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

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE PHONE + BLUETOOTH & DTS B/G/N

MODEL NUMBER: LGL31L, L31L, LG-L31L

FCC ID: ZNFL31L

REPORT NUMBER: 13U16673-1

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Prepared for

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TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS 5
2. TEST METHODOLOGY 6
3. FACILITIES AND ACCREDITATION 6
4. CALIBRATION AND UNCERTAINTY 6
4.1. MEASURING INSTRUMENT CALIBRATION 6
4.2. SAMPLE CALCULATION 6
4.3. MEASUREMENT UNCERTAINTY 6
5. EQUIPMENT UNDER TEST 7
5.1. DESCRIPTION OF EUT 7
5.2. MAXIMUM OUTPUT POWER 7
5.3. MAXIMUM OUTPUT POWER (LTE) 8
5.4. DESCRIPTION OF AVAILABLE ANTENNAS 9
5.6. DESCRIPTION OF TEST SETUP 10
6. TEST AND MEASUREMENT EQUIPMENT 13
7. Summary Table 14
8. RF POWER OUTPUT VERIFICATION 15
8.1. GSM/GPRS/EDGE 15
8.1.1. GSM OUTPUT POWER RESULT 16
8.2. UMTS REL 99 17
8.2.1. UMTS REL 99 OUTPUT POWER RESULT 17
8.3. UMTS HSDPA 18
8.3.1. UMTS HSDPA OUTPUT POWER RESULT 18
8.4. LTE OUTPUT VERIFICATION 23
8.4.1. 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 32
10.1.2. LTE OCCUPIED BANDWIDTH RESULTS 34
10.1.1. OCCUPIED BANDWIDTH PLOTS 36

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10.2. BAND EDGE EMISSIONS 40
10.2.1. BAND EDGE PLOTS 41
10.3. OUT OF BAND EMISSIONS 54
10.3.1. OUT OF BAND EMISSIONS RESULT 55
10.3.2. OUT OF BAND EMISSIONS PLOTS 58
10.4. FREQUENCY STABILITY 63
11. RADIATED TEST RESULTS 66
11.1. RADIATED POWER (ERP & EIRP) 66
11.1.1. ERP/EIRP Results 67
11.1.2. LTE ERP/EIRP Results 69
11.1.3. ERP/EIRP PLOTS 71
11.2. FIELD STRENGTH OF SPURIOUS RADIATION 89
11.2.1. SPURIOUS RADIATION PLOTS 90
12. SETUP PHOTOS 106

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC.

EUT DESCRIPTION: GSM/WCDMA/LTE Phone + Bluetooth & DTS b/g/n

MODEL: LGL31L, L31L, LG-L31L

SERIAL NUMBER: 1792208-VS

DATE TESTED: DECEMBER 13 – 30, 2013

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, FCC CFR 47 Part 27

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

EIRP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna) + Substitution Antenna Factor (dBi)

ERP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – 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 18000 MHz	4.94 dB

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + Bluetooth & DTS b/g/n capability that is manufactured by (LG)

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	
			Peak (dBm)	Peak (mW)	Peak (dBm)	Peak (mW)
GSM850	824~849	GMSK	33.70	2344.23		
	824~849	GPRS	33.70	2344.23	29.401	871.16
	824~849	EGPRS	27.50	562.34	24.601	288.47
GSM1900	1850~1910	GMSK	30.70	1174.90		
	1850~1910	GPRS	30.70	1174.90	30.88	1224.62
	1850~1910	EGPRS	25.70	371.54	29.678	928.54
Band 5	824~849	REL99	23.70	234.42	19.421	87.52
	824~849	HSDPA	23.70	234.42	18.54	71.45
	824~849	HSUPA	23.70	234.42		
Band 2	1850~1910	REL99	23.70	234.42	25.35	342.77
	1850~1910	HSDPA	23.70	234.42	24.05	254.10
	1850~1910	HSUPA	23.70	234.42		

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5.3. MAXIMUM OUTPUT POWER (LTE)

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

FCC Part 27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			Peak	Peak (dBm)	Peak (mW)	Peak (dBm)	Peak (mW)
LTE17	704~716	10MHz	QPSK	24.20	263.03	18.781	75.53
			16QAM	23.10	204.17	18.52	71.12

FCC Part 27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			Peak	Peak (dBm)	Peak (mW)	Peak (dBm)	Peak (mW)
LTE17	704~716	5MHz	QPSK	24.20	263.03	19.151	82.24
			16QAM	23.10	204.17	18.411	69.36

FCC Part27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			Peak	Peak (dBm)	Peak (mW)	Peak (dBm)	Peak (mW)
LTE4	1710~1755	10MHz	QPSK	24.20	263.00	21.69	147.6
			16QAM	23.20	208.90	21.64	145.9

FCC Part 27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			Peak	Peak (dBm)	Peak (mW)	Peak (dBm)	Peak (mW)
LTE4	1710~1755	5MHz	QPSK	24.20	263.03	20.88	122.46
			16QAM	23.20	208.93	20.80	120.23

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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)
Band 5 824~849MHz	-2.15
Band2 1850~1910MHz	-1.36
LTE4, 1710~1755MHz	-1.16
LTE17, 704~716MHz	-4.48

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	ZNFL31L	N/A	N/A
Headset	LG	N/A	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.

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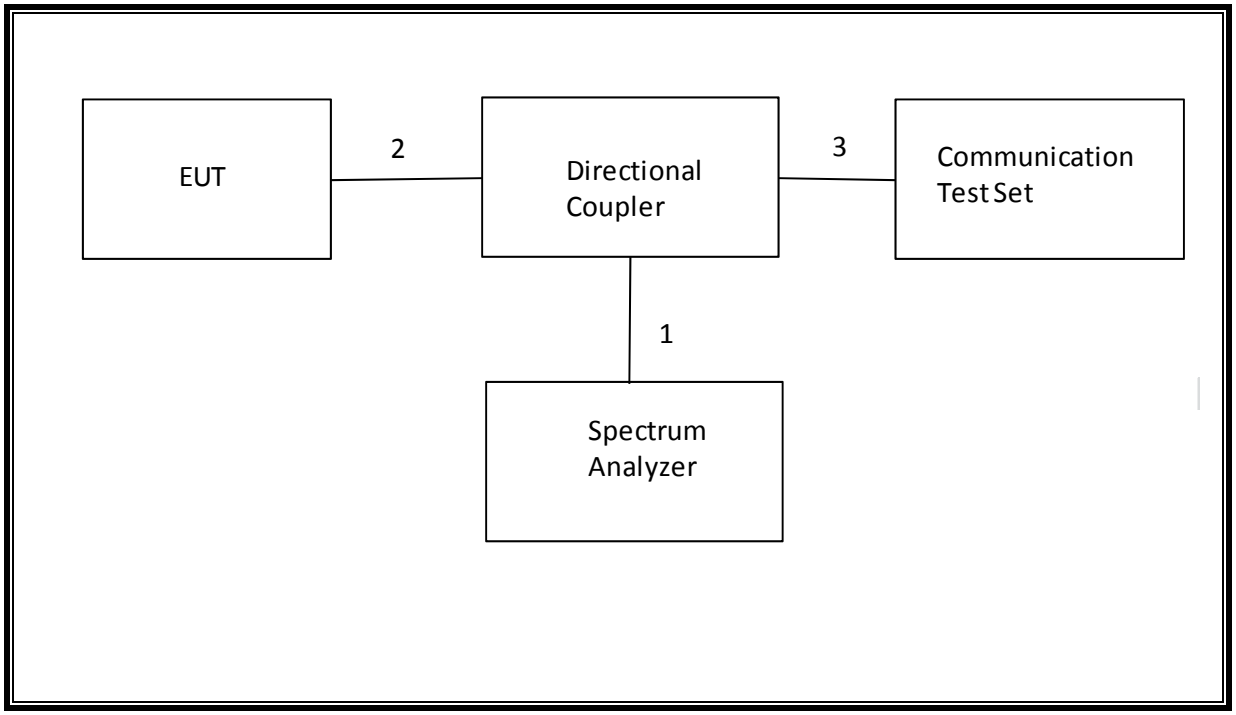
SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)

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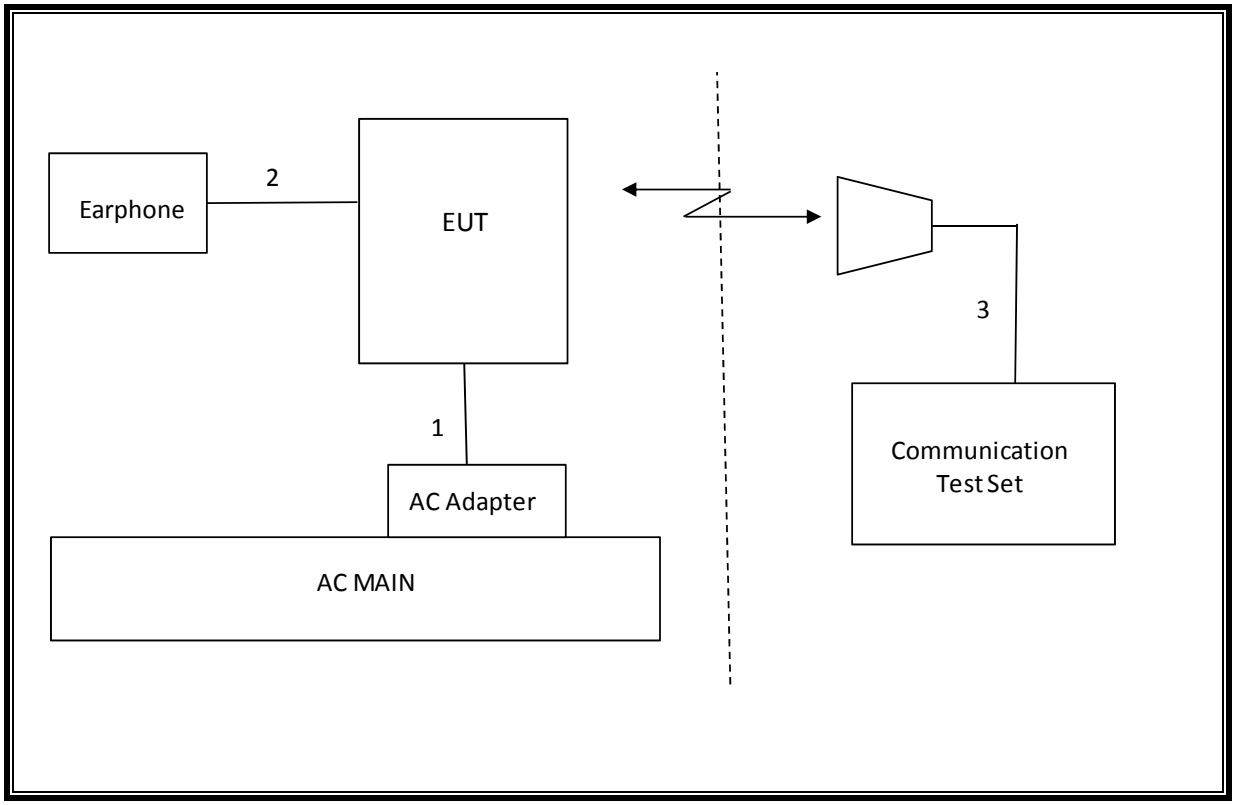

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6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Antenna, Horn, 18 GHz	EMCO	3115	C00872	10/25/14
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	12/11/14
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01179	02/26/14
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/14
Communication Test Set	Agilent / HP	E5515C	C01086	06/20/14
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/14
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02689	CNR
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01016	08/14/14
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	07/06/14

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7. Summary Table

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case	Note
2.1049	N/A	Occupied Band width (99%)	N/A	Conducted	Pass	8.97 MHz	
22.917(a) 24.238(a) 27.53(g) 90.691	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-16.45dBm	EGPRS
2.1046	N/A	Conducted output power	N/A		Pass	33.7 dBm	GSM
22.355 24.235 27.54 90.213	RSS-132(4.3) RSS-133(6.3) RSS-139(6.3) RSS-199(4.3)	Frequency Stability	2.5PPM		Pass	-0.061 ppm	Band 4
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	29.4 dBm	Band 5
27.50(b)(10)	N/A		34.77 dBm		Pass		Band 17
24.232(c) 27.50(d)(4)	RSS-133(6.4) RSS-139(6.4)	Equivalent Isotropic Radiated Power	33dBm 30dBm		Pass	30.88 dBm	Band 2 Band 4
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	-30.5 dBm	

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8. RF POWER OUTPUT VERIFICATION

8.1. GSM/GPRS/EDGE

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900

Press Connection control to choose the different menus

Press RESET > choose all to reset all settings

Connection Press Signal Off to turn off the signal and change settings

Network Support > GSM+GPRS or GSM+EGPRS

Main Service > Packet Data

Service selection > Test Mode A – Auto Slot Config. off

MS Signal Press Slot Config bottom on the right twice to select and change the number of time slots and power setting

> Slot configuration > Uplink/Gamma

> 33 dBm for GPRS 850/900

> 30 dBm for GPRS1800/1900

BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel

Frequency Offset > + 0 Hz

Mode > BCCH and TCH

BCCH Level > -85 dBm (May need to adjust if link is not stable)

BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]

Channel Type > Off

P0> 4 dB

Slot Config > Unchanged (if already set under MS Signal)

TCH > choose desired test channel

Hopping > Off

Main Timeslot > 3 (Default)

Network Coding Scheme > CS4 (GPRS) and MCS9 (EGPRS)

Bit Stream > 2E9-1PSR Bit Pattern

AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input

Connection Press Signal On to turn on the signal and change settings

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8.1.1. GSM OUTPUT POWER RESULT

Band	Mode	Ch.	f(MHz)	1 time slot	2 time slot	3 time slot	4 time slot
				PK (dBm)	PK (dBm)	PK (dBm)	PK (dBm)
GSM850	GMSK	128	824.2	33.7			
		190	836.6	33.7			
		251	848.8	33.6			
	GPRS	128	824.2	33.7	31.2		
		190	836.6	33.7	31.1		
		251	848.8	33.6	30.9		
	EGPRS	128	824.2	27.5	26.6		
		190	836.6	27.4	26.5		
		251	848.8	27.4	26.5		
GSM1900	GMSK	512	1850.2	30.5			
		661	1880	30.7			
		810	1909.8	30.7			
	GPRS	512	1850.2	30.5	28.4		
		661	1880	30.7	28.6		
		810	1909.8	30.7	28.7		
	EGPRS	512	1850.2	25.6	24.5		
		661	1880	25.7	24.5		
		810	1909.8	25.7	24.5		

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8.2. UMTS REL 99

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	βc	Not Applicable
	βd	Not Applicable
	βec	Not Applicable
	βc/βd	8/15
	βhs	Not Applicable
	βed	Not Applicable

8.2.1. UMTS REL 99 OUTPUT POWER RESULT

Band	Mode	Ch.	f(MHz)	Conducted Power (dBm) Avg (dBm)
Band 5	REL99	4145	826.6	23.7
		4183	836.6	23.7
		4220	846.4	23.6
Band 2	REL99	9275	1852.6	23.7
		9400	1880	23.7
		9525	1907.4	23.5

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8.3. UMTS HSDPA

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel5 HSDPA			
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

8.3.1. UMTS HSDPA OUTPUT POWER RESULT

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm) Avg (dBm)
Band 5	HSDPA	1	4145	826.6	23.5
			4183	836.6	23.7
			4220	846.4	23.5
		2	4145	826.6	23.6
			4183	836.6	23.6
			4220	846.4	23.6
		3	4145	826.6	23.1
			4183	836.6	23.1
			4220	846.4	23.1
		4	4145	826.6	23.2
			4183	836.6	23.1
			4220	846.4	23.1

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Band 2	HSDPA	1	9275	1852.6	23.6
			9400	1880	23.7
			9525	1907.4	23.5
		2	9275	1852.6	23.7
			9400	1880	23.7
			9525	1907.4	23.7
		3	9275	1852.6	23.1
			9400	1880	23.2
			9525	1907.4	23.1
		4	9275	1852.6	23.2
			9400	1880	23.2
			9525	1907.4	23.1

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8.3.1. UMTS HSUPA

TEST PROCEDURE

The following summary of these settings are illustrated below: (ETSI TS 134.121-1 Table C.11.1)

	Mode	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	P-CPICH (dB)	-10				
	P-CCPCH (dB)	-12				
	SCH (dB)	-12				
	PICH(dB)	-15				
	DPCH (dB)	-9				
	HS-SCCH_1 (dB)	-8				
	HS-PDSCH (dB)	-3				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	Bc	11/15	6/15	15/15	2/15	15/15
	Bd	15/15	15/15	9/15	15/15	15/15
	Bec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	Bhs	22/15	12/15	30/15	4/15	30/15
	βed (note1)	1309/225	94/75	47/15 47/15	56/75	134/15
	MPR	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	Reference E-TFCIs	5	5	2	5	5
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

Note1: βed cannot be set directly, it is set by Absolute Grant Value.

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8.3.2. UMTS HSUPA OUTPUT POWER RESULT

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm) Avg (dBm)
Band 5	HSUPA	1	4145	826.6	23.5
			4183	836.6	23.1
			4220	846.4	23.5
		2	4145	826.6	21.3
			4183	836.6	21.9
			4220	846.4	22.0
		3	4145	826.6	22.3
			4183	836.6	22.6
			4220	846.4	22.4
		4	4145	826.6	22.3
			4183	836.6	22.4
			4220	846.4	22.2
		5	4145	826.6	23.7
			4183	836.6	23.7
			4220	846.4	23.7
Band 2	HSUPA	1	9275	1852.6	23.1
			9400	1880	23.2
			9525	1907.4	23.2
		2	9275	1852.6	22.3
			9400	1880	22.3
			9525	1907.4	21.7
		3	9275	1852.6	22.4
			9400	1880	22.6
			9525	1907.4	22.5
		4	9275	1852.6	22.1
			9400	1880	22.4
			9525	1907.4	22.1
		5	9275	1852.6	23.7
			9400	1880	23.6
			9525	1907.4	23.6

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8.4. LTE OUTPUT VERIFICATION

8.4.1. LTE OUTPUT RESULT

Band	Frequency	Modulation	BW (MHz)	RB Size	RB Offset	Average
LTE17	710	QPSK	10	1	0	24.0
				1	24	24.2
				1	49	24.2
				25	0	22.8
				25	11	23.0
				25	24	23.0
				50	0	23.1
	710	16QAM		1	0	22.9
				1	24	23.1
				1	49	23.1
				25	0	21.8
				25	11	21.9
				25	24	22.1
				50	0	22.0

Band	Frequency	Modulation	BW (MHz)	RB Size	RB Offset	Average
LTE17	710	QPSK	5	1	0	23.9
				1	11	24.1
				1	24	24.1
				12	0	23.0
				12	5	23.2
				12	11	23.0
				25	0	23.0
	710	16QAM		1	0	22.8
				1	11	23.0
				1	24	23.1
				12	0	21.9
				12	5	22.1
				12	11	22.0
				25	0	22.0

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Band	Frequency	Modulation	BW (MHz)	RB Size	RB Offset	Average
LTE4	1715	QPSK	10	1	0	24.1
				1	24	24.0
				1	49	24.1
				25	0	23.0
				25	11	23.0
				25	24	23.0
				50	0	22.9
	1715	16QAM		1	0	23.1
				1	24	23.1
				1	49	23.1
				25	0	21.9
				25	11	21.8
				25	24	21.8
				50	0	21.8
	1732.5	QPSK		1	0	24.1
				1	24	24.0
				1	49	24.1
				25	0	22.9
				25	11	22.9
				25	24	22.9
				50	0	23.0
	1732.5	16QAM		1	0	23.2
				1	24	23.1
				1	49	23.1
				25	0	21.9
				25	11	22.0
				25	24	22.0
				50	0	21.9
	1750	QPSK		1	0	24.2
				1	24	24.1
				1	49	24.2
				25	0	22.8
				25	11	22.9
				25	24	22.9
				50	0	22.8
	1750	16QAM		1	0	23.1
				1	24	23.0
				1	49	23.1
				25	0	21.8
				25	11	21.8
				25	24	21.8
				50	0	21.8

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Band	Frequency	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak	Average
LTE4	1712.5	QPSK	5	1	0		24.2
				1	11		24.2
				1	24		24.1
				12	0		23.2
				12	5		23.2
				12	11		23.2
				25	0		23.2
	1712.5	16QAM		1	0		23.2
				1	11		23.1
				1	24		23.2
				12	0		21.9
				12	5		22.0
				12	11		22.1
				25	0		22.0
	1732.5	QPSK		1	0		24.1
				1	11		24.1
				1	24		24.1
				12	0		23.1
				12	5		23.1
				12	11		23.1
				25	0		23.1
	1732.5	16QAM		1	0		23.1
				1	11		23.1
				1	24		23.2
				12	0		22.0
				12	5		22.0
				12	11		22.1
				25	0		22.0
	1752.5	QPSK		1	0		24.1
				1	11		24.2
				1	24		24.2
				12	0		23.1
				12	5		23.2
				12	11		23.1
				25	0		23.1
	1752.5	16QAM		1	0		23.1
				1	11		23.1
				1	24		23.1
				12	0		22.0
				12	5		22.1
				12	11		22.0
				25	0		22.1

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9. PEAK TO AVERAGE RATIO

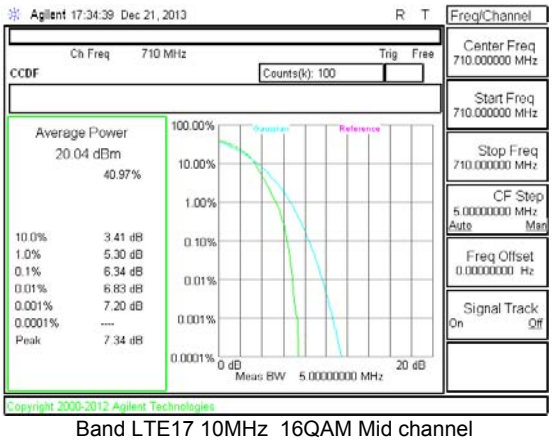
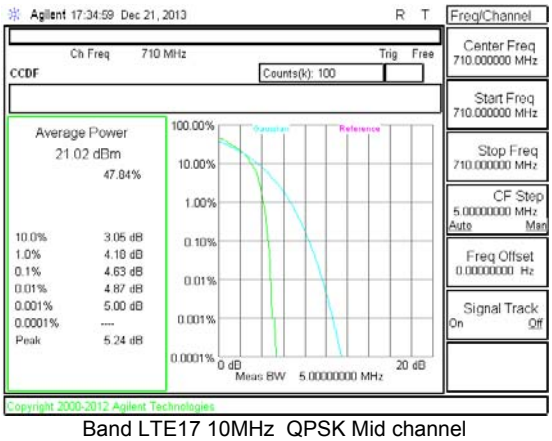
Test Procedure

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

Band LTE17 10MHz 16QAM	 Band LTE17 10MHz 16QAM Mid channel	 Band LTE17 10MHz QPSK Mid channel

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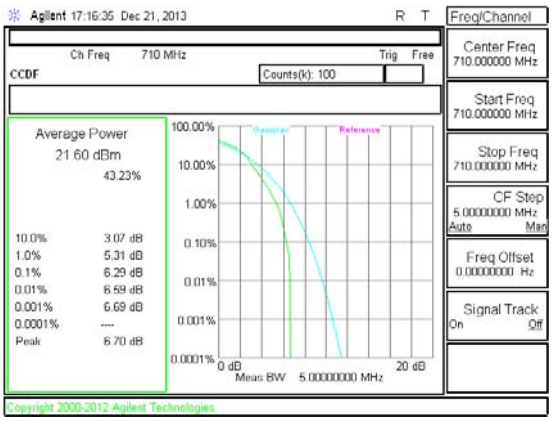
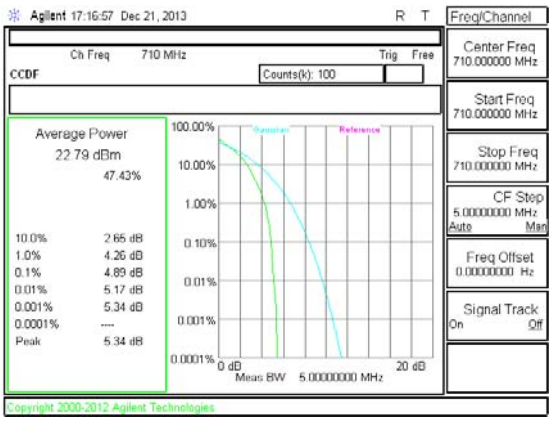
Band LTE17 5MHz 16QAM

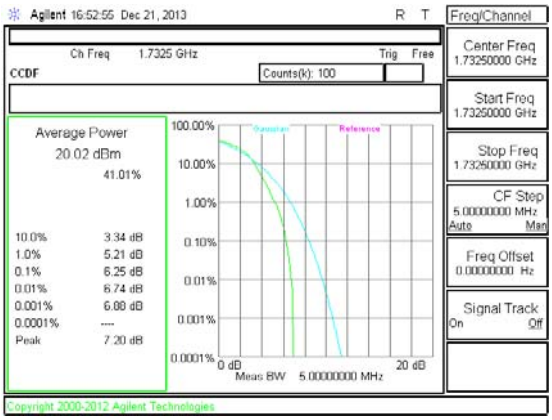


Band LTE17 5MHz 16QAM Mid channel

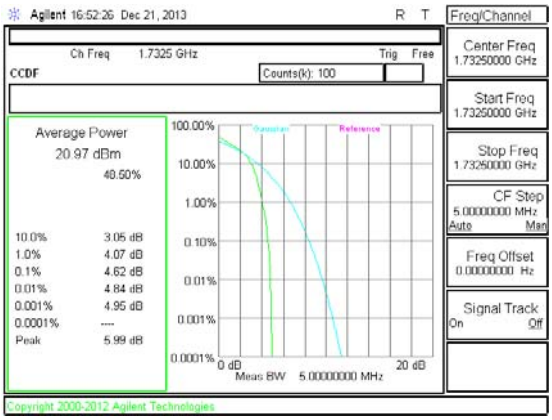


Band LTE17 5MHz QPSK Mid channel

Band LTE4 10MHz 16QAM



Band LTE4 10MHz 16QAM Mid channel



Band LTE4 10MHz QPSK Mid channel

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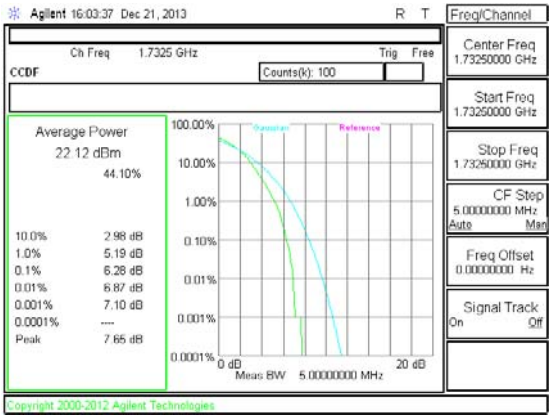
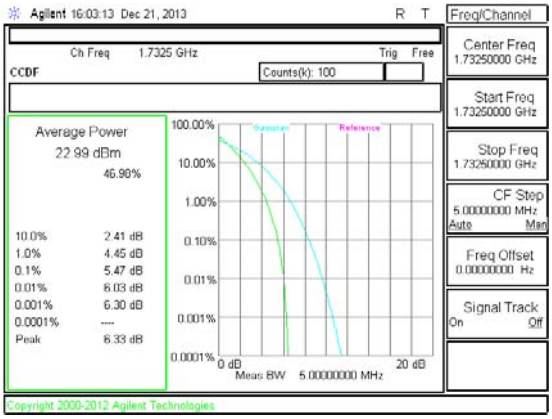
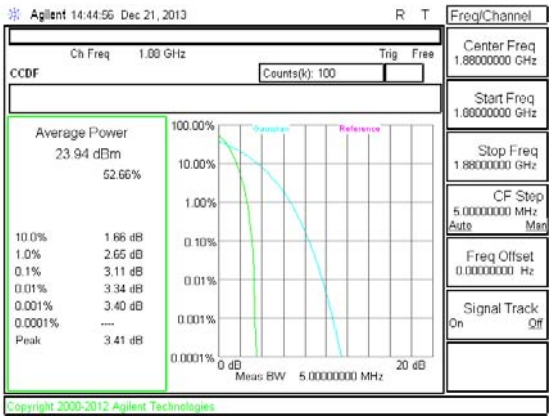
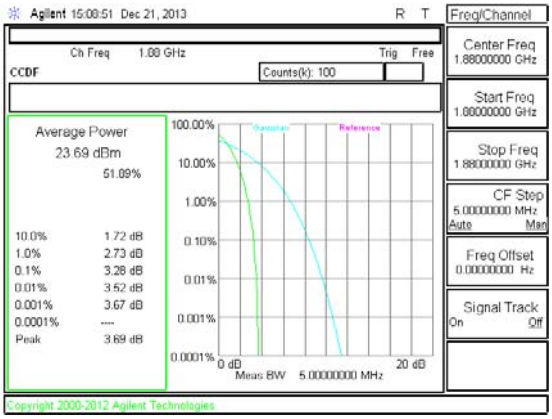
Band LTE4 5MHz 16QAM	 Band LTE4 5MHz 16QAM Mid channel	 Band LTE4 5MHz QPSK Mid channel

Band 2 WCDMA	 Band WCDMA B2 REL99	 HSDPA B2

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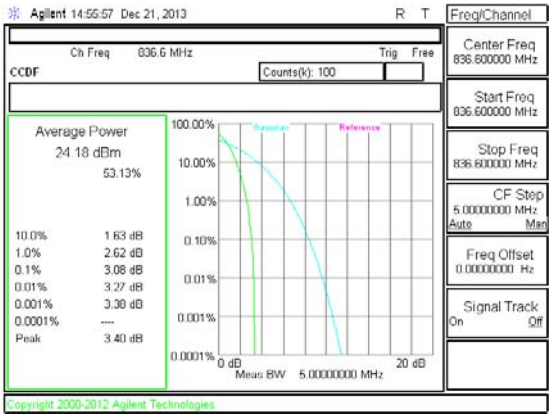
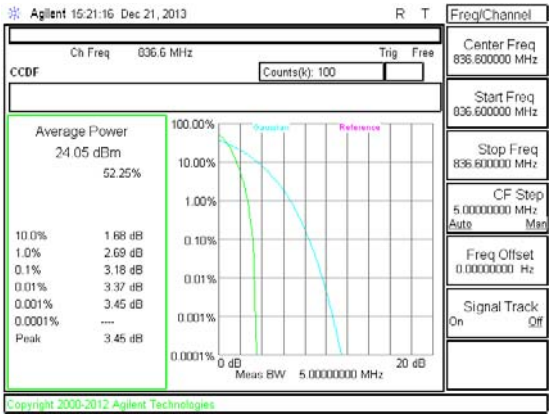
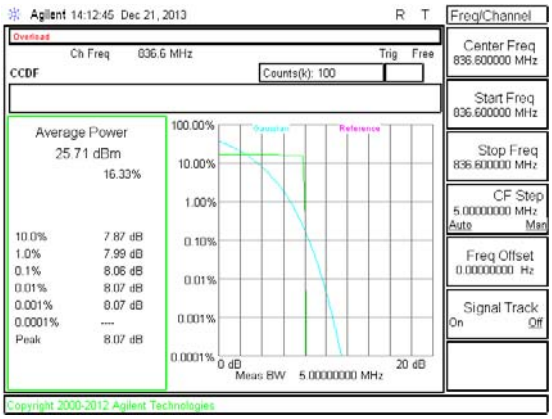
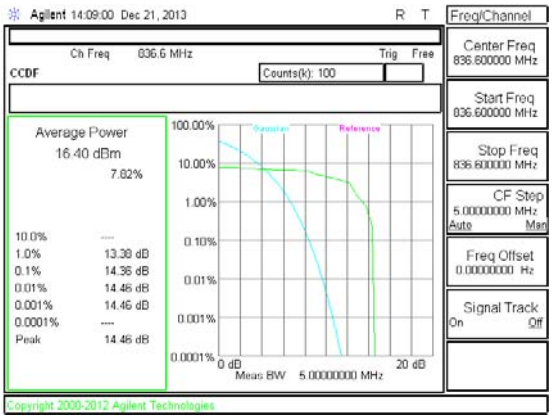
Band 5 WCDMA	 Band WCDMA B5 REL99	 Band WCDMA B5 HSDPA
GSM 850	 GPRS 850	 EGPRS 850

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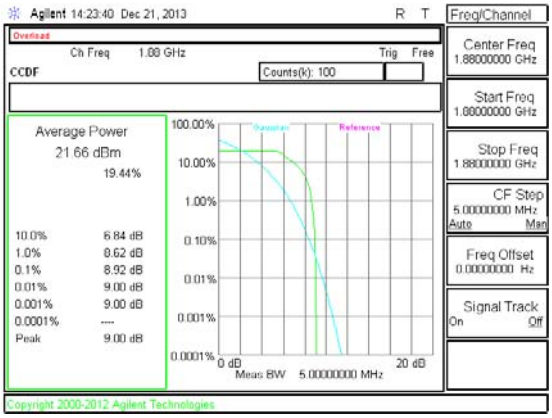
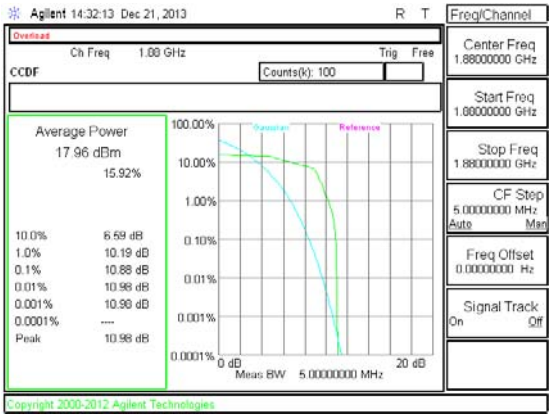
GSM 1900	 GPRS 1900	 EGPRS 1900

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10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049
IC: RSS-132, 4.5; RSS-133, 6.5

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)

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10.1.1. OCCUPIED BANDWIDTH RESULTS

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
GSM850	GPRS	128	824.2	0.251	0.325
		190	836.6	0.246	0.315
		251	848.8	0.235	0.312
	EGPRS	128	824.2	0.253	0.312
		190	836.6	0.243	0.32
		251	848.8	0.236	0.282
GSM1900	GPRS	512	1850.2	0.244	0.312
		661	1880	0.24	0.313
		810	1909.8	0.255	0.333
	EGPRS	512	1850.2	0.245	0.309
		661	1880	0.246	0.312
		810	1909.8	0.243	0.297

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Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Band 5	REL99	4145	826.6	4.14	4.63
		4183	836.6	4.14	4.61
		4220	846.4	4.21	4.64
	HSDPA	4145	826.6	4.15	4.61
		4183	836.6	4.15	4.63
		4220	846.4	4.15	4.65
Band 2	REL99	9275	1852.6	4.16	4.67
		9400	1880	4.16	4.69
		9525	1907.4	4.15	4.69
	HSDPA	9275	1852.6	4.16	4.66
		9400	1880	4.13	4.62
		9525	1907.4	4.14	4.62

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10.1.2. LTE OCCUPIED BANDWIDTH RESULTS

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE17	10	QPSK	50/0	709	8.95	9.66
			50/0	710	8.95	9.72
			50/0	711	8.94	9.65
		16QAM	50/0	709	8.97	9.76
			50/0	710	8.94	9.72
			50/0	711	8.95	9.72

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE17	5	QPSK	25/0	706.5	4.46	4.89
			25/0	710	4.47	4.86
			25/0	713.5	4.45	4.86
		16QAM	25/0	706.5	4.45	4.83
			25/0	710	4.48	4.91
			25/0	713.5	4.46	4.87

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE4	10	QPSK	50/0	1715	8.92	9.75
			50/0	1732.5	8.94	9.69
			50/0	1750	8.93	9.7
		16QAM	50/0	1715	8.92	9.72
			50/0	1732.5	8.93	9.59
			50/0	1750	8.93	9.5

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Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE4	5	QPSK	25/0	1712.5	4.46	4.88
			25/0	1732.5	4.45	4.88
			25/0	1752.5	4.46	4.84
		16QAM	25/0	1712.5	4.45	4.86
			25/0	1732.5	4.45	4.87
			25/0	1752.5	4.47	4.89

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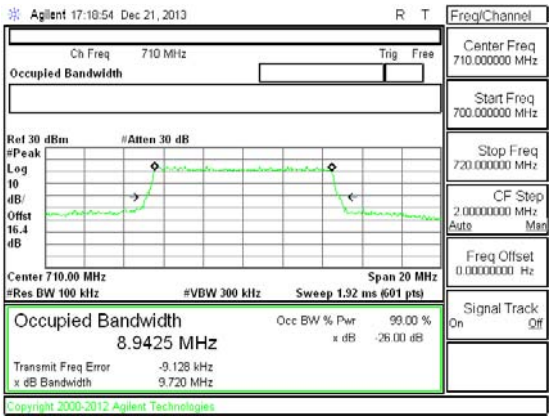
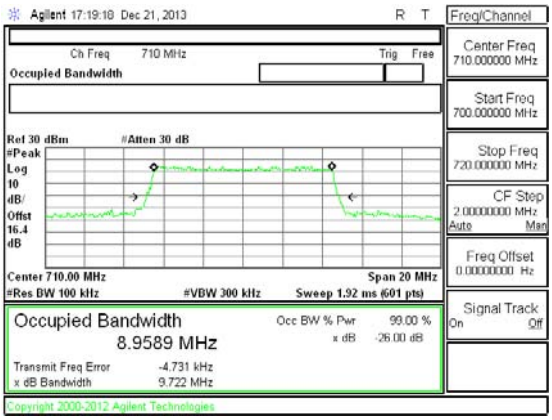
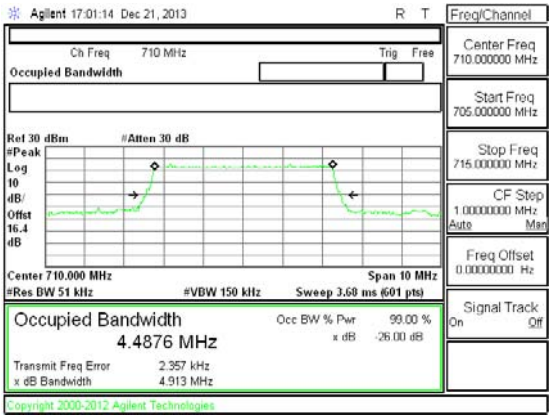
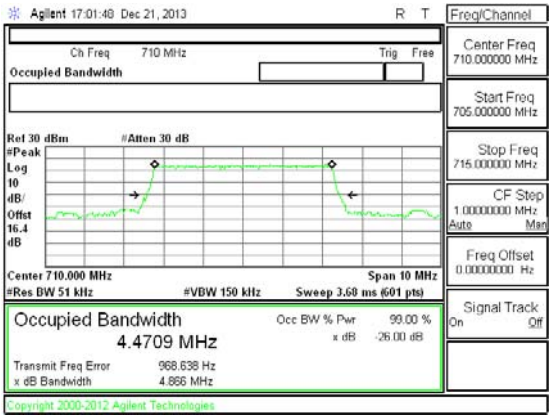
10.1.1. OCCUPIED BANDWIDTH PLOTS

Band LTE17 10MHz 16QAM	 Band LTE17 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE17 10MHz OBW QPSK Mid Channel FRB.gif
Band LTE17 5MHz 16QAM	 Band LTE17 5MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE17 5MHz OBW QPSK Mid Channel FRB.gif

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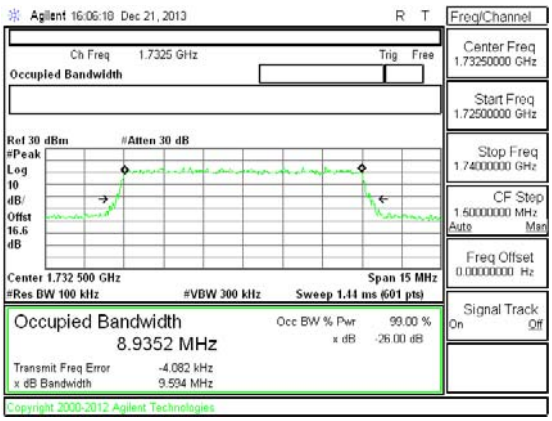
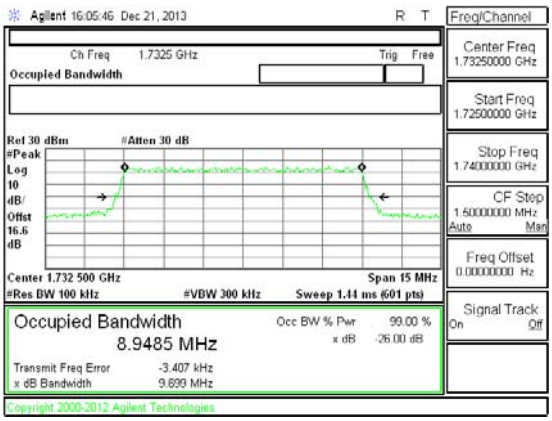
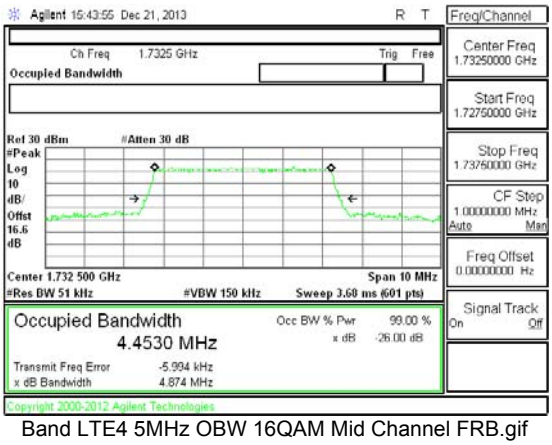
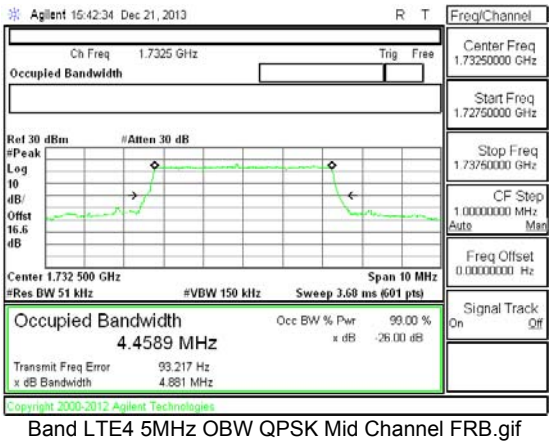
Band LTE4 10MHz 16QAM	 Band LTE4 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE4 10MHz OBW QPSK Mid Channel FRB.gif
Band LTE4 5MHz 16QAM	 Band LTE4 5MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE4 5MHz OBW QPSK Mid Channel FRB.gif

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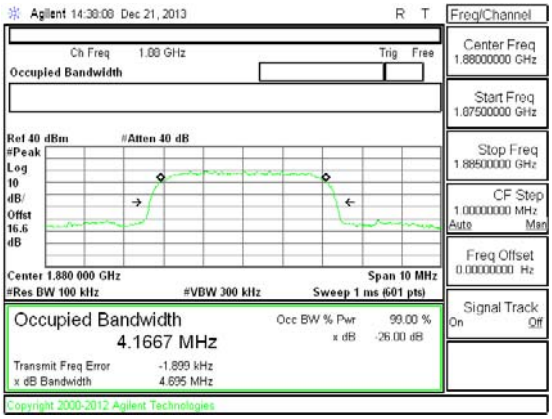
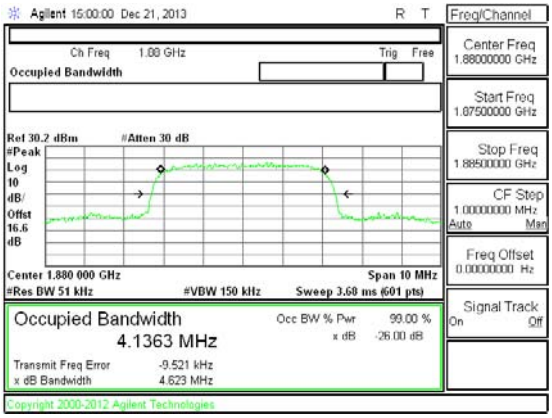
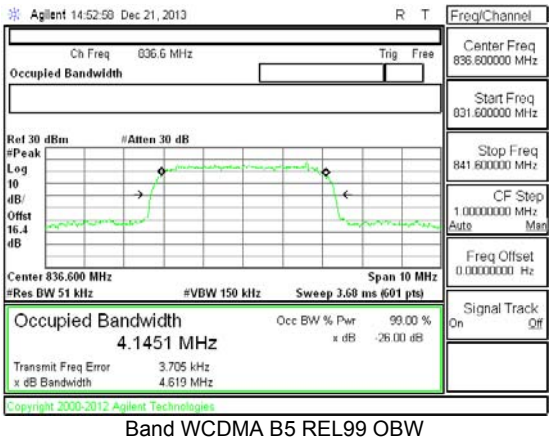
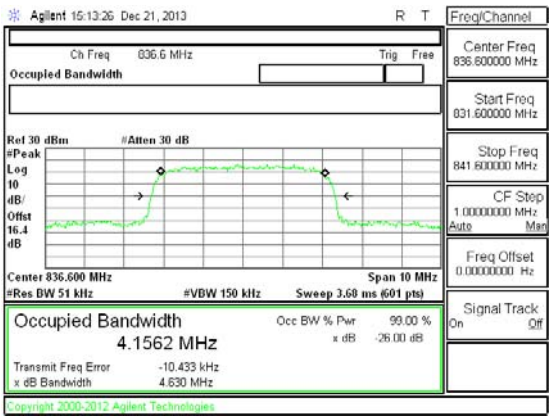
Band Band 2 WCDMA	 Band WCDMA B2 REL99 OBW	 Band WCDMA B2 HSDPA OBW
Band Band 5 WCDMA	 Band WCDMA B5 REL99 OBW	 Band WCDMA B5 HSDPA OBW

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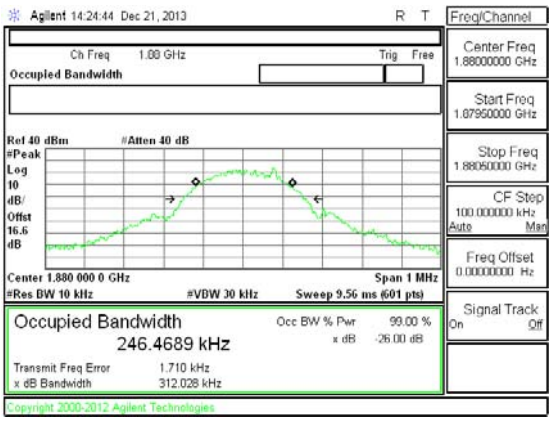
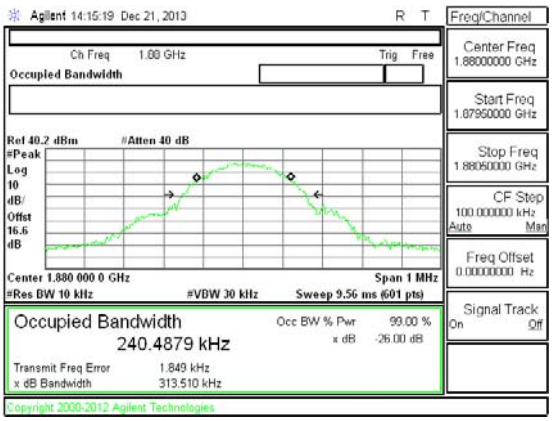
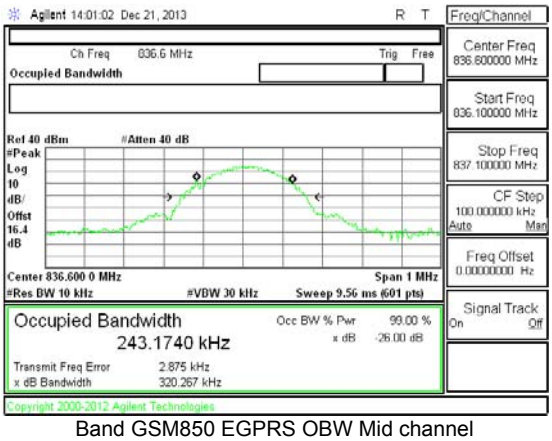
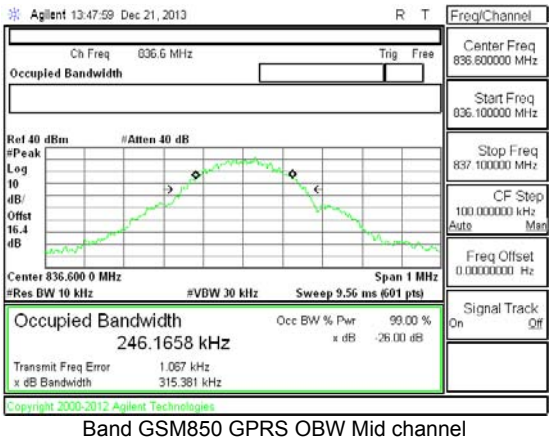
Band GSM1900	 Band GSM1900 EGPRS OBW Mid channel	 Band GSM1900 GPRS OBW Mid channel
Band GSM850	 Band GSM850 EGPRS OBW Mid channel	 Band GSM850 GPRS OBW Mid channel

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10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238 and § 27

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.

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.

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.
- (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

LTE Band 4 and 17

GSM 850 and 1900

WCDMA Band 2 and Band 5

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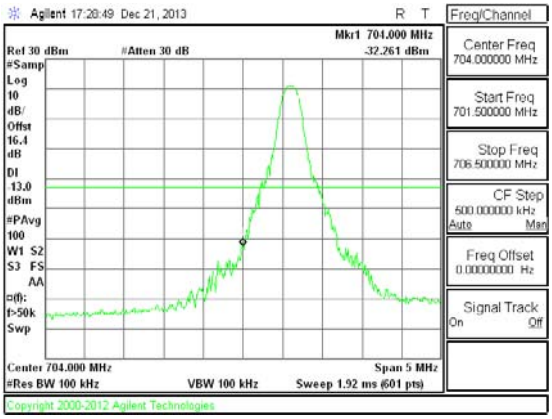
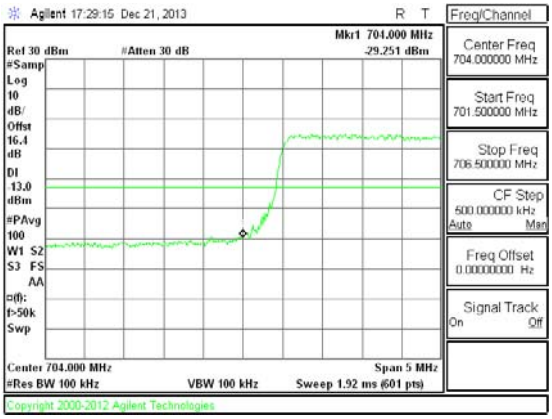
RESULTS

10.2.1. BAND EDGE PLOTS

Band LTE17 10MHz 16QAM	 Band LTE17 10MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE17 10MHz CBE 16QAM Low Channel FRB.gif

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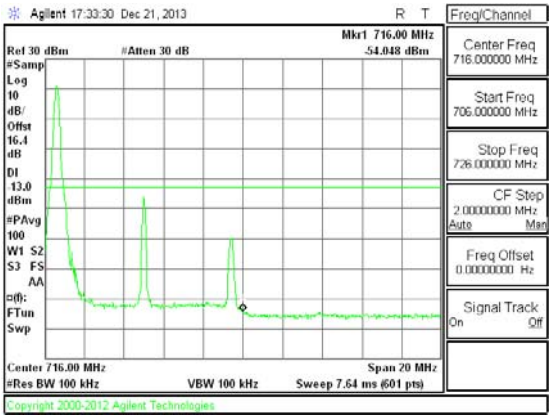
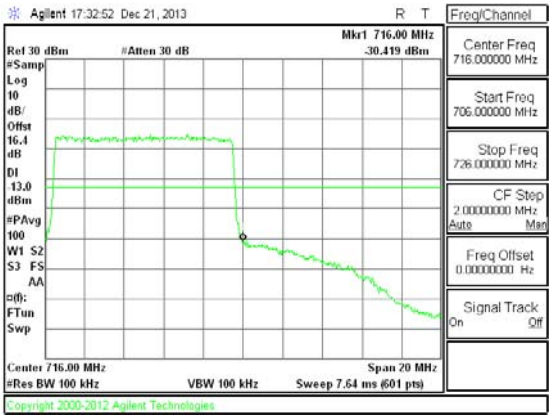
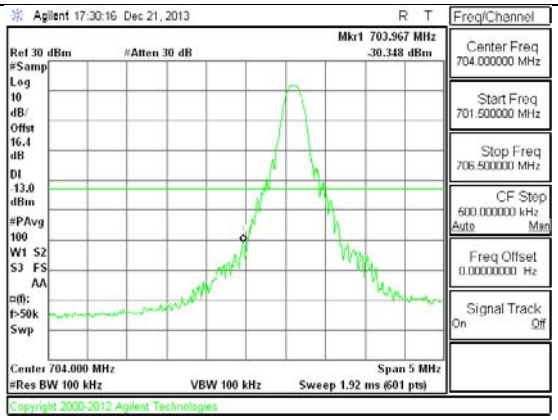
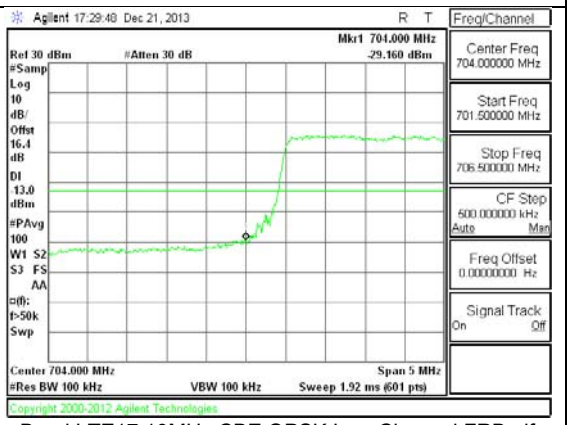
Band LTE17 10MHz 16QAM	 Band LTE17 10MHz CBE 16QAM High Channel 1RB.gif	 Band LTE17 10MHz CBE 16QAM High Channel FRB.gif
Band LTE17 10MHz QPSK	 Band LTE17 10MHz CBE QPSK Low Channel 1RB.gif	 Band LTE17 10MHz CBE QPSK Low Channel FRB.gif

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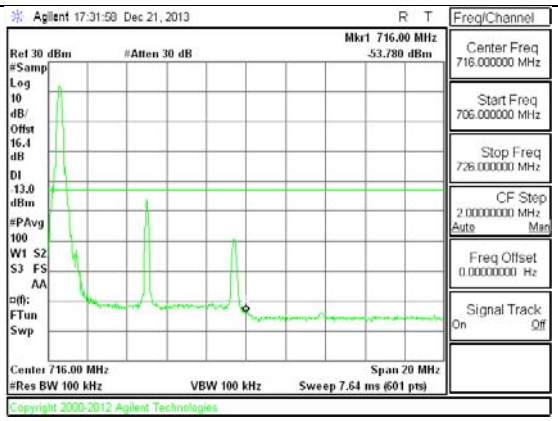
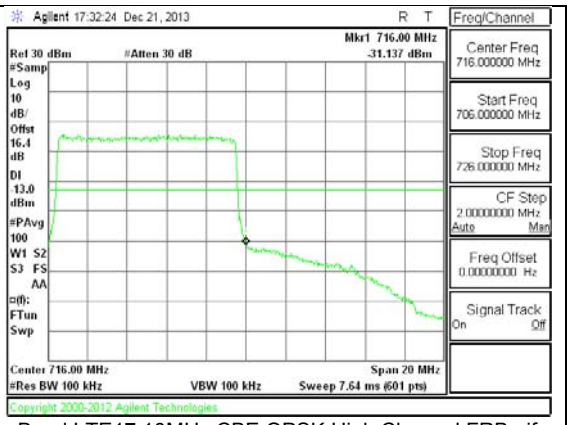
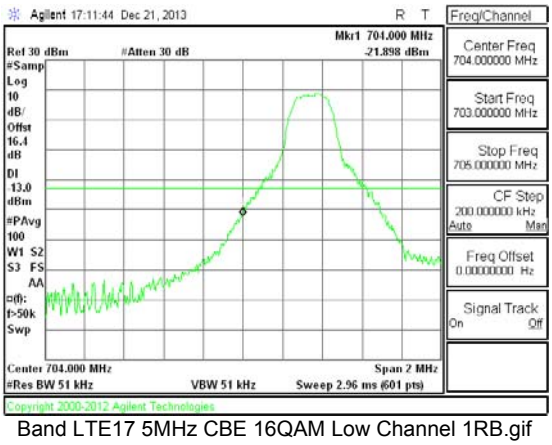
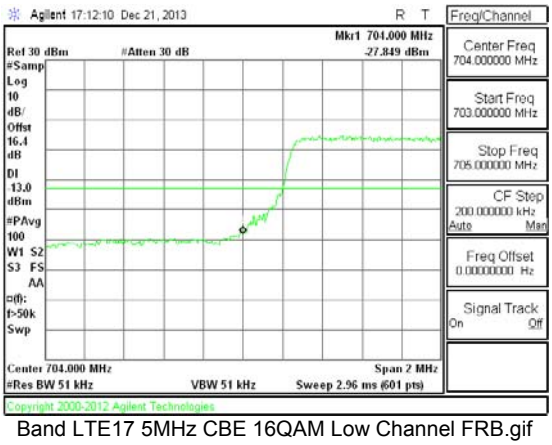
Band LTE17 10MHz QPSK	 Band LTE17 10MHz CBE QPSK High Channel 1RB.gif	 Band LTE17 10MHz CBE QPSK High Channel FRB.gif

Band LTE17 5MHz 16QAM	 Band LTE17 5MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE17 5MHz CBE 16QAM Low Channel FRB.gif

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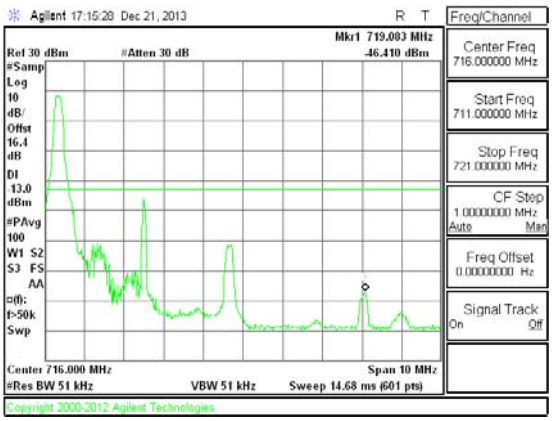
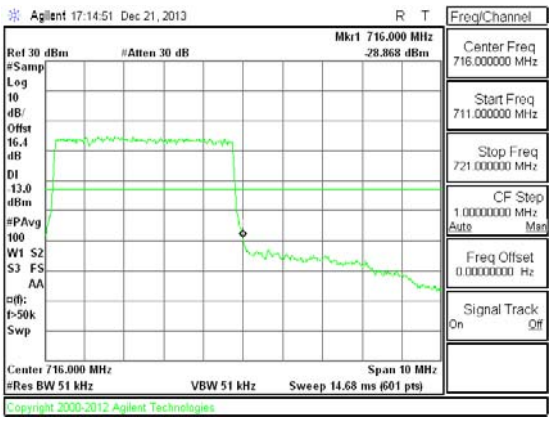
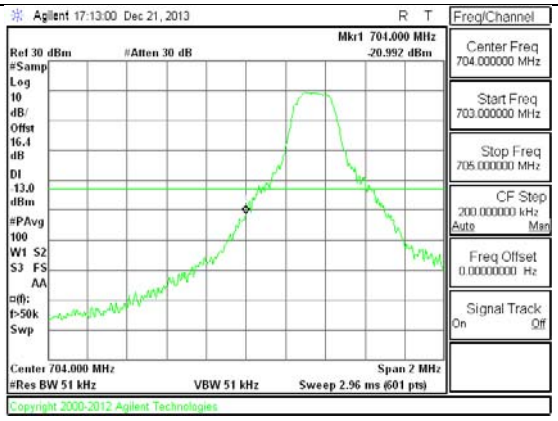
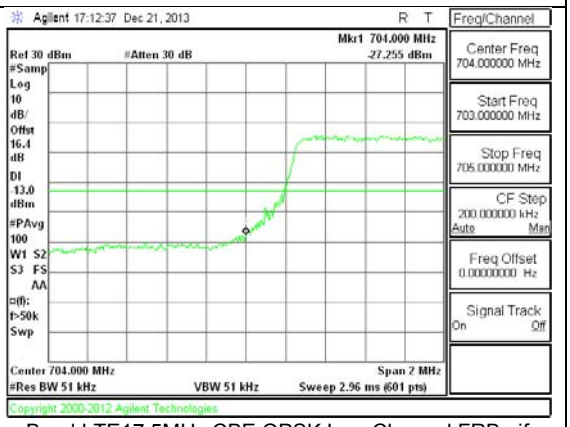
Band LTE17 5MHz 16QAM	 Band LTE17 5MHz CBE 16QAM High Channel 1RB.gif	 Band LTE17 5MHz CBE 16QAM High Channel FRB.gif
Band LTE17 5MHz QPSK	 Band LTE17 5MHz CBE QPSK Low Channel 1RB.gif	 Band LTE17 5MHz CBE QPSK Low Channel FRB.gif

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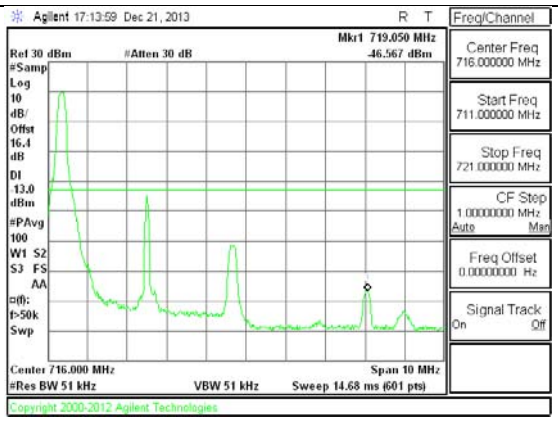
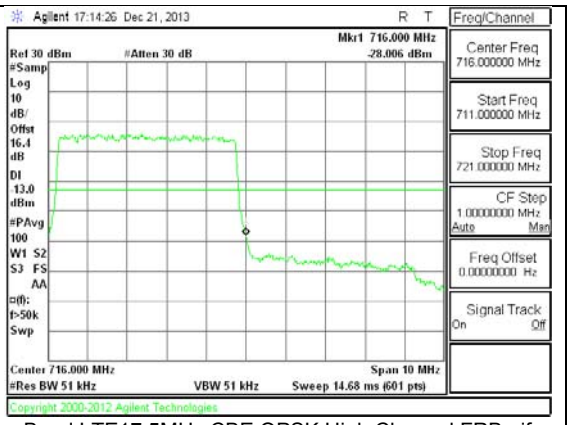
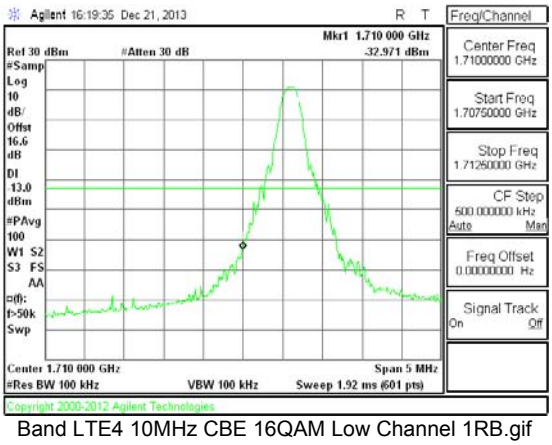
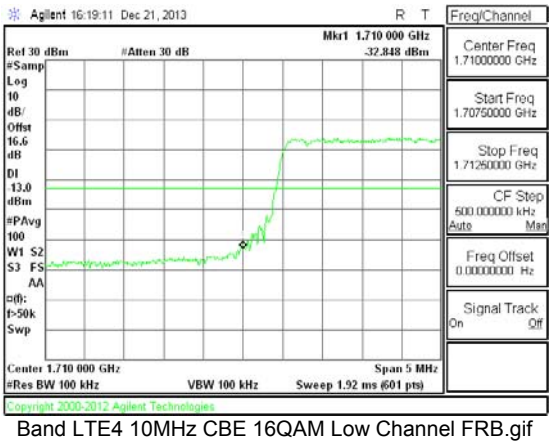
Band LTE17 5MHz QPSK	 Band LTE17 5MHz CBE QPSK High Channel 1RB.gif	 Band LTE17 5MHz CBE QPSK High Channel FRB.gif

Band LTE4 10MHz 16QAM	 Band LTE4 10MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE4 10MHz CBE 16QAM Low Channel FRB.gif

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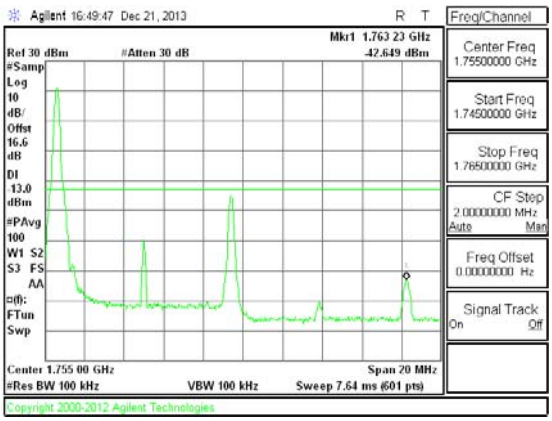
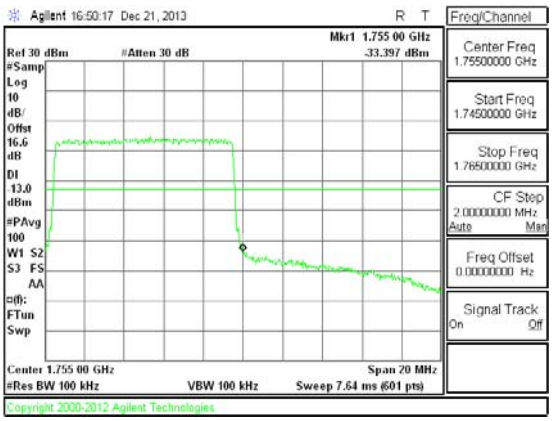
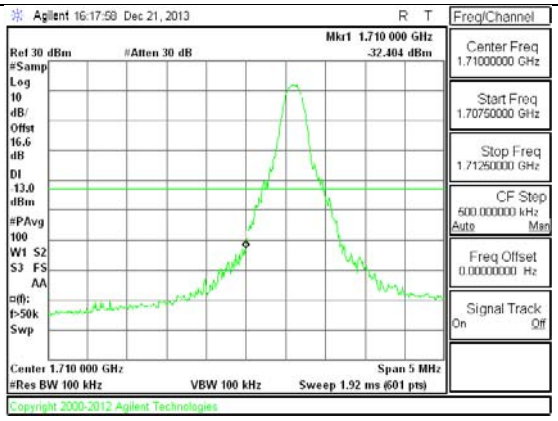
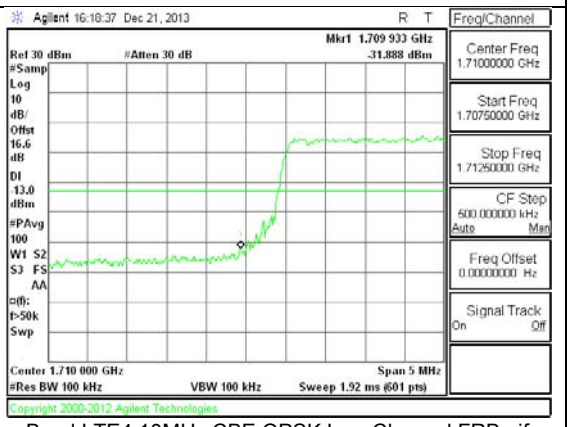
Band LTE4 10MHz 16QAM	 Band LTE4 10MHz CBE 16QAM High Channel 1RB.gif	 Band LTE4 10MHz CBE 16QAM High Channel FRB.gif
Band LTE4 10MHz QPSK	 Band LTE4 10MHz CBE QPSK Low Channel 1RB.gif	 Band LTE4 10MHz CBE QPSK Low Channel FRB.gif

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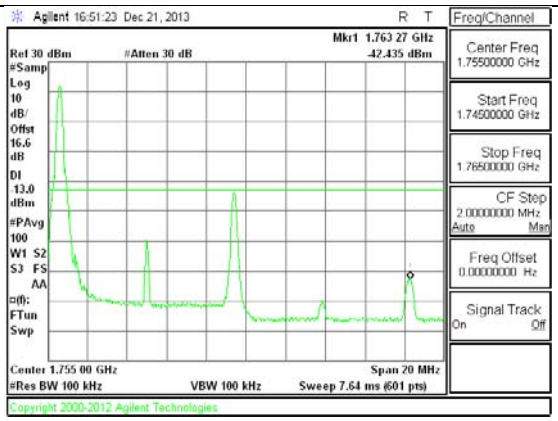
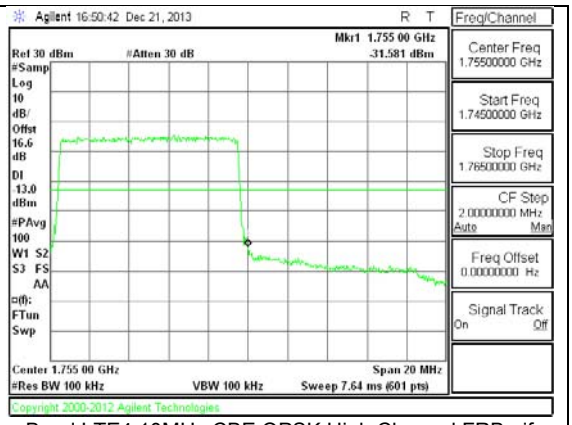
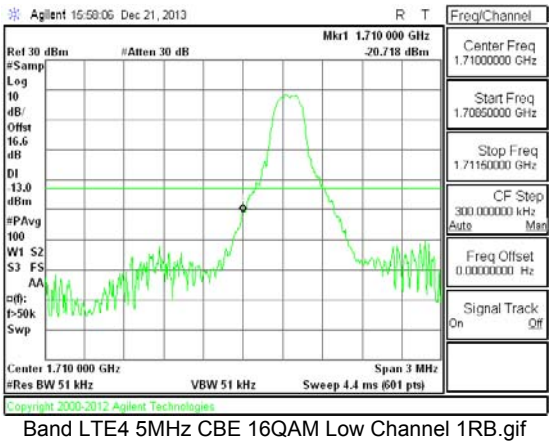
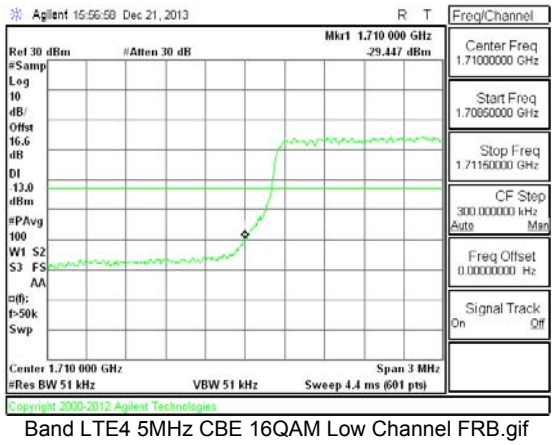
Band LTE4 10MHz QPSK	 Band LTE4 10MHz CBE QPSK High Channel 1RB.gif	 Band LTE4 10MHz CBE QPSK High Channel FRB.gif

Band LTE4 5MHz 16QAM	 Band LTE4 5MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE4 5MHz CBE 16QAM Low Channel FRB.gif

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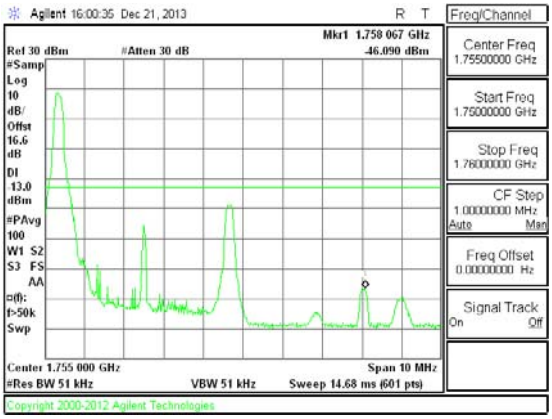
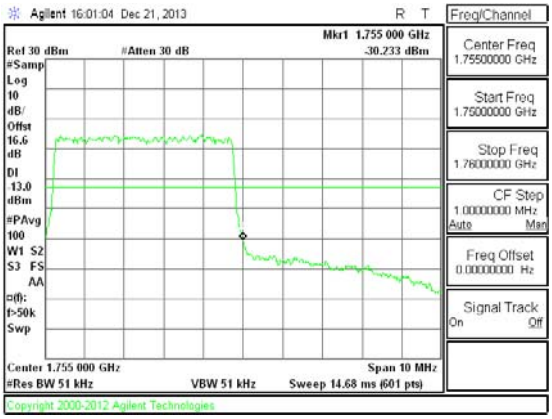
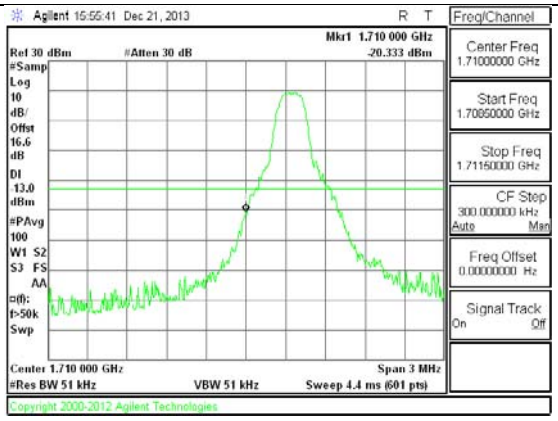
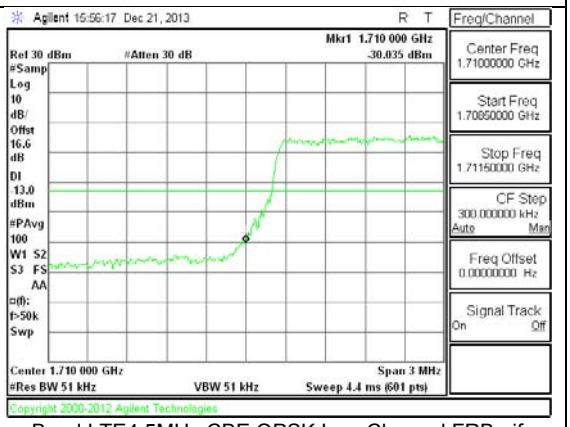
Band LTE4 5MHz 16QAM	 Band LTE4 5MHz CBE 16QAM High Channel 1RB.gif	 Band LTE4 5MHz CBE 16QAM High Channel FRB.gif
Band LTE4 5MHz QPSK	 Band LTE4 5MHz CBE QPSK Low Channel 1RB.gif	 Band LTE4 5MHz CBE QPSK Low Channel FRB.gif

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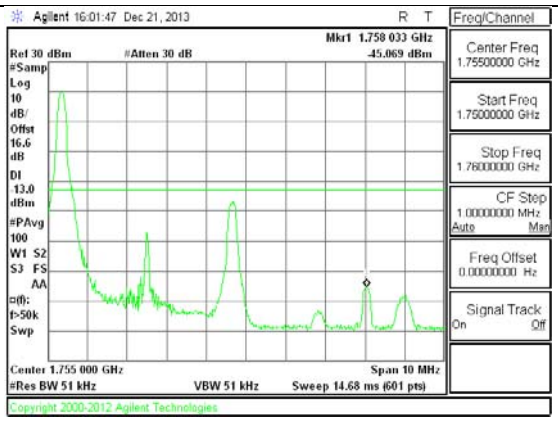
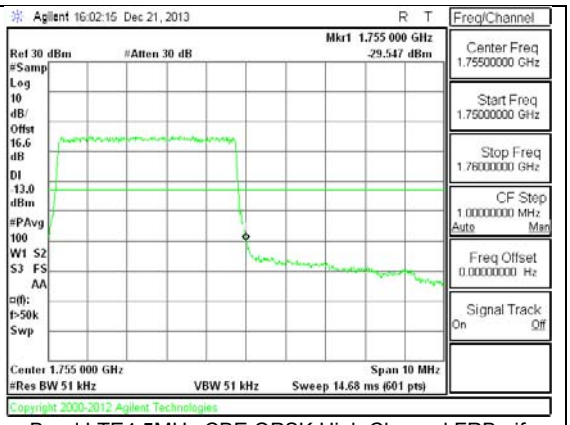
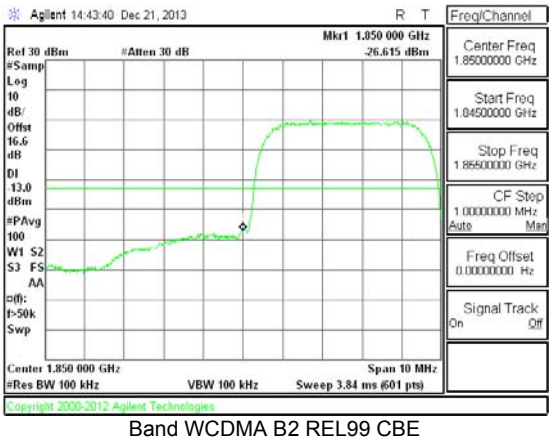
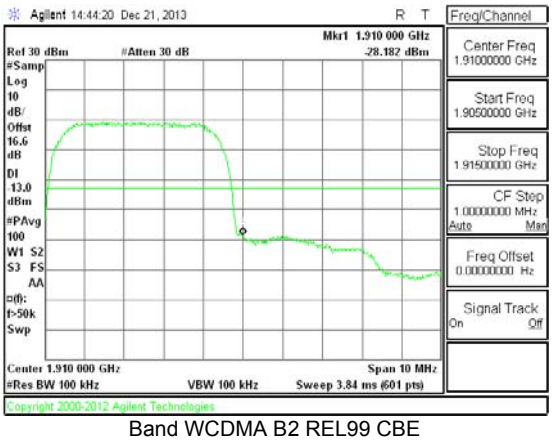
Band LTE4 5MHz QPSK	 Band LTE4 5MHz CBE QPSK High Channel 1RB.gif	 Band LTE4 5MHz CBE QPSK High Channel FRB.gif

Band Band 2 REL99	 Band WCDMA B2 REL99 CBE	 Band WCDMA B2 REL99 CBE

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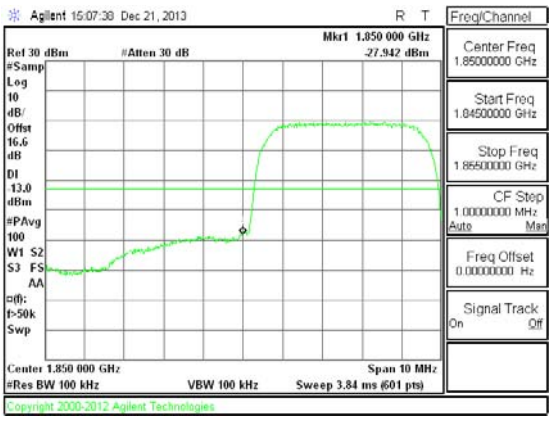
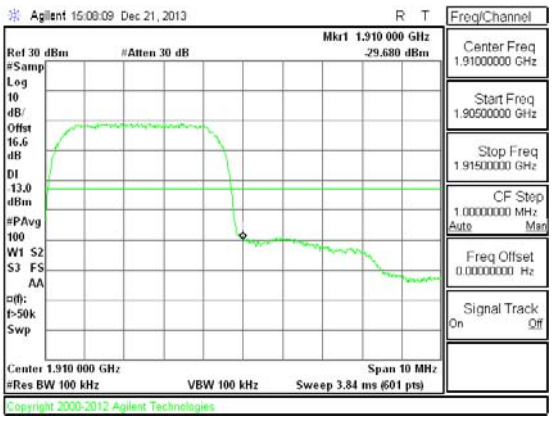
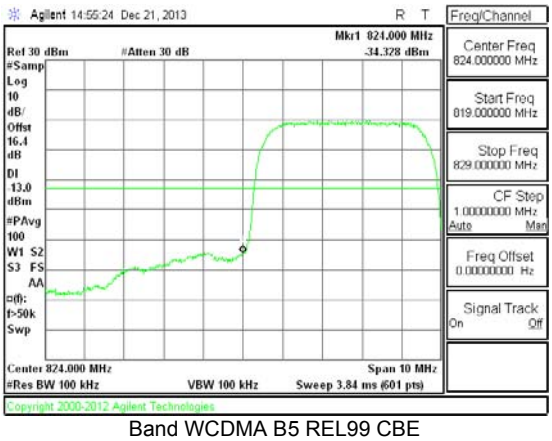
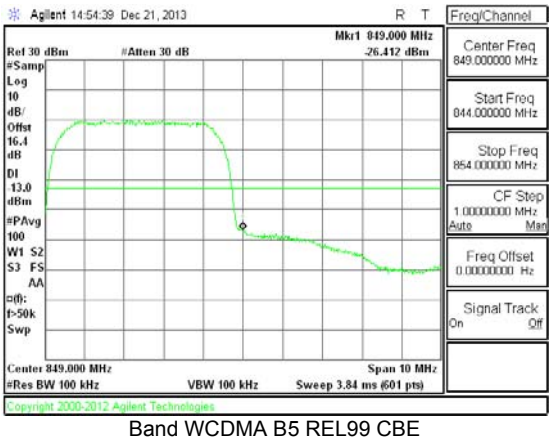
Band Band 2 HSDPA	 Band WCDMA B2 HSDPA CBE	 Band WCDMA B2 HSDPA CBE

Band Band 5 REL99	 Band WCDMA B5 REL99 CBE	 Band WCDMA B5 REL99 CBE

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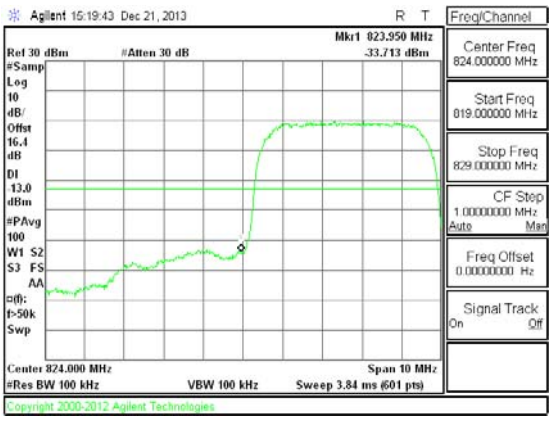
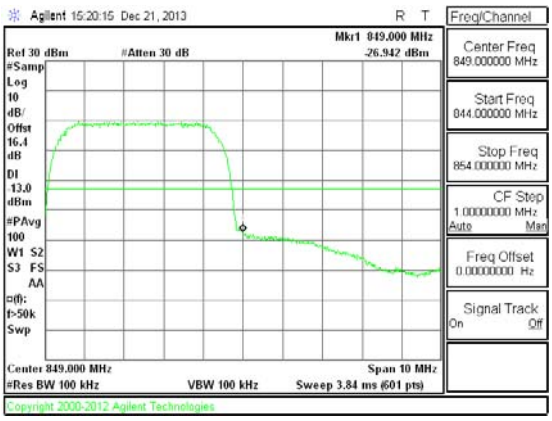
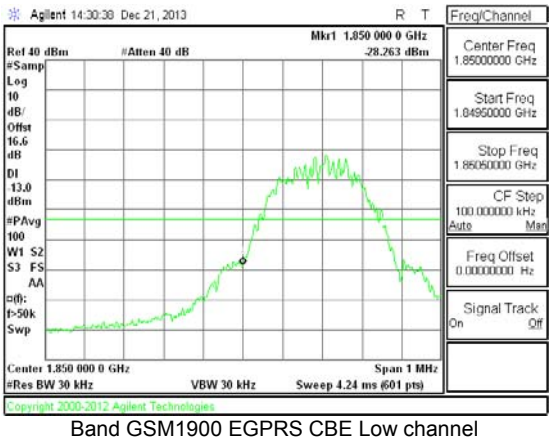
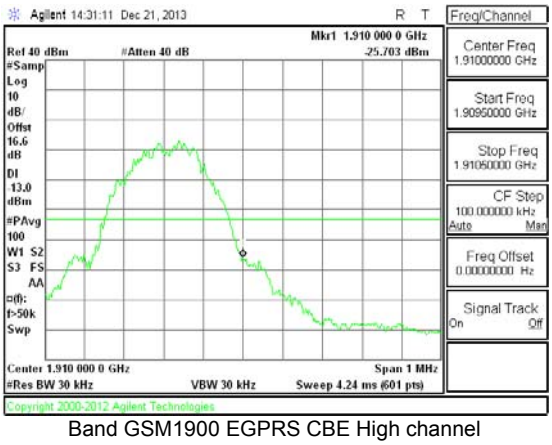
Band Band 5 HSDPA	 Band WCDMA B5 HSDPA CBE	 Band WCDMA B5 HSDPA CBE

Band GSM1900 EGPRS	 Band GSM1900 EGPRS CBE Low channel	 Band GSM1900 EGPRS CBE High channel

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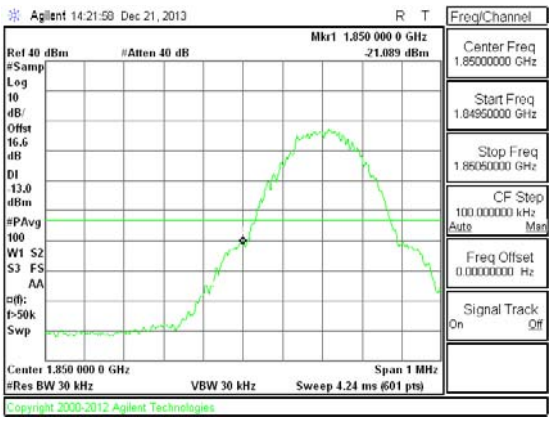
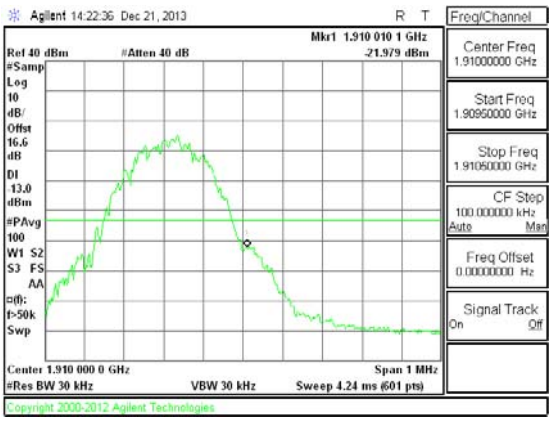
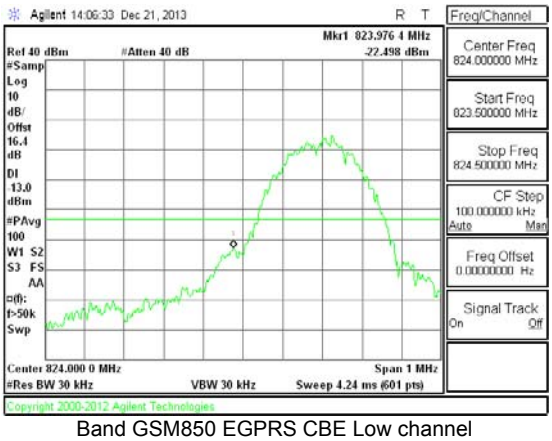
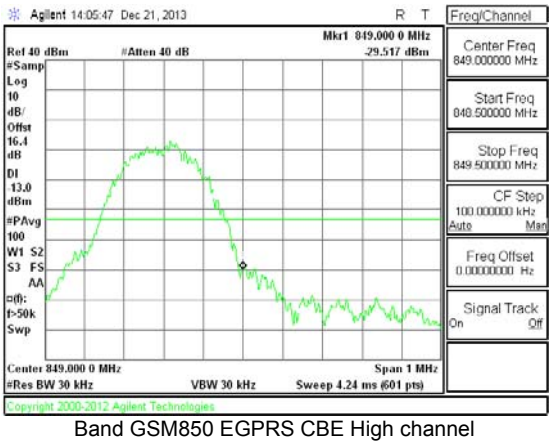
Band GSM1900 GPRS	 Band GSM1900 GPRS CBE Low channel	 Band GSM1900 GPRS CBE High channel

Band GSM850 EGPRS	 Band GSM850 EGPRS CBE Low channel	 Band GSM850 EGPRS CBE High channel

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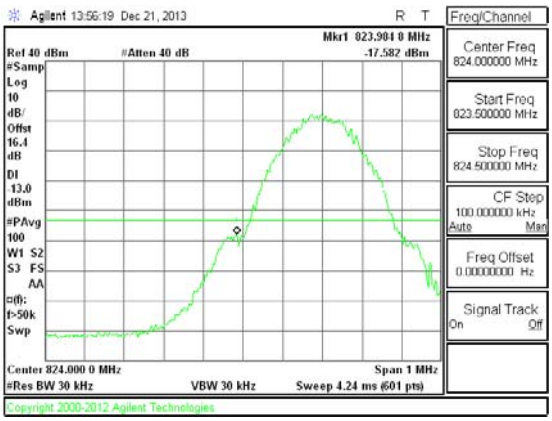
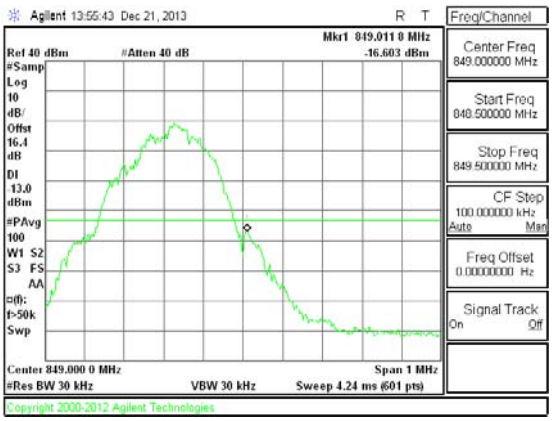
Band GSM850 GPRS	 Band GSM850 GPRS CBE Low channel	 Band GSM850 GPRS CBE High channel

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10.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238 and §27

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.

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.

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

RESULTS

LTE Band 4 and 17
GSM 850 and 1900
WCDMA Band 2 and Band 5

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10.3.1. OUT OF BAND EMISSIONS RESULT

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE17	10	QPSK	709	-28.82	-13	-15.82
			710	-29.25	-13	-16.25
			711	-27.36	-13	-14.36
		16QAM	709	-30.26	-13	-17.26
			710	-27	-13	-14
			711	-28.01	-13	-15.01

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE17	5	QPSK	706.5	-29.72	-13	-16.72
			710	-26.55	-13	-13.55
			713.5	-26.29	-13	-13.29
		16QAM	706.5	-27.7	-13	-14.7
			710	-29.07	-13	-16.07
			713.5	-28.43	-13	-15.43

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	10	QPSK	1715	-26.75	-13	-13.75
			1732.5	-27.09	-13	-14.09
			1750	-26.13	-13	-13.13
		16QAM	1715	-28.55	-13	-15.55
			1732.5	-27.34	-13	-14.34
			1750	-28.71	-13	-15.71

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Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	5	QPSK	1712.5	-27.2	-13	-14.2
			1732.5	-27.58	-13	-14.58
			1752.5	-26.83	-13	-13.83
		16QAM	1712.5	-28	-13	-15
			1732.5	-27.42	-13	-14.42
			1752.5	-26.22	-13	-13.22

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM850	GPRS	824.2	-16.84	-13	-3.84
		836.6	-17.25	-13	-4.25
		848.8	-17.75	-13	-4.75
	EGPRS	824.2	-16.83	-13	-3.83
		836.6	-16.53	-13	-3.53
		848.8	-17.51	-13	-4.51
GSM1900	GPRS	1850.2	-17.38	-13	-4.38
		1880	-17.53	-13	-4.53
		1909.8	-17.53	-13	-4.53
	EGPRS	1850.2	-17.93	-13	-4.93
		1880	-17.16	-13	-4.16
		1909.8	-16.45	-13	-3.45

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Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
Band 5	REL99	826.6	-27.86	-13	-14.86
		836.6	-27.68	-13	-14.68
		846.4	-29.03	-13	-16.03
Band 2	REL99	1852.6	-25.56	-13	-12.56
		1880	-27.64	-13	-14.64
		1907.4	-29.1	-13	-16.1
Band 5	HSDPA	826.6	-28.01	-13	-15.01
		836.6	-27.26	-13	-14.26
		846.4	-26.18	-13	-13.18
Band 2	HSDPA	1852.6	-29.12	-13	-16.12
		1880	-27.49	-13	-14.49
		1907.4	-29.1	-13	-16.1

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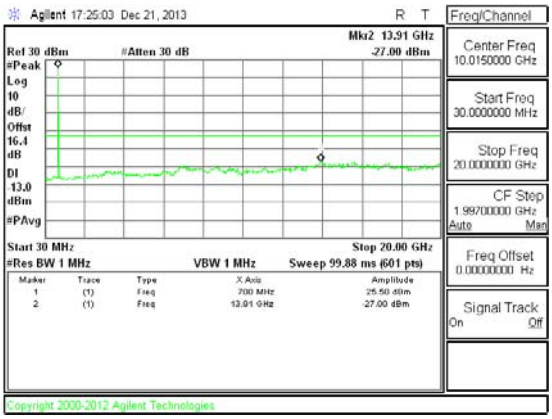
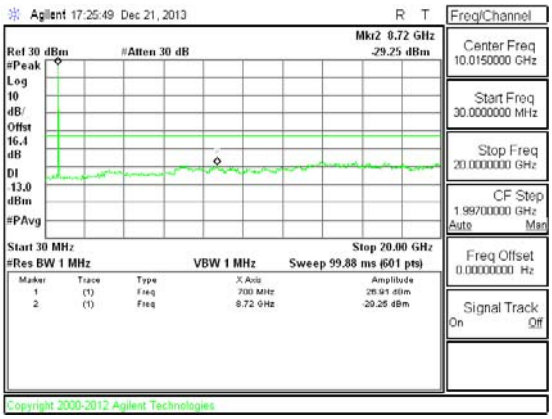
10.3.2. OUT OF BAND EMISSIONS PLOTS

Band LTE17 10MHz 16QAM	 Band LTE17 10MHz CSE 16QAM Mid channel	 Band LTE17 10MHz CSE QPSK Mid channel

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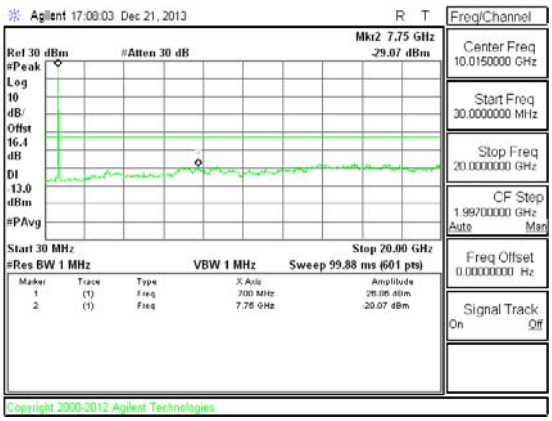
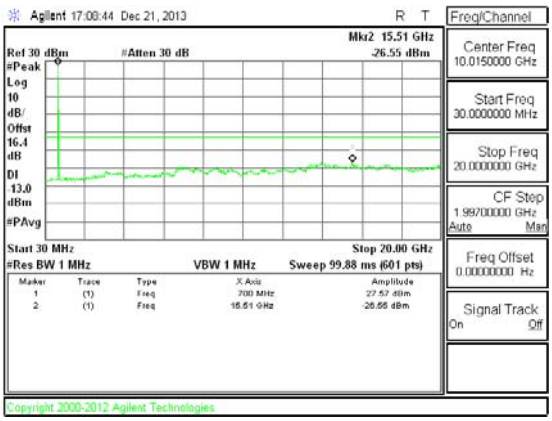
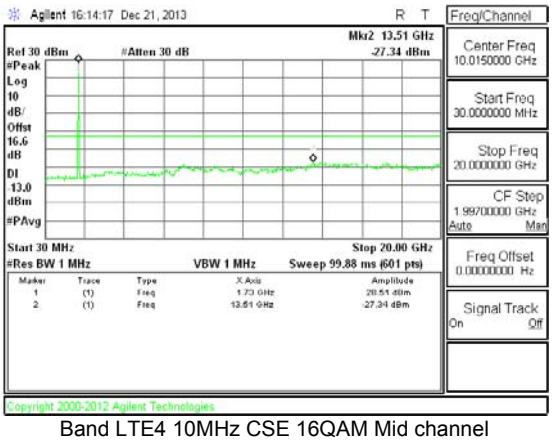
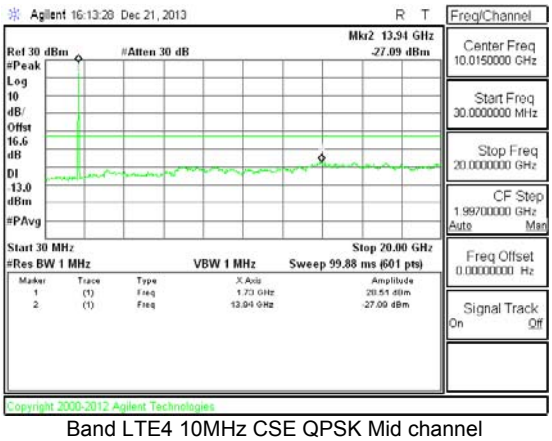
Band LTE17 5MHz 16QAM	 Band LTE17 5MHz CSE 16QAM Mid channel	 Band LTE17 5MHz CSE QPSK Mid channel

Band LTE4 10MHz 16QAM	 Band LTE4 10MHz CSE 16QAM Mid channel	 Band LTE4 10MHz CSE QPSK Mid channel

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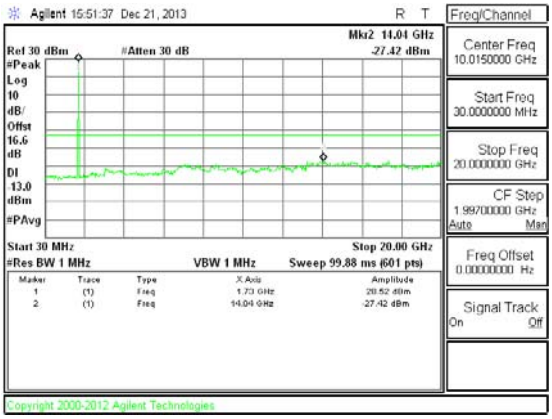
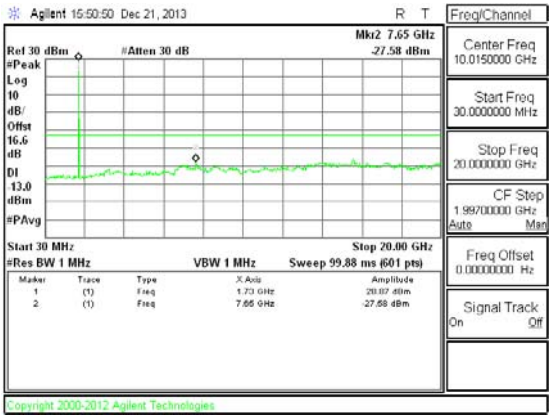
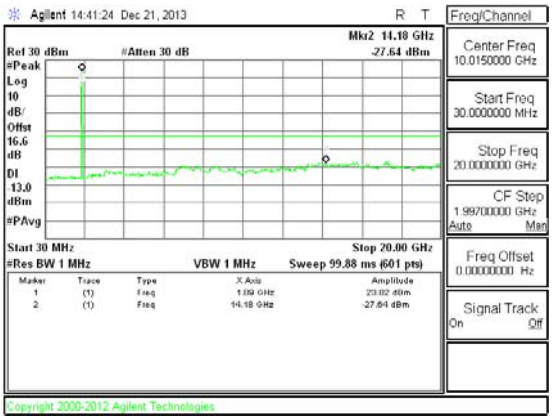
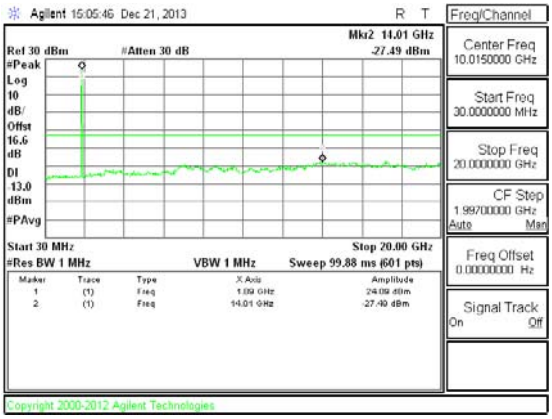
Band LTE4 5MHz 16QAM	 Band LTE4 5MHz CSE 16QAM Mid channel	 Band LTE4 5MHz CSE QPSK Mid channel

Band Band 2	 Band WCDMA B2 REL99 CSE	 Band WCDMA B2 HSDPA CSE

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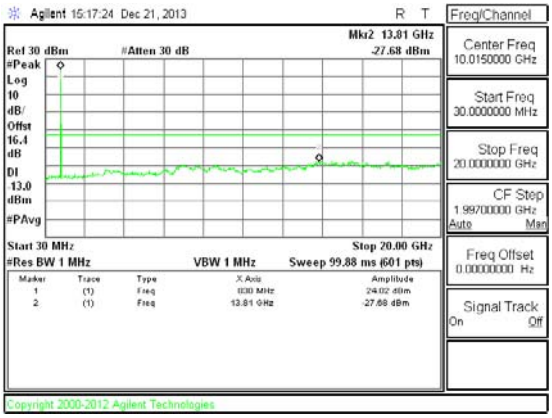
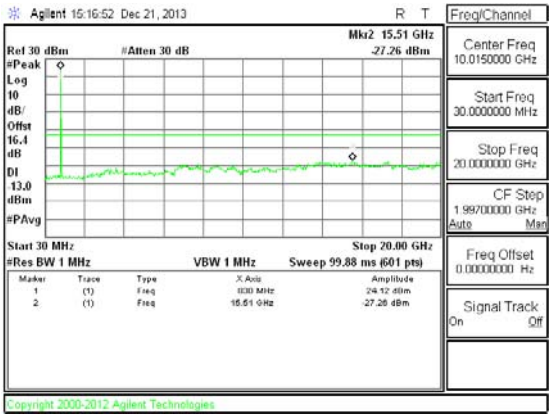
Band Band 5	 Band WCDMA B5 REL99 CSE	 Band WCDMA B5 HSDPA CSE	

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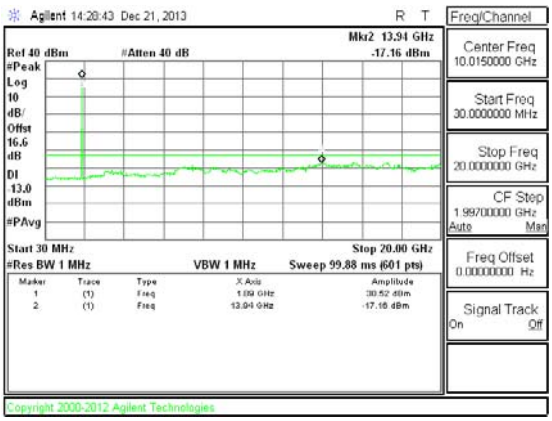
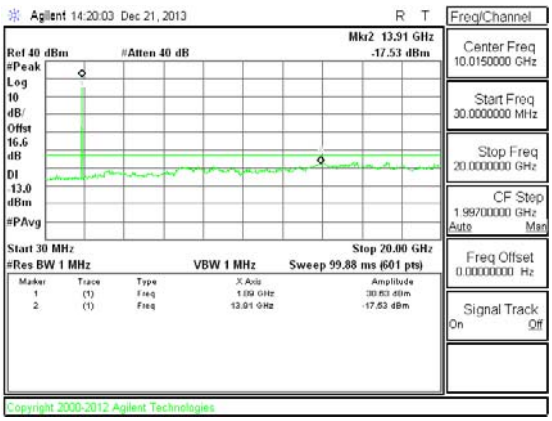
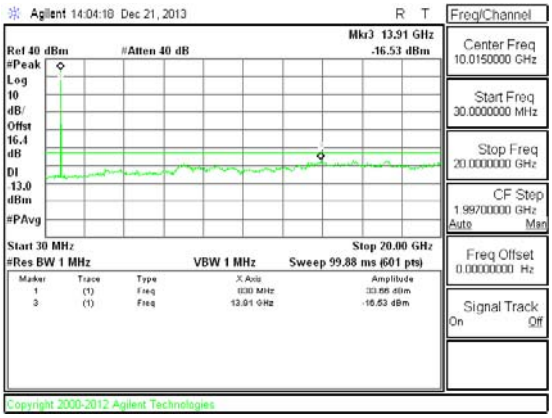
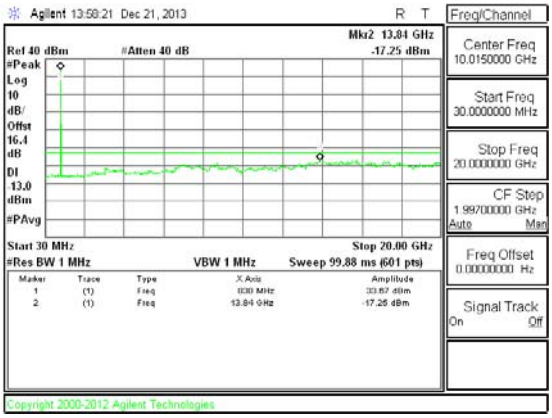
Band GSM1900 EGPRS	 Band GSM1900 EGPRS CSE Mid channel	 Band GSM1900 GPRS CSE Mid channel
Band GSM850	 Band GSM850 EGPRS CSE Mid channel	 Band GSM850 GPRS CSE Mid channel

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10.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, and §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

Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to 20ºC 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 +50ºC 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 3.20 to 4.20 VDC.

MODES TESTED

LTE Band 4 and 17
WCDMA Band 2 and Band 5

RESULTS

See the following pages.

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BAND 5 – MID CHANNEL

Reference Frequency: Mid Channel 836.000010 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.70	50	836.599997	0.007	2.5
3.70	40	836.600004	-0.001	2.5
3.70	30	836.600002	0.001	2.5
3.70	***20***	***836.600003***	***0***	***2.5***
3.70	10	836.600005	-0.003	2.5
3.70	0	836.600008	-0.006	2.5
3.70	-10	836.600008	-0.006	2.5
3.70	-20	836.600004	-0.001	2.5
3.70	-30	836.599996	0.009	2.5

Reference Frequency: Mid Channel 836.600010 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
			Delta (ppm)	Limit (ppm)
3.70	***20***	***836.599994***	***0.00000***	***2.5***
4.20	20	836.600005	*-0.01335*	2.5
3.30	20	836.600006	*-0.01465*	2.5
End Volt(3.2)	20	836.600006	*-0.01383*	2.5

BAND 2 – MID CHANNEL

Reference Frequency: Mid Channel 1800.000010 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4500.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.70	50	1800.000008	0.000	2.5
3.70	40	1800.000008	0.000	2.5
3.70	30	1800.000008	0.000	2.5
3.70	***20***	***1800.000008***	***0***	***2.5***
3.70	10	1800.000008	0.000	2.5
3.70	0	1800.000010	-0.001	2.5
3.70	-10	1800.000007	0.001	2.5
3.70	-20	1800.000011	-0.001	2.5
3.70	-30	1800.000010	-0.001	2.5

Reference Frequency: Mid Channel 836.600010 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4500.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
			Delta (ppm)	Limit (ppm)
3.70	***20***	***1800.000008***	***0.00000***	***2.5***
4.20	20	1800.000007	*0.00053*	2.5
3.30	20	1800.000008	*-0.00002*	2.5
End Volt(3.2)	20	1800.000010	*-0.00117*	2.5

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LTE BAND 17 – MID CHANNEL

Reference Frequency: Mid Channel 710.000010 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 1775.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.70	50	710.000040	-0.042	2.5
3.70	40	710.000030	-0.028	2.5
3.70	30	710.000020	-0.014	2.5
3.70	***20***	***710.000010***	***0***	***2.5***
3.70	10	710.000010	0.000	2.5
3.70	0	710.000020	-0.014	2.5
3.70	-10	710.000053	-0.061	2.5
3.70	-20	710.000042	-0.045	2.5
3.70	-30	710.000053	-0.061	2.5

Reference Frequency: Mid Channel 710.000010 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 1775.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse	Delta (ppm)	Limit (ppm)
3.70	***20***	***710.000010***	***0.00000***	***2.5***
4.20	20	710.000040	*-0.04225*	2.5
3.30	20	710.000020	*-0.01408*	2.5
End Volt(3.2)	20	710.000030	*-0.02817*	2.5

LTE BAND 4 – MID CHANNEL

Reference Frequency: PCS Mid Channel 1732.500001MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4331.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.70	50	1732.500002	-0.001	2.5
3.70	40	1732.500003	-0.001	2.5
3.70	30	1732.500004	-0.002	2.5
3.70	***20***	***1732.500001***	***0***	***2.5***
3.70	10	1732.500002	-0.001	2.5
3.70	0	1732.500004	-0.002	2.5
3.70	-10	1732.500002	-0.001	2.5
3.70	-20	1732.500004	-0.002	2.5
3.70	-30	1732.500003	-0.001	2.5

Reference Frequency: PCS Mid Channel 1732.500001 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4331.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse	Delta (ppm)	Limit (ppm)
3.70	***20***	***1732.500001***	***0.00000***	***2.5***
4.20	20	1732.500003	*-0.00115*	2.5
3.30	20	1732.500004	*-0.00173*	2.5
End Volt(3.2)	20	1732.500004	*-0.00173*	2.5

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11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, and § 27.

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.

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

MODES TESTED

WCDMA Band 2 and Band 5
GSM 850 and 1900
LTE 4 and LTE 17

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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TEST RESULTS

11.1.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 2	REL99	9275	1852.6	25.35	342.77
		9400	1880	24.37	273.53
		9525	1907.4	24.41	276.06
	HSDPA	9275	1852.6	24.05	254.10
		9400	1880	22.38	172.98
		9525	1907.4	22.07	161.06

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 5	REL99	4145	826.6	19.421	87.52
		4183	836.6	18.851	76.75
		4220	846.4	19.421	87.52
	HSDPA	4145	826.6	18.54	71.45
		4183	836.6	17.25	53.09
		4220	846.4	18.26	66.99

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM1900	GMSK	512	1850.2		
		661	1880		
		810	1909.8		
	GPRS	512	1850.2	30.88	1224.62
		661	1880	30.48	1116.86
		810	1909.8	30.738	1185.22
	EGPRS	512	1850.2	29.24	839.5
		661	1880	29.07	807.2
		810	1909.8	29.678	928.54

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Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM850	GMSK	128	824.2		
		190	836.6		
		251	848.8		
	GPRS	128	824.2	27.101	512.98
		190	836.6	29.401	871.16
		251	848.8	28.431	696.79
	EGPRS	128	824.2	21.511	141.6
		190	836.6	24.381	274.22
		251	848.8	24.601	288.47

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11.1.2. LTE ERP/EIRP Results

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE17	10	QPSK	1/0	709	18.651	73.3
			1/0	710	18.781	75.53
			1/0	711	18.201	66.08
		16QAM	1/0	709	18.52	71.12
			1/0	710	18.061	63.99
			1/0	711	18.091	64.43

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE17	5	QPSK	1/0	706.5	19.151	82.24
			1/0	710	18.441	69.84
			1/0	713.5	18.651	73.3
		16QAM	1/0	706.5	18.351	68.41
			1/0	710	18.251	66.85
			1/0	713.5	18.411	69.36

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	10	QPSK	1/0	1715	21.57	143.5
			1/0	1732.5	21.50	141.25
			1/0	1750	21.69	147.6
		16QAM	1/0	1715	20.89	122.7
			1/0	1732.5	19.90	97.72
			1/0	1750	21.64	145.9

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Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	5	QPSK	1/0	1712.5	20.88	122.46
			1/0	1732.5	20.53	112.98
			1/0	1752.5	20.73	118.30
		16QAM	1/0	1712.5	20.80	120.23
			1/0	1732.5	20.27	106.41
			1/0	1752.5	20.09	102.09

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11.1.3. ERP/EIRP PLOTS

Band

LTE17

10MHz

16QAM

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Charles Vergonio
Configuration: EUT Only and AC Adapter
Mode: LTE Band 17_10MHz_16QAM

Test Equipment:
Receiving: Sunol T243, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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								
706.50	15.16	V	0.5	0.0	14.66	38.5	-23.8	
706.50	19.02	H	0.5	0.0	18.52	38.5	-19.9	
Mid Ch								
710.00	15.19	V	0.5	0.0	14.69	38.5	-23.8	
710.00	18.56	H	0.5	0.0	18.06	38.5	-20.4	
High Ch								
711.00	14.75	V	0.5	0.0	14.25	38.5	-24.2	
711.00	18.59	H	0.5	0.0	18.09	38.5	-20.4	

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Band

LTE17

10MHz

QPSK

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Charles Vergonio
Configuration: EUT Only and AC Adapter
Mode: LTE Band 17_10MHz_QPSK

Test Equipment:
Receiving: Sunol T243, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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								
709.00	15.11	V	0.5	0.0	14.61	38.5	-23.8	
709.00	19.15	H	0.5	0.0	18.65	38.5	-19.8	
Mid Ch								
710.00	15.09	V	0.5	0.0	14.59	38.5	-23.9	
710.00	19.28	H	0.5	0.0	18.78	38.5	-19.7	
High Ch								
711.00	14.99	V	0.5	0.0	14.49	38.5	-24.0	
711.00	18.70	H	0.5	0.0	18.20	38.5	-20.2	

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Band

LTE17

5MHz

16QAM

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Charles Vergonio
Configuration: EUT Only and AC Adapter
Mode: LTE Band 17_5MHz_16QAM

Test Equipment:
Receiving: Sunol T345, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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								
706.50	15.05	V	0.5	0.0	14.55	38.5	-23.9	
706.50	18.85	H	0.5	0.0	18.35	38.5	-20.1	
Mid Ch								
710.00	15.25	V	0.5	0.0	14.75	38.5	-23.7	
710.00	18.75	H	0.5	0.0	18.25	38.5	-20.2	
High Ch								
713.50	15.47	V	0.5	0.0	14.97	38.5	-23.5	
713.50	18.91	H	0.5	0.0	18.41	38.5	-20.0	

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Band

LTE17

5MHz

QPSK

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Charles Vergonio
Configuration: EUT Only and AC Adapter
Mode: LTE Band 17_5MHz_QPSK

Test Equipment:
Receiving: Sunol T345, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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								
706.50	15.10	V	0.5	0.0	14.60	38.5	-23.8	
706.50	19.65	H	0.5	0.0	19.15	38.5	-19.3	
Mid Ch								
710.00	15.40	V	0.5	0.0	14.90	38.5	-23.5	
710.00	18.94	H	0.5	0.0	18.44	38.5	-20.0	
High Ch								
713.50	15.20	V	0.5	0.0	14.70	38.5	-23.7	
713.50	19.15	H	0.5	0.0	18.65	38.5	-19.8	

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Band

LTE4

10MHz

16QAM

High Frequency Fundamental Measurement
Compliance Certification Services Chamber C

Company: LG
Project #: 13U16673
Date: 12/16/13
Test Engineer: Charles Vergonio
Configuration: Y Position, EUT only
Mode: LTE_B4_10MHz_16QAM

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T711 Substitution, 4ft SMA Cable (244639001) 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								
1.715	16.2	V	0.85	5.58	20.89	33.0	-12.1	
1.715	14.0	H	0.85	5.58	18.73	33.0	-14.3	
Mid Ch								
1.732	15.2	V	0.85	5.60	19.90	33.0	-13.1	
1.732	13.5	H	0.85	5.60	18.24	33.0	-14.8	
High Ch								
1.750	16.9	V	0.85	5.63	21.64	33.0	-11.4	
1.750	15.5	H	0.85	5.63	20.32	33.0	-12.7	

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Note: The limit is 30dBm for band 4

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Band

LTE4

10MHz

QPSK

High Frequency Fundamental Measurement
Compliance Certification Services Chamber C

Company: LG
Project #: 13U16673
Date: 12/16/13
Test Engineer: Charles Vergonio
Configuration: Y Position, EUT only
Mode: LTE_B4_10MHz_QPSK

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T711 Substitution, 4ft SMA Cable (244639001) 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								
1.715	16.8	V	0.85	5.58	21.57	33.0	-11.4	
1.715	14.7	H	0.85	5.58	19.47	33.0	-13.5	
Mid Ch								
1.732	16.8	V	0.85	5.60	21.50	33.0	-11.5	
1.732	13.3	H	0.85	5.60	18.07	33.0	-14.9	
High Ch								
1.750	16.9	V	0.85	5.63	21.69	33.0	-11.3	
1.750	15.4	H	0.85	5.63	20.22	33.0	-12.8	

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Note: The limit is 30dBm for band 4

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Band

LTE4

5MHz

16QAM

High Frequency Fundamental Measurement
Compliance Certification Services Chamber C

Company: LG
Project #: 13U16673
Date: 12/16/13
Test Engineer: Charles Vergonio
Configuration: Y Position, EUT only
Mode: LTE_B4_5MHz_16QAM

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T711 Substitution, 4ft SMA Cable (244639001) 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								
1.712	16.1	V	0.85	5.58	20.80	33.0	-12.2	
1.712	13.7	H	0.85	5.58	18.47	33.0	-14.5	
Mid Ch								
1.732	15.5	V	0.85	5.60	20.27	33.0	-12.7	
1.732	12.7	H	0.85	5.60	17.40	33.0	-15.6	
High Ch								
1.752	15.3	V	0.85	5.63	20.09	33.0	-12.9	
1.752	13.9	H	0.85	5.63	18.66	33.0	-14.3	

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Note: The limit is 30dBm for band 4

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Band

LTE4

5MHz

QPSK

High Frequency Fundamental Measurement
Compliance Certification Services Chamber C

Company: LG
Project #: 13U16673
Date: 12/16/13
Test Engineer: Charles Vergonio
Configuration: Y Position, EUT only
Mode: LTE_B4_5MHz_QPSK

Test Equipment:
Receiving: Horn T345, and Chamber C SMA Cables
Substitution: Horn T711 Substitution, 4ft SMA Cable (244639001) 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								
1.712	16.2	V	0.85	5.58	20.88	33.0	-12.1	
1.712	14.3	H	0.85	5.58	19.03	33.0	-14.0	
Mid Ch								
1.732	15.8	V	0.85	5.60	20.53	33.0	-12.5	
1.732	13.2	H	0.85	5.60	17.95	33.0	-15.1	
High Ch								
1.752	16.0	V	0.85	5.63	20.73	33.0	-12.3	
1.752	14.5	H	0.85	5.63	19.31	33.0	-13.7	

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Note: The limit is 30dBm for band 4

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High Frequency Fundamental Measurement
Compliance Certification Services Chamber C

Company: LG
Project #: 13U16673
Date: 12/1052013
Test Engineer: Kiya Kedida
Configuration: X Position, EUT only
Mode: WCDMA_Rel 99_1900

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T711 Substitution, 4ft SMA Cable (244639001) Warehouse

Band

Band 2

REL99

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.852	12.9	V	0.85	5.58	17.59	33.0	-15.4	
1.852	20.6	H	0.85	5.58	25.35	33.0	-7.7	
Mid Ch								
1.880	13.0	V	0.85	5.60	17.73	33.0	-15.3	
1.880	19.6	H	0.85	5.60	24.37	33.0	-8.6	
High Ch								
1.908	13.3	V	0.85	5.63	18.12	33.0	-14.9	
1.908	19.6	H	0.85	5.63	24.41	33.0	-8.6	

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Band 2

HSDPA

High Frequency Fundamental Measurement
Compliance Certification Services Chamber C

Company: LG
Project #: 13U16673
Date: 12/1052013
Test Engineer: Kiya Kedida
Configuration: X Position, EUT only
Mode: WCDMA_HSDPA_ 1900

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T711 Substitution, 4ft SMA Cable (244639001) 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								
1.852	11.5	V	0.85	5.58	16.18	33.0	-16.8	
1.852	19.3	H	0.85	5.58	24.05	33.0	-9.0	
Mid Ch								
1.880	8.6	V	0.85	5.60	13.39	33.0	-19.6	
1.880	17.6	H	0.85	5.60	22.38	33.0	-10.6	
High Ch								
1.908	10.2	V	0.85	5.63	14.99	33.0	-18.0	
1.908	17.3	H	0.85	5.63	22.07	33.0	-10.9	

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Band

Band 5

REL99

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Charles Vergonio
Configuration: EUT, Z position
Mode: WCDMA_Rel 99_850

Test Equipment:
Receiving: Sunol T243, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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								
826.60	13.14	V	0.9	0.0	12.24	38.5	-26.2	
826.60	20.32	H	0.9	0.0	19.42	38.5	-19.0	
Mid Ch								
836.60	13.27	V	0.9	0.0	12.37	38.5	-26.1	
836.60	19.75	H	0.9	0.0	18.85	38.5	-19.6	
High Ch								
846.40	12.99	V	0.9	0.0	12.09	38.5	-26.4	
846.40	20.32	H	0.9	0.0	19.42	38.5	-19.0	

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Band

Band 5

HSDPA

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Charles Vergonio
Configuration: EUT, Z position
Mode: WCDMA_HSDPA_ 850

Test Equipment:
Receiving: Sunol T243, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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								
826.60	12.17	V	0.9	0.0	11.27	38.5	-27.2	
826.60	19.44	H	0.9	0.0	18.54	38.5	-19.9	
Mid Ch								
836.60	11.73	V	0.9	0.0	10.83	38.5	-27.6	
836.60	18.15	H	0.9	0.0	17.25	38.5	-21.2	
High Ch								
846.40	11.86	V	0.9	0.0	10.96	38.5	-27.5	
846.40	19.16	H	0.9	0.0	18.26	38.5	-20.2	

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Band

GSM1900

EGPRS

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: LG
Project #: 13U16673
Date: 12/17/13
Test Engineer: Charles Vergonio
Configuration: Y Position, EUT only
Mode: EGPRS 1900MHz

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T711 Substitution, 4ft SMA Cable (244639001) 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								
1.850	24.5	V	0.85	5.58	29.24	33.0	-3.8	
1.850	24.4	H	0.85	5.58	29.11	33.0	-3.9	
Mid Ch								
1.880	24.3	V	0.85	5.60	29.07	33.0	-3.9	
1.880	24.0	H	0.85	5.60	28.73	33.0	-4.3	
High Ch								
1.910	22.0	V	0.85	5.63	26.73	33.0	-6.3	
1.910	24.9	H	0.85	5.63	29.68	33.0	-3.3	

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High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Steven Tran
Configuration: Y Position, EUT only and AC adapter
Mode: GPRS 1900MHz

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T711 Substitution, 4ft SMA Cable (244639001) Warehouse

Band

GSM1 900

GPRS

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	25.5	V	0.85	5.58	30.27	33.0	-2.7	
1.850	26.2	H	0.85	5.58	30.88	33.0	-2.1	
Mid Ch								
1.880	25.4	V	0.85	5.60	30.16	33.0	-2.8	
1.880	25.7	H	0.85	5.60	30.48	33.0	-2.5	
High Ch								
1.910	25.8	V	0.85	5.63	30.61	33.0	-2.4	
1.910	26.0	H	0.85	5.63	30.74	33.0	-2.3	

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Band

GSM850

EGPRS

High Frequency Substitution Measurement
Compliance Certification Services Chamber C

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Charles Vergonio
Configuration: Z Position, AC Charger
Mode: EGRPS 850MHz

Test Equipment:
Receiving: Sunol T243, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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								
824.20	22.41	V	0.9	0.0	21.51	38.5	-16.9	
824.20	22.23	H	0.9	0.0	21.33	38.5	-17.1	
Mid Ch								
836.60	22.57	V	0.9	0.0	21.67	38.5	-16.8	
836.60	25.28	H	0.9	0.0	24.38	38.5	-14.1	
High Ch								
848.80	24.49	V	0.9	0.0	23.59	38.5	-14.9	
848.80	25.50	H	0.9	0.0	24.60	38.5	-13.8	

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Band

GSM850

EGPRS

High Frequency Substitution Measurement
Compliance Certification Services Chamber C

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Charles Vergonio
Configuration: Z Position, AC Charger
Mode: EGRPS 850MHz

Test Equipment:
Receiving: Sunol T243, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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								
824.20	22.41	V	0.9	0.0	21.51	38.5	-16.9	
824.20	22.23	H	0.9	0.0	21.33	38.5	-17.1	
Mid Ch								
836.60	22.57	V	0.9	0.0	21.67	38.5	-16.8	
836.60	25.28	H	0.9	0.0	24.38	38.5	-14.1	
High Ch								
848.80	24.49	V	0.9	0.0	23.59	38.5	-14.9	
848.80	25.50	H	0.9	0.0	24.60	38.5	-13.8	

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Band

GSM850

GPRS

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Charles Vergonio
Configuration: Z Position, AC Charger
Mode: GRPS 850MHz

Test Equipment:
Receiving: Sunol T243, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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								
824.20	28.36	V	0.9	0.0	27.46	38.5	-11.0	
824.20	28.00	H	0.9	0.0	27.10	38.5	-11.3	
Mid Ch								
836.60	27.98	V	0.9	0.0	27.08	38.5	-11.4	
836.60	30.30	H	0.9	0.0	29.40	38.5	-9.0	
High Ch								
848.80	27.13	V	0.9	0.0	26.23	38.5	-12.2	
848.80	29.33	H	0.9	0.0	28.43	38.5	-10.0	

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Band

GSM850

GPRS

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Charles Vergonio
Configuration: Z Position, AC Charger
Mode: GRPS 850MHz

Test Equipment:
Receiving: Sunol T243, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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								
824.20	28.36	V	0.9	0.0	27.46	38.5	-11.0	
824.20	28.00	H	0.9	0.0	27.10	38.5	-11.3	
Mid Ch								
836.60	27.98	V	0.9	0.0	27.08	38.5	-11.4	
836.60	30.30	H	0.9	0.0	29.40	38.5	-9.0	
High Ch								
848.80	27.13	V	0.9	0.0	26.23	38.5	-12.2	
848.80	29.33	H	0.9	0.0	28.43	38.5	-10.0	

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11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, and §27

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. 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

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

WCDMA Band 2 and Band 5
GSM 850 and 1900
LTE 4 and LTE 17

RESULTS

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11.2.1. SPURIOUS RADIATION PLOTS

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 01/06/13
Test Engineer: Kiya Kedida
Configuration: EUT with Wireless charger
Mode: TX, LTE B17 10MHz har 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	T145 8449B	Filter 1	Part 22

Band

LTE17

10MHz

16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (709MHz)									
1.418	-23.9	V	3.0	33.1	1.0	-56.0	-13.0	-43.0	
2.127	-20.1	V	3.0	31.6	1.0	-50.7	-13.0	-37.7	
2.836	-19.3	V	3.0	31.0	1.0	-49.3	-13.0	-36.3	
1.418	-23.8	H	3.0	33.1	1.0	-55.9	-13.0	-42.9	
2.127	-22.3	H	3.0	31.6	1.0	-52.9	-13.0	-39.9	
2.836	-20.7	H	3.0	31.0	1.0	-50.8	-13.0	-37.8	
Mid Ch, (710MHz)									
1.420	-24.2	V	3.0	33.1	1.0	-56.3	-13.0	-43.3	
2.130	-20.5	V	3.0	31.6	1.0	-51.1	-13.0	-38.1	
2.840	-20.1	V	3.0	31.0	1.0	-50.1	-13.0	-37.1	
1.420	-23.9	H	3.0	33.1	1.0	-56.0	-13.0	-43.0	
2.130	-21.7	H	3.0	31.6	1.0	-52.3	-13.0	-39.3	
2.840	-20.6	H	3.0	31.0	1.0	-50.7	-13.0	-37.7	
High Ch, (711MHz)									
1.422	-25.0	V	3.0	33.1	1.0	-57.0	-13.0	-44.0	
2.133	-19.7	V	3.0	31.6	1.0	-50.3	-13.0	-37.3	
2.844	-19.8	V	3.0	31.0	1.0	-49.8	-13.0	-36.8	
1.422	-24.1	H	3.0	33.1	1.0	-56.1	-13.0	-43.1	
2.133	-20.8	H	3.0	31.6	1.0	-51.3	-13.0	-38.3	
2.844	-19.7	H	3.0	31.0	1.0	-49.7	-13.0	-36.7	

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 01/06/13
Test Engineer: Kiya Kedida
Configuration: EUT with Wireless charger
Mode: TX, LTE B17 10MHz har QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	T145 8449B	Filter 1	Part 22

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, (709MHz)									
LTE17	1.418	-22.7	V	3.0	33.1	1.0	-54.8	-13.0	-41.8	
	2.127	-18.8	V	3.0	31.6	1.0	-49.4	-13.0	-36.4	
10MHz	2.836	-18.5	V	3.0	31.0	1.0	-48.5	-13.0	-35.5	
	1.418	-22.8	H	3.0	33.1	1.0	-54.9	-13.0	-41.9	
	2.127	-21.0	H	3.0	31.6	1.0	-51.6	-13.0	-38.6	
QPSK	2.836	-19.5	H	3.0	31.0	1.0	-49.5	-13.0	-36.5	
	Mid Ch, (710MHz)									
	1.420	-23.3	V	3.0	33.1	1.0	-55.4	-13.0	-42.4	
	2.130	-19.3	V	3.0	31.6	1.0	-49.9	-13.0	-36.9	
	2.840	-18.9	V	3.0	31.0	1.0	-48.9	-13.0	-35.9	
	1.420	-22.8	H	3.0	33.1	1.0	-54.9	-13.0	-41.9	
	2.130	-20.8	H	3.0	31.6	1.0	-51.4	-13.0	-38.4	
	2.840	-19.5	H	3.0	31.0	1.0	-49.5	-13.0	-36.5	
	High Ch, (711MHz)									
	1.422	-23.7	V	3.0	33.1	1.0	-55.8	-13.0	-42.8	
	2.133	-18.6	V	3.0	31.6	1.0	-49.2	-13.0	-36.2	
	2.844	-18.9	V	3.0	31.0	1.0	-48.9	-13.0	-35.9	
	1.422	-23.1	H	3.0	33.1	1.0	-55.1	-13.0	-42.1	
	2.133	-19.6	H	3.0	31.6	1.0	-50.2	-13.0	-37.2	
	2.844	-18.8	H	3.0	31.0	1.0	-48.8	-13.0	-35.8	

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #: LG
Date: 13U16673
Test Engineer: 01/06/13
Configuration: Kiya Kedida
Mode: EUT with Wireless charger
TX, LTE B17 5MHz har 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	T145 8449B	Filter 1	Part 22

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, (706.5MHz)									
LTE17	1.413	-23.0	V	3.0	33.1	1.0	-55.0	-13.0	-42.0	
	2.120	-18.3	V	3.0	31.6	1.0	-48.9	-13.0	-35.9	
5MHz	2.826	-17.9	V	3.0	31.0	1.0	-48.0	-13.0	-35.0	
	1.413	-23.8	H	3.0	33.1	1.0	-55.9	-13.0	-42.9	
	2.120	-20.9	H	3.0	31.6	1.0	-51.5	-13.0	-38.5	
16QAM	2.826	-20.0	H	3.0	31.0	1.0	-50.0	-13.0	-37.0	
	Mid Ch, (710MHz)									
	1.420	-23.6	V	3.0	33.1	1.0	-55.7	-13.0	-42.7	
	2.130	-18.5	V	3.0	31.6	1.0	-49.1	-13.0	-36.1	
	2.840	-18.8	V	3.0	31.0	1.0	-48.8	-13.0	-35.8	
	1.420	-23.7	H	3.0	33.1	1.0	-55.8	-13.0	-42.8	
	2.130	-20.9	H	3.0	31.6	1.0	-51.5	-13.0	-38.5	
	2.840	-19.5	H	3.0	31.0	1.0	-49.6	-13.0	-36.6	
	High Ch, (713.5MHz)									
	1.427	-24.9	V	3.0	33.1	1.0	-57.0	-13.0	-44.0	
	2.141	-19.6	V	3.0	31.6	1.0	-50.1	-13.0	-37.1	
	2.854	-19.3	V	3.0	31.0	1.0	-49.3	-13.0	-36.3	
	1.427	-24.4	H	3.0	33.1	1.0	-56.5	-13.0	-43.5	
	2.141	-20.4	H	3.0	31.6	1.0	-50.9	-13.0	-37.9	
	2.854	-19.1	H	3.0	31.0	1.0	-49.1	-13.0	-36.1	

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #: LG
Date: 13U16673
Test Engineer: 01/06/13
Configuration: Kiya Kedida
Mode: EUT with Wireless charger
TX, LTE B17 5MHz har QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	T145 8449B	Filter 1	Part 22

Band

LTE17

5MHz

QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (706.5MHz)									
1.413	-21.4	V	3.0	33.1	1.0	-53.5	-13.0	-40.5	
2.120	-17.1	V	3.0	31.6	1.0	-47.7	-13.0	-34.7	
2.826	-17.2	V	3.0	31.0	1.0	-47.2	-13.0	-34.2	
1.413	-22.7	H	3.0	33.1	1.0	-54.8	-13.0	-41.8	
2.120	-19.5	H	3.0	31.6	1.0	-50.1	-13.0	-37.1	
2.826	-18.9	H	3.0	31.0	1.0	-48.9	-13.0	-35.9	
Mid Ch, (710MHz)									
1.420	-22.3	V	3.0	33.1	1.0	-54.4	-13.0	-41.4	
2.130	-17.2	V	3.0	31.6	1.0	-47.8	-13.0	-34.8	
2.840	-17.6	V	3.0	31.0	1.0	-47.7	-13.0	-34.7	
1.420	-22.7	H	3.0	33.1	1.0	-54.8	-13.0	-41.8	
2.130	-19.4	H	3.0	31.6	1.0	-50.0	-13.0	-37.0	
2.840	-17.7	H	3.0	31.0	1.0	-47.8	-13.0	-34.8	
High Ch, (713.5MHz)									
1.427	-23.3	V	3.0	33.1	1.0	-55.3	-13.0	-42.3	
2.141	-17.9	V	3.0	31.6	1.0	-48.5	-13.0	-35.5	
2.854	-17.3	V	3.0	31.0	1.0	-47.3	-13.0	-34.3	
1.427	-23.2	H	3.0	33.1	1.0	-55.3	-13.0	-42.3	
2.141	-19.4	H	3.0	31.6	1.0	-49.9	-13.0	-36.9	
2.854	-17.7	H	3.0	31.0	1.0	-47.7	-13.0	-34.7	

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Steven
Configuration: Y Position
Mode: TX, LTE band 4, 10MHz BW, 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

Band

LTE4

10MHz

16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1715 MHz)									
3.430	-20.8	V	3.0	30.4	1.0	-50.2	-13.0	-37.2	
5.145	-17.0	V	3.0	28.8	1.0	-44.7	-13.0	-31.7	
6.860	-16.3	V	3.0	27.1	1.0	-42.4	-13.0	-29.4	
3.430	-20.6	H	3.0	30.4	1.0	-50.0	-13.0	-37.0	
5.145	-16.6	H	3.0	28.8	1.0	-44.3	-13.0	-31.3	
6.860	-14.1	H	3.0	27.1	1.0	-40.2	-13.0	-27.2	
Mid Ch, (1732.5 MHz)									
3.465	-20.7	V	3.0	30.4	1.0	-50.1	-13.0	-37.1	
5.198	-17.7	V	3.0	28.7	1.0	-45.4	-13.0	-32.4	
6.930	-15.8	V	3.0	27.1	1.0	-41.9	-13.0	-28.9	
3.465	-19.9	H	3.0	30.4	1.0	-49.3	-13.0	-36.3	
5.198	-17.1	H	3.0	28.7	1.0	-44.8	-13.0	-31.8	
6.930	-14.5	H	3.0	27.1	1.0	-40.6	-13.0	-27.6	
High Ch, (1750 MHz)									
3.500	-20.0	V	3.0	30.4	1.0	-49.4	-13.0	-36.4	
5.250	-17.1	V	3.0	28.7	1.0	-44.8	-13.0	-31.8	
7.000	-15.2	V	3.0	27.0	1.0	-41.2	-13.0	-28.2	
3.500	-19.9	H	3.0	30.4	1.0	-49.2	-13.0	-36.2	
5.250	-17.4	H	3.0	28.7	1.0	-45.0	-13.0	-32.0	
7.000	-13.7	H	3.0	27.0	1.0	-39.7	-13.0	-26.7	

Rev. 03.03.09

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Steven
Configuration: Y Position
Mode: TX, LTE band 4, 10MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, (1715 MHz)									
LTE4	3.430	-19.8	V	3.0	30.4	1.0	-49.2	-13.0	-36.2	
	5.145	-16.0	V	3.0	28.8	1.0	-43.7	-13.0	-30.7	
10MH	6.860	-15.3	V	3.0	27.1	1.0	-41.4	-13.0	-28.4	
z	3.430	-20.2	H	3.0	30.4	1.0	-49.7	-13.0	-36.7	
	5.145	-15.9	H	3.0	28.8	1.0	-43.7	-13.0	-30.7	
QPSK	6.860	-13.7	H	3.0	27.1	1.0	-39.8	-13.0	-26.8	
	Mid Ch, (1732.5 MHz)									
	3.465	-20.2	V	3.0	30.4	1.0	-49.6	-13.0	-36.6	
	5.198	-17.2	V	3.0	28.7	1.0	-44.9	-13.0	-31.9	
	6.930	-15.3	V	3.0	27.1	1.0	-41.4	-13.0	-28.4	
	3.465	-19.4	H	3.0	30.4	1.0	-48.8	-13.0	-35.8	
	5.198	-16.6	H	3.0	28.7	1.0	-44.3	-13.0	-31.3	
	6.930	-14.0	H	3.0	27.1	1.0	-40.1	-13.0	-27.1	
	High Ch, (1750 MHz)									
	3.500	-19.5	V	3.0	30.4	1.0	-48.9	-13.0	-35.9	
	5.250	-16.6	V	3.0	28.7	1.0	-44.3	-13.0	-31.3	
	7.000	-14.7	V	3.0	27.0	1.0	-40.7	-13.0	-27.7	
	3.500	-19.4	H	3.0	30.4	1.0	-48.7	-13.0	-35.7	
	5.250	-16.9	H	3.0	28.7	1.0	-44.5	-13.0	-31.5	
	7.000	-13.2	H	3.0	27.0	1.0	-39.2	-13.0	-26.2	

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Steven
Configuration: Y Position
Mode: TX, LTE band 4, 5MHz BW, 16 QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, (1712.5 MHz)									
LTE4	3.420	-20.7	V	3.0	30.4	1.0	-50.1	-13.0	-37.1	
	5.131	-18.3	V	3.0	28.8	1.0	-46.1	-13.0	-33.1	
5MHz	6.841	-9.4	V	3.0	27.2	1.0	-35.6	-13.0	-22.6	
	3.420	-19.8	H	3.0	30.4	1.0	-49.3	-13.0	-36.3	
	5.131	-17.2	H	3.0	28.8	1.0	-44.9	-13.0	-31.9	
16QAM	6.921	-4.8	H	3.0	27.1	1.0	-30.9	-13.0	-17.9	
	Mid Ch, (1732.5 MHz)									
	3.460	-20.3	V	3.0	30.4	1.0	-49.7	-13.0	-36.7	
	5.190	-6.5	V	3.0	28.7	1.0	-34.2	-13.0	-21.2	
	6.920	-15.6	V	3.0	27.1	1.0	-41.6	-13.0	-28.6	
	3.460	-20.4	H	3.0	30.4	1.0	-49.8	-13.0	-36.8	
	5.000	-3.8	H	3.0	28.9	1.0	-31.7	-13.0	-18.7	
	5.191	-12.6	H	3.0	28.7	1.0	-40.4	-13.0	-27.4	
	High Ch, (1752.5 MHz)									
	3.500	-20.4	V	3.0	30.4	1.0	-49.7	-13.0	-36.7	
	5.520	-16.7	V	3.0	28.4	1.0	-44.1	-13.0	-31.1	
	7.001	-15.8	V	3.0	27.0	1.0	-41.8	-13.0	-28.8	
	3.501	-20.7	H	3.0	30.4	1.0	-50.0	-13.0	-37.0	
	5.250	-16.7	H	3.0	28.7	1.0	-44.4	-13.0	-31.4	
	7.001	-14.0	H	3.0	27.0	1.0	-40.0	-13.0	-27.0	

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UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Steven
Configuration: Y Position
Mode: TX, LTE band 4, 5MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

Band
LTE4
5MHz
QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1712.5 MHz)									
3.425	-20.2	V	3.0	30.4	1.0	-49.6	-13.0	-36.6	
5.139	-17.8	V	3.0	28.8	1.0	-45.6	-13.0	-32.6	
6.850	-8.9	V	3.0	27.1	1.0	-35.1	-13.0	-22.1	
3.427	-19.3	H	3.0	30.4	1.0	-48.8	-13.0	-35.8	
5.134	-16.7	H	3.0	28.8	1.0	-44.5	-13.0	-31.5	
6.849	-4.5	H	3.0	27.1	1.0	-30.7	-13.0	-17.7	
Mid Ch, (1732.5 MHz)									
3.460	-19.9	V	3.0	30.4	1.0	-49.3	-13.0	-36.3	
5.190	-6.0	V	3.0	28.7	1.0	-33.7	-13.0	-20.7	
6.921	-15.1	V	3.0	27.1	1.0	-41.2	-13.0	-28.2	
3.460	-20.0	H	3.0	30.4	1.0	-49.4	-13.0	-36.4	
5.191	-2.8	H	3.0	28.7	1.0	-30.5	-13.0	-17.5	
6.921	-9.2	H	3.0	27.1	1.0	-35.3	-13.0	-22.3	
High Ch, (1752.5 MHz)									
3.500	-19.9	V	3.0	30.4	1.0	-49.3	-13.0	-36.3	
5.251	-16.6	V	3.0	28.7	1.0	-44.2	-13.0	-31.2	
7.001	-15.4	V	3.0	27.0	1.0	-41.4	-13.0	-28.4	
3.500	-20.2	H	3.0	30.4	1.0	-49.6	-13.0	-36.6	
5.264	-16.2	H	3.0	28.6	1.0	-43.9	-13.0	-30.9	
7.000	-13.5	H	3.0	27.0	1.0	-39.5	-13.0	-26.5	

Rev. 03.03.09

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Steven Tran
Configuration: X Position w/ charger
Mode: Tx, 1900MHz Rel 99

Chamber	Pre-amplifer	Filter	Limit
5m Chamber C	T34 8449B	Filter 1	Part 24

Band

Band 2

REL99

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.705	-22.0	V	3.0	35.4	1.0	-56.4	-13.0	-43.4	
5.557	-16.1	V	3.0	34.7	1.0	-49.8	-13.0	-36.8	
7.409	-9.2	V	3.0	34.9	1.0	-43.1	-13.0	-30.1	
3.705	-22.3	H	3.0	35.4	1.0	-56.7	-13.0	-43.7	
5.557	-17.8	H	3.0	34.7	1.0	-51.5	-13.0	-38.5	
7.409	-13.3	H	3.0	34.9	1.0	-47.2	-13.0	-34.2	
Mid Ch, 1880MHz									
3.760	-22.8	V	3.0	35.3	1.0	-57.2	-13.0	-44.2	
5.640	-19.2	V	3.0	34.7	1.0	-52.9	-13.0	-39.9	
7.520	-14.8	V	3.0	34.9	1.0	-48.7	-13.0	-35.7	
3.760	-19.1	H	3.0	35.3	1.0	-53.5	-13.0	-40.5	
5.640	-15.7	H	3.0	34.7	1.0	-49.4	-13.0	-36.4	
7.520	-15.1	H	3.0	34.9	1.0	-49.0	-13.0	-36.0	
High Ch, 1907.6MHz									
3.815	-20.5	V	3.0	35.3	1.0	-54.8	-13.0	-41.8	
5.723	-13.0	V	3.0	34.7	1.0	-46.7	-13.0	-33.7	
7.630	-8.4	V	3.0	34.9	1.0	-42.4	-13.0	-29.4	
3.815	-19.7	H	3.0	35.3	1.0	-54.0	-13.0	-41.0	
5.723	-14.3	H	3.0	34.7	1.0	-48.0	-13.0	-35.0	
7.630	-9.3	H	3.0	34.9	1.0	-43.2	-13.0	-30.2	

Rev. 03.03.09

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Steven Tran
Configuration: X Position w/ charger
Mode: Tx, 1900MHz Rel 99

Chamber	Pre-amplifer	Filter	Limit
5m Chamber C	T34 8449B	Filter 1	Part 24

Band

Band 2

REL99

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.705	-22.0	V	3.0	35.4	1.0	-56.4	-13.0	-43.4	
5.557	-16.1	V	3.0	34.7	1.0	-49.8	-13.0	-36.8	
7.409	-9.2	V	3.0	34.9	1.0	-43.1	-13.0	-30.1	
3.705	-22.3	H	3.0	35.4	1.0	-56.7	-13.0	-43.7	
5.557	-17.8	H	3.0	34.7	1.0	-51.5	-13.0	-38.5	
7.409	-13.3	H	3.0	34.9	1.0	-47.2	-13.0	-34.2	
Mid Ch, 1880MHz									
3.760	-22.8	V	3.0	35.3	1.0	-57.2	-13.0	-44.2	
5.640	-19.2	V	3.0	34.7	1.0	-52.9	-13.0	-39.9	
7.520	-14.8	V	3.0	34.9	1.0	-48.7	-13.0	-35.7	
3.760	-19.1	H	3.0	35.3	1.0	-53.5	-13.0	-40.5	
5.640	-15.7	H	3.0	34.7	1.0	-49.4	-13.0	-36.4	
7.520	-15.1	H	3.0	34.9	1.0	-49.0	-13.0	-36.0	
High Ch, 1907.6MHz									
3.815	-20.5	V	3.0	35.3	1.0	-54.8	-13.0	-41.8	
5.723	-13.0	V	3.0	34.7	1.0	-46.7	-13.0	-33.7	
7.630	-8.4	V	3.0	34.9	1.0	-42.4	-13.0	-29.4	
3.815	-19.7	H	3.0	35.3	1.0	-54.0	-13.0	-41.0	
5.723	-14.3	H	3.0	34.7	1.0	-48.0	-13.0	-35.0	
7.630	-9.3	H	3.0	34.9	1.0	-43.2	-13.0	-30.2	

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UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Steven Tran
Configuration: X Position w/ charger
Mode: Tx, 1900MHz HSDPA

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T34 8449B	Filter 1	Part 24

Band

Band 5

HSDPA

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.705	-19.7	V	3.0	35.4	1.0	-54.1	-13.0	-41.1	
5.557	-15.1	V	3.0	34.7	1.0	-48.8	-13.0	-35.8	
7.409	-8.0	V	3.0	34.9	1.0	-42.0	-13.0	-29.0	
3.705	-19.0	H	3.0	35.4	1.0	-53.4	-13.0	-40.4	
5.557	-15.5	H	3.0	34.7	1.0	-49.2	-13.0	-36.2	
7.409	-12.8	H	3.0	34.9	1.0	-46.7	-13.0	-33.7	
Mid Ch, 1880MHz									
3.760	-19.5	V	3.0	35.3	1.0	-53.8	-13.0	-40.8	
5.640	-16.8	V	3.0	34.7	1.0	-50.5	-13.0	-37.5	
7.520	-13.6	V	3.0	34.9	1.0	-47.5	-13.0	-34.5	
3.760	-20.8	H	3.0	35.3	1.0	-55.1	-13.0	-42.1	
5.640	-15.7	H	3.0	34.7	1.0	-49.4	-13.0	-36.4	
7.520	-13.7	H	3.0	34.9	1.0	-47.7	-13.0	-34.7	
High Ch, 1907.6MHz									
3.815	-20.1	V	3.0	35.3	1.0	-54.4	-13.0	-41.4	
5.723	-13.4	V	3.0	34.7	1.0	-47.1	-13.0	-34.1	
7.630	-8.5	V	3.0	34.9	1.0	-42.5	-13.0	-29.5	
3.815	-19.9	H	3.0	35.3	1.0	-54.2	-13.0	-41.2	
5.723	-15.0	H	3.0	34.7	1.0	-48.8	-13.0	-35.8	
7.630	-11.3	H	3.0	34.9	1.0	-45.3	-13.0	-32.3	

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

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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Band

Band 5

HSDPA

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 01/08/13
Test Engineer: Kiya Kedida
Configuration: Y Position w/ charger
Mode: WCDMA_HSDPA_ 850

Chamber	Pre-amplifer	Filter	Limit
3m Chamber B	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)	Notes
Low Ch, 826.40MHz									
1.652	-28.0	V	3.0	37.4	1.0	-64.4	-13.0	-51.4	
2.479	-23.9	V	3.0	36.4	1.0	-59.3	-13.0	-46.3	
3.306	-18.6	V	3.0	35.8	1.0	-53.4	-13.0	-40.4	
1.652	-29.2	H	3.0	37.4	1.0	-65.5	-13.0	-52.5	
2.479	-25.4	H	3.0	36.4	1.0	-60.8	-13.0	-47.8	
3.306	-18.5	H	3.0	35.8	1.0	-53.3	-13.0	-40.3	
Mid Ch, 836.6MHz									
1.673	-28.9	V	3.0	37.3	1.0	-65.2	-13.0	-52.2	
2.510	-23.3	V	3.0	36.4	1.0	-58.7	-13.0	-45.7	
3.346	-19.0	V	3.0	35.8	1.0	-53.8	-13.0	-40.8	
1.673	-28.2	H	3.0	37.3	1.0	-64.5	-13.0	-51.5	
2.510	-24.0	H	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3.346	-18.9	H	3.0	35.8	1.0	-53.6	-13.0	-40.6	
High Ch, 846.6MHz									
1.693	-27.5	V	3.0	37.3	1.0	-63.8	-13.0	-50.8	
2.539	-23.2	V	3.0	36.3	1.0	-58.6	-13.0	-45.6	
3.386	-18.9	V	3.0	35.7	1.0	-53.6	-13.0	-40.6	
1.693	-28.4	H	3.0	37.3	1.0	-64.7	-13.0	-51.7	
2.539	-24.4	H	3.0	36.3	1.0	-59.8	-13.0	-46.8	
3.386	-19.5	H	3.0	35.7	1.0	-54.2	-13.0	-41.2	

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

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Steven Tran
Configuration: Y w/ ac charger
Mode: EGPRS 1900

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T343 8449B	Filter 1	Part 24

Band: GSM1900 EGPRS

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850MHz									
3.700	-22.7	V	3.0	35.4	1.0	-57.1	-13.0	-44.1	
5.550	-14.7	V	3.0	34.7	1.0	-48.4	-13.0	-35.4	
7.400	-12.4	V	3.0	34.9	1.0	-46.3	-13.0	-33.3	
3.700	-15.4	H	3.0	35.4	1.0	-49.8	-13.0	-36.8	
5.550	-6.3	H	3.0	34.7	1.0	-40.0	-13.0	-27.0	
7.400	-11.2	H	3.0	34.9	1.0	-45.1	-13.0	-32.1	
Mid Ch, 1880.0MHz									
3.760	-22.4	V	3.0	35.3	1.0	-56.8	-13.0	-43.8	
5.640	-12.7	V	3.0	34.7	1.0	-46.4	-13.0	-33.4	
7.520	-10.7	V	3.0	34.9	1.0	-44.7	-13.0	-31.7	
3.760	-21.7	H	3.0	35.3	1.0	-56.1	-13.0	-43.1	
5.640	-10.9	H	3.0	34.7	1.0	-44.6	-13.0	-31.6	
7.520	-4.6	H	3.0	34.9	1.0	-38.5	-13.0	-25.5	
High Ch, 1909.8 MHz									
3.822	-22.7	V	3.0	35.3	1.0	-57.0	-13.0	-44.0	
5.729	-12.8	V	3.0	34.7	1.0	-46.5	-13.0	-33.5	
7.640	-11.3	V	3.0	35.0	1.0	-45.2	-13.0	-32.2	
3.822	-16.7	H	3.0	35.3	1.0	-51.0	-13.0	-38.0	
5.729	-12.8	H	3.0	34.7	1.0	-46.5	-13.0	-33.5	
7.640	-5.2	H	3.0	35.0	1.0	-39.2	-13.0	-26.2	

Rev. 03.03.09

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 12/18/13
Test Engineer: Steven Tran
Configuration: Y w/ ac charger
Mode: GPRS 1900

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T343 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
	Low Ch, 1850MHz									
GSM1 900	3.700	-21.0	V	3.0	35.4	1.0	-55.4	-13.0	-42.4	
	5.550	-13.8	V	3.0	34.7	1.0	-47.5	-13.0	-34.5	
	7.400	-11.3	V	3.0	34.9	1.0	-45.2	-13.0	-32.2	
GPRS	3.700	-16.1	H	3.0	35.4	1.0	-50.5	-13.0	-37.5	
	5.550	-10.1	H	3.0	34.7	1.0	-43.9	-13.0	-30.9	
	7.400	-9.5	H	3.0	34.9	1.0	-43.4	-13.0	-30.4	
	Mid Ch, 1880.0MHz									
	3.760	-21.9	V	3.0	35.3	1.0	-56.3	-13.0	-43.3	
	5.640	-13.6	V	3.0	34.7	1.0	-47.3	-13.0	-34.3	
	7.520	-14.6	V	3.0	34.9	1.0	-48.6	-13.0	-35.6	
	3.760	-21.3	H	3.0	35.3	1.0	-55.6	-13.0	-42.6	
	5.640	-12.1	H	3.0	34.7	1.0	-45.8	-13.0	-32.8	
	7.520	-6.1	H	3.0	34.9	1.0	-40.0	-13.0	-27.0	
	High Ch, 1909.8 MHz									
	3.822	-22.7	V	3.0	35.3	1.0	-57.0	-13.0	-44.0	
	5.729	-14.4	V	3.0	34.7	1.0	-48.1	-13.0	-35.1	
	7.640	-11.1	V	3.0	35.0	1.0	-45.1	-13.0	-32.1	
	3.822	-15.5	H	3.0	35.3	1.0	-49.8	-13.0	-36.8	
	5.729	-16.3	H	3.0	34.7	1.0	-50.1	-13.0	-37.1	
	7.640	-3.8	H	3.0	35.0	1.0	-37.8	-13.0	-24.8	

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 01/08/14
Test Engineer: Kiya Kedida
Configuration: Y w/ ac charger
Mode: EGPRS 850

Chamber	Pre-amplifer	Filter	Limit
3m Chamber B	T34 8449B	Filter 1	Part 24

Band

GSM850

EGPRS

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1.648	-28.8	V	3.0	37.4	1.0	-65.2	-13.0	-52.2	
2.473	-23.2	V	3.0	36.4	1.0	-58.5	-13.0	-45.5	
3.297	-18.6	V	3.0	35.8	1.0	-53.4	-13.0	-40.4	
1.648	-29.0	H	3.0	37.4	1.0	-65.3	-13.0	-52.3	
2.473	-23.6	H	3.0	36.4	1.0	-58.9	-13.0	-45.9	
3.297	-18.7	H	3.0	35.8	1.0	-53.5	-13.0	-40.5	
Mid Ch, 836.6MHz									
1.673	-28.5	V	3.0	37.3	1.0	-64.8	-13.0	-51.8	
2.510	-22.4	V	3.0	36.4	1.0	-57.7	-13.0	-44.7	
3.346	-18.4	V	3.0	35.8	1.0	-53.2	-13.0	-40.2	
1.673	-27.8	H	3.0	37.3	1.0	-64.1	-13.0	-51.1	
2.510	-24.0	H	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3.346	-18.8	H	3.0	35.8	1.0	-53.6	-13.0	-40.6	
High Ch, 848.8MHz									
1.698	-28.1	V	3.0	37.3	1.0	-64.4	-13.0	-51.4	
2.547	-23.3	V	3.0	36.3	1.0	-58.7	-13.0	-45.7	
3.395	-18.2	V	3.0	35.7	1.0	-52.9	-13.0	-39.9	
1.698	-27.8	H	3.0	37.3	1.0	-64.1	-13.0	-51.1	
2.547	-23.9	H	3.0	36.3	1.0	-59.2	-13.0	-46.2	
3.395	-18.9	H	3.0	35.7	1.0	-53.6	-13.0	-40.6	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 13U16673
Date: 01/08/14
Test Engineer: Kiya Kedida
Configuration: Y w/ ac charger
Mode: GPRS 850

Chamber	Pre-amplifer	Filter	Limit
3m 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
	Low Ch, 824.2MHz									
GSM850	1.648	-28.5	V	3.0	37.4	1.0	-64.9	-13.0	-51.9	
	2.473	-23.7	V	3.0	36.4	1.0	-59.1	-13.0	-46.1	
	3.297	-18.7	V	3.0	35.8	1.0	-53.5	-13.0	-40.5	
	1.648	-28.2	H	3.0	37.4	1.0	-64.6	-13.0	-51.6	
	2.473	-23.0	H	3.0	36.4	1.0	-58.4	-13.0	-45.4	
GPRS	3.297	-18.9	H	3.0	35.8	1.0	-53.7	-13.0	-40.7	
	Mid Ch, 836.6MHz									
	1.673	-27.7	V	3.0	37.3	1.0	-64.1	-13.0	-51.1	
	2.510	-23.8	V	3.0	36.4	1.0	-59.1	-13.0	-46.1	
	3.346	-18.7	V	3.0	35.8	1.0	-53.5	-13.0	-40.5	
	1.673	-28.7	H	3.0	37.3	1.0	-65.1	-13.0	-52.1	
	2.510	-25.2	H	3.0	36.4	1.0	-60.5	-13.0	-47.5	
	3.346	-18.4	H	3.0	35.8	1.0	-53.1	-13.0	-40.1	
	High Ch, 848.8MHz									
	1.698	-28.0	V	3.0	37.3	1.0	-64.3	-13.0	-51.3	
	2.547	-23.3	V	3.0	36.3	1.0	-58.7	-13.0	-45.7	
	3.395	-17.8	V	3.0	35.7	1.0	-52.5	-13.0	-39.5	
	1.698	-28.4	H	3.0	37.3	1.0	-64.7	-13.0	-51.7	
	2.547	-23.8	H	3.0	36.3	1.0	-59.1	-13.0	-46.1	
	3.395	-18.5	H	3.0	35.7	1.0	-53.2	-13.0	-40.2	

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

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