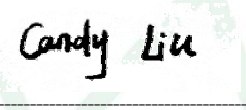
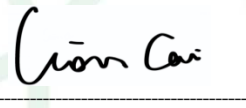
Shenzhen Huatongwei International Inspection Co., Ltd.
1/F,Bldg 3,Hongfa Hi-tech Industrial Park,Genyu Road,Tianliao,Gongming,Shenzhen,China
Phone:86-755-26748019 Fax:86-755-26748089 http://www.szhtw.com.cn

# FCC REPORT

| | | |
|---|---|---|
| **Report Reference No. ..... :** | **TRE1607016001** | R/C…….: 72857 |
| **FCC ID ..... :** | **O55452816** | |
| **Applicant's name ..... :** | **SWAGTEK** | |
| Address.....: | 10205 NW19th Street,STE101,Miami,Florida,33172,United States | |
| Manufacturer.....: | SWAGTEK | |
| Address.....: | 10205 NW19th Street,STE101,Miami,Florida,33172,United States | |
| **Test item description ..... :** | **4.5 INCH SMART PHONE** | |
| Trade Mark .....: | LOGIC | |
| Model/Type reference.....: | X4.5 LITE | |
| Listed Model(s) .....: | SPARK,UM450 | |
| **Standard ..... :** | **FCC Part 22: PUBLIC MOBILE SERVICES**<br>**FCC Part 24: PERSONAL COMMUNICATIONS SERVICES** | |
| Date of receipt of test sample……..: | Jul.25, 2016 | |
| Date of testing……: | Jul.26, 2016 ~ Aug.05, 2016 | |
| Date of issue……...: | Aug.08, 2016 | |
| **Result..... ……..:** | **Pass** | |

| | | |
|---|---|---|
| Compiled by<br>( position+printed name+signature)..: | File administrators Candy Liu |  |
| Supervised by<br>( position+printed name+signature)..: | Project Engineer Lion Cai |  |
| Approved by<br>( position+printed name+signature)..: | Manager Hans Hu |  |

| | |
|---|---|
| **Testing Laboratory Name ..... :** | **Shenzhen Huatongwei International Inspection Co., Ltd** |
| Address.....: | 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China |



*The test report merely corresponds to the test sample.*
*It is not permitted to copy extracts of these test result without the written permission of the test laboratory.*

# Contents

# 1. TEST STANDARDS AND TEST DESCRIPTION

## 1.1. Test Standards

The tests were performed according to following standards:

FCC Part 22 (10-1-13 Edition): PRIVATE LAND MOBILE RADIO SERVICES.
FCC Part 24(10-1-13 Edition): PUBLIC MOBILE SERVICES
TIA/EIA 603 D June 2010: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
47 CFR FCC Part 15 Subpart B: - Unintentional Radiators
FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS
971168 D01 Power Meas License Digital Systems v02r02: provides a methodology for fully characterizing the fundamental power of wideband (> 1 MHz) digitally modulated RF signals acceptable to the FCC for demonstrating compliance for licensed transmitters.
ANSI C63.10-2013:AmericanNationalStandardforTestingUnlicensedWirelessDevices

## 1.2. Test Description

| Test Item | Section in CFR 47 | Result |
|---|---|---|
| RF Output Power | Part 2.1046<br>Part 22.913 (a)(2)<br>Part 24.232 (c) | Pass |
| Modulation Characteristics | Part 2.1047 | Pass |
| 99% & -26 dB Occupied Bandwidth | Part 2.1049<br>Part 22.917<br>Part 24.238 | Pass |
| Spurious Emissions at Antenna Terminal | Part 2.1051<br>Part 22.917 (a)<br>Part 24.238 (a) | Pass |
| Field Strength of Spurious Radiation | Part 2.1053<br>Part 22.917 (a)<br>Part 24.238 (a) | Pass |
| Out of band emission, Band Edge | Part 22.917 (a)<br>Part 24.238 (a) | Pass |
| Frequency stability vs. temperature | Part 2.1055(a)(1)(b) | Pass |
| Frequency stability vs. voltage | Part 2.1055(d)(1)(2) | Pass |
| Peak-Average Ratio | Part 24.232 (d) | Pass |

Remark: The measurement uncertainty is not included in the test result.

# 2. SUMMARY

## 2.1. Client Information

| | |
|---|---|
| Applicant: | SWAGTEK |
| Address: | 10205 NW19th Street,STE101,Miami,Florida,33172,United States |
| Manufacturer: | SWAGTEK |
| Address: | 10205 NW19th Street,STE101,Miami,Florida,33172,United States |

## 2.2. Product Description

| | |
|---|---|
| Name of EUT | 4.5 INCH SMART PHONE |
| Trade Mark: | LOGIC |
| Model No.: | X4.5 LITE |
| Listed Model(s): | SPARK,UM450 |
| IMEI 1: | 353975010831143 |
| IMEI 2: | 353975010831150 |
| Power supply: | DC 3.7V From internal battery |
| Adapter information: | Input:AC 100-240V 50/60Hz 0.2A<br>Output: 5Vd.c., 700mA |
| **2G:** | |
| Support Network: | GSM, GPRS, EGPRS |
| Support Band: | GSM850, DCS1900 |
| Modulation: | GSM/GPRS/EGPRS: GMSK |
| Transmit Frequency: | GSM850: 824.20MHz-848.80MHz<br>PCS1900: 1850.20MHz-1909.80MHz |
| Receive Frequency: | GSM850: 869.20MHz-893.80MHz<br>PCS1900: 1930.20MHz-1989.80MHz |
| GPRS Class: | 12 |
| EGPRS Class: | 12 |
| Antenna type: | Intergal Antenna |
| Antenna gain: | GSM850:-1.0 dBi<br>PCS1900: 1.5 dBi |
| Hardware version: | V4.0 |
| Software version: | LOGIC_X4.5_LITE_GENERIC_V7.0_c_06072016 |
| **3G:** | |
| Operation Band: | FDD Band II and FDD Band V |
| Power Class: | Power Class 3 |
| Modilation Type: | QPSK |
| DC-HSUPA Release Version: | Not Supported |
| Antenna type: | Intergal Antenna |
| Antenna gain: | Band II: 1.4 dBi, Band V: -0.5 dBi |

Test Frequency:

| GSM 850 | | PCS1900 | |
|---|---|---|---|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 128 | 824.20 | 512 | 1850.20 |
| 190 | 836.60 | 661 | 1880.00 |
| 251 | 848.80 | 810 | 1909.80 |

| FDD Band II | | FDD Band V | |
|---|---|---|---|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 9262 | 1852.4 | 4132 | 826.40 |
| 9400 | 1880.0 | 4183 | 836.60 |
| 9538 | 1907.6 | 4233 | 846.60 |

## 2.3. EUT operation mode

1.The EUT has been tested under typical operating condition. The Applicant provides software to control the EUT for staying in continous transmitting and receiving mode for testing.

## 2.4. EUT configuration

**The following peripheral devices and interface cables were connected during the measurement:**

● - supplied by the manufacturer

○ - supplied by the lab

| | | | |
|---|---|---|---|
| | | Length (m) : | / |
| | | Shield : | / |
| | | Detachable : | / |
| | | Manufacturer : | / |
| | | Model No. : | / |

## 2.5. Modifications

No modifications were implemented to meet testing criteria.

# 3. TEST ENVIRONMENT

## 3.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd.
Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

## 3.2. Test Facility

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

**CNAS-Lab Code: L1225**
Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

**A2LA-Lab Cert. No. 3902.01**
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until December 31, 2016.

**FCC-Registration No.: 317478**
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

**IC-Registration No.: 5377A&5377B**
The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.
Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017.

**ACA**
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

**VCCI**
The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2484. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 29, 2015.
Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.
Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.
Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

**DNV**
Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

## 3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|---|---|
| Normal Temperature/Tnor: | 15~35°C |
| lative Humidity | 30~60 % |
| Air Pressure | 950-1050 hPa |

## 3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 1" and TR-100028-02 "Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

| Test Items | Measurement Uncertainty | Notes |
|---|---|---|
| Frequency stability | 25 Hz | (1) |
| Transmitter power conducted | 0.57 dB | (1) |
| Transmitter power Radiated | 2.20 dB | (1) |
| Conducted spurious emission 9KHz-12.75 GHz | 1.60 dB | (1) |
| Conducted Emission 9KHz-30MHz | 3.39 dB | (1) |
| Radiated Emission 30~1000MHz | 4.24 dB | (1) |
| Radiated Emissio 1~18GHz | 5.16 dB | (1) |
| Radiated Emissio 18-40GHz | 5.54 dB | (1) |
| Occupied Bandwidth | --------- | (1) |
| Emission Mask | --------- | (1) |
| Modulation Characteristic | --------- | (1) |
| Transmitter Frequency Behavior | --------- | (1) |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

## 3.5. Equipments Used during the Test

| Output Power(Conducted) & Occupied Bandwidth & Emission Bandwidth & Band Edge Compliance & Conducted Spurious Emission | | | | | |
|---|---|---|---|---|---|
| No. | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | UNIVERSAL RADIO COMMUNICATION | Rohde&Schwarz | CMU200 | 112012 | 2015/11/2 |
| 2 | Spectrum Analyzer | Rohde&Schwarz | FSU26 | 201141 | 2015/11/2 |
| 3 | Splitter | Mini-Circuit | ZAPD-4 | 400059 | 2015/11/2 |

| Frequency Stability | | | | | |
|---|---|---|---|---|---|
| No. | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | UNIVERSAL RADIO COMMUNICATION | Rohde&Schwarz | CMU200 | 112012 | 2015/11/2 |
| 2 | Spectrum Analyzer | Rohde&Schwarz | FSU26 | 201141 | 2015/11/2 |
| 3 | Climate Chamber | ESPEC | EL-10KA | 05107008 | 2015/11/2 |
| 4 | Splitter | Mini-Circuit | ZAPD-4 | 400059 | 2015/11/2 |

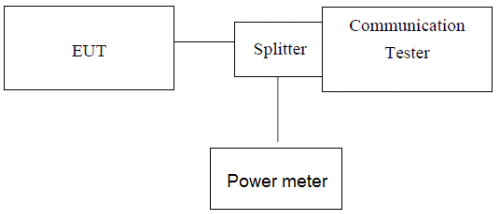
| Output Power (Radiated) & Radiated Spurious Emission | | | | | |
|---|---|---|---|---|---|
| No. | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | UNIVERSAL RADIO COMMUNICATION | Rohde&Schwarz | CMU200 | 112012 | 2015/11/2 |
| 2 | Spectrum Analyzer | Rohde&Schwarz | FSU26 | 201141 | 2015/11/2 |
| 3 | HORN ANTENNA | ShwarzBeck | 9120D | 1012 | 2015/11/2 |
| 4 | HORN ANTENNA | ShwarzBeck | 9120D | 1011 | 2015/11/2 |
| 5 | Ultra-Broadband Antenna | ShwarzBeck | VULB9163 | 538 | 2015/11/2 |
| 6 | Ultra-Broadband Antenna | ShwarzBeck | VULB9163 | 539 | 2015/11/2 |
| 7 | TURNTABLE | MATURO | TT2.0 | ---- | N/A |
| 8 | ANTENNA MAST | MATURO | TAM-4.0-P | ---- | N/A |
| 9 | EMI Test Software | Audix | E3 | N/A | N/A |
| 10 | EMI Test Receiver | Rohde&Schwarz | ESIB 26 | 100009 | 2015/11/2 |
| 11 | RF Test Panel | Rohde&Schwarz | TS / RSP | 335015/ 0017 | 2015/11/2 |
| 12 | High pass filter | Compliance Direction systems | BSU-6 | 34202 | 2015/11/2 |
| 13 | Splitter | Mini-Circuit | ZAPD-4 | 400059 | 2015/11/2 |
| 14 | Horn Antenna | SCHWARZBECK | BBHA9170 | 25841 | 2015/11/2 |
| 15 | Horn Antenna | SCHWARZBECK | BBHA9170 | 25842 | 2015/11/2 |
| 16 | Preamplifier | ShwarzBeck | BBV 9718 | BBV 9718 | 2015/11/2 |
| 17 | Broadband Preamplifier | ShwarzBeck | BBV743 | 9743-0079 | 2015/11/2 |
| 18 | Signal Generator | Rohde&Schwarz | SMF100A | 101932 | 2015/11/2 |
| 19 | Amplifer | Compliance Direction systems | PAP1-4060 | 120 | 2015/11/2 |
| 20 | TURNTABLE | ETS | 2088 | 2149 | 2015/11/2 |
| 21 | ANTENNA MAST | ETS | 2075 | 2346 | 2015/11/2 |
| 22 | HORN ANTENNA | Rohde&Schwarz | HF906 | 100068 | 2015/11/2 |
| 23 | HORN ANTENNA | Rohde&Schwarz | HF906 | 100039 | 2015/11/2 |

The calibration interval was one year.

# 4. TEST CONDITIONS AND RESULTS

## 4.1. Conducted Output Power

**TEST CONFIGURATION**




*Note: Measurement setup for testing on Antenna connector*

**TEST PROCEDURE**

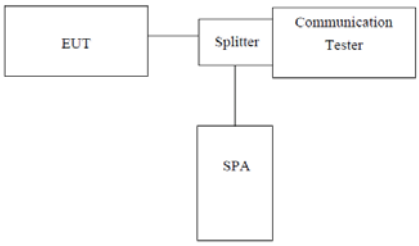
1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure the maximum burst average power.

**TEST RESULTS**

| EUT Mode | Channel | Frequency (MHz) | Power (dBm) |
|---|---|---|---|
| GSM 850 (GMSK) | 128 | 824.20 | 32.64 |
| | 190 | 836.60 | 32.67 |
| | 251 | 848.80 | 32.58 |
| GPRS850 (GMSK,1Slot) | 128 | 824.20 | 32.65 |
| | 190 | 836.60 | 32.61 |
| | 251 | 848.80 | 32.60 |
| EGPRS850 (GMSK,1Slot) | 128 | 824.20 | 32.15 |
| | 190 | 836.60 | 32.32 |
| | 251 | 848.80 | 32.41 |
| PCS1900 (GMSK) | 512 | 1850.20 | 30.53 |
| | 661 | 1880.00 | 30.11 |
| | 810 | 1909.80 | 29.80 |
| GPRS1900 (GMSK,1Slot) | 512 | 1850.20 | 30.47 |
| | 661 | 1880.00 | 30.05 |
| | 810 | 1909.80 | 29.72 |
| EGPRS1900 (GMSK,1Slot) | 512 | 1850.20 | 30.25 |
| | 661 | 1880.00 | 29.72 |
| | 810 | 1909.80 | 30.08 |
| WCDMA Band II | 9262 | 1852.40 | 22.14 |
| | 9400 | 1880.00 | 22.35 |
| | 9538 | 1907.60 | 22.28 |
| WCDMA Band V | 4132 | 826.40 | 23.08 |
| | 4183 | 836.60 | 23.12 |
| | 4233 | 846.60 | 23.32 |

## 4.2. Occupy Bandwidth

**TEST CONFIGURATION**




***Note:** Measurement setup for testing on Antenna connector*

**TEST PROCEDURE**

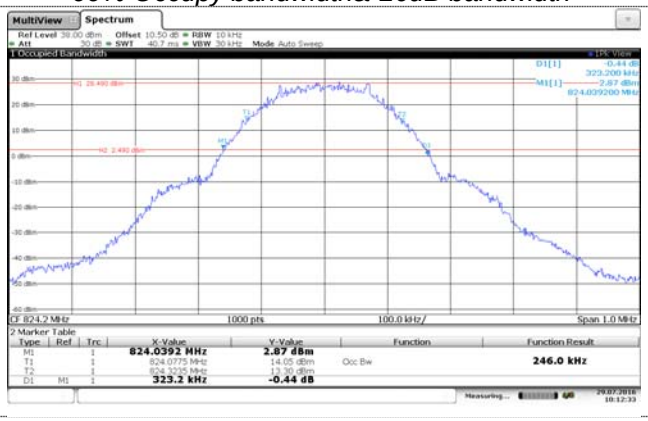
1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer
2. RBW was set to about 1% of emission BW, VBW= 3 times RBW.
3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

**TEST RESULTS**

| EUT Mode | Channel | Frequency (MHz) | 99% Occupy bandwidth (KHz) | -26dB bandwidth (KHz) |
|---|---|---|---|---|
| GSM 850 (GMSK) | 128 | 824.20 | 246.00 | 323.20 |
| | 190 | 836.60 | 247.00 | 317.20 |
| | 251 | 848.80 | 244.00 | 320.10 |
| GPRS850 (GMSK,1Slot) | 128 | 824.20 | 246.00 | 319.80 |
| | 190 | 836.60 | 244.00 | 312.70 |
| | 251 | 848.80 | 245.00 | 319.90 |
| EGPRS850 (GMSK,1Slot) | 128 | 824.20 | 245.00 | 320.20 |
| | 190 | 836.60 | 243.00 | 312.90 |
| | 251 | 848.80 | 244.00 | 318.80 |
| PCS1900 (GMSK) | 512 | 1850.20 | 248.00 | 316.30 |
| | 661 | 1880.00 | 244.00 | 318.90 |
| | 810 | 1909.80 | 246.00 | 317.90 |
| GPRS1900 (GMSK,1Slot) | 512 | 1850.20 | 246.00 | 322.40 |
| | 661 | 1880.00 | 243.00 | 320.60 |
| | 810 | 1909.80 | 245.00 | 314.60 |
| EGPRS1900 (GMSK,1Slot) | 512 | 1850.20 | 244.00 | 316.30 |
| | 661 | 1880.00 | 245.00 | 318.90 |
| | 810 | 1909.80 | 244.00 | 315.90 |
| WCDMA Band II | 9262 | 1852.4 | 4150.00 | 4698.00 |
| | 9400 | 1880.0 | 4160.00 | 4703.00 |
| | 9538 | 1907.6 | 4160.00 | 4713.00 |
| WCDMA Band V | 4132 | 826.4 | 4160.00 | 4663.00 |
| | 4183 | 836.6 | 4140.00 | 4679.00 |
| | 4233 | 846.6 | 4130.00 | 4679.00 |

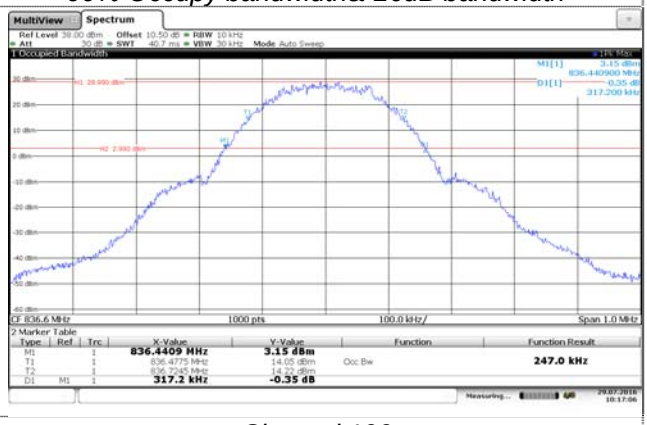
## GSM850 For GMSK Moudlation

*99% Occupy bandwidth&-26dB bandwidth*

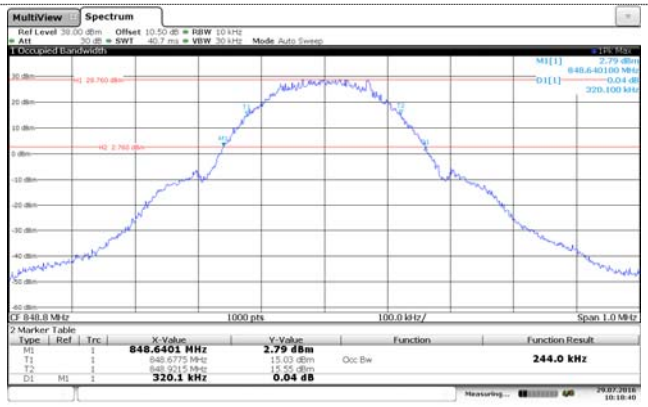



*Channel 128*

*99% Occupy bandwidth&-26dB bandwidth*



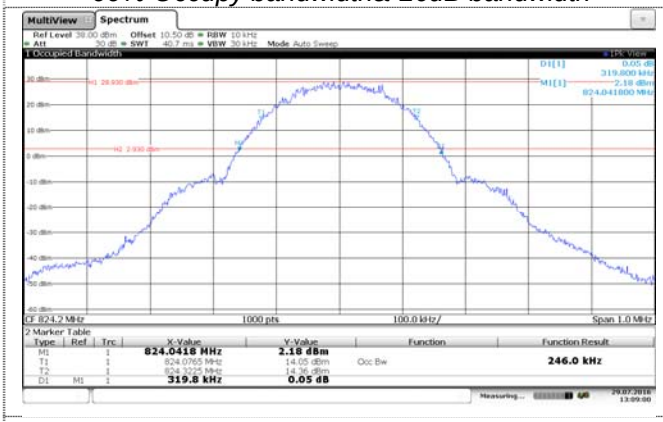

*Channel 190*




*Channel 251*

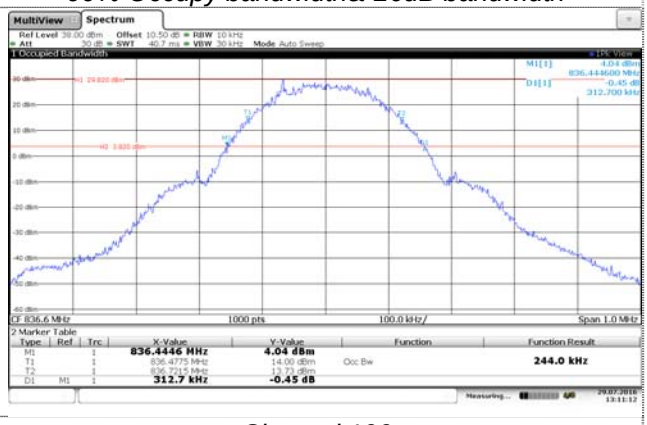
## GPRS850 For GMSK Moudlation

*99% Occupy bandwidth&-26dB bandwidth*

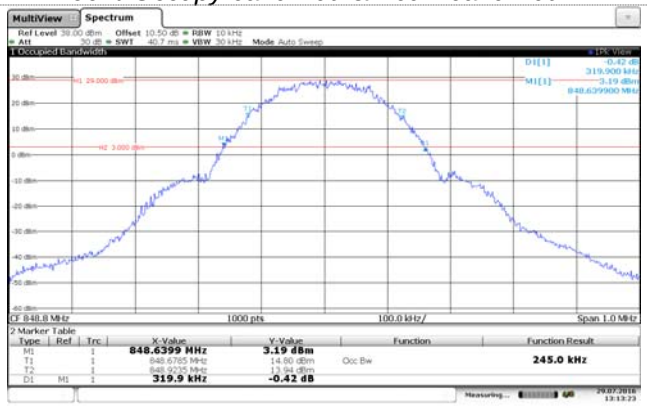
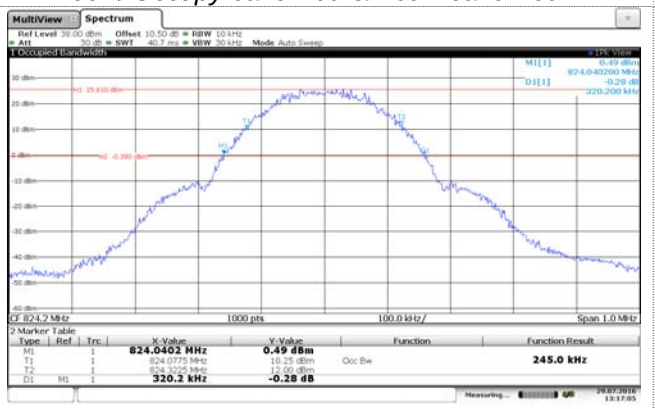
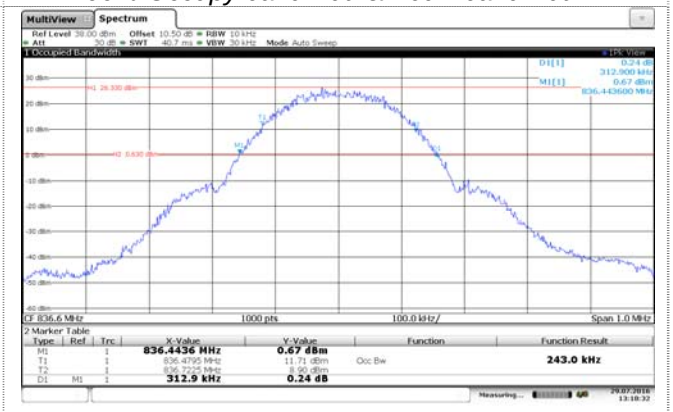



*Channel 128*

*99% Occupy bandwidth&-26dB bandwidth*




*Channel 190*

| *99% Occupy bandwidth&-26dB bandwidth* | *99% Occupy bandwidth&-26dB bandwidth* |
|---|---|
|  | |
| *Channel 251* | |
| *EGPRS850 For GMSK Moudlation* | |
| *99% Occupy bandwidth&-26dB bandwidth* | *99% Occupy bandwidth&-26dB bandwidth* |
|  |  |
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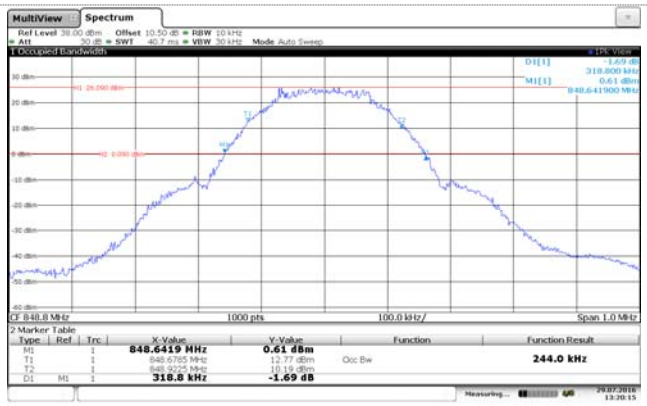
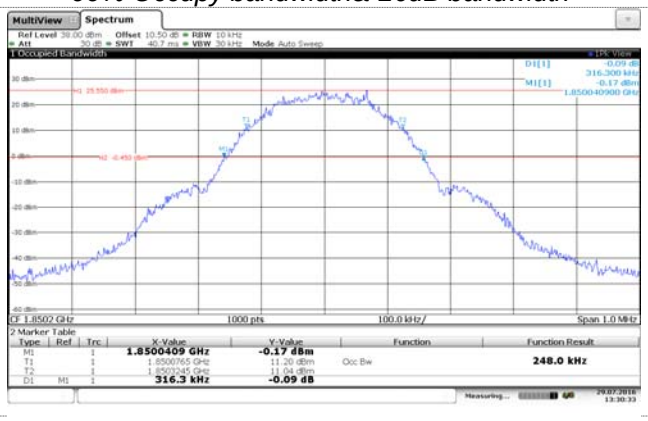
|  | |
| *Channel 251* | |

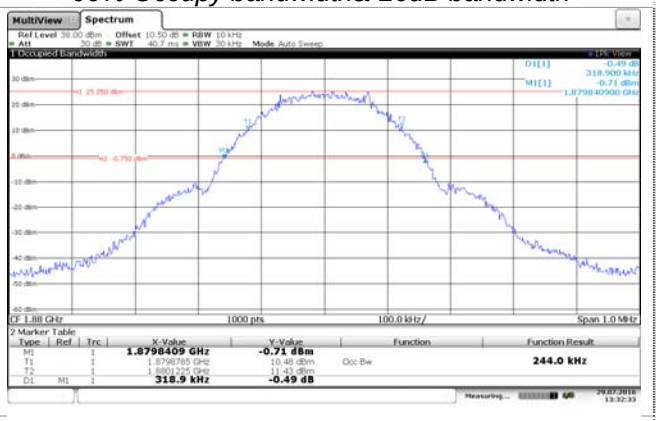
## PCS1900 For GMSK Moudlation

*99% Occupy bandwidth&-26dB bandwidth*

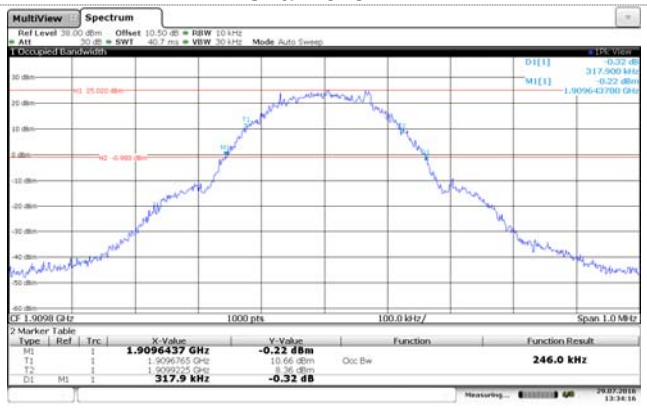



*Channel 512*

*99% Occupy bandwidth&-26dB bandwidth*



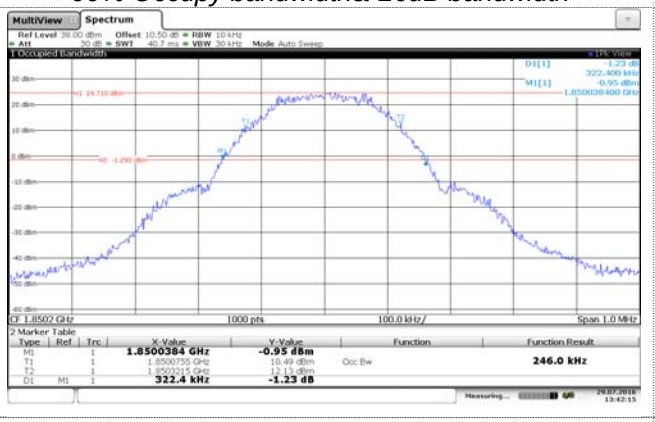

*Channel 661*




*Channel 810*

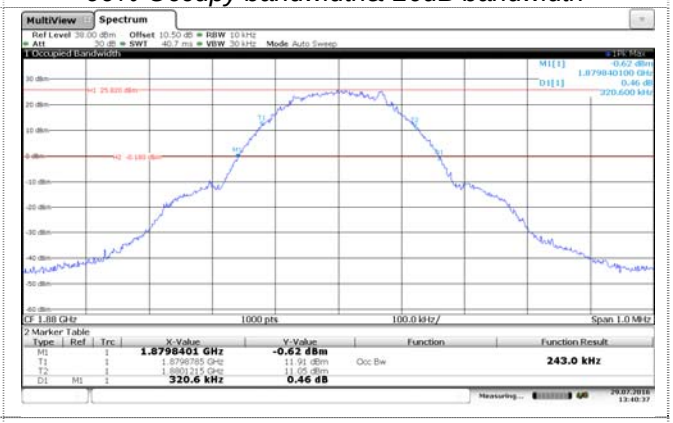
## GPRS1900 For GMSK Moudlation

*99% Occupy bandwidth&-26dB bandwidth*

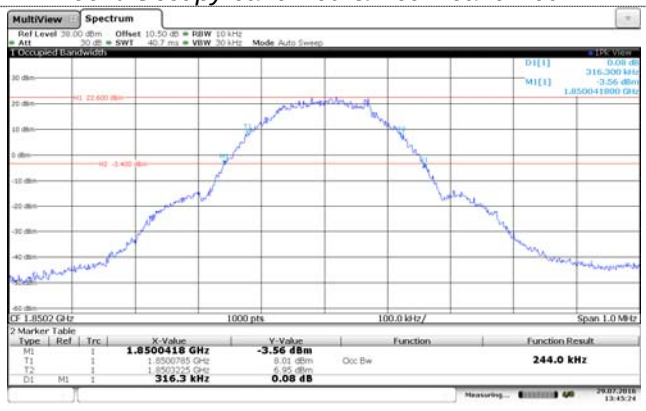
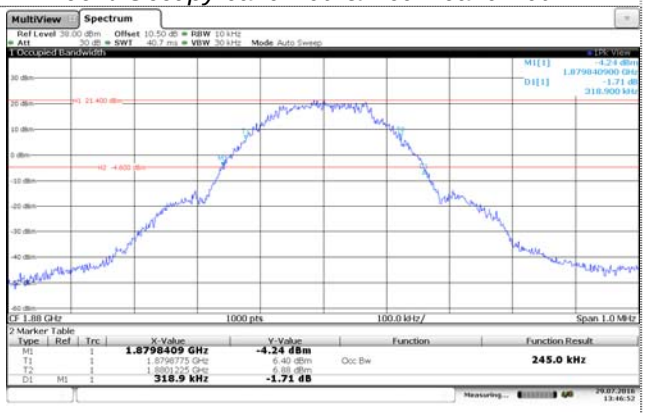
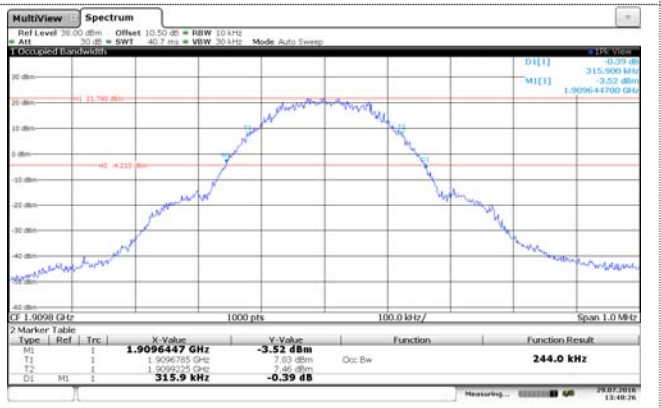



*Channel 512*

*99% Occupy bandwidth&-26dB bandwidth*

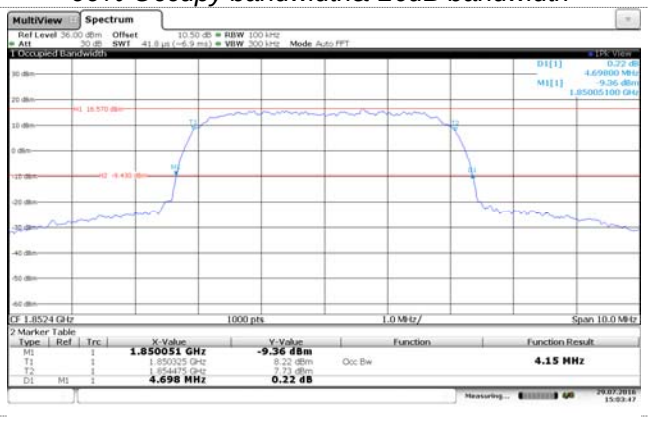



*Channel 661*

| *99% Occupy bandwidth&-26dB bandwidth* | *99% Occupy bandwidth&-26dB bandwidth* |
|---|---|
|  | |
| *Channel 810* | |
| *EGPRS1900 For* GMSK *Moudlation* | |
| *99% Occupy bandwidth&-26dB bandwidth* | *99% Occupy bandwidth&-26dB bandwidth* |
|  |  |
| *Channel 512* | *Channel 661* |
|  | |
| *Channel 810* | |

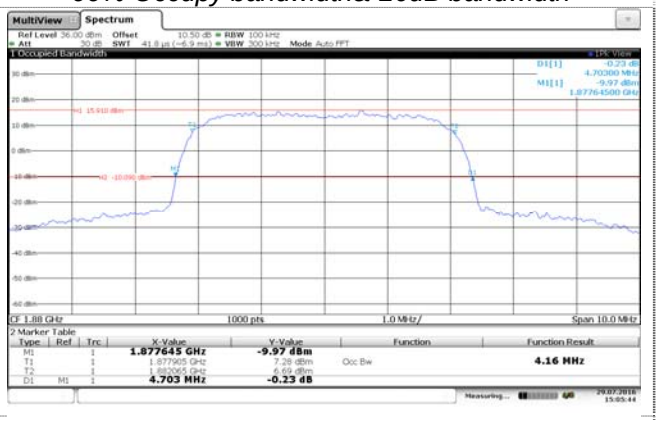
## WCDMA Band II

*99% Occupy bandwidth&-26dB bandwidth*

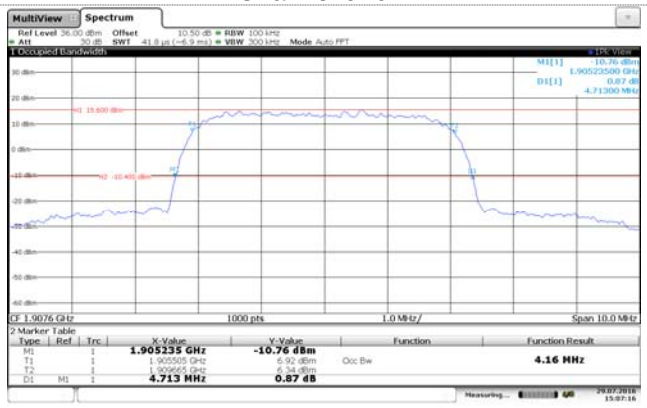



*Channel 9262*

*99% Occupy bandwidth&-26dB bandwidth*



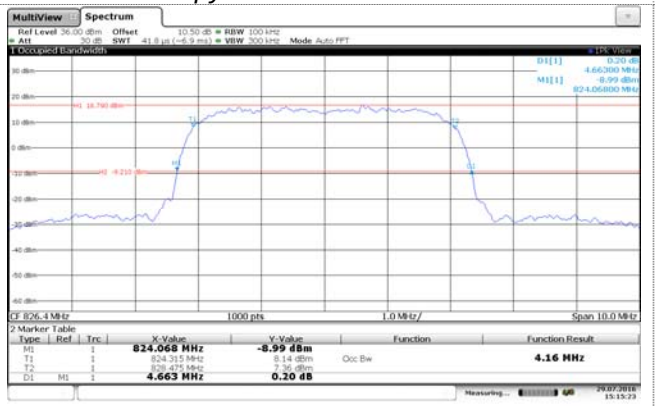

*Channel 9400*




*Channel 9538*

## WCDMA Band V

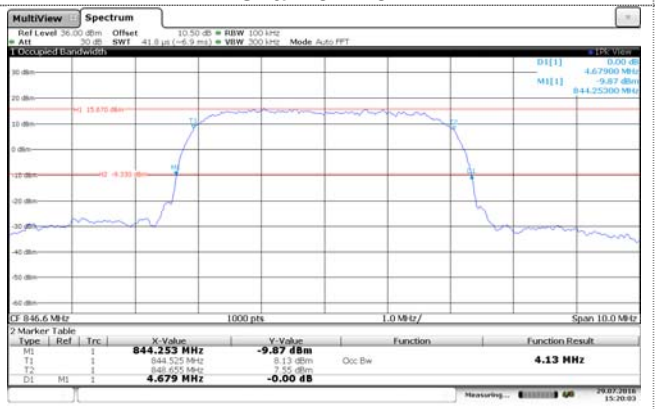
*99% Occupy bandwidth&-26dB bandwidth*




*Channel 4132*

*99% Occupy bandwidth&-26dB bandwidth*


*Channel 4183*




*Channel 4233*

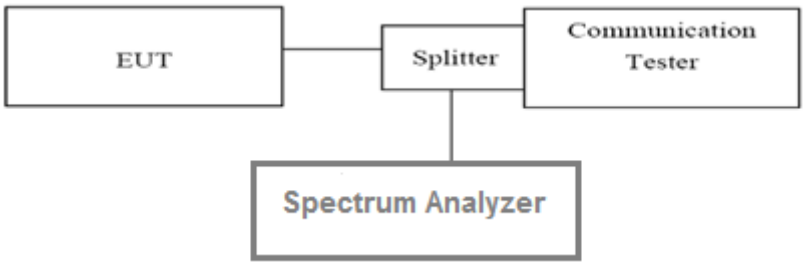
## 4.3. Out of band emission at antenna terminals

**LIMIT**

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

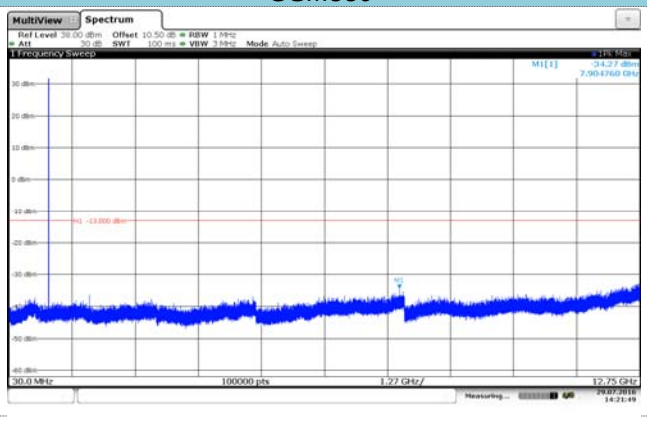
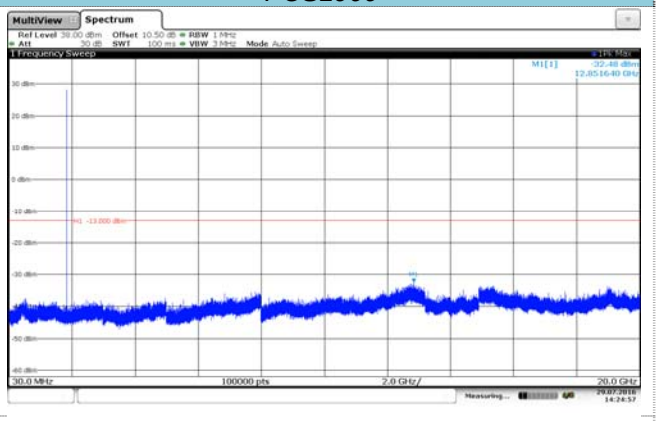
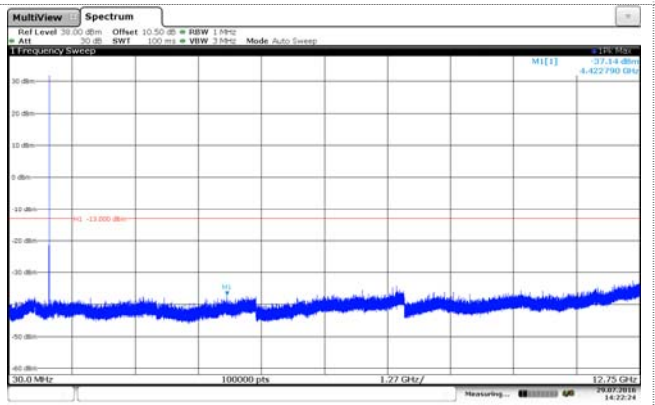
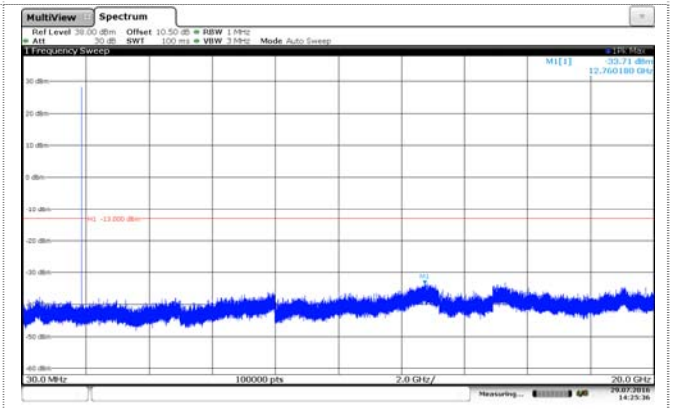
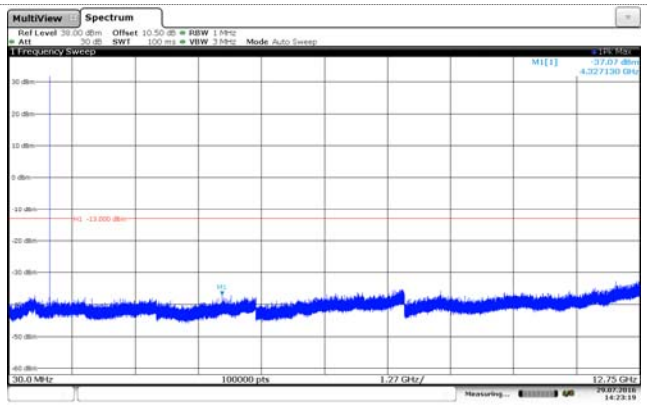
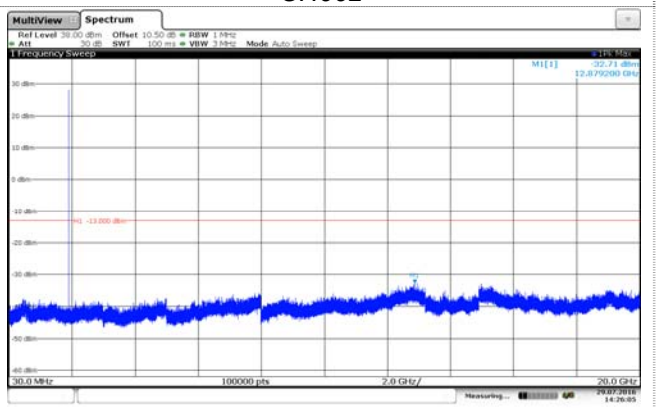
**TEST CONFIGURATION**

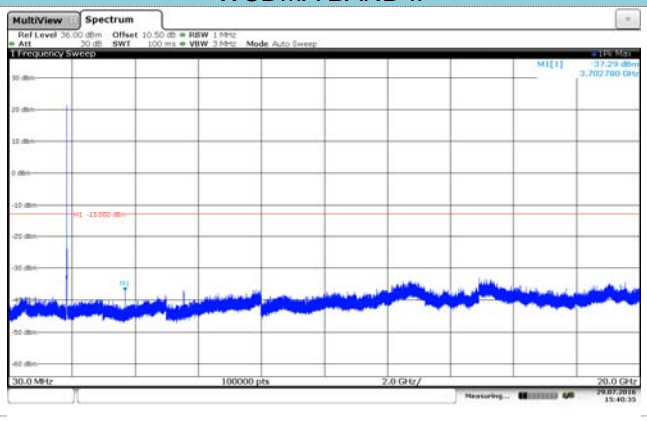
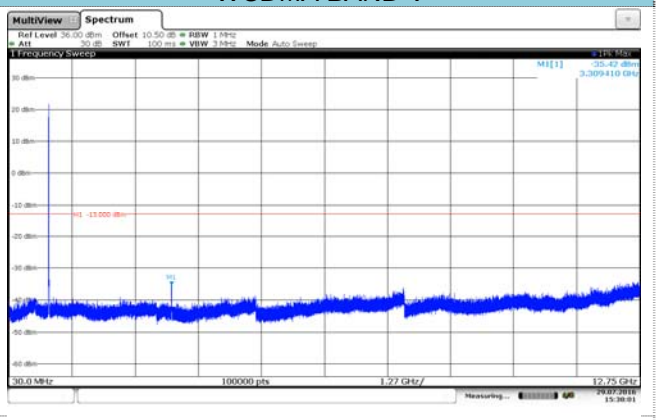
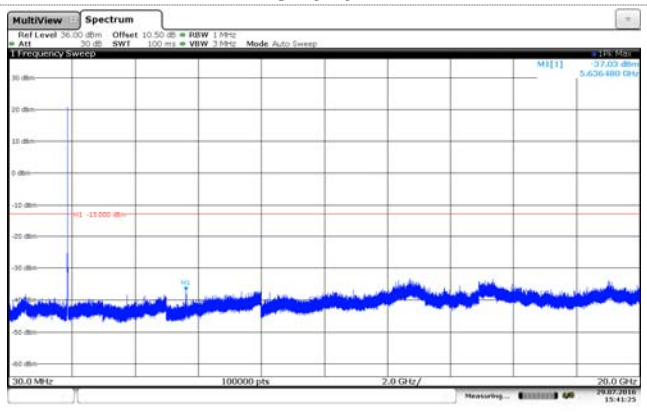
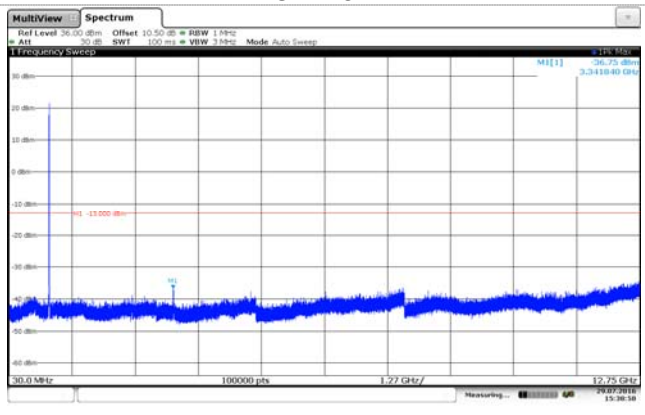
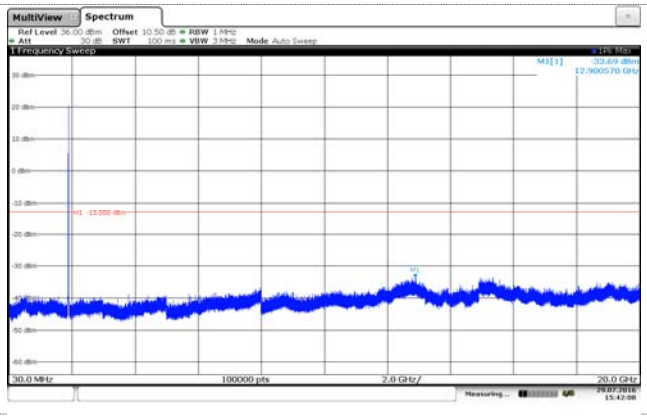
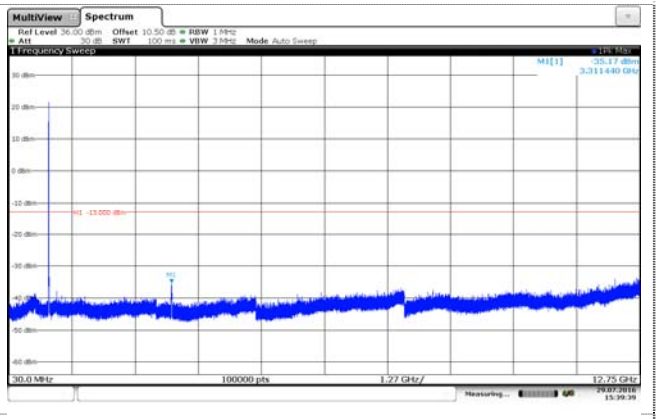



**TEST PROCEDURE**

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
3. For the out of band: Set the RBW= 1MHz, VBW = 3MHz, Start=30MHz, Stop= 10th harmonic.

**TEST RESULTS**

| GSM850 | PCS1900 |
| --- | --- |
|  |  |
| CH128 | CH512 |
|  |  |
| CH190 | CH661 |
|  |  |
| CH251 | CH810 |

| WCDMA BAND II | WCDMA BAND V |
|---|---|
|  |  |
| CH9262 | CH4132 |
|  |  |
| CH9400 | CH4183 |
|  |  |
| CH9538 | CH4233 |

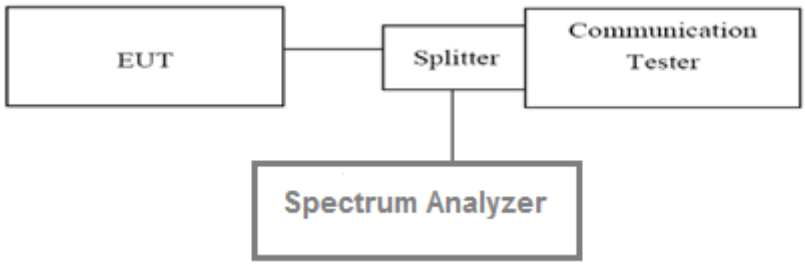
## 4.4. Band Edge compliance

**LIMIT**

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

**TEST CONFIGURATION**




**TEST PROCEDURE**

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. For the bandedge: 2G:Set the RBW=3KHz, VBW = 10KHz, Sweep time= Auto

   3G: Set the RBW=100KHz, VBW = 300KHz, Sweep time= Auto

**TEST RESULTS**

| GSM850 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 128 | 824.20 | 823.8 | -18.11 | -13.00 | Pass |
| 251 | 848.80 | 849 | -17.15 | -13.00 | Pass |

| GPRS850 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 128 | 824.20 | 824 | -20.56 | -13.00 | Pass |
| 251 | 848.80 | 849 | -21.52 | -13.00 | Pass |

| EGPRS850 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 128 | 824.20 | 824 | -19.07 | -13.00 | Pass |
| 251 | 848.80 | 849. | -18.66 | -13.00 | Pass |

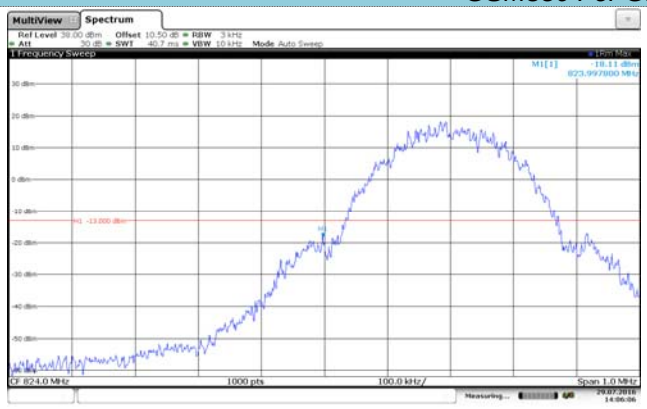
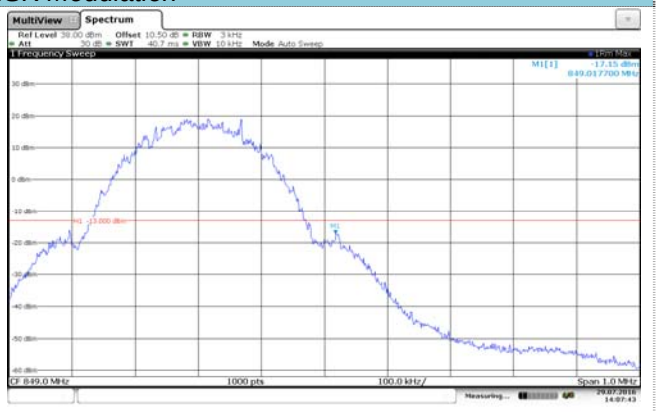
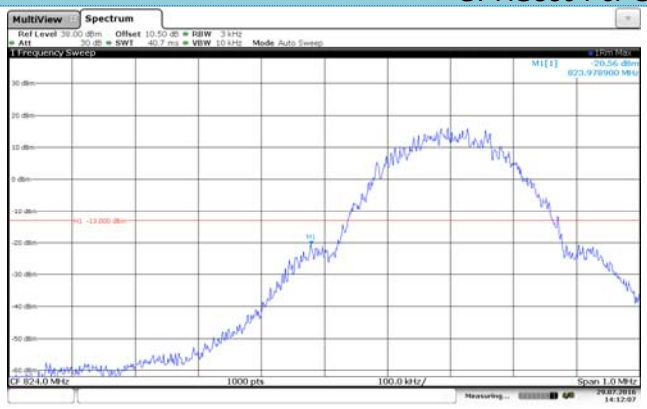
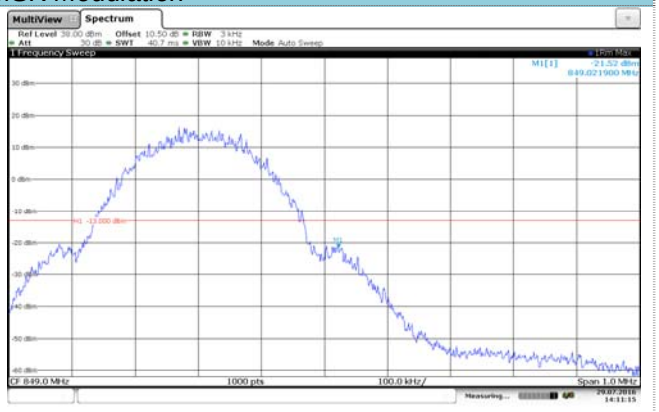
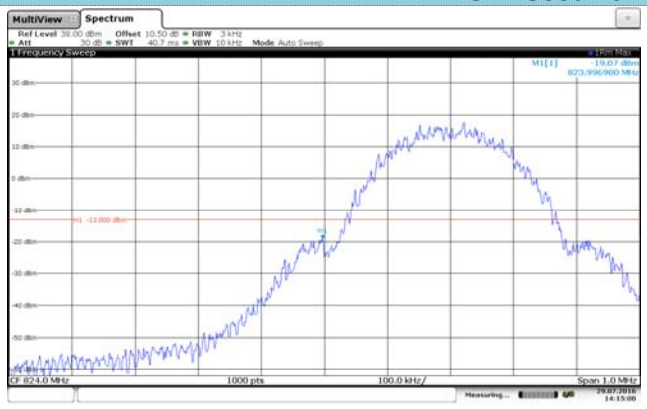
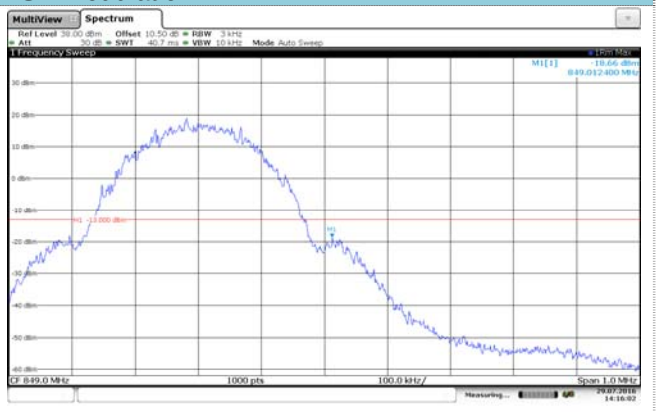
| PCS1900 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 512 | 1850.20 | 1850 | -17.37 | -13.00 | Pass |
| 810 | 1909.80 | 1910 | -19.19 | -13.00 | Pass |

| GPRS1900 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 512 | 1850.20 | 1850 | -15.94 | -13.00 | Pass |
| 810 | 1909.80 | 1910 | -17.04 | -13.00 | Pass |

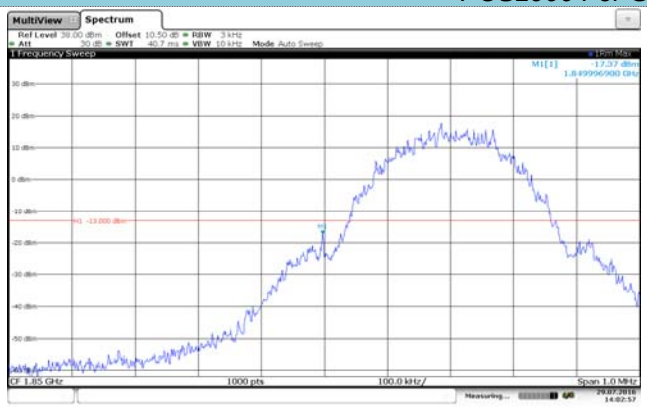
| EGPRS1900 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 512 | 1850.20 | 1850 | -20.43 | -13.00 | Pass |
| 810 | 1909.80 | 1910 | -18.58 | -13.00 | Pass |

| WCDMA Band II | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 9262 | 1852.4 | 1850 | -30.43 | -13.00 | Pass |
| 9538 | 1907.6 | 1910 | -33.72 | -13.00 | Pass |

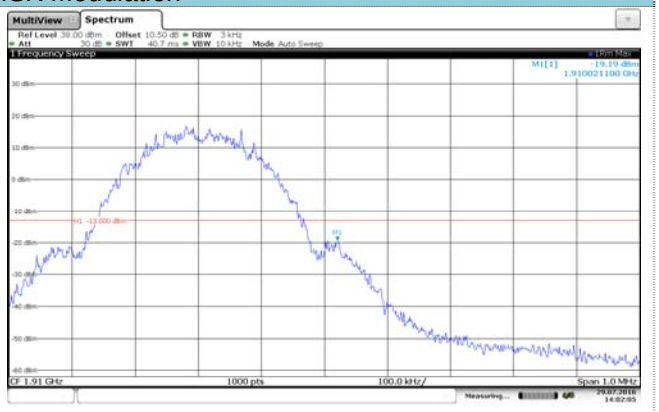
| WCDMA Band V | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 4132 | 826.4 | 824 | -29.81 | -13.00 | Pass |
| 4233 | 846.6 | 849 | -31.12 | -13.00 | Pass |

| GSM850 For GMSK Moudlation | |
|---|---|
|  |  |
| Channel 128 | Channel 251 |
| **GPRS850 For GMSK Moudlation** | |
|  |  |
| Channel 128 | Channel 251 |
| **EGPRS850 For GMSK Moudlation** | |
|  |  |
| Channel 128 | Channel 251 |

*PCS1900 For GMSK Moudlation*

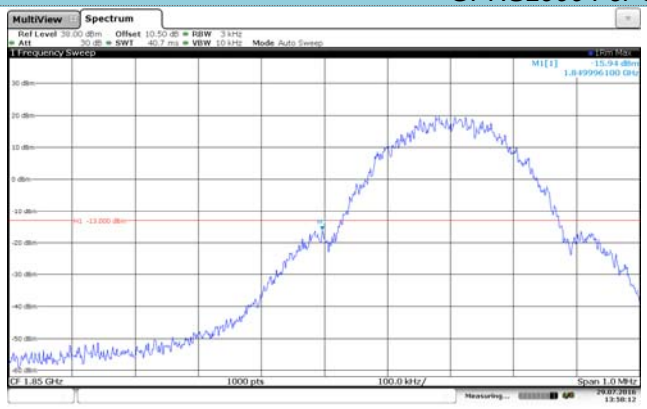


*Channel 512*

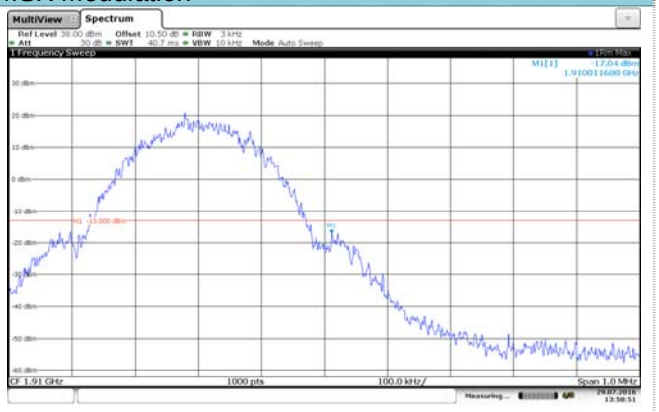


*Channel 810*

*GPRS1900 For GMSK Moudlation*

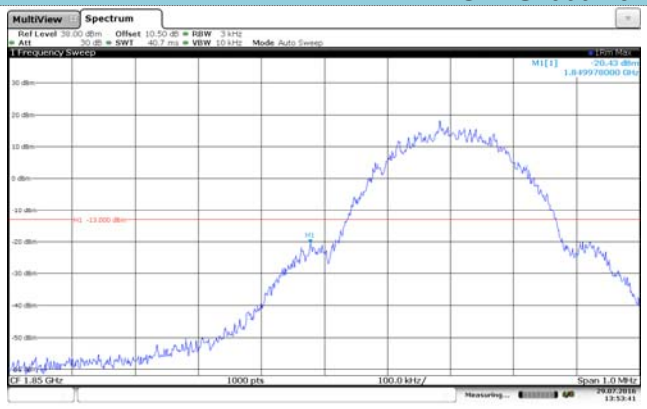


*Channel 512*

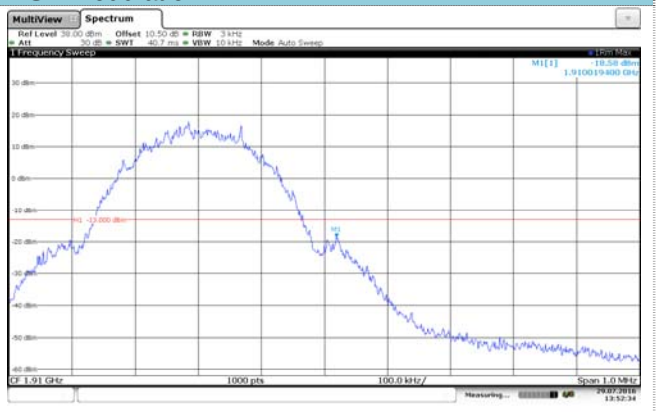


*Channel 810*

*EGPRS1900 For GMSK Moudlation*

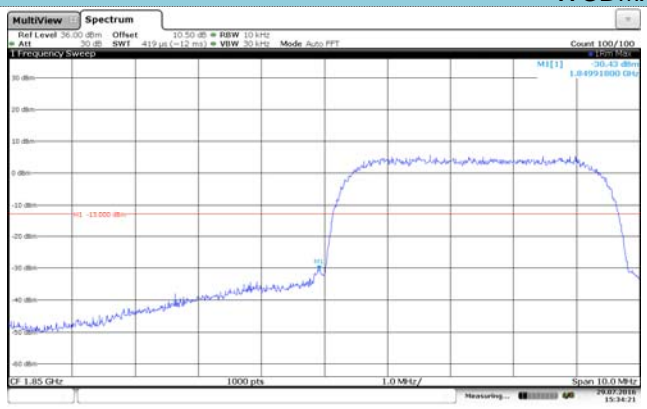


*Channel 512*

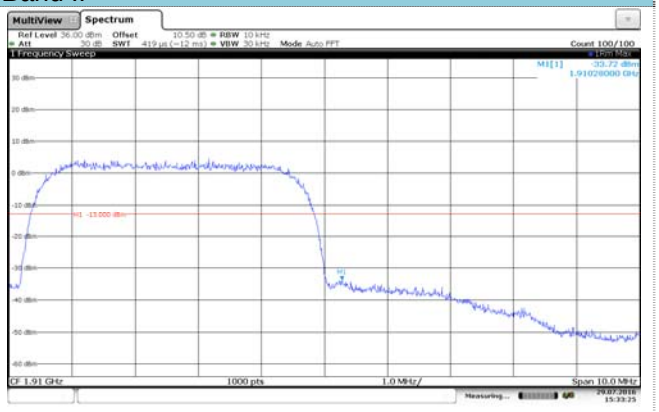


*Channel 810*

*WCDMA Band II*

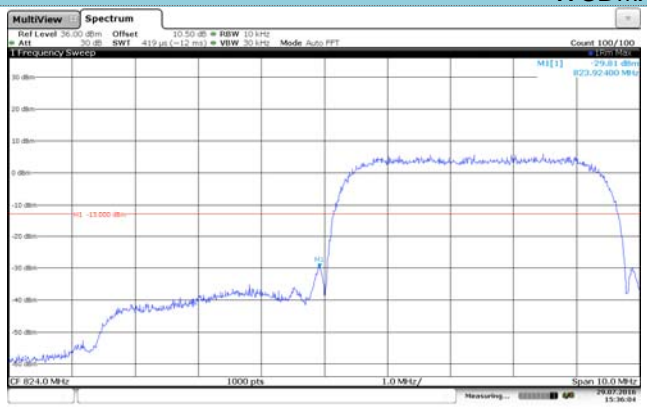



*Channel* 9262

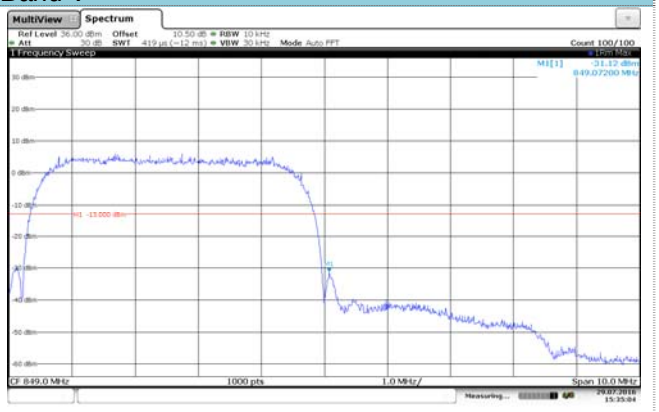



*Channel 9538*

*WCDMA Band V*




*Channel 4132*




*Channel 4233*

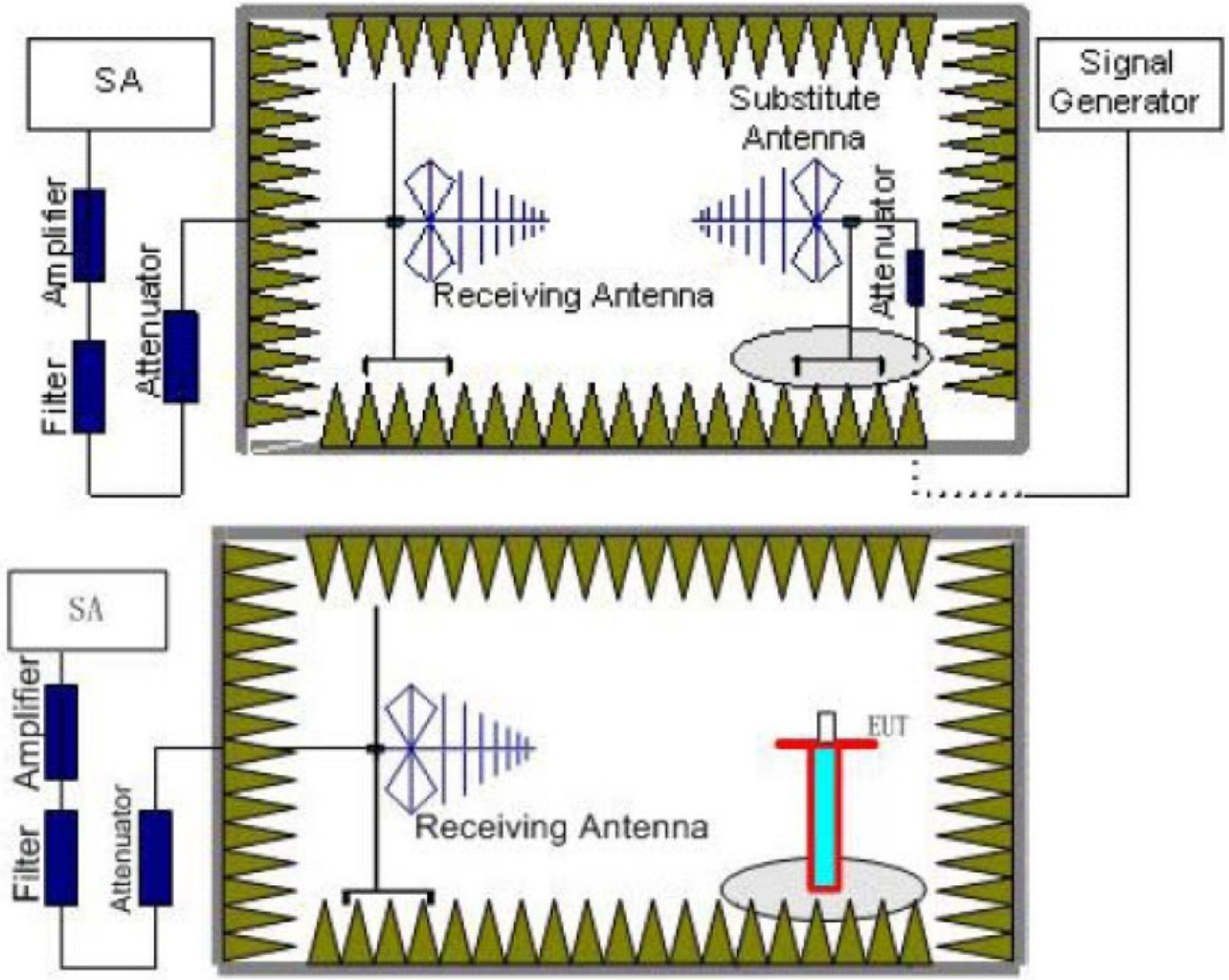
## 4.5. Radiated Power Measurement

**LIMIT**

GSM850/WCDMA Band V: 7W ERP

PCS1900/WCDMA Band II: 2W EIRP

**TEST CONFIGURATION**




**TEST PROCEDURE**

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz,, And the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver

reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:
   Power(EIRP)=PMea- PAg - Pcl + Ga
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
   ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

**TEST RESULTS**

GSM:

| Mode | Channel | Antenna Pol. | ERP | Limit (dBm) | Result |
|---|---|---|---|---|---|
| GSM850 | 128 | V | 29.02 | 38.45 | Pass |
| | | H | 19.59 | | |
| | 190 | V | 27.29 | | |
| | | H | 19.36 | | |
| | 251 | V | 28.92 | | |
| | | H | 20.67 | | |
| GPRS850 | 128 | V | 29.27 | 38.45 | Pass |
| | | H | 19.65 | | |
| | 190 | V | 27.15 | | |
| | | H | 19.42 | | |
| | 251 | V | 28.98 | | |
| | | H | 20.69 | | |
| EGPRS850 | 128 | V | 29.31 | 38.45 | Pass |
| | | H | 19.49 | | |
| | 190 | V | 27.24 | | |
| | | H | 19.79 | | |
| | 251 | V | 28.32 | | |
| | | H | 20.58 | | |

| Mode | Channel | Antenna Pol. | EIRP | Limit (dBm) | Result |
|---|---|---|---|---|---|
| PCS1900 | 512 | V | 26.75 | 33.01 | Pass |
| | | H | 28.49 | | |
| | 661 | V | 27.52 | | |
| | | H | 28.69 | | |
| | 810 | V | 24.58 | | |
| | | H | 28.83 | | |
| GPRS1900 | 512 | V | 26.25 | 33.01 | Pass |
| | | H | 28.39 | | |
| | 661 | V | 27.84 | | |
| | | H | 28.75 | | |
| | 810 | V | 25.25 | | |
| | | H | 28.21 | | |
| EGPRS 1900 | 512 | V | 26.37 | 33.01 | Pass |
| | | H | 28.02 | | |
| | 661 | V | 27.34 | | |
| | | H | 28.19 | | |
| | 810 | V | 24.23 | | |
| | | H | 28.38 | | |

WCDMA:

| Mode | Channel | Antenna Pol. | EIRP | Limit (dBm) | Result |
|---|---|---|---|---|---|
| WCDMA Band II | 9262 | V | 17.52 | 33.01 | Pass |
| | | H | 14.87 | | |
| | 9400 | V | 17.99 | | |
| | | H | 14.88 | | |
| | 9538 | V | 18.14 | | |
| | | H | 14.11 | | |

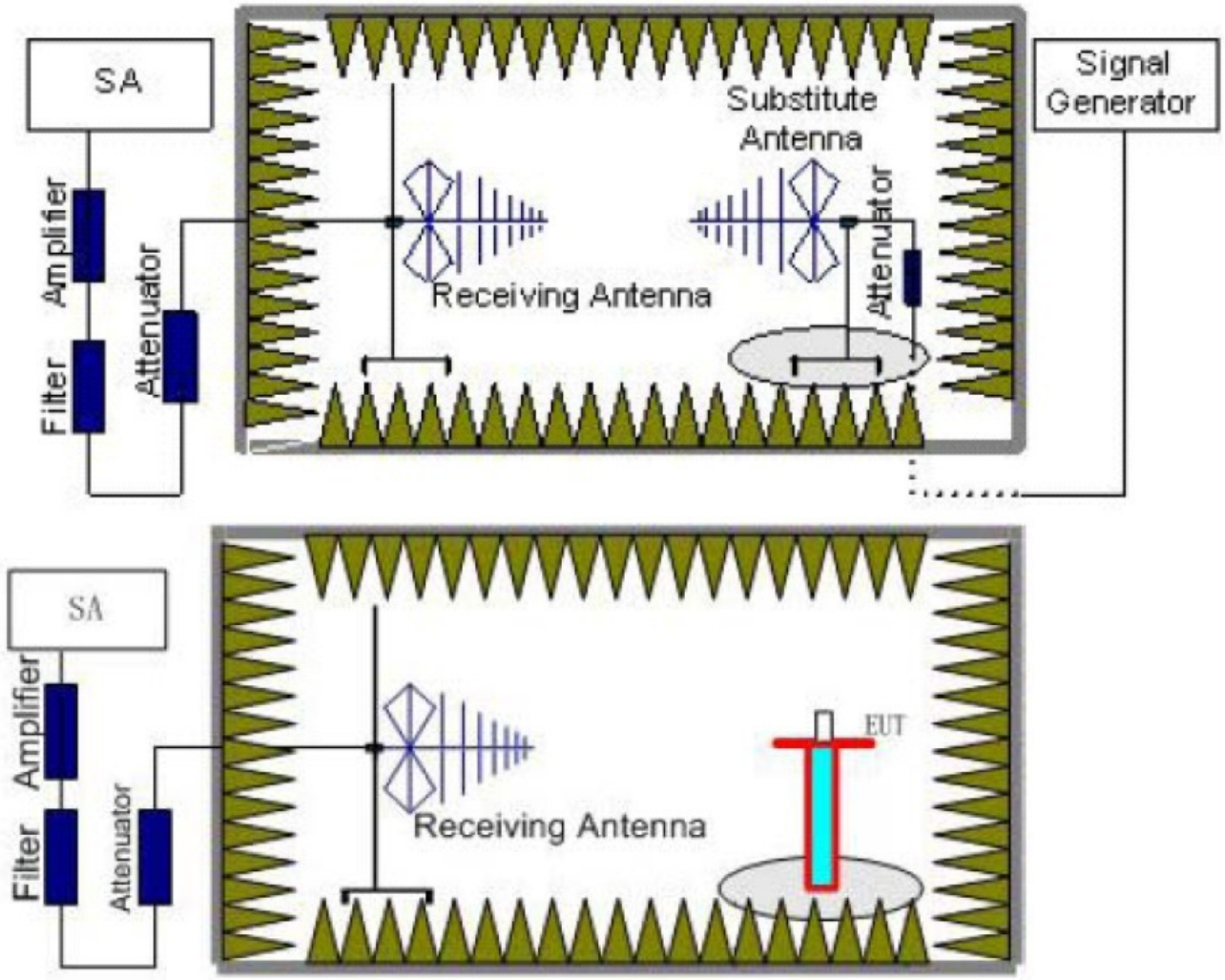
| Mode | Channel | Antenna Pol. | ERP | Limit (dBm) | Result |
|---|---|---|---|---|---|
| WCDMA Band V | 4132 | V | 21.14 | 38.45 | Pass |
| | | H | 20.81 | | |
| | 4183 | V | 18.38 | | |
| | | H | 19.42 | | |
| | 4233 | V | 18.84 | | |
| | | H | 18.89 | | |

## 4.6. Radiated Spurious Emssion

**LIMIT**

-13dBm

**TEST CONFIGURATION**




**TEST RESULTS**

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:
   Power(EIRP)=PMea- PAg - Pcl + Ga
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
   ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

**TEST RESULTS**

| GSM850 | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | | Polarization | Level (dBm) | | |
| 128 | 1648.40 | Vertical | -20.57 | -13.00 | Pass |
| | 2472.60 | V | -28.41 | | |
| | 3296.80 | V | -50.25 | | |
| | 4121.00 | V | -46.61 | | |
| | 4945.20 | V | --- | | |
| | 1648.40 | Horizontal | -18.97 | -13.00 | Pass |
| | 2472.60 | H | -25.73 | | |
| | 3296.80 | H | -50.15 | | |
| | 4121.00 | H | -50.24 | | |
| | 4945.20 | H | --- | | |
| 190 | 1673.20 | Vertical | -47.36 | -13.00 | Pass |
| | 2509.80 | V | -24.57 | | |
| | 3346.40 | V | -50.36 | | |
| | 4183.00 | V | -49.19 | | |
| | 5019.60 | V | --- | | |
| | 1673.20 | Horizontal | -37.65 | -13.00 | Pass |
| | 2509.80 | H | -28.48 | | |
| | 3346.40 | H | -50.65 | | |
| | 4183.00 | H | -48.09 | | |
| | 5019.60 | H | --- | | |
| 251 | 1697.60 | Vertical | -50.25 | -13.00 | Pass |
| | 2546.40 | V | -42.69 | | |
| | 3395.20 | V | -50.18 | | |
| | 4244.00 | V | -50.47 | | |
| | 5092.80 | V | --- | | |
| | 1697.60 | Horizontal | -50.36 | -13.00 | Pass |
| | 2546.40 | H | -36.62 | | |
| | 3395.20 | H | -50.72 | | |
| | 4244.00 | H | -50.36 | | |
| | 5092.80 | H | --- | | |

Remark：

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark”---“ means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| PCS1900 | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | | Polarization | Level (dBm) | | |
| 512 | 3700.40 | Vertical | -46.25 | -13.00 | Pass |
| | 5550.60 | V | -51.76 | | |
| | 7400.80 | V | -50.28 | | |
| | 9251.00 | V | -50.47 | | |
| | 11101.20 | V | --- | | |
| | 3700.40 | Horizontal | -47.31 | -13.00 | Pass |
| | 5550.60 | H | -48.49 | | |
| | 7400.80 | H | -50.25 | | |
| | 9251.00 | H | -50.47 | | |
| | 11101.20 | H | --- | | |
| 661 | 3760.00 | Vertical | -47.32 | -13.00 | Pass |
| | 5640.00 | V | -45.63 | | |
| | 7520.00 | V | -50.25 | | |
| | 9400.00 | V | -50.64 | | |
| | 11280.00 | V | --- | | |
| | 3760.00 | Horizontal | -50.47 | -13.00 | Pass |
| | 5640.00 | H | -49.52 | | |
| | 7520.00 | H | -50.38 | | |
| | 9400.00 | H | -50.65 | | |
| | 11280.00 | H | --- | | |
| 810 | 3819.60 | Vertical | -50.91 | -13.00 | Pass |
| | 5729.40 | V | -48.95 | | |
| | 7639.20 | V | -50.25 | | |
| | 9549.00 | V | -51.36 | | |
| | 11458.80 | V | --- | | |
| | 3819.60 | Horizontal | -49.71 | -13.00 | Pass |
| | 5729.40 | H | -43.72 | | |
| | 7639.20 | H | -50.25 | | |
| | 9549.00 | H | -50.47 | | |
| | 11458.80 | H | --- | | |

Remark：

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark”---“ means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| WCDMA Band II | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | | Polarization | Level (dBm) | | |
| 9262 | 3704.80 | Vertical | -46.84 | -13.00 | Pass |
| | 5557.20 | V | -49.86 | | |
| | 7409.60 | V | -52.38 | | |
| | 9262.00 | V | --- | | |
| | 3704.80 | Horizontal | -50.93 | -13.00 | Pass |
| | 5557.20 | H | -49.85 | | |
| | 7409.60 | H | -53.65 | | |
| | 9262.00 | H | --- | | |
| 9400 | 3760.00 | Vertical | -47.85 | -13.00 | Pass |
| | 5640.00 | V | -49.84 | | |
| | 7520.00 | V | -53.45 | | |
| | 9400.00 | V | --- | | |
| | 3760.00 | Horizontal | -49.83 | -13.00 | Pass |
| | 5640.00 | H | -49.26 | | |
| | 7520.00 | H | -52.45 | | |
| | 9400.00 | H | --- | | |
| 9538 | 3815.20 | Vertical | -45.74 | -13.00 | Pass |
| | 5722.80 | V | -48.52 | | |
| | 7630.40 | V | -53.43 | | |
| | 9538.00 | V | --- | | |
| | 3815.20 | Horizontal | -48.45 | -13.00 | Pass |
| | 5722.80 | H | -49.32 | | |
| | 7630.40 | H | -50.66 | | |
| | 9538.00 | H | --- | | |

Remark：

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark”---“ means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| WCDMA Band V | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | | Polarization | Level (dBm) | | |
| 4132 | 1652.80 | Vertical | -50.47 | -13.00 | Pass |
| | 2479.20 | V | -16.25 | | |
| | 3305.60 | V | -37.52 | | |
| | 4132.00 | V | --- | | |
| | 1652.80 | Horizontal | -46.17 | -13.00 | Pass |
| | 2479.20 | H | -36.52 | | |
| | 3305.60 | H | -37.99 | | |
| | 4132.00 | H | --- | | |
| 4183 | 1673.20 | Vertical | -48.74 | -13.00 | Pass |
| | 2509.80 | V | -17.52 | | |
| | 3346.40 | V | -38.45 | | |
| | 4183.00 | V | --- | | |
| | 1673.20 | Horizontal | -49.56 | -13.00 | Pass |
| | 2509.80 | H | -18.47 | | |
| | 3346.40 | H | -37.98 | | |
| | 4183.00 | H | --- | | |
| 4233 | 1693.20 | Vertical | -46.17 | -13.00 | Pass |
| | 2539.80 | V | -36.52 | | |
| | 3386.40 | V | -38.47 | | |
| | 4233.00 | V | --- | | |
| | 1693.20 | Horizontal | -46.47 | -13.00 | Pass |
| | 2539.80 | H | -34.62 | | |
| | 3386.40 | H | -46.25 | | |
| | 4233.00 | H | --- | | |

Remark：

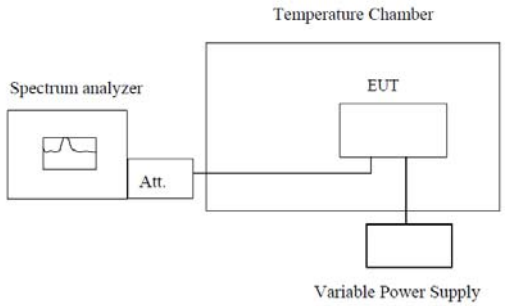
1. The emission behaviour belongs to narrowband spurious emission.
2. Remark”---“ means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

## 4.7. Frequency stability V.S. Temperature measurement

**LIMIT**

2.5ppm

**TEST CONFIGURATION**




**Note :** Measurement setup for testing on Antenna connector

**TEST PROCEDURE**

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to –30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

**TEST RESULTS**

| Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz | | | | | |
|---|---|---|---|---|---|
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 17 | 0.020 | 2.5 | Pass |
| | -20 | 22 | 0.026 | | |
| | -10 | 26 | 0.031 | | |
| | 0 | 27 | 0.032 | | |
| | 10 | 19 | 0.023 | | |
| | 20 | 21 | 0.025 | | |
| | 30 | 23 | 0.027 | | |
| | 40 | 25 | 0.030 | | |
| | 50 | 29 | 0.035 | | |
| Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 53 | 0.028 | 2.5 | Pass |
| | -20 | 49 | 0.026 | | |
| | -10 | 52 | 0.028 | | |
| | 0 | 36 | 0.019 | | |
| | 10 | 34 | 0.018 | | |
| | 20 | 46 | 0.024 | | |
| | 30 | 39 | 0.021 | | |
| | 40 | 37 | 0.020 | | |
| | 50 | 44 | 0.023 | | |

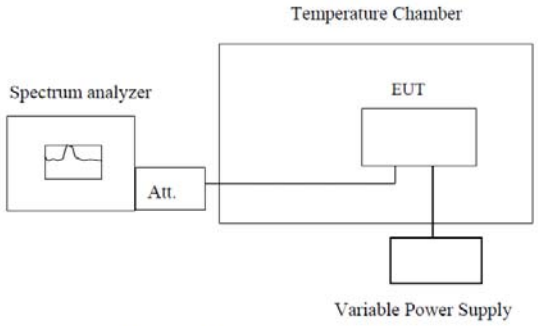
| Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz | | | | | |
|---|---|---|---|---|---|
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 21 | 0.011 | 2.5 | Pass |
| | -20 | 17 | 0.009 | | |
| | -10 | 18 | 0.010 | | |
| | 0 | 15 | 0.008 | | |
| | 10 | 19 | 0.010 | | |
| | 20 | 23 | 0.012 | | |
| | 30 | 25 | 0.013 | | |
| | 40 | 29 | 0.015 | | |
| | 50 | 31 | 0.016 | | |
| Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 21 | 0.025 | 2.5 | Pass |
| | -20 | 18 | 0.022 | | |
| | -10 | 17 | 0.020 | | |
| | 0 | 14 | 0.017 | | |
| | 10 | 15 | 0.018 | | |
| | 20 | 10 | 0.012 | | |
| | 30 | 11 | 0.013 | | |
| | 40 | 19 | 0.023 | | |
| | 50 | 18 | 0.022 | | |

## 4.8. Frequency stability V.S. Voltage measurement

**LIMIT**

2.5ppm

**TEST CONFIGURATION**




**Note :** Measurement setup for testing on Antenna connector

**TEST PROCEDURE**

1. Set chamber temperature to 25℃. Use a variable DC power source to power the EUT and set the voltage to rated voltage.
2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.

**TEST RESULTS**

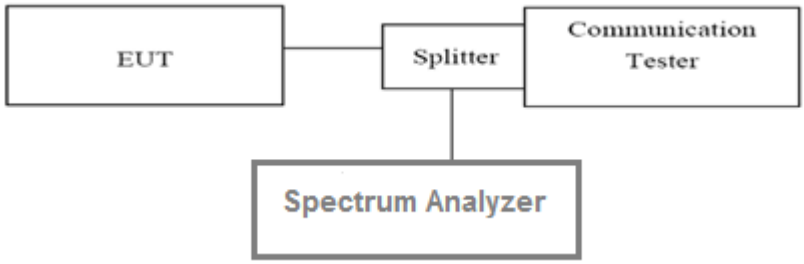
| Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 19 | 0.023 | 2.5 | Pass |
| | 3.70 | 21 | 0.025 | | |
| | 3.60 | 25 | 0.030 | | |
| Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz | | | | | |
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 43 | 0.023 | 2.5 | Pass |
| | 3.70 | 46 | 0.024 | | |
| | 3.60 | 39 | 0.021 | | |
| Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz | | | | | |
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 28 | 0.015 | 2.5 | Pass |
| | 3.70 | 23 | 0.012 | | |
| | 3.60 | 24 | 0.013 | | |
| Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz | | | | | |
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 18 | 0.022 | 2.5 | Pass |
| | 3.70 | 10 | 0.012 | | |
| | 3.60 | 15 | 0.018 | | |

## 4.9. Peak-Average Ratio

**LIMIT**

13dB

**TEST CONFIGURATION**




**TEST PROCEDURE**

According with KDB 971168
1. The signal analyzer' s CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals(>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal " RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the " on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

**TEST RESULTS**

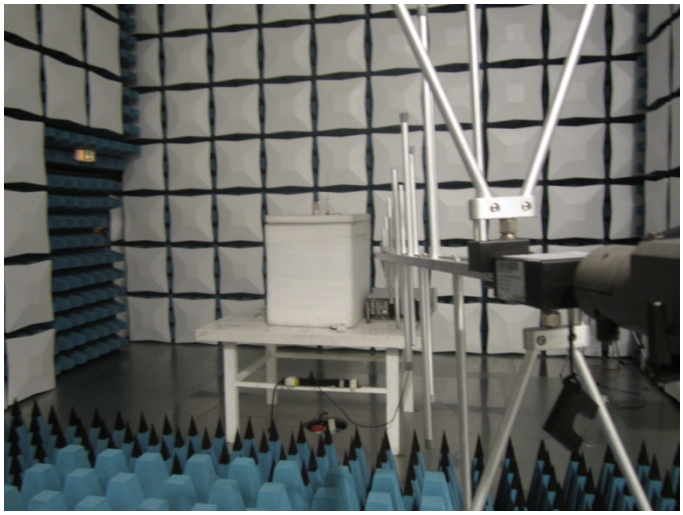
**Worst case GSM1900,WCDMA BAND1700,WCDMA BAND1900**

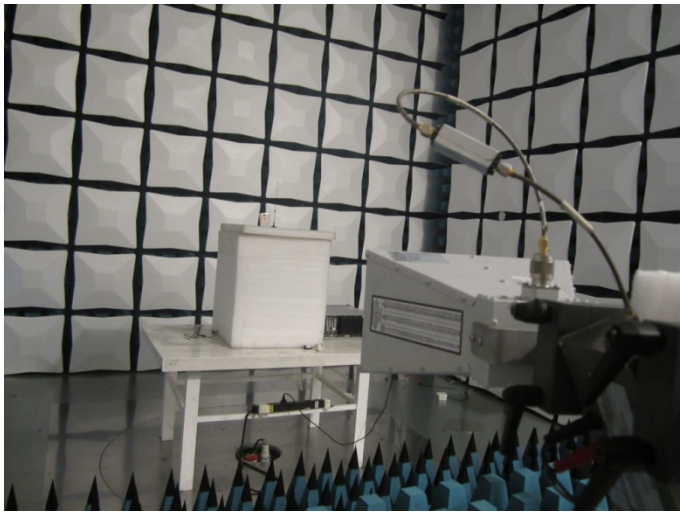
| Band | Channel | Frequency(MHz) | PAR | Limit(dB) | Result |
|---|---|---|---|---|---|
| GSM1900 | 512 | 1850.2 | 7.92 | 13 | Pass |
| | 661 | 1880.0 | 9.67 | 13 | Pass |
| | 810 | 1909.8 | 9.39 | 13 | Pass |

| Band | Channel | Frequency(MHz) | PAR | Limit(dB) | Result |
|---|---|---|---|---|---|
| WCDMA BAND II | 9262 | 1852.4 | 3.73 | 13 | Pass |
| | 9400 | 1880.0 | 3.67 | 13 | Pass |
| | 9538 | 1907.6 | 3.70 | 13 | Pass |

# 5. Test Setup Photos of the EUT

Radiated emission:

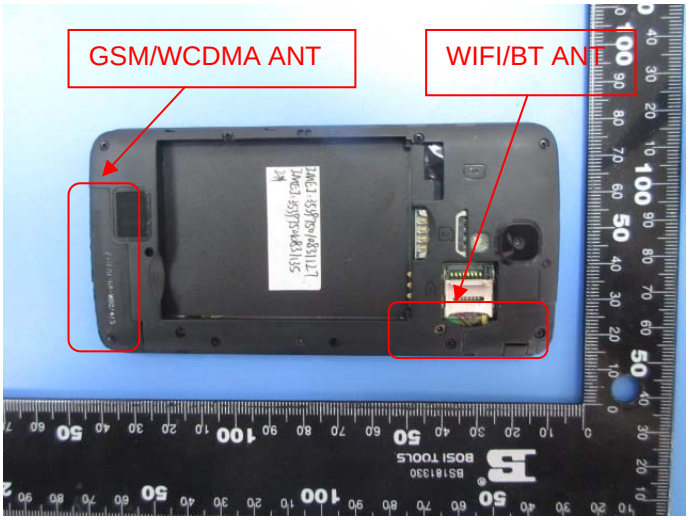


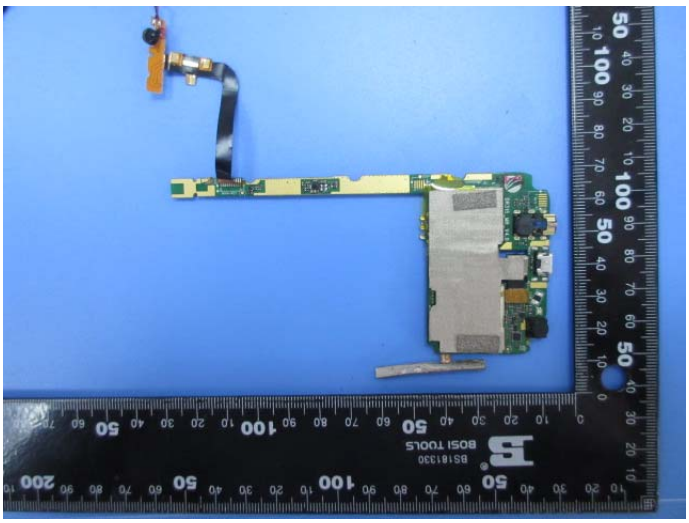


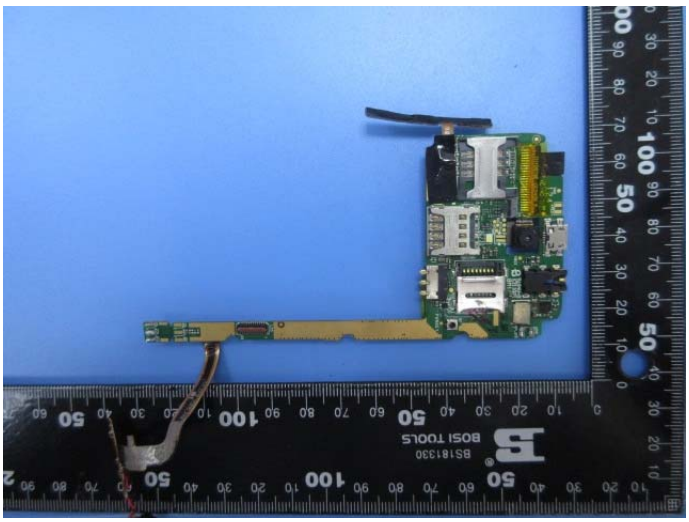
# 6. External and Internal Photos of the EUT

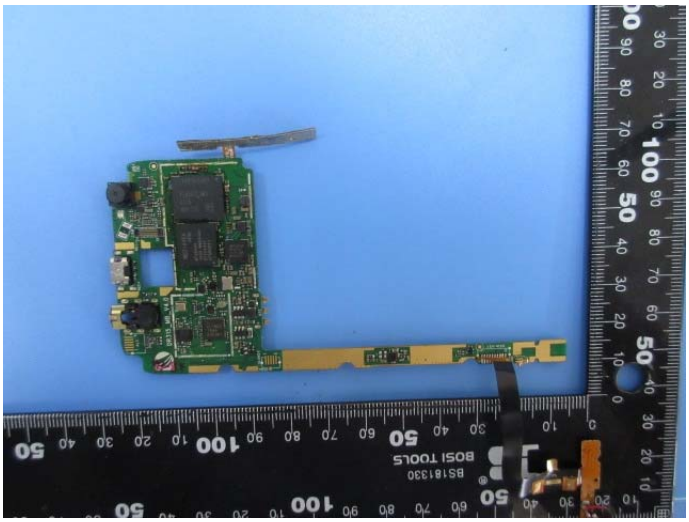
## External photos of the EUT

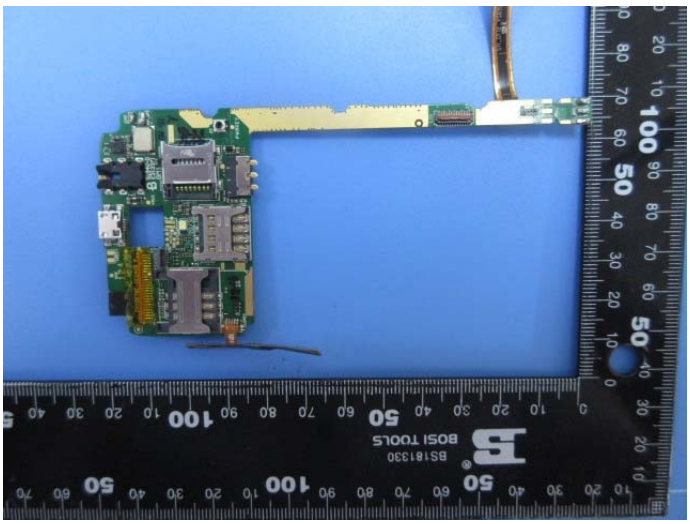
# Internal photos of the EUT

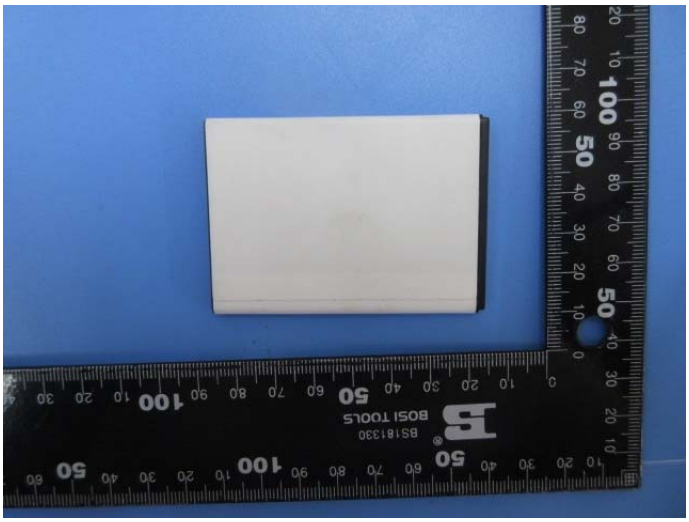










.....End of Report.....