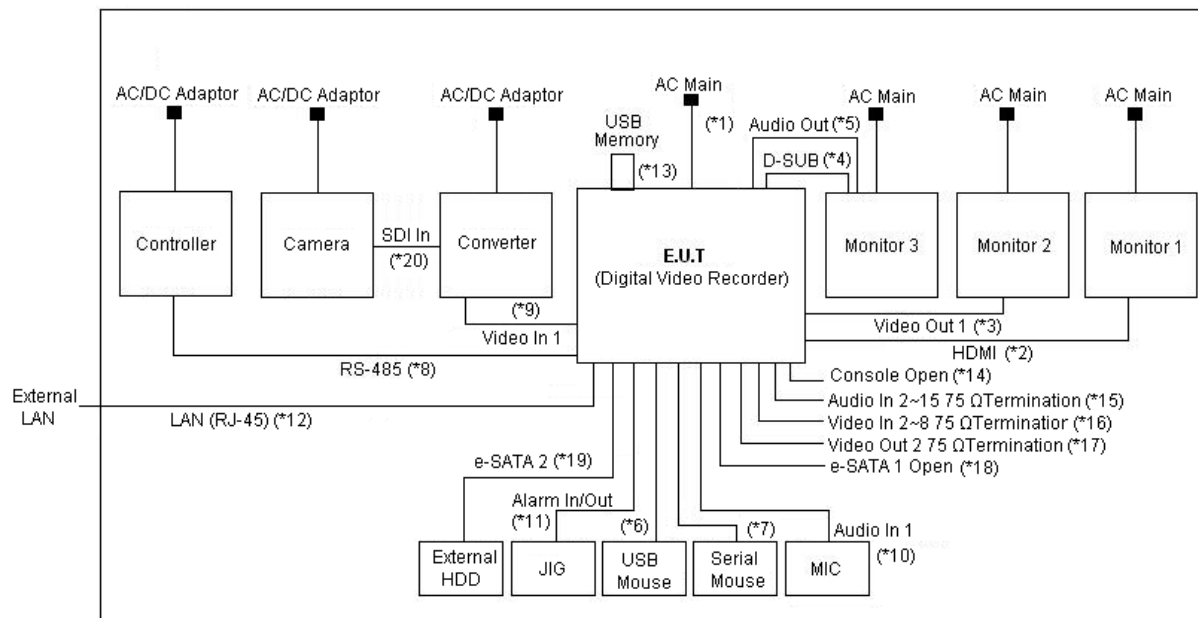
4.2 Product description

Type of product	Digital Video Recorder
Model name (Basic)	SRD-880DN
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	120 V , 60 Hz
Product rating	AC 100 - 240 V , 50 / 60 Hz
Internal clock frequency	Above 108 Mhz
Note	-

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Monitor 1	2693HM	N935H1KQ700971L	SAMSUNG
Monitor 2	PM24KO	YER8HVDBA00052A	SAMSUNG
Monitor 3	PM24KO	ZQ9XH1HBB00353H	SAMSUNG
Controller	SCC-1000	EW089028913	SAMSUNG
Camera	SCB-6000	-	SAMSUNG
Converter	HSC1200	21SCTS037RH	-
USB Mouse	MO56UO	520113167	DELL
Serial Mouse	Microsoft HOME	489798	Microsoft Corp.
MIC	-	-	-
JIG	-	-	-
External HDD	Spro	-	Valueplus
USB Memory(4GB)	-	-	-

4.4 Test configuration



Note	Start		End		Cable	
*	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT (Digital Video Recorder)	Power	AC Main	Power	2.0	Non-Shield
2		HDMI	Monitor 1	HDMI	2.0	Shield
3		Video Out 1	Monitor 2	Video In	3.0	Shield
4		D-SUB	Monitor 3	D-SUB	1.5	Shield
5		Audio Out	Monitor 3	Audio In	1.5	Shield
6		USB	USB Mouse	USB	1.5	Shield
7		Serial	Serial Mouse	Serial	1.5	Shield
8		RS-485	Controller	RS-485	3.0	Non-Shield
9		Video In 1	Converter	Video Out	3.0	Shield
10		Audio In 1	MIC	Audio Out	1.5	Shield
11		Alarm In/Out	JIG	Alarm In/Out	3.0	Non-Shield
12		LAN(RJ-45)	External LAN	LAN(RJ-45)	3.0	Non-Shield
13		USB	USB Memory	USB	Direct	-
14		Console	Open	-	2.0	Non-Shield
15		Audio In 2~15	75 Ω Termination	-	1.5	Shield
16		Video In 2~8	75 Ω Termination	-	3.0	Shield
17		Video Out 2	75 Ω Termination	-	3.0	Shield
18		e-SATA 1	Open	-	0.5	Shield
19		e-SATA 2	External HDD	e-SATA 2	1.0	Shield
20	Converter	SDI In	Camera	SDI Out	1.0	Shield

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
1	Web view monitoring test.
	Ping test.
	Controller test.
	Alarm & Audio In/Out test.

5. Summary of test results

In the above configuration tested, The EUT complied with the requirement of the specification

5.1 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 Hz		
Test facility	Shielded room (CE#1)		
Date	2013. 10. 08		
Temperature (°C)	26 °C	Humidity (% R.H.)	38 % R.H.
Remarks	Complied		

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

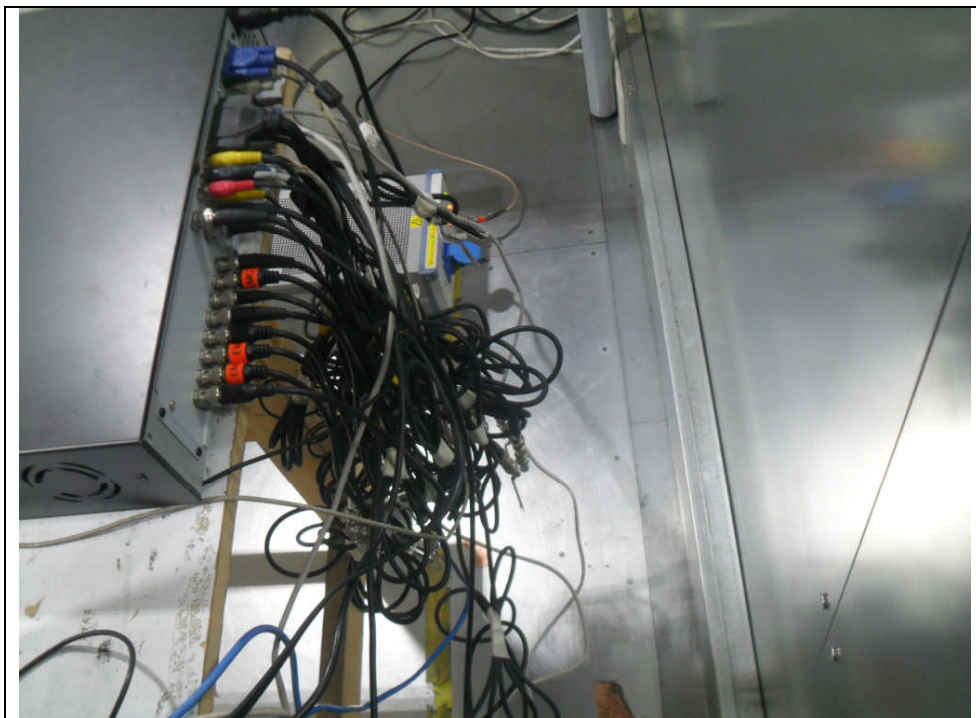
The measurements were performed in a shielded room. EUT was setup as shown in photograph and placed on a non-metallic table height of 0.8 m above the reference ground plane. The rear of table was located 0.4 m to the vertical conducted plane. EUT was power through the LISN, which was bonded to the ground 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	828765/009	R&S	2013.10.22	☐
Test Receiver	ESCI7	100732	R&S	2014.02.18	☐
Test Receiver	ESCI	100001	R&S	2014.07.25	☐
Test Receiver	ESCI	100710	R&S	2013.11.06	☒
LISN	ENV216	101358	R&S	2014.10.04	☒
LISN	ESH3-Z5	100267	R&S	2014.07.08	☒

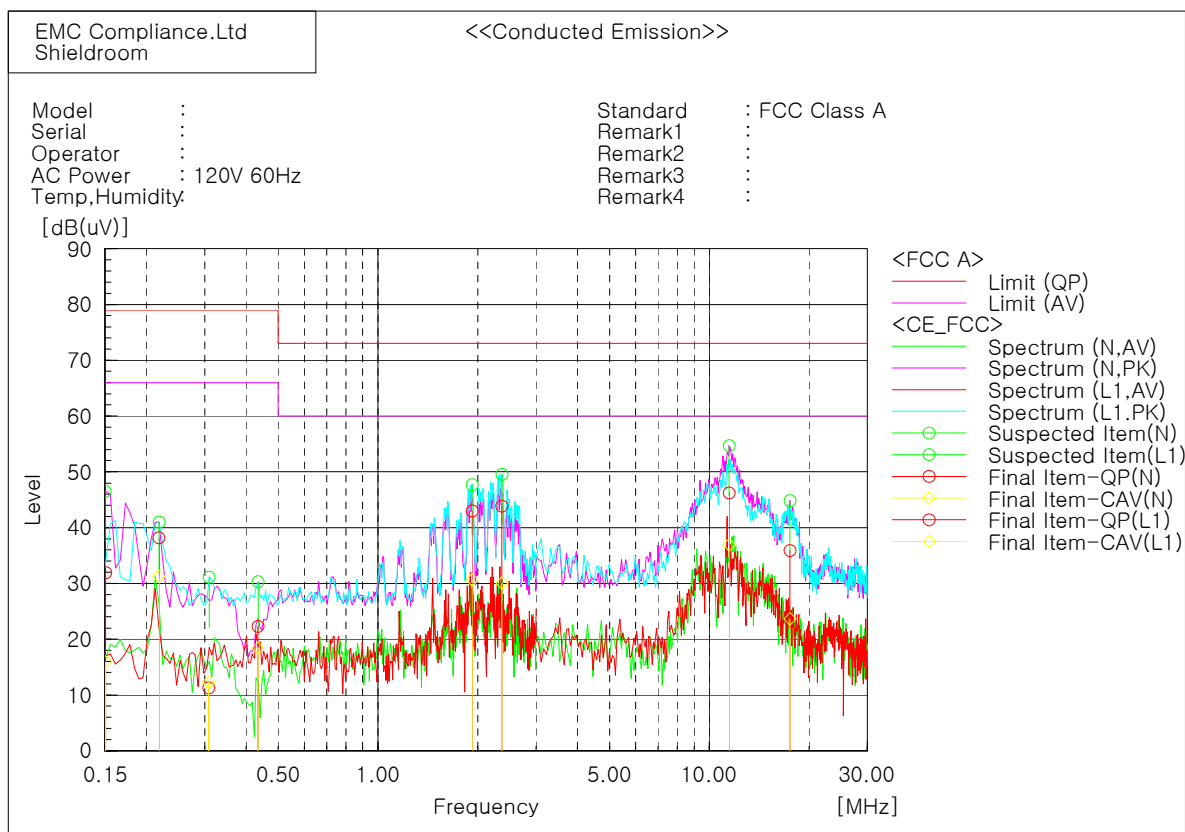
6.1.4 Photographs of test setup

* AC Main



6.1.5 Conducted emission measurement result

* AC Main (SRD-880DN)



Final Result

--- N 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	0.15087	22.2	6.2	9.7	31.9	15.9	79.0	66.0	47.1	50.1
2	11.47848	36.5	27.2	9.7	46.2	36.9	73.0	60.0	26.8	23.1
3	17.5234	25.9	13.7	10.0	35.9	23.7	73.0	60.0	37.1	36.3

--- L1 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	0.21802	28.2	21.3	10.0	38.2	31.3	79.0	66.0	40.8	34.7
2	0.3083	1.4	2.4	9.9	11.3	12.3	79.0	66.0	67.7	53.7
3	0.43462	12.2	8.3	10.1	22.3	18.4	79.0	66.0	56.7	47.6
4	1.92278	33.3	21.0	9.7	43.0	30.7	73.0	60.0	30.0	29.3
5	2.36422	34.3	20.5	9.6	43.9	30.1	73.0	60.0	29.1	29.9

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	2013. 10. 08		
Temperature (°C)	23 °C	Humidity (% R.H.)	61 % R.H.
Remarks	Complied		

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 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	2014.07.25	☐
Test Receiver	ESCI	100710	R&S	2013.11.06	☒
Bi-Log Antenna	VULB 9163	552	SCHWARZBECK	2014.07.18	☒
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	00155772	ETS	2014.03.20	☒
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

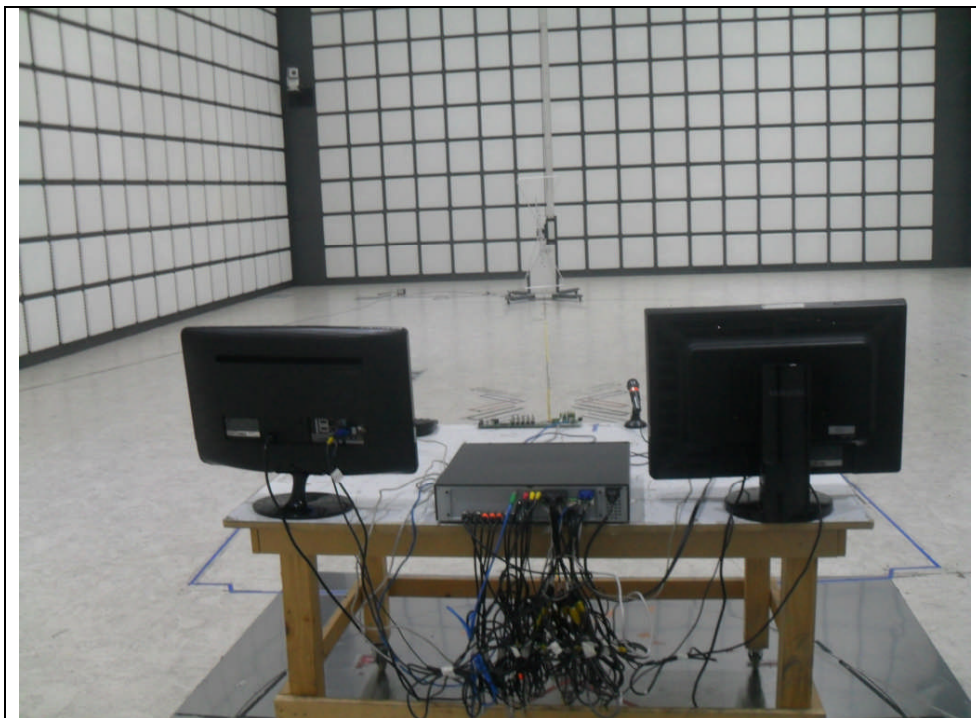
3 dB Att = 3 dB Attenuator

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

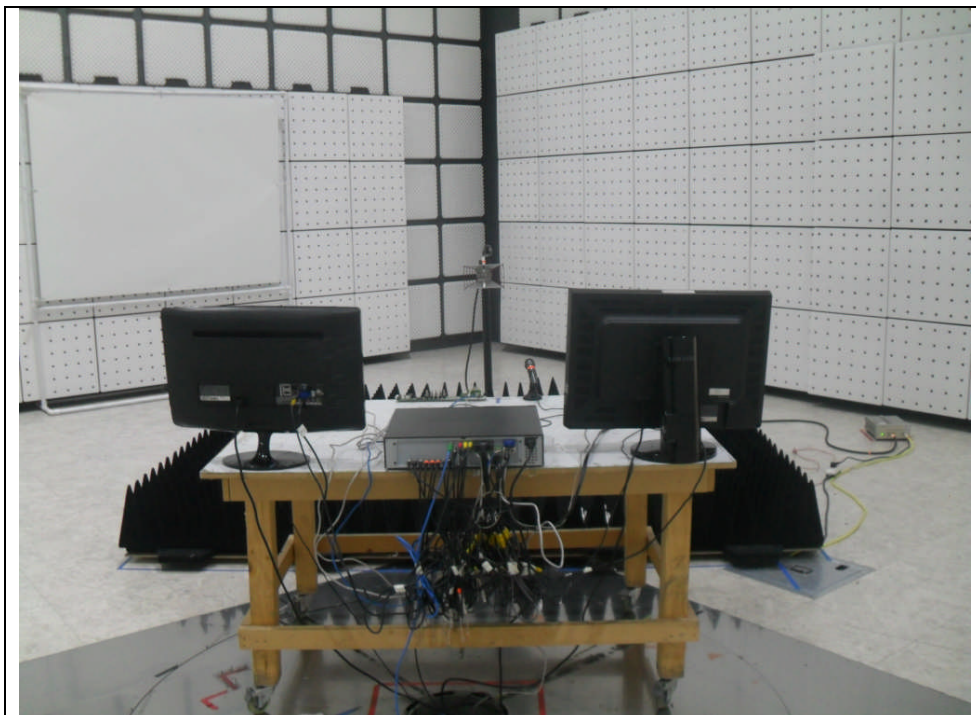
The result is $30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$

6.2.5 Photographs of test setup

* 30 MHz ~ 1 GHz



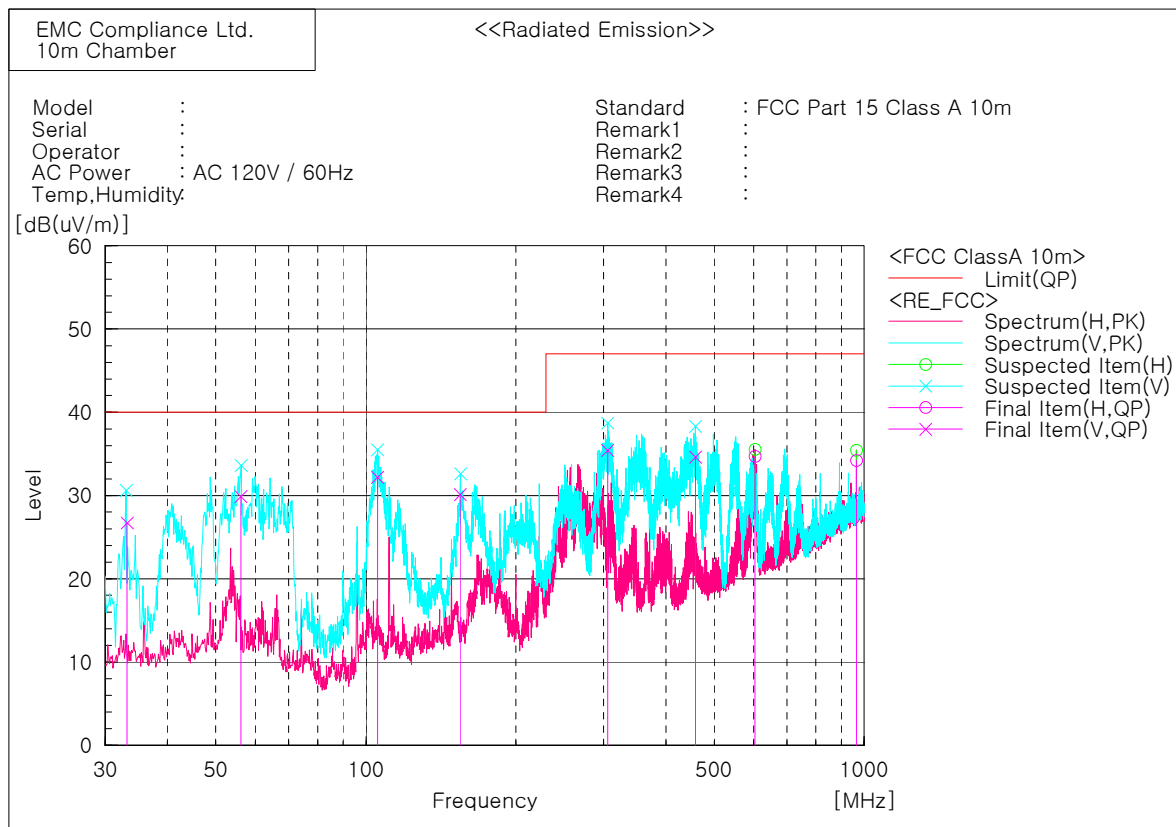
* 1 GHz ~ 6 GHz



6.2.6 Radiated emission measurement result

* Graph and Data

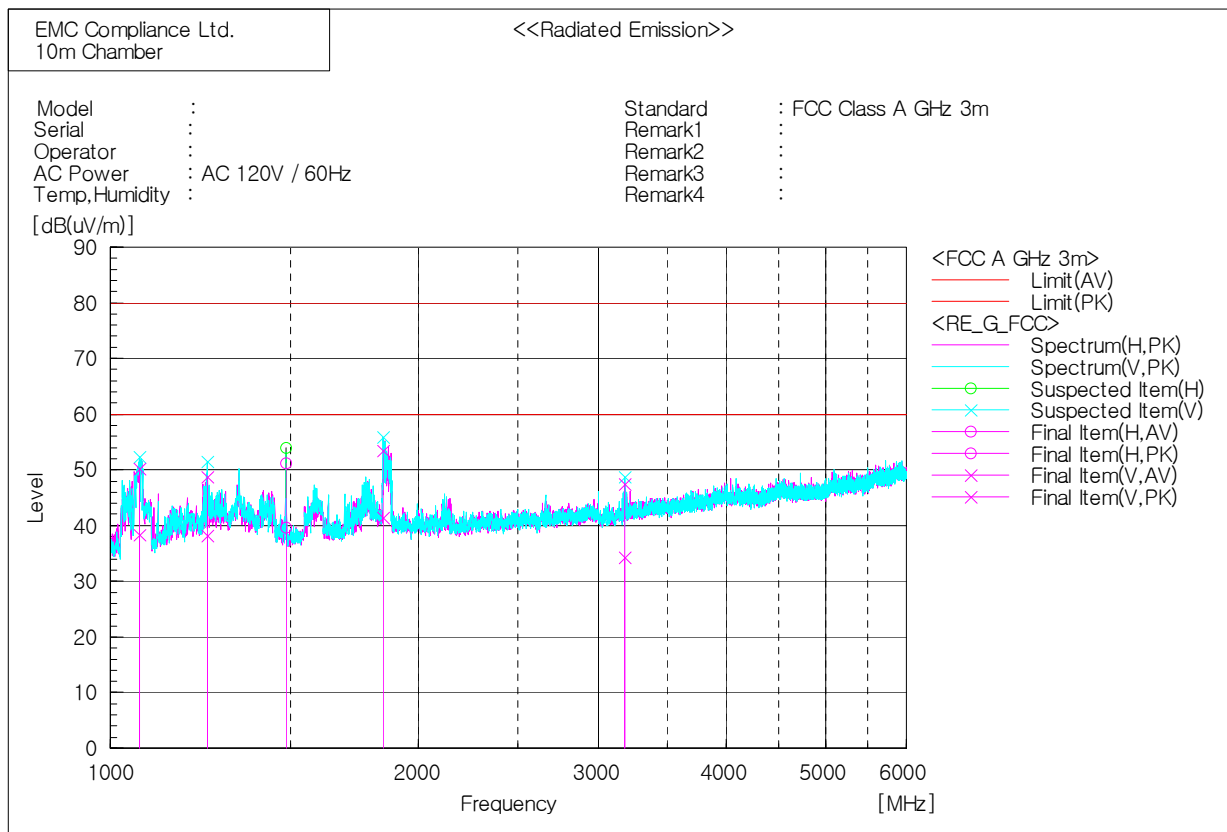
* 30 MHz ~ 1 GHz (SRD-880DN)



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]
1	33.182	V	42.3	-15.6	26.7	40.0	13.3	100.0	39.7
2	56.157	V	44.3	-14.4	29.9	40.0	10.1	100.0	142.5
3	105.583	V	50.0	-17.8	32.2	40.0	7.8	100.0	134.2
4	154.725	V	43.6	-13.5	30.1	40.0	9.9	100.0	125.8
5	305.585	V	47.3	-11.9	35.4	47.0	11.6	100.0	125.8
6	458.327	V	42.3	-7.7	34.6	47.0	12.4	100.0	109.8
7	604.117	H	38.8	-4.1	34.7	47.0	12.3	100.0	241.6
8	965.308	H	31.7	2.5	34.2	47.0	12.8	100.0	98.7

* 1 GHz ~ 6 GHz (SRD-880DN)



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	1066.875	V	46.8	58.6	-8.4	38.4	50.2	60.0	80.0	21.6	29.8	100.0	328.5
2	1242.500	V	44.8	55.5	-6.7	38.1	48.8	60.0	80.0	21.9	31.2	100.0	348.6
3	1485.000	H	44.2	55.8	-4.6	39.6	51.2	60.0	80.0	20.4	28.8	100.0	46.8
4	1848.125	V	43.7	55.6	-2.2	41.5	53.4	60.0	80.0	18.5	26.6	100.0	318.9
5	3185.625	V	32.3	45.6	1.9	34.2	47.5	60.0	80.0	25.8	32.5	100.0	301.4

7. E.U.T. photographs

Front View



Rear View



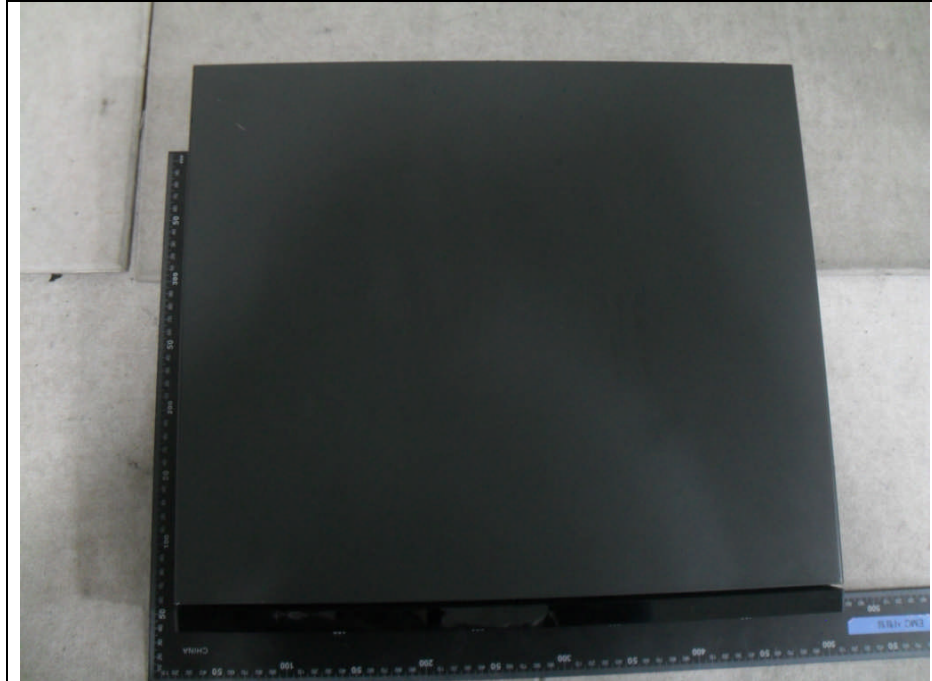
Left View



Right View



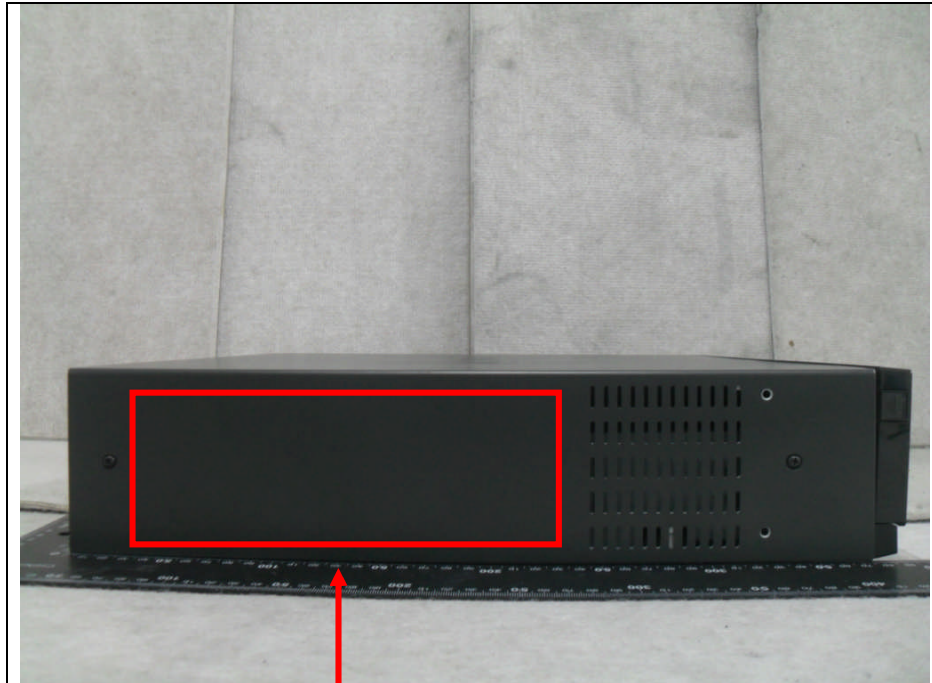
Top View



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.

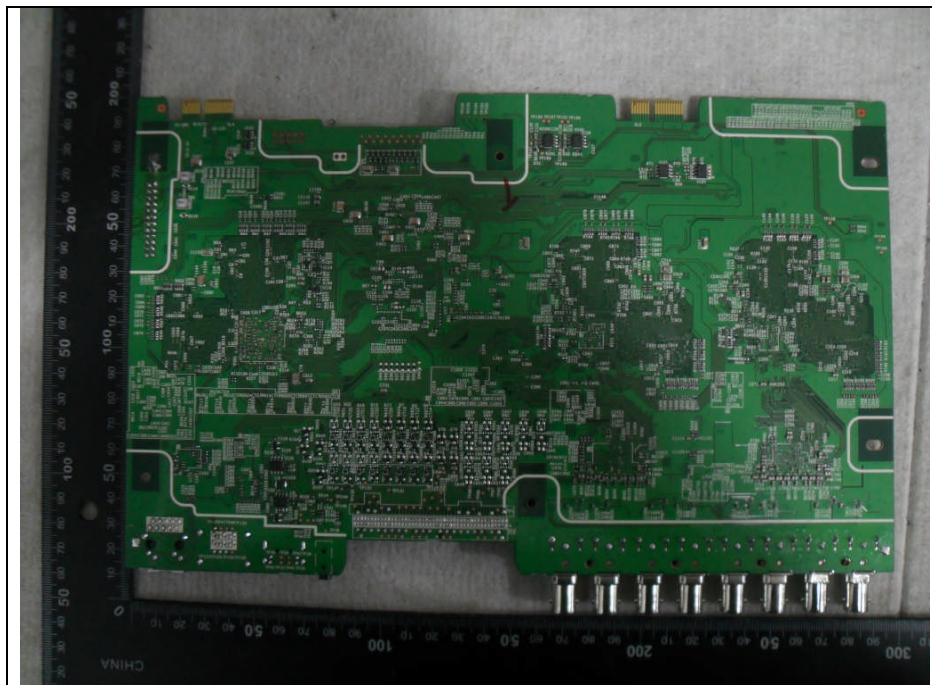
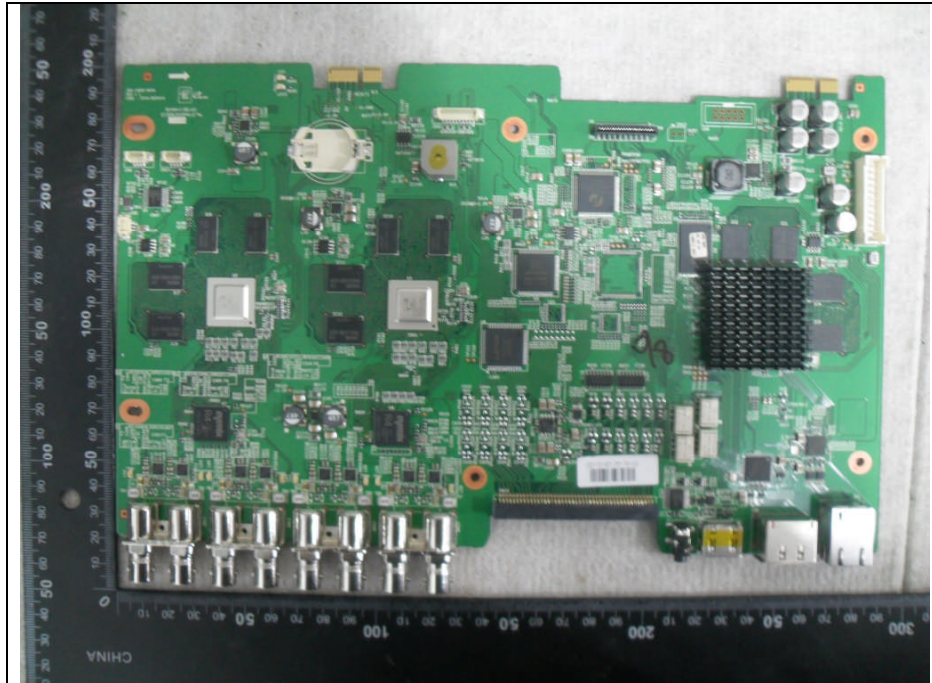
Port



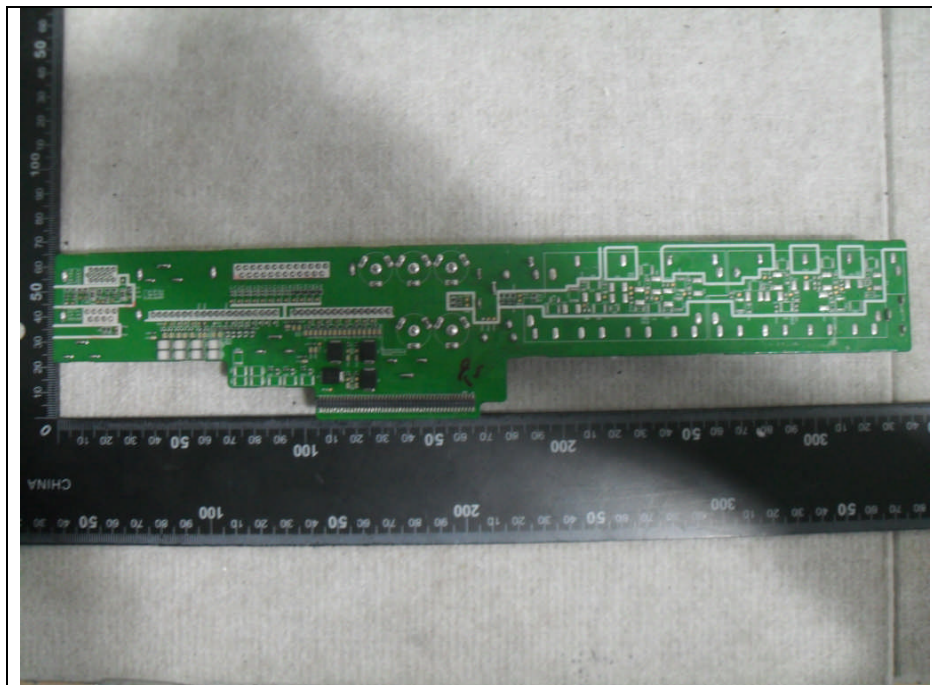
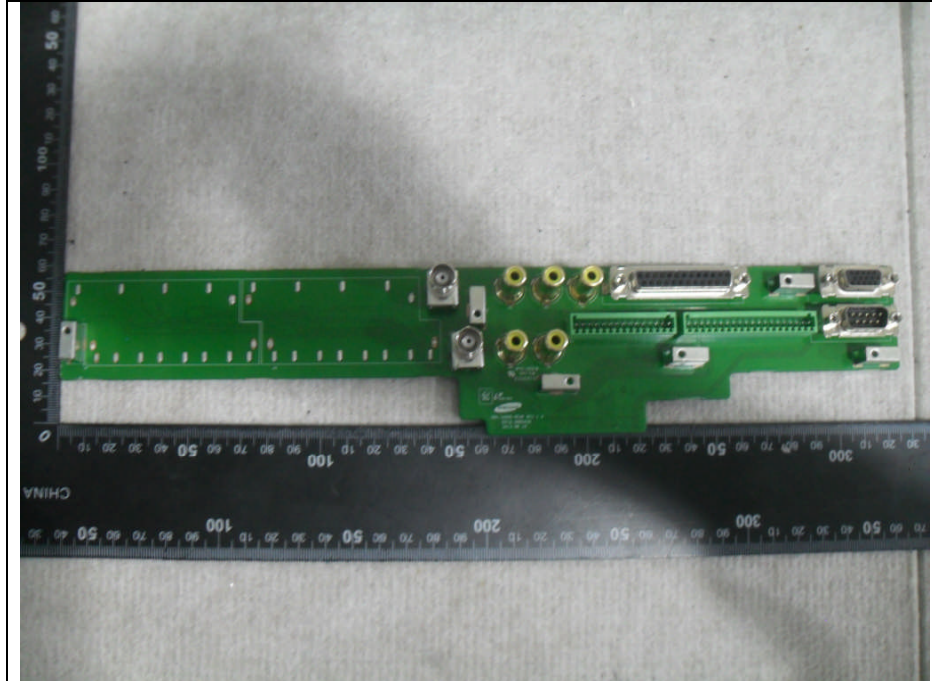
Inside



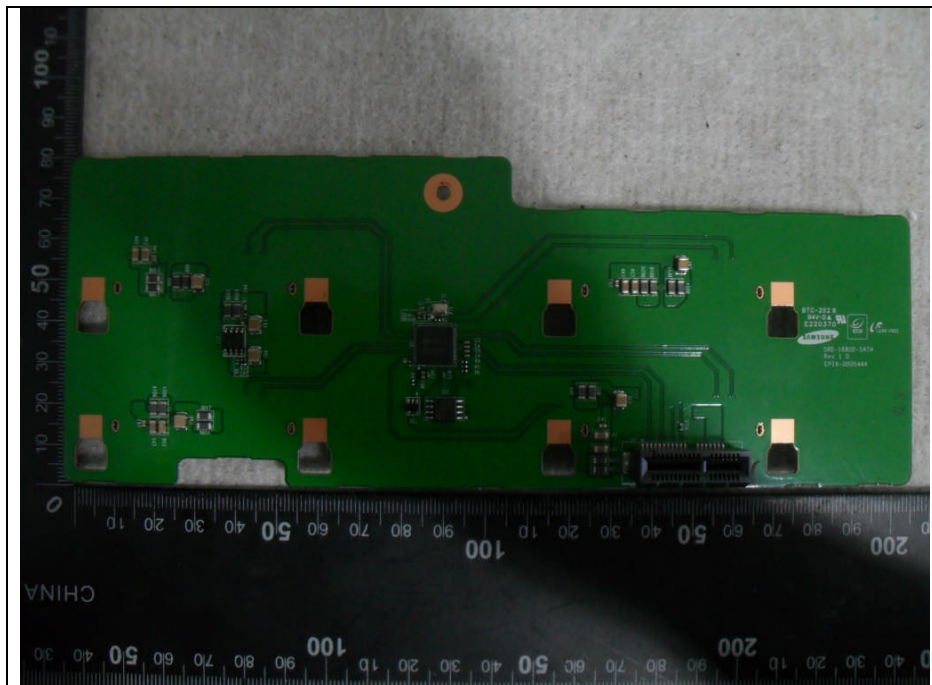
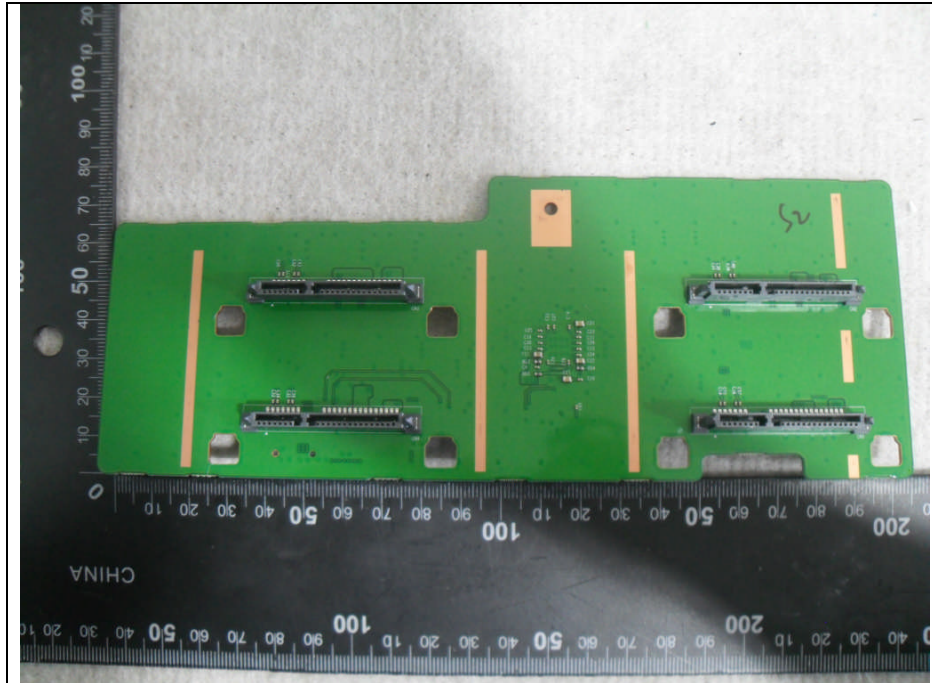
Main Board



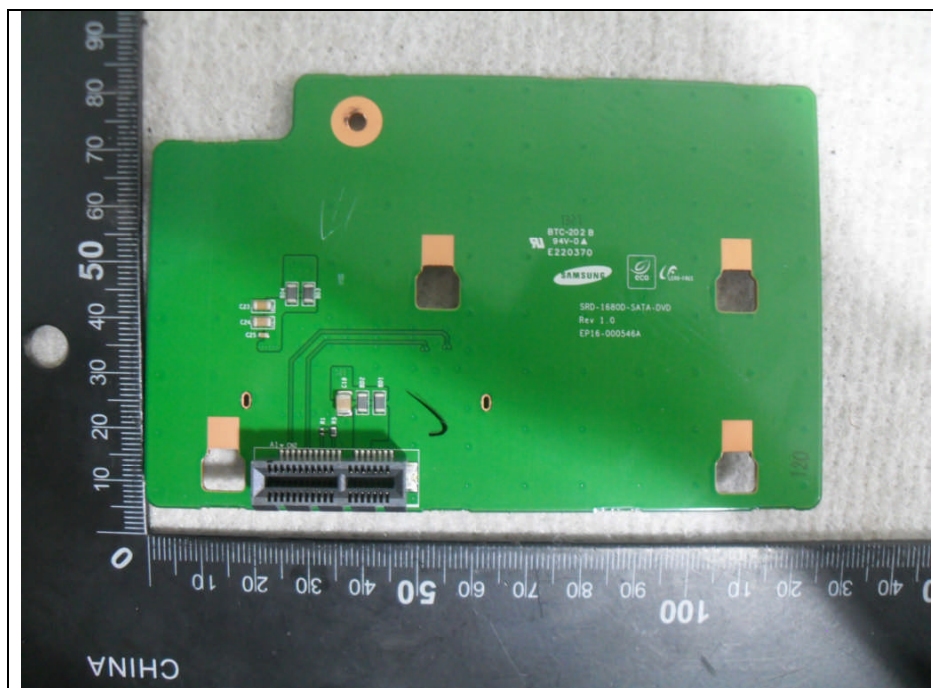
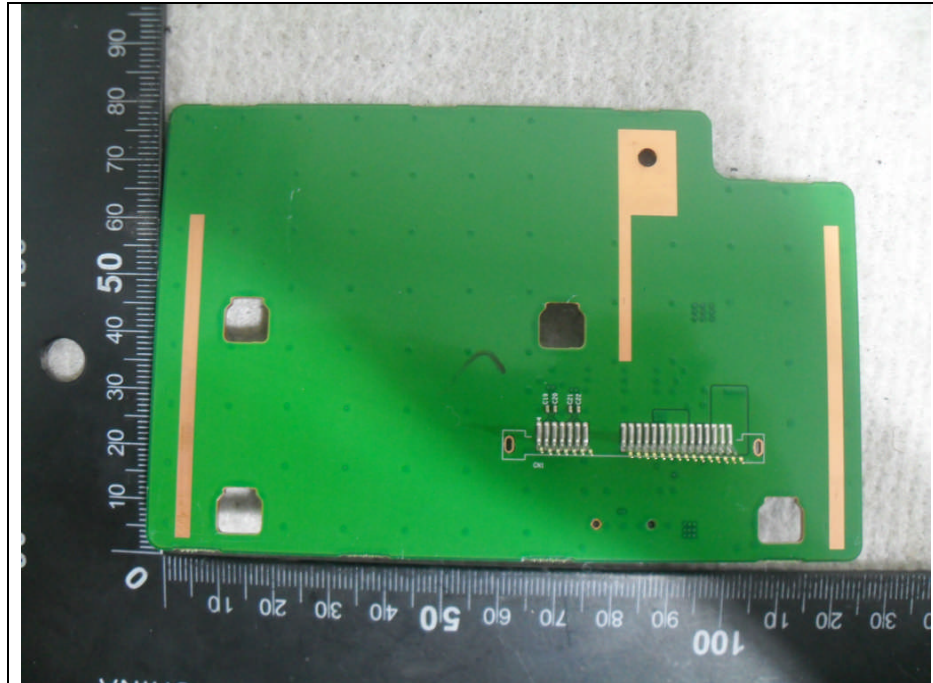
Port Board



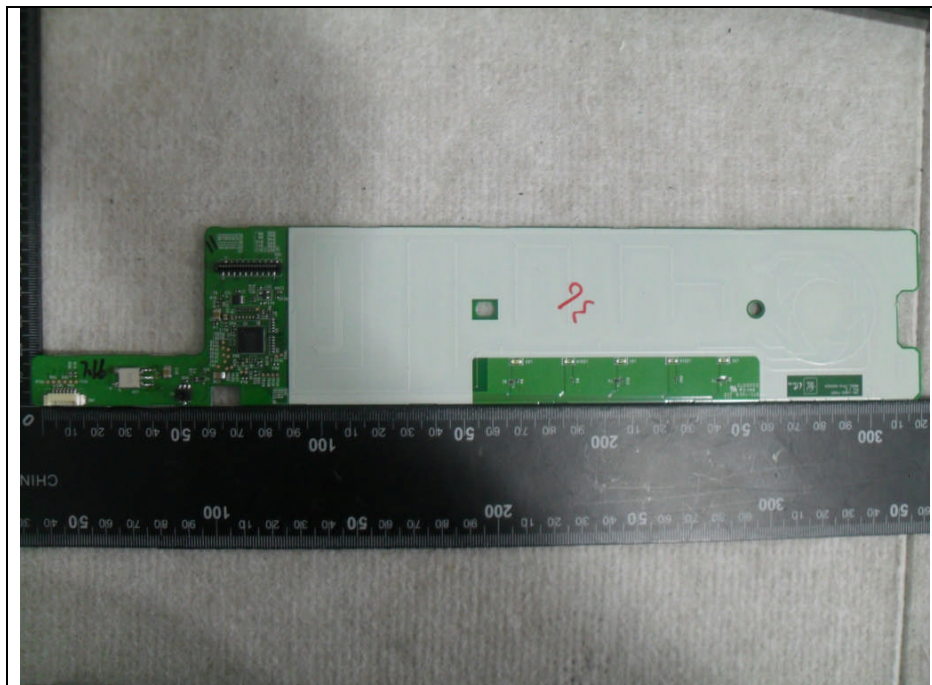
SUB Board 1



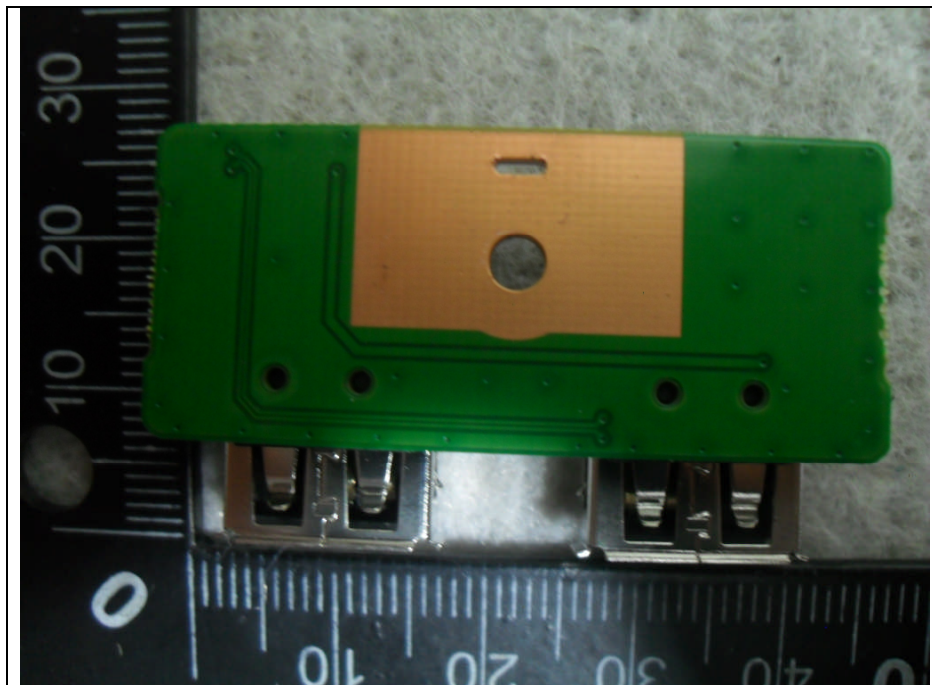
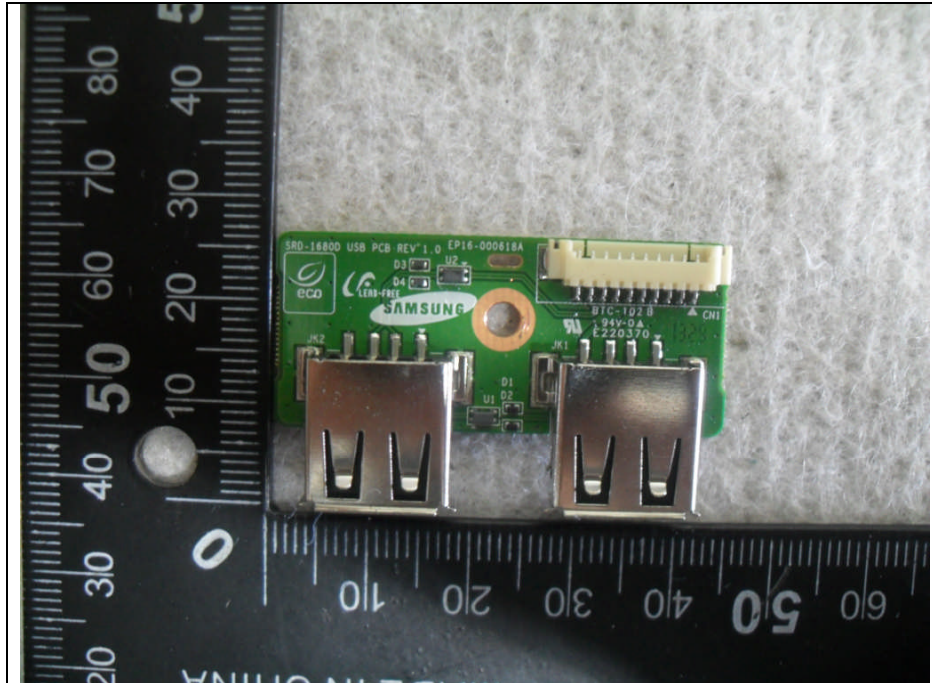
SUB Board 2



Touch Pad Board



USB Board



HDD (500GB)





ODD





