

EMC TEST REPORT

Test item : Cellular/PCS GSM/GPRS/EDGE & Cellular HSDPA
Phone with Bluetooth and WLAN

Model No. : LG-E510f

Additional Model(s) : E510f, LGE510f, LG-E510F, E510F, LGE510F

Order No. : 1106-00821

Date of receipt : 2011-06-10

Test duration : 2011-06-21 ~ 2011-06-24

Use of report : FCC Marking

Date of Issue : 2011-06-30

Applicant : LG Electronics Inc.
60-39, Gasan-dong, Gumchon-gu, Seoul, 153-023, Korea

Test laboratory : Digital EMC Co., Ltd.
683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-080, Korea

Test specification : ANSI C 63.4:2003
FCC Part 15 Subpart B
(Type of Device : Class B Computing Device Peripheral (JBP))

Test environment : Temperature (21 ~ 22) °C,
Humidity (40 ~ 44) % R.H.

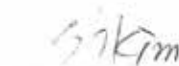
Test result : ☒ Comply ☐ Not Comply

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DIGITAL EMC CO., LTD.

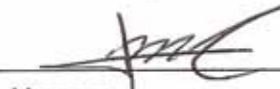
Tested by:

Witnessed by:

Reviewed by:



Engineer
S.H.KIM



Manager
M.J.SONG



Manager
Y.K.SHIN

The above test report is the accredited test results by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

PRESIDENT OF DIGITAL EMC CO., LTD.

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1. General Remarks

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

Address : 683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-080, Korea

<http://www.digitalemc.com>

Tel: +82-31-321-2664 Fax: +82-31-321-1664

2. Test Laboratory

Digital EMC Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table;

Certificate	Nation	Agency	Code	Mark
Accreditation	Korea	KOLAS	393	ISO/IEC 17025
Site Filing	USA	FCC	101842	Test Facility list & NSA Data
	Japan	VCCI	C-1427 R-1364, R-3385 T-1442, G-338	Test Facility list & NSA Data
Certification	Korea	KC	KR0034	Test Facility list & NSA Data
	Germany	TUV	ROK1028C	ISO/IEC 17025

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".

3. General Information of EUT

3.1 Product Description

Equipment Under Test (E.U.T) is Cellular/PCS GSM/GPRS/EDGE & Cellular HSDPA Phone with Bluetooth and WLAN

Model: LG-E510f manufactured by LG Electronics Inc. Its basic purpose is used for communications.

3.2 Product Information

Model No.	LG-E510f
Add Model No.	E510f, LGE510f, LG-E510F, E510F, LGE510F
EUT Type	Cellular/PCS GSM/GPRS/EDGE & Cellular HSDPA Phone with Bluetooth and WLAN
Serial No	NONE
FCC ID	BEJE510F
Type of Sample Tested	Pre-Production
High Frequency	800MHz
Supplied Power for Test	AC120V, 60Hz
Applicant	LG Electronics Inc. 60-39, Gasan-dong, Gumchon-gu, Seoul, 153-023, Korea
TX Frequency	824.20 MHz to 848.80 MHz (GSM850) 1850.20 MHz to 1909.80 MHz (GSM1900) 826.4 MHz to 846.6 MHz (WCDMA850)
RX Frequency	869.20 MHz to 893.80 MHz (GSM850) 1930.20 MHz to 1989.80 MHz (GSM1900) 826.4 MHz to 846.6 MHz (WCDMA850)
Date of Receipt of Sample	2011-06-02

Related Submittal(s) / Grant(s)

Original submittal only.

4. Test Summary

4.1 Applied standards and test results

Test Items	Applied Standards	Results
Conducted Disturbance	ANSI C63.4:2003	Comply
Radiated Disturbance	ANSI C63.4:2003	Comply

The data in this test report are traceable to the national or international standards.

4.2 Test environment and conditions

Test Items	Test date (MM-DD)	Temp (°C)	Humidity (% R.H.)	Pressure (hPa)
Conducted Disturbance	06-24	22	44	-
Radiated Disturbance	06-21	21	40	

4.3 Test result Summary

(1) Conducted Emission

Power Line Conducted Emissions			FCC PART 15b Class B		
Frequency (MHz)	Amplitude (dBμV)	Conductor	Detector	Limit (dBμV)	Margin (dB)
0.151	57.0	N	Quasi-Peak	65.9	8.9
0.151	57.2	L1	Quasi-Peak	65.9	8.7

(2) Radiated emission

Frequency [MHz]	Pol.	Reading [dBμV]	C.F. [dBμV]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
239.991	V	49.1	-9.8	39.8	46.0	6.2

5. Test Set-up and operation mode

5.1 Principle of Configuration Selection

Emission : The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

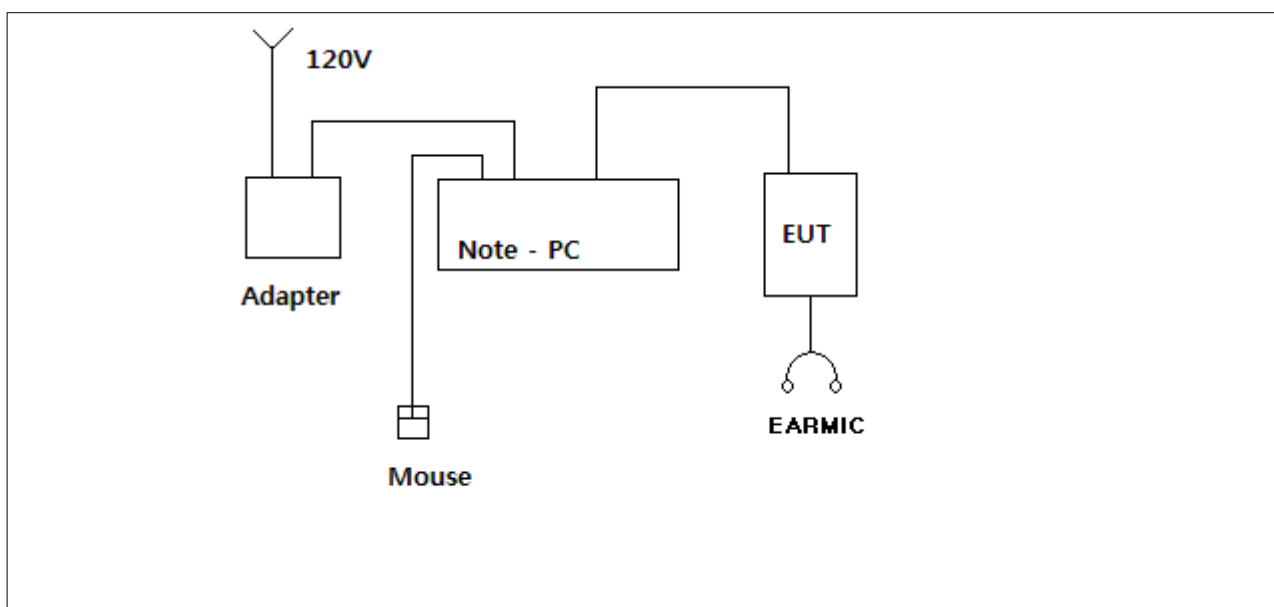
5.2 Test Operation Mode

- PC link mode(The measurement was made of the maximized by: Write/Delete the “H” pattern mode; data exchange speed; moving the cable)

5.3 Support Equipment Used

Unit	Model No.	Serial No.	Manufacturer	CABLE			Backshell	FCC ID
				Connect type	Length (m)	shield		
NOTE PC	LGX14	F022040	LG	DC IN	1.6	Shield	Plastic	DOC
				USB	1.4	Shield	Plastic	
				USB	1.1	Shield	Plastic	
AC/DC ADAPTER	ADP-40PH	6T1094	DELTA ELECTRONICS,INC.	AC POWER	1.2	Non-Shield	Plastic	VER
MOUSE	MS111-L	CN-09RRC7	LOGITECH Inc.	USB	1.4	Shield	Plastic	DOC
EarMic	A187	N/A	N/A	Stereo	1.2	Shield	Plastic	DOC

(Configuration of Tested System)



6. Test Results : Emission

6.1 Conducted Disturbance

6.1.1 Measurement Procedure

In the range of 0.15MHz to 30MHz, the conducted disturbance was measured and set-up was made accordance with **ANSI C63.4:2003**.

If the EUT is table top equipment, it was placed on a wooden table with a height of 0.8m above the reference ground plane and 0.4m from the conducting wall of the shielded room.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15m above the reference ground plane.

Connect the EUT's power source lines to the appropriate power mains / peripherals through the LISN. All the other peripherals are connected to the 2nd LISN, if any.

Unused measuring port of the LISN was resistively terminated by 50 ohm terminator.

The measuring port of the LISN for EUT was connected to spectrum analyzer.

Using conducted emission test software, the emissions were scanned with peak detector mode.

After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and Average detector.

By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.

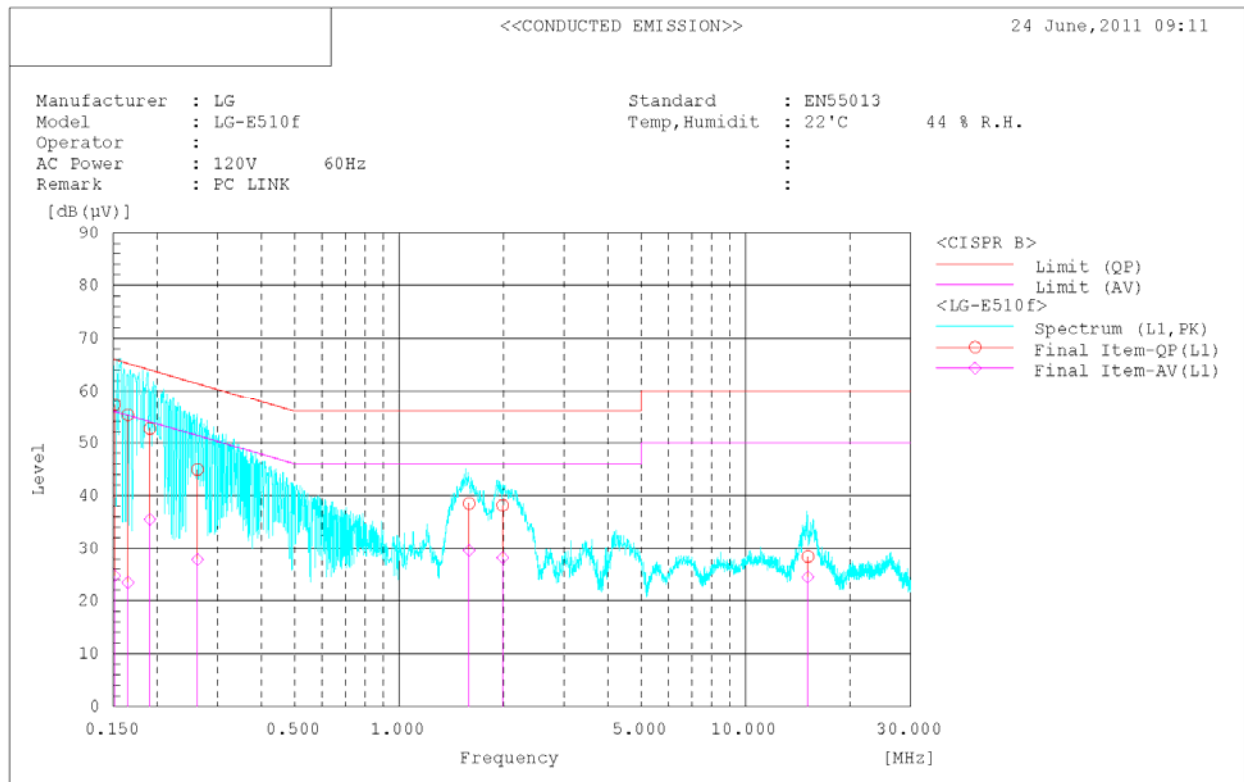
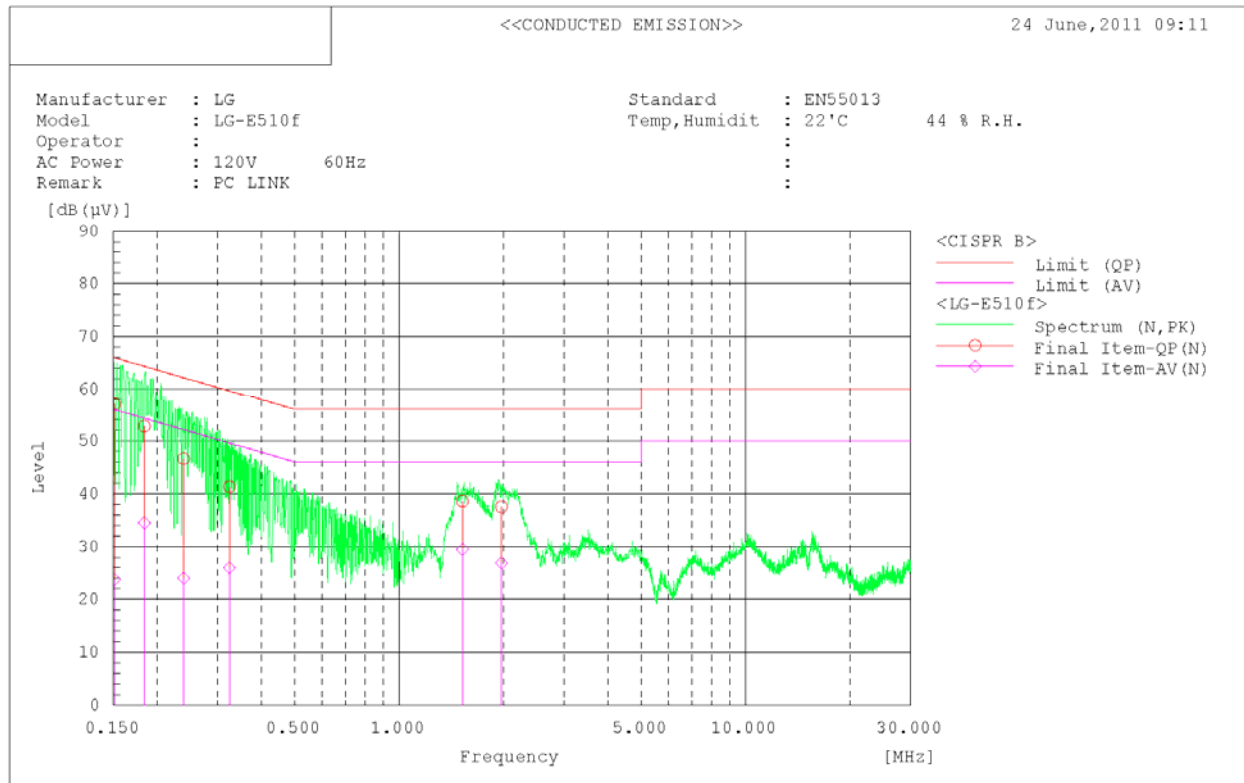
For further description of the configuration refer to the picture of the test set-up.

6.1.2 Limit for Conducted Disturbance

(1) Conducted disturbance at mains ports.

Frequency range (MHz)	Limits dB(μV)			
	Quasi-peak		Average	
	Class A	Class B	Class A	Class B
0.15 to 0.50	79	66 to 56	66	56 to 46
0.50 to 5	73	56	60	46
5 to 30		60		50
Note 1 The lower limit shall apply at the transition frequencies.				
Note 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.				

Test Result



 <<CONDUCTED EMISSION>>

24 June, 2011 09:11

```
Standard      : EN55013
Manufacturer  : LG
Model         : LG-E510f
Operator      :
AC Power      : 120V          60Hz
Remark        : PC LINK
Temp, Humidit : 22'C          44 % R.H.
:
:
:
```

Final Result

--- N Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB(μV)]	[dB(μV)]	[dB]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]	
1	0.151	56.9	23.6	0.1	57.0	23.7	65.9	55.9	8.9	32.2	
2	0.184	52.7	34.4	0.1	52.8	34.5	64.3	54.3	11.5	19.8	
3	0.239	46.5	25.0	0.1	46.6	25.1	62.1	52.1	10.5	28.1	
4	0.324	41.2	25.9	0.1	41.3	26.0	59.6	49.6	18.3	23.6	
5	1.524	38.4	29.3	0.2	38.6	29.5	56.0	46.0	17.4	16.5	
6	1.975	37.3	26.7	0.2	37.5	26.9	56.0	46.0	18.5	19.1	

--- L1 Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]	[dB]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.151	55.0	24.5	0.3	57.2	24.8	55.3	25.3	8.7	31.3	
2	0.165	55.0	23.2	0.3	55.3	23.5	55.2	23.9	3.9	31.7	
3	0.191	52.4	35.2	0.3	52.7	35.5	64.0	54.0	11.3	18.5	
4	0.262	44.6	27.6	0.3	44.9	27.9	61.4	51.4	16.5	23.5	
5	1.593	38.2	29.3	0.3	38.5	29.6	56.0	46.0	17.5	16.4	
6	3.991	27.8	23.6	0.3	28.1	23.9	56.0	46.0	17.9	17.8	
7	15.145	27.5	23.6	0.9	28.4	24.5	60.0	50.0	31.6	29.5	

6.2 Radiated Disturbance

6.2.1 Measurement Procedure

The radiated disturbance was measured and set-up was made accordance with **ANSI C63.4:2003**.

If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8m above the reference ground plane and 3m away from the interference receiving antenna in the **10m semi-anechoic chamber**.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15m above the reference ground plane.

Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4m above the reference ground plane continuously to determine associated with higher emission levels and record them.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

For below 1GHz frequency range, Quasi-Peak detector with 120kHz RBW was used.

Also Peak and Average detector with 1MHz RBW were used for above 1GHz frequency range.

For further description of the configuration refer to the picture of the test set-up.

6.2.2 Limit for Radiated Disturbance

- The test frequency range of Radiated Disturbance measurements are listed below.

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 6GHz, whichever is lower

(1) Limit for Radiated Emission below 1000MHz

Frequency range (MHz)	Class A Equipment (10m distance)	Class B Equipment (3m distance)
	Quasi-peak limits (dBμV/m)	Quasi-peak limits (dBμV/m)
30 to 88	39.1	40
88 to 216	43.5	43.5
216 to 960	46.4	46
960 to 1000	49.5	54
Note 1 The lower limit shall apply at the transition frequency. Note 2 Additional provisions may be required for cases where interference occurs. Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards(CISPR), Pub. 22 shown as below.		
30 to 230	40	30
230 to 1000	47	37

(2) Limits for Radiated Emission in the frequency range 1000 - 2000MHz at a measuring distance of 10m

Frequency (GHz)	Class A Equipment		Class B Equipment	
	peak (dBμV/m)	peak (dBμV/m)	peak (dBμV/m)	Average (dBμV/m)
1 to 2	69.5	49.5	63.5	43.5

(3) Limits for Radiated Emission above 1000MHz at a measuring distance of 3m

Frequency (GHz)	Class A Equipment		Class B Equipment	
	peak (dBμV/m)	peak (dBμV/m)	peak (dBμV/m)	Average (dBμV/m)
1 to 40	80	60	74	54

Test Result

< 30MHz-1GHz >



RADIATED EMISSION

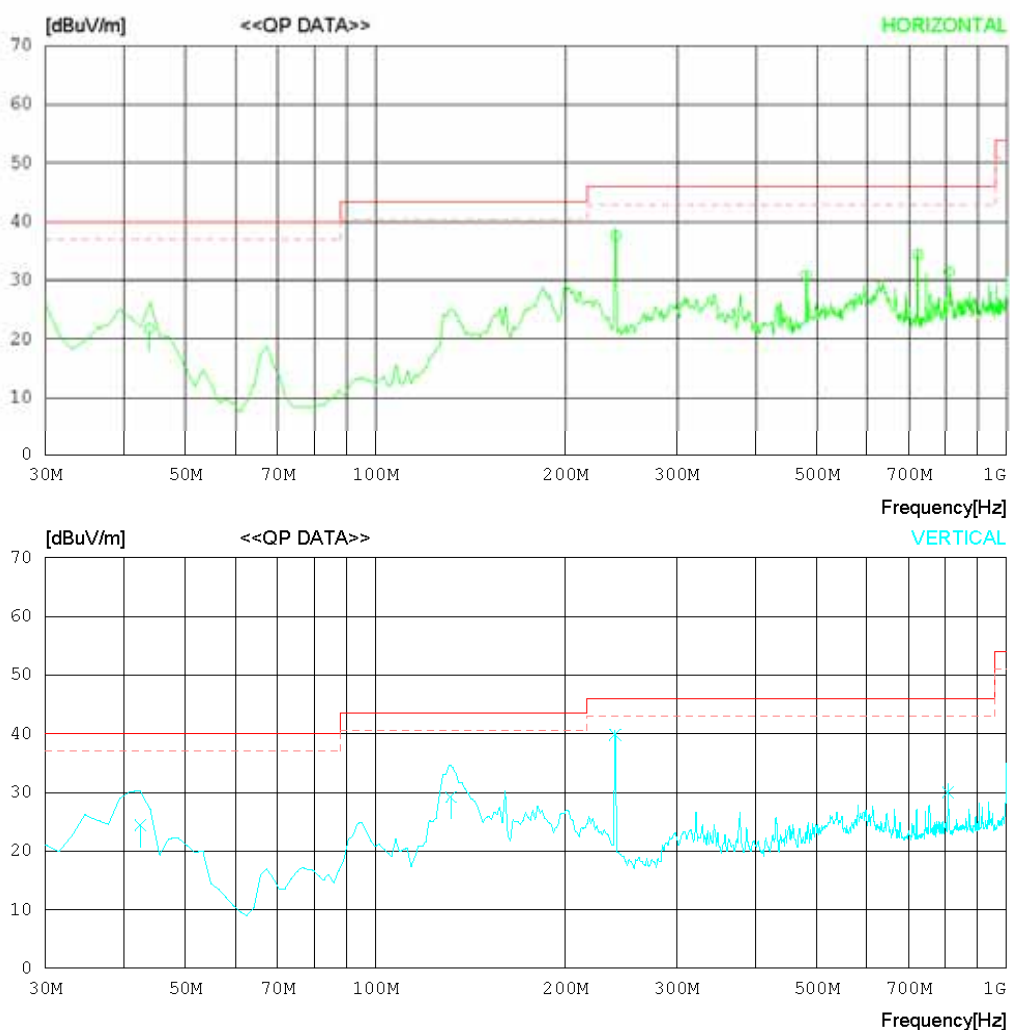
Date : 2011-06-21

Model Name : LG-E510f
Model No. :
Serial No. :
Test Condition : PC LINK

Reference No. :
Power Supply : 120V 60Hz
Temp/Humi : 21 °C 40 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB



RADIATED EMISSION

Date : 2011-06-21

Model Name : LG-E510f	Reference No. :
Model No. :	Power Supply : 120V 60Hz
Serial No. :	Temp/Humi : 21 °C 40 % R.H.
Test Condition : PC LINK	Operator :

Memo :

LIMIT : FCC Part15 Subpart B Class B (3m)
MARGIN: 3 dB

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	43.825	29.4	14.1	0.8	22.6	21.7	40.0	18.3	201	203
2	240.115	46.9	12.4	1.8	23.5	37.6	46.0	8.4	100	258
3	480.037	35.5	17.3	2.6	24.6	30.8	46.0	15.2	201	264
4	720.812	36.0	19.2	3.3	24.0	34.5	46.0	11.5	100	100
5	809.650	31.4	20.3	3.4	23.6	31.5	46.0	14.5	100	358
----- Vertical -----										
6	42.467	32.2	14.0	0.8	22.6	24.4	40.0	15.6	100	221
7	131.744	39.4	11.4	1.3	22.9	29.2	43.5	14.3	100	284
8	239.991	49.1	12.4	1.8	23.5	39.8	46.0	6.2	100	201
9	807.871	29.9	20.3	3.4	23.6	30.0	46.0	16.0	100	211

< 1GHz-6GHz_Peak >



RADIATED EMISSION

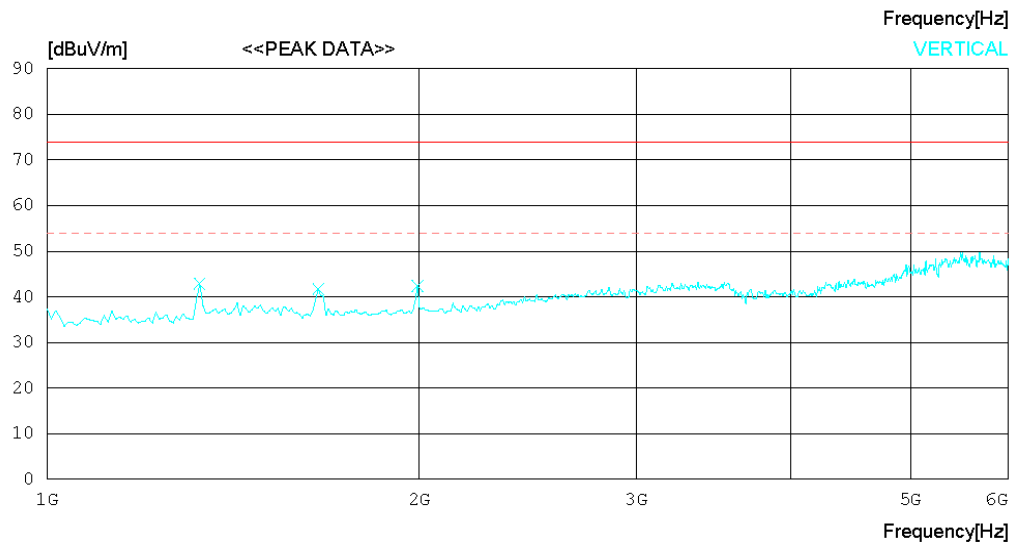
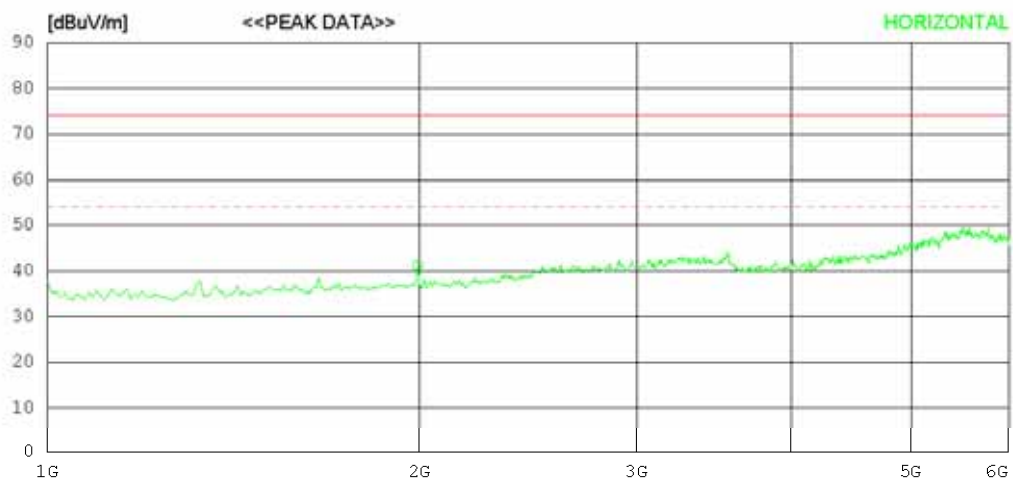
Date : 2011-06-21

Model Name : LG-E510f
Model No. :
Serial No. :
Test Condition : PC LINK

Reference No. :
Power Supply : 120V 60Hz
Temp/Humi : 21 °C 40 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)



RADIATED EMISSION

Date : 2011-06-21

Model Name : LG-E510f	Reference No. :
Model No. :	Power Supply : 120V 60Hz
Serial No. :	Temp/Humi : 21 'C 40 % R.H.
Test Condition : PC LINK	Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	PEAK [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	1993.589	50.9	25.2	7.0	42.0	41.1	74.0	32.9	100	358
----- Vertical -----										
2	1328.526	54.6	24.6	5.6	41.9	42.9	74.0	31.1	100	301
3	1657.051	52.1	25.2	6.3	41.9	41.7	74.0	32.3	100	1
4	1993.589	52.2	25.2	7.0	42.0	42.4	74.0	31.6	100	1

< 1GHz-6GHz_Average >



RADIATED EMISSION

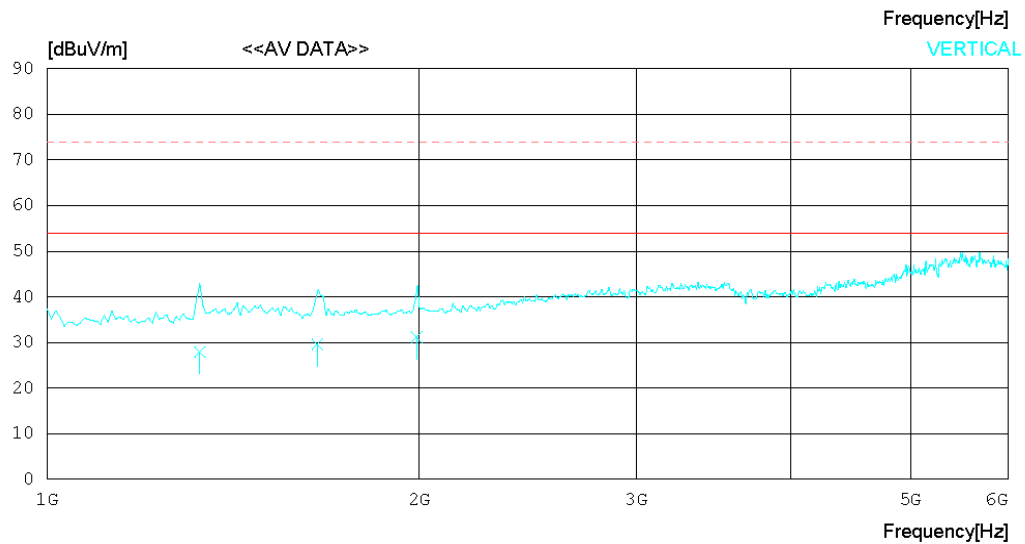
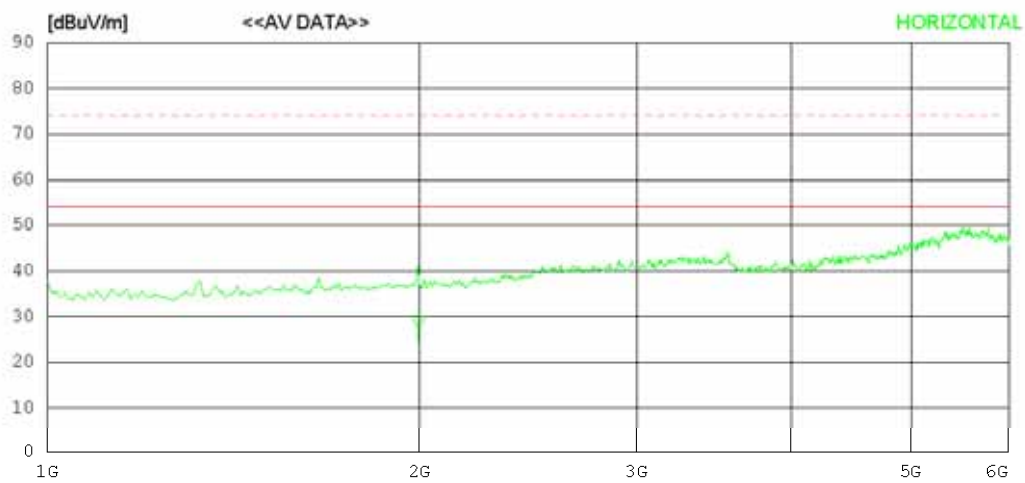
Date : 2011-06-21

Model Name : LG-E510f
Model No. :
Serial No. :
Test Condition : PC LINK

Reference No. :
Power Supply : 120V 60Hz
Temp/Humi : 21 °C 40 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg)
FCC Part15 Subpart.B Class B (3m) - 18G(Peak)



RADIATED EMISSION

Date : 2011-06-21

Model Name : LG-E510f	Reference No. :
Model No. :	Power Supply : 120V 60Hz
Serial No. :	Temp/Humi : 21 'C 40 % R.H.
Test Condition : PC LINK	Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg)
FCC Part15 Subpart.B Class B (3m) - 18G(Peak)

No.	FREQ [MHz]	READING AV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	1996.836	39.0	25.2	7.0	42.0	29.2	54.0	24.8	100	358
----- Vertical -----										
2	1328.929	39.6	24.6	5.6	41.9	27.9	54.0	26.1	100	301
3	1655.477	40.0	25.2	6.3	41.9	29.6	54.0	24.4	100	1
4	1991.640	41.0	25.2	7.0	42.0	31.2	54.0	22.8	100	1

Appendix 1

List of Test and Measurement Instruments

1. Conducted Disturbance

Name of Instrument		Model No.	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
☐	EMI Test Receiver	ESCI	100364	Rohde & Schwarz	2011.03.08	2012.03.08
☐	LISN	LISN1600	197204	TTI	2010.07.02	2011.07.02
☐	LISN(EUT)	ESH2-Z5	828739/006	R&S	2010.10.01	2011.10.01
☐	50 ohm Terminator	CT-01	N/A	TME	2011.01.11	2012.01.11
☒	Spectrum Analyzer	8591E	3649A05889	H/P	2011.03.07	2012.03.07
☒	RFI/Field intensity Meter	KNM-2402	4N-170-3	KYORITSU	2010.07.02	2011.07.02
☒	LISN	KNW-407	8-317-8	KYORITSU	2011.01.11	2012.01.11
☒	LISN	KNW-242	8-654-15	KYORITSU	2010.07.02	2011.07.02
☒	50 ohm Terminator	CT-01	N/A	TME	2011.01.11	2012.01.11
☐	ISN	T4A	24869	Teseq GmbH	2011.01.11	2012.01.11
☐	LISN(DC)	NNBM8125	8125-821	SCHWARZBECK	2010.07.01	2011.07.01

2. Radiated Disturbance

Name of Instrument		Model No.	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
☒	EMI Test Receiver	ESU	100014	Rohde & Schwarz	2011.01.20	2012.01.20
☒	Bilog Antenna	CBL6112B	2737	SCHAFFNER	2010.07.14	2012.07.14
☒	Horn Antenna	BBHA9120A	322	SCHWARZBECK	2010.04.13	2012.04.13
☒	Amplifier(22dB)	8447E	2945A02865	H/P	2011.01.11	2012.01.11
☒	Pre Amplifier	MLA-00108-B02-36	1518831	TSJ	2011.01.11	2012.01.11
☒	Controller	5905A	N/A	TOKIN	-	-
☒	ANT.master	N/A	N/A	TOKIN	-	-
☐	EMI Test Receiver	ESCI	100364	Rohde & Schwarz	2011.03.08	2012.03.08
☐	BICONICAL ANT.	VHA 9103	91031946	SCHWARZBECK	2010.12.21	2012.12.21
☐	LOG-PERIODIC ANT.	UHALP 9108A-A1	1098	SCHWARZBECK	2010.11.29	2012.11.29
☐	Pre Amplifier	MLA-100K01-B01-26	1252741	TSJ	2011.03.07	2012.03.07
☐	Position Controller	5901T	14173	TOKIN	-	-
☐	DRIVER	5902T2	14174	TOKIN	-	-
☐	Spectrum Analyzer	E4411B	US41062735	Agilent	2010.07.01	2011.07.01
☐	Amplifier (25dB)	8447D	2443A03690	Agilent	2010.07.01	2011.07.01
☐	Bilog Antenna	VULB9160	3151	SCHAFFNER	2010.08.25	2012.08.25
☐	Controller	5900	N/A	TOKIN	-	-