

CERTIFICATE of EMC Compliance

Type of equipment: Digital Video Recorder

Basic Model Name: KDMH-16S2C4N

**Variant Model Name: KDMH-16S2C2, KDMH-08S2C2
KDMH-04S2H1, KDMH-16U2C4N
KDMH-08U2H2, KDMH-04U2D1
KDMH-08S1C2, KDMH-04S1H1**

Report No: EMC-FCC-0723

Applicant: K-pro Tech Co., Ltd

**Address: 2nd Floor, #202, Myung-ji e-Space II 218, An-yang 7 Dong,
Man-an Gu, An-yang City, Gyeong-gi Do, Korea**

Manufacturer: K-pro Tech Co., Ltd

**Address: 2nd Floor, #202, Myung-ji e-Space II 218, An-yang 7 Dong,
Man-an Gu, An-yang City, Gyeong-gi Do, Korea**

Date of Issue : August 04 , 2008

Test required : FCC part 15 subpart B, Class A

ANSI C63.4 – 2003

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.

RECEIVED

By CHOICECYCLE at 8:25 am, Mar 17, 2009

YOO, SUNG-YUNG / Manager

Test Laboratory

EMC compliance, LTD
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Kyunggi-do 449-825, Korea
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EMI TEST REPORT

Test report No. : EMC-FCC-0723
Type of Equipment : Digital Video Recorder
Model Name: KDMH-16S2C4N
Variant Model: KDMH-16S2C2, KDMH-08S2C2, KDMH-04S2H1
KDMH-16U2C4N, KDMH-08U2H2,
KDMH-04U2D1, KDMH-08S1C2, KDMH-04S1H1
Applicant/ Manufacturer: K-pro Tech Co., Ltd
2nd Floor,#202,Myung-ji e-Space II
218,An-yang 7 Dong,Man-an Gu,
An-yang City,Gyeong-gi Do,Korea
Test standards : FCC part 15 subpart B, Class A

Test Procedure and Items

- AC Power Line Conducted Emissions Measurement: ANSI C63.4-2003
- Radiated Emissions Measurement : ANSI C63.4-2003

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.

Receipt date: 2007. 02.19

Date of testing: 2008. 03.18 ~03.18

Issued date: 2008. 08.04

Tested by: _____

CHOI, SUNG-HOH

Approved by: _____

YOO, SUNG-YUNG

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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	7
4.3 Auxiliary equipments	8
4.4 Test configuration.....	8
4.5 Operating conditions	9
5. Summary of test results.....	10
5.1 Modification to the E.U.T.....	10
5.2 Summary of EMI emission test results	10
6. Test results	11
6.1 Conducted Emission	11
6.2 Radiated Emission	17
7. E.U.T. photographs	22

1. Applicant information

Applicant : K-pro Tech Co., Ltd
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2. Laboratory information

Address

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Telephone Number : 82 31 336 9919

Facsimile Number : 82 31 336 4767

CBTL Testing Laboratory

FCC Filing No.: 793334

FCC CAB.: KR0040

VCCI Registration No. : C-1713, R-2710, T-258

KOLAS NO.: 231

SITE MAP



EMC Compliance Ltd.

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TEL: 82 31 336 9919 FAX : 82 31 336 4767

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3. Test system configuration

3.1 Operation environment

	Temperature	Humidity	Pressure
OATS :	14 °C	32 %	-
Shielded room :	22 °C	43 %	-

Test site

These testing items were performed following locations;

Shielded Room : Conducted Emission
OATS (10m) : Radiated Emission (#4)

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 NIS 80, 81, the measurement uncertainty level with a 95% confidence level was applied.

Conducted emission measurement :(k=2, 95%)

9kHz-150 kHz : ± 3.48 [dB]

150kHz-30 MHz : ± 3.04 [dB]

Radiated Emission measurement :(k=2, 95%)

30-300 MHz ; 3 m: ±3.72 [dB], 10 m: ±3.71 [dB]

300-1000 MHz ; 3 m: ±3.82 [dB], 10 m: ±8.80 [dB]

4. Description of E.U.T.

4.1 General information

- KDMH-16S2C4N is a Digital Video Recorder.

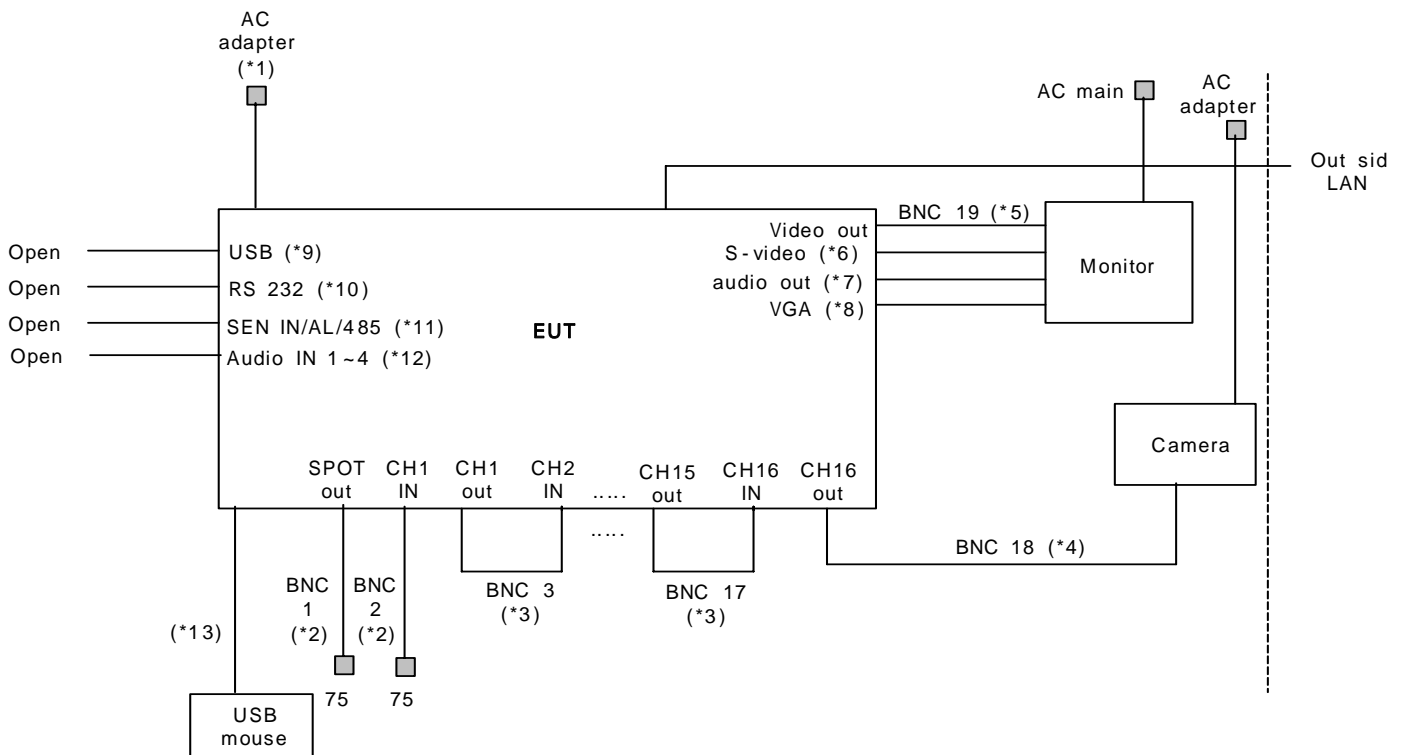
4.2 Product description

Type of product:	Digital Video Recorder
Model name (Basic):	KDMH-16S2C4N
Model name (Variant):	KDMH-16S2C2, KDMH-08S2C2, KDMH-04S2H1 KDMH-16U2C4N, KDMH-08U2H2, KDMH-04U2D1 KDMH-08S1C2, KDMH-04S1H1
Difference:	Channel
Serial no:	-
Trade name :	-
Testing Voltage:	120Vac, 60Hz
Product rating:	120Vac, 60Hz
Note :	-

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Camera	N/T	260X	-
Monitor	CX911MW	N732H11L900528X	SAMSUNG
USB mouse	M-UV69a	-	SAMSUNG

4.4 Test configuration



Type	Description	Connection (To)	Spec.	Length (m)	Note *
Power	AC adapter	AC main	Non-Shield	1.5	1
Signal	BNC cable 1~2	75 termination	Shield	3.0	2
	BNC cable 3~17	Loop	Shield	3.0	3
	BNC cable 18 (CH16 out)	Camera	Shield	3.0	4
	BNC cable 19 (video out)	Monitor	Shield	3.0	5
	S-video cable	Monitor	Shield	1.5	6
	Audio cable	Monitor	Shield	1.5	7
	VGA cable	Monitor	Shield	1.5	8
	USB cable	Open	Shield	1.2	9
	RS232 cable	Open	Shield	2.0	10
	SEN IN/AL/458 cable	Open	Shield	1.5	11
	Audio IN cable 1~4	Open	Shield	1.5	12
	USB mouse cable	USB mouse	Shield	1.5	13

4.5 Operating conditions

The EUT was configured as normal intended use.

This test was done at worst case.

Test mode	Normal operating
1	Ping test
2	For test, a camera was used for recording, displaying on the monitor.

5. Summary of test results

5.1 Modification to the E.U.T.

None

5.2 Summary of EMI emission test results

FCC Part 15 Subpart B (Class A)

ANSI C63.4 – 2003

Application	Test method	Test result
Conducted emission - AC main port	ANSI C63.4 – 2003	Complied
Radiated emission	ANSI C63.4 – 2003	Complied

6. Test results

6.1 Conducted Emission

Test specification	FCC Part 15, Section 15.107, Class A		
Test mode	Ping test For test a camera was used for recording, displaying on the monitor.		
Date:	2008.03.18		
Power supply	120V, 60Hz		
Test facility	Shielded room (CE#2)		
Temperature(°C)	22°C	Humidity (%)	43 %
Remarks	Complied limit margin is 17.50 dB at 14.81 MHz. (Average)		

6.1.1 Limits of conducted emission measurement

Frequency [MHz]	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66-56 *	56-46*
0.5 - 5	73	60	56	46
5 - 30	73	60	60	50

*The limit decreases linearly with the logarithm of frequency.

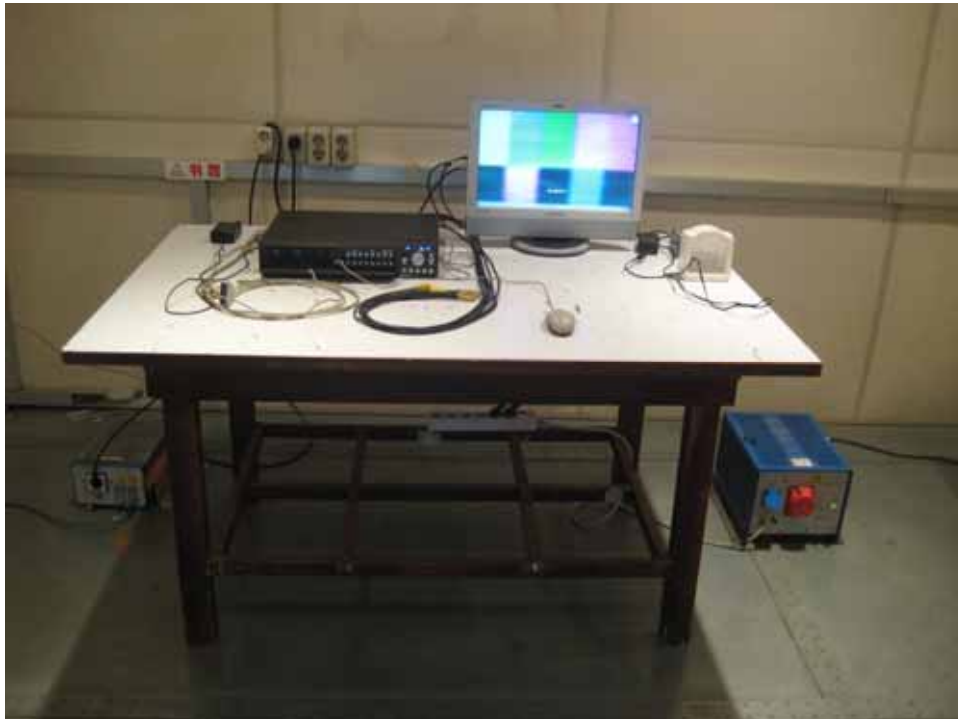
6.2.2 Measurement procedure

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 40 cm to the Horizontal metal ground 30 – 40 cm long. The power cord was bundles in the center. All peripheral equipment was powered from a sub LISN. The LISN and ISN were positioned 80 cm 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	844827/001	R&S	08.08.07	<input checked="" type="checkbox"/>
LISN	ESH3-Z5	846128/024	R&S	08.07.30	<input checked="" type="checkbox"/>
LISN	L3-32	0120J20305	PMM	-	<input checked="" type="checkbox"/>

6.1.4 Photographs of test setup





6.1.5 Conducted emission measurement result

Test mode : AC mains

Frequency [MHz]	Correction Factor		Line	Quasi-peak			Average		
	LISN	Cable		Limit	Reading	Result	Limit	Reading	Result
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.180	0.08	0.1	N	79.00	47.95	48.13	66.00	32.46	32.64
0.189	0.09	0.1	H		47.39	47.58		34.20	34.39
0.243	0.08	0.1	N		42.77	42.95		26.81	26.99
0.252	0.09	0.1	H		43.17	43.36		29.02	29.21
0.264	0.09	0.1	H		41.95	42.14		26.65	26.84
0.312	0.09	0.1	H		35.15	35.34		20.89	21.08
2.907	0.16	0.1	H	73.00	40.07	40.33	60.00	26.86	27.12
3.110	0.14	0.1	N		38.53	38.77		24.92	25.16
3.840	0.16	0.1	N		34.91	35.17		28.01	28.27
14.810	0.55	0.2	N		50.31	51.06		41.75	42.50
14.830	0.62	0.2	H		49.73	50.55		40.05	40.87
27.000	0.64	0.3	N		35.63	36.57		35.12	36.06

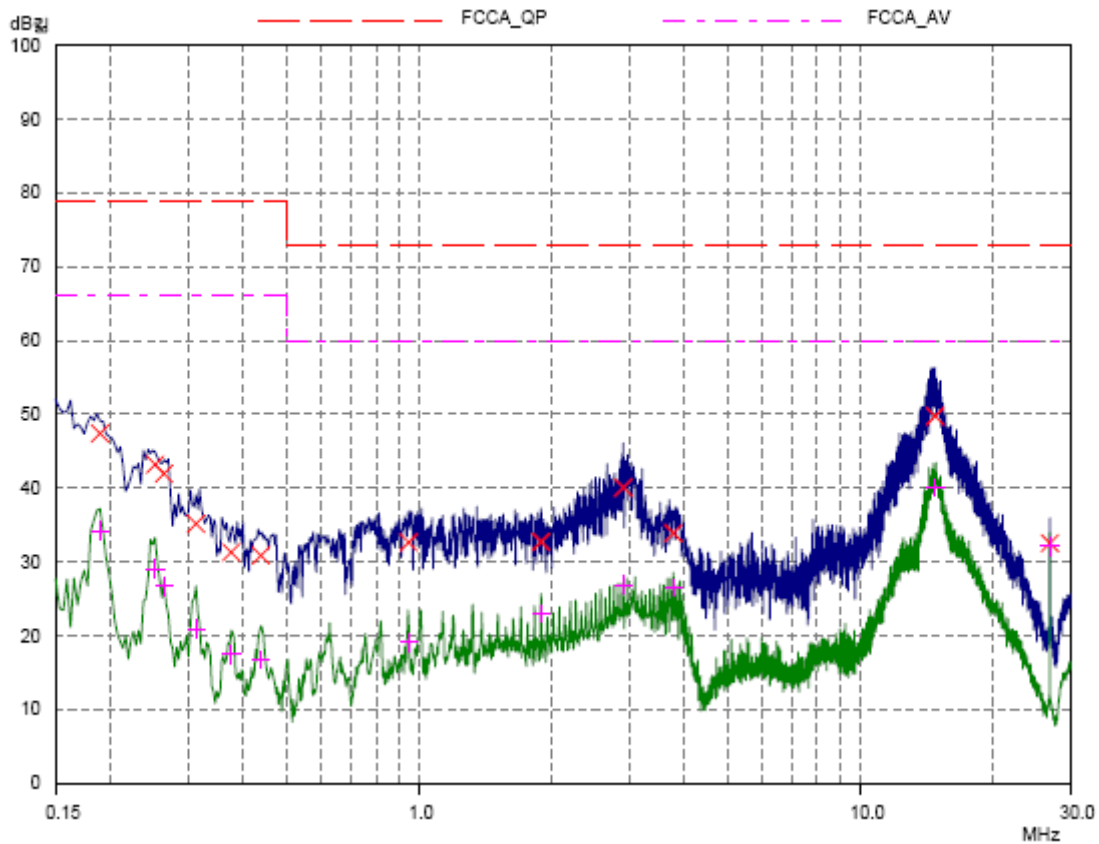
EUT:
 Manuf: K-PRO Tech
 Op Cond: H
 Operator:
 Test Spec: FCC Class A Conducted Emission
 Comment:

Result File: 0802057h.dat : 0802057_H

Scan Settings (2 Ranges)

Frequencies			Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
150kHz	3MHz	3kHz	10kHz	PK+AV	10msec	Auto	OFF	60dB	
3MHz	30MHz	10kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB	

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

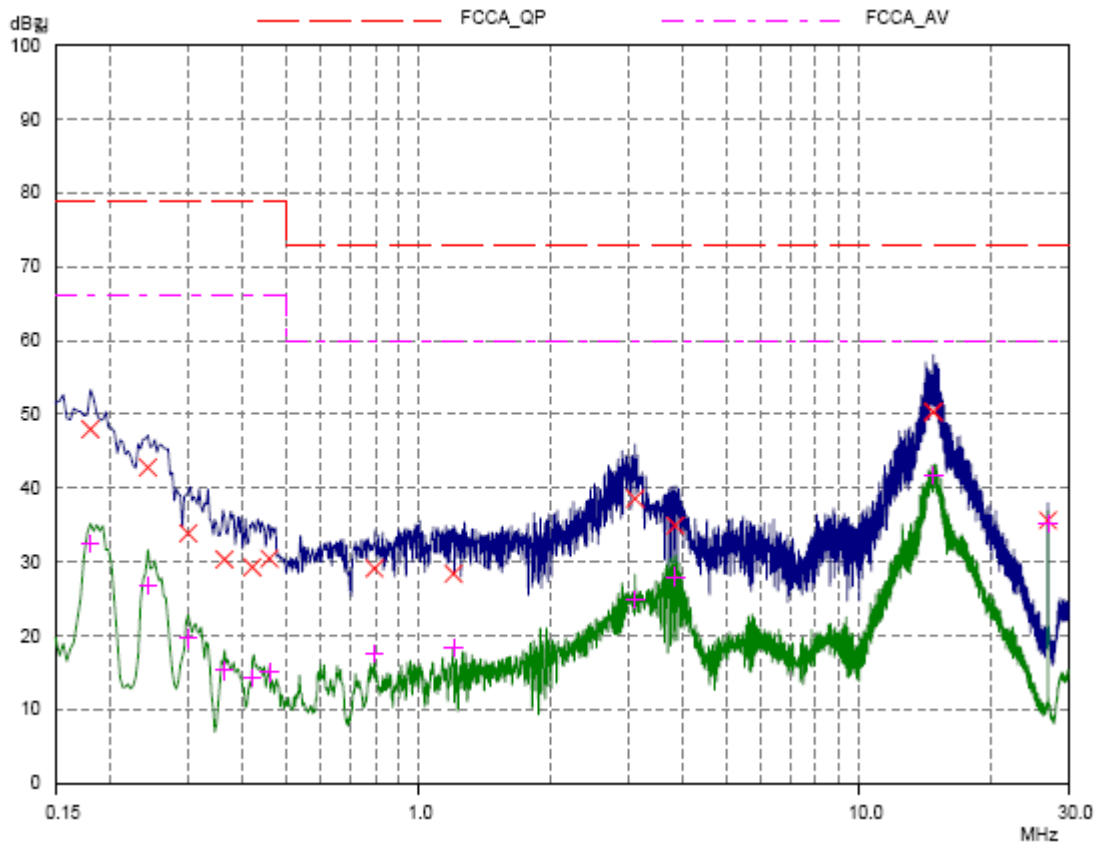


EUT:
 Manuf: K-
 Op Cond: N
 Operator:
 Test Spec: FCC Class A Conducted Emission
 Comment:

Result File: 0802057n.dat : 0802057_N

Scan Settings (2 Ranges)			Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
150kHz	3MHz	3kHz	10kHz	PK+AV	10msec	Auto	OFF	60dB	
3MHz	30MHz	10kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB	

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



6.2 Radiated Emission

Test specification	FCC Part 15, Section 15.109, Class B		
Test mode	Ping test For test a camera was used for recording, displaying on the monitor.		
Date	2008.03.18		
Power supply	120V, 60Hz		
Test facility	Semi-anechoic chamber #4, 10m OATS		
Temperature(°C)	14 °C	Humidity (%)	32 %
Remarks	Complied Minimum limit margin is 2.97 dB at 866.70 MHz.		

6.2.1 Limits of radiated emission measurement

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

[Note] Alternative standard : CISPR, Pub. 22

6.2.2 Measurement procedure

A pretest was performed at 3m distance in a semi-anechoic chamber for searching correct frequency. The final test was done at a 10m open area test site with a quasi-peak detector. EUT was placed on a non-metallic table height of 0.8m above the reference ground plane. Cables were folded back and forth forming a bundle 0.3m to 0.4m long and were hanged at a 0.4m height to the ground plane.

Cables connected to EUT were fixed to cause maximum emission. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.

The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

6.2.3 Used equipments

Equipment	Model no.	Serial no.	Makers	Next cal. date	Used
Test Receiver	ESCI	100001	R&S	08.11.16	<input checked="" type="checkbox"/>
TRILOG SUPER BROADBAND ANT	VULB9160	3228	Schwarzbeck	10.02.21	<input checked="" type="checkbox"/>
Antenna Mast	A109	N/A	DAEIL	-	<input checked="" type="checkbox"/>
Turn Table	TS25	N/A	DAEIL	-	<input checked="" type="checkbox"/>
3m OATS	-	-	EMC Compliance	-	<input checked="" type="checkbox"/>

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:

$$FS = MR + AF + CL + AT - AG$$

MR = Meter Reading

AF = Antenna Factor

CL = Cable Loss

AP = Antenna Pad

AG=Amplifier Gain

If MR is 30dB, AF 12dB, CL 5dB, AP 10dB, AG 35dB

The result (MR) is

$$30 + 12 + 5 + 10 - 35 = 22\text{dBuV/m}$$

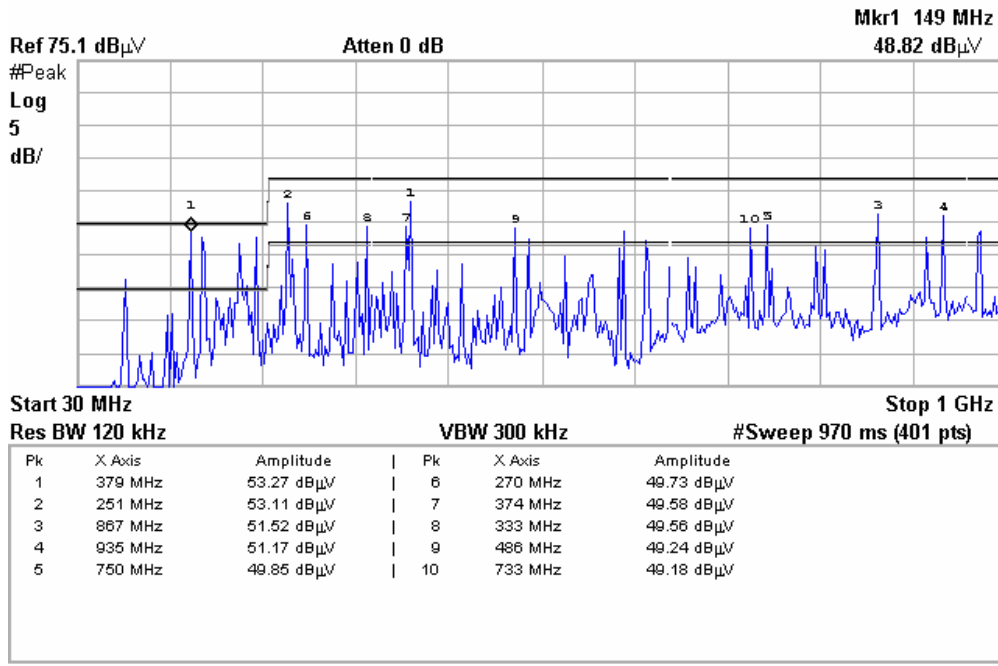
6.2.5 Photographs of test setup



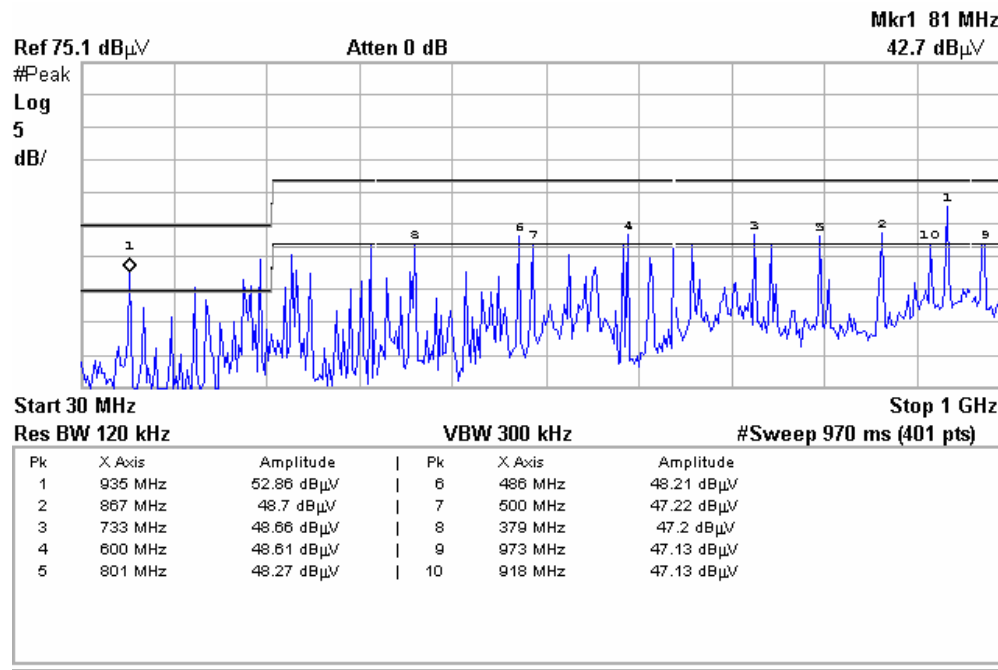
6.2.6 Radiated emission measurement result

***3m Semi-anechoic chamber Pre-scan Data (#4)**

-Horizontal



-Vertical



***10m OATS measurement data**

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	angle	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
					Antenna	Cable			
59.29	16.0	H	4.0	359	11.60	1.39	39.0	28.99	10.01
124.47	18.3	H	3.8	356	11.49	2.06	43.5	31.85	11.65
148.50	19.5	V	1.1	78	12.80	2.22	43.5	34.52	8.98
161.00	19.3	V	1.1	175	12.75	2.31	43.5	34.36	9.14
195.56	10.7	V	1.0	174	9.73	2.63	43.5	23.06	20.44
216.06	23.9	V	1.0	164	9.89	2.76	46.4	36.55	9.85
250.15	24.3	H	4.0	317	11.21	2.99	46.4	38.50	7.90
270.10	23.7	H	3.9	330	11.81	3.13	46.4	38.65	7.75
377.99	22.8	H	3.2	276	14.39	3.76	46.4	40.95	5.45
746.34	16.2	H	3.1	329	21.26	5.58	46.4	43.05	3.35
866.70	15.1	H	1.0	181	22.34	6.00	46.4	43.43	2.97
933.33	10.9	V	2.7	219	23.09	5.73	46.4	39.72	6.68

* Note : Reading = Test Receiver value,

7. E.U.T. photographs

Front View



Rear View



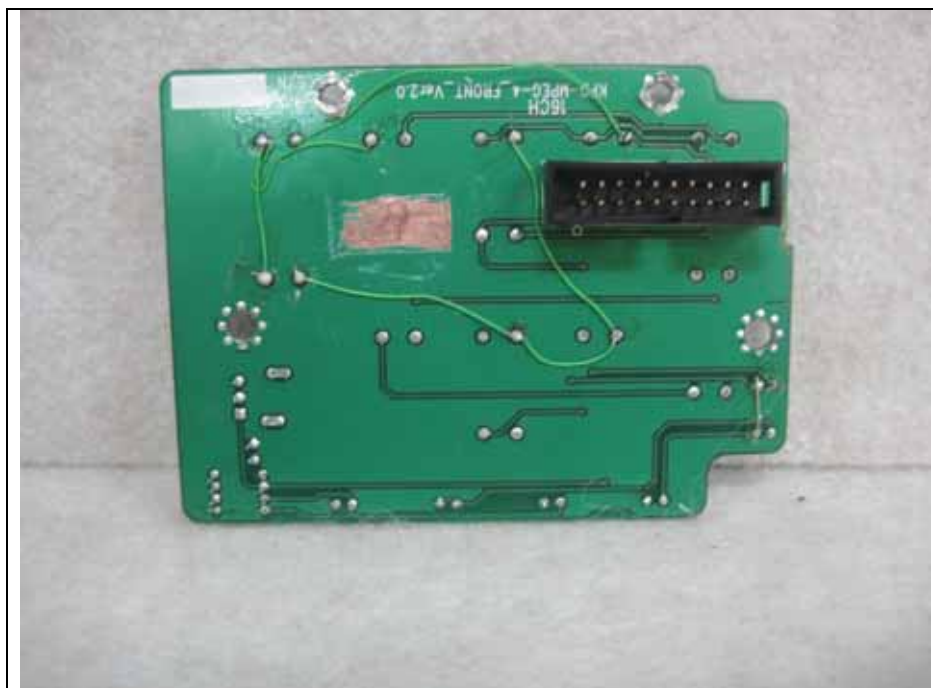
Inside



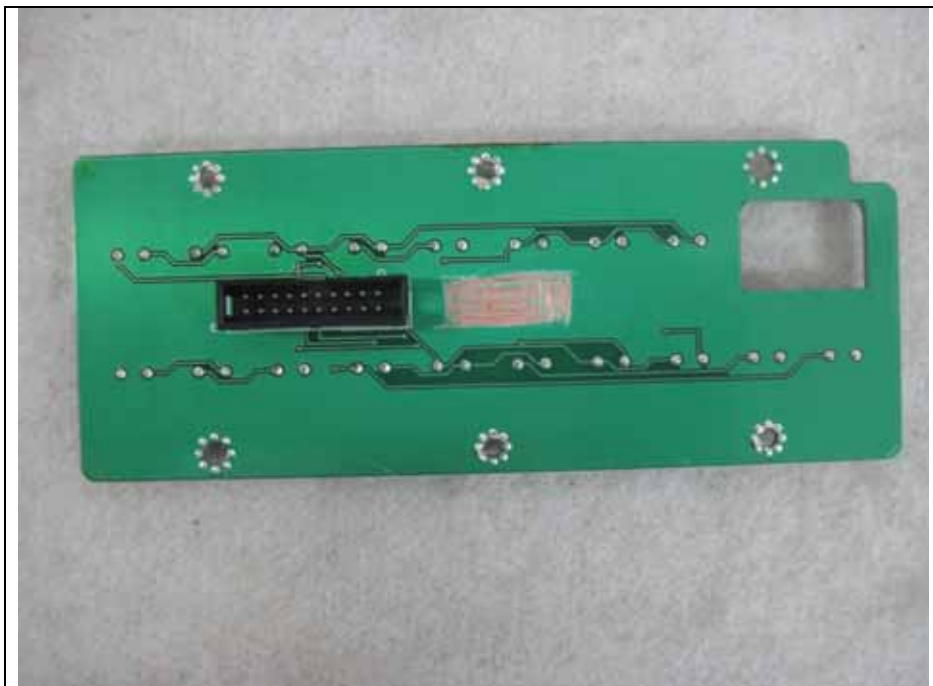
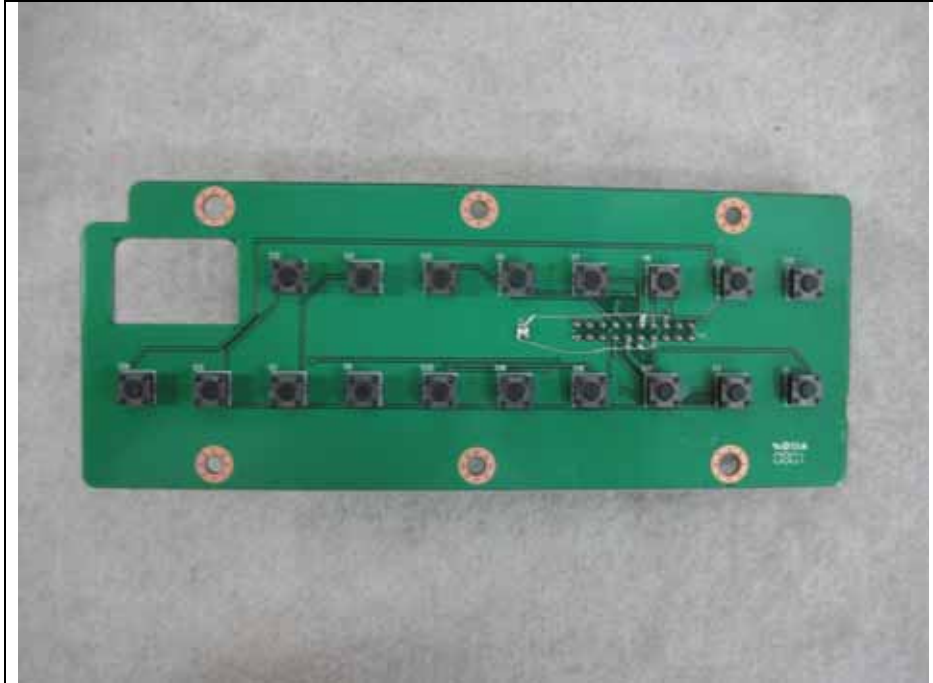
Main Board



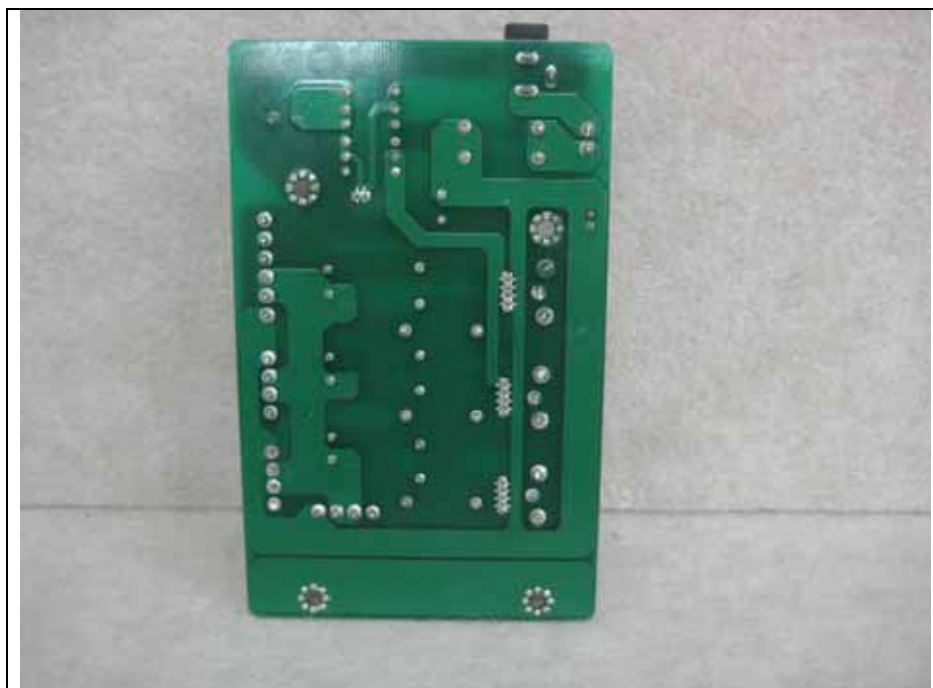
Button Board 1



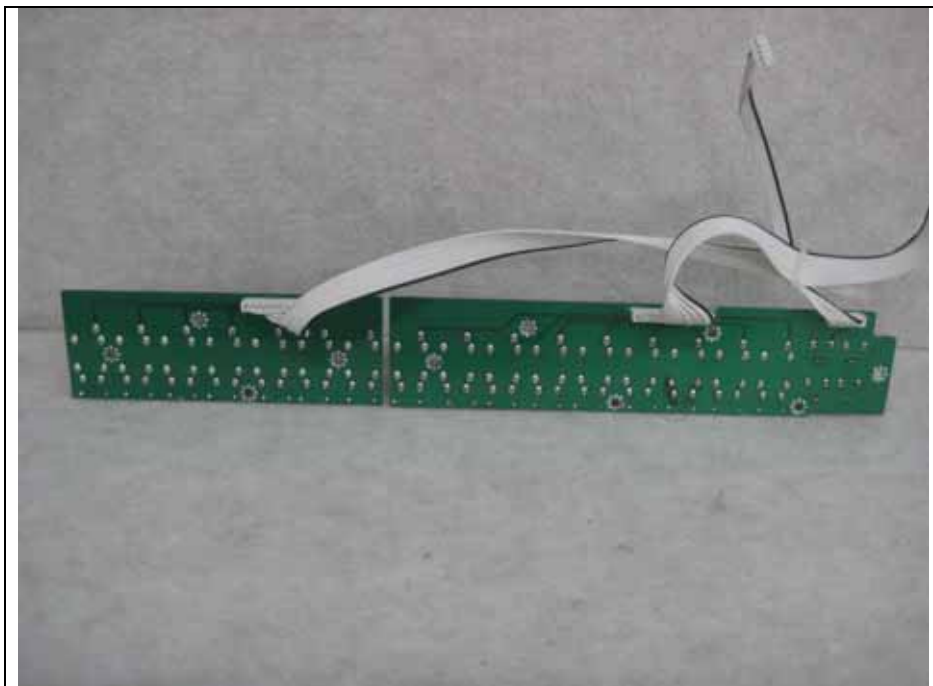
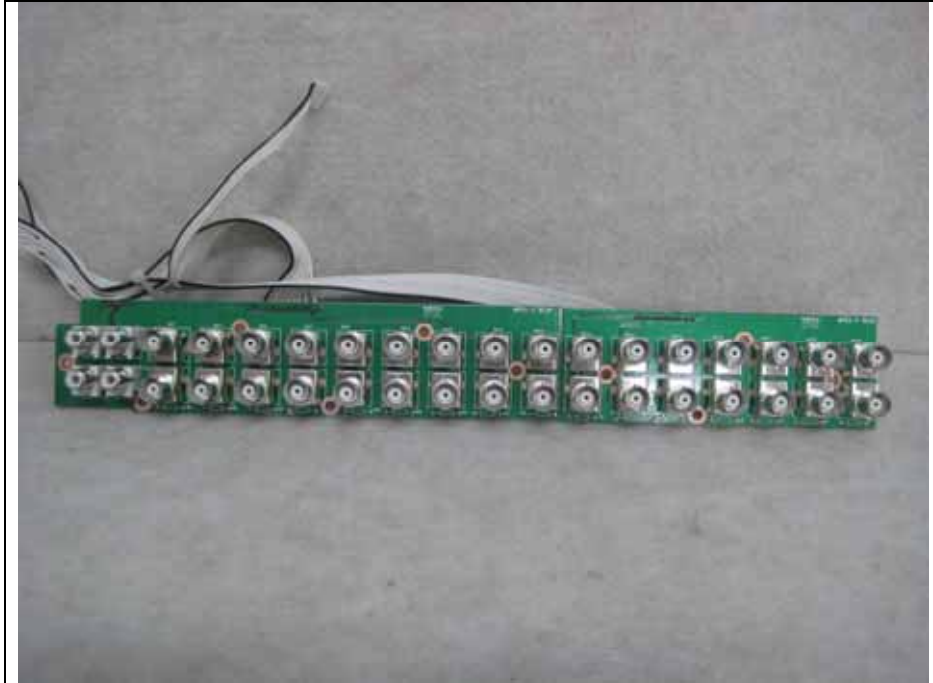
Button Board 2



Power Board



BNC Board



HDD



BNC cable



AV cable



RS232 cable



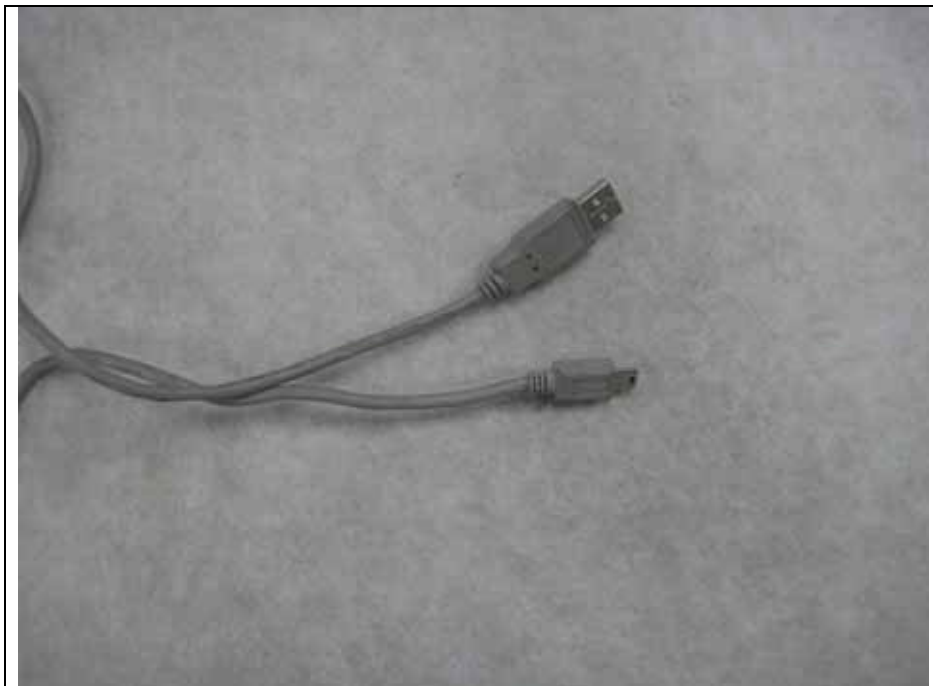
SEN IN/AL/485 cable



S-video cable



USB cable



VGA cable

