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

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n & ANT+ & NFC

MODEL NUMBER: SM-G7508W

FCC ID: A3LSMG7508W

REPORT NUMBER: 14I18943-E1

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	**SAMSUNG ELECTRONICS CO., LTD.**
EUT DESCRIPTION:	**GSM/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n, ANT+ & NFC**
MODEL:	**SM-G7508W**
SERIAL NUMBER:	**1964696 (Radiated); 1964692 (Conducted)**
DATE TESTED:	**SEPTEMBER 26-29, 2014**

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 22H, 24E and 27M	PASS

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
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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 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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)

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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 27000 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 & UNII a/b/g/n + ANT+ & NFC.

5.2. MAXIMUM OUTPUT POWER

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

FCC Part 22/24/27						
Band	Frequency Range(MHz)	Modulation	Conducted		Radiated	
			AVG (dBm)	mW	AVG (dBm)	mW
GSM850	824~849	GMSK	32.8	1905		
	824~849	GPRS	32.8	1905	28.67	736
	824~849	EGPRS	26.1	407	22.95	197
GSM1900	1850~1910	GMSK	30.0	100		
	1850~1910	GPRS	30.0	100	29.28	847
	1850~1910	EGPRS	25.1	316	25.90	389
Band 5	824~849	REL99	22.0	158	16.84	48
	824~849	HSDPA	21.0	126	15.24	33
	824~849	HSUPA	21.0	126		
Band 2	1850~1910	REL99	22.1	158	21.96	157
	1850~1910	HSDPA	21.0	126	21.83	152
	1850~1910	HSUPA	21.1	126		

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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 22/24/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	dBm	mW	dBm	mW
LTE41	2496~2690	20MHz	QPSK	23.22	210	22.65	184
	2496~2690	20MHz	16QAM	22.34	171	20.85	122

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	dBm	mW	dBm	mW
LTE41	2496~2690	15MHz	QPSK	23.03	201	22.29	169
	2496~2690	15MHz	16QAM	22.17	165	21.65	146

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	dBm	mW	dBm	mW
LTE41	2496~2690	10MHz	QPSK	23.07	203	22.60	182
	2496~2690	10MHz	16QAM	22.39	173	21.40	138

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	dBm	mW	dBm	mW
LTE41	2496~2690	5MHz	QPSK	23.11	205	22.20	166
	2496~2690	5MHz	16QAM	22.50	178	21.39	138

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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	-4.97
Band 2, 1850~1910MHz	-2.42
LTE41, 2496~2690MHz	-2.79

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SAMSUNG	EP-TA50CBC	N/A	N/A
Earphone	SAMSUNG	EHS61ASFWE	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 R & S call box during the tests.

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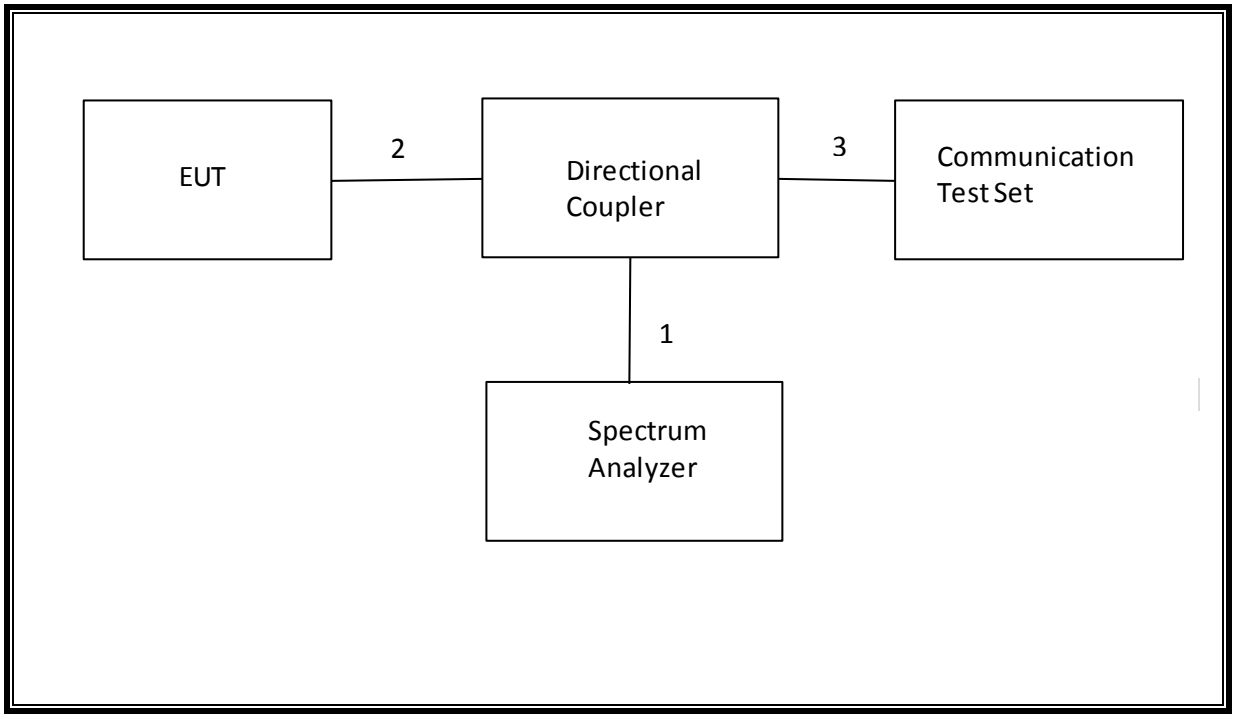
SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



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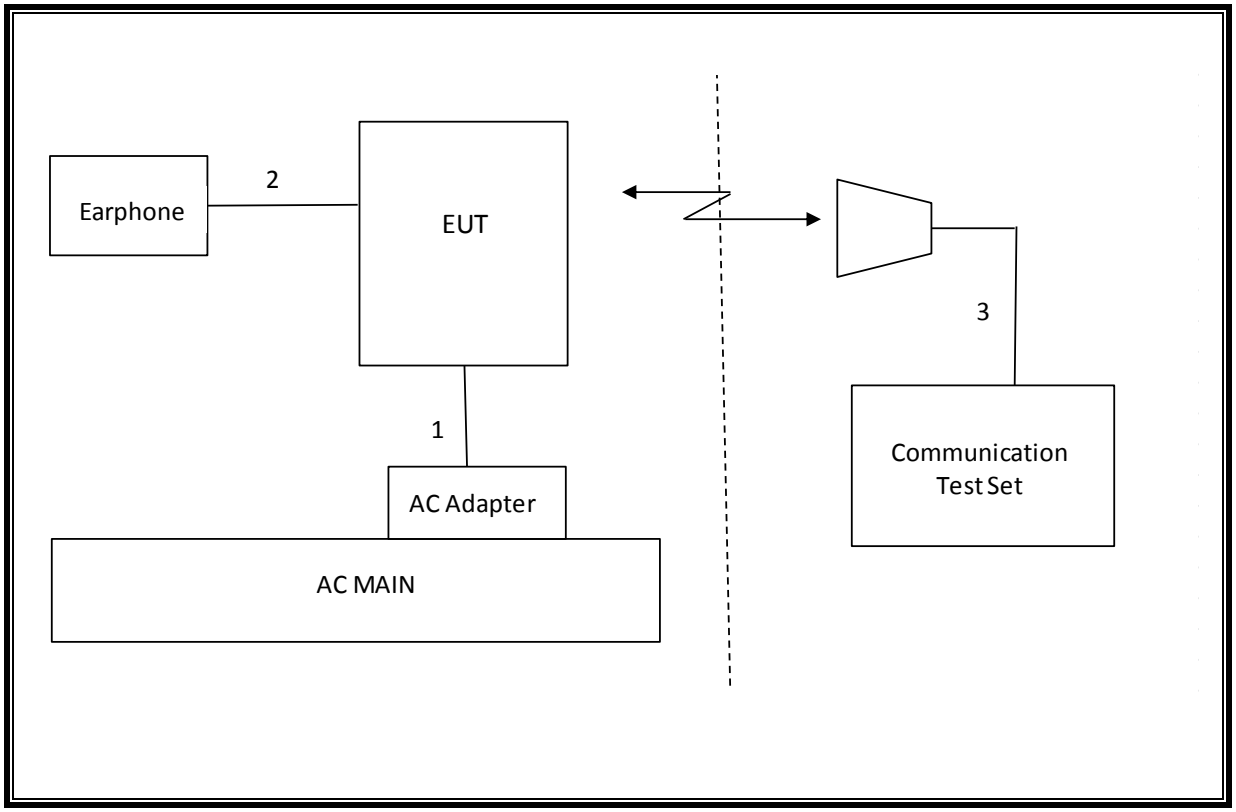
SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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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**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01179	02/26/15
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	08/14/15
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/14
Antenna, Horn, 18 GHz	EMCO	3115	C00784	10/25/14
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02688	CNR
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/15
Communications Test Set	R&S	CMW500	T159	07/02/15
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	07/06/15
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	C00993	02/14/15
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/14

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7. Summary Table

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst case
2.1049	N/A	Occupied Band width (99%)	N/A	Conducted	Pass	17.84MHz
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-25.86dBm
27.53(m)	RSS-199(4.5)		-25dBm		Pass	-30.73dBm
2.1046	N/A	Conducted output power	N/A		Pass	32.8dBm
27.53(m)	RSS-199(4.5)	Emission Mask			Pass	-17.34dBm
22.355 24.235 27.54	RSS-132(4.3) RSS-133(6.3) RSS-199(6.3)	Frequency Stability	2.5PPM		Pass	0.010PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	28.67dBm
24.232(c) 27.50(h)(2)	RSS-133(6.4) RSS-199(4.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	29.28dBm
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1)	Radiated Spurious Emission	-13dBm		Pass	-24.0dBm
27.53(m)	RSS-199(4.5)		-25dBm		Pass	-30.7dBm

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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 MCS5 ~ 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
				Avg (dBm)	Avg (dBm)	Avg (dBm)	Avg (dBm)
GSM850	GMSK	128	824.2	32.8			
		190	836.6	32.8			
		251	848.8	32.6			
	GPRS	128	824.2	32.8	31.0	29.9	27.4
		190	836.6	32.8	31.0	29.8	27.5
		251	848.8	32.6	31.0	29.6	27.2
	EGPRS	128	824.2	26.1	26.1	24.0	24.0
		190	836.6	25.9	25.9	23.9	23.9
		251	848.8	25.8	25.7	23.7	23.7
GSM1900	GMSK	512	1850.2	29.6			
		661	1880	30.0			
		810	1909.8	30.0			
	GPRS	512	1850.2	29.6	27.7	25.8	24.3
		661	1880	30.0	28.0	26.0	24.5
		810	1909.8	30.0	28.0	26.0	24.5
	EGPRS	512	1850.2	25.0	24.9	22.7	22.6
		661	1880	25.1	25.0	22.8	22.7
		810	1909.8	25.1	25.0	22.8	22.7

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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	4132	826.4	21.9
		4183	836.6	22.0
		4233	846.6	21.9
Band 2	REL99	9262	1852.4	22.0
		9400	1880	22.1
		9538	1907.6	22.1

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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			

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8.3.1. UMTS HSDPA OUTPUT POWER RESULT

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm)
					Avg (dBm)
Band 5	HSDPA	1	4132	826.4	20.9
			4183	836.6	21.0
			4233	846.6	20.8
		2	4132	826.4	21.0
			4183	836.6	20.9
			4233	846.6	20.8
		3	4132	826.4	20.3
			4183	836.6	20.3
			4233	846.6	20.2
		4	4132	826.4	20.4
			4183	836.6	20.5
			4233	846.6	20.3
Band 2	HSDPA	1	9262	1852.4	20.9
			9400	1880	21.0
			9538	1907.6	20.9
		2	9262	1852.4	20.9
			9400	1880	21.0
			9538	1907.6	21.0
		3	9262	1852.4	20.5
			9400	1880	20.5
			9538	1907.6	20.5
		4	9262	1852.4	20.5
			9400	1880	20.5
			9538	1907.6	20.5

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8.3.2. 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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8.3.3. UMTS HSUPA OUTPUT POWER RESULT

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm)
					Avg (dBm)
Band 5	HSUPA	1	4132	826.4	20.8
			4183	836.6	21.0
			4233	846.6	20.8
		2	4132	826.4	19.7
			4183	836.6	19.4
			4233	846.6	19.3
		3	4132	826.4	19.7
			4183	836.6	19.5
			4233	846.6	19.6
		4	4132	826.4	19.8
			4183	836.6	19.9
			4233	846.6	20.0
		5	4132	826.4	21.0
			4183	836.6	21.0
			4233	846.6	20.9
Band 2	HSUPA	1	9262	1852.4	20.9
			9400	1880	21.0
			9538	1907.6	21.0
		2	9262	1852.4	19.9
			9400	1880	19.8
			9538	1907.6	19.4
		3	9262	1852.4	19.9
			9400	1880	19.9
			9538	1907.6	19.7
		4	9262	1852.4	19.7
			9400	1880	20.2
			9538	1907.6	20.1
		5	9262	1852.4	20.9
			9400	1880	21.0
			9538	1907.6	21.0

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8.3.4. DC-HSDPA

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

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Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	20.9
		4183	836.6	0	21.0
		4233	846.6	0	20.8
	Subtest 2	4132	826.4	0	21.0
		4183	836.6	0	20.9
		4233	846.6	0	20.8
	Subtest 3	4132	826.4	0.5	20.3
		4183	836.6	0.5	20.3
		4233	846.6	0.5	20.2
	Subtest 4	4132	826.4	0.5	20.4
		4183	836.6	0.5	20.5
		4233	846.6	0.5	20.3

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	20.9
		9400	1880.0	0	21.0
		9538	1907.6	0	20.9
	Subtest 2	9262	1852.4	0	20.9
		9400	1880.0	0	21.0
		9538	1907.6	0	21.0
	Subtest 3	9262	1852.4	0.5	20.5
		9400	1880.0	0.5	20.5
		9538	1907.6	0.5	20.5
	Subtest 4	9262	1852.4	0.5	20.5
		9400	1880.0	0.5	20.5
		9538	1907.6	0.5	20.5

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8.4. LTE OUTPUT VERIFICATION

8.4.1. LTE OUTPUT RESULT

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						39750	40620	41490
						2506 MHz	2593 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	22.98	23.22	22.95
			1	49	0	22.76	23.12	22.99
			1	99	0	22.79	22.50	23.06
			50	0	1	21.92	21.98	21.96
			50	24	1	21.81	21.88	21.92
			50	50	1	21.75	21.84	21.93
			100	0	1	21.82	21.88	21.99
		16QAM	1	0	1	21.74	22.34	21.50
			1	49	1	21.57	22.21	21.50
			1	99	1	21.59	21.79	21.50
			50	0	2	20.88	20.90	20.91
			50	24	2	20.79	20.86	20.85
			50	50	2	20.73	20.84	20.89
			100	0	2	20.83	20.78	20.81

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Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						39725	40620	41515
						2503.5 MHz	2593 MHz	2682.5 MHz
LTE Band 41	15	QPSK	1	0	0	22.83	22.86	22.89
			1	37	0	22.69	22.68	22.93
			1	74	0	22.65	22.51	22.94
			36	0	1	21.90	21.93	21.94
			36	20	1	21.86	21.82	21.89
			36	39	1	21.79	21.79	21.92
			75	0	1	21.83	21.90	21.91
		16QAM	1	0	1	22.16	21.95	21.53
			1	37	1	22.04	21.85	21.57
			1	74	1	22.00	21.78	21.54
			36	0	2	20.79	20.75	20.85
			36	20	2	20.76	20.74	20.85
			36	39	2	20.70	20.64	20.83
			75	0	2	20.80	20.75	20.87

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Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						39700	40620	41540
						2501 MHz	2593 MHz	2685 MHz
LTE Band 41	10	QPSK	1	0	0	22.86	22.66	23.01
			1	25	0	22.78	22.57	22.96
			1	49	0	22.69	22.50	22.89
			25	0	1	21.92	21.81	21.90
			25	12	1	21.94	21.81	21.92
			25	25	1	21.88	21.72	21.89
			50	0	1	21.92	21.83	21.87
		16QAM	1	0	1	22.20	22.39	21.59
			1	25	1	22.08	22.22	21.57
			1	49	1	22.03	22.14	21.53
			25	0	2	20.91	20.68	20.77
			25	12	2	20.85	20.69	20.78
			25	25	2	20.85	20.63	20.78
			50	0	2	20.83	20.81	20.84

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Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						39675	40620	41565
						2498.5 MHz	2593 MHz	2687.5 MHz
LTE Band 41	5	QPSK	1	0	0	22.76	22.68	22.99
			1	12	0	22.66	22.63	22.95
			1	24	0	22.62	22.55	22.98
			12	0	1	21.92	21.73	21.87
			12	7	1	21.92	21.73	21.90
			12	13	1	21.86	21.69	21.88
			25	0	1	21.98	21.74	21.87
		16QAM	1	0	1	22.50	21.50	21.83
			1	12	1	22.50	21.50	21.93
			1	24	1	22.49	21.50	21.92
			12	0	2	21.21	20.77	20.75
			12	7	2	21.17	20.74	20.74
			12	13	2	21.16	20.70	20.75
			25	0	2	20.87	20.79	20.79

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9. PEAK TO AVERAGE RATIO

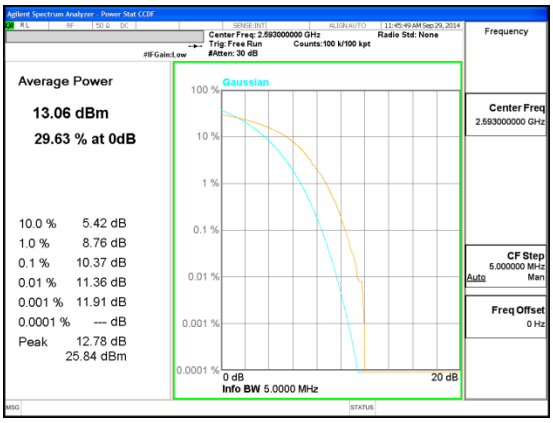
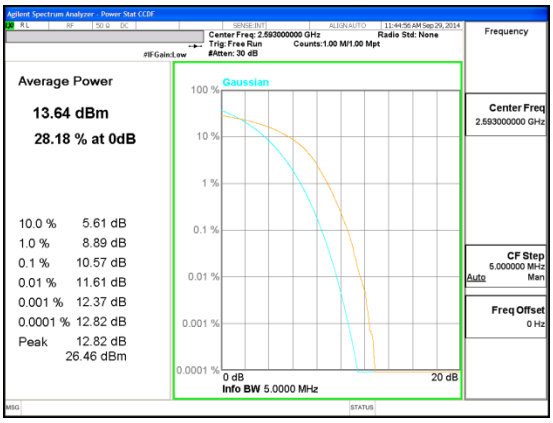
Test Procedure

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 LTE41 20MHz	 Band LTE41 20MHz 16QAM Mid channel	 Band LTE41 20MHz QPSK Mid channel

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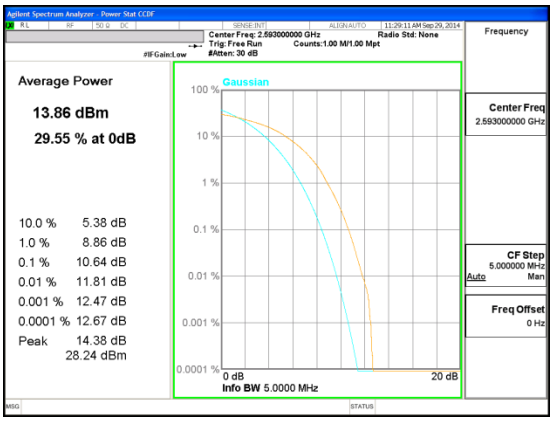
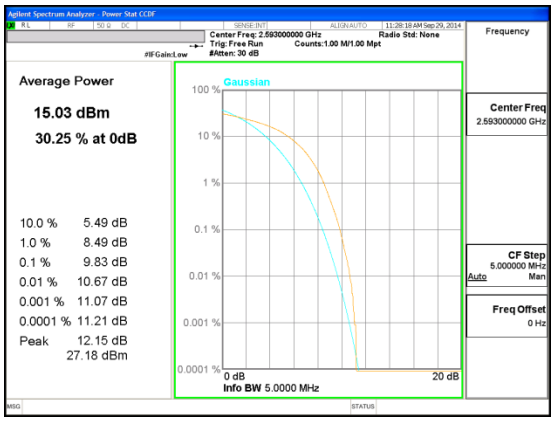
Band LTE41 15MHz	 Band LTE41 15MHz 16QAM Mid channel	 Band LTE41 15MHz QPSK Mid channel

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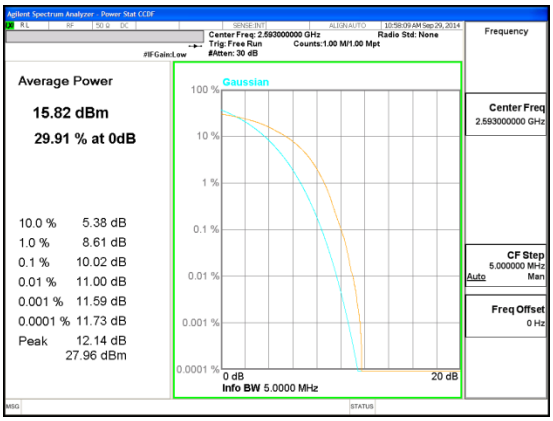
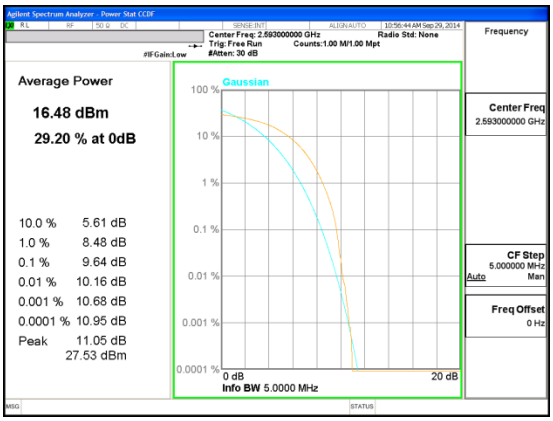
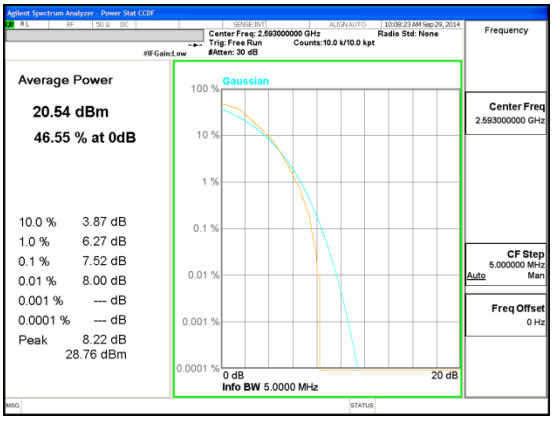
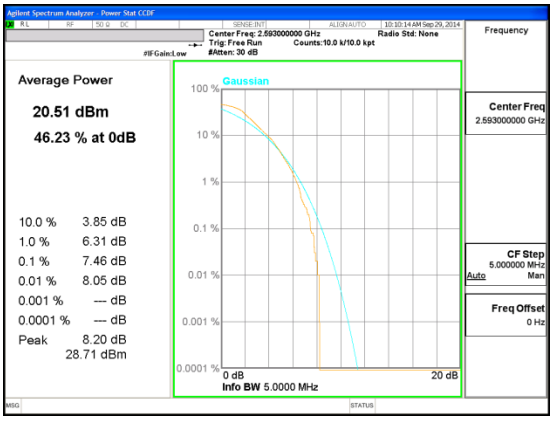
Band LTE41 10MHz	 Band LTE41 10MHz 16QAM Mid channel	 Band LTE41 10MHz QPSK Mid channel
Band LTE41 5MHz	 Band LTE41 5MHz 16QAM Mid channel	 Band LTE41 5MHz QPSK Mid channel

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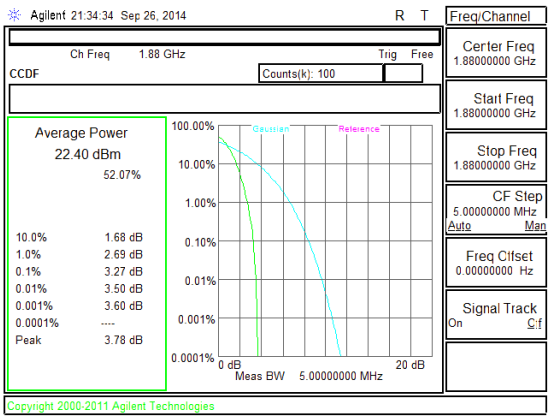
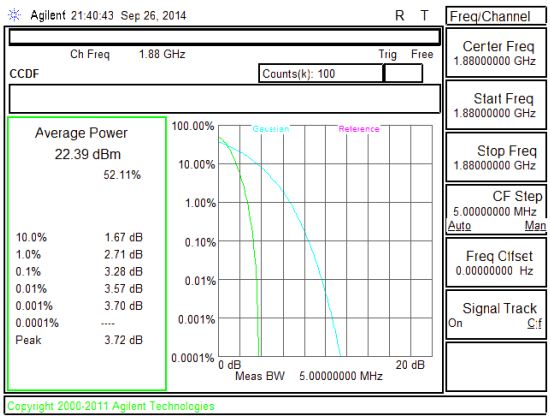
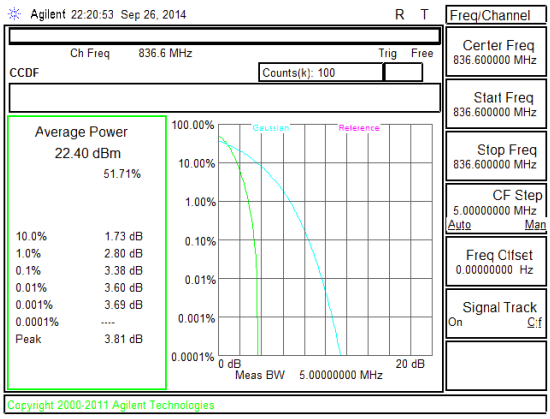
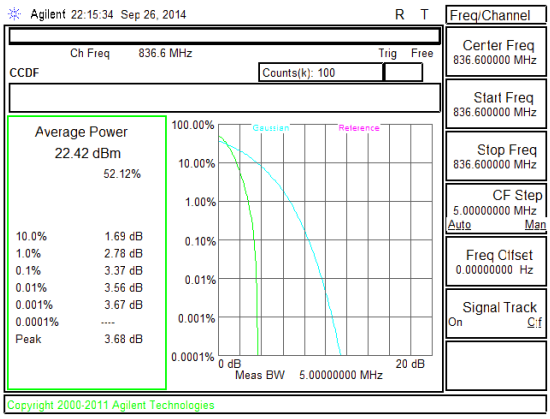
Band Band 2	 Band WCDMA B2 HSDPA	 Band WCDMA B2 REL99
Band Band 5	 Band WCDMA B5 HSDPA	 Band WCDMA B5 REL99

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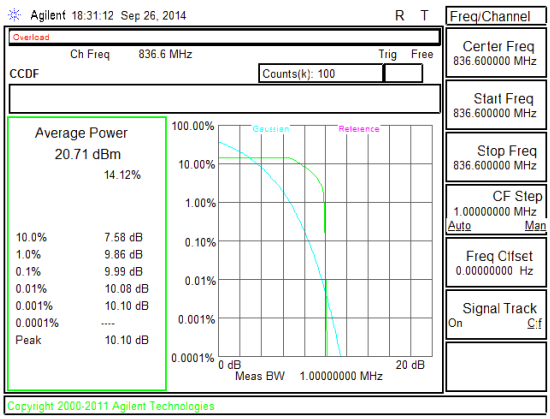
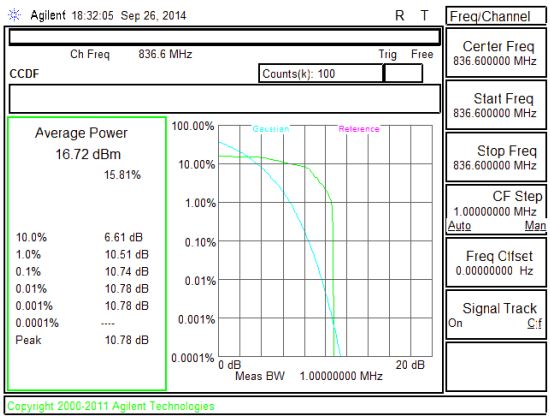
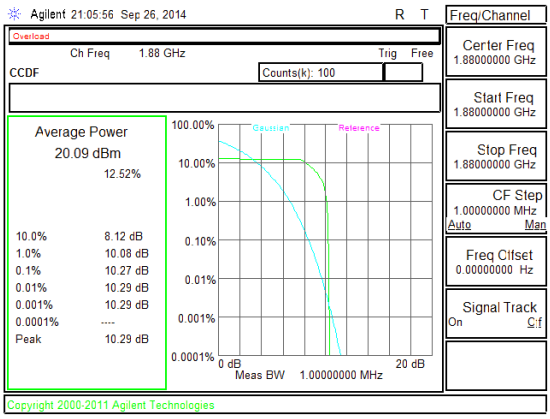
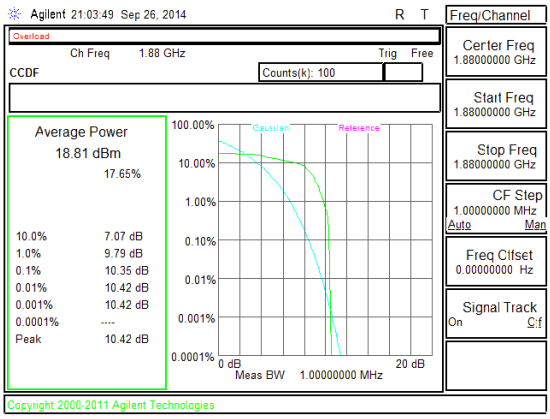
Band GSM 850	 GPRS	 EGPRS
Band GSM 1900	 GPRS	 EGPRS

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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 (KHz)	-26dB BW (KHz)
GSM850	GPRS	128	824.2	242	318
		190	836.6	240	318
		251	848.8	244	315
	EGPRS	128	824.2	259	336
		190	836.6	241	304
		251	848.8	250	310
GSM1900	GPRS	512	1850.2	241	321
		661	1880	245	321
		810	1909.8	244	325
	EGPRS	512	1850.2	257	341
		661	1880	244	311
		810	1909.8	241	311
Band 5	REL99	4132	826.4	4162	4632
		4183	836.6	4166	4634
		4233	846.6	4183	4640
	HSDPA	4132	826.4	4161	4622
		4183	836.6	4161	4634
		4233	846.6	4163	4629
Band 2	REL99	9262	1852.4	4171	4647
		9400	1880	4177	4636
		9538	1907.6	4165	4640
	HSDPA	9262	1852.4	4167	4637
		9400	1880	4150	4645
		9538	1907.6	4156	4654

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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)
LTE41	20	QPSK	100/0	2506	17.82	19.04
			100/0	2593	17.79	19.03
			100/0	2680	17.84	18.99
		16QAM	100/0	2506	17.83	18.96
			100/0	2593	17.84	19.05
			100/0	2680	17.80	18.91

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE41	15	QPSK	75/0	2503.5	13.40	14.37
			75/0	2593	13.38	14.40
			75/0	2682.5	13.39	14.39
		16QAM	75/0	2503.5	13.39	14.37
			75/0	2593	13.38	14.35
			75/0	2682.5	13.39	14.40

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE41	10	QPSK	50/0	2501	8.95	9.79
			50/0	2593	8.93	9.75
			50/0	2685	8.93	9.65
		16QAM	50/0	2501	8.92	9.68
			50/0	2593	8.94	9.74
			50/0	2685	8.93	9.69
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE41	5	QPSK	25/0	2498.5	4.47	4.91
			25/0	2593	4.48	4.92
			25/0	2687.5	4.47	4.93
		16QAM	25/0	2498.5	4.78	4.97
			25/0	2593	4.47	4.91
			25/0	2687.5	4.47	4.90

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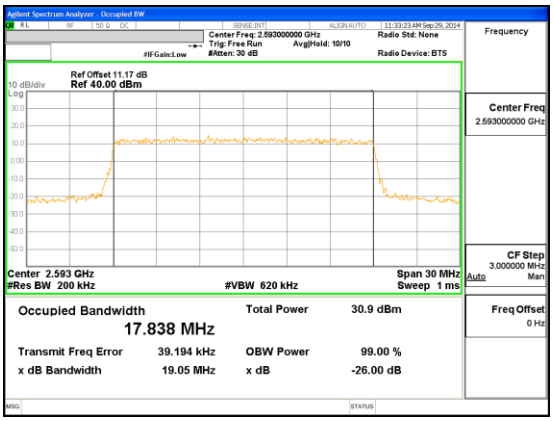
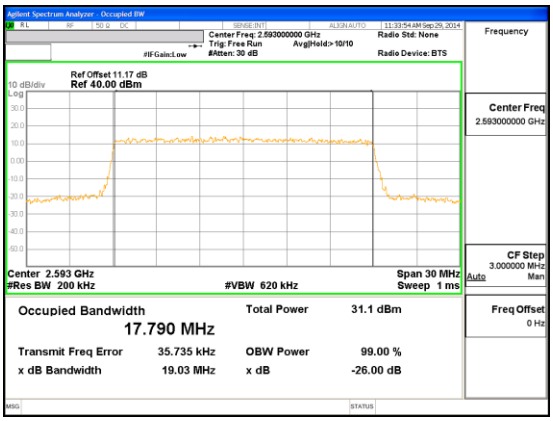
10.1.3. OCCUPIED BANDWIDTH PLOTS

Band LTE41 20MHz	 Band LTE41 20MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE41 20MHz OBW QPSK Mid Channel FRB.gif

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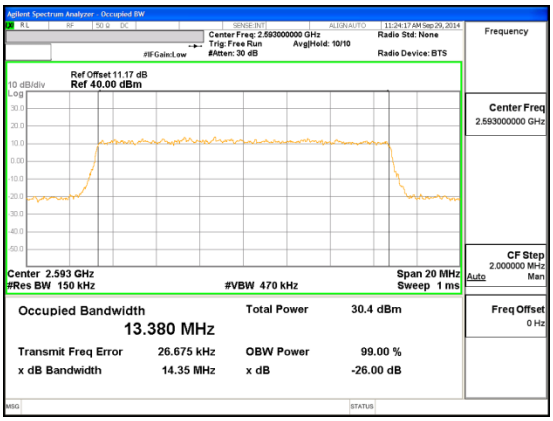
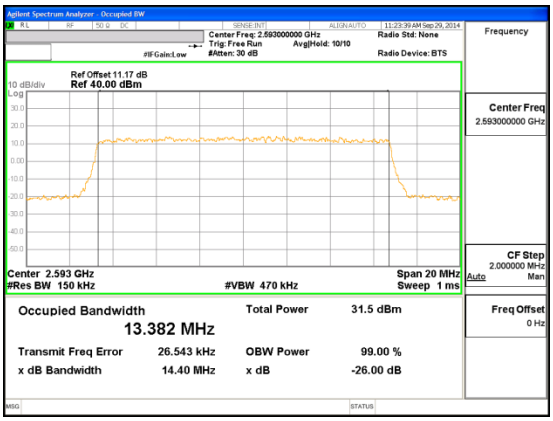
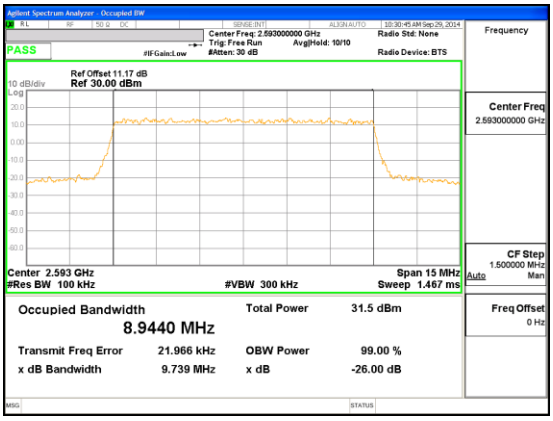
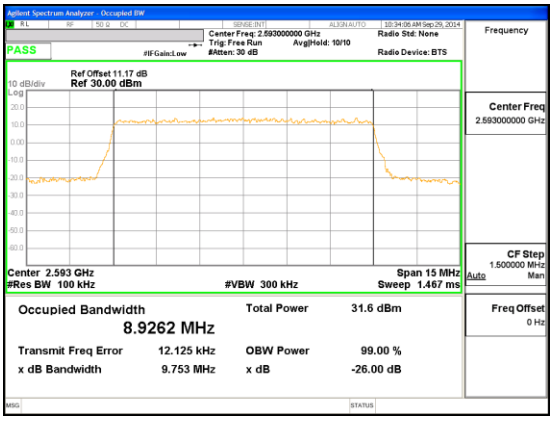
Band LTE41 15MHz	 Band LTE41 15MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE41 15MHz OBW QPSK Mid Channel FRB.gif
Band LTE41 10MHz	 Band LTE41 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE41 10MHz OBW QPSK Mid Channel FRB.gif

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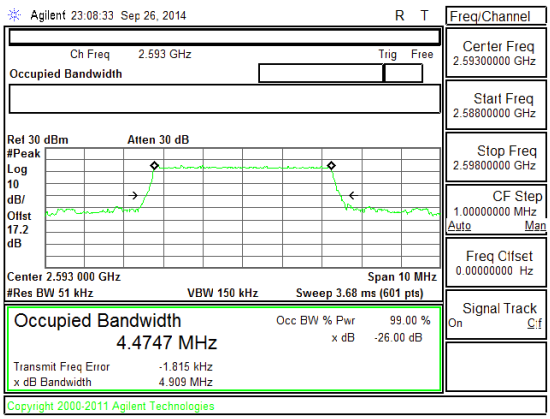
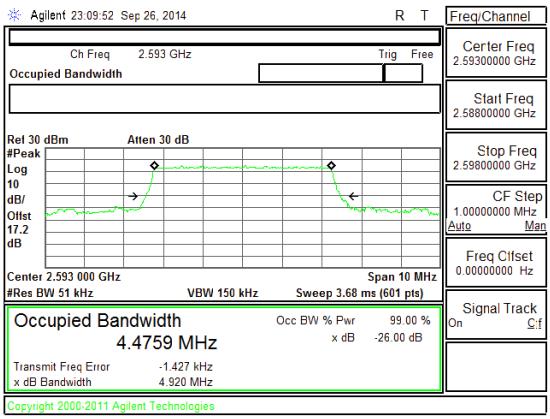
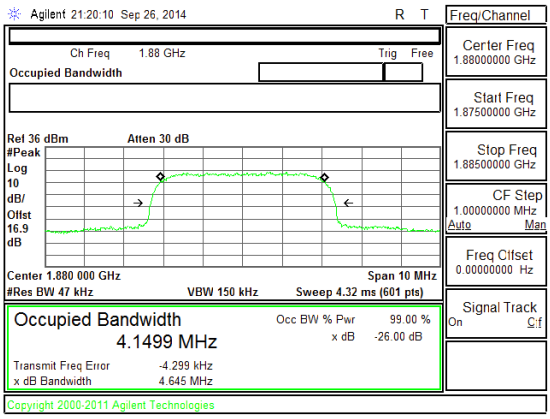
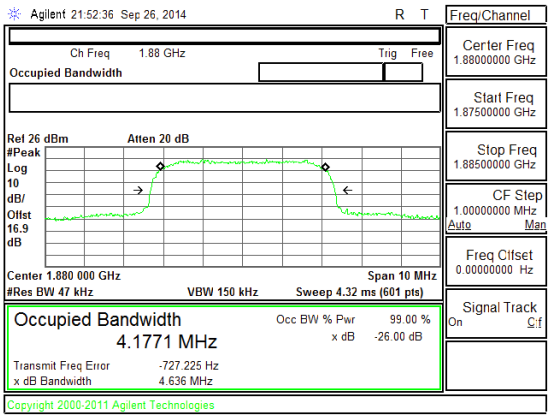
Band LTE41 5MHz	 Band LTE41 5MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE41 5MHz OBW QPSK Mid Channel FRB.gif
Band Band 2	 Band WCDMA B2 HSDPA OBW	 Band WCDMA B2 REL99 OBW

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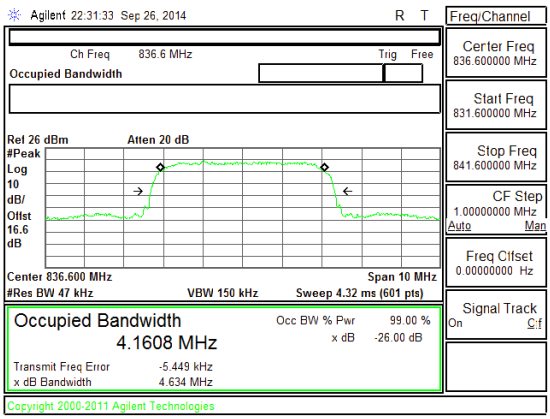
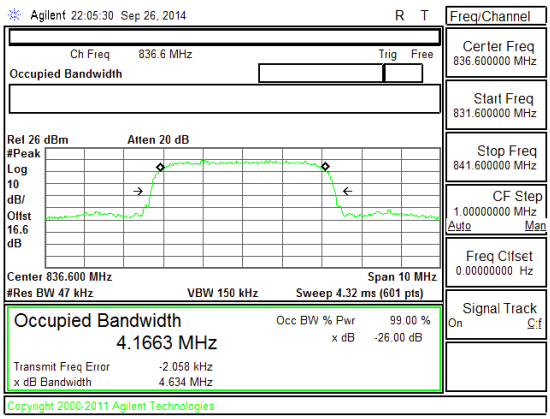
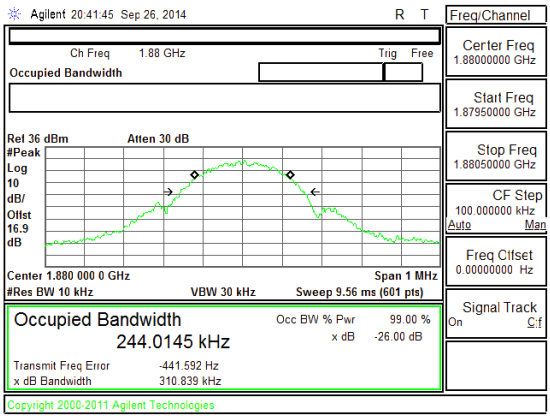
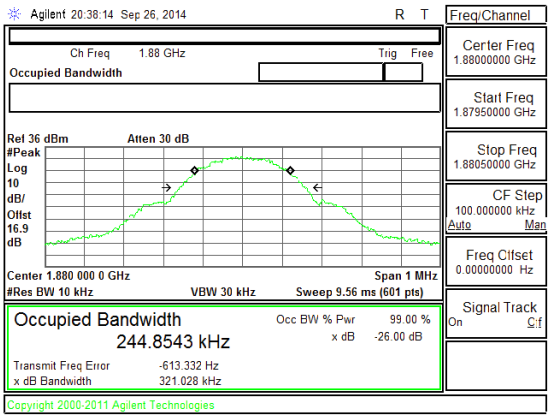
Band Band 5	 Band WCDMA B5 HSDPA OBW	 Band WCDMA B5 REL99 OBW
Band GSM1900	 Band GSM1900 EGPRS OBW Mid channel	 Band GSM1900 GPRS OBW Mid channel

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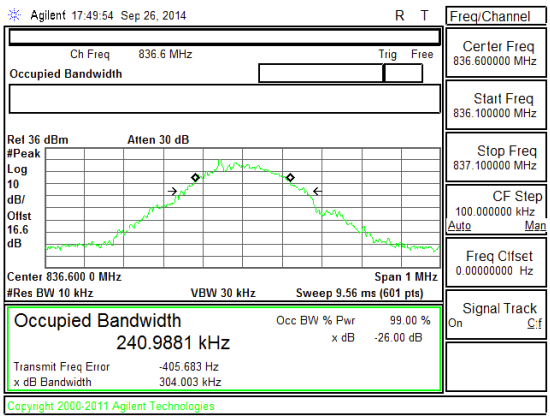
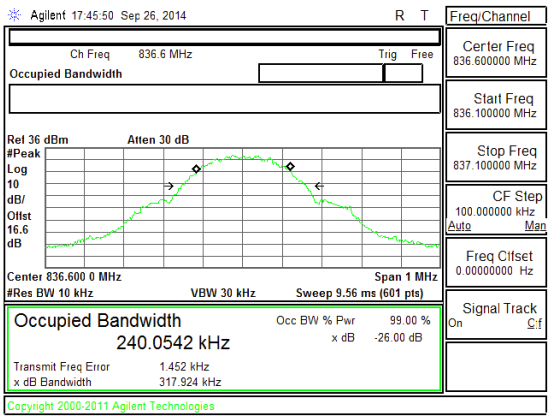
Band GSM850	 Band GSM850 EGPRS OBW Mid channel	 Band GSM850 GPRS OBW Mid channel

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10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238, §27. 53

LIMITS

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

Part 27: (m)(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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.

RESULTS

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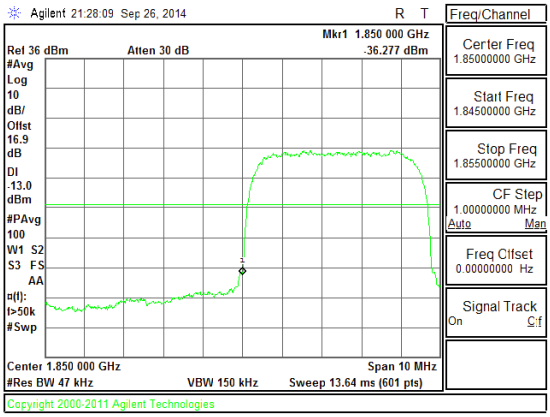
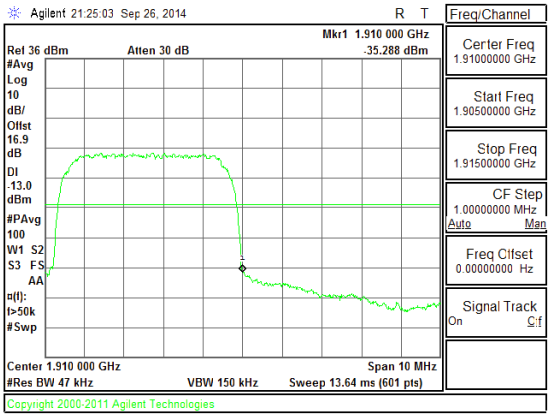
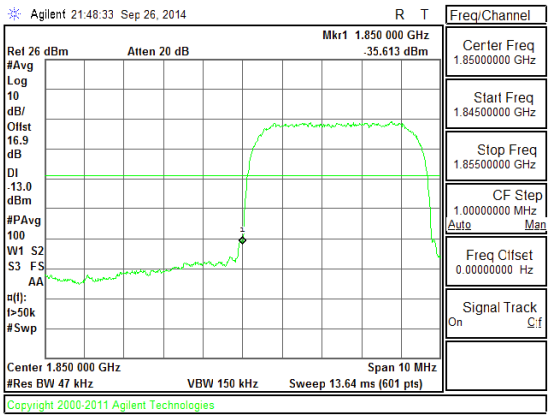
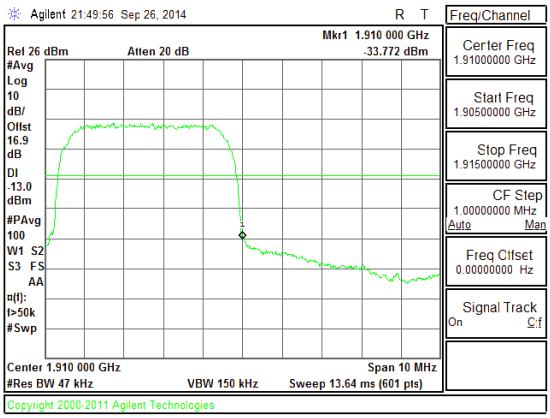
10.2.1. BAND EDGE PLOTS

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

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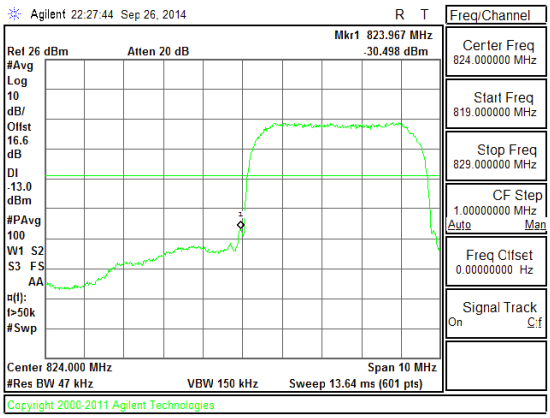
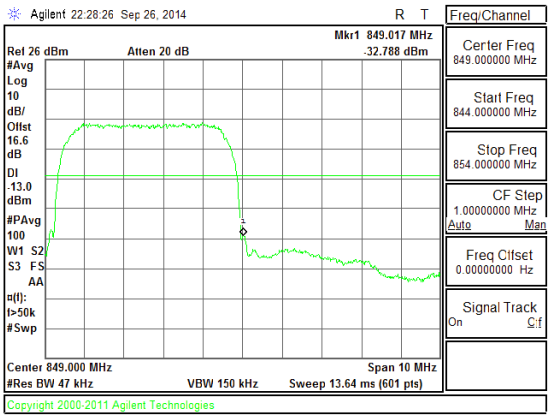
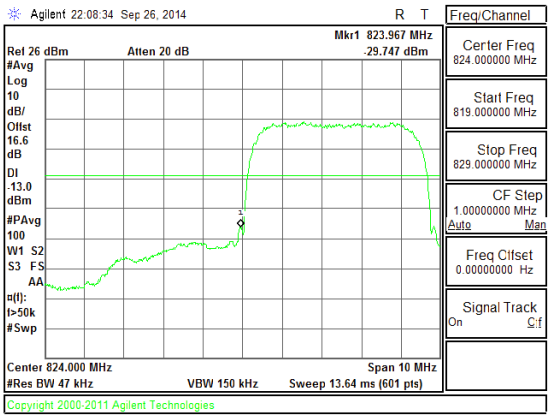
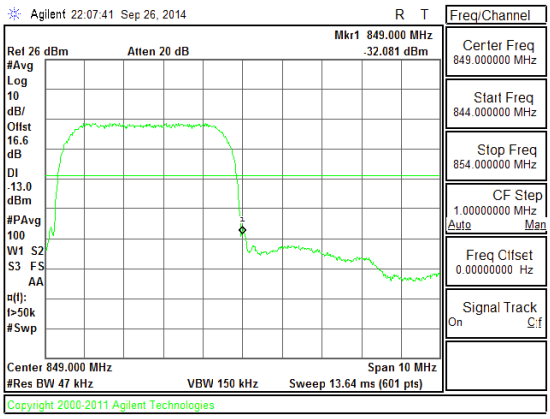
Band Band 5 HSDPA	 Band WCDMA B5 HSDPA CBE	 Band WCDMA B5 HSDPA CBE
Band Band 5 REL99	 Band WCDMA B5 REL99 CBE	 Band WCDMA B5 REL99 CBE

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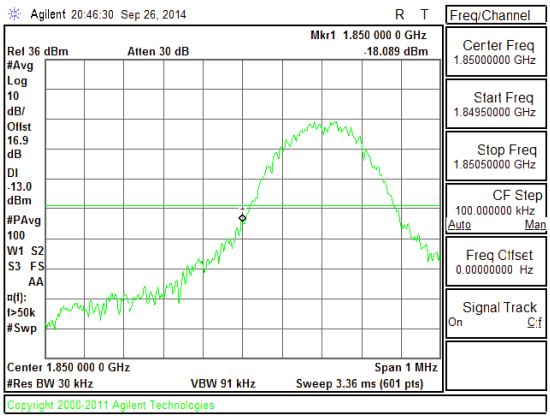
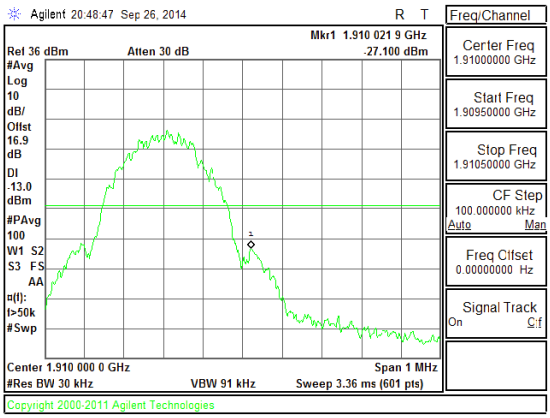
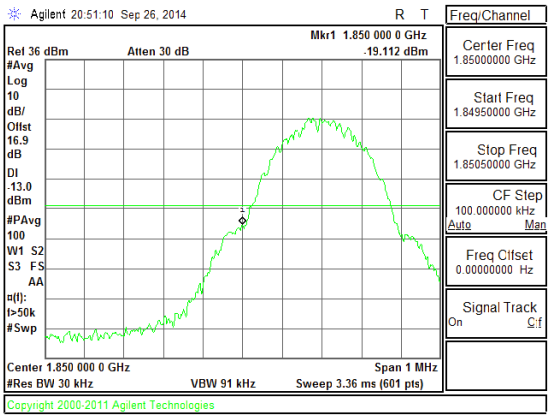
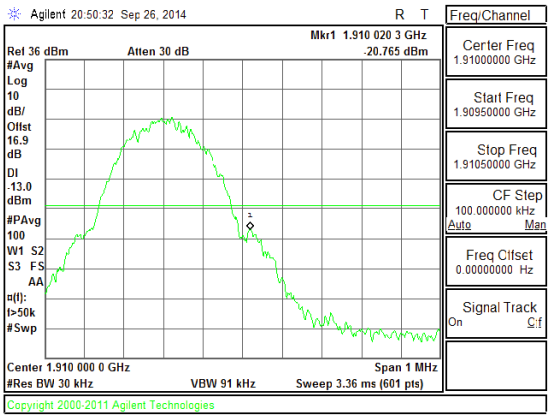
Band GSM1900 EGPRS	 Band GSM1900 EGPRS CBE Low channel	 Band GSM1900 EGPRS CBE High channel
Band GSM1900 GPRS	 Band GSM1900 GPRS CBE Low channel	 Band GSM1900 GPRS CBE High channel

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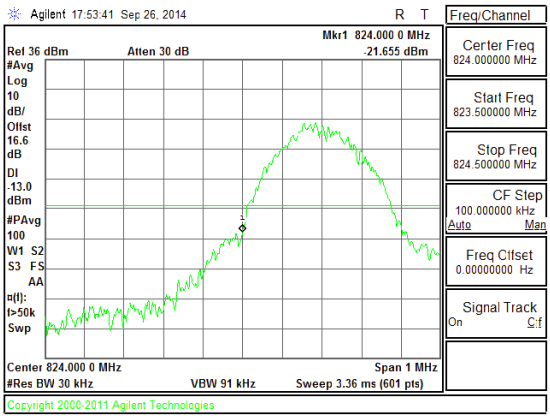
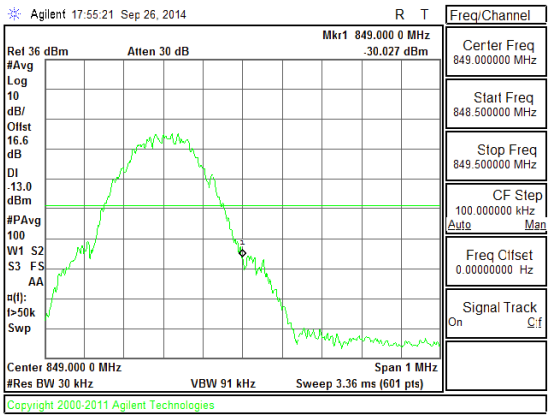
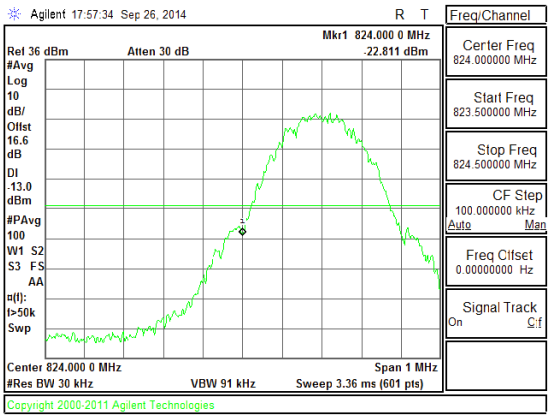
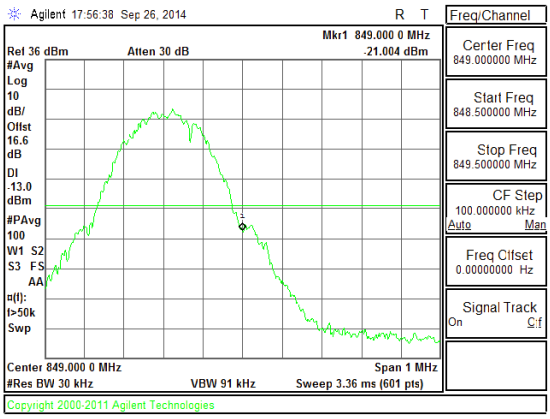
Band GSM850 EGPRS	 Band GSM850 EGPRS CBE Low channel	 Band GSM850 EGPRS CBE High channel
Band GSM850 GPRS	 Band GSM850 GPRS CBE Low channel	 Band GSM850 GPRS CBE High channel

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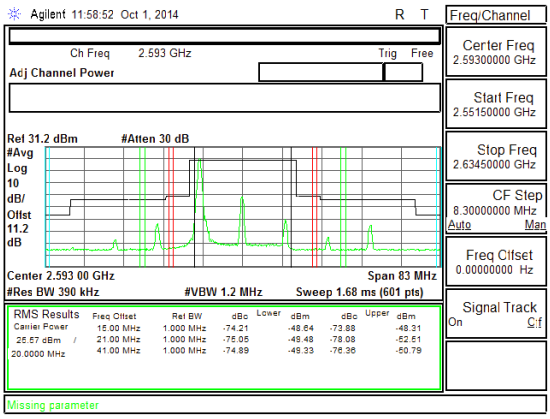
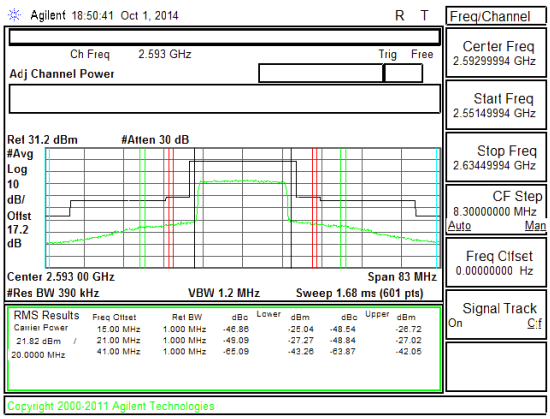
10.2.2. EMISSION MASK PLOTS

Band LTE41 20MHz 16QAM	 Band LTE41 20MHz EM 16QAM 1RB.gif	 Band LTE41 20MHz EM 16QAM FRB.gif

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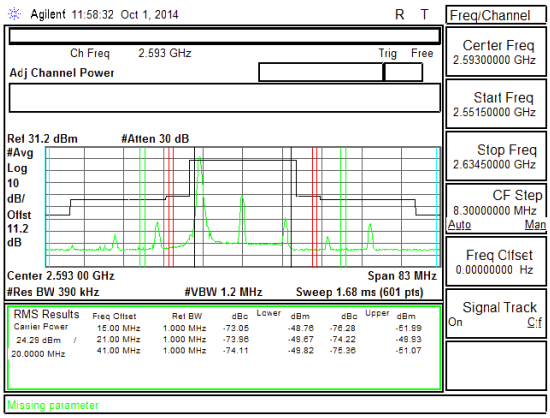
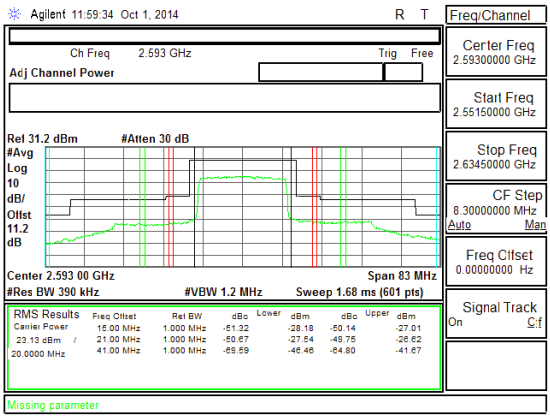
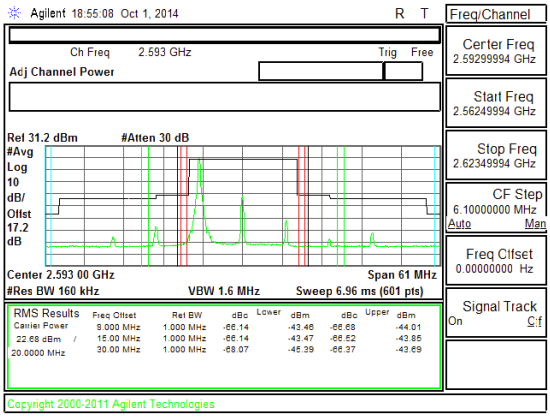
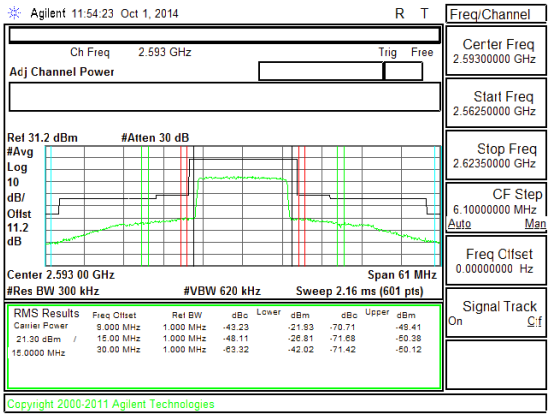
Band LTE41 20MHz QPSK	 Band LTE41 20MHz EM QPSK 1RB.gif	 Band LTE41 20MHz EM QPSK FRB.gif
Band LTE41 15MHz 16QAM	 Band LTE41 15MHz EM 16QAM 1RB.gif	 Band LTE41 15MHz EM 16QAM FRB.gif

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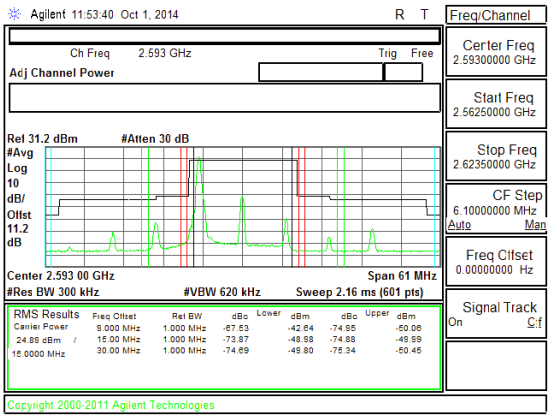
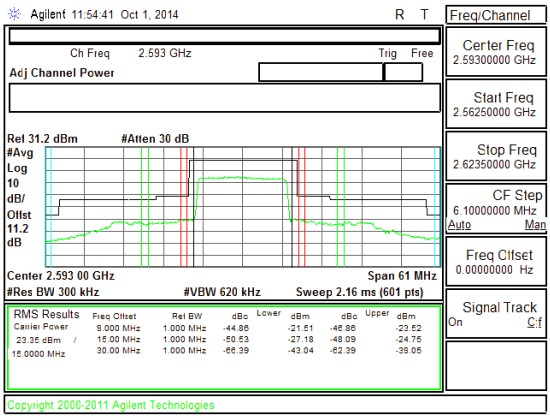
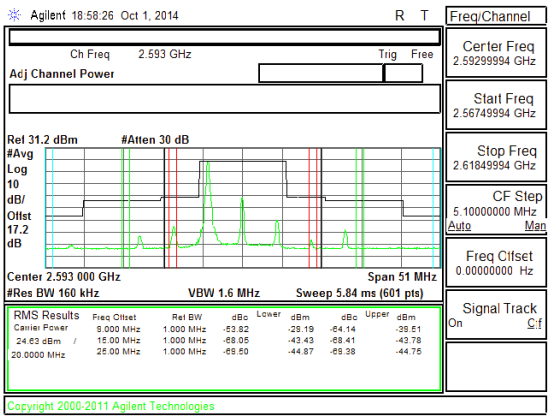
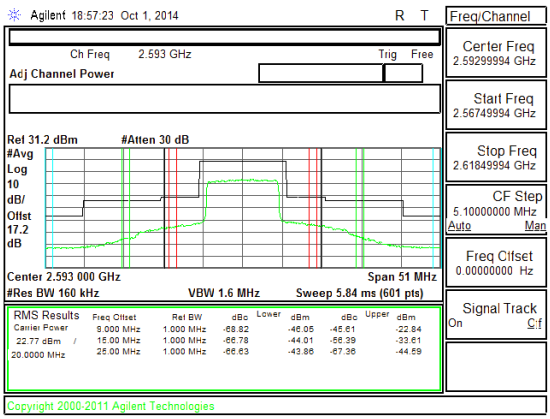
Band LTE41 15MHz QPSK	 Band LTE41 15MHz EM QPSK 1RB.gif	 Band LTE41 15MHz EM QPSK FRB.gif
Band LTE41 10MHz 16QAM	 Band LTE41 10MHz EM 16QAM 1RB.gif	 Band LTE41 10MHz EM 16QAM FRB.gif

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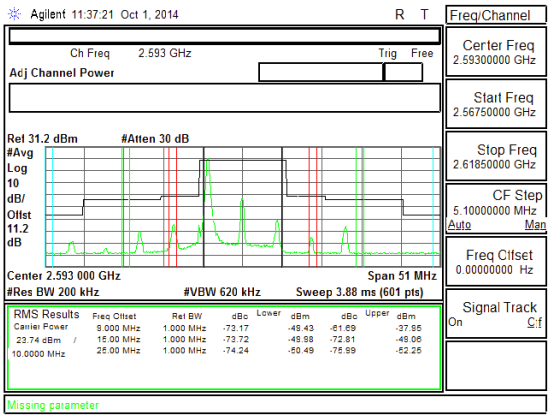
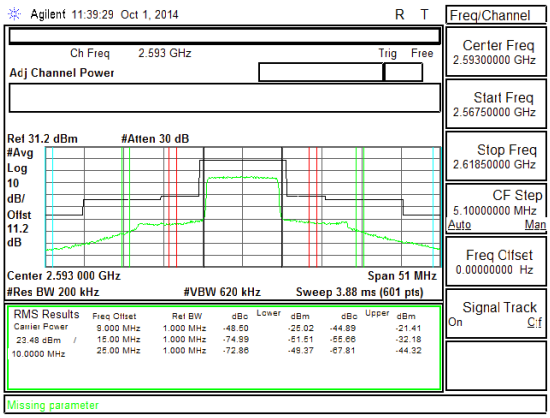
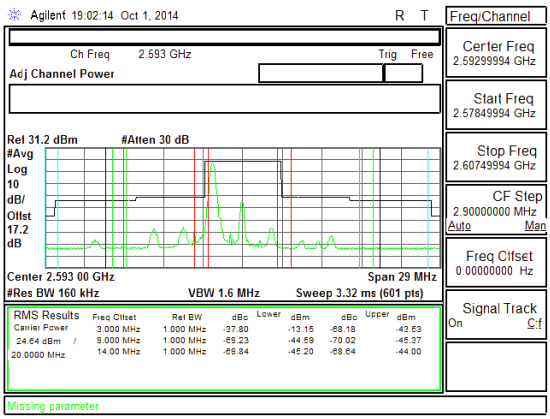
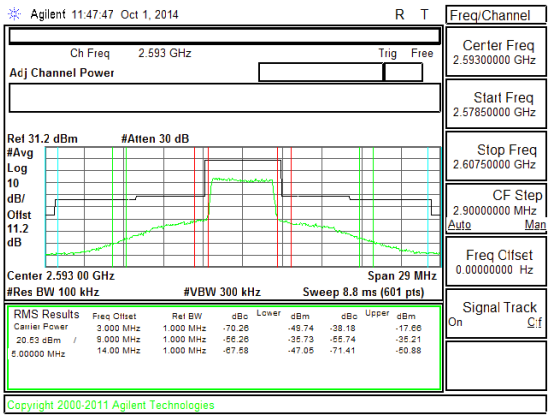
Band LTE41 10MHz QPSK	 Band LTE41 10MHz EM QPSK 1RB.gif	 Band LTE41 10MHz EM QPSK FRB.gif
Band LTE41 5MHz 16QAM	 Band LTE41 5MHz EM 16QAM Mid Channel 1RB.gif	 Band LTE41 5MHz EM 16QAM Mid Channel FRB.gif

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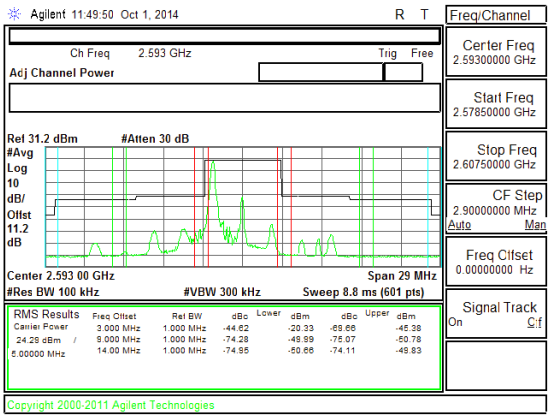
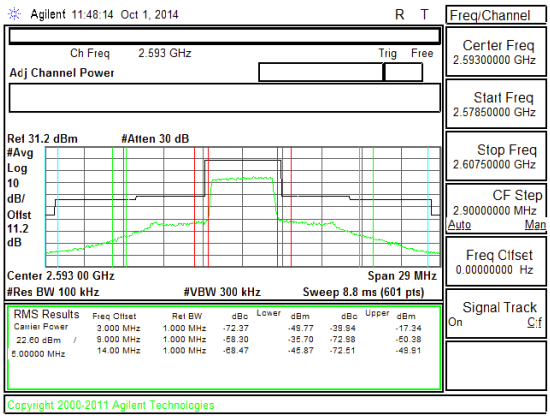
Band LTE41 5MHz QPSK	 Band LTE41 5MHz EM QPSK Mid Channel 1RB.gif	 Band LTE41 5MHz EM QPSK Mid Channel FRB.gif

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10.3. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

Part 27: (m)(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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.

RESULTS

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10.3.1. OUT OF BAND EMISSIONS RESULT

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	20	QPSK	2506	-31.27	-25	-6.27
			2593	-33.69	-25	-8.69
			2680	-35.07	-25	-10.07
		16QAM	2506	-36.25	-25	-11.25
			2593	-33.12	-25	-8.12
			2680	-34.41	-25	-9.41

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	15	QPSK	2503.5	-33.23	-25	-8.23
			2593	-34.39	-25	-9.39
			2682.5	-34.11	-25	-9.11
		16QAM	2503.5	-34.37	-25	-9.37
			2593	-35.08	-25	-10.08
			2682.5	-35.79	-25	-10.79

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	10	QPSK	2501	-35.28	-25	-10.28
			2593	-32.79	-25	-7.79
			2685	-35.18	-25	-10.18
		16QAM	2501	-35.30	-25	-10.3
			2593	-34.46	-25	-9.46
			2685	-34.38	-25	-9.38

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	5	QPSK	2498.5	-32.87	-25	-7.87
			2593	-30.73	-25	-5.73
			2687.5	-32.68	-25	-7.68
		16QAM	2498.5	-34.68	-25	-9.68
			2593	-34.74	-25	-9.74
			2687.5	-35.35	-25	-10.35

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Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM850	GPRS	824.2	-29.43	-13	-16.13
		836.6	-27.19	-13	-14.19
		848.8	-29.27	-13	-16.27
	EGPRS	824.2	-27.65	-13	-14.65
		836.6	-27.12	-13	-14.12
		848.8	-26.53	-13	-13.53
GSM1900	GPRS	1850.2	-27.03	-13	-14.03
		1880	-26.21	-13	-13.21
		1909.8	-25.86	-13	-12.86
	EGPRS	1850.2	-27.03	-13	-14.03
		1880	-26.61	-13	-13.61
		1909.8	-26.22	-13	-13.22
Band 5	REL99	826.4	-37.46	-13	-24.46
		836.6	-36.64	-13	-23.64
		846.6	-36.24	-13	-23.24
	HSDPA	826.4	-37.68	-13	-24.68
		836.6	-36.81	-13	-23.81
		846.6	-36.92	-13	-23.92
Band 2	REL99	1852.4	-36.92	-13	-23.92
		1880	-36.34	-13	-23.34
		1907.6	-37.77	-13	-24.77
	HSDPA	1852.4	-36.80	-13	-23.80
		1880	-36.26	-13	-23.26
		1907.6	-36.67	-13	-23.67

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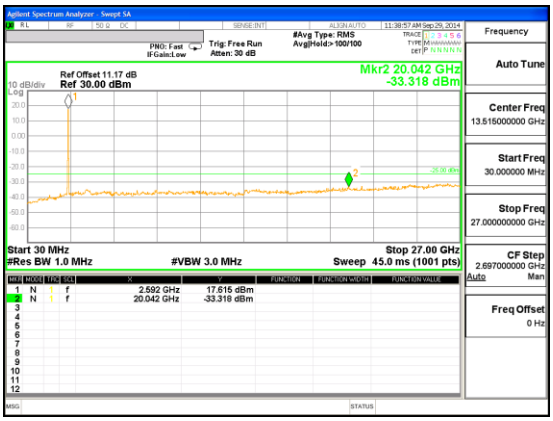
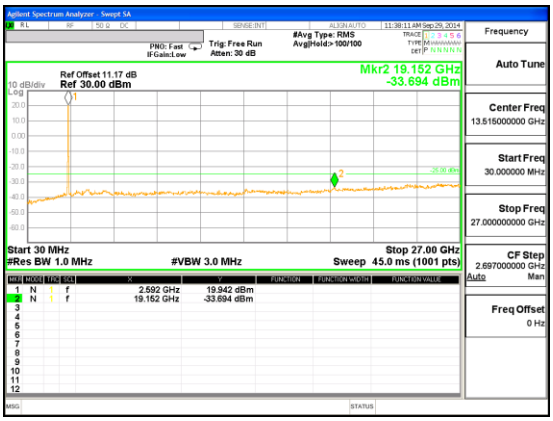
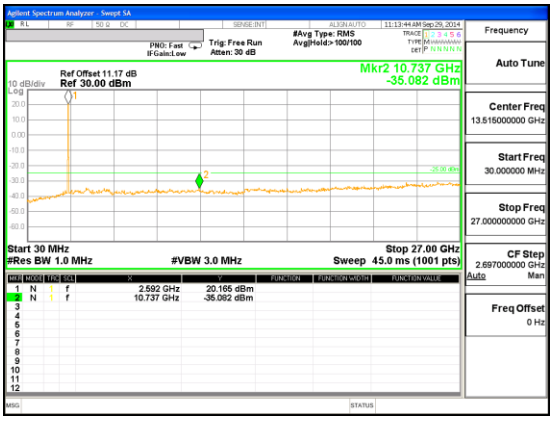
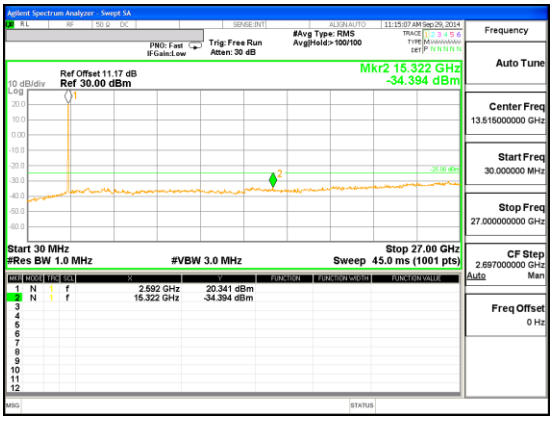
10.3.2. OUT OF BAND EMISSIONS PLOTS

Band LTE41 20MHz	 Band LTE41 20MHz CSE 16QAM Mid channel	 Band LTE41 20MHz CSE QPSK Mid channel
Band LTE41 15MHz	 Band LTE41 15MHz CSE 16QAM Mid channel	 Band LTE41 15MHz CSE QPSK Mid channel

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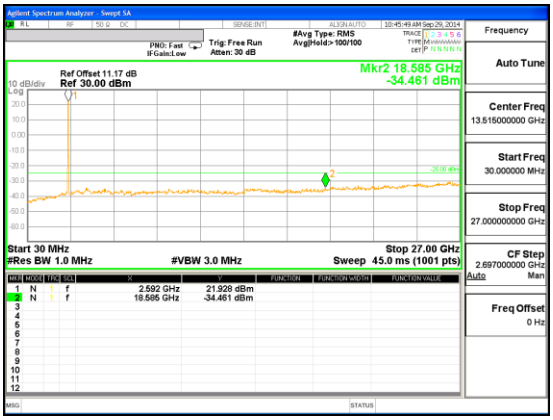
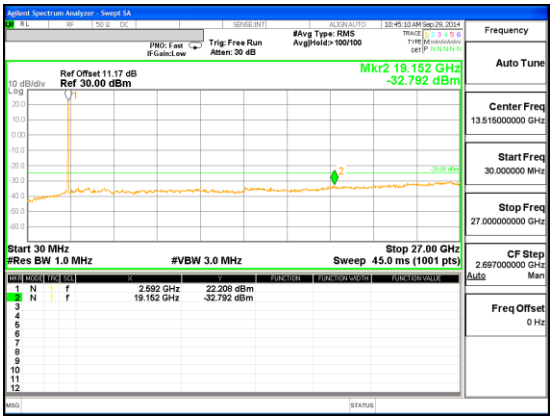
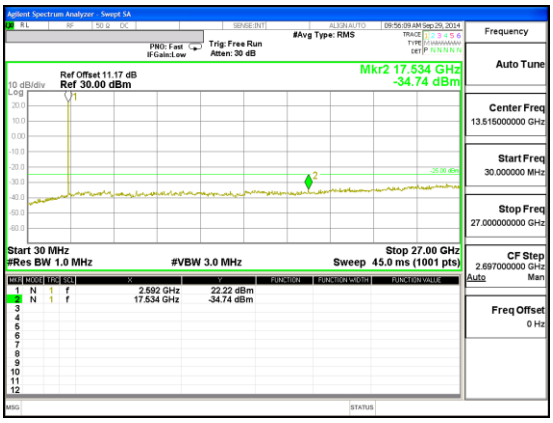
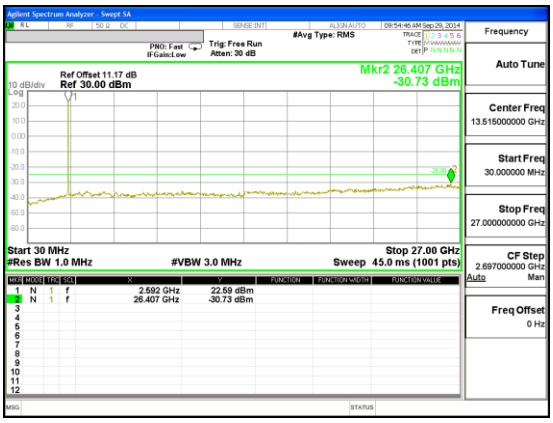
Band LTE41 10MHz	 Band LTE41 10MHz CSE 16QAM Mid channel	 Band LTE41 10MHz CSE QPSK Mid channel

Band LTE41 5MHz	 Band LTE41 5MHz CSE 16QAM Mid channel	 Band LTE41 5MHz CSE QPSK Mid channel

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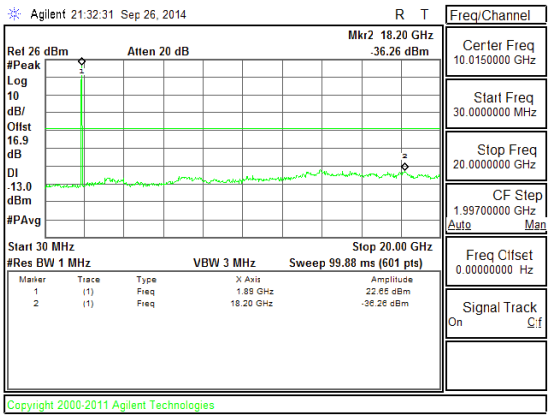
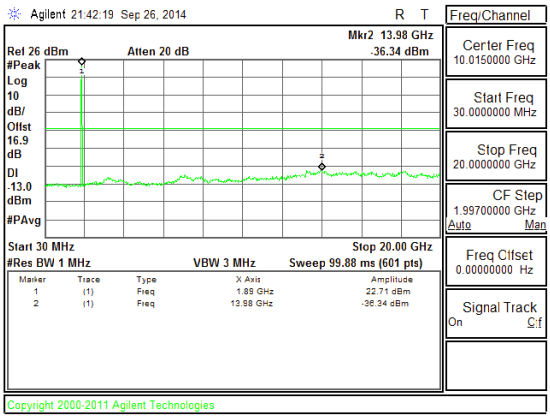
Band

Band 2

HSDPA



Band WCDMA B2 HSDPA CSE

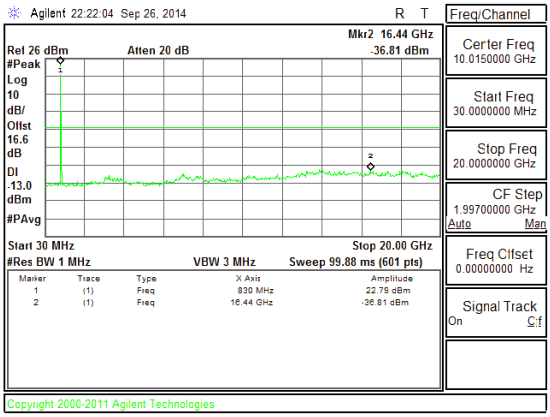


Band WCDMA B2 REL99 CSE

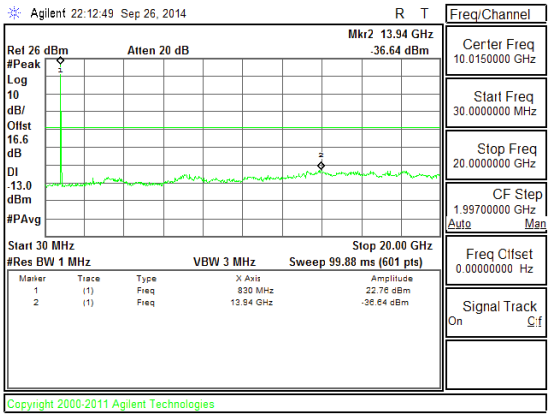
Band

Band 5

HSDPA



Band WCDMA B5 HSDPA CSE



Band WCDMA B5 REL99 CSE

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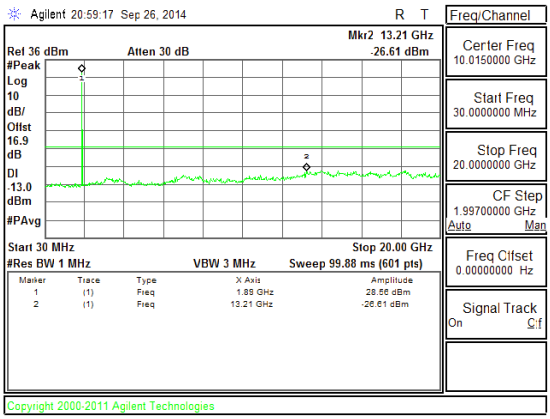
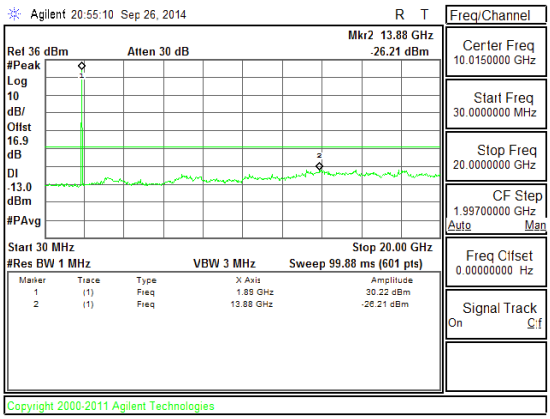
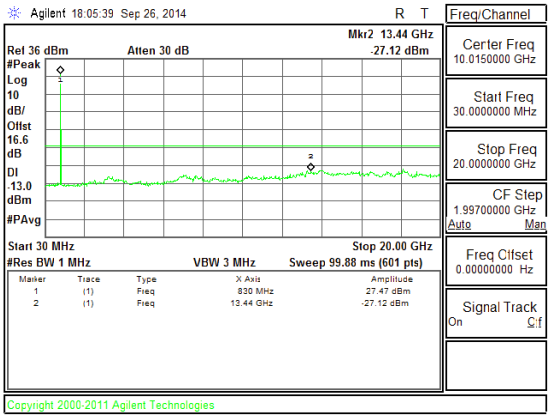
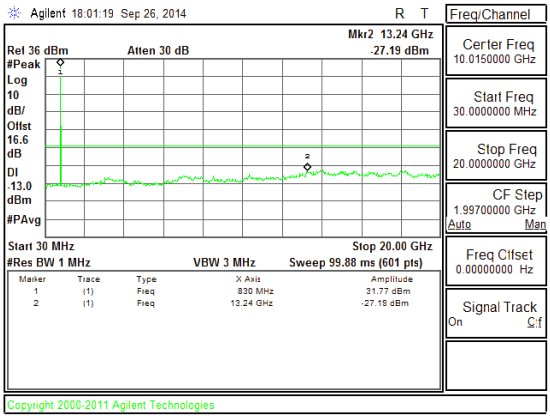
Band GSM1900	 Band GSM1900 EGPRS CSE Mid channel	 Band GSM1900 GPRS CSE Mid channel
Band GSM850	 Band GSM850 EGPRS CSE Mid channel	 Band GSM850 GPRS CSE Mid channel

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10.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §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

RESULTS

See the following pages.

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10.4.1. FREQUENCY STABILITY RESULTS

GPRS 1900, Channel 661 Freq: 1880MHz– MID CHANNEL

Reference Frequency: PCS Mid Channel		1880	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		4700.000	Hz	
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000072	-0.001	2.5
3.80	40	1880.000069	0.001	2.5
3.80	30	1880.000064	0.004	2.5
3.80	***20***	1880.000070	**0**	***2.5***
3.80	10	1880.000063	0.004	2.5
3.80	0	1880.000064	0.003	2.5
3.80	-10	1880.000066	0.002	2.5
3.80	-20	1880.000063	0.004	2.5
3.80	-30	1880.000061	0.005	2.5

Reference Frequency: PCS Mid Channel		1880	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		4700.000	Hz	
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1880.000070***	***0***	***2.5***
4.30	20	1880.000068	*0.001*	2.5
3.20	20	1880.000062	*0.004*	2.5

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GPRS 850 CELL BAND, – MID CHANNEL190, Frequency 836.6MHz

Reference Frequency: Cell Mid Channel 836.6 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.600023	-0.003	2.5
3.80	40	836.600023	-0.004	2.5
3.80	30	836.600022	-0.002	2.5
3.80	***20***	836.600020	***0***	***2.5***
3.80	10	836.600019	0.002	2.5
3.80	0	836.600018	0.002	2.5
3.80	-10	836.600016	0.004	2.5
3.80	-20	836.600017	0.003	2.5
3.80	-30	836.600019	0.001	2.5

Reference Frequency: Cell Mid Channel 836.6 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
			Delta (ppm)	Limit (ppm)
3.80	***20***	***836.600020***	***0.00000***	***2.5***
4.30	20	836.600019	*0.00104*	2.5
3.20	20	836.600021	*-0.00106*	2.5

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LTE41 10MHz, Freq: 2593MHz– MID CHANNEL

Reference Frequency: PCS Mid Channel		2593	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		6482.500	Hz	
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse (MHz)**	**Delta (ppm)**	**Limit (ppm)**
3.80	50	2593.000014	0.000	2.5
3.80	40	2593.000015	0.000	2.5
3.80	30	2593.000015	0.000	2.5
3.80	***20***	**2593.000015**	**0**	***2.5***
3.80	10	2593.000014	0.000	2.5
3.80	0	2593.000011	0.001	2.5
3.80	-10	2592.999990	0.009	2.5
3.80	-20	2592.999989	0.010	2.5
3.80	-30	2592.999989	0.010	2.5

Reference Frequency: PCS Mid Channel		2593	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		6482.500	Hz	
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse (MHz)**	**Delta (ppm)**	**Limit (ppm)**
3.80	***20***	***2593.000015***	***0***	***2.5***
4.30	20	2593.000011	*0.001*	2.5
3.20	20	2593.000016	*-0.001*	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, §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.

27.50(h) - (2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.(LTE B41 & 7)

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

TEST PROCEDURE

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

For peak power measurement with a PSA:

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

For average power measurement with a PSA:

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

TEST RESULTS

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11.1.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	21.96	157
		9400	1880	21.15	130
		9538	1907.6	20.96	125
	HSDPA	9262	1852.4	21.83	152
		9400	1880	21.42	138
		9538	1907.6	21.36	137

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 5	REL99	4132	826.4	16.03	40
		4183	836.6	16.84	48
		4233	846.6	16.14	41
	HSDPA	4132	826.4	15.08	32
		4183	836.6	15.24	33
		4233	846.6	15.05	32

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM1900	GPRS	512	1850.2	29.28	847
		661	1880	28.96	787
		810	1909.8	28.97	789
	EGPRS	512	1850.2	25.90	389
		661	1880	25.70	372
		810	1909.8	25.87	386

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM850	GPRS	128	824.2	27.62	578
		190	836.6	27.67	585
		251	848.8	28.67	736
	EGPRS	128	824.2	22.60	182
		190	836.6	22.95	197
		251	848.8	22.89	195

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11.1.2. LTE ERP/EIRP Results

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE41	20	QPSK	1/0	2506	22.65	184
			1/0	2593	21.85	153
			1/0	2680	21.55	143
		16QAM	1/0	2506	21.75	150
			1/0	2593	20.61	115
			1/0	2680	20.85	122

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE41	15	QPSK	1/0	2503.5	22.29	169
			1/0	2593	21.85	153
			1/0	2682.5	22.25	168
		16QAM	1/0	2503.5	20.55	114
			1/0	2593	20.61	115
			1/0	2682.5	21.65	146

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE41	10	QPSK	1/0	2501	21.40	138
			1/0	2593	21.80	151
			1/0	2685	22.60	182
		16QAM	1/0	2501	20.60	115
			1/0	2593	20.56	114
			1/0	2685	21.40	138

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE41	5	QPSK	1/0	2498.5	22.20	166
			1/0	2593	21.77	150
			1/0	2687.5	22.10	162
		16QAM	1/0	2498.5	20.99	126
			1/0	2593	20.56	114
			1/0	2687.5	21.39	138

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11.1.3. ERP/EIRP DATA

Band

LTE41

20MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18943
Date: 10/2/14
Test Engineer: D. Sblendorio / K. Kedida
Configuration: EUT only
Mode: LTE 41 20M 16QAM

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2506.00	8.40	V	0.9	9.5	17.05	33.0	-16.0	
2506.00	13.10	H	0.9	9.5	21.75	33.0	-11.3	
Mid Ch								
2593.00	11.00	V	0.9	9.5	19.65	33.0	-13.4	
2593.00	11.96	H	0.9	9.5	20.61	33.0	-12.4	
High Ch								
2680.00	10.60	V	0.9	9.5	19.25	33.0	-13.8	
2680.00	12.20	H	0.9	9.5	20.85	33.0	-12.2	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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Band

LTE41

20MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18943
Date: 10/2/14
Test Engineer: D. Sblendorio / K. Kedida
Configuration: EUT only
Mode:LTE 41 20M QPSK

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2506.00	8.90	V	0.9	9.5	17.55	33.0	-15.5	
2506.00	14.00	H	0.9	9.5	22.65	33.0	-10.4	
Mid Ch								
2593.00	13.10	V	0.9	9.5	21.75	33.0	-11.3	
2593.00	13.20	H	0.9	9.5	21.85	33.0	-11.2	
High Ch								
2680.00	11.90	V	0.9	9.5	20.55	33.0	-12.5	
2680.00	12.90	H	0.9	9.5	21.55	33.0	-11.5	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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Band

LTE41

15MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18943
Date: 10/2/14
Test Engineer: D. Sblendorio / K. Kedida
Configuration: EUT only
Mode: LTE 41 10M 16QAM

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2503.50	11.80	V	0.9	9.5	20.45	33.0	-12.6	
2503.50	11.90	H	0.9	9.5	20.55	33.0	-12.5	
Mid Ch								
2593.00	11.00	V	0.9	9.5	19.65	33.0	-13.4	
2593.00	11.96	H	0.9	9.5	20.61	33.0	-12.4	
High Ch								
2682.50	12.60	V	0.9	9.5	21.25	33.0	-11.8	
2682.50	13.00	H	0.9	9.5	21.65	33.0	-11.4	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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Band

LTE41

15MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18943
Date: 10/2/14
Test Engineer: D. Sblendorio / K. Kedida
Configuration: EUT only
Mode: LTE 41 10M 16QAM

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2503.50	13.00	V	0.9	9.5	21.65	33.0	-11.4	
2503.50	13.64	H	0.9	9.5	22.29	33.0	-10.7	
Mid Ch								
2593.00	13.10	V	0.9	9.5	21.75	33.0	-11.3	
2593.00	13.20	H	0.9	9.5	21.85	33.0	-11.2	
High Ch								
2682.50	13.40	V	0.9	9.5	22.05	33.0	-11.0	
2682.50	13.60	H	0.9	9.5	22.25	33.0	-10.8	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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Band

LTE41

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18943
Date: 10/2/14
Test Engineer: D. Sblendorio / K. Kedida
Configuration: EUT only
Mode: LTE 41 10M 16QAM

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2501.00	11.20	V	0.9	9.5	19.80	33.0	-13.2	
2501.00	12.00	H	0.9	9.5	20.60	33.0	-12.4	
Mid Ch								
2593.00	11.00	V	0.9	9.5	19.60	33.0	-13.4	
2593.00	11.96	H	0.9	9.5	20.56	33.0	-12.4	
High Ch								
2685.00	12.40	V	0.9	9.5	21.00	33.0	-12.0	
2685.00	12.80	H	0.9	9.5	21.40	33.0	-11.6	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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Band

LTE41

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18943
Date: 10/2/14
Test Engineer: D. Sblendorio / K. Kedida
Configuration: EUT only
Mode: LTE 41 10M QPSK

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2501.00	12.40	V	0.9	9.5	21.00	33.0	-12.0	
2501.00	12.80	H	0.9	9.5	21.40	33.0	-11.6	
Mid Ch								
2593.00	13.10	V	0.9	9.5	21.70	33.0	-11.3	
2593.00	13.20	H	0.9	9.5	21.80	33.0	-11.2	
High Ch								
2685.00	13.00	V	0.9	9.5	21.60	33.0	-11.4	
2685.00	14.00	H	0.9	9.5	22.60	33.0	-10.4	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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Band

LTE41

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18943
Date: 10/2/14
Test Engineer: D. Sblendorio / K. Kedida
Configuration: EUT only
Mode: LTE41 5MHz 16QAM Fund

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2498.50	9.80	V	0.9	9.5	18.40	33.0	-14.6	
2498.50	12.39	H	0.9	9.5	20.99	33.0	-12.0	
Mid Ch								
2593.00	11.00	V	0.9	9.5	19.60	33.0	-13.4	
2593.00	11.96	H	0.9	9.5	20.56	33.0	-12.4	
High Ch								
2687.50	8.60	V	0.9	9.6	17.30	33.0	-15.7	
2687.50	12.69	H	0.9	9.6	21.39	33.0	-11.6	

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Note: For Band 4 EIRP limit is 30dBm

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Band

LTE41

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18943
Date: 10/2/14
Test Engineer: D. Sblendorio / K. Kedida
Configuration: EUT only
Mode: LTE41 5MHz QPSK Fund

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2498.50	11.00	V	0.9	9.5	19.60	33.0	-13.4	
2498.50	13.60	H	0.9	9.5	22.20	33.0	-10.8	
Mid Ch								
2593.00	13.10	V	0.9	9.5	21.70	33.0	-11.3	
2593.00	13.17	H	0.9	9.5	21.77	33.0	-11.2	
High Ch								
2687.50	9.00	V	0.9	9.6	17.70	33.0	-15.3	
2687.50	13.40	H	0.9	9.6	22.10	33.0	-10.9	

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Note: For Band 4 EIRP limit is 30dBm

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Band

Band 2

HSDPA

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18943
Date: 10/01/14
Test Engineer: Jude Semana/Jonathan Hsu
Configuration: X-pos EUT Only SN 1964696
Mode: HDSPA Band 2

Test Equipment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59 Substitution, 5ft SMA Cable (SN: 16795) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	13.17	V	0.8	7.9	20.26	33.0	-12.7	
1852.40	14.74	H	0.8	7.9	21.83	33.0	-11.2	
Mid Ch								
1880.00	9.58	V	0.8	7.9	16.65	33.0	-16.4	
1880.00	14.35	H	0.8	7.9	21.42	33.0	-11.6	
High Ch								
1907.60	13.16	V	0.8	7.9	20.24	33.0	-12.8	
1907.60	14.28	H	0.8	7.9	21.36	33.0	-11.6	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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Band

Band 2

REL99

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber A

Company: Samsung
Project #: 14I18943
Date: 09/27/14
Test Engineer: O. Stoelting
Configuration: X-pos EUT Only
Mode: REL99 B2

Test Equipment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59 Substitution, 5ft SMA Cable (SN: 16795) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	12.65	V	0.8	7.9	19.73	33.0	-13.3	
1852.40	14.87	H	0.8	7.9	21.96	33.0	-11.0	
Mid Ch								
1880.00	11.97	V	0.8	7.9	19.04	33.0	-14.0	
1880.00	14.08	H	0.8	7.9	21.15	33.0	-11.8	
High Ch								
1907.60	9.83	V	0.8	7.9	16.91	33.0	-16.1	
1907.60	13.88	H	0.8	7.9	20.96	33.0	-12.0	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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Band

Band 5

HSDPA

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: SAMSUNG
Project #: 14I18943
Date: 09/30/14
Test Engineer: R. Alegre
Configuration: EUT only x-pos Sample 1964696
Mode: HSDPA B5

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								
826.40	7.02	V	0.9	0.0	6.12	38.5	-32.3	
826.40	15.98	H	0.9	0.0	15.08	38.5	-23.4	
Mid Ch								
836.60	7.34	V	0.9	0.0	6.44	38.5	-32.0	
836.60	16.14	H	0.9	0.0	15.24	38.5	-23.2	
High Ch								
846.60	7.31	V	0.9	0.0	6.41	38.5	-32.0	
846.60	15.95	H	0.9	0.0	15.05	38.5	-23.4	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

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Band

Band 5

REL99

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: SAMSUNG
Project #: 14I18943
Date: 09/30/14
Test Engineer: R. Alegre
Configuration: EUT only x-pos Sample 1964696
Mode: REL99 B5

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								
826.40	8.00	V	0.9	0.0	7.10	38.5	-31.3	
826.40	16.93	H	0.9	0.0	16.03	38.5	-22.4	
Mid Ch								
836.60	8.01	V	0.9	0.0	7.11	38.5	-31.3	
836.60	17.74	H	0.9	0.0	16.84	38.5	-21.6	
High Ch								
846.60	8.24	V	0.9	0.0	7.34	38.5	-31.1	
846.60	17.04	H	0.9	0.0	16.14	38.5	-22.3	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

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Band

GSM 1900

EGPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber A

Company: Samsung
Project #: 14I18943
Date: 09/30/14
Test Engineer: L. Lara
Configuration: X-pos EUT Only SN 1964696
Mode: EGPRS 1900

Test Equipment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59 Substitution, 5ft SMA Cable (SN: 16795) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.20	5.36	V	0.8	7.9	12.44	33.0	-20.6	
1850.20	18.82	H	0.8	7.9	25.90	33.0	-7.1	
Mid Ch								
1880.00	4.65	V	0.8	7.9	11.72	33.0	-21.3	
1880.00	18.63	H	0.8	7.9	25.70	33.0	-7.3	
High Ch								
1909.80	4.60	V	0.8	7.9	11.68	33.0	-21.3	
1909.80	18.79	H	0.8	7.9	25.87	33.0	-7.1	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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Band

GSM 1900

GPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber A

Company: Samsung
Project #: 14I18943
Date: 09/27/14
Test Engineer: O. Stoelting
Configuration: X-pos EUT Only
Mode: GPRS 1880

Test Equipment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59 Substitution, 5ft SMA Cable (SN: 16795) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.20	20.51	V	0.8	7.9	27.60	33.0	-5.4	
1850.20	22.20	H	0.8	7.9	29.28	33.0	-3.7	
Mid Ch								
1880.00	19.20	V	0.8	7.9	26.27	33.0	-6.7	
1880.00	21.89	H	0.8	7.9	28.96	33.0	-4.0	
High Ch								
1909.80	16.08	V	0.8	7.9	23.16	33.0	-9.8	
1909.80	21.89	H	0.8	7.9	28.97	33.0	-4.0	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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Band

GSM 850

EGPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: SAMSUNG
Project #: 14I18943
Date: 09/26/14
Test Engineer: J. GOMEZ
Configuration: EUT only x-pos Sample 1964696
Mode: EGPRS850

Test Equipment:
Receiving: Sunol T185, 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	20.24	V	0.8	0.0	19.44	38.5	-19.0	
824.20	23.40	H	0.8	0.0	22.60	38.5	-15.8	
Mid Ch								
836.60	19.25	V	0.8	0.0	18.45	38.5	-20.0	
836.60	23.75	H	0.8	0.0	22.95	38.5	-15.5	
High Ch								
848.80	17.15	V	0.8	0.0	16.35	38.5	-22.1	
848.80	23.69	H	0.8	0.0	22.89	38.5	-15.6	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

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Band

GSM 850

GPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: SAMSUNG
Project #: 14I18943
Date: 09/26/14
Test Engineer: J. GOMEZ
Configuration: EUT only x-pos Sample 1964696
Mode: GPRS850

Test Equipment:
Receiving: Sunol T185, 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	19.88	V	0.8	0.0	19.09	38.5	-19.4	
824.20	28.42	H	0.8	0.0	27.62	38.5	-10.8	
Mid Ch								
836.60	19.80	V	0.8	0.0	19.00	38.5	-19.4	
836.60	28.47	H	0.8	0.0	27.67	38.5	-10.8	
High Ch								
848.80	19.97	V	0.8	0.0	19.17	38.5	-19.3	
848.80	29.47	H	0.8	0.0	28.67	38.5	-9.8	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

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11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238

LIMIT

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

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.

RESULTS

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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11.2.1. SPURIOUS RADIATION DATA

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/30/14
Test Engineer: J. Hsu
Configuration: X-pos EUT/AC Charger/Headset
Mode: LTE band 41, 20MHz BW 16QAM HARM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T145 8449B	Filter 1	Part 27

Band
LTE41
20MHz
16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (2506 MHz)									
5.012	-15.8	V	3.0	28.9	1.0	-43.7	-25.0	-18.7	
7.518	-13.9	V	3.0	26.3	1.0	-39.3	-25.0	-14.3	
10.024	-12.9	V	3.0	23.1	1.0	-35.0	-25.0	-10.0	
5.012	-17.8	H	3.0	28.9	1.0	-45.7	-25.0	-20.7	
7.518	-13.1	H	3.0	26.3	1.0	-38.4	-25.0	-13.4	
10.024	-11.1	H	3.0	23.1	1.0	-33.2	-25.0	-8.2	
Mid Ch, (2593 MHz)									
5.186	-17.2	V	3.0	28.7	1.0	-45.0	-25.0	-20.0	
7.779	-12.8	V	3.0	26.0	1.0	-37.8	-25.0	-12.8	
10.372	-10.4	V	3.0	23.0	1.0	-32.4	-25.0	-7.4	
5.186	-15.7	H	3.0	28.7	1.0	-43.4	-25.0	-18.4	
7.779	-12.3	H	3.0	26.0	1.0	-37.3	-25.0	-12.3	
10.372	-11.0	H	3.0	23.0	1.0	-32.9	-25.0	-7.9	
High Ch, (2680 MHz)									
5.360	-18.1	V	3.0	28.5	1.0	-45.6	-25.0	-20.6	
8.040	-13.9	V	3.0	25.6	1.0	-38.5	-25.0	-13.5	
10.720	-11.3	V	3.0	22.9	1.0	-33.2	-25.0	-8.2	
5.360	-16.9	H	3.0	28.5	1.0	-44.4	-25.0	-19.4	
8.040	-13.3	H	3.0	25.6	1.0	-38.0	-25.0	-13.0	
10.720	-11.9	H	3.0	22.9	1.0	-33.8	-25.0	-8.8	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/30/14
Test Engineer: J. Hsu
Configuration: X-pos EUT/AC Charger/Headset
Mode: LTE band 41, 20MHz BW QPSK HARM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T145 8449B	Filter 1	Part 27

Band: LTE41 20MHz QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (2506 MHz)									
5.012	-16.5	V	3.0	28.9	1.0	-44.4	-25.0	-19.4	
7.518	-14.3	V	3.0	26.3	1.0	-39.6	-25.0	-14.6	
10.024	-12.3	V	3.0	23.1	1.0	-34.4	-25.0	-9.4	
5.012	-17.5	H	3.0	28.9	1.0	-45.4	-25.0	-20.4	
7.518	-12.9	H	3.0	26.3	1.0	-38.3	-25.0	-13.3	
10.024	-12.2	H	3.0	23.1	1.0	-34.3	-25.0	-9.3	
Mid Ch, (2593 MHz)									
5.186	-17.1	V	3.0	28.7	1.0	-44.8	-25.0	-19.8	
7.779	-12.7	V	3.0	26.0	1.0	-37.7	-25.0	-12.7	
10.372	-10.5	V	3.0	23.0	1.0	-32.5	-25.0	-7.5	
5.186	-14.8	H	3.0	28.7	1.0	-42.6	-25.0	-17.6	
7.779	-11.9	H	3.0	26.0	1.0	-36.9	-25.0	-11.9	
10.372	-11.0	H	3.0	23.0	1.0	-33.0	-25.0	-8.0	
High Ch, (2680 MHz)									
5.360	-16.7	V	3.0	28.5	1.0	-44.3	-25.0	-19.3	
8.040	-12.8	V	3.0	25.6	1.0	-37.4	-25.0	-12.4	
10.720	-11.1	V	3.0	22.9	1.0	-33.0	-25.0	-8.0	
5.360	-17.0	H	3.0	28.5	1.0	-44.5	-25.0	-19.5	
8.040	-12.3	H	3.0	25.6	1.0	-36.9	-25.0	-11.9	
10.720	-11.0	H	3.0	22.9	1.0	-32.9	-25.0	-7.9	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/30/14
Test Engineer: J. Hsu
Configuration: X-pos EUT/AC Charger/Headset
Mode: TX, LTE band 41, 15MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T145 8449B	Filter 1	Part 27

Band: LTE41, 15MHz, 16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (2503.5 MHz)									
5.007	-15.7	V	3.0	28.9	1.0	-43.6	-25.0	-18.6	
7.511	-13.5	V	3.0	26.3	1.0	-38.8	-25.0	-13.8	
10.014	-11.4	V	3.0	23.1	1.0	-33.5	-25.0	-8.5	
5.007	-18.4	H	3.0	28.9	1.0	-46.3	-25.0	-21.3	
7.511	-11.9	H	3.0	26.3	1.0	-37.3	-25.0	-12.3	
10.014	-11.2	H	3.0	23.1	1.0	-33.3	-25.0	-8.3	
Mid Ch, (2593 MHz)									
5.186	-18.0	V	3.0	28.7	1.0	-45.8	-25.0	-20.8	
7.779	-12.7	V	3.0	26.0	1.0	-37.7	-25.0	-12.7	
10.372	-11.6	V	3.0	23.0	1.0	-33.5	-25.0	-8.5	
5.186	-16.6	H	3.0	28.7	1.0	-44.3	-25.0	-19.3	
7.779	-11.9	H	3.0	26.0	1.0	-36.9	-25.0	-11.9	
10.372	-11.5	H	3.0	23.0	1.0	-33.5	-25.0	-8.5	
High Ch, (2682.5 MHz)									
5.365	-15.2	V	3.0	28.5	1.0	-42.8	-25.0	-17.8	
8.052	-13.4	V	3.0	25.6	1.0	-38.0	-25.0	-13.0	
10.730	-8.8	V	3.0	22.9	1.0	-30.7	-25.0	-5.7	
5.365	-15.7	H	3.0	28.5	1.0	-43.2	-25.0	-18.2	
8.052	-11.8	H	3.0	25.6	1.0	-36.5	-25.0	-11.5	
10.730	-11.8	H	3.0	22.9	1.0	-33.7	-25.0	-8.7	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/30/14
Test Engineer: J. Hsu
Configuration: X-pos EUT/AC Charger/Headset
Mode: TX, LTE band 41, 15MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T145 8449B	Filter 1	Part 27

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, (2503.5 MHz)									
LTE41	5.007	-15.6	V	3.0	28.9	1.0	-43.5	-25.0	-18.5	
	7.511	-11.2	V	3.0	26.3	1.0	-36.5	-25.0	-11.5	
15MHz	10.014	-11.1	V	3.0	23.1	1.0	-33.2	-25.0	-8.2	
	5.007	-16.7	H	3.0	28.9	1.0	-44.6	-25.0	-19.6	
	7.511	-13.5	H	3.0	26.3	1.0	-38.8	-25.0	-13.8	
QPSK	10.014	-12.1	H	3.0	23.1	1.0	-34.2	-25.0	-9.2	
	Mid Ch, (2593 MHz)									
	5.186	-18.3	V	3.0	28.7	1.0	-46.0	-25.0	-21.0	
	7.779	-13.4	V	3.0	26.0	1.0	-38.4	-25.0	-13.4	
	10.372	-10.5	V	3.0	23.0	1.0	-32.5	-25.0	-7.5	
	5.186	-16.6	H	3.0	28.7	1.0	-44.3	-25.0	-19.3	
	7.779	-12.1	H	3.0	26.0	1.0	-37.1	-25.0	-12.1	
	10.372	-11.0	H	3.0	23.0	1.0	-33.0	-25.0	-8.0	
	High Ch, (2682.5 MHz)									
	5.365	-14.0	V	3.0	28.5	1.0	-41.5	-25.0	-16.5	
	8.052	-13.6	V	3.0	25.6	1.0	-38.3	-25.0	-13.3	
	10.730	-11.7	V	3.0	22.9	1.0	-33.6	-25.0	-8.6	
	5.365	-16.4	H	3.0	28.5	1.0	-44.0	-25.0	-19.0	
	8.052	-12.4	H	3.0	25.6	1.0	-37.0	-25.0	-12.0	
	10.730	-11.4	H	3.0	22.9	1.0	-33.3	-25.0	-8.3	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/30/14
Test Engineer: J. Hsu
Configuration: X-pos EUT/AC Charger/Headset
Mode: TX, LTE band 41, 10MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T145 8449B	Filter 1	Part 27

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, (2501 MHz)									
LTE41	5.002	-14.9	V	3.0	28.9	1.0	-42.9	-25.0	-17.9	
	7.503	-13.8	V	3.0	26.3	1.0	-39.1	-25.0	-14.1	
10MHz	10.004	-12.7	V	3.0	23.1	1.0	-34.8	-25.0	-9.8	
	5.002	-16.9	H	3.0	28.9	1.0	-44.8	-25.0	-19.8	
	7.503	-14.2	H	3.0	26.3	1.0	-39.5	-25.0	-14.5	
16QAM	10.004	-11.3	H	3.0	23.1	1.0	-33.4	-25.0	-8.4	
	Mid Ch, (2593 MHz)									
	5.186	-12.4	V	3.0	28.7	1.0	-40.1	-25.0	-15.1	
	7.779	-13.1	V	3.0	26.0	1.0	-38.1	-25.0	-13.1	
	10.372	-11.7	V	3.0	23.0	1.0	-33.7	-25.0	-8.7	
	5.186	-18.1	H	3.0	28.7	1.0	-45.8	-25.0	-20.8	
	7.779	-12.8	H	3.0	26.0	1.0	-37.8	-25.0	-12.8	
	10.372	-10.9	H	3.0	23.0	1.0	-32.9	-25.0	-7.9	
	High Ch, (2685 MHz)									
	5.370	-15.4	V	3.0	28.5	1.0	-42.9	-25.0	-17.9	
	8.055	-13.5	V	3.0	25.6	1.0	-38.2	-25.0	-13.2	
	10.740	-11.6	V	3.0	22.9	1.0	-33.4	-25.0	-8.4	
	5.370	-16.4	H	3.0	28.5	1.0	-43.9	-25.0	-18.9	
	8.055	-12.8	H	3.0	25.6	1.0	-37.4	-25.0	-12.4	
	10.740	-13.1	H	3.0	22.9	1.0	-35.0	-25.0	-10.0	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/30/14
Test Engineer: J. Hsu
Configuration: X-pos EUT/AC Charger/Headset
Mode: TX, LTE band 41, 10MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T145 8449B	Filter 1	Part 27

Band: LTE41 10MHz QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (2501 MHz)									
5.002	-15.0	V	3.0	28.9	1.0	-42.9	-25.0	-17.9	
7.503	-12.9	V	3.0	26.3	1.0	-38.2	-25.0	-13.2	
10.004	-13.1	V	3.0	23.1	1.0	-35.2	-25.0	-10.2	
5.002	-16.2	H	3.0	28.9	1.0	-44.1	-25.0	-19.1	
7.503	-13.7	H	3.0	26.3	1.0	-39.1	-25.0	-14.1	
10.004	-15.0	H	3.0	23.1	1.0	-37.1	-25.0	-12.1	
Mid Ch, (2593 MHz)									
5.186	-12.2	V	3.0	28.7	1.0	-39.9	-25.0	-14.9	
7.779	-12.9	V	3.0	26.0	1.0	-37.9	-25.0	-12.9	
10.372	-13.4	V	3.0	23.0	1.0	-35.4	-25.0	-10.4	
5.186	-17.6	H	3.0	28.7	1.0	-45.3	-25.0	-20.3	
7.779	-11.7	H	3.0	26.0	1.0	-36.7	-25.0	-11.7	
10.372	-13.2	H	3.0	23.0	1.0	-35.2	-25.0	-10.2	
High Ch, (2685 MHz)									
5.370	-15.7	V	3.0	28.5	1.0	-43.3	-25.0	-18.3	
8.055	-12.8	V	3.0	25.6	1.0	-37.4	-25.0	-12.4	
10.740	-11.7	V	3.0	22.9	1.0	-33.5	-25.0	-8.5	
5.370	-15.2	H	3.0	28.5	1.0	-42.7	-25.0	-17.7	
8.055	-11.6	H	3.0	25.6	1.0	-36.3	-25.0	-11.3	
10.740	-12.8	H	3.0	22.9	1.0	-34.7	-25.0	-9.7	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/30/14
Test Engineer: J. Hsu
Configuration: X-pos EUT/AC Charger/Headset
Mode: TX, LTE band 41, 5MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T145 8449B	Filter 1	Part 27

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, (2498.5 MHz)									
LTE41	4.997	-16.6	V	3.0	28.9	1.0	-44.5	-25.0	-19.5	
	7.495	-14.2	V	3.0	26.4	1.0	-39.6	-25.0	-14.6	
5MHz	9.994	-12.1	V	3.0	23.1	1.0	-34.2	-25.0	-9.2	
	4.997	-16.3	H	3.0	28.9	1.0	-44.2	-25.0	-19.2	
	7.495	-12.9	H	3.0	26.4	1.0	-38.3	-25.0	-13.3	
16QAM	9.994	-11.9	H	3.0	23.1	1.0	-34.0	-25.0	-9.0	
	Mid Ch, (2593 MHz)									
	5.186	-15.5	V	3.0	28.7	1.0	-43.2	-25.0	-18.2	
	7.779	-10.0	V	3.0	26.0	1.0	-35.0	-25.0	-10.0	
	10.372	-11.0	V	3.0	23.0	1.0	-33.0	-25.0	-8.0	
	5.186	-16.9	H	3.0	28.7	1.0	-44.6	-25.0	-19.6	
	7.779	-11.4	H	3.0	26.0	1.0	-36.4	-25.0	-11.4	
	10.372	-10.9	H	3.0	23.0	1.0	-32.9	-25.0	-7.9	
	High Ch, (2687.5 MHz)									
	5.375	-15.3	V	3.0	28.5	1.0	-42.8	-25.0	-17.8	
	8.055	-13.3	V	3.0	25.6	1.0	-37.9	-25.0	-12.9	
	10.740	-12.0	V	3.0	22.9	1.0	-33.9	-25.0	-8.9	
	5.375	-16.7	H	3.0	28.5	1.0	-44.3	-25.0	-19.3	
	8.055	-12.8	H	3.0	25.6	1.0	-37.4	-25.0	-12.4	
	10.740	-12.4	H	3.0	22.9	1.0	-34.3	-25.0	-9.3	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/30/14
Test Engineer: J. Hsu
Configuration: X-pos EUT/AC Charger/Headset
Mode: TX, LTE band 41, 5MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T145 8449B	Filter 1	Part 27

Band: LTE41 5MHz QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (2498.5 MHz)									
4.997	-17.1	V	3.0	28.9	1.0	-45.0	-25.0	-20.0	
7.495	-13.2	V	3.0	26.4	1.0	-38.5	-25.0	-13.5	
9.994	-12.0	V	3.0	23.1	1.0	-34.1	-25.0	-9.1	
4.997	-16.5	H	3.0	28.9	1.0	-44.4	-25.0	-19.4	
7.495	-13.5	H	3.0	26.4	1.0	-38.8	-25.0	-13.8	
9.994	-11.7	H	3.0	23.1	1.0	-33.8	-25.0	-8.8	
Mid Ch, (2593 MHz)									
5.186	-15.1	V	3.0	28.7	1.0	-42.8	-25.0	-17.8	
7.779	-10.5	V	3.0	26.0	1.0	-35.5	-25.0	-10.5	
10.372	-11.3	V	3.0	23.0	1.0	-33.3	-25.0	-8.3	
5.186	-16.9	H	3.0	28.7	1.0	-44.6	-25.0	-19.6	
7.779	-11.9	H	3.0	26.0	1.0	-36.8	-25.0	-11.8	
10.372	-9.9	H	3.0	23.0	1.0	-31.9	-25.0	-6.9	
High Ch, (2687.5 MHz)									
5.375	-14.5	V	3.0	28.5	1.0	-42.1	-25.0	-17.1	
8.055	-13.2	V	3.0	25.6	1.0	-37.8	-25.0	-12.8	
10.740	-10.7	V	3.0	22.9	1.0	-32.6	-25.0	-7.6	
5.375	-16.4	H	3.0	28.5	1.0	-44.0	-25.0	-19.0	
8.055	-12.1	H	3.0	25.6	1.0	-36.7	-25.0	-11.7	
10.740	-11.5	H	3.0	22.9	1.0	-33.4	-25.0	-8.4	

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

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

Company: Samsung
Project #: 14I18943
Date: 09/28/14
Test Engineer: O. Stoelting
Configuration: X-Pos EUT w/ AC Charger + HS
Mode: HSDPA_B2

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

Band

Band 2

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	-12.2	V	3.0	35.4	1.0	-46.6	-13.0	-33.6	
5.557	-15.2	V	3.0	34.7	1.0	-48.9	-13.0	-35.9	
7.410	-13.5	V	3.0	34.9	1.0	-47.4	-13.0	-34.4	
3.705	-12.9	H	3.0	35.4	1.0	-47.3	-13.0	-34.3	
5.557	-13.9	H	3.0	34.7	1.0	-47.6	-13.0	-34.6	
7.410	-12.1	H	3.0	34.9	1.0	-46.0	-13.0	-33.0	
Mid Ch, 1880MHz									
3.760	-10.5	V	3.0	35.3	1.0	-44.8	-13.0	-31.8	
5.640	-15.0	V	3.0	34.7	1.0	-48.7	-13.0	-35.7	
7.520	-13.0	V	3.0	34.9	1.0	-46.9	-13.0	-33.9	
3.760	-12.5	H	3.0	35.3	1.0	-46.8	-13.0	-33.8	
5.640	-14.6	H	3.0	34.7	1.0	-48.3	-13.0	-35.3	
7.520	-11.3	H	3.0	34.9	1.0	-45.2	-13.0	-32.2	
High Ch, 1907.6MHz									
3.815	-9.3	V	3.0	35.3	1.0	-43.6	-13.0	-30.6	
5.723	-13.5	V	3.0	34.7	1.0	-47.2	-13.0	-34.2	
7.630	-11.5	V	3.0	34.9	1.0	-45.5	-13.0	-32.5	
3.815	-10.3	H	3.0	35.3	1.0	-44.6	-13.0	-31.6	
5.723	-13.7	H	3.0	34.7	1.0	-47.4	-13.0	-34.4	
7.630	-11.0	H	3.0	34.9	1.0	-45.0	-13.0	-32.0	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/28/14
Test Engineer: O. Stoelting
Configuration: X-Pos EUT w/ AC Charger + HS
Mode: Rel99_B2

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T492	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	-14.0	V	3.0	35.4	1.0	-48.4	-13.0	-35.4	
5.557	-14.2	V	3.0	34.7	1.0	-48.0	-13.0	-35.0	
7.410	-12.4	V	3.0	34.9	1.0	-46.3	-13.0	-33.3	
3.705	-16.3	H	3.0	35.4	1.0	-50.7	-13.0	-37.7	
5.557	-14.0	H	3.0	34.7	1.0	-47.7	-13.0	-34.7	
7.410	-12.5	H	3.0	34.9	1.0	-46.4	-13.0	-33.4	
Mid Ch, 1880MHz									
3.760	-11.7	V	3.0	35.3	1.0	-46.0	-13.0	-33.0	
5.640	-14.6	V	3.0	34.7	1.0	-48.3	-13.0	-35.3	
7.520	-13.0	V	3.0	34.9	1.0	-47.0	-13.0	-34.0	
3.760	-10.1	H	3.0	35.3	1.0	-44.5	-13.0	-31.5	
5.640	-14.5	H	3.0	34.7	1.0	-48.2	-13.0	-35.2	
7.520	-11.1	H	3.0	34.9	1.0	-45.0	-13.0	-32.0	
High Ch, 1907.6MHz									
3.815	-9.1	V	3.0	35.3	1.0	-43.3	-13.0	-30.3	
5.723	-14.2	V	3.0	34.7	1.0	-47.9	-13.0	-34.9	
7.630	-12.0	V	3.0	34.9	1.0	-45.9	-13.0	-32.9	
3.815	-13.6	H	3.0	35.3	1.0	-47.8	-13.0	-34.8	
5.723	-13.6	H	3.0	34.7	1.0	-47.4	-13.0	-34.4	
7.630	-11.6	H	3.0	34.9	1.0	-45.6	-13.0	-32.6	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/30/14
Test Engineer: L. Lara
Configuration: X-pos EUT Only SN 1964696
Mode: HSDPA B5

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T34 8449B	Filter 1	Part 22

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, 826.4MHz									
1.653	-9.6	V	3.0	37.4	1.0	-45.9	-13.0	-32.9	
2.479	-19.6	V	3.0	36.4	1.0	-54.9	-13.0	-41.9	
3.306	-13.3	V	3.0	35.8	1.0	-48.1	-13.0	-35.1	
1.653	-10.9	H	3.0	37.4	1.0	-47.2	-13.0	-34.2	
2.479	-24.2	H	3.0	36.4	1.0	-59.6	-13.0	-46.6	
3.306	-18.5	H	3.0	35.8	1.0	-53.3	-13.0	-40.3	
Mid Ch, 836.6MHz									
1.673	-7.0	V	3.0	37.3	1.0	-43.3	-13.0	-30.3	
2.510	-17.9	V	3.0	36.4	1.0	-53.2	-13.0	-40.2	
3.346	-10.9	V	3.0	35.8	1.0	-45.6	-13.0	-32.6	
1.673	-11.0	H	3.0	37.3	1.0	-47.3	-13.0	-34.3	
2.510	-22.9	H	3.0	36.4	1.0	-58.3	-13.0	-45.3	
3.346	-13.4	H	3.0	35.8	1.0	-48.1	-13.0	-35.1	
High Ch, 846.6MHz									
1.693	-7.7	V	3.0	37.3	1.0	-44.0	-13.0	-31.0	
2.540	-20.9	V	3.0	36.3	1.0	-56.2	-13.0	-43.2	
3.386	-12.5	V	3.0	35.7	1.0	-47.3	-13.0	-34.3	
1.693	-10.8	H	3.0	37.3	1.0	-47.1	-13.0	-34.1	
2.540	-24.1	H	3.0	36.3	1.0	-59.5	-13.0	-46.5	
3.386	-16.8	H	3.0	35.7	1.0	-51.5	-13.0	-38.5	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/30/14
Test Engineer: L. Lara
Configuration: X-pos EUT Only SN 1964696
Mode: REL99 B5

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T34 8449B	Filter 1	Part 22

Band

Band 5

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, 826.4MHz									
1.653	-8.5	V	3.0	37.4	1.0	-44.9	-13.0	-31.9	
2.479	-18.4	V	3.0	36.4	1.0	-53.8	-13.0	-40.8	
3.306	-14.2	V	3.0	35.8	1.0	-49.0	-13.0	-36.0	
1.653	-13.8	H	3.0	37.4	1.0	-50.2	-13.0	-37.2	
2.479	-24.5	H	3.0	36.4	1.0	-59.9	-13.0	-46.9	
3.306	-17.9	H	3.0	35.8	1.0	-52.7	-13.0	-39.7	
Mid Ch, 836.6MHz									
1.673	-7.5	V	3.0	37.3	1.0	-43.8	-13.0	-30.8	
2.510	-18.4	V	3.0	36.4	1.0	-53.7	-13.0	-40.7	
3.346	-14.1	V	3.0	35.8	1.0	-48.9	-13.0	-35.9	
1.673	-16.0	H	3.0	37.3	1.0	-52.4	-13.0	-39.4	
2.510	-22.1	H	3.0	36.4	1.0	-57.5	-13.0	-44.5	
3.346	-16.6	H	3.0	35.8	1.0	-51.4	-13.0	-38.4	
High Ch, 846.6MHz									
1.693	-9.4	V	3.0	37.3	1.0	-45.7	-13.0	-32.7	
2.540	-21.1	V	3.0	36.3	1.0	-56.4	-13.0	-43.4	
3.386	-17.8	V	3.0	35.7	1.0	-52.5	-13.0	-39.5	
1.693	-10.0	H	3.0	37.3	1.0	-46.3	-13.0	-33.3	
2.540	-21.8	H	3.0	36.3	1.0	-57.1	-13.0	-44.1	
3.386	-18.3	H	3.0	35.7	1.0	-53.0	-13.0	-40.0	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/27/14
Test Engineer: O. Stoelting
Configuration: X-Pos EUT w/ AC Charger + HS
Mode: EGPRS1900

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T492	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, 1850.2MHz									
3.700	-7.8	V	3.0	35.4	1.0	-42.2	-13.0	-29.2	
5.551	-14.7	V	3.0	34.7	1.0	-48.5	-13.0	-35.5	
7.401	-14.4	V	3.0	34.9	1.0	-48.3	-13.0	-35.3	
3.700	-5.9	H	3.0	35.4	1.0	-40.3	-13.0	-27.3	
5.551	-11.8	H	3.0	34.7	1.0	-45.5	-13.0	-32.5	
7.401	-13.6	H	3.0	34.9	1.0	-47.5	-13.0	-34.5	
Mid Ch, 1880.0MHz									
3.760	-2.1	V	3.0	35.3	1.0	-36.5	-13.0	-23.5	
5.640	-11.3	V	3.0	34.7	1.0	-45.0	-13.0	-32.0	
7.520	-13.9	V	3.0	34.9	1.0	-47.8	-13.0	-34.8	
3.760	-7.5	H	3.0	35.3	1.0	-41.8	-13.0	-28.8	
5.640	-14.4	H	3.0	34.7	1.0	-48.2	-13.0	-35.2	
7.520	-12.7	H	3.0	34.9	1.0	-46.6	-13.0	-33.6	
High Ch, 1909.8MHz									
3.820	-7.1	V	3.0	35.3	1.0	-41.4	-13.0	-28.4	
5.729	-13.1	V	3.0	34.7	1.0	-46.8	-13.0	-33.8	
7.639	-12.5	V	3.0	35.0	1.0	-46.5	-13.0	-33.5	
3.820	-9.7	H	3.0	35.3	1.0	-44.0	-13.0	-31.0	
5.729	-14.3	H	3.0	34.7	1.0	-48.0	-13.0	-35.0	
7.639	-11.1	H	3.0	35.0	1.0	-45.0	-13.0	-32.0	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/27/14
Test Engineer: O. Stoelting
Configuration: X-Pos EUT w/ AC Charger + HS
Mode: GPRS1900

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T492	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, 1850.2MHz									
GSM1900	3.700	-8.9	V	3.0	35.4	1.0	-43.3	-13.0	-30.3	
	5.551	-9.9	V	3.0	34.7	1.0	-43.7	-13.0	-30.7	
	7.401	-14.4	V	3.0	34.9	1.0	-48.3	-13.0	-35.3	
	3.700	-7.9	H	3.0	35.4	1.0	-42.3	-13.0	-29.3	
	5.551	-14.1	H	3.0	34.7	1.0	-47.8	-13.0	-34.8	
	7.401	-13.2	H	3.0	34.9	1.0	-47.1	-13.0	-34.1	
	Mid Ch, 1880.0MHz									
GPRS	3.760	-6.3	V	3.0	35.3	1.0	-40.7	-13.0	-27.7	
	5.640	-13.2	V	3.0	34.7	1.0	-47.0	-13.0	-34.0	
	7.520	-13.9	V	3.0	34.9	1.0	-47.8	-13.0	-34.8	
	3.760	-5.3	H	3.0	35.3	1.0	-39.6	-13.0	-26.6	
	5.640	-13.9	H	3.0	34.7	1.0	-47.6	-13.0	-34.6	
	7.520	-13.2	H	3.0	34.9	1.0	-47.2	-13.0	-34.2	
	High Ch, 1909.8MHz									
	3.820	-5.5	V	3.0	35.3	1.0	-39.8	-13.0	-26.8	
	5.729	-11.6	V	3.0	34.7	1.0	-45.3	-13.0	-32.3	
	7.639	-11.6	V	3.0	35.0	1.0	-45.5	-13.0	-32.5	
	3.820	-5.2	H	3.0	35.3	1.0	-39.4	-13.0	-26.4	
	5.729	-13.5	H	3.0	34.7	1.0	-47.3	-13.0	-34.3	
	7.639	-12.9	H	3.0	35.0	1.0	-46.8	-13.0	-33.8	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/27/14
Test Engineer: O. Stoelting
Configuration: X-Pos EUT w/ AC Charger + HS
Mode: EGPRS 850

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T492	Filter 1	Part 22

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	7.4	V	3.0	37.4	1.0	-29.0	-13.0	-16.0	
2.473	-12.6	V	3.0	36.4	1.0	-48.0	-13.0	-35.0	
3.297	-20.8	V	3.0	35.8	1.0	-55.6	-13.0	-42.6	
1.648	5.4	H	3.0	37.4	1.0	-31.0	-13.0	-18.0	
2.473	-7.3	H	3.0	36.4	1.0	-42.6	-13.0	-29.6	
3.297	-21.1	H	3.0	35.8	1.0	-55.9	-13.0	-42.9	
Mid Ch, 836.6MHz									
1.673	4.1	V	3.0	37.3	1.0	-32.3	-13.0	-19.3	
2.510	-18.0	V	3.0	36.4	1.0	-53.4	-13.0	-40.4	
3.346	-23.4	V	3.0	35.8	1.0	-58.1	-13.0	-45.1	
1.673	3.1	H	3.0	37.3	1.0	-33.2	-13.0	-20.2	
2.510	-18.0	H	3.0	36.4	1.0	-53.4	-13.0	-40.4	
3.346	-20.9	H	3.0	35.8	1.0	-55.6	-13.0	-42.6	
High Ch, 848.8MHz									
1.698	0.7	V	3.0	37.3	1.0	-35.6	-13.0	-22.6	
2.547	-17.5	V	3.0	36.3	1.0	-52.8	-13.0	-39.8	
3.395	-20.2	V	3.0	35.7	1.0	-54.9	-13.0	-41.9	
1.698	1.3	H	3.0	37.3	1.0	-35.0	-13.0	-22.0	
2.547	-14.8	H	3.0	36.3	1.0	-50.2	-13.0	-37.2	
3.395	-20.8	H	3.0	35.7	1.0	-55.5	-13.0	-42.5	

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

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UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18943
Date: 09/27/14
Test Engineer: O. Stoelting
Configuration: X-Pos EUT w/ AC Charger + HS
Mode: GPRS 850

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T492	Filter 1	Part 22

Band

GSM850

GPRS

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	8.4	V	3.0	37.4	1.0	-28.0	-13.0	-15.0	
2.473	-10.4	V	3.0	36.4	1.0	-45.8	-13.0	-32.8	
3.297	-25.6	V	3.0	35.8	1.0	-60.4	-13.0	-47.4	
1.648	6.8	H	3.0	37.4	1.0	-29.5	-13.0	-16.5	
2.473	-5.9	H	3.0	36.4	1.0	-41.3	-13.0	-28.3	
3.297	-26.2	H	3.0	35.8	1.0	-61.0	-13.0	-48.0	
Mid Ch, 836.6MHz									
1.673	12.4	V	3.0	37.3	1.0	-24.0	-13.0	-11.0	
2.510	-7.7	V	3.0	36.4	1.0	-43.1	-13.0	-30.1	
3.346	-24.8	V	3.0	35.8	1.0	-59.6	-13.0	-46.6	
1.673	10.6	H	3.0	37.3	1.0	-25.8	-13.0	-12.8	
2.510	-8.2	H	3.0	36.4	1.0	-43.6	-13.0	-30.6	
3.346	-25.7	H	3.0	35.8	1.0	-60.4	-13.0	-47.4	
High Ch, 848.8MHz									
1.698	9.4	V	3.0	37.3	1.0	-26.9	-13.0	-13.9	
2.547	-5.6	V	3.0	36.3	1.0	-41.0	-13.0	-28.0	
3.395	-25.5	V	3.0	35.7	1.0	-60.2	-13.0	-47.2	
1.698	8.2	H	3.0	37.3	1.0	-28.1	-13.0	-15.1	
2.547	-18.1	H	3.0	36.3	1.0	-53.4	-13.0	-40.4	
3.395	-24.8	H	3.0	35.7	1.0	-59.5	-13.0	-46.5	

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

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