



**FCC CFR47 PART 15 SUBPART C**

**CERTIFICATION TEST REPORT**

**FOR**

**CELLULAR/PCS CDMA/EVDO/GSM/GPRS/EDGE, PCS WCDMA/HSPA AND AWS  
LTE PHONE WITH BLUETOOTH&WLAN&NFC**

**MODEL NUMBER: VS950, LG-VS950, LGVS950**

**FCC ID: ZNFVS950**

**REPORT NUMBER: 12U14390-8**

**ISSUE DATE: MAY 15, 2012**

*Prepared for*  
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**NVLAP LAB CODE 200065-0**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
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## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS</b>	<b>4</b>
<b>2. TEST METHODOLOGY</b>	<b>5</b>
<b>3. FACILITIES AND ACCREDITATION</b>	<b>5</b>
<b>4. CALIBRATION AND UNCERTAINTY</b>	<b>5</b>
4.1. MEASURING INSTRUMENT CALIBRATION	5
4.2. SAMPLE CALCULATION	5
4.3. MEASUREMENT UNCERTAINTY	5
<b>5. EQUIPMENT UNDER TEST</b>	<b>6</b>
5.1. DESCRIPTION OF EUT	6
5.2. MAXIMUM OUTPUT POWER	6
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	6
5.4. MODEL DIFFERNECE	6
5.5. SOFTWARE AND FIRMWARE	6
5.6. WORST-CASE CONFIGURATION AND MODE	7
5.7. MODIFICATIONS	7
<b>5 TEST AND MEASUREMENT EQUIPMENT</b>	<b>10</b>
<b>6 RADIATED EMISSION TEST RESULTS</b>	<b>11</b>
7.1 LIMITS AND PROCEDURE	11
7.1.1 FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)	13
7.1.2 TX SPURIOUS EMISSION 30 TO 1000 MHz (HORIZONTAL)	14
7.1.3 TX SPURIOUS EMISSION 30 TO 1000 MHz (VERTICAL)	15
7.1.4 TX SPURIOUS EMISSIONS ABOVE 1 GHz	17
<b>8 AC MAINS LINE CONDUCTED EMISSIONS</b>	<b>18</b>
<b>9 FREQUENCY STABILITY</b>	<b>22</b>
<b>10 SETUP PHOTOS</b>	<b>23</b>

# 1. ATTESTATION OF TEST RESULTS

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

**EUT DESCRIPTION:** Cellular/PCS CDMA/EVDO/GSM/GPRS/EDGE, PCS  
WCDMA/HSPA and AWS LTE Phone with Bluetooth & WLAN &  
NFC

**MODEL:** VS950, LG-VS950, LGVS950

**SERIAL NUMBER:** CCS03041 for Emissions, CCS03043 for Conducted

**DATE TESTED:** APRIL 30 to MAY 15. 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	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:

Tested By:



TIM LEE  
STAFF ENGINEER  
UL CCS

THANH NGUYEN  
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:

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

### 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 a Cellular/PCS CDMA/EVDO/GSM/GPRS/EDGE, PCS WCDMA/HSPA and AWS LTE Phone with Bluetooth&WLAN&NFC operating at 13.56MHz.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBuV/m @ 30m)
13.56	Normal	26.50

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Monopole antenna, with a maximum gain of -1.1 dBi.

### 5.4. MODEL DIFFERNECE

Model LG-VS950 is identical to Models LGVS950 and VS950 except for model designation.

### 5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Android Version 4.0.3

The test utility software used during testing was VS9500CA

## 5.6. WORST-CASE CONFIGURATION AND MODE

Since the EUT is a portable device, an X, Y, and Z orientations, and worst orientations among X, Y, and Z with Headset and AC Adapter were investigated to determine the worst case. After the investigation the worst case turned out to be Y(Upward)-Orientation with an AC Adapter.

## 5.7. MODIFICATIONS

No modifications were made during testing.

## 5.8. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
AC ADAPTER	LG ELECTRONICS	MCS-01WR	RA1Z0051473
HEADSET	LG ELECTRONICS	NA	N/A

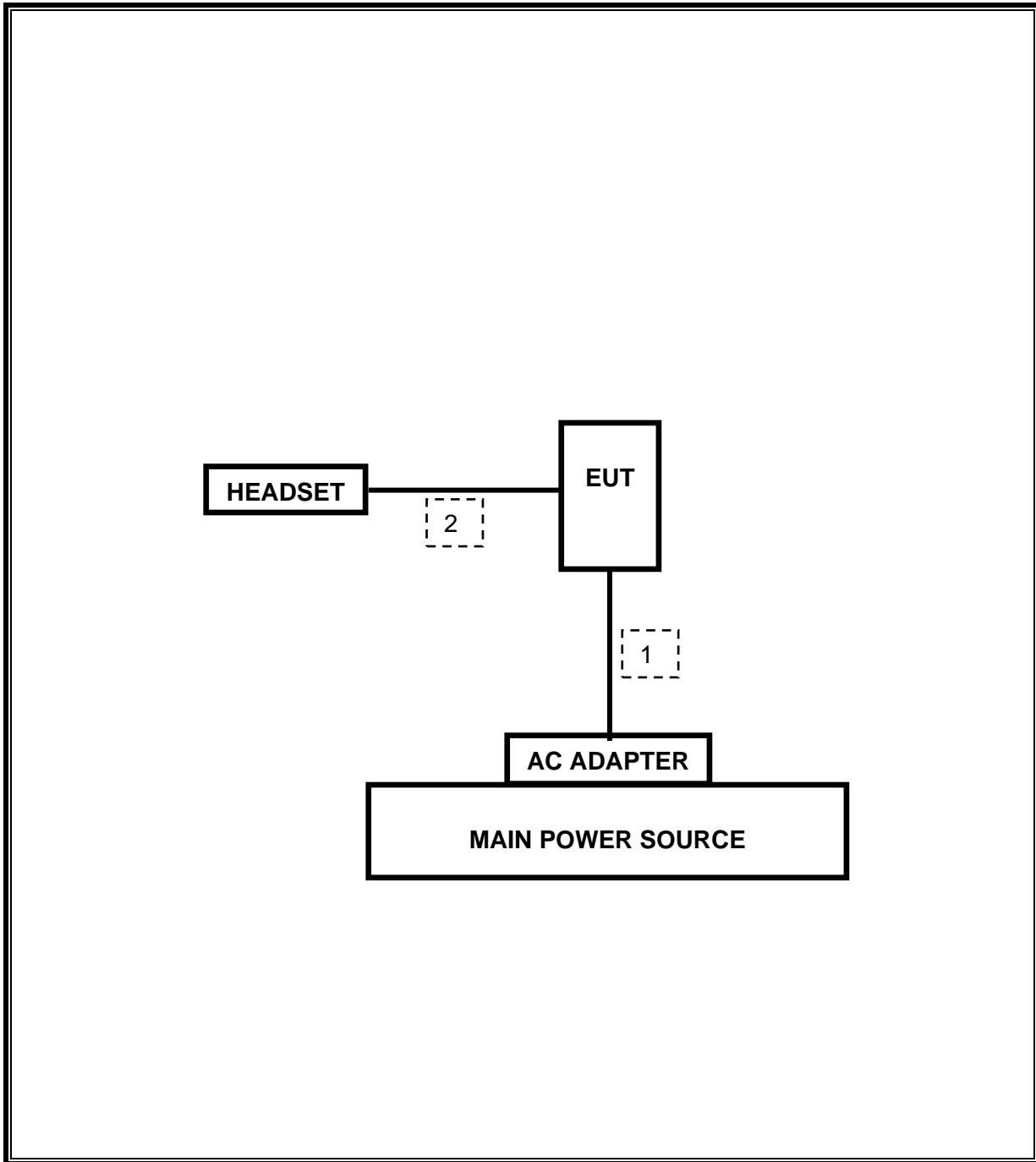
### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	MINI USB	UN-SHELDED	1.0m	LG-DLC300 (BA21)
2	AUDIO	1	MINI JACK	UN-SHELDED	1.0m	N/A

### TEST SETUP



**SETUP DIAGRAM FOR TESTS**



## 5 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
Antenna, Loop, 5 MHz	EMCO	6511	N02337	03/04/12	03/04/13
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	07/12/11	07/12/12
Antenna, Horn, 18 GHz	EMCO	3115	C00783	06/29/11	06/29/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	01/27/11	12/30/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	07/14/11	07/14/12
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/30/11	08/30/12
Spectrum Analyzer, 9Khz- 40 G	Agilent / HP	8564E	C00961	03/30/12	03/30/13
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	06/08/11	06/05/13
LISN, 30 MHz	FCC	3115	N02625	08/16/11	11/10/12
Temperature / Humidity Chan	Thermotron	SE 600-10-10	C00930	04/20/12	10/20/12

## 6 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<sup>th</sup> harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater (1000MHz)

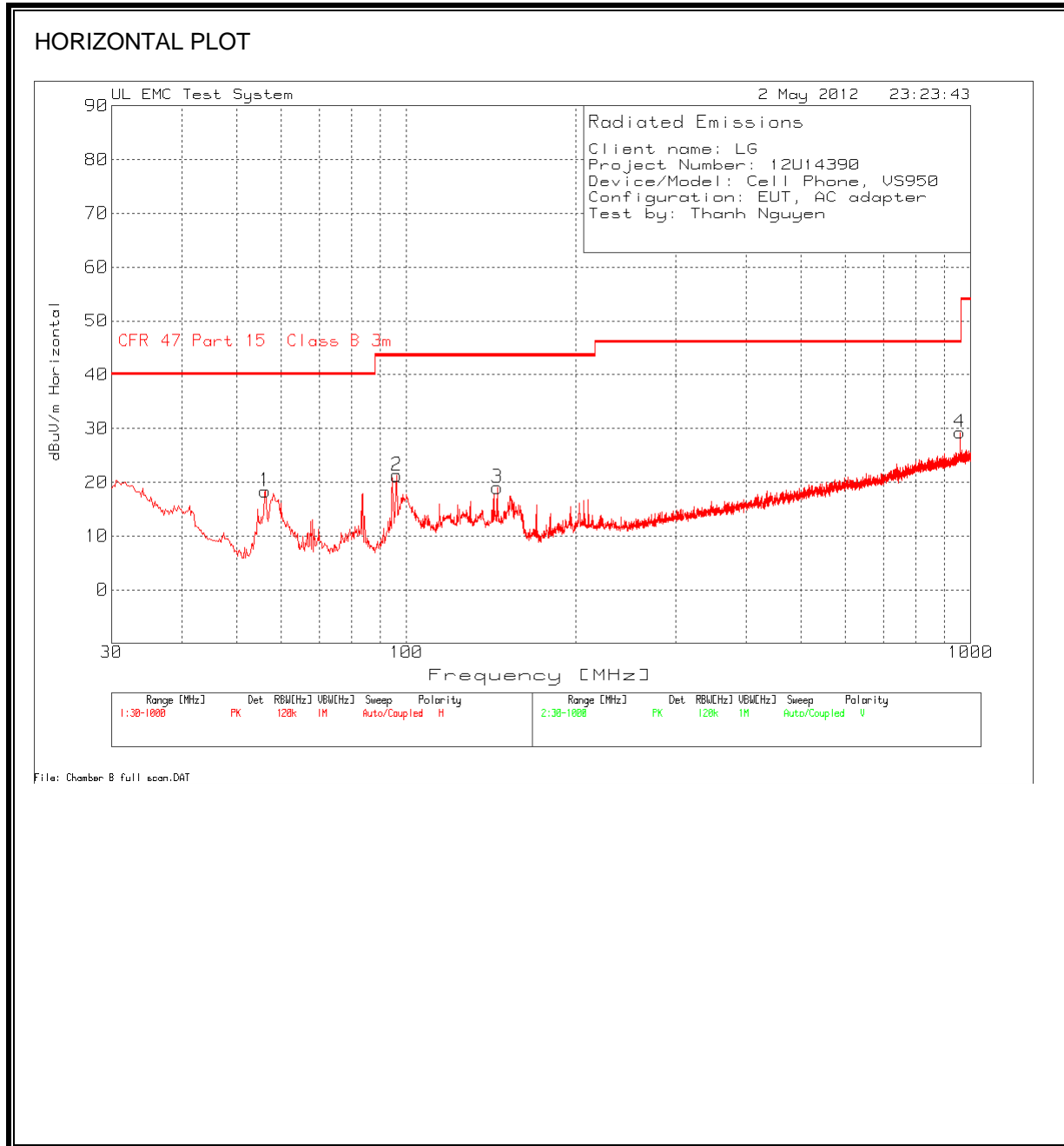
### **RESULTS**

No non-compliance noted:

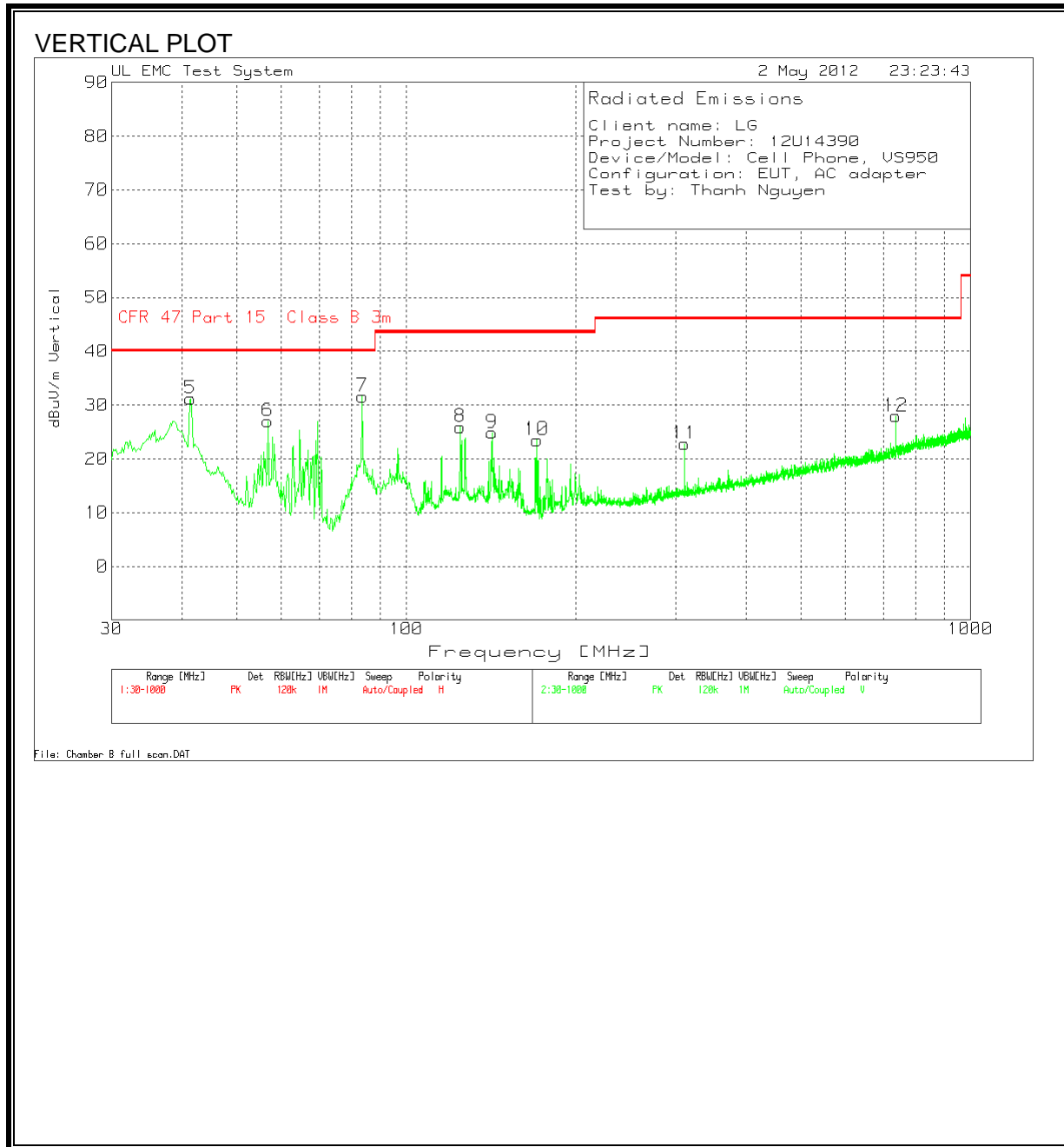
**7.1.1 FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)**

FCC Part 15, Subpart B & C      10 Meter Distance Measurement At Open Field												
Company: LG Project #: 12U14390 Model #: VS950 Tester: Thanh Nguyen Date: 05/1/2012												
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	35.03		N/A	10.56	-19.08	26.50	N/A	84.00	N/A	-57.5	N/A	
27.12	27.53		N/A	9.046	-19.08	17.49	N/A	29.54	N/A	-12.0	N/A	
Loop Antenna Face Off:												
13.56	30.87		N/A	10.56	-19.08	22.34	N/A	84.00	N/A	-61.7	N/A	
27.12	27.03		N/A	9.046	-19.08	16.99	N/A	29.54	N/A	-12.5	N/A	
* 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  Rev. 10.23.09												

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



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



**EMISSIONS DATA**

**Client name: LG**  
**Project Number: 12U14390**  
**Device/Model: Cell Phone, VS950**  
**Configuration: EUT, AC adapter**  
**Test by: Thanh Nguyen**

<b>Horizontal 30 - 1000MHz</b>									
<b>Test</b>	<b>Meter</b>	<b>Detector</b>	<b>AMP</b>	<b>Ant</b>	<b>EMI Value</b>	<b>CFR 47</b>	<b>Margin</b>	<b>Height [cm]</b>	<b>Polarity</b>
<b>Frequency</b>	<b>Reading</b>		<b>Factor(db)</b>	<b>Factor</b>	<b>dBuV/m</b>	<b>Part 15</b>			
<b>Class B</b>									
56.1691	39.44	PK	-29	7.9	18.34	40	-21.66	200	Horz
96.1011	40.78	PK	-28.6	9.1	21.28	43.5	-22.22	200	Horz
144.95	34.21	PK	-28.1	12.9	19.01	43.5	-24.49	200	Horz
957.7418	31.58	PK	-24.4	22.1	29.28	46	-16.72	300	Horz
<b>Vertical 30 - 1000MHz</b>									
<b>Test</b>	<b>Meter</b>	<b>Detector</b>	<b>AMP</b>	<b>Ant</b>	<b>EMI Value</b>	<b>CFR 47</b>	<b>Margin</b>	<b>Height [cm]</b>	<b>Polarity</b>
<b>Frequency</b>	<b>Reading</b>		<b>Factor(db)</b>	<b>Factor</b>	<b>dBuV/m</b>	<b>Part 15</b>			
<b>Class B</b>									
41.4369	47.2	PK	-29.2	13.2	31.2	40	-8.8	200	Vert
56.7506	48.13	PK	-29	7.9	27.03	40	-12.97	200	Vert
83.5012	52.7	PK	-28.7	7.6	31.6	40	-8.4	100	Vert
124.5963	40.42	PK	-28.3	13.8	25.92	43.5	-17.58	300	Vert
141.8485	39.85	PK	-28.1	13.1	24.85	43.5	-18.65	100	Vert
170.3437	41.09	PK	-27.8	10.2	23.49	43.5	-20.01	100	Vert
311.0751	36.06	PK	-26.8	13.5	22.76	46	-23.24	100	Vert
737.3401	33.82	PK	-25.8	19.9	27.92	46	-18.08	100	Vert



### 7.1.4 TX SPURIOUS EMISSIONS ABOVE 1 GHz

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 3m Chamber

Company: LG  
 Project #: 12U1439014383  
 Date: 5/2/2012  
 Test Engineer: Thanh Nguyen  
 Configuration: EUT at worst position  
 Mode: Generate Continuous Emissions

**Test Equipment:**

<b>Horn 1-18GHz</b>	<b>Pre-amplifier 1-26GHz</b>	<b>Pre-amplifier 26-40GHz</b>	<b>Horn &gt; 18GHz</b>	<b>Limit</b>
T60; S/N: 2238 @3m	T34 HP 8449B		T125; ARA 18-26GHz; S/N:1007	FCC 15.209

Hi Frequency Cables

<b>3' cable 22807700</b>	<b>12' cable 22807600</b>	<b>20' cable 22807500</b>	<b>HPF</b>	<b>Reject Filter</b>
3' cable 22807700	12' cable 22807600	20' cable 22807500		

**Peak Measurements**  
 RBW=VBW=1MHz  
**Average Measurements**  
 RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.533	3.0	47.0	31.2	26.6	3.5	-37.0	0.0	0.0	40.0	24.2	74	54	-34.0	-29.8	V
1.650	3.0	47.6	32.7	26.9	3.6	-36.8	0.0	0.0	41.2	26.3	74	54	-32.8	-27.7	V
1.827	3.0	49.0	32.4	27.5	3.8	-36.6	0.0	0.0	43.7	27.1	74	54	-30.3	-26.9	V
1.040	3.0	46.3	31.3	25.0	2.8	-37.8	0.0	0.0	36.4	21.4	74	54	-37.6	-32.6	H

No other emissions were detected above the noise floor.

Rev. 11.10.11

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

## 8 AC MAINS LINE CONDUCTED EMISSIONS

### LIMITS

§15.207

(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 50 $\mu$ H/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 (dB $\mu$ V)	
	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

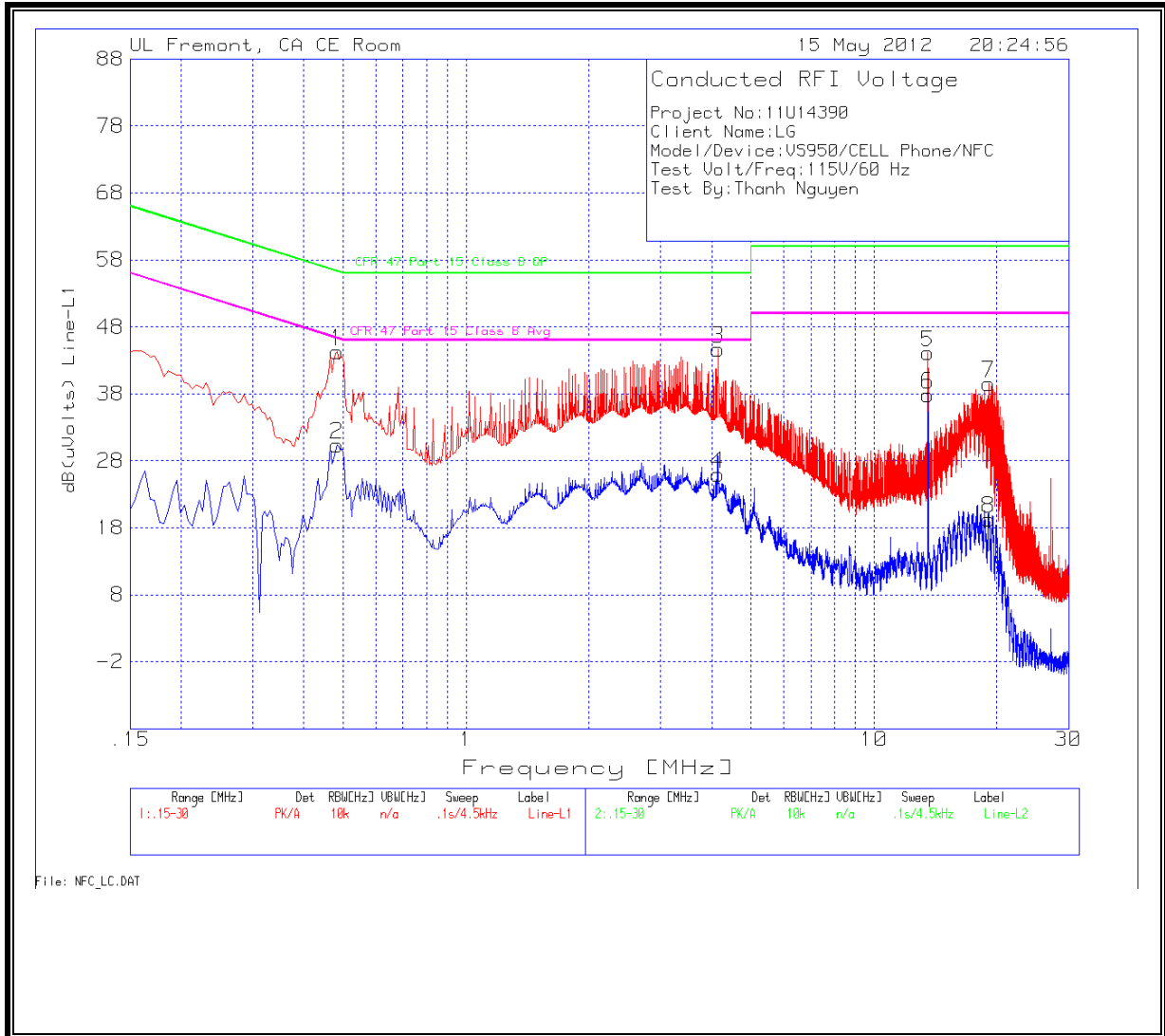
### RESULTS

No non-compliance noted:

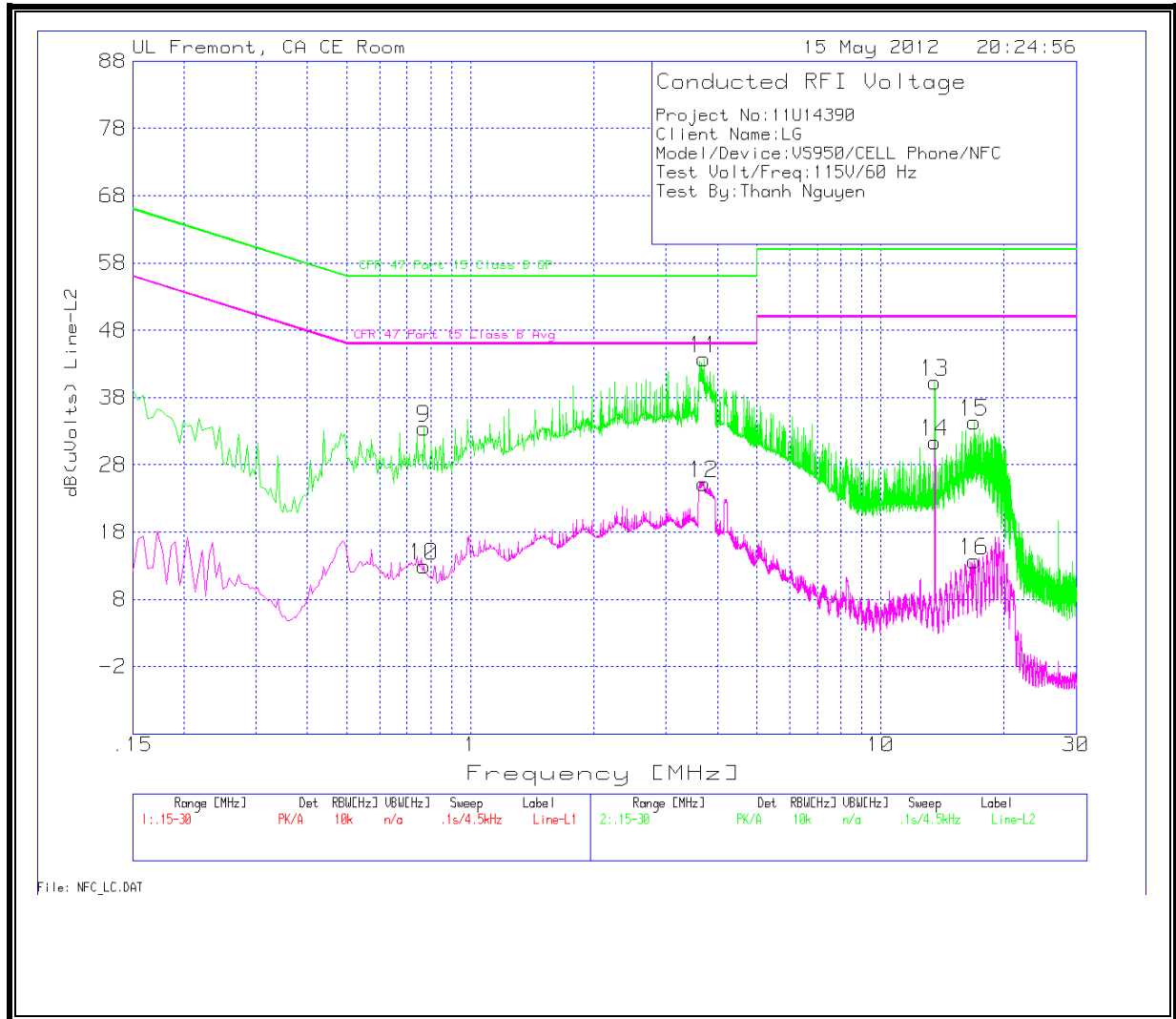
**6 WORST EMISSIONS**

<b>Project No:11U14390</b>									
<b>Client Name:LG</b>									
<b>Model/Device:VS950/CELL Phone/NFC</b>									
<b>Test Volt/Freq:115V/60 Hz</b>									
<b>Test By:Thanh Nguyen</b>									
<b>Line-L1 .15 - 30MHz</b>									
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	Corrected Reading dB(μV)	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.483	44.14	PK	0.1	0	44.24	56.3	-12.06	-	-
0.483	30.25	Av	0.1	0	30.35	-	-	46.3	-15.95
4.155	44.47	PK	0.1	0.1	44.67	56	-11.33	-	-
4.155	25.84	Av	0.1	0.1	26.04	-	-	46	-19.96
13.56	43.7	PK	0.2	0.2	44.1	60	-15.9	-	-
13.56	37.45	Av	0.2	0.2	37.85	-	-	50	-12.15
19.0815	39.16	PK	0.2	0.2	39.56	60	-20.44	-	-
19.0815	18.89	Av	0.2	0.2	19.29	-	-	50	-30.71
<b>Line-L2 .15 - 30MHz</b>									
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	Corrected Reading dB(μV)	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.771	33.42	PK	0.1	0	33.52	56	-22.48	-	-
0.771	12.92	Av	0.1	0	13.02	-	-	46	-32.98
3.7095	43.63	PK	0.1	0.1	43.83	56	-12.17	-	-
3.7095	25.03	Av	0.1	0.1	25.23	-	-	46	-20.77
13.56	39.87	PK	0.2	0.2	40.27	60	-19.73	-	-
13.56	30.95	Av	0.2	0.2	31.35	-	-	50	-18.65
16.9485	33.91	PK	0.2	0.2	34.31	60	-25.69	-	-
16.9485	13.31	Av	0.2	0.2	13.71	-	-	50	-36.29

**LINE 1 RESULTS**



**LINE 2 RESULTS**



## 9 FREQUENCY STABILITY

### LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  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 Frequency 13.56 MHz @ 20°C				
Limit: $\pm 100$ ppm = 135.606 kHz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	13.5603538	-0.18334	$\pm 100$
115.00	40	13.5604213	-0.13352	$\pm 100$
115.00	30	13.5604241	-0.13149	$\pm 100$
<b>115.00</b>	<b>20</b>	<b>13.5606024</b>	<b>0.000</b>	<b><math>\pm 100</math></b>
115.00	10	13.5605216	-0.05959	$\pm 100$
115.00	0	13.5605204	-0.06045	$\pm 100$
115.00	-10	13.5605306	-0.05294	$\pm 100$
115.00	-20	13.5604775	-0.09206	$\pm 100$
97.15	20	13.5605774	-0.01840	$\pm 100$
132.25	20	13.5606147	0.00907	$\pm 100$