

# TEST REPORT

**FCC ID: 2ADK8STR**

**Product: STRIKE ONE IoT Module**

**Model No.: SC01**

**Additional Model No.: N/A**

**Trade Mark:**  STRIKE ONE  
TEST OF FIGHT

**Report No.: TCT160127E008**

**Issued Date: Mar. 02, 2016**

Issued for:

**Galapad Technology Limited**

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**TABLE OF CONTENTS**

|  |           |
|--|-----------|
| <b>1. Test Certification</b> .....   | <b>3</b>  |
| <b>2. Test Result Summary</b> .....  | <b>4</b>  |
| <b>3. EUT Description</b> .....  | <b>5</b>  |
| <b>4. Genera Information</b> .....   | <b>6</b>  |
| 4.1. Test environment and mode.....  | 6         |
| 4.2. Test Mode.....  | 7         |
| 4.3. Description of Support Units .....  | 7         |
| 4.4. Configuration of Tested System.....   | 8         |
| 4.5. Measurement Results Explanation Example.....  | 8         |
| <b>5. Facilities and Accreditations</b> .....  | <b>9</b>  |
| 5.1. Facilities .....  | 9         |
| 5.2. Location .....  | 9         |
| 5.3. Measurement Uncertainty.....  | 9         |
| <b>6. Test Results and Measurement Data</b> .....  | <b>10</b> |
| 6.1. Conducted Output Power Measurement .....  | 10        |
| 6.2. Peak to Average Ratio.....  | 12        |
| 6.3. 99% Occupied Bandwidth and 26dB Bandwidth Measurement .....                         | 18        |
| 6.4. Band Edge and Conducted Spurious Emission Measurement .....                         | 24        |
| 6.5. Test Specification .....  | 24        |
| 6.6. Effective Radiated Power and Effective Isotropic Radiated Power<br>Measurement..... | 33        |
| 6.7. Field Strength of Spurious Radiation Measurement .....                              | 38        |
| 6.8. Frequency Stability Measurement .....   | 43        |
| <b>Appendix A: Photographs of Test Setup</b>   |           |
| <b>Appendix B: Photographs of EUT</b>  |           |

**1. Test Certification**

|                              |   |
|------------------------------|---|
| <b>Product:</b>              | STRIKE ONE IoT Module   |
| <b>Model No.:</b>            | SC01  |
| <b>Additional Model No.:</b> | N/A   |
| <b>Applicant:</b>            | Galapad Technology Limited  |
| <b>Address:</b>              | Unit 1601, 16/F, Exchange Tower, 33 Wang Chiu Road, Kowloon Bay, Kowloon, Hong Kong               |
| <b>Manufacturer:</b>         | Shen Zhen Galapad Technology Co.,Ltd  |
| <b>Address:</b>              | Unit 603, Tower B Tian'an Hi-Tech Venture Park, Futian District, Shenzhen City                    |
| <b>Date of Test:</b>         | Jan. 27 –Mar. 01, 2016  |
| <b>Applicable Standards:</b> | FCC CFR Title 47 Part 2<br>FCC CFR Title 47 Part22 Subpart H<br>FCC CFR Title 47 Part24 Subpart E |

*The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.*

**Tested By:** Neil Wong **Date:** Mar. 01, 2016  
Neil Wong

**Reviewed By:** Joe Zhou **Date:** Mar. 02, 2016  
Joe Zhou

**Approved By:** Tomsin **Date:** Mar. 02, 2016  
Tomsin

## 2. Test Result Summary

| Requirement                                   | CFR 47 Section                      | Result |
|---|-------------------------------------|--------|
| Conducted Output Power                        | §2.1046                             | PASS   |
| Peak-to-Average Ratio                         | §24.232(d)                          | PASS   |
| Effective Radiated Power                      | §22.913(a)(2)                       | PASS   |
| Equivalent Isotropic Radiated Power           | §24.232(c)                          | PASS   |
| Occupied Bandwidth                            | §2.1049<br>§22.917(b)<br>§24.238(b) | PASS   |
| Band Edge                                     | §2.1051<br>§22.917(a)<br>§24.238(a) | PASS   |
| Conducted Spurious Emission                   | §2.1051<br>§22.917(a)<br>§24.238(a) | PASS   |
| Field Strength of Spurious Radiation          | §2.1053<br>§22.917(a)<br>§24.238(a) | PASS   |
| Frequency Stability for Temperature & Voltage | §2.1055<br>§22.355<br>§24.235       | PASS   |

**Note:**

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

### 3. EUT Description

|                            |  |
|----------------------------|--|
| <b>Product Name:</b>       | STRIKE ONE IoT Module  |
| <b>Model :</b>             | SC01   |
| <b>Additional Model:</b>   | N/A  |
| <b>Trade Mark:</b>         | <br>STRIKE ONE<br>First of Pkkt                           |
| <b>Tx Frequency:</b>       | GSM850: 824.2 MHz ~ 848.8 MHz<br>GSM1900: 1850.2 MHz ~ 1909.8MHz<br>GPRS 850: 824.2 MHz ~ 848.8 MHz<br>GPRS 1900: 1850.2 MHz ~ 1909.8MHz   |
| <b>Rx Frequency:</b>       | GSM850: 869.2 MHz ~ 893.8 MHz<br>GSM1900: 1930.2 MHz ~ 1989.8 MHz<br>GPRS 850: 869.2 MHz ~ 893.8 MHz<br>GPRS 1900: 1930.2 MHz ~ 1989.8 MHz |
| <b>Type of Modulation:</b> | GSM/GPRS: GMSK   |
| <b>Antenna Type:</b>       | PCB Antenna  |
| <b>Antenna Gain:</b>       | -1dBi  |
| <b>Power Supply:</b>       | DC3.7V   |

## 4. Genera Information

### 4.1. Test environment and mode

| Operating Environment: |  |
|------------------------|--|
| Temperature:           | 25.0 °C  |
| Humidity:              | 56 % RH  |
| Atmospheric Pressure:  | 1010 mbar  |
| Test Mode:             |  |
| Operation mode:        | Keep the EUT in communication with CMU200 and select channel with modulation |

The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

#### Description Operation Frequency

| GSM 850  |                 | PCS1900  |                 |
|----------|-----------------|----------|-----------------|
| Channel: | Frequency (MHz) | Channel: | Frequency (MHz) |
| 128      | 824.20          | 512      | 1850.20         |
| 129      | 824.40          | 513      | 1850.40         |
| ....     | ....            | ....     | ....            |
| 189      | 836.40          | 660      | 1879.80         |
| 190      | 836.60          | 661      | 1880.00         |
| 191      | 836.80          | 662      | 1880.20         |
| ...      | ...             | ...      | ...             |
| 250      | 848.60          | 809      | 1909.60         |
| 251      | 848.80          | 810      | 1909.80         |

## 4.2. Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power. Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 10000 MHz for GSM850.
2. 30 MHz to 20000 MHz for PCS1900.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

| Test Mode |                                |                                |
|-----------|--------------------------------|--------------------------------|
| Band      | Radiated TCs                   | Conducted TCs                  |
| GSM 850   | GSM Link<br>GPRS class 12 Link | GSM Link<br>GPRS class 12 Link |
| PCS 1900  | GSM Link<br>GPRS class 12 Link | GSM Link<br>GPRS class 12 Link |

**Note:** The maximum power levels are chosen to test as the worst case configuration as follows:

GSM multi-slot class 8 mode for GMSK modulation,  
RMC 12.2Kbps mode for WCDMA band V and WCDMA band II, only these modes were used for all tests. In addition to above worst-case test, below investigating on all data rates and all modes are compliance with each FCC test case which has specific test limits. For spurious emissions at antenna port, the EUT was investigated the band edges on low and high channels, and the unwanted spurious emissions on middle channel for all modes, the results are PASS, then only the worst-results were reported in the test report. The Radiated Spurious emissions for GSM modes were investigated on the middle channel and the PASS results were not worst than those data tested from the highest power channels.

## 4.3. Description of Support Units

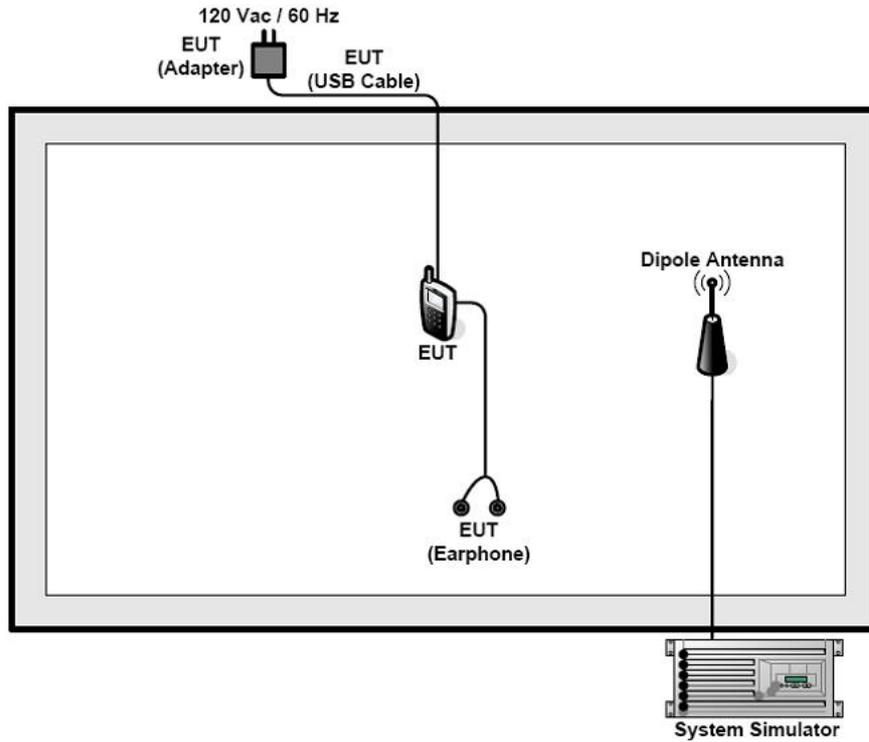
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Equipment | Model No. | Serial No. | FCC ID | Trade Name |
|-----------|-----------|------------|--------|------------|
| /         | /         | /          | /      | /          |

**Note:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 4.4. Configuration of Tested System



## 4.5. Measurement Results Explanation Example

**For all conducted test items:**

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level. The spectrum analyzer offset is derived from RF cable loss and attenuator factor.  
*Offset = RF cable loss + attenuator factor.*

The following shows an offset computation example with RF cable loss 4.2 dB and a 10dB attenuator.

Example:  $Offset(dB) = RF\ cable\ loss(dB) + attenuator\ factor(dB)$   
 $= 4.2 + 10 = 14.2\ (dB)$

## 5. Facilities and Accreditations

### 5.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 572331

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

- CNAS - Registration No.: CNAS L6165

Shenzhen TCT Testing Technology Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6165.

### 5.2. Location

Shenzhen Tongce Testing Lab

Address: 1F, Leinuo Watch Building, Fuyong Town, Baoan Dist, Shenzhen, China

Tel: 86-755-36638142

### 5.3. Measurement Uncertainty

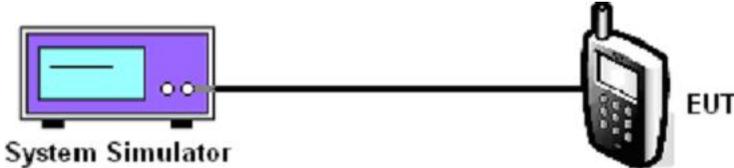
The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

| No. | Item                          | MU                      |
|-----|-------------------------------|-------------------------|
| 1   | Conducted Emission            | $\pm 2.56\text{dB}$     |
| 2   | RF power, conducted           | $\pm 0.12\text{dB}$     |
| 3   | Spurious emissions, conducted | $\pm 0.11\text{dB}$     |
| 4   | All emissions, radiated(<1G)  | $\pm 3.92\text{dB}$     |
| 5   | All emissions, radiated(>1G)  | $\pm 4.28\text{dB}$     |
| 6   | Temperature                   | $\pm 0.1^\circ\text{C}$ |
| 7   | Humidity                      | $\pm 1.0\%$             |

## 6. Test Results and Measurement Data

### 6.1. Conducted Output Power Measurement

#### 6.1.1. Test Specification

|                          |   |
|--------------------------|---|
| <b>Test Requirement:</b> | FCC part 22.913(a) and FCC part 24.232(b)   |
| <b>Test Method:</b>      | FCC part 2.1046   |
| <b>Operation mode:</b>   | Refer to item 4.1   |
| <b>Limits:</b>           | GSM 850 7W<br>PCS 1900 2W   |
| <b>Test Setup:</b>       |  <p>The diagram illustrates the test setup. On the left is a purple 'System Simulator' with a screen and two buttons. A black cable connects it to a silver mobile phone on the right, labeled 'EUT'.</p>   |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The transmitter output port was connected to the system simulator.</li> <li>2. Set EUT at maximum power through system simulator.</li> <li>3. Select lowest, middle, and highest channels for each band and different modulation.</li> <li>4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.</li> </ol> |
| <b>Test Result:</b>      | PASS  |

#### 6.1.2. Test Instruments

| Equipment        | Manufacturer | Model  | Serial Number | Calibration Due |
|------------------|--------------|--------|---------------|-----------------|
| System simulator | R&S          | CMU200 | 111382        | Sep. 11, 2016   |
| Power sensor     | Agilent      | E9031A | MY41497725    | Sep. 11, 2016   |
| Power meter      | Agilent      | E4418B | GB43312526    | Sep. 11, 2016   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

**6.1.3. Test data**

| Mode                  | GSM850 (GSM) |       |       | GSM850 (GPRS class 8) |       |       |
|-----------------------|--------------|-------|-------|-----------------------|-------|-------|
|                       | 128          | 190   | 251   | 128                   | 190   | 251   |
| Frequency (MHz)       | 824.2        | 836.6 | 848.8 | 824.2                 | 836.6 | 848.8 |
| Conducted Power (dBm) | 32.41        | 32.38 | 32.29 | 32.96                 | 32.38 | 32.07 |

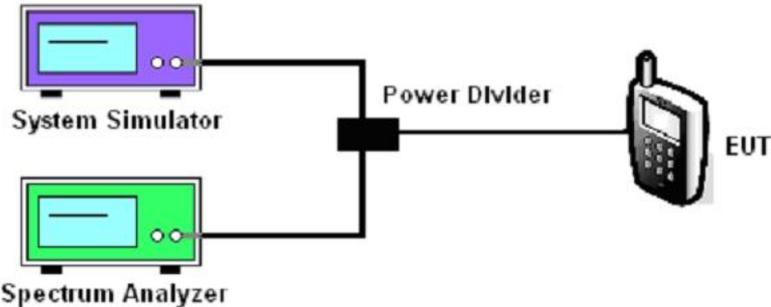
**Note:** Maximum Burst Average Power for GSM.

| Mode                  | GSM 1900 (GSM) |       |        | GSM 1900 (GPRS class 8) |       |        |
|-----------------------|----------------|-------|--------|-------------------------|-------|--------|
|                       | 512            | 661   | 810    | 512                     | 661   | 810    |
| Frequency (MHz)       | 1850.2         | 1880  | 1909.8 | 1850.2                  | 1880  | 1909.8 |
| Conducted Power (dBm) | 30.53          | 30.17 | 30.08  | 29.72                   | 29.84 | 29.28  |

**Note:** Maximum Burst Average Power for GSM.

## 6.2. Peak to Average Ratio

### 6.2.1. Test Specification

|                          |   |
|--------------------------|---|
| <b>Test Requirement:</b> | FCC Part24.232  |
| <b>Test Method:</b>      | FCC KDB 971168 v02r02 Section 5.7.1   |
| <b>Operation mode:</b>   | Refer to item 4.1   |
| <b>Limit:</b>            | The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.   |
| <b>Test Setup:</b>       |  <p>The diagram illustrates the test setup. On the left, there are two pieces of equipment: a System Simulator (top) and a Spectrum Analyzer (bottom). Both are connected to a central Power Divider. The Power Divider is then connected to the EUT (Equipment Under Test) on the right.</p>   |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.</li> <li>2. The EUT was connected to spectrum analyzer and system simulator via a power divider.</li> <li>3. Set EUT to transmit at maximum output power.</li> <li>4. For GSM/EGPRS operating modes, signal gating is implemented on the spectrum analyzer by triggering from the system simulator.</li> <li>5. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer.<br/>Record the maximum PAPR level associated with a probability of 0.1%.</li> </ol> |
| <b>Test Result:</b>      | PASS  |

### 6.2.2. Test Instruments

| Equipment         | Manufacturer | Model  | Serial Number | Calibration Due |
|-------------------|--------------|--------|---------------|-----------------|
| System simulator  | R&S          | CMU200 | 111382        | Sep. 11, 2016   |
| Spectrum Analyzer | Agilent      | N9020A | MY49100060    | Sep. 12, 2016   |
| System simulator  | R&S          | CMU200 | 111382        | Sep. 11, 2016   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.2.3. Test Data

| Mode                       | GSM850 (GSM) |       |       | GSM850 (GPRS class 8) |       |       |
|----------------------------|--------------|-------|-------|-----------------------|-------|-------|
| Channel                    | 128          | 190   | 251   | 128                   | 190   | 251   |
| Frequency (MHz)            | 824.2        | 836.6 | 848.8 | 824.2                 | 836.6 | 848.8 |
| Peak-to-Average Ratio (dB) | 9.91         | 9.54  | 8.45  | 9.73                  | 9.39  | 9.60  |

| Mode                       | GSM 1900 (GSM) |      |        | GSM 1900 (GPRS class 8) |      |        |
|----------------------------|----------------|------|--------|-------------------------|------|--------|
| Channel                    | 512            | 661  | 810    | 512                     | 661  | 810    |
| Frequency (MHz)            | 1850.2         | 1880 | 1909.8 | 1850.2                  | 1880 | 1909.8 |
| Peak-to-Average Ratio (dB) | 8.78           | 9.91 | 9.58   | 10.26                   | 9.34 | 9.29   |

Peak-to-Average Ratio on Channel 128



Peak-to-Average Ratio on Channel 190



Peak-to-Average Ratio on Channel 251



Peak-to-Average Ratio on Channel 512



Peak-to-Average Ratio on Channel 661

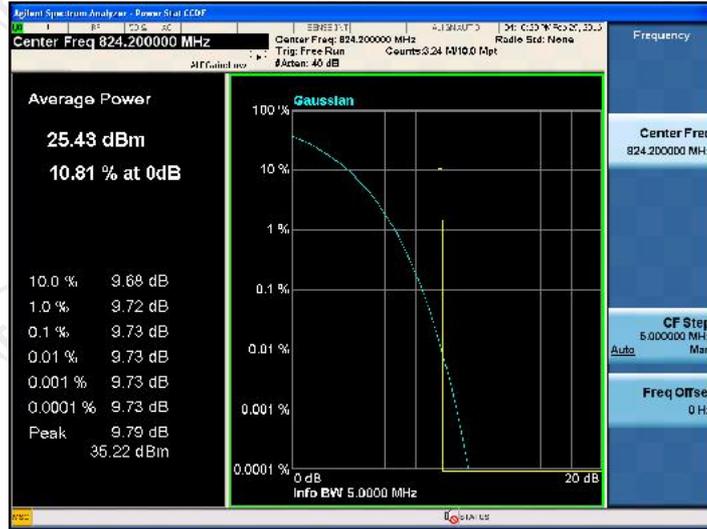


Peak-to-Average Ratio on Channel 810



**GSM 850**

**Peak-to-Average Ratio on Channel 128**



**Peak-to-Average Ratio on Channel 190**



**Peak-to-Average Ratio on Channel 251**



Peak-to-Average Ratio on Channel 512



Peak-to-Average Ratio on Channel 661



Peak-to-Average Ratio on Channel 810



### 6.3. 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 6.3.1. Test Specification

|                          |  |
|--------------------------|--|
| <b>Test Requirement:</b> | FCC part 22.913(a) and FCC part 24.232(b)  |
| <b>Test Method:</b>      | FCC part 2.1049  |
| <b>Operation mode:</b>   | Refer to item 4.1  |
| <b>Limit:</b>            | N/A  |
| <b>Test Setup:</b>       | <p>The diagram illustrates the test setup. A System Simulator (purple box) and a Spectrum Analyzer (green box) are connected to a Power Divider. The Power Divider is connected to the EUT (Equipment Under Test), which is a mobile phone.</p>  |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 4.2.</li> <li>2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.</li> <li>3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3*RBW, sample detector, trace maximum hold.</li> <li>5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.</li> </ol> |
| <b>Test Result:</b>      | PASS   |

#### 6.3.2. Test Instruments

| Equipment         | Manufacturer | Model  | Serial Number | Calibration Due |
|-------------------|--------------|--------|---------------|-----------------|
| System simulator  | R&S          | CMU200 | 111382        | Sep. 11, 2016   |
| Spectrum Analyzer | Agilent      | N9020A | MY49100060    | Sep. 12, 2016   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.3.3. Test data

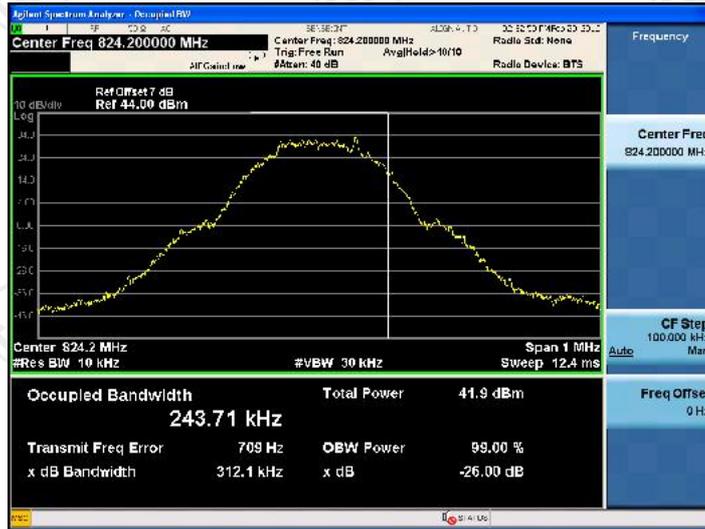
| Cellular Band   |              |        |        |                |        |        |
|-----------------|--------------|--------|--------|----------------|--------|--------|
| Mode            | GSM850 (GSM) |        |        | GSM 1900 (GSM) |        |        |
| Channel         | 128          | 190    | 251    | 512            | 661    | 810    |
| Frequency (MHz) | 824.2        | 836.6  | 848.8  | 1850.2         | 1880.0 | 1909.8 |
| 99% OBW (kHz)   | 243.71       | 246.78 | 244.20 | 248.28         | 244.42 | 247.20 |
| 26dB BW (kHz)   | 312.1        | 318.7  | 316.1  | 316.7          | 318.6  | 314.4  |

| Cellular Band   |               |        |        |                 |        |        |
|-----------------|---------------|--------|--------|-----------------|--------|--------|
| Mode            | GSM850 (GPRS) |        |        | GSM 1900 (GPRS) |        |        |
| Channel         | 128           | 190    | 251    | 512             | 661    | 810    |
| Frequency (MHz) | 824.2         | 836.6  | 848.8  | 1850.2          | 1880   | 1909.8 |
| 99% OBW (kHz)   | 247.09        | 242.89 | 247.71 | 245.95          | 241.33 | 246.36 |
| 26dB BW (kHz)   | 318.0         | 312.0  | 311.4  | 319.4           | 314.3  | 321.8  |

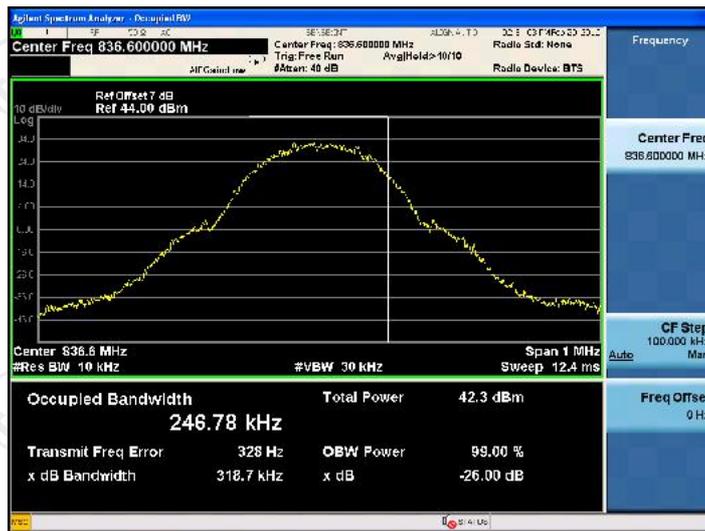
Test plots as follows:

|       |         |            |                 |
|-------|---------|------------|-----------------|
| Band: | GSM 850 | Test Mode: | GSM Link (GMSK) |
|-------|---------|------------|-----------------|

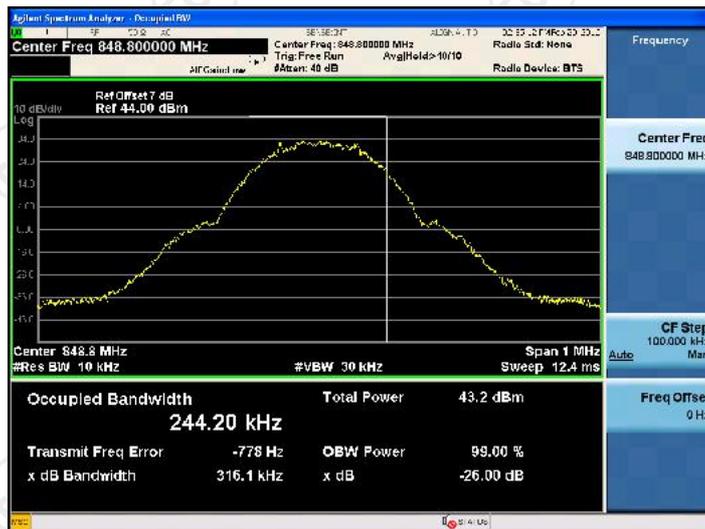
### Occupied Bandwidth Plot on Channel 128



### Occupied Bandwidth Plot on Channel 190

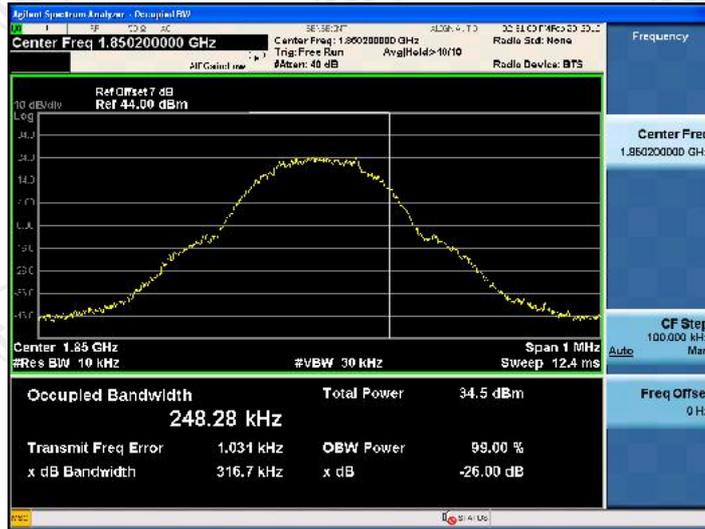


### Occupied Bandwidth Plot on Channel 251

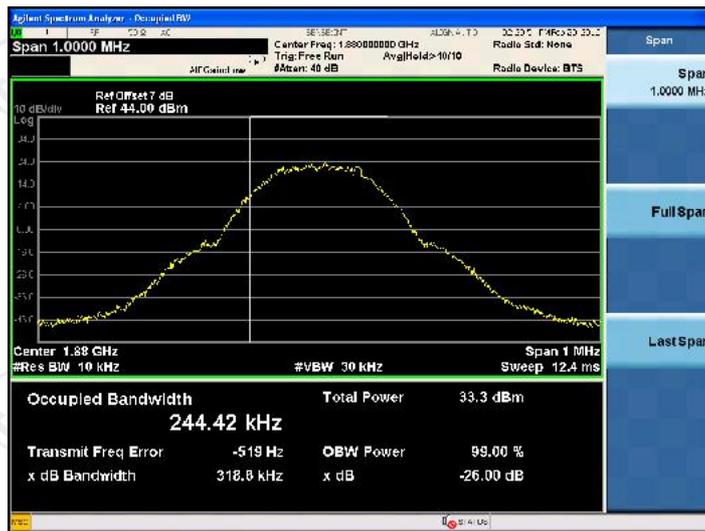


|       |          |            |                 |
|-------|----------|------------|-----------------|
| Band: | GSM 1900 | Test Mode: | GSM Link (GMSK) |
|-------|----------|------------|-----------------|

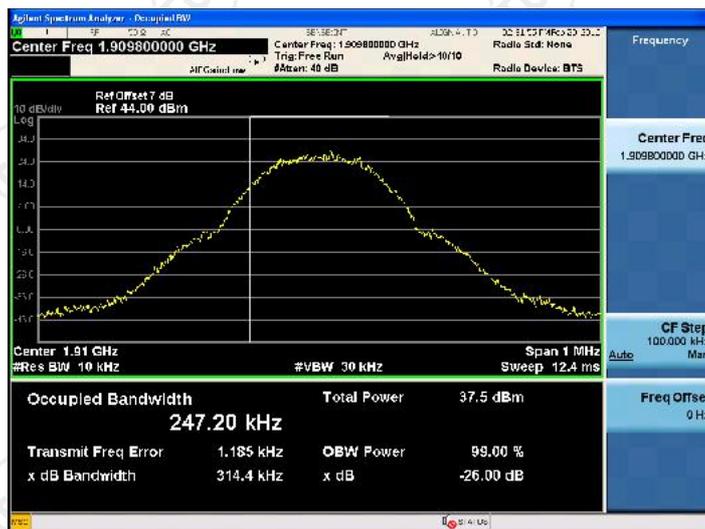
### Occupied Bandwidth Plot on Channel 512



### Occupied Bandwidth Plot on Channel 661

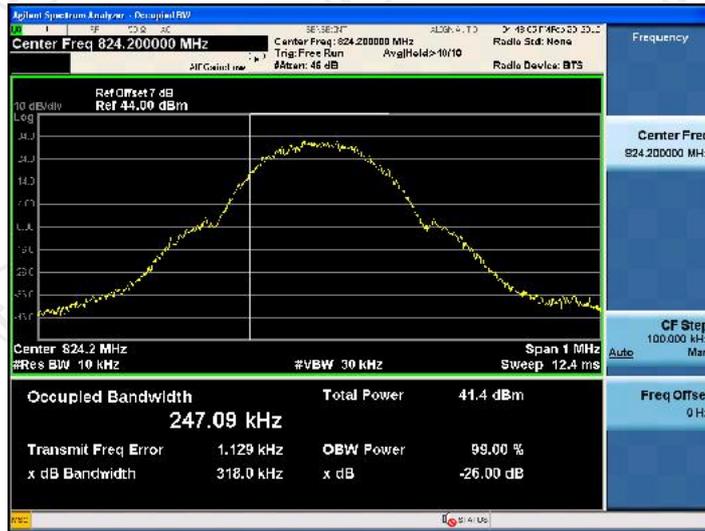


### Occupied Bandwidth Plot on Channel 810

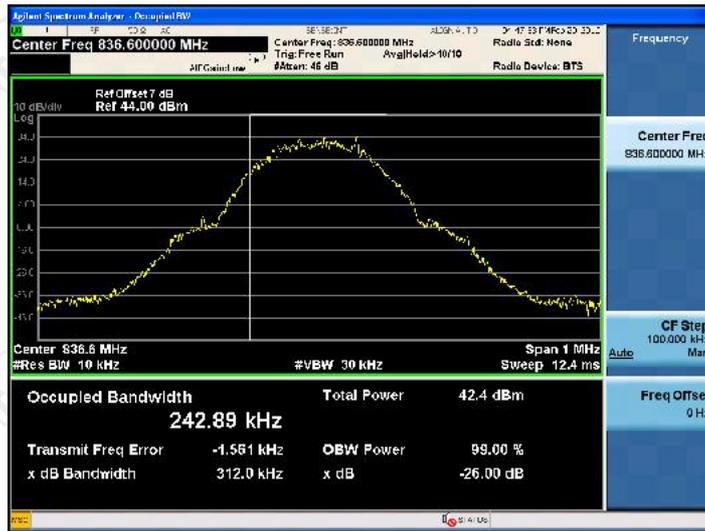


|       |         |            |                          |
|-------|---------|------------|--------------------------|
| Band: | GPRS850 | Test Mode: | GPRS Class 8 Link (8PSK) |
|-------|---------|------------|--------------------------|

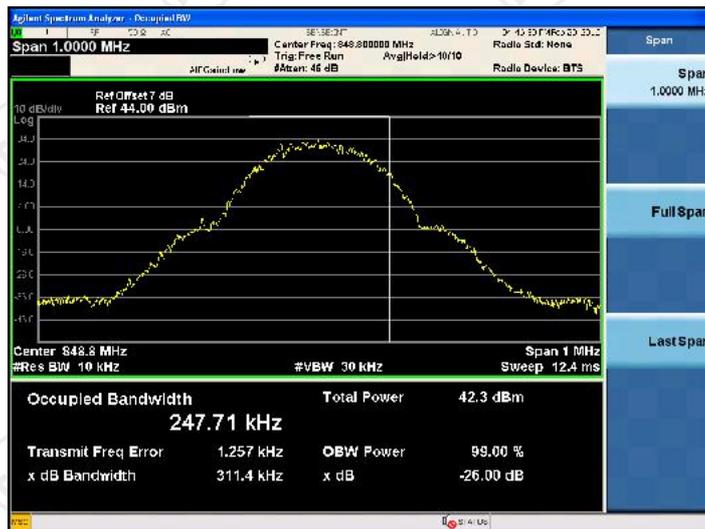
### Occupied Bandwidth Plot on Channel 128



### Occupied Bandwidth Plot on Channel 190

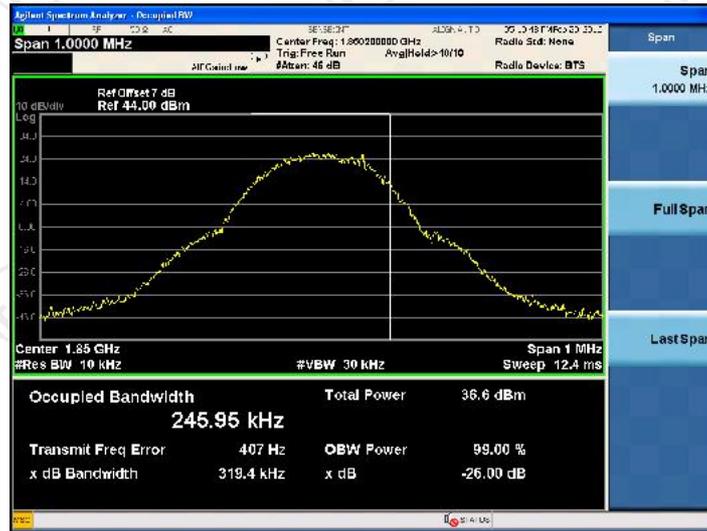


### Occupied Bandwidth Plot on Channel 251

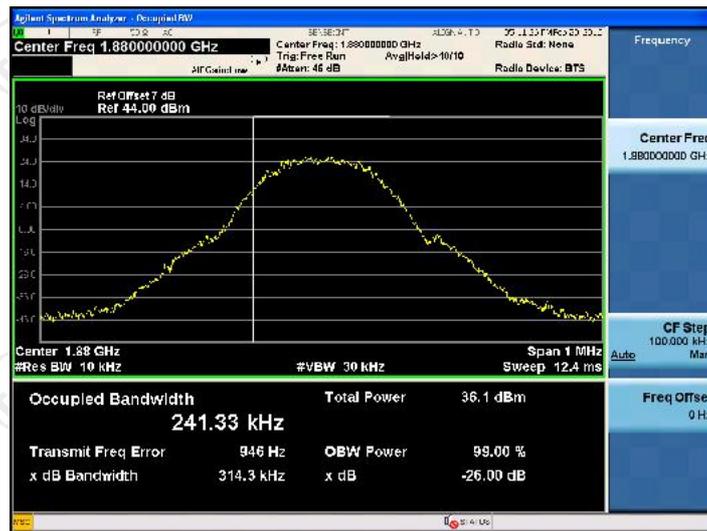


|       |          |            |                          |
|-------|----------|------------|--------------------------|
| Band: | GPRS1900 | Test Mode: | GPRS Class 8 Link (8PSK) |
|-------|----------|------------|--------------------------|

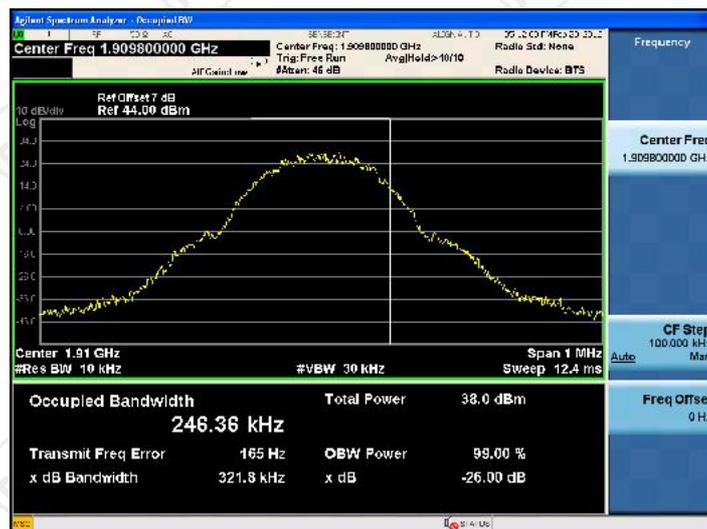
### Occupied Bandwidth Plot on Channel 512



### Occupied Bandwidth Plot on Channel 661

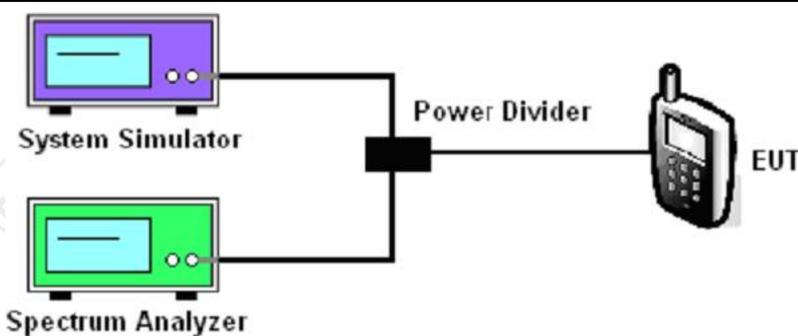


### Occupied Bandwidth Plot on Channel 810



## 6.4. Band Edge and Conducted Spurious Emission Measurement

### 6.5. Test Specification

|                          |   |
|--------------------------|---|
| <b>Test Requirement:</b> | FCC part22.917(a) and FCC part24.238(a)   |
| <b>Test Method:</b>      | FCC part2.1051  |
| <b>Operation mode:</b>   | Refer to item 4.1   |
| <b>Limit:</b>            | -13dBm  |
| <b>Test Setup:</b>       |  <p>The diagram illustrates the test setup. On the left, there are two computer monitors: the top one is labeled 'System Simulator' and the bottom one is labeled 'Spectrum Analyzer'. Both are connected to a central 'Power Divider' block. From the Power Divider, a line connects to a mobile phone labeled 'EUT' (Equipment Under Test).</p>   |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 6.0.</li> <li>2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.</li> <li>3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>4. The band edges of low and high channels for the highest RF powers were measured.</li> <li>5. The conducted spurious emission for the whole frequency range was taken.</li> <li>6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.</li> <li>7. The limit line is derived from <math>43 + 10\log(P)</math> dB below the transmitter power<br/> <math>P(\text{Watts}) = P(W) - [43 + 10\log(P)] \text{ (dB)} = [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)} = -13\text{dBm}</math>.</li> </ol> |
| <b>Test Result:</b>      | PASS  |

#### 6.5.1. Test Instruments

| Equipment         | Manufacturer | Model  | Serial Number | Calibration Due |
|-------------------|--------------|--------|---------------|-----------------|
| System simulator  | R&S          | CMU200 | 111382        | Sep. 11, 2016   |
| Spectrum Analyzer | Agilent      | N9020A | MY49100060    | Sep. 12, 2016   |

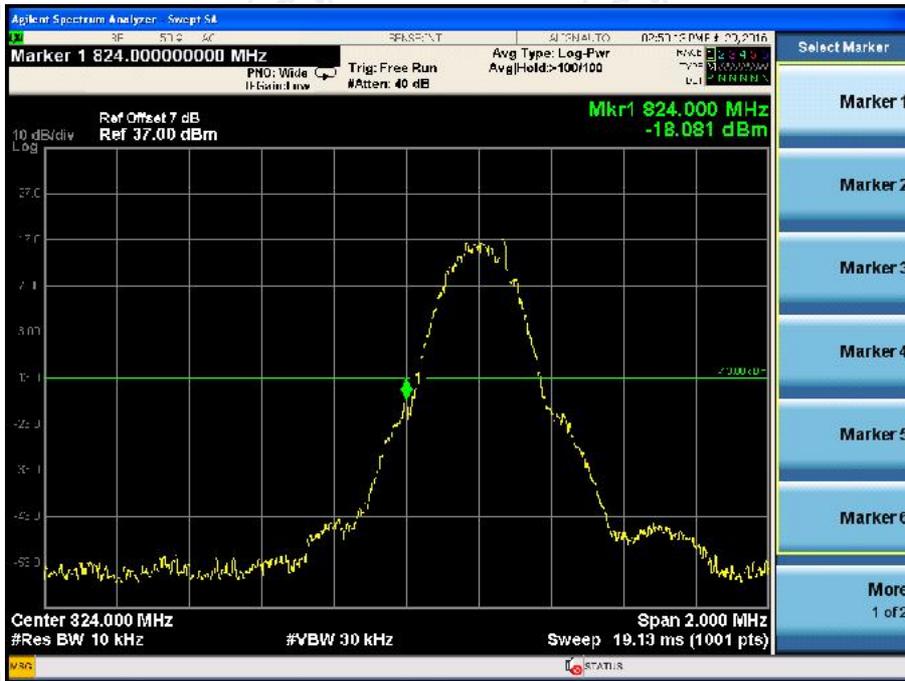
**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.5.2. Test data

Test plots as follows:

|       |         |            |                 |
|-------|---------|------------|-----------------|
| Band: | GSM 850 | Test Mode: | GSM Link (GMSK) |
|-------|---------|------------|-----------------|

Lower Band Edge Plot on Channel 128

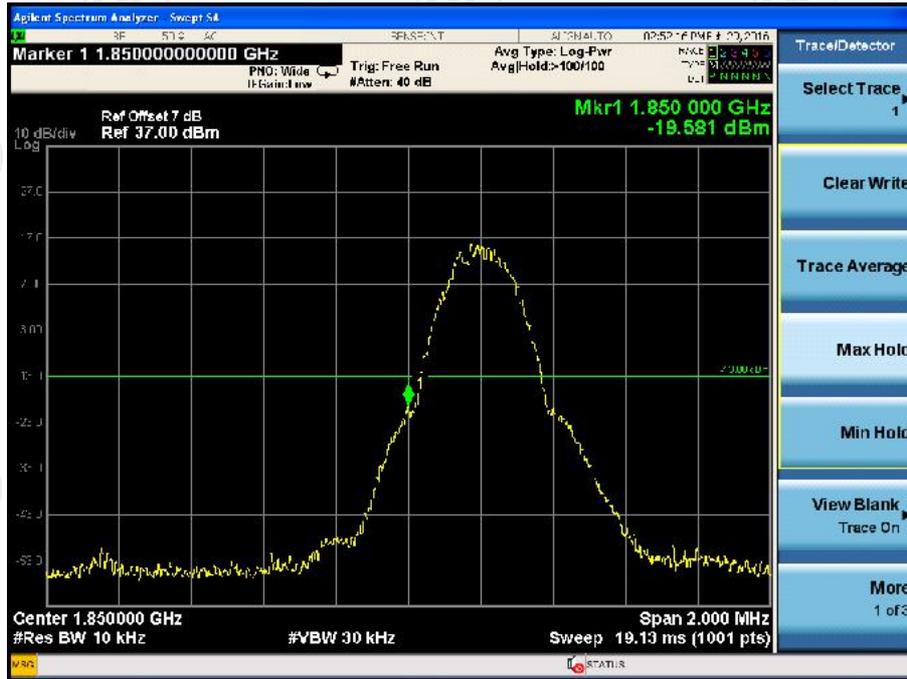


Higher Band Edge Plot on Channel 251

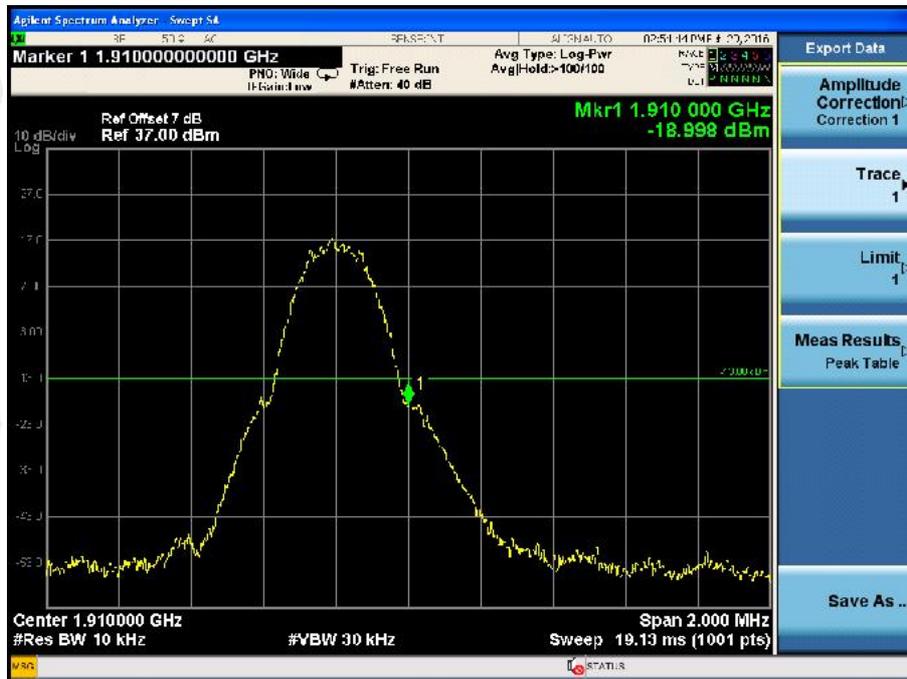


|       |          |            |                 |
|-------|----------|------------|-----------------|
| Band: | GSM 1900 | Test Mode: | GSM Link (GMSK) |
|-------|----------|------------|-----------------|

Lower Band Edge Plot on Channel 512



Higher Band Edge Plot on Channel 810



|       |          |            |                          |
|-------|----------|------------|--------------------------|
| Band: | GPRS 850 | Test Mode: | GPRS Class 8 Link (8PSK) |
|-------|----------|------------|--------------------------|

Lower Band Edge Plot on Channel 128

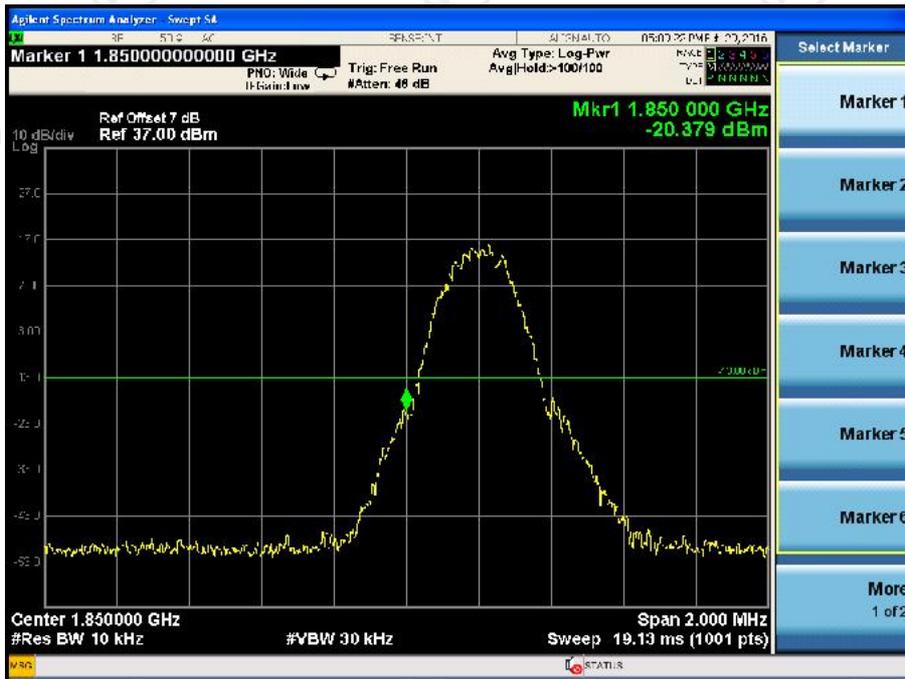


Higher Band Edge Plot on Channel 251

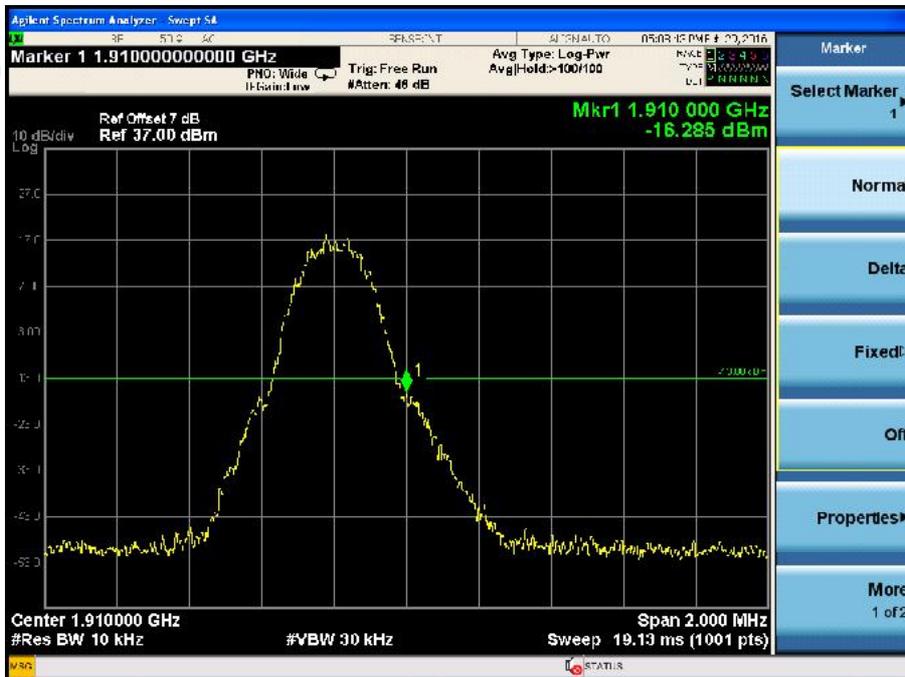


|       |           |            |                          |
|-------|-----------|------------|--------------------------|
| Band: | GPRS 1900 | Test Mode: | GPRS Class 8 Link (8PSK) |
|-------|-----------|------------|--------------------------|

Lower Band Edge Plot on Channel 512

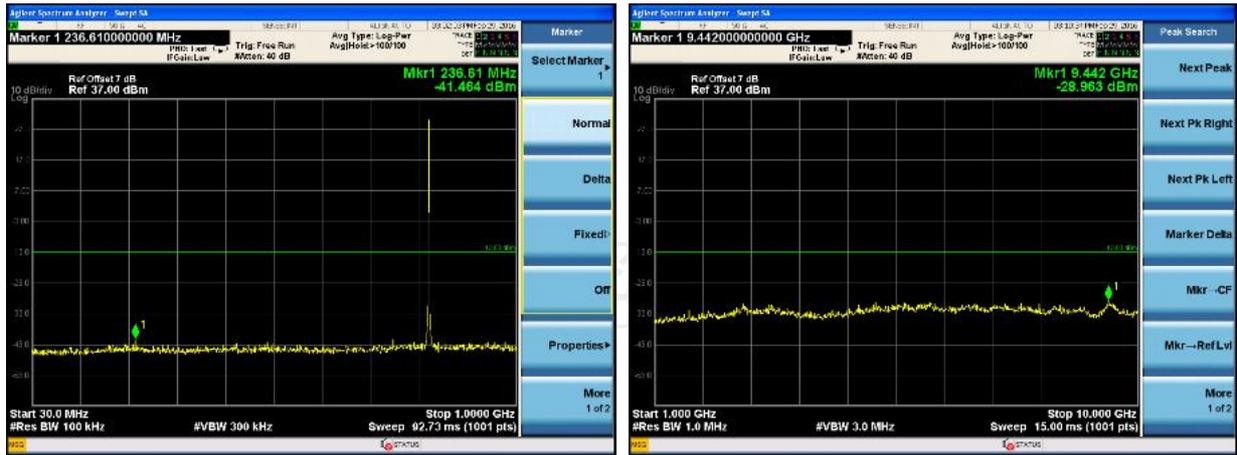


Higher Band Edge Plot on Channel 810

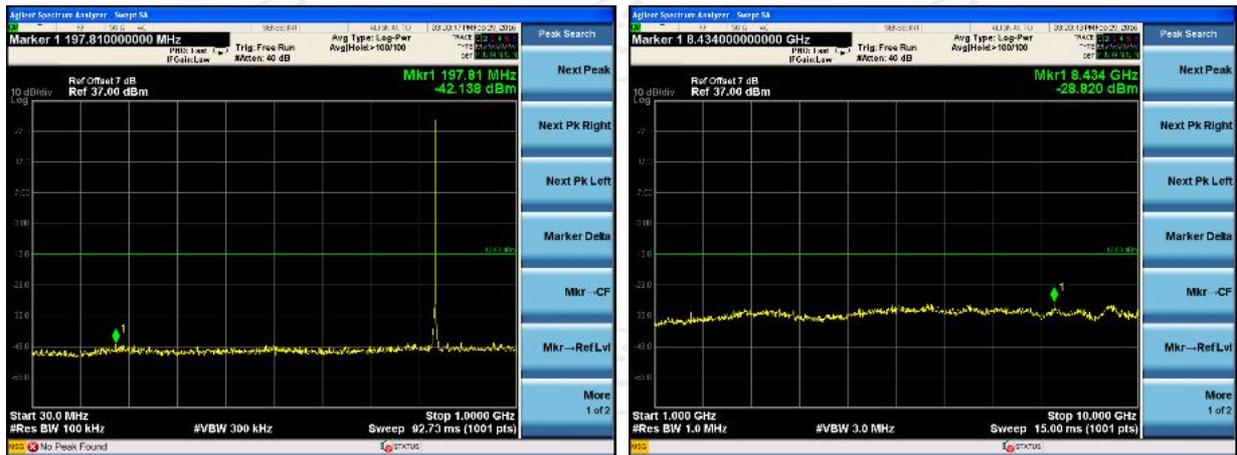


|       |         |            |                 |
|-------|---------|------------|-----------------|
| Band: | GSM 850 | Test Mode: | GSM Link (GMSK) |
|-------|---------|------------|-----------------|

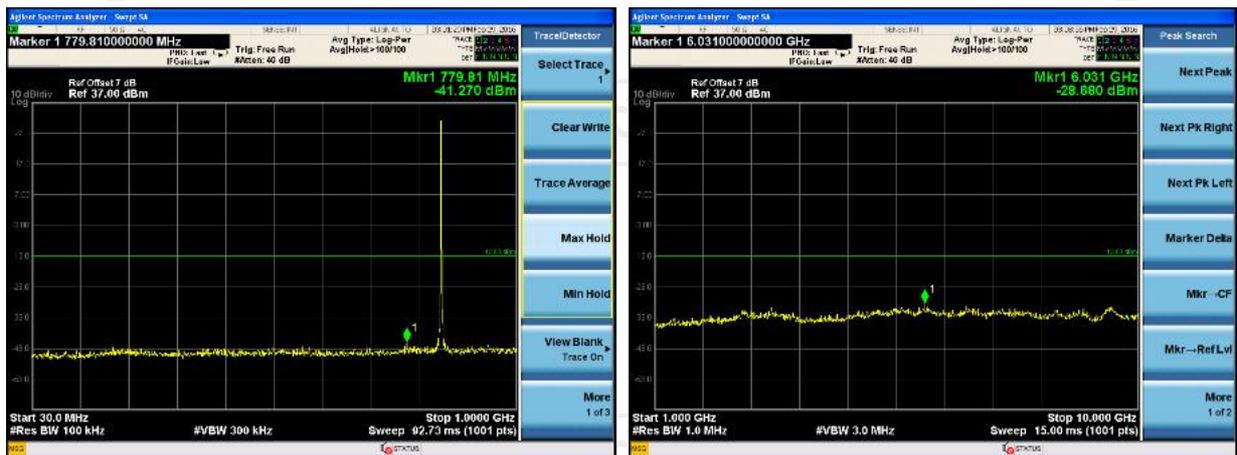
Conducted Spurious Emission on Channel 128



Conducted Spurious Emission on Channel 190

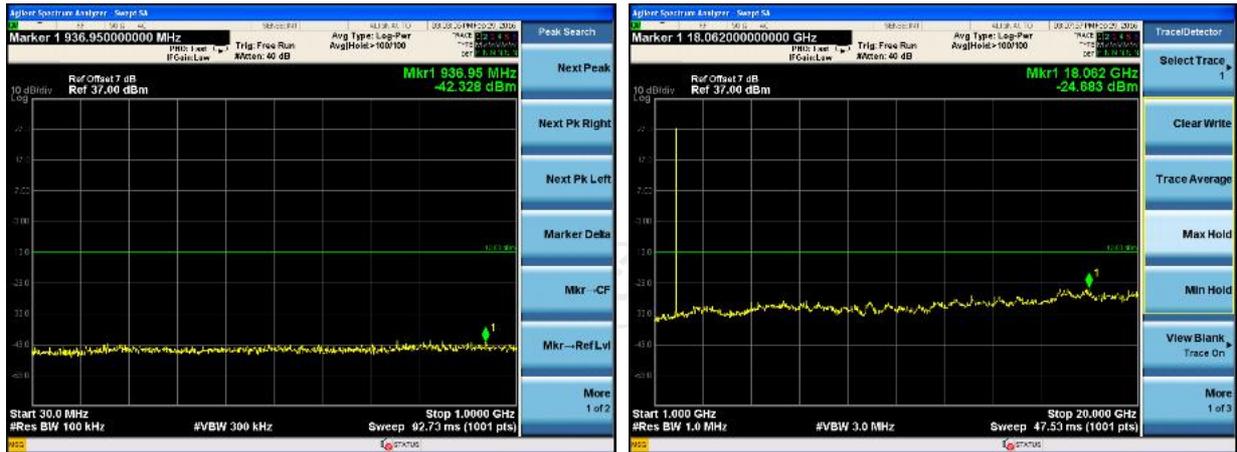


Conducted Spurious Emission on Channel 251



|       |          |            |                 |
|-------|----------|------------|-----------------|
| Band: | GSM 1900 | Test Mode: | GSM Link (GMSK) |
|-------|----------|------------|-----------------|

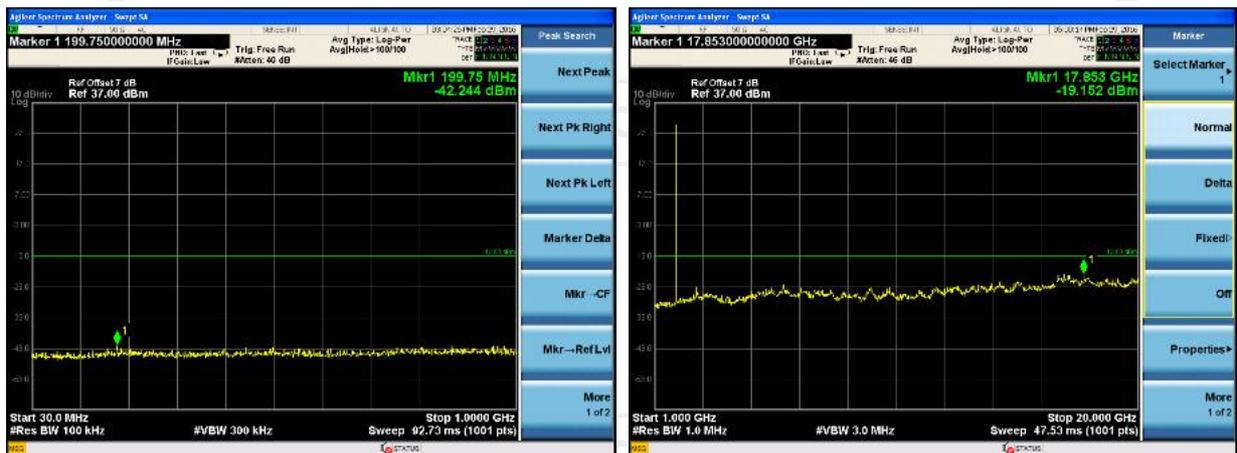
Conducted Spurious Emission on Channel 512



Conducted Spurious Emission on Channel 661

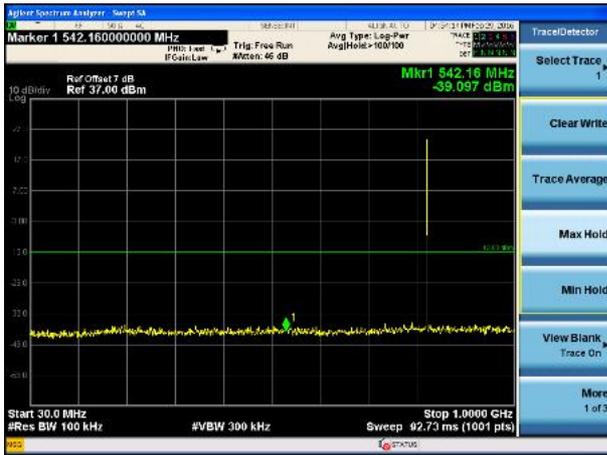


Conducted Spurious Emission on Channel 810

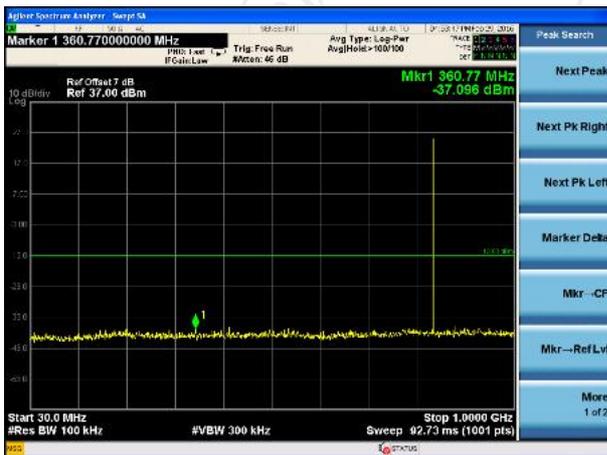


|       |          |            |                          |
|-------|----------|------------|--------------------------|
| Band: | GPRS 850 | Test Mode: | GPRS Class 8 Link (GMSK) |
|-------|----------|------------|--------------------------|

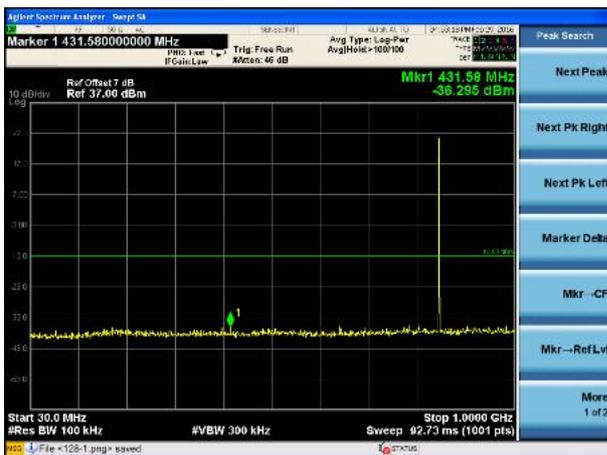
Conducted Spurious Emission on Channel 128



Conducted Spurious Emission on Channel 190



Conducted Spurious Emission on Channel 251



|       |           |            |                          |
|-------|-----------|------------|--------------------------|
| Band: | GPRS 1900 | Test Mode: | GPRS Class 8 Link (GMSK) |
|-------|-----------|------------|--------------------------|

Conducted Spurious Emission on Channel 512



Conducted Spurious Emission on Channel 661



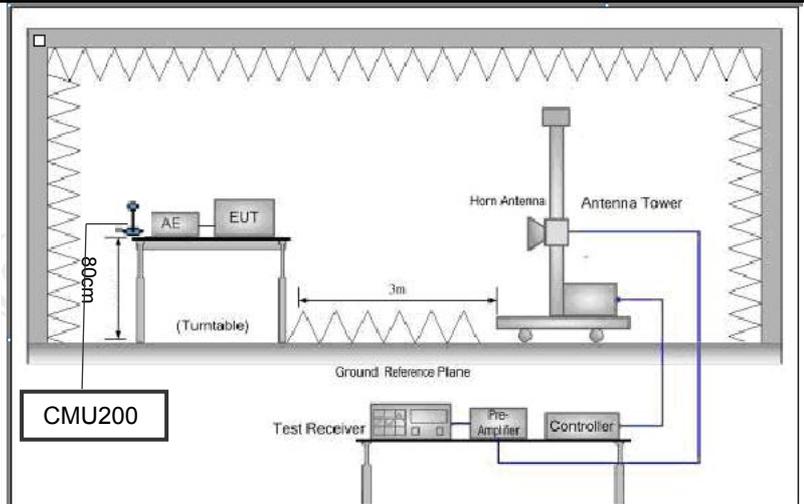
Conducted Spurious Emission on Channel 810



## 6.6. Effective Radiated Power and Effective Isotropic Radiated Power Measurement

### 6.6.1. Test Specification

|                          |   |               |            |
|--------------------------|---|---------------|------------|
| <b>Test Requirement:</b> | FCC part 22.913(a) and FCC part 24.232(b) |               |            |
| <b>Test Method:</b>      | FCC part 2.1046                           |               |            |
| <b>Receiver Setup:</b>   |   | GSM/GPRS/EDGE | WCDMA/HSPA |
|                          | SPAN                                      | 500kHz        | 10MHz      |
|                          | RBW                                       | 10kHz         | 100kHz     |
|                          | VBW                                       | 30kHz         | 300kHz     |
|                          | Detector                                  | RMS           | RMS        |
|                          | Trace                                     | Average       | Average    |
|                          | Average Type                              | Power         | Power      |
|                          | Sweep Count                               | 100           | 100        |
| <b>Limit:</b>            | GSM850 7W ERP<br>PCS1900 2W EIRP          |               |            |
| <b>Test setup:</b>       | For ERP                                   |               |            |
|                          | <p>CMU200</p> <p>Above EIRP</p>           |               |            |



**Test Procedure:**

1. The testing follows FCC KDB 971168 v02r02 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-C-2004 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01.
3. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at the same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor,  $EIRP = LVL + \text{Correction factor}$  and  $ERP = EIRP - 2.15$ .

**Test results:**

PASS

**6.6.2. Test Instruments**

| Radiated Emission Test Site (966) |  |            |               |                 |
|-----------------------------------|--|------------|---------------|-----------------|
| Name of Equipment                 | Manufacturer                             | Model      | Serial Number | Calibration Due |
| ESPI Test Receiver                | ROHDE&SCHW<br>ARZ                        | ESVD       | 100008        | Sep. 11, 2016   |
| Spectrum Analyzer                 | ROHDE&SCHW<br>ARZ                        | FSEM       | 848597/001    | Sep. 11, 2016   |
| Spectrum Analyzer                 | Agilent                                  | N9020A     | MY49100060    | Sep. 12, 2016   |
| Pre-amplifier                     | EM Electronics<br>Corporation<br>CO.,LTD | EM30265    | 07032613      | Sep. 11, 2016   |
| Pre-amplifier                     | HP                                       | 8447D      | 2727A05017    | Sep. 11, 2016   |
| Broadband Antenna                 | Schwarzbeck                              | VULB9163   | 340           | Sep. 13, 2016   |
| Horn Antenna                      | Schwarzbeck                              | BBHA 9120D | 631           | Sep. 13, 2016   |
| Broadband Antenna                 | Schwarzbeck                              | VULB9163   | 412           | Sep. 13, 2016   |
| Horn Antenna                      | Schwarzbeck                              | BBHA 9120D | 813           | Sep. 13, 2016   |
| Coax cable                        | TCT                                      | RE-low-01  | N/A           | Sep. 11, 2016   |
| Coax cable                        | TCT                                      | RE-high-02 | N/A           | Sep. 11, 2016   |
| Coax cable                        | TCT                                      | RE-low-03  | N/A           | Sep. 11, 2016   |
| Coax cable                        | TCT                                      | RE-High-04 | N/A           | Sep. 11, 2016   |
| Antenna Mast                      | CCS                                      | CC-A-4M    | N/A           | Sep. 12, 2016   |
| EMI Test Software                 | Shurple<br>Technology                    | EZ-EMC     | N/A           | N/A             |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

**6.6.3. Test Data**

**Test Result of ERP**

| GSM850 (GSM) Radiated Power ERP |           |                        |           |         |
|---------------------------------|-----------|------------------------|-----------|---------|
| Horizontal Polarization         |           |                        |           |         |
| Frequency (MHz)                 | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (W) |
| 824.4                           | 13.56     | 21.66                  | 33.07     | 2.03    |
| 836.4                           | 13.07     | 21.54                  | 32.46     | 1.76    |
| 848.8                           | 13.24     | 21.46                  | 32.55     | 1.80    |
| Vertical Polarization           |           |                        |           |         |
| Frequency (MHz)                 | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (W) |
| 824.4                           | 9.26      | 21.66                  | 28.77     | 0.75    |
| 836.4                           | 9.14      | 21.54                  | 28.53     | 0.71    |
| 848.8                           | 9.03      | 21.46                  | 28.34     | 0.68    |

\* ERP = LVL (dBm) + Correction Factor (dB) – 2.15

| GSM850 (GPRS class 8) Radiated Power ERP |           |                        |           |         |
|--|-----------|------------------------|-----------|---------|
| Horizontal Polarization                  |           |                        |           |         |
| Frequency (MHz)                          | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (W) |
| 824.4                                    | 13.59     | 21.66                  | 33.1      | 2.04    |
| 836.4                                    | 13.48     | 21.54                  | 32.87     | 1.94    |
| 848.8                                    | 13.56     | 21.46                  | 32.87     | 1.94    |
| Vertical Polarization                    |           |                        |           |         |
| Frequency (MHz)                          | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (W) |
| 824.4                                    | 9.15      | 21.66                  | 28.66     | 0.73    |
| 836.4                                    | 9.02      | 21.54                  | 28.41     | 0.69    |
| 848.8                                    | 9.11      | 21.46                  | 28.42     | 0.70    |

\* ERP = LVL (dBm) + Correction Factor (dB) – 2.15

**Test Result of EIRP**

| GSM1900 (GSM) Radiated Power EIRP |           |                        |           |         |
|-----------------------------------|-----------|------------------------|-----------|---------|
| Horizontal Polarization           |           |                        |           |         |
| Frequency (MHz)                   | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (W) |
| 1850.20                           | 8.35      | 21.66                  | 30.01     | 1.00    |
| 1880.00                           | 8.16      | 21.54                  | 29.70     | 0.93    |
| 1909.80                           | 8.32      | 21.46                  | 29.78     | 0.95    |
| Vertical Polarization             |           |                        |           |         |
| Frequency (MHz)                   | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (W) |
| 1850.20                           | 3.49      | 21.66                  | 25.15     | 0.33    |
| 1880.00                           | 3.64      | 21.54                  | 25.18     | 0.33    |
| 1909.80                           | 3.52      | 21.46                  | 24.98     | 0.31    |

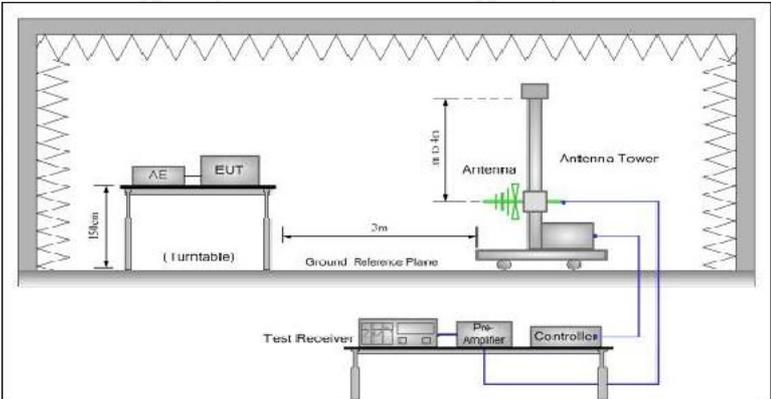
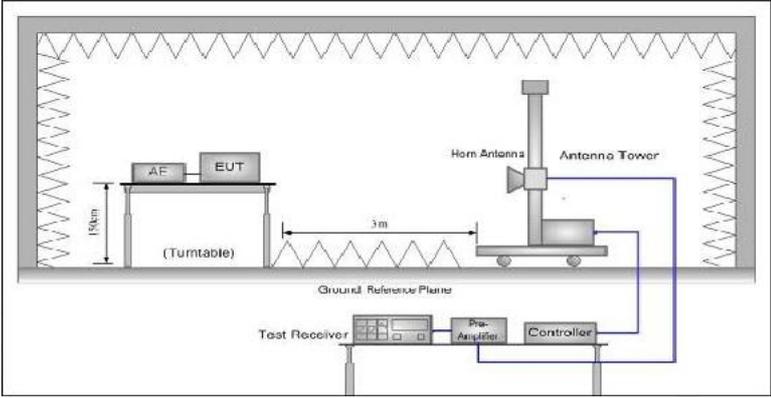
*EIRP = LVL (dBm) + Correction Factor (dB)*

| GSM1900 (GPRS class 8) Radiated Power EIRP |           |                        |           |         |
|--|-----------|------------------------|-----------|---------|
| Horizontal Polarization                    |           |                        |           |         |
| Frequency (MHz)                            | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (W) |
| 1850.20                                    | 8.29      | 21.66                  | 29.95     | 0.99    |
| 1880.00                                    | 8.46      | 21.54                  | 30.00     | 1.00    |
| 1909.80                                    | 8.21      | 21.46                  | 29.67     | 0.93    |
| Vertical Polarization                      |           |                        |           |         |
| Frequency (MHz)                            | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (W) |
| 1850.20                                    | 3.72      | 21.66                  | 25.38     | 0.35    |
| 1880.00                                    | 3.64      | 21.54                  | 25.18     | 0.33    |
| 1909.80                                    | 3.55      | 21.46                  | 25.01     | 0.32    |

*\* EIRP = LVL (dBm) + Correction Factor (dB)*

## 6.7. Field Strength of Spurious Radiation Measurement

### 6.7.1. Test Specification

|                          |  |
|--------------------------|--|
| <b>Test Requirement:</b> | FCC part 22.917(a) and FCC part 24.238(a)  |
| <b>Test Method:</b>      | FCC part 2.1053  |
| <b>Operation mode:</b>   | Refer to item 4.1  |
| <b>Limit:</b>            | -13dBm   |
| <b>Test setup:</b>       | <p>For 30MHz~1GHz</p>   |
|                          | <p>Above 1GHz</p>    |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.</li> <li>2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.</li> <li>3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.</li> <li>4. The table was rotated 360 degrees to determine the position of the highest spurious emission.</li> <li>5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.</li> <li>6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of</li> </ol> |

|                      |  |
|----------------------|--|
|                      | <p>maximum spurious emission.</p> <p>7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.</p> <p>8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.</p> <p>9. Taking the record of output power at antenna port.</p> <p>10. Repeat step 7 to step 8 for another polarization.</p> <p>11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain</p> <p>12. ERP (dBm) = EIRP - 2.15</p> <p>13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.</p> <p>14. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)</p> <p>= P(W) - [43 + 10log(P)] (dB)</p> <p>= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)</p> <p>= -13dBm.</p> |
| <b>Test results:</b> | PASS   |

6.7.2. Test Instruments

| Radiated Emission Test Site (966) |  |            |               |                 |
|-----------------------------------|--|------------|---------------|-----------------|
| Name of Equipment                 | Manufacturer                             | Model      | Serial Number | Calibration Due |
| ESPI Test Receiver                | ROHDE&SCHW<br>ARZ                        | ESVD       | 100008        | Sep. 11, 2016   |
| Spectrum Analyzer                 | ROHDE&SCHW<br>ARZ                        | FSEM       | 848597/001    | Sep. 11, 2016   |
| Spectrum Analyzer                 | Agilent                                  | N9020A     | MY49100060    | Sep. 12, 2016   |
| Pre-amplifier                     | EM Electronics<br>Corporation<br>CO.,LTD | EM30265    | 07032613      | Sep. 11, 2016   |
| Pre-amplifier                     | HP                                       | 8447D      | 2727A05017    | Sep. 11, 2016   |
| Loop antenna                      | ZHINAN                                   | ZN30900A   | 12024         | Sep. 13, 2016   |
| Broadband Antenna                 | Schwarzbeck                              | VULB9163   | 340           | Sep. 13, 2016   |
| Horn Antenna                      | Schwarzbeck                              | BBHA 9120D | 631           | Sep. 13, 2016   |
| Horn Antenna                      | Schwarzbeck                              | BBHA 9170  | 373           | Sep. 13, 2016   |
| Coax cable                        | TCT                                      | RE-low-01  | N/A           | Sep. 11, 2016   |
| Coax cable                        | TCT                                      | RE-high-02 | N/A           | Sep. 11, 2016   |
| Coax cable                        | TCT                                      | RE-low-03  | N/A           | Sep. 11, 2016   |
| Coax cable                        | TCT                                      | RE-High-04 | N/A           | Sep. 11, 2016   |
| Antenna Mast                      | CCS                                      | CC-A-4M    | N/A           | Sep. 12, 2016   |
| EMI Test Software                 | Shurple<br>Technology                    | EZ-EMC     | N/A           | N/A             |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

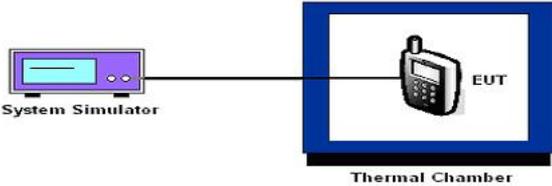
6.7.3. Test Data

|                   |  |             |                           |                |
|-------------------|--|-------------|---------------------------|----------------|
| <b>Band</b>       | <b>GSM850</b>  |             | <b>Test channel:</b>      | <b>Lowest</b>  |
| <b>Test mode:</b> | <b>GSM Link (GMSK)</b>   |             | <b>Temperature :</b>      | <b>25°C</b>    |
|                   |  |             | <b>Relative Humidity:</b> | <b>56%</b>     |
| <b>Note:</b>      | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |             |                           |                |
| Frequency (MHz)   | Spurious Emission  |             | Limit (dBm)               | Result         |
|                   | Polarization   | Level (dBm) |                           |                |
| 1648.40           | Vertical   | -46.19      | -13.00                    | PASS           |
| 2472.60           | V  | -39.48      |                           |                |
| 3296.80           | V  | -52.75      |                           |                |
| 1648.40           | Horizontal   | -41.68      |                           |                |
| 2472.60           | H  | -39.42      |                           |                |
| 3296.80           | H  | -52.89      |                           |                |
| <b>Band</b>       | <b>GSM850</b>  |             | <b>Test channel:</b>      | <b>Middle</b>  |
| <b>Test mode:</b> | <b>GSM Link (GMSK)</b>   |             | <b>Temperature :</b>      | <b>25°C</b>    |
|                   |  |             | <b>Relative Humidity:</b> | <b>56%</b>     |
| <b>Note:</b>      | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |             |                           |                |
| Frequency (MHz)   | Spurious Emission  |             | Limit (dBm)               | Result         |
|                   | Polarization   | Level (dBm) |                           |                |
| 1673.20           | Vertical   | -41.96      | -13.00                    | PASS           |
| 2509.80           | V  | -45.42      |                           |                |
| 3346.40           | V  | -51.59      |                           |                |
| 1673.20           | Horizontal   | -41.95      |                           |                |
| 2509.80           | H  | -40.58      |                           |                |
| 3346.40           | H  | -51.34      |                           |                |
| <b>Band</b>       | <b>GSM850</b>  |             | <b>Test channel:</b>      | <b>Highest</b> |
| <b>Test mode:</b> | <b>GSM Link (GMSK)</b>   |             | <b>Temperature :</b>      | <b>25°C</b>    |
|                   |  |             | <b>Relative Humidity:</b> | <b>56%</b>     |
| <b>Note:</b>      | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |             |                           |                |
| Frequency (MHz)   | Spurious Emission  |             | Limit (dBm)               | Result         |
|                   | Polarization   | Level (dBm) |                           |                |
| 1697.60           | Vertical   | -41.23      | -13.00                    | PASS           |
| 2546.40           | V  | -44.38      |                           |                |
| 3395.20           | V  | -52.73      |                           |                |
| 1697.60           | Horizontal   | -41.24      |                           |                |
| 2546.40           | H  | -40.95      |                           |                |
| 3395.20           | H  | -52.16      |                           |                |

| Band            | GSM 1900   |             | Test channel:      | Lowest  |
|-----------------|--|-------------|--------------------|---------|
| Test mode:      | GSM Link (GMSK)  |             | Temperature :      | 25°C    |
|                 |  |             | Relative Humidity: | 56%     |
| Note:           | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |             |                    |         |
| Frequency (MHz) | Spurious Emission  |             | Limit (dBm)        | Result  |
|                 | Polarization   | Level (dBm) |                    |         |
| 3700.40         | Vertical   | -46.71      | -13.00             | PASS    |
| 5550.60         | V  | -38.79      |                    |         |
| 7400.80         | V  | -51.09      |                    |         |
| 3700.40         | Horizontal   | -43.41      |                    |         |
| 5550.60         | H  | -38.04      |                    |         |
| 7400.80         | H  | -51.67      |                    |         |
| Test mode:      | GSM 1900   |             | Test channel:      | Middle  |
| Test mode:      | GSM Link (GMSK)  |             | Temperature :      | 25°C    |
|                 |  |             | Relative Humidity: | 56%     |
| Note:           | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |             |                    |         |
| Frequency (MHz) | Spurious Emission  |             | Limit (dBm)        | Result  |
|                 | Polarization   | Level (dBm) |                    |         |
| 3760.00         | Vertical   | -41.75      | -13.00             | PASS    |
| 5640.00         | V  | -45.00      |                    |         |
| 7520.00         | V  | -52.03      |                    |         |
| 3760.00         | Horizontal   | -42.64      |                    |         |
| 5640.00         | H  | -39.29      |                    |         |
| 7520.00         | H  | -51.90      |                    |         |
| Test mode:      | GSM 1900   |             | Test channel:      | Highest |
| Test mode:      | GSM Link (GMSK)  |             | Temperature :      | 25°C    |
|                 |  |             | Relative Humidity: | 56%     |
| Note:           | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |             |                    |         |
| Frequency (MHz) | Spurious Emission  |             | Limit (dBm)        | Result  |
|                 | Polarization   | Level (dBm) |                    |         |
| 3819.60         | Vertical   | -40.12      | -13.00             | PASS    |
| 5729.40         | V  | -44.68      |                    |         |
| 7639.20         | V  | -51.72      |                    |         |
| 3819.60         | Horizontal   | -40.99      |                    |         |
| 5729.40         | H  | -40.73      |                    |         |
| 7639.20         | H  | -52.35      |                    |         |

## 6.8. Frequency Stability Measurement

### 6.8.1. Test Specification

|                          |  |
|--------------------------|--|
| <b>Test Requirement:</b> | FCC Part 2.1055(a)(1)(b)   |
| <b>Test Method:</b>      | FCC Part 2.1055(a)(1)(b)   |
| <b>Operation mode:</b>   | Refer to item 4.1  |
| <b>Limit:</b>            | ±2.5 ppm   |
| <b>Test Setup:</b>       |  <p>The diagram illustrates the test setup. On the left, a 'System Simulator' is connected via a cable to a 'Thermal Chamber'. Inside the thermal chamber, an 'EUT' (Equipment Under Test) is shown.</p>   |
| <b>Test Procedure:</b>   | <p><b>Test Procedures for Temperature Variation</b></p> <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 9.0.</li> <li>2. The EUT was set up in the thermal chamber and connected with the system simulator.</li> <li>3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.</li> <li>4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.</li> </ol> <p><b>Test Procedures for Voltage Variation</b></p> <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 9.0.</li> <li>2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.</li> <li>3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.</li> <li>4. The variation in frequency was measured for the worst case.</li> </ol> |
| <b>Test Result:</b>      | PASS   |

### 6.8.2. Test Instruments

| Equipment        | Manufacturer | Model  | Serial Number | Calibration Due |
|------------------|--------------|--------|---------------|-----------------|
| System simulator | R&S          | CMU200 | 111382        | Sep. 11, 2016   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.8.3. Test Data

Test Result of Temperature Variation

| Band :           | GSM 850                  | Channel:                  | 190      |
|------------------|--------------------------|---------------------------|----------|
| Limit (ppm) :    | 2.5ppm                   | Frequency:                | 836.6MHz |
| Temperature (°C) | Frequency Deviation (Hz) | Frequency Deviation (ppm) | Result   |
| 50               | 18                       | 0.022                     | PASS     |
| 40               | 25                       | 0.030                     |          |
| 30               | 20                       | 0.024                     |          |
| 20               | 19                       | 0.023                     |          |
| 10               | 17                       | 0.020                     |          |
| 0                | 23                       | 0.027                     |          |
| -10              | 26                       | 0.031                     |          |
| -20              | 20                       | 0.024                     |          |
| -30              | 21                       | 0.025                     |          |

| Band :           | GSM 1900                 | Channel:                  | 661     |
|------------------|--------------------------|---------------------------|---------|
| Limit (ppm) :    | Note                     | Frequency:                | 1880MHz |
| Temperature (°C) | Frequency Deviation (Hz) | Frequency Deviation (ppm) | Result  |
| 50               | 31                       | 0.016                     | PASS    |
| 40               | 28                       | 0.015                     |         |
| 30               | 37                       | 0.020                     |         |
| 20               | 23                       | 0.012                     |         |
| 10               | 25                       | 0.013                     |         |
| 0                | 32                       | 0.017                     |         |
| -10              | 36                       | 0.019                     |         |
| -20              | 35                       | 0.019                     |         |
| -30              | 28                       | 0.015                     |         |

**Note:** The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

**Test Result of Voltage Variation**

| Band & Channel | Mode | Voltage (Volt) | Deviation (ppm) | Limit (ppm) | Result |
|----------------|------|----------------|-----------------|-------------|--------|
| GSM 850 CH190  | GSM  | 4.2            | -0.023          | 2.5         | PASS   |
|                |      | 3.7            | -0.024          |             |        |
|                |      | BEP            | -0.019          |             |        |
| GSM 1900 CH661 | GSM  | 4.2            | 0.019           | (Note 3.)   |        |
|                |      | 3.7            | 0.021           |             |        |
|                |      | BEP            | 0.016           |             |        |

**Note:**

1. Normal Voltage = 3.7V.
2. Battery End Point (BEP) = 3.5 V.
3. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

**\*\*\*\*\*END OF REPORT\*\*\*\*\***