

 ESTECH Co., Ltd. Rm 1015, World Venture Center II, 426-5 Gasan-dong, Guncheon-gu, Seoul, 158-803, Korea	   		Electromagnetic Interference Test Report

Test Report for FCC

FCC ID:BEJASW1000UA

Report Number		ESTF150904-006			
Applicant	Company name	LG Electronics USA			
	Address	1000 Sylvan Avenue Englewood Cliffs, NJ 07632			
	Telephone	847-941-8373			
Product	Product name	Media Box			
	Model name	ASW1000-UA	Manufacturer	LG Electronics Inc.	
	Serial number	NONE	Country of origin	KOREA	
Test date	2009-4-13 ~ 2009-4-14		Date of issue	15-Apr-09	
Testing location	ESTECH. Co., Ltd. 97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea				
Standard	FCC PART 15 2007 , ANSI C 63.4 2003 , ICES-003				
Test item	☒ Conducted Emission	☐ Class A	☒ Class B	Test result	OK
	☒ Radiated Emission	☐ Class A	☒ Class B	Test result	OK
	☒ Antenna conducted power	☐ Class A	☐ Class B	Test result	OK
Measurement facility registration number		94696			
Tested by	Senior Engineer H.H.Lee 				
Reviewed by	Engineering Manager J.M.Yang 				
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable				
* Note - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test result based on a single evaluation of one sample of the above mentioned					

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Appendix 1. Spectral diagram(HDMI & RGB)

Appendix 2. Spectral diagram(AV)



1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report. ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co. Ltd

Head Office : Rm 1015, World Venture Center II, 426-5, Gasan-dong, Geumcheon-gu, Seoul, Korea
(Safety & Telecom. Test Lab)

EMC Test Lab : 58-1 Osan-Ri, GaNam-Myon, YeoJoo-Gun, KyungKi-Do, Korea
97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea

1.3 Official Qualification(s)

KCC : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements

FCC : Filed Laboratory at Federal Communications Commission

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test

Product Name : Media Box
 Model Number : ASW1000-UA
 Serial Number : NONE
 Manufacturer : LG Electronics Inc.
 Country of origin : KOREA
 Rating : INPUT:AC100-240V ~ 50 /60Hz
 Receipt Date : 1-Apr-09
 X-tal list(s) : 4MHz, 3.69MHz, 24MHz, 12MHz, 25MHz

2.2 General descriptions of EUT

MODELS	Media Box
Dimensions (Width x Height x Depth)	16.7 x 2.7 x 9.5 inches 426.0 x 68.6 x 234.5 mm
Weight	5.7 lbs / 2.6 kg
Power requirement	AC100-240V ~ 50/60Hz
Television System	NTSC-M, ATSC, 64 & 256 QAM
Program Coverage	VHF 2-13, UHF 14-69, CATV 1-135, DTV 2-69, CADTV 1-135
External Antenna Impedance	75 ohm

3. Test Standards

Test Standard : FCC PART 15 (2007) & ICES-003

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.4 (2003)

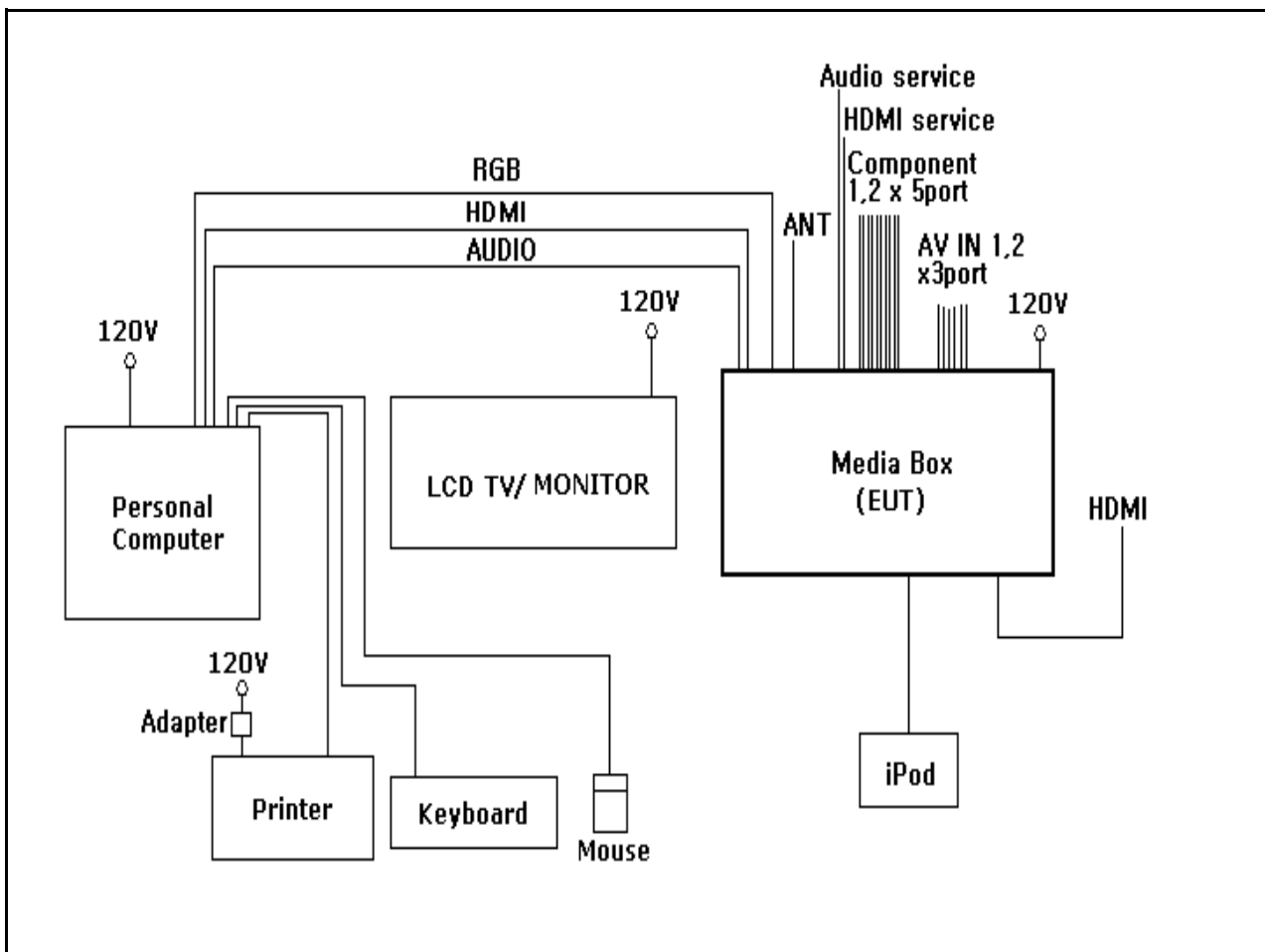
This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.

4. Measurement Condition(HDMI & RGB)

4.1 EUT Operation.

- * The EUT was in the following operation mode during all testing
- * The operational conditions of the EUT was determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission
- * After setting as test arrangment diagram, we tested the EUT under continuous displaying "H" character

4.2 Configuration and Peripherals

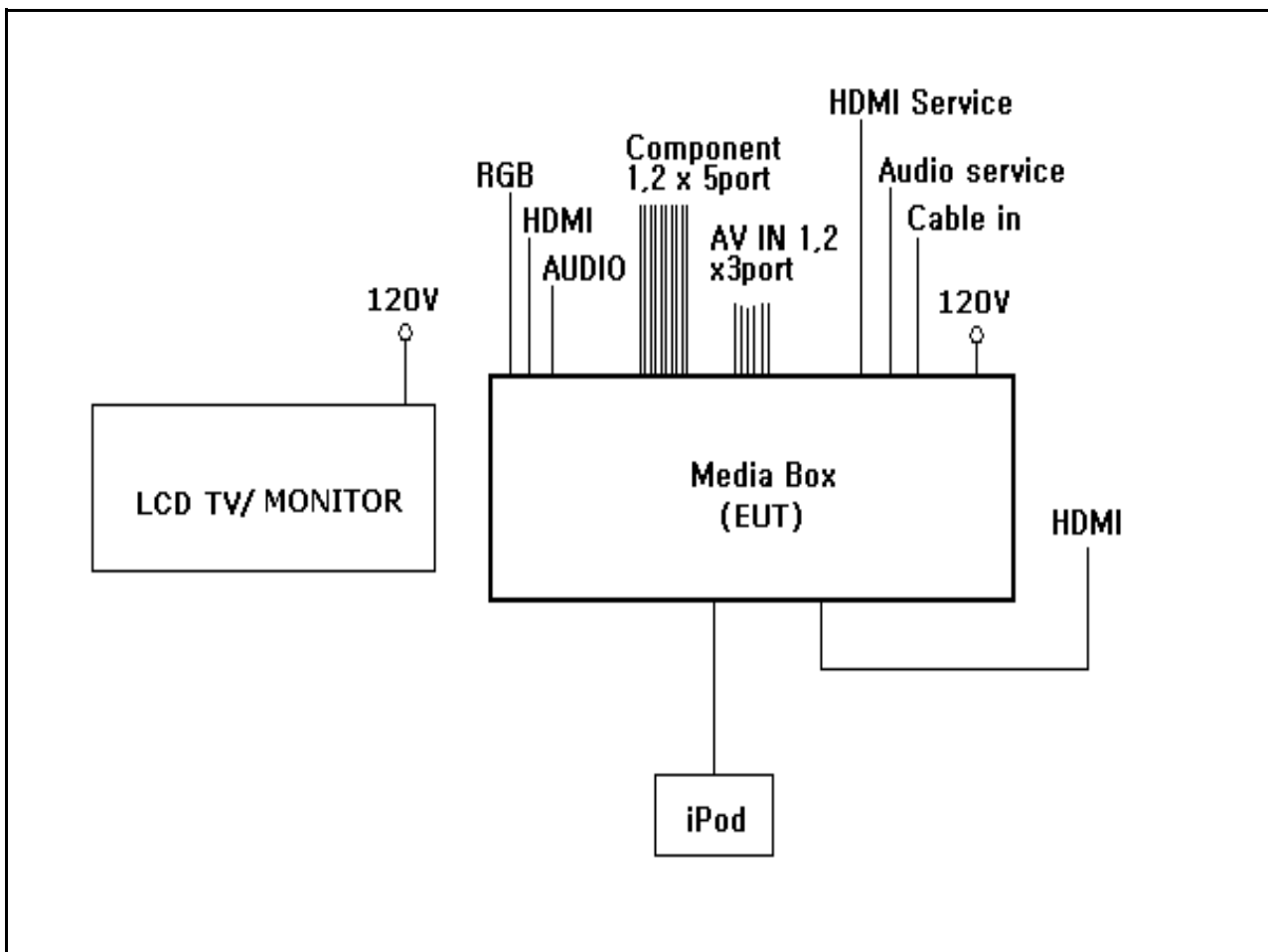


4. Measurement Condition(AV)

4.1 EUT Operation.

- * The EUT was in the following operation mode during all testing
- * The EUT is receiving continuously the color pattern from external generator and is displaying the color pattern on the monitor screen.
- * The operational conditions of the EUT was determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission

4.2 Configuration and Peripherals



4.3 EUT and Support equipment(HDMI & RGB)

Equipment Name	Model	S/N	Manufacturer	Remark (FCC ID)
Media Box	ASW1000-UA	NONE	LG Electronics Inc.	EUT
LCD TV/MONITOR	55 LH85-UC	NONE	LG Electronics Inc.	-
Keyboard	1047	7691401962096	Microsoft	-
Mouse	Wheel Mouse Optical	3902C693	Microsoft	-
iPod	A1136	9C6453A6V9K	Apple Computer Inc.	-
Printer	MJC-5750	NA34BFFP313555K	SAMSUNG ELECTRONICS(SHANDONG) DIGITAL PRINTING CO.,LTD.	-
Adapter	PA8040WB	0703016326	Bestec Electronics (DongGuan)Co.,Ltd.	-

4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Media Box	Component 1 x5port	-	-	2	N	
Media Box	component 2 x5port	-	-	2	N	
Media Box	AV in 1 x 3port	-	-	2	N	
Media Box	AV in 2 x 3port	-	-	2	N	
Media Box	ANT	-	-	2	N	
Media Box	HDMI	-	-	2	Y	
Media Box	USB	iPid	USB	1	Y	
Media Box	HDMI	Personal Computer	HDMI	2	Y	
Media Box	RGB	Personal Computer	RGB	2	Y	
Media Box	AUDIO	Personal Computer	AUDIO	2	N	
Media Box	AUDIO SERVICE	-	-	2	N	
Media Box	HDMI SERVICE	-	-	2	Y	
Personal Computer	USB	Mouse	USB	2	Y	
Personal Computer	USB	Keyboard	USB	2	Y	
Personal Computer	USB	Printer	USB	2	Y	
Printer	POWER	Adapter	-	2	N	

4.3 EUT and Support equipment (AV)

Equipment Name	Model	S/N	Manufacturer	Remark (FCC ID)
Media Box	ASW1000-UA	NONE	LG Electronics Inc.	EUT
LCD TV/MONITOR	55 LH85-UC	NONE	LG Electronics Inc.	-

4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Media Box	Component 1 x5port	-	-	2	N	
Media Box	component 2 x5port	-	-	2	N	
Media Box	AV in 1 x 3port	-	-	2	N	
Media Box	AV in 2 x 3port	-	-	2	N	
Media Box	HDMI	-	-	2	Y	
Media Box	RGB	-	-	2	Y	
Media Box	AUDIO	-	-	2	N	
Media Box	HDMI SERVICE	-	-	2	Y	
Media Box	AUDIO SERVICE	-	-	2	N	
Media Box	USB	iPid	USB	1	Y	
Media Box	Cable in	TV signal generator	Cable out	20	Y	
Media Box	HDMI	-	-	2	Y	

5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC Part 15 (2007) & ICES-003. The test setup was made according to ANSI C 63.4 (2003) on an open test site, which allows a 3m distance measurement. The EUT was placed in the center of wooden turntable. The height of this table was 0.8m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

5.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Test Receiver	ESVS10	Rohde & Schwarz	838562/002	2010. 1. 29
Spectrum Analyzer	R3273	ADVANTEST	110600592	2009. 6. 09
LogBicon Antenna	VULB 9160	Schwarzbeck	3142	2009. 5. 15
Amplifier	8447F	HP	2805A02972	2009. 6. 26
Turn Table	2087	EMCO	2129	-
Antenna Mast	2070-01	EMCO	9702-203	-
ANT Mast Controller	2090	EMCO	1535	-
Turn Table Controller	2090	EMCO	1535	-

5.2 Environmental Condition

Test Place : Open site(3m)
 Temperature (°C) : 15 °C
 Humidity (%) : 39 %

5.3 Test data (HDMI)

Test Date : 14-Apr-09

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
38.99	16.10	V	1.0	11.55	1.0	40.0	28.61	-11.39
72.31	17.30	V	1.0	9.40	1.3	40.0	28.00	-12.00
123.52	15.70	V	1.0	11.46	1.8	43.5	28.93	-14.57
133.03	20.00	H	4.0	12.22	1.9	43.5	34.07	-9.43
171.00	20.30	V	1.0	11.83	2.2	43.5	34.34	-9.17
218.51	17.40	V	1.0	10.31	2.5	46.0	30.22	-15.78
246.99	15.10	V	1.0	11.30	2.8	46.0	29.16	-16.84
256.46	26.00	V	1.0	11.60	2.8	46.0	40.42	-5.58
294.56	22.90	V	1.0	12.78	3.1	46.0	38.82	-7.18
379.98	20.10	H	1.9	14.68	3.9	46.0	38.65	-7.35
427.48	20.70	V	1.0	15.90	4.3	46.0	40.89	-5.11
465.48	17.10	V	1.0	16.71	4.6	46.0	38.37	-7.63
520.76	9.50	V	1.0	17.56	4.9	46.0	31.99	-14.01
684.04	11.60	V	1.0	20.39	6.2	46.0	38.16	-7.84

Remark	H : Horizontal, V : Vertical TEST MODE ; Resolution1920*1080(60Hz) at HDMI mode (Worse Case) *CL = Cable Loss-Amplifier Gain(In case of above1000Mhz) *CL = Cable Loss(In case of below1000Mhz) *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120KHz for Quasi-peak detection at frequency below 1GHz.
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5.3 Test data (RGB)

Test Date : 14-Apr-09

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
74.22	20.40	V	1.0	9.09	1.3	40.0	30.81	-9.19
110.87	13.40	V	1.0	10.31	1.6	43.5	25.34	-18.16
127.05	15.60	V	1.0	11.74	1.8	43.5	29.12	-14.38
148.37	17.10	V	1.0	12.75	2.0	43.5	31.84	-11.66
170.36	13.90	H	4.0	11.88	2.2	43.5	27.99	-15.51
222.81	14.70	H	4.0	10.46	2.5	46.0	27.71	-18.29
237.71	10.70	V	1.0	10.97	2.7	46.0	24.34	-21.66
278.01	13.80	V	1.0	12.27	3.1	46.0	29.14	-16.86
348.46	14.90	V	1.0	13.98	3.6	46.0	32.51	-13.49
402.31	9.00	H	1.6	15.20	4.0	46.0	28.23	-17.77
522.31	12.10	H	1.2	17.60	4.9	46.0	34.64	-11.36
663.63	6.20	H	1.2	20.20	6.1	46.0	32.49	-13.51

Remark	H : Horizontal, V : Vertical TEST MODE ; Resolution 1920*1080(60Hz) at RGB mode (Worse Case) *CL = Cable Loss-Amplifier Gain(In case of above 1000Mhz) *CL = Cable Loss(In case of below 1000Mhz) *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120KHz for Quasi-peak detection at frequency below 1GHz.
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5.3 Test data (AV)

Test Date : 14-Apr-09

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
32.17	14.50	V	1.0	11.17	0.9	40.0	26.57	-13.43
57.24	18.30	V	1.0	11.88	1.2	40.0	31.33	-8.67
114.13	13.00	V	1.0	10.62	1.7	43.5	25.29	-18.21
148.32	15.90	V	1.0	12.75	2.0	43.5	30.65	-12.85
170.51	9.80	H	2.5	11.87	2.2	43.5	23.88	-19.62
222.73	21.00	H	2.3	10.46	2.5	46.0	34.01	-11.99
256.48	15.60	V	15.6	11.60	2.8	46.0	30.02	-15.98
295.99	24.10	V	24.1	12.83	3.2	46.0	40.08	-5.92
330.74	17.80	H	17.8	13.60	3.5	46.0	34.90	-11.10
395.76	13.90	H	13.9	15.04	4.0	46.0	32.92	-13.08
430.36	9.10	H	9.1	15.98	4.3	46.0	29.40	-16.60
520.23	10.70	V	10.7	17.55	4.9	46.0	33.17	-12.83
596.74	8.10	V	8.1	19.36	5.4	46.0	32.91	-13.09
740.14	4.60	V	4.6	21.60	6.6	46.0	32.79	-13.21
Remark	H : Horizontal, V : Vertical TEST MODE ; Resolution1920*1080(60Hz) at AV mode (Worse Case) *CL = Cable Loss-Amplifier Gain(In case of above1000Mhz) *CL = Cable Loss(In case of below1000Mhz) *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120KHz for Quasi-peak detection at frequency below 1GHz.							

6. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 to 30 MHz was measured in accordance to FCC Part 15 (2007) & ICES-003. The test setup was made according to ANSI C 63.4 (2003) in a shielded. The EUT was placed on a non-conductive table at least 80 above the ground plan. A grounded vertical reference plane was positioned in a distance of 40cm from the EUT. The distance from the EUT to other metal surfaces was at least 0.8m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0m.. The test receiver with Quasi Peak detector complies with CISPR 16.

6.1 Measurement equipments (HDMI & RGB)

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
LISN	NNLA8120A	Schwarzbeck	8120161	2010. 2. 21
LISN	ESH3-Z5	Schwarzbeck	838979/010	2010. 2. 21
TEST Receive	ESPI7	Rohde & Schwarz	100185	2009. 8. 27
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	2009. 9. 10

6.1-1 Measurement equipments (AV)

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
LISN	NNLA8120A	Schwarzbeck	8120161	2010. 2. 21
LISN	ESH3-Z5	Schwarzbeck	838979/010	2010. 2. 21
TEST Receive	ESPI7	Rohde & Schwarz	100185	2009. 8. 27
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	2009. 9. 10
TV SIGNAL GENERATOR	54200	FLUKE	54200PN2	2009. 7. 09

6.2 Environmental Condition

Test Place : Shield Room
 Temperature (°C) : 21 °C
 Humidity (%) : 42 %

6.3 Test data (HDMI & RGB)

Test Date : 13-Apr-09

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dBμV)	Reading (dBμV)	Result (dBμV)	Limit (dBμV)	Reading (dBμV)	Result (dB)
0.16	0.09	0.2	N	65.46	56.19	56.51	55.46	45.28	45.60
0.17	0.09	0.2	H	64.86	30.04	30.36	54.86	19.55	19.87
0.24	0.09	0.2	N	62.13	46.37	46.69	52.13	36.73	37.05
0.32	0.09	0.2	N	59.73	37.03	37.36	49.73	28.26	28.59
0.40	0.10	0.3	H	57.83	37.13	37.52	47.83	32.75	33.14
0.48	0.10	0.3	H	56.36	39.79	40.24	46.36	36.01	36.46
0.56	0.10	0.4	H	56.00	33.15	33.62	46.00	30.94	31.41
0.64	0.10	0.4	N	56.00	34.85	35.33	46.00	32.14	32.62
0.72	0.11	0.4	H	56.00	36.01	36.51	46.00	33.88	34.38
0.88	0.11	0.4	N	56.00	33.93	34.48	46.00	31.40	31.95
1.44	0.12	0.5	N	56.00	33.78	34.37	46.00	31.34	31.93
1.84	0.14	0.4	H	56.00	35.93	36.50	46.00	30.96	31.53
6.23	0.28	0.7	N	60.00	34.25	35.24	50.00	28.63	29.62
8.47	0.33	0.8	N	60.00	35.67	36.83	50.00	32.16	33.32
9.12	0.35	0.9	H	60.00	34.85	36.05	50.00	29.66	30.86
11.95	0.49	0.9	N	60.00	41.28	42.69	50.00	39.52	40.93
25.03	0.89	1.3	H	60.00	36.21	38.39	50.00	27.69	29.87
25.72	0.88	1.3	N	60.00	36.68	38.88	50.00	29.45	31.65
Remark	H : Hot Line, N : Neutral Line								

6.3 Test data (AV)

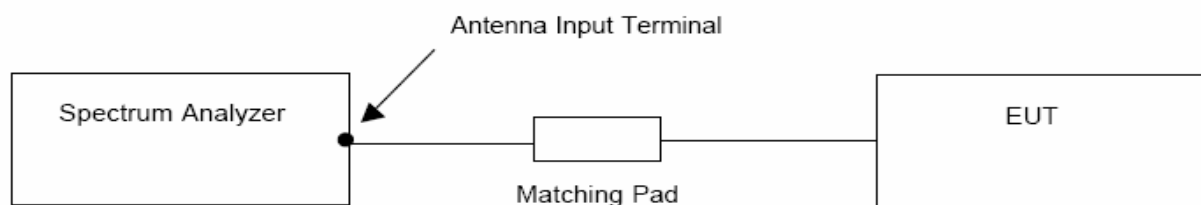
Test Date : 13-Apr-09

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dBμV)	Reading (dBμV)	Result (dBμV)	Limit (dBμV)	Reading (dBμV)	Result (dB)
0.16	0.09	0.2	H	65.41	55.21	55.53	55.41	45.06	45.38
0.24	0.09	0.2	N	62.06	46.11	46.43	52.06	36.66	36.98
0.32	0.09	0.2	N	59.66	36.26	36.60	49.66	27.74	28.08
0.40	0.10	0.3	N	57.83	37.29	37.68	47.83	33.31	33.70
0.48	0.10	0.3	H	56.30	40.02	40.47	46.30	36.30	36.75
0.64	0.10	0.4	N	56.00	34.78	35.26	46.00	32.69	33.17
0.72	0.11	0.4	H	56.00	35.04	35.54	46.00	30.64	31.14
2.73	0.16	0.5	N	56.00	34.14	34.77	46.00	30.06	30.69
3.37	0.18	0.5	N	56.00	34.31	35.00	46.00	30.47	31.16
3.85	0.20	0.5	N	56.00	36.97	37.71	46.00	35.83	36.57
4.66	0.22	0.6	N	56.00	38.10	38.92	46.00	35.46	36.28
5.86	0.26	0.7	N	60.00	38.90	39.84	50.00	35.10	36.04
6.18	0.28	0.7	N	60.00	36.87	37.85	50.00	33.25	34.23
8.67	0.34	0.8	N	60.00	36.67	37.84	50.00	34.46	35.63
9.23	0.35	0.9	H	60.00	36.47	37.67	50.00	35.03	36.23
22.72	0.84	1.2	H	60.00	36.81	38.87	50.00	32.14	34.20
25.06	0.89	1.3	N	60.00	39.94	42.12	50.00	32.44	34.62
Remark	H : Hot Line, N : Neutral Line								

7. Measurement of Antenna conducted power

Power on the receive antenna terminals was to be determined by measurement of the voltage present at these terminals. Antenna-conducted power measurements is performed with the EUT antenna terminals connected directly to a spectrum analyzer, if the antenna impedance matches the impedance of the measuring instrument. Otherwise, use an impedance-matching network to connect the measuring instrument to the antenna terminals of the EUT. Losses in decibels in any impedance-matching network used is added to the measured value in dBμV.

With the EUT tuned to one of the frequency over which device operates , measure both the frequency and voltage present at the antenna input terminals over the frequency range specified in the individual equipment requirements. Repeat this measurement with the receiver tuned to another frequency until the number of frequencies specified have been successively measured. Power on the receive antenna terminals is the ratio of V^2/R , where V is the loss-corrected voltage measured at the antenna terminals, and R is the impedance of the measuring instrument.



7.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Matching Pad	358.5414.02	R/S	862571/051	-
Spectrum Analyzer	R3273	ADVANTEST	110600592	2009. 6. 09

7.2 Environmental Condition

Test Place : Shielded Room
 Temperature (°C) : 21 °C
 Humidity (%) : 42 %

7.3 Test data (AV)

Test date : 13-Apr-09

[illegible]

Notes :

1. Emission level = Reading level + Cable loss / Margin = limit - Emission level
2. Cable loss = Cable loss+Matching Pad
3. There is no detected the antenna conducted emission during the testing.

8. Photographs of test setup (HDMI & RGB)

8.1 Setup for Radiated Test : 30 ~ 1000 MHz

[Front]



[Rear]



8. Photographs of test setup (AV)

8.1 Setup for Radiated Test : 30 ~ 1000 MHz

[Front]



[Rear]

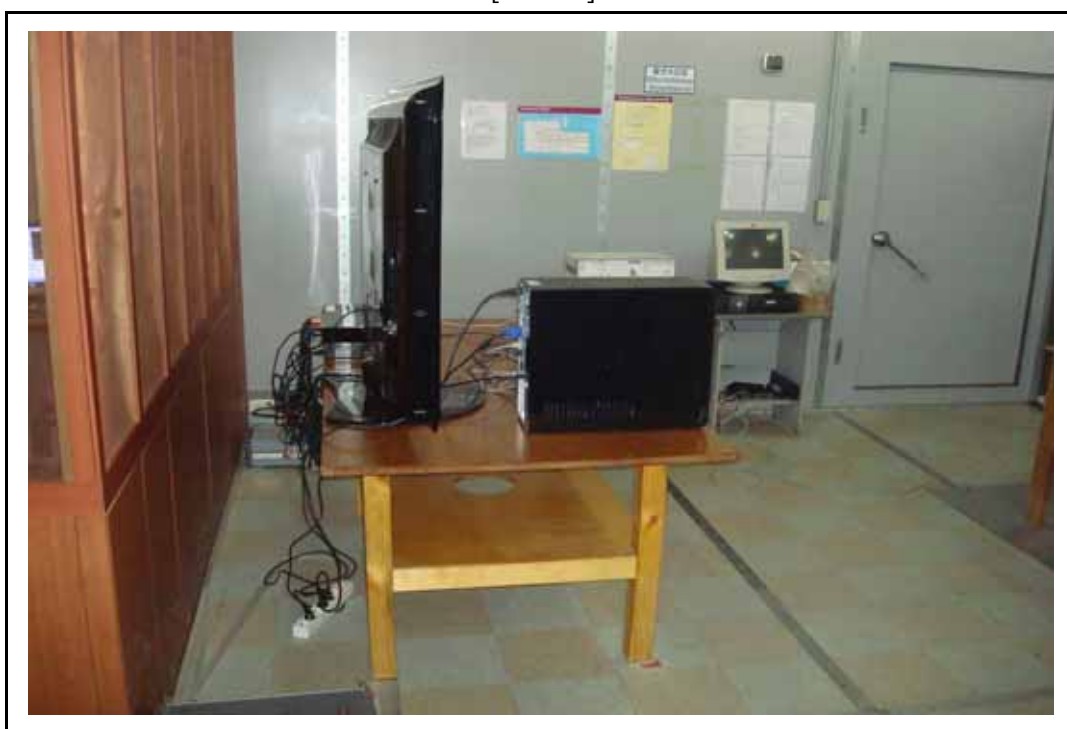


8.2 Setup for Conducted Test : 0.15 ~ 30 MHz (HDMI & RGB)

[Front]



[Rear]



8.2 Setup for Conducted Test : 0.15 ~ 30 MHz (AV)

[Front]



[Rear]



8.3 Antenna conducted power



9. Photographs of EUT

[Front]

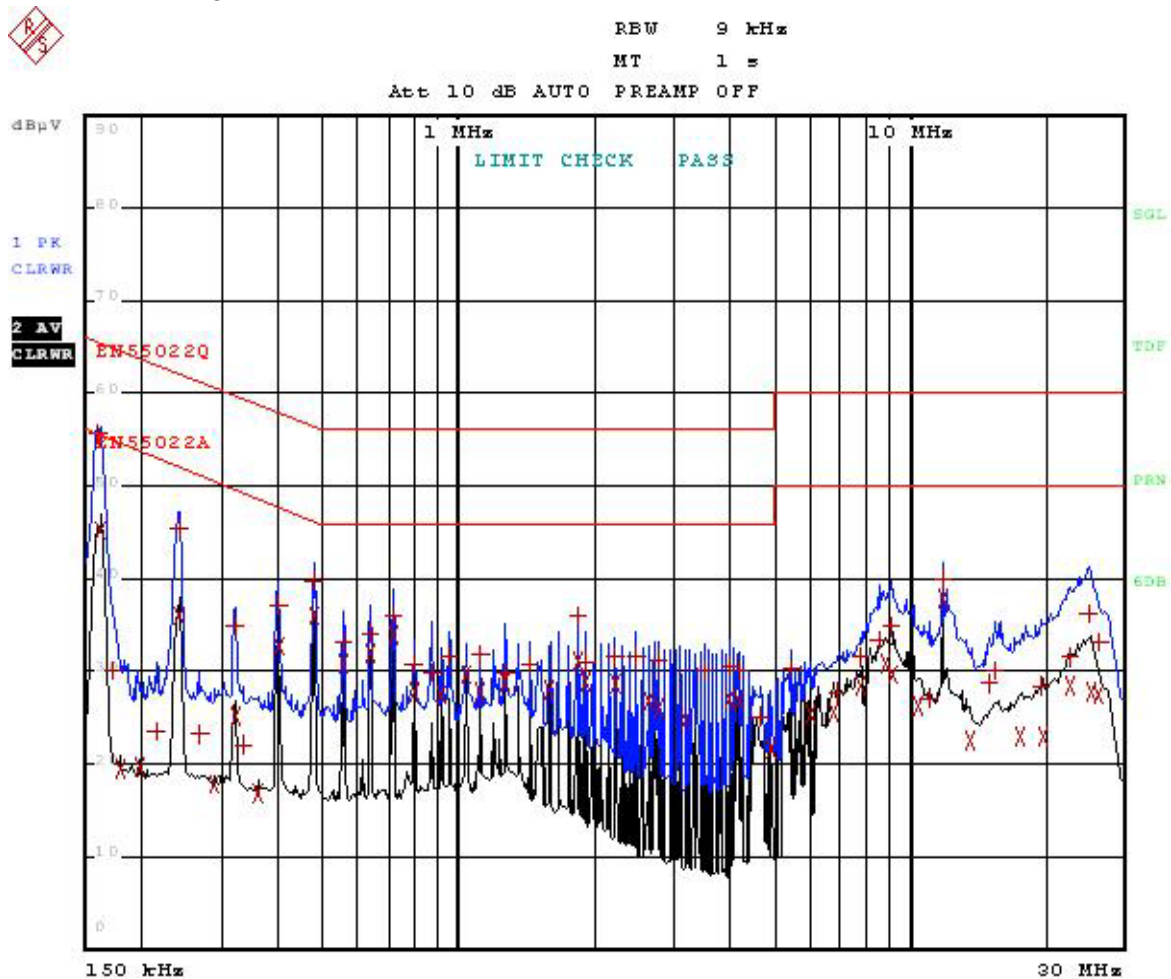


[Rear]



Appendix 1. Spectral diagram(HDMI & RGB)

*HOT



Comment: A3W1000-UA_NEUTRAL
Date: 13.APR.2009 17:10:23

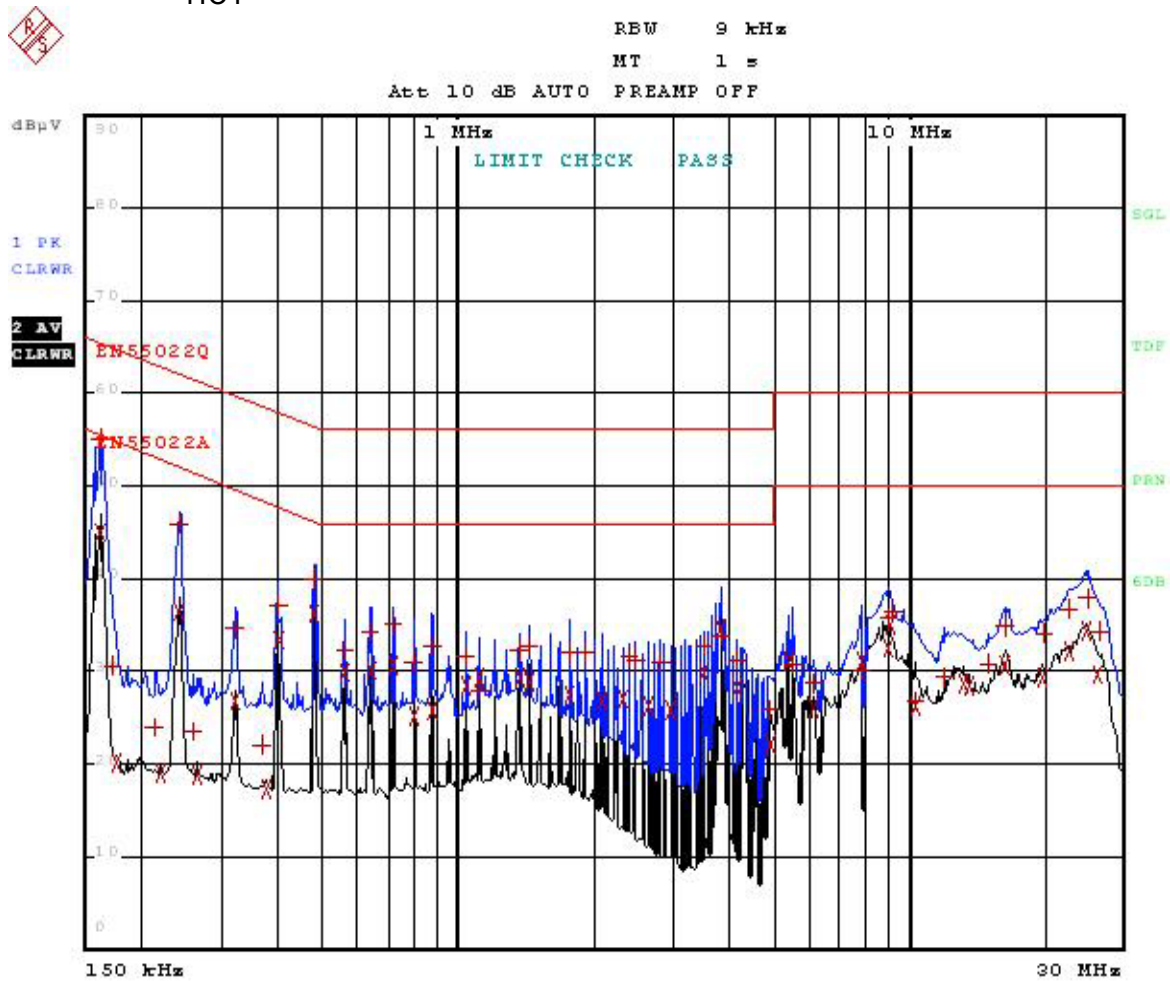
MT 1 5

The image displays a spectral plot with two traces, EN55022Q (red) and EN55022A (blue), plotted against frequency from 150 kHz to 30 MHz. The y-axis represents power spectral density in dBpV, ranging from 60 to 90. The plot includes a grid and various markers like '+' and 'x'. Text overlays include 'LIMIT CHECK PASS', '1 PK CLRWR', '2 AV CLRWR', and 'SGL TDF PRN GDB'.

EST-QP-20-01(0)-(F15)

Appendix 2. Spectral diagram(AV)

*HOT



Comment: ASW-1000-UA-HOT
Date: 13.APR.2009 11:40:45

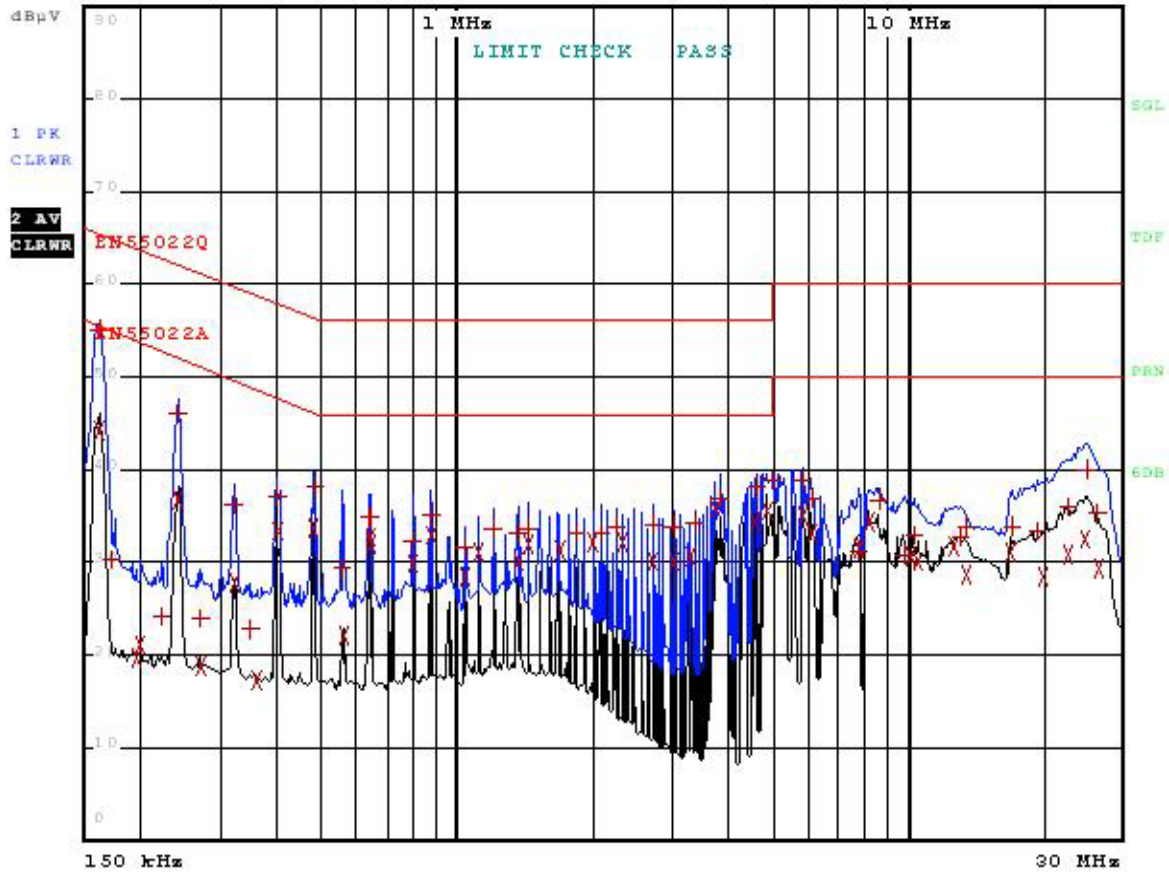
*NEUTRAL



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



Comment: A3W-1000-UA-NEUTRAL

Date: 13.APR.2009 11:45:36