

FCC DECLARATION OF CONFORMITY

Certificate No : EMC-2012/054
Type of equipment : SATELLITE RECEIVER
Model Name : HR44-500

It's herewith confirmed to comply with the requirements of FCC Part 15 Rules. (Class B)

Operating 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

The equipment was tested by EMC compliance. Ltd. for compliance with the requirements Set forth in the FCC Rules and Regulation Part 15 and the measurement procedure according to ANSI C63.4. The test was carried out from the submitted samples.

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

The following importer/ manufacturer is responsible for this declaration

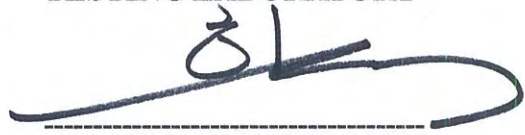
Applicant : HUMAX Co., Ltd
Address : 212-1, Yubang-dong, Cheoin-gu
 Yong-in-si, Gyeonggi-do, Korea
Manufacturer : HUMAX Co., Ltd
Address : 212-1, Yubang-dong, Cheoin-gu
 Yong-in-si, Gyeonggi-do, Korea

MANUFACTURER/IMPORTER

(Name)

(Date)

TESTING LABORATORY



(Name) Han-Seok, Yeom

(Date) November 05, 2012

FCC COMPLIANCE REPORT

Test report No : EMC-2012/054
Type of Equipment : SATELLITE RECEIVER
Model Name : HR44-500
Applicant : HUMAX Co., Ltd
212-1, Yubang-dong, Cheoin-gu
Yong-in-si, Gyeonggi-do, Korea
Manufacturer : HUMAX Co., Ltd
212-1, Yubang-dong, Cheoin-gu
Yong-in-si, Gyeonggi-do, Korea
Test standards : FCC part 15 subpart B, Class B
Classification : DoC
Test Procedure and Items
-AC Power Line Conducted Emissions Measurement: ANSI C63.4-2009
- Radiated Emissions Measurement : ANSI C63.4-2009
Testing Laboratory : EMC Compliance Ltd.
Test result : Complied

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

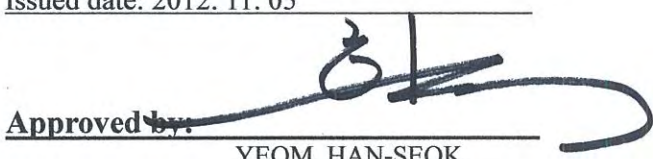
These results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations.

Date of receipt: 2012. 09. 11

Date of testing: 2012. 10. 10 ~ 10. 11

Issued date: 2012. 11. 05

Tested by: 
BEAK, JEONG-SOO

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	12
5. Summary of test results	13
5.1 Summary of EMI emission test results.....	13
6. Test results	14
6.1 Conducted Emission.....	14
6.2 Radiated Emission	30
7. E.U.T. photographs	48

1. Applicant information

Applicant: HUMAX Co., Ltd
Address: 212-1, Yubang-dong, Cheoin-gu Yong-in-si,
Gyeonggi-do, Korea
Telephone : +82-31-776-6748
Fax: +82-31-776-6149
E-mail: nysung@humaxdigital.com
Contact name: **Seong Nak Yul**

Manufacturer: HUMAX Co., Ltd
Address: 212-1, Yubang-dong, Cheoin-gu Yong-in-si,
Gyeonggi-do, Korea
Telephone : +82-31-776-6748
Fax: +82-31-776-6149
E-mail: nysung@humaxdigital.com
Contact name: **Seong Nak Yul**

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

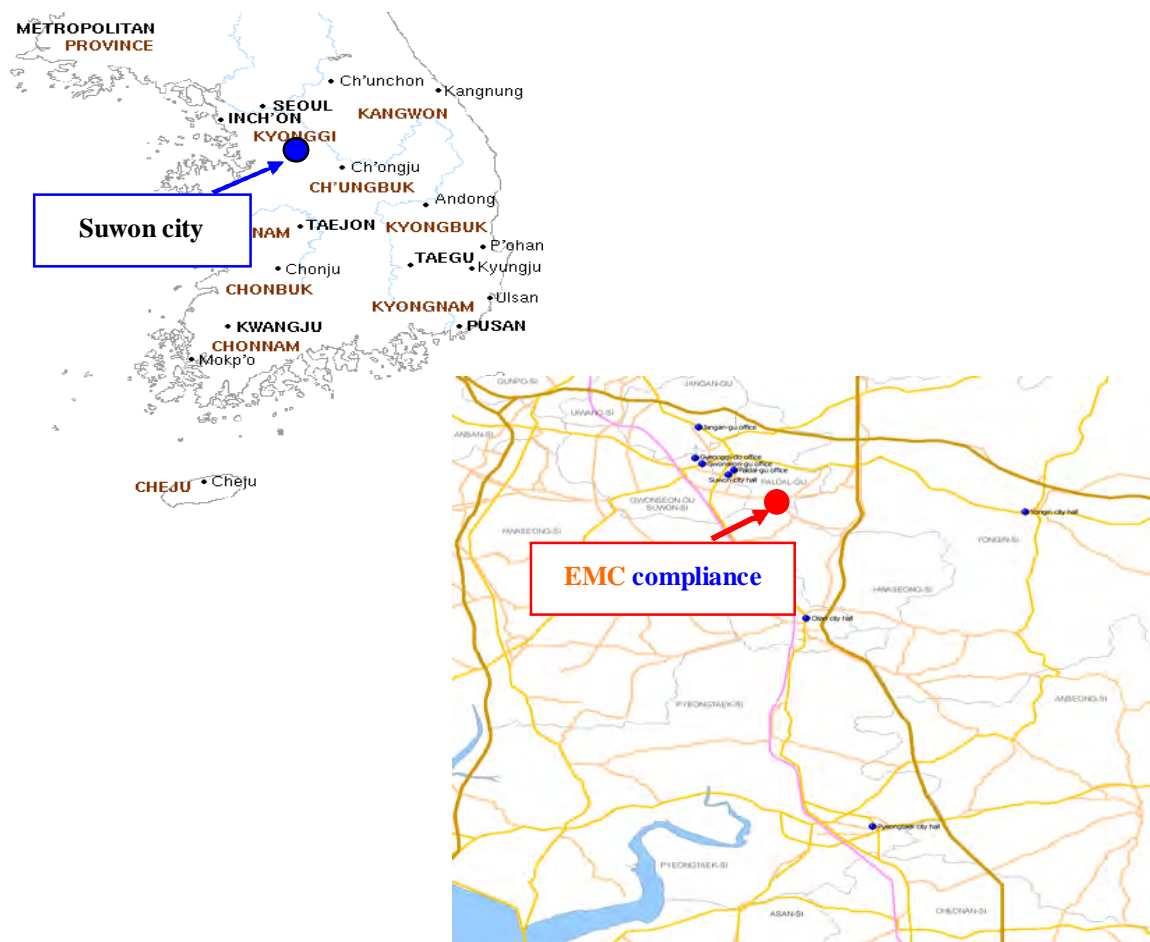
FCC CAB.: KR0040

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)	: 25 °C	48 % R.H.	-
Shielded room(CE)	: 24 °C	40 % 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

Items	Description	Remark
System		
CPU	BCM7346DRKFEB35G	
Sub-uCOM	None	
NOR Flash	S29GL01GS11DHSS60	128MB
NAND Flash	None	
DRAM	4 x H5TQ2G83DFR-RDC	DDR3 1GB, 1866MHz
EEPROM	AT24C512C-SSHD-T	64kB
HDD	ST1000VM002	1TB, SATA2
Real Time Clock	-	
Front End (Tuner / Demodulator)		
Input Connector	F-Type, IEC 169-24, Female, 1 x Input	
Frequency Range	950MHz to 2150MHz	
Signal level	-15dBm to -69dBm	
LNB Control	-	
22Khz Tone	-	
DiSEqC	-	
Demodulation	DVB-S2 - Compliant to EN302 307, DVB-S - Compliant to EN300 421	
Bandwidth	Up to 36Mhz	
Input, Symbol Rate	DVB-S2 : 3~42 MBaud(QPSK) , 3~30MBaud(8PSK) DVB-S : 1~45MBaud	
FEC mode	DVB-S: Auto, 1/2, 2/3, 3/4, 5/6, 7/8 DVB-S2: Auto, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10(QPSK) Auto, 3/5, 2/3, 3/4, 5/6, 8/9, 9/10(8PSK) 1/2,2/3, 6/7 (DirecTV Legacy mode)	
Video/Audio Processing		
Video Decoder	MPEG2 (HP@HL), H.264 (HP@L4.2) MPEG-2, AVC, 1080P and MVC decode	
Audio Decoder	MPEG-1 Part 3 (Layer II, AC-3) MPEG-4 Part 3 (HE-AAC), ATSC A/52A [3, 5, 12] (Dolby Digital), AAC+ (AAC-SBR)	
Picture Decoder	MPEG2 I-Frame, JPEG, JPEG2000, BMP, GIF, PNG	
Output Resolution	1080p/1080i/720p/480p/480i	
Graphics	32bpp with 256 alpha blending	
Audio Mode	Single/Dual Mono/ Stereo/ Joint Stereo	
Conditional Access Interface & DRM		
CAS	NDS	
DRM	-	
CI+	-	
HW Security	NDS	
I/O Specification		
Tuner	6 x AMC tuner (SWM)	
TV SCART	-	
VCR SCART	-	
eSATA	1 S-ATA external connector	
Modem	Modem Jack (RJ-11)	

RCA Out	1 x CVBS/L/R	
Component Out	1 x Y,Pb,Pr	
HDMI Out	1 x HDMI 1.4a with HDCP	
S/PDIF Out	Optical + Coaxial	
USB	2 x USB 2.0	1 of Front, 1 of Rear
Ethernet	1 x 10/100 Ethernet	-
Smart Card Slot	1 Slot, ISO7816 Compatible	1 x @Front
CI/CI+	-	-
Power Supply		
Power Type	Adaptor	12V, 4A
Power Consumption (Operation mode)	TBD	
Power Consumption (Standby mode)	TBD	
Input Voltage	TBD	
Power Cord	TBD	
Power Switch	No	
Protection	Separate Internal Fuse & Lightning protection	
Max Load for USB1	0.5A	
Max Load for USB2	0.5A	
Max Load for Active Antenna	TBD	
Max Load for LNB	TBD	
Physical Specification		
Size (W x H x D)	333 x 46 x 246 mm (W x H x D)	
Weight	TBD	
Others		
Accessories	1 x User Manual 1 x Adaptor 1 x Smart card	
Front Panel		
# of Buttons (=11)	11 Buttons (Power, Menu, Guide, Select, Record, Up, Down, Right, left, Resolution, Red Button reset)	
USB 2.0	1 x USB 2.0 Port	
RCU Sensor	1 Infrared RCU sensor	
CI/CI+	-	
RCA Out	1 x CVBS/L/R	
Component Out	1 x Y,Pb,Pr	
HDMI Out	1 x HDMI 1.4a with HDCP	
S/PDIF Out	Optical + Coaxial	

4.2 Product description

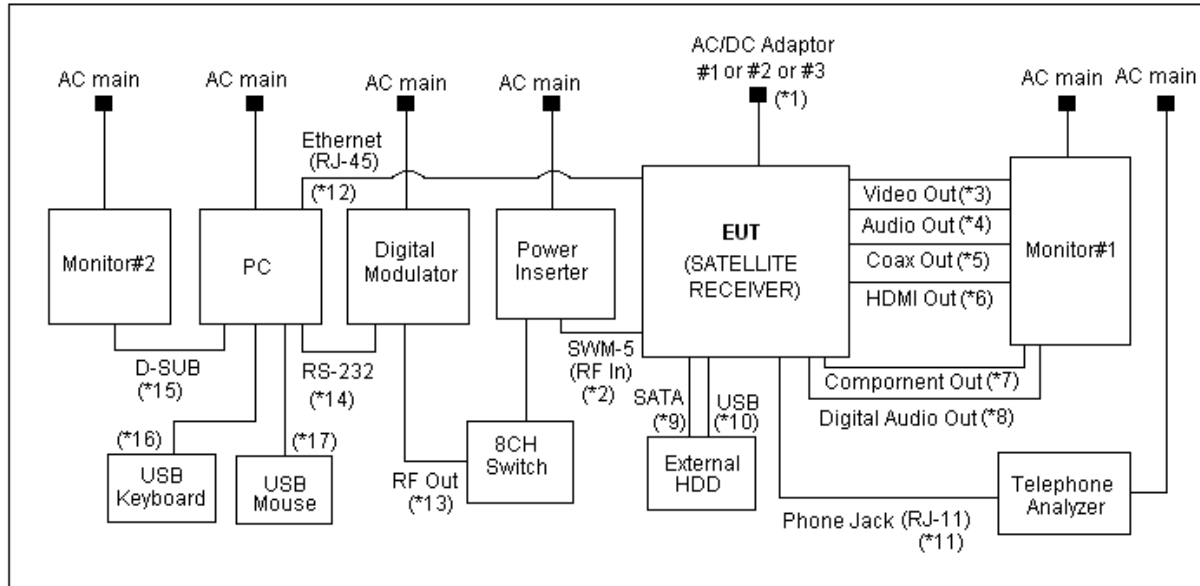
Type of product	SATELLITE RECEIVER
Model name (Basic)	HR44-500
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	Engineering Sample
Testing voltage	120 V, 60 Hz
Product rating	*Adaptor #1 (model name: EPS44R0-16) Input: 120 V, 60 Hz, 1.1 A Output: DC 12 V, 4.0 A *Adaptor #2 (model name: EPS44R0-15) Input: 120 V, 60 Hz, 1.3 A Output: DC 12 V, 4.0 A *Adaptor #2 (model name: EPS44R0-08) Input: 120 V, 60 Hz, 1.3 A Output: DC 12 V, 4.0 A
Note	AC/DC adaptors were provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Digital Modulator	DM240	-	RADYNE
8CH Switch	SWM8-Z	-	DIRECTTV
Power Inserter	P129R1-03	P129R1-03	DIRECTTV
PC	DHM	-	DELL
Monitor#1	19LU7000	903MMRY00014	LG
Monitor#2	GH17PS	N866HVBP819756K	SAMSUNG
USB Keyboard	SK-8115	-	DELL
USB Mouse	MOC5UO	-	DELL
Telephone Analyzer	DD-5601C1D	520105125	CREDIX
External HDD(320GB)	XD1	001NMYSHX1354	LG

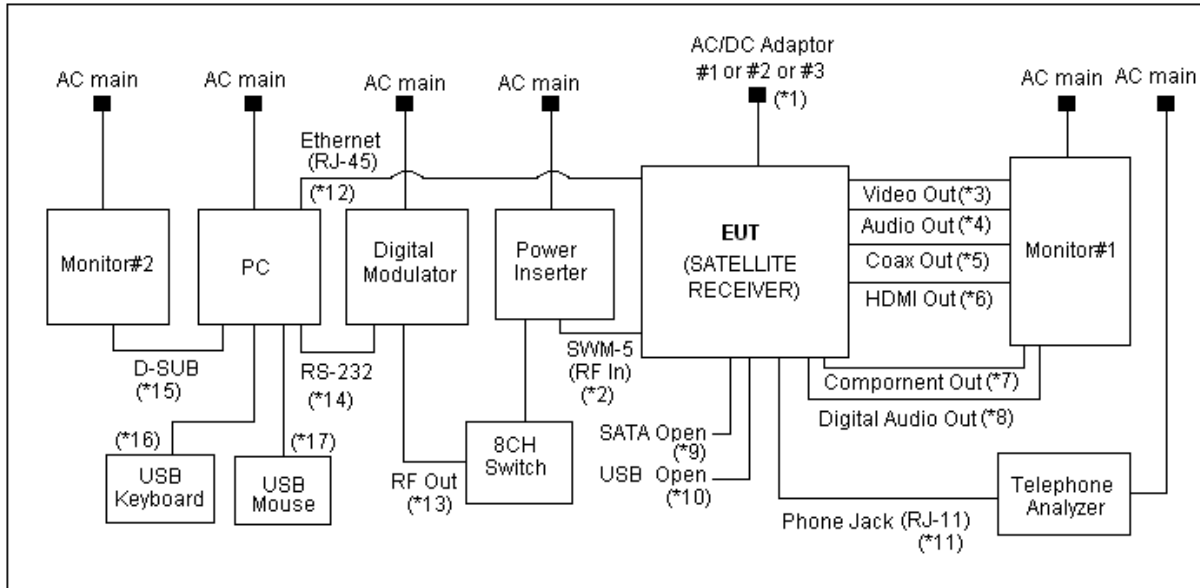
4.4 Test configuration

* Satellite Receiving mode (Adaptor#1,#2,#3_External HDD)



Note	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT (SATELLITE RECEIVER)	Power	AC/DC Adaptor (#1 or #2 or #3)	Power	2.5	Non-Shield
2		SWM-5 (RF In)	Power Inserter	RF Out	2.0	Shield
3		Video Out	Monitor#1	Video In	1.5	Shield
4		Audio Out	Monitor#1	Audio In	1.5	Shield
5		Coax Out	Monitor#1	Coax In	1.5	Shield
6		HDMI Out	Monitor#1	HDMI In	1.5	Shield
7		Component Out	Monitor#1	Component In	1.5	Shield
8		Digital Audio Out	Monitor#1	Digital Audio In	1.0	Non-Shield
9		SATA	External HDD	SATA	1.0	Non-Shield
10		USB	External HDD	USB	1.0	Shield
11		Phone Jack (RJ-11)	Telephone Analyzer	RJ-11	2.0	Non-Shield
12		Ethernet(RJ-45)	PC	RJ-45	2.0	Non-Shield
13		Digital Modulator	RF Out	8CH Switch	RF In	1.0
14	RS-232	PC	RS-232	1.0	Shield	
15	PC	D-SUB	Monitor#2	D-SUB	1.8	Shield
16		USB	USB Keyboard	USB	2.0	Shield
17		USB	USB Mouse	USB	1.5	Shield

* Satellite Receiving mode (Adaptor#1,#2,#3_Internal HDD)



Note	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT (SATELLITE RECEIVER)	Power	AC/DC Adaptor (#1 or #2 or #3)	Power	2.5	Non-Shield
2		SWM-5 (RF In)	Power Inserter	RF Out	2.0	Shield
3		Video Out	Monitor#1	Video In	1.5	Shield
4		Audio Out	Monitor#1	Audio In	1.5	Shield
5		Coax Out	Monitor#1	Coax In	1.5	Shield
6		HDMI Out	Monitor#1	HDMI In	1.5	Shield
7		Component Out	Monitor#1	Component In	1.5	Shield
8		Digital Audio Out	Monitor#1	Digital Audio In	1.0	Non-Shield
9		SATA	Open	-	1.0	Non-Shield
10		USB	Open	-	1.0	Shield
11		Phone Jack (RJ-11)	Telephone Analyzer	RJ-11	2.0	Non-Shield
12	Ethernet(RJ-45)	PC	RJ-45	2.0	Non-Shield	
13	Digital Modulator	RF Out	8CH Switch	RF In	1.0	Shield
14	Digital Modulator	RS-232	PC	RS-232	1.0	Shield
15	PC	D-SUB	Monitor#2	D-SUB	1.8	Shield
16		USB	USB Keyboard	USB	2.0	Shield
17		USB	USB Mouse	USB	1.5	Shield

4.5 Operating conditions

The EUT was configured as normal intended use.

This test was done at worst case.

Test mode	Normal operation
1	Satellite Receiving mode. (Program: Direct TV test system.exe)
* Note Test#1: Satellite Receiving mode (Adaptor#1_External HDD) Test#2: Satellite Receiving mode (Adaptor#1_Internal HDD) Test#3: Satellite Receiving mode (Adaptor#2_External HDD) Test#4: Satellite Receiving mode (Adaptor#2_Internal HDD) Test#5: Satellite Receiving mode (Adaptor#3_External HDD) Test#6: Satellite Receiving mode (Adaptor#3_Internal HDD)	

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 B)

ANSI C63.4 – 2009

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

6. Test results

6.1 Conducted Emission

Test specification	FCC Part 15, Section 15.107(a), Class B		
Testing voltage	120 V, 60 Hz		
Test facility	Shielded room (CE#3)		
Date	2012. 10. 11		
Temperature (°C)	24 °C	Humidity (% R.H.)	40 % R.H.
Remarks	Complied		

6.1.1 Limits of conducted emission measurement

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

*The limit decreases linearly with the logarithm of frequency.

6.1.2 Measurement procedure

The measurements were performed in a shielded room. EUT was setup as shown in photograph and placed on a non-metallic table height of 0.8 m above the reference ground plane. The rear of table was located 0.4 m to the vertical conducted plane. EUT was power through the LISN, which was bonded to the ground plane. The LISN power was filtered. Each EUT power lead, except ground (safety) lead was individually connected through a LISN to input power source. EUT signal cables that hung closer than 0.4 m to the Horizontal metal ground 0.3 m ~ 0.4 m long. The power cord was bundles in the center. All peripheral equipment was powered from a sub LISN. The LISN and ISN were positioned 0.8 m from the EUT. Peak and Average detection were used in preliminary testing and Quasi-peak and Average detections were used at final measurement.

6.1.3 Used equipments

Equipment	Model	Serial No.	Makers	Next Cal. Date	Used
Test Receiver	ESHS10	843276/003	R&S	2013.06.15	<input checked="" type="checkbox"/>
LISN	ESH3-Z5	100267	R&S	2013.07.05	<input checked="" type="checkbox"/>
LISN	NNLK8121	8121-472	SCHWARZBECK	2013.07.13	<input checked="" type="checkbox"/>
PULSE LIMITER	ESH3-Z2	357881052	R&S	2013.07.03	<input checked="" type="checkbox"/>

6.1.4 Photographs of test setup

* AC Main (Test#1, #3, #5)



* AC Main (Test#2, #4, #6)

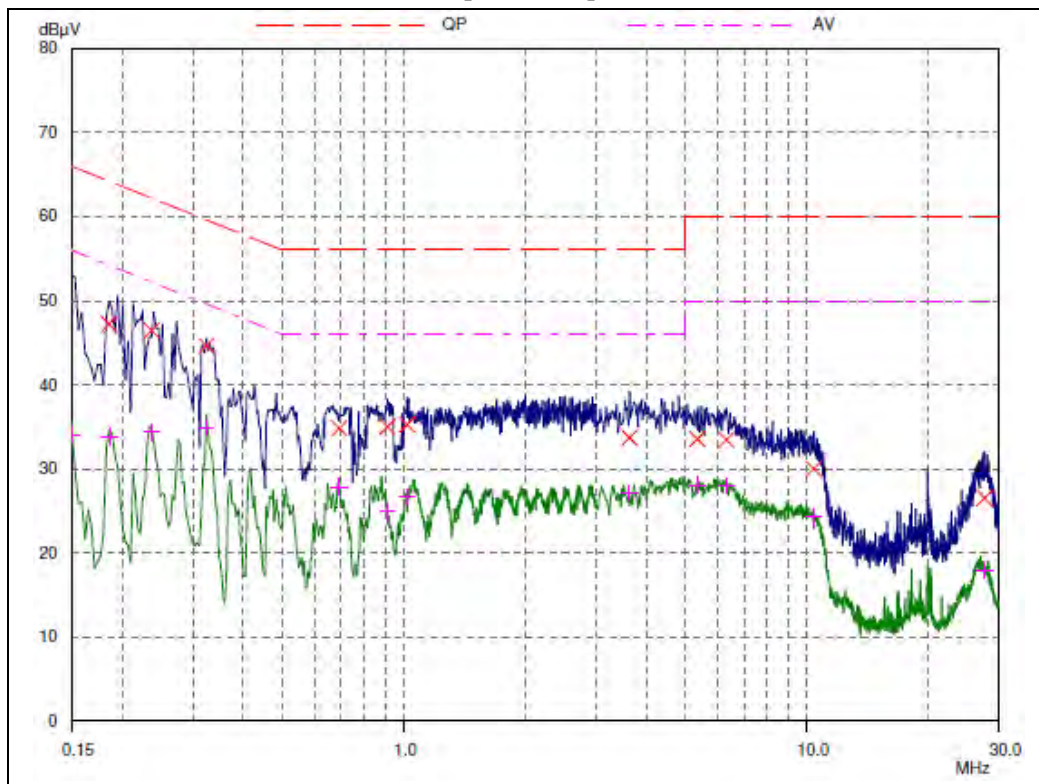


6.1.5 Conducted emission measurement result

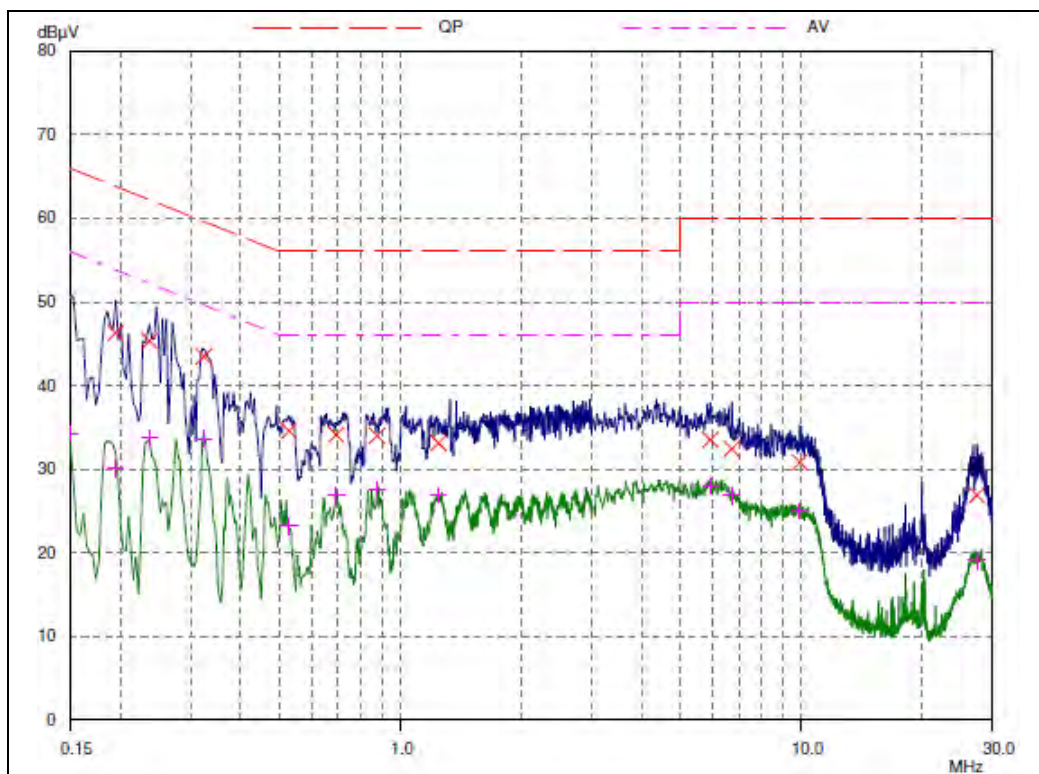
* AC Main (Test#1)

Frequency	Correction Factor		Line	Quasi-peak				Average			
	LISN	Cable		Limit	Reading	Result	Margin	Limit	Reading	Result	Margin
[MHz]				[dB(μ V)]	[dB(μ V)]	[dB(μ V)]	[dB]	[dB(μ V)]	[dB(μ V)]	[dB(μ V)]	[dB]
0.150	9.90	0.02	N	66.00	40.61	50.53	15.47	56.00	24.34	34.26	21.74
0.186	9.91	0.03	H	64.21	37.29	47.23	16.98	54.21	23.97	33.91	20.30
0.195	9.90	0.03	N	63.82	36.42	46.35	17.47	53.82	20.19	30.12	23.70
0.237	9.91	0.03	H	62.20	36.53	46.47	15.73	52.20	24.47	34.41	17.79
0.324	9.93	0.04	H	59.60	34.69	44.66	14.94	49.60	24.98	34.95	14.65
0.528	9.94	0.05	N	56.00	24.64	34.63	21.37	46.00	13.30	23.29	22.71
0.693	9.95	0.06	H		24.88	34.89	21.11		17.91	27.92	18.08
0.876	9.95	0.06	N		24.06	34.07	21.93		17.63	27.64	18.36
0.912	9.96	0.06	H		25.07	35.09	20.91		14.97	24.99	21.01
1.020	9.96	0.06	H		25.30	35.32	20.68		16.72	26.74	19.26
3.640	9.98	0.08	H		23.72	33.78	22.22		17.19	27.25	18.75
5.360	9.99	0.08	H	60.00	23.57	33.64	26.36	50.00	18.05	28.12	21.88
5.940	10.04	0.09	N		23.48	33.61	26.39		17.96	28.09	21.91
6.320	10.05	0.09	H		23.43	33.57	26.43		17.95	28.09	21.91
6.720	10.08	0.10	N		22.33	32.51	27.49		16.76	26.94	23.06
9.940	10.21	0.10	N		20.62	30.93	29.07		14.75	25.06	24.94
10.420	10.27	0.10	H		19.75	30.12	29.88		13.97	24.34	25.66

[Hot-Line]



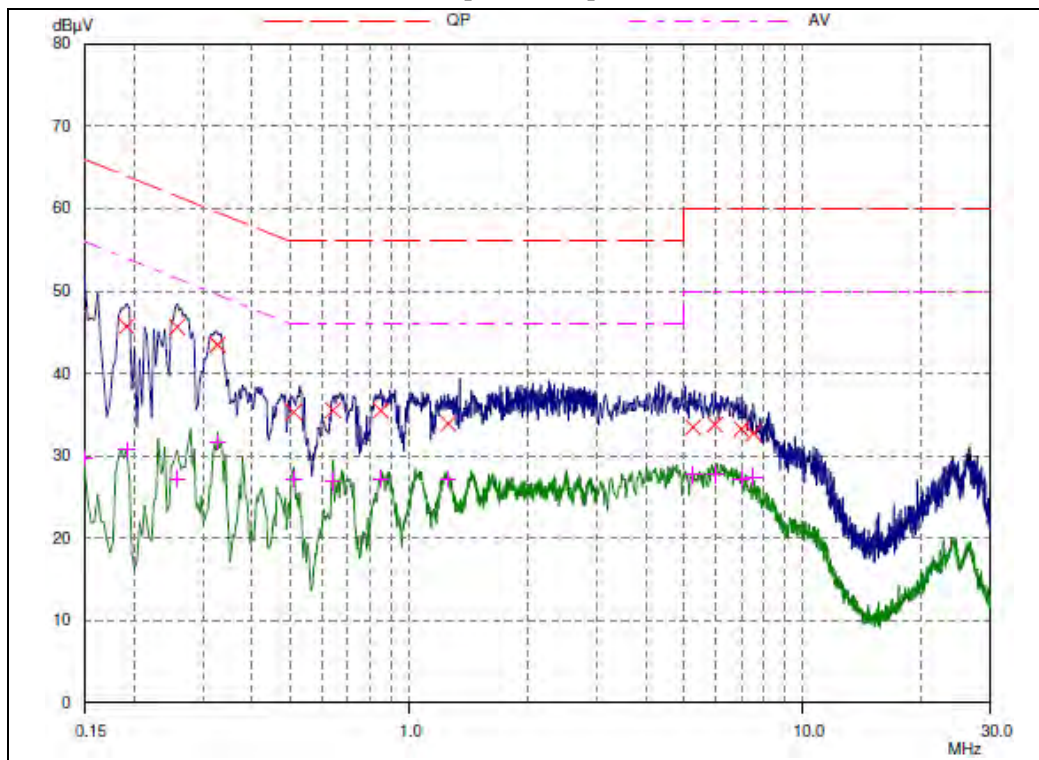
[Neutral-Line]



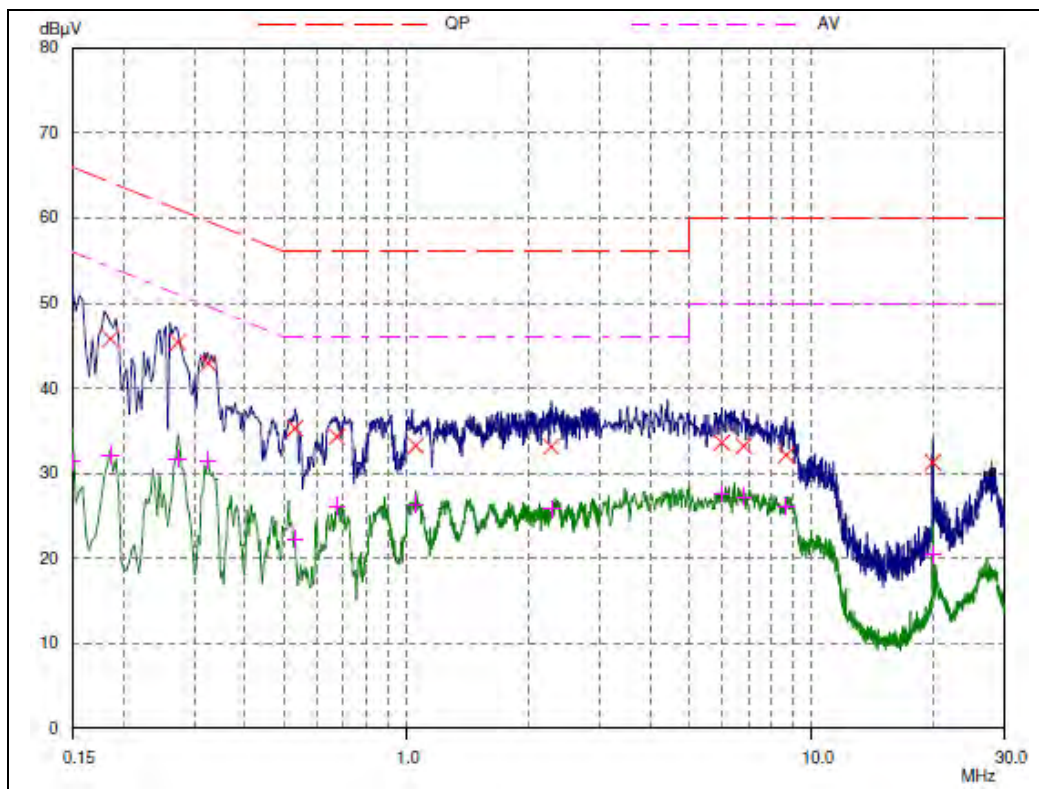
* AC Main (Test#2)

Frequency [MHz]	Correction Factor		Line	Quasi-peak				Average			
	LISN	Cable		Limit [dB(μ V)]	Reading [dB(μ V)]	Result [dB(μ V)]	Margin [dB]	Limit [dB(μ V)]	Reading [dB(μ V)]	Result [dB(μ V)]	Margin [dB]
0.150	9.90	0.02	N	66.00	37.70	47.62	18.38	56.00	21.47	31.39	24.61
0.192	9.91	0.03	H	63.95	35.79	45.73	18.22	53.95	20.90	30.84	23.11
0.258	9.91	0.03	H	61.50	35.72	45.66	15.84	51.50	17.32	27.26	24.24
0.273	9.90	0.03	N	61.03	35.47	45.40	15.63	51.03	21.82	31.75	19.28
0.324	9.92	0.04	N	59.60	33.02	42.98	16.62	49.60	21.60	31.56	18.04
0.327	9.93	0.04	H	59.53	33.55	43.52	16.01	49.53	21.75	31.72	17.81
0.510	9.95	0.05	H	56.00	25.34	35.34	20.66	46.00	17.21	27.21	18.79
0.531	9.94	0.05	N		25.34	35.33	20.67		12.38	22.37	23.63
0.642	9.95	0.06	H		25.57	35.58	20.42		16.91	26.92	19.08
0.675	9.95	0.06	N		24.37	34.38	21.62		16.18	26.19	19.81
0.849	9.95	0.06	H		25.51	35.52	20.48		17.24	27.25	18.75
1.260	9.96	0.06	H		23.94	33.96	22.04		17.21	27.23	18.77
5.280	9.99	0.08	H	60.00	23.48	33.55	26.45	50.00	17.74	27.81	22.19
6.000	10.05	0.09	H		23.74	33.88	26.12		17.61	27.75	22.25
6.200	10.04	0.09	N		23.57	33.70	26.30		17.51	27.64	22.36
6.820	10.08	0.10	N		23.14	33.32	26.68		17.10	27.28	22.72
7.000	10.12	0.10	H		23.12	33.34	26.66		17.12	27.34	22.66
7.500	10.18	0.10	H		22.56	32.84	27.16		17.26	27.54	22.46

[Hot-Line]



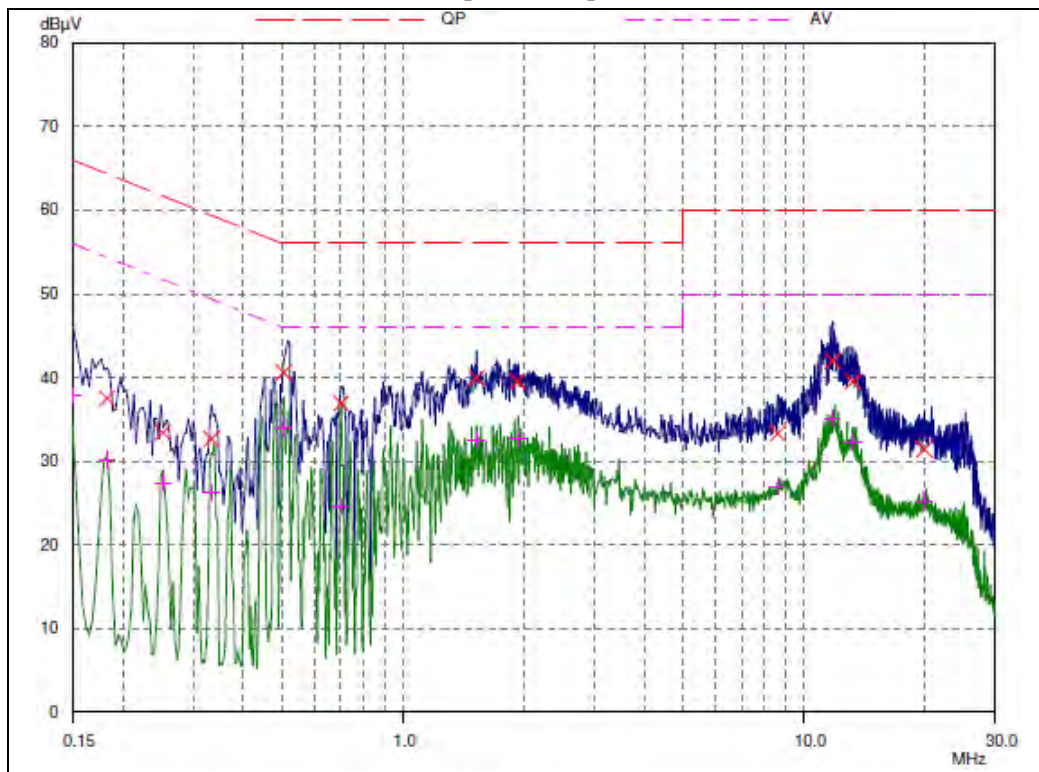
[Neutral-Line]



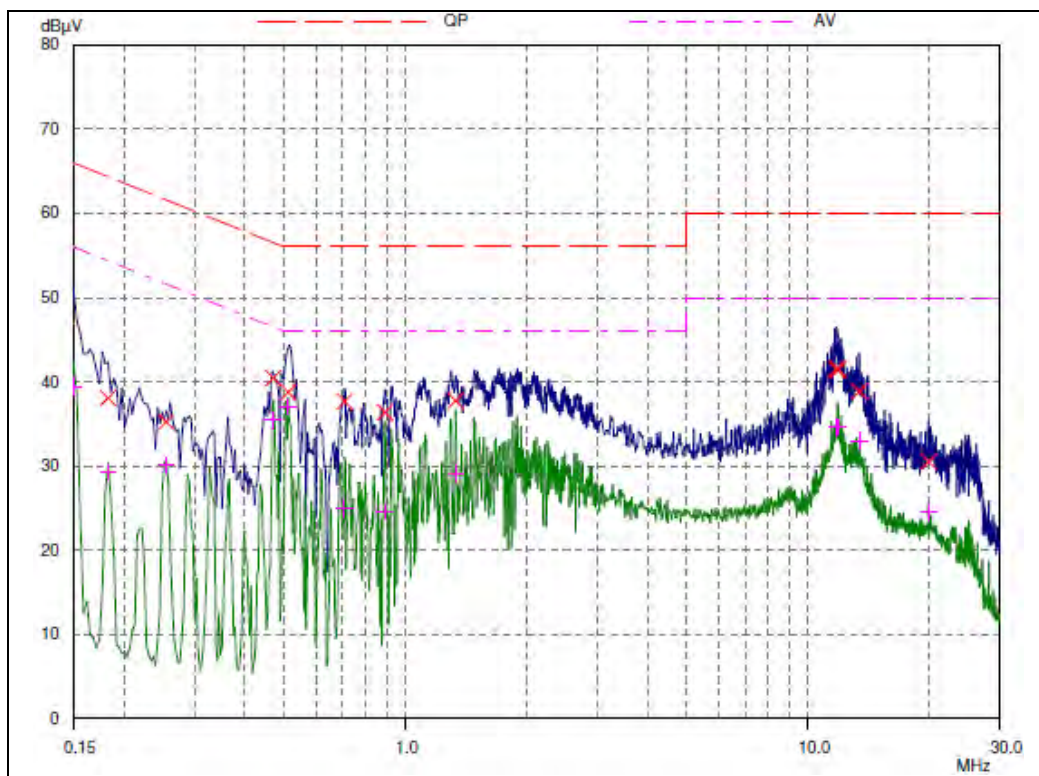
* AC Main (Test#3)

Frequency [MHz]	Correction Factor		Line	Quasi-peak				Average			
	LISN	Cable		Limit [dB(μ V)]	Reading [dB(μ V)]	Result [dB(μ V)]	Margin [dB]	Limit [dB(μ V)]	Reading [dB(μ V)]	Result [dB(μ V)]	Margin [dB]
0.150	9.90	0.02	N	66.00	37.08	47.00	19.00	56.00	29.56	39.48	16.52
0.183	9.90	0.03	N	64.35	28.17	38.10	26.25	54.35	19.36	29.29	25.06
0.252	9.91	0.03	H	61.69	23.52	33.46	28.23	51.69	17.54	27.48	24.21
0.255	9.90	0.03	N	61.59	25.34	35.27	26.32	51.59	20.19	30.12	21.47
0.333	9.93	0.04	H	59.38	22.71	32.68	26.70	49.38	16.30	26.27	23.11
0.471	10.02	0.05	N	56.50	30.42	40.49	16.01	46.50	25.44	35.51	10.99
0.504	9.95	0.05	H	56.00	30.65	40.65	15.35	46.00	23.95	33.95	12.05
0.513	9.94	0.05	N		28.82	38.81	17.19		27.06	37.05	8.95
0.708	9.95	0.06	N		27.72	37.73	18.27		14.98	24.99	21.01
1.335	9.95	0.06	N		27.80	37.81	18.19		19.21	29.22	16.78
1.527	9.96	0.06	H		29.97	39.99	16.01		22.52	32.54	13.46
1.938	9.96	0.06	H		29.53	39.55	16.45		22.69	32.71	13.29
8.620	10.25	0.10	H	60.00	23.07	33.42	26.58	50.00	16.63	26.98	23.02
11.820	10.39	0.11	H		31.59	42.09	17.91		24.68	35.18	14.82
11.840	10.32	0.11	N		31.25	41.68	18.32		24.28	34.71	15.29
11.880	10.32	0.11	N		31.03	41.46	18.54		24.35	34.78	15.22
13.260	10.45	0.12	H		29.05	39.62	20.38		21.82	32.39	17.61
13.440	10.37	0.12	N		28.48	38.97	21.03		22.65	33.14	16.86

[Hot-Line]



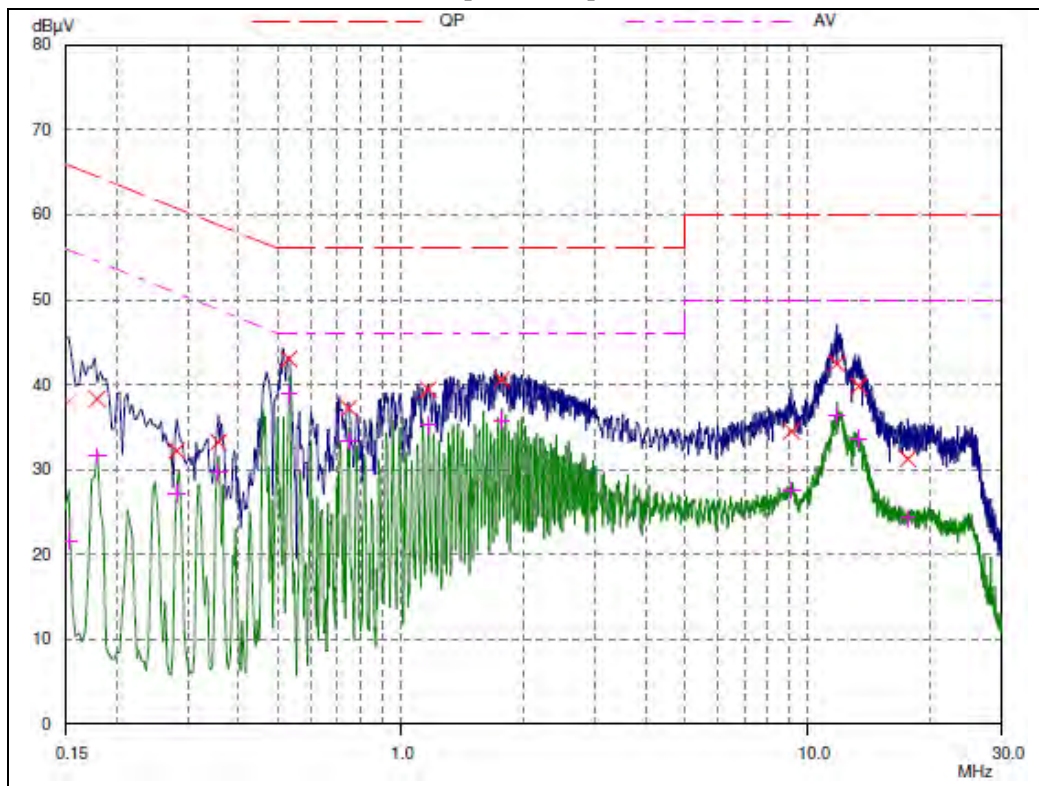
[Neutral-Line]



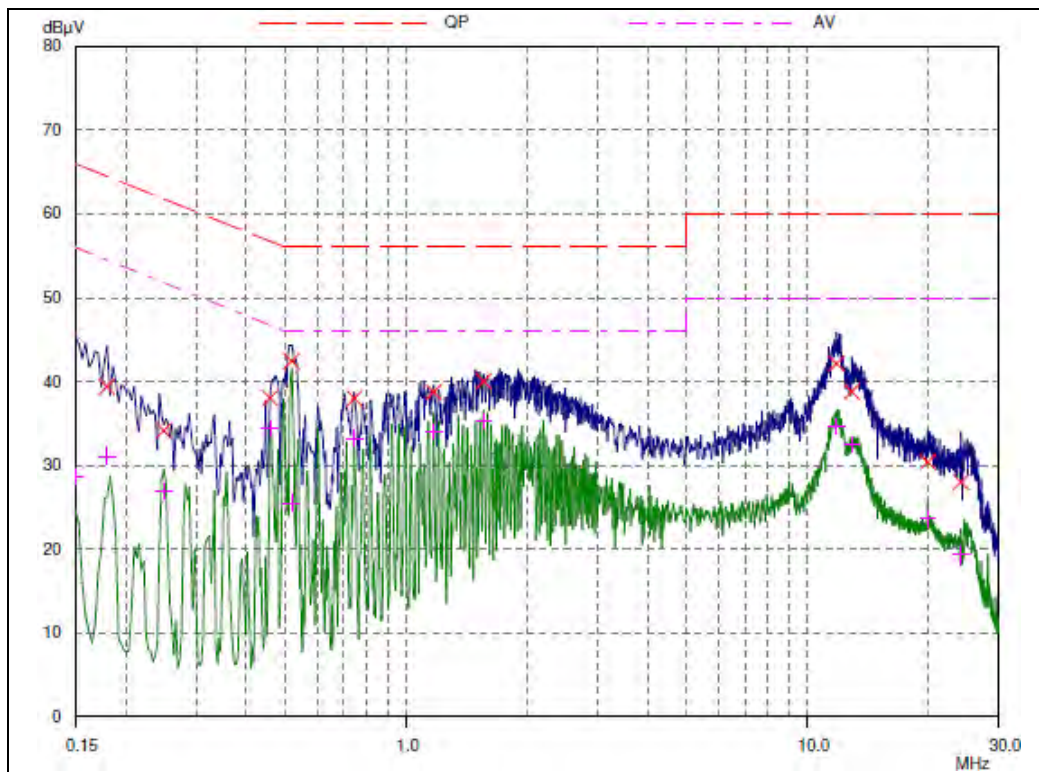
* AC Main (Test#4)

Frequency	Correction Factor		Line	Quasi-peak				Average			
	LISN	Cable		Limit	Reading	Result	Margin	Limit	Reading	Result	Margin
[MHz]				[dB(μ V)]	[dB(μ V)]	[dB(μ V)]	[dB]	[dB(μ V)]	[dB(μ V)]	[dB(μ V)]	[dB]
0.150	9.90	0.02	N	66.00	35.76	45.68	20.32	56.00	18.84	28.76	27.24
0.153	9.90	0.02	H	65.84	28.11	38.03	27.81	55.84	11.71	21.63	34.21
0.180	9.90	0.03	N	64.49	29.50	39.43	25.06	54.49	21.17	31.10	23.39
0.249	9.90	0.03	N	61.79	24.22	34.15	27.64	51.79	17.07	27.00	24.79
0.357	9.93	0.04	H	58.80	23.32	33.29	25.51	48.80	19.71	29.68	19.12
0.459	10.02	0.05	N	56.71	28.01	38.08	18.63	46.71	24.42	34.49	12.22
0.519	9.94	0.05	N	56.00	32.49	42.48	13.52	46.00	15.39	25.38	20.62
0.531	9.95	0.05	H		33.07	43.07	12.93		28.90	38.90	7.10
1.170	9.96	0.06	H		29.48	39.50	16.50		25.25	35.27	10.73
1.173	9.95	0.06	N		28.79	38.80	17.20		24.11	34.12	11.88
1.560	9.95	0.06	N		30.09	40.10	15.90		25.33	35.34	10.66
1.773	9.96	0.06	H		30.63	40.65	15.35		25.83	35.85	10.15
9.140	10.25	0.10	H	60.00	24.25	34.60	25.40	50.00	17.33	27.68	22.32
11.820	10.39	0.11	H		32.05	42.55	17.45		25.96	36.46	13.54
11.840	10.32	0.11	N		31.82	42.25	17.75		24.35	34.78	15.22
12.940	10.37	0.12	N		28.43	38.92	21.08		22.16	32.65	17.35
13.380	10.45	0.12	H		29.38	39.95	20.05		23.21	33.78	16.22
17.640	10.68	0.13	H		20.58	31.39	28.61		13.56	24.37	25.63

[Hot-Line]



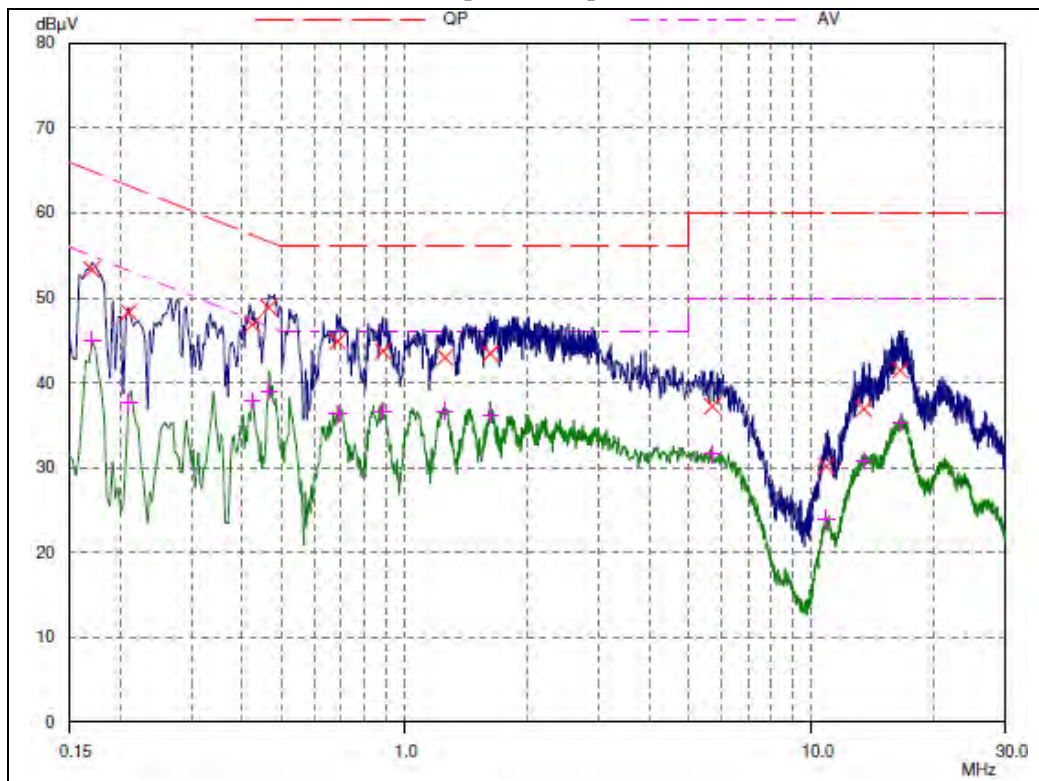
[Neutral-Line]



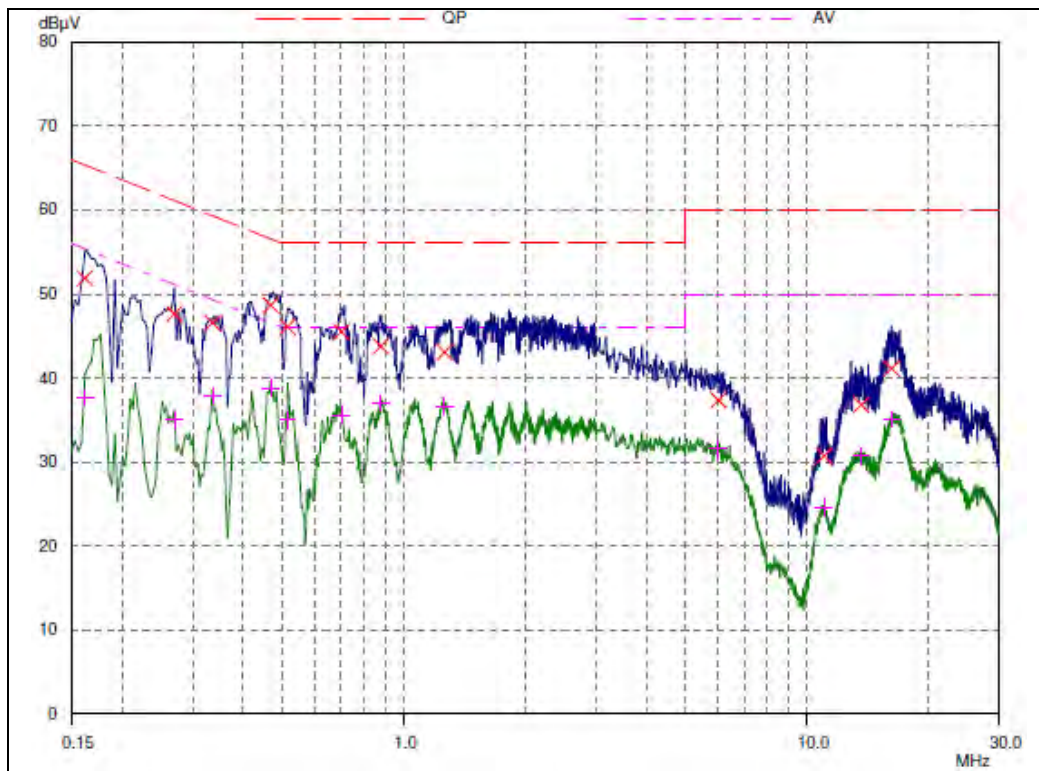
* AC Main (Test#5)

Frequency [MHz]	Correction Factor		Line	Quasi-peak				Average			
	LISN	Cable		Limit [dB(μ V)]	Reading [dB(μ V)]	Result [dB(μ V)]	Margin [dB]	Limit [dB(μ V)]	Reading [dB(μ V)]	Result [dB(μ V)]	Margin [dB]
0.162	9.90	0.02	N	65.36	41.98	51.90	13.46	55.36	27.75	37.67	17.69
0.171	9.90	0.02	H	64.91	43.41	53.33	11.58	54.91	35.13	45.05	9.86
0.336	9.92	0.04	N	59.30	36.65	46.61	12.69	49.30	27.94	37.90	11.40
0.423	10.03	0.05	H	57.39	36.81	46.89	10.50	47.39	27.84	37.92	9.47
0.465	10.03	0.05	H	56.60	38.83	48.91	7.69	46.60	29.01	39.09	7.51
0.468	10.02	0.05	N	56.55	38.66	48.73	7.82	46.55	28.77	38.84	7.71
0.516	9.94	0.05	N	56.00	36.14	46.13	9.87	46.00	25.08	35.07	10.93
0.687	9.95	0.06	H		34.92	44.93	11.07		26.32	36.33	9.67
0.702	9.95	0.06	N		35.55	45.56	10.44		25.62	35.63	10.37
0.879	9.95	0.06	N		33.82	43.83	12.17		27.07	37.08	8.92
0.888	9.96	0.06	H		33.74	43.76	12.24		26.64	36.66	9.34
1.626	9.96	0.06	H		33.44	43.46	12.54		26.18	36.20	9.80
5.720	10.05	0.09	H	60.00	27.18	37.32	22.68	50.00	21.52	31.66	18.34
6.040	10.04	0.09	N		27.31	37.44	22.56		21.55	31.68	18.32
13.480	10.45	0.12	H		26.45	37.02	22.98		20.35	30.92	19.08
13.680	10.41	0.12	N		26.40	36.93	23.07		20.33	30.86	19.14
16.239	10.48	0.12	N		30.66	41.26	18.74		24.57	35.17	14.83
16.559	10.65	0.12	H		30.80	41.57	18.43		24.62	35.39	14.61

[Hot-Line]



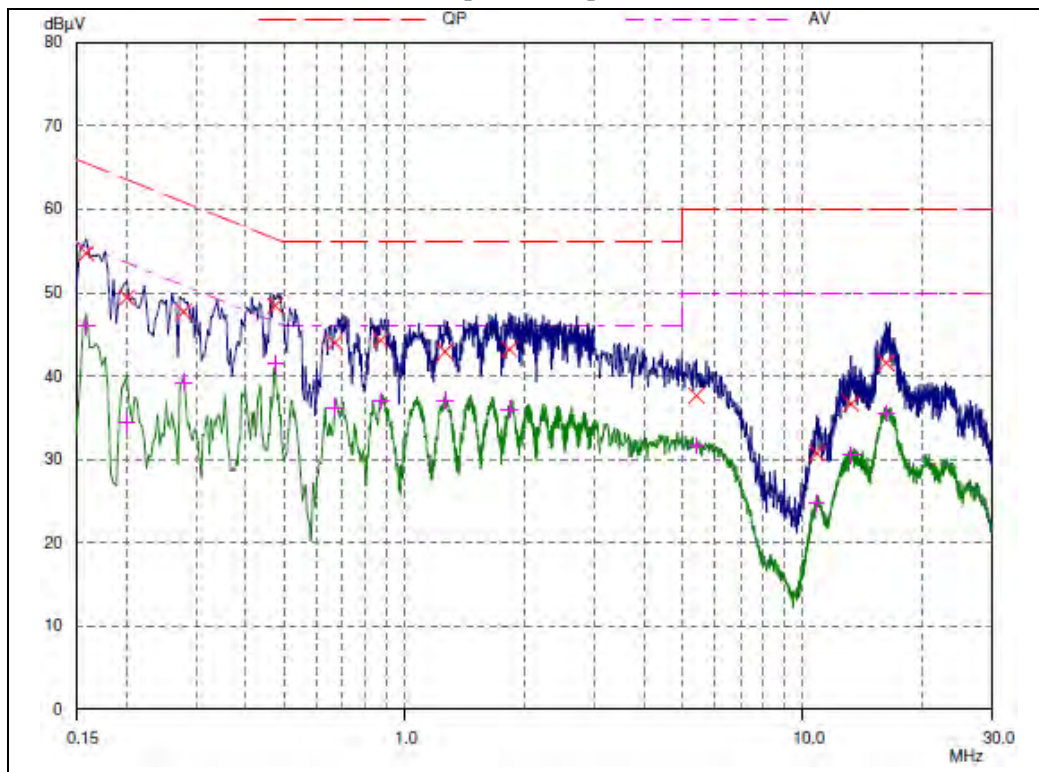
[Neutral-Line]



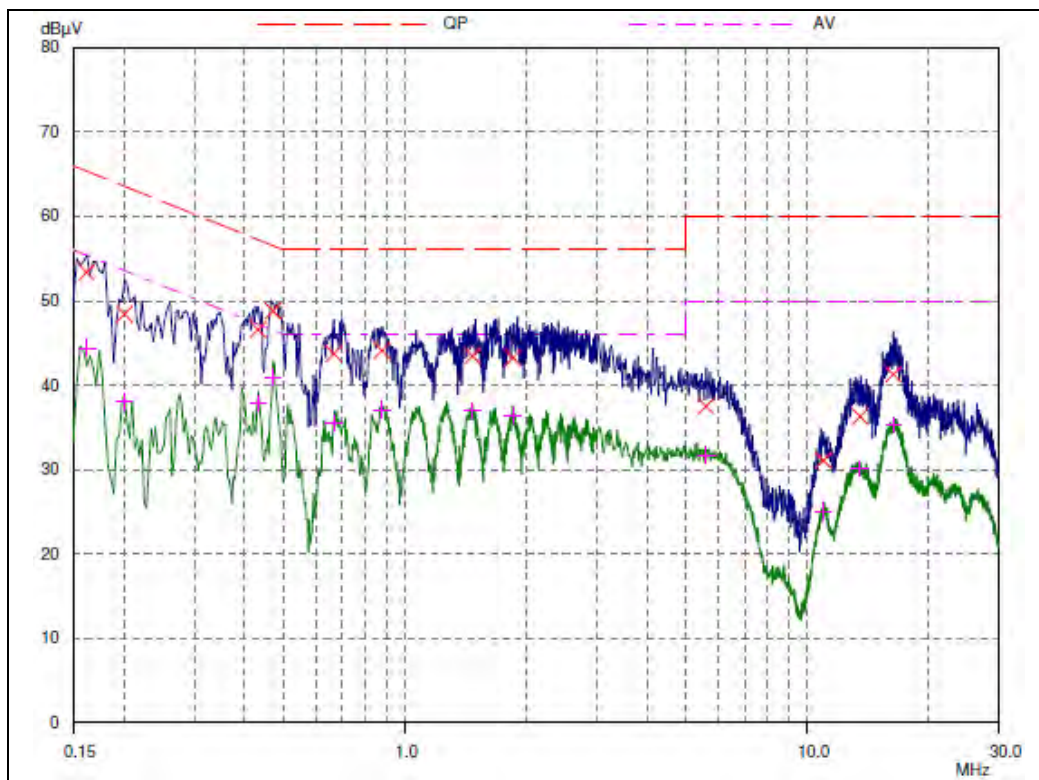
* AC Main (Test#6)

Frequency [MHz]	Correction Factor		Line	Quasi-peak				Average			
	LISN	Cable		Limit [dB(μ V)]	Reading [dB(μ V)]	Result [dB(μ V)]	Margin [dB]	Limit [dB(μ V)]	Reading [dB(μ V)]	Result [dB(μ V)]	Margin [dB]
0.159	9.90	0.02	H	65.52	44.82	54.74	10.78	55.52	36.06	45.98	9.54
0.162	9.90	0.02	N	65.36	43.47	53.39	11.97	55.36	34.49	44.41	10.95
0.201	9.91	0.03	H	63.57	39.50	49.44	14.13	53.57	24.47	34.41	19.16
0.432	10.02	0.05	N	57.21	36.55	46.62	10.59	47.21	27.89	37.96	9.25
0.471	10.02	0.05	N	56.50	38.77	48.84	7.66	46.50	30.92	40.99	5.51
0.474	10.03	0.05	H	56.44	38.38	48.46	7.98	46.44	31.48	41.56	4.88
0.666	9.94	0.06	N	56.00	33.77	43.77	12.23	46.00	25.54	35.54	10.46
0.669	9.95	0.06	H		34.03	44.04	11.96		26.26	36.27	9.73
0.873	9.95	0.06	H		34.34	44.35	11.65		27.07	37.08	8.92
0.879	9.95	0.06	N		34.14	44.15	11.85		27.12	37.13	8.87
1.473	9.95	0.06	N		33.50	43.51	12.49		27.10	37.11	8.89
1.860	9.95	0.06	N		33.30	43.31	12.69		26.40	36.41	9.59
5.420	9.99	0.08	H	60.00	27.64	37.71	22.29	50.00	21.68	31.75	18.25
5.620	10.04	0.09	N		27.46	37.59	22.41		21.69	31.82	18.18
13.260	10.45	0.12	H		26.18	36.75	23.25		20.03	30.60	19.40
13.560	10.41	0.12	N		25.87	36.40	23.60		19.78	30.31	19.69
16.239	10.62	0.12	H		30.98	41.72	18.28		24.91	35.65	14.35
16.399	10.48	0.12	N		30.81	41.41	18.59		24.78	35.38	14.62

[Hot-Line]



[Neutral-Line]



6.2 Radiated Emission

Test specification	FCC Part 15, Section 15.109(g), Class B		
Testing voltage	120 V, 60 Hz		
Test facility	10 m Chamber (#F2)		
Test distance	3 m		
Date	2012. 10. 10		
Temperature (°C)	25 °C	Humidity (% R.H.)	48 % R.H.
Remarks	Complied		

6.2.1 Limits of radiated emission measurement

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

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

6.2.2 Measurement procedure

The test was done at a 10 m chamber with a quasi-peak detector. EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane. Cables were folded back and forth forming a bundle 0.3 m to 0.4 m long and were hanged at a 0.4 m height to the ground plane. Cables connected to EUT were fixed to cause maximum emission. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

6.2.3 Used equipments

Equipment	Model no.	Serial no.	Makers	Next cal. date	Used
Test Receiver	ESCI	100710	R&S	2012.11.28	<input checked="" type="checkbox"/>
Bi-Log Antenna	VULB 9168	9168-440	SCHWARZBECK	2013.10.04	<input checked="" type="checkbox"/>
Amplifier	310N	293004	SONOMA INSTRUMENT	2012.11.28	<input checked="" type="checkbox"/>
3 dB Attenuator	8491A	27444	HP	2012.11.28	<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"/>
Horn ANT	3115	00086706	ETS	2013.11.21	<input checked="" type="checkbox"/>
Amplifier	8449B	3008A02343	AGILENT	2012.11.28	<input checked="" type="checkbox"/>
Spectrum Analyzer	FSP7	100289	R&S	2012.12.19	<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:

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

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

A.G = Amplifier Gain

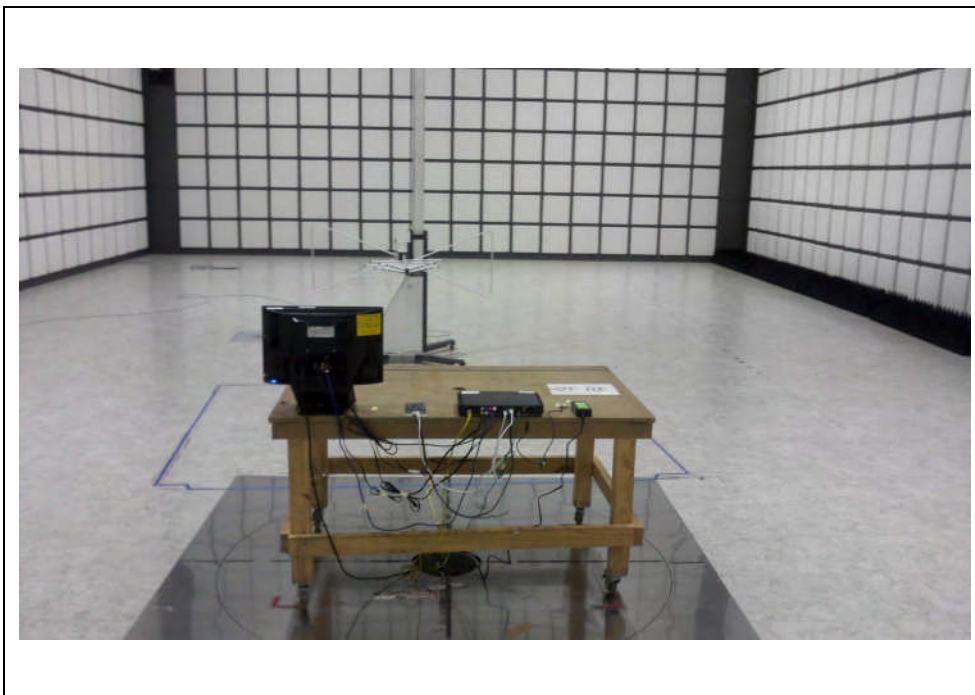
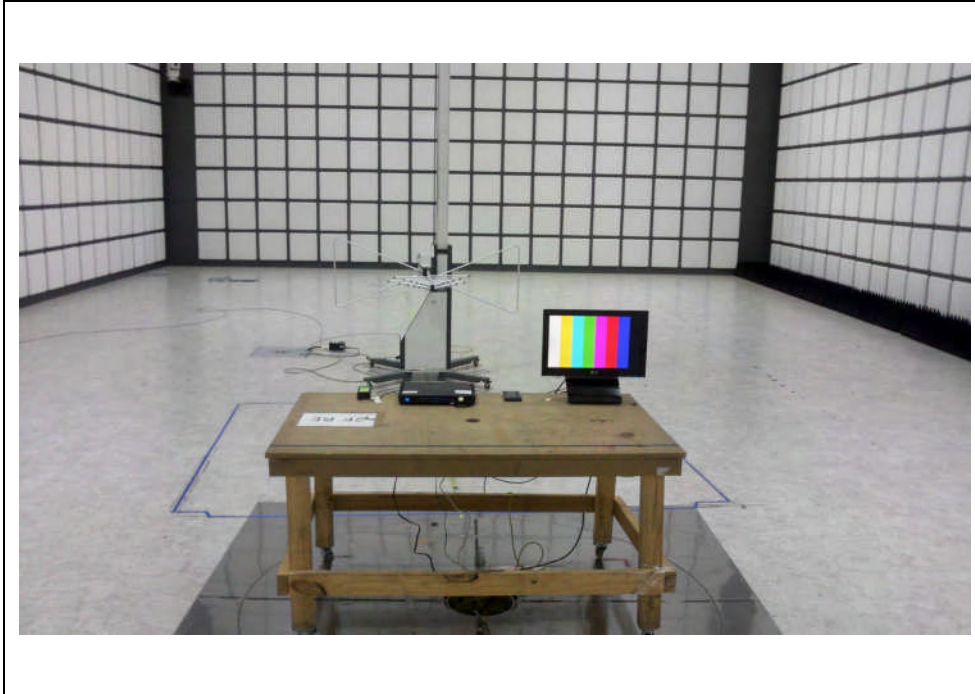
3 dB Att = 3 dB Attenuator

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

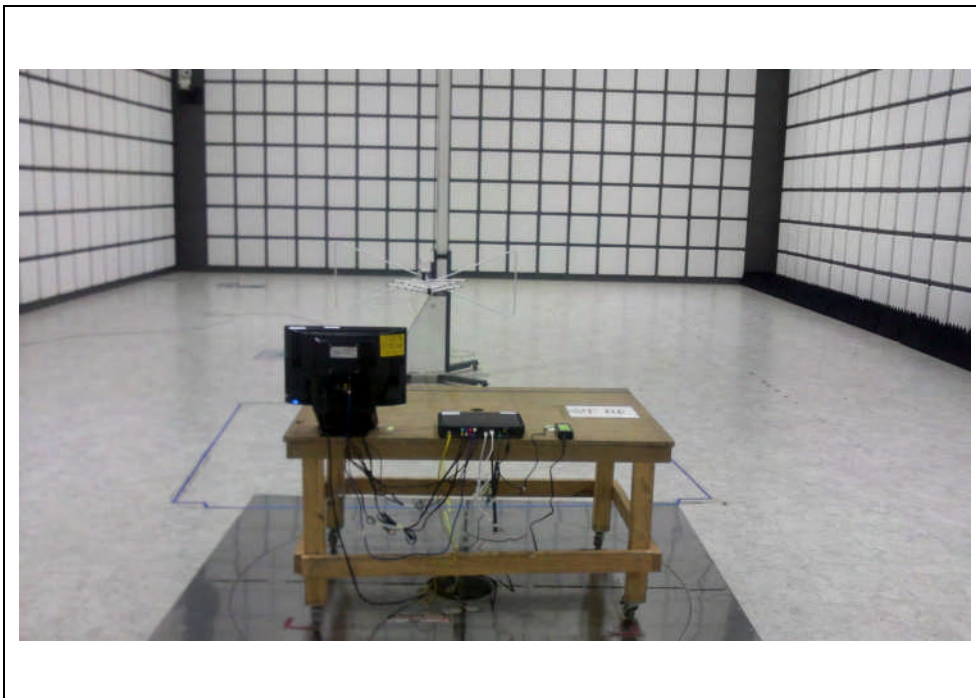
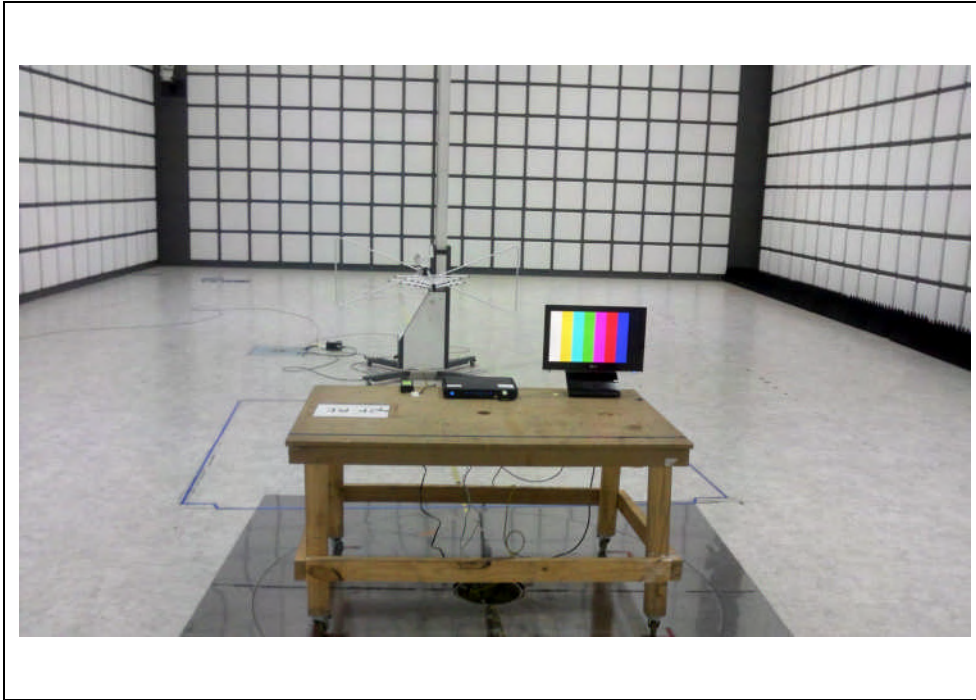
The result is $30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$

6.2.5 Photographs of test setup

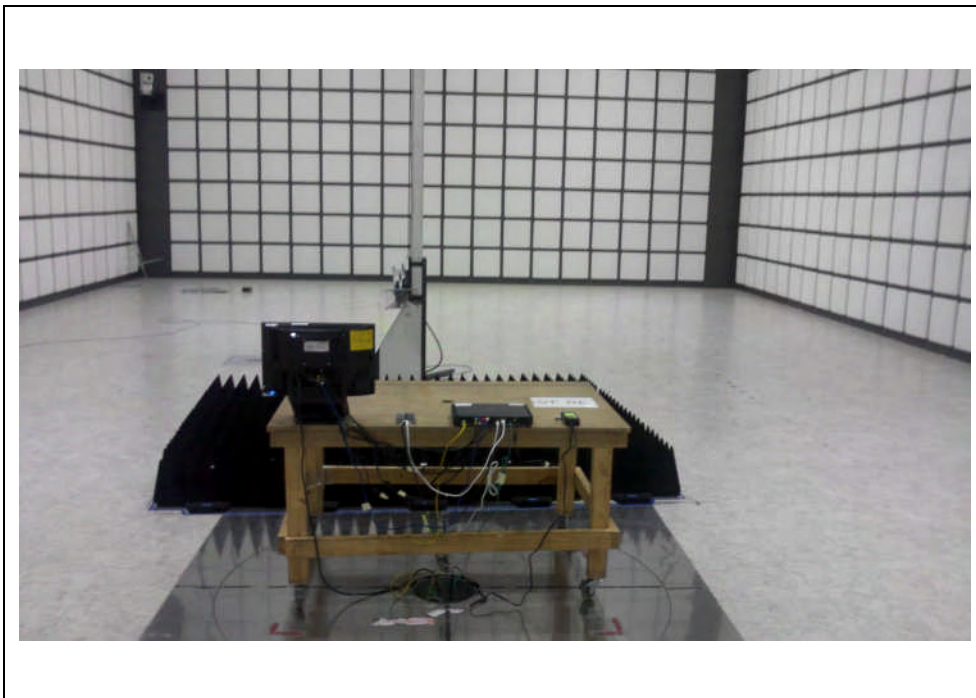
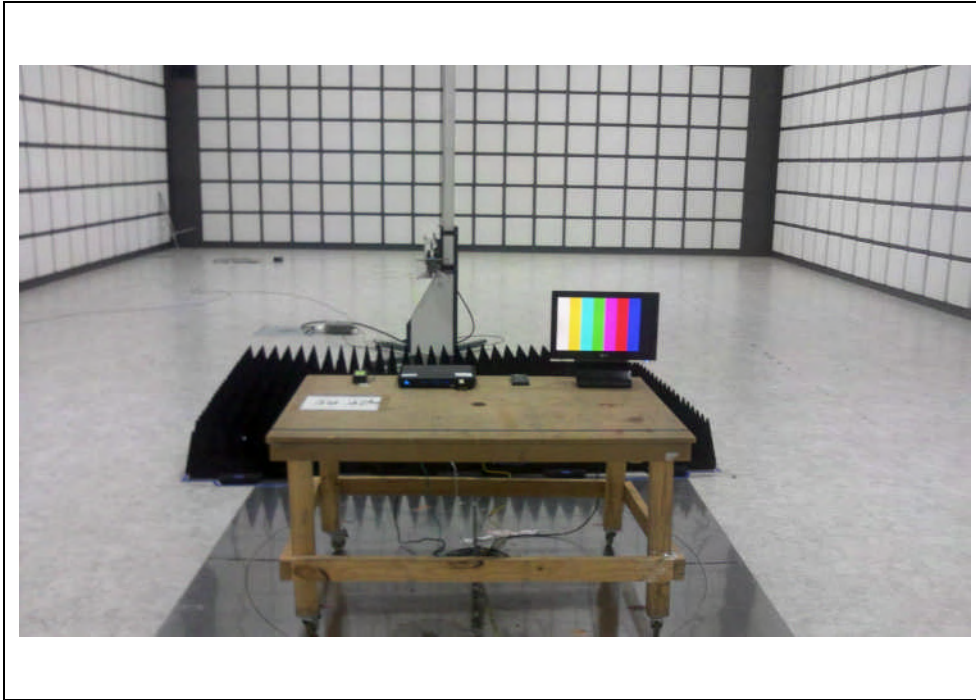
* 30 MHz ~ 1 GHz (Test#1, #3, #5)



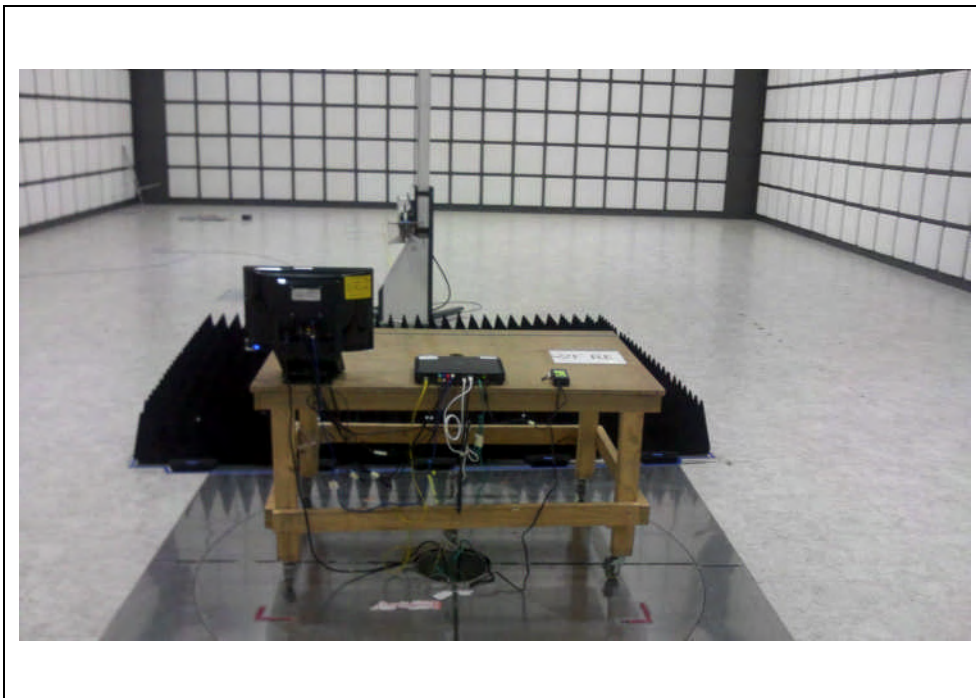
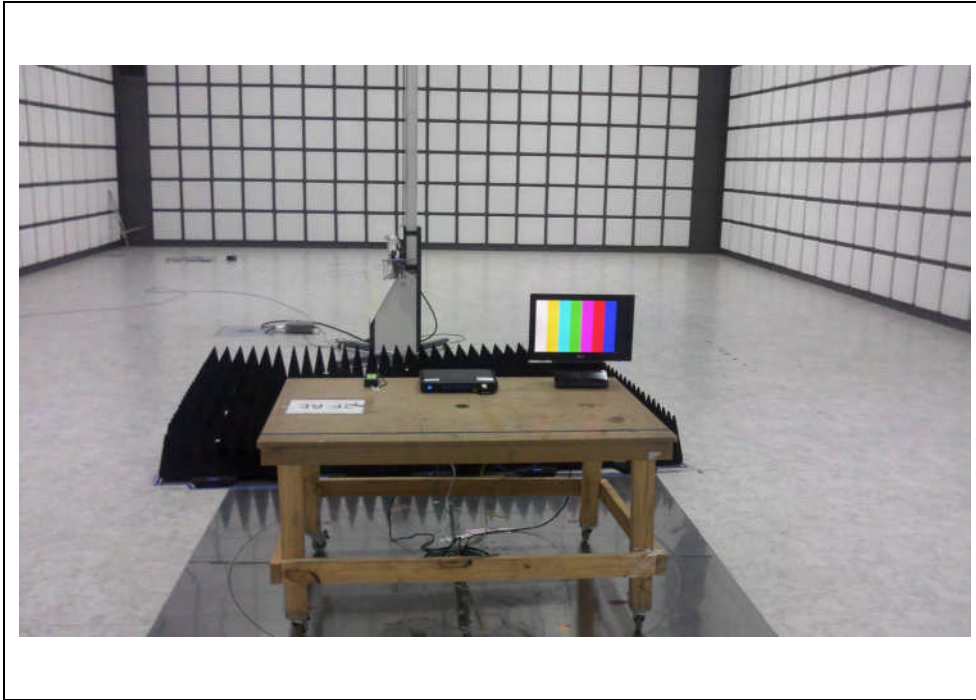
* 30 MHz ~ 1 GHz (Test#2, #4, #6)



* 1 GHz ~ 7.5 GHz (Test#1, #3, #5)



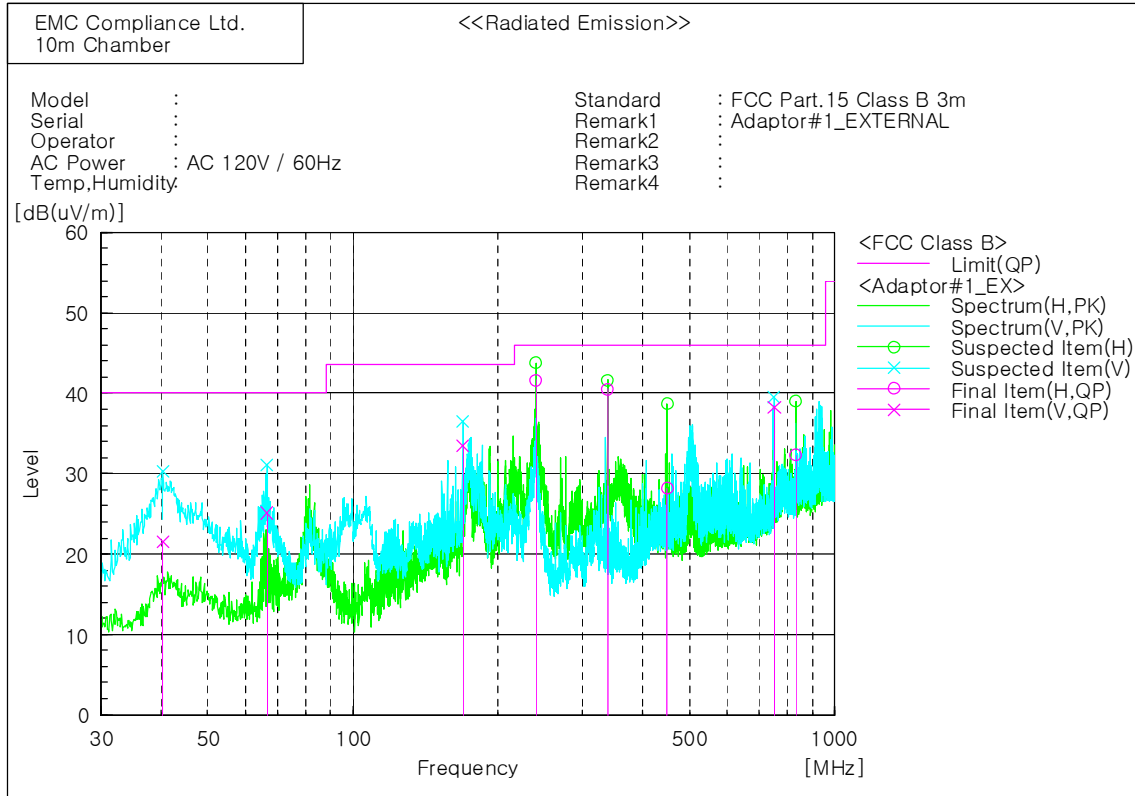
* 1 GHz ~ 7.5 GHz (Test#2, #4, #6)



6.2.6 Radiated emission measurement result

* Graph and Data

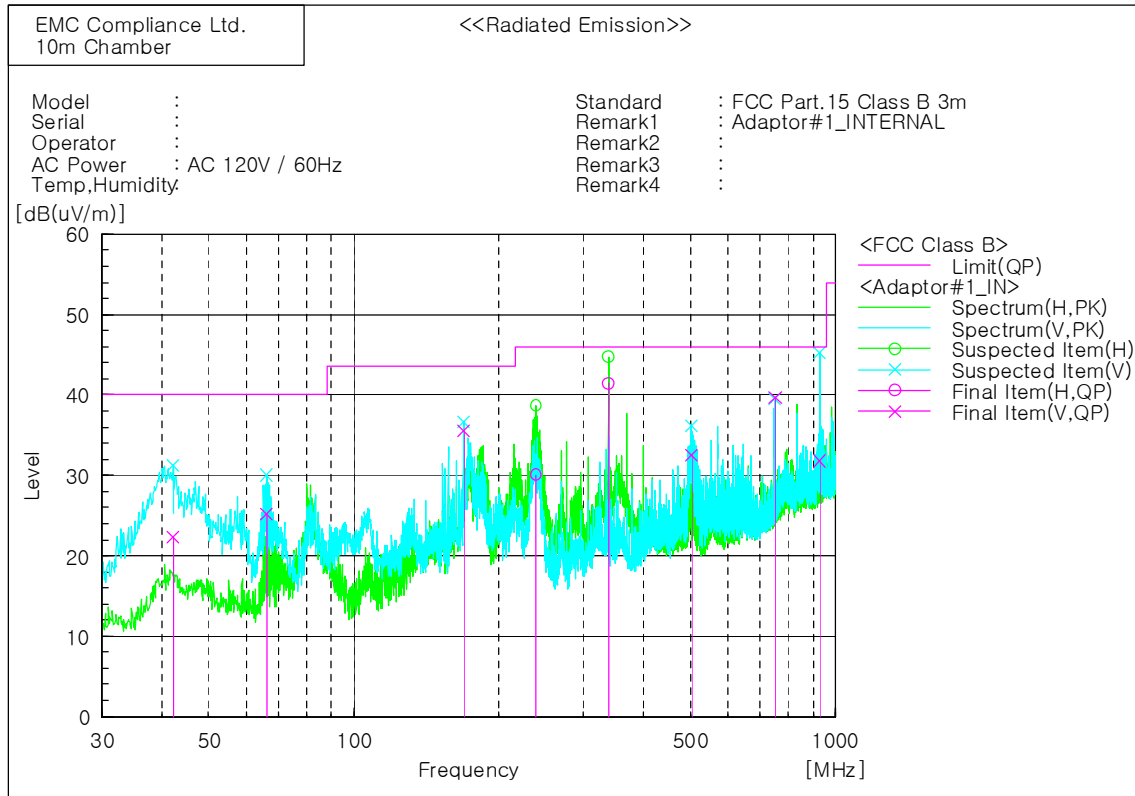
* 30 MHz ~ 1 GHz (HR44-500)_Test#1



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]	Remark
1	40.306	V	36.3	-14.7	21.6	40.0	18.4	100.0	179.0	
2	66.385	V	40.2	-15.1	25.1	40.0	14.9	100.0	0.5	
3	169.416	V	47.2	-13.7	33.5	43.5	10.0	100.0	291.6	
4	240.046	H	56.3	-14.7	41.6	46.0	4.4	100.0	117.6	
5	337.987	H	51.5	-11.0	40.5	46.0	5.5	100.0	0.0	
6	450.010	H	36.3	-8.1	28.2	46.0	17.8	100.0	198.4	
7	750.140	V	40.2	-1.9	38.3	46.0	7.7	100.0	347.1	
8	833.039	H	32.6	-0.3	32.3	46.0	13.7	100.0	187.9	

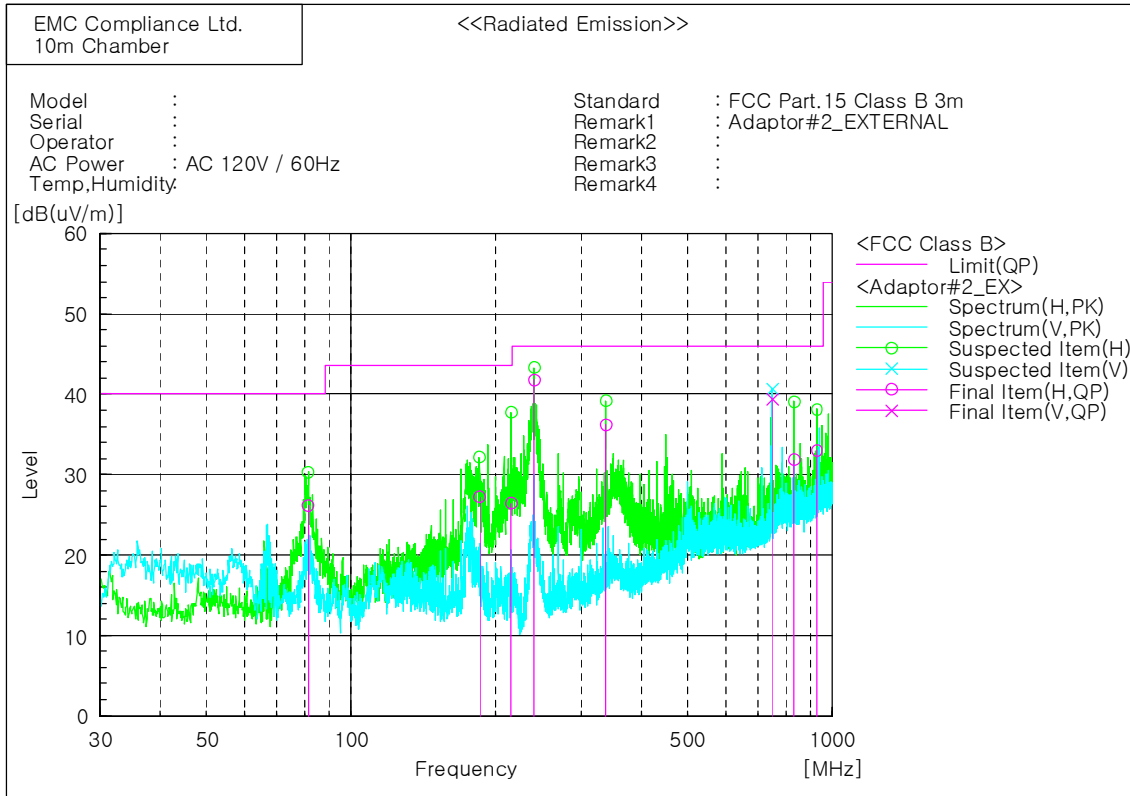
* 30 MHz ~ 1 GHz (HR44-500) _Test#2



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]	Remark
1	42.246	V	36.7	-14.4	22.3	40.0	17.7	100.0	161.1	
2	65.890	V	40.2	-15.0	25.2	40.0	14.8	100.0	297.8	
3	169.316	V	49.2	-13.7	35.5	43.5	8.0	100.0	6.6	
4	239.012	H	44.8	-14.7	30.1	46.0	15.9	100.0	327.6	
5	337.975	H	52.5	-11.0	41.5	46.0	4.5	100.0	188.1	
6	503.000	V	39.2	-6.7	32.5	46.0	13.5	100.0	150.6	
7	750.153	V	41.6	-1.9	39.7	46.0	6.3	100.0	357.0	
8	928.947	V	30.4	1.4	31.8	46.0	14.2	100.0	182.1	

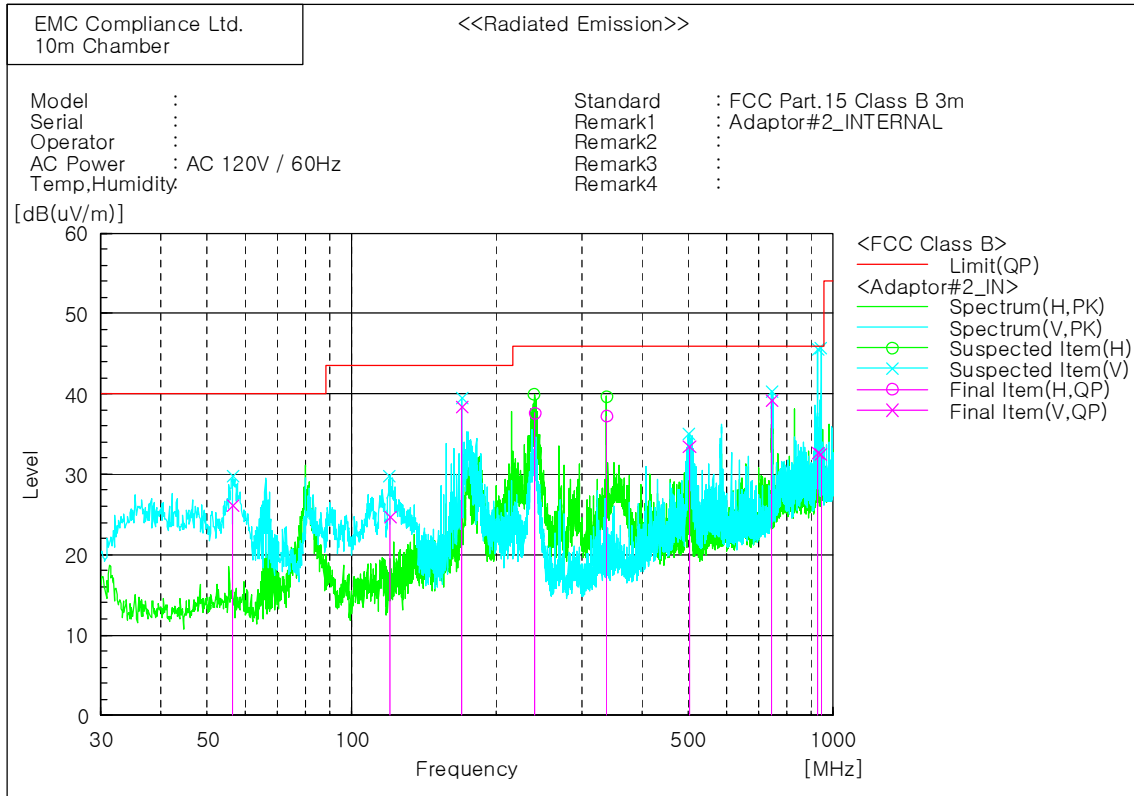
* 30 MHz ~ 1 GHz (HR44-500) _Test#3



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]	Remark
1	81.372	H	44.3	-18.1	26.2	40.0	13.8	400.0	24.9	
2	185.300	H	42.5	-15.3	27.2	43.5	16.3	100.0	227.8	
3	215.028	H	42.3	-15.9	26.4	43.5	17.1	100.0	30.9	
4	240.062	H	56.5	-14.7	41.8	46.0	4.2	100.0	154.1	
5	337.985	H	47.2	-11.0	36.2	46.0	9.8	100.0	353.4	
6	750.104	V	41.3	-1.9	39.4	46.0	6.6	400.0	22.0	
7	833.039	H	32.1	-0.3	31.8	46.0	14.2	100.0	196.2	
8	929.554	H	31.6	1.4	33.0	46.0	13.0	100.0	167.7	

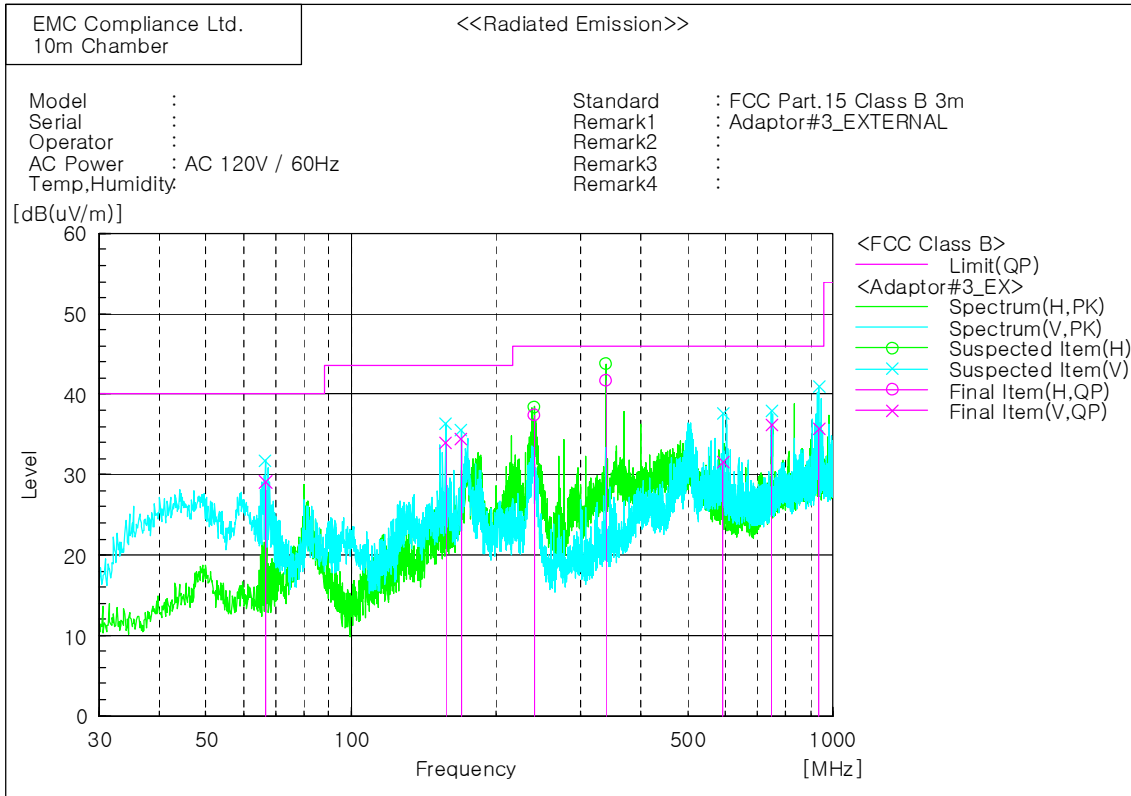
* 30 MHz ~ 1 GHz (HR44-500) _Test#4



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]	Remark
1	56.554	V	40.2	-14.1	26.1	40.0	13.9	100.0	259.0	
2	120.112	V	40.5	-15.8	24.7	43.5	18.8	100.0	244.0	
3	169.344	V	52.1	-13.7	38.4	43.5	5.1	100.0	286.1	
4	240.000	H	52.3	-14.7	37.6	46.0	8.4	100.0	331.7	
5	337.986	H	48.2	-11.0	37.2	46.0	8.8	100.0	339.2	
6	503.000	V	40.2	-6.7	33.5	46.0	12.5	100.0	152.3	
7	746.588	V	41.2	-2.0	39.2	46.0	6.8	100.0	353.5	
8	930.524	V	31.2	1.4	32.6	46.0	13.4	100.0	167.4	
9	943.134	V	30.8	1.7	32.5	46.0	13.5	100.0	162.8	

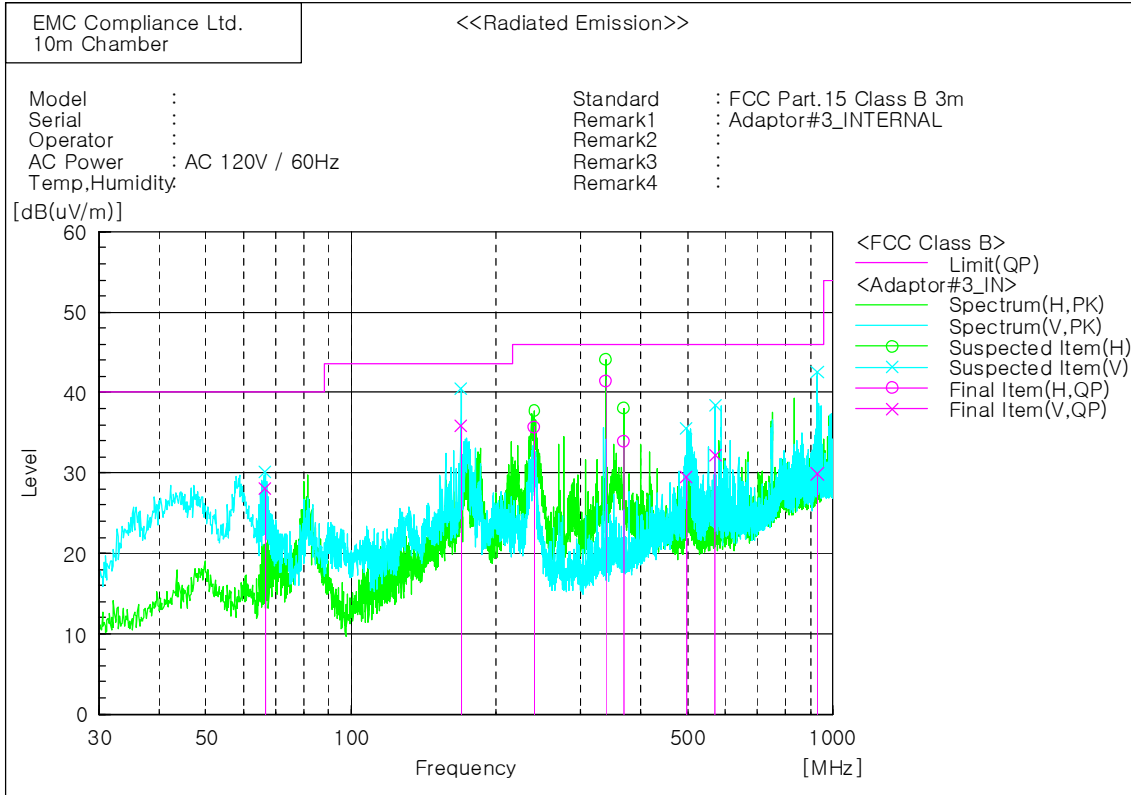
* 30 MHz ~ 1 GHz (HR44-500) _Test#5



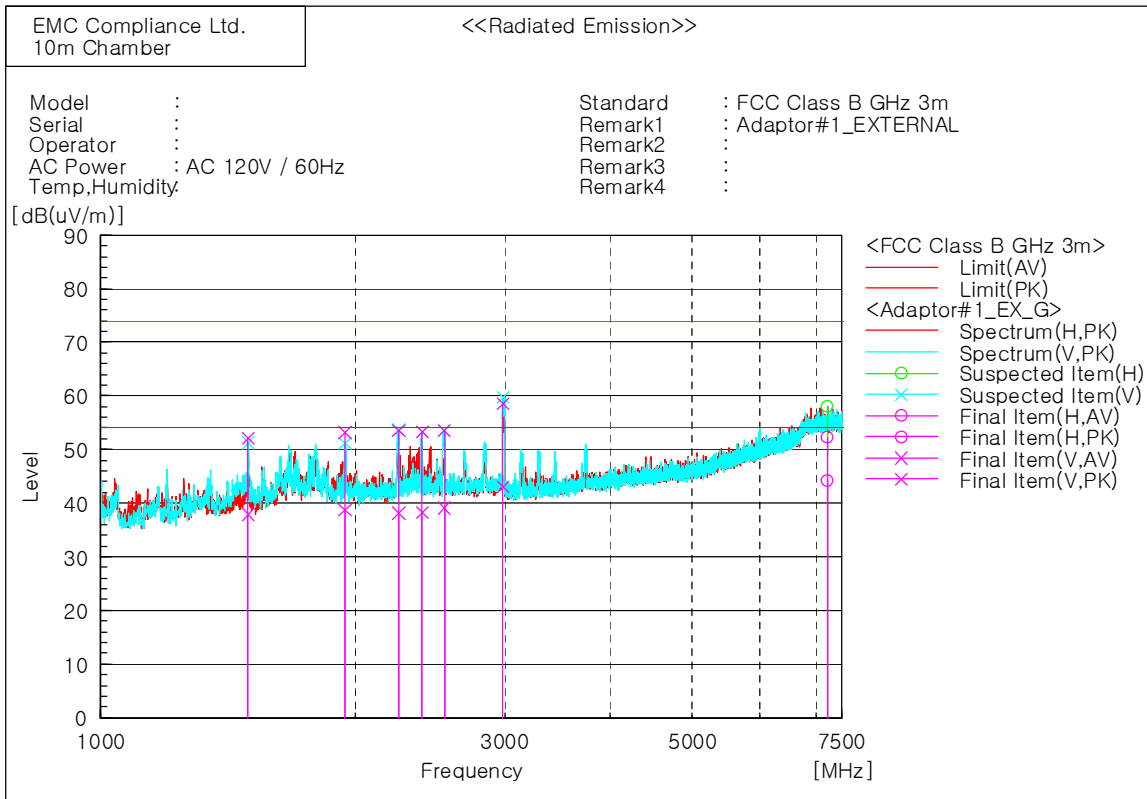
Final Result

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]	Remark
1	66.412	V	44.2	-15.1	29.1	40.0	10.9	100.0	27.4	
2	157.191	V	47.4	-13.4	34.0	43.5	9.5	100.0	349.0	
3	169.316	V	48.1	-13.7	34.4	43.5	9.1	100.0	317.5	
4	240.005	H	52.1	-14.7	37.4	46.0	8.6	100.0	151.4	
5	337.975	H	52.7	-11.0	41.7	46.0	4.3	400.0	6.7	
6	593.328	V	36.2	-4.6	31.6	46.0	14.4	100.0	165.7	
7	746.588	V	38.2	-2.0	36.2	46.0	9.8	100.0	352.9	
8	938.647	V	34.1	1.6	35.7	46.0	10.3	100.0	155.1	

* 30 MHz ~ 1 GHz (HR44-500) _Test#6



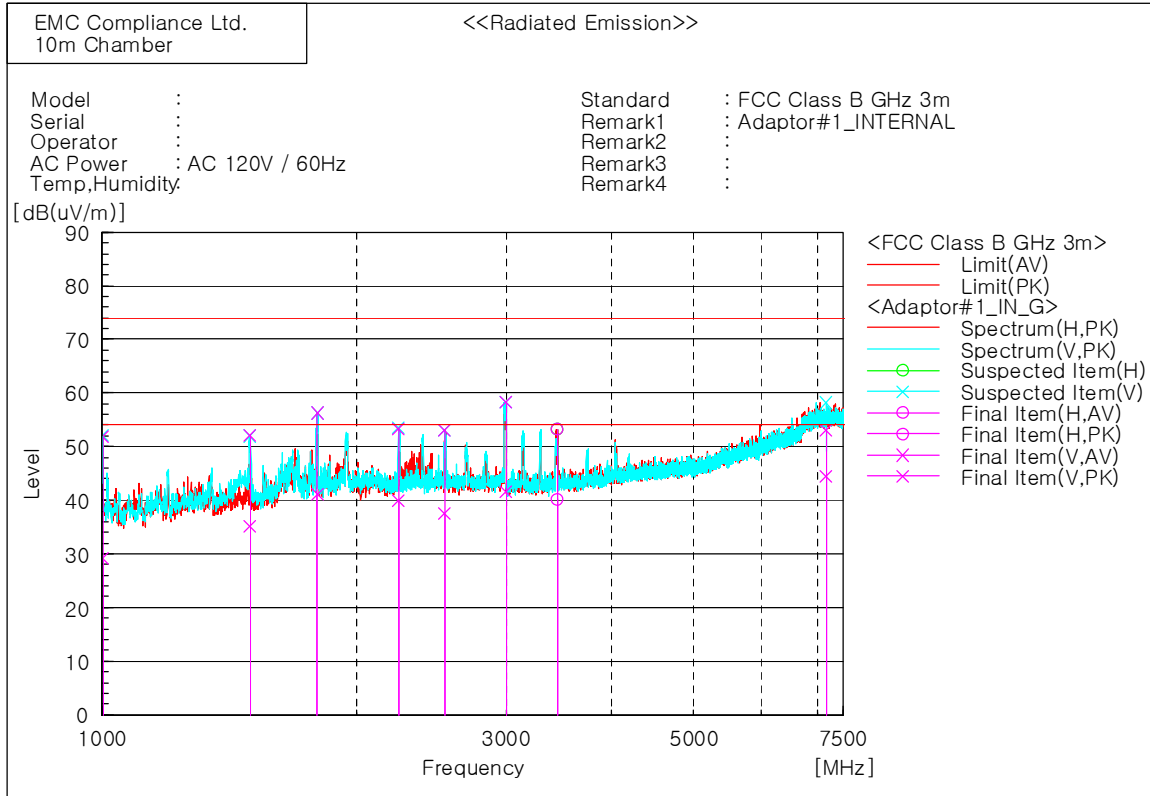
* 1 GHz ~ 7.5 GHz (HR44-500) _Test#1



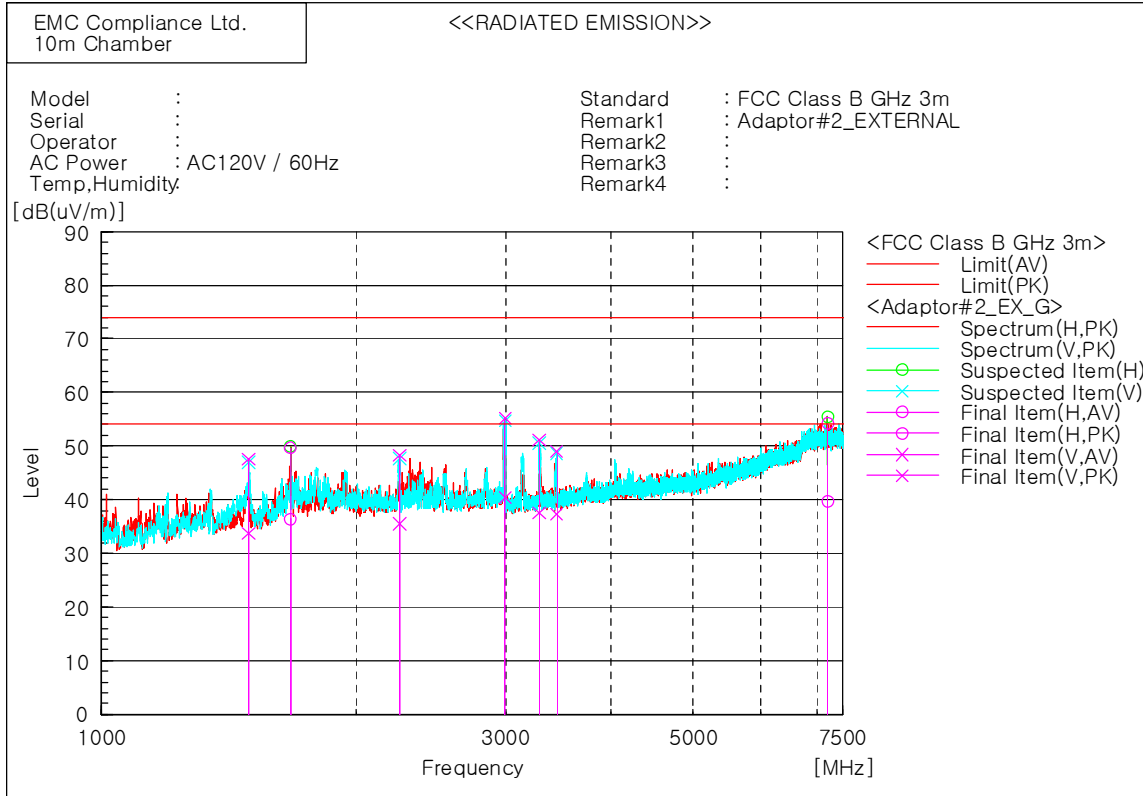
Final Result

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]	Remark
1	1494.000	V	43.0	57.3	-5.1	37.9	52.2	54.0	74.0	16.1	21.8	201.0	190.2	
2	1943.313	V	41.3	55.7	-2.5	38.8	53.2	54.0	74.0	15.2	20.8	201.0	190.2	
3	2249.625	V	39.4	54.8	-1.3	38.1	53.5	54.0	74.0	15.9	20.5	201.0	41.5	
4	2397.500	V	39.5	54.5	-1.2	38.3	53.3	54.0	74.0	15.7	20.7	201.0	41.5	
5	2547.813	V	40.0	54.4	-0.9	39.1	53.5	54.0	74.0	14.9	20.5	201.0	41.5	
6	2986.563	V	43.3	58.8	-0.2	43.1	58.6	54.0	74.0	10.9	15.4	201.0	41.5	
7	7217.251	H	29.7	37.7	14.6	44.3	52.3	54.0	74.0	9.7	21.7	100.0	21.8	

* 1 GHz ~ 7.5 GHz (HR44-500) _Test#2



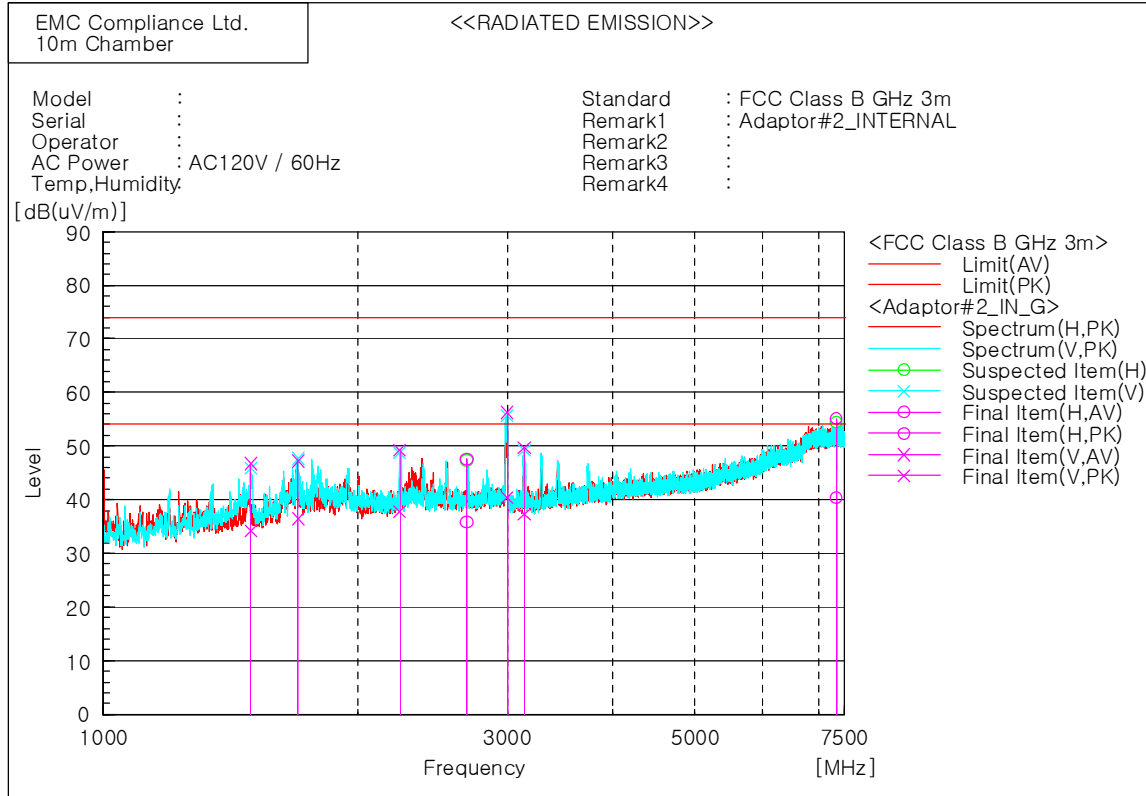
* 1 GHz ~ 7.5 GHz (HR44-500) _Test#3



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]	Remark
1	1492.375	V	42.3	56.1	-8.5	33.8	47.6	54.0	74.0	20.2	26.4	100.0	359.4	
2	1671.938	H	43.5	56.7	-7.1	36.4	49.6	54.0	74.0	17.6	24.4	100.0	275.6	
3	2249.625	V	39.8	52.6	-4.3	35.5	48.3	54.0	74.0	18.5	25.7	100.0	297.2	
4	2997.125	V	43.6	58.3	-3.1	40.5	55.2	54.0	74.0	13.5	18.8	100.0	348.1	
5	3286.375	V	39.5	53.2	-2.0	37.5	51.2	54.0	74.0	16.5	22.8	100.0	35.2	
6	3448.875	V	38.4	50.3	-1.2	37.2	49.1	54.0	74.0	16.8	24.9	100.0	342.1	
7	7199.376	H	28.6	43.1	11.1	39.7	54.2	54.0	74.0	14.3	19.8	100.0	194.6	

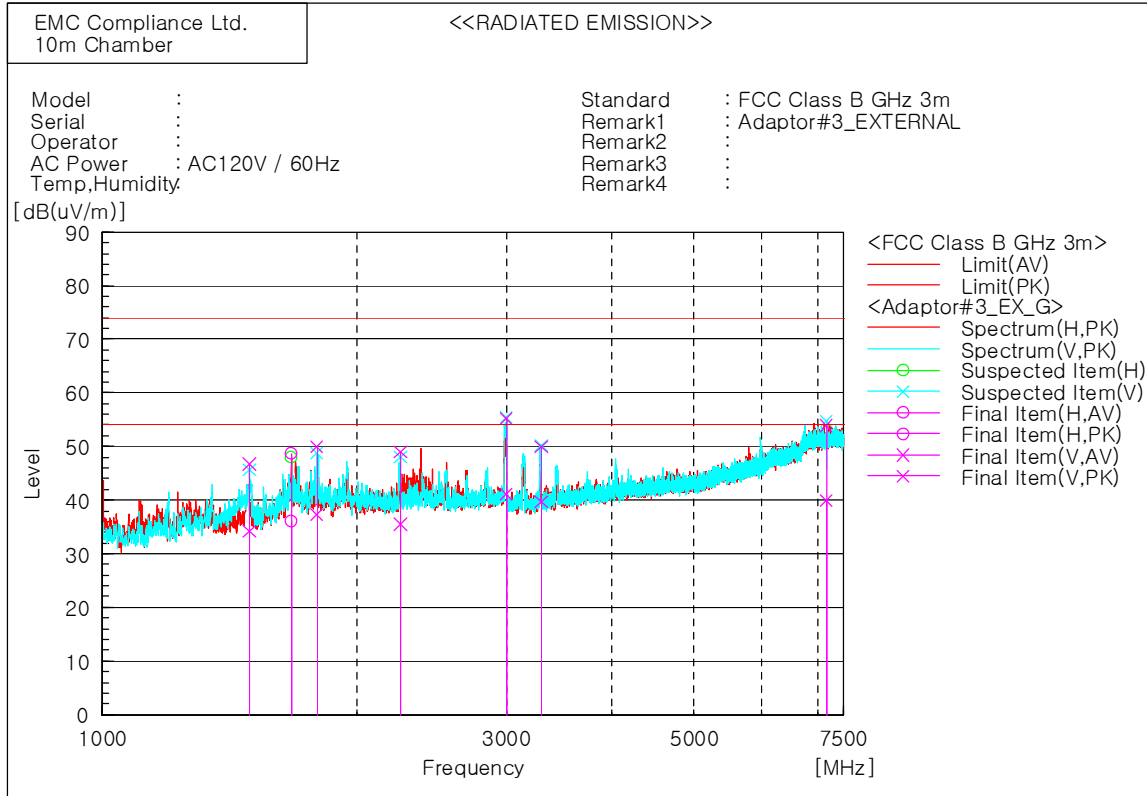
* 1 GHz ~ 7.5 GHz (HR44-500) _Test#4



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]	Remark
1	1493.188	V	42.7	55.2	-8.5	34.2	46.7	54.0	74.0	19.8	27.3	100.0	352.3	
2	1698.750	V	43.4	54.1	-6.9	36.5	47.2	54.0	74.0	17.5	26.8	100.0	352.3	
3	2239.063	V	42.1	53.6	-4.3	37.8	49.3	54.0	74.0	16.2	24.7	100.0	316.9	
4	2686.750	H	39.4	51.2	-3.6	35.8	47.6	54.0	74.0	18.2	26.4	100.0	12.8	
5	2996.750	V	43.6	59.4	-3.1	40.5	56.3	54.0	74.0	13.5	17.7	100.0	352.3	
6	3140.938	V	39.8	52.3	-2.6	37.2	49.7	54.0	74.0	16.8	24.3	100.0	21.9	
7	7340.751	H	29.4	44.2	10.9	40.3	55.1	54.0	74.0	13.7	18.9	100.0	290.2	

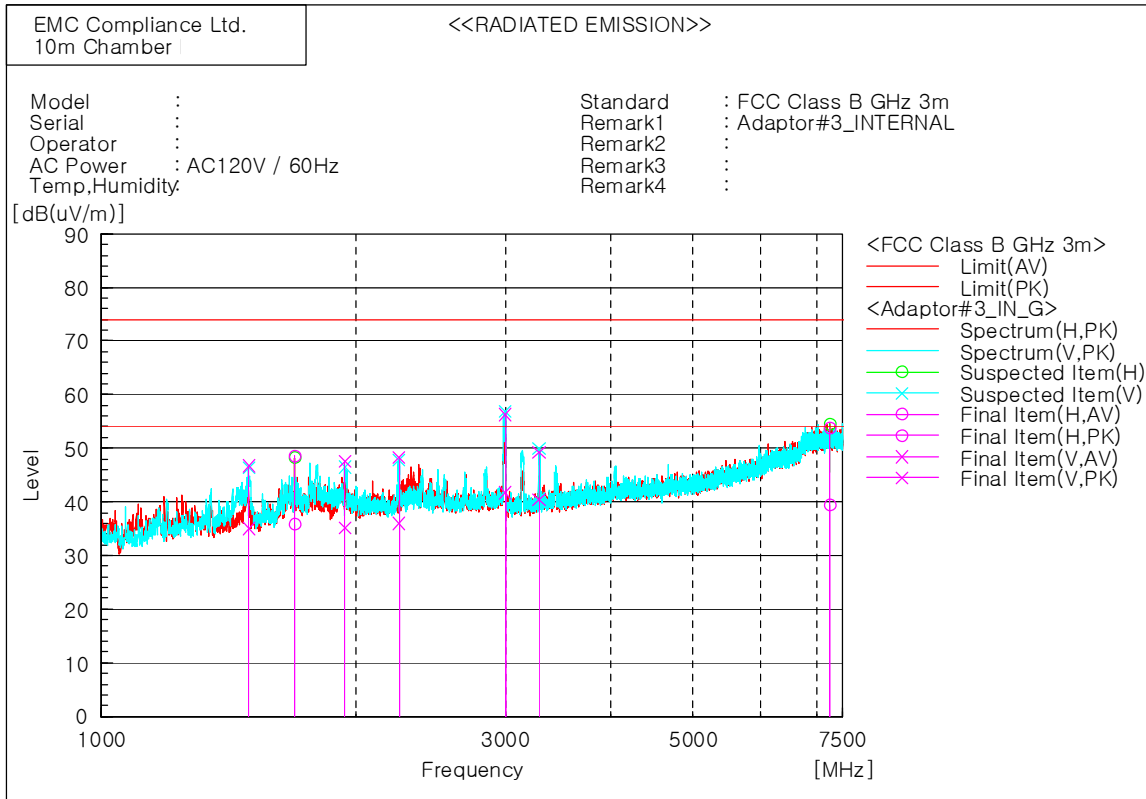
* 1 GHz ~ 7.5 GHz (HR44-500) _Test#5



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]	Remark
1	1492.375	V	42.7	55.2	-8.5	34.2	46.7	54.0	74.0	19.8	27.3	100.0	11.1	
2	1671.125	H	43.3	55.8	-7.1	36.2	46.7	54.0	74.0	17.8	25.3	100.0	324.2	
3	1793.000	V	43.6	56.4	-6.4	37.2	50.0	54.0	74.0	16.8	24.0	100.0	174.2	
4	2249.625	V	39.8	53.2	-4.3	35.5	48.9	54.0	74.0	18.5	25.1	100.0	11.1	
5	3000.375	V	44.2	58.3	-3.1	41.1	55.2	54.0	74.0	12.9	18.8	100.0	346.7	
6	3298.563	V	41.7	51.8	-1.9	39.8	49.9	54.0	74.0	14.2	24.1	100.0	20.8	
7	7158.751	V	28.9	42.8	11.1	40.0	53.9	54.0	74.0	14.0	20.1	100.0	231.3	

* 1 GHz ~ 7.5 GHz (HR44-500) _Test#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]	Remark
1	1493.188	V	43.5	55.2	-8.5	35.0	46.7	54.0	74.0	19.0	27.3	100.0	359.8	
2	1693.063	H	42.8	55.6	-7.0	35.8	48.6	54.0	74.0	18.2	25.4	100.0	267.7	
3	1940.875	V	40.8	53.1	-5.6	35.2	47.5	54.0	74.0	18.8	26.5	100.0	359.8	
4	2246.375	V	40.3	52.6	-4.3	36.0	48.3	54.0	74.0	18.0	25.7	100.0	11.4	
5	2996.750	V	44.8	59.4	-3.1	41.7	56.3	54.0	74.0	12.3	17.7	100.0	351.4	
6	3295.563	V	42.3	51.2	-2.0	40.3	49.2	54.0	74.0	13.7	24.8	100.0	21.9	
7	7243.251	H	28.4	42.8	11.0	39.4	53.8	54.0	74.0	14.6	20.2	100.0	321.7	

7. E.U.T. photographs

Whole



Front View



Rear View



Left View



Right View



Top View



Bottom View

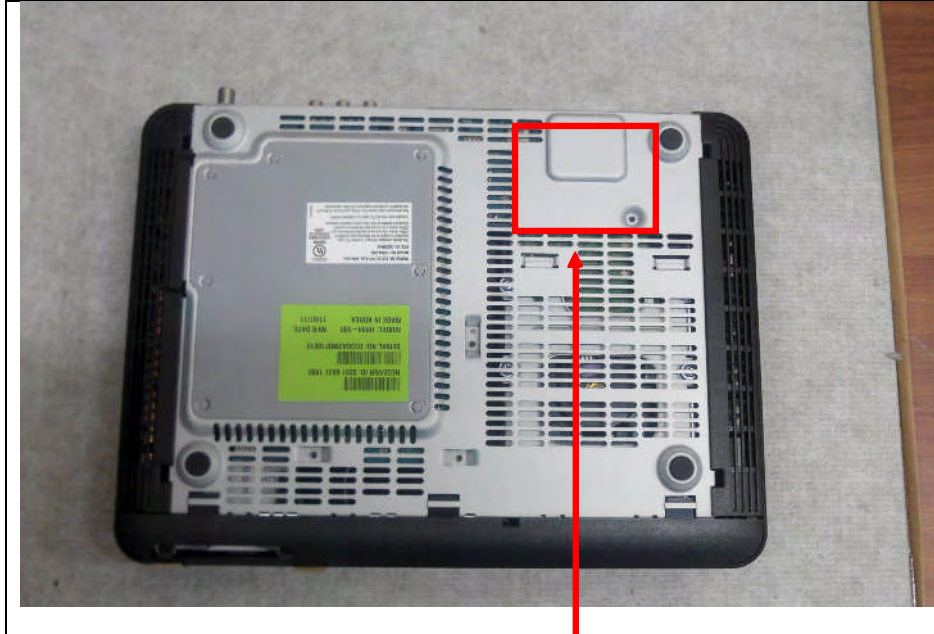


Bottom View





Label



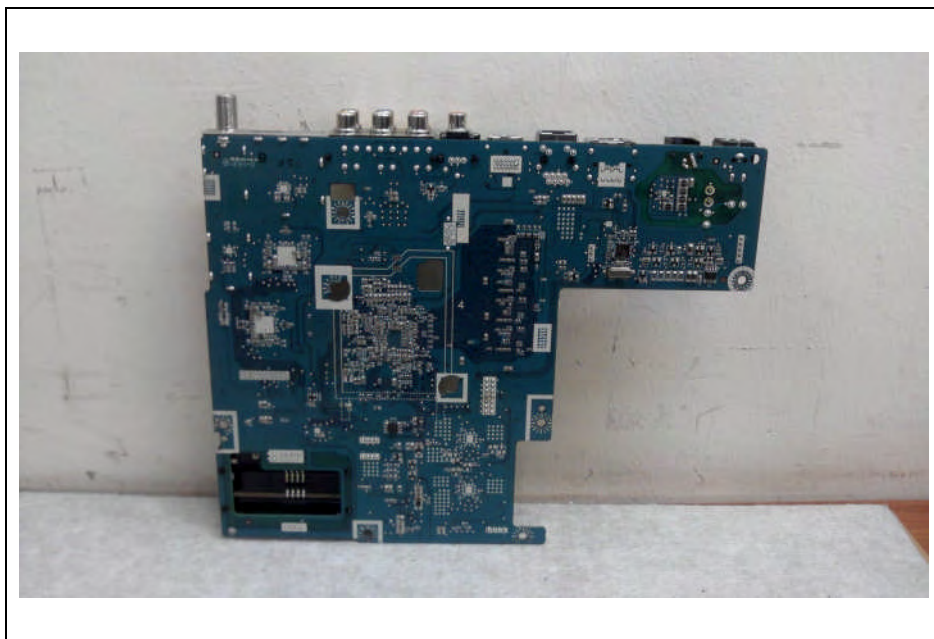
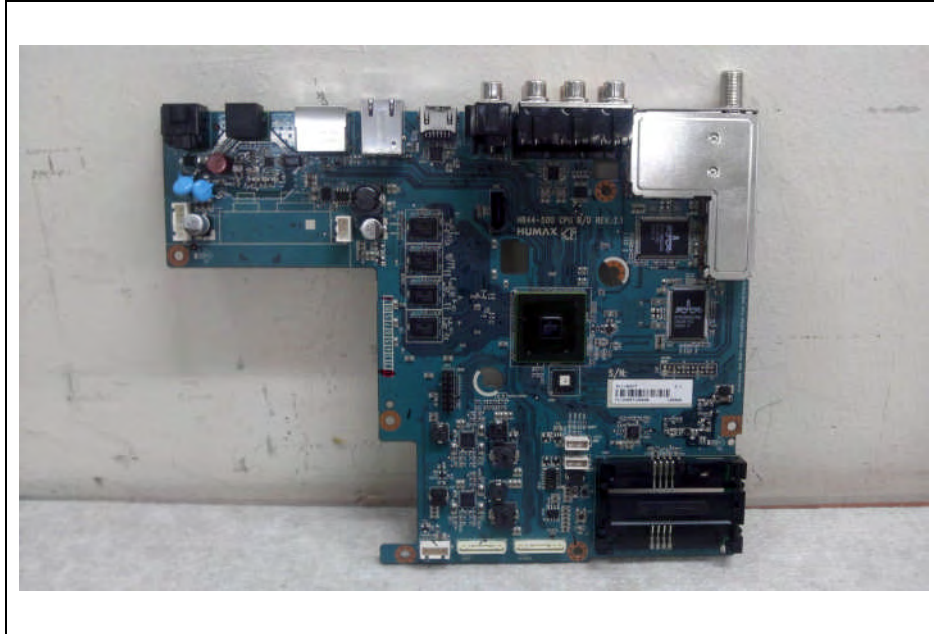
FCC Label Location



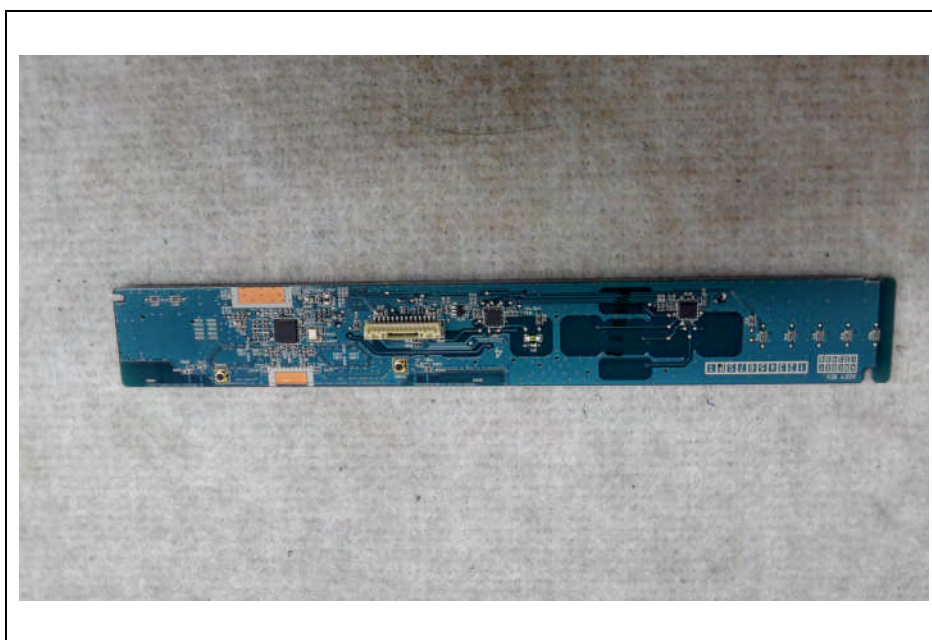
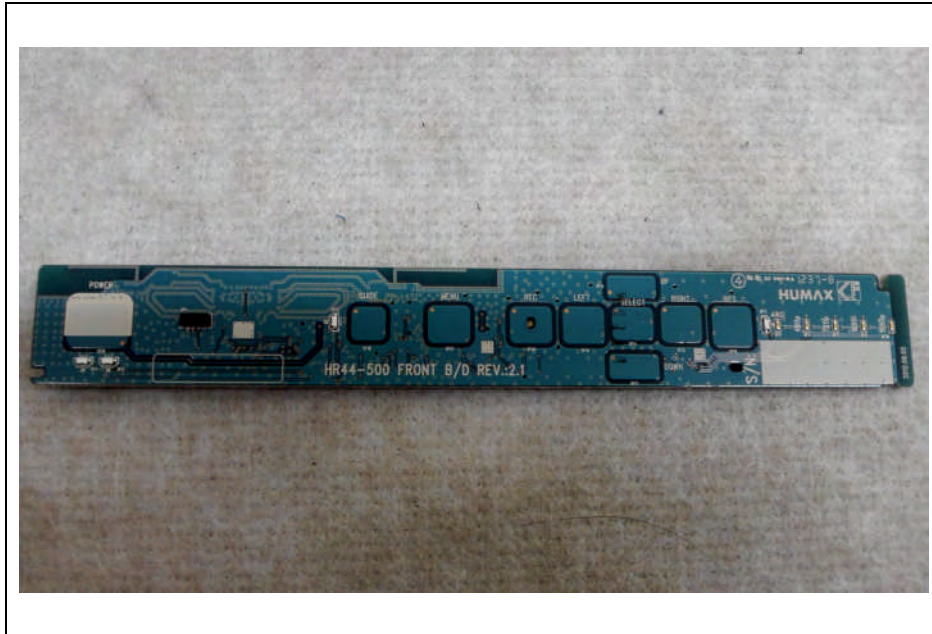
Inside



Main Board

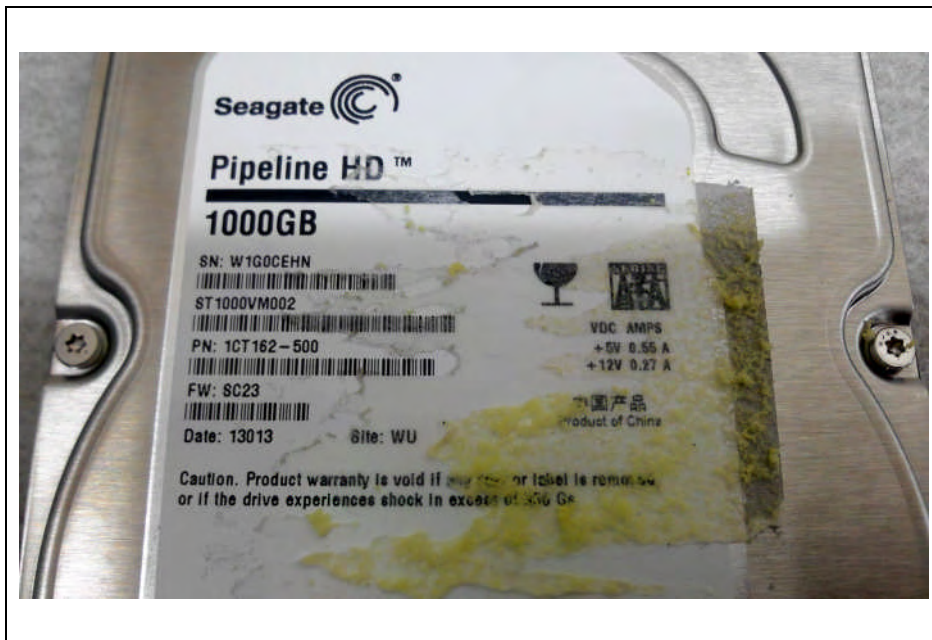


Button Board

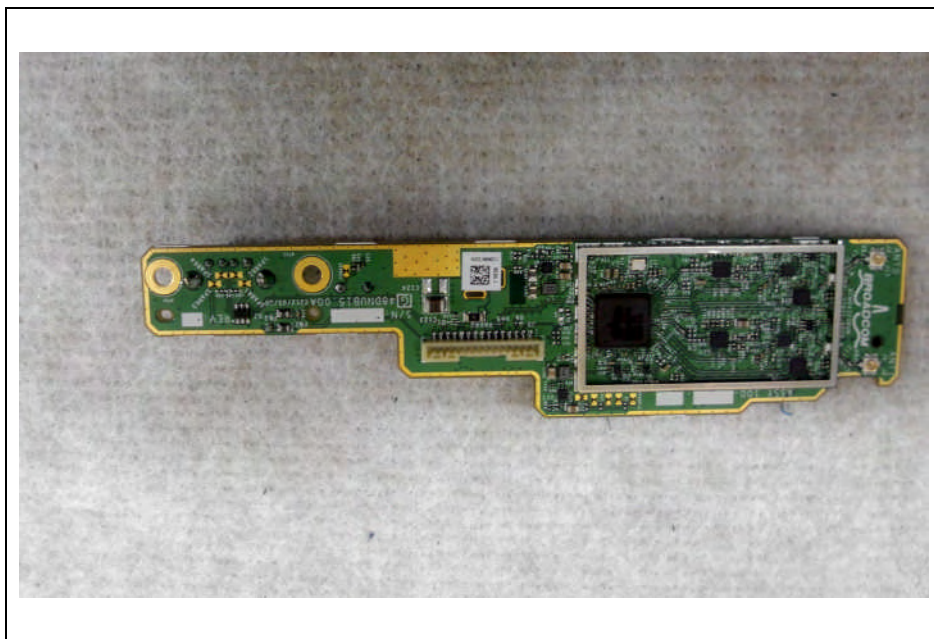
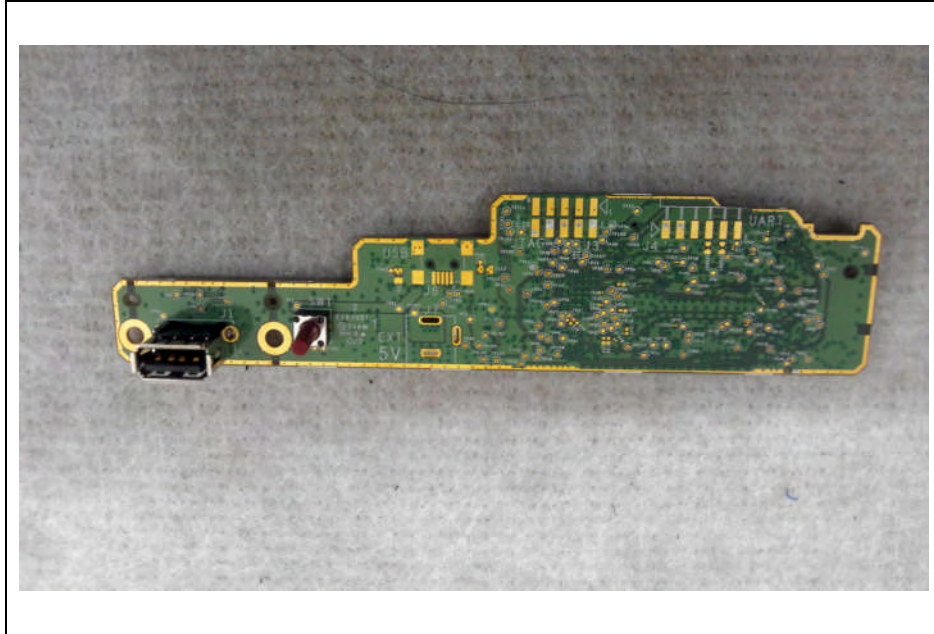


Internal HDD(1000GB)





Wireless Board



AC/DC Adaptor#1



AC/DC Adaptor#2



