



# FCC RF Test Report

**APPLICANT** : Huawei Technologies Co., Ltd.  
**EQUIPMENT** : HUAWEI Ascend G 301;  
HSDPA/UMTS/GSM/GPRS/EDGE Mobile  
Phone with Bluetooth

**BRAND NAME** : HUAWEI  
**MODEL NAME** : HUAWEI U8816-1, U8816-1  
**FCC ID** : QISU8816-1  
**STANDARD** : FCC 47 CFR Part 2, 22(H), 24(E)  
**CLASSIFICATION** : PCS Licensed Transmitter Held to Ear (PCE)  
**Tx/Rx FREQUENCY RANGE** : GSM850 : 824.2 ~ 848.8 MHz /  
869.2 ~ 893.8 MHz  
GSM1900 : 1850.2 ~ 1909.8 MHz /  
1930.2 ~ 1989.8 MHz

**MAX. ERP/EIRP POWER** : GSM850 (GSM) : 0.2911 W  
GSM850 (EDGE 8) : 0.0925 W  
GSM1900 (GSM) : 0.9311 W  
GSM1900 (EDGE 8) : 0.4365 W

The product was received on Apr. 06, 2012 and completely tested on May 28, 2012. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai / Manager



**SPORTON INTERNATIONAL (KUNSHAN) INC.**  
**No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.**



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### SUMMARY OF TEST RESULT

| Report Section | FCC Rule                            | Description                          | Limit                                  | Result | Remark                                     |
|----------------|-------------------------------------|--------------------------------------|--|--------|--|
| 3.1            | §2.1046                             | Conducted Output Power               | N/A                                    | PASS   | -  |
| 3.2            | §22.913(a)(2)                       | Effective Radiated Power             | < 7 Watts                              | PASS   | -  |
| 3.2            | §24.232(c)                          | Equivalent Isotropic Radiated Power  | < 2 Watts                              | PASS   | -  |
| 3.3            | §2.1053<br>§22.917(a)<br>§24.238(a) | Field Strength of Spurious Radiation | $< 43 + 10 \log_{10}(P[\text{Watts}])$ | PASS   | Under limit<br>45.53 dB at<br>7520.000 MHz |

# 1 General Description

## 1.1 Applicant

**Huawei Technologies Co., Ltd.**

Bantian, Longgang District, Shenzhen, 51829 Guangdong, P.R.China

## 1.2 Manufacturer

**Huawei Technologies Co., Ltd.**

Bantian, Longgang District, Shenzhen, 51829 Guangdong, P.R.China

## 1.3 Feature of Equipment Under Test

| Product Feature & Specification        |   |
|--|---|
| <b>Equipment</b>                       | HUAWEI Ascend G 301; HSDPA/UMTS/GSM/GPRS/EDGE Mobile Phone with Bluetooth |
| <b>Brand Name</b>                      | HUAWEI  |
| <b>Model Name</b>                      | HUAWEI U8816-1, U8816-1   |
| <b>FCC ID</b>                          | QISU8816-1  |
| <b>Tx Frequency</b>                    | GSM850 : 824 MHz ~ 849 MHz<br>GSM1900 : 1850 MHz ~ 1910 MHz               |
| <b>Rx Frequency</b>                    | GSM850 : 869 MHz ~ 894 MHz<br>GSM1900 : 1930 MHz ~ 1990 MHz               |
| <b>Maximum Output Power to Antenna</b> | GSM850 : 32.24 dBm<br>GSM1900 : 29.78 dBm                                 |
| <b>Antenna Type</b>                    | Fixed Internal Antenna  |
| <b>HW Version</b>                      | HD3U8815M   |
| <b>SW Version</b>                      | U8816V100R001C00B879  |
| <b>Type of Modulation</b>              | GSM: GMSK<br>GPRS: GMSK<br>EDGE: GMSK / 8PSK                              |
| <b>EUT Stage</b>                       | Identical Prototype   |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Emission Designator and Maximum ERP/EIRP Power

| FCC Rule | System         | Type of Modulation | Emission Designator | Maximum ERP/EIRP |
|----------|----------------|--------------------|---------------------|------------------|
| Part 22  | GSM850 GSM     | GMSK               | 248KGXW             | 0.2911 W         |
| Part 22  | GSM850 EDGE 8  | 8PSK               | 238KG7W             | 0.0925 W         |
| Part 24  | GSM1900 GSM    | GMSK               | 246KGXW             | 0.9311 W         |
| Part 24  | GSM1900 EDGE 8 | 8PSK               | 246KG7W             | 0.4365 W         |

## 1.5 Testing Site

|                           |  |           |                                |
|---------------------------|--|-----------|--------------------------------|
| <b>Test Site</b>          | SPORTON INTERNATIONAL (KUNSHAN) INC.   |           |                                |
| <b>Test Site Location</b> | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.<br>TEL: +86-0512-5790-0158<br>FAX: +86-0512-5790-0958 |           |                                |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b>  |           | <b>FCC/IC Registration No.</b> |
|                           | TH01-KS  | 03CH01-KS | 149928/4086E-1                 |

## 1.6 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.
- ♦ FCC 47 CFR Part 2, 22(H), 24(E)
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v01

### Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



### 1.7 Ancillary Equipment List

| Item | Equipment        | Trade Name | Model No. | FCC ID | Data Cable | Power Cord        |
|------|------------------|------------|-----------|--------|------------|-------------------|
| 1.   | System Simulator | R&S        | CMU200    | N/A    | N/A        | Unshielded, 1.8 m |
| 2.   | DC Power Supply  | GWINSTEK   | GPS-3030D | N/A    | N/A        | Unshielded, 1.8 m |

## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for GSM850.
2. 30 MHz to 19000 MHz for GSM1900.

| Test Modes |   |   |
|------------|---|---|
| Band       | Radiated TCs  | Conducted TCs   |
| GSM 850    | <ul style="list-style-type: none"> <li>■ GSM Link</li> <li>■ EDGE 8 Link</li> </ul> | <ul style="list-style-type: none"> <li>■ GSM Link</li> <li>■ EDGE 8 Link</li> </ul> |
| GSM 1900   | <ul style="list-style-type: none"> <li>■ GSM Link</li> <li>■ EDGE 8 Link</li> </ul> | <ul style="list-style-type: none"> <li>■ GSM Link</li> <li>■ EDGE 8 Link</li> </ul> |

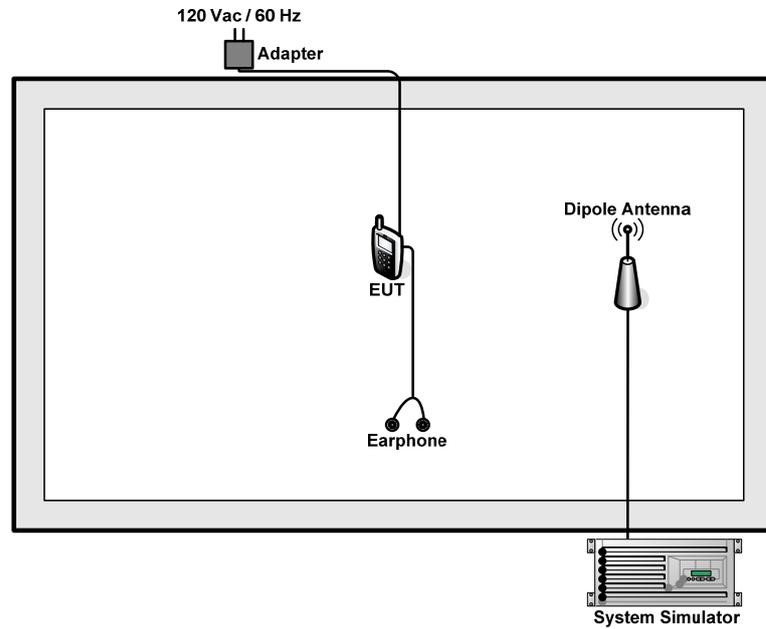
**Note:**

1. The maximum power levels are GSM mode for GSM850 and GSM1900 GMSK link, EDGE multi-slot class 8 mode for 8PSK link, only these modes were used for all tests.
2. Because there are individual antennas for each WWAN, WLAN, and Bluetooth, the co-location test modes are not required.

The conducted power tables are as follows:

| Conducted Power (*Unit: dBm)    |        |       |       |         |        |        |
|---------------------------------|--------|-------|-------|---------|--------|--------|
| Band                            | GSM850 |       |       | GSM1900 |        |        |
| Channel                         | 128    | 189   | 251   | 512     | 661    | 810    |
| Frequency                       | 824.2  | 836.4 | 848.8 | 1850.2  | 1880.0 | 1909.8 |
| GSM (1 Uplink)                  | 32.24  | 32.18 | 32.10 | 29.27   | 29.77  | 29.78  |
| GPRS 8 (1 Uplink) – CS1         | 32.26  | 32.18 | 32.10 | 29.27   | 29.77  | 29.80  |
| GPRS 10 (2 Uplink) – CS1        | 31.13  | 31.09 | 31.04 | 28.14   | 28.10  | 28.18  |
| EDGE 8 (8PSK, 1 Uplink) – MCS9  | 26.78  | 26.74 | 26.66 | 25.77   | 25.81  | 25.89  |
| EDGE 10 (8PSK, 2 Uplink) – MCS9 | 25.76  | 25.71 | 25.64 | 24.74   | 24.75  | 24.82  |

## 2.2 Connection Diagram of Test System



### 3 Test Result

#### 3.1 Conducted Output Power Measurement

##### 3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

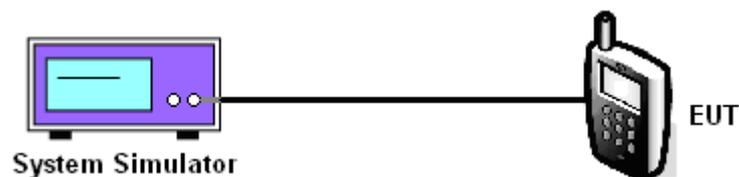
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.

##### 3.1.4 Test Setup



**3.1.5 Test Result of Conducted Output Power**

| Cellular Band           |              |              |               |                 |              |               |
|-------------------------|--------------|--------------|---------------|-----------------|--------------|---------------|
| Modes                   | GSM850 (GSM) |              |               | GSM850 (EDGE 8) |              |               |
| Channel                 | 128<br>(Low) | 189<br>(Mid) | 251<br>(High) | 128<br>(Low)    | 189<br>(Mid) | 251<br>(High) |
| Frequency (MHz)         | 824.2        | 836.4        | 848.8         | 824.2           | 836.4        | 848.8         |
| Conducted Power (dBm)   | 32.24        | 32.18        | 32.10         | 26.78           | 26.74        | 26.66         |
| Conducted Power (Watts) | 1.67         | 1.65         | 1.62          | 0.48            | 0.47         | 0.46          |

| PCS Band                |               |              |               |                  |              |               |
|-------------------------|---------------|--------------|---------------|------------------|--------------|---------------|
| Modes                   | GSM1900 (GSM) |              |               | GSM1900 (EDGE 8) |              |               |
| Channel                 | 512<br>(Low)  | 661<br>(Mid) | 810<br>(High) | 512<br>(Low)     | 661<br>(Mid) | 810<br>(High) |
| Frequency (MHz)         | 1850.2        | 1880         | 1909.8        | 1850.2           | 1880         | 1909.8        |
| Conducted Power (dBm)   | 29.27         | 29.77        | 29.78         | 25.77            | 25.81        | 25.89         |
| Conducted Power (Watts) | 0.85          | 0.95         | 0.95          | 0.38             | 0.38         | 0.39          |



## 3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

### 3.2.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v01. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The EUT was placed on a turntable with 1.0 meter height in a fully anechoic chamber.
2. The EUT was set at 1.2 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiated power.
4. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
5. Taking the record of maximum ERP/EIRP.
6. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
7. The conducted power at the terminal of the dipole antenna is measured.
8. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
9.  $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$

$P_s$  (dBm) : Input power to substitution antenna.

$G_s$  (dBi or dBd) : Substitution antenna Gain.

$E_t = R_t + AF$

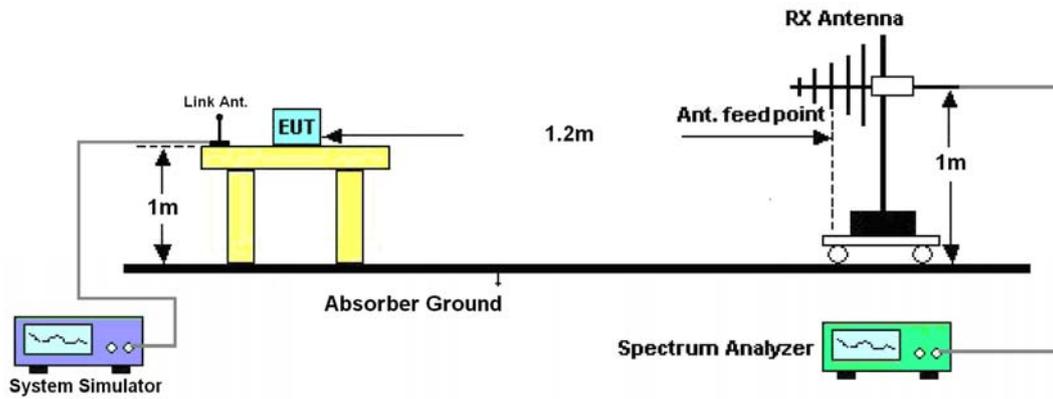
$E_s = R_s + AF$

$AF$  (dB/m) : Receive antenna factor

$R_t$  : The highest received signal in spectrum analyzer for EUT.

$R_s$  : The highest received signal in spectrum analyzer for substitution antenna.

### 3.2.4 Test Setup



**3.2.5 Test Result of ERP**

| <b>GSM850 (GSM) Radiated Power ERP</b> |                 |                 |                 |                 |                  |                |
|--|-----------------|-----------------|-----------------|-----------------|------------------|----------------|
| Horizontal Polarization                |                 |                 |                 |                 |                  |                |
| <b>Frequency (MHz)</b>                 | <b>Rt (dBm)</b> | <b>Rs (dBm)</b> | <b>Ps (dBm)</b> | <b>Gs (dBd)</b> | <b>ERP (dBm)</b> | <b>ERP (W)</b> |
| 824.20                                 | -25.66          | -48.12          | 0.00            | -1.08           | 21.38            | 0.1374         |
| 836.40                                 | -24.07          | -48.28          | 0.00            | -0.93           | 23.28            | 0.2128         |
| 848.80                                 | -22.95          | -48.35          | 0.00            | -0.76           | 24.64            | 0.2911         |
| Vertical Polarization                  |                 |                 |                 |                 |                  |                |
| <b>Frequency (MHz)</b>                 | <b>Rt (dBm)</b> | <b>Rs (dBm)</b> | <b>Ps (dBm)</b> | <b>Gs (dBd)</b> | <b>ERP (dBm)</b> | <b>ERP (W)</b> |
| 824.20                                 | -41.00          | -47.97          | 0.00            | -1.08           | 5.89             | 0.0039         |
| 836.40                                 | -38.62          | -48.01          | 0.00            | -0.93           | 8.46             | 0.0070         |
| 848.80                                 | -36.67          | -48.05          | 0.00            | -0.76           | 10.62            | 0.0115         |

| <b>GSM850 (EDGE 8) Radiated Power ERP</b> |                 |                 |                 |                 |                  |                |
|---|-----------------|-----------------|-----------------|-----------------|------------------|----------------|
| Horizontal Polarization                   |                 |                 |                 |                 |                  |                |
| <b>Frequency (MHz)</b>                    | <b>Rt (dBm)</b> | <b>Rs (dBm)</b> | <b>Ps (dBm)</b> | <b>Gs (dBd)</b> | <b>ERP (dBm)</b> | <b>ERP (W)</b> |
| 824.20                                    | -31.28          | -48.12          | 0.00            | -1.08           | 15.76            | 0.0377         |
| 836.40                                    | -29.83          | -48.28          | 0.00            | -0.93           | 17.52            | 0.0565         |
| 848.80                                    | -27.93          | -48.35          | 0.00            | -0.76           | 19.66            | 0.0925         |
| Vertical Polarization                     |                 |                 |                 |                 |                  |                |
| <b>Frequency (MHz)</b>                    | <b>Rt (dBm)</b> | <b>Rs (dBm)</b> | <b>Ps (dBm)</b> | <b>Gs (dBd)</b> | <b>ERP (dBm)</b> | <b>ERP (W)</b> |
| 824.20                                    | -42.74          | -47.97          | 0.00            | -1.08           | 4.15             | 0.0026         |
| 836.40                                    | -41.86          | -48.01          | 0.00            | -0.93           | 5.22             | 0.0033         |
| 848.80                                    | -41.01          | -48.05          | 0.00            | -0.76           | 6.28             | 0.0042         |

3.2.6 Test Result of EIRP

| GSM1900 (GSM) Radiated Power EIRP |          |          |          |          |            |          |
|-----------------------------------|----------|----------|----------|----------|------------|----------|
| Horizontal Polarization           |          |          |          |          |            |          |
| Frequency (MHz)                   | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBi) | EIRP (dBm) | EIRP (W) |
| 1850.20                           | -24.39   | -51.88   | 0.00     | 1.96     | 29.45      | 0.8810   |
| 1880.00                           | -25.51   | -52.99   | 0.00     | 2.00     | 29.48      | 0.8872   |
| 1909.80                           | -27.98   | -54.28   | 0.00     | 1.98     | 28.28      | 0.6730   |
| Vertical Polarization             |          |          |          |          |            |          |
| Frequency (MHz)                   | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBi) | EIRP (dBm) | EIRP (W) |
| 1850.20                           | -24.64   | -52.13   | 0.00     | 1.96     | 29.45      | 0.8810   |
| 1880.00                           | -25.48   | -53.17   | 0.00     | 2.00     | 29.69      | 0.9311   |
| 1909.80                           | -26.57   | -54.13   | 0.00     | 1.98     | 29.54      | 0.8995   |

| GSM1900 (EDGE 8) Radiated Power EIRP |          |          |          |          |            |          |
|--------------------------------------|----------|----------|----------|----------|------------|----------|
| Horizontal Polarization              |          |          |          |          |            |          |
| Frequency (MHz)                      | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBi) | EIRP (dBm) | EIRP (W) |
| 1850.20                              | -28.26   | -51.88   | 0.00     | 1.96     | 25.58      | 0.3614   |
| 1880.00                              | -28.95   | -52.99   | 0.00     | 2.00     | 26.04      | 0.4018   |
| 1909.80                              | -29.97   | -54.28   | 0.00     | 1.98     | 26.29      | 0.4256   |
| Vertical Polarization                |          |          |          |          |            |          |
| Frequency (MHz)                      | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBi) | EIRP (dBm) | EIRP (W) |
| 1850.20                              | -28.14   | -52.13   | 0.00     | 1.96     | 25.95      | 0.3936   |
| 1880.00                              | -28.94   | -53.17   | 0.00     | 2.00     | 26.23      | 0.4198   |
| 1909.80                              | -29.71   | -54.13   | 0.00     | 1.98     | 26.40      | 0.4365   |

### 3.3 Field Strength of Spurious Radiation Measurement

#### 3.3.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

#### 3.3.2 Measuring Instruments

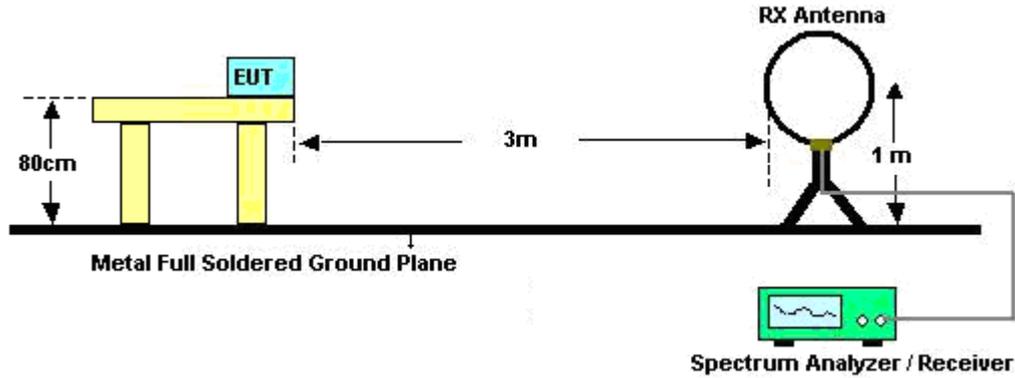
See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

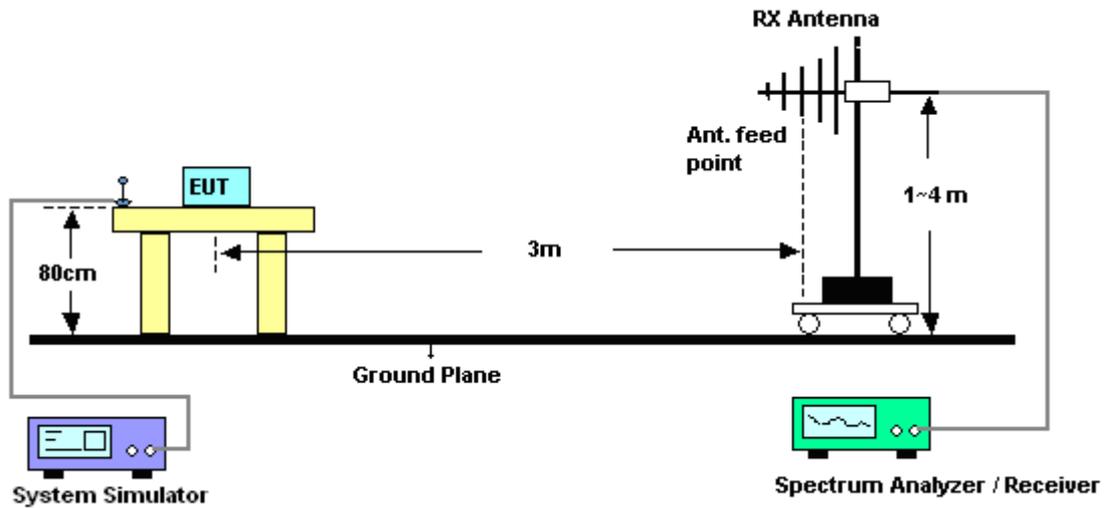
1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10.  $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11.  $ERP \text{ (dBm)} = EIRP - 2.15$

### 3.3.4 Test Setup

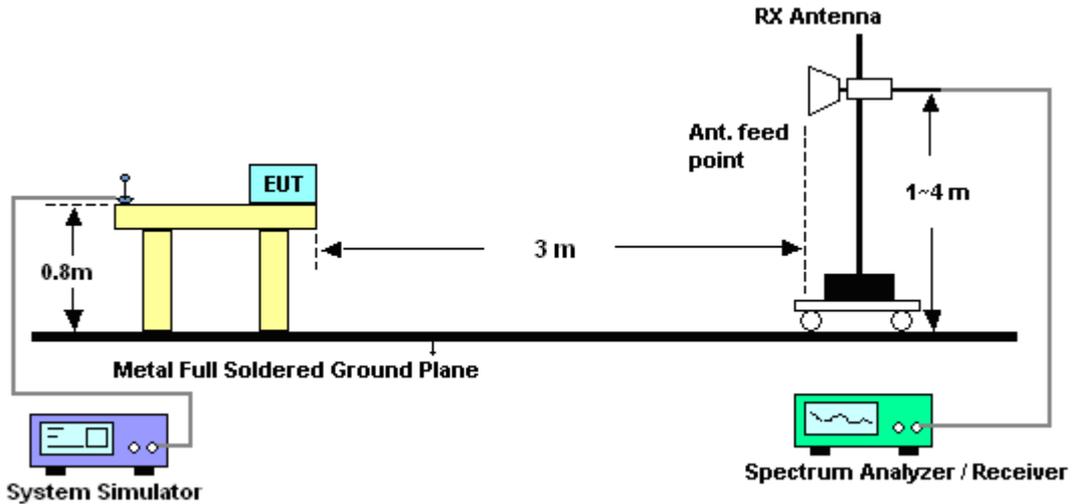
For radiated emissions below 30MHz



For radiated emissions from 30MHz ~ 1000 MHz



For radiated emissions above 1000 MHz



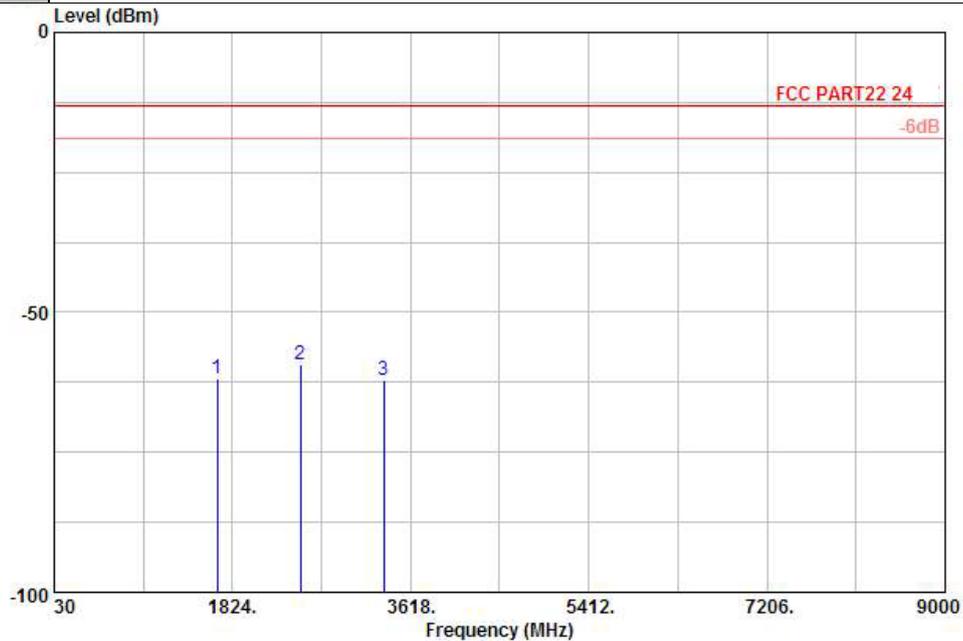
### 3.3.5 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

The low frequency, which started from 9 KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.



3.3.6 Test Result of Field Strength of Spurious Radiated

|                 |  |                     |            |
|-----------------|--|---------------------|------------|
| Band :          | GSM850   | Temperature :       | 24~25°C    |
| Test Mode :     | GSM Link   | Relative Humidity : | 40~41%     |
| Test Engineer : | Jack Li  | Polarization :      | Horizontal |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |            |

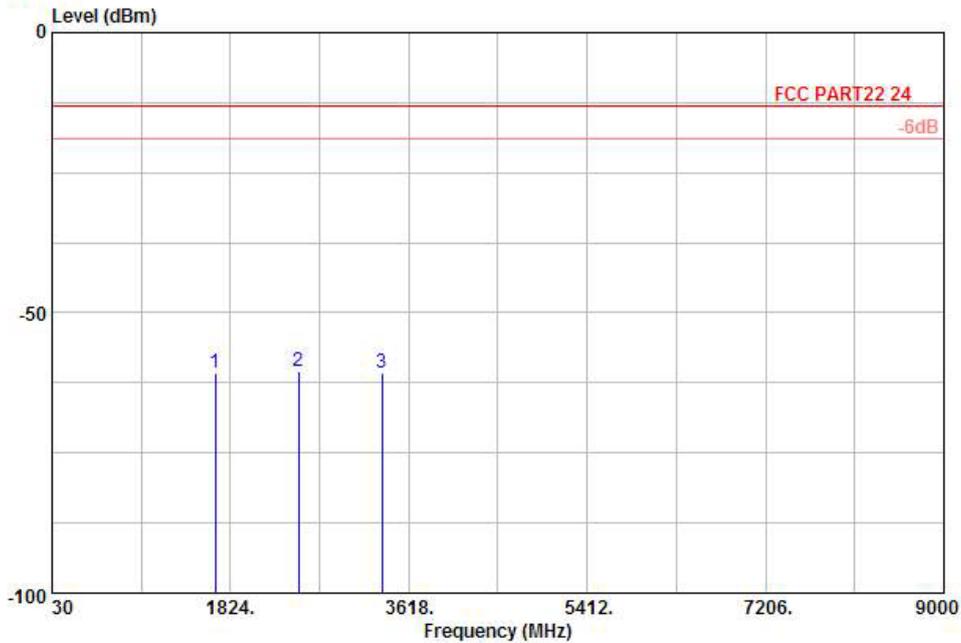


Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 HORIZONTAL  
 Project : (FG) 240601-01  
 Plan : E2

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading ( dBm ) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain ( dBi ) | Polarization ( H/V ) | Result |
|-------------------|-------------|---------------|-------------------|---------------------|--------------------|----------------------|-------------------------|----------------------|--------|
| 1672              | -61.81      | -13           | -48.81            | -57.59              | -62.46             | 0.57                 | 3.37                    | H                    | Pass   |
| 2510              | -59.47      | -13           | -46.47            | -61.72              | -61.70             | 0.78                 | 5.16                    | H                    | Pass   |
| 3345              | -62.22      | -13           | -49.22            | -64.16              | -65.86             | 0.87                 | 6.66                    | H                    | Pass   |



|                 |  |                     |          |
|-----------------|--|---------------------|----------|
| Band :          | GSM850   | Temperature :       | 24~25°C  |
| Test Mode :     | GSM Link   | Relative Humidity : | 40~41%   |
| Test Engineer : | Jack Li  | Polarization :      | Vertical |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |          |

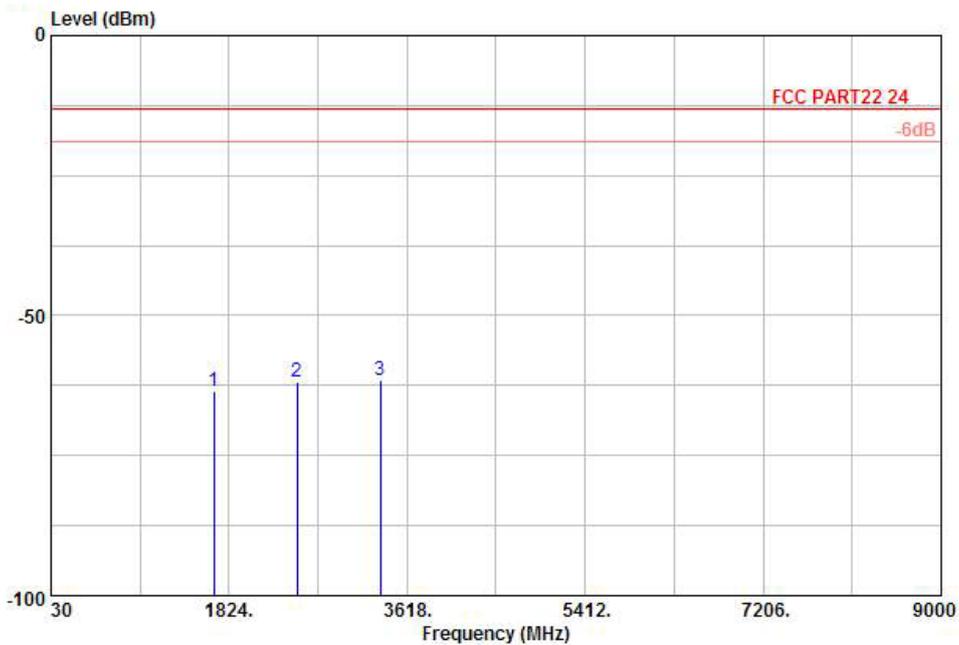


Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 VERTICAL  
 Project : (FG) 240601-01  
 Plan : E2

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading ( dBm ) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain ( dBi ) | Polarization ( H/V ) | Result |
|-------------------|-------------|---------------|-------------------|---------------------|--------------------|----------------------|-------------------------|----------------------|--------|
| 1672              | -60.69      | -13           | -47.69            | -56.34              | -61.34             | 0.57                 | 3.37                    | V                    | Pass   |
| 2510              | -60.53      | -13           | -47.53            | -63.64              | -62.76             | 0.78                 | 5.16                    | V                    | Pass   |
| 3345              | -60.75      | -13           | -47.75            | -62.73              | -64.39             | 0.87                 | 6.66                    | V                    | Pass   |



|                        |  |                            |            |
|------------------------|--|----------------------------|------------|
| <b>Band :</b>          | GSM850   | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Mode :</b>     | EDGE 8 Link  | <b>Relative Humidity :</b> | 40~41%     |
| <b>Test Engineer :</b> | Jack Li  | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                            |            |

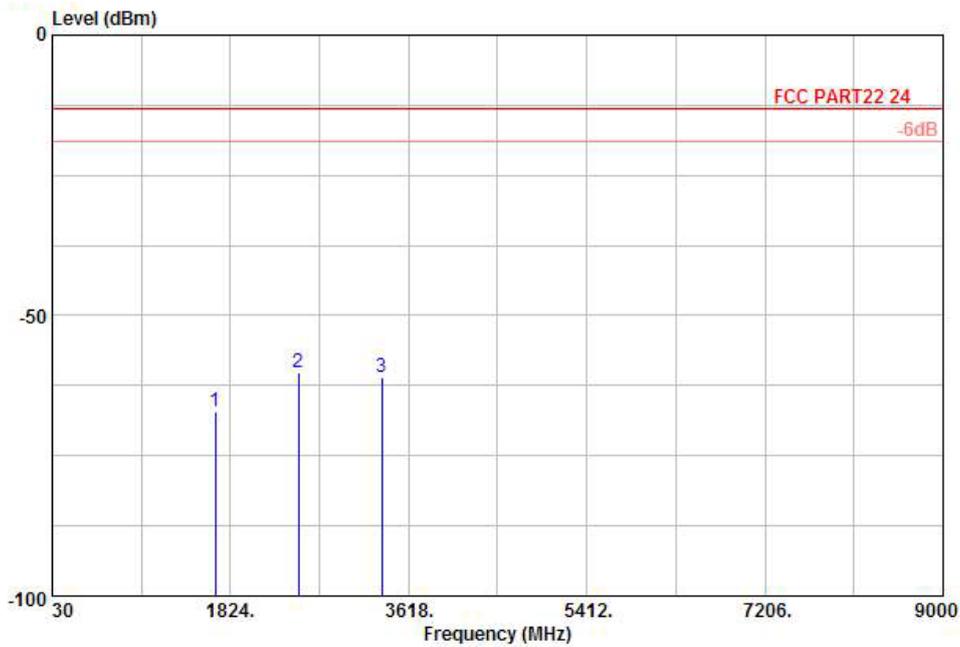


Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 HORIZONTAL  
 Project : (FG) 240601-01  
 Plan : E2

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading ( dBm ) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain ( dBi ) | Polarization ( H/V ) | Result |
|-------------------|-------------|---------------|-------------------|---------------------|--------------------|----------------------|-------------------------|----------------------|--------|
| 1672              | -63.49      | -13           | -50.49            | -59.27              | -64.14             | 0.57                 | 3.37                    | H                    | Pass   |
| 2510              | -61.85      | -13           | -48.85            | -64.10              | -64.08             | 0.78                 | 5.16                    | H                    | Pass   |
| 3345              | -61.52      | -13           | -48.52            | -63.46              | -65.16             | 0.87                 | 6.66                    | H                    | Pass   |



|                        |  |                            |          |
|------------------------|--|----------------------------|----------|
| <b>Band :</b>          | GSM850   | <b>Temperature :</b>       | 24~25°C  |
| <b>Test Mode :</b>     | EDGE 8 Link  | <b>Relative Humidity :</b> | 40~41%   |
| <b>Test Engineer :</b> | Jack Li  | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                            |          |

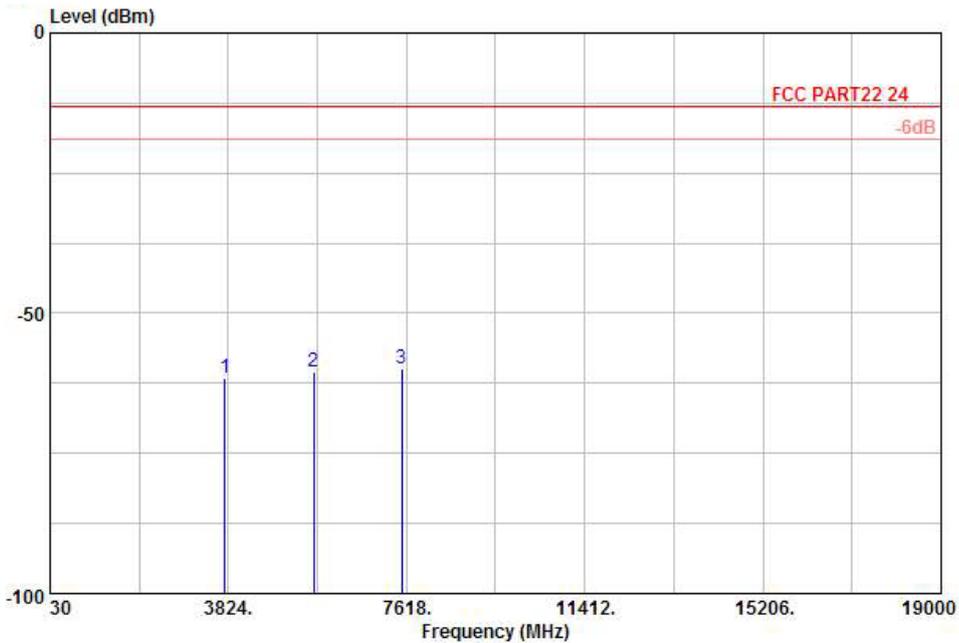


Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 VERTICAL  
 Project : (FG) 240601-01  
 Plan : E2

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading ( dBm ) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain ( dBi ) | Polarization ( H/V ) | Result |
|-------------------|-------------|---------------|-------------------|---------------------|--------------------|----------------------|-------------------------|----------------------|--------|
| 1672              | -67.06      | -13           | -54.06            | -62.71              | -67.71             | 0.57                 | 3.37                    | V                    | Pass   |
| 2510              | -60.27      | -13           | -47.27            | -63.38              | -62.50             | 0.78                 | 5.16                    | V                    | Pass   |
| 3345              | -61.11      | -13           | -48.11            | -63.09              | -64.75             | 0.87                 | 6.66                    | V                    | Pass   |



|                        |  |                            |            |
|------------------------|--|----------------------------|------------|
| <b>Band :</b>          | GSM1900  | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Mode :</b>     | GSM Link   | <b>Relative Humidity :</b> | 40~41%     |
| <b>Test Engineer :</b> | Jack Li  | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                            |            |

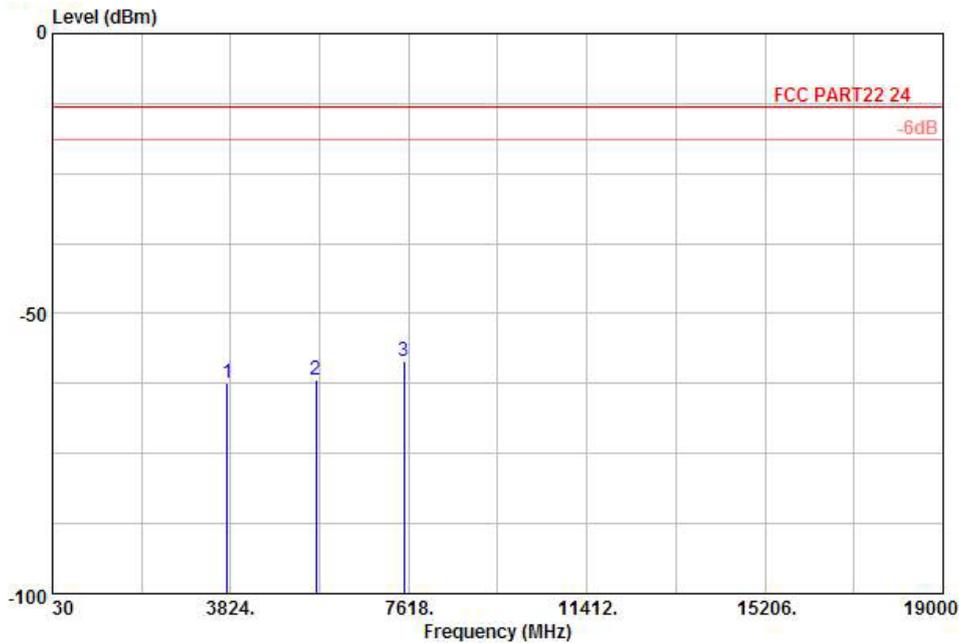


Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 HORIZONTAL  
 Project : (FG) 240601-01  
 Plan : E2

| Frequency<br>( MHz ) | EIRP<br>( dBm ) | Limit<br>( dBm ) | Over<br>Limit<br>( dB ) | SPA<br>Reading<br>( dBm ) | S.G.<br>Power<br>( dBm ) | TX Cable<br>loss<br>( dB ) | TX Antenna<br>Gain<br>( dBi ) | Polarization<br>( H/V ) | Result |
|----------------------|-----------------|------------------|-------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| 3760                 | -61.54          | -13              | -48.54                  | -62.51                    | -67.92                   | 0.78                       | 7.16                          | H                       | Pass   |
| 5640                 | -60.56          | -13              | -47.56                  | -64.74                    | -69.10                   | 1.04                       | 9.58                          | H                       | Pass   |
| 7520                 | -59.97          | -13              | -46.97                  | -65.10                    | -70.08                   | 1.35                       | 11.46                         | H                       | Pass   |



|                 |  |                     |          |
|-----------------|--|---------------------|----------|
| Band :          | GSM1900  | Temperature :       | 24~25°C  |
| Test Mode :     | GSM Link   | Relative Humidity : | 40~41%   |
| Test Engineer : | Jack Li  | Polarization :      | Vertical |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |          |

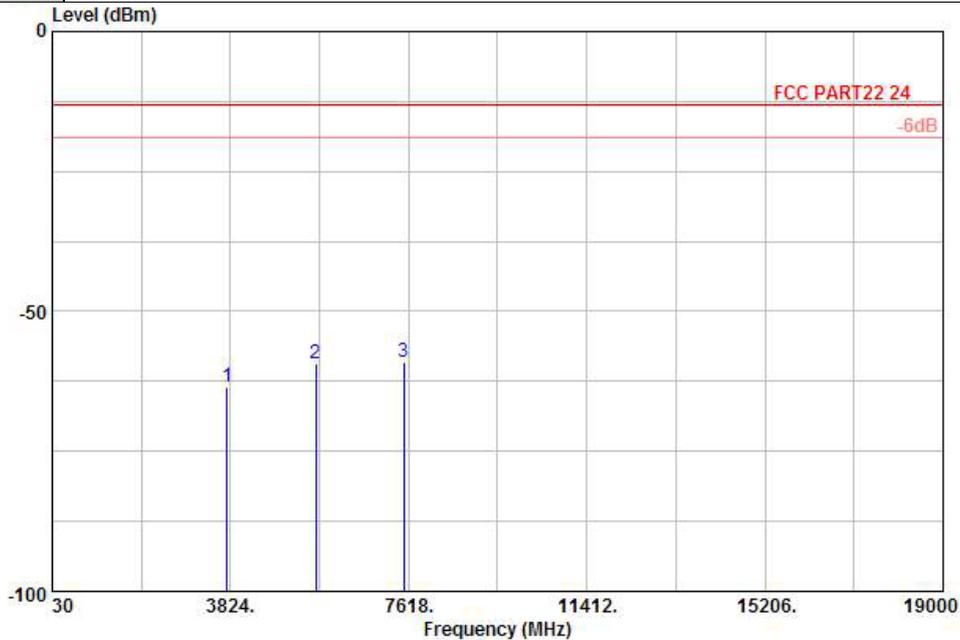


Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 VERTICAL  
 Project : (FG) 240601-01  
 Plan : E2

| Frequency<br>( MHz ) | EIRP<br>( dBm ) | Limit<br>( dBm ) | Over<br>Limit<br>( dB ) | SPA<br>Reading<br>( dBm ) | S.G.<br>Power<br>( dBm ) | TX Cable<br>loss<br>( dB ) | TX Antenna<br>Gain<br>( dBi ) | Polarization<br>( H/V ) | Result |
|----------------------|-----------------|------------------|-------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| 3760                 | -62.36          | -13              | -49.36                  | -63.73                    | -68.74                   | 0.78                       | 7.16                          | V                       | Pass   |
| 5640                 | -61.95          | -13              | -48.95                  | -65.17                    | -70.49                   | 1.04                       | 9.58                          | V                       | Pass   |
| 7520                 | -58.53          | -13              | -45.53                  | -63.02                    | -68.64                   | 1.35                       | 11.46                         | V                       | Pass   |



|                        |  |                            |            |
|------------------------|--|----------------------------|------------|
| <b>Band :</b>          | GSM1900  | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Mode :</b>     | EDGE 8 Link  | <b>Relative Humidity :</b> | 40~41%     |
| <b>Test Engineer :</b> | Jack Li  | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                            |            |

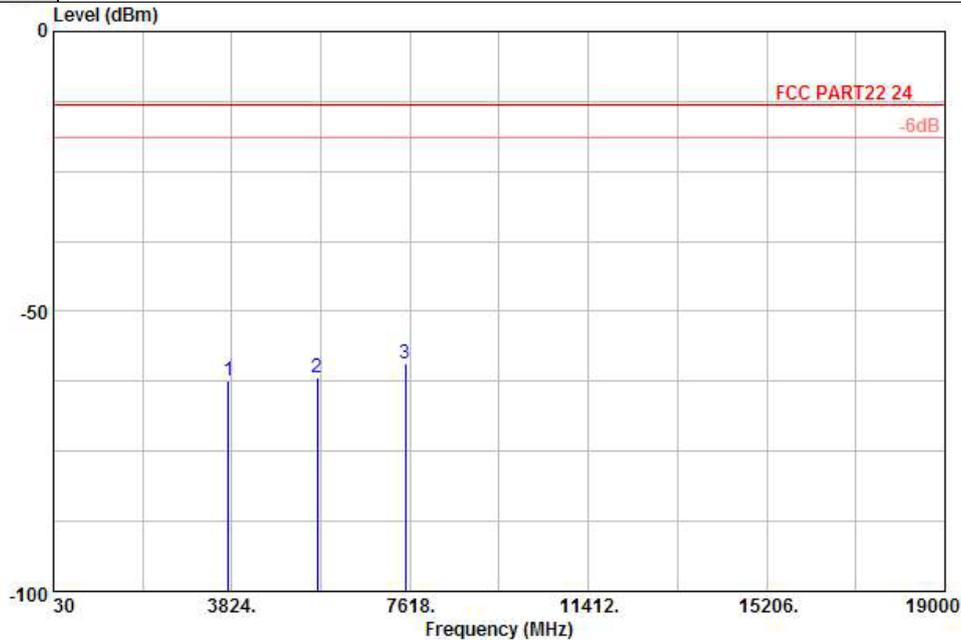


Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 HORIZONTAL  
 Project : (FG) 240601-01  
 Plan : E2

| Frequency<br>( MHz ) | EIRP<br>( dBm ) | Limit<br>( dBm ) | Over<br>Limit<br>( dB ) | SPA<br>Reading<br>( dBm ) | S.G.<br>Power<br>( dBm ) | TX Cable<br>loss<br>( dB ) | TX Antenna<br>Gain<br>( dBi ) | Polarization<br>( H/V ) | Result |
|----------------------|-----------------|------------------|-------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| 3760                 | -63.42          | -13              | -50.42                  | -64.39                    | -69.80                   | 0.78                       | 7.16                          | H                       | Pass   |
| 5640                 | -59.40          | -13              | -46.40                  | -63.58                    | -67.94                   | 1.04                       | 9.58                          | H                       | Pass   |
| 7520                 | -59.11          | -13              | -46.11                  | -64.24                    | -69.22                   | 1.35                       | 11.46                         | H                       | Pass   |



|                        |  |                            |          |
|------------------------|--|----------------------------|----------|
| <b>Band :</b>          | GSM1900  | <b>Temperature :</b>       | 24~25°C  |
| <b>Test Mode :</b>     | EDGE 8 Link  | <b>Relative Humidity :</b> | 40~41%   |
| <b>Test Engineer :</b> | Jack Li  | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                            |          |



Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 VERTICAL  
 Project : (FG) 240601-01  
 Plan : E2

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading ( dBm ) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain ( dBi ) | Polarization ( H/V ) | Result |
|-------------------|--------------|---------------|-------------------|---------------------|--------------------|----------------------|-------------------------|----------------------|--------|
| 3760              | -62.35       | -13           | -49.35            | -63.72              | -68.73             | 0.78                 | 7.16                    | V                    | Pass   |
| 5640              | -61.96       | -13           | -48.96            | -65.18              | -70.50             | 1.04                 | 9.58                    | V                    | Pass   |
| 7520              | -59.22       | -13           | -46.22            | -63.71              | -69.33             | 1.35                 | 11.46                   | V                    | Pass   |



## 4 List of Measuring Equipment

| Instrument                | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date    | Due Date      | Remark                |
|---------------------------|--------------|-----------|------------|-----------------|------------------|--------------|---------------|-----------------------|
| Spectrum Analyzer         | R&S          | FSP40     | 100319     | 9kHz~40GHz      | Dec. 30, 2011    | May 28, 2012 | Dec. 29, 2012 | Conducted (TH01-KS)   |
| System Simulator          | R&S          | CMU200    | 837587/066 | 2G Full-Band    | Dec. 30, 2011    | May 28, 2012 | Dec. 29, 2012 | Conducted (TH01-KS)   |
| DC Power Supply           | GWINSTEK     | GPS-3030D | E1884515   | N/A             | Aug. 23, 2011    | May 28, 2012 | Aug. 22, 2012 | Conducted (TH01-KS)   |
| Thermal Chamber           | Ten Billion  | TTC-B3S   | TBN-960502 | N/A             | Dec. 30, 2011    | May 28, 2012 | Dec. 29, 2012 | Conducted (TH01-KS)   |
| EMI Test Receiver         | R&S          | ESCI      | 100534     | 9kHz~3GHz       | Nov. 09, 2011    | May 24, 2012 | Nov. 08, 2012 | Radiation (03CH01-KS) |
| Spectrum Analyzer         | R&S          | FSP40     | 100319     | 9kHz~40GHz      | Dec. 30, 2011    | May 24, 2012 | Dec. 29, 2012 | Radiation (03CH01-KS) |
| Bilog Antenna             | SCHAFFNER    | CBL6112D  | 23182      | 25MHz~2GHz      | Dec. 08, 2011    | May 24, 2012 | Dec. 07, 2012 | Radiation (03CH01-KS) |
| Double Ridge Horn Antenna | EMCO         | 3117      | 00075959   | 1GHz~18GHz      | Jan. 06, 2012    | May 24, 2012 | Jan. 05, 2013 | Radiation (03CH01-KS) |
| Amplifier                 | Wireless     | FPA-6592G | 060007     | 30MHz~2GHz      | Dec. 30, 2011    | May 24, 2012 | Dec. 29, 2012 | Radiation (03CH01-KS) |
| Amplifier                 | Agilent      | 8449B     | 3008A02370 | 1GHz~26.5GHz    | Dec. 30, 2011    | May 24, 2012 | Dec. 29, 2012 | Radiation (03CH01-KS) |
| SHE-EHF Horn              | Schwarzbeck  | BBHA9170  | BBHA170249 | 15GHz~40GHz     | Oct. 11, 2011    | May 24, 2012 | Oct. 10, 2012 | Radiation (03CH01-KS) |
| Loop Antenna              | R&S          | HFH2-Z2   | 860004/00  | 9kHz~30 MHz     | Jul. 28, 2011    | May 24, 2012 | Jul. 27, 2012 | Radiation (03CH01-KS) |
| System Simulator          | R&S          | CMU200    | 116456     | Full-Band       | Sep. 20, 2011    | May 24, 2012 | Sep. 19, 2012 | Radiation (03CH01-KS) |

## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

| Contribution   | Uncertainty of $X_i$ |                          | $u(X_i)$ |
|--|----------------------|--------------------------|----------|
|  | dB                   | Probability Distribution |          |
| Receiver Reading   | 0.41                 | Normal (k=2)             | 0.21     |
| Antenna Factor Calibration   | 0.83                 | Normal (k=2)             | 0.42     |
| Cable Loss Calibration   | 0.25                 | Normal (k=2)             | 0.13     |
| Pre-Amplifier Gain Calibration   | 0.27                 | Normal (k=2)             | 0.14     |
| RCV/SPA Specification  | 2.50                 | Rectangular              | 0.72     |
| Antenna Factor Interpolation for Frequency   | 1.00                 | Rectangular              | 0.29     |
| Site Imperfection  | 1.43                 | Rectangular              | 0.83     |
| Mismatch   | +0.39 / -0.41        | U-Shape                  | 0.28     |
| <b>Combined Standard Uncertainty <math>U_c(y)</math></b>                                 | <b>1.27</b>          |                          |          |
| <b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b> | <b>2.54</b>          |                          |          |

### Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

| Contribution   | Uncertainty of $X_i$ |                          | $u(X_i)$ | $C_i$ | $C_i * u(X_i)$ |
|--|----------------------|--------------------------|----------|-------|----------------|
|  | dB                   | Probability Distribution |          |       |                |
| Receiver Reading   | $\pm 0.10$           | Normal (k=2)             | 0.10     | 1     | 0.10           |
| Antenna Factor Calibration   | $\pm 1.70$           | Normal (k=2)             | 0.85     | 1     | 0.85           |
| Cable Loss Calibration   | $\pm 0.50$           | Normal (k=2)             | 0.25     | 1     | 0.25           |
| Receiver Correction  | $\pm 2.00$           | Rectangular              | 1.15     | 1     | 1.15           |
| Antenna Factor Directional   | $\pm 1.50$           | Rectangular              | 0.87     | 1     | 0.87           |
| Site Imperfection  | $\pm 2.80$           | Triangular               | 1.14     | 1     | 1.14           |
| Mismatch<br>Receiver VSWR $\Gamma_1 = 0.197$<br>Antenna VSWR $\Gamma_2 = 0.194$<br>Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$ | +0.34 / -0.35        | U-Shape                  | 0.244    | 1     | 0.244          |
| <b>Combined Standard Uncertainty <math>U_c(y)</math></b>   | <b>2.36</b>          |                          |          |       |                |
| <b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>   | <b>4.72</b>          |                          |          |       |                |