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## TEST REPORT

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Report No.: SRTC2014-H024-E0032

Product Name: GSM/GPRS/EDGE/UMTS

Digital Mobile Phone with Bluetooth and WiFi

Product Model: Philips I928

Applicant: Shenzhen Sang Fei Consumer Communications  
Co., Ltd.

Manufacturer: Shenzhen Sang Fei Consumer Communications  
Co., Ltd.

Specification: FCC Part 24E, Part 22H, Part 2  
(October 1, 2013 edition)

FCC ID: VQRCTI928

The State Radio\_monitoring\_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

Tel: 86-10-68009202 Fax: 86-10-68009205

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## 1. General information

### 1.1 Notes of the test report

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The test results relate only to individual items of the samples which have been tested.

### 1.2 Information about the testing laboratory

Company: The State Radio\_monitoring\_center Testing Center (SRTC)  
Address: No.80 Beilishi Road, Xicheng District, Beijing China  
City: Beijing  
Country or Region: China  
Contacted person: Wang Junfeng  
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Fax: +86 10 68009195 +86 10 68009205  
Email: wangjf@srrc.org.cn / wangjunfeng@srtc.org.cn

### 1.3 Applicant's details

Company: Shenzhen Sang Fei Consumer Communications Co., Ltd.  
Address: 11 Science & Technology Rd., Shenzhen Hi-tech Industrial  
Park, Nanshan District  
City: Shenzhen  
Country or Region: China  
Grantee Code: VQR  
Contacted person: Helen.Lin  
Tel: 86-755-33308888  
Fax: 86-755-26614979  
Email: Helen.Lin@sangfei.com

### 1.4 Manufacturer's details

Company: Shenzhen Sang Fei Consumer Communications Co., Ltd.  
Address: 11 Science & Technology Rd., Shenzhen Hi-tech Industrial  
Park, Nanshan District  
City: Shenzhen  
Country or Region: China  
Contacted person: Helen.Lin  
Tel: 86-755-33308888  
Fax: 86-755-26614979  
Email: Helen.Lin@sangfei.com

## 1.5 Application details

Date of reception of test sample: 10<sup>th</sup> June 2014

Date of test: 12<sup>th</sup> June 2014 to 4<sup>th</sup> July 2014

## 1.6 Reference specification

FCC Part 24E, Part22H, Part 2 (October 1, 2013 edition)

## 1.7 Information of EUT

### 1.7.1 General information

|                            |                                                                                       |
|----------------------------|---------------------------------------------------------------------------------------|
| Name of EUT                | GSM/GPRS/EDGE/UMTS Digital Mobile Phone with Bluetooth and WiFi                       |
| FCC ID                     | VQRCTI928                                                                             |
| Frequency Range            | GSM850:<br>Tx:824~849MHz Rx:869~894MHz<br>PCS1900:<br>Tx:1850~1910MHz Rx:1930~1990MHz |
| Rated Output Power         | GSM850:33.0dBm<br>PCS1900:30.0dBm                                                     |
| Modulation Type            | GSM/GPRS:GMSK<br>EDGE: GMSK(Uplink direction)<br>8PSK(Downlink direction)             |
| Emission Designator        | 300KGXW                                                                               |
| Duplex Mode                | FDD                                                                                   |
| Duplex Spacing             | GSM850:45MHz<br>PCS1900:80MHz                                                         |
| Antenna Type               | Fixed Internal                                                                        |
| Power Supply               | Battery or Charger                                                                    |
| Rated Power Supply Voltage | 3.8V                                                                                  |
| Extreme Temperature        | Lowest: -30°C<br>Highest: +50°C                                                       |
| Extreme Voltage            | Minimum: 3.5V<br>Maximum: 4.2V                                                        |
| HW Version                 | TMBHb                                                                                 |
| SW Version                 | I928_M6592_1418_00_V01A_T01_AG                                                        |

### 1.7.2 EUT details

| Product Name                                                    | Product Model | IMEI            |
|-----------------------------------------------------------------|---------------|-----------------|
| GSM/GPRS/EDGE/UMTS Digital Mobile Phone with Bluetooth and WiFi | Philips I928  | 864359020039884 |

### 1.7.3 Auxiliary equipment details

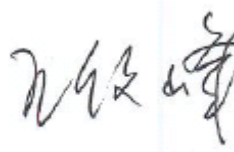
| Equipment      | Charger                     |
|----------------|-----------------------------|
| Manufacturer   | Salcomp (Shenzhen) Co., Ltd |
| Model Number   | S14B08                      |
| Input Voltage  | 100V-240V a.c.              |
| Output Voltage | 5.0V d.c.                   |
| Frequency      | 50/60Hz                     |

| Equipment     | Battery                      |
|---------------|------------------------------|
| Manufacturer  | harbin coslight powerco.,ltd |
| Model Number  | AB3000BWMC                   |
| Capacity      | 3000mAh                      |
| Rated Voltage | 3.8V d.c.                    |

## 2. Test information

### 2.1 Summary of the test results

| No. | Test case                                                             | FCC reference              | Verdict |
|-----|-----------------------------------------------------------------------|----------------------------|---------|
| 1   | RF Power Output                                                       | 2.1046                     | Pass    |
| 2   | Effective Radiated Power<br>and<br>Effective Isotropic Radiated Power | 22.913(a)/24.232(c)        | Pass    |
| 3   | Occupied Bandwidth                                                    | 2.1049                     | Pass    |
| 4   | Emission Bandwidth                                                    | 22.917(b)/24.238(b)        | Pass    |
| 5   | Spurious Emissions at antenna<br>terminals                            | 2.1051/22.917(a)/24.238(a) | Pass    |
| 6   | Band Edges Compliance                                                 | 2.1051/22.917(a)/24.238(a) | Pass    |
| 7   | Frequency Stability                                                   | 2.1055/22.355/24.235       | Pass    |
| 8   | Radiated Spurious Emissions                                           | 2.1053/22.917(a)/24.238(a) | Pass    |

|                                                                                                                                                                           |                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>This Test Report Is Issued by:<br/>Mr. Song Qizhu<br/>Director of the test lab</p>  | <p>Checked by:<br/>Mr. Wang Junfeng<br/>Deputy director of the test lab</p>  |
| <p>Tested by:<br/>Mr. Zhang Wentao<br/>Test engineer</p>                               | <p>Issued date:</p> <p><b>2014.07.22</b></p>                                                                                                                     |

## 2.2 Test result

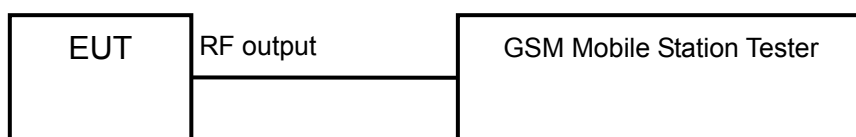
### 2.2.1 GSM850

#### 2.2.1.1 RF Power Output-FCC Part2.1046

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 42%               | 101.9kPa |

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. Then the test data can be read at the tester screen. The loss between RF output port of the EUT and the input port of the tester will be taken into consideration.

The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

| Limits | $\leq 33\text{dBm}$ |
|--------|---------------------|
|--------|---------------------|

Test result:

GSM/GPRS MODE:

| Carrier frequency (MHz) | Channel No. | RF Power Output (dBm) |
|-------------------------|-------------|-----------------------|
| 824.2                   | 128         | 32.19                 |
| 836.4                   | 189         | 32.25                 |
| 848.8                   | 251         | 32.29                 |

EDGE (GMSK, 1Slot) MODE:

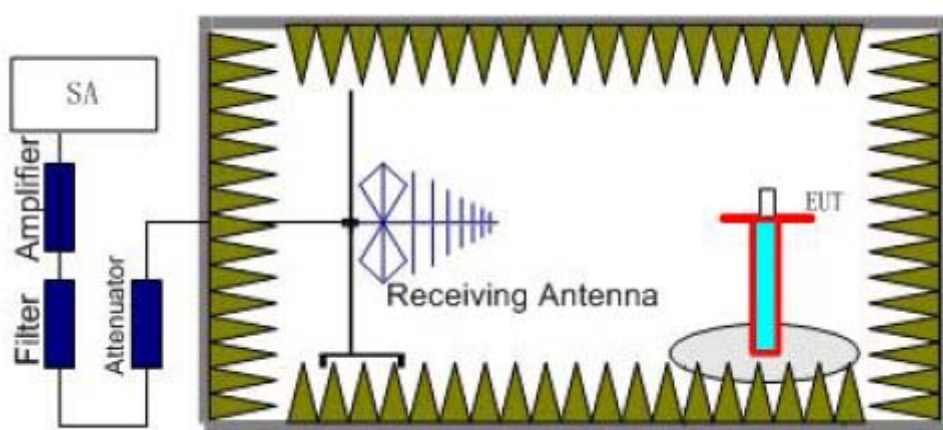
| Carrier frequency (MHz) | Channel No. | RF Power Output (dBm) |
|-------------------------|-------------|-----------------------|
| 824.2                   | 128         | 32.18                 |
| 836.4                   | 189         | 32.25                 |
| 848.8                   | 251         | 32.29                 |

## 2.2.1.2 Effective Radiated Power-FCC Part22.913(a)

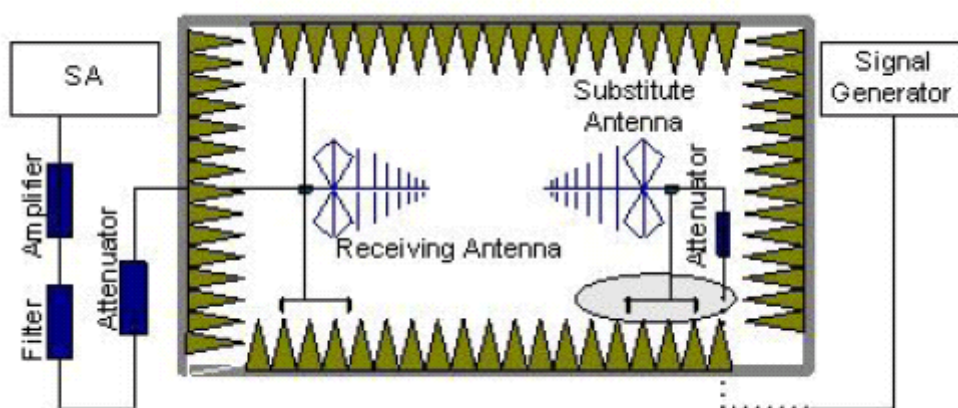
Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 19.3°C      | 41.3%             | 100.7kPa |

Test setup:



Step 1



Step 2

Test procedure:

The measurements procedures in TIA-603C-2004 are used.

Step 1:

The measurement is carried out in the fully anechoic chamber. EUT was placed on a 2.4 meters high non-conductive table at a 3 meters test distance from the

test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna is 2.4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and RBW is set to 3MHz. Then the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum power value on spectrum analyzer or receiver. And the maximum value of the receiver should be recorded as (Pr).

#### Step 2:

A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator. To repeat the same procedure as step1 and the level of signal generator will be adjusted till the same power value on the spectrum analyzer or receiver. The ERP/EIRP of the EUT can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

A power (P<sub>mea</sub>) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (P<sub>mea</sub>) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

A "reference path loss" should be calculated after test. The attenuation of "reference path loss" is the cable loss between the Signal Source with the Substitution Antenna (P<sub>ca</sub>) and the Substitution Antenna Gain (G<sub>a</sub>).

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{\text{mea}} + P_{\text{ca}} + G_{\text{a}}$$

This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP – 2.15 (dB).

The measurement will be done at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

#### Limits:

| Operation Mode | Power Step | E.R.P. (dBm) |
|----------------|------------|--------------|
| GSM            | 5          | ≤38.45       |
| GPRS           | 3          | ≤38.45       |
| EDGE           | 6          | ≤38.45       |

Test result:

GSM/GPRS MODE:

| Frequency (MHz) | Power step | Peak ERP (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Correction (dB) | Pmea (dBm) | Polarization |
|-----------------|------------|----------------|--------------------|----------------------|-----------------|------------|--------------|
| 824.2           | 5          | 32.49          | -3.8               | 8.6                  | 2.15            | 29.84      | Vertical     |
| 836.4           | 5          | 32.47          | -3.8               | 8.6                  | 2.15            | 29.82      | Vertical     |
| 848.8           | 5          | 33.10          | -3.8               | 8.6                  | 2.15            | 30.45      | Vertical     |

EDGE (GMSK, 1Slot) MODE:

| Frequency (MHz) | Power step | Peak ERP (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Correction (dB) | Pmea (dBm) | Polarization |
|-----------------|------------|----------------|--------------------|----------------------|-----------------|------------|--------------|
| 824.2           | 6          | 32.07          | -3.8               | 8.6                  | 2.15            | 29.42      | Vertical     |
| 836.4           | 6          | 32.75          | -3.8               | 8.6                  | 2.15            | 30.10      | Vertical     |
| 848.8           | 6          | 33.32          | -3.8               | 8.6                  | 2.15            | 30.67      | Vertical     |

Frequency: 848.8MHz

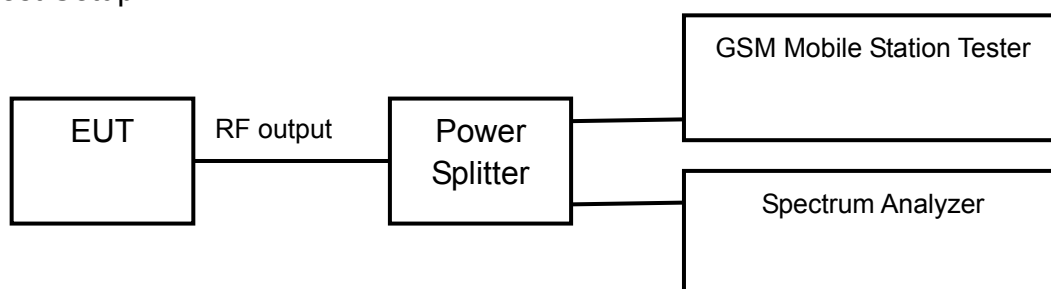
Peak ERP(dBm) = Pmea(30.67dBm)+Pca (-3.8dB)+Ga(8.6dB)-2.15dB = 33.32dBm

### 2.2.1.3 Occupied Bandwidth-FCC Part2.1049

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 42%               | 101.9kPa |

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of 99% power can be read on spectrum analyzer.

The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

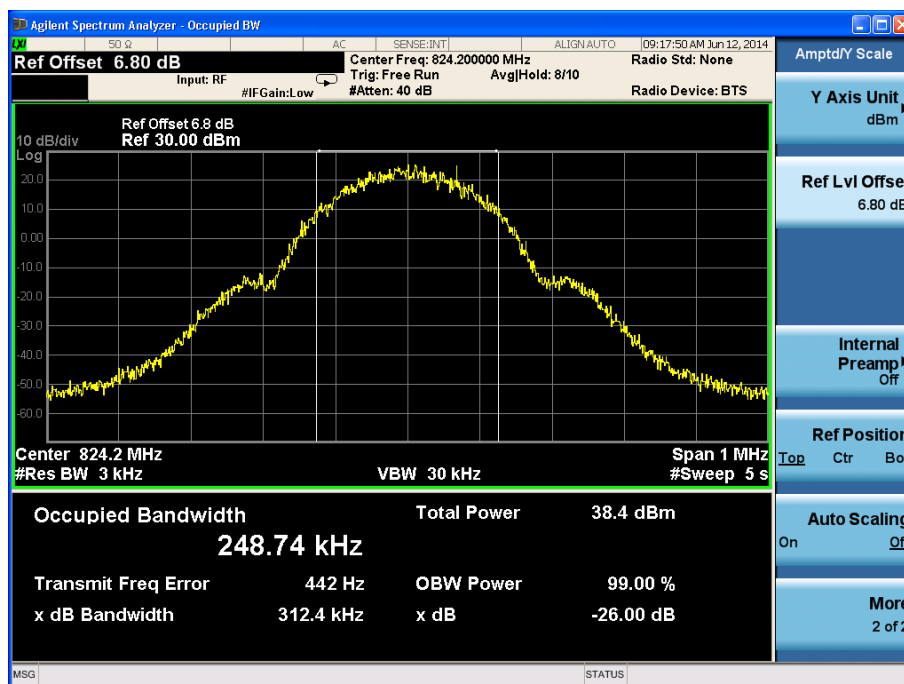
GSM/GPRS MODE:

| Carrier frequency (MHz) | Channel No. | Bandwidth of 99% Power (kHz) |
|-------------------------|-------------|------------------------------|
| 824.2                   | 128         | 248.74                       |
| 836.4                   | 189         | 244.54                       |
| 848.8                   | 251         | 246.57                       |

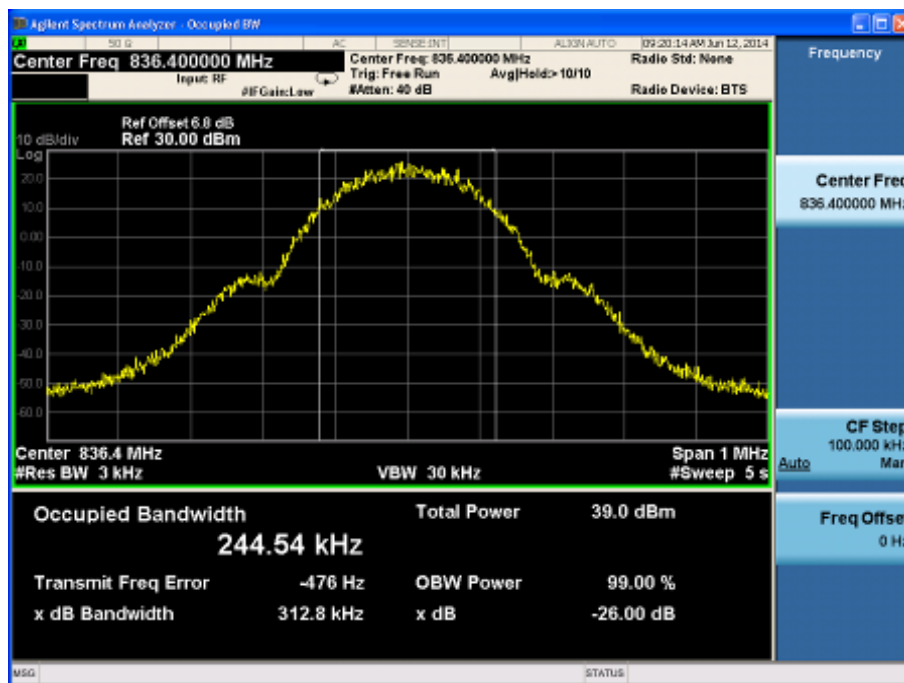
EDGE (GMSK) MODE:

| Carrier frequency (MHz) | Channel No. | Bandwidth of 99% Power (kHz) |
|-------------------------|-------------|------------------------------|
| 824.2                   | 128         | 247.63                       |
| 836.4                   | 189         | 248.10                       |
| 848.8                   | 251         | 246.02                       |

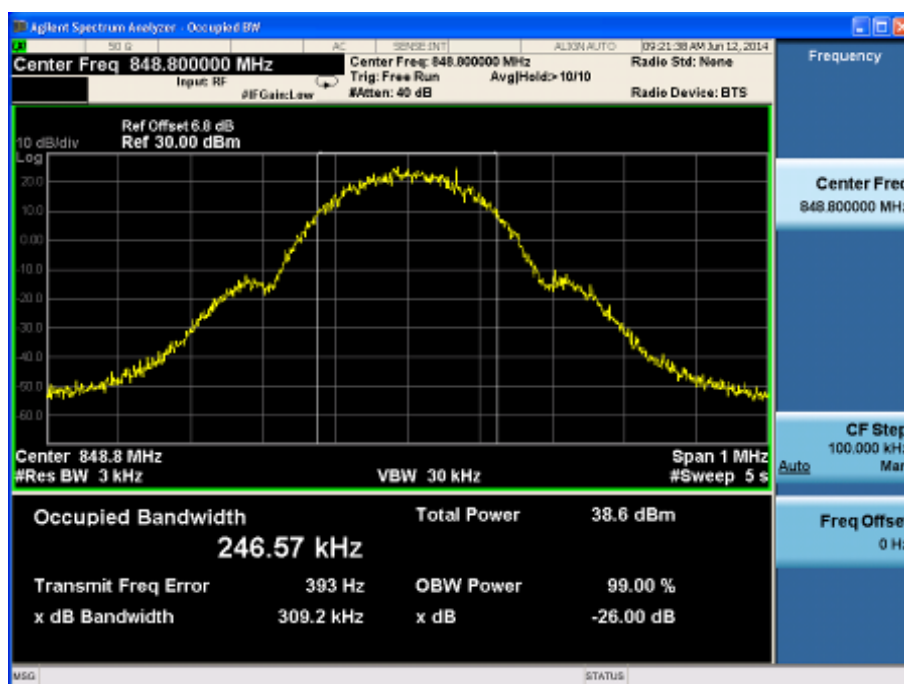
## GSM/GPRS MODE:



Channel 128

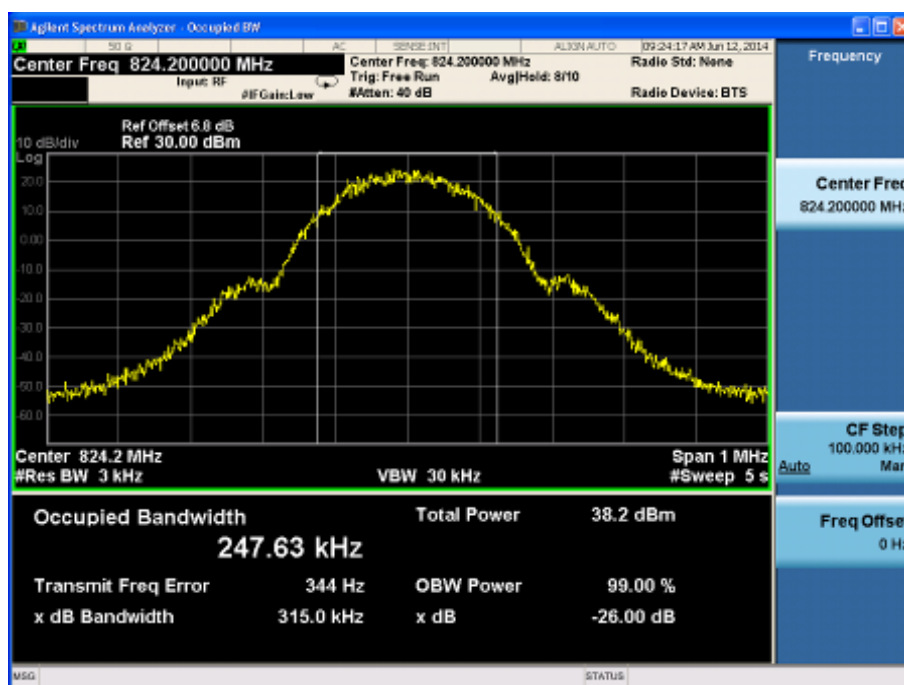


Channel 189

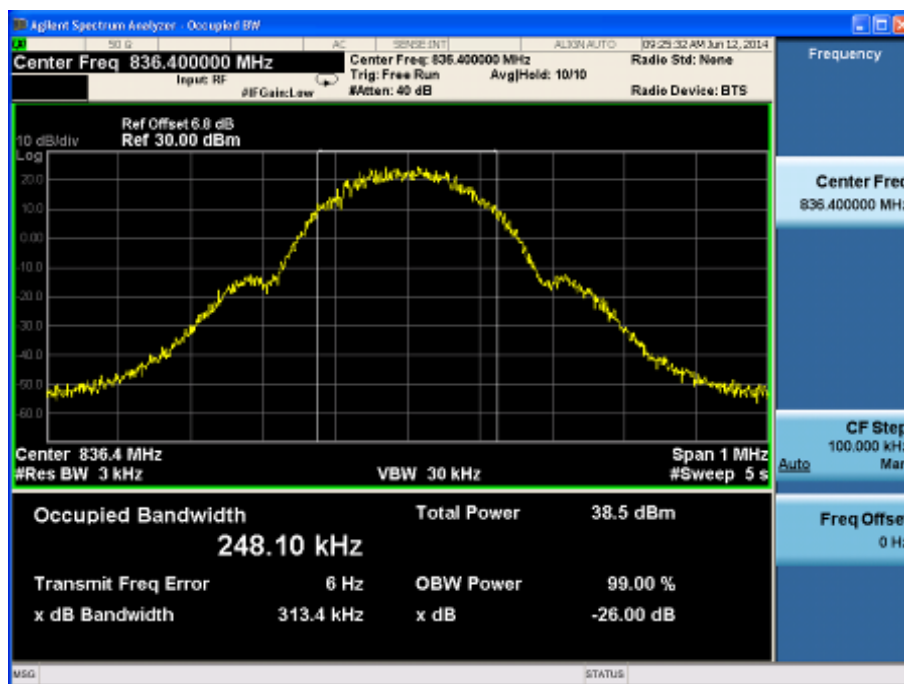


Channel 251

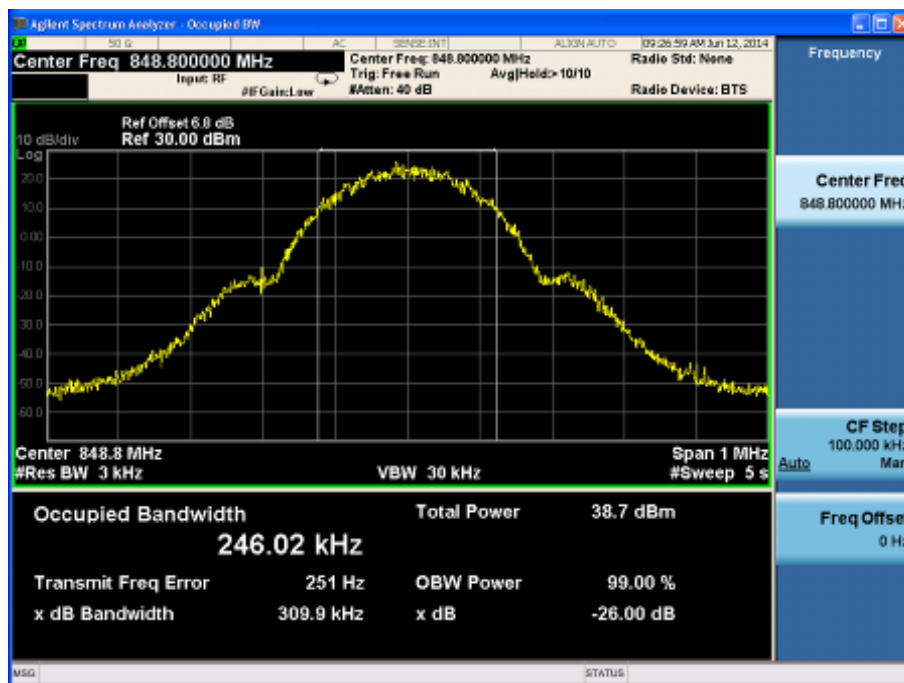
EDGE (GMSK) MODE:



Channel 128



Channel 189



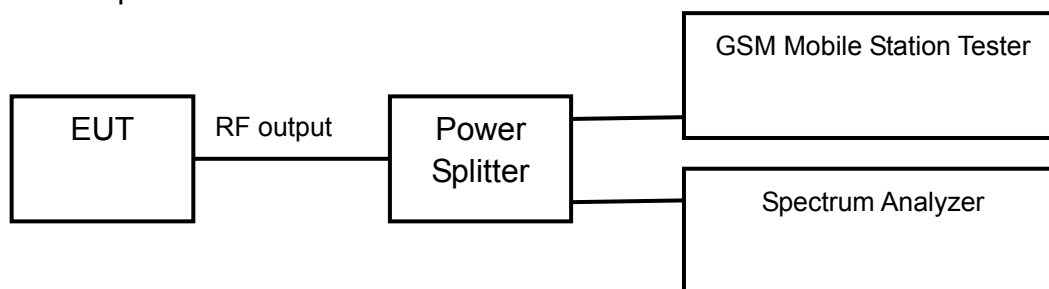
Channel 251

#### 2.2.1.4 Emission Bandwidth-FCC Part22.917(b)

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23℃         | 42%               | 101.9kPa |

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The emission bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of -26dB transmitter power can be read on spectrum analyzer.

The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

Limits: No specific emission bandwidth requirements in part 22.917(b)

Test result:

GSM/GPRS MODE:

| Carrier frequency (MHz) | Channel No. | Bandwidth of -26dB transmitter power (kHz) |
|-------------------------|-------------|--------------------------------------------|
| 824.2                   | 128         | 312.4                                      |
| 836.4                   | 189         | 312.8                                      |
| 848.8                   | 251         | 309.2                                      |

EDGE (GMSK) MODE:

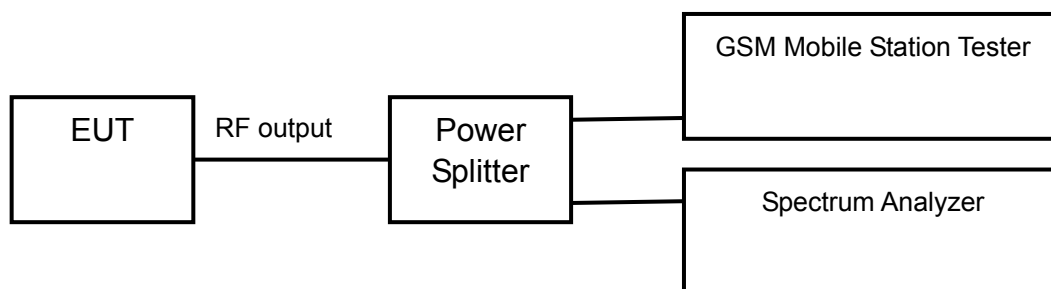
| Carrier frequency (MHz) | Channel No. | Bandwidth of -26dB transmitter power (kHz) |
|-------------------------|-------------|--------------------------------------------|
| 824.2                   | 128         | 315.0                                      |
| 836.4                   | 189         | 313.4                                      |
| 848.8                   | 251         | 309.9                                      |

### 2.2.1.5 Spurious Emissions at antenna terminal-FCC Part2.1051/22.917(a)

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 42%               | 101.9kPa |

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 9GHz (higher than the 10<sup>th</sup> harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.

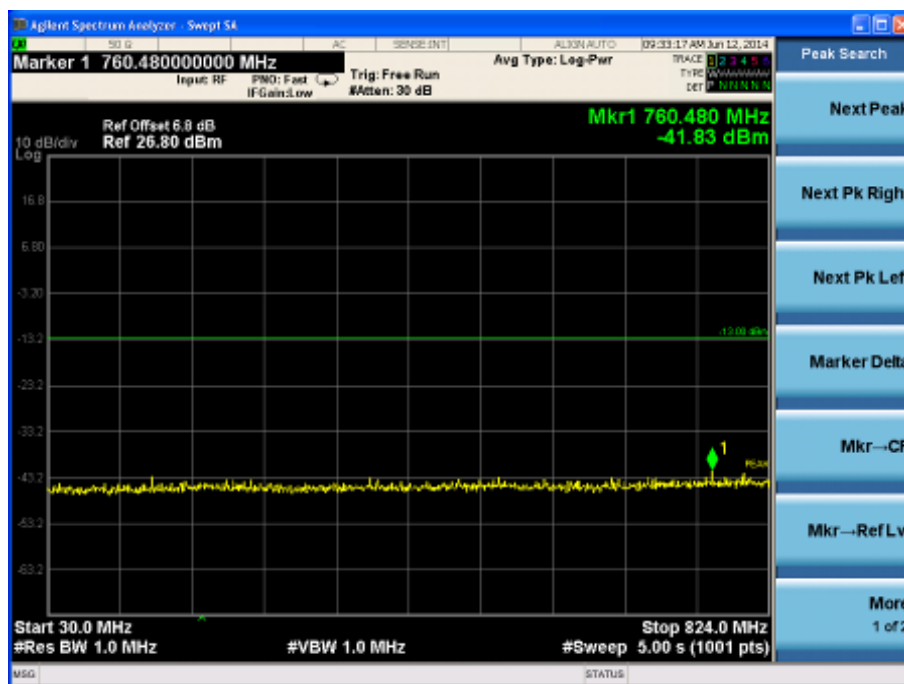
The measurement will be conducted at one channel No189 (middle channel of GSM850 band)

|        |                      |
|--------|----------------------|
| Limits | $\leq -13\text{dBm}$ |
|--------|----------------------|

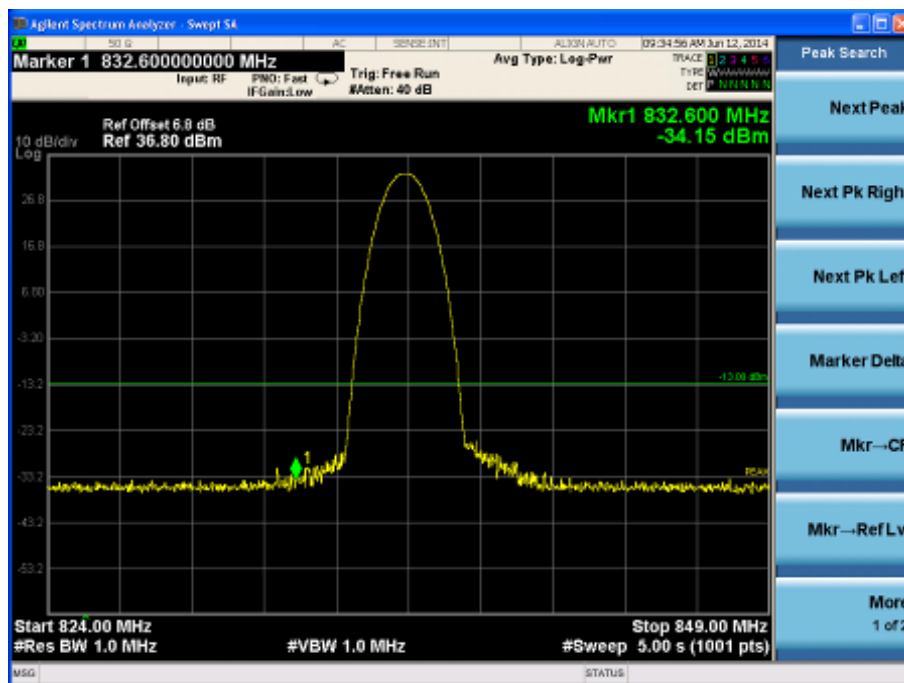
Test result:

Refer to the following figures.

## GSM/GPRS MODE:

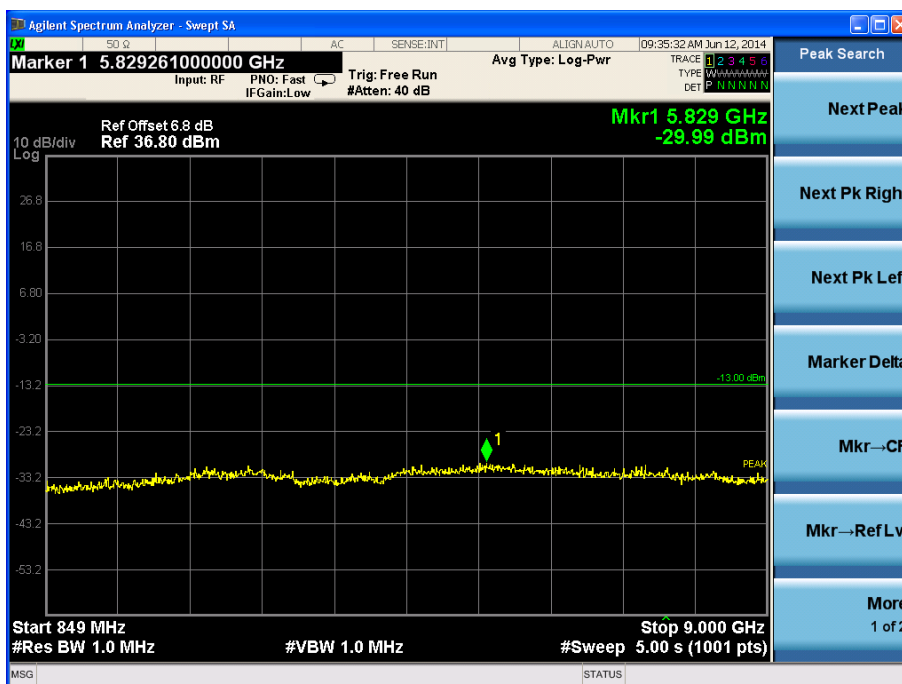


Channel 189, 30MHz~824MHz



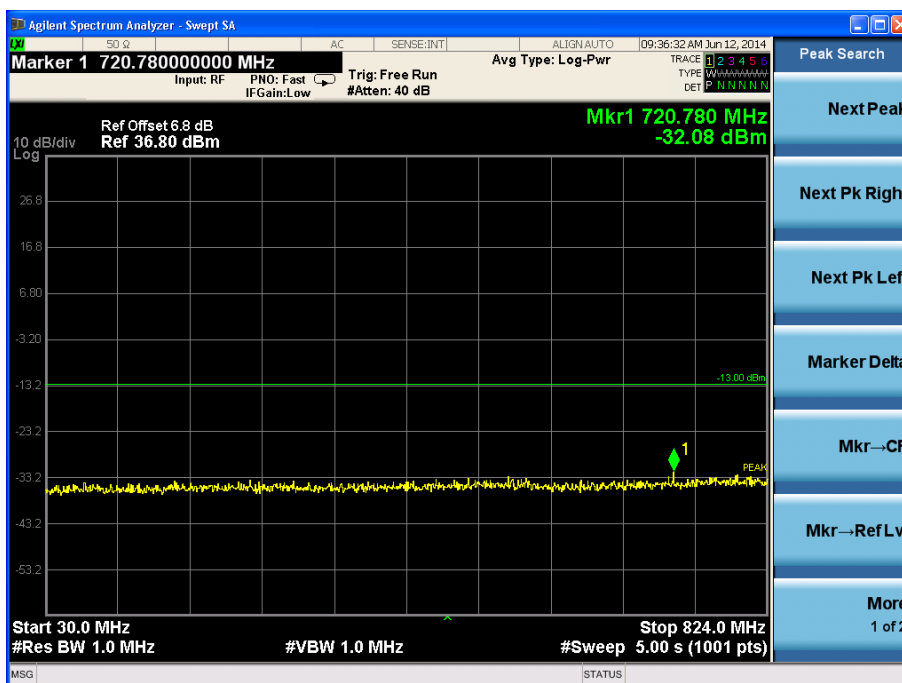
Channel 189, 824MHz~849MHz

Note: The signal beyond the limit is the base station simulator carrier.

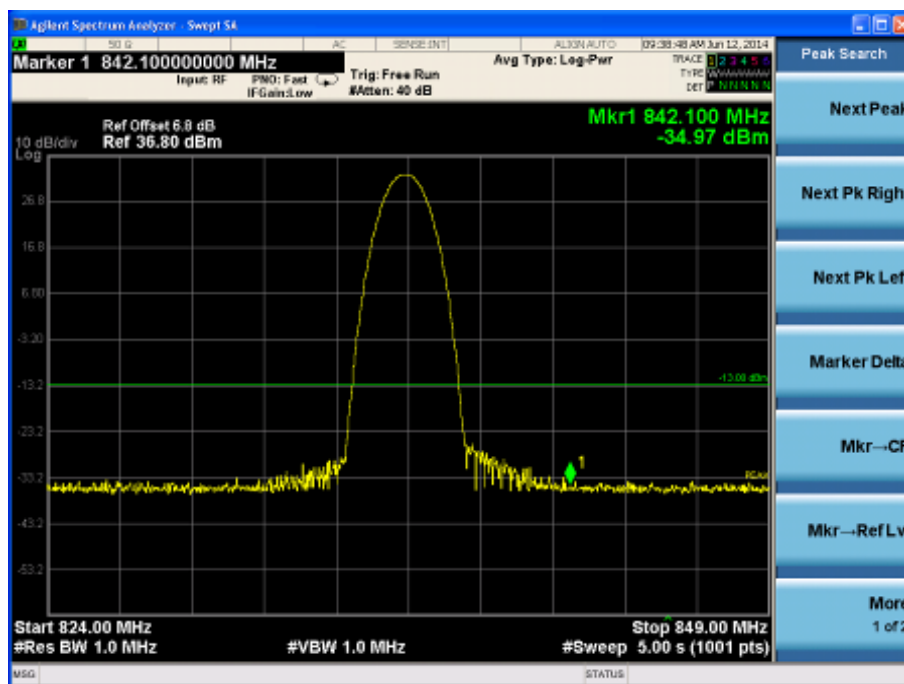


Channel 189, 849MHz~9GHz

EDGE (GMSK) MODE:

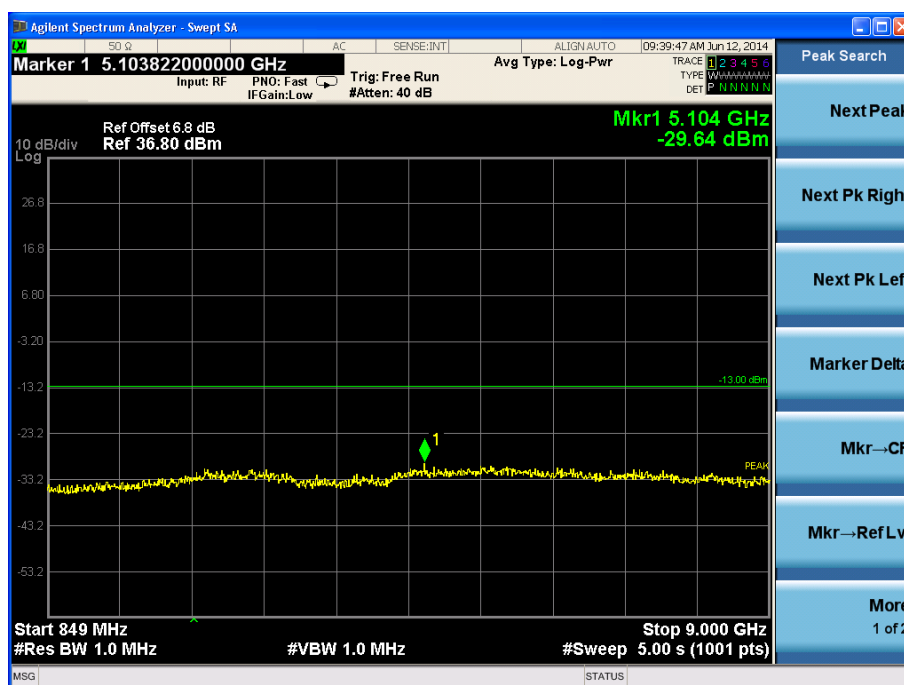


Channel 189, 30MHz~824MHz



Channel 189, 824MHz~849MHz

Note: The signal beyond the limit is the base station simulator carrier.



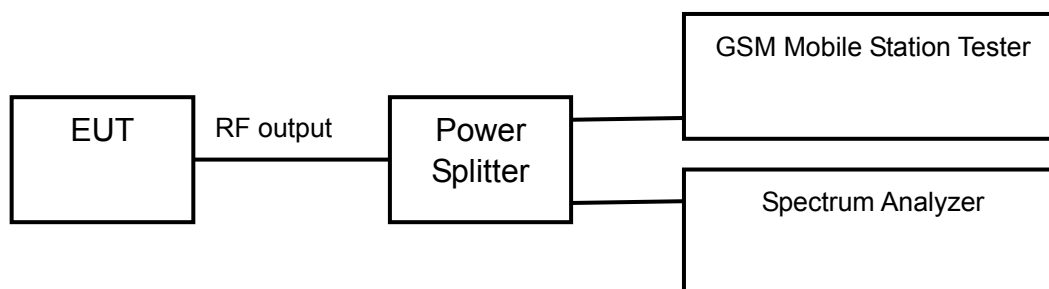
Channel 189, 849MHz~9GHz

### 2.2.1.6 Band Edges Compliance-FCC Part2.1051/22.917(a)

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 42%               | 101.9kPa |

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The peak detector is used and RBW is set to at least 1% of the emission bandwidth on spectrum analyzer.

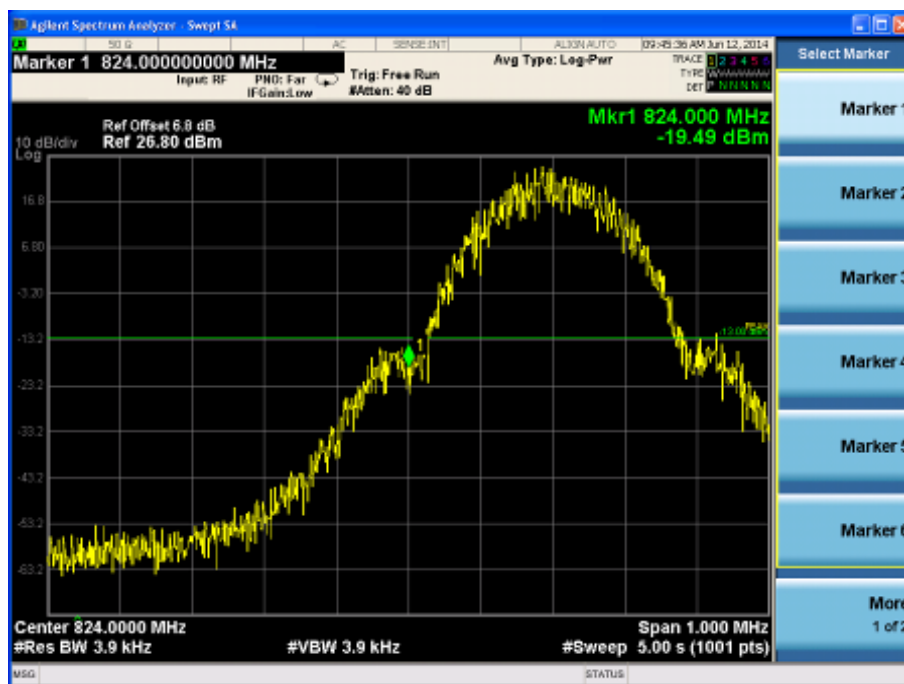
The measurement will be conducted at two channels No128 and No251 (Bottom and top channels of GSM850 band)

| Limits | $\leq -13\text{dBm}$ |
|--------|----------------------|
|--------|----------------------|

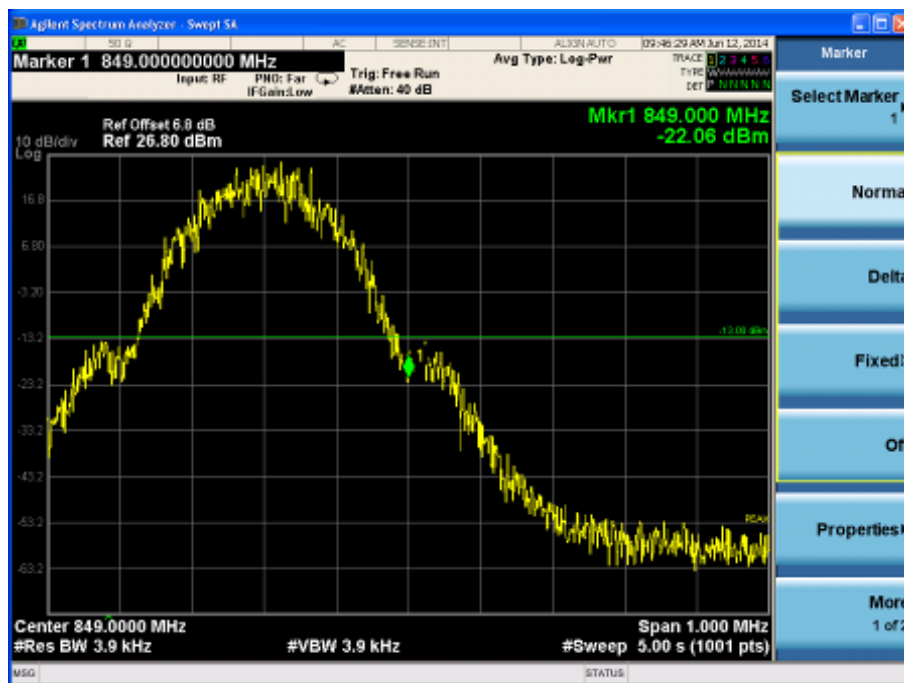
Test result:

Refer to the following figures.

## GSM/GPRS MODE:

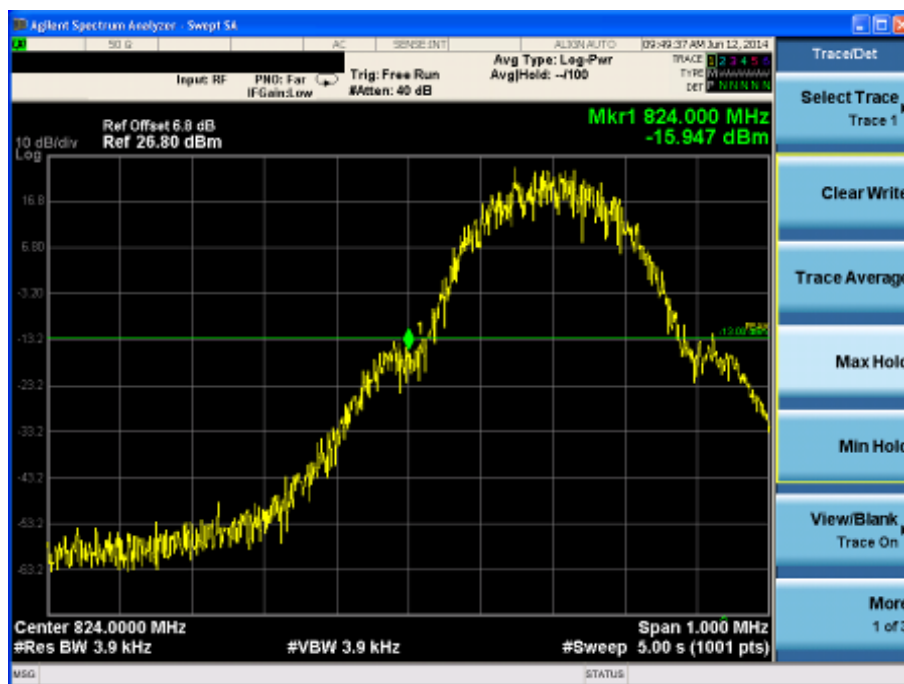


Channel 128

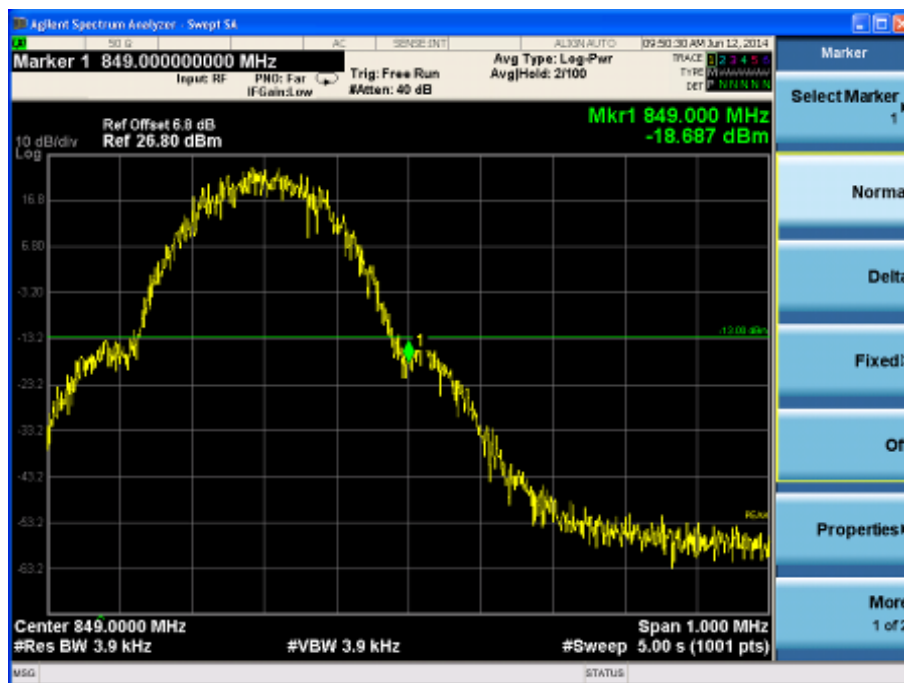


Channel 251

## EDGE (GMSK) MODE:



Channel 128



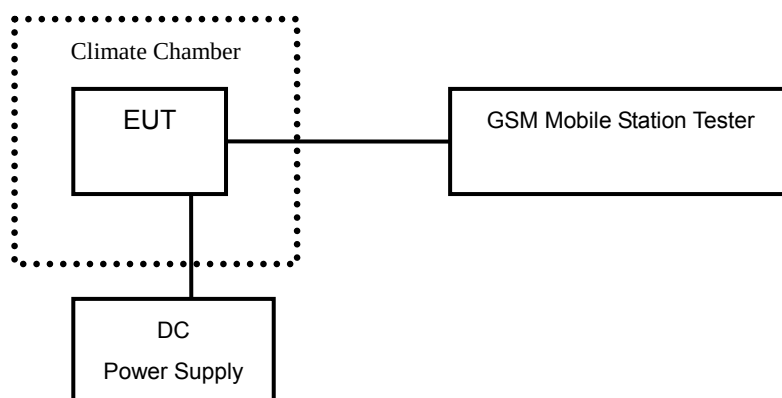
Channel 251

### 2.2.1.7 Frequency Stability-FCC Part2.1055/22.355

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 42%               | 101.9kPa |

Test setup:



Test Procedure:

A radio link shall be established between EUT and Tester. The tester will sample the transmitter RF output signal and measure its frequency. The temperature inside the climate chamber is varied from -30 to +50°C in 10°C step size, and also the DC power supply voltage to the EUT is varied from 3.5 to 4.2V. The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band).

Limits: No specific frequency stability requirements in part 2.1055 and part 22.355.

Test result:

GSM/GPRS MODE:

| Temperature(°C) | Test Result (ppm)@3.8V |             |             |
|-----------------|------------------------|-------------|-------------|
|                 | Channel 128            | Channel 189 | Channel 251 |
| -30             | 0.017                  | 0.022       | 0.021       |
| -20             | 0.019                  | 0.021       | 0.022       |
| -10             | 0.018                  | 0.023       | 0.021       |
| 0               | 0.016                  | 0.023       | 0.023       |
| +10             | 0.015                  | 0.022       | 0.023       |
| +20             | 0.017                  | 0.021       | 0.024       |
| +30             | 0.016                  | 0.020       | 0.021       |
| +40             | 0.015                  | 0.024       | 0.022       |
| +50             | 0.018                  | 0.021       | 0.023       |

| Voltage (V) | Test Result (ppm)@20°C |             |             |
|-------------|------------------------|-------------|-------------|
|             | Channel 128            | Channel 189 | Channel 251 |
| 3.5         | 0.017                  | 0.023       | 0.023       |
| 4.2         | 0.018                  | 0.021       | 0.021       |

EDGE (GMSK) MODE:

| Temperature(°C) | Test Result (ppm)@3.8V |             |             |
|-----------------|------------------------|-------------|-------------|
|                 | Channel 128            | Channel 189 | Channel 251 |
| -30             | 0.022                  | 0.022       | 0.019       |
| -20             | 0.023                  | 0.023       | 0.019       |
| -10             | 0.021                  | 0.021       | 0.020       |
| 0               | 0.025                  | 0.023       | 0.018       |
| +10             | 0.024                  | 0.025       | 0.021       |
| +20             | 0.021                  | 0.024       | 0.018       |
| +30             | 0.021                  | 0.022       | 0.017       |
| +40             | 0.023                  | 0.022       | 0.019       |
| +50             | 0.022                  | 0.021       | 0.019       |

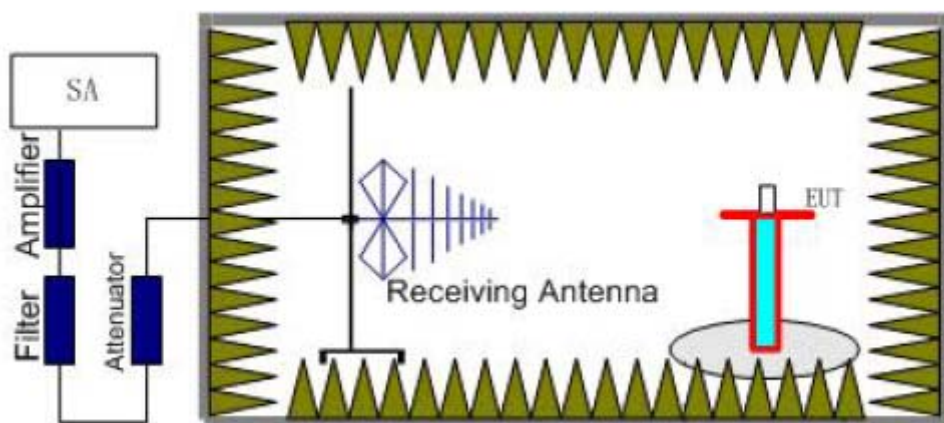
| Voltage (V) | Test Result (ppm)@20°C |             |             |
|-------------|------------------------|-------------|-------------|
|             | Channel 128            | Channel 189 | Channel 251 |
| 3.5         | 0.022                  | 0.022       | 0.019       |
| 4.2         | 0.021                  | 0.024       | 0.018       |

## 2.2.1.8 Radiated Spurious Emissions-FCC Part2.1053/22.917(a)

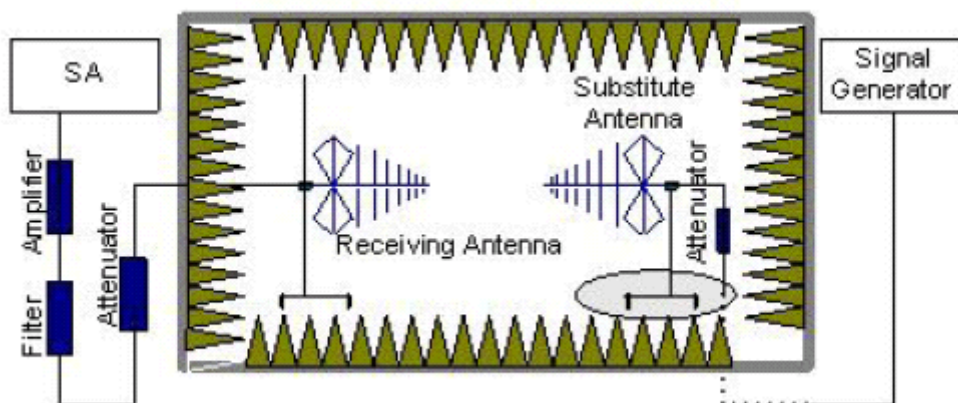
Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 43%               | 99.7kPa  |

Test Setup:



Step 1



Step 2

Test procedure:

The measurements procedures in TIA-603C-2004 are used.

The spectrum was scanned from 30MHz to the 10<sup>th</sup> harmonic of the highest frequency generated within the equipment.

Step 1:

The measurement is carried out in the fully anechoic chamber. EUT was placed

on a 2.4 meter high non-conductive table at a 3 meter test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna is 2.4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10<sup>th</sup> harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.

#### Step 2:

A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

A power ( $P_{mea}$ ) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded ( $P_r$ ). The power of signal source ( $P_{mea}$ ) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

A “reference path loss” should be calculated after test. The attenuation of “reference path loss” is the cable loss between the Signal Source with the Substitution Antenna ( $P_{ca}$ ) and the Substitution Antenna Gain ( $G_a$ ).

#### Calculation procedure:

The data of cable loss and antenna gain has been calibrated in full testing frequency range before the testing.

The power of the Radiated Spurious Emissions is calculated by adding the cable loss and antenna gain. The basic equation with a sample calculation is as followed:

$$\text{Power(EIRP)} = P_{mea} + P_{ca} + G_a$$

This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15 \text{ (dB)}$ .

Assumed the power of signal source record is -20dBm. A cable loss of -30dB, and an antenna gain of 11dB are added.

$$P = P_{\text{mea}} + P_{\text{ca}} + G_a = (-20\text{dBm}) + (-30\text{dB}) + (11\text{dB}) = -39\text{dBm}$$

The measurement will be done at carrier frequencies that pertain to bottom (Channel 128), middle (Channel 189) and top (Channel 251) channels of the GSM 850 band.

## Test result

### GSM/GPRS MODE Channel 128

| Frequency (MHz) | Power (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Limited (dBm) | Polarization |
|-----------------|-------------|--------------------|----------------------|------------|---------------|--------------|
| 1622.95         | -41.30      | -4.6               | 8.3                  | -45.00     | -13           | Vertical     |
| 2565.03         | -42.45      | -5.9               | 8.9                  | -45.45     | -13           | Vertical     |
| 2768.11         | -43.10      | -5.9               | 8.9                  | -46.10     | -13           | Vertical     |
| 3312.85         | -52.31      | -7.5               | 10.2                 | -55.01     | -13           | Vertical     |
| 7022.45         | -53.71      | -9.4               | 12.0                 | -56.31     | -13           | Vertical     |
| 9921.21         | -54.25      | -11.4              | 13.8                 | -56.65     | -13           | Horizontal   |

### EDGE (GMSK) MODE Channel 128:

| Frequency (MHz) | Power (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Limited (dBm) | Polarization |
|-----------------|-------------|--------------------|----------------------|------------|---------------|--------------|
| 1637.82         | -41.14      | -4.6               | 8.3                  | -44.84     | -13           | Vertical     |
| 2561.07         | -42.30      | -5.9               | 8.9                  | -45.30     | -13           | Vertical     |
| 2847.73         | -42.84      | -5.9               | 8.9                  | -45.84     | -13           | Vertical     |
| 3377.47         | -52.57      | -7.5               | 10.2                 | -55.27     | -13           | Vertical     |
| 7026.48         | -53.49      | -9.4               | 12.0                 | -56.09     | -13           | Horizontal   |
| 9933.79         | -54.57      | -11.4              | 13.8                 | -56.97     | -13           | Vertical     |

GSM/GPRS MODE Channel 189:

| Frequency (MHz) | Power (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Limited (dBm) | Polarization |
|-----------------|-------------|--------------------|----------------------|------------|---------------|--------------|
| 1635.52         | -41.55      | -4.6               | 8.3                  | -45.25     | -13           | Vertical     |
| 2556.04         | -42.57      | -5.9               | 8.9                  | -45.57     | -13           | Vertical     |
| 2822.93         | -42.11      | -5.9               | 8.9                  | -45.11     | -13           | Vertical     |
| 3315.79         | -52.75      | -7.5               | 10.2                 | -55.45     | -13           | Horizontal   |
| 6979.59         | -54.68      | -9.4               | 12.0                 | -57.28     | -13           | Vertical     |
| 9973.75         | -55.10      | -11.4              | 13.8                 | -57.50     | -13           | Vertical     |

EDGE (GMSK) MODE Channel 189:

| Frequency (MHz) | Power (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Limited (dBm) | Polarization |
|-----------------|-------------|--------------------|----------------------|------------|---------------|--------------|
| 1645.54         | -41.31      | -4.6               | 8.3                  | -45.01     | -13           | Vertical     |
| 2547.23         | -41.61      | -5.9               | 8.9                  | -44.61     | -13           | Vertical     |
| 2769.55         | -42.47      | -5.9               | 8.9                  | -45.47     | -13           | Vertical     |
| 3358.53         | -51.87      | -7.5               | 10.2                 | -54.57     | -13           | Horizontal   |
| 6968.10         | -54.45      | -9.4               | 12.0                 | -57.05     | -13           | Vertical     |
| 9974.01         | -55.13      | -11.4              | 13.8                 | -57.53     | -13           | Vertical     |

GSM/GPRS MODE Channel 251:

| Frequency (MHz) | Power (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Limited (dBm) | Polarization |
|-----------------|-------------|--------------------|----------------------|------------|---------------|--------------|
| 1637.25         | -41.38      | -4.6               | 8.3                  | -45.08     | -13           | Vertical     |
| 2564.92         | -42.23      | -5.9               | 8.9                  | -45.23     | -13           | Horizontal   |
| 2855.96         | -42.65      | -5.9               | 8.9                  | -45.65     | -13           | Vertical     |
| 3347.76         | -53.41      | -7.5               | 10.2                 | -56.11     | -13           | Vertical     |
| 7025.39         | -54.38      | -9.4               | 12.0                 | -56.98     | -13           | Vertical     |
| 9972.85         | -54.91      | -11.4              | 13.8                 | -57.31     | -13           | Vertical     |

EDGE (GMSK) MODE Channel 251:

| Frequency<br>(MHz) | Power<br>(dBm) | Pca<br>Cable loss(dB) | Ga<br>Antenna<br>Gain (dB) | Pmea<br>(dBm) | Limited<br>(dBm) | Polarization |
|--------------------|----------------|-----------------------|----------------------------|---------------|------------------|--------------|
| 1656.54            | -41.55         | -4.6                  | 8.3                        | -45.25        | -13              | Vertical     |
| 2567.59            | -42.60         | -5.9                  | 8.9                        | -45.60        | -13              | Horizontal   |
| 2764.04            | -42.60         | -5.9                  | 8.9                        | -45.60        | -13              | Vertical     |
| 3345.55            | -53.02         | -7.5                  | 10.2                       | -55.72        | -13              | Vertical     |
| 6995.10            | -53.91         | -9.4                  | 12.0                       | -56.51        | -13              | Vertical     |
| 9968.27            | -55.45         | -11.4                 | 13.8                       | -57.85        | -13              | Vertical     |

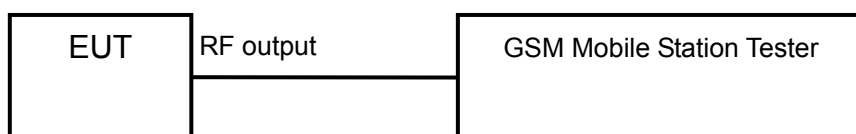
## 2.2.2 PCS1900

### 2.2.2.1 RF Power Output-FCC Part2.1046

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 42%               | 101.9kPa |

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. Then the test data can be read at the tester screen. The loss between RF output port of the EUT and the input port of the tester will be taken into consideration.

The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

|        |                     |
|--------|---------------------|
| Limits | $\leq 30\text{dBm}$ |
|--------|---------------------|

Test result:

GSM/GPRS MODE:

| Carrier frequency (MHz) | Channel No. | RF Power Output (dBm) |
|-------------------------|-------------|-----------------------|
| 1850.2                  | 512         | 29.33                 |
| 1880.0                  | 661         | 29.36                 |
| 1909.8                  | 810         | 29.42                 |

EDGE (GMSK, 1Slot) MODE:

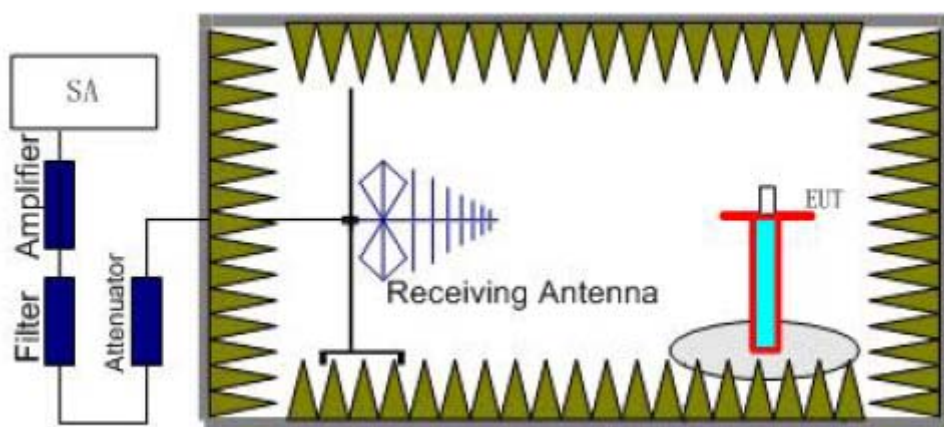
| Carrier frequency (MHz) | Channel No. | RF Power Output (dBm) |
|-------------------------|-------------|-----------------------|
| 1850.2                  | 512         | 29.35                 |
| 1880.0                  | 661         | 29.38                 |
| 1909.8                  | 810         | 29.44                 |

## 2.2.2.2 Effective Isotropic Radiated Power-FCC Part24.232(c)

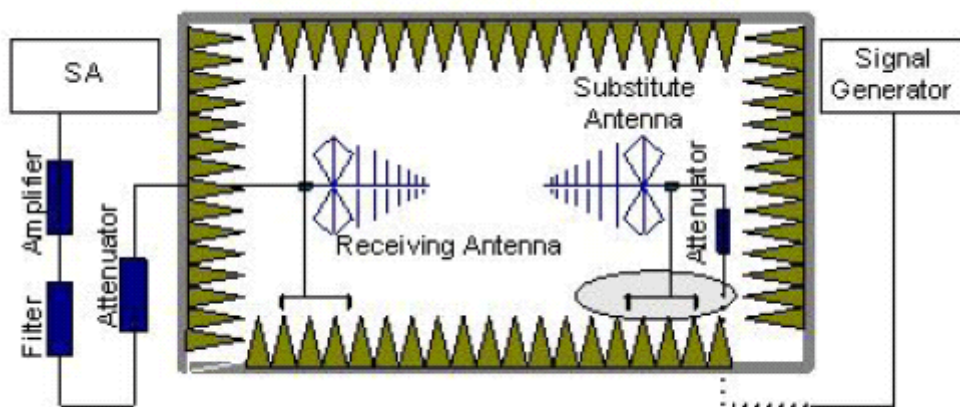
Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 43%               | 99.7kPa  |

Test setup:



Step 1



Step 2

Test procedure:

The measurements procedures in TIA-603C-2004 are used.

Step 1:

The measurement is carried out in the fully anechoic chamber. EUT was placed

on a 2.4 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna is 2.4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and RBW is set to 3MHz. Then the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum power value on spectrum analyzer or receiver. And the maximum value of the receiver should be recorded as (Pr).

#### Step 2:

A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator. To repeat the same procedure as step1 and the level of signal generator will be adjusted till the same power value on the spectrum analyzer or receiver. The ERP/EIRP of the EUT can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

A power (P<sub>mea</sub>) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (P<sub>mea</sub>) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

A “reference path loss” should be calculated after test. The attenuation of “reference path loss” is the cable loss between the Signal Source with the Substitution Antenna (P<sub>ca</sub>) and the Substitution Antenna Gain (Ga).

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{\text{mea}} + P_{\text{ca}} + G_a$$

The measurement will be done at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

#### Limits:

| Operation Mode | Power Step | E.I.R.P. (dBm) |
|----------------|------------|----------------|
| GSM            | 0          | ≤33            |
| GPRS           | 3          | ≤33            |
| EDGE           | 5          | ≤33            |

Test result:

GSM/GPRS MODE:

| Frequency (MHz) | Power step | Peak EIRP(dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Polarization |
|-----------------|------------|----------------|--------------------|----------------------|------------|--------------|
| 1850.2          | 0          | 30.40          | -4.8               | 8.6                  | 26.60      | Vertical     |
| 1880.0          | 0          | 30.65          | -4.8               | 8.6                  | 26.85      | Vertical     |
| 1909.8          | 0          | 30.41          | -4.8               | 8.6                  | 26.61      | Vertical     |

EDGE (GMSK, 1Slot) MODE:

| Frequency (MHz) | Power step | Peak EIRP(dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Polarization |
|-----------------|------------|----------------|--------------------|----------------------|------------|--------------|
| 1850.2          | 5          | 29.80          | -4.8               | 8.6                  | 29.80      | Vertical     |
| 1880.0          | 5          | 30.02          | -4.8               | 8.6                  | 30.02      | Vertical     |
| 1909.8          | 5          | 30.38          | -4.8               | 8.6                  | 30.38      | Vertical     |

Frequency: 1880.0MHz

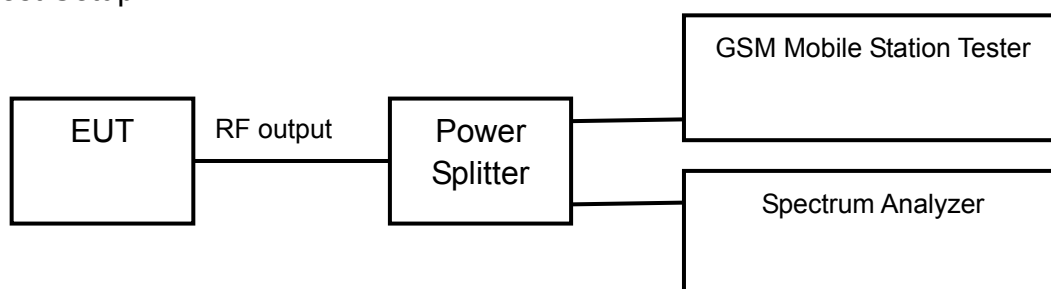
Peak EIRP(dBm) = Pmea(26.85dBm)+Pca(-4.8dB)+Ga(8.6dB) = 30.65dBm

### 2.2.2.3 Occupied Bandwidth-FCC Part2.1049

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 42%               | 101.9kPa |

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of 99% power can be read on spectrum analyzer.

The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

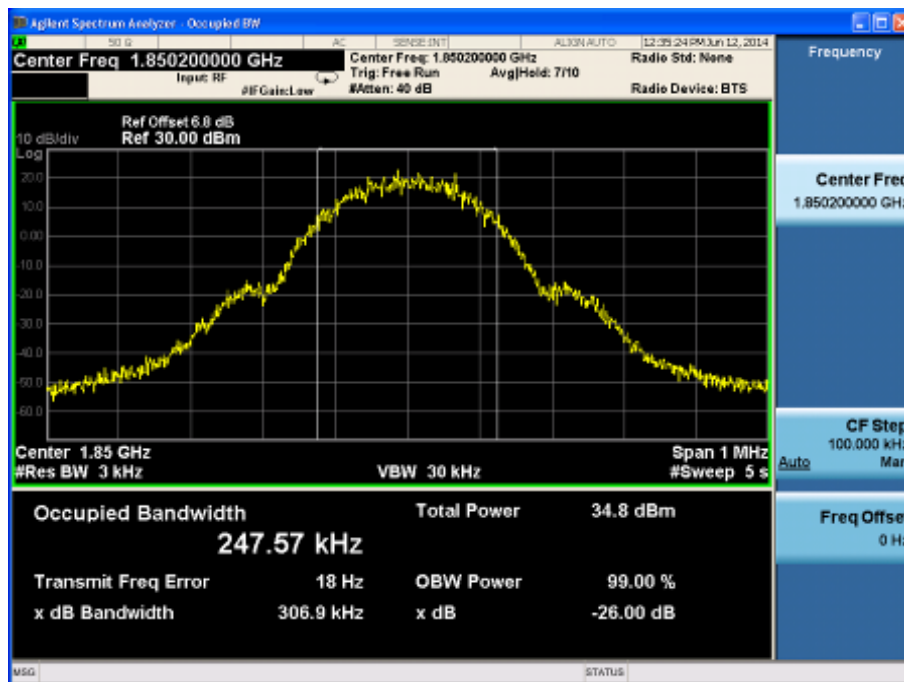
GSM/GPRS MODE:

| Carrier frequency (MHz) | Channel No. | Bandwidth of 99% Power (kHz) |
|-------------------------|-------------|------------------------------|
| 1850.2                  | 512         | 247.57                       |
| 1880.0                  | 661         | 245.85                       |
| 1909.8                  | 810         | 243.78                       |

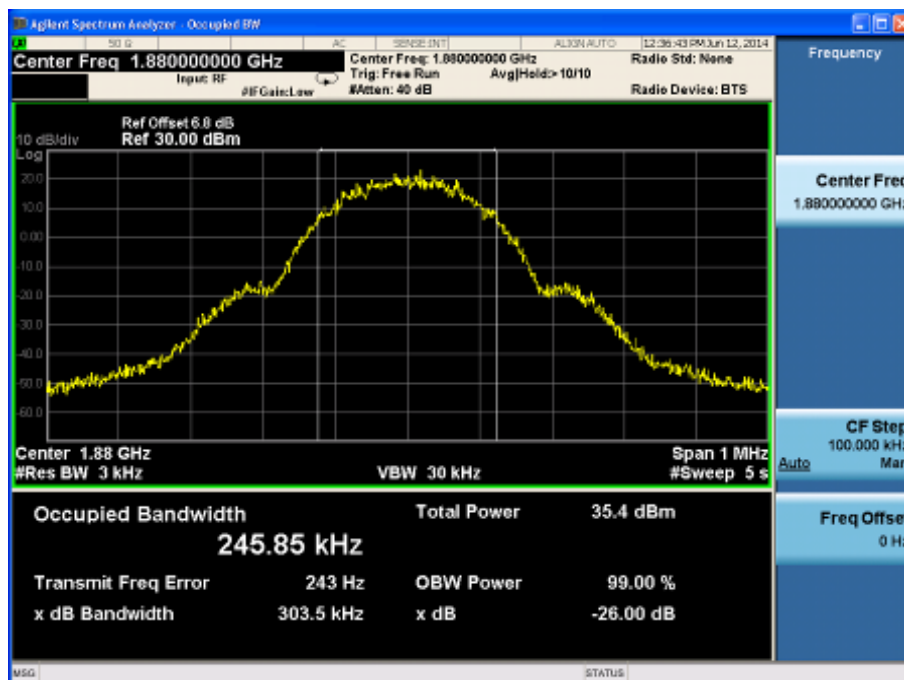
EDGE (GMSK) MODE:

| Carrier frequency (MHz) | Channel No. | Bandwidth of 99% Power (kHz) |
|-------------------------|-------------|------------------------------|
| 1850.2                  | 512         | 246.07                       |
| 1880.0                  | 661         | 246.75                       |
| 1909.8                  | 810         | 245.99                       |

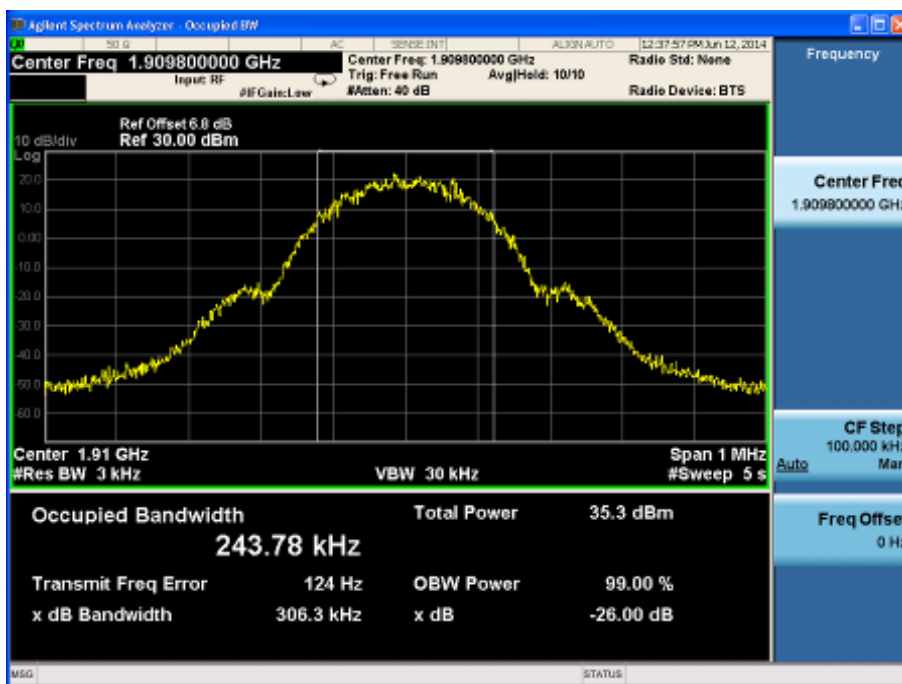
GSM/GPRS MODE:



Channel 512

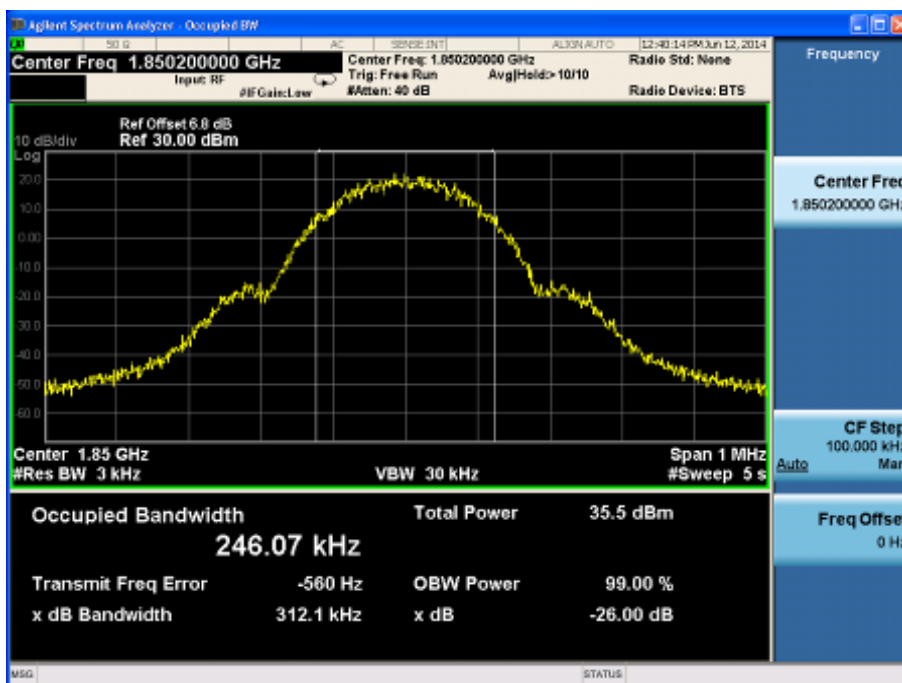


Channel 661

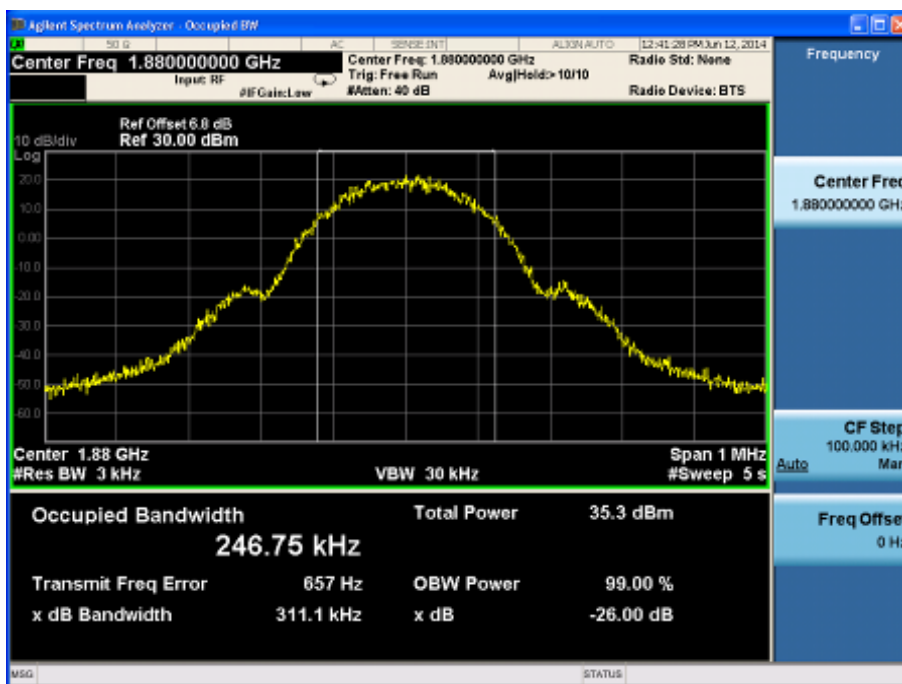


Channel 810

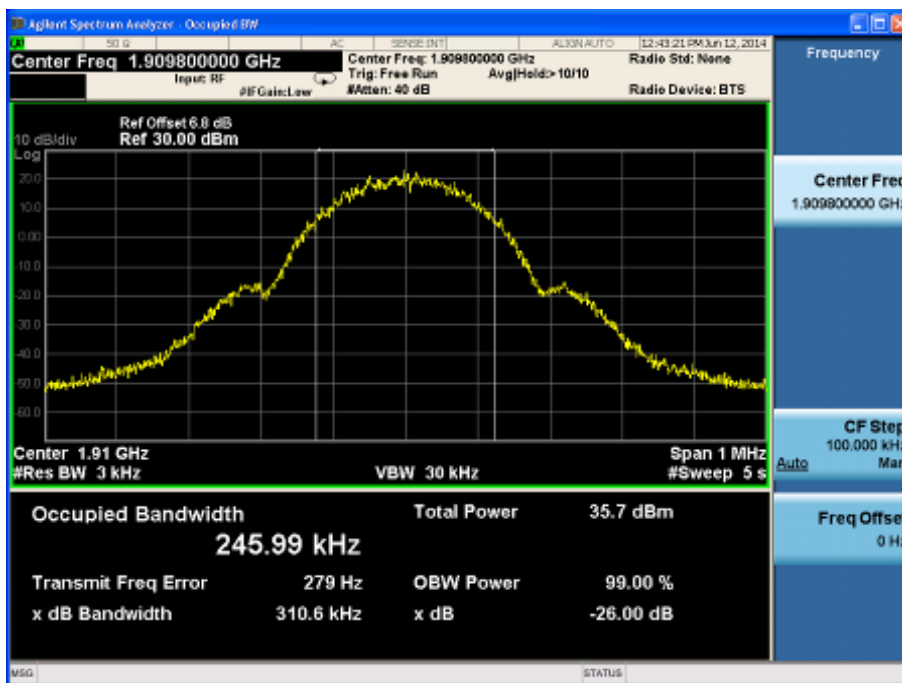
EDGE (GMSK) MODE:



Channel 512



Channel 661



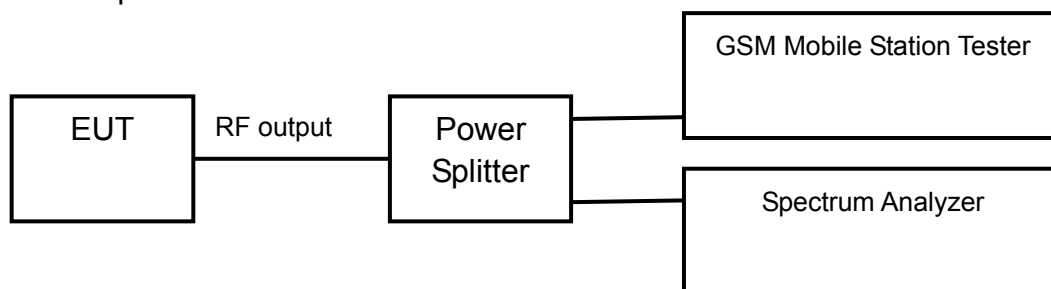
Channel 810

## 2.2.2.4 Emission Bandwidth-FCC Part24.238(b)

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23℃         | 42%               | 101.9kPa |

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The emission bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of -26dB transmitter power can be read on spectrum analyzer.

The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

Limits: No specific emission bandwidth requirements in part 24.238(b)

Test result:

GSM/GPRS MODE:

| Carrier frequency (MHz) | Channel No. | Bandwidth of -26dB transmitter power (kHz) |
|-------------------------|-------------|--------------------------------------------|
| 1850.2                  | 512         | 306.9                                      |
| 1880.0                  | 661         | 303.5                                      |
| 1909.8                  | 810         | 306.3                                      |

EDGE (GMSK) MODE:

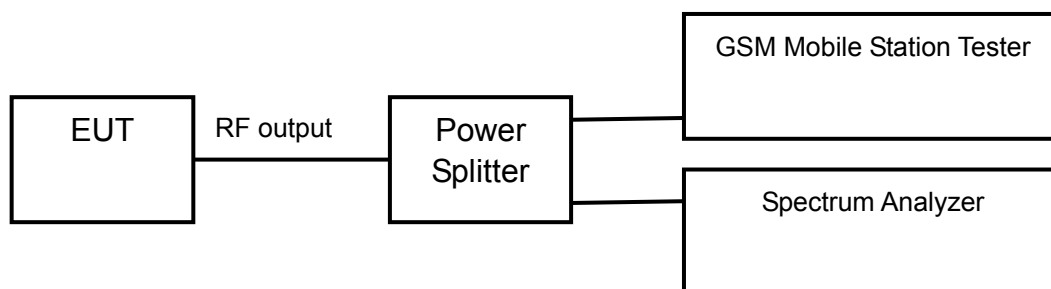
| Carrier frequency (MHz) | Channel No. | Bandwidth of -26dB transmitter power (kHz) |
|-------------------------|-------------|--------------------------------------------|
| 1850.2                  | 512         | 312.1                                      |
| 1880.0                  | 661         | 311.1                                      |
| 1909.8                  | 810         | 310.6                                      |

## 2.2.2.5 Spurious Emissions at antenna terminal-FCC Part2.1051/24.238(a)

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 42%               | 101.9kPa |

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10<sup>th</sup> harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.

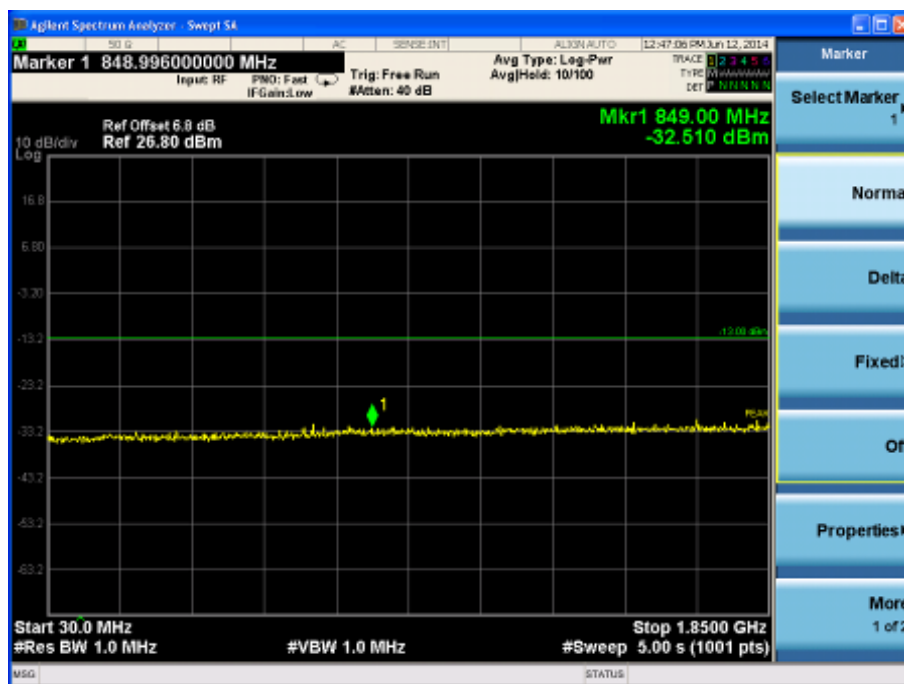
The measurement will be conducted at one channel No661 (middle channel of PCS1900 band)

|        |                      |
|--------|----------------------|
| Limits | $\leq -13\text{dBm}$ |
|--------|----------------------|

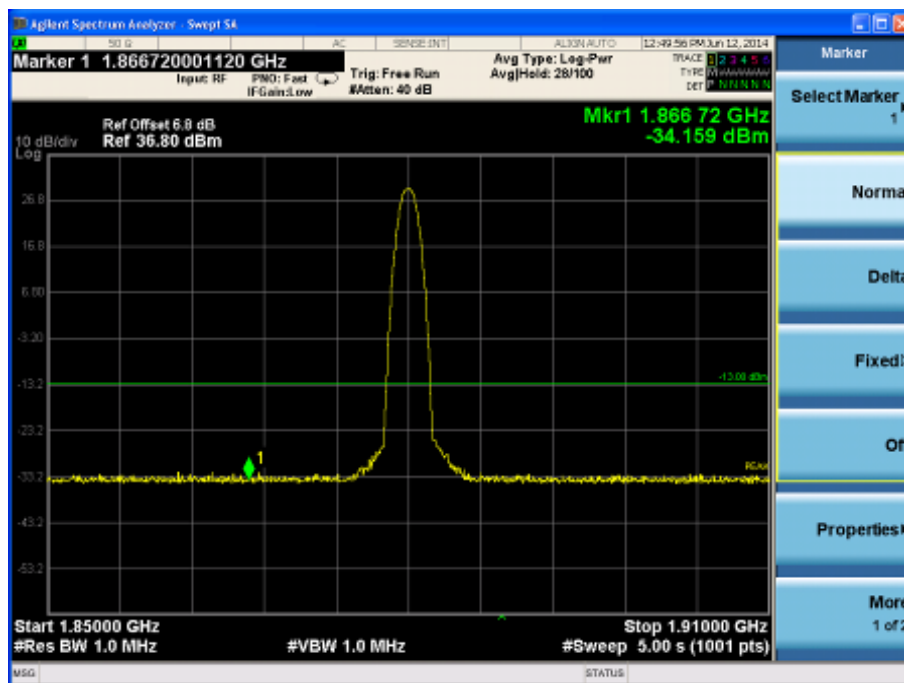
Test result:

Refer to the following figures.

## GSM/GPRS MODE:

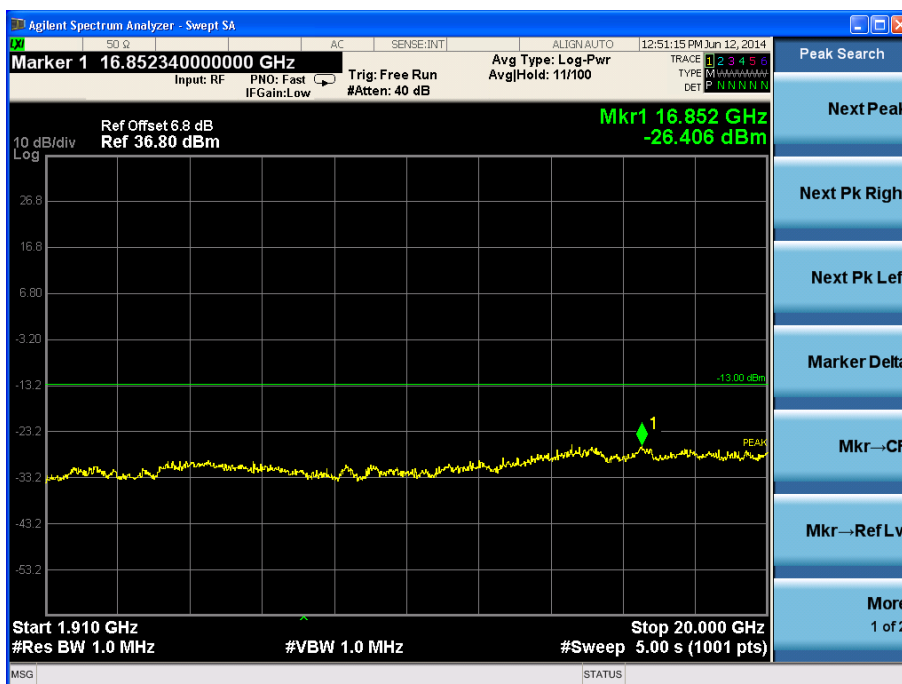


Channel 661, 30MHz~1850MHz



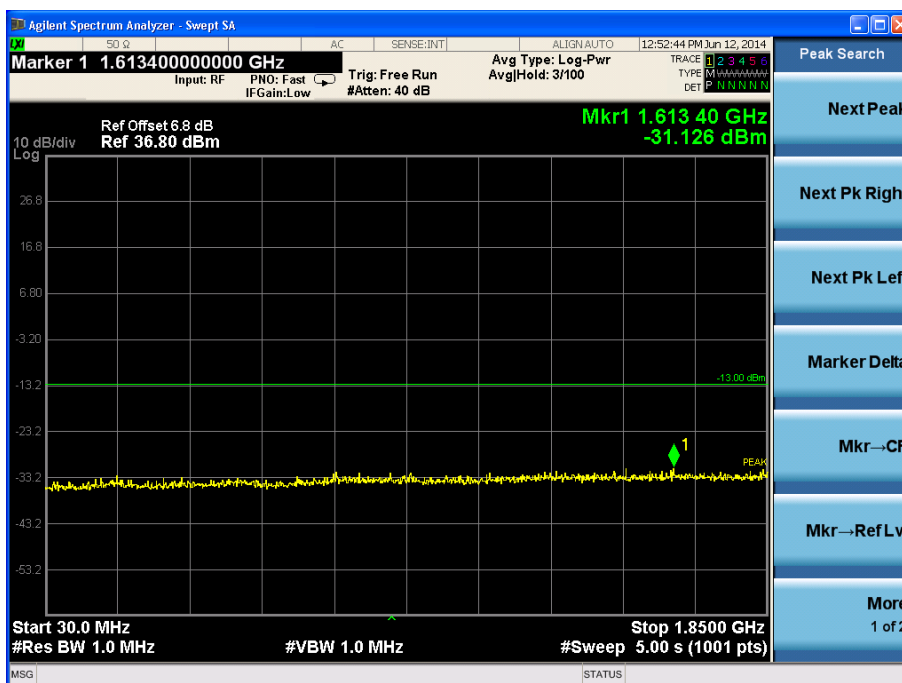
Channel 661, 1850MHz~1910MHz

Note: The signal beyond the limit is the base station simulator carrier.

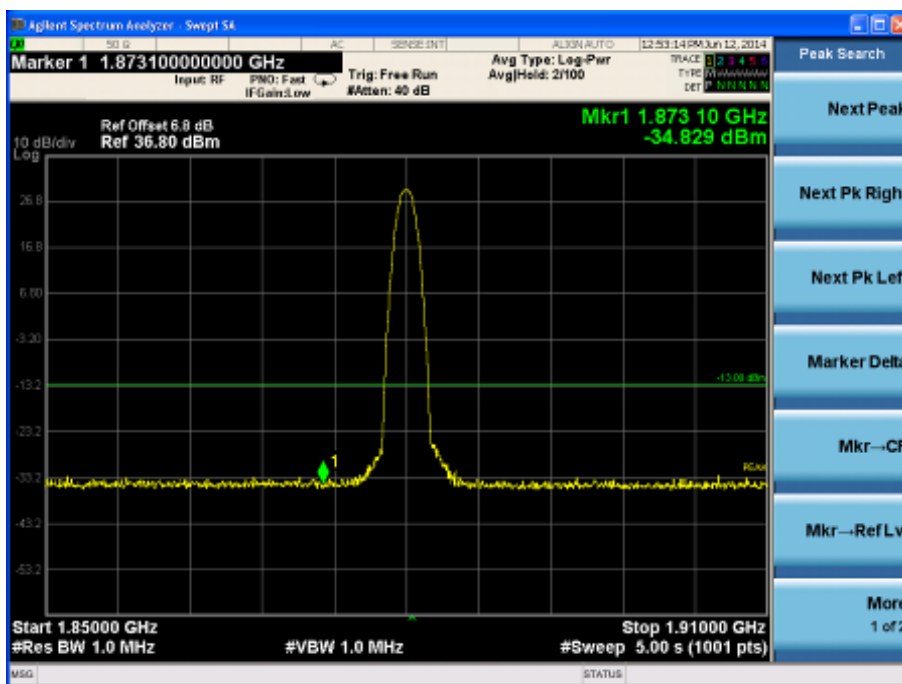


Channel 661, 1910MHz~20GHz

EDGE (GMSK) MODE:



Channel 661, 30MHz~1850MHz



Channel 661, 1850MHz~1910MHz

Note: The signal beyond the limit is the base station simulator carrier.



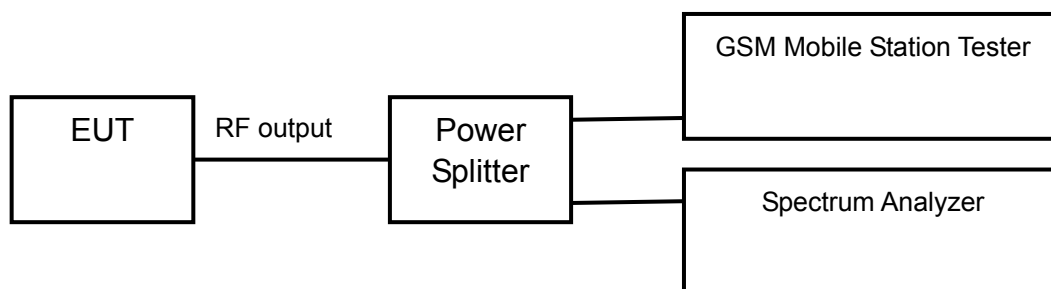
Channel 661, 1910MHz~20GHz

## 2.2.2.6 Band Edges Compliance-FCC Part2.1051/24.238(a)

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 42%               | 101.9kPa |

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The peak detector is used and RBW is set to at least 1% of the emission bandwidth on spectrum analyzer.

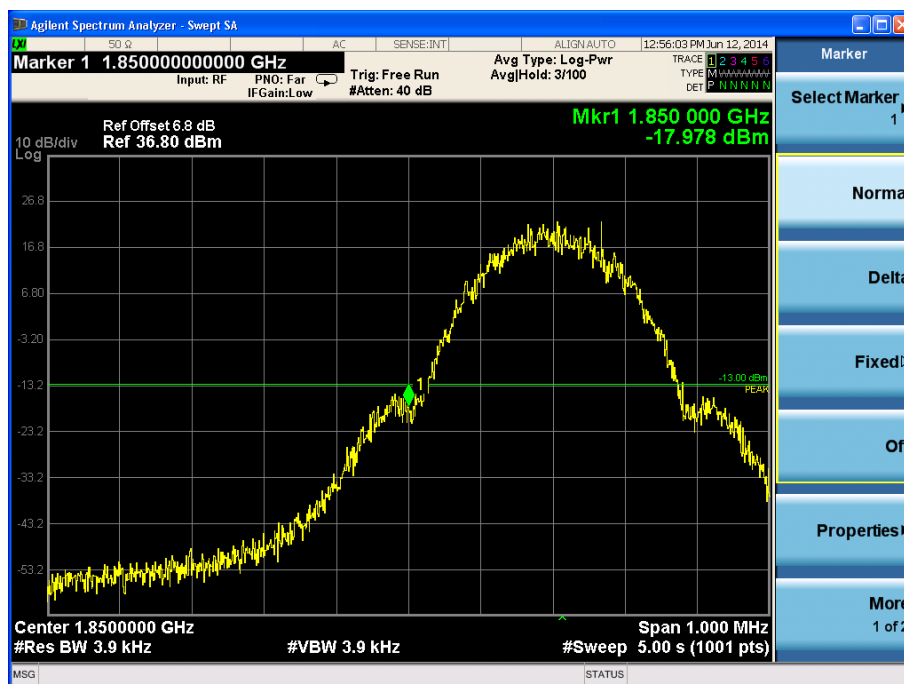
The measurement will be conducted at two channels No512 and No810 (Bottom and top channels of PCS1900 band)

| Limits | $\leq -13\text{dBm}$ |
|--------|----------------------|
|--------|----------------------|

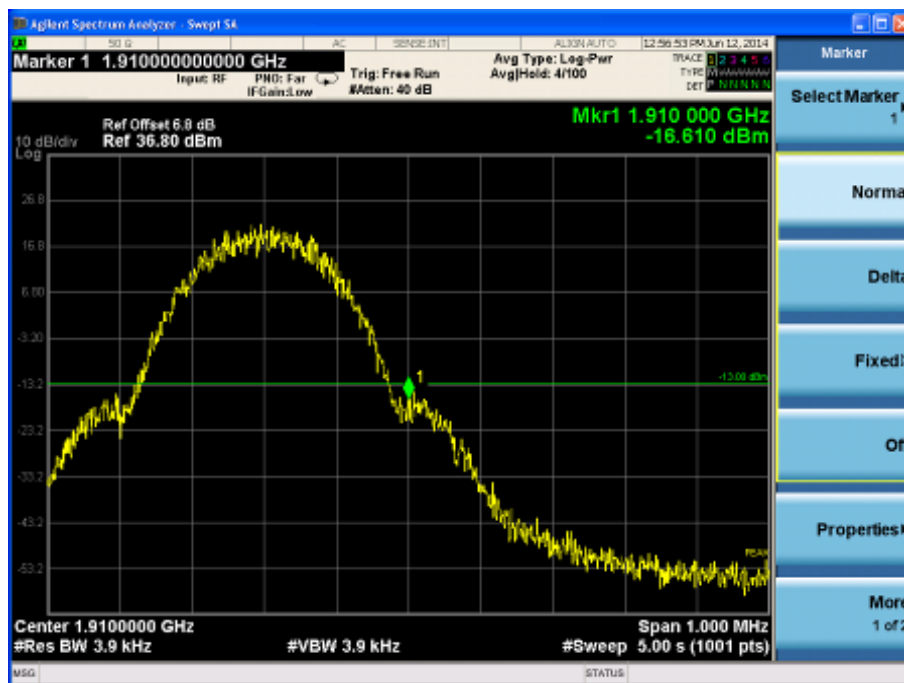
Test result:

Refer to the following figures.

## GSM/GPRS MODE:

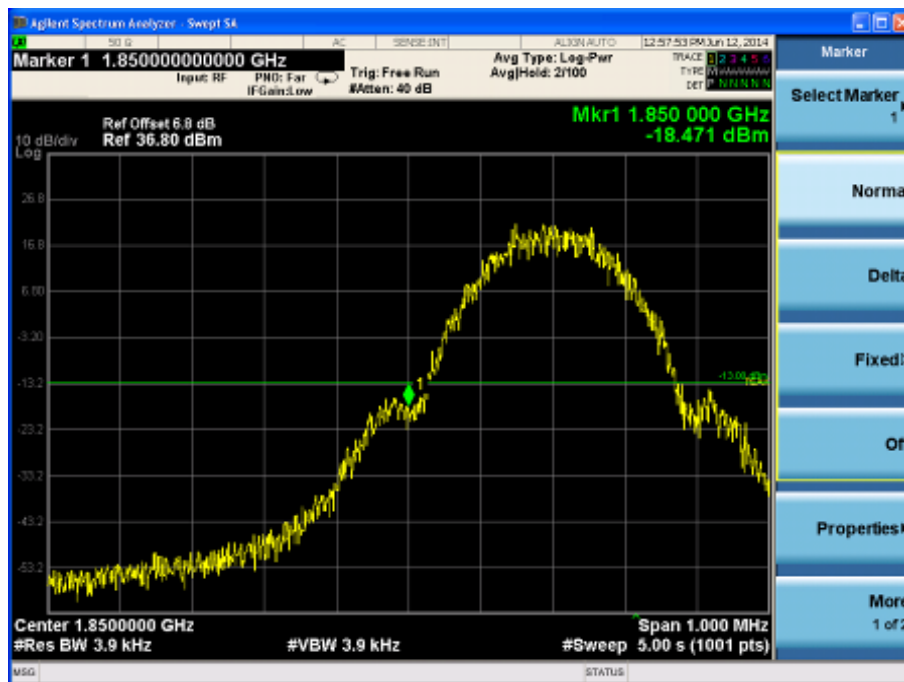


Channel 512

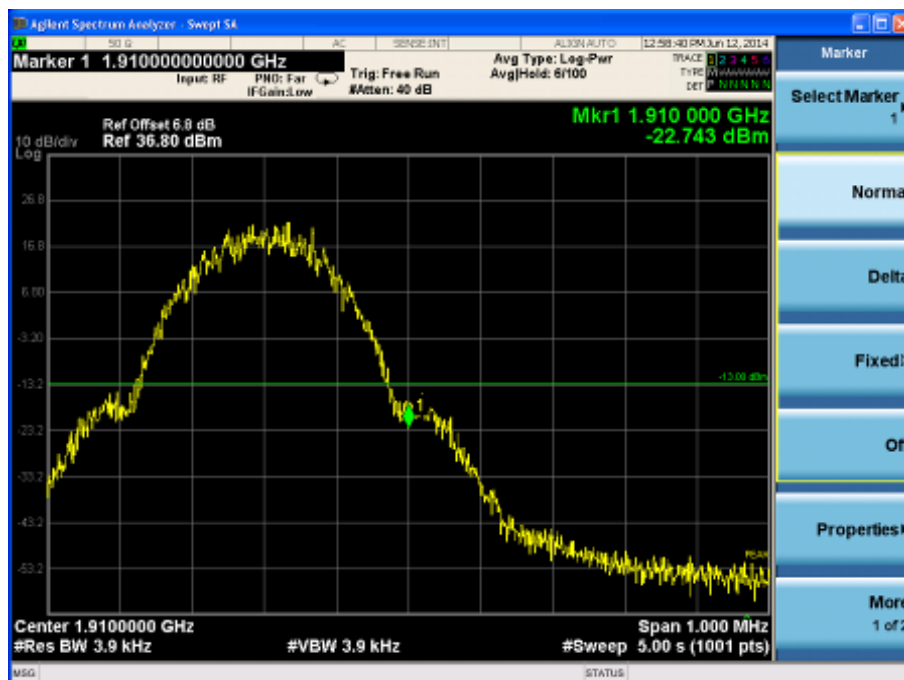


Channel 810

## EDGE (GMSK) MODE:



Channel 512



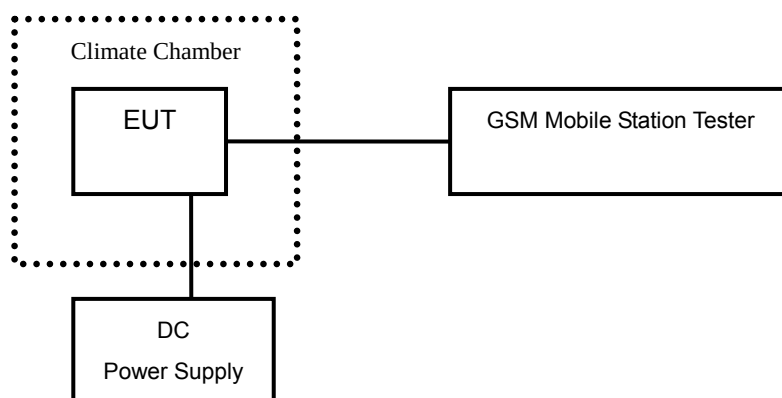
Channel 810

### 2.2.2.7 Frequency Stability-FCC Part2.1055/24.235

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C        | 42%               | 101.9kPa |

Test setup:



Test Procedure:

A radio link shall be established between EUT and Tester. The tester will sample the transmitter RF output signal and measure its frequency. The temperature inside the climate chamber is varied from -30 to +50°C in 10°C step size, and also the DC power supply voltage to the EUT is varied from 3.5 to 4.2V. The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band).

Limits: No specific frequency stability requirements in part 2.1055 and part 24.235.

Test result:

GSM/GPRS MODE:

| Temperature(°C) | Test Result (ppm)@3.8V |             |             |
|-----------------|------------------------|-------------|-------------|
|                 | Channel 512            | Channel 661 | Channel 810 |
| -30             | 0.017                  | 0.010       | 0.012       |
| -20             | 0.014                  | 0.016       | 0.013       |
| -10             | 0.015                  | 0.015       | 0.014       |
| 0               | 0.016                  | 0.018       | 0.011       |
| +10             | 0.015                  | 0.015       | 0.016       |
| +20             | 0.016                  | 0.014       | 0.014       |
| +30             | 0.014                  | 0.017       | 0.013       |
| +40             | 0.015                  | 0.016       | 0.015       |
| +50             | 0.017                  | 0.015       | 0.013       |

| Voltage (V) | Test Result (ppm)@20°C |             |             |
|-------------|------------------------|-------------|-------------|
|             | Channel 512            | Channel 661 | Channel 810 |
| 3.5         | 0.013                  | 0.015       | 0.014       |
| 4.2         | 0.014                  | 0.016       | 0.015       |

EDGE (GMSK) MODE:

| Temperature(°C) | Test Result (ppm)@3.8V |             |             |
|-----------------|------------------------|-------------|-------------|
|                 | Channel 512            | Channel 661 | Channel 810 |
| -30             | 0.016                  | 0.014       | 0.015       |
| -20             | 0.015                  | 0.017       | 0.016       |
| -10             | 0.017                  | 0.015       | 0.015       |
| 0               | 0.018                  | 0.015       | 0.013       |
| +10             | 0.015                  | 0.016       | 0.014       |
| +20             | 0.016                  | 0.015       | 0.013       |
| +30             | 0.018                  | 0.014       | 0.015       |
| +40             | 0.016                  | 0.015       | 0.016       |
| +50             | 0.017                  | 0.016       | 0.014       |

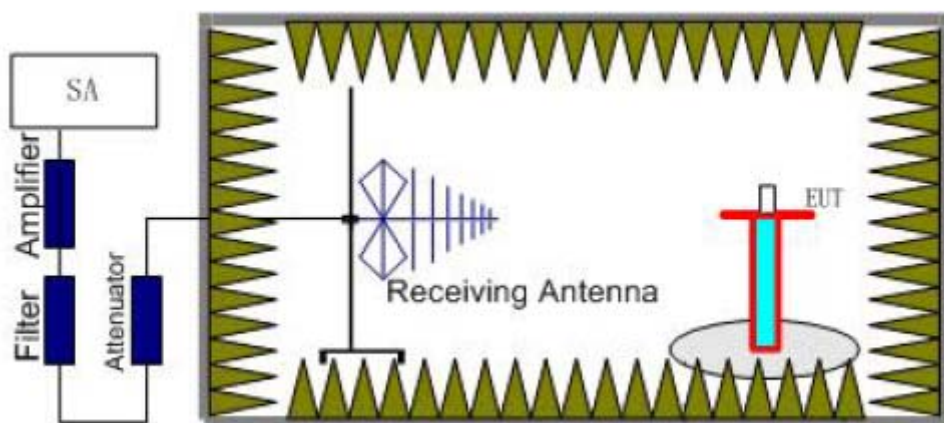
| Voltage (V) | Test Result (ppm)@20°C |             |             |
|-------------|------------------------|-------------|-------------|
|             | Channel 512            | Channel 661 | Channel 810 |
| 3.5         | 0.014                  | 0.016       | 0.014       |
| 4.2         | 0.013                  | 0.014       | 0.016       |

## 2.2.2.8 Radiated Spurious Emissions-FCC Part2.1053/24.238(a)

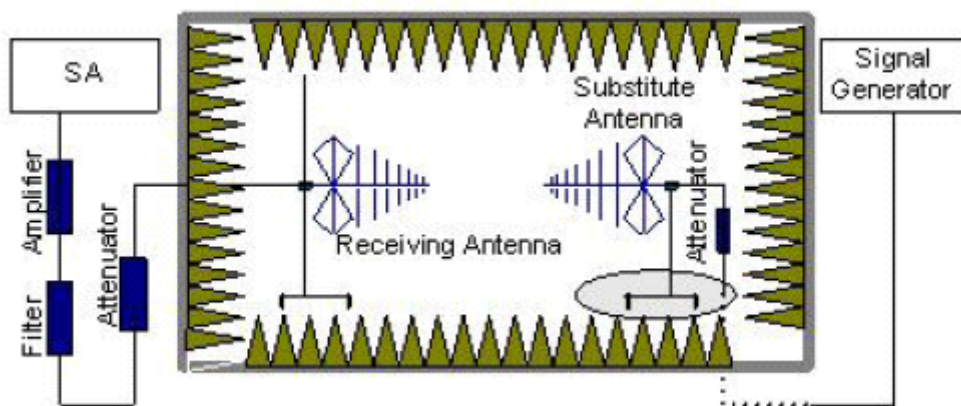
Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 19.3°C      | 41.3%             | 100.7kPa |

Test Setup:



Step 1



Step 2

Test procedure:

The measurements procedures in TIA-603C-2004 are used.

The spectrum was scanned from 30MHz to the 10<sup>th</sup> harmonic of the highest frequency generated within the equipment.

Step 1:

The measurement is carried out in the fully anechoic chamber. EUT was placed

on a 2.4 meter high non-conductive table at a 3 meter test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna is 2.4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10<sup>th</sup> harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.

#### Step 2:

A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

A power ( $P_{mea}$ ) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded ( $P_r$ ). The power of signal source ( $P_{mea}$ ) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

A “reference path loss” should be calculated after test. The attenuation of “reference path loss” is the cable loss between the Signal Source with the Substitution Antenna ( $P_{ca}$ ) and the Substitution Antenna Gain ( $G_a$ ).

#### Calculation procedure:

The data of cable loss and antenna gain has been calibrated in full testing frequency range before the testing.

The power of the Radiated Spurious Emissions is calculated by adding the cable loss and antenna gain. The basic equation with a sample calculation is as followed:

$$\text{Power(EIRP)} = P_{mea} + P_{ca} + G_a$$

This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15 \text{ (dB)}$ .

Assumed the power of signal source record is -20dBm. A cable loss of -30dB and an antenna gain of 11dB are added.

$$P=P_{\text{mea}}+P_{\text{ca}}+G_a=(-20\text{dBm})+(-30\text{dB})+(11\text{dB})=-39\text{dBm}$$

The measurement will be done at carrier frequencies that pertain to bottom (Channel 512), middle (Channel 661) and top (Channel 810) channels of PCS 1900 band.

Test result:

GSM/GPRS MODE Channel 512:

| Frequency (MHz) | Power (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Limited (dBm) | Polarization |
|-----------------|-------------|--------------------|----------------------|------------|---------------|--------------|
| 2847.50         | -53.06      | -5.8               | 8.9                  | -56.16     | -13           | Vertical     |
| 2869.84         | -53.58      | -5.8               | 8.9                  | -56.68     | -13           | Vertical     |
| 3669.64         | -54.18      | -7.9               | 10.4                 | -56.68     | -13           | Vertical     |
| 6977.44         | -54.48      | -9.4               | 12.0                 | -57.08     | -13           | Vertical     |
| 7557.72         | -55.33      | -10.8              | 12.0                 | -56.53     | -13           | Vertical     |
| 17352.87        | -55.51      | -13.9              | 12.3                 | -53.91     | -13           | Vertical     |

EDGE (GMSK) MODE Channel 512:

| Frequency (MHz) | Power (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Limited (dBm) | Polarization |
|-----------------|-------------|--------------------|----------------------|------------|---------------|--------------|
| 2868.01         | -53.23      | -5.8               | 8.9                  | -56.0      | -56.33        | Vertical     |
| 2876.77         | -53.20      | -5.8               | 8.9                  | -56.4      | -56.30        | Vertical     |
| 3672.83         | -54.02      | -7.9               | 10.4                 | -56.8      | -56.52        | Vertical     |
| 6995.32         | -54.45      | -9.4               | 12.0                 | -57.3      | -57.05        | Vertical     |
| 7565.14         | -55.77      | -10.8              | 12.0                 | -56.7      | -56.97        | Vertical     |
| 17348.25        | -55.72      | -13.9              | 12.3                 | -54.3      | -54.12        | Vertical     |

GSM/GPRS MODE Channel 661:

| Frequency (MHz) | Power (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Limited (dBm) | Polarization |
|-----------------|-------------|--------------------|----------------------|------------|---------------|--------------|
| 2824.65         | -52.39      | -5.8               | 8.9                  | -55.49     | -13           | Vertical     |
| 2878.47         | -53.20      | -5.8               | 8.9                  | -56.30     | -13           | Vertical     |
| 3711.84         | -53.34      | -7.9               | 10.4                 | -55.84     | -13           | Vertical     |
| 6956.03         | -53.88      | -9.4               | 12.0                 | -56.48     | -13           | Vertical     |
| 7556.34         | -54.25      | -10.8              | 12.0                 | -55.45     | -13           | Horizontal   |
| 17355.62        | -55.05      | -13.9              | 12.3                 | -53.45     | -13           | Vertical     |

EDGE (GMSK) MODE Channel 661:

| Frequency (MHz) | Power (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Limited (dBm) | Polarization |
|-----------------|-------------|--------------------|----------------------|------------|---------------|--------------|
| 2836.45         | -52.33      | -5.8               | 8.9                  | -55.43     | -13           | Vertical     |
| 2862.72         | -52.76      | -5.8               | 8.9                  | -55.86     | -13           | Horizontal   |
| 3770.45         | -53.31      | -7.9               | 10.4                 | -55.81     | -13           | Vertical     |
| 6975.90         | -54.74      | -9.4               | 12.0                 | -57.34     | -13           | Vertical     |
| 7547.68         | -55.06      | -10.8              | 12.0                 | -56.26     | -13           | Vertical     |
| 17366.69        | -55.76      | -13.9              | 12.3                 | -54.16     | -13           | Vertical     |

GSM/GPRS MODE Channel 810:

| Frequency (MHz) | Power (dBm) | Pca Cable loss(dB) | Ga Antenna Gain (dB) | Pmea (dBm) | Limited (dBm) | Polarization |
|-----------------|-------------|--------------------|----------------------|------------|---------------|--------------|
| 2846.27         | -52.38      | -5.8               | 8.9                  | -55.48     | -13           | Vertical     |
| 2859.40         | -52.62      | -5.8               | 8.9                  | -55.72     | -13           | Vertical     |
| 3758.07         | -53.41      | -7.9               | 10.4                 | -55.91     | -13           | Vertical     |
| 6992.09         | -55.08      | -9.4               | 12.0                 | -57.68     | -13           | Vertical     |
| 7545.47         | -55.14      | -10.8              | 12.0                 | -56.34     | -13           | Vertical     |
| 17337.95        | -56.47      | -13.9              | 12.3                 | -54.87     | -13           | Vertical     |

EDGE (GMSK) MODE Channel 810:

| Frequency<br>(MHz) | Power<br>(dBm) | Pca<br>Cable loss(dB) | Ga<br>Antenna<br>Gain (dB) | Pmea<br>(dBm) | Limited<br>(dBm) | Polarization |
|--------------------|----------------|-----------------------|----------------------------|---------------|------------------|--------------|
| 2854.61            | -52.26         | -5.8                  | 8.9                        | -55.36        | -13              | Vertical     |
| 2869.62            | -53.43         | -5.8                  | 8.9                        | -56.53        | -13              | Horizontal   |
| 3768.69            | -53.41         | -7.9                  | 10.4                       | -55.91        | -13              | Vertical     |
| 6993.35            | -54.11         | -9.4                  | 12.0                       | -56.71        | -13              | Vertical     |
| 7572.94            | -55.05         | -10.8                 | 12.0                       | -56.25        | -13              | Vertical     |
| 17328.91           | -55.71         | -13.9                 | 12.3                       | -54.11        | -13              | Vertical     |

### 2.3. List of test equipments

| No. | Name/Model                                  | Manufacturer | S/N        | Calibration Due Date |
|-----|---------------------------------------------|--------------|------------|----------------------|
| 1   | E5515C(8960) Mobile Station Tester          | Agilent      | MY48367401 | 2014.8               |
| 2   | N9020A Spectrum Analyzer                    | Agilent      | MY48010771 | 2014.8               |
| 3   | DC Power Supply E3645A                      | Agilent      | MY40000740 | 2014.8               |
| 4   | Power Splitter 11850C                       | Agilent      | 026057     | 2014.8               |
| 5   | Temperature chamber SH241                   | ESPEC        | 92000390   | 2014.8               |
| 6   | 12.65m×8.03m×7.50m Fully-Anechoic Chamber   | FRANKONIA    | -----      | -----                |
| 7   | Turn table Diameter:1m                      | HD           | -----      | -----                |
| 8   | Antenna master FAC(MA4.0)                   | MATURO       | -----      | -----                |
| 9   | HF 906 Double-Ridged Waveguide Horn Antenna | R&S          | 100030     | 2014.8               |
| 10  | HL562 Ultra log antenna                     | R&S          | 100016     | 2014.8               |
| 11  | 3160-09 Receive antenna                     | SCHWARZ-BECK | 002058-002 | 2014.8               |
| 12  | ESI 40 EMI test receiver                    | R&S          | 100015     | 2014.8               |
| 13  | Radio tester                                | CMU 200      | 114667     | 2014.8               |

## Appendix

### Appendix1 Test Setup