Declaration of Conformity

SAMSUNG TECHWIN

CE

Type of equipment:	**8CH MOBILE VIDEO RECORDER**
Brand Name /Trade Mark:	**SAMSUNG**
Type designation /model:	**SRM-872**
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

2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment (recast)

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

EN 61000-6-4:2007+A1:2011	Electromagnetic compatibility Generic standards - Emission standard for industrial environments
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
EN 50121-4:2006	Railway applications
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 61000-4-9:1993+A1:2001	Pulse magnetic field immunity test

The CE Marking on the products and/or their packaging signifies that SAMSUNG TECHWIN CO., LTD. holds the reference technical file available to the European Union authorities.

Place and date of issue: #42 Seongju-Dong, Changwon-Shi, Kyungsangnam-Do,Korea / December 26, 2013

Authorized Signatory: Name : Jei Soon, Kang

Title : Principal Research Engineer

Signature : 

EMC TEST REPORT

Test report No	:	**EMC-CE-4445**
Type of Equipment	:	**8CH MOBILE VIDEO RECORDER**
Model Name	:	**SRM-872**
Applicant	:	**Samsung Techwin Co., Ltd.** **#42 Seongju-Dong, Changwon-Shi,** **Kyungsangnam-Do, Korea**
Manufacturer	:	**win4NET CO., LTD** **WIN4NET BUILDING,1027-5HOGYE-DONG,** **DONGAN-GU, ANYANG-SI, KOREA**
Test standards	:	**EN 61000-6-4:2007+A1:2011** **EN 50121-4:2006**
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. 10. 21

Date of testing: 2013. 12. 03 ~ 12. 23

Issued date: 2013. 12. 26

Tested by: SUNG, KI-MUN

Approved by: YEOM, HAN-SEOK

Contents

1. Applicant information

Applicant: Samsung Techwin Co., Ltd.
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Telephone: +82-70-7147-8361
Fax: +82-31-277-2784
E-mail: js2002.kang@samsung.com
Contact name: **Kang Jei Soon**

Manufacturer#1: win4NET CO., LTD
Address: WIN4NET BUILDING,1027-5HOGYE-DONG,
DONGAN-GU, ANYANG-SI, KOREA

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

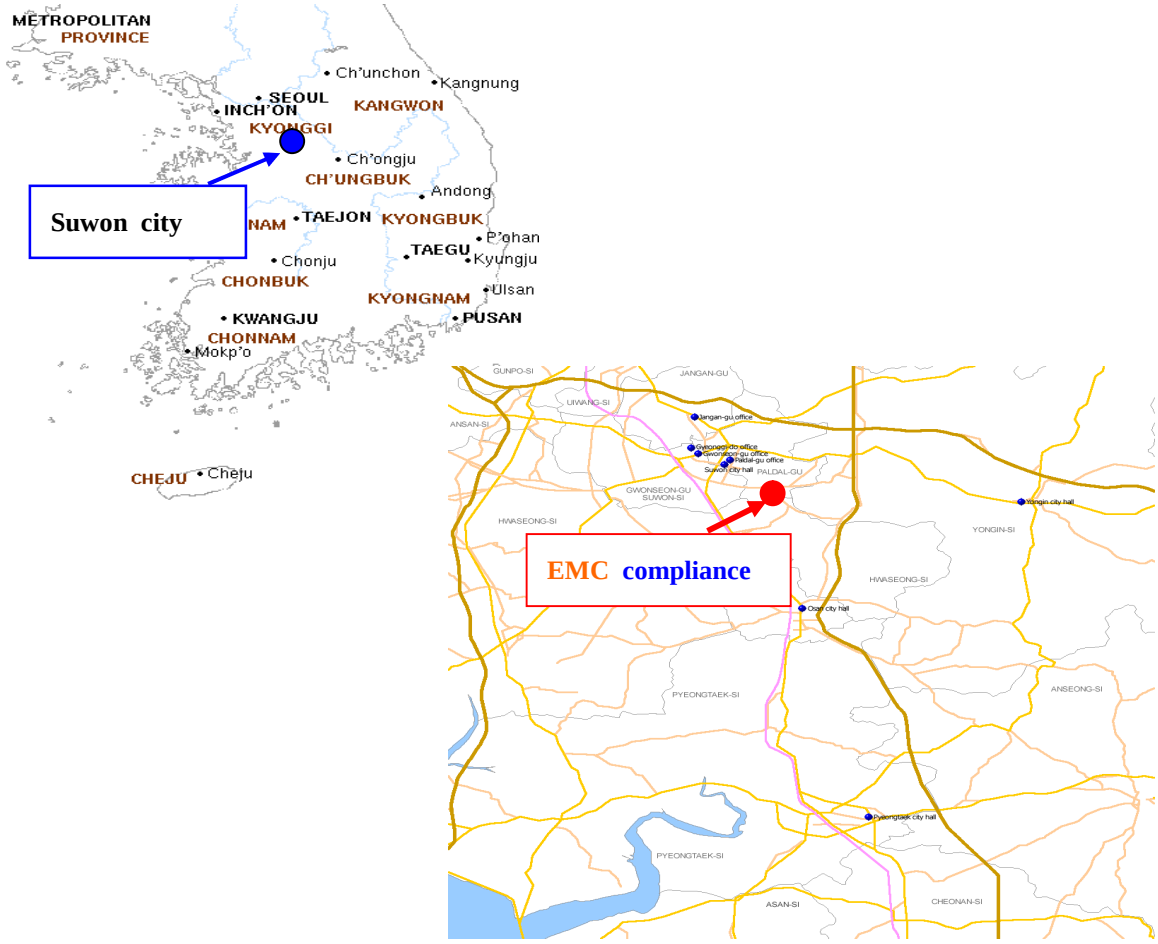
FCC CAB.: KR0040

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)	:	20.6 °C	28.9 % R.H.	-
Shielded room(CE)	:	25.4 °C	21.9 % R.H.	-
Shielded room(ESD)	:	21.3 °C	31.0 % R.H.	101.8 kPa

Test site

These testing items were performed following locations;

Test item	Test site
Conducted Emission	Shielded Room
Radiated Emission	10 m Chamber
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
Magnetic field immunity	Shielded Room
Pulse magnetic field immunity	Shielded Room

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		

4. Description of E.U.T.

4.1 General information

Video		SRM-872
N/W Camera	Inputs	Up to 8CH
	Resolution	CIF, VGA, 4CIF, 1.3M, 2M, 3M
	Protocols	ONVIF
Installation	Camera Setup	Resolution, Frame rate, bit rate setup.
	Viewer	Built-in Webviewer
	Multi Screen Monitor display	1/4/9
Performance		
OS		Embedded Linux
Recording	Compression	H.264, MJPEG
	Rec. bit rate	64Mbps
	Record Rate	Up to 240fps @1280 x 720 (1.3M)
	Record Mode	Emergency, Schedule (Time/Event)
	Overwrite modes	Continuous, Auto Deletion w/ Retention duration
	Pre-alarm	Up to 30 sec.
	Post-Alarm	Up to 6 hour.
Event	Source	Sensor, MD, V-Loss, G-Sensor, IP camera event
Network	Ethernet	Gigabit Ethernet x 1, FE x8 w/PSE
	Transmission speed	Up to 1Gbps.
	Max. Remote users	Live (10)/ Search(3)/ Setup (1)
	Protocol support	TCP/IP, DHCP, SMTP, NTP, HTTP, DDNS, RTP, RTSP
	Monitoring	CMS, Webviewer, Smart-phone Viewer.
	Connection Mode	Static/DHCP
Storage	Internal HDD	1 HDD(2.5") or 1 SSD
	Removable	Micro SD(Industrial, 최대 32GB 까지 지원)
Backup	USB	2 USB Ports (아래쪽 2 개 포트만 사용 가능)
	File Format	STRG(NVR Player), EXE(Include Player), AVI
Search	Backup Viewer	Search Playback on Google Map

	Function	8ch Search/Playback, GPS information, G-Sensor
Interface		
Video	Inputs	8 RJ-45 (PoE Support)
	Output	1 HDMI, 1 VGA, Upto 1080p
Audio	Inputs	Network Camera audio input, up to 8CH
	Compression	G.711, G.726
	Ext. Audio Output	1 Phone Jack (main unit), 1 RCA Connector(Control BOX)
Alarm	Inputs	Terminal 8 inputs, NO/NC
	Outputs	Terminal 2 relay outputs, NO/NC
Others	Ethernet	1 RJ45 (10/100/1000 Base-T Ethernet)
	USB	3 USB(2.0 High Speed)
	GPS	1 SMA
Functions		
Power Management	Shutdown Delay	1 Min. ~ 30 Min. (User selectable)
General		
Electrical	Input Voltage	12V ~ 24V DC
	Power consumption	Max. 30 W
	Camera Power Output	Max. 8 W per channel, Total 64W(PoE, IEEE 802.3af)
Environmental	Operating Temp./Humidity	-25°C to +50°C (-13°F to +122°F) / 20% to 85% RH
Mechanical	Dimension (W x H x D)	• SYSTEM :225.5(W)x 59(H) x 312.2(D) mm • I/O Box : 155(W) X 44(H) X 70(D) mm • Control Box : 121(W) X 32(H) X 75(D) mm
	Weight (With Out HDD)	• SYSTEM : 2.83 Kg • I/O Box : 0.35Kg • Control Box : 0.18Kg
Approvals	EMC/Safety	CE, FCC, cUL, e-Mark, KCC, EN50155
	Shock, Vibration	MIL STD-810F method 514.5, EN61373

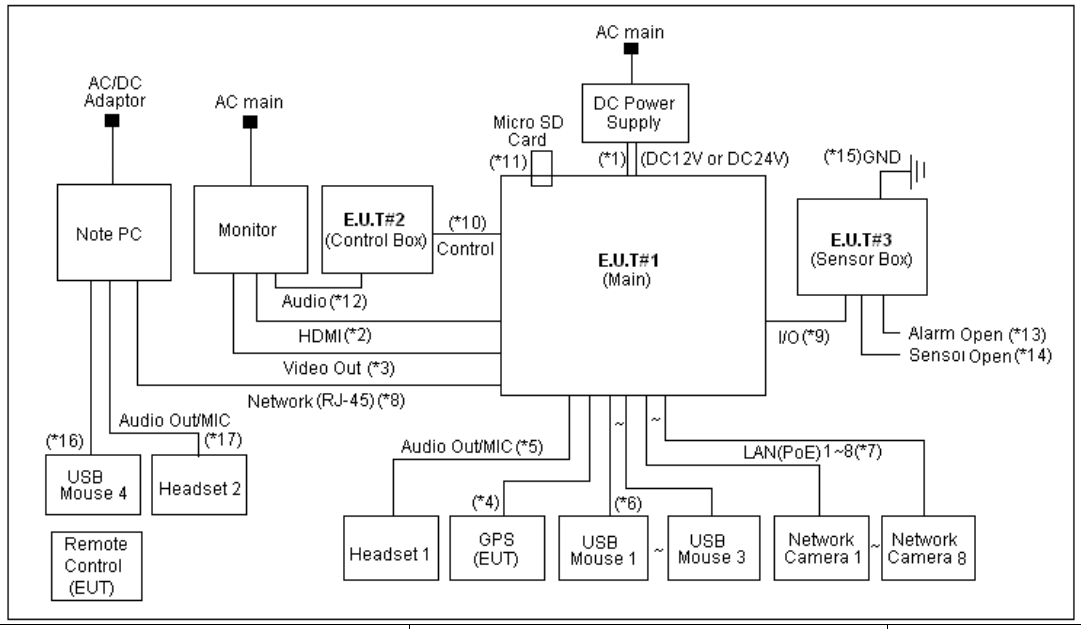
4.2 Product description

Type of product	8CH MOBILE VIDEO RECORDER
Model name (Basic)	SRM-872
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	DC 12 Ⅴ, DC 24 Ⅴ
Product rating	DC 12 Ⅴ, DC 24 Ⅴ
Internal clock frequency	Above 108 ㎒
Note	-

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Monitor	PM24KO	ZQ9XH1HBA01776V	SAMSUNG
DC Power Supply	6032A	-	HP
Note PC	C1410	473680121639	FUJITSU
USB Mouse 1	1088	8165906051010	Microsoft
USB Mouse 2	1088	8165906051216	Microsoft
USB Mouse 3	1088	8165906051224	Microsoft
USB Mouse 4	1088	8165900112700	Microsoft
Headset 1	SHS-250V	-	SAMSUNG
Headset 2	SHS-250V	-	SAMSUNG
Micro SD Card(2GB)	-	-	SanDisk
Network Camera 1~8	SNV-6012N	-	SAMSUNG

4.4 Test configuration



Note *	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.Cable
1	**EUT#1** (Main)	Power	DC Power Supply	Power	1.8	Non-Shield
2		HDMI	Monitor	HDMI	1.5	Shield
3		Video Out	Monitor	Video In	1.5	Shield
4		GPS	GPS(EUT)	GPS	2.5	Non-Shield
5		Audio Out/MIC	Headset 1	Audio In/MIC	2.0	Non-Shield
6		USB 1~3	USB Mouse 1~3	USB 1~3	2.0	Shield
7		LAN(PoE) 1~8	Network Camera 1~8	LAN(PoE) 1~8	3.0	Non-Shield
8		Network (RJ-45)	Note PC	Network (RJ-45)	3.0	Non-Shield
9		I/O	EUT#3 (Sensor Box)	I/O	3.0	Non-Shield
10		Control	EUT#2 (Control Box)	Control	3.0	Non-Shield
11		Micro SD	Micro SD Card	Micro SD	Direct	-
12	**EUT#2** (Control Box)	Audio	Monitor	Audio	1.4	Shield
13	**EUT#3** (Sensor Box)	Alarm	Open	-	3.0	Non-Shield
14		Sensor	Open	-	3.0	Non-Shield
15		GND	GND	GND	1.8	Non-Shield
16	Note PC	USB	USB Mouse 4	USB	2.0	Shield
17		Audio Out/MIC	Headset 2	Audio In/MIC	2.0	Non-Shield

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
1	Web view test
	Video REC, Monitoring test

* Note: 2 types of powers are available for the product, that are DC Power Supply (DC 12 V, DC 24 V).
Therefore, tests were performed for 2 different types of powers.

5. Summary of test results

5.1 Summary of EMI emission test results

Applied	Test items	Test method	Result
☒	Conducted Emission	EN 61000-6-4:2007+A1:2011	Complied
☒	Radiated Emission	EN 61000-6-4:2007+A1:2011	Complied

5.2 Summary of immunity test results

Applied	Test items	Test method	Result
*** EN 50121-4:2006**			
☒	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
☐	Magnetic field immunity	EN 61000-4-8:2010	N/A
☒	Pulse magnetic field immunity	EN 61000-4-9:1993+A1:2001	Complied

5.3 Performance criteria

The performance criteria were based on the following guidelines:
The variety and the diversity of the apparatus within the scope of this set standards makes if difficult to define to define precise criteria for the evaluation of the immunity results.

if, as a result of the application of the tests defined in this set standards, the apparatus becomes dangerous or unsafe, the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance criteria, during or as a consequence of the EMC testing shall be provided by manufacturer and noted in the test report, based of the following criteria:

Performance criterion A: The apparatus shall continue to operate as intended during and after the test. No degradation of performance of loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible description and documentation, and from what the user may reasonably expect from the apparatus if used intended.

* Though the noise appeared on the display during the testing, it is judged criterion A if there is no problem to distinguish the things. This is the criterion set by the manufacturer.

Performance criterion B: The apparatus shall continue of operate as intended after the test.
No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level of the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and from what the user may reasonable expect from the apparatus if used as intended.

Performance criterion C: Temporary loss of function as allowed, provided the function is self-recoverable or can restored by the operation of the controls.

6. Test results

6.1 Conducted Emission

Test specification	EN 61000-6-4:2007+A1:2011		
Testing voltage	DC 12 V, DC 24 V		
Test facility	Shielded room (CE#2)		
Date	2013. 12. 03		
Temperature (°C)	25.4 °C	Humidity (% R.H.)	21.9 % R.H.
Remarks	Complied		

6.1.1 Limits of conducted emission measurement

☐ AC main

Frequency [㎒]	Limit values (dB(㎶))	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

☒ Telecommunication

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

* The limits decrease linearly with the logarithm of the frequency in the range 0.15 ㎒ to 0.5 ㎒

* 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).

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.

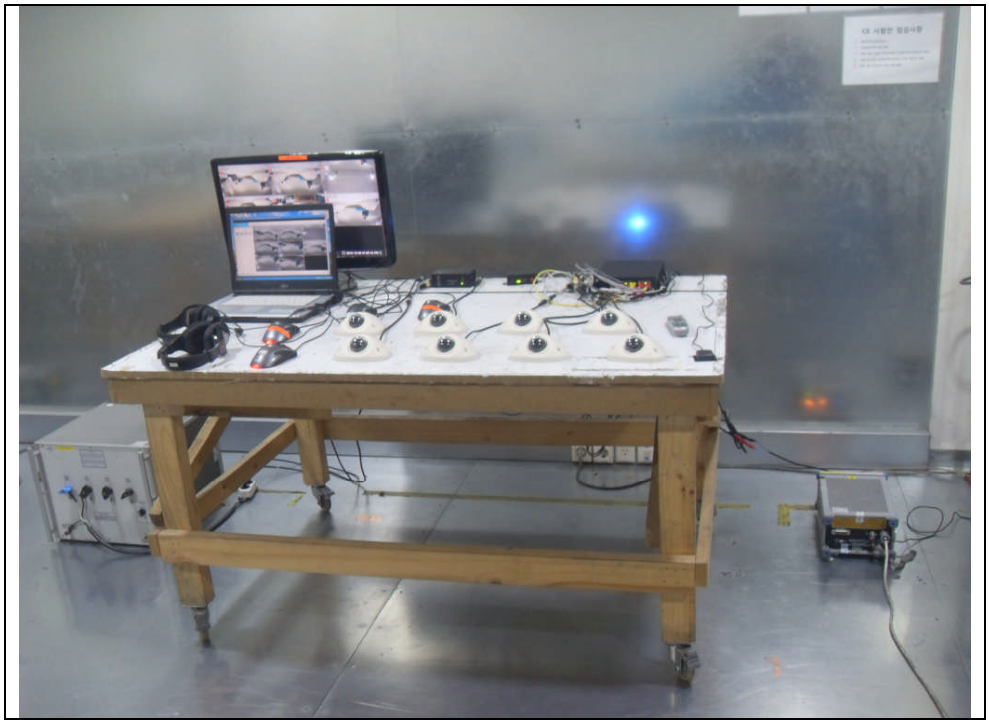
6.1.3 Used equipments

Equipment	Model	Serial No.	Makers	Next Cal. Date	Used
Test Receiver	ESHS30	844827/011	R&S	2014.08.05	☐
Test Receiver	ESCI7	100732	R&S	2014.02.18	☐
Test Receiver	ESCI	100001	R&S	2014.07.25	☒
Test Receiver	ESCI	100710	R&S	2014.10.28	☐
LISN	ENV216	101352	R&S	2014.01.07	☒
LISN	NNLK8121	8121-472	SCHWARZBECK	2014.07.08	☒
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	2014.06.21	☐
ISN	ENY81	101545	R&S	2014.08.29	☒

6.1.4 Photographs of test setup

* Telecommunication

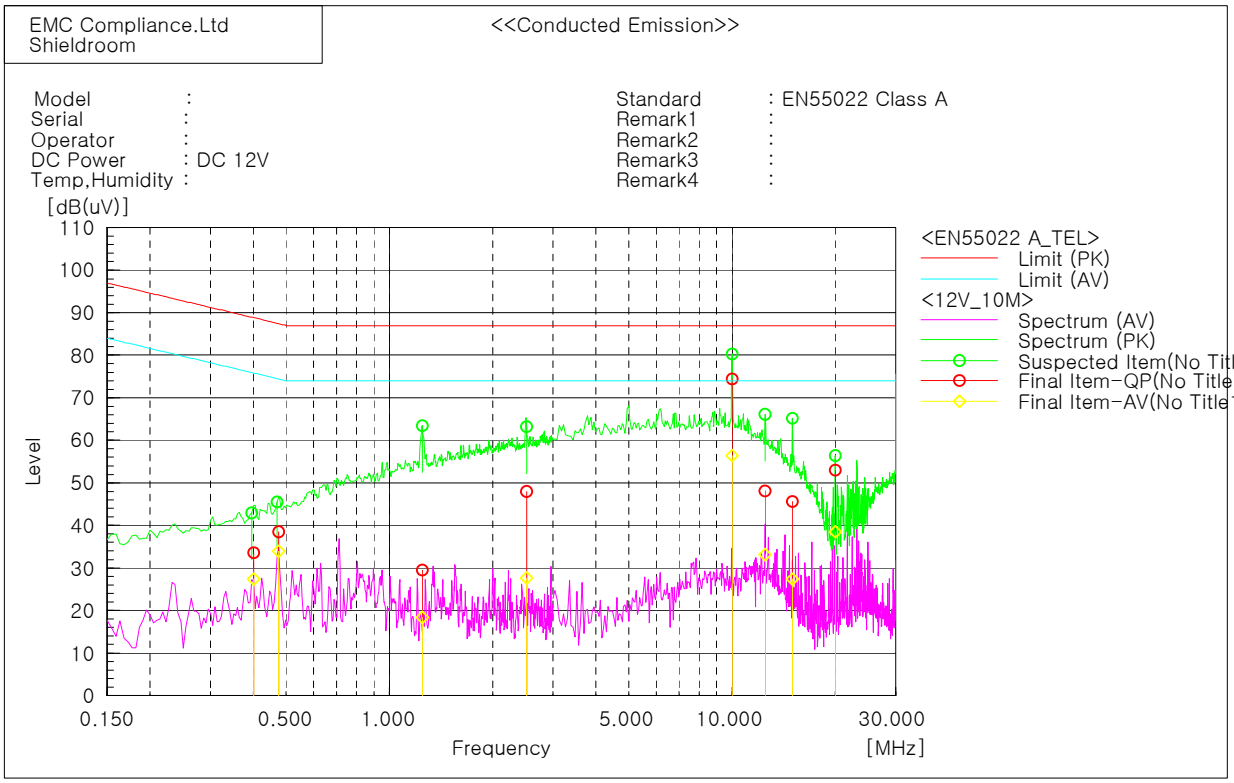
#1-DC 12V, #2-DC 24V



6.1.5 Conducted emission measurement result

* Telecommunication port

#1-DC 12V _LCL 55 dB (Network (RJ-45) Port) _10 Mbps_(SRM-872)

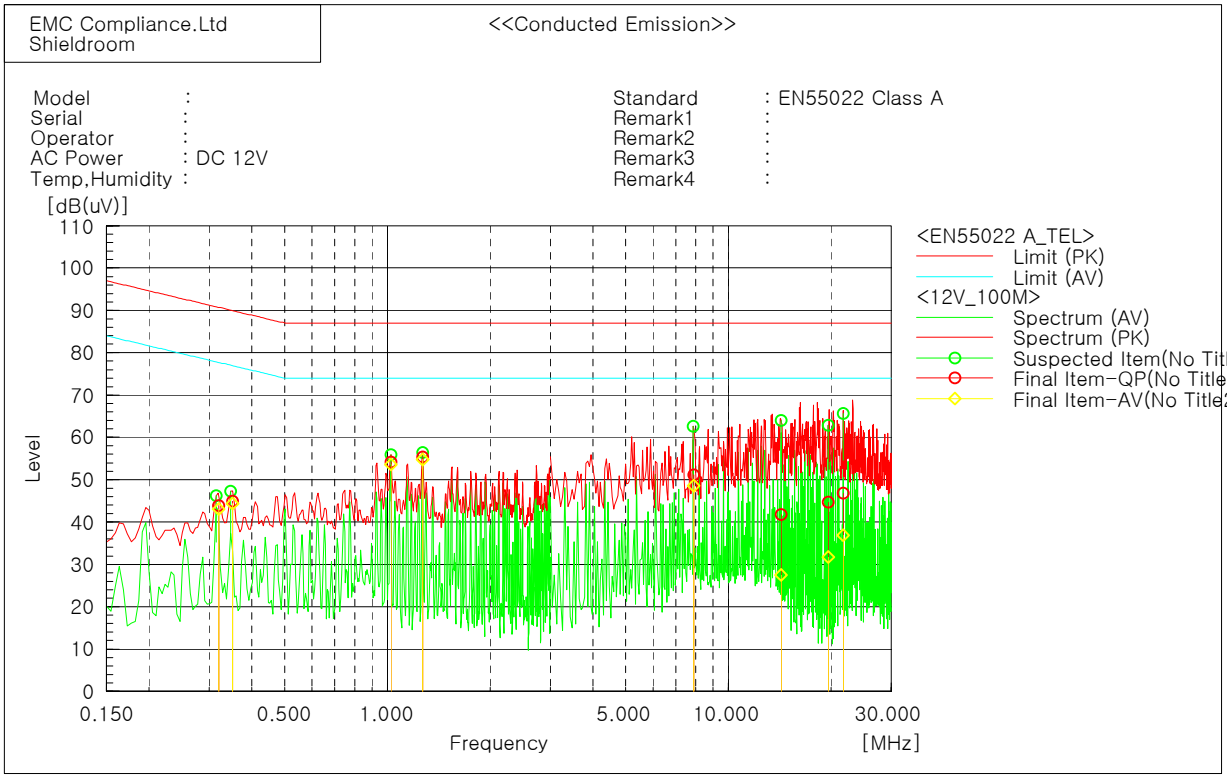


Final Result

--- 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	0.40163	23.8	17.7	9.7	33.5	27.4	88.8	75.8	55.3	48.4
2	0.4747	29.0	24.3	9.6	38.6	33.9	87.4	74.4	48.8	40.5
3	1.24668	20.0	8.9	9.5	29.5	18.4	87.0	74.0	57.5	55.6
4	2.51573	38.5	18.1	9.5	48.0	27.6	87.0	74.0	39.0	46.4
5	10.00463	65.0	47.0	9.4	74.4	56.4	87.0	74.0	12.6	17.6
6	12.47206	38.6	23.6	9.5	48.1	33.1	87.0	74.0	38.9	40.9
7	14.99057	36.2	17.9	9.5	45.7	27.4	87.0	74.0	41.3	46.6
8	20.00036	43.5	29.0	9.5	53.0	38.5	87.0	74.0	34.0	35.5

#1-DC 12V _LCL 65 dB (Network (RJ-45) Port) _100 Mbps_(SRM-872)

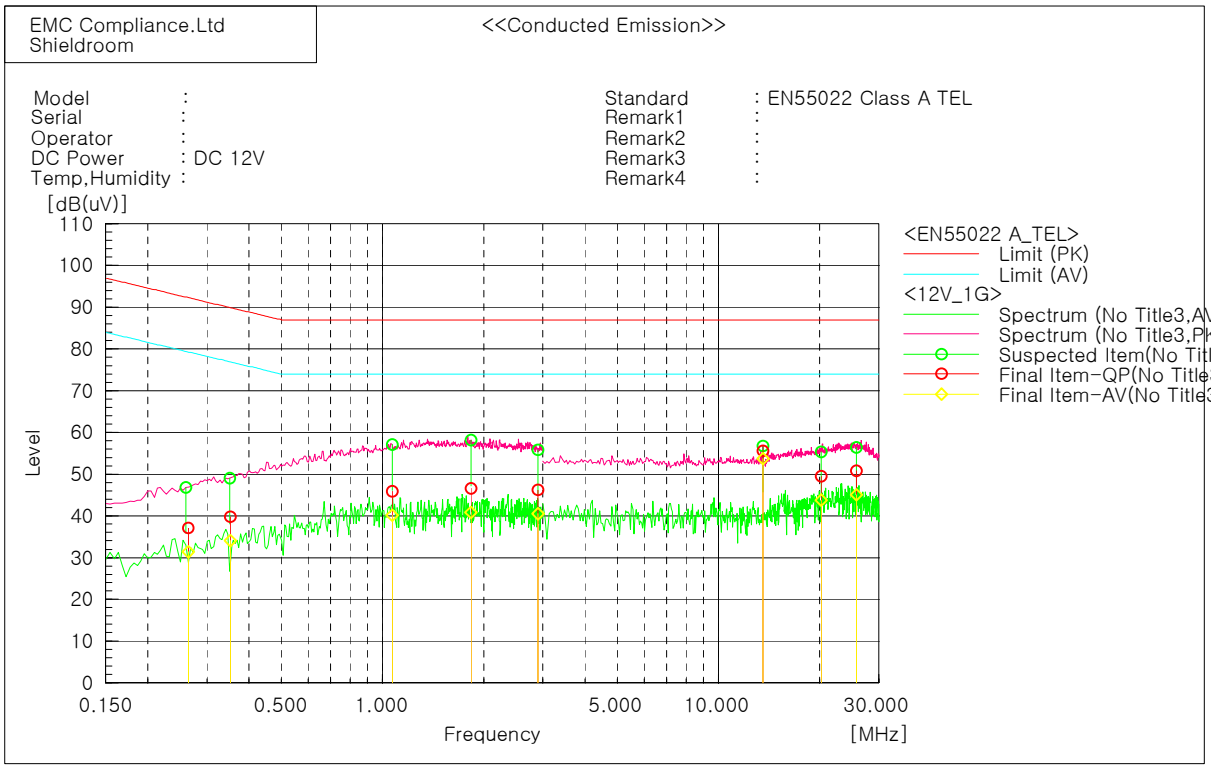


Final Result

--- 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	0.31942	33.8	33.0	10.1	43.9	43.1	90.7	77.7	46.8	34.6
2	0.35139	34.9	34.3	10.0	44.9	44.3	89.9	76.9	45.0	32.6
3	1.0229	44.3	43.8	9.8	54.1	53.6	87.0	74.0	32.9	20.4
4	1.26702	45.5	45.0	9.8	55.3	54.8	87.0	74.0	31.7	19.2
5	7.89291	41.5	38.9	9.6	51.1	48.5	87.0	74.0	35.9	25.5
6	14.25499	32.1	17.9	9.6	41.7	27.5	87.0	74.0	45.3	46.5
7	19.57711	35.0	22.1	9.7	44.7	31.8	87.0	74.0	42.3	42.2
8	21.65403	37.1	27.2	9.7	46.8	36.9	87.0	74.0	40.2	37.1

#1-DC 12V _LCL 75 dB (Network (RJ-45) Port) _1000 Mbps_(SRM-872)

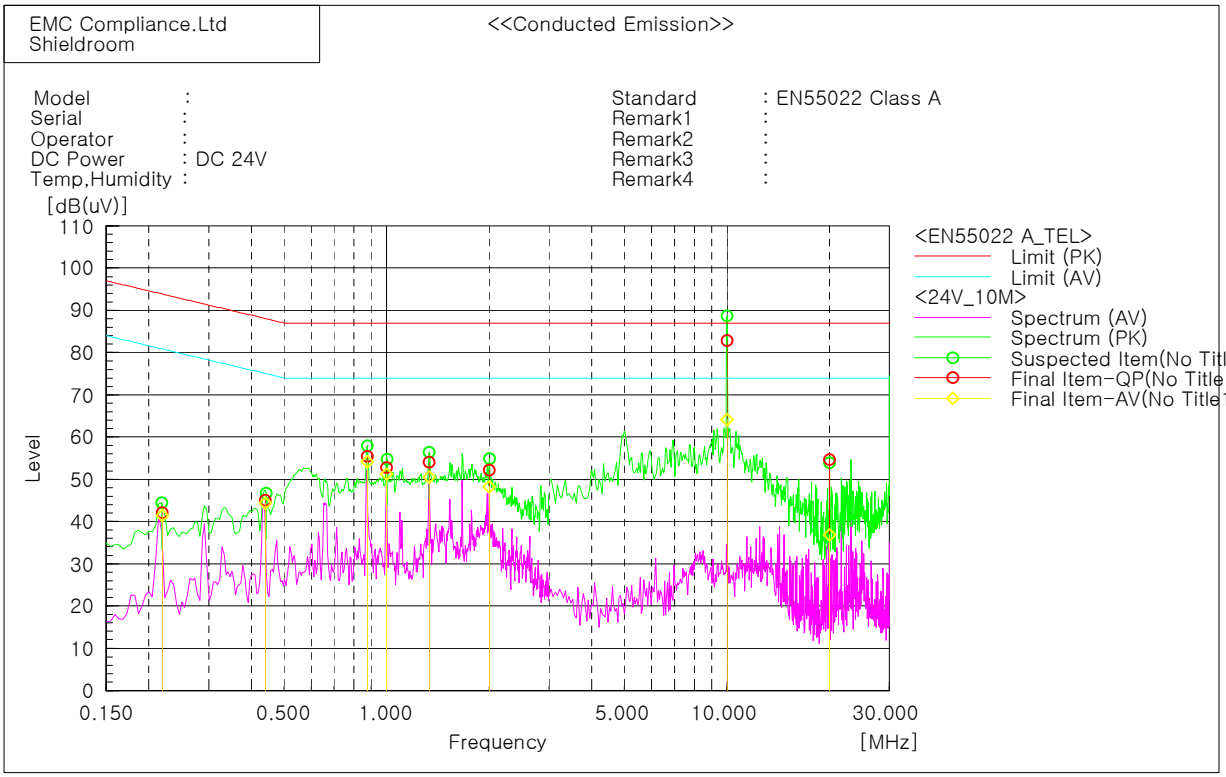


Final Result

--- 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	0.26461	27.2	21.5	9.9	37.1	31.4	92.3	79.3	55.2	47.9
2	0.35295	30.0	24.3	9.8	39.8	34.1	89.9	76.9	50.1	42.8
3	1.06881	36.3	30.5	9.6	45.9	40.1	87.0	74.0	41.1	33.9
4	1.83423	37.0	31.2	9.6	46.6	40.8	87.0	74.0	40.4	33.2
5	2.90451	36.7	30.9	9.6	46.3	40.5	87.0	74.0	40.7	33.5
6	13.56033	46.0	44.1	9.6	55.6	53.7	87.0	74.0	31.4	20.3
7	20.17289	39.9	34.1	9.6	49.5	43.7	87.0	74.0	37.5	30.3
8	25.67273	41.2	35.4	9.6	50.8	45.0	87.0	74.0	36.2	29.0

#2-DC 24V _LCL 55 dB (Network (RJ-45) Port) _10 Mbps_(SRM-872)

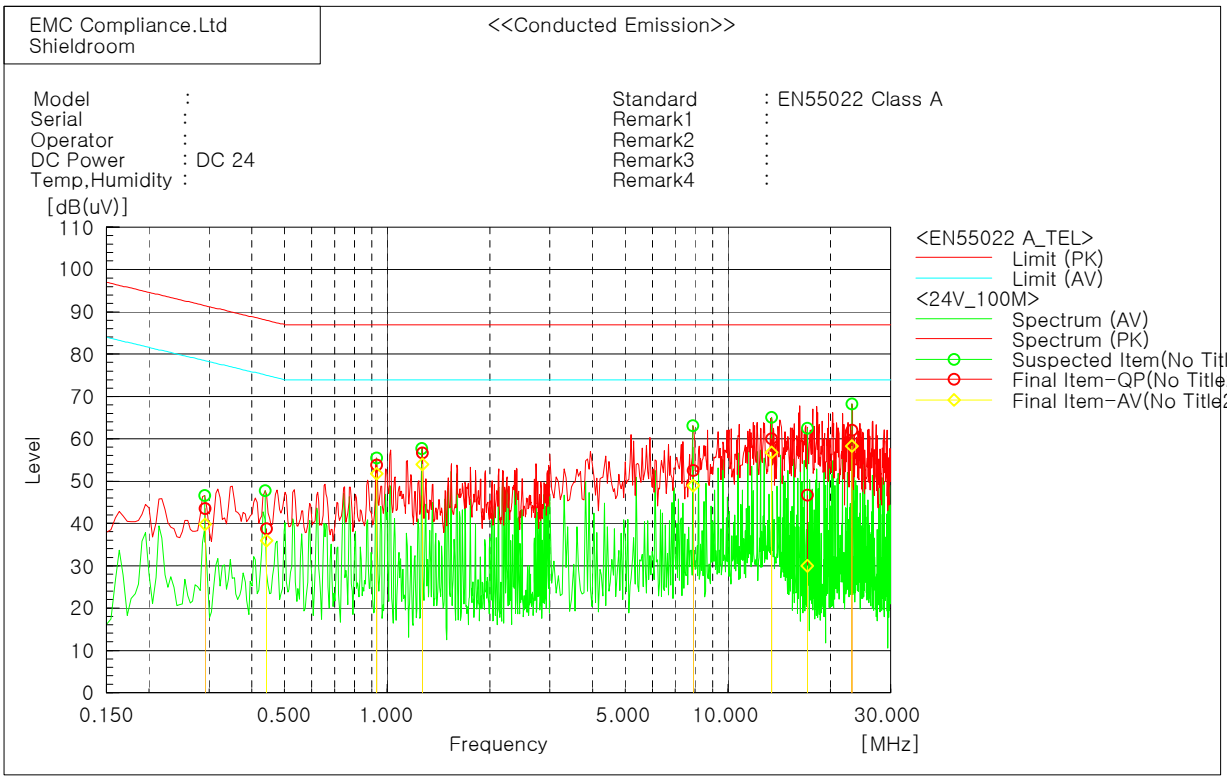


Final Result

--- 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	0.21907	32.3	31.6	9.8	42.1	41.4	93.9	80.9	51.8	39.5
2	0.43917	35.4	34.6	9.7	45.1	44.3	88.1	75.1	43.0	30.8
3	0.8767	45.9	44.6	9.6	55.5	54.2	87.0	74.0	31.5	19.8
4	1.00012	43.3	41.7	9.5	52.8	51.2	87.0	74.0	34.2	22.8
5	1.33408	44.5	41.1	9.5	54.0	50.6	87.0	74.0	33.0	23.4
6	2.00105	42.7	38.7	9.5	52.2	48.2	87.0	74.0	34.8	25.8
7	10.00463	73.5	54.7	9.4	82.9	64.1	87.0	74.0	4.1	9.9
8	20.00062	45.2	27.4	9.5	54.7	36.9	87.0	74.0	32.3	37.1

#2-DC 24V _LCL 65 dB (Network (RJ-45) Port) _100 Mbps_(SRM-872)

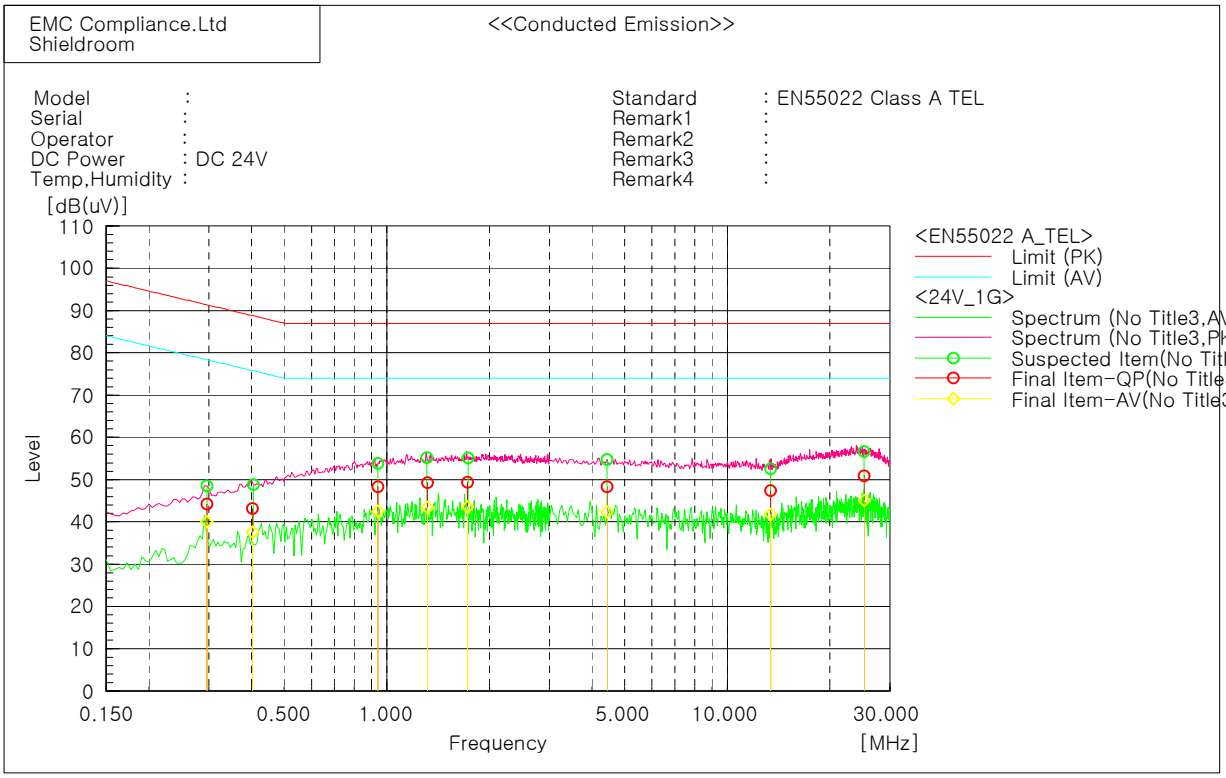


Final Result

--- 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	0.29226	33.5	29.7	10.1	43.6	39.8	91.5	78.5	47.9	38.7
2	0.44273	28.7	26.0	10.0	38.7	36.0	88.0	75.0	49.3	39.0
3	0.93122	44.0	41.9	9.8	53.8	51.7	87.0	74.0	33.2	22.3
4	1.26714	46.8	44.1	9.8	56.6	53.9	87.0	74.0	30.4	20.1
5	7.89302	42.9	39.3	9.6	52.5	48.9	87.0	74.0	34.5	25.1
6	13.42289	50.5	47.1	9.6	60.1	56.7	87.0	74.0	26.9	17.3
7	17.06749	37.0	20.2	9.7	46.7	29.9	87.0	74.0	40.3	44.1
8	23.12518	52.3	48.6	9.7	62.0	58.3	87.0	74.0	25.0	15.7

#2-DC 24V _LCL 75 dB (Network (RJ-45) Port) _1000 Mbps_(SRM-872)



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	0.29575	34.3	30.1	9.9	44.2	40.0	91.4	78.4	47.2	38.4
2	0.40255	33.4	27.7	9.8	43.2	37.5	88.8	75.8	45.6	38.3
3	0.94242	38.7	32.8	9.7	48.4	42.5	87.0	74.0	38.6	31.5
4	1.31509	39.7	33.8	9.6	49.3	43.4	87.0	74.0	37.7	30.6
5	1.72603	39.7	33.9	9.6	49.3	43.5	87.0	74.0	37.7	30.5
6	4.42656	38.7	32.8	9.6	48.3	42.4	87.0	74.0	38.7	31.6
7	13.38961	37.8	32.2	9.6	47.4	41.8	87.0	74.0	39.6	32.2
8	25.20094	41.3	35.5	9.6	50.9	45.1	87.0	74.0	36.1	28.9

6.2 Radiated Emission

Test specification	EN 61000-6-4:2007+A1:2011		
Testing voltage	DC 12 V, DC 24 V		
Test facility	10 m Chamber (#F2)		
Test distance	10 m, 3 m		
Date	2013. 12. 03		
Temperature (°C)	20.6 °C	Humidity (% R.H.)	28.9 % R.H.
Remarks	Complied		

6.2.1 Limits of radiated emission measurement

☒ Limits below 1 ㎓

Frequency [㎒]	(dB(㎶/m)) @10 m
30 ~ 230	40
230 ~ 1 000	47

☒ Limits above 1 ㎓

Frequency [㎓]	(dB(㎶/m)) @ 3 m	
	Average limit	Peak limit
1 ~ 3	56	76
3 ~ 6	60	80
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.

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	2014.10.28	☐
Test Receiver	ESR	101078	R&S	2014.10.17	☐
Bi-Log Antenna	VULB 9168	440	SCHWARZBECK	2015.10.16	☒
Amplifier	310N	293004	SONOMA INSTRUMENT	2014.10.31	☒
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	2014.10.31	☒
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:

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

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

A.G= Amplifier Gain

3 dB Att = 3 dB Attenuator

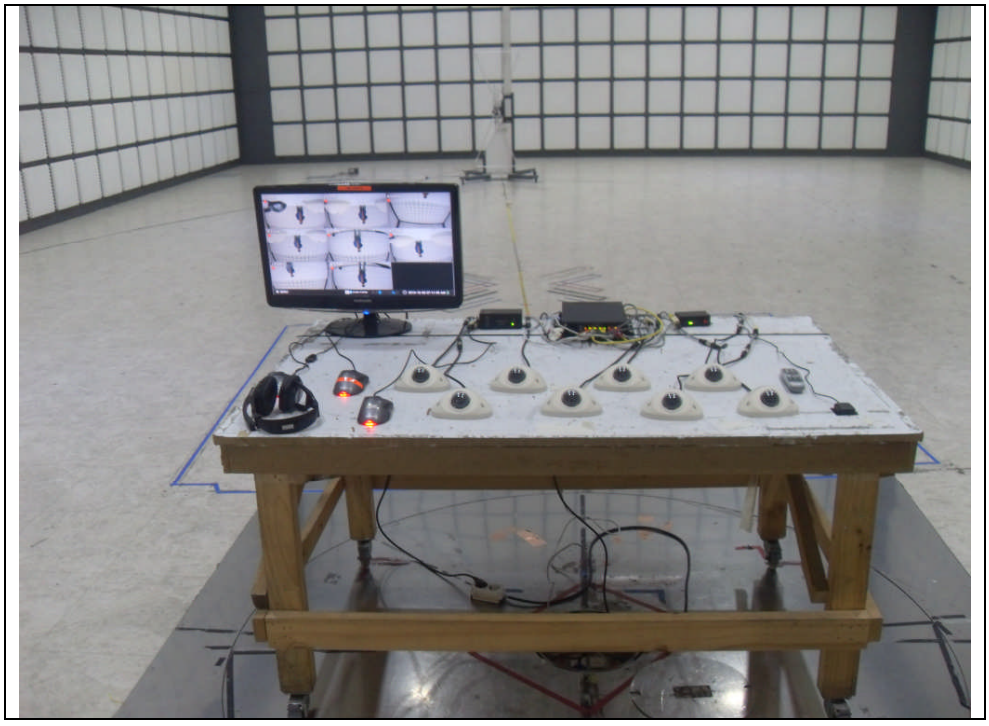
If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

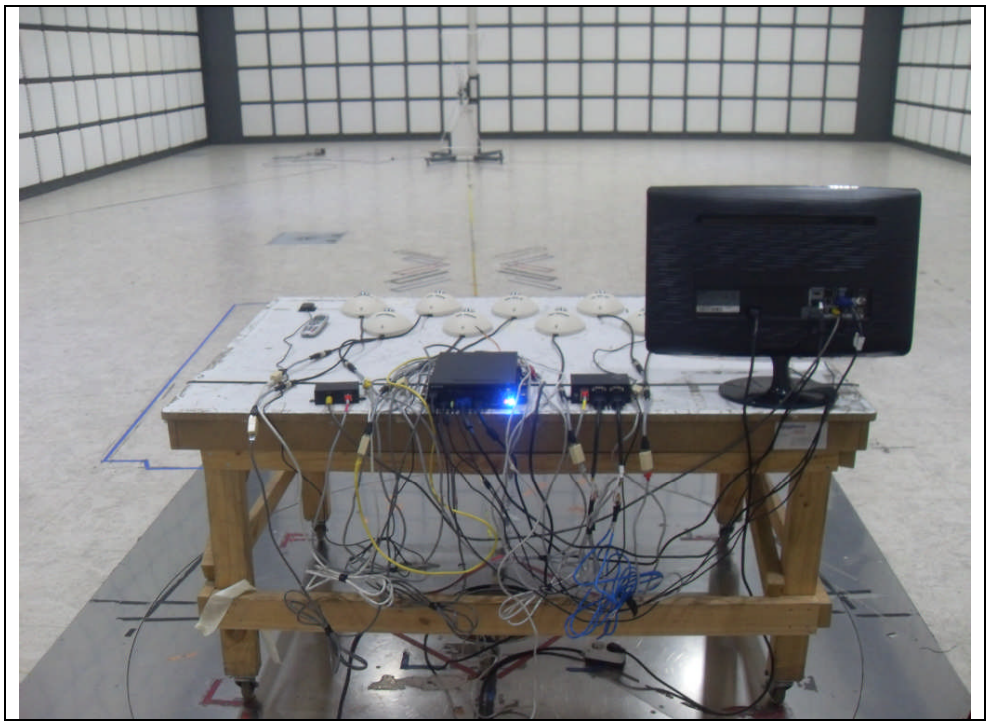
The result is

30 + 12 + 5 + 3 – 35 = 15 dB(μV/m)

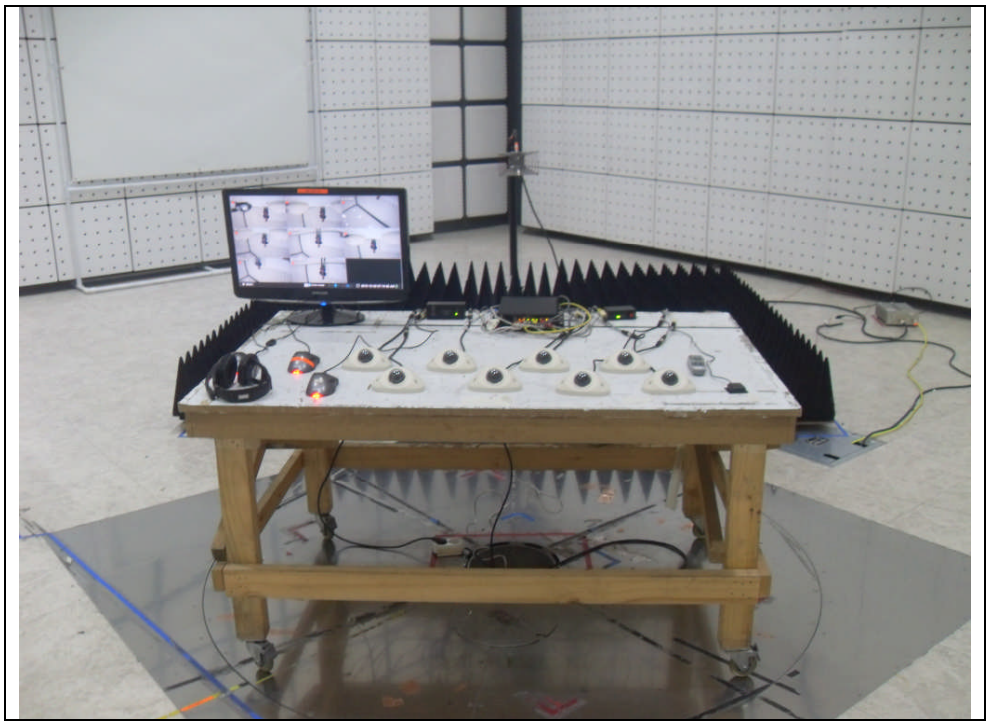
6.2.5 Photographs of test setup

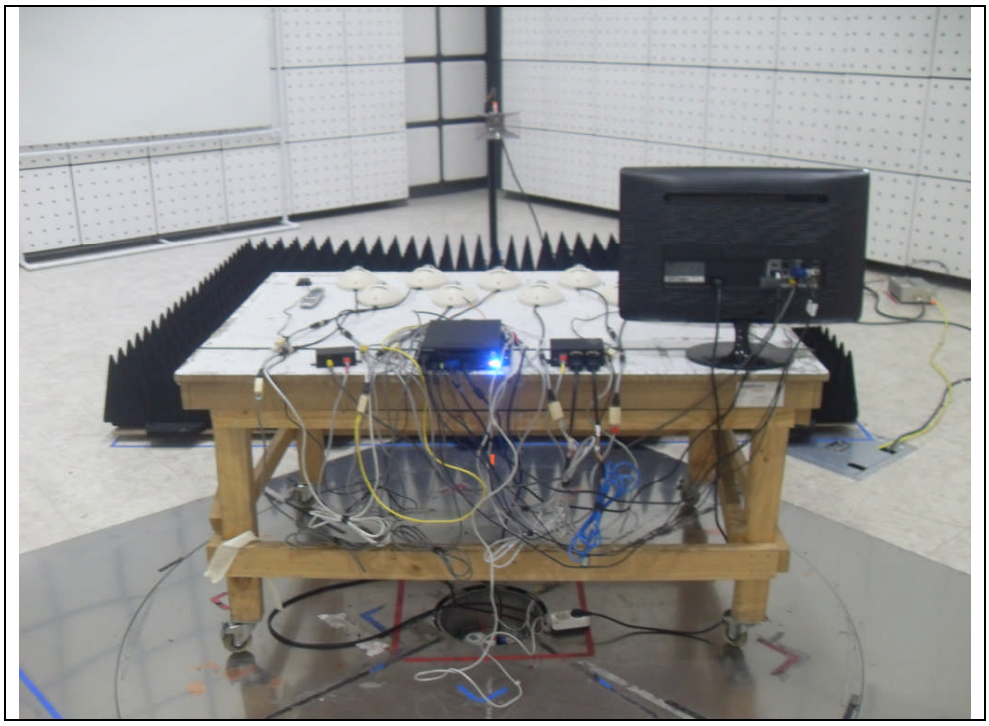
* 30 ㎒ ~ 1 ㎓ (#1-DC 12V, #2-DC 24V)





* 1 ㎓ ~ 6 ㎓ (#1-DC 12V, #2-DC 24V)

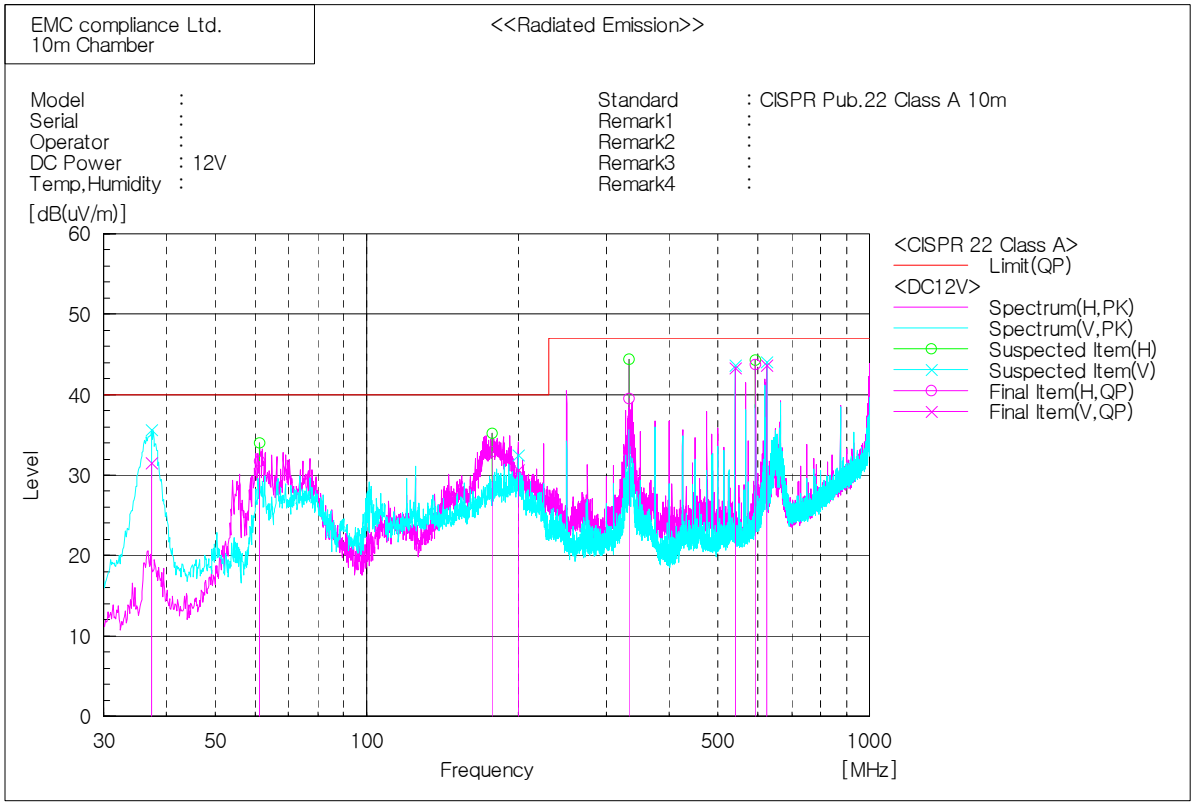




6.2.6 Radiated emission measurement result

*** Graph and Data**

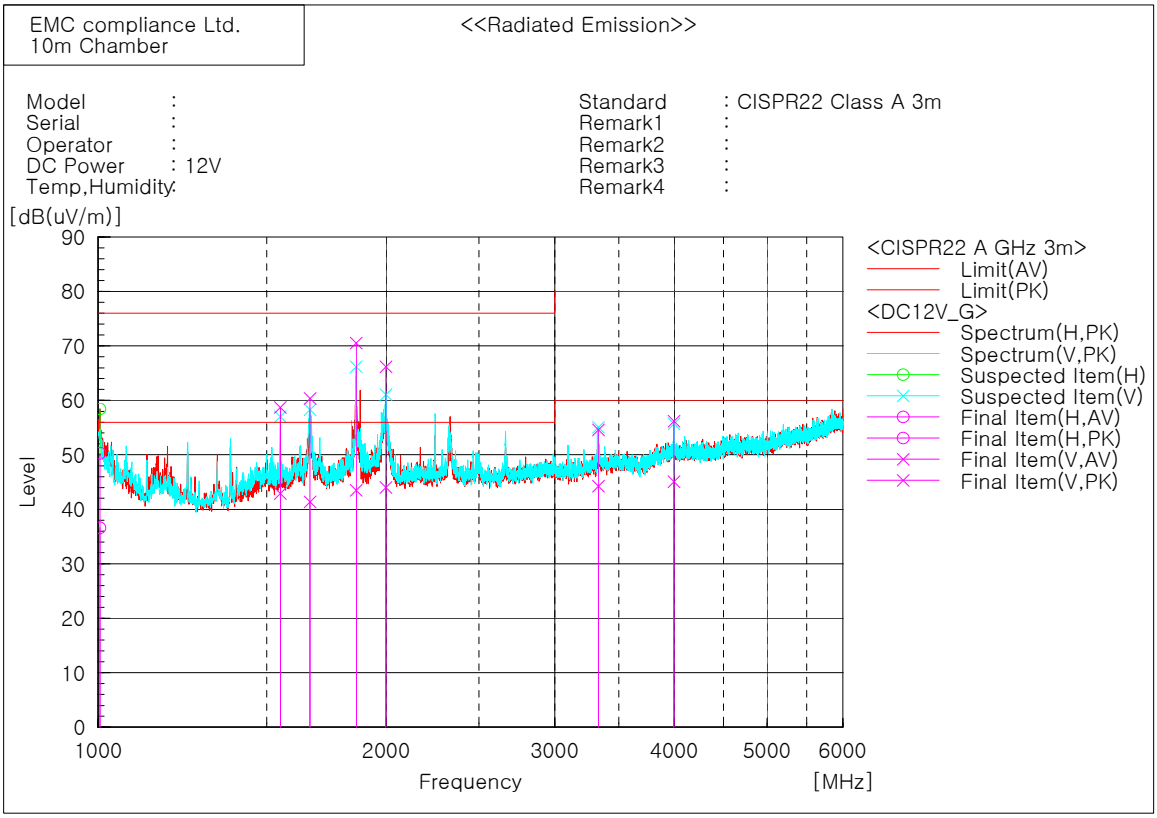
* 30 ㎒ ~ 1 ㎓ (SRM-872) (#1-DC 12V)



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	37.396	V	45.8	-14.3	31.5	40.0	8.5	400.0	241.7
2	61.283	H	46.1	-14.4	31.7	40.0	8.3	300.0	124.4
3	177.804	H	46.0	-13.1	32.9	40.0	7.1	400.0	274.9
4	199.993	V	45.5	-14.8	30.7	40.0	9.3	100.0	160.0
5	333.004	H	48.6	-9.1	39.5	47.0	7.5	300.0	302.0
6	539.978	V	46.7	-3.4	43.3	47.0	3.7	298.0	220.9
7	594.055	H	45.8	-2.0	43.8	47.0	3.2	201.0	357.4
8	624.974	V	45.1	-1.5	43.6	47.0	3.4	100.0	202.0

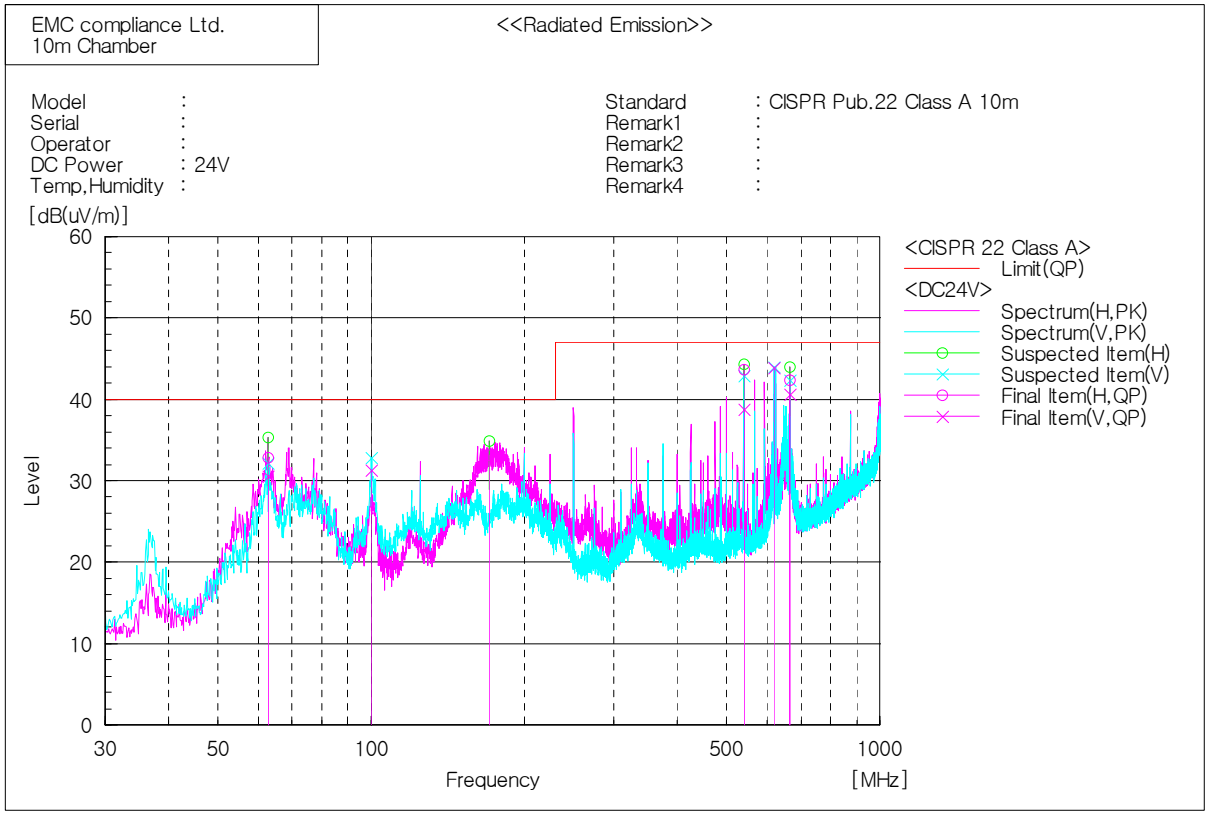
* 1 ㎓ ~ 6 ㎓ (SRM-872) (#1-DC 12V)



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	1004.375	H	43.5	57.2	-6.9	36.6	50.3	56.0	76.0	19.4	25.7	100.0	357.4
2	1550.000	V	44.2	60.0	-1.3	42.9	58.7	56.0	76.0	13.1	17.3	100.0	44.3
3	1663.750	V	42.1	61.1	-0.7	41.4	60.4	56.0	76.0	14.6	15.6	100.0	152.3
4	1860.325	V	42.9	69.9	0.6	43.5	70.5	56.0	76.0	12.5	5.5	100.0	30.9
5	1996.875	V	42.7	64.9	1.3	44.0	66.2	56.0	76.0	12.0	9.8	100.0	165.8
6	3331.250	V	38.2	48.5	6.1	44.3	54.6	60.0	80.0	15.7	25.4	100.0	189.9
7	3995.625	V	35.9	47.0	9.2	45.1	56.2	60.0	80.0	14.9	23.8	100.0	165.8

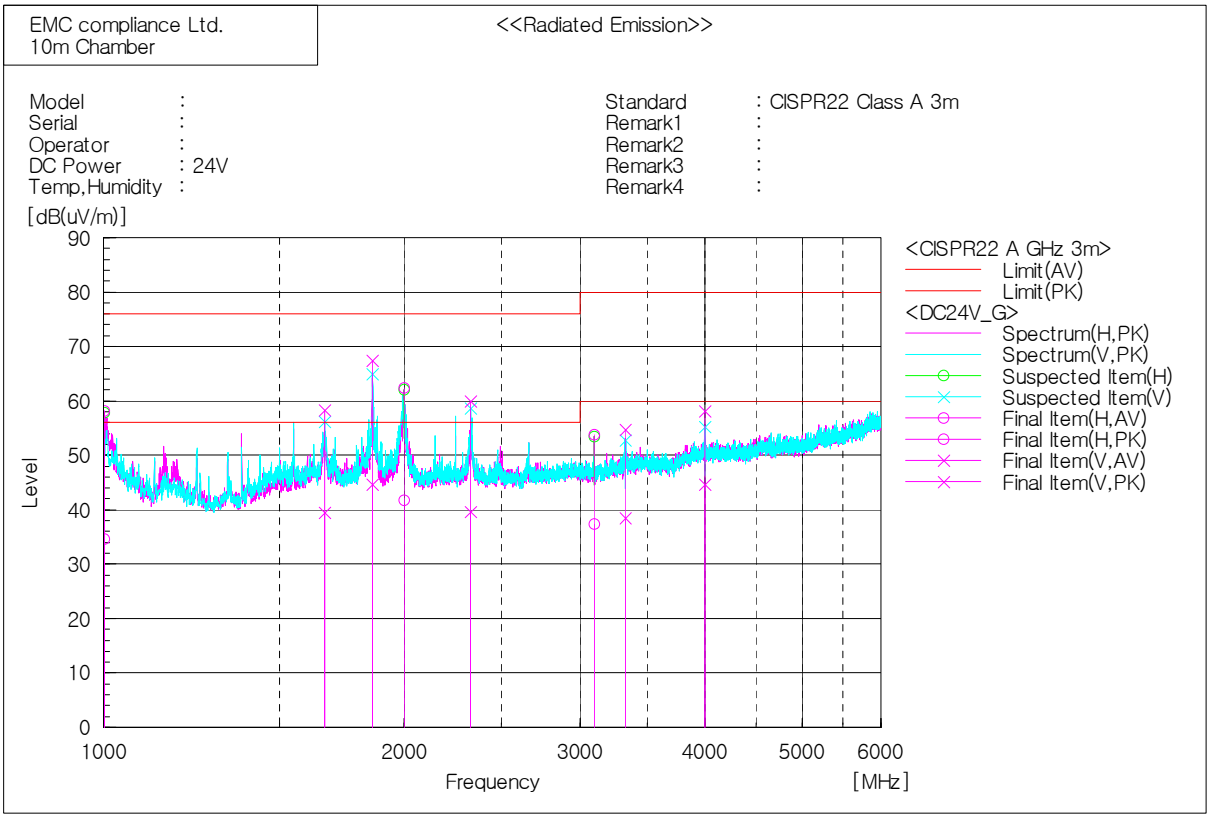
* 30 ㎒ ~ 1 ㎓ (SRM-872) (#2-DC 24V)



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	62.738	H	47.4	-14.6	32.8	40.0	7.2	400.0	350.1
2	62.738	V	45.1	-14.6	30.5	40.0	9.5	400.0	226.9
3	100.204	V	48.7	-17.4	31.3	40.0	8.7	298.0	358.6
4	171.135	H	46.2	-13.1	33.1	40.0	6.9	400.0	284.3
5	539.978	H	47.0	-3.4	43.6	47.0	3.4	202.0	220.4
6	539.978	V	42.2	-3.4	38.8	47.0	8.2	298.0	322.0
7	620.003	V	45.4	-1.5	43.9	47.0	3.1	298.0	153.7
8	666.078	H	43.2	-0.9	42.3	47.0	4.7	202.0	347.3
9	666.078	V	41.5	-0.9	40.6	47.0	6.4	199.0	115.1

* 1 ㎓ ~ 6 ㎓ (SRM-872) (#2-DC 24V)



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	1001.875	H	41.5	65.0	-6.9	34.6	58.1	56.0	76.0	21.4	17.9	100.0	329.7
2	1665.763	V	40.2	59.0	-0.7	39.5	58.3	56.0	76.0	16.5	17.7	100.0	181.9
3	1860.108	V	44.1	66.8	0.6	44.7	67.4	56.0	76.0	11.3	8.6	100.0	346.9
4	1999.375	H	40.5	61.1	1.3	41.8	62.4	56.0	76.0	14.2	13.6	100.0	89.1
5	2331.063	V	37.2	57.4	2.5	39.7	59.9	56.0	76.0	16.3	16.1	100.0	301.9
6	3100.625	H	32.5	49.0	4.8	37.3	53.8	60.0	80.0	22.7	26.2	100.0	348.5
7	3328.288	V	32.4	48.7	6.1	38.5	54.8	60.0	80.0	21.5	25.2	100.0	192.4
8	3995.675	V	35.5	49.0	9.2	44.7	58.2	60.0	80.0	15.3	21.8	100.0	157.9

6.3 Electrostatic Discharge

Test specification	EN 61000-4-2:2009, Criteria: B				
Test level	☒ Contact: ± 6 ㎸ ☒ Air: ± 2 ㎸, ± 4 ㎸, ± 8 ㎸ ☒ HCP: ± 2 ㎸, ± 4 ㎸, ± 6 ㎸ ☒ VCP: ± 2 ㎸, ± 4 ㎸, ± 6 ㎸				
Discharge impedance	330 Ω / 150 ㎊				
Number of discharge (Each polarity)	☒ Contact: 10 ☒ Air: 10 ☒ HCP / VCP: 10				
Interval between discharges	1 s				
Testing voltage	DC 12 ㅿ, DC 24 ㅿ				
Test facility	Shielded room				
Date	2013. 12. 05				
Temperature(°C)	21.3 °C	Humidity (% R.H.)	31.0 % R.H.	Pressure (㎪)	101.8 ㎪
Remarks	Complied - A: There was no change of operation status during above testing.				

6.3.1 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 ㎡ of insulating Support. In case of table top equipment, EUT was placed on a wooden table 0.8 ㎡ above the reference grounded floor. A horizontal coupling plane (HCP) was placed on the table, and Connected to the reference plane via a 470 ㏀ resistor located in each end (0.5 ㎜ insulating support between EUT and HCP). In both cases a vertical coupling plane(VCP) OF 0.5 X 0.5 ㎡ was located 0.1 ㎡ from the EUT's sides. The VCP was connected to the reference plane in the same matter as the HCP.

6.3.2 Used equipments

Equipment	Model No.	Serial No.	Makers	Next Cal. Date	Used
ESD Tester	PESD 1600	H011 309	HAEFELY	2014.07.15	☒
ESD Tester	NSG 437	182	TESEQ	2014.05.21	☐
HCP	-	-	-	-	☒
VCP	-	-	-	-	☒

6.3.3 Photographs of test setup

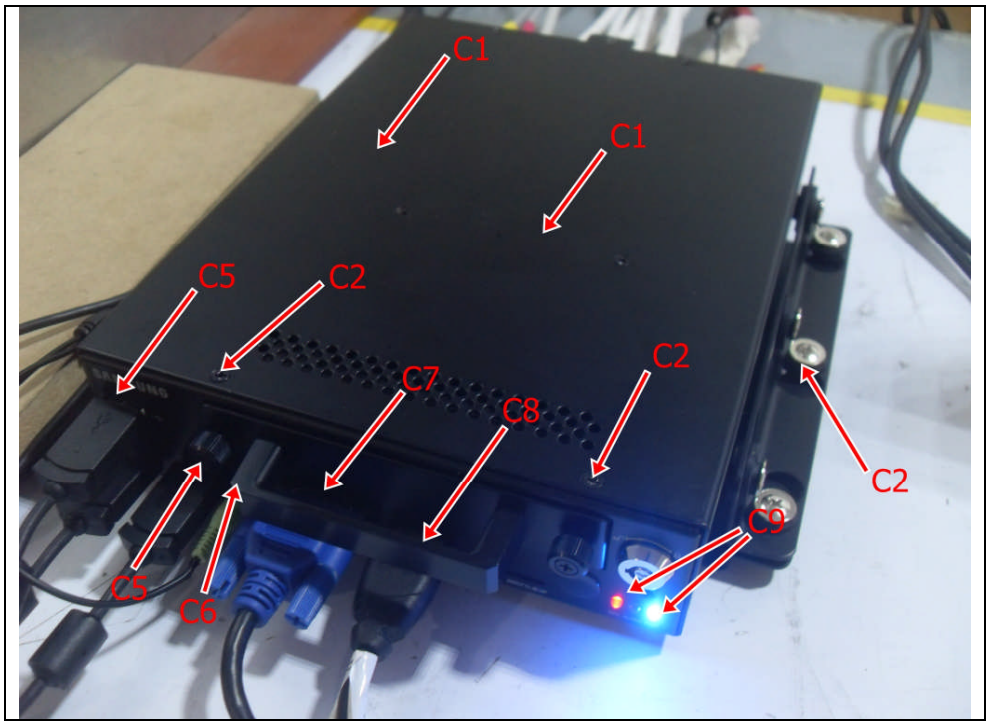
#1-DC 12 V, #2-DC 24 V

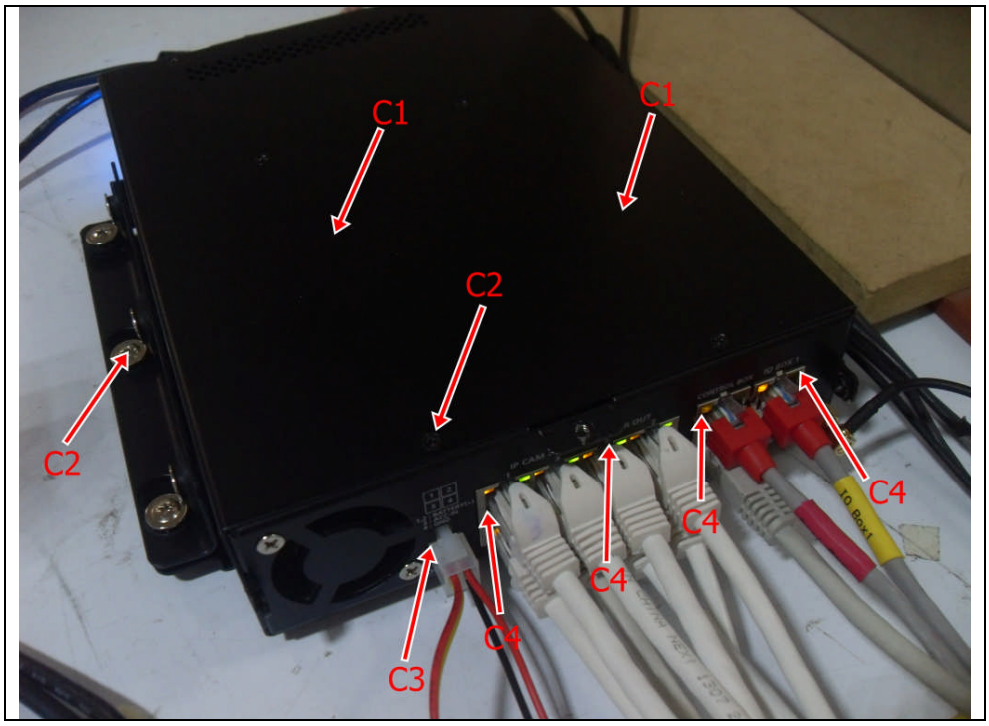
6.3.4 Measurement result

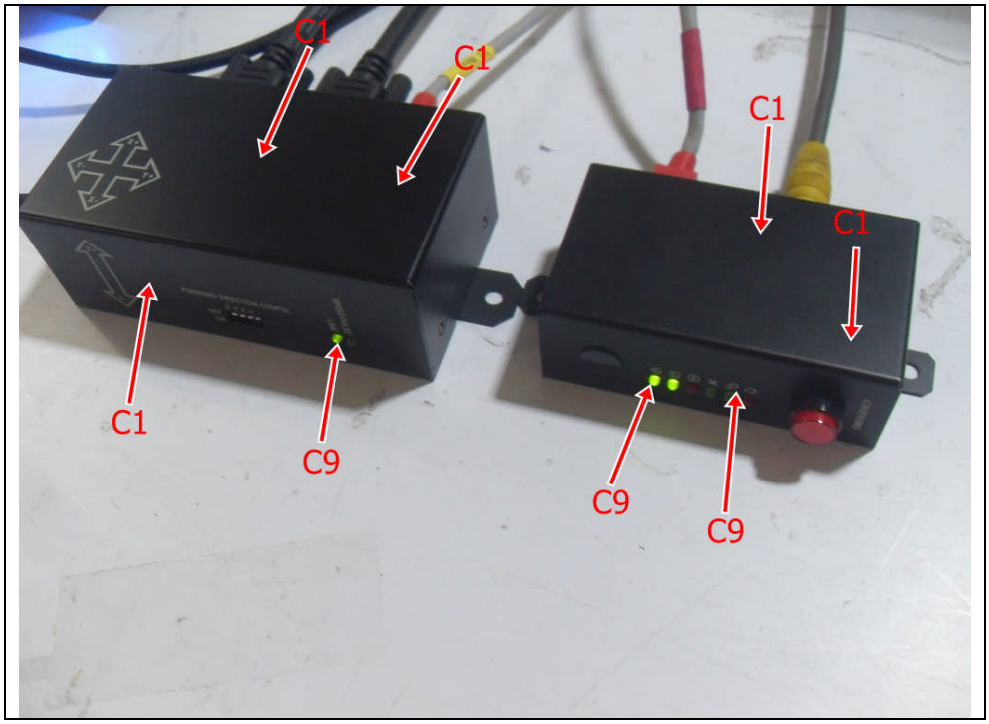
Electrostatic Discharge (Test Point)

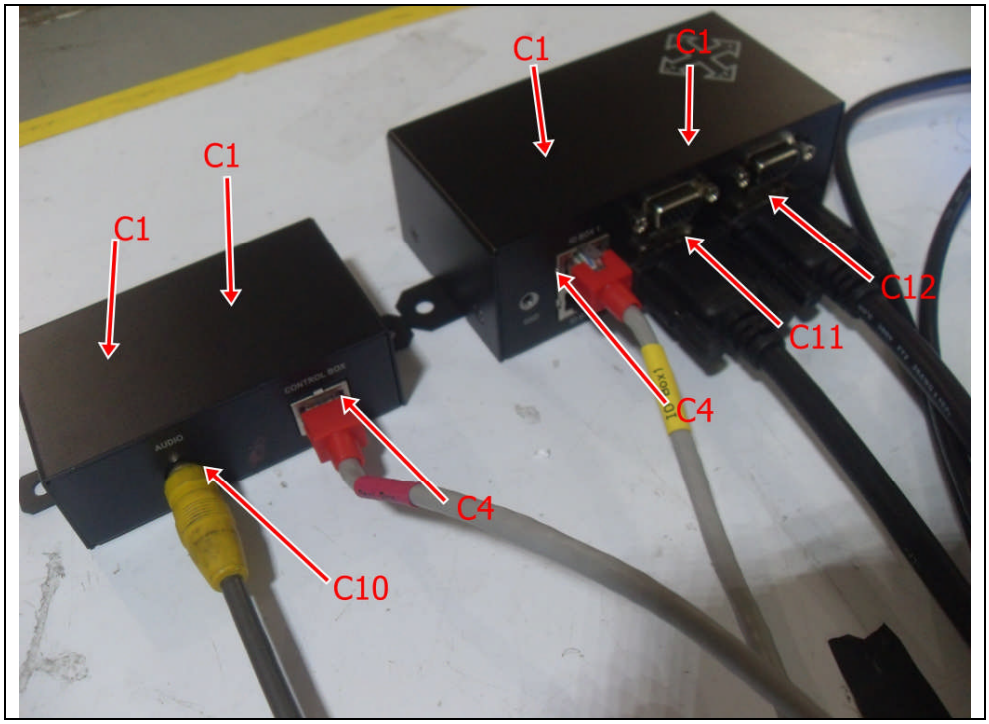
Air discharge	→
Contact discharge	→

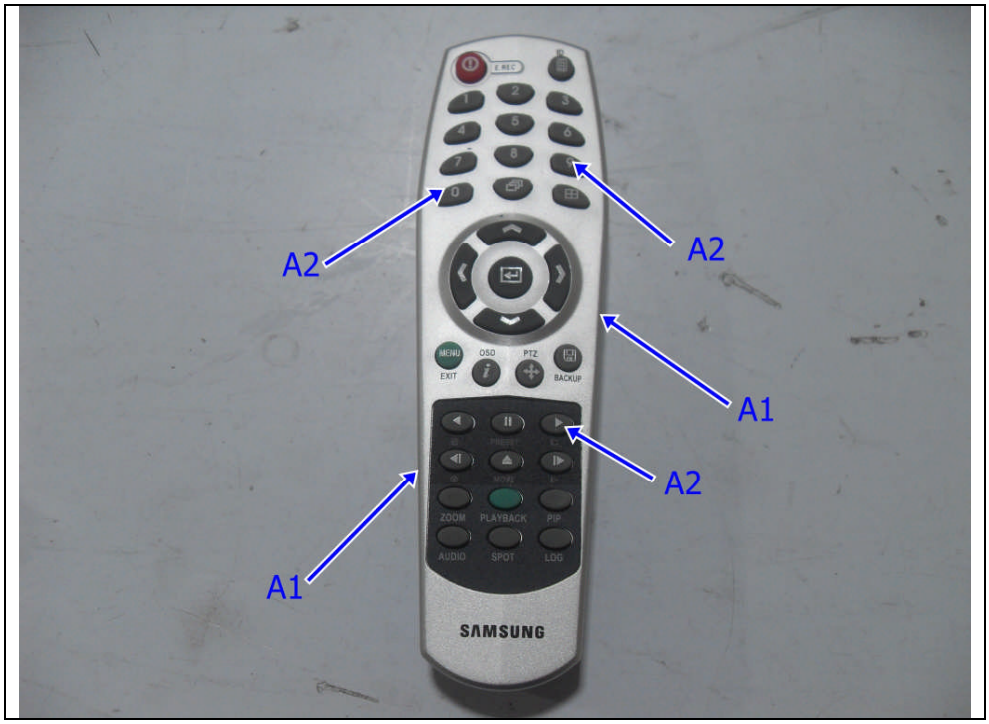
#1-DC 12 V, #2-DC 24 V

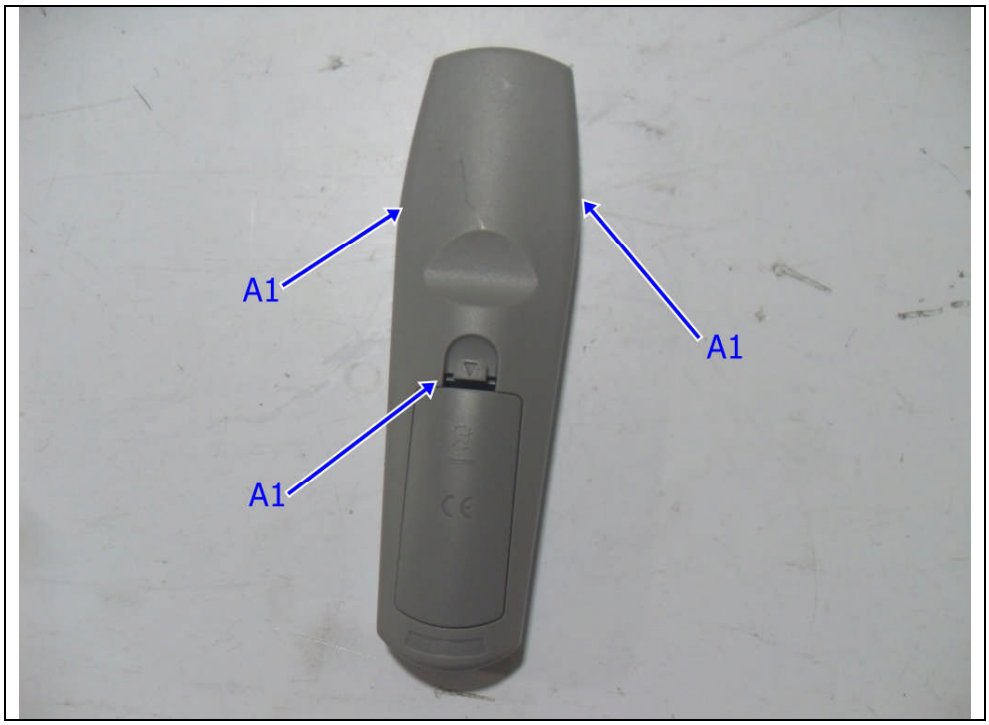












#1-DC 12 V, #2-DC 24 V

HCP/VCP discharge

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

Contact discharge

Location(EUT)		Applied level (±)	Result
C1	Enclosure(Case)	± 6 ㎸	A
C2	Screw	± 6 ㎸	A
C3	Power Port around	± 6 ㎸	A
C4	LAN Port	± 6 ㎸	A
C5	USB Port	± 6 ㎸	A
C6	Audio Out Port 1	± 6 ㎸	A
C7	Video Out Port	± 6 ㎸	A
C8	HDMI Port	± 6 ㎸	A
C9	LED around	± 6 ㎸	A
C10	Audio Out Port 2	± 6 ㎸	A
C11	Alarm Port	± 6 ㎸	A
C12	Sensor Port	± 6 ㎸	A

Air discharge

Location(EUT)		Applied level (±)	Result
A1	Remote Control_ Enclosure(Case)	± 2 ㎸, ± 4 ㎸, ± 8 ㎸	A
A2	Remote Control_Button	± 2 ㎸, ± 4 ㎸, ± 8 ㎸	A

6.4 Radio Frequency Electromagnetic Fields

Test specification	EN 61000-4-3:2006+A2:2010, Criteria: A				
Tested frequency	800 ㎒ ~ 1 ㎓, 80 ㎒ ~ 1 ㎓, 1.4 ㎓ ~ 2.1 ㎓, 2.1 ㎓ ~ 2.5 ㎓				
Test level & Modulation	800 ㎒ ~ 1 ㎓: 20 ㎷/m, 80 % Amplitude Modulation (1 ㎑) 80 ㎒ ~ 1 ㎓: 10 ㎷/m, 80 % Amplitude Modulation (1 ㎑) 1.4 ㎓ ~ 2.1 ㎓: 10 ㎷/m, 80 % Amplitude Modulation (1 ㎑) 2.1 ㎓ ~ 2.5 ㎓: 5 ㎷/m, 80 % Amplitude Modulation (1 ㎑)				
Frequency Step	log 1 % step				
Dwell time	3 s				
Distance	3 m from EUT to tip of antenna				
Testing voltage	DC 12 ㎷, DC 24 ㎷				
Test facility	Fully anechoic chamber (3 m) (80 ㎒ ~ 1 ㎓, 1.4 ㎓ ~ 2.1 ㎓, 2.1 ㎓ ~ 2.5 ㎓) Koreaemc Lab (800 ㎒ ~ 1 ㎓)				
Date	2013. 12. 13				
Temperature(°C)	21.9 °C	Humidity (% R.H.)	20.0 % R.H.	Pressure (㎪)	101.8 ㎪
Remarks	Complied - A: There was no change of operation status during above testing.				

6.4.1 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.

6.4.2 Used equipments

* (5 V/m, 10 V/m)

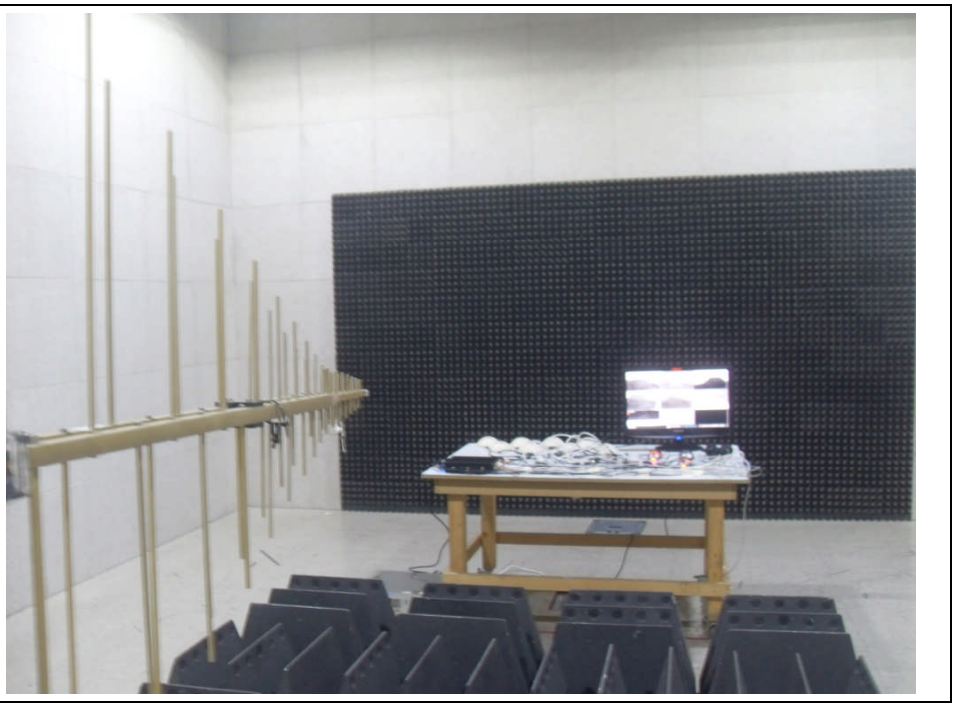
Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Power meter	PM2002	302852	AR	2014.04.05	☒
Power sensor	PH2000	303224	AR	2014.04.05	☒
Power sensor	PH2000	311217	AR	2014.04.05	☒
Directional coupler	DC6180	303976	AR	2014.04.08	☒
Directional coupler	DC7144M1	320279	AR	2014.02.07	☒
Signal generator	E4421B	GB40052295	AGILENT	2014.10.08	☒
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	-	☒

* (20 V/m)

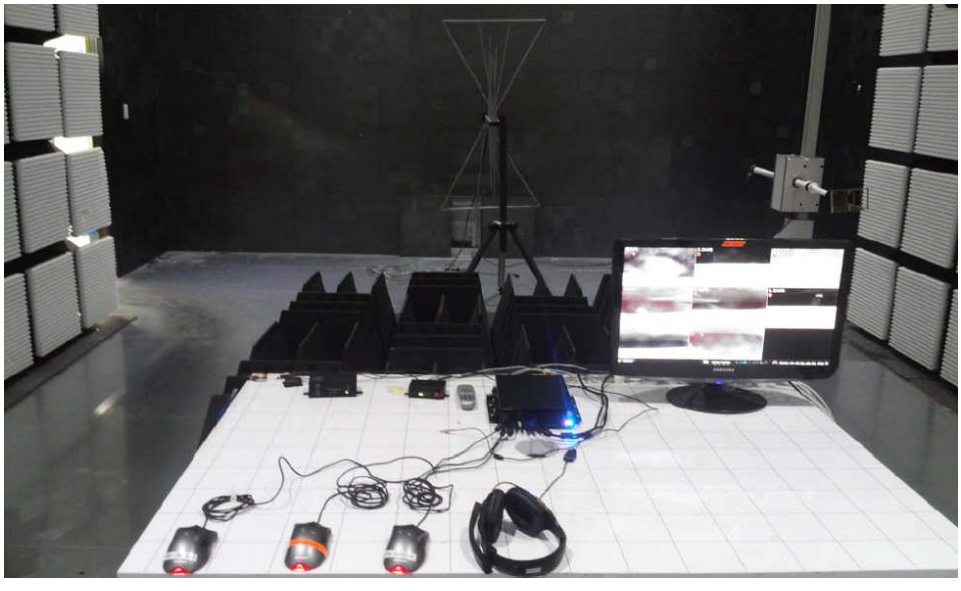
Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Signal generator	8468C	3642U01859	HEWLETT PACKARD	2014.01.15	☒
Power meter	NRVD	101176	ROHDE&SCHWARZ	2014.01.15	☒
Power sensor	NRV-Z51	100921	ROHDE&SCHWARZ	2014.01.15	☒
Power sensor	NRV-Z51	100922	ROHDE&SCHWARZ	2014.01.15	☒
Power Amplifier	500W1000M5	21402	Amplifier Research	-	☒
BI-Log ANT.	3142	9704-1175	EMCO	-	☒
Directional Coupler	DC6180A	0330522	Amplifier Research	2014.10.03	☒
RF RELAY MATRIX	RFM-S3A3C1LR	04339	TSJ	-	☒

6.4.3 Photographs of test setup

#1-DC 12 V, #2-DC 24 V (5 V/m, 10 V/m)



#1-DC 12 V, #2-DC 24 V (20 V/m)



6.4.4 Measurement result

#1-DC 12 V, #2-DC 24 V

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

6.5 Electric Fast Transient/BURST

Test specification	EN 61000-4-4:2004+A1:2010, Criteria: A				
Coupling	☒ DC 12 V, DC 24 V ☒ Signal: Clamp ☒ Telecommunication: Clamp				
Test level	☒ DC 12 V, DC 24 V: ± 2 kV Peak ☒ Signal: ± 2 kV Peak ☒ Telecommunication: ± 2 kV Peak				
Repetition frequency	5 kHz, Tr/Th = 5 / 50 ns				
Coupling time	60 s				
Testing Voltage	DC 12 V, DC 24 V				
Test facility	Shielded room				
Date	2013. 12. 09				
Temperature(°C)	25.6 °C	Humidity (% R.H.)	20.5 % R.H.	Pressure (kPa)	100.8 kPa
Remarks	Complied - A: There was no change of operation status during above testing. * DC port: Clamp apply (DC ports, which are not intended to be connected to a DC distribution network, e.g. outputs for Sounders, are treated as signal ports.)				

6.5.1 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.

6.5.2 Used equipments

Equipment	Model No.	Serial No.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS500M	0701-03	EM TEST	2014.06.21	☒
Capacitive Coupling Clamp	-	-	EM TEST	-	☒

6.5.3 Photographs of test setup

#1-DC 12 Ⅴ, #2-DC 24 Ⅴ

6.5.4 Measurement result

* DC Line (#1-DC 12 V, #2-DC 24 V)

EFT coupling point	(+)	(-)	Result (Criterion)
DC 12 V	+ 2 kV	- 2 kV	A
DC 24 V	+ 2 kV	- 2 kV	A

* Signal (#1-DC 12 V, #2-DC 24 V)

EFT coupling point	(+)	(-)	Result (Criterion)
I/O	+ 2 kV	- 2 kV	A
Control	+ 2 kV	- 2 kV	A
Alarm	+ 2 kV	- 2 kV	A
Sensor	+ 2 kV	- 2 kV	A

* Telecommunication (#1-DC 12 V, #2-DC 24 V)

EFT coupling point	(+)	(-)	Result (Criterion)
LAN(PoE)	+ 2 kV	- 2 kV	A
Network(RJ-45)	+ 2 kV	- 2 kV	A

6.6 Surge

Test specification	EN 61000-4-5:2006				
Coupling	☒ DC 12 V, DC 24 V: CDN ☒ Signal: CDN				
Test level	☒ DC 12 V, DC 24 V: ± 1 kV ☒ Signal: ± 1 kV				
Coupling Impedance	☐ Differential mode: 18 μF ☒ 40 Ω + 0.5 μF		☐ Common mode: 10 Ω + 9 μF ☐ Direct		
Surge pulse shape	Tr/Th = 1.2 / 50 μs				
Number of surge	5				
Coupling time	1 min				
Testing Voltage	DC 12 V, DC 24 V				
Test facility	Shielded room				
Date	2013. 12. 09				
Temperature(°C)	25.6 °C	Humidity (% R.H.)	20.5 % R.H.	Pressure (kPa)	100.8 kPa
Remarks	Complied - A: There was no change of operation status during above testing.				

6.6.1 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.

6.6.2 Used equipments

Equipment	Model No.	Serial No.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS 500-M	V0545100858	EM TEST	2014.01.31	☐
Ultra compact simulator	UCS500M	0701-03	EM TEST	2014.06.21	☒
CDN	CNV 508 N1	V1108108861	EM TEST	2014.01.03	☒

6.6.3 Photographs of test setup

#1-DC 12 V, #2-DC 24 V

6.6.4 Measurement result

* DC Line (#1-DC 12V, #2-DC 24V)

Coupling point	(+)	(-)	Result
DC 12V	+ 1 kV	- 1 kV	A
DC 24V	+ 1 kV	- 1 kV	A

* Signal (#1-DC 12V, #2-DC 24V)

Coupling point	(+)	(-)	Result
Alarm	+ 1 kV	- 1 kV	A
Sensor	+ 1 kV	- 1 kV	A

6.7 Conducted Immunity

Test specification	EN 61000-4-6:2009, Criteria : A				
Tested frequency	0.15 ㎒ ~ 80 ㎒				
Test level & Modulation	10 Ⅴ, 80 % Amplitude Modulation (1 ㎑)				
Frequency Step	log 1 % step				
Coupling method	☒ DC 12 Ⅴ, DC 24 Ⅴ: CDN(M2) ☒ Signal: Clamp ☒ Telecommunication: CDN(T8-RJ45)				
Testing Voltage	DC 12 Ⅴ, DC 24 Ⅴ				
Test facility	Shielded room				
Date	2013. 12. 06				
Temperature(°C)	20.1 °C	Humidity (% R.H.)	29.5 % R.H.	Pressure (㎪)	101.5 ㎪
Remarks	Complied - A: There was no change of operation status during above testing.				

6.7.1 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 80 ㎒. This frequency range was Modulated with 1 ㎑ sine wave at 80 %.

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

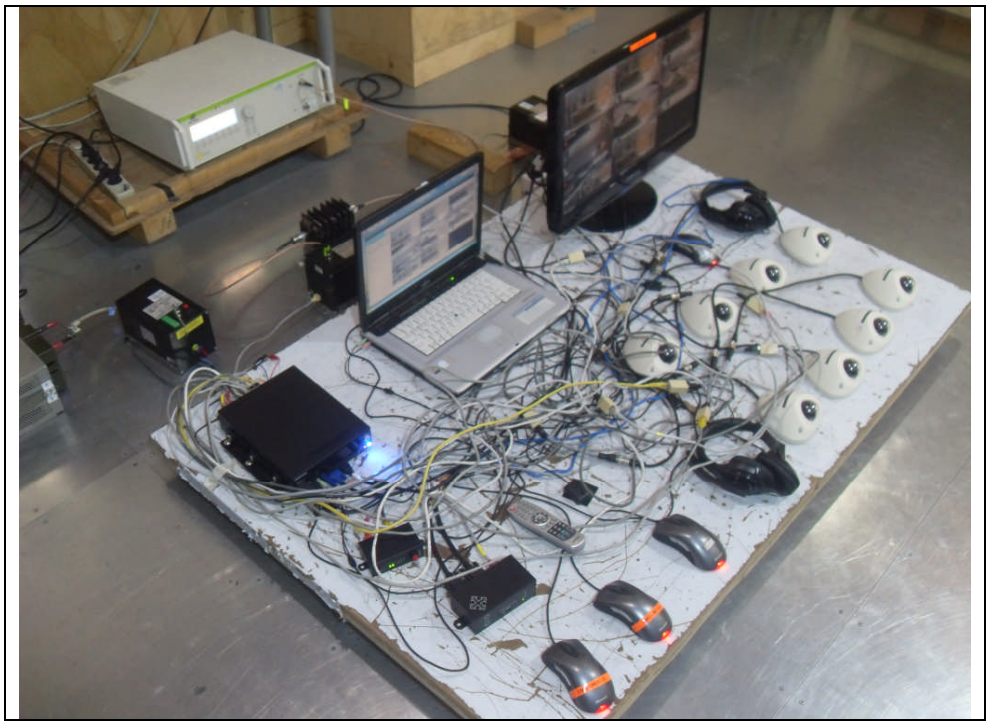
The power and all network cable, I/O cables longer than 3 m length were tested.

6.7.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
CS generator	CWS 500	V0635101750	EM TEST	2014.01.17	☒
CDN	CDN L-801 M2/M3	2936	EM TEST	2014.02.06	☒
CDN	CDN M2/M3	0906-12	EM TEST	2014.10.04	☒
Attenuator	73-6-34	MU918	MCE/WEINSCHEL	2014.10.04	☒
EM Clamp	KEMZ 801	17643	Schaffner	2014.04.17	☒
CDN	CDN-T8-RJ45	0113-22	EM TEST	2014.02.22	☒

6.7.3 Photographs of test setup

#1-DC 12 V, #2-DC 24 V



6.7.4 Measurement result

* DC Line (#1-DC 12 V, #2-DC 24 V)

Coupling point	Coupling method	Result (Criterion)
DC 12 V	CDN(M2)	A
DC 24 V	CDN(M2)	A

* Signal (#1-DC 12 V, #2-DC 24 V)

Coupling point	Coupling method	Result (Criterion)
I/O	Clamp	A
Control	Clamp	A
Alarm	Clamp	A
Sensor	Clamp	A

* Telecommunication (#1-DC 12 V, #2-DC 24 V)

Coupling point	Coupling method	Result (Criterion)
LAN(PoE)	CDN(T8-RJ45)	A
Network(RJ-45)	CDN(T8-RJ45)	A

6.8 Pulse magnetic field immunity

Test specification	EN 61000-4-9:1993+A1:2001, Criteria : B				
Magnetic field strength	300 A/m (rms)				
Coupling time	60 s				
Polarization	X, Y, Z				
Testing voltage	DC 12 Ⅴ, DC 24 Ⅴ				
Test facility	Shielded room				
Test Date	2013. 12. 09				
Temperature (°C)	25.6 °C	Humidity (% R.H.)	20.5 % R.H.	Pressure (㎪)	100.8 ㎪
Remarks	Complied - A: There was no change of operation status during above testing.				

6.8.1 Measurement procedure

The ground plane (GRP) shall be placed in the laboratory; the EUT and auxiliary test equipment shall be placed on it and connected to it. The ground plane shall be a non-magnetic metal sheet (copper or aluminium) of 0,25 mm thickness; other metals may be used but in this case they shall have 0,65 mm minimum thickness.
The minimum size of the ground plane is 1 m × 1 m.
The final size depends on the dimensions of the EUT.
The ground plane shall be connected to the safety earth system of the laboratory.

The equipment is configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0,1 m thickness insulating support (e.g. dry wood).
The equipment cabinets shall be connected to the safety earth directly on the GRP with a connection of minimum length via the earth terminal of the EUT. The power supply, input and output circuits shall be connected to the sources of power supply, control and signals via the back filters.
The cables supplied or recommended by the equipment manufacturer shall be used. In absence of any recommendation, unshielded cables shall be adopted, of a type appropriate for the signals involved.
All cables shall be exposed to the magnetic field for 1 m of their length. The back filters shall be inserted in the circuits at 1 m cable lengths from the EUT and connected to the ground plane.

The input and output circuits, to the simulator, shall be provided with back filters in order to prevent interference to that equipment. The communication lines (data lines) shall be connected to the EUT by the cables given in the technical specification or standard for this application. Each line, in the proximity of the EUT, shall be maintained at a distance of about 0,1 m from the GRP.

The test generator shall be placed at less than 3 m distance from the induction coil.
One terminal of the generator shall be connected to the ground plane.

The induction coil, of the type specified in 6.2.1, shall enclose the EUT placed at its centre.
Different induction coils may be selected for testing in the different orthogonal directions, according to the general criteria specified in 6.2.1 a) and b). Induction coils used in the vertical position (horizontal polarization of the field) can be bonded (at the foot of one vertical conductor) directly to the ground plane, which represents the low side of the coil, as a part of it. In this case, 0,1 m minimum distance from EUT to the ground plane is sufficient.
The induction coil shall be connected to the test generator in the same way as for the calibration procedure specified in 6.2.2. The induction coil selected for the tests shall be specified in the test plan.

6.8.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Ultra compact simulator	UCS 500-M	V0545100858	EM TEST	2014.01.31	☐
Ultra compact simulator	UCS500M	0701-03	EM TEST	2014.06.21	☒
Magnetic coil	MS 100	0701-03	EM TEST	-	☒
Current transformer	MC 2630	113-97	EM TEST	-	☒
ELF Field Monitor	ELF-66D	K316093	WALKER	2014.04.26	☒

6.8.3 Photographs of test setup

* #1-DC 12 V, #2-DC 24 V

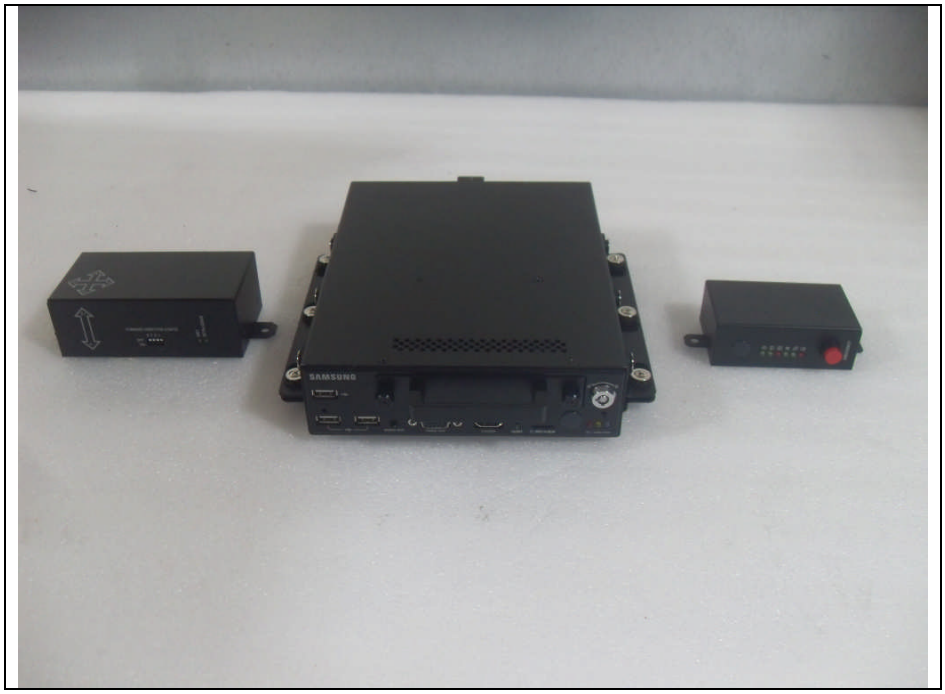
6.8.4 Measurement result

(#1-DC 12 V, #2-DC 24 V)

Positions	Coil Polarity	Test level	Result (Criterion)
Enclosure	X	300 A/m	A
	Y		A
	Z		A

7. E.U.T. photographs

Whole



*** Main**

Front View

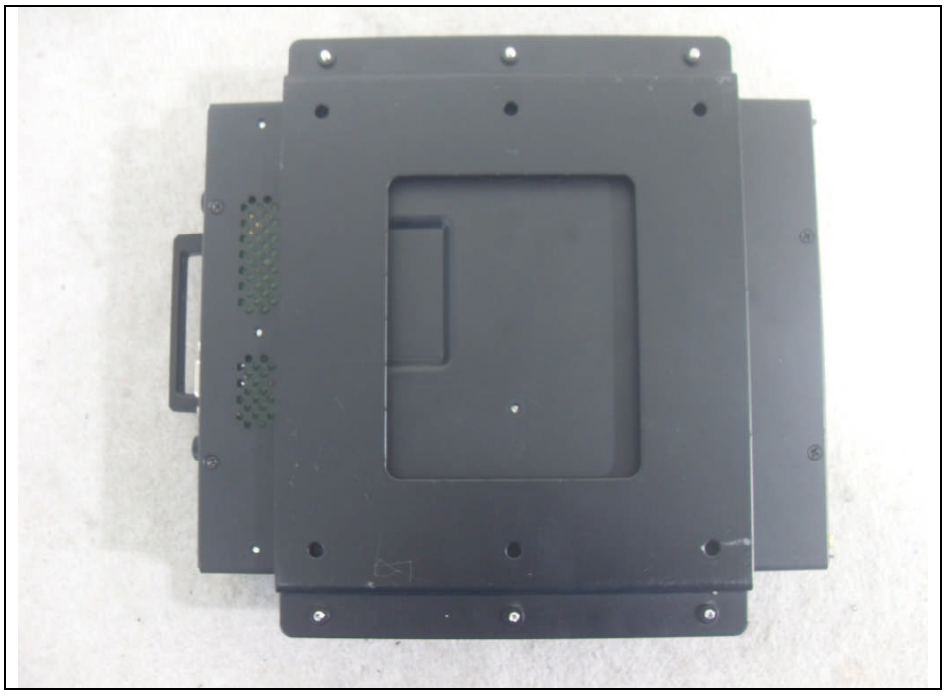
Rear View

Left View

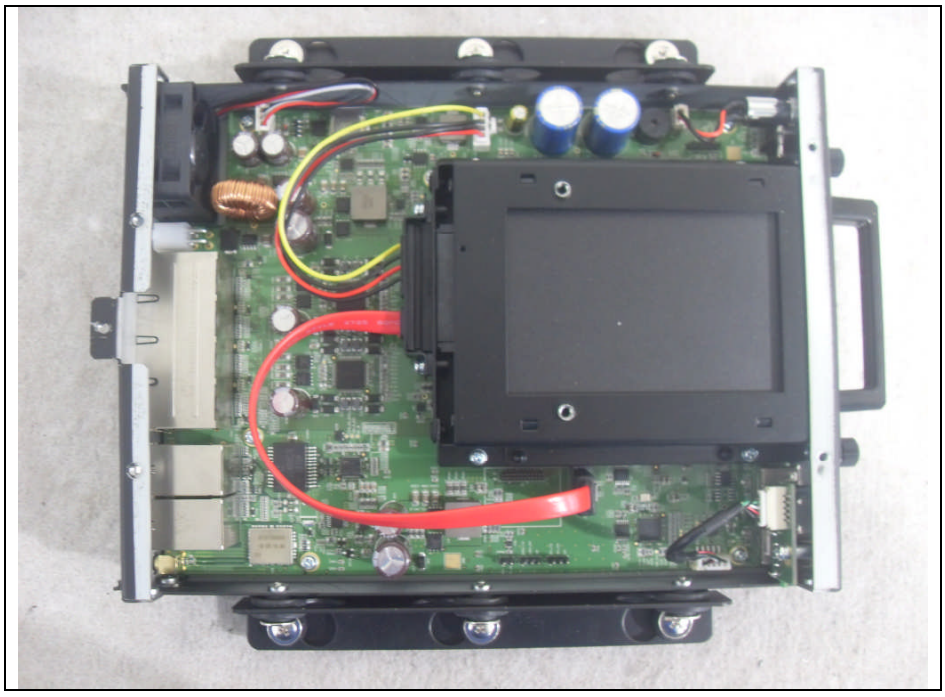
Right View

Top View

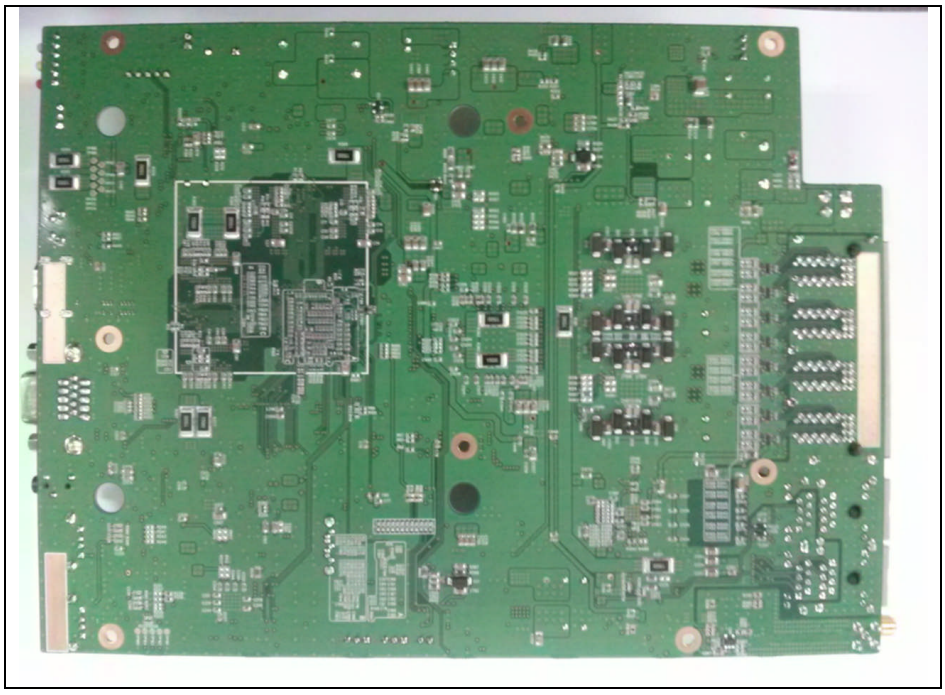
Bottom View



Inside

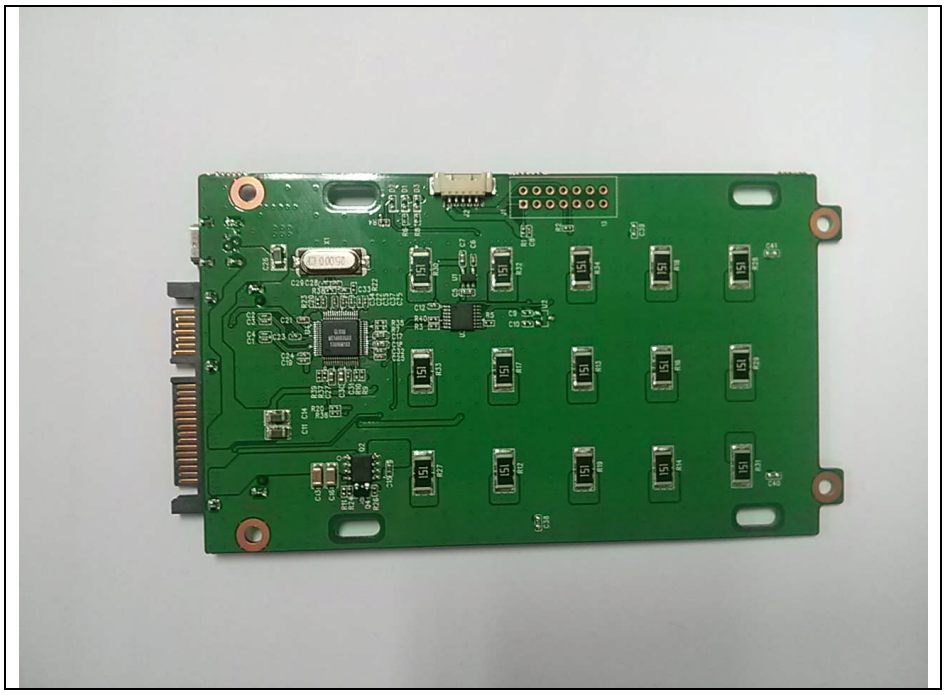


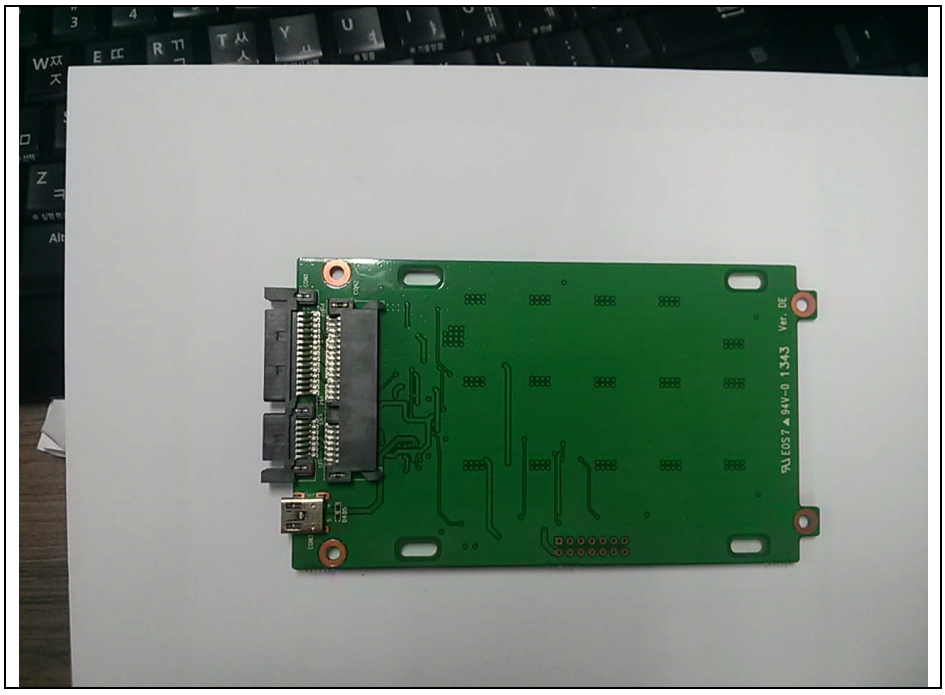
Main Board



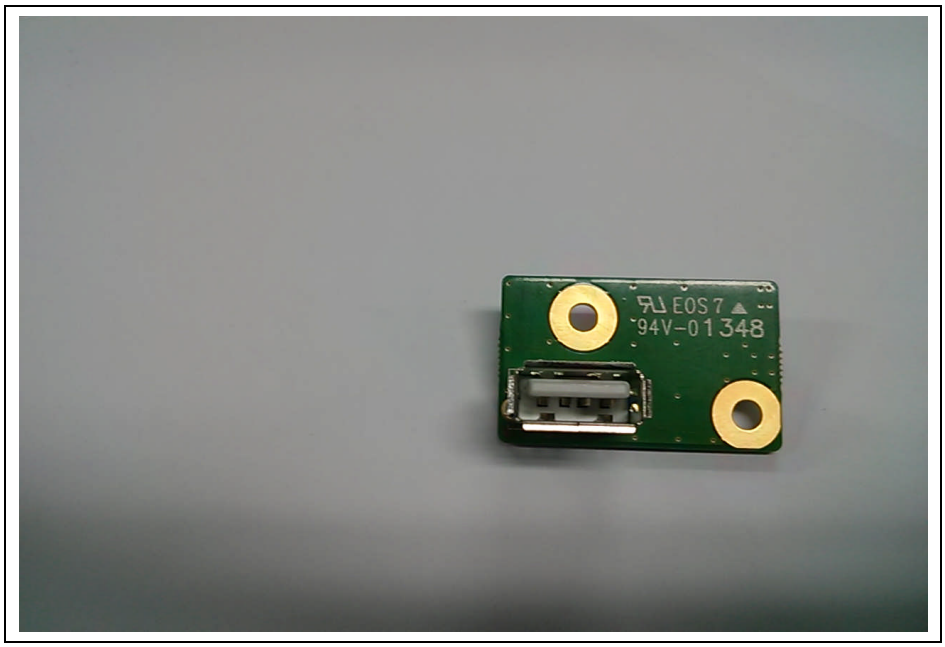
HDD(1TB)

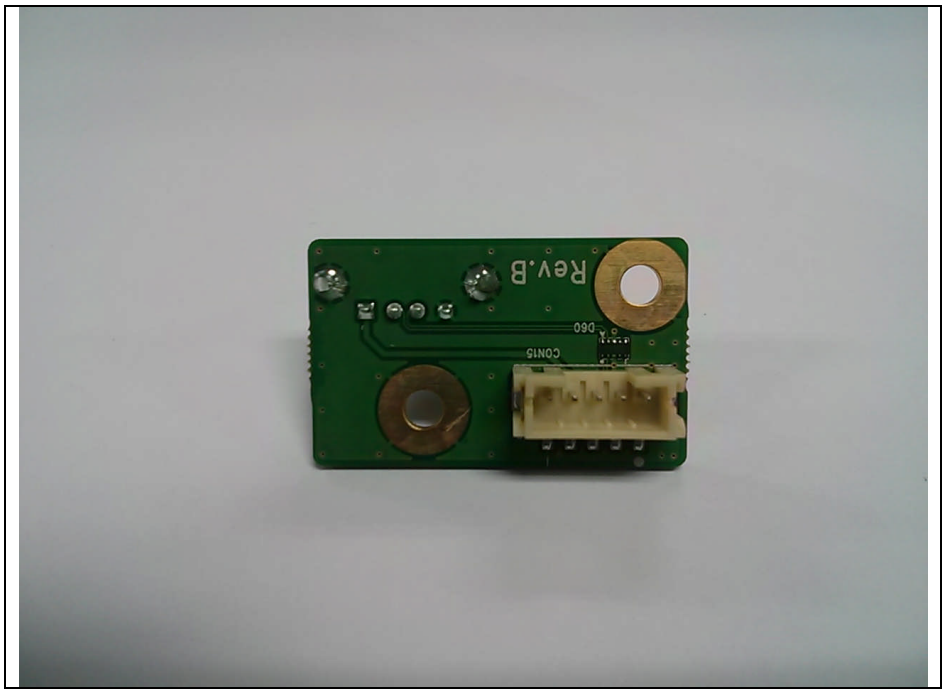
HDD Rack Board





Front USB Board



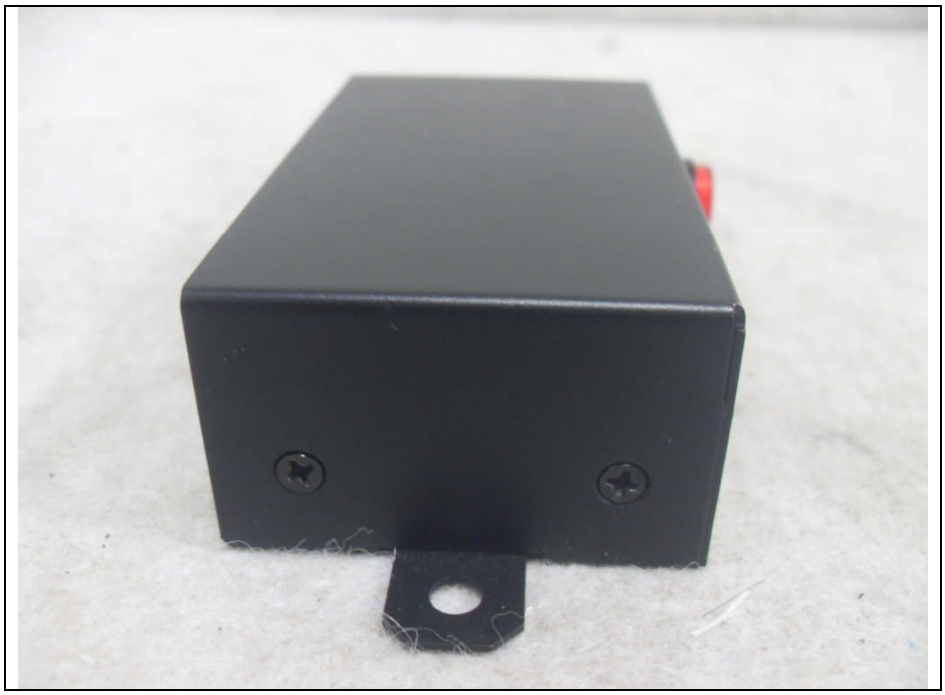


*** Control Box**

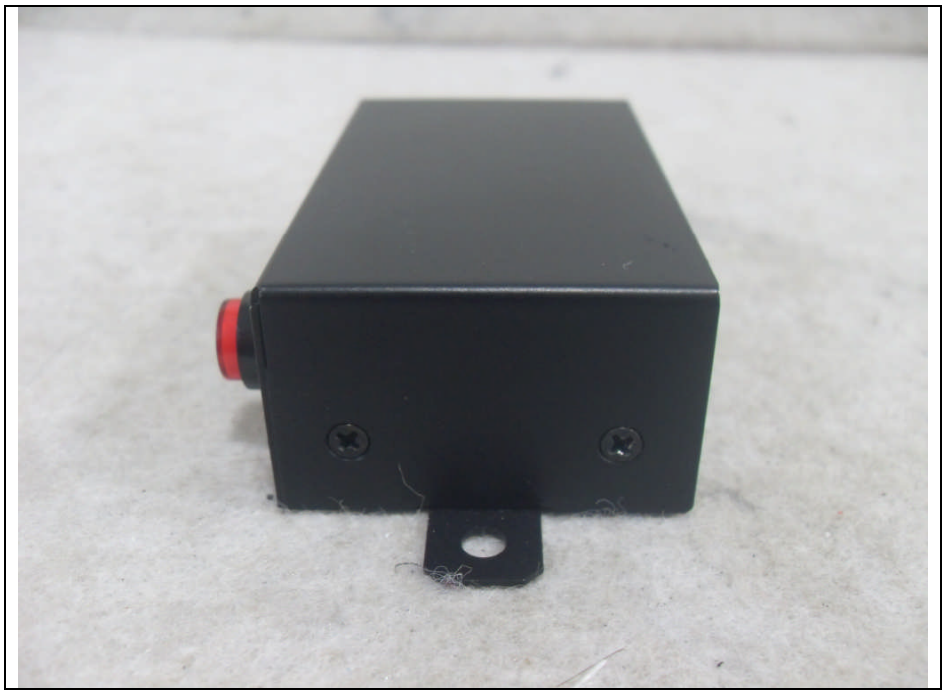
Front View

Rear View

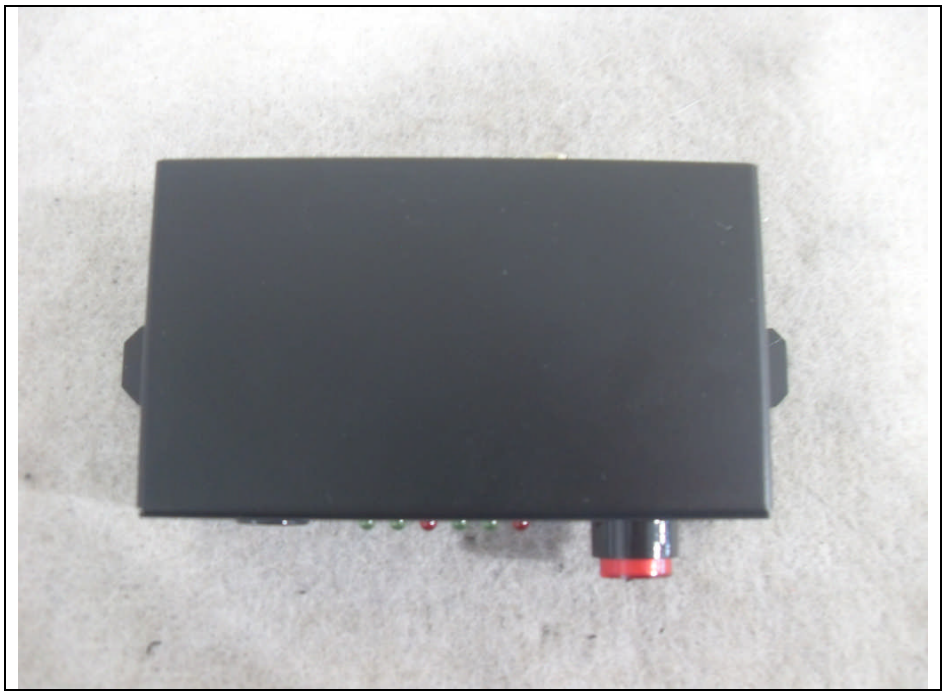
Left View



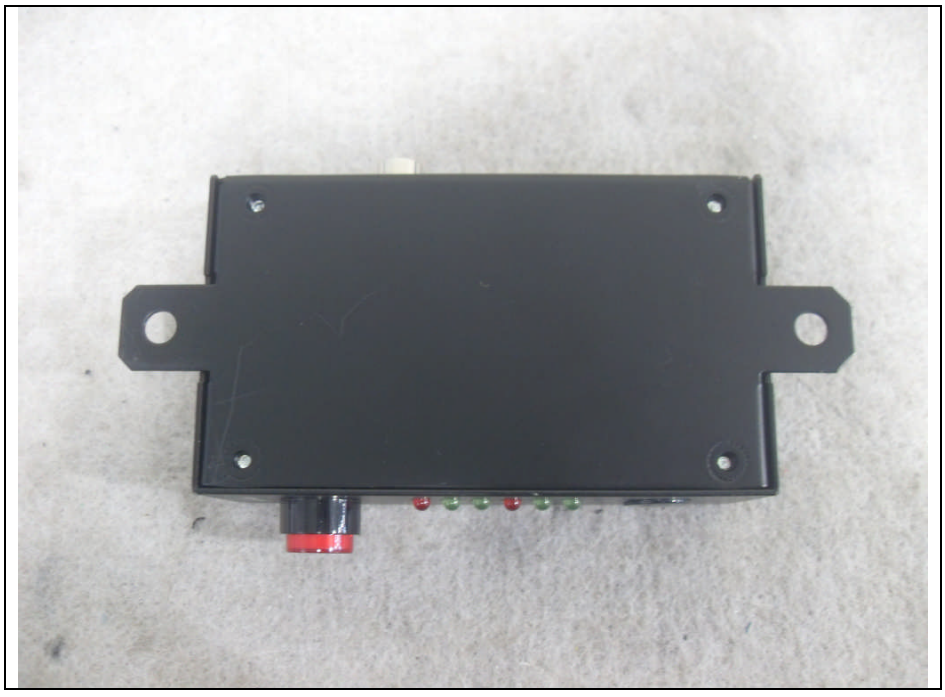
Right View



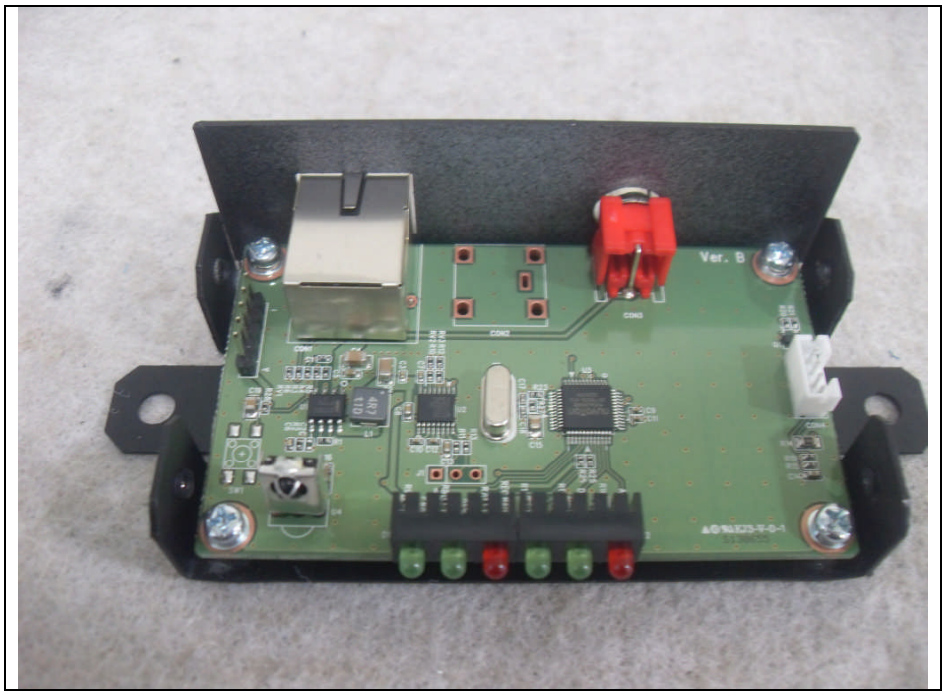
Top View



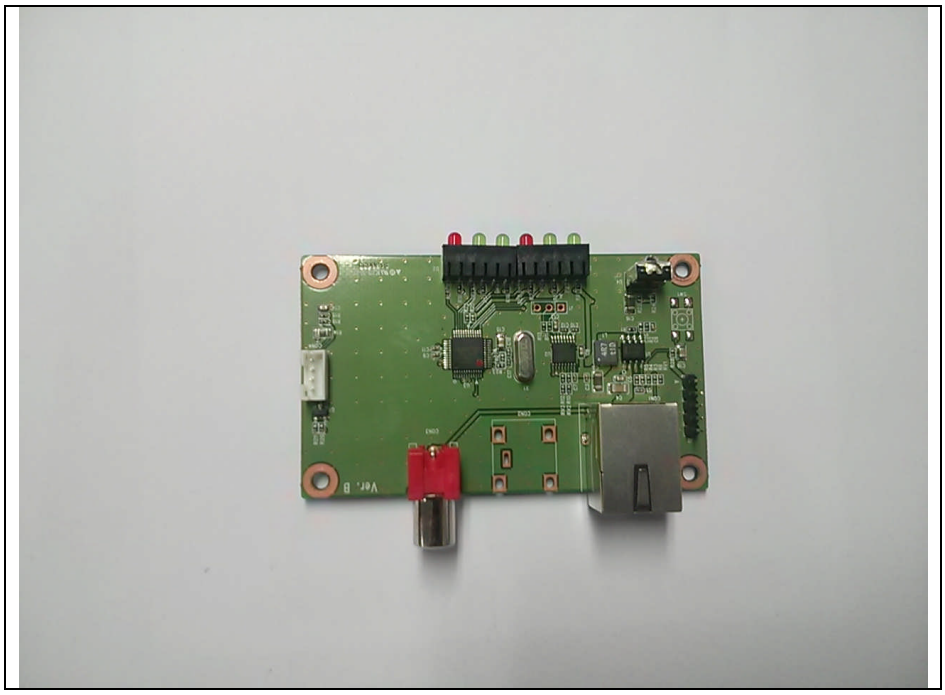
Bottom View

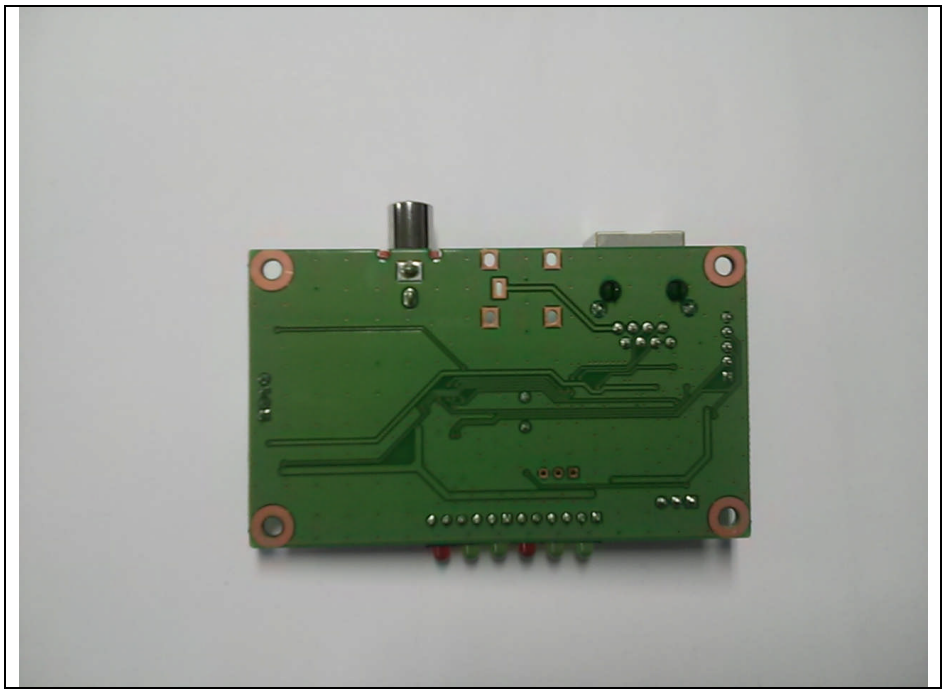


Inside



Main Board



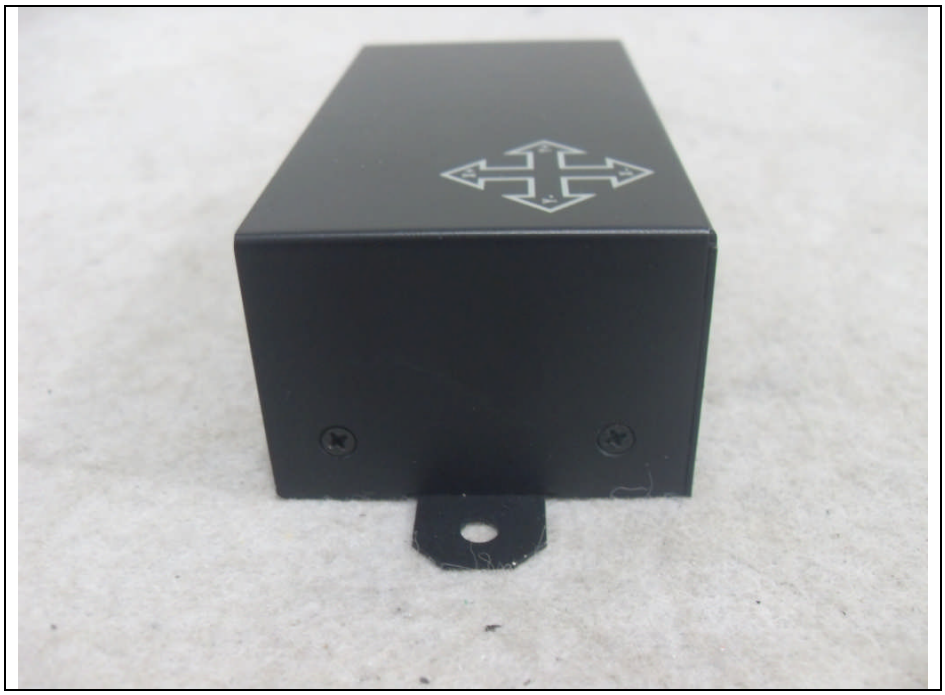


*** Sensor Box**

Front View

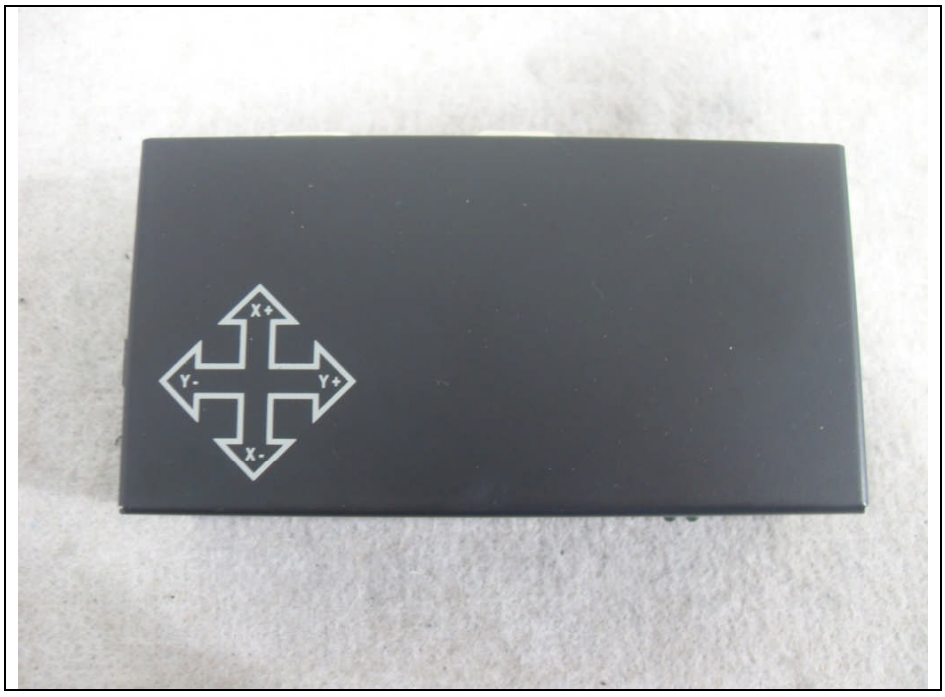
Rear View

Left View



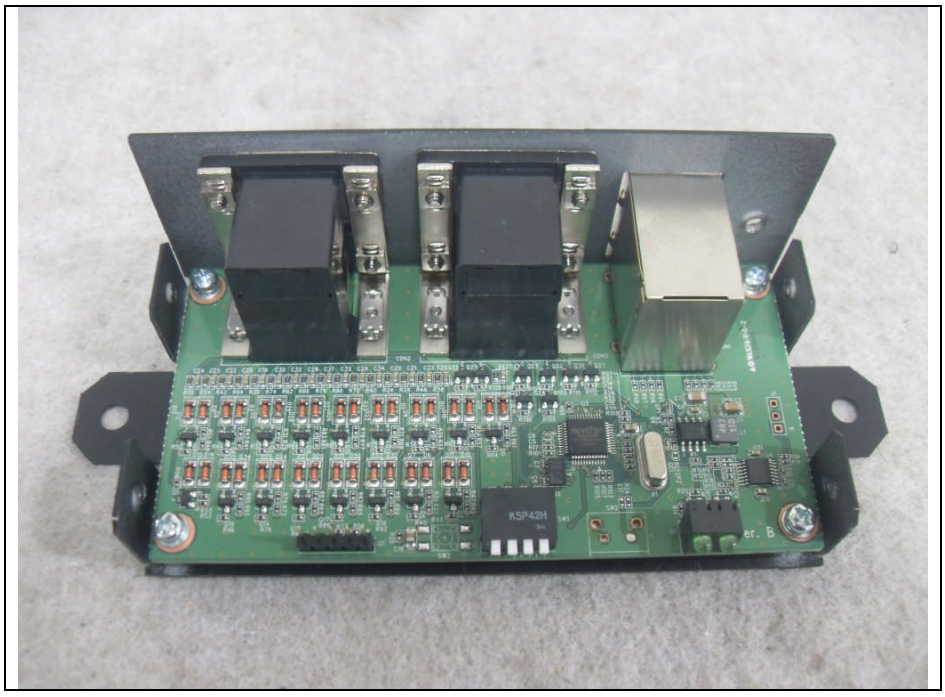
Right View

Top View

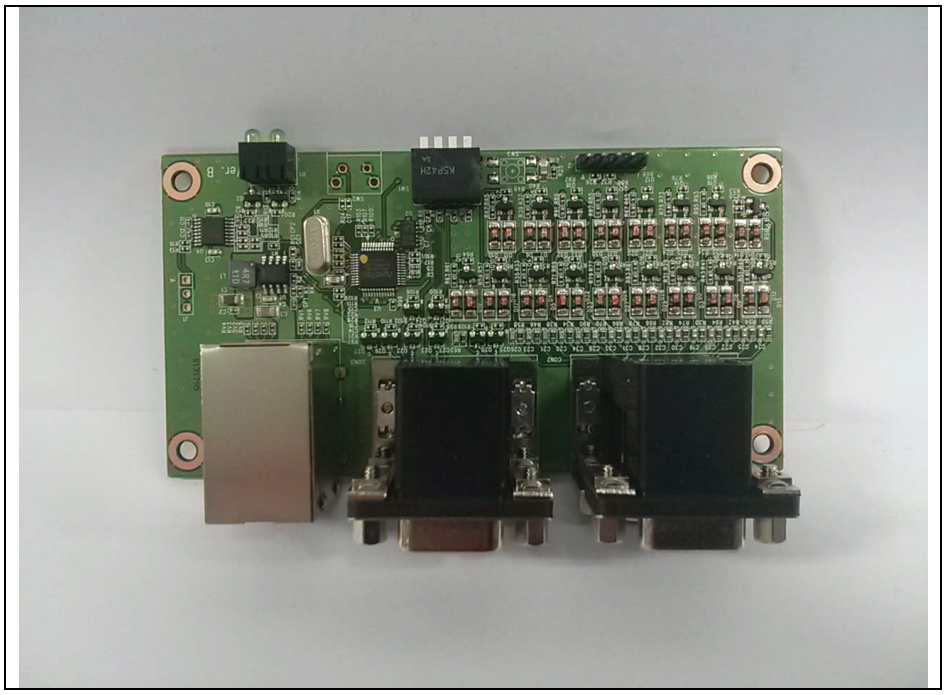


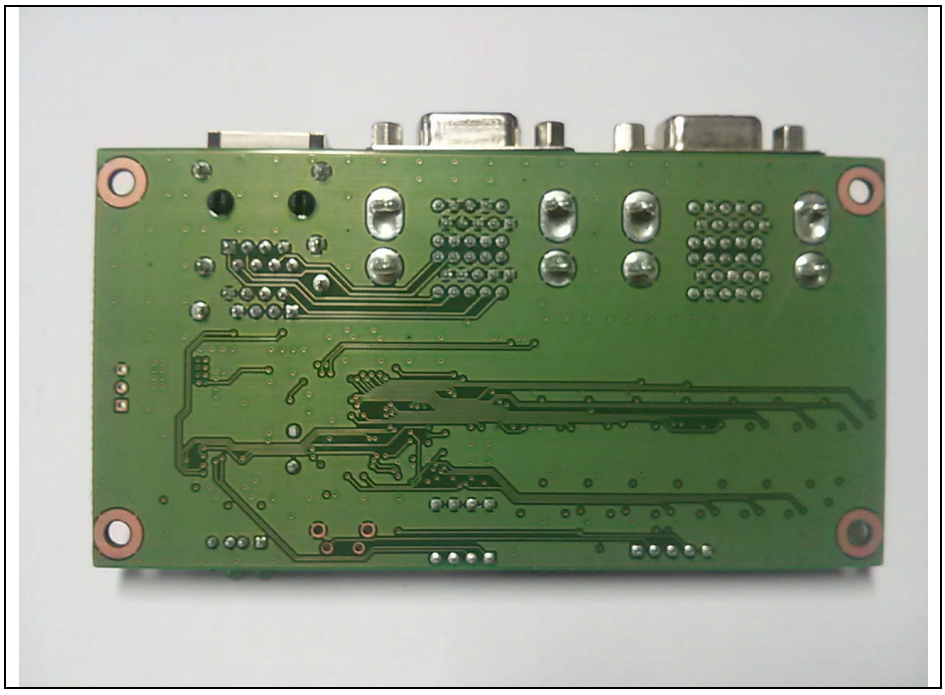
Bottom View

Inside



Main Board





GPS

Remote Control