EMC TEST REPORT

Test item	: Cellular/PCS GSM/GPRS/EDGE/ WCDMA/HSDPA Phone with Bluetooth, WLAN
Model No.	: LG-E405f
Order No.	: 1205-00513
Date of receipt	: 2012-05-02
Test duration	: 2012-05-10 ~ 2012-05-11
Use of report	: FCC CoC Marking
Date of Issue	: 2012-05-11

Applicant : LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

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 (Class B personal computers and peripherals)
Test environment	: Temperature : (23 ~ 24) °C, Humidity : (43 ~ 45) % R.H.
Test result	: ☒ Comply ☐ Not Comply

Tested by:

Manager
H.S.KO

Reviewed by:

General Manager
C.H.LEE

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 678747	Test Facility list & NSA Data
	Canada	IC	5740A-1 5740A-2	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	ROK1124C	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

Model No.	LG-E405f
Add Model No.	E405f, LGE405f
FCC Band	GSM 850/1900, WCDMA 850(HSDPA)
Serial No	NONE
FCC ID	ZNFE405F
Max CPU clock	800 MHz
Supplied Power for Test	AC120V, 60Hz
Applicant	LG Electronics MobileComm U.S.A., Inc. 1000 Sylvan Avenue, Englewood Cliffs NJ 07632
Manufacturer	LG Electronics MobileComm U.S.A., Inc. 1000 Sylvan Avenue, Englewood Cliffs NJ 07632

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	**C**
Radiated Disturbance	ANSI C63.4:2003	**C**
C=Comply N/C=Not Comply N/T=Not Tested N/A=Not Applicable		

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 (℃)	Humidity (% R.H.)	Pressure (hPa)
Conducted Disturbance	05-11	23	45	-
Radiated Disturbance	05-10	24	43	

4.3 Test result Summary

(1) Conducted Emission

Frequency [MHz]	Phase	Result [dBμV]	Detector	Limit [dBμV]	Margin [dB]
0.15155	**L1**	**56.5**	Quasi-Peak	**65.9**	**9.4**

(2) Radiated Emission

Frequency [MHz]	Pol.	Result [dB(μV/m)]	Detector	Limit [dB(μV/m)]	Margin [dB]
223.519	**V**	**26.9**	Quasi-Peak	**30.0**	**3.1**

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.

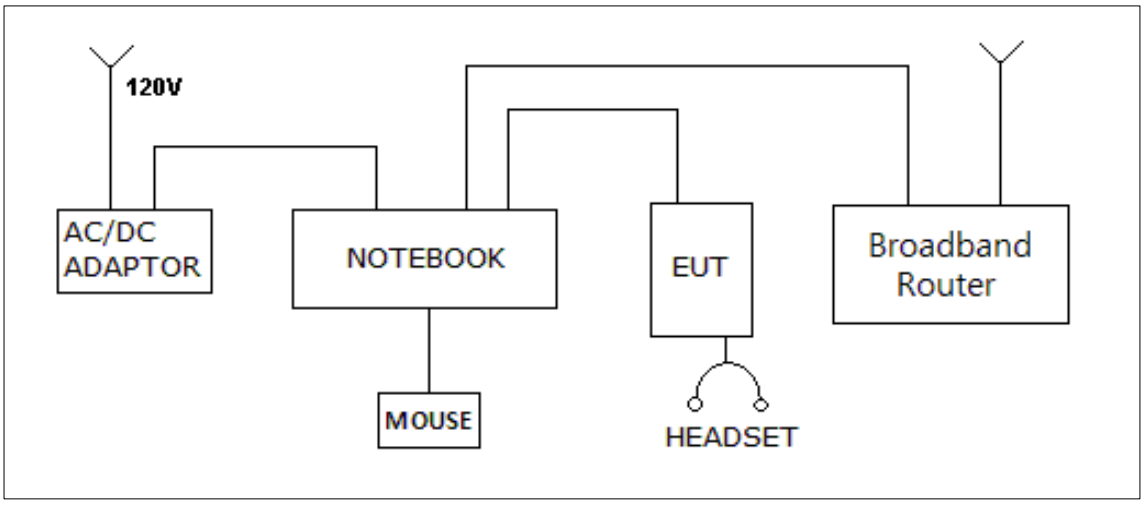
5.2 Test Operation Mode

- 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		
Notebook	LGX14	009QTAF022136	LG	POWER USB RJ-45	1.8 1.2 1.5	Non-Shield Shield Non-Shield	Plastic Metal Plastic	DOC
AC/DC Adaptor	ADP-40PH AD	-	Delta electronics Ltd.	POWER	1.6	Non-Shield	Metal	VER
Mouse	M-UAE96	-	Logitech	USB	1.5	Shield	Plastic	DOC
Headset	SGEY0003744	-	CRESYN	STEREO	1.1	Non-Shield	Plastic	VER
Broadband Router	Iptime N804	-	EFM Networks	POWER	1.8	Non-Shield	-	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.**

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

Digital EMC

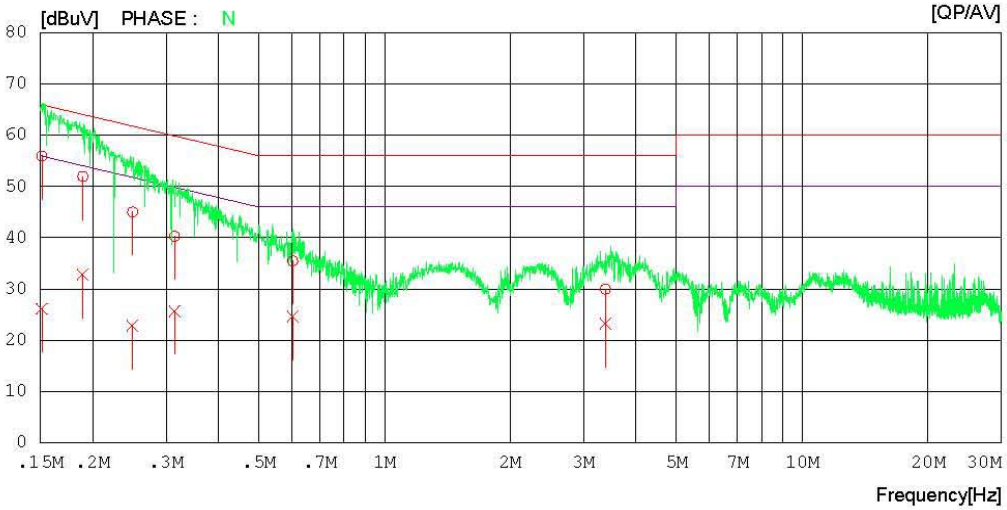
Results of Conducted Emission

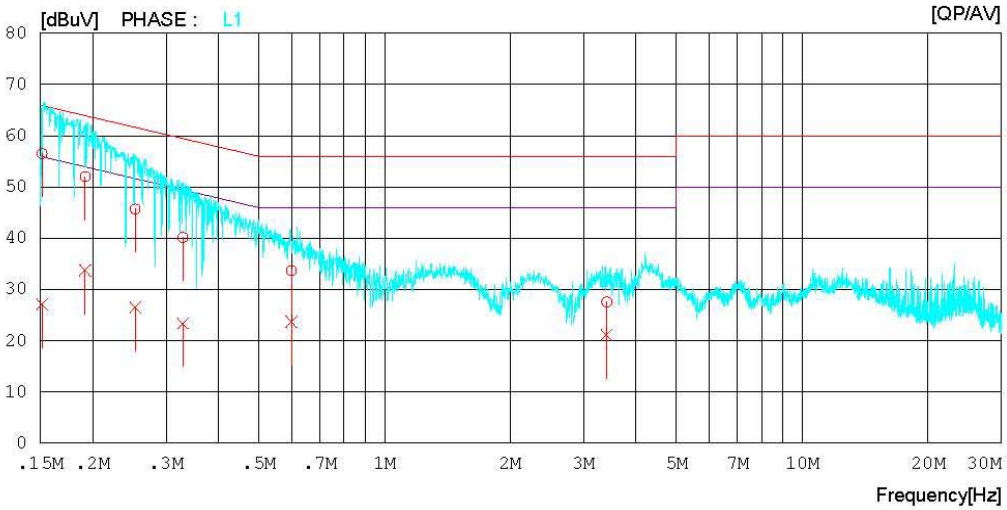
Digital EMC
Date : 2012-05-11

Model No.	:	LG-E405f	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi.	:	23 'C 45 % R.H.
Test Condition	:	PC LINK MODE	Operator	:	H.S KO

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV





Results of Conducted Emission

Digital EMC
Date : 2012-05-11

Model No.	:	LG-E405f	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi.	:	23 'C 45 % R.H.
Test Condition	:	PC LINK MODE	Operator	:	H.S KO

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15114	55.6	25.9	0.3	55.9	26.2	65.9	55.9	10.0	29.7	N
2	0.18968	51.7	32.6	0.2	51.9	32.8	64.1	54.1	12.2	21.3	N
3	0.24928	44.8	22.6	0.2	45.0	22.8	61.8	51.8	16.8	29.0	N
4	0.31450	40.1	25.5	0.2	40.3	25.7	59.9	49.9	19.6	24.2	N
5	0.60330	35.3	24.4	0.2	35.5	24.6	56.0	46.0	20.5	21.4	N
6	3.38300	29.5	22.8	0.4	29.9	23.2	56.0	46.0	26.1	22.8	N
7	0.15155	56.2	26.8	0.3	56.5	27.1	65.9	55.9	9.4	28.8	L1
8	0.19203	51.8	33.5	0.2	52.0	33.7	63.9	53.9	11.9	20.2	L1
9	0.25324	45.5	26.4	0.2	45.7	26.6	61.7	51.7	16.0	25.1	L1
10	0.32911	40.0	23.2	0.2	40.2	23.4	59.5	49.5	19.3	26.1	L1
11	0.59850	33.5	23.5	0.2	33.7	23.7	56.0	46.0	22.3	22.3	L1
12	3.40750	27.2	20.7	0.4	27.6	21.1	56.0	46.0	28.4	24.9	L1

6.2 Radiated Disturbance

6.2.1 Measurement Procedure

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

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 or 10m 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	5th harmonic of the highest frequency or 40GHz, 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 (dBμV/m)	Quasi-peak (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.		
Frequency range (MHz)	**Class A Equipment (10m distance)**	**Class B Equipment (10m distance)**
	Quasi-peak (dBμV/m)	**Quasi-peak (dBμV/m)**
30 to 230	40	30
230 to 1000	47	37

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

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

Test Result

< 30 MHz ~ 1 GHz >

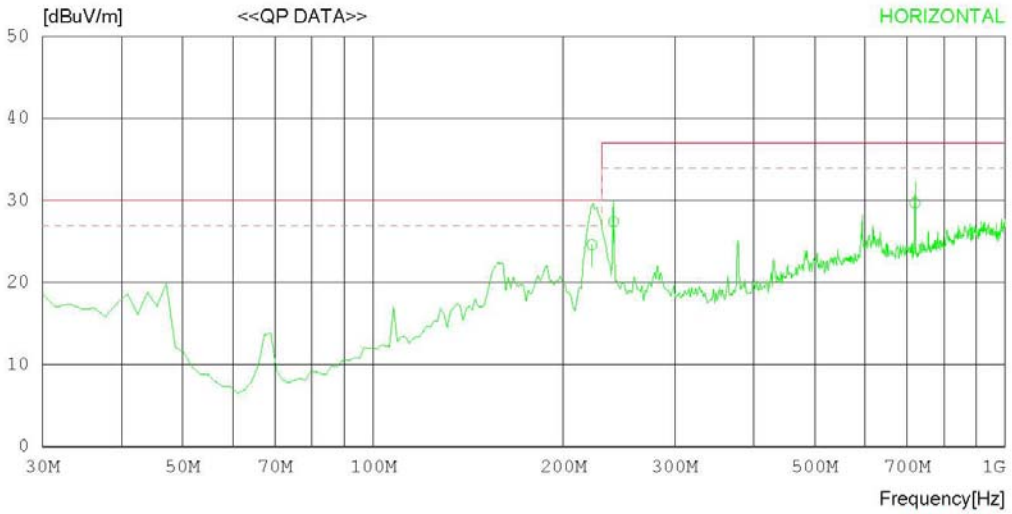
RADIATED EMISSION

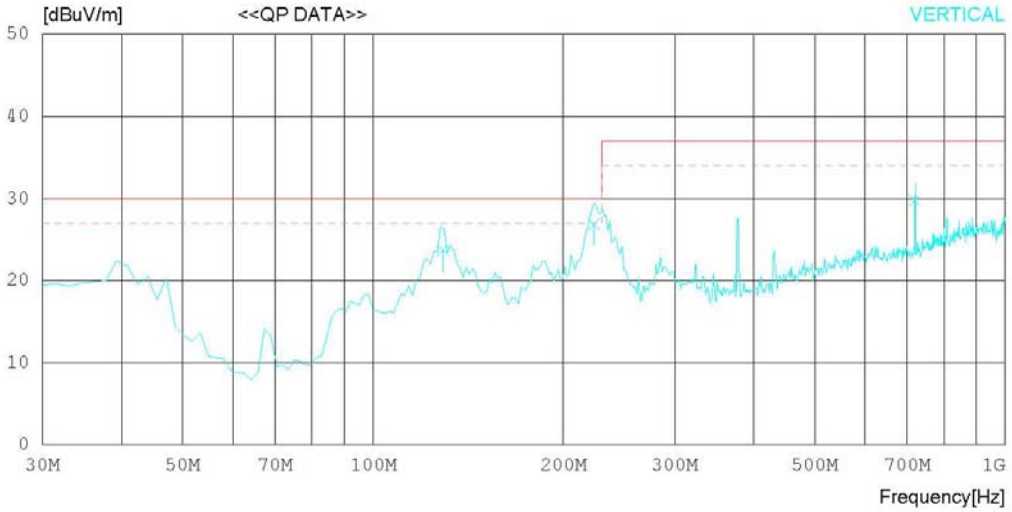
Date : 2012-05-10

Model Name	:	LG-E405f	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	24 'C 43 % R.H.
Test Condition	:	PC link mode	Operator	:	H.S KO

Memo :

LIMIT : CISPR Pub.22 Class B (10m)
MARGIN: 3 dB





RADIATED EMISSION

Date : 2012-05-10

Model Name	:	LG-E405f	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	24 'C 43 % R.H.
Test Condition	:	PC link mode	Operator	:	H.S KO

Memo :

LIMIT : CISPR Pub.22 Class B (10m)
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	221.872	34.5	11.1	2.5	23.5	24.6	30.0	5.4	329	116
2	240.000	36.0	12.4	2.6	23.6	27.4	37.0	9.6	310	145
3	720.000	29.7	19.2	4.9	24.1	29.7	37.0	7.3	121	359
----- Vertical ------										
4	129.228	33.2	11.6	1.8	22.9	23.7	30.0	6.3	100	1
5	223.519	36.6	11.3	2.5	23.5	26.9	30.0	3.1	100	359
6	720.000	29.8	19.2	4.9	24.1	29.8	37.0	7.2	236	358

< 1 GHz ~ 6 GHz_Peak >

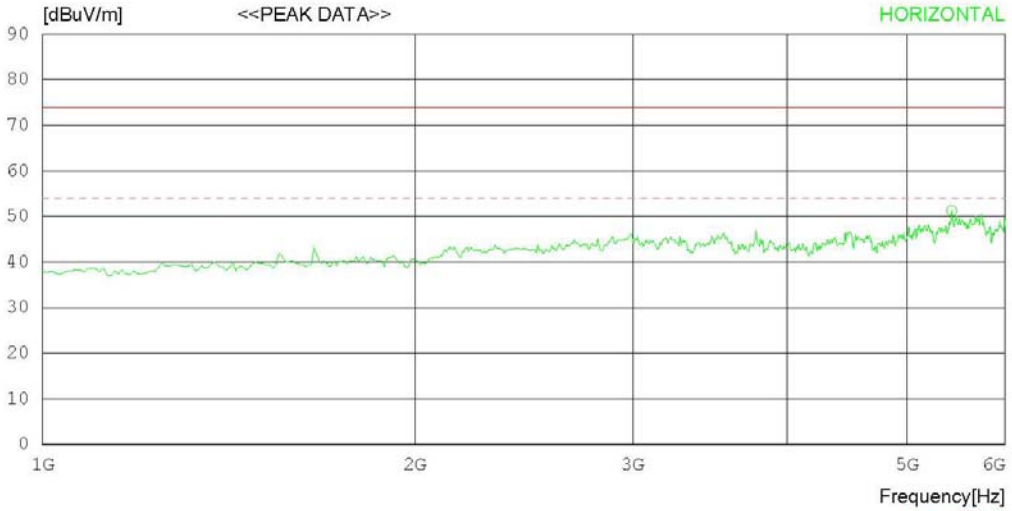
RADIATED EMISSION

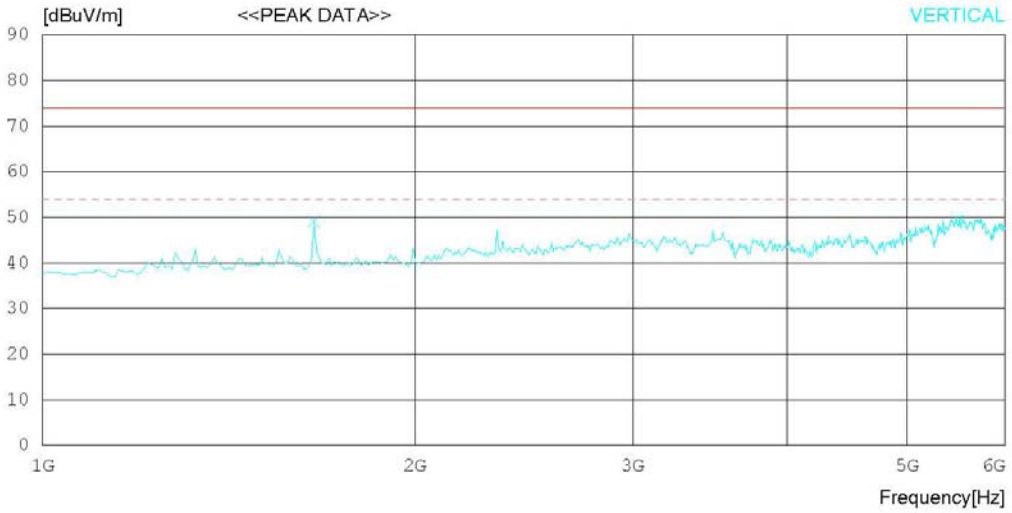
Date : 2012-05-10

Model Name	:	LG-E405f	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	24 'C 43 % R.H.
Test Condition	:	PC link mode	Operator	:	H.S KO

Memo :

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





RADIATED EMISSION

Date : 2012-05-10

Model Name	:	LG-E405f	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	24 'C 43 % R.H.
Test Condition	:	PC link mode	Operator	:	H.S KO

Memo :

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

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	5431.099	47.0	35.1	11.8	42.6	51.3	74.0	22.7	99	1
----- Vertical ------										
2	1657.051	59.7	24.7	6.3	41.7	49.0	74.0	25	99	198

< 1 GHz ~ 6 GHz_Average >

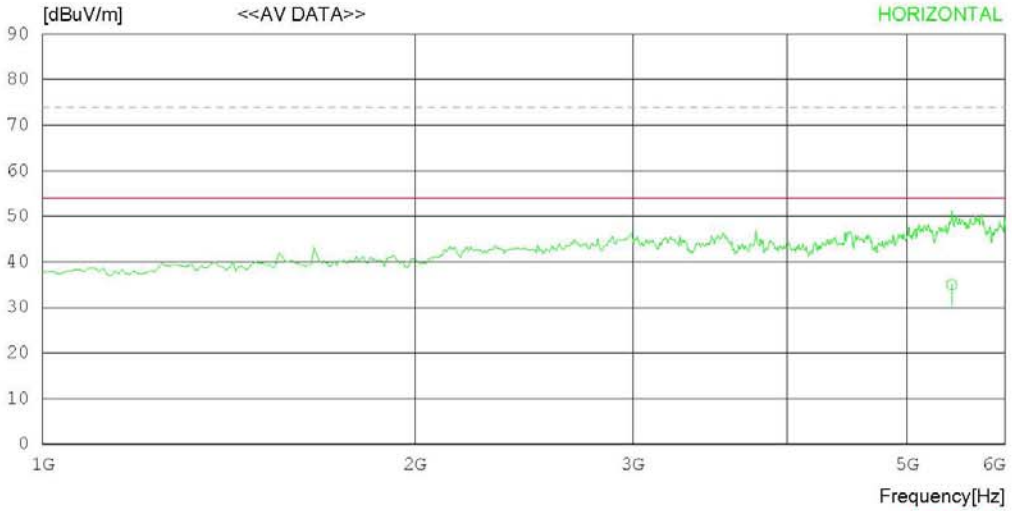
RADIATED EMISSION

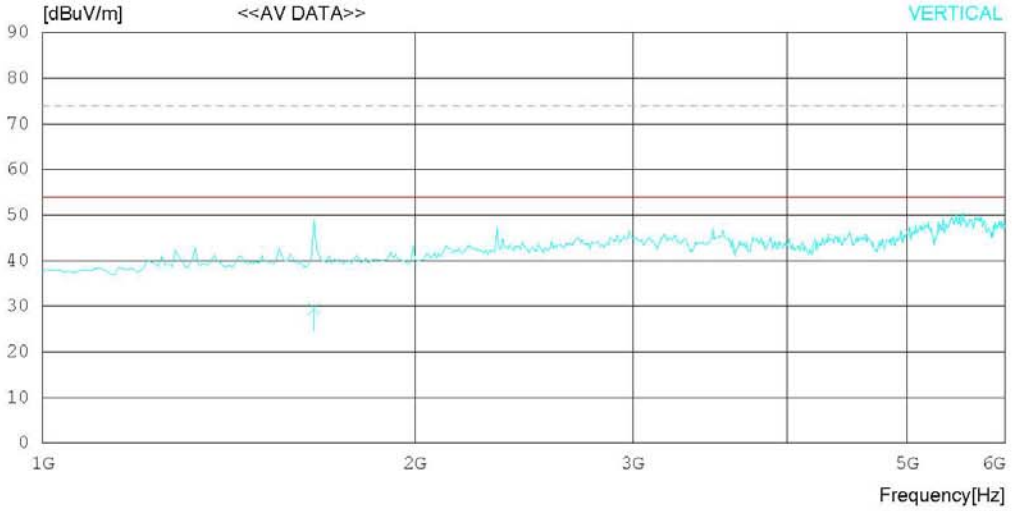
Date : 2012-05-10

Model Name	:	LG-E405f	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	24 'C 43 % R.H.
Test Condition	:	PC link mode	Operator	:	H.S KO

Memo :

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





RADIATED EMISSION

Date : 2012-05-10

Model Name	:	LG-E405f	Reference No.	:	
Model No.	:		Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi	:	24 'C 43 % R.H.
Test Condition	:	PC link mode	Operator	:	H.S KO

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	5431.099	30.7	35.1	11.8	42.6	35.0	54.0	19.0	99	1
----- Vertical ------										
2	1657.051	40.2	24.7	6.3	41.7	29.5	54.0	24.5	99	198

Appendix 1

List of Test and Measurement Instruments

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment is identified by the Test Laboratory.

1. Conducted Disturbance

Name of Instrument		Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
☐	SPECTRUM ANALYZER	8591E	H/P	3649A05889	2012.03.05	2013.03.05
☐	RFI/FIELD INTENSITY METER	KNM-2402	KYORITSU	4N-170-3	2011.07.02	2012.07.02
☐	LISN	KNW-407	KYORITSU	8-317-8	2012.01.09	2013.01.09
☐	LISN	KNW-242	KYORITSU	8-654-15	2011.09.19	2012.09.19
☐	50 OHM TERMINATOR	CT-01	TME	N/A	2012.01.09	2013.01.09
☒	EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2012.03.06	2013.03.06
☒	LISN	ESH2-Z5	ROHDE & SCHWARZ	828739/006	2011.09.30	2012.09.30
☒	LISN	LISN1600	TTI	197204	2011.07.02	2012.07.02
☒	50 OHM TERMINATOR	CT-01	TME	N/A	2012.01.09	2013.01.09

2. Radiated Disturbance

Name of Instrument		Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
☒	EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100014	2012.01.09	2013.01.09
☒	BILOG ANTENNA	CBL6112B	SCHAFFNER	2737	2010.07.14	2012.07.14
☒	HORN ANTENNA	BBHA9120A	SCHAFFNER	556	2011.06.14	2013.06.14
☒	AMPLIFIER	8447E	H/P	2945A02865	2012.01.09	2013.01.09
☒	AMPLIFIER	MLA-00108-B02-36	TSJ	1518831	2012.01.09	2013.01.09
☐	SPECTRUM ANALYZER	E4411B	AGILENT	US41062735	2011.07.11	2012.07.11
☐	AMPLIFIER	8447D	AGILENT	2443A03690	2011.07.01	2012.07.01
☐	BILOG ANTENNA	VULB9160	SCHAFFNER	3151	2010.08.25	2012.08.25
☐	EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2012.03.06	2013.03.06
☐	BICONICAL ANT.	VHA 9103	SCHWARZBECK	91032789	2010.11.29	2012.11.29
☐	LOG-PERIODIC ANT.	UHALP 9108A	SCHWARZBECK	590	2010.07.07	2012.07.07
☐	BICONICAL ANT.	VHA 9103	SCHWARZBECK	91031946	2010.12.21	2012.12.21
☐	LOG-PERIODIC ANT.	UHALP 9108-A1	SCHWARZBECK	1098	2010.11.29	2012.11.29
☐	AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2012.03.05	2013.03.05