Declaration of Conformity

SAMSUNG TECHWIN

CE

Type of equipment:	**Digital Video Recorder**
Brand Name /Trade Mark:	**SAMSUNG**
Type designation /model:	**SRD-1654DP**
Applicant:	**SAMSUNG TECHWIN CO., LTD.**

In accordance with the following Directives:

2004/108/EC	The Electromagnetic Compatibility Directive

Including amendments by the CE Marking Directive 93/68/EEC

The following harmonized European standards or technical specifications have been applied:

EN 55022:2010	Limits and methods of measurement of radio disturbance characteristics of information technology equipment
EN 50130-4:2011	Product family standard: Immunity requirements for components of fire, intruder and social alarm systems
EN 61000-3-2:2006+A2:2009	Limits for harmonic current emissions
EN 61000-3-3:2008	Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <=16 A per phase and not subject to conditional connection
EN 61000-4-2:2009	Electrostatic discharge immunity test
EN 61000-4-3:2006+A2:2010	Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4:2004+A1:2010	Electrical fast transient/burst immunity test
EN 61000-4-5:2006	Surge immunity test
EN 61000-4-6:2009	Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-11:2004	Voltage dips, short interruptions and voltage variations immunity tests

and the Directive (2011/65/EU) on the restriction of the use of certain hazardous substances in electrical and electronic equipment

Place and date of issue: #42 Seongju-Dong, Changwon-Shi, Kyungsangnam-Do,Korea / May 14, 2013

Authorized Signatory: Name : Jei Soon, Kang

Title : Principal Research Engineer

Signature :



EMC TEST REPORT

Test report No	:	**EMC-CE-4038**
Type of Equipment	:	**Digital Video Recorder**
Model Name	:	**SRD-1654DP**
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	:	**EN 55022:2010, Class A** **EN 50130-4:2011** **EN 61000-3-2:2006+A2:2009** **EN 61000-3-3:2008**
Testing Laboratory	:	**EMC Compliance Ltd.**
Test result	:	**Complied**

This product complies with the requirements of the EMC Directive 2004/108/ EC.
The results in this report apply only to the sample tested.
This test report shall not be reproduced, except in full, without the written approval of EMC compliance Laboratory.

Date of receipt: 2013. 04. 16

Date of testing: 2013. 04. 23 ~ 04. 29

Issued date: 2013. 05. 14

Tested by: SUNG, KI-MUN

Approved by: YEOM, HAN-SEOK

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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

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2. Laboratory information

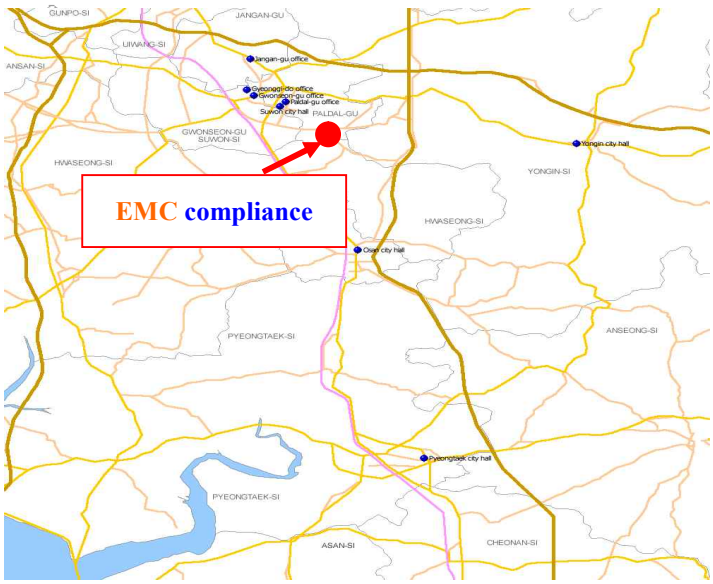
Address

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





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3. Test system configuration

3.1 Operation environment

		Temperature	Humidity	Pressure
Chamber(10 m)	:	22 °C	31 % R.H.	-
Shielded room(CE)	:	23 °C	33 % R.H.	-
Shielded room(ESD)	:	24 °C	36 % R.H.	100.3 kPa

Test site

These testing items were performed following locations;

Test item	Test site
Conducted Emission	Shielded Room
Radiated Emission	10 m Chamber
Harmonics current	Immunity area
Voltage fluctuations and flickers	Immunity area
Electrostatic discharge	Shielded Room
Radiated RF immunity	Fully anechoic chamber (3 m)
Electric Fast Transient/BURST	Shielded Room
Surge	Shielded Room
Conducted RF immunity	Shielded Room
Voltage dip/interruption	Shielded Room
Mains supply voltage variations	Shielded Room

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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
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
Radio Frequency Electromagnetic Fields (C.L: Approx 95 %, k = 2)		
± 1.82 dB		
Disturbance power Electromagnetic Fields (C.L: Approx 95 %, k = 2)		
± 3.73 dB		

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4. Description of E.U.T.

4.1 General information

Video	Inputs	16 composite video 0.5–1 Vpp, 75 ohm automatic termination
	Resolution	960x480 NTSC, 960x576 PAL / 720x480 NTSC, 720x576 PAL
Live	Frame rate	480fps NTSC, 400fps PAL
	Resolution	928x480 NTSC, 928x576 PAL(704x480 NTSC, 704x576 PAL)
	Multi Screen display	1/4/7/9/13/16/16A/PIP/Sequence
Performance		
Operating System	Embedded	Linux
Recording	Compression	H.264
	Record Rate	NTSC: Up to 480fps @ 928x480 / PAL: Up to 400fps @ 928x576
		NTSC: Up to 480fps @ 704x480 / PAL: Up to 400fps @ 704x576
		NTSC: Up to 480fps @ 704x240 / PAL: Up to 400fps @ 704x288
		NTSC: Up to 480fps @ 352x240 / PAL: Up to 400fps @ 352x288
	Mode	NTSC: Manual, Schedule (Continuous/Event), Event(Pre/Post), Time lapse (1~30 fps)
		PAL: Manual, Schedule (Continuous/Event), Event(Pre/Post), Time lapse (1~25 fps)
	Event	Video Loss, Motion(Level 1~10), Alarm
	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	Search mode	Date/time, Event, Back up, Pos, Motion (※ All Search Included Prview Function)
	Playback function	Fast Forward/Backward , Slow Forward/Backward , Step Forward/Backward
Network (IPv4)	Transmission speed	4CIF/2CIF/CIF 120/240/480fps NTSC, 100/200/400fps PAL
	Bandwidth	Up to 32Mbps
	Bandwidth control	Selectable
	Stream	H.264(4CIF/2CIF/CIF Selectable)
	Remote users Maximum	Search(3)/Live Unicast(10)/Live Multicast(20)
	Protocol support	TCP/IP,DHCP,PPPoE,SMTP,NTP,HTTP,DDNS,RTP,RTSP,SNMP
	Monitoring	Net-I Viewer,Smart viewer,Webviewer
Smart phone	Platform	Android , iOS
	Protocol support	RTP,RTSP,HTTP,CGI
	Remote users Maximum	Live(1)
Storage	Internal HDD	Up to 4 SATA HDDs
	External (e-SATA Interface)	N/A
	DVD Writer (Back-up)	YES
	USB (Back-up)	2 USB Ports
	File Format (Back-up)	BU(DVR Player), EXE(Include Player), AVI
Security	Password Protection	1 Admin, 10 Group , 10 User per 1 Group
	Data Authentication	Watermark
Interface		
Monitors	VGA	1 VGA (1280x720, 1280x1024, 1920x1080)
	HDMI	1 HDMI (1280x720, 1280x1024, 1920x1080)
	Main Composite	N/A
	Spot Composite	Digital Spot (2 BNC, 1 Vp-p, 75 ohm) ※ Incldued OSD On Screen
	Loop Outputs	N/A
Audio	Inputs/Output	4CH line in / 1CH line out
	Compression	G.711
	Sampling rate	8KHz
Alarm	Inputs/Outputs	Terminal 16 Inputs (NO/NC) / Terminal 4 relay Outputs (NO/NC), Rating : 30V DC/2A, 250V AC/0.25A
	Remote notification	Notification via e-mail
Connections	Ethernet	1 RJ45 10/100/1000 Base-T
	Serial interface	RS-232/RS-485 for PTZ, Samsung System Keyboard
	USB	USB 2.0, 2 ports
	e-SATA	N/A
	Application Supoort	Mouse, Remote Controller
	Protocol support	Samsung-E/Samsung-T/Pelco-D/Pelco-p/Panasonic/ Phillips/ AD/ DIAMOND/ ERNA/ KALATEL/ VCL
General		
Electrical	Input Voltage/Current	100 to 240 VAC ±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)	W440 x H88 x D246.8(17.32" x 3.46" x 9.72")
	Weight (With hard disks)	Approx. 5.2 kg (11.46 lb)
	Rack mount kit	2 EA
Lauguage		Korean, Japanese, Chinese, English, French, German, Spanish, Italian, Russian, Polish, Czech, Turkish, Netherlands, Portuguese,Swedish,Danish, Thailandais, Rumania, Serbia, Croatia, Hungary, Greek, Taiwan (23 Language)

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4.2 Product description

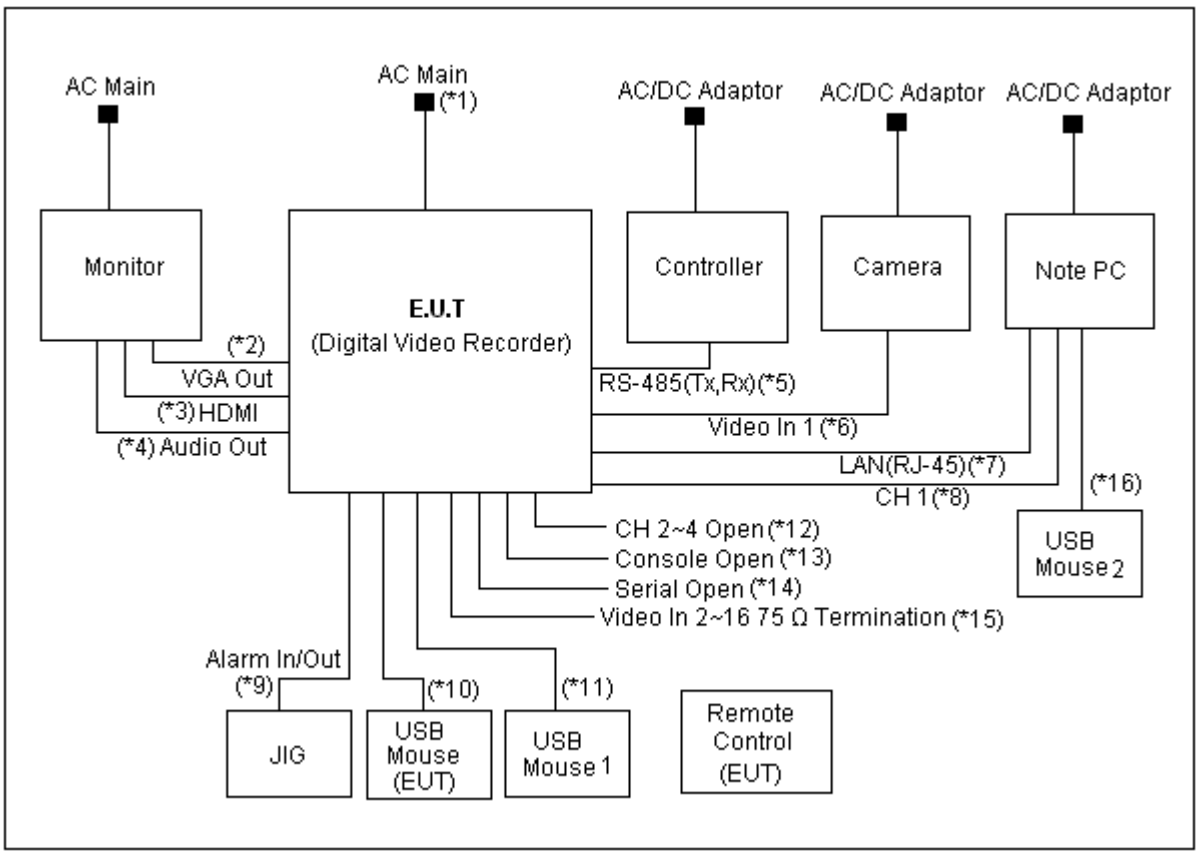
Type of product	Digital Video Recorder
Model name (Basic)	SRD-1654DP
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	230 Ⅴ, 50 ㎐
Product rating	AC 100 - 240 Ⅴ, 50 / 60 ㎐
Internal clock frequency	Above 108 ㎒
Note	-

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Note PC	PSLQ0K-02N005	3A045920Q	TOSHIBA
Monitor	PM24KO	ZQ9XH1HBB00255L	SAMSUNG
Controller	SCC-2000	-	SAMSUNG
Camera	SNZ-5200	C62D6V3B901004Z	SAMSUNG
USB Mouse 1	MSK-1088	X809742-003PID81659-487-2418346-0	Microsoft
USB Mouse 2	1088	8165900106780	Microsoft
JIG	-	-	-

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4.4 Test configuration



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Note	Start		End		Cable		
*	Name	I/O port	Name	I/O port	Length (m)	Spec.	Cable
1	**EUT** (Digital Video Recorder)	Power	AC Main	Power	1.8	Non-Shield	-
2		VGA Out	Monitor	VGA In	1.5	Shield	-
3		HDMI	Monitor	HDMI	2.0	Shield	-
4		Audio Out	Monitor	Audio In	1.4	Shield	-
5		RS-485 (Tx,Rx)	Controller	RS-485 (Tx,Rx)	3.0	Non-Shield	Out-door
6		Video In 1	Camera	Video Out	3.0	Shield	Out-door
7		LAN(RJ-45)	Note PC	LAN(RJ-45)	3.0	Non-Shield	-
8		CH 1	Note PC	CH 1	1.2	Non-Shield	-
9		Alarm In/Out	JIG	Alarm In/Out	3.0	Non-Shield	Out-door
10		USB	USB Mouse (EUT)	USB	2.0	Shield	-
11		USB	USB Mouse 1	USB	2.0	Shield	-
12		CH 2~4	Open	-	1.4	Shield	-
13		Console	Open	-	2.0	Shield	-
14		Serial	Open	-	2.0	Shield	-
15		Video In 2~16	75 Ω Termination	-	1.0	Shield	-
16	Note PC	USB	USB Mouse 2	USB	2.0	Shield	-

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
1	Video REC test.
	Web view test.

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5. Summary of test results

5.1 Summary of EMI emission test results

Applied	Test items	Test method	Result
☒	Conducted Emission	EN 55022:2010	Complied
☒	Radiated Emission	EN 55022:2010	Complied
☒	Harmonics current	EN 61000-3-2:2006+A2:2009	Complied
☒	Voltage fluctuations and flickers	EN 61000-3-3:2008	Complied

5.2 Summary of immunity test results

Applied	Test items	Test method	Result
*** EN 50130-4:2011**			
☒	Electrostatic discharge	EN 61000-4-2:2009	Complied
☒	Radiated RF immunity	EN 61000-4-3:2006+A2:2010	Complied
☒	Electric Fast Transient/BURST	EN 61000-4-4:2004+A1:2010	Complied
☒	Surge	EN 61000-4-5:2006	Complied
☒	Conducted RF immunity	EN 61000-4-6:2009	Complied
☒	Voltage dip/interruption	EN 61000-4-11:2004	Complied
☒	Mains supply voltage variations	EN 50130-4:2011	Complied

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5.3 Performance criteria

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.
If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.
A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change,

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such Flickering of indicators occurs at a field strength of 3 V/m. For components of CCTV systems, where the picture is allowed at 10 V/m, providing.

(a) there is no permanent damage or change to EUT
(e.g. no corruption of memory or changes to programmable setting etc.)
(b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and
(c) there is no observable deterioration of the picture at 1 V/m.

Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as

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Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change,
and no such flickering of indicators oeuvres at U = 130 dBμV.
For component of CCTV systems, where the status is monitored by observing the TV picture,
then deterioration of the picture is allowed at U = 140 dBμV, providing:

(a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings etc.)
(b) at U = 130 dBμV, any deterioration of the picture is so minor that the system could still be used; and
(c) there in no observable deterioration of the picture at U = 120 dBμV.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test, after the conditioning.

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6. Test results

6.1 Conducted Emission

Test specification	EN 55022:2010, Class A		
Testing voltage	230 V, 50 Hz		
Test facility	Shielded room (CE#1)		
Date	2013. 04. 24		
Temperature (°C)	23 °C	Humidity (% R.H.)	33 % R.H.
Remarks	Complied		

6.1.1 Limits of conducted emission measurement

☒ AC main

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.

☒ Telecommunication

Frequency [MHz]	Class A Voltage Limits (dB(μV))		Current Limits (dB(μA))	
	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(μV))		Current Limits (dB(μA))	
	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).

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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

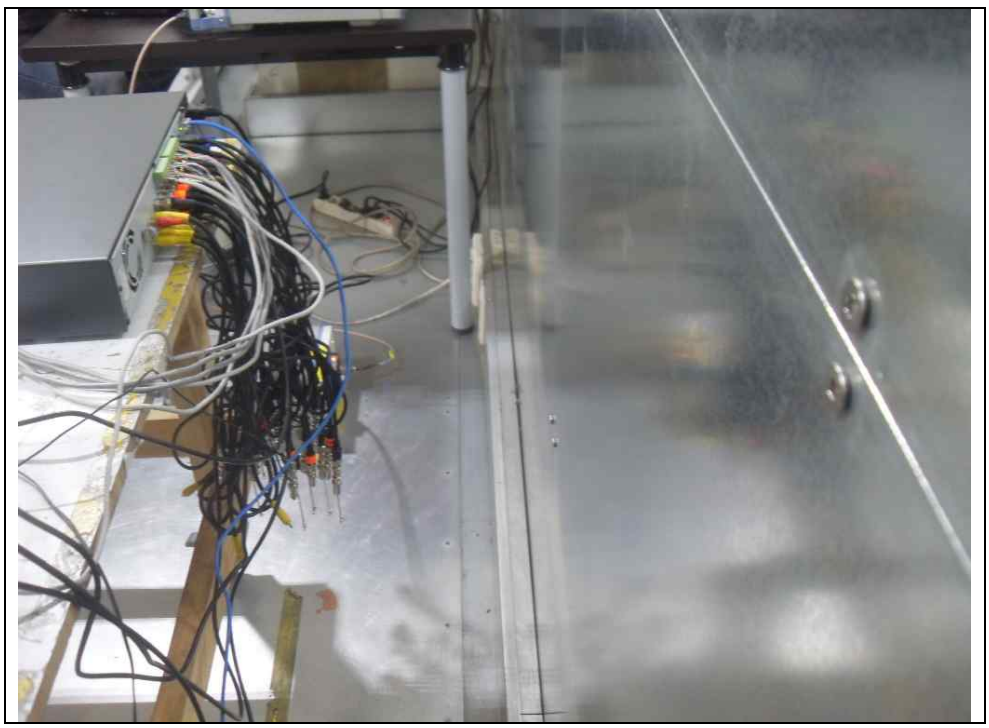
Equipment	Model	Serial No.	Makers	Next Cal. Date	Used
Test Receiver	ESHS30	828765/009	R&S	2013.10.22	☐
Test Receiver	ESCI7	100732	R&S	2014.02.18	☐
Test Receiver	ESCI	100001	R&S	2013.07.10	☐
Test Receiver	ESCI	100710	R&S	2013.11.06	☒
LISN	ENV216	101358	R&S	2013.10.22	☒
LISN	ESH3-Z5	100267	R&S	2013.07.05	☒
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	2013.06.07	☐
ISN	ENY81	101545	R&S	2013.08.29	☒

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6.1.4 Photographs of test setup

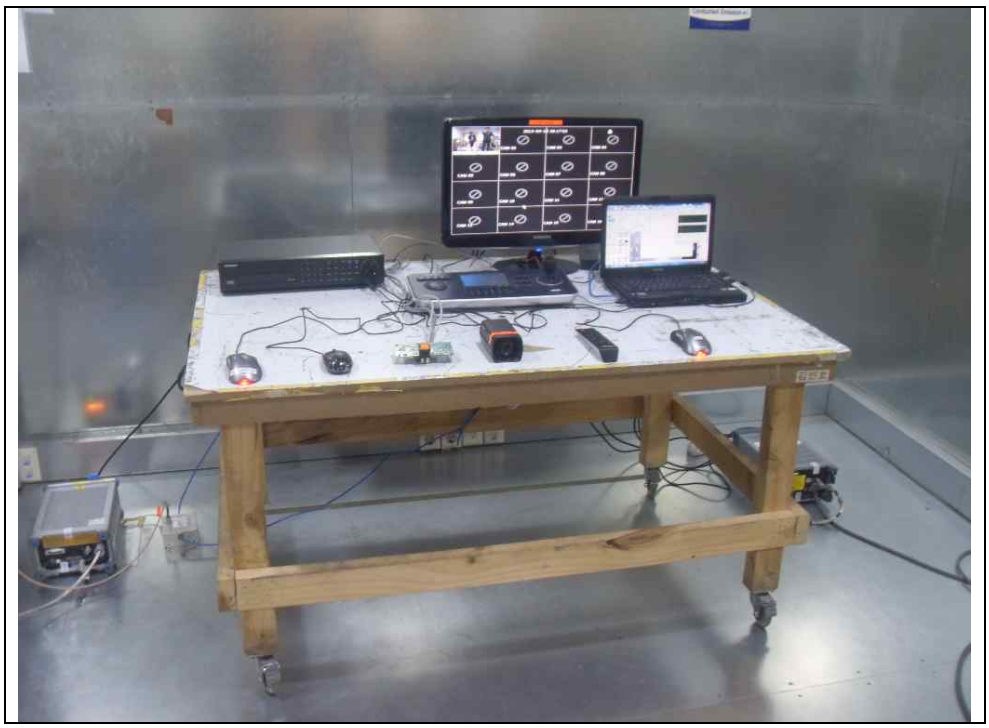
* AC Main





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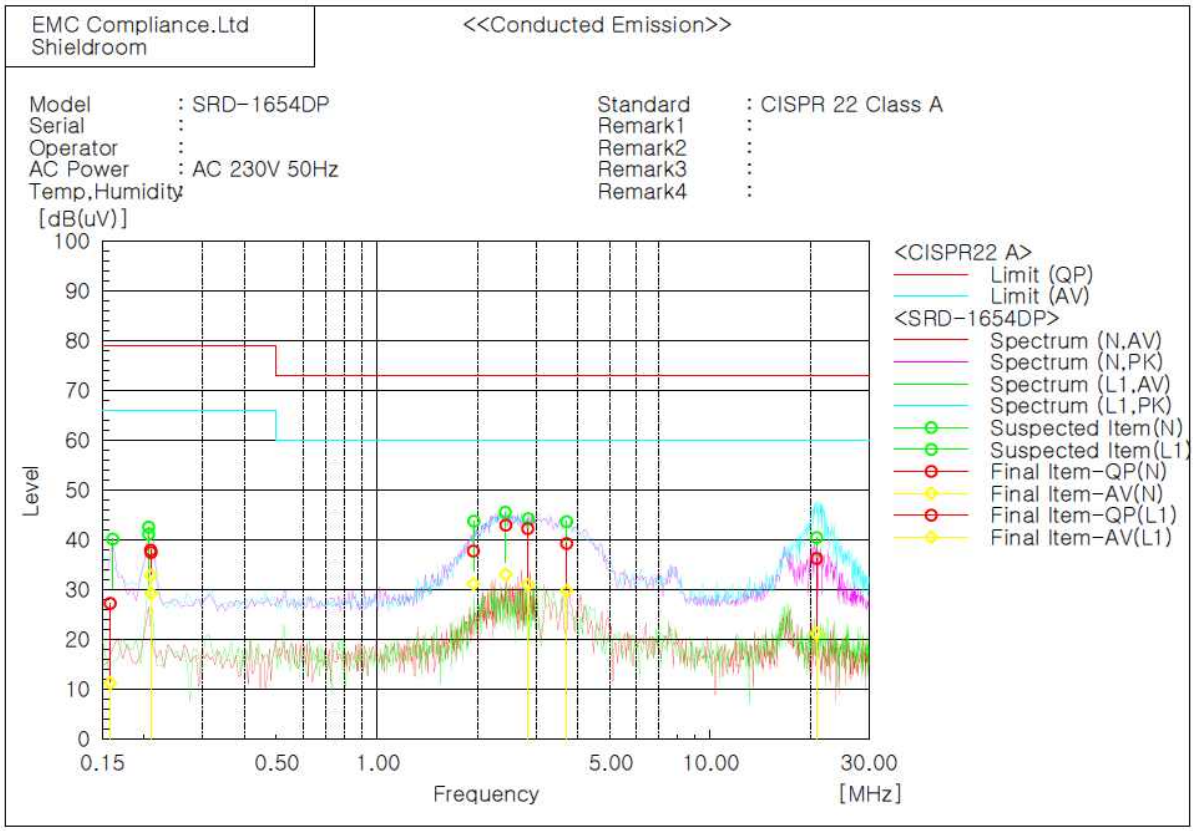
* Telecommunication



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6.1.5 Conducted emission measurement result

* AC Main



Final Result

-- N 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	0.15846	17.2	1.2	10.1	27.3	11.3	79.0	66.0	51.7	54.7
2	0.21006	27.6	19.4	9.9	37.5	29.3	79.0	66.0	41.5	36.7
3	1.94962	28.1	21.5	9.7	37.8	31.2	73.0	60.0	35.2	28.8
4	2.43346	33.3	23.4	9.7	43.0	33.1	73.0	60.0	30.0	26.9
5	20.82352	26.4	11.3	9.9	36.3	21.2	73.0	60.0	36.7	38.8

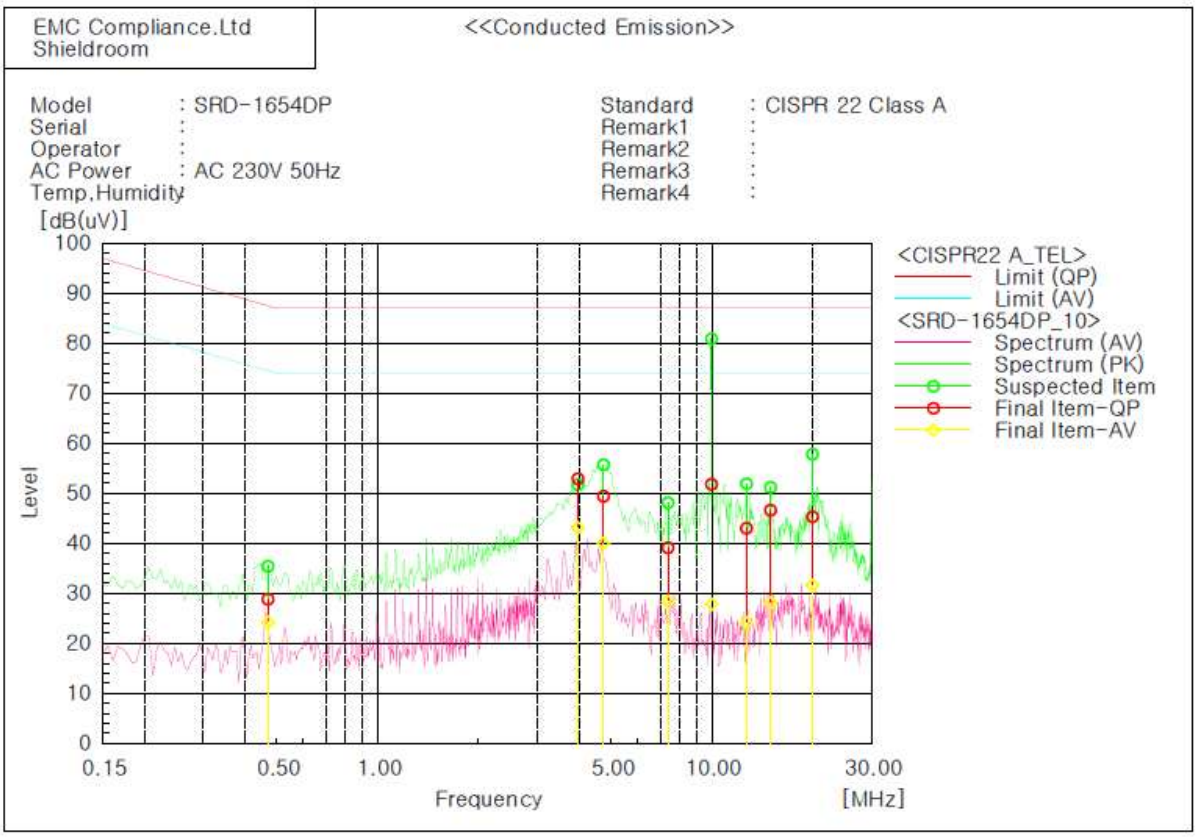
-- L1 Phase --

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	0.2098	28.1	23.0	9.9	38.0	32.9	79.0	66.0	41.0	33.1
2	2.83776	32.6	21.3	9.7	42.3	31.0	73.0	60.0	30.7	29.0
3	3.70054	29.6	20.1	9.7	39.3	29.8	73.0	60.0	33.7	30.2

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* Telecommunication port

* LCL 55 dB (RJ-45 Port)_10Mbps



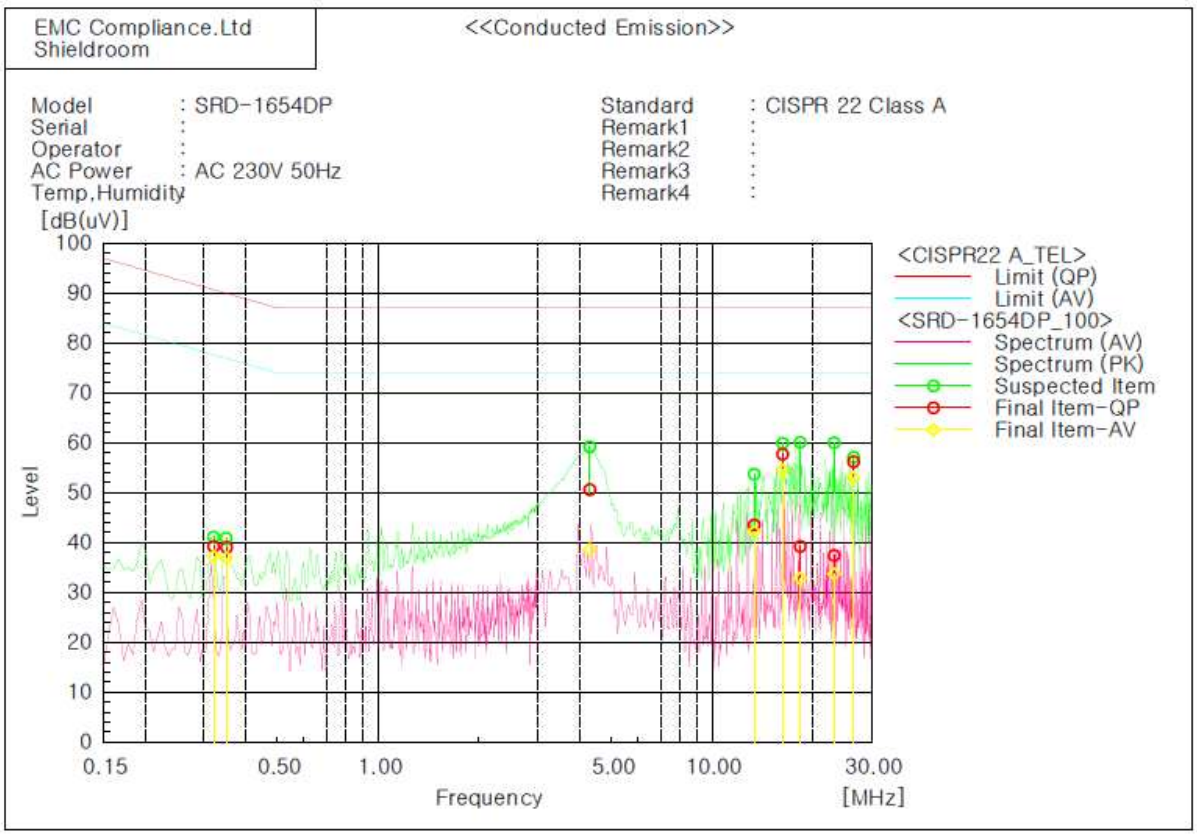
Final Result

--- 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	0.46966	18.7	14.1	10.1	28.8	24.2	87.5	74.5	58.7	50.3
2	3.96874	43.2	33.4	9.7	52.9	43.1	87.0	74.0	34.1	30.9
3	4.73254	39.7	30.3	9.7	49.4	40.0	87.0	74.0	37.6	34.0
4	7.37044	29.4	18.7	9.7	39.1	28.4	87.0	74.0	47.9	45.6
5	9.96964	42.1	18.1	9.7	51.8	27.8	87.0	74.0	35.2	46.2
6	12.66964	33.3	14.4	9.7	43.0	24.1	87.0	74.0	44.0	49.9
7	14.93896	36.9	18.4	9.7	46.6	28.1	87.0	74.0	40.4	45.9
8	20.00818	35.6	21.9	9.7	45.3	31.6	87.0	74.0	41.7	42.4

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* LCL 65 dB (RJ-45 Port)_100Mbps



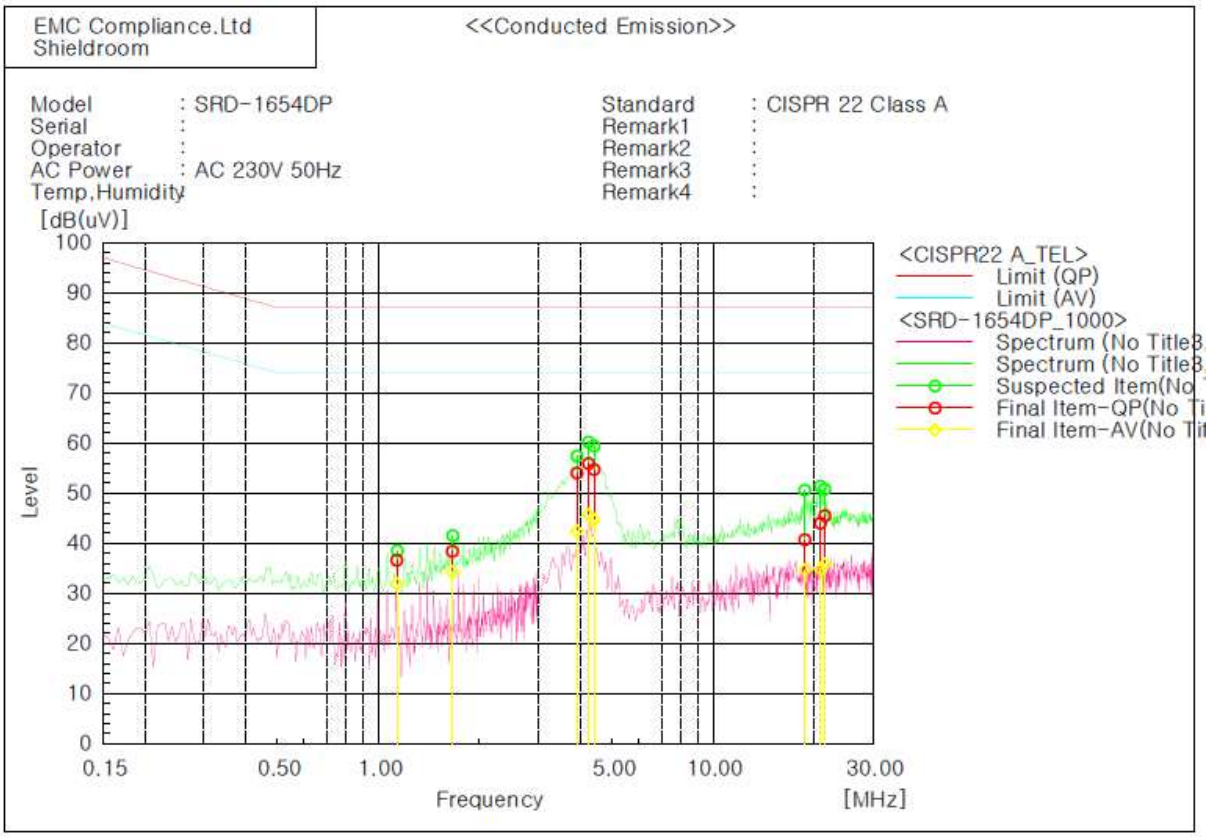
Final Result

--- 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	0.32096	29.1	27.1	10.1	39.2	37.2	90.7	77.7	51.5	40.5
2	0.35148	28.9	26.8	10.1	39.0	36.9	89.9	76.9	50.9	40.0
3	4.3006	40.9	28.9	9.7	50.6	38.6	87.0	74.0	36.4	35.4
4	13.36314	33.8	32.5	9.7	43.5	42.2	87.0	74.0	43.5	31.8
5	16.22762	48.0	44.8	9.7	57.7	54.5	87.0	74.0	29.3	19.5
6	18.33552	29.5	23.1	9.7	39.2	32.8	87.0	74.0	47.8	41.2
7	23.1371	27.7	24.0	9.7	37.4	33.7	87.0	74.0	49.6	40.3
8	26.48702	46.5	43.3	9.7	56.2	53.0	87.0	74.0	30.8	21.0

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* LCL 75 dB (RJ-45 Port)_1000Mbps



Final Result

--- ENY81-CAT6 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	1.13142	26.9	22.2	9.7	36.6	31.9	87.0	74.0	50.4	42.1
2	1.66256	28.7	24.5	9.7	38.4	34.2	87.0	74.0	48.6	39.8
3	3.92154	44.7	33.1	9.3	54.0	42.4	87.0	74.0	33.0	31.6
4	4.24608	46.6	36.4	9.3	55.9	45.7	87.0	74.0	31.1	28.3
5	4.40094	45.3	35.3	9.4	54.7	44.7	87.0	74.0	32.3	29.3
6	18.7729	31.0	25.0	9.7	40.7	34.7	87.0	74.0	46.3	39.3
7	20.8697	34.3	25.1	9.7	44.0	34.8	87.0	74.0	43.0	39.2
8	21.581	35.8	26.1	9.7	45.5	35.8	87.0	74.0	41.5	38.2

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6.2 Radiated Emission

Test specification	EN 55022:2010, Class A		
Testing voltage	230 V, 50 Hz		
Test facility	10 m Chamber (#F2)		
Test distance	10 m, 3 m		
Date	2013. 04. 23		
Temperature (°C)	22 °C	Humidity (% R.H.)	31 % 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 ~ 1 000	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.

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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:

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

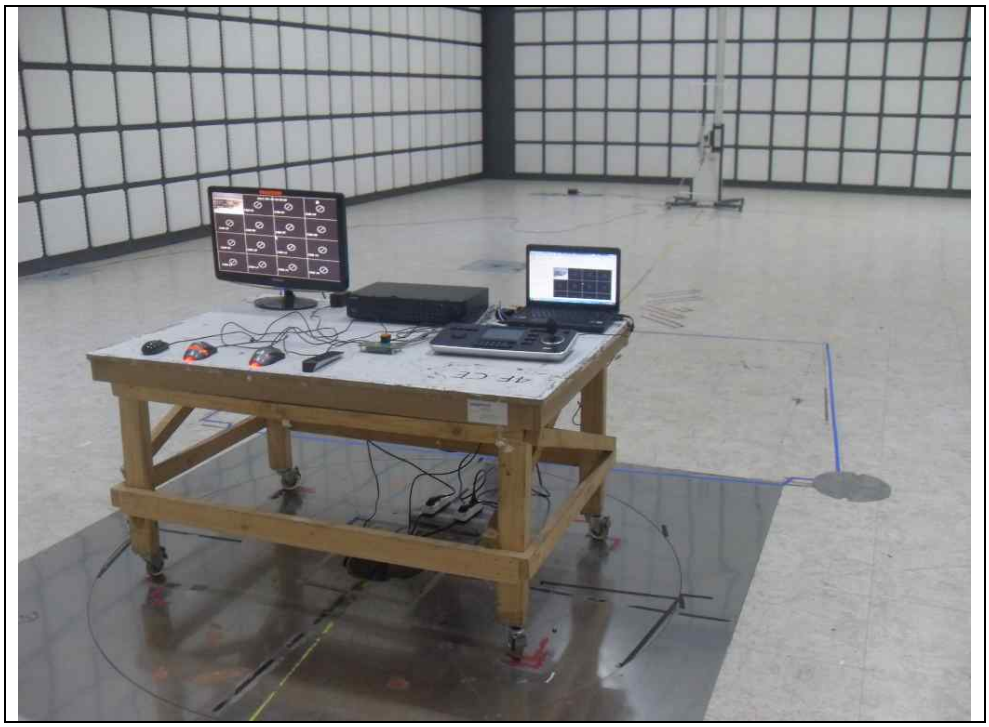
The result is

30 + 12 + 5 + 3 – 35 = 15 dB(μV/m)

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6.2.5 Photographs of test setup

* 30 ㎒ ~ 1 ㎓

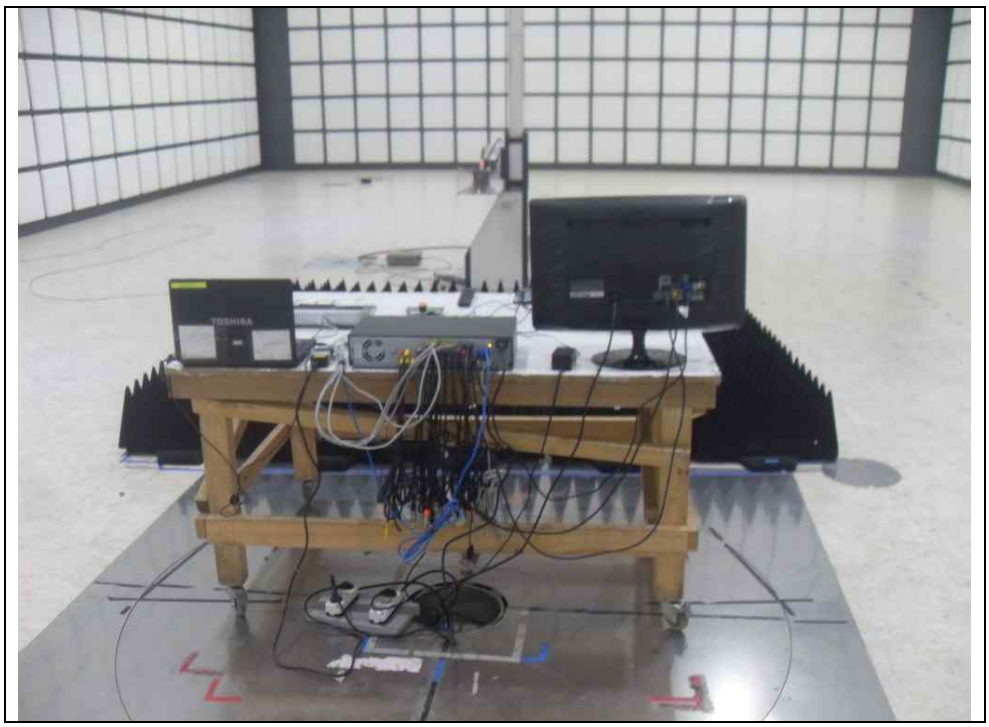




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* 1 ㎓ ~ 6 ㎓



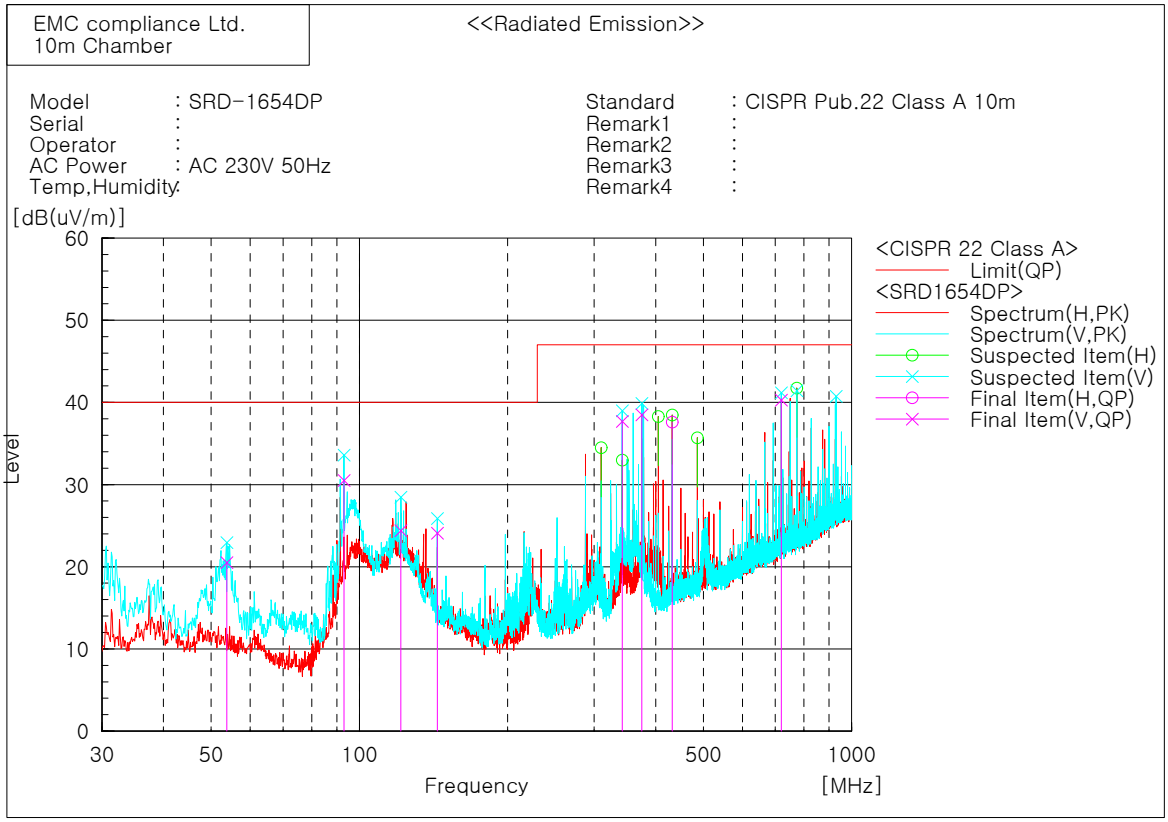


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6.2.6 Radiated emission measurement result

*** Graph and Data**

* 30 ㎒ ~ 1 ㎓

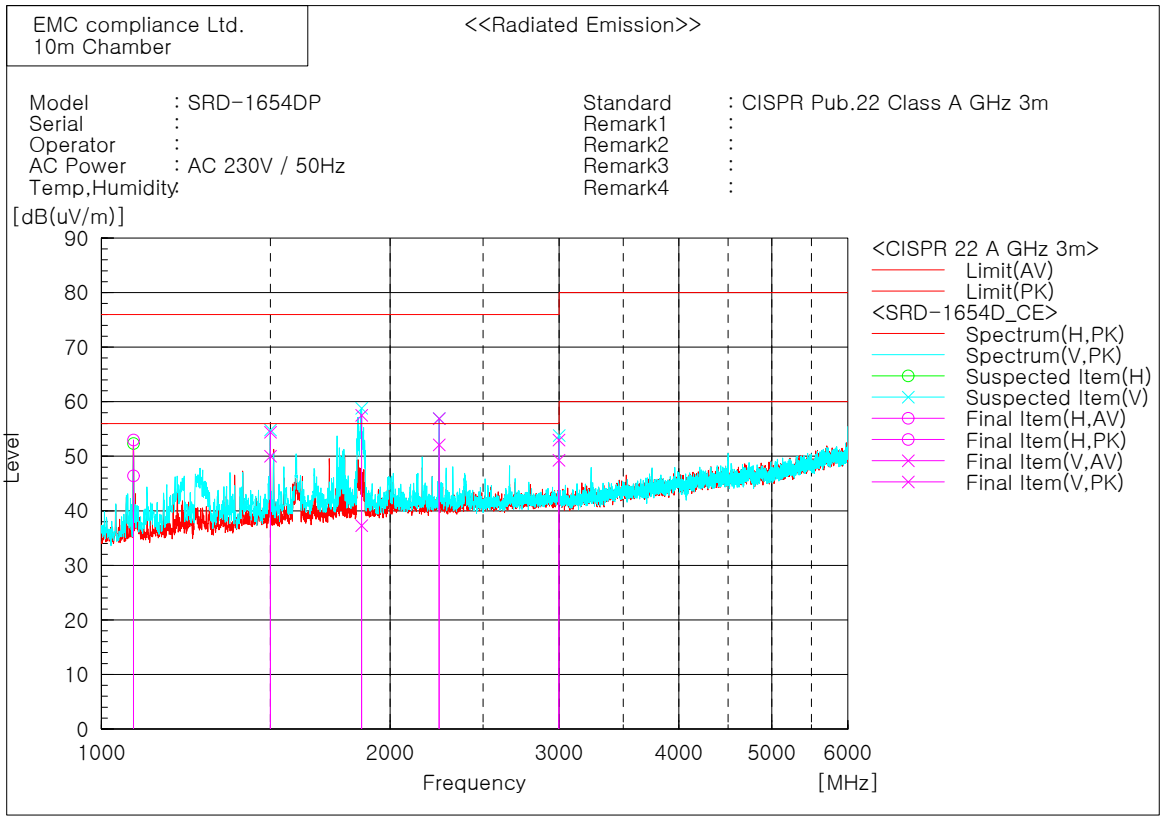


Final Result

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	53.765	V	36.0	-15.5	20.5	40.0	19.5	101.0	96.5
2	93.050	V	49.3	-18.8	30.5	40.0	9.5	199.0	308.0
3	121.423	V	40.1	-15.7	24.4	40.0	15.6	400.0	112.1
4	143.975	V	38.0	-13.9	24.1	40.0	15.9	101.0	216.8
5	341.976	V	49.6	-11.9	37.7	47.0	9.3	101.0	347.5
6	374.956	V	49.5	-11.0	38.5	47.0	8.5	101.0	8.7
7	431.944	H	46.7	-9.1	37.6	47.0	9.4	202.0	339.7
8	720.034	V	43.4	-3.1	40.3	47.0	6.7	299.0	286.3

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* 1 ㎓ ~ 6 ㎓



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	1080.000	H	55.2	61.8	-8.8	46.4	53.0	56.0	76.0	9.6	23.0	100.0	228.9
2	1500.000	V	55.1	59.5	-5.1	50.0	54.4	56.0	76.0	6.0	21.6	100.0	11.7
3	1867.500	V	40.2	60.4	-2.9	37.3	57.5	56.0	76.0	18.7	18.5	100.0	231.0
4	2250.125	V	53.4	58.2	-1.3	52.1	56.9	56.0	76.0	3.9	19.1	100.0	336.3
5	2999.147	V	49.5	53.2	-0.2	49.3	53.0	56.0	76.0	6.7	23.0	100.0	30.8

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6.3 Harmonics

Test specification	EN 61000-3-2:2006+A2:2009				
Testing voltage	230 V, 50 Hz				
Test facility	Immunity area				
Date	2013. 04. 24				
Temperature(°C)	24 °C	Humidity (% R.H.)	32 % R.H.	Pressure (kPa)	100.0 kPa
Remarks	Complied				

6.3.1 Measurement procedure

The equipment is supplied in series with shunt(s) Rm or current transformer(s) from a source having the same nominal voltage and frequency as the rated supply voltage and frequency of the equipment. Measurements shall be made under normal load, or conditions for adequate heat discharge, and under normal operating conditions. User's operation controls or automatic programmers shall be set to produce the maximum harmonic component, for each successive harmonic component in turn. For the purpose of harmonic current limitation, equipment is classified as follows :

Class A : Equipment not specified in one of the three other Classes shall be considered as Class A equipment.

- Balanced three-phase equipment;
- Household appliances excluding equipment identified as Class D;
- Tools excluding portable tools;
- Dimmers for incandescent lamps;
- Audio equipment.

Class B : Portable tools; Arc welding equipment which is not professional equipment.

Class C : Lighting equipment.

Class D : Equipment having a specified power according to 6.2.2 less than or equal to 600 w, of the following types:

- Personal computers and personal computer monitors;
- Television receivers.

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6.3.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Harmonics/Flicker meter	5001x-CTS -400-413	54984	C.I.	2013.05.23	☒

6.3.3 Photographs of test setup



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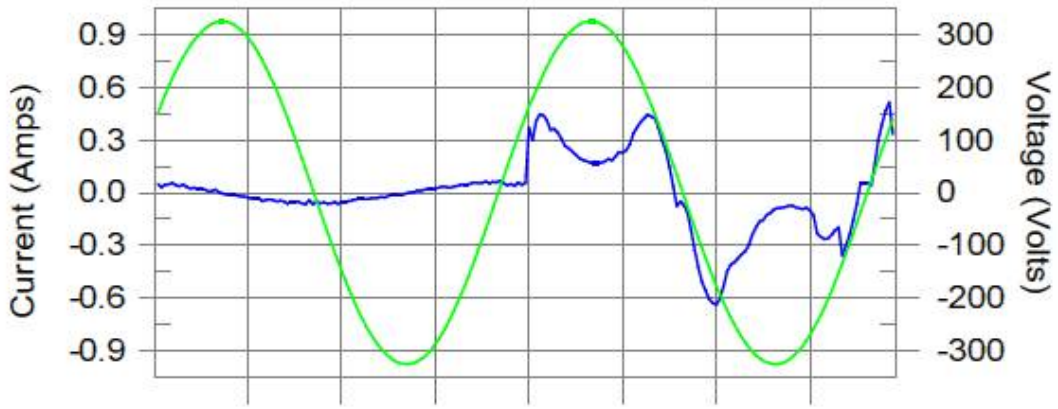
6.3.4 Measurement result

Harmonics – Class-A per Ed. 3.2 (2009)(Run time) incl. inter-harmonics

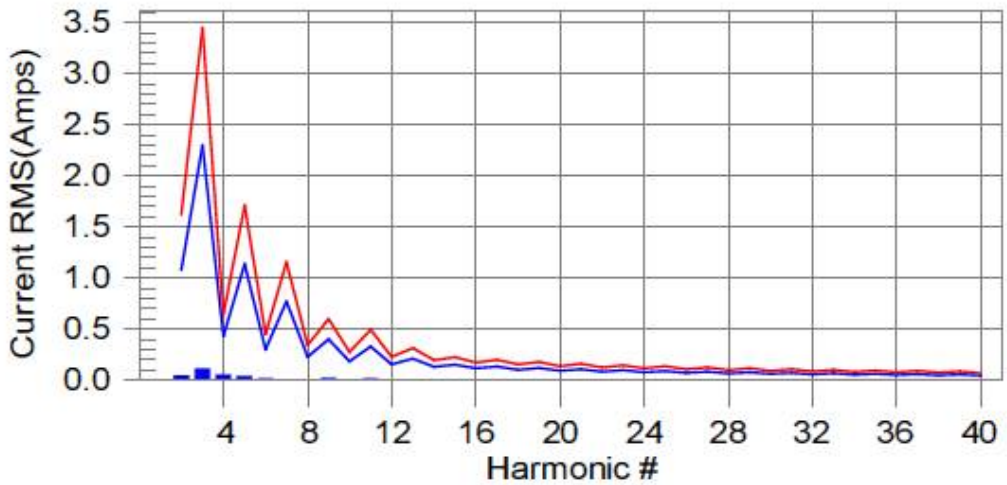
EUT: SRD-1654DP
Test category: Class-A per Ed. 3.2 (2009) (European limits)
Tested by: Test Operator
Test Margin: 100
Test date: 2013-04-24
Start time: 오후 3:21:26
End time: 오후 3:24:16
Test duration (min): 2.5
Data file name: H-000631.cts_data
Comment: Comments
Customer: Samsung Techwin Co., Ltd.

Test Result: Pass
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line
European Limits



Test result: Pass
Worst harmonic was #4 with 9.49% of the limit.

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Current Test Result Summary (Run time)

EUT: SRD-1654DP
Tested by: Test Operator
Test category: Class-A per Ed. 3.2 (2009) (European limits)
Test Margin: 100
Test date: 2013-04-24
Start time: 오후 3:21:26
End time: 오후 3:24:16
Test duration (min): 2.5
Data file name: H-000631.cts_data
Comment: Comments
Customer: Samsung Techwin Co., Ltd.

Test Result: Pass
Source qualification: Normal
THC(A): 0.13
I-THD(%): 110.02
POHC(A): 0.000
POHC Limit(A): 0.320
Highest parameter values during test:

V_RMS (Volts):	229.56	Frequency(Hz):	50.00
I_Peak (Amps):	0.915	I_RMS (Amps):	0.226
I_Fund (Amps):	0.120	Crest Factor:	4.441
Power (Watts):	23.2	Power Factor:	0.488

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.036	1.080	3.3	0.048	1.620	2.96	Pass
3	0.106	2.300	4.6	0.110	3.450	3.20	Pass
4	0.041	0.430	9.5	0.050	0.645	7.73	Pass
5	0.032	1.140	2.8	0.036	1.710	2.11	Pass
6	0.009	0.300	3.2	0.014	0.450	3.09	Pass
7	0.008	0.770	1.0	0.010	1.155	0.83	Pass
8	0.008	0.230	3.3	0.010	0.345	2.95	Pass
9	0.014	0.400	3.5	0.017	0.600	2.81	Pass
10	0.009	0.184	4.7	0.012	0.276	4.47	Pass
11	0.013	0.330	4.0	0.015	0.495	3.02	Pass
12	0.007	0.153	4.5	0.009	0.230	3.97	Pass
13	0.009	0.210	4.5	0.011	0.315	3.60	Pass
14	0.005	0.131	4.0	0.007	0.197	3.74	Pass
15	0.006	0.150	4.0	0.008	0.225	3.53	Pass
16	0.004	0.115	3.7	0.006	0.173	3.42	Pass
17	0.004	0.132	0.0	0.005	0.199	2.39	Pass
18	0.003	0.102	0.0	0.004	0.153	2.54	Pass
19	0.003	0.118	0.0	0.004	0.178	2.25	Pass
20	0.003	0.092	0.0	0.004	0.138	3.22	Pass
21	0.004	0.107	4.0	0.005	0.161	3.15	Pass
22	0.004	0.084	0.0	0.004	0.125	3.50	Pass
23	0.005	0.098	4.6	0.006	0.147	3.92	Pass
24	0.003	0.077	0.0	0.004	0.115	3.11	Pass
25	0.003	0.090	0.0	0.004	0.135	2.76	Pass
26	0.002	0.071	0.0	0.003	0.106	2.87	Pass
27	0.002	0.083	0.0	0.003	0.125	2.22	Pass
28	0.002	0.066	0.0	0.003	0.099	2.73	Pass
29	0.002	0.078	0.0	0.003	0.116	2.20	Pass
30	0.002	0.061	0.0	0.002	0.092	2.55	Pass
31	0.002	0.073	0.0	0.002	0.109	2.20	Pass
32	0.002	0.058	0.0	0.003	0.086	3.04	Pass
33	0.002	0.068	0.0	0.002	0.102	2.37	Pass
34	0.002	0.054	0.0	0.003	0.081	3.39	Pass
35	0.002	0.064	0.0	0.002	0.096	2.46	Pass
36	0.002	0.051	0.0	0.002	0.077	2.76	Pass
37	0.002	0.061	0.0	0.002	0.091	2.23	Pass
38	0.002	0.048	0.0	0.002	0.073	3.07	Pass
39	0.002	0.058	0.0	0.002	0.087	2.22	Pass
40	0.001	0.046	0.0	0.002	0.069	2.79	Pass

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Voltage Source Verification Data (Run time)

EUT: SRD-1654DP
Test category: Class-A per Ed. 3.2 (2009) (European limits)
Tested by: Test Operator
Test Margin: 100
Test date: 2013-04-24
Start time: 오후 3:21:26
End time: 오후 3:24:16
Test duration (min): 2.5
Data file name: H-000631.cts_data
Comment: Comments
Customer: Samsung Techwin Co., Ltd.

Test Result: Pass
Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	229.56	Frequency(Hz):	50.00
I_Peak (Amps):	0.915	I_RMS (Amps):	0.226
I_Fund (Amps):	0.120	Crest Factor:	4.441
Power (Watts):	23.2	Power Factor:	0.488

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.104	0.459	22.76	OK
3	0.533	2.066	25.79	OK
4	0.022	0.459	4.74	OK
5	0.025	0.918	2.77	OK
6	0.028	0.459	6.09	OK
7	0.020	0.689	2.89	OK
8	0.021	0.459	4.65	OK
9	0.019	0.459	4.16	OK
10	0.010	0.459	2.08	OK
11	0.023	0.230	10.18	OK
12	0.030	0.230	12.97	OK
13	0.026	0.230	11.29	OK
14	0.008	0.230	3.53	OK
15	0.008	0.230	3.51	OK
16	0.027	0.230	11.84	OK
17	0.010	0.230	4.14	OK
18	0.008	0.230	3.50	OK
19	0.011	0.230	4.98	OK
20	0.010	0.230	4.43	OK
21	0.010	0.230	4.54	OK
22	0.009	0.230	4.08	OK
23	0.007	0.230	3.05	OK
24	0.005	0.230	2.12	OK
25	0.009	0.230	4.05	OK
26	0.009	0.230	4.05	OK
27	0.005	0.230	2.26	OK
28	0.011	0.230	4.84	OK
29	0.011	0.230	4.66	OK
30	0.012	0.230	5.30	OK
31	0.005	0.230	2.03	OK
32	0.012	0.230	5.23	OK
33	0.004	0.230	1.71	OK
34	0.006	0.230	2.82	OK
35	0.010	0.230	4.17	OK
36	0.009	0.230	3.92	OK
37	0.008	0.230	3.47	OK
38	0.013	0.230	5.73	OK
39	0.014	0.230	6.22	OK
40	0.009	0.230	4.00	OK

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6.4 Flicker

Test specification	EN 61000-3-3:2008				
Testing voltage	230 V, 50 Hz				
Test facility	Immunity area				
Date	2013. 04. 24				
Temperature(°C)	24 °C	Humidity (% R.H.)	32 % R.H.	Pressure (kPa)	100.0 kPa
Remarks	Complied				

6.4.1 Measurement procedure

EUT was connected to the power analyzer system.

Measurement was performed to obtain the desired flicker parameters.

The measuring time depends on which parameters are to be measured.

P_{lt} = 2 h

P_{st} = 10 min

Controls and automatic programs shall be set to produce the most unfavorable sequence of voltage changes, using only those combinations of controls and programs are mentioned by the manufacturer in the instruction manual.

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6.4.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Harmonics/Flicker meter	5001x-CTS -400-413	54984	C.I.	2013.05.23	☒

6.4.3 Photographs of test setup



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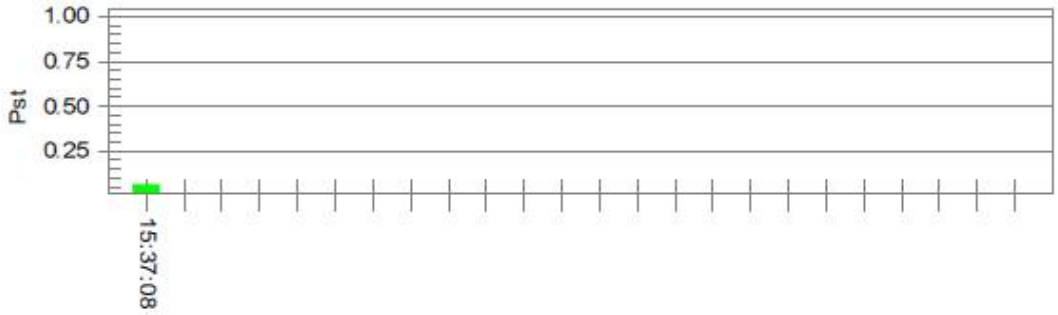
6.4.4 Measurement result

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

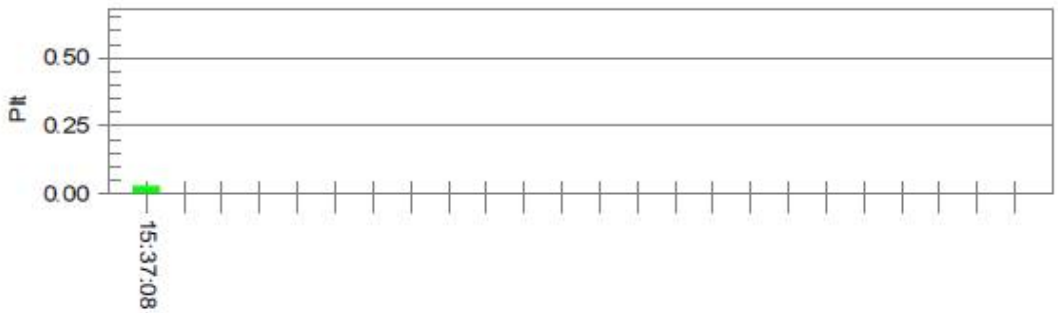
EUT: SRD-1654DP
Test category: All parameters (European limits)
Tested by: Test Operator
Test Margin: 100
Test date: 2013-04-24
Start time: 오후 3:26:48
End time: 오후 3:37:09
Test duration (min): 10
Data file name: F-000632.cts_data
Comment: Comments
Customer: Samsung Techwin Co., Ltd.

Test Result: Pass
Status: Test Completed

Pst and limit line
European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.50			
Highest dt (%):	0.00	Test limit (%):	3.30	Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.028	Test limit:	0.650	Pass

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6.5 Electrostatic Discharge

Test specification	EN 61000-4-2:2009				
Test level	☒ Contact: ± 6 kV ☒ Air: ± 2 kV, ± 4 kV, ± 8 kV ☒ HCP: ± 2 kV, ± 4 kV, ± 6 kV ☒ VCP: ± 2 kV, ± 4 kV, ± 6 kV				
Discharge impedance	330 Ω / 150 pF				
Number of discharge (Each polarity)	☒ Contact: 10 ☒ Air: 10 ☒ HCP / VCP: 10				
Interval between discharges	1 s				
Testing voltage	230 V, 50 Hz				
Test facility	Shielded room				
Date	2013. 04. 25				
Temperature(°C)	24 °C	Humidity (% R.H.)	36 % R.H.	Pressure (kPa)	100.3 kPa
Remarks	Complied - There was no change of operation status during above testing.				

6.5.1 Measurement procedure

A ground reference plane was located on the floor, and connected to earth via a low Impedance connection. The return cable of the ESD generator was connected to the reference plane.
In case of floor standing equipment, EUT was placed on the reference plane on 0.1 m of insulating Support. In case of table top equipment, EUT was placed on a wooden table 0.8 m above the reference grounded floor. A horizontal coupling plane (HCP) was placed on the table, and Connected to the reference plane via a 470 kΩ resistor located in each end (0.5 mm insulating support between EUT and HCP). In both cases a vertical coupling plane(VCP) OF 0.5 X 0.5 m was located 0.1 m from the EUT's sides. The VCP was connected to the reference plane in the same matter as the HCP.

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6.5.2 Used equipments

Equipment	Model No.	Serial No.	Makers	Next Cal. Date	Used
ESD Tester	PESD 1600	H011 309	HAEFELY	2013.07.18	☒
ESD Tester	NSG 437	182	TESEQ	2013.05.24	☐
HCP	-	-	-	-	☒
VCP	-	-	-	-	☒

6.5.3 Photographs of test setup



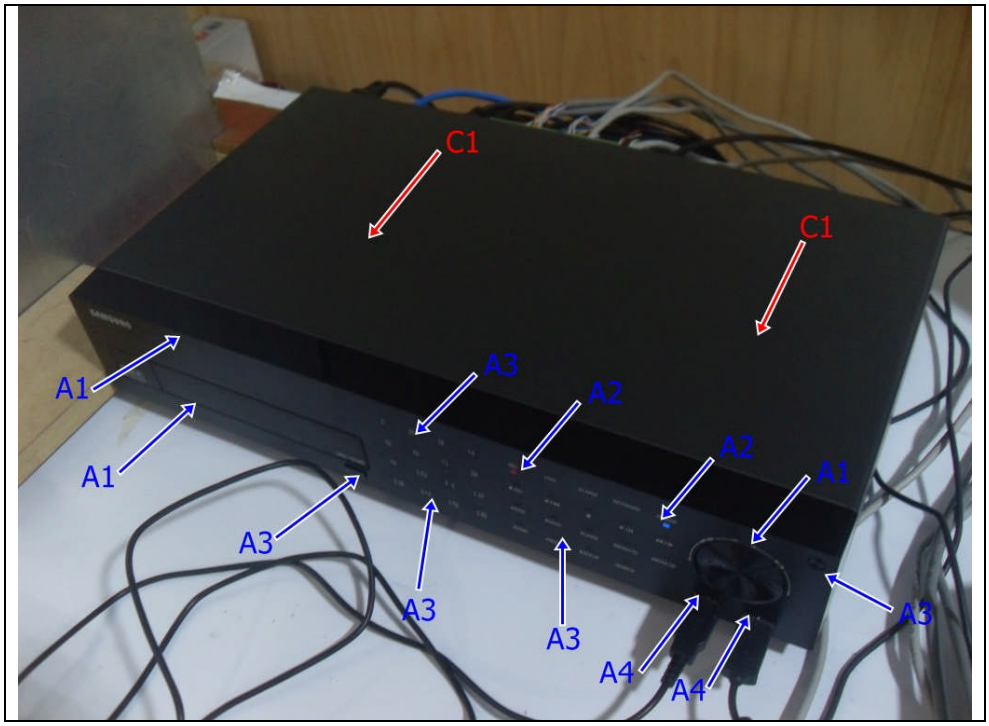
This test report shall not be reproduced, except in full, without the written approval.

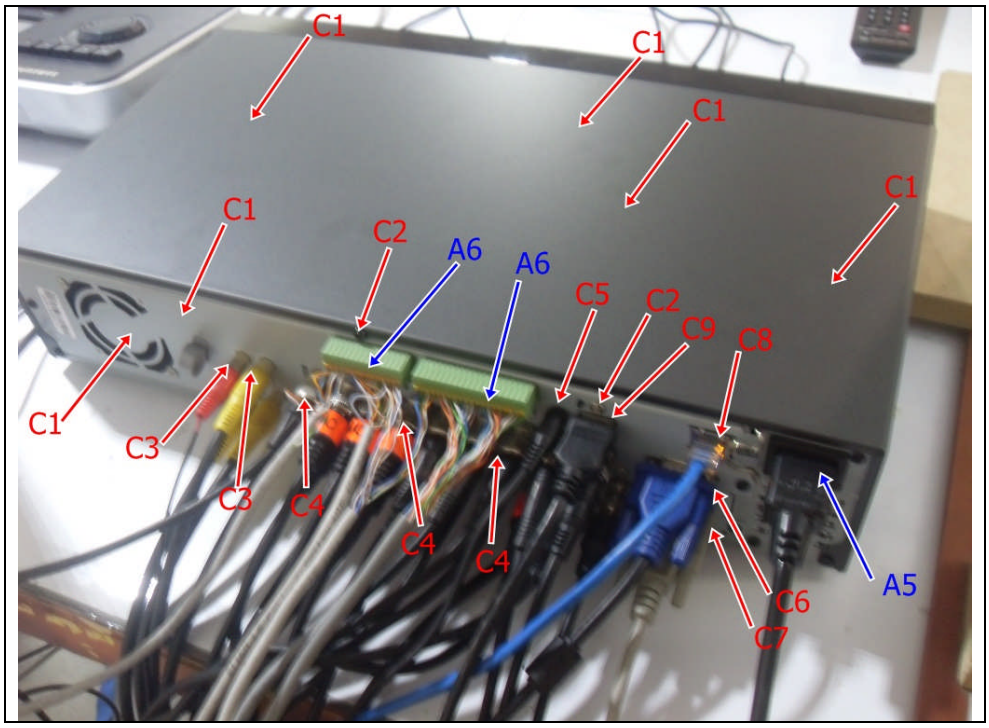
6.5.4 Measurement result

Electrostatic Discharge (Test Point)

Air discharge →

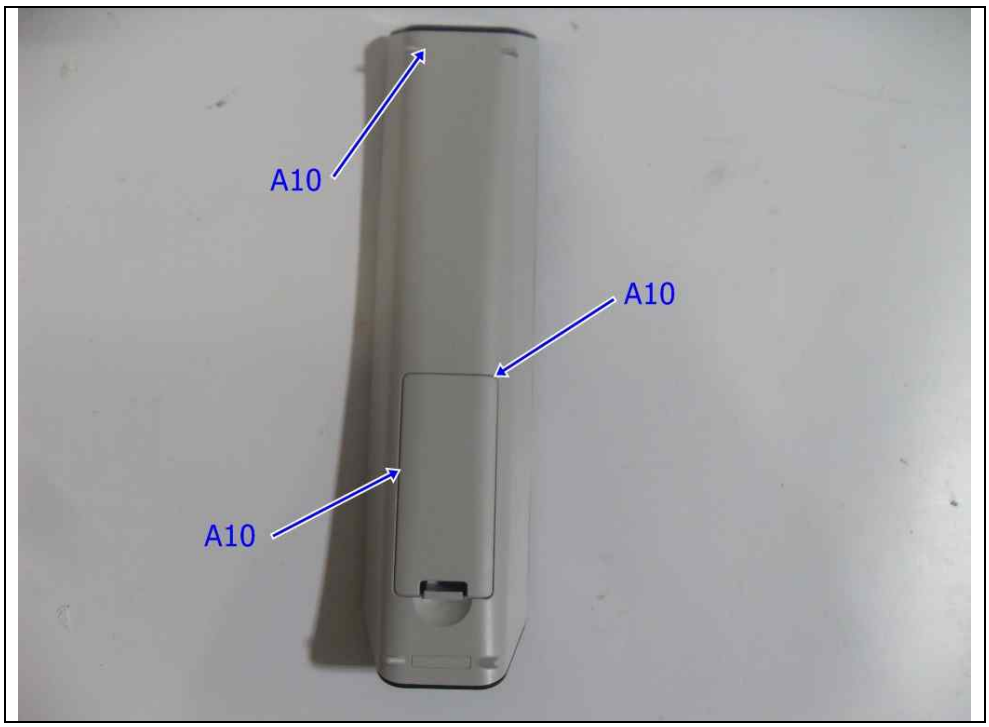
Contact discharge →



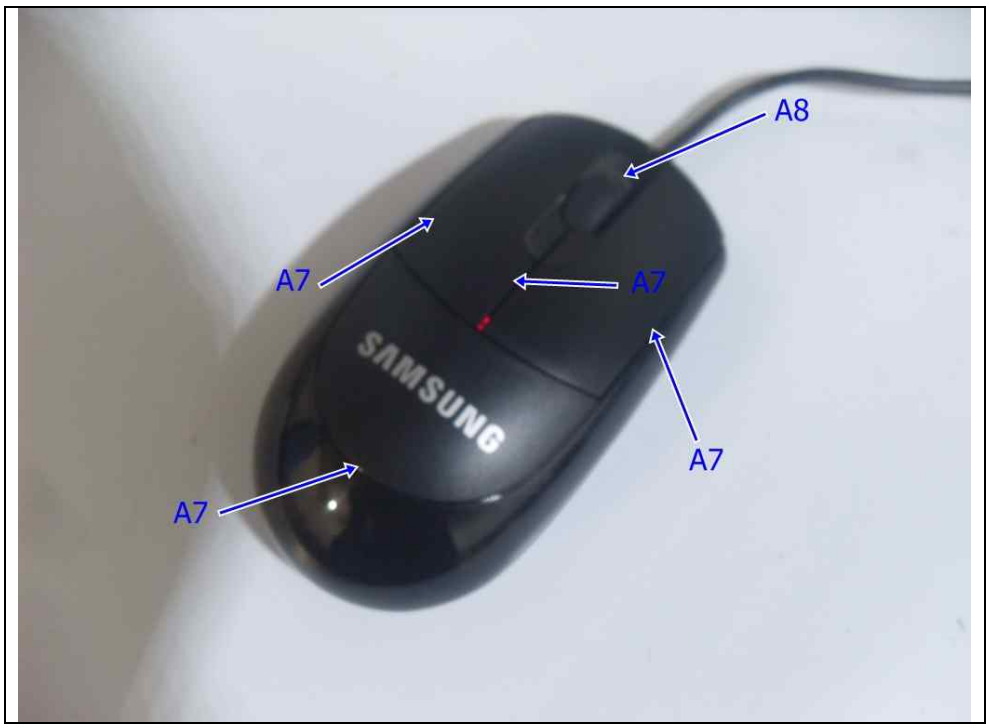


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HCP/VCP discharge

Location(EUT)	Applied level (±)	Result
HCP (All 4 sides)	± 2 kV, ± 4 kV, ± 6 kV	Complied
VCP (All 4 sides)	± 2 kV, ± 4 kV, ± 6 kV	Complied

Contact discharge

Location(EUT)		Applied level (±)	Result
C1	Enclosure(Case)	± 6 kV	Complied
C2	Screw	± 6 kV	Complied
C3	Audio Port	± 6 kV	Complied
C4	Video Port	± 6 kV	Complied
C5	Console Port	± 6 kV	Complied
C6	VGA Port	± 6 kV	Complied
C7	Serial Port	± 6 kV	Complied
C8	LAN Port	± 6 kV	Complied
C9	HDMI Port	± 6 kV	Complied

Air discharge

Location(EUT)		Applied level (±)	Result
A1	Enclosure(Case)	± 2 kV, ± 4 kV, ± 8 kV	Complied
A2	LED	± 2 kV, ± 4 kV, ± 8 kV	Complied
A3	Button	± 2 kV, ± 4 kV, ± 8 kV	Complied
A4	USB Port	± 2 kV, ± 4 kV, ± 8 kV	Complied
A5	Power Port	± 2 kV, ± 4 kV, ± 8 kV	Complied
A6	Alarm In/Out Port	± 2 kV, ± 4 kV, ± 8 kV	Complied
A7	Mouse Case	± 2 kV, ± 4 kV, ± 8 kV	Complied
A8	Mouse Wheel	± 2 kV, ± 4 kV, ± 8 kV	Complied
A9	Remote Control Button	± 2 kV, ± 4 kV, ± 8 kV	Complied
A10	Remote Control Case	± 2 kV, ± 4 kV, ± 8 kV	Complied

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6.6 Radio Frequency Electromagnetic Fields

Test specification	EN 61000-4-3:2006+A2:2010				
Tested frequency	80 ㎒ ~ 2.7 ㎓				
Test level & Modulation	1 V/m, 3 V/m, 10 V/m, 80 % Amplitude Modulation (1 ㎑) 1 V/m, 3 V/m, 10 V/m, Pulse Modulation (1 Hz (0.5 s ON: 0.5 s OFF))				
Frequency Step	log 1 % step				
Dwell time	3 s				
Distance	3 m from EUT to tip of antenna				
Testing Voltage	230 V, 50 Hz				
Test facility	Fully anechoic chamber (3 m)				
Date	2013. 04. 26				
Temperature(°C)	25 °C	Humidity (% R.H.)	38 % R.H.	Pressure (㎪)	100.1 ㎪
Remarks	Complied - There was no change of operation status during above testing.				

6.6.1 Measurement procedure

The test was performed at 3 m full anechoic chamber.

For floor standing equipment, the EUT was standing on the floor.

For tabletop equipment, the EUT was located on a wooden table 0.8 m above the floor.

The EUT was tested all sides, horizontal and vertical polarization.

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6.6.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Power meter	PM2002	302852	AR	2014.04.05	☒
Power sensor	PH2000	303224	AR	2014.04.05	☒
Power sensor	PH2000	311217	AR	2014.04.05	☒
Directional coupler	DC6180	303976	AR	2014.04.08	☒
Directional coupler	DC7144M1	320279	AR	2014.02.07	☒
Signal generator	E4421B	GB40052295	AGILENT	2013.10.11	☒
Amplifier	BBA100	100996-1	R&S	2014.02.12	☒
Amplifier	60S1G3M2	320444	AR	2014.04.09	☒
Broadband Ant.	LPDA-0803	130269	ETS	-	☒
Fiber Optic Modem	HI-4413P	-	ETS-LINDGREM	-	☒
Antenna master	-	-	ETS	-	☒

6.6.3 Photographs of test setup



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6.6.4 Measurement result

Location(EUT)	Antenna polarization	Result
Front side	Horizontal	Complied
	Vertical	Complied
Rear side	Horizontal	Complied
	Vertical	Complied
Left side	Horizontal	Complied
	Vertical	Complied
Right side	Horizontal	Complied
	Vertical	Complied

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6.7 Electric Fast Transient/BURST

Test specification	EN 61000-4-4:2004+A1:2010				
Coupling	☒ AC main ☒ Signal/Control: Clamp ☒ Telecommunication: Clamp				
Test level	☒ AC main: ± 2 kV Peak ☒ Signal/Control: ± 1 kV Peak ☒ Telecommunication: ± 1 kV Peak				
Repetition frequency	100 ㎑, Tr/Th = 5 / 50 ns				
Coupling time	60 s				
Testing Voltage	230 V, 50 Hz				
Test facility	Shielded room				
Date	2013. 04. 29				
Temperature(°C)	24 °C	Humidity (% R.H.)	35 % R.H.	Pressure (㎪)	100.1 ㎪
Remarks	Complied - During the test, EUT appeared white dot, After this test, EUT was operated normally.				

6.7.1 Measurement procedure

A ground reference plane was located on the floor.
EFT generator was connected to reference ground plane via low impedance connection.
For floor standing equipment, EUT was placed on a 0.1 m wooden table.
For tabletop equipment, EUT was placed on a 0.1 m above the ground reference plane.
Test generator and coupling/decoupling network was placed on, and bounded to, the ground reference plane. When using the coupling clamp, the minimum distance between the coupling plates and all other conductive surfaces, except the ground reference plane beneath the coupling clamp, Shall be 0.5 m.

6.7.2 Used equipments

Equipment	Model No.	Serial No.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS 500 M6	V0545100858	EM TEST	2014.01.31	☒
Ultra compact simulator	UCS 500 M6	0701-03	EM TEST	2013.06.13	☐
Capacitive Coupling Clamp	-	-	EM TEST	-	☒

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6.7.3 Photographs of test setup





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6.7.4 Measurement result

* AC main

EFT coupling point	(+)	(-)	Result
L+N+PE	+ 2 kV	- 2 kV	Complied

* Signal / Control

EFT coupling point	(+)	(-)	Result
RS-485(Tx,Rx)	+ 1 kV	- 1 kV	Complied
Video In	+ 1 kV	- 1 kV	Complied
Alarm In/Out	+ 1 kV	- 1 kV	Complied

* Telecommunication

EFT coupling point	(+)	(-)	Result
LAN(RJ-45)	+ 1 kV	- 1 kV	Complied

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6.8 Surge

Test specification	EN 61000-4-5:2006				
Coupling	☒ AC main: Direct ☒ Signal/Control: Direct, CDN				
Test level	☒ AC main: ☒Differential mode: ± 0.5 kV, ± 1 kV ☒Common mode: ± 0.5 kV, ± 1 kV, ± 2 kV ☒ Signal/Control: ± 0.5 kV, ± 1 kV				
Coupling Impedance	☒ Differential mode: 18 μF ☒ Common mode: 10 Ω + 9 μF ☒ 40 Ω + 0.5 μF ☒ Direct				
Surge pulse shape	Tr/Th = 1.2 / 50 μs				
Angles	0 °, 90 °, 180 °, 270 °				
Number of surge	5				
Coupling time	1 min				
Testing Voltage	230 V, 50 Hz				
Test facility	Shielded room				
Date	2013. 04. 29				
Temperature(°C)	24 °C	Humidity (% R.H.)	37 % R.H.	Pressure (kPa)	100.1 kPa
Remarks	Complied - There was no change of operation status during above testing.				

6.8.1 Measurement procedure

A ground reference plane was located on the floor. SURGE generator was connected to reference ground plane via low impedance connection. For floor standing equipment & table top equipment, EUT was placed on a wooden table.

6.8.2 Used equipments

Equipment	Model No.	Serial No.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS 500 M6	V0545100858	EM TEST	2014.01.31	☒
Ultra compact simulator	UCS 500 M6	0701-03	EM TEST	2013.06.13	☐
CDN	CNV 508 N1	V1108108861	EM TEST	2014.01.03	☒

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6.8.3 Photographs of test setup





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6.8.4 Measurement result

* AC main

Coupling point	(+)	(-)	Result
L+N	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied
L+PE	+ 0.5 kV, + 1 kV, + 2 kV	- 0.5 kV, - 1 kV, - 2 kV	Complied
N+PE	+ 0.5 kV, + 1 kV, + 2 kV	- 0.5 kV, - 1 kV, - 2 kV	Complied

* Signal / Control

Coupling point	(+)	(-)	Result
RS-485(Tx,Rx)	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied
Video In	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied
Alarm In/Out	+ 0.5 kV, + 1 kV	- 0.5 kV, - 1 kV	Complied

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6.9 Conducted Immunity

Test specification	EN 61000-4-6:2009				
Tested frequency	0.15 ㎒ ~ 100 ㎒				
Test level & Modulation	1 Ⅴ, 3 Ⅴ, 10 Ⅴ, 80 % Amplitude Modulation (1 ㎑) 1 Ⅴ, 3 Ⅴ, 10 Ⅴ, Pulse Modulation (1 ㎐ (0.5 s ON: 0.5 s OFF))				
Frequency Step	log 1 % step				
Coupling method	☒ AC main: CDN(M3) ☒ Signal/Control:Clamp, CDN (S1/75) ☒ Telecommunication: CDN(T8-RJ45)				
Testing Voltage	230 Ⅴ, 50 ㎐				
Test facility	Shielded room				
Date	2013. 04. 25				
Temperature(°C)	24 °C	Humidity (% R.H)	36 % R.H	Pressure(㎪)	100.3 ㎪
Remarks	Complied - There was no change of operation status during above testing.				

6.9.1 Measurement procedure

A ground reference plane was located on the floor.

The test was performed on a ground reference plane on a 0.1 m wooden table. This test were Performed using CDN for mains, clamp for signal and injection probe. The frequency range was swept from 0.15 ㎒ to 100 ㎒. This frequency range was Modulated with 1 ㎑ sine wave at 80 %.

The signal generators provided the modulated frequency at a 1 % step size.

The power and all network cable, I/O cables longer than 3 m length were tested.

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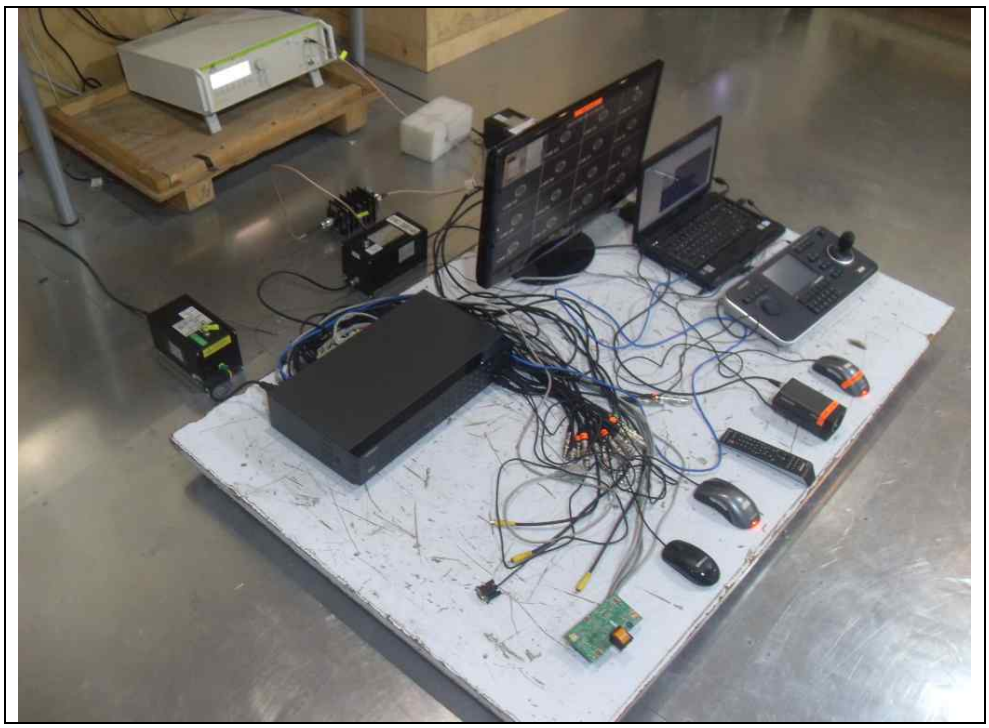
6.9.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
CS generator	CWS 500	V0635101750	EM TEST	2014.01.17	☒
CS generator	CWS500N1	V1041107702	EM TEST	2013.11.01	☐
CDN	CDN L-801 M2/M3	2936	EM TEST	2014.02.06	☒
CDN	CDN M2/M3	0906-12	EM TEST	2013.10.11	☒
Attenuator	73-6-34	MU918	MCE/WEINSCHEL	2013.10.11	☒
EM Clamp	KEMZ 801	17643	Schaffner	2014.04.17	☒
CDN	CDN S1/75	0410-28	EM TEST	2013.05.15	☒
CDN	CDN-T8-RJ45	0113-22	EM TEST	2014.02.22	☒
Current probe	MD720	W1345167/M6/0068	Schaffner	-	☐

6.9.3 Photographs of test setup



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6.9.4 Measurement result

* AC main

Coupling point	Coupling method	Result
Power	CDN(M3)	Complied

* Signal / Control

Coupling point	Coupling method	Result
RS-485(Tx,Rx)	Clamp	Complied
Video In	CDN (S1/75)	Complied
Alarm In/Out	Clamp	Complied

* Telecommunication

Coupling point	Coupling method	Result
LAN(RJ-45)	CDN(T8-RJ45)	Complied

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6.10 Dips and Interruptions

Test specification	EN 61000-4-11:2004				
Number of dips	3 T				
Duration	10 s				
Phase	Zero crossing (0 °)				
Testing Voltage	100 Ⅴ, 50 ㎐ / 240 Ⅴ, 50 ㎐				
Test facility	Shielded room				
Test Date	2013. 04. 29				
Temperature (°C)	24 °C	Humidity (% R.H)	36 % R.H	Pressure (㎪)	100.1 ㎪
Remarks	Complied				

6.10.1 Measurement procedure

The dips/interruption test is only applicable to AC mains.
The dips/interruptions were applied at zero crossing.

6.10.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS 500 M6	V0545100858	EM TEST	2014.01.31	☒
Ultra compact simulator	UCS 500 M6	0701-03	EM TEST	2013.06.13	☐

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6.10.3 Photographs of test setup



6.10.4 Measurement result

* 100 V, 50 Hz / 240 V, 50 Hz

Test Level (%UT)	Dip/Int. (%UT)	Duration /Period	Phase (°)	Count number	Result
80 %	20%	250 Period (1)	0	3T	Complied
70 %	30 %	25Period	0	3T	Complied
40 %	60 %	10 Period	0	3T	Complied
0%	100 %	250 Period (2)	0	3T	Note*

Comment:

- There was no change of operation status during above testing. (250 Period (1), 25Period, 10 Period)
- Note* (250 Period (2))

The power of EUT is off during the test. After the test, EUT is getting back to normal operation.

It fully recorded using ancillary Power source equipment to content with Manufacturer`s set up manual.

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6.11 Mains supply voltage variations

Test specification	EN 50130-4:2011				
Supply voltage	*U nom* + 10 %, *U nom* - 15 %				
Testing voltage	100 V, 50 Hz / 240 V, 50 Hz				
Date	2013. 04. 29				
Temperature (°C)	24 °C	Humidity (% R.H)	36 % R.H	Pressure (kPa)	100.1 kPa
Remarks	Complied				

6.11.1 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS 500 M6	V0545100858	EM TEST	2014.01.31	☒
Ultra compact simulator	UCS 500 M6	0701-03	EM TEST	2013.06.13	☐

6.11.2 Measurement result

* 240 V, 50 Hz

Supply voltage		Result
+ 10 %	264 V	Complied
- 15 %	204 V	Complied

Comment:

- There was no change of operation status during above testing.

* 100 V, 50 Hz

Supply voltage		Result
+ 10 %	110 V	Complied
- 15 %	85 V	Complied

Comment:

- There was no change of operation status during above testing.

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7. E.U.T. photographs

Front View



Rear View



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Left View



Right View

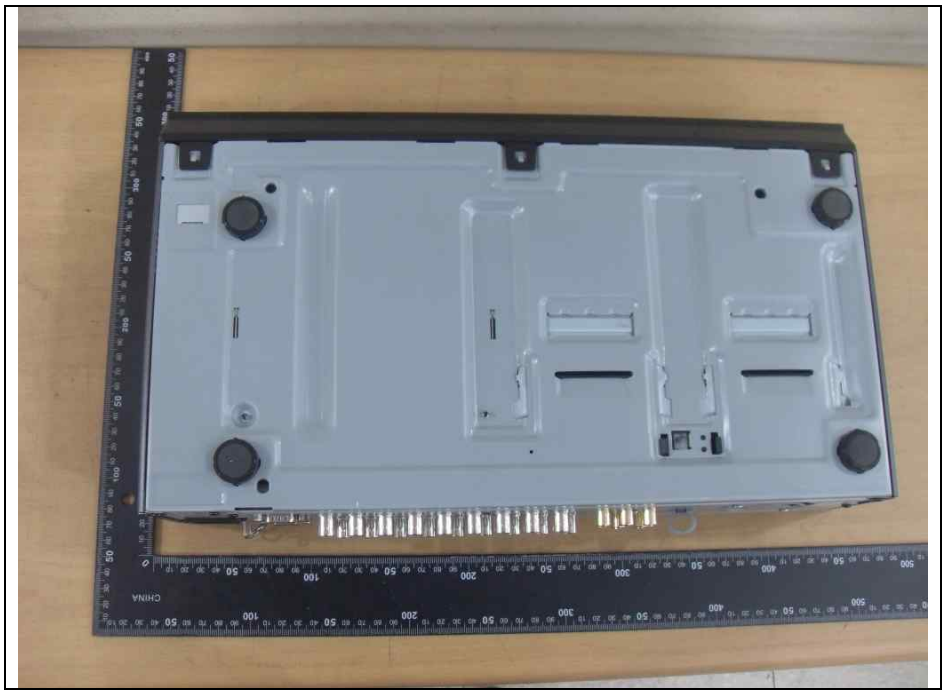


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Top View



Bottom View



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Port





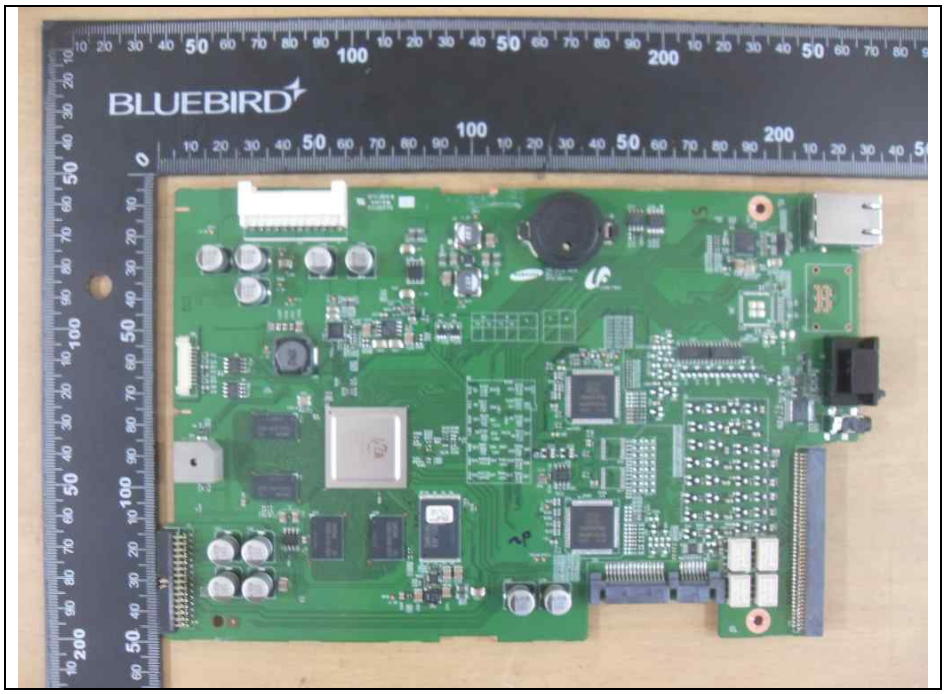
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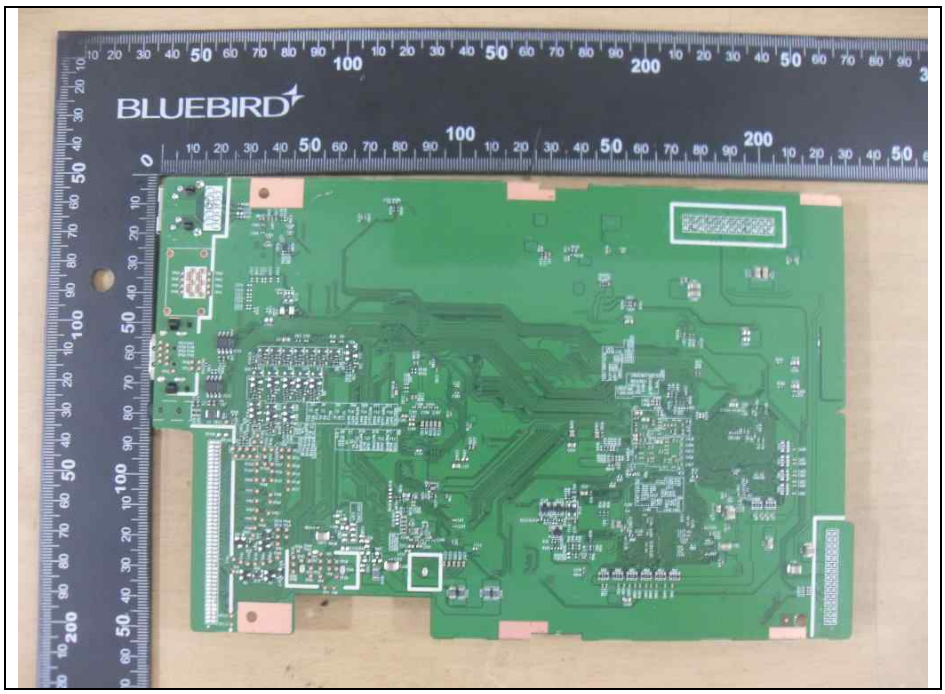
Inside



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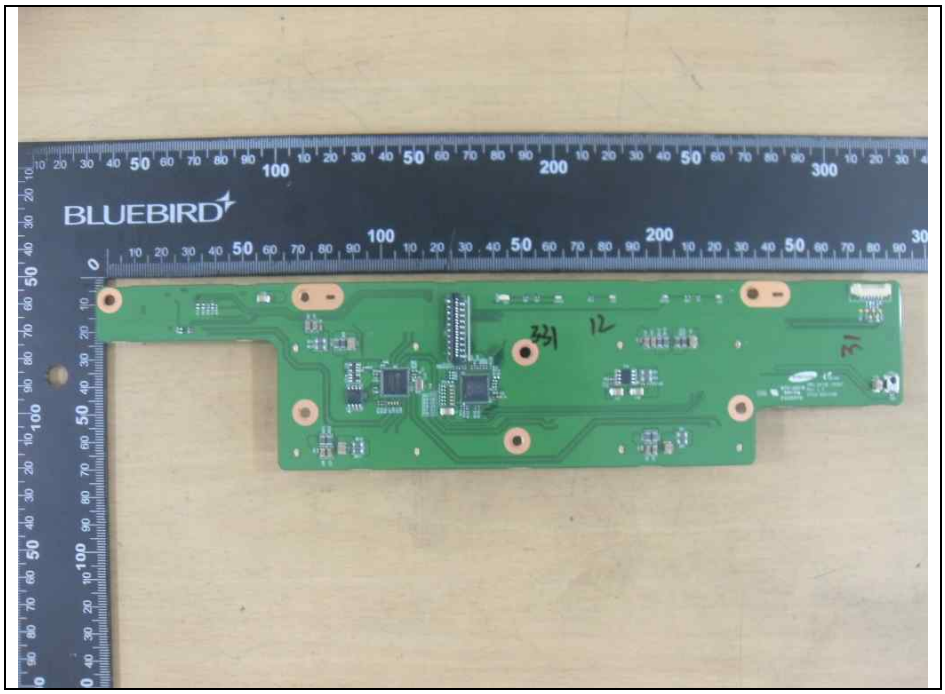
Main Board

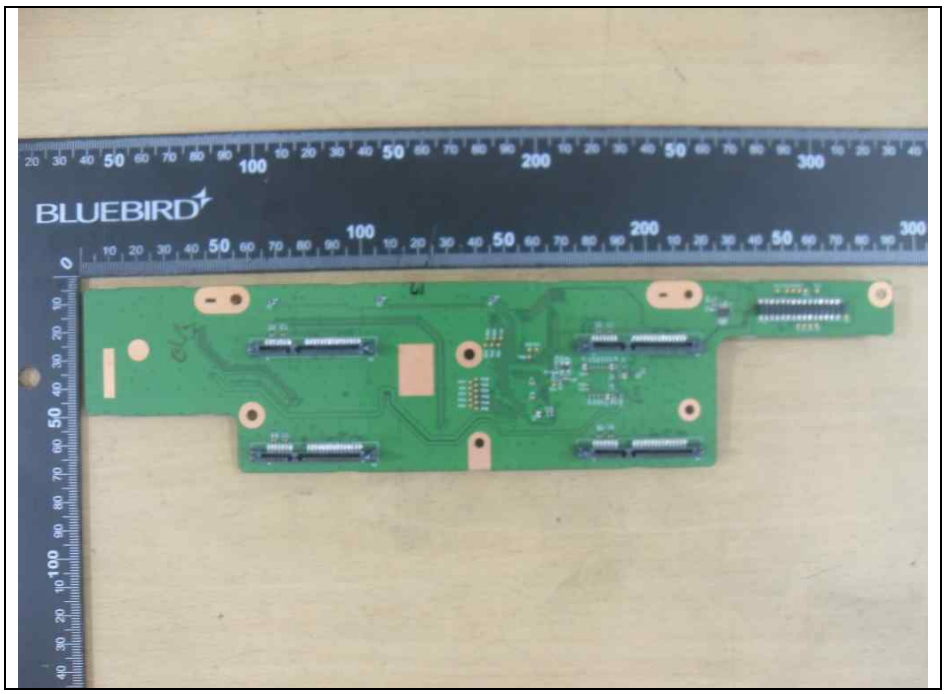




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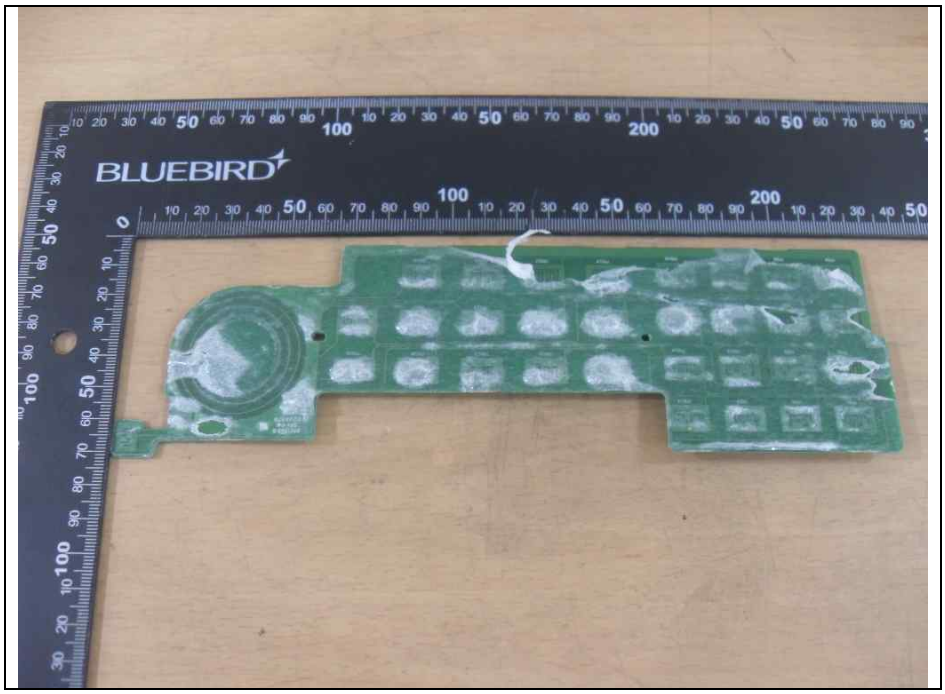
SUB Board

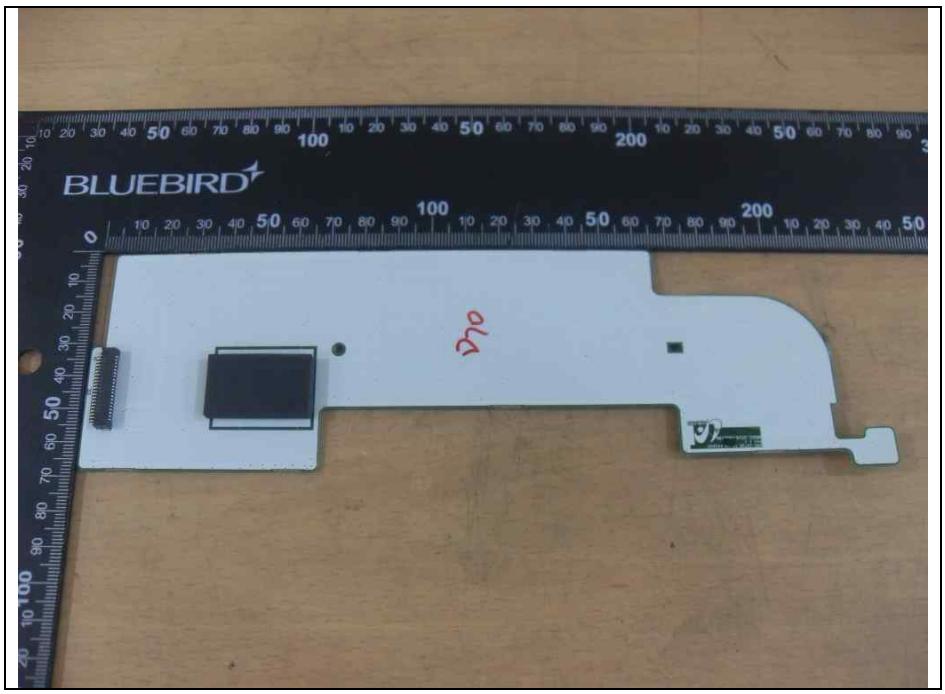




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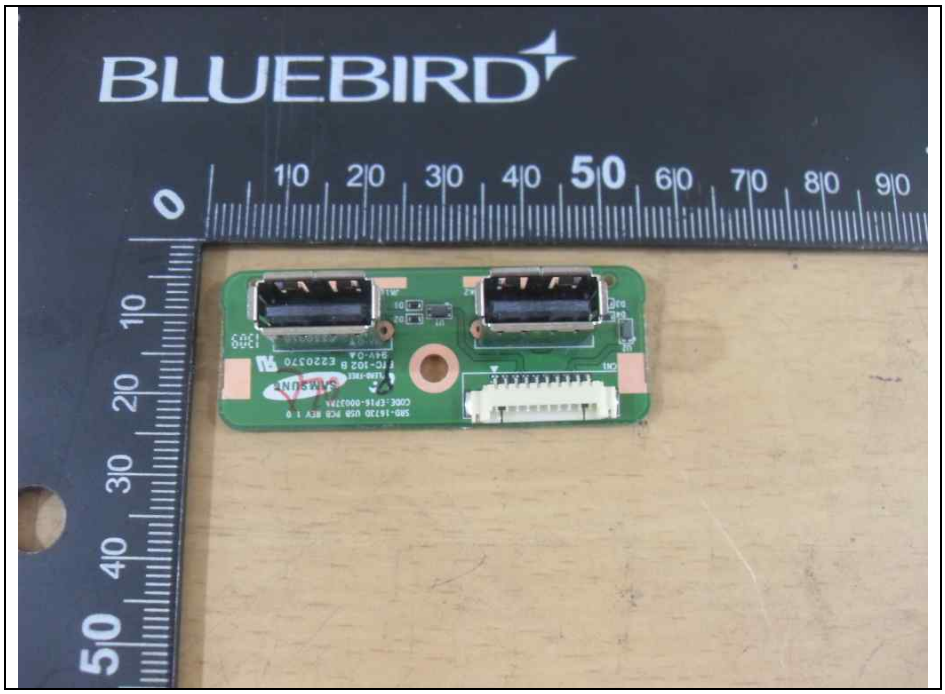
Button Board

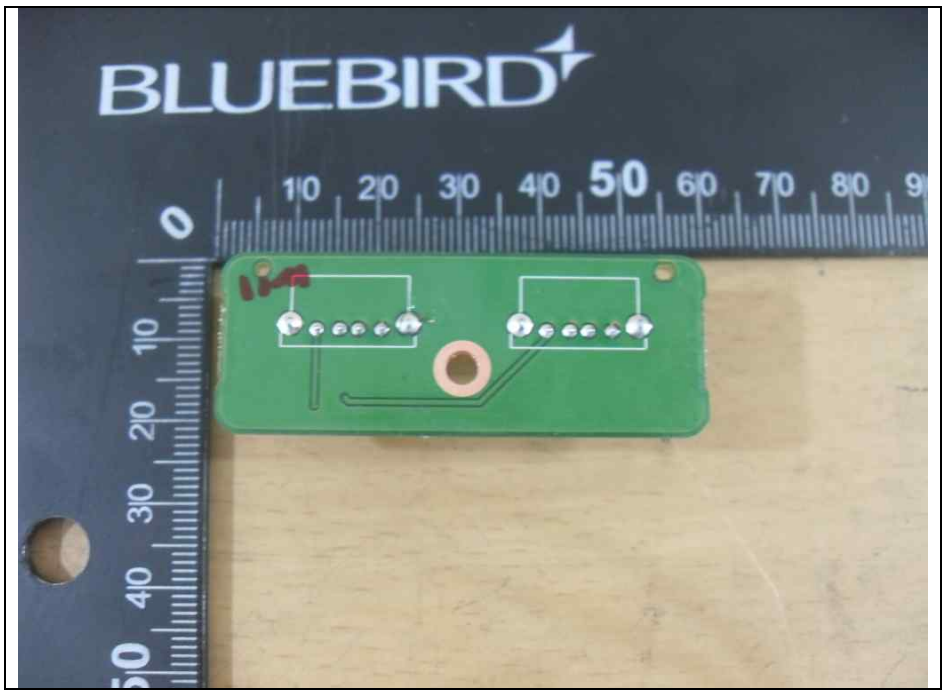




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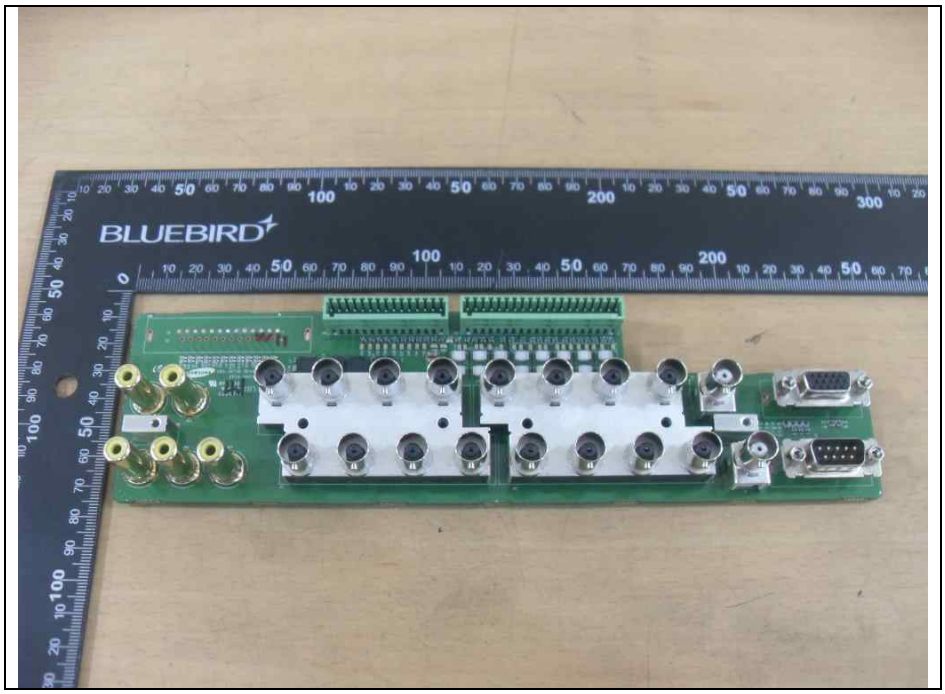
USB Board

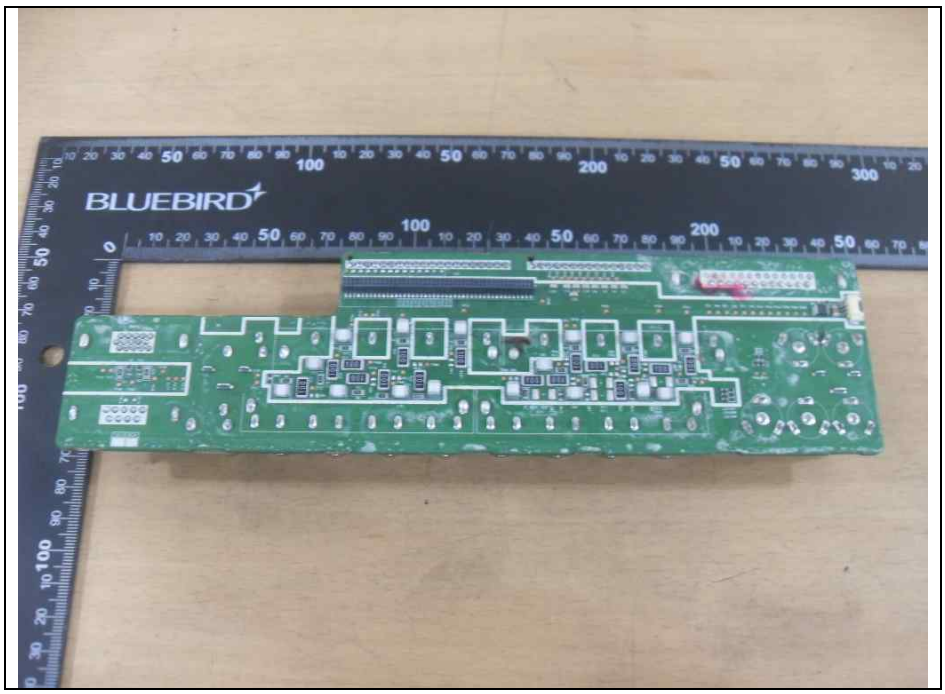




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Rear Board

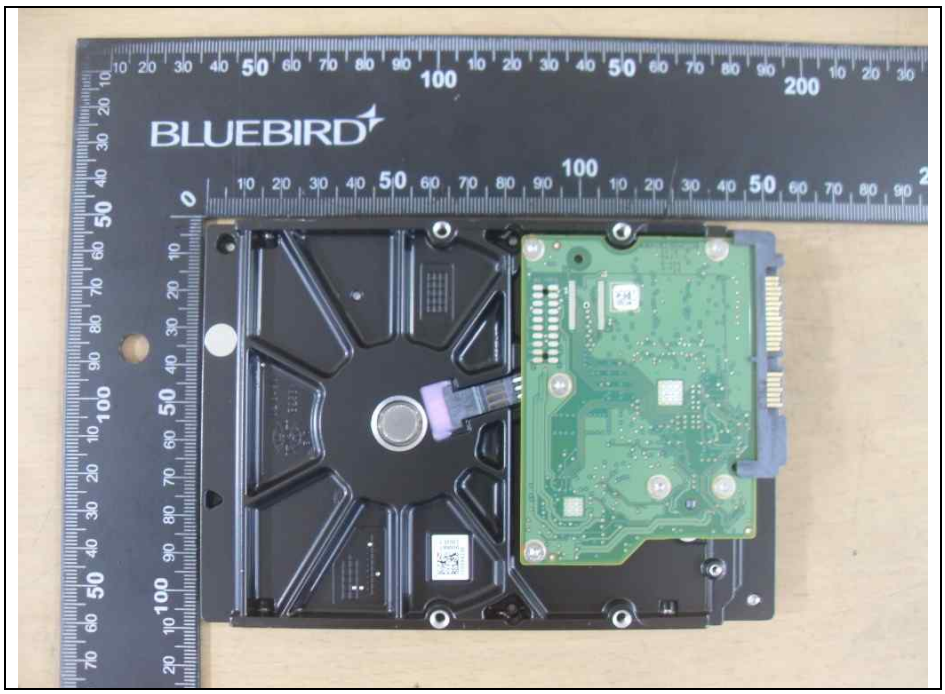




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HDD (500 GB)





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ODD



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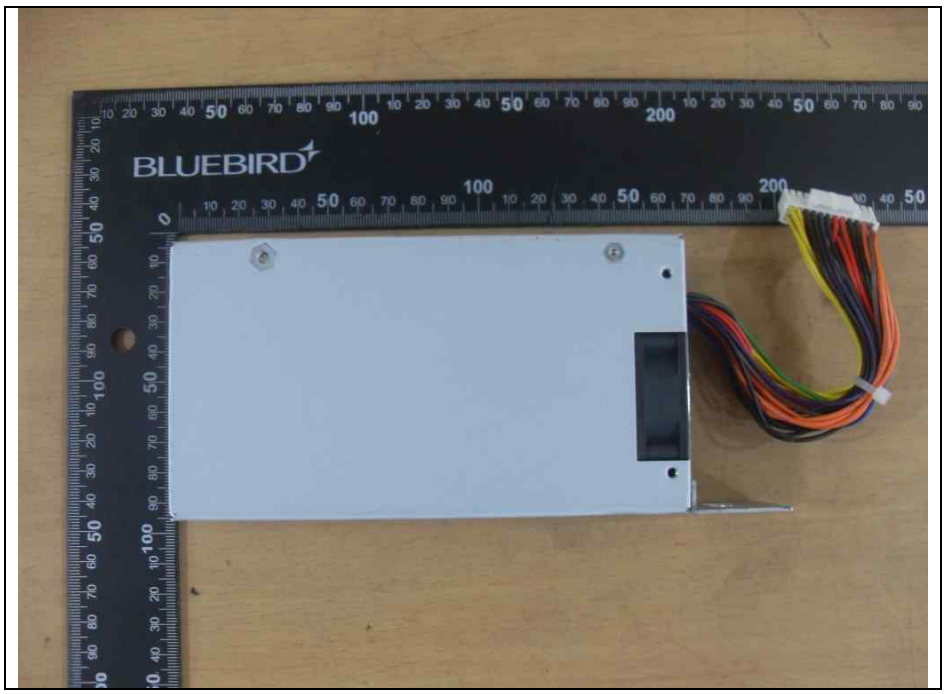




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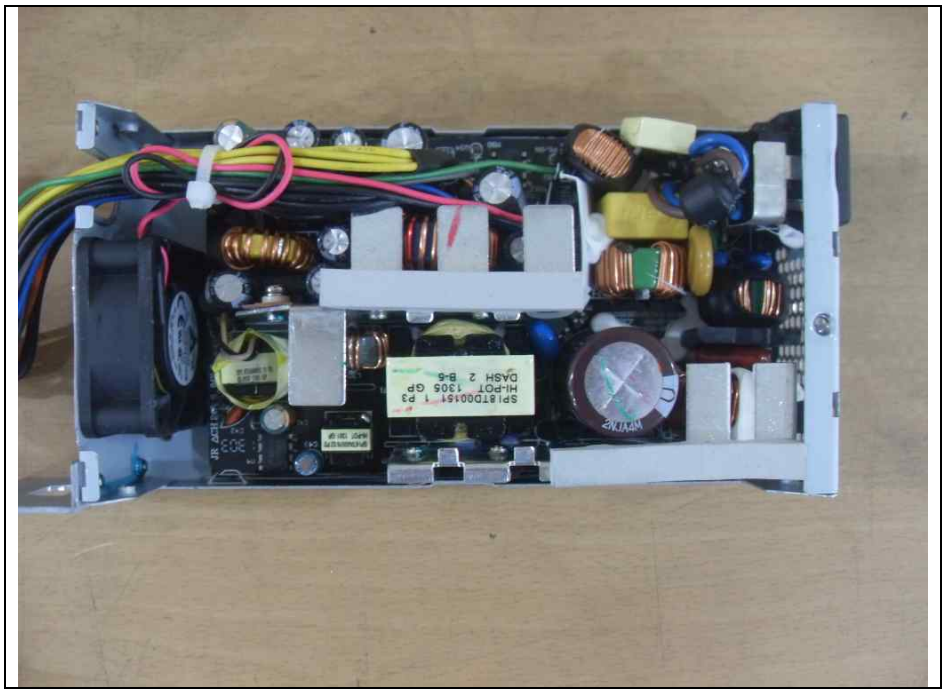
Power



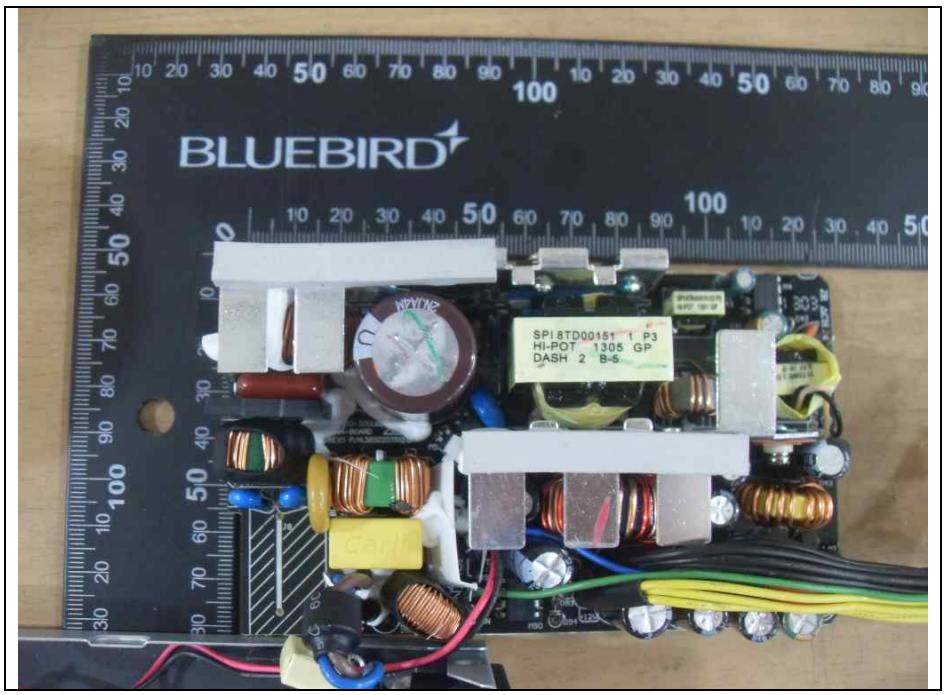


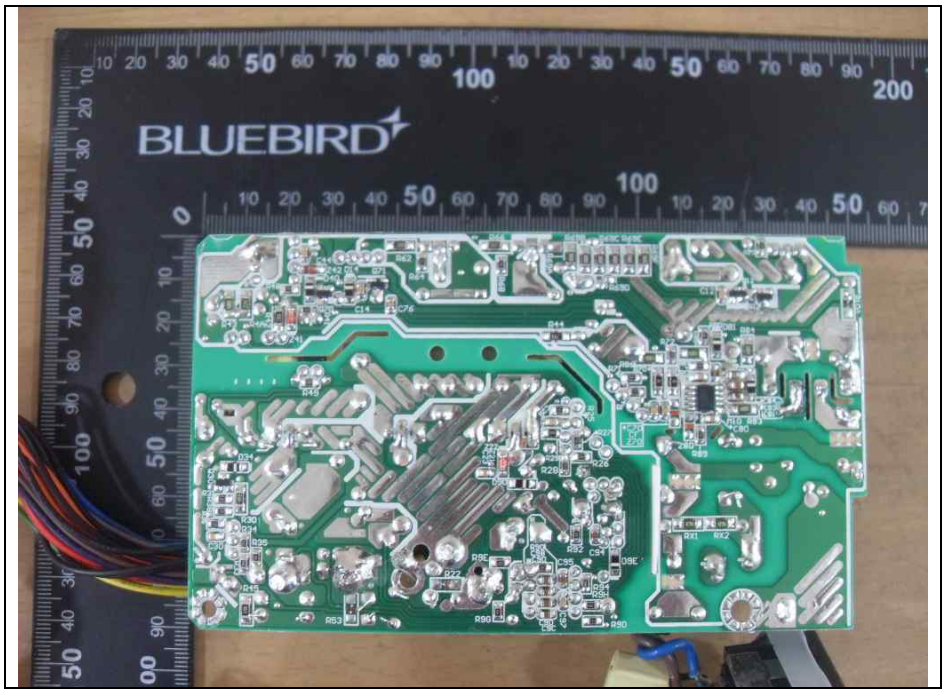
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USB Mouse





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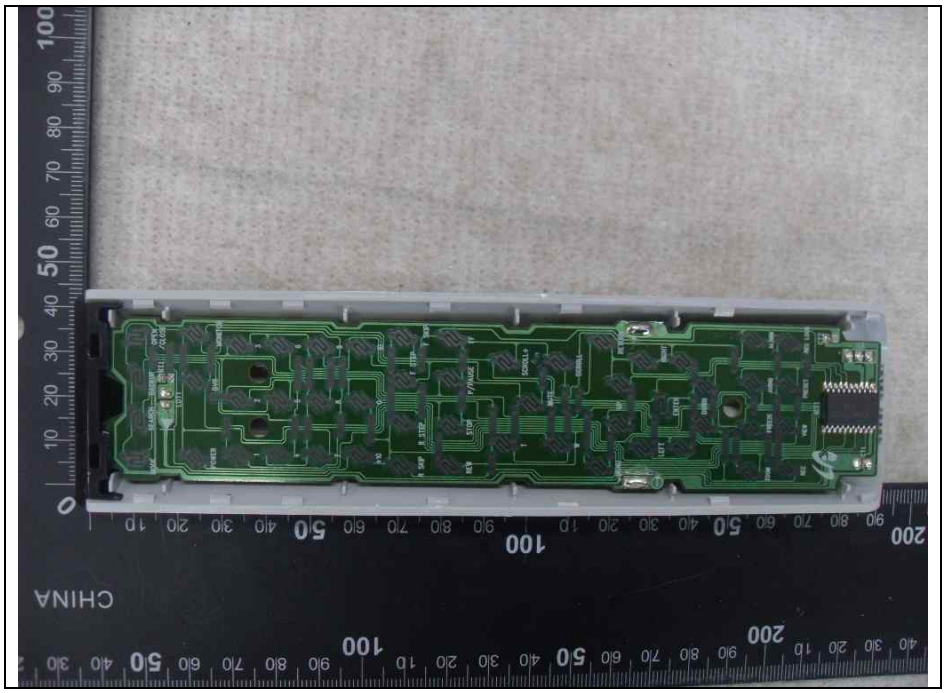


Remote Control

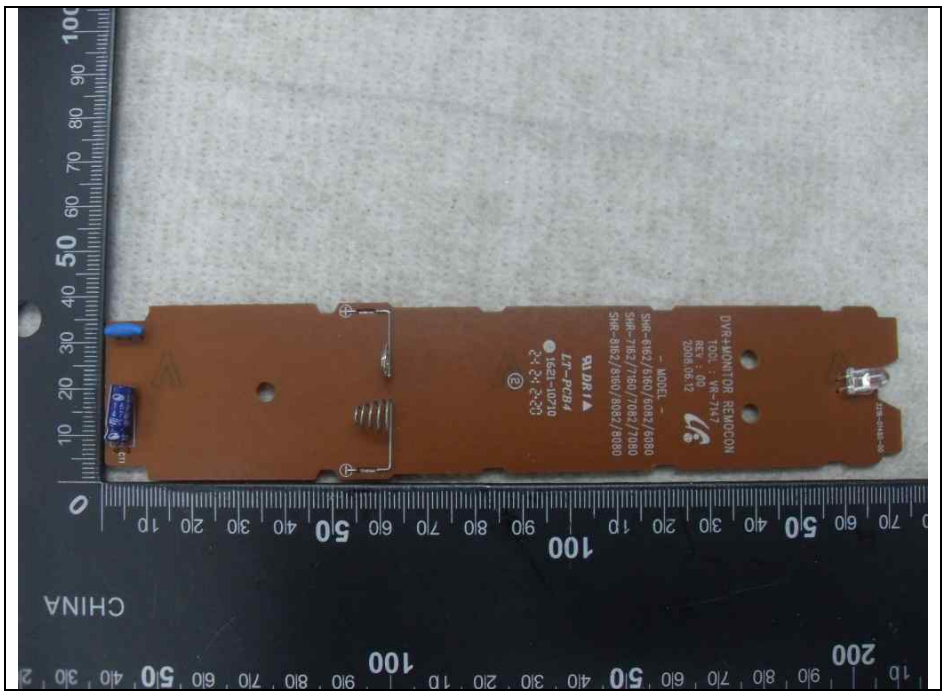


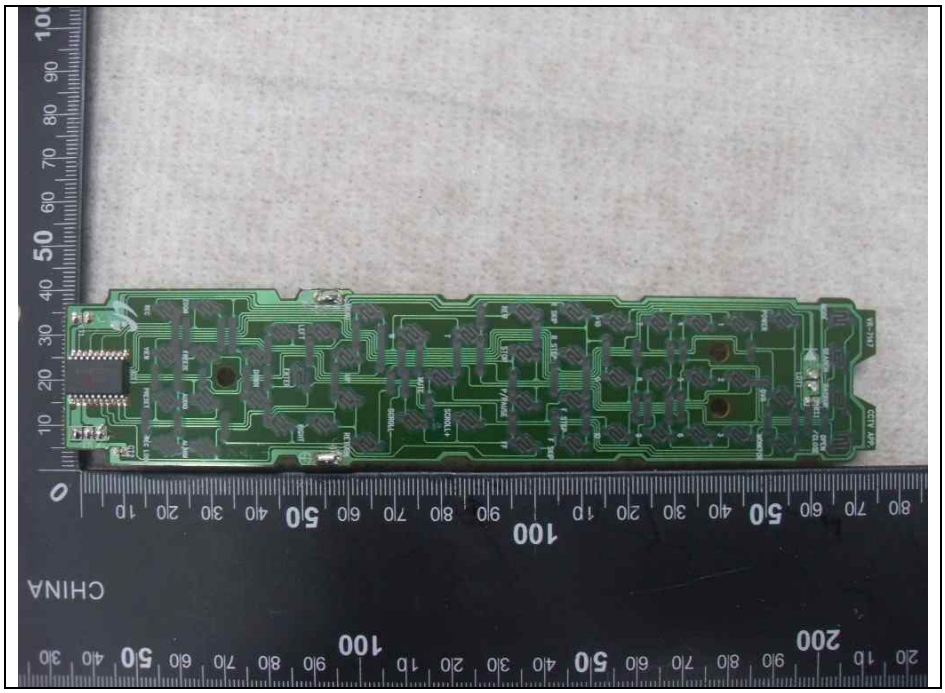
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