



FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E
FCC CFR47 PART 27 SUBPART L
FCC CFR47 PART 27 SUBPART E

CLASS II PERMISSIVE CHANGE

CERTIFICATION TEST REPORT

FOR

CDMA/LTE Phone + Bluetooth, and DTS b/g/n

MODEL NUMBER: LG-VS810PP, VS810PP, LGVS810PP

FCC ID: ZNFVS810PP

REPORT NUMBER: 14U18510-E1

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Prepared for

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC
EUT DESCRIPTION: CDMA/LTE Phone + Bluetooth, and DTS b/g/n
MODEL: LG-VS810PP, VS810PP, and LGVS810PP
SERIAL NUMBER: 3451
DATE TESTED: SEPTEMBER 22-25, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H, 24E, 27E and 27L	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.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 22, FCC CFR Part 24, and FCC CFR 47 Part 27.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☒ Chamber A	☐ Chamber D
☒ Chamber B	☐ Chamber E
☒ Chamber C	☐ Chamber F
	☐ Chamber G
	☐ Chamber H

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

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:

$$\text{EIRP} = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss(between the SG and substitution antenna)} + \text{Substitution Antenna Factor (dBi)}$$

$$\text{ERP} = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss(between the SG and substitution antenna)}$$

$$(\text{Path loss} = \text{Signal generator output} - \text{PSA reading with substitution antenna})$$

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 CDMA/LTE Phone + Bluetooth & WLAN (2.4GHz).

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted and radiated ERP/EIRP output powers as follows:

FCC Part 22/24/27						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			dBm	mW	dBm	mW
BC0	824~849	1xRTT	24.4	275.42	22.16	164.44
	824~849	EVDO REL. 0	24.5	281.84	21.27	193.97
	824~849	EVDO REV. A				
BC1	1850~1910	1xRTT	24.6	288.40	22.53	179.06
	1850~1910	EVDO REL. 0	24.6	288.40	23.17	207.49
	1850~1910	EVDO REV. A				

5.3. MAXIMUM OUTPUT POWER (LTE)

The transmitter has a maximum peak conducted and radiated ERP/EIRP output powers as follows:

FCC Part 22/24/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				dBm	mW	dBm	mW
LTE13	777~787	10MHz	QPSK	24.07	255.27	21.70	116.95
	777~787	10MHz	16QAM	22.95	197.24	19.72	93.76

FCC Part 22/24/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				dBm	mW	dBm	mW
LTE4	1710~1755	20MHz	QPSK	23.14	206.06	22.0	158.49
	1710~1755	20MHz	16QAM	22.20	165.96	21.90	154.88

FCC Part 22/24/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				dBm	mW	dBm	mW
LTE4	1710~1755	15MHz	QPSK	23.08	203.24	22.60	181.97
	1710~1755	15MHz	16QAM	22.20	165.96	22.20	165.96

FCC Part 22/24/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				dBm	mW	dBm	mW
LTE4	1710~1755	10MHz	QPSK	22.92	195.88	23.20	208.93
	1710~1755	10MHz	16QAM	21.77	150.31	22.23	167.11

FCC Part 22/24/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				dBm	mW	dBm	mW
LTE4	1710~1755	5MHz	QPSK	22.91	195.43	23.33	215.28
	1710~1755	5MHz	16QAM	21.83	152.41	22.26	168.27

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna for the [List the bands supported] with a maximum peak gain as follow:

Frequency (MHz)	Peak Gain (dBi)
BC0, 824~849MHz	-2.06
BC1, 1850~1910MHz	0.04
LTE4, 1710~1755MHz	0.04
LTE13, 777~787MHz	-2.11

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	VS-810PP	RA481001374	N/A
Headset	LG	VS-810PP	N/A	N/A

I/O CABLES (CONDUCTED SETUP)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA
3	RF In/Out	1	Communication Test Set	Shielded	1m	NA

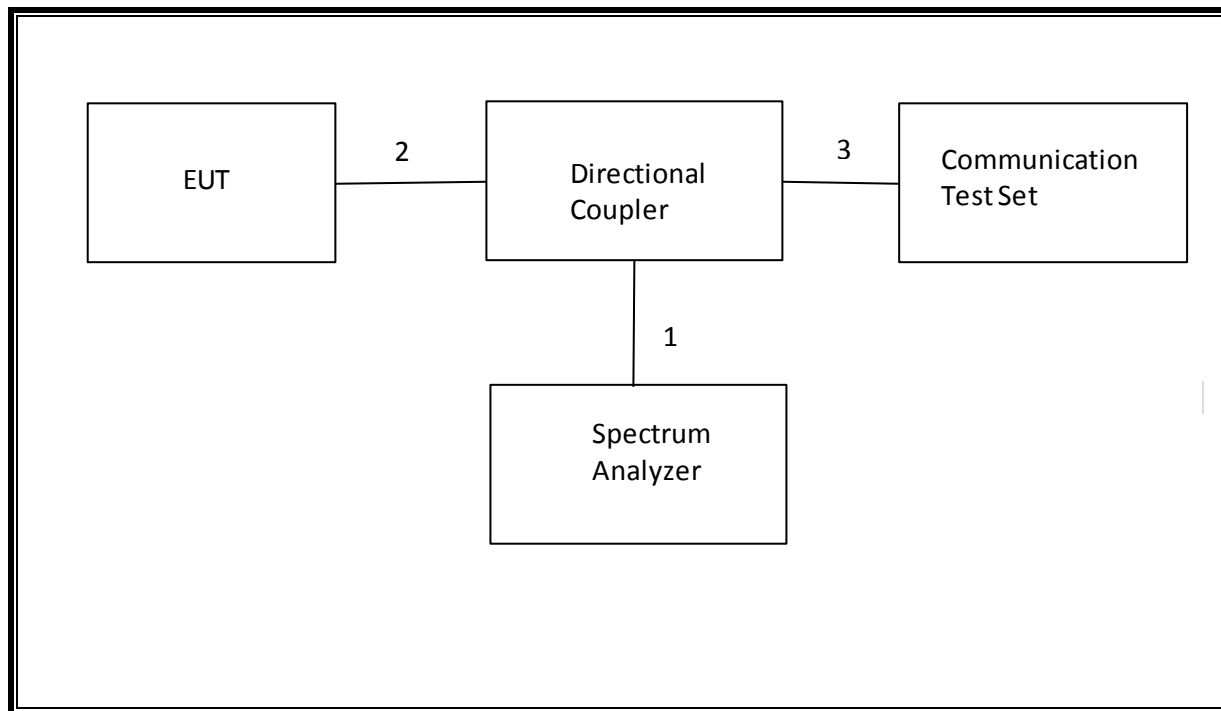
I/O CABLES (RADIATED SETUP)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2m	No
2	Jack	1	Headset	Shielded	1m	No
3	RF In/out	1	Communication Test Set	Un-shielded	2m	Yes

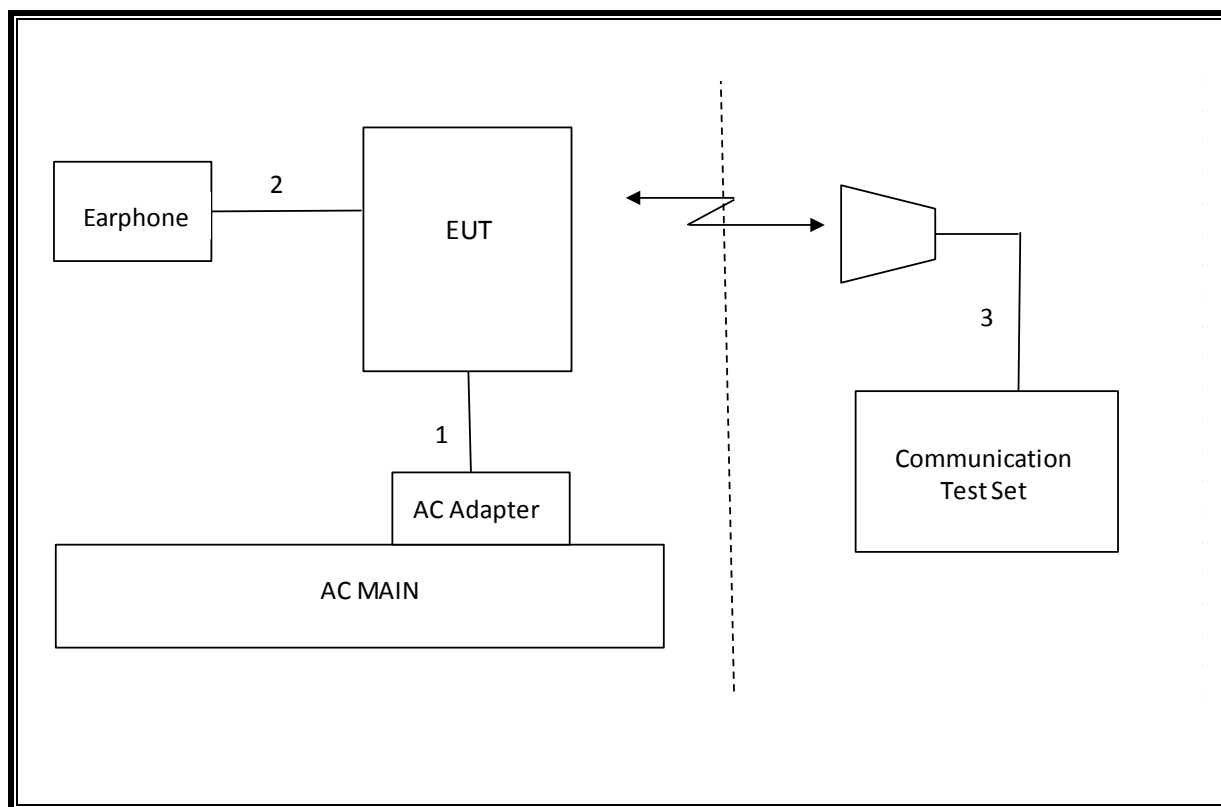
TEST SETUP

The EUT is continuously communicated to the call box during the tests.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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	C01179	02/26/15
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	04/22/15
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/14
Antenna, Horn, 18 GHz	EMCO	3115	C00784	10/25/14
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02688	CNR
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/15
Communications Test Set	R&S	CMW500	T159	07/02/15
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	06/18/15
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	C00993	02/14/15
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/14

7. Summary Table

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Note
2.1049	N/A	Occupied Band width (99%)	N/A	Conducted	Pass	See Original
22.917(a) 24.238(a) 27.53(g)	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	See Original
2.1046	N/A	Conducted output power	N/A		Pass	24.6 dBm
22.355 24.235 27.54	RSS-132(4.3) RSS-133(6.3) RSS-139(6.3) RSS-199(4.3)	Frequency Stability	2.5PPM		Pass	See Original
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	22.16dBm
27.50(b)(10)	N/A		34.77 dBm		Pass	21.70 dBm
24.232(c) 27.50(h)(2)	RSS-133(6.4) RSS-199(4.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	23.17 dBm
27.50(d)(4)	RSS-139(6.4)		30dBm		Pass	23.33 dBm
22.917(a) 24.238(a) 27.53(g)	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Radiated Spurious Emission	-13dBm		Pass	-28.2 dBm

8.1.2. CDMA2000 OUTPUT POWER RESULT

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)
BC0	RC1, SO55 (Loopback)	1013	824.70	24.4
		384	836.52	24.4
		777	848.31	24.4
	RC3, SO55 (Loopback)	1013	824.70	24.3
		384	836.52	24.4
		777	848.31	24.4
	RC3, SO32 (+F-SCH)	1013	824.70	24.4
		384	836.52	24.4
		777	848.31	24.4

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)
BC1	RC1, SO55 (Loopback)	25	1851.25	24.6
		600	1880.00	24.6
		1175	1908.75	24.6
	RC3, SO55 (Loopback)	25	1851.25	24.6
		600	1880.00	24.6
		1175	1908.75	24.6
	RC3, SO32 (+F-SCH)	25	1851.25	24.6
		600	1880.00	24.6
		1175	1908.75	24.6

8.1.3. 1xEV-DO Release 0

TEST PROCEDURE

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

<u>Application</u>	<u>Rev, License</u>
1xEV-DO Terminal Test	A.09.13

EVDO Release 0 - RTAP

- Call Setup > Shift & Preset
- Call Control:
 - Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
 - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Params:
 - Cell Power > -105.5 dBm/1.23 MHz
 - Cell Band > (Select US Cellular or US PCS)
 - Channel > (Enter channel number)
 - Application Config > Enhanced Test Application Protocol > RTAP
 - RTAP Rate > 153.6 kbps
 - Rvs Power Ctrl > Active bits
 - Protocol Rel > 0 (1xEV-DO)
- Press "Start Data Connection" when "Session Open" appear in "Active Cell"
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

EVDO Release 0 - FTAP

- Call Setup > Shift & Preset
- Call Control:
 - Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
 - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Params:
 - Cell Power > -105.5 dBm/1.23 MHz
 - Cell Band > (Select US Cellular or US PCS)
 - Channel > (Enter channel number)
 - Application Config > Enhanced Test Application Protocol > FTAP (default)
 - FTAP Rate > 307.2 kbps (2 Slot, QPSK)
 - Rvs Power Ctrl > Active bits
 - Protocol Rel > 0 (1xEV-DO)
- Press "Start Data Connection" when "Session Open" appear in "Active Cell"
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

8.1.4. 1XEVD0 REL 0 OUTPUT POWER RESULT

Band	FTAP Rate	Channel	f (MHz)	Avg Pwr (dBm)
BC0	307.2 kbps (2 slot, QPSK)	1013	824.70	24.4
		384	836.52	24.5
		777	848.31	24.5

Band	FTAP Rate	Channel	f (MHz)	Avg Pwr (dBm)
BC1	307.2 kbps (2 slot, QPSK)	25	1851.25	24.6
		600	1880.00	24.6
		1175	1908.75	24.6

8.1.5. 1xEV-DO Rev. A

TEST PROCEDURE

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

<u>Application</u>	<u>Rev, License</u>
1xEV-DO Terminal Test	A.09.13

EVDO Release A – RETAP

- Call Setup > Shift & Preset
 - Cell Power > -60 dBm/1.23 MHz
 - Protocol Rev > A (1xEV-DO-A)
 - Application Config > Enhanced Test Application Protocol > RETAP
 - R-Data Pkt Size > 4096
 - Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2
- > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
 - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
 - > ACK R-Data After > Subpacket 0 (All ACK)
 - Rvs Power Ctrl > All Up bits (to get the maximum power)

EVDO Release A - FETAP

- Call Setup > Shift & Preset
 - Cell Power > -60 dBm/1.23 MHz
 - Protocol Rev > A (1xEV-DO-A)
 - Application Config > Enhanced Test Application Protocol > FETAP
 - F-Traffic Format > 4 (1024, 2,128) Canonical (307.2k, QPSK)
 - Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2
- > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
 - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
 - > ACK R-Data After > Subpacket 0 (All ACK)
 - Rvs Power Ctrl > All Up bits (to get the maximum power)

8.1.6. 1xEVDO REV A OUTPUT RESULT

Band	FETAP Traffic Format	Channel	f (MHz)	Avg Pwr (dBm)
BC0	307.2k, QPSK/ ACK channel is transmitted at all the slots	1013	824.70	24.4
		384	836.52	24.5
		777	848.31	24.5

Band	FETAP Traffic Format	Channel	f (MHz)	Avg Pwr (dBm)
BC1	307.2k, QPSK/ ACK channel is transmitted at all the slots	25	1851.25	24.6
		600	1880.00	24.6
		1175	1908.75	24.6

8.2. LTE OUTPUT VERIFICATION

8.2.1. LTE OUTPUT RESULT

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
						23230
						782 MHz
LTE Band 13	10	QPSK	1	0	0	24.07
			1	25	0	23.99
			1	49	0	23.99
			25	0	1	22.98
			25	12	1	22.93
			25	25	1	22.89
			50	0	1	22.94
		16QAM	1	0	1	22.95
			1	25	1	22.88
			1	49	1	22.92
			25	0	2	21.99
			25	12	2	21.98
			25	25	2	21.90
			50	0	2	21.93

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20050	20175	20300
						1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0	22.93	22.94	22.91
			1	49	0	22.97	23.04	22.98
			1	99	0	22.95	23.14	23.01
			50	0	1	21.96	21.95	22.05
			50	24	1	21.99	22.04	22.07
			50	50	1	22.02	22.08	22.06
			100	0	1	21.93	22.01	22.15
		16QAM	1	0	1	22.05	21.98	22.06
			1	49	1	22.07	22.16	22.08
			1	99	1	22.04	22.20	22.14
			50	0	2	21.00	21.01	21.12
			50	24	2	21.02	21.11	21.15
			50	50	2	21.03	21.15	21.12
			100	0	2	20.96	21.10	21.14
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20025	20175	20325
						1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	22.76	22.94	23.08
			1	37	0	22.75	22.85	22.97
			1	74	0	22.91	22.92	22.99
			36	0	1	21.92	21.92	22.09
			36	20	1	21.87	21.87	21.96
			36	39	1	21.98	21.98	22.04
			75	0	1	21.88	21.88	22.03
		16QAM	1	0	1	21.70	21.70	22.20
			1	37	1	21.72	21.72	22.20
			1	74	1	21.80	21.80	22.20
			36	0	2	20.94	20.94	21.08
			36	20	2	20.85	20.85	20.99
			36	39	2	20.92	20.92	21.05
			75	0	2	20.87	20.87	21.07

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20000	20175	20350
						1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	22.72	22.92	22.81
			1	25	0	22.73	22.85	22.87
			1	49	0	22.80	22.73	22.86
			25	0	1	21.88	21.84	21.99
			25	12	1	21.87	22.01	21.97
			25	25	1	21.87	22.06	21.88
			50	0	1	21.88	22.00	21.96
		16QAM	1	0	1	21.67	21.68	21.72
			1	25	1	21.64	21.76	21.77
			1	49	1	21.72	21.67	21.75
			25	0	2	20.89	20.85	21.05
			25	12	2	20.86	21.02	21.10
			25	25	2	20.85	21.07	21.02
			50	0	2	20.92	21.05	21.06
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19975	20175	20375
						1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	22.75	22.82	22.89
			1	12	0	22.74	22.87	22.79
			1	24	0	22.74	22.91	22.88
			12	0	1	21.90	21.90	21.90
			12	7	1	21.84	21.97	21.87
			12	13	1	21.86	22.05	21.84
			25	0	1	21.81	22.09	21.87
		16QAM	1	0	1	21.61	21.70	21.76
			1	12	1	21.59	21.72	21.67
			1	24	1	21.61	21.83	21.78
			12	0	2	20.93	20.96	20.95
			12	7	2	20.89	21.04	20.93
			12	13	2	20.94	21.12	20.92
			25	0	2	20.96	21.20	21.01

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20000	20175	20350
						1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	23.20	23.00	23.00
			1	25	0	23.10	23.00	23.00
			1	49	0	23.20	23.00	22.90
			25	0	1	22.20	22.10	22.20
			25	12	1	22.10	22.10	22.20
			25	25	1	22.10	22.10	22.20
			50	0	1	22.10	22.10	22.20
		16QAM	1	0	1	22.20	21.60	22.10
			1	25	1	22.20	21.60	22.00
			1	49	1	22.20	21.60	21.90
			25	0	2	21.10	21.20	21.20
			25	12	2	21.20	21.20	21.20
			25	25	2	21.20	21.20	21.20
			50	0	2	21.20	21.10	21.20
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19975	20175	20375
						1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	23.10	23.20	23.20
			1	12	0	23.00	23.00	23.20
			1	24	0	23.10	23.00	23.20
			12	0	1	22.20	22.10	22.20
			12	7	1	22.10	22.00	22.20
			12	13	1	22.10	22.00	22.20
			25	0	1	22.10	22.00	22.20
		16QAM	1	0	1	21.70	22.20	22.15
			1	12	1	21.60	22.10	22.00
			1	24	1	21.60	22.10	21.90
			12	0	2	21.20	21.10	21.20
			12	7	2	21.15	21.10	21.20
			12	13	2	21.20	21.10	21.20
			25	0	2	21.20	21.15	21.20

9. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

Test Spec

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

9.1. CONDUCTED PEAK TO AVERAGE RESULT

Please refer to project 14U18508 for details.

10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v02r01 - 06/07/2013)

MODES TESTED

CDMA BC0, CDMA BC1, LTE Band 4, LTE Band 13

10.1.1. OCCUPIED BANDWIDTH RESULTS

Please refer to project 14U18508 for details.

10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238, §27.53

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Part 27: (m)(4) For mobile station, the attenuation factor shall be not less than $43 + 10 \log(P)$ dB at the channel edge and $(55 + 10 \log(P))$ dB at 5.5 MHz from the channel edges.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

The transmitter output was connected to an Agilent 8960 or a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

MODES TESTED

CDMA BC0, CDMA BC1, LTE Band 4, LTE Band 13

RESULTS

Please refer to project 14U18508 for details.

10.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

Part 27: (m)(4) For mobile station, the attenuation factor shall be not less than $43+10\log(P)$ dB at the channel edge and $(55+10\log(P))$ dB at 5.5MHz from the channel edges.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

SOP

For each out of band emissions measurement:

- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

MODES TESTED

CDMA BC0, CDMA BC1, LTE Band 4, LTE Band 13

RESULTS

Please refer to project 14U18508 for details.

10.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54

LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

§27.54 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

SOP

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50°C is reached. Reference power supply voltage for these tests is 3.7Vdc.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case). The test voltage ranges from 3.50 to 4.26 VDC.

MODES TESTED

CDMA BC0, CDMA BC1, LTE Band 4, LTE Band 13

RESULTS

Please refer to project 14U18508 for details.

RADIATED TEST RESULTS

10.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, and §27.50.

LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

27.50(b) - (10) Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP. (LTE B13)

27.50(d) - (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.(Band 4)

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17; PSA setting reference to 971168 D01 v02r01

For peak power measurement with a PSA:

a) Set the RBW $\geq$ OBW; b) Set VBW $\geq 3 \times$ RBW; c) Set span $\geq 2 \times$ RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points $\geq$ span/RBW; g) Trace mode = max hold;

For average power measurement with a PSA:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW $\geq 3 \times$ RBW; d) Set number of points in sweep $\geq 2 \times$ span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle ≥ 98 ; h) Use trigger to capture bursts If burst duty cycle < 98 ; i) Trace average at least 100 traces in power averaging (i.e., RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

MODES TESTED

CDMA BC0, CDMA BC1, LTE Band 4, LTE Band 13

TEST RESULTS

10.1.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
BC1	1xRTT	25	1851.25	21.99	158.12
		600	1880	22.28	169.04
		1175	1908.75	22.53	179.06
	EVDO REL. 0	25	1851.25	22.91	195.43
		600	1880	23.17	207.49
		1175	1908.75	23.09	203.70
	EVDO REV. A	25	1851.25		
		600	1880		
		1175	1908.75		

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
BC0	1xRTT	1013	824.7	22.16	164.44
		384	836.52	19.98	99.54
		777	848.31	19.89	97.50
	EVDO REL. 0	1013	824.7	21.27	133.97
		384	836.52	20.61	115.08
		777	848.31	21.08	128.23
	EVDO REV. A	1013	824.7		
		384	836.52		
		777	848.31		

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE13	10	QPSK	1/0	782	21.70	116.95
			1/0	782		
			1/0	782		
		16QAM	1/0	782	19.72	93.76
			1/0	782		
			1/0	782		

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	20	QPSK	1/0	1720	22.00	158.49
			1/0	1732.5	21.82	152.05
			1/0	1745	22.00	158.49
		16QAM	1/0	1720	21.40	138.04
			1/0	1732.5	21.02	126.47
			1/0	1745	21.90	154.88

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	15	QPSK	1/0	1717.5	22.60	181.97
			1/0	1732.5	22.07	161.06
			1/0	1747.5	21.90	154.88
		16QAM	1/0	1717.5	21.80	151.35
			1/0	1732.5	21.12	129.42
			1/0	1747.5	22.20	165.96

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	10	QPSK	1/0	1715	23.20	208.93
			1/0	1732.5	20.76	118.03
			1/0	1750	23.20	208.93
		16QAM	1/0	1715	22.17	164.82
			1/0	1732.5	19.72	93.76
			1/0	1750	22.23	167.10

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	5	QPSK	1/0	1712.5	23.33	215.28
			1/0	1732.5	23.03	200.91
			1/0	1752.5	21.90	154.88
		16QAM	1/0	1712.5	22.26	168.27
			1/0	1732.5	21.92	155.60
			1/0	1752.5	21.50	141.25

10.1.3. ERP/EIRP PLOTS

Band

LTE13

10MHz

16QAM

High Frequency Substitution Measurement

UL Verification Services, Inc. Chamber B

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

LG

14U18510

09/25/14

J. Gomez

X-Pos EUT

LTE13 10MHz 16QAM

Test Equipment:

Receiving: Horn T345, and Chamber B SMA Cables

Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 208955002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
N/A		V	0.9	0.0		38.5		
		H	0.9	0.0		38.5		
Mid Ch								
782.00	9.84	V	0.9	0.0	8.99	38.5	-29.5	
782.00	20.57	H	0.9	0.0	19.72	38.5	-18.7	
High Ch								
N/A		V	0.9	0.0		38.5		
N/A		H	0.9	0.0		38.5		

Rev. 3.17.11

Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

Band

LTE13

10MHz

QPSK

High Frequency Substitution Measurement

UL Verification Services, Inc. Chamber B

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

Test Equipment:

Receiving: Horn T345, and Chamber B SMA Cables

Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 208955002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
N/A		V	0.9	0.0		38.5		
		H	0.9	0.0		38.5		
Mid Ch								
782.00	10.59	V	0.9	0.0	9.74	38.5	-28.7	
782.00	22.55	H	0.9	0.0	21.70	38.5	-16.7	
High Ch								
N/A		V	0.9	0.0		38.5		
N/A		H	0.9	0.0		38.5		

Rev. 3.17.11

Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

Band LTE4 20MHz QPSK	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber B Company: LG Project #: 14U18510 Date: 09/22/14 Test Engineer: D. Sblendorio Configuration: X-Pos EUT Mode: LTE4 20MHz QPSK Test Equipment: Receiving: Horn T345, and Chamber B SMA Cables Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Margin (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>Low Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1720.00</td> <td>12.90</td> <td>V</td> <td>0.8</td> <td>6.7</td> <td>18.80</td> <td>30.0</td> <td>-11.2</td> <td></td> </tr> <tr> <td>1720.00</td> <td>16.10</td> <td>H</td> <td>0.8</td> <td>6.7</td> <td>22.00</td> <td>30.0</td> <td>-8.0</td> <td></td> </tr> <tr> <td>Mid Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1732.50</td> <td>13.90</td> <td>V</td> <td>0.8</td> <td>6.7</td> <td>19.80</td> <td>30.0</td> <td>-10.2</td> <td></td> </tr> <tr> <td>1732.50</td> <td>15.92</td> <td>H</td> <td>0.8</td> <td>6.7</td> <td>21.82</td> <td>30.0</td> <td>-8.2</td> <td></td> </tr> <tr> <td>High Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1745.00</td> <td>14.90</td> <td>V</td> <td>0.8</td> <td>6.7</td> <td>20.80</td> <td>30.0</td> <td>-9.2</td> <td></td> </tr> <tr> <td>1745.00</td> <td>16.10</td> <td>H</td> <td>0.8</td> <td>6.7</td> <td>22.00</td> <td>30.0</td> <td>-8.0</td> <td></td> </tr> </tbody> </table> Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									1720.00	12.90	V	0.8	6.7	18.80	30.0	-11.2		1720.00	16.10	H	0.8	6.7	22.00	30.0	-8.0		Mid Ch									1732.50	13.90	V	0.8	6.7	19.80	30.0	-10.2		1732.50	15.92	H	0.8	6.7	21.82	30.0	-8.2		High Ch									1745.00	14.90	V	0.8	6.7	20.80	30.0	-9.2		1745.00	16.10	H	0.8	6.7	22.00	30.0	-8.0	
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																			
Low Ch																																																																																											
1720.00	12.90	V	0.8	6.7	18.80	30.0	-11.2																																																																																				
1720.00	16.10	H	0.8	6.7	22.00	30.0	-8.0																																																																																				
Mid Ch																																																																																											
1732.50	13.90	V	0.8	6.7	19.80	30.0	-10.2																																																																																				
1732.50	15.92	H	0.8	6.7	21.82	30.0	-8.2																																																																																				
High Ch																																																																																											
1745.00	14.90	V	0.8	6.7	20.80	30.0	-9.2																																																																																				
1745.00	16.10	H	0.8	6.7	22.00	30.0	-8.0																																																																																				

Band

LTE4

15MHz

16QAM

High Frequency Substitution Measurement

UL Verification Services, Inc. Chamber B

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

Test Equipment:

Receiving: Horn T345, and Chamber B SMA Cables

Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes
MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
Low Ch								
1717.50	14.00	V	0.8	6.7	19.90	30.0	-10.1	
1717.50	15.90	H	0.8	6.7	21.80	30.0	-8.2	
Mid Ch								
1732.50	13.33	V	0.8	6.7	19.23	30.0	-10.8	
1732.50	15.22	H	0.8	6.7	21.12	30.0	-8.9	
High Ch								
1747.50	14.90	V	0.8	6.7	20.80	30.0	-9.2	
1747.50	16.30	H	0.8	6.7	22.20	30.0	-7.8	

Rev. 3.17.11

Note: For Band 4 EIRP limit is 30dBm

Band LTE4 15MHz QPSK	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber B							
	Company: LG Project #: 14U18510 Date: 09/22/14 Test Engineer: D. Sblendorio Configuration: X-Pos EUT Mode: LTE4 15MHz QPSK							
	Test Equipment: Receiving: Horn T345, and Chamber B SMA Cables Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse							
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
	Low Ch							
	1717.50	14.70	V	0.8	6.7	20.60	30.0	-9.4
	1717.50	16.70	H	0.8	6.7	22.60	30.0	-7.4
	Mid Ch							
	1732.50	13.98	V	0.8	6.7	19.88	30.0	-10.1
	1732.50	16.17	H	0.8	6.7	22.07	30.0	-7.9
	High Ch							
	1747.50	15.60	V	0.8	6.7	21.50	30.0	-8.5
	1747.50	16.00	H	0.8	6.7	21.90	30.0	-8.1
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								

Band

LTE4

10MHz

16QAM

High Frequency Substitution Measurement

UL Verification Services, Inc. Chamber B

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

Test Equipment:

Receiving: Horn T345, and Chamber B SMA Cables

Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes
MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
Low Ch								
1715.00	13.10	V	0.8	6.7	19.00	30.0	-11.0	
1715.00	16.27	H	0.8	6.7	22.17	30.0	-7.8	
Mid Ch								
1732.50	13.10	V	0.8	6.7	19.00	30.0	-11.0	
1732.50	13.82	H	0.8	6.7	19.72	30.0	-10.3	
High Ch								
1750.00	13.70	V	0.8	6.7	19.60	30.0	-10.4	
1750.00	16.33	H	0.8	6.7	22.23	30.0	-7.8	

Rev. 3.17.11

Note: For Band 4 EIRP limit is 30dBm

Band

LTE4

10MHz

QPSK

High Frequency Fundamental Measurement

Compliance Certification Services Chamber B

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

LG

14U18510

09/22/14

D. Sblendorio

X-Pos EUT

LTE4 10MHz QPSK

Test Equipment:

Receiving: Horn T345, and Chamber B SMA Cables

Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1715.00	13.57	V	0.8	6.7	19.47	30.0	-10.5	
1715.00	17.30	H	0.8	6.7	23.20	30.0	-6.8	
Mid Ch								
1732.50	14.10	V	0.8	6.7	20.00	30.0	-10.0	
1732.50	14.86	H	0.8	6.7	20.76	30.0	-9.2	
High Ch								
1750.00	14.85	V	0.8	6.7	20.75	30.0	-9.3	
1750.00	17.30	H	0.8	6.7	23.20	30.0	-6.8	

Rev. 3.17.11

Note: For Band 4 EIRP limit is 30dBm

Band BC1 EVDO REL. 0	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber B							
	Company: LG Project #: 14U18510 Date: 09/24/14 Test Engineer: D. Sblendorio / K. Kedida Configuration: X-Pos EUT Mode: CDMA EVDOR0 BC1							
	Test Equipment: Receiving: Horn T345, and Chamber C SMA Cables Substitution: Horn T963 Substitution, 4ft SMA Cable Warehouse							
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
	Low Ch							
	1851.25	14.89	V	0.9	7.8	21.84	33.0	-11.2
	1851.25	15.96	H	0.9	7.8	22.91	33.0	-10.1
	Mid Ch							
	1880.00	14.03	V	0.9	7.8	20.98	33.0	-12.0
	1880.00	16.22	H	0.9	7.8	23.17	33.0	-9.8
	High Ch							
	1908.75	14.89	V	0.9	7.9	21.94	33.0	-11.1
	1908.75	16.04	H	0.9	7.9	23.09	33.0	-9.9
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								

Band

BC1

1xRTT

High Frequency Fundamental Measurement

UL Verification Services Chamber A

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

LG

14U18510

09/22/14

L. Lara

X-pos EUT only (SN: 1961966)

CDMA RTT BC1

Test Equipment:

Receiving: T136, and Chamber A SMA Cables

Substitution: Horn T961 Substitution, 4ft SMA Cable (244640002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.851	7.8	V	0.80	7.80	14.83	33.0	-18.2	
1.851	15.0	H	0.80	7.80	21.99	33.0	-11.0	
Mid Ch								
1.880	8.3	V	0.80	7.80	15.27	33.0	-17.7	
1.880	15.3	H	0.80	7.80	22.28	33.0	-10.7	
High Ch								
1.909	8.3	V	0.80	7.90	15.42	33.0	-17.6	
1.909	15.4	H	0.80	7.90	22.53	33.0	-10.5	

Rev. 3.17.11

Band BC0 EVDO REL. 0	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber B							
	Company: LG Project #: 14U18510 Date: 09/24/14 Test Engineer: D. Sblendorio / K. Kedida Configuration: X-Pos EUT Mode: CDMA EVDOR0 BC0							
	Test Equipment: Receiving: Horn T345, and Chamber B SMA Cables Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 208955002) Warehouse.							
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)
	Notes							
	Low Ch							
	824.70	14.59	V	0.9	0.0	13.74	38.5	-24.7
	824.70	22.12	H	0.9	0.0	21.27	38.5	-17.2
	Mid Ch							
	836.52	13.49	V	0.9	0.0	12.64	38.5	-25.8
	836.52	21.46	H	0.9	0.0	20.61	38.5	-17.8
	High Ch							
	848.31	12.92	V	0.9	0.0	12.07	38.5	-26.4
	848.31	21.93	H	0.9	0.0	21.08	38.5	-17.4
Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								

Band BC0 1xRTT	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber A								
	Company: LG Project #: 14U18510 Date: 09/22/14 Test Engineer: L. Lara Configuration: X-pos EUT only (SN: 1961966) Mode: CDMA RTT BC0								
	Test Equipment: Receiving: Sunol T477, and 5m Chamber A N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) Warehouse.								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	824.70	14.36	V	0.5	0.0	13.86	38.5	-24.6	
	824.70	22.66	H	0.5	0.0	22.16	38.5	-16.3	
	Mid Ch								
	836.52	12.76	V	0.5	0.0	12.26	38.5	-26.2	
836.52	20.48	H	0.5	0.0	19.98	38.5	-18.5		
High Ch									
848.31	12.48	V	0.5	0.0	11.98	38.5	-26.5		
848.31	20.39	H	0.5	0.0	19.89	38.5	-18.6		
Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

10.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, and §27.53

LIMIT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

Part 27: (m)(4) For mobile station, the attenuation factor shall be not less than $43+10\log(P)$ dB at the channel edge and $(55+10\log(P))$ dB at 5.5MHz from the channel edges.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

MODES TESTED

CDMA BC0, CDMA BC1, LTE Band 4, LTE Band 13

RESULTS

10.2.1. SPURIOUS RADIATION PLOTS

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company: LG Project #: 14U18510 Date: 09/23/14 Test Engineer: O. Stoelting Configuration: X-Pos EUT w/ AC charger, headset Mode: LTE 13 BW10 16QAM										
Chamber 3m Chamber		Pre-amplifier T34 8449B		Filter Filter 1		Limit Part 22				
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
LTE13 10MHz 16QAM	Low Ch, N/A									
	N/A		V					-13.0		
	N/A		V					-13.0		
	N/A		V					-13.0		
	N/A		H					-13.0		
	N/A		H					-13.0		
	N/A		H					-13.0		
	Mid Ch, 782MHz									
	1.564	-27.6	V	3.0	37.5	1.0	-64.1	-13.0	-51.1	
	2.346	-23.1	V	3.0	36.5	1.0	-58.6	-13.0	-45.6	
	3.128	-21.4	V	3.0	36.0	1.0	-56.4	-13.0	-43.4	
	1.564	-26.3	H	3.0	37.5	1.0	-62.8	-13.0	-49.8	
	2.346	-24.3	H	3.0	36.5	1.0	-59.8	-13.0	-46.8	
	3.128	-21.3	H	3.0	36.0	1.0	-56.3	-13.0	-43.3	
	High Ch, N/A									
	N/A		V					-13.0		
	N/A		V					-13.0		
	N/A		V					-13.0		
N/A		H					-13.0			
N/A		H					-13.0			
N/A		H					-13.0			
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement											
Company: LG Project #: 14U18510 Date: 09/23/14 Test Engineer: O. Stoelting Configuration: EUT w/ headset and AC adapter x-pos Mode: TX, LTE band 4, 20MHz BW, 16QAM											
		Chamber	Pre-amplifier	Filter	Limit						
		3m Chamber	T145 8449B	Filter 1	Part 27						
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
LTE4 20MHz 16QAM	Low Ch, (1720 MHz)										
	3.440	-19.8	V	3.0	30.4	1.0	-49.2	-13.0	-36.2		
	5.160	-16.7	V	3.0	28.7	1.0	-44.4	-13.0	-31.4		
	6.880	-12.4	V	3.0	27.1	1.0	-38.5	-13.0	-25.5		
	3.440	-20.3	H	3.0	30.4	1.0	-49.8	-13.0	-36.8		
	5.160	-15.5	H	3.0	28.7	1.0	-43.3	-13.0	-30.3		
	6.880	-11.7	H	3.0	27.1	1.0	-37.8	-13.0	-24.8		
	Mid Ch, (1732.5 MHz)										
	3.465	-19.9	V	3.0	30.4	1.0	-49.3	-13.0	-36.3		
	5.198	-16.3	V	3.0	28.7	1.0	-44.0	-13.0	-31.0		
	6.930	-10.9	V	3.0	27.1	1.0	-37.0	-13.0	-24.0		
	3.465	-20.4	H	3.0	30.4	1.0	-49.8	-13.0	-36.8		
	5.198	-15.6	H	3.0	28.7	1.0	-43.3	-13.0	-30.3		
	6.930	-10.8	H	3.0	27.1	1.0	-36.8	-13.0	-23.8		
	High Ch, (1745 MHz)										
	3.490	-20.1	V	3.0	30.4	1.0	-49.5	-13.0	-36.5		
	5.235	-16.5	V	3.0	28.7	1.0	-44.1	-13.0	-31.1		
	6.980	-11.8	V	3.0	27.0	1.0	-37.8	-13.0	-24.8		
	3.490	-19.6	H	3.0	30.4	1.0	-49.0	-13.0	-36.0		
	5.235	-15.5	H	3.0	28.7	1.0	-43.2	-13.0	-30.2		
	6.980	-10.9	H	3.0	27.0	1.0	-36.9	-13.0	-23.9		
	Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company: LG Project #: 14U18510 Date: 09/23/14 Test Engineer: O. Stoelting Configuration: EUT w/ headset and AC adapter x-pos Mode: TX, LTE band 4, 20MHz BW, QPSK										
Chamber 3m Chamber		Pre-amplifier T145 8449B		Filter Filter 1		Limit Part 27				
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
LTE4 20MHz QPSK	Low Ch, (1720 MHz)									
	3.440	-20.1	V	3.0	30.4	1.0	-49.5	-13.0	-36.5	
	5.160	-16.2	V	3.0	28.7	1.0	-43.9	-13.0	-30.9	
	6.880	-12.8	V	3.0	27.1	1.0	-38.9	-13.0	-25.9	
	3.440	-20.3	H	3.0	30.4	1.0	-49.7	-13.0	-36.7	
	5.160	-16.0	H	3.0	28.7	1.0	-43.7	-13.0	-30.7	
	6.880	-11.2	H	3.0	27.1	1.0	-37.3	-13.0	-24.3	
	Mid Ch, (1732.5 MHz)									
	3.465	-20.0	V	3.0	30.4	1.0	-49.4	-13.0	-36.4	
	5.198	-16.2	V	3.0	28.7	1.0	-43.9	-13.0	-30.9	
	6.930	-11.4	V	3.0	27.1	1.0	-37.5	-13.0	-24.5	
	3.465	-20.3	H	3.0	30.4	1.0	-49.7	-13.0	-36.7	
	5.198	-15.6	H	3.0	28.7	1.0	-43.3	-13.0	-30.3	
	6.930	-11.0	H	3.0	27.1	1.0	-37.0	-13.0	-24.0	
	High Ch, (1745 MHz)									
	3.490	-20.2	V	3.0	30.4	1.0	-49.6	-13.0	-36.6	
	5.235	-15.8	V	3.0	28.7	1.0	-43.5	-13.0	-30.5	
	6.980	-11.8	V	3.0	27.0	1.0	-37.8	-13.0	-24.8	
3.490	-20.4	H	3.0	30.4	1.0	-49.8	-13.0	-36.8		
5.235	-15.5	H	3.0	28.7	1.0	-43.1	-13.0	-30.1		
6.980	-10.7	H	3.0	27.0	1.0	-36.7	-13.0	-23.7		
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Band BC1 EVDO REL. 0	Company:		LG						
	Project #:		14U18510						
	Date:		09/25/14						
	Test Engineer:		D. Soper						
	Configuration:		X-Pos EUT w/ AC charger, headset						
	Mode:		CDMA EVDOBC0						
	Chamber		Pre-amplifier		Filter		Limit		
	3m Chamber		T34 8449B		Filter 1		Part 24		
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)
Low Ch, 1851.25MHz									
3.703	-11.9	V	3.0	35.4	1.0	-46.3	-13.0	-33.3	
5.554	-4.4	V	3.0	34.7	1.0	-38.2	-13.0	-25.2	
7.405	-5.0	V	3.0	34.9	1.0	-38.9	-13.0	-25.9	
3.703	-6.3	H	3.0	35.4	1.0	-40.7	-13.0	-27.7	
5.554	-2.1	H	3.0	34.7	1.0	-35.8	-13.0	-22.8	
7.405	-7.6	H	3.0	34.9	1.0	-41.5	-13.0	-28.5	
Mid Ch, 1880MHz									
3.760	-7.3	V	3.0	35.3	1.0	-41.7	-13.0	-28.7	
5.640	-7.1	V	3.0	34.7	1.0	-40.8	-13.0	-27.8	
7.520	-9.4	V	3.0	34.9	1.0	-43.3	-13.0	-30.3	
3.760	-7.1	H	3.0	35.3	1.0	-41.5	-13.0	-28.5	
5.640	-3.7	H	3.0	34.7	1.0	-37.4	-13.0	-24.4	
7.520	-2.9	H	3.0	34.9	1.0	-36.9	-13.0	-23.9	
High Ch, 1908.75MHz									
3.818	0.1	V	3.0	35.3	1.0	-34.2	-13.0	-21.2	
5.726	-1.5	V	3.0	34.7	1.0	-35.2	-13.0	-22.2	
7.635	-9.9	V	3.0	34.9	1.0	-43.9	-13.0	-30.9	
3.818	-2.0	H	3.0	35.3	1.0	-36.3	-13.0	-23.3	
5.726	5.6	H	3.0	34.7	1.0	-28.2	-13.0	-15.2	
7.635	-7.9	H	3.0	34.9	1.0	-41.8	-13.0	-28.8	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company: LG Project #: 14U18510 Date: 09/25/14 Test Engineer: J. Gomez Configuration: X-Pos EUT w/ AC charger, headset Mode: CDMA RTT BC0										
Chamber 3m Chamber		Pre-amplifier T34 8449B		Filter Filter 1		Limit Part 22				
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
BC1 1xRTT	Low Ch, 1851.25MHz									
	3.703	-4.0	V	3.0	35.4	1.0	-38.4	-13.0	-25.4	
	5.554	-3.5	V	3.0	34.7	1.0	-37.3	-13.0	-24.3	
	7.405	-8.2	V	3.0	34.9	1.0	-42.1	-13.0	-29.1	
	3.703	-12.4	H	3.0	35.4	1.0	-46.8	-13.0	-33.8	
	5.554	-9.6	H	3.0	34.7	1.0	-43.4	-13.0	-30.4	
	7.405	-8.5	H	3.0	34.9	1.0	-42.5	-13.0	-29.5	
	Mid Ch, 1880MHz									
	3.760	-7.9	V	3.0	35.3	1.0	-42.2	-13.0	-29.2	
	5.640	-0.3	V	3.0	34.7	1.0	-34.0	-13.0	-21.0	
	7.520	-8.3	V	3.0	34.9	1.0	-42.2	-13.0	-29.2	
	3.760	-7.8	H	3.0	35.3	1.0	-42.1	-13.0	-29.1	
	5.640	-6.5	H	3.0	34.7	1.0	-40.2	-13.0	-27.2	
	7.520	-8.1	H	3.0	34.9	1.0	-42.0	-13.0	-29.0	
	High Ch, 1908.75MHz									
	3.818	-2.4	V	3.0	35.3	1.0	-36.7	-13.0	-23.7	
	5.726	0.6	V	3.0	34.7	1.0	-33.2	-13.0	-20.2	
	7.635	-9.0	V	3.0	34.9	1.0	-43.0	-13.0	-30.0	
	3.818	-1.7	H	3.0	35.3	1.0	-36.0	-13.0	-23.0	
	5.726	-5.0	H	3.0	34.7	1.0	-38.7	-13.0	-25.7	
	7.635	-8.0	H	3.0	34.9	1.0	-42.0	-13.0	-29.0	
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 14U18510
Date: 09/25/14
Test Engineer: D. Soper
Configuration: X-Pos EUT w/ AC charger, headset
Mode: CDMA EVDO BC0

Chamber

3m Chamber

Pre-amplifier

T34 8449B

Filter

Filter 1

Limit

Part 24

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.7MHz									
BC0	1.649	-30.1	V	3.0	37.4	1.0	-66.5	-13.0	-53.5	
	2.474	-25.6	V	3.0	36.4	1.0	-61.0	-13.0	-48.0	
EVDO	3.299	-21.3	V	3.0	35.8	1.0	-56.1	-13.0	-43.1	
	1.649	-29.2	H	3.0	37.4	1.0	-65.5	-13.0	-52.5	
REL. 0	2.474	-25.2	H	3.0	36.4	1.0	-60.6	-13.0	-47.6	
	3.299	-20.7	H	3.0	35.8	1.0	-55.5	-13.0	-42.5	
	Mid Ch, 836.52MHz									
	1.673	-29.0	V	3.0	37.3	1.0	-65.4	-13.0	-52.4	
	2.510	-23.0	V	3.0	36.4	1.0	-58.3	-13.0	-45.3	
	3.346	-20.9	V	3.0	35.8	1.0	-55.7	-13.0	-42.7	
	1.673	-28.9	H	3.0	37.3	1.0	-65.2	-13.0	-52.2	
	2.510	-24.5	H	3.0	36.4	1.0	-59.8	-13.0	-46.8	
	3.346	-21.5	H	3.0	35.8	1.0	-56.3	-13.0	-43.3	
	High Ch, 848.31MHz									
	1.697	-28.7	V	3.0	37.3	1.0	-65.0	-13.0	-52.0	
	2.545	-23.4	V	3.0	36.3	1.0	-58.7	-13.0	-45.7	
	3.393	-20.9	V	3.0	35.7	1.0	-55.6	-13.0	-42.6	
	1.697	-29.1	H	3.0	37.3	1.0	-65.4	-13.0	-52.4	
	2.545	-24.7	H	3.0	36.3	1.0	-60.0	-13.0	-47.0	
	3.393	-21.2	H	3.0	35.7	1.0	-55.9	-13.0	-42.9	

Rev. 03.03.09
 Note: No other emissions were detected above the system noise floor.

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Band BC0 1xRTT	Company:		LG						
	Project #:		14U18510						
	Date:		09/25/14						
	Test Engineer:		J. Gomez						
	Configuration:		X-Pos EUT w/ AC charger, headset						
	Mode:		CDMA RTT BC0						
	Chamber		Pre-amplifier		Filter		Limit		
	3m Chamber		T34 8449B		Filter 1		Part 22		
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)
Low Ch, 824.7MHz									
1.649	-18.8	V	3.0	37.4	1.0	-55.2	-13.0	-42.2	
2.474	-17.3	V	3.0	36.4	1.0	-52.7	-13.0	-39.7	
3.299	-11.9	V	3.0	35.8	1.0	-46.7	-13.0	-33.7	
1.649	-22.9	H	3.0	37.4	1.0	-59.3	-13.0	-46.3	
2.474	-17.1	H	3.0	36.4	1.0	-52.5	-13.0	-39.5	
3.299	-11.2	H	3.0	35.8	1.0	-46.0	-13.0	-33.0	
Mid Ch, 836.52MHz									
1.673	-17.3	V	3.0	37.3	1.0	-53.6	-13.0	-40.6	
2.510	-15.0	V	3.0	36.4	1.0	-50.4	-13.0	-37.4	
3.346	-16.2	V	3.0	35.8	1.0	-51.0	-13.0	-38.0	
1.673	-15.6	H	3.0	37.3	1.0	-51.9	-13.0	-38.9	
2.510	-16.7	H	3.0	36.4	1.0	-52.0	-13.0	-39.0	
3.346	-19.8	H	3.0	35.8	1.0	-54.5	-13.0	-41.5	
High Ch, 848.31MHz									
1.697	-18.1	V	3.0	37.3	1.0	-54.4	-13.0	-41.4	
2.545	-15.6	V	3.0	36.3	1.0	-51.0	-13.0	-38.0	
3.393	-16.3	V	3.0	35.7	1.0	-51.0	-13.0	-38.0	
1.697	-17.3	H	3.0	37.3	1.0	-53.6	-13.0	-40.6	
2.545	-15.8	H	3.0	36.3	1.0	-51.1	-13.0	-38.1	
3.393	-16.0	H	3.0	35.7	1.0	-50.7	-13.0	-37.7	
Rev: 03.03.09									
Note: No other emissions were detected above the system noise floor.									