



# FCC RF Test Report

**APPLICANT** : Motorola Mobility, LLC  
**EQUIPMENT** : Mobile Cellular Phone  
**BRAND NAME** : Motorola  
**MODEL NAME** : 4584  
**FCC ID** : IHDT56QF2  
**STANDARD** : FCC 47 CFR Part 2, 22(H), 24(E), 27(L)  
**CLASSIFICATION** : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Dec. 03, 2014 and testing was completed on Dec. 22, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and has been in compliance with the applicable technical standards.

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

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Reviewed by: Joseph Lin / Supervisor

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Approved by: Jones Tsai / Manager



## **SPORTON INTERNATIONAL INC.**

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## REVISION HISTORY

| REPORT NO.  | VERSION | DESCRIPTION                                                                                                                                                                                                                                                               | ISSUED DATE   |
|-------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| FG4N1320-02 | Rev. 01 | Initial issue of report                                                                                                                                                                                                                                                   | Jan. 07, 2015 |
| FG4N1320-02 | Rev. 02 | Add GSM850 Tx/Rx frequency and GSM/GPRS/EDGE modulation in section 1.4.                                                                                                                                                                                                   | Jan. 08, 2015 |
| FG4N1320-02 | Rev. 03 | Revising report from Initial to variant, thus the WWAN circuit of this variant model (4584) is identical to that of the parent product (4583), based on the product equality declaration by the manufacturer.<br><br>Adding GSM850/EDGE850/PCS Band remark in section 1.4 | Jan. 12, 2015 |
|             |         |                                                                                                                                                                                                                                                                           |               |
|             |         |                                                                                                                                                                                                                                                                           |               |
|             |         |                                                                                                                                                                                                                                                                           |               |
|             |         |                                                                                                                                                                                                                                                                           |               |
|             |         |                                                                                                                                                                                                                                                                           |               |
|             |         |                                                                                                                                                                                                                                                                           |               |
|             |         |                                                                                                                                                                                                                                                                           |               |
|             |         |                                                                                                                                                                                                                                                                           |               |
|             |         |                                                                                                                                                                                                                                                                           |               |
|             |         |                                                                                                                                                                                                                                                                           |               |
|             |         |                                                                                                                                                                                                                                                                           |               |
|             |         |                                                                                                                                                                                                                                                                           |               |



## SUMMARY OF TEST RESULT

| Report Section | FCC Rule                           | Description                                      | Limit                                           | Result | Remark                                     |
|----------------|------------------------------------|--------------------------------------------------|-------------------------------------------------|--------|--------------------------------------------|
| 3.1            | §2.1046                            | Conducted Output Power                           | Reporting Only                                  | PASS   | -                                          |
| 3.2            | §24.232(d)                         | Peak-to-Average Ratio                            | < 13 dB                                         | PASS   | -                                          |
| 3.3            | §22.913(a)(2)                      | Effective Radiated Power                         | < 7 Watts                                       | PASS   | -                                          |
|                | §27.50(d)(4)                       | Equivalent Isotropic Radiated Power              | < 1 Watts                                       | PASS   | -                                          |
| 3.4            | §2.1049<br>§22.917(b)<br>§27.53(g) | Occupied Bandwidth                               | Reporting Only                                  | PASS   | -                                          |
| 3.5            | §2.1051<br>§22.917(a)<br>§27.53(h) | Band Edge Measurement                            | < 43+10log10(P[Watts])                          | PASS   | -                                          |
| 3.6            | §2.1051<br>§22.917(a)<br>§27.53(h) | Conducted Emission                               | < 43+10log10(P[Watts])                          | PASS   | -                                          |
| 3.7            | §2.1053<br>§22.917(a)<br>§27.53(h) | Field Strength of Spurious Radiation             | < 43+10log10(P[Watts])                          | PASS   | Under limit<br>27.01 dB at<br>1672.000 MHz |
| 3.8            | §2.1055<br>§22.355                 | Frequency Stability for<br>Temperature & Voltage | < 2.5 ppm for Part 22<br>Within Authorized Band | PASS   | -                                          |
|                | §2.1055<br>§27.54                  |                                                  |                                                 |        |                                            |



# 1 General Description

## 1.1 Applicant

Motorola Mobility, LLC

222 W. Merchandise Mart Plaza, Suite 1800, Chicago IL. 60654, USA

## 1.2 Manufacturer

Motorola Mobility, LLC

222 W. Merchandise Mart Plaza, Suite 1800, Chicago IL. 60654, USA

## 1.3 Product Feature of Equipment Under Test

| Product Feature                 |                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------|
| Equipment                       | Mobile Cellular Phone                                                                |
| Brand Name                      | Motorola                                                                             |
| Model Name                      | 4584                                                                                 |
| FCC ID                          | IHDT56QF2                                                                            |
| IMEI Code                       | 355451060005333                                                                      |
| EUT supports Radios application | GSM/EGPRS/WCDMA/HSPA<br>WLAN 11b/g/n HT20<br>Bluetooth v2.1 EDR<br>Bluetooth v4.0 LE |
| HW Version                      | P2                                                                                   |
| EUT Stage                       | Identical Prototype                                                                  |

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

| Accessory List |                        |
|----------------|------------------------|
| AC Adapter     | Brand Name : Motorola  |
|                | Model Name : SPN5810A  |
| Battery        | Brand Name : Sony      |
|                | Model Name : SNN5956A  |
| Earphone       | Brand Name : Motorola  |
|                | Model Name : SJYN1181B |

## 1.4 Product Specification subjective to this standard

| Product Specification subjective to this standard |                                                                                                                                                                                               |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tx Frequency</b>                               | GSM850: 824.2 MHz ~ 848.8 MHz<br>GSM1900: 1850.2 MHz ~ 1909.8MHz<br>WCDMA Band V: 826.4 MHz ~ 846.6 MHz<br>WCDMA Band IV : 1712.4 MHz ~ 1752.6 MHz<br>WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz  |
| <b>Rx Frequency</b>                               | GSM850: 869.2 MHz ~ 893.8 MHz<br>GSM1900: 1930.2 MHz ~ 1989.8 MHz<br>WCDMA Band V: 871.4 MHz ~ 891.6 MHz<br>WCDMA Band IV : 2112.4 MHz ~ 2152.6 MHz<br>WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz |
| <b>Maximum Output Power to Antenna</b>            | WCDMA Band V : 22.54 dBm<br>WCDMA Band IV : 22.58 dBm                                                                                                                                         |
| <b>99% Occupied Bandwidth</b>                     | WCDMA Band V: 4.18MHz<br>WCDMA Band IV: 4.18MHz                                                                                                                                               |
| <b>Antenna Type</b>                               | Fixed Internal Antenna                                                                                                                                                                        |
| <b>Type of Modulation</b>                         | GSM: GMSK<br>GPRS: GMSK<br>EDGE: GMSK / 8PSK<br>WCDMA: QPSK (Uplink)<br>HSDPA: 64QAM (Downlink)<br>HSUPA: QPSK (Uplink)                                                                       |

**Remark:** The GSM850/EDGE850/PCS band test results refer to appendix A.

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

| FCC Rule | System                     | Type of Modulation | Maximum ERP/EIRP (W) | Frequency Tolerance (ppm) | Emission Designator |
|----------|----------------------------|--------------------|----------------------|---------------------------|---------------------|
| Part 22  | WCDMA Band V RMC 12.2Kbps  | QPSK               | 0.0957               | 0.0179 ppm                | 4M18F9W             |
| Part 27  | WCDMA Band IV RMC 12.2Kbps | QPSK               | 0.2588               | 0.0219 ppm                | 4M18F9W             |

## 1.7 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

|                    |                                                                                                                                                                 |           |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Test Site          | SPORTON INTERNATIONAL INC.                                                                                                                                      |           |
| Test Site Location | No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park,<br>Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL: +886-3-327-3456<br>FAX: +886-3-328-4978 |           |
| Test Site No.      | Sporton Site No.                                                                                                                                                |           |
|                    | TH02-HY                                                                                                                                                         | 03CH07-HY |

## 1.8 Applicable Standards

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

- 47 CFR Part 2, 22(H), 24,(E), 27(L)
- ANSI / TIA / EIA-603-C-2004
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

### Remark:

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



## 2 Test Configuration of Equipment Under Test

### 2.1 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 9000 MHz for WCDMA Band V.
2. 30 MHz to 18000 MHz for WCDMA Band IV

All modes and data rates and positions were investigated.

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

| Test Modes    |                     |                     |
|---------------|---------------------|---------------------|
| Band          | Radiated TCs        | Conducted TCs       |
| WCDMA Band V  | ■ RMC 12.2Kbps Link | ■ RMC 12.2Kbps Link |
| WCDMA Band IV | ■ RMC 12.2Kbps Link | ■ RMC 12.2Kbps Link |

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

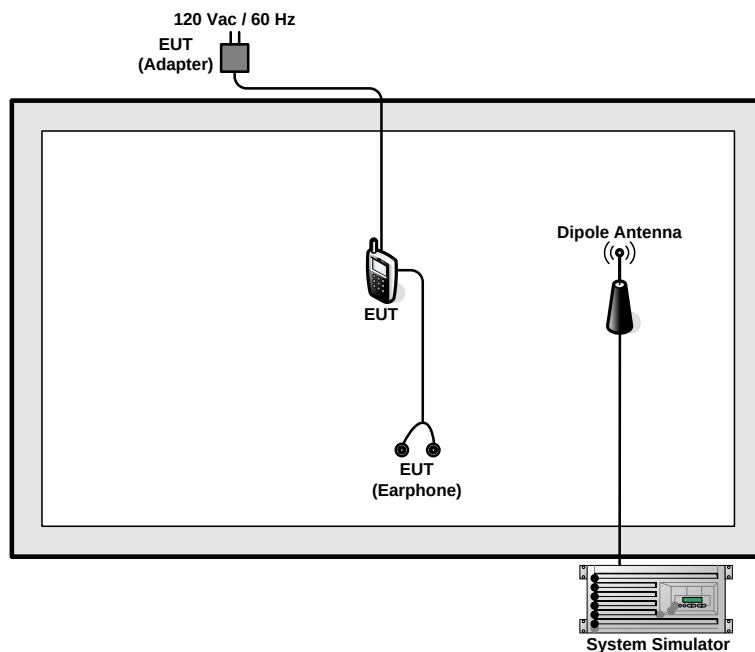
RMC 12.2Kbps mode for WCDMA band V and WCDMA band IV, only these modes were used for all tests.

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 WCDMA / HSDPA modes were investigated on the middle channel and the passed results were not worst than those data tested from the highest power channels.

**Conducted Power Measurement Results:**

| Conducted Power (*Unit: dBm) |              |       |       |               |        |        |
|------------------------------|--------------|-------|-------|---------------|--------|--------|
| Band                         | WCDMA Band V |       |       | WCDMA Band IV |        |        |
| Channel                      | 4132         | 4182  | 4233  | 1312          | 1413   | 1513   |
| Frequency                    | 826.4        | 836.4 | 846.6 | 1712.4        | 1732.6 | 1752.6 |
| RMC 12.2K                    | 22.52        | 22.25 | 22.54 | 22.58         | 22.32  | 22.57  |
| HSDPA Subtest-1              | 21.36        | 21.48 | 21.37 | 21.64         | 21.47  | 21.60  |
| HSDPA Subtest-2              | 21.45        | 21.53 | 21.40 | 21.72         | 21.57  | 21.54  |
| HSDPA Subtest-3              | 20.99        | 20.97 | 20.92 | 21.17         | 20.88  | 21.04  |
| HSDPA Subtest-4              | 20.94        | 21.09 | 20.95 | 21.16         | 21.02  | 21.01  |
| HSUPA Subtest-1              | 21.29        | 21.31 | 21.47 | 21.54         | 21.53  | 21.43  |
| HSUPA Subtest-2              | 20.40        | 20.48 | 20.51 | 20.58         | 20.66  | 20.49  |
| HSUPA Subtest-3              | 20.25        | 20.21 | 20.25 | 20.38         | 20.35  | 20.29  |
| HSUPA Subtest-4              | 20.99        | 20.94 | 20.88 | 20.77         | 20.80  | 20.65  |
| HSUPA Subtest-5              | 21.39        | 21.48 | 21.42 | 21.61         | 21.43  | 21.49  |

## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration

| Item | Equipment        | Trade Name | Model No. | FCC ID | Data Cable | Power Cord        |
|------|------------------|------------|-----------|--------|------------|-------------------|
| 1.   | System Simulator | R&S        | CMU 200   | N/A    | N/A        | Unshielded, 1.8 m |

## 2.4 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 :

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 4.2 + 10 = 14.2 \text{ (dB)}\end{aligned}$$

### 3 Test Result

#### 3.1 Conducted Output Power Measurement

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

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

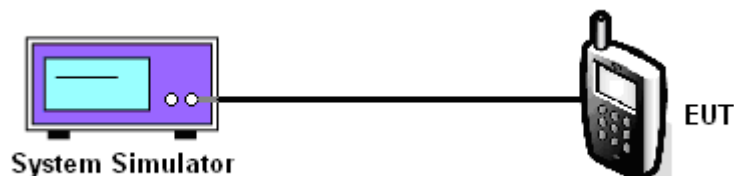
##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

##### 3.1.4 Test Setup



### 3.1.5 Test Result of Conducted Output Power

| Cellular Band         |                             |            |             |
|-----------------------|-----------------------------|------------|-------------|
| Modes                 | WCDMA Band V (RMC 12.2Kbps) |            |             |
| Channel               | 4132 (Low)                  | 4182 (Mid) | 4233 (High) |
| Frequency (MHz)       | 826.4                       | 836.4      | 846.6       |
| Conducted Power (dBm) | 22.52                       | 22.25      | 22.54       |

| AWS Band              |                              |            |             |
|-----------------------|------------------------------|------------|-------------|
| Modes                 | WCDMA Band IV (RMC 12.2Kbps) |            |             |
| Channel               | 1312 (Low)                   | 1413 (Mid) | 1513 (High) |
| Frequency (MHz)       | 1712.4                       | 1732.6     | 1752.6      |
| Conducted Power (dBm) | 22.58                        | 22.32      | 22.57       |

**Note:** maximum burst average power for GSM, and maximum average power for WCDMA.

## **3.2 Peak-to-Average Ratio**

### **3.2.1 Description of the PAR Measurement**

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

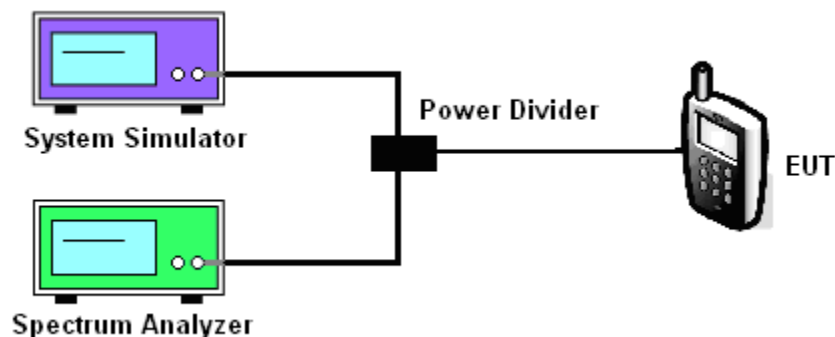
### **3.2.2 Measuring Instruments**

The measuring equipment is listed in the section 4 of this test report.

### **3.2.3 Test Procedures**

1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. Set EUT to transmit at maximum output power.
4. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer.
5. Record the maximum PAPR level associated with a probability of 0.1%.

### **3.2.4 Test Setup**



### 3.2.5 Test Result of Peak-to-Average Ratio

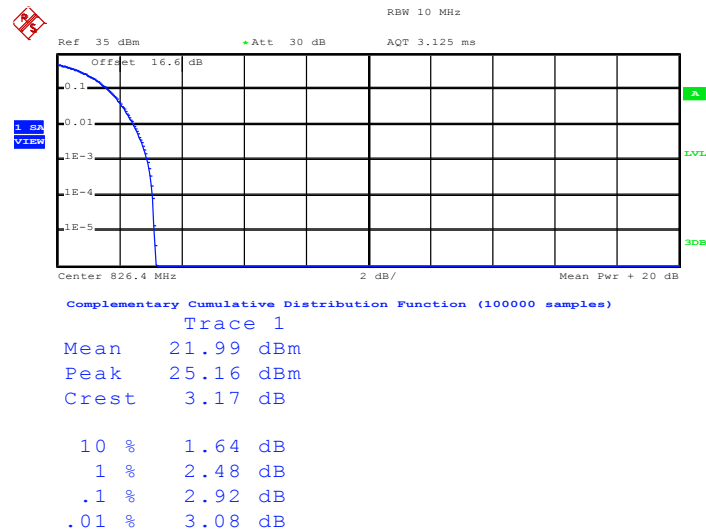
| Cellular Band              |                             |            |             |
|----------------------------|-----------------------------|------------|-------------|
| Modes                      | WCDMA Band V (RMC 12.2Kbps) |            |             |
| Channel                    | 4132 (Low)                  | 4182 (Mid) | 4233 (High) |
| Frequency (MHz)            | 826.4                       | 836.4      | 846.6       |
| Peak-to-Average Ratio (dB) | 2.92                        | 2.92       | 2.96        |

| AWS Band                   |                              |            |             |
|----------------------------|------------------------------|------------|-------------|
| Modes                      | WCDMA Band IV (RMC 12.2Kbps) |            |             |
| Channel                    | 1312(Low)                    | 1413 (Mid) | 1513 (High) |
| Frequency (MHz)            | 1712.4                       | 1732.6     | 1752.6      |
| Peak-to-Average Ratio (dB) | 3.04                         | 2.96       | 3.04        |

### 3.2.6 Test Result (Plots) of Peak-to-Average Ratio

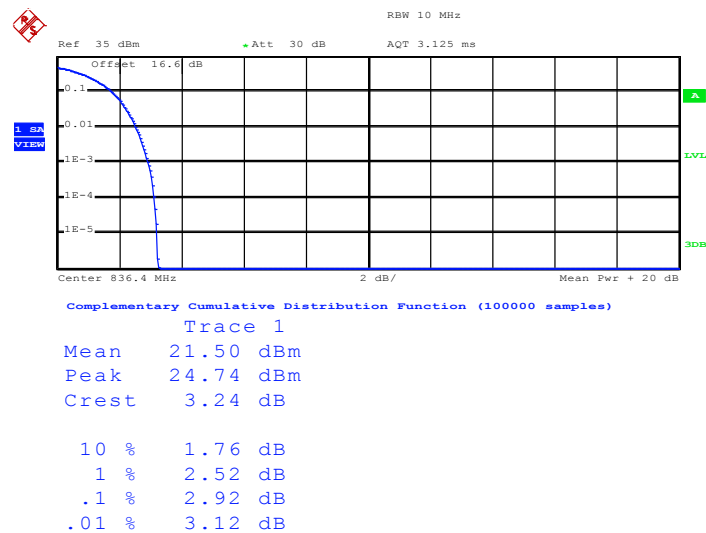
|               |              |                    |                          |
|---------------|--------------|--------------------|--------------------------|
| <b>Band :</b> | WCDMA Band V | <b>Test Mode :</b> | RMC 12.2Kbps Link (QPSK) |
|---------------|--------------|--------------------|--------------------------|

#### Peak-to-Average Ratio on Channel 4132 (826.4 MHz)



Date: 22.DEC.2014 09:43:23

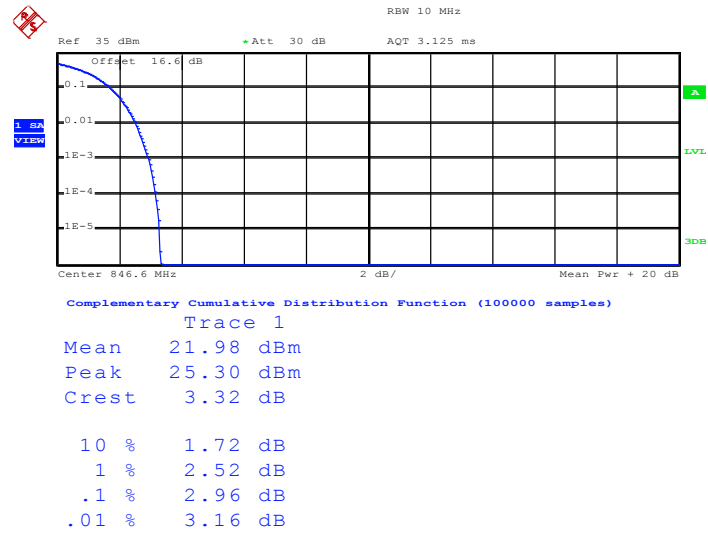
#### Peak-to-Average Ratio on Channel 4182 (836.4 MHz)



Date: 22.DEC.2014 09:43:31

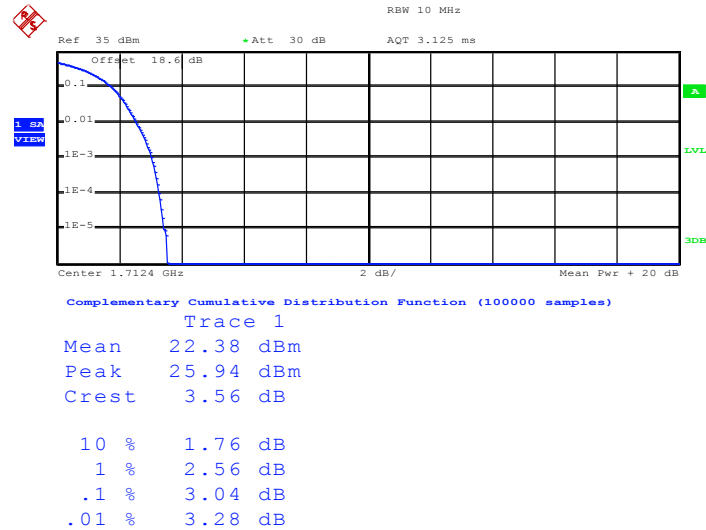


Peak-to-Average Ratio on Channel 4233 (846.6 MHz)

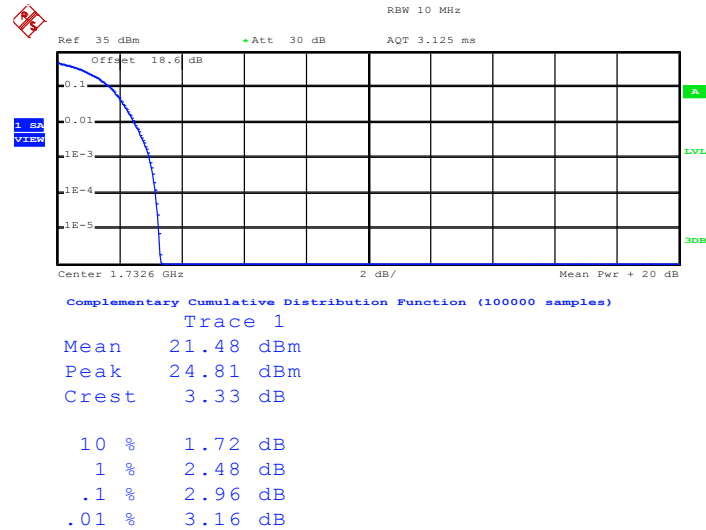


Date: 22.DEC.2014 09:43:40

|               |               |                    |                          |
|---------------|---------------|--------------------|--------------------------|
| <b>Band :</b> | WCDMA Band IV | <b>Test Mode :</b> | RMC 12.2Kbps Link (QPSK) |
|---------------|---------------|--------------------|--------------------------|

**Peak-to-Average Ratio on Channel 1312 (1712.4 MHz)**


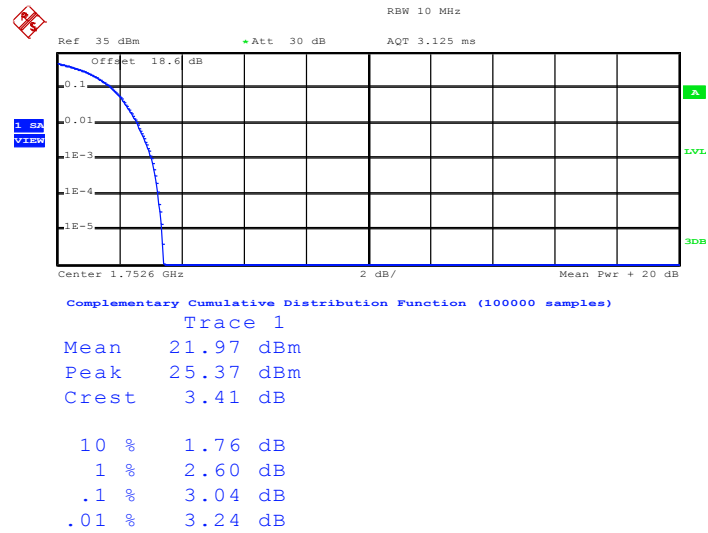
Date: 22.DEC.2014 10:00:10

**Peak-to-Average Ratio on Channel 1413 (1732.6 MHz)**


Date: 22.DEC.2014 10:00:20



Peak-to-Average Ratio on Channel 1513 (1752.6 MHz)



Date: 22.DEC.2014 10:00:32

### 3.3 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

#### 3.3.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. The ERP of mobile transmitters must not exceed 7 Watts (Cellular Band) and the EIRP of mobile transmitters are limited to 1 Watts (AWS Band).

#### 3.3.2 Measuring Instruments

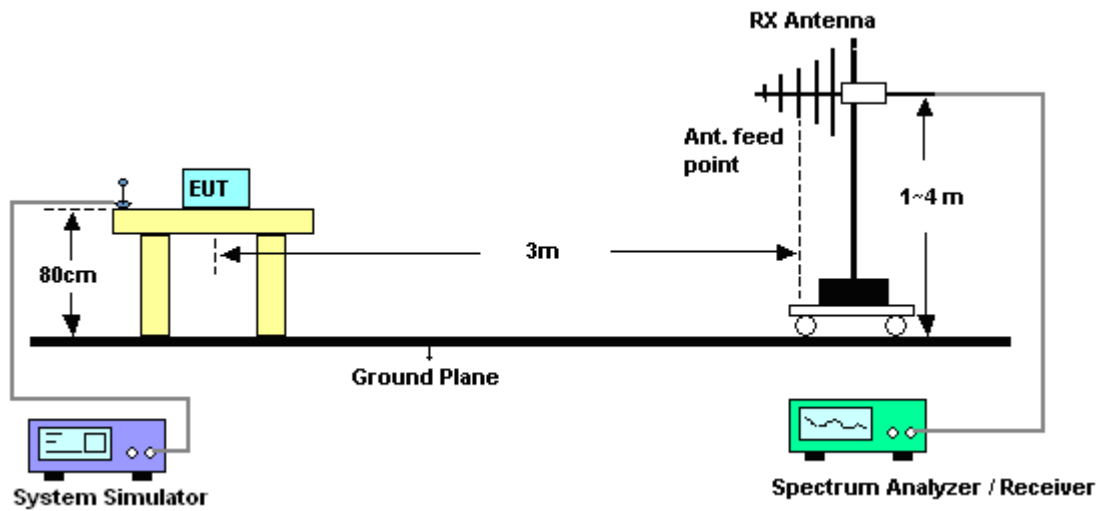
The measuring equipment is listed in the section 4 of this test report.

#### 3.3.3 Test Procedures

1. 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.
2. 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.
3. 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  $ERP = EIRP - 2.15$ .

|              | WCDMA/HSPA |
|--------------|------------|
| SPAN         | 10MHz      |
| RBW          | 100kHz     |
| VBW          | 300kHz     |
| Detector     | RMS        |
| Trace        | Average    |
| Average Type | Power      |
| Sweep Count  | 100        |

### 3.3.4 Test Setup



### 3.3.5 Test Result of ERP

| WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP |              |                           |              |            |
|------------------------------------------------|--------------|---------------------------|--------------|------------|
| Horizontal Polarization                        |              |                           |              |            |
| Frequency<br>(MHz)                             | LVL<br>(dBm) | Correction Factor<br>(dB) | ERP<br>(dBm) | ERP<br>(W) |
| 826.4                                          | -18.63       | 31.44                     | 10.66        | 0.0116     |
| 836.4                                          | -20.51       | 32.04                     | 9.38         | 0.0087     |
| 846.6                                          | -21.02       | 32.63                     | 9.46         | 0.0088     |
| Vertical Polarization                          |              |                           |              |            |
| Frequency<br>(MHz)                             | LVL<br>(dBm) | Correction Factor<br>(dB) | ERP<br>(dBm) | ERP<br>(W) |
| 826.4                                          | -12.43       | 32.78                     | 18.20        | 0.0661     |
| 836.4                                          | -11.78       | 32.82                     | 18.89        | 0.0774     |
| 846.6                                          | -11.44       | 33.4                      | 19.81        | 0.0957     |

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

### 3.3.6 Test Result of EIRP

| WCDMA Band IV (RMC 12.2Kbps) Radiated Power EIRP |              |                           |               |             |
|--------------------------------------------------|--------------|---------------------------|---------------|-------------|
| Horizontal Polarization                          |              |                           |               |             |
| Frequency<br>(MHz)                               | LVL<br>(dBm) | Correction Factor<br>(dB) | EIRP<br>(dBm) | EIRP<br>(W) |
| 2112.4                                           | -22.36       | 44.56                     | 22.20         | 0.1660      |
| 2132.6                                           | -21.69       | 44.48                     | 22.79         | 0.1901      |
| 2152.6                                           | -21.47       | 44.64                     | 23.17         | 0.2075      |
| Vertical Polarization                            |              |                           |               |             |
| Frequency<br>(MHz)                               | LVL<br>(dBm) | Correction Factor<br>(dB) | EIRP<br>(dBm) | EIRP<br>(W) |
| 2112.4                                           | -23.14       | 46.69                     | 23.55         | 0.2265      |
| 2132.6                                           | -22.48       | 45.69                     | 23.21         | 0.2094      |
| 2152.6                                           | -21.51       | 45.64                     | 24.13         | 0.2588      |

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

### 3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 3.4.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

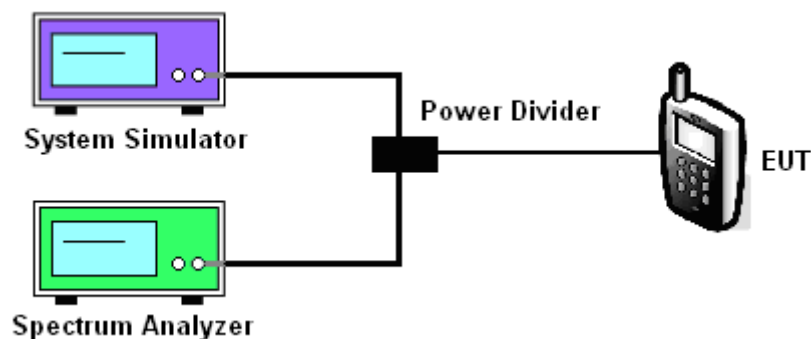
#### 3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.4.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 4.2.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
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.
4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3\*RBW, sample detector, trace maximum hold.
5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3\*RBW, peak detector, trace maximum hold.

#### 3.4.4 Test Setup



### 3.4.5 Test Result of Occupied Bandwidth and 26dB Bandwidth

| Cellular Band   |                             |            |             |
|-----------------|-----------------------------|------------|-------------|
| Modes           | WCDMA Band V (RMC 12.2Kbps) |            |             |
| Channel         | 4132 (Low)                  | 4182 (Mid) | 4233 (High) |
| Frequency (MHz) | 826.4                       | 836.4      | 846.6       |
| 99% OBW (MHz)   | 4.15                        | 4.18       | 4.18        |
| 26dB BW (MHz)   | 4.73                        | 4.76       | 4.76        |

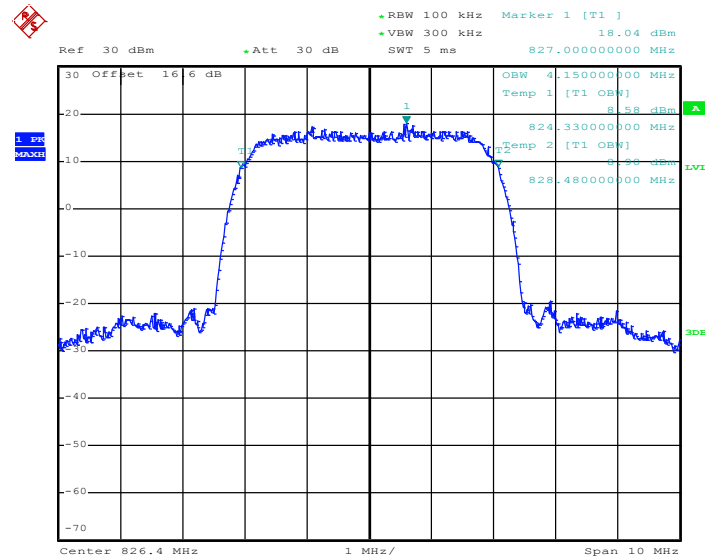
| AWS Band        |                              |            |             |
|-----------------|------------------------------|------------|-------------|
| Modes           | WCDMA Band IV (RMC 12.2Kbps) |            |             |
| Channel         | 1312(Low)                    | 1413 (Mid) | 1513 (High) |
| Frequency (MHz) | 1712.4                       | 1732.6     | 1752.6      |
| 99% OBW (MHz)   | 4.17                         | 4.17       | 4.18        |
| 26dB BW (MHz)   | 4.73                         | 4.73       | 4.74        |



## 3.4.6 Test Result (Plots) of Occupied Bandwidth and 26dB Bandwidth

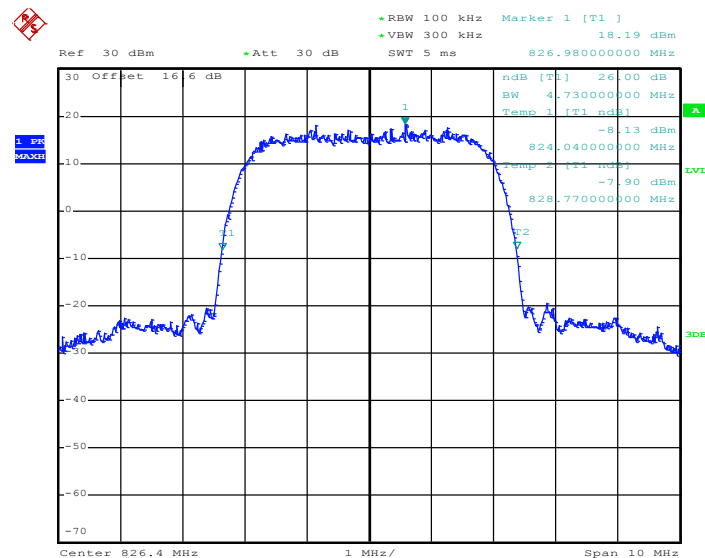
|        |              |             |                          |
|--------|--------------|-------------|--------------------------|
| Band : | WCDMA Band V | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|--------------|-------------|--------------------------|

## 99% Occupied Bandwidth Plot on Channel 4132 (826.4 MHz)



Date: 22.DEC.2014 09:37:42

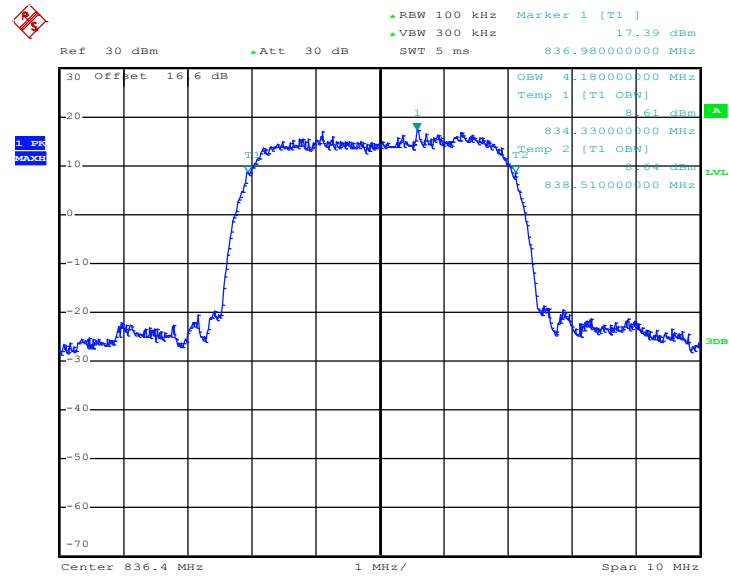
## 26dB Bandwidth Plot on Channel 4132 (826.4 MHz)



Date: 22.DEC.2014 09:35:49

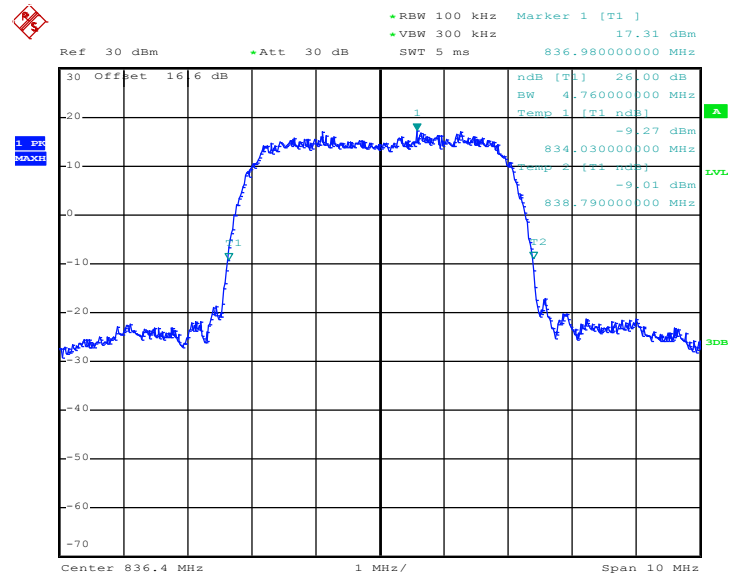


### 99% Occupied Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 22.DEC.2014 09:38:10

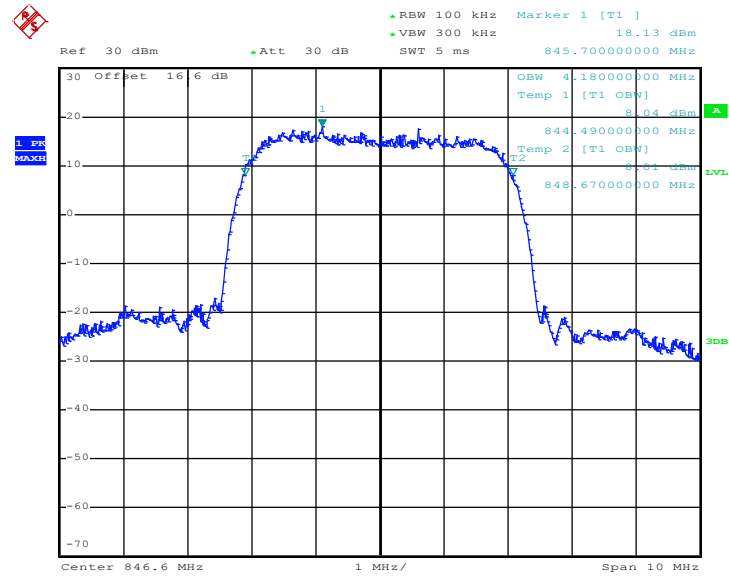
### 26dB Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 22.DEC.2014 09:36:17

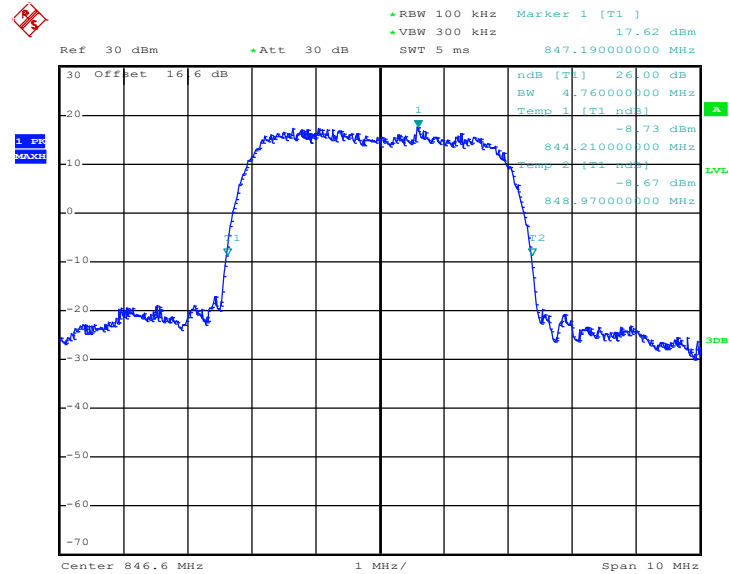


### 99% Occupied Bandwidth Plot on Channel 4233 (846.6 MHz)



Date: 22.DEC.2014 09:38:38

### 26dB Bandwidth Plot on Channel 4233 (846.6 MHz)

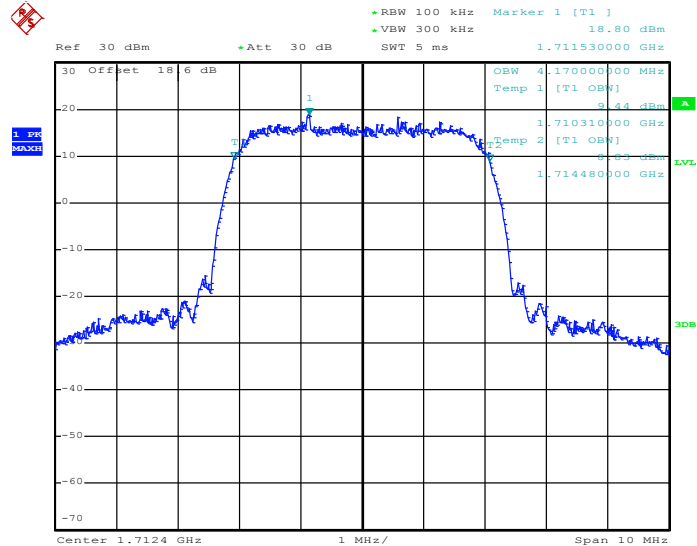


Date: 22.DEC.2014 09:36:45



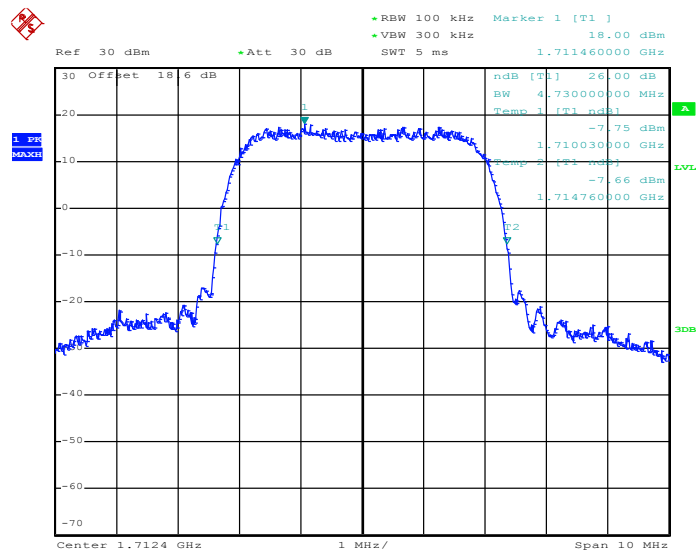
|        |               |             |                          |
|--------|---------------|-------------|--------------------------|
| Band : | WCDMA Band IV | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|---------------|-------------|--------------------------|

## 99% Occupied Bandwidth Plot on Channel 1312 (1712.4 MHz)

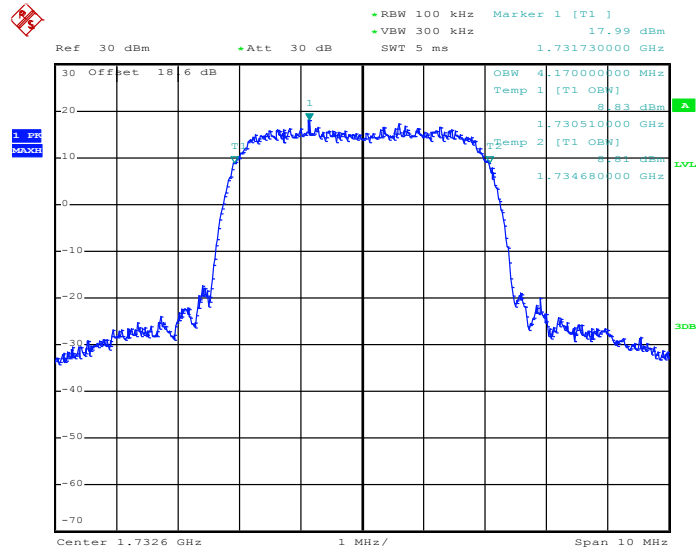


Date: 22.DEC.2014 09:52:40

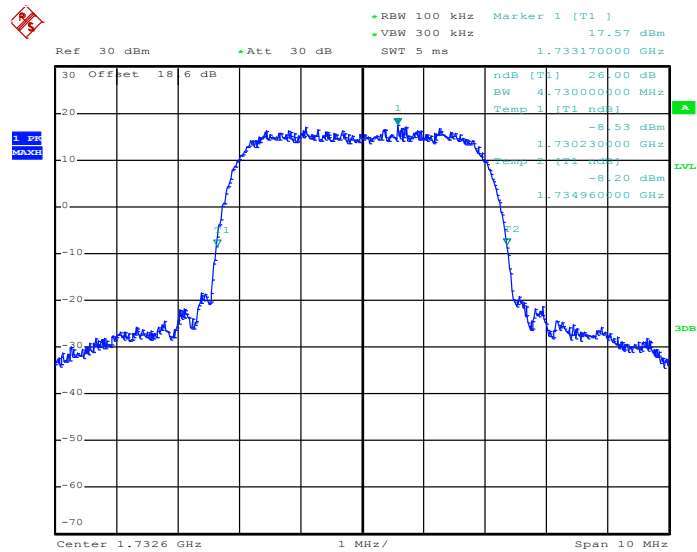
## 26dB Bandwidth Plot on Channel 1312 (1712.4 MHz)



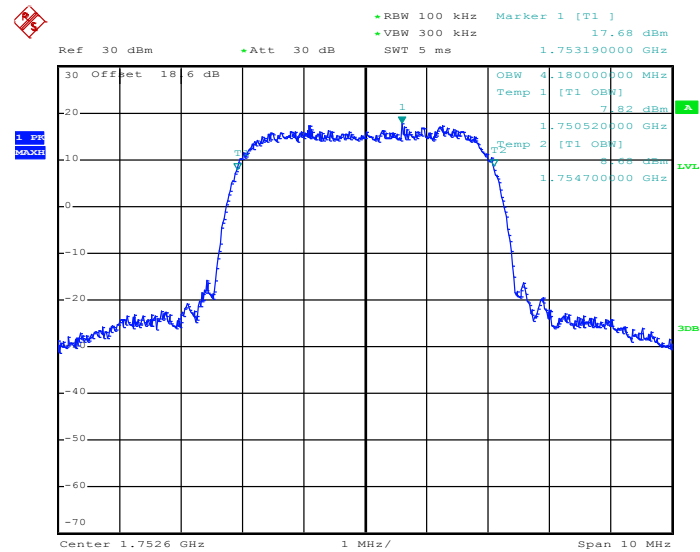
Date: 22.DEC.2014 09:50:26

**99% Occupied Bandwidth Plot on Channel 1413 (1732.6 MHz)**


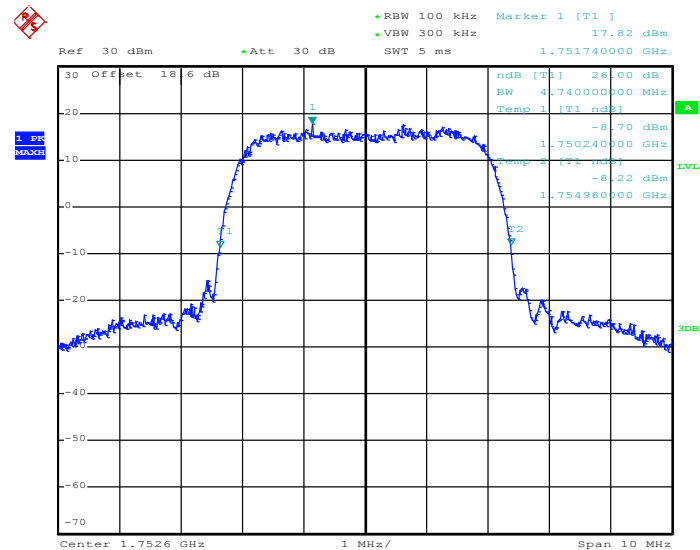
Date: 22.DEC.2014 09:53:08

**26dB Bandwidth Plot on Channel 1413 (1732.6 MHz)**


Date: 22.DEC.2014 09:50:54

**99% Occupied Bandwidth Plot on Channel 1513 (1752.6 MHz)**


Date: 22.DEC.2014 09:53:36

**26dB Bandwidth Plot on Channel 1513 (1752.6 MHz)**


Date: 22.DEC.2014 09:51:22

### 3.5 Band Edge Measurement

#### 3.5.1 Description of Band Edge Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

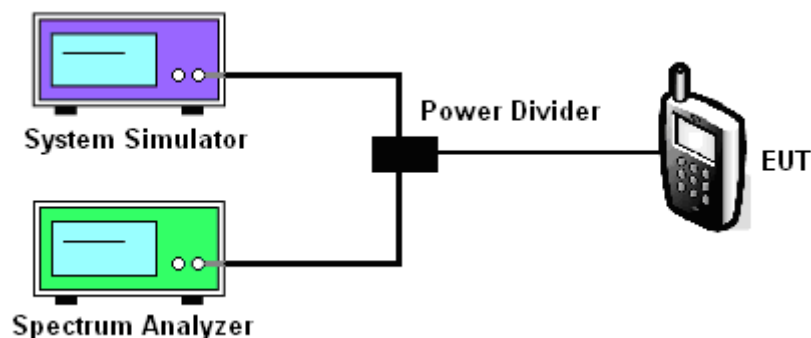
#### 3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.5.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
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.
4. The band edges of low and high channels for the highest RF powers were measured.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$   
 $= -13\text{dBm}.$

#### 3.5.4 Test Setup

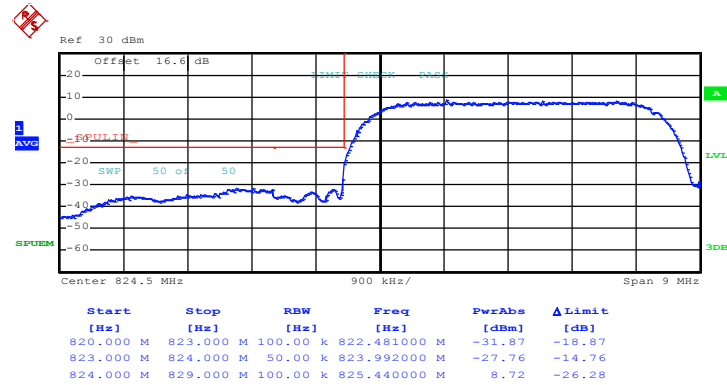




## 3.5.5 Test Result (Plots) of Conducted Band Edge

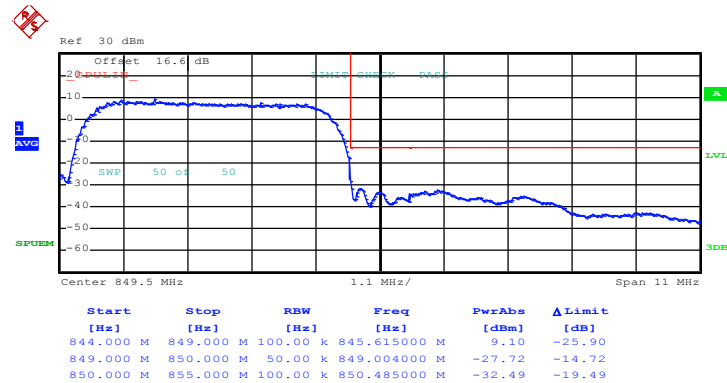
|        |              |             |                          |
|--------|--------------|-------------|--------------------------|
| Band : | WCDMA Band V | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|--------------|-------------|--------------------------|

## Lower Band Edge Plot on Channel 4132 (826.4 MHz)



Date: 22.DEC.2014 09:40:15

## Higher Band Edge Plot on Channel 4233 (846.6 MHz)

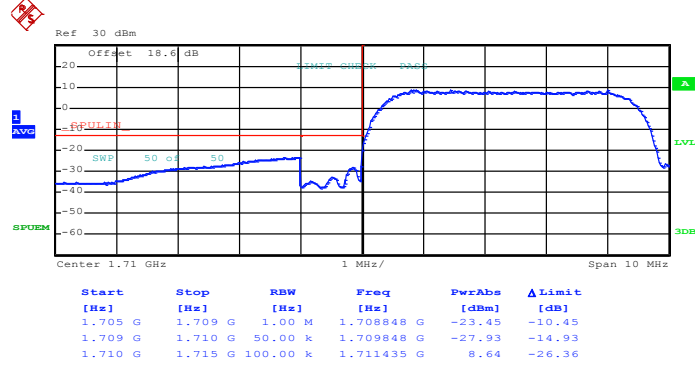


Date: 22.DEC.2014 09:41:27



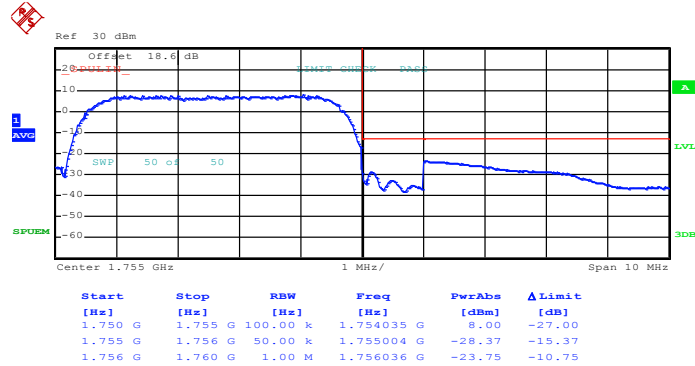
|        |               |             |                          |
|--------|---------------|-------------|--------------------------|
| Band : | WCDMA Band IV | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|---------------|-------------|--------------------------|

Lower Band Edge Plot on Channel 1312 (1712.4 MHz)



Date: 22.DEC.2014 09:56:00

Higher Band Edge Plot on Channel 1513 (1752.6 MHz)



Date: 22.DEC.2014 09:57:20

## 3.6 Conducted Spurious Emission Measurement

### 3.6.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

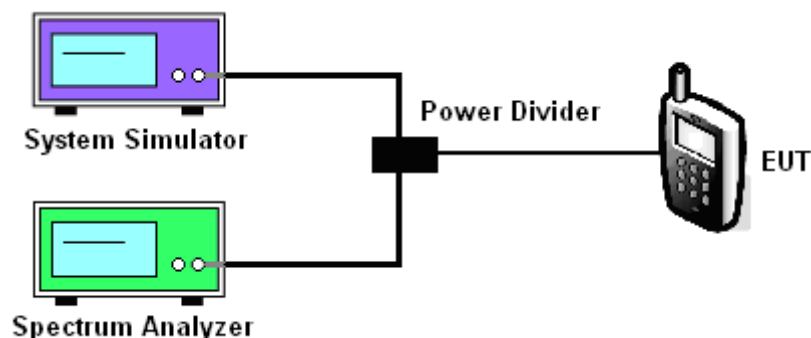
### 3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.6.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
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.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$   
 $= -13\text{dBm}.$

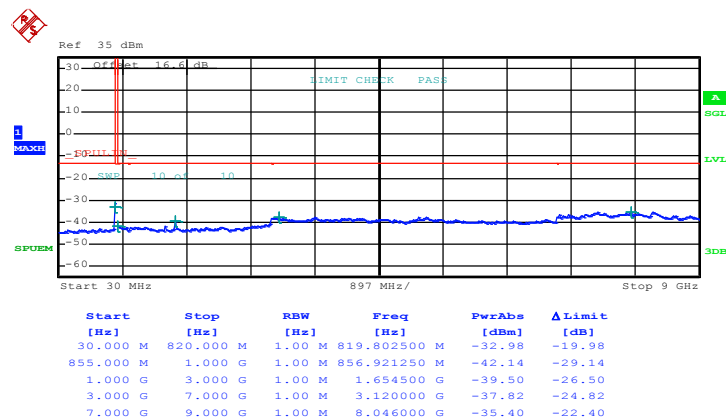
### 3.6.4 Test Setup



### 3.6.5 Test Result (Plots) of Conducted Spurious Emission

|                    |                          |                    |           |
|--------------------|--------------------------|--------------------|-----------|
| <b>Band :</b>      | WCDMA Band V             | <b>Channel :</b>   | CH4132    |
| <b>Test Mode :</b> | RMC 12.2Kbps Link (QPSK) | <b>Frequency :</b> | 826.4 MHz |

**Conducted Spurious Emission Plot between 30MHz ~ 9GHz**

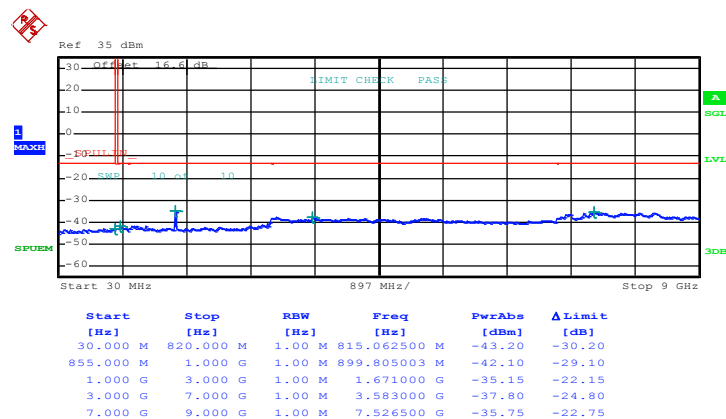


Date: 22.DEC.2014 09:42:24



|             |                          |             |           |
|-------------|--------------------------|-------------|-----------|
| Band :      | WCDMA Band V             | Channel :   | CH4182    |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 836.4 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 9GHz

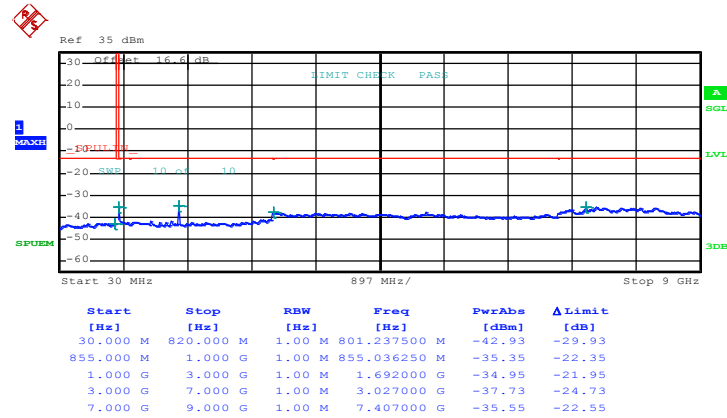


Date: 22.DEC.2014 09:42:48



|             |                          |             |           |
|-------------|--------------------------|-------------|-----------|
| Band :      | WCDMA Band V             | Channel :   | CH4233    |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 846.6 MHz |

Conducted Spurious Emission Plot between 30MHz ~ 9GHz

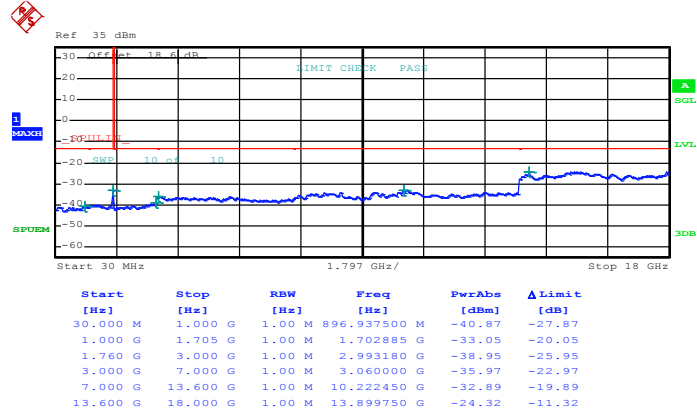


Date: 22.DEC.2014 09:43:13



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | WCDMA Band IV            | Channel :   | CH1312     |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 1712.4 MHz |

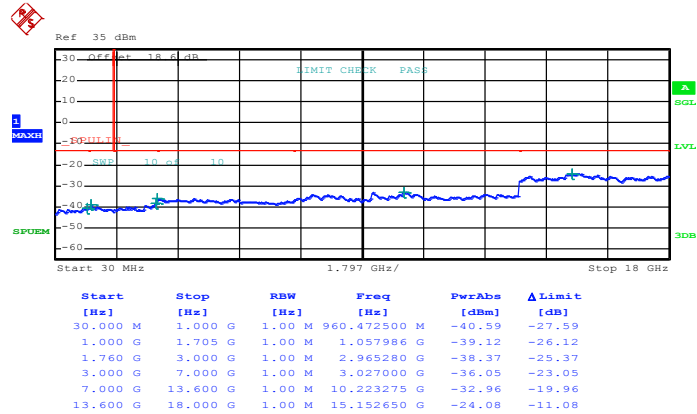
Conducted Spurious Emission Plot between 30MHz ~ 18GHz



Date: 22.DEC.2014 09:58:20



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | WCDMA Band IV            | Channel :   | CH1413     |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 1732.6 MHz |

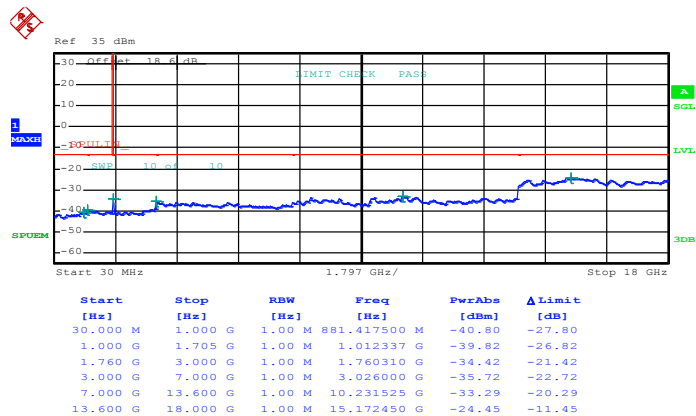
**Conducted Spurious Emission Plot between 30MHz ~ 18GHz**

Date: 22.DEC.2014 09:58:45



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | WCDMA Band IV            | Channel :   | CH1513     |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 1752.6 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 18GHz



Date: 22.DEC.2014 09:59:50

## **3.7 Field Strength of Spurious Radiation Measurement**

### **3.7.1 Description of Field Strength of Spurious Radiated Measurement**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

### **3.7.2 Measuring Instruments**

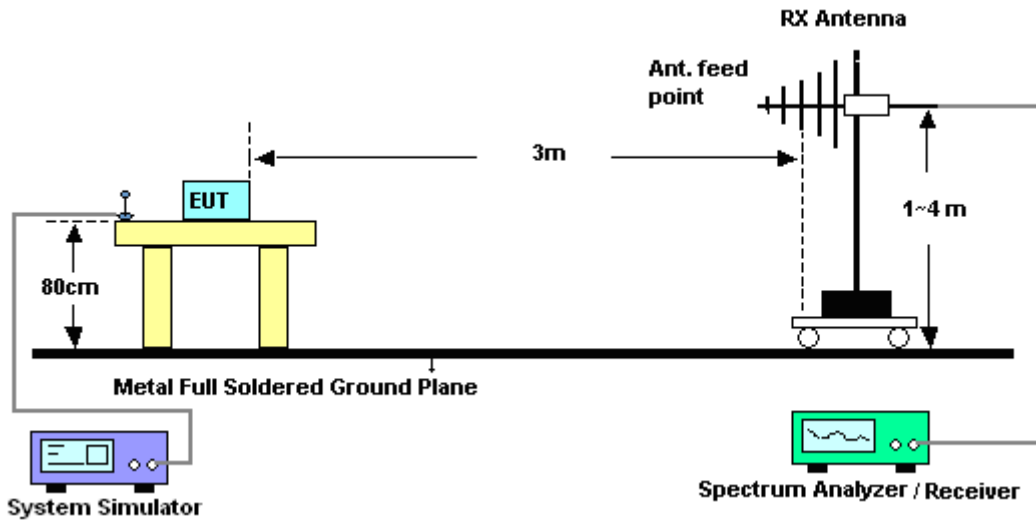
The measuring equipment is listed in the section 4 of this test report.

### **3.7.3 Test Procedures**

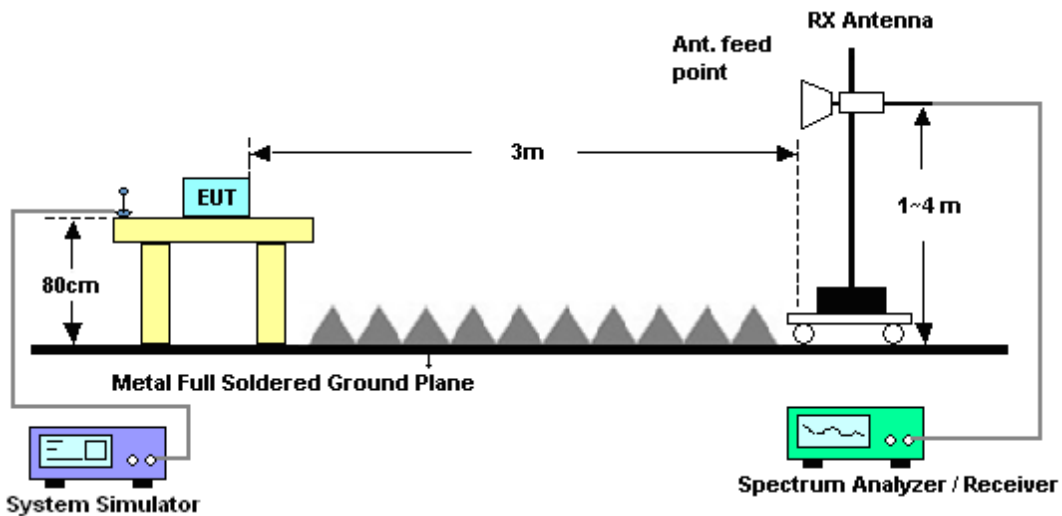
1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
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.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11.  $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12.  $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$   
 $= -13\text{dBm}.$

### 3.7.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





## 3.7.5 Test Result of Field Strength of Spurious Radiated

## &lt;Low Channel&gt;

|                 |                                                                                  |                     |            |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|------------|---------|---------|----------|------------|--------------|--------|
| Band :          | WCDMA Band V                                                                     | Temperature :       | 23~24°C    |         |         |          |            |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%     |         |         |          |            |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Horizontal |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |            |         |         |          |            |              |        |
| Frequency       | ERP                                                                              | Limit               | Over       | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
|                 |                                                                                  |                     | Limit      | Reading | Power   | loss     | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | ( dB )     | (dBm)   | ( dBm ) | ( dB )   | (dBi)      | (H/V)        |        |
| 1656            | -48.66                                                                           | -13                 | -35.66     | -61     | -50.39  | 0.98     | 4.86       | H            | Pass   |
| 2480            | -59.61                                                                           | -13                 | -46.61     | -76.87  | -61.52  | 1.28     | 5.34       | H            | Pass   |
| 3304            | -59.23                                                                           | -13                 | -46.23     | -77.86  | -62.67  | 1.54     | 7.14       | H            | Pass   |

|                 |                                                                                  |                     |                 |                    |                  |                |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|-----------------|--------------------|------------------|----------------|-----------------|--------------|--------|
| Band :          | WCDMA Band V                                                                     | Temperature :       | 23~24°C         |                    |                  |                |                 |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%          |                    |                  |                |                 |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Vertical        |                    |                  |                |                 |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |                 |                    |                  |                |                 |              |        |
| Frequency       | ERP                                                                              | Limit               | Over            | SPA                | S.G.             | TX Cable       | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB ) | Gain<br>( dBi ) | (H/V)        |        |
| 1656            | -53.55                                                                           | -13                 | -40.55          | -64.87             | -55.28           | 0.98           | 4.86            | V            | Pass   |
| 2480            | -61.77                                                                           | -13                 | -48.77          | -77.02             | -63.68           | 1.28           | 5.34            | V            | Pass   |
| 3304            | -60.28                                                                           | -13                 | -47.28          | -77.6              | -63.72           | 1.54           | 7.14            | V            | Pass   |

**<Middle Channel>**

|                 |                                                                                  |                     |                 |                  |                  |                |               |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|-----------------|------------------|------------------|----------------|---------------|--------------|--------|
| Band :          | WCDMA Band V                                                                     | Temperature :       | 23~24°C         |                  |                  |                |               |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%          |                  |                  |                |               |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Horizontal      |                  |                  |                |               |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |                 |                  |                  |                |               |              |        |
| Frequency       | ERP                                                                              | Limit               | Over            | SPA              | S.G.             | TX Cable       | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm ) | loss<br>( dB ) | Gain<br>(dBi) | (H/V)        |        |
| 1672            | -40.01                                                                           | -13                 | -27.01          | -52.17           | -41.69           | 0.99           | 4.82          | H            | Pass   |
| 2512            | -59.81                                                                           | -13                 | -46.81          | -77.2            | -61.78           | 1.29           | 5.41          | H            | Pass   |
| 3344            | -58.88                                                                           | -13                 | -45.88          | -77.72           | -62.49           | 1.56           | 7.31          | H            | Pass   |

|                 |                                                                                  |                     |                 |                    |                  |                |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|-----------------|--------------------|------------------|----------------|-----------------|--------------|--------|
| Band :          | WCDMA Band V                                                                     | Temperature :       | 23~24°C         |                    |                  |                |                 |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%          |                    |                  |                |                 |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Vertical        |                    |                  |                |                 |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |                 |                    |                  |                |                 |              |        |
| Frequency       | ERP                                                                              | Limit               | Over            | SPA                | S.G.             | TX Cable       | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB ) | Gain<br>( dBi ) | (H/V)        |        |
| 1672            | -43.50                                                                           | -13                 | -30.50          | -54.97             | -45.18           | 0.99           | 4.82            | V            | Pass   |
| 2512            | -61.48                                                                           | -13                 | -48.48          | -77.11             | -63.45           | 1.29           | 5.41            | V            | Pass   |
| 3344            | -60.63                                                                           | -13                 | -47.63          | -78.03             | -64.24           | 1.56           | 7.31            | V            | Pass   |

**<High Channel>**

| Band :          | WCDMA Band V                                                                     | Temperature :       | 23~24°C    |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|------------|---------|---------|----------|------------|--------------|--------|
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%     |         |         |          |            |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Horizontal |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |            |         |         |          |            |              |        |
| Frequency       | ERP                                                                              | Limit               | Over       | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit      | Reading | Power   | loss     | Gain       | (H/V)        |        |
| ( dB )          | ( dBm )                                                                          | ( dBm )             | ( dB )     | ( dBm ) | ( dBm ) | ( dB )   | ( dBi )    |              |        |
| 1696            | -40.29                                                                           | -13                 | -27.29     | -53.35  | -41.89  | 1.00     | 4.75       | H            | Pass   |
| 2536            | -59.65                                                                           | -13                 | -46.65     | -77.2   | -61.63  | 1.30     | 5.43       | H            | Pass   |
| 3384            | -58.91                                                                           | -13                 | -45.91     | -77.88  | -62.68  | 1.57     | 7.49       | H            | Pass   |

|                 |                                                                                  |                     |                 |                    |                  |                |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|-----------------|--------------------|------------------|----------------|-----------------|--------------|--------|
| Band :          | WCDMA Band V                                                                     | Temperature :       | 23~24°C         |                    |                  |                |                 |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%          |                    |                  |                |                 |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Vertical        |                    |                  |                |                 |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |                 |                    |                  |                |                 |              |        |
| Frequency       | ERP                                                                              | Limit               | Over            | SPA                | S.G.             | TX Cable       | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB ) | Gain<br>( dBi ) | (H/V)        |        |
| 1696            | -45.87                                                                           | -13                 | -32.87          | -57.53             | -47.47           | 1.00           | 4.75            | V            | Pass   |
| 2536            | -61.90                                                                           | -13                 | -48.90          | -77.17             | -63.88           | 1.30           | 5.43            | V            | Pass   |
| 3384            | -59.88                                                                           | -13                 | -46.88          | -77.69             | -63.65           | 1.57           | 7.49            | V            | Pass   |



## &lt;Low Channel&gt;

| Band :          | WCDMA Band IV                                                                    | Temperature :       | 23~24°C    |         |        |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|------------|---------|--------|----------|------------|--------------|--------|
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%     |         |        |          |            |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Horizontal |         |        |          |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |            |         |        |          |            |              |        |
| Frequency       | EIRP                                                                             | Limit               | Over       | SPA     | S.G.   | TX Cable | TX Antenna | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit      | Reading | Power  | loss     | Gain       | (H/V)        |        |
| 3707            | -52.07                                                                           | -13                 | -39.07     | -72.12  | -58.65 | 1.67     | 8.25       | H            | Pass   |
| 5555            | -56.36                                                                           | -13                 | -43.36     | -79.6   | -63.43 | 2.66     | 9.72       | H            | Pass   |
| 7410            | -53.35                                                                           | -13                 | -40.35     | -80.39  | -62.51 | 2.46     | 11.62      | H            | Pass   |

| Band :          | WCDMA Band IV                                                                    | Temperature :       | 23~24°C  |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|----------|---------|---------|----------|------------|--------------|--------|
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%   |         |         |          |            |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Vertical |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |          |         |         |          |            |              |        |
| Frequency       | EIRP                                                                             | Limit               | Over     | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit    | Reading | Power   | loss     | Gain       | (H/V)        |        |
| ( dB )          | ( dBm )                                                                          | ( dB )              | ( dBm )  | ( dBm ) | ( dBm ) | ( dB )   | (dBi)      |              |        |
| 3707            | -56.34                                                                           | -13                 | -43.34   | -75.38  | -62.92  | 1.67     | 8.25       | V            | Pass   |
| 5555            | -56.84                                                                           | -13                 | -43.84   | -79.39  | -63.91  | 2.66     | 9.72       | V            | Pass   |
| 7410            | -55.49                                                                           | -13                 | -42.49   | -80.64  | -64.65  | 2.46     | 11.62      | V            | Pass   |

**<Middle Channel>**

|                 |                                                                                  |                     |            |               |               |             |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|------------|---------------|---------------|-------------|------------|--------------|--------|
| Band :          | WCDMA Band IV                                                                    | Temperature :       | 23~24°C    |               |               |             |            |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%     |               |               |             |            |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Horizontal |               |               |             |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |            |               |               |             |            |              |        |
| Frequency       | EIRP                                                                             | Limit               | Over Limit | SPA           | S.G.          | TX Cable    | TX Antenna | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | ( dB )     | Reading (dBm) | Power ( dBm ) | loss ( dB ) | Gain (dBi) | (H/V)        |        |
| 3763            | -52.26                                                                           | -13                 | -39.26     | -72.5         | -58.89        | 1.69        | 8.32       | H            | Pass   |
| 5639            | -55.48                                                                           | -13                 | -42.48     | -78.89        | -62.53        | 2.71        | 9.76       | H            | Pass   |
| 7522            | -52.95                                                                           | -13                 | -39.95     | -80.34        | -62.34        | 2.42        | 11.81      | H            | Pass   |

|                 |                                                                                  |                     |          |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|----------|---------|---------|----------|------------|--------------|--------|
| Band :          | WCDMA Band IV                                                                    | Temperature :       | 23~24°C  |         |         |          |            |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%   |         |         |          |            |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Vertical |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |          |         |         |          |            |              |        |
| Frequency       | EIRP                                                                             | Limit               | Over     | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
|                 |                                                                                  |                     | Limit    | Reading | Power   | loss     | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | ( dB )   | (dBm)   | ( dBm ) | ( dB )   | (dBi)      | (H/V)        |        |
| 3763            | -56.76                                                                           | -13                 | -43.76   | -75.99  | -63.39  | 1.69     | 8.32       | V            | Pass   |
| 5639            | -56.63                                                                           | -13                 | -43.63   | -79.36  | -63.68  | 2.71     | 9.76       | V            | Pass   |
| 7522            | -54.55                                                                           | -13                 | -41.55   | -80.24  | -63.94  | 2.42     | 11.81      | V            | Pass   |

**<High Channel>**

|                 |                                                                                  |                     |            |               |               |             |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|------------|---------------|---------------|-------------|------------|--------------|--------|
| Band :          | WCDMA Band IV                                                                    | Temperature :       | 23~24°C    |               |               |             |            |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%     |               |               |             |            |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Horizontal |               |               |             |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |            |               |               |             |            |              |        |
| Frequency       | EIRP                                                                             | Limit               | Over Limit | SPA           | S.G.          | TX Cable    | TX Antenna | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | ( dB )     | Reading (dBm) | Power ( dBm ) | loss ( dB ) | Gain (dBi) | (H/V)        |        |
| 3812            | -52.48                                                                           | -13                 | -39.48     | -72.69        | -59.15        | 1.70        | 8.37       | H            | Pass   |
| 5723            | -56.11                                                                           | -13                 | -43.11     | -79.5         | -63.15        | 2.75        | 9.79       | H            | Pass   |
| 7627            | -52.35                                                                           | -13                 | -39.35     | -79.98        | -61.84        | 2.39        | 11.88      | H            | Pass   |

|                 |                                                                                  |                     |          |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|----------|---------|---------|----------|------------|--------------|--------|
| Band :          | WCDMA Band IV                                                                    | Temperature :       | 23~24°C  |         |         |          |            |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%   |         |         |          |            |              |        |
| Test Engineer : | Nick Yu                                                                          | Polarization :      | Vertical |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |          |         |         |          |            |              |        |
| Frequency       | EIRP                                                                             | Limit               | Over     | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
|                 |                                                                                  |                     | Limit    | Reading | Power   | loss     | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | ( dB )   | (dBm)   | ( dBm ) | ( dB )   | (dBi)      | (H/V)        |        |
| 3812            | -56.65                                                                           | -13                 | -43.65   | -75.99  | -63.32  | 1.70     | 8.37       | V            | Pass   |
| 5723            | -57.05                                                                           | -13                 | -44.05   | -79.36  | -64.09  | 2.75     | 9.79       | V            | Pass   |
| 7627            | -53.99                                                                           | -13                 | -40.99   | -80.12  | -63.48  | 2.39     | 11.88      | V            | Pass   |

## 3.8 Frequency Stability Measurement

### 3.8.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5\text{ppm}$ ) of the center frequency.

### 3.8.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

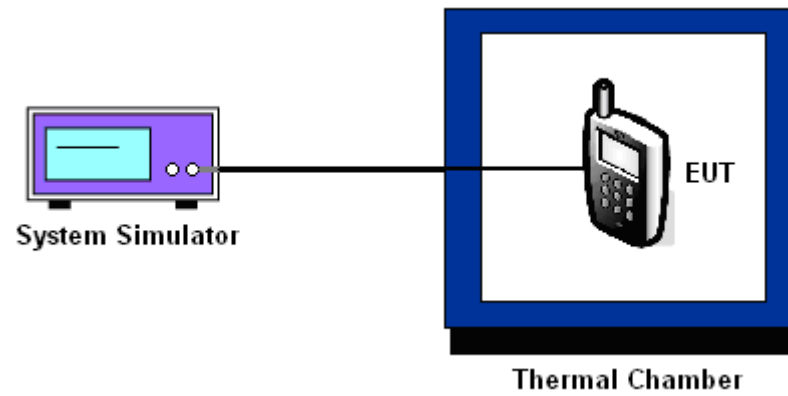
### 3.8.3 Test Procedures for Temperature Variation

1. The testing follows FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to  $-30^{\circ}\text{C}$  and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in  $10^{\circ}\text{C}$  steps up to  $50^{\circ}\text{C}$ . 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.

### 3.8.4 Test Procedures for Voltage Variation

1. The testing follows FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was placed in a temperature chamber at  $25\pm 5^{\circ}\text{C}$  and connected with the system simulator.
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.
4. The variation in frequency was measured for the worst case.

### 3.8.5 Test Setup



### 3.8.6 Test Result of Temperature Variation

|                      |              |                    |           |
|----------------------|--------------|--------------------|-----------|
| <b>Band :</b>        | WCDMA Band V | <b>Channel :</b>   | 4182      |
| <b>Limit (ppm) :</b> | 2.5          | <b>Frequency :</b> | 836.4 MHz |

| Temperature (°C) | RMC 12.2Kbps    | Result |
|------------------|-----------------|--------|
|                  | Deviation (ppm) |        |
| 50               | 0.0155          | PASS   |
| 40               | 0.0143          |        |
| 30               | 0.0036          |        |
| 20(Ref.)         | 0.0000          |        |
| 10               | 0.0012          |        |
| 0                | 0.0024          |        |
| -10              | 0.0012          |        |
| -20              | 0.0012          |        |
| -30              | 0.0024          |        |

|                      |                        |                    |            |
|----------------------|------------------------|--------------------|------------|
| <b>Band :</b>        | WCDMA Band IV          | <b>Channel :</b>   | 1413       |
| <b>Limit (ppm) :</b> | within authorized band | <b>Frequency :</b> | 1732.6 MHz |

| Temperature (°C) | RMC 12.2Kbps    | Result |
|------------------|-----------------|--------|
|                  | Deviation (ppm) |        |
| 50               | 0.0219          | PASS   |
| 40               | 0.0173          |        |
| 30               | 0.0006          |        |
| 20(Ref.)         | 0.0000          |        |
| 10               | 0.0035          |        |
| 0                | 0.0029          |        |
| -10              | 0.0017          |        |
| -20              | 0.0035          |        |
| -30              | 0.0029          |        |

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

**3.8.7 Test Result of Voltage Variation**

| Band & Channel          | Mode            | Voltage (Volt) | Deviation (ppm) | Limit (ppm) | Result |
|-------------------------|-----------------|----------------|-----------------|-------------|--------|
| WCDMA Band V<br>CH4182  | RMC<br>12.2Kbps | 4.35           | 0.0036          | 2.5         | PASS   |
|                         |                 | 3.80           | 0.0179          |             |        |
|                         |                 | BEP            | 0.0143          |             |        |
| WCDMA Band IV<br>CH1413 | RMC<br>12.2Kbps | 4.35           | 0.0006          | (Note 3.)   |        |
|                         |                 | 3.80           | 0.0179          |             |        |
|                         |                 | BEP            | 0.0202          |             |        |

**Note:**

1. Normal Voltage = 3.80V.
2. Battery End Point (BEP) = 3.42 V.
3. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.



## 4 List of Measuring Equipment

| Instrument                | Manufacturer    | Model No.     | Serial No.    | Characteristics  | Calibration Date | Test Date     | Due Date      | Remark                |
|---------------------------|-----------------|---------------|---------------|------------------|------------------|---------------|---------------|-----------------------|
| System Simulator          | Rohde & Schwarz | CMU200        | 117995        | N/A              | Jul. 29, 2014    | Dec. 22, 2014 | Jul. 28, 2015 | Conducted (TH02-HY)   |
| Spectrum Analyzer         | Rohde & Schwarz | FSP40         | 100055        | 9kHz~40GHz       | Jun. 09, 2014    | Dec. 22, 2014 | Jun. 08, 2015 | Conducted (TH02-HY)   |
| Thermal Chamber           | Ten Billion     | TTH-D3SP      | TBN-930701    | N/A              | Jul. 17, 2014    | Dec. 22, 2014 | Jul. 16, 2015 | Conducted (TH02-HY)   |
| Spectrum Analyzer         | Rohde & Schwarz | FSV30         | 101749        | 10Hz ~ 30GHz     | Feb. 10, 2014    | Dec. 22, 2014 | Feb. 09, 2015 | Radiation (03CH07-HY) |
| Bilog Antenna             | Schaffner       | CBL6111C      | 2726          | 30MHz ~ 1GHz     | Sep. 27, 2014    | Dec. 22, 2014 | Sep. 26, 2015 | Radiation (03CH07-HY) |
| Double Ridge Horn Antenna | ESCO            | 3117          | 75962         | 1GHz~18GHz       | Aug. 19, 2014    | Dec. 22, 2014 | Aug. 18, 2015 | Radiation (03CH07-HY) |
| Preamplifier              | COM-POWER       | PA-103A       | 161241        | 10 MHz ~ 1000MHz | Mar. 17, 2014    | Dec. 22, 2014 | Mar. 16, 2015 | Radiation (03CH07-HY) |
| Preamplifier              | Agilent         | 8449B         | 3008A02362    | 1 GHz~26.5 GHz   | Oct. 21, 2014    | Dec. 22, 2014 | Oct. 20, 2015 | Radiation (03CH07-HY) |
| Turn Table                | ChainTek        | ChainTek 3000 | N/A           | 0 ~ 360 degree   | N/A              | Dec. 22, 2014 | N/A           | Radiation (03CH07-HY) |
| Antenna Mast              | ChainTek        | M-400-0       | 114/8000604/L | N/A              | N/A              | Dec. 22, 2014 | N/A           | Radiation (03CH07-HY) |
| SHF-EHF Horn Antenna      | SCHWARZBECK     | BBHA 9170     | BBHA9170251   | 18GHz~40GHz      | Oct. 02, 2014    | Dec. 22, 2014 | Oct. 01, 2015 | Radiation (03CH07-HY) |
| Signal Generator          | Rohde & Schwarz | SMF100A       | 101107        | 100kHz~40GHz     | May 23, 2014     | Dec. 22, 2014 | May 22, 2015  | Radiation (03CH07-HY) |
| Double Ridge Horn Antenna | ESCO            | 3117          | 00066583      | 1GHz~18GHz       | Jul. 24, 2014    | Dec. 22, 2014 | Jul. 23, 2015 | Radiation (03CH07-HY) |



## 5 Uncertainty of Evaluation

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

|                                                                          |      |
|--------------------------------------------------------------------------|------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 4.50 |
|--------------------------------------------------------------------------|------|



## **Appendix A. Original Report**

Please refer to Sporton report number FG4N1320 as below.



# FCC RF Test Report

APPLICANT : Motorola Mobility, LLC  
EQUIPMENT : Mobile Cellular Phone  
BRAND NAME : Motorola  
MODEL NAME : 4583  
FCC ID : IHDT56QF1  
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)  
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Nov. 13, 2014 and testing was completed on Dec. 04, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and has been in compliance with the applicable technical standards.

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

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



## SPORTON INTERNATIONAL INC.

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FCC ID : IHDT56QF1

Page Number : 1 of 105  
Report Issued Date : Dec. 30, 2014  
Report Version : Rev. 01  
Report Template No.: BU5-FG22/24 Version 1.1



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## REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION             | ISSUED DATE   |
|------------|---------|-------------------------|---------------|
| FG4N1320   | Rev. 01 | Initial issue of report | Dec. 30, 2014 |
|            |         |                         |               |
|            |         |                         |               |
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|            |         |                         |               |
|            |         |                         |               |
|            |         |                         |               |
|            |         |                         |               |



## SUMMARY OF TEST RESULT

| Report Section | FCC Rule                            | Description                                   | Limit                                 | Result | Remark                                     |
|----------------|-------------------------------------|-----------------------------------------------|---------------------------------------|--------|--------------------------------------------|
| 3.1            | §2.1046                             | Conducted Output Power                        | N/A                                   | PASS   | -                                          |
| 3.2            | §24.232(d)                          | Peak-to-Average Ratio                         | <13 dB                                | PASS   | -                                          |
| 3.3            | §22.913(a)(2)                       | Effective Radiated Power                      | < 7 Watts                             | PASS   | -                                          |
|                | §24.232(c)                          | Equivalent Isotropic Radiated Power           | < 2 Watts                             | PASS   | -                                          |
| 3.4            | §2.1049<br>§22.917(b)<br>§24.238(b) | Occupied Bandwidth                            | N/A                                   | PASS   | -                                          |
| 3.5            | §2.1051<br>§22.917(a)<br>§24.238(a) | Band Edge Measurement                         | $< 43 + 10\log_{10}(P[\text{Watts}])$ | PASS   | -                                          |
| 3.6            | §2.1051<br>§22.917(a)<br>§24.238(a) | Conducted Spurious Emission                   | $< 43 + 10\log_{10}(P[\text{Watts}])$ | PASS   | -                                          |
| 3.7            | §2.1053<br>§22.917(a)<br>§24.238(a) | Field Strength of Spurious Radiation          | $< 43 + 10\log_{10}(P[\text{Watts}])$ | PASS   | Under limit<br>23.95 dB at<br>1672.000 MHz |
| 3.8            | §2.1055<br>§22.355                  | Frequency Stability for Temperature & Voltage | < 2.5 ppm for Part 22                 | PASS   | -                                          |
|                | §2.1055<br>§24.235                  |                                               | Within Authorized Band                |        |                                            |



# 1 General Description

## 1.1 Applicant

Motorola Mobility, LLC

222 W. Merchandise Mart Plaza, Suite 1800, Chicago IL. 60654, USA

### 1.1. Manufacturer

Motorola Mobility, LLC

222 W. Merchandise Mart Plaza, Suite 1800, Chicago IL. 60654, USA

## 1.2 Product Feature of Equipment Under Test

| Product Feature                 |                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------|
| Equipment                       | Mobile Cellular Phone                                                                  |
| Brand Name                      | Motorola                                                                               |
| Model Name                      | 4583                                                                                   |
| FCC ID                          | IHDT56QF1                                                                              |
| IMEI Code                       | 353323060035770                                                                        |
| EUT supports Radios application | GSM/EGPRS/WCDMA/HSPA<br>WLAN 11b/g/n HT20<br>Bluetooth v2.1 EDR<br>Bluetooth v4.0 - LE |
| HW Version                      | P2                                                                                     |
| EUT Stage                       | Identical Prototype                                                                    |

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

| Accessory List |                        |
|----------------|------------------------|
| AC Adapter     | Brand Name : Motorola  |
|                | Model Name : SPN5810A  |
| USB Cable      | Brand Name : Motorola  |
|                | Model Name : SKN6447A  |
| Battery        | Brand Name : Sony      |
|                | Model Name : SNN5956A  |
| Earphone       | Brand Name : Motorola  |
|                | Model Name : SJYN1181B |



### 1.3 Product Specification subjective to this standard

| Product Specification subjective to this standard |                                                                                                                                                    |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tx Frequency</b>                               | GSM850: 824.2 MHz ~ 848.8 MHz<br>GSM1900: 1850.2 MHz ~ 1909.8MHz<br>WCDMA Band V: 826.4 MHz ~ 846.6 MHz<br>WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz  |
| <b>Rx Frequency</b>                               | GSM850: 869.2 MHz ~ 893.8 MHz<br>GSM1900: 1930.2 MHz ~ 1989.8 MHz<br>WCDMA Band V: 871.4 MHz ~ 891.6 MHz<br>WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz |
| <b>Maximum Output Power to Antenna</b>            | GSM850 : 32.53 dBm<br>GSM1900 : 29.39 dBm<br>WCDMA Band V : 22.48 dBm<br>WCDMA Band II : 22.76 dBm                                                 |
| <b>99% Occupied Bandwidth</b>                     | GSM850: 0.250MHz<br>GSM1900: 0.245MHz<br>WCDMA Band V: 4.19MHz<br>WCDMA Band II: 4.18MHz                                                           |
| <b>Antenna Type</b>                               | Fixed Internal Antenna                                                                                                                             |
| <b>Type of Modulation</b>                         | GSM: GMSK<br>GPRS: GMSK<br>EDGE: GMSK / 8PSK<br>WCDMA: QPSK (Uplink)<br>HSDPA: 64QAM (Downlink)<br>HSUPA: QPSK (Uplink)                            |

### 1.4 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.5 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

| FCC Rule | System                     | Type of Modulation | Maximum ERP/EIRP (W) | Frequency Tolerance (ppm) | Emission Designator |
|----------|----------------------------|--------------------|----------------------|---------------------------|---------------------|
| Part 22  | GSM850 GSM                 | GMSK               | 0.8630               | 0.0072 ppm                | 250KGXW             |
| Part 22  | GSM850 EDGE class 8        | 8PSK               | 0.1380               | 0.0072 ppm                | 244KG7W             |
| Part 22  | WCDMA Band V RMC 12.2Kbps  | QPSK               | 0.0914               | 0.0143 ppm                | 4M19F9W             |
| Part 24  | GSM1900 GPRS class 8       | GMSK               | 0.6026               | 0.0037 ppm                | 242KGXW             |
| Part 24  | GSM1900 EDGE class 8       | 8PSK               | 0.2323               | 0.0197 ppm                | 245KG7W             |
| Part 24  | WCDMA Band II RMC 12.2Kbps | QPSK               | 0.1866               | 0.0032 ppm                | 4M18F9W             |

## 1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

|                           |                                                                                                                                                                 |           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Test Site</b>          | SPORTON INTERNATIONAL INC.                                                                                                                                      |           |
| <b>Test Site Location</b> | No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park,<br>Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL: +886-3-327-3456<br>FAX: +886-3-328-4978 |           |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b>                                                                                                                                         |           |
|                           | TH02-HY                                                                                                                                                         | 03CH07-HY |



## **1.7 Applicable Standards**

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

- ♦ FCC 47 CFR Part 2, 22(H), 24(E)
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

### **Remark:**

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



## 2 Test Configuration of Equipment Under Test

### 2.1 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 9000 MHz for GSM850 and WCDMA Band V.
2. 30 MHz to 19000 MHz for GSM1900 and WCDMA Band II.

All modes and data rates and positions were investigated.

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

| Test Modes    |                     |                     |
|---------------|---------------------|---------------------|
| Band          | Radiated TCs        | Conducted TCs       |
| GSM 850       | ■ GSM Link          | ■ GSM Link          |
|               | ■ EDGE class 8 Link | ■ EDGE class 8 Link |
| GSM 1900      | ■ GPRS class 8 Link | ■ GPRS class 8 Link |
|               | ■ EDGE class 8 Link | ■ EDGE class 8 Link |
| WCDMA Band V  | ■ RMC 12.2Kbps Link | ■ RMC 12.2Kbps Link |
| WCDMA Band II | ■ RMC 12.2Kbps Link | ■ RMC 12.2Kbps Link |

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

GSM or GPRS multi-slot class 8 mode for GMSK modulation, EDGE multi-slot class 8 mode for 8PSK modulation, RMC 12.2Kbps mode for WCDMA band V, RMC 12.2Kbps mode for WCDMA band II, only these modes were used for all tests.

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/GPRS/EGPRS/HSDPA modes were investigated on the middle channel and the passed results were not worse than those data tested from the highest power channels.

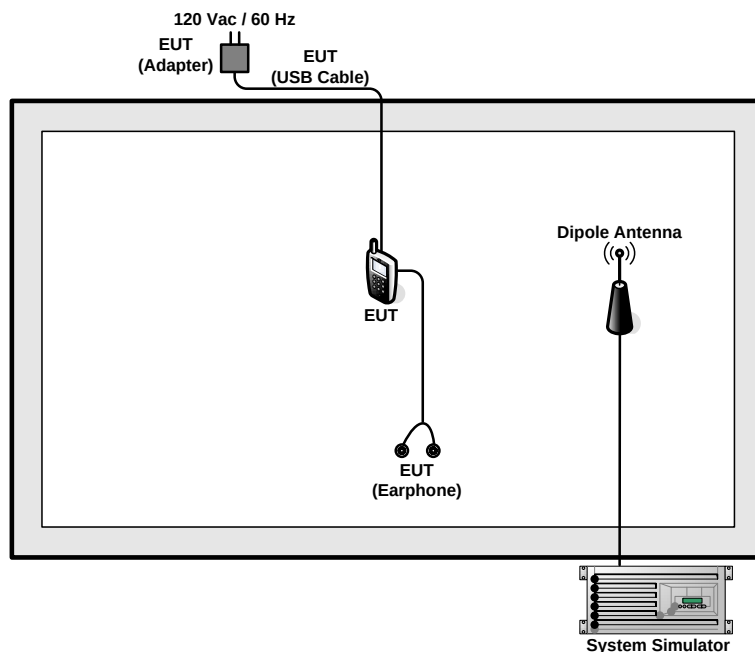


## Conducted Power Measurement Results:

| Conducted Power (*Unit: dBm) |        |       |       |         |        |        |
|------------------------------|--------|-------|-------|---------|--------|--------|
| Band                         | GSM850 |       |       | GSM1900 |        |        |
| Channel                      | 128    | 189   | 251   | 512     | 661    | 810    |
| Frequency                    | 824.2  | 836.4 | 848.8 | 1850.2  | 1880.0 | 1909.8 |
| GSM                          | 32.27  | 32.49 | 32.53 | 29.27   | 29.38  | 29.25  |
| GPRS class 8                 | 32.26  | 32.48 | 32.50 | 29.28   | 29.39  | 29.26  |
| GPRS class 10                | 31.06  | 31.17 | 31.36 | 28.09   | 28.12  | 28.10  |
| GPRS class 11                | 27.19  | 27.50 | 27.43 | 24.64   | 24.72  | 24.63  |
| GPRS class 12                | 25.81  | 25.95 | 26.11 | 23.20   | 23.25  | 23.18  |
| EGPRS class 8                | 26.20  | 26.33 | 26.45 | 25.17   | 25.18  | 25.05  |
| EGPRS class 10               | 25.14  | 25.27 | 25.40 | 24.07   | 24.11  | 24.01  |
| EGPRS class 11               | 22.09  | 22.22 | 22.34 | 20.91   | 20.97  | 20.84  |
| EGPRS class 12               | 21.55  | 21.70 | 21.80 | 20.76   | 20.82  | 20.79  |

| Conducted Power (*Unit: dBm) |              |       |       |               |        |        |
|------------------------------|--------------|-------|-------|---------------|--------|--------|
| Band                         | WCDMA Band V |       |       | WCDMA Band II |        |        |
| Channel                      | 4132         | 4182  | 4233  | 9262          | 9400   | 9538   |
| Frequency                    | 826.4        | 836.4 | 846.6 | 1852.4        | 1880.0 | 1907.6 |
| RMC 12.2K                    | 22.33        | 22.36 | 22.48 | 22.76         | 22.58  | 22.45  |
| HSDPA Subtest-1              | 21.38        | 21.39 | 21.58 | 21.75         | 21.62  | 21.50  |
| HSDPA Subtest-2              | 21.33        | 21.35 | 21.56 | 21.73         | 21.58  | 21.48  |
| HSDPA Subtest-3              | 20.84        | 20.87 | 20.95 | 21.15         | 21.13  | 21.10  |
| HSDPA Subtest-4              | 20.82        | 20.86 | 20.94 | 21.13         | 21.12  | 21.08  |
| HSUPA Subtest-1              | 21.02        | 21.07 | 21.30 | 21.15         | 21.05  | 21.42  |
| HSUPA Subtest-2              | 20.48        | 20.39 | 20.35 | 20.52         | 20.45  | 20.65  |
| HSUPA Subtest-3              | 20.28        | 20.31 | 20.56 | 20.21         | 20.17  | 20.28  |
| HSUPA Subtest-4              | 20.89        | 20.92 | 21.10 | 20.73         | 20.67  | 20.78  |
| HSUPA Subtest-5              | 21.25        | 21.30 | 21.42 | 21.59         | 21.56  | 21.36  |

## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration

| Item | Equipment        | Trade Name | Model No. | FCC ID | Data Cable | Power Cord        |
|------|------------------|------------|-----------|--------|------------|-------------------|
| 1.   | System Simulator | R&S        | CMU 200   | N/A    | N/A        | Unshielded, 1.8 m |

## 2.4 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 :

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\
 &= 4.2 + 10 = 14.2 \text{ (dB)}
 \end{aligned}$$

### **3 Test Result**

#### **3.1 Conducted Output Power Measurement**

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

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

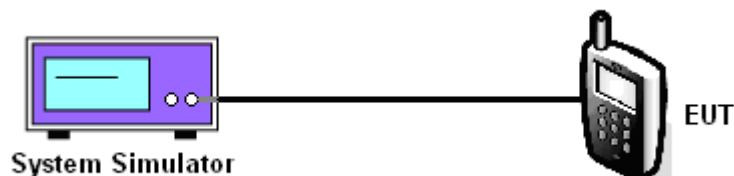
##### **3.1.2 Measuring Instruments**

The measuring equipment is listed in the section 4 of this test report.

##### **3.1.3 Test Procedures**

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

##### **3.1.4 Test Setup**



**3.1.5 Test Result of Conducted Output Power**

| Cellular Band               |              |              |               |                       |              |               |                             |               |                |
|-----------------------------|--------------|--------------|---------------|-----------------------|--------------|---------------|-----------------------------|---------------|----------------|
| Modes                       | GSM850 (GSM) |              |               | GSM850 (EDGE class 8) |              |               | WCDMA Band V (RMC 12.2Kbps) |               |                |
| Channel                     | 128<br>(Low) | 189<br>(Mid) | 251<br>(High) | 128<br>(Low)          | 189<br>(Mid) | 251<br>(High) | 4132<br>(Low)               | 4182<br>(Mid) | 4233<br>(High) |
| Frequency<br>(MHz)          | 824.2        | 836.4        | 848.8         | 824.2                 | 836.4        | 848.8         | 826.4                       | 836.4         | 846.6          |
| Conducted<br>Power<br>(dBm) | 32.27        | 32.49        | 32.53         | 26.20                 | 26.33        | 26.45         | 22.33                       | 22.36         | 22.48          |

| PCS Band                    |                        |              |               |                        |              |               |                              |               |                |
|-----------------------------|------------------------|--------------|---------------|------------------------|--------------|---------------|------------------------------|---------------|----------------|
| Modes                       | GSM1900 (GPRS class 8) |              |               | GSM1900 (EDGE class 8) |              |               | WCDMA Band II (RMC 12.2Kbps) |               |                |
| Channel                     | 512<br>(Low)           | 661<br>(Mid) | 810<br>(High) | 512<br>(Low)           | 661<br>(Mid) | 810<br>(High) | 9262<br>(Low)                | 9400<br>(Mid) | 9538<br>(High) |
| Frequency<br>(MHz)          | 1850.2                 | 1880         | 1909.8        | 1850.2                 | 1880         | 1909.8        | 1852.4                       | 1880          | 1907.6         |
| Conducted<br>Power<br>(dBm) | 29.28                  | 29.39        | 29.26         | 25.17                  | 25.18        | 25.05         | 22.76                        | 22.58         | 22.45          |

**Note:** maximum burst average power for GSM, and maximum average power for WCDMA .

## 3.2 Peak-to-Average Ratio

### 3.2.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 3.2.2 Measuring Instruments

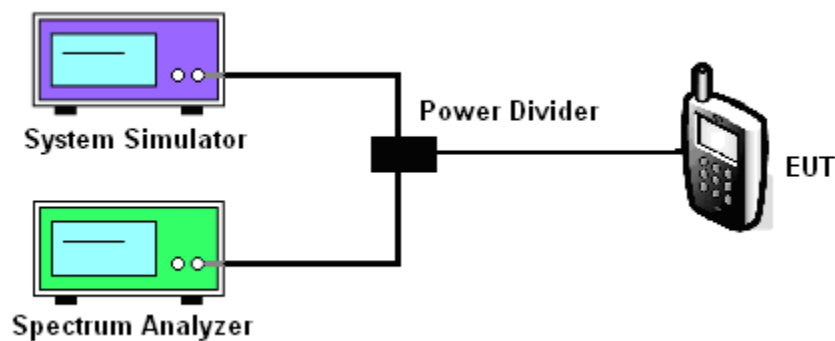
The measuring equipment is listed in the section 4 of this test report.

### 3.2.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. Set EUT to transmit at maximum output power.
4. For GSM/EGPRS operating modes, signal gating is implemented on the spectrum analyzer by triggering from the system simulator.
5. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer.

Record the maximum PAPR level associated with a probability of 0.1%.

### 3.2.4 Test Setup



**3.2.5 Test Result of Peak-to-Average Ratio**

| Cellular Band                 |              |              |               |                       |              |               |                                |               |                |
|-------------------------------|--------------|--------------|---------------|-----------------------|--------------|---------------|--------------------------------|---------------|----------------|
| Modes                         | GSM850 (GSM) |              |               | GSM850 (EDGE class 8) |              |               | WCDMA Band V<br>(RMC 12.2Kbps) |               |                |
| Channel                       | 128<br>(Low) | 189<br>(Mid) | 251<br>(High) | 128<br>(Low)          | 189<br>(Mid) | 251<br>(High) | 4132<br>(Low)                  | 4182<br>(Mid) | 4233<br>(High) |
| Frequency<br>(MHz)            | 824.2        | 836.4        | 848.8         | 824.2                 | 836.4        | 848.8         | 826.4                          | 836.4         | 846.6          |
| Peak-to-Average<br>Ratio (dB) | 0.28         | 0.24         | 0.28          | 3.32                  | 3.24         | 3.88          | 2.96                           | 2.96          | 2.88           |

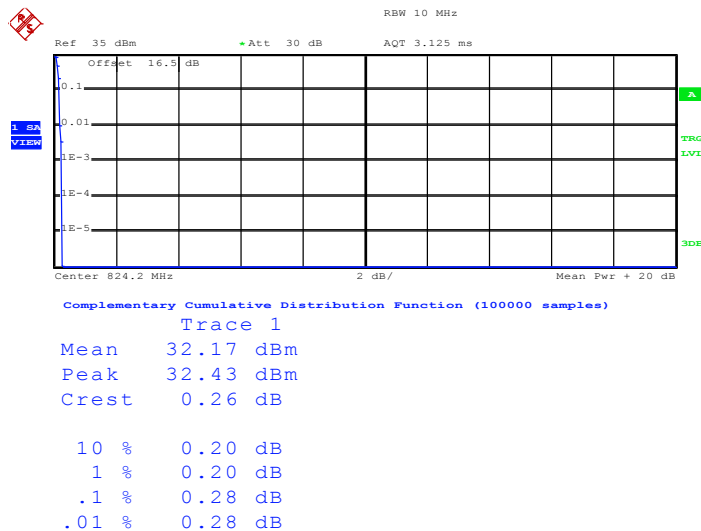
| PCS Band                      |                        |              |               |                        |              |               |                                 |               |                |
|-------------------------------|------------------------|--------------|---------------|------------------------|--------------|---------------|---------------------------------|---------------|----------------|
| Modes                         | GSM1900 (GPRS class 8) |              |               | GSM1900 (EDGE class 8) |              |               | WCDMA Band II<br>(RMC 12.2Kbps) |               |                |
| Channel                       | 512<br>(Low)           | 661<br>(Mid) | 810<br>(High) | 512<br>(Low)           | 661<br>(Mid) | 810<br>(High) | 9262<br>(Low)                   | 9400<br>(Mid) | 9538<br>(High) |
| Frequency<br>(MHz)            | 1850.2                 | 1880         | 1909.8        | 1850.2                 | 1880         | 1909.8        | 1852.4                          | 1880          | 1907.6         |
| Peak-to-Average<br>Ratio (dB) | 0.28                   | 0.32         | 0.28          | 3.24                   | 3.36         | 3.36          | 3.08                            | 3.08          | 3.08           |



## 3.2.6 Test Result (Plots) of Peak-to-Average Ratio

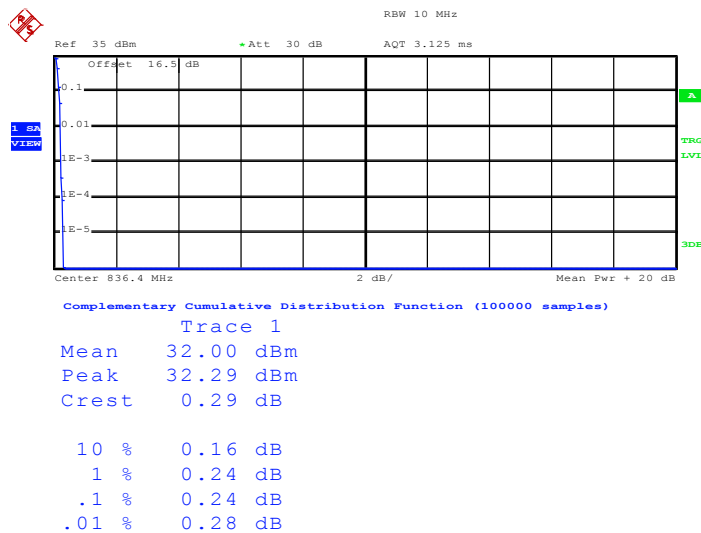
|        |         |             |                 |
|--------|---------|-------------|-----------------|
| Band : | GSM 850 | Test Mode : | GSM Link (GMSK) |
|--------|---------|-------------|-----------------|

## Peak-to-Average Ratio on Channel 128 (824.2 MHz)



Date: 23.NOV.2014 16:57:09

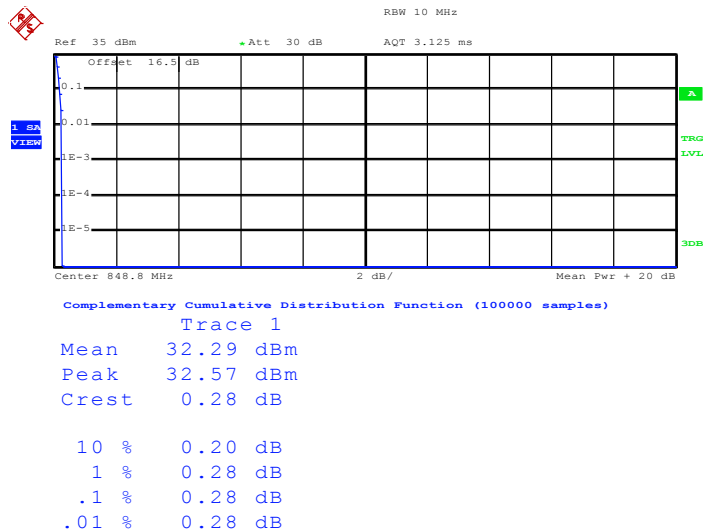
## Peak-to-Average Ratio on Channel 189 (836.4 MHz)



Date: 23.NOV.2014 16:57:38



Peak-to-Average Ratio on Channel 251 (848.8 MHz)

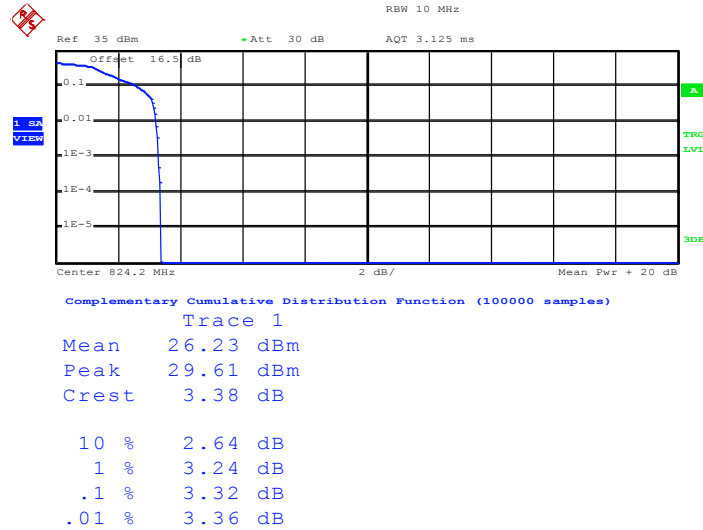


Date: 23.NOV.2014 16:58:04



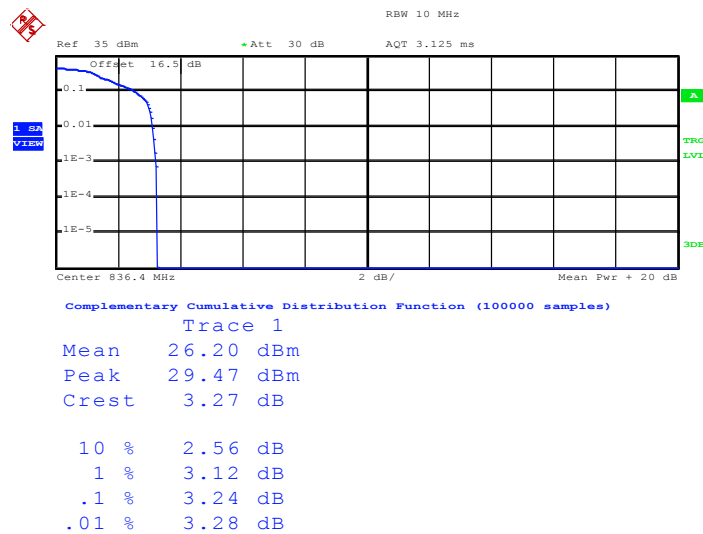
|        |         |             |                          |
|--------|---------|-------------|--------------------------|
| Band : | GSM 850 | Test Mode : | EDGE class 8 Link (8PSK) |
|--------|---------|-------------|--------------------------|

Peak-to-Average Ratio on Channel 128 (824.2 MHz)



Date: 24.NOV.2014 19:12:51

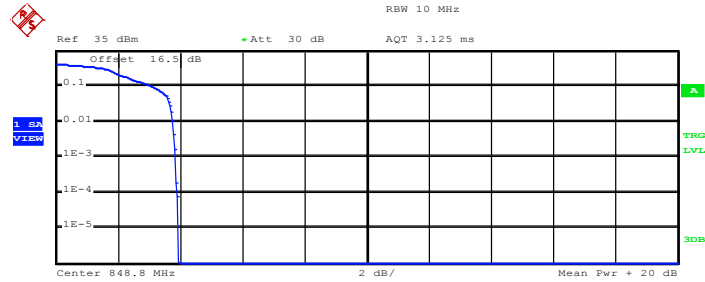
Peak-to-Average Ratio on Channel 189 (836.4 MHz)



Date: 24.NOV.2014 19:13:59



Peak-to-Average Ratio on Channel 251 (848.8 MHz)



Complementary Cumulative Distribution Function (100000 samples)

Trace 1  
Mean 25.88 dBm  
Peak 29.82 dBm  
Crest 3.94 dB

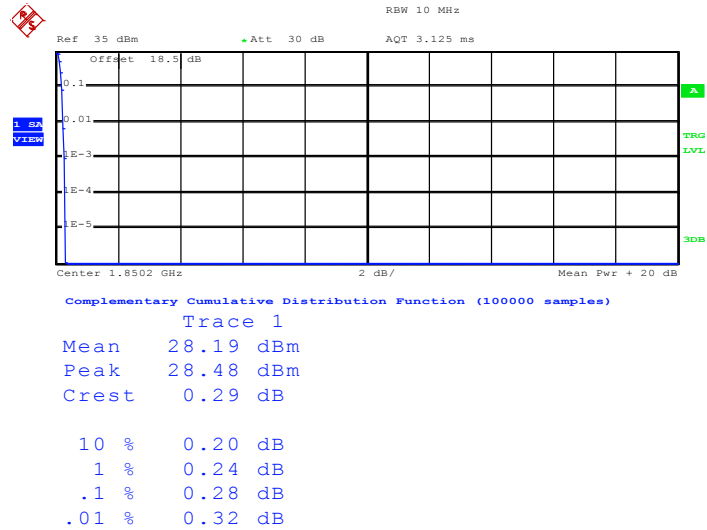
|       |         |
|-------|---------|
| 10 %  | 3.16 dB |
| 1 %   | 3.76 dB |
| .1 %  | 3.88 dB |
| .01 % | 3.92 dB |

Date: 24.NOV.2014 19:15:29



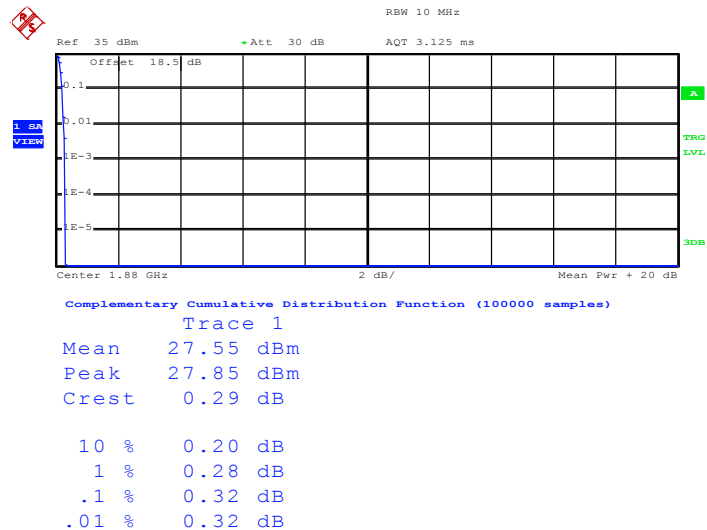
|        |          |             |                          |
|--------|----------|-------------|--------------------------|
| Band : | GSM 1900 | Test Mode : | GPRS class 8 Link (GMSK) |
|--------|----------|-------------|--------------------------|

## Peak-to-Average Ratio on Channel 512 (1850.2 MHz)



Date: 3.DEC.2014 19:08:59

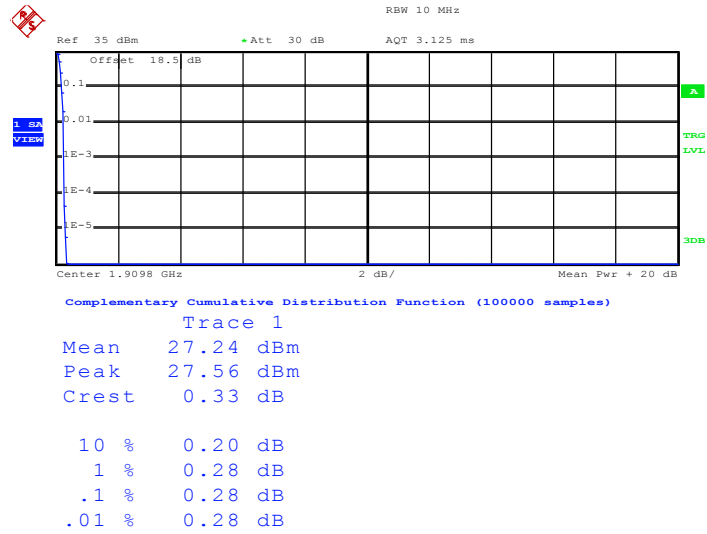
## Peak-to-Average Ratio on Channel 661 (1880.0 MHz)



Date: 3.DEC.2014 19:09:20



Peak-to-Average Ratio on Channel 810 (1909.8 MHz)

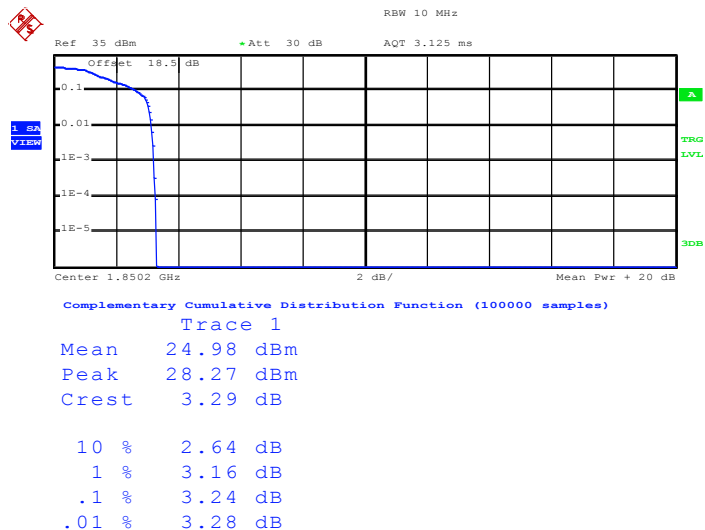


Date: 3.DEC.2014 19:09:46



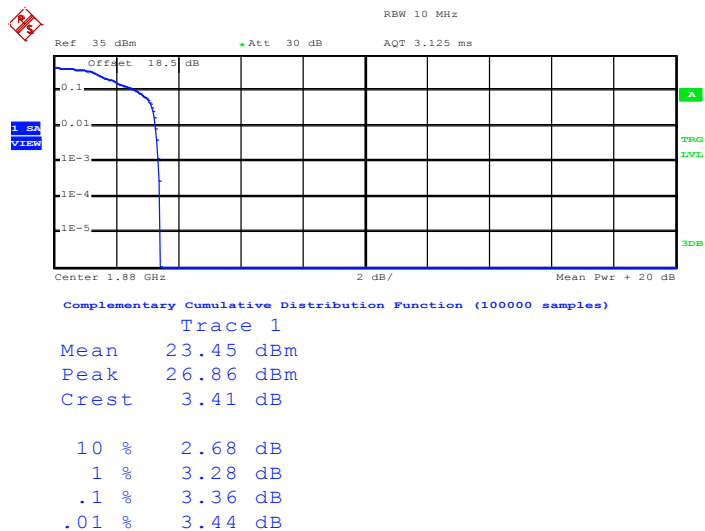
|        |          |             |                          |
|--------|----------|-------------|--------------------------|
| Band : | GSM 1900 | Test Mode : | EDGE class 8 Link (8PSK) |
|--------|----------|-------------|--------------------------|

## Peak-to-Average Ratio on Channel 512 (1850.2 MHz)



Date: 4.DEC.2014 17:01:35

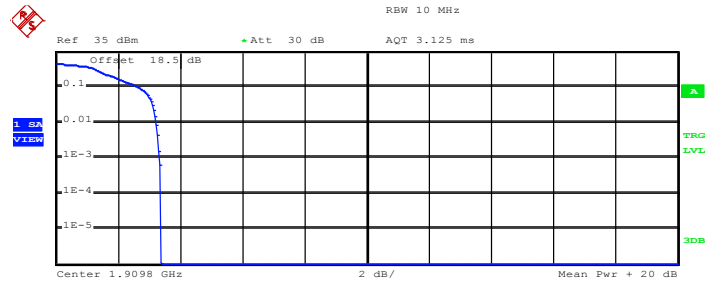
## Peak-to-Average Ratio on Channel 661 (1880.0 MHz)



Date: 3.DEC.2014 19:20:29



Peak-to-Average Ratio on Channel 810 (1909.8 MHz)



Complementary Cumulative Distribution Function (100000 samples)

Trace 1  
Mean 23.19 dBm  
Peak 26.58 dBm  
Crest 3.38 dB

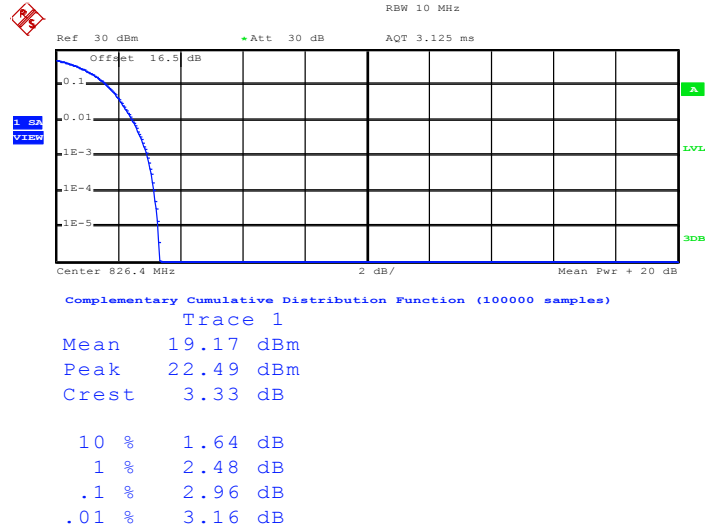
|       |         |
|-------|---------|
| 10 %  | 2.68 dB |
| 1 %   | 3.24 dB |
| .1 %  | 3.36 dB |
| .01 % | 3.40 dB |

Date: 3.DEC.2014 19:20:58



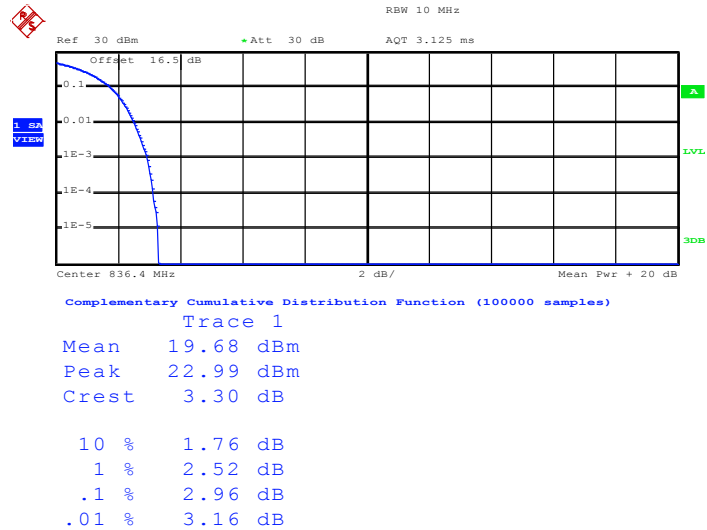
|        |              |             |                          |
|--------|--------------|-------------|--------------------------|
| Band : | WCDMA Band V | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|--------------|-------------|--------------------------|

Peak-to-Average Ratio on Channel 4132 (826.4 MHz)



Date: 3.DEC.2014 19:35:11

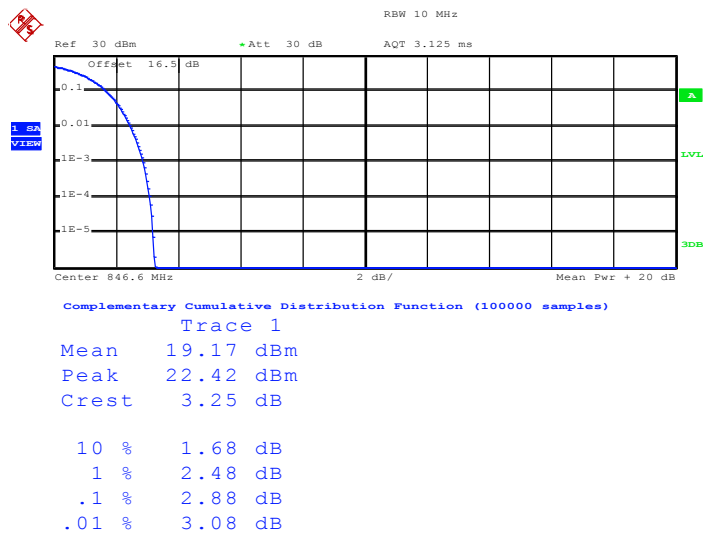
Peak-to-Average Ratio on Channel 4182 (836.4 MHz)



Date: 3.DEC.2014 19:35:21



Peak-to-Average Ratio on Channel 4233 (846.6 MHz)

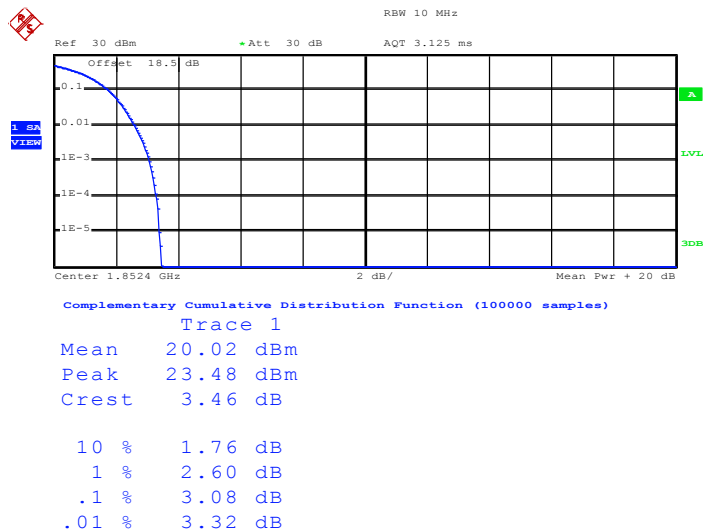


Date: 3.DEC.2014 19:35:32



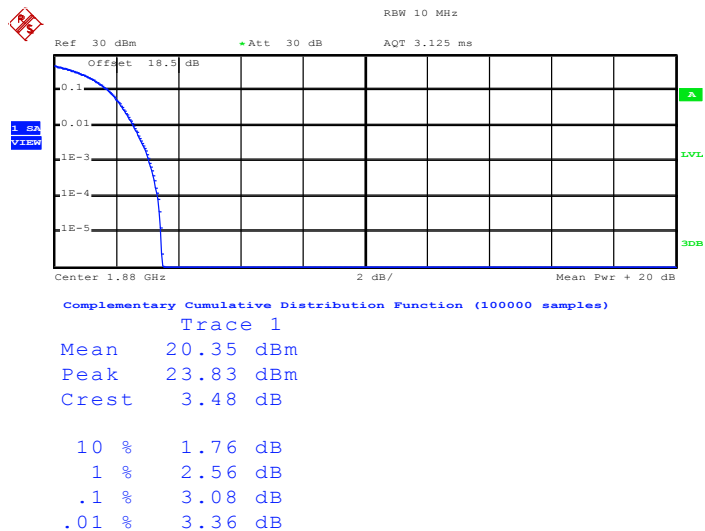
|        |               |             |                          |
|--------|---------------|-------------|--------------------------|
| Band : | WCDMA Band II | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|---------------|-------------|--------------------------|

## Peak-to-Average Ratio on Channel 9262 (1852.4 MHz)



Date: 3.DEC.2014 19:28:23

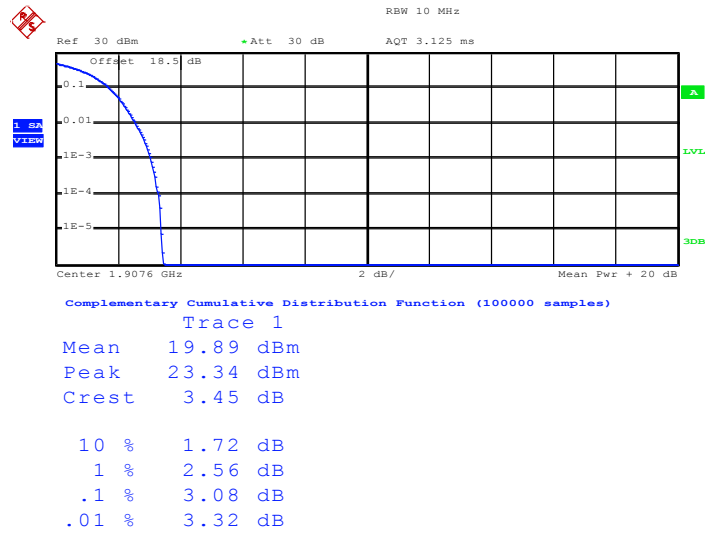
## Peak-to-Average Ratio on Channel 9400 (1880.0 MHz)



Date: 3.DEC.2014 19:28:32



Peak-to-Average Ratio on Channel 9538 (1907.6 MHz)



Date: 3.DEC.2014 19:28:42



### **3.3 Effective Radiated Power and Effective Isotropic Radiated Power Measurement**

#### **3.3.1 Description of the ERP/EIRP Measurement**

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

#### **3.3.2 Measuring Instruments**

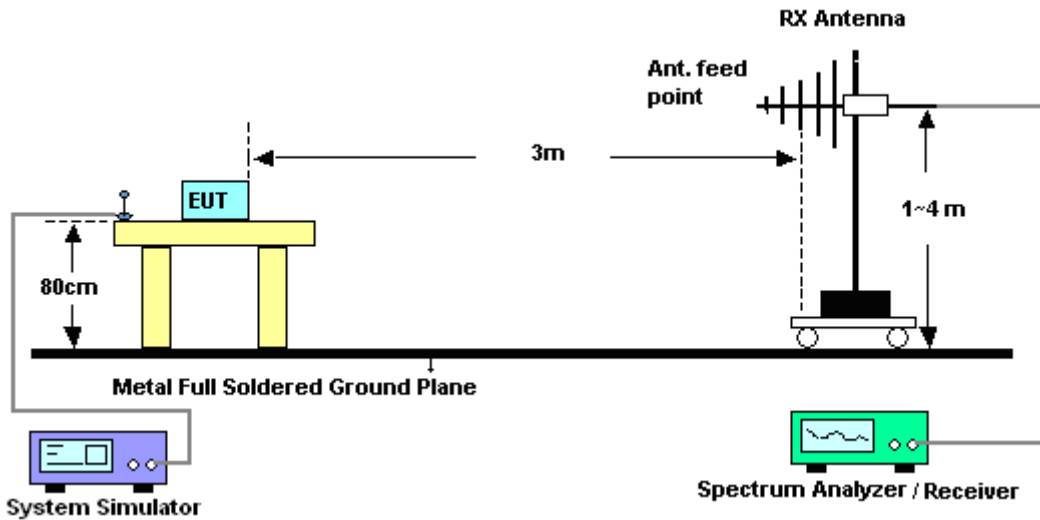
The measuring equipment is listed in the section 4 of this test report.

#### **3.3.3 Test Procedures**

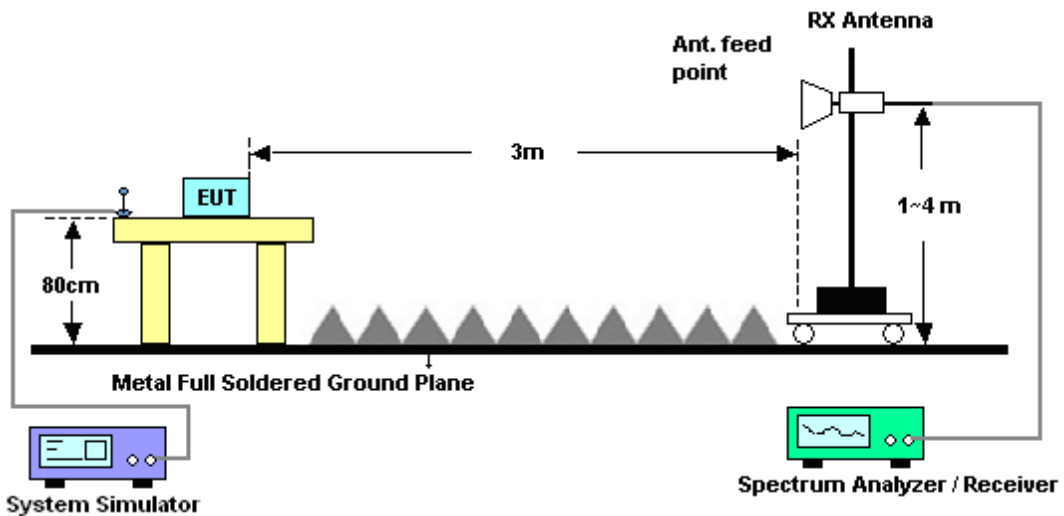
1. The testing follows FCC KDB 971168 v02r02 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-C-2004 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental 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  $ERP = EIRP - 2.15$ .

### 3.3.4 Test Setup

For ERP



For EIRP





## 3.3.5 Test Result of ERP

| GSM850 (GSM) Radiated Power ERP |              |                           |              |            |
|---------------------------------|--------------|---------------------------|--------------|------------|
| Horizontal Polarization         |              |                           |              |            |
| Frequency<br>(MHz)              | LVL<br>(dBm) | Correction Factor<br>(dB) | ERP<br>(dBm) | ERP<br>(W) |
| 824.2                           | -6.91        | 31.54                     | 22.48        | 0.1770     |
| 836.4                           | -9.41        | 32.04                     | 20.48        | 0.1117     |
| 848.8                           | -11.54       | 32.59                     | 18.90        | 0.0776     |
| Vertical Polarization           |              |                           |              |            |
| Frequency<br>(MHz)              | LVL<br>(dBm) | Correction Factor<br>(dB) | ERP<br>(dBm) | ERP<br>(W) |
| 824.2                           | -1.58        | 32.93                     | 29.20        | 0.8318     |
| 836.4                           | -1.43        | 32.82                     | 29.24        | 0.8395     |
| 848.8                           | -2.11        | 33.62                     | 29.36        | 0.8630     |

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

| GSM850 (EDGE class 8) Radiated Power ERP |              |                           |              |            |
|------------------------------------------|--------------|---------------------------|--------------|------------|
| Horizontal Polarization                  |              |                           |              |            |
| Frequency<br>(MHz)                       | LVL<br>(dBm) | Correction Factor<br>(dB) | ERP<br>(dBm) | ERP<br>(W) |
| 824.2                                    | -15.11       | 31.54                     | 14.28        | 0.0268     |
| 836.4                                    | -18.23       | 32.04                     | 11.66        | 0.0147     |
| 848.8                                    | -18.02       | 32.59                     | 12.42        | 0.0175     |
| Vertical Polarization                    |              |                           |              |            |
| Frequency<br>(MHz)                       | LVL<br>(dBm) | Correction Factor<br>(dB) | ERP<br>(dBm) | ERP<br>(W) |
| 824.2                                    | -9.45        | 32.93                     | 21.33        | 0.1358     |
| 836.4                                    | -9.66        | 32.82                     | 21.01        | 0.1262     |
| 848.8                                    | -10.07       | 33.62                     | 21.40        | 0.1380     |

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



| WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP |              |                           |              |            |
|------------------------------------------------|--------------|---------------------------|--------------|------------|
| Horizontal Polarization                        |              |                           |              |            |
| Frequency<br>(MHz)                             | LVL<br>(dBm) | Correction Factor<br>(dB) | ERP<br>(dBm) | ERP<br>(W) |
| 826.40                                         | -18.65       | 31.44                     | 10.64        | 0.0116     |
| 836.40                                         | -20.03       | 32.04                     | 9.86         | 0.0097     |
| 846.60                                         | -20.72       | 32.63                     | 9.76         | 0.0095     |
| Vertical Polarization                          |              |                           |              |            |
| Frequency<br>(MHz)                             | LVL<br>(dBm) | Correction Factor<br>(dB) | ERP<br>(dBm) | ERP<br>(W) |
| 826.40                                         | -12.99       | 32.78                     | 17.64        | 0.0581     |
| 836.40                                         | -11.84       | 32.82                     | 18.83        | 0.0764     |
| 846.60                                         | -11.64       | 33.4                      | 19.61        | 0.0914     |

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

### 3.3.6 Test Result of EIRP

| <b>GSM1900 (GPRS class 8) Radiated Power EIRP</b> |                      |                                   |                       |                     |
|---------------------------------------------------|----------------------|-----------------------------------|-----------------------|---------------------|
| Horizontal Polarization                           |                      |                                   |                       |                     |
| <b>Frequency<br/>(MHz)</b>                        | <b>LVL<br/>(dBm)</b> | <b>Correction Factor<br/>(dB)</b> | <b>EIRP<br/>(dBm)</b> | <b>EIRP<br/>(W)</b> |
| 1850.2                                            | -17.56               | 45.34                             | 27.78                 | 0.5998              |
| 1880.0                                            | -18.95               | 46.01                             | 27.06                 | 0.5082              |
| 1909.8                                            | -18.51               | 45.81                             | 27.30                 | 0.5370              |
| Vertical Polarization                             |                      |                                   |                       |                     |
| <b>Frequency<br/>(MHz)</b>                        | <b>LVL<br/>(dBm)</b> | <b>Correction Factor<br/>(dB)</b> | <b>EIRP<br/>(dBm)</b> | <b>EIRP<br/>(W)</b> |
| 1850.2                                            | -21.93               | 49.22                             | 27.29                 | 0.5358              |
| 1880.0                                            | -23.06               | 50.42                             | 27.36                 | 0.5445              |
| 1909.8                                            | -21.20               | 49.00                             | 27.80                 | 0.6026              |

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

| <b>GSM1900 (EDGE class 8) Radiated Power EIRP</b> |                      |                                   |                       |                     |
|---------------------------------------------------|----------------------|-----------------------------------|-----------------------|---------------------|
| Horizontal Polarization                           |                      |                                   |                       |                     |
| <b>Frequency<br/>(MHz)</b>                        | <b>LVL<br/>(dBm)</b> | <b>Correction Factor<br/>(dB)</b> | <b>EIRP<br/>(dBm)</b> | <b>EIRP<br/>(W)</b> |
| 1850.2                                            | -22.70               | 45.34                             | 22.64                 | 0.1837              |
| 1880.0                                            | -23.94               | 46.01                             | 22.07                 | 0.1611              |
| 1909.8                                            | -24.16               | 45.81                             | 21.65                 | 0.1462              |
| Vertical Polarization                             |                      |                                   |                       |                     |
| <b>Frequency<br/>(MHz)</b>                        | <b>LVL<br/>(dBm)</b> | <b>Correction Factor<br/>(dB)</b> | <b>EIRP<br/>(dBm)</b> | <b>EIRP<br/>(W)</b> |
| 1850.2                                            | -25.56               | 49.22                             | 23.66                 | 0.2323              |
| 1880.0                                            | -27.87               | 50.42                             | 22.55                 | 0.1799              |
| 1909.8                                            | -26.14               | 49.00                             | 22.86                 | 0.1932              |

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



| WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP |              |                           |               |             |
|--------------------------------------------------|--------------|---------------------------|---------------|-------------|
| Horizontal Polarization                          |              |                           |               |             |
| Frequency<br>(MHz)                               | LVL<br>(dBm) | Correction Factor<br>(dB) | EIRP<br>(dBm) | EIRP<br>(W) |
| 1852.40                                          | -23.47       | 45.37                     | 21.90         | 0.1549      |
| 1880.00                                          | -24.16       | 46.01                     | 21.85         | 0.1531      |
| 1907.60                                          | -24.58       | 45.87                     | 21.29         | 0.1346      |
| Vertical Polarization                            |              |                           |               |             |
| Frequency<br>(MHz)                               | LVL<br>(dBm) | Correction Factor<br>(dB) | EIRP<br>(dBm) | EIRP<br>(W) |
| 1852.40                                          | -26.52       | 49.23                     | 22.71         | 0.1866      |
| 1880.00                                          | -27.76       | 50.42                     | 22.66         | 0.1845      |
| 1907.60                                          | -26.65       | 49.04                     | 22.39         | 0.1734      |

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

### 3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 3.4.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

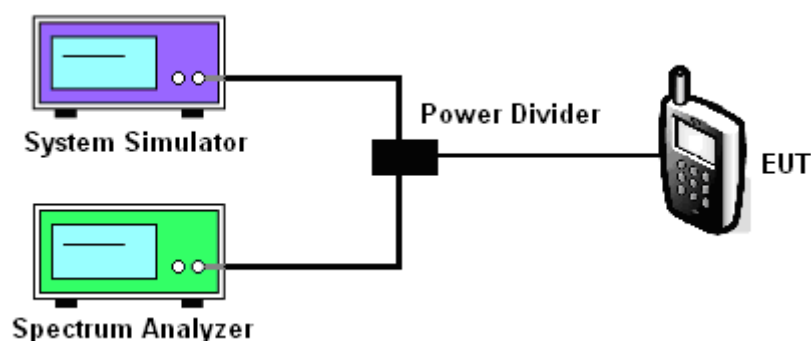
#### 3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.4.3 Test Procedures

5. The testing follows FCC KDB 971168 v02r02 Section 4.2.
6. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
7. 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.
8. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3\*RBW, sample detector, trace maximum hold.
9. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3\*RBW, peak detector, trace maximum hold.

#### 3.4.4 Test Setup





## 3.4.5 Test Result of Occupied Bandwidth and 26dB Bandwidth

| Cellular Band   |              |              |               |                       |              |               |
|-----------------|--------------|--------------|---------------|-----------------------|--------------|---------------|
| Modes           | GSM850 (GSM) |              |               | GSM850 (EDGE class 8) |              |               |
| Channel         | 128<br>(Low) | 189<br>(Mid) | 251<br>(High) | 128<br>(Low)          | 189<br>(Mid) | 251<br>(High) |
| Frequency (MHz) | 824.2        | 836.4        | 848.8         | 824.2                 | 836.4        | 848.8         |
| 99% OBW (kHz)   | 250.00       | 248.00       | 248.00        | 242.00                | 244.00       | 242.00        |
| 26dB BW (kHz)   | 314.00       | 314.00       | 312.00        | 312.00                | 308.00       | 302.00        |

| PCS Band        |                        |              |               |                        |              |               |
|-----------------|------------------------|--------------|---------------|------------------------|--------------|---------------|
| Modes           | GSM1900 (GPRS class 8) |              |               | GSM1900 (EDGE class 8) |              |               |
| Channel         | 512<br>(Low)           | 661<br>(Mid) | 810<br>(High) | 512<br>(Low)           | 661<br>(Mid) | 810<br>(High) |
| Frequency (MHz) | 1850.2                 | 1880         | 1909.8        | 1850.2                 | 1880         | 1909.8        |
| 99% OBW (kHz)   | 241.00                 | 242.00       | 241.00        | 245.00                 | 243.00       | 238.00        |
| 26dB BW (kHz)   | 310.00                 | 316.00       | 311.00        | 311.00                 | 289.00       | 286.00        |

| Cellular Band   |                             |            |             |
|-----------------|-----------------------------|------------|-------------|
| Modes           | WCDMA Band V (RMC 12.2Kbps) |            |             |
| Channel         | 4132 (Low)                  | 4182 (Mid) | 4233 (High) |
| Frequency (MHz) | 826.4                       | 836.4      | 846.6       |
| 99% OBW (MHz)   | 4.14                        | 4.18       | 4.19        |
| 26dB BW (MHz)   | 4.72                        | 4.75       | 4.75        |

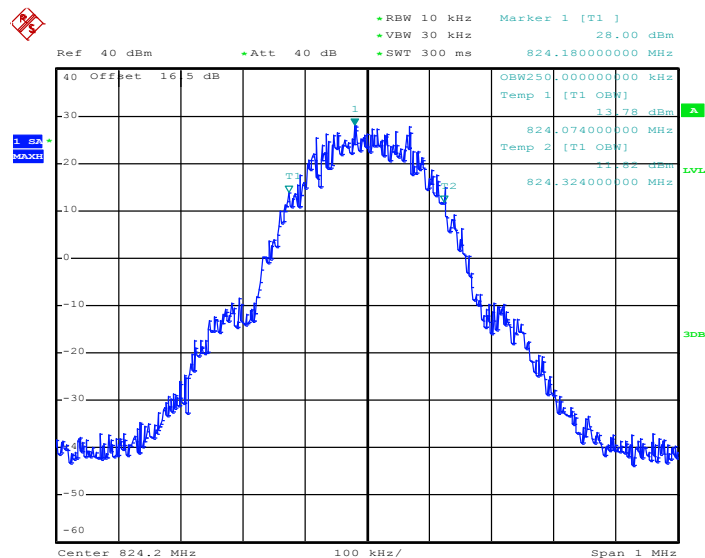
| PCS Band        |                              |            |             |
|-----------------|------------------------------|------------|-------------|
| Modes           | WCDMA Band II (RMC 12.2Kbps) |            |             |
| Channel         | 9262 (Low)                   | 9400 (Mid) | 9538 (High) |
| Frequency (MHz) | 1852.4                       | 1880       | 1907.6      |
| 99% OBW (MHz)   | 4.17                         | 4.18       | 4.16        |
| 26dB BW (MHz)   | 4.75                         | 4.73       | 4.72        |



## 3.4.6 Test Result (Plots) of Occupied Bandwidth and 26dB Bandwidth

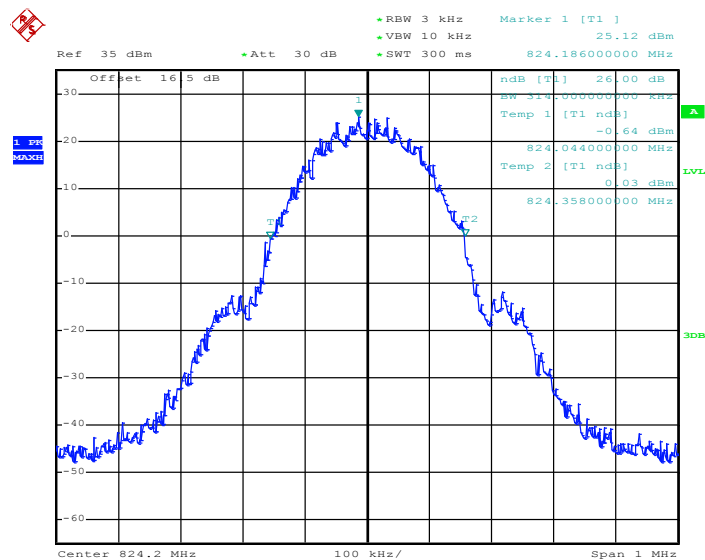
|        |         |             |                 |
|--------|---------|-------------|-----------------|
| Band : | GSM 850 | Test Mode : | GSM Link (GMSK) |
|--------|---------|-------------|-----------------|

## 99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 23.NOV.2014 17:43:31

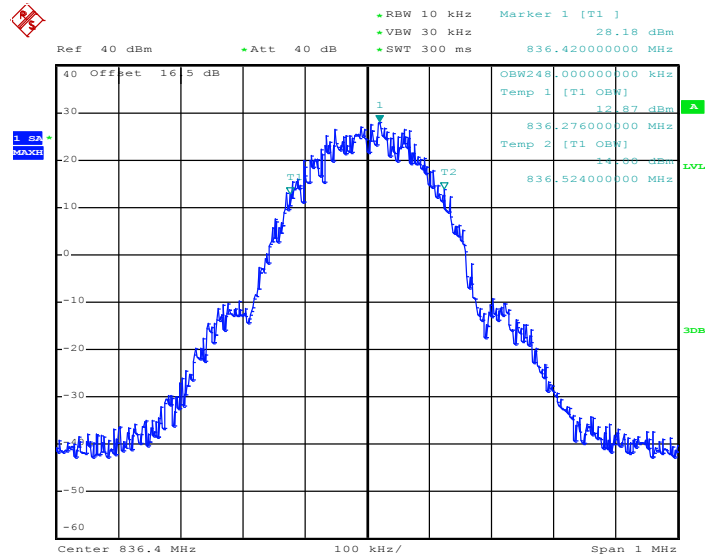
## 26dB Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 23.NOV.2014 17:40:57

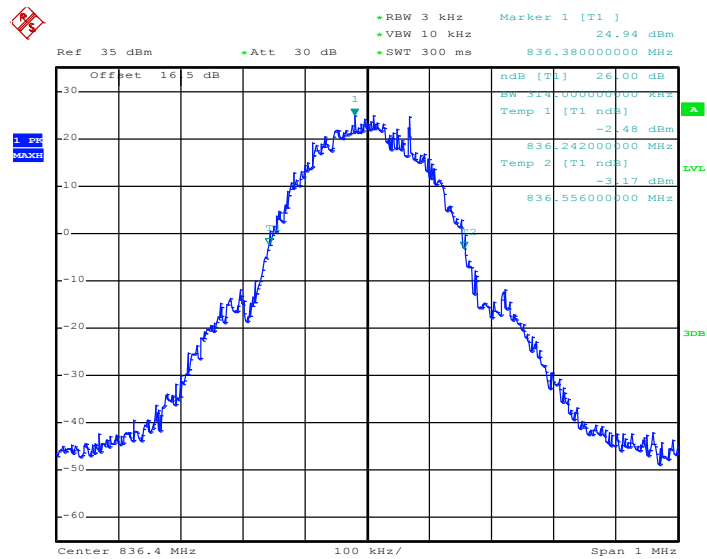


99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 23.NOV.2014 17:44:06

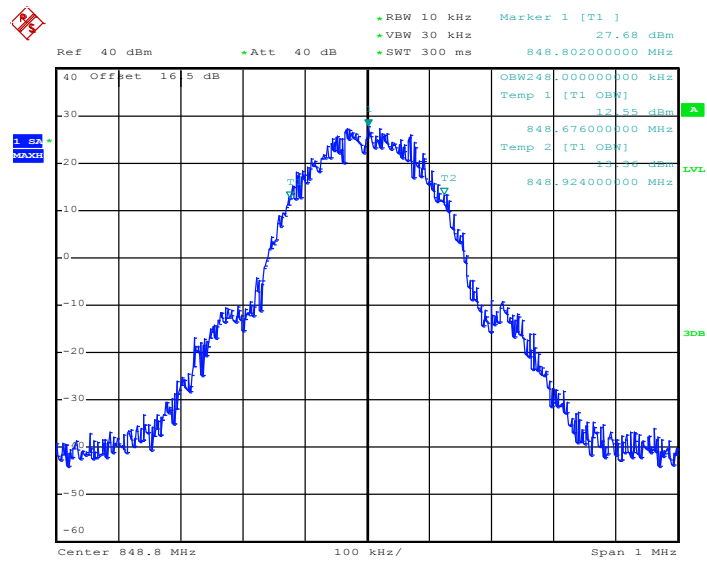
26dB Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 23.NOV.2014 17:41:33

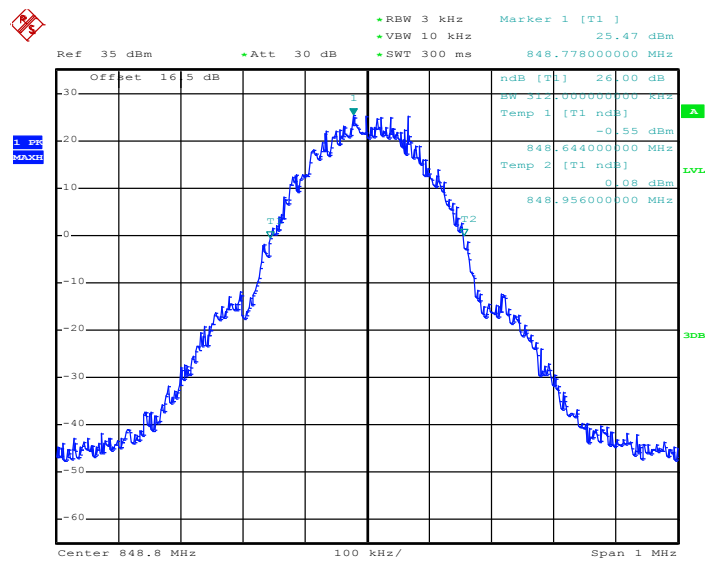


### 99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 23.NOV.2014 17:46:55

### 26dB Bandwidth Plot on Channel 251 (848.8 MHz)

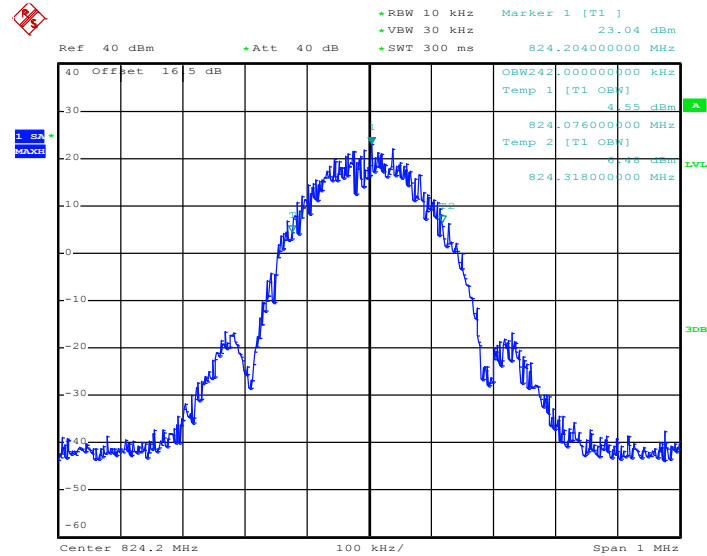


Date: 23.NOV.2014 17:42:06



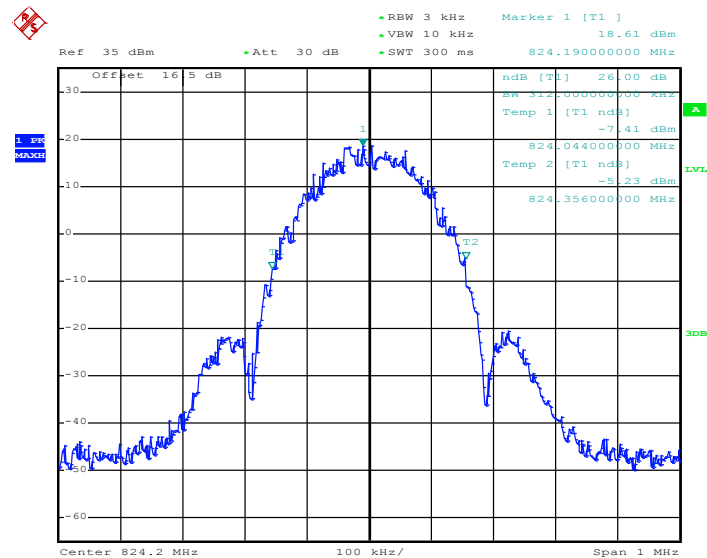
|        |         |             |                          |
|--------|---------|-------------|--------------------------|
| Band : | GSM 850 | Test Mode : | EDGE class 8 Link (8PSK) |
|--------|---------|-------------|--------------------------|

## 99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 24.NOV.2014 18:56:36

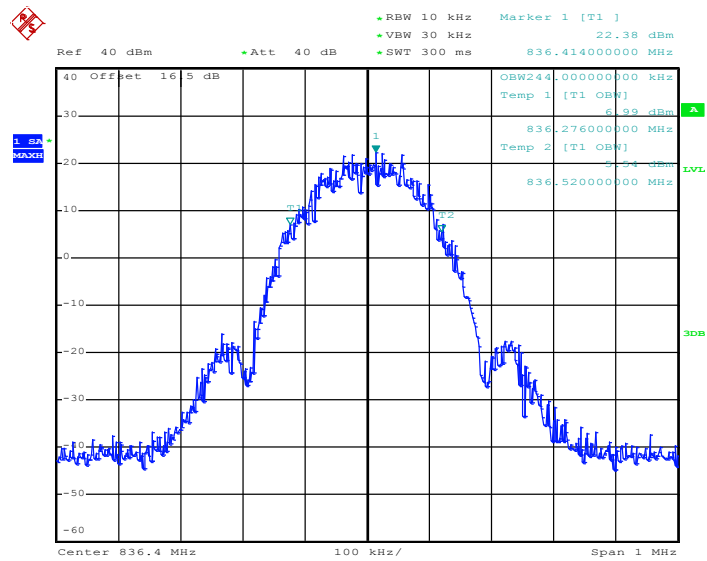
## 26dB Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 24.NOV.2014 18:54:38

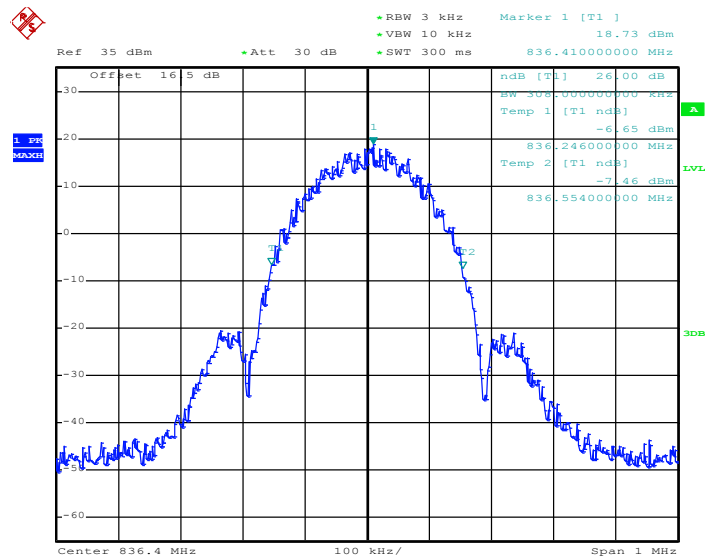


### 99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 24.NOV.2014 18:57:07

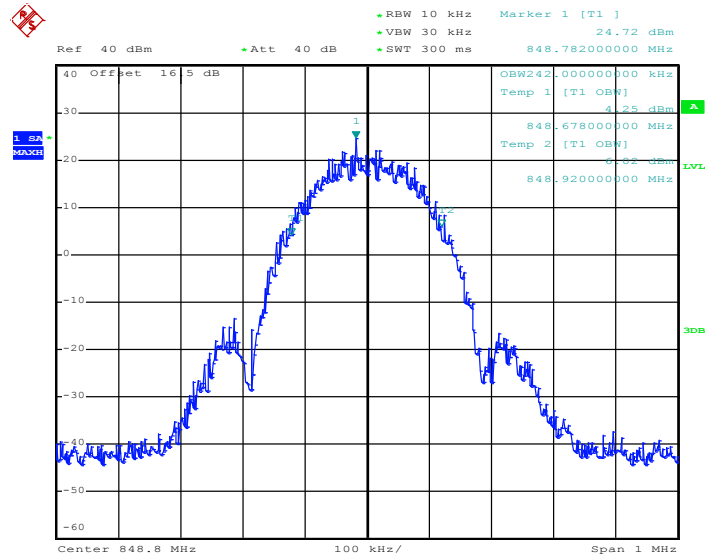
### 26dB Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 24.NOV.2014 18:55:14

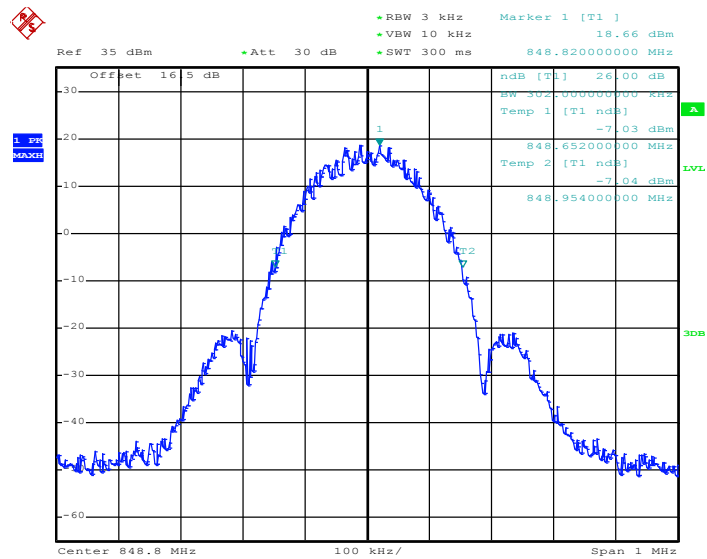


### 99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 24.NOV.2014 18:57:43

### 26dB Bandwidth Plot on Channel 251 (848.8 MHz)

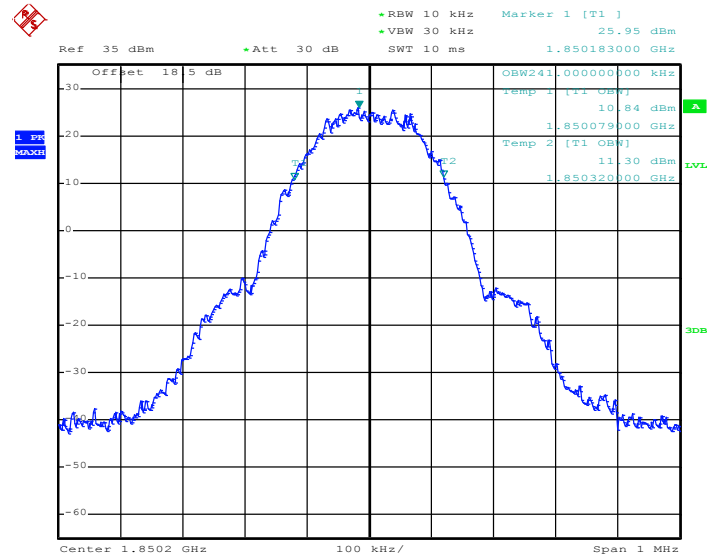


Date: 24.NOV.2014 18:55:54



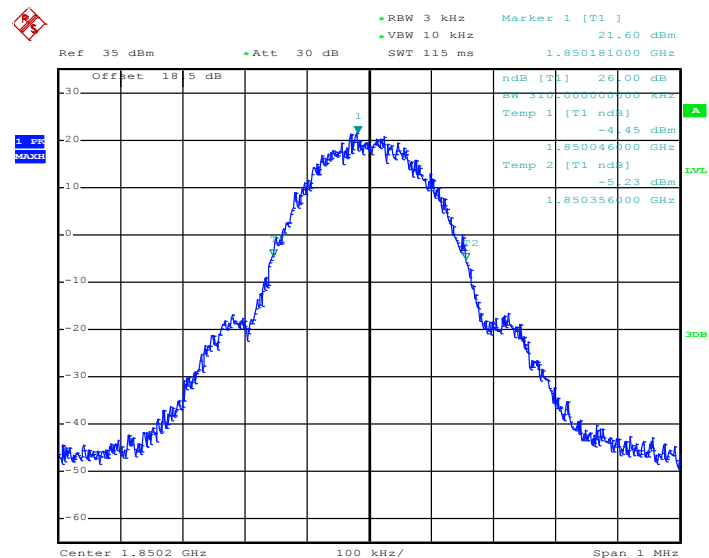
|        |          |             |                          |
|--------|----------|-------------|--------------------------|
| Band : | GSM 1900 | Test Mode : | GPRS class 8 Link (GMSK) |
|--------|----------|-------------|--------------------------|

99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)



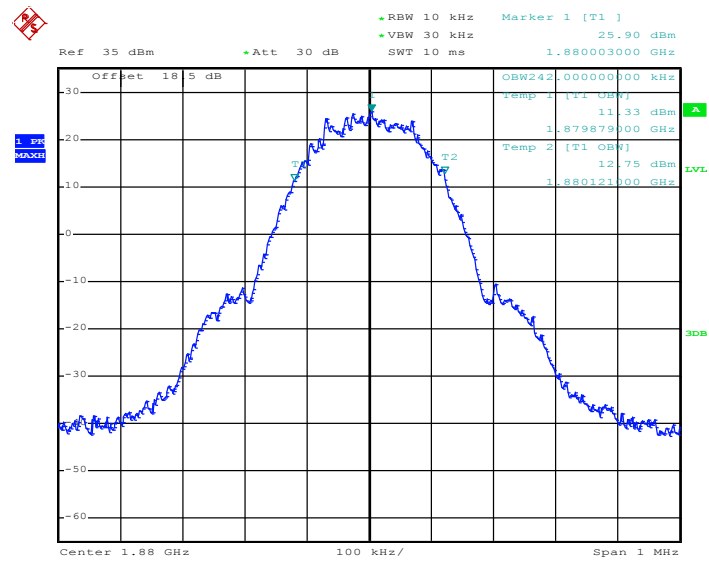
Date: 3.DEC.2014 19:05:42

26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



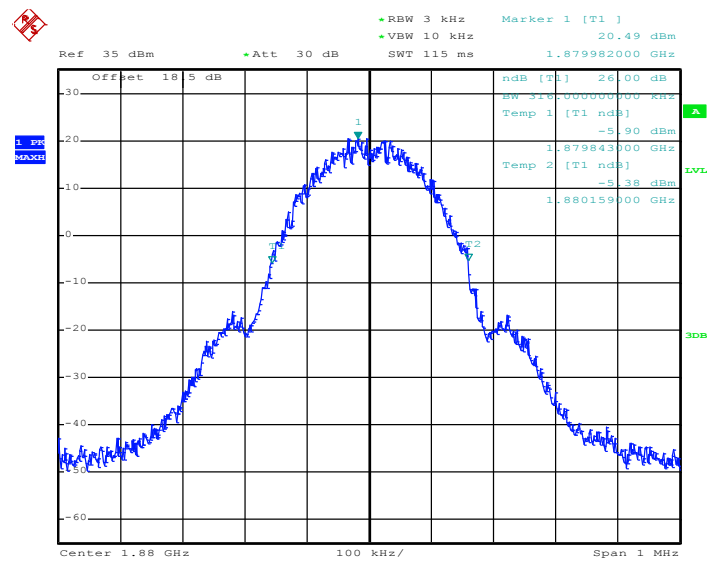
Date: 3.DEC.2014 19:02:56

### 99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)



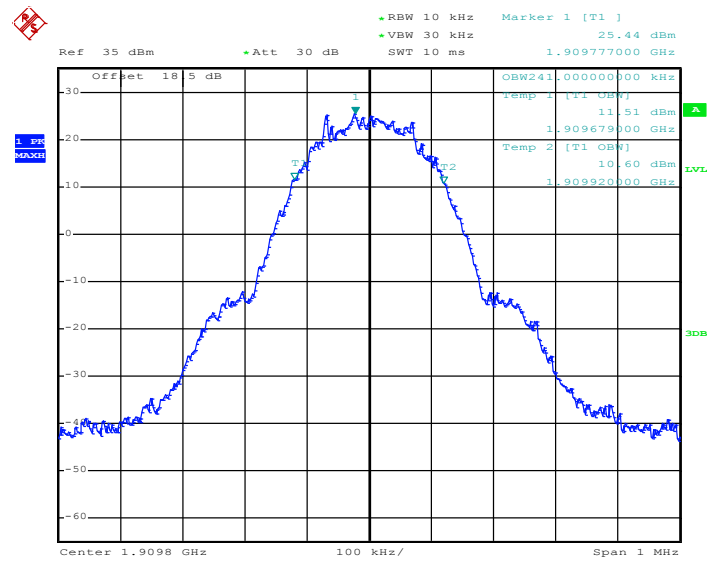
Date: 3.DEC.2014 19:06:10

### 26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



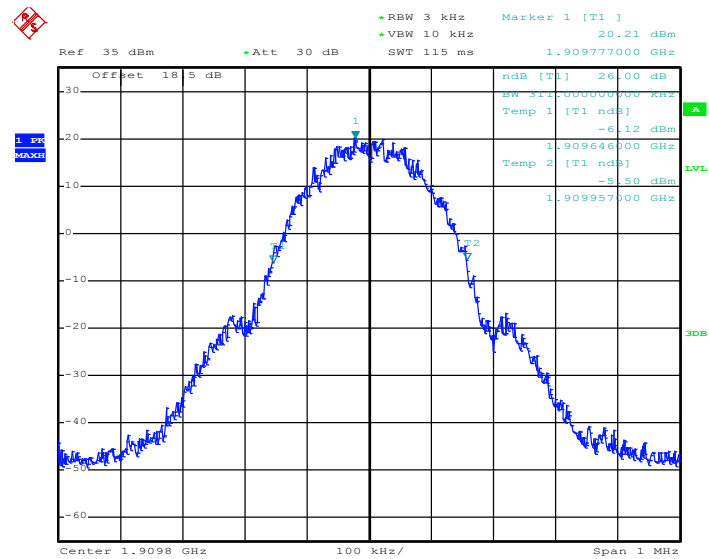
Date: 3.DEC.2014 19:03:24

### 99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 3.DEC.2014 19:06:38

### 26dB Bandwidth Plot on Channel 810 (1909.8 MHz)

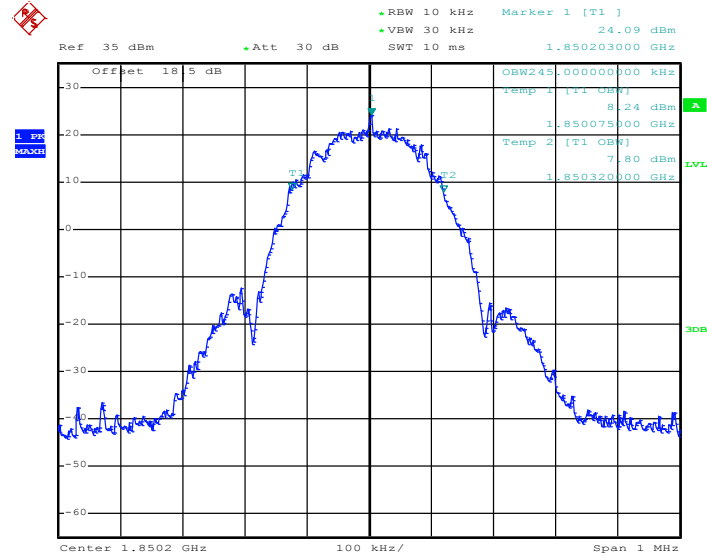


Date: 3.DEC.2014 19:03:53



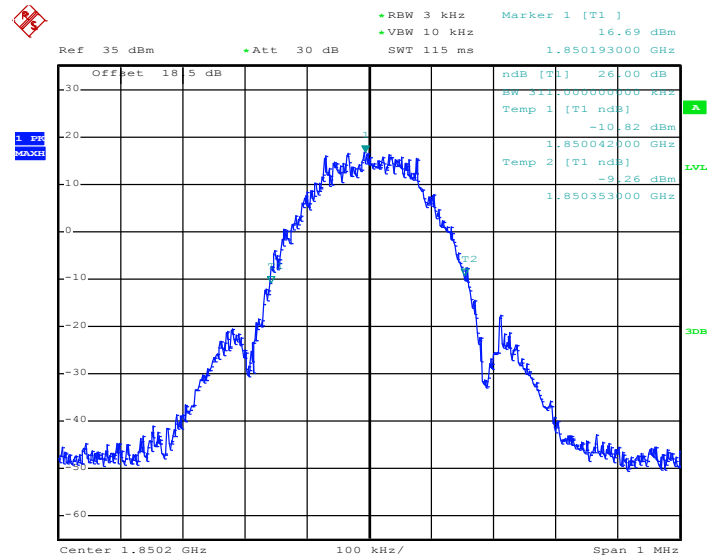
|        |          |             |                          |
|--------|----------|-------------|--------------------------|
| Band : | GSM 1900 | Test Mode : | EDGE class 8 Link (8PSK) |
|--------|----------|-------------|--------------------------|

## 99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 3.DEC.2014 19:15:29

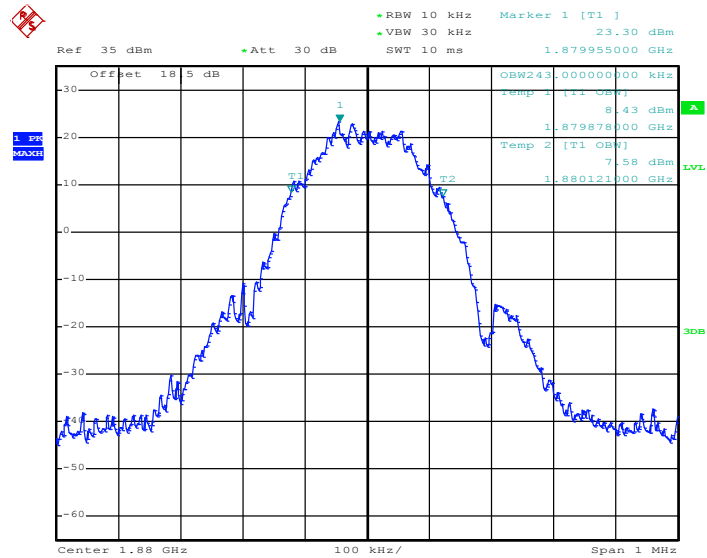
## 26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 3.DEC.2014 19:13:52

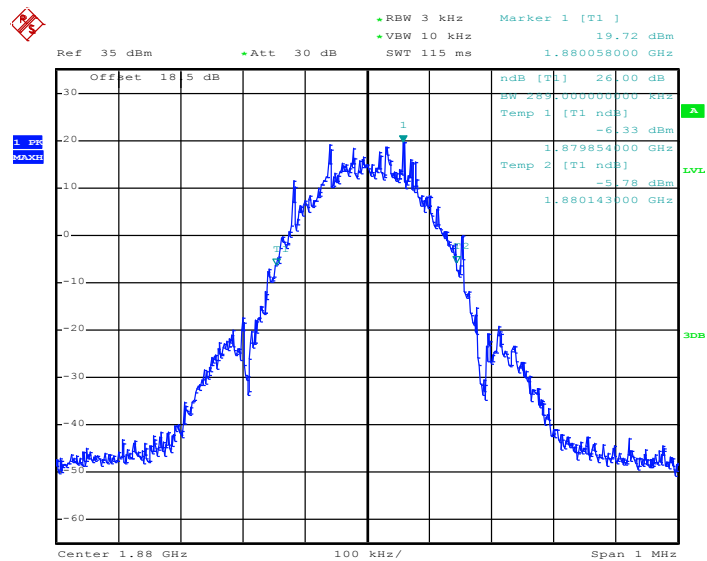


## 99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 3.DEC.2014 19:15:57

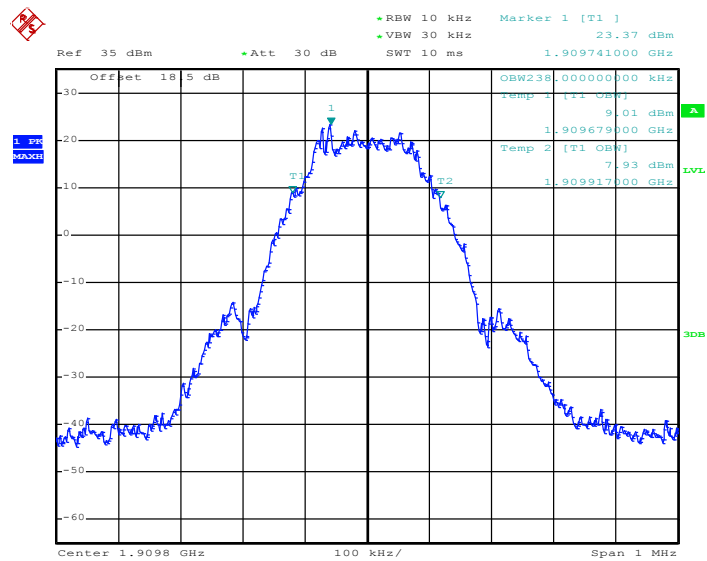
## 26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 3.DEC.2014 19:14:20

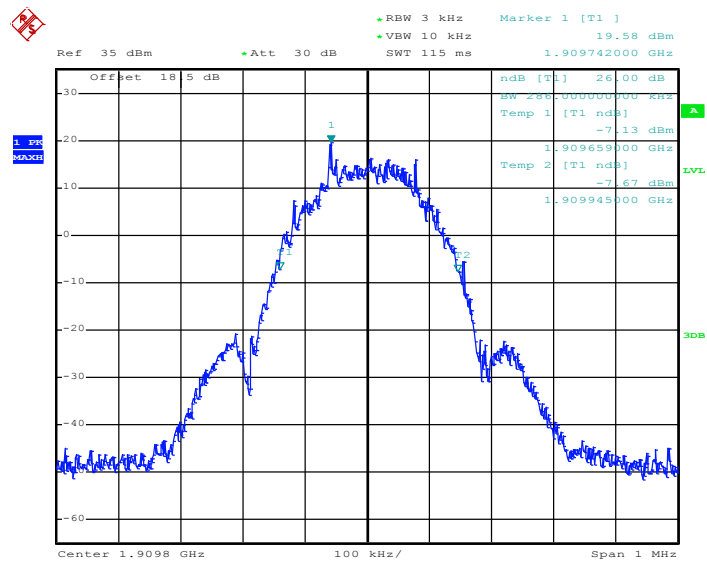


### 99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 3.DEC.2014 19:16:25

### 26dB Bandwidth Plot on Channel 810 (1909.8 MHz)

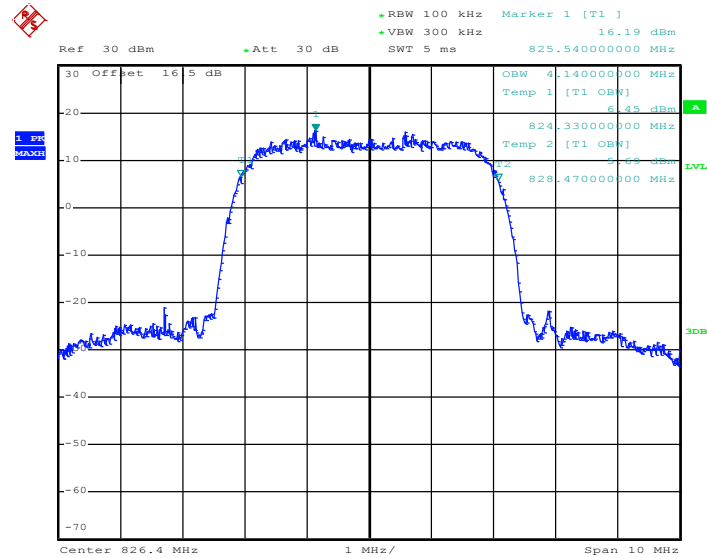


Date: 3.DEC.2014 19:14:48



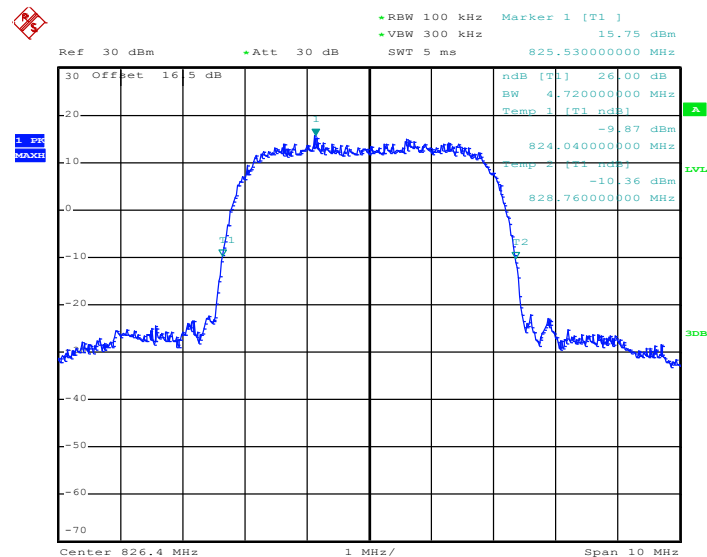
|        |              |             |                          |
|--------|--------------|-------------|--------------------------|
| Band : | WCDMA Band V | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|--------------|-------------|--------------------------|

## 99% Occupied Bandwidth Plot on Channel 4132 (826.4 MHz)



Date: 3.DEC.2014 19:33:10

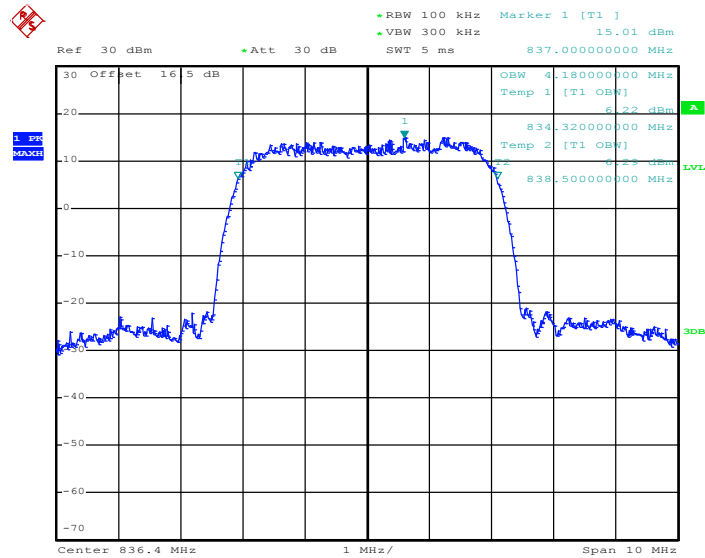
## 26dB Bandwidth Plot on Channel 4132 (826.4 MHz)



Date: 3.DEC.2014 19:30:53

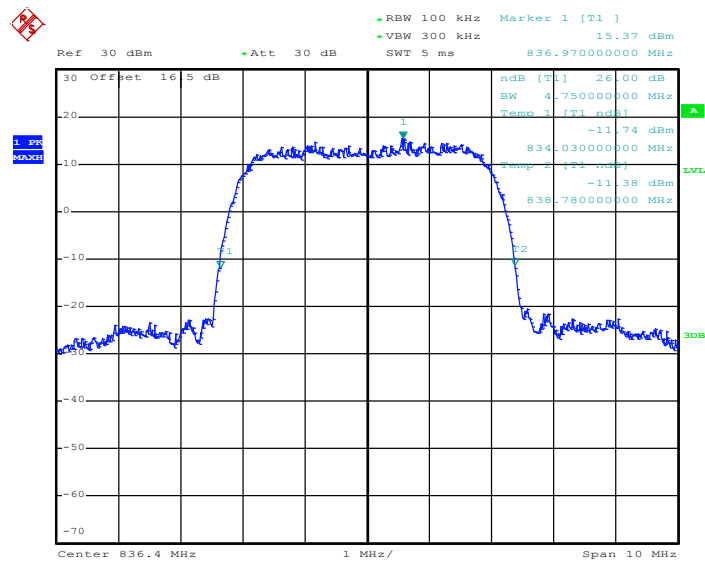


## 99% Occupied Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 3.DEC.2014 19:33:38

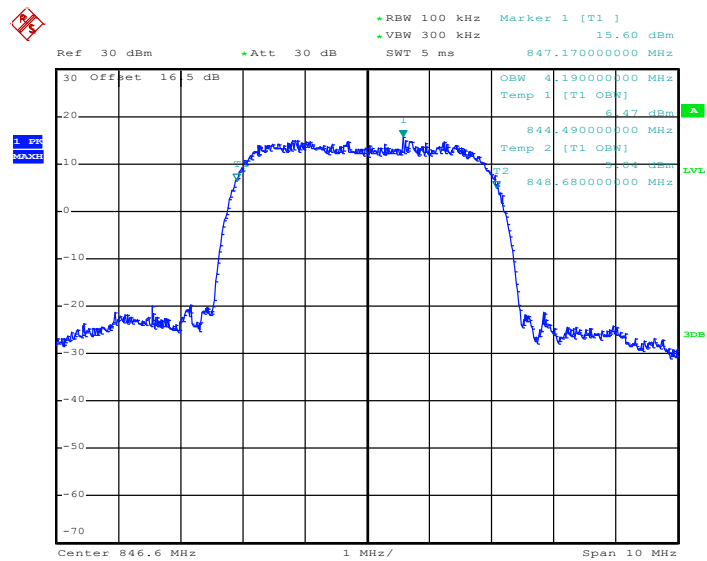
## 26dB Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 3.DEC.2014 19:31:21

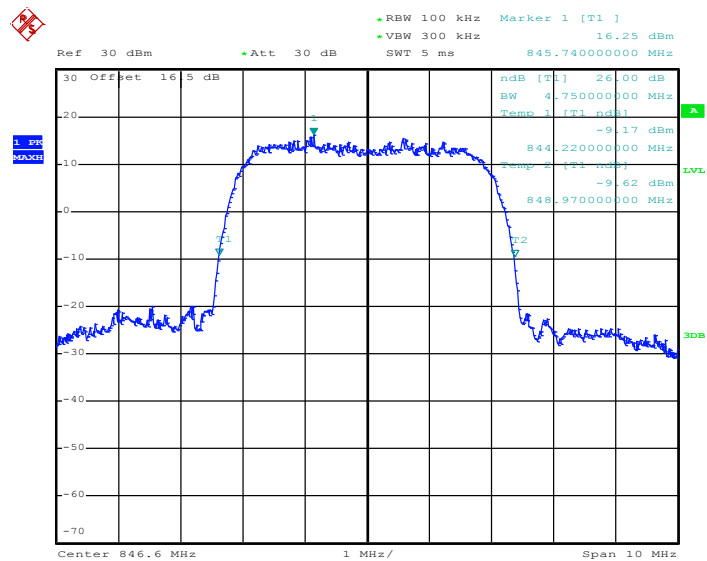


### 99% Occupied Bandwidth Plot on Channel 4233 (846.6 MHz)



Date: 3.DEC.2014 19:34:06

### 26dB Bandwidth Plot on Channel 4233 (846.6 MHz)

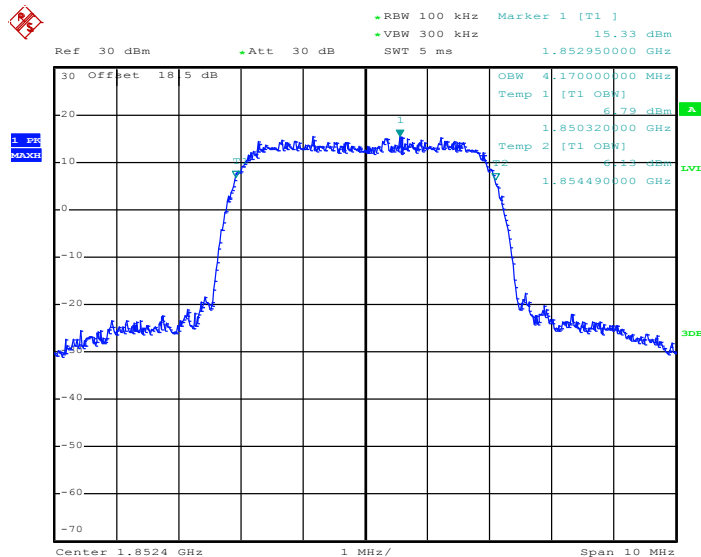


Date: 3.DEC.2014 19:31:48



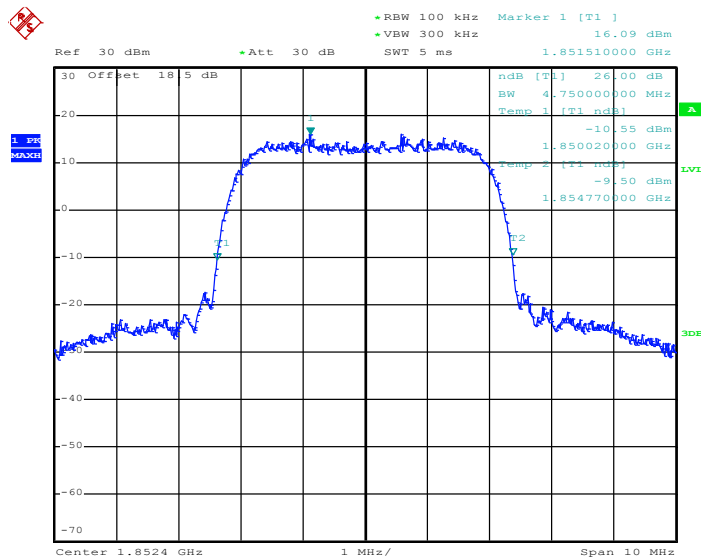
|        |               |             |                          |
|--------|---------------|-------------|--------------------------|
| Band : | WCDMA Band II | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|---------------|-------------|--------------------------|

## 99% Occupied Bandwidth Plot on Channel 9262 (1852.4 MHz)



Date: 3.DEC.2014 19:25:06

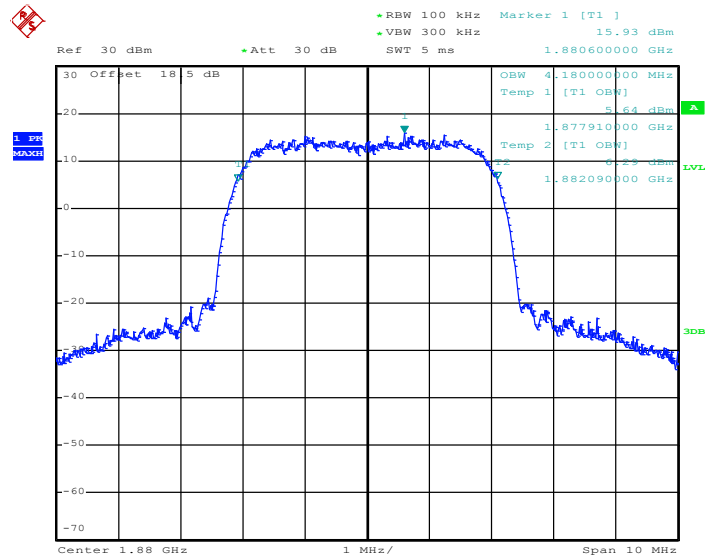
## 26dB Bandwidth Plot on Channel 9262 (1852.4 MHz)



Date: 3.DEC.2014 19:23:32

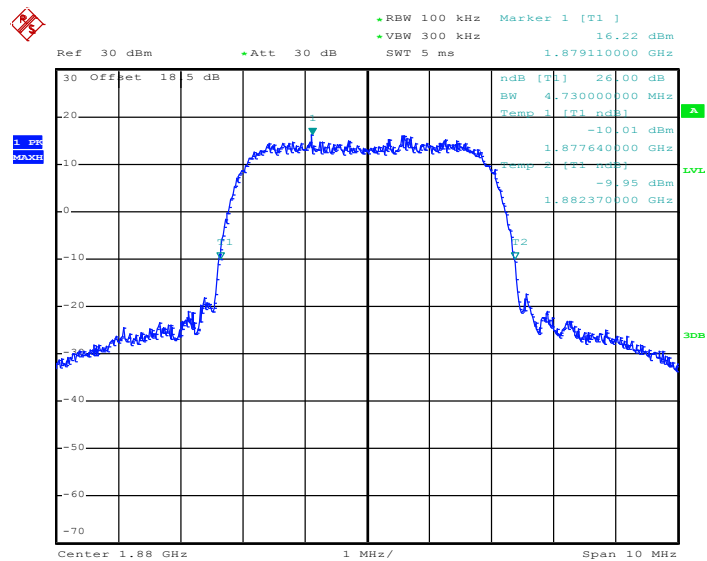


## 99% Occupied Bandwidth Plot on Channel 9400 (1880.0 MHz)



Date: 3.DEC.2014 19:25:34

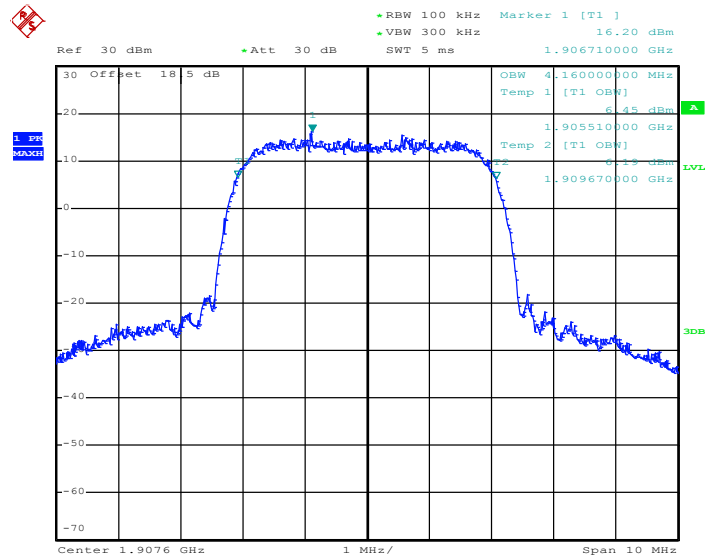
## 26dB Bandwidth Plot on Channel 9400 (1880.0 MHz)



Date: 3.DEC.2014 19:24:00

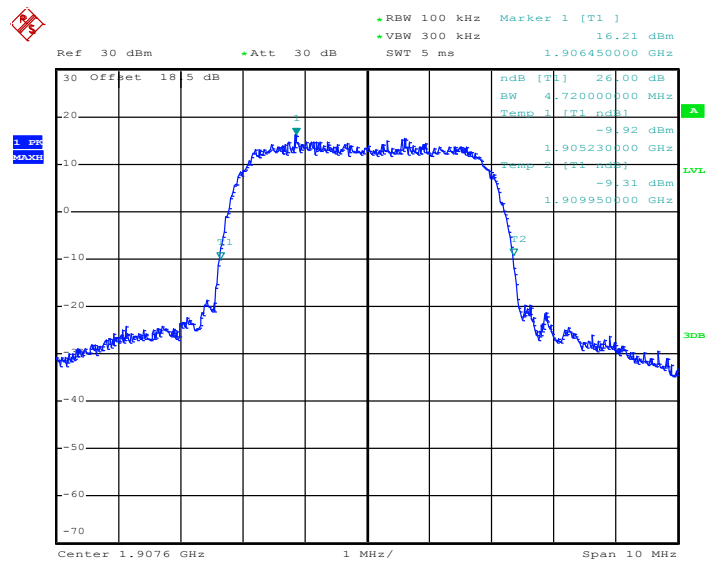


### 99% Occupied Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 3.DEC.2014 19:26:02

### 26dB Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 3.DEC.2014 19:24:28

### 3.5 Band Edge Measurement

#### 3.5.1 Description of Band Edge Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

#### 3.5.2 Measuring Instruments

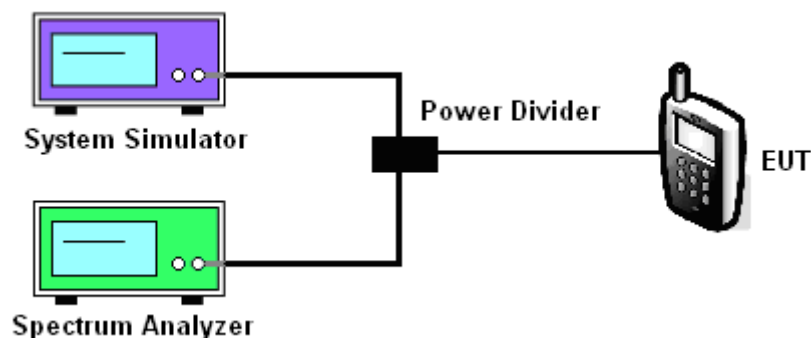
The measuring equipment is listed in the section 4 of this test report.

#### 3.5.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
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.
4. The band edges of low and high channels for the highest RF powers were measured.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$   
 $= -13\text{dBm}.$

#### 3.5.4 Test Setup

<Conducted Band Edge >

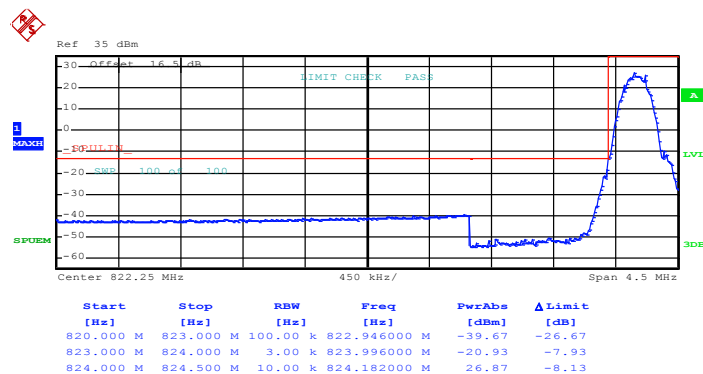




## 3.5.5 Test Result (Plots) of Conducted Band Edge

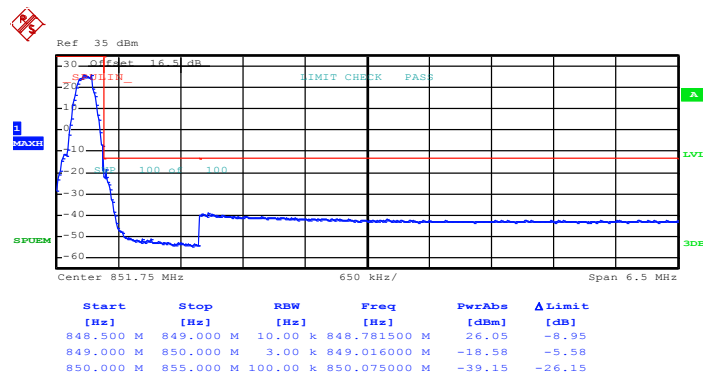
|        |        |             |                 |
|--------|--------|-------------|-----------------|
| Band : | GSM850 | Test Mode : | GSM Link (GMSK) |
|--------|--------|-------------|-----------------|

Lower Band Edge Plot on Channel 128 (824.2 MHz)



Date: 23.NOV.2014 17:15:00

Higher Band Edge Plot on Channel 251 (848.8 MHz)

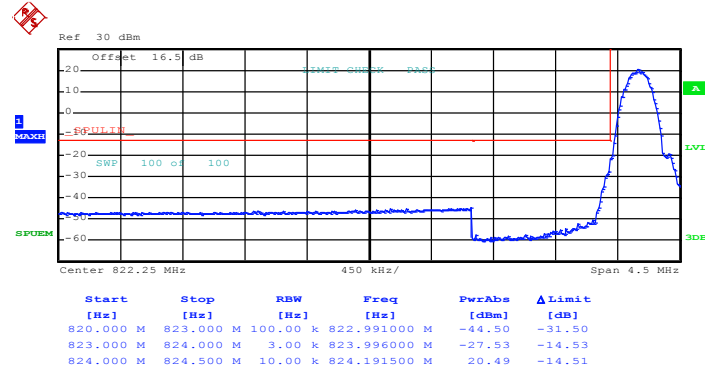


Date: 23.NOV.2014 17:03:06



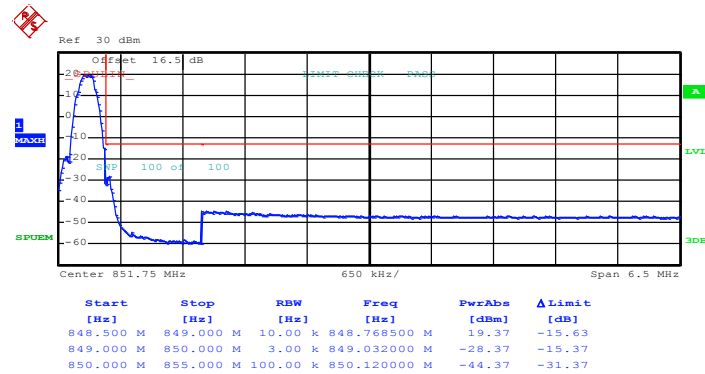
|        |        |             |                          |
|--------|--------|-------------|--------------------------|
| Band : | GSM850 | Test Mode : | EDGE class 8 Link (8PSK) |
|--------|--------|-------------|--------------------------|

Lower Band Edge Plot on Channel 128 (824.2 MHz)



Date: 24.NOV.2014 19:09:49

Higher Band Edge Plot on Channel 251 (848.8 MHz)



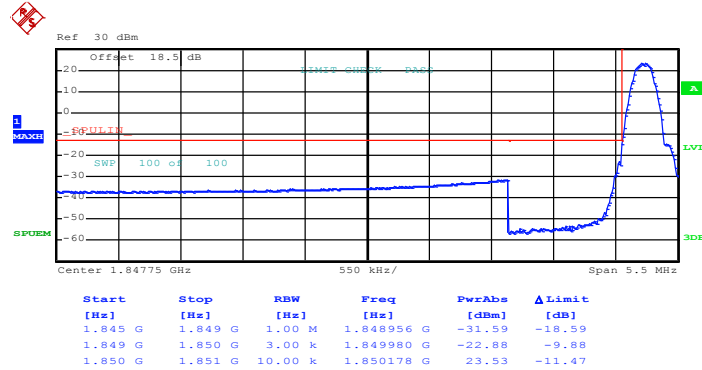
Date: 24.NOV.2014 19:05:57



Band : GSM1900

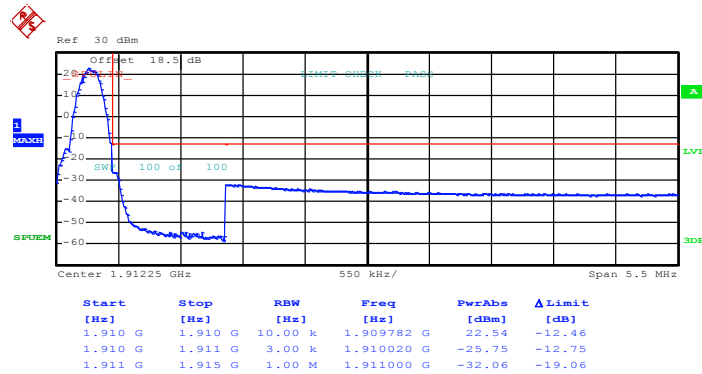
Test Mode : GPRS class 8 Link (GMSK)

## Lower Band Edge Plot on Channel 512 (1850.2 MHz)



Date: 4.DEC.2014 10:11:24

## Higher Band Edge Plot on Channel 810 (1909.8 MHz)



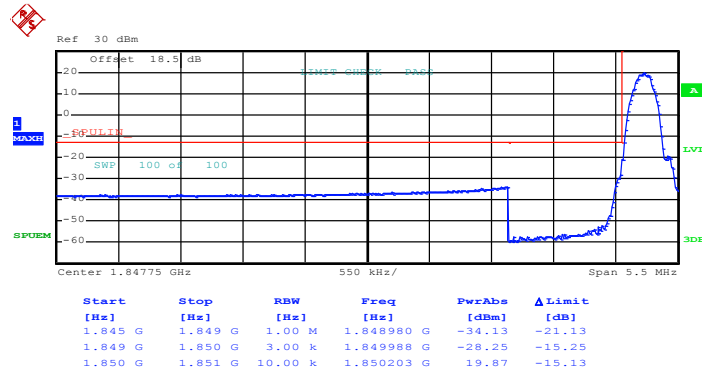
Date: 4.DEC.2014 10:13:59



Band : GSM1900

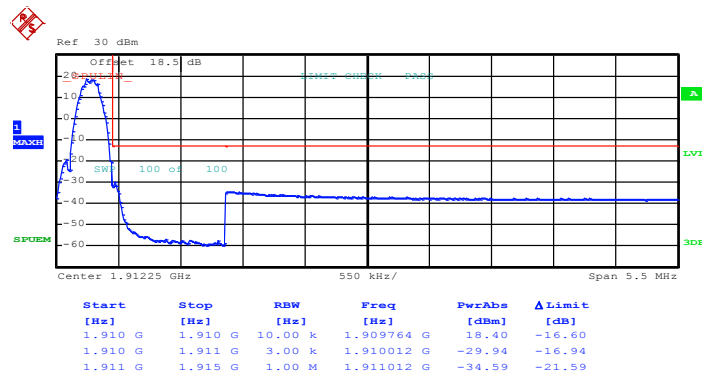
Test Mode : EDGE class 8 Link (8PSK)

## Lower Band Edge Plot on Channel 512 (1850.2 MHz)



Date: 4.DEC.2014 10:17:54

## Higher Band Edge Plot on Channel 810 (1909.8 MHz)



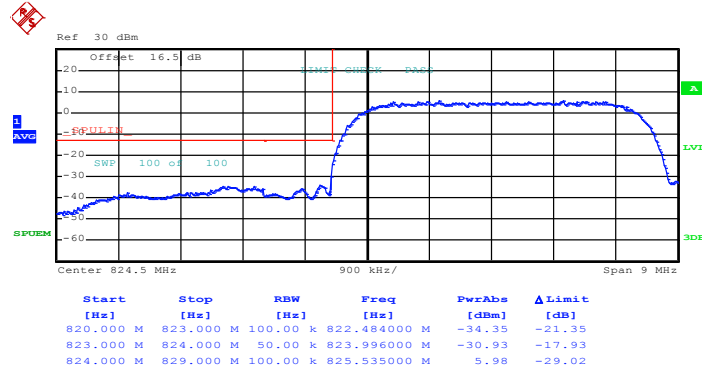
Date: 4.DEC.2014 10:20:46



Band : WCDMA Band V

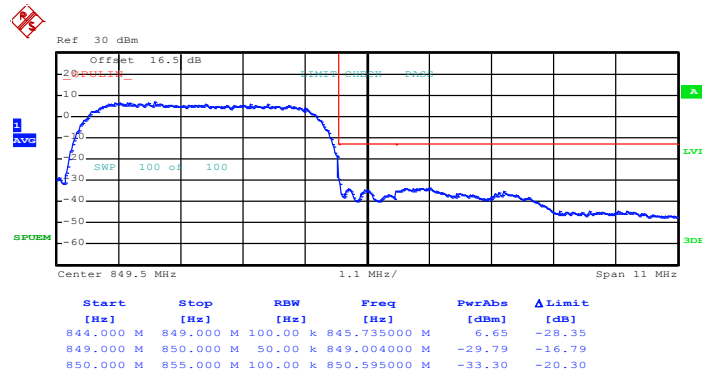
Test Mode : RMC 12.2Kbps Link (QPSK)

## Lower Band Edge Plot on Channel 4132 (826.4 MHz)



Date: 4.DEC.2014 10:36:57

## Higher Band Edge Plot on Channel 4233 (846.6 MHz)



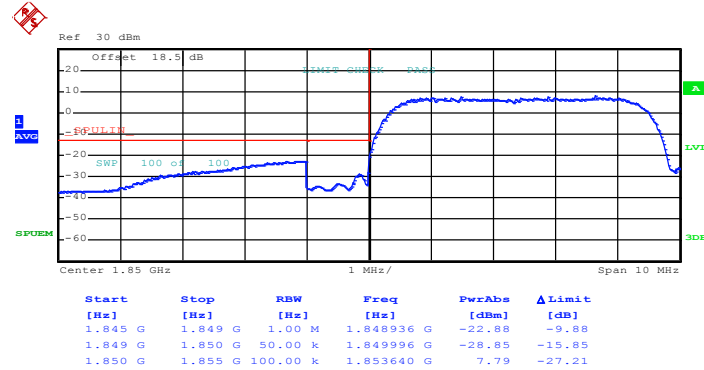
Date: 4.DEC.2014 10:40:36



Band : WCDMA Band II

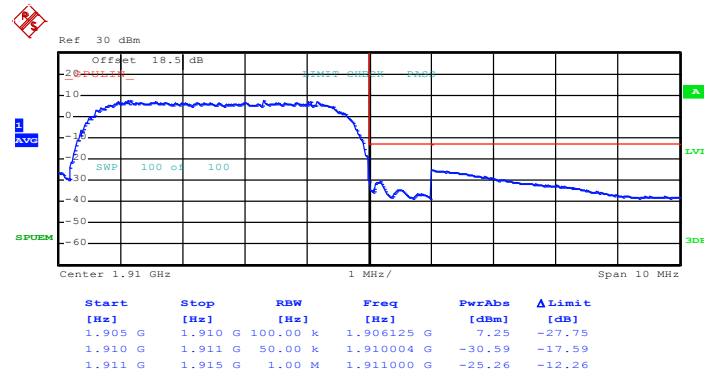
Test Mode : RMC 12.2Kbps Link (QPSK)

## Lower Band Edge Plot on Channel 9262 (1852.4 MHz)



Date: 4.DEC.2014 10:27:28

## Higher Band Edge Plot on Channel 9538 (1907.6 MHz)



Date: 4.DEC.2014 10:30:50

## 3.6 Conducted Spurious Emission Measurement

### 3.6.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

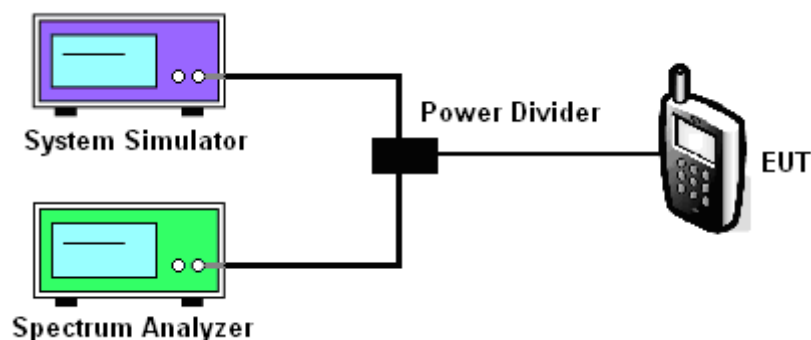
### 3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.6.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
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.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)]$  (dB)  
 $= [30 + 10\log(P)]$  (dBm) -  $[43 + 10\log(P)]$  (dB)  
 $= -13\text{dBm}$ .

### 3.6.4 Test Setup

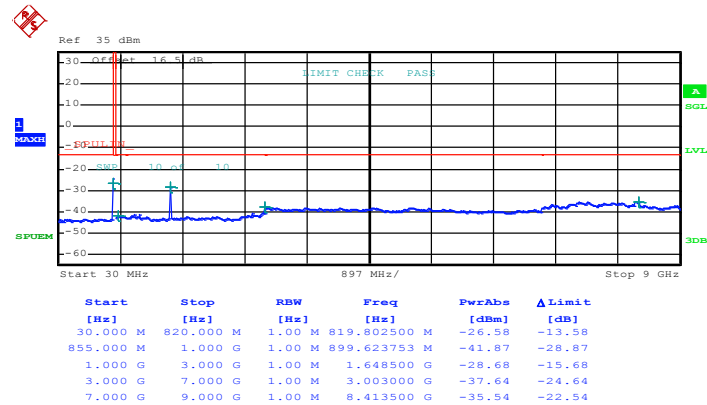




## 3.6.5 Test Result (Plots) of Conducted Spurious Emission

|             |                 |             |           |
|-------------|-----------------|-------------|-----------|
| Band :      | GSM850          | Channel :   | CH128     |
| Test Mode : | GSM Link (GMSK) | Frequency : | 824.2 MHz |

Conducted Spurious Emission Plot between 30MHz ~ 9GHz

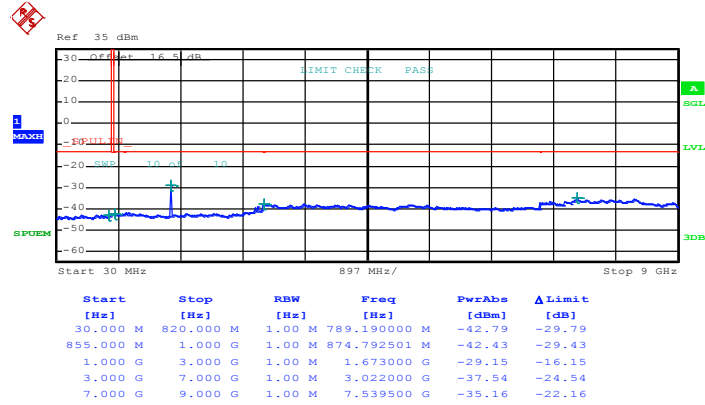


Date: 3.DEC.2014 18:25:15



|             |                 |             |           |
|-------------|-----------------|-------------|-----------|
| Band :      | GSM850          | Channel :   | CH189     |
| Test Mode : | GSM Link (GMSK) | Frequency : | 836.4 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 9GHz

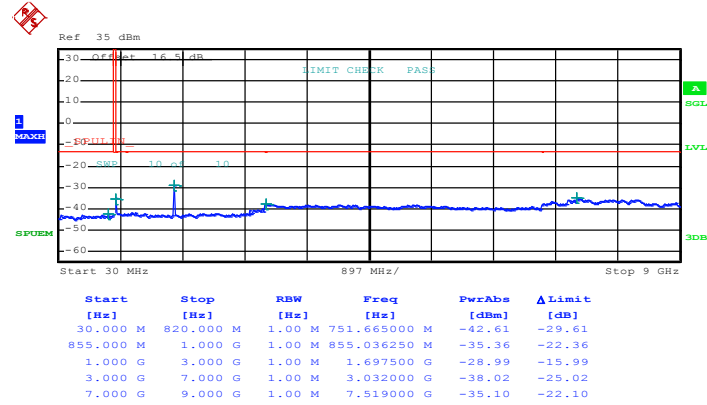


Date: 3.DEC.2014 18:25:33



|             |                 |             |           |
|-------------|-----------------|-------------|-----------|
| Band :      | GSM850          | Channel :   | CH251     |
| Test Mode : | GSM Link (GMSK) | Frequency : | 848.8 MHz |

Conducted Spurious Emission Plot between 30MHz ~ 9GHz

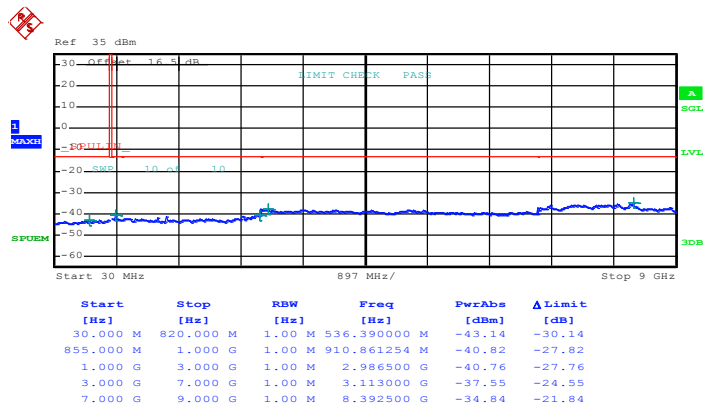


Date: 3.DEC.2014 18:25:53



|             |                          |             |           |
|-------------|--------------------------|-------------|-----------|
| Band :      | GSM850                   | Channel :   | CH128     |
| Test Mode : | EDGE class 8 Link (8PSK) | Frequency : | 824.2 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 9GHz

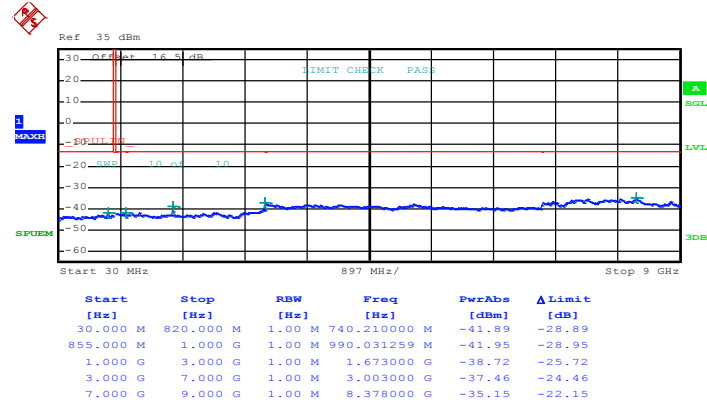


Date: 3.DEC.2014 18:28:09



|             |                          |             |           |
|-------------|--------------------------|-------------|-----------|
| Band :      | GSM850                   | Channel :   | CH189     |
| Test Mode : | EDGE class 8 Link (8PSK) | Frequency : | 836.4 MHz |

Conducted Spurious Emission Plot between 30MHz ~ 9GHz

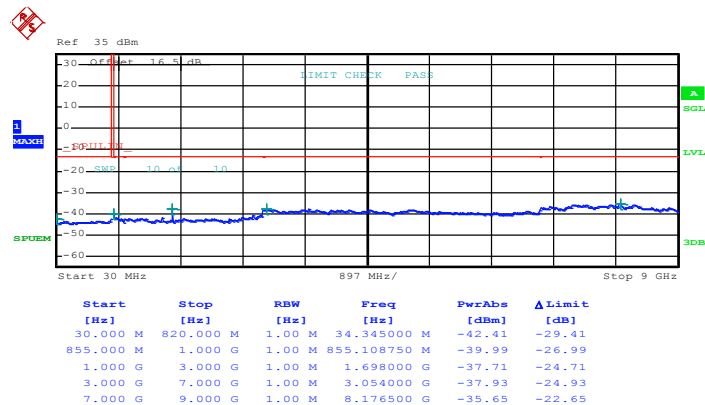


Date: 3.DEC.2014 18:28:28



|             |                          |             |           |
|-------------|--------------------------|-------------|-----------|
| Band :      | GSM850                   | Channel :   | CH251     |
| Test Mode : | EDGE class 8 Link (8PSK) | Frequency : | 848.8 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 9GHz

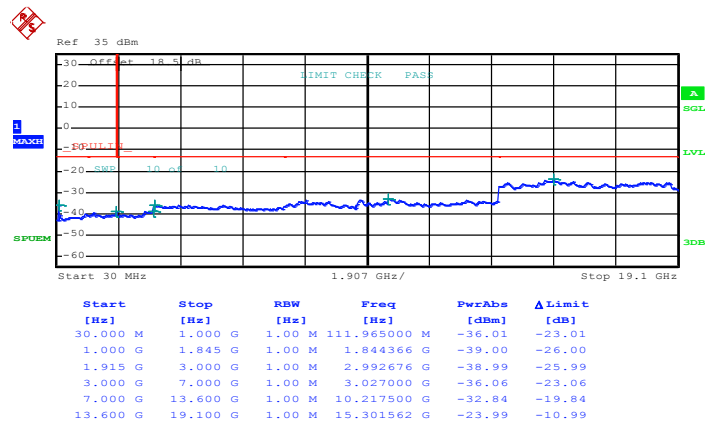


Date: 3.DEC.2014 18:28:46



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | GSM1900                  | Channel :   | CH512      |
| Test Mode : | GPRS class 8 Link (GMSK) | Frequency : | 1850.2 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz

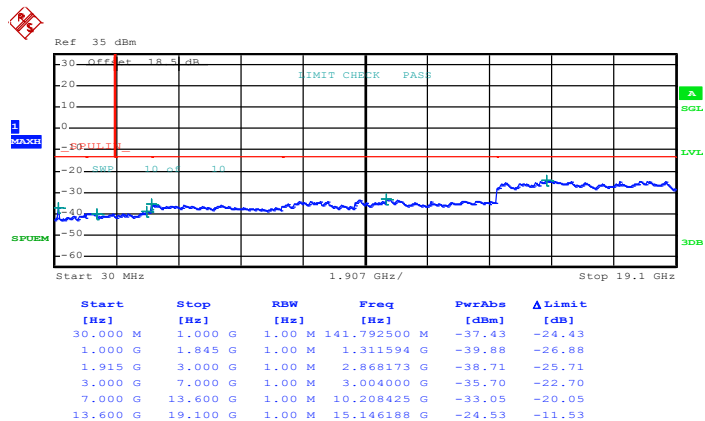


Date: 3.DEC.2014 19:07:22



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | GSM1900                  | Channel :   | CH661      |
| Test Mode : | GPRS class 8 Link (GMSK) | Frequency : | 1880.0 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz

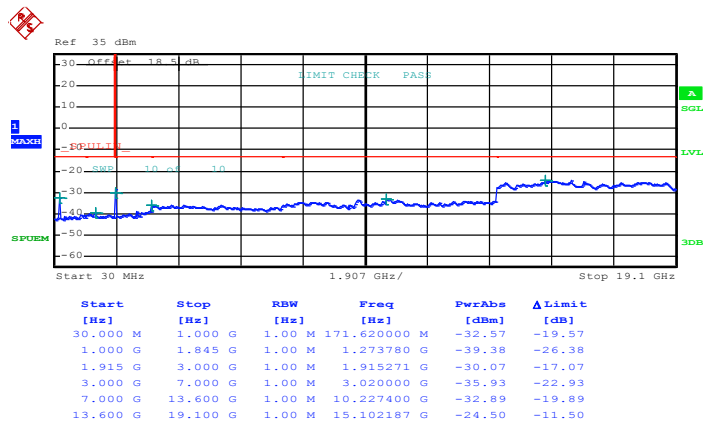


Date: 3.DEC.2014 19:07:49



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | GSM1900                  | Channel :   | CH810      |
| Test Mode : | GPRS class 8 Link (GMSK) | Frequency : | 1909.8 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz

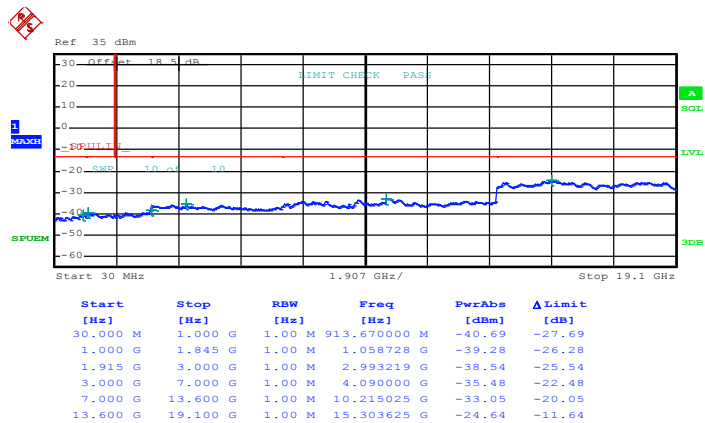


Date: 3.DEC.2014 19:08:20



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | GSM1900                  | Channel :   | CH512      |
| Test Mode : | EDGE class 8 Link (8PSK) | Frequency : | 1850.2 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz

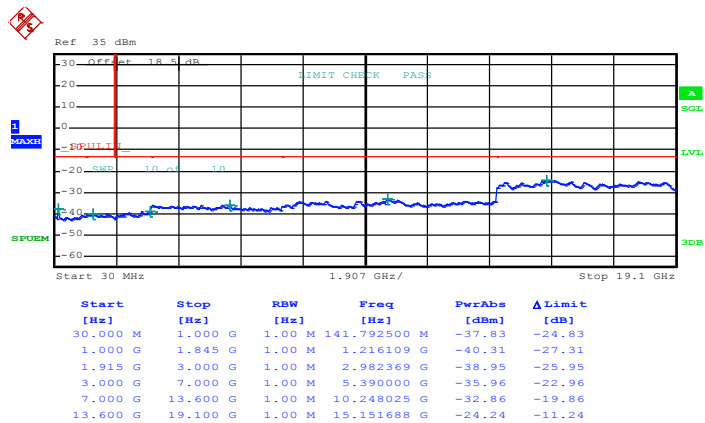


Date: 3.DEC.2014 19:18:35



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | GSM1900                  | Channel :   | CH661      |
| Test Mode : | EDGE class 8 Link (8PSK) | Frequency : | 1880.0 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz

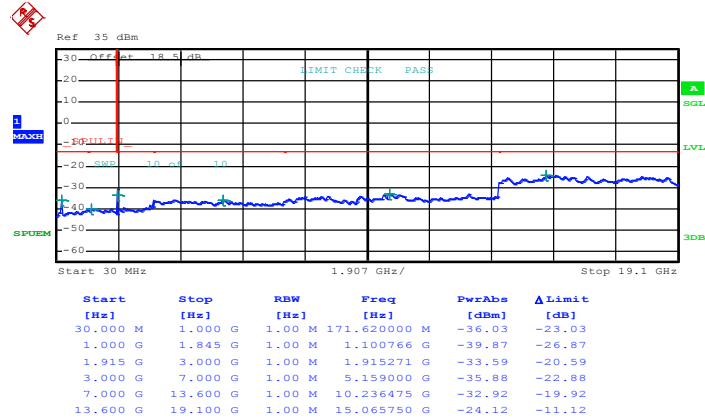


Date: 3.DEC.2014 19:19:01



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | GSM1900                  | Channel :   | CH810      |
| Test Mode : | EDGE class 8 Link (8PSK) | Frequency : | 1909.8 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz

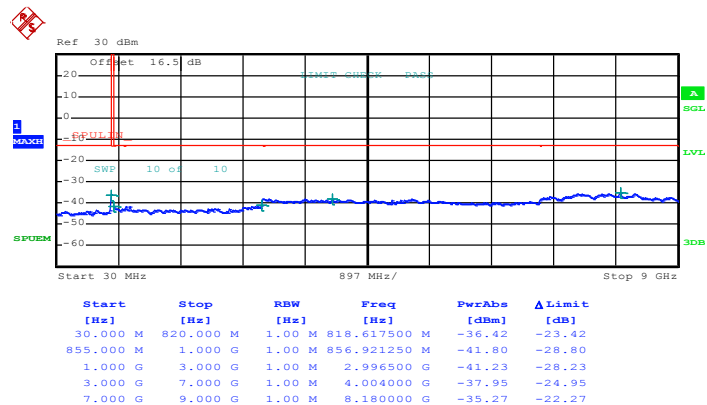


Date: 3.DEC.2014 19:19:27



|             |                          |             |           |
|-------------|--------------------------|-------------|-----------|
| Band :      | WCDMA Band V             | Channel :   | CH4132    |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 826.4 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 9GHz

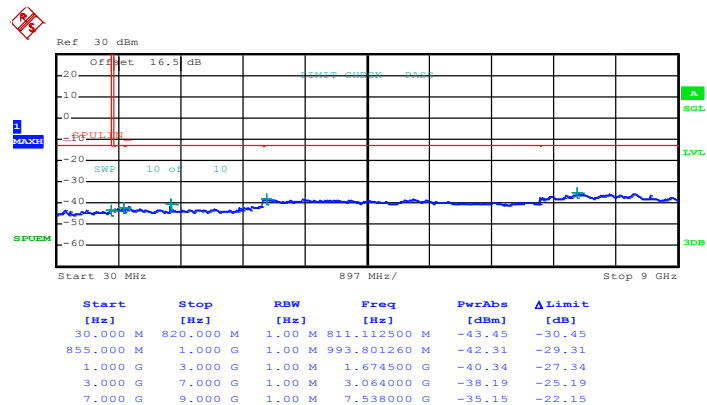


Date: 3.DEC.2014 19:34:26



|             |                          |             |           |
|-------------|--------------------------|-------------|-----------|
| Band :      | WCDMA Band V             | Channel :   | CH4182    |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 836.4 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 9GHz

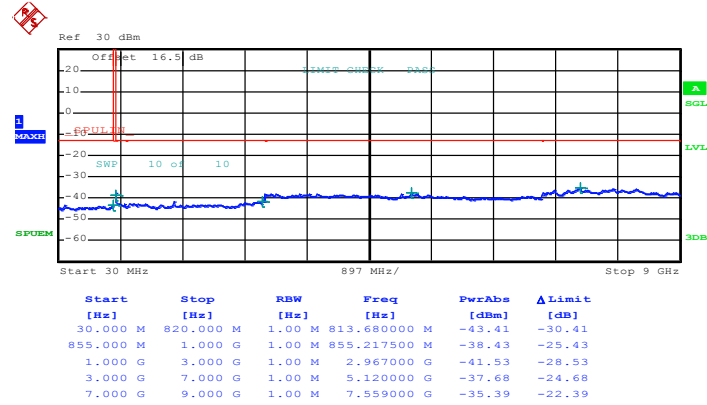


Date: 3.DEC.2014 19:34:44



|             |                          |             |           |
|-------------|--------------------------|-------------|-----------|
| Band :      | WCDMA Band V             | Channel :   | CH4233    |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 846.6 MHz |

Conducted Spurious Emission Plot between 30MHz ~ 9GHz

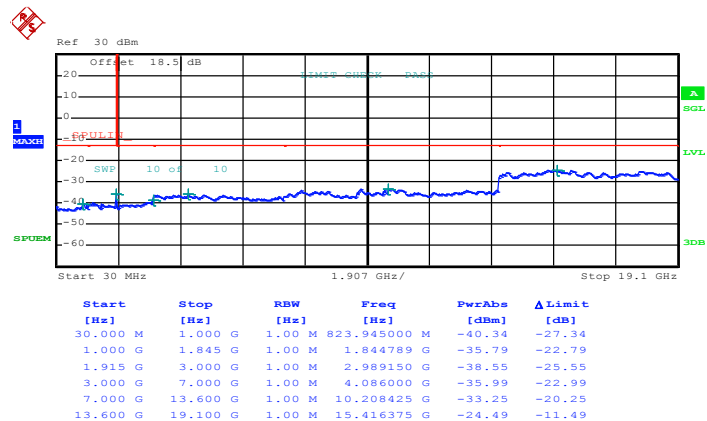


Date: 3.DEC.2014 19:35:02



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | WCDMA Band II            | Channel :   | CH9262     |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 1852.4 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz

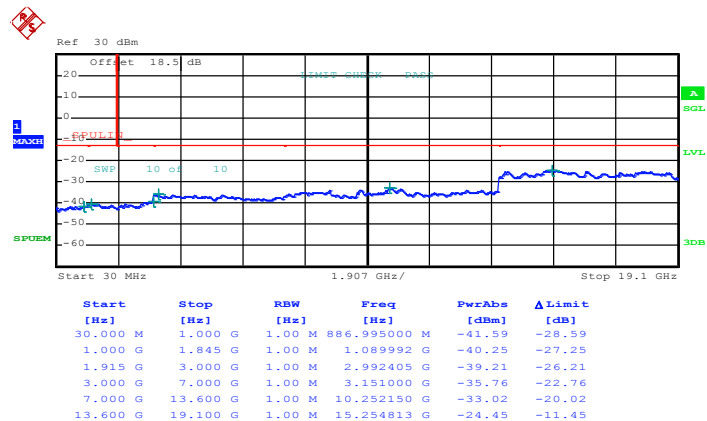


Date: 3.DEC.2014 19:26:34



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | WCDMA Band II            | Channel :   | CH9400     |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 1880.0 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz

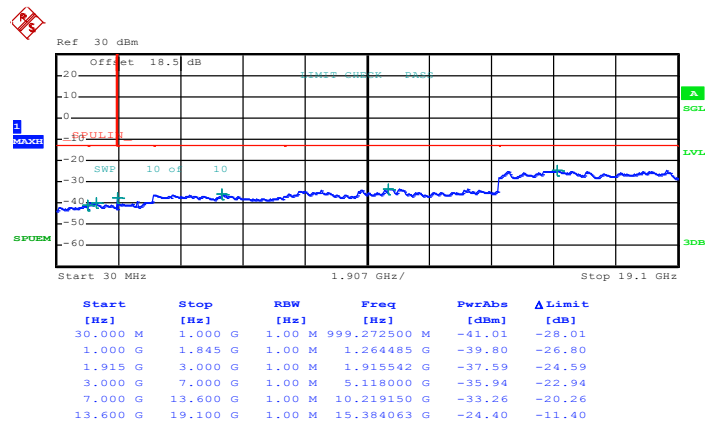


Date: 3.DEC.2014 19:26:59



|             |                          |             |            |
|-------------|--------------------------|-------------|------------|
| Band :      | WCDMA Band II            | Channel :   | CH9538     |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 1907.6 MHz |

## Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz



Date: 3.DEC.2014 19:27:31



## **3.7 Field Strength of Spurious Radiation Measurement**

### **3.7.1 Description of Field Strength of Spurious Radiated Measurement**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

### **3.7.2 Measuring Instruments**

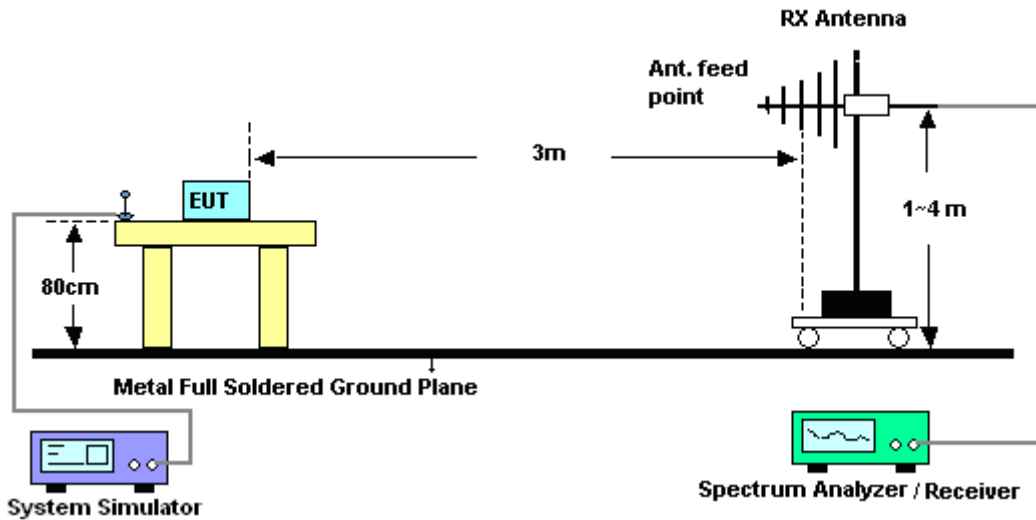
The measuring equipment is listed in the section 4 of this test report.

### **3.7.3 Test Procedures**

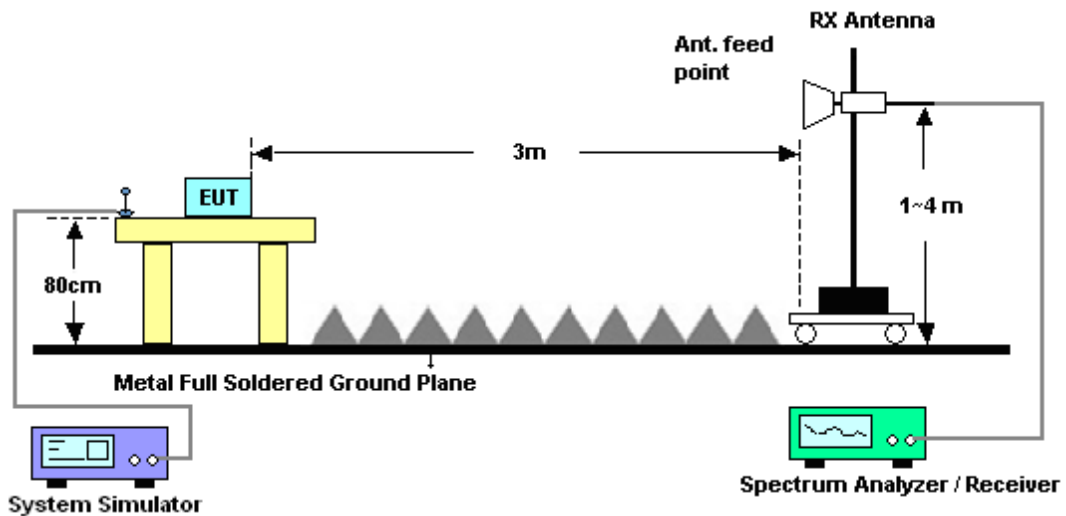
1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
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.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11.  $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12.  $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$   
 $= -13\text{dBm}.$

### 3.7.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





## 3.7.5 Test Result of Field Strength of Spurious Radiated

## &lt;Low Channel&gt;

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | GSM850                                                                           |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | GSM Link (GMSK)                                                                  |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Horizontal      |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | ERP                                                                              | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 1648            | -40.95                                                                           | -13     | -27.95          | -51.44             | -42.71           | 0.98                | 4.89            | H            | Pass   |
| 2472            | -43.98                                                                           | -13     | -30.98          | -59.68             | -45.86           | 1.28                | 5.32            | H            | Pass   |
| 3296            | -50.70                                                                           | -13     | -37.70          | -66.52             | -54.11           | 1.54                | 7.10            | H            | Pass   |

|                 |                                                                                  |                     |          |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|----------|---------|---------|----------|------------|--------------|--------|
| Band :          | GSM850                                                                           | Temperature :       | 23~24°C  |         |         |          |            |              |        |
| Test Mode :     | GSM Link (GMSK)                                                                  | Relative Humidity : | 46~48%   |         |         |          |            |              |        |
| Test Engineer : | Derreck Chen                                                                     | Polarization :      | Vertical |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |          |         |         |          |            |              |        |
| Frequency       | ERP                                                                              | Limit               | Over     | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit    | Reading | Power   | loss     | Gain       | (H/V)        |        |
| ( dB )          | ( dB )                                                                           | ( dB )              | ( dB )   | ( dBm ) | ( dBm ) | ( dB )   | ( dBi )    |              |        |
| 1648            | -38.10                                                                           | -13                 | -25.10   | -50.73  | -39.86  | 0.98     | 4.89       | V            | Pass   |
| 2472            | -41.33                                                                           | -13                 | -28.33   | -57.39  | -43.21  | 1.28     | 5.32       | V            | Pass   |
| 3296            | -48.08                                                                           | -13                 | -35.08   | -66.1   | -51.49  | 1.54     | 7.10       | V            | Pass   |

**<Middle Channel>**

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | GSM850                                                                           |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | GSM Link (GMSK)                                                                  |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Horizontal      |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | ERP                                                                              | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 1672            | -38.36                                                                           | -13     | -25.36          | -49.56             | -40.04           | 0.99                | 4.82            | H            | Pass   |
| 2512            | -42.42                                                                           | -13     | -29.42          | -57.73             | -44.39           | 1.29                | 5.41            | H            | Pass   |
| 3345            | -50.68                                                                           | -13     | -37.68          | -66.89             | -54.29           | 1.56                | 7.32            | H            | Pass   |

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | GSM850                                                                           |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | GSM Link (GMSK)                                                                  |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Vertical        |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | ERP                                                                              | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 1672            | -37.54                                                                           | -13     | -24.54          | -50.5              | -39.22           | 0.99                | 4.82            | V            | Pass   |
| 2512            | -45.89                                                                           | -13     | -32.89          | -61.26             | -47.86           | 1.29                | 5.41            | V            | Pass   |
| 3345            | -49.60                                                                           | -13     | -36.60          | -66.8              | -53.21           | 1.56                | 7.32            | V            | Pass   |



## &lt;High Channel&gt;

|                 |                                                                                  |                     |                 |                    |                  |                |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|-----------------|--------------------|------------------|----------------|-----------------|--------------|--------|
| Band :          | GSM850                                                                           | Temperature :       | 23~24°C         |                    |                  |                |                 |              |        |
| Test Mode :     | GSM Link (GMSK)                                                                  | Relative Humidity : | 46~48%          |                    |                  |                |                 |              |        |
| Test Engineer : | Derreck Chen                                                                     | Polarization :      | Horizontal      |                    |                  |                |                 |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |                 |                    |                  |                |                 |              |        |
| Frequency       | ERP                                                                              | Limit               | Over            | SPA                | S.G.             | TX Cable       | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB ) | Gain<br>( dBi ) | (H/V)        |        |
| 1696            | -48.84                                                                           | -13                 | -35.84          | -60.22             | -50.44           | 1.00           | 4.75            | H            | Pass   |
| 2546            | -50.13                                                                           | -13                 | -37.13          | -65.59             | -52.11           | 1.31           | 5.44            | H            | Pass   |
| 3395            | -50.27                                                                           | -13                 | -37.27          | -65.99             | -54.09           | 1.57           | 7.54            | H            | Pass   |

|                 |                                                                                  |                     |                 |                    |                  |                |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|-----------------|--------------------|------------------|----------------|-----------------|--------------|--------|
| Band :          | GSM850                                                                           | Temperature :       | 23~24°C         |                    |                  |                |                 |              |        |
| Test Mode :     | GSM Link (GMSK)                                                                  | Relative Humidity : | 46~48%          |                    |                  |                |                 |              |        |
| Test Engineer : | Derreck Chen                                                                     | Polarization :      | Vertical        |                    |                  |                |                 |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |                 |                    |                  |                |                 |              |        |
| Frequency       | ERP                                                                              | Limit               | Over            | SPA                | S.G.             | TX Cable       | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB ) | Gain<br>( dBi ) | (H/V)        |        |
| 1696            | -43.61                                                                           | -13                 | -30.61          | -56.93             | -45.21           | 1.00           | 4.75            | V            | Pass   |
| 2546            | -49.21                                                                           | -13                 | -36.21          | -65.29             | -51.19           | 1.31           | 5.44            | V            | Pass   |
| 3395            | -48.62                                                                           | -13                 | -35.62          | -65.92             | -52.44           | 1.57           | 7.54            | V            | Pass   |

**<Low Channel>**

|                 |                                                                                  |         |                 |                  |                  |                     |               |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|------------------|------------------|---------------------|---------------|--------------|--------|
| Band :          | GSM850                                                                           |         |                 |                  |                  | Temperature :       | 23~24°C       |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         |         |                 |                  |                  | Relative Humidity : | 46~48%        |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                  |                  | Polarization :      | Horizontal    |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                  |                  |                     |               |              |        |
| Frequency       | ERP                                                                              | Limit   | Over            | SPA              | S.G.             | TX Cable            | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>(dBi) | (H/V)        |        |
| 1648            | -47.59                                                                           | -13     | -34.59          | -58.29           | -49.35           | 0.98                | 4.89          | H            | Pass   |
| 2472            | -46.00                                                                           | -13     | -33.00          | -61.69           | -47.88           | 1.28                | 5.32          | H            | Pass   |
| 3296            | -49.76                                                                           | -13     | -36.76          | -65.84           | -53.17           | 1.54                | 7.10          | H            | Pass   |

|                 |                                                                                  |         |                 |                  |                  |                     |               |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|------------------|------------------|---------------------|---------------|--------------|--------|
| Band :          | GSM850                                                                           |         |                 |                  |                  | Temperature :       | 23~24°C       |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         |         |                 |                  |                  | Relative Humidity : | 46~48%        |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                  |                  | Polarization :      | Vertical      |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                  |                  |                     |               |              |        |
| Frequency       | ERP                                                                              | Limit   | Over            | SPA              | S.G.             | TX Cable            | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>(dBi) | (H/V)        |        |
| 1648            | -42.51                                                                           | -13     | -29.51          | -55.75           | -44.27           | 0.98                | 4.89          | V            | Pass   |
| 2472            | -47.11                                                                           | -13     | -34.11          | -62.64           | -48.99           | 1.28                | 5.32          | V            | Pass   |
| 3296            | -48.98                                                                           | -13     | -35.98          | -66.4            | -52.39           | 1.54                | 7.10          | V            | Pass   |



## &lt;Middle Channel&gt;

|                 |                                                                                  |         |                 |                  |                  |                     |               |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|------------------|------------------|---------------------|---------------|--------------|--------|
| Band :          | GSM850                                                                           |         |                 |                  |                  | Temperature :       | 23~24°C       |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         |         |                 |                  |                  | Relative Humidity : | 46~48%        |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                  |                  | Polarization :      | Horizontal    |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                  |                  |                     |               |              |        |
| Frequency       | ERP                                                                              | Limit   | Over            | SPA              | S.G.             | TX Cable            | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>(dBi) | (H/V)        |        |
| 1672            | -48.54                                                                           | -13     | -35.54          | -59.04           | -50.22           | 0.99                | 4.82          | H            | Pass   |
| 2512            | -44.85                                                                           | -13     | -31.85          | -60.5            | -46.82           | 1.29                | 5.41          | H            | Pass   |
| 3345            | -49.54                                                                           | -13     | -36.54          | -65.75           | -53.15           | 1.56                | 7.32          | H            | Pass   |

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | GSM850                                                                           |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Vertical        |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | ERP                                                                              | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 1672            | -46.14                                                                           | -13     | -33.14          | -59.43             | -47.82           | 0.99                | 4.82            | V            | Pass   |
| 2512            | -43.42                                                                           | -13     | -30.42          | -59.16             | -45.39           | 1.29                | 5.41            | V            | Pass   |
| 3345            | -48.60                                                                           | -13     | -35.60          | -66.3              | -52.21           | 1.56                | 7.32            | V            | Pass   |



## &lt;High Channel&gt;

|                 |                                                                                  |                     |            |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|------------|---------|---------|----------|------------|--------------|--------|
| Band :          | GSM850                                                                           | Temperature :       | 23~24°C    |         |         |          |            |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         | Relative Humidity : | 46~48%     |         |         |          |            |              |        |
| Test Engineer : | Derreck Chen                                                                     | Polarization :      | Horizontal |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |            |         |         |          |            |              |        |
| Frequency       | ERP                                                                              | Limit               | Over       | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
|                 |                                                                                  |                     | Limit      | Reading | Power   | loss     | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | ( dB )     | ( dBm ) | ( dBm ) | ( dB )   | ( dBi )    | ( H/V )      |        |
| 1696            | -53.61                                                                           | -13                 | -40.61     | -64.61  | -55.21  | 1.00     | 4.75       | H            | Pass   |
| 2546            | -47.38                                                                           | -13                 | -34.38     | -63.06  | -49.36  | 1.31     | 5.44       | H            | Pass   |
| 3395            | -50.00                                                                           | -13                 | -37.00     | -66.03  | -53.82  | 1.57     | 7.54       | H            | Pass   |

|                 |                                                                                  |                     |                 |                    |                  |                |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|-----------------|--------------------|------------------|----------------|-----------------|--------------|--------|
| Band :          | GSM850                                                                           | Temperature :       | 23~24°C         |                    |                  |                |                 |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         | Relative Humidity : | 46~48%          |                    |                  |                |                 |              |        |
| Test Engineer : | Derreck Chen                                                                     | Polarization :      | Vertical        |                    |                  |                |                 |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |                 |                    |                  |                |                 |              |        |
| Frequency       | ERP                                                                              | Limit               | Over            | SPA                | S.G.             | TX Cable       | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB ) | Gain<br>( dBi ) | (H/V)        |        |
| 1696            | -51.01                                                                           | -13                 | -38.01          | -64.15             | -52.61           | 1.00           | 4.75            | V            | Pass   |
| 2546            | -45.98                                                                           | -13                 | -32.98          | -61.45             | -50.11           | 1.31           | 5.44            | V            | Pass   |
| 3395            | -48.60                                                                           | -13                 | -35.60          | -66.64             | -54.57           | 1.57           | 7.54            | V            | Pass   |



## &lt;Low Channel&gt;

|                 |                                                                                  |         |        |         |         |                     |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|--------|---------|---------|---------------------|------------|--------------|--------|
| Band :          | GSM1900                                                                          |         |        |         |         | Temperature :       | 23~24°C    |              |        |
| Test Mode :     | GPRS class 8 Link (GMSK)                                                         |         |        |         |         | Relative Humidity : | 46~48%     |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |        |         |         | Polarization :      | Horizontal |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |        |         |         |                     |            |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over   | SPA     | S.G.    | TX Cable            | TX Antenna | Polarization | Result |
|                 |                                                                                  |         | Limit  | Reading | Power   | loss                | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | ( dB ) | (dBm)   | ( dBm ) | ( dB )              | (dBi)      | (H/V)        |        |
| 3700            | -48.44                                                                           | -13     | -35.44 | -65.67  | -55.01  | 1.67                | 8.24       | H            | Pass   |
| 5550            | -45.22                                                                           | -13     | -32.22 | -67.65  | -52.29  | 2.65                | 9.72       | H            | Pass   |
| 7400            | -38.25                                                                           | -13     | -25.25 | -67.65  | -47.39  | 2.46                | 11.60      | H            | Pass   |

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | GSM1900                                                                          |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | GPRS class 8 Link (GMSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Vertical        |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 3700            | -48.46                                                                           | -13     | -35.46          | -66.75             | -55.03           | 1.67                | 8.24            | V            | Pass   |
| 5550            | -43.05                                                                           | -13     | -30.05          | -65.25             | -50.12           | 2.65                | 9.72            | V            | Pass   |
| 7400            | -38.25                                                                           | -13     | -25.25          | -67.4              | -47.39           | 2.46                | 11.60           | V            | Pass   |



## &lt;Middle Channel&gt;

|                 |                                                                                  |                     |            |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|------------|---------|---------|----------|------------|--------------|--------|
| Band :          | GSM1900                                                                          | Temperature :       | 23~24°C    |         |         |          |            |              |        |
| Test Mode :     | GPRS class 8 Link (GMSK)                                                         | Relative Humidity : | 46~48%     |         |         |          |            |              |        |
| Test Engineer : | Derreck Chen                                                                     | Polarization :      | Horizontal |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |            |         |         |          |            |              |        |
| Frequency       | EIRP                                                                             | Limit               | Over       | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
|                 |                                                                                  |                     | Limit      | Reading | Power   | loss     | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | ( dB )     | (dBm)   | ( dBm ) | ( dB )   | (dBi)      | (H/V)        |        |
| 3760            | -48.59                                                                           | -13                 | -35.59     | -66.03  | -55.22  | 1.69     | 8.31       | H            | Pass   |
| 5640            | -41.79                                                                           | -13                 | -28.79     | -64.1   | -48.84  | 2.71     | 9.76       | H            | Pass   |
| 7520            | -37.90                                                                           | -13                 | -24.90     | -67.51  | -47.29  | 2.42     | 11.81      | H            | Pass   |

|                 |                                                                                  |                     |                 |                    |                  |                |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|-----------------|--------------------|------------------|----------------|-----------------|--------------|--------|
| Band :          | GSM1900                                                                          | Temperature :       | 23~24°C         |                    |                  |                |                 |              |        |
| Test Mode :     | GPRS class 8 Link (GMSK)                                                         | Relative Humidity : | 46~48%          |                    |                  |                |                 |              |        |
| Test Engineer : | Derreck Chen                                                                     | Polarization :      | Vertical        |                    |                  |                |                 |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |                 |                    |                  |                |                 |              |        |
| Frequency       | EIRP                                                                             | Limit               | Over            | SPA                | S.G.             | TX Cable       | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB ) | Gain<br>( dBi ) | (H/V)        |        |
| 3760            | -47.66                                                                           | -13                 | -34.66          | -66.44             | -54.29           | 1.69           | 8.31            | V            | Pass   |
| 5640            | -42.06                                                                           | -13                 | -29.06          | -64.33             | -49.11           | 2.71           | 9.76            | V            | Pass   |
| 7520            | -38.62                                                                           | -13                 | -25.62          | -67.76             | -48.01           | 2.42           | 11.81           | V            | Pass   |



## &lt;High Channel&gt;

|                 |                                                                                  |         |        |         |         |                     |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|--------|---------|---------|---------------------|------------|--------------|--------|
| Band :          | GSM1900                                                                          |         |        |         |         | Temperature :       | 23~24°C    |              |        |
| Test Mode :     | GPRS class 8 Link (GMSK)                                                         |         |        |         |         | Relative Humidity : | 46~48%     |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |        |         |         | Polarization :      | Horizontal |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |        |         |         |                     |            |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over   | SPA     | S.G.    | TX Cable            | TX Antenna | Polarization | Result |
|                 |                                                                                  |         | Limit  | Reading | Power   | loss                | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dB )              | ( dBi )    | ( H/V )      |        |
| 3819            | -49.00                                                                           | -13     | -36.00 | -66.31  | -55.68  | 1.70                | 8.38       | H            | Pass   |
| 5729            | -41.26                                                                           | -13     | -28.26 | -64.17  | -48.29  | 2.76                | 9.79       | H            | Pass   |
| 7639            | -38.90                                                                           | -13     | -25.90 | -67.24  | -48.4   | 2.38                | 11.88      | H            | Pass   |

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | GSM1900                                                                          |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | GPRS class 8 Link (GMSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Vertical        |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 3819            | -47.01                                                                           | -13     | -34.01          | -65.91             | -53.69           | 1.70                | 8.38            | V            | Pass   |
| 5729            | -38.26                                                                           | -13     | -25.26          | -60.76             | -45.29           | 2.76                | 9.79            | V            | Pass   |
| 7639            | -38.77                                                                           | -13     | -25.77          | -67.16             | -48.27           | 2.38                | 11.88           | V            | Pass   |

**<Low Channel>**

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | GSM1900                                                                          |         |                 |                    |                  | Temperature :       | 23~24℃          |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Horizontal      |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | ( H/V )      |        |
| 3700            | -48.82                                                                           | -13     | -35.82          | -66.34             | -55.39           | 1.67                | 8.24            | H            | Pass   |
| 5550            | -44.24                                                                           | -13     | -31.24          | -66.34             | -51.31           | 2.65                | 9.72            | H            | Pass   |
| 7400            | -38.55                                                                           | -13     | -25.55          | -67.73             | -47.69           | 2.46                | 11.60           | H            | Pass   |

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | GSM1900                                                                          |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Vertical        |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 3700            | -47.82                                                                           | -13     | -34.82          | -66.11             | -54.39           | 1.67                | 8.24            | V            | Pass   |
| 5550            | -41.44                                                                           | -13     | -28.44          | -63.28             | -48.51           | 2.65                | 9.72            | V            | Pass   |
| 7400            | -39.15                                                                           | -13     | -26.15          | -67.97             | -48.29           | 2.46                | 11.60           | V            | Pass   |



## &lt;Middle Channel&gt;

|                 |                                                                                  |                     |            |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|------------|---------|---------|----------|------------|--------------|--------|
| Band :          | GSM1900                                                                          | Temperature :       | 23~24°C    |         |         |          |            |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         | Relative Humidity : | 46~48%     |         |         |          |            |              |        |
| Test Engineer : | Derreck Chen                                                                     | Polarization :      | Horizontal |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |            |         |         |          |            |              |        |
| Frequency       | EIRP                                                                             | Limit               | Over       | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
|                 |                                                                                  |                     | Limit      | Reading | Power   | loss     | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | ( dB )     | (dBm)   | ( dBm ) | ( dB )   | (dBi)      | (H/V)        |        |
| 3760            | -49.68                                                                           | -13                 | -36.68     | -66.96  | -56.31  | 1.69     | 8.31       | H            | Pass   |
| 5640            | -44.17                                                                           | -13                 | -31.17     | -66.91  | -51.22  | 2.71     | 9.76       | H            | Pass   |
| 7520            | -39.30                                                                           | -13                 | -26.30     | -68.46  | -48.69  | 2.42     | 11.81      | H            | Pass   |

|                 |                                                                                  |                     |                 |                    |                  |                |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|-----------------|--------------------|------------------|----------------|-----------------|--------------|--------|
| Band :          | GSM1900                                                                          | Temperature :       | 23~24°C         |                    |                  |                |                 |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         | Relative Humidity : | 46~48%          |                    |                  |                |                 |              |        |
| Test Engineer : | Derreck Chen                                                                     | Polarization :      | Vertical        |                    |                  |                |                 |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |                 |                    |                  |                |                 |              |        |
| Frequency       | EIRP                                                                             | Limit               | Over            | SPA                | S.G.             | TX Cable       | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB ) | Gain<br>( dBi ) | (H/V)        |        |
| 3760            | -48.98                                                                           | -13                 | -35.98          | -66.99             | -55.61           | 1.69           | 8.31            | V            | Pass   |
| 5640            | -44.61                                                                           | -13                 | -31.61          | -66.73             | -51.66           | 2.71           | 9.76            | V            | Pass   |
| 7520            | -38.84                                                                           | -13                 | -25.84          | -68.15             | -48.23           | 2.42           | 11.81           | V            | Pass   |

**<High Channel>**

|                 |                                                                                  |         |                 |                  |                  |                     |               |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|------------------|------------------|---------------------|---------------|--------------|--------|
| Band :          | GSM1900                                                                          |         |                 |                  |                  | Temperature :       | 23~24°C       |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         |         |                 |                  |                  | Relative Humidity : | 46~48%        |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                  |                  | Polarization :      | Horizontal    |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                  |                  |                     |               |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over            | SPA              | S.G.             | TX Cable            | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>(dBi) | (H/V)        |        |
| 3819            | -49.28                                                                           | -13     | -36.28          | -67.08           | -55.96           | 1.70                | 8.38          | H            | Pass   |
| 5729            | -43.93                                                                           | -13     | -30.93          | -66.66           | -50.96           | 2.76                | 9.79          | H            | Pass   |
| 7639            | -38.59                                                                           | -13     | -25.59          | -66.95           | -48.09           | 2.38                | 11.88         | H            | Pass   |

|                 |                                                                                  |         |            |               |               |                     |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|------------|---------------|---------------|---------------------|------------|--------------|--------|
| Band :          | GSM1900                                                                          |         |            |               |               | Temperature :       | 23~24°C    |              |        |
| Test Mode :     | EDGE class 8 Link (8PSK)                                                         |         |            |               |               | Relative Humidity : | 46~48%     |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |            |               |               | Polarization :      | Vertical   |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |            |               |               |                     |            |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over Limit | SPA           | S.G.          | TX Cable            | TX Antenna | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | ( dB )     | Reading (dBm) | Power ( dBm ) | loss ( dB )         | Gain (dBi) | (H/V)        |        |
| 3819            | -48.16                                                                           | -13     | -35.16     | -66.98        | -54.84        | 1.70                | 8.38       | V            | Pass   |
| 5729            | -42.58                                                                           | -13     | -29.58     | -64.86        | -49.61        | 2.76                | 9.79       | V            | Pass   |
| 7639            | -38.89                                                                           | -13     | -25.89     | -67.33        | -48.39        | 2.38                | 11.88      | V            | Pass   |



## &lt;Low Channel&gt;

|                 |                                                                                  |         |        |         |         |                     |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|--------|---------|---------|---------------------|------------|--------------|--------|
| Band :          | WCDMA Band V                                                                     |         |        |         |         | Temperature :       | 23~24°C    |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         |         |        |         |         | Relative Humidity : | 46~48%     |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |        |         |         | Polarization :      | Horizontal |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |        |         |         |                     |            |              |        |
| Frequency       | ERP                                                                              | Limit   | Over   | SPA     | S.G.    | TX Cable            | TX Antenna | Polarization | Result |
|                 |                                                                                  |         | Limit  | Reading | Power   | loss                | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dB )              | ( dBi )    | ( H/V )      |        |
| 1696            | -37.07                                                                           | -13     | -24.07 | -48.18  | -38.67  | 1.00                | 4.75       | H            | Pass   |
| 2536            | -50.00                                                                           | -13     | -37.00 | -65.52  | -51.98  | 1.30                | 5.43       | H            | Pass   |
| 3384            | -49.70                                                                           | -13     | -36.70 | -65.8   | -53.47  | 1.57                | 7.49       | H            | Pass   |

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | WCDMA Band V                                                                     |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Vertical        |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | ERP                                                                              | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 1696            | -39.73                                                                           | -13     | -26.73          | -53.05             | -41.33           | 1.00                | 4.75            | V            | Pass   |
| 2536            | -49.50                                                                           | -13     | -36.50          | -65.51             | -51.48           | 1.30                | 5.43            | V            | Pass   |
| 3384            | -48.04                                                                           | -13     | -35.04          | -65.98             | -51.81           | 1.57                | 7.49            | V            | Pass   |

**<Middle Channel>**

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | WCDMA Band V                                                                     |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Horizontal      |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | ERP                                                                              | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 1672            | -37.09                                                                           | -13     | -24.09          | -48.19             | -38.77           | 0.99                | 4.82            | H            | Pass   |
| 2509            | -51.03                                                                           | -13     | -38.03          | -65.9              | -52.99           | 1.29                | 5.41            | H            | Pass   |
| 3345            | -49.68                                                                           | -13     | -36.68          | -66.17             | -53.29           | 1.56                | 7.32            | H            | Pass   |

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | WCDMA Band V                                                                     |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Vertical        |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | ERP                                                                              | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | ( H/V )      |        |
| 1672            | -36.95                                                                           | -13     | -23.95          | -49.96             | -38.63           | 0.99                | 4.82            | V            | Pass   |
| 2509            | -49.31                                                                           | -13     | -36.31          | -65.51             | -51.27           | 1.29                | 5.41            | V            | Pass   |
| 3345            | -48.60                                                                           | -13     | -35.60          | -66.32             | -52.21           | 1.56                | 7.32            | V            | Pass   |

**<High Channel>**

|                 |                                                                                  |         |        |         |         |                     |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|--------|---------|---------|---------------------|------------|--------------|--------|
| Band :          | WCDMA Band V                                                                     |         |        |         |         | Temperature :       | 23~24°C    |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         |         |        |         |         | Relative Humidity : | 46~48%     |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |        |         |         | Polarization :      | Horizontal |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |        |         |         |                     |            |              |        |
| Frequency       | ERP                                                                              | Limit   | Over   | SPA     | S.G.    | TX Cable            | TX Antenna | Polarization | Result |
|                 |                                                                                  |         | Limit  | Reading | Power   | loss                | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dB )              | ( dBi )    | ( H/V )      |        |
| 1696            | -37.07                                                                           | -13     | -24.07 | -48.18  | -38.67  | 1.00                | 4.75       | H            | Pass   |
| 2536            | -50.00                                                                           | -13     | -37.00 | -65.52  | -51.98  | 1.30                | 5.43       | H            | Pass   |
| 3384            | -49.70                                                                           | -13     | -36.70 | -65.8   | -53.47  | 1.57                | 7.49       | H            | Pass   |

|                 |                                                                                  |                     |                 |                    |                  |                |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|-----------------|--------------------|------------------|----------------|-----------------|--------------|--------|
| Band :          | WCDMA Band V                                                                     | Temperature :       | 23~24°C         |                    |                  |                |                 |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         | Relative Humidity : | 46~48%          |                    |                  |                |                 |              |        |
| Test Engineer : | Derreck Chen                                                                     | Polarization :      | Vertical        |                    |                  |                |                 |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |                 |                    |                  |                |                 |              |        |
| Frequency       | ERP                                                                              | Limit               | Over            | SPA                | S.G.             | TX Cable       | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB ) | Gain<br>( dBi ) | (H/V)        |        |
| 1696            | -39.73                                                                           | -13                 | -26.73          | -53.05             | -41.33           | 1.00           | 4.75            | V            | Pass   |
| 2536            | -49.50                                                                           | -13                 | -36.50          | -65.51             | -51.48           | 1.30           | 5.43            | V            | Pass   |
| 3384            | -48.04                                                                           | -13                 | -35.04          | -65.98             | -51.81           | 1.57           | 7.49            | V            | Pass   |

**<Low Channel>**

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | WCDMA Band II                                                                    |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Horizontal      |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | ( H/V )      |        |
| 3707            | -42.64                                                                           | -13     | -29.64          | -60.15             | -49.22           | 1.67                | 8.25            | H            | Pass   |
| 5557            | -45.25                                                                           | -13     | -32.25          | -67.31             | -52.31           | 2.66                | 9.72            | H            | Pass   |
| 7409            | -39.06                                                                           | -13     | -26.06          | -68.01             | -48.22           | 2.46                | 11.62           | H            | Pass   |

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | WCDMA Band II                                                                    |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Vertical        |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | ( H/V )      |        |
| 3707            | -47.11                                                                           | -13     | -34.11          | -65.54             | -53.69           | 1.67                | 8.25            | V            | Pass   |
| 5557            | -42.45                                                                           | -13     | -29.45          | -64.59             | -49.51           | 2.66                | 9.72            | V            | Pass   |
| 7409            | -39.23                                                                           | -13     | -26.23          | -68.04             | -48.39           | 2.46                | 11.62           | V            | Pass   |



## &lt;Middle Channel&gt;

|                 |                                                                                  |         |        |         |         |                     |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|--------|---------|---------|---------------------|------------|--------------|--------|
| Band :          | WCDMA Band II                                                                    |         |        |         |         | Temperature :       | 23~24℃     |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         |         |        |         |         | Relative Humidity : | 46~48%     |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |        |         |         | Polarization :      | Horizontal |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |        |         |         |                     |            |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over   | SPA     | S.G.    | TX Cable            | TX Antenna | Polarization | Result |
|                 |                                                                                  |         | Limit  | Reading | Power   | loss                | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dB )              | ( dBi )    | ( H/V )      |        |
| 3760            | -44.59                                                                           | -13     | -31.59 | -61.83  | -51.22  | 1.69                | 8.31       | H            | Pass   |
| 5640            | -44.41                                                                           | -13     | -31.41 | -66.75  | -51.46  | 2.71                | 9.76       | H            | Pass   |
| 7520            | -38.82                                                                           | -13     | -25.82 | -68.21  | -48.21  | 2.42                | 11.81      | H            | Pass   |

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | WCDMA Band II                                                                    |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Vertical        |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 3760            | -47.76                                                                           | -13     | -34.76          | -66.28             | -54.39           | 1.69                | 8.31            | V            | Pass   |
| 5640            | -43.91                                                                           | -13     | -30.91          | -66.08             | -50.96           | 2.71                | 9.76            | V            | Pass   |
| 7520            | -39.28                                                                           | -13     | -26.28          | -68.2              | -48.67           | 2.42                | 11.81           | V            | Pass   |

**<High Channel>**

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | WCDMA Band II                                                                    |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Horizontal      |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 3812            | -42.94                                                                           | -13     | -29.94          | -60.42             | -49.61           | 1.70                | 8.37            | H            | Pass   |
| 5722            | -44.07                                                                           | -13     | -31.07          | -66.76             | -51.11           | 2.75                | 9.79            | H            | Pass   |
| 7630            | -38.56                                                                           | -13     | -25.56          | -67.2              | -48.05           | 2.39                | 11.88           | H            | Pass   |

|                 |                                                                                  |         |                 |                    |                  |                     |                 |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|-----------------|--------------------|------------------|---------------------|-----------------|--------------|--------|
| Band :          | WCDMA Band II                                                                    |         |                 |                    |                  | Temperature :       | 23~24°C         |              |        |
| Test Mode :     | RMC 12.2Kbps Link (QPSK)                                                         |         |                 |                    |                  | Relative Humidity : | 46~48%          |              |        |
| Test Engineer : | Derreck Chen                                                                     |         |                 |                    |                  | Polarization :      | Vertical        |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |                 |                    |                  |                     |                 |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over            | SPA                | S.G.             | TX Cable            | TX Antenna      | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | Limit<br>( dB ) | Reading<br>( dBm ) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>( dBi ) | (H/V)        |        |
| 3812            | -47.62                                                                           | -13     | -34.62          | -66.31             | -54.29           | 1.70                | 8.37            | V            | Pass   |
| 5722            | -44.05                                                                           | -13     | -31.05          | -66.83             | -51.09           | 2.75                | 9.79            | V            | Pass   |
| 7630            | -38.77                                                                           | -13     | -25.77          | -67.56             | -48.26           | 2.39                | 11.88           | V            | Pass   |

## **3.8 Frequency Stability Measurement**

### **3.8.1 Description of Frequency Stability Measurement**

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5\text{ppm}$ ) of the center frequency.

### **3.8.2 Measuring Instruments**

The measuring equipment is listed in the section 4 of this test report.

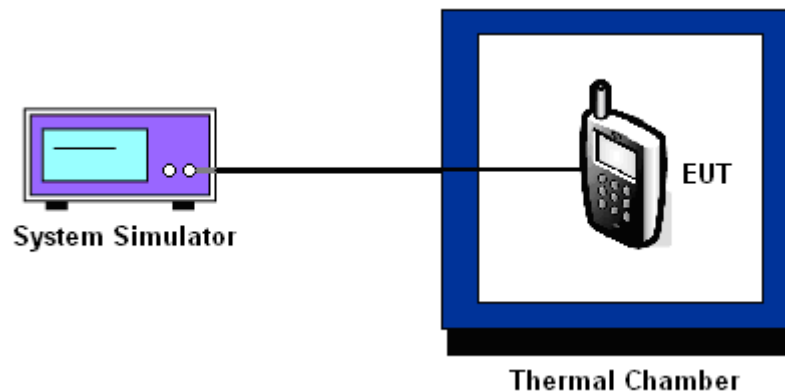
### **3.8.3 Test Procedures for Temperature Variation**

1. The testing follows FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to  $-30^{\circ}\text{C}$  and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in  $10^{\circ}\text{C}$  steps up to  $50^{\circ}\text{C}$ . 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.

### **3.8.4 Test Procedures for Voltage Variation**

1. The testing follows FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was placed in a temperature chamber at  $25\pm 5^{\circ}\text{C}$  and connected with the system simulator.
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.
4. The variation in frequency was measured for the worst case.

### **3.8.5 Test Setup**





## 3.8.6 Test Result of Temperature Variation

|               |         |             |           |
|---------------|---------|-------------|-----------|
| Band :        | GSM 850 | Channel :   | 189       |
| Limit (ppm) : | 2.5     | Frequency : | 836.4 MHz |

| Temperature (°C) | GSM             | EDGE class 8    | Result |
|------------------|-----------------|-----------------|--------|
|                  | Deviation (ppm) | Deviation (ppm) |        |
| 50               | 0.0036          | 0.0048          | PASS   |
| 40               | 0.0048          | 0.0000          |        |
| 30               | 0.0048          | 0.0012          |        |
| 20(Ref.)         | 0.0000          | 0.0000          |        |
| 10               | 0.0060          | 0.0024          |        |
| 0                | 0.0024          | 0.0072          |        |
| -10              | 0.0036          | 0.0024          |        |
| -20              | 0.0072          | 0.0012          |        |
| -30              | 0.0000          | 0.0000          |        |

|               |                        |             |            |
|---------------|------------------------|-------------|------------|
| Band :        | GSM 1900               | Channel :   | 661        |
| Limit (ppm) : | within authorized band | Frequency : | 1880.0 MHz |

| Temperature (°C) | GPRS class 8    | EDGE class 8    | Result |
|------------------|-----------------|-----------------|--------|
|                  | Deviation (ppm) | Deviation (ppm) |        |
| 50               | 0.0021          | 0.0021          | PASS   |
| 40               | 0.0016          | 0.0005          |        |
| 30               | 0.0011          | 0.0000          |        |
| 20(Ref.)         | 0.0000          | 0.0000          |        |
| 10               | 0.0037          | 0.0005          |        |
| 0                | 0.0032          | 0.0027          |        |
| -10              | 0.0027          | 0.0016          |        |
| -20              | 0.0005          | 0.0011          |        |
| -30              | 0.0011          | 0.0197          |        |

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



|                      |              |                    |           |
|----------------------|--------------|--------------------|-----------|
| <b>Band :</b>        | WCDMA Band V | <b>Channel :</b>   | 4182      |
| <b>Limit (ppm) :</b> | 2.5          | <b>Frequency :</b> | 836.4 MHz |

| Temperature<br>(°C) | RMC 12.2Kbps       | Result |
|---------------------|--------------------|--------|
|                     | Deviation<br>(ppm) |        |
| 50                  | 0.0036             | PASS   |
| 40                  | 0.0012             |        |
| 30                  | 0.0024             |        |
| 20(Ref.)            | 0.0000             |        |
| 10                  | 0.0012             |        |
| 0                   | 0.0048             |        |
| -10                 | 0.0048             |        |
| -20                 | 0.0036             |        |
| -30                 | 0.0000             |        |

|                      |                        |                    |            |
|----------------------|------------------------|--------------------|------------|
| <b>Band :</b>        | WCDMA Band II          | <b>Channel :</b>   | 9400       |
| <b>Limit (ppm) :</b> | within authorized band | <b>Frequency :</b> | 1880.0 MHz |

| Temperature<br>(°C) | RMC 12.2Kbps       | Result |
|---------------------|--------------------|--------|
|                     | Deviation<br>(ppm) |        |
| 50                  | 0.0000             | PASS   |
| 40                  | 0.0021             |        |
| 30                  | 0.0005             |        |
| 20(Ref.)            | 0.0000             |        |
| 10                  | 0.0016             |        |
| 0                   | 0.0011             |        |
| -10                 | 0.0005             |        |
| -20                 | 0.0016             |        |
| -30                 | 0.0011             |        |

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

**3.8.7 Test Result of Voltage Variation**

| Band & Channel          | Mode            | Voltage (Volt) | Deviation (ppm) | Limit (ppm) | Result |
|-------------------------|-----------------|----------------|-----------------|-------------|--------|
| GSM 850<br>CH189        | GSM             | 4.35           | 0.0060          | 2.5         | PASS   |
|                         |                 | 3.8            | 0.0048          |             |        |
|                         |                 | BEP            | 0.0012          |             |        |
|                         | EDGE<br>class 8 | 4.35           | 0.0012          |             |        |
|                         |                 | 3.8            | 0.0060          |             |        |
|                         |                 | BEP            | 0.0012          |             |        |
| GSM 1900<br>CH661       | GPRS<br>class 8 | 4.35           | 0.0027          | (Note 3.)   |        |
|                         |                 | 3.8            | 0.0011          |             |        |
|                         |                 | BEP            | 0.0011          |             |        |
|                         | EDGE<br>class 8 | 4.35           | 0.0021          |             |        |
|                         |                 | 3.8            | 0.0011          |             |        |
|                         |                 | BEP            | 0.0000          |             |        |
| WCDMA Band V<br>CH4182  | RMC<br>12.2Kbps | 4.35           | 0.0108          | 2.5         |        |
|                         |                 | 3.8            | 0.0143          |             |        |
|                         |                 | BEP            | 0.0143          |             |        |
| WCDMA Band II<br>CH9400 | RMC<br>12.2Kbps | 4.35           | 0.0016          | (Note 3.)   |        |
|                         |                 | 3.8            | 0.0032          |             |        |
|                         |                 | BEP            | 0.0011          |             |        |

**Note:**

1. Normal Voltage = 3.8V.
2. Battery End Point (BEP) = 3.42 V.
3. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.



## 4 List of Measuring Equipment

| Instrument                | Manufacturer    | Model No.     | Serial No.    | Characteristics  | Calibration Date | Test Date                       | Due Date      | Remark                |
|---------------------------|-----------------|---------------|---------------|------------------|------------------|---------------------------------|---------------|-----------------------|
| System Simulator          | Rohde & Schwarz | CMU200        | 117995        | N/A              | Jul. 29, 2014    | Nov. 23, 2014~<br>Dec. 04, 2014 | Jul. 28, 2015 | Conducted (TH02-HY)   |
| Spectrum Analyzer         | Rohde & Schwarz | FSP40         | 100055        | 9kHz~40GHz       | Jun. 09, 2014    | Nov. 23, 2014~<br>Dec. 04, 2014 | Jun. 08, 2015 | Conducted (TH02-HY)   |
| Thermal Chamber           | Ten Billion     | TTH-D3SP      | TBN-930701    | N/A              | Jul. 17, 2014    | Nov. 23, 2014~<br>Dec. 04, 2014 | Jul. 16, 2015 | Conducted (TH02-HY)   |
| Spectrum Analyzer         | Rohde & Schwarz | FSV30         | 101749        | 10Hz ~ 30GHz     | Feb. 10, 2014    | Nov. 22, 2014                   | Feb. 09, 2015 | Radiation (03CH07-HY) |
| Bilog Antenna             | Schaffner       | CBL6111C      | 2726          | 30MHz ~ 1GHz     | Sep. 27, 2014    | Nov. 22, 2014                   | Sep. 26, 2015 | Radiation (03CH07-HY) |
| Double Ridge Horn Antenna | ESCO            | 3117          | 75962         | 1GHz~18GHz       | Aug. 19, 2014    | Nov. 22, 2014                   | Aug. 18, 2015 | Radiation (03CH07-HY) |
| SHF-EHF Horn Antenna      | SCHWARZBECK     | BBHA 9170     | BBHA9170251   | 18GHz~40GHz      | Oct. 02, 2014    | Nov. 22, 2014                   | Oct. 01, 2015 | Radiation (03CH07-HY) |
| Preamplifier              | COM-POWER       | PA-103A       | 161241        | 10 MHz ~ 1000MHz | Mar. 17, 2014    | Nov. 22, 2014                   | Mar. 16, 2015 | Radiation (03CH07-HY) |
| Preamplifier              | Agilent         | 8449B         | 3008A02362    | 1 GHz~26.5 GHz   | Nov. 29, 2013    | Nov. 22, 2014                   | Nov. 28, 2014 | Radiation (03CH07-HY) |
| Turn Table                | ChainTek        | ChainTek 3000 | N/A           | 0 ~ 360 degree   | N/A              | Nov. 22, 2014                   | N/A           | Radiation (03CH07-HY) |
| Antenna Mast              | ChainTek        | M-400-0       | 114/8000604/L | N/A              | N/A              | Nov. 22, 2014                   | N/A           | Radiation (03CH07-HY) |
| Signal Generator          | Rohde & Schwarz | SMF100A       | 101107        | 100kHz~40GHz     | May 23, 2014     | Nov. 22, 2014                   | May 22, 2015  | Radiation (03CH07-HY) |
| Double Ridge Horn Antenna | ESCO            | 3117          | 00066583      | 1GHz~18GHz       | Jul. 24, 2014    | Nov. 22, 2014                   | Jul. 23, 2015 | Radiation (03CH07-HY) |



## 5 Uncertainty of Evaluation

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

|                                                                          |      |
|--------------------------------------------------------------------------|------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 4.50 |
|--------------------------------------------------------------------------|------|