



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

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER: LG-VS810PP, VS810PP, LGVS810PP

FCC ID: ZNFVS810PP

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TABLE OF CONTENTS

1.	ATTESTATION OF TEST RESULTS	5
2.	TEST METHODOLOGY	7
3.	FACILITIES AND ACCREDITATION	7
4.	CALIBRATION AND UNCERTAINTY	7
4.1.	MEASURING INSTRUMENT CALIBRATION	7
4.2.	SAMPLE CALCULATION	7
4.3.	MEASUREMENT UNCERTAINTY.....	8
5.	EQUIPMENT UNDER TEST	9
5.1.	DESCRIPTION OF EUT	9
5.2.	MAXIMUM OUTPUT POWER.....	9
5.3.	MAXIMUM OUTPUT POWER (LTE).....	10
5.4.	DESCRIPTION OF AVAILABLE ANTENNAS	11
5.5.	DESCRIPTION OF TEST SETUP.....	12
6.	TEST AND MEASUREMENT EQUIPMENT	15
7.	Summary Table	16
8.1.	CDMA2000	17
8.1.1.	1xRTT	17
8.1.2.	CDMA2000 OUTPUT POWER RESULT	18
8.1.3.	1xEV-DO Release 0.....	19
8.1.4.	1XEVD0 REL 0 OUTPUT POWER RESULT.....	20
8.1.5.	1xEV-DO Rev. A.....	21
8.1.6.	1xEVD0 REV A OUTPUT RESULT.....	22
8.2.	LTE OUTPUT VERIFICATION.....	23
8.2.1.	LTE OUTPUT RESULT	23
9.	PEAK TO AVERAGE RATIO	26
9.1.	CONDUCTED PEAK TO AVERAGE RESULT.....	26
10.	LIMITS AND CONDUCTED RESULTS	31
10.1.	OCCUPIED BANDWIDTH.....	31
10.1.1.	OCCUPIED BANDWIDTH RESULTS.....	33
10.1.2.	LTE OCCUPIED BANDWIDTH RESULTS	34
10.1.1.	OCCUPIED BANDWIDTH PLOTS	36

10.2.	<i>BAND EDGE EMISSIONS</i>	40
10.2.1.	BAND EDGE PLOTS	41
10.3.	<i>OUT OF BAND EMISSIONS</i>	52
10.3.1.	OUT OF BAND EMISSIONS RESULT	53
10.3.2.	OUT OF BAND EMISSIONS PLOTS.....	55
10.4.	<i>FREQUENCY STABILITY</i>	59
10.4.1.	FREQUENCY STABILITY RESULTS.....	60
RADIATED TEST RESULTS		64
10.5.	<i>RADIATED POWER (ERP & EIRP)</i>	64
10.5.1.	ERP/EIRP Results.....	65
10.5.3.	ERP/EIRP PLOTS.....	68
10.6.	<i>FIELD STRENGTH OF SPURIOUS RADIATION</i>	82
10.6.1.	SPURIOUS RADIATION PLOTS.....	84
11.	SETUP PHOTOS	98

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: 18 (Conducted), 22 (Radiated)
DATE TESTED: August 8 -16, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H, 24E, 27Eand 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
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input checked="" type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input checked="" type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F
	<input type="checkbox"/> Chamber G
	<input type="checkbox"/> 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:

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

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

(Path loss = Signal generator output – 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 22/2 4/27						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			dBm	mW	dBm	mW
BC0	824~849	1xRTT	24.7	295.12	22.2	165.96
	824~849	EVDO REL. 0	24.7	295.12	18.2	66.07
	824~849	EVDO REV. A				
BC1	1850~1910	1xRTT	24.7	295.12	25.4	346.74
	1850~1910	EVDO REL. 0	24.7	295.12	20.9	123.03
	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	24.2	263.03	20.55	113.50
	777~787	10MHz	16QAM	23.3	213.80	21.00	125.89

FCC Part 22/24/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				dBm	mW	dBm	mW
LTE4	1710~1755	20MHz	QPSK	23.2	208.93	23.97	249.46
	1710~1755	20MHz	16QAM	22.2	165.96	23.20	208.93

FCC Part 22/24/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				dBm	mW	dBm	mW
LTE4	1710~1755	15MHz	QPSK	23.2	208.93	23.75	237.14
	1710~1755	15MHz	16QAM	22.2	165.96	22.68	185.35

FCC Part 22/24/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				dBm	mW	dBm	mW
LTE4	1710~1755	10MHz	QPSK	23.2	208.93	23.42	219.79
	1710~1755	10MHz	16QAM	22.2	165.96	22.32	170.61

FCC Part 22/24/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				dBm	mW	dBm	mW
LTE4	1710~1755	5MHz	QPSK	23.2	208.93	23.32	214.78
	1710~1755	5MHz	16QAM	22.1	162.18	22.41	174.18

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

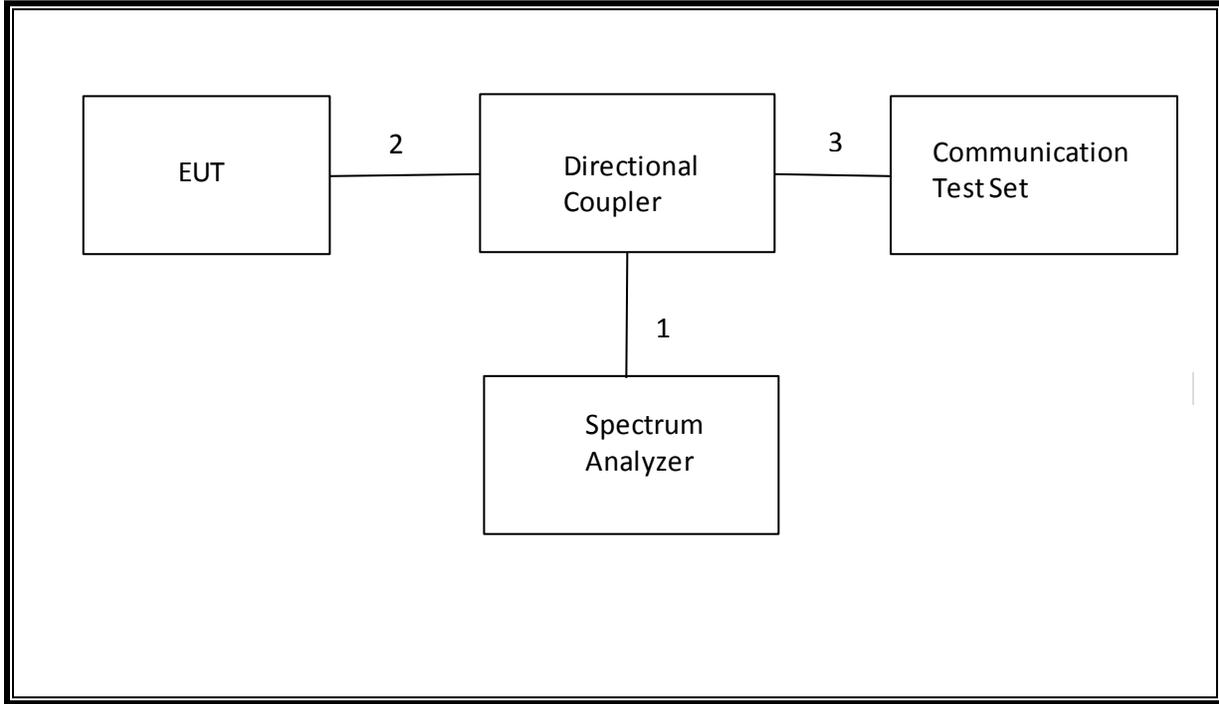
I/O CABLES (RADIATED SETUP)

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

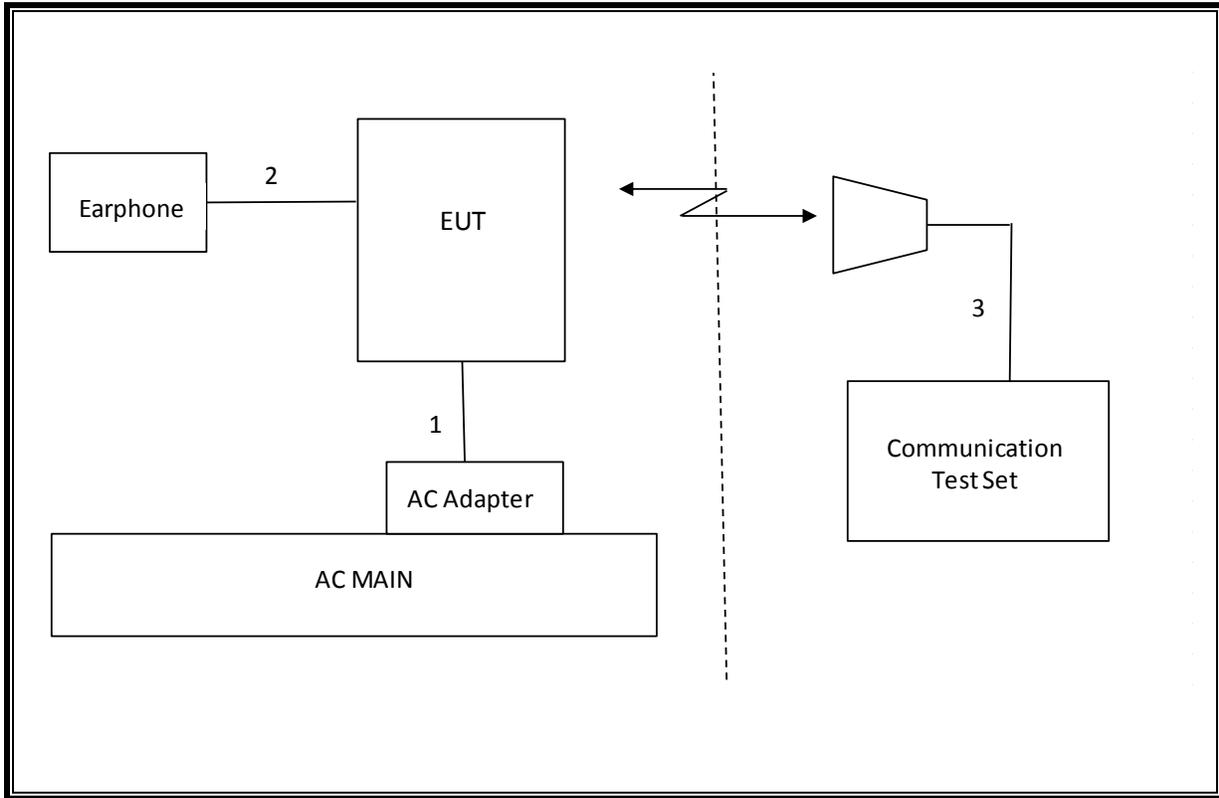
TEST SETUP

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	17.83 MHz
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	-18.97 dBm
2.1046	N/A	Conducted output power	N/A		Pass	24.7 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	0.015 PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	22.2 dBm
27.50(b)(10)	N/A		34.77 dBm		Pass	21.0 dBm
24.232(c) 27.50(h)(2)	RSS-133(6.4) RSS-199(4.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	25.4 dBm
27.50(d)(4)	RSS-139(6.4)		30dBm		Pass	24.0 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	-34.7 dBm

8.1. CDMA2000

8.1.1. 1xRTT

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>
CDMA2000 Mobile Test	B.13.08, L

- Call Setup > Shift & Preset
- Cell Info > Cell Parameters > System ID (SID) > 7
 > Network ID (NID) > 1
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > Please see following table or details
- FCH Service Option (SO) Setup > Please see following table or details
- Traffic Data Rate > Full
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps
 > R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Rvs Power Ctrl > Active bits
 - Rvs Power Ctrl > All Up bits (Maximum TxPout)

8.1.2. CDMA2000 OUTPUT POWER RESULT

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)
BC0	RC1, SO55 (Loopback)	1013	824.70	24.7
		384	836.52	24.6
		777	848.31	24.7
	RC3, SO55 (Loopback)	1013	824.70	24.7
		384	836.52	24.6
		777	848.31	24.7
	RC3, SO32 (+F-SCH)	1013	824.70	24.7
		384	836.52	24.6
		777	848.31	24.7

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)
BC1	RC1, SO55 (Loopback)	25	1851.25	24.6
		600	1880.00	24.7
		1175	1908.75	24.6
	RC3, SO55 (Loopback)	25	1851.25	24.6
		600	1880.00	24.7
		1175	1908.75	24.6
	RC3, SO32 (+F-SCH)	25	1851.25	24.6
		600	1880.00	24.7
		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	24.7
		384	836.52	24.6
		777	848.31	24.7

Band	FTAP Rate	Channel	f (MHz)	Avg Pwr (dBm)
BC1	307.2 kbps (2 slot, QPSK)	25	1851.25	24.5
		600	1880.00	24.7
		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	24.6
		384	836.52	24.6
		777	848.31	24.6

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	24.7
		600	1880.00	24.7
		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	24.20
			1	25	0	24.00
			1	49	0	24.10
			25	0	1	23.30
			25	12	1	23.20
			25	25	1	23.00
			50	0	1	23.20
		16QAM	1	0	1	23.30
			1	25	1	23.10
			1	49	1	23.10
			25	0	2	22.30
			25	12	2	22.30
			25	25	2	22.15
			50	0	2	22.25

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	23.2	23.2	23.2
			1	49	0	23.2	23.1	23.2
			1	99	0	23.1	23.2	23.2
			50	0	1	22.2	22.1	22.2
			50	24	1	22.2	22.1	22.2
			50	50	1	22.0	22.1	22.2
		100	0	1	22.1	22.1	22.2	
		16QAM	1	0	1	22.2	22.2	22.2
			1	49	1	22.2	22.2	22.2
			1	99	1	22.1	22.2	22.2
			50	0	2	21.2	21.2	21.2
			50	24	2	21.2	21.2	21.2
			50	50	2	21.2	21.2	21.2
			100	0	2	21.2	21.1	21.2
100	0		2	21.2	21.1	21.2		
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	23.0	23.1	23.2
			1	37	0	23.0	23.1	23.2
			1	74	0	23.0	23.1	23.2
			36	0	1	22.2	22.0	22.2
			36	20	1	22.2	22.1	22.2
			36	39	1	22.2	22.1	22.2
		75	0	1	22.2	22.1	22.2	
		16QAM	1	0	1	22.2	22.2	22.2
			1	37	1	22.2	22.2	22.2
			1	74	1	21.9	22.2	22.2
			36	0	2	21.1	21.2	21.2
			36	20	2	21.2	21.2	21.2
			36	39	2	21.2	21.2	21.2
			75	0	2	21.2	21.1	21.2
75	0		2	21.2	21.1	21.2		

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

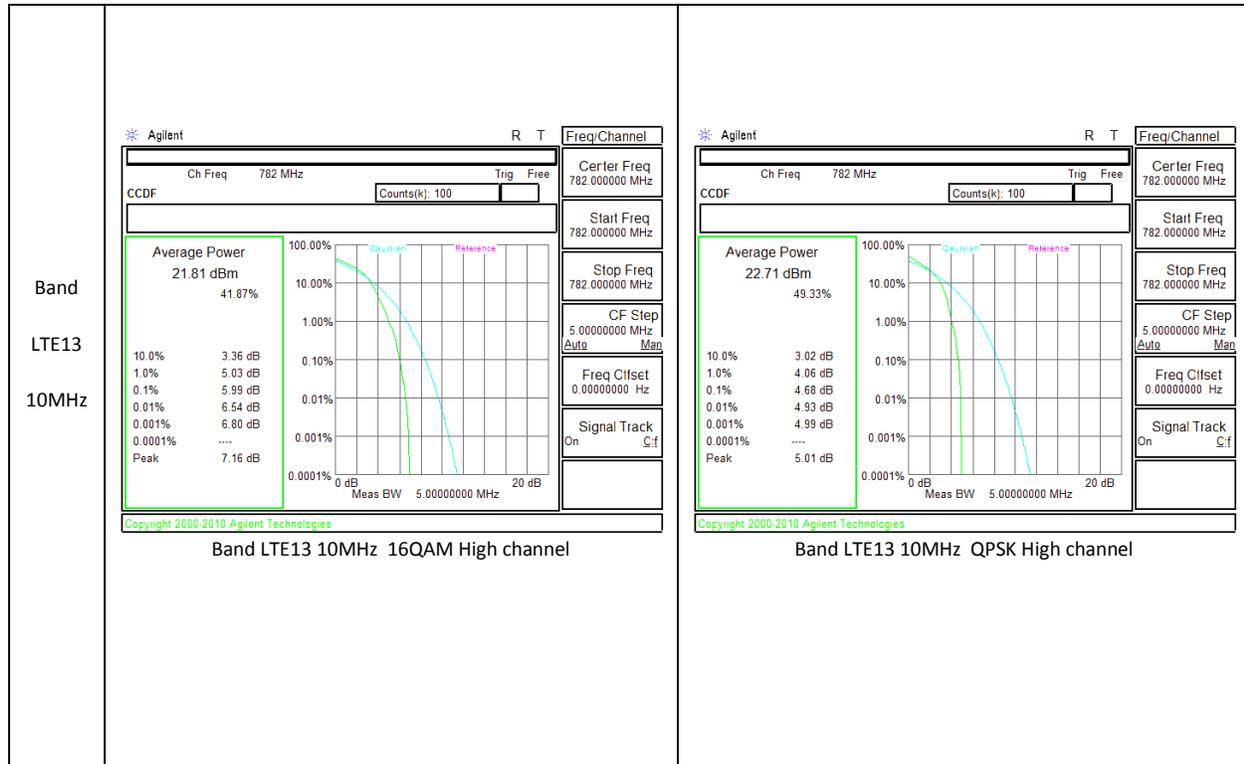
Per KDB 971168 D01 Power Meas License Digital Systems v02r01

Test Spec

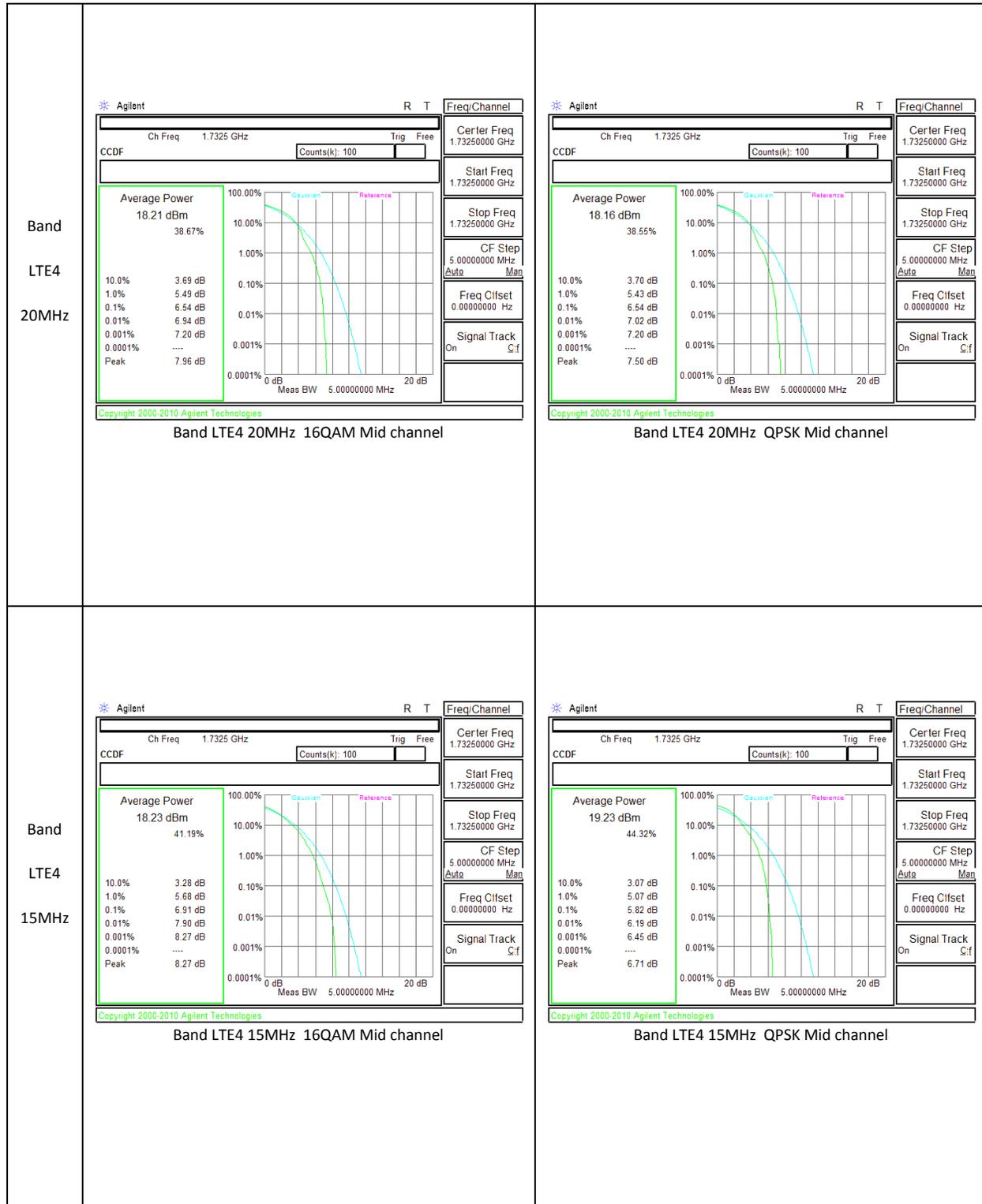
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

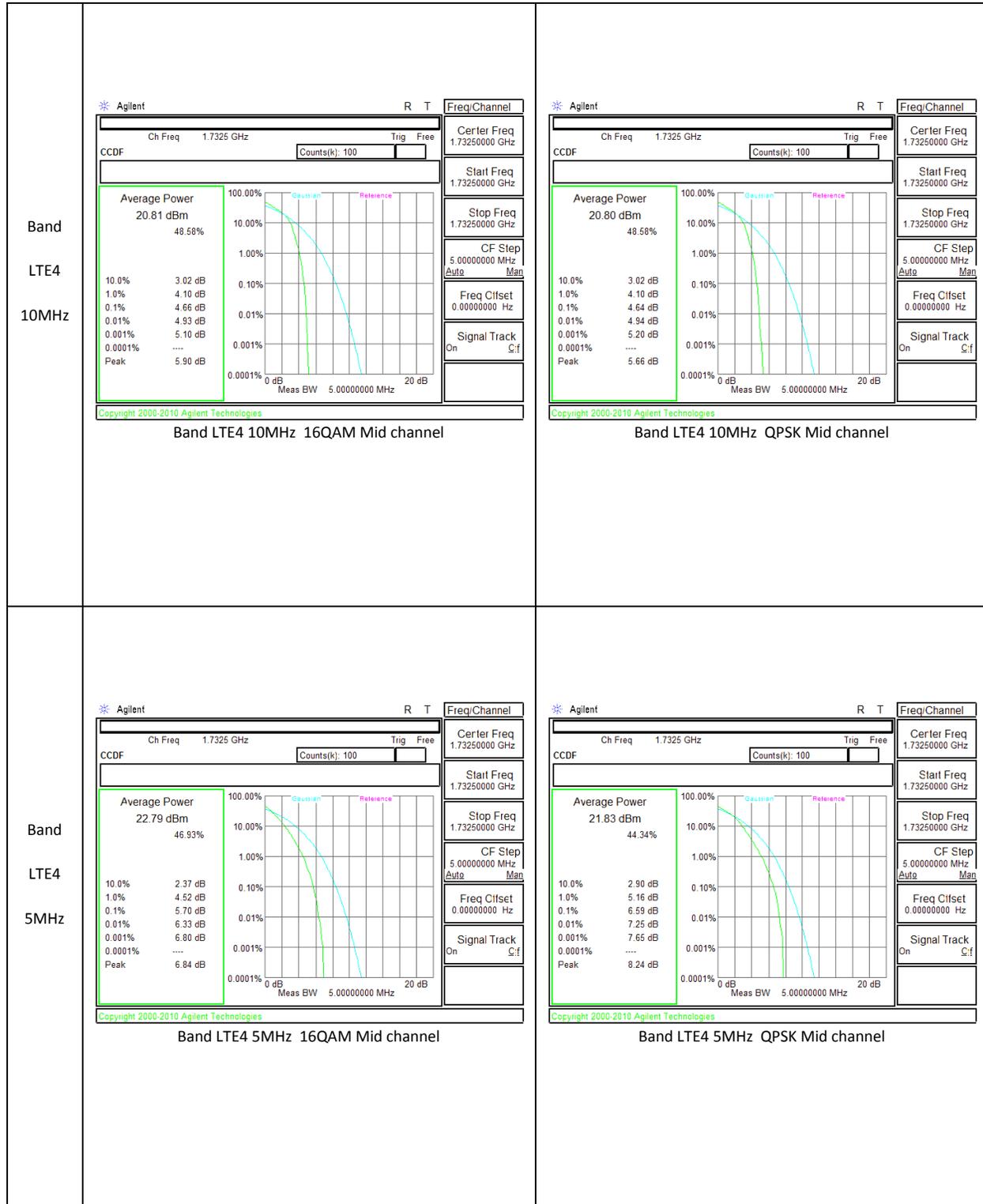
9.1. CONDUCTED PEAK TO AVERAGE RESULT

LTE 13

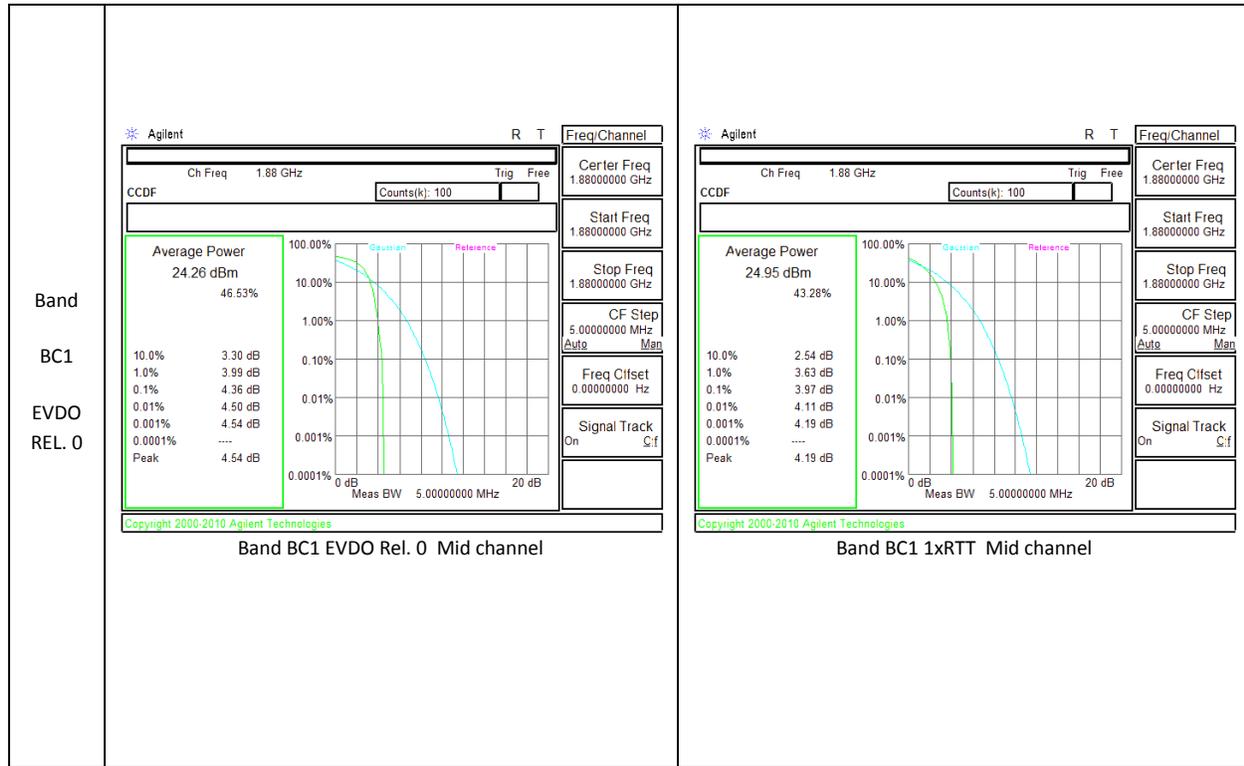


LTE 4

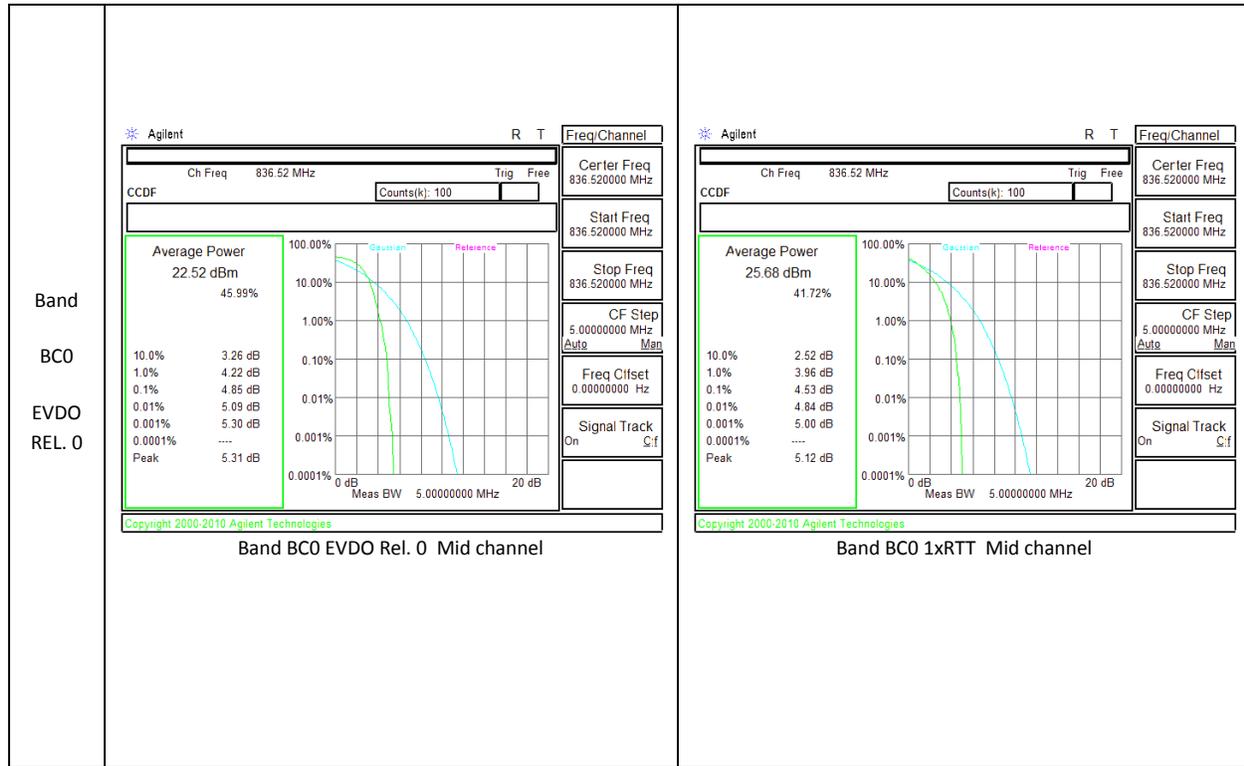




CDMA BC1



CDMA BC0



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)

SOP

Occupied bandwidth – relative measurement procedure (26dB)

The reference value is the highest level of the spectral envelope of the modulated signal.

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
- b) The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- c) Set the reference level of the instrument as required to prevent the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- d) NOTE—*Steps a) through c) may require iteration to adjust within the specified tolerances.*
- e) The dynamic range of the spectrum analyzer at the selected RBW shall be at least 10 dB below the target “-X dB down” requirement (*i.e.*, if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference value).
- f) Set the detection mode to peak, and the trace mode to max hold.
- g) Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
- h) Determine the “-X dB down amplitude” as equal to (Reference Value – X). Alternatively, this calculation can be performed by the analyzer by using the marker-delta function.

i) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB down amplitude” determined in step g). If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.

j) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display. The frequency and amplitude axes and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

2. Occupied bandwidth – power bandwidth (99%) measurement procedure

The following procedure shall be used for measuring (99 %) power bandwidth per KDB 971168 D01 Power Meas License Digital Systems v02r01 4

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (*i.e.*, two to five times the OBW).

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.

d) NOTE—*Steps a) through c) may require iteration to adjust within the specified tolerances.*

e) Set the detection mode to peak, and the trace mode to max hold..

f) Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.

g) If the instrument does not have a 99 % power bandwidth function, the trace data points are to be recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99 % power bandwidth is the difference between these two frequencies.

h) The OBW shall be reported by providing plot(s) of the measuring instrument display. The frequency and amplitude axes and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s). Record the displayed OBW value. MODES TESTED

MODES TESTED

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

10.1.1. OCCUPIED BANDWIDTH RESULTS

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
BC0	1xRTT	1013	824.7	1.238	1.428
		384	836.52	1.266	1.421
		777	848.31	1.261	1.420
	EVDO REL. 0	1013	824.7	1.269	1.428
		384	836.52	1.270	1.421
		777	848.31	1.267	1.427
	EVDO REV. A	1013	824.7		
		384	836.52		
		777	848.31		
BC1	1xRTT	25	1851.25	1.270	1.440
		600	1880	1.274	1.427
		1175	1908.75	1.277	1.446
	EVDO REL. 0	25	1851.25	1.270	1.434
		600	1880	1.270	1.432
		1175	1908.75	1.272	1.431
	EVDO REV. A	25	1851.25		
		600	1880		
		1175	1908.75		

10.1.2. LTE OCCUPIED BANDWIDTH RESULTS

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
LTE13	10	QPSK	50/0	782	8.895	9.385
			50/0	782	8.895	9.385
			50/0	782	8.895	9.385
		16QAM	50/0	782	8.852	9.381
			50/0	782	8.852	9.381
			50/0	782	8.852	9.381

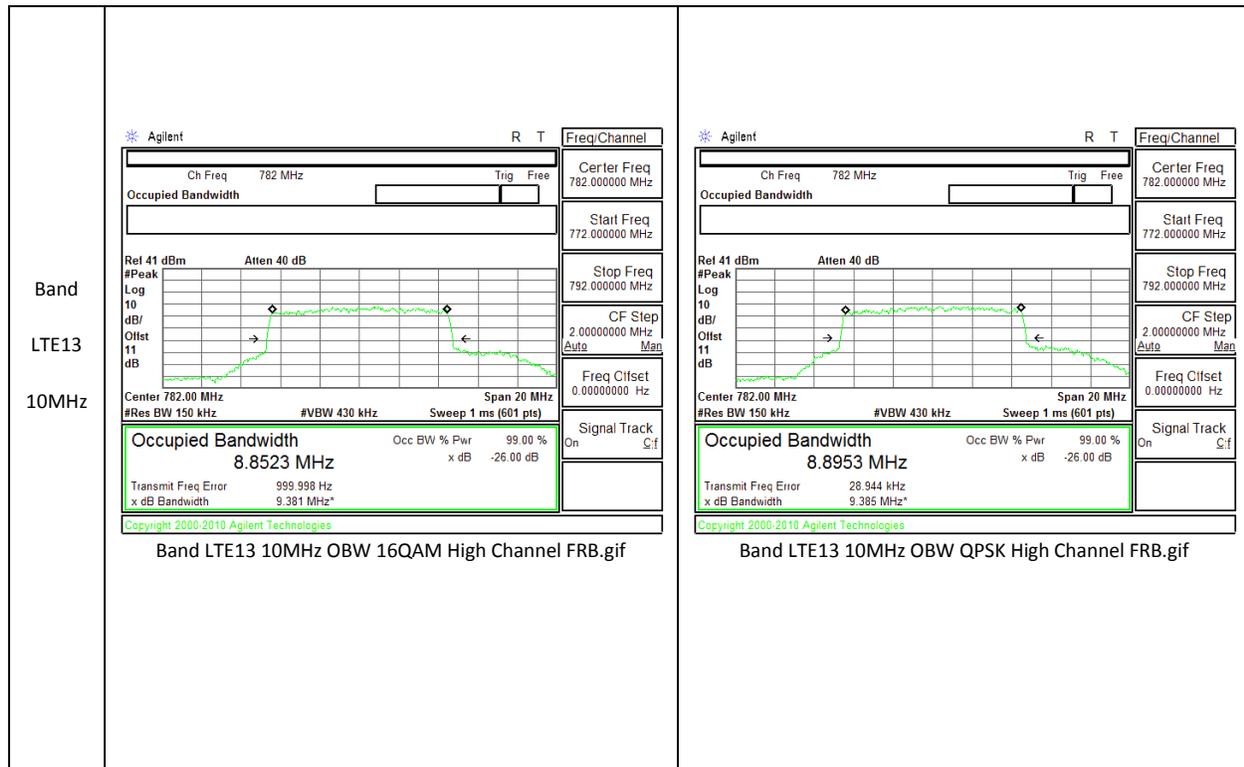
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
LTE4	20	QPSK	100/0	1720	17.625	18.458
			100/0	1732.5	17.756	18.557
			100/0	1745	17.747	18.546
		16QAM	100/0	1720	17.724	18.561
			100/0	1732.5	17.365	18.451
			100/0	1745	17.832	18.524

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
LTE4	15	QPSK	75/0	1717.5	13.371	13.906
			75/0	1732.5	13.382	13.943
			75/0	1747.5	13.334	13.885
		16QAM	75/0	1717.5	13.297	13.898
			75/0	1732.5	13.382	13.943
			75/0	1747.5	13.341	13.871

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
LTE4	10	QPSK	50/0	1715	8.884	9.274
			50/0	1732.5	8.925	9.258
			50/0	1750	8.907	9.265
		16QAM	50/0	1715	8.907	9.291
			50/0	1732.5	8.838	9.420
			50/0	1750	8.862	9.256

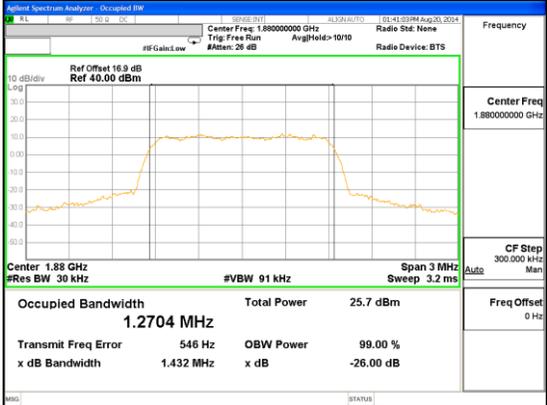
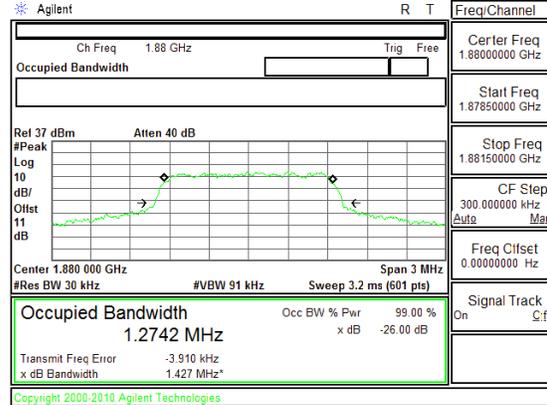
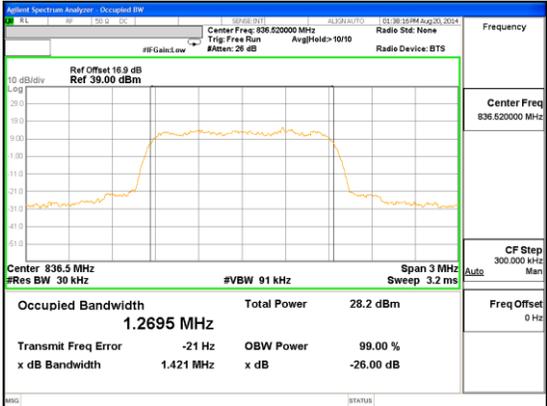
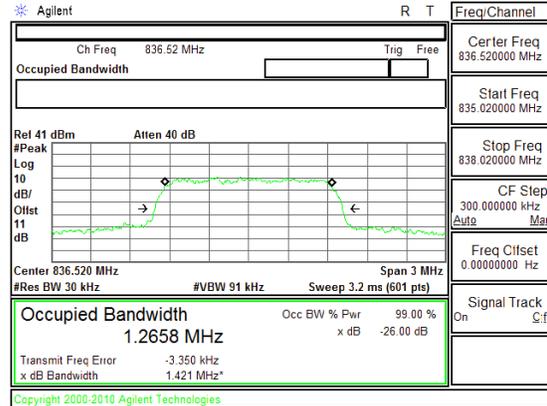
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
LTE4	5	QPSK	25/0	1712.5	4.474	4.672
			25/0	1732.5	4.363	4.607
			25/0	1752.5	4.495	4.772
		16QAM	25/0	1712.5	4.467	4.685
			25/0	1732.5	4.346	4.704
			25/0	1752.5	4.486	4.646

10.1.1. OCCUPIED BANDWIDTH PLOTS



<p>Band LTE4 20MHz</p>	<p>Band LTE4 20MHz OBW 16QAM Mid Channel FRB.gif</p>	<p>Band LTE4 20MHz OBW QPSK Mid Channel FRB.gif</p>
<p>Band LTE4 15MHz</p>	<p>Band LTE4 15MHz OBW 16QAM Mid Channel FRB.gif</p>	<p>Band LTE4 15MHz OBW QPSK Mid Channel FRB.gif</p>

<p>Band LTE4 10MHz</p>	<p>Band LTE4 10MHz OBW 16QAM Mid Channel FRB.gif</p>	<p>Band LTE4 10MHz OBW QPSK Mid Channel FRB.gif</p>
<p>Band LTE4 5MHz</p>	<p>Band LTE4 5MHz OBW 16QAM Mid Channel FRB.gif</p>	<p>Band LTE4 5MHz OBW QPSK Mid Channel FRB.gif</p>

<p>Band BC1 EVDO REL. 0</p>	 <p style="text-align: center;">Band BC1 EVDO Rel. 0 OBW Mid channel</p>	 <p style="text-align: center;">Band BC1 1xRTT OBW Mid channel</p>
<p>Band BC0 EVDO REL. 0</p>	 <p style="text-align: center;">Band BC0 EVDO Rel. 0 OBW Mid channel</p>	 <p style="text-align: center;">Band BC0 1xRTT OBW Mid channel</p>

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 5.5MHz 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.

SOP

For each band edge measurement:

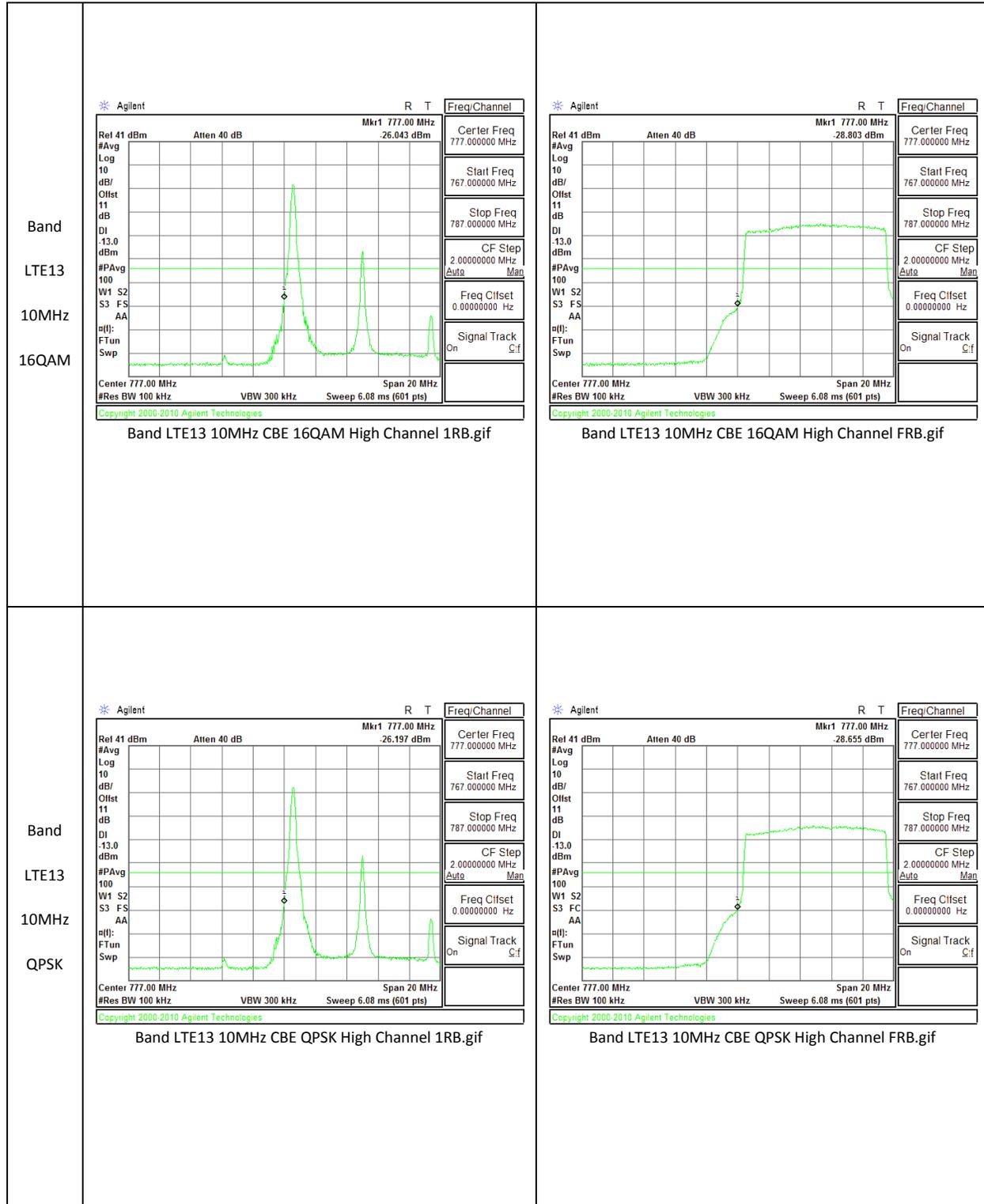
- Set the spectrum analyzer span to include the block edge frequency (824, 849, 1850, 1910 and 1915MHz)
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm.
- Set resolution bandwidth to at least 1% of emission bandwidth.
- For Part 27.53 (LTE 41)
- (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.
- (m)(6) Compliance with these rules is based on the user of measurement instrumentation employing a resolution bandwidth of 1MHz or greater. However, in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 1 percent of the emission bandwidth may be employed.

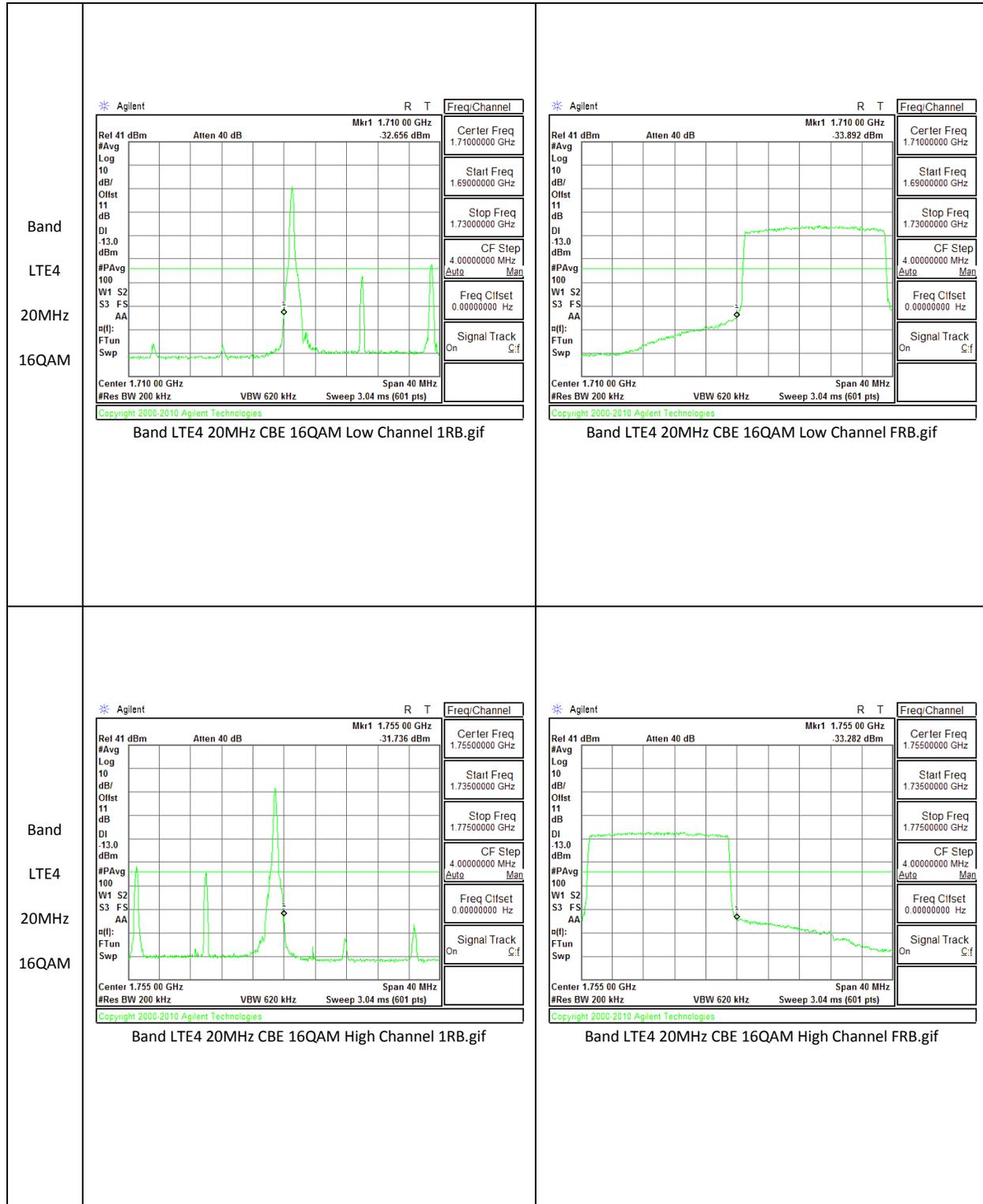
MODES TESTED

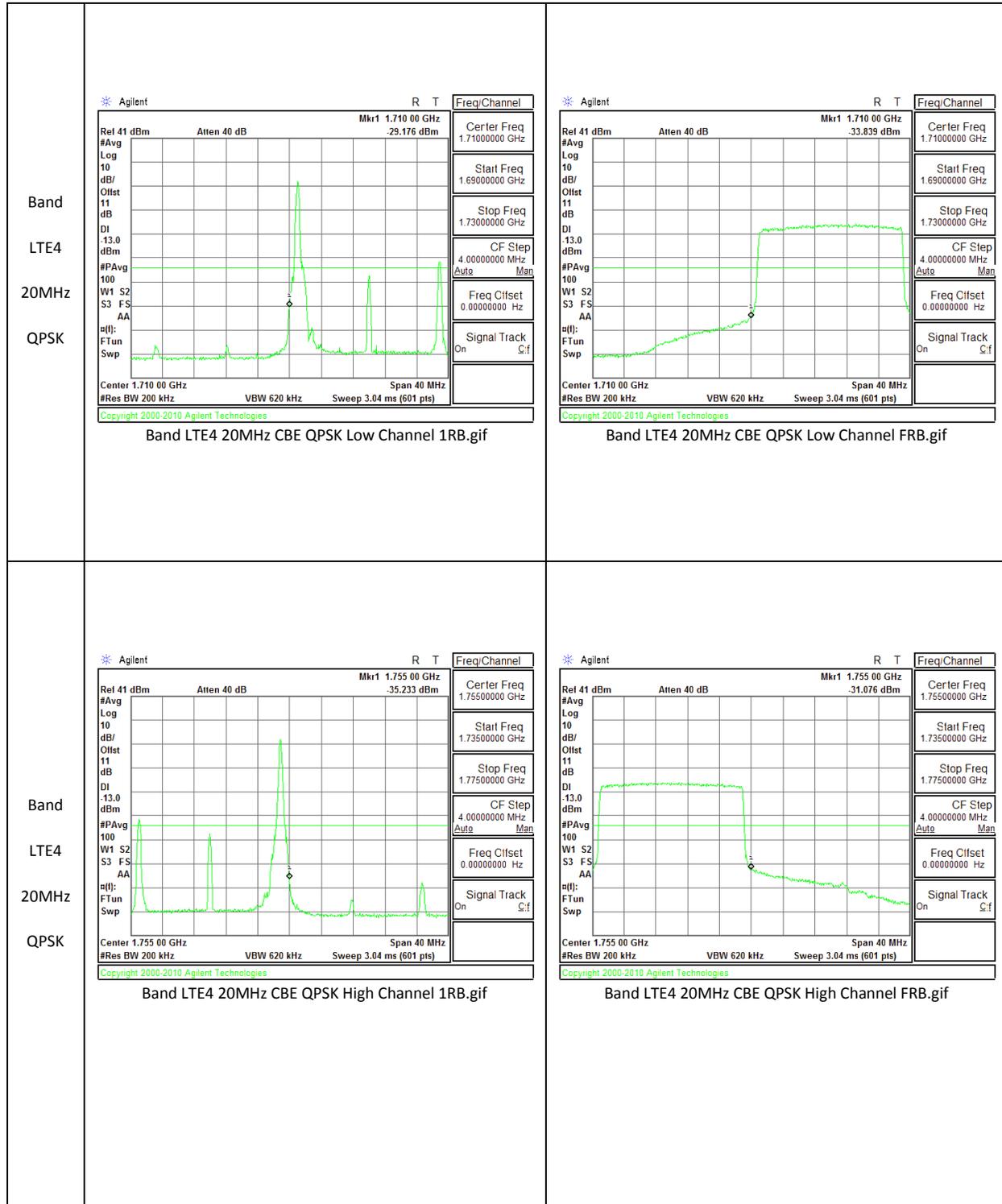
CDMA BC0, CDMA BC1, LTE Band 4, LTE Band 13

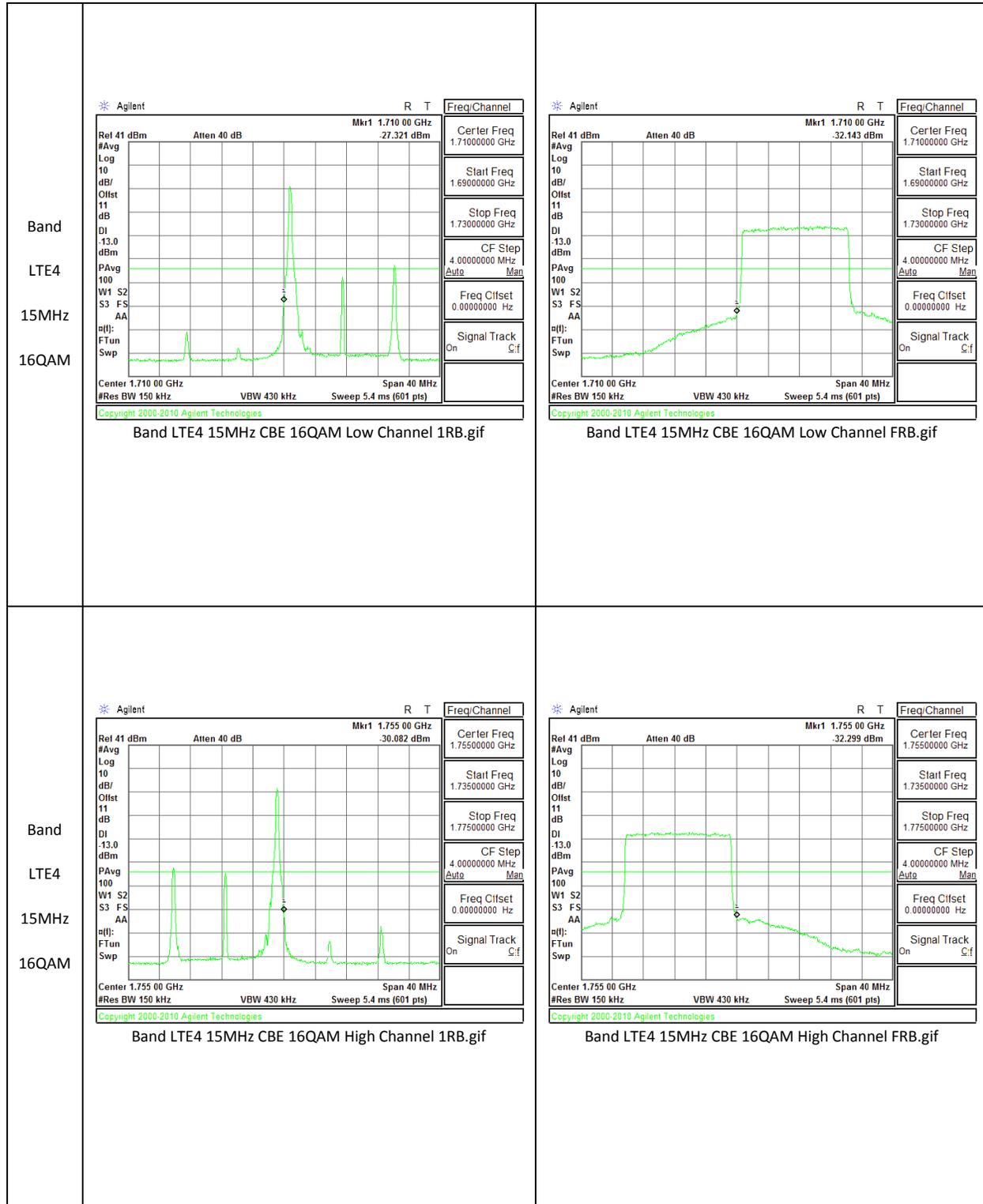
RESULTS

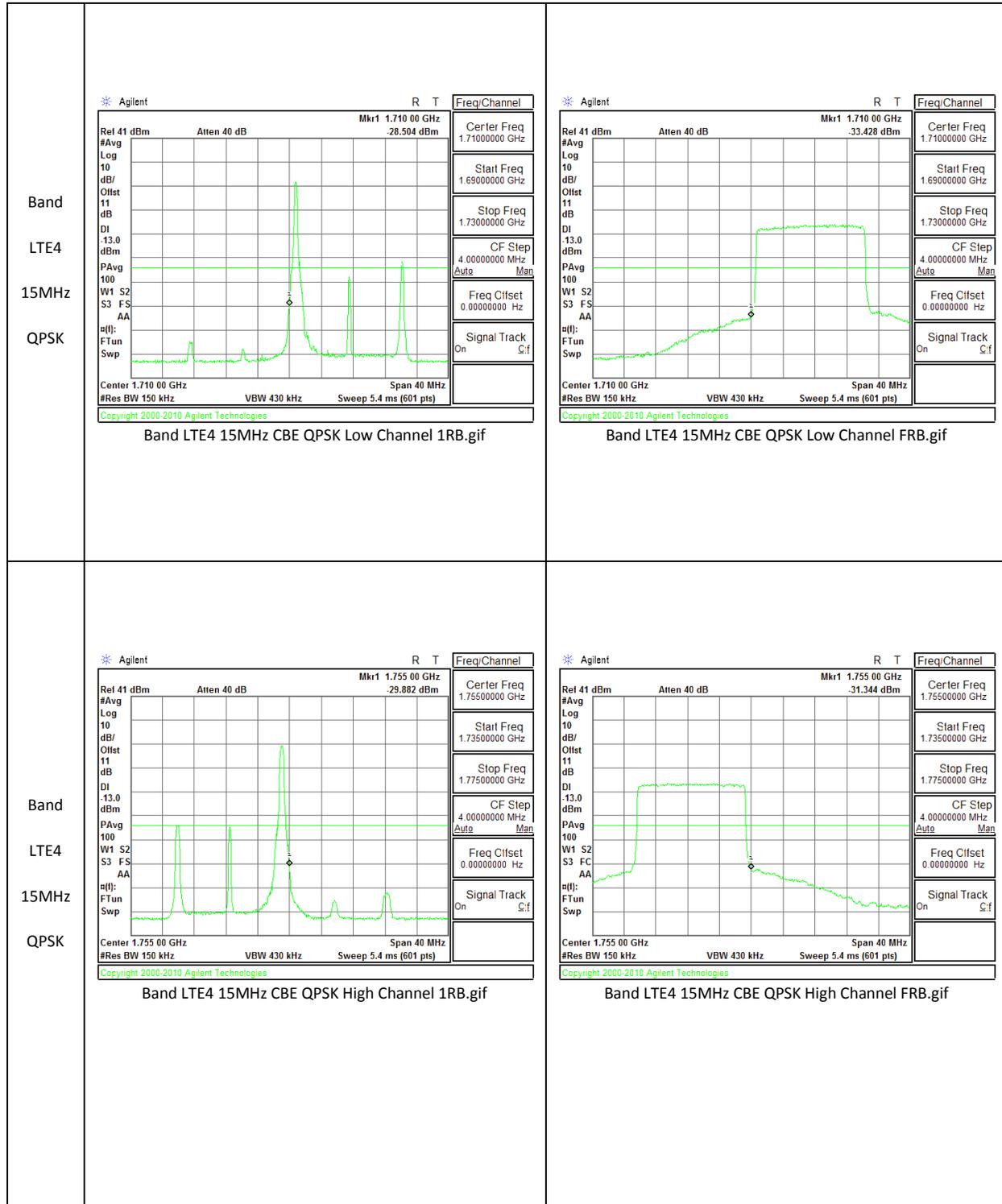
10.2.1. BAND EDGE PLOTS

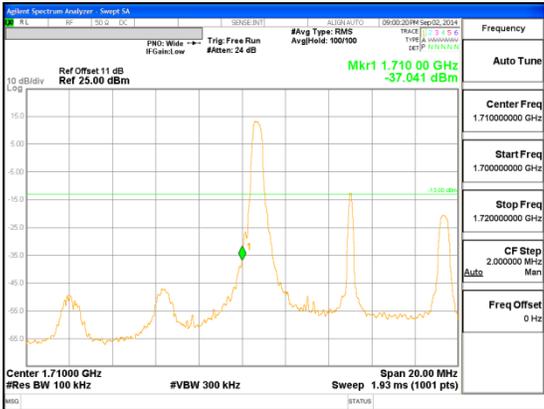
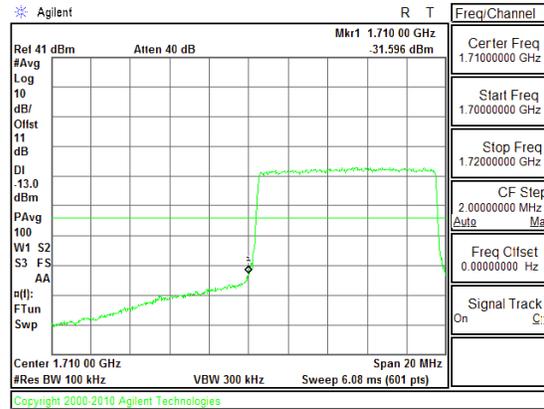
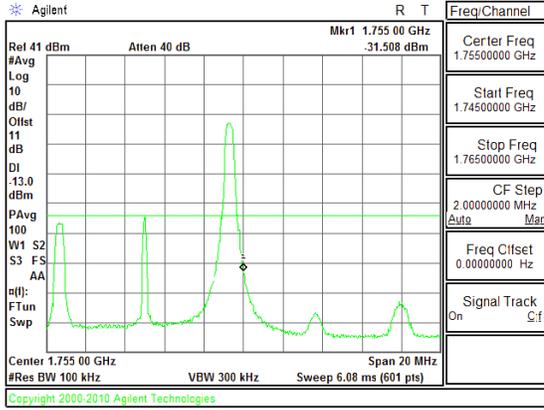
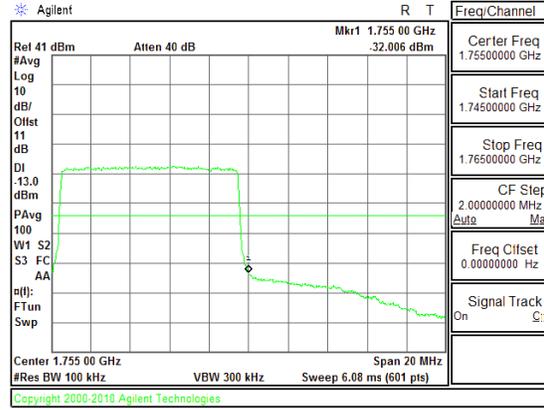


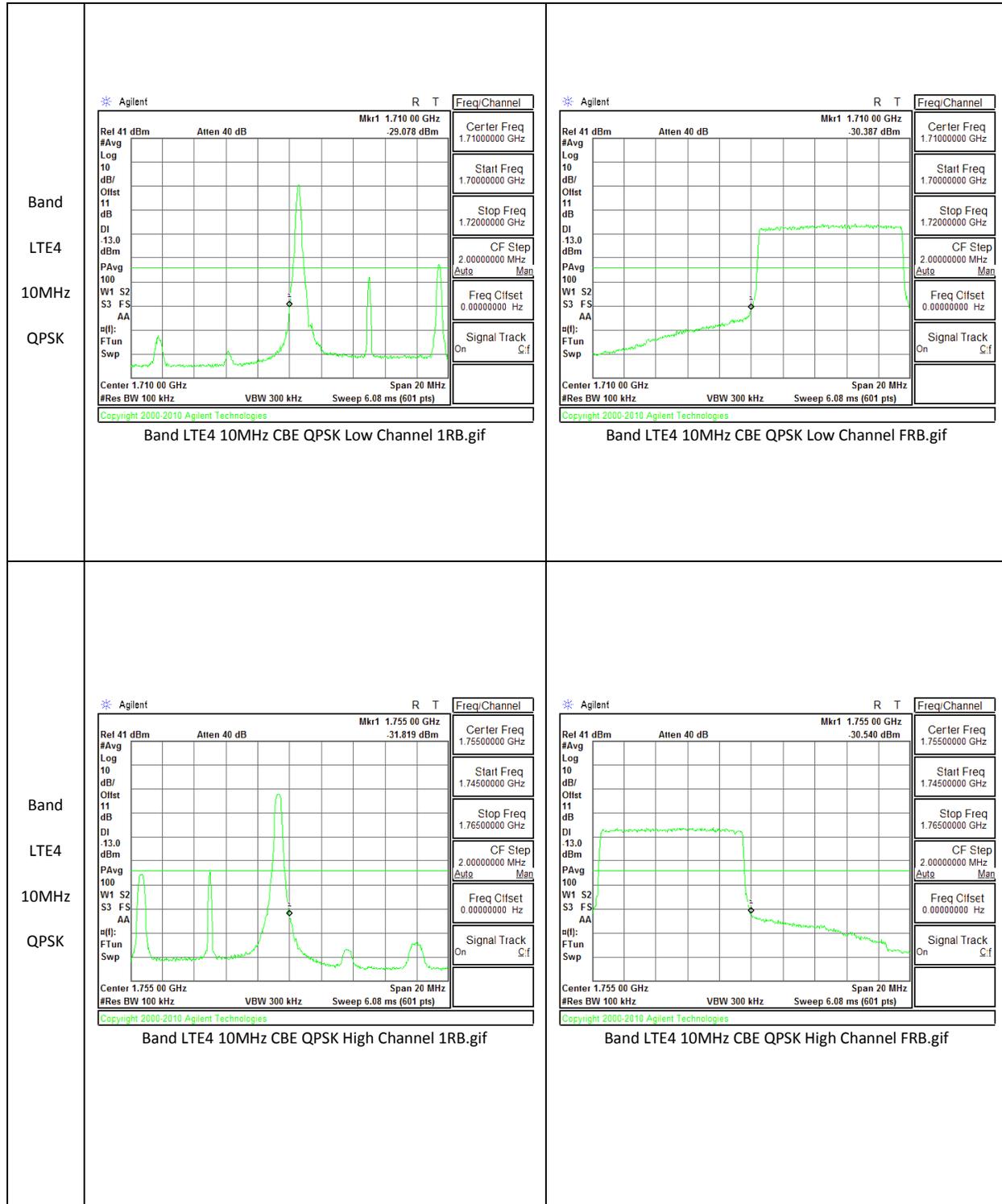


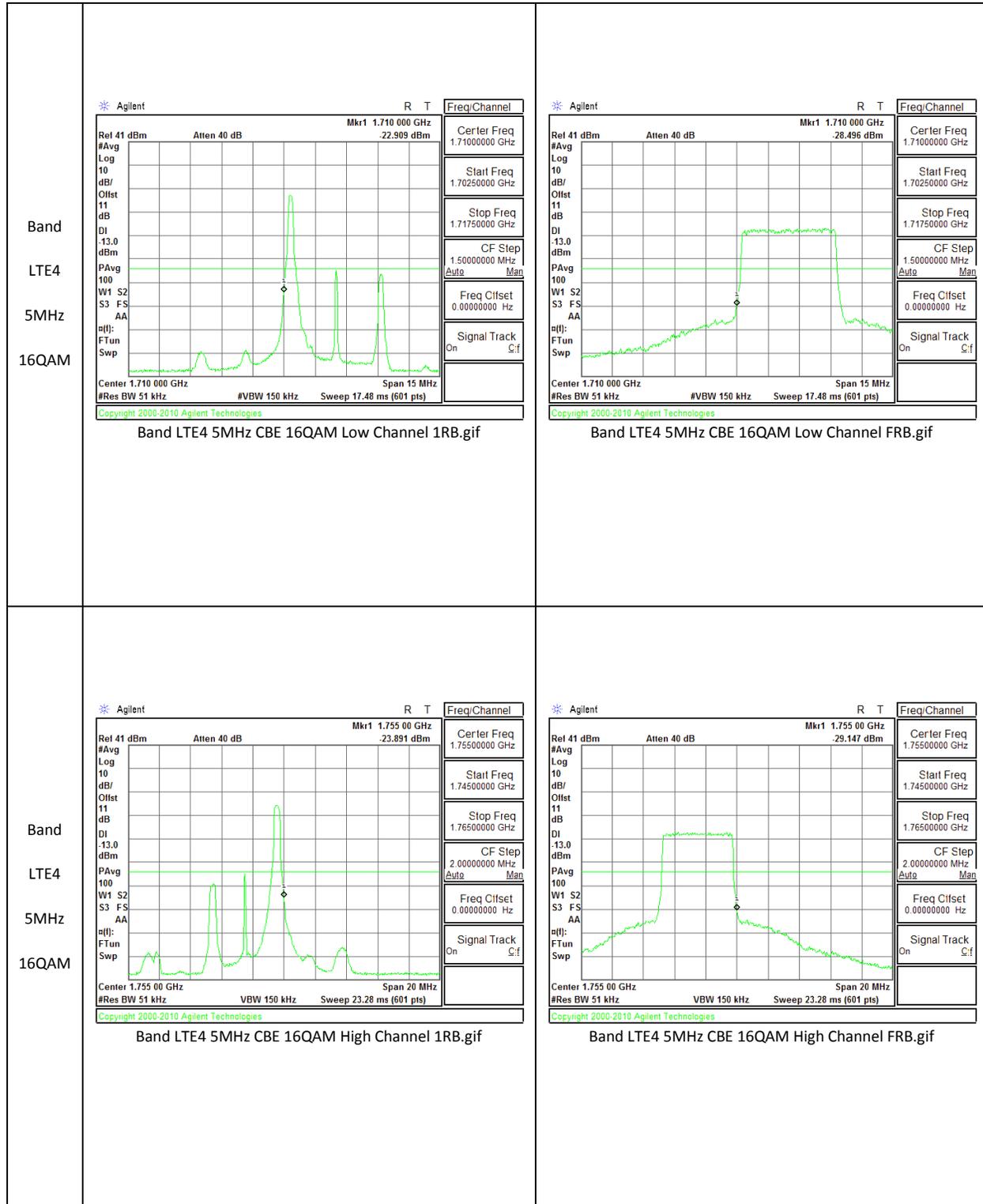


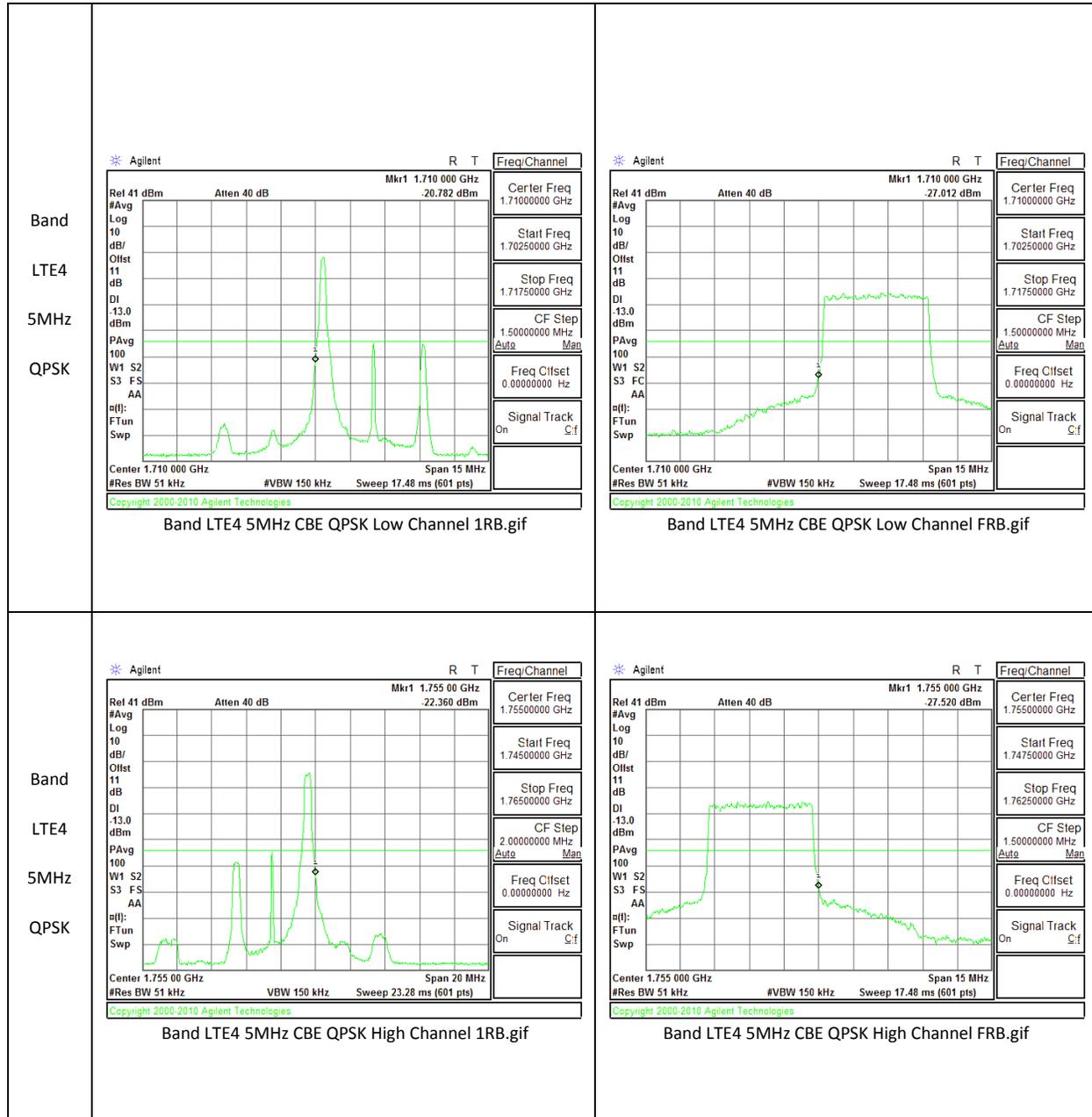


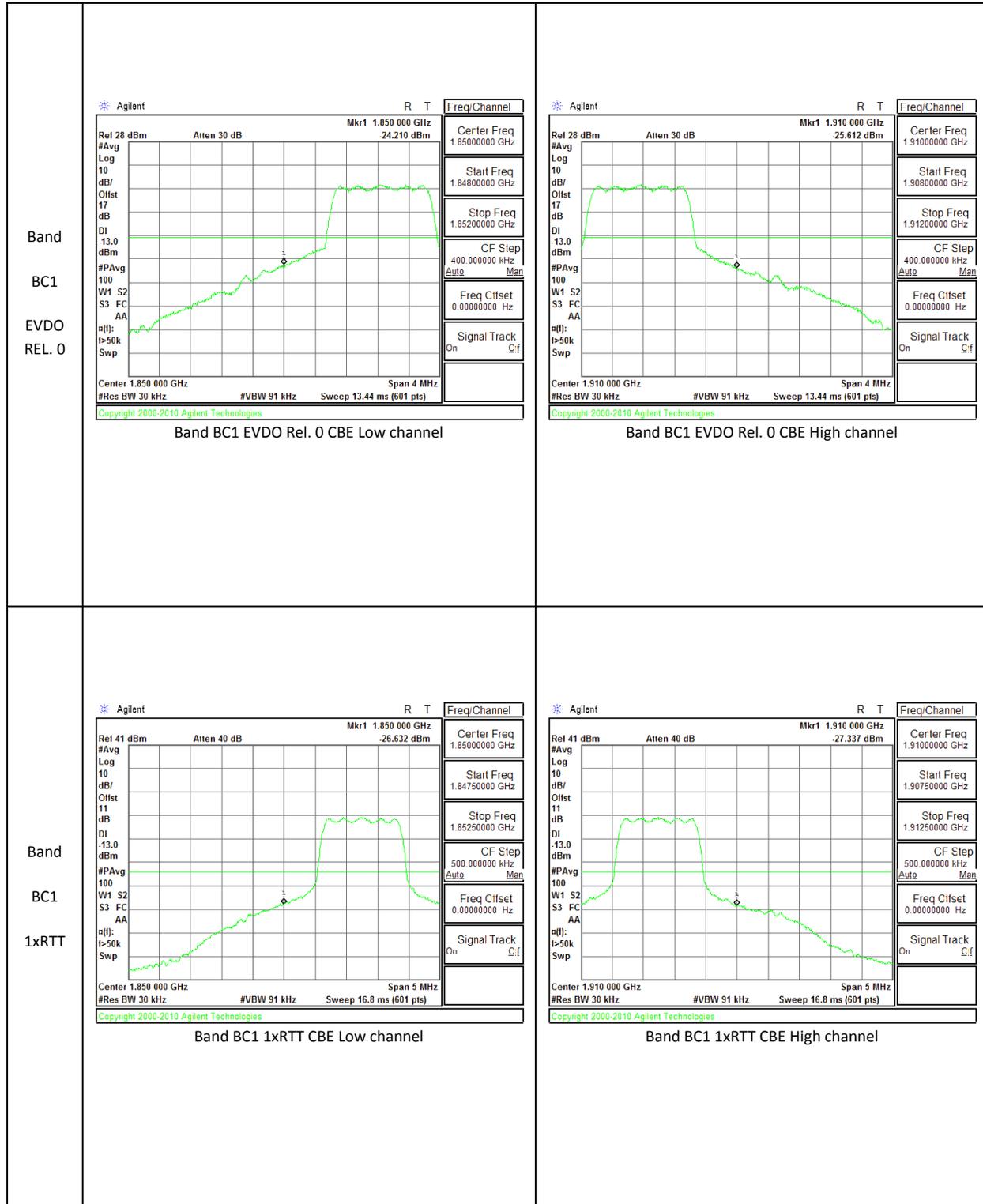


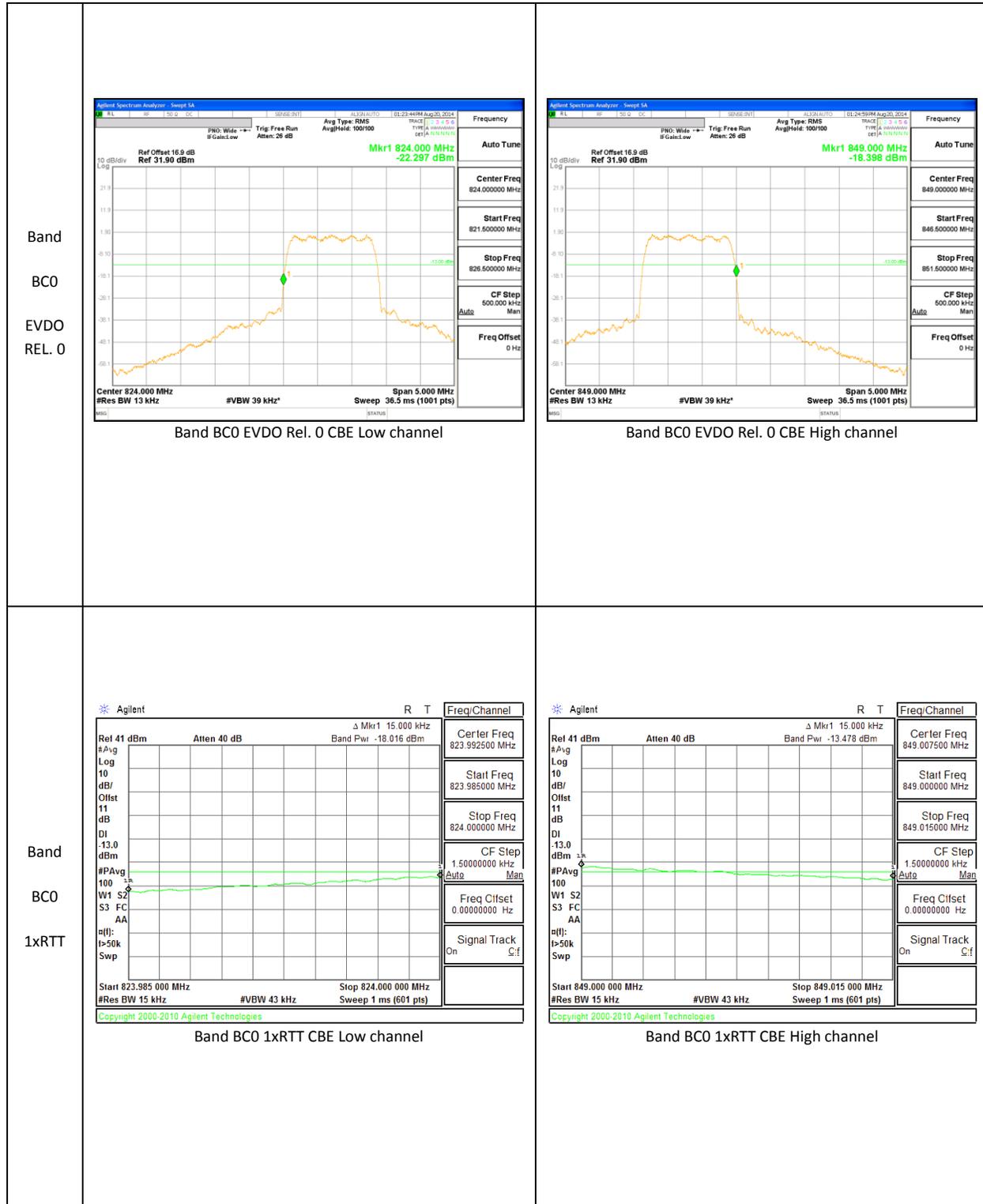
<p>Band LTE4 10MHz 16QAM</p>	 <p>Agilent Spectrum Analyzer - Sweep SA</p> <p>Center Freq 1.71000000 GHz Start Freq 1.70000000 GHz Stop Freq 1.72000000 GHz CF Step 2.000000 MHz Freq Offset 0 Hz</p> <p>Mkr1 1.710 00 GHz -37.041 dBm</p> <p>Center 1.71000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 1.93 ms (1001 pts)</p> <p>Band LTE4 10MHz CBE 16QAM Low Channel 1RB.gif</p>	 <p>Agilent R T Freq/Channel</p> <p>Rel 41 dBm Atten 40 dB Mkr1 1.710 00 GHz -31.596 dBm</p> <p>Center Freq 1.71000000 GHz Start Freq 1.70000000 GHz Stop Freq 1.72000000 GHz CF Step 2.00000000 MHz Freq Offset 0.00000000 Hz Signal Track On</p> <p>Center 1.710 00 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 6.08 ms (601 pts)</p> <p>Band LTE4 10MHz CBE 16QAM Low Channel FRB.gif</p>
<p>Band LTE4 10MHz 16QAM</p>	 <p>Agilent R T Freq/Channel</p> <p>Rel 41 dBm Atten 40 dB Mkr1 1.755 00 GHz -31.508 dBm</p> <p>Center Freq 1.75500000 GHz Start Freq 1.74500000 GHz Stop Freq 1.76500000 GHz CF Step 2.00000000 MHz Freq Offset 0.00000000 Hz Signal Track On</p> <p>Center 1.755 00 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 6.08 ms (601 pts)</p> <p>Band LTE4 10MHz CBE 16QAM High Channel 1RB.gif</p>	 <p>Agilent R T Freq/Channel</p> <p>Rel 41 dBm Atten 40 dB Mkr1 1.755 00 GHz -32.006 dBm</p> <p>Center Freq 1.75500000 GHz Start Freq 1.74500000 GHz Stop Freq 1.76500000 GHz CF Step 2.00000000 MHz Freq Offset 0.00000000 Hz Signal Track On</p> <p>Center 1.755 00 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 6.08 ms (601 pts)</p> <p>Band LTE4 10MHz CBE 16QAM High Channel FRB.gif</p>











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

10.3.1. OUT OF BAND EMISSIONS RESULT

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE13	10	QPSK	782	-26.04	-13	-13.04
			782	-26.04	-13	-13.04
			782	-26.04	-13	-13.04
		16QAM	782	-27.23	-13	-14.23
			782	-27.23	-13	-14.23
			782	-27.23	-13	-14.23

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	20	QPSK	1720	-27.87	-13	-14.87
			1732.5	-27.92	-13	-14.92
			1745	-27.75	-13	-14.75
		16QAM	1720	-27.77	-13	-14.77
			1732.5	-27.78	-13	-14.78
			1745	-28.40	-13	-15.40

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	15	QPSK	1717.5	-26.05	-13	-13.05
			1732.5	-26.55	-13	-13.55
			1747.5	-26.34	-13	-13.34
		16QAM	1717.5	-26.99	-13	-13.99
			1732.5	-25.97	-13	-12.97
			1747.5	-25.10	-13	-12.10

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	10	QPSK	1715	-25.59	-13	-12.59
			1732.5	-27.40	-13	-14.40
			1750	-24.70	-13	-11.70
		16QAM	1715	-26.41	-13	-13.41
			1732.5	-25.55	-13	-12.55
			1750	-25.85	-13	-12.85

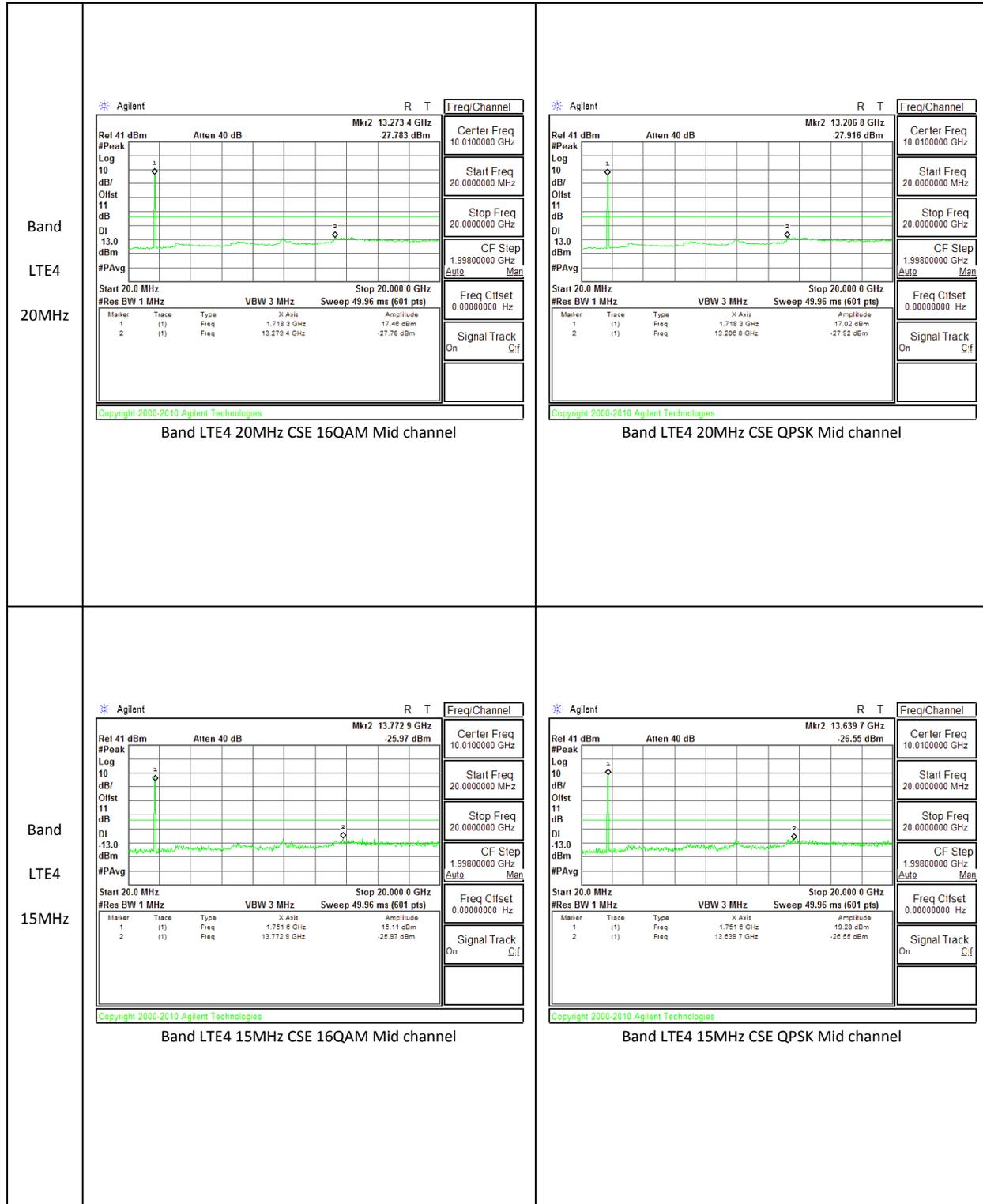
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	5	QPSK	1712.5	-27.74	-13	-14.74
			1732.5	-25.84	-13	-12.84
			1752.5	-26.83	-13	-13.83
		16QAM	1712.5	-25.80	-13	-12.80
			1732.5	-26.38	-13	-13.38
			1752.5	-26.51	-13	-13.51

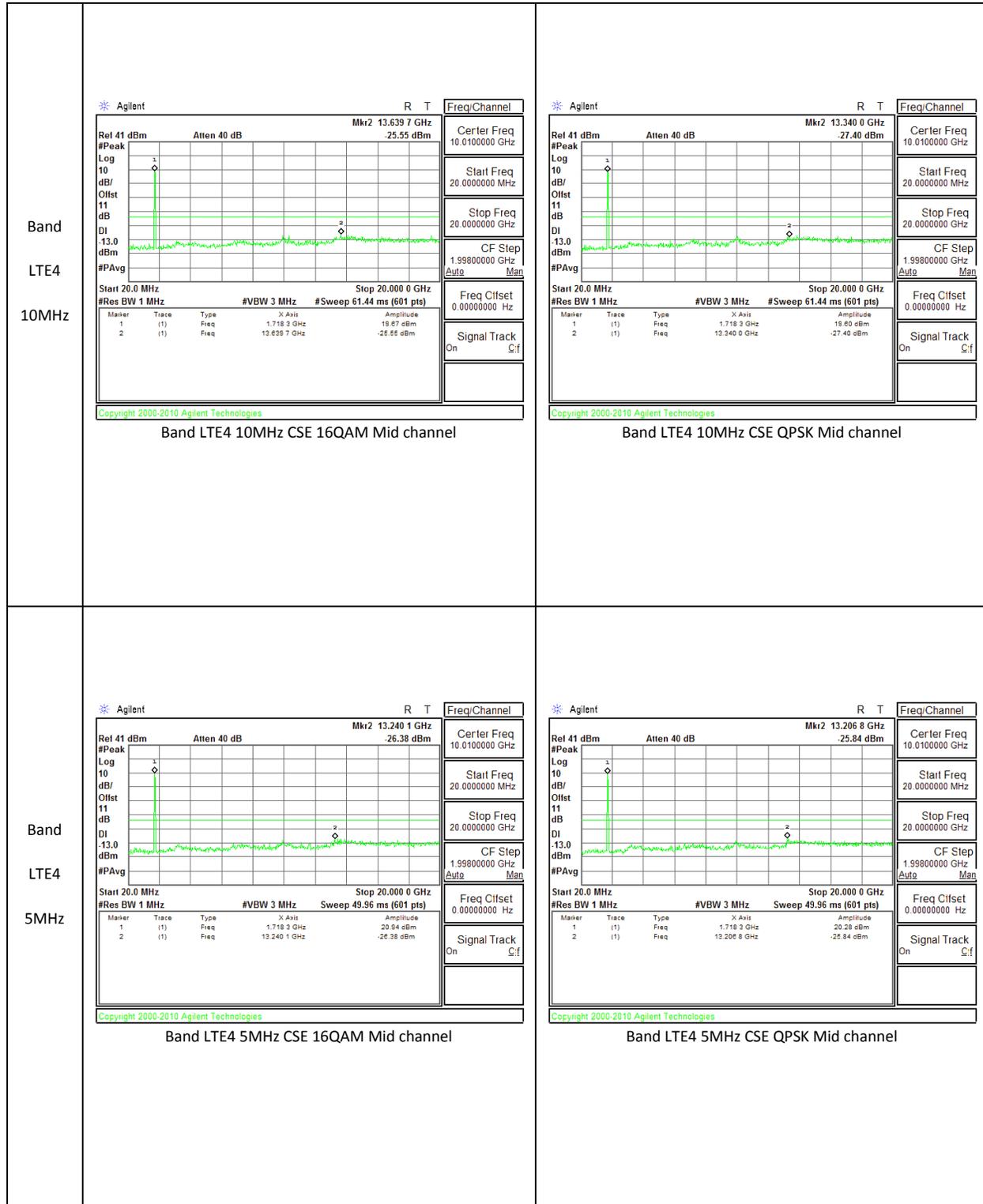
Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
BC0	1xRTT	824.7	-27.12	-13	-14.12
		836.52	-26.85	-13	-13.85
		848.31	-24.16	-13	-11.16
BC1	1xRTT	1851.25	-28.05	-13	-15.05
		1880	-27.97	-13	-14.97
		1908.75	-27.72	-13	-14.72

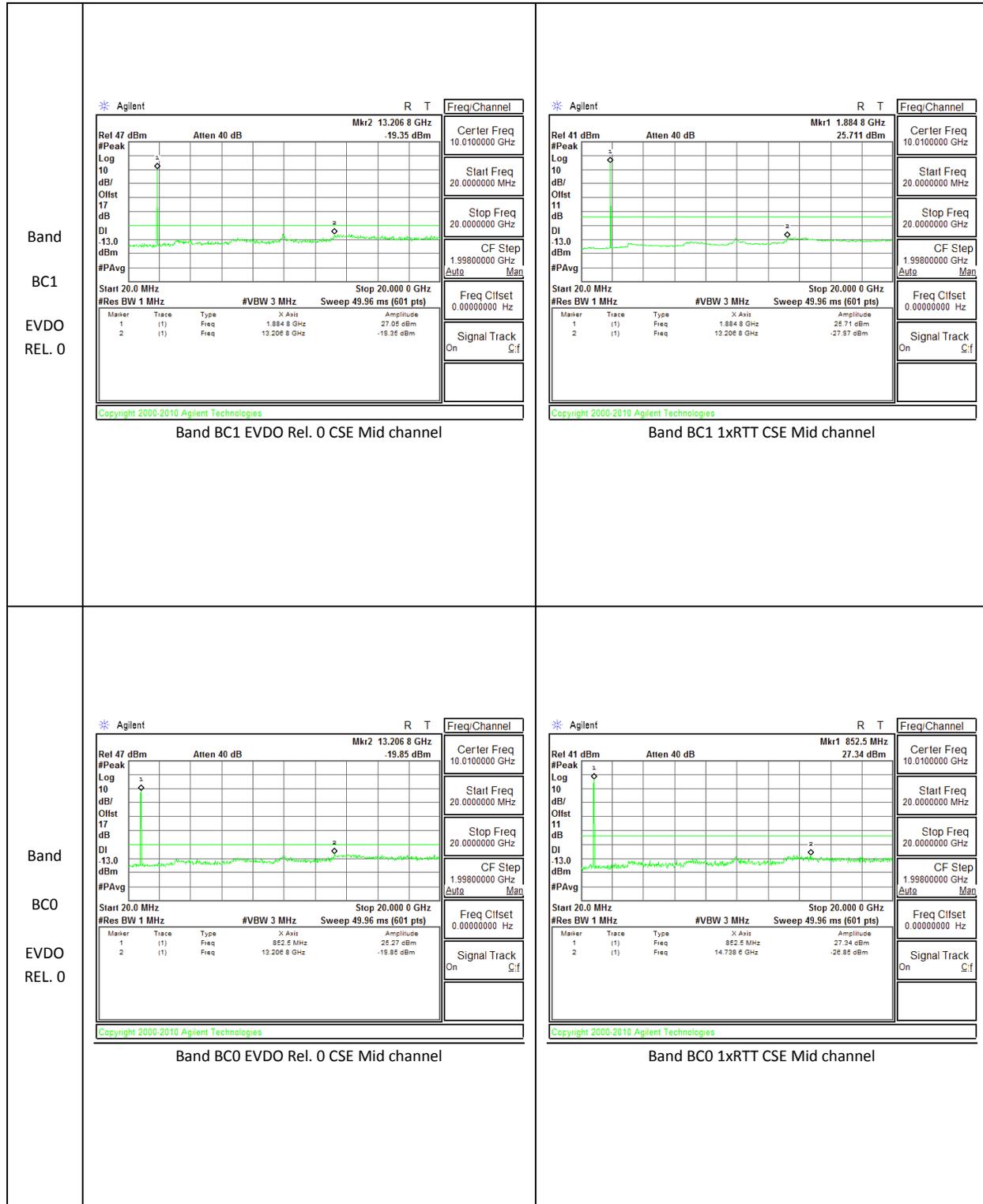
Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
BC0	EVDO	824.7	-19.43	-13	-6.43
		836.52	-19.85	-13	-6.85
		848.31	-18.97	-13	-5.97
BC1	EVDO	1851.25	-19.37	-13	-6.37
		1880	-19.35	-13	-6.35
		1908.75	-19.92	-13	-6.92

10.3.2. OUT OF BAND EMISSIONS PLOTS









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

10.4.1. FREQUENCY STABILITY RESULTS

CELL, CDMA MODULATION – MID CHANNEL

Reference Frequency: CDMA2000_Mid Channe 836.520001 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.300 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.520003	-0.002	2.5
3.80	40	836.520002	-0.001	2.5
3.80	30	836.520001	0.000	2.5
3.80	20	836.520001	0	2.5
3.80	10	836.520000	0.001	2.5
3.80	0	836.520000	0.001	2.5
3.80	-10	836.519997	0.005	2.5
3.80	-20	836.519993	0.010	2.5
3.8	-30	836.519992	0.011	2.5

Reference Frequency: CDMA2000_Mid channel 836.520001 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.300 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	836.520001	0	2.5
4.30	20	836.520000	0.001	2.5
3.40	20	836.520003	-0.002	2.5

PCS, CDMA MODULATION – MID CHANNEL BC1

Reference Frequency: PCS Mid Channel 1880.000036MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000010	0.001	2.5
3.80	40	1880.000014	-0.001	2.5
3.80	30	1880.000011	0.001	2.5
3.80	20	1880.000012	0	2.5
3.80	10	1880.000011	0.001	2.5
3.80	0	1880.000011	0.001	2.5
3.80	-10	1880.000009	0.002	2.5
3.80	-20	1880.000010	0.001	2.5
3.8	-30	1880.000012	0.000	2.5

Reference Frequency: PCS Mid Channel 1880.000004MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	1880.000012	0.00000	2.5
4.30	20	1880.000010	0.00106	2.5
3.40	20	1880.000013	-0.00053	2.5

LTE BAND 4 – MID CHANNEL

Reference Frequency: PCS Mid Channel 1732.500012MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4331.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1732.500019	-0.003	2.5
3.80	40	1732.500015	-0.001	2.5
3.80	30	1732.500018	-0.003	2.5
3.80	20	1732.500013	0	2.5
3.80	10	1732.500015	-0.001	2.5
3.80	0	1732.500016	-0.002	2.5
3.80	-10	1732.500013	0.000	2.5
3.80	-20	1732.500010	0.002	2.5
3.80	-30	1732.500012	0.001	2.5

Reference Frequency: PCS Mid Channel 1732.500012 MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4331.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	1732.500013	0.00000	2.5
4.30	20	1732.500020	-0.00404	2.5
3.40	20	1732.500011	0.00115	2.5

LTE BAND 13 – MID CHANNEL

Reference Frequency: Mid Channel 782.000031 MHz @ 20°C				
Limit: within the authorized block or +- 2.5 ppm = 1955.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	782.000006	0.001	2.5
3.80	40	781.999995	0.015	2.5
3.80	30	782.000004	0.003	2.5
3.80	20	782.000007	0	2.5
3.80	10	782.000006	0.001	2.5
3.80	0	782.000005	0.002	2.5
3.80	-10	782.000006	0.002	2.5
3.80	-20	782.000006	0.001	2.5
3.80	-30	782.000005	0.002	2.5

Reference Frequency: Mid Channel 782.000031 MHz @ 20°C				
Limit: within the authorized block or +- 2.5 ppm = 1955.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	782.000007	0.00000	2.5
4.30	20	782.000006	0.00115	2.5
3.40	20	782.000005	0.00225	2.5

RADIATED TEST RESULTS

10.5. 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

10.5.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
BC1	1xRTT	25	1851.25	24.914	310.03
		600	1880	25.417	348.10
		1175	1908.75	24.875	307.26
	EVDO REL. 0	25	1851.25	20.576	114.18
		600	1880	20.913	123.40
		1175	1908.75	20.175	104.11
	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	22.221	166.76
		384	836.52	21.625	145.38
		777	848.31	21.269	133.94
	EVDO REL. 0	1013	824.7	18.152	65.34
		384	836.52	17.802	60.28
		777	848.31	17.874	61.29
	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	21.00	125.89
			1/0	782	21.00	125.89
			1/0	782	21.00	125.89
		16QAM	1/0	782	20.55	113.50
			1/0	782	20.55	113.50
			1/0	782	20.55	113.50

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	20	QPSK	1/0	1720	23.97	249.46
			1/0	1732.5	21.74	149.28
			1/0	1745	23.02	200.45
		16QAM	1/0	1720	23.20	208.93
			1/0	1732.5	21.01	126.18
			1/0	1745	22.31	170.22

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	15	QPSK	1/0	1717.5	23.75	237.14
			1/0	1732.5	23.24	210.86
			1/0	1747.5	23.43	220.29
		16QAM	1/0	1717.5	22.68	185.35
			1/0	1732.5	22.32	170.61
			1/0	1747.5	22.45	175.79

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	10	QPSK	1/0	1715	22.20	165.96
			1/0	1732.5	22.32	170.61
			1/0	1750	23.42	219.79
		16QAM	1/0	1715	21.26	133.66
			1/0	1732.5	21.43	139.00
			1/0	1750	22.32	170.61

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	5	QPSK	1/0	1712.5	22.36	172.19
			1/0	1732.5	23.32	214.78
			1/0	1752.5	22.82	191.43
		16QAM	1/0	1712.5	21.61	144.88
			1/0	1732.5	22.41	174.18
			1/0	1752.5	21.58	143.88

10.5.3. ERP/EIRP PLOTS

Band LTE13 10MHz 16QAM	High Frequency Substitution Measurement Compliance Certification Services Chamber F																																																																																										
	<p> Company: LG Electronics Project #: 14U18508 Date: 08/12/14 Test Engineer: J. Semana Configuration: EUT only Mode: LTE 13 B10 16QAM </p>																																																																																										
	<p> Test Equipment: Receiving: Sunol T243, and Chamber B Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 208955002) Warehouse. </p>																																																																																										
	<table border="1"> <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 (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Margin (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>n/a</td> <td></td> <td>V</td> <td></td> <td>0.0</td> <td></td> <td>38.5</td> <td></td> <td></td> </tr> <tr> <td>n/a</td> <td></td> <td>H</td> <td></td> <td>0.0</td> <td></td> <td>38.5</td> <td></td> <td></td> </tr> <tr> <td colspan="9">Mid ch</td> </tr> <tr> <td>782.00</td> <td>11.69</td> <td>V</td> <td></td> <td>0.0</td> <td>11.69</td> <td>38.5</td> <td>-26.8</td> <td></td> </tr> <tr> <td>782.00</td> <td>20.55</td> <td>H</td> <td></td> <td>0.0</td> <td>20.55</td> <td>38.5</td> <td>-17.9</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>n/a</td> <td></td> <td>V</td> <td></td> <td>0.0</td> <td></td> <td>38.5</td> <td></td> <td></td> </tr> <tr> <td>n/a</td> <td></td> <td>H</td> <td></td> <td>0.0</td> <td></td> <td>38.5</td> <td></td> <td></td> </tr> </tbody> </table>	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		0.0		38.5			n/a		H		0.0		38.5			Mid ch									782.00	11.69	V		0.0	11.69	38.5	-26.8		782.00	20.55	H		0.0	20.55	38.5	-17.9		High Ch									n/a		V		0.0		38.5			n/a		H		0.0		38.5		
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																			
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	<p> Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm </p>																																																																																										

Band LTE13 10MHz QPSK	High Frequency Substitution Measurement Compliance Certification Services Chamber F								
	Company: LG Electronics Project #: 14U18508 Date: 08/12/14 Test Engineer: J. Semana Configuration: EUT only Mode: LTE 13 B10 QPSK								
	Test Equipment: Receiving: T243, and Chamber B Cable (Setup this one for testing EUT) 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		0.0		38.5		
	n/a		H		0.0		38.5		
	Mid ch								
	782.00	15.21	V		0.0	15.21	38.5	-23.2	
	782.00	21.00	H		0.0	21.00	38.5	-17.4	
High Ch									
n/a		V		0.0		38.5			
n/a		H		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 16QAM	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C								
	Company:		LG						
	Project #:		14U18508						
	Date:		08/12/14						
	Test Engineer:		G. Chan, L. Lee						
	Configuration:		X-Pos EUT						
	Mode:		LTE4 20MHz 16QAM						
	Test Equipment:								
	Receiving: Horn T119, and Chamber C SMA Cables								
	Substitution: Horn T217 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								
	1720.00	13.43	V	0.8	6.7	19.33	30.0	-10.7	
	1720.00	17.30	H	0.8	6.7	23.20	30.0	-6.8	
	Mid Ch								
	1732.50	8.50	V	0.8	6.7	14.40	30.0	-15.6	
	1732.50	15.11	H	0.8	6.7	21.01	30.0	-9.0	
	High Ch								
	1745.00	12.56	V	0.8	6.7	18.46	30.0	-11.5	
	1745.00	16.41	H	0.8	6.7	22.31	30.0	-7.7	
	Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								

Band LTE4 20MHz QPSK	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C								
	Company: LG Project #: 14U18508 Date: 08/12/14 Test Engineer: G. Chan, L. Lee Configuration: X-Pos EUT Mode: LTE4 20MHz QPSK								
	Test Equipment: Receiving: Horn T119, and Chamber C SMA Cables Substitution: Horn T217 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								
	1720.00	14.47	V	0.8	6.7	20.37	30.0	-9.6	
	1720.00	18.07	H	0.8	6.7	23.97	30.0	-6.0	
	Mid Ch								
	1732.50	9.12	V	0.8	6.7	15.02	30.0	-15.0	
	1732.50	15.84	H	0.8	6.7	21.74	30.0	-8.3	
High Ch									
1745.00	13.36	V	0.8	6.7	19.26	30.0	-10.7		
1745.00	17.12	H	0.8	6.7	23.02	30.0	-7.0		
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm									

Band LTE4 15MHz 16QAM	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C								
	Company:		LG						
	Project #:		14U18508						
	Date:		08/12/14						
	Test Engineer:		G. Chan, L. Lee						
	Configuration:		X-Pos EUT						
	Mode:		LTE4 15MHz 16QAM						
	Test Equipment:								
	Receiving: Horn T119, and Chamber C SMA Cables								
	Substitution: Horn T217 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	13.75	V	0.8	6.7	19.65	30.0	-10.4	
	1717.50	16.78	H	0.8	6.7	22.68	30.0	-7.3	
	Mid Ch								
	1732.50	14.72	V	0.8	6.7	20.62	30.0	-9.4	
	1732.50	16.42	H	0.8	6.7	22.32	30.0	-7.7	
	High Ch								
	1747.50	14.72	V	0.8	6.7	20.62	30.0	-9.4	
	1747.50	16.55	H	0.8	6.7	22.45	30.0	-7.6	
	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 C								
	Company :		LG						
	Project #:		14U18508						
	Date:		08/12/14						
	Test Engineer:		G. Chan, L. Lee						
	Configuration:		X-Pos EUT						
	Mode:		LTE4 15MHz QPSK						
	Test Equipment:								
	Receiving: Horn T119, and Chamber C SMA Cables								
	Substitution: Horn T217 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								
	1717.50	15.05	V	0.8	6.7	20.95	30.0	-9.1	
	1717.50	17.85	H	0.8	6.7	23.75	30.0	-6.3	
	Mid Ch								
	1732.50	15.74	V	0.8	6.7	21.64	30.0	-8.4	
	1732.50	17.34	H	0.8	6.7	23.24	30.0	-6.8	
	High Ch								
	1747.50	13.75	V	0.8	6.7	19.65	30.0	-10.4	
	1747.50	17.53	H	0.8	6.7	23.43	30.0	-6.6	
	Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								

Band LTE4 10MHz QPSK	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C																																																																																																	
	Company:		LG																																																																																															
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10.6. 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

10.6.1. SPURIOUS RADIATION PLOTS

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company:		LG								
Project #:		14U18508								
Date:		08/25/14								
Test Engineer:		T.Oeur								
Configuration:		X-Pos EUT w/ AC charger, headset								
Mode:		LTE 13 BW10 16QAM								
Chamber		Pre-amplifier		Filter		Limit				
5m Chamber B		T34 8449B		Filter 1		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
	Low Ch, N/A									
LTE13	N/A		V					-13.0		
	N/A		V					-13.0		
	N/A		V					-13.0		
10MHz	N/A		H					-13.0		
	N/A		H					-13.0		
	N/A		H					-13.0		
16QAM	Mid Ch, 782MHz									
	1.564	-31.3	V	3.0	37.5	1.0	-67.9	-13.0	-54.9	
	2.346	-24.4	V	3.0	36.5	1.0	-59.9	-13.0	-46.9	
	3.128	-22.4	V	3.0	36.0	1.0	-57.4	-13.0	-44.4	
	1.564	-30.7	H	3.0	37.5	1.0	-67.2	-13.0	-54.2	
	2.346	-25.7	H	3.0	36.5	1.0	-61.2	-13.0	-48.2	
	3.128	-22.0	H	3.0	36.0	1.0	-56.9	-13.0	-43.9	
	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.										

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company:		LG								
Project #:		14U18508								
Date:		08/25/14								
Test Engineer:		T.Oeur								
Configuration:		X-Pos EUT w/ AC charger, headset								
Mode:		LTE 13 BW10 QPSK								
Chamber		Pre-amplifier		Filter		Limit				
5m Chamber B		T34 8449B		Filter 1		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
	Low Ch, N/A									
LTE13	N/A		V					-13.0		
	N/A		V					-13.0		
	N/A		V					-13.0		
10MHz	N/A		H					-13.0		
	N/A		H					-13.0		
	N/A		H					-13.0		
QPSK	Mid Ch, 782MHz									
	1.564	-31.0	V	3.0	37.5	1.0	-67.5	-13.0	-54.5	
	2.346	-24.6	V	3.0	36.5	1.0	-60.1	-13.0	-47.1	
	3.128	-21.9	V	3.0	36.0	1.0	-56.8	-13.0	-43.8	
	1.564	-30.2	H	3.0	37.5	1.0	-66.7	-13.0	-53.7	
	2.346	-26.1	H	3.0	36.5	1.0	-61.6	-13.0	-48.6	
	3.128	-22.2	H	3.0	36.0	1.0	-57.1	-13.0	-44.1	
	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.										

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 14U18508
Date: 08/12/14
Test Engineer: G. Chan, L. Lee
Configuration: X-Pos EUT w/ AC charger, headset
Mode: LTE4 20MHz 16QAM

Chamber
 3m Chamber

Pre-amplifier
 T34 8449B

Filter
 Filter 1

Limit
 Part 27

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, 1720.0MHz									
LTE4	3.440	-20.1	V	3.0	35.7	1.0	-54.7	-13.0	-41.7	
	5.160	-16.4	V	3.0	34.7	1.0	-50.1	-13.0	-37.1	
	6.880	-12.1	V	3.0	34.8	1.0	-46.0	-13.0	-33.0	
20MHz	3.440	-20.3	H	3.0	35.7	1.0	-55.0	-13.0	-42.0	
	5.160	-15.9	H	3.0	34.7	1.0	-49.6	-13.0	-36.6	
	6.880	-11.2	H	3.0	34.8	1.0	-45.0	-13.0	-32.0	
16QAM	Mid Ch, 1732.5MHz									
	3.465	-20.0	V	3.0	35.6	1.0	-54.6	-13.0	-41.6	
	5.198	-16.0	V	3.0	34.7	1.0	-49.7	-13.0	-36.7	
	6.930	-11.6	V	3.0	34.8	1.0	-45.4	-13.0	-32.4	
	3.465	-20.2	H	3.0	35.6	1.0	-54.8	-13.0	-41.8	
	5.198	-15.5	H	3.0	34.7	1.0	-49.2	-13.0	-36.2	
	6.930	-10.6	H	3.0	34.8	1.0	-44.4	-13.0	-31.4	
	High Ch, 1745.0MHz									
	3.490	-20.2	V	3.0	35.6	1.0	-54.9	-13.0	-41.9	
	5.235	-15.8	V	3.0	34.7	1.0	-49.5	-13.0	-36.5	
	6.980	-11.2	V	3.0	34.8	1.0	-45.1	-13.0	-32.1	
	3.490	-20.2	H	3.0	35.6	1.0	-54.8	-13.0	-41.8	
5.235	-15.3	H	3.0	34.7	1.0	-49.0	-13.0	-36.0		
6.980	-10.3	H	3.0	34.8	1.0	-44.2	-13.0	-31.2		

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

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 14U18508
Date: 08/12/14
Test Engineer: G. Chan, L. Lee
Configuration: X-Pos EUT w/ AC charger, headset
Mode: LTE4 20MHz QPSK

Chamber

3m Chamber

Pre-amplifier

T34 8449B

Filter

Filter 1

Limit

Part 27

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, 1720.0MHz									
LTE4	3.440	-20.1	V	3.0	35.7	1.0	-54.7	-13.0	-41.7	
	5.160	-16.3	V	3.0	34.7	1.0	-50.0	-13.0	-37.0	
	6.880	-12.1	V	3.0	34.8	1.0	-46.0	-13.0	-33.0	
20MHz	3.440	-20.4	H	3.0	35.7	1.0	-55.1	-13.0	-42.1	
	5.160	-15.9	H	3.0	34.7	1.0	-49.6	-13.0	-36.6	
	6.880	-11.2	H	3.0	34.8	1.0	-45.0	-13.0	-32.0	
QPSK	Mid Ch, 1732.5MHz									
	3.465	-20.1	V	3.0	35.6	1.0	-54.7	-13.0	-41.7	
	5.198	-15.9	V	3.0	34.7	1.0	-49.6	-13.0	-36.6	
	6.930	-11.5	V	3.0	34.8	1.0	-45.4	-13.0	-32.4	
	3.465	-20.1	H	3.0	35.6	1.0	-54.7	-13.0	-41.7	
	5.198	-15.6	H	3.0	34.7	1.0	-49.3	-13.0	-36.3	
	6.930	-10.6	H	3.0	34.8	1.0	-44.5	-13.0	-31.5	
	High Ch, 1745.0MHz									
	3.490	-20.1	V	3.0	35.6	1.0	-54.7	-13.0	-41.7	
	5.235	-15.8	V	3.0	34.7	1.0	-49.5	-13.0	-36.5	
	6.980	-11.3	V	3.0	34.8	1.0	-45.2	-13.0	-32.2	
	3.490	-20.2	H	3.0	35.6	1.0	-54.8	-13.0	-41.8	
	5.235	-15.3	H	3.0	34.7	1.0	-49.0	-13.0	-36.0	
	6.980	-10.3	H	3.0	34.8	1.0	-44.2	-13.0	-31.2	

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

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company:		LG								
Project #:		14U18508								
Date:		08/12/14								
Test Engineer:		G. Chan, L. Lee								
Configuration:		X-Pos EUT w/ AC charger, headset								
Mode:		LTE4 15MHz 16QAM								
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber		T34 8449B		Filter 1		Part 27				
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, 1717.5MHz									
LTE4	3.435	-21.2	V	3.0	35.7	1.0	-55.8	-13.0	-42.8	
	5.153	-17.6	V	3.0	34.7	1.0	-51.3	-13.0	-38.3	
	6.870	-13.3	V	3.0	34.8	1.0	-47.1	-13.0	-34.1	
15MHz	3.435	-21.1	H	3.0	35.7	1.0	-55.7	-13.0	-42.7	
	5.153	-16.0	H	3.0	34.7	1.0	-49.8	-13.0	-36.8	
	6.870	-13.7	H	3.0	34.8	1.0	-47.6	-13.0	-34.6	
16QAM	Mid Ch, 1732.5MHz									
	3.465	-21.1	V	3.0	35.6	1.0	-55.7	-13.0	-42.7	
	5.198	-17.2	V	3.0	34.7	1.0	-50.9	-13.0	-37.9	
	6.930	-12.9	V	3.0	34.8	1.0	-46.7	-13.0	-33.7	
	3.465	-21.3	H	3.0	35.6	1.0	-56.0	-13.0	-43.0	
	5.198	-16.9	H	3.0	34.7	1.0	-50.5	-13.0	-37.5	
	6.930	-11.9	H	3.0	34.8	1.0	-45.7	-13.0	-32.7	
	High Ch, 1747.5MHz									
	3.495	-21.2	V	3.0	35.6	1.0	-55.8	-13.0	-42.8	
	5.243	-17.5	V	3.0	34.7	1.0	-51.2	-13.0	-38.2	
	6.990	-12.2	V	3.0	34.8	1.0	-46.0	-13.0	-33.0	
	3.495	-21.5	H	3.0	35.6	1.0	-56.1	-13.0	-43.1	
	5.243	-16.5	H	3.0	34.7	1.0	-50.2	-13.0	-37.2	
	6.990	-11.2	H	3.0	34.8	1.0	-45.1	-13.0	-32.1	
Rev. 03.03.09										
Note: No other emissions were detected above the system noise floor.										

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 14U18508
Date: 08/12/14
Test Engineer: G. Chan, L. Lee
Configuration: X-Pos EUT w/ AC charger, headset
Mode: LTE4 15MHz QPSK

Chamber
 3m Chamber

Pre-amplifier
 T34 8449B

Filter
 Filter 1

Limit
 Part 27

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, 1717.5MHz									
LTE4	3.435	-21.2	V	3.0	35.7	1.0	-55.8	-13.0	-42.8	
	5.153	-17.6	V	3.0	34.7	1.0	-51.3	-13.0	-38.3	
	6.870	-13.3	V	3.0	34.8	1.0	-47.1	-13.0	-34.1	
15MHz	3.435	-21.1	H	3.0	35.7	1.0	-55.8	-13.0	-42.8	
	5.153	-18.5	H	3.0	34.7	1.0	-52.2	-13.0	-39.2	
	6.870	-12.3	H	3.0	34.8	1.0	-46.2	-13.0	-33.2	
QPSK	Mid Ch, 1732.5MHz									
	3.465	-21.0	V	3.0	35.6	1.0	-55.7	-13.0	-42.7	
	5.198	-17.2	V	3.0	34.7	1.0	-50.9	-13.0	-37.9	
	6.930	-12.9	V	3.0	34.8	1.0	-46.7	-13.0	-33.7	
	3.465	-21.7	H	3.0	35.6	1.0	-56.4	-13.0	-43.4	
	5.198	-15.4	H	3.0	34.7	1.0	-49.1	-13.0	-36.1	
	6.930	-13.0	H	3.0	34.8	1.0	-46.8	-13.0	-33.8	
	High Ch, 1747.5MHz									
	3.495	-21.4	V	3.0	35.6	1.0	-56.0	-13.0	-43.0	
	5.243	-16.9	V	3.0	34.7	1.0	-50.6	-13.0	-37.6	
	6.990	-12.2	V	3.0	34.8	1.0	-46.1	-13.0	-33.1	
	3.495	-21.7	H	3.0	35.6	1.0	-56.3	-13.0	-43.3	
	5.243	-16.4	H	3.0	34.7	1.0	-50.1	-13.0	-37.1	
	6.990	-11.2	H	3.0	34.8	1.0	-45.1	-13.0	-32.1	

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

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company:		LG								
Project #:		14U18508								
Date:		08/12/14								
Test Engineer:		G. Chan, L. Lee								
Configuration:		X-Pos EUT w/ AC charger, headset								
Mode:		LTE4 10MHz 16QAM								
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber		T34 8449B		Filter 1		Part 27				
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, 1715.0MHz									
LTE4	3.430	-22.7	V	3.0	35.7	1.0	-57.4	-13.0	-44.4	
	5.145	-19.5	V	3.0	34.7	1.0	-53.2	-13.0	-40.2	
	6.860	-15.1	V	3.0	34.8	1.0	-49.0	-13.0	-36.0	
10MHz	3.430	-22.8	H	3.0	35.7	1.0	-57.5	-13.0	-44.5	
	5.145	-20.3	H	3.0	34.7	1.0	-54.0	-13.0	-41.0	
	6.860	-14.1	H	3.0	34.8	1.0	-48.0	-13.0	-35.0	
16QAM	Mid Ch, 1732.5MHz									
	3.465	-22.8	V	3.0	35.6	1.0	-57.4	-13.0	-44.4	
	5.198	-18.9	V	3.0	34.7	1.0	-52.6	-13.0	-39.6	
	6.930	-14.6	V	3.0	34.8	1.0	-48.4	-13.0	-35.4	
	3.465	-23.0	H	3.0	35.6	1.0	-57.6	-13.0	-44.6	
	5.198	-19.8	H	3.0	34.7	1.0	-53.5	-13.0	-40.5	
	6.930	-13.6	H	3.0	34.8	1.0	-47.4	-13.0	-34.4	
	High Ch, 1750.0MHz									
	3.500	-23.4	V	3.0	35.6	1.0	-58.0	-13.0	-45.0	
	2.625	-26.3	V	3.0	36.3	1.0	-60.6	-13.0	-47.6	
	7.000	-14.0	V	3.0	34.8	1.0	-47.8	-13.0	-34.8	
	3.500	-23.2	H	3.0	35.6	1.0	-57.8	-13.0	-44.8	
	2.625	-26.9	H	3.0	36.3	1.0	-62.2	-13.0	-49.2	
	7.000	-12.9	H	3.0	34.8	1.0	-46.8	-13.0	-33.8	
Rev. 03.03.09										
Note: No other emissions were detected above the system noise floor.										

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company:		LG								
Project #:		14U18508								
Date:		08/12/14								
Test Engineer:		G. Chan, L. Lee								
Configuration:		X-Pos EUT w/ AC charger, headset								
Mode:		LTE4 10MHz QPSK								
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber		T34 8449B		Filter 1		Part 27				
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, 1715.0MHz									
LTE4	3.430	-22.7	V	3.0	35.7	1.0	-57.4	-13.0	-44.4	
	5.145	-19.5	V	3.0	34.7	1.0	-53.2	-13.0	-40.2	
	6.860	-15.1	V	3.0	34.8	1.0	-49.0	-13.0	-36.0	
10MHz	3.430	-22.9	H	3.0	35.7	1.0	-57.5	-13.0	-44.5	
	5.145	-19.4	H	3.0	34.7	1.0	-53.1	-13.0	-40.1	
	6.860	-14.2	H	3.0	34.8	1.0	-48.1	-13.0	-35.1	
QPSK	Mid Ch, 1732.5MHz									
	3.465	-22.8	V	3.0	35.6	1.0	-57.4	-13.0	-44.4	
	5.198	-18.9	V	3.0	34.7	1.0	-52.6	-13.0	-39.6	
	6.930	-14.6	V	3.0	34.8	1.0	-48.5	-13.0	-35.5	
	3.465	-22.9	H	3.0	35.6	1.0	-57.6	-13.0	-44.6	
	5.198	-18.4	H	3.0	34.7	1.0	-52.1	-13.0	-39.1	
	6.930	-13.6	H	3.0	34.8	1.0	-47.4	-13.0	-34.4	
	High Ch, 1750.0MHz									
	3.500	-23.4	V	3.0	35.6	1.0	-58.0	-13.0	-45.0	
	2.625	-25.3	V	3.0	36.3	1.0	-60.6	-13.0	-47.6	
	7.000	-14.0	V	3.0	34.8	1.0	-47.8	-13.0	-34.8	
	3.500	-23.0	H	3.0	35.6	1.0	-57.6	-13.0	-44.6	
	2.625	-27.3	H	3.0	36.3	1.0	-62.6	-13.0	-49.6	
	7.000	-13.7	H	3.0	34.8	1.0	-47.5	-13.0	-34.5	
Rev. 03.03.09										
Note: No other emissions were detected above the system noise floor.										

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 14U18508
Date: 08/12/14
Test Engineer: G. Chan, L. Lee
Configuration: X-Pos EUT w/ AC charger, headset
Mode: LTE4 5MHz 16QAM

Chamber

3m Chamber

Pre-amplifier

T34 8449B

Filter

Filter 1

Limit

Part 27

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, 1712.5MHz									
LTE4	3.425	-25.6	V	3.0	35.7	1.0	-60.2	-13.0	-47.2	
	5.138	-22.7	V	3.0	34.7	1.0	-56.4	-13.0	-43.4	
	6.850	-18.2	V	3.0	34.8	1.0	-52.0	-13.0	-39.0	
5MHz	3.425	-25.8	H	3.0	35.7	1.0	-60.5	-13.0	-47.5	
	5.138	-22.4	H	3.0	34.7	1.0	-56.1	-13.0	-43.1	
	6.850	-17.3	H	3.0	34.8	1.0	-51.1	-13.0	-38.1	
16QAM	Mid Ch, 1732.5MHz									
	3.465	-25.9	V	3.0	35.6	1.0	-60.5	-13.0	-47.5	
	5.198	-22.0	V	3.0	34.7	1.0	-55.7	-13.0	-42.7	
	6.930	-17.7	V	3.0	34.8	1.0	-51.6	-13.0	-38.6	
	3.465	-26.1	H	3.0	35.6	1.0	-60.8	-13.0	-47.8	
	5.198	-23.4	H	3.0	34.7	1.0	-57.1	-13.0	-44.1	
	6.930	-16.6	H	3.0	34.8	1.0	-50.4	-13.0	-37.4	
	High Ch, 1752.5MHz									
	3.505	-26.3	V	3.0	35.6	1.0	-60.9	-13.0	-47.9	
5.258	-21.9	V	3.0	34.7	1.0	-55.6	-13.0	-42.6		
7.010	-17.2	V	3.0	34.8	1.0	-51.0	-13.0	-38.0		
3.505	-26.4	H	3.0	35.6	1.0	-61.0	-13.0	-48.0		
5.258	-22.5	H	3.0	34.7	1.0	-56.2	-13.0	-43.2		
7.010	-16.2	H	3.0	34.8	1.0	-50.0	-13.0	-37.0		

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

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 14U18508
Date: 08/12/14
Test Engineer: G. Chan, L. Lee
Configuration: X-Pos EUT w/ AC charger, headset
Mode: LTE4 5MHz QPSK

Chamber
 3m Chamber

Pre-amplifier
 T34 8449B

Filter
 Filter 1

Limit
 Part 27

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, 1712.5MHz									
LTE4	3.425	-25.5	V	3.0	35.7	1.0	-60.2	-13.0	-47.2	
	5.138	-22.7	V	3.0	34.7	1.0	-56.4	-13.0	-43.4	
	6.850	-18.2	V	3.0	34.8	1.0	-52.0	-13.0	-39.0	
5MHz	3.425	-25.7	H	3.0	35.7	1.0	-60.4	-13.0	-47.4	
	5.138	-22.3	H	3.0	34.7	1.0	-56.0	-13.0	-43.0	
	6.850	-17.2	H	3.0	34.8	1.0	-51.1	-13.0	-38.1	
QPSK	Mid Ch, 1732.5MHz									
	3.465	-25.9	V	3.0	35.6	1.0	-60.6	-13.0	-47.6	
	5.198	-21.9	V	3.0	34.7	1.0	-55.6	-13.0	-42.6	
	6.930	-17.2	V	3.0	34.8	1.0	-51.0	-13.0	-38.0	
	3.465	-26.1	H	3.0	35.6	1.0	-60.8	-13.0	-47.8	
	5.198	-22.8	H	3.0	34.7	1.0	-56.5	-13.0	-43.5	
	6.930	-16.2	H	3.0	34.8	1.0	-50.0	-13.0	-37.0	
	High Ch, 1752.5MHz									
	3.505	-26.3	V	3.0	35.6	1.0	-60.9	-13.0	-47.9	
5.258	-21.9	V	3.0	34.7	1.0	-55.6	-13.0	-42.6		
7.010	-17.0	V	3.0	34.8	1.0	-50.9	-13.0	-37.9		
3.505	-26.4	H	3.0	35.6	1.0	-61.0	-13.0	-48.0		
5.258	-22.7	H	3.0	34.7	1.0	-56.4	-13.0	-43.4		
7.010	-15.6	H	3.0	34.8	1.0	-49.4	-13.0	-36.4		

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

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company:		LG								
Project #:		14U17508								
Date:		08/18/14								
Test Engineer:		G. Chan, L. Lee								
Configuration:		X-Pos EUT								
Mode:		CDMA EVDOR0 BC1								
Chamber		Pre-amplifier			Filter		Limit			
5m Chamber B		T34 8449B			Filter 1		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
BC1 EVDO REL. 0	Low Ch, 1851.25MHz									
	3.703	-13.8	V	3.0	35.4	1.0	-48.2	-13.0	-35.2	
	5.554	-11.0	V	3.0	34.7	1.0	-44.7	-13.0	-31.7	
	7.405	-10.8	V	3.0	34.9	1.0	-44.7	-13.0	-31.7	
	3.703	-14.5	H	3.0	35.4	1.0	-48.9	-13.0	-35.9	
	5.554	-11.0	H	3.0	34.7	1.0	-44.7	-13.0	-31.7	
	7.405	-10.4	H	3.0	34.9	1.0	-44.4	-13.0	-31.4	
	Mid Ch, 1880.00MHz									
	3.760	-14.4	V	3.0	35.3	1.0	-48.7	-13.0	-35.7	
5.640	-6.3	V	3.0	34.7	1.0	-40.0	-13.0	-27.0		
7.520	-11.4	V	3.0	34.9	1.0	-45.3	-13.0	-32.3		
3.760	-13.9	H	3.0	35.3	1.0	-48.3	-13.0	-35.3		
5.640	-8.1	H	3.0	34.7	1.0	-41.8	-13.0	-28.8		
7.520	-9.7	H	3.0	34.9	1.0	-43.6	-13.0	-30.6		
High Ch, 1908.75MHz										
3.818	-13.6	V	3.0	35.3	1.0	-47.9	-13.0	-34.9		
5.726	-2.6	V	3.0	34.7	1.0	-36.3	-13.0	-23.3		
7.635	-11.1	V	3.0	34.9	1.0	-45.0	-13.0	-32.0		
3.818	-13.2	H	3.0	35.3	1.0	-47.4	-13.0	-34.4		
5.726	-4.8	H	3.0	34.7	1.0	-38.6	-13.0	-25.6		
7.635	-9.7	H	3.0	34.9	1.0	-43.6	-13.0	-30.6		
Rev. 03.03.09										
Note: No other emissions were detected above the system noise floor.										

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 14U18508
Date: 08/12/14
Test Engineer: K.Huynh
Configuration: X-Pos EUT w/ AC charger, headset
Mode: CDMA RTT BC1

Chamber

5m Chamber B

Pre-amplifier

T34 8449B

Filter

Filter 1

Limit

Part 24

	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Band BC1 1xRTT	Low Ch, 1851.25MHz										
		3.703	-15.6	V	3.0	35.4	1.0	-50.0	-13.0	-37.0	
		5.554	-14.2	V	3.0	34.7	1.0	-47.9	-13.0	-34.9	
		7.405	-13.4	V	3.0	34.9	1.0	-47.3	-13.0	-34.3	
		3.703	-15.5	H	3.0	35.4	1.0	-49.9	-13.0	-36.9	
		5.554	-13.0	H	3.0	34.7	1.0	-46.8	-13.0	-33.8	
		7.405	-11.6	H	3.0	34.9	1.0	-45.5	-13.0	-32.5	
	Mid Ch, 1880.00MHz										
		3.760	-15.2	V	3.0	35.3	1.0	-49.5	-13.0	-36.5	
		5.640	-13.7	V	3.0	34.7	1.0	-47.5	-13.0	-34.5	
		7.520	-12.8	V	3.0	34.9	1.0	-46.7	-13.0	-33.7	
		3.760	-15.3	H	3.0	35.3	1.0	-49.7	-13.0	-36.7	
		5.640	-11.6	H	3.0	34.7	1.0	-45.4	-13.0	-32.4	
		7.520	-10.9	H	3.0	34.9	1.0	-44.8	-13.0	-31.8	
	High Ch, 1908.75MHz										
		3.818	-15.6	V	3.0	35.3	1.0	-49.9	-13.0	-36.9	
		5.726	-13.2	V	3.0	34.7	1.0	-47.0	-13.0	-34.0	
		7.635	-12.7	V	3.0	34.9	1.0	-46.6	-13.0	-33.6	
	3.818	-14.8	H	3.0	35.3	1.0	-49.0	-13.0	-36.0		
	5.726	-12.8	H	3.0	34.7	1.0	-46.6	-13.0	-33.6		
	7.635	-10.7	H	3.0	34.9	1.0	-44.6	-13.0	-31.6		

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

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 14U17508
Date: 08/18/14
Test Engineer: G. Chan, L. Lee
Configuration: X-Pos EUT
Mode: CDMA EVDOR0 BCO

Chamber
 5m Chamber B

Pre-amplifier
 T34 8449B

Filter
 Filter 1

Limit
 Part 22

	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes		
Band BCO EVDO REL. 0	Low Ch, 824.7MHz											
		1.649	-23.4	V	3.0	37.4	1.0	-59.8	-13.0	-46.8		
		2.474	-20.4	V	3.0	36.4	1.0	-55.8	-13.0	-42.8		
		3.299	-17.2	V	3.0	35.8	1.0	-52.0	-13.0	-39.0		
		1.649	-24.2	H	3.0	37.4	1.0	-60.6	-13.0	-47.6		
		2.474	-21.6	H	3.0	36.4	1.0	-57.0	-13.0	-44.0		
		3.299	-17.9	H	3.0	35.8	1.0	-52.7	-13.0	-39.7		
		Mid Ch, 836.52MHz										
		1.673	-23.4	V	3.0	37.3	1.0	-59.8	-13.0	-46.8		
		2.510	-20.1	V	3.0	36.4	1.0	-55.4	-13.0	-42.4		
		3.346	-17.5	V	3.0	35.8	1.0	-52.3	-13.0	-39.3		
		1.673	-23.3	H	3.0	37.3	1.0	-59.7	-13.0	-46.7		
		2.510	-21.9	H	3.0	36.4	1.0	-57.2	-13.0	-44.2		
		3.346	-17.6	H	3.0	35.8	1.0	-52.3	-13.0	-39.3		
		High Ch, 848.31MHz										
	1.697	-23.4	V	3.0	37.3	1.0	-59.7	-13.0	-46.7			
	2.545	-19.8	V	3.0	36.3	1.0	-55.2	-13.0	-42.2			
	3.393	-17.4	V	3.0	35.7	1.0	-52.1	-13.0	-39.1			
	1.697	-22.5	H	3.0	37.3	1.0	-58.8	-13.0	-45.8			
	2.545	-20.8	H	3.0	36.3	1.0	-56.1	-13.0	-43.1			
	3.393	-17.2	H	3.0	35.7	1.0	-51.9	-13.0	-38.9			

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

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 14U18508
Date: 08/13/14
Test Engineer: K.Huynh
Configuration: X-Pos EUT w/ AC charger, headset
Mode: CDMA RTT BC0

Chamber

5m Chamber B

Pre-amplifier

T34 8449B

Filter

Filter 1

Limit

Part 22

	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes		
Band BC0 1xRTT	Low Ch, 824.7MHz											
		1.649		V	3.0	37.4	1.0	-36.4	-13.0	-23.4		
		2.474		V	3.0	36.4	1.0	-35.4	-13.0	-22.4		
		3.299		V	3.0	35.8	1.0	-34.8	-13.0	-21.8		
		1.649		H	3.0	37.4	1.0	-36.4	-13.0	-23.4		
		2.474		H	3.0	36.4	1.0	-35.4	-13.0	-22.4		
		3.299		H	3.0	35.8	1.0	-34.8	-13.0	-21.8		
		Mid Ch, 836.52MHz										
		1.673		V	3.0	37.3	1.0	-36.3	-13.0	-23.3		
		2.510		V	3.0	36.4	1.0	-35.4	-13.0	-22.4		
		3.346		V	3.0	35.8	1.0	-34.8	-13.0	-21.8		
		1.673		H	3.0	37.3	1.0	-36.3	-13.0	-23.3		
		2.510		H	3.0	36.4	1.0	-35.4	-13.0	-22.4		
		3.346		H	3.0	35.8	1.0	-34.8	-13.0	-21.8		
		High Ch, 848.31MHz										
		1.697		V	3.0	37.3	1.0	-36.3	-13.0	-23.3		
		2.545		V	3.0	36.3	1.0	-35.3	-13.0	-22.3		
		3.393		V	3.0	35.7	1.0	-34.7	-13.0	-21.7		
	1.697		H	3.0	37.3	1.0	-36.3	-13.0	-23.3			
	2.545		H	3.0	36.3	1.0	-35.3	-13.0	-22.3			
	3.393		H	3.0	35.7	1.0	-34.7	-13.0	-21.7			

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