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, WLAN 2.4GHz b/g/n, ANT+ and NFC

MODEL NUMBER: SM-G3589W

FCC ID: A3LSMG3589W

REPORT NUMBER: 14U17686-1 REVISION B

ISSUE DATE: June 16, 2014

Prepared for

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--	5/29/14	Initial issue	P. Zhang
A	6/10/14	Updated radiated table header; LTE B41 OBW	P. Zhang
B	6/16/14	Updated B41 OBW	P. Zhang

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD. 416, MAETAN 3-DONG, YEONGTONG-GU SUWON-CITY, GYEONGGI-DO 443-742, SOUTH KOREA
EUT DESCRIPTION:	GSM/WCDMA/LTE Phone + Bluetooth, WLAN 2.4GHz b/g/n, ANT+ and NFC
MODEL:	SM-G3589W
SERIAL NUMBER:	FL-161-A, FL-161-B, FL-161-C (Radiated), FL-161-D (Conducted)
DATE TESTED:	MAY 9 – June 16, 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.

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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

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

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 18000 MHz	4.94 dB

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + Bluetooth, WLAN 2.4GHz b/g/n, ANT+ and 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						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			Peak(dBm)	Peak (mW)	Peak (dBm)	Peak (mW)
GSM850	824~849	GMSK	33.0	1995.26		
	824~849	GPRS	33.0	1995.26	26.931	493.29
	824~849	EGPRS	27.5	562.34	22.431	175.02
GSM1900	1850~1910	GMSK	30.0	1000.00		
	1850~1910	GPRS	30.0	1000.00	31.32	1355.19
	1850~1910	EGPRS	26.0	398.11	27.76	597.04

FCC Part 22/24						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			Avg (dBm)	Avg (mW)	Avg (dBm)	Avg (mW)
Band 5	824~849	REL99	22.9	194.98	15.97	39.55
	824~849	HSDPA	21.6	144.54	15.11	32.44
	824~849	HSUPA	21.5	141.25		
Band 2	1850~1910	REL99	22.6	181.97	22.01	158.9
	1850~1910	HSDPA	21.6	144.54	21.07	127.98
	1850~1910	HSUPA	21.5	141.25		

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5.3. MAXIMUM OUTPUT POWER (LTE)

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

FCC Part 27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			Peak	Avg (dBm)	Avg (mW)	Avg (dBm)	Avg (mW)
LTE41	2496~2690	20MHz	QPSK	23.5	223.87	18.65	73.28
	2496~2690	20MHz	16QAM	22.48	177.01	17.45	55.59

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			Peak	Avg (dBm)	Avg (mW)	Avg (dBm)	Avg (mW)
LTE41	2496~2690	15MHz	QPSK	23.48	222.84	18.85	76.74
	2496~2690	15MHz	16QAM	22.46	176.20	17.75	59.57

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			Peak	Avg (dBm)	Avg (mW)	Avg (dBm)	Avg (mW)
LTE41	2496~2690	10MHz	QPSK	23.48	222.84	19.65	92.26
	2496~2690	10MHz	16QAM	22.46	176.20	18.55	71.61

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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	-1.45
Band 2, 1850~1910MHz	-0.76
LTE41, 2496~2690MHz	-1.57

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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	ETA-U90CBC	N/A	N/A
Earphone	Samsung	GH59	N/A	N/A

I/O CABLES (CONDUCTED SETUP)

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

I/O CABLES (RADIATED SETUP)

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

TEST SETUP

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

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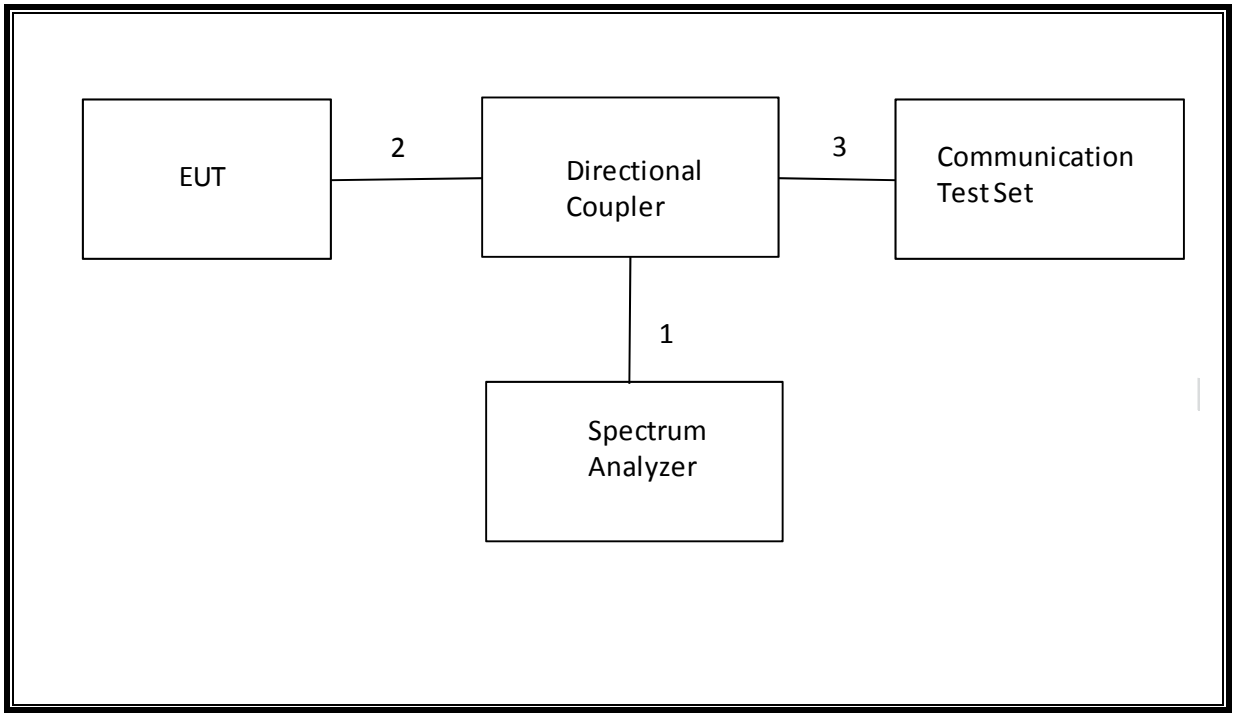
SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



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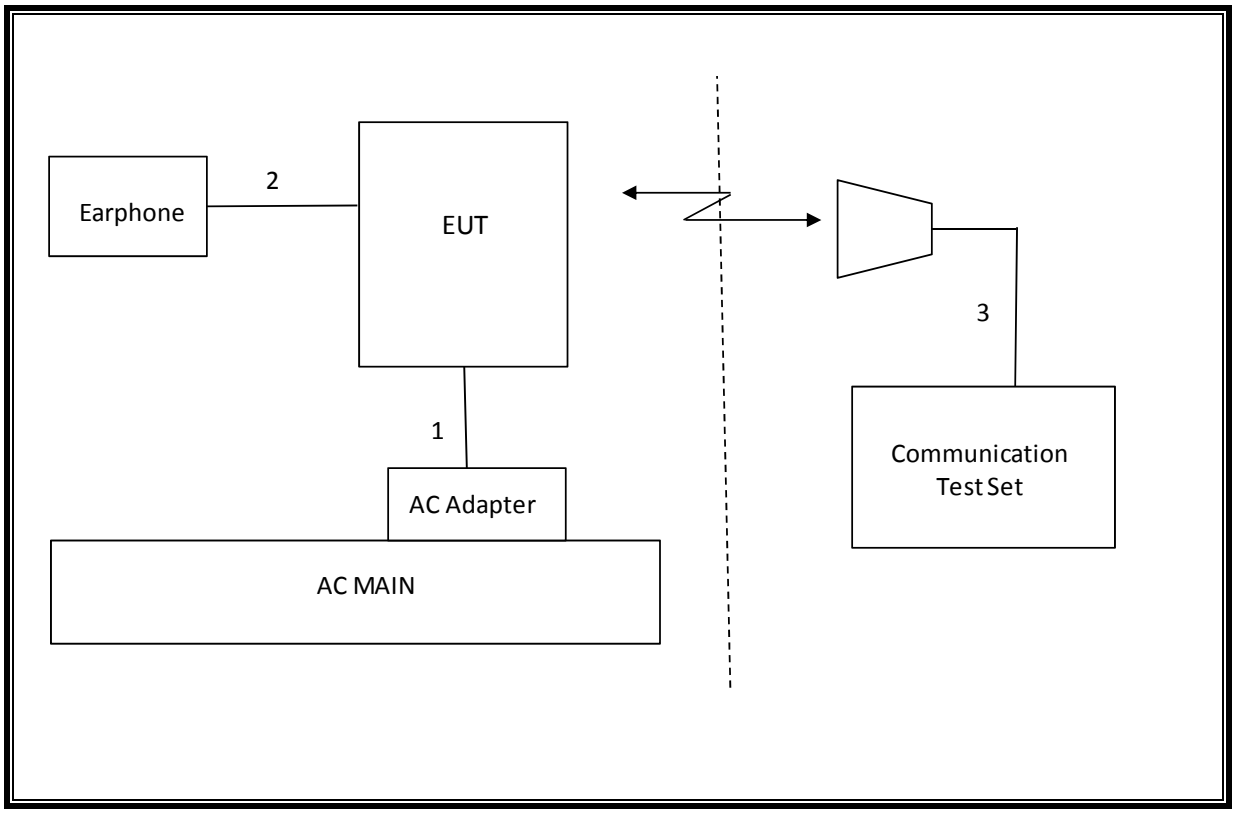
SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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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	08/14/14
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/14
Antenna, Horn, 18 GHz	EMCO	3115	C00784	09/25/14
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	07/02/14
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	07/06/14
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	C00993	02/14/15
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR
Antenna, Horn,18- 26 GHz	ARA	MWH-1826/B	C00946	11/12/14

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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	18.13MHz
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-21.954dBm
27.53(m)	RSS-199(4.5)		-25dBm		Pass	-25.13dBm
2.1046	N/A	Conducted output power	N/A		Pass	33dBm
27.53(m)	RSS-199(4.5)	Emission Mask			Pass	-25.13dBm
22.355 24.235 90.213	RSS-132(4.3) RSS-133(6.3) RSS-199(4.3)	Frequency Stability	2.5PPM		Pass	0.007PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	26.93dBm
24.232(c) 27.50(h)(2)	RSS-133(6.4) RSS-199(4.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	31.32dBm
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1)	Radiated Spurious Emission	-13dBm		Pass	-33.1dBm
27.53(m)	RSS-199(4.5)		-25dBm		Pass	

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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
				Peak (dBm)	Peak (dBm)	Peak (dBm)	Peak (dBm)
GSM850	GMSK	128	824.2	32.9			
		190	836.6	33.0			
		251	848.8	33.0			
	GPRS	128	824.2	32.9	30.0	28.2	27.0
		190	836.6	33.0	30.1	28.3	27.1
		251	848.8	33.0	30.1	28.3	27.1
	EGPRS	128	824.2	27.4	26.4	24.0	23.6
		190	836.6	27.5	26.5	24.0	23.7
		251	848.8	27.5	26.5	24.0	23.7
GSM1900	GMSK	512	1850.2	29.9			
		661	1880	30.0			
		810	1909.8	30.0			
	GPRS	512	1850.2	29.9	27.2	24.9	23.5
		661	1880	30.0	27.3	25.0	23.6
		810	1909.8	30.0	27.3	24.9	23.5
	EGPRS	512	1850.2	25.9	25.4	22.7	22.6
		661	1880	26.0	25.5	22.8	22.7
		810	1909.8	26.0	25.5	22.8	22.6

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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	22.8
		4183	836.6	22.9
		4233	846.6	22.9
Band 2	REL99	9262	1852.4	22.5
		9400	1880	22.6
		9538	1907.6	22.6

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8.3. UMTS HSDPA

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

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

8.3.1. UMTS HSDPA OUTPUT POWER RESULT

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm) Avg (dBm)
Band 5	HSDPA	1	4132	826.4	21.5
			4183	836.6	21.5
			4233	846.6	21.6
		2	4132	826.4	21.5
			4183	836.6	21.5
			4233	846.6	21.5
		3	4132	826.4	21.6
			4183	836.6	21.6
			4233	846.6	21.6
		4	4132	826.4	21.4
			4183	836.6	21.5
			4233	846.6	21.5
Band 2	HSDPA	1	9262	1852.4	21.4

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			9400	1880	21.5
			9538	1907.6	21.6
		2	9262	1852.4	21.5
			9400	1880	21.6
			9538	1907.6	21.6
		3	9262	1852.4	21.5
			9400	1880	21.6
			9538	1907.6	21.6
		4	9262	1852.4	21.5
			9400	1880	21.6
			9538	1907.6	21.6

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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	21.5
			4183	836.6	21.5
			4233	846.6	21.4
		2	4132	826.4	21.3
			4183	836.6	21.3
			4233	846.6	21.4
		3	4132	826.4	21.4
			4183	836.6	21.5
			4233	846.6	21.4
		4	4132	826.4	21.3
			4183	836.6	21.3
			4233	846.6	21.3
		5	4132	826.4	21.5
			4183	836.6	21.5
			4233	846.6	21.5
Band 2	HSUPA	1	9262	1852.4	21.5
			9400	1880	21.5
			9538	1907.6	21.5
		2	9262	1852.4	21.1
			9400	1880	21.2
			9538	1907.6	21.2
		3	9262	1852.4	21.4
			9400	1880	21.5
			9538	1907.6	21.5
		4	9262	1852.4	21.4
			9400	1880	21.5
			9538	1907.6	21.5
		5	9262	1852.4	21.4
			9400	1880	21.4
			9538	1907.6	21.5

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8.4. LTE OUTPUT VERIFICATION

8.4.1. LTE OUTPUT RESULT

Band	Frequency	Modulation	BW (MHz)	RB Size	RB Offset	Average
LTE41	2506	QPSK	20	1	0	23.50
				1	49	23.45
				1	99	23.44
				50	0	22.46
				50	24	22.46
				50	49	22.48
				100	0	22.46
	2506	16QAM		1	0	22.48
				1	49	22.48
				1	99	22.45
				50	0	21.44
				50	24	21.50
				50	49	21.45
				100	0	21.48
	2593	QPSK		1	0	23.44
				1	49	23.43
				1	99	23.42
				50	0	22.36
				50	24	22.35
				50	49	22.33
				100	0	22.34
	2593	16QAM		1	0	22.47
				1	49	22.46
				1	99	22.41
				50	0	21.41
				50	24	21.38
				50	49	21.39
				100	0	21.40
	2680	QPSK		1	0	23.42
				1	49	23.41
				1	99	23.40
				50	0	22.41
				50	24	22.42
				50	49	22.46
				100	0	22.42
	2680	16QAM		1	0	22.45
				1	49	22.42
				1	99	22.43
				50	0	21.40
				50	24	21.41
				50	49	21.40
				100	0	21.39

Band	Frequency	Modulation	BW (MHz)	RB Size	RB Offset	Average
LTE41	2503.5	QPSK	15	1	0	23.48
				1	37	23.43

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				1	74	23.42
				37	0	22.44
				37	17	22.44
				37	36	22.46
				75	0	22.44
	2503.5	16QAM		1	0	22.46
				1	37	22.46
				1	74	22.43
				37	0	21.42
				37	17	21.48
				37	36	21.43
				75	0	21.46
	2593	QPSK		1	0	23.43
				1	37	23.42
				1	74	23.41
				37	0	22.35
				37	17	22.34
				37	36	22.32
				75	0	22.33
	2593	16QAM		1	0	22.46
				1	37	22.45
				1	74	22.40
				37	0	21.40
				37	17	21.37
				37	36	21.38
				75	0	21.39
	2682.5	QPSK		1	0	23.33
				1	37	23.32
				1	74	23.31
				37	0	22.32
				37	17	22.33
				37	36	22.37
				75	0	22.33
	2682.5	16QAM		1	0	22.36
				1	37	22.33
				1	74	22.34
				37	0	21.31
				37	17	21.32
				37	36	21.31
				75	0	21.30

Band	Frequency	Modulation	BW (MHz)	RB Size	RB Offset	Average
LTE41	2501	QPSK	10	1	0	23.48
				1	24	23.43
				1	49	23.42
				25	0	22.44
				25	11	22.44
				25	24	22.46
				50	0	22.44
	2501	16QAM		1	0	22.46
				1	24	22.46
				1	49	22.43
				25	0	21.42

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				25	11	21.48
				25	24	21.43
				50	0	21.46
	2593	QPSK		1	0	23.43
				1	24	23.42
				1	49	23.41
				25	0	22.35
				25	11	22.34
				25	24	22.32
				50	0	22.33
	2593	16QAM		1	0	22.46
				1	24	22.45
				1	49	22.40
				25	0	21.40
				25	11	21.37
				25	24	21.38
				50	0	21.39
	2685	QPSK		1	0	23.33
				1	24	23.32
				1	49	23.31
				25	0	22.32
				25	11	22.33
				25	24	22.37
				50	0	22.33
	2685	16QAM		1	0	22.36
				1	24	22.33
				1	49	22.34
				25	0	21.31
				25	11	21.32
				25	24	21.31
				50	0	21.30

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9. PEAK TO AVERAGE RATIO

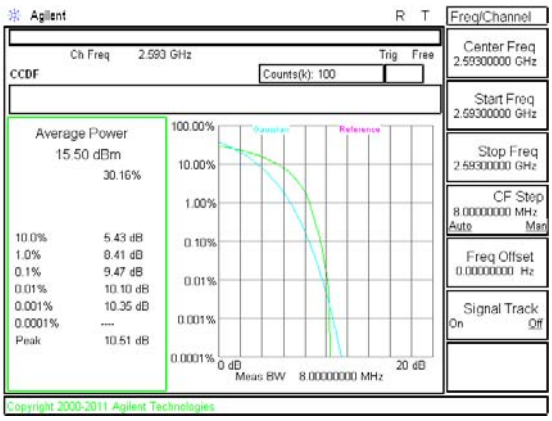
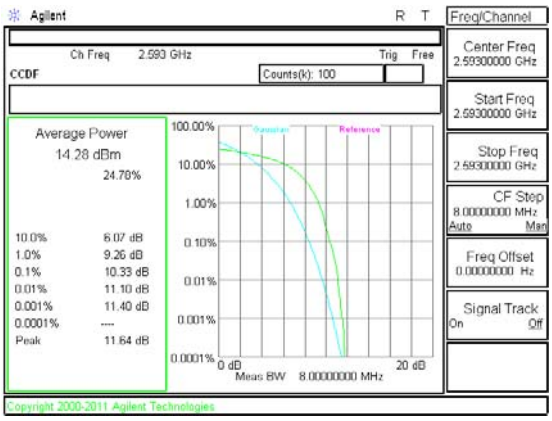
Test Procedure

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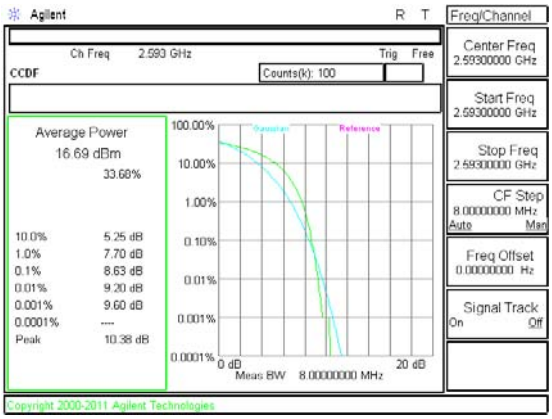
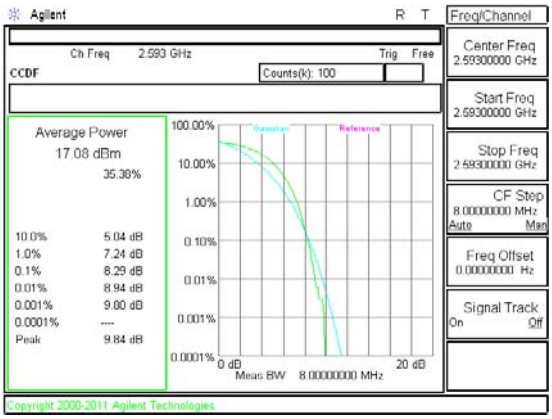
Band LTE41 15MHz	 Band LTE41 15MHz 16QAM Mid channel	 Band LTE41 15MHz QPSK Mid channel

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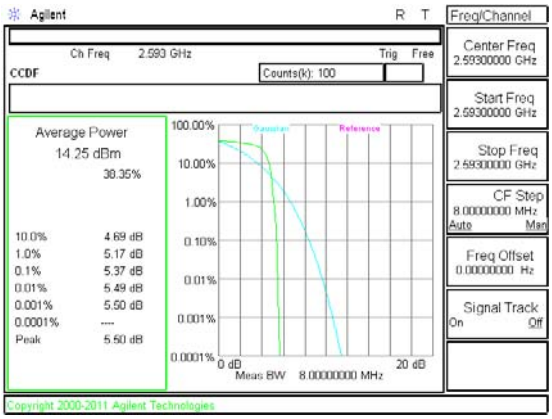
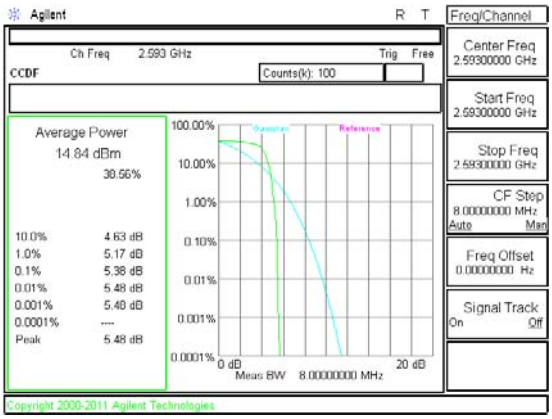
Band LTE41 10MHz	 Band LTE41 10MHz 16QAM Mid channel	 Band LTE41 10MHz QPSK Mid channel

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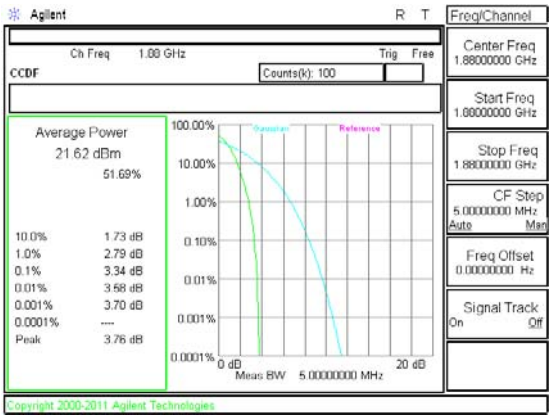
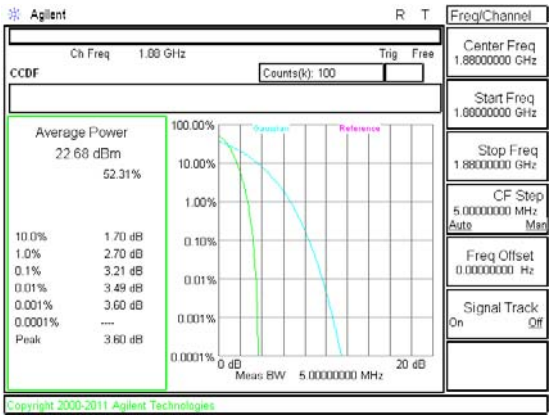
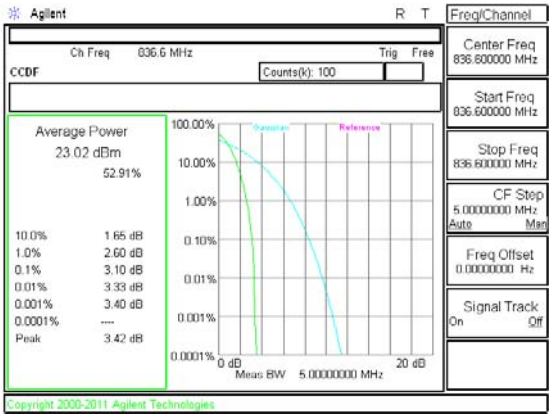
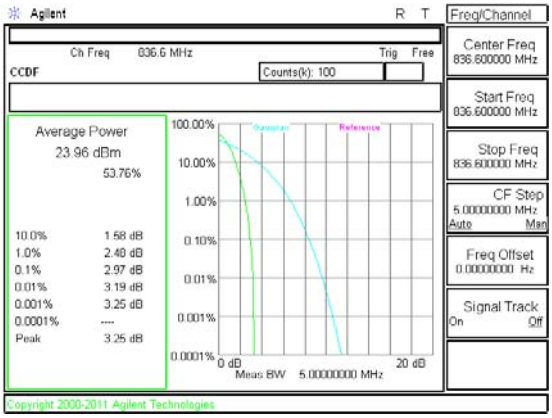
Band Band 2	 Band WCDMA B2 HSDPA	 Band WCDMA B2 REL99
Band Band 5	 Band WCDMA B5 HSDPA	 Band WCDMA B5 REL99

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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	247	326
		190	836.6	248	329
		251	848.8	244	328
	EGPRS	128	824.2	246	329
		190	836.6	245	327
		251	848.8	243	324
GSM1900	GPRS	512	1850.2	246	326
		661	1880	248	326
		810	1909.8	246	324
	EGPRS	512	1850.2	242	326
		661	1880	248	331
		810	1909.8	249	327
Band 5	REL99	4132	826.4	4172	4650
		4183	836.6	4170	4640
		4233	846.6	4192	4643
	HSDPA	4132	826.4	4163	4604
		4183	836.6	4156	4646
		4233	846.6	4185	4598
Band 2	REL99	9262	1852.4	4177	4615
		9400	1880	4175	4632
		9538	1907.6	4175	4621
	HSDPA	9262	1852.4	4153	4618
		9400	1880	4172	4623
		9538	1907.6	4189	4646

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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	17.952	30.133
			100/0	2593	18.058	33.770
			100/0	2680	17.883	26.174
		16QAM	100/0	2506	18.130	33.392
			100/0	2593	17.808	18.699
			100/0	2680	18.015	30.914

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE41	15	QPSK	75/0	2503.5	13.570	25.036
			75/0	2593	14.044	28.165
			75/0	2682.5	13.630	23.867
		16QAM	75/0	2503.5	13.512	19.668
			75/0	2593	13.768	28.362
			75/0	2682.5	13.844	26.540

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE41	10	QPSK	50/0	2501	9.028	16.412
			50/0	2593	9.607	19.656
			50/0	2685	9.450	19.430
		16QAM	50/0	2501	9.708	18.259
			50/0	2593	9.079	19.133
			50/0	2685	9.806	19.856

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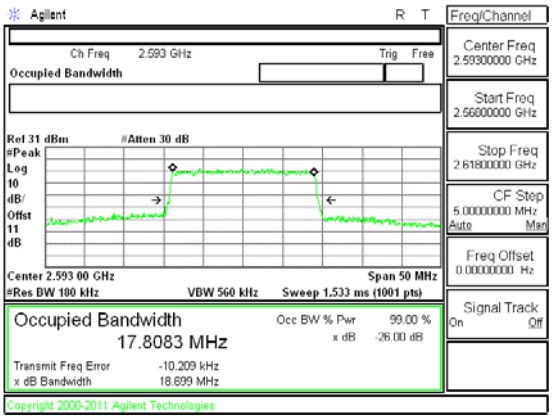
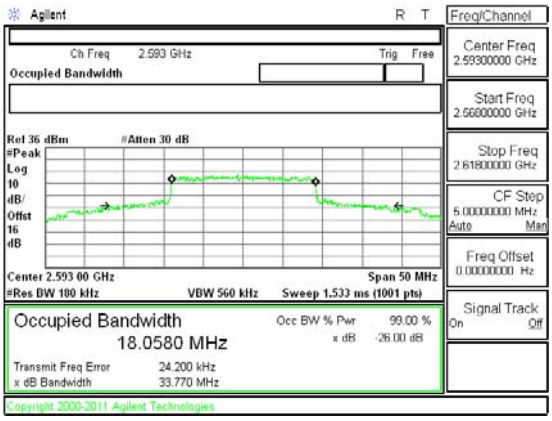
10.1.3. OCCUPIED BANDWIDTH PLOTS

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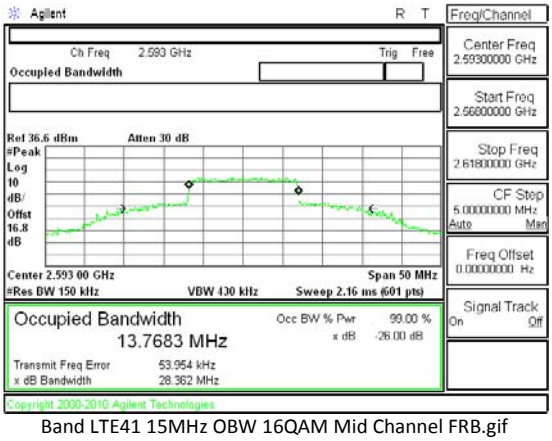
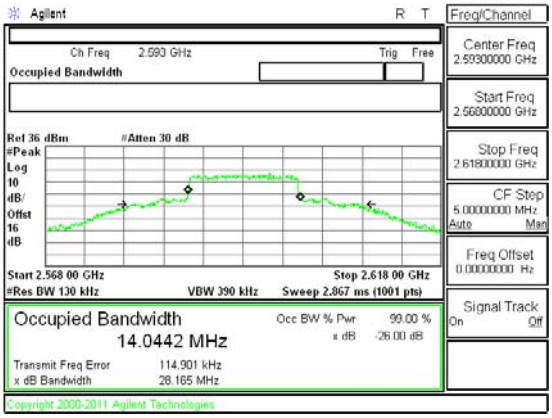
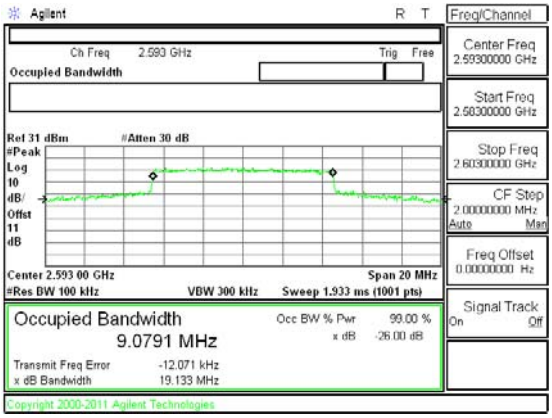
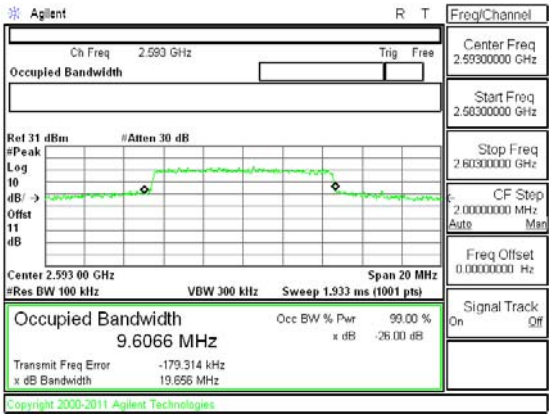
Band LTE41 15MHz	 Band LTE41 15MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE41 15MHz OBW QPSK Mid Channel FRB.gif
Band LTE41 10MHz	 Band LTE41 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE41 10MHz OBW QPSK Mid Channel FRB.gif

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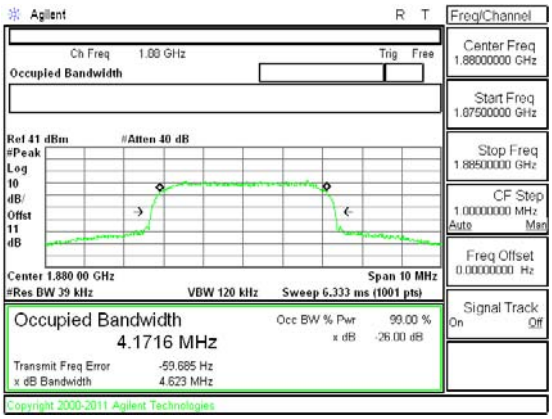
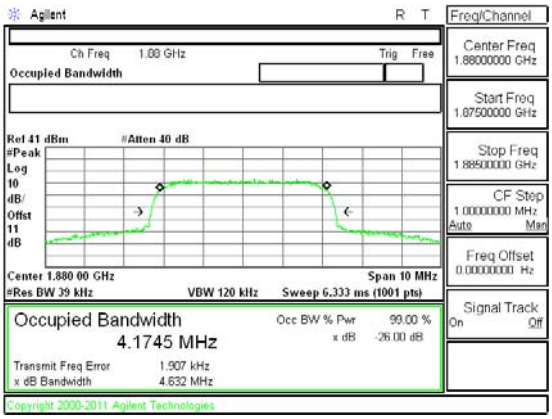
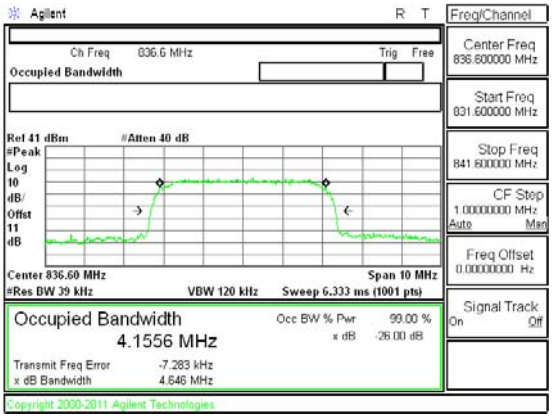
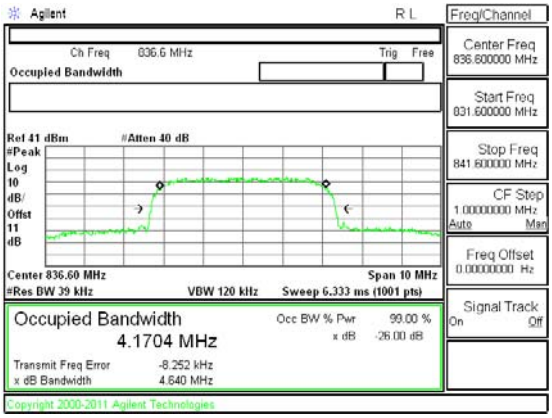
Band Band 2	 Band WCDMA B2 HSDPA OBW	 Band WCDMA B2 REL99 OBW
Band Band 5	 Band WCDMA B5 HSDPA OBW	

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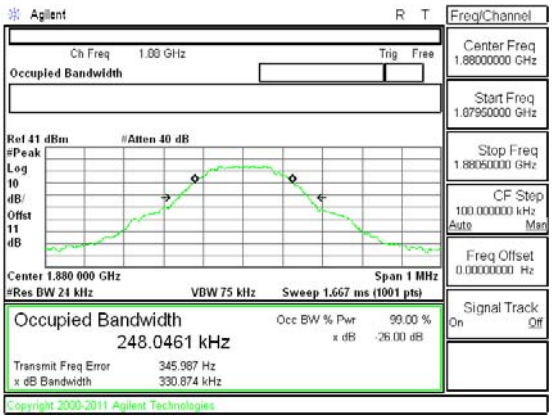
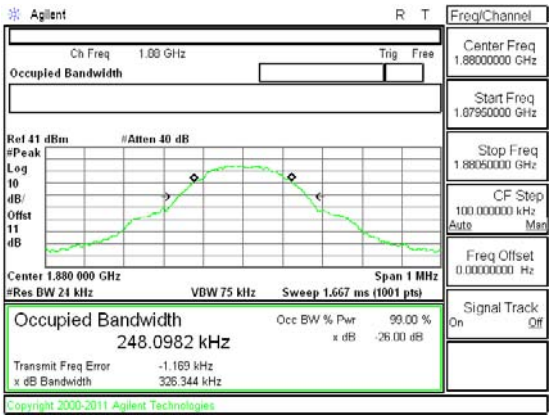
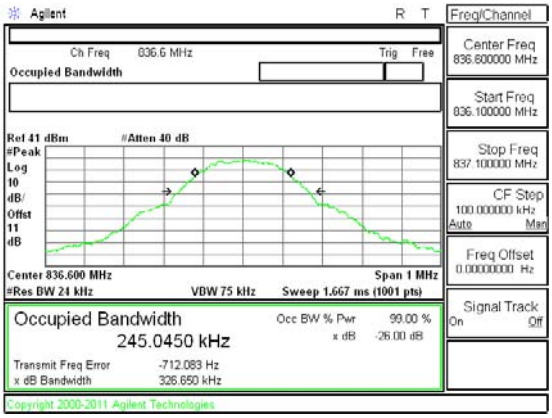
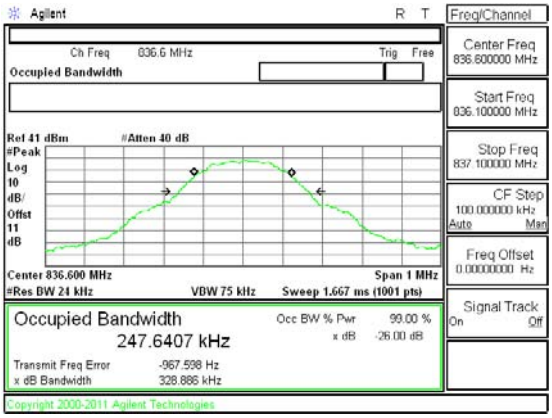
Band GSM1900	 Band GSM1900 EGPRS OBW Mid channel	 Band GSM1900 GPRS OBW Mid channel
Band GSM850 EGPRS	 Band GSM850 EGPRS OBW Mid channel	 Band GSM850 GPRS OBW Mid channel

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10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238 , §27

LIMITS

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

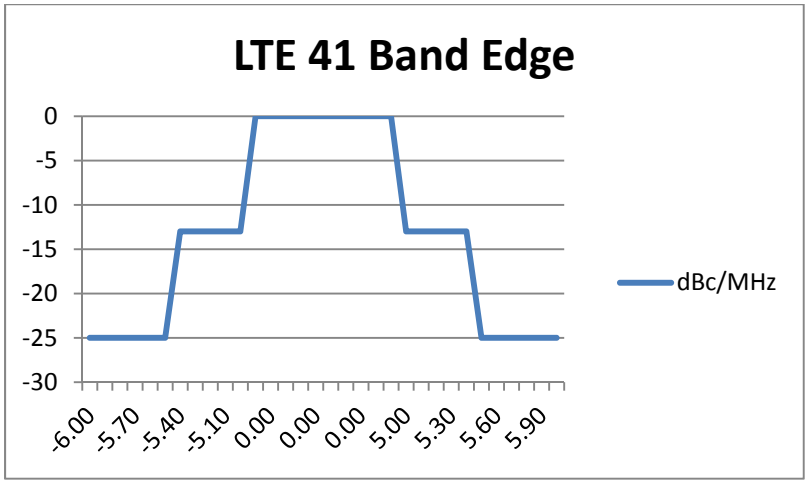
TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

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

- For Part 27.53 (LTE 41)
- (m)(4) For mobile station, the attenuation factor shall be not less than 43+10Log(P)dB at the channel edge and (55+10Log(P)dB) at 5.5MHz from the channel edges.

Edge Masks



RESULTS

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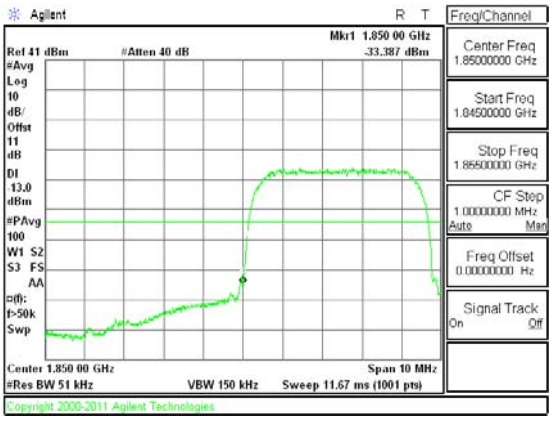
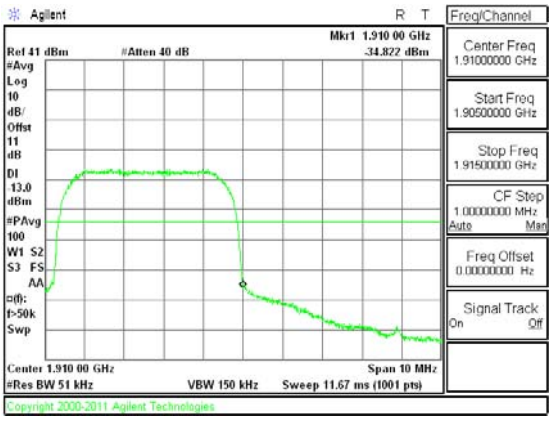
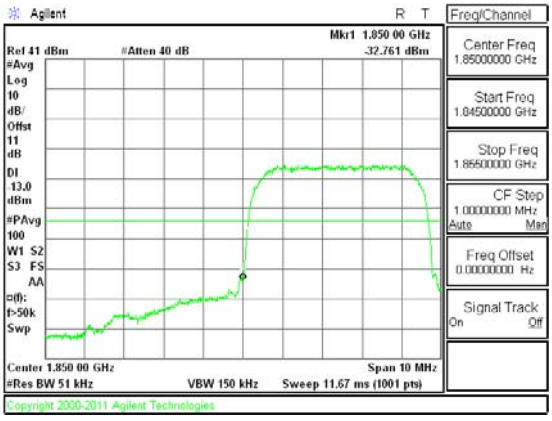
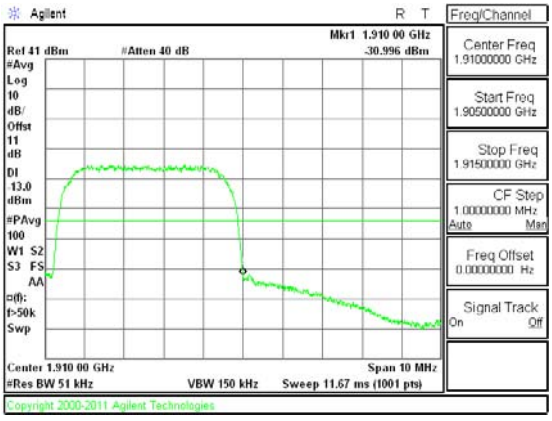
10.2.1. BAND EDGE PLOTS

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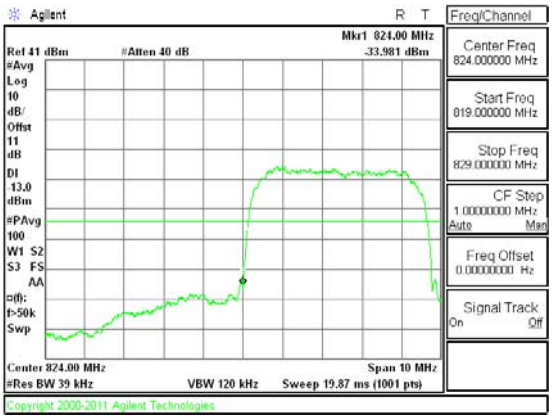
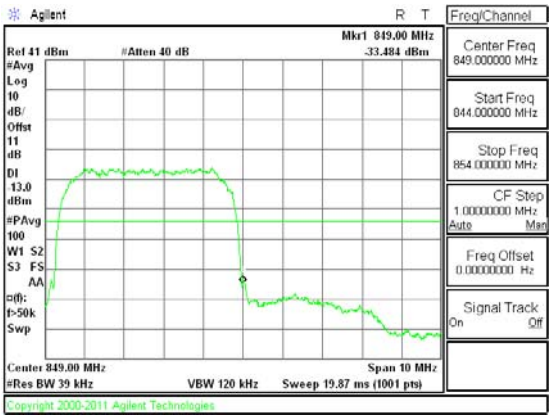
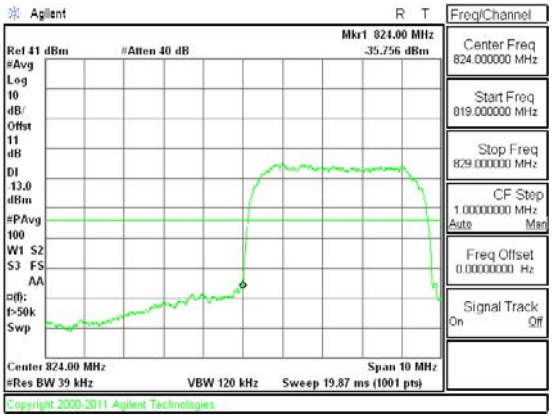
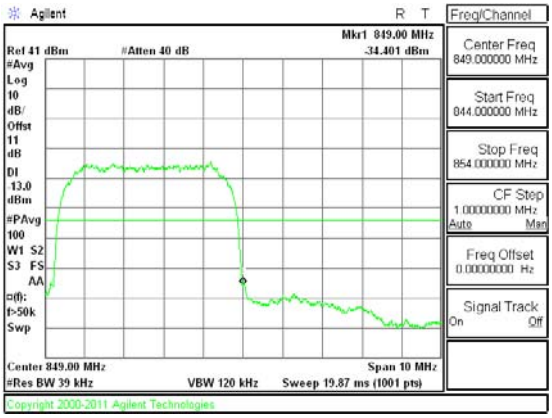
Band Band 5 HSDPA	 Band WCDMA B5 HSDPA CBE	 Band WCDMA B5 HSDPA CBE
Band Band 5 REL99	 Band WCDMA B5 REL99 CBE	 Band WCDMA B5 REL99 CBE

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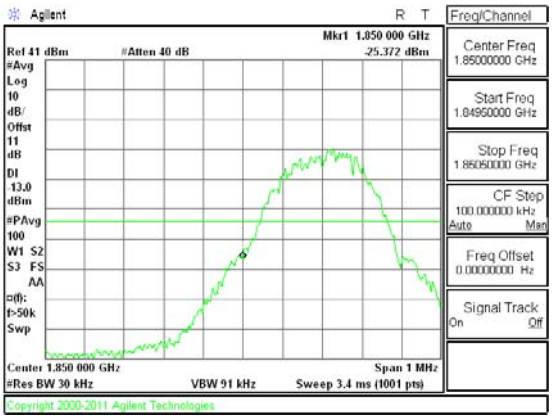
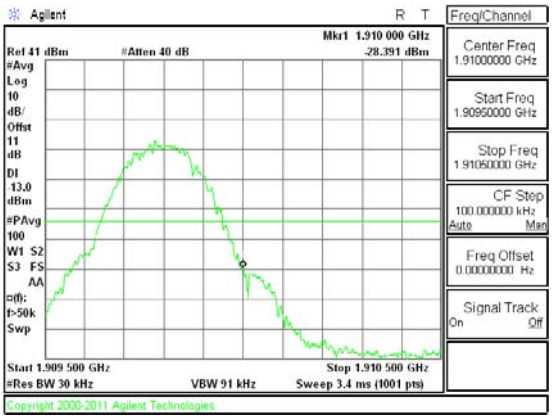
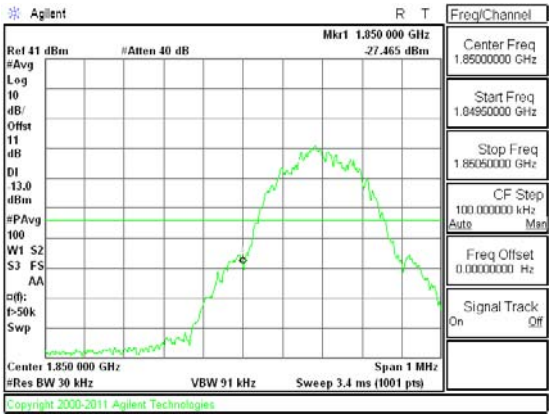
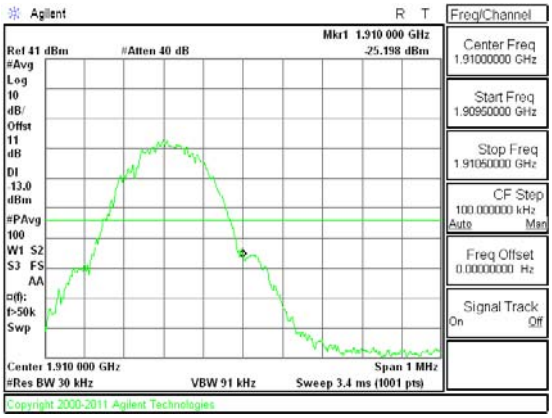
Band GSM1900 EGPRS	 Band GSM1900 EGPRS CBE Low channel	 Band GSM1900 EGPRS CBE High channel
Band GSM1900 GPRS	 Band GSM1900 GPRS CBE Low channel	 Band GSM1900 GPRS CBE High channel

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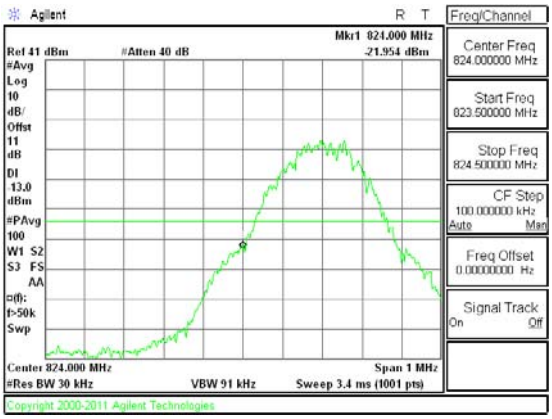
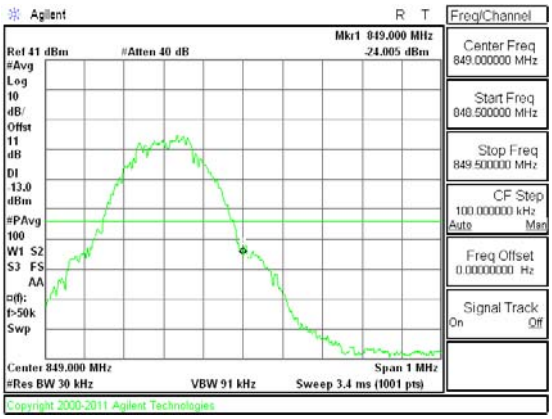
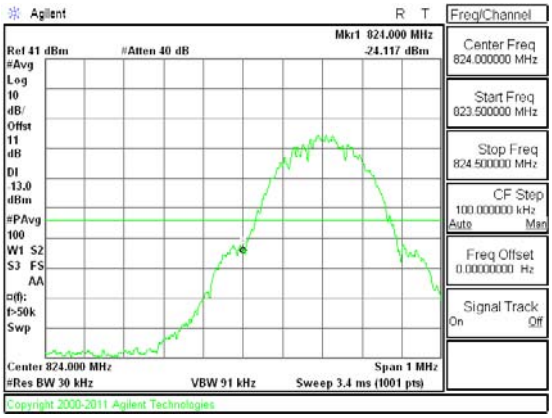
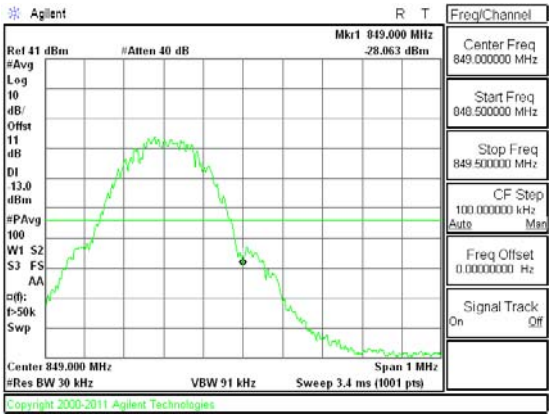
Band GSM850 EGPRS	 Band GSM850 EGPRS CBE Low channel	 Band GSM850 EGPRS CBE High channel
Band GSM850 GPRS	 Band GSM850 GPRS CBE Low channel	 Band GSM850 GPRS CBE High channel

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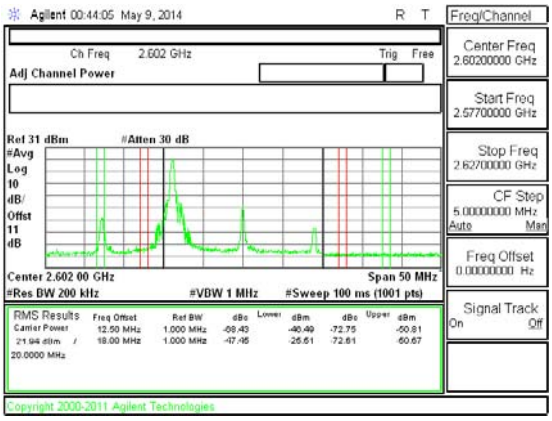
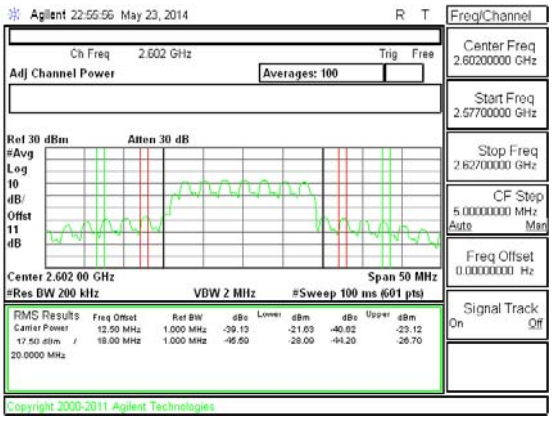
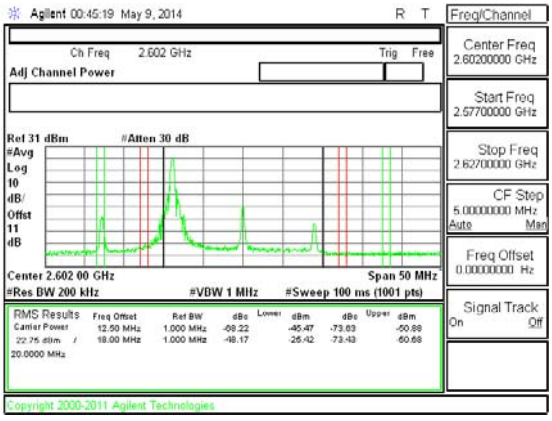
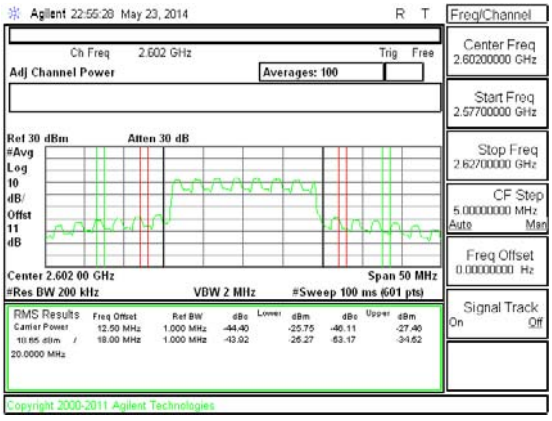
10.2.2. EMISSION MASK PLOTS

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

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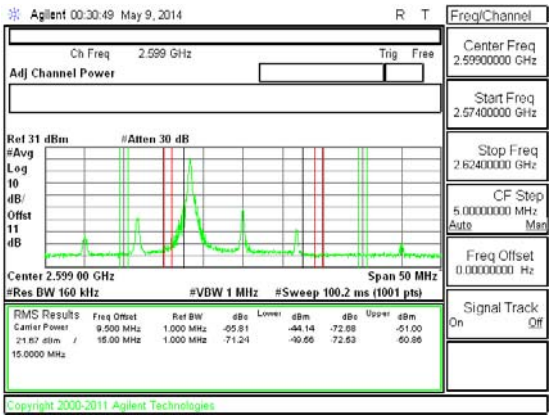
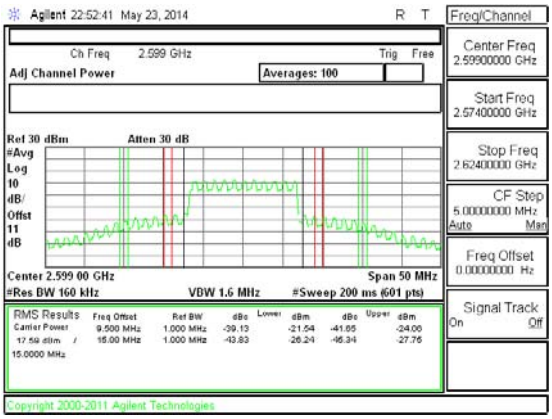
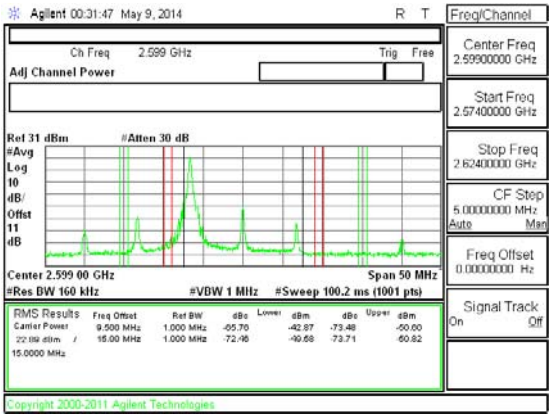
Band LTE41 15MHz 16QAM	 Band LTE41 15MHz EM 16QAM 1RB.gif	 Band LTE41 15MHz EM 16QAM FRB.gif
Band LTE41 15MHz QPSK	 Band LTE41 15MHz EM QPSK 1RB.gif	 Band LTE41 15MHz EM QPSK FRB.gif

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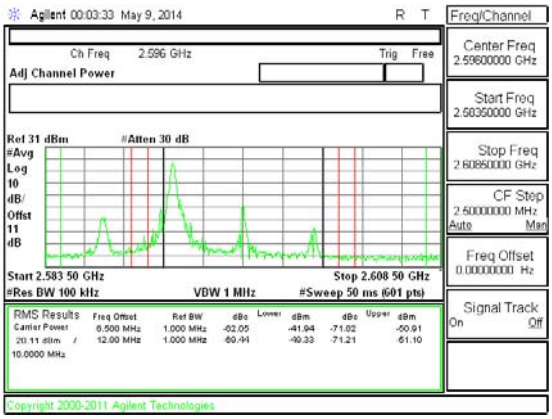
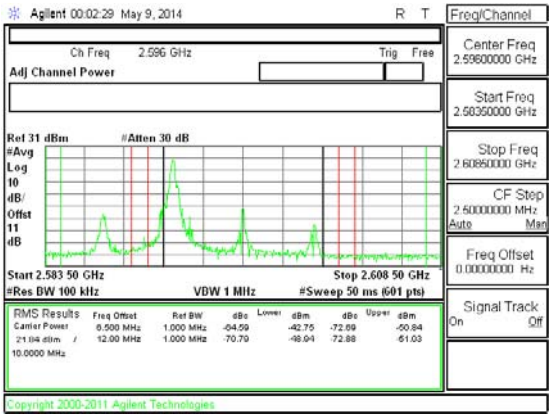
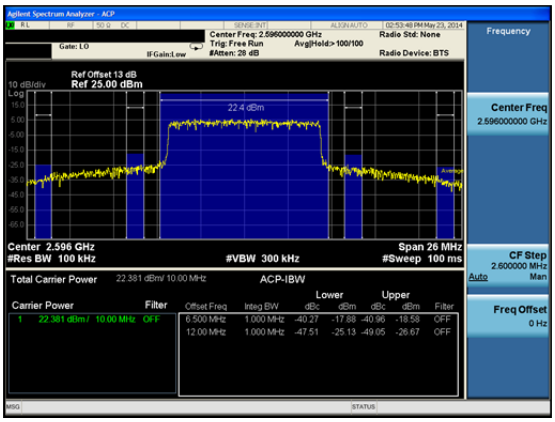
Band LTE41 10MHz 16QAM	 Band LTE41 10MHz EM 16QAM 1RB.gif	 Band LTE41 10MHz EM 16QAM FRB.gif
Band LTE41 10MHz QPSK	 Band LTE41 10MHz EM QPSK 1RB.gif	 Band LTE41 10MHz EM QPSK FRB.gif

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10.3. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

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

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	-27.98	-13	-14.98
			2593	-26.62	-13	-13.62
			2680	-26.75	-13	-13.75
		16QAM	2506	-26.54	-13	-13.54
			2593	-27.14	-13	-14.14
			2680	-26.51	-13	-13.51
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	15	QPSK	2503.5	-30.67	-13	-17.67
			2593	-27.39	-13	-14.39
			2682.5	-26.24	-13	-13.24
		16QAM	2503.5	-26.87	-13	-13.87
			2593	-26.81	-13	-13.81
			2682.5	-27.48	-13	-14.48
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	10	QPSK	2501	-31.53	-13	-18.53
			2593	-34.81	-13	-21.81
			2685	-31.2	-13	-18.2
		16QAM	2501	-33.44	-13	-20.44
			2593	-33.31	-13	-20.31
			2685	-32.1	-13	-19.1

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Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM850	GPRS	824.2	-25.72	-13	-12.72
		836.6	-24.27	-13	-11.27
		848.8	-23.87	-13	-10.87
	EGPRS	824.2	-23.58	-13	-10.58
		836.6	-24.67	-13	-11.67
		848.8	-24.43	-13	-11.43
GSM1900	GPRS	1850.2	-26.04	-13	-13.04
		1880	-25.4	-13	-12.4
		1909.8	-25.16	-13	-12.16
	EGPRS	1850.2	-24.66	-13	-11.66
		1880	-24.23	-13	-11.23
		1909.8	-23.71	-13	-10.71
Band 5	REL99	826.4	-25.03	-13	-12.03
		836.6	-24.65	-13	-11.65
		846.6	-24.68	-13	-11.68
	HSDPA	826.4	-25.48	-13	-12.48
		836.6	-23.91	-13	-10.91
		846.6	-24.62	-13	-11.62
Band 2	REL99	1852.4	-25	-13	-12
		1880	-24.75	-13	-11.75
		1907.6	-25.01	-13	-12.01
	HSDPA	1852.4	-24.7	-13	-11.7
		1880	-25.46	-13	-12.46
		1907.6	-24.22	-13	-11.22

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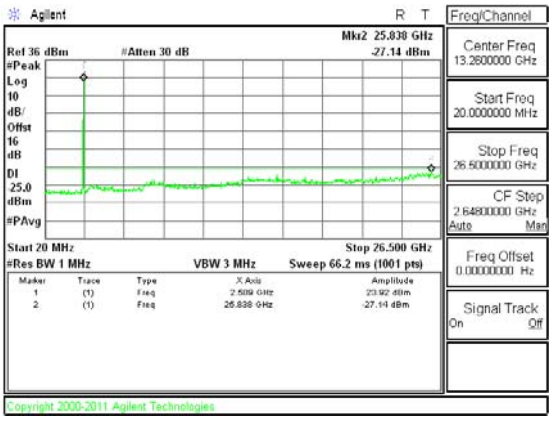
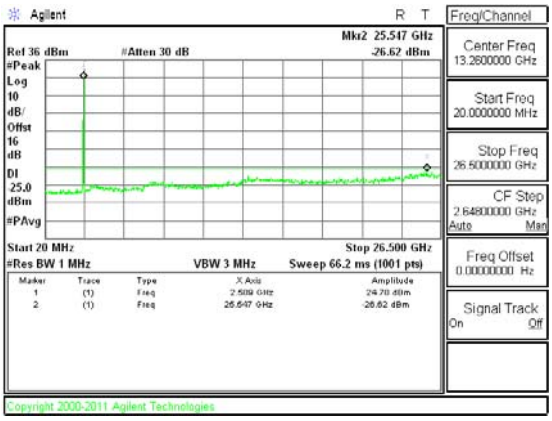
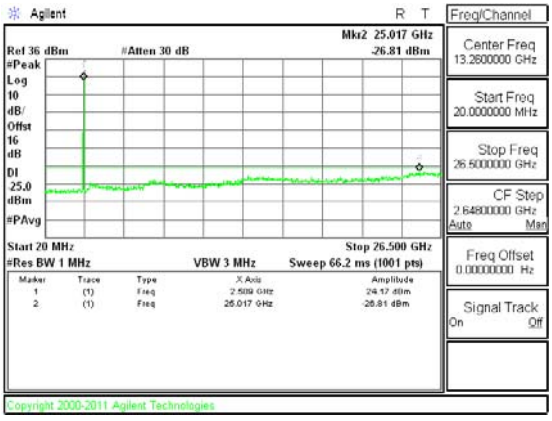
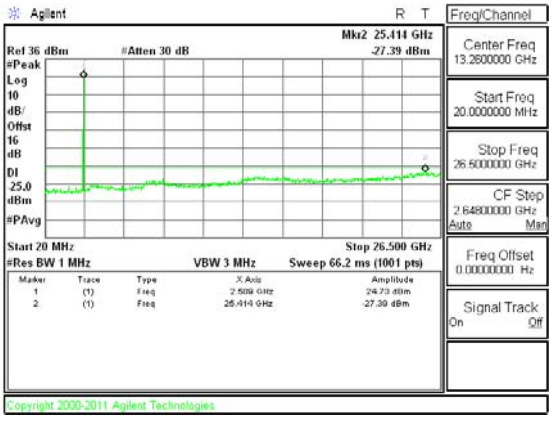
10.3.2. OUT OF BAND EMISSIONS PLOTS

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

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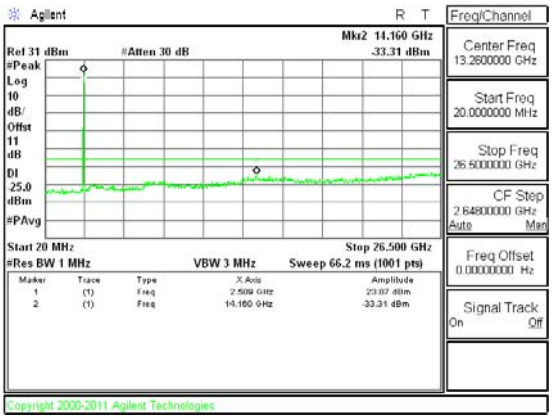
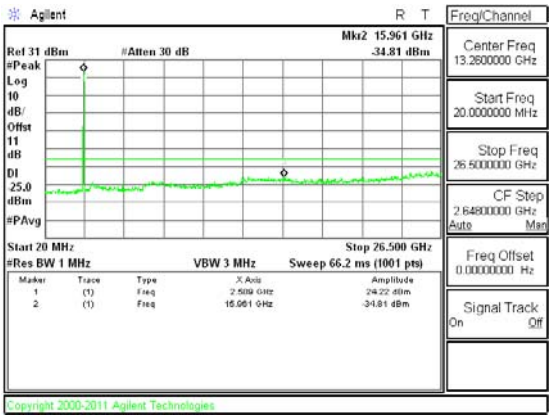
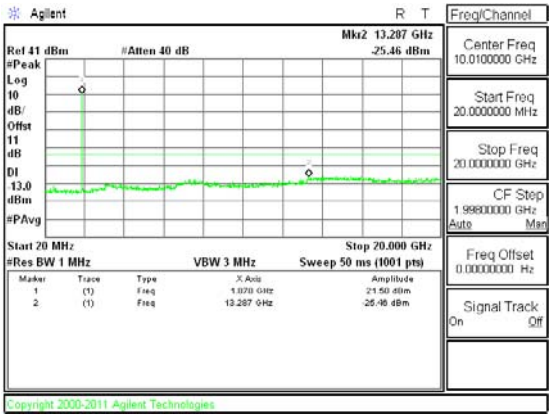
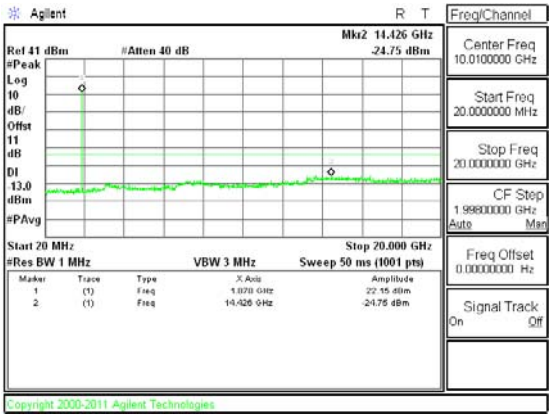
Band LTE41 10MHz 16QAM	 Band LTE41 10MHz CSE 16QAM Mid channel	 Band LTE41 10MHz CSE QPSK Mid channel
Band Band 2 HSDPA	 Band WCDMA B2 HSDPA CSE	 Band WCDMA B2 REL99 CSE

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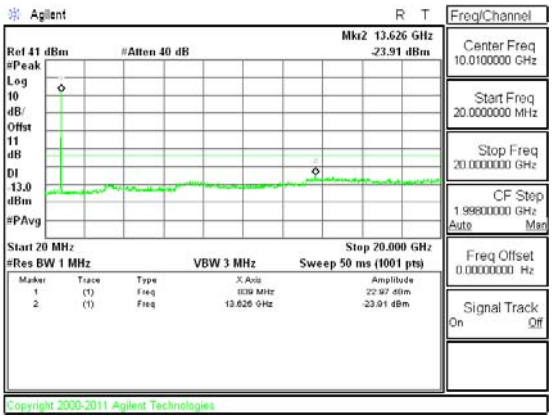
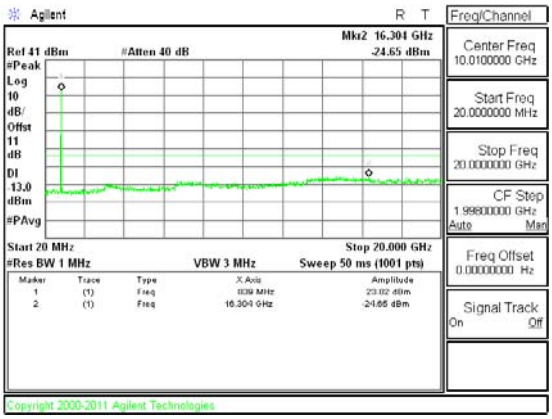
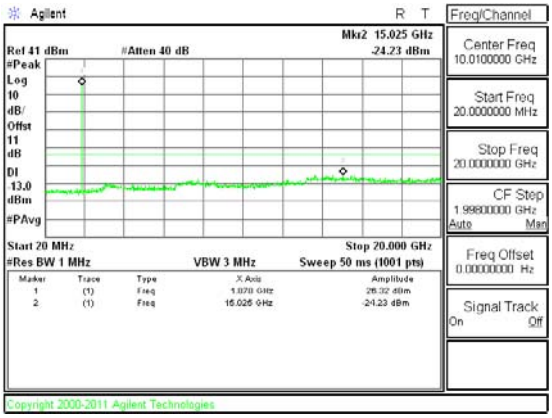
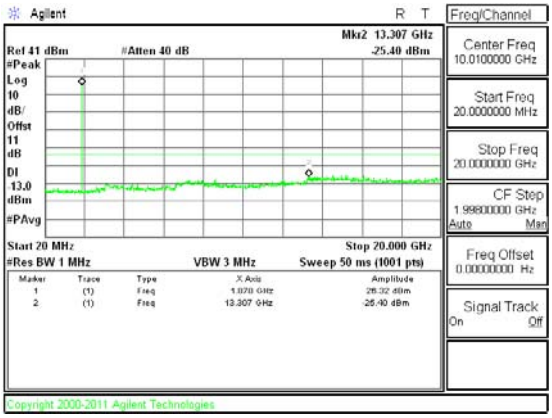
Band Band 5 HSDPA	 Band WCDMA B5 HSDPA CSE	 Band WCDMA B5 REL99 CSE
Band GSM1900 EGPRS	 Band GSM1900 EGPRS CSE Mid channel	 Band GSM1900 GPRS CSE Mid channel

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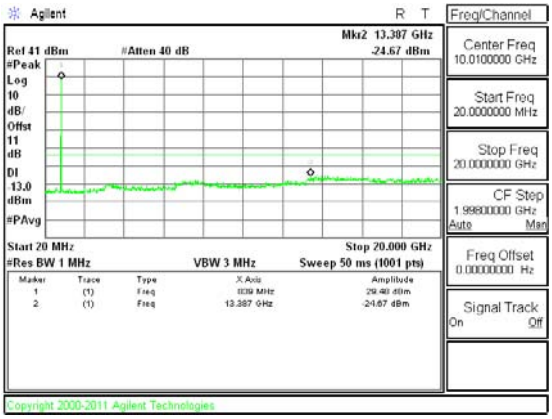
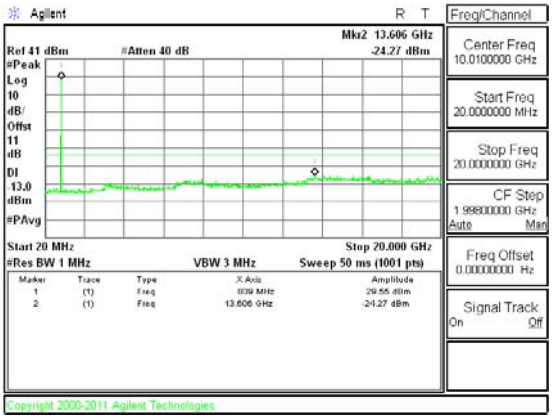
Band GSM850 EGPRS	 Band GSM850 EGPRS CSE Mid channel	 Band GSM850 GPRS CSE Mid channel

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10.4. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

RESULTS

See the following pages.

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10.4.1. FREQUENCY STABILITY RESULTS

GSM1900, Channel 661 Freq: 1880MHz– MID CHANNEL

Reference Frequency: GSM1900 Channel 661 Freq : 1880MHz @ 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	1880.000059	0.001	2.5
3.80	40	1880.000057	0.002	2.5
3.80	30	1880.000059	0.001	2.5
3.80	***20***	***1880.000060***	***0***	***2.5***
3.80	10	1880.000055	0.003	2.5
3.80	0	1880.000061	-0.001	2.5
3.80	-10	1880.000067	-0.004	2.5
3.80	-20	1880.000069	-0.005	2.5
3.80	-30	1880.000068	-0.004	2.5

Reference Frequency: GSM1900 Channel 661 Freq : 1880MHz @ 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***	***1880.000060***	***0***	***2.5***
3.30	20	1880.000057	*0.002*	2.5
4.20	20	1880.000063	-0.002	2.5

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GSM850, – MID CHANNEL190, Frequency 836.6MHz

Reference Frequency: GSM850 Channel 190 Freq : 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	836.600022	0.007	2.5
3.80	40	836.600024	0.005	2.5
3.80	30	836.600029	-0.001	2.5
3.80	***20***	***836.600028***	***0***	***2.5***
3.80	10	836.600026	0.002	2.5
3.80	0	836.600030	-0.002	2.5
3.80	-10	836.600027	0.001	2.5
3.80	-20	836.600026	0.002	2.5
3.80	-30	836.600029	-0.001	2.5

Reference Frequency: GSM850 Channel 190 Freq : 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***	***836.600028***	***0.00000***	***2.5***
3.30	20	836.600030	*-0.00239*	2.5
4.20	20	836.600027	*0.00120*	2.5

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LTE41 Channel 40620 Freq: 2593 MHz– MID CHANNEL

Reference Frequency: LTE41 Channel 40620 Freq : 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	2593.000022	0.001	2.5
3.80	40	2593.000025	0.000	2.5
3.80	30	2593.000020	0.002	2.5
3.80	***20***	2593.000024	***0***	***2.5***
3.80	10	2593.000019	0.002	2.5
3.80	0	2593.000021	0.001	2.5
3.80	-10	2593.000023	0.000	2.5
3.80	-20	2593.000018	0.002	2.5
3.80	-30	2593.000025	0.000	2.5

Reference Frequency: LTE41 Channel 40620 Freq : 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***	2593.000024	***0***	***2.5***
3.30	20	2593.000022	*0.001*	2.5
4.20	20	2593.000026	-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, and § 27.

LIMITS

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

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

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

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17

TEST RESULTS

11.1.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	21.97	157.37
		9400	1880	21.72	148.53
		9538	1907.6	22.01	158.9
	HSDPA	9262	1852.4	21.02	126.45
		9400	1880	21.06	127.59
		9538	1907.6	21.07	127.98

Band	Mode	Channel	f(MHz)	ERP	
				dBm	mW
Band 5	REL99	4132	826.4	15.92	39.09
		4183	836.6	15.35	34.28
		4233	846.6	15.97	39.55
	HSDPA	4132	826.4	14.97	31.41
		4183	836.6	13.96	24.89

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		4233	846.6	15.11	32.44

Band	Mode	Channel	f(MHz)	EIRP	
				dBm	mW
GSM1900	GPRS	512	1850.2	30.7	1174.9
		661	1880	31.28	1342.76
		810	1909.8	31.32	1355.19
	EGPRS	512	1850.2	27.43	553.35
		661	1880	27.71	590.2
		810	1909.8	27.76	597.04

Band	Mode	Channel	f(MHz)	ERP	
				dBm	mW
GSM850	GPRS	128	824.2	24.911	309.81
		190	836.6	26.231	419.86
		251	848.8	26.931	493.29
	EGPRS	128	824.2	19.561	90.39
		190	836.6	21.461	139.99
		251	848.8	22.431	175.02

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11.1.2. LTE ERP/EIRP Results

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	EIRP	
					dBm	mW
LTE41	20	QPSK	1/0	2506	18.65	73.28
			1/0	2593	17.75	59.57
			1/0	2680	15.9	38.9
		16QAM	1/0	2506	17.45	55.59
			1/0	2593	16.75	47.32
			1/0	2680	14.6	28.84

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	EIRP	
					dBm	mW
LTE41	15	QPSK	1/0	2503.5	18.85	76.74
			1/0	2593	17.95	62.37
			1/0	2682.5	16.3	42.66
		16QAM	1/0	2503.5	17.75	59.57
			1/0	2593	16.75	47.32
			1/0	2682.5	15.1	32.36

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	EIRP	
					dBm	mW
LTE41	10	QPSK	1/0	2501	19.65	92.26
			1/0	2593	19.15	82.22
			1/0	2685	16.7	46.77
		16QAM	1/0	2501	18.55	71.61
			1/0	2593	18.15	65.31
			1/0	2685	15.4	34.67

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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 #: 14U17686
Date: 05/22/14
Test Engineer: K.Kedida
Configuration: EUT only
Mode: LTE band 41, 20MHz BW QPSK

Test Equipment:
Receiving: Horn T346, and Chamber E SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2506.00	8.80	V	0.9	9.5	17.45	33.0	-15.6	
2506.00	8.30	H	0.9	9.5	16.95	33.0	-16.1	
Mid Ch								
2593.00	8.00	V	0.9	9.5	16.65	33.0	-16.4	
2593.00	8.10	H	0.9	9.5	16.75	33.0	-16.3	
High Ch								
2680.00	5.80	V	0.9	9.6	14.55	33.0	-18.5	
2680.00	5.85	H	0.9	9.6	14.60	33.0	-18.4	

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

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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Band

LTE41

20MHz

QPSK

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

Company: Samsung
Project #: 14U17686
Date: 05/22/14
Test Engineer: K.Kedida
Configuration: EUT only
Mode: LTE band 41, 20MHz BW QPSK

Test Equipment:
Receiving: Horn T346, and Chamber E SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2506.00	10.00	V	0.9	9.5	18.65	33.0	-14.4	
2506.00	9.40	H	0.9	9.5	18.05	33.0	-15.0	
Mid Ch								
2593.00	9.10	V	0.9	9.5	17.75	33.0	-15.3	
2593.00	9.00	H	0.9	9.5	17.65	33.0	-15.4	
High Ch								
2680.00	6.90	V	0.9	9.6	15.65	33.0	-17.4	
2680.00	7.15	H	0.9	9.6	15.90	33.0	-17.1	

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 #: 14U17686
Date: 05/22/14
Test Engineer: K.Kedida
Configuration: EUT only
Mode: LTE band 41, 15MHz BW QPSK

Test Equipment:
Receiving: Horn T346, and Chamber E SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2503.50	9.10	V	0.9	9.5	17.75	33.0	-15.3	
2503.50	8.60	H	0.9	9.5	17.25	33.0	-15.8	
Mid Ch								
2593.00	8.10	V	0.9	9.5	16.75	33.0	-16.3	
2593.00	8.00	H	0.9	9.5	16.65	33.0	-16.4	
High Ch								
2682.50	5.90	V	0.9	9.6	14.65	33.0	-18.4	
2682.50	6.35	H	0.9	9.6	15.10	33.0	-17.9	

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 #: 14U17686
Date: 05/22/14
Test Engineer: K.Kedida
Configuration: EUT only
Mode: LTE band 41, 15MHz BW QPSK

Test Equipment:
Receiving: Horn T346, and Chamber E SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2503.50	10.20	V	0.9	9.5	18.85	33.0	-14.2	
2503.50	9.90	H	0.9	9.5	18.55	33.0	-14.5	
Mid Ch								
2593.00	9.30	V	0.9	9.5	17.95	33.0	-15.1	
2593.00	9.20	H	0.9	9.5	17.85	33.0	-15.2	
High Ch								
2682.50	7.00	V	0.9	9.6	15.75	33.0	-17.3	
2682.50	7.55	H	0.9	9.6	16.30	33.0	-16.7	

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 E

Company: Samsung
Project #: 14U17686
Date: 05/22/14
Test Engineer: K.Kedida
Configuration: EUT only
Mode: LTE band 41, 10MHz BW 16QAM

Test Equipment:
Receiving: Horn T346, and Chamber E SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2501.00	9.90	V	0.9	9.5	18.55	33.0	-14.5	
2501.00	9.30	H	0.9	9.5	17.95	33.0	-15.1	
Mid Ch								
2593.00	9.50	V	0.9	9.5	18.15	33.0	-14.9	
2593.00	9.20	H	0.9	9.5	17.85	33.0	-15.2	
High Ch								
2685.00	6.60	V	0.9	9.6	15.35	33.0	-17.7	
2685.00	6.65	H	0.9	9.6	15.40	33.0	-17.6	

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 E

Company: Samsung
Project #: 14U17686
Date: 05/22/14
Test Engineer: K.Kedida
Configuration: EUT only
Mode: LTE band 41, 10MHz BW QPSK

Test Equipment:
Receiving: Horn T346, and Chamber E SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2501.00	11.00	V	0.9	9.5	19.65	33.0	-13.4	
2501.00	10.40	H	0.9	9.5	19.05	33.0	-14.0	
Mid Ch								
2593.00	10.30	V	0.9	9.5	18.95	33.0	-14.1	
2593.00	10.50	H	0.9	9.5	19.15	33.0	-13.9	
High Ch								
2685.00	7.70	V	0.9	9.6	16.45	33.0	-16.6	
2685.00	7.95	H	0.9	9.6	16.70	33.0	-16.3	

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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 #: 14U17686
Date: 05/19/14
Test Engineer: O. Stoelting
Configuration: EUT, X Position
Mode: WCDMA_HSDPA_1900

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T119 Substitution, 5ft (S/N: 16795) 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								
1852.40	17.07	V	0.85	4.8	21.02	33.0	-12.0	
1852.40	16.19	H	0.85	4.8	20.14	33.0	-12.9	
Mid Ch								
1880.00	17.11	V	0.85	4.6	20.85	33.0	-12.2	
1880.00	17.32	H	0.85	4.6	21.06	33.0	-11.9	
High Ch								
1907.60	17.48	V	0.85	4.4	21.07	33.0	-11.9	
1907.60	16.79	H	0.85	4.4	20.38	33.0	-12.6	

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 B

Company: Samsung
Project #: 14U17686
Date: 05/19/14
Test Engineer: O. Stoelting
Configuration: EUT, X Position
Mode: WCDMA_Rel 99_1900

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T119 Substitution, 5ft (S/N: 16795) 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								
1852.40	18.02	V	0.85	4.8	21.97	33.0	-11.0	
1852.40	17.26	H	0.85	4.8	21.21	33.0	-11.8	
Mid Ch								
1880.00	17.98	V	0.85	4.6	21.72	33.0	-11.3	
1880.00	17.69	H	0.85	4.6	21.43	33.0	-11.6	
High Ch								
1907.60	18.42	V	0.85	4.4	22.01	33.0	-11.0	
1907.60	17.89	H	0.85	4.4	21.48	33.0	-11.5	

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 #: 14U17686
Date: 05/19/14
Test Engineer: O. Stoelting
Configuration: EUT, X Position
Mode: WCDMA_HSDPA_850

Test Equipment:
Receiving: T345, and Chamber B Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 2ft SMA Cable.

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	9.13	V	0.5	0.0	8.63	38.5	-29.8	
826.40	15.47	H	0.5	0.0	14.97	38.5	-23.5	
Mid Ch								
836.60	8.87	V	0.5	0.0	8.37	38.5	-30.1	
836.60	14.46	H	0.5	0.0	13.96	38.5	-24.5	
High Ch								
846.60	8.31	V	0.5	0.0	7.81	38.5	-30.6	
846.60	15.61	H	0.5	0.0	15.11	38.5	-23.3	

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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 #: 14U17686
Date: 05/19/14
Test Engineer: O. Stoelting
Configuration: EUT, X Position
Mode: WCDMA_Rel99_850

Test Equipment:
Receiving: T345, and Chamber B Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 2ft SMA Cable.

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	9.28	V	0.5	0.0	8.78	38.5	-29.7	
826.40	16.42	H	0.5	0.0	15.92	38.5	-22.5	
Mid Ch								
836.60	9.06	V	0.5	0.0	8.56	38.5	-29.9	
836.60	15.85	H	0.5	0.0	15.35	38.5	-23.1	
High Ch								
846.60	8.53	V	0.5	0.0	8.03	38.5	-30.4	
846.60	16.47	H	0.5	0.0	15.97	38.5	-22.5	

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

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Band

GSM1900

EGPRS

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: SAMSUNG
Project #: 14U17686
Date: 05/10/14
Test Engineer: R. Alegre
Configuration: EUT ONLY, X Position
Mode: EGPRS 1900MHz

Test Equipment:
Receiving: T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	14.9	V	0.85	7.90	21.96	33.0	-11.0	
1.850	20.4	H	0.85	7.90	27.43	33.0	-5.6	
Mid Ch								
1.880	12.3	V	0.85	7.90	19.39	33.0	-13.6	
1.880	20.7	H	0.85	7.90	27.71	33.0	-5.3	
High Ch								
1.910	8.5	V	0.85	7.80	15.47	33.0	-17.5	
1.910	20.8	H	0.85	7.80	27.76	33.0	-5.2	

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Band

GSM1900

EGPRS

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: SAMSUNG
Project #: 14U17686
Date: 05/10/14
Test Engineer: R. Alegre
Configuration: EUT ONLY, X Position
Mode: EGPRS 1900MHz

Test Equipment:
Receiving: T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	14.9	V	0.85	7.90	21.96	33.0	-11.0	
1.850	20.4	H	0.85	7.90	27.43	33.0	-5.6	
Mid Ch								
1.880	12.3	V	0.85	7.90	19.39	33.0	-13.6	
1.880	20.7	H	0.85	7.90	27.71	33.0	-5.3	
High Ch								
1.910	8.5	V	0.85	7.80	15.47	33.0	-17.5	
1.910	20.8	H	0.85	7.80	27.76	33.0	-5.2	

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Band

GSM1900

GPRS

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: SAMSUNG
Project #: 14U17686
Date: 05/10/14
Test Engineer: R. Alegre
Configuration: EUT ONLY, X Position
Mode: GPRS 1900MHz

Test Equipment:
Receiving: T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	18.0	V	0.85	7.90	25.05	33.0	-8.0	
1.850	23.7	H	0.85	7.90	30.70	33.0	-2.3	
Mid Ch								
1.880	15.3	V	0.85	7.90	22.34	33.0	-10.7	
1.880	24.2	H	0.85	7.90	31.28	33.0	-1.7	
High Ch								
1.910	11.8	V	0.85	7.80	18.75	33.0	-14.3	
1.910	24.4	H	0.85	7.80	31.32	33.0	-1.7	

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Band

GSM1900

GPRS

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: SAMSUNG
Project #: 14U17686
Date: 05/10/14
Test Engineer: R. Alegre
Configuration: EUT ONLY, X Position
Mode: GPRS 1900MHz

Test Equipment:
Receiving: T345, and Chamber B SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	18.0	V	0.85	7.90	25.05	33.0	-8.0	
1.850	23.7	H	0.85	7.90	30.70	33.0	-2.3	
Mid Ch								
1.880	15.3	V	0.85	7.90	22.34	33.0	-10.7	
1.880	24.2	H	0.85	7.90	31.28	33.0	-1.7	
High Ch								
1.910	11.8	V	0.85	7.80	18.75	33.0	-14.3	
1.910	24.4	H	0.85	7.80	31.32	33.0	-1.7	

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Band

GSM850

EGPRS

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: SAMSUNG
Project #: 14U17686
Date: 05/10/14
Test Engineer: R. Alegre
Configuration: EUT Only X position
Mode: EGRPS 850MHz

Test Equipment:
Receiving: Sunol T477, 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	12.92	V	0.9	0.0	12.02	38.5	-26.4	
824.20	20.46	H	0.9	0.0	19.56	38.5	-18.9	
Mid Ch								
836.60	13.58	V	0.9	0.0	12.68	38.5	-25.8	
836.60	22.36	H	0.9	0.0	21.46	38.5	-17.0	
High Ch								
848.80	14.33	V	0.9	0.0	13.43	38.5	-25.0	
848.80	23.33	H	0.9	0.0	22.43	38.5	-16.0	

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Band

GSM850

EGPRS

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: SAMSUNG
Project #: 14U17686
Date: 05/10/14
Test Engineer: R. Alegre
Configuration: EUT Only X position
Mode: EGRPS 850MHz

Test Equipment:
Receiving: Sunol T477, 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	12.92	V	0.9	0.0	12.02	38.5	-26.4	
824.20	20.46	H	0.9	0.0	19.56	38.5	-18.9	
Mid Ch								
836.60	13.58	V	0.9	0.0	12.68	38.5	-25.8	
836.60	22.36	H	0.9	0.0	21.46	38.5	-17.0	
High Ch								
848.80	14.33	V	0.9	0.0	13.43	38.5	-25.0	
848.80	23.33	H	0.9	0.0	22.43	38.5	-16.0	

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Band

GSM850

GPRS

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: SAMSUNG
Project #: 14U17686
Date: 05/10/14
Test Engineer: R. Alegre
Configuration: EUT Only X position
Mode: GRPS 850MHz

Test Equipment:
Receiving: Sunol T477, 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	16.68	V	0.9	0.0	15.78	38.5	-22.7	
824.20	25.81	H	0.9	0.0	24.91	38.5	-13.5	
Mid Ch								
836.60	17.39	V	0.9	0.0	16.49	38.5	-22.0	
836.60	27.13	H	0.9	0.0	26.23	38.5	-12.2	
High Ch								
848.80	18.87	V	0.9	0.0	17.97	38.5	-20.5	
848.80	27.83	H	0.9	0.0	26.93	38.5	-11.5	

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Band

GSM850

GPRS

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: SAMSUNG
Project #: 14U17686
Date: 05/10/14
Test Engineer: R. Alegre
Configuration: EUT Only X position
Mode: GRPS 850MHz

Test Equipment:
Receiving: Sunol T477, 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	16.68	V	0.9	0.0	15.78	38.5	-22.7	
824.20	25.81	H	0.9	0.0	24.91	38.5	-13.5	
Mid Ch								
836.60	17.39	V	0.9	0.0	16.49	38.5	-22.0	
836.60	27.13	H	0.9	0.0	26.23	38.5	-12.2	
High Ch								
848.80	18.87	V	0.9	0.0	17.97	38.5	-20.5	
848.80	27.83	H	0.9	0.0	26.93	38.5	-11.5	

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11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

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

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB

TEST PROCEDURE

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

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

RESULTS

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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11.2.1. SPURIOUS RADIATION DATA

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14U17686
Date: 05/22/14
Test Engineer: O. Stoelting
Configuration: EUT/AC Charegr/Headphones
Mode: TX, LTE band 41, 20MHz, 16QAM

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)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (2506 MHz)									
5.012	-3.1	V	3.0	28.9	1.0	-31.0	-25.0	-6.0	
7.518	-2.7	V	3.0	26.3	1.0	-28.0	-25.0	-3.0	
10.553	0.9	V	3.0	22.9	1.0	-21.0	-25.0	4.0	
5.012	-1.7	H	3.0	28.9	1.0	-29.6	-25.0	-4.6	
7.518	-1.5	H	3.0	26.3	1.0	-26.8	-25.0	-1.8	
10.553	1.4	H	3.0	22.9	1.0	-20.5	-25.0	4.5	
Mid Ch, (2593 MHz)									
5.186	-0.4	V	3.0	28.7	1.0	-28.1	-25.0	-3.1	
7.779	-1.9	V	3.0	26.0	1.0	-26.9	-25.0	-1.9	
10.372	0.9	V	3.0	23.0	1.0	-21.1	-25.0	3.9	
5.186	-0.1	H	3.0	28.7	1.0	-27.8	-25.0	-2.8	
7.779	0.8	H	3.0	26.0	1.0	-24.2	-25.0	0.8	
10.372	1.5	H	3.0	23.0	1.0	-20.5	-25.0	4.5	
High Ch, (2680 MHz)									
5.360	-7.1	V	3.0	28.5	1.0	-34.6	-25.0	-9.6	
8.040	-2.3	V	3.0	25.6	1.0	-27.0	-25.0	-2.0	
10.720	2.1	V	3.0	22.9	1.0	-19.8	-25.0	5.2	
5.360	-6.1	H	3.0	28.5	1.0	-33.6	-25.0	-8.6	
8.040	-0.9	H	3.0	25.6	1.0	-25.5	-25.0	-0.5	
10.720	1.5	H	3.0	22.9	1.0	-20.3	-25.0	4.7	

Rev. 03.03.09

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

Company: Samsung
Project #: 14U17686
Date: 05/22/14
Test Engineer: O. Stoelting
Configuration: EUT/AC Charegr/Headphones
Mode: TX, LTE band 41, 20MHz, 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)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, (2506 MHz)									
LTE41	5.012	-2.9	V	3.0	28.9	1.0	-30.8	-25.0	-5.8	
	7.518	-2.4	V	3.0	26.3	1.0	-27.7	-25.0	-2.7	
20MHz	10.553	1.0	V	3.0	22.9	1.0	-21.0	-25.0	4.0	
	5.012	-1.3	H	3.0	28.9	1.0	-29.2	-25.0	-4.2	
	7.518	-1.7	H	3.0	26.3	1.0	-27.0	-25.0	-2.0	
QPSK	10.553	0.8	H	3.0	22.9	1.0	-21.1	-25.0	3.9	
	Mid Ch, (2593 MHz)									
	5.186	0.0	V	3.0	28.7	1.0	-27.8	-25.0	-2.8	
	7.779	-2.0	V	3.0	26.0	1.0	-27.0	-25.0	-2.0	
	10.372	1.0	V	3.0	23.0	1.0	-21.0	-25.0	4.0	
	5.186	0.4	H	3.0	28.7	1.0	-27.3	-25.0	-2.3	
	7.779	2.1	H	3.0	26.0	1.0	-22.9	-25.0	2.1	
	10.372	2.1	H	3.0	23.0	1.0	-19.8	-25.0	5.2	
	High Ch, (2680 MHz)									
	5.360	-6.7	V	3.0	28.5	1.0	-34.3	-25.0	-9.3	
	8.040	-1.4	V	3.0	25.6	1.0	-26.1	-25.0	-1.1	
	10.720	1.2	V	3.0	22.9	1.0	-20.7	-25.0	4.3	
	5.360	-6.6	H	3.0	28.5	1.0	-34.1	-25.0	-9.1	
	8.040	-0.6	H	3.0	25.6	1.0	-25.3	-25.0	-0.3	
	10.720	1.3	H	3.0	22.9	1.0	-20.6	-25.0	4.4	

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14U17686
Date: 05/22/14
Test Engineer: K.Kedida
Configuration: EUT/AC Charegr/Headphones
Mode: LTE band 41, 15MHz BW QPSK HARM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber E	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)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (2503.5 MHz)									
5.007	-32.5	V	3.0	28.9	1.0	-60.4	-25.0	-35.4	
7.511	-31.9	V	3.0	26.3	1.0	-57.2	-25.0	-32.2	
10.014	-29.2	V	3.0	23.1	1.0	-51.3	-25.0	-26.3	
5.007	-32.1	H	3.0	28.9	1.0	-60.0	-25.0	-35.0	
7.511	109.3	H	3.0	26.3	1.0	83.9	-25.0	108.9	
10.014	-27.0	H	3.0	23.1	1.0	-49.1	-25.0	-24.1	
Mid Ch, (2593 MHz)									
5.186	-34.2	V	3.0	28.7	1.0	-61.9	-25.0	-36.9	
7.779	-29.9	V	3.0	26.0	1.0	-54.9	-25.0	-29.9	
10.372	-29.7	V	3.0	23.0	1.0	-51.7	-25.0	-26.7	
5.186	-31.8	H	3.0	28.7	1.0	-59.5	-25.0	-34.5	
7.779	-29.2	H	3.0	26.0	1.0	-54.2	-25.0	-29.2	
10.372	-27.6	H	3.0	23.0	1.0	-49.6	-25.0	-24.6	
High Ch, (2682.5 MHz)									
5.365	-34.4	V	3.0	28.5	1.0	-61.9	-25.0	-36.9	
8.052	-28.9	V	3.0	25.6	1.0	-53.5	-25.0	-28.5	
10.730	-29.6	V	3.0	22.9	1.0	-51.5	-25.0	-26.5	
5.365	-33.2	H	3.0	28.5	1.0	-60.7	-25.0	-35.7	
8.052	-28.5	H	3.0	25.6	1.0	-53.1	-25.0	-28.1	
10.730	-27.4	H	3.0	22.9	1.0	-49.3	-25.0	-24.3	

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14U17686
Date: 05/22/14
Test Engineer: K.Kedida
Configuration: EUT/AC Charegr/Headphones
Mode: LTE band 41, 20MHz BW QPSK HARM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber E	T145 8449B	Filter 1	Part 27

Band: LTE41 15MHz QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (2503.5 MHz)									
5.007	-32.0	V	3.0	28.9	1.0	-59.9	-25.0	-34.9	
7.511	-31.3	V	3.0	26.3	1.0	-56.6	-25.0	-31.6	
10.014	-28.7	V	3.0	23.1	1.0	-50.8	-25.0	-25.8	
5.007	-31.4	H	3.0	28.9	1.0	-59.3	-25.0	-34.3	
7.511	-30.8	H	3.0	26.3	1.0	-56.2	-25.0	-31.2	
10.014	-26.7	H	3.0	23.1	1.0	-48.8	-25.0	-23.8	
Mid Ch, (2593 MHz)									
5.186	-32.8	V	3.0	28.7	1.0	-60.5	-25.0	-35.5	
7.779	-29.2	V	3.0	26.0	1.0	-54.2	-25.0	-29.2	
10.372	-28.3	V	3.0	23.0	1.0	-50.3	-25.0	-25.3	
5.186	-31.0	H	3.0	28.7	1.0	-58.7	-25.0	-33.7	
7.779	-28.7	H	3.0	26.0	1.0	-53.7	-25.0	-28.7	
10.372	-27.1	H	3.0	23.0	1.0	-49.1	-25.0	-24.1	
High Ch, (2682.5 MHz)									
5.365	-33.8	V	3.0	28.5	1.0	-61.3	-25.0	-36.3	
8.052	-28.6	V	3.0	25.6	1.0	-53.2	-25.0	-28.2	
10.730	-28.6	V	3.0	22.9	1.0	-50.5	-25.0	-25.5	
5.365	-32.4	H	3.0	28.5	1.0	-59.9	-25.0	-34.9	
8.052	-28.3	H	3.0	25.6	1.0	-52.9	-25.0	-27.9	
10.730	-26.6	H	3.0	22.9	1.0	-48.5	-25.0	-23.5	

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

Company: Samsung
Project #: 14U17686
Date: 05/22/14
Test Engineer: O. Stoelting
Configuration: EUT/AC Charegr/Headphones
Mode: TX, LTE band 41, 10MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T145 8449B	Filter 1	Part 27

Band: LTE41, 10MHz, 16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (2501 MHz)									
5.002	-20.6	V	3.0	28.9	1.0	-48.5	-25.0	-23.5	
7.503	-23.0	V	3.0	26.3	1.0	-48.3	-25.0	-23.3	
10.004	-25.0	V	3.0	23.1	1.0	-47.1	-25.0	-22.1	
5.002	-30.6	H	3.0	28.9	1.0	-58.5	-25.0	-33.5	
7.503	-22.4	H	3.0	26.3	1.0	-47.7	-25.0	-22.7	
10.004	-26.4	H	3.0	23.1	1.0	-48.5	-25.0	-23.5	
Mid Ch, (2593 MHz)									
5.186	-9.9	V	3.0	28.7	1.0	-37.7	-25.0	-12.7	
7.779	-8.1	V	3.0	26.0	1.0	-33.1	-25.0	-8.1	
10.372	-14.2	V	3.0	23.0	1.0	-36.2	-25.0	-11.2	
5.186	-9.7	H	3.0	28.7	1.0	-37.4	-25.0	-12.4	
7.779	-8.7	H	3.0	26.0	1.0	-33.7	-25.0	-8.7	
10.372	-14.2	H	3.0	23.0	1.0	-36.2	-25.0	-11.2	
High Ch, (2685 MHz)									
5.375	-21.6	V	3.0	28.5	1.0	-49.2	-25.0	-24.2	
8.055	-16.2	V	3.0	25.6	1.0	-40.8	-25.0	-15.8	
10.740	-15.7	V	3.0	22.9	1.0	-37.5	-25.0	-12.5	
5.375	-19.8	H	3.0	28.5	1.0	-47.3	-25.0	-22.3	
8.055	-15.0	H	3.0	25.6	1.0	-39.7	-25.0	-14.7	
10.740	-14.3	H	3.0	22.9	1.0	-36.2	-25.0	-11.2	

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14U17686
Date: 05/22/14
Test Engineer: O. Stoelting
Configuration: EUT/AC Charegr/Headphones
Mode: TX, LTE band 41, 10MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	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)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (2501 MHz)									
5.002	-20.4	V	3.0	28.9	1.0	-48.3	-25.0	-23.3	
7.503	-22.0	V	3.0	26.3	1.0	-47.3	-25.0	-22.3	
10.004	-23.4	V	3.0	23.1	1.0	-45.5	-25.0	-20.5	
5.002	-19.0	H	3.0	28.9	1.0	-46.9	-25.0	-21.9	
7.503	-25.7	H	3.0	26.3	1.0	-51.0	-25.0	-26.0	
10.004	-23.7	H	3.0	23.1	1.0	-45.8	-25.0	-20.8	
Mid Ch, (2593 MHz)									
5.186	-9.5	V	3.0	28.7	1.0	-37.2	-25.0	-12.2	
7.779	-8.1	V	3.0	26.0	1.0	-33.1	-25.0	-8.1	
10.372	-14.7	V	3.0	23.0	1.0	-36.6	-25.0	-11.6	
5.186	-9.5	H	3.0	28.7	1.0	-37.2	-25.0	-12.2	
7.779	-8.9	H	3.0	26.0	1.0	-33.9	-25.0	-8.9	
10.372	-13.3	H	3.0	23.0	1.0	-35.3	-25.0	-10.3	
High Ch, (2685 MHz)									
5.375	-21.6	V	3.0	28.5	1.0	-49.2	-25.0	-24.2	
8.055	-15.7	V	3.0	25.6	1.0	-40.4	-25.0	-15.4	
10.740	-16.1	V	3.0	22.9	1.0	-38.0	-25.0	-13.0	
5.375	-19.4	H	3.0	28.5	1.0	-47.0	-25.0	-22.0	
8.055	-14.9	H	3.0	25.6	1.0	-39.5	-25.0	-14.5	
10.740	-15.0	H	3.0	22.9	1.0	-36.9	-25.0	-11.9	

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14U17686
Date: 05/12/14
Test Engineer: O. Stoelting
Configuration: X-pos. EUT with AC charger & HS
Mode: Tx, 1900MHz HSDPA

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	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	-22.2	V	3.0	35.4	1.0	-56.6	-13.0	-43.6	
5.557	-25.4	V	3.0	34.7	1.0	-59.2	-13.0	-46.2	
7.409	-21.4	V	3.0	34.9	1.0	-55.3	-13.0	-42.3	
3.705	-25.4	H	3.0	35.4	1.0	-59.8	-13.0	-46.8	
5.557	-25.0	H	3.0	34.7	1.0	-58.7	-13.0	-45.7	
7.409	-21.7	H	3.0	34.9	1.0	-55.6	-13.0	-42.6	
Mid Ch, 1880MHz									
3.760	-25.3	V	3.0	35.3	1.0	-59.6	-13.0	-46.6	
5.640	-25.3	V	3.0	34.7	1.0	-59.0	-13.0	-46.0	
7.520	-22.7	V	3.0	34.9	1.0	-56.7	-13.0	-43.7	
3.760	-23.0	H	3.0	35.3	1.0	-57.4	-13.0	-44.4	
5.640	-24.9	H	3.0	34.7	1.0	-58.6	-13.0	-45.6	
7.520	-21.6	H	3.0	34.9	1.0	-55.6	-13.0	-42.6	
High Ch, 1907.6MHz									
3.815	-24.9	V	3.0	35.3	1.0	-59.2	-13.0	-46.2	
5.723	-23.9	V	3.0	34.7	1.0	-57.7	-13.0	-44.7	
7.630	-21.7	V	3.0	34.9	1.0	-55.6	-13.0	-42.6	
3.815	-21.9	H	3.0	35.3	1.0	-56.1	-13.0	-43.1	
5.723	-23.6	H	3.0	34.7	1.0	-57.4	-13.0	-44.4	
7.630	-21.5	H	3.0	34.9	1.0	-55.5	-13.0	-42.5	

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14U17686
Date: 05/12/14
Test Engineer: O. Stoelting
Configuration: X-pos. EUT with AC charger & HS
Mode: Tx, 1900MHz Rel 99

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

Band

Band 2

REL99

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.705	-25.9	V	3.0	35.4	1.0	-60.3	-13.0	-47.3	
5.557	-25.4	V	3.0	34.7	1.0	-59.1	-13.0	-46.1	
7.409	-23.2	V	3.0	34.9	1.0	-57.1	-13.0	-44.1	
3.705	-20.0	H	3.0	35.4	1.0	-54.4	-13.0	-41.4	
5.557	-24.4	H	3.0	34.7	1.0	-58.1	-13.0	-45.1	
7.409	-21.8	H	3.0	34.9	1.0	-55.7	-13.0	-42.7	
Mid Ch, 1880MHz									
3.760	-23.5	V	3.0	35.3	1.0	-57.8	-13.0	-44.8	
5.640	-25.5	V	3.0	34.7	1.0	-59.2	-13.0	-46.2	
7.520	-22.6	V	3.0	34.9	1.0	-56.6	-13.0	-43.6	
3.760	-22.6	H	3.0	35.3	1.0	-57.0	-13.0	-44.0	
5.640	-24.5	H	3.0	34.7	1.0	-58.2	-13.0	-45.2	
7.520	-21.7	H	3.0	34.9	1.0	-55.7	-13.0	-42.7	
High Ch, 1907.6MHz									
3.815	-25.9	V	3.0	35.3	1.0	-60.2	-13.0	-47.2	
5.723	-24.4	V	3.0	34.7	1.0	-58.1	-13.0	-45.1	
7.630	-21.2	V	3.0	34.9	1.0	-55.2	-13.0	-42.2	
3.815	-17.7	H	3.0	35.3	1.0	-52.0	-13.0	-39.0	
5.723	-23.7	H	3.0	34.7	1.0	-57.4	-13.0	-44.4	
7.630	-21.1	H	3.0	34.9	1.0	-55.0	-13.0	-42.0	

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Band

Band 5

HSDPA

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14U17686
Date: 05/19/14
Test Engineer: O. Stoelting
Configuration: X-pos. EUT with AC charger & HS
Mode: WCDMA_HSDPA_ 850

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

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.652	-24.3	V	3.0	37.4	1.0	-60.7	-13.0	-47.7	
2.479	-28.3	V	3.0	36.4	1.0	-63.7	-13.0	-50.7	
3.306	-23.9	V	3.0	35.8	1.0	-58.7	-13.0	-45.7	
1.652	-21.2	H	3.0	37.4	1.0	-57.5	-13.0	-44.5	
2.479	-30.2	H	3.0	36.4	1.0	-65.6	-13.0	-52.6	
3.306	-25.4	H	3.0	35.8	1.0	-60.2	-13.0	-47.2	
Mid Ch, 836.6MHz									
1.673	-14.6	V	3.0	37.3	1.0	-50.9	-13.0	-37.9	
2.510	-12.7	V	3.0	36.4	1.0	-48.1	-13.0	-35.1	
3.346	-25.8	V	3.0	35.8	1.0	-60.6	-13.0	-47.6	
1.673	-22.1	H	3.0	37.3	1.0	-58.4	-13.0	-45.4	
2.510	-26.7	H	3.0	36.4	1.0	-62.1	-13.0	-49.1	
3.346	-26.9	H	3.0	35.8	1.0	-61.7	-13.0	-48.7	
High Ch, 846.6MHz									
1.693	0.6	V	3.0	37.3	1.0	-35.7	-13.0	-22.7	
2.539	6.5	V	3.0	36.3	1.0	-28.9	-13.0	-15.9	
3.386	-15.5	V	3.0	35.7	1.0	-50.3	-13.0	-37.3	
1.693	10.5	H	3.0	37.3	1.0	-25.8	-13.0	-12.8	
2.539	15.9	H	3.0	36.3	1.0	-19.4	-13.0	-6.4	
3.386	-7.0	H	3.0	35.7	1.0	-41.7	-13.0	-28.7	

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

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Band

Band 5

REL99

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14U17686
Date: 05/19/14
Test Engineer: O. Stoelting
Configuration: X-pos. EUT with AC charger & HS
Mode: WCDMA_Rel 99_ 850

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

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.652	-23.1	V	3.0	37.4	1.0	-59.4	-13.0	-46.4	
2.479	-29.6	V	3.0	36.4	1.0	-65.0	-13.0	-52.0	
3.306	-21.7	V	3.0	35.8	1.0	-56.4	-13.0	-43.4	
1.652	-21.2	H	3.0	37.4	1.0	-57.5	-13.0	-44.5	
2.479	-27.7	H	3.0	36.4	1.0	-63.1	-13.0	-50.1	
3.306	-24.2	H	3.0	35.8	1.0	-59.0	-13.0	-46.0	
Mid Ch, 836.6MHz									
1.673	-18.5	V	3.0	37.3	1.0	-54.9	-13.0	-41.9	
2.510	-20.7	V	3.0	36.4	1.0	-56.1	-13.0	-43.1	
3.346	-24.8	V	3.0	35.8	1.0	-59.6	-13.0	-46.6	
1.673	-6.3	H	3.0	37.3	1.0	-42.7	-13.0	-29.7	
2.510	-3.2	H	3.0	36.4	1.0	-38.5	-13.0	-25.5	
3.346	-21.3	H	3.0	35.8	1.0	-56.1	-13.0	-43.1	
High Ch, 846.6MHz									
1.693	1.0	V	3.0	37.3	1.0	-35.3	-13.0	-22.3	
2.539	7.1	V	3.0	36.3	1.0	-28.3	-13.0	-15.3	
3.386	-15.6	V	3.0	35.7	1.0	-50.3	-13.0	-37.3	
1.693	9.0	H	3.0	37.3	1.0	-27.3	-13.0	-14.3	
2.539	14.0	H	3.0	36.3	1.0	-21.4	-13.0	-8.4	
3.386	-9.4	H	3.0	35.7	1.0	-44.1	-13.0	-31.1	

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

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Band

GSM1900

EGPRS

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14U17686
Date: 05/12/14
Test Engineer: O. Stoelting
Configuration: X-pos. EUT w/ ac charger & HS
Mode: EGPRS 1900

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

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850MHz									
3.700	-24.1	V	3.0	35.4	1.0	-58.5	-13.0	-45.5	
5.550	-22.4	V	3.0	34.7	1.0	-56.1	-13.0	-43.1	
7.400	-21.7	V	3.0	34.9	1.0	-55.6	-13.0	-42.6	
3.700	-23.3	H	3.0	35.4	1.0	-57.7	-13.0	-44.7	
5.550	-24.3	H	3.0	34.7	1.0	-58.0	-13.0	-45.0	
7.400	-22.1	H	3.0	34.9	1.0	-56.0	-13.0	-43.0	
Mid Ch, 1880.0MHz									
3.760	-27.3	V	3.0	35.3	1.0	-61.7	-13.0	-48.7	
5.640	-17.7	V	3.0	34.7	1.0	-51.4	-13.0	-38.4	
7.520	-20.8	V	3.0	34.9	1.0	-54.7	-13.0	-41.7	
3.760	-22.2	H	3.0	35.3	1.0	-56.5	-13.0	-43.5	
5.640	-23.1	H	3.0	34.7	1.0	-56.8	-13.0	-43.8	
7.520	-16.4	H	3.0	34.9	1.0	-50.3	-13.0	-37.3	
High Ch, 1909.8 MHz									
3.820	-17.3	V	3.0	35.3	1.0	-51.6	-13.0	-38.6	
5.729	-24.0	V	3.0	34.7	1.0	-57.8	-13.0	-44.8	
7.639	-23.0	V	3.0	35.0	1.0	-56.9	-13.0	-43.9	
3.820	-17.4	H	3.0	35.3	1.0	-51.7	-13.0	-38.7	
5.729	-23.2	H	3.0	34.7	1.0	-56.9	-13.0	-43.9	
7.639	-22.3	H	3.0	35.0	1.0	-56.3	-13.0	-43.3	

Rev. 03.03.09

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

Company: Samsung
Project #: 14U17686
Date: 05/12/14
Test Engineer: O. Stoelting
Configuration: X-pos. EUT w/ ac charger & HS
Mode: GPRS 1900

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

Band

GSM1900

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, 1850MHz									
3.700	-26.9	V	3.0	35.4	1.0	-61.3	-13.0	-48.3	
5.550	-19.8	V	3.0	34.7	1.0	-53.5	-13.0	-40.5	
7.400	-23.3	V	3.0	34.9	1.0	-57.2	-13.0	-44.2	
3.700	-26.1	H	3.0	35.4	1.0	-60.6	-13.0	-47.6	
5.550	-18.8	H	3.0	34.7	1.0	-52.5	-13.0	-39.5	
7.400	-17.8	H	3.0	34.9	1.0	-51.7	-13.0	-38.7	
Mid Ch, 1880.0MHz									
3.760	-16.9	V	3.0	35.3	1.0	-51.2	-13.0	-38.2	
5.640	-17.8	V	3.0	34.7	1.0	-51.6	-13.0	-38.6	
7.520	-12.8	V	3.0	34.9	1.0	-46.7	-13.0	-33.7	
3.760	-15.3	H	3.0	35.3	1.0	-49.6	-13.0	-36.6	
5.640	-21.7	H	3.0	34.7	1.0	-55.4	-13.0	-42.4	
7.520	-18.2	H	3.0	34.9	1.0	-52.1	-13.0	-39.1	
High Ch, 1909.8 MHz									
3.820	-25.5	V	3.0	35.3	1.0	-59.8	-13.0	-46.8	
5.729	-21.1	V	3.0	34.7	1.0	-54.9	-13.0	-41.9	
7.639	-22.0	V	3.0	35.0	1.0	-55.9	-13.0	-42.9	
3.820	-18.0	H	3.0	35.3	1.0	-52.3	-13.0	-39.3	
5.729	-23.6	H	3.0	34.7	1.0	-57.3	-13.0	-44.3	
7.639	-14.5	H	3.0	35.0	1.0	-48.4	-13.0	-35.4	

Rev. 03.03.09

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

Company: Samsung
Project #: 14U17686
Date: 05/19/14
Test Engineer: O. Stoelting
Configuration: X-pos. EUT with AC charger & HS
Mode: EGPRS 850

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T34 8449B	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	-30.3	V	3.0	37.4	1.0	-66.7	-13.0	-53.7	
2.473	-30.2	V	3.0	36.4	1.0	-65.5	-13.0	-52.5	
3.297	-29.0	V	3.0	35.8	1.0	-63.8	-13.0	-50.8	
1.648	-28.1	H	3.0	37.4	1.0	-64.5	-13.0	-51.5	
2.473	-32.8	H	3.0	36.4	1.0	-68.2	-13.0	-55.2	
3.297	-29.3	H	3.0	35.8	1.0	-64.1	-13.0	-51.1	
Mid Ch, 836.6MHz									
1.673	-20.1	V	3.0	37.3	1.0	-56.5	-13.0	-43.5	
2.510	-30.8	V	3.0	36.4	1.0	-66.1	-13.0	-53.1	
3.346	-27.3	V	3.0	35.8	1.0	-62.1	-13.0	-49.1	
1.673	-18.7	H	3.0	37.3	1.0	-55.1	-13.0	-42.1	
2.510	-33.1	H	3.0	36.4	1.0	-68.5	-13.0	-55.5	
3.346	-27.7	H	3.0	35.8	1.0	-62.4	-13.0	-49.4	
High Ch, 848.8MHz									
1.698	-19.5	V	3.0	37.3	1.0	-55.8	-13.0	-42.8	
2.547	-28.2	V	3.0	36.3	1.0	-63.5	-13.0	-50.5	
3.395	-28.5	V	3.0	35.7	1.0	-63.2	-13.0	-50.2	
1.698	-21.2	H	3.0	37.3	1.0	-57.5	-13.0	-44.5	
2.547	-30.4	H	3.0	36.3	1.0	-65.7	-13.0	-52.7	
3.395	-28.5	H	3.0	35.7	1.0	-63.2	-13.0	-50.2	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14U17686
Date: 05/19/14
Test Engineer: O. Stoelting
Configuration: X-pos. EUT with AC charger & HS
Mode: GPRS 850

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

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.2MHz									
GSM850 GPRS	1.648	-25.5	V	3.0	37.4	1.0	-61.8	-13.0	-48.8	
	2.473	-30.9	V	3.0	36.4	1.0	-66.3	-13.0	-53.3	
	3.297	-29.0	V	3.0	35.8	1.0	-63.8	-13.0	-50.8	
	1.648	-26.5	H	3.0	37.4	1.0	-62.8	-13.0	-49.8	
	2.473	-32.7	H	3.0	36.4	1.0	-68.1	-13.0	-55.1	
	3.297	-29.2	H	3.0	35.8	1.0	-64.0	-13.0	-51.0	
	Mid Ch, 836.6MHz									
	1.673	-15.3	V	3.0	37.3	1.0	-51.6	-13.0	-38.6	
	2.510	-30.6	V	3.0	36.4	1.0	-65.9	-13.0	-52.9	
	3.346	-27.5	V	3.0	35.8	1.0	-62.3	-13.0	-49.3	
	1.673	-18.3	H	3.0	37.3	1.0	-54.6	-13.0	-41.6	
	2.510	-32.4	H	3.0	36.4	1.0	-67.8	-13.0	-54.8	
	3.346	-27.6	H	3.0	35.8	1.0	-62.4	-13.0	-49.4	
	High Ch, 848.8MHz									
	1.698	-18.2	V	3.0	37.3	1.0	-54.5	-13.0	-41.5	
	2.547	-27.8	V	3.0	36.3	1.0	-63.1	-13.0	-50.1	
	3.395	-28.4	V	3.0	35.7	1.0	-63.1	-13.0	-50.1	
	1.698	-20.8	H	3.0	37.3	1.0	-57.1	-13.0	-44.1	
	2.547	-30.2	H	3.0	36.3	1.0	-65.6	-13.0	-52.6	
	3.395	-28.7	H	3.0	35.7	1.0	-63.4	-13.0	-50.4	

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

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