

EMC TEST REPORT

Test item : Mobile Handset
Model No. : LG-D120f
Order No. : DEMC1404-01248
Date of receipt : 2014-04-07
Test duration : 2014-04-11 ~ 2014-04-14
Date of Issue : 2014-04-23

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 : (22 ~ 23) °C,
Humidity : (38 ~ 45) % 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:

Reviewed by:



Manager
HyunSuk Ko



Manager
YoungKyu Shin

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.

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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.	LG-D120f
Serial No	NONE
FCC ID	ZNFD120F
Supplied Power for Test	AC 120 V, 60 Hz
Clock Frequency	1 GHz
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	2014-04-11	22	38
Radiated Disturbance	2014-04-14	23	45

4.3 Test result Summary

(1) Conducted Emission

Frequency [MHz]	Phase	Result [dB μ V]	Detector	Limit [dB μ V]	Margin [dB]
5.10550	N	44.9	Average	50.0	5.1

(2) Radiated Emission

Frequency [MHz]	Pol.	Result [dB(μ V/m)]	Detector	Limit [dB(μ V/m)]	Margin [dB]
143.993	H	33.5	Quasi-Peak	43.5	10.0

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 ; 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		
PC	DC8M	D8FQFBX	DELL	POWER	1.8	Non-shield	Plastic	DOC
				DVI	1.7	Shield		
				USB	1.6	Shield		
				USB	1.5	Shield		
				USB	1.0	Shield		
				PARALLEL	2.0	Shield		
				RJ45	10.0	Non-shield		
STEREO	2.1	Non-shield						
LCD Monitor	M2450D-PN	202KCYQ8Q586	LG	POWER	1.8	Non-shield	Plastic	DOC
				DVI	1.7	Shield		
Printer	SRP-770	NONE	BIXOLON	PARALLEL	2.0	Shield	Plastic	DOC
				POWER	1.7	Non-shield		
Keyboard	SKG-2100UB	TAKC119482T	MONTEREY INTERNATIONAL CORP.	USB	1.6	Shield	Plastic	DOC
MOUSE	1094	X817158-002	MICROSOFT CORPORATION	USB	1.5	Shield	Plastic	DOC
External HDD	9ZR8N1-500	NA0H2L7Z	Seagate	USB	1.0	Shield	Plastic	DOC
HEADSET	COV903	NONE	COSY	STEREO	2.1	Non-shield	Plastic	-

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

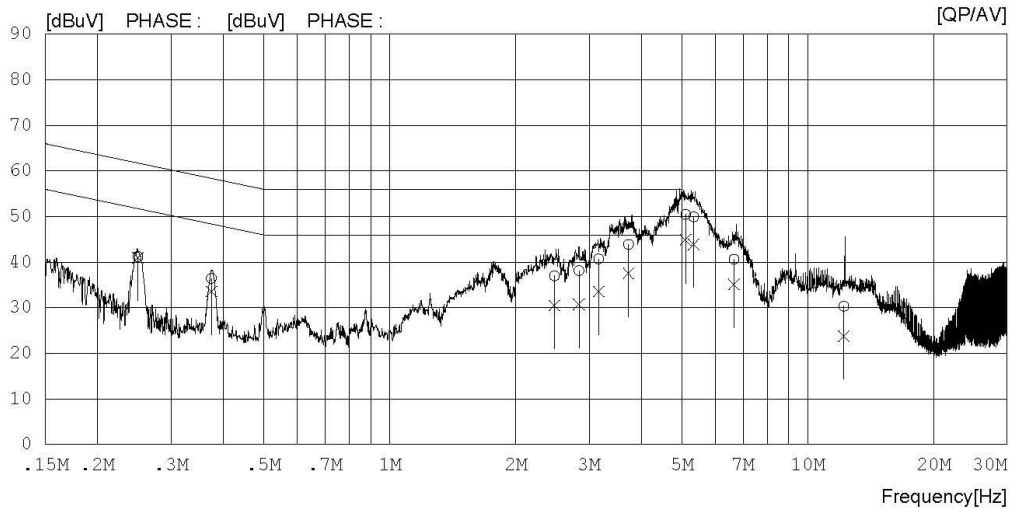
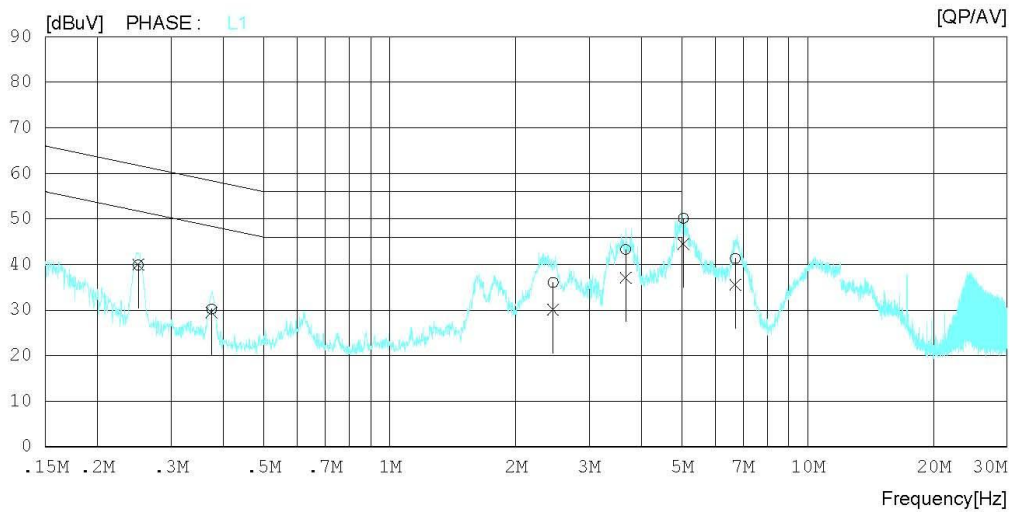
Results of Conducted Emission

Digital EMC
Date : 2014-04-11

Model No.	: LG-D120f	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	:	Temp/Humi.	: 22 °C 38 % R.H.
Test Condition	:	Operator	: H.S KO

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV



Results of Conducted Emission

Digital EMC
 Date : 2014-04-11

Model No. : LG-D120f	Reference No. :
Type :	Power Supply : 120 V 60 Hz
Serial No. :	Temp/Humi. : 22°C 38 % R.H.
Test Condition :	Operator : H.S KO

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	0.25004	29.6	29.7	10.3	39.9	40.0	61.8	51.8	21.9	11.8	L1
2	0.37479	19.9	19.2	10.3	30.2	29.5	58.4	48.4	28.2	18.9	L1
3	2.45950	25.8	19.7	10.3	36.1	30.0	56.0	46.0	19.9	16.0	L1
4	3.66700	33.0	26.8	10.3	43.3	37.1	56.0	46.0	12.7	8.9	L1
5	5.03950	39.8	34.1	10.3	50.1	44.4	60.0	50.0	9.9	5.6	L1
6	6.71100	30.9	25.2	10.4	41.3	35.6	60.0	50.0	18.7	14.4	L1
7	0.24981	30.9	30.7	10.3	41.2	41.0	61.8	51.8	20.6	10.8	N
8	0.37414	26.1	23.3	10.3	36.4	33.6	58.4	48.4	22.0	14.8	N
9	2.47850	26.7	20.2	10.3	37.0	30.5	56.0	46.0	19.0	15.5	N
10	2.83450	27.9	20.4	10.3	38.2	30.7	56.0	46.0	17.8	15.3	N
11	3.16050	30.4	23.3	10.3	40.7	33.6	56.0	46.0	15.3	12.4	N
12	3.72750	33.6	27.2	10.3	43.9	37.5	56.0	46.0	12.1	8.5	N
13	5.10550	40.1	34.6	10.3	50.4	44.9	60.0	50.0	9.6	5.1	N
14	5.33500	39.6	33.6	10.3	49.9	43.9	60.0	50.0	10.1	6.1	N
15	6.66400	30.2	24.7	10.4	40.6	35.1	60.0	50.0	19.4	14.9	N
16	12.19700	19.7	13.2	10.6	30.3	23.8	60.0	50.0	29.7	26.2	N

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 (dB μ V/m)	Quasi-peak (dB μ V/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 (dB μ V/m)	Quasi-peak (dB μ V/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 (dB μ V/m)	Average (dB μ V/m)	Peak (dB μ V/m)	Average (dB μ V/m)
1 to 40	80	60	74	54

Note) 1. Emission Level = Reading Value + loss - gain + Ant Factor

2. Margin = Limit - Emission level

3. Below 1 GHz : loss = Cable loss, gain = Amp gain, Ant Factor = Antenna Factor

4. Above 1 GHz : loss = Cable loss, Ant Factor = Antenna Factor - Amp gain

Test Result

< 30 MHz ~ 1 GHz >

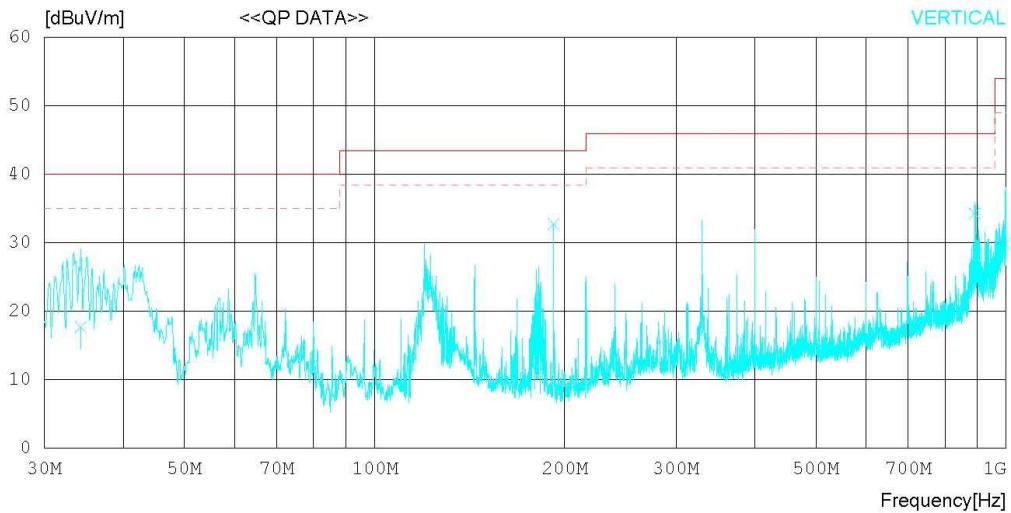
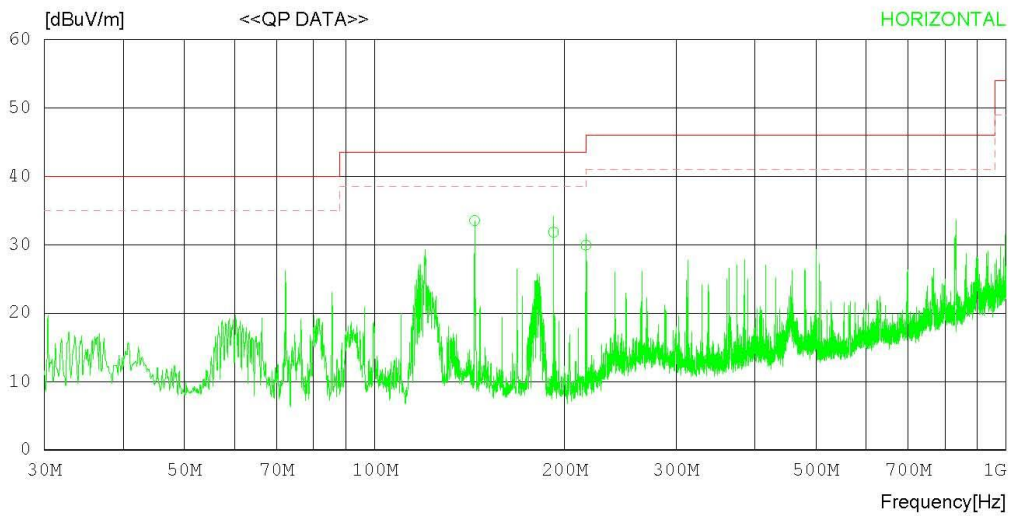
Results of Radiated Emissions

Date : 2014-04-14

Model No.	: LG-D120f	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial	:	Temp/Humi	: 23 °C 45 % R.H.
Test Condition	:	Operator	: H.S KO

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 5 dB



Results of Radiated Emissions

Date : 2014-04-14

Model No. : LG-D120f	Reference No. :
Type :	Power Supply : 120 V 60 Hz
Serial :	Temp/Humi : 23 °C 45 % R.H.
Test Condition :	Operator : H.S KO

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)
 MARGIN: 5 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	143.993	45.3	13.6	1.2	26.6	33.5	43.5	10.0	400	359
2	191.998	46.0	11.0	1.4	26.6	31.8	43.5	11.7	183	0
3	215.990	44.3	10.7	1.4	26.5	29.9	43.5	13.6	139	0
4	832.500	21.7	22.0	3.2	26.4	20.5	46.0	25.5	202	172
----- Vertical -----										
5	34.275	31.4	12.3	0.6	26.6	17.7	40.0	22.3	205	0
6	192.000	47.0	11.0	1.4	26.6	32.8	43.5	10.7	100	74
7	891.005	35.1	22.4	3.3	26.5	34.3	46.0	11.7	100	359
8	998.515	30.1	23.4	3.5	27.1	29.9	54.0	24.1	151	26

RADIATED EMISSION

Date : 2014-04-14

Model Name : LG-D120f	Reference No. :
Model No. :	Power Supply : 120 V 60 Hz
Serial No. :	Temp/Humi : 23 °C 45 % R.H.
Test Condition :	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	4720.500	37.6	-5.7	9.0	0.0	40.9	74.0	33.1	100	149
----- Vertical -----										
2	4765.125	37.3	-5.7	9.2	0.0	40.8	74.0	33.2	100	3

RADIATED EMISSION

Date : 2014-04-14

Model Name : LG-D120f	Reference No. :
Model No. :	Power Supply : 120 V 60 Hz
Serial No. :	Temp/Humi : 23 °C 45 % R.H.
Test Condition :	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	4720.500	23.5	-5.7	9.0	0.0	26.8	54.0	27.2	100	149
----- Vertical -----										
2	4765.125	23.8	-5.7	9.2	0.0	27.3	54.0	26.7	100	3

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
<input checked="" type="checkbox"/>	ARTIFICIAL MAINS NETWORK	PMM L2-16B	NARDA S.T.S. / PMM	000WX20305	2013.06.27	2014.06.27
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESC17	ROHDE & SCHWARZ	100910	2014.02.27	2015.02.27
<input checked="" type="checkbox"/>	LISN	NNLK8121	SCHWARZBECK	NNLK8121-580	2013.08.12	2014.08.12
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	ROHDE&SCHWARZ	101334	2014.01.08	2015.01.08
<input checked="" type="checkbox"/>	50 OHM TERMINATOR	CT-01	TME	N/A	2014.01.08	2015.01.08
<input type="checkbox"/>	EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2014.02.27	2015.02.27
<input type="checkbox"/>	LISN	ESH2-Z5	ROHDE & SCHWARZ	828739/006	2013.09.12	2014.09.12
<input type="checkbox"/>	LISN	LISN1600	TTI	197204	2013.06.28	2014.06.28
<input type="checkbox"/>	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
<input type="checkbox"/>	SPECTRUM ANALYZER	E4411B	AGILENT	US41062735	2013.06.27	2014.06.27
<input type="checkbox"/>	AMPLIFIER	8447D	AGILENT	2443A03690	2013.06.28	2014.06.28
<input checked="" type="checkbox"/>	TRILOG BROAD BAND ANTENNA	VULB9160	SCHWARZBECK	9160-3339	2013.02.05	2015.02.05
<input checked="" type="checkbox"/>	HORN ANTENNA WITH PREAMPLIFIER (1~6GHZ)	3117/ MLA-0106-B03-36	ETS-LINDGREN/ TSJ	00143291/ 1784347	2013.03.06	2015.03.06
<input checked="" type="checkbox"/>	LOW NOISE PRE AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2014.02.28	2015.02.28
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU 8	ROHDE&SCHWARZ	100348	2013.10.22	2014.10.22

Appendix 2

Report Revision History

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