

# FCC Part22H&24E Test Report

Product Name : GSM Mobile Phone

Model No. : HUAWEI G6151

FCC ID : QISG6151

Applicant : HUAWEI TECHNOLOGIES CO., LTD

Address : Administration Building, Huawei Base, Bantian,  
Longgang District, Shenzhen 518129

Date of Receipt : 14/09/2011

Test Date : 14/09/2011~23/09/2011

Issued Date : 23/09/2011

Report No. : 119S018R-HP-US-P07V01

Report Version : V 1.0

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

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# Test Report Certification

Issued Date : 23/09/2011

Report No. : 119S018R-HP-US-P07V01



Product Name : GSM Mobile Phone

Applicant : HUAWEI TECHNOLOGIES CO., LTD

Address : Administration Building, Huawei Base, Bantian, Longgang  
District, Shenzhen 518129

Manufacturer : HUAWEI TECHNOLOGIES CO., LTD

Address : Administration Building, Huawei Base, Bantian, Longgang  
District, Shenzhen 518129

Model No. : HUAWEI G6151

FCC ID : QISG6151

EUT Voltage : DC: 3.7V

Brand Name : HUAWEI

Applicable Standard : FCC CFR Title 47 Part 2, TIA/EIA 603-C  
FCC Part22 Subpart H, FCC Part24 Subpart E

Test Result : Complied

Performed Location : Suzhou EMC Laboratory  
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FCC Registration Number: 800392

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(Engineering Supervisor: Marlin Chen)

## Laboratory Information

We, **Quietek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

|                      |                         |
|----------------------|-------------------------|
| <b>Taiwan R.O.C.</b> | <b>: BSMI, NCC, TAF</b> |
| <b>Germany</b>       | <b>: TUV Rheinland</b>  |
| <b>Norway</b>        | <b>: Nemko, DNV</b>     |
| <b>USA</b>           | <b>: FCC, NVLAP</b>     |
| <b>Japan</b>         | <b>: VCCI</b>           |

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://www.quietek.com/tw/ctg/cts/accreditations.htm>  
The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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## 1. General Information

### 1.1. EUT Description

|                         |                                               |
|-------------------------|-----------------------------------------------|
| Product Name            | GSM Mobile Phone                              |
| Model No.               | HUAWEI G6151                                  |
| Hardware Version        | NICOLE-V2.0                                   |
| Software Version        | G6151SSW.P00.M41.00.03                        |
| Device Category         | Portable                                      |
| RF Exposure Environment | Uncontrolled                                  |
| Antenna Type            | Internal                                      |
| <b>2G</b>               |                                               |
| Support Band            | GSM850/GSM900/DCS1800/PCS1900                 |
| GPRS Type               | Class B                                       |
| GPRS Class              | Class 12                                      |
| Tx Frequency Range      | GSM 850: 824~849MHz<br>PCS 1900: 1850~1910MHz |
| Rx Frequency Range      | GSM 850: 869~894MHz<br>PCS 1900: 1930~1990MHz |
| Release Version         | R99                                           |
| Type of modulation      | GMSK for GSM/GPRS                             |
| Antenna Gain            | -2.4dBi for GSM 850<br>-2.2dBi for PCS 1900   |
| <b>Bluetooth</b>        |                                               |
| Bluetooth Frequency     | 2402~2480MHz                                  |
| Bluetooth Version       | V2.1 + EDR                                    |
| Type of modulation      | FHSS                                          |
| Data Rate               | 1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps (8DPSK) |
| Antenna Gain            | -2dBi                                         |
| <b>Wi-Fi</b>            |                                               |
| Wi-Fi Frequency         | 2412~2462MHz                                  |
| Type of modulation      | 802.11b: DSSS                                 |
| Data Rate               | 802.11b: 1/2/5.5/11 Mbps                      |
|                         | 802.11g: 6/9/12/18/24/36/48/54 Mbps           |
| Antenna Gain            | -2dBi                                         |

| Components           |                                                                                                 |
|----------------------|-------------------------------------------------------------------------------------------------|
| Headset Model Number | HT-1350002-22K001                                                                               |
| Battery              | Brand Name: HUAWEI<br>M/N: HB5A3<br>Rated Voltage and Capacitance: 3.7V/1000mAh                 |
| Adapter              | Manufacturer: HUAWEI<br>M/N: HS-050040U6<br>Input: 100-240V~50/60Hz 0.2A<br>Output: 5Vdc, 400mA |

## 1.2. Mode of Operation

QuietTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

| Test Mode             |
|-----------------------|
| Mode 1: GSM 850 Link  |
| Mode 2: PCS 1900 Link |

Note:

1. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. Radiated power output working at GSM link was higher than that working at GPRS link, so all of test items were done working at GSM mode. Refer to peak power output for more details.
3. For the ERP/EIRP and radiated emission test, every axis (X, Y, Z) was verified, and show the worst (Z axis) result on this report.
4. This device is a composite device in accordance with Part 15 Subpart B regulations. The report number is 119276R-ITUSP01V02.

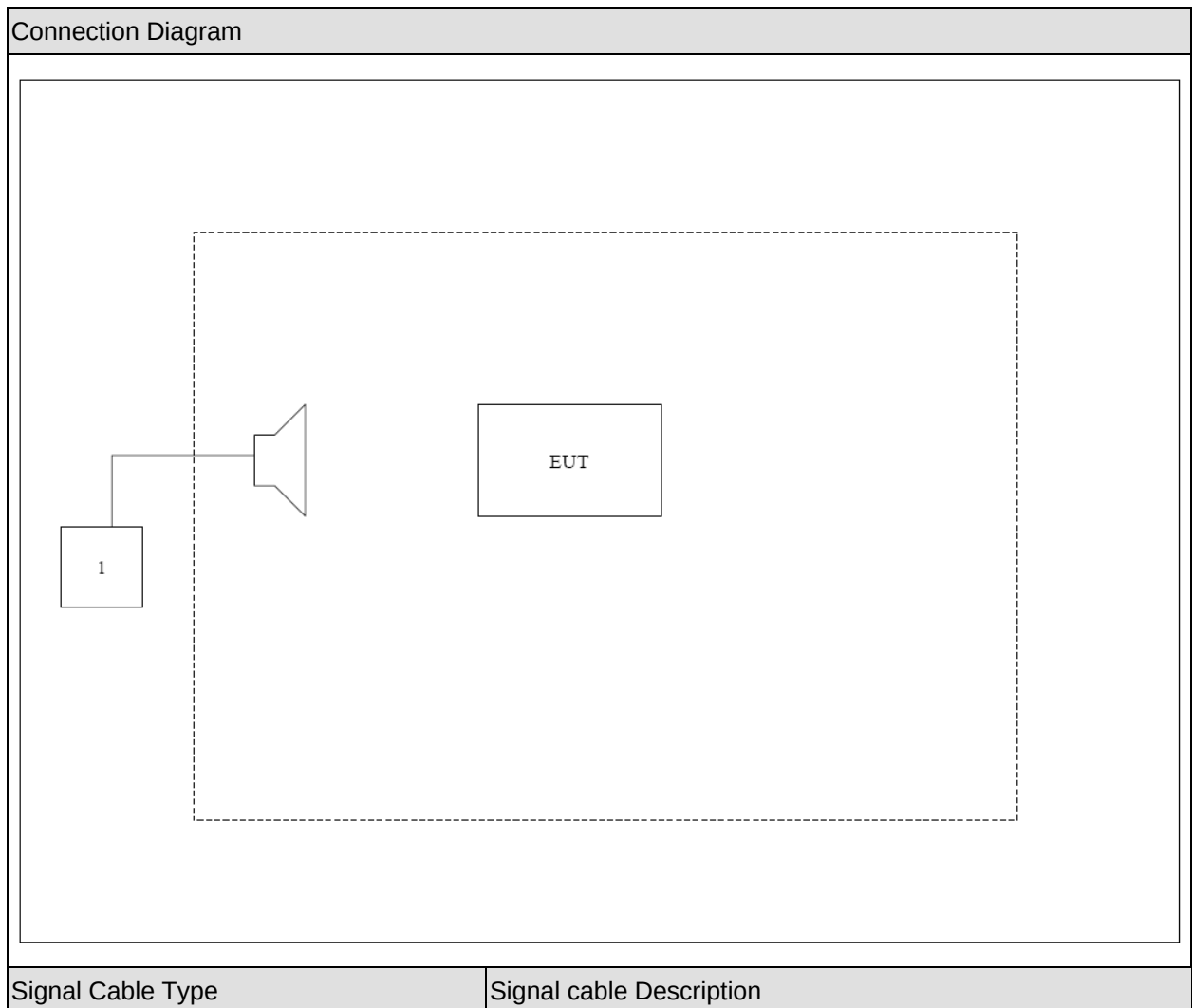


### 1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

| Product |        | Manufacturer | Model No. | Serial No. | Power Cord |
|---------|--------|--------------|-----------|------------|------------|
| 1       | CMU200 | R&S          | CMU200    | N/A        | N/A        |

## 1.4. Configuration of Tested System



**1.5. EUT Exercise Software**

|   |                                                           |
|---|-----------------------------------------------------------|
| 1 | Setup the EUT and simulators as shown on above.           |
| 2 | Turn on the power of all equipment.                       |
| 3 | EUT Communicate with CMU200, then select channel to test. |

## 2. Technical Test

### 2.1. Summary of Test Result

- ☒ No deviations from the test standards  
☐ Deviations from the test standards as below description:

For GSM 850 (FCC Part 22H & Part 2)

| Emission                                                   |                                            |                |           |
|------------------------------------------------------------|--------------------------------------------|----------------|-----------|
| Performed Item                                             | Normative References                       | Test Performed | Deviation |
| Peak Output Power                                          | FCC Part 22.913(a)(2) and Part 2.1046      | Yes            | No        |
| Modulation Characteristic                                  | FCC Part 2.1047(d)                         | Yes            | No        |
| Occupied Bandwidth                                         | FCC Part 2.1049                            | Yes            | No        |
| Spurious Emission At Antenna Terminals (+/- 1MHz)          | FCC Part 22.917(a) and Part 2.1049         | Yes            | No        |
| Spurious Emission                                          | FCC Part 22.917(b) and Part 2.1051, 2.1053 | Yes            | No        |
| Frequency Stability Under Temperature & Voltage Variations | FCC Part 22.355 and 2.1055                 | Yes            | No        |

For PCS 1900 (FCC Part 24E & Part 2)

| Emission                                                   |                                            |                |           |
|------------------------------------------------------------|--------------------------------------------|----------------|-----------|
| Performed Item                                             | Normative References                       | Test Performed | Deviation |
| Peak Output Power                                          | FCC Part 24.232(b) and Part 2.1046         | Yes            | No        |
| Modulation Characteristic                                  | FCC Part 2.1047(d)                         | Yes            | No        |
| Occupied Bandwidth                                         | FCC Part 24.238(b) and Part 2.1049         | Yes            | No        |
| Spurious Emission At Antenna Terminals (+/- 1MHz)          | FCC Part 24.238(a) and Part 2.1049         | Yes            | No        |
| Spurious Emission                                          | FCC Part 24.238(b) and Part 2.1051, 2.1053 | Yes            | No        |
| Frequency Stability Under Temperature & Voltage Variations | FCC Part 24.235 and 2.1055                 | Yes            | No        |

## 2.2. Test Environment

| Items                      | Required (IEC 68-1) | Actual   |
|----------------------------|---------------------|----------|
| Temperature (°C)           | 15-35               | 23       |
| Humidity (%RH)             | 25-75               | 52       |
| Barometric pressure (mbar) | 860-1060            | 950-1000 |

### 3. Peak Output Power

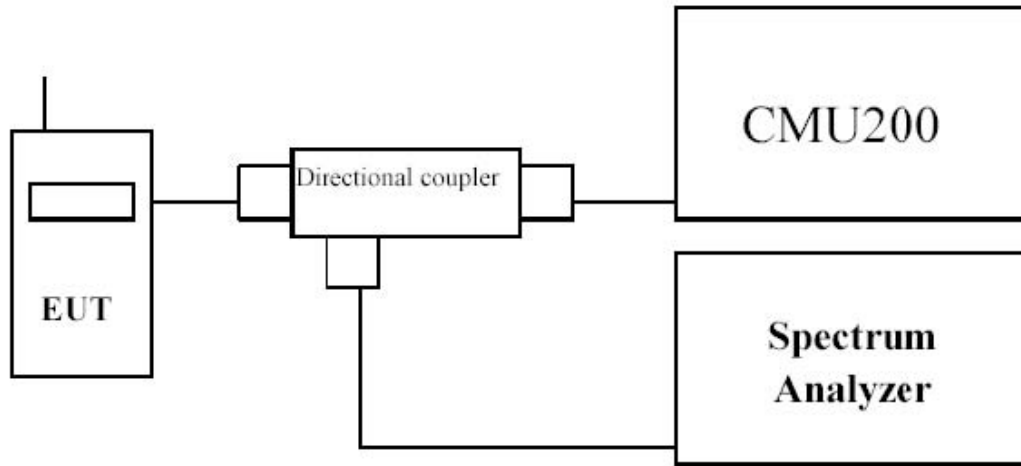
#### 3.1. Test Equipment

Peak Output Power / AC-5

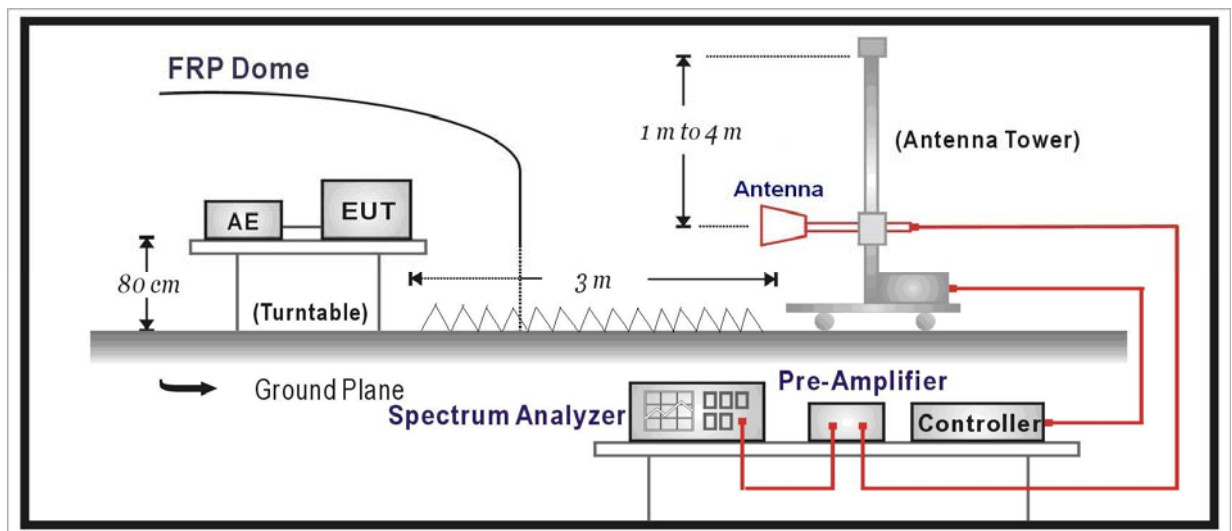
| Instrument                     | Manufacturer | Type No.   | Serial No   | Cali. Due Date |
|--------------------------------|--------------|------------|-------------|----------------|
| PSA Series Spectrum Analyzer   | Agilent      | E4440A     | MY49420184  | 2012.04.10     |
| Radio Communication Tester     | R&S          | CMU 200    | 117088      | 2012.04.29     |
| Dual Directional Coupler       | Agilent      | 778D       | 20160       | 2012.04.20     |
| 10dB Coaxial Coupler           | Agilent      | 87300C     | MY44300299  | 2012.04.20     |
| PSG Analog Signal Generator    | Agilent      | E8257D     | MY44321116  | 2012.04.23     |
| Preamplifier                   | QuieTek      | AP-025C    | CHM-0503006 | 2012.05.05     |
| Preamplifier                   | Miteq        | NSP1800-25 | 1364185     | 2012.05.05     |
| Bilog Antenna                  | Teseq GmbH   | CBL6112D   | 27612       | 2011.10.18     |
| Half Wave Tuned Dipole Antenna | COM-POWER    | AD-100     | 40137       | 2011.11.24     |
| Broad-Band Horn Antenna        | Schwarzbeck  | BBHA9120D  | 737         | 2011.11.24     |
| Broad-Band Horn Antenna        | Schwarzbeck  | BBHA9120D  | 499         | 2012.06.11     |
| Temperature/Humidity Meter     | Zhicheng     | ZC1-2      | AC5-TH      | 2012.01.14     |

### 3.2. Test Setup

Conducted Power Measurement:



Radiated Power Measurement:



### 3.3. Limit

**For FCC Part 22.913(a)(2):**

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

**For FCC Part 24.232(b):**

The EIRP of mobile transmitters and auxiliary test transmitters must not exceed 2 Watts.

### 3.4. Test Procedure

**Conducted Power Measurement:**

- a) Place the EUT on a bench and set it in transmitting mode.
- b) Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
- c) EUT Communicate with CMU200, then selects a channel for testing.
- d) Add a correction factor to the display of spectrum, and then test.

**Radiated Power Measurement:**

- e) The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- f) The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- g) The output of the test antenna shall be connected to the measuring receiver.
- h) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- i) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- j) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- k) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- l) The maximum signal level detected by the measuring receiver shall be noted.
- m) The transmitter shall be replaced by a substitution antenna.
- n) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- o) The substitution antenna shall be connected to a calibrated signal generator.
- p) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- q) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- r) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- s) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- t) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if



necessary.

- u) Test site anechoic chamber refer to ANSI C63.4: 2009.

### **3.5. Uncertainty**

The measurement uncertainty is defined as for Conducted Power Measurement  $\pm 1.2$  dB,  
for Radiated Power Measurement  $\pm 3.2$  dB

### 3.6. Test Result

Table 1

| No. of timeslots                                    | 1     | 2     | 3        | 4     |
|-----------------------------------------------------|-------|-------|----------|-------|
| Duty Cycle                                          | 1 : 8 | 1 : 4 | 1 : 2.66 | 1 : 2 |
| Timebased avg. power compared to slotted avg. power | -9 dB | -6 dB | -4.25 dB | -3 dB |

The following table shows the conducted power measured and time based average power calculated:

Table 2

#### GSM850

| Channel No. | Frequency (MHz) | Modulation | Avg. Burst Power (dBm) | Duty Cycle Factor (dB) | Frame Power (dBm) | ERP (dBm) | Limit (dBm) |
|-------------|-----------------|------------|------------------------|------------------------|-------------------|-----------|-------------|
| 128         | 824.2           | GMSK       | 32.69                  | -9                     | 23.69             | 29.17     | 38.50       |
| 189         | 836.4           | GMSK       | 32.67                  | -9                     | 23.67             | 29.55     | 38.50       |
| 251         | 848.8           | GMSK       | 32.66                  | -9                     | 23.66             | 30.86     | 38.50       |

#### PCS1900

| Channel No. | Frequency (MHz) | Modulation | Avg. Burst Power (dBm) | Duty Cycle Factor (dB) | Frame Power (dBm) | EIRP (dBm) | Limit (dBm) |
|-------------|-----------------|------------|------------------------|------------------------|-------------------|------------|-------------|
| 512         | 1850.2          | GMSK       | 30.17                  | -9                     | 21.17             | 30.14      | 33.00       |
| 661         | 1880.0          | GMSK       | 30.40                  | -9                     | 21.40             | 30.65      | 33.00       |
| 810         | 1909.8          | GMSK       | 30.30                  | -9                     | 21.30             | 30.23      | 33.00       |

#### GPRS 850

| Channel No. | Frequency (MHz) | Modulation | Avg. Burst Power (dBm) | Duty Cycle Factor (dB) | Frame Power (dBm) | ERP (dBm) | Limit (dBm) |
|-------------|-----------------|------------|------------------------|------------------------|-------------------|-----------|-------------|
| 128         | 824.2           | GMSK       | 32.58                  | -9                     | 23.58             | 28.20     | 38.50       |
| 189         | 836.4           | GMSK       | 32.56                  | -9                     | 23.56             | 29.03     | 38.50       |
| 251         | 848.8           | GMSK       | 32.59                  | -9                     | 23.59             | 30.55     | 38.50       |

## GPRS1900

| Channel No. | Frequency (MHz) | Modulation | Avg. Burst Power (dBm) | Duty Cycle Factor (dB) | Frame Power (dBm) | EIRP (dBm) | Limit (dBm) |
|-------------|-----------------|------------|------------------------|------------------------|-------------------|------------|-------------|
| 512         | 1850.2          | GMSK       | 29.87                  | -9                     | 20.87             | 29.97      | 33.00       |
| 661         | 1880.0          | GMSK       | 30.22                  | -9                     | 21.22             | 30.48      | 33.00       |
| 810         | 1909.8          | GMSK       | 30.15                  | -9                     | 21.15             | 30.01      | 33.00       |

## Radiated Measurement

## GSM850

| Frequency<br>(MHz)             | SA<br>Reading<br>(dBm) | Ant. Pol.<br>(H/V) | SG<br>Reading<br>(dBm) | Cable<br>Loss<br>(dB) | Gain<br>(dBd) | ERP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------------------|------------------------|--------------------|------------------------|-----------------------|---------------|--------------|----------------|----------------|
| Low Channel 128 (824.20MHz)    |                        |                    |                        |                       |               |              |                |                |
| 824.2                          | -18.11                 | H                  | 15.58                  | 1.76                  | -0.02         | 13.80        | 38.50          | -24.7          |
| 824.2                          | -3.48                  | V                  | 30.95                  | 1.76                  | -0.02         | 29.17        | 38.50          | -9.33          |
| Middle Channel 189 (836.40MHz) |                        |                    |                        |                       |               |              |                |                |
| 836.4                          | -19.27                 | H                  | 14.50                  | 1.75                  | 0.10          | 12.85        | 38.50          | -25.65         |
| 836.4                          | -3.45                  | V                  | 31.20                  | 1.75                  | 0.10          | 29.55        | 38.50          | -8.95          |
| High Channel 251 (848.80MHz)   |                        |                    |                        |                       |               |              |                |                |
| 848.8                          | -17.3                  | H                  | 16.67                  | 1.78                  | 0.13          | 15.02        | 38.50          | -23.48         |
| 848.8                          | -2.072                 | V                  | 32.51                  | 1.78                  | 0.13          | 30.86        | 38.50          | -7.64          |

## PCS1900

| Frequency<br>(MHz)              | SA<br>Reading<br>(dBm) | Ant .Pol.<br>(H/V) | SG<br>Reading<br>(dBm) | Cable<br>Loss<br>(dB) | Gain<br>(dBi) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------------------------------|------------------------|--------------------|------------------------|-----------------------|---------------|---------------|----------------|----------------|
| Low Channel 512 (1850.20MHz)    |                        |                    |                        |                       |               |               |                |                |
| 1850.2                          | 23.82                  | H                  | 22.42                  | 2.68                  | 10.40         | 30.14         | 33.00          | -10.58         |
| 1850.2                          | 13.27                  | V                  | 11.68                  | 2.68                  | 10.40         | 19.40         | 33.00          | -21.32         |
| Middle Channel 661 (1880.00MHz) |                        |                    |                        |                       |               |               |                |                |
| 1880.0                          | 24.40                  | H                  | 22.90                  | 2.68                  | 10.43         | 30.65         | 33.00          | -10.10         |
| 1880.0                          | 14.72                  | V                  | 12.88                  | 2.68                  | 10.43         | 20.63         | 33.00          | -20.12         |
| High Channel 810 (1909.80MHz)   |                        |                    |                        |                       |               |               |                |                |
| 1909.8                          | 23.83                  | H                  | 22.49                  | 2.70                  | 10.44         | 30.23         | 33.00          | -10.51         |
| 1909.8                          | 12.90                  | V                  | 11.10                  | 2.70                  | 10.44         | 18.84         | 33.00          | -21.90         |

## GPRS 850

| Frequency<br>(MHz)             | SA<br>Reading<br>(dBm) | Ant. Pol.<br>(H/V) | SG<br>Reading<br>(dBm) | Cable<br>Loss<br>(dB) | Gain<br>(dBd) | ERP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------------------|------------------------|--------------------|------------------------|-----------------------|---------------|--------------|----------------|----------------|
| Low Channel 128 (824.20MHz)    |                        |                    |                        |                       |               |              |                |                |
| 824.2                          | -18.67                 | H                  | 15.02                  | 1.76                  | -0.02         | 13.24        | 38.50          | -25.26         |
| 824.2                          | -3.71                  | V                  | 29.98                  | 1.76                  | -0.02         | 28.20        | 38.50          | -10.30         |
| Middle Channel 189 (836.40MHz) |                        |                    |                        |                       |               |              |                |                |
| 836.4                          | -20.12                 | H                  | 13.65                  | 1.75                  | 0.10          | 12.00        | 38.50          | -26.50         |
| 836.4                          | -3.98                  | V                  | 30.68                  | 1.75                  | 0.10          | 29.03        | 38.50          | -9.47          |
| High Channel 251 (848.80MHz)   |                        |                    |                        |                       |               |              |                |                |
| 848.8                          | -18.23                 | H                  | 15.75                  | 1.78                  | 0.13          | 14.10        | 38.50          | -24.40         |
| 848.8                          | -2.37                  | V                  | 32.20                  | 1.78                  | 0.13          | 30.55        | 38.50          | -7.95          |

## GPRS1900

| Frequency<br>(MHz)              | SA<br>Reading<br>(dBm) | Ant .Pol.<br>(H/V) | SG<br>Reading<br>(dBm) | Cable<br>Loss<br>(dB) | Gain<br>(dBi) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------------------------------|------------------------|--------------------|------------------------|-----------------------|---------------|---------------|----------------|----------------|
| Low Channel 512 (1850.20MHz)    |                        |                    |                        |                       |               |               |                |                |
| 1850.2                          | 23.65                  | H                  | 22.25                  | 2.68                  | 10.40         | 29.97         | 33.00          | -10.75         |
| 1850.2                          | 13.79                  | V                  | 12.20                  | 2.68                  | 10.40         | 19.92         | 33.00          | -20.80         |
| Middle Channel 661 (1880.00MHz) |                        |                    |                        |                       |               |               |                |                |
| 1880.0                          | 24.23                  | H                  | 22.73                  | 2.68                  | 10.43         | 30.48         | 33.00          | -10.27         |
| 1880.0                          | 15.23                  | V                  | 13.37                  | 2.68                  | 10.43         | 21.12         | 33.00          | -19.63         |
| High Channel 810 (1909.80MHz)   |                        |                    |                        |                       |               |               |                |                |
| 1909.8                          | 23.62                  | H                  | 22.27                  | 2.70                  | 10.44         | 30.01         | 33.00          | -10.73         |
| 1909.8                          | 13.78                  | V                  | 11.99                  | 2.70                  | 10.44         | 19.73         | 33.00          | -21.01         |

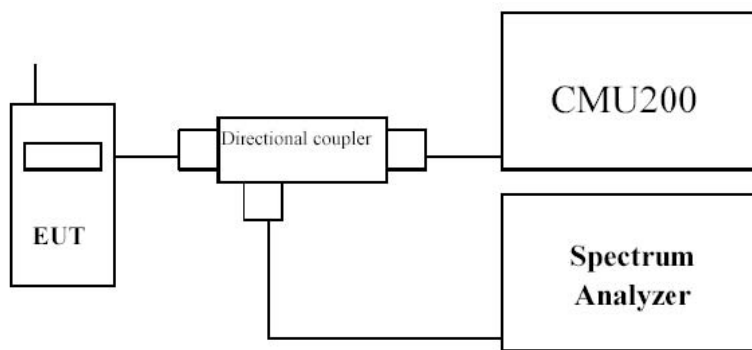
## 4. Modulation Characteristic

### 4.1. Test Equipment

Modulation Characteristic / AC-6

| Instrument                   | Manufacturer | Type No. | Serial No  | Cal. Date  |
|------------------------------|--------------|----------|------------|------------|
| PSA Series Spectrum Analyzer | Agilent      | E4440A   | MY49420184 | 2012.04.10 |
| Radio Communication Tester   | R&S          | CMU 200  | 117088     | 2012.04.29 |
| Dual Directional Coupler     | Agilent      | 778D     | 20160      | 2012.04.20 |
| 10dB Coaxial Coupler         | Agilent      | 87300C   | MY44300299 | 2012.04.20 |
| Temperature/Humidity Meter   | Zhicheng     | ZC1-2    | AC6-TH     | 2012.01.14 |

### 4.2. Test Setup



#### 4.3. Limit

N/A

#### 4.4. Test Procedure

GMSK is a form of binary signaling schemes which represent digital states as a shift between discrete sinusoidal frequencies called Frequency Shift Keying (FSK). Minimum Shift Keying (MSK) is continuous phase FSK with the smallest possible modulation index  $h$ . Modulation index is defined as:  $h = 2 \cdot F \cdot T_b$

where  $F$  = Peak frequency deviation in Hz and  $T_b$  = Bit period in seconds

Two discrete frequencies, representing two distinct digital states, with equal phases at switch time  $t = 0$  requires a minimum value of  $h = 0.5$ . The Gaussian part of GMSK describes the fact that the digital pulses are filtered in the time domain. This results in bits which are sinusoidal rather than square. The effective spectrum is then compressed with the average carrier frequency in the center of the passband. This is a great advantage because of the significantly reduced bandwidth. GMSK is utilized because of these bandwidth conservation properties.

The bandwidth for GSM is a 60 MHz up-link at 1850-1910 MHz and down-link at 1930-1990 MHz. The 65 MHz is divided into 299 channels, each of which is 200 kHz wide. Slight spectral spillage is allowed into neighboring channels (which is minimized by GMSK). This separated transmit/receive frequencies scheme under GSM enables easier duplex filtering.

Within the bandwidth, individual channels are subdivided into multiframes (made of 26 frames), frames (made of 8 time slots), and time slots (made of 8 fields). The time slots are 0.57 ms long allowing 156.25 bits of information including overhead.

The modulation used in GPRS is the same used in GSM. A GSM channel contains eight timeslots, each timeslot is dedicated to one circuit switched call. For GPRS the timeslots are assigned on an as needed basis, and more than one timeslot can be assigned for a particular transmission depending on the network and the device.

#### 4.5. Uncertainty

The measurement uncertainty is defined as 0.1%

#### **4.6. Test Result**

The modulation of GSM/GPRS were verified and confirmed compliance with requirement.



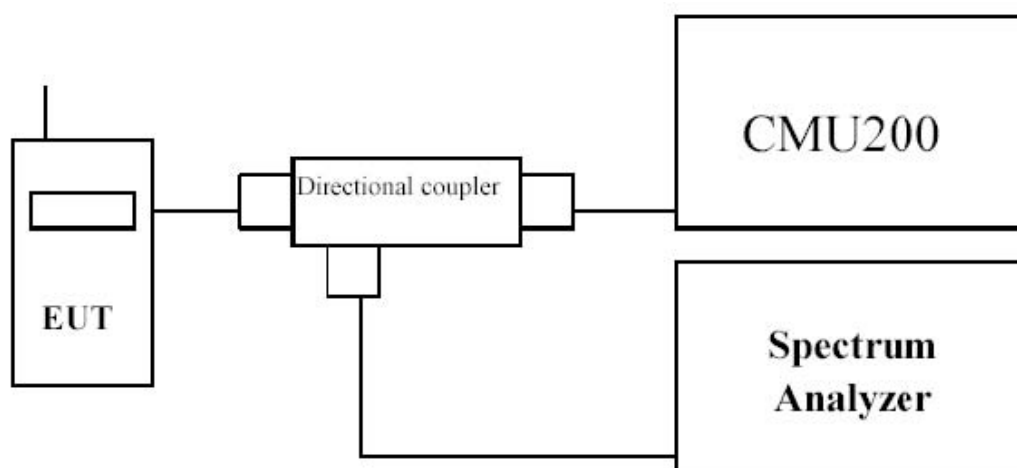
## 5. Occupied Bandwidth

### 5.1. Test Equipment

Occupied Bandwidth / AC-6

| Instrument                   | Manufacturer | Type No. | Serial No  | Cali. Due Date |
|------------------------------|--------------|----------|------------|----------------|
| PSA Series Spectrum Analyzer | Agilent      | E4440A   | MY49420184 | 2012.04.10     |
| Radio Communication Tester   | R&S          | CMU 200  | 117088     | 2012.04.29     |
| Dual Directional Coupler     | Agilent      | 778D     | 20160      | 2012.04.20     |
| 10dB Coaxial Coupler         | Agilent      | 87300C   | MY44300299 | 2012.04.20     |
| Temperature/Humidity Meter   | Zhicheng     | ZC1-2    | AC6-TH     | 2012.01.14     |

### 5.2. Test Setup



**5.3. Limit**

N/A

**5.4. Test Procedure**

Using Occupied Bandwidth measurement function of spectrum analyzer, and setting as follows:

For GSM 850/1900 test --- RBW = 3 kHz and VBW = 10 kHz

**5.5. Uncertainty**

The measurement uncertainty is defined as  $\pm 10$  Hz

## 5.6. Test Result

|              |                     |           |      |
|--------------|---------------------|-----------|------|
| Product      | GSM Mobile Phone    |           |      |
| Test Item    | Occupied Bandwidth  |           |      |
| Test Mode    | Mode 1: GSM850 Link |           |      |
| Date of Test | 2011/09/21          | Test Site | AC-6 |

| Channel No. | Frequency (MHz) | -26dB Occupied Bandwidth (kHz) | 99% Occupied Bandwidth (kHz) |
|-------------|-----------------|--------------------------------|------------------------------|
| 128         | 824.20          | 313.75                         | 244.65                       |
| 189         | 836.40          | 313.55                         | 243.65                       |
| 251         | 848.80          | 311.35                         | 246.43                       |

Figure Channel 128 (824.20MHz)

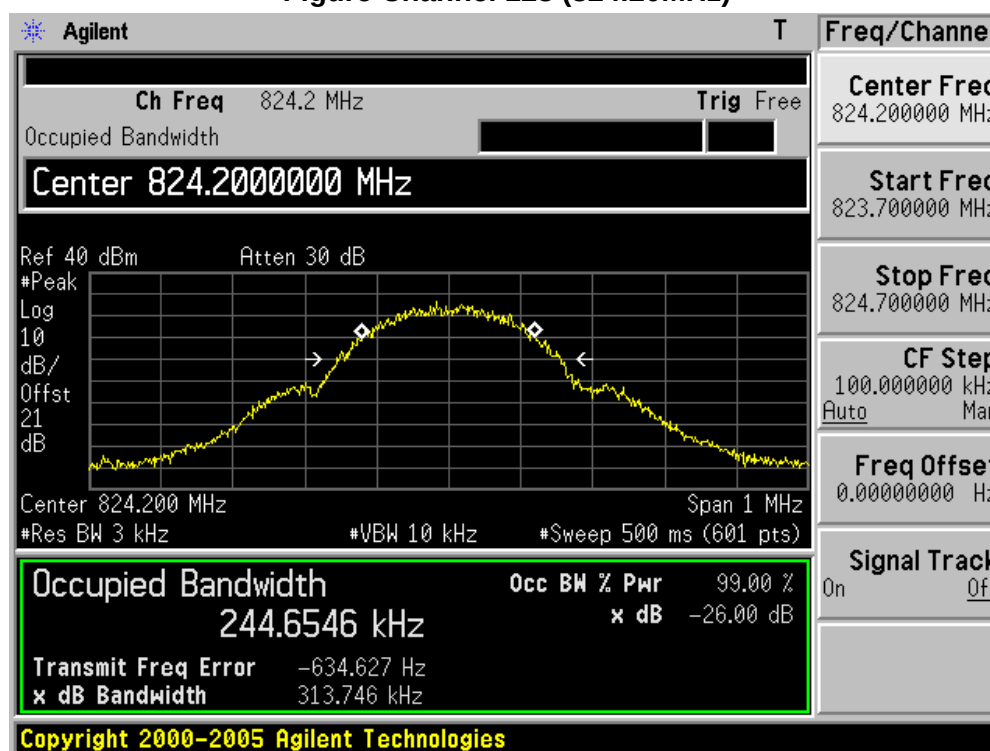


Figure Channel 189 (836.40MHz)

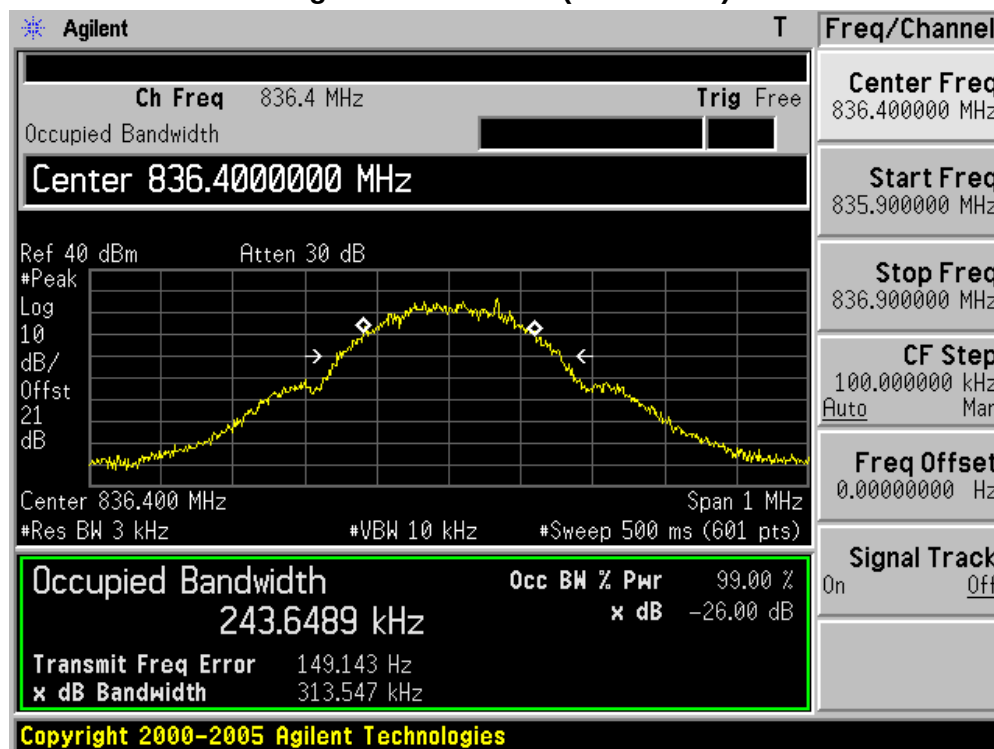
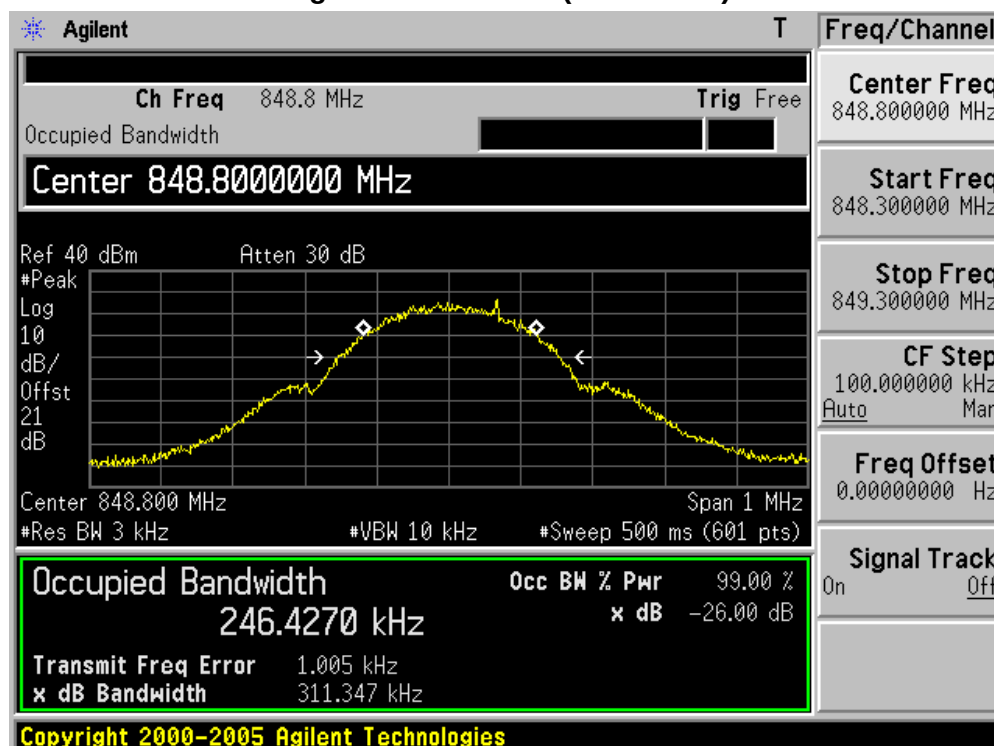


Figure Channel 251 (848.80MHz)



|              |                       |           |      |
|--------------|-----------------------|-----------|------|
| Product      | GSM Mobile Phone      |           |      |
| Test Item    | Occupied Bandwidth    |           |      |
| Test Mode    | Mode 2: PCS 1900 Link |           |      |
| Date of Test | 2011/09/21            | Test Site | AC-6 |

| Channel No. | Frequency (MHz) | -26dB Occupied Bandwidth (kHz) | 99% Occupied Bandwidth (kHz) |
|-------------|-----------------|--------------------------------|------------------------------|
| 512         | 1850.20         | 313.48                         | 244.63                       |
| 661         | 1880.00         | 315.76                         | 245.98                       |
| 810         | 1909.80         | 312.30                         | 246.30                       |

Figure Channel 512 (1850.20MHz)

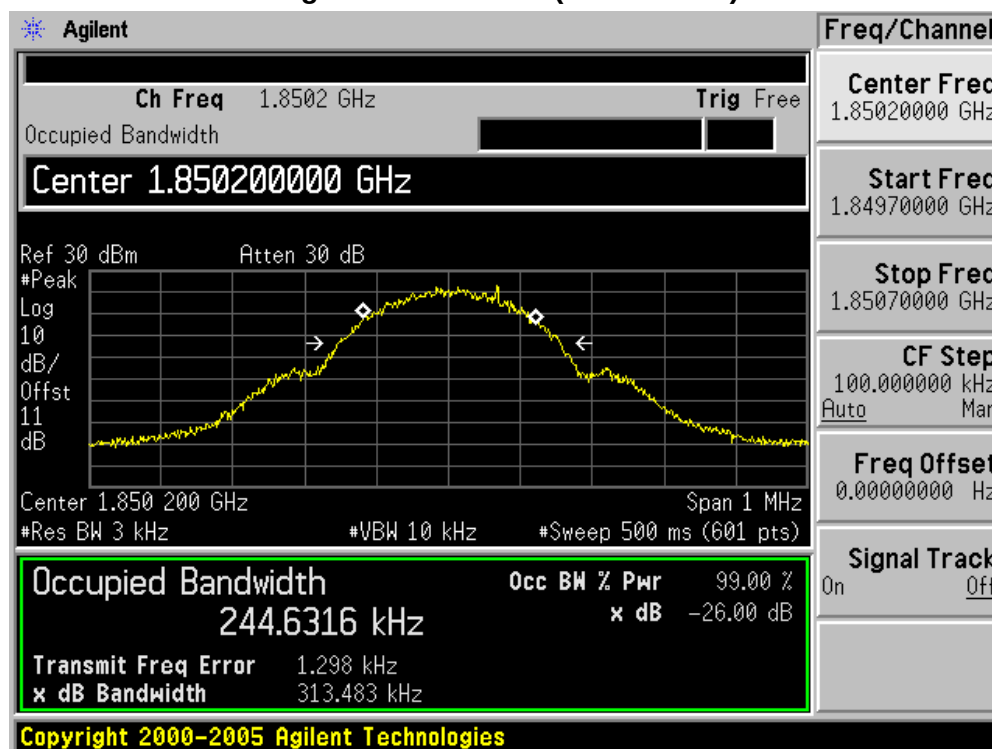


Figure Channel 661 (1880.00MHz)

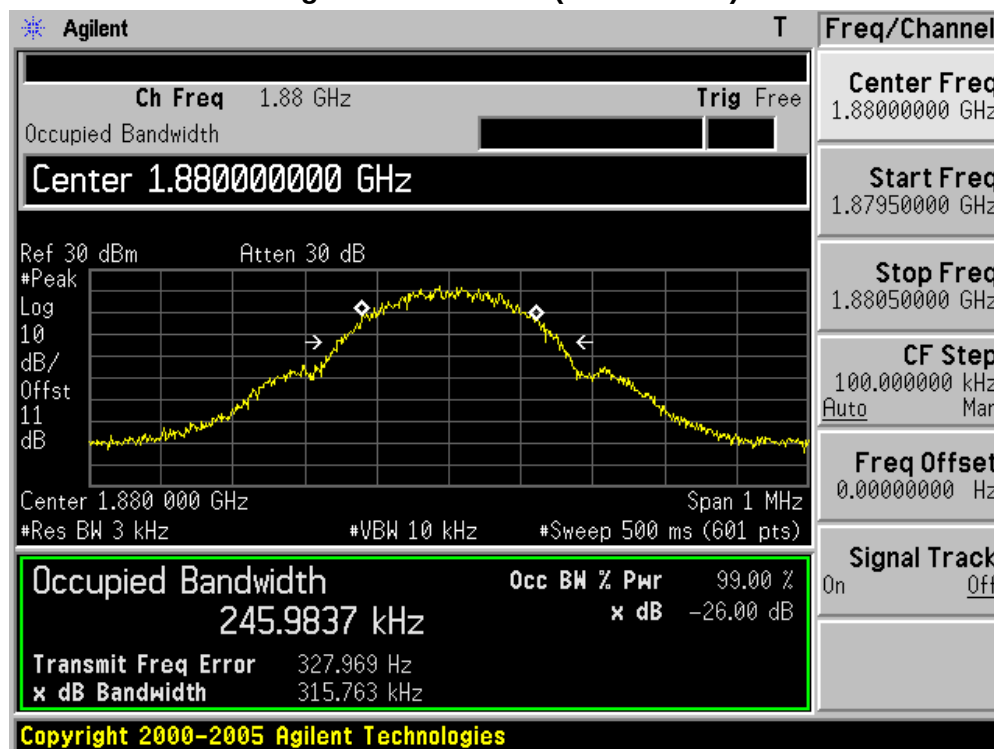
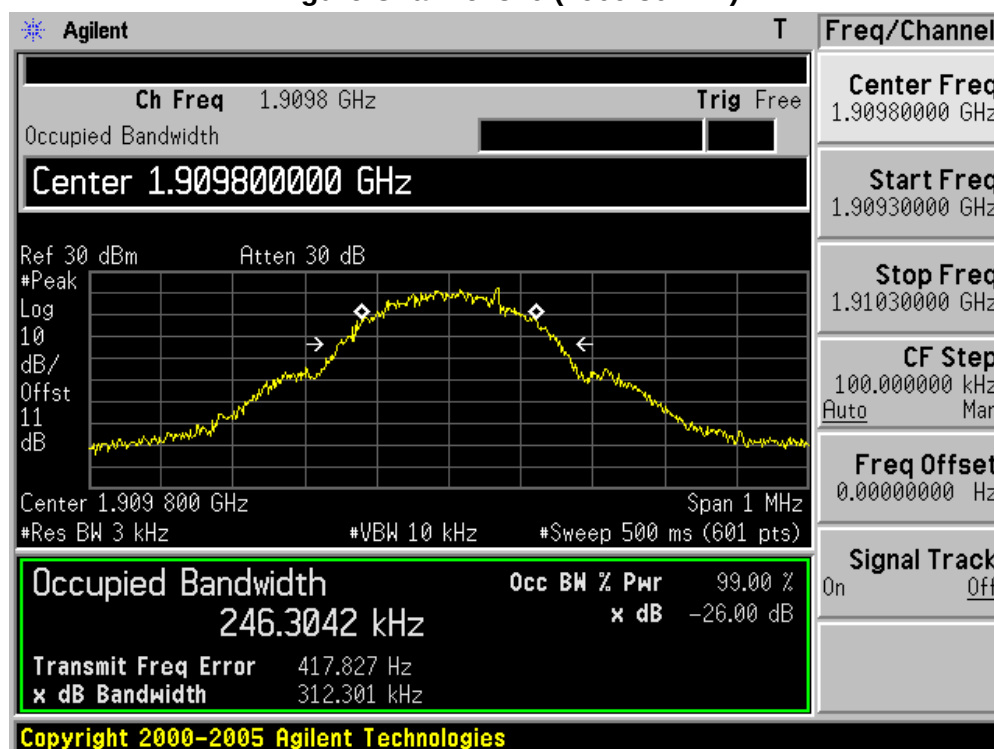


Figure Channel 810 (1909.80MHz)



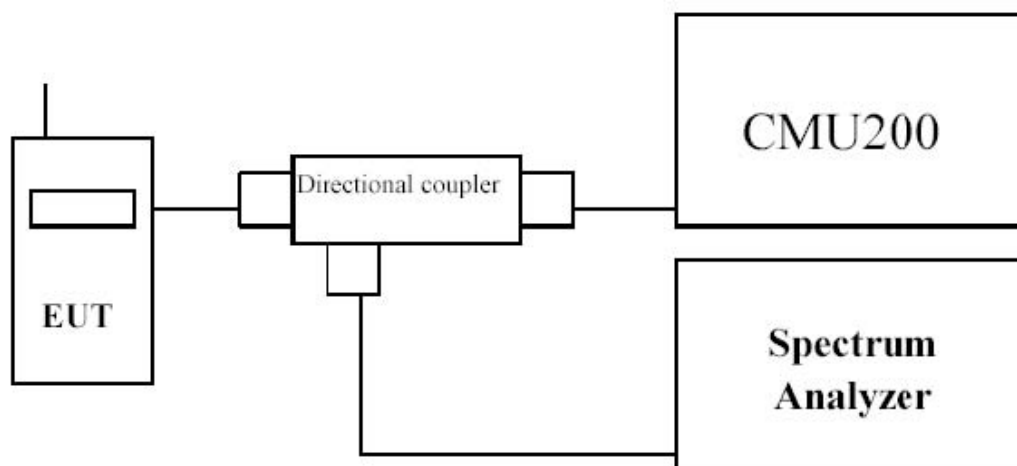
## 6. Spurious Emission At Antenna Terminals (+/- 1MHz)

### 6.1. Test Equipment

Spurious Emission At Antenna Terminals (+/- 1MHz) / AC-6

| Instrument                   | Manufacturer | Type No. | Serial No  | Cali. Due Date |
|------------------------------|--------------|----------|------------|----------------|
| PSA Series Spectrum Analyzer | Agilent      | E4440A   | MY49420184 | 2012.04.10     |
| Radio Communication Tester   | R&S          | CMU 200  | 117088     | 2012.04.29     |
| Dual Directional Coupler     | Agilent      | 778D     | 20160      | 2012.04.20     |
| 10dB Coaxial Coupler         | Agilent      | 87300C   | MY44300299 | 2012.04.20     |
| Temperature/Humidity Meter   | Zhicheng     | ZC1-2    | AC6-TH     | 2012.01.14     |

### 6.2. Test Setup



**6.3. 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.

**6.4. Test Procedure**

In the 1MHz 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 to measure the out of band Emissions.

**6.5. Uncertainty**

The measurement uncertainty is defined as  $\pm 1.2$  dB.



## 6.6. Test Result

|              |                                                   |           |      |
|--------------|---------------------------------------------------|-----------|------|
| Product      | GSM Mobile Phone                                  |           |      |
| Test Item    | Spurious Emission At Antenna Terminals (+/- 1MHz) |           |      |
| Test Mode    | Mode 1: GSM 850 Link                              |           |      |
| Date of Test | 2011/09/21                                        | Test Site | AC-6 |

Figure Channel 128 (824.20MHz)

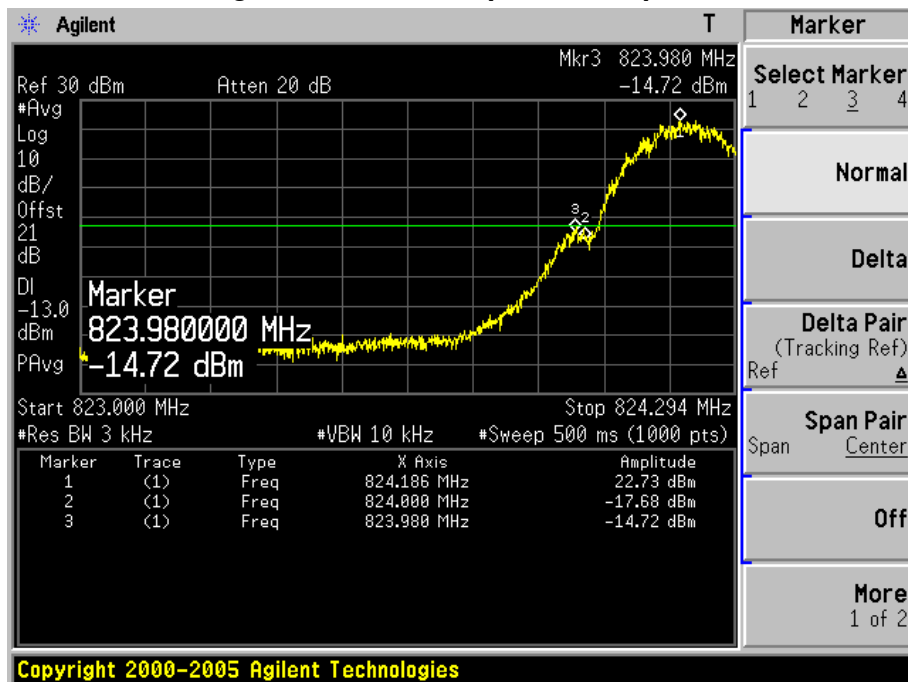
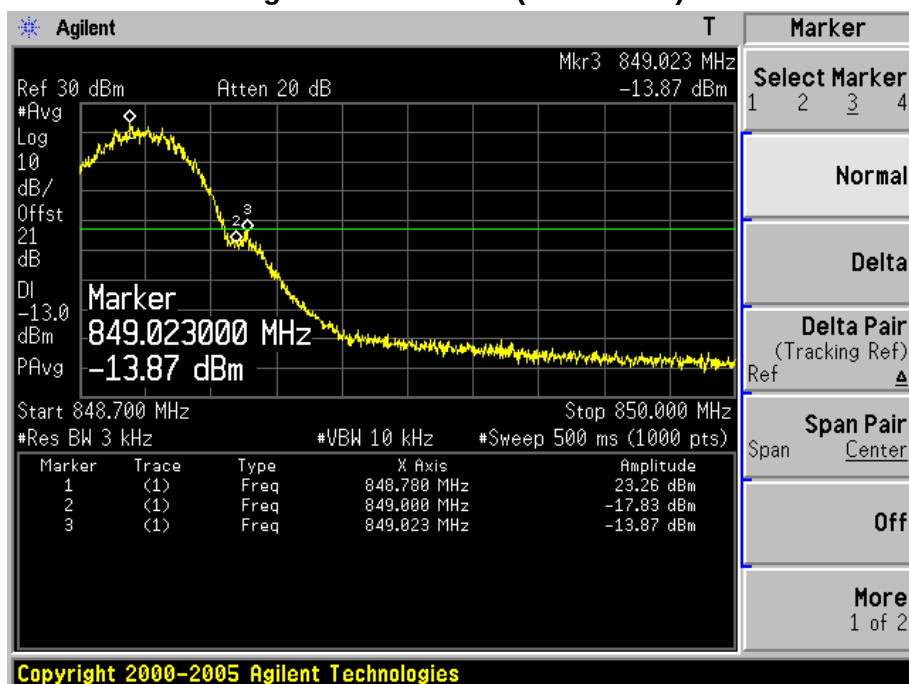


Figure Channel 251 (848.80MHz)



|              |                                                   |           |      |
|--------------|---------------------------------------------------|-----------|------|
| Product      | GSM Mobile Phone                                  |           |      |
| Test Item    | Spurious Emission At Antenna Terminals (+/- 1MHz) |           |      |
| Test Mode    | Mode 2: PCS1900 Link                              |           |      |
| Date of Test | 2011/09/21                                        | Test Site | AC-6 |

Figure Channel 512 (1850.20MHz)

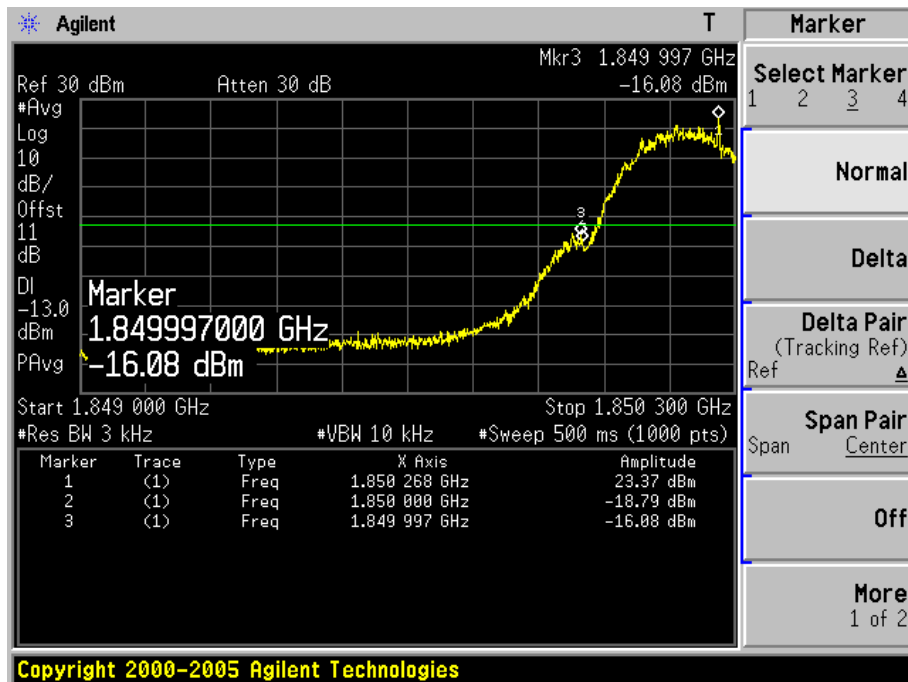
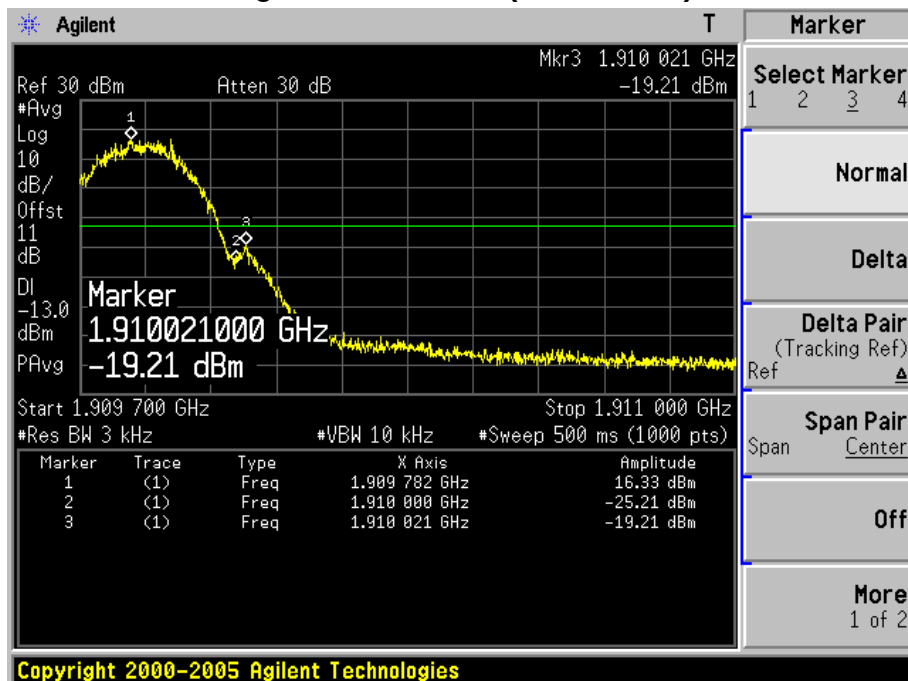


Figure Channel 810 (1909.80MHz)



## 7. Spurious Emission

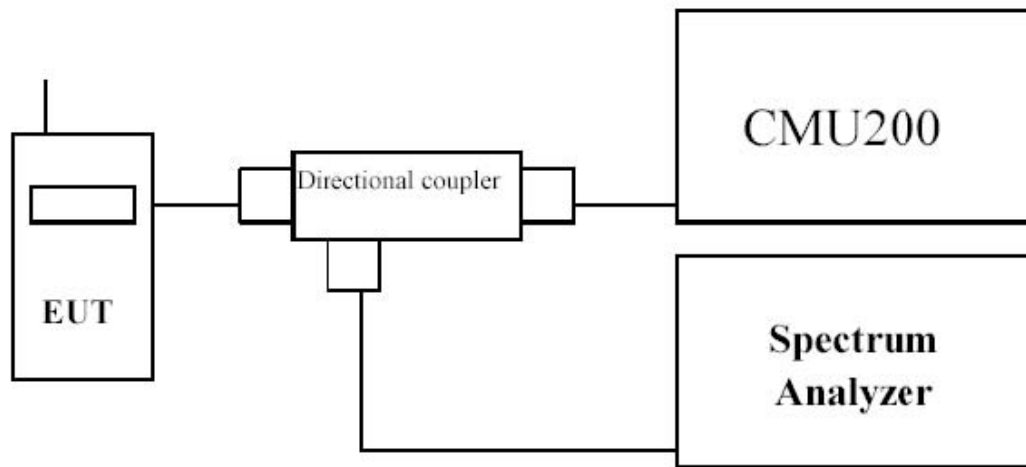
### 7.1. Test Equipment

Spurious Emission / AC-5

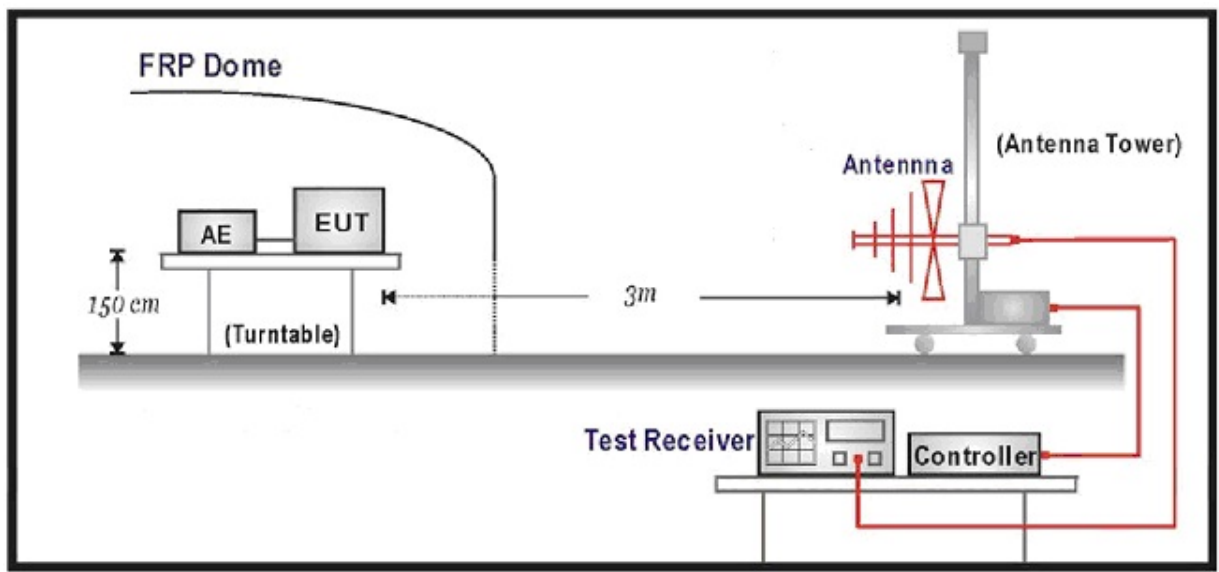
| Instrument                     | Manufacturer | Type No.   | Serial No   | Cali. Due Date |
|--------------------------------|--------------|------------|-------------|----------------|
| PSA Series Spectrum Analyzer   | Agilent      | E4440A     | MY49420184  | 2012.04.10     |
| Radio Communication Tester     | R&S          | CMU 200    | 117088      | 2012.04.29     |
| Dual Directional Coupler       | Agilent      | 778D       | 20160       | 2012.04.20     |
| 10dB Coaxial Coupler           | Agilent      | 87300C     | MY44300299  | 2012.04.20     |
| PSG Analog Signal Generator    | Agilent      | E8257D     | MY44321116  | 2012.04.23     |
| Preamplifier                   | QuieTek      | AP-025C    | CHM-0503006 | 2012.05.05     |
| Preamplifier                   | Miteq        | NSP1800-25 | 1364185     | 2012.05.05     |
| Bilog Antenna                  | Teseq GmbH   | CBL6112D   | 27612       | 2011.10.18     |
| Half Wave Tuned Dipole Antenna | COM-POWER    | AD-100     | 40137       | 2011.11.24     |
| Broad-Band Horn Antenna        | Schwarzbeck  | BBHA9120D  | 737         | 2011.11.24     |
| Broad-Band Horn Antenna        | Schwarzbeck  | BBHA9120D  | 499         | 2012.06.11     |
| Temperature/Humidity Meter     | Zhicheng     | ZC1-2      | AC5-TH      | 2012.01.14     |

## 7.2. Test Setup

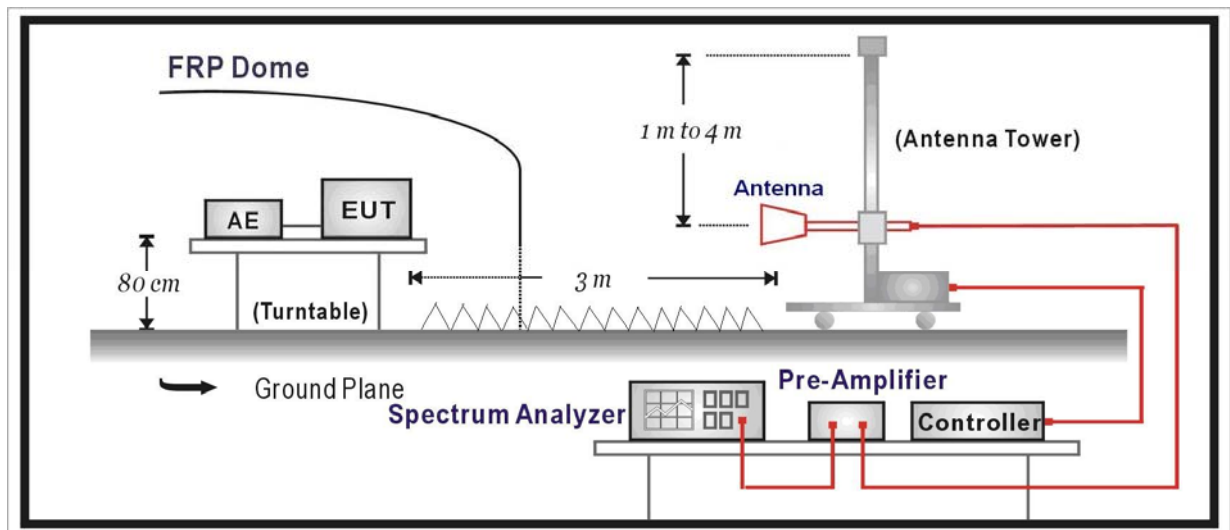
Conducted Spurious Emission Measurement:



Radiated Spurious Measurement: below 1GHz



### Radiated Spurious Measurement: above 1GHz



### 7.3. 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.

### 7.4. Test Procedure

#### Conducted Spurious Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
- EUT Communicate with CMU200, then select a channel for testing.
- Add a correction factor to the display of spectrum, and then test.
- The resolution bandwidth of the spectrum analyzer was set at 1 MHz, sufficient scans were taken to show the out of band Emission if any up to 10<sup>th</sup> harmonic.

#### Radiated Spurious Measurement:

- The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter

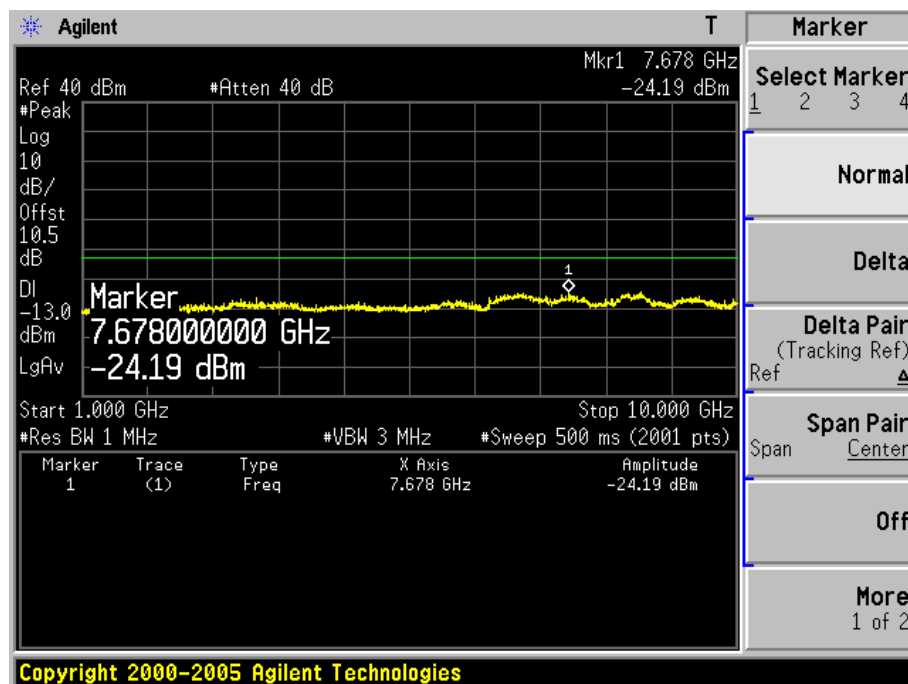
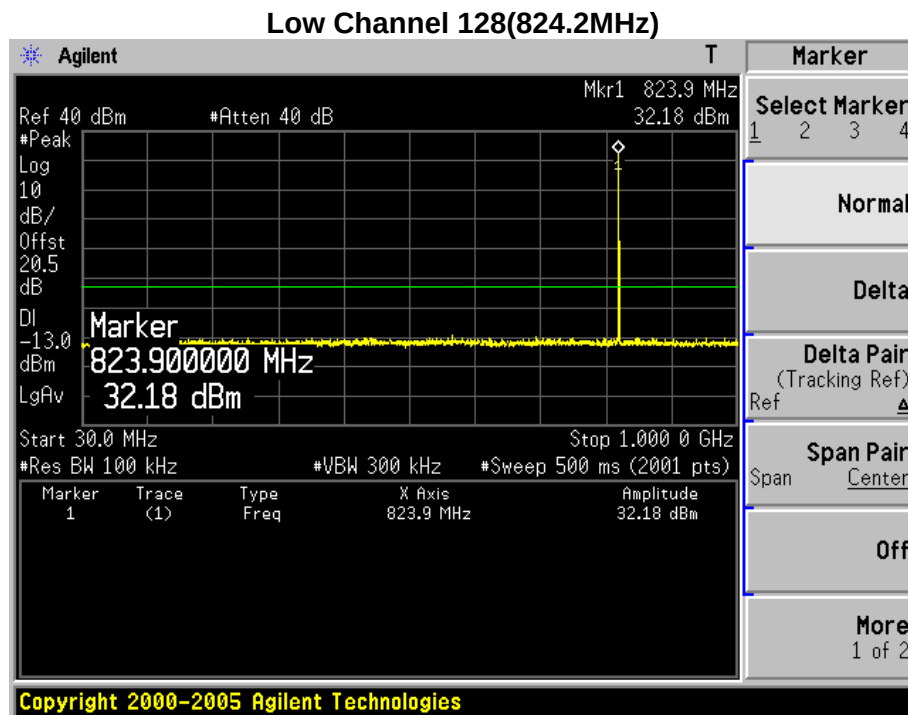
- c) The output of the test antenna shall be connected to the measuring receiver.
- d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- v) The maximum signal level detected by the measuring receiver shall be noted.
- h) The transmitter shall be replaced by a substitution antenna.
- i) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- j) The substitution antenna shall be connected to a calibrated signal generator.
- k) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- l) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- m) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- n) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- o) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- p) The frequency range was checked up to 10<sup>th</sup> harmonic.
- q) Test site anechoic chamber refer to ANSI C63.4: 2009

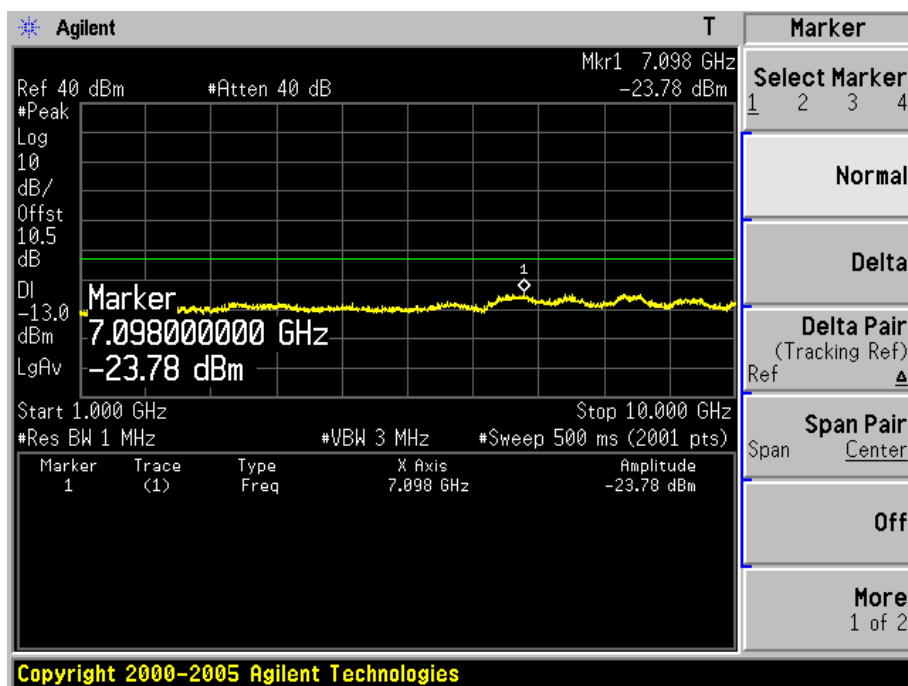
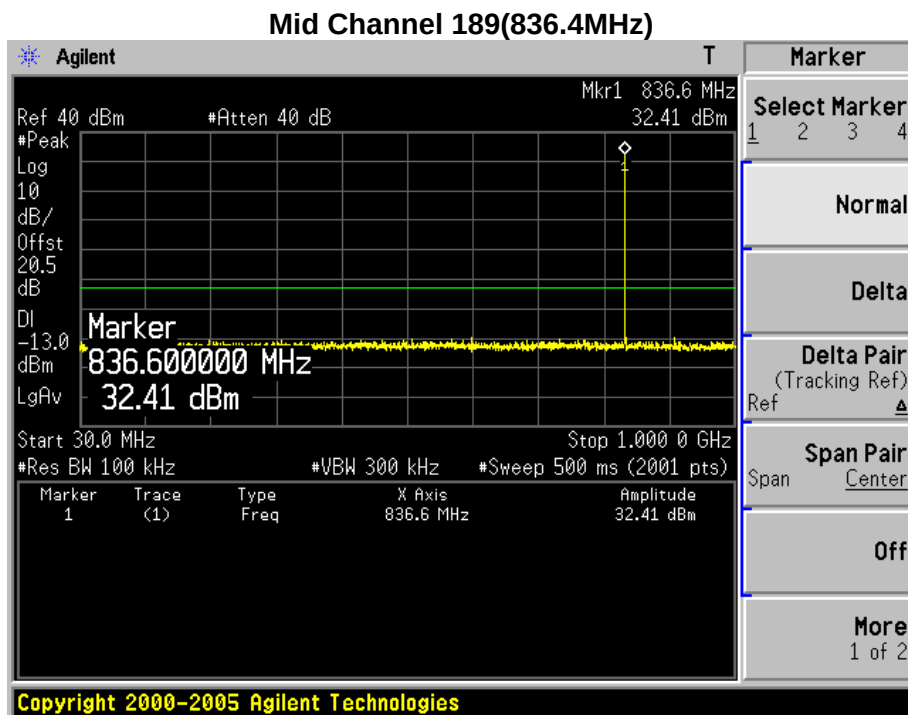
## 7.5. Uncertainty

The measurement uncertainty is defined as 3.2 dB for Radiated Power Measurement.

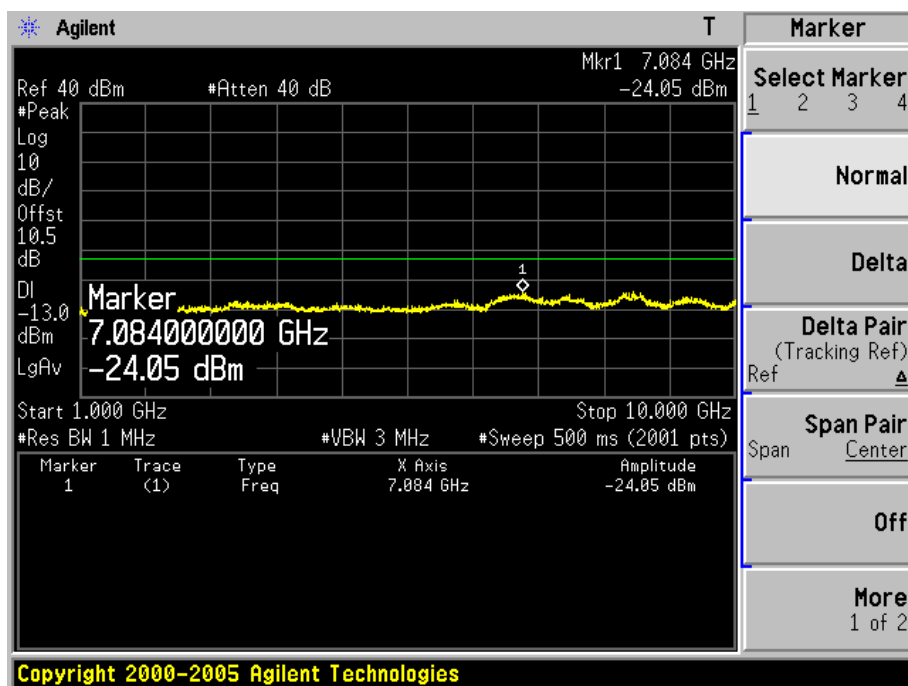
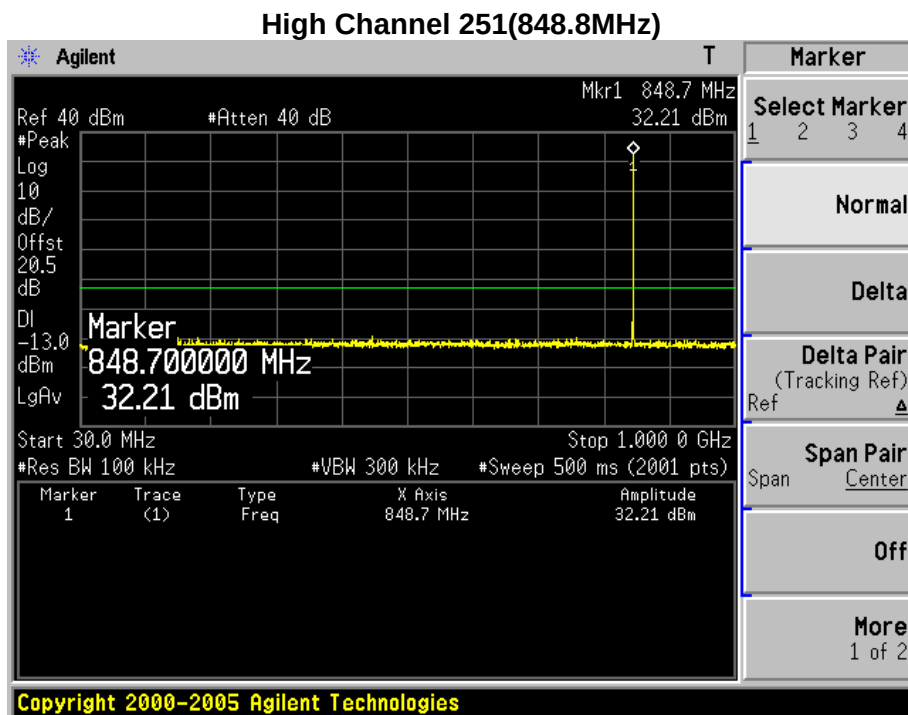
## 7.6. Test Result

|              |                             |           |      |
|--------------|-----------------------------|-----------|------|
| Product      | GSM Mobile Phone            |           |      |
| Test Item    | Conducted Spurious Emission |           |      |
| Test Mode    | Mode 1: GSM 850 Link        |           |      |
| Date of Test | 2011/09/26                  | Test Site | TR-8 |



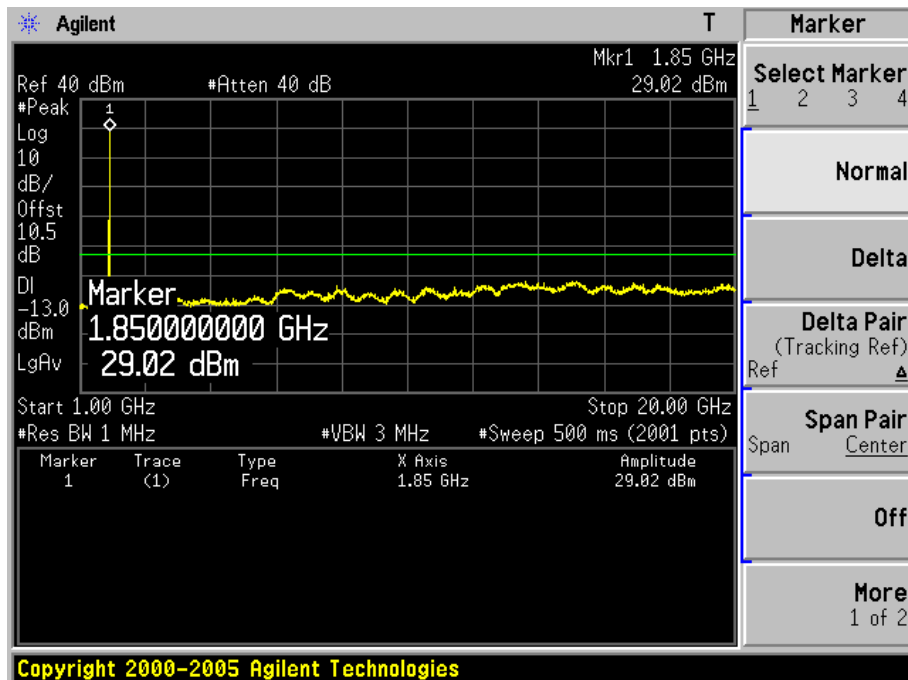
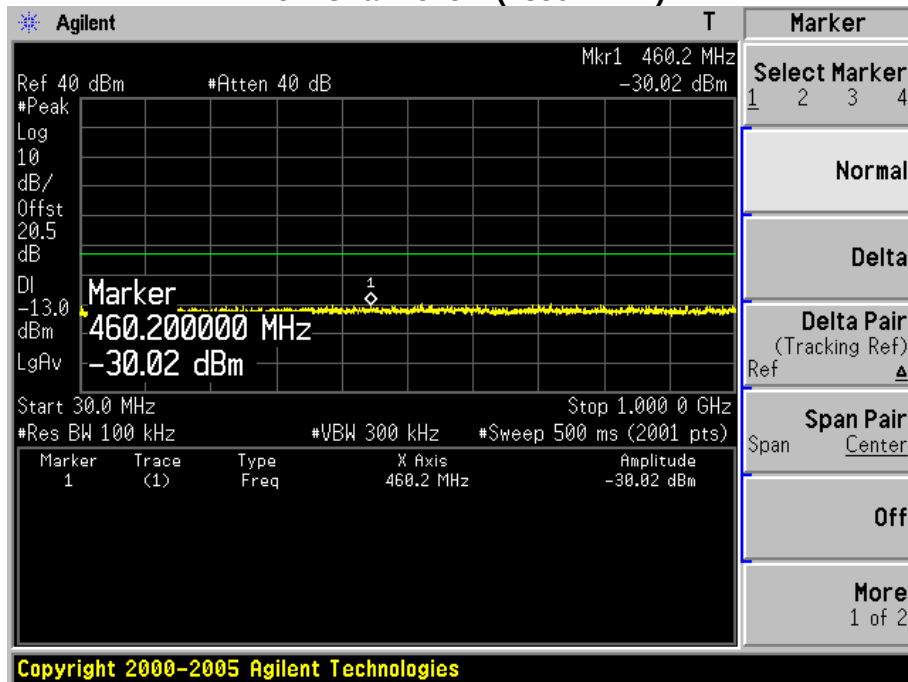




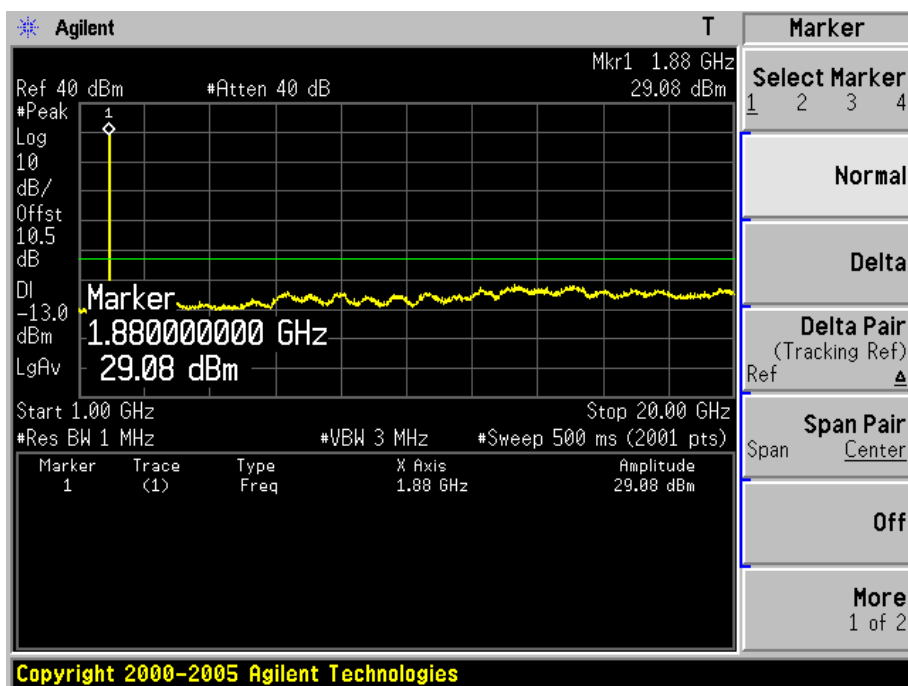
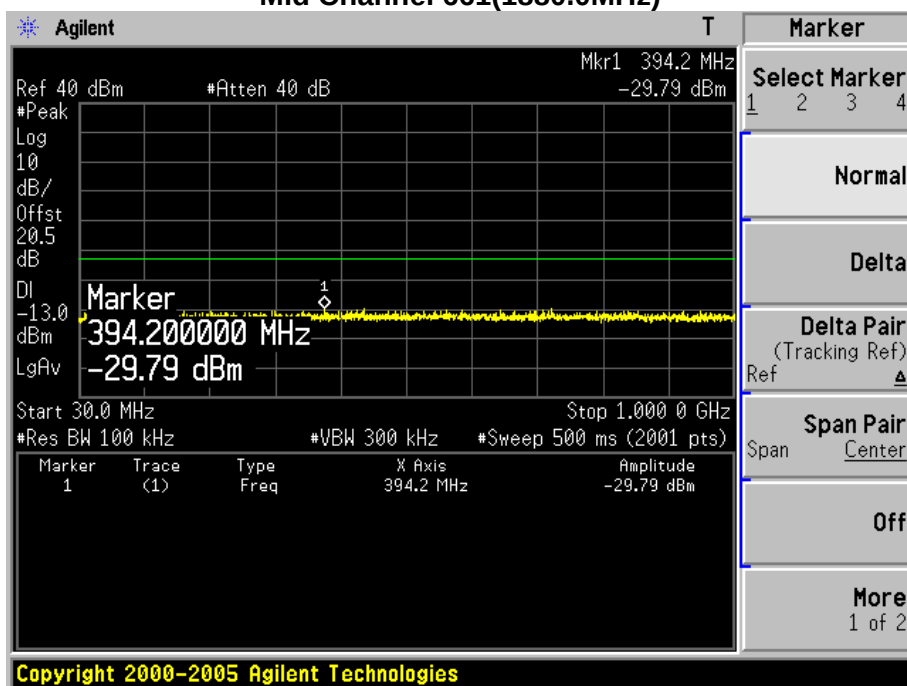


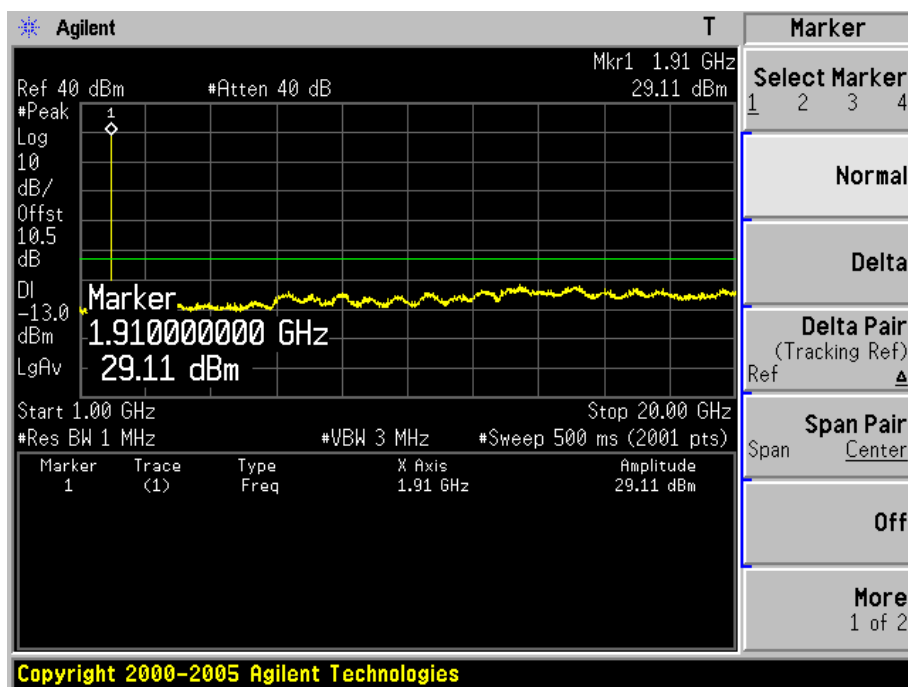
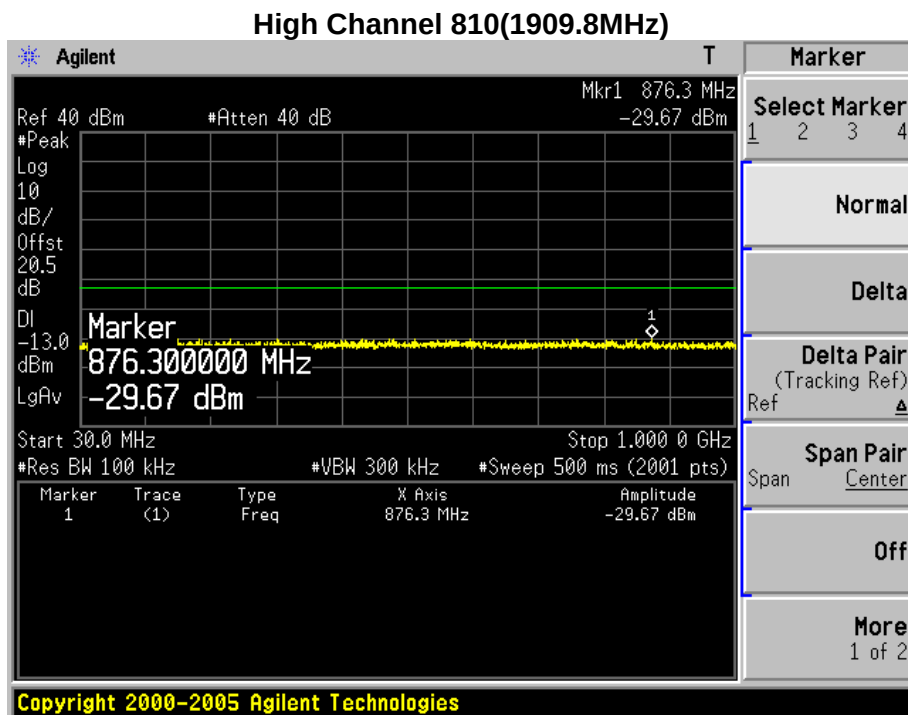
|              |                             |           |      |
|--------------|-----------------------------|-----------|------|
| Product      | GSM Mobile Phone            |           |      |
| Test Item    | Conducted Spurious Emission |           |      |
| Test Mode    | Mode 2: PCS1900 Link        |           |      |
| Date of Test | 2011/09/26                  | Test Site | TR-8 |

## Low Channel 512(1850.2MHz)



### Mid Channel 661(1880.0MHz)





|              |                            |           |      |
|--------------|----------------------------|-----------|------|
| Product      | GSM Mobile Phone           |           |      |
| Test Item    | Radiated Spurious Emission |           |      |
| Test Mode    | Mode 1: GSM850 Link        |           |      |
| Date of Test | 2011/09/21                 | Test Site | AC-5 |

| Frequency<br>(MHz)             | SA<br>Reading<br>(dBm) | Ant.Pol.<br>(H/V) | SG<br>Reading<br>(dBm) | Cable<br>Loss<br>(dB) | Gain<br>(dBi) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------------------|------------------------|-------------------|------------------------|-----------------------|---------------|---------------|----------------|----------------|
| Low Channel 128 (824.20MHz)    |                        |                   |                        |                       |               |               |                |                |
| 1646.00                        | -52.43                 | V                 | -57.72                 | 2.50                  | 9.75          | -50.47        | -13.00         | -44.72         |
| 2470.50                        | -59.42                 | V                 | -60.90                 | 3.12                  | 10.48         | -53.54        | -13.00         | -47.90         |
| 1646.00                        | -51.25                 | H                 | -56.63                 | 2.50                  | 9.75          | -49.38        | -13.00         | -43.63         |
| 2470.50                        | -56.02                 | H                 | -57.35                 | 3.12                  | 10.48         | -49.99        | -13.00         | -44.35         |
| Middle Channel 189 (836.40MHz) |                        |                   |                        |                       |               |               |                |                |
| 1671.50                        | -52.09                 | V                 | -57.46                 | 2.52                  | 9.95          | -50.03        | -13.00         | -44.46         |
| 2513.00                        | -59.74                 | V                 | -61.41                 | 3.18                  | 10.62         | -53.97        | -13.00         | -48.41         |
| 1671.50                        | -50.48                 | H                 | -55.61                 | 2.52                  | 9.95          | -48.18        | -13.00         | -42.61         |
| 2513.00                        | -57.36                 | H                 | -58.65                 | 3.18                  | 10.62         | -51.21        | -13.00         | -45.65         |
| High Channel 251 (848.80MHz)   |                        |                   |                        |                       |               |               |                |                |
| 1697.00                        | -53.50                 | V                 | -58.93                 | 2.54                  | 10.06         | -51.41        | -13.00         | -45.93         |
| 2547.00                        | -53.37                 | V                 | -54.25                 | 3.14                  | 10.68         | -46.71        | -13.00         | -41.25         |
| 1697.00                        | -50.28                 | H                 | -54.98                 | 2.54                  | 10.06         | -47.46        | -13.00         | -41.98         |
| 2547.00                        | -53.41                 | H                 | -54.04                 | 3.14                  | 10.68         | -46.50        | -13.00         | -41.04         |

|              |                            |           |      |
|--------------|----------------------------|-----------|------|
| Product      | GSM Mobile Phone           |           |      |
| Test Item    | Radiated Spurious Emission |           |      |
| Test Mode    | Mode 2: PCS1900 Link       |           |      |
| Date of Test | 2011/09/21                 | Test Site | AC-5 |

| Frequency<br>(MHz)              | SA<br>Reading<br>(dBm) | Ant.Pol.<br>(H/V) | SG<br>Reading<br>(dBm) | Cable<br>Loss<br>(dB) | Gain<br>(dBi) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------------------------------|------------------------|-------------------|------------------------|-----------------------|---------------|---------------|----------------|----------------|
| Low Channel 512 (1850.20MHz)    |                        |                   |                        |                       |               |               |                |                |
| 3703.00                         | -54.32                 | V                 | -53.01                 | 3.84                  | 12.69         | -44.16        | -13.00         | -40.01         |
| 5547.50                         | -64.89                 | V                 | -58.53                 | 4.82                  | 13.15         | -50.20        | -13.00         | -45.53         |
| 3703.00                         | -53.02                 | H                 | -51.80                 | 3.84                  | 12.69         | -42.95        | -13.00         | -38.80         |
| 5547.50                         | -64.59                 | H                 | -58.86                 | 4.82                  | 13.15         | -50.53        | -13.00         | -45.86         |
| Middle Channel 661 (1880.00MHz) |                        |                   |                        |                       |               |               |                |                |
| 3762.50                         | -53.13                 | V                 | -52.06                 | 3.73                  | 12.72         | -43.07        | -13.00         | -39.06         |
| 5641.00                         | -63.81                 | V                 | -58.02                 | 4.93                  | 13.14         | -49.81        | -13.00         | -45.02         |
| 3762.50                         | -53.53                 | H                 | -52.38                 | 3.73                  | 12.72         | -43.39        | -13.00         | -39.38         |
| 5641.00                         | -63.84                 | H                 | -58.37                 | 4.93                  | 13.14         | -50.16        | -13.00         | -45.37         |
| High Channel 810 (1909.80MHz)   |                        |                   |                        |                       |               |               |                |                |
| 3822.00                         | -51.60                 | V                 | -50.03                 | 4.02                  | 12.73         | -41.32        | -13.00         | -37.03         |
| 5726.00                         | -64.37                 | V                 | -57.85                 | 4.87                  | 13.11         | -49.61        | -13.00         | -44.85         |
| 3822.00                         | -50.93                 | H                 | -49.21                 | 4.02                  | 12.73         | -40.50        | -13.00         | -36.21         |
| 5726.00                         | -61.97                 | H                 | -55.88                 | 4.87                  | 13.11         | -47.64        | -13.00         | -42.88         |

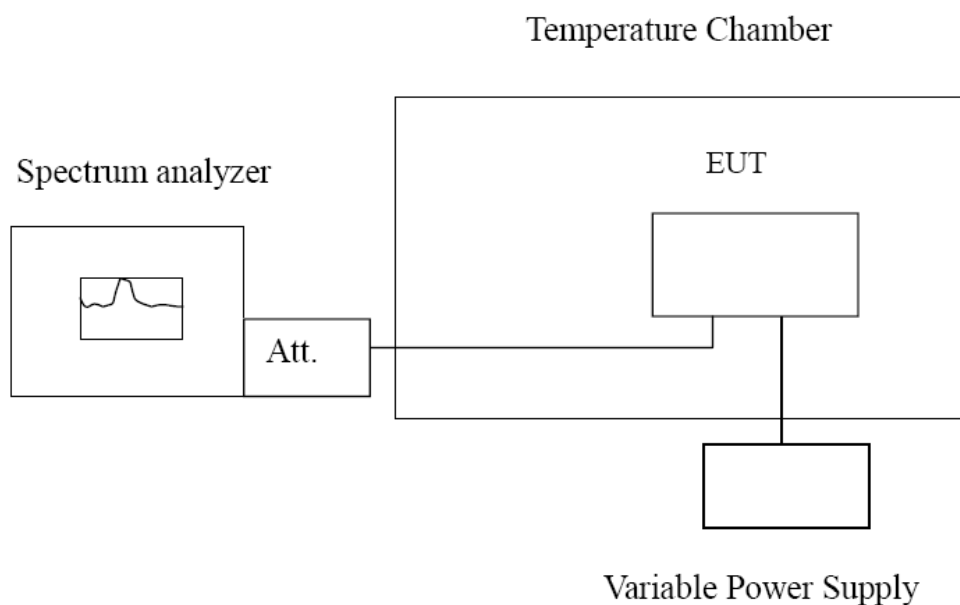
## 8. Frequency Stability Under Temperature & Voltage Variations

### 8.1. Test Equipment

Frequency Stability Under Temperature & Voltage Variations / AC-6

| Instrument                     | Manufacturer | Type No.     | Serial No    | Cali. Due Date |
|--------------------------------|--------------|--------------|--------------|----------------|
| PSA Series Spectrum Analyzer   | Agilent      | E4440A       | MY49420184   | 2012.04.10     |
| Radio Communication Tester     | R&S          | CMU 200      | 117088       | 2012.04.29     |
| Dual Directional Coupler       | Agilent      | 778D         | 20160        | 2012.04.20     |
| 10dB Coaxial Coupler           | Agilent      | 87300C       | MY44300299   | 2012.04.20     |
| DC Power Supply                | IDRC         | CD-035-020PR | 977272       | 2011.10.21     |
| Temperature & Humidity Chamber | Gaoyu        | TH-1P-B      | WIT-05121302 | 2012.01.19     |
| Temperature/Humidity Meter     | Zhicheng     | ZC1-2        | AC6-TH       | 2012.01.14     |

### 8.2. Test Setup



### 8.3. Limit

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

|       |                         |
|-------|-------------------------|
| Limit | $< \pm 2.5 \text{ ppm}$ |
|-------|-------------------------|

### 8.4. Test Procedure

#### Frequency Stability Under Temperature Variations:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

#### Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ( $\pm 15\%$ ) and endpoint, record the maximum frequency change.

### 8.5. Uncertainty

The measurement uncertainty is defined as  $\pm 10 \text{ Hz}$ .



## 8.6. Test Result

|              |                                                            |           |     |
|--------------|------------------------------------------------------------|-----------|-----|
| Product      | GSM Mobile Phone                                           |           |     |
| Test Item    | Frequency Stability Under Temperature & Voltage Variations |           |     |
| Test Mode    | Mode 1: GSM 850 Link                                       |           |     |
| Date of Test | 2011/09/21                                                 | Test Site | TR7 |

### Frequency Stability under Temperature

| Temperature Interval (°C) | Test Frequency (MHz) | Deviation (Hz) | Limit (Hz) |
|---------------------------|----------------------|----------------|------------|
| -30                       | 836.40               | -93            | ± 2091     |
| -20                       | 836.40               | -113           | ± 2091     |
| -10                       | 836.40               | -120           | ± 2091     |
| 0                         | 836.40               | -64            | ± 2091     |
| 10                        | 836.40               | -87            | ± 2091     |
| 20                        | 836.40               | -73            | ± 2091     |
| 30                        | 836.40               | -66            | ± 2091     |
| 40                        | 836.40               | -75            | ± 2091     |
| 50                        | 836.40               | -41            | ± 2091     |

### Frequency Stability under Voltage

| DC Voltage (V) | Test Frequency (MHz) | Deviation (Hz) | Limit (Hz) |
|----------------|----------------------|----------------|------------|
| 4.200          | 836.40               | -63            | ± 2091     |
| 3.700          | 836.40               | -11            | ± 2091     |
| 3.600          | 836.40               | -48            | ± 2091     |

|              |                                                            |           |     |
|--------------|------------------------------------------------------------|-----------|-----|
| Product      | GSM Mobile Phone                                           |           |     |
| Test Item    | Frequency Stability Under Temperature & Voltage Variations |           |     |
| Test Mode    | Mode 2: PCS1900 Link                                       |           |     |
| Date of Test | 2011/09/21                                                 | Test Site | TR7 |

#### Frequency Stability under Temperature

| Temperature Interval (°C) | Test Frequency (MHz) | Deviation (Hz) | Limit (Hz) |
|---------------------------|----------------------|----------------|------------|
| -30                       | 1880.00              | -17            | ± 4700     |
| -20                       | 1880.00              | -24            | ± 4700     |
| -10                       | 1880.00              | -44            | ± 4700     |
| 0                         | 1880.00              | -26            | ± 4700     |
| 10                        | 1880.00              | -31            | ± 4700     |
| 20                        | 1880.00              | -8             | ± 4700     |
| 30                        | 1880.00              | 11             | ± 4700     |
| 40                        | 1880.00              | 20             | ± 4700     |
| 50                        | 1880.00              | 34             | ± 4700     |

#### Frequency Stability under Voltage

| DC Voltage (V) | Test Frequency (MHz) | Deviation (Hz) | Limit (Hz) |
|----------------|----------------------|----------------|------------|
| 4.200          | 1880.00              | -22            | ± 4700     |
| 3.700          | 1880.00              | -23            | ± 4700     |
| 3.600          | 1880.00              | -34            | ± 4700     |