



FCC RF Test Report

APPLICANT : ASUSTeK COMPUTER INC.
EQUIPMENT : ASUS Phone
BRAND NAME : ASUS
MODEL NAME : ASUS_Z00VD
MARKETING NAME : ZC500TG
FCC ID : MSQZ00VD
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Apr. 13, 2015 and testing was completed on May 26, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



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



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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 | Occupied Bandwidth | N/A | PASS | - |
| 3.5 | §2.1051 §22.917(a) §24.238(a) | Band Edge Measurement | $< 43+10\log_{10}(P[\text{Watts}])$ | PASS | - |
| 3.6 | §2.1051 §22.917(a) §24.238(a) | Conducted Spurious Emission | $< 43+10\log_{10}(P[\text{Watts}])$ | PASS | - |
| 3.7 | §2.1053 §22.917(a) §24.238(a) | Field Strength of Spurious Radiation | $< 43+10\log_{10}(P[\text{Watts}])$ | PASS | Under limit 10.55 dB at 11280.000 MHz |
| 3.8 | §2.1055 §22.355 | Frequency Stability for Temperature & Voltage | < 2.5 ppm for Part 22 Within Authorized Band | PASS | - |
| | §2.1055 §24.235 | | | | |



1 General Description

1.1 Applicant

ASUSTeK COMPUTER INC.

4F, No.150,Li-Te Rd., Peitou,Taipei 112.Taiwan

1.2 Manufacturer

Dongguan Xinheng Electronic and Technology Co.,Ltd

A-1 DISTRICT, 4/F, NO.9 INDUSTRIAL NORTHERN ROAD DONGGUAN SONGSHAN LAKE NATIONAL HIGH-TECH INDUSTRIAL DEVELOPMENT ZONE DONGGUAN, GUANGDONG, CHINA

1.3 Product Feature of Equipment Under Test

| Product Feature | |
|---------------------------------|---|
| Equipment | ASUS Phone |
| Brand Name | ASUS |
| Model Name | ASUS_Z00VD |
| Marketing Name | ZC500TG |
| FCC ID | MSQZ00VD |
| EUT supports Radios application | GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+(Downlink Only)/ WLAN 2.4GHz 802.11b/g/n HT20/HT40/ Bluetooth v3.0 + EDR/Bluetooth v4.0 LE |
| HW Version | AW806_MB_PCB_V2.0 |
| SW Version | AW806_ZC500TG_20150407 |
| 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.

1.4 Product Specification subjective to this standard

| Product Specification subjective to this standard | |
|---|--|
| Tx Frequency | GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz |
| Rx Frequency | GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz |
| Maximum Output Power to Antenna | GSM850 : 32.69 dBm GSM1900 : 30.11 dBm WCDMA Band V : 23.35 dBm WCDMA Band II : 23.32 dBm |
| Antenna Type | PIFA Antenna |
| Type of Modulation | GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink) HSPA+: 16QAM (Downlink Only) |

1.5 Component List

| Component | Sample 1 | Sample 2 |
|---------------------|---|---|
| Memory | hynix H9TQ17ABJTM C URKUM 516A | hynix H9TQ64ABJTM C URKUM 514A |
| PCB | Evertex AW806_MB_PCB_V2.0 | Evertex AW806_MB_PCB_V2.0 |
| Front_camera | QUNHUI GV5770-00025 | QUNHUI GV5770-00025 |
| Back_camera | GUANGZHEN LA R140530R1448XAN | GUANGZHEN LA R140530R1448XAN |
| Motor | HONGZHIFA B1027-26-1 | HONGZHIFA HZF1027A-P02L10-1 |
| Speaker | HAOSHEN KFSC1115G3.5-08-0.7W-D | HAOSHEN XHS151118SW43P38-02 |
| CTP | TOPTOUCH GT915L 1503-B26A 14BC0600 E5S263xxxx | TOPTOUCH GT915L 1503-B26A 14BC0600 E5S263xxxx |
| LCD | TXD TD-TNHD5031-3 | TXD TXDT500SYPA-AW806 |

| Component | Sample 3 | Sample 4 |
|---------------------|----------------------------------|----------------------------------|
| Memory | hynix H9TQ17ABJTMC URKUM 516A | hynix H9TQ64ABJTMC URKUM 514A |
| PCB | wuzhu AW806_MB_PCB_V2.0 | wuzhu AW806_MB_PCB_V2.0 |
| Front_camera | HUAQUAN O6P2-QL1700HQ | HUAQUAN Q6P2-QL1700HQ |
| Back_camera | QIUTAI F4H5CAE-S | QIUTAI F4H5CAE-S |
| Motor | LEHUI B1027-26-1 | LEHUI HZF1027A-P02L10-1 |
| Speaker | XICHUN KFSC1115G3.5-08-0.7W-D | XICHUN XHS151118SW43P38-02 |
| CTP | MUTTO FT5346DQQ ERH392E | MUTTO FT5346DQQ ERH392E |
| LCD | TCL TD-TNHD5031-3 | TCL TXDT500SYPA-AW806 |

1.6 Modification of EUT

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

1.7 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 | 0.5791 | 0.0514 ppm | 240KGXW |
| Part 22 | GSM850 EDGE class 8 | 8PSK | 0.2364 | 0.0550 ppm | 246KG7W |
| Part 22 | WCDMA Band V RMC 12.2Kbps | QPSK | 0.0532 | 0.0622 ppm | 4M16F9W |
| Part 24 | GSM1900 GSM | GMSK | 0.6125 | 0.0239 ppm | 240KGXW |
| Part 24 | GSM1900 EDGE class 8 | 8PSK | 0.2577 | 0.0154 ppm | 244KG7W |
| Part 24 | WCDMA Band II RMC 12.2Kbps | QPSK | 0.1765 | 0.0266 ppm | 4M18F9W |

1.8 Testing Location

| | | | |
|---------------------------|--|-----------|-----------------------------|
| Test Site | SPORTON INTERNATIONAL (KUNSHAN) INC. | | |
| Test Site Location | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958 | | |
| Test Site No. | Sporton Site No. | | FCC Registration No. |
| | TH01-KS | 03CH02-KS | 418269 |

1.9 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 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 10th harmonic for GSM850 and WCDMA Band V.
2. 30 MHz to 10th harmonic 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 ■ EDGE class 8 Link | ■ GSM Link ■ EDGE class 8 Link |
| GSM 1900 | ■ GSM Link ■ EDGE class 8 Link | ■ GSM 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 |



Conducted Power Measurement Results:

For SIM1 Card:

| 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 | 31.59 | 32.67 | 32.69 | 29.99 | 30.08 | 30.11 |
| GPRS class 8 | 31.58 | 32.66 | 32.68 | 29.98 | 30.06 | 30.10 |
| GPRS class 10 | 30.68 | 31.75 | 31.81 | 29.15 | 29.24 | 29.31 |
| GPRS class 11 | 28.78 | 29.86 | 29.88 | 27.28 | 27.42 | 27.52 |
| GPRS class 12 | 27.52 | 28.65 | 28.66 | 26.04 | 26.24 | 26.30 |
| EGPRS class 8 | 28.09 | 28.12 | 28.33 | 26.92 | 26.73 | 26.54 |
| EGPRS class 10 | 27.00 | 27.06 | 27.28 | 25.91 | 25.64 | 25.48 |
| EGPRS class 11 | 24.77 | 24.81 | 25.02 | 23.67 | 23.41 | 23.18 |
| EGPRS class 12 | 23.44 | 23.58 | 23.71 | 22.25 | 22.18 | 21.81 |

| 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 |
| AMR 12.2K | 23.24 | 23.32 | 23.34 | 22.93 | 23.11 | 23.30 |
| RMC 12.2K | 23.25 | 23.33 | 23.35 | 22.94 | 23.12 | 23.32 |
| HSDPA Subtest-1 | 22.27 | 22.40 | 22.41 | 21.95 | 22.21 | 22.36 |
| HSDPA Subtest-2 | 22.26 | 22.36 | 22.37 | 21.95 | 22.17 | 22.39 |
| HSDPA Subtest-3 | 21.85 | 21.91 | 21.92 | 21.47 | 21.69 | 21.94 |
| HSDPA Subtest-4 | 21.84 | 21.90 | 21.91 | 21.44 | 21.67 | 21.92 |
| HSUPA Subtest-1 | 20.30 | 20.38 | 20.39 | 20.01 | 20.24 | 20.47 |
| HSUPA Subtest-2 | 20.41 | 20.48 | 20.49 | 20.16 | 20.31 | 20.50 |
| HSUPA Subtest-3 | 21.27 | 21.30 | 21.31 | 20.94 | 21.13 | 21.35 |
| HSUPA Subtest-4 | 19.92 | 19.98 | 19.99 | 19.55 | 19.76 | 20.00 |
| HSUPA Subtest-5 | 21.25 | 21.30 | 21.31 | 21.25 | 21.43 | 21.67 |

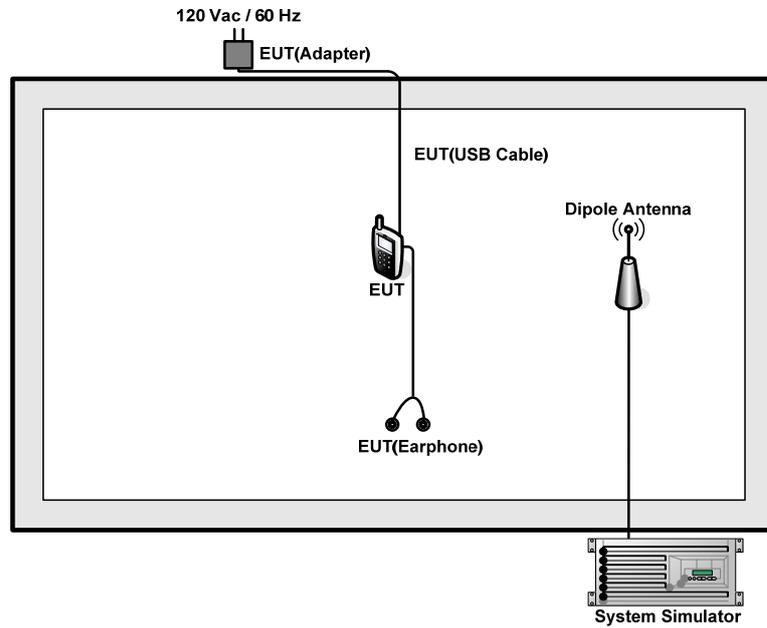


For SIM2 Card:

| 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 | 31.57 | 32.66 | 32.67 | 29.95 | 30.04 | 30.09 |
| GPRS class 8 | 31.56 | 32.65 | 32.66 | 29.94 | 30.03 | 30.08 |
| GPRS class 10 | 30.63 | 31.70 | 31.78 | 29.12 | 29.22 | 29.25 |
| GPRS class 11 | 28.75 | 29.85 | 29.86 | 27.26 | 27.41 | 27.47 |
| GPRS class 12 | 27.50 | 28.61 | 28.62 | 26.01 | 26.23 | 26.25 |
| EGPRS class 8 | 28.05 | 28.09 | 28.31 | 26.89 | 26.71 | 26.51 |
| EGPRS class 10 | 26.98 | 27.04 | 27.24 | 25.90 | 25.61 | 25.45 |
| EGPRS class 11 | 24.73 | 24.78 | 24.99 | 23.65 | 23.39 | 23.17 |
| EGPRS class 12 | 23.39 | 23.53 | 23.66 | 22.20 | 22.14 | 21.78 |

| 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 |
| AMR 12.2K | 23.16 | 23.24 | 23.31 | 22.87 | 23.05 | 23.28 |
| RMC 12.2K | 23.18 | 23.30 | 23.32 | 22.88 | 23.10 | 23.30 |
| HSDPA Subtest-1 | 22.24 | 22.36 | 22.32 | 21.93 | 22.17 | 22.28 |
| HSDPA Subtest-2 | 22.23 | 22.31 | 22.22 | 21.93 | 22.13 | 22.25 |
| HSDPA Subtest-3 | 21.78 | 21.88 | 21.88 | 21.43 | 21.67 | 21.92 |
| HSDPA Subtest-4 | 21.77 | 21.87 | 21.86 | 21.38 | 21.65 | 21.88 |
| HSUPA Subtest-1 | 20.28 | 20.34 | 20.36 | 19.99 | 20.22 | 20.45 |
| HSUPA Subtest-2 | 20.36 | 20.47 | 20.45 | 20.12 | 20.31 | 20.48 |
| HSUPA Subtest-3 | 21.24 | 21.24 | 21.28 | 20.94 | 21.07 | 21.33 |
| HSUPA Subtest-4 | 19.88 | 19.93 | 19.96 | 19.53 | 19.74 | 19.92 |
| HSUPA Subtest-5 | 21.18 | 21.24 | 21.26 | 21.21 | 21.37 | 21.65 |

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. | DC Power Supply | GW INSTRON | GPS-3030D | 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 5.5 dB and a 10dB attenuator.

Example :

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 5.5 + 10 = 15.5 \text{ (dB)} \end{aligned}$$

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.

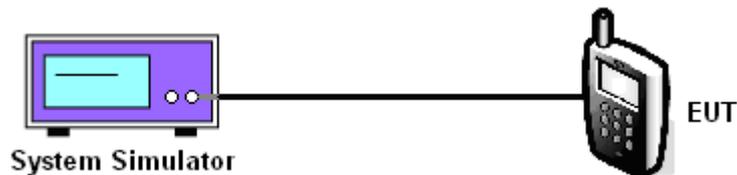
3.1.2 Measuring Instruments

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 (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) | 31.59 | 32.67 | 32.69 | 28.09 | 28.12 | 28.33 | 23.25 | 23.33 | 23.35 |

| PCS Band | | | | | | | | | |
|-----------------------|---------------|--------------|---------------|------------------------|--------------|---------------|------------------------------|---------------|----------------|
| Modes | GSM1900 (GSM) | | | GSM1900 (EDGE class 8) | | | WCDMA Band II (RMC 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) | 29.99 | 30.08 | 30.11 | 26.92 | 26.73 | 26.54 | 22.94 | 23.12 | 23.32 |

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.

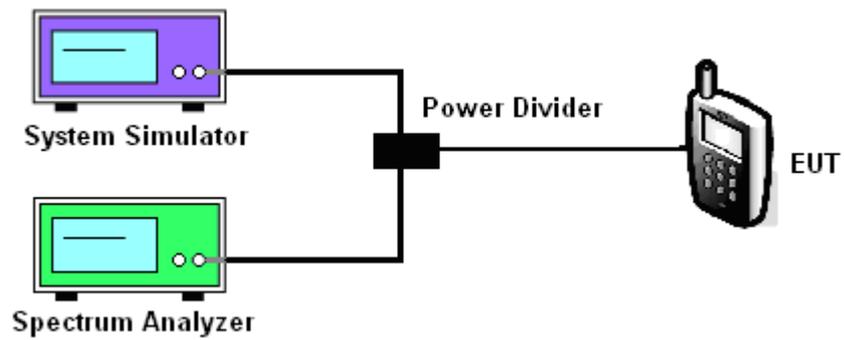
3.2.2 Measuring Instruments

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 the spectrum analyzer and system simulator via a power divider.
3. For GSM/EGPRS operating modes:
 - a. Set EUT in maximum power output.
 - b. Set the RBW = 1MHz, VBW = 3MHz, Peak detector on spectrum analyzer for first trace.
 - c. Set the RBW = 1MHz, VBW = 3MHz, RMS detector on spectrum analyzer for second trace.
 - d. The wanted burst signal is triggered by spectrum analyzer, and measured respectively the peak level and Mean level without burst-off time, after system simulator has synchronized with the spectrum analyzer.
4. For UMTS operating modes:
 - a. Set the CCDF (Complementary Cumulative Distribution Function) option on the spectrum analyzer.
 - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.2.4 Test Setup





3.2.5 Test Result of Peak-to-Average Ratio

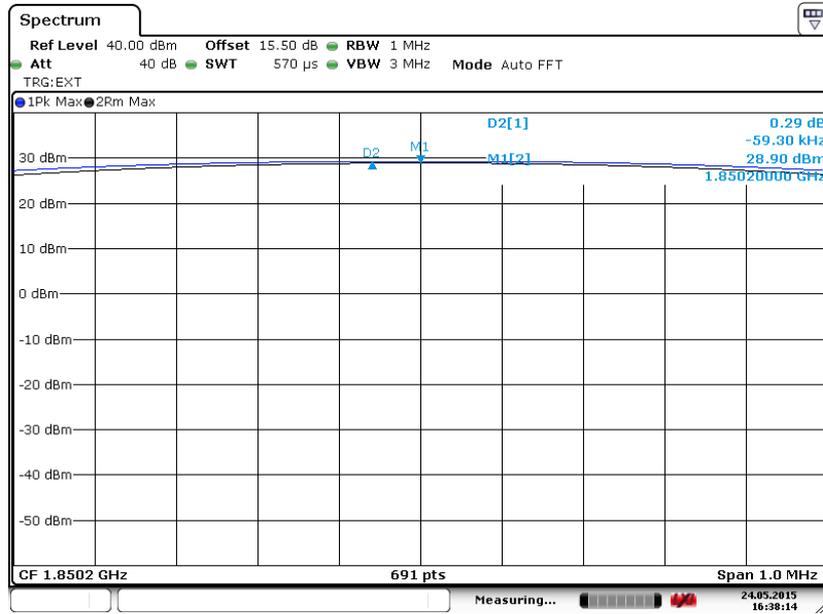
| PCS Band | | | | | | | | | |
|----------------------------|---------------|-----------|------------|------------------------|-----------|------------|------------------------------|------------|-------------|
| Modes | GSM1900 (GSM) | | | GSM1900 (EDGE class 8) | | | WCDMA Band II (RMC 12.2Kbps) | | |
| 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 |
| Peak-to-Average Ratio (dB) | 0.29 | 0.29 | 0.29 | 3.00 | 2.98 | 2.97 | 3.08 | 3.24 | 3.12 |



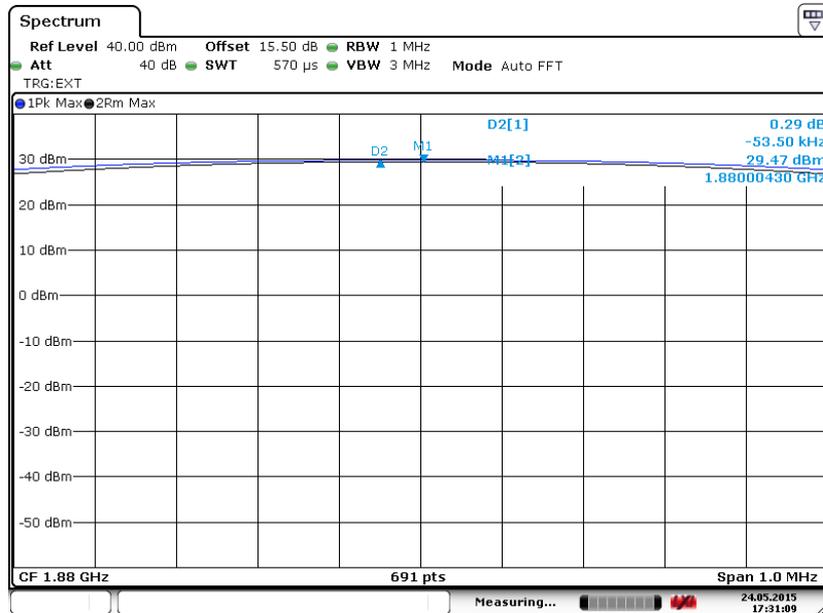
3.2.6 Test Result (Plots) of Peak-to-Average Ratio

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

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

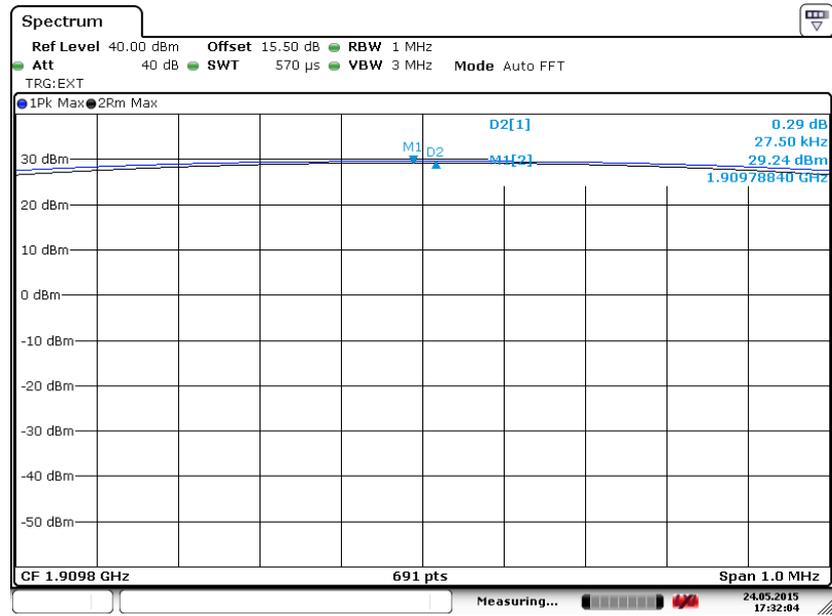


Peak-to-Average Ratio on Channel 661 (1880.0 MHz)





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

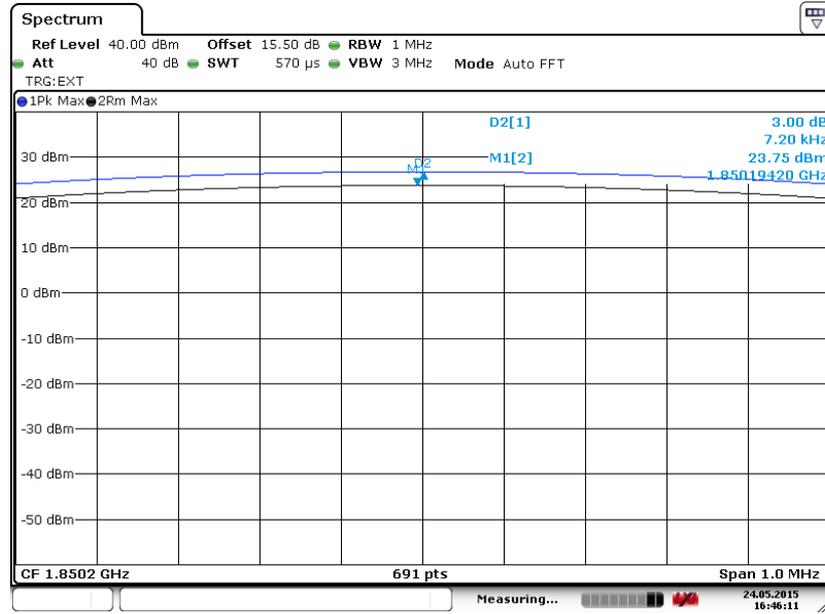


Date: 24 MAY 2015 17:32:04



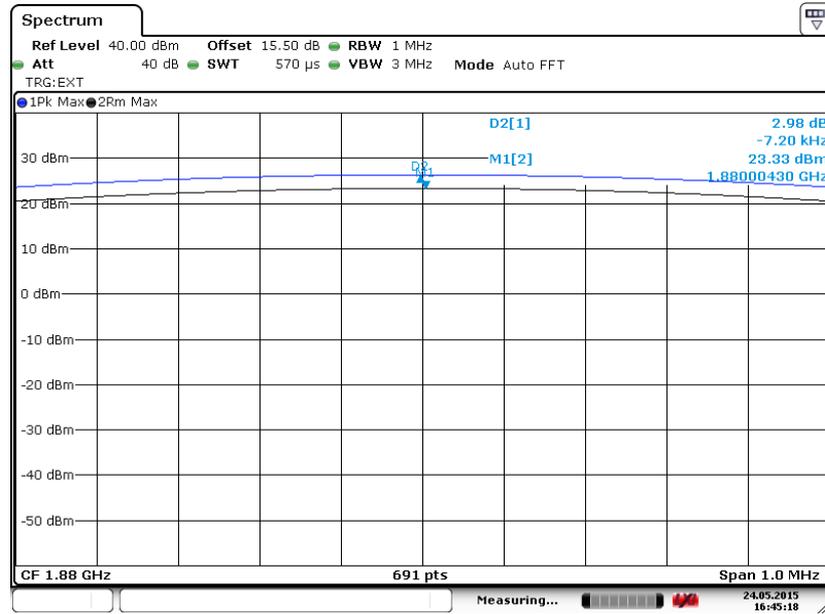
| | | | |
|---------------|----------|--------------------|--------------------------|
| Band : | GSM 1900 | Test Mode : | EDGE class 8 Link (8PSK) |
|---------------|----------|--------------------|--------------------------|

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



Date: 24 MAY 2015 16:46:11

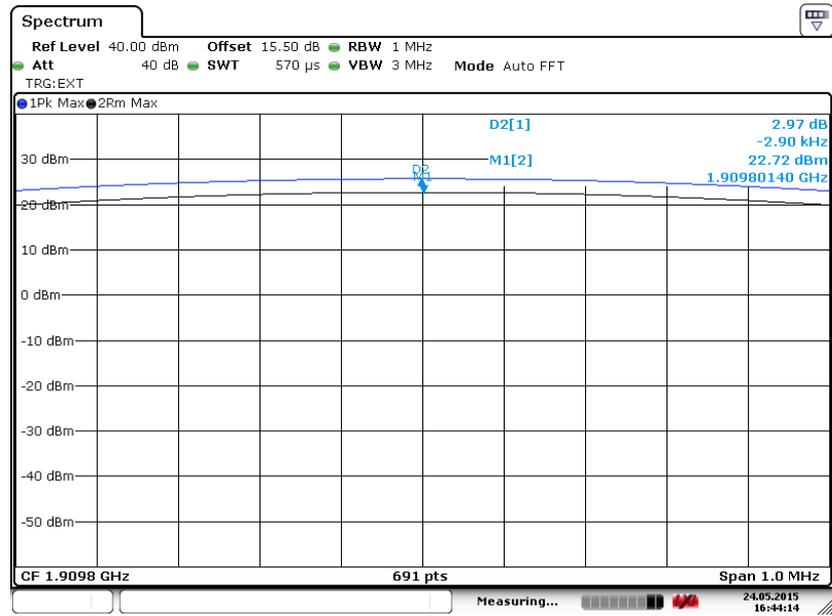
Peak-to-Average Ratio on Channel 661 (1880.0 MHz)



Date: 24 MAY 2015 16:45:18



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

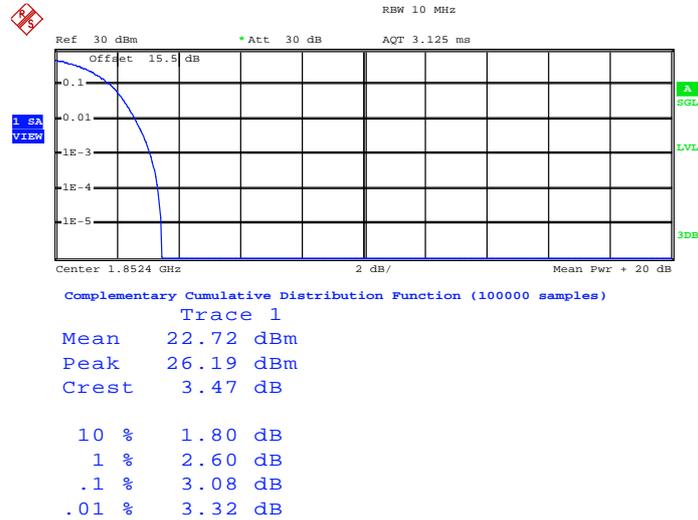


Date: 24 MAY 2015 16:44:15



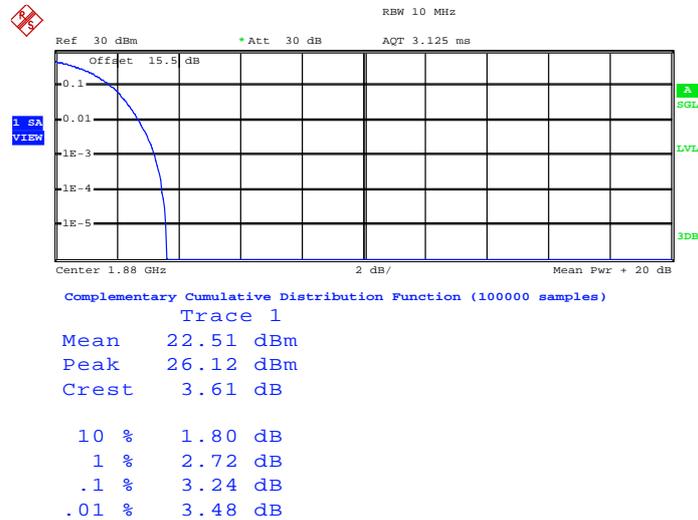
| | | | |
|---------------|---------------|--------------------|--------------------------|
| Band : | WCDMA Band II | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|---------------|---------------|--------------------|--------------------------|

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



Date: 25.MAY.2015 01:38:54

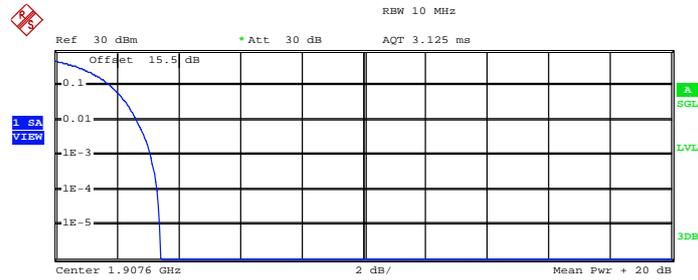
Peak-to-Average Ratio on Channel 9400 (1880.0 MHz)



Date: 25.MAY.2015 01:40:57



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



Complementary Cumulative Distribution Function (100000 samples)

Trace 1

| | |
|-------|-----------|
| Mean | 22.64 dBm |
| Peak | 26.05 dBm |
| Crest | 3.41 dB |
| 10 % | 1.80 dB |
| 1 % | 2.64 dB |
| .1 % | 3.12 dB |
| .01 % | 3.32 dB |

Date: 25.MAY.2015 01:43:21



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

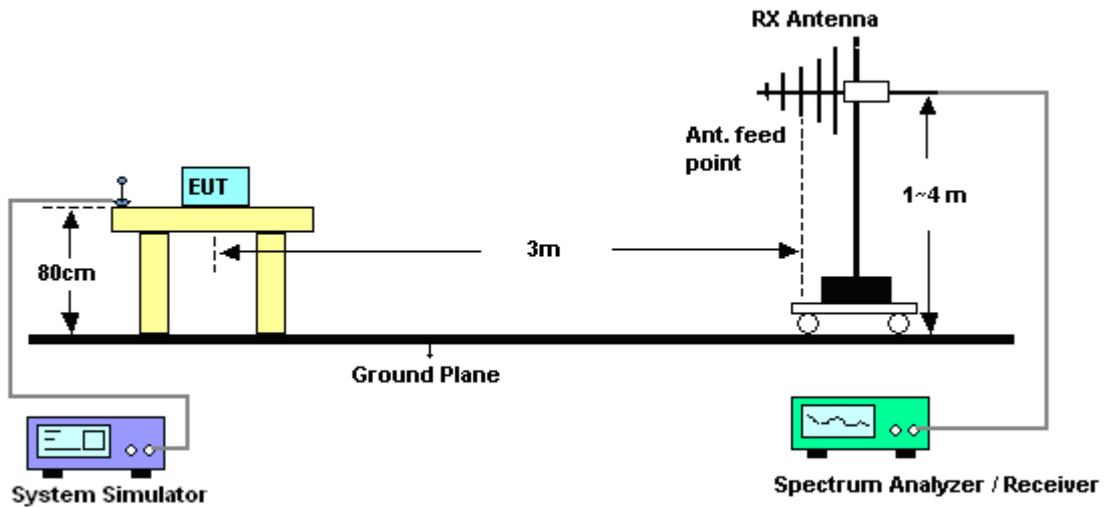
The measuring equipment is listed in the section 4 of this test report.

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 the substitution antenna at 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 $ERP = EIRP - 2.15$. Take the record of the output power at substitution antenna.

| | 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 ERP

| GSM850 (GSM) Radiated Power ERP | | | | | |
|---------------------------------|-----------------|------------|--------|----------|--------|
| Channel | Frequency (MHz) | Horizontal | | Vertical | |
| | | ERP(dBm) | ERP(W) | ERP(dBm) | ERP(W) |
| Lowest | 824.20 | 26.43 | 0.4397 | 12.96 | 0.0198 |
| Middle | 836.40 | 27.63 | 0.5791 | 14.74 | 0.0298 |
| Highest | 848.80 | 27.18 | 0.5224 | 14.89 | 0.0308 |
| Limit | ERP < 7W | Result | | PASS | |

| GSM850 (EDGE class 8) Radiated Power ERP | | | | | |
|--|-----------------|------------|--------|----------|--------|
| Channel | Frequency (MHz) | Horizontal | | Vertical | |
| | | ERP(dBm) | ERP(W) | ERP(dBm) | ERP(W) |
| Lowest | 824.20 | 22.30 | 0.1697 | 8.85 | 0.0077 |
| Middle | 836.40 | 23.29 | 0.2134 | 10.46 | 0.0111 |
| Highest | 848.80 | 23.74 | 0.2364 | 11.39 | 0.0138 |
| Limit | ERP < 7W | Result | | PASS | |

| WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP | | | | | |
|--|-----------------|------------|--------|----------|--------|
| Channel | Frequency (MHz) | Horizontal | | Vertical | |
| | | ERP(dBm) | ERP(W) | ERP(dBm) | ERP(W) |
| Lowest | 826.40 | 17.26 | 0.0532 | 3.97 | 0.0025 |
| Middle | 836.40 | 16.84 | 0.0483 | 4.22 | 0.0026 |
| Highest | 846.60 | 16.83 | 0.0482 | 4.61 | 0.0029 |
| Limit | ERP < 7W | Result | | PASS | |

3.3.6 Test Result of EIRP

| GSM1900 (GSM) Radiated Power EIRP | | | | | |
|-----------------------------------|-----------------|------------|--------|----------|--------|
| Channel | Frequency (MHz) | Horizontal | | Vertical | |
| | | ERP(dBm) | ERP(W) | ERP(dBm) | ERP(W) |
| Lowest | 1850.20 | 27.27 | 0.5338 | 27.49 | 0.5608 |
| Middle | 1880.00 | 27.27 | 0.5336 | 27.72 | 0.5910 |
| Highest | 1909.80 | 27.19 | 0.5235 | 27.87 | 0.6125 |
| Limit | EIRP < 2W | Result | | PASS | |

| GSM1900 (EDGE class 8) Radiated Power EIRP | | | | | |
|--|-----------------|------------|--------|----------|--------|
| Channel | Frequency (MHz) | Horizontal | | Vertical | |
| | | ERP(dBm) | ERP(W) | ERP(dBm) | ERP(W) |
| Lowest | 1850.20 | 23.57 | 0.2278 | 23.78 | 0.2388 |
| Middle | 1880.00 | 23.38 | 0.2179 | 23.86 | 0.2432 |
| Highest | 1909.80 | 23.45 | 0.2213 | 24.11 | 0.2577 |
| Limit | EIRP < 2W | Result | | PASS | |

| WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP | | | | | |
|--|-----------------|------------|--------|----------|--------|
| Channel | Frequency (MHz) | Horizontal | | Vertical | |
| | | ERP(dBm) | ERP(W) | ERP(dBm) | ERP(W) |
| Lowest | 1852.40 | 21.39 | 0.1378 | 21.73 | 0.1490 |
| Middle | 1880.00 | 22.00 | 0.1586 | 22.47 | 0.1765 |
| Highest | 1907.60 | 21.29 | 0.1344 | 21.81 | 0.1516 |
| Limit | EIRP < 2W | Result | | PASS | |

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.

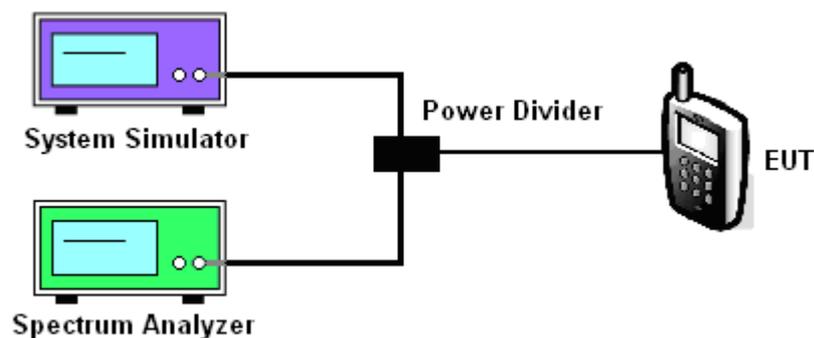
3.4.2 Measuring Instruments

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 | GSM850 (GSM) | | | GSM850 (EDGE class 8) | | |
| Channel | 128 (Low) | 189 (Mid) | 251 (High) | 128 (Low) | 189 (Mid) | 251 (High) |
| Frequency (MHz) | 824.2 | 836.4 | 848.8 | 824.2 | 836.4 | 848.8 |
| 99% OBW (kHz) | 238.00 | 236.00 | 240.00 | 244.00 | 246.00 | 244.00 |
| 26dB BW (kHz) | 308.00 | 308.00 | 310.00 | 298.00 | 302.00 | 308.00 |

| PCS Band | | | | | | |
|-----------------|---------------|--------------|---------------|------------------------|--------------|---------------|
| Modes | GSM1900 (GSM) | | | GSM1900 (EDGE class 8) | | |
| Channel | 512 (Low) | 661 (Mid) | 810 (High) | 512 (Low) | 661 (Mid) | 810 (High) |
| Frequency (MHz) | 1850.2 | 1880 | 1909.8 | 1850.2 | 1880 | 1909.8 |
| 99% OBW (kHz) | 238.00 | 236.00 | 240.00 | 244.00 | 244.00 | 244.00 |
| 26dB BW (kHz) | 306.00 | 314.00 | 312.00 | 310.00 | 308.00 | 308.00 |

| 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 | 4.14 | 4.16 |
| 26dB BW (MHz) | 4.68 | 4.68 | 4.68 |

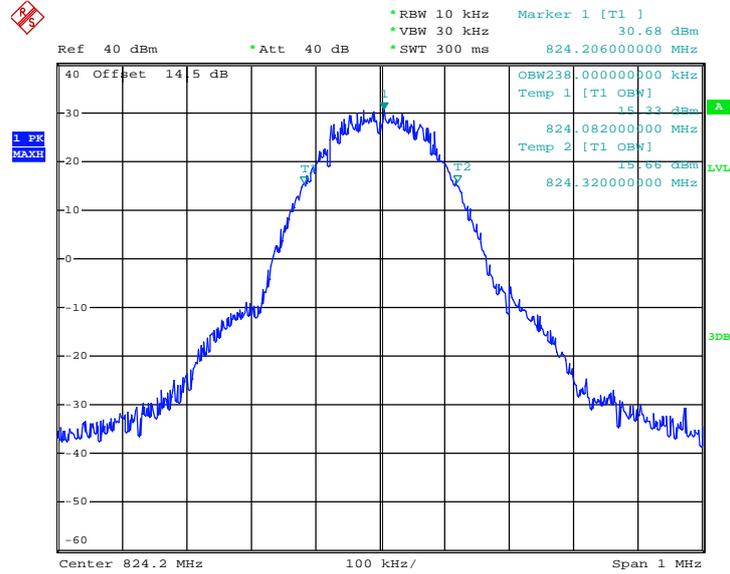
| PCS Band | | | |
|-----------------|------------------------------|------------|-------------|
| Modes | WCDMA Band II (RMC 12.2Kbps) | | |
| Channel | 9262 (Low) | 9400 (Mid) | 9538 (High) |
| Frequency (MHz) | 1852.4 | 1880 | 1907.6 |
| 99% OBW (MHz) | 4.16 | 4.14 | 4.18 |
| 26dB BW (MHz) | 4.70 | 4.70 | 4.70 |



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

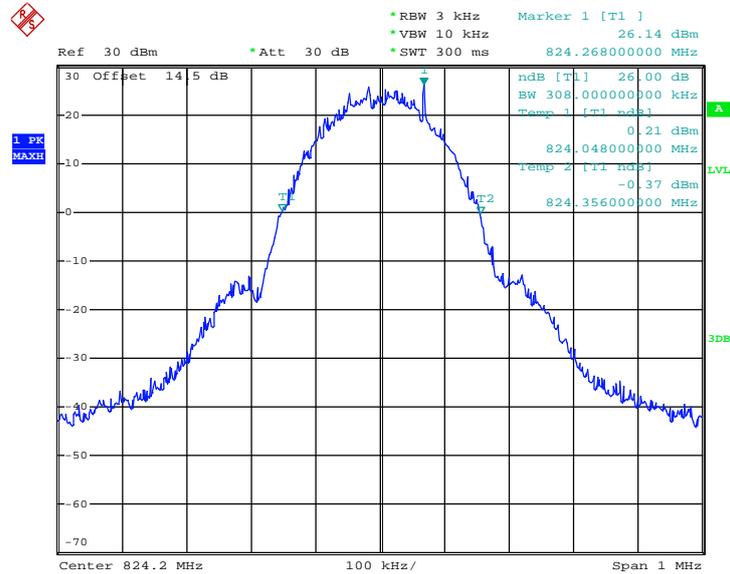
| | | | |
|--------|---------|-------------|-----------------|
| Band : | GSM 850 | Test Mode : | GSM Link (GMSK) |
|--------|---------|-------------|-----------------|

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



Date: 24.MAY.2015 21:41:34

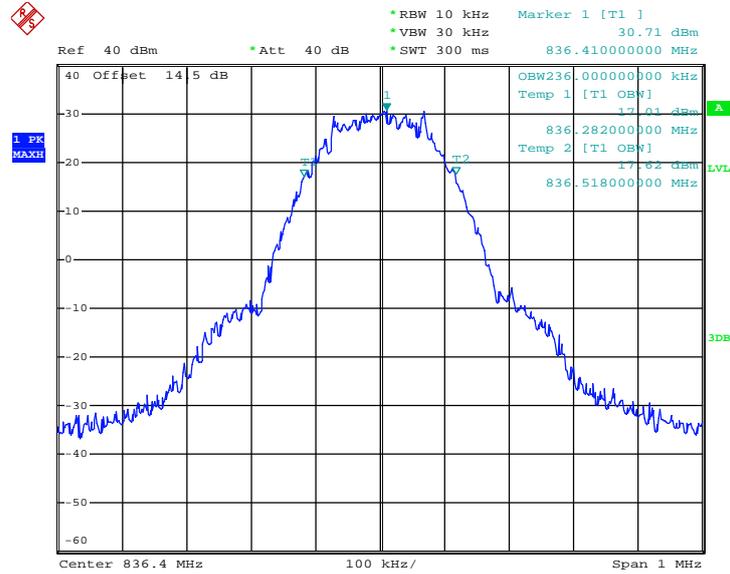
26dB Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 24.MAY.2015 21:30:39

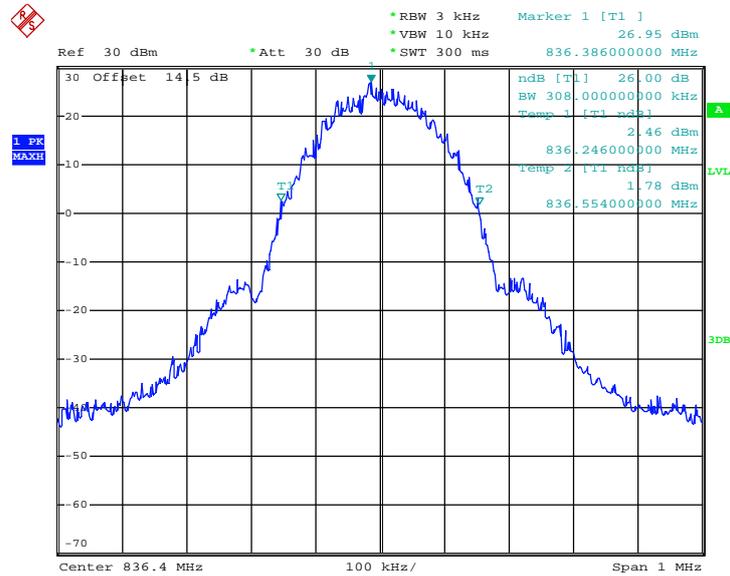


99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 24.MAY.2015 21:41:03

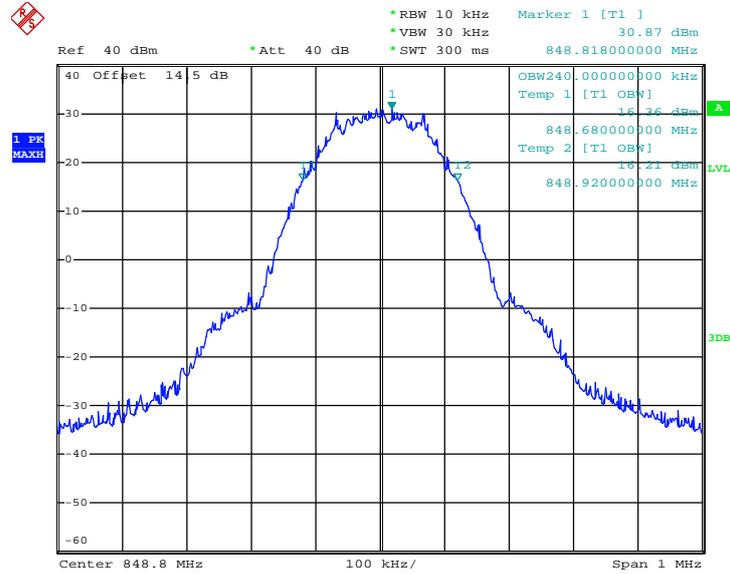
26dB Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 24.MAY.2015 21:32:03

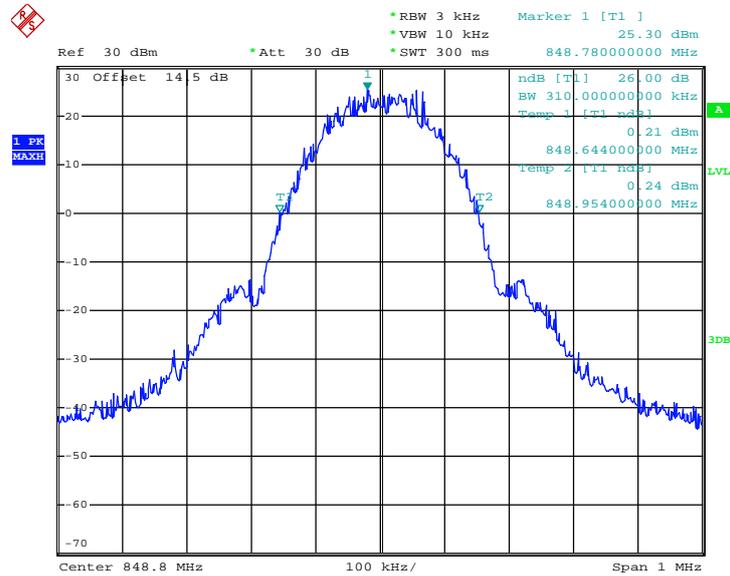


99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 24.MAY.2015 21:39:38

26dB Bandwidth Plot on Channel 251 (848.8 MHz)

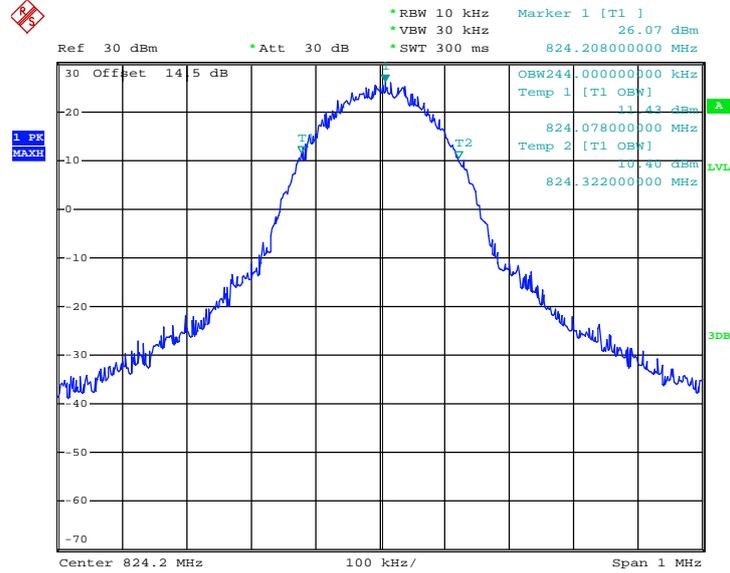


Date: 24.MAY.2015 21:32:38



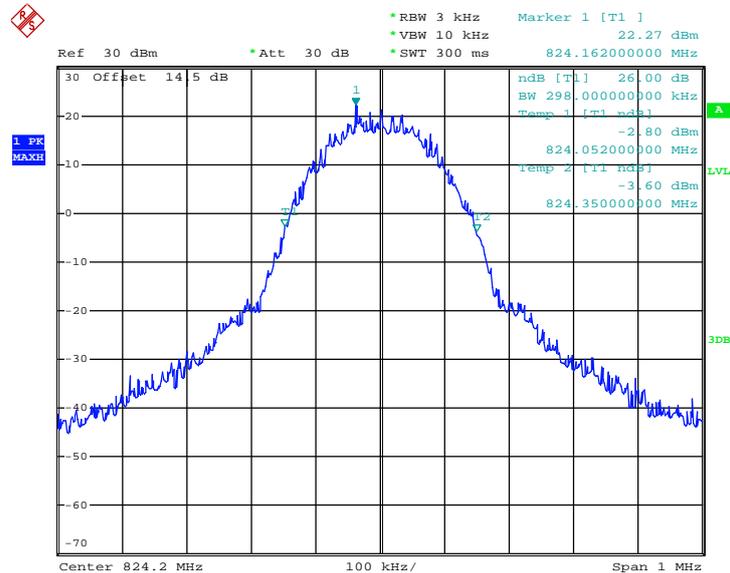
| | | | |
|---------------|---------|--------------------|--------------------------|
| Band : | GSM 850 | Test Mode : | EDGE class 8 Link (8PSK) |
|---------------|---------|--------------------|--------------------------|

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



Date: 24.MAY.2015 22:53:31

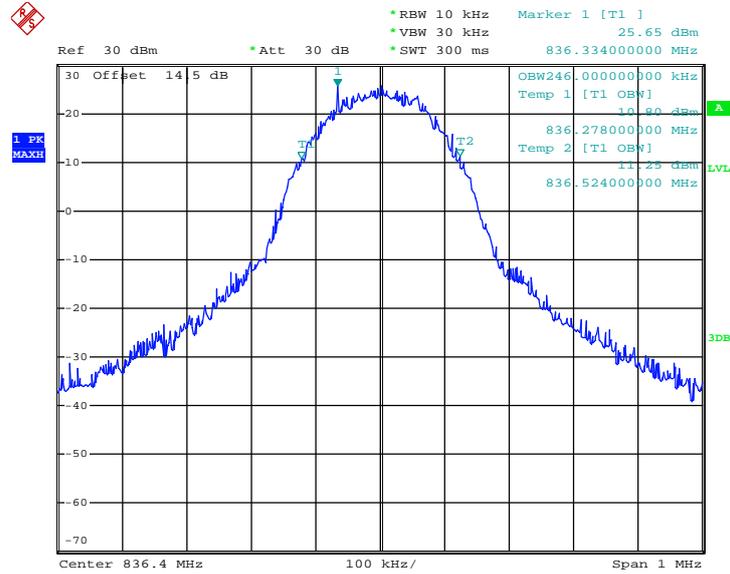
26dB Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 24.MAY.2015 22:40:22

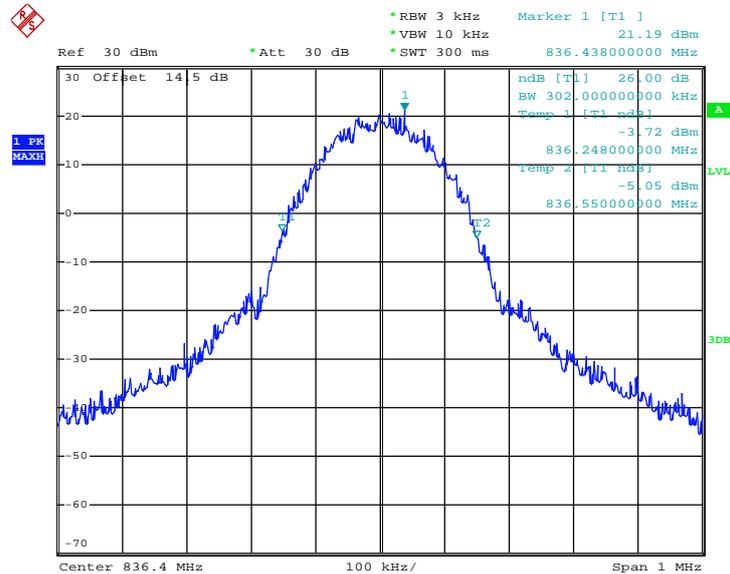


99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 24.MAY.2015 22:51:43

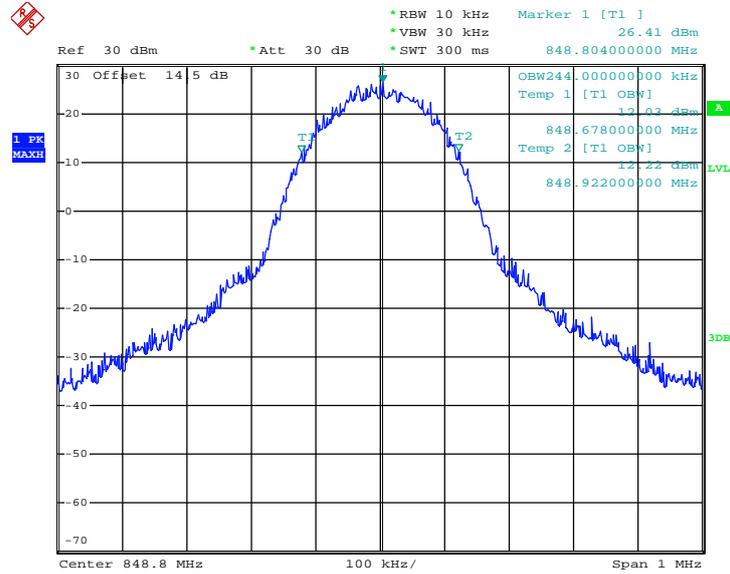
26dB Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 24.MAY.2015 22:41:27

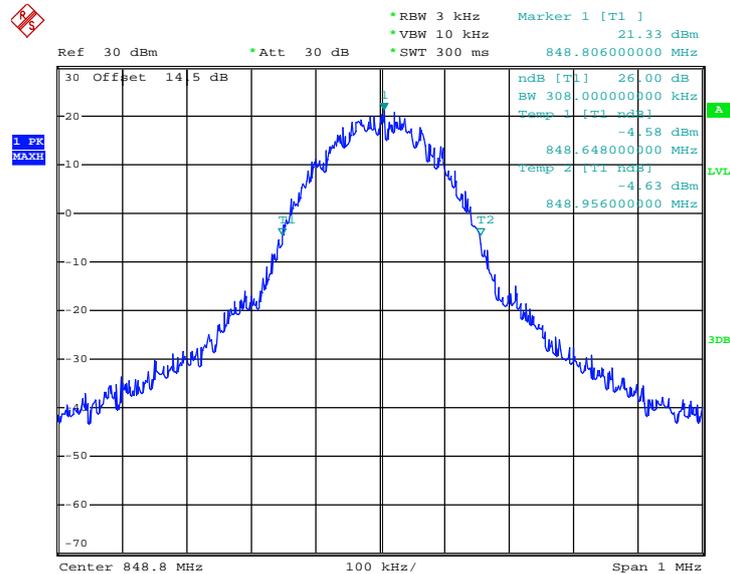


99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 24.MAY.2015 22:47:43

26dB Bandwidth Plot on Channel 251 (848.8 MHz)

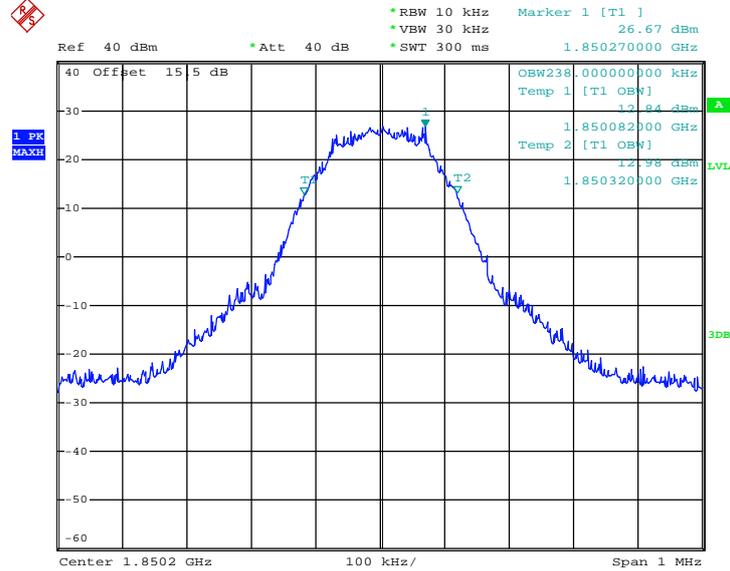


Date: 24.MAY.2015 22:43:09



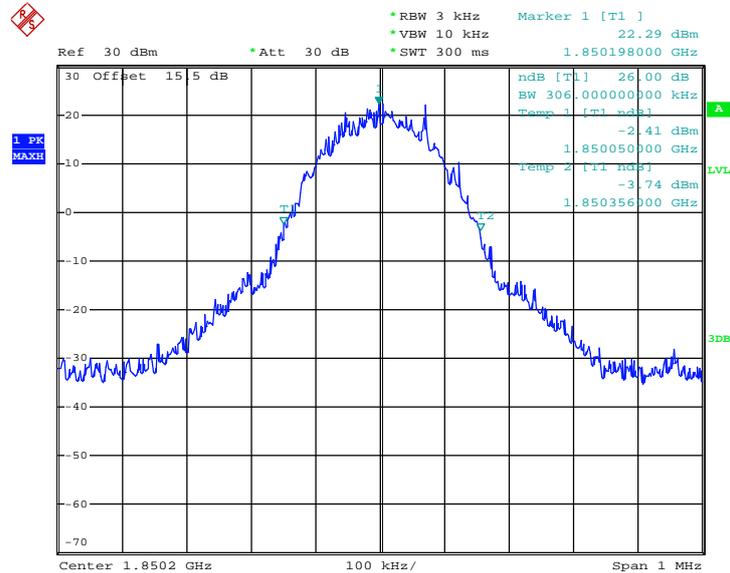
| | | | |
|--------|----------|-------------|-----------------|
| Band : | GSM 1900 | Test Mode : | GSM Link (GMSK) |
|--------|----------|-------------|-----------------|

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



Date: 25.MAY.2015 03:17:19

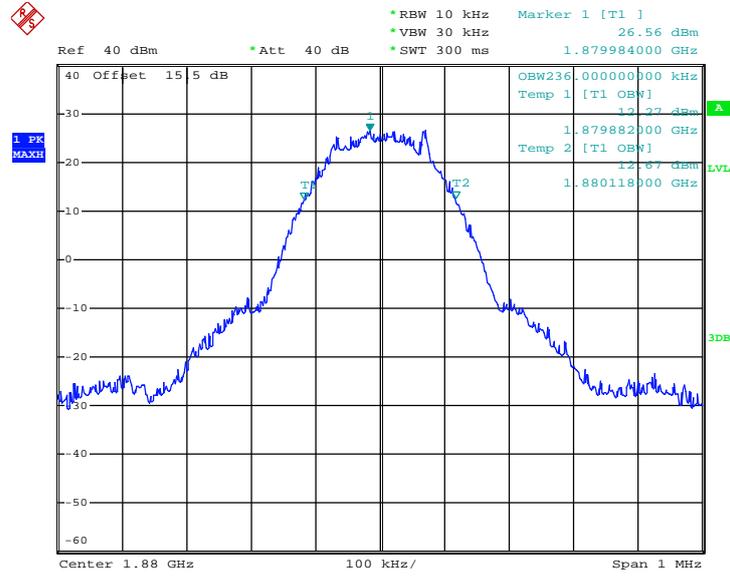
26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 25.MAY.2015 03:07:47

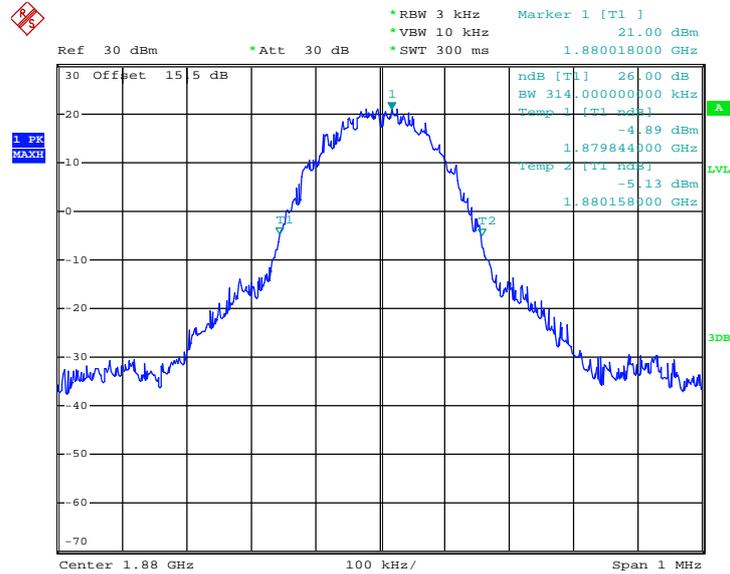


99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 25.MAY.2015 03:16:08

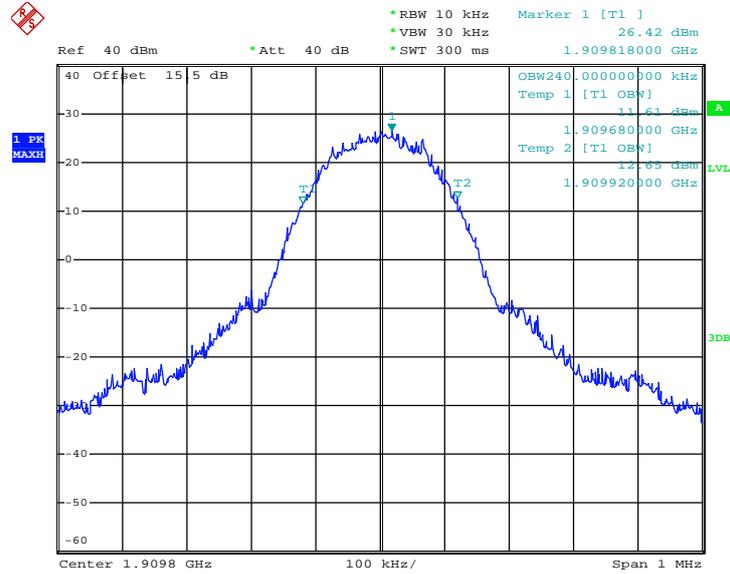
26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 25.MAY.2015 03:09:00

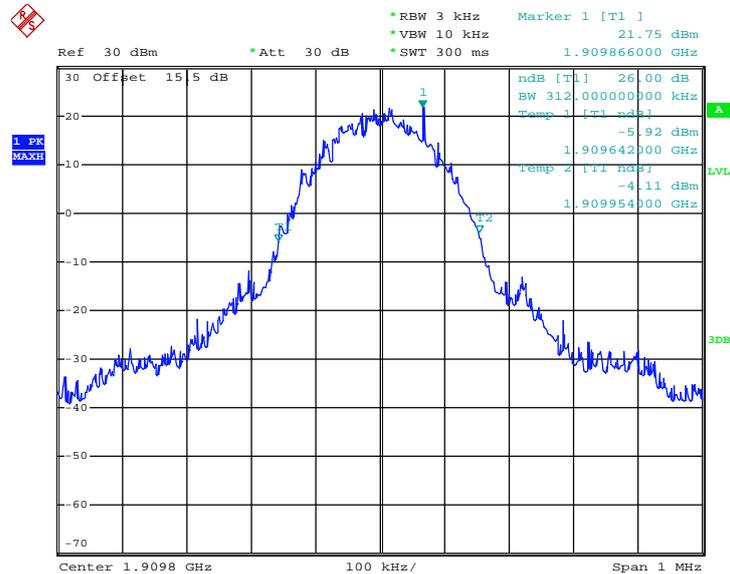


99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 25.MAY.2015 03:12:06

26dB Bandwidth Plot on Channel 810 (1909.8 MHz)

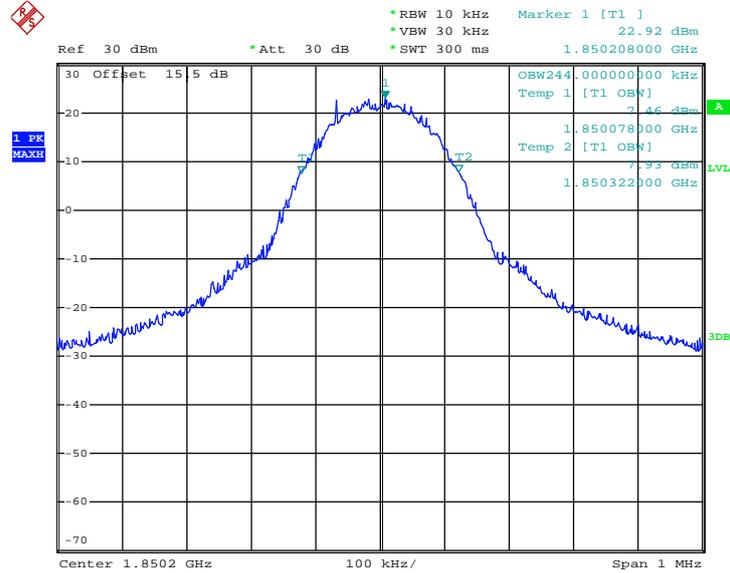


Date: 25.MAY.2015 03:09:55



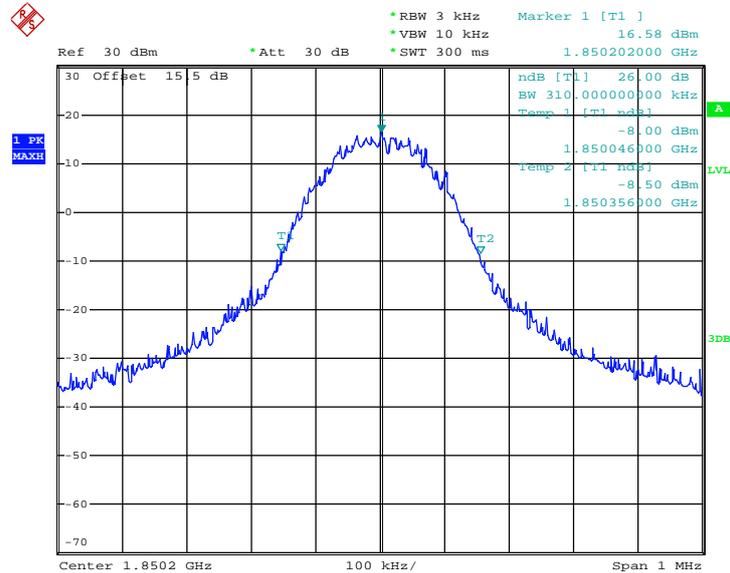
| | | | |
|--------|----------|-------------|--------------------------|
| Band : | GSM 1900 | Test Mode : | EDGE class 8 Link (8PSK) |
|--------|----------|-------------|--------------------------|

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



Date: 25.MAY.2015 04:03:25

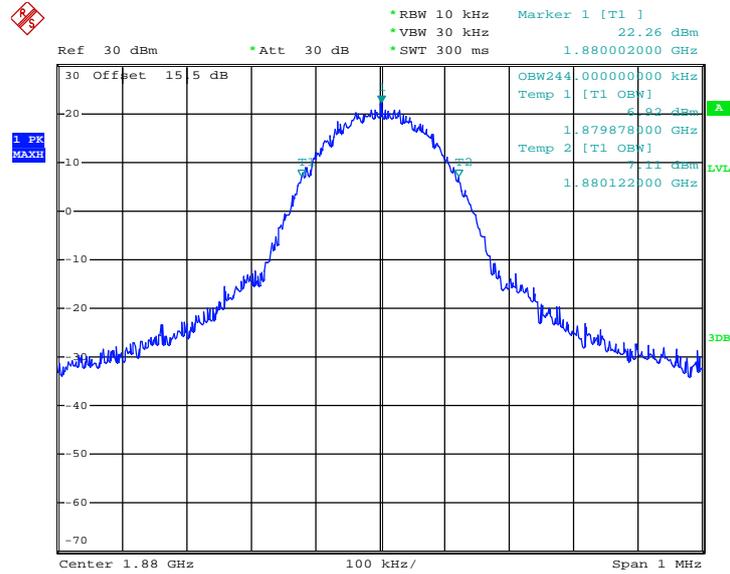
26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 25.MAY.2015 03:50:20

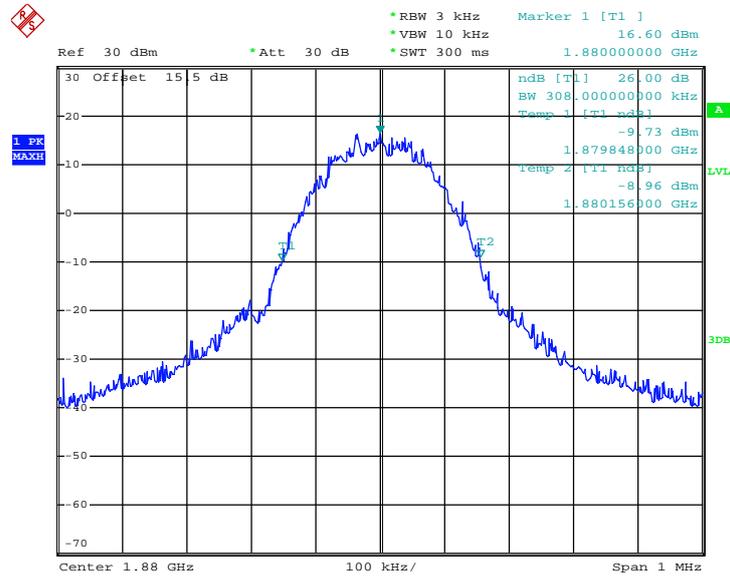


99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 25.MAY.2015 03:57:56

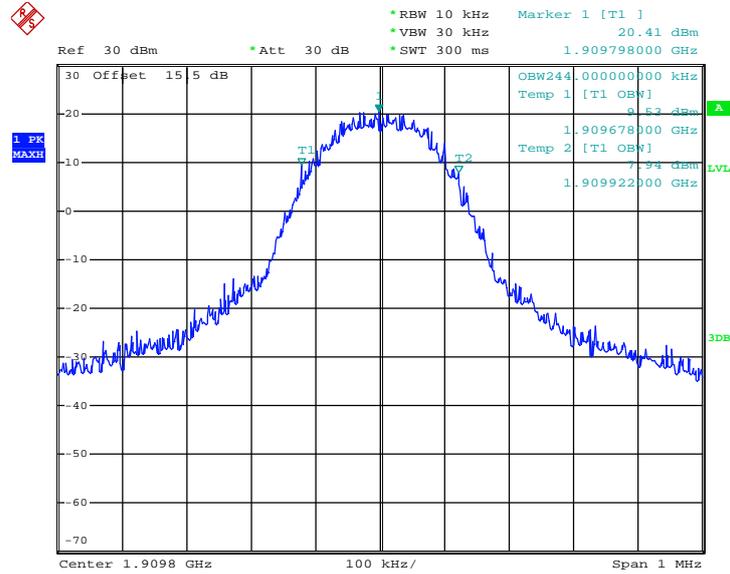
26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 25.MAY.2015 03:51:17

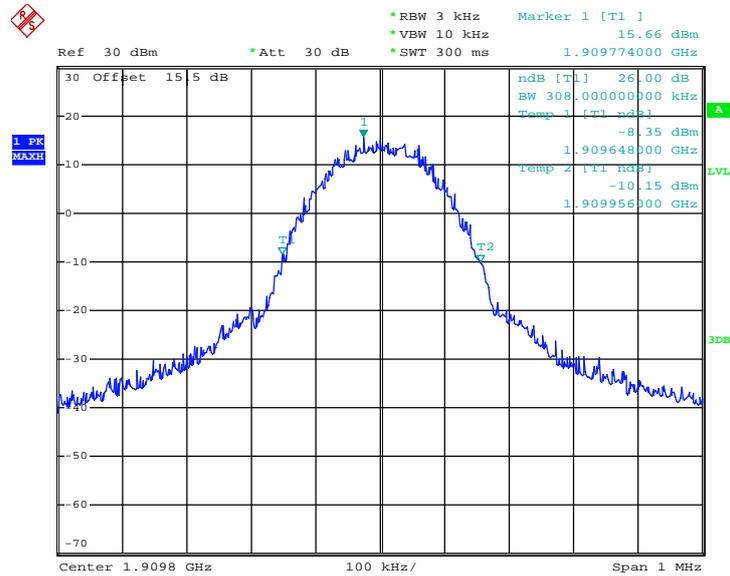


99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 25.MAY.2015 03:56:47

26dB Bandwidth Plot on Channel 810 (1909.8 MHz)

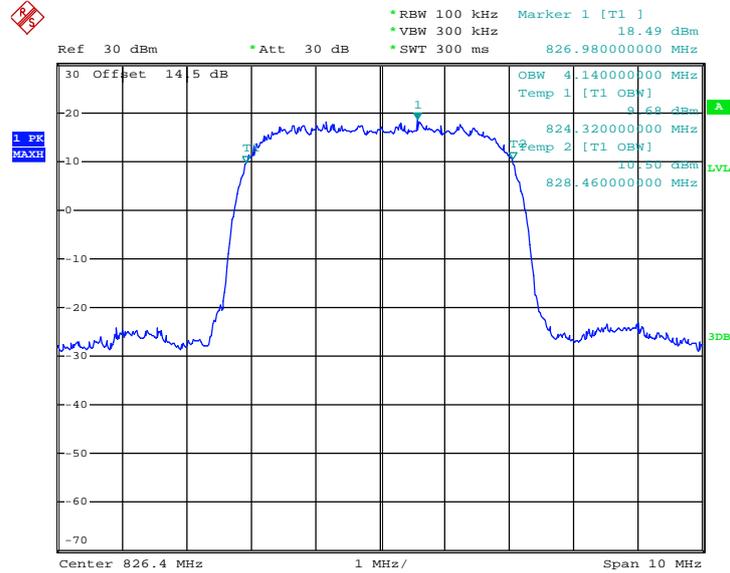


Date: 25.MAY.2015 03:52:26



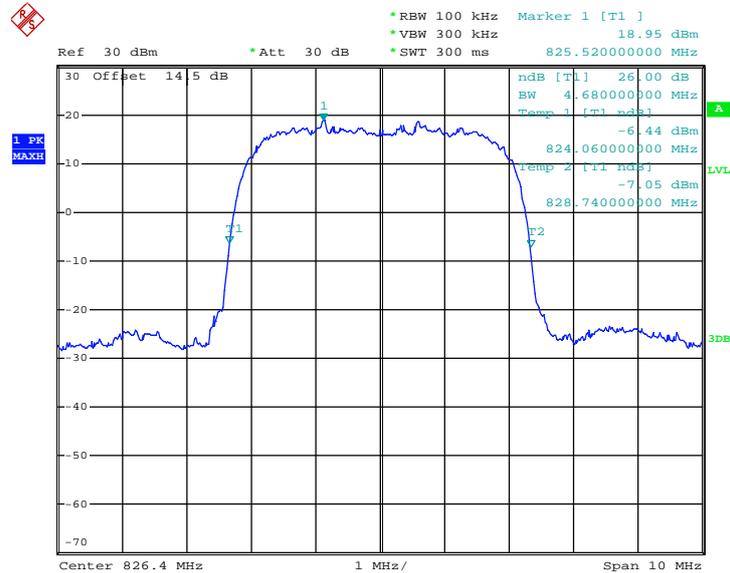
| | | | |
|--------|--------------|-------------|--------------------------|
| Band : | WCDMA Band V | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|--------------|-------------|--------------------------|

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



Date: 24.MAY.2015 23:30:46

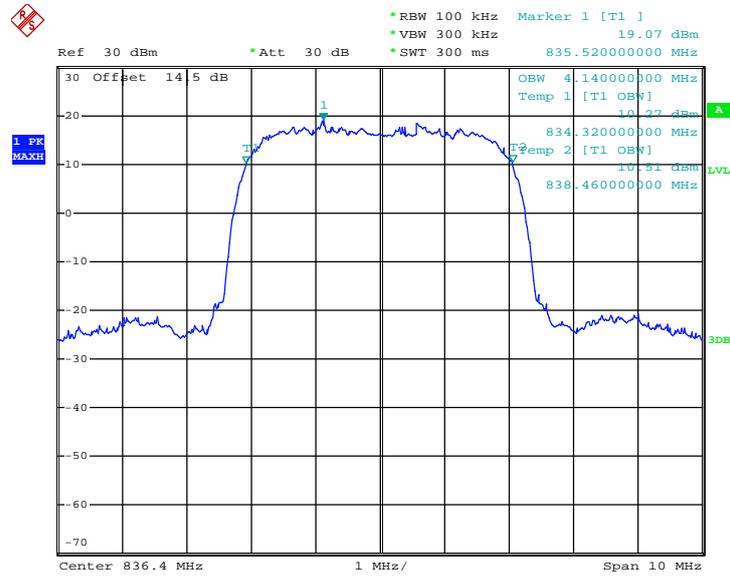
26dB Bandwidth Plot on Channel 4132 (826.4 MHz)



Date: 24.MAY.2015 23:25:37

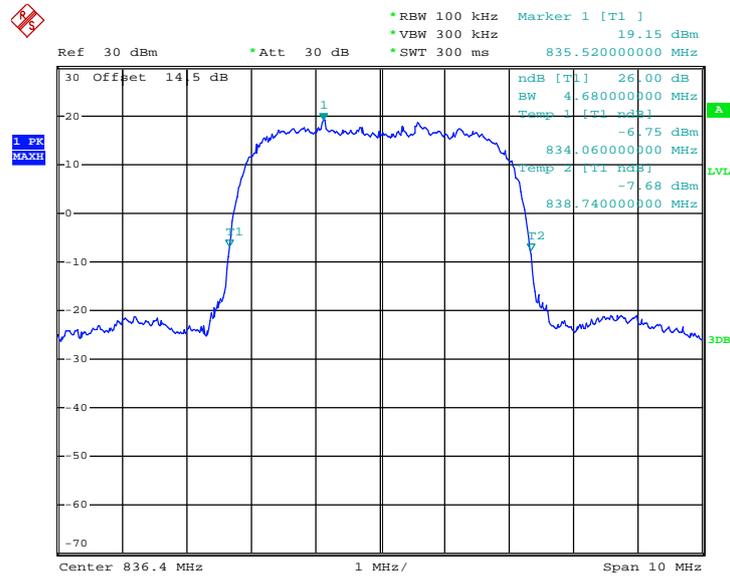


99% Occupied Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 24.MAY.2015 23:30:15

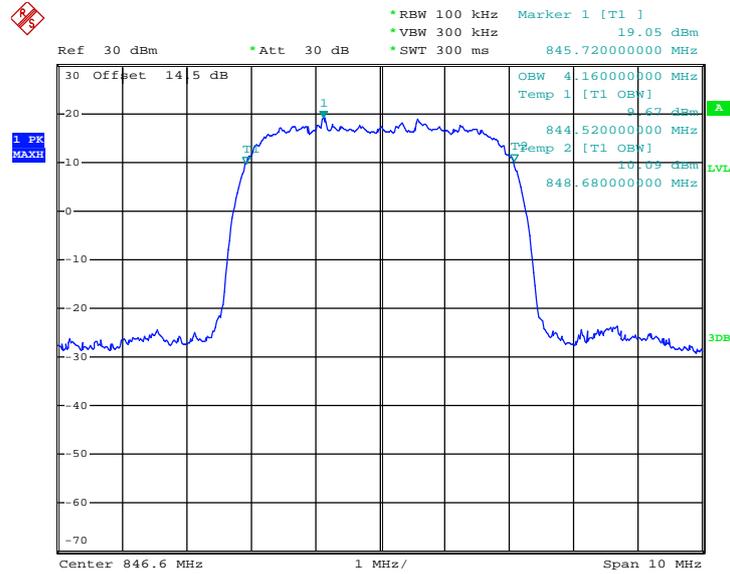
26dB Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 24.MAY.2015 23:26:10

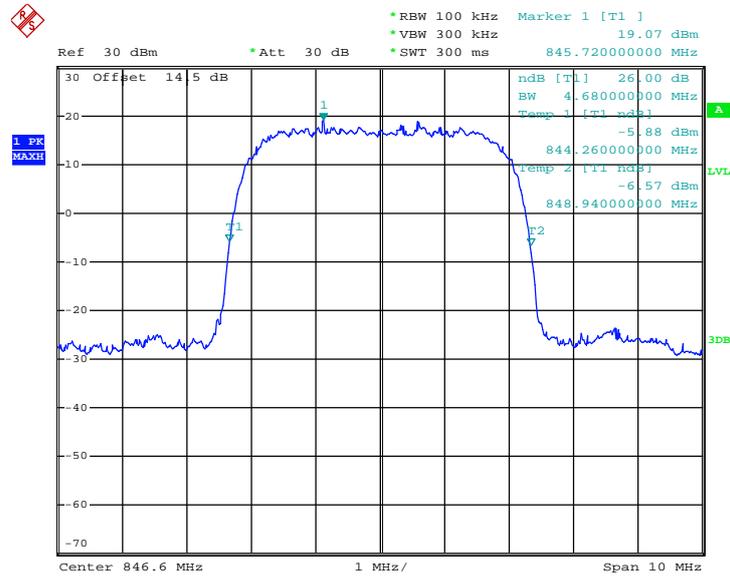


99% Occupied Bandwidth Plot on Channel 4233 (846.6 MHz)



Date: 24.MAY.2015 23:28:11

26dB Bandwidth Plot on Channel 4233 (846.6 MHz)

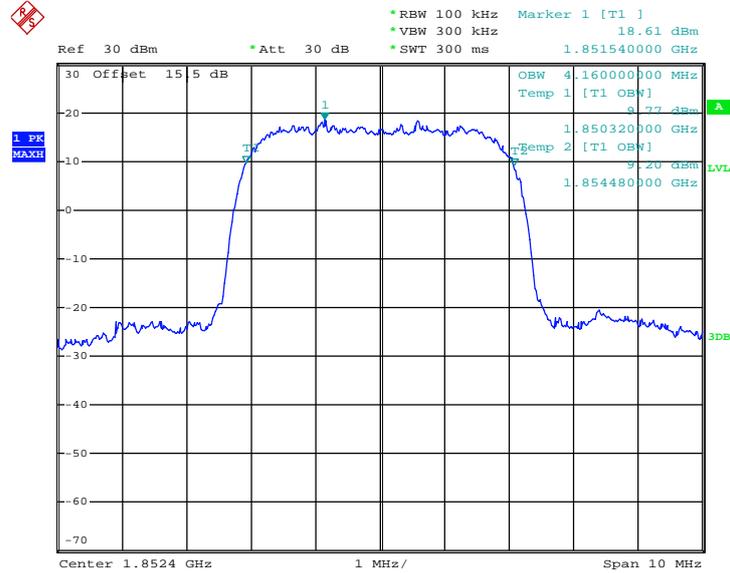


Date: 24.MAY.2015 23:26:41



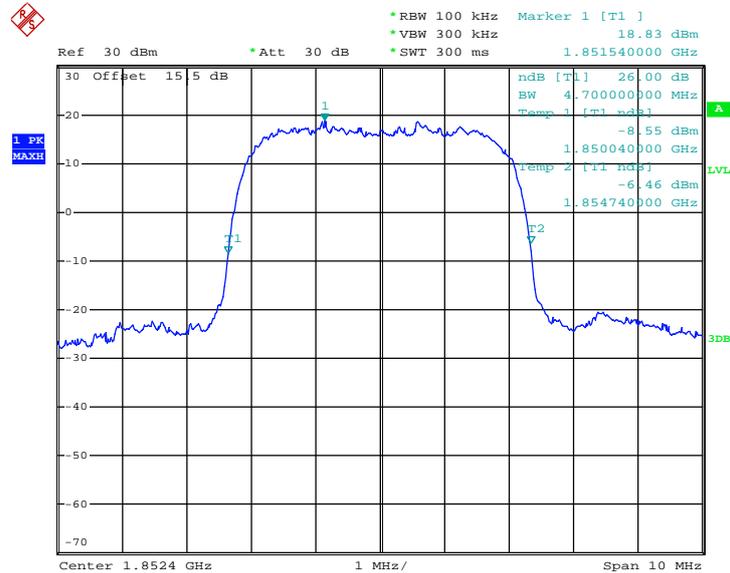
| | | | |
|--------|---------------|-------------|--------------------------|
| Band : | WCDMA Band II | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|---------------|-------------|--------------------------|

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



Date: 25.MAY.2015 01:28:39

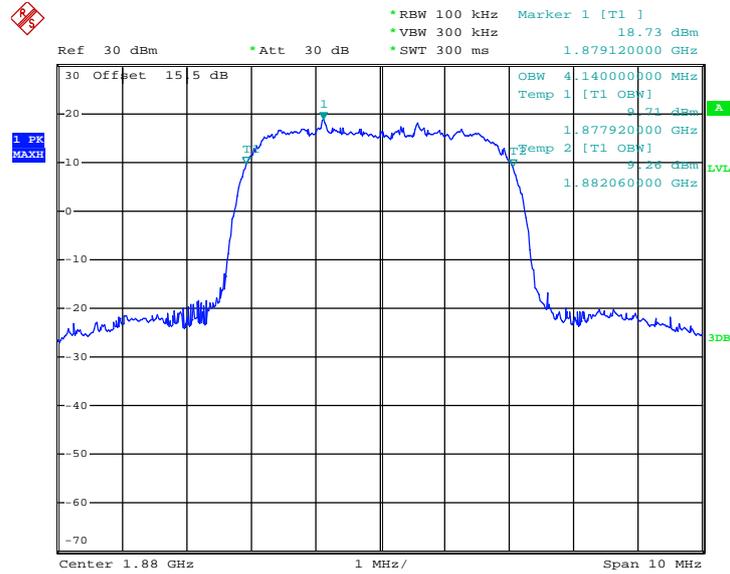
26dB Bandwidth Plot on Channel 9262 (1852.4 MHz)



Date: 25.MAY.2015 01:23:27

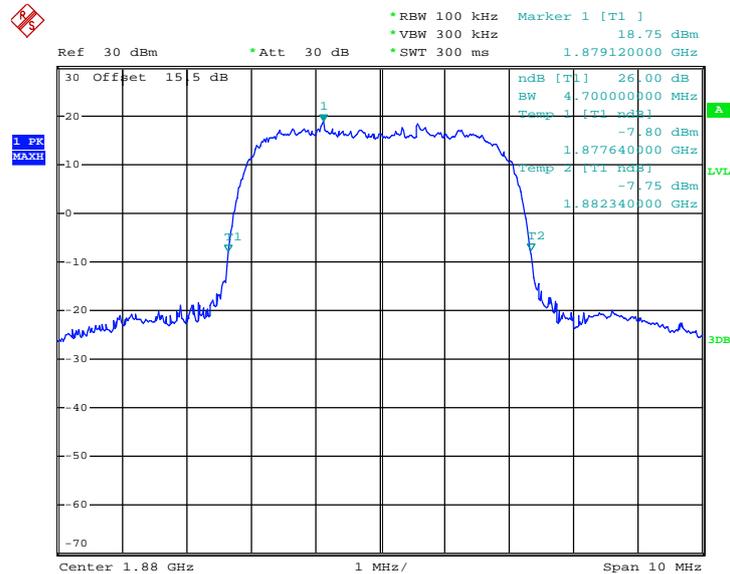


99% Occupied Bandwidth Plot on Channel 9400 (1880.0 MHz)



Date: 25.MAY.2015 01:27:56

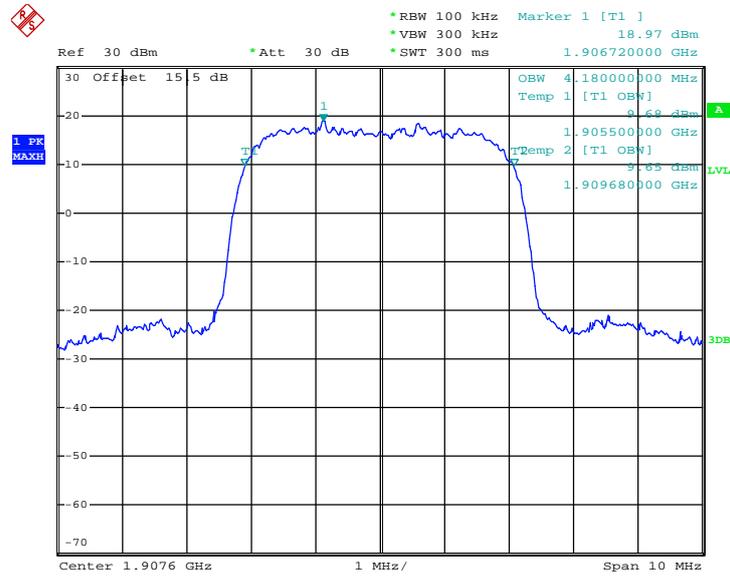
26dB Bandwidth Plot on Channel 9400 (1880.0 MHz)



Date: 25.MAY.2015 01:24:02

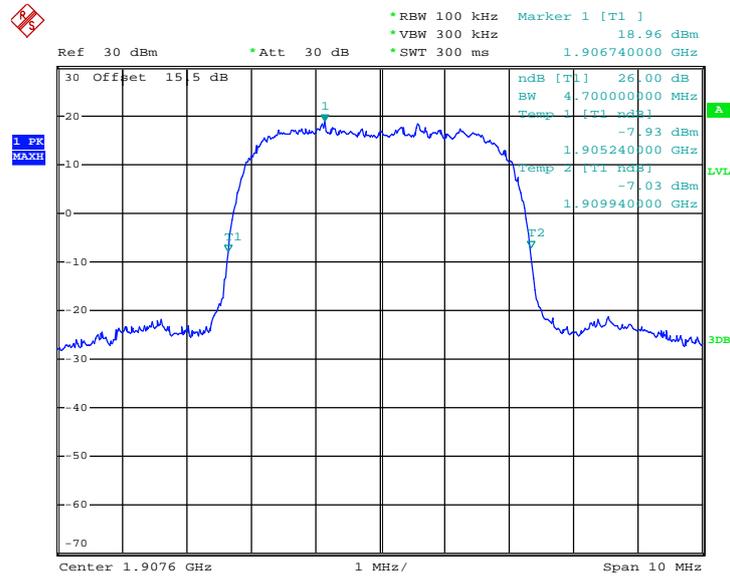


99% Occupied Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 25.MAY.2015 01:25:32

26dB Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 25.MAY.2015 01:24:40



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

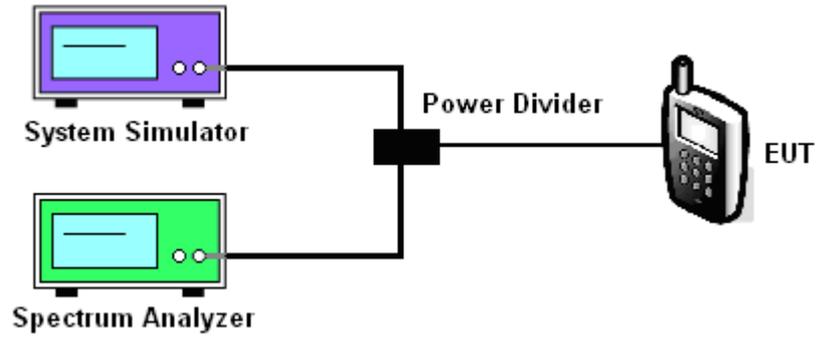
The measuring equipment is listed in the section 4 of this test report.

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)
= $P(W) - [43 + 10\log(P)]$ (dB)
= $[30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
= -13dBm.

3.5.4 Test Setup

<Conducted Band Edge >

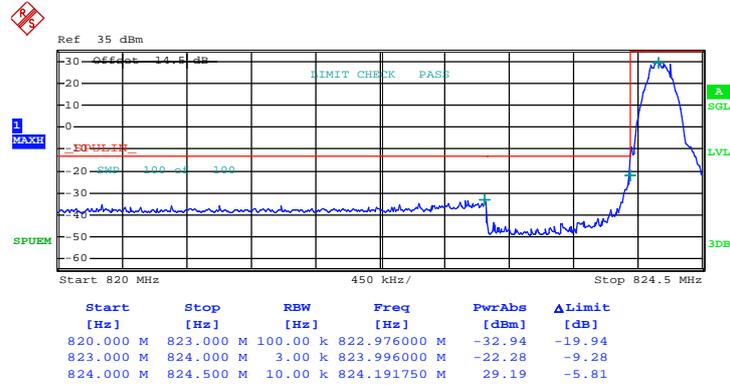




3.5.5 Test Result (Plots) of Conducted Band Edge

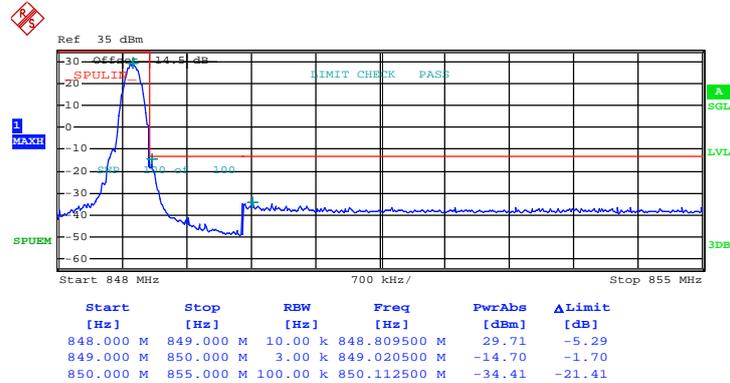
| | | | |
|--------|--------|-------------|-----------------|
| Band : | GSM850 | Test Mode : | GSM Link (GMSK) |
|--------|--------|-------------|-----------------|

Lower Band Edge Plot on Channel 128 (824.2 MHz)



Date: 24.MAY.2015 21:48:52

Higher Band Edge Plot on Channel 251 (848.8 MHz)

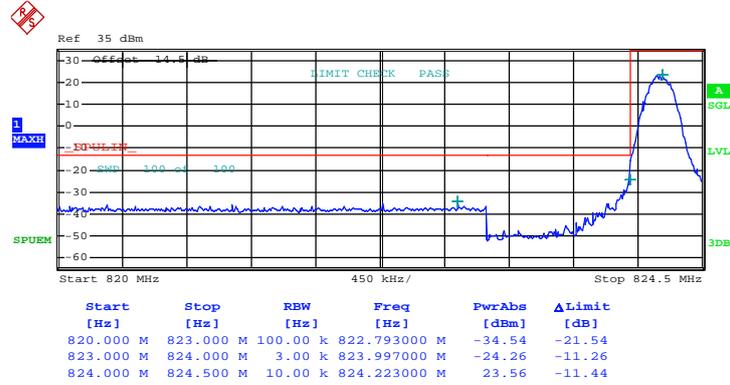


Date: 24.MAY.2015 21:53:54



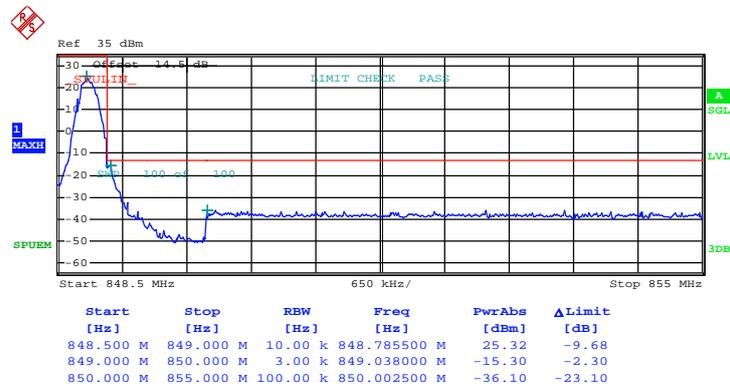
| | | | |
|--------|--------|-------------|--------------------------|
| Band : | GSM850 | Test Mode : | EDGE class 8 Link (8PSK) |
|--------|--------|-------------|--------------------------|

Lower Band Edge Plot on Channel 128 (824.2 MHz)



Date: 25.MAY.2015 23:35:21

Higher Band Edge Plot on Channel 251 (848.8 MHz)

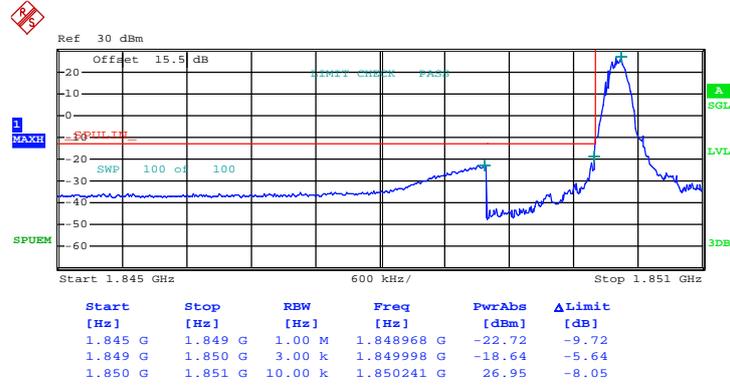


Date: 25.MAY.2015 23:37:41



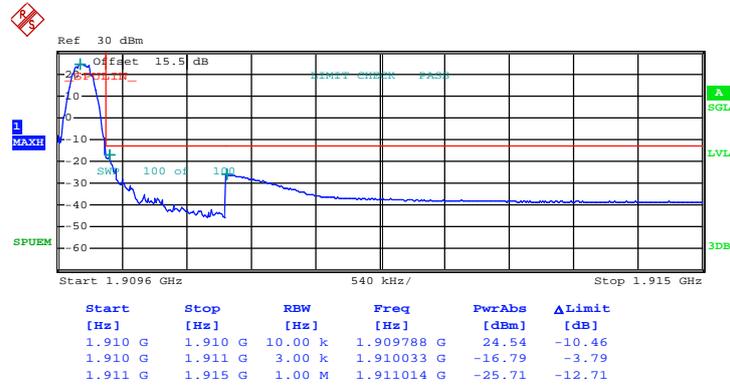
| | | | |
|--------|---------|-------------|-----------------|
| Band : | GSM1900 | Test Mode : | GSM Link (GMSK) |
|--------|---------|-------------|-----------------|

Lower Band Edge Plot on Channel 512 (1850.2 MHz)



Date: 25.MAY.2015 03:06:02

Higher Band Edge Plot on Channel 810 (1909.8 MHz)

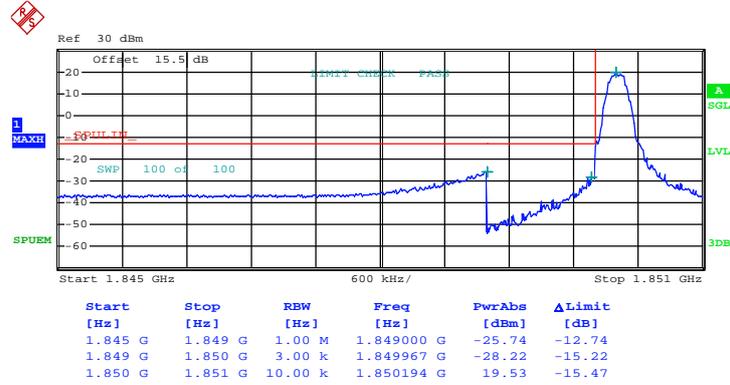


Date: 25.MAY.2015 03:01:39



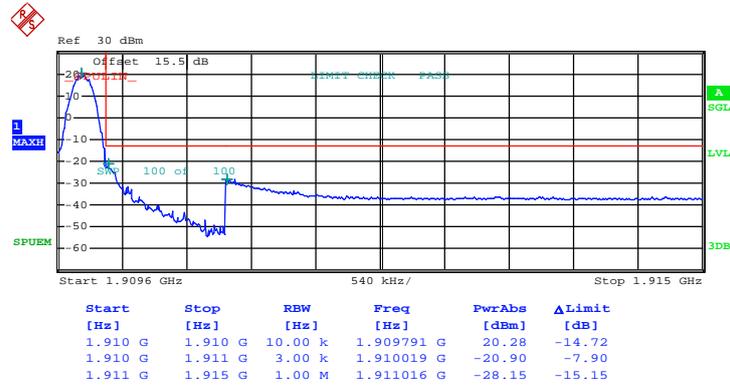
| | | | |
|--------|---------|-------------|--------------------------|
| Band : | GSM1900 | Test Mode : | EDGE class 8 Link (8PSK) |
|--------|---------|-------------|--------------------------|

Lower Band Edge Plot on Channel 512 (1850.2 MHz)



Date: 25.MAY.2015 03:45:24

Higher Band Edge Plot on Channel 810 (1909.8 MHz)

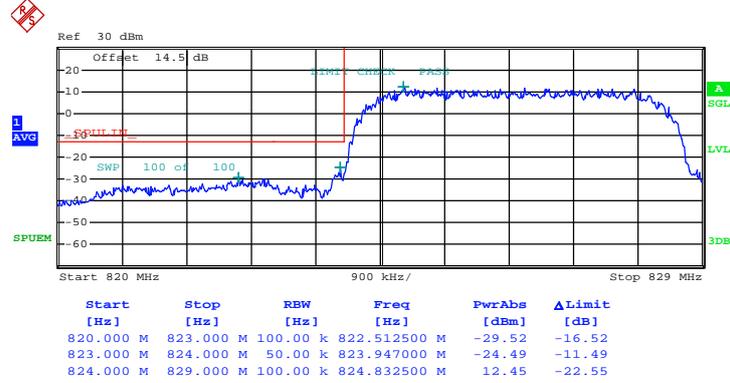


Date: 25.MAY.2015 03:47:08



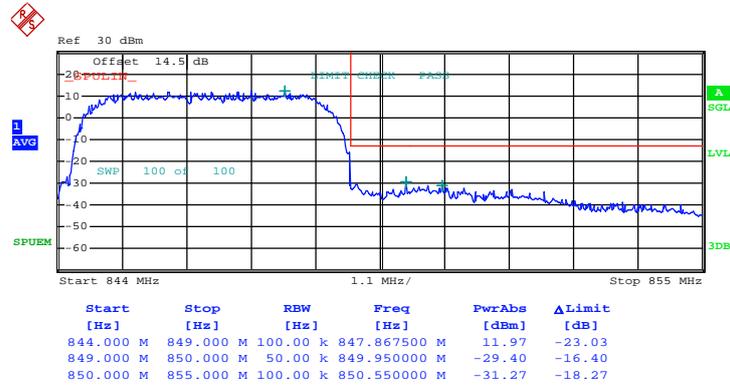
| | | | |
|--------|--------------|-------------|--------------------------|
| Band : | WCDMA Band V | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|--------------|-------------|--------------------------|

Lower Band Edge Plot on Channel 4132 (826.4 MHz)



Date: 24.MAY.2015 23:22:01

Higher Band Edge Plot on Channel 4233 (846.6 MHz)

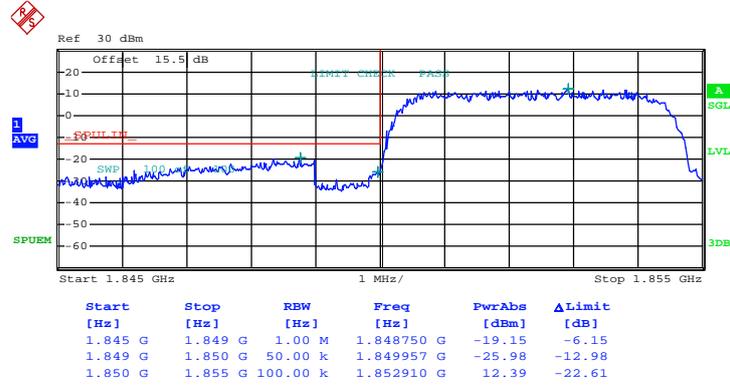


Date: 24.MAY.2015 23:23:50



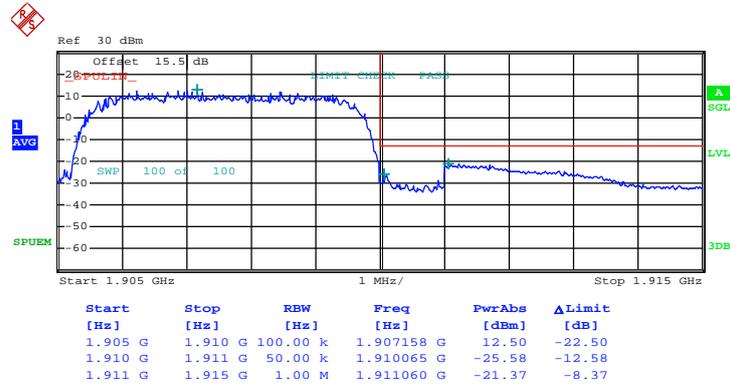
| | | | |
|--------|---------------|-------------|--------------------------|
| Band : | WCDMA Band II | Test Mode : | RMC 12.2Kbps Link (QPSK) |
|--------|---------------|-------------|--------------------------|

Lower Band Edge Plot on Channel 9262 (1852.4 MHz)



Date: 25.MAY.2015 01:34:27

Higher Band Edge Plot on Channel 9538 (1907.6 MHz)



Date: 25.MAY.2015 01:36:56

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 10th harmonic.

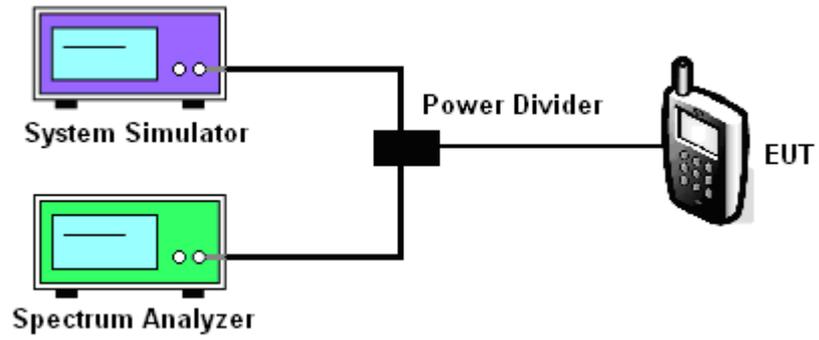
3.6.2 Measuring Instruments

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)
= -13dBm.

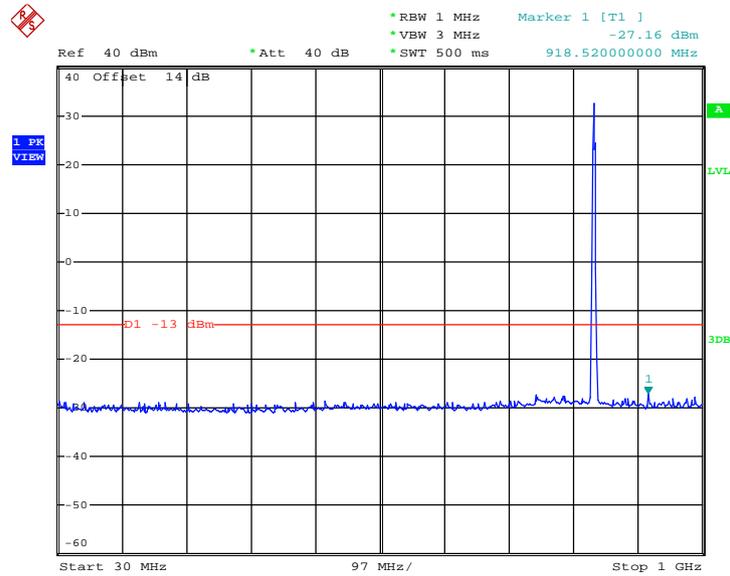
3.6.4 Test Setup



3.6.5 Test Result (Plots) of Conducted Spurious Emission

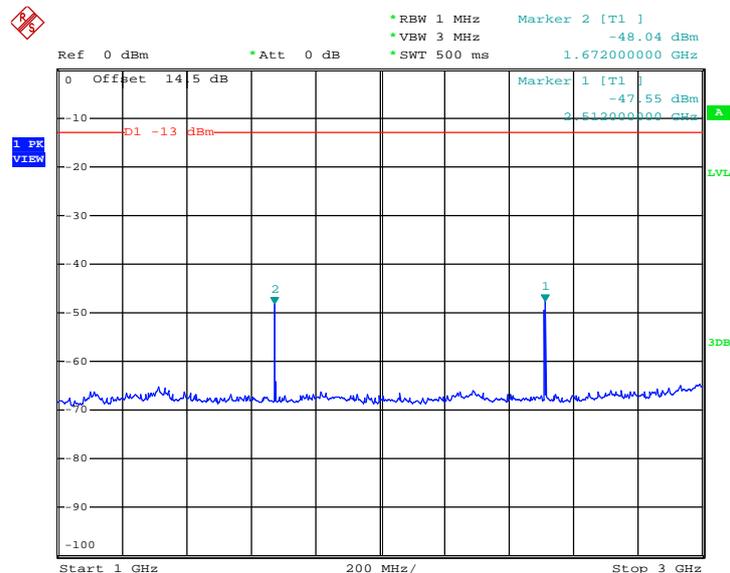
| | | | |
|--------------------|-----------------|--------------------|-----------|
| Band : | GSM850 | Channel : | CH189 |
| Test Mode : | GSM Link (GMSK) | Frequency : | 836.4 MHz |

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 24.MAY.2015 22:01:28

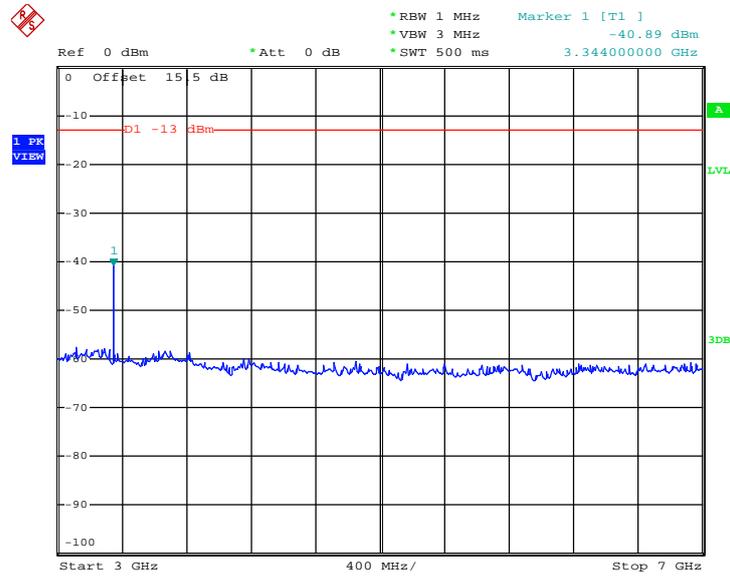
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 24.MAY.2015 22:06:16

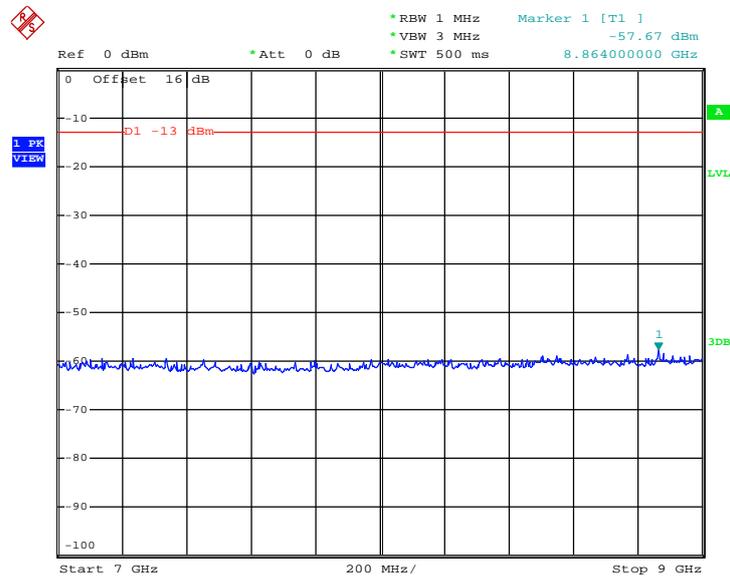


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 24.MAY.2015 22:16:28

Conducted Spurious Emission Plot between 7GHz ~ 9GHz

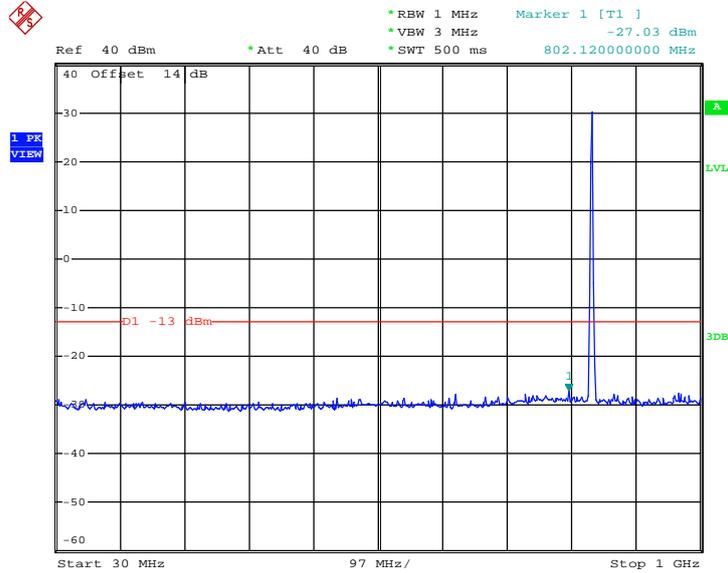


Date: 24.MAY.2015 22:09:58



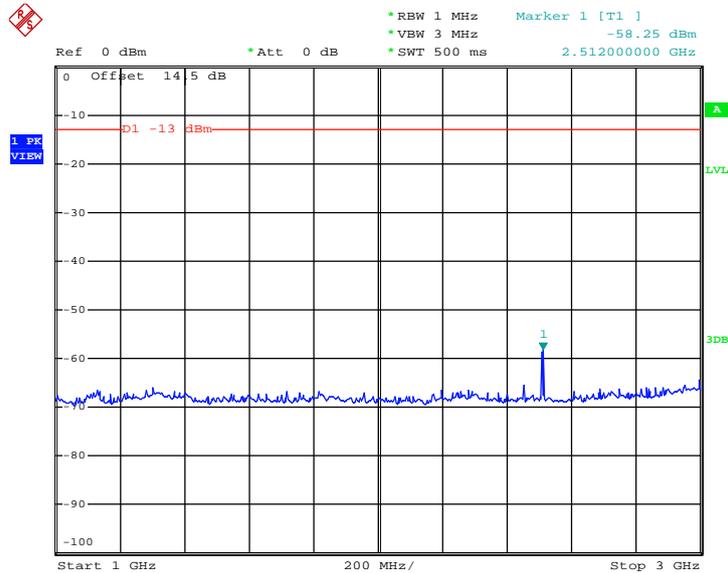
| | | | |
|--------------------|--------------------------|--------------------|-----------|
| Band : | GSM850 | Channel : | CH189 |
| Test Mode : | EDGE class 8 Link (8PSK) | Frequency : | 836.4 MHz |

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 24.MAY.2015 22:35:18

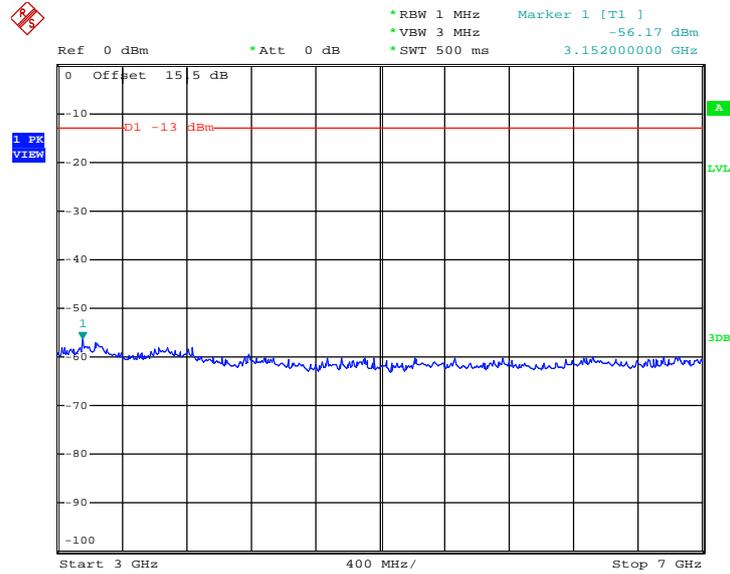
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 24.MAY.2015 22:31:04

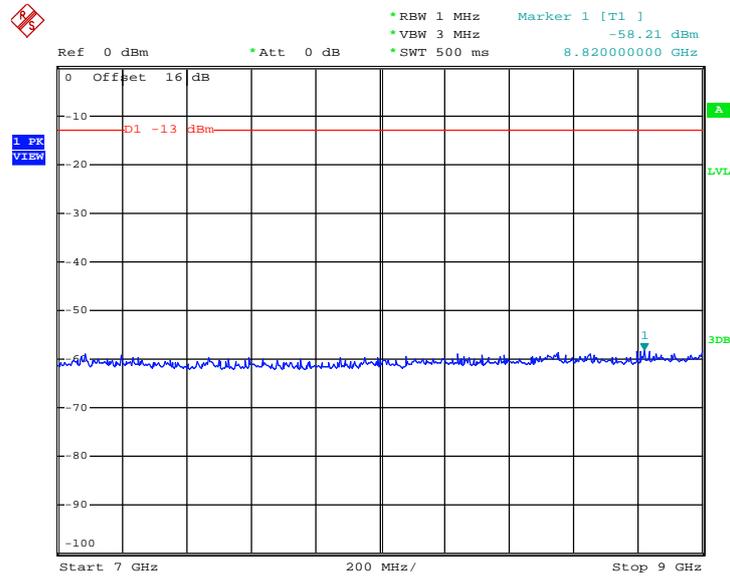


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 24.MAY.2015 22:29:47

Conducted Spurious Emission Plot between 7GHz ~ 9GHz

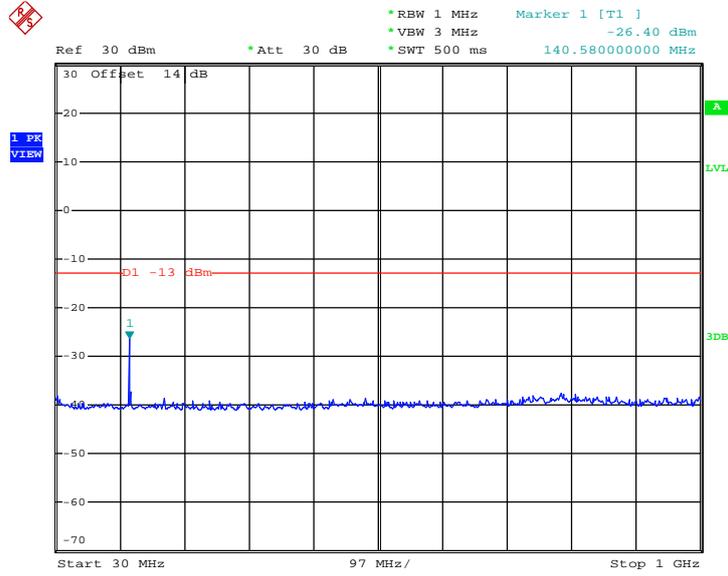


Date: 24.MAY.2015 22:31:53



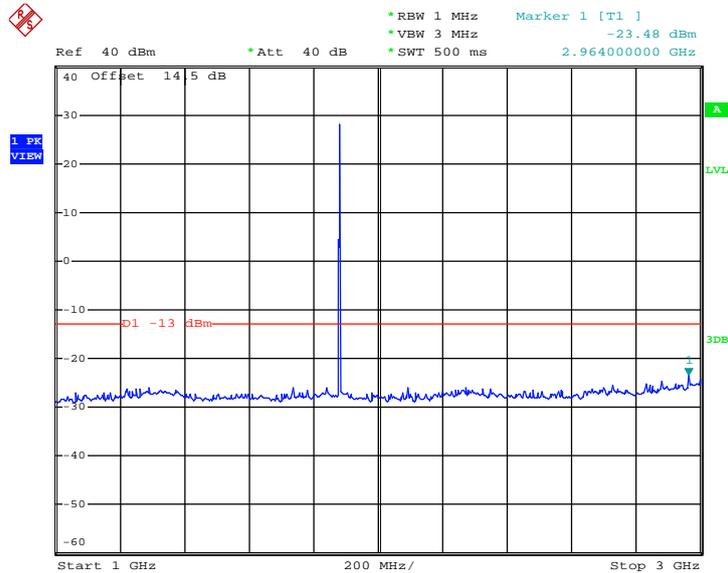
| | | | |
|--------------------|-----------------|--------------------|------------|
| Band : | GSM1900 | Channel : | CH661 |
| Test Mode : | GSM Link (GMSK) | Frequency : | 1880.0 MHz |

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 25.MAY.2015 03:26:36

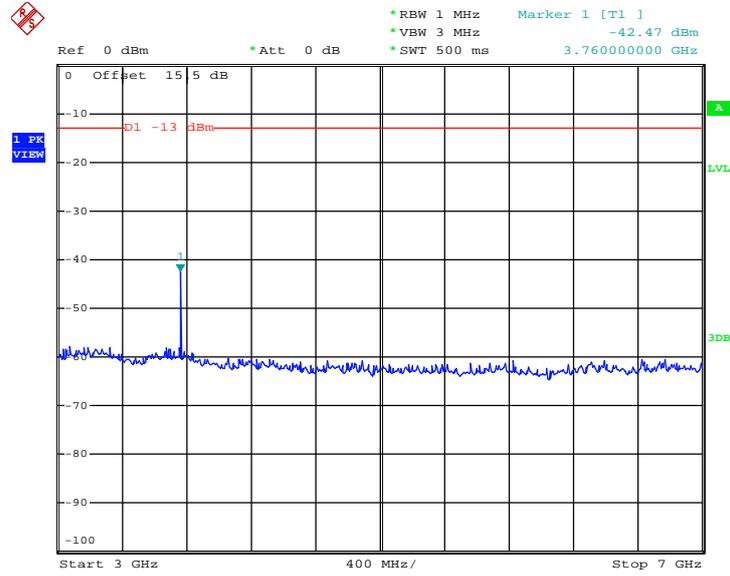
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 25.MAY.2015 03:28:07

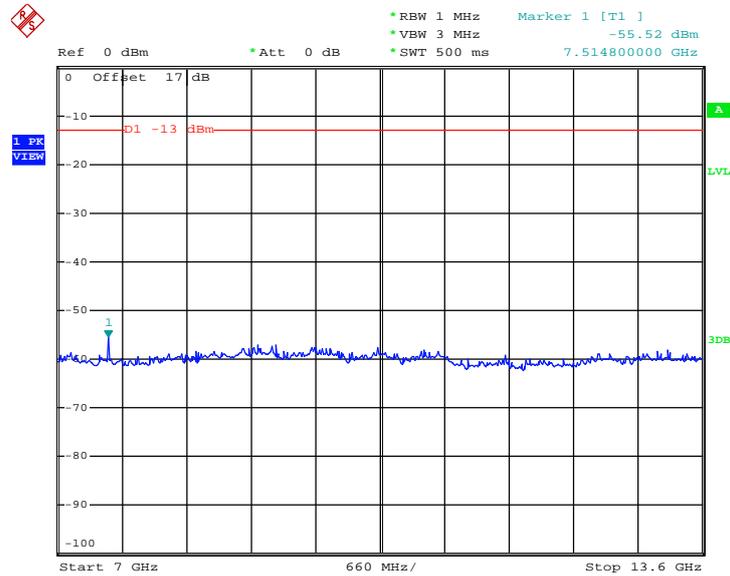


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 25.MAY.2015 03:29:56

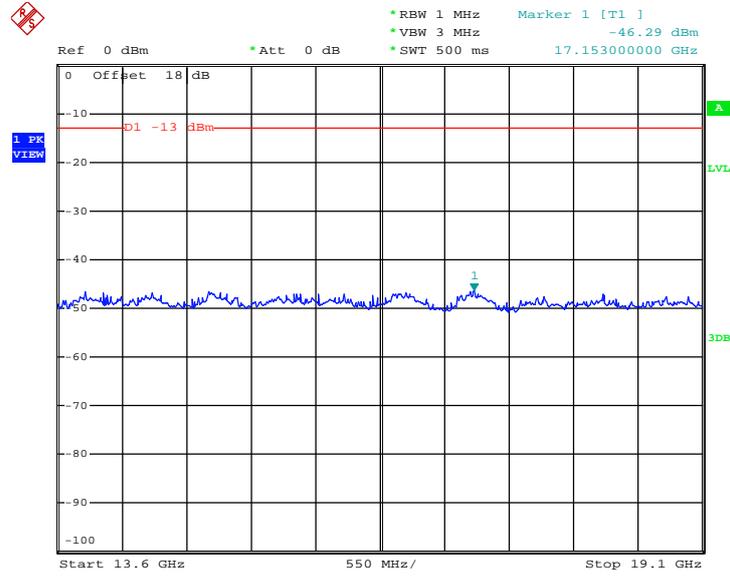
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 25.MAY.2015 03:31:27



Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz

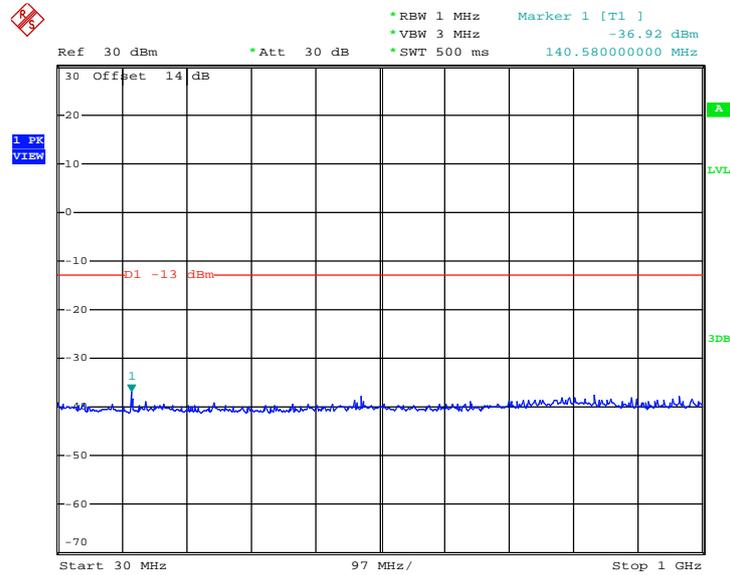


Date: 25.MAY.2015 03:32:29



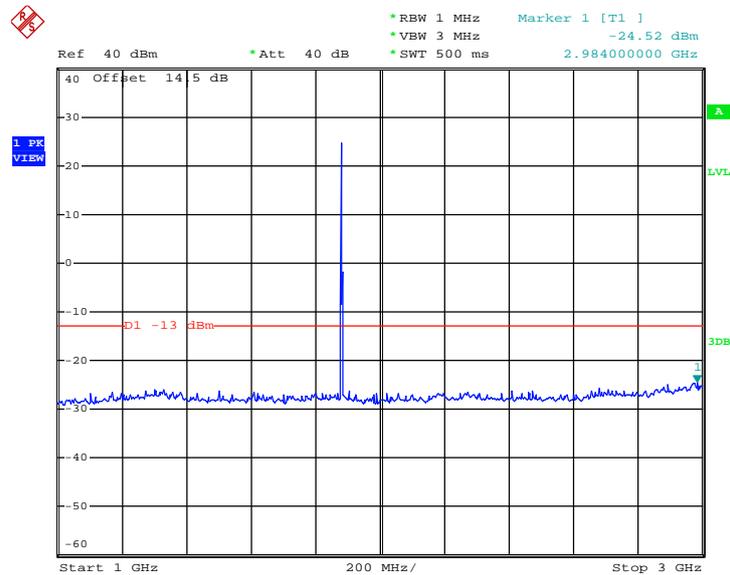
| | | | |
|--------------------|--------------------------|--------------------|------------|
| Band : | GSM1900 | Channel : | CH661 |
| Test Mode : | EDGE class 8 Link (8PSK) | Frequency : | 1880.0 MHz |

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 25.MAY.2015 03:39:15

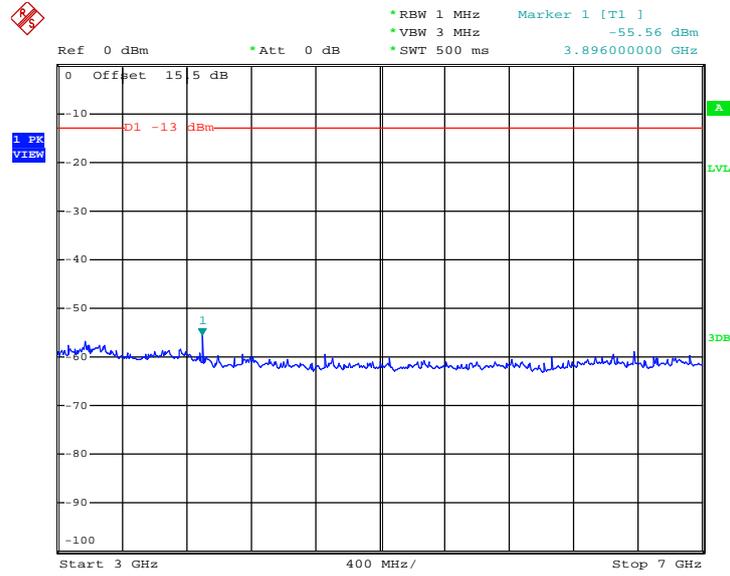
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 25.MAY.2015 03:41:07

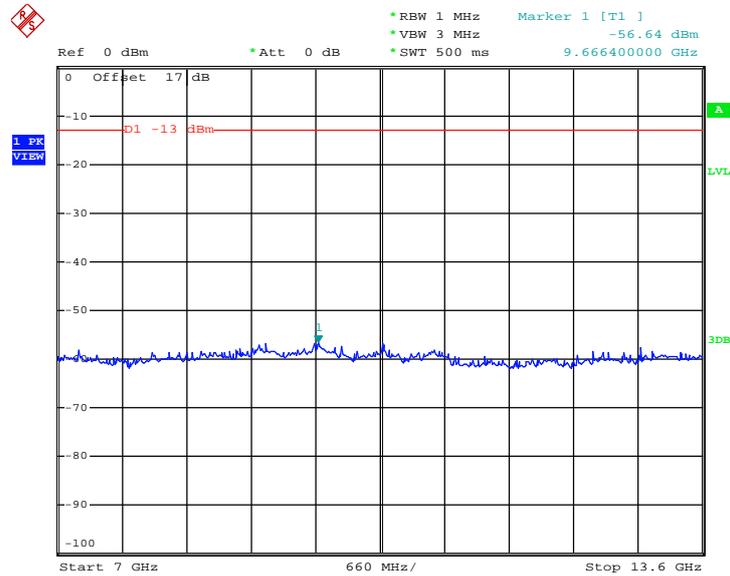


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 25.MAY.2015 03:41:48

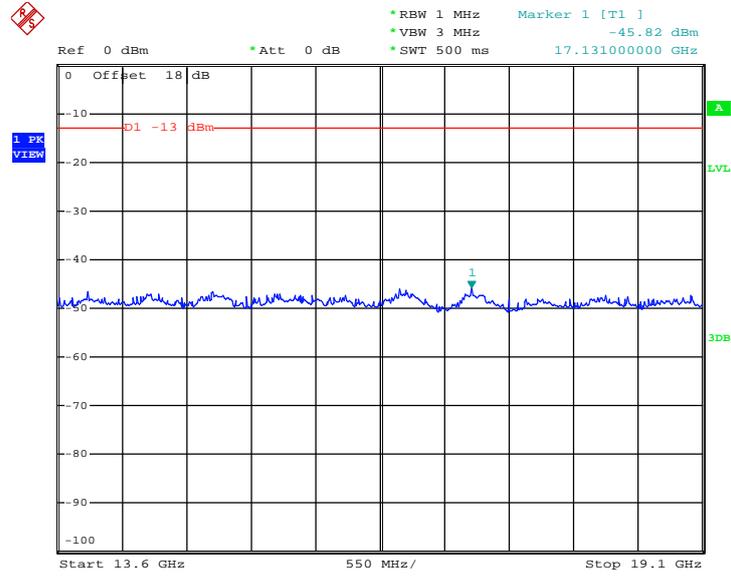
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 25.MAY.2015 03:42:36



Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz

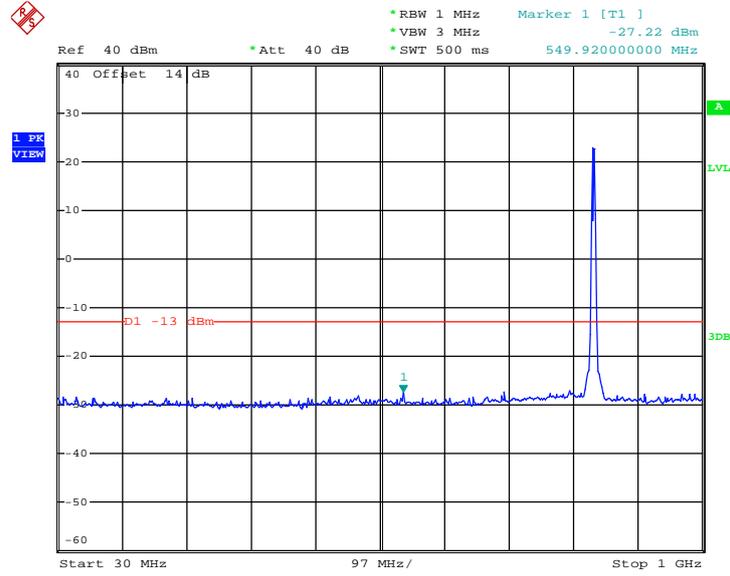


Date: 25.MAY.2015 03:38:17



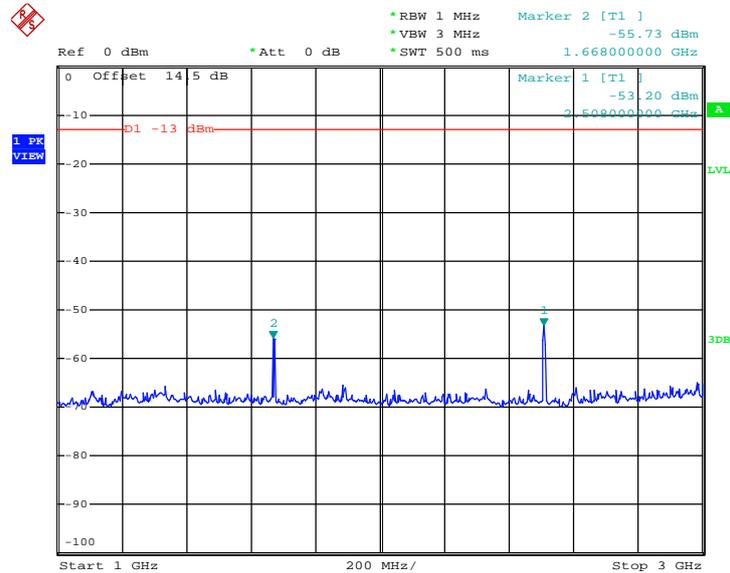
| | | | |
|--------------------|--------------------------|--------------------|-----------|
| Band : | WCDMA Band V | Channel : | CH4182 |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 836.4 MHz |

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 25.MAY.2015 01:04:15

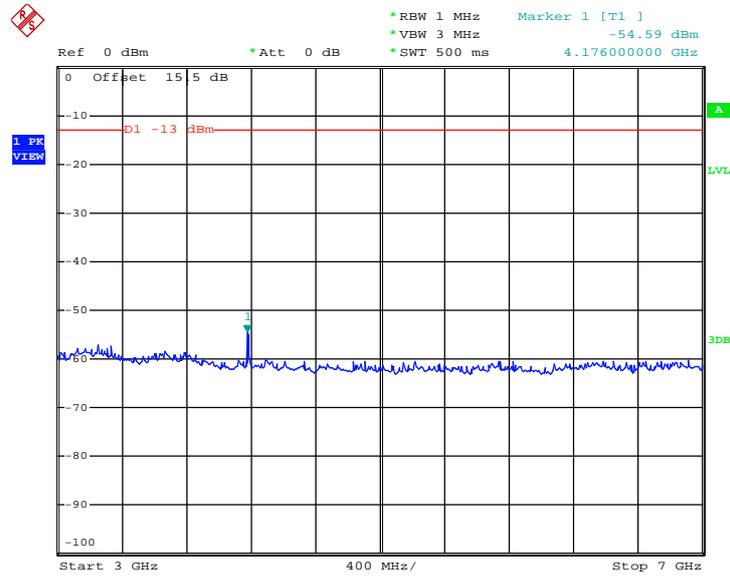
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 25.MAY.2015 22:29:22

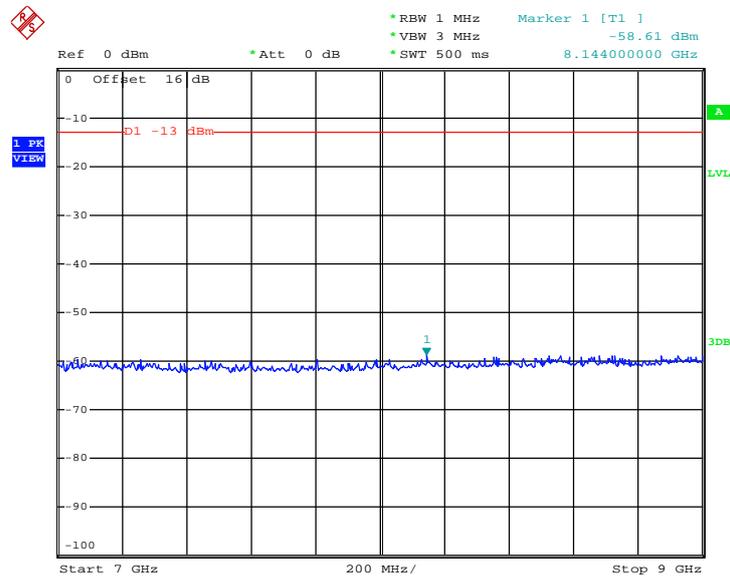


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 25.MAY.2015 01:07:26

Conducted Spurious Emission Plot between 7GHz ~ 9GHz

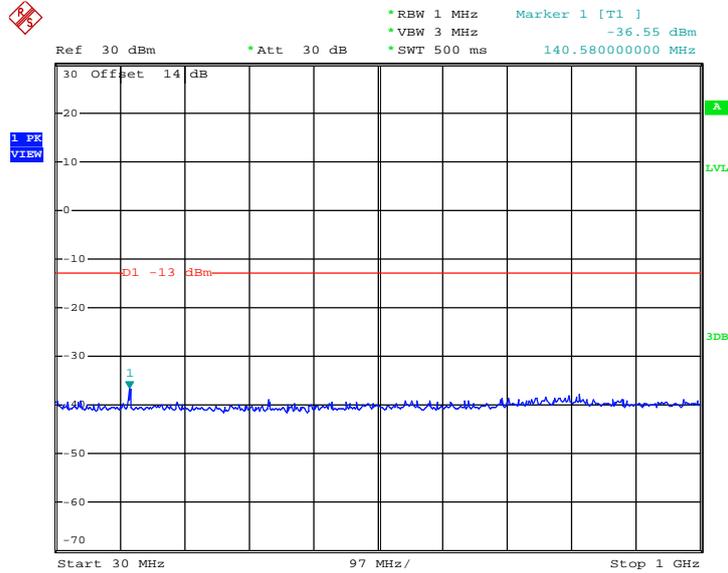


Date: 25.MAY.2015 01:08:10



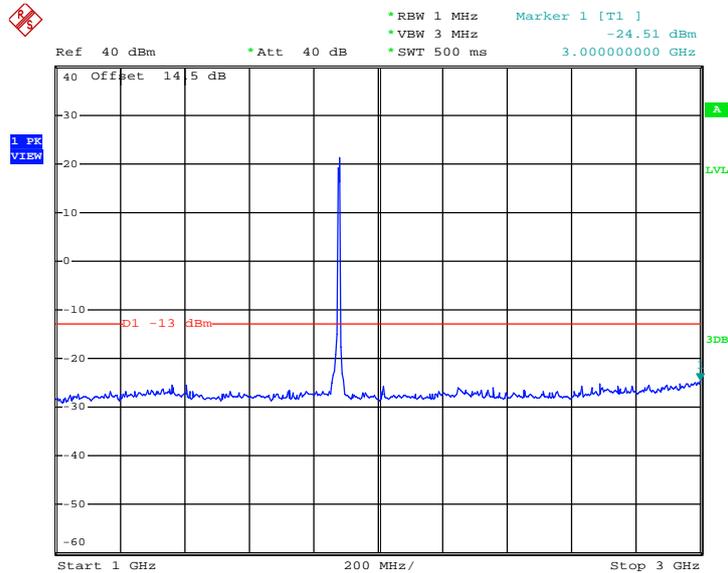
| | | | |
|-------------|--------------------------|-------------|------------|
| Band : | WCDMA Band II | Channel : | CH9400 |
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Frequency : | 1880.0 MHz |

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 25.MAY.2015 01:15:31

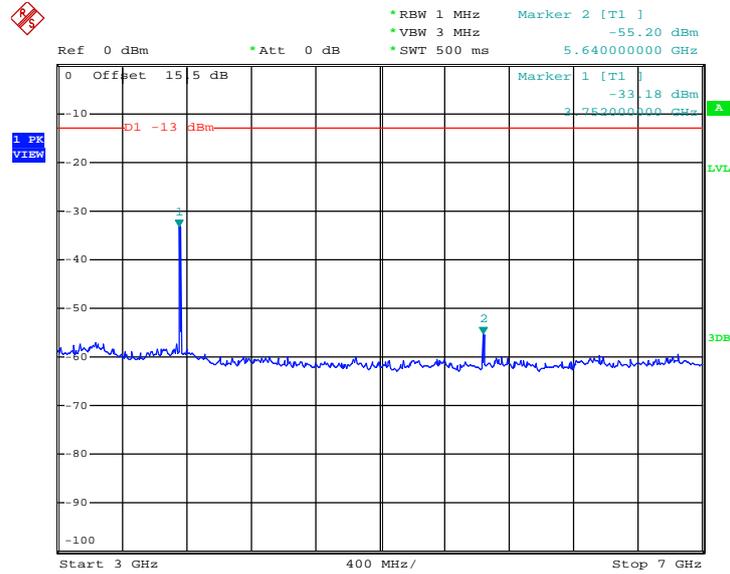
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 25.MAY.2015 01:17:05

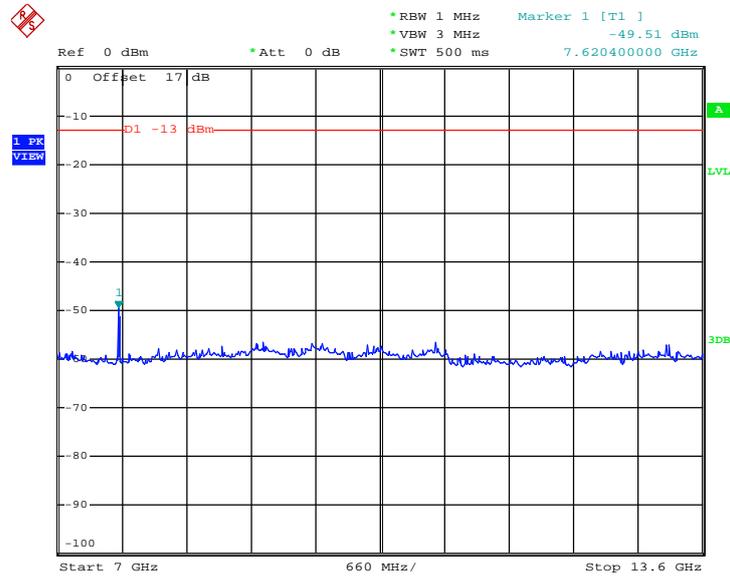


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 25.MAY.2015 01:18:40

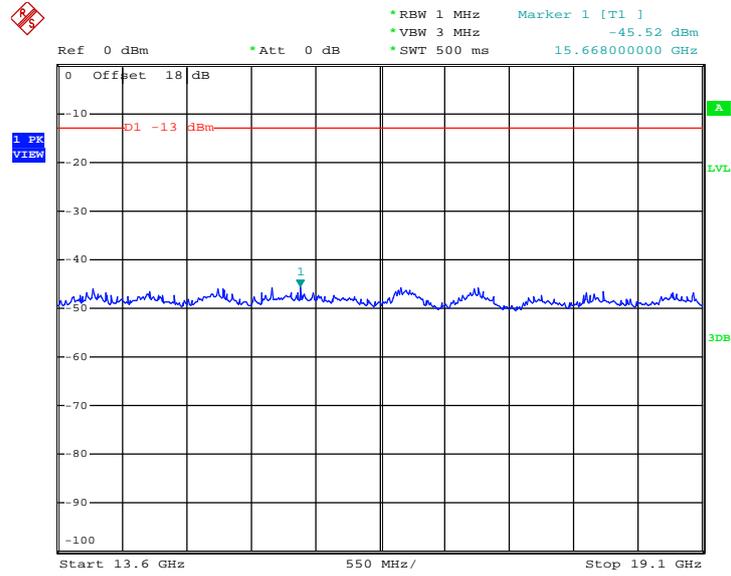
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 25.MAY.2015 22:35:42



Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz



Date: 25.MAY.2015 22:36:49

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

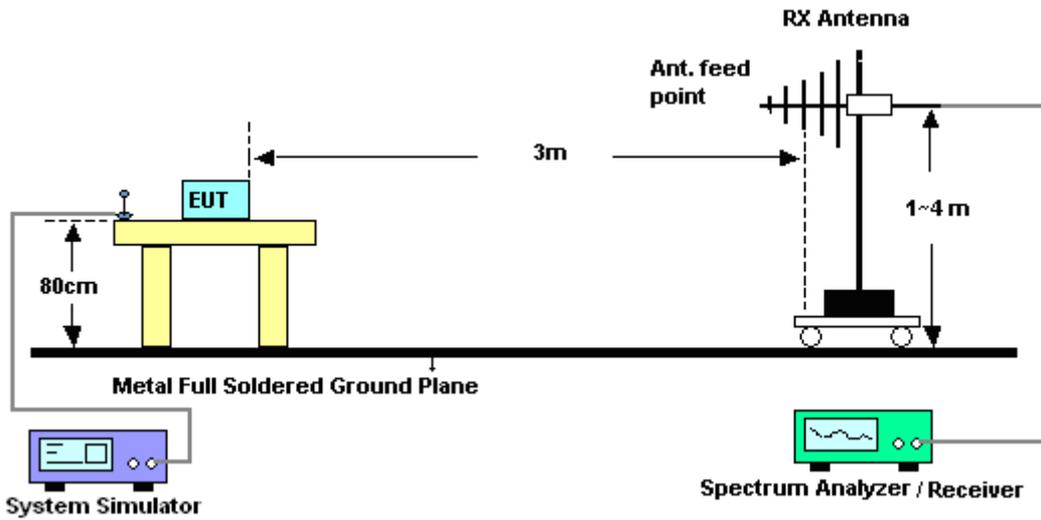
The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedures

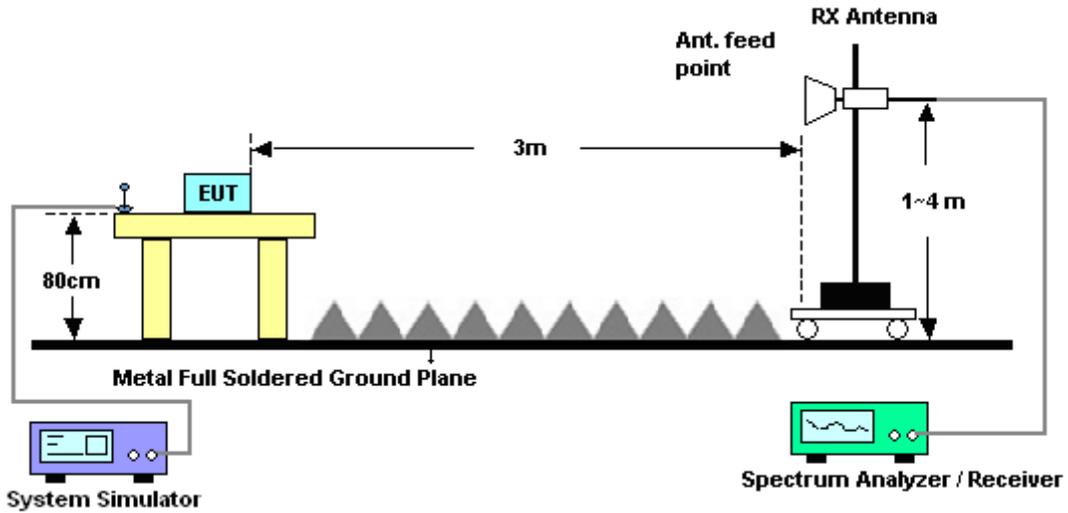
1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 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)
= $P(W) - [43 + 10\log(P)] \text{ (dB)}$
= $[30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
= -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

| Band : | GSM850 for Sample 1 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-----------------------|--------|
| Test Mode : | GSM Link (GMSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 |
| 1674 | -51.20 | -13 | -38.20 | -53.67 | -53.09 | 1.86 | 5.90 | H | Pass |
| 2510 | -42.37 | -13 | -29.37 | -55.09 | -44.71 | 2.31 | 6.80 | H | Pass |
| 3346 | -43.90 | -13 | -30.90 | -58.67 | -46.30 | 2.85 | 7.40 | H | Pass |
| 4182 | -51.06 | -13 | -38.06 | -62.47 | -53.74 | 3.07 | 7.90 | H | Pass |
| 5018 | -42.71 | -13 | -29.71 | -56.06 | -46.51 | 3.25 | 9.20 | H | Pass |
| 5854 | -41.51 | -13 | -28.51 | -54.97 | -45.96 | 3.7 | 10.30 | H | Pass |

| Band : | GSM850 for Sample 1 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-----------------------|--------|
| Test Mode : | GSM Link (GMSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 | -49.45 | -13 | -36.45 | -52.06 | -51.34 | 1.86 | 5.90 | V | Pass |
| 2510 | -50.45 | -13 | -37.45 | -61.42 | -52.79 | 2.31 | 6.80 | V | Pass |
| 3346 | -41.79 | -13 | -28.79 | -58.23 | -44.19 | 2.85 | 7.40 | V | Pass |
| 4182 | -42.94 | -13 | -29.94 | -58.28 | -45.62 | 3.07 | 7.90 | V | Pass |
| 5018 | -41.18 | -13 | -28.18 | -55.96 | -44.98 | 3.25 | 9.20 | V | Pass |
| 5856 | -48.13 | -13 | -35.13 | -57.57 | -52.58 | 3.70 | 10.30 | V | Pass |



| Band : | GSM850 for Sample 1 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| Test Mode : | EDGE class 8 Link (8PSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 | -50.81 | -13 | -37.81 | -53.33 | -52.70 | 1.86 | 5.90 | H | Pass |
| 2510 | -48.00 | -13 | -35.00 | -58.21 | -50.34 | 2.31 | 6.80 | H | Pass |
| 3344 | -52.74 | -13 | -39.74 | -65.37 | -55.14 | 2.85 | 7.40 | H | Pass |

| Band : | GSM850 for Sample 1 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| Test Mode : | EDGE class 8 Link (8PSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 |
| 1674 | -48.85 | -13 | -35.85 | -51.67 | -50.74 | 1.86 | 5.90 | V | Pass |
| 2510 | -42.49 | -13 | -29.49 | -56.36 | -44.83 | 2.31 | 6.80 | V | Pass |
| 3344 | -51.69 | -13 | -38.69 | -65.67 | -54.09 | 2.85 | 7.40 | V | Pass |



| Band : | GSM1900 for Sample 1 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-----------------------|--------|
| Test Mode : | GSM Link (GMSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 |
| 3759 | -51.32 | -13 | -38.32 | -65.52 | -55.92 | 3 | 7.60 | H | Pass |
| 5640 | -49.60 | -13 | -36.60 | -63.39 | -55.86 | 3.84 | 10.10 | H | Pass |
| 7521 | -38.93 | -13 | -25.93 | -58.71 | -46.43 | 4.43 | 11.93 | H | Pass |
| 9399 | -42.49 | -13 | -29.49 | -61.75 | -50.15 | 4.92 | 12.58 | H | Pass |
| 11280 | -27.31 | -13 | -14.31 | -53.04 | -33.76 | 5.95 | 12.40 | H | Pass |

| Band : | GSM1900 for Sample 1 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-----------------------|--------|
| Test Mode : | GSM Link (GMSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 |
| 3759 | -52.72 | -13 | -39.72 | -65.21 | -57.32 | 3 | 7.60 | V | Pass |
| 5640 | -50.58 | -13 | -37.58 | -62.99 | -56.84 | 3.84 | 10.10 | V | Pass |
| 7521 | -34.34 | -13 | -21.34 | -54.27 | -41.84 | 4.43 | 11.93 | V | Pass |
| 9399 | -39.47 | -13 | -26.47 | -60.28 | -47.13 | 4.92 | 12.58 | V | Pass |
| 11280 | -23.55 | -13 | -10.55 | -50.44 | -30.00 | 5.95 | 12.40 | V | Pass |



| Band : | GSM1900 for Sample 1 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-----------------------|--------|
| Test Mode : | EDGE class 8 Link (8PSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 |
| 3759 | -50.80 | -13 | -37.80 | -65.00 | -55.40 | 3 | 7.60 | H | Pass |
| 5640 | -48.77 | -13 | -35.77 | -62.56 | -55.03 | 3.84 | 10.10 | H | Pass |
| 7521 | -40.76 | -13 | -27.76 | -60.54 | -48.26 | 4.43 | 11.93 | H | Pass |

| Band : | GSM1900 for Sample 1 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-----------------------|--------|
| Test Mode : | EDGE class 8 Link (8PSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 |
| 3759 | -53.63 | -13 | -40.63 | -66.12 | -58.23 | 3 | 7.60 | V | Pass |
| 5640 | -51.18 | -13 | -38.18 | -63.59 | -57.44 | 3.84 | 10.10 | V | Pass |
| 7524 | -42.28 | -13 | -29.28 | -60.07 | -49.78 | 4.43 | 11.93 | V | Pass |



| Band : | WCDMA Band V for Sample 1 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| Test Mode : | RMC 12.2Kbps Link (QPSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 | -55.75 | -13 | -42.75 | -57.93 | -57.64 | 1.86 | 5.90 | H | Pass |
| 2509 | -53.85 | -13 | -40.85 | -62.88 | -56.19 | 2.31 | 6.80 | H | Pass |
| 3344 | -53.20 | -13 | -40.20 | -65.83 | -55.60 | 2.85 | 7.40 | H | Pass |

| Band : | WCDMA Band V for Sample 1 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| Test Mode : | RMC 12.2Kbps Link (QPSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 | -59.74 | -13 | -46.74 | -58.60 | -61.63 | 1.86 | 5.90 | V | Pass |
| 2508 | -53.40 | -13 | -40.40 | -64.37 | -55.74 | 2.31 | 6.80 | V | Pass |
| 3344 | -50.63 | -13 | -37.63 | -64.61 | -53.03 | 2.85 | 7.40 | V | Pass |



| Band : | WCDMA Band II for Sample 1 | Temperature : | 22~23°C | | | | | | |
|------------------------|--|----------------------------|-------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Relative Humidity : | 42~43% | | | | | | |
| Test Engineer : | Simon Lu | 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 |
| 3759 | -48.54 | -13 | -35.54 | -62.74 | -53.14 | 3 | 7.60 | H | Pass |
| 5640 | -49.20 | -13 | -36.20 | -62.99 | -55.46 | 3.84 | 10.10 | H | Pass |
| 7521 | -41.76 | -13 | -28.76 | -61.54 | -49.26 | 4.43 | 11.93 | H | Pass |

| Band : | WCDMA Band II for Sample 1 | Temperature : | 22~23°C | | | | | | |
|------------------------|--|----------------------------|-------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| Test Mode : | RMC 12.2Kbps Link (QPSK) | Relative Humidity : | 42~43% | | | | | | |
| Test Engineer : | Simon Lu | 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 |
| 3759 | -51.30 | -13 | -38.30 | -63.79 | -55.90 | 3 | 7.60 | V | Pass |
| 5640 | -51.99 | -13 | -38.99 | -64.4 | -58.25 | 3.84 | 10.10 | V | Pass |
| 7521 | -43.40 | -13 | -30.40 | -61.19 | -50.90 | 4.43 | 11.93 | V | Pass |



| Band : | GSM850 for Sample 2 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| Test Mode : | GSM Link (GMSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 |
| 1674 | -39.75 | -13 | -26.75 | -45.92 | -41.64 | 1.86 | 5.90 | H | Pass |
| 2512 | -40.65 | -13 | -27.65 | -53.92 | -42.99 | 2.31 | 6.80 | H | Pass |
| 3348 | -49.55 | -13 | -36.55 | -62.18 | -51.95 | 2.85 | 7.40 | H | Pass |
| 4186 | -51.02 | -13 | -38.02 | -62.43 | -53.70 | 3.07 | 7.90 | H | Pass |
| 5022 | -44.46 | -13 | -31.46 | -56.80 | -48.26 | 3.25 | 9.20 | H | Pass |
| 5860 | -47.42 | -13 | -34.42 | -57.43 | -51.87 | 3.7 | 10.30 | H | Pass |

| Band : | GSM850 for Sample 2 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| Test Mode : | GSM Link (GMSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 |
| 1674 | -36.90 | -13 | -23.90 | -43.47 | -38.79 | 1.86 | 5.90 | V | Pass |
| 2508 | -52.34 | -13 | -39.34 | -63.31 | -54.68 | 2.31 | 6.80 | V | Pass |
| 3348 | -48.03 | -13 | -35.03 | -62.01 | -50.43 | 2.85 | 7.40 | V | Pass |
| 4186 | -46.41 | -13 | -33.41 | -60.00 | -49.09 | 3.07 | 7.90 | V | Pass |
| 5022 | -47.75 | -13 | -34.75 | -59.10 | -51.55 | 3.25 | 9.20 | V | Pass |
| 5854 | -51.84 | -13 | -38.84 | -61.28 | -56.29 | 3.70 | 10.30 | V | Pass |



| Band : | GSM1900 for Sample 2 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| Test Mode : | GSM Link (GMSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 |
| 3759 | -51.02 | -13 | -38.02 | -65.22 | -55.62 | 3 | 7.60 | H | Pass |
| 5640 | -50.47 | -13 | -37.47 | -64.26 | -56.73 | 3.84 | 10.10 | H | Pass |
| 7521 | -41.25 | -13 | -28.25 | -61.03 | -48.75 | 4.43 | 11.93 | H | Pass |
| 9399 | -42.38 | -13 | -29.38 | -61.64 | -50.04 | 4.92 | 12.58 | H | Pass |
| 11280 | -31.61 | -13 | -18.61 | -55.67 | -38.06 | 5.95 | 12.40 | H | Pass |

| Band : | GSM1900 for Sample 2 | | Temperature : | 22~23°C | | | | | |
|------------------------|--|------------------|----------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|-------------------------|--------|
| Test Mode : | GSM Link (GMSK) | | Relative Humidity : | 42~43% | | | | | |
| Test Engineer : | Simon Lu | | 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 |
| 3759 | -53.18 | -13 | -40.18 | -65.67 | -57.78 | 3 | 7.60 | V | Pass |
| 5640 | -51.95 | -13 | -38.95 | -64.36 | -58.21 | 3.84 | 10.10 | V | Pass |
| 7521 | -40.00 | -13 | -27.00 | -57.79 | -47.50 | 4.43 | 11.93 | V | Pass |
| 9399 | -39.46 | -13 | -26.46 | -60.27 | -47.12 | 4.92 | 12.58 | V | Pass |
| 11280 | -25.58 | -13 | -12.58 | -51.95 | -32.03 | 5.95 | 12.40 | 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.

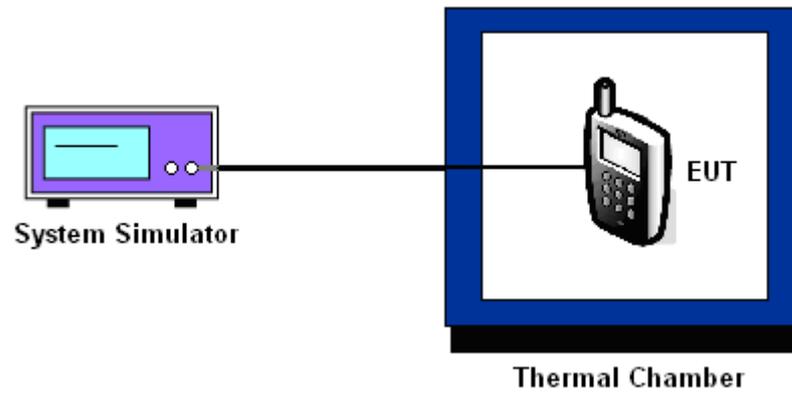
3.8.3 Test Procedures for Temperature Variation

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°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 $25\pm 5^{\circ}\text{C}$ 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 | 0.0108 | 0.0108 | PASS |
| 40 | 0.0048 | 0.0550 | |
| 30 | 0.0514 | 0.0466 | |
| 20(Ref.) | 0.0000 | 0.0000 | |
| 10 | 0.0442 | 0.0048 | |
| 0 | 0.0072 | 0.0430 | |
| -10 | 0.0036 | 0.0478 | |
| -20 | 0.0490 | 0.0084 | |
| -30 | 0.0108 | 0.0096 | |

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

| Temperature (°C) | GSM | EDGE class 8 | Result |
|------------------|-----------------|-----------------|--------|
| | Deviation (ppm) | Deviation (ppm) | |
| 50 | 0.0239 | 0.0064 | PASS |
| 40 | 0.0043 | 0.0154 | |
| 30 | 0.0229 | 0.0128 | |
| 20(Ref.) | 0.0000 | 0.0000 | |
| 10 | 0.0154 | 0.0005 | |
| 0 | 0.0021 | 0.0027 | |
| -10 | 0.0144 | 0.0128 | |
| -20 | 0.0176 | 0.0011 | |
| -30 | 0.0149 | 0.0144 | |

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



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

| Temperature (°C) | RMC 12.2Kbps | | Result |
|------------------|-----------------|--|--------|
| | Deviation (ppm) | | |
| 50 | 0.0586 | | PASS |
| 40 | 0.0538 | | |
| 30 | 0.0502 | | |
| 20(Ref.) | 0.0000 | | |
| 10 | 0.0454 | | |
| 0 | 0.0096 | | |
| -10 | 0.0574 | | |
| -20 | 0.0120 | | |
| -30 | 0.0622 | | |

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

| Temperature (°C) | RMC 12.2Kbps | | Result |
|------------------|-----------------|--|--------|
| | Deviation (ppm) | | |
| 50 | 0.0059 | | PASS |
| 40 | 0.0011 | | |
| 30 | 0.0170 | | |
| 20(Ref.) | 0.0000 | | |
| 10 | 0.0223 | | |
| 0 | 0.0011 | | |
| -10 | 0.0181 | | |
| -20 | 0.0144 | | |
| -30 | 0.0234 | | |

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 CH189 | GSM | 4.35 | 0.0155 | 2.5 | PASS |
| | | 3.8 | 0.0430 | | |
| | | BEP | 0.0407 | | |
| | EDGE class 8 | 4.35 | 0.0060 | | |
| | | 3.8 | 0.0383 | | |
| | | BEP | 0.0167 | | |
| GSM 1900 CH661 | GSM | 4.35 | 0.0011 | (Note 3.) | |
| | | 3.8 | 0.0165 | | |
| | | BEP | 0.0154 | | |
| | EDGE class 8 | 4.35 | 0.0011 | | |
| | | 3.8 | 0.0149 | | |
| | | BEP | 0.0005 | | |
| WCDMA Band V CH4182 | RMC 12.2Kbps | 4.35 | 0.0383 | 2.5 | |
| | | 3.8 | 0.0060 | | |
| | | BEP | 0.0395 | | |
| WCDMA Band II CH9400 | RMC 12.2Kbps | 4.35 | 0.0027 | (Note 3.) | |
| | | 3.8 | 0.0165 | | |
| | | BEP | 0.0266 | | |

Note:

1. Normal Voltage = 3.8V.
2. Battery End Point (BEP) = 3.6 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 |
|---------------------------|--------------|-----------|------------------|---------------------------|------------------|-----------------------------|---------------|-----------------------|
| Spectrum Analyzer | R&S | FSP40 | 100319 | 9kHz~40GHz | Oct. 28, 2014 | May 24,2015~ May 25,2015 | Oct. 27, 2015 | Conducted (TH01-KS) |
| Spectrum Analyzer | R&S | FSV30 | 100845 | 9kHz~30GHz | Oct. 28, 2014 | May 24,2015~ May 25,2015 | Oct. 27, 2015 | Conducted (TH01-KS) |
| Thermal Chamber | Ten Billion | TTC-B3S | TBN-960502 | -40~+150°C | Oct. 25, 2014 | May 24,2015~ May 25,2015 | Oct. 24, 2015 | Conducted (TH01-KS) |
| EMI Test Receiver | R&S | ESR7 | 101403 | 9kHz~7GHz; Max 30dBm | Sep. 29, 2014 | May 26, 2015 | Sep. 28, 2015 | Radiation (03CH02-KS) |
| Spectrum Analyzer | R&S | FSV40 | 101040 | 10kHz~40GHz;Max 30dBm | Sep. 25, 2014 | May 26, 2015 | Sep. 24, 2015 | Radiation (03CH02-KS) |
| Bilog Antenna | TeseQ | CBL6112D | 37879 | 30MHz~2GHz | Sep. 13, 2014 | May 26, 2015 | Sep. 12, 2015 | Radiation (03CH02-KS) |
| Double Ridge Horn Antenna | ETS-Lindgren | 3117 | 75957 | 1GHz~18GHz | Nov. 08, 2014 | May 26, 2015 | Nov. 07, 2015 | Radiation (03CH02-KS) |
| Active Horn Antenna | com-power | AHA-118 | 701030 | 1GHz~18GHz | Nov. 08, 2014 | May 26, 2015 | Nov. 07, 2015 | Radiation (03CH02-KS) |
| SHF-EHF Horn | com-power | AH-840 | 101070 | 18GHz~40GHz | Sep. 04, 2014 | May 26, 2015 | Sep. 03, 2015 | Radiation (03CH02-KS) |
| Amplifier | com-power | PA-103A | 161069 | 1kHz~1000MHz / 32 dB | May 04, 2015 | May 26, 2015 | May 03, 2016 | Radiation (03CH02-KS) |
| Amplifier | Agilent | 8449B | 3008A02384 | 1GHz~26.5GHz Gain 30dB | Oct. 28, 2014 | May 26, 2015 | Oct. 27, 2015 | Radiation (03CH02-KS) |
| AC Power Source | Chroma | 61601 | 61601000247 3 | N/A | NCR | May 26, 2015 | NCR | Radiation (03CH02-KS) |
| Turn Table | MF | MF7802 | N/A | 0~360 degree | NCR | May 26, 2015 | NCR | Radiation (03CH02-KS) |
| Antenna Mast | MF | MF7802 | N/A | 1 m~4 m | NCR | May 26, 2015 | NCR | Radiation (03CH02-KS) |



5 Uncertainty of Evaluation

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

| | |
|---|-------|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 5.1dB |
|---|-------|