



**FCC CFR47 PART 22 SUBPART H  
FCC CFR47 PART 24 SUBPART E  
CERTIFICATION TEST REPORT**

**FOR**

**GSM/UMTS BAR PHONE WITH 802.11BGN, BLUETOOTH AND BLE**

**MODEL NUMBER: GT-S7270L**

**FCC ID: A3LGTS7270L**

**REPORT NUMBER: 13I15068-5**

**ISSUE DATE: MAY 22, 2013**

*Prepared for*

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**NVLAP LAB CODE 200065-0**

Revision History

Rev.	Issue Date	Revisions	Revised By
---	5/22/13	Initial Issue	

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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/UMTS BAR PHONE WITH 802.11BGN, BT & BLE

**MODEL:** GT-S7270L

**SERIAL NUMBER:** 1624865

**DATE TESTED:** MAY 02 TO 08, 2013

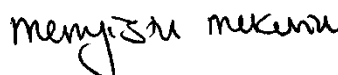
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H AND 24E	PASS

UL CCS 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 CCS 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS 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 2, 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 Benicia Street, Fremont, California, USA.

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

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

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

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a bar-style cell phone featuring 802.11 bgn 1x1+ BT4.0 +basic rates +EDR+GSM/WCDMA850/1900MHz.

### 5.2. MAXIMUM OUTPUT POWER

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

Part 22/24 Band					
Frequency range (MHz)	Modulation	Conducted		ERP/EIRP	
		dBm	mW	dBm	mW
824.2 - 848.8	GPRS	32.50	1778.3	28.45	699.8
1850.2-1909.8		29.82	959.4	29.03	799.8

Part 22/24 Bands					
Frequency range (MHz)	Modulation	Conducted		ERP/EIRP	
		dBm	mW	dBm	mW
826.4 - 846.6	REL 99	24.00	251.2	22.27	168.7
1852.4 - 1907.6		23.47	222.3	25.57	360.6
826.4 - 846.6	HSUPA	26.92	492.0	23.65	231.7
1852.4 - 1907.6		27.29	535.8	26.73	471.0

### 5.3. SOFTWARE AND FIRMWARE

The EUT is linked with Agilent 8960 Communication Test Set.

### 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral antenna with a maximum peak gain as follow:

Frequency (MHz)	Gain (dBi)
850MHz	-2.11
1900MHz	-1.13

## 5.5. WORST-CASE CONFIGURATION AND MODE

Based on the investigation results, the highest peak power and enhanced data rate is the worst-case scenario for all measurements.

Worst-case modes: GPRS, UMTS WCDMA and UMTS HSUPA Sub-test 3.

Since the EUT is a portable device, to determine the worst/highest emissions, the X, Y, and Z orientations of the EUT with respect to the turntable and the worst among them with headset and an AC adapter were investigated. After the investigations, Y-Orientation without AC adapter and headset was the worst case for cell bands, and Z-Orientation for PCS bands.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	ETA0U10JBS	FK-118-A	N/A
Headset	Samsung	N/A	N/A	N/A

### I/O CABLES (CONDUCTED SETUP)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	RF	1	Antenna Port	Un-Shielded	0.2m	NA
2	RF In/Out	1	Call Box	Un-Shielded	0.5m	NA
3	RF Out	1	Spectrum Analyzer	None	None	NA

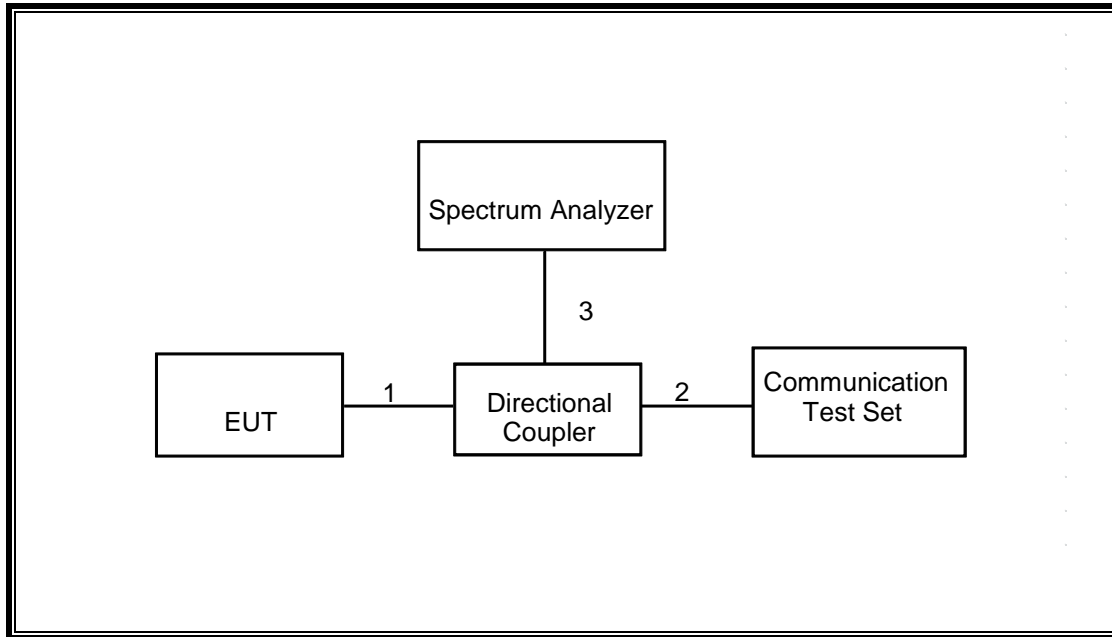
### I/O CABLES (RADIATED SETUP)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	DC	1	DC	Un-shielded	1m	NA
2	Jack	1	Earphone	Un-shielded	1.2m	NA

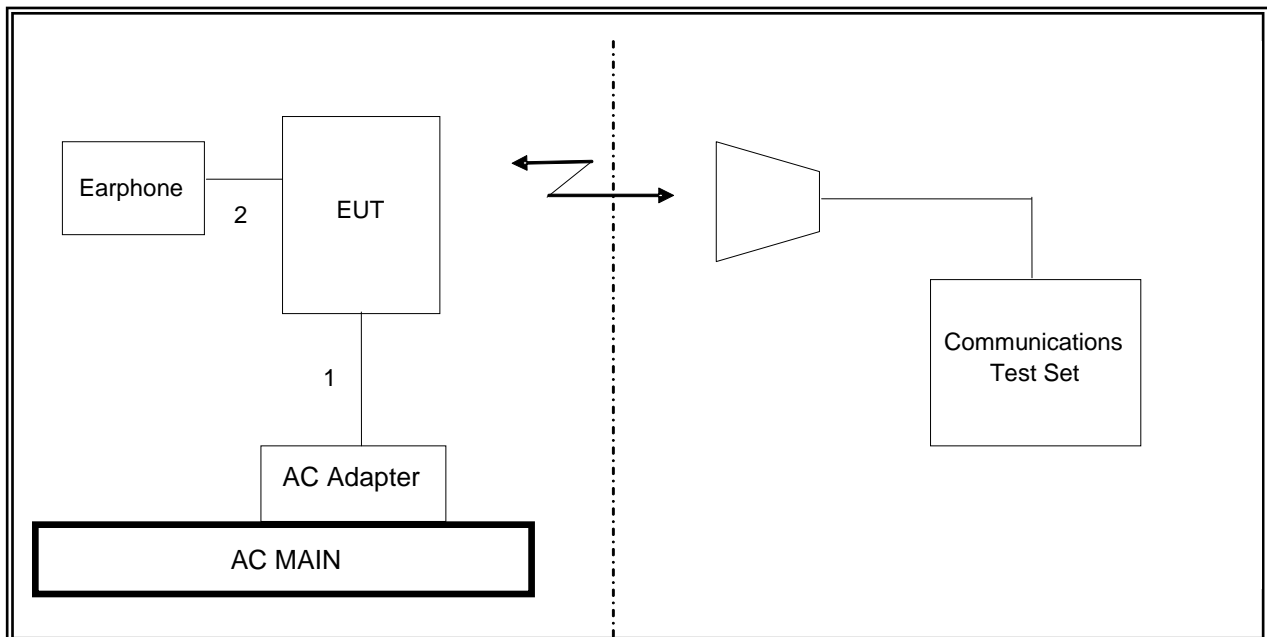
**TEST SETUP**

The EUT is a stand-alone device. A link is established between the EUT and the communications test set.

**SETUP DIAGRAM FOR RF CONDUCTED TESTS**



**SETUP DIAGRAM FOR RF RADIATED TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Horn, 18 GHz	EMCO	3115	C00872	10/25/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	12/11/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01179	02/26/14
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/13
Communication Test Set	Agilent / HP	E5515C	C01086	06/20/13
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/14
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02689	CNR
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01016	08/14/13
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	07/06/13
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121C DB4	C00993	02/14/14

## 7. RF POWER OUTPUT VERIFICATION

### 7.1. GSM-GPRS MODE

#### TEST PROCEDURE

The transmitter output was connected to the input terminal of Directional Coupler via calibrated coaxial cable. The output coupling terminal of the Directional Coupler was directly connected to a spectrum analyzer while the output through terminal connected to the communication test set via calibrated coaxial cable.

The output power was measured with the spectrum analyzer at the low, middle and high channel in each band.

- Set the spectrum analyzer span wide enough or greater than the modulated signal BW.
- Set a spectrum analyzer at peak detection mode with VBW  $\geq$  RBW  $\geq$  26dB BW, typically 3MHz.
- Set a marker to point the corresponding peak value.

#### GPRS/EGPRS

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

> 27 dBm for EGPRS 850/900

> 30 dBm for GPRS1800/1900

> 26 dBm for EGPRS1800/1900

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 > CS1 (GPRS) and MCS5 (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

**RESULTS**

**CELL**

	Ch.	f (MHz)	1 time slots	2 time slots	3 time slots	4 time slots
			Peak	Peak	Peak	Peak
GPRS	128	824.2	<b>32.5</b>	29.94	28.94	26.91
	190	836.6	32.4	29.93	28.93	26.92
	251	848.8	32.3	29.88	28.88	26.86

**PCS**

	Ch.	f (MHz)	1 time slots	2 time slots	3 time slots	4 time slots
			Peak	Peak	Peak	Peak
GPRS	512	1850.2	29.50	26.40	25.38	23.29
	661	1880.0	29.73	26.70	25.69	23.69
	810	1909.8	<b>29.82</b>	26.84	25.86	23.91

## 7.2. UMTS REL 99 MODE

### TEST PROCEDURE

The transmitter output was connected to the input terminal of Directional Coupler via calibrated coaxial cable. The output coupling terminal of the Directional Coupler was directly connected to a spectrum analyzer while the output through terminal connected to the communication test set via calibrated coaxial cable.

The output power was measured with the spectrum analyzer at the low, middle and high channel in each band.

- Set the spectrum analyzer span wide enough or greater than the modulated signal BW.
- Set a spectrum analyzer at peak detection mode with VBW  $\geq$  RBW  $\geq$  26dB BW, typically 5MHz.
- Set a marker to point the corresponding peak value.

### 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

**RESULTS****UMTS REL99**

Band	UL Ch	DL Ch	Frequency	Avg Conducted output power (dBm)	Peak Conducted output power (dBm)
UMTS 850	4132	4357	826.4	21.82	<b>24.00</b>
	4180	4405	836.0	21.72	23.77
	4230	4455	846.0	21.92	23.96
	9262	9662	1858.4	21.68	23.43
	9400	9800	1880	21.75	<b>23.47</b>
	9538	9938	1907.6	21.80	23.27

### 7.3. HSDPA REL 5 (HSDPA)

The following 4 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121.

Summary of 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	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			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

### Result

Band	Subtest	UL Ch	DL Ch	Frequency	Avg Conducted output power (dBm)	Peak Conducted output power (dBm)
UMTS850/UM TS1900 (Band V / II)	1*	4132	4357	826.4	21.84	25.69
		4180	4405	836.0	21.73	25.49
		4230	4455	846.0	21.92	25.72
		9262	9662	1852.4	22.07	25.79
		9400	9800	1880	22.05	26.00
		9538	9938	1907.6	22.05	25.66
	2	4132	4357	826.4	21.55	26.34
		4180	4405	836.0	21.41	26.04
		4230	4455	846.0	21.67	26.49
		9262	9662	1852.4	21.80	26.67
		9400	9800	1880	21.84	26.56
		9538	9938	1907.6	21.84	26.16
	3	4132	4357	826.4	21.35	<b>26.54</b>
		4180	4405	836.0	21.23	26.39
		4230	4455	846.0	21.51	26.62
		9262	9662	1852.4	21.57	26.64
		9400	9800	1880	21.53	26.60
		9538	9938	1907.6	21.49	<b>26.92</b>
	4	4132	4357	826.4	21.28	26.50
		4180	4405	836.0	21.19	26.33
		4230	4455	846.0	21.40	26.61
		9262	9662	1852.4	21.54	26.62
		9400	9800	1880	21.52	26.68
		9538	9938	1907.6	21.47	26.70

Note \* Maximum output power levels that are possible for all subtests reported.

### 7.4. HSPA REL 6 (HSDPA & HSUPA)

#### TEST PROCEDURE

The following summary of these settings are illustrated below:

	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				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	$\beta_c$	11/15	6/15	15/15	2/15	15/15
	$\beta_d$	15/15	15/15	9/15	15/15	0
	$\beta_{ec}$	209/225	12/15	30/15	2/15	5/15
	$\beta_c/\beta_d$	11/15	6/15	15/9	2/15	-
	$\beta_{hs}$	22/15	12/15	30/15	4/15	5/15
$\beta_{ed}$	1309/225	94/75	47/15 47/15	56/75	47/15	
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				
	A <sub>hs</sub> = $\beta_{hs}/\beta_c$	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	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	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

**RESULTS**

Band	Subtest	UL Ch	DL Ch	Frequency	Avg Conducted output power (dBm)	Peak Conducted output power (dBm)
UMTS850 / UMTS1900 (Band V / II)	1	4132	4357	826.4	20.26	25.65
		4180	4408	836.6	20.18	25.37
		4230	4458	846.6	20.38	25.79
		9262	9662	1852.4	20.54	25.71
		9400	9800	1880	20.50	25.68
		9538	9938	1907.6	20.50	25.45
	2	4132	4357	826.4	20.74	26.09
		4180	4408	836.6	20.59	25.94
		4230	4458	846.6	20.89	26.28
		9262	9662	1852.4	21.03	26.26
		9400	9800	1880	21.05	26.21
		9538	9938	1907.6	21.01	25.81
	3	4132	4357	826.4	20.84	25.57
		4180	4408	836.6	20.70	25.14
		4230	4458	846.6	20.94	25.60
		9262	9662	1852.4	21.01	26.08
		9400	9800	1880	20.96	26.17
		9538	9938	1907.6	20.99	25.76
	4*	4132	4357	826.4	21.76	26.32
		4180	4408	836.6	21.63	25.73
		4230	4458	846.6	21.89	26.18
		9262	9662	1852.4	21.92	26.26
		9400	9800	1880	21.97	26.12
		9538	9938	1907.6	21.96	26.27
	5	4132	4357	826.4	21.85	26.87
		4180	4408	836.6	20.94	26.46
		4230	4458	846.6	21.15	26.92
		9262	9662	1852.4	21.33	27.29
		9400	9800	1880.8	21.22	27.04
		9538	9938	1907.6	21.10	26.35

Note \* Maximum output power levels that are possible for all subtests reported.

## 8. CONDUCTED TEST RESULTS

### 8.1. 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.

#### MODES TESTED

- GSM-GPRS
- UMTS-REL 99/HSUPA

#### RESULTS

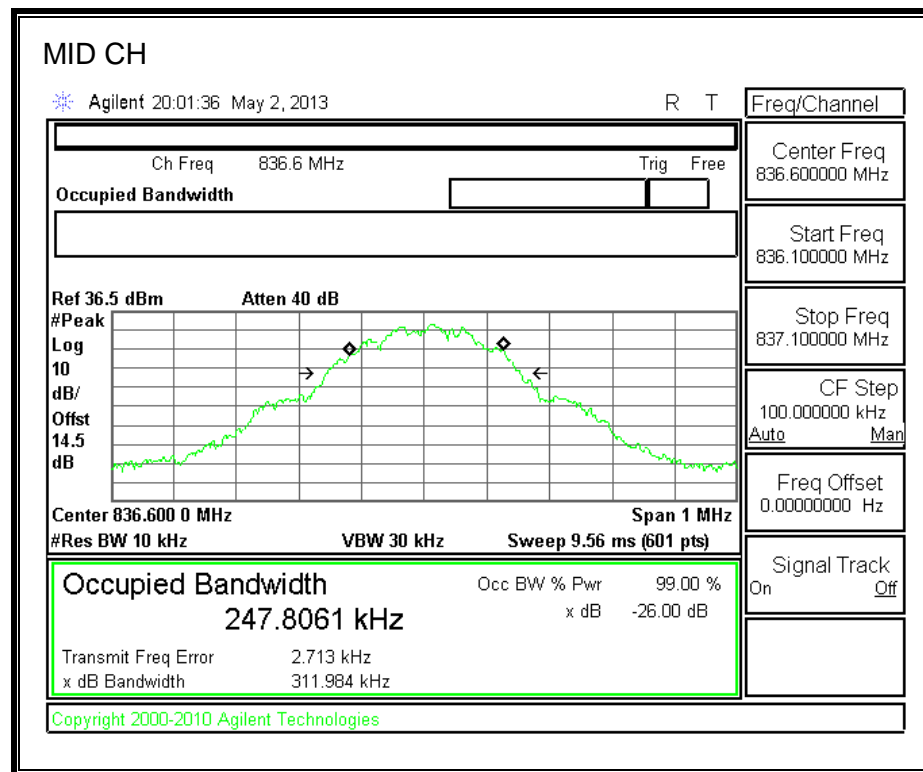
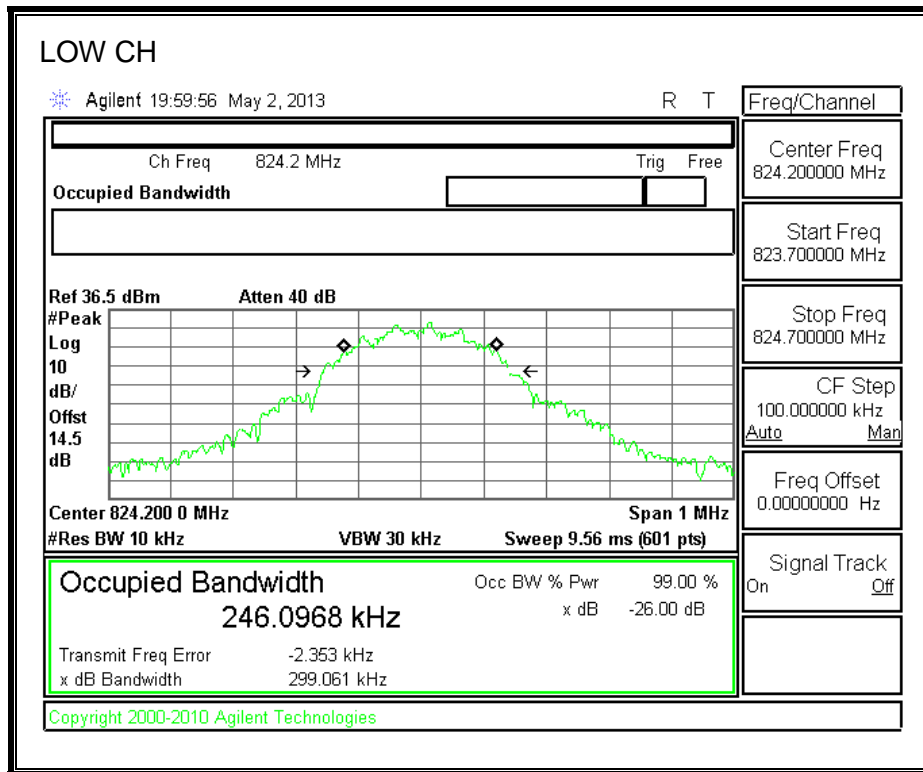
Band	Mode	Channel	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
Cellular	GPRS	128	824.20	246.0968	299.061
		190	836.60	247.8061	311.984
		251	848.80	247.4847	306.537
PCS		512	1850.2	256.4298	319.281
		661	1880.0	248.5877	310.872
		810	1909.8	247.6439	312.593

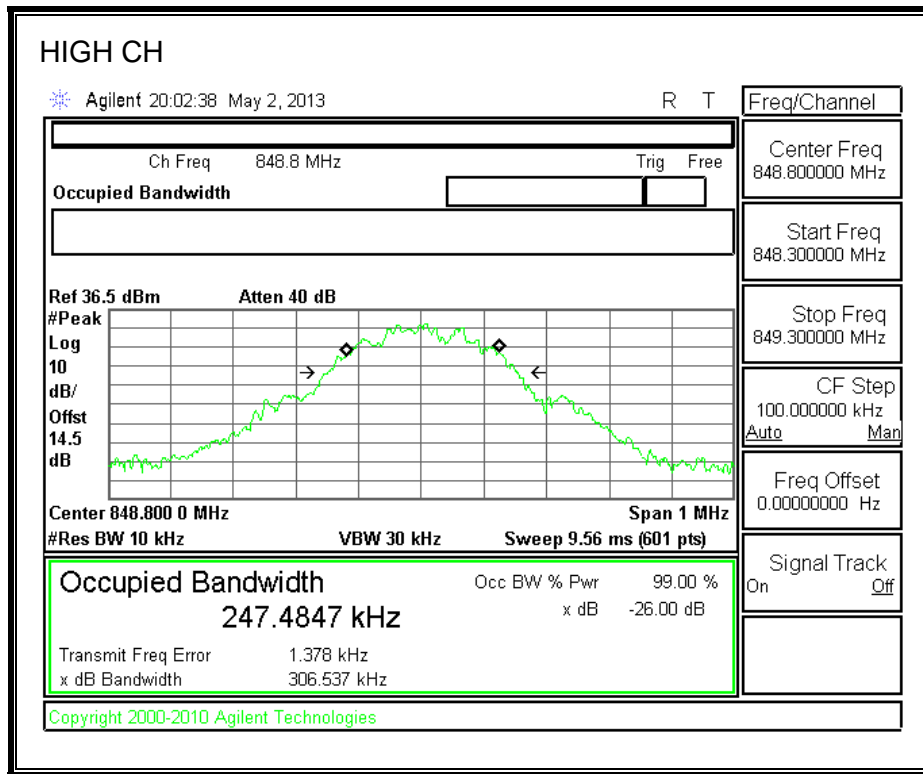
Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Cellular	UMTS REL 99	4357	826.4	4.1286	4.681
		4408	836.6	4.1441	4.751
		4458	846.6	4.1147	4.665
PCS		9662	1852.4	4.1462	4.735
		9800	1880	4.1103	4.682
		9938	1907.6	4.1633	4.760

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Cellular	UMTS HSUPA	4357	826.4	4.1028	4.717
		4408	836.6	4.1950	4.689
		4458	846.6	4.1120	4.656
PCS		9662	1852.4	4.1431	4.658
		9800	1880	4.1113	4.623
		9938	1907.6	4.1822	4.673

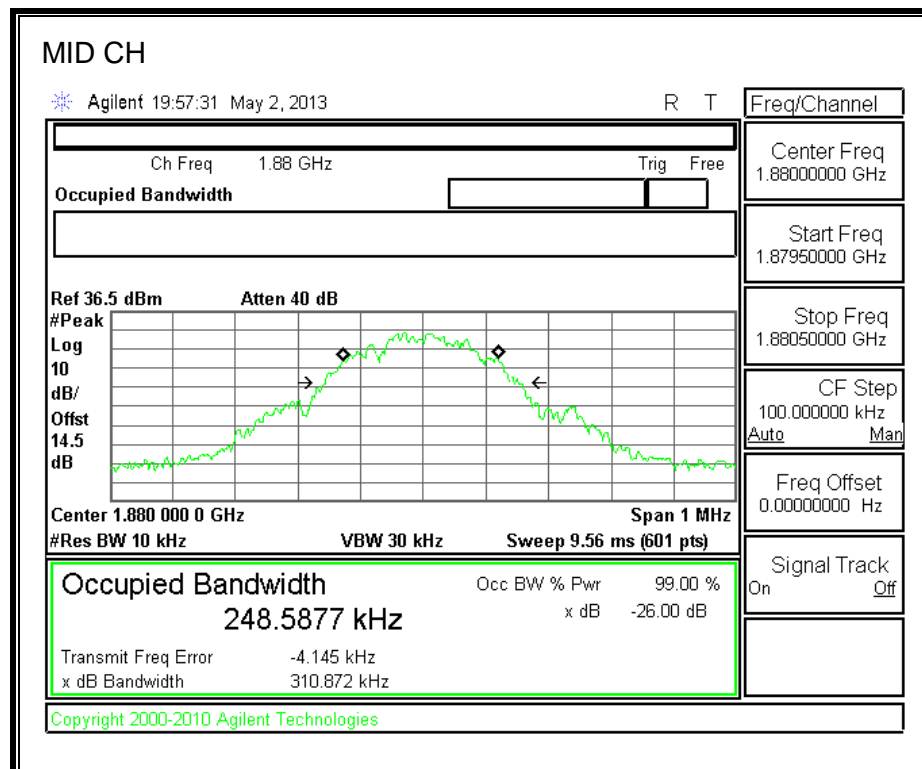
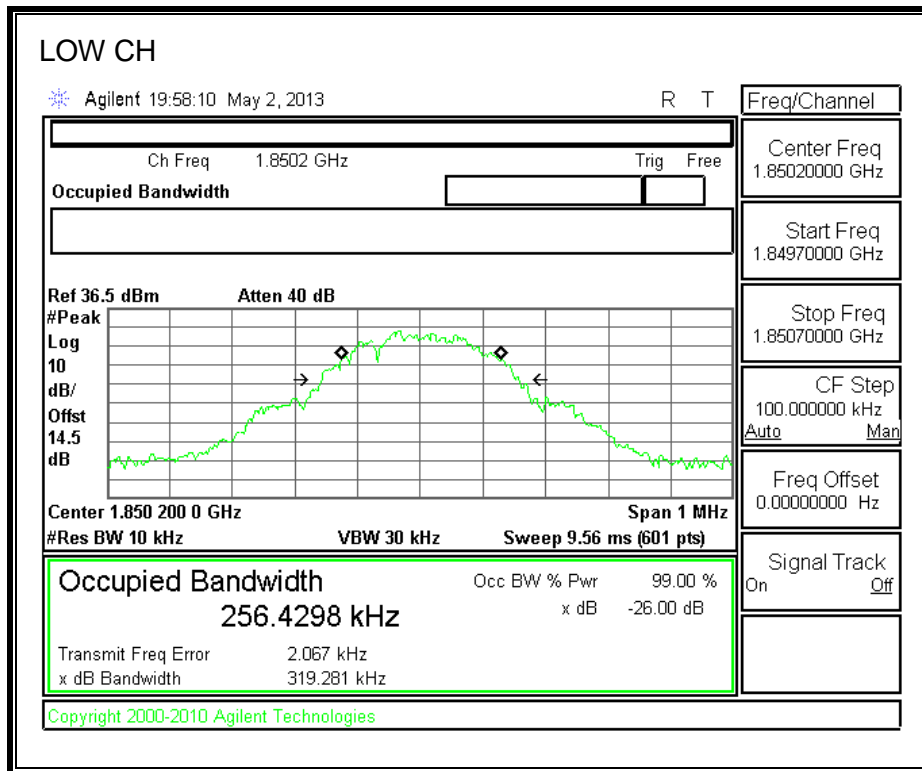
### 8.1.1. GSM-GPRS MODE

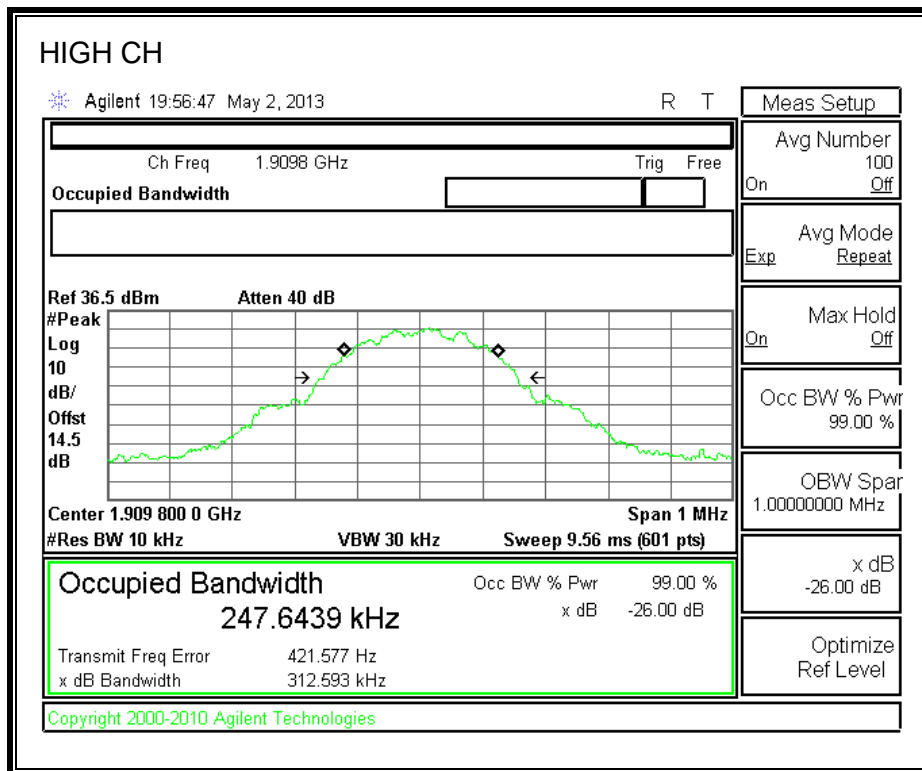
#### CELL BAND





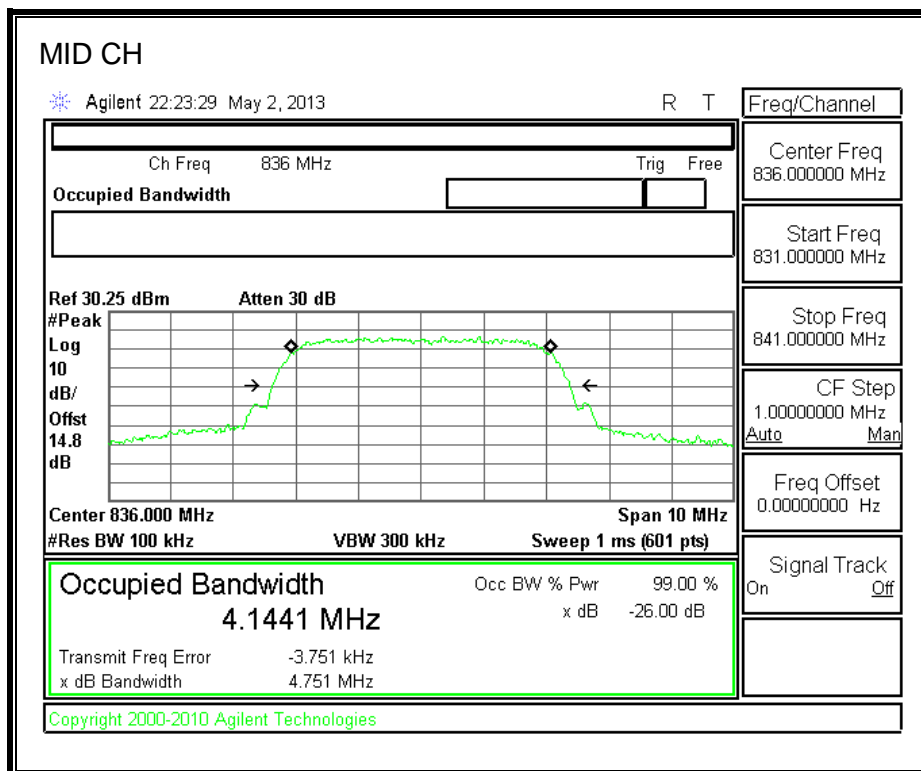
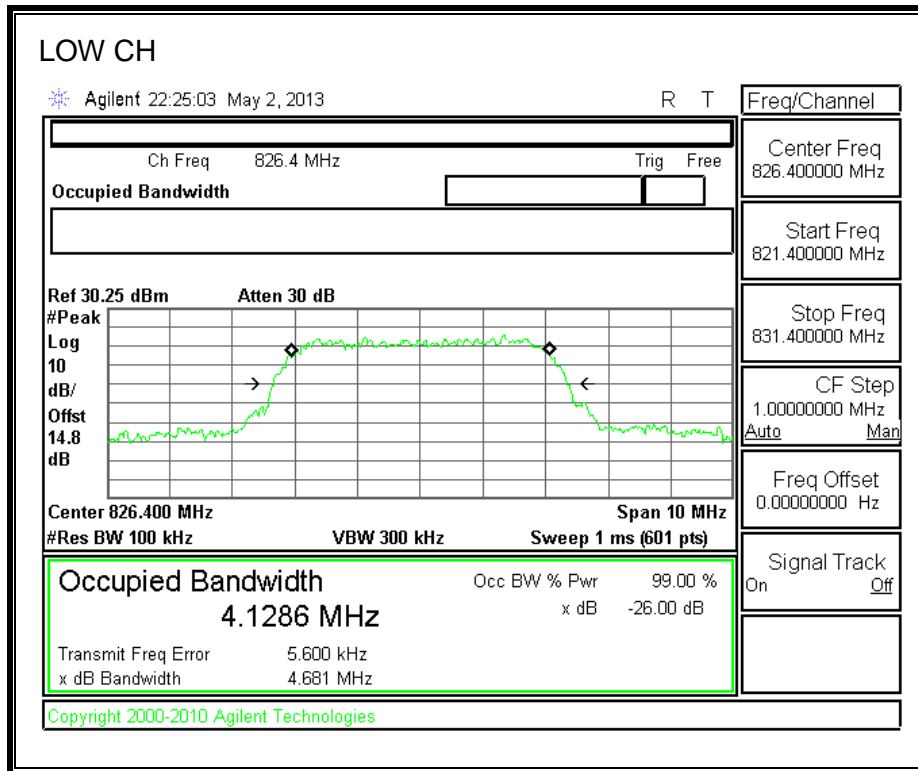
**PCS Band**

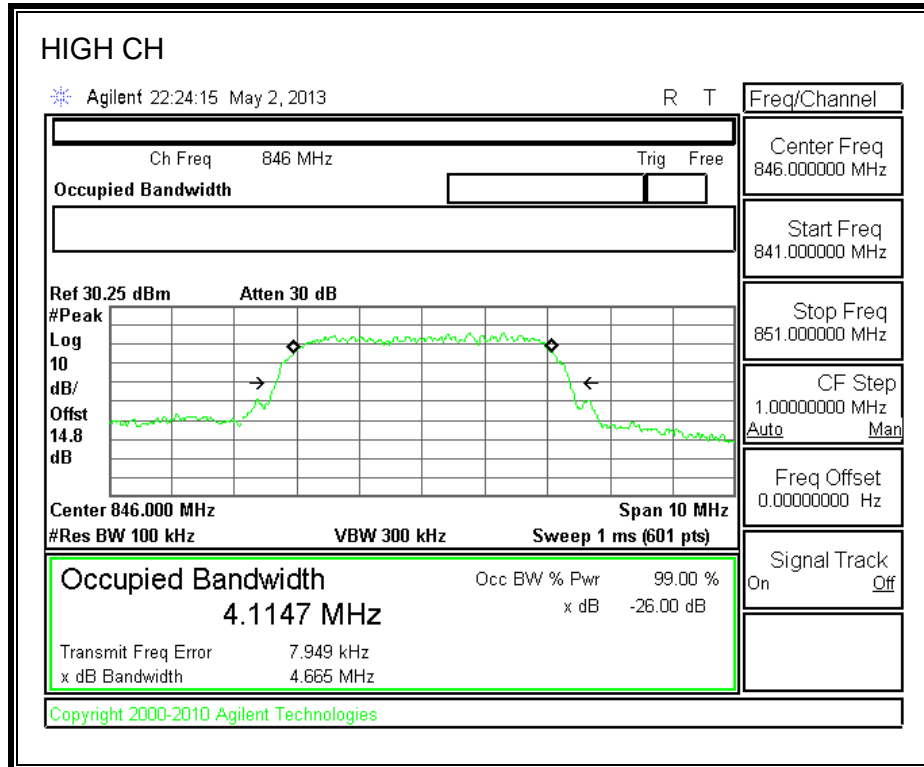




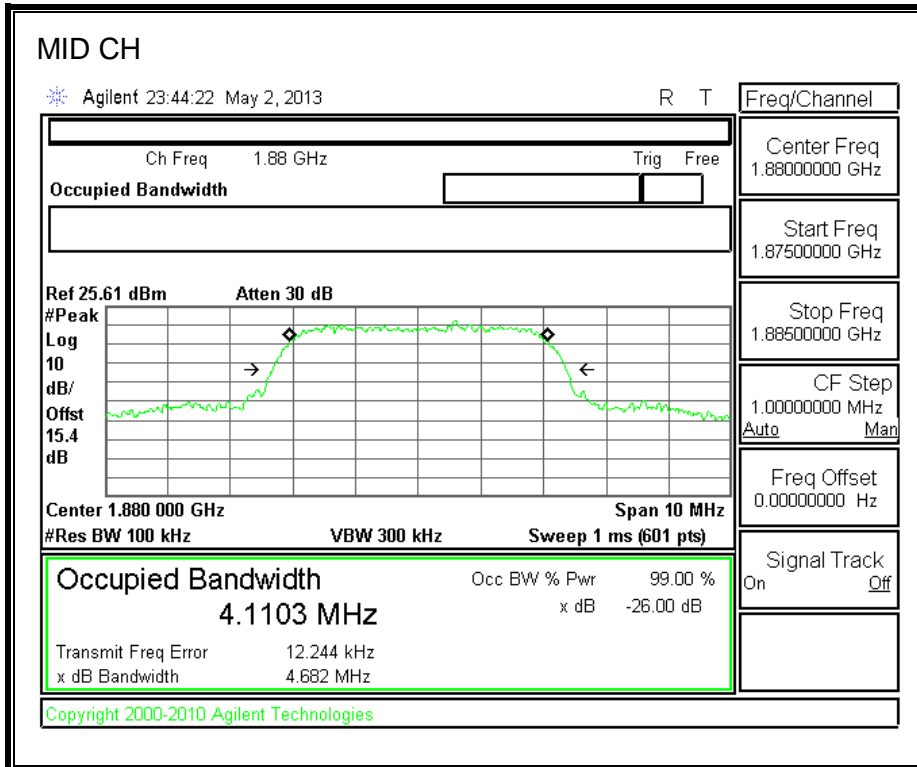
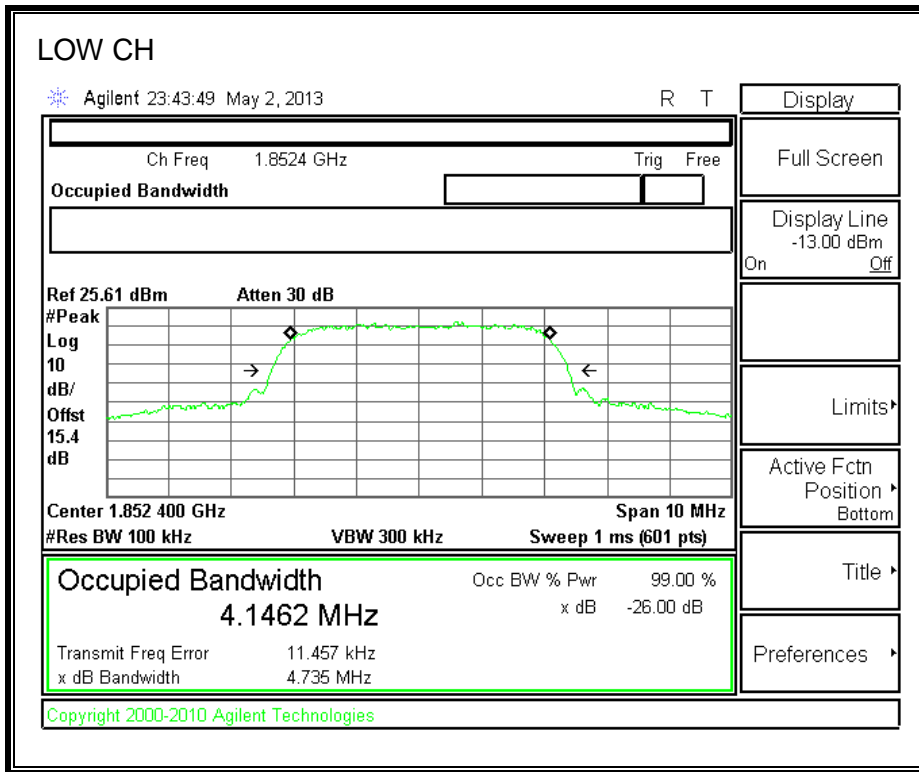
### 8.1.2. UMTS REL 99 MODE

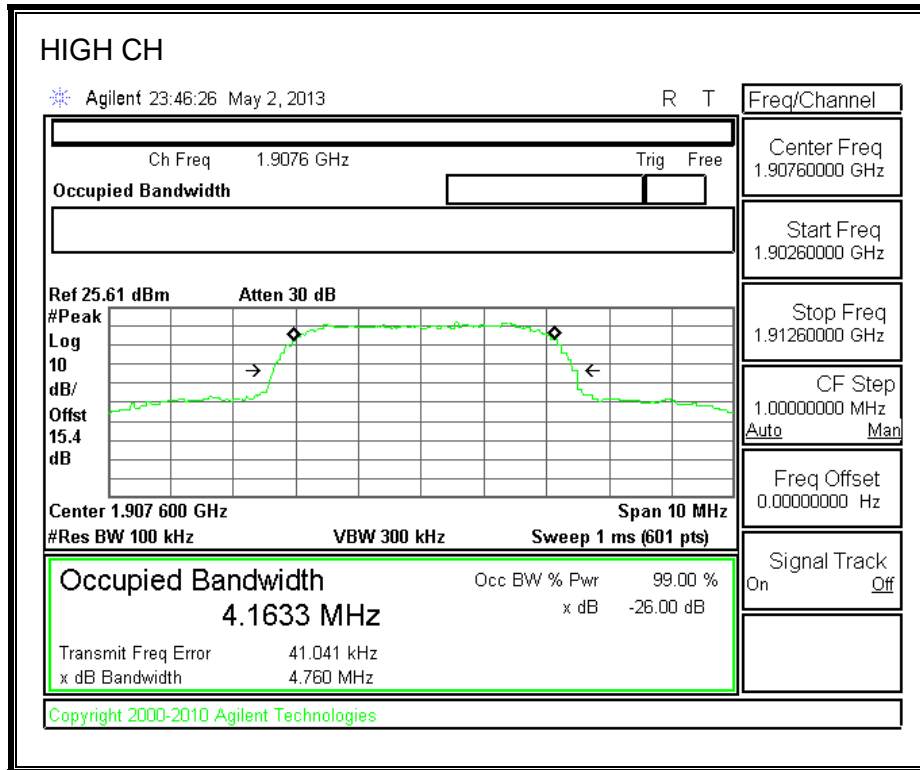
#### CELL Band





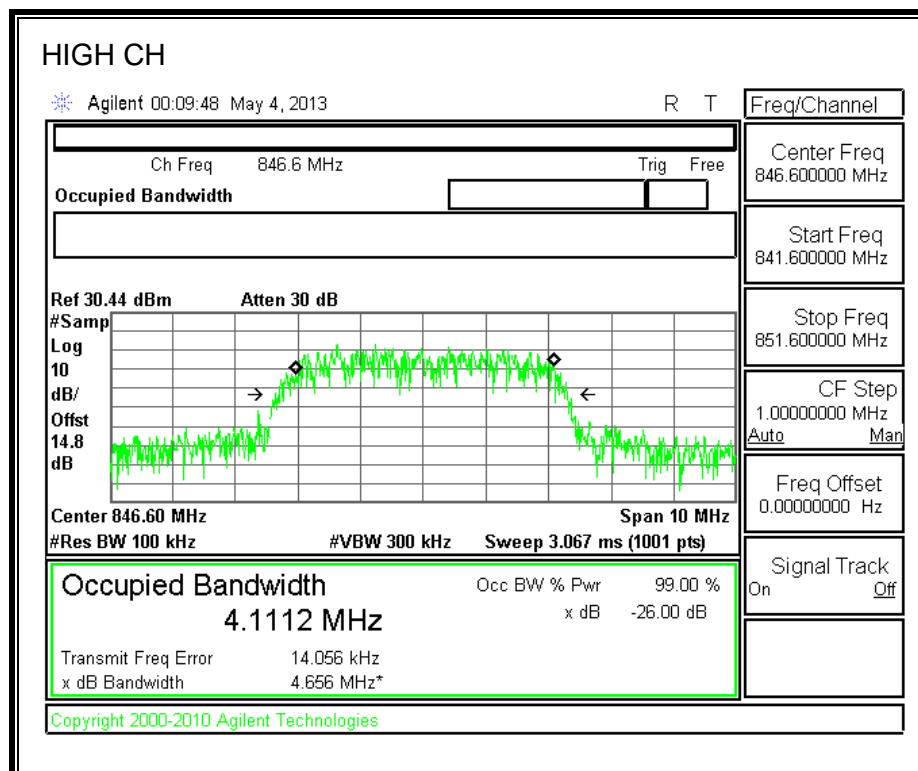
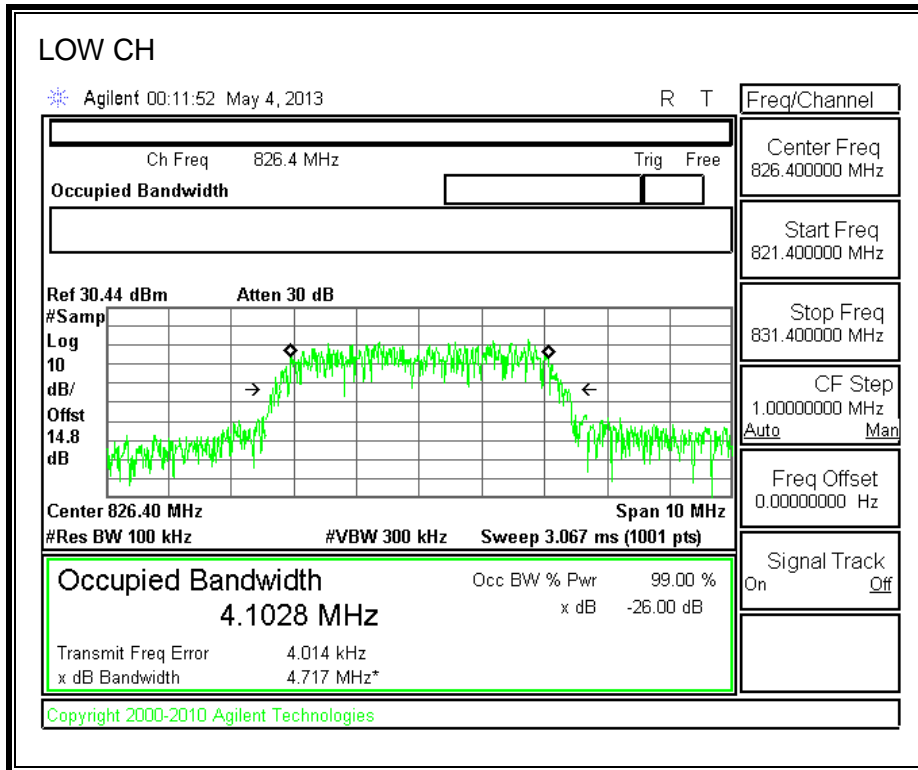
**PCS Band**



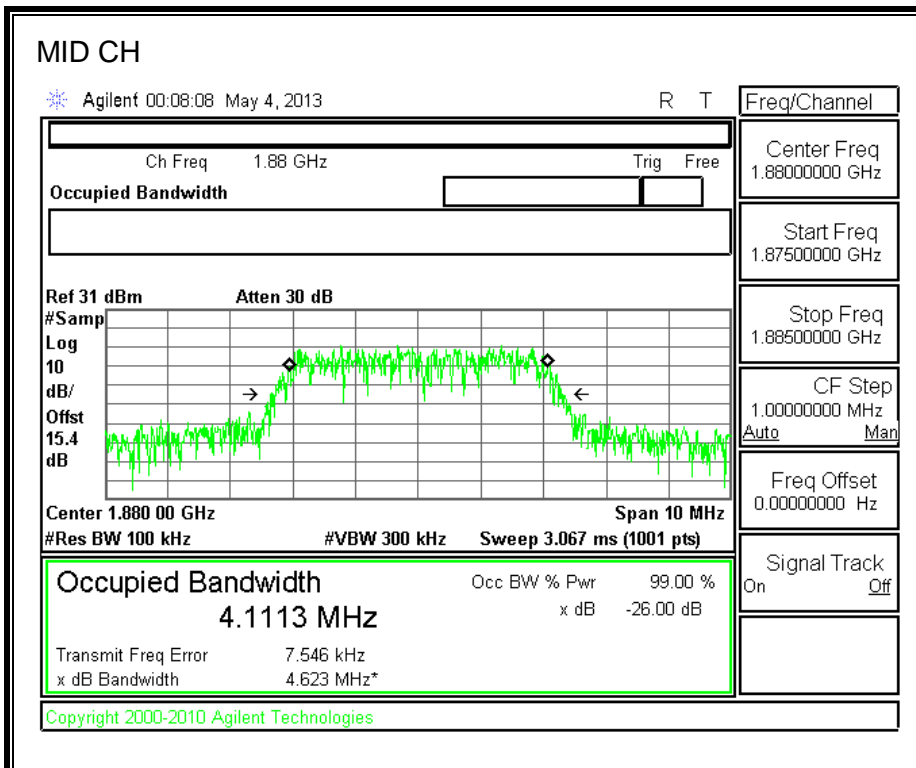
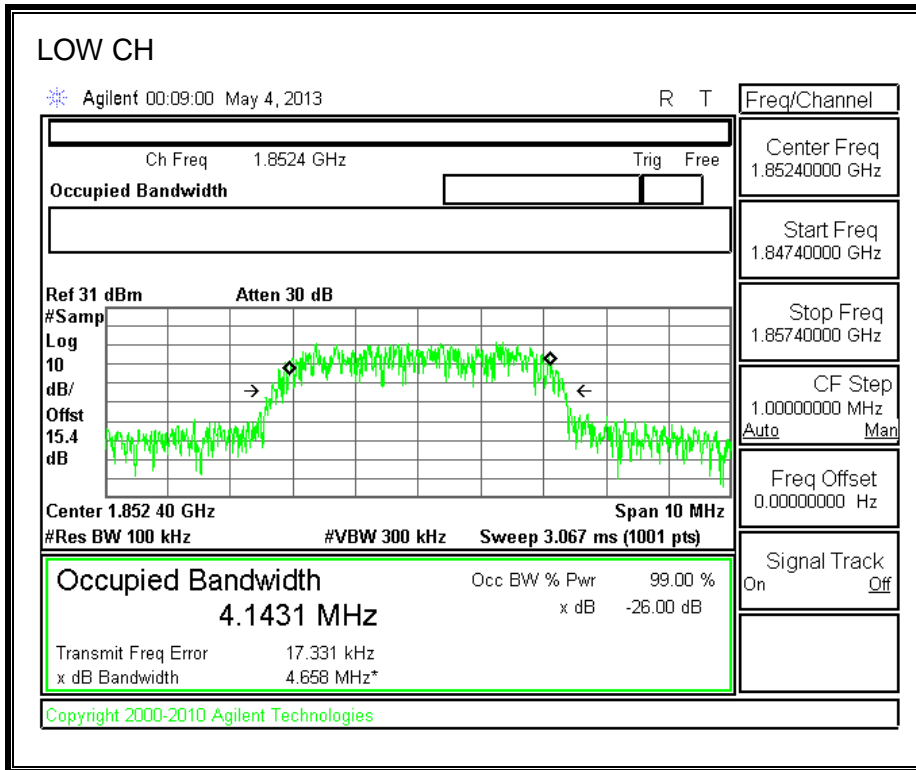


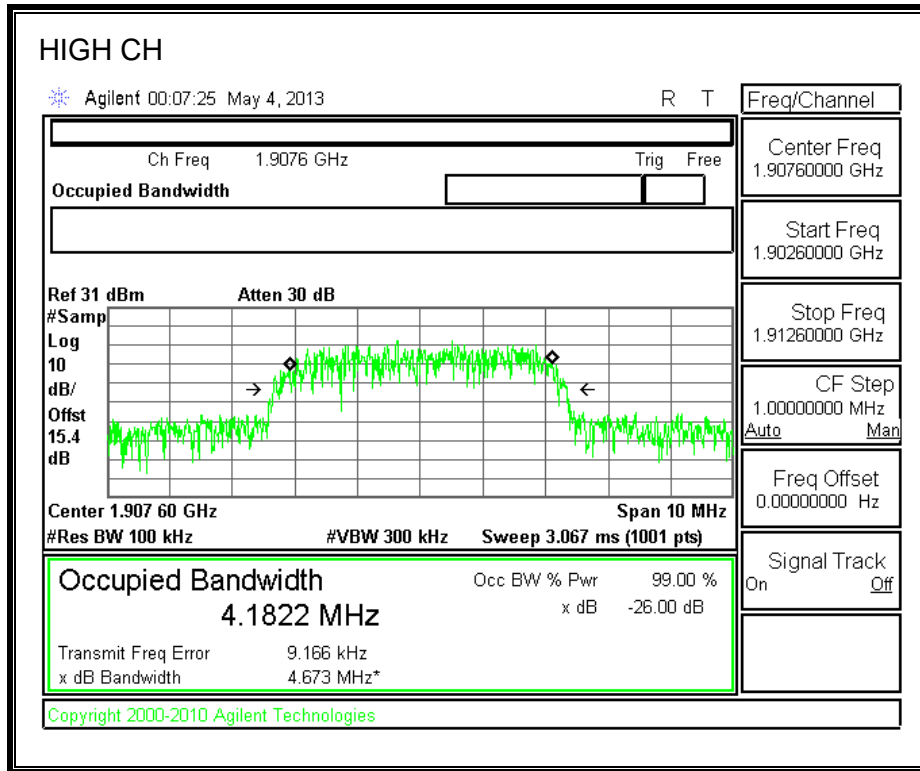
### 8.1.3. UMTS HSUPA MODE

#### CELL Band



**PCS Band**





## **8.2. BAND EDGE**

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

FCC: §22.359, 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**

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

For each band edge measurement:

- Set the spectrum analyzer span to include the block edge frequency (824, 848, 1850, 1910MHz)
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

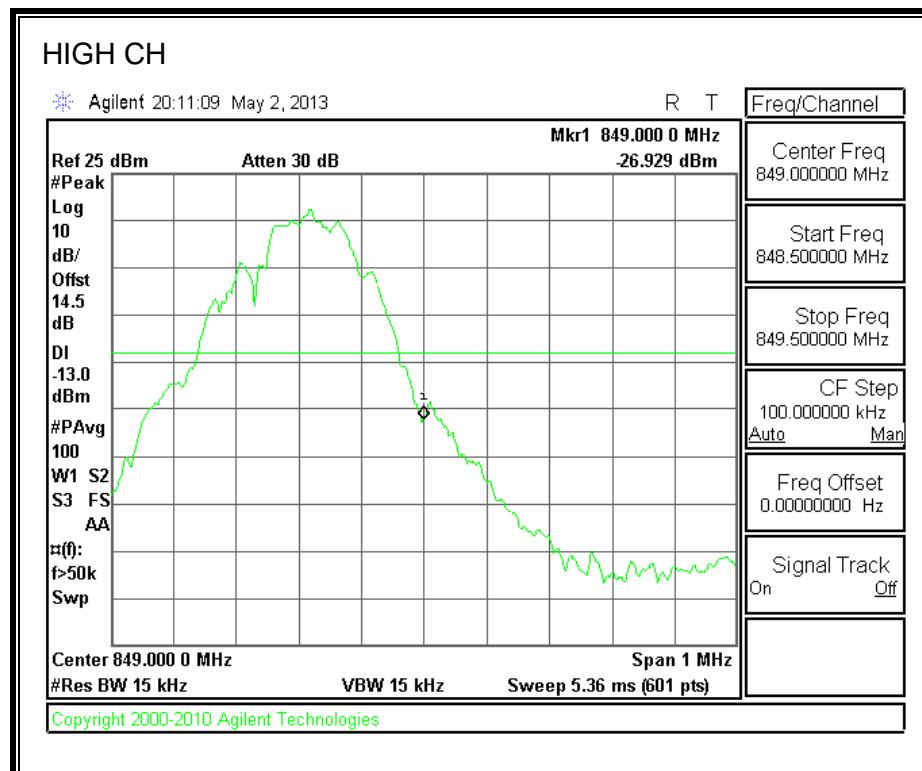
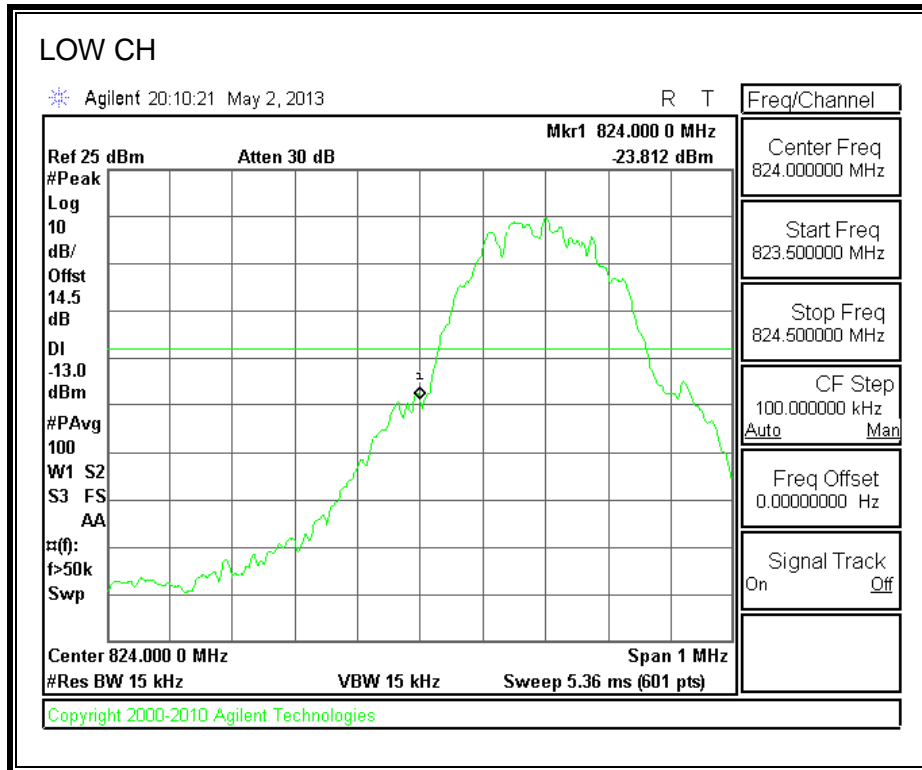
### **MODES TESTED**

- GSM-GPRS
- UMTS-REL 99/HSUPA

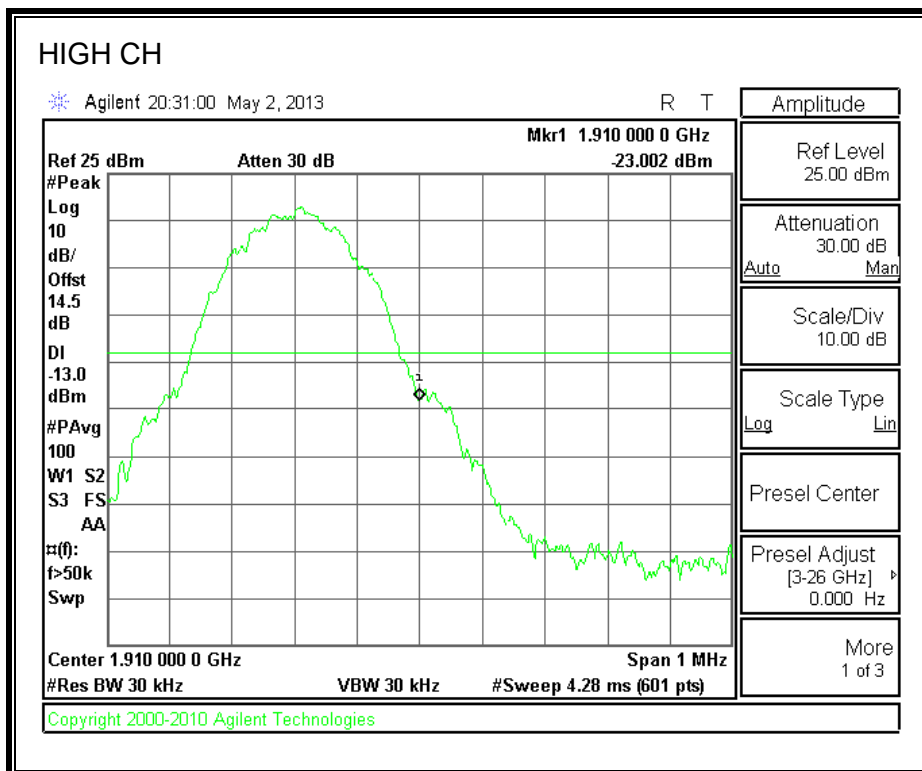
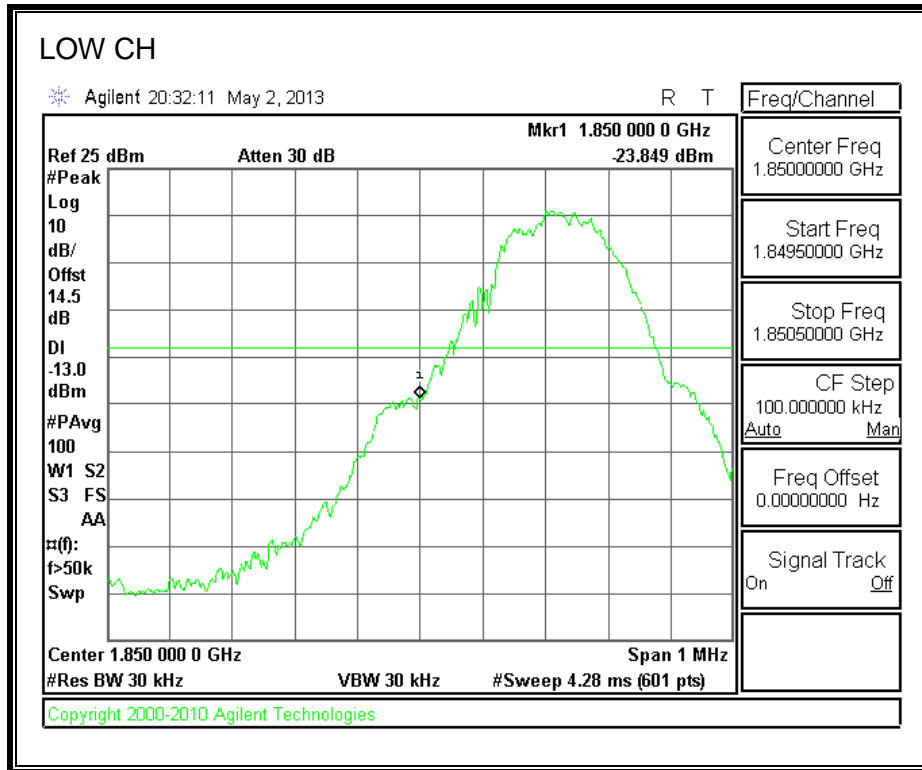
### **RESULTS**

### 8.2.1. GSM-GPRS MODE

#### CELL BAND

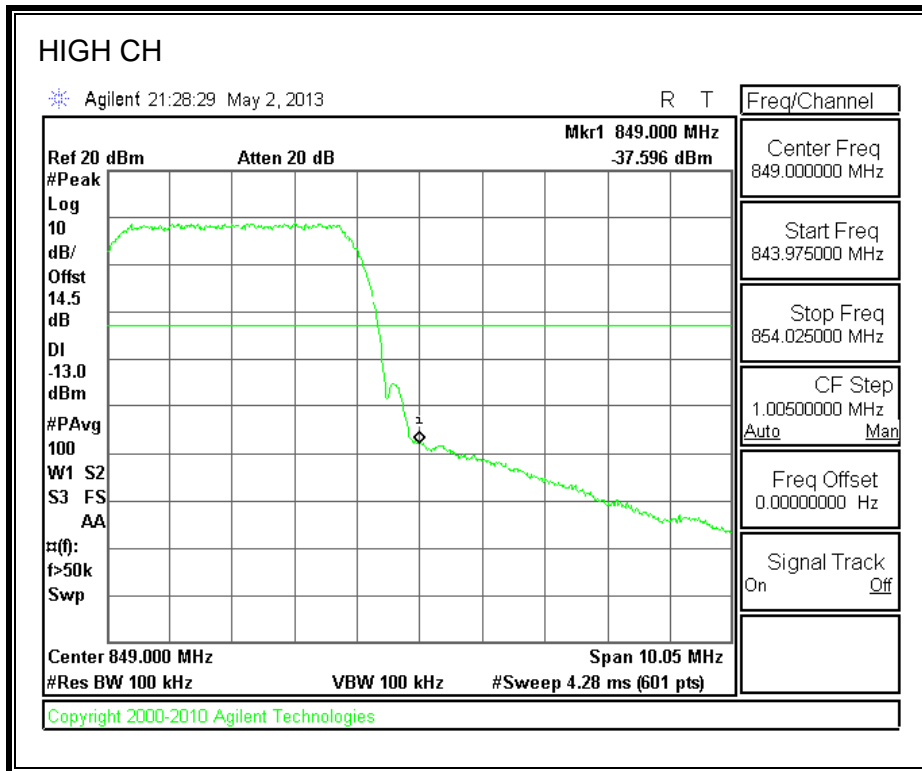
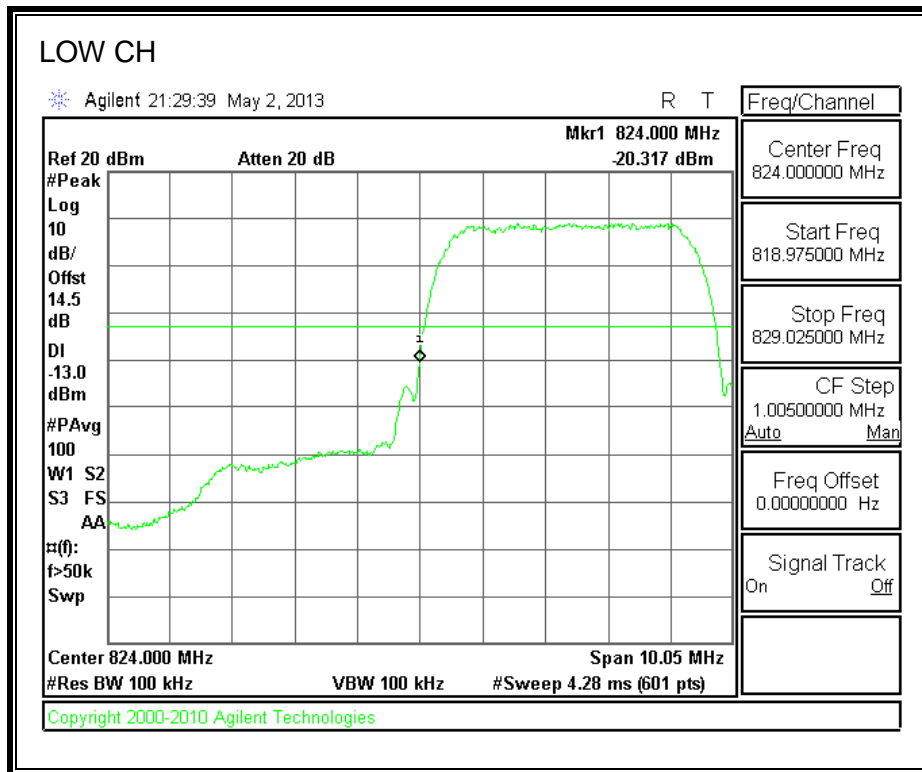


**PCS BAND**

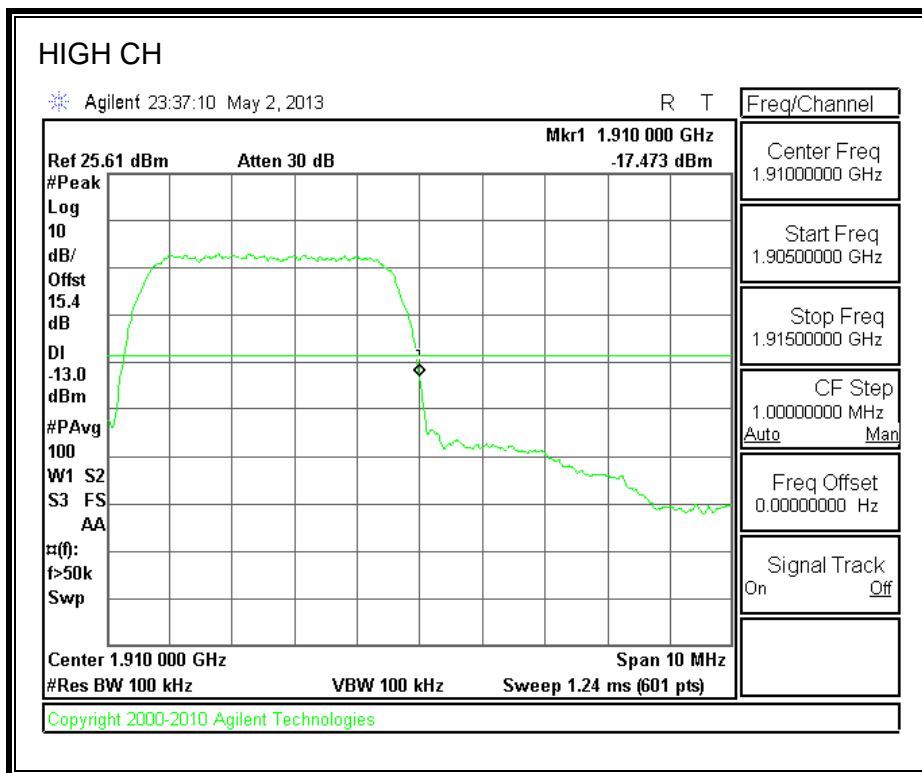
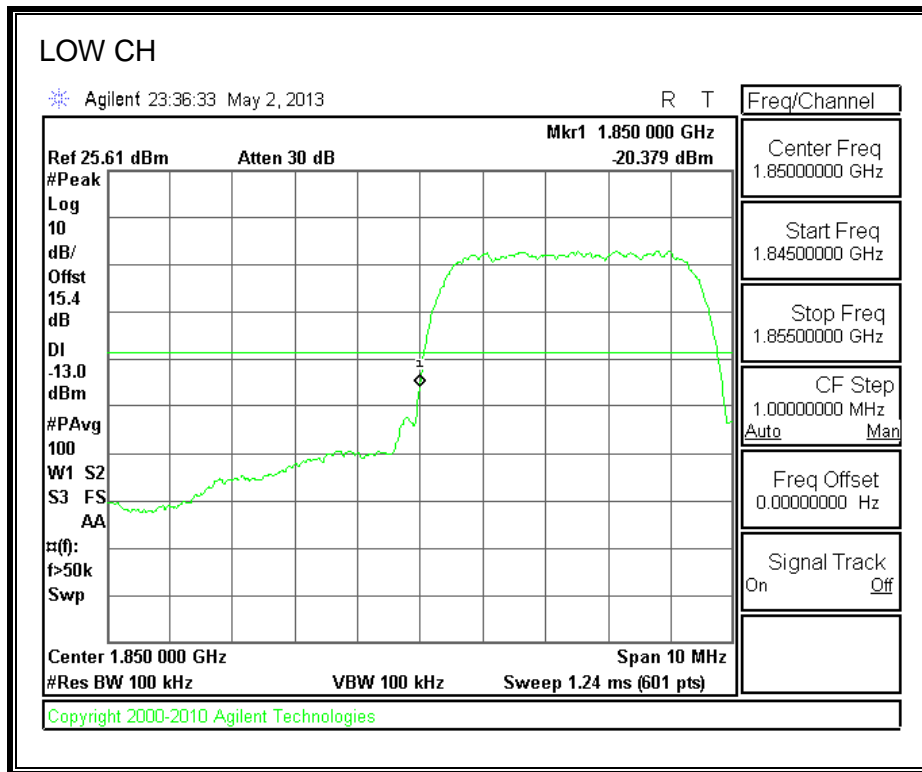


**8.2.2. UMTS REL 99 MODE**

**CELL BAND**

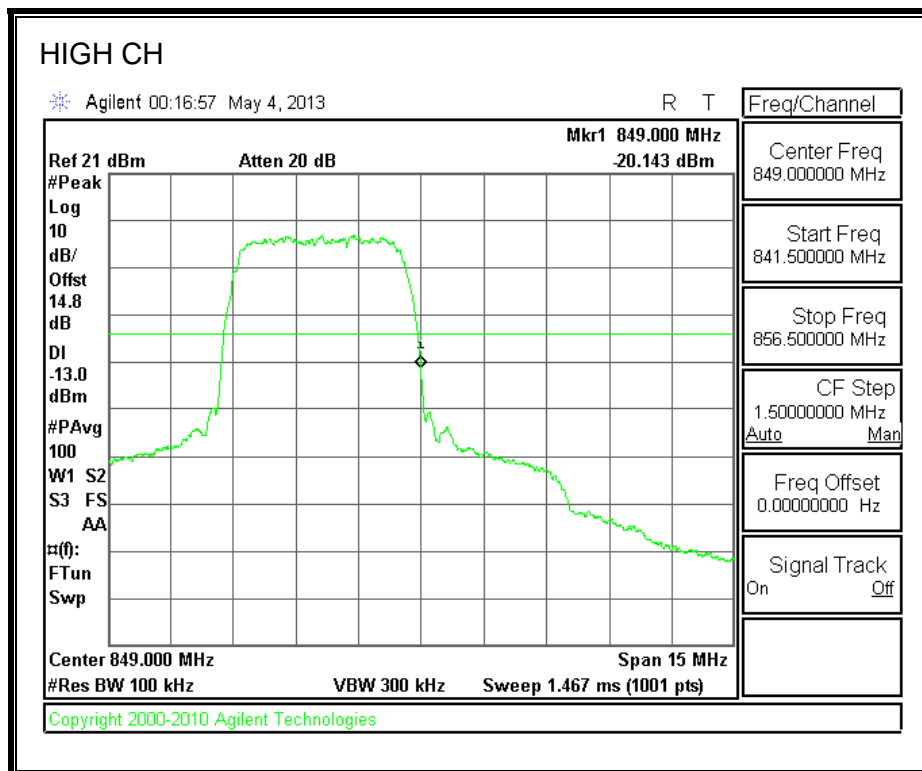
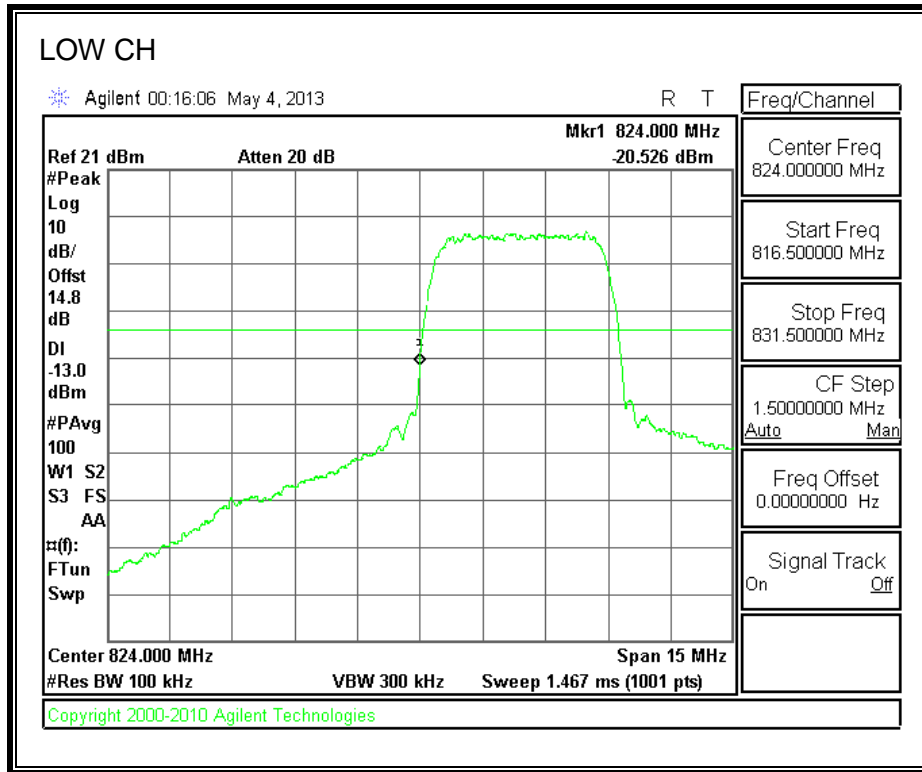


**PCS BAND**

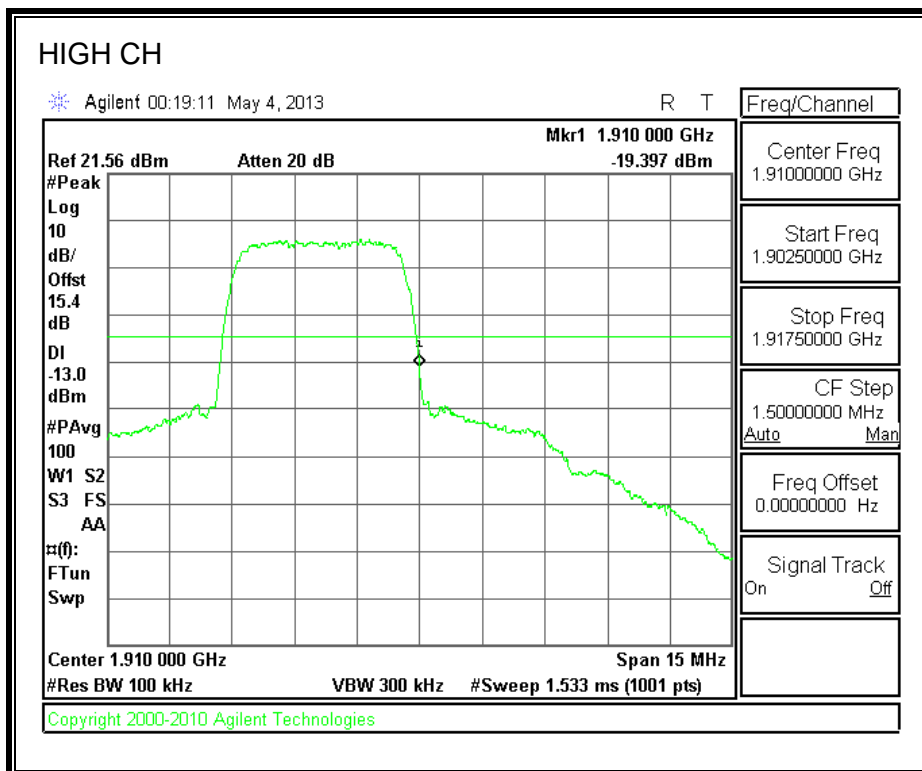
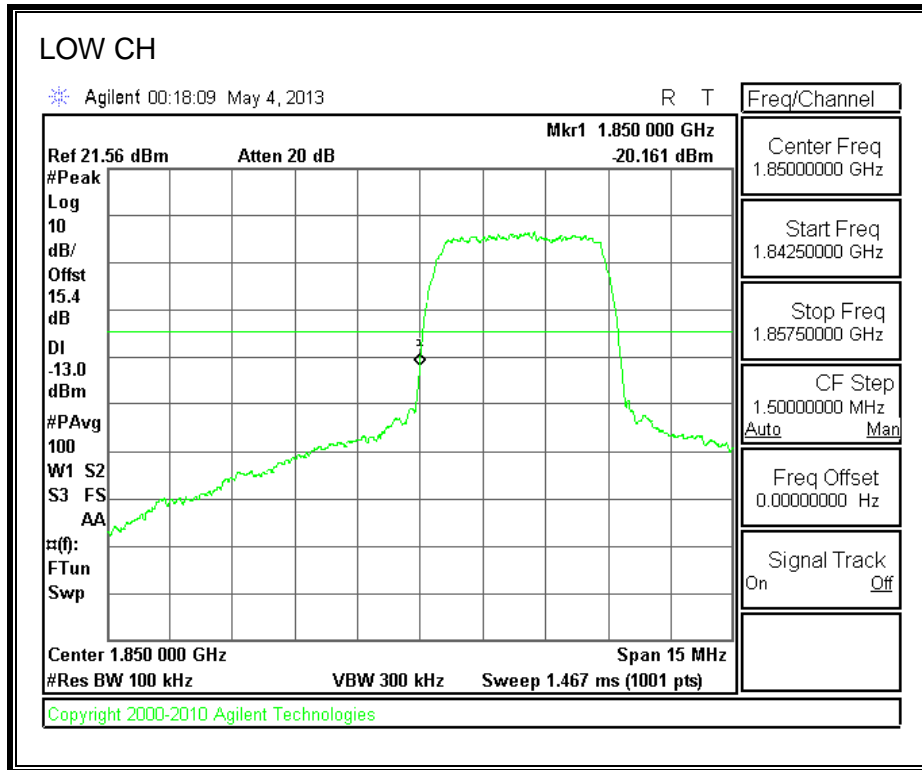


### 8.2.3. UMTS HSUPA MODE

#### CELL BAND



**PCS BAND**



### **8.3. OUT OF BAND EMISSIONS**

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

FCC: §2.1051, §22.901, §22.917, §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**

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

For each out of band emissions measurement:

- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

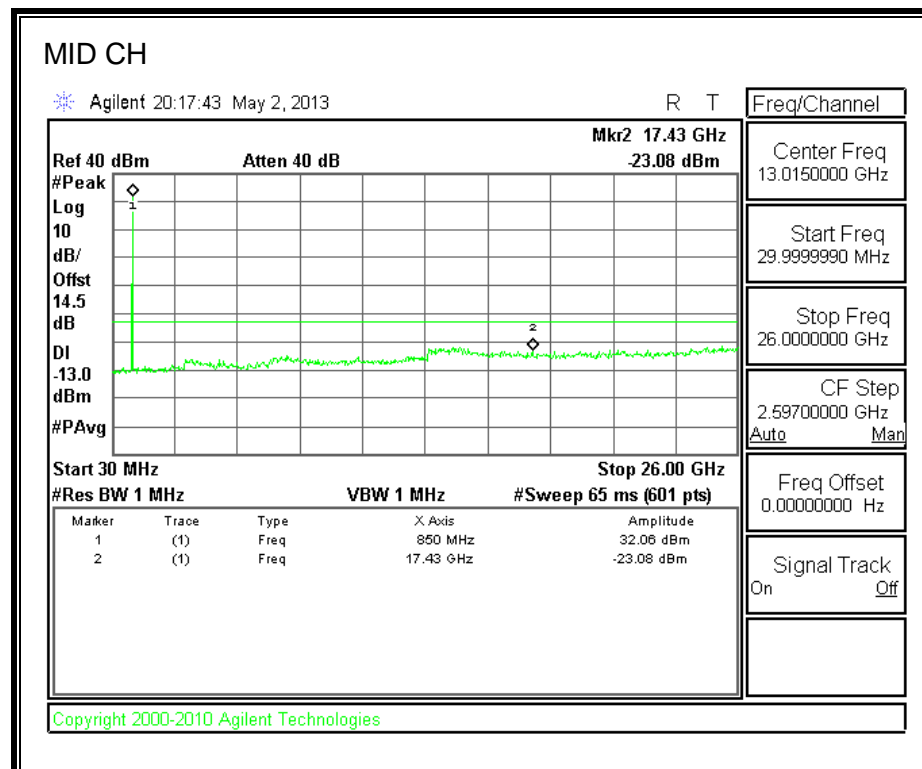
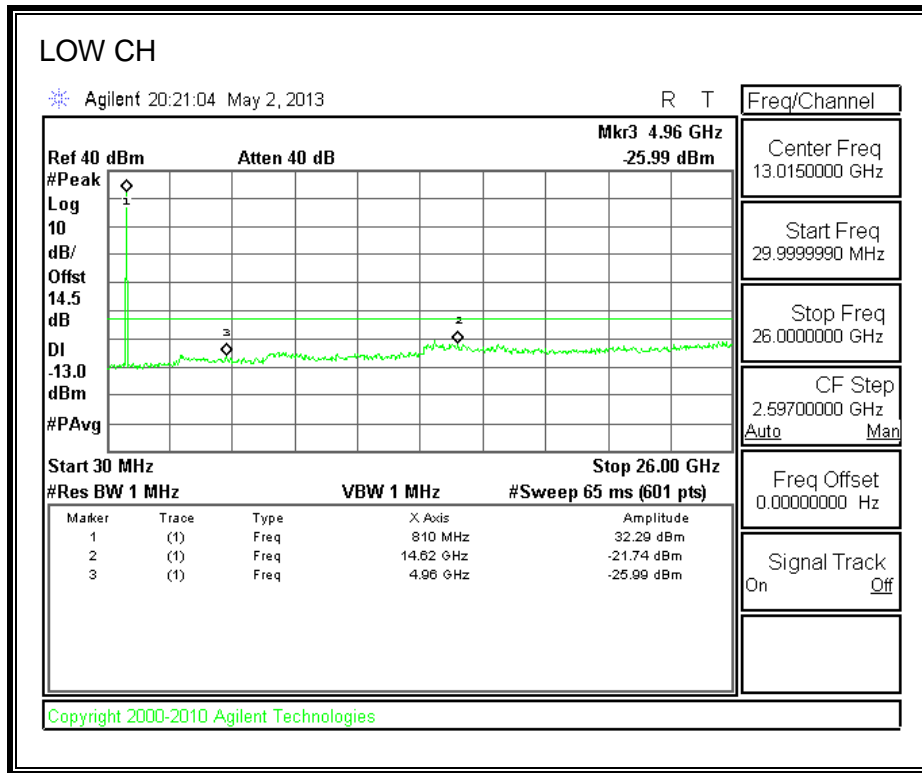
#### **MODES TESTED**

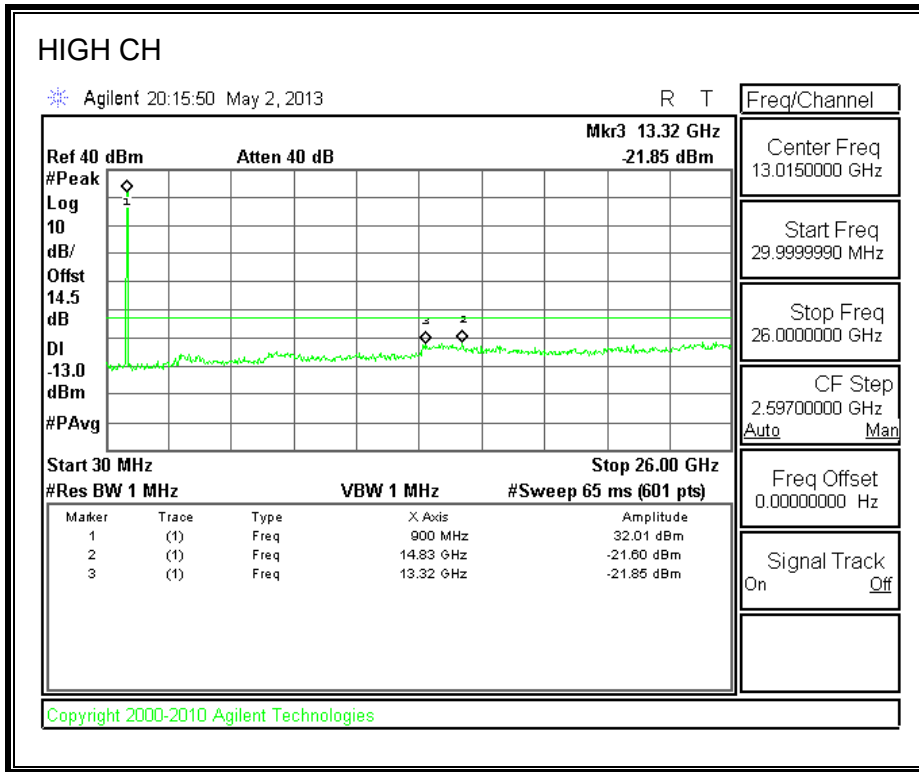
- GSM-GPRS
- UMTS-REL 99/HSUPA

#### **RESULTS**

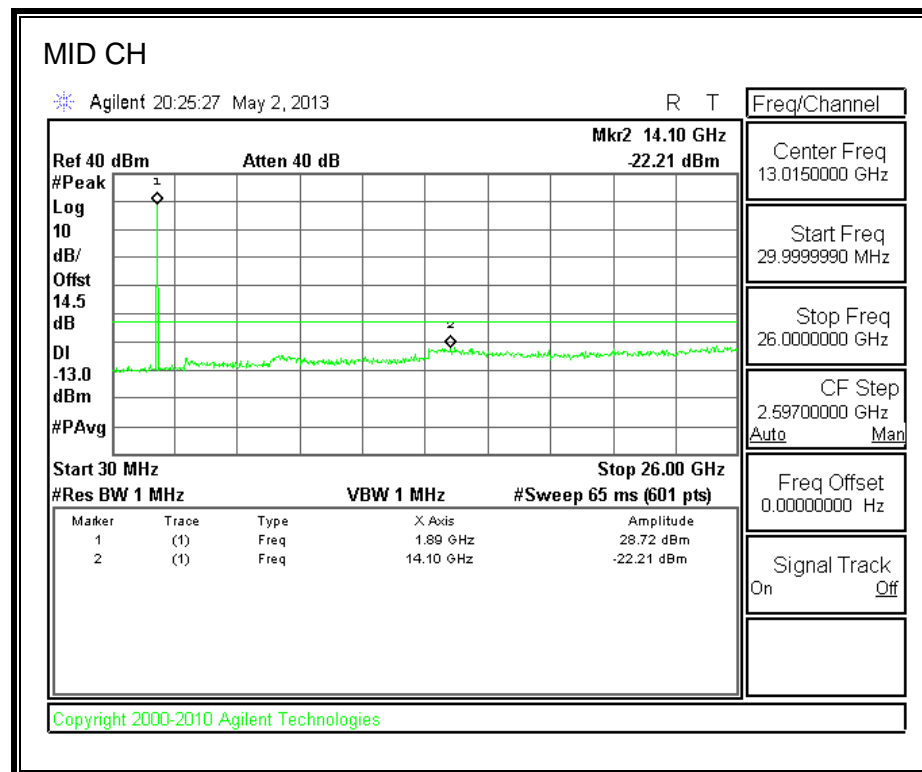
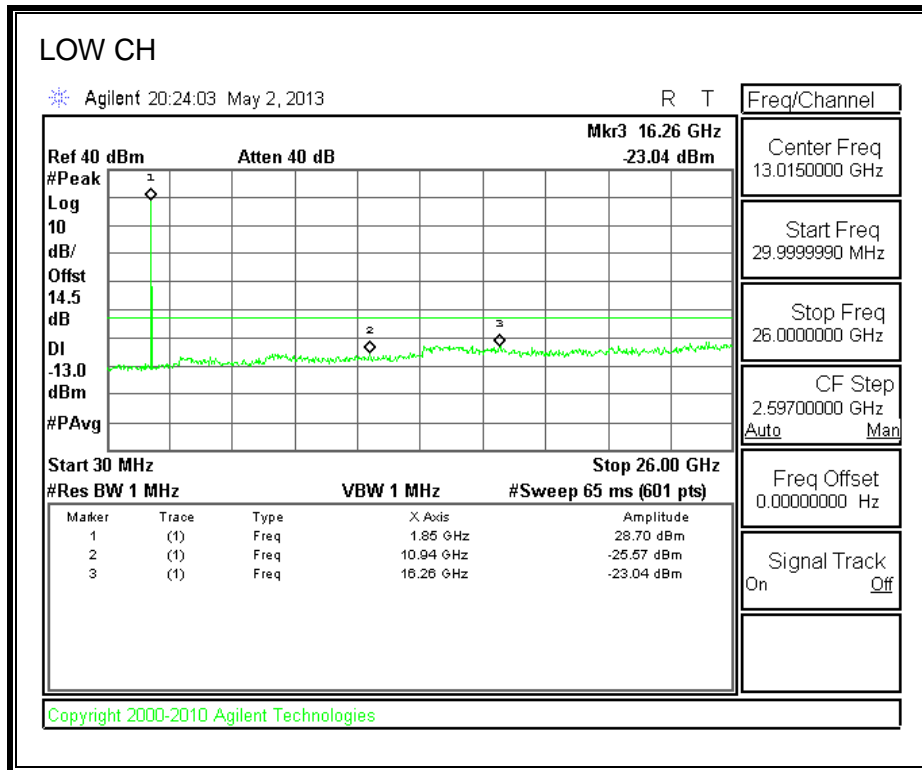
### 8.3.1. GSM-GPRS MODE

#### CELL BAND





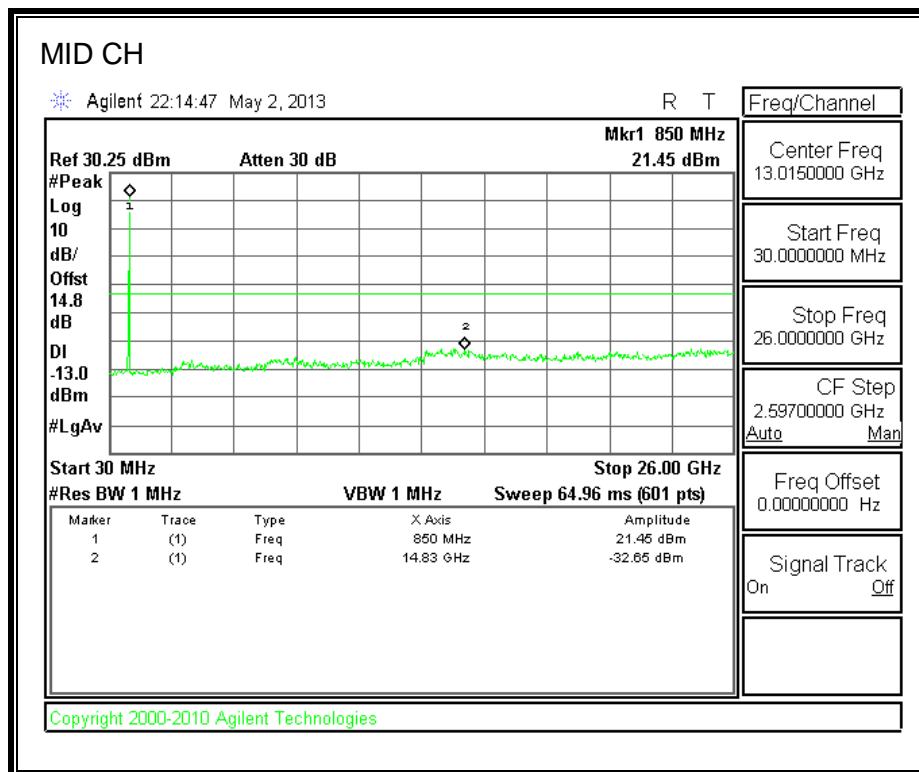
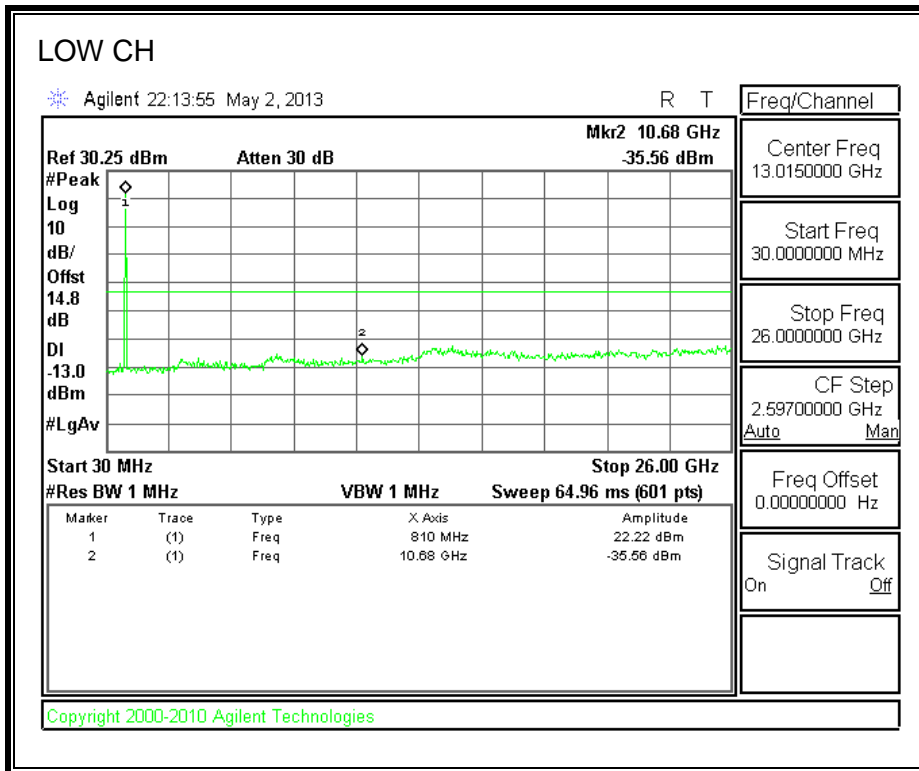
**PCS BAND**

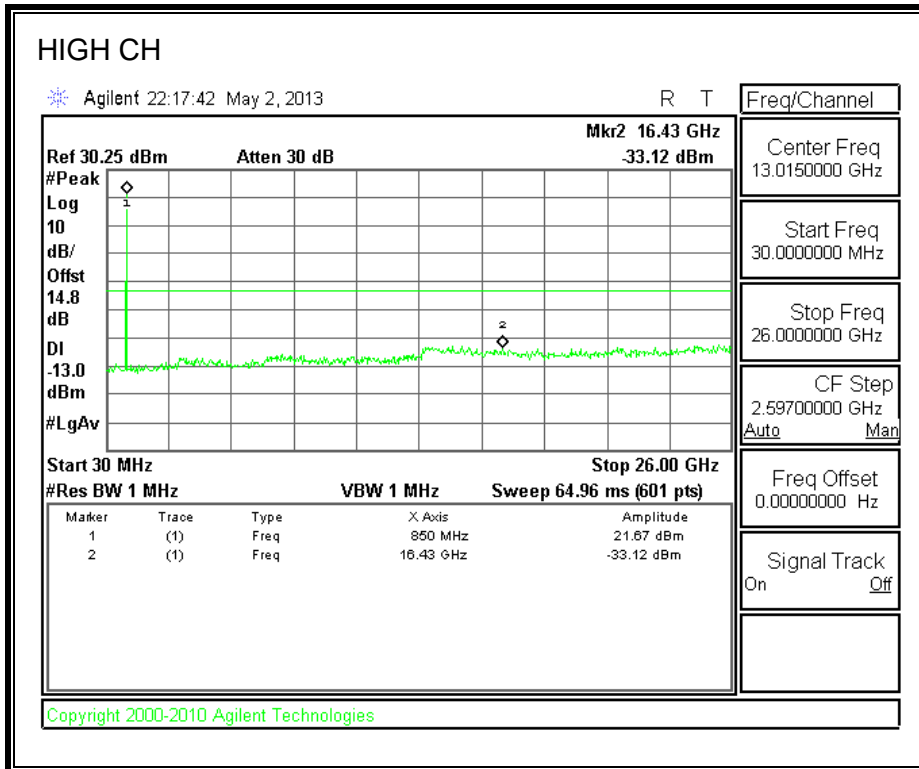




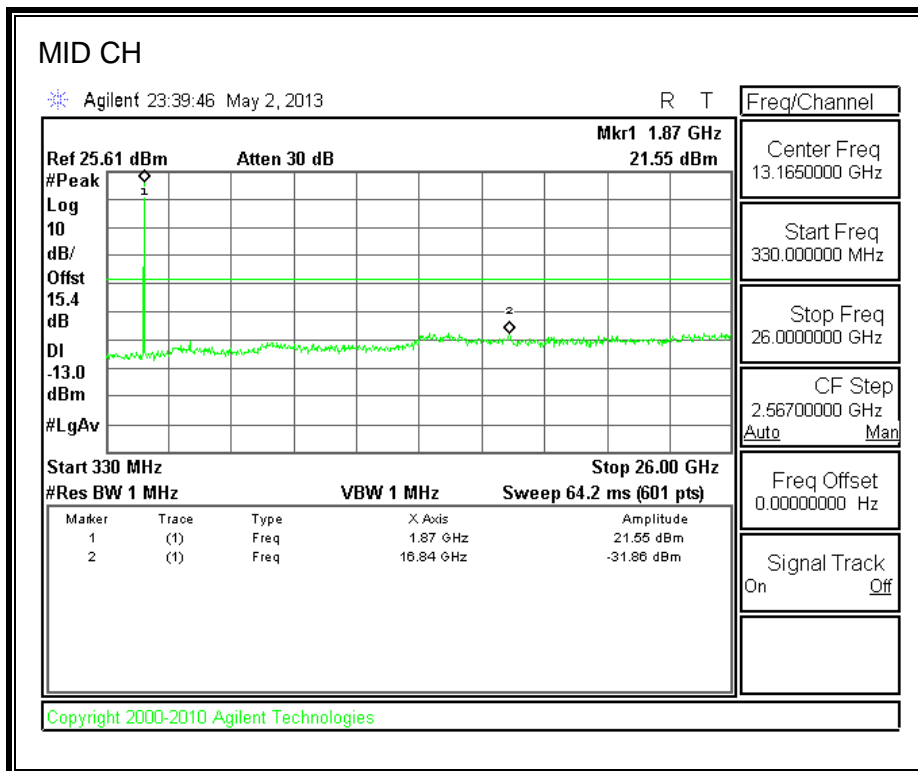
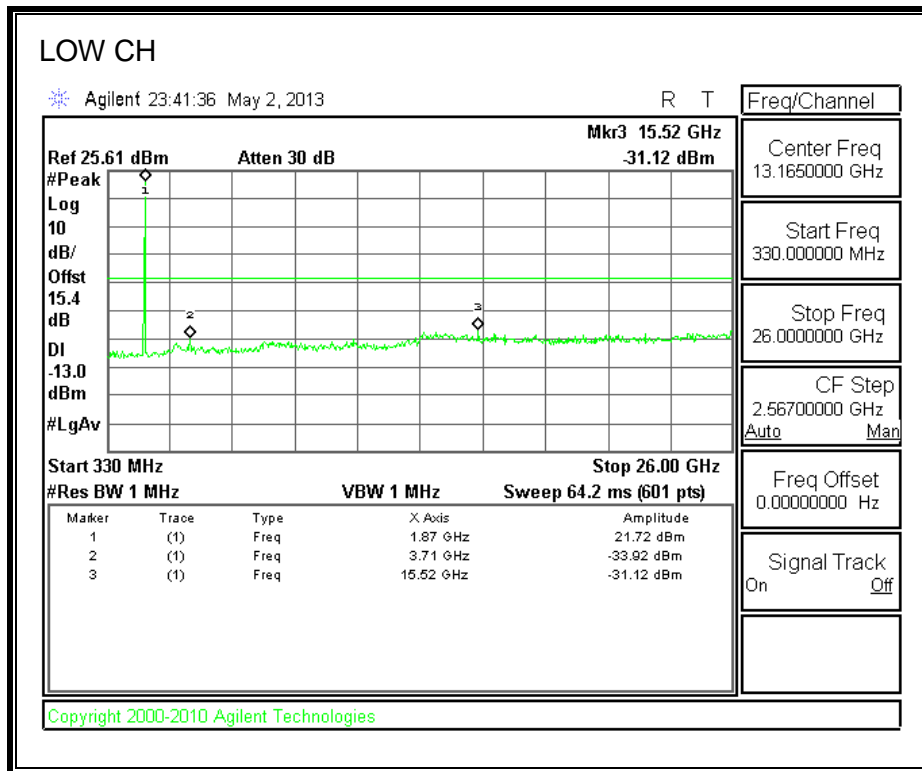
### 8.3.2. UMTS REL 99 MODE

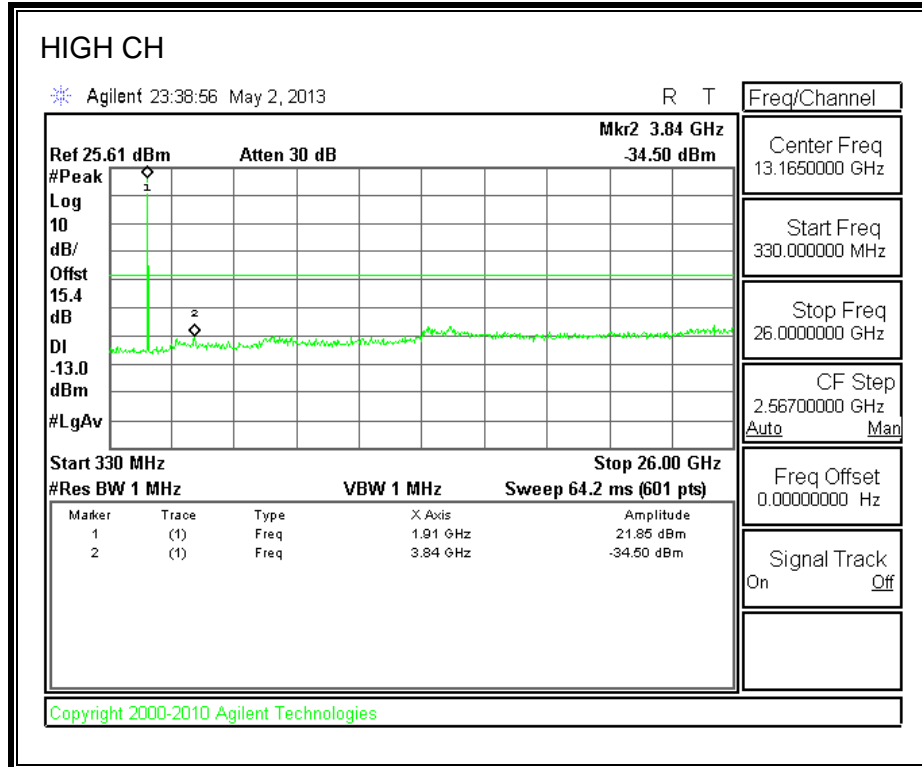
#### CELL BAND





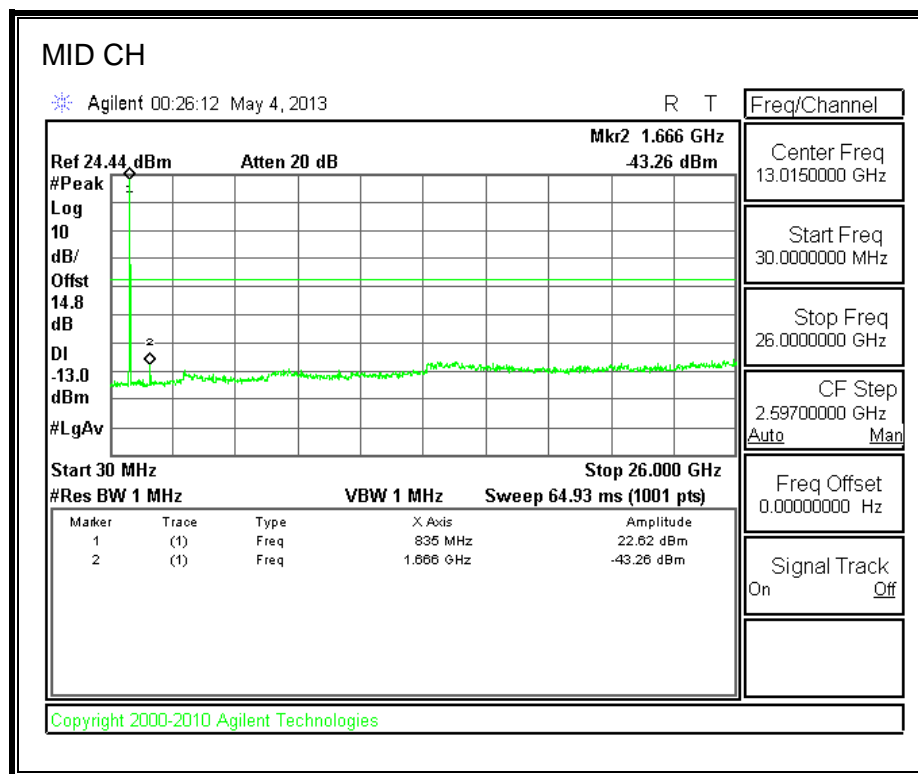
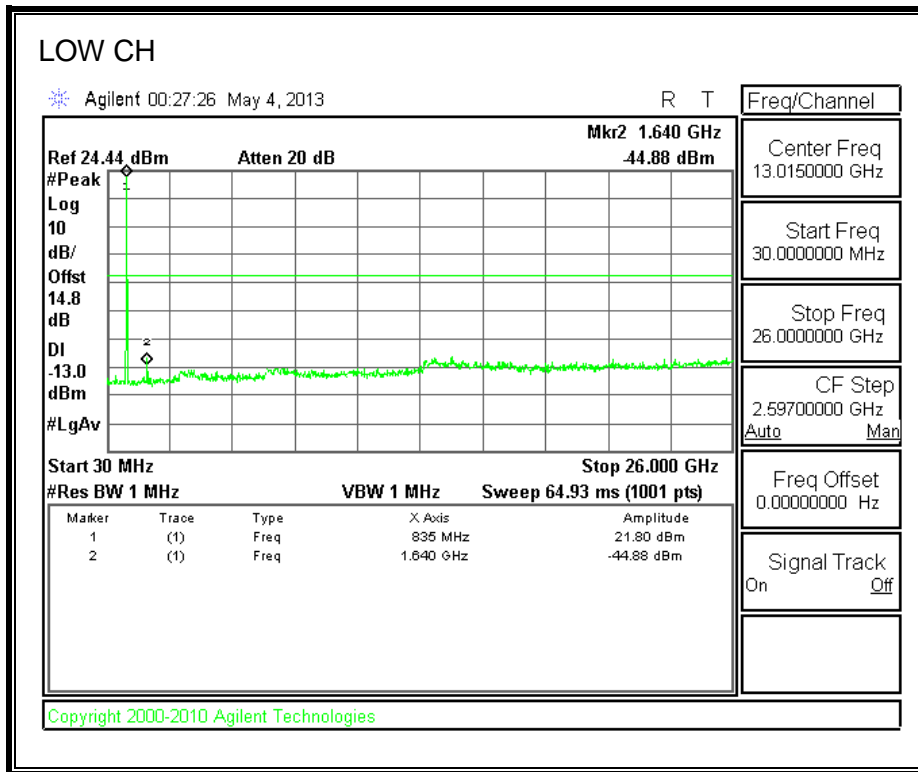
**PCS BAND**

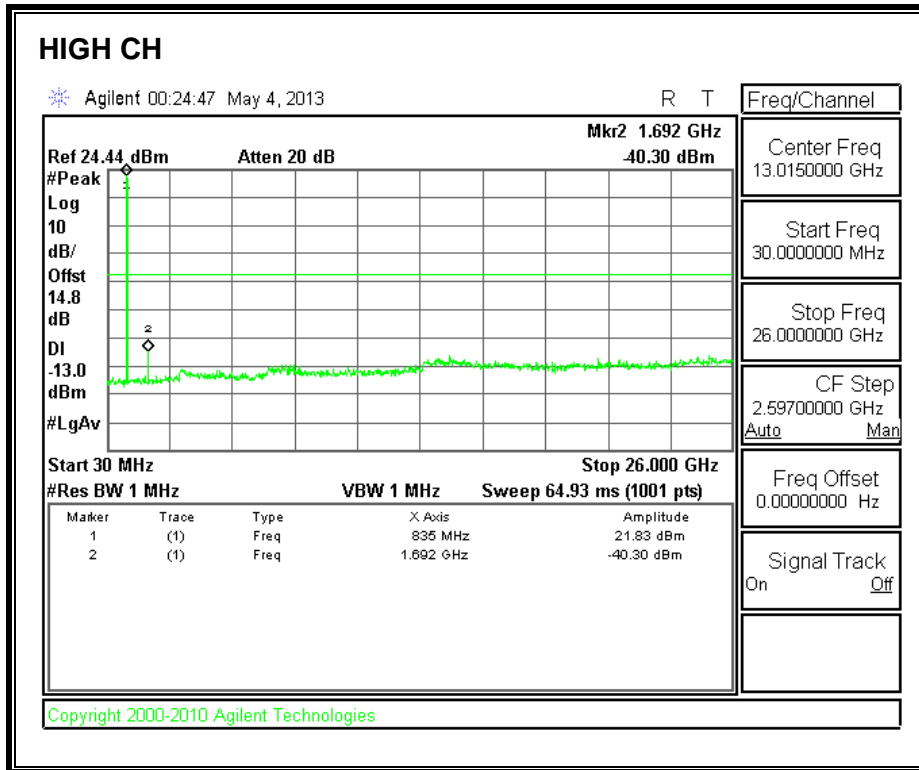




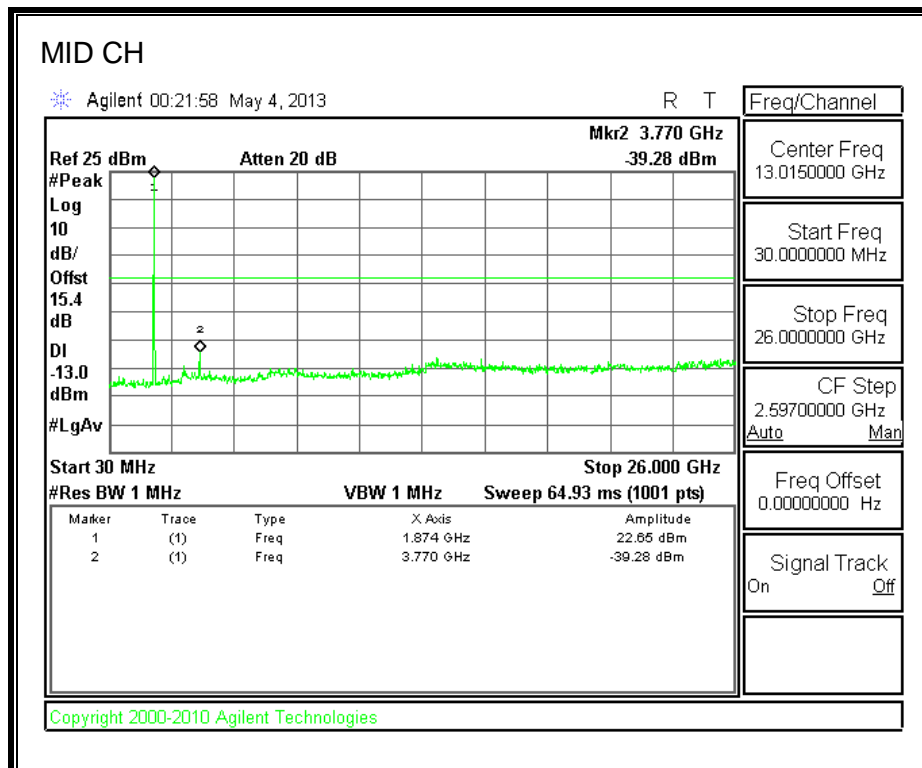
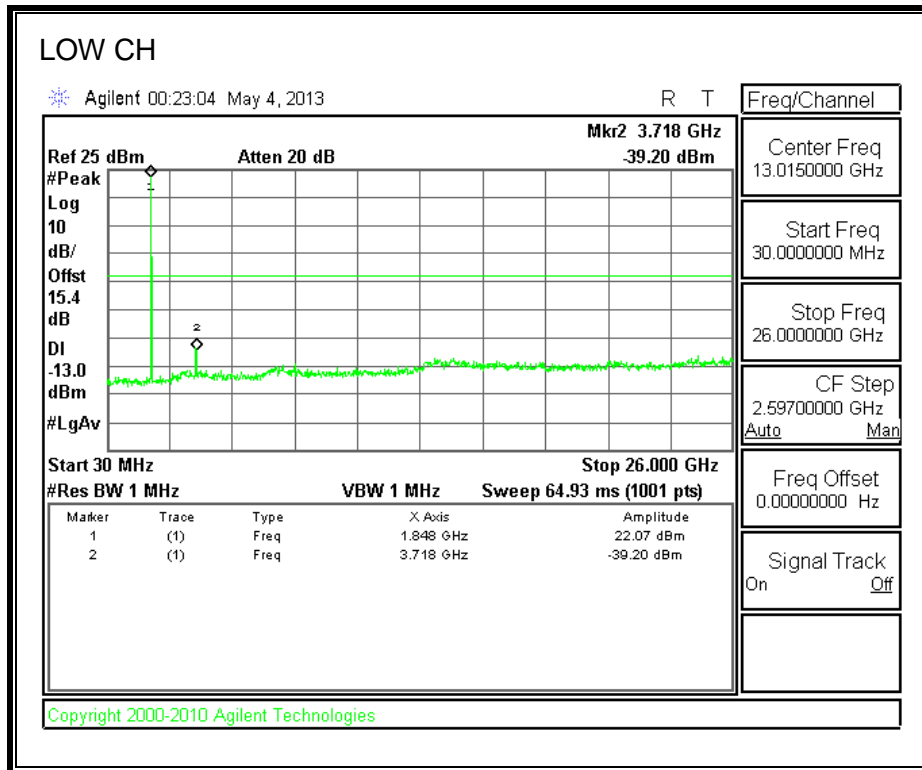
### 8.3.3. UMTS HSUPA MODE

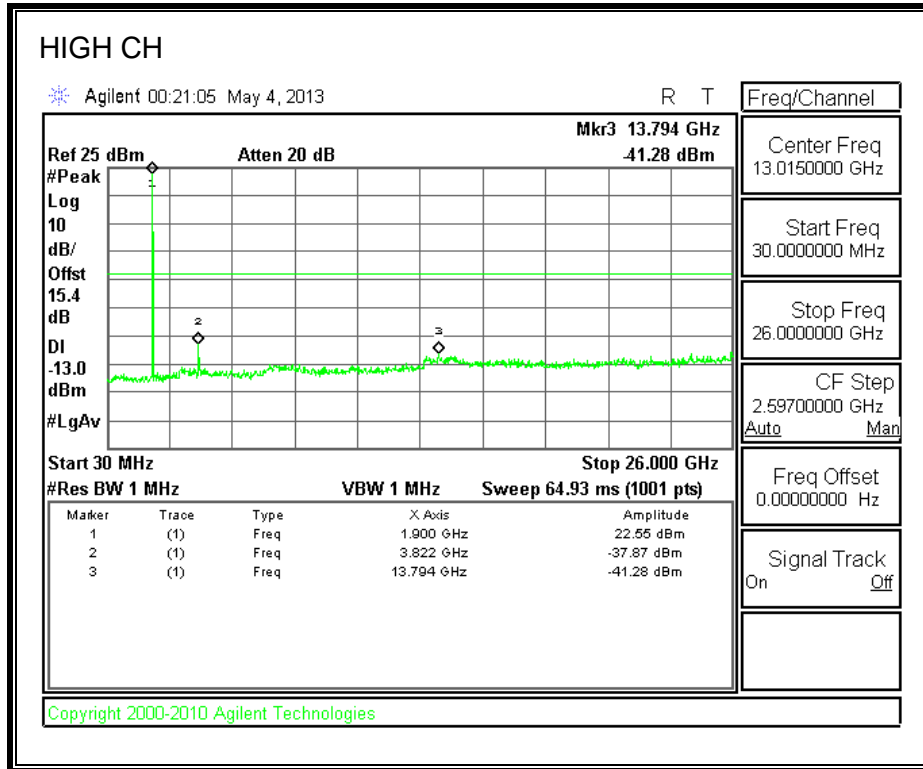
#### CELL BAND





**PCS BAND**





## 9. FREQUENCY STABILITY

### RULE PART(S)

FCC: §2.1055, §22.355, §24.235

### LIMITS

§22.355 & RSS-132 4.3 - 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

Use Agilent 8960 and CMW 500 with Frequency Error measurement capability.

- Temp. =  $-30^{\circ}$  to  $+50^{\circ}\text{C}$
- Voltage = Normal, 3.7Vdc, Low, 3.5Vdc and High, 4.26Vdc.

#### **Frequency Stability vs Temperature:**

The EUT is placed inside a temperature chamber. The temperature is set to  $20^{\circ}\text{C}$  and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until  $+50^{\circ}\text{C}$  is reached.

#### **Frequency Stability vs Voltage:**

The peak frequency error is recorded (worst-case)

### MODES TESTED

- GSM-GPRS
- UMTS-REL 99/HSUPA

### RESULTS

See the following pages

**CELL, GPRS MODULATION – MID CHANNEL**

Reference Frequency: Cellular Mid Channel 836.600020MHz @ 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	836.600050	-0.036	2.5
3.80	40	836.600040	-0.024	2.5
3.80	30	836.600030	-0.012	2.5
<b>3.80</b>	<b>20</b>	<b>836.600020</b>	<b>0</b>	<b>2.5</b>
3.80	10	836.600010	0.012	2.5
3.80	0	836.600000	0.024	2.5
3.80	-10	836.599990	0.036	2.5
3.80	-20	836.599980	0.048	2.5
3.80	-30	836.599970	0.060	2.5

Reference Frequency: Cellular Mid Channel 836.600020MHz @ 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>836.600020</b>	<b>0</b>	<b>2.5</b>
4.37	20	836.600020	0.000	2.5
3.23	20	836.600020	0.000	2.5

**PCS, GPRS MODULATION – MID CHANNEL**

Reference Frequency: PCS Mid Channel 1880.000020MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000050	-0.016	2.5
3.80	40	1880.000040	-0.011	2.5
3.80	30	1880.000030	-0.005	2.5
<b>3.80</b>	<b>20</b>	<b>1880.000020</b>	<b>0</b>	<b>2.5</b>
3.80	10	1880.000010	0.005	2.5
3.80	0	1880.000000	0.011	2.5
3.80	-10	1879.999990	0.016	2.5
3.80	-20	1879.999980	0.021	2.5
3.80	-30	1879.999970	0.027	2.5

Reference Frequency: PCS Mid Channel 1880.000020MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
<b>3.80</b>	<b>20</b>	<b>1880.000020</b>	<b>0.00000</b>	<b>2.5</b>
4.37	20	1880.000020	0.00000	2.5
3.23	20	1880.000020	0.00000	2.5

**CELL WCDMA- MID CHANNEL**

Reference Frequency: Cellular Mid Channel 836.599975MHz @ 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	836.599972	0.003	2.5
3.80	40	836.599973	0.003	2.5
3.80	30	836.599975	0.001	2.5
<b>3.80</b>	<b>20</b>	<b>836.599975</b>	<b>0</b>	<b>2.5</b>
3.80	10	836.599978	-0.003	2.5
3.80	0	836.599979	-0.004	2.5
3.80	-10	836.599980	-0.006	2.5
3.80	-20	836.599982	-0.008	2.5
3.80	-30	836.599982	-0.009	2.5

Reference Frequency: Cellular Mid Channel 836.599975MHz @ 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>836.599975</b>	<b>0</b>	<b>2.5</b>
4.37	20	836.599975	0.000	2.5
3.23	20	836.599976	-0.001	2.5

**PCS WCDMA- MID CHANNEL**

Reference Frequency: PCS Mid Channel 1879.999951MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1,879.999953	-0.001	2.5
3.80	40	1,879.999952	-0.001	2.5
3.80	30	1,879.999951	0.000	2.5
3.80	<b>20</b>	<b>1,879.999951</b>	<b>0</b>	<b>2.5</b>
3.80	10	1,879.999954	-0.002	2.5
3.80	0	1,879.999956	-0.003	2.5
3.80	-10	1,879.999960	-0.005	2.5
3.80	-20	1,879.999962	-0.006	2.5
3.80	-30	1,879.999962	-0.006	2.5

Reference Frequency: PCS Mid Channel 1879.999951MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
<b>3.80</b>	<b>20</b>	<b>1,879.999951</b>	<b>0.00000</b>	<b>2.5</b>
4.37	20	1,879.999954	-0.00184	2.5
3.23	20	1,879.999946	0.00244	2.5

## 10. RADIATED TEST RESULTS

### 10.1. 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.

#### TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 2.2.17

The ERP/EIRP power was measured with the spectrum analyzer which attached with receiver antenna via calibrated cable. The measurements have been taken at the low, middle and high channel in each band.

- Set the spectrum analyzer span wide enough or greater than the modulated signal BW.
- Set a spectrum analyzer at peak detection mode with VBW  $\geq$  RBW  $\geq$  26dB BW, typically 3MHz for GSM and 5MHz for WCDMA modes respectively.
- Set a marker to point the corresponding peak value.

#### MODES TESTED

- GSM-GPRS
- UMTS-REL 99/HSUPA

#### RESULTS

Mode	Channel	f (MHz)	ERP	
			dBm	mW
GPRS	128	824.20	25.67	368.98
	190	836.60	27.80	602.56
	251	848.80	28.45	699.84

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
GPRS	512	1850.20	29.03	799.83
	661	1880.00	28.11	647.14
	810	1909.80	25.59	362.24

Mode	Channel	f (MHz)	ERP	
			dBm	mW
REL 99	4357	826.40	20.66	116.41
	4408	836.60	20.47	111.43
	4458	846.60	22.27	168.66

Mode	Channel	f (MHz)	ERP	
			dBm	mW
REL 99	9662	1858.40	25.57	360.58
	9800	1880.00	24.83	304.09
	9938	1907.60	24.97	314.05

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
HSUPA	4357	826.40	22.29	169.43
	4405	836.00	22.27	168.66
	4455	846.00	23.65	231.74

Mode	Channel	f (MHz)	ERP	
			dBm	mW
HSUPA	9662	1858.40	26.73	470.98
	9800	1880.00	25.83	382.82
	9938	1907.60	25.90	389.05

**GSM-GPRS 850 (Cellular Band)**

High Frequency Substitution Measurement Compliance Certification Services Chamber B								
<p><b>Company:</b> Samsung  <b>Project #:</b> 13I15068  <b>Date:</b> 05/06/13  <b>Test Engineer:</b> Steven Tran  <b>Configuration:</b> X config EUT only  <b>Mode:</b> GPRS GSM 850</p>								
<b>Test Equipment:</b>								
Receiving: Sunol T243, and Chamber B N-type Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	19.31	V	0.6	0.0	18.71	38.5	-19.7	
824.20	26.27	H	0.6	0.0	25.67	38.5	-12.8	
Mid Ch								
836.60	21.11	V	0.6	0.0	20.51	38.5	-17.9	
836.60	28.40	H	0.6	0.0	27.80	38.5	-10.6	
High Ch								
848.80	22.40	V	0.6	0.0	21.80	38.5	-16.6	
848.80	29.05	H	0.6	0.0	28.45	38.5	-10.0	
Rev. 3.17.11								

**GSM-GPRS 1900 (Cellular Band)**

High Frequency Fundamental Measurement Compliance Certification Services Chamber B								
Company: Samsung								
Project #: 13I15068								
Date: 05/06/13								
Test Engineer: Steven Tran								
Configuration: X position EUT w/ headphones+charger								
Mode: GSM 1900 GPRS								
<b>Test Equipment:</b>								
Receiving: Horn T59, and Chamber B SMA Cables								
Substitution: Horn T217 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	15.8	V	0.85	8.05	23.00	33.0	-10.0	
1.850	22.0	H	0.85	7.89	29.03	33.0	-4.0	
Mid Ch								
1.880	16.6	V	0.85	8.10	23.83	33.0	-9.2	
1.880	21.1	H	0.85	7.88	28.11	33.0	-4.9	
High Ch								
1.910	13.4	V	0.85	8.19	20.69	33.0	-12.3	
1.910	18.5	H	0.85	7.95	25.59	33.0	-7.4	
Rev. 3.17.11								

**UMTS-REL 99 (Cellular Band)**

High Frequency Substitution Measurement Compliance Certification Services Chamber B								
<b>Company:</b> Samsung <b>Project #:</b> 13115068 <b>Date:</b> 05/06/13 <b>Test Engineer:</b> Steven Tran <b>Configuration:</b> X EUT only <b>Mode:</b> WCDMA, Rel 99 850								
<b>Test Equipment:</b>								
Receiving: Sunol T243, and Chamber B N-type Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	14.68	V	0.6	0.0	14.08	38.5	-24.4	
826.40	21.26	H	0.6	0.0	20.66	38.5	-17.8	
Mid ch								
836.60	14.39	V	0.6	0.0	13.79	38.5	-24.7	
836.60	21.07	H	0.6	0.0	20.47	38.5	-18.0	
High Ch								
846.60	13.92	V	0.6	0.0	13.32	38.5	-25.1	
846.60	22.87	H	0.6	0.0	22.27	38.5	-16.2	
Rev. 3.17.11								

**UMTS-REL 99 (PCS Band)**

High Frequency Fundamental Measurement Compliance Certification Services Chamber B								
<b>Company:</b>		Samsung						
<b>Project #:</b>		13115068						
<b>Date:</b>		05/06/13						
<b>Test Engineer:</b>		Steven Tran						
<b>Configuration:</b>		EUT, x position						
<b>Mode:</b>		TX, UMTS REL 99 1900						
<b>Test Equipment:</b>								
Receiving: Horn T73, and Chamber B SMA Cables								
Substitution: Horn T217 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								
1858.400	8.4	V	0.85	8.38	15.96	33.0	-17.0	
1858.400	17.8	H	0.85	8.59	25.57	33.0	-7.4	
X								
1.880	8.0	V	0.85	8.26	15.36	33.0	-17.6	
1.880	17.1	H	0.85	8.55	24.83	33.0	-8.2	
High Ch								
1907.600	7.3	V	0.85	8.21	14.70	33.0	-18.3	
1907.600	17.3	H	0.85	8.54	24.97	33.0	-8.0	
Rev. 3.17.11								

**UMTS-HSUPA (Cellular Band)**

High Frequency Substitution Measurement Compliance Certification Services Chamber B								
<p><b>Company:</b> Samsung  <b>Project #:</b> 13I15068  <b>Date:</b> 05/09/13  <b>Test Engineer:</b> Steven Tran  <b>Configuration:</b> EUT with charger and headphones  <b>Mode:</b> WCDMA, HSUPA 850 MHz</p>								
<p><b>Test Equipment:</b>                      Receiving: Sunol T243, and Chamber B N-type Cable (Setup this one for testing EUT)                      Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.</p>								
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	14.37	V	0.6	0.0	13.77	38.5	-24.7	
826.40	22.89	H	0.6	0.0	22.29	38.5	-16.2	
Mid ch								
836.60	12.59	V	0.6	0.0	11.99	38.5	-26.5	
836.60	22.87	H	0.6	0.0	22.27	38.5	-16.2	
High Ch								
846.60	15.90	V	0.6	0.0	15.30	38.5	-23.1	
846.60	24.25	H	0.6	0.0	23.65	38.5	-14.8	
Rev. 3.17.11								

**UMTS-HSUPA (PCS Band)**

High Frequency Fundamental Measurement Compliance Certification Services Chamber B								
<b>Company:</b>		Samsung						
<b>Project #:</b>		13115068						
<b>Date:</b>		05/09/13						
<b>Test Engineer:</b>		Steven Tran						
<b>Configuration:</b>		EUT X position						
<b>Mode:</b>		TX, WCDMA HSUPA 1900						
<b>Test Equipment:</b>								
Receiving: Horn T73, and Chamber B SMA Cables								
Substitution: Horn T217 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		9662.0						
1858.400	7.8	V	0.85	8.38	15.30	33.0	-17.7	
1858.400	19.0	H	0.85	8.59	26.73	33.0	-6.3	
Mid Ch		9800.0						
1.880	6.4	V	0.85	8.26	13.80	33.0	-19.2	
1.880	18.1	H	0.85	8.55	25.83	33.0	-7.2	
High Ch		9938.0						
1907.600	6.3	V	0.85	8.21	13.69	33.0	-19.3	
1907.600	18.2	H	0.85	8.54	25.90	33.0	-7.1	
Rev. 3.17.11								

## **10.2. 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.

### **MODES TESTED**

- GSM-GPRS
- UMTS-REL 99/HSUPA

### **RESULTS**

**GSM-GPRS (Cellular Band)**

**Compliance Certification Services**  
Above 1GHz High Frequency Substitution Measurement

Company: Samsung  
 Project #: 13115068  
 Date: 05/07/13  
 Test Engineer: Steven Tran  
 Configuration: X position, EUT w/ headphones+charger  
 Mode: Tx, 850MHz GPRS MODE

Chamber

Pre-amplifier

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)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, (824.2MHz)</b>									
2.473	-0.5	V	3.0	36.4	1.0	-35.9	-13.0	-22.9	
2.473	0.2	H	3.0	36.4	1.0	-35.2	-13.0	-22.2	
<b>Mid Ch, (836.6MHz)</b>									
2.510	-0.4	V	3.0	36.4	1.0	-35.8	-13.0	-22.8	
2.510	-0.4	H	3.0	36.4	1.0	-35.8	-13.0	-22.8	
<b>High Ch, (848.8MHz)</b>									
2.546	-0.1	V	3.0	36.3	1.0	-35.4	-13.0	-22.4	
2.546	-1.2	H	3.0	36.3	1.0	-36.6	-13.0	-23.6	

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

**GSM-GPRS (PCS Band)**

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		13I15068							
<b>Date:</b>		05/07/13							
<b>Test Engineer:</b>		Steven Tran							
<b>Configuration:</b>		X position, EUT with headphones/charger							
<b>Mode:</b>		Tx, 1900MHz GPRS MODE							
<b>Chamber</b>		<b>Pre-amplifer</b>			<b>Filter</b>		<b>Limit</b>		
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
<b>Low Ch, 1850.2MHz</b>									
3.700	-10.2	V	3.0	35.4	1.0	-44.6	-13.0	-31.6	
5.551	-16.1	V	3.0	34.7	1.0	-49.8	-13.0	-36.8	
3.700	-5.7	H	3.0	35.4	1.0	-40.1	-13.0	-27.1	
5.551	-15.7	H	3.0	34.7	1.0	-49.4	-13.0	-36.4	
<b>Mid Ch, 1880MHz</b>									
3.760	-9.1	V	3.0	35.3	1.0	-43.4	-13.0	-30.4	
5.640	-13.8	V	3.0	34.7	1.0	-47.5	-13.0	-34.5	
3.760	-3.8	H	3.0	35.3	1.0	-38.1	-13.0	-25.1	
5.640	-13.8	H	3.0	34.7	1.0	-47.6	-13.0	-34.6	
<b>High Ch, 1909.8MHz</b>									
3.820	-11.9	V	3.0	35.3	1.0	-46.1	-13.0	-33.1	
5.729	-12.9	V	3.0	34.7	1.0	-46.7	-13.0	-33.7	
3.820	-6.2	H	3.0	35.3	1.0	-40.5	-13.0	-27.5	
5.729	-13.8	H	3.0	34.7	1.0	-47.6	-13.0	-34.6	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

**UMTS-REL 99 (Cellular Band)**

**Compliance Certification Services**  
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Samsung  
**Project #:** 13U14068  
**Date:** 05/07/13  
**Test Engineer:** Steven Tran  
**Configuration:** EUT w/ headphones+charger, X position  
**Mode:** TX, UMTS 850MHz, Rel 99

Chamber

Pre-amplifier

Filter

Limit

5m Chamber B

T145 8449B

Filter 1

FCC Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Channel (826.4MHz)</b>									
1.653	-15.0	V	3.0	35.5	1.0	-49.5	-13.0	-36.5	
1.653	-10.9	H	3.0	35.5	1.0	-45.4	-13.0	-32.4	
<b>Mid Channel (836.6MHz)</b>									
1.673	-18.3	V	3.0	35.5	1.0	-52.9	-13.0	-39.9	
1.673	-13.9	H	3.0	35.5	1.0	-48.5	-13.0	-35.5	
<b>High Channel (846.8MHz)</b>									
1.694	-14.3	V	3.0	35.5	1.0	-48.8	-13.0	-35.8	
1.694	-7.6	H	3.0	35.5	1.0	-42.1	-13.0	-29.1	

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

**UTMS-REL 99 (PCS Band)**

**Compliance Certification Services**  
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Samsung  
**Project #:** 13115068  
**Date:** 05/07/13  
**Test Engineer:** Steven Tran  
**Configuration:** X position, EUT w/ charger+headphones  
**Mode:** Tx, 1900MHz WCDMA Rel 99 MODE

Chamber

5m Chamber B

Pre-amplifier

T145 8449B

Filter

Filter 1

Limit

Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 1852.4MHz</b>									
3.705	-12.9	V	3.0	35.4	1.0	-47.3	-13.0	-34.3	
3.705	-6.7	H	3.0	35.4	1.0	-41.0	-13.0	-28.0	
<b>Mid Ch, 1880.0MHz</b>									
3.760	-10.8	V	3.0	35.3	1.0	-45.2	-13.0	-32.2	
3.760	-4.5	H	3.0	35.3	1.0	-38.9	-13.0	-25.9	
<b>High Ch, 1907.6MHz</b>									
3.815	-9.9	V	3.0	35.3	1.0	-44.2	-13.0	-31.2	
3.815	-5.6	H	3.0	35.3	1.0	-39.9	-13.0	-26.9	

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

**UMTS-HSUPA (Cellular Band)**

**Compliance Certification Services**  
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Samsung  
**Project #:** 13115068  
**Date:** 05/09/13  
**Test Engineer:** Steven Tran  
**Configuration:** EUT, x position  
**Mode:** Tx, 850MHz WCDMA HSUPA MODE

Chamber

5m Chamber B

Pre-amplifier

T145 8449B

Filter

Filter 1

Limit

FCC Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Channel (826.4MHz)</b>									
1.653	-16.6	V	3.0	35.5	1.0	-51.1	-13.0	-38.1	
1.653	-12.3	H	3.0	35.5	1.0	-46.9	-13.0	-33.9	
<b>Mid Channel (836.6MHz)</b>									
1.673	-21.3	V	3.0	35.5	1.0	-55.8	-13.0	-42.8	
1.673	-16.5	H	3.0	35.5	1.0	-51.1	-13.0	-38.1	
<b>High Channel (846.8MHz)</b>									
1.694	-18.7	V	3.0	35.5	1.0	-53.2	-13.0	-40.2	
1.694	-9.0	H	3.0	35.5	1.0	-43.5	-13.0	-30.5	

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

**UMTS-HSUPA (PCS Band)**

**Compliance Certification Services**  
**Above 1GHz High Frequency Substitution Measurement**

Company: Samsung  
 Project #: 13115068  
 Date: 05/08/13  
 Test Engineer: Steven Tran  
 Configuration: EUT, x position  
 Mode: Tx, 1900MHz WCDMA HSDPA MODE

Chamber

5m Chamber B

Pre-amplifier

T145 8449B

Filter

Filter 1

Limit

Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 1852.4MHz</b>									
3.705	-14.9	V	3.0	35.4	1.0	-49.3	-13.0	-36.3	
3.705	-8.6	H	3.0	35.4	1.0	-42.9	-13.0	-29.9	
<b>Mid Ch, 1880.0MHz</b>									
3.760	-10.8	V	3.0	35.3	1.0	-45.1	-13.0	-32.1	
3.760	-4.8	H	3.0	35.3	1.0	-39.1	-13.0	-26.1	
<b>High Ch, 1907.6MHz</b>									
3.815	-13.1	V	3.0	35.3	1.0	-47.4	-13.0	-34.4	
3.815	-6.9	H	3.0	35.3	1.0	-41.2	-13.0	-28.2	

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