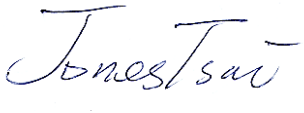
# FCC/IC RF Test Report

| | | |
|---|---|---|
| **APPLICANT** | : | **Sony Mobile Communications Inc** |
| **EQUIPMENT** | : | **PDA Phone** |
| **BRAND NAME** | : | **Sony** |
| **TYPE NAME** | : | **PM-0785-BV** |
| **FCC ID** | : | **PY7-PM0785** |
| **IC** | : | **4170B-PM0785** |
| **STANDARD** | : | **FCC 47 CFR Part 2, 22(H), 24(E), 27(L)**<br>**IC RSS-132 issue 3, IC RSS-133 issue 6, and IC RSS-139 issue 2** |
| **CLASSIFICATION** | : | **PCS Licensed Transmitter Held to Ear (PCE)** |

**The product was received on Dec. 04, 2014 and testing was completed on Feb. 04, 2015. 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**

Testing Laboratory
1190

***SPORTON INTERNATIONAL INC.***
***No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.***

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# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FG4D0462A | Rev. 01 | Initial issue of report | Mar. 16, 2015 |
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# SUMMARY OF TEST RESULT

| Report Section | FCC Rule | IC Rule | Description | Limit | Result | Remark |
|---|---|---|---|---|---|---|
| 3.1 | §2.1046 | RSS-132 (5.4)<br>RSS-133 (6.4)<br>RSS-139 (6.4) | Conducted Output Power | Reporting Only | PASS | - |
| 3.2 | - | RSS-139 (6.4) | Peak-to-Average Ratio | < 13 dB | PASS | - |
| 3.3 | §27.50(d)(4) | RSS-139 (6.4)<br>SRSP-513(5.1.2) | Equivalent Isotropic Radiated Power | < 1 Watts | PASS | - |
| 3.4 | §2.1049<br>§27.53(g) | RSS-GEN(4.6.1)<br>RSS-139 (6.5) | Occupied Bandwidth | Reporting Only | PASS | - |
| 3.5 | §2.1051<br>§27.53(h) | RSS-GEN(4.9)<br>RSS-139 (6.5) | Band Edge Measurement | < 43+10log10(P[Watts]) | PASS | - |
| 3.6 | §2.1051<br>§27.53(h) | RSS-GEN(4.9)<br>RSS-139 (6.5) | Conducted Emission | < 43+10log10(P[Watts]) | PASS | - |
| 3.7 | §2.1053<br>§27.53(h) | RSS-GEN(4.9)<br>RSS-139 (6.5) | Field Strength of Spurious Radiation | < 43+10log10(P[Watts]) | PASS | Under limit 19.03 dB at 15282.000 MHz |
| 3.8 | §2.1055<br>§27.54 | RSS-GEN(4.7)<br>RSS-139 (6.3) | Frequency Stability for Temperature & Voltage | Within Authorized Band | PASS | - |

# 1 General Description

## 1.1 Applicant

**Sony Mobile Communications Inc**
Nya Vattentornet 22188 Lund/Sweden

## 1.2 Manufacturer

**Sony Mobile Communications Inc**
Nya Vattentornet 22188 Lund/Sweden

## 1.3 Product Feature of Equipment Under Test

The Equipment Under Test (hereafter called: EUT) is PDA Phone supporting, GSM/WCDMA/LTE, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n, Bluetooth with FM Receiver, GPS, ANT+, and NFC features, and below is details of information.

| Product Feature | |
|---|---|
| **Equipment** | PDA Phone |
| **Brand Name** | Sony |
| **Type Name** | PM-0785-BV |
| **FCC ID** | PY7-PM0785 |
| **IC** | 4170B-PM0785 |
| **GSM Operating Band(s)** | GSM 850/900/1800/1900MHz |
| **GPRS / EGPRS Multi Slot Class** | GPRS Class 33, EGPRS Class 33 |
| **WCDMA Operating Band(s)** | FDD Band I / II / IV / V / VIII |
| **WCDMA Rel. Version** | Rel. 8 |
| **LTE Operating Band(s)** | FDD Band II / IV / V / VII / XII / XIII / XVII / XXVIII |
| **LTE Rel. Version** | Rel. 10 |
| **Wi-Fi Specification** | 802.11b/g/n HT20<br>802.11a/n HT20/HT40 |
| **Bluetooth Version** | v3.0 + EDR / v4.0 - LE |
| **NFC Specification** | ISO14443A / ISO14443B / Felica / ISO15693 |
| **ANT+** | ANT+ |
| **Power Supply** | Battery / AC Adapter / Car Charger |

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

| EUT Information List | | | | |
|---|---|---|---|---|
| IMEI | HW Version | SW Version | S/N | Performed Test Item |
| IMEI : 004402454111331 | AP | 26.1.A.0.66 | YT9110K9N9 | RF conducted measurement<br>Radiated Spurious Emission<br>ERP/EIRP Test |

| Accessory List | |
|---|---|
| **AC Adapter** | Model No. : EP800 |
| | Type No. : AC-0030-US |
| | S/N : 3114W44203166 |
| **Battery** | Model No. : Bellis |
| **Earphone** | Model No. : MH410c |
| | Type No. : AG-1100 |
| | S/N : 12431A1A00118E8 |
| **USB Cable** | Model No. : EC450 |
| | Type No. : AI-0700 |
| | S/N : 142412DF3337518 |

## 1.4 Product Specification subjective to this standard

| Product Specification subjective to this standard | |
|---|---|
| **Tx Frequency** | 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 |
| **Rx Frequency** | 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 |
| **Maximum Output Power to Antenna** | GSM850 : 33.36 dBm<br>GSM1900 : 30.71 dBm<br>WCDMA Band V : 24.33 dBm<br>WCDMA Band IV : 23.45 dBm<br>WCDMA Band II : 23.52 dBm |
| **99% Occupied Bandwidth** | WCDMA Band IV: 4.18MHz |
| **Antenna Type** | PIFA Antenna |
| **Type of Modulation** | GSM: GMSK<br>GPRS: GMSK<br>EDGE: GMSK / 8PSK<br>WCDMA: QPSK (Uplink)<br>HSDPA: 64QAM (Downlink)<br>HSUPA: QPSK (Uplink) |

## 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 27 | WCDMA Band IV RMC 12.2Kbps | QPSK | 0.1977 | 0.0133 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 1st Rd., Hwa Ya Technology Park,<br>Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.<br>TEL: +886-3-327-3456<br>FAX: +886-3-328-4978 | |
| **Test Site No.** | **Sporton Site No.** | |
| | TH02-HY | |

| | | |
|---|---|---|
| **Test Site** | SPORTON INTERNATIONAL INC. | |
| **Test Site Location** | No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd.<br>Kwei-Shan District, Tao Yuan City, Taiwan (R.O.C.)<br>TEL: +886-3-327-0855 | |
| **Test Site No.** | **Sporton Site No.** | **IC Registration No.** |
| | 03CH10-HY | 4086H-1 |

## 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
- IC RSS-132 Issue 3
- IC RSS-133 Issue 6
- IC RSS-139 Issue 2
- IC RSS-Gen Issue 4
- NOTICE 2012-DRS0126

**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.
3. Per the section 2.2.3 of Notice of 2012-DRS0126, " Receivers Excluded from Industry Canada Requirements", only radiocommunication receivers operating in stand-alone mode within the band 30-960 MHz and scanner receivers are subject to Industry Canada requirements.

# 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
3. 30 MHz to 19000 MHz for GSM1900.

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 1900** | ■ GPRS class 8 Link | - |
| **WCDMA Band V** | ■ 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:

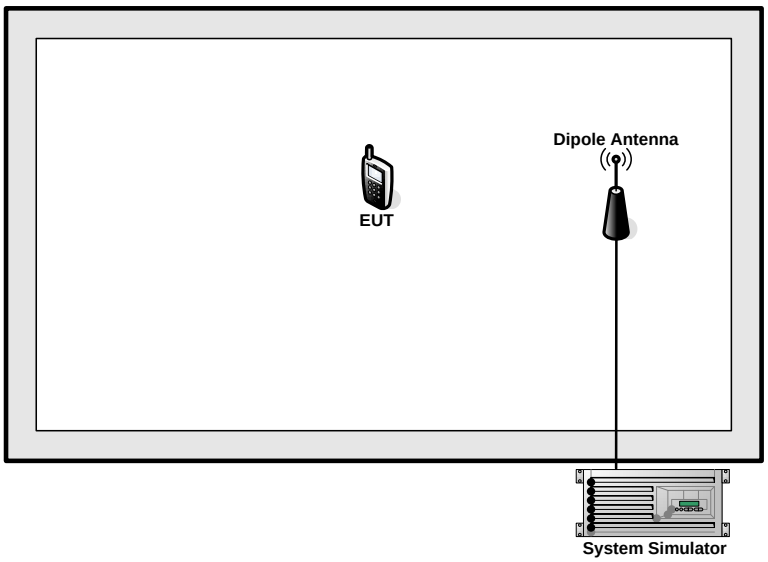
GPRS multi-slot class 8 mode for GMSK modulation, RMC 12.2Kbps Link mode for WCDMA band IV and WCDMA Band V, only these modes were used for all tests.

**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** | 33.17 | 33.27 | **33.36** | 30.59 | 30.59 | 30.70 |
| **GPRS class 8** | 33.25 | 33.27 | **33.36** | 30.63 | 30.63 | **30.71** |
| **GPRS class 10** | 28.89 | 28.91 | 29.04 | 29.17 | 29.35 | 29.52 |
| **GPRS class 11** | 27.70 | 27.77 | 27.59 | 27.33 | 27.30 | 27.44 |
| **GPRS class 12** | 27.97 | 27.65 | 27.81 | 27.34 | 27.37 | 27.43 |
| **EGPRS class 8** | 26.17 | 26.20 | **26.22** | 25.45 | 25.47 | 25.60 |
| **EGPRS class 10** | 25.98 | 25.97 | 25.94 | 25.70 | 25.85 | **25.93** |
| **EGPRS class 11** | 25.90 | 25.86 | 25.78 | 25.63 | 25.81 | 25.66 |
| **EGPRS class 12** | 24.80 | 24.62 | 24.71 | 24.63 | 24.84 | 24.94 |

| Conducted Power (*Unit: dBm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Band** | **WCDMA Band V** | | | **WCDMA Band II** | | | **WCDMA Band IV** | | |
| **Channel** | **4132** | **4182** | **4233** | **9262** | **9400** | **9538** | **1312** | **1413** | **1513** |
| **Frequency** | **826.4** | **836.4** | **846.6** | **1852.4** | **1880** | **1907.6** | **1712.4** | **1732.6** | **1752.6** |
| **RMC 12.2K** | 24.27 | 24.29 | **24.33** | 23.50 | 23.50 | **23.52** | 23.27 | 23.44 | **23.45** |
| **HSDPA Subtest-1** | 23.85 | 23.64 | 23.81 | 23.01 | 23.00 | 23.14 | 23.02 | 22.94 | 22.95 |
| **HSDPA Subtest-2** | 23.78 | 23.85 | 23.88 | 22.86 | 22.92 | 23.02 | 23.07 | 22.72 | 22.87 |
| **HSDPA Subtest-3** | 23.24 | 23.26 | 23.40 | 22.32 | 22.29 | 22.47 | 22.38 | 22.23 | 22.49 |
| **HSDPA Subtest-4** | 23.37 | 23.32 | 23.38 | 22.33 | 22.36 | 22.38 | 22.28 | 22.33 | 22.25 |
| **HSUPA Subtest-1** | 23.25 | 23.75 | 23.51 | 22.35 | 22.60 | 22.89 | 23.08 | 22.96 | 22.64 |
| **HSUPA Subtest-2** | 21.97 | 22.34 | 21.95 | 21.65 | 21.67 | 21.82 | 21.50 | 21.53 | 21.54 |
| **HSUPA Subtest-3** | 22.33 | 22.41 | 22.34 | 21.48 | 21.62 | 21.35 | 21.83 | 21.70 | 21.77 |
| **HSUPA Subtest-4** | 22.47 | 22.90 | 22.97 | 22.36 | 21.72 | 22.27 | 22.46 | 22.34 | 22.13 |
| **HSUPA Subtest-5** | 23.86 | 23.80 | 23.96 | 22.91 | 22.99 | 22.96 | 22.99 | 22.83 | 22.86 |

## 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. | System Simulator | Anritsu | MT8820C | 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 :

*Offset(dB) = RF cable loss(dB) + attenuator factor(dB).*

= 4.2 + 10 = 14.2 (dB)

# 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.

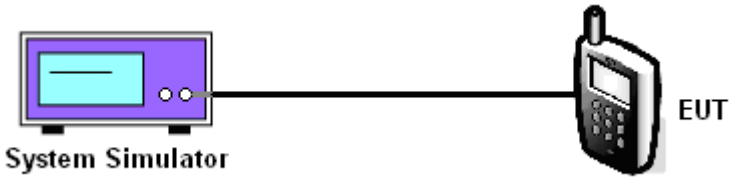
### 3.1.2 Measuring Instruments

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 (GPRS class 8)** | | | **GSM850 (EDGE class 8)** | | | **WCDMA Band V (RMC 12.2Kbps 12.2Kbps)** | | |
| **Channel** | **128 (Low)** | **189 (Mid)** | **251 (High)** | **128 (Low)** | **189 (Mid)** | **251 (High)** | **4132 (Low)** | **4182 (Mid)** | **4233 (High)** |
| **Frequency (MHz)** | **824.2** | **836.4** | **848.8** | **824.2** | **836.4** | **848.8** | **826.4** | **836.4** | **846.6** |
| **Conducted Power (dBm)** | 33.25 | 33.27 | 33.36 | 26.17 | 26.20 | 26.22 | 24.27 | 24.29 | 24.33 |

| PCS Band | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Modes** | **GSM1900 (GPRS class 8)** | | | **GSM1900 (EDGE class 8)** | | | **WCDMA Band II (RMC 12.2Kbps 12.2Kbps)** | | |
| **Channel** | **512 (Low)** | **661 (Mid)** | **810 (High)** | **512 (Low)** | **661 (Mid)** | **810 (High)** | **9262 (Low)** | **9400 (Mid)** | **9538 (High)** |
| **Frequency (MHz)** | **1850.2** | **1880** | **1909.8** | **1850.2** | **1880** | **1909.8** | **1852.4** | **1880** | **1907.6** |
| **Conducted Power (dBm)** | 30.63 | 30.63 | 30.71 | 25.70 | 25.85 | 25.93 | 23.50 | 23.50 | 23.52 |

| 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)** | 23.27 | 23.44 | 23.45 |

**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.

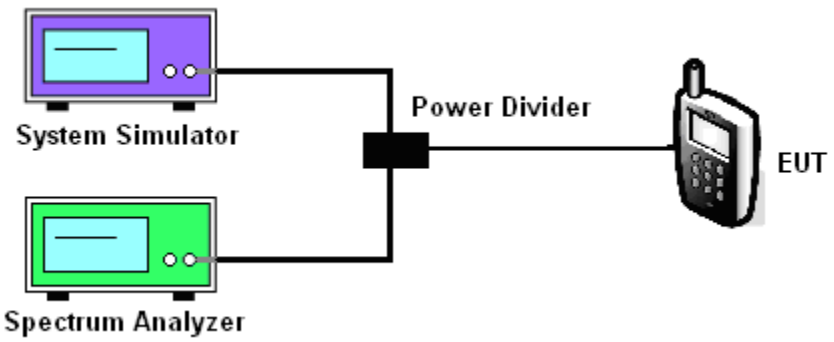
### 3.2.2 Measuring Instruments

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. When the duty cycle is less than 98%, then signal gating will be 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



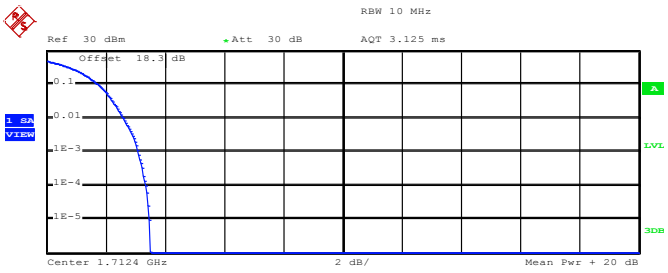

### 3.2.5 Test Result of Peak-to-Average Ratio

| 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) | 3.12 | 3.04 | 3.16 |

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

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

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




Complementary Cumulative Distribution Function (100000 samples)

| | Trace 1 |
|---|---|
| Mean | 20.06 dBm |
| Peak | 23.55 dBm |
| Crest | 3.50 dB |
| 10 % | 1.76 dB |
| 1 % | 2.60 dB |
| .1 % | 3.12 dB |
| .01 % | 3.36 dB |

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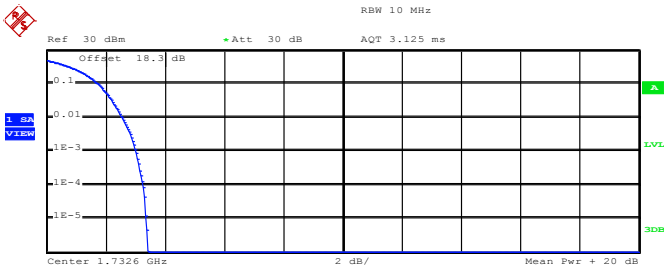
**Peak-to-Average Ratio on Channel 1413 (1732.6 MHz)**




Complementary Cumulative Distribution Function (100000 samples)

| | Trace 1 |
|---|---|
| Mean | 20.76 dBm |
| Peak | 24.19 dBm |
| Crest | 3.43 dB |
| 10 % | 1.76 dB |
| 1 % | 2.56 dB |
| .1 % | 3.04 dB |
| .01 % | 3.28 dB |

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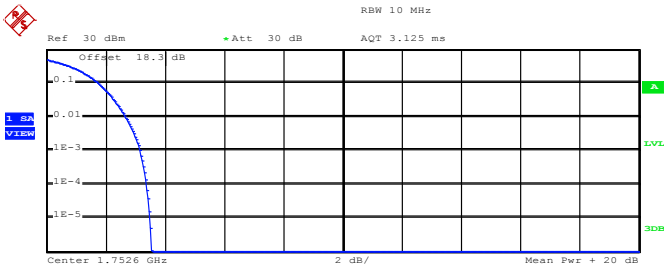
**Peak-to-Average Ratio on Channel 1513 (1752.6 MHz)**




Complementary Cumulative Distribution Function (100000 samples)

| | Trace 1 |
|---|---|
| Mean | 20.59 dBm |
| Peak | 24.12 dBm |
| Crest | 3.53 dB |
| 10 % | 1.76 dB |
| 1 % | 2.68 dB |
| .1 % | 3.16 dB |
| .01 % | 3.40 dB |

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# 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 EIRP of mobile transmitters are limited to 1 Watts (AWS Band).

## 3.3.2 Measuring Instruments

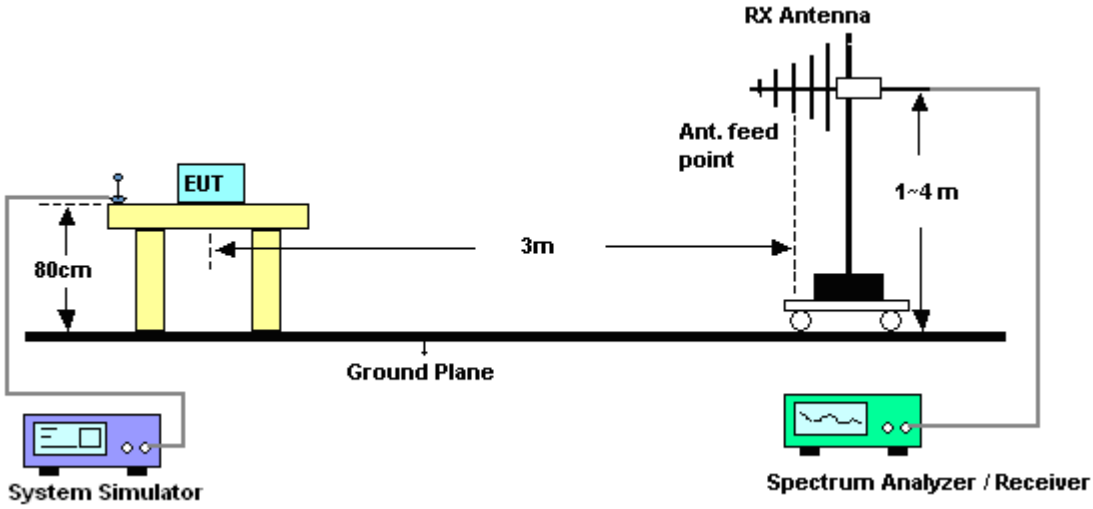
The measuring equipment is listed in the section 4 of this test report.

## 3.3.3 Test Procedures

1. The 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 + Correction factor and ERP = EIRP – 2.15 .

| | GSM/GPRS/EDGE | WCDMA/HSPA |
|---|---|---|
| SPAN | 500kHz | 10MHz |
| RBW | 10kHz | 100kHz |
| VBW | 30kHz | 300kHz |
| Detector | RMS | RMS |
| Trace | Average | Average |
| Average Type | Power | Power |
| Sweep Count | 100 | 100 |

### 3.3.4 Test Setup



### 3.3.5 Test Result of EIRP

| WCDMA Band IV (RMC 12.2Kbps) Radiated Power EIRP | | | | |
|---|---|---|---|---|
| Horizontal Polarization | | | | |
| **Frequency (MHz)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1712.4 | -21.22 | 43.22 | 22.00 | 0.1585 |
| 1732.6 | -21.39 | 43.49 | 22.10 | 0.1622 |
| 1752.6 | -20.58 | 43.54 | 22.96 | 0.1977 |
| Vertical Polarization | | | | |
| **Frequency (MHz)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1712.4 | -28.18 | 46.53 | 18.35 | 0.0684 |
| 1732.6 | -28.56 | 46.43 | 17.87 | 0.0612 |
| 1752.6 | -29.94 | 48.05 | 18.11 | 0.0647 |

* 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.

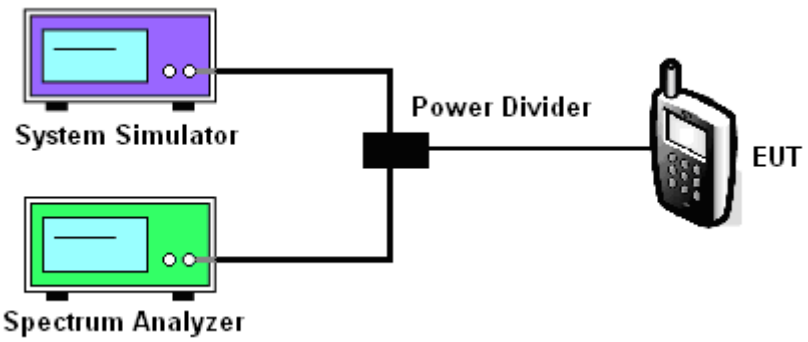
## 3.4.2 Measuring Instruments

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



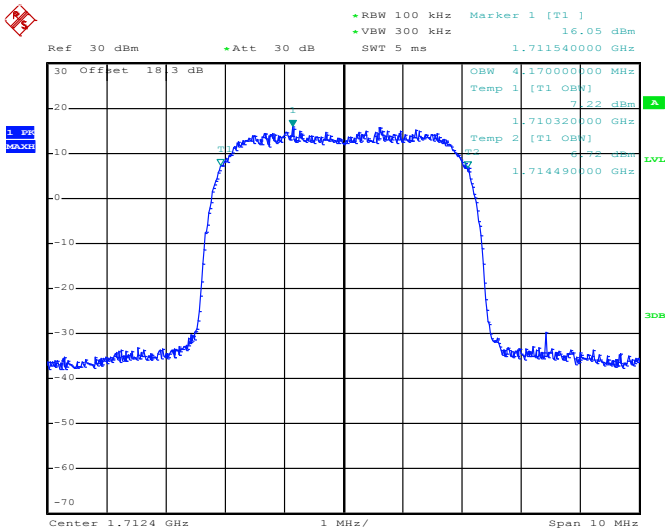
### 3.4.5 Test Result of Occupied Bandwidth and 26dB Bandwidth

| 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)** | 4.66 | 4.67 | 4.67 |

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

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

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

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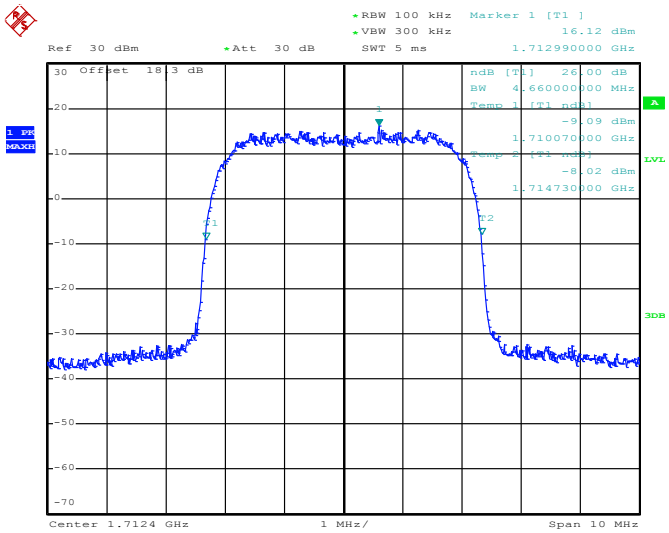
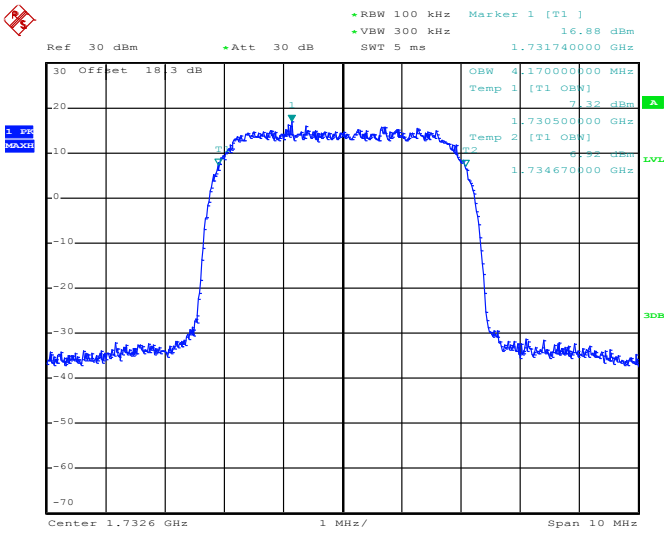
**26dB Bandwidth Plot on Channel 1312 (1712.4 MHz)**



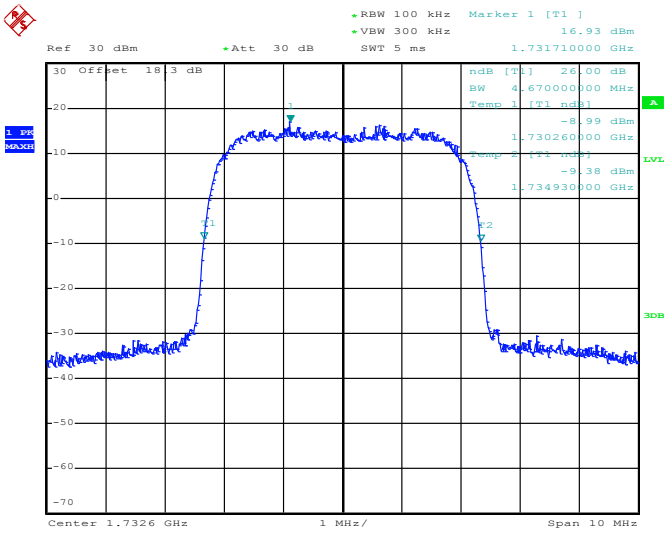

Date: 30.JAN.2015 21:29:05

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



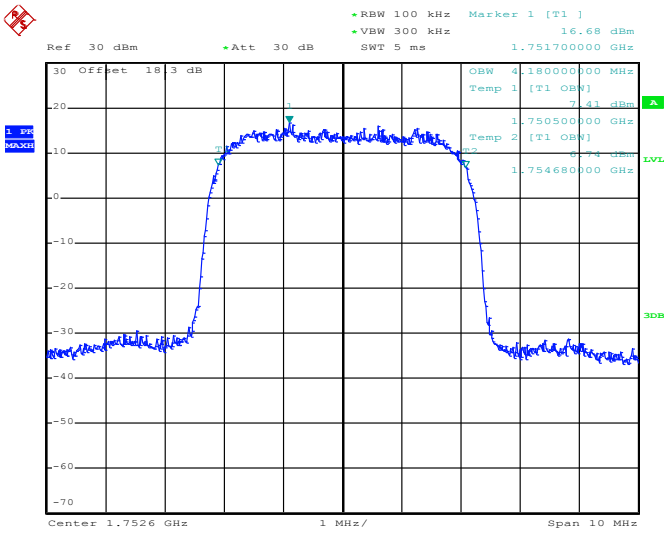

Date: 30.JAN.2015 21:44:47

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




Date: 30.JAN.2015 21:29:34

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

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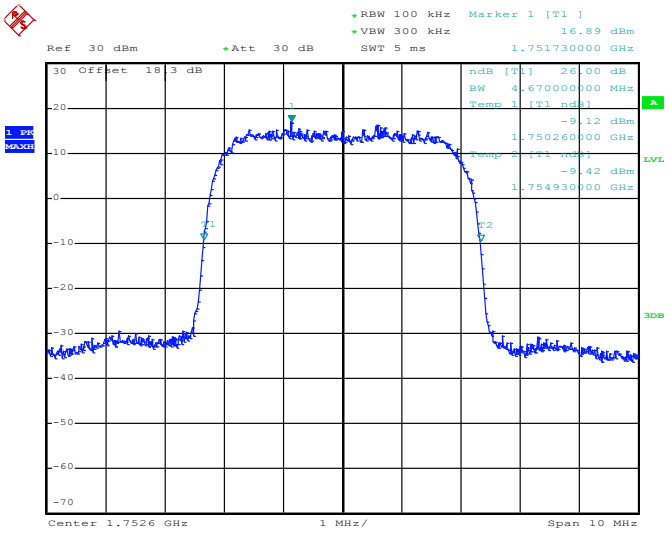
## 26dB Bandwidth Plot on Channel 1513 (1752.6 MHz)

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# 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

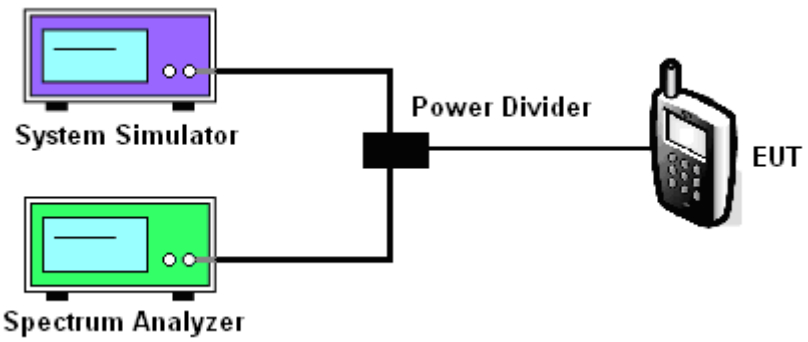
The measuring equipment is listed in the section 4 of this test report.

## 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 + 10log(P) dB below the transmitter power P(Watts)
   = P(W) - [43 + 10log(P) ] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P) ] (dB)
   = -13dBm.

## 3.5.4 Test Setup

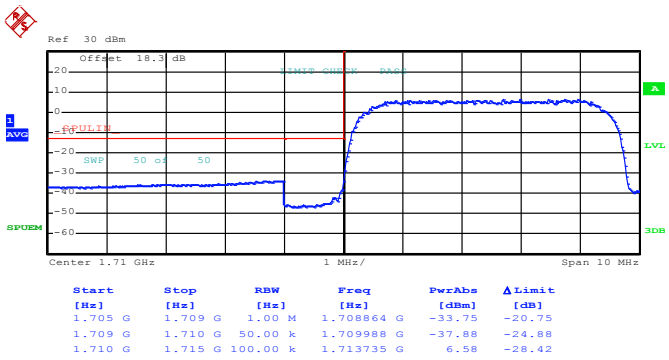
**<Conducted Band Edge >**



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

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

**Lower Band Edge Plot on Channel 1312 (1712.4 MHz)**




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 1.705 G | 1.709 G | 1.00 M | 1.708864 G | -33.75 | -20.75 |
| 1.709 G | 1.710 G | 50.00 k | 1.709988 G | -37.88 | -24.88 |
| 1.710 G | 1.715 G | 100.00 k | 1.713735 G | 6.58 | -28.42 |

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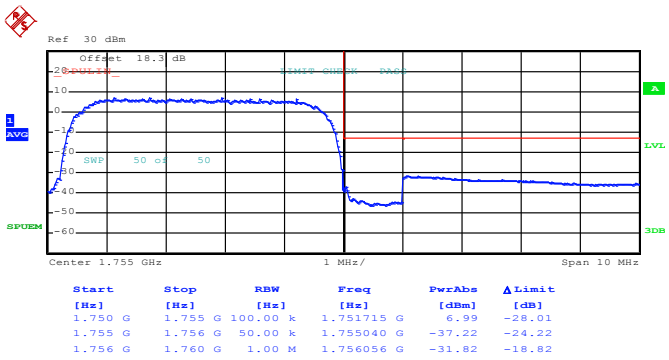
**Higher Band Edge Plot on Channel 1513 (1752.6 MHz)**




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 1.750 G | 1.755 G | 100.00 k | 1.751715 G | 6.99 | -28.01 |
| 1.755 G | 1.756 G | 50.00 k | 1.755040 G | -37.22 | -24.22 |
| 1.756 G | 1.760 G | 1.00 M | 1.756056 G | -31.82 | -18.82 |

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*1. Correction Factor(dB)= 10log(1% Emission BW/RBW)*

*2. Band Edge= Measurement Value + Correction Factor(dB)*

# 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$^{th}$ harmonic.

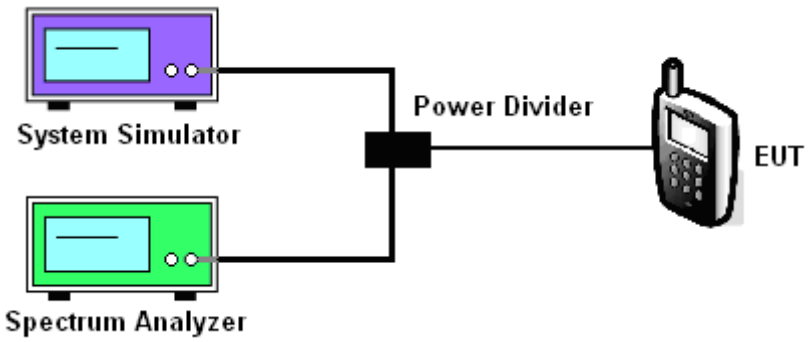
## 3.6.2 Measuring Instruments

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 + 10log(P) dB below the transmitter power P(Watts)
   = P(W) - [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

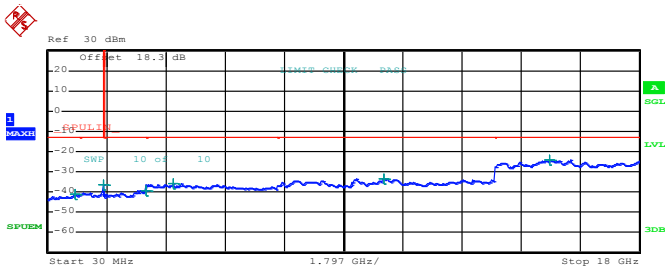
## 3.6.4 Test Setup



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

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

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




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 852.075000 M | -41.19 | -28.19 |
| 1.000 G | 1.705 G | 1.00 M | 1.703061 G | -36.19 | -23.19 |
| 1.760 G | 3.000 G | 1.00 M | 2.999690 G | -39.27 | -26.27 |
| 3.000 G | 7.000 G | 1.00 M | 3.824000 G | -35.94 | -22.94 |
| 7.000 G | 13.600 G | 1.00 M | 10.227400 G | -33.44 | -20.44 |
| 13.600 G | 18.000 G | 1.00 M | 15.256050 G | -23.98 | -10.98 |

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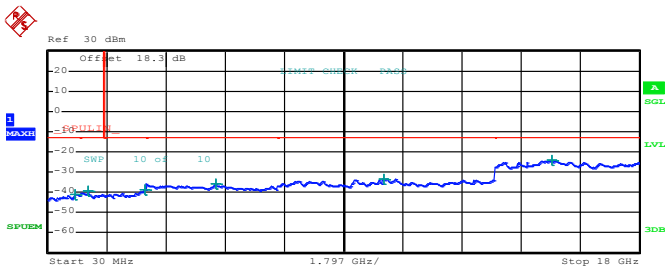
| Band : | WCDMA Band IV | Channel : | CH1413 |
|---|---|---|---|
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 1732.6 MHz |

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




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 860.562500 M | -41.15 | -28.15 |
| 1.000 G | 1.705 G | 1.00 M | 1.267195 G | -39.59 | -26.59 |
| 1.760 G | 3.000 G | 1.00 M | 2.982020 G | -38.75 | -25.75 |
| 3.000 G | 7.000 G | 1.00 M | 5.126000 G | -35.89 | -22.89 |
| 7.000 G | 13.600 G | 1.00 M | 10.243900 G | -33.18 | -20.18 |
| 13.600 G | 18.000 G | 1.00 M | 15.339100 G | -24.27 | -11.27 |

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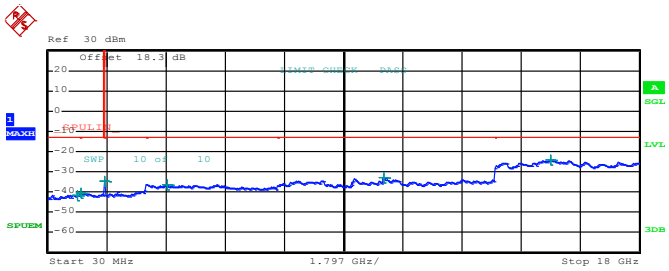
| Band : | WCDMA Band IV | Channel : | CH1513 |
|---|---|---|---|
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 1752.6 MHz |

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




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 915.125000 M | -41.43 | -28.43 |
| 1.000 G | 1.705 G | 1.00 M | 1.023089 G | -40.20 | -27.20 |
| 1.760 G | 3.000 G | 1.00 M | 1.760310 G | -34.88 | -21.88 |
| 3.000 G | 7.000 G | 1.00 M | 3.661000 G | -36.28 | -23.28 |
| 7.000 G | 13.600 G | 1.00 M | 10.227400 G | -33.13 | -20.13 |
| 13.600 G | 18.000 G | 1.00 M | 15.319850 G | -24.05 | -11.05 |

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# 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 (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (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 + 10log(P) dB below the transmitter power P(Watts)

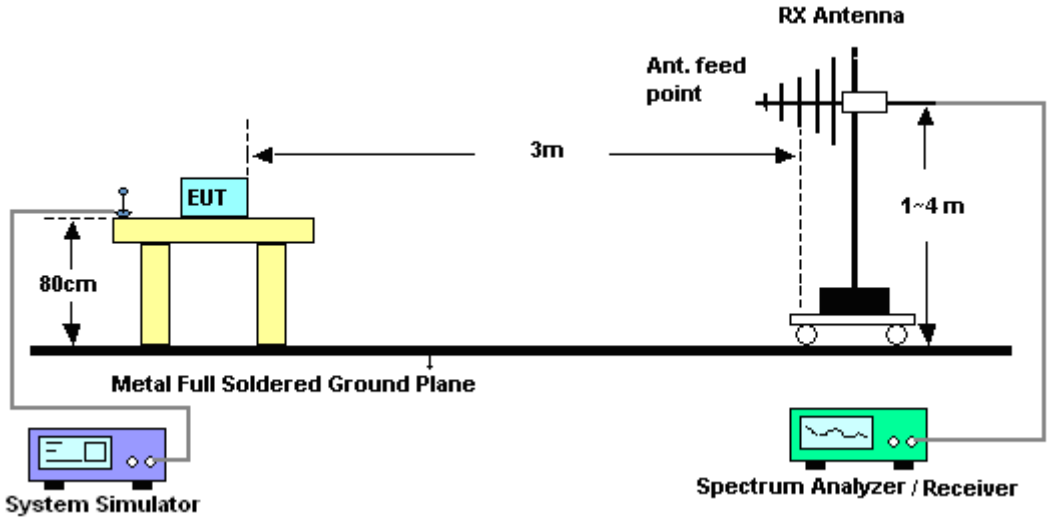
    = P(W) - [43 + 10log(P)] (dB)

    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

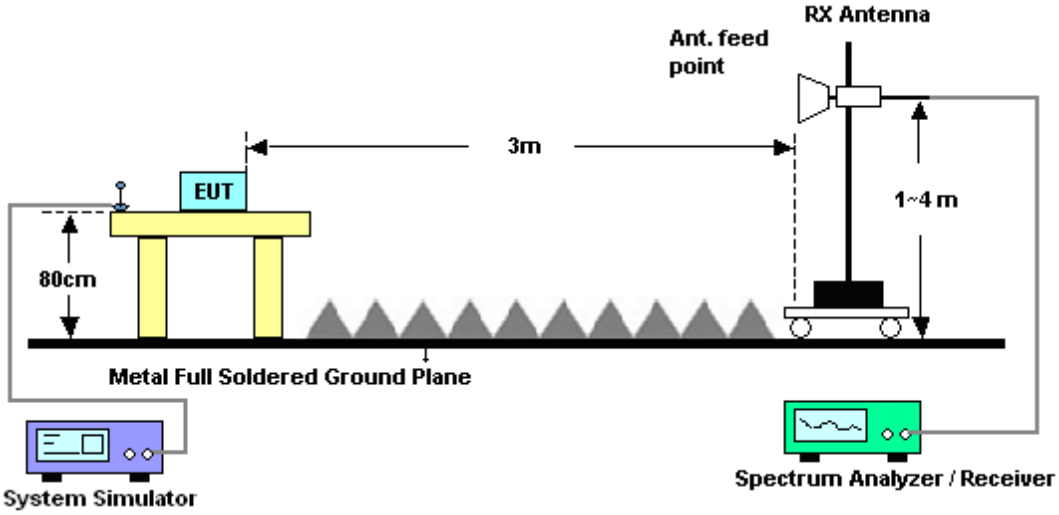
    = -13dBm.

### 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

**<Low Channel>**

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band V | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Horizontal |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 1648 | -63.26 | -13 | -50.26 | -73.04 | -65.02 | 0.98 | 4.89 | H | Pass |
| 2480 | -61.66 | -13 | -48.66 | -75.02 | -63.57 | 1.28 | 5.34 | H | Pass |
| 3304 | -59.34 | -13 | -46.34 | -75.98 | -62.78 | 1.54 | 7.14 | H | Pass |

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band V | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Vertical |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 1648 | -65.05 | -13 | -52.05 | -72.83 | -66.81 | 0.98 | 4.89 | V | Pass |
| 2480 | -59.64 | -13 | -46.64 | -74.99 | -61.55 | 1.28 | 5.34 | V | Pass |
| 3304 | -60.32 | -13 | -47.32 | -75.73 | -63.76 | 1.54 | 7.14 | V | Pass |

**<Middle Channel>**

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band V | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Horizontal |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 1672 | -61.33 | -13 | -48.33 | -70.78 | -63.01 | 0.99 | 4.82 | H | Pass |
| 2509 | -60.42 | -13 | -47.42 | -73.97 | -62.38 | 1.29 | 5.41 | H | Pass |
| 3344 | -59.39 | -13 | -46.39 | -75.66 | -63 | 1.56 | 7.31 | H | Pass |

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band V | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Vertical |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 1672 | -62.86 | -13 | -49.86 | -70.27 | -64.54 | 0.99 | 4.82 | V | Pass |
| 2509 | -58.53 | -13 | -45.53 | -74.12 | -60.49 | 1.29 | 5.41 | V | Pass |
| 3344 | -60.17 | -13 | -47.17 | -75.51 | -63.78 | 1.56 | 7.31 | V | Pass |

**<High Channel>**

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band V | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Horizontal |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 1696 | -58.94 | -13 | -45.94 | -68.54 | -60.54 | 1.00 | 4.75 | H | Pass |
| 2536 | -60.05 | -13 | -47.05 | -73.63 | -62.03 | 1.30 | 5.43 | H | Pass |
| 3384 | -58.58 | -13 | -45.58 | -75.26 | -62.35 | 1.57 | 7.49 | H | Pass |

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band V | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Vertical |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 1696 | -61.94 | -13 | -48.94 | -69.81 | -63.54 | 1.00 | 4.75 | V | Pass |
| 2536 | -58.86 | -13 | -45.86 | -74.34 | -60.84 | 1.30 | 5.43 | V | Pass |
| 3384 | -60.16 | -13 | -47.16 | -75.87 | -63.93 | 1.57 | 7.49 | V | Pass |

**<Low Channel>**

| | | | |
|---|---|---|---|
| **Band :** | GSM1900 | **Temperature :** | 20~22°C |
| **Test Mode :** | GPRS class 8 Link (GMSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Horizontal |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3700 | -44.81 | -13 | -31.81 | -63.68 | -51.38 | 1.67 | 8.24 | H | Pass |
| 5548 | -46.18 | -13 | -33.18 | -70.15 | -53.25 | 2.65 | 9.72 | H | Pass |
| 7403 | -41.91 | -13 | -28.91 | -70.88 | -51.06 | 2.46 | 11.61 | H | Pass |
| 14807 | -36.26 | -13 | -23.26 | -73.83 | -46.11 | 3.52 | 13.37 | H | Pass |

| | | | |
|---|---|---|---|
| **Band :** | GSM1900 | **Temperature :** | 20~22°C |
| **Test Mode :** | GPRS class 8 Link (GMSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Vertical |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3700 | -43.67 | -13 | -30.67 | -62.53 | -50.24 | 1.67 | 8.24 | V | Pass |
| 5548 | -45.82 | -13 | -32.82 | -68.09 | -52.89 | 2.65 | 9.72 | V | Pass |
| 7403 | -42.09 | -13 | -29.09 | -70.18 | -51.24 | 2.46 | 11.61 | V | Pass |
| 14807 | -37.15 | -13 | -24.15 | -76.4 | -47 | 3.52 | 13.37 | V | Pass |

**<Middle Channel>**

| | | | |
|---|---|---|---|
| **Band :** | GSM1900 | **Temperature :** | 20~22°C |
| **Test Mode :** | GPRS class 8 Link (GMSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Horizontal |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3763 | -40.49 | -13 | -27.49 | -60.03 | -47.12 | 1.69 | 8.32 | H | Pass |
| 5639 | -46.74 | -13 | -33.74 | -70.52 | -53.79 | 2.71 | 9.76 | H | Pass |
| 7522 | -38.48 | -13 | -25.48 | -67.27 | -47.87 | 2.42 | 11.81 | H | Pass |
| 11282.5 | -41.84 | -13 | -28.84 | -74.82 | -51.54 | 2.68 | 12.39 | H | Pass |
| 13163.5 | -37.76 | -13 | -24.76 | -76.93 | -48.02 | 2.97 | 13.23 | H | Pass |
| 15044.5 | -34.71 | -13 | -21.71 | -71.97 | -44.76 | 3.62 | 13.66 | H | Pass |

| | | | |
|---|---|---|---|
| **Band :** | GSM1900 | **Temperature :** | 20~22°C |
| **Test Mode :** | GPRS class 8 Link (GMSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Vertical |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3763 | -45.40 | -13 | -32.40 | -64.15 | -52.03 | 1.69 | 8.32 | V | Pass |
| 5639 | -43.31 | -13 | -30.31 | -65.82 | -50.36 | 2.71 | 9.76 | V | Pass |
| 7522 | -39.89 | -13 | -26.89 | -68.57 | -49.28 | 2.42 | 11.81 | V | Pass |
| 11282.5 | -37.08 | -13 | -24.08 | -69.59 | -46.78 | 2.68 | 12.39 | V | Pass |
| 13163.5 | -36.05 | -13 | -23.05 | -73.32 | -46.31 | 2.97 | 13.23 | V | Pass |
| 15044.5 | -34.38 | -13 | -21.38 | -73.8 | -44.43 | 3.62 | 13.66 | V | Pass |

**<High Channel>**

| | | | |
|---|---|---|---|
| **Band :** | GSM1900 | **Temperature :** | 20~22°C |
| **Test Mode :** | GPRS class 8 Link (GMSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Horizontal |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3819 | -38.47 | -13 | -25.47 | -58.42 | -45.15 | 1.70 | 8.38 | H | Pass |
| 5730 | -46.17 | -13 | -33.17 | -70.54 | -53.2 | 2.76 | 9.79 | H | Pass |
| 7641 | -36.56 | -13 | -23.56 | -65.11 | -46.06 | 2.38 | 11.88 | H | Pass |
| 11463 | -40.97 | -13 | -27.97 | -74.12 | -50.6 | 2.68 | 12.31 | H | Pass |
| 15282 | -32.03 | -13 | -19.03 | -69.68 | -42.31 | 3.72 | 13.99 | H | Pass |

| | | | |
|---|---|---|---|
| **Band :** | GSM1900 | **Temperature :** | 20~22°C |
| **Test Mode :** | GPRS class 8 Link (GMSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Vertical |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3819 | -42.44 | -13 | -29.44 | -61.32 | -49.12 | 1.70 | 8.38 | V | Pass |
| 5730 | -47.35 | -13 | -34.35 | -70.68 | -54.38 | 2.76 | 9.79 | V | Pass |
| 7641 | -36.90 | -13 | -23.90 | -65.01 | -46.4 | 2.38 | 11.88 | V | Pass |
| 11463 | -35.48 | -13 | -22.48 | -68.68 | -45.11 | 2.68 | 12.31 | V | Pass |
| 15282 | -33.85 | -13 | -20.85 | -73.94 | -44.13 | 3.72 | 13.99 | V | Pass |

**<Low Channel>**

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band IV | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Horizontal |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3427 | -47.05 | -13 | -34.05 | -64.07 | -53.15 | 1.58 | 7.68 | H | Pass |
| 5135 | -50.57 | -13 | -37.57 | -73.53 | -57.86 | 2.41 | 9.70 | H | Pass |
| 8558 | -41.62 | -13 | -28.62 | -72.29 | -51.76 | 2.39 | 12.52 | H | Pass |

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band IV | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Vertical |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3427 | -49.49 | -13 | -36.49 | -66.02 | -55.59 | 1.58 | 7.68 | V | Pass |
| 5135 | -54.36 | -13 | -41.36 | -76.33 | -61.65 | 2.41 | 9.70 | V | Pass |
| 8558 | -45.52 | -13 | -32.52 | -74.83 | -55.66 | 2.39 | 12.52 | V | Pass |

**<Middle Channel>**

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band IV | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Horizontal |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3462 | -46.57 | -13 | -33.57 | -63.78 | -52.81 | 1.59 | 7.83 | H | Pass |
| 5198 | -52.07 | -13 | -39.07 | -74.96 | -59.32 | 2.45 | 9.70 | H | Pass |
| 6934 | -47.14 | -13 | -34.14 | -74.71 | -55.25 | 2.61 | 10.72 | H | Pass |
| 8663 | -42.03 | -13 | -29.03 | -72.99 | -52.18 | 2.41 | 12.57 | H | Pass |

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band IV | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Vertical |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3462 | -49.90 | -13 | -36.90 | -66.91 | -56.14 | 1.59 | 7.83 | V | Pass |
| 5198 | -54.23 | -13 | -41.23 | -76.68 | -61.48 | 2.45 | 9.70 | V | Pass |
| 6934 | -48.40 | -13 | -35.40 | -75.58 | -56.51 | 2.61 | 10.72 | V | Pass |
| 8663 | -44.38 | -13 | -31.38 | -73.89 | -54.53 | 2.41 | 12.57 | V | Pass |

**<High Channel>**

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band IV | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Horizontal |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3504 | -45.10 | -13 | -32.10 | -62.41 | -51.5 | 1.61 | 8.00 | H | Pass |
| 5254 | -51.29 | -13 | -38.29 | -73.96 | -58.51 | 2.48 | 9.70 | H | Pass |
| 7004 | -44.19 | -13 | -31.19 | -72.02 | -52.41 | 2.59 | 10.81 | H | Pass |
| 8768 | -41.17 | -13 | -28.17 | -72.22 | -51.34 | 2.43 | 12.61 | H | Pass |

| | | | |
|---|---|---|---|
| **Band :** | WCDMA Band IV | **Temperature :** | 20~22°C |
| **Test Mode :** | RMC 12.2Kbps Link (QPSK) | **Relative Humidity :** | 45~48% |
| **Test Engineer :** | Lewis He and Karl Hou | **Polarization :** | Vertical |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3504 | -47.96 | -13 | -34.96 | -65.8 | -54.36 | 1.61 | 8.00 | V | Pass |
| 5254 | -53.84 | -13 | -40.84 | -76.81 | -61.06 | 2.48 | 9.70 | V | Pass |
| 7004 | -46.79 | -13 | -33.79 | -74.42 | -55.01 | 2.59 | 10.81 | V | Pass |
| 8768 | -42.72 | -13 | -29.72 | -73.25 | -52.89 | 2.43 | 12.61 | 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 ±0.00025% (±2.5ppm) of the center frequency.

## 3.8.2 Measuring Instruments

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

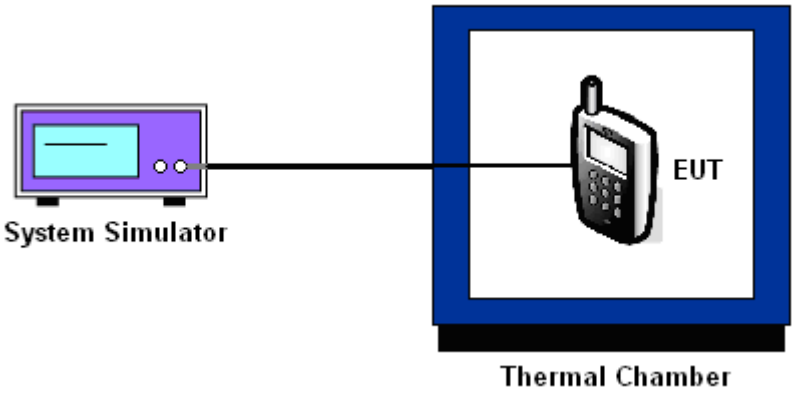
## 3.8.3 Test Procedures for Temperature Variation

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°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°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

## 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±5° 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 : | WCDMA Band IV | Channel : | 1413 |
|---|---|---|---|
| Limit (ppm) : | within authorized band | Frequency : | 1732.6 MHz |

| Temperature (°C) | RMC 12.2Kbps | Result |
|---|---|---|
| | Deviation (ppm) | |
| 50 | 0.0040 | PASS |
| 40 | 0.0017 | |
| 30 | 0.0012 | |
| 20(Ref.) | 0.0000 | |
| 10 | 0.0012 | |
| 0 | 0.0017 | |
| -10 | 0.0006 | |
| -20 | 0.0133 | |
| -30 | 0.0046 | |

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 IV CH1413 | RMC 12.2Kbps | 4.10 | 0.0029 | (Note 3.) | PASS |
| | | 3.7 | 0.0046 | | |
| | | BEP | 0.0040 | | |

**Note:**

1. Normal Voltage = 4.10V.
2. Battery End Point (BEP) = 3.50 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 | Jan. 30, 2015 | Jul. 28, 2015 | Conducted (TH02-HY) |
| Spectrum Analyzer | Rohde & Schwarz | FSP30 | 101329 | 9kHz~30GHz | Jun. 14, 2014 | Jan. 30, 2015 | Jun. 13, 2015 | Conducted (TH02-HY) |
| Temperature Chamber | ESPEC | SU-641 | 92013721 | -30 ~70 | Dec. 01, 2014 | Jan. 30, 2015 | Nov. 30, 2015 | Conducted (TH02-HY) |
| Hygrometer | Testo | 608-H1 | 34893241 | N/A | May 06, 2014 | Jan. 30, 2015 | May 05, 2015 | Conducted (TH02-HY) |
| RF cable | WOKEN | S05 | S05-130708-22 | N/A | Jan. 21, 2015 | Jan. 30, 2015 | Jan. 20, 2016 | Conducted (TH02-HY) |
| Preamplifier | Keysight | 83017A | MY53270078 | 1GHz~26.5GHz | Nov. 20, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Nov. 19, 2015 | Radiation (03CH10-HY) |
| Amplifier | SONOMA | 310N | 187311 | 0.1MHz~1000MHz | Nov. 24, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Nov. 23, 2015 | Radiation (03CH10-HY) |
| Preamplifier | MITEQ | JS44-18004000-33-8P | 1840917 | 18GHz ~ 40GHz | Jun. 09, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Jun. 08, 2015 | Radiation (03CH10-HY) |
| Bilog Antenna | TESEQ | CBL 6111D | 35413 | 30MHz~1GHz | Oct. 24, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Oct. 23, 2015 | Radiation (03CH10-HY) |
| Double Ridged Guide Horn | SCHWARZBECK | BBHA 9120 D | 9120D-1325 | 1GHz ~ 18GHz | Oct. 03, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Oct. 02, 2015 | Radiation (03CH10-HY) |
| Horn Antenna | SCHWARZBECK | BBHA 9170 | BBHA9170584 | 18GHz- 40GHz | Nov. 03, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Nov. 02, 2015 | Radiation (03CH10-HY) |
| Spectrum Analyzer | Keysight | N9010A | MY54200485 | 10Hz ~ 44GHZ | Oct. 14, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Oct. 13, 2015 | Radiation (03CH10-HY) |
| EMI Test Receiver | Keysight | N9038A | MY54130085 | 20Hz ~ 26.5GHz | Nov. 05, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Nov. 04, 2015 | Radiation (03CH10-HY) |
| Controller | EMEC | EM 1000 | N/A | Control Turn table & Ant Mast | N/A | Feb. 03, 2015~ Feb. 04, 2015 | N/A | Radiation (03CH10-HY) |
| Turn Table | EMEC | TT 2200 | N/A | 0-360 degree | N/A | Feb. 03, 2015~ Feb. 04, 2015 | N/A | Radiation (03CH10-HY) |
| Antenna Mast | EMEC | AM-BS-4500-B | N/A | 1~4m | N/A | Feb. 03, 2015~ Feb. 04, 2015 | N/A | Radiation (03CH10-HY) |
| Hygrometer | TECPEL | DTM-303B | TP140320 | N/A | Nov. 17, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Nov. 16, 2015 | Radiation (03CH10-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 104 | MY24956/4 MY24952/4MY2 | 25GHz~40GHz | Nov. 06, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Nov. 05, 2015 | Radiation (03CH10-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 104 | MY24956/4 MY24952/4MY2 | 30MHz~1GHz | Nov. 06, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Nov. 05, 2015 | Radiation (03CH10-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 104 | MY249564 MY249524MY2 | 1GHz~25GHz | Nov. 06, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Nov. 05, 2015 | Radiation (03CH10-HY) |

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| Notch Filter | Wainwright | WRCG 824/849/814/85 | SN35 | GSM850 / WCDMA 850 | Oct. 01, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Sep. 30, 2015 | Radiation (03CH10-HY) |
| Notch Filter | Wainwright | WRCT1850/1910-40/8SS | SN21 | 1900 | Oct. 01, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Sep. 30, 2015 | Radiation (03CH10-HY) |
| Notch Filter | Wainwright | WRCG1710/1755-1690/1755-45 | SN2 | AWS Band | Oct. 01, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Sep. 30, 2015 | Radiation (03CH10-HY) |
| Filter | Microwave Circuits | H1G013G1 | SN477215 | 1GHz HPF | Oct. 01, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Sep. 30, 2015 | Radiation (03CH10-HY) |
| Filter | Wainwright Instruments | WLKS1200-8SS | SN3 | 1.2GHz LPF | Oct. 01, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Sep. 30, 2015 | Radiation (03CH10-HY) |
| Filter | Microwave Circuits | H3G018G1 | SN477220 | 3GHz HPF | Oct. 01, 2014 | Feb. 03, 2015~ Feb. 04, 2015 | Sep. 30, 2015 | Radiation (03CH10-HY) |
| Test Software | Audix | E3 | Version 6.2009-8-24 | N/A | N/A | Feb. 03, 2015~ Feb. 04, 2015 | N/A | Radiation (03CH10-HY) |

# 5 Uncertainty of Evaluation

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

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **4.9** |