# FCC RF Test Report

| | | |
|---|---|---|
| APPLICANT | : | LG Electronics Mobile Comm USA |
| EQUIPMENT | : | Smart phone |
| BRAND NAME | : | LG |
| MODEL NAME | : | LG-X210mb |
| FCC ID | : | ZNFX210MB |
| STANDARD | : | FCC 47 CFR Part 2, 22(H), 24(E), 27(L) |
| CLASSIFICATION | : | PCS Licensed Transmitter Held to Ear (PCE) |

**The product was received on Nov. 20, 2015 and testing was completed on Jan. 04, 2016. 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-D-2010 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.**

James Huang

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Jones Tsai

**Approved by: Jones Tsai / Manager**

Testing Laboratory
2627

***SPORTON INTERNATIONAL (KUNSHAN) INC.***

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**APPENDIX B. TEST RESULTS OF RADIATED TEST**

# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FG5N2006 | Rev. 01 | Initial issue of report | Jan. 27, 2016 |
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# SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|---|---|---|---|---|---|
| 3.4 | §2.1046 | Conducted Output Power | Reporting Only | PASS | - |
| 3.5 | §24.232(d) | Peak-to-Average Ratio | < 13 dB | PASS | - |
| 3.6 | §2.1049<br>§22.917(b)<br>§24.238(b)<br>§27.53(g) | Occupied Bandwidth | Reporting Only | PASS | - |
| 3.7 | §2.1051<br>§22.917(a)<br>§24.238(a)<br>§27.53(h) | Band Edge Measurement | < 43+10log10(P[Watts]) | PASS | - |
| 3.8 | §2.1051<br>§22.917(a)<br>§24.238(a)<br>§27.53(h) | Conducted Emission | < 43+10log10(P[Watts]) | PASS | - |
| 3.9 | §2.1055<br>§22.355 | Frequency Stability for Temperature & Voltage | < 2.5 ppm for Part 22H | PASS | - |
| | §2.1055<br>§24.235<br>§27.54 | | Within Authorized Band | | |

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|---|---|---|---|---|---|
| 4.4 | §22.913(a)(2) | Effective Radiated Power | < 7 Watts | PASS | - |
| | §24.232(c) | Equivalent Isotropic Radiated Power | < 2 Watts | PASS | - |
| | §27.50(d)(4) | Equivalent Isotropic Radiated Power | < 1 Watts | PASS | - |
| 4.5 | §2.1053<br>§22.917(a)<br>§24.238(a)<br>§27.53(h) | Field Strength of Spurious Radiation | < 43+10log10(P[Watts]) | PASS | Under limit 32.54 dB at 5640.000 MHz |

# 1 General Description

## 1.1 Applicant

**LG Electronics Mobile Comm USA**
1000 Sylvan Avenue Englewood Cliffs, NJ 07632

## 1.2 Manufacturer

**Arima Communications Corp.**
6F, No.866, Jhongjheng Rd., Jhonghe Dist., New Taipei City 23586, Taiwan

## 1.3 Product Feature of Equipment Under Test

| Product Feature | |
|---|---|
| **Equipment** | Smart phone |
| **Brand Name** | LG |
| **Model Name** | LG-X210mb |
| **FCC ID** | ZNFX210MB |
| **EUT supports Radios application** | GSM/GPRS/EGPRS(Downlink Only)/WCDMA/HSPA/<br>HSPA+(16QAM uplink is not supported)/<br>WLAN 2.4GHz 802.11b/g/n HT20/HT40/<br>Bluetooth v3.0 + EDR/Bluetooth v4.0 LE |
| **IMEI Code** | Conducted: 356240070005220/356240070005238<br>Radiation: 356240070005303/356240070005311<br>ERP&EIRP: 356240070005360/356240070005378 |
| **HW Version** | 5541MB-002 |
| **SW Version** | LGX210g-00-v10a-334-20-dec-09-2015+0 |
| **EUT Stage** | Production Unit |

**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** | **GSM/GPRS:**<br>850: 824.2 MHz ~ 848.8 MHz<br>1900: 1850.2 MHz ~ 1909.8MHz<br>**WCDMA:**<br>Band V: 826.4 MHz ~ 846.6 MHz<br>Band II: 1852.4 MHz ~ 1907.6 MHz<br>Band IV: 1712.4 MHz ~ 1752.6 MHz |
| **Rx Frequency** | **GSM/GPRS:**<br>850: 869.2 MHz ~ 893.8 MHz<br>1900: 1930.2 MHz ~ 1989.8 MHz<br>**WCDMA:**<br>Band V: 871.4 MHz ~ 891.6 MHz<br>Band II: 1932.4 MHz ~ 1987.6 MHz<br>Band IV: 2112.4 MHz ~ 2152.6 MHz |
| **Maximum Output Power to Antenna** | **GSM/GPRS:**<br>850: 33.20 dBm<br>1900: 30.26 dBm<br>**WCDMA:**<br>Band V: 23.26 dBm<br>Band II: 23.29 dBm<br>Band IV: 23.09 dBm |
| **Antenna Type** | IFA Antenna |
| **Type of Modulation** | GSM: GMSK<br>GPRS: GMSK<br>EDGE: GMSK / 8PSK(Downlink Only)<br>WCDMA : QPSK (Uplink)<br>HSDPA : QPSK (Uplink)<br>HSUPA : QPSK (Uplink)<br>HSPA+ : 16QAM uplink is not supported |

## 1.5 Accessories and Support Equipment

| Specification of Accessory | | | | |
|---|---|---|---|---|
| **AC Adapter** | **Brand Name** | LG | **P/N** | SSAD0038201(STA-U17WD) |
| | **Power Rating** | I/P: 100-240Vac, 0.2A, O/P: 5Vdc, 0.85A | | |
| **Battery** | **Brand Name** | LG | **P/N** | EAC63079701(BL-46ZH) |
| | **Power Rating** | 3.8Vdc, 2125mAh | | |
| **USB Cable** | **Brand Name** | NINGBO | **P/N** | EAD62377902(LG0108) |
| | **Signal Line Type** | 0.98m shielded without core | | |
| **Earphone** | **Brand Name** | LG | **P/N** | EAB64228801(BHS300-K0) |
| | **Signal Line Type** | 1.10meter, non-shielded cable without core | | |

## 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 22H | GSM850 GSM | GMSK | 0.7362 | 0.0430 ppm | 244KGXW |
| Part 22H | WCDMA Band V RMC 12.2Kbps | QPSK | 0.0904 | 0.0371 ppm | 4M15F9W |
| Part 24E | GSM1900 GSM | GMSK | 0.6081 | 0.0255 ppm | 245KGXW |
| Part 24E | WCDMA Band II RMC 12.2Kbps | QPSK | 0.1368 | 0.0138 ppm | 4M16F9W |
| Part 27L | WCDMA Band IV RMC 12.2Kbps | QPSK | 0.1361 | 0.0231 ppm | 4M16F9W |

## 1.8 Testing Location

| | | | |
|---|---|---|---|
| **Test Site** | SPORTON INTERNATIONAL (KUNSHAN) INC. | | |
| **Test Site Location** | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China<br>TEL: +86-0512-5790-0158<br>FAX: +86-0512-5790-0958 | | |
| **Test Site No.** | **Sporton Site No.** | | **FCC Registration No.** |
| | TH01-KS | 03CH03-KS | 306251 |

## 1.9 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-D-2010
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

**Remark:**

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

# 2 Test Configuration of Equipment Under Test

## 2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 10th harmonic for GSM850 and WCDMA Band V.
2. 30 MHz to 10th harmonic for WCDMA Band IV.
3. 30 MHz to 10th harmonic for GSM1900 and WCDMA Band II.

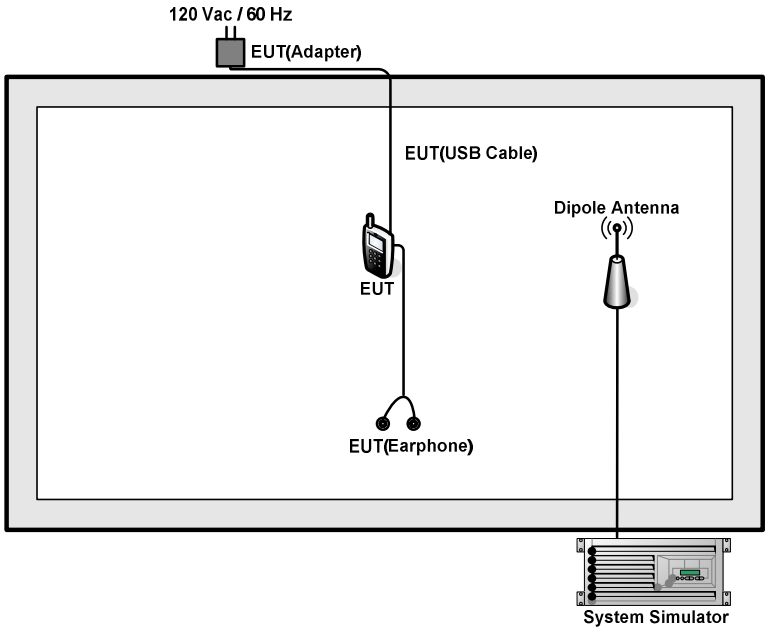
All modes and data rates and positions were investigated.

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

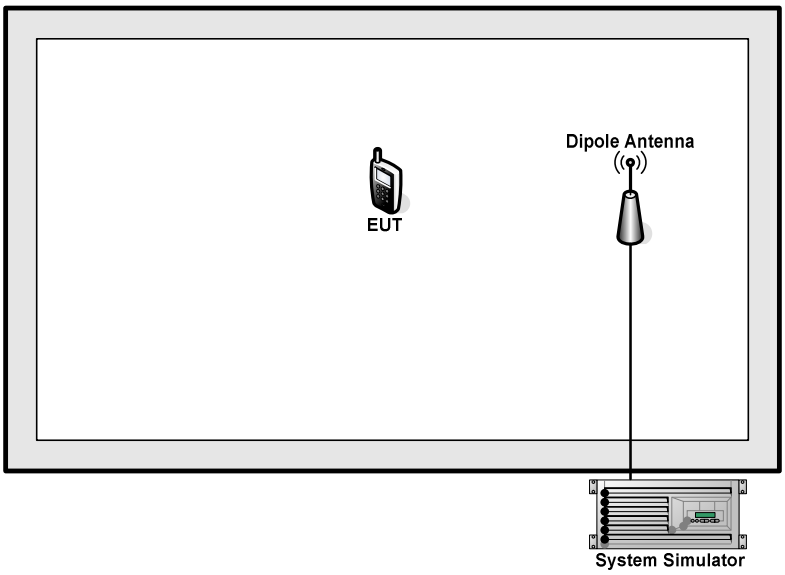
| Test Modes | | |
|---|---|---|
| **Band** | **Radiated TCs** | **Conducted TCs** |
| **GSM 850** | ■ GSM Link | ■ GSM Link |
| **GSM 1900** | ■ GSM Link | ■ GSM Link |
| **WCDMA Band V** | ■ RMC 12.2Kbps Link | ■ RMC 12.2Kbps Link |
| **WCDMA Band II** | ■ RMC 12.2Kbps Link | ■ RMC 12.2Kbps Link |
| **WCDMA Band IV** | ■ RMC 12.2Kbps Link | ■ RMC 12.2Kbps Link |

## 2.2 Connection Diagram of Test System

**22(H), 27(L)**




**24(E)**



## 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 INSTEK | 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 4.2 dB and a 10dB attenuator.

Example :

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

*= 4.2 + 10 = 14.2* (dB)

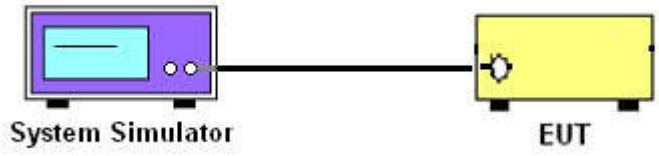
# 3 Conducted Test Result

## 3.1 Measuring Instruments

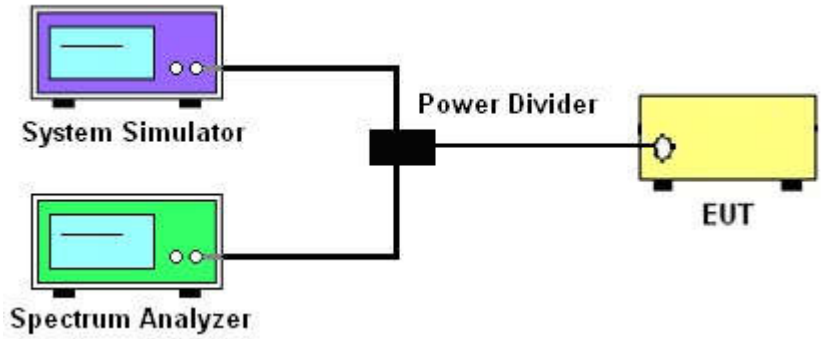
See list of measuring instruments of this test report.

## 3.2 Test Setup

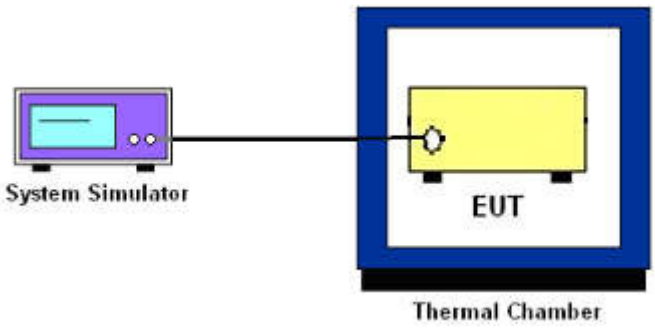
### 3.2.1 Conducted Output Power




### 3.2.2 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission




### 3.2.3 Frequency Stability




## 3.3 Test Result of Conducted Test

Please refer to Appendix A.

## 3.4 Conducted Output Power

### 3.4.1 Description of the Conducted Output Power

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.

### 3.4.2 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.

## 3.5 Peak-to-Average Ratio

### 3.5.1 Description of the PAR Measurement

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

### 3.5.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 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%.

## 3.6 99% Occupied Bandwidth and 26dB Bandwidth Measurement

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

The 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 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

### 3.6.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 4.2.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

## 3.7 Conducted Band Edge

### 3.7.1 Description of Conducted 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.

### 3.7.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 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.

## 3.8 Conducted Spurious Emission

### 3.8.1 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.

### 3.8.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 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.

## 3.9 Frequency Stability

### 3.9.1 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.

### 3.9.2 Test Procedures for Temperature Variation

1. The testing follows FCC KDB 971168 D01 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.

### 3.9.3 Test Procedures for Voltage Variation

1. The testing follows FCC KDB 971168 D01 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 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

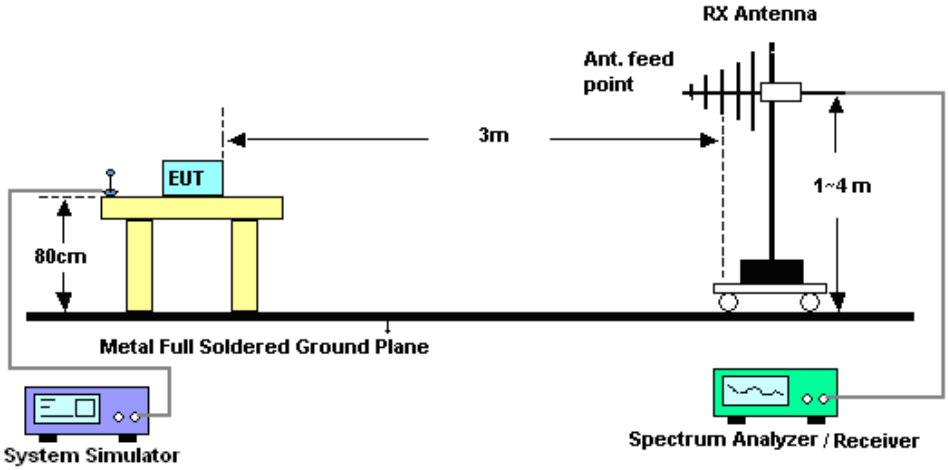
# 4 Radiated Test Items

## 4.1 Measuring Instruments

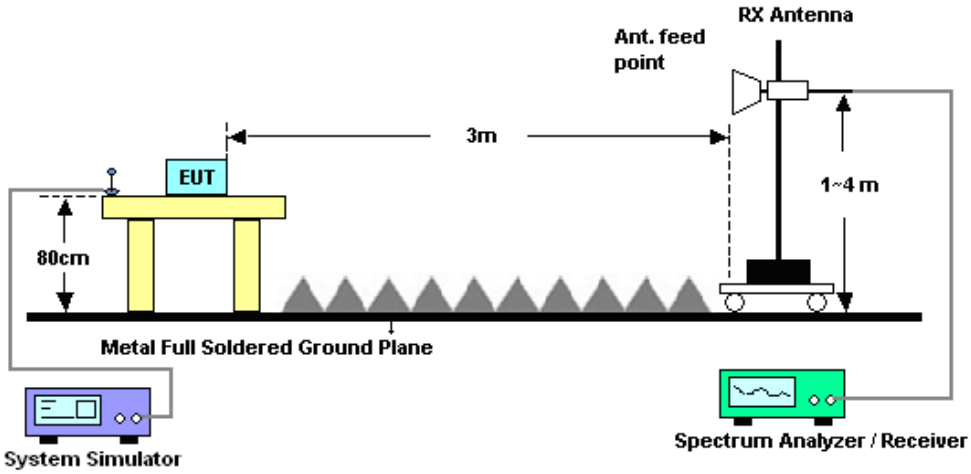
See list of measuring instruments of this test report.

## 4.2 Test Setup

### 4.2.1 For radiated test from 30MHz to 1GHz




### 4.2.2 For radiated test above 1GHz




## 4.3 Test Result of Radiated Test

Please refer to Appendix B.

## 4.4 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

### 4.4.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-D-2010, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. The ERP of mobile transmitters must not exceed 7 Watts (Cellular Band) and the EIRP of mobile transmitters are limited to 2 Watts (PCS Band) and 1 Watts (AWS Band).

### 4.4.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-D-2010 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-D. 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 + 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 |

# 4.5 Field Strength of Spurious Radiation Measurement

## 4.5.1 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.

## 4.5.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 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.

# 5 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSV30 | 101338 | 9kHz~30GHz | May 04, 2015 | Nov. 25, 2015~ Nov. 27, 2015 | May 03, 2016 | Conducted (TH01-KS) |
| Thermal Chamber | Ten Billion | TTC-B3S | TBN-960502 | -40~+150°C | Oct. 24, 2015 | Nov. 25, 2015~ Nov. 27, 2015 | Oct. 23, 2016 | Conducted (TH01-KS) |
| EXA Spectrum Analyzer | Keysight | N9010A | MY55150244 | 10Hz-44GHz | Jun. 05, 2015 | Jan. 04, 2016 | Jun. 04, 2016 | Radiation (03CH03-KS) |
| Bilog Antenna | TeseQ | CBL6112D | 35406 | 25MHz-2GHz | Jun. 25, 2015 | Jan. 04, 2016 | Jun. 24, 2016 | Radiation (03CH03-KS) |
| Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-1356 | 1GHz~18GHz | Jun. 25, 2015 | Jan. 04, 2016 | Jun. 24, 2016 | Radiation (03CH03-KS) |
| SHF-EHF Horn | Schwarzbeck | BBHA 9170 | BBHA170249 | 15GHz ~40GHz | Mar. 03, 2015 | Jan. 04, 2016 | Mar. 02, 2016 | Radiation (03CH03-KS) |
| Amplifier | Burgeon | BPA-530 | 102212 | 0.01MHz-3000MHz | Aug. 10, 2015 | Jan. 04, 2016 | Aug. 09, 2016 | Radiation (03CH03-KS) |
| Amplifier | Agilent | 8449B | 3008A02370 | 1GHz~26.5GHz | Oct. 24, 2015 | Jan. 04, 2016 | Oct. 23, 2016 | Radiation (03CH03-KS) |
| AC Power Source | Chroma | 61601 | F104090004 | N/A | NCR | Jan. 04, 2016 | NCR | Radiation (03CH03-KS) |
| Turn Table | ChamPro | EM 1000-T | 060762-T | 0~360 degree | NCR | Jan. 04, 2016 | NCR | Radiation (03CH03-KS) |
| Antenna Mast | ChamPro | EM 1000-A | 060762-A | 1 m~4 m | NCR | Jan. 04, 2016 | NCR | Radiation (03CH03-KS) |

# 6 Uncertainty of Evaluation

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

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **4.5 dB** |

# Appendix A. Test Results of Conducted Test

## Conducted Output Power(Average power)

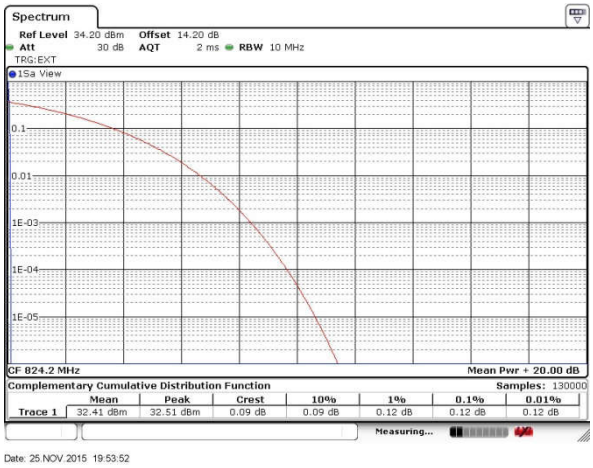
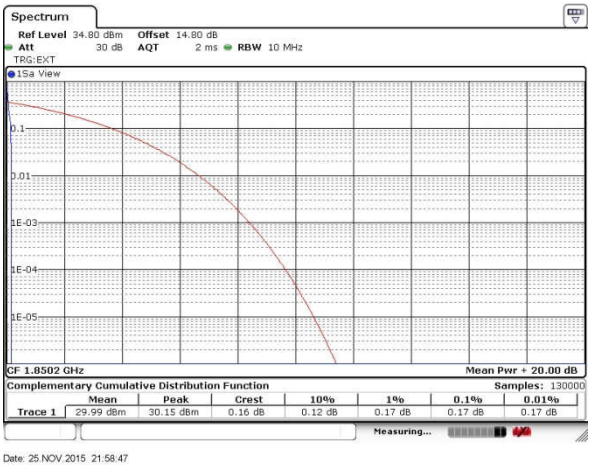
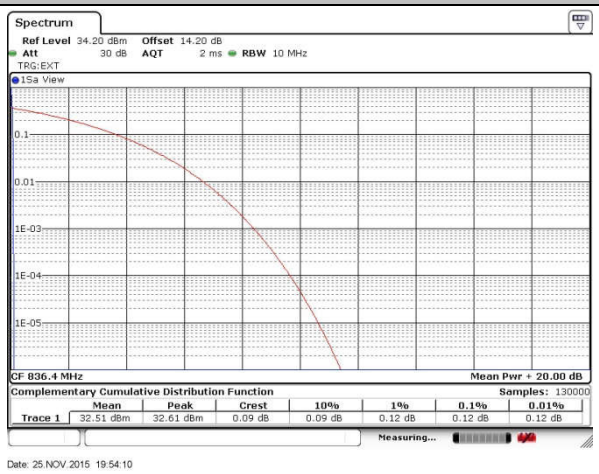
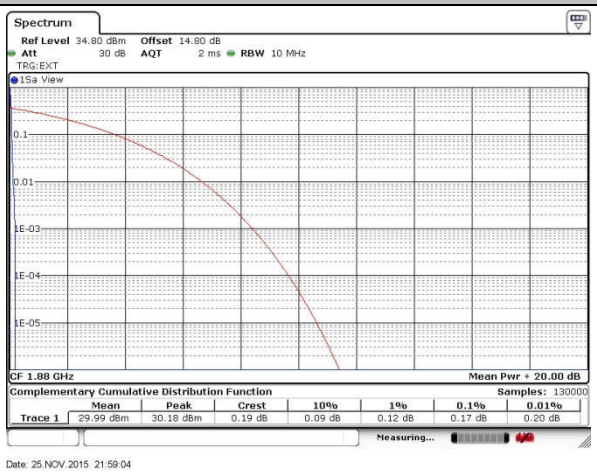
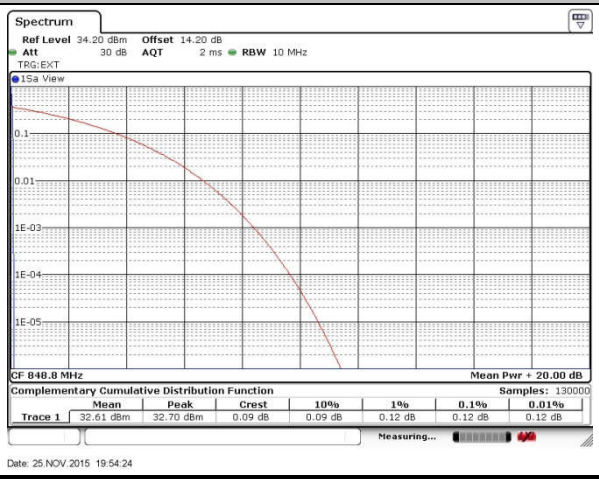
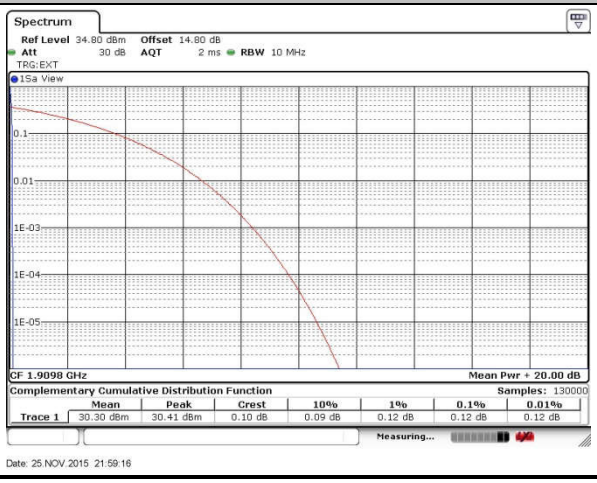
| Conducted Power (*Unit: dBm) | | | | | | |
|---|---|---|---|---|---|---|
| Band | GSM850 | | | GSM1900 | | |
| Channel | 128 | 189 | 251 | 512 | 661 | 810 |
| Frequency | 824.2 | 836.4 | 848.8 | 1850.2 | 1880.0 | 1909.8 |
| GSM | 33.10 | 33.12 | 33.20 | 30.23 | 30.26 | 30.23 |
| GPRS class 8 | 33.08 | 33.10 | 33.19 | 30.22 | 30.25 | 30.23 |
| GPRS class 10 | 31.99 | 32.05 | 32.18 | 29.04 | 29.08 | 29.00 |
| GPRS class 11 | 29.08 | 29.11 | 29.29 | 26.01 | 26.05 | 25.91 |
| GPRS class 12 | 27.50 | 27.58 | 27.75 | 24.45 | 24.46 | 24.35 |

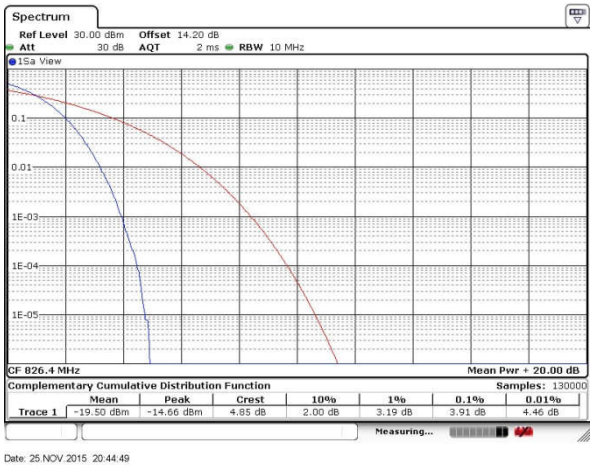
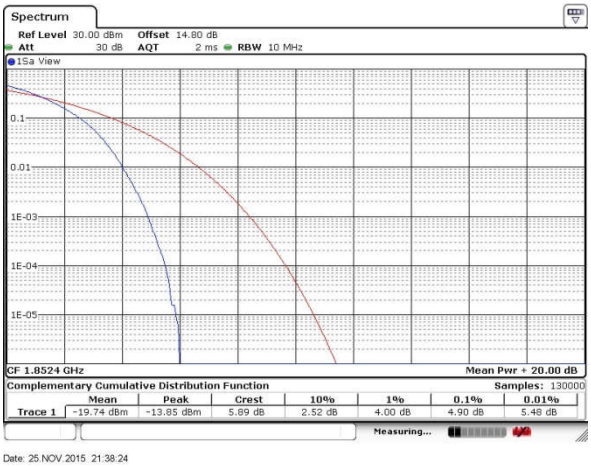
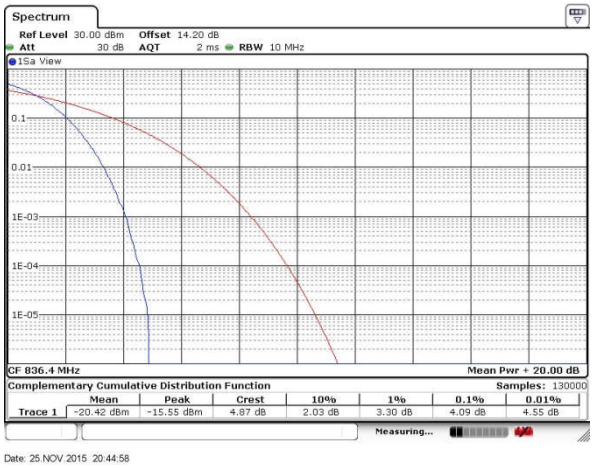
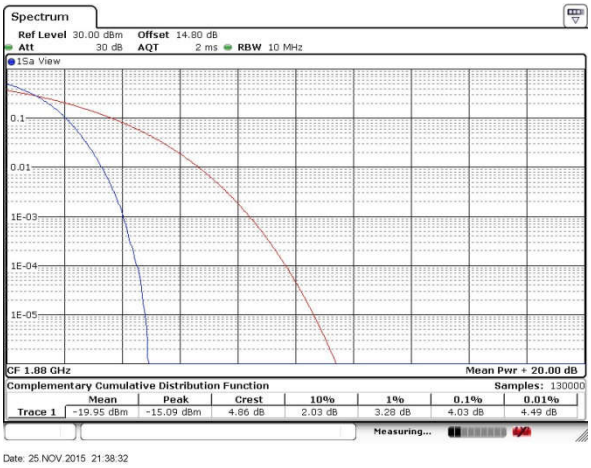
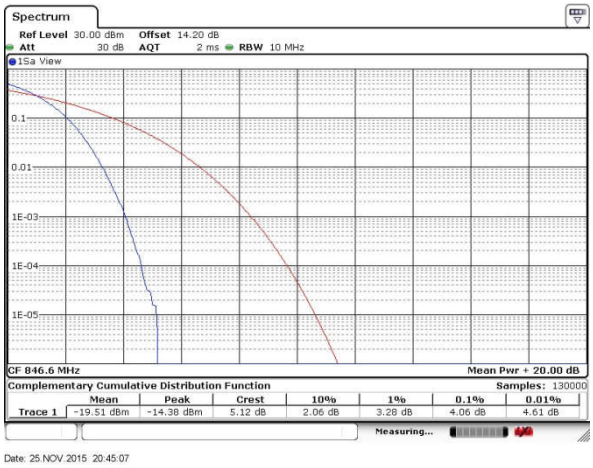
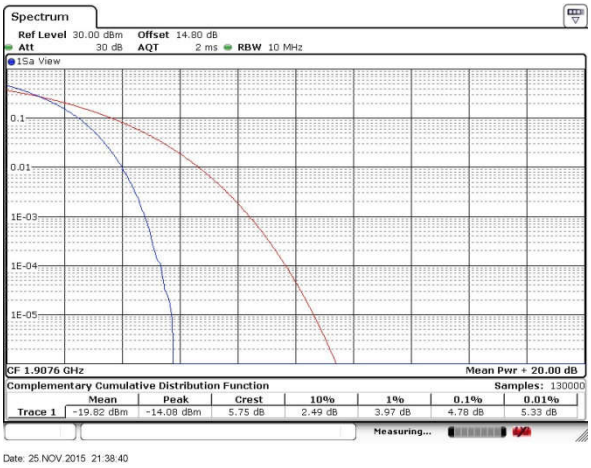
| Conducted Power (*Unit: dBm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Band | WCDMA Band V | | | WCDMA Band II | | | WCDMA Band IV | | |
| Channel | 4132 | 4182 | 4233 | 9262 | 9400 | 9538 | 1312 | 1413 | 1513 |
| Frequency | 826.4 | 836.4 | 846.6 | 1852.4 | 1880 | 1907.6 | 1712.4 | 1732.6 | 1752.6 |
| AMR 12.2Kbps | 23.25 | 23.10 | 23.11 | 23.09 | 23.28 | 23.20 | 22.99 | 23.01 | 23.08 |
| RMC 12.2Kbps | 23.26 | 23.12 | 23.13 | 23.10 | 23.29 | 23.22 | 23.00 | 23.02 | 23.09 |
| HSDPA Subtest-1 | 22.19 | 22.05 | 22.08 | 22.10 | 22.10 | 21.95 | 21.99 | 22.07 | 22.18 |
| HSDPA Subtest-2 | 22.18 | 22.06 | 22.07 | 22.10 | 22.10 | 21.92 | 21.97 | 22.09 | 22.16 |
| HSDPA Subtest-3 | 22.17 | 22.07 | 22.07 | 22.08 | 22.09 | 21.93 | 21.51 | 21.58 | 21.65 |
| HSDPA Subtest-4 | 22.19 | 22.08 | 22.09 | 22.10 | 22.11 | 21.94 | 21.50 | 21.51 | 21.64 |
| HSUPA Subtest-1 | 21.21 | 21.06 | 21.14 | 21.39 | 21.36 | 21.22 | 20.93 | 20.98 | 21.12 |
| HSUPA Subtest-2 | 21.22 | 21.08 | 21.15 | 21.40 | 21.37 | 21.24 | 20.95 | 20.98 | 21.17 |
| HSUPA Subtest-3 | 22.20 | 22.07 | 22.12 | 22.35 | 22.39 | 22.19 | 21.96 | 22.08 | 22.18 |
| HSUPA Subtest-4 | 20.75 | 20.63 | 20.66 | 20.85 | 20.90 | 20.75 | 20.42 | 20.49 | 20.56 |
| HSUPA Subtest-5 | 22.66 | 22.52 | 22.56 | 22.82 | 22.90 | 22.72 | 22.98 | 22.91 | 22.95 |

# Peak-to-Average Ratio

| Mode | GSM | | Limit: 13dB |
|---|---|---|---|
| Mod. | GSM850 | GSM1900 | Result |
| Lowest CH | 0.12 | 0.17 | PASS |
| Middle CH | 0.12 | 0.17 | |
| Highest CH | 0.12 | 0.12 | |

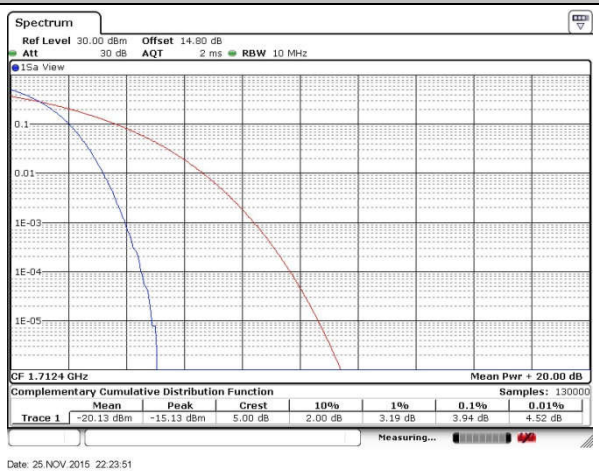
| Mode | WCDMA Band V | WCDMA Band II | WCDMA Band IV | Limit: 13dB |
|---|---|---|---|---|
| Mod. | RMC 12.2Kbps | RMC 12.2Kbps | RMC 12.2Kbps | Result |
| Lowest CH | 3.91 | 4.90 | 3.94 | PASS |
| Middle CH | 4.09 | 4.03 | 3.91 | |
| Highest CH | 4.06 | 4.78 | 4.00 | |

| GSM850 (GSM) | GSM1900 (GSM) |
|---|---|
| **Lowest Channel** | **Lowest Channel** |
|  |  |
| **Middle Channel** | **Middle Channel** |
|  |  |
| **Highest Channel** | **Highest Channel** |
|  |  |

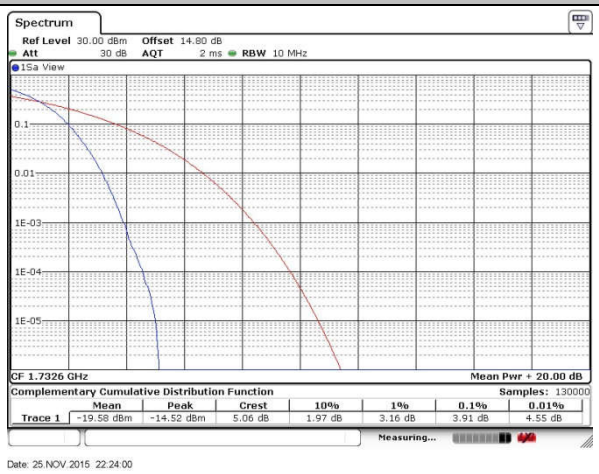
| WCDMA Band V (RMC 12.2Kbps) | WCDMA Band II (RMC 12.2Kbps) |
|---|---|
| **Lowest Channel** | **Lowest Channel** |
|  |  |
| **Middle Channel** | **Middle Channel** |
|  |  |
| **Highest Channel** | **Highest Channel** |
|  |  |

## WCDMA Band IV (RMC 12.2Kbps)

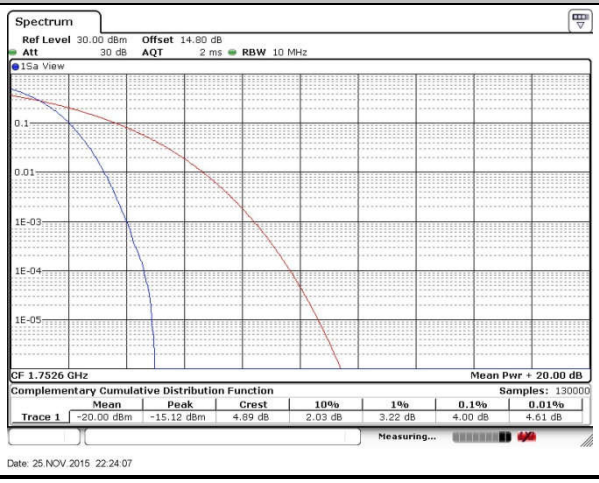
### Lowest Channel




### Middle Channel




### Highest Channel



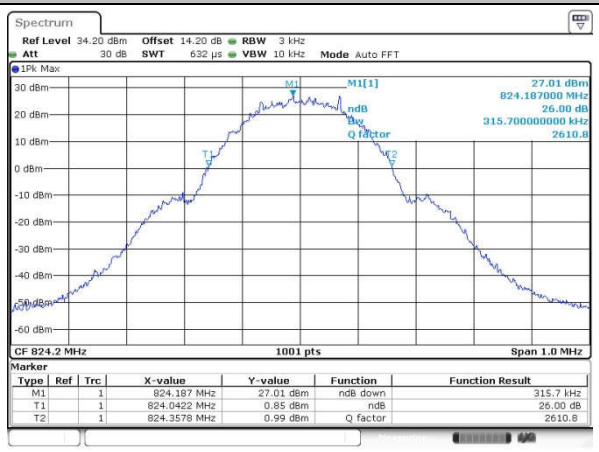
# 26dB Bandwidth

| Mode | GSM | |
|---|---|---|
| Mod. | GSM850 | GSM1900 |
| Lowest CH | 0.316 | 0.316 |
| Middle CH | 0.316 | 0.315 |
| Highest CH | 0.314 | 0.313 |

| Mode | WCDMA Band V | WCDMA Band II | WCDMA Band IV |
|---|---|---|---|
| Mod. | RMC 12.2Kbps | RMC 12.2Kbps | RMC 12.2Kbps |
| Lowest CH | 4.68 | 4.68 | 4.68 |
| Middle CH | 4.68 | 4.68 | 4.68 |
| Highest CH | 4.67 | 4.69 | 4.69 |

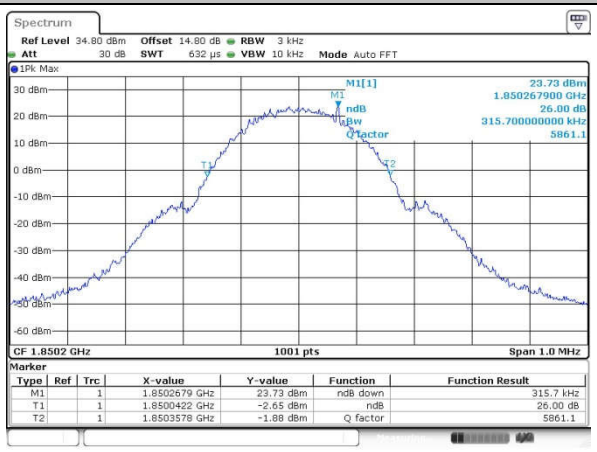
## GSM850 (GSM)

### Lowest Channel

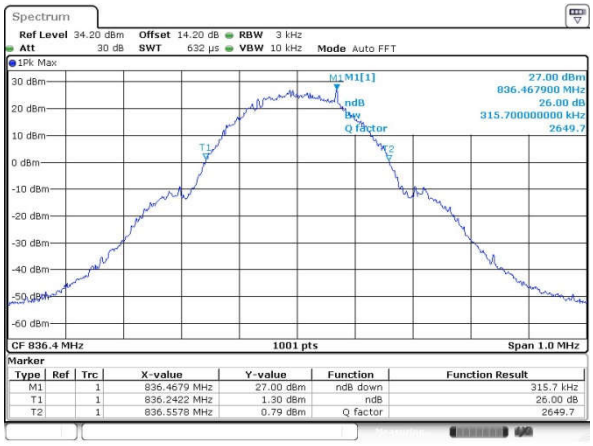



## GSM1900 (GSM)

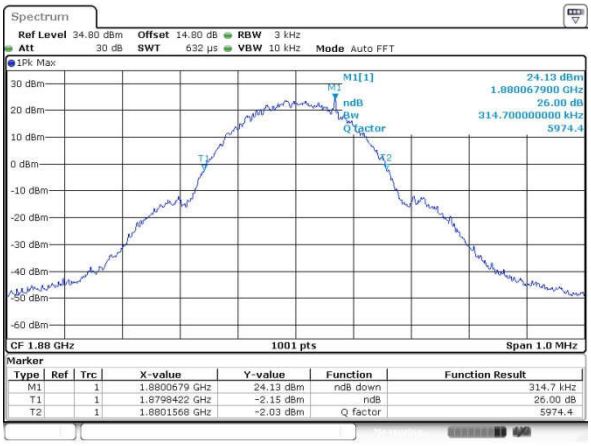
### Lowest Channel



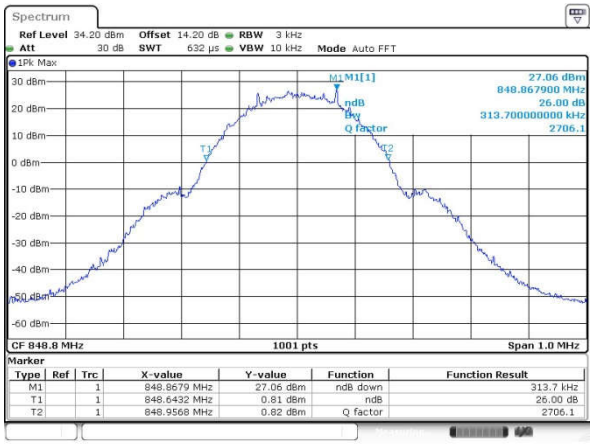

### Middle Channel



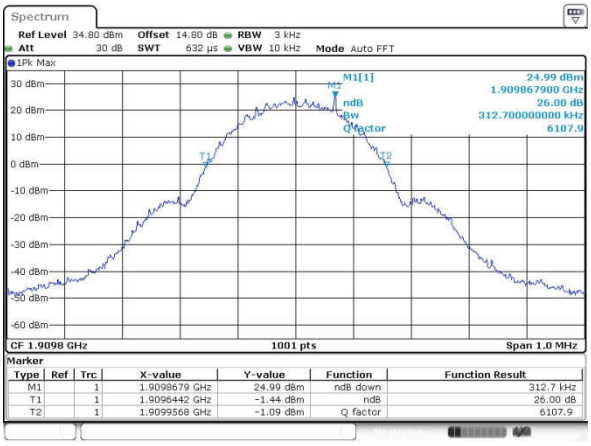

### Middle Channel




### Highest Channel

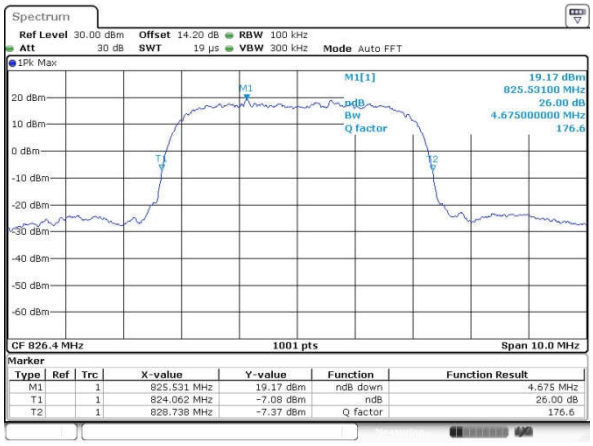



### Highest Channel

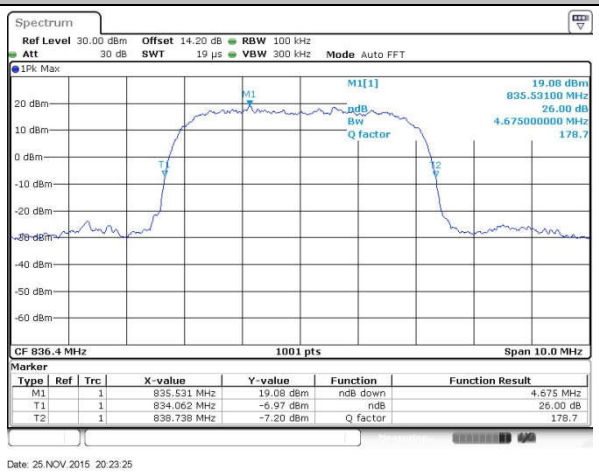


## WCDMA Band V (RMC 12.2Kbps)

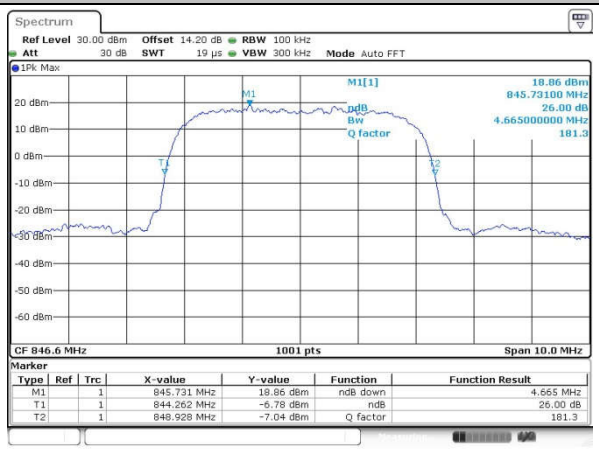
### Lowest Channel




### Middle Channel

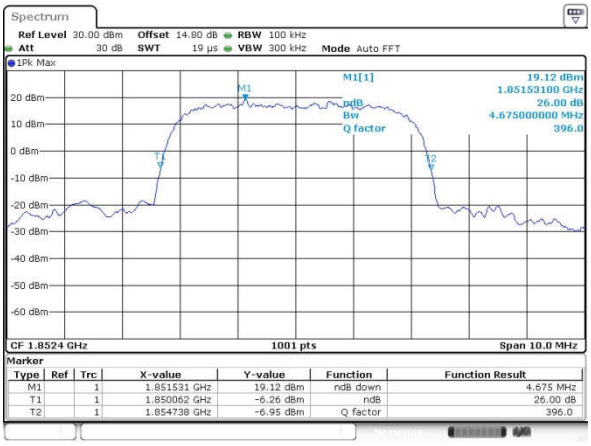



### Highest Channel

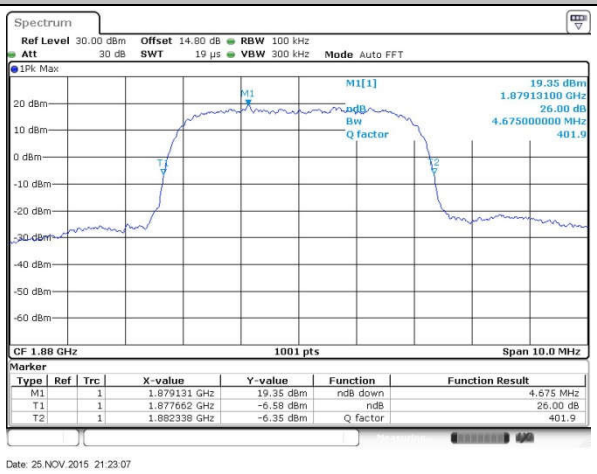



## WCDMA Band II (RMC 12.2Kbps)

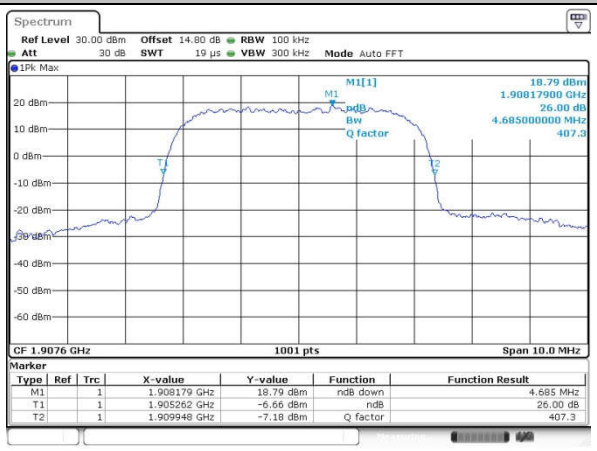
### Lowest Channel




### Middle Channel

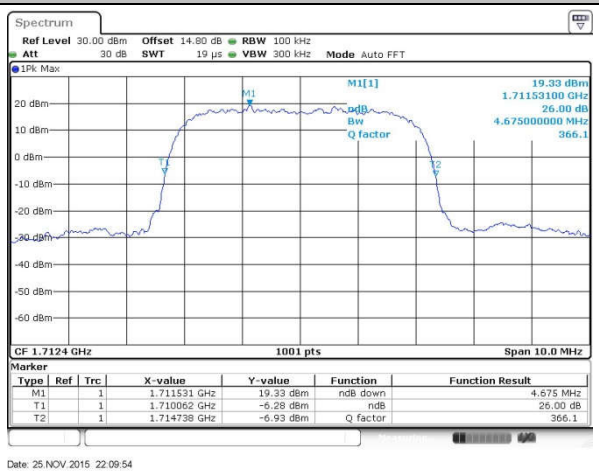



### Highest Channel

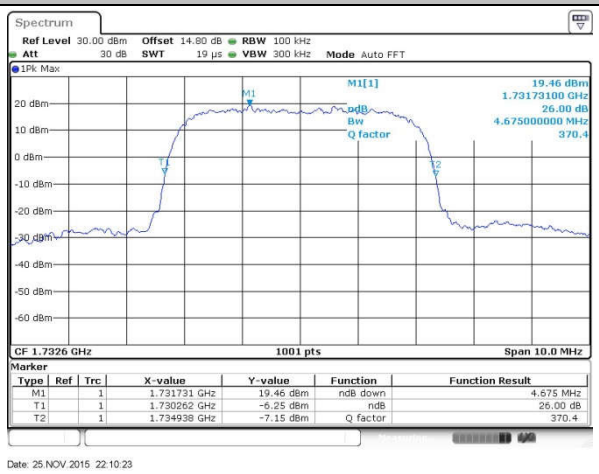


## WCDMA Band IV (RMC 12.2Kbps)

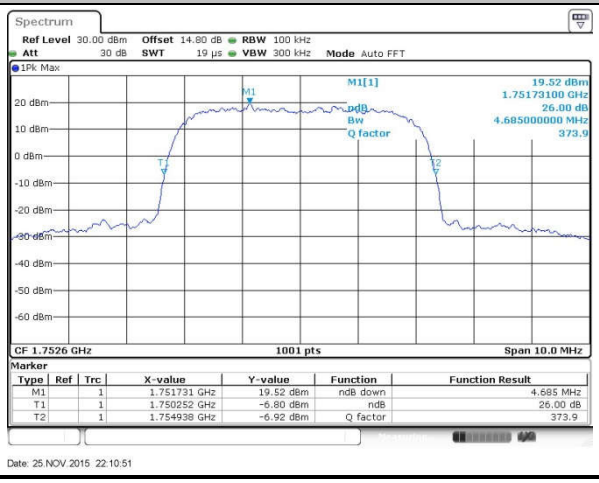
### Lowest Channel




### Middle Channel




### Highest Channel



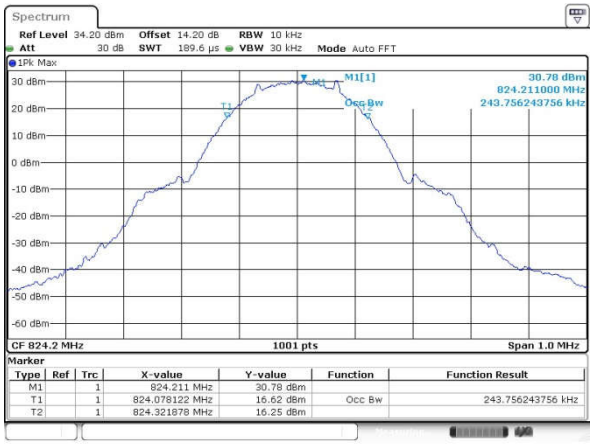
# Occupied Bandwidth

| Mode | GSM | |
|---|---|---|
| Mod. | GSM850 | GSM1900 |
| Lowest CH | 0.244 | 0.245 |
| Middle CH | 0.244 | 0.244 |
| Highest CH | 0.242 | 0.242 |

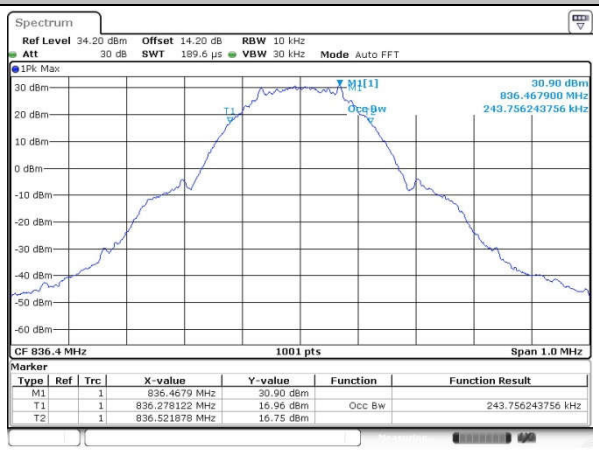
| Mode | WCDMA Band V | WCDMA Band II | WCDMA Band IV |
|---|---|---|---|
| Mod. | RMC 12.2Kbps | RMC 12.2Kbps | RMC 12.2Kbps |
| Lowest CH | 4.15 | 4.15 | 4.15 |
| Middle CH | 4.15 | 4.16 | 4.16 |
| Highest CH | 4.14 | 4.16 | 4.16 |

## GSM850 (GSM)

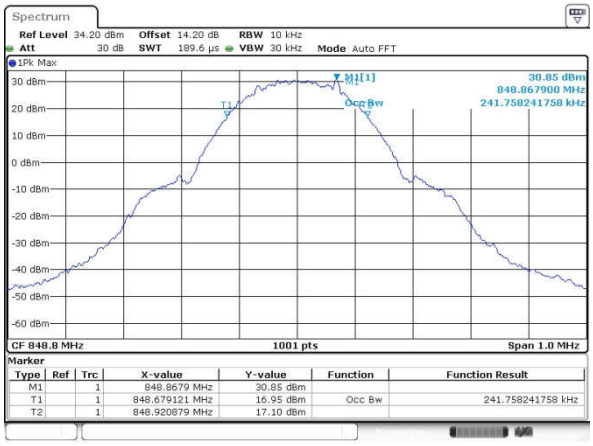
### Lowest Channel




### Middle Channel

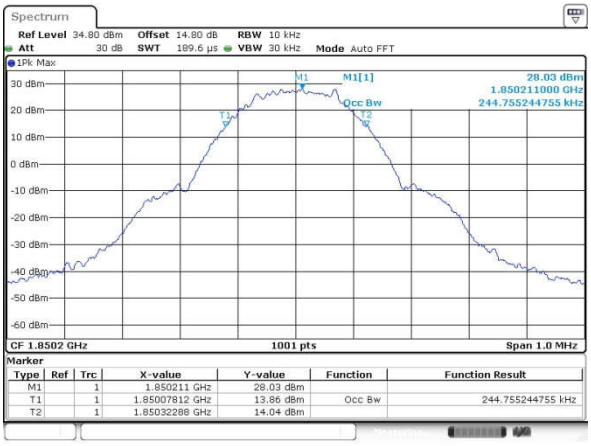



### Highest Channel

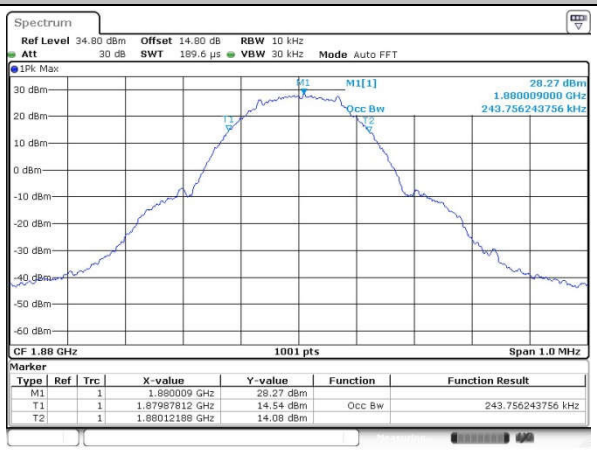



## GSM1900 (GSM)

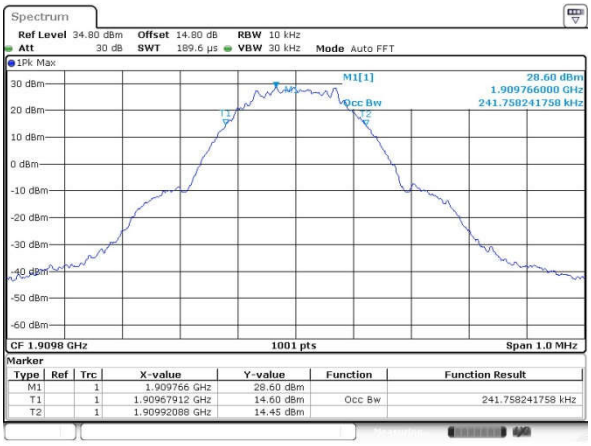
### Lowest Channel




### Middle Channel

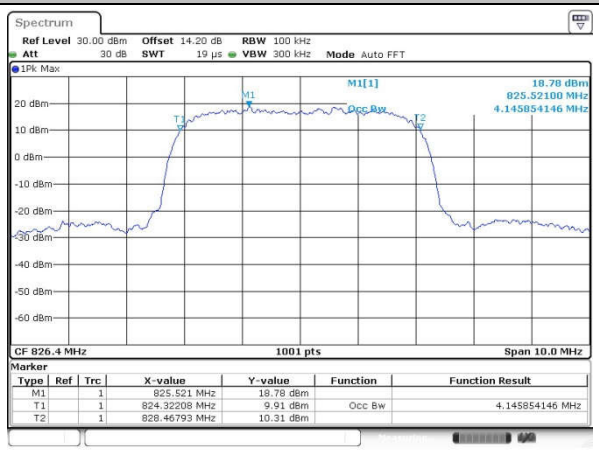



### Highest Channel

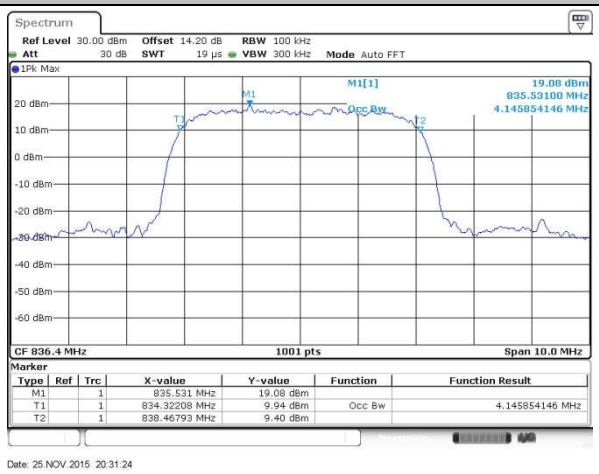


## WCDMA Band V (RMC 12.2Kbps)

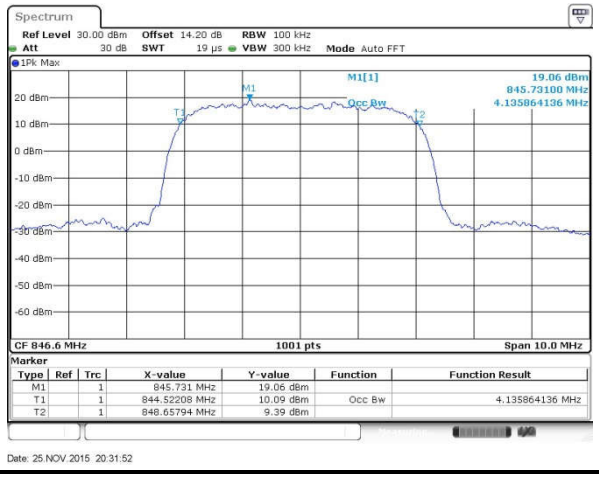
### Lowest Channel




### Middle Channel

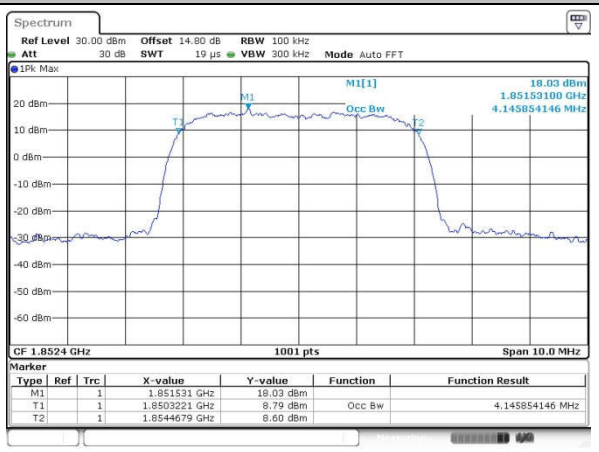



### Highest Channel

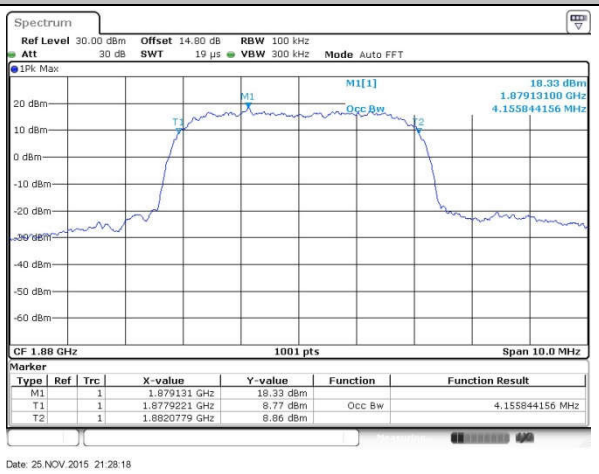



## WCDMA Band II (RMC 12.2Kbps)

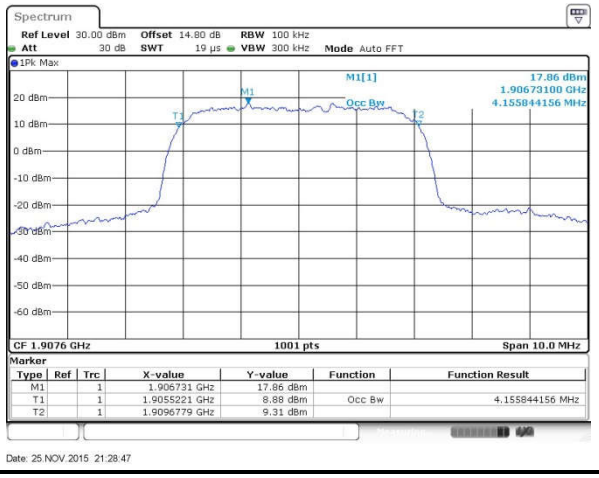
### Lowest Channel




### Middle Channel

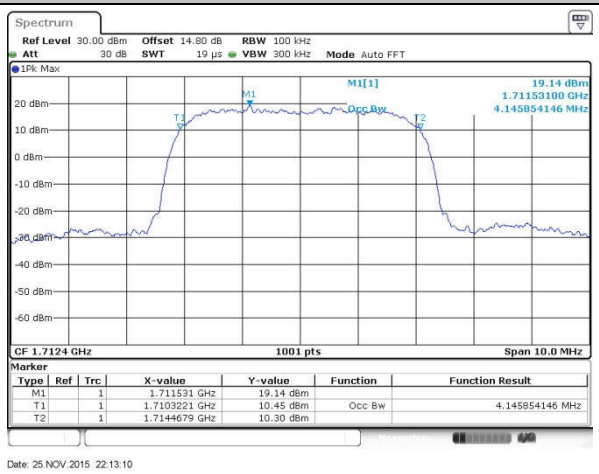



### Highest Channel

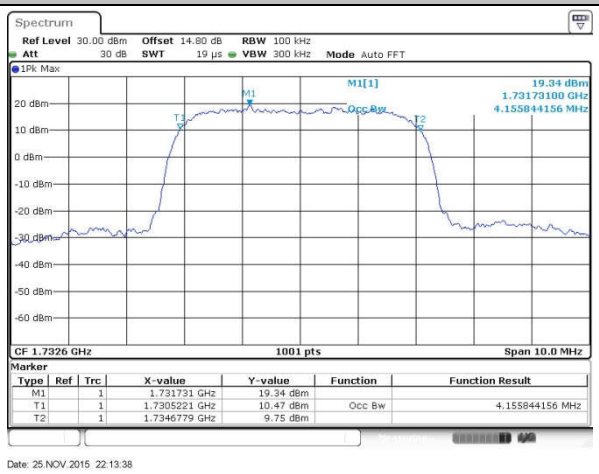


## WCDMA Band IV (RMC 12.2Kbps)

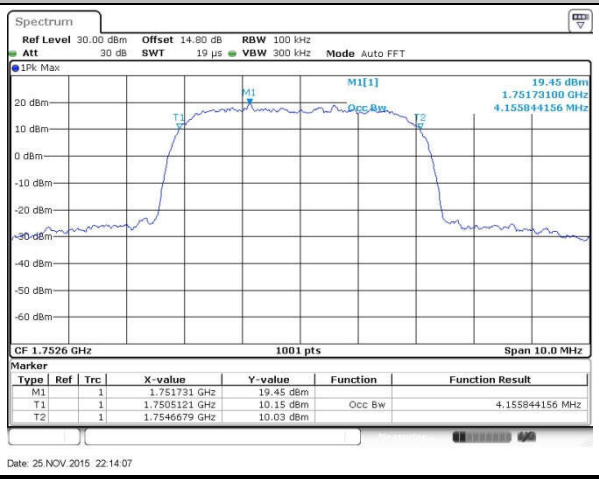
### Lowest Channel




### Middle Channel



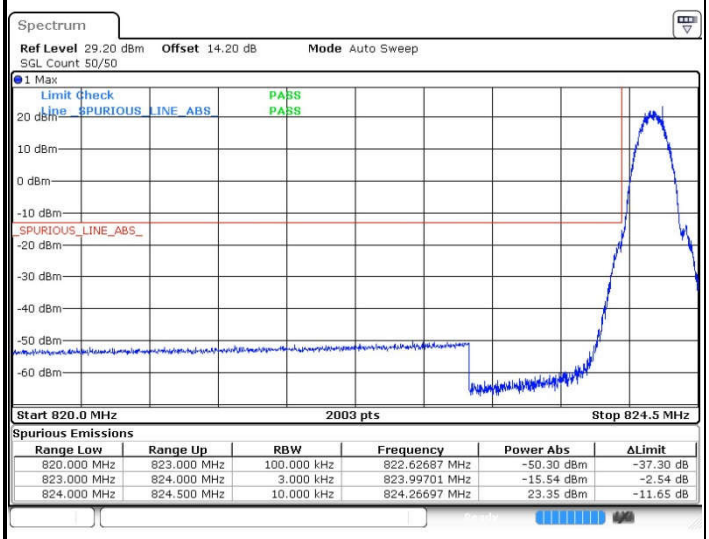

### Highest Channel



# Conducted Band Edge

## GSM850 (GSM)

### Lowest Band Edge

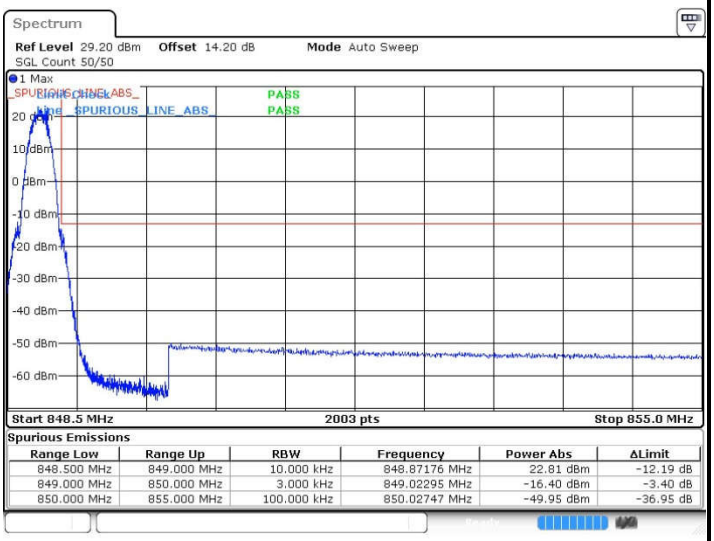



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 820.000 MHz | 823.000 MHz | 100.000 kHz | 822.62687 MHz | -50.30 dBm | -37.30 dB |
| 823.000 MHz | 824.000 MHz | 3.000 kHz | 823.99701 MHz | -15.54 dBm | -2.54 dB |
| 824.000 MHz | 824.500 MHz | 10.000 kHz | 824.26697 MHz | 23.35 dBm | -11.65 dB |

Date: 25.NOV.2015 19:42:57

### Highest Band Edge



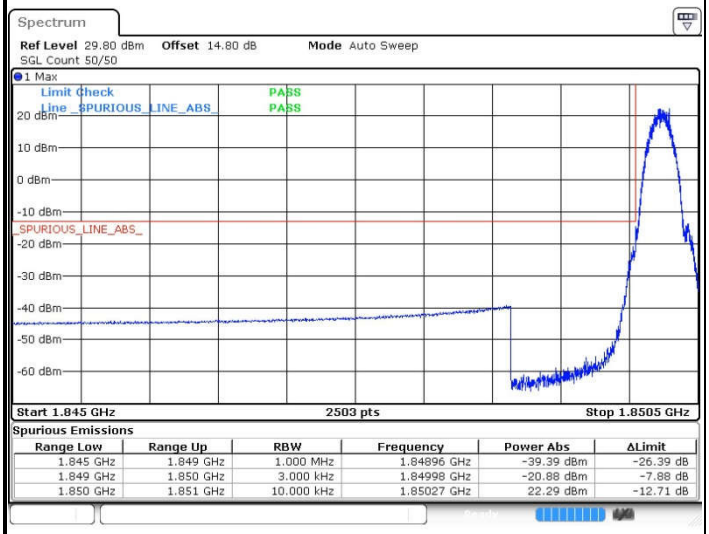

Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 848.500 MHz | 849.000 MHz | 10.000 kHz | 848.87176 MHz | 22.81 dBm | -12.19 dB |
| 849.000 MHz | 850.000 MHz | 3.000 kHz | 849.02295 MHz | -16.40 dBm | -3.40 dB |
| 850.000 MHz | 855.000 MHz | 100.000 kHz | 850.02747 MHz | -49.95 dBm | -36.95 dB |

Date: 25.NOV.2015 19:44:23

## GSM1900 (GSM)

### Lowest Band Edge

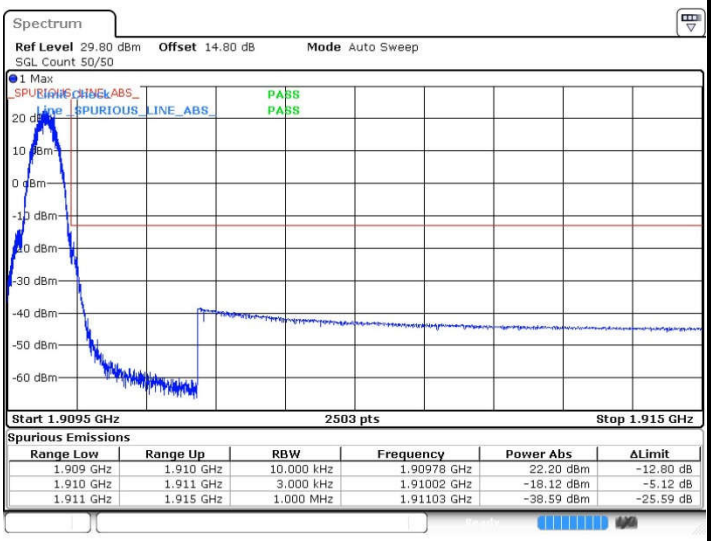



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 1.845 GHz | 1.849 GHz | 1.000 MHz | 1.84896 GHz | -39.39 dBm | -26.39 dB |
| 1.849 GHz | 1.850 GHz | 3.000 kHz | 1.84998 GHz | -20.88 dBm | -7.88 dB |
| 1.850 GHz | 1.851 GHz | 10.000 kHz | 1.85027 GHz | 22.29 dBm | -12.71 dB |

Date: 25.NOV.2015 21:53:00

### Highest Band Edge



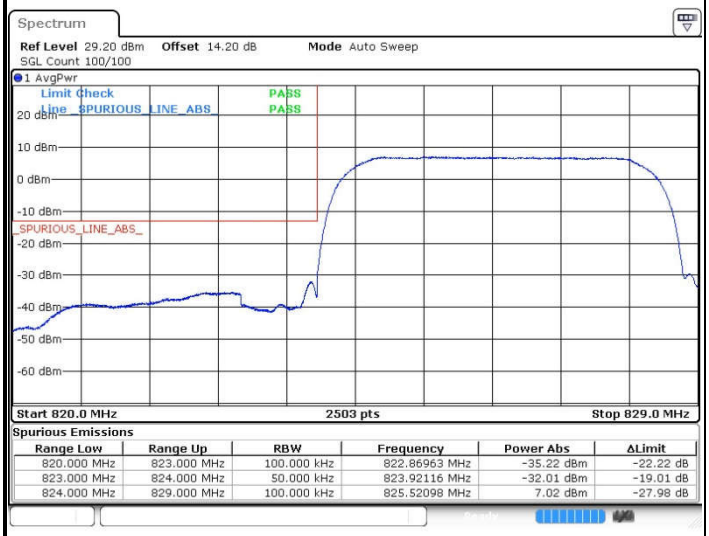

Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 1.909 GHz | 1.910 GHz | 10.000 kHz | 1.90978 GHz | 22.20 dBm | -12.80 dB |
| 1.910 GHz | 1.911 GHz | 3.000 kHz | 1.91002 GHz | -18.12 dBm | -5.12 dB |
| 1.911 GHz | 1.915 GHz | 1.000 MHz | 1.91103 GHz | -38.59 dBm | -25.59 dB |

Date: 25.NOV.2015 21:54:26

## WCDMA Band V (RMC 12.2Kbps)

### Lowest Band Edge

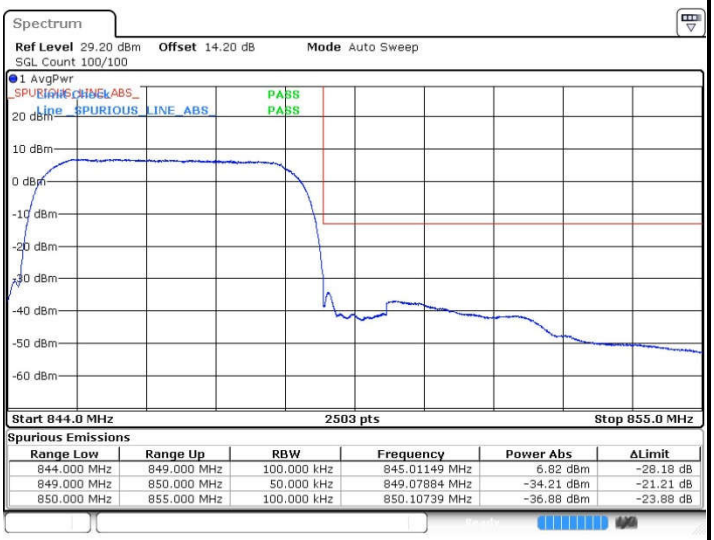



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 820.000 MHz | 823.000 MHz | 100.000 kHz | 822.86963 MHz | -35.22 dBm | -22.22 dB |
| 823.000 MHz | 824.000 MHz | 50.000 kHz | 823.92116 MHz | -32.01 dBm | -19.01 dB |
| 824.000 MHz | 829.000 MHz | 100.000 kHz | 825.52098 MHz | 7.02 dBm | -27.98 dB |

Date: 25.NOV.2015 20:34:37

### Highest Band Edge



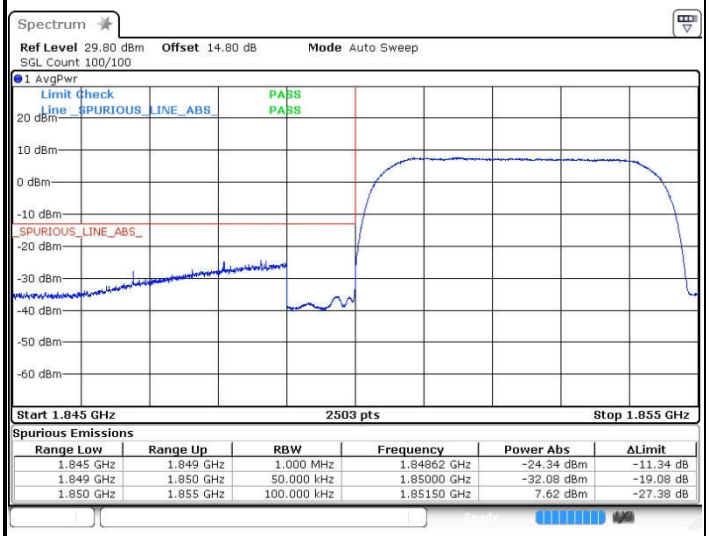

Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 844.000 MHz | 849.000 MHz | 100.000 kHz | 845.01149 MHz | 6.82 dBm | -28.18 dB |
| 849.000 MHz | 850.000 MHz | 50.000 kHz | 849.07884 MHz | -34.21 dBm | -21.21 dB |
| 850.000 MHz | 855.000 MHz | 100.000 kHz | 850.10739 MHz | -36.88 dBm | -23.88 dB |

Date: 25.NOV.2015 20:37:18

## WCDMA Band II (RMC 12.2Kbps)

### Lowest Band Edge

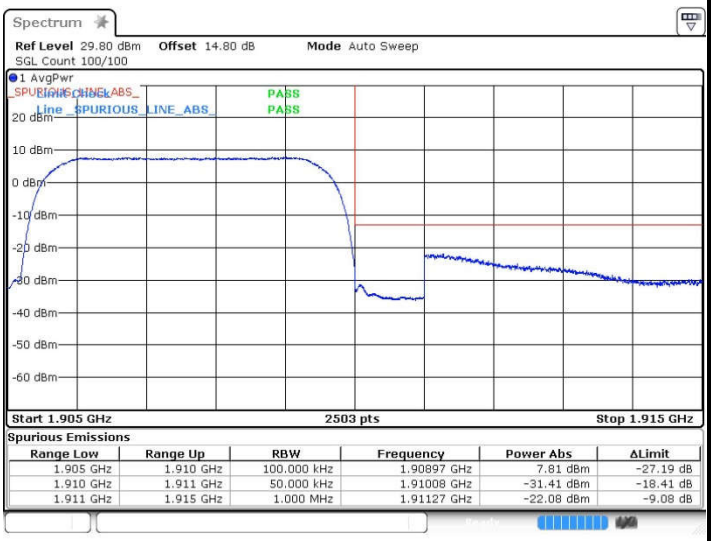



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 1.845 GHz | 1.849 GHz | 1.000 MHz | 1.84862 GHz | -24.34 dBm | -11.34 dB |
| 1.849 GHz | 1.850 GHz | 50.000 kHz | 1.85000 GHz | -32.08 dBm | -19.08 dB |
| 1.850 GHz | 1.855 GHz | 100.000 kHz | 1.85150 GHz | 7.62 dBm | -27.38 dB |

Date: 27.NOV.2015 01:14:39

### Highest Band Edge



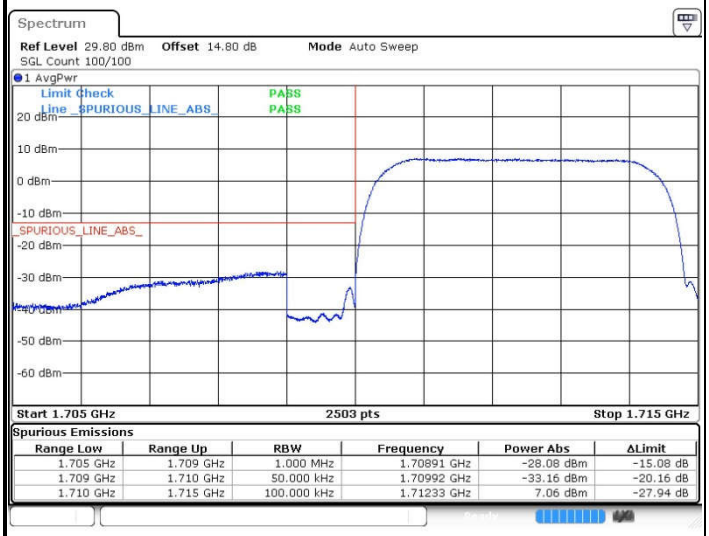

Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 1.905 GHz | 1.910 GHz | 100.000 kHz | 1.90897 GHz | 7.81 dBm | -27.19 dB |
| 1.910 GHz | 1.911 GHz | 50.000 kHz | 1.91008 GHz | -31.41 dBm | -18.41 dB |
| 1.911 GHz | 1.915 GHz | 1.000 MHz | 1.91127 GHz | -22.08 dBm | -9.08 dB |

Date: 27.NOV.2015 01:17:20

## WCDMA Band IV (RMC 12.2Kbps)

### Lowest Band Edge

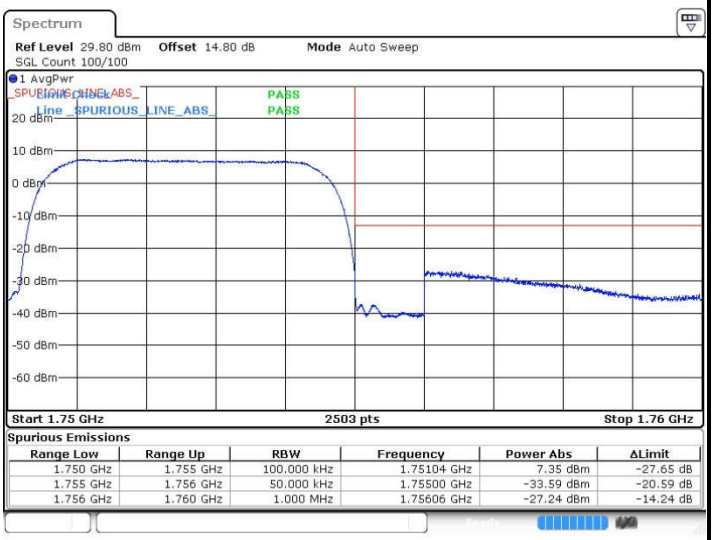



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 1.705 GHz | 1.709 GHz | 1.000 MHz | 1.70891 GHz | -28.08 dBm | -15.08 dB |
| 1.709 GHz | 1.710 GHz | 50.000 kHz | 1.70992 GHz | -33.16 dBm | -20.16 dB |
| 1.710 GHz | 1.715 GHz | 100.000 kHz | 1.71233 GHz | 7.06 dBm | -27.94 dB |

Date: 25.NOV.2015 22:17:04

### Highest Band Edge




Spurious Emissions

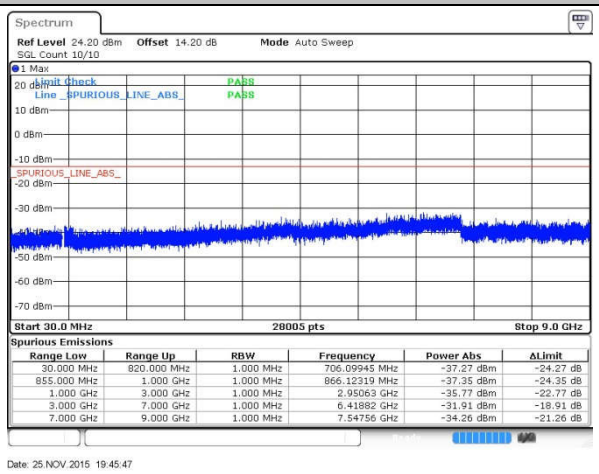
| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 1.750 GHz | 1.755 GHz | 100.000 kHz | 1.75104 GHz | 7.35 dBm | -27.65 dB |
| 1.755 GHz | 1.756 GHz | 50.000 kHz | 1.75500 GHz | -33.59 dBm | -20.59 dB |
| 1.756 GHz | 1.760 GHz | 1.000 MHz | 1.75606 GHz | -27.24 dBm | -14.24 dB |

Date: 25.NOV.2015 22:19:45

# Conducted Spurious Emission

## GSM850 (GSM)

### Lowest Channel

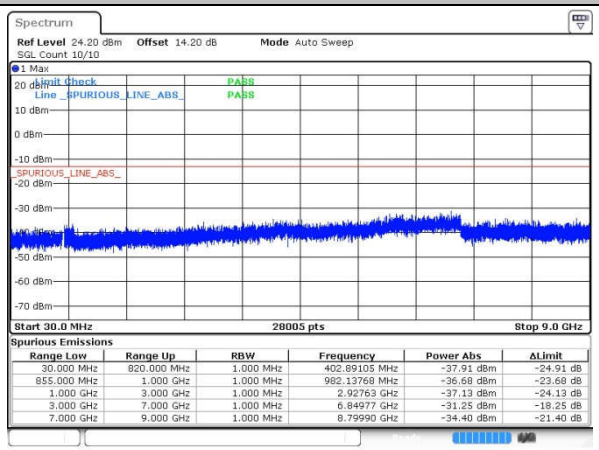



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 1.000 MHz | 706.09945 MHz | -37.27 dBm | -24.27 dB |
| 855.000 MHz | 1.000 GHz | 1.000 MHz | 866.12319 MHz | -37.35 dBm | -24.35 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 2.95063 GHz | -35.77 dBm | -22.77 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.41882 GHz | -31.91 dBm | -18.91 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 7.54756 GHz | -34.26 dBm | -21.26 dB |

Date: 25.NOV.2015 19:45:47

### Middle Channel

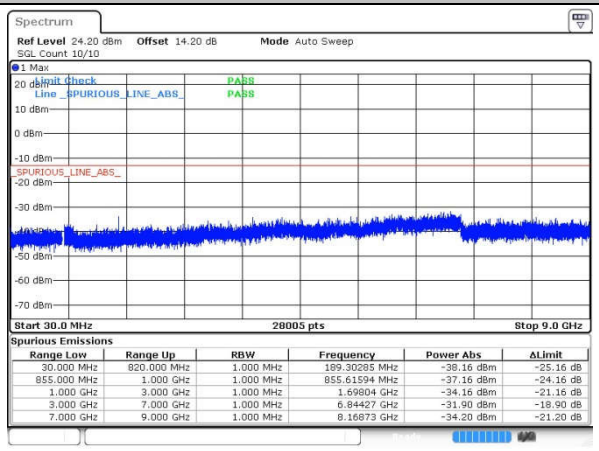



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 1.000 MHz | 402.89105 MHz | -37.91 dBm | -24.91 dB |
| 855.000 MHz | 1.000 GHz | 1.000 MHz | 982.13768 MHz | -36.68 dBm | -23.68 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 2.92763 GHz | -37.13 dBm | -24.13 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.84977 GHz | -31.25 dBm | -18.25 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 8.79990 GHz | -34.40 dBm | -21.40 dB |

Date: 25.NOV.2015 19:47:03

### Highest Channel



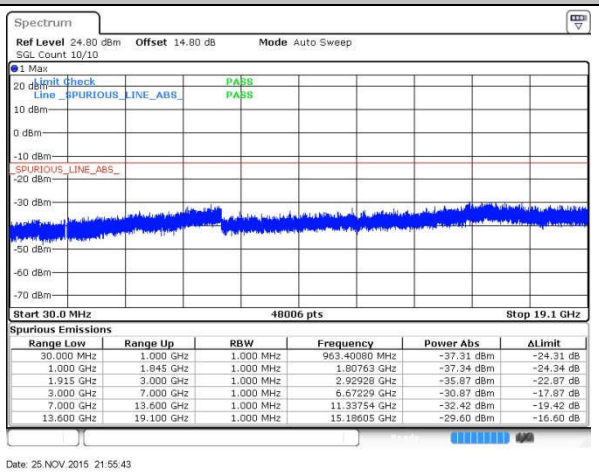

Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 1.000 MHz | 189.30285 MHz | -38.16 dBm | -25.16 dB |
| 855.000 MHz | 1.000 GHz | 1.000 MHz | 855.61594 MHz | -37.16 dBm | -24.16 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 1.69804 GHz | -34.16 dBm | -21.16 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.84427 GHz | -31.90 dBm | -18.90 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 8.16873 GHz | -34.20 dBm | -21.20 dB |

Date: 25.NOV.2015 19:48:18

## GSM1900 (GSM)

### Lowest Channel

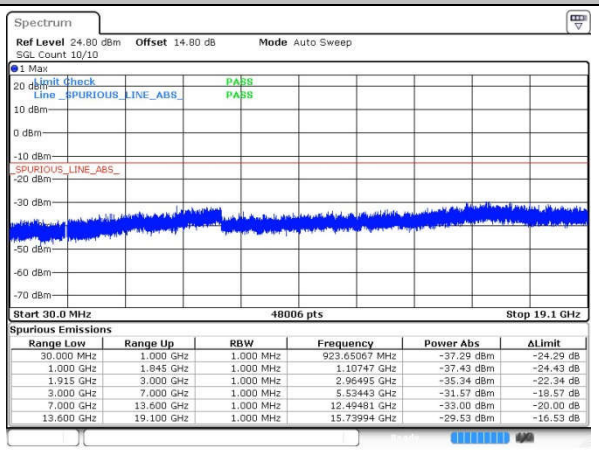



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 963.40080 MHz | -37.31 dBm | -24.31 dB |
| 1.000 GHz | 1.845 GHz | 1.000 MHz | 1.80763 GHz | -37.34 dBm | -24.34 dB |
| 1.915 GHz | 3.000 GHz | 1.000 MHz | 2.92928 GHz | -35.87 dBm | -22.87 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.67229 GHz | -30.87 dBm | -17.87 dB |
| 7.000 GHz | 13.600 GHz | 1.000 MHz | 11.33754 GHz | -32.42 dBm | -19.42 dB |
| 13.600 GHz | 19.100 GHz | 1.000 MHz | 15.18605 GHz | -29.60 dBm | -16.60 dB |

Date: 25.NOV.2015 21:55:43

### Middle Channel

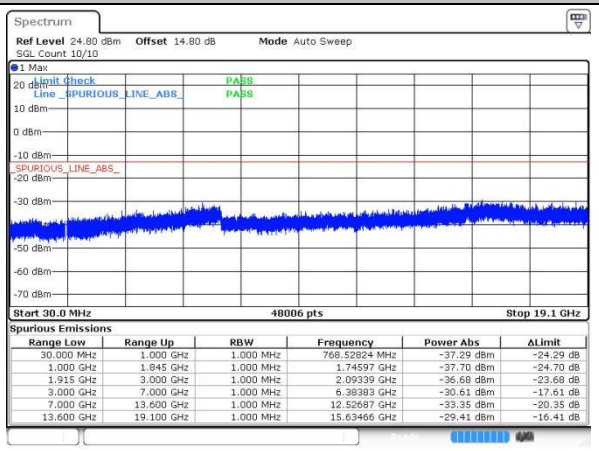



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 923.65067 MHz | -37.29 dBm | -24.29 dB |
| 1.000 GHz | 1.845 GHz | 1.000 MHz | 1.10747 GHz | -37.43 dBm | -24.43 dB |
| 1.915 GHz | 3.000 GHz | 1.000 MHz | 2.96495 GHz | -35.34 dBm | -22.34 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 5.53443 GHz | -31.57 dBm | -18.57 dB |
| 7.000 GHz | 13.600 GHz | 1.000 MHz | 12.49481 GHz | -33.00 dBm | -20.00 dB |
| 13.600 GHz | 19.100 GHz | 1.000 MHz | 15.73994 GHz | -29.53 dBm | -16.53 dB |

Date: 25.NOV.2015 21:57:00

### Highest Channel



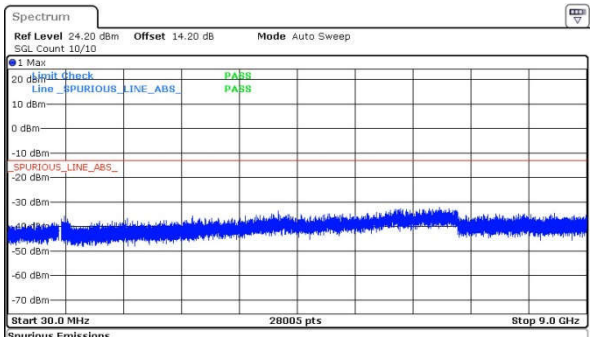

Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 768.52824 MHz | -37.29 dBm | -24.29 dB |
| 1.000 GHz | 1.845 GHz | 1.000 MHz | 1.74597 GHz | -37.70 dBm | -24.70 dB |
| 1.915 GHz | 3.000 GHz | 1.000 MHz | 2.09339 GHz | -36.68 dBm | -23.68 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.38383 GHz | -30.61 dBm | -17.61 dB |
| 7.000 GHz | 13.600 GHz | 1.000 MHz | 12.52687 GHz | -33.35 dBm | -20.35 dB |
| 13.600 GHz | 19.100 GHz | 1.000 MHz | 15.63466 GHz | -29.41 dBm | -16.41 dB |

Date: 25.NOV.2015 21:58:16

## WCDMA Band V (RMC 12.2Kbps)

### Lowest Channel

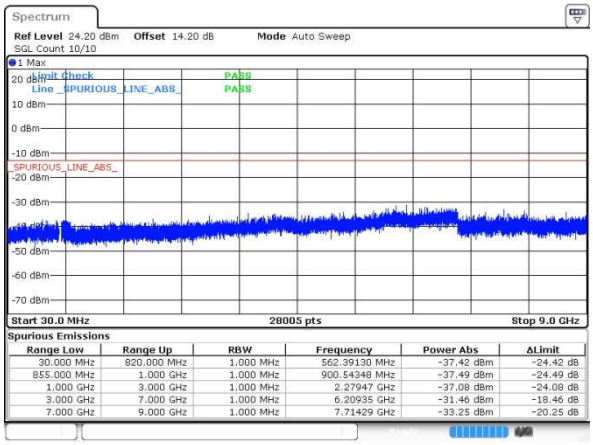



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 1.000 MHz | 742.42129 MHz | -38.43 dBm | -25.43 dB |
| 855.000 MHz | 1.000 GHz | 1.000 MHz | 906.19565 MHz | -35.93 dBm | -22.93 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 2.88714 GHz | -35.93 dBm | -22.93 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.72328 GHz | -32.28 dBm | -19.28 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 8.50369 GHz | -34.52 dBm | -21.52 dB |

Date: 25.NOV.2015 20:39:35

### Middle Channel

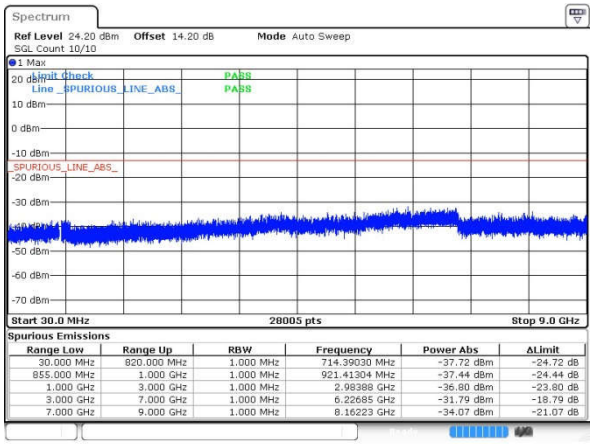



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 1.000 MHz | 562.39130 MHz | -37.42 dBm | -24.42 dB |
| 855.000 MHz | 1.000 GHz | 1.000 MHz | 900.54348 MHz | -37.49 dBm | -24.49 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 2.27947 GHz | -37.08 dBm | -24.08 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.20935 GHz | -31.46 dBm | -18.46 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 7.71429 GHz | -33.25 dBm | -20.25 dB |

Date: 25.NOV.2015 20:40:52

### Highest Channel



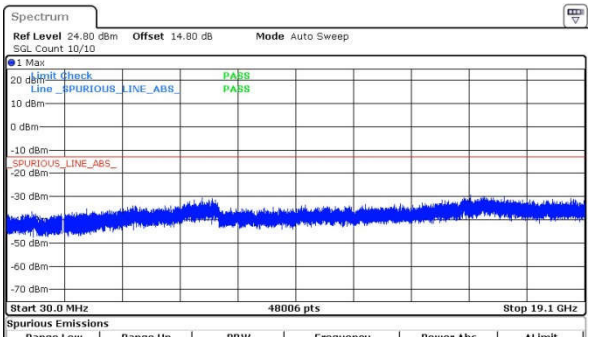

Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 1.000 MHz | 714.39030 MHz | -37.72 dBm | -24.72 dB |
| 855.000 MHz | 1.000 GHz | 1.000 MHz | 921.41304 MHz | -37.44 dBm | -24.44 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 2.98388 GHz | -36.80 dBm | -23.80 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.22685 GHz | -31.79 dBm | -18.79 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 8.16223 GHz | -34.07 dBm | -21.07 dB |

Date: 25.NOV.2015 20:42:07

## WCDMA Band II (RMC 12.2Kbps)

### Lowest Channel




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 839.78761 MHz | -36.43 dBm | -23.43 dB |
| 1.000 GHz | 1.845 GHz | 1.000 MHz | 1.81734 GHz | -37.41 dBm | -24.41 dB |
| 1.915 GHz | 3.000 GHz | 1.000 MHz | 2.66471 GHz | -35.19 dBm | -22.19 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.47682 GHz | -30.60 dBm | -17.60 dB |
| 7.000 GHz | 13.600 GHz | 1.000 MHz | 13.02843 GHz | -33.14 dBm | -20.14 dB |
| 13.600 GHz | 19.100 GHz | 1.000 MHz | 15.34554 GHz | -29.38 dBm | -16.38 dB |

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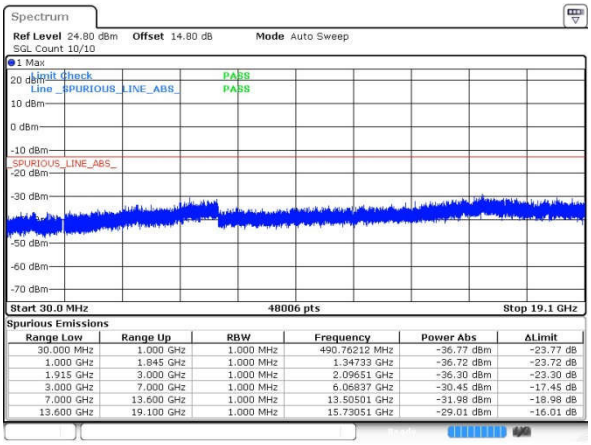
### Middle Channel




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 490.76212 MHz | -36.77 dBm | -23.77 dB |
| 1.000 GHz | 1.845 GHz | 1.000 MHz | 1.34733 GHz | -36.72 dBm | -23.72 dB |
| 1.915 GHz | 3.000 GHz | 1.000 MHz | 2.09651 GHz | -36.30 dBm | -23.30 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.06837 GHz | -30.45 dBm | -17.45 dB |
| 7.000 GHz | 13.600 GHz | 1.000 MHz | 13.50501 GHz | -31.98 dBm | -18.98 dB |
| 13.600 GHz | 19.100 GHz | 1.000 MHz | 15.73051 GHz | -29.01 dBm | -16.01 dB |

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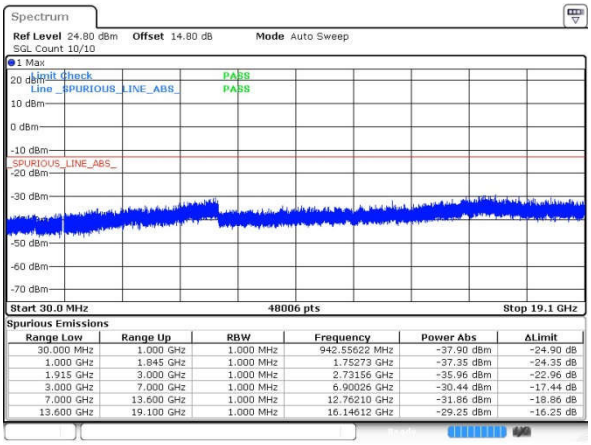
### Highest Channel




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 942.55622 MHz | -37.90 dBm | -24.90 dB |
| 1.000 GHz | 1.845 GHz | 1.000 MHz | 1.75273 GHz | -37.35 dBm | -24.35 dB |
| 1.915 GHz | 3.000 GHz | 1.000 MHz | 2.73156 GHz | -35.96 dBm | -22.96 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.90026 GHz | -30.44 dBm | -17.44 dB |
| 7.000 GHz | 13.600 GHz | 1.000 MHz | 12.76210 GHz | -31.86 dBm | -18.86 dB |
| 13.600 GHz | 19.100 GHz | 1.000 MHz | 16.14612 GHz | -29.25 dBm | -16.25 dB |

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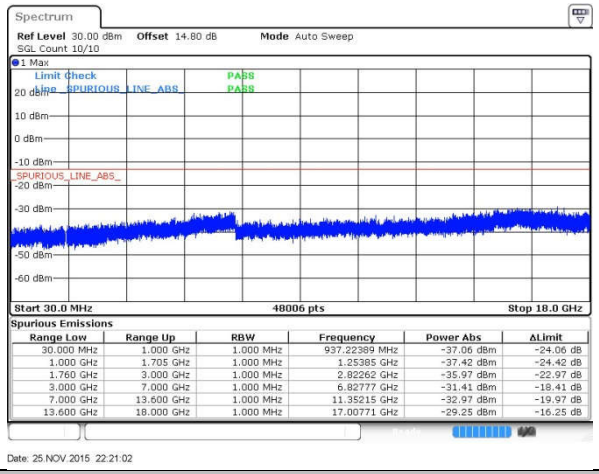
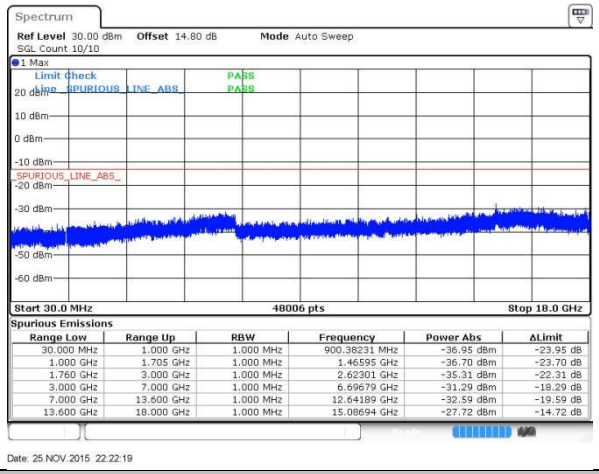
## WCDMA Band IV (RMC 12.2Kbps)

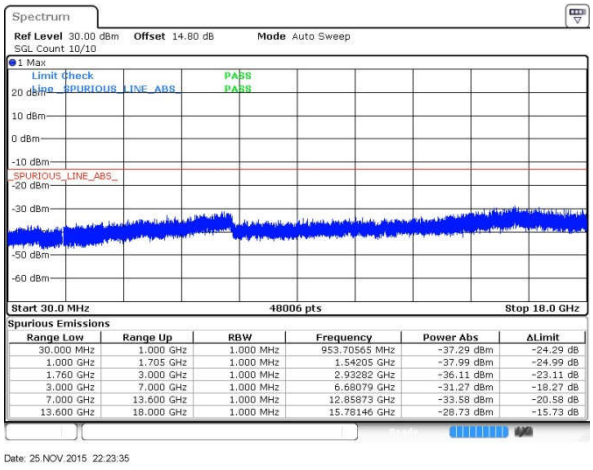
### Lowest Channel




### Middle Channel




### Highest Channel



# Frequency Stability

| Test Conditions | Middle Channel | GSM850 (GSM) | Limit 2.5ppm |
|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Deviation (ppm) | Result |
| 50 | Normal Voltage | 0.0120 | PASS |
| 40 | Normal Voltage | 0.0084 | |
| 30 | Normal Voltage | 0.0072 | |
| 20(Ref.) | Normal Voltage | 0.0000 | |
| 10 | Normal Voltage | 0.0012 | |
| 0 | Normal Voltage | 0.0084 | |
| -10 | Normal Voltage | 0.0036 | |
| -20 | Normal Voltage | 0.0203 | |
| -30 | Normal Voltage | 0.0287 | |
| 20 | Maximum Voltage | 0.0215 | |
| 20 | Normal Voltage | 0.0287 | |
| 20 | Battery End Point | 0.0430 | |

**Note:** Normal Voltage = 3.8V. ；Battery End Point (BEP) = 3.5V.；Maximum Voltage =4.3 V

| Test Conditions | Middle Channel | GSM1900 (GSM) | Limit Note 2. |
|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Deviation (ppm) | Result |
| 50 | Normal Voltage | 0.0059 | PASS |
| 40 | Normal Voltage | 0.0027 | |
| 30 | Normal Voltage | 0.0011 | |
| 20(Ref.) | Normal Voltage | 0.0000 | |
| 10 | Normal Voltage | 0.0043 | |
| 0 | Normal Voltage | 0.0043 | |
| -10 | Normal Voltage | 0.0149 | |
| -20 | Normal Voltage | 0.0229 | |
| -30 | Normal Voltage | 0.0255 | |
| 20 | Maximum Voltage | 0.0032 | |
| 20 | Normal Voltage | 0.0005 | |
| 20 | Battery End Point | 0.0032 | |

**Note:**

1. Normal Voltage = 3.8V. ；Battery End Point (BEP) = 3.5V.；Maximum Voltage =4.3 V
2. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

| Test Conditions | Middle Channel | WCDMA Band V (RMC 12.2KbpsRMC 12.2Kbps) | Limit 2.5ppm |
|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Deviation (ppm) | Result |
| 50 | Normal Voltage | 0.0287 | PASS |
| 40 | Normal Voltage | 0.0239 | |
| 30 | Normal Voltage | 0.0191 | |
| 20(Ref.) | Normal Voltage | 0.0000 | |
| 10 | Normal Voltage | 0.0227 | |
| 0 | Normal Voltage | 0.0215 | |
| -10 | Normal Voltage | 0.0263 | |
| -20 | Normal Voltage | 0.0371 | |
| -30 | Normal Voltage | 0.0311 | |
| 20 | Maximum Voltage | 0.0155 | |
| 20 | Normal Voltage | 0.0167 | |
| 20 | Battery End Point | 0.0024 | |

**Note:** Normal Voltage = 3.8V. ；Battery End Point (BEP) = 3.5V.；Maximum Voltage =4.3 V

| Test Conditions | Middle Channel | WCDMA Band II (RMC 12.2Kbps) | Limit Note 2. |
|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Deviation (ppm) | Result |
| 50 | Normal Voltage | 0.0064 | PASS |
| 40 | Normal Voltage | 0.0032 | |
| 30 | Normal Voltage | 0.0005 | |
| 20(Ref.) | Normal Voltage | 0.0000 | |
| 10 | Normal Voltage | 0.0011 | |
| 0 | Normal Voltage | 0.0021 | |
| -10 | Normal Voltage | 0.0064 | |
| -20 | Normal Voltage | 0.0005 | |
| -30 | Normal Voltage | 0.0059 | |
| 20 | Maximum Voltage | 0.0138 | |
| 20 | Normal Voltage | 0.0106 | |
| 20 | Battery End Point | 0.0101 | |

**Note:**

1. Normal Voltage = 3.8V. ；Battery End Point (BEP) = 3.5 V.；Maximum Voltage =4.3 V
2. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

| Test Conditions | Middle Channel | WCDMA Band IV (RMC 12.2Kbps) | Limit Note 2. |
|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Deviation (ppm) | Result |
| 50 | Normal Voltage | 0.0173 | PASS |
| 40 | Normal Voltage | 0.0133 | |
| 30 | Normal Voltage | 0.0121 | |
| 20(Ref.) | Normal Voltage | 0.0000 | |
| 10 | Normal Voltage | 0.0144 | |
| 0 | Normal Voltage | 0.0156 | |
| -10 | Normal Voltage | 0.0150 | |
| -20 | Normal Voltage | 0.0139 | |
| -30 | Normal Voltage | 0.0231 | |
| 20 | Maximum Voltage | 0.0012 | |
| 20 | Normal Voltage | 0.0104 | |
| 20 | Battery End Point | 0.0029 | |

**Note:**

1. Normal Voltage = 3.8V. ；Battery End Point (BEP) = 3.5 V.；Maximum Voltage =4.3 V
2. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

# Appendix B. Test Results of Radiated Test

## ERP/EIRP

| Channel | Mode | Horizontal | | Vertical | |
|---|---|---|---|---|---|
| | | ERP(dBm) | ERP(W) | ERP(dBm) | ERP(W) |
| Lowest | GSM850 GSM | 28.06 | 0.6397 | 14.01 | 0.0252 |
| Middle | | 28.23 | 0.6653 | 14.56 | 0.0286 |
| Highest | | 28.67 | 0.7362 | 15.43 | 0.0349 |
| Lowest | WCDMA Band V RMC 12.2Kbps | 19.56 | 0.0904 | 5.61 | 0.0036 |
| Middle | | 18.93 | 0.0782 | 5.38 | 0.0035 |
| Highest | | 19.14 | 0.0820 | 5.89 | 0.0039 |
| Limit | ERP < 7W | Result | | PASS | |

| Channel | Mode | Horizontal | | Vertical | |
|---|---|---|---|---|---|
| | | EIRP(dBm) | EIRP(W) | EIRP(dBm) | EIRP(W) |
| Lowest | GSM1900 GSM | 27.61 | 0.5768 | 26.70 | 0.4677 |
| Middle | | 27.16 | 0.5200 | 27.15 | 0.5188 |
| Highest | | 27.79 | 0.6012 | 27.84 | 0.6081 |
| Lowest | WCDMA Band II RMC 12.2Kbps | 19.82 | 0.0959 | 18.95 | 0.0785 |
| Middle | | 20.82 | 0.1208 | 20.86 | 0.1219 |
| Highest | | 21.36 | 0.1368 | 21.31 | 0.1352 |
| Limit | EIRP < 2W | Result | | PASS | |

| Channel | Mode | Horizontal | | Vertical | |
|---|---|---|---|---|---|
| | | EIRP(dBm) | EIRP(W) | EIRP(dBm) | EIRP(W) |
| Lowest | WCDMA Band IV RMC 12.2Kbps | 20.46 | 0.1112 | 19.75 | 0.0944 |
| Middle | | 20.84 | 0.1213 | 20.25 | 0.1059 |
| Highest | | 21.34 | 0.1361 | 20.36 | 0.1086 |
| Limit | EIRP < 1W | Result | | PASS | |

# Radiated Spurious Emission

| GSM850 (GSM) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel | 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) |
| Middle | 1674 | -54.18 | -13 | -41.18 | -54.78 | -56.20 | 1.73 | 5.90 | H |
| | 2510 | -52.07 | -13 | -39.07 | -56.37 | -54.61 | 2.11 | 6.80 | H |
| | 3345 | -59.57 | -13 | -46.57 | -64.65 | -62.35 | 2.47 | 7.40 | H |
| | 1674 | -54.44 | -13 | -41.44 | -56.14 | -56.46 | 1.73 | 5.90 | V |
| | 2510 | -52.75 | -13 | -39.75 | -58.16 | -55.29 | 2.11 | 6.80 | V |
| | 3345 | -59.87 | -13 | -46.87 | -65.16 | -62.65 | 2.47 | 7.40 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| GSM1900 (GSM) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel | 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) |
| Middle | 3759 | -56.90 | -13 | -43.90 | -66.46 | -61.90 | 2.60 | 7.60 | H |
| | 5640 | -45.54 | -13 | -32.54 | -60.18 | -52.54 | 3.10 | 10.10 | H |
| | 7521 | -49.98 | -13 | -36.98 | -68.71 | -56.14 | 5.77 | 11.93 | H |
| | 3760 | -55.46 | -13 | -42.46 | -65.98 | -60.46 | 2.60 | 7.60 | V |
| | 5640 | -48.73 | -13 | -35.73 | -63.19 | -55.73 | 3.10 | 10.10 | V |
| | 7521 | -50.52 | -13 | -37.52 | -68.44 | -56.68 | 5.77 | 11.93 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| WCDMA Band V(RMC 12.2Kbps) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel | 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) |
| Middle | 1672 | -61.90 | -13 | -48.90 | -61.98 | -63.92 | 1.73 | 5.90 | H |
| | 2509 | -59.18 | -13 | -46.18 | -63.31 | -61.72 | 2.11 | 6.80 | H |
| | 3345 | -61.46 | -13 | -48.46 | -66.54 | -64.24 | 2.47 | 7.40 | H |
| | 1672 | -61.05 | -13 | -48.05 | -62.2 | -63.07 | 1.73 | 5.90 | V |
| | 2509 | -58.81 | -13 | -45.81 | -64.3 | -61.35 | 2.11 | 6.80 | V |
| | 3345 | -60.34 | -13 | -47.34 | -65.63 | -63.12 | 2.47 | 7.40 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| WCDMA Band II(RMC 12.2Kbps) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel | 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) |
| Middle | 3759 | -56.71 | -13 | -43.71 | -66.27 | -61.71 | 2.60 | 7.60 | H |
| | 5640 | -53.83 | -13 | -40.83 | -67.82 | -60.83 | 3.10 | 10.10 | H |
| | 7521 | -50.09 | -13 | -37.09 | -68.82 | -56.25 | 5.77 | 11.93 | H |
| | 3759 | -55.90 | -13 | -42.90 | -66.42 | -60.90 | 2.60 | 7.60 | V |
| | 5640 | -52.74 | -13 | -39.74 | -67.2 | -59.74 | 3.10 | 10.10 | V |
| | 7521 | -50.83 | -13 | -37.83 | -68.75 | -56.99 | 5.77 | 11.93 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| WCDMA Band IV(RMC 12.2Kbps) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel | 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) |
| Middle | 3465 | -56.18 | -13 | -43.18 | -63.94 | -61.16 | 2.51 | 7.49 | H |
| | 5197.8 | -53.58 | -13 | -40.58 | -67.17 | -60.05 | 2.98 | 9.45 | H |
| | 6930 | -52.01 | -13 | -39.01 | -68.80 | -58.08 | 5.28 | 11.35 | H |
| | 3465 | -53.34 | -13 | -40.34 | -60.2 | -58.32 | 2.51 | 7.49 | V |
| | 5197.8 | -54.09 | -13 | -41.09 | -68.05 | -60.56 | 2.98 | 9.45 | V |
| | 6930 | -50.93 | -13 | -37.93 | -67.96 | -57.00 | 5.28 | 11.35 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.