

EMC TEST REPORT

Test item : USB Modem
Model No. : L-03F
Order No. : DEMC1401-00298
Date of receipt : 2014-01-23
Test duration : 2014-02-19
Use of report : FCC CoC Marking
Date of Issue : 2014-02-26

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

Test laboratory : Digital EMC Co., Ltd.
42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

Test specification : ANSI C 63.4:2009
FCC Part 15 Subpart B
(Class B personal computers and peripherals)

Test environment : Temperature : (21 ~ 24) °C,
Humidity : (34 ~ 36) % 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.
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Tested by:



Engineer
JunHo Park

Reviewed by:



Manager
MyungJin Song

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 : 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

<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 596748	Test Facility list & NSA Data
	Canada	IC	5740A-1 5740A-2	Test Facility list & NSA Data
	Japan	VCCI	C-1427 R-1364, R-3385, R-4076, T-1442, G-338, G754	Test Facility list & NSA Data
Certification	Korea	KC	KR0034	Test Facility list & NSA Data
	Germany	TUV	CARAT 13 11 86721 001	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.	L-03F
Serial No	NONE
FCC ID	ZNFL03F
Supplied Power for Test	AC 120 V, 60 Hz
Clock Frequency	700 MGHz
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 C63.4:2009	C
Radiated Disturbance	ANSI C63.4:2009	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 (YYYY-MM-DD)	Temp (°C)	Humidity (% R.H.)
Conducted Disturbance	2014-02-19	21	34
Radiated Disturbance	2014-02-19	22	34
	2014-02-19	24	36

4.3 Test result Summary

(1) Conducted Emission

Frequency [MHz]	Phase	Result [dB μ V]	Detector	Limit [dB μ V]	Margin [dB]
3.63160	L1	37.7	Average-Peak	46.0	8.3

(2) Radiated Emission

Frequency [MHz]	Pol.	Result [dB(μ V/m)]	Detector	Limit [dB(μ V/m)]	Margin [dB]
339.102	H	37.8	Quasi-Peak	46.0	8.2

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

- EUT Connected with PC and USB, charging in normal operating mode.

5.3 Support Equipment Used

Unit	Model No.	Serial No.	Manufacturer	CABLE			Backshell	FCC ID
				Connect type	Length (m)	shield		
PC	DC8M	D8FQFBX	DELL	POWER	1.8	Non-Shield	Plastic	DOC
				DVI	2.0	Shield	Plastic	
				USB	1.7	Shield	Plastic	
				USB	1.6	Shield	Plastic	
				USB	1.2	Shield	Plastic	
				USB	0.55	Shield	Plastic	
				STEREO	2.0	Non-Shield	Plastic	
				PARALLEL	2.1	Shield	Plastic	
				ETHERNET	20.0	Non-Shield	Plastic	
LCD Monitor	U2312HM1	CN-036N7K-74445-199-358L	DELL	POWER	1.8	Non-Shield	Plastic	DOC
				DVI	2.0	Shield	Plastic	
Printer	SRP-770	N/A	BIXOLON	POWER	1.8	Non-Shield	Plastic	DOC
				PARALLEL	2.1	Shield	Plastic	
Keyboard	SKG-3000UB	N/A	MONTEREY INTERNATIONAL CORP.	USB	1.7	Shield	Plastic	DOC
Mouse	1094	X817158-002	MICROSOFT CORPORATION	USB	1.6	Shield	Plastic	DOC
Headset	COV909	N/A	COSY	STEREO	2.0	Non-Shield	Plastic	-
External HDD	9ZR8N1-500	NA0H2L7Z	Seagate	USB	1.2	Shield	Plastic	DOC

6. Test Results : Emission

6.1 Conducted Disturbance

6.1.1 Measurement Procedure

In the range of 0.15 MHz to 30 MHz, 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 0.8 m above the reference ground plane and 0.4 m 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 0.15 m 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 0.15 MHz to 0.5 MHz.				

Note) 1. Emission Level = Reading Value + Correction Factor.

2. Correction Factor = Cable Loss + Insertion Loss of LISN

3. Margin = Limit - Emission level

Test Result



Results of Conducted Emission

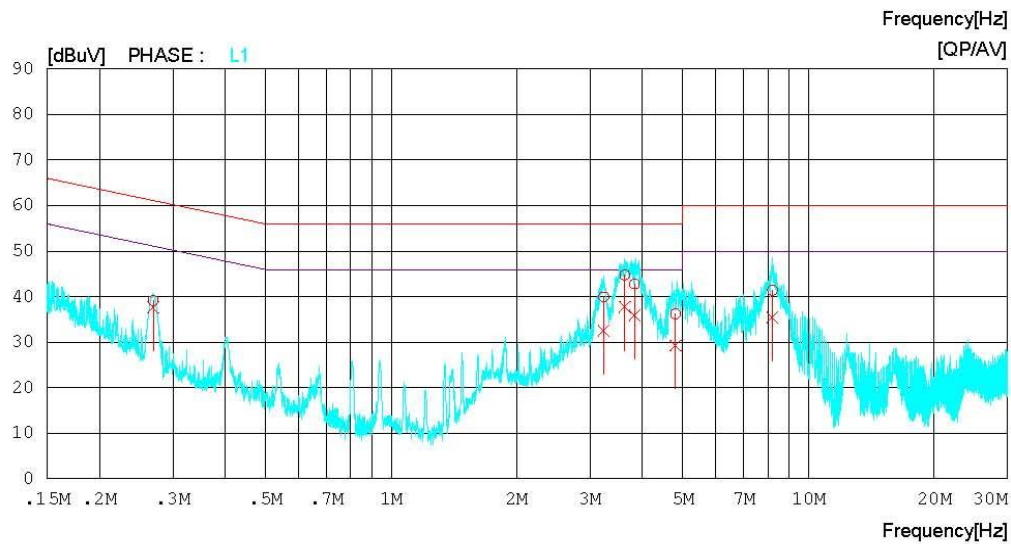
Digital EMC
Date : 2014-02-19

Model No. : L-03F
Type :
Serial No. :
Test Condition :

Reference No. :
Power Supply : 120V 60Hz
Temp/Humi. : 21°C 34 % R. H.
Operator :

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV



Results of Conducted Emission

Digital EMC
Date : 2014-02-19

Model No. : L-03F
Type :
Serial No. :
Test Condition :

Reference No. :
Power Supply : 120V 60Hz
Temp/Humi. : 21°C 34 % R. H.
Operator :

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.26946	39.0	36.9	0.1	39.1	37.0	61.1	51.1	22.0	14.1	N
2	3.21440	39.8	32.4	0.4	40.2	32.8	56.0	46.0	15.8	13.2	N
3	3.63160	43.8	36.9	0.4	44.2	37.3	56.0	46.0	11.8	8.7	N
4	3.86680	42.1	35.7	0.4	42.5	36.1	56.0	46.0	13.5	9.9	N
5	4.70780	36.8	30.3	0.5	37.3	30.8	56.0	46.0	18.7	15.2	N
6	8.14880	40.8	34.5	0.4	41.2	34.9	60.0	50.0	18.8	15.1	N
7	0.26917	39.1	37.6	0.1	39.2	37.7	61.1	51.1	21.9	13.4	L1
8	3.23200	39.6	32.1	0.4	40.0	32.5	56.0	46.0	16.0	13.5	L1
9	3.63160	44.4	37.3	0.4	44.8	37.7	56.0	46.0	11.2	8.3	L1
10	3.83280	42.4	35.5	0.4	42.8	35.9	56.0	46.0	13.2	10.1	L1
11	4.80180	35.7	28.7	0.5	36.2	29.2	56.0	46.0	19.8	16.8	L1
12	8.20560	41.0	35.0	0.4	41.4	35.4	60.0	50.0	18.6	14.6	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 0.8 m above the reference ground plane and 3 m or 10 m 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 0.15 m above the reference ground plane.

Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m 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 1 GHz frequency range, Quasi-Peak detector with 120 kHz RBW was used.

Peak detector with 1 MHz RBW and 1 MHz VBW were used for above 1 GHz frequency range, also used linear average detector with defined in CISPR 16-1-1.

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	1 000
108 – 500	2 000
500 – 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

(1) Limit for Radiated Emission below 1 000MHz

Frequency range (MHz)	Class A Equipment (10 m distance)	Class B Equipment (3 m 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 1 000	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 (10 m distance)	Class B Equipment (10 m distance)
	Quasi-peak (dBμV/m)	Quasi-peak (dBμV/m)
30 to 230	40	30
230 to 1 000	47	37

(2) Limits for Radiated Emission above 1 000MHz at a measuring distance of 3 m

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

Note) 1. Emission Level = Reading Value + Correction Factor.

2. Correction Factor = Cable loss - Amp gain + Antenna Factor

3. Margin = Limit - Emission level

Test Result

< 30 MHz ~ 1 GHz >

RADIATED EMISSION

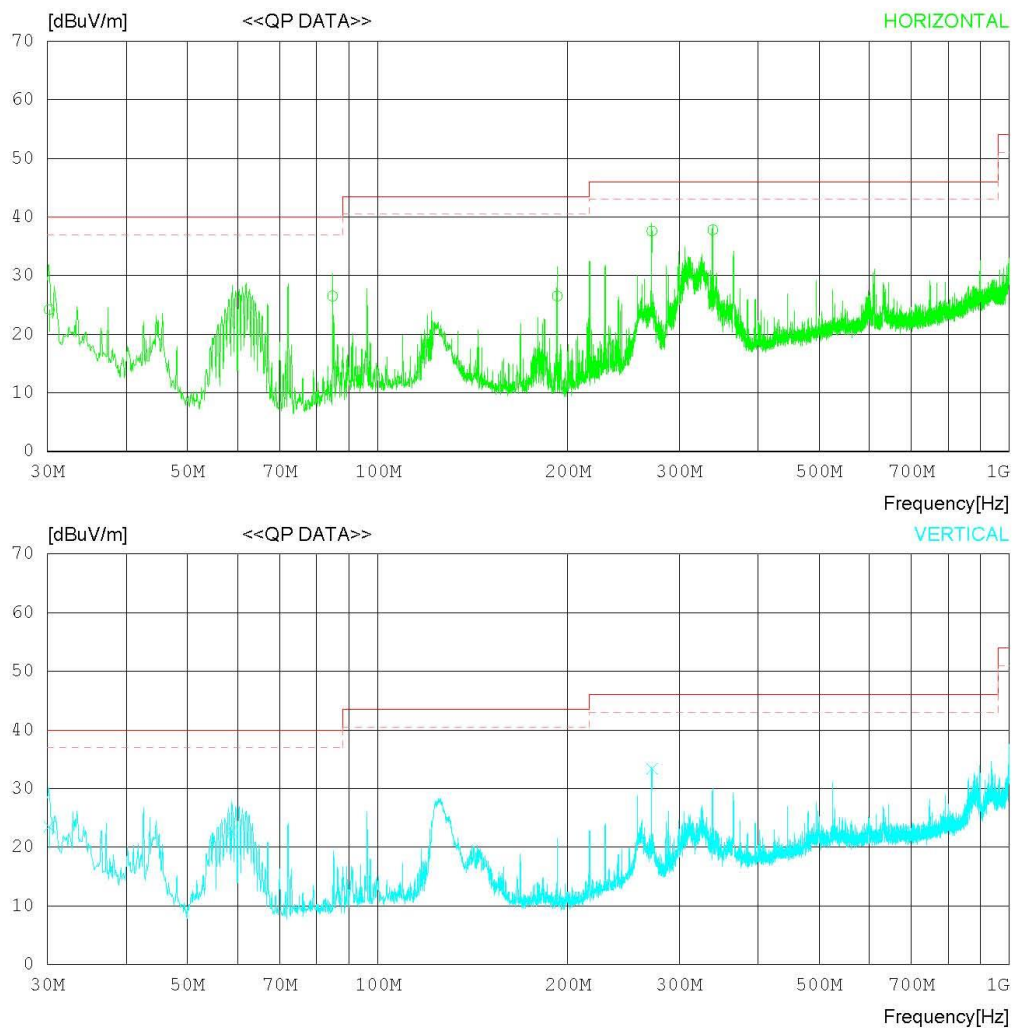
Date : 2014-02-19

Model Name : L-03F
Model No. :
Serial No. :
Test Condition :

Reference No. :
Power Supply : 120V 60Hz
Temp/Humi : 22°C 34 % R. H.
Operator :

Memo :

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



RADIATED EMISSION

Date : 2014-02-19

Model Name : L-03F	Reference No. :
Model No. :	Power Supply : 120V 60Hz
Serial No. :	Temp/Humi : 22°C 34 % R. H.
Test Condition :	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	30.200	28.2	17.8	0.8	22.6	24.2	40.0	15.8	205	151
2	84.822	39.5	8.1	1.6	22.7	26.5	40.0	13.5	248	116
3	192.483	37.6	9.7	2.2	23.0	26.5	43.5	17.0	100	5
4	271.644	45.2	13.2	2.7	23.5	37.6	46.0	8.4	100	225
5	339.102	43.9	14.6	3.2	23.9	37.8	46.0	8.2	108	323
----- Vertical -----										
6	30.220	27.4	17.8	0.9	22.6	23.5	40.0	16.5	222	125
7	58.711	38.2	5.8	1.4	22.6	22.8	40.0	17.2	283	64
8	271.623	41.0	13.2	2.7	23.5	33.4	46.0	12.6	321	252

< (1 ~ 6) GHz_Peak >

RADIATED EMISSION

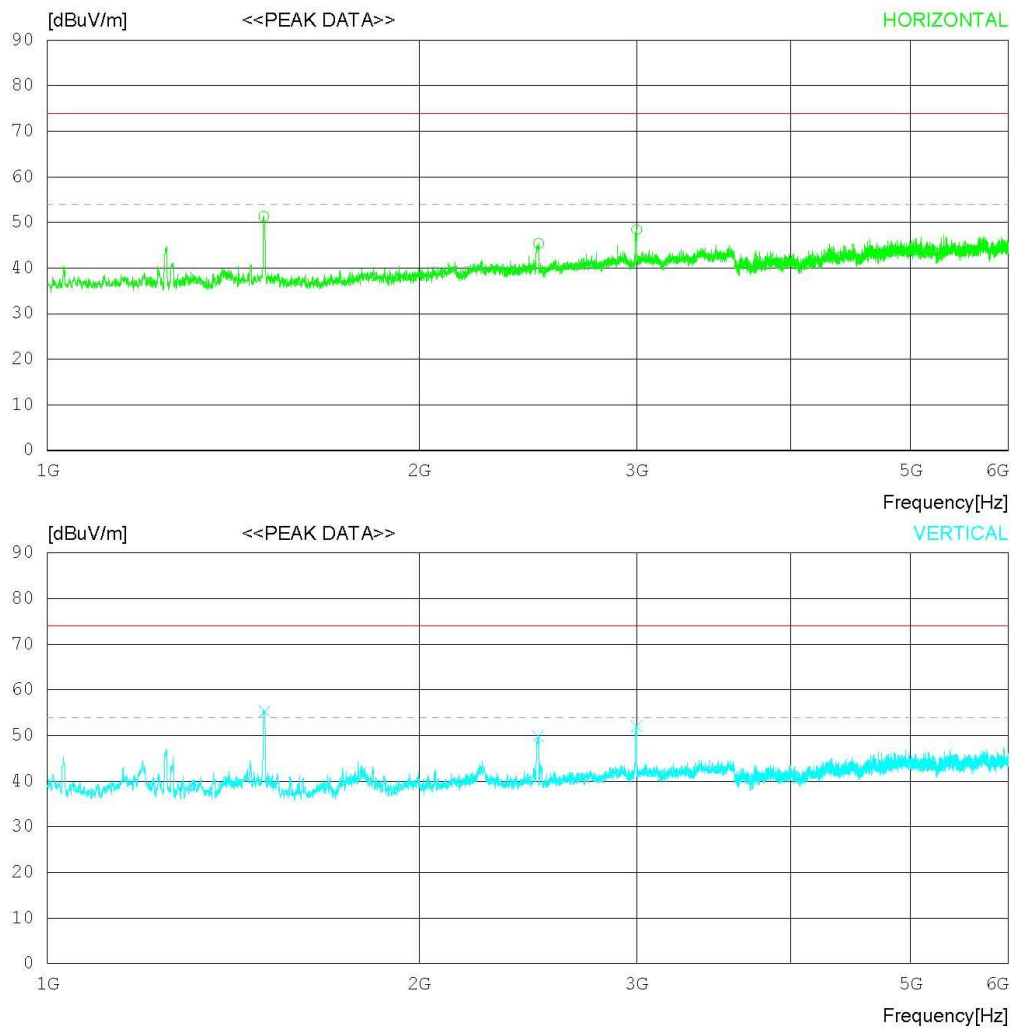
Date : 2014-02-19

Model Name : L-03F
Model No. :
Serial No. :
Test Condition :

Reference No. :
Power Supply : 120V 60Hz
Temp/Humi : 24°C 36 % 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 : 2014-02-19

Model Name : L-03F	Reference No. :
Model No. :	Power Supply : 120V 60Hz
Serial No. :	Temp/Humi : 24°C 36 % R. H.
Test Condition :	Operator :

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	1496.875	62.0	25.3	4.1	40.1	51.3	74.0	22.7	100	359
2	2498.750	52.2	27.3	5.2	39.3	45.4	74.0	28.6	100	207
3	3000.000	53.2	28.8	5.7	39.3	48.4	74.0	25.6	100	289
----- Vertical -----										
4	1500.000	66.0	25.3	4.1	40.1	55.3	74.0	18.7	100	0
5	2498.750	56.6	27.3	5.2	39.3	49.8	74.0	24.2	100	179
6	3000.625	56.8	28.8	5.7	39.3	52.0	74.0	22	100	0

< (1 ~ 6) GHz_Average >

RADIATED EMISSION

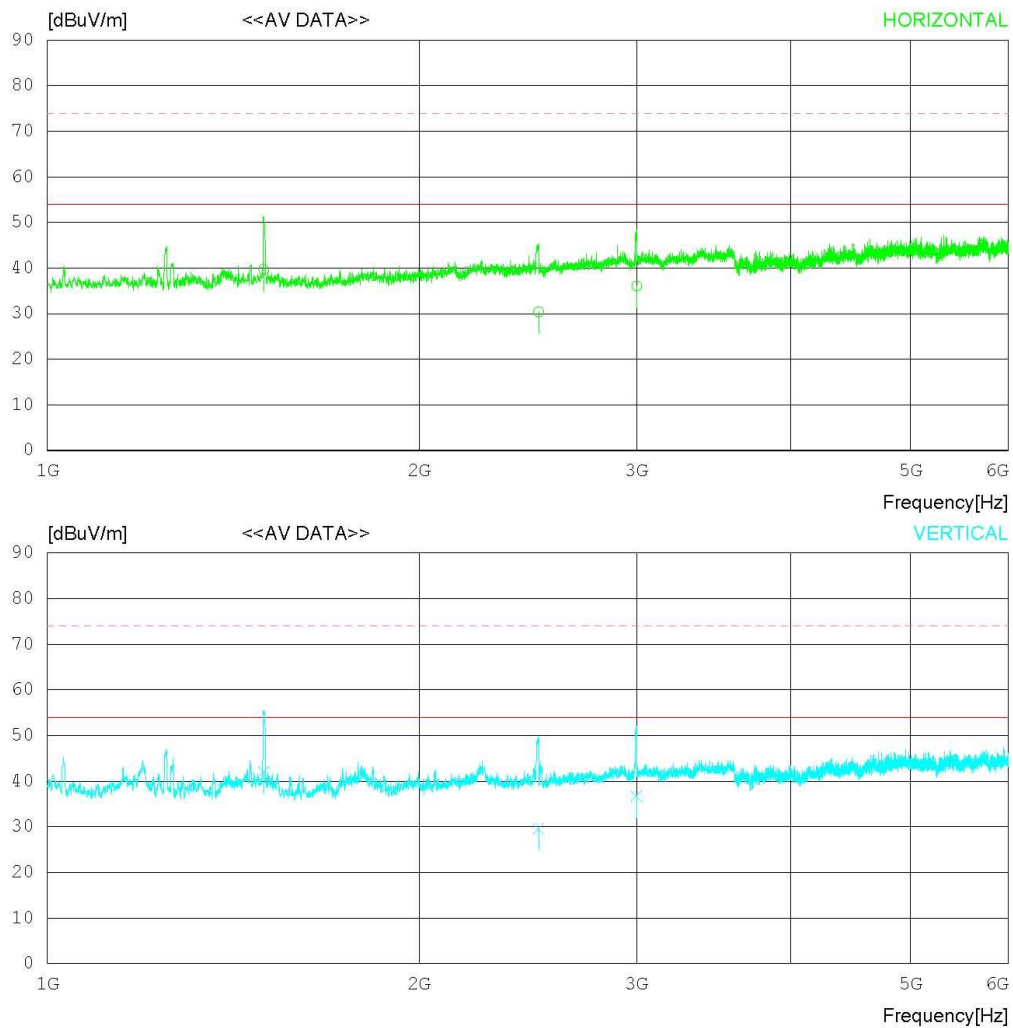
Date : 2014-02-19

Model Name : L-03F
Model No. :
Serial No. :
Test Condition :

Reference No. :
Power Supply : 120V 60Hz
Temp/Humi : 24°C 36 % 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 : 2014-02-19

Model Name : L-03F	Reference No. :
Model No. :	Power Supply : 120V 60Hz
Serial No. :	Temp/Humi : 24°C 36 % R. H.
Test Condition :	Operator :

Memo :

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

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	AV	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
		[dBuV]	[dB]							
----- Horizontal -----										
1	1496.575	50.4	25.3	4.1	40.1	39.7	54.0	14.3	100	157
2	2498.657	37.2	27.3	5.2	39.3	30.4	54.0	23.6	100	207
3	3000.177	40.9	28.8	5.7	39.3	36.1	54.0	17.9	100	289
----- Vertical -----										
4	1496.400	52.7	25.3	4.1	40.1	42.0	54.0	12.0	100	21
5	2498.933	36.4	27.3	5.2	39.3	29.6	54.0	24.4	100	179
6	3000.175	41.5	28.8	5.7	39.3	36.7	54.0	17.3	100	157

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	2013.02.28	2014.02.28
☐ RFI/FIELD INTENSITY METER	KNM-2402	KYORITSU	4N-170-3	2013.06.28	2014.06.28
☐ LISN	KNW-407	KYORITSU	8-317-8	2014.01.08	2015.01.08
☐ LISN	PMM L2-16B	NARDA S.T.S. / PMM	000WX20305	2013.06.27	2014.06.27
☐ 50 OHM TERMINATOR	CT-01	TME	N/A	2014.01.08	2015.01.08
☒ EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2013.02.27	2014.02.27
☒ LISN	ESH2-Z5	ROHDE & SCHWARZ	828739/006	2013.09.12	2014.09.12
☒ LISN	LISN1600	TTI	197204	2013.06.28	2014.06.28
☒ 50 OHM TERMINATOR	CT-01	TME	N/A	2014.01.08	2015.01.08

2. Radiated Disturbance

Name of Instrument	Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
☒ EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100014	2014.01.08	2015.01.08
☒ BILOG ANTENNA	CBL6112B	SCHAFFNER	2737	2012.11.06	2014.11.06
☒ HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1014	2012.10.21	2014.10.21
☒ AMPLIFIER	8447E	H/P	2945A02865	2014.01.08	2015.01.08
☒ AMPLIFIER	8449B	AGILENT	3008A01590	2013.02.27	2014.02.27
☐ SPECTRUM ANALYZER	E4411B	AGILENT	US41062735	2013.06.27	2014.06.27
☐ AMPLIFIER	8447D	AGILENT	2443A03690	2013.06.28	2014.06.28
☐ EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2013.02.27	2014.02.27
☐ BICONICAL ANT.	VHA 9103	SCHWARZBECK	91032789	2012.04.10	2014.04.10
☐ LOG-PERIODIC ANT.	UHALP 9108A	SCHWARZBECK	590	2012.10.04	2014.10.04
☐ BICONICAL ANT.	VHA 9103	SCHWARZBECK	91031946	2013.05.16	2015.05.16
☐ LOG-PERIODIC ANT.	UHALP 9108-A1	SCHWARZBECK	0411	2013.05.16	2015.05.16
☐ AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2013.02.28	2014.02.28

Appendix 2

Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None	Original	N/A	N/A