FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN

MODEL NUMBER: LS840, LG-LS840, LGLS840

FCC ID: ZNFLS840

REPORT NUMBER: 11U14124-4

ISSUE DATE: NOVEMBER 21, 2011

Prepared for
LG ELECTRONICS MOBILECOMM U.S.A., INC.
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SAN DIEGO, CA 92131

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	11/21/11	Initial Issue	

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC.
10101 OLD GROVE ROAD
SAN DIEGO, CA 92131

EUT DESCRIPTION: Cellular/PCS CDMA and LTE PHONE with Bluetooth and WLAN

MODEL: LS840, LG-LS840, LGLS840

SERIAL NUMBER: 74000557

DATE TESTED: NOVEMBER 3~7, 2011

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	Pass
INDUSTRY CANADA RSS-210 Issue 8, Annex 2	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

Compliance Certification Services (UL CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL CCS By:

DAVE WEAVER
EMC SUPERVISOR
UL CCS

Tested By:

TOM CHEN
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a smart phone that features PCS/CDMA, LTE It also supports BLUETOOTH, WLAN and NFC operating at 13.56MHz.

5.2. MAXIMUM OUTPUT POWER

The transmitter maximum E-field at 10m distance is 28.02 dBuV/m

5.3. SOFTWARE AND FIRMWARE

The EUT software installed during testing was LS840Z06

The test utility software used during testing was NFC FCC Test.

5.4. WORST-CASE CONFIGURATION AND MODE

The EUT powered by USB cable from AC adapter.
The EUT set to the continuous TX mode with worst position.

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	LG Electronics	MCS-02WS	SA14258000036	N/A

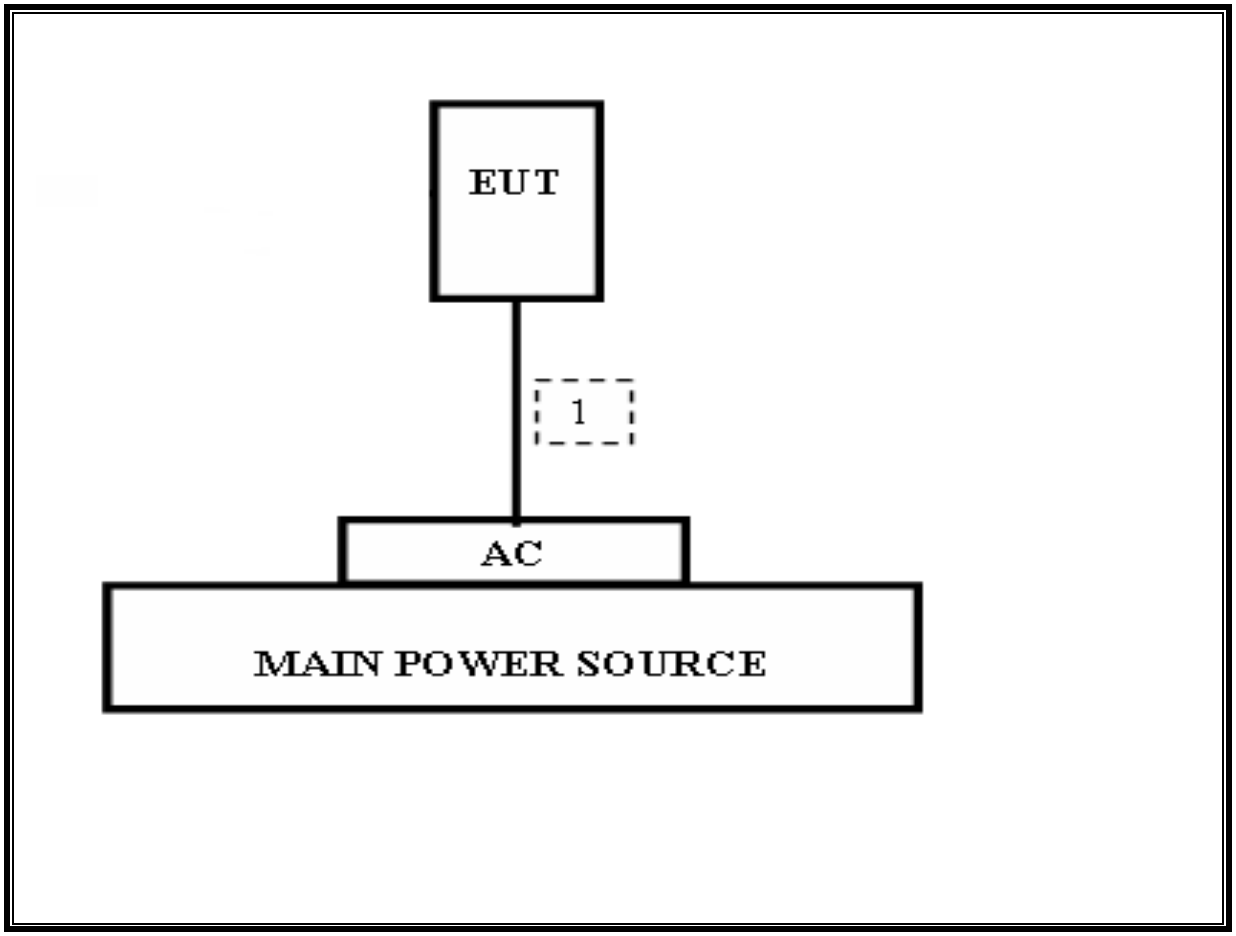
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	DC	1	MINI USB	Un-Shielded	1.0m	

TEST SETUP

The EUT is a stand-alone device and was tested with AC/USB adapter.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	09/02/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	01/27/12
Antenna, Horn, 18 GHz	EMCO	3115	C00872	09/20/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01171	07/16/12
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01159	08/11/12
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	07/06/12
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/10/11
Antenna, Loop, 30 MHz	EMCO	6502	C00593	02/10/13

7. RADIATED EMISSION TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMIT

§15.225
IC RSS-210, Section 2.6 (Transmitter)
IC RSS-GEN, Section 6 (Receiver)

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:
§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.
§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the filed strength from uV/m to dBuV/m is:
Limit (dBuV/m) = 20 log limit (uV/m)

In addition:

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

TEST PROCEDURE

ANSI C63.4

The EUT is an intentional radiator that incorporates a digital device. The highest fundamental frequency generated or used in the device is 19.2 MHz. The frequency range was investigated from 30 MHz to the 10^{th} harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater (1000MHz)

RESULTS

No non-compliance noted:

7.1.1. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)

FCC Part 15, Subpart B & C **10 Meter Distance Measurement At Open Field**

Company: LG
Project #: 11U14124
Model #: LS 840
Tester: Tom Chen
Date: 11/4/2011

Frequency (MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	AF dB/m	Distance Correction (dB)	PK Corrected Reading (dBuV/m)	AV Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	PK Margin (dB)	AV Margin (dB)	Notes
Loop Antenna Face On:												
13.56	36.54		N/A	10.56	-19.08	28.02	N/A	84.00	N/A	-56.0	N/A	Fundamental @ 10m Dist
13.41	14.85		N/A	10.54	-19.08	6.31	N/A	50.48	N/A	-44.2	N/A	13.41-13.553MHz Spurious @ 10m
13.553	30.43		N/A	10.56	-19.08	21.91	N/A	50.48	N/A	-28.6	N/A	13.41-13.553MHz Spurious @ 10m
13.567	33.58		N/A	10.56	-19.08	25.06	N/A	50.48	N/A	-25.4	N/A	13.567-13.710MHz Spurious @ 10m
13.71	18.82		N/A	10.57	-19.08	10.31	N/A	50.48	N/A	-40.2	N/A	13.567-13.710MHz Spurious @ 10m
13.11	17.04		N/A	10.51	-19.08	8.47	N/A	40.51	N/A	-32.0	N/A	13.110-13.410MHz Spurious @ 10m
13.41	14.85		N/A	10.54	-19.08	6.31	N/A	40.51	N/A	-34.2	N/A	13.110-13.410MHz Spurious @ 10m
13.71	18.82		N/A	10.57	-19.08	10.31	N/A	40.51	N/A	-30.2	N/A	13.710-14.010MHz Spurious @ 10m
14.01	22.44		N/A	10.6	-19.08	13.96	N/A	40.51	N/A	-26.5	N/A	13.710-14.010MHz Spurious @ 10m
27.145	28.16		N/A	9.043	-19.08	18.12	N/A	29.54	N/A	-11.4	N/A	14.010-30MHz Spurious @ 10m
Loop Antenna Face Off:												
13.56	28.43		N/A	10.56	-19.08	19.90	N/A	84.00	N/A	-64.1	N/A	Fundamental @ 10m Dist
13.41	13.41		N/A	10.54	-19.08	4.87	N/A	50.48	N/A	-45.6	N/A	13.41-13.553MHz Spurious @ 10m
13.553	23.65		N/A	10.56	-19.08	15.12	N/A	50.48	N/A	-35.4	N/A	13.41-13.553MHz Spurious @ 10m
13.567	28.06		N/A	10.56	-19.08	19.53	N/A	50.48	N/A	-30.9	N/A	13.567-13.710MHz Spurious @ 10m
13.71	10.45		N/A	10.57	-19.08	1.94	N/A	50.48	N/A	-48.5	N/A	13.567-13.710MHz Spurious @ 10m
13.11	13.14		N/A	10.51	-19.08	4.57	N/A	40.51	N/A	-35.9	N/A	13.110-13.410MHz Spurious @ 10m
13.41	13.41		N/A	10.54	-19.08	4.87	N/A	40.51	N/A	-35.6	N/A	13.110-13.410MHz Spurious @ 10m
13.71	10.45		N/A	10.57	-19.08	1.94	N/A	40.51	N/A	-38.6	N/A	13.710-14.010MHz Spurious @ 10m
14.01	12.3		N/A	10.6	-19.08	3.82	N/A	40.51	N/A	-36.7	N/A	13.710-14.010MHz Spurious @ 10m
27.145	27.71		N/A	9.043	-19.08	17.67	N/A	29.54	N/A	-11.9	N/A	14.010-30MHz Spurious @ 10m

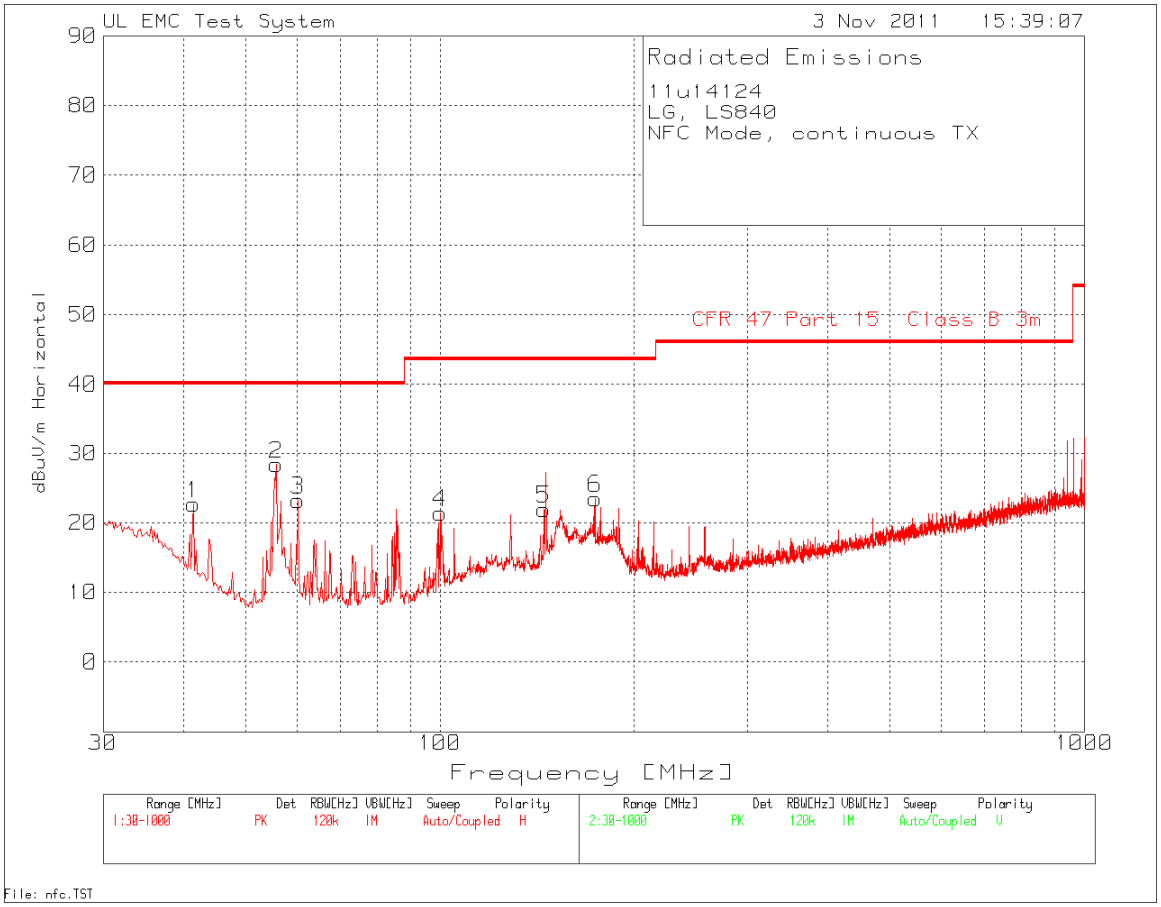
* No more emissions were found up to 30MHz

Note: The emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 10000Mhz. Radiated emission limits in these three bands are based on measurements employing an average detector.

P.K. = Peak
Q.P. = Quasi Peak Readings
A.F. = Antenna factor

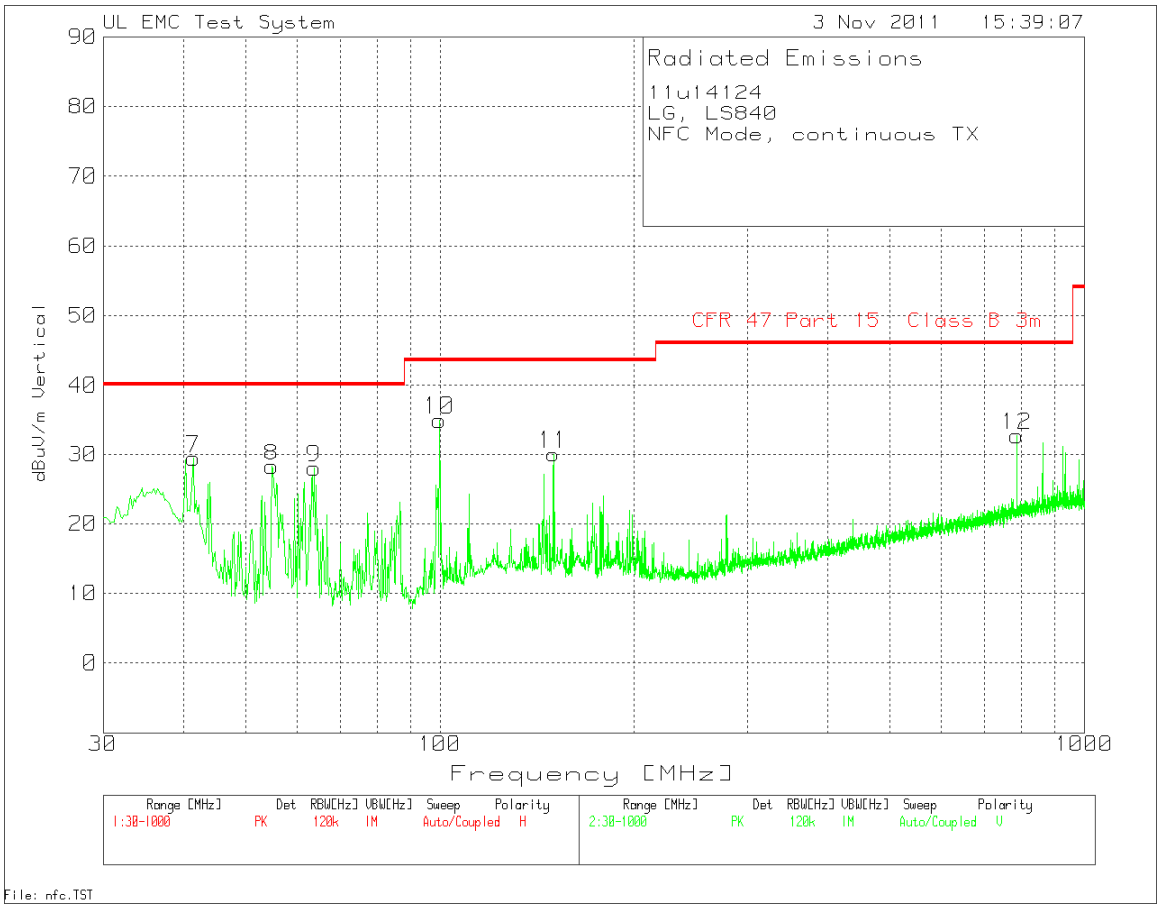
7.1.2. TX SPURIOUS EMISSION 30 TO 1000 MHz (HORIZONTAL)

HORIZONTAL PLOT



7.1.3. TX SPURIOUS EMISSION 30 TO 1000 MHz (VERTICAL)

VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Test Frequency	Meter Reading	Detector	5m A Cable below 1GHz.TXT [dB]	5m A T64 PreAmp below 1GHz.TXT [dB]	5m A T122 Bilog below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
41.4369	37.23	PK	0.7	-28.3	13	22.63	40	-17.37	100	Horz
55.7814	47.75	PK	0.8	-28.3	8.1	28.35	40	-11.65	300	Horz
60.2398	42.79	PK	0.8	-28.3	7.9	23.19	40	-16.81	300	Horz
100.1719	38.55	PK	1.1	-28.2	10	21.45	43.5	-22.05	200	Horz
144.95	35.84	PK	1.3	-28.1	12.9	21.94	43.5	-21.56	200	Horz
174.0268	39.63	PK	1.4	-28.1	10.5	23.43	43.5	-20.07	200	Horz

Test Frequency	Meter Reading	Detector	5m A Cable below 1GHz.TXT [dB]	5m A T64 PreAmp below 1GHz.TXT [dB]	5m A T122 Bilog below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
41.4369	44.01	PK	0.7	-28.3	13	29.41	40	-10.59	100	Vert
54.8122	47.6	PK	0.8	-28.3	8.1	28.2	40	-11.8	200	Vert
63.729	47.42	PK	0.8	-28.2	8	28.02	40	-11.98	100	Vert
99.7842	52.14	PK	1.1	-28.2	9.9	34.94	43.5	-8.56	100	Vert
149.99	44.27	PK	1.3	-28.1	12.6	30.07	43.5	-13.43	100	Vert
786.7706	36.03	PK	3.1	-27.2	20.8	32.73	46	-13.27	100	Vert

8. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207
IC RSS-GEN, Section 7.2.2

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Notes: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

TEST PROCEDURE

ANSI C63.4

RESULTS

No non-compliance noted:

6 WORST EMISSIONS

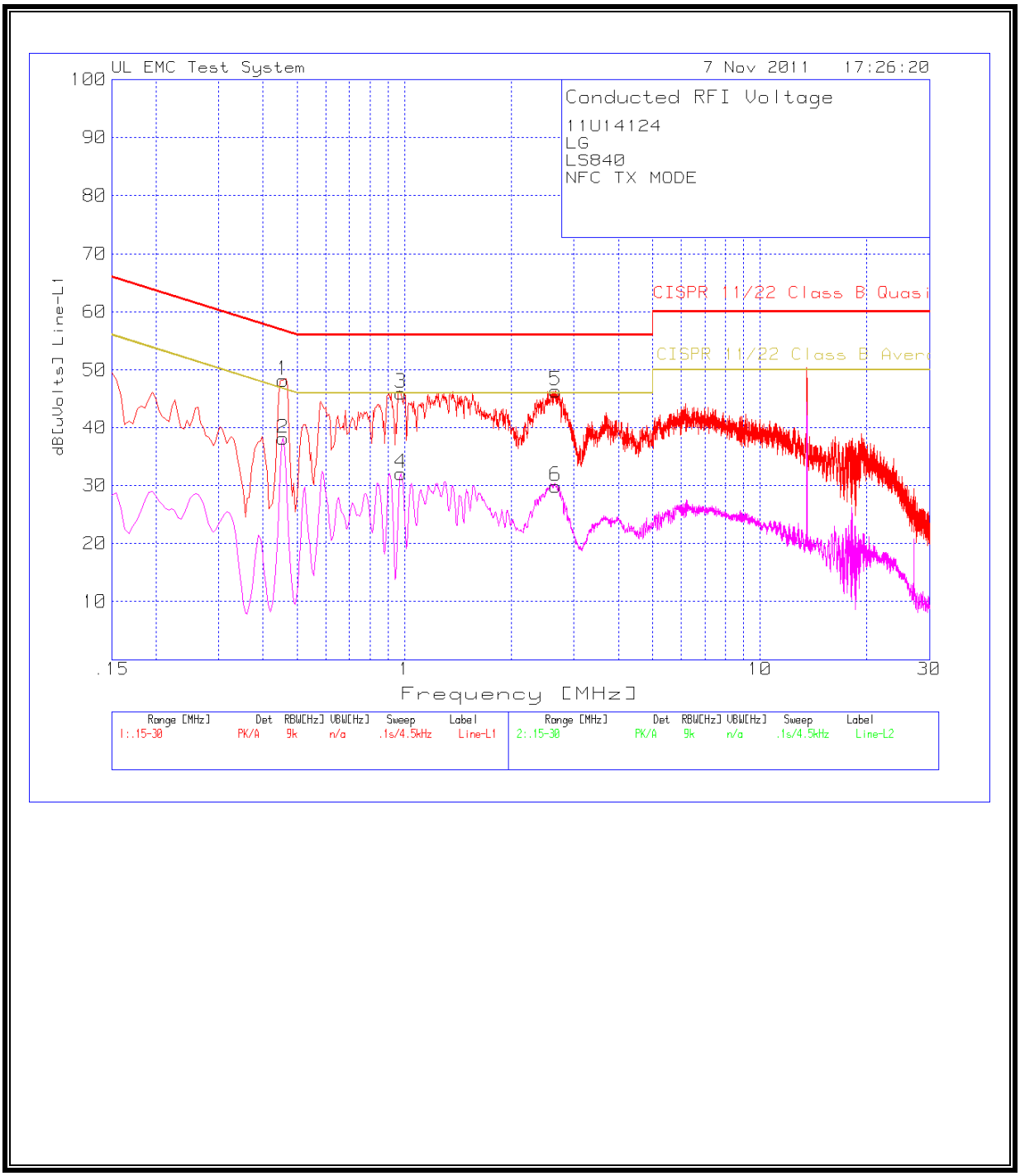
Line-L1 .15 - 30MHz

Test Frequency	Meter Reading	Detector	LISN [dB]	Conducted Emission Cable [dB]	dB[uVolts]	CISPR 11/22 Class B Quasi-peak	Margin	CISPR 11/22 Class B Average	Margin
0.456	48.28	PK	0	0	48.28	56.8	-8.52	46.8	1.48
0.456	38.18	Av	0	0	38.18	56.8	-18.62	46.8	-8.62
0.978	46	PK	0	0	46	56	-9.95	46	0
0.978	32.1	Av	0	0	32.1	56	-23.9	46	-13.9
2.6655	45.4	PK	0	0	45.4	56	-9.6	46	-0.6
2.6655	29.83	Av	0	0	29.83	56	-26.17	46	-16.17

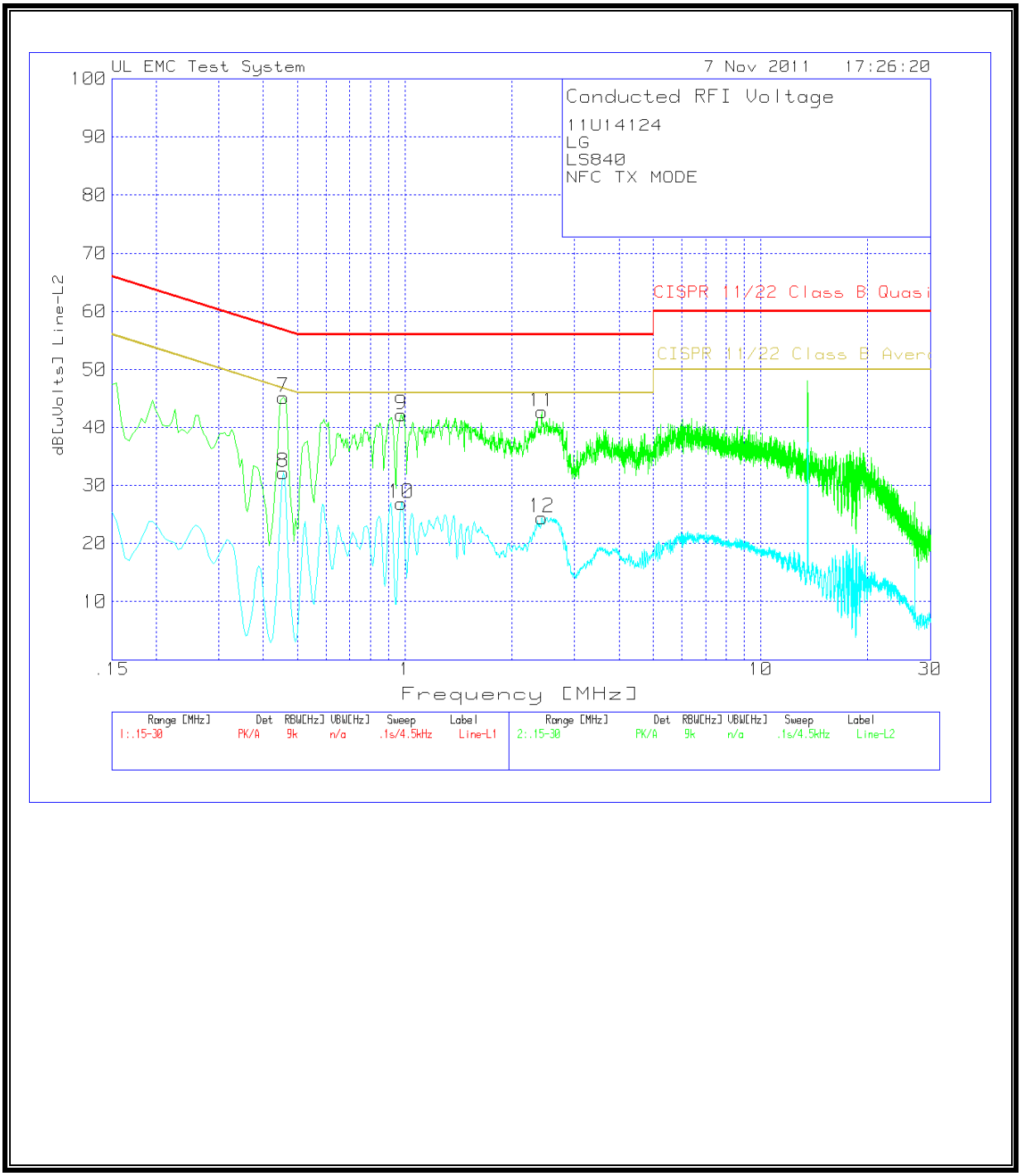
Line-L2 .15 - 30MHz

Test Frequency	Meter Reading	Detector	LISN [dB]	Conducted Emission Cable [dB]	dB[uVolts]	11/22 Class B Quasi-peak	Margin	CISPR 11/22 Class B Average	Margin
0.456	45.22	PK	0	0	45.22	56.8	-11.58	46.8	-1.58
0.456	32.23	Av	0	0	32.23	56.8	-24.57	46.8	-14.57
0.978	42.31	PK	0	0	42.31	56	-13.69	46	-3.69
0.978	26.82	Av	0	0	26.82	56	-29.18	46	-19.18
2.427	42.78	PK	0	0	42.78	56	-13.22	46	-3.22
2.427	24.43	Av	0	0	24.43	56	-31.57	46	-21.57

LINE 1 RESULTS



LINE 2 RESULTS



9. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 2.3.1 and 2.3.2

RESULTS

No non-compliance noted.

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC **Limit: ± 100 ppm = 135.600 kHz**				
Power Supply (Vdc)	**Environment Temperature (ºC)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
3.70	50	13.5607000	-0.516	± 100
3.70	40	13.5607000	-0.516	± 100
3.70	30	13.5607000	-0.516	± 100
3.70	***20***	***13.5600000***	***0.000***	***± 100***
3.70	10	13.5605000	-0.369	± 100
3.70	0	13.5607000	-0.516	± 100
3.70	-10	13.5607000	-0.516	± 100
3.70	-20	13.5607000	-0.516	± 100
3.50	20	13.5603300	-0.243	± 100
4.26	20	13.5603300	-0.243	± 100