



**FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8
C2PC CERTIFICATION TEST REPORT**

FOR

**GSM/CDMA/WCDMA/LTE Phone + Bluetooth &
WLAN (2.4GHz & 5GHz) and NFC**

MODEL NUMBER: LG-D820, LGD820 and D820

FCC ID: ZNFD820

REPORT NUMBER: 13U15778-10, Revision B

ISSUE DATE: SEPTEMBER 17, 2013

Prepared for
**LG ELECTRONICS MOBILECOMM U.S.A., INC
100 SYLVAN AVENUE
ENGEWOOD CLIFFS,
NEW JERSEV, 07632, U.S.A.**

Prepared by
**UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888**



NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	8/21/2013	Initial Issue	P. Kim
A	9/12/13	Updated Section 5.3 Software and Firmware	AAumentado
B	9/17/13	Updated the standard version section 7.1	P. Kim

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY	5
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i>	<i>5</i>
4.2. <i>SAMPLE CALCULATION</i>	<i>5</i>
4.3. <i>MEASUREMENT UNCERTAINTY.....</i>	<i>5</i>
5. EQUIPMENT UNDER TEST	6
5.1. <i>DESCRIPTION OF EUT</i>	<i>6</i>
5.2. <i>MAXIMUM OUTPUT POWER.....</i>	<i>6</i>
5.3. <i>SOFTWARE AND FIRMWARE.....</i>	<i>6</i>
5.4. <i>WORST-CASE CONFIGURATION AND MODE.....</i>	<i>6</i>
5.5. <i>MODIFICATIONS</i>	<i>6</i>
5.6. <i>DESCRIPTION OF TEST SETUP.....</i>	<i>7</i>
6. TEST AND MEASUREMENT EQUIPMENT	10
7. RADIATED EMISSION TEST RESULTS.....	11
7.1. <i>LIMITS AND PROCEDURE.....</i>	<i>11</i>
7.1.1. <i>FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)</i>	<i>13</i>
7.1.2. <i>TX SPURIOUS EMISSION 30 TO 1000 MHz</i>	<i>14</i>
SETUP PHOTOS.....	16

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC.
1000 SYLVAN AVENUE
ENGLEWOOD CLIFFS, NEW JERSEY 07632 U.S.A.

EUT DESCRIPTION: GSM/CDMA/WCDMA + LTE Phone Bluetooth, WLAN (2.4GHz & 5GHz) and NFC

MODEL: LG-D820, , LGD820 and D820

SERIAL NUMBER: 01EB817E20C97E2D

DATE TESTED: JULY 31- AUG 2, 2013

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

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 Verification Services Inc. By:

Tested By:



PHILIP KIM
WISE PROGRAM MANAGER
UL Verification Services Inc.



ROLLY ALEGRE
EMC ENGINEER
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2 and 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 Verification Services Inc. 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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

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 an LTE cell phone with WLAN, Bluetooth and NFC capability that is manufactured by LG Electronics.

5.2. MAXIMUM OUTPUT POWER

The transmitter maximum E-field at 30m distance is 14.74 dBuV/m

5.3. SOFTWARE AND FIRMWARE

Android OS Version: 3.40-gbab8bca-00002-gd1a7716.
Kernel Version: M8974A-0.0.19.0.05.

5.4. WORST-CASE CONFIGURATION AND MODE

The NFC function was tested at its' fundamental and only operational frequency of 13.56 MHz. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that the Z-orientation was the worst-case orientation; therefore final radiated testing was performed with the EUT in the Z-orientation while generating continuous emissions. Excluding the 30MHz-1000MHz radiated testing. It was performed on X position.

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Radiated Emissions Above 30 MHz, AC Line Conducted Emissions and Frequency Stability:

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG Electronics	MCS-04WT2	TA360000209	N/A
Earphone	LG Electronics	N/A	N/A	N/A

I/O CABLES

Radiated Emissions above 30 MHz, AC Line Conducted Emissions :

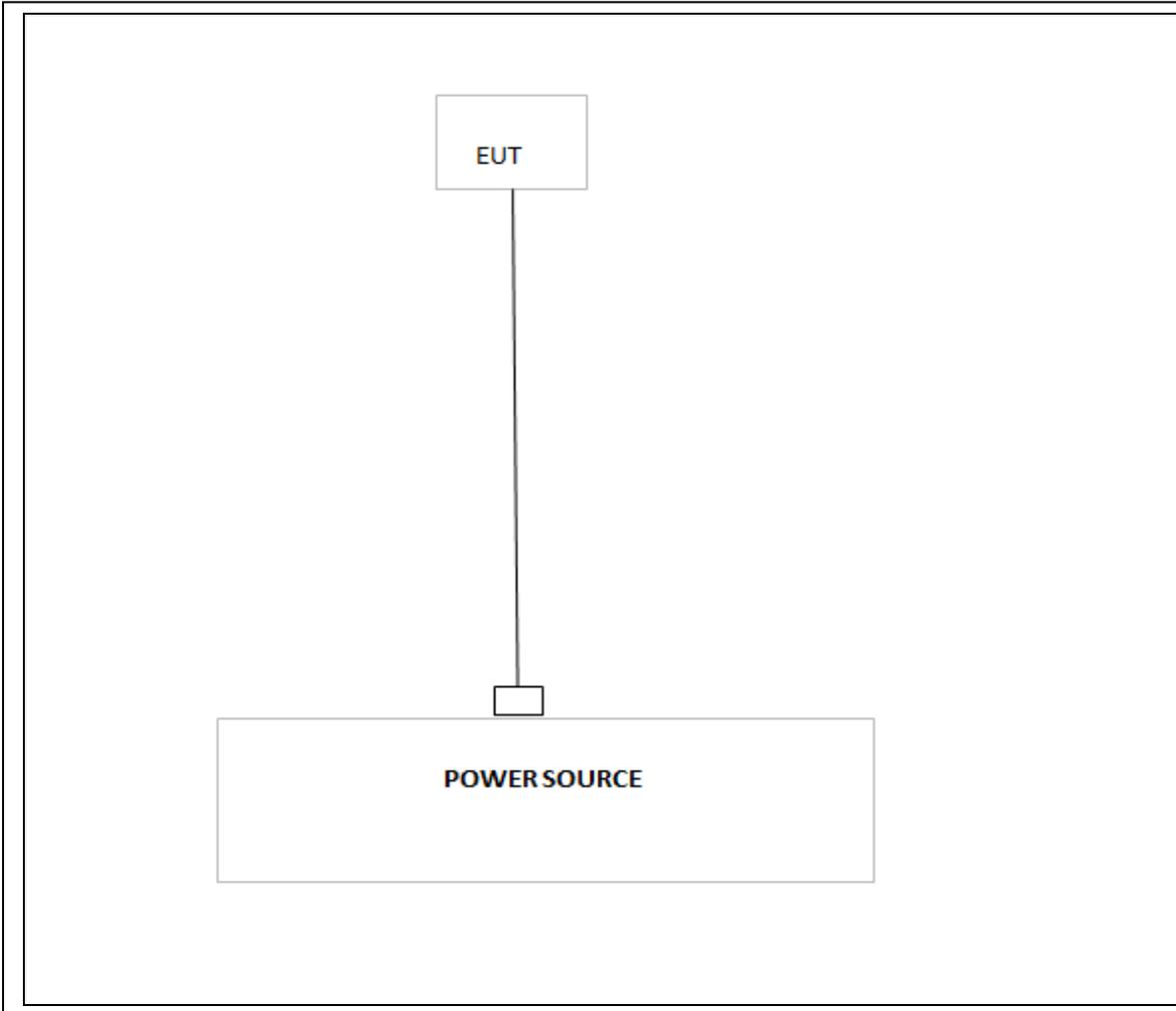
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Micro-USB	Shielded	1 m	None
2	Audio	1	Mini-Jack	Un-Shielded	1 m	None

TEST SETUP

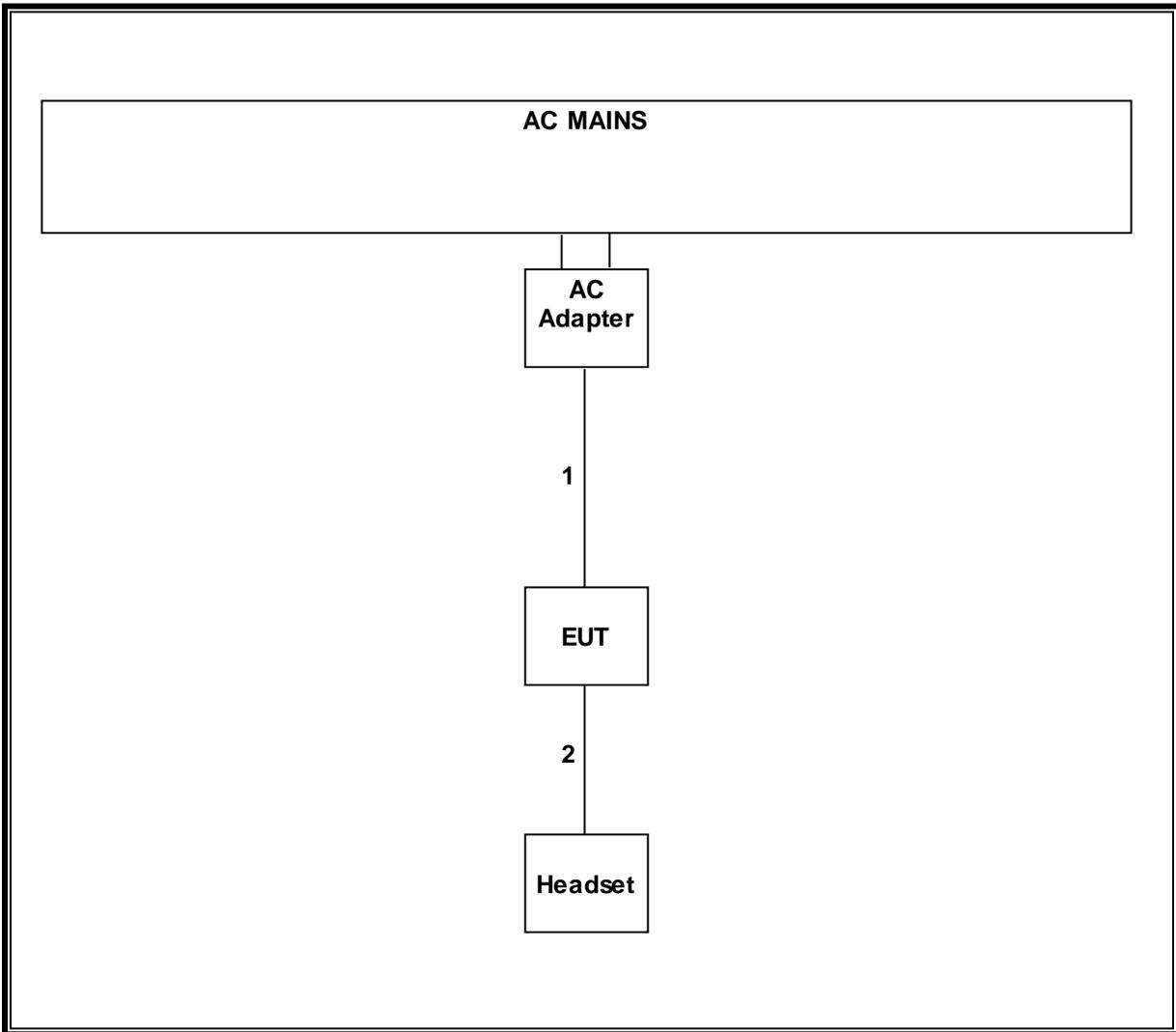
The EUT is a stand-alone device configured and tested in a worst-case setup.

SETUP DIAGRAM FOR TESTS

Radiated Emissions Below 30 MHz:



Radiated Emissions Above 30 MHz, AC Line Conducted Emissions :



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 Date	Cal Due
ESA-E Spectrum Analyzer, 9kHz-26.5 GHz	Agilent / HP	E4407B	C01098	03/29/12	04/04/14
Antenna, Loop, 30 MHz	EMCO	6502	C00593	02/10/11	02/20/14
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01011	03/23/12	03/23/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/21/12	01/21/14
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/15/13	08/15/14
DMM	Fluke	77-11	N02303	10/31/11	10/31/13
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/13	02/13/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	03/23/13	03/23/14
Spectrum Analyzer, 26.5GHz	Agilent / HP	E4440A	C01161	05/07/13	05/07/14

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 C63.4-2009

EUT scan for below 30MHz start from 150 KHz up to 30MHz.

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 10th harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater (1000MHz)

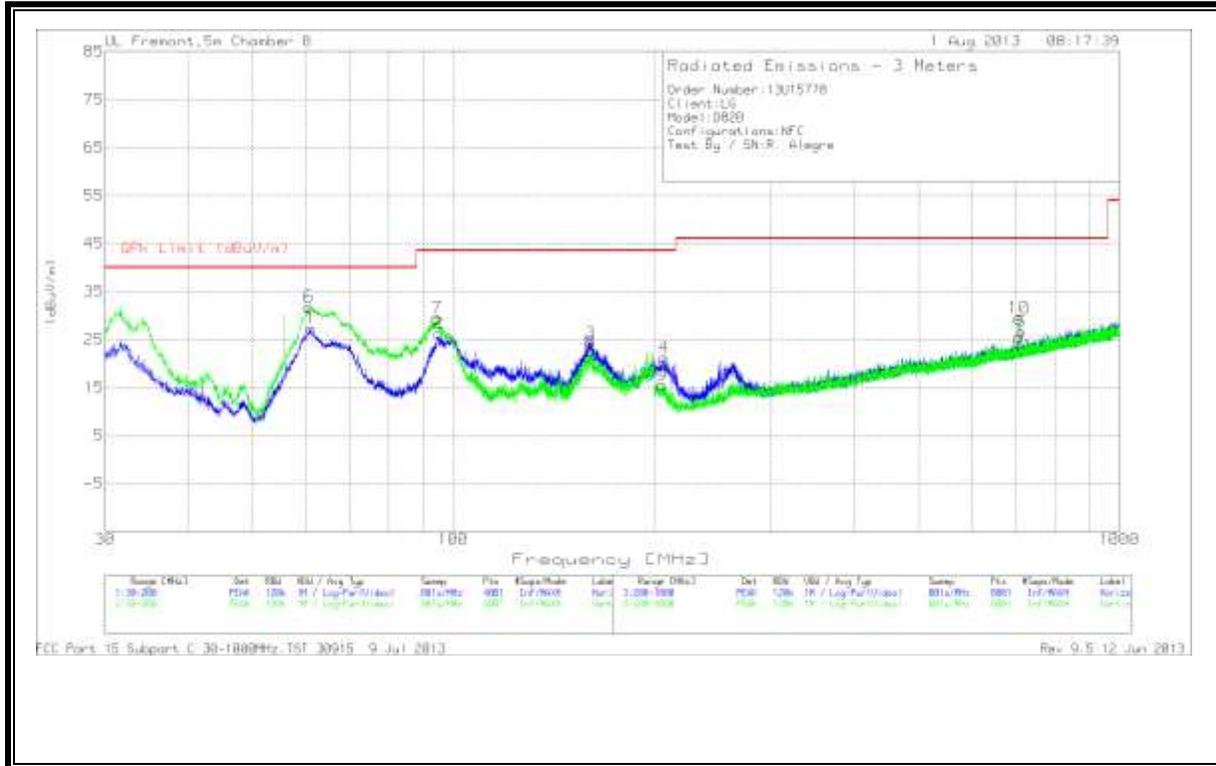
RESULTS

No non-compliance noted:

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

FCC Part 15, Subpart B & C		3 Meter Distance Measurement At Open Field										
Company: LG												
Project #: 13U15778												
Model #: D820												
Tester: R. Alegre												
Date: 07/31/13												
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: Z position worst												
13.56	44.18		N/A	10.56	-40.00	14.74	N/A	84.00	N/A	-69.3	N/A	Fundamental @ 3m Dist
13.48	30.06		N/A	10.56	-40.00	-0.36	N/A	50.48	N/A	-50.8	N/A	13.41MHz-13.553MHz
13.64	29.08		N/A	10.56	-40.00	-0.36	N/A	50.48	N/A	-50.8	N/A	13.567MHz-13.71MHz
13.15	33.49		N/A	10.52	-40.00	4.01	N/A	40.51	N/A	-36.5	N/A	13.110-13.410MHz
13.84	37.65		N/A	10.58	-40.00	8.23	N/A	40.51	N/A	-32.3	N/A	13.71-14.01MHz
4.27	42.13		N/A	10.2	-40.00	12.33	N/A	29.54	N/A	-17.2	N/A	9k-13.11MHz
27.12	32.27		N/A	9.046	-40.00	1.32	N/A	29.54	N/A	-28.2	N/A	14.01MHz-30MHz
Loop Antenna Face off: Z position												
13.56	35.78		N/A	10.56	-40.00	6.34	N/A	84.00	N/A	-77.7	N/A	Fundamental @ 3m Dist
13.47	31.28		N/A	10.55	-40.00	1.83	N/A	50.48	N/A	-48.7	N/A	13.41MHz-13.553MHz
13.65	33.76		N/A	10.57	-40.00	4.33	N/A	50.48	N/A	-46.2	N/A	13.567MHz-13.71MHz
13.38	31.6		N/A	10.54	-40.00	2.14	N/A	40.51	N/A	-38.4	N/A	13.110-13.410MHz
13.84	37.57		N/A	10.58	-40.00	8.15	N/A	40.51	N/A	-32.4	N/A	13.71-14.01MHz
7.21	38.21		N/A	10.2	-40.00	8.41	N/A	29.54	N/A	-21.1	N/A	9k-13.11MHz
27.12	33.12		N/A	9.046	-40.00	2.17	N/A	29.54	N/A	-27.4	N/A	14.01MHz-30MHz
* 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 Reading												
A.F. = Antenna factor												
Rev. 10.23.09												

7.1.2. TX SPURIOUS EMISSION 30 TO 1000 MHz



Frequency (MHz)	Meter Reading (dBuV)	Det	AFT243 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
61.1525	48.52	PK	7.2	-28.5	27.22	40	-12.78	0-360	400	H
95.025	45.65	PK	8.7	-28.1	26.25	43.52	-17.27	0-360	200	H
160.7725	39.49	PK	12	-27.3	24.19	43.52	-19.33	0-360	200	H
60.6425	53.06	PK	7.2	-28.5	31.76	40	-8.24	0-360	100	V
94.5575	48.95	PK	8.6	-28.1	29.45	43.52	-14.07	0-360	100	V
160.645	37.73	PK	12	-27.3	22.43	43.52	-21.09	0-360	100	V
207.5	37.4	PK	10.6	-26.8	21.2	43.52	-22.32	0-360	200	H
712.9	30.83	PK	20.3	-24.6	26.53	46.02	-19.49	0-360	400	H
206	31.54	PK	10.8	-26.9	15.44	43.52	-28.08	0-360	200	V
706.5	33.86	PK	20.3	-24.7	29.46	46.02	-16.56	0-360	200	V

PK - Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 9 Jul 2013 Rev 9.5 12 Jun 2013