

CERTIFICATE of EMC Compliance

Report No : EMC-FCC-2123
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 : FCC part 15 subpart B, Class A
Classification : Verification

The above equipment was tested by EMC compliance Testing Laboratory for with the requirements of FCC Rules and Regulations. The results of testing in this report apply to the product / system which was tested only.

These results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations.

Laboratory

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

Tel: 82 31 336 9919
Fax: 82 505 299 8311



Yeom, Han-Seok / Manager

EMI TEST REPORT

Test report No : EMC-FCC-2123
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 : FCC part 15 subpart B, Class A
Classification : Verification
Test Procedure and Items
- Radiated Emissions Measurement : ANSI C63.4-2009
Testing Laboratory : EMC Compliance Ltd.
Test result : Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

These results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations.

Date of receipt: 2013. 10. 21

Date of testing: 2013. 12. 03

Issued date: 2013. 12. 24

Tested by:

SUNG, KI-MUN

Approved by:

YEOM, HAN-SEOK

Contents

1. Applicant information	3
2. Laboratory information	4
3. Test system configuration	5
3.1 Operation environment	5
3.2 Measurement Uncertainty	6
4. Description of E.U.T.	7
4.1 General information.....	7
4.2 Product description.....	9
4.3 Auxiliary equipments.....	9
4.4 Test configuration	10
4.5 Operating conditions	11
5. Summary of test results	12
5.1 Summary of EMI emission test results.....	12
6. Test results	13
6.1 Radiated Emission	13
7. E.U.T. photographs	21

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: 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

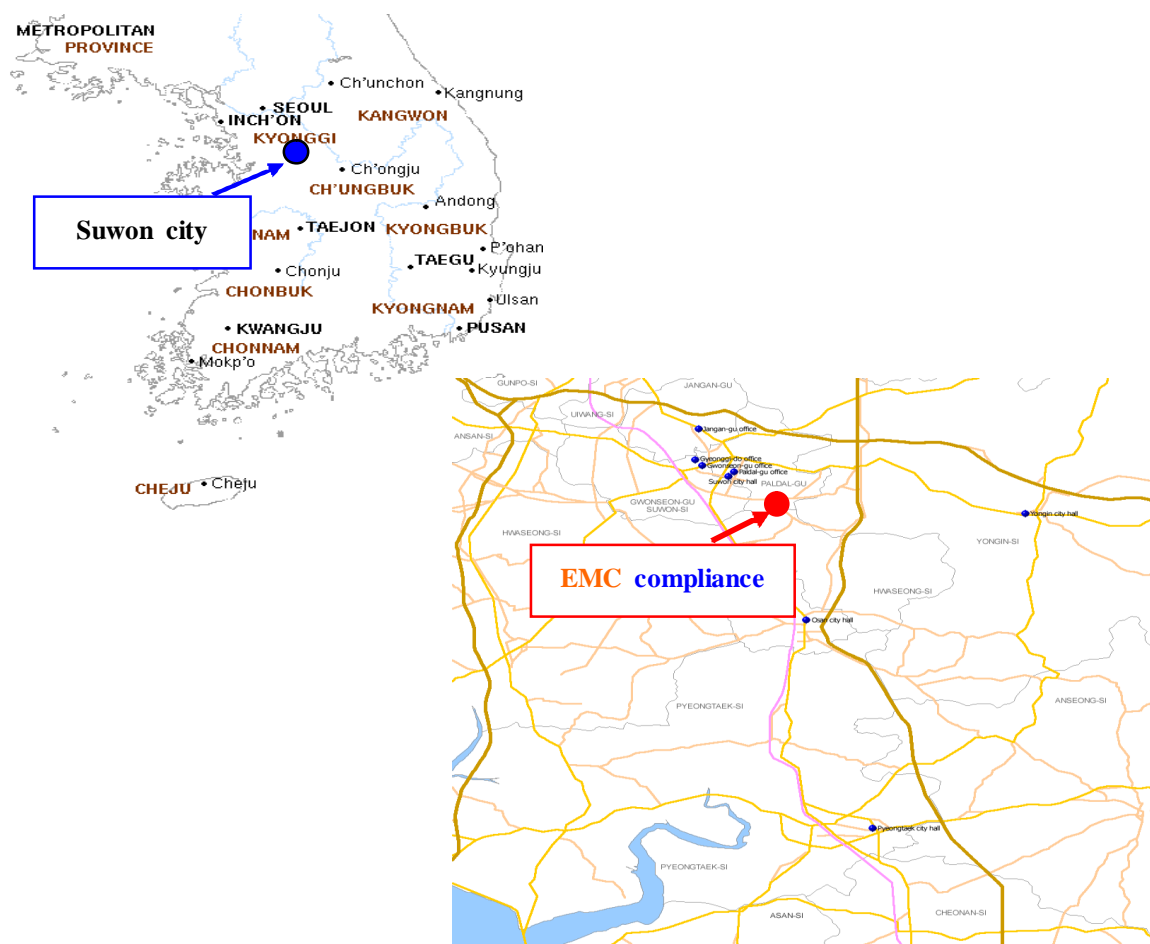
FCC CAB.: KR0040

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.	-

Test site

These testing items were performed following locations;

Test item	Test site
Conducted Emission	Shielded Room
Radiated Emission	10 m Chamber

3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC.

The factors contributing to uncertainties are test receiver, cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability. Based on CISPR 16-4-2, the measurement uncertainty level with a 95 % confidence level was applied.

Conducted emission measurement (C.L: Approx 95 %, k = 2)		
Shielded Room (CE#1)	9 kHz ~ 150 kHz: ± 3.82 dB 150 kHz ~ 30 MHz: ± 3.43 dB	
Shielded Room (CE#2)	9 kHz ~ 150 kHz: ± 3.82 dB 150 kHz ~ 30 MHz: ± 3.43 dB	
Shielded Room (CE#3)	9 kHz ~ 150 kHz: ± 4.00 dB 150 kHz ~ 30 MHz: ± 3.63 dB	
Radiated Emission measurement (C.L: Approx 95 %, k = 2)		
10 m Chamber (#F4)	30 MHz ~ 300 MHz	3 m: + 4.56 dB, - 4.58 dB 10 m: + 4.56 dB, - 4.56 dB
	300 MHz ~ 1 000 MHz	3 m: + 4.84 dB, - 4.85 dB 10 m: + 4.71 dB, - 4.72 dB
	1 GHz ~ 6 GHz	3 m: + 6.19 dB, - 6.20 dB
	6 GHz ~ 18 GHz	3 m: + 6.41 dB, - 6.53 dB
10 m Chamber (#F2)	30 MHz ~ 300 MHz	3 m: + 4.86 dB, - 4.88 dB 10 m: + 4.86 dB, - 4.86 dB
	300 MHz ~ 1 000 MHz	3 m: + 4.98 dB, - 4.99 dB 10 m: + 4.85 dB, - 4.87 dB
	1 GHz ~ 6 GHz	3 m: + 6.19 dB, - 6.20 dB
	6 GHz ~ 18 GHz	3 m: + 6.41 dB, - 6.53 dB

4. Description of E.U.T.

4.1 General information

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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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

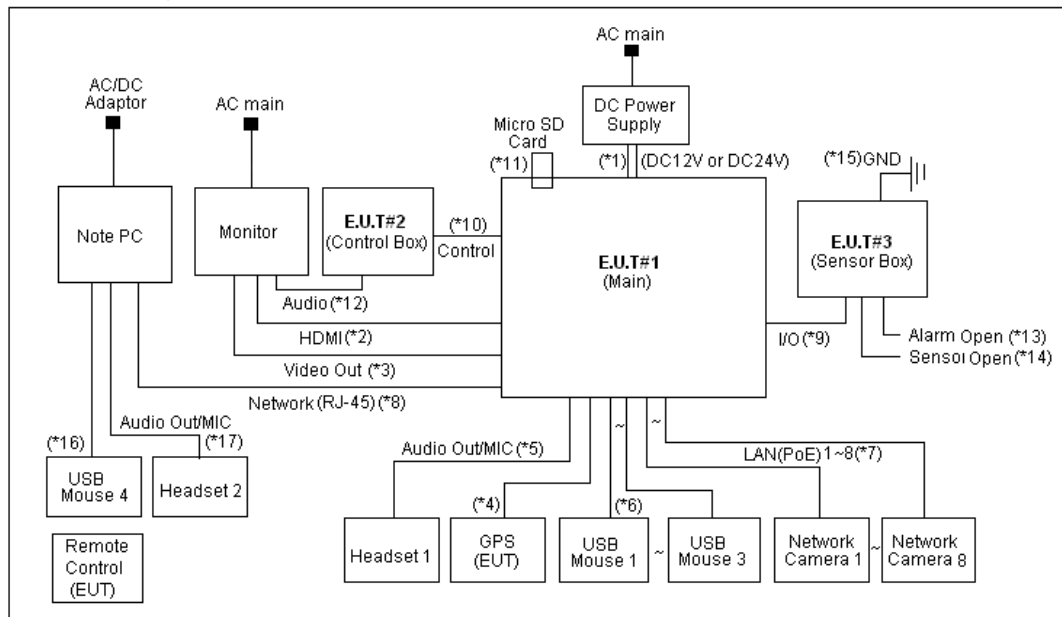
4.2 Product description

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 MHz
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.
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	EUT#2 (Control Box)	Control	EUT#2 (Control Box)	Control	3.0	Non-Shield
11		Micro SD	Micro SD Card	Micro SD	Direct	-
12		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 In/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

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

5.1 Summary of EMI emission test results

FCC Part 15 Subpart B (Class A)

ANSI C63.4 – 2009

Applied	Test items	Test method	Result
<input type="checkbox"/>	Conducted Emission	ANSI C63.4 – 2009	N/A
<input checked="" type="checkbox"/>	Radiated Emission	ANSI C63.4 – 2009	Complied

6. Test results

6.1 Radiated Emission

Test specification	FCC Part 15, Section 15.109(g), Class A		
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		

6.1.1 Limits of radiated emission measurement

Frequency [MHz]	Class A (dB(μ V/m)) @ 10 m	Class B (dB(μ V/m)) @ 3 m
30-88	39	40
88-216	43.5	43.5
216-960	46.4	46
Above 960	49.5	54

* Note- Alternative standard: CISPR, Pub. 22 *

6.1.2 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.

6.1.3 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
Test Receiver	ESCI7	100732	R&S	2014.02.18	<input checked="" type="checkbox"/>
Test Receiver	ESCI	100001	R&S	2014.07.25	<input type="checkbox"/>
Test Receiver	ESCI	100710	R&S	2014.10.28	<input type="checkbox"/>
Test Receiver	ESR	101078	R&S	2014.10.17	<input type="checkbox"/>
Bi-Log Antenna	VULB 9168	440	SCHWARZBECK	2015.10.16	<input checked="" type="checkbox"/>
Amplifier	310N	293004	SONOMA INSTRUMENT	2014.10.31	<input checked="" type="checkbox"/>
3 dB Attenuator	8491B	22981	HP	2014.03.19	<input checked="" type="checkbox"/>
Antenna Mast	MA4000-EP	303	Innco Systems	-	<input checked="" type="checkbox"/>
Turn Table	DT2000S-1t	079	Innco Systems	-	<input checked="" type="checkbox"/>
Amplifier	8449B	3008A02343	AGILENT	2014.10.31	<input checked="" type="checkbox"/>
Horn ANT	3115	00086706	ETS	2014.09.05	<input checked="" type="checkbox"/>
Spectrum Analyzer	FSP7	100289	R&S	2013.12.14	<input type="checkbox"/>

6.1.4 Sample calculation

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.

The sample calculation is as follow:

$$\text{Result} = \text{M.R} + \text{C.F}(\text{A.F} + \text{C.L} + 3 \text{ dB Att} - \text{A.G})$$

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

A.G= Amplifier Gain

3 dB Att = 3 dB Attenuator

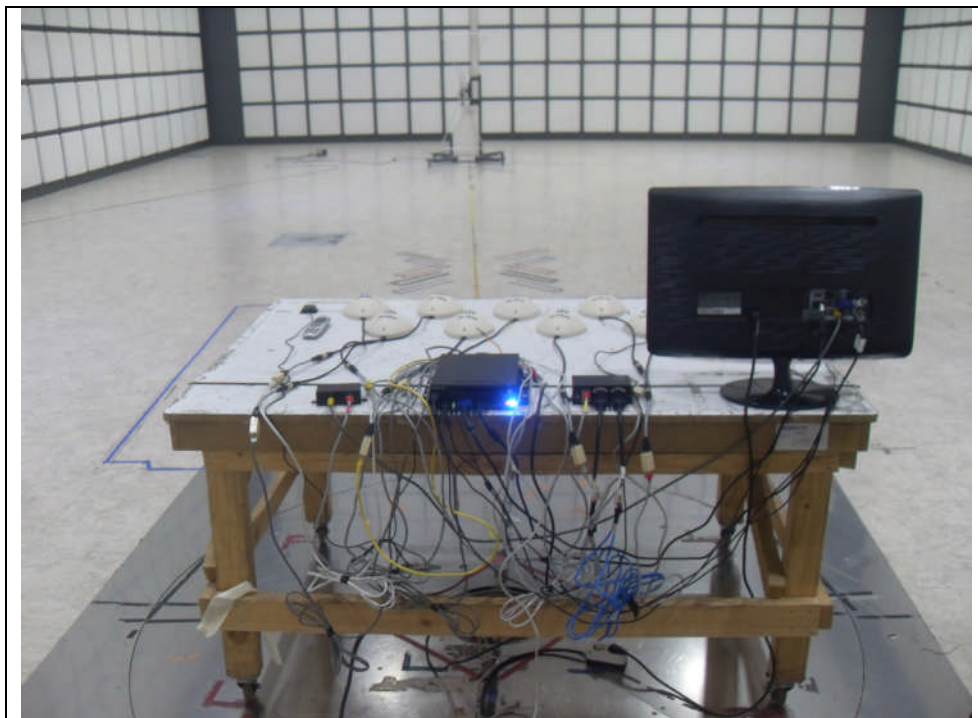
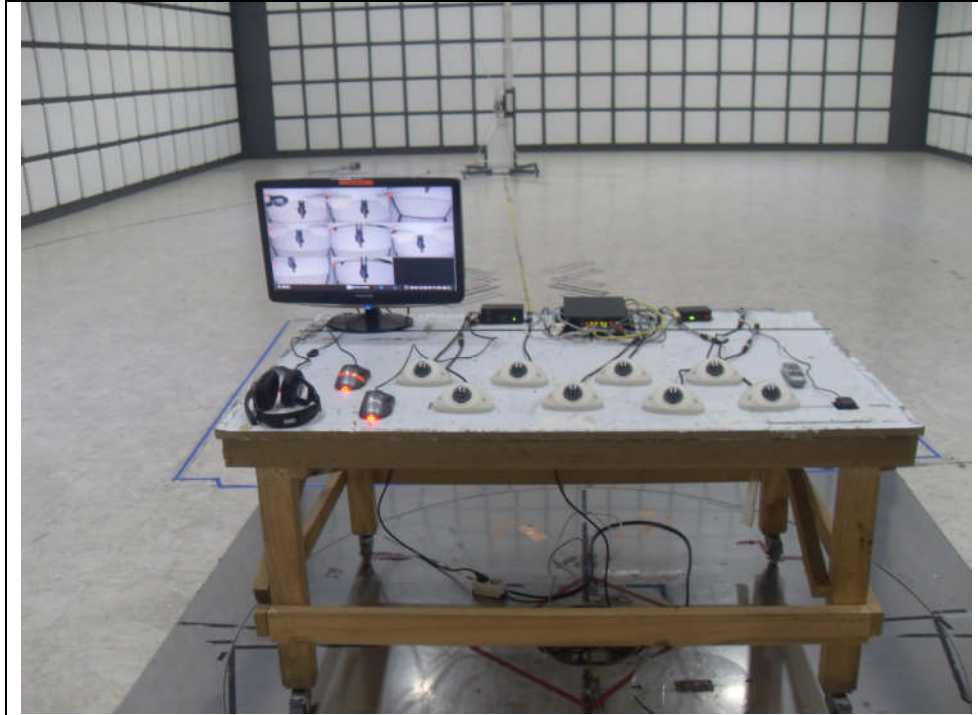
If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

The result is

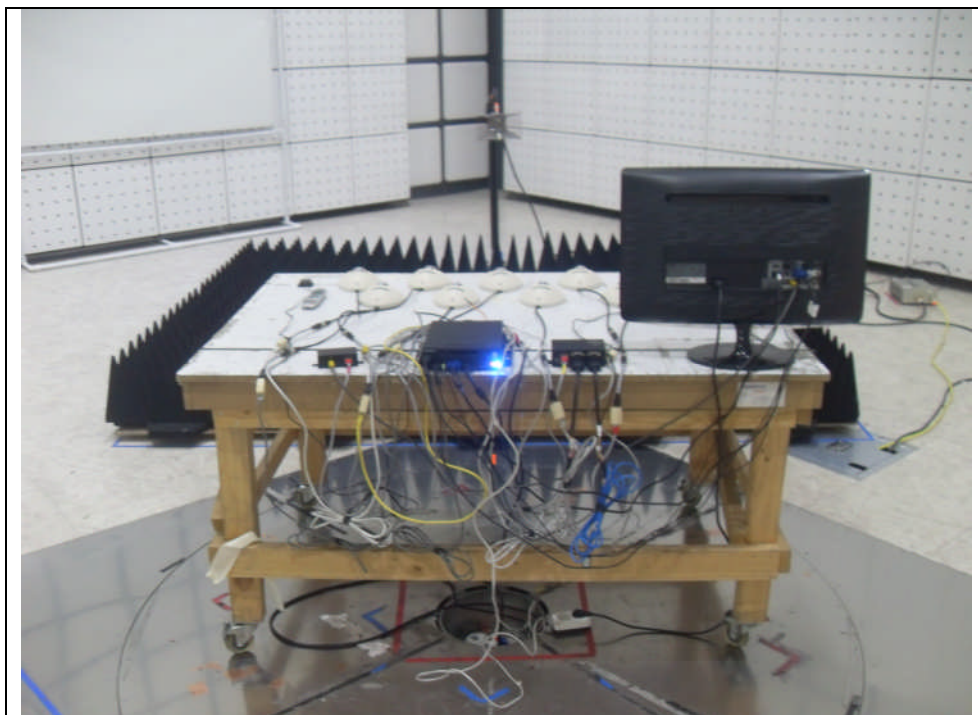
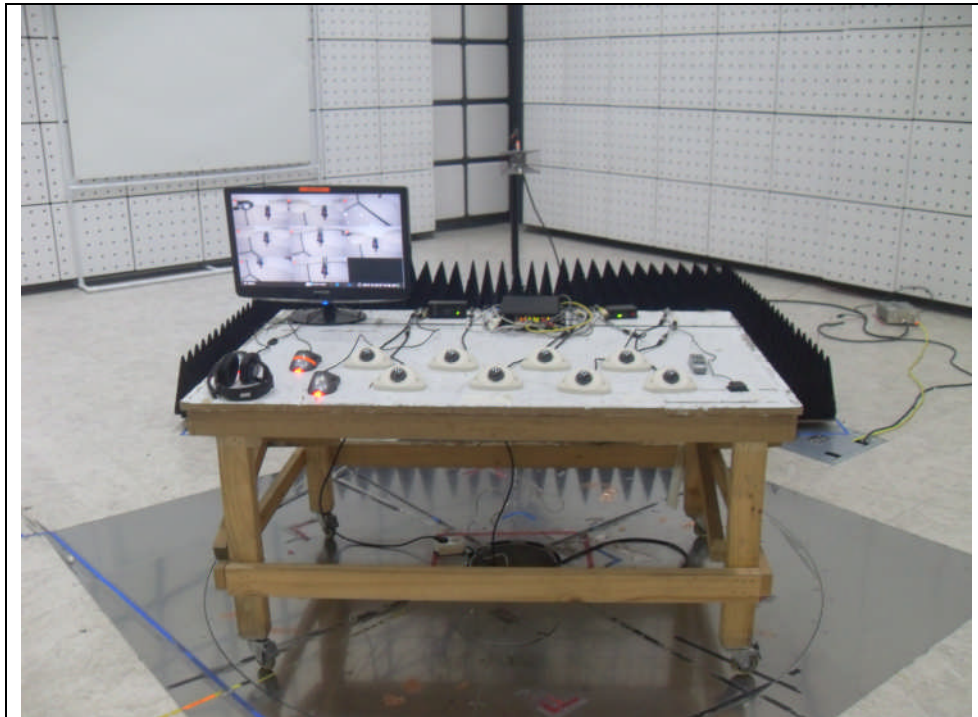
$$30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$$

6.1.5 Photographs of test setup

* 30 MHz ~ 1 GHz



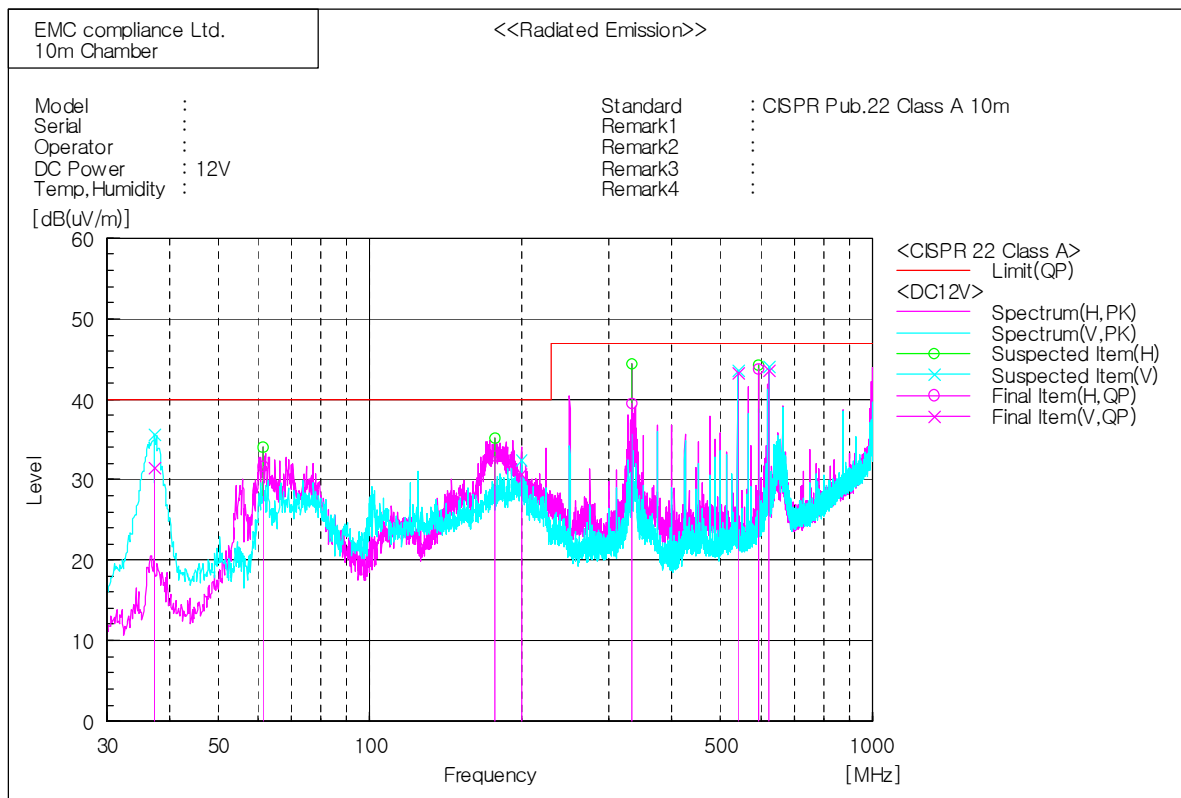
* 1 GHz ~ 5 GHz



6.1.6 Radiated emission measurement result

* Graph and Data

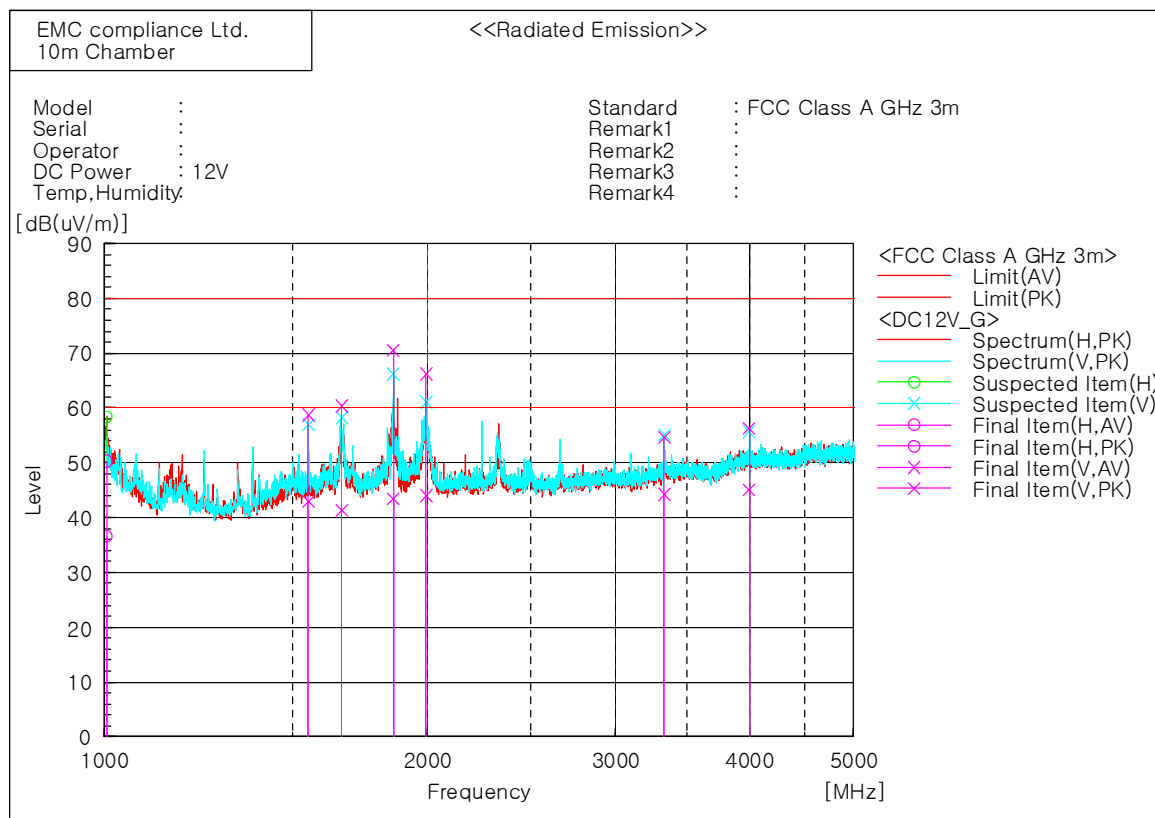
* 30 MHz ~ 1 GHz (DC 12V_SRM-872)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	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

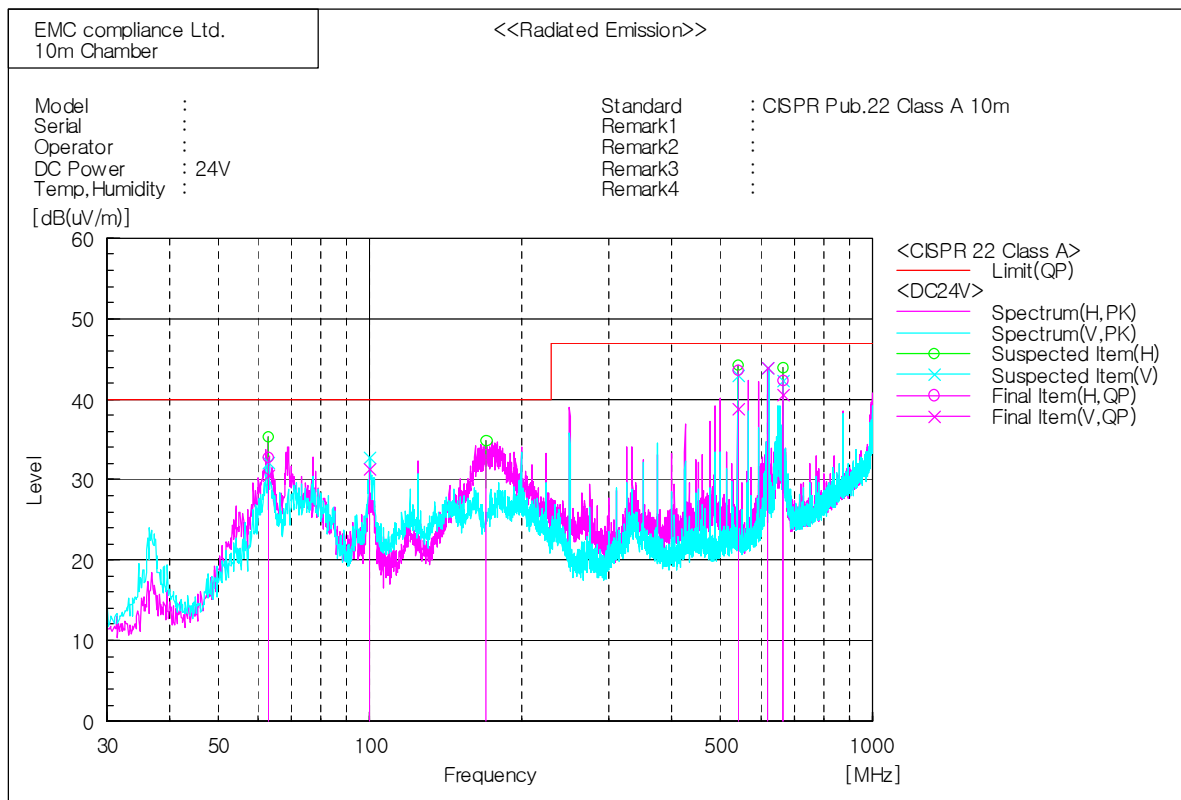
* 1 GHz ~ 5 GHz (DC 12V_SRM-872)



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	60.0	80.0	23.4	29.7	100.0	357.4
2	1550.000	V	44.2	60.0	-1.3	42.9	58.7	60.0	80.0	17.1	21.3	100.0	44.3
3	1663.750	V	42.1	61.1	-0.7	41.4	60.4	60.0	80.0	18.6	19.6	100.0	152.3
4	1860.325	V	42.9	69.9	0.6	43.5	70.5	60.0	80.0	16.5	9.5	100.0	30.9
5	1996.875	V	42.7	64.9	1.3	44.0	66.2	60.0	80.0	16.0	13.8	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

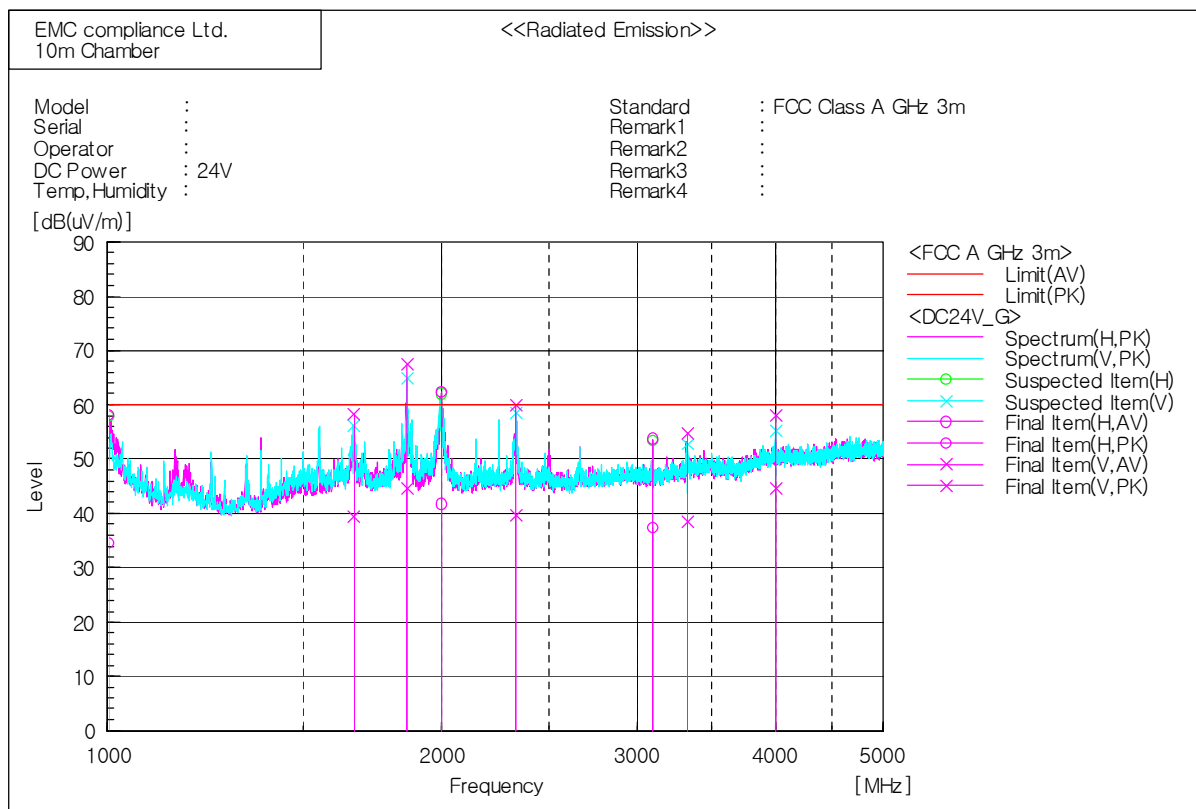
* 30 MHz ~ 1 GHz (DC 24V_SRM-872)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	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 GHz ~ 5 GHz (DC 24V_SRM-872)



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/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	60.0	80.0	25.4	21.9	100.0	329.7
2	1665.763	V	40.2	59.0	-0.7	39.5	58.3	60.0	80.0	20.5	21.7	100.0	181.9
3	1860.108	V	44.1	66.8	0.6	44.7	67.4	60.0	80.0	15.3	12.6	100.0	346.9
4	1999.375	H	40.5	61.1	1.3	41.8	62.4	60.0	80.0	18.2	17.6	100.0	89.1
5	2331.063	V	37.2	57.4	2.5	39.7	59.9	60.0	80.0	20.3	20.1	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

7. E.U.T. photographs

Whole



*** Main**

Front View



Rear View



Left View



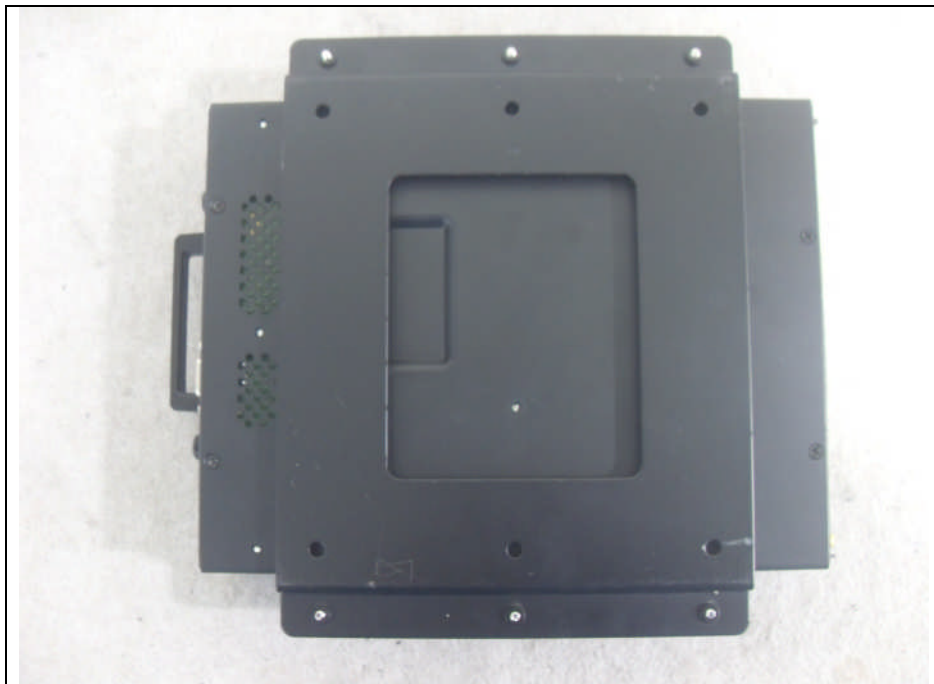
Right View



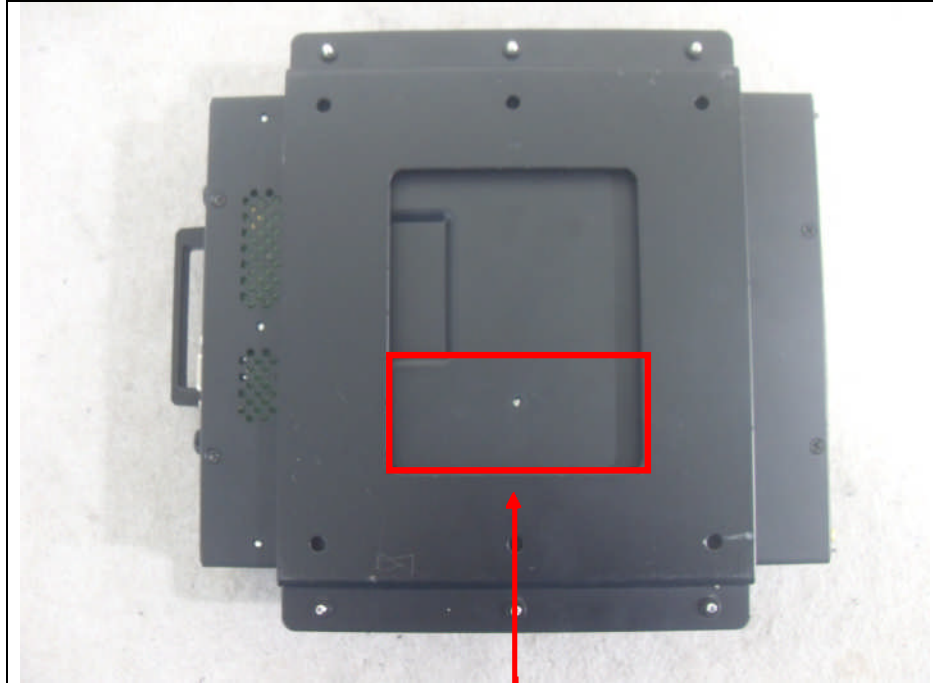
Top View



Bottom View



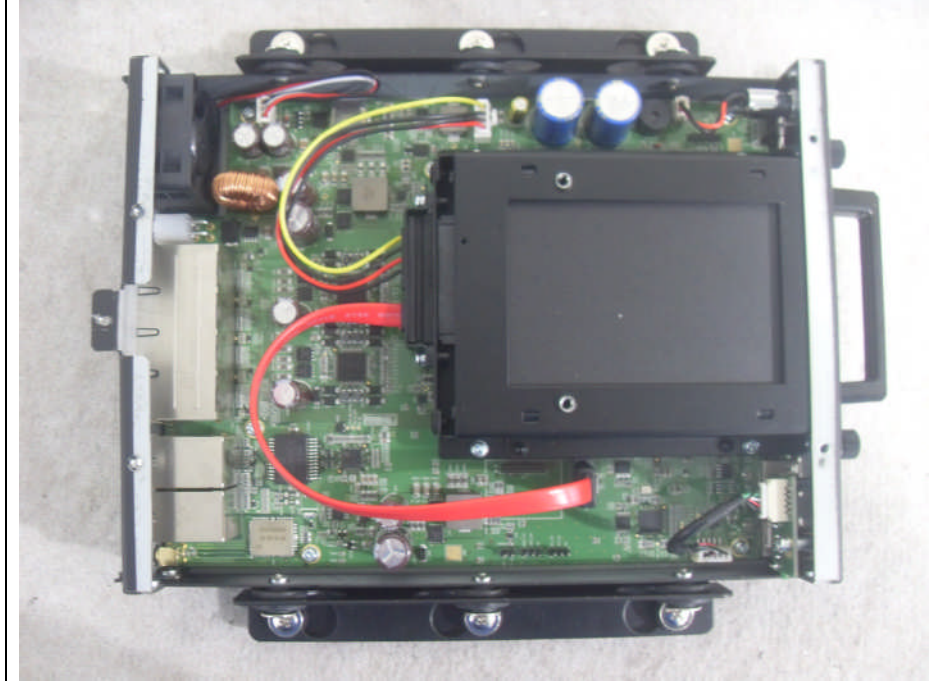
Label



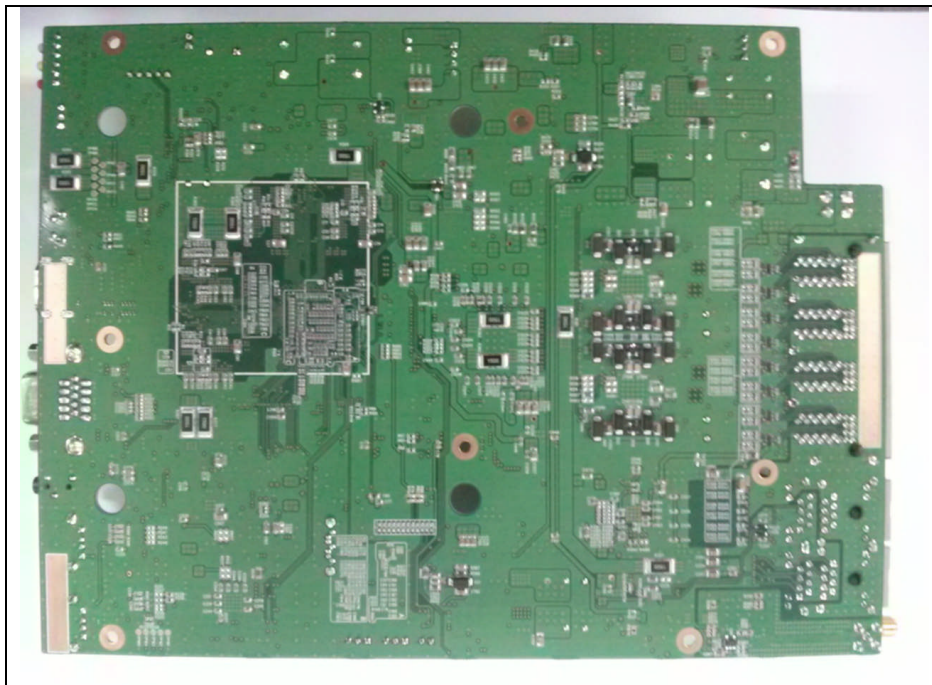
FCC Label Location

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Inside



Main Board

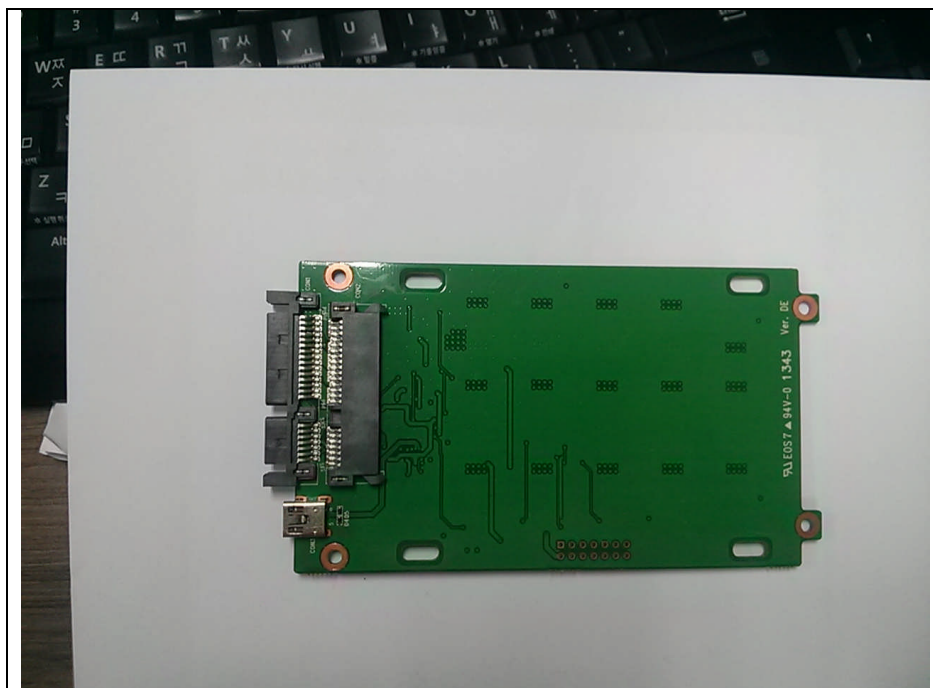
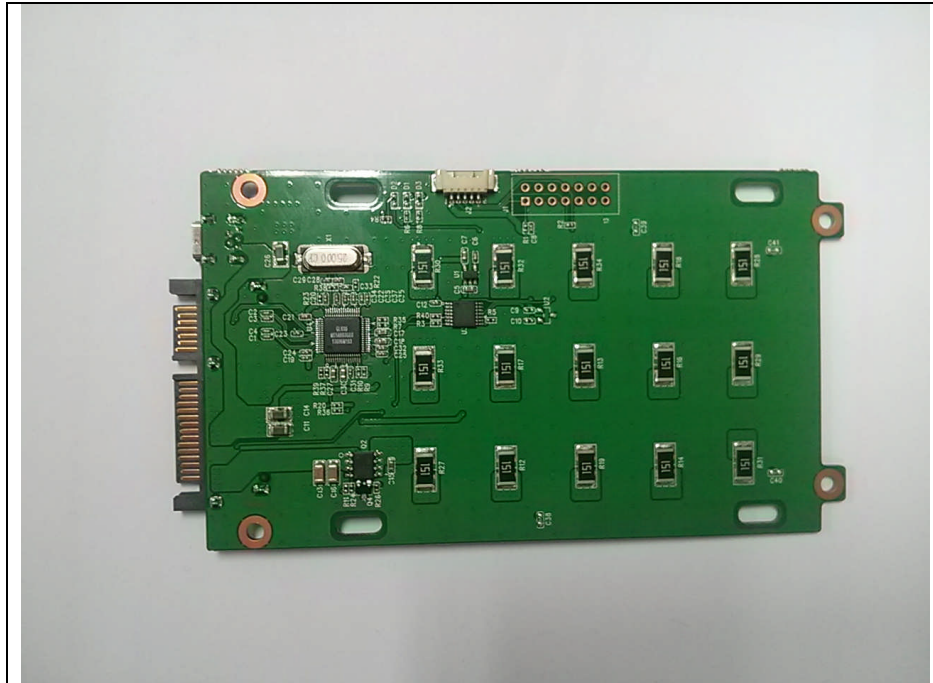


HDD(1TB)

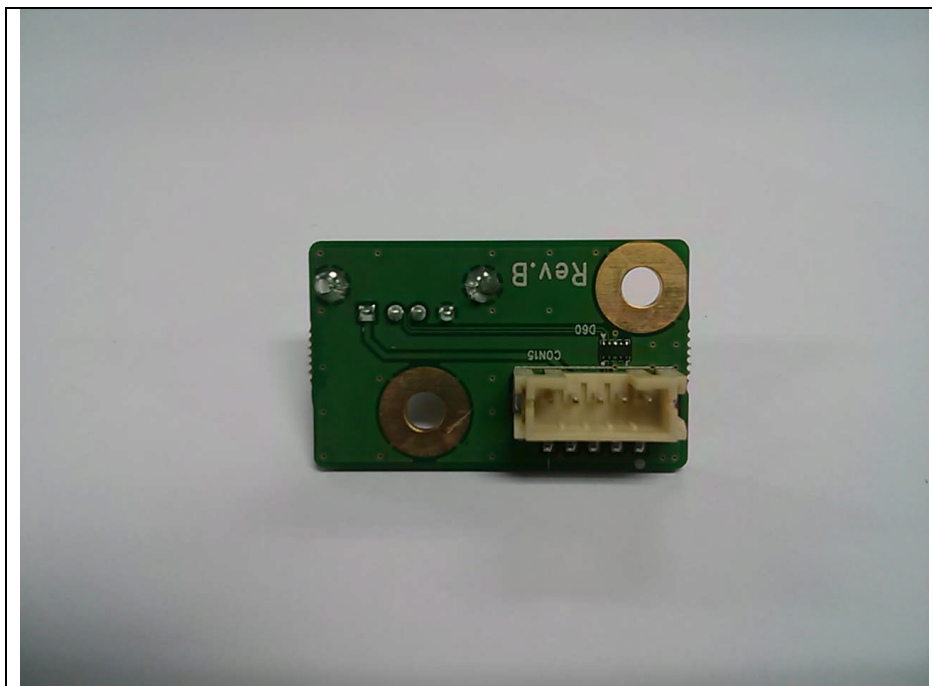
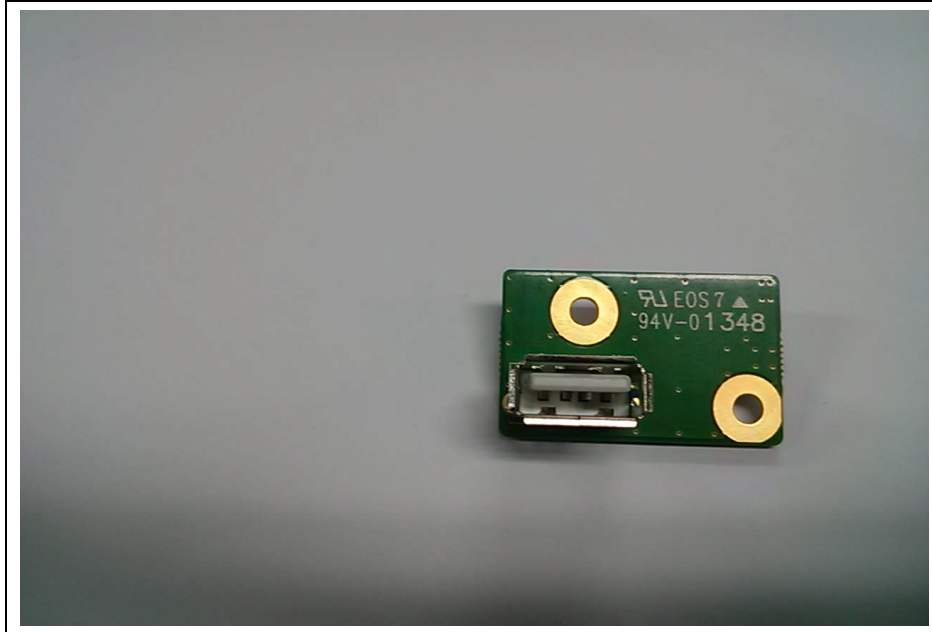




HDD Rack Board



Front USB Board



*** Control Box**

Front View



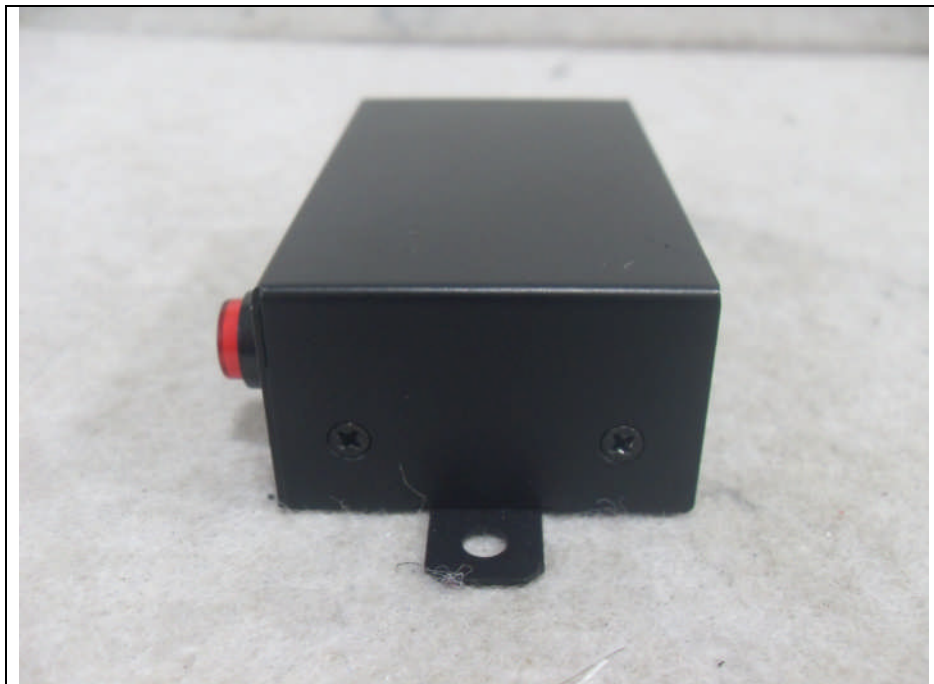
Rear View



Left View



Right View



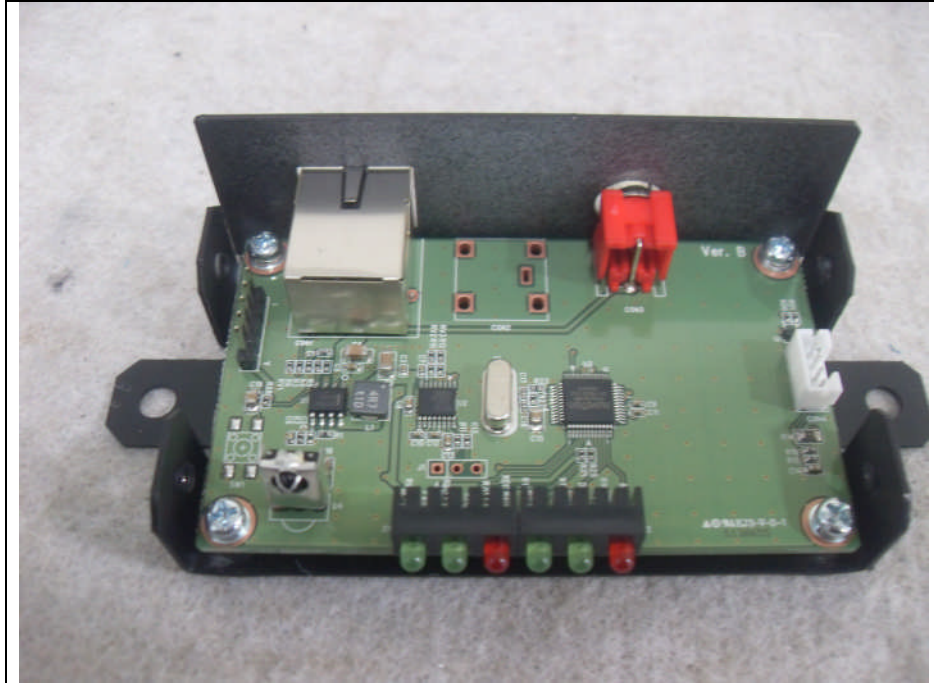
Top View



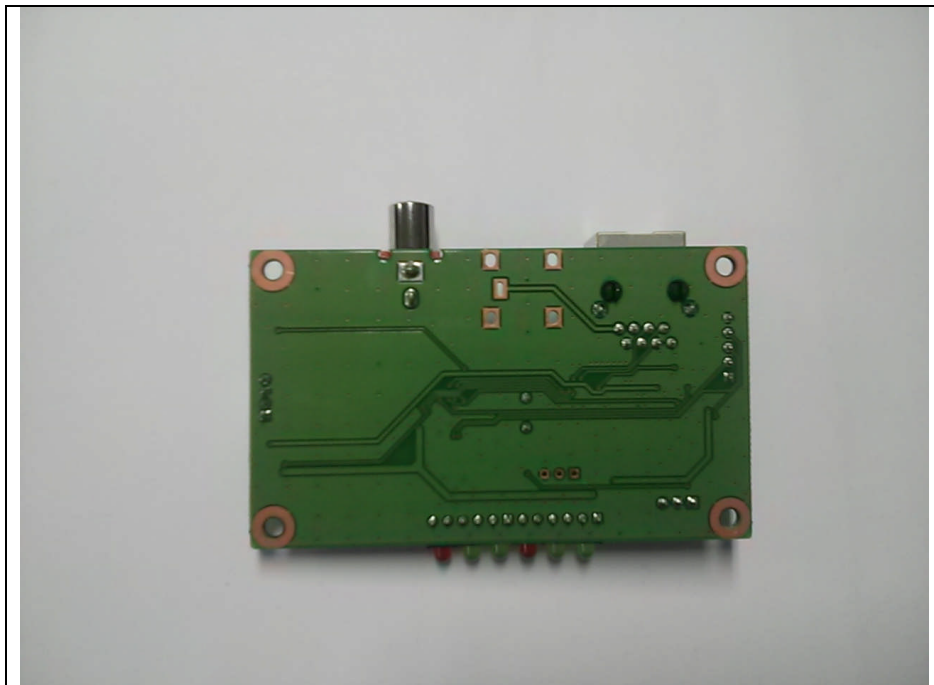
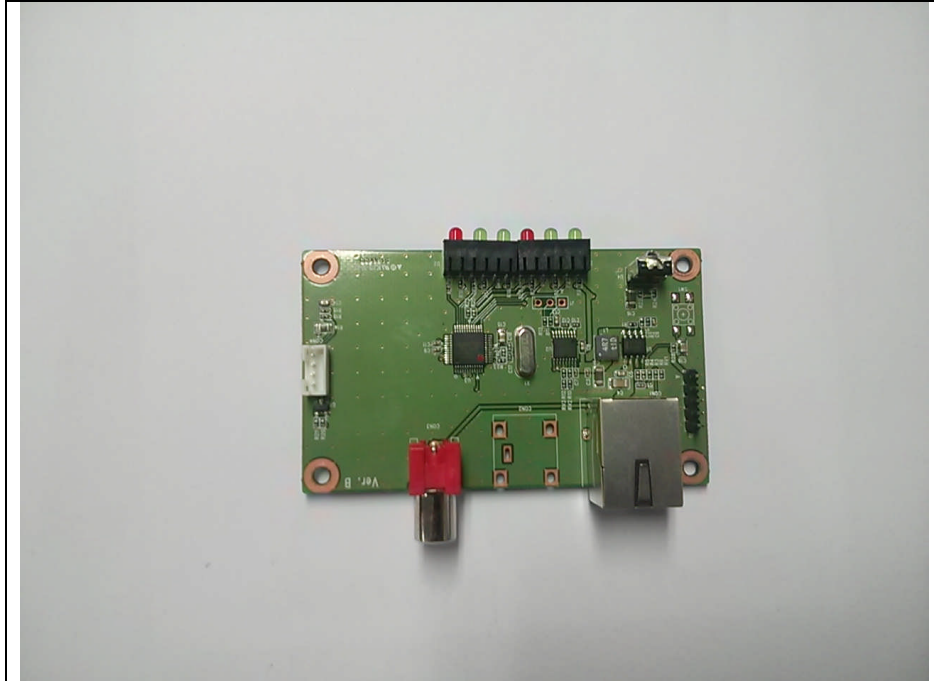
Bottom View



Inside



Main Board



*** Sensor Box**

Front View



Rear View



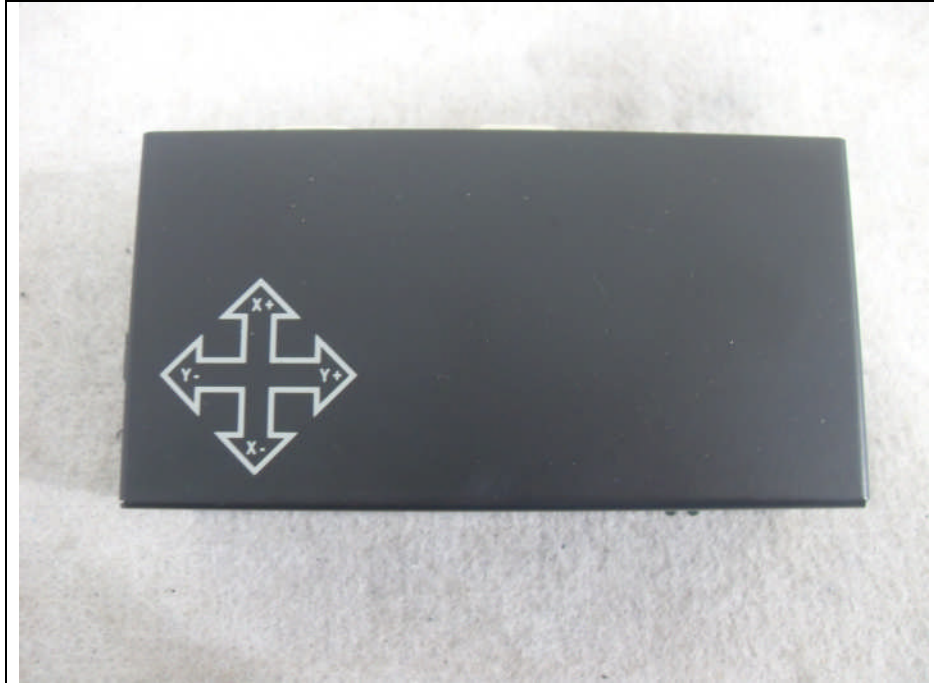
Left View



Right View



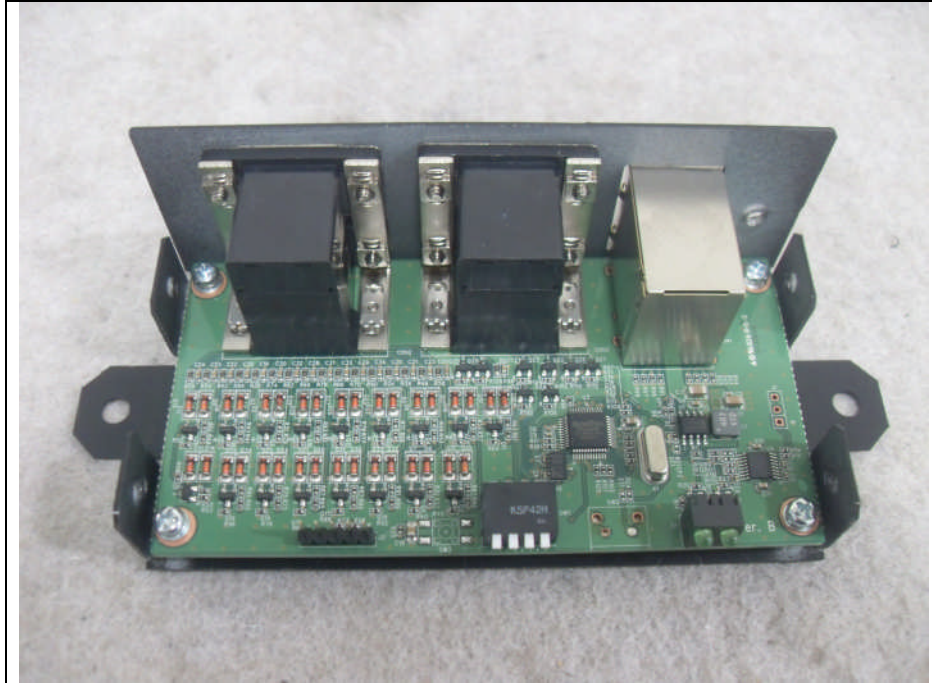
Top View



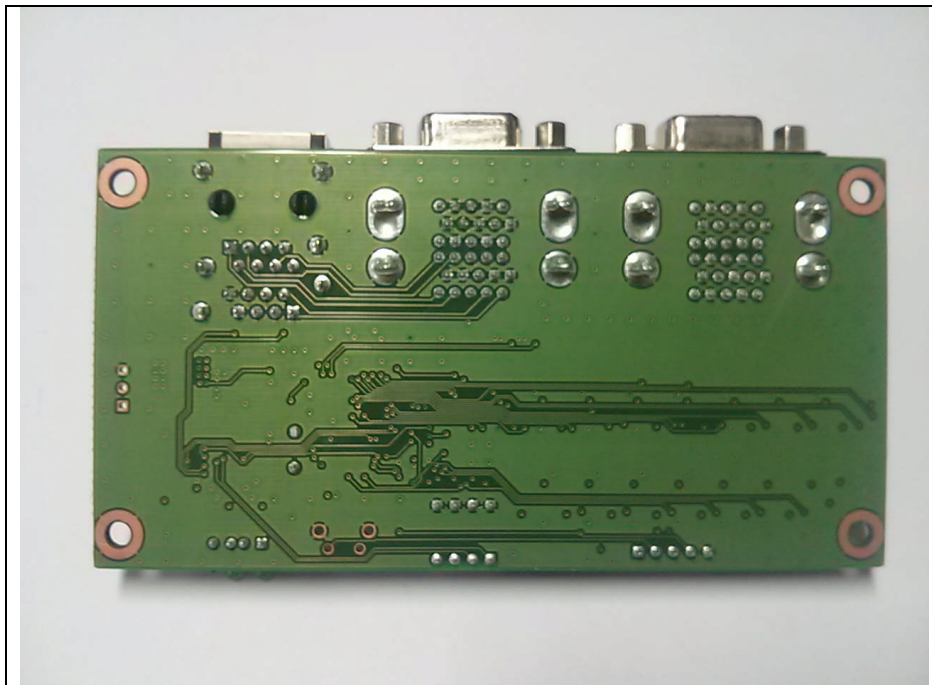
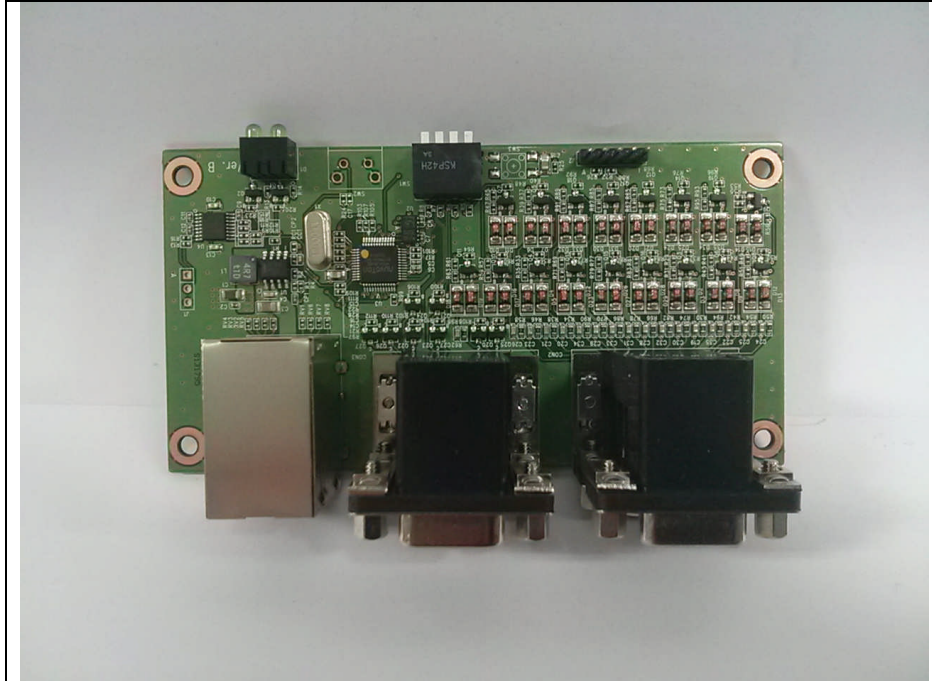
Bottom View



Inside



Main Board



GPS



Remote Control





