# TEST REPORT

## No. I17N00068-GSM

**for**

**Power Idea Technology (Shenzhen) Co., Ltd.**

**TD-LTE digital mobile phone**

**Model Name: RG730**

**IC: 11113A-RG730**

**with**

**Hardware Version: 1.04**

**Software Version: RG730_US_25_V1.01_V02W_20161205**

**Issued Date: 2017-03-06**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

**Test Laboratory:**

***IC O.A.T.S listed: No.21856***

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# REPORT HISTORY

| Report Number | Revision | Description | Issue Date |
|---|---|---|---|
| I17N00068-GSM | Rev.0 | 1st edition | 2017-03-06 |

NOTE: All the original values of this report quoted directly from No.I17N00067.

# CONTENTS

# 1. Test Laboratory

## 1.1. Testing Location

| | |
|---|---|
| Company Name: | CTTL ShenZhen,Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT |
| Address: | TCL International E city No. 1001 Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong, China |
| Postal Code: | 518048 |
| Telephone: | +86(755)33322000 |
| Fax: | +86(755)33322000 |

## 1.2. Testing Environment

| | |
|---|---|
| Normal Temperature: | 15-35℃ |
| Relative Humidity: | 20-75% |
| Air pressure | 980 - 1040 hPa |

The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

## 1.3. Project data

| | |
|---|---|
| Testing Start Date: | 2017-01-19 |
| Testing End Date: | 2017-02-28 |

## 1.4. Signature

Lai Minghua
**(Prepared this test report)**

Yang Zi'an
**(Reviewed this test report)**

Zhang Bojun
**Deputy Director of the laboratory**
**(Approved this test report)**

# 2. Client Information

## 2.1. Applicant Information

| | |
|---|---|
| Company Name: | Power Idea Technology (Shenzhen) Co., Ltd. |
| Address /Post: | 4th Floor, A Section, Languang Science&technology Building, No.7 Xinxi RD, Hi-Tech Industrial Park North, Nanshan District, ShenZhen, P.R.C. |
| Contact Person: | alex.ma |
| Contact Email | alex.ma@pwidea.com |
| Telephone: | 0086-0755-86220211 |
| Fax: | / |

## 2.2. Manufacturer Information

| | |
|---|---|
| Company Name: | Power Idea Technology (Shenzhen) Co., Ltd. |
| Address /Post: | 4th Floor, A Section, Languang Science&technology Building, No.7 Xinxi RD, Hi-Tech Industrial Park North, Nanshan District, ShenZhen, P.R.C. |
| Contact Person: | alex.ma |
| Contact Email | alex.ma@pwidea.com |
| Telephone: | 0086-0755-86220211 |
| Fax: | / |

# 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

## 3.1. About EUT

| | |
|---|---|
| Description | TD-LTE digital mobile phone |
| Model Name | RG730 |
| IC | 11113A-RG730 |
| Antenna | Integrated |
| RF power setting in TEST SW | RG730_US_25_V1.01_V02W_20161205 |
| Extreme vol. Limits | 3.6VDC to 4.2VDC (nominal: 3.7VDC) |
| Extreme temp. Tolerance | -30°C to +50°C |

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

## 3.2. Internal Identification of EUT used during the test

| EUT ID* | IMEI | HW Version | SW Version | Sample Arrival Date |
|---|---|---|---|---|
| S01 | 867453021949725 | 1.04 | RG730_US_25_V1.01_V02W_20161205 | 2017-01-19 |

*EUT ID: is used to identify the test sample in the lab internally.

## 3.3. Internal Identification of AE used during the test

| AE ID* | Description |
|---|---|
| AE1 | Battery |
| AE2 | Charger |

AE1

| | |
|---|---|
| Model | Li-ion Rechargeable Battery |
| Manufacturer | Springpower Technology (Shenzhen) Co., LTD |
| Capacitance | 3020mAh |

AE2

| | |
|---|---|
| Model | HKC0055010-2D |
| Manufacturer | SHENZHEN HUNTKEY ELECTRIC CO., LTD |

*AE ID: is used to identify the test sample in the lab internally.

## 3.4. General Description

The Equipment Under Test (EUT) is a model TD-LTE mobile phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test.

# 4. Reference Documents

## 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

| Reference | Title | Version |
|---|---|---|
| RSS-Gen | RSS-Gen —General Requirements for Compliance of Radio Apparatus | Issue 4 |
| RSS-132 | Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz | Issue 3 |
| RSS-133 | 2 GHz Personal Communications Services | Issue 6 |
| ANSI/TIA-603-D | Land Mobile FM or PM Communications Equipment Measurement and Performance Standards | 2010 |
| ANSI C63.4 | Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz | 2014 |
| KDB 971168 D01 | Power Meas License Digital Systems | v02r02 |
| ANSI C63.26 | American National Standard of Procedures for Compliance Testing of Licensed Transmitters Used in Licensed Radio Service | 2015 |

# 5. LABORATORY ENVIRONMENT

**Control room / conducted chamber** did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ˚C, Max. = 35 ˚C |
| Relative humidity | Min. =20 %, Max. = 80 % |
| Shielding effectiveness | > 110 dB |
| Electrical insulation | > 2 MΩ |
| Ground system resistance | < 0.5 Ω |

**Fully-anechoic chamber 2** (8.6 meters×6.1 meters×3.85 meters) did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ˚C**,** Max. = 30 ˚C |
| Relative humidity | Min. = 35 %**,** Max. = 60 % |
| Shielding effectiveness | > 110 dB |
| Electrical insulation | > 2 MΩ |
| Ground system resistance | < 1 Ω |
| Site voltage standing-wave ratio ($S_{VSWR}$) | Between 0 and 6 dB, from 1GHz to 18GHz |
| Uniformity of field strength | Between 0 and 6 dB, from 80 to 4000 MHz |

**Semi-anechoic chamber 2 / Fully-anechoic chamber 3** (10 meters×6.7 meters×6.15 meters) did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ˚C**,** Max. = 30 ˚C |
| Relative humidity | Min. = 35 %**,** Max. = 60 % |
| Shielding effectiveness | > 100 dB |
| Electrical insulation | > 2 MΩ |
| Ground system resistance | < 0.5 Ω |
| Normalised site attenuation (NSA) | **<** ±3.5 dB, 3 m distance |
| Site voltage standing-wave ratio ($S_{VSWR}$) | Between 0 and 6 dB, from 1GHz to 18GHz |
| Uniformity of field strength | Between 0 and 6 dB, from 80 to 3000 MHz |

# 6. SUMMARY OF TEST RESULTS

**GSM 850**

| Items | Test Name | Clause in IC rules RSS-Gen and RSS-132 | Section in this report | Verdict |
|---|---|---|---|---|
| 1 | Output Power | 4.4 | A.1 | P |
| 2 | Emission Limit | 4.5 | A.2 | P |
| 3 | Frequency Stability | 4.3 | A.3 | P |
| 4 | Occupied Bandwidth | 4.1/4.6.1 | A.4 | P |
| 5 | Emission Bandwidth | 4.6.1 | A.5 | P |
| 6 | Band Edge Compliance | 4.5 | A.6 | P |
| 7 | Conducted Spurious Emission | 4.5 | A.7 | P |
| 8 | peak-to-average power ratio | 5.4 | A.8 | P |

**PCS 1900**

| Items | Test Name | Clause in IC rules RSS-Gen and RSS- 133 | Section in this report | Verdict |
|---|---|---|---|---|
| 1 | Output Power | 6.4 | A.1 | P |
| 2 | Emission Limit | 6.5 | A.2 | P |
| 3 | Frequency Stability | 6.3 | A.3 | P |
| 4 | Occupied Bandwidth | 4.1/4.6.1 | A.4 | P |
| 5 | Emission Bandwidth | 4.6.1 | A.5 | P |
| 6 | Band Edge Compliance | 6.5 | A.6 | P |
| 7 | Conducted Spurious Emission | 6.5 | A.7 | P |
| 8 | peak-to-average power ratio | 6.4 | A.8 | P |

**Receiver Radiated Emission**

| Items | Test Name | Clause in IC rules | | Section in this report | Verdict |
|---|---|---|---|---|---|
| | | RSS-132 | RSS-133 | | |
| 9 | Receiver Radiated Emissions | 4.6 | 6.6 | A.9 | P |

## 7. Test Equipments Utilized

| NO. | Description | TYPE | Manufacture | series number | CAL DUE DATE |
|---|---|---|---|---|---|
| 1 | Test Receiver | ESR7 | R&S | 101675 | 2017-07-21 |
| 2 | BiLog Antenna | VULB9163 | Schwarzbeck | 9163 330 | 2017-04-22 |
| 3 | Horn Antenna | 3117 | ETS-Lindgren | 00066585 | 2019-03-05 |
| 4 | Antenna | SBA 9113 | 814 | Schwarzbeck | / |
| 5 | Antenna | SBA 9112 | 302 | Schwarzbeck | / |
| 6 | Antenna | 3160-09 | LM4750/00118388 | ETS-Lindgren | 2018.07.14 |
| 7 | preamplifier | 83017A | MY39501110 | Agilent | / |
| 8 | Signal Generator | SMR40 | R&S | 100541 | 2017-06-27 |
| 9 | Fully Anechoic Chamber | FACT5-2.0 | ETS-Lindgren | 4166 | 2018-05-13 |
| 10 | Spectrum Analyzer | FSP40 | R&S | 100378 | 2017-12-15 |
| 11 | Universal Radio Communication Tester | CMU200 | R&S | 114544 | 2017-09-09 |
| 12 | Universal Radio Communication Tester | CMU200 | R&S | 123210 | 2017-12-25 |
| 13 | Spectrum Analyzer | FSU | R&S | 200679 | 2017-12-25 |
| 14 | Temperature Chamber | SH-241 | ESPECs | 92007516 | 2017-11-29 |
| 15 | DC Power Supply | U3606A | Agilent Technologies | MY50450012 | 2017-11-22 |

**Test software**

| Item | Name | Vesion |
|---|---|---|
| Radiated | EMC32 | Version 10.01.00 |

# ANNEX A: MEASUREMENT RESULTS

## A.1 OUTPUT POWER

### A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU-200) to ensure max power transmission and proper modulation.

This result contains output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

### A.1.2 Conducted

#### A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies, 1850.2 MHz, 1880.0MHz and 1909.8MHz for PCS1900 band; 824.4MHz, 836.6MHz and 848.8MHz for GSM850 band. (bottom, middle and top of operational frequency range).

**GSM850**

| | Power step | Nominal Peak output power (dBm) |
|---|---|---|
| GSM | 5 | 33dBm(2W) |
| GPRS | 3 | 33dBm(2W) |
| EGPRS | 6 | 27dBm(0.5W) |

**Measurement result**

**GSM(GMSK)**

| Frequency(MHz) | Power Step | Output power(dBm) |
|---|---|---|
| 824.2 | 5 | 32.29 |
| 836.6 | 5 | 32.41 |
| 848.8 | 5 | 32.49 |

**GPRS(GMSK，1Slot)**

| Frequency(MHz) | Power Step | Output power(dBm) |
|---|---|---|
| 824.2 | 3 | 32.27 |
| 836.6 | 3 | 32.38 |
| 848.8 | 3 | 32.48 |

**EGPRS(8PSK，1Slot)**

| Frequency(MHz) | Power Step | Output power(dBm) |
|---|---|---|
| 824.2 | 6 | 26.56 |
| 836.6 | 6 | 26.68 |
| 848.8 | 6 | 26.75 |

**PCS1900**

| | Power step | Nominal Peak output power (dBm) |
|---|---|---|
| GSM | 0 | 30dBm(1W) |
| GPRS | 3 | 30dBm(1W) |
| EGPRS | 5 | 26dBm(0.4W) |

**Measurement result**

**GSM(GMSK)**

| Frequency(MHz) | Power Step | Output power(dBm) |
|---|---|---|
| 1850.2 | 0 | 28.52 |
| 1880.0 | 0 | 28.76 |
| 1909.8 | 0 | 28.79 |

**GPRS(GMSK，1Slot)**

| Frequency(MHz) | Power Step | Output power(dBm) |
|---|---|---|
| 1850.2 | 3 | 28.51 |
| 1880.0 | 3 | 28.77 |
| 1909.8 | 3 | 28.78 |

**EGPRS(8PSK，1Slot)**

| Frequency(MHz) | Power Step | Output power(dBm) |
|---|---|---|
| 1850.2 | 5 | 25.02 |
| 1880.0 | 5 | 25.32 |
| 1909.8 | 5 | 25.36 |

### A.1.3 Radiated

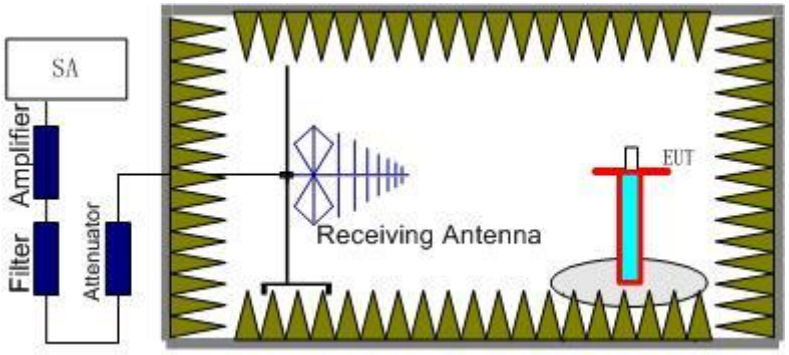
#### A.1.3.1 Description

This is the test for the maximum radiated power from the EUT.

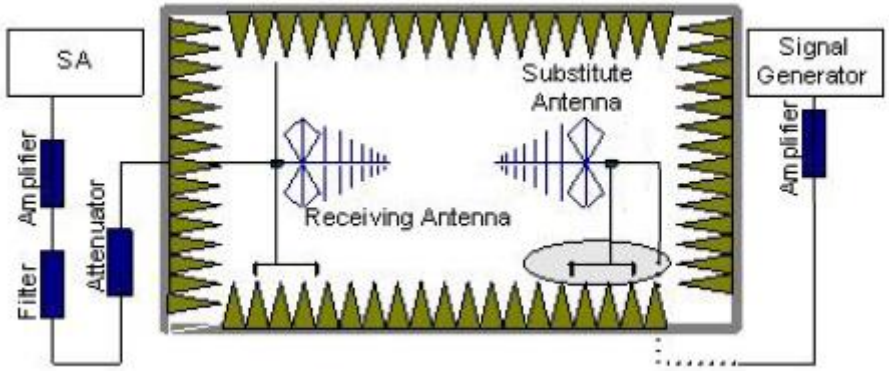
#### A.1.3.2 Method of Measurement

The measurements procedures in TIA-603-D-2010 are used.

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 1.5m. The test setup refers to figure below. 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. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.




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 ($P_{Mea}$) 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 ($P_r$). The power of signal source ($P_{Mea}$) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. 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 ($P_{cl}$) ,the Substitution Antenna Gain ($G_a$) and the Amplifier Gain ($P_{Ag}$) should be recorded after test.

The measurement results are obtained as described below:

Power(EIRP)=$P_{Mea}$- $P_{Ag}$ - $P_{cl}$ + $G_a$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

**GSM 850-ERP**

**Measurement result**

**GSM**

| Frequency(MHz) | $P_{Mea}$(dBm) | $P_{cl}$(dB)+ $P_{Ag}$(dB) | $G_a$ Antenna Gain(dB) | Correction (dB) | ERP(dBm) | Limit(dBm) | Polarization |
|---|---|---|---|---|---|---|---|
| **824.20** | **-3.37** | **-33.60** | **0.28** | **2.15** | **28.36** | **40.61** | **H** |
| 836.60 | -6.61 | -33.50 | 0.25 | 2.15 | 24.99 | 40.61 | H |
| 848.80 | -4.26 | -33.50 | 0.21 | 2.15 | 27.30 | 40.61 | H |

**GPRS**

| Frequency(MHz) | $P_{Mea}$(dBm) | $P_{cl}$(dB)+ $P_{Ag}$(dB) | $G_a$ Antenna Gain(dB) | Correction (dB) | ERP(dBm) | Limit(dBm) | Polarization |
|---|---|---|---|---|---|---|---|
| 824.20 | -5.42 | -33.60 | 0.28 | 2.15 | 26.31 | 40.61 | H |
| 836.60 | -6.93 | -33.50 | 0.25 | 2.15 | 24.67 | 40.61 | H |
| 848.80 | -5.04 | -33.50 | 0.21 | 2.15 | 26.52 | 40.61 | H |

**EGPRS-8PSK**

| Frequency(MHz) | $P_{Mea}$(dBm) | $P_{cl}$(dB)+ $P_{Ag}$(dB) | $G_a$ Antenna Gain(dB) | Correction (dB) | ERP(dBm) | Limit(dBm) | Polarization |
|---|---|---|---|---|---|---|---|
| 824.20 | -5.71 | -33.60 | 0.28 | 2.15 | 26.02 | 40.61 | H |
| 836.60 | -7.45 | -33.50 | 0.25 | 2.15 | 24.15 | 40.61 | H |
| 848.80 | -5.85 | -33.50 | 0.21 | 2.15 | 25.71 | 40.61 | H |

Frequency: 824.20MHz

Peak ERP(dBm)=$P_{Mea}$(-3.37dBm)-（$P_{cl}$+$P_{Ag}$）(-33.60dB)+$G_a$(0.28dB)-2.15dB=28.36Bm

**ANALYZER SETTINGS: RBW = VBW = 3MHz**

**PCS1900-EIRP**

**Measurement result**

**GSM**

| Frequency(MHz) | $P_{Mea}$(dBm) | $P_{cl}$(dB)+ $P_{Ag}$(dB) | $G_a$ Antenna Gain(dB) | EIRP(dBm) | Limit(dBm) | Polarization |
|---|---|---|---|---|---|---|
| 1850.20 | -5.93 | -29.40 | 0.15 | 23.62 | 33.00 | H |
| 1880.00 | -4.43 | -29.30 | 0.25 | 25.12 | 33.00 | H |
| 1909.80 | -4.29 | -29.30 | 0.35 | 25.36 | 33.00 | H |

**GPRS**

| Frequency(MHz) | $P_{Mea}$(dBm) | $P_{cl}$(dB)+ $P_{Ag}$(dB) | $G_a$ Antenna Gain(dB) | EIRP(dBm) | Limit(dBm) | Polarization |
|---|---|---|---|---|---|---|
| 1850.20 | -6.11 | -29.40 | 0.15 | 23.44 | 33.00 | H |
| 1880.00 | -4.29 | -29.30 | 0.25 | 25.26 | 33.00 | H |
| **1909.80** | **-3.88** | **-29.30** | **0.35** | **25.77** | **33.00** | **H** |

**EGPRS-8PSK**

| Frequency(MHz) | $P_{Mea}$(dBm) | $P_{cl}$(dB)+ $P_{Ag}$(dB) | $G_a$ Antenna Gain(dB) | EIRP(dBm) | Limit(dBm) | Polarization |
|---|---|---|---|---|---|---|
| 1850.20 | -7.09 | -29.40 | 0.15 | 22.46 | 33.00 | H |
| 1880.00 | -5.97 | -29.30 | 0.25 | 23.58 | 33.00 | H |
| 1909.80 | -5.91 | -29.30 | 0.35 | 23.74 | 33.00 | H |

Frequency**:** 1909.80MHz

Peak EIRP(dBm)= $P_{Mea}$(-3.88dBm) -（$P_{cl}$+$P_{Ag}$）(-29.30dB)+$G_a$ (0.35dB) =25.77dBm

**ANALYZER SETTINGS: RBW = VBW = 3MHz**

## A.2 EMISSION LIMIT

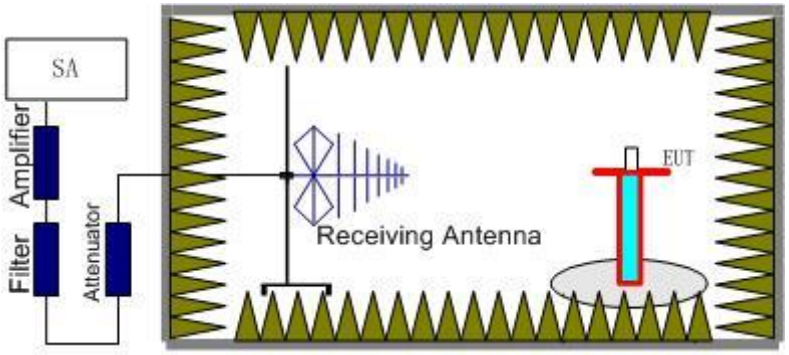
### A.2.1 Measurement Method

The measurement procedures in TIA-603-D-2010 are used.

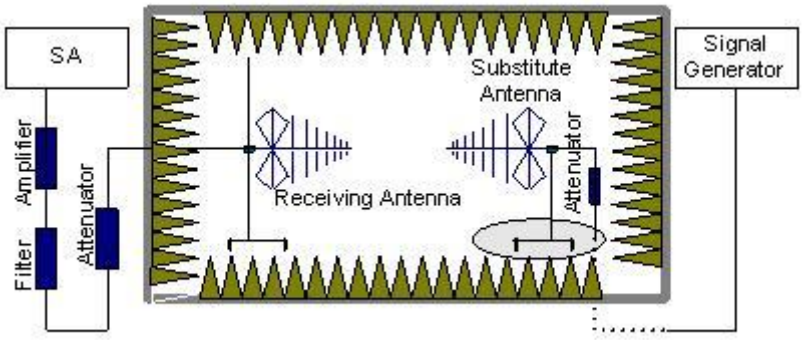
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of PCS1900 and GSM850.

**The procedure of radiated spurious emissions is as follows:**

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 1.5m. The test setup refers to figure below. 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 non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.




2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.




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 ($P_{Mea}$) 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 ($P_r$). The power of signal source ($P_{Mea}$) is recorded. The

test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss ($P_{pl}$) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain ($G_a$) should be recorded after test.
   A amplifier should be connected in for the test.
   The Path loss ($P_{pl}$) is the summation of the cable loss and the gain of the amplifier.
   The measurement results are obtained as described below:
   Power(EIRP)=$P_{Mea}$ - $P_{pl}$ + $G_a$
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

**A.2.2 Measurement Limit**

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.

**A.2.3 Measurement Results**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz) and GSM850 band (824.2MHz, 836.6MHz, 848.8MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the PCS1900 ,GSM850 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

**A.2.4 Measurement Results Table**

| Frequency | Channel | Frequency Range | Result |
|---|---|---|---|
| GSM 850MHz | Low | 30MHz-10GHz | Pass |
| | Middle | 30MHz-10GHz | Pass |
| | High | 30MHz-10GHz | Pass |
| GSM 1900MHz | Low | 30MHz-20GHz | Pass |
| | Middle | 30MHz-10GHz | Pass |
| | High | 30MHz-20GHz | Pass |

**A.2.5 Sweep Table**

| Working Frequency | Subrange (GHz) | RBW | VBW | Sweep time (s) |
|---|---|---|---|---|
| 850MHz | 0.03~1 | 100KHz | 300KHz | 10 |
| | 1-2 | 1 MHz | 3 MHz | 2 |
| | 2~5 | 1 MHz | 3 MHz | 3 |
| | 5~8 | 1 MHz | 3 MHz | 3 |
| | 8~10 | 1 MHz | 3 MHz | 3 |
| 1900MHz | 0.03~1 | 100KHz | 300KHz | 10 |
| | 1-2 | 1 MHz | 3 MHz | 2 |
| | 2~5 | 1 MHz | 3 MHz | 3 |
| | 5~8 | 1 MHz | 3 MHz | 3 |
| | 8~11 | 1 MHz | 3 MHz | 3 |
| | 11~14 | 1 MHz | 3 MHz | 3 |
| | 14~18 | 1 MHz | 3 MHz | 3 |
| | 18~20 | 1 MHz | 3 MHz | 2 |

**GSM Mode Channel 128/824.2MHz**

| Frequency(MHz) | $P_{Mea}$(dBm) | Path loss | Antenna Gain | Peak ERP(dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 7016.50 | -40.95 | 1.80 | -2.85 | -47.75 | -13.00 | V |
| 7640.00 | -41.65 | 1.80 | -2.58 | -48.18 | -13.00 | H |
| 8649.00 | -42.58 | 2.00 | -1.64 | -48.37 | -13.00 | V |
| 8976.50 | -42.28 | 2.10 | -1.58 | -48.11 | -13.00 | H |
| 9355.50 | -42.18 | 2.10 | -1.12 | -47.55 | -13.00 | V |
| 9593.50 | -43.07 | 2.10 | -0.92 | -48.24 | -13.00 | H |

**GSM Mode Channel 190/836.6MHz**

| Frequency(MHz) | $P_{Mea}$(dBm) | Path loss | Antenna Gain | Peak ERP(dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 8115.00 | -41.40 | 1.80 | -2.15 | -47.50 | -13.00 | V |
| 8165.50 | -41.24 | 1.80 | -2.15 | -47.34 | -13.00 | H |
| 8583.50 | -41.47 | 2.00 | -1.77 | -47.39 | -13.00 | H |
| 8729.50 | -41.71 | 2.00 | -1.63 | -47.49 | -13.00 | V |
| 8791.00 | -41.64 | 2.00 | -1.63 | -47.42 | -13.00 | V |
| 9389.00 | -41.94 | 2.10 | -1.12 | -47.31 | -13.00 | V |

**GSM Mode Channel 251/848.8MHz**

| Frequency(MHz) | $P_{Mea}$(dBm) | Path loss | Antenna Gain | Peak ERP(dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 7068.00 | -40.62 | 1.80 | -2.85 | -47.42 | -13.00 | V |
| 8072.00 | -42.00 | 1.80 | -2.18 | -48.13 | -13.00 | V |
| 8496.50 | -42.24 | 1.80 | -1.79 | -47.98 | -13.00 | H |
| 8606.50 | -41.80 | 2.00 | -1.64 | -47.59 | -13.00 | H |
| 8729.00 | -41.87 | 2.00 | -1.63 | -47.65 | -13.00 | V |
| 9411.50 | -42.49 | 2.10 | -0.86 | -47.60 | -13.00 | V |

**GSM Mode Channel 512/1850.2MHz**

| Frequency(MHz) | $P_{Mea}$(dBm) | Path loss | Antenna Gain | Peak ERP(dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 16877.16 | -34.23 | 2.90 | -0.26 | -37.39 | -13.00 | H |
| 17305.03 | -33.81 | 2.90 | -0.98 | -37.69 | -13.00 | H |
| 17444.16 | -33.51 | 3.20 | -1.08 | -37.79 | -13.00 | H |
| 17622.66 | -33.66 | 3.20 | -1.01 | -37.87 | -13.00 | H |
| 17778.84 | -33.19 | 3.20 | -0.75 | -37.14 | -13.00 | H |
| 17917.31 | -32.69 | 3.20 | -0.64 | -36.53 | -13.00 | H |

**GSM Mode Channel 661/1880.0MHz**

| Frequency(MHz) | $P_{Mea}$(dBm) | Path loss | Antenna Gain | Peak ERP(dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 16869.28 | -33.97 | 2.90 | -0.26 | -37.13 | -13.00 | H |
| 16953.28 | -34.04 | 2.90 | -0.50 | -37.44 | -13.00 | H |
| 17198.06 | -33.19 | 2.90 | -0.79 | -36.88 | -13.00 | H |
| 17452.03 | -31.92 | 3.20 | -1.08 | -36.20 | -13.00 | H |
| 17782.78 | -32.35 | 3.20 | -0.75 | -36.30 | -13.00 | H |
| 17923.88 | -31.93 | 3.20 | -0.64 | -35.77 | -13.00 | H |

**GSM Mode Channel 810/1909.8MHz**

| Frequency(MHz) | $P_{Mea}$(dBm) | Path loss | Antenna Gain | Peak ERP(dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 16826.63 | -33.01 | 2.90 | -0.26 | -36.17 | -13.00 | H |
| 17263.69 | -33.74 | 2.90 | -1.01 | -37.65 | -13.00 | H |
| 17446.78 | -33.38 | 3.20 | -1.08 | -37.66 | -13.00 | H |
| 17594.44 | -33.73 | 3.20 | -0.81 | -37.74 | -13.00 | H |
| 17772.28 | -33.34 | 3.20 | -0.75 | -37.29 | -13.00 | H |
| 17858.25 | -32.49 | 3.20 | -0.84 | -36.53 | -13.00 | H |

## A.3 FREQUENCY STABILITY

### A.3.1 Method of Measurement

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on mid channel of PCS 1900 and GSM850, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50℃ to -30℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

### A.3.2 Measurement Limit

#### A.3.2.1 For Hand carried battery powered equipment

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.6VDC and 4.2VDC, with a nominal voltage of 3.7VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

#### A.3.2.2 For equipment powered by primary supply voltage

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

### A.3.3 Measurement results

**GSM 850**

**Frequency Error vs Voltage**

| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
|---|---|---|
| 3.6 | -17 | 0.020 |
| 3.7 | -9 | 0.011 |
| 4.2 | -36 | 0.043 |

**Frequency Error vs Temperature**

| temperature(℃) | Frequency error(Hz) | Frequency error(ppm) |
|---|---|---|
| -30 | -8 | 0.010 |
| -20 | -2 | 0.002 |
| -10 | -14 | 0.017 |
| 0 | 2 | 0.002 |
| 10 | -13 | 0.016 |
| 20 | 5 | 0.006 |
| 30 | -9 | 0.011 |
| 40 | -34 | 0.041 |
| 50 | -7 | 0.008 |

**EGPRS 850 - 8PSK**

**Frequency Error vs Voltage**

| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
|---|---|---|
| 3.6 | 1 | 0.001 |
| 3.7 | -7 | 0.008 |
| 4.2 | -32 | 0.038 |

**Frequency Error vs Temperature**

| temperature(℃) | Frequency error(Hz) | Frequency error(ppm) |
|---|---|---|
| -30 | -8 | 0.010 |
| -20 | -19 | 0.023 |
| -10 | -22 | 0.026 |
| 0 | -6 | 0.007 |
| 10 | -12 | 0.014 |
| 20 | 4 | 0.005 |
| 30 | 7 | 0.008 |
| 40 | -26 | 0.031 |
| 50 | -31 | 0.037 |

**PCS 1900**

**Frequency Error vs Voltage**

| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
|---|---|---|
| 3.6 | 13 | 0.007 |
| 3.7 | 3 | 0.002 |
| 4.2 | 7 | 0.004 |

**Frequency Error vs Temperature**

| temperature(℃) | Frequency error(Hz) | Frequency error(ppm) |
|---|---|---|
| -30 | 21 | 0.011 |
| -20 | 18 | 0.010 |
| -10 | 27 | 0.014 |
| 0 | 9 | 0.005 |
| 10 | 6 | 0.003 |
| 20 | 11 | 0.006 |
| 30 | 14 | 0.007 |
| 40 | 3 | 0.002 |
| 50 | 27 | 0.014 |

**EGPRS 1900 - 8PSK**

**Frequency Error vs Voltage**

| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
|---|---|---|
| 3.6 | 32 | 0.017 |
| 3.7 | 10 | 0.005 |
| 4.2 | 8 | 0.004 |

**Frequency Error vs Temperature**

| temperature(℃) | Frequency error(Hz) | Frequency error(ppm) |
|---|---|---|
| -30 | 25 | 0.013 |
| -20 | 14 | 0.007 |
| -10 | 7 | 0.004 |
| 0 | 3 | 0.002 |
| 10 | 6 | 0.003 |
| 20 | 11 | 0.006 |
| 30 | 19 | 0.010 |
| 40 | 26 | 0.014 |
| 50 | 33 | 0.018 |

## A.4 OCCUPIED BANDWIDTH

**Reference**

IC: RSS-GEN 4.6.1

**A.4.1 Occupied Bandwidth Results**

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

The measurement method of IC is from RSS-GEN 4.6.1:

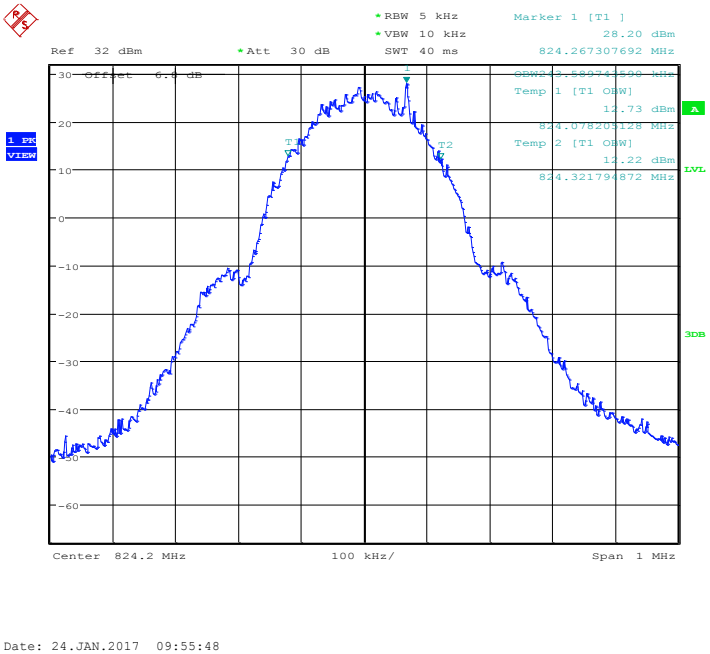
The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual. The trace data points are recovered and directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

**GSM 850(99% BW)**

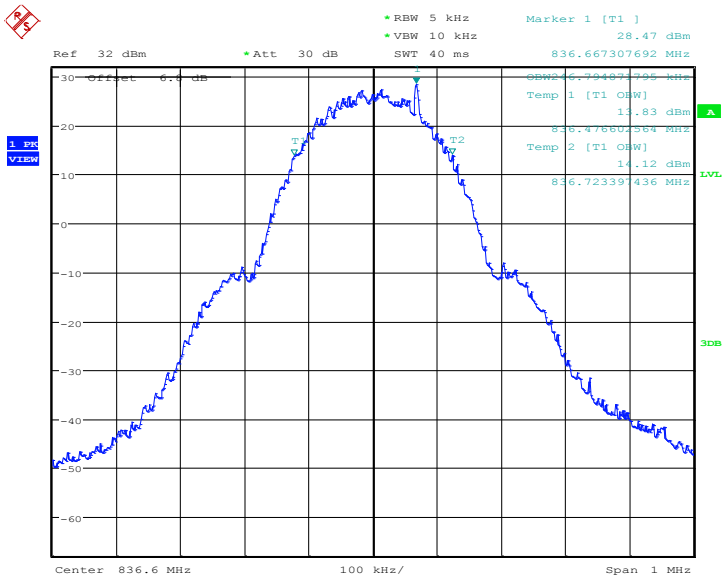
| Frequency(MHz) | Occupied Bandwidth (99% BW)( kHz) |
|---|---|
| 824.2 | 243.59 |
| 836.6 | 246.79 |
| 848.8 | 245.19 |

**GSM 850**

**Channel 128-Occupied Bandwidth (99% BW)**

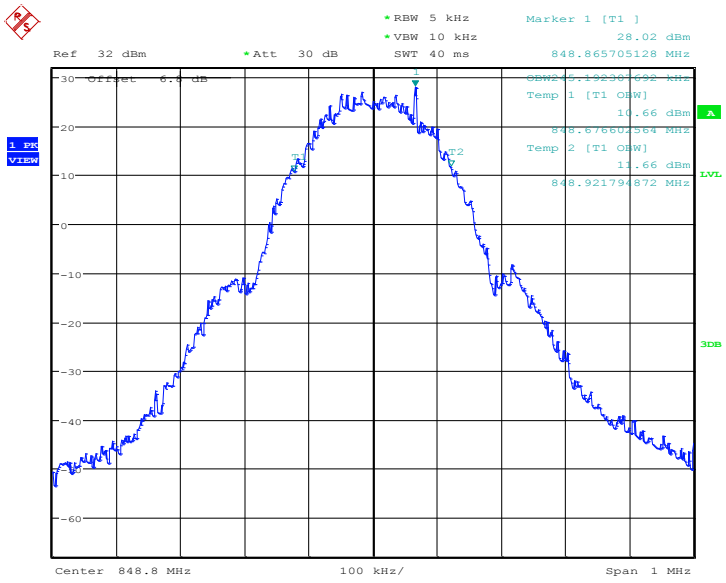


## Channel 190-Occupied Bandwidth (99% BW)




Date: 24.JAN.2017 09:54:34

## Channel 251-Occupied Bandwidth (99% BW)



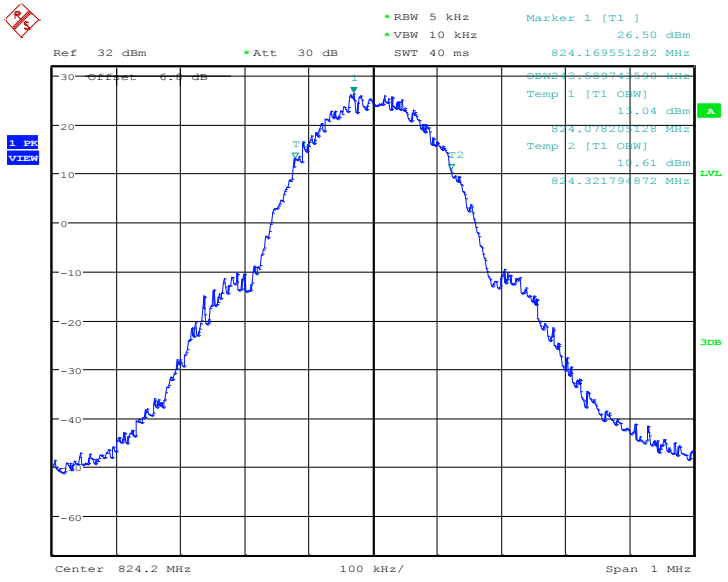

Date: 24.JAN.2017 09:49:36

**GPRS 850(99% BW)**

| Frequency(MHz) | Occupied Bandwidth (99% BW)( kHz) |
|---|---|
| 824.2 | 243.59 |
| 836.6 | 245.19 |
| 848.8 | 245.19 |

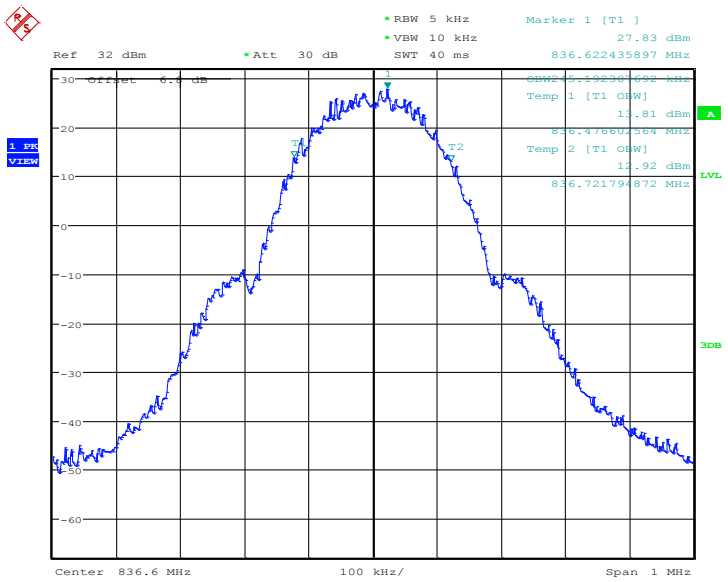
**GPRS 850**

**Channel 128-Occupied Bandwidth (99% BW)**



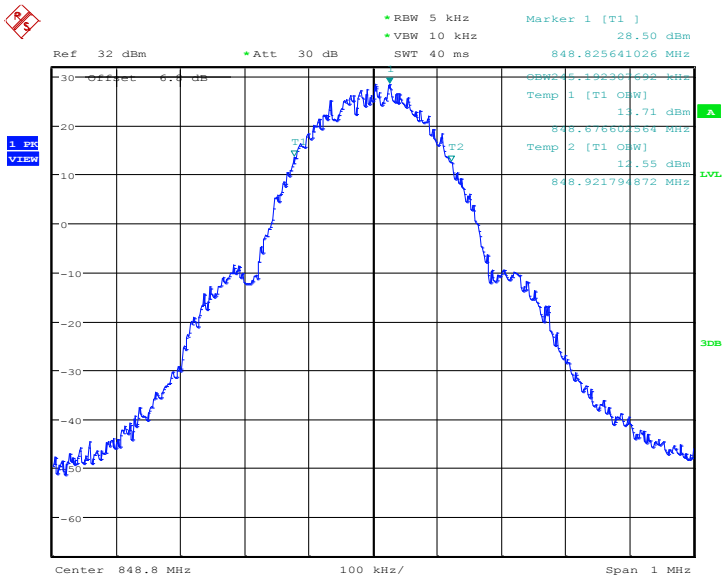

Date: 24.JAN.2017 09:27:57

**Channel 190-Occupied Bandwidth (99% BW)**




Date: 24.JAN.2017 09:29:40

## Channel 251-Occupied Bandwidth (99% BW)



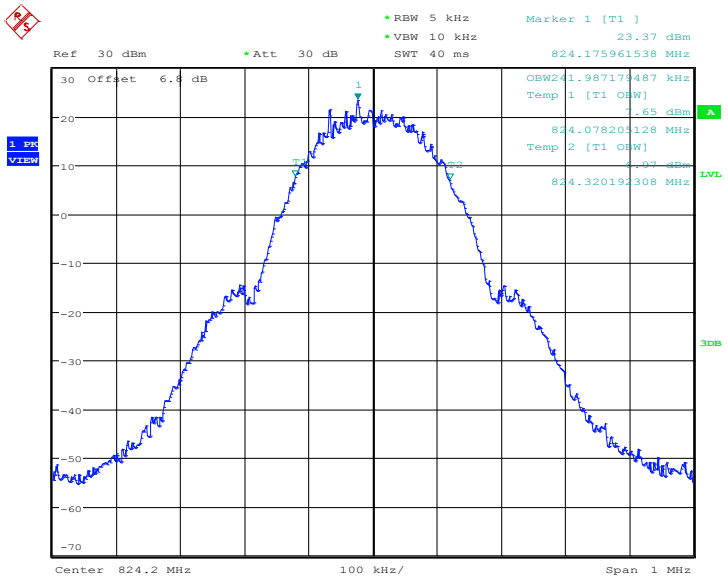

Date: 24.JAN.2017 09:34:23

**EGPRS 850-8PSK(99% BW)**

| Frequency(MHz) | Occupied Bandwidth (99% BW)( kHz) |
|---|---|
| 824.2 | 241.99 |
| 836.6 | 245.19 |
| 848.8 | 245.19 |

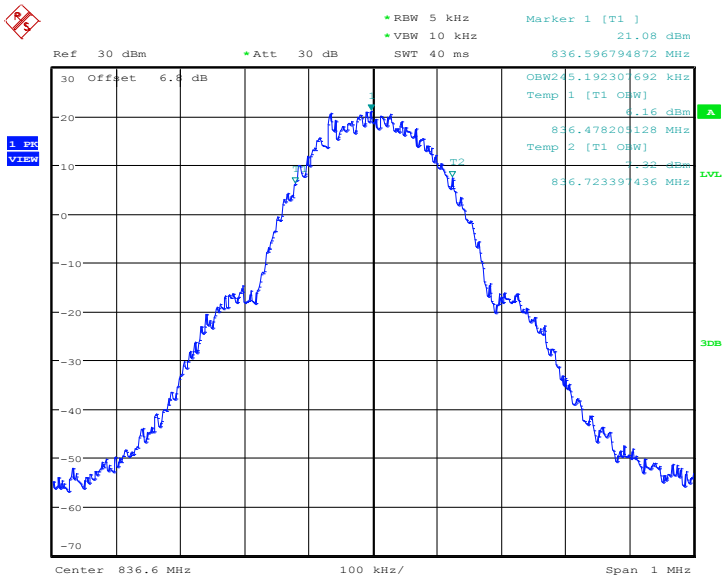
**EGPRS 850-8PSK**

**Channel 128-Occupied Bandwidth (99% BW)**



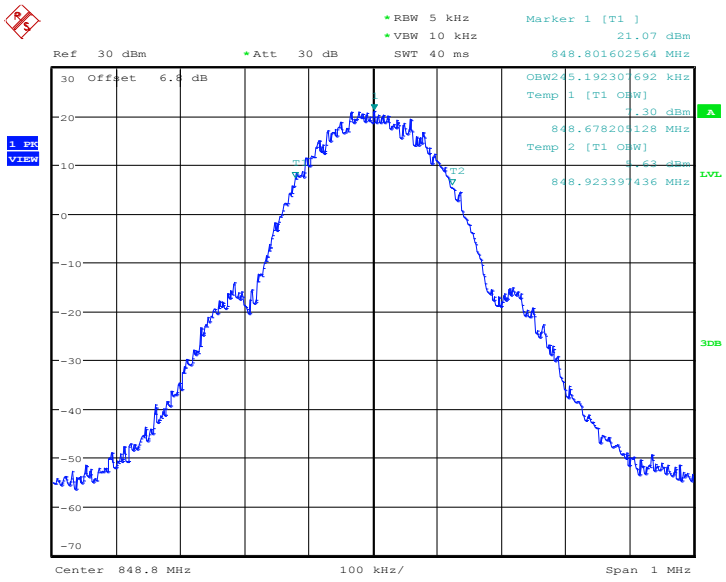

Date: 24.JAN.2017 09:20:50

**Channel 190-Occupied Bandwidth (99% BW)**




Date: 24.JAN.2017 09:19:25

## Channel 251-Occupied Bandwidth (99% BW)



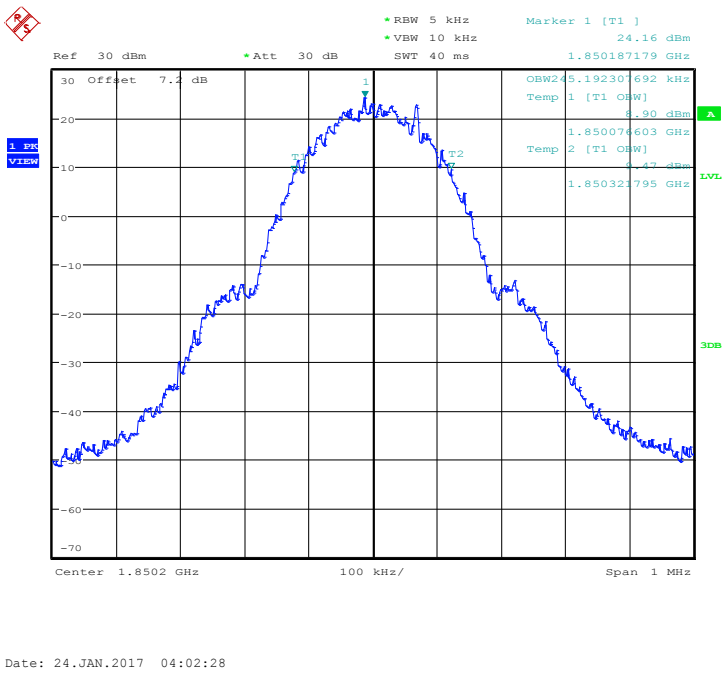

Date: 24.JAN.2017 09:16:01

**PCS 1900(99% BW)**

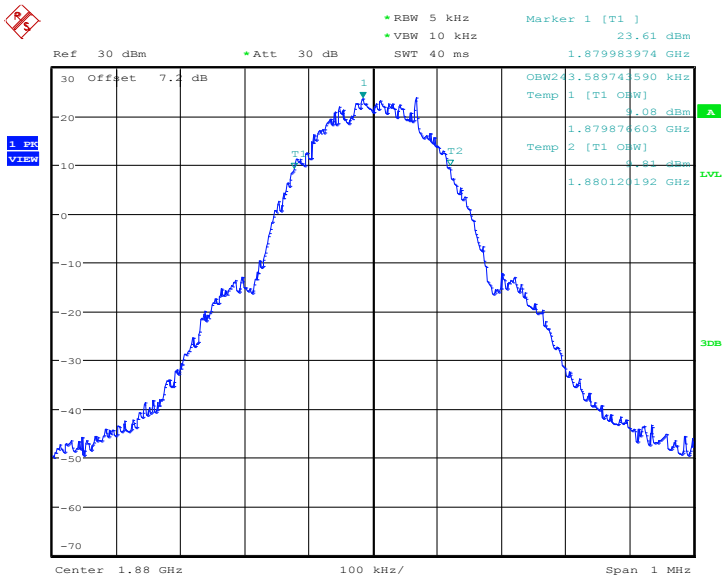
| Frequency(MHz) | Occupied Bandwidth (99% BW)( kHz) |
|---|---|
| 1850.2 | 245.19 |
| 1880.0 | 243.59 |
| 1909.8 | 243.59 |

**PCS 1900**

**Channel 512-Occupied Bandwidth (99% BW)**

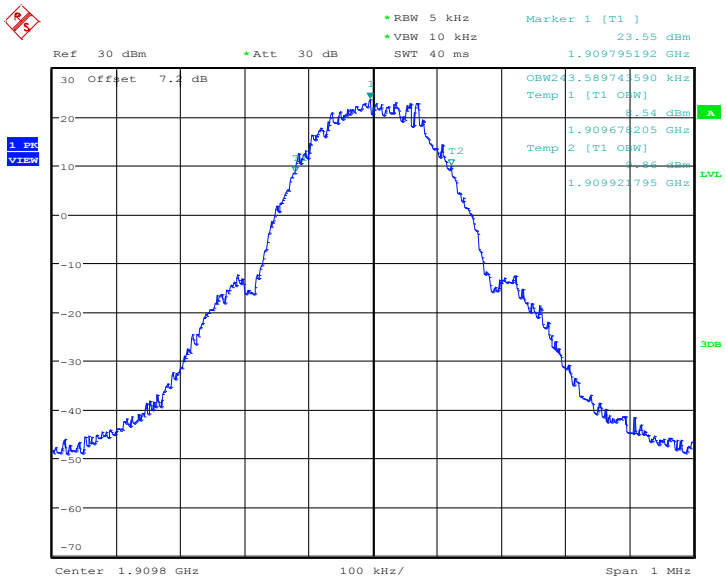


## Channel 661-Occupied Bandwidth (99% BW)




Date: 24.JAN.2017 04:06:33

## Channel 810-Occupied Bandwidth (99% BW)



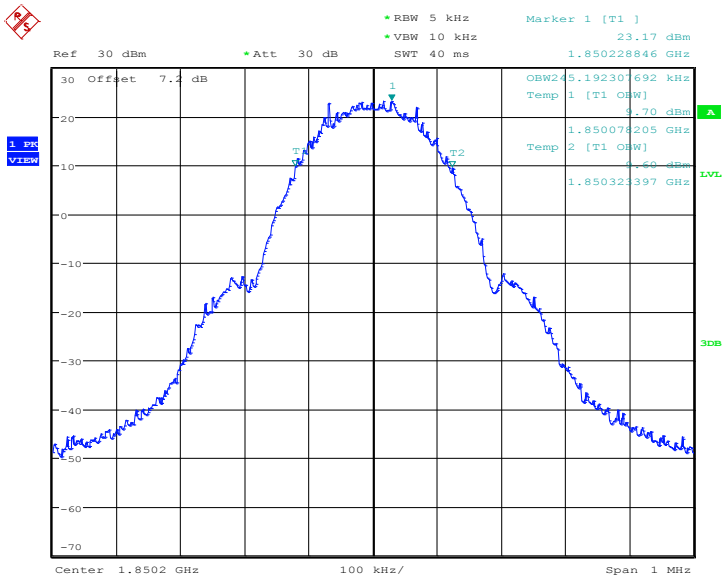

Date: 24.JAN.2017 04:07:50

**GPRS 1900(99% BW)**

| Frequency(MHz) | Occupied Bandwidth (99% BW)( kHz) |
|---|---|
| 1850.2 | 245.19 |
| 1880.0 | 245.19 |
| 1909.8 | 243.59 |

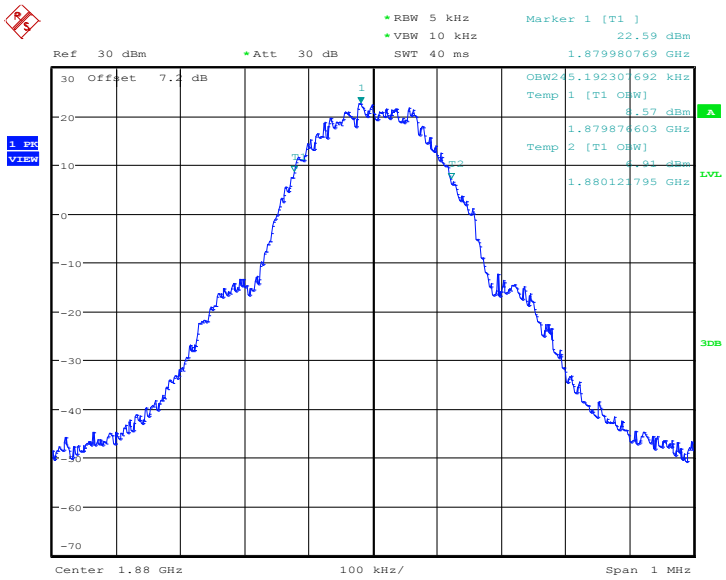
**GPRS 1900**

**Channel 512-Occupied Bandwidth (99% BW)**



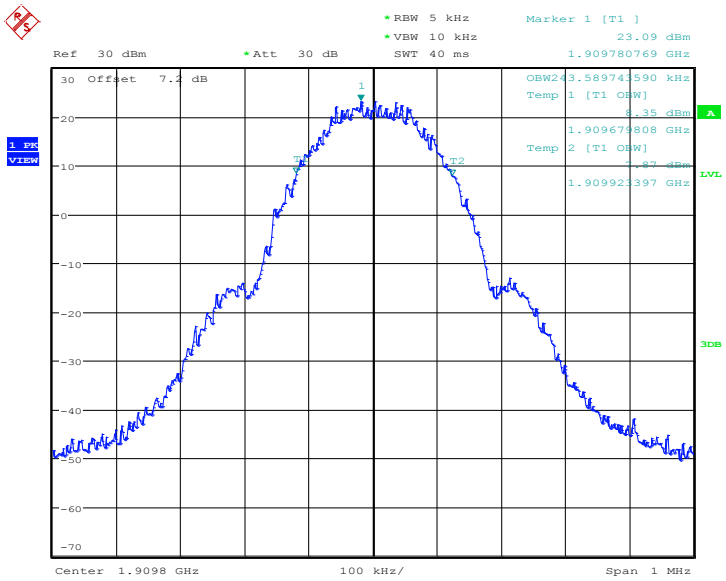

Date: 24.JAN.2017 04:49:01

## Channel 661-Occupied Bandwidth (99% BW)




Date: 24.JAN.2017 04:44:04

## Channel 810-Occupied Bandwidth (99% BW)



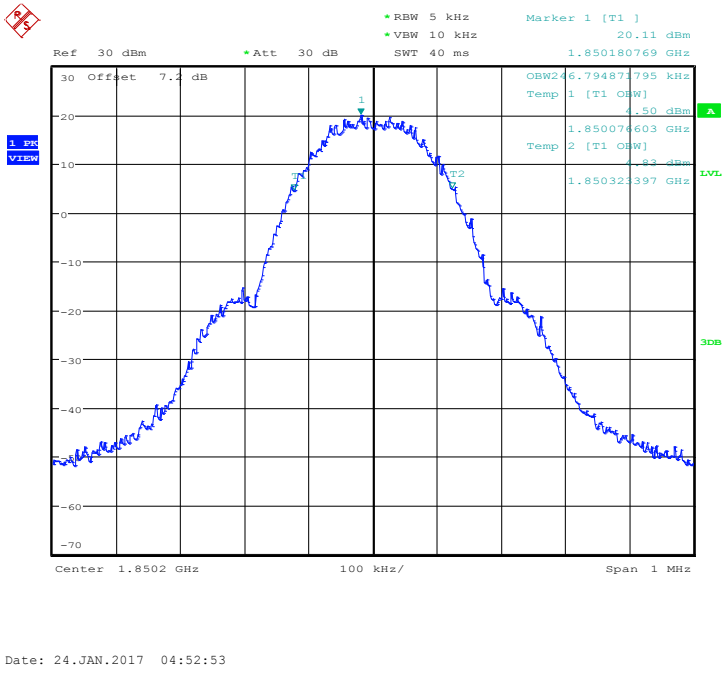

Date: 24.JAN.2017 04:43:26

**EGPRS 1900-8PSK(99% BW)**

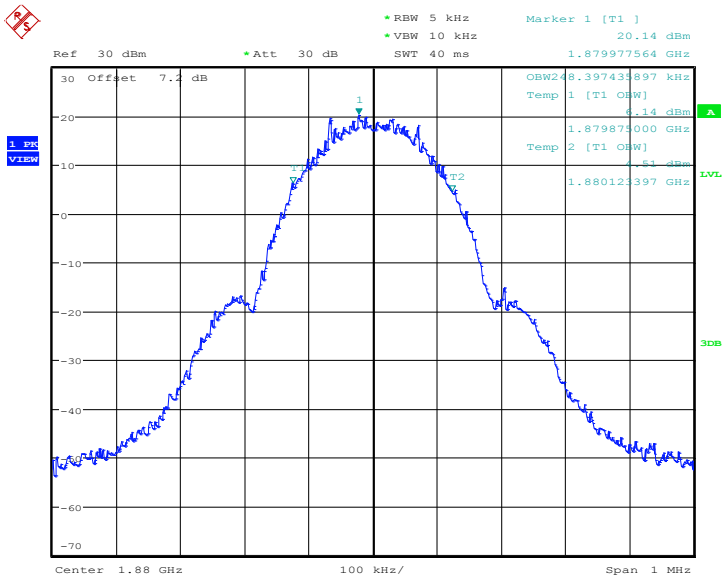
| Frequency(MHz) | Occupied Bandwidth (99% BW)( kHz) |
|---|---|
| 1850.2 | 246.79 |
| 1880.0 | 248.40 |
| 1909.8 | 245.19 |

**EGPRS 1900-8PSK**

**Channel 512-Occupied Bandwidth (99% BW)**

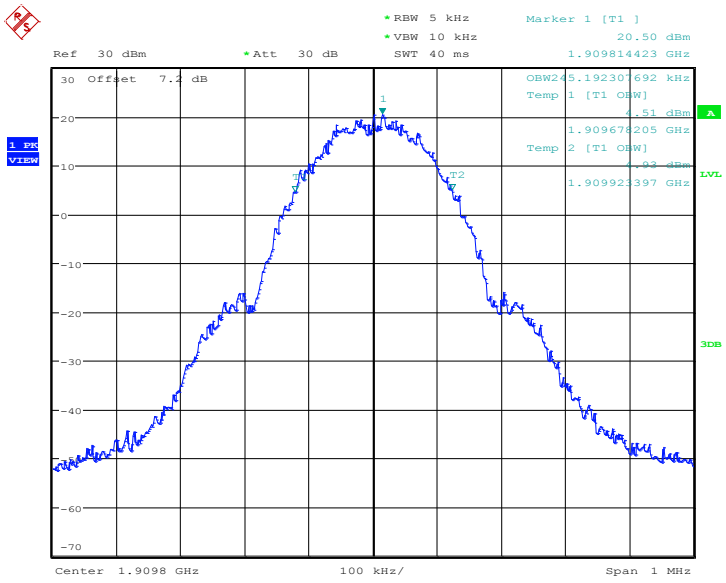


## Channel 661-Occupied Bandwidth (99% BW)




Date: 24.JAN.2017 04:55:17

## Channel 810-Occupied Bandwidth (99% BW)




Date: 24.JAN.2017 04:56:20

## A.5 EMISSION BANDWIDTH

### A.5.1Emission Bandwidth Results

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

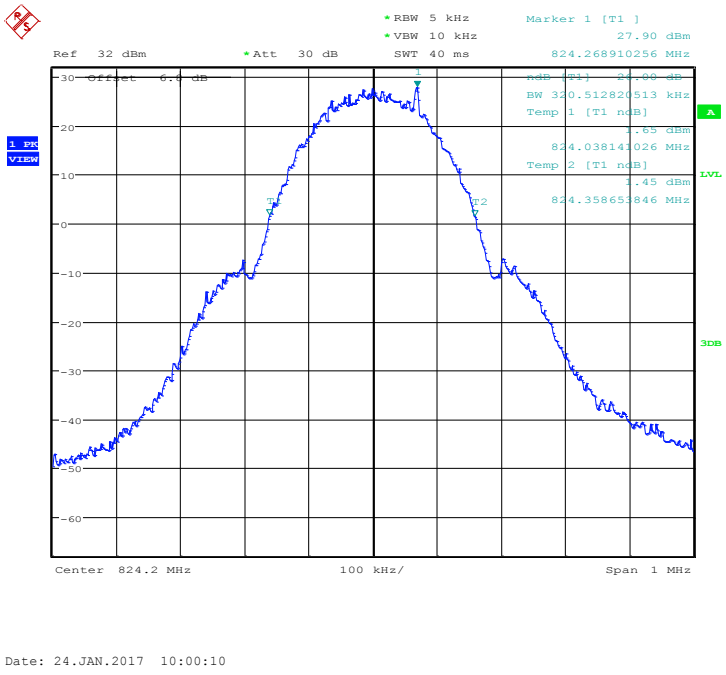
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band and GSM850 band. Table below lists the measured -26dB BW. Spectrum analyzer plots are included on the following pages.

**GSM 850(-26dB BW)**

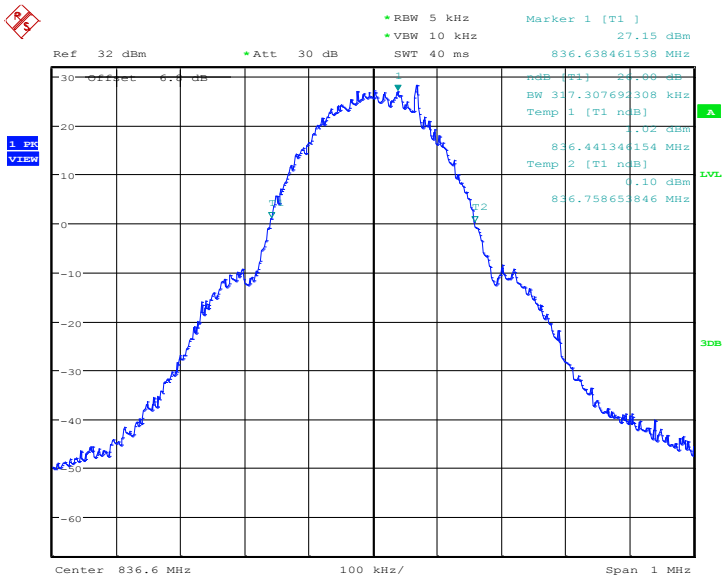
| Frequency(MHz) | Emission Bandwidth (-26dB BW)( kHz) |
|---|---|
| 824.2 | 320.51 |
| 836.6 | 317.31 |
| 848.8 | 317.31 |

**GSM 850**

**Channel 128-Emission Bandwidth (-26dB BW)**

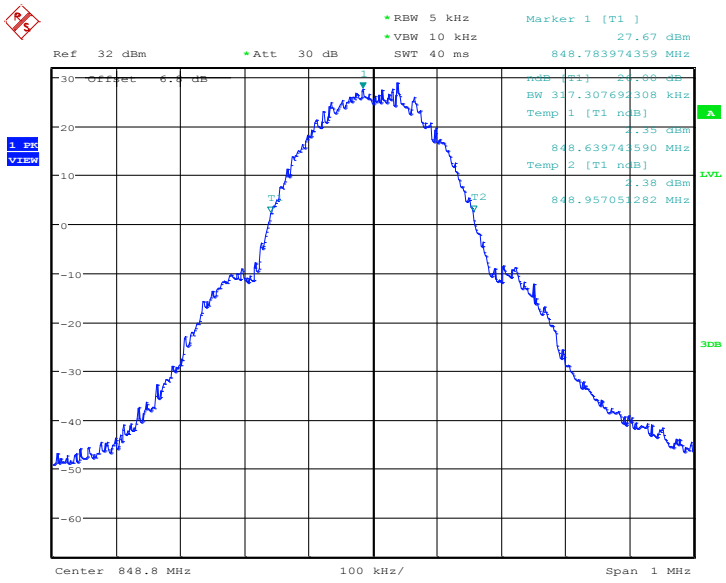


## Channel 190-Emission Bandwidth (-26dB BW)




Date: 24.JAN.2017 09:52:26

## Channel 251-Emission Bandwidth (-26dB BW)



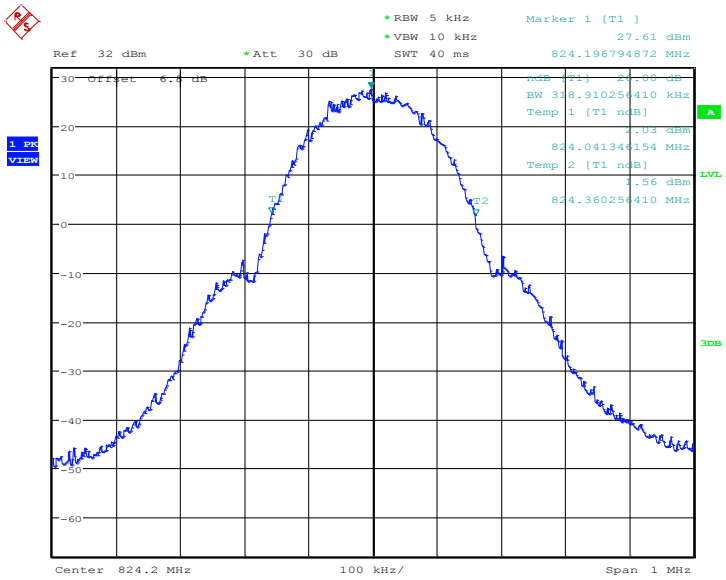

Date: 24.JAN.2017 09:50:51

**GPRS 850(-26dB BW)**

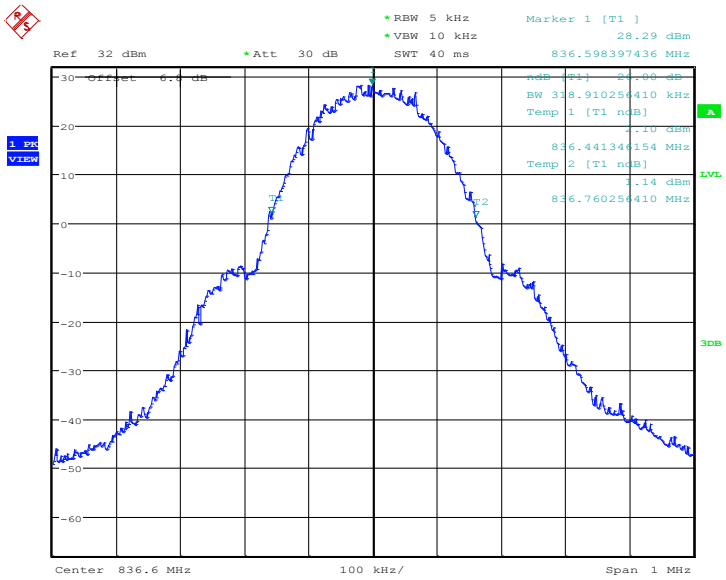
| Frequency(MHz) | Emission Bandwidth (-26dB BW)( kHz) |
|---|---|
| 824.2 | 318.91 |
| 836.6 | 318.91 |
| 848.8 | 318.91 |

**GPRS 850**

**Channel 128-Emission Bandwidth (-26dB BW)**

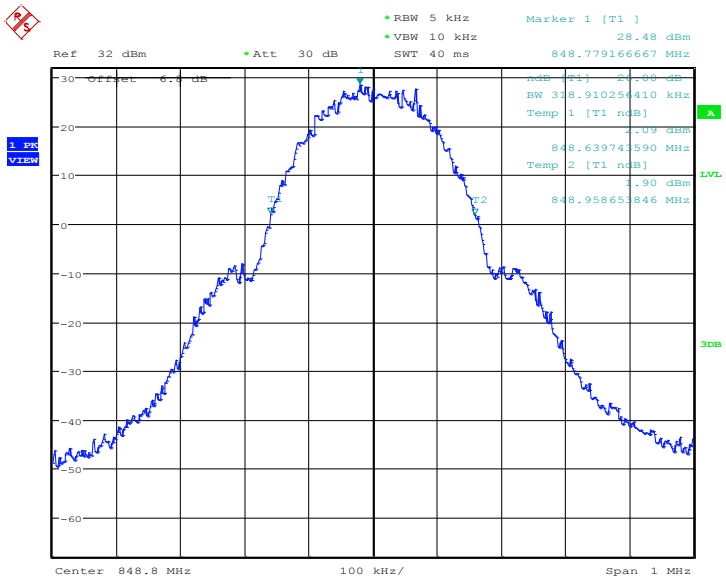


## Channel 190-Emission Bandwidth (-26dB BW)




Date: 24.JAN.2017 09:32:05

## Channel 251-Emission Bandwidth (-26dB BW)



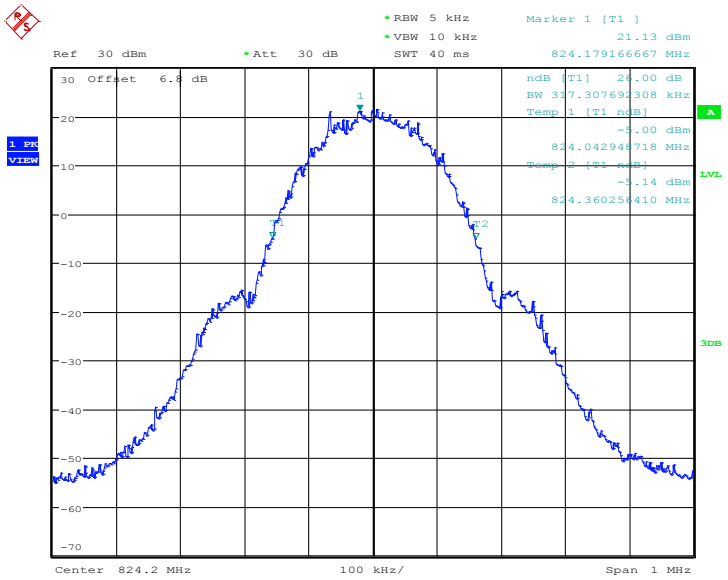

Date: 24.JAN.2017 09:33:44

**EGPRS 850-8PSK(-26dB BW)**

| Frequency(MHz) | Emission Bandwidth (-26dB BW)( kHz) |
|---|---|
| 824.2 | 317.31 |
| 836.6 | 317.31 |
| 848.8 | 317.31 |

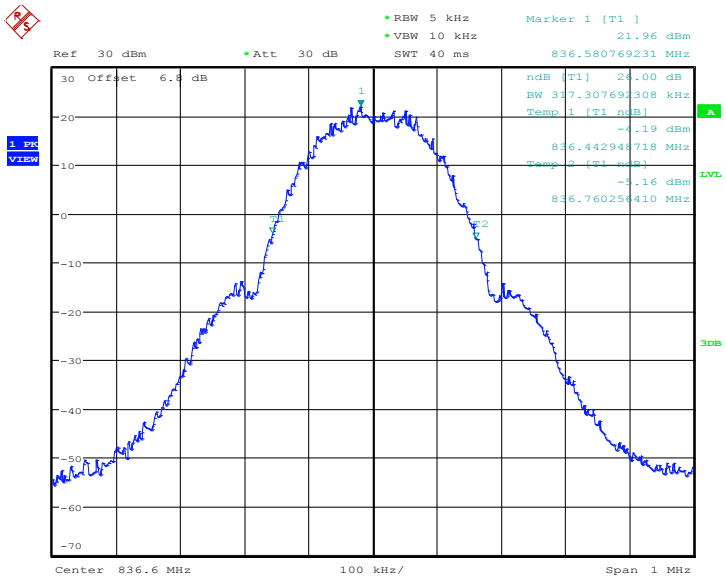
**EGPRS 850-8PSK**

**Channel 128-Emission Bandwidth (-26dB BW)**



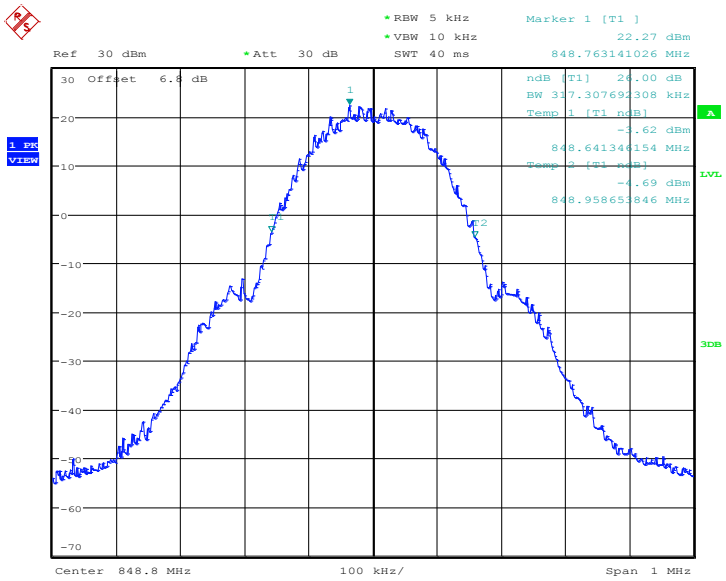

Date: 24.JAN.2017 09:22:06

## Channel 190-Emission Bandwidth (-26dB BW)




Date: 24.JAN.2017 09:18:49

## Channel 251-Emission Bandwidth (-26dB BW)



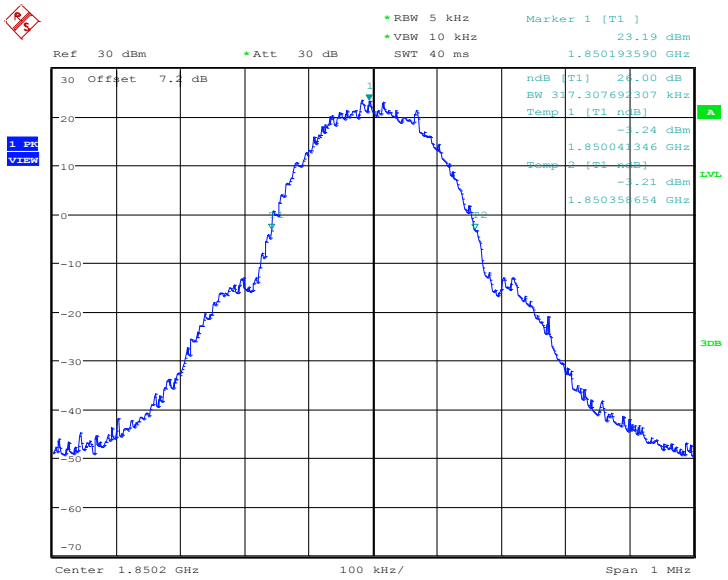

Date: 24.JAN.2017 09:17:28

**PCS 1900(-26dB BW)**

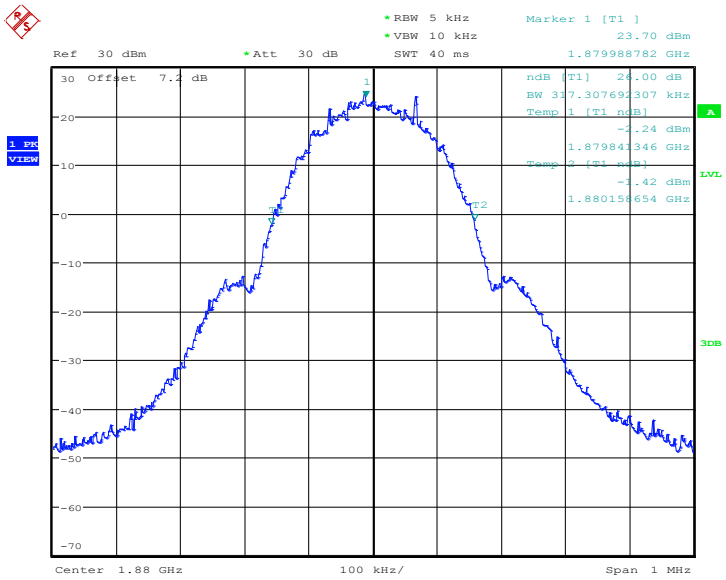
| Frequency(MHz) | Emission Bandwidth (-26dB BW)( kHz) |
|---|---|
| 1850.2 | 317.31 |
| 1880.0 | 317.31 |
| 1909.8 | 317.31 |

**PCS 1900**

**Channel 512-Emission Bandwidth (-26dB BW)**

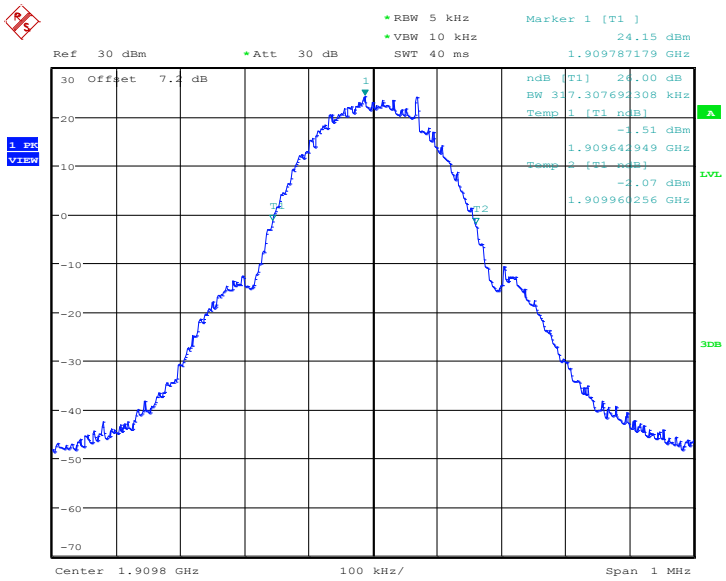


## Channel 661-Emission Bandwidth (-26dB BW)




Date: 24.JAN.2017 04:05:23

## Channel 810-Emission Bandwidth (-26dB BW)



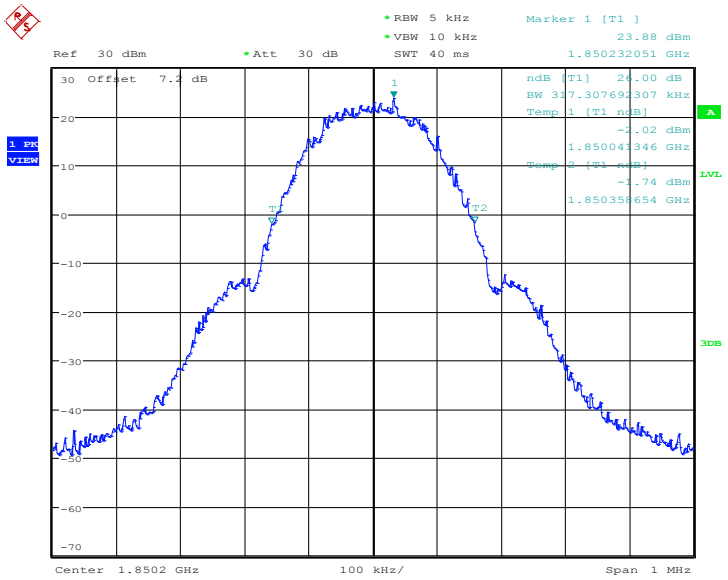

Date: 24.JAN.2017 04:09:59

**GPRS 1900(-26dB BW)**

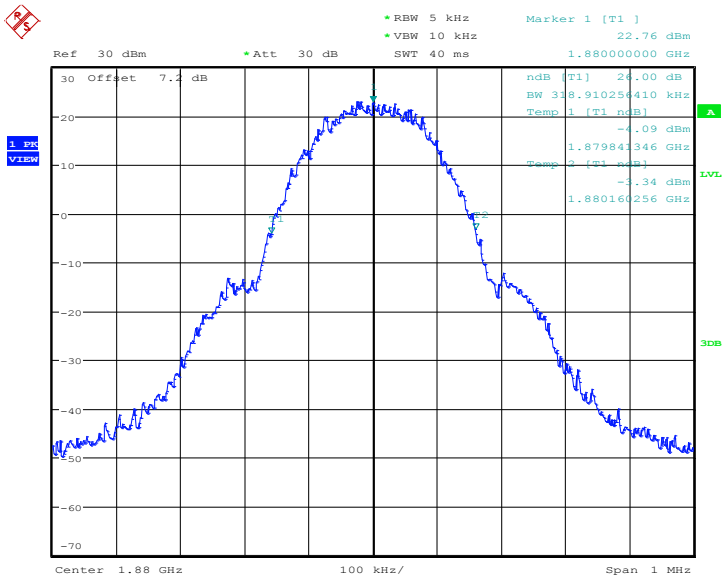
| Frequency(MHz) | Emission Bandwidth (-26dB BW)( kHz) |
|---|---|
| 1850.2 | 317.31 |
| 1880.0 | 318.91 |
| 1909.8 | 320.51 |

**GPRS 1900**

**Channel 512-Emission Bandwidth (-26dB BW)**

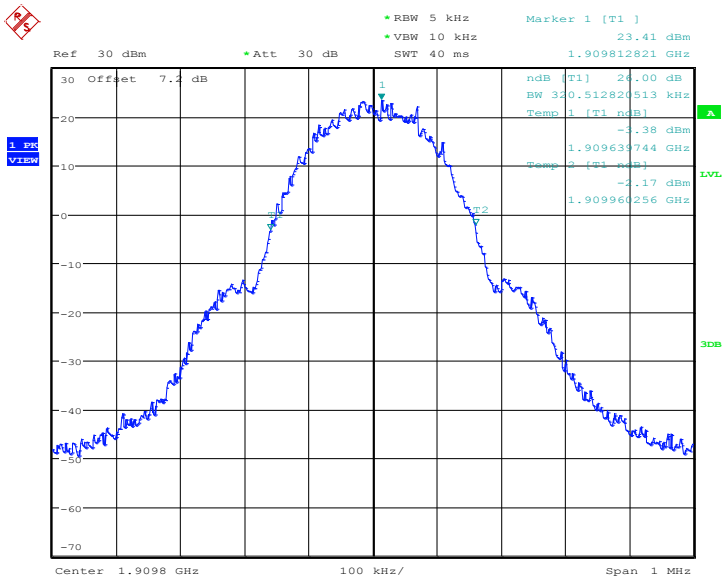


## Channel 661-Emission Bandwidth (-26dB BW)




Date: 24.JAN.2017 04:44:58

## Channel 810-Emission Bandwidth (-26dB BW)



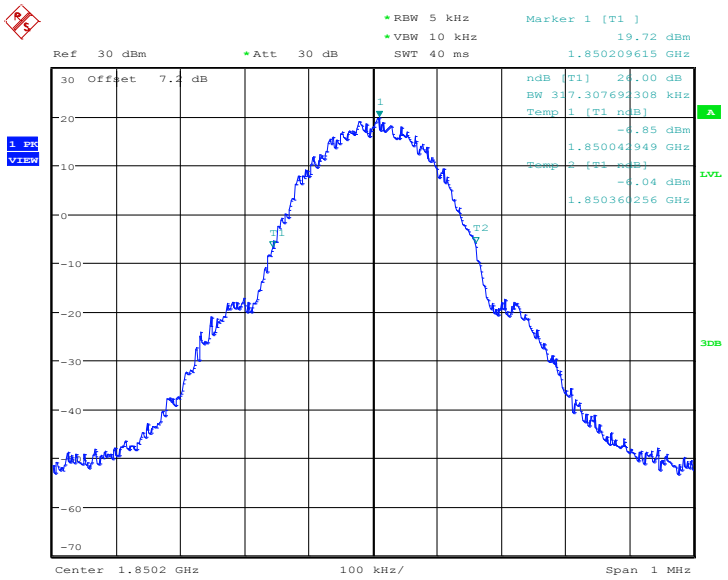

Date: 24.JAN.2017 04:42:48

**EGPRS 1900-8PSK(-26dB BW)**

| Frequency(MHz) | Emission Bandwidth (-26dB BW)( kHz) |
|---|---|
| 1850.2 | 317.31 |
| 1880.0 | 320.51 |
| 1909.8 | 317.31 |

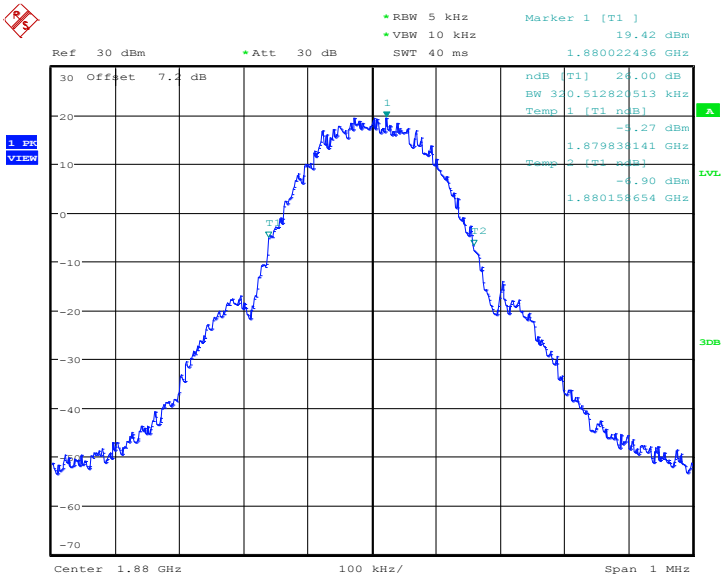
**EGPRS 1900-8PSK**

**Channel 512-Emission Bandwidth (-26dB BW)**



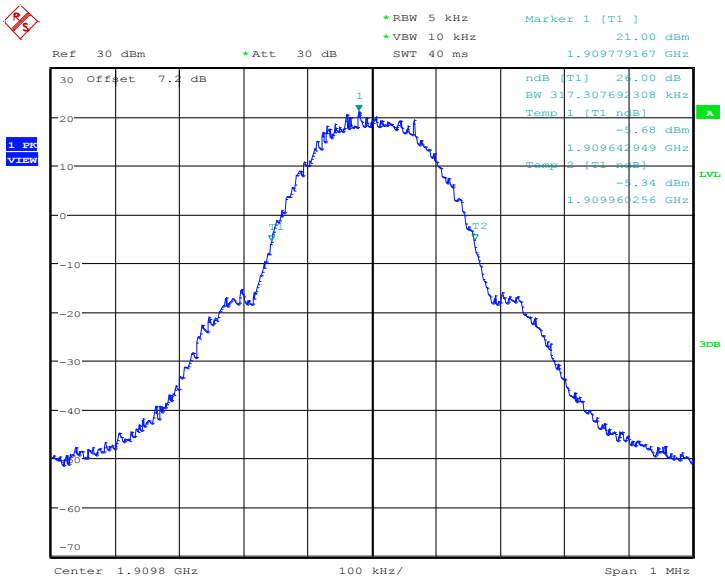

Date: 24.JAN.2017 04:53:35

## Channel 661-Emission Bandwidth (-26dB BW)




Date: 24.JAN.2017 04:54:18

## Channel 810-Emission Bandwidth (-26dB BW)




Date: 24.JAN.2017 04:58:59

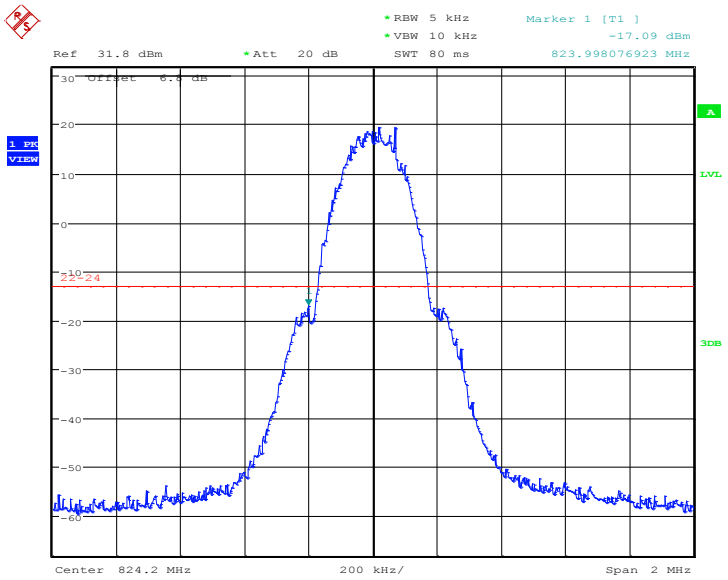
## A.6 BAND EDGE COMPLIANCE

**Measurement limit**

On any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log (P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm. According to KDB 971168, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

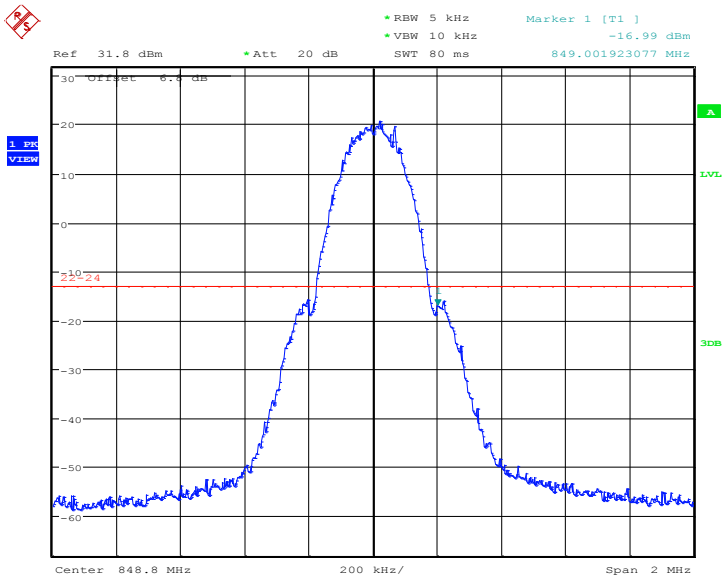
**GSM 850**

**LOW BAND EDGE BLOCK-A (GSM850)-Channel 128**




Date: 24.JAN.2017 09:45:32

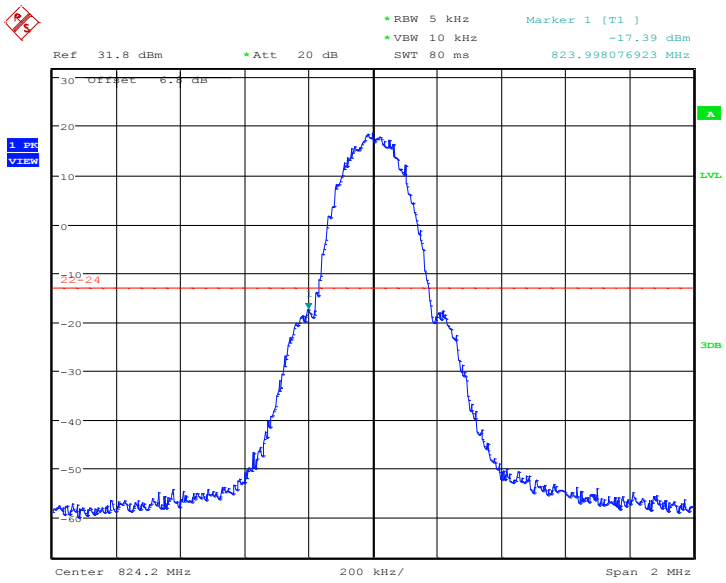
## HIGH BAND EDGE BLOCK-C (GSM850) –Channel 251




Date: 24.JAN.2017 09:48:23

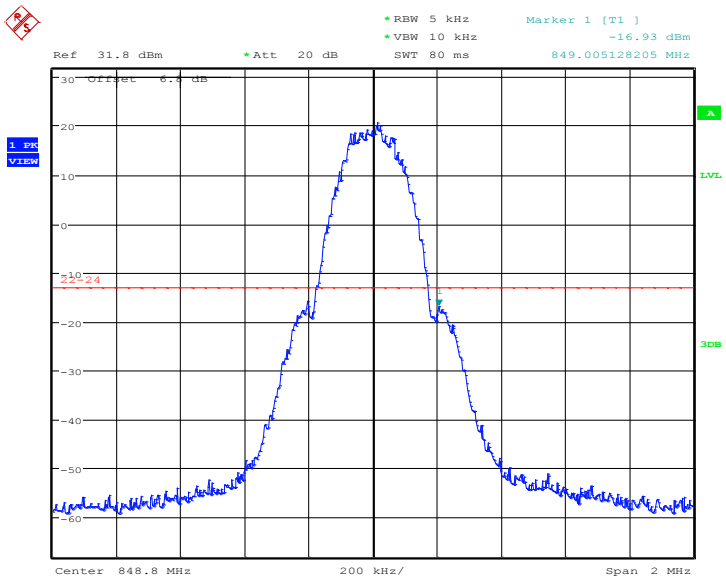
## GPRS 850

## LOW BAND EDGE BLOCK-A (GSM850)-Channel 128




Date: 24.JAN.2017 09:39:32

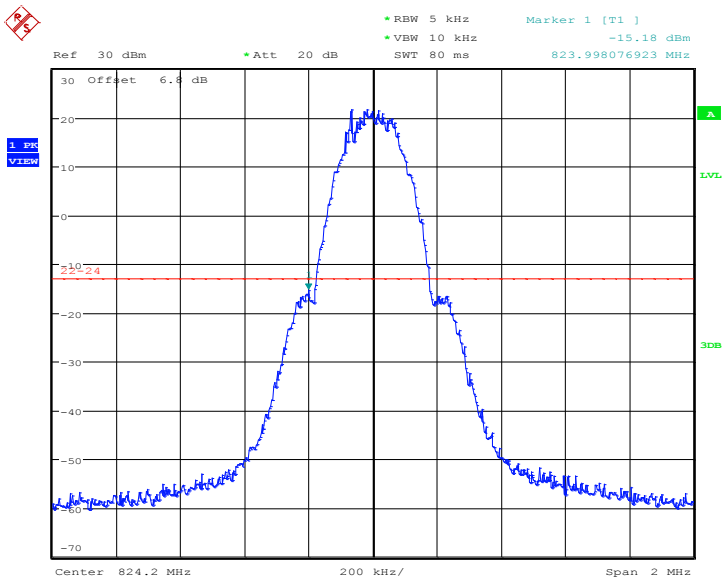
## HIGH BAND EDGE BLOCK-C (GSM850) –Channel 251




Date: 24.JAN.2017 09:37:51

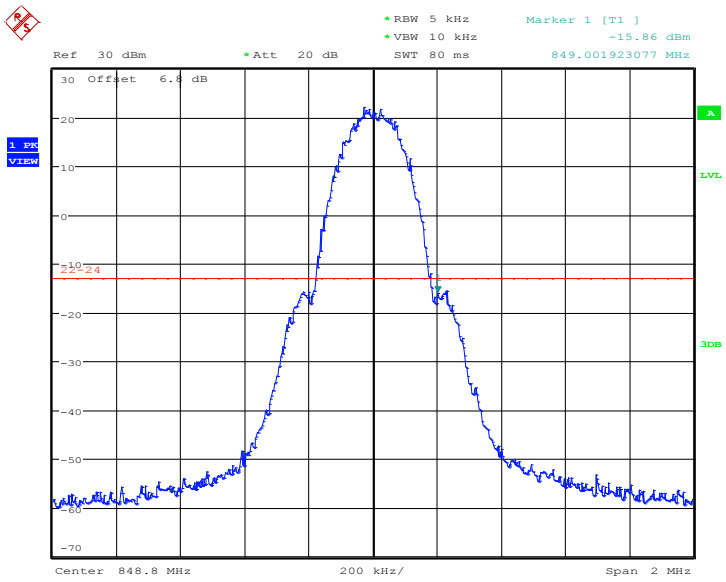
## EGPRS 850-8PSK

## LOW BAND EDGE BLOCK-A (GSM850)-Channel 128




Date: 24.JAN.2017 09:13:08

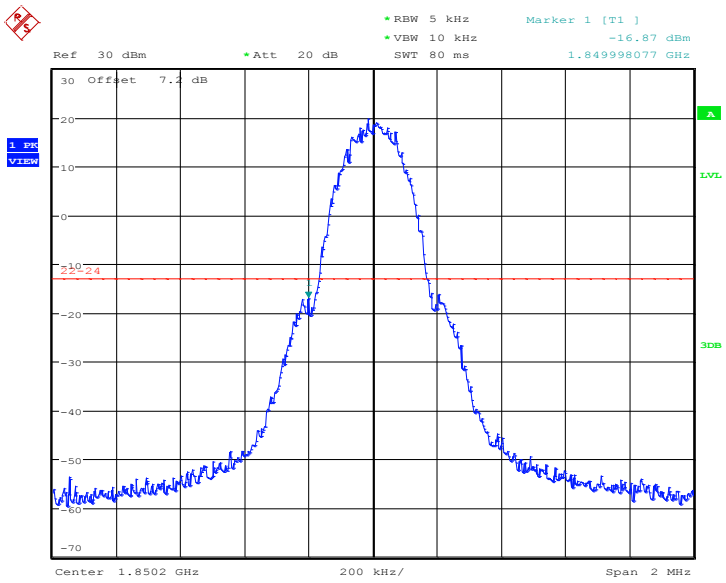
## HIGH BAND EDGE BLOCK-C (GSM850) –Channel 251




Date: 24.JAN.2017 09:14:52

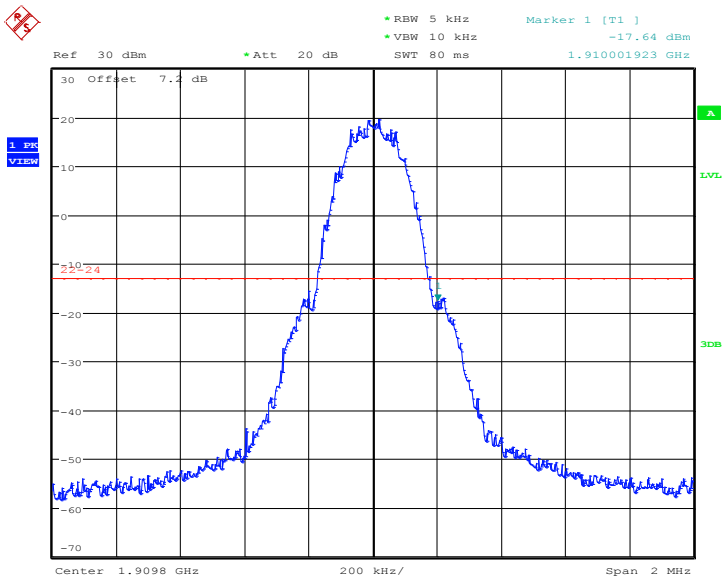
## PCS 1900

## LOW BAND EDGE BLOCK-A (PCS-1900)-Channel 512




Date: 24.JAN.2017 04:13:05

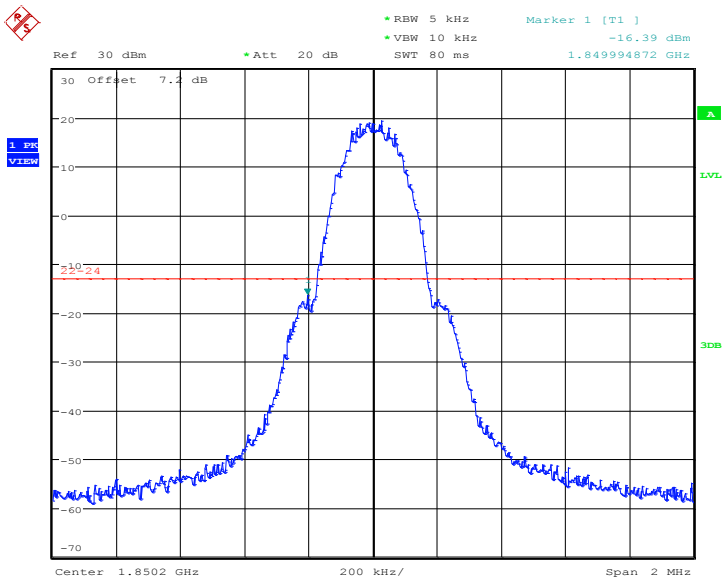
## HIGH BAND EDGE BLOCK-C (PCS-1900) –Channel 810




Date: 24.JAN.2017 04:12:05

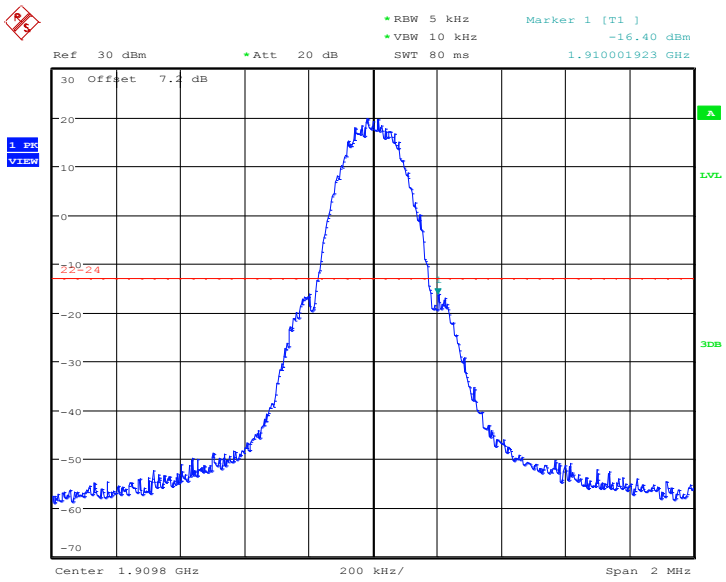
## GPRS 1900

## LOW BAND EDGE BLOCK-A (PCS-1900)-Channel 512




Date: 24.JAN.2017 04:40:07

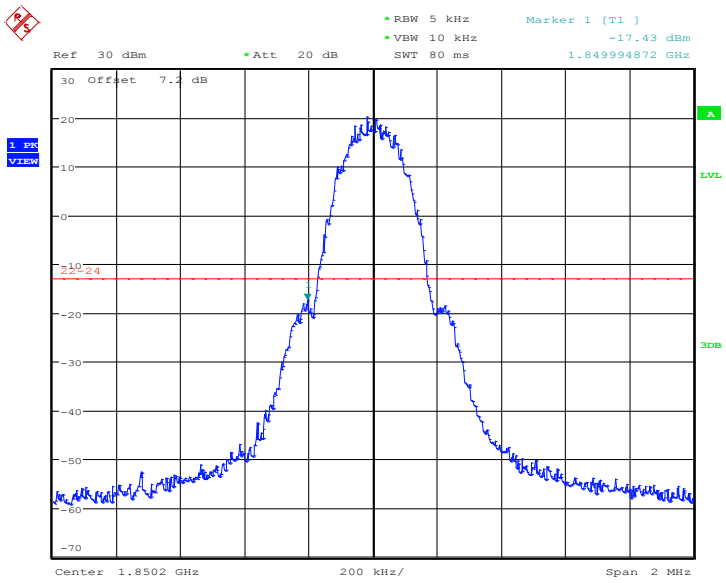
## HIGH BAND EDGE BLOCK-C (PCS-1900) –Channel 810




Date: 24.JAN.2017 04:41:26

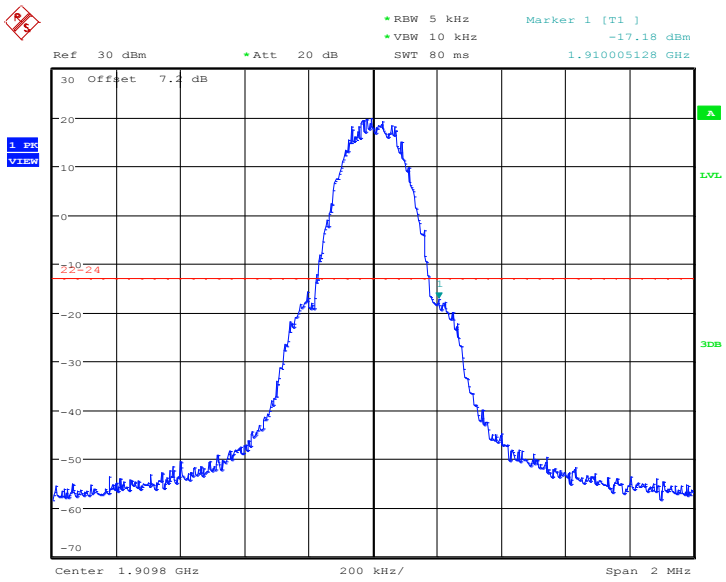
## EGPRS 1900-8PSK

## LOW BAND EDGE BLOCK-A (PCS-1900)-Channel 512




Date: 24.JAN.2017 05:01:56

## HIGH BAND EDGE BLOCK-C (PCS-1900) –Channel 810




Date: 24.JAN.2017 05:00:58

## A.7 CONDUCTED SPURIOUS EMISSION

### A.7.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: The spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 9 GHz, data taken from 10 MHz to 25 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3. According to KDB 971168, the applicable rule part specifies the reference bandwidth for measuring unwanted emission levels (typically, 100 kHz if the authorized frequency band/block is at or below 1 GHz and 1 MHz if the authorized frequency band/block is above 1 GHz)

**GSM850 Transmitter**

| Channel | Frequency (MHz) |
|---|---|
| 128 | 824.2 |
| 190 | 836.6 |
| 251 | 848.8 |

**PCS1900 Transmitter**

| Channel | Frequency (MHz) |
|---|---|
| 512 | 1850.2 |
| 661 | 1880.0 |
| 810 | 1909.8 |

### A. 7.2 Measurement Limit

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.

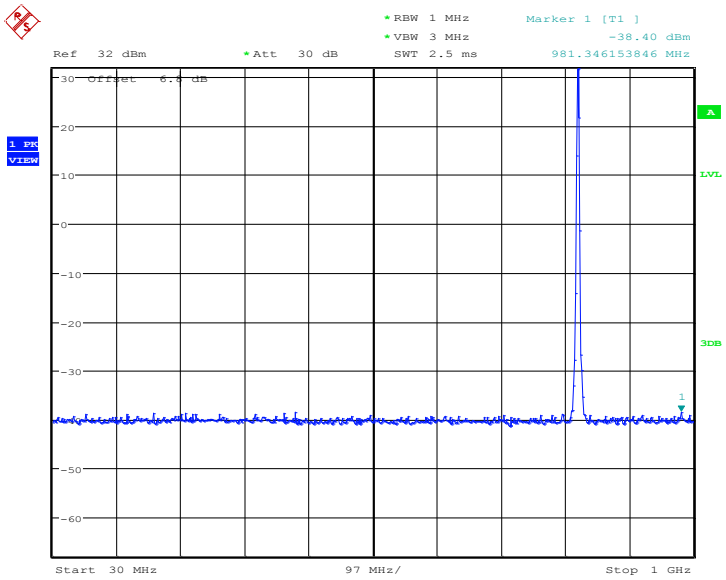
**A. 7.3 Measurement result**

**GSM850**

**Channel 128: 30MHz – 1GHz**

Spurious emission limit –13dBm.

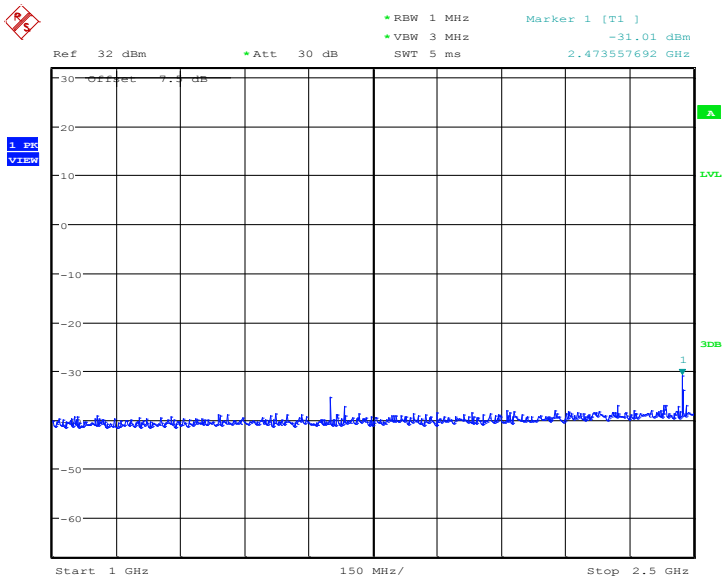
**NOTE: peak above the limit line is the carrier frequency.**




Date: 24.JAN.2017 10:04:11

**Channel 128: 1GHz – 2.5GHz**

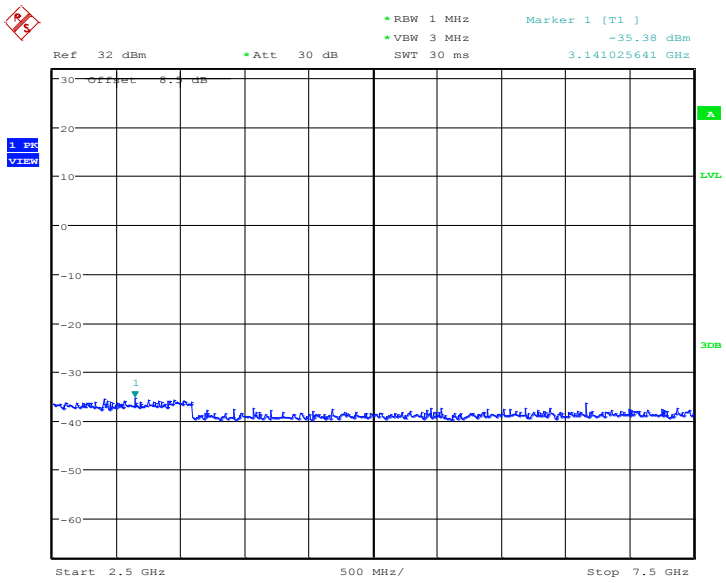
Spurious emission limit –13dBm.




Date: 24.JAN.2017 10:10:16

**Channel 128: 2.5GHz – 7.5GHz**

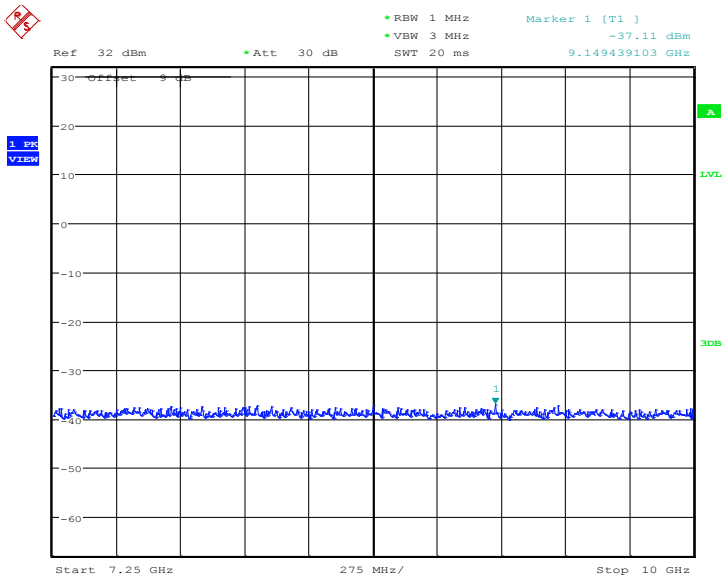
Spurious emission limit –13dBm.




Date: 24.JAN.2017 10:11:23

**Channel 128: 7.5GHz –10GHz**

Spurious emission limit –13dBm.

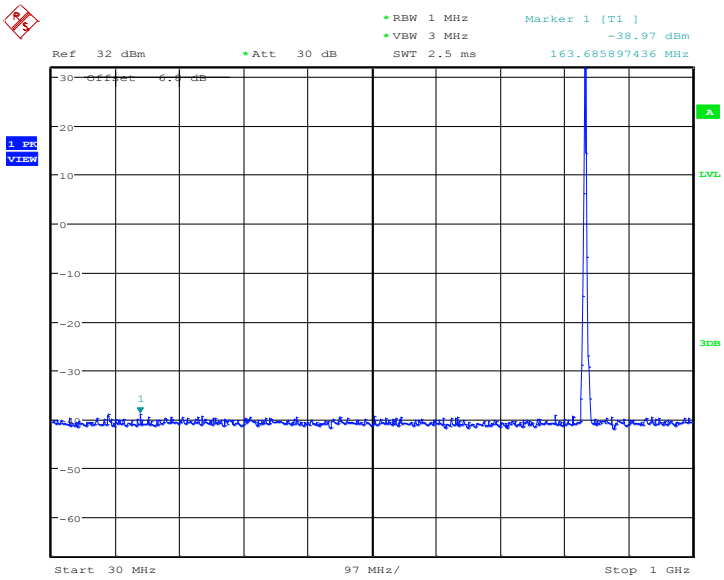



Date: 24.JAN.2017 10:14:10

**Channel 190: 30MHz – 1GHz**

Spurious emission limit –13dBm

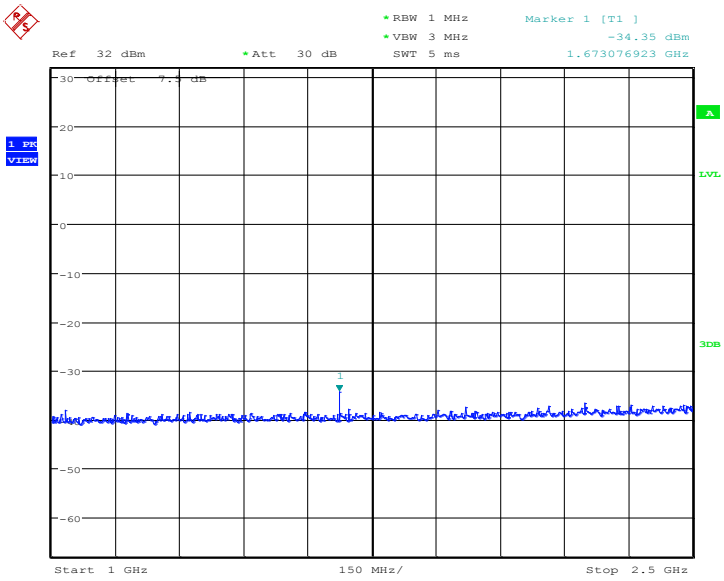
**NOTE: peak above the limit line is the carrier frequency.**




Date: 24.JAN.2017 10:05:00

**Channel 190: 1GHz –2.5GHz**

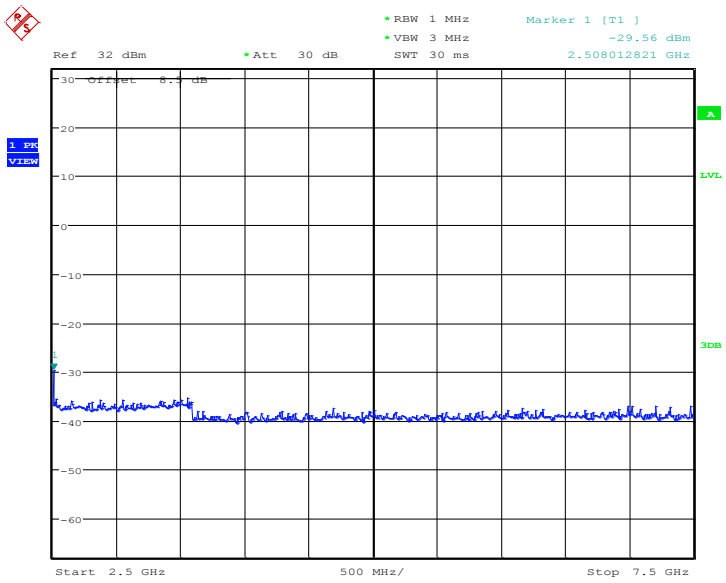
Spurious emission limit –13dBm




Date: 24.JAN.2017 10:09:53

**Channel 190: 2.5GHz –7.5GHz**

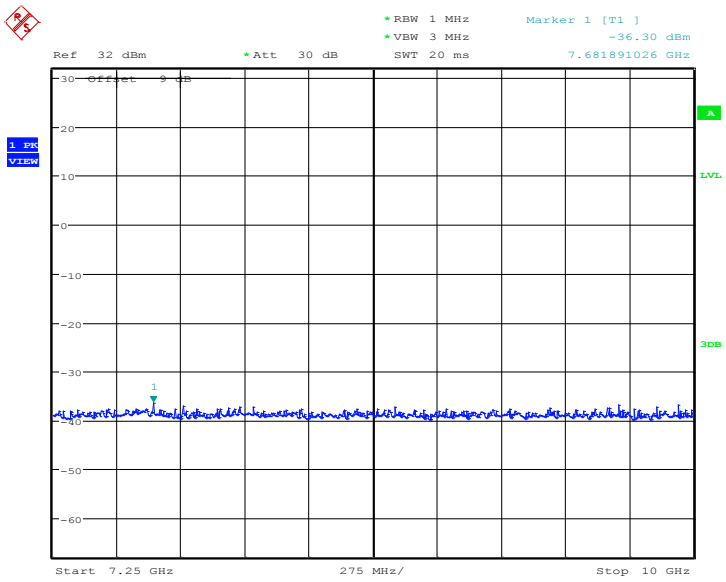
Spurious emission limit –13dBm




Date: 24.JAN.2017 10:11:58

**Channel 190: 7.5GHz –10GHz**

Spurious emission limit –13dBm

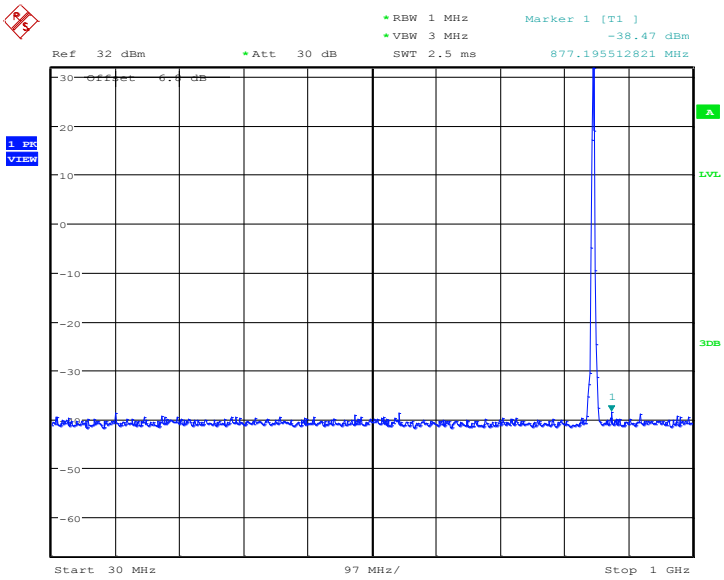



Date: 24.JAN.2017 10:13:49

**Channel 251: 30MHz – 1GHz**

Spurious emission limit –13dBm.

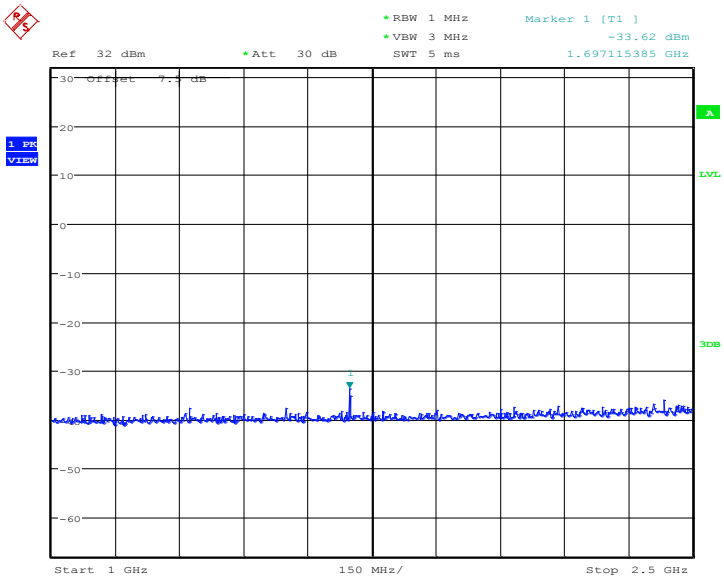
**NOTE: peak above the limit line is the carrier frequency.**




Date: 24.JAN.2017 10:05:44

**Channel 251: 1GHz – 2.5GHz**

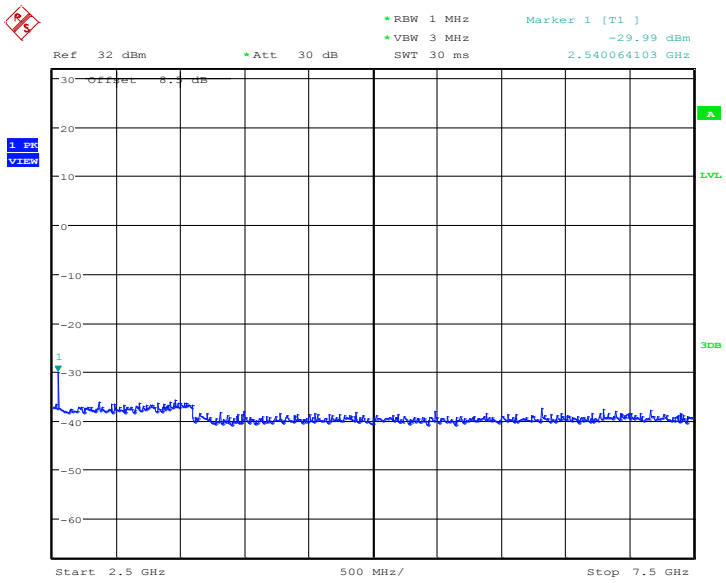
Spurious emission limit –13dBm.




Date: 24.JAN.2017 10:08:43

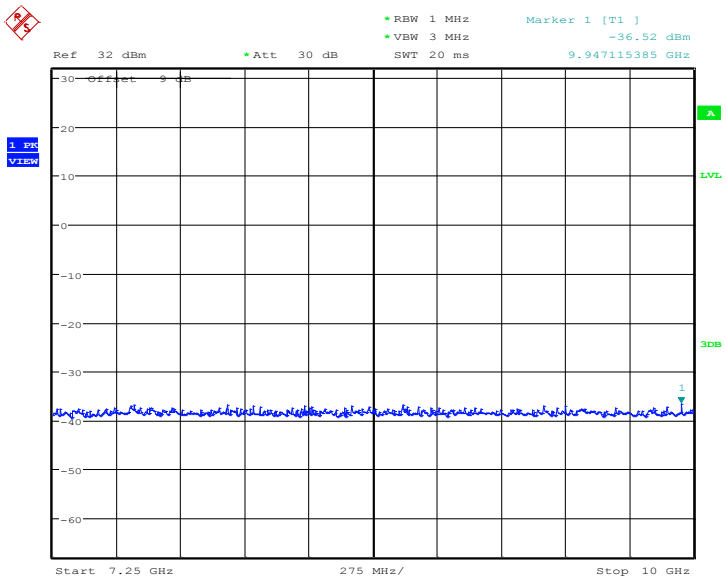
**Channel 251:2.5GHz – 7.5GHz**

Spurious emission limit –13dBm.




**Channel 251: 7.5GHz – 10GHz**

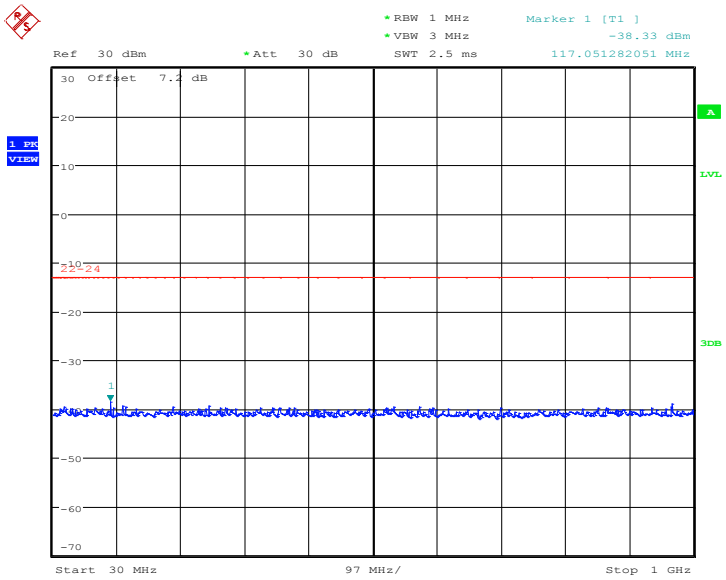
Spurious emission limit –13dBm.



**PCS1900**

**Channel 512: 30MHz – 1GHz**

Spurious emission limit –13dBm.

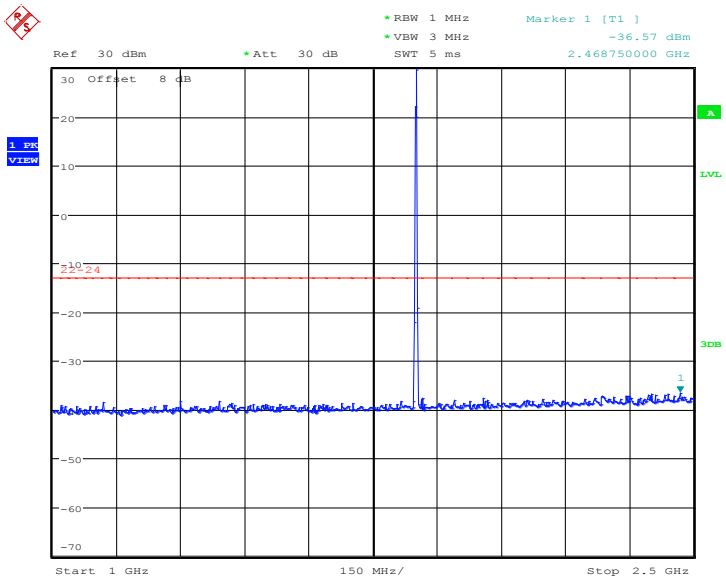



Date: 24.JAN.2017 04:14:30

**Channel 512: 1GHz – 2.5GHz**

Spurious emission limit –13dBm.

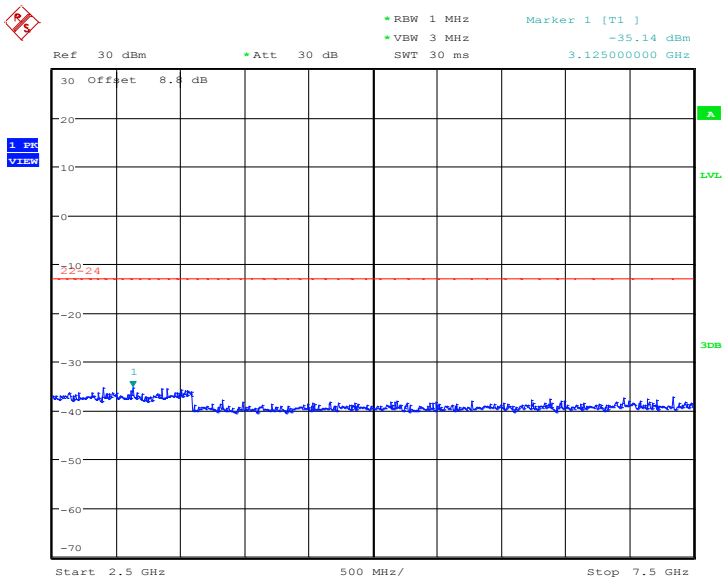
**NOTE: peak above the limit line is the carrier frequency.**




Date: 24.JAN.2017 04:19:49

**Channel 512: 2.5GHz – 7.5GHz**

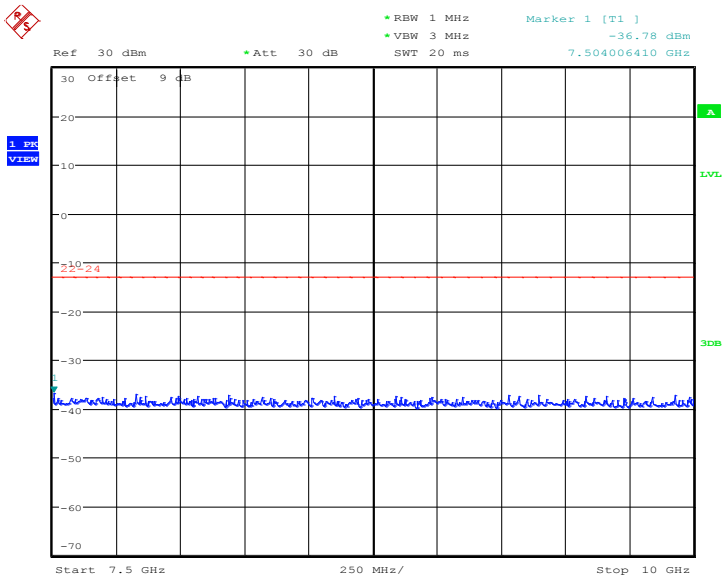
Spurious emission limit –13dBm.




Date: 24.JAN.2017 04:20:36

**Channel 512: 7.5GHz –10GHz**

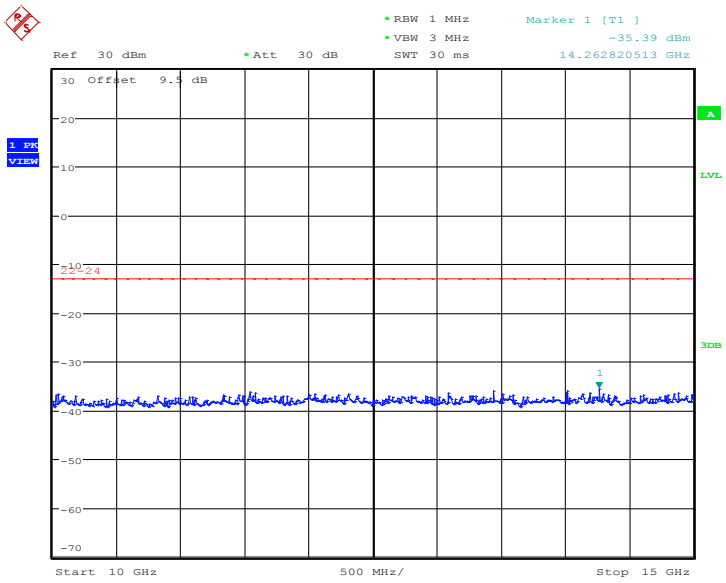
Spurious emission limit –13dBm.




Date: 24.JAN.2017 04:24:42

**Channel 512: 10GHz –15GHz**

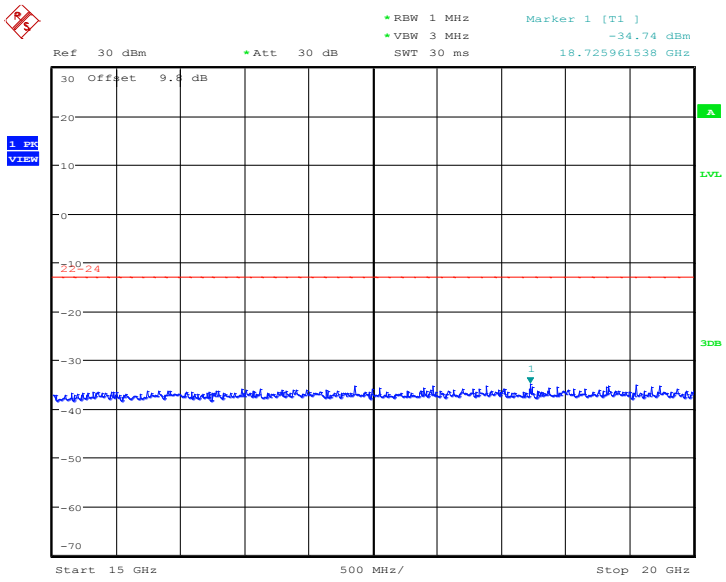
Spurious emission limit –13dBm.




Date: 24.JAN.2017 04:25:22

**Channel 512: 15GHz –20GHz**

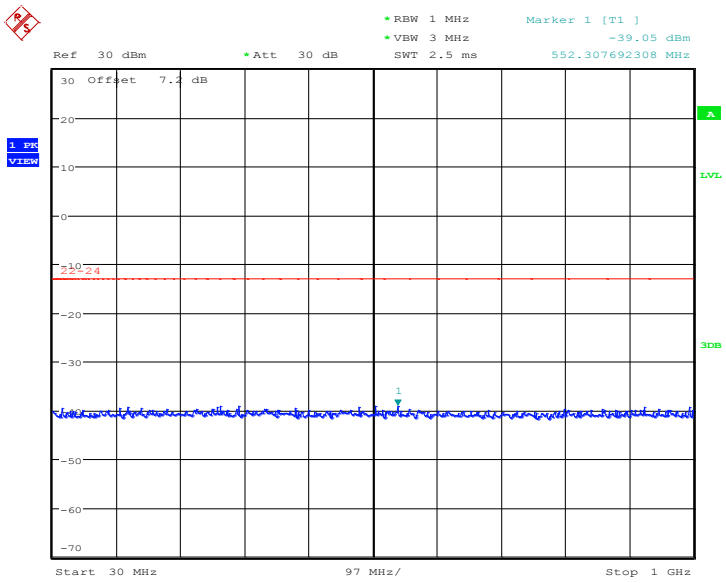
Spurious emission limit –13dBm.




Date: 24.JAN.2017 04:30:32

**Channel 661: 30MHz – 1GHz**

Spurious emission limit –13dBm

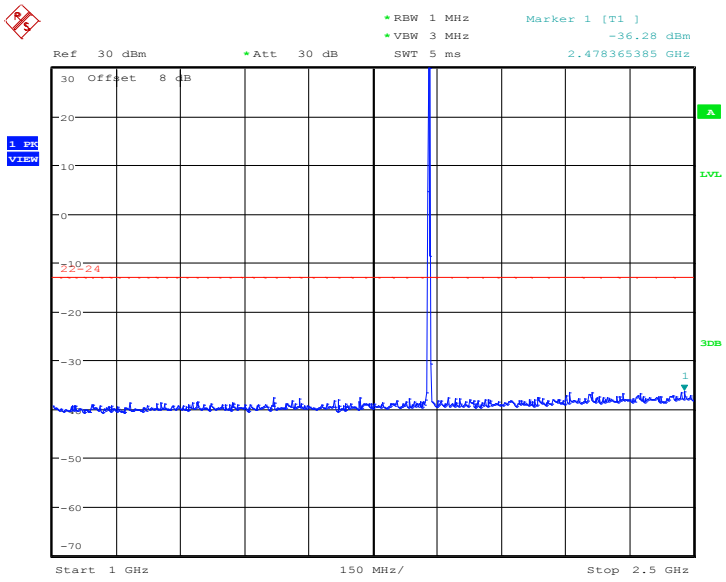



Date: 24.JAN.2017 04:15:35

**Channel 661: 1GHz –2.5GHz**

Spurious emission limit –13dBm

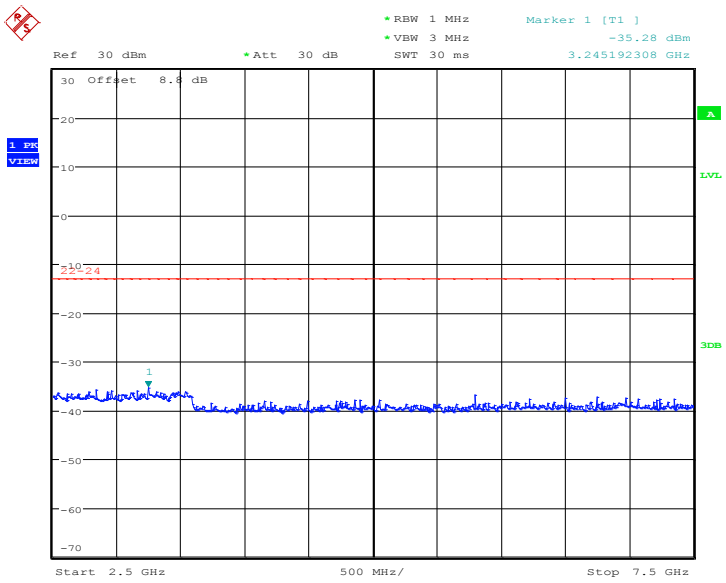
**NOTE: peak above the limit line is the carrier frequency.**




Date: 24.JAN.2017 04:18:47

**Channel 661: 2.5GHz –7.5GHz**

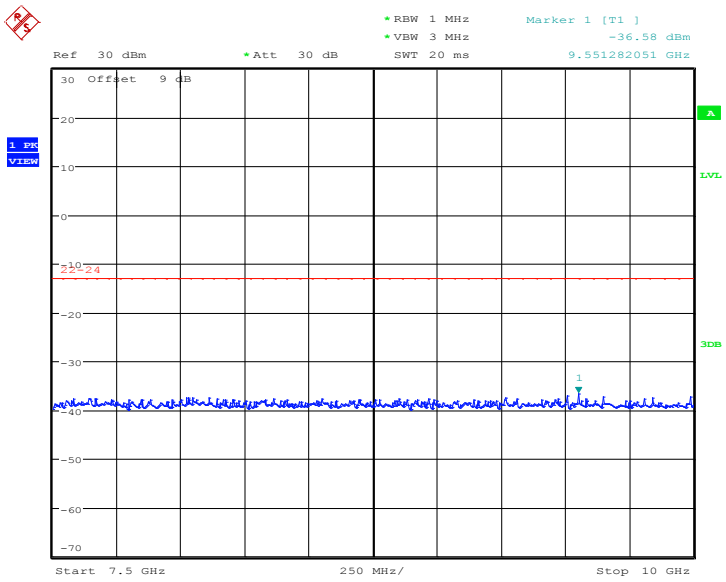
Spurious emission limit –13dBm




Date: 24.JAN.2017 04:21:12

**Channel 661: 7.5GHz –10GHz**

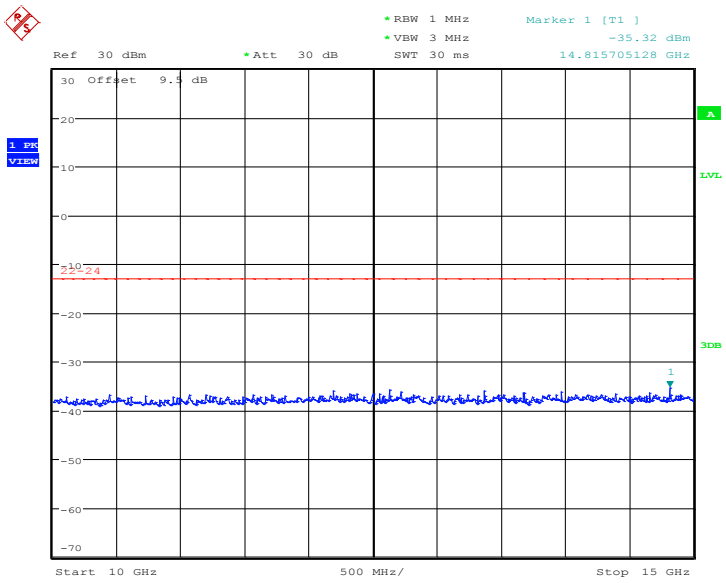
Spurious emission limit –13dBm




Date: 24.JAN.2017 04:24:09

**Channel 661: 10GHz –15GHz**

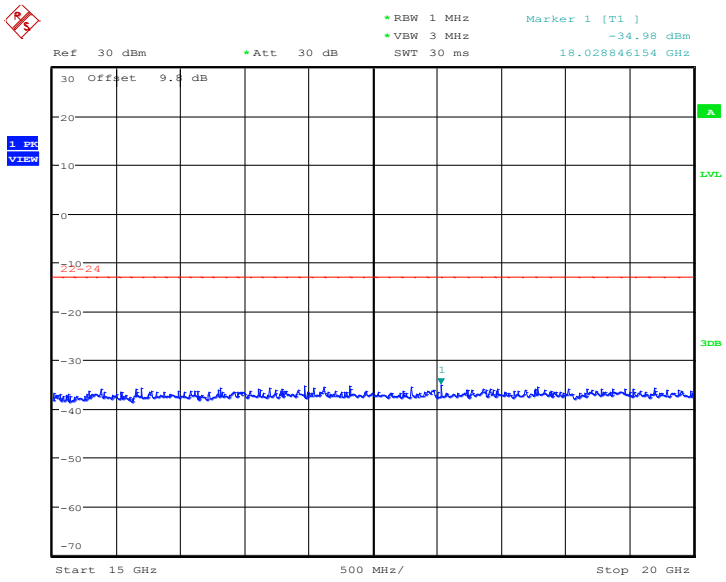
Spurious emission limit –13dBm.




Date: 24.JAN.2017 04:26:08

**Channel 661: 15GHz –20GHz**

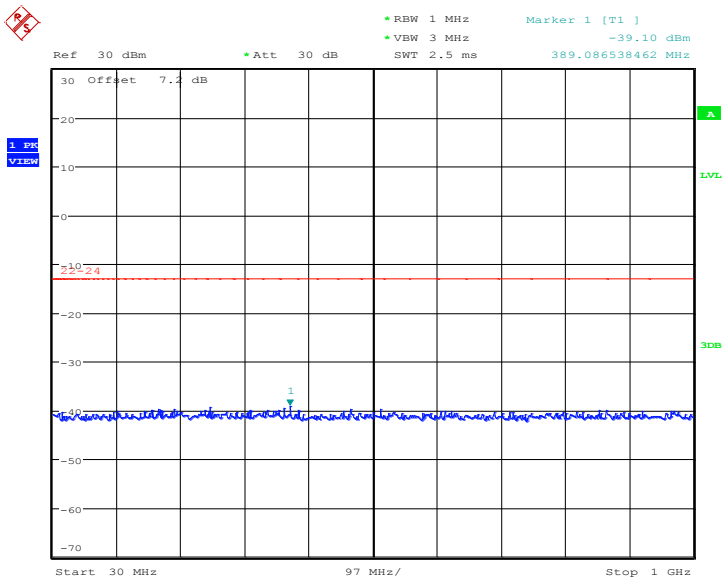
Spurious emission limit –13dBm.




Date: 24.JAN.2017 04:30:00

**Channel 810: 30MHz – 1GHz**

Spurious emission limit –13dBm.

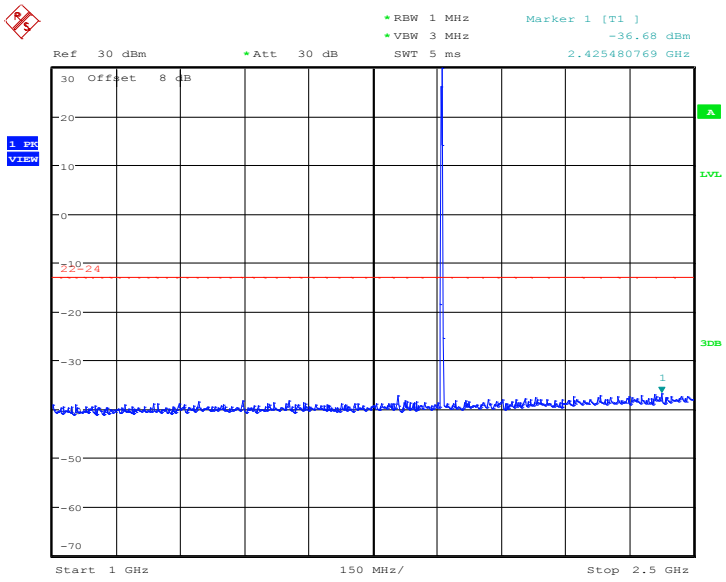



Date: 24.JAN.2017 04:16:10

**Channel 810: 1GHz – 2.5GHz**

Spurious emission limit –13dBm.

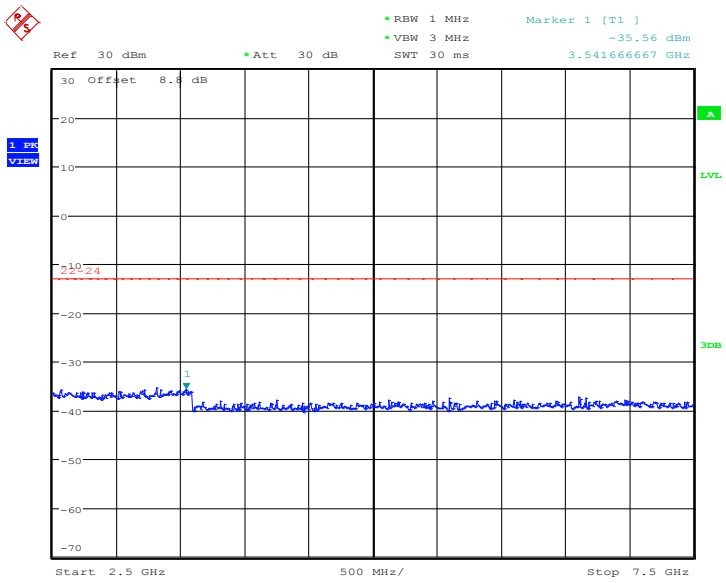
**NOTE: peak above the limit line is the carrier frequency.**




Date: 24.JAN.2017 04:17:15

**Channel 810:2.5GHz – 7.5GHz**

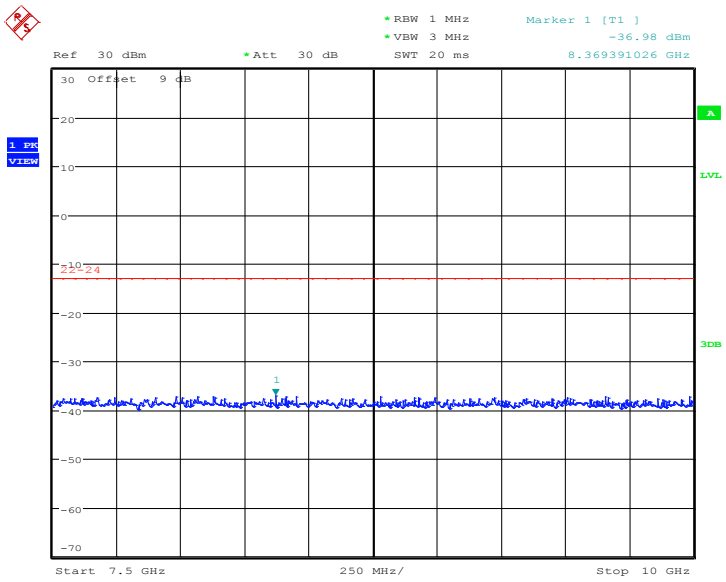
Spurious emission limit –13dBm.




Date: 24.JAN.2017 04:22:15

**Channel 810: 7.5GHz – 10GHz**

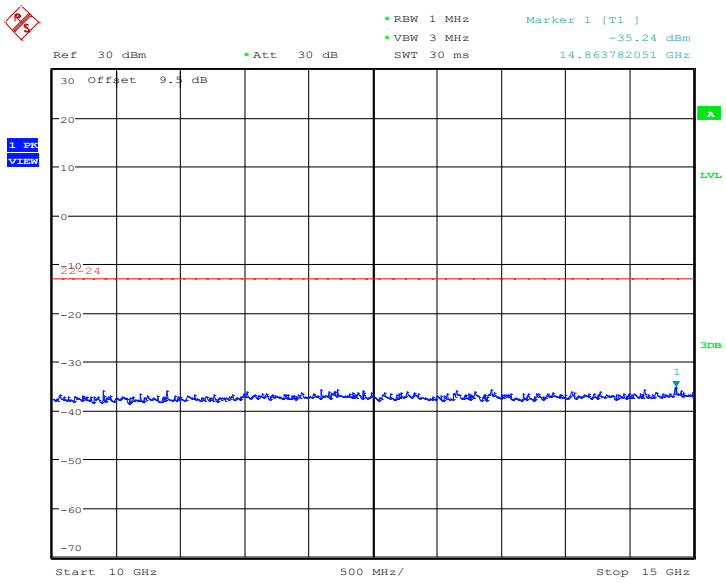
Spurious emission limit –13dBm.




Date: 24.JAN.2017 04:23:33

**Channel 810: 10GHz –15GHz**

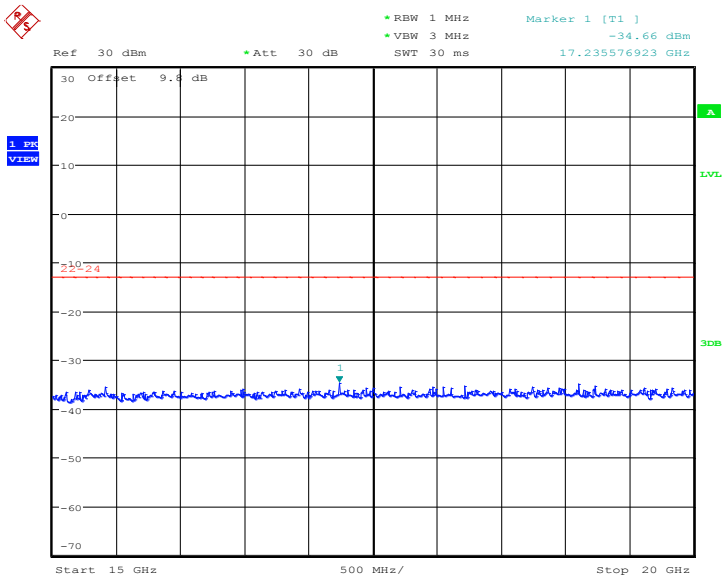
Spurious emission limit –13dBm.




Date: 24.JAN.2017 04:28:46

**Channel 810: 15GHz –20GHz**

Spurious emission limit –13dBm.

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## A.8 PEAK-TO-AVERAGE POWER RATIO

**Reference**

RSS 132, RSS133

According to RSS 132 and 133, the transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

According to KDB 971168:

a)Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Set the measurement interval to 1 ms

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

**A.8.1 Measurement limit**

not exceed 13 dB

**A.8.2 Measurement results**

| | Frequency(MHz) | PAPR(dB) |
|---|---|---|
| GSM850 | 836.6 | 7.45 |
| GPRS850 | 836.6 | 7.49 |
| EGPRS850(8PSK) | 836.6 | 7.55 |
| PCS1900 | 1880.0 | 7.51 |
| GPRS1900 | 1880.0 | 7.48 |
| EGPRS1900(8PSK) | 1880.0 | 7.49 |

## A.9 RECEIVER RADIATION EMISSION

### A.9.1 Method of Measurement

The measurement procedure in ANSI C64.4-2003 is used. The EUT is placed on a 80cm height non-conductive table locating on the center of turntable. From 30MHz-1GHz, the measurement distance is 10m. For frequency range above 1GHz, the measurement distance is 3m.

The EUT is measured with travel charger and the operating mode is idle without CMU200's signaling.

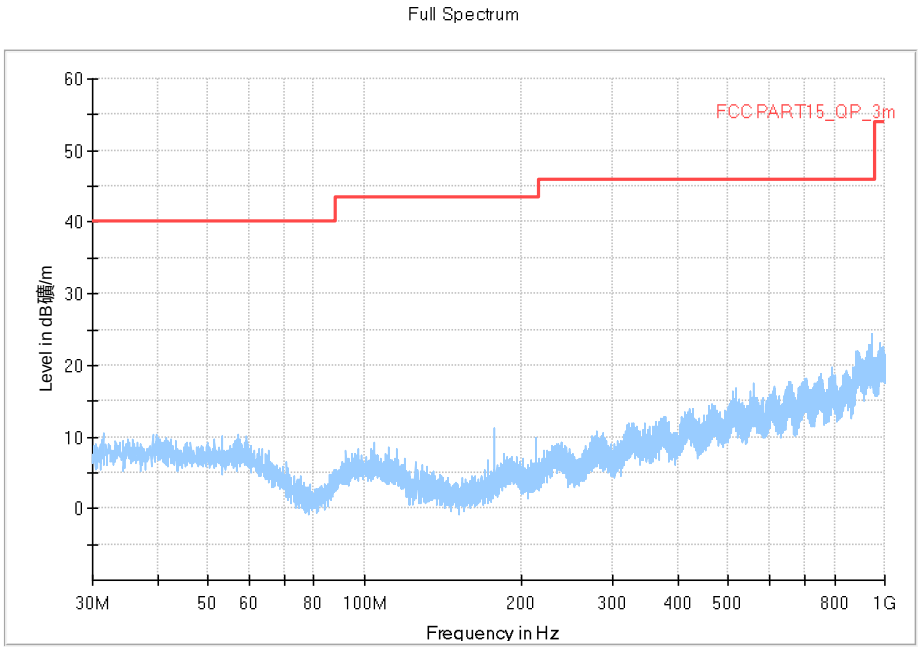
### A.9.2 Method of Measurement

| Frequency of Emission (MHz) | Limit (dBμV/m) | Measurement Distance (m) |
|---|---|---|
| 30-88 | 30 | 10 |
| 88-216 | 33.5 | 10 |
| 216-960 | 36 | 10 |
| 960-1000 | 44 | 10 |
| >1000 | 54 | 3 |

**A. 9.3 Measurement results**

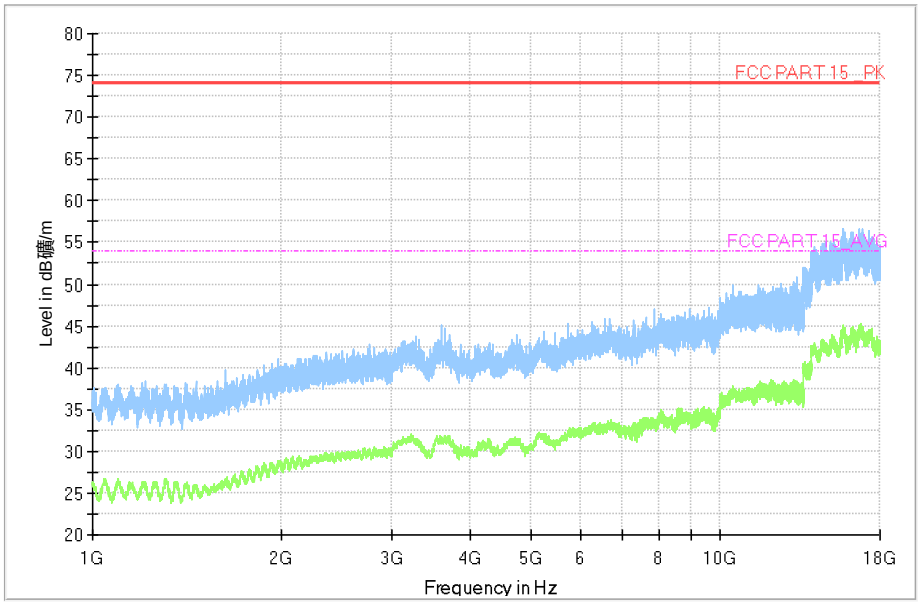
IF bandwidth: 120 kHz

**Idle Mode: 30MHz-1GHz**




RBW / VBW 1 MHz

**Idle Mode: 1GHz-18GHz**




*****END OF REPORT*****