

 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:BEJ50PA4500UA

Report Number		ESTF151201-002			
Applicant	Company name	LG Electronics USA			
	Address	1000 Sylvan Avenue Englewood Cliffs, NJ 07632			
	Telephone	847-941-8373			
Product	Product name	PLASMA TV/MONITOR			
	Model No.	50PA4500-UA	Manufacturer	LG Electronics Inc.	
	Serial No.	NONE	Country of origin	KOREA	
Test date	27-Dec-11		Date of issue	6-Jan-12	
Testing location	ESTECH Co., Ltd. 58-1 OSan-Ri Kanam-Myon, Yeoju-Gun, KyungKi-Do, Korea				
Standard	FCC PART 15 (2010) & ICES-003 , ANSI C 63.4 2003				
Test item	☒ Conducted Emission	☐ Class A	☒ Class B	Test result	OK
	☒ Radiated Emission	☐ Class A	☒ Class B	Test result	OK
Measurement facility registration number		94696			
Tested by	Senior Engineer D.H.Jung		(Signature)		
Reviewed by	Engineering Manager J.M.Yang		(Signature)		
Abbreviation	OK, Pass = Complied, Fail = Failed, N/A = not applicable				
* Note - Basic model : 50PA4500-UA - Additional model(s) : 50PA4500-UF and 50PA450C-UF - 50PA4500-UF and 50PA450C-UF was added according to marketing model from report No.ESTF151110-003 . - This test report was remeasured according to change components from report No.ESTF151110-003 . - 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. Special diagram

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 Kanam-Myon, Yeoju-Gun, 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 : PLASMA TV/MONITOR
 Model Number : 50PA4500-UA
 Serial Number : NONE
 Manufacturer : LG Electronics USA
 Country of origin : KOREA
 Rating : AC (100 – 240) V , (50 – 60) Hz
 Receipt Date : 27-Dec-11
 X-tal list(s) or
 Frequencies generated : 24 MHz , 25 MHz , 666 MHz(Max)

2.2 General descriptions of EUT

Power requirement		AC100 - 240 V ~ 50/60 Hz
Television System		NTSC-M, ATSC, 64 & 256 QAM
Program Coverage		VHF 2-13, UHF 14-69, CATV 1-135, DTV 2-69, CDTV 1-135
External Antenna Impedance		75 Ω
Environment condition	Operating Temperature	0 - 40°C
	Operating Humidity	Less than 80%
	Storage Temperature	-20 - 60°C
	Storage Humidity	Less than 85%

MODELS		50PA4500 (50PA4500-UA)
Dimensions (W x H x D)	With stand	1168.0 mm x 758.0 mm x 297.0 mm (45.9 inch x 29.8 inch x 11.6 inch)
	Without stand	1168.0 mm x 704.0 mm x 52.5 mm (45.9 inch x 27.7 inch x 2.0 inch)
Weight	With stand	26.2 kg (62.1 lbs)
	Without stand	25.8 kg (56.8 lbs)

3. Test Standards

Test Standard : FCC PART 15 (2010) & 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)

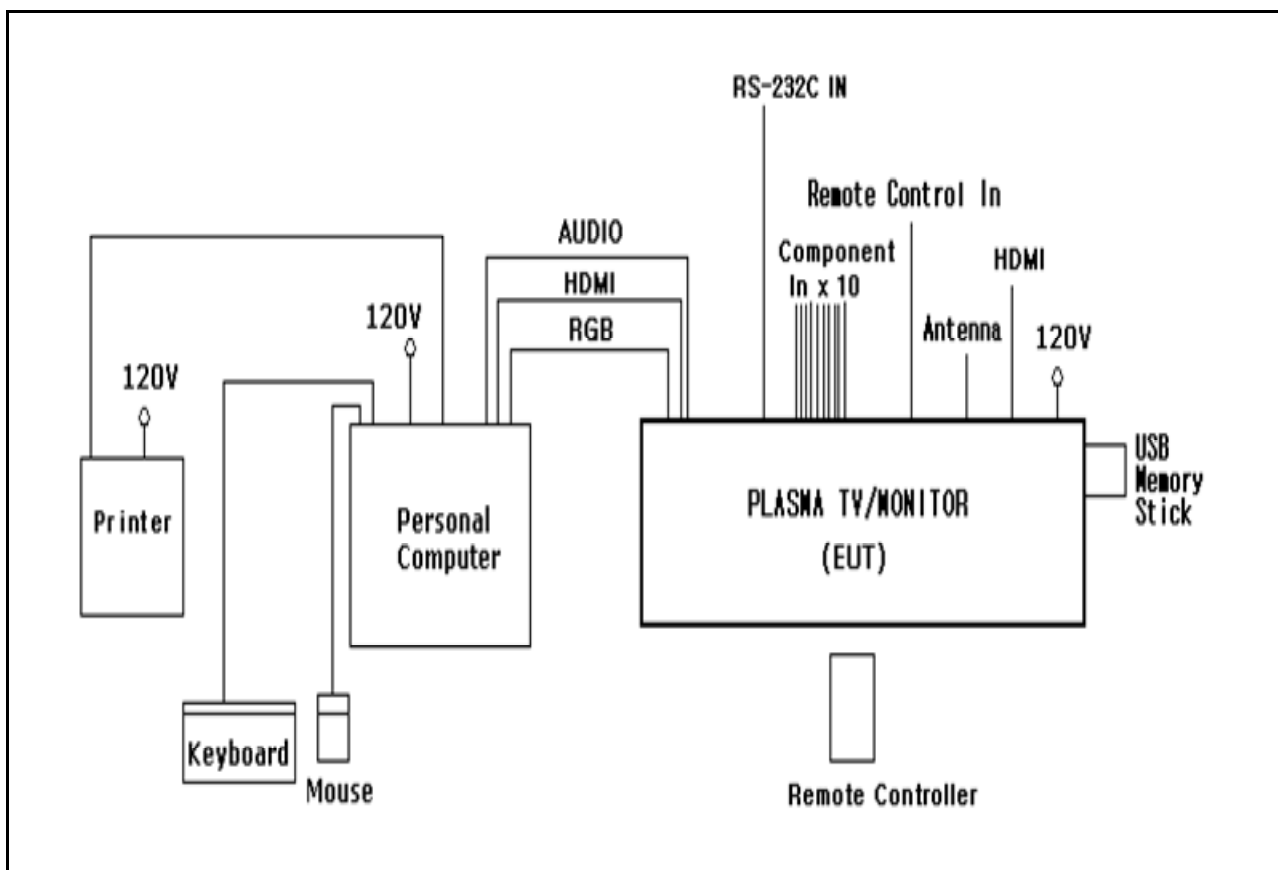
This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and 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

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 arrangement diagram, we tested the EUT under continuous displaying "H" character and playing Audio out /Video

4.2 Configuration and Peripherals



4.3 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
PLASMA TV/MONITOR	50PA4500-UA	NONE	LG Electronics Inc.	EUT
Personal Computer	DCMF	6RKPHBX	Dell Inc.	-
Printer	K10229	NONE	CANON	-
Keyboard	KU-0847	NONE	LOGITECH	-
Mouse	X802382	NONE	Microsoft Corporation	-
Remote Controller	NONE	NONE	LG Electronics Inc.	-
USB Memory Stick	NONE	NONE	NONE	-

4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
PLASMA TV/MONITOR	RGB	Personal Computer	RGB	2	Shielded	
PLASMA TV/MONITOR	HDMI	Personal Computer	HDMI	2	Shielded	
PLASMA TV/MONITOR	AUDIO	Personal Computer	AUDIO	2	Unshielded	
PLASMA TV/MONITOR	Component x 10 Port	-	-	2	Unshielded	
PLASMA TV/MONITOR	Antenna	-	-	2	Unshielded	
PLASMA TV/MONITOR	Remote Control In	-	-	2	Unshielded	
PLASMA TV/MONITOR	RS-232C IN	-	-	2	Unshielded	
PLASMA TV/MONITOR	USB	USB Memory Stick	USB	-	-	
PLASMA TV/MONITOR	HDMI	-	-	2	Shielded	
Personal Computer	USB	Keyboard	USB	2	Shielded	
Personal Computer	USB	Mouse	USB	2	Shielded	
Personal Computer	USB	Printer	USB	2	Shielded	

Remark : To meet the radiated emission ,three ferrite core attached at power,audio, RGB cable.

5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC PART 15 (2010) & ICES-003. The test setup was made according to ANSI C 63.4 (2003) on an open test site, which allows a 3 m distance measurement. The EUT was placed in the center of wooden turntable. The height of this table was 0.8 m. 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	27-Jan-12
Test Receiver	ESPI7	Rohde & Schwarz	100185	6-May-12
LogBicon Antenna	VULB 9160	Schwarzbeck	3106	14-Apr-12
Pre Amplifier	8447F	HP	2944A03711	11-Jan-12
Pre Amplifier	8449B	HP	3008A00581	27-Jan-12
Turn Table	2081-1.2M	EMCO	NONE	–
Antenna Mast	2070-1	EMCO	0005-2205	–
ANT Mast Controller	2090	EMCO	9612-1202	–
Horn Antenna	BBHA 9120 D	Schwarzbeck	352	22-Mar-12

5.2 Environmental Condition

Test Place : Open site(3 m)

RGB mode

Temperature (°C) : -2 °C

Humidity (%) : 49 % R.H.

HDMI mode

Temperature (°C) : -3 °C

Humidity (%) : 48 % R.H.

5.3 Test data (Below 1 GHz) – RGB MODE

Test Date : 27-Dec-11

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value(Quasi-peak)		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
40.17	42.00	V	1.0	10.88	-25.96	40.00	26.92	13.08
65.28	40.20	H	4.0	10.44	-24.72	40.00	25.92	14.08
115.84	38.50	H	4.0	10.45	-24.28	43.50	24.67	18.83
120.65	44.00	H	4.0	10.92	-24.19	43.50	30.73	12.77
133.65	36.30	H	4.0	11.96	-24.33	43.50	23.92	19.58
143.62	45.80	H	4.0	12.51	-24.35	43.50	33.96	9.54
168.00	42.50	H	4.0	12.17	-23.49	43.50	31.18	12.32
240.00	41.20	V	1.0	11.42	-22.87	46.00	29.75	16.25
264.02	40.00	V	1.0	12.75	-22.95	46.00	29.80	16.20
384.04	40.20	V	1.0	15.54	-23.90	46.00	31.84	14.16
432.00	41.80	V	1.0	17.33	-23.69	46.00	35.44	10.56
523.72	42.20	H	1.7	19.60	-23.66	46.00	38.14	7.86
Remark	H : Horizontal, V : Vertical *Reading = receiver reading + Amplifier Gain *CL = Cable Loss-Amplifier Gain *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection							
	The following test mode was scanned during the preliminary test :For RGB mode : 1920 x 1080 (60 Hz) , 1280 x 1024 (75 Hz) , 1024 x 768 (60 Hz), 800 x 600 (60 Hz). After the preliminary scan, highest radiated emission was detected at 1920 x 1080 (60 Hz) mode and the data of the worst case was recorded.							

5.3 Test data (Below 1 GHz) – HDMI MODE

Test Date : 27-Dec-11

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value(Quasi-peak)		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
42.00	43.00	V	1.0	11.09	-25.73	40.00	28.36	11.64
51.27	34.50	H	4.0	11.74	-25.68	40.00	20.56	19.44
62.45	39.80	H	4.0	10.81	-25.12	40.00	25.49	14.51
113.90	37.20	H	4.0	10.25	-24.32	43.50	23.13	20.37
137.91	38.40	H	4.0	12.29	-24.53	43.50	26.16	17.34
143.95	44.70	H	4.0	12.52	-24.33	43.50	32.89	10.61
168.02	41.50	H	4.0	12.17	-23.49	43.50	30.18	13.32
240.00	41.20	V	1.0	11.42	-22.87	46.00	29.75	16.25
256.51	40.00	H	4.0	12.21	-22.96	46.00	29.25	16.75
264.00	40.00	V	1.0	12.75	-22.95	46.00	29.79	16.21
384.03	39.50	V	1.0	15.54	-23.90	46.00	31.14	14.86
427.45	44.80	H	2.8	17.18	-23.64	46.00	38.34	7.66
507.80	34.30	H	2.0	18.72	-23.91	46.00	29.11	16.89
Remark	H : Horizontal, V : Vertical *Reading = receiver reading + Amplifier Gain *CL = Cable Loss-Amplifier Gain *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection The following test mode was scanned during the preliminary test :For HDMI Mode : 1920 x 1080 (60 Hz), 1280 x 1024 (60 Hz), 1360 x 768 (60 Hz), 800 x 600 (60 Hz). After the preliminary scan, highest radiated emission was detected at 1920 x 1080 (60 Hz) mode and the data of the worst case was recorded.							

5.3 Test data (Above 1 GHz)

Test Date : 27-Dec-11

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
Peak(RBW:1 MHz VBW:1 MHz)								
1459.69	48.40	H	1.5	25.11	-26.91	74.00	46.60	27.40
1459.69	52.14	V	1.0	25.11	-26.91	74.00	50.34	23.66
1598.64	48.62	H	1.3	25.36	-26.51	74.00	47.46	26.54
1598.64	45.48	V	1.2	25.36	-26.51	74.00	44.32	29.68
2593.52	40.10	H	1.0	27.52	-24.41	74.00	43.22	30.78
2593.52	43.25	V	1.0	27.52	-24.41	74.00	46.37	27.63
Average(RBW:1 MHz VBW:10 Hz)								
1459.69	36.80	H	1.5	25.11	-26.91	54.00	35.00	19.00
1459.69	36.82	V	1.0	25.11	-26.91	54.00	35.02	18.98
1598.64	34.20	H	1.3	25.36	-26.51	54.00	33.04	20.96
1598.64	33.92	V	1.2	25.36	-26.51	54.00	32.76	21.24
2593.52	33.95	H	1.0	27.52	-24.41	54.00	37.07	16.93
2593.52	35.50	V	1.0	27.52	-24.41	54.00	38.62	15.38
Remark	H : Horizontal, V : Vertical *Reading = receiver reading + Amplifier Gain *CL = Cable Loss-Amplifier Gain *The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 10 Hz for average detection at frequency above 1 GHz.							
	*Application method of the highest frequency is in the following *Highest frequency of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. *Highest frequency of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. *Highest frequency of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. *Highest frequency of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz,							

6. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 MHz to 30 MHz was measured in accordance to FCC PART 15 (2010) & ICES-003. The test setup was made according to ANSI C 63.4 (2003) in a shielded room. The EUT was placed on a non-conductive table at least 0.8 m above the ground plan. A grounded vertical reference plane was positioned in a distance of 0.4 m from the EUT. The distance from the EUT to other metal surfaces was at least 0.8 m. 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 1.0 m. The test receiver with Quasi Peak detector complies with CISPR 16.

6.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESHS 30	Rohde & Schwarz	828765/002	16-Dec-12
LISN	ESH2-Z5	POLARAD	872461/048	11-Jan-12
LISN	ESH3-Z5	Rohde & Schwarz	838979/025	27-Sep-12
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	21-Mar-12

6.2 Environmental Condition

Test Place : Shielded Room

Temperature (°C) : 25 °C

Humidity (% R.H.) : 40 % R.H.

6.3 Test data

Test Date : 27-Dec-11

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.16	0.10	0.35	H	65.46	45.56	46.01	55.46		
0.17	0.17	0.35	N	64.96	40.60	41.12	54.96		
0.19	0.10	0.36	H	64.04	41.63	42.09	54.04		
0.26	0.10	0.36	H	61.43	42.86	43.33	51.43		
0.39	0.18	0.37	N	58.06	35.29	35.84	48.06		
0.44	0.12	0.37	H	57.06	51.16	51.64	47.06		
0.89	0.14	0.43	H	56.00	46.38	46.95	46.00		
1.11	0.14	0.47	H	56.00	43.51	44.12	46.00		
1.56	0.16	0.45	H	56.00	41.13	41.74	46.00		
2.23	0.17	0.44	H	56.00	40.97	41.58	46.00		
2.72	0.18	0.43	H	56.00	42.12	42.74	46.00		
3.12	0.19	0.43	H	56.00	41.57	42.19	46.00		
5.28	0.24	0.39	H	60.00	34.87	35.50	50.00		
5.90	0.25	0.36	H	60.00	30.05	30.66	50.00		
6.29	0.26	0.34	H	60.00	37.63	38.22	50.00		
8.18	0.29	0.39	H	60.00	28.37	29.04	50.00		
8.79	0.29	0.43	H	60.00	29.26	29.99	50.00		
9.68	0.31	0.50	H	60.00	27.34	28.14	50.00		
Remark	H : Hot Line, N : Neutral Line *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading								



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7. Photographs of test setup

7.1 Setup for Radiated Test : 30 MHz ~ 1000 MHz

[Front]



[Rear]





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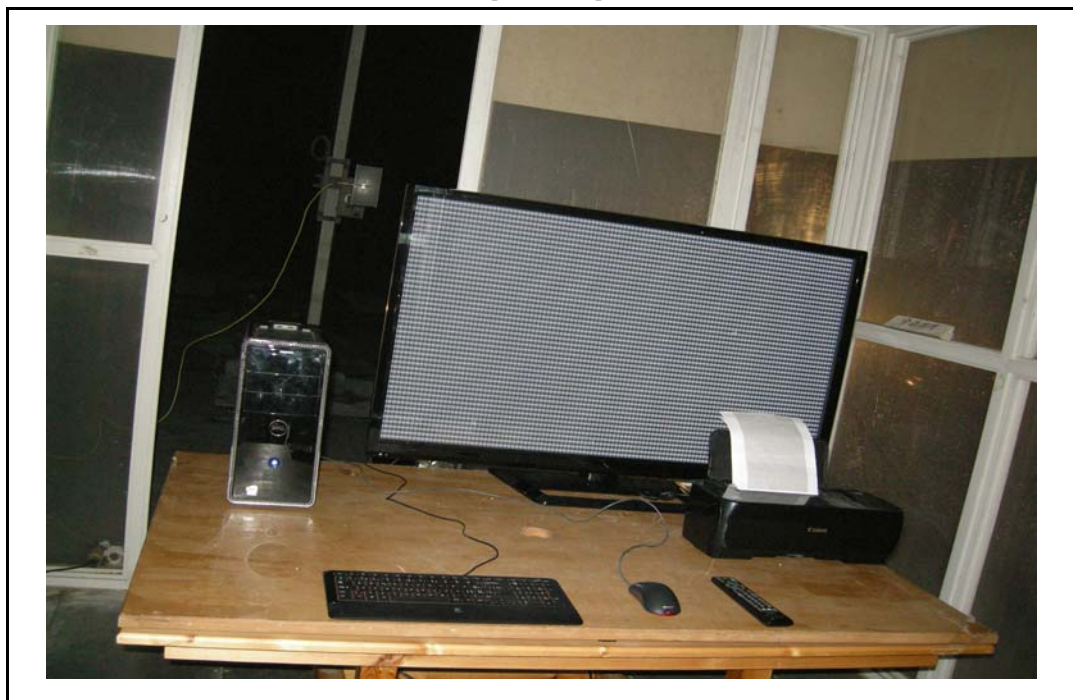
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7.2 Setup for Radiated Test : Above 1 GHz

[Front]



[Rear]





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7.3 Setup for Conducted Test : 0.15 MHz ~ 30 MHz

[Front]



[Rear]



8. Photographs of EUT

[Front]



[Rear]



Appendix 1. Special diagram

*HOT

ES TECH
HOT LINE

27 Dec 2011 01:26

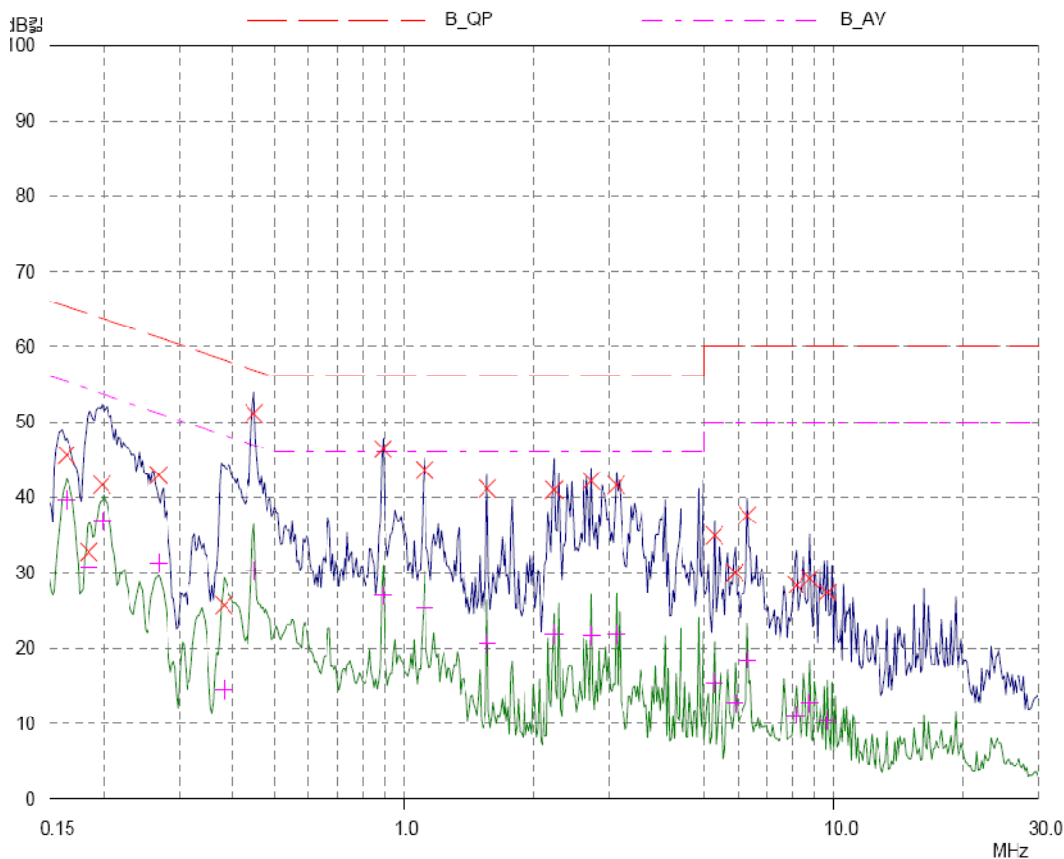
EUT: 50PA4500-UA
Manuf:
Op Cond: 120 V
Operator: 연구원 정동화
Test Spec: CLASS B
Comment:

Result File: 120102_h.dat . ESTCI1201-002

Scan Settings (1 Range)

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0.8%	10kHz	PK+AV	10msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Subranges: 25
Acc Margin: 0 dB



EST-QP-20-01(1)-(F15)

*NEUTRAL

ES TECH

27 Dec 2011 01:36

NEUTRAL LINE

EUT: 50PA4500-UA
Manuf:
Op Cond: 120 V
Operator: 연규원 정동화
Test Spec: CLASS B
Comment:

Result File: 120102_n.dat : ESTCI1201-002

Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten
150kHz	30MHz	0.3%	10kHz	PK+AV	10msec	Auto

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Subranges: 25
Acc Margin: 0 dB

