



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

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA Phone + Bluetooth & WLAN 2.4GHz b/g/n

MODEL NUMBER: SM-G316MY

FCC ID: A3LSMG316MY

REPORT NUMBER: 15I19748-E1 REVISION B

ISSUE DATE: JANUARY 15, 2015

*Prepared for*  
SAMSUNG ELECTRONICS CO., LTD.  
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,  
GYEONGGI-DO, 443-742, KOREA

*Prepared by*  
UL VERIFICATION SERVICES INC.  
47173 BENICIA STREET  
FREMONT, CA 94538, U.S.A.  
TEL: (510) 771-1000  
FAX: (510) 661-0888



NVLAP LAB CODE 200065-0

## Revision History

Rev.	Date	Revisions	Revised By
--	1/12/15	Initial issue	P. Zhang
A	1/14/15	Updated GPRS 1900 EIRP power table	P. Zhang
B	1/15/15	Updated test setup for PAR in section 9	P. Zhang

## TABLE OF CONTENTS

<b>1.</b>	<b>ATTESTATION OF TEST RESULTS .....</b>	<b>5</b>
<b>2.</b>	<b>TEST METHODOLOGY .....</b>	<b>6</b>
<b>3.</b>	<b>FACILITIES AND ACCREDITATION .....</b>	<b>6</b>
<b>4.</b>	<b>CALIBRATION AND UNCERTAINTY .....</b>	<b>7</b>
4.1.	MEASURING INSTRUMENT CALIBRATION .....	7
4.2.	SAMPLE CALCULATION .....	7
4.3.	MEASUREMENT UNCERTAINTY .....	7
<b>5.</b>	<b>EQUIPMENT UNDER TEST .....</b>	<b>8</b>
5.1.	DESCRIPTION OF EUT .....	8
5.2.	MAXIMUM OUTPUT POWER .....	8
5.3.	DESCRIPTION OF AVAILABLE ANTENNAS .....	9
5.4.	DESCRIPTION OF TEST SETUP .....	10
<b>6.</b>	<b>TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>13</b>
<b>7.</b>	<b>Summary Table .....</b>	<b>14</b>
<b>8.</b>	<b>RF POWER OUTPUT VERIFICATION .....</b>	<b>15</b>
8.1.	GSM/GPRS/EDGE .....	15
8.2.	UMTS REL 99 .....	17
8.2.1.	UMTS REL 99 OUTPUT POWER RESULT .....	17
8.3.	UMTS HSDPA .....	18
8.3.1.	UMTS HSDPA OUTPUT POWER RESULT .....	19
8.3.2.	UMTS HSUPA .....	20
8.3.3.	UMTS HSUPA OUTPUT POWER RESULT .....	21
<b>9.</b>	<b>PEAK TO AVERAGE RATIO .....</b>	<b>22</b>
9.1.	CONDUCTED PEAK TO AVERAGE RESULT .....	22
<b>10.</b>	<b>LIMITS AND CONDUCTED RESULTS .....</b>	<b>23</b>
10.1.	OCCUPIED BANDWIDTH .....	23
10.1.1.	OCCUPIED BANDWIDTH RESULTS .....	24
10.1.1.	OCCUPIED BANDWIDTH PLOTS .....	25
<b>11.</b>	<b>BAND EDGE EMISSIONS .....</b>	<b>26</b>
11.1.1.	BAND EDGE PLOTS .....	27
11.2.	OUT OF BAND EMISSIONS .....	30
11.2.1.	OUT OF BAND EMISSIONS RESULT .....	31

11.2.2. OUT OF BAND EMISSIONS PLOTS..... 32

11.3. FREQUENCY STABILITY ..... 33

11.3.1. FREQUENCY STABILITY RESULTS..... 34

**12. RADIATED TEST RESULTS..... 36**

12.1. RADIATED POWER (ERP & EIRP)..... 36

12.1.1. ERP/EIRP Results ..... 37

12.1.2. ERP/EIRP DATA ..... 38

12.2. FIELD STRENGTH OF SPURIOUS RADIATION..... 42

12.2.1. SPURIOUS RADIATION PLOTS..... 43

**13. SETUP PHOTOS ..... 47**

# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.  
**EUT DESCRIPTION:** GSM/WCDMA Phone + Bluetooth & WLAN 2.4GHz b/g/n  
**MODEL:** SM-G316MY  
**SERIAL NUMBER:** R91D027A, 2028948 (conducted); RV1F91CWXVA, 2028949 (radiated)  
**DATE TESTED:** OCTOBER 1 – 2, JANUARY 7-8, 2015

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H, 24E	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  
UL Verification Services Inc. By:



PENG ZHANG  
CONSUMER TECHNOLOGY DIVISION  
PROJECT LEAD  
UL Verification Services Inc.

Tested By:



CHARLES VERGONIO  
CONSUMER TECHNOLOGY DIVISION  
LAB ENGINEER  
UL Verification Services Inc.

## 2. TEST METHODOLOGY

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

## 3. FACILITIES AND ACCREDITATION

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

47173 Benicia Street	47266 Benicia Street
<input checked="" type="checkbox"/> Chamber A(IC: 2324B-1)	<input type="checkbox"/> Chamber D(IC: 2324B-4)
<input checked="" type="checkbox"/> Chamber B(IC: 2324B-2)	<input type="checkbox"/> Chamber E(IC: 2324B-5)
<input type="checkbox"/> Chamber C(IC: 2324B-3)	<input type="checkbox"/> Chamber F(IC: 2324B-6)
	<input type="checkbox"/> Chamber G(IC: 2324B-7)
	<input type="checkbox"/> Chamber H(IC: 2324B-8)

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)

### 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 26000 MHz	4.94 dB

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a GSM Phone + Bluetooth & WLAN 2.4GHz b/g/n

### 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	
			dBm	mW	dBm	mW
GSM850	824~849	GMSK	32.6	1819.70		
	824~849	GPRS	32.6	1819.70	29.10	812.83
GSM1900	1850~1910	GMSK	29.5	891.25		
	1850~1910	GPRS	29.5	891.25	30.23	1054.39

FCC Part 22/24						
Band	Frequency Range(MHz)	Modulation	Conducted		Radiated	
			Avg (dBm)	Avg (mW)	Avg (dBm)	Avg (mW)
Band 2	1850~1910	REL99	22.0	158.49	21.12	129.42
	1850~1910	HSDPA	21.5	141.25	20.10	102.33
	1850~1910	HSUPA	21.5	141.25		

### 5.3. 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)
GSM850, 824~849MHz	-1.9
GSM1900, 1850~1910MHz	1.1

## 5.4. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	ETA0U10EBE	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

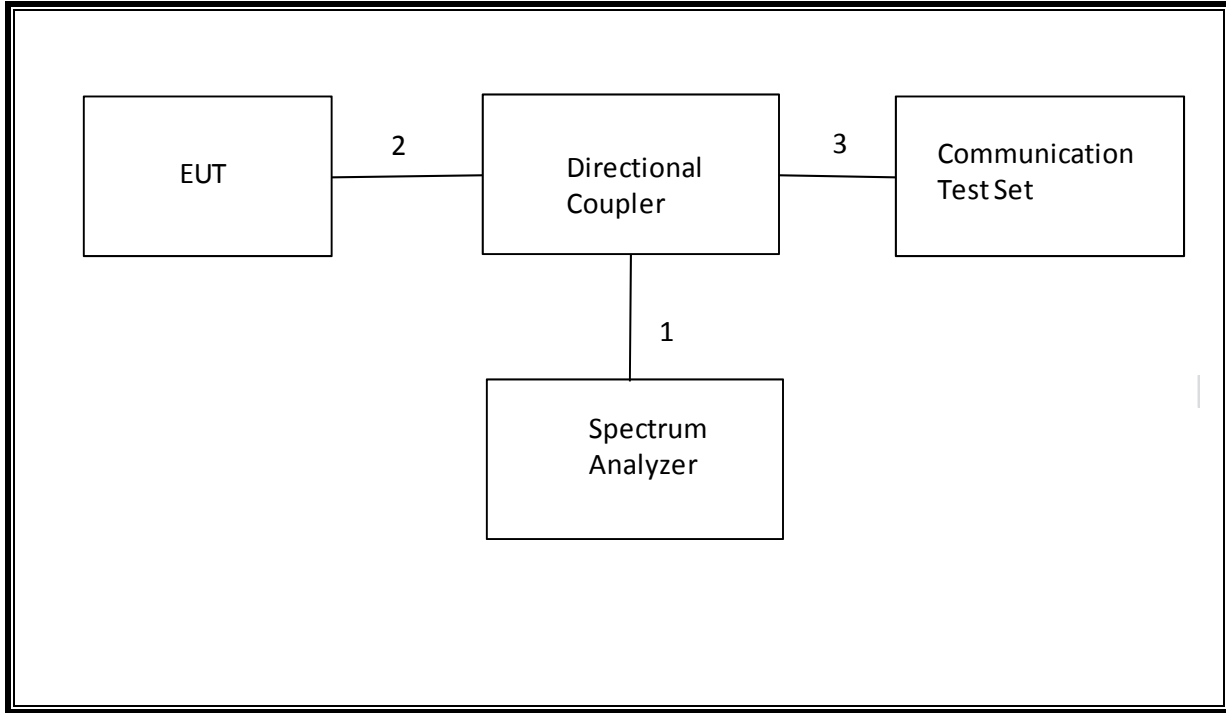
### I/O CABLES (RADIATED SETUP)

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

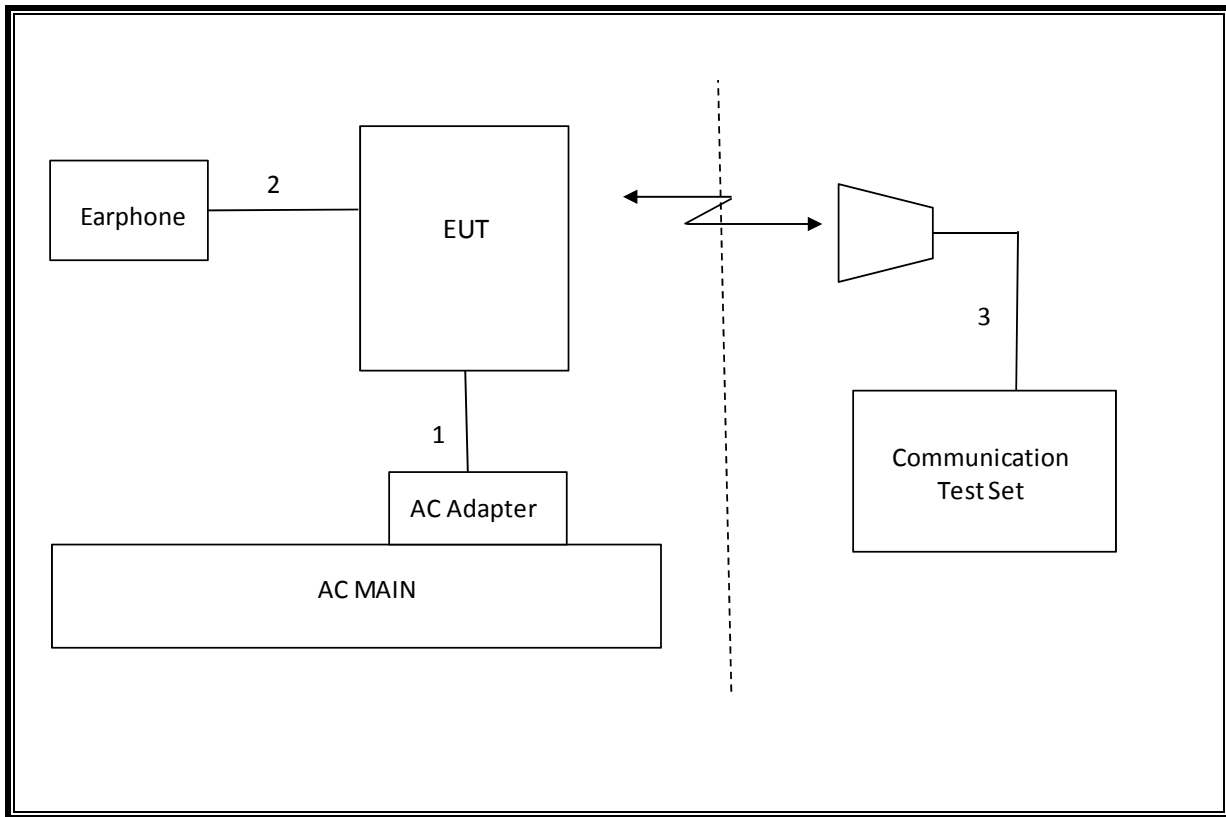
### TEST SETUP

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

**SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)**



**SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01179	02/26/15
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	A121003	04/22/15
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/15
Antenna, Horn, 18 GHz	EMCO	3115	C00784	10/25/15
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	T956	02/28/15
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
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	12/17/15
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/2015
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/2015

## 7. Summary Table

The model FCC ID: A3LSMG316MY shares the same enclosure and circuit board as mode FCC ID: A3LSMG316HU. The WWAN/WLAN/Bluetooth circuitry and layout, including antenna, are almost identical between the two units. The WWAN/WLAN/Bluetooth antenna and surrounding circuitry is the same between these two units.

The WWAN circuitry and layout, including antenna, are almost identical between the two units. Only Difference is addition of B2 circuit.

After confirming through preliminary radiated emissions that the performance of the A3LSMG316HU GSM data remains representative of this model (FCC ID: A3LSMG316MY). GSM Test data for FCC ID: A3LSMG316HU is being submitted for this application.

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		Pass	4.102MHz
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-15.391dBm
2.1046	N/A	Conducted output power	N/A	Conducted	Pass	32.6dBm
22.355 24.235	RSS-132(4.3) RSS-133(6.3) RSS-139(6.3) RSS-199(4.3)	Frequency Stability	2.5PPM		Pass	0.048PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	29.1dBm
24.232(c)	RSS-133(6.4) RSS-199(4.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	30.23dBm
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Radiated Spurious Emission	-13dBm		Pass	-39.0dBm

## 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

**GSM850 Measured Results**

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	
850	GSM (Voice)	CS1	1	128	824.2	32.5	23.4	
				190	836.6	32.6	23.5	
				251	848.8	32.6	23.6	
	GPRS (GMSK)	CS1	1	1	128	824.2	32.5	23.5
					190	836.6	32.6	23.5
					251	848.8	32.6	23.6
			2	1	128	824.2	29.8	23.7
					190	836.6	29.8	23.8
					251	848.8	29.9	23.9
			3	1	128	824.2	28.2	23.9
					190	836.6	28.3	24.0
					251	848.8	28.3	24.1
			4	1	128	824.2	26.7	23.6
					190	836.6	26.7	23.7
					251	848.8	26.8	23.8

**GSM1900 Measured Results**

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)	
1900	GSM (Voice)	CS1	1	512	1850.2	29.4	20.3	
				661	1880.0	29.4	20.3	
				810	1909.8	29.5	20.4	
	GPRS (GMSK)	CS1	1	1	512	1850.2	29.4	20.3
					661	1880.0	29.4	20.3
					810	1909.8	29.5	20.4
			2	1	512	1850.2	27.3	21.2
					661	1880.0	27.3	21.2
					810	1909.8	27.2	21.1
			3	1	512	1850.2	25.3	21.0
					661	1880.0	25.3	21.0
					810	1909.8	25.2	21.0
			4	1	512	1850.2	24.1	21.1
					661	1880.0	24.1	21.1
					810	1909.8	24.0	21.0

## 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
	$\beta_c$	Not Applicable
	$\beta_d$	Not Applicable
	$\beta_{ec}$	Not Applicable
	$\beta_c/\beta_d$	8/15
	$\beta_{hs}$	Not Applicable
	$\beta_{ed}$	Not Applicable

### 8.2.1. UMTS REL 99 OUTPUT POWER RESULT

Band	Mode	Ch.	f(MHz)	Conducted Power
				(dBm) Avg (dBm)
Band 2	REL99	9262	1852.4	22.0
		9400	1880	22.0
		9538	1907.6	21.7

### 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			
	$\beta_c$	2/15	12/15	15/15	15/15
	$\beta_d$	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	$\beta_c/\beta_d$	2/15	12/15	15/8	15/4
	$\beta_{hs}$	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			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

**8.3.1. UMTS HSDPA OUTPUT POWER RESULT**

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm)
					Avg (dBm)
Band 2	HSDPA	1	9262	1852.4	21.1
			9400	1880	21.5
			9538	1907.6	21.5
		2	9262	1852.4	21.1
			9400	1880	21.4
			9538	1907.6	21.5
		3	9262	1852.4	21.1
			9400	1880	21.4
			9538	1907.6	21.4
		4	9262	1852.4	21.1
			9400	1880	21.4
			9538	1907.6	21.4

### 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
	$\beta_c/\beta_d$	11/15	6/15	15/9	2/15	15/15
Bhs	22/15	12/15	30/15	4/15	30/15	
$\beta_{ed}$ (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 = $\beta_{hs}/\beta_c$	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:  $\beta_{ed}$  cannot be set directly, it is set by Absolute Grant Value.

**8.3.3. UMTS HSUPA OUTPUT POWER RESULT**

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm)
					Avg (dBm)
Band 2	HSUPA	1	9262	1852.4	20.3
			9400	1880	21.1
			9538	1907.6	20.5
		2	9262	1852.4	20.3
			9400	1880	20.3
			9538	1907.6	20.0
		3	9262	1852.4	21.3
			9400	1880	21.3
			9538	1907.6	21.1
		4	9262	1852.4	20.3
			9400	1880	20.3
			9538	1907.6	20.0
		5	9262	1852.4	21.5
			9400	1880	21.1
			9538	1907.6	21.5

## 9. PEAK TO AVERAGE RATIO

### Test Procedure

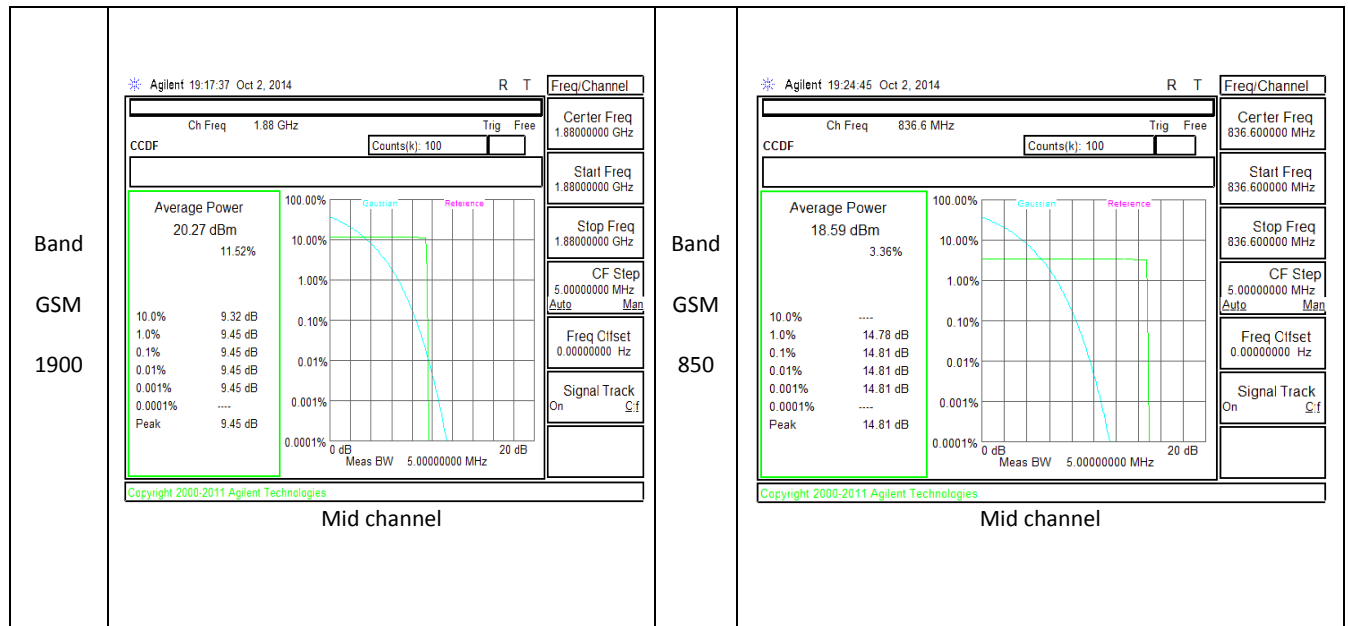
Per KDB 971168 D01 Power Meas License Digital Systems v02r01;

The transmitter output was connected to an Agilent 8960 or a CMW500 Test Set and configured to operate at maximum power. The PAR were measured on the Spectrum Analyzer for GSM or Power meter for WCDMA.

### 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



#### PAR Measurement

Cell Bandwidth	Channel (Mhz)	Mode	Peak (dBm)	Average (dBm)	Delta
WCDMA B2	1880	REL99	25.82	21.7	4.12
		HSDPA	24.69	21.3	3.369

## **10. LIMITS AND CONDUCTED RESULTS**

### **10.1. OCCUPIED BANDWIDTH**

#### **RULE PART(S)**

FCC: §2.1049

#### **LIMITS**

For reporting purposes only

#### **TEST PROCEDURE**

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

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

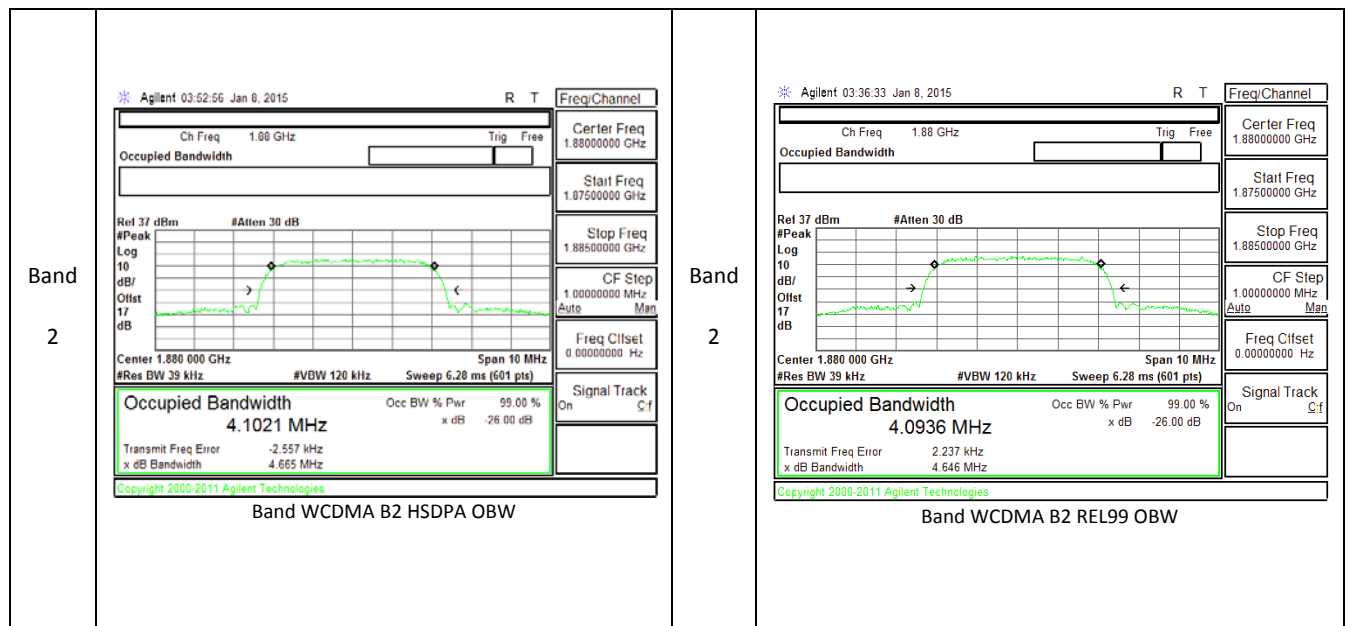
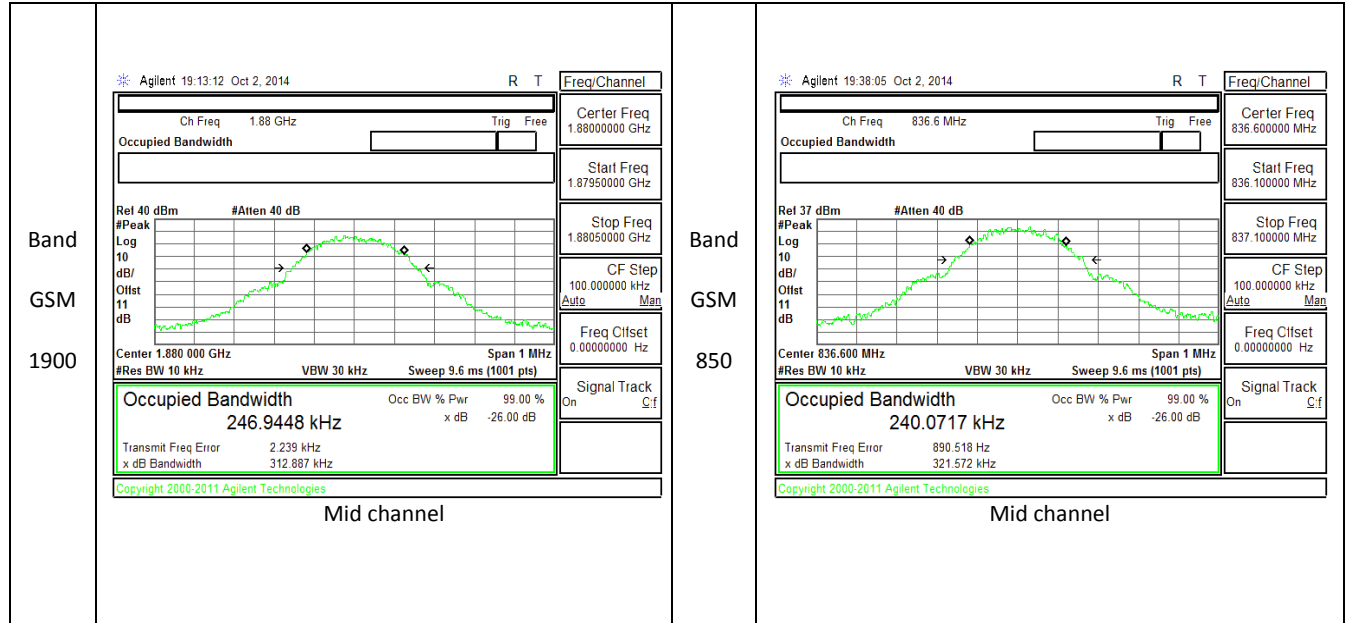
### 10.1.1. OCCUPIED BANDWIDTH RESULTS

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW
GSM850	GMSK	128	824.2		
		190	836.6		
		251	848.8		
	GPRS	128	824.2	0.2473	0.3104
		190	836.6	0.2401	0.3216
		251	848.8	0.2525	0.3235
GSM1900	GMSK	512	1850.2		
		661	1880		
		810	1909.8		
	GPRS	512	1850.2	0.2399	0.3137
		661	1880	0.2469	0.3128
		810	1909.8	0.2419	0.3253

### WCDMA OCCUPIED BANDWIDTH RESULTS

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Band 2	REL99	9262	1852.4	4.099	4.657
		9400	1880	4.094	4.646
		9538	1907.6	4.089	4.657
	HSDPA	9262	1852.4	4.101	4.647
		9400	1880	4.102	4.665
		9538	1907.6	4.074	4.655
	HSUPA	9262	1852.4		
		9400	1880		
		9538	1907.6		

### 10.1.1. OCCUPIED BANDWIDTH PLOTS



## **11. BAND EDGE EMISSIONS**

### **RULE PART(S)**

FCC: §22.359, and §24.238

### **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.

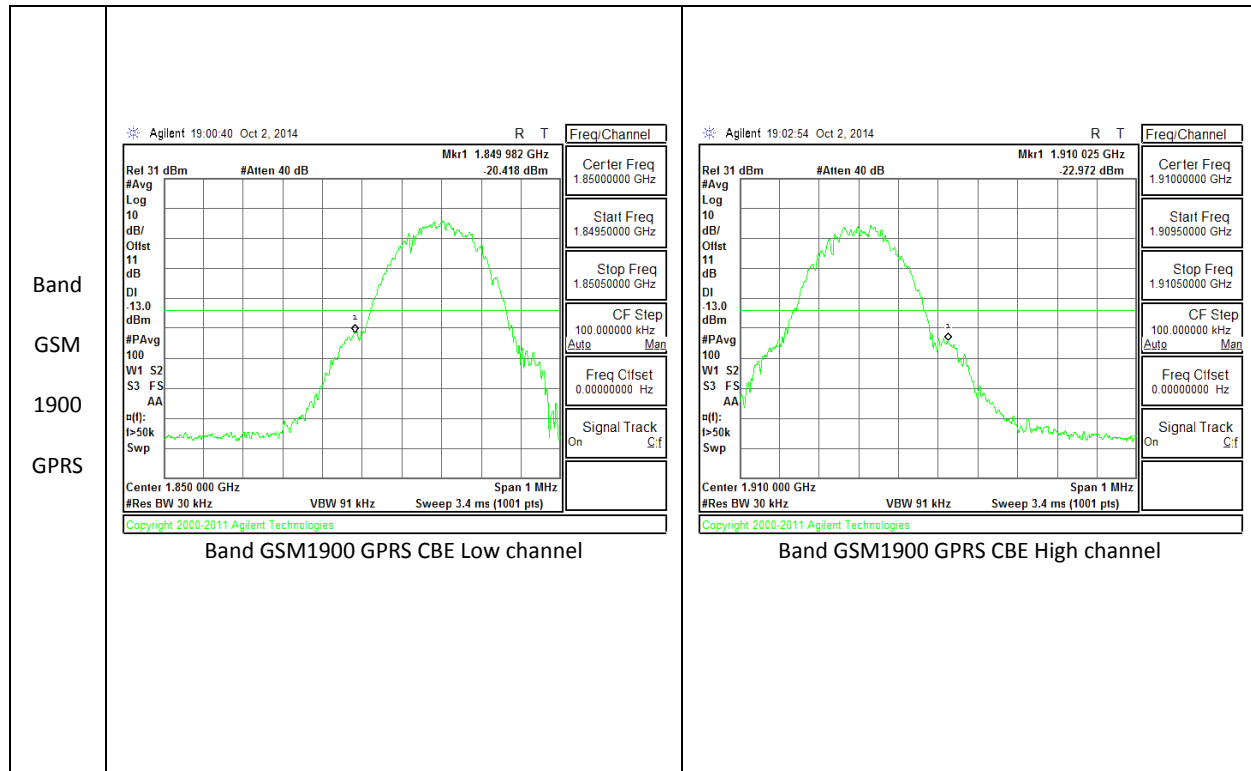
### **TEST PROCEDURE**

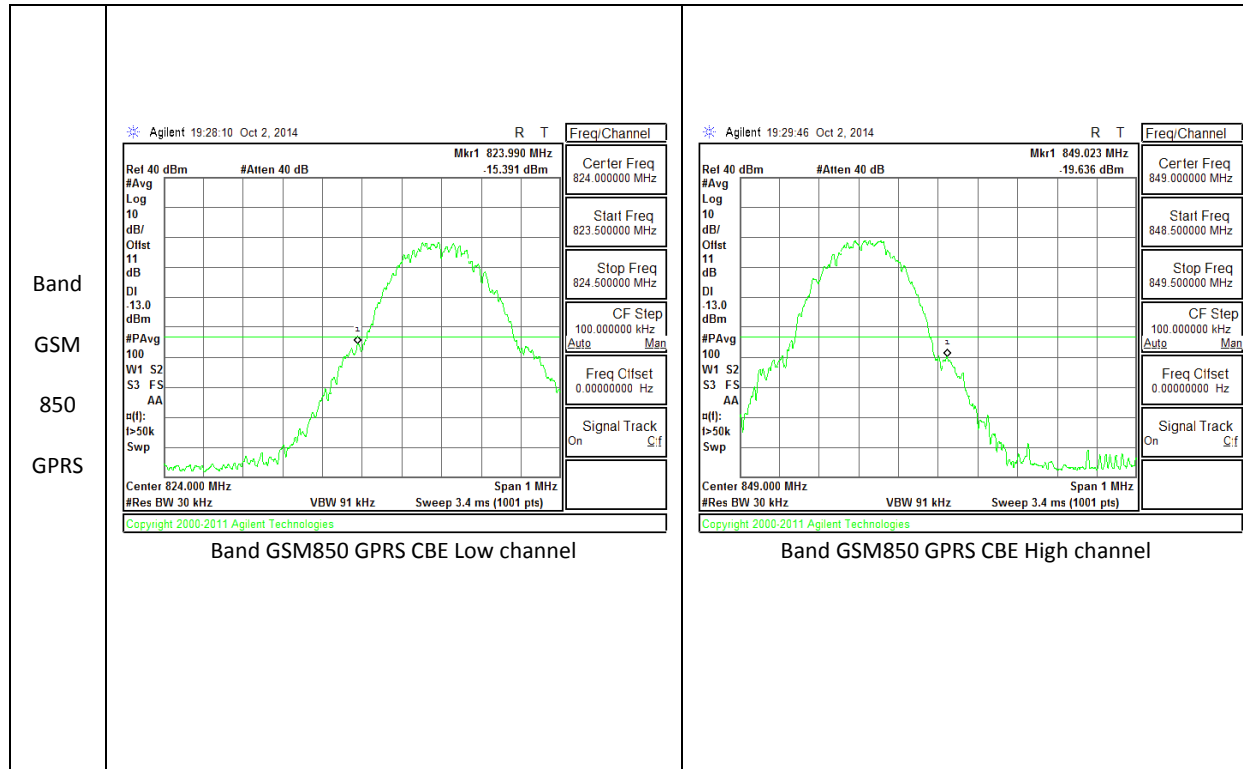
Per KDB 971168 D01 Power Meas License Digital Systems v02r01

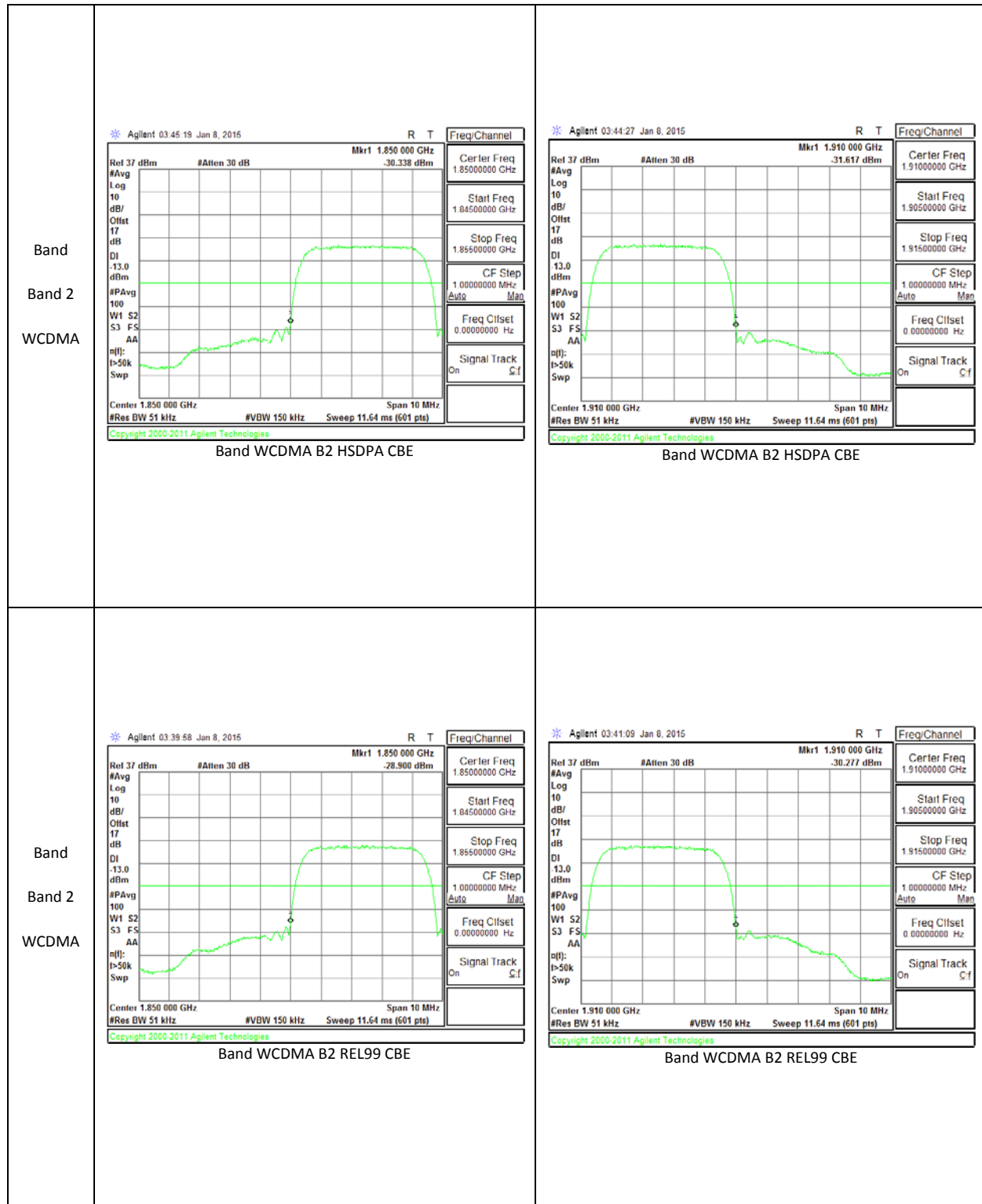
The transmitter output was connected to an Agilent 8960 or a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

### **RESULTS**

### 11.1.1. BAND EDGE PLOTS







## **11.2. OUT OF BAND EMISSIONS**

### **RULE PART(S)**

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

### **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.

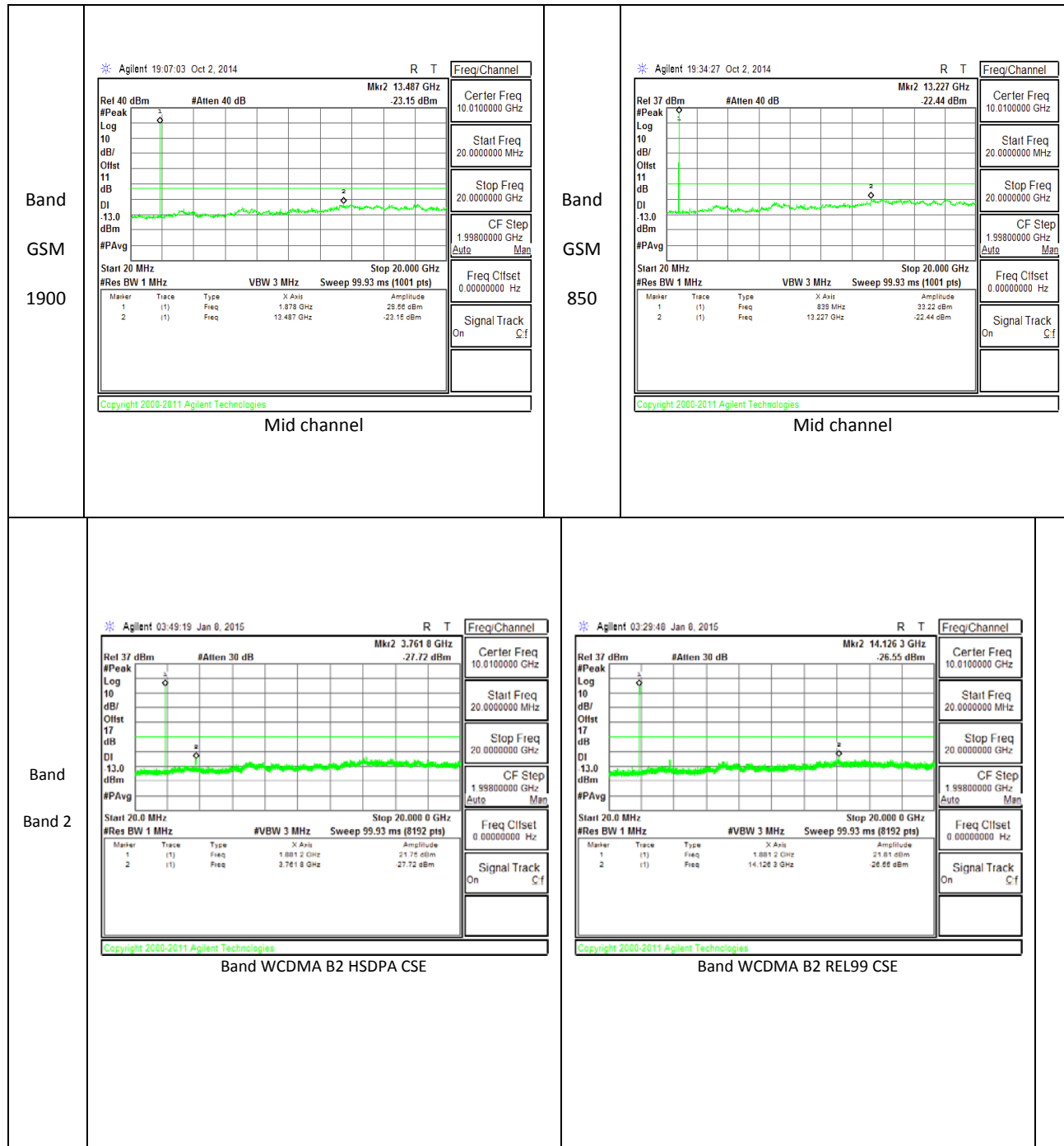
### **RESULTS**

### 11.2.1. OUT OF BAND EMISSIONS RESULT

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM850	GMSK	824.2			
		836.6			
		848.8			
	GPRS	824.2	-23.36	-13	-10.36
		836.6	-22.44	-13	-9.44
		848.8	-23.56	-13	-10.56
GSM1900	GMSK	1850.2			
		1880			
		1909.8			
	GPRS	1850.2	-22.29	-13	-9.29
		1880	-23.15	-13	-10.15
		1909.8	-22.77	-13	-9.77

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
Band 2	REL99	1852.4	-25.76	-13	-12.76
		1880	-26.55	-13	-13.55
		1907.6	-26.60	-13	-13.60
	HSDPA	1852.4	-27.85	-13	-14.85
		1880	-27.72	-13	-14.72
		1907.6	-26.23	-13	-13.23

### 11.2.2. OUT OF BAND EMISSIONS PLOTS



### **11.3. FREQUENCY STABILITY**

#### **RULE PART(S)**

FCC: §2.1055, §22.355, §24.235,

#### **LIMITS**

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

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

#### **TEST PROCEDURE**

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

### 11.3.1. 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 Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999907	0.03246	2.5
3.80	40	1879.999925	0.02253	2.5
3.80	30	1879.999920	0.02521	2.5
<b>3.80</b>	<b>20</b>	<b>1879.999968</b>	<b>0.00000</b>	<b>2.5</b>
3.80	10	1879.999936	0.01697	2.5
3.80	0	1879.999932	0.01896	2.5
3.80	-10	1879.999938	0.01570	2.5
3.80	-20	1879.999926	0.02202	2.5
3.80	-30	1879.999919	0.02591	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 Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
<b>3.80</b>	<b>20</b>	<b>1879.999968</b>	<b>0.00000</b>	<b>2.5</b>
4.37	20	1879.999951	0.00905	2.5
3.30	20	1879.999931	0.01961	2.5
End Volt (3.2)	20	1879.999930	0.02014	2.5

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

Reference Frequency: PCS Mid Channel 836.6 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.600009	0.00634	2.5
3.80	40	836.599974	0.04817	2.5
3.80	30	836.599976	0.04558	2.5
<b>3.80</b>	<b>20</b>	<b>836.600014</b>	<b>0.00000</b>	<b>2.5</b>
3.80	10	836.600030	-0.01976	2.5
3.80	0	836.600019	-0.00663	2.5
3.80	-10	836.600024	-0.01150	2.5
3.80	-20	836.600024	-0.01235	2.5
3.80	-30	836.600028	-0.01678	2.5

Reference Frequency: PCS Mid Channel 836.6 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
<b>3.80</b>	<b>20</b>	<b>836.600014</b>	<b>0.00000</b>	<b>2.5</b>
4.37	20	836.6000126	0.00159	2.5
3.30	20	836.6000126	0.00155	2.5
End Volt (3.2)	20	836.6000124	0.00179	2.5

## 12. RADIATED TEST RESULTS

### 12.1. RADIATED POWER (ERP & EIRP)

#### RULE PART(S)

FCC: §2.1046, §22.913, §24.232,

#### 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; PSA setting reference to 971168 D01 v02r01

For peak power measurement with a PSA:

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

For average power measurement with a PSA:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW  $\geq 3 \times$  RBW; d) Set number of points in sweep  $\geq 2 \times$  span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle  $\geq 98$ ; 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

### 12.1.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM1900	GMSK	512	1850.2		
		661	1880		
		810	1909.8		
	GPRS	512	1850.2	28.86	769.13
		661	1880	30.23	1054.39
		810	1909.8	28.62	727.78

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM850	GMSK	128	824.2		
		190	836.6		
		251	848.8		
	GPRS	128	824.2	29.101	813.02
		190	836.6	28.531	713.02
		251	848.8	28.461	701.62

Band	Mode	Channel	f(MHz)	EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	21.12	129.42
		9400	1880	20.82	120.78
		9538	1907.6	20.69	117.22
	HSDPA	9262	1852.4	20.10	102.33
		9400	1880	20.0	100.00
		9538	1907.6	20.09	102.09
	HSUPA	9262	1852.4		
		9400	1880		
		9538	1907.6		

### 12.1.2. ERP/EIRP DATA

Band  GSM  1900  GPRS	<b>High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C</b>								
	<b>Company:</b>		Samsung						
	<b>Project #:</b>		14I19012						
	<b>Date:</b>		10/02/14						
	<b>Test Engineer:</b>		R. Alegre						
	<b>Configuration:</b>		EUT only						
	<b>Mode:</b>		GPRS 1900						
	<b>Test Equipment:</b>								
	Receiving: Horn T119, and Chamber C SMA Cables								
	Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>EIRP</b>	<b>Limit</b>	<b>Margin</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	<b>Low</b>								
	1850.20	15.51	V	0.90	7.86	22.47	33.0	-10.5	
	1850.20	21.90	H	0.90	7.86	28.86	33.0	-4.1	
	<b>Mid</b>								
	1880.00	16.41	V	0.90	7.86	23.37	33.0	-9.6	
	1880.00	23.27	H	0.90	7.86	30.23	33.0	-2.8	
	<b>High</b>								
	1909.80	16.11	V	0.90	7.86	23.07	33.0	-9.9	
	1909.80	21.66	H	0.90	7.86	28.62	33.0	-4.4	
	Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								

Band  GSM  850  GPRS	<b>High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C</b>								
	<b>Company:</b>		Samsung						
	<b>Project #:</b>		14I19012						
	<b>Date:</b>		10/02/14						
	<b>Test Engineer:</b>		R. Alegre						
	<b>Configuration:</b>		EUT only						
	<b>Mode:</b>		GPRS850						
	<b>Test Equipment:</b>								
	Receiving: Sunol T185, and Chamber C N-type Cable								
	Substitution: Dipole T416, 8ft SMA Cable Warehouse.								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>ERP</b>	<b>Limit</b>	<b>Margin</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBd)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	<b>Low Ch</b>								
	824.20	20.66	V	0.9	0.0	19.76	38.5	-18.7	
	824.20	30.00	H	0.9	0.0	29.10	38.5	-9.3	
	<b>Mid Ch</b>								
	836.60	20.46	V	0.9	0.0	19.56	38.5	-18.9	
	836.60	29.43	H	0.9	0.0	28.53	38.5	-9.9	
	<b>High Ch</b>								
	848.80	22.18	V	0.9	0.0	21.28	38.5	-17.2	
	848.80	29.36	H	0.9	0.0	28.46	38.5	-10.0	
	Rev. 3.17.11								
	Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								

High Frequency Substitution Measurement UL Verification Services, Inc. Chamber B								
<p><b>Company:</b> Samsung  <b>Project #:</b> 15I19748  <b>Date:</b> 1/7/2015  <b>Test Engineer:</b> R. Alegre  <b>Configuration:</b> EUT Only  <b>Mode:</b> HSDPA B2</p>								
<p><b>Test Equipment:</b>            Receiving: Horn T345, and Chamber B SMA Cables            Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse</p>								
Band								
Band 2								
HSDPA								
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	9.33	V	0.9	7.9	16.28	33.0	-16.7	
1852.40	13.15	H	0.9	7.9	20.10	33.0	-12.9	
Mid Ch								
1880.00	9.16	V	0.9	7.9	16.11	33.0	-16.9	
1880.00	13.05	H	0.9	7.9	20.00	33.0	-13.0	
High Ch								
1907.60	9.83	V	0.9	7.9	16.78	33.0	-16.2	
1907.60	13.14	H	0.9	7.9	20.09	33.0	-12.9	
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								

		High Frequency Substitution Measurement UL Verification Services, Inc. Chamber B							
		<b>Company:</b> Samsung <b>Project #:</b> 15I19748 <b>Date:</b> 1/7/2015 <b>Test Engineer:</b> R. Alegre <b>Configuration:</b> EUT Only <b>Mode:</b> Rel99 B2							
		<b>Test Equipment:</b> <b>Receiving:</b> Horn T345, and Chamber B SMA Cables <b>Substitution:</b> Horn T59 Substitution, 4ft SMA Cable Warehouse							
Band									
Band 2									
REL99									
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	9.83	V	0.9	7.9	16.78	33.0	-16.2		
1852.40	14.17	H	0.9	7.9	21.12	33.0	-11.9		
Mid Ch									
1880.00	9.54	V	0.9	7.9	16.49	33.0	-16.5		
1880.00	13.87	H	0.9	7.9	20.82	33.0	-12.2		
High Ch									
1907.60	9.75	V	0.9	7.9	16.70	33.0	-16.3		
1907.60	13.74	H	0.9	7.9	20.69	33.0	-12.3		
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm									

## 12.2. 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

### 12.2.1. SPURIOUS RADIATION PLOTS

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company:		Samsung								
Project #:		14I19012								
Date:		10/02/14								
Test Engineer:		R. Alegre								
Configuration:		X-Pos EUT w/ AC Charger + HS								
Mode:		GPRS 1900								
Chamber		Pre-amplifer		Filter		Limit				
3m Chamber		T34 8449B		Filter 1		Part 24				
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
GSM	Low Ch, 1850.2MHz									
	3.700	-9.2	V	3.0	35.4	1.0	-43.6	-13.0	-30.6	
	5.551	-14.4	V	3.0	34.7	1.0	-48.1	-13.0	-35.1	
1900	7.401	-13.2	V	3.0	34.9	1.0	-47.1	-13.0	-34.1	
	3.700	-7.1	H	3.0	35.4	1.0	-41.5	-13.0	-28.5	
	5.551	-15.5	H	3.0	34.7	1.0	-49.2	-13.0	-36.2	
GPRS	7.401	-12.0	H	3.0	34.9	1.0	-45.9	-13.0	-32.9	
	Mid Ch, 1880.0MHz									
	3.760	-15.5	V	3.0	35.3	1.0	-49.9	-13.0	-36.9	
	5.640	-14.1	V	3.0	34.7	1.0	-47.9	-13.0	-34.9	
	7.520	-13.6	V	3.0	34.9	1.0	-47.5	-13.0	-34.5	
	3.760	-10.0	H	3.0	35.3	1.0	-44.3	-13.0	-31.3	
	5.640	-15.4	H	3.0	34.7	1.0	-49.1	-13.0	-36.1	
	7.520	-12.0	H	3.0	34.9	1.0	-45.9	-13.0	-32.9	
High Ch, 1909.8MHz										
	3.820	-15.0	V	3.0	35.3	1.0	-49.2	-13.0	-36.2	
	5.729	-13.0	V	3.0	34.7	1.0	-46.8	-13.0	-33.8	
	7.639	-12.8	V	3.0	35.0	1.0	-46.7	-13.0	-33.7	
	3.820	-19.2	H	3.0	35.3	1.0	-53.4	-13.0	-40.4	
	5.729	-15.2	H	3.0	34.7	1.0	-48.9	-13.0	-35.9	
	7.639	-11.7	H	3.0	35.0	1.0	-45.6	-13.0	-32.6	
Rev. 03.03.09										
Note: No other emissions were detected above the system noise floor.										

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

**Company:** Samsung  
**Project #:** 14I19012  
**Date:** 10/02/14  
**Test Engineer:** R. Alegre  
**Configuration:** EUT w/ AC Adaptor + HS, y-pos  
**Mode:** GPRS850 Harm

**Chamber**

3m Chamber

**Pre-amplifier**

T34 8449B

**Filter**

Filter 1

**Limit**

Part 22

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.2MHz									
GSM	1.648	-11.2	V	3.0	37.4	1.0	-47.6	-13.0	-34.6	
	2.473	-20.8	V	3.0	36.4	1.0	-56.2	-13.0	-43.2	
	3.297	-9.5	V	3.0	35.8	1.0	-44.3	-13.0	-31.3	
850	1.648	-6.4	H	3.0	37.4	1.0	-42.8	-13.0	-29.8	
	2.473	-21.3	H	3.0	36.4	1.0	-56.7	-13.0	-43.7	
	3.297	-4.8	H	3.0	35.8	1.0	-39.6	-13.0	-26.6	
GPRS	Mid Ch, 836.6MHz									
	1.673	-12.5	V	3.0	37.3	1.0	-48.8	-13.0	-35.8	
	2.510	-22.5	V	3.0	36.4	1.0	-57.9	-13.0	-44.9	
	3.346	-11.5	V	3.0	35.8	1.0	-46.2	-13.0	-33.2	
	1.673	-8.7	H	3.0	37.3	1.0	-45.0	-13.0	-32.0	
	2.510	-22.0	H	3.0	36.4	1.0	-57.3	-13.0	-44.3	
	3.346	-14.2	H	3.0	35.8	1.0	-48.9	-13.0	-35.9	
	High Ch, 848.8MHz									
	1.698	-14.7	V	3.0	37.3	1.0	-51.0	-13.0	-38.0	
	2.547	-16.9	V	3.0	36.3	1.0	-52.2	-13.0	-39.2	
	3.395	-9.4	V	3.0	35.7	1.0	-44.1	-13.0	-31.1	
	1.698	-11.4	H	3.0	37.3	1.0	-47.7	-13.0	-34.7	
2.547	-17.7	H	3.0	36.3	1.0	-53.1	-13.0	-40.1		
3.395	-11.1	H	3.0	35.7	1.0	-45.8	-13.0	-32.8		

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

UL Verification Services Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b> Samsung <b>Project #:</b> 15I19748 <b>Date:</b> 01/07/15 <b>Test Engineer:</b> R. Alegre <b>Configuration:</b> EUT w/ AC Charger + HS <b>Mode:</b> HSDPA_B2									
<div style="border: 1px solid black; padding: 2px; display: inline-block; background-color: #e0f0ff;">Chamber</div> 5m Chamber B		<div style="border: 1px solid black; padding: 2px; display: inline-block; background-color: #e0f0ff;">Pre-amplifier</div> T34 8449B		<div style="border: 1px solid black; padding: 2px; display: inline-block; background-color: #e0f0ff;">Filter</div> Filter 1		<div style="border: 1px solid black; padding: 2px; display: inline-block; background-color: #e0f0ff;">Limit</div> Part 24			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Band									
Band 2									
HSDPA									
Low Ch, 1852.4MHz									
3.705	-15.0	V	3.0	35.4	1.0	-49.4	-13.0	-36.4	
5.557	-12.3	V	3.0	34.7	1.0	-46.0	-13.0	-33.0	
7.410	-9.2	V	3.0	34.9	1.0	-43.1	-13.0	-30.1	
3.705	-14.8	H	3.0	35.4	1.0	-49.2	-13.0	-36.2	
5.557	-10.4	H	3.0	34.7	1.0	-44.1	-13.0	-31.1	
7.410	-8.5	H	3.0	34.9	1.0	-42.4	-13.0	-29.4	
Mid Ch, 1880MHz									
3.760	-13.4	V	3.0	35.3	1.0	-47.7	-13.0	-34.7	
5.640	-11.0	V	3.0	34.7	1.0	-44.8	-13.0	-31.8	
7.520	-11.0	V	3.0	34.9	1.0	-44.9	-13.0	-31.9	
3.760	-13.3	H	3.0	35.3	1.0	-47.6	-13.0	-34.6	
5.640	-10.4	H	3.0	34.7	1.0	-44.2	-13.0	-31.2	
7.520	-10.0	H	3.0	34.9	1.0	-44.0	-13.0	-31.0	
High Ch, 1907.6MHz									
3.815	-15.4	V	3.0	35.3	1.0	-49.6	-13.0	-36.6	
5.723	-10.7	V	3.0	34.7	1.0	-44.5	-13.0	-31.5	
7.630	-7.4	V	3.0	34.9	1.0	-41.4	-13.0	-28.4	
3.815	-14.1	H	3.0	35.3	1.0	-48.4	-13.0	-35.4	
5.723	-10.1	H	3.0	34.7	1.0	-43.9	-13.0	-30.9	
7.630	-8.6	H	3.0	34.9	1.0	-42.5	-13.0	-29.5	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

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

**Company:** Samsung  
**Project #:** 15I19748  
**Date:** 01/07/15  
**Test Engineer:** R. Alegre  
**Configuration:** EUT w/ AC Charger + HS  
**Mode:** Rel99\_B2

Chamber

Pre-amplifier

Filter

Limit

5m Chamber B

T34 8449B

Filter 1

Part 24

	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Band	Low Ch, 1852.4MHz									
	3.705	-16.4	V	3.0	35.4	1.0	-50.8	-13.0	-37.8	
Band 2	5.557	-12.5	V	3.0	34.7	1.0	-46.2	-13.0	-33.2	
	7.410	-10.0	V	3.0	34.9	1.0	-44.0	-13.0	-31.0	
REL99	3.705	-14.8	H	3.0	35.4	1.0	-49.2	-13.0	-36.2	
	5.557	-8.1	H	3.0	34.7	1.0	-41.9	-13.0	-28.9	
	7.410	-8.5	H	3.0	34.9	1.0	-42.4	-13.0	-29.4	
	Mid Ch, 1880MHz									
	3.760	-13.2	V	3.0	35.3	1.0	-47.6	-13.0	-34.6	
	5.640	-11.2	V	3.0	34.7	1.0	-45.0	-13.0	-32.0	
	7.520	-9.3	V	3.0	34.9	1.0	-43.2	-13.0	-30.2	
	3.760	-14.5	H	3.0	35.3	1.0	-48.8	-13.0	-35.8	
	5.640	-9.7	H	3.0	34.7	1.0	-43.4	-13.0	-30.4	
	7.520	-7.4	H	3.0	34.9	1.0	-41.4	-13.0	-28.4	
	High Ch, 1907.6MHz									
	3.815	-13.5	V	3.0	35.3	1.0	-47.8	-13.0	-34.8	
	5.723	-10.1	V	3.0	34.7	1.0	-43.9	-13.0	-30.9	
	7.630	-5.0	V	3.0	34.9	1.0	-39.0	-13.0	-26.0	
	3.815	-13.6	H	3.0	35.3	1.0	-47.9	-13.0	-34.9	
	5.723	-9.3	H	3.0	34.7	1.0	-43.0	-13.0	-30.0	
	7.630	-8.3	H	3.0	34.9	1.0	-42.3	-13.0	-29.3	

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