# FCC RF TEST REPORT

| | |
|---|---|
| **Report No.:** | R201811001 |
| **Model No.:** | JA32 |
| **Grant No.:** | JOY |
| **FCC ID:** | JOYJA32 |
| **Date of Receipt:** | Oct 10,2018 |
| **Date of Test:** | Oct 10,2018~ Nov 19,2018 |
| **Date of Issue:** | Nov 26,2018 |
| **Test Result:** | PASS |

| | |
|---|---|
| **Applicant:** | KYOCERA CORPORATION |
| **Manufacturer:** | KYOCERA CORPORATION |
| **Factory:** | KYOCERA CORPORATION |
| **Product Name** | SMART PHONE |
| **Trade Mark** | KYOCERA |
| **Address:** | Yokohama Office 2-1-1 Kagahara,Tsuzuki-ku Yokohama-shi,Kanagawa,Japan |
| **Issued By:** | BYD Precise Manufacture Co., Ltd. |
| **Lab Location:** | No. 3001, Baohe Road, Baolong Longgang, Shenzhen, 518116, People's Republic of China |

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# 1 REPORT ISSUED HISTORY

| Version | Description | Issued Data |
|---|---|---|
| Rev. 01 | Original issue | Nov 26,2018 |
| | | |

# 2 CERTIFICATION

| | |
|---|---|
| **PRODUCT:** | Smart Phone |
| **MODEL:** | JA32 |
| **BRAND:** | KYOCERA |
| **APPLICANT:** | KYOCERA |
| **TEST SAMPLE:** | ENGINEERING SAMPLE |
| **SN.:** | JA32125479850089K0036/ JA32125479850089K0021 |
| **HW Version:** | JA32 |
| **SW Version:** | Sdm660_64-userdebug 9 |
| **TESTED:** | Oct 10,2018~ Nov 19,2018 |
| **STANDARDS:** | FCC 47 CFR Part2,22(H),24(E),27(L) |

The above equipment has been tested by **BYD Precise Manufacture Co., Ltd.,** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**PREPARED BY :** , **, DATE:** **2018-11-26**

(Fen Lu，Yi Xue / Engineer)

**TECHNICAL ACCEPTANCE :** **, DATE:** **2018-11-26**

Responsible for EMS (Zhaohui Feng / Manager)

**APPROVED BY :** **, DATE:** **2018-11-26**

(Jie Yan / Director )

# 3 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| SN. | FCC RULE | Description | RESULT | REMARK |
|---|---|---|---|---|
| JA32125479850089K0036 | §2.1046 | Conducted Output Power | Pass | Reporting Only |
| | §24.232(d) | peak-to-average ratio | Pass | <13dB |
| | §2.1049<br>§22.917 ( b )<br>§24.238(b)<br>§27.53(g) | Bandwidth | Pass | Reporting Only |
| | §2.1051<br>§22.917(a)<br>§24.238(a)<br>§27.53(h) | Band Edges | Pass | <43+10log10(P[Watts]) |
| | §2.1051<br>§22.917(a)<br>§24.238(a)<br>§27.53(h) | Spurious Emission | Pass | <43+10log10(P[Watts]) |
| | §2.1055<br>§22.355<br>§24.235<br>§27.54 | Frequency Stability | Pass | <2.5ppm for Part22<br>Within Authorized Band |
| | §Part22.913(a)(2)<br>§Part24.232(c)<br>§Part27.50(d)(4) | ERP/EIRP | Pass | Band5:ERP<7W<br>Band2:EIRP<2W<br>Band4:EIRP<1W |
| JA32125479850089K0021 | §2.1053<br>§22.917(a)<br>§24.238(a)<br>§27.53(h) | Field Strength of Spurious Radiation | Pass | <43+10log10(P[Watts]) |

## 3.1 Measurement Uncertainty

| Parameter | Measurement Uncertainty |
|---|---|
| Occupied Channel Bandwidth | ±5% |
| RF output power, Conducted | ±0.59dB |
| Bandwidth, conducted | ±1.78kHz |
| Unwanted Emissions, conducted | ±0.9dB |
| Temperature | ±1℃ |
| Humidity | ±5% |
| DC and low frequency voltages | ±0.4% |

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

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 5.0dB |

**Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)**

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 4.8dB |

# 4 GENERAL INFORMATION

## 4.1 Test Equipments List

| Description & Manufacturer | MODEL NO. | SERIAL NO. | Next Calibration date |
|---|---|---|---|
| WIDEBAND RADIO COMMUNICATION TESTER ROHDE & SCHWARZ | CMW500 | 148277 | 2019/10/16 |
| SIGNAL ANALYZER ROHDE & SCHWARZ | FSQ26 | 200393 | 2019/4/9 |
| CMU200 ROHDE & SCHWARZ | CMU200 | 117747 | 2018/5/30 |
| Temperature Chamber WEISS | Temperature Chamber | '58226087670060 | 2019/3/5 |
| DC Power Supply Agilent | E3632A | MY40029031 | 2019/3/5 |
| RF cable | Huber Suhner SUCOFLEX 104PE | - | - |
| PC | - | 30008979 | - |
| Power Divider | - | C279810-01 | - |
| Universal radio communication tester | CMU 200 | 100677 | 2019.4.9 |
| Antenna | ETS 3142C | 79888 | 2019.1.29 |
| Antenna | ETS 3117 | 57412 | 2019.1.25 |
| EMI test receiver | ESU | 100041 | 2019.4.9 |
| EMC32 software | R&S | - | - |
| ETS 3M Semi-Anechoic Chamber | 9.47m*6.59m*5.91m | A88030002609000010071 | 2019.1.22 |

NOTE: Calibration cycle 12 months.

## 4.2 Description of Test Modes

| Test items | function type | Channel |
|---|---|---|
| Conducted Output Power | GSM850/PCS1900(GMSK+8PSK)+WCDMA BAND5(RMC 12.2kbps) | L/M/H |
| peak-to-average ratio | | L/M/H |
| Bandwidth | | L/M/H |
| Band Edges | | L/H |
| Spurious Emission | | L/M/H |
| Frequency Stability | | M |
| Effective Radiated Power and Effective Isotropic Radiated Power | | L/M/H |
| Filed Strength of Spurious Radiation | GSM 850 TX mode /PCS 1900 TX mode/ WCDMA Band5 TX mode | M |

## 4.3 Test Environment and List of Software and Accessory

| Test Items | Software | Accessory | Environment |
|---|---|---|---|
| Conducted Output Power | - | USB Cable、Fake battery、Power Divider | Temp.:25℃±3 |
| | | | Humi:30%~60% |
| | | | Volt.:3.8V |
| peak-to-average ratio | - | USB Cable、Fake battery、Power Divider | Temp.:25℃±3 |
| | | | Humi:30%~60% |
| | | | Volt.:3.8V |
| Bandwidth | - | USB Cable、Fake battery、Power Divider | Temp.:25℃±3 |
| | | | Humi:30%~60% |
| | | | Volt.:3.8V |
| Band Edges | - | USB Cable、Fake battery、Power Divider | Temp.:25℃±3 |
| | | | Humi:30%~60% |

| | | | |
|---|---|---|---|
| | | | Volt.:3.8V |
| Spurious Emission | - | USB Cable、Fake battery、Power Divider | Temp.:25℃±3 |
| | | | Humi:30%~60% |
| | | | Volt.:3.8V |
| Frequency Stability | - | USB Cable、Fake battery、Power Divider | Temp.:-20℃~60℃ |
| | | | Humi:30%~60% |
| | | | Volt.:3.8、3.42、4.18V |
| Effective Radiated Power and Effective Isotropic Radiated Power | - | USB Cable、Fake battery、Power Divider | Temp.:25℃±3 |
| | | | Humi:30%~60% |
| | | | Volt.:3.8V |
| Filed Strength of Spurious Radiation | EMC32 | Charger: AC-10UC(NOKIA) Headset: HSEJ03JY(Mi) | Temp.:25℃±3 |
| | | | Humi:30%~60% |
| | | | Volt.:3.8V |

## 4.4 Testing Location

| | |
|---|---|
| **Test Site** | BYD Precise Manufacture Co., Ltd. |
| **Test Site Location** | No. 3001, Baohe Road, Baolong Longgang, Shenzhen, 518116, People’ s Republic of China |
| **Post Code** | 518116 |
| **Telephone** | +86-755 8489 8888 55501 |
| **Fax** | +86-755 8964 3771 |

## 4.5 Test Facility

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

**• A2LA (Certificate No. 4886.01)**

BYD Precise Manufacture Co., Ltd., Baolong Shenzhen Laboratory is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4886.01.

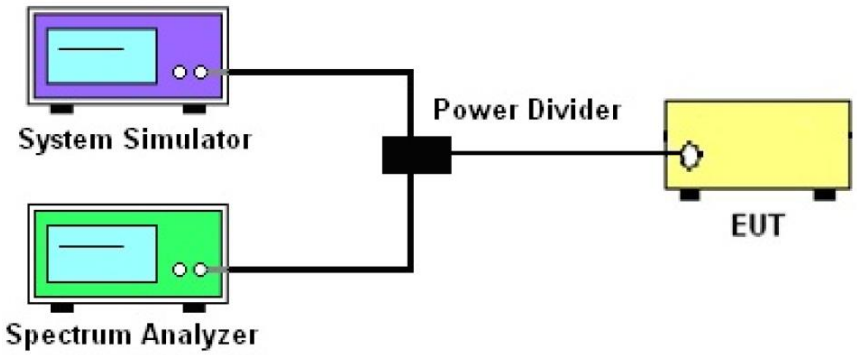
**• FCC –Designation Number: CN1232**

BYD Precise Manufacture Co., Ltd., Baolong Shenzhen Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1232.

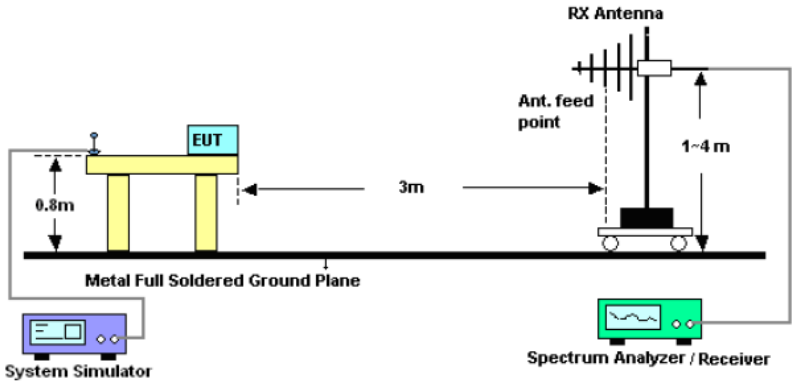
## 4.6 Configuration of System Under Test

Conducted:

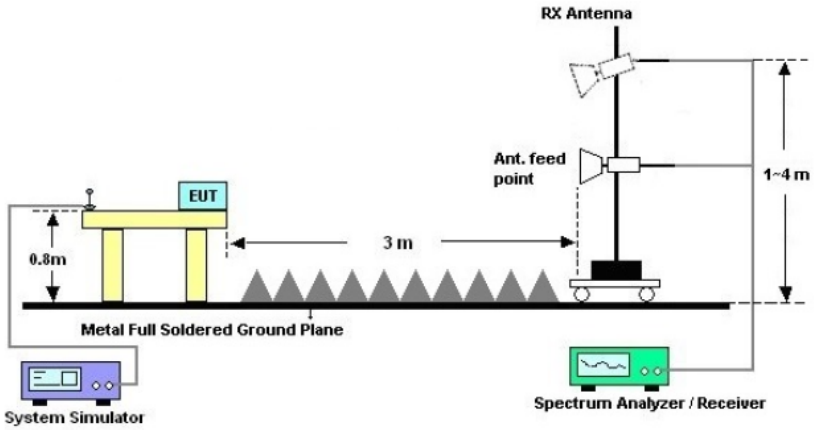



Radiated:

**For radiated emissions from 30MHz to 1GHz**




**For radiated emissions above 1GHz**



## 4.7 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part2, 22(H), 24(E), 27(L)

ANSI/TIA/EIA-603-D-2010

FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

All test items have been performed and recorded as per the above standards.

# 5 TEST TYPES AND RESULTS

## 5.1 Conducted Output Power (Reporting Only)

### 5.1.1 Description of the Conducted Output Power

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported

### 5.1.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

### 5.1.3 Test Procedure

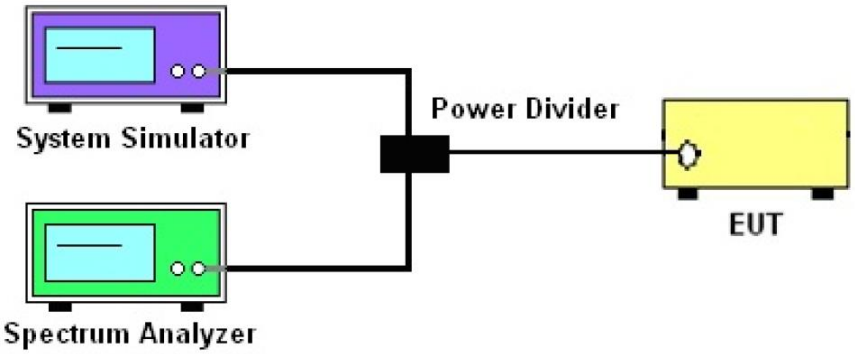
a. The transmitter output port was connected to the system simulator.

b. Set EUT at maximum power through system simulator.

c. Select lowest, middle, and highest channels for each band and different modulation.

d. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

### 5.1.4 Test Setup




### 5.1.5 Test Results

| Modes | GSM850 | | | Modes | PCS1900 | | |
|---|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | Channel | 512 | 661 | 810 |
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | Frequency(MHz) | 1850.2 | 1880 | 1909.8 |
| Conducted Power (dBm) | 32.83 | 32.54 | 32.36 | Conducted Power(dBm) | 27.97 | 28.72 | 29.35 |

| Modes | WCDMA BAND5 | | |
|---|---|---|---|
| Channel | 4132 | 4182 | 4233 |
| Frequency(MHz) | 826.4 | 836.4 | 846.6 |
| Conducted Power(dBm) | 22.66 | 22.89 | 22.70 |

| Modes | GPRS 850 | | | Modes | GPRS 1900 | | |
|---|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | Channel | 512 | 661 | 810 |
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | Frequency(MHz) | 1850.2 | 1880 | 1909.8 |
| Conducted Power(dBm) | 33.04 | 32.75 | 32.59 | Conducted Power(dBm) | 28.42 | 29.05 | 29.54 |

| Modes | EGPRS 850 | | | Modes | EGPRS 1900 | | |
|---|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | Channel | 512 | 661 | 810 |
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | Frequency(MHz) | 1850.2 | 1880 | 1909.8 |
| Conducted Power(dBm) | 26.68 | 26.66 | 26.81 | Conducted Power(dBm) | 24.55 | 24.83 | 25.54 |

## 5.2 Peak-To-Average Ratio

### 5.2.1 Description

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

### 5.2.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

### 5.2.3 Test Procedure

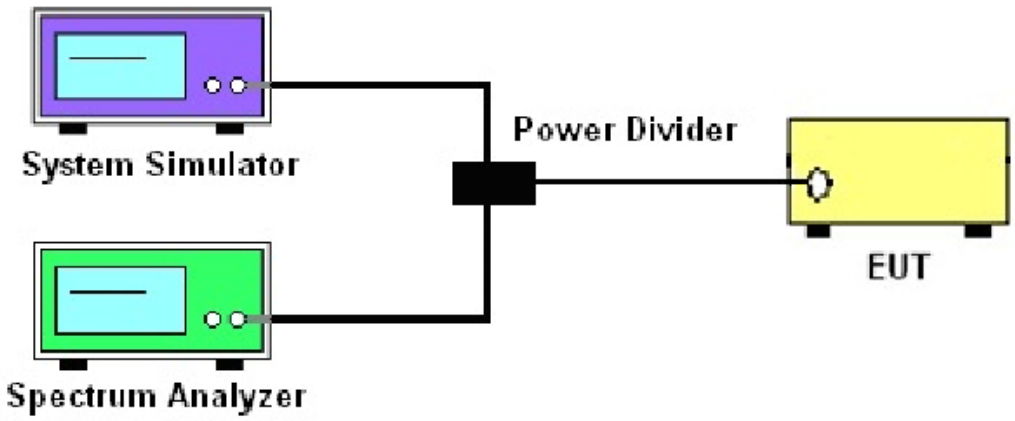
a. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

b. Set EUT in maximum power output.

c. For GSM, Set spectrum analyzer: RBW=1MHz, VBW=3MHz, Peak detector on spectrum analyzer for first trace, RMS detector on spectrum analyzer for second trace. Record the deviation as Peak to Average Ratio.

d. For WCDMA, Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.

### 5.2.4 Test Setup



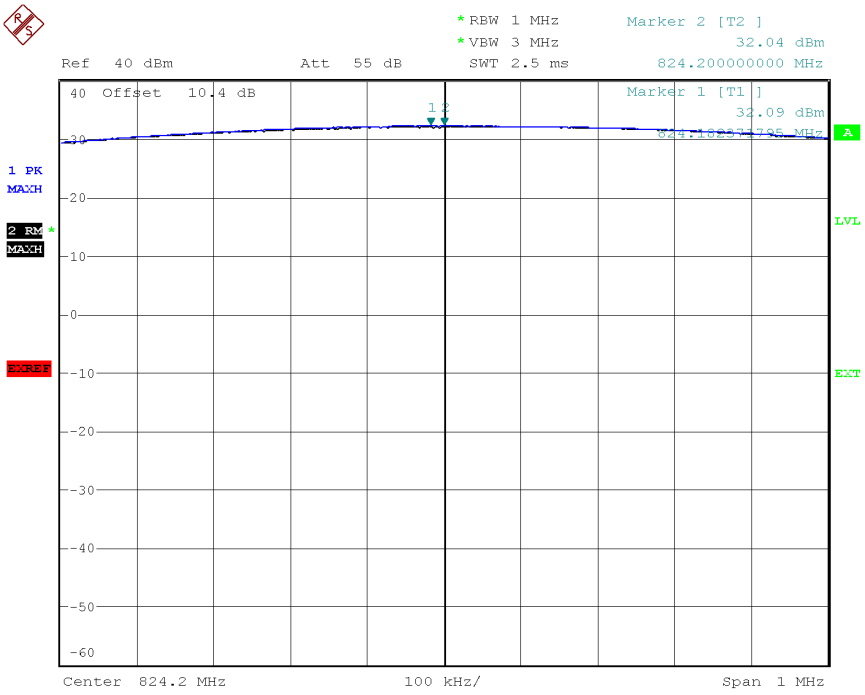

### 5.2.5 Test Result

| Modes | GSM850 | PCS1900 |
|---|---|---|

| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
|---|---|---|---|---|---|---|
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | 1850.2 | 1880 | 1909.8 |
| Peak-to-Average Ratio(dB) | 0.05 | 0.05 | 0.05 | 0.03 | 0.05 | 0.06 |
| Result(<13dB) | Pass | Pass | Pass | Pass | Pass | Pass |
| Modes | WCDMA BAND5 | | | | | |
| Channel | 4132 | 4182 | 4233 | | | |
| Frequency(MHz) | 826.4 | 836.4 | 846.6 | | | |
| Peak-to-Average Ratio(dB) | 3.04 | 3.01 | 2.85 | | | |
| Result(<13dB) | Pass | Pass | Pass | | | |

| Modes | GPRS850 | | | GPRS1900 | | |
|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | 1850.2 | 1880 | 1909.8 |
| Peak-to-Average Ratio(dB) | 0.05 | 0.03 | 0.06 | 0.05 | 0.06 | 0.06 |
| Result(<13dB) | Pass | Pass | Pass | Pass | Pass | Pass |

| Modes | EGPRS850 | | | EGPRS1900 | | |
|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | 1850.2 | 1880 | 1909.8 |
| Peak-to-Average Ratio(dB) | 0.02 | 0.07 | 0.09 | 0.09 | 0.08 | 0.06 |
| Result(<13dB) | Pass | Pass | Pass | Pass | Pass | Pass |

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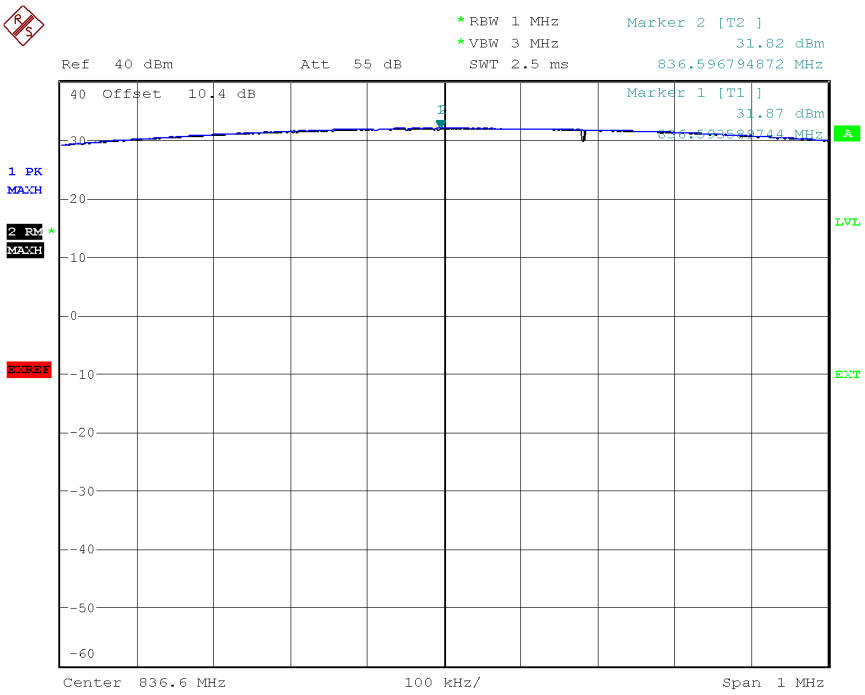
GSM850 Low Channel

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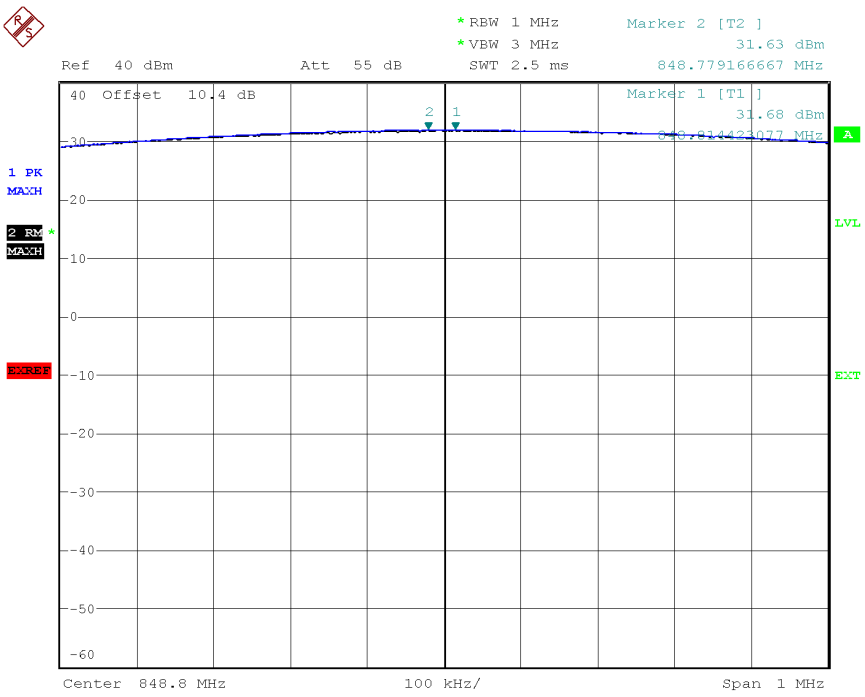


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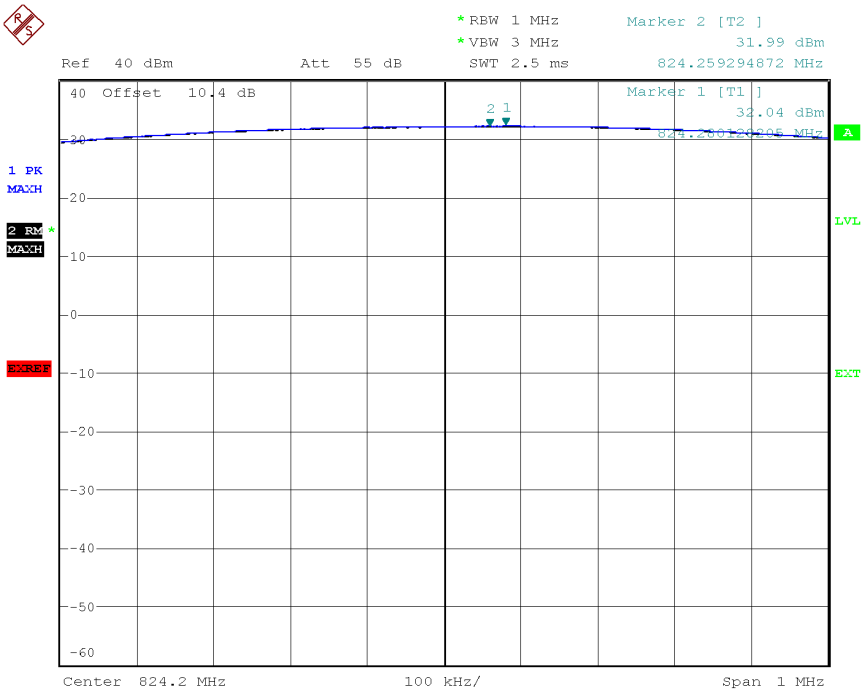


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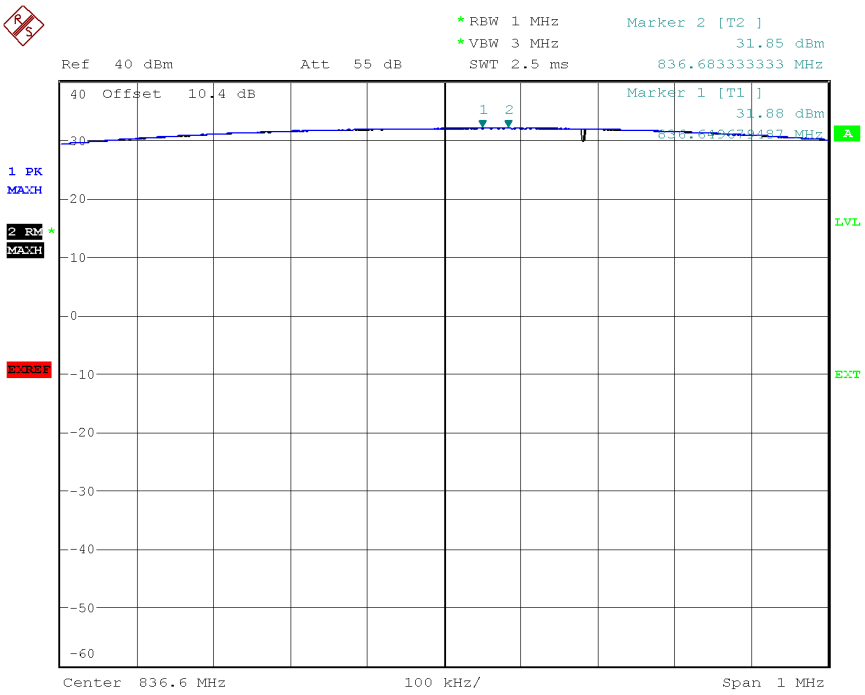
GPRS850 Low Channel

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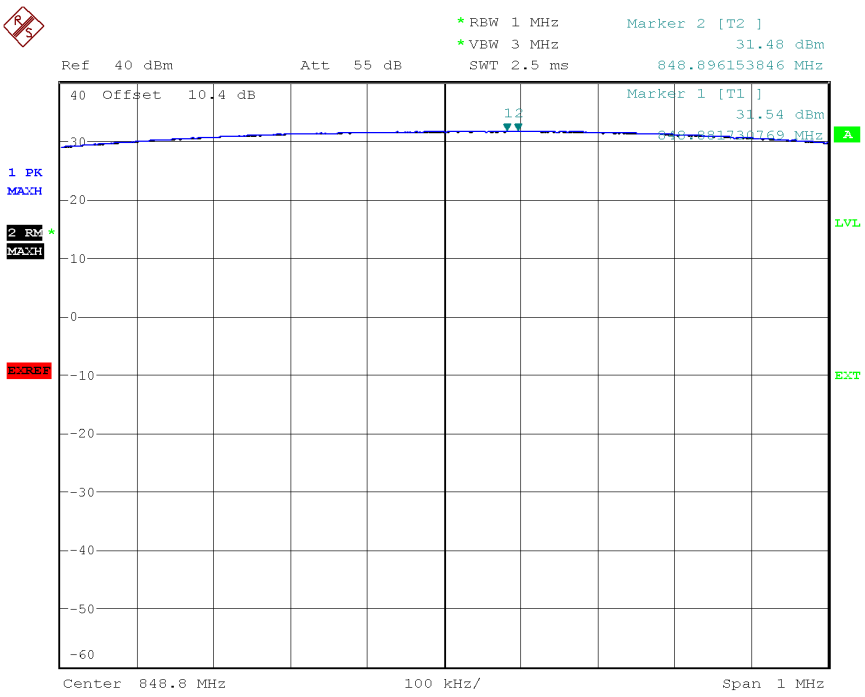
GPRS850 Mid Channel

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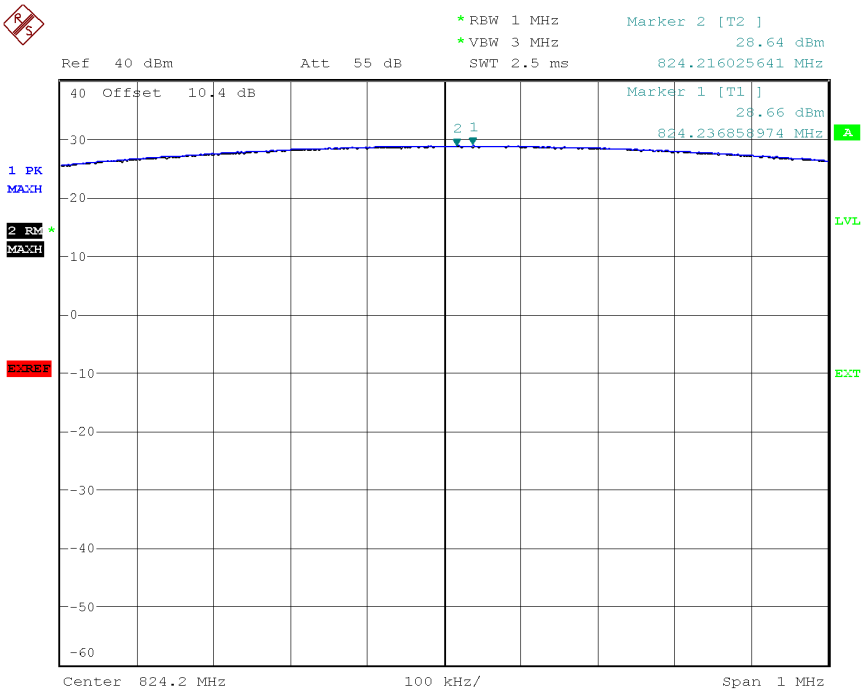
GPRS850 High Channel

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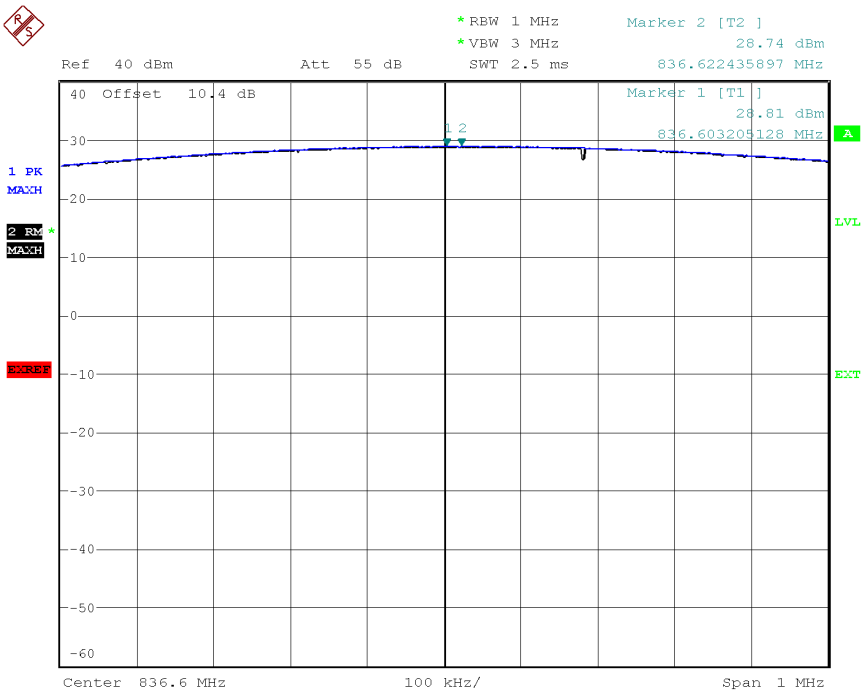
EGPRS850 Low Channel

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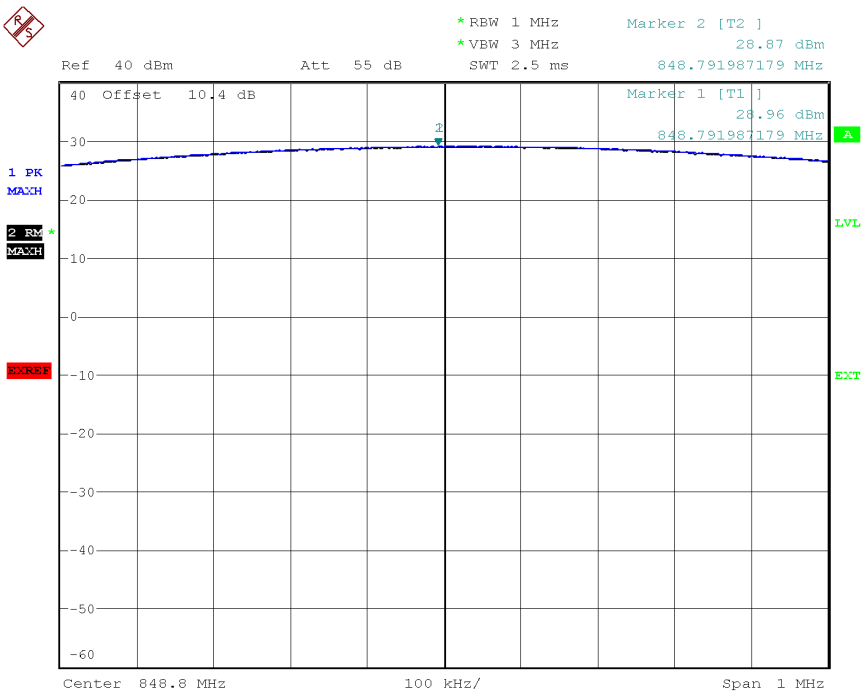
EGPRS850 Mid Channel

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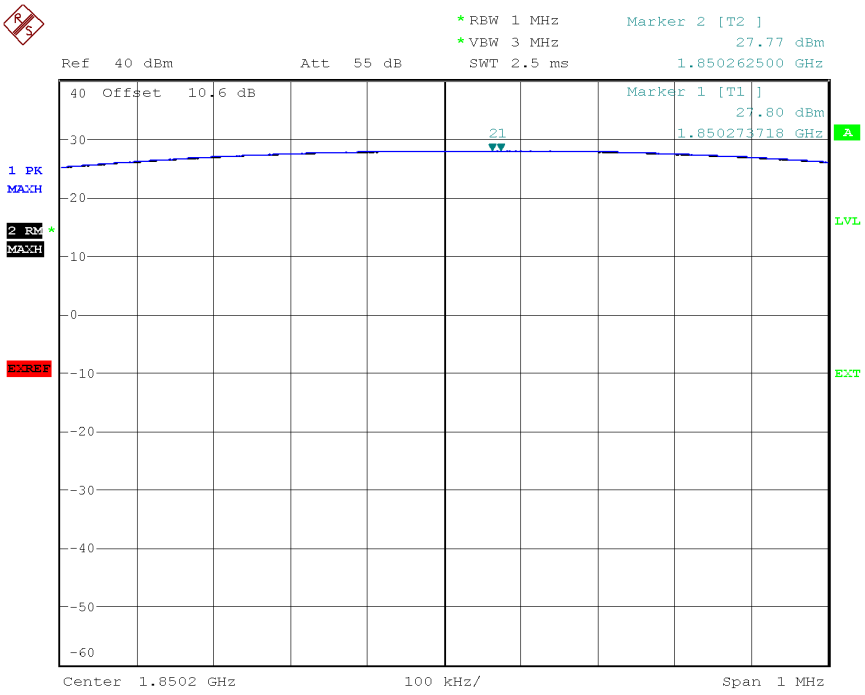
EGPRS850 High Channel

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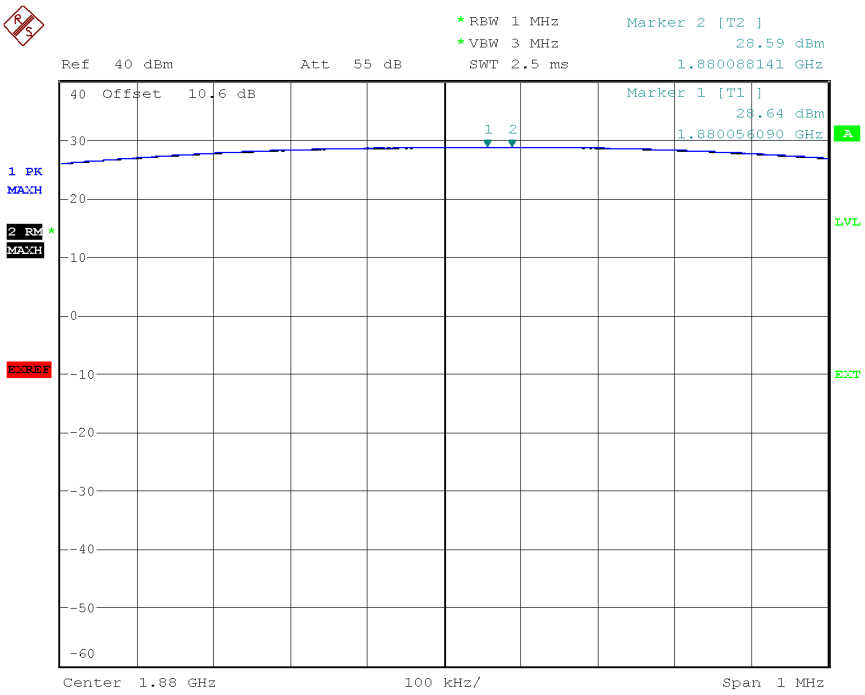
PCS1900 Low Channel

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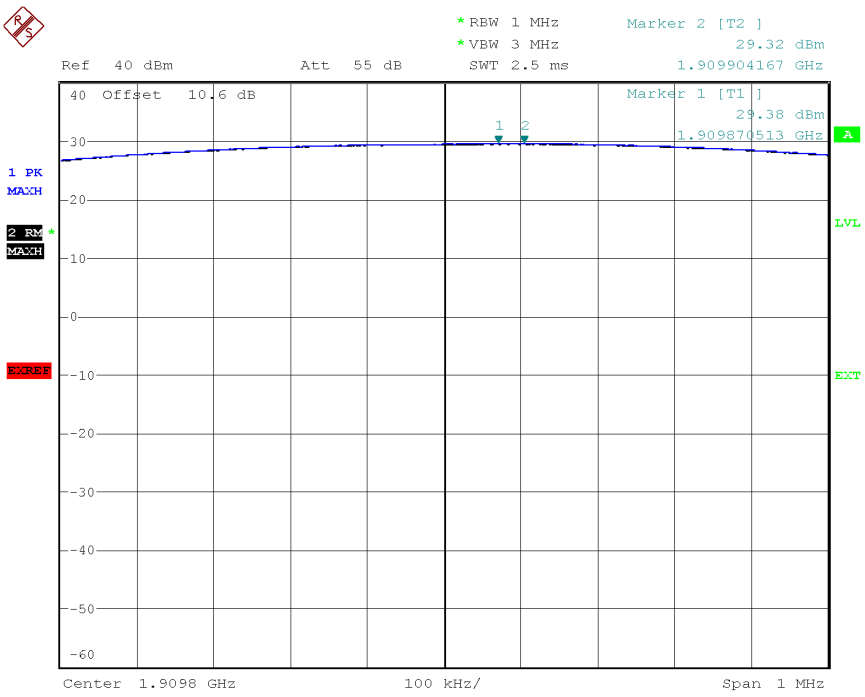
PCS1900 Mid Channel

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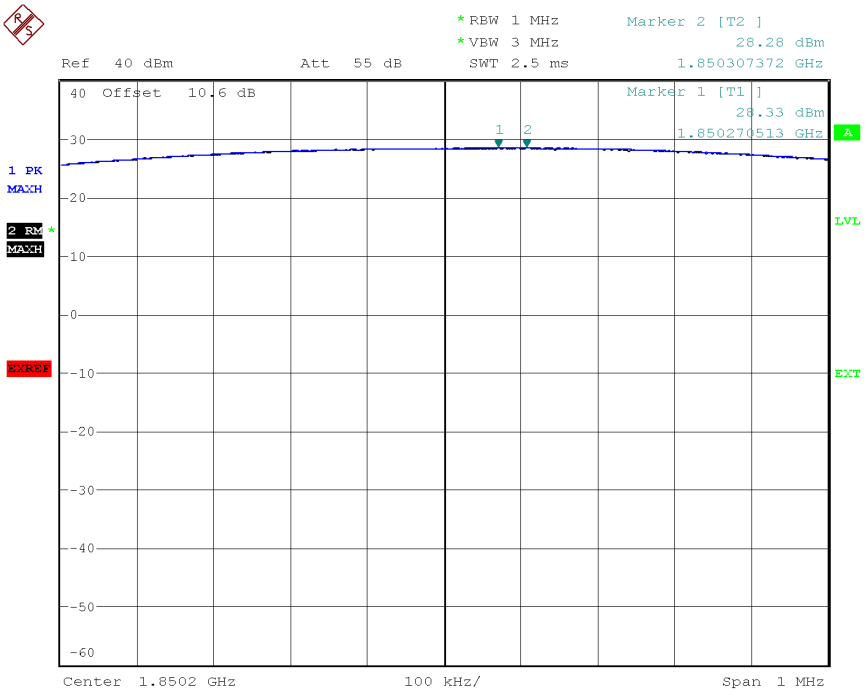
PCS1900 High Channel

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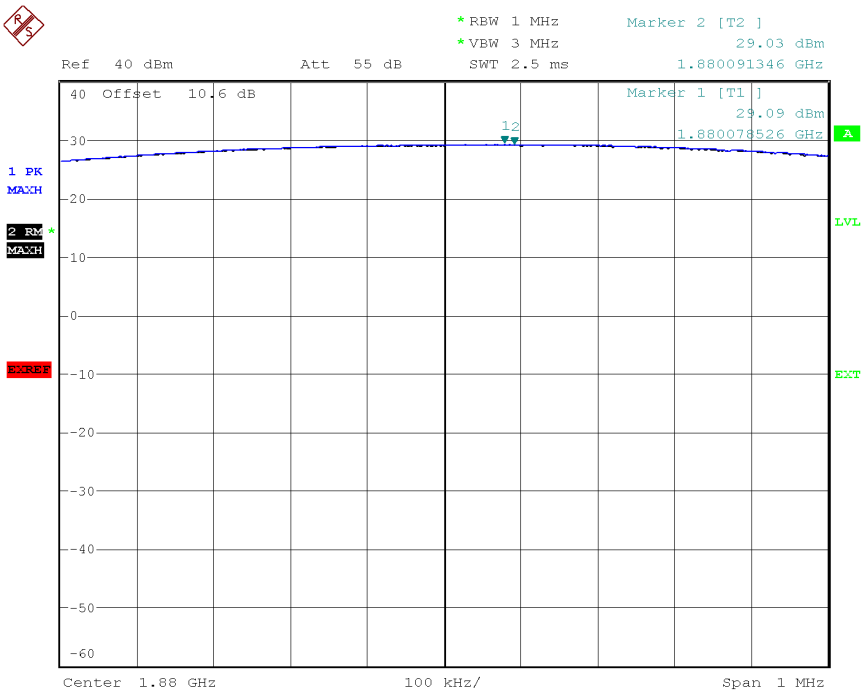
GPRS1900 Low Channel

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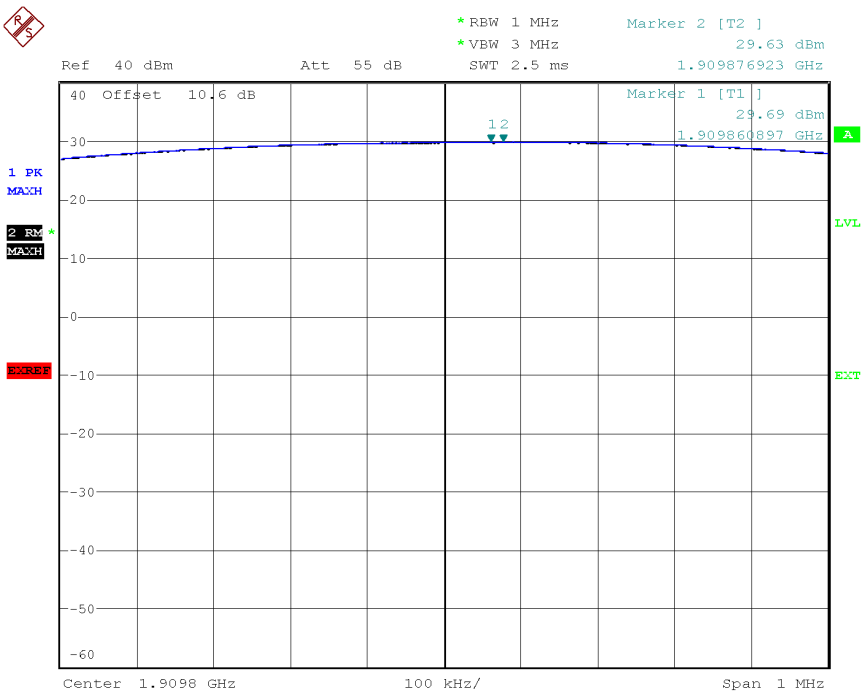
GPRS1900 Mid Channel

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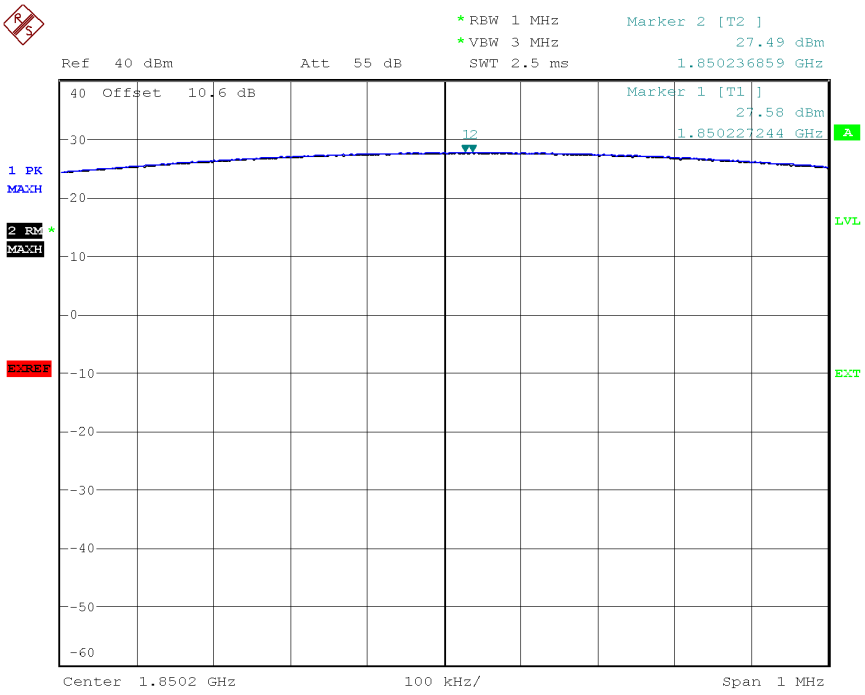
GPRS1900 High Channel

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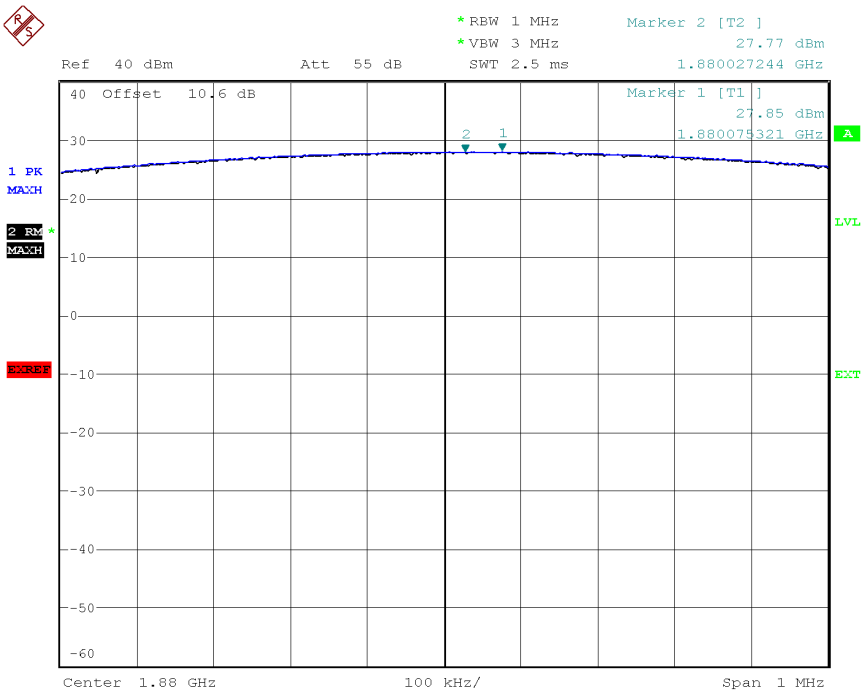
EGPRS1900 Low Channel

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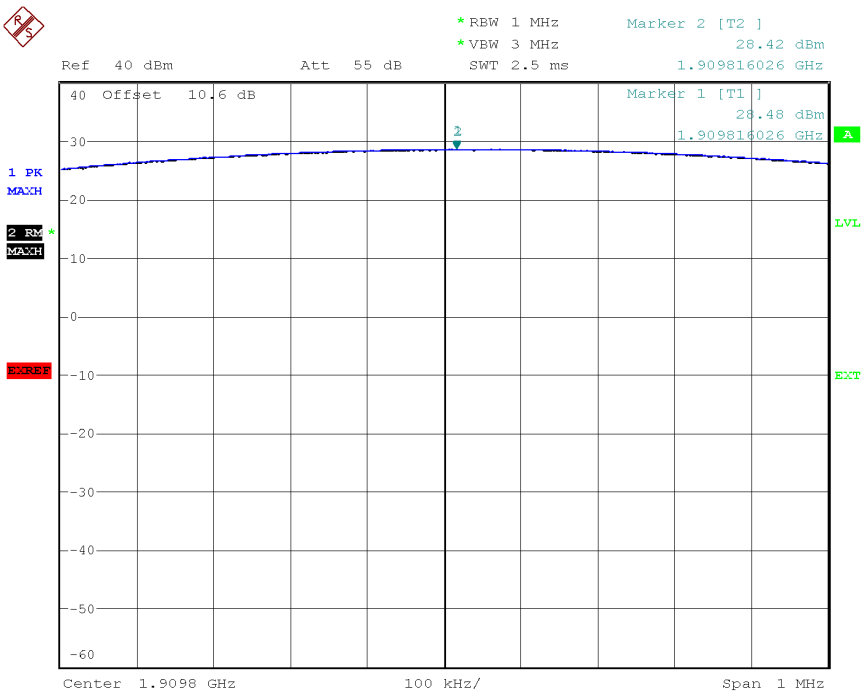
EGPRS1900 Mid Channel

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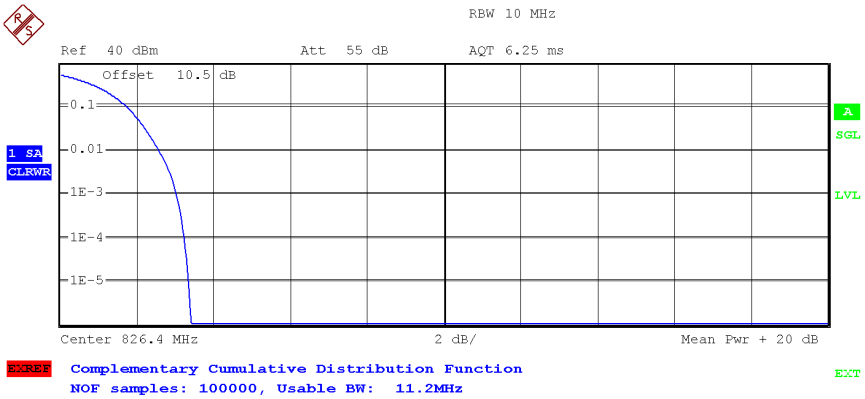
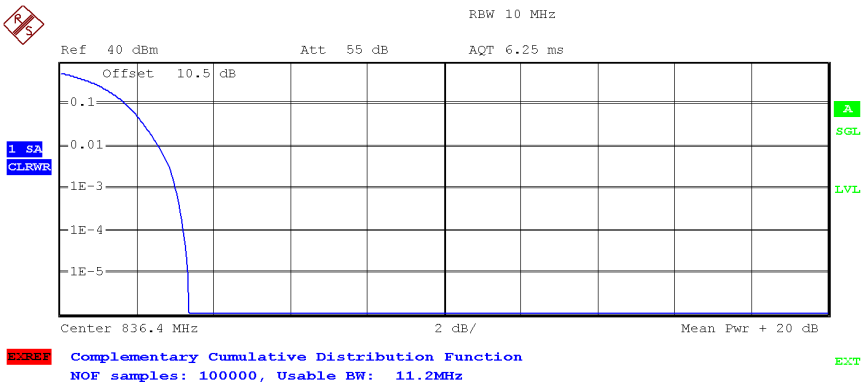
EGPRS1900 High Channel




| | Trace 1 |
|---|---|
| Mean | 21.59 dBm |
| Peak | 25.00 dBm |
| Crest | 3.41 dB |
| 10 % | 1.73 dB |
| 1 % | 2.56 dB |
| .1 % | 3.04 dB |
| .01 % | 3.24 dB |

Date: 15.OCT.2018 17:01:49

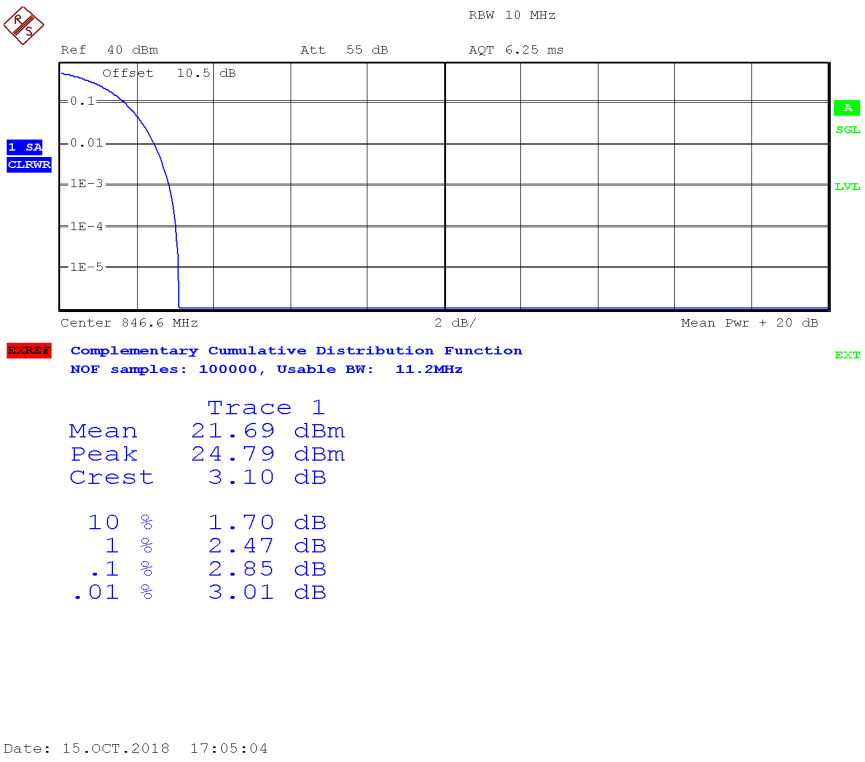
WCDMA BAND5 Low Channel




| | Trace 1 |
|---|---|
| Mean | 21.79 dBm |
| Peak | 25.14 dBm |
| Crest | 3.35 dB |
| 10 % | 1.70 dB |
| 1 % | 2.56 dB |
| .1 % | 3.01 dB |
| .01 % | 3.21 dB |

Date: 15.OCT.2018 17:03:34

WCDMA BAND5 Mid Channel




WCDMA BAND5 High Channel

## 5.3 99% & 26dB Occupied Bandwidth (Reporting Only)

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

The 99% occupied band width is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

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

### 5.3.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

### 5.3.3 Test Procedure

a. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

b. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.

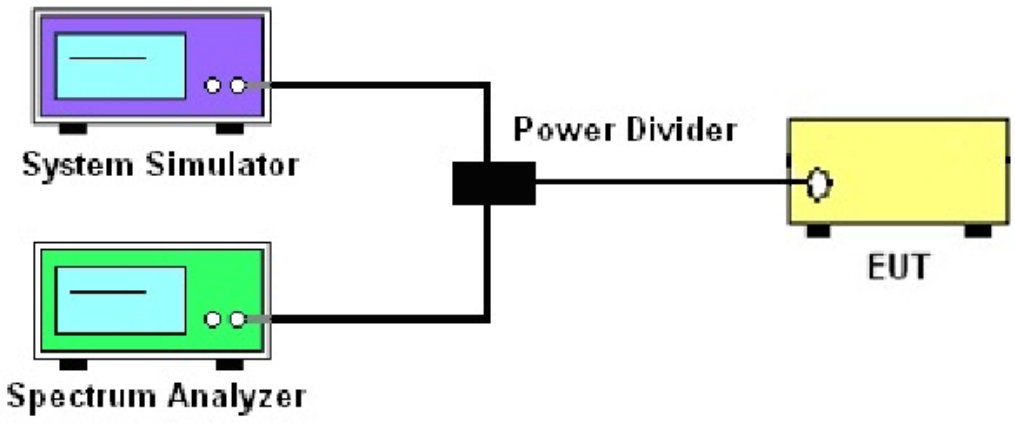
c. The 99% occupied bandwidth were measured, set RBW=1~5% of the anticipated OBW, VBW≥3*RBW, peak detector, trace maximum hold.

d. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)

e. Use the 99% power bandwidth function of the spectrum analyzer and report the measured bandwidth.

f. Use the N dB Down function of the spectrum analyzer and report the measured bandwidth.

### 5.3.4 Test Setup



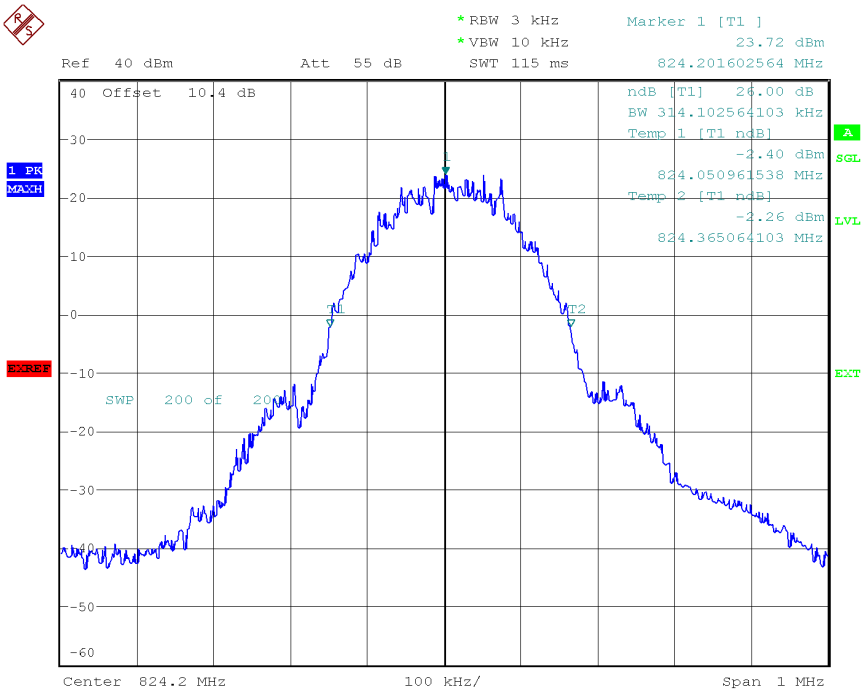
### 5.3.5 Test Result

| Modes | GSM850 | | | PCS1900 | | |
|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | 1850.2 | 1880 | 1909.8 |
| 26dB OBW(kHz) | 314.10 | 312.50 | 310.90 | 312.5 | 314.10 | 314.10 |
| 99% OBW(kHz) | 245.19 | 246.79 | 245.19 | 241.99 | 241.99 | 241.99 |

| Modes | WCDMA BAND5 | | |
|---|---|---|---|
| Channel | 4132 | 4182 | 4233 |
| Frequency(MHz) | 826.4 | 836.4 | 846.6 |
| 26dB OBW(kHz) | 4.73 | 4.70 | 4.73 |
| 99% OBW(kHz) | 4.15 | 4.13 | 4.13 |

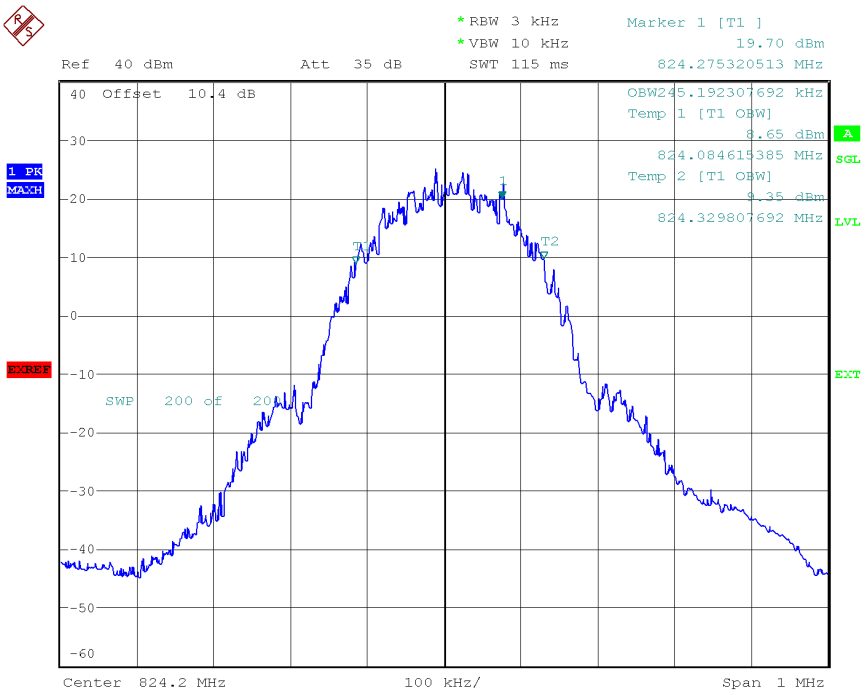
| Modes | GPRS850 | | | GPRS1900 | | |
|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | 1850.2 | 1880 | 1909.8 |
| 26dB OBW(kHz) | 310.90 | 312.50 | 310.90 | 315.71 | 310.90 | 312.50 |
| 99% OBW(kHz) | 248.40 | 246.79 | 243.59 | 248.40 | 245.19 | 243.59 |

| Modes | EGPRS850 | | | EGPRS1900 | | |
|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | 1850.2 | 1880 | 1909.8 |
| 26dB OBW(kHz) | 310.90 | 309.29 | 307.69 | 302.88 | 302.88 | 299.68 |
| 99% OBW(kHz) | 246.79 | 245.19 | 248.40 | 246.79 | 253.21 | 250.00 |



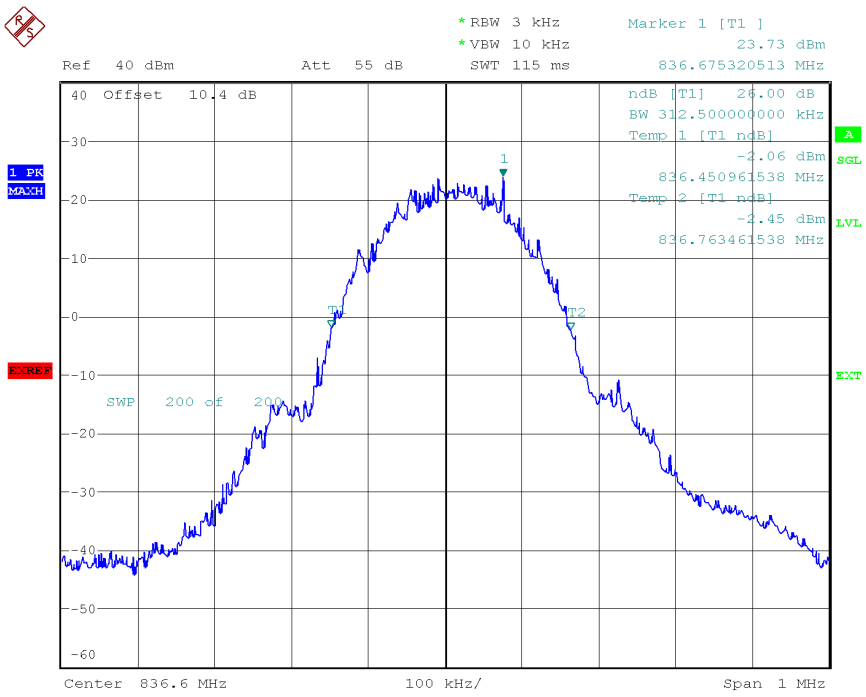

Date: 16.OCT.2018 12:24:51

GSM850 Low Channel 26dB BW



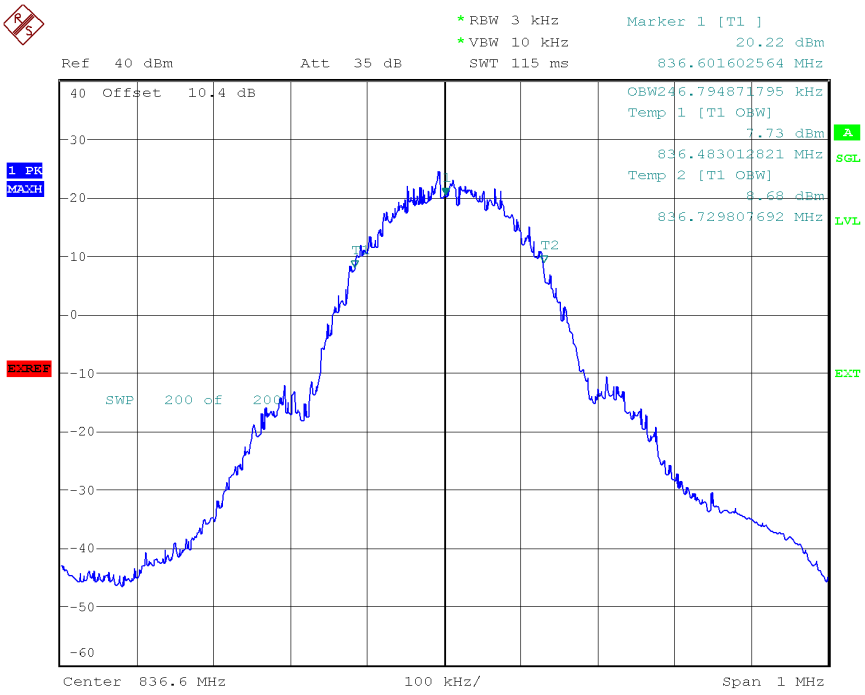

Date: 16.OCT.2018 12:33:33

GSM850 Low Channel 99% OBW



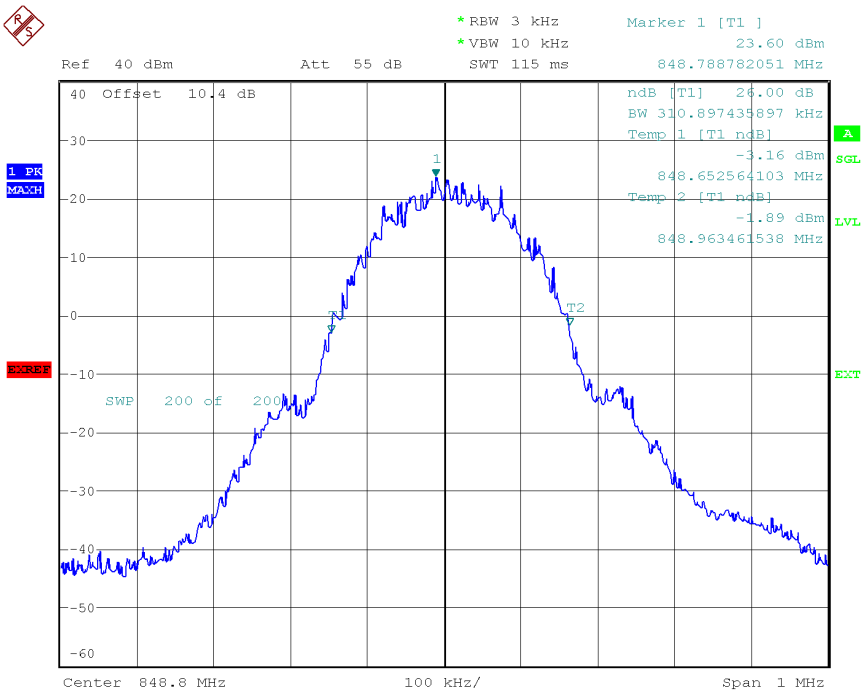

Date: 16.OCT.2018 12:29:59

GSM850 Mid Channel 26dB BW



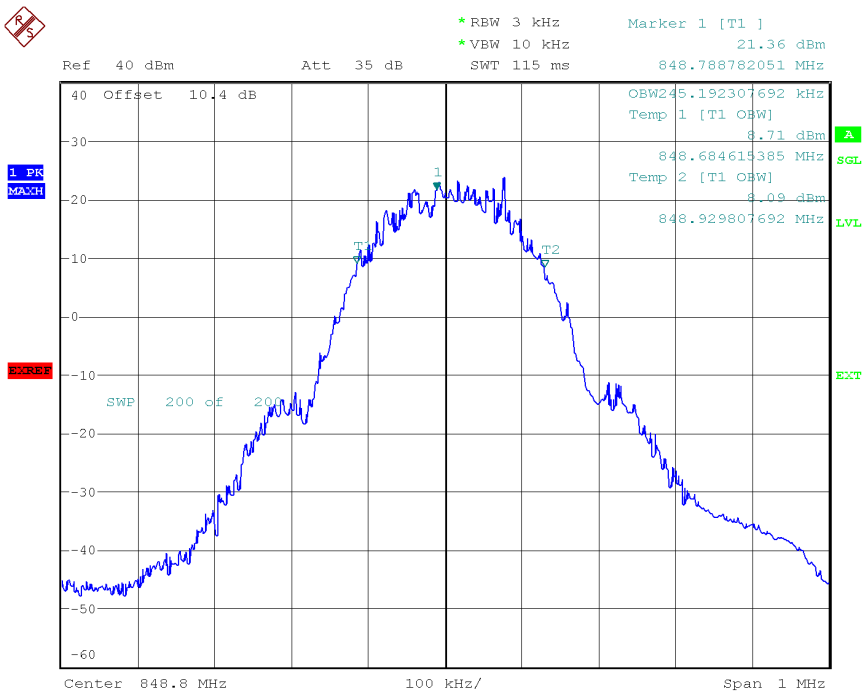

Date: 16.OCT.2018 12:35:09

GSM850 Mid Channel 99% OBW



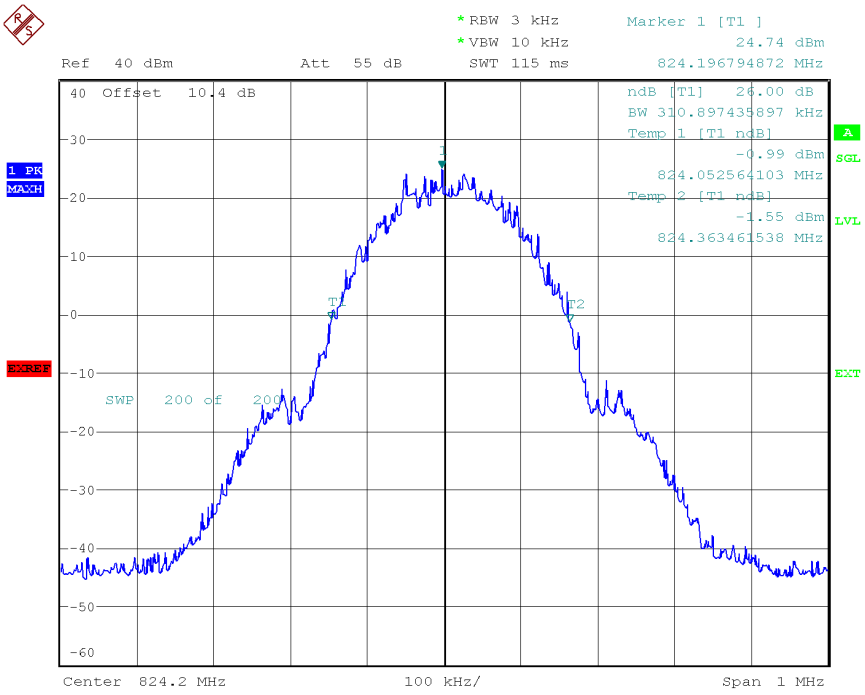

Date: 16.OCT.2018 12:36:19

GSM850 High Channel 26dB BW



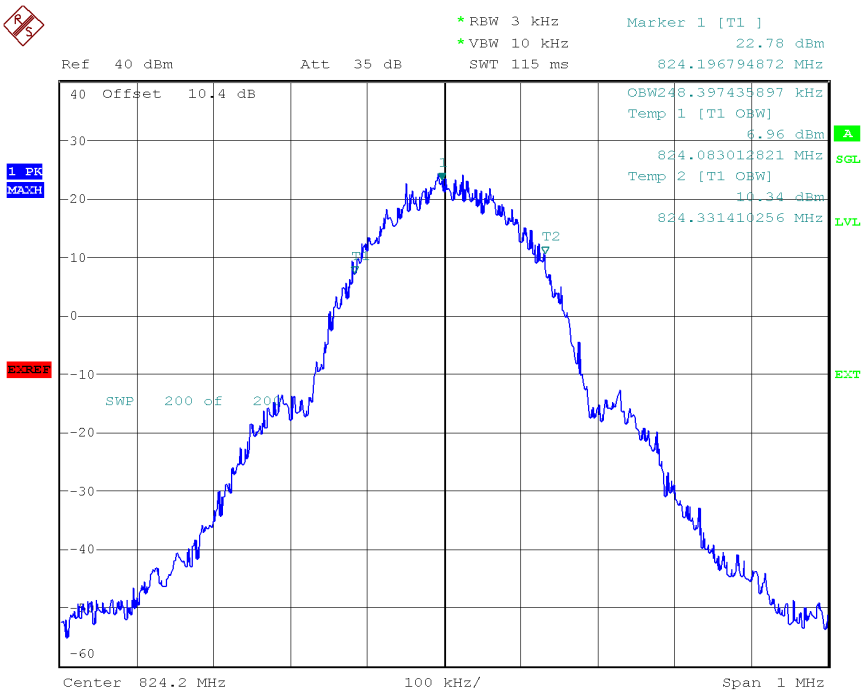

Date: 16.OCT.2018 12:37:26

GSM850 High Channel 99% OBW



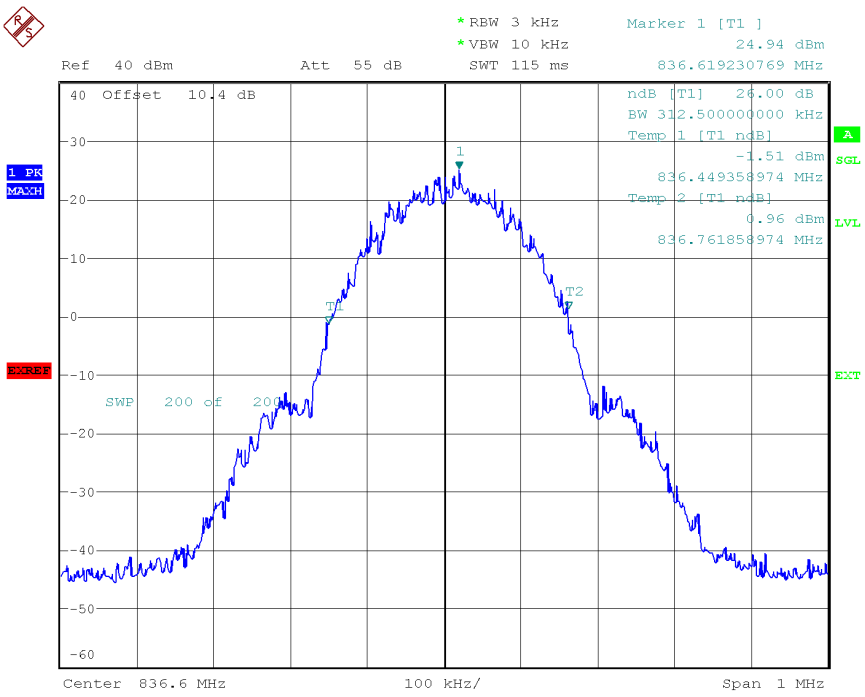

Date: 18.OCT.2018 11:40:38

GPRS850 Low Channel 26dB BW



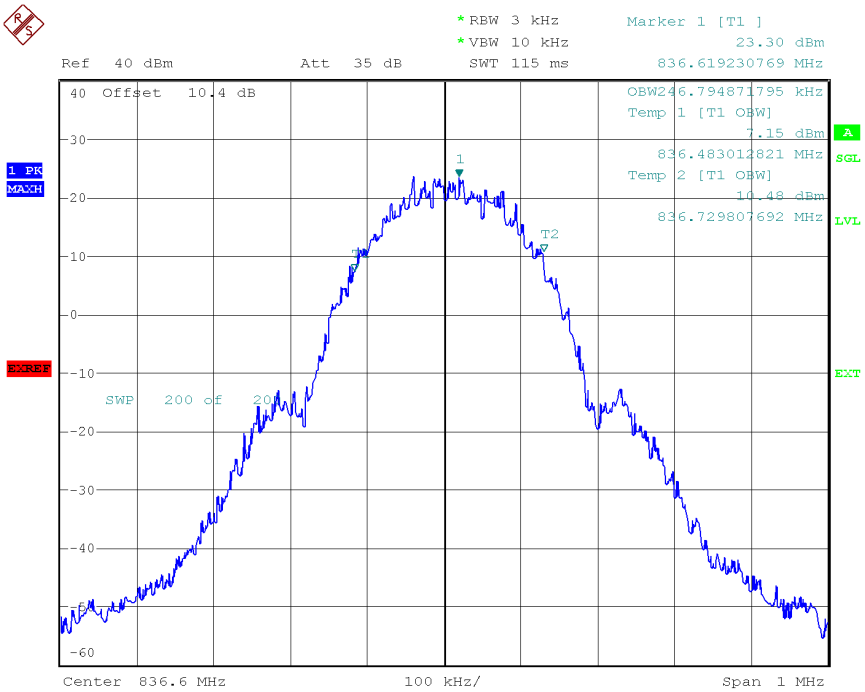

Date: 18.OCT.2018 11:41:33

GPRS850 Low Channel 99% OBW



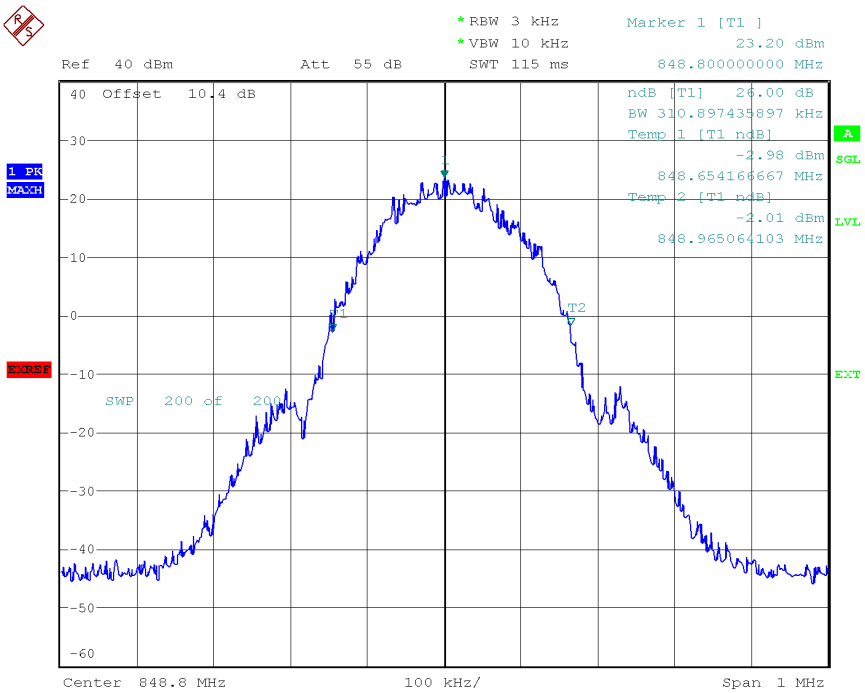

Date: 18.OCT.2018 11:38:01

GPRS850 Mid Channel 26dB BW



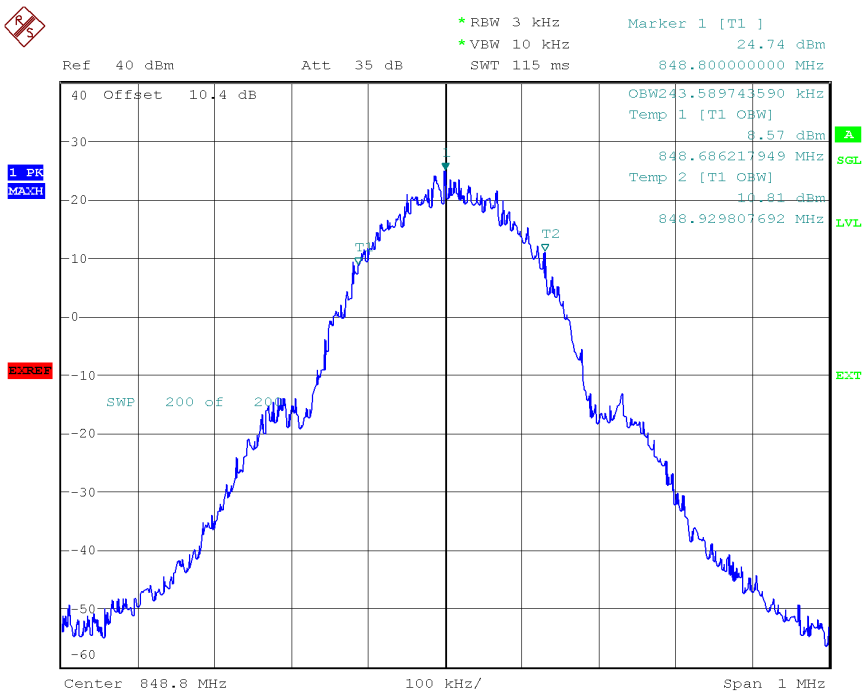

Date: 18.OCT.2018 11:39:14

GPRS850 Mid Channel 99% OBW



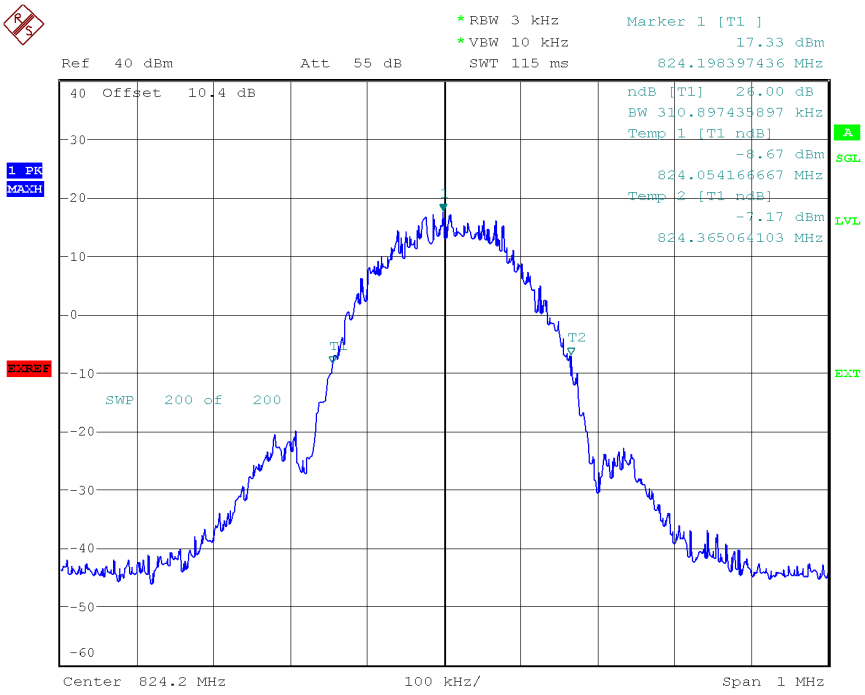

Date: 18.OCT.2018 11:35:33

GPRS850 High Channel 26dB BW



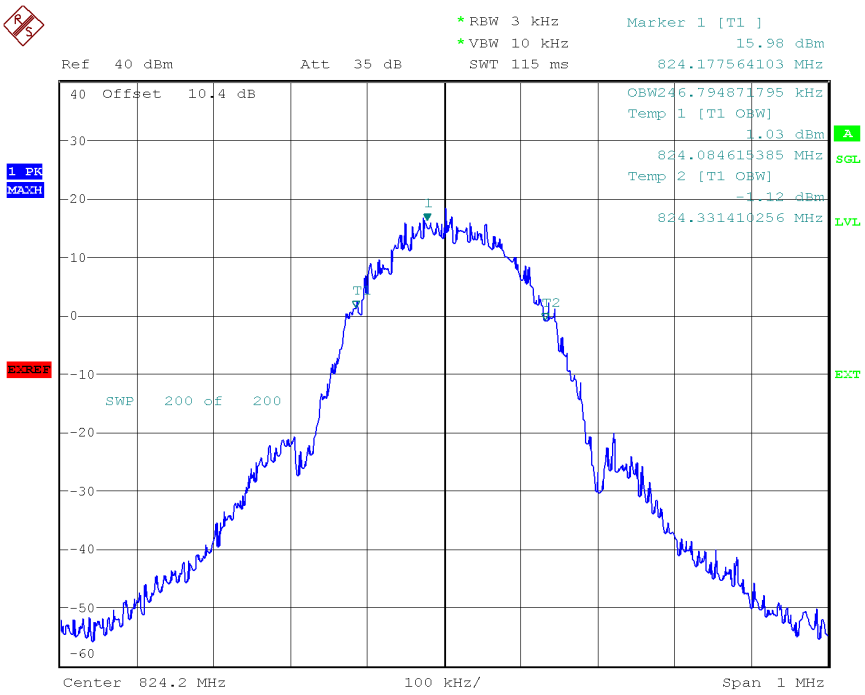

Date: 18.OCT.2018 11:36:35

GPRS850 High Channel 99% OBW



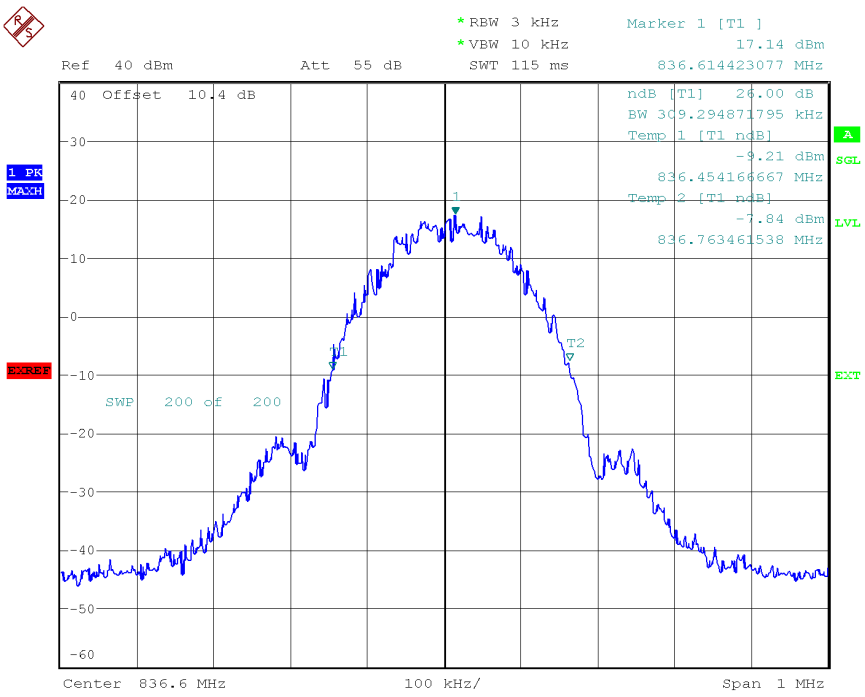

Date: 18.OCT.2018 15:55:37

EGPRS850 Low Channel 26dB BW



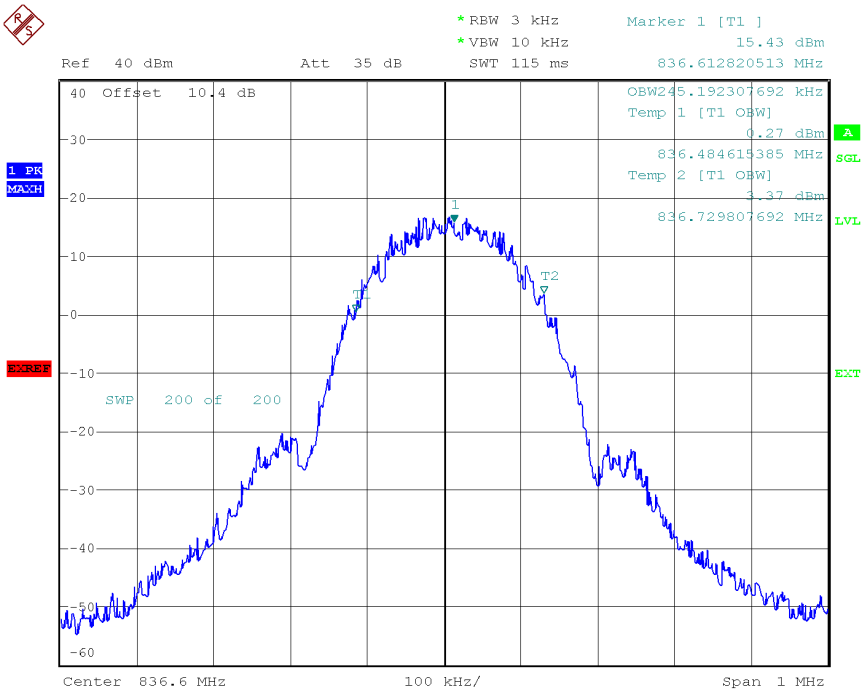

Date: 18.OCT.2018 15:57:05

EGPRS850 Low Channel 99% OBW



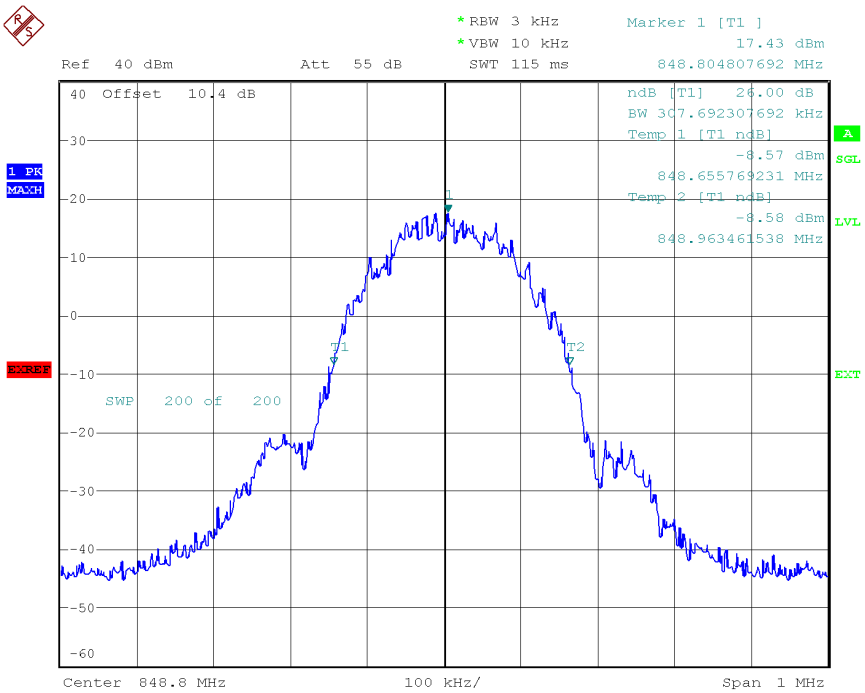

Date: 18.OCT.2018 15:58:14

EGPRS850 Mid Channel 26dB BW



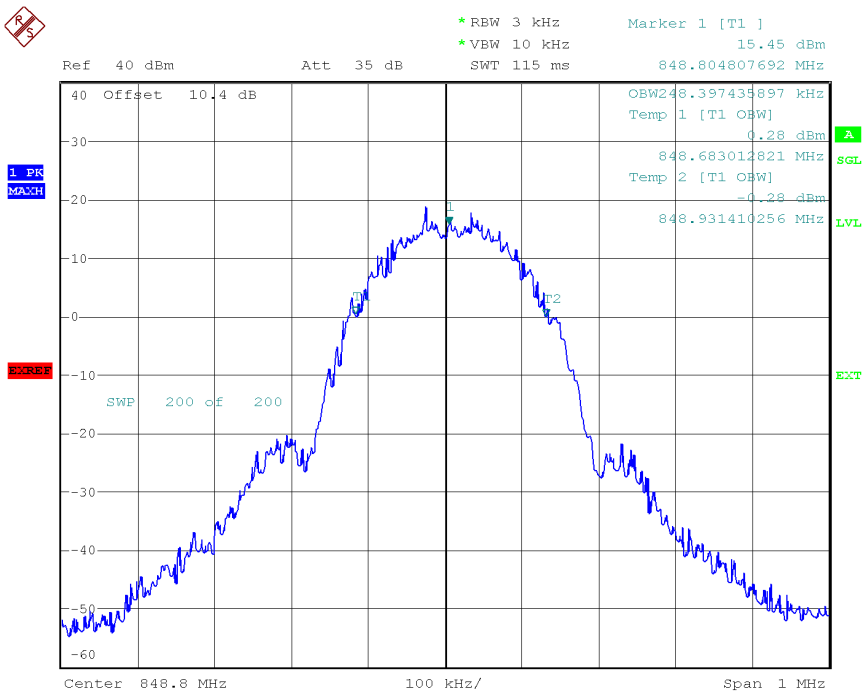

Date: 18.OCT.2018 15:59:18

EGPRS850 Mid Channel 99% OBW



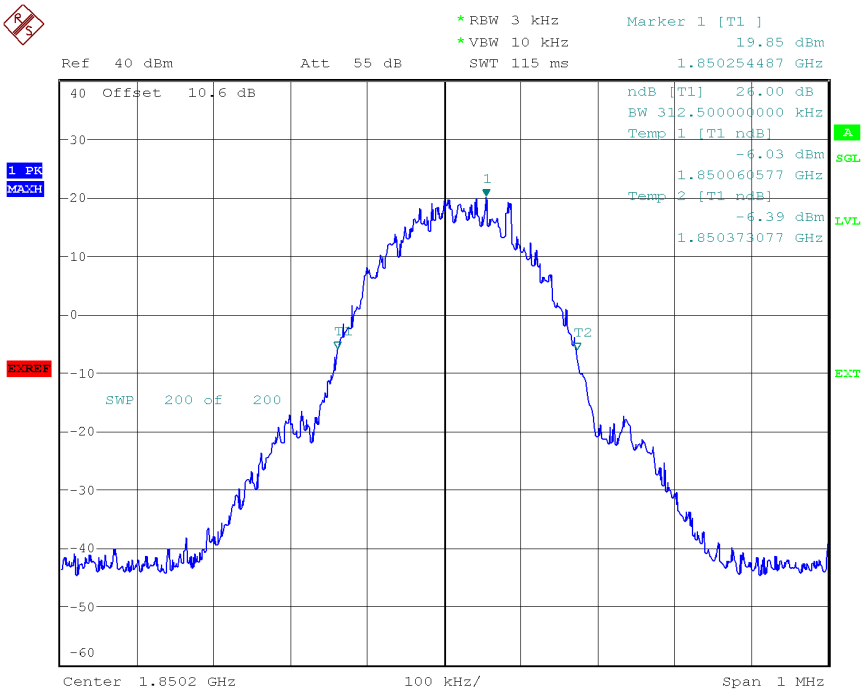

Date: 18.OCT.2018 16:02:14

EGPRS850 High Channel 26dB BW



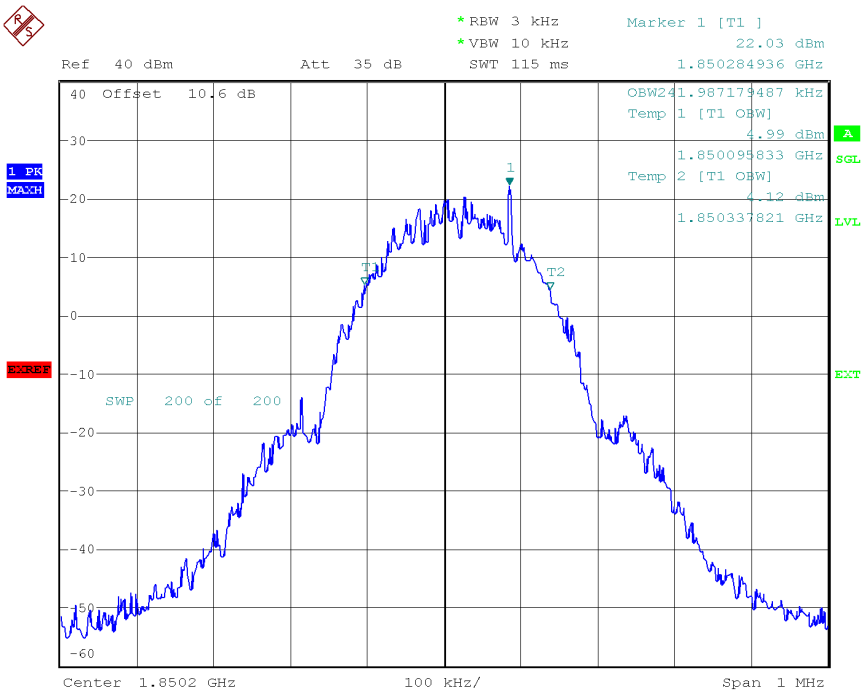

Date: 18.OCT.2018 16:03:09

EGPRS850 High Channel 99% OBW



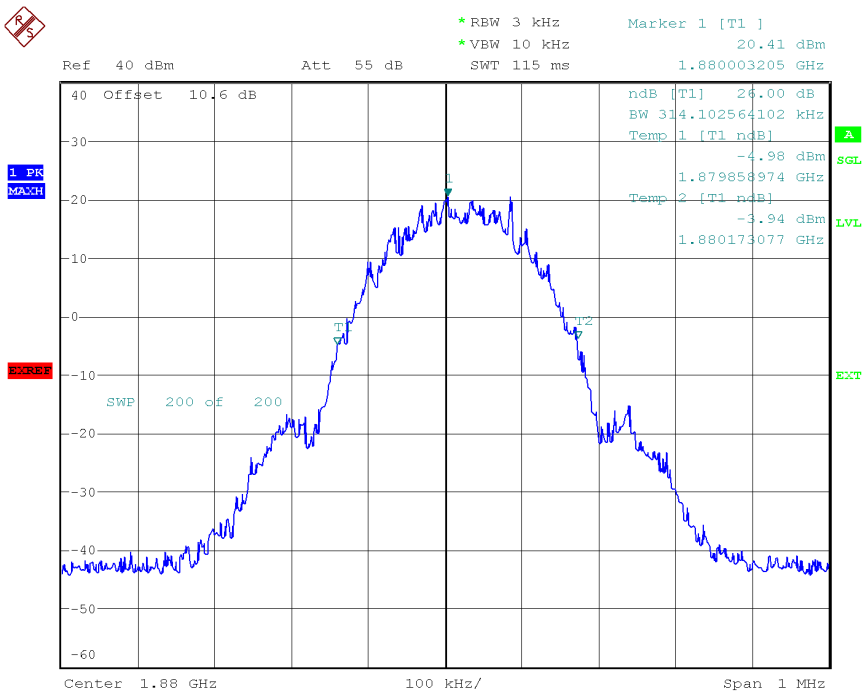

Date: 16.OCT.2018 14:36:07

PCS1900 Low Channel 26dB BW



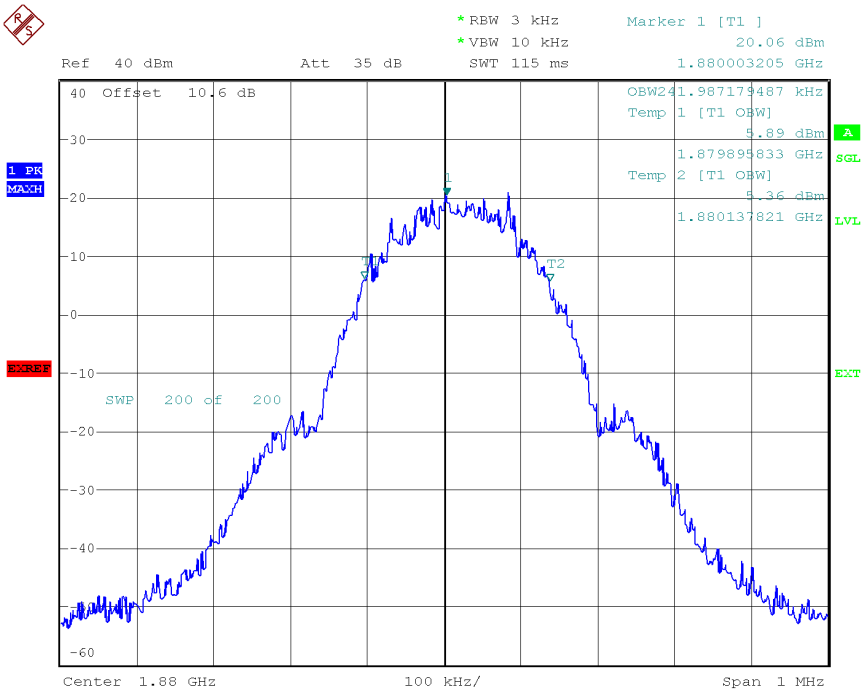

Date: 16.OCT.2018 14:38:20

PCS1900 Low Channel 99% OBW



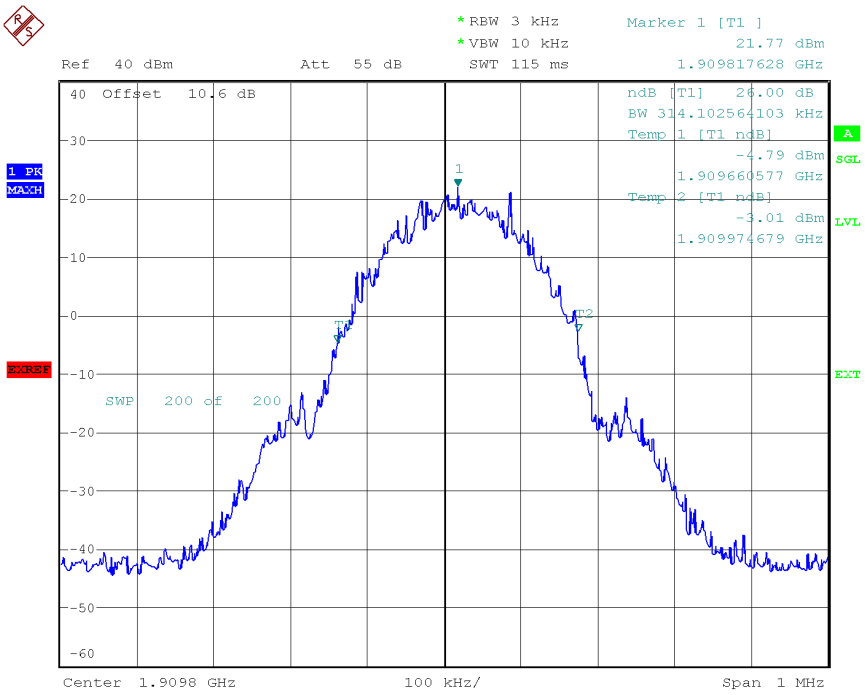

Date: 16.OCT.2018 14:46:26

PCS1900 Mid Channel 26dB BW



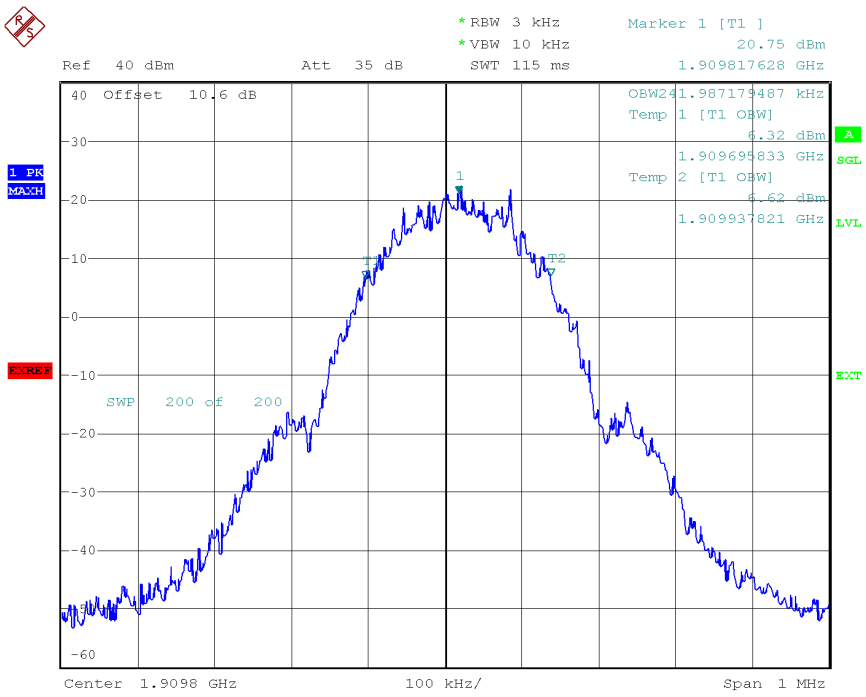

Date: 16.OCT.2018 14:47:18

PCS1900 Mid Channel 99% OBW




Date: 16.OCT.2018 14:48:52

PCS1900 High Channel 26dB BW

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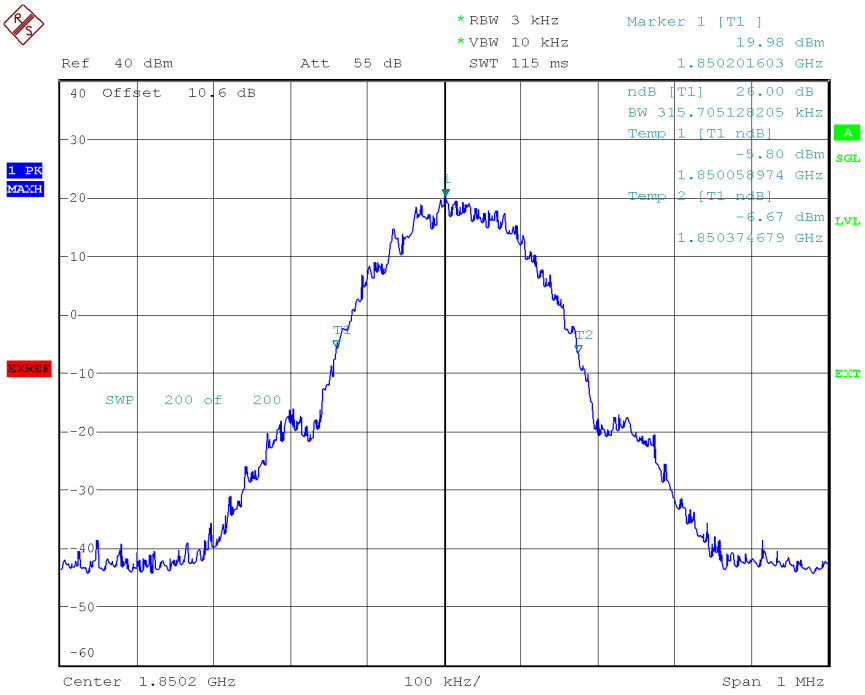
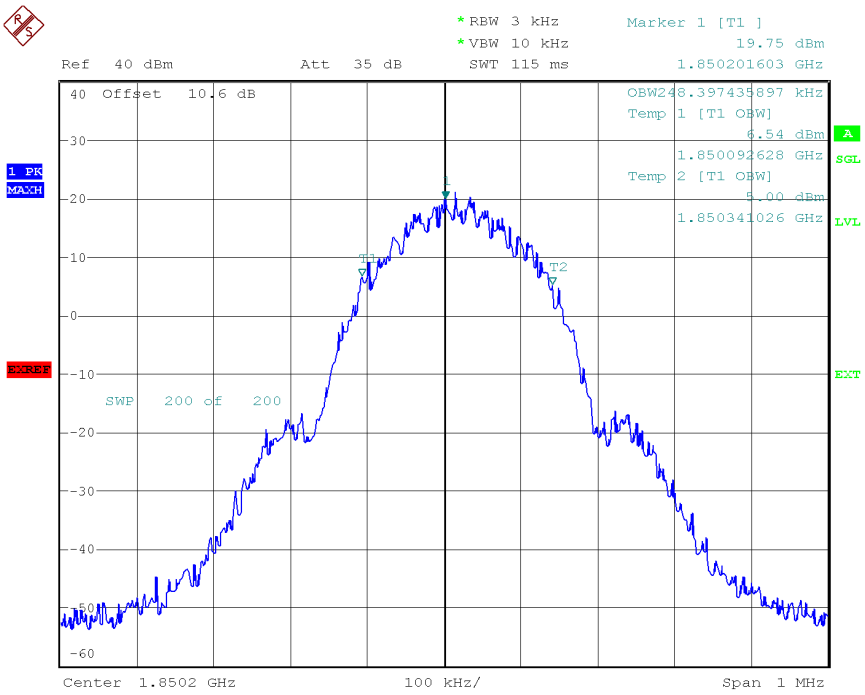
PCS1900 High Channel 99% OBW



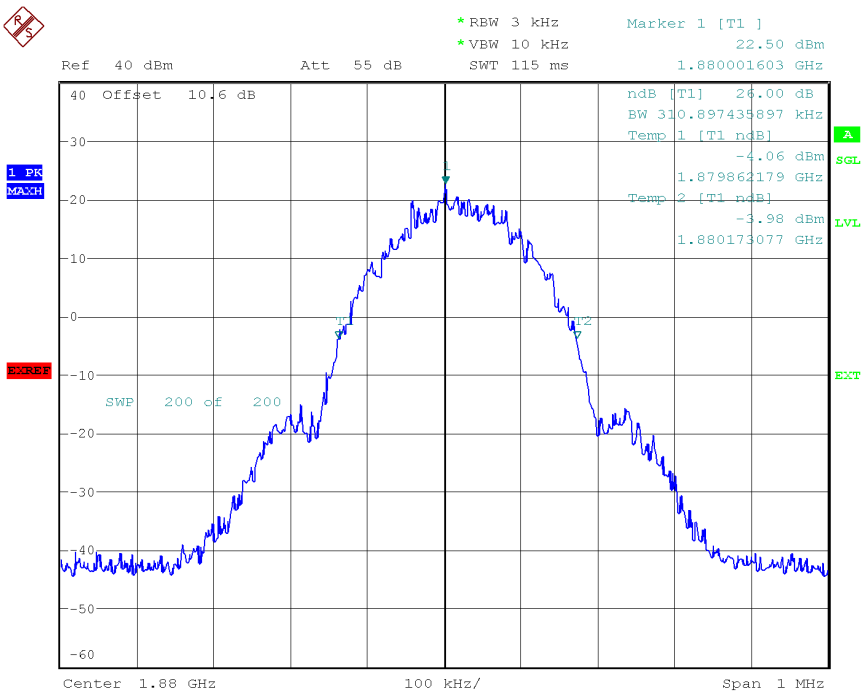

Date: 18.OCT.2018 12:20:20

GPRS1900 Low Channel 26dB BW



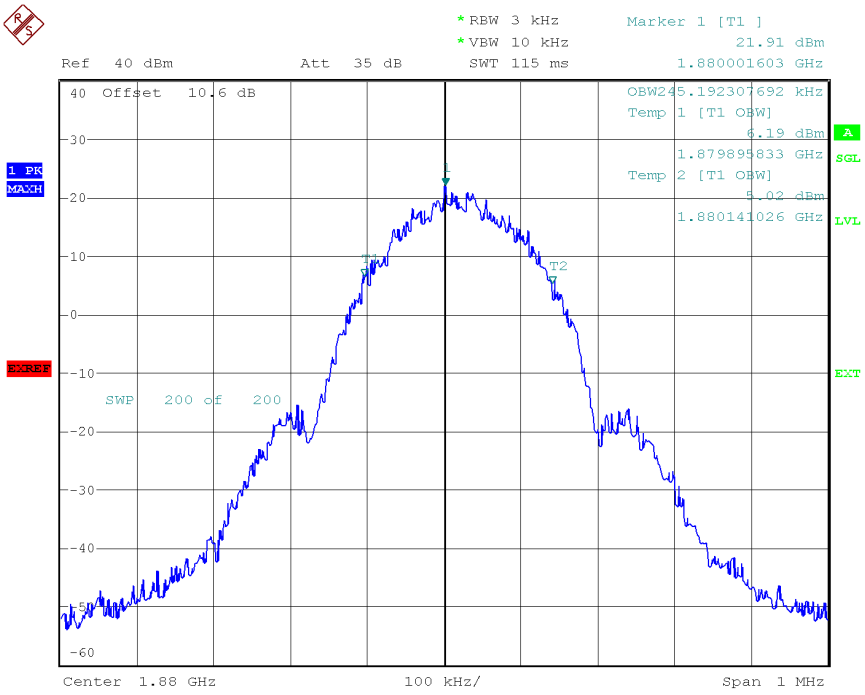

Date: 18.OCT.2018 12:21:12

GPRS1900 Low Channel 99% OBW



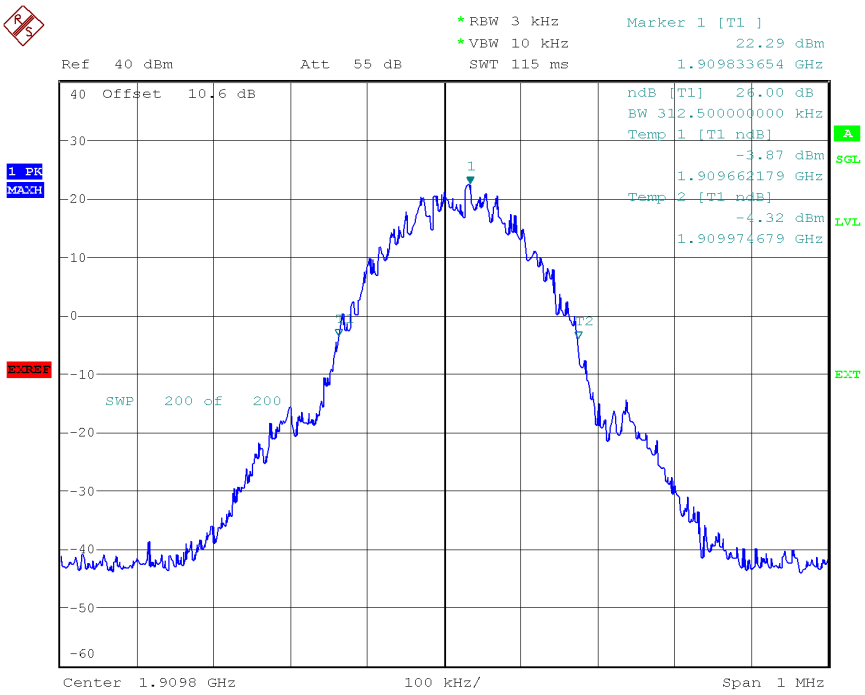

Date: 18.OCT.2018 12:22:19

GPRS1900 Mid Channel 26dB BW



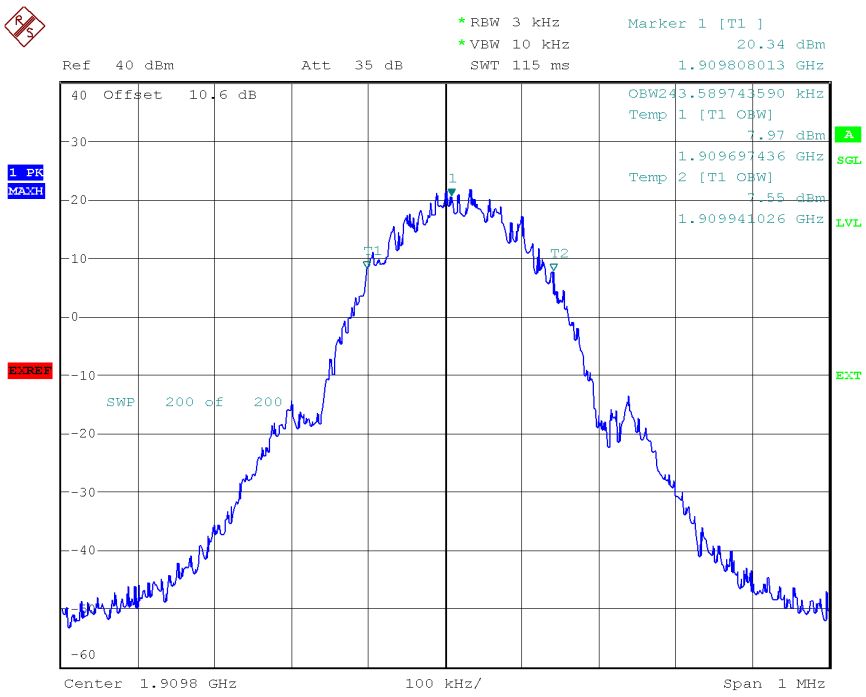

Date: 18.OCT.2018 12:23:18

GPRS1900 Mid Channel 99% OBW



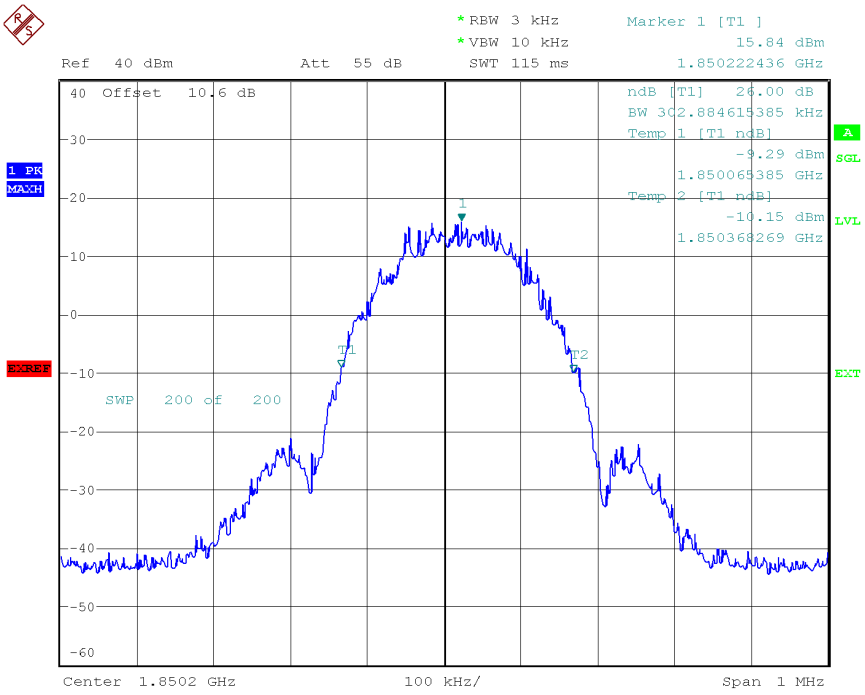

Date: 18.OCT.2018 12:31:09

GPRS1900 High Channel 26dB BW



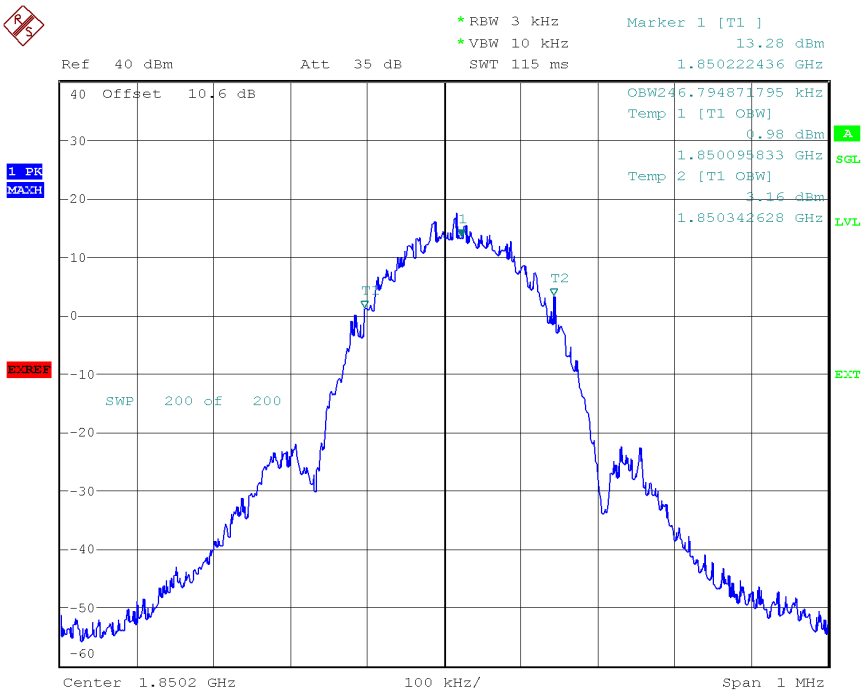

Date: 18.OCT.2018 12:29:46

GPRS1900 High Channel 99% OBW



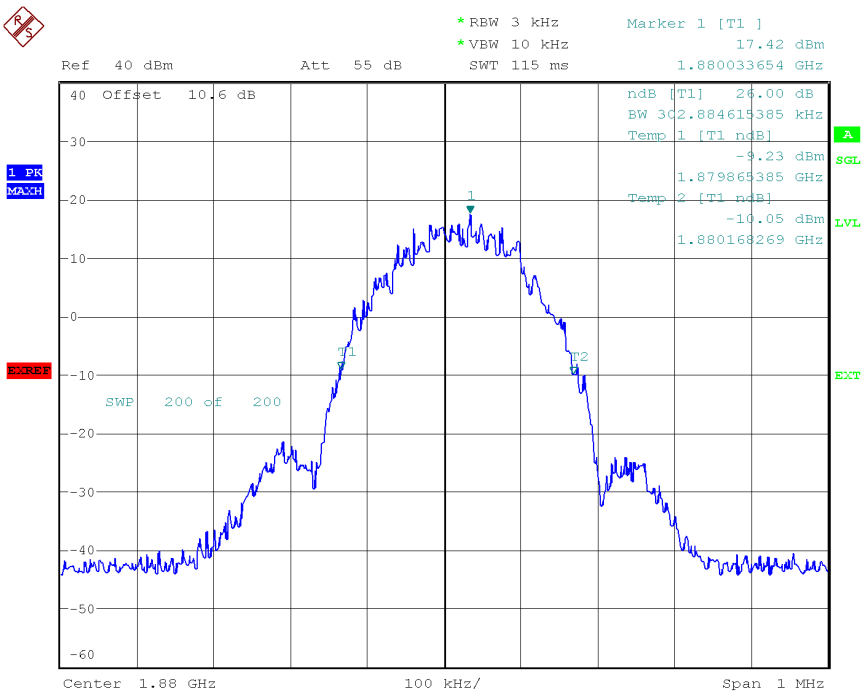

Date: 18.OCT.2018 16:36:58

EGPRS1900 Low Channel 26dB BW



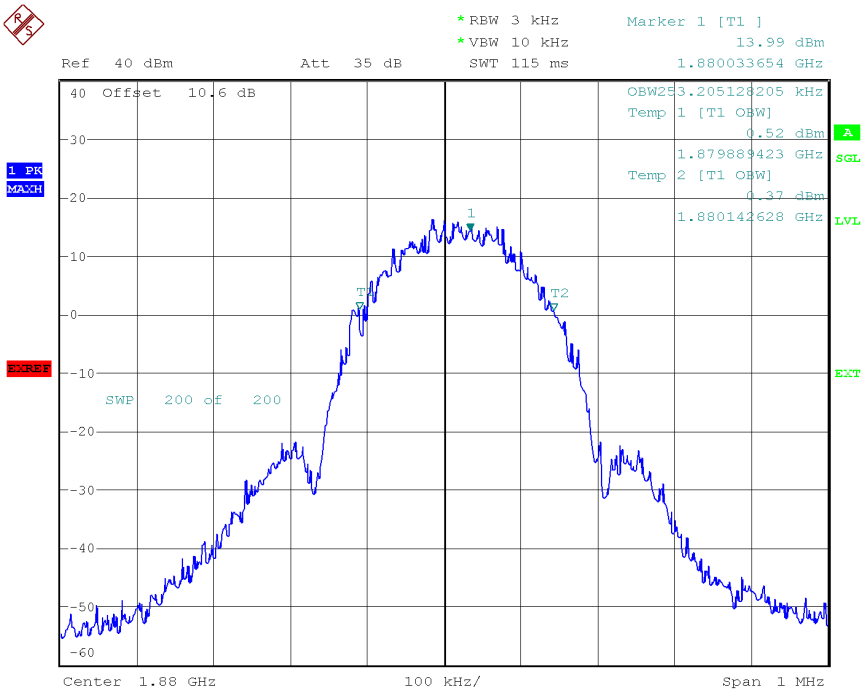

Date: 18.OCT.2018 16:39:04

EGPRS1900 Low Channel 99% OBW



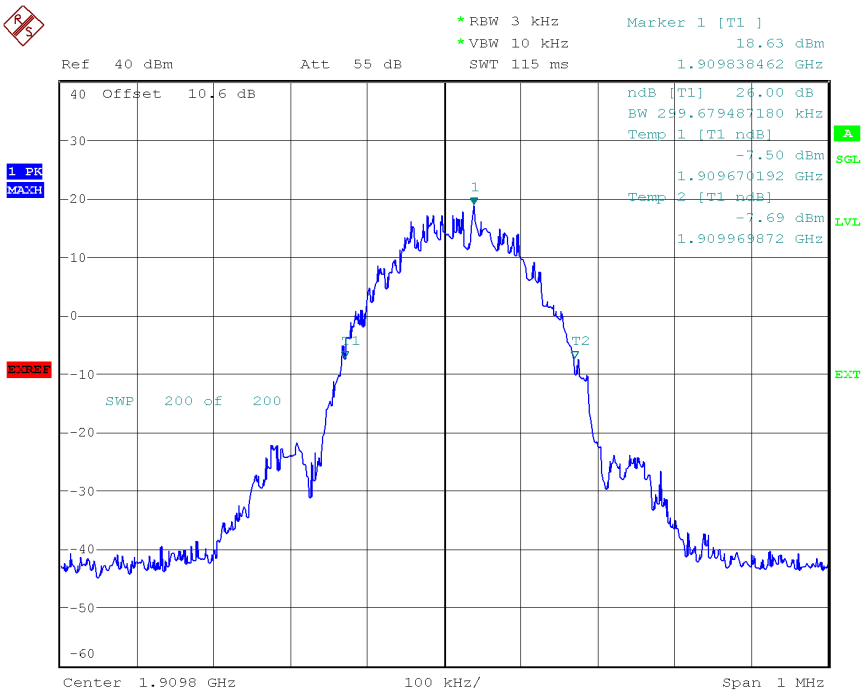

Date: 18.OCT.2018 16:34:57

EGPRS1900 Mid Channel 26dB BW



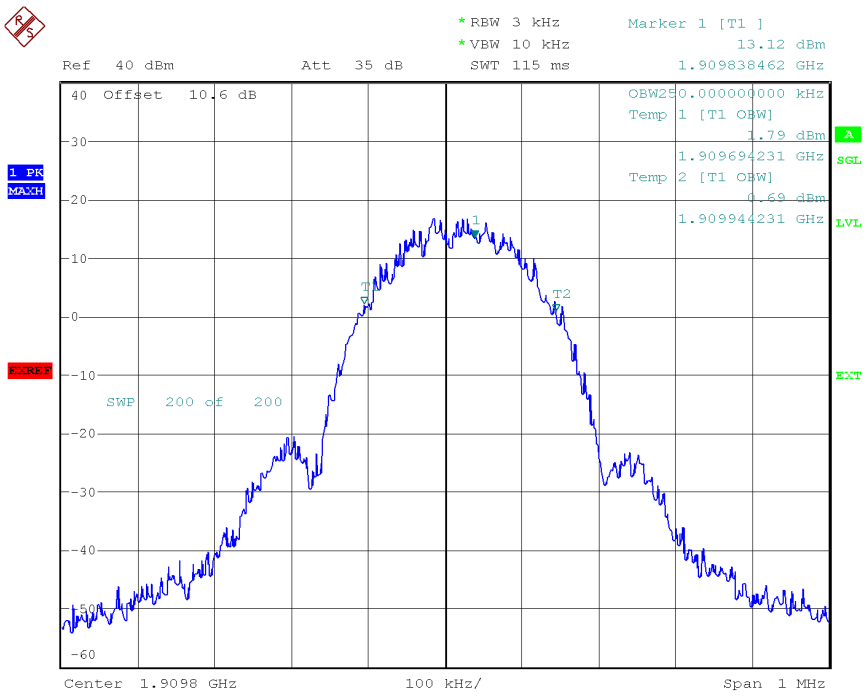

Date: 18.OCT.2018 16:35:52

EGPRS1900 Mid Channel 99% OBW



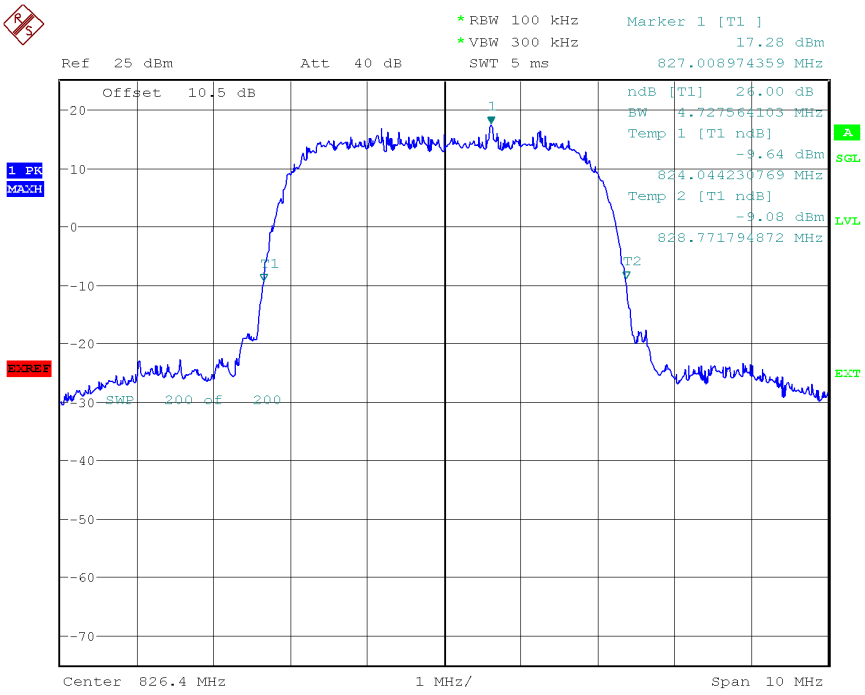

Date: 18.OCT.2018 16:32:28

EGPRS1900 High Channel 26dB BW



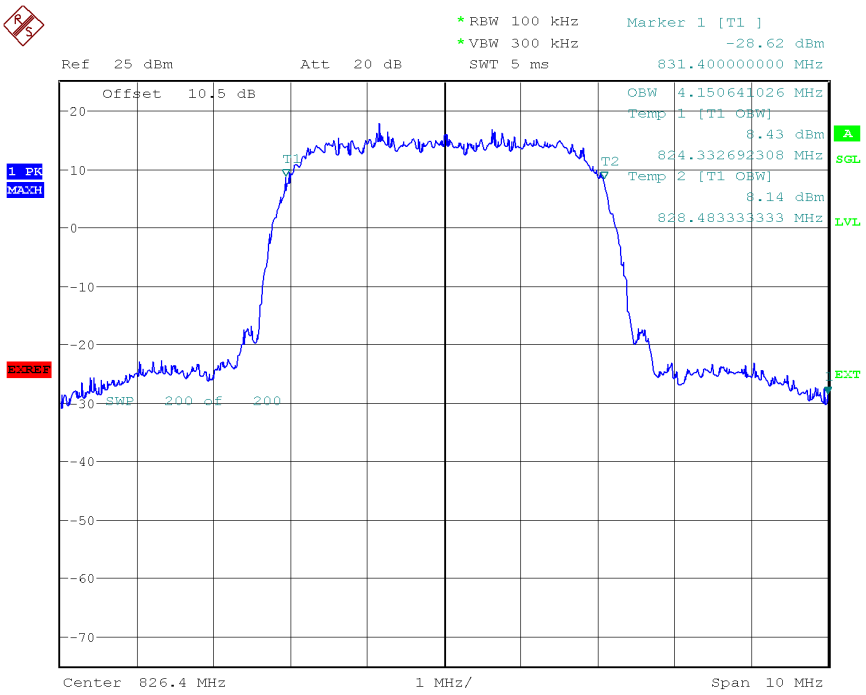

Date: 18.OCT.2018 16:33:18

EGPRS1900 High Channel 99% OBW



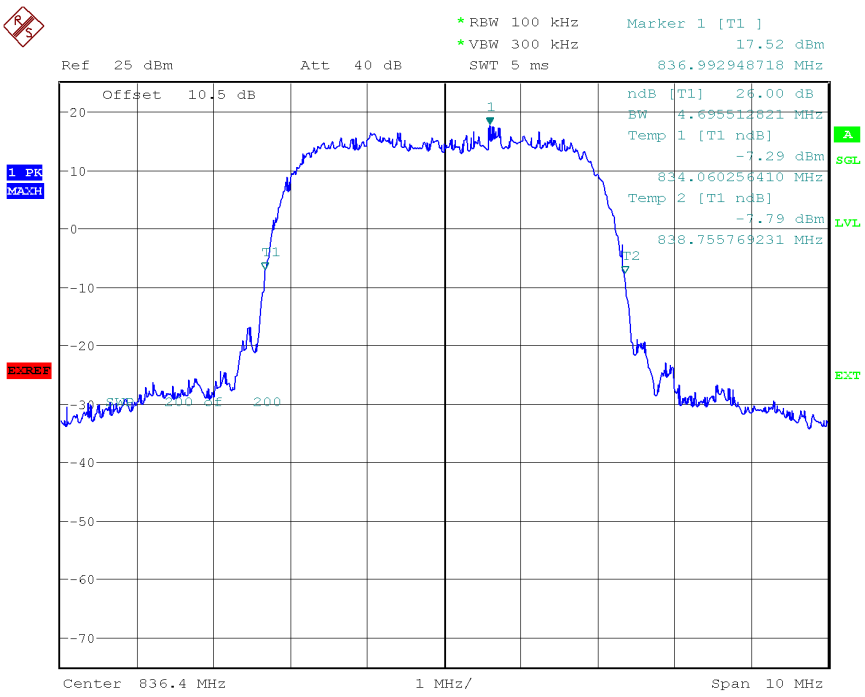

Date: 15.OCT.2018 17:15:23

WCDMA BAND5 Low Channel 26dB BW



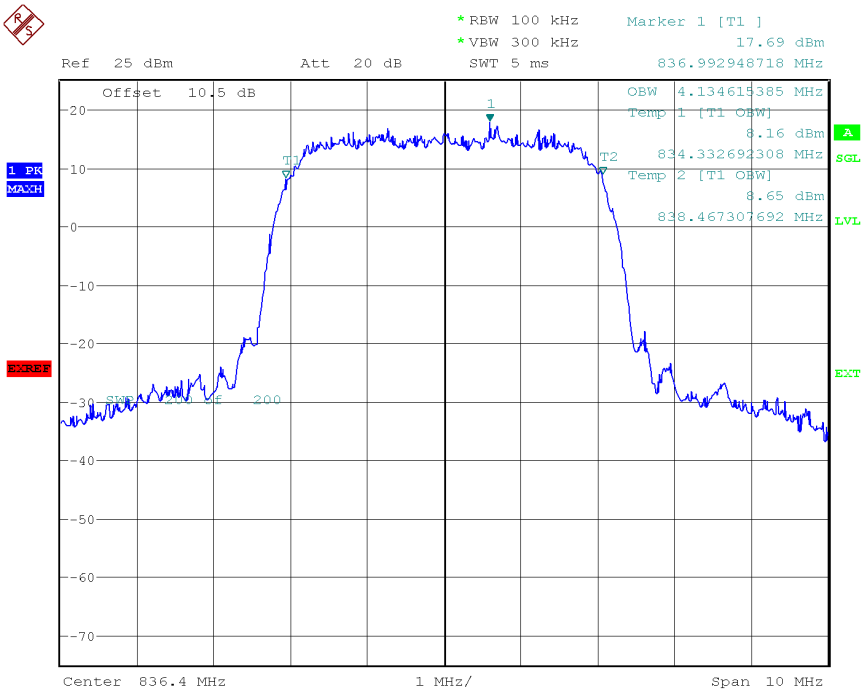

Date: 15.OCT.2018 17:21:24

WCDMA BAND5 Low Channel 99% OBW



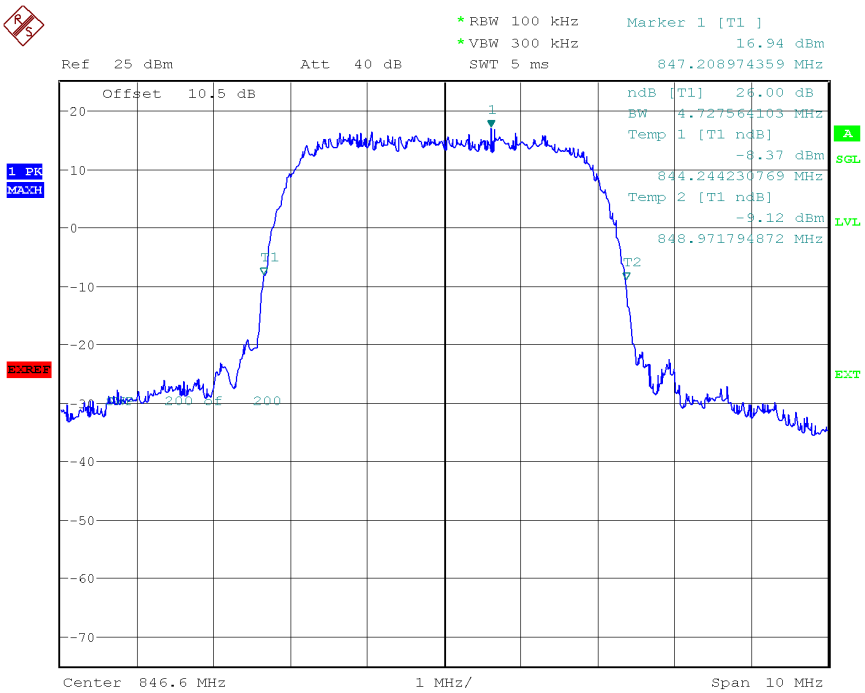

Date: 15.OCT.2018 17:22:38

WCDMA BAND5 Mid Channel 26dB BW




Date: 15.OCT.2018 17:23:18

WCDMA BAND5 Mid Channel 99% OBW

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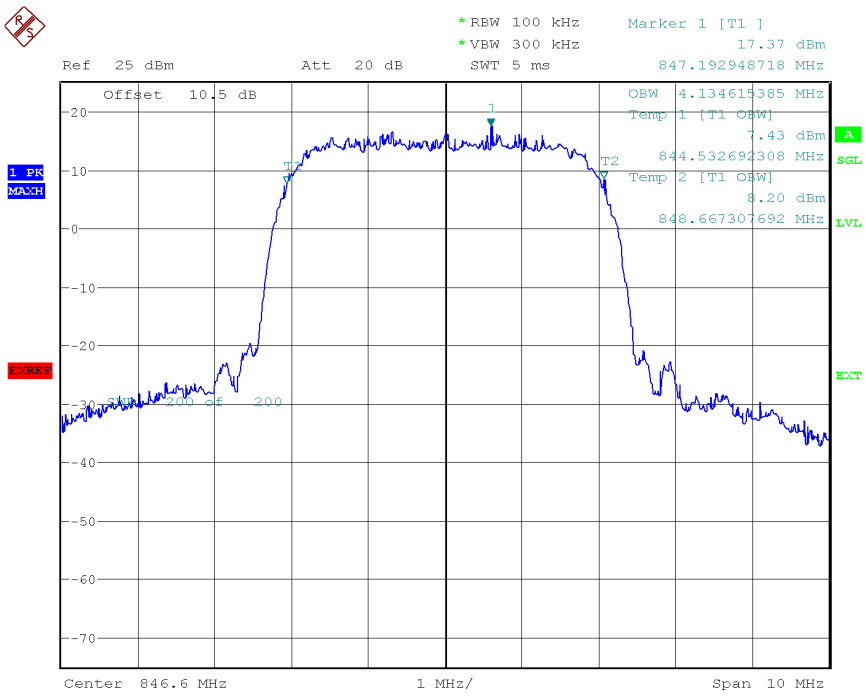
WCDMA BAND5 High Channel 26dB BW




Date: 15.OCT.2018 17:18:34

WCDMA BAND5 High Channel 99% OBW

## 5.4 Conducted Band Edge

### 5.4.1 Description of Conducted Band Edge Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10log (P) dB.

### 5.4.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

### 5.4.3 Test Procedure

a. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

b. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

c. The band edges of low and high channels for the highest RF powers were measured.

d. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

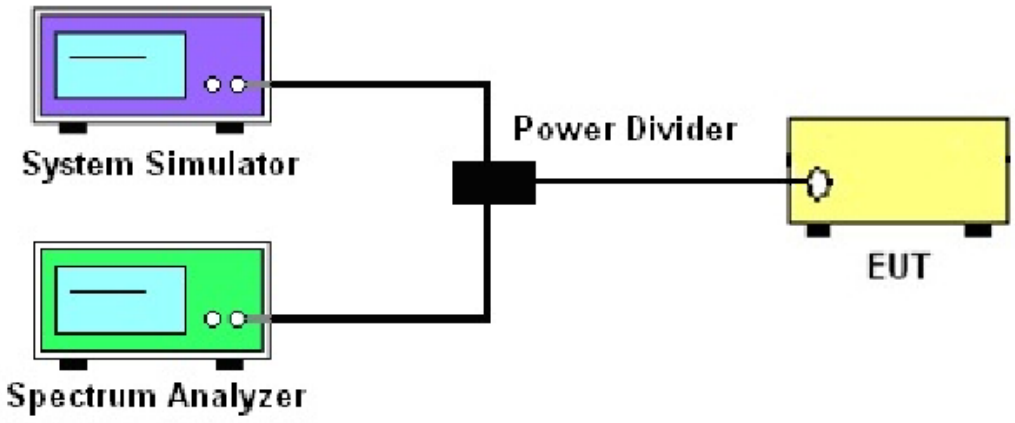
e. The limit line is derived from 43+ 10log (P) dB below the transmitter power P (Watts).

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

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

= -13dBm.

### 5.4.4 Test Setup

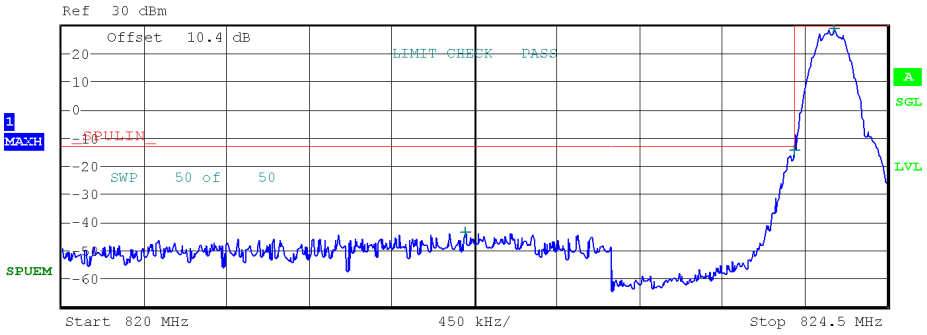


### 5.4.5 Test Result

| Modes | GSM850 | | PCS1900 | | WCDMA BAND5 | |
|---|---|---|---|---|---|---|
| Channel | 128 | 251 | 512 | 810 | 4132 | 4233 |
| Bandedge(<-13dBm) | Pass | Pass | Pass | Pass | Pass | Pass |

| Modes | GPRS850 | | GPRS1900 | |
|---|---|---|---|---|
| Channel | 128 | 251 | 512 | 810 |
| Bandedge(<-13dBm) | Pass | Pass | Pass | Pass |

| Modes | EGPRS850 | | EGPRS1900 | |
|---|---|---|---|---|
| Channel | 128 | 251 | 512 | 810 |
| Bandedge(<-13dBm) | Pass | Pass | Pass | Pass |

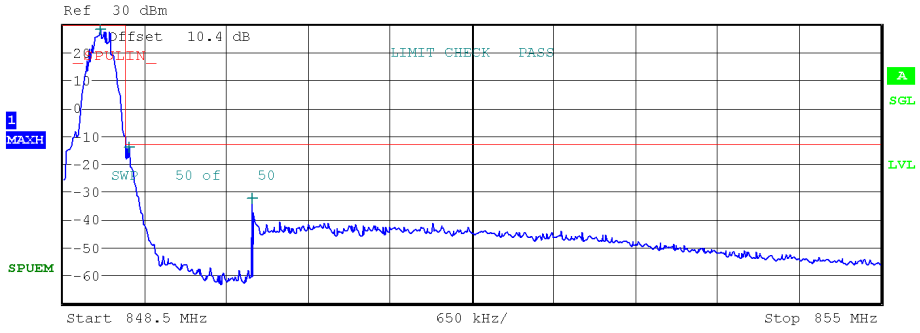



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 820.000 M | 823.000 M | 100.00 k | 822.197115 M | -44.08 | -31.08 |
| 823.000 M | 824.000 M | 3.00 k | 823.995500 M | -14.74 | -1.74 |
| 824.000 M | 824.500 M | 10.00 k | 824.214933 M | 28.14 | -1.86 |

BAND

Date: 28.NOV.2018 04:48:20

GSM850 Low Channel

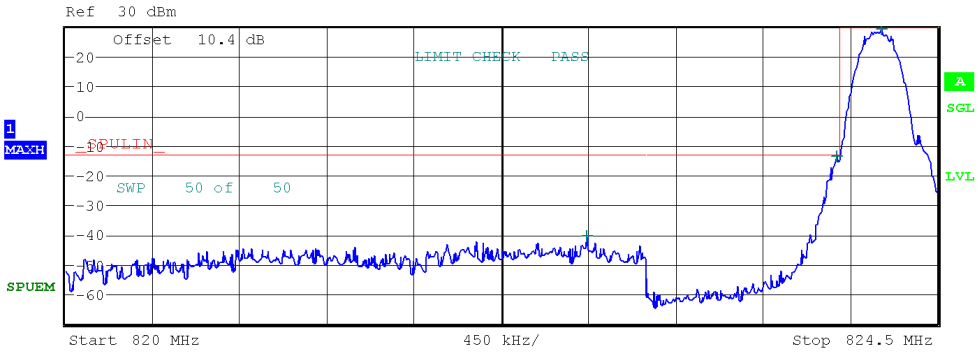



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 848.500 M | 849.000 M | 10.00 k | 848.791667 M | 27.90 | -2.10 |
| 849.000 M | 850.000 M | 3.00 k | 849.017000 M | -14.17 | -1.17 |
| 850.000 M | 855.000 M | 100.00 k | 850.003000 M | -32.55 | -19.55 |

BAND

Date: 28.NOV.2018 04:44:25

GSM850 High Channel

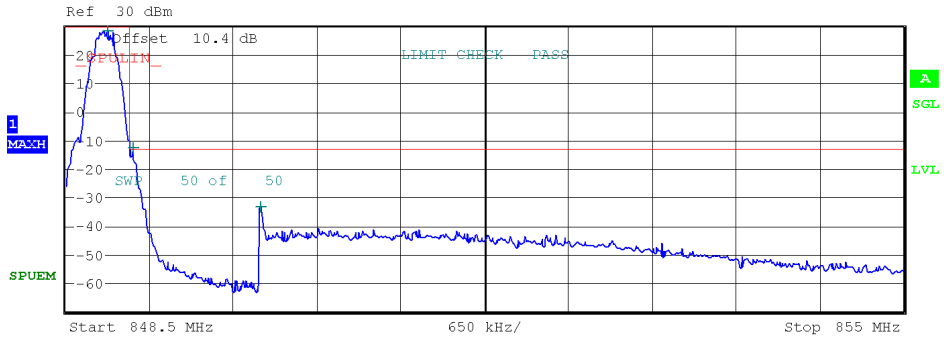



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 820.000 M | 823.000 M | 100.00 k | 822.687500 M | -40.87 | -27.87 |
| 823.000 M | 824.000 M | 3.00 k | 823.981500 M | -13.84 | -0.84 |
| 824.000 M | 824.500 M | 10.00 k | 824.209850 M | 29.01 | -0.99 |

BAND

Date: 28.NOV.2018 07:41:20

GPRS850 Low Channel

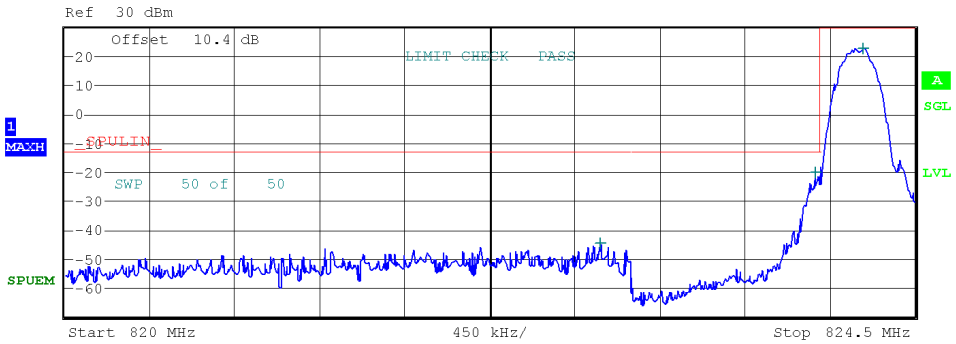



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 848.500 M | 849.000 M | 10.00 k | 848.819712 M | 27.98 | -2.02 |
| 849.000 M | 850.000 M | 3.00 k | 849.021400 M | -13.14 | -0.14 |
| 850.000 M | 855.000 M | 100.00 k | 850.008833 M | -33.51 | -20.51 |

BAND

Date: 28.NOV.2018 07:38:54

GPRS850 High Channel

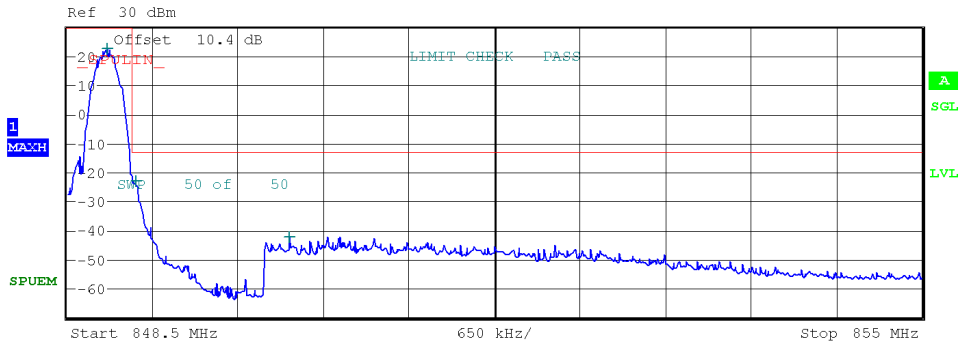



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 820.000 M | 823.000 M | 100.00 k | 822.831731 M | -44.90 | -31.90 |
| 823.000 M | 824.000 M | 3.00 k | 823.975500 M | -20.59 | -7.59 |
| 824.000 M | 824.500 M | 10.00 k | 824.223650 M | 22.20 | -7.80 |

BAND

Date: 28.NOV.2018 07:29:50

EGPRS850 Low Channel

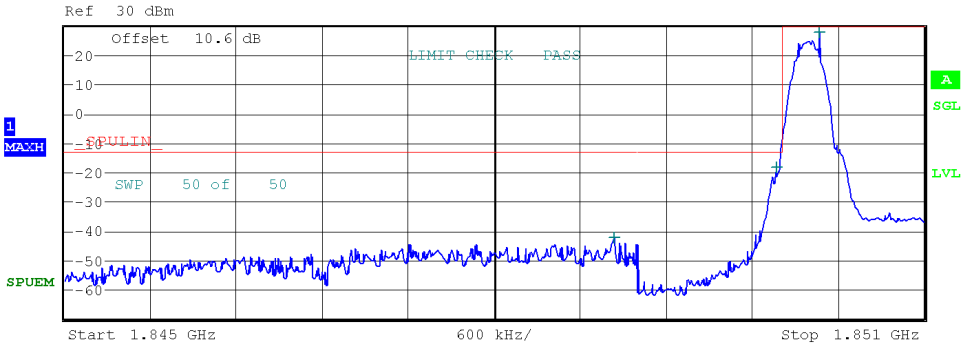



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 848.500 M | 849.000 M | 10.00 k | 848.805288 M | 22.06 | -7.94 |
| 849.000 M | 850.000 M | 3.00 k | 849.022100 M | -23.52 | -10.52 |
| 850.000 M | 855.000 M | 100.00 k | 850.191667 M | -42.31 | -29.31 |

BAND

Date: 28.NOV.2018 07:32:32

EGPRS850 High Channel

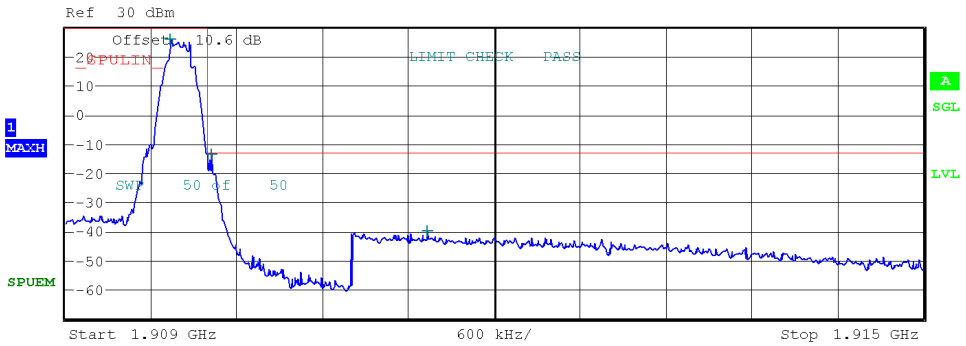



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 1.845 G | 1.849 G | 1.00 M | 1.848833 G | -42.37 | -29.37 |
| 1.849 G | 1.850 G | 3.00 k | 1.849972 G | -18.78 | -5.78 |
| 1.850 G | 1.851 G | 10.00 k | 1.850266 G | 27.33 | -2.67 |

BAND

Date: 28.NOV.2018 08:01:23

PCS1900 Low Channel

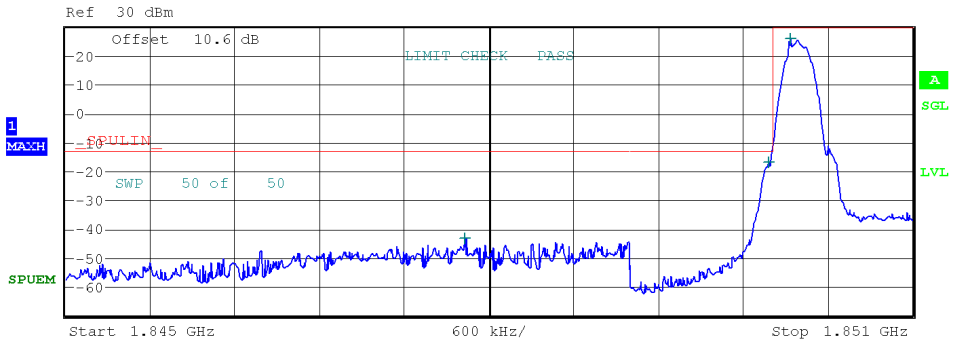



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 1.909 G | 1.910 G | 10.00 k | 1.909734 G | 25.50 | -4.50 |
| 1.910 G | 1.911 G | 3.00 k | 1.910017 G | -13.80 | -0.80 |
| 1.911 G | 1.915 G | 1.00 M | 1.911525 G | -40.00 | -27.00 |

BAND

Date: 28.NOV.2018 08:06:15

PCS1900 High Channel

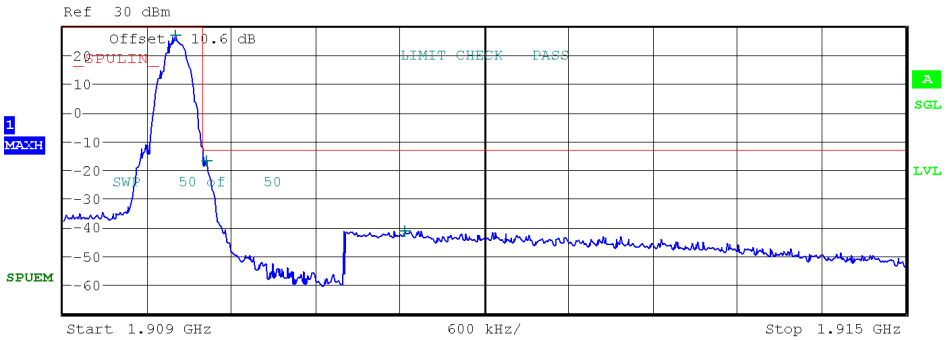



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 1.845 G | 1.849 G | 1.00 M | 1.847827 G | -43.54 | -30.54 |
| 1.849 G | 1.850 G | 3.00 k | 1.849979 G | -17.23 | -4.23 |
| 1.850 G | 1.851 G | 10.00 k | 1.850130 G | 25.52 | -4.48 |

BAND

Date: 28.NOV.2018 08:10:54

GPRS1900 Low Channel

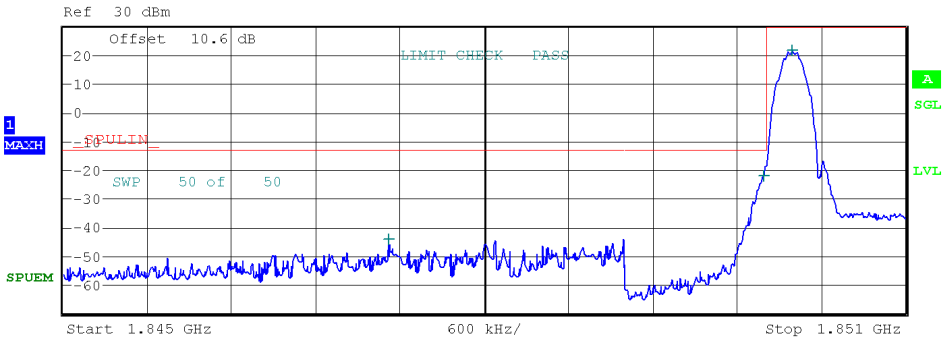



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 1.909 G | 1.910 G | 10.00 k | 1.909795 G | 26.30 | -3.70 |
| 1.910 G | 1.911 G | 3.00 k | 1.910019 G | -17.08 | -4.08 |
| 1.911 G | 1.915 G | 1.00 M | 1.911436 G | -41.44 | -28.44 |

BAND

Date: 28.NOV.2018 08:08:25

GPRS1900 High Channel

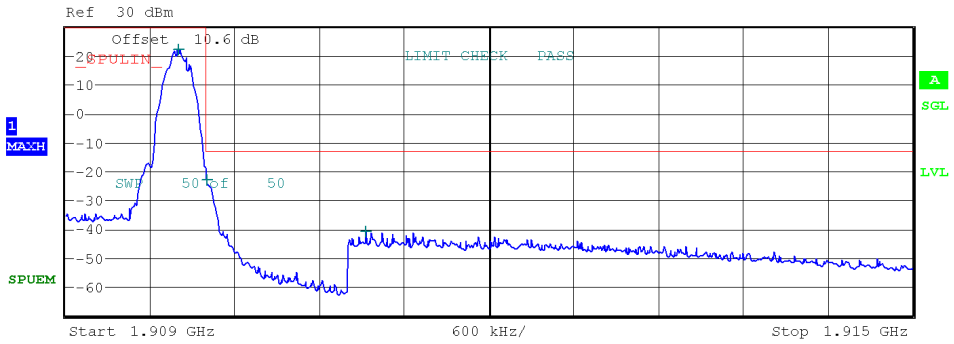



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 1.845 G | 1.849 G | 1.00 M | 1.847314 G | -44.44 | -31.44 |
| 1.849 G | 1.850 G | 3.00 k | 1.849990 G | -22.57 | -9.57 |
| 1.850 G | 1.851 G | 10.00 k | 1.850192 G | 21.22 | -8.78 |

BAND

Date: 28.NOV.2018 08:18:20

EGPRS1900 Low Channel

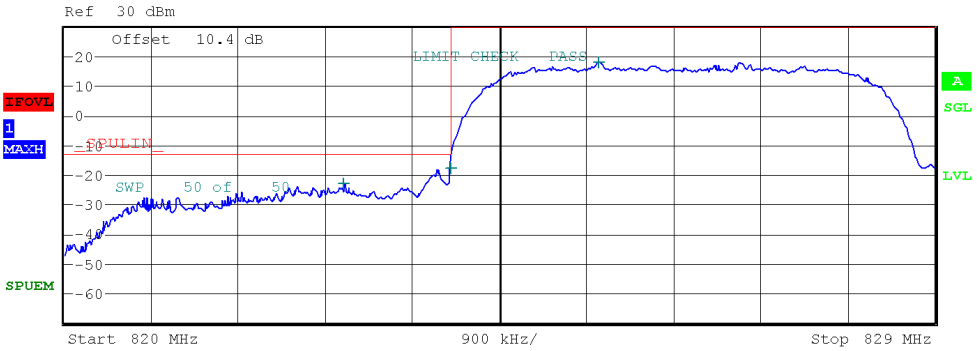



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 1.909 G | 1.910 G | 10.00 k | 1.909800 G | 21.88 | -8.12 |
| 1.910 G | 1.911 G | 3.00 k | 1.910001 G | -23.31 | -10.31 |
| 1.911 G | 1.915 G | 1.00 M | 1.911127 G | -41.20 | -28.20 |

BAND

Date: 28.NOV.2018 08:21:40

EGPRS1900 High Channel

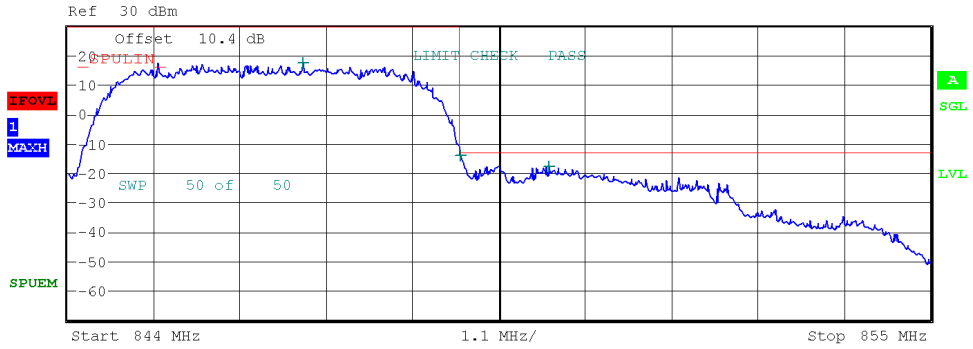



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 820.000 M | 823.000 M | 100.00 k | 822.889423 M | -23.49 | -10.49 |
| 823.000 M | 824.000 M | 50.00 k | 823.999000 M | -18.22 | -5.22 |
| 824.000 M | 829.000 M | 100.00 k | 825.524167 M | 17.74 | -12.26 |

BAND

Date: 28.NOV.2018 08:38:59

WCDMA BAND5 Low Channel




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 844.000 M | 849.000 M | 100.00 k | 846.988782 M | 17.26 | -12.74 |
| 849.000 M | 850.000 M | 50.00 k | 849.012200 M | -14.25 | -1.25 |
| 850.000 M | 855.000 M | 100.00 k | 850.139000 M | -17.95 | -4.95 |

BAND

Date: 28.NOV.2018 09:04:17

WCDMA BAND5 High Channel

## 5.5 Conducted Spurious Emissions

### 5.5.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43+10log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its $10^{th}$ harmonic.

### 5.5.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

### 5.5.3 Test Procedure

a. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

b. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

c. The middle channel for the highest RF power within the transmitting frequency was measured.

d. The conducted spurious emission for the whole frequency range was taken.

e. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

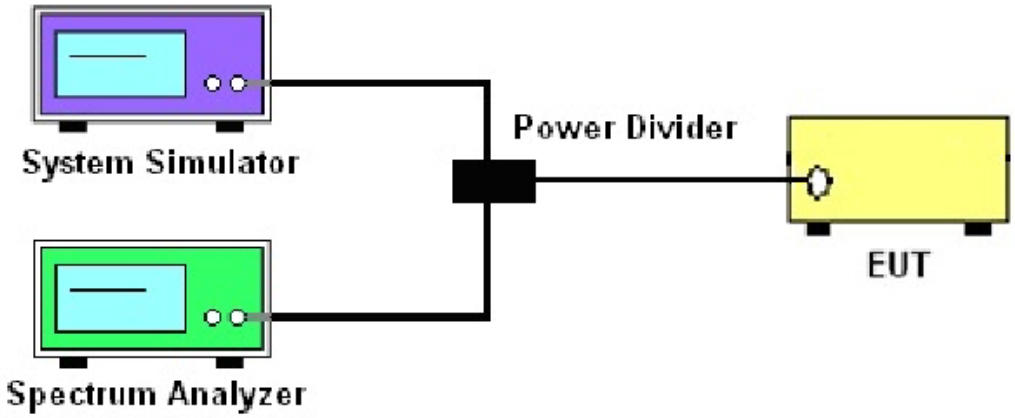
f. The limit line is derived from 43+10log (P) dB below the transmitter power P (Watts).

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

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

= -13dBm.

### 5.5.4 Test Setup



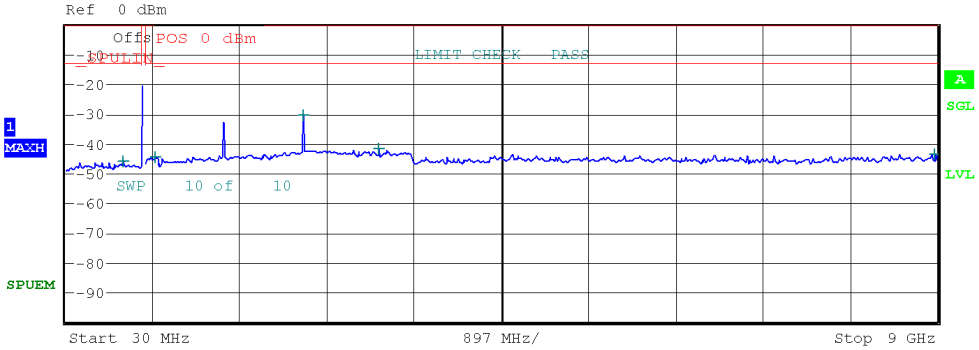

### 5.5.5 Test Result

| Modes | GSM850 | | | PCS1900 | | |
|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| Conducted Spurious emissions(<-13dBm) | Pass | Pass | Pass | Pass | Pass | Pass |

| Modes | WCDMA BAND5 | | |
|---|---|---|---|
| Channel | 4132 | 4182 | 4233 |
| Conducted Spurious emissions(<-13dBm) | Pass | Pass | Pass |

| Modes | GPRS850 | | | GPRS1900 | | |
|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| Conducted Spurious emissions(<-13dBm) | Pass | Pass | Pass | Pass | Pass | Pass |

| Modes | EGPRS850 | | | EGPRS1900 | | |
|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| Conducted Spurious emissions(<-13dBm) | Pass | Pass | Pass | Pass | Pass | Pass |

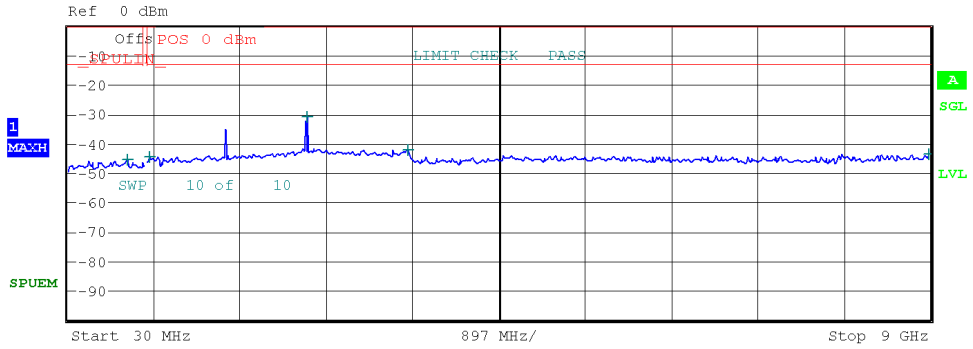



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 618.701923 M | -46.06 | -33.06 |
| 855.000 M | 1.000 G | 1.00 M | 943.479000 M | -44.71 | -31.71 |
| 1.000 G | 3.000 G | 1.00 M | 2.472933 G | -30.77 | -17.77 |
| 3.000 G | 7.000 G | 1.00 M | 3.251467 G | -42.17 | -29.17 |
| 7.000 G | 9.000 G | 1.00 M | 8.974026 G | -43.69 | -30.69 |

BAND

Date: 28.NOV.2018 10:00:44

GSM850 Low Channel

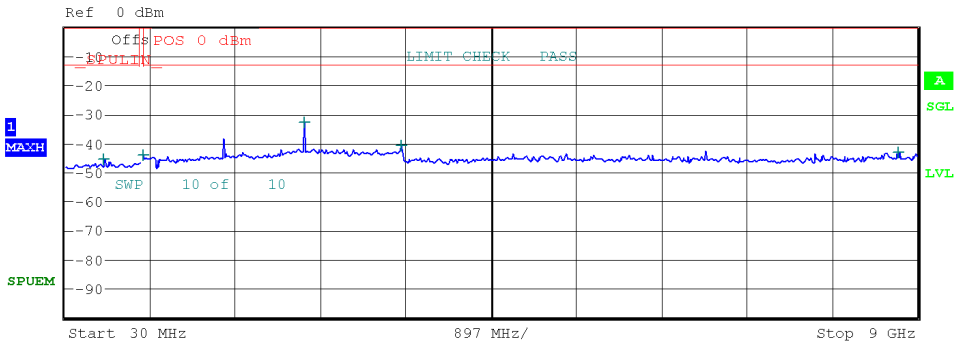



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 642.756410 M | -45.76 | -32.76 |
| 855.000 M | 1.000 G | 1.00 M | 883.463500 M | -44.77 | -31.77 |
| 1.000 G | 3.000 G | 1.00 M | 2.509867 G | -31.13 | -18.13 |
| 3.000 G | 7.000 G | 1.00 M | 3.572400 G | -42.42 | -29.42 |
| 7.000 G | 9.000 G | 1.00 M | 8.987013 G | -43.80 | -30.80 |

BAND

Date: 28.NOV.2018 09:59:27

GSM850 Mid Channel

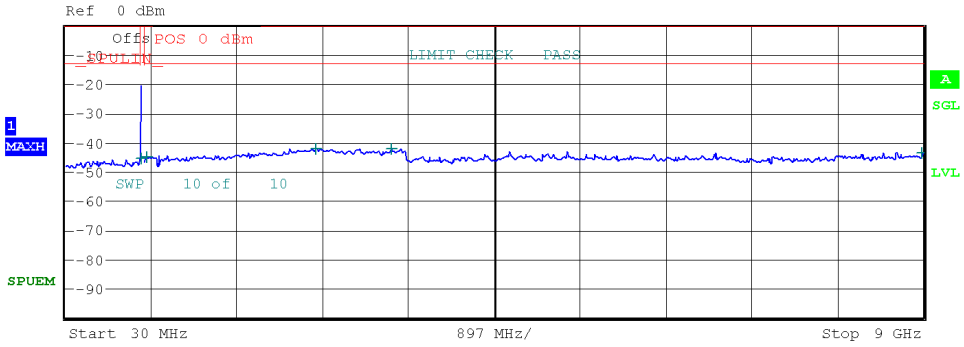



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 438.926282 M | -45.83 | -32.83 |
| 855.000 M | 1.000 G | 1.00 M | 855.232000 M | -44.30 | -31.30 |
| 1.000 G | 3.000 G | 1.00 M | 2.546800 G | -33.24 | -20.24 |
| 3.000 G | 7.000 G | 1.00 M | 3.569333 G | -40.89 | -27.89 |
| 7.000 G | 9.000 G | 1.00 M | 8.805195 G | -43.28 | -30.28 |

BAND

Date: 28.NOV.2018 09:55:02

GSM850 High Channel

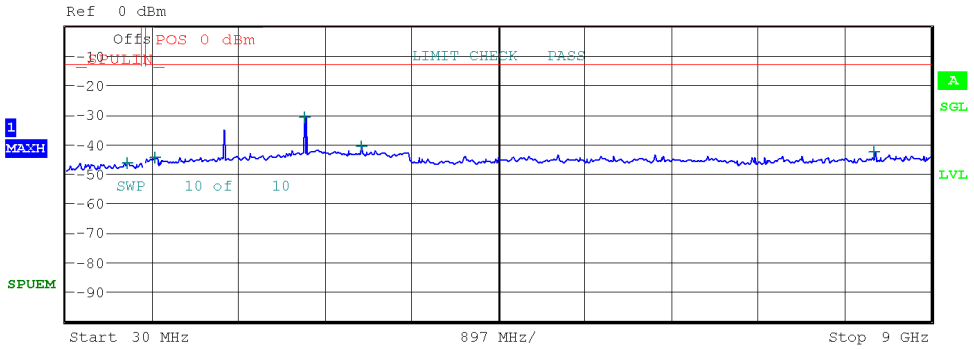



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 818.733974 M | -45.83 | -32.83 |
| 855.000 M | 1.000 G | 1.00 M | 873.226500 M | -45.27 | -32.27 |
| 1.000 G | 3.000 G | 1.00 M | 2.652467 G | -42.46 | -29.46 |
| 3.000 G | 7.000 G | 1.00 M | 3.440533 G | -42.28 | -29.28 |
| 7.000 G | 9.000 G | 1.00 M | 8.987013 G | -43.85 | -30.85 |

BAND

Date: 28.NOV.2018 10:01:47

GPRS850 Low Channel

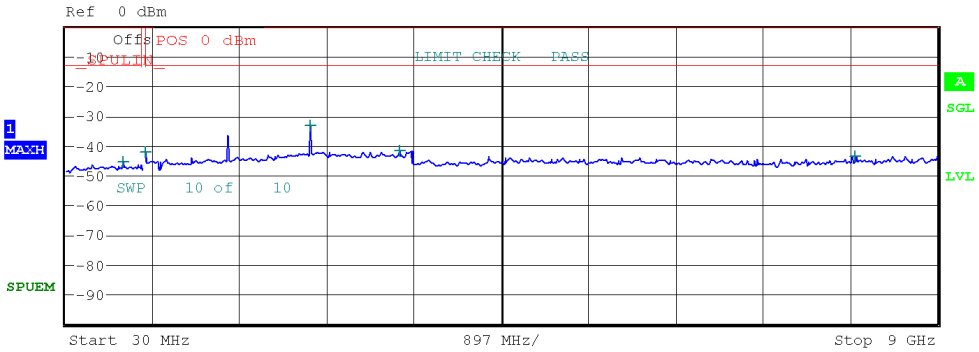



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 666.810897 M | -46.63 | -33.63 |
| 855.000 M | 1.000 G | 1.00 M | 944.842000 M | -45.02 | -32.02 |
| 1.000 G | 3.000 G | 1.00 M | 2.509667 G | -31.34 | -18.34 |
| 3.000 G | 7.000 G | 1.00 M | 3.097200 G | -41.23 | -28.23 |
| 7.000 G | 9.000 G | 1.00 M | 8.415584 G | -42.79 | -29.79 |

BAND

Date: 28.NOV.2018 10:02:27

GPRS850 Mid Channel

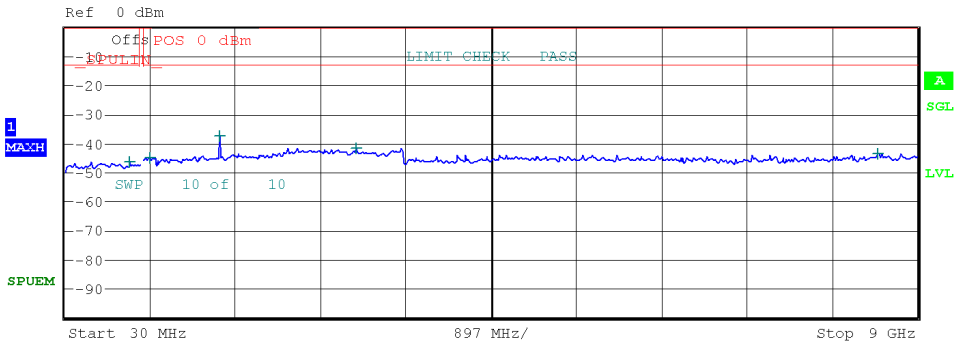



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 618.701923 M | -45.96 | -32.96 |
| 855.000 M | 1.000 G | 1.00 M | 855.029000 M | -42.47 | -29.47 |
| 1.000 G | 3.000 G | 1.00 M | 2.546533 G | -33.74 | -20.74 |
| 3.000 G | 7.000 G | 1.00 M | 3.462800 G | -42.23 | -29.23 |
| 7.000 G | 9.000 G | 1.00 M | 8.155844 G | -43.82 | -30.82 |

BAND

Date: 28.NOV.2018 10:03:05

GPRS850 High Channel

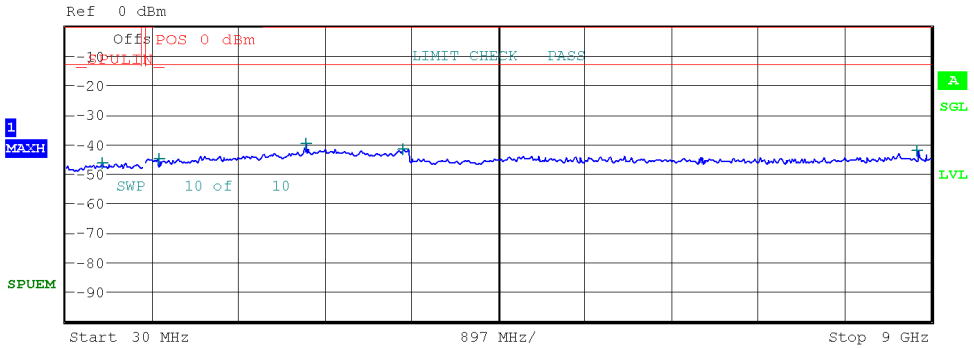



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 709.855769 M | -46.79 | -33.79 |
| 855.000 M | 1.000 G | 1.00 M | 914.377500 M | -45.10 | -32.10 |
| 1.000 G | 3.000 G | 1.00 M | 1.648333 G | -37.89 | -24.89 |
| 3.000 G | 7.000 G | 1.00 M | 3.090933 G | -41.81 | -28.81 |
| 7.000 G | 9.000 G | 1.00 M | 8.584416 G | -43.79 | -30.79 |

BAND

Date: 28.NOV.2018 10:06:35

EGPRS850 Low Channel

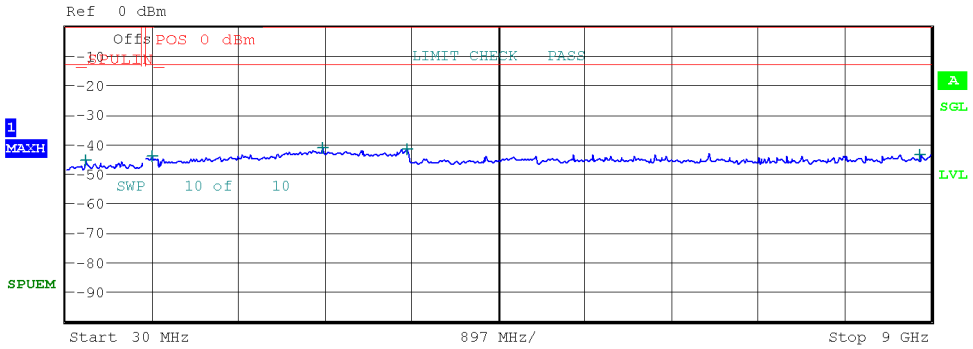



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 406.009615 M | -46.76 | -33.76 |
| 855.000 M | 1.000 G | 1.00 M | 993.707000 M | -45.42 | -32.42 |
| 1.000 G | 3.000 G | 1.00 M | 2.509800 G | -39.92 | -26.92 |
| 3.000 G | 7.000 G | 1.00 M | 3.526133 G | -41.85 | -28.85 |
| 7.000 G | 9.000 G | 1.00 M | 8.857143 G | -42.49 | -29.49 |

BAND

Date: 28.NOV.2018 10:05:56

EGPRS850 Mid Channel

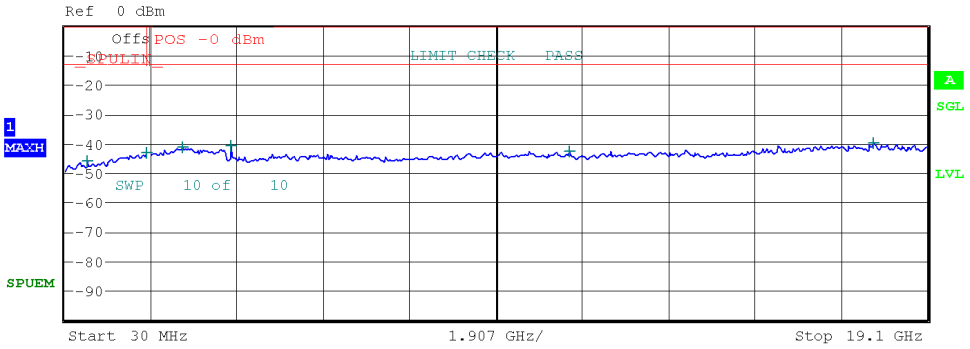



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 233.830128 M | -45.87 | -32.87 |
| 855.000 M | 1.000 G | 1.00 M | 915.030000 M | -44.59 | -31.59 |
| 1.000 G | 3.000 G | 1.00 M | 2.682200 G | -41.36 | -28.36 |
| 3.000 G | 7.000 G | 1.00 M | 3.559867 G | -41.79 | -28.79 |
| 7.000 G | 9.000 G | 1.00 M | 8.883117 G | -43.72 | -30.72 |

BAND

Date: 28.NOV.2018 10:05:18

EGPRS850 High Channel

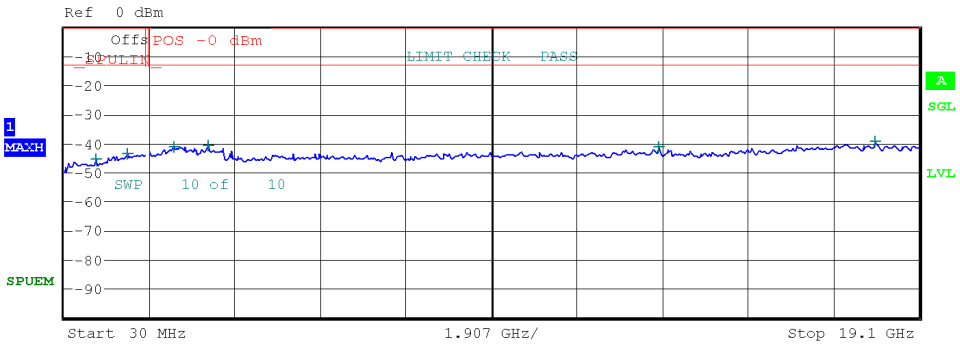



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 511.891026 M | -46.10 | -33.10 |
| 1.000 G | 1.845 G | 1.00 M | 1.843310 G | -43.32 | -30.32 |
| 1.915 G | 3.000 G | 1.00 M | 2.619888 G | -41.75 | -28.75 |
| 3.000 G | 7.000 G | 1.00 M | 3.700400 G | -41.01 | -28.01 |
| 7.000 G | 13.600 G | 1.00 M | 11.200000 G | -43.03 | -30.03 |
| 13.600 G | 19.100 G | 1.00 M | 17.921429 G | -40.11 | -27.11 |

BAND

Date: 28.NOV.2018 09:41:58

PCS1900 Low Channel



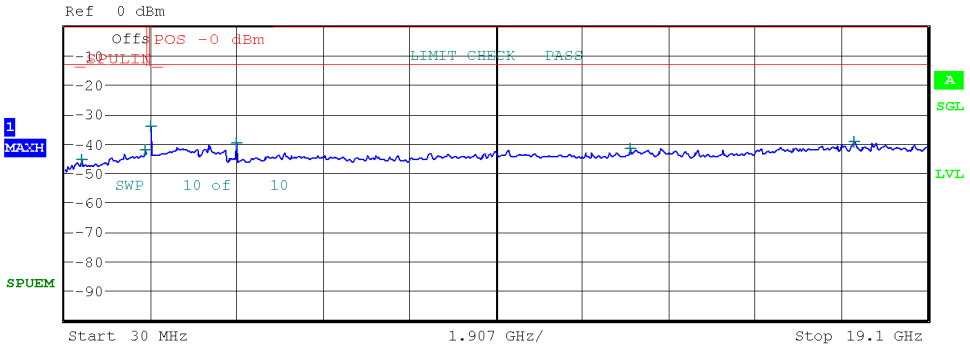

LOUNL

| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 718.637821 M | -45.85 | -32.85 |
| 1.000 G | 1.845 G | 1.00 M | 1.426978 G | -43.95 | -30.95 |
| 1.915 G | 3.000 G | 1.00 M | 2.484372 G | -41.33 | -28.33 |
| 3.000 G | 7.000 G | 1.00 M | 3.244800 G | -40.85 | -27.85 |
| 7.000 G | 13.600 G | 1.00 M | 13.300000 G | -41.66 | -28.66 |
| 13.600 G | 19.100 G | 1.00 M | 18.135714 G | -39.80 | -26.80 |

BAND

Date: 28.NOV.2018 09:35:58

PCS1900 Mid Channel



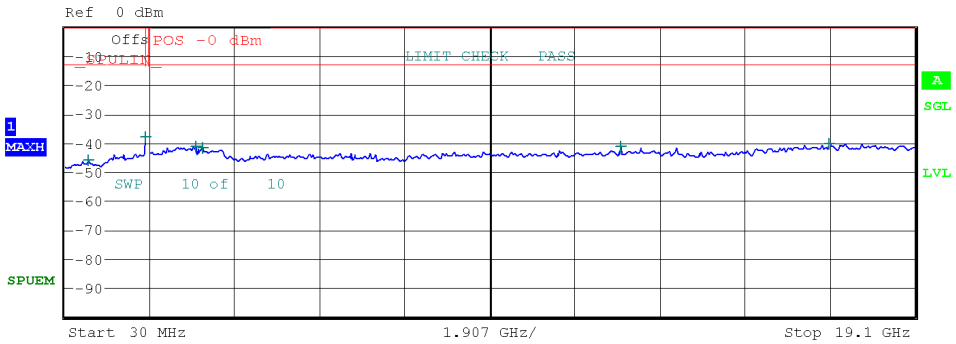

LOUNL

| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 404.631410 M | -45.84 | -32.84 |
| 1.000 G | 1.845 G | 1.00 M | 1.797595 G | -42.55 | -29.55 |
| 1.915 G | 3.000 G | 1.00 M | 1.915036 G | -34.55 | -21.55 |
| 3.000 G | 7.000 G | 1.00 M | 3.819733 G | -39.98 | -26.98 |
| 7.000 G | 13.600 G | 1.00 M | 12.528571 G | -41.81 | -28.81 |
| 13.600 G | 19.100 G | 1.00 M | 17.492857 G | -39.87 | -26.87 |

BAND

Date: 28.NOV.2018 09:34:48

PCS1900 High Channel

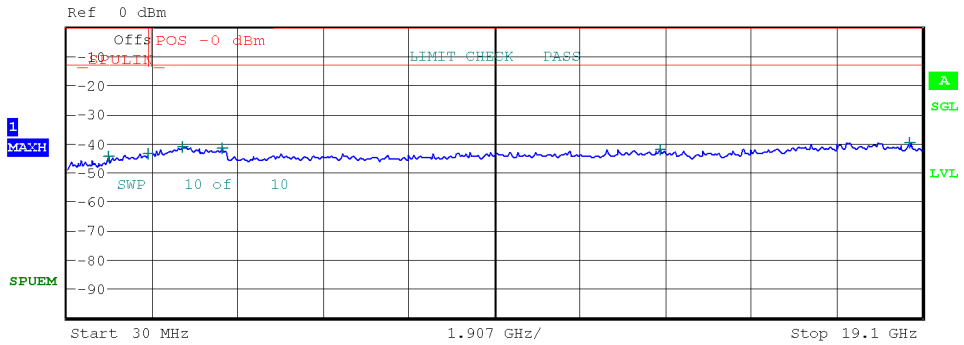



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 560.080128 M | -46.20 | -33.20 |
| 1.000 G | 1.845 G | 1.00 M | 1.844578 G | -38.49 | -25.49 |
| 1.915 G | 3.000 G | 1.00 M | 2.955117 G | -41.69 | -28.69 |
| 3.000 G | 7.000 G | 1.00 M | 3.116933 G | -41.99 | -28.99 |
| 7.000 G | 13.600 G | 1.00 M | 12.485714 G | -41.59 | -28.59 |
| 13.600 G | 19.100 G | 1.00 M | 17.171429 G | -40.38 | -27.38 |

BAND

Date: 28.NOV.2018 09:48:21

GPRS1900 Low Channel

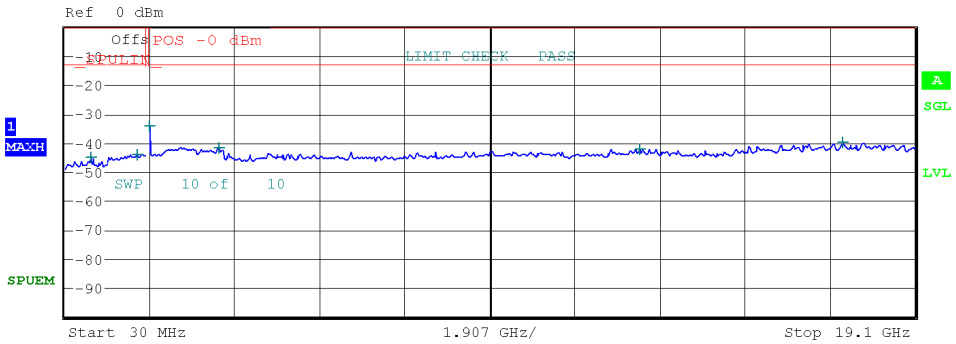



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 942.483974 M | -44.93 | -31.93 |
| 1.000 G | 1.845 G | 1.00 M | 1.818974 G | -43.86 | -30.86 |
| 1.915 G | 3.000 G | 1.00 M | 2.589798 G | -41.74 | -28.74 |
| 3.000 G | 7.000 G | 1.00 M | 3.486133 G | -42.05 | -29.05 |
| 7.000 G | 13.600 G | 1.00 M | 13.257143 G | -42.33 | -29.33 |
| 13.600 G | 19.100 G | 1.00 M | 18.814286 G | -40.25 | -27.25 |

BAND

Date: 28.NOV.2018 09:49:09

GPRS1900 Mid Channel

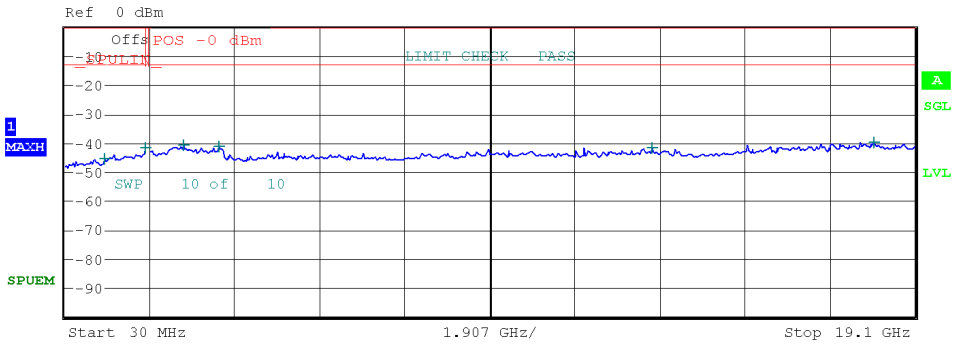



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 608.269231 M | -45.41 | -32.41 |
| 1.000 G | 1.845 G | 1.00 M | 1.640848 G | -44.17 | -31.17 |
| 1.915 G | 3.000 G | 1.00 M | 1.915036 G | -34.57 | -21.57 |
| 3.000 G | 7.000 G | 1.00 M | 3.496667 G | -41.84 | -28.84 |
| 7.000 G | 13.600 G | 1.00 M | 12.914286 G | -42.41 | -29.41 |
| 13.600 G | 19.100 G | 1.00 M | 17.492857 G | -39.94 | -26.94 |

BAND

Date: 28.NOV.2018 09:50:00

GPRS1900 High Channel

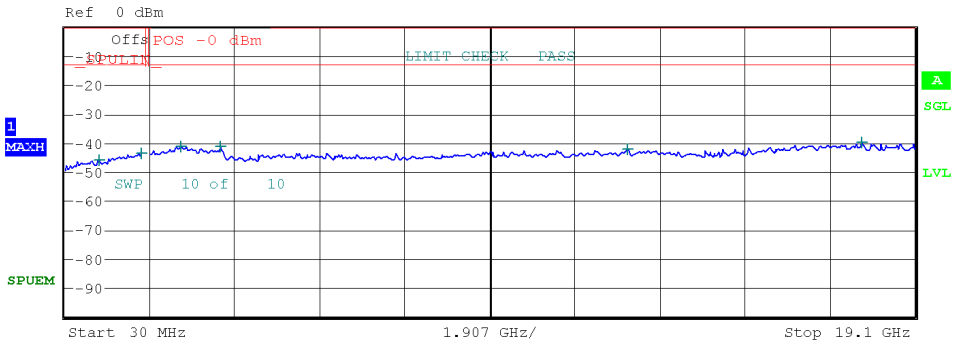



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 923.830128 M | -45.68 | -32.68 |
| 1.000 G | 1.845 G | 1.00 M | 1.843310 G | -42.10 | -29.10 |
| 1.915 G | 3.000 G | 1.00 M | 2.684988 G | -41.03 | -28.03 |
| 3.000 G | 7.000 G | 1.00 M | 3.469867 G | -41.50 | -28.50 |
| 7.000 G | 13.600 G | 1.00 M | 13.214286 G | -41.80 | -28.80 |
| 13.600 G | 19.100 G | 1.00 M | 18.171429 G | -40.13 | -27.13 |

BAND

Date: 28.NOV.2018 09:44:12

EGPRS1900 Low Channel

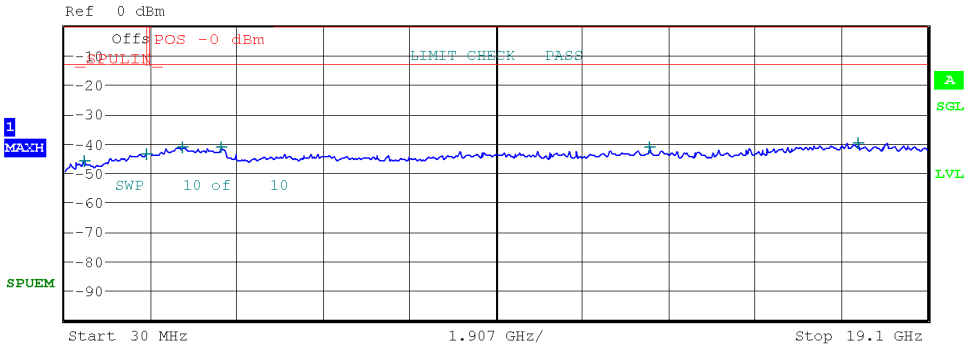



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 788.589744 M | -46.20 | -33.20 |
| 1.000 G | 1.845 G | 1.00 M | 1.754331 G | -43.84 | -30.84 |
| 1.915 G | 3.000 G | 1.00 M | 2.642456 G | -41.65 | -28.65 |
| 3.000 G | 7.000 G | 1.00 M | 3.506533 G | -41.78 | -28.78 |
| 7.000 G | 13.600 G | 1.00 M | 12.657143 G | -42.55 | -29.55 |
| 13.600 G | 19.100 G | 1.00 M | 17.921429 G | -40.20 | -27.20 |

BAND

Date: 28.NOV.2018 09:45:03

EGPRS1900 Mid Channel

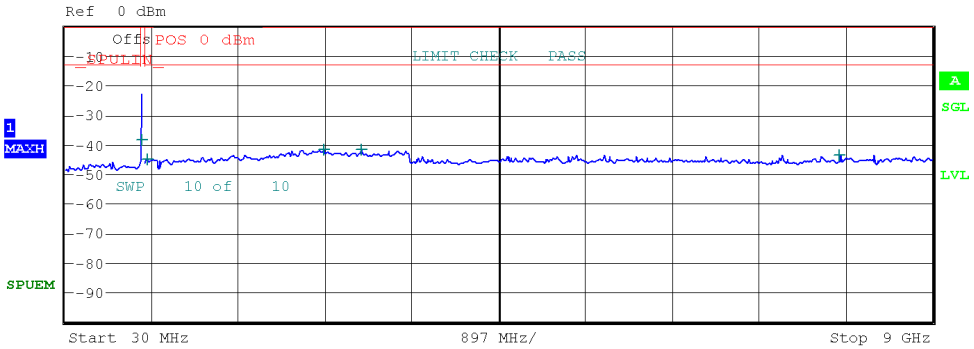



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 445.048077 M | -46.41 | -33.41 |
| 1.000 G | 1.845 G | 1.00 M | 1.822607 G | -43.85 | -30.85 |
| 1.915 G | 3.000 G | 1.00 M | 2.640576 G | -41.64 | -28.64 |
| 3.000 G | 7.000 G | 1.00 M | 3.479733 G | -41.75 | -28.75 |
| 7.000 G | 13.600 G | 1.00 M | 12.957143 G | -41.74 | -28.74 |
| 13.600 G | 19.100 G | 1.00 M | 17.564286 G | -40.27 | -27.27 |

BAND

Date: 28.NOV.2018 09:45:54

EGPRS1900 High Channel

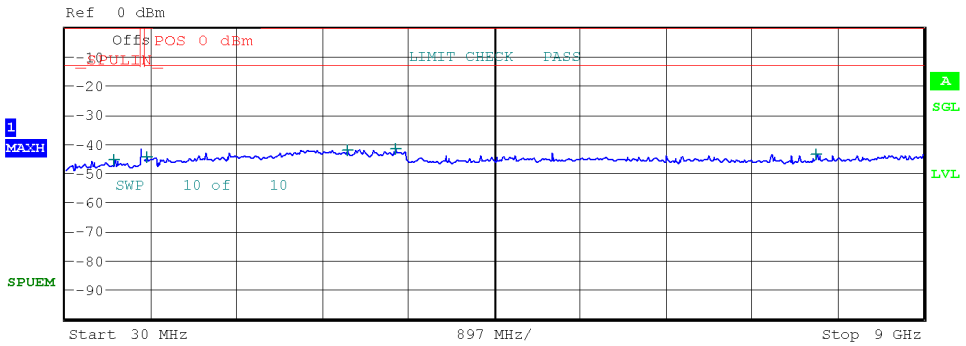



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 818.733974 M | -38.51 | -25.51 |
| 855.000 M | 1.000 G | 1.00 M | 877.504000 M | -45.09 | -32.09 |
| 1.000 G | 3.000 G | 1.00 M | 2.710200 G | -41.90 | -28.90 |
| 3.000 G | 7.000 G | 1.00 M | 3.093733 G | -42.20 | -29.20 |
| 7.000 G | 9.000 G | 1.00 M | 8.038961 G | -43.89 | -30.89 |

BAND

Date: 28.NOV.2018 10:12:35

WCDMA BAND5 Low Channel

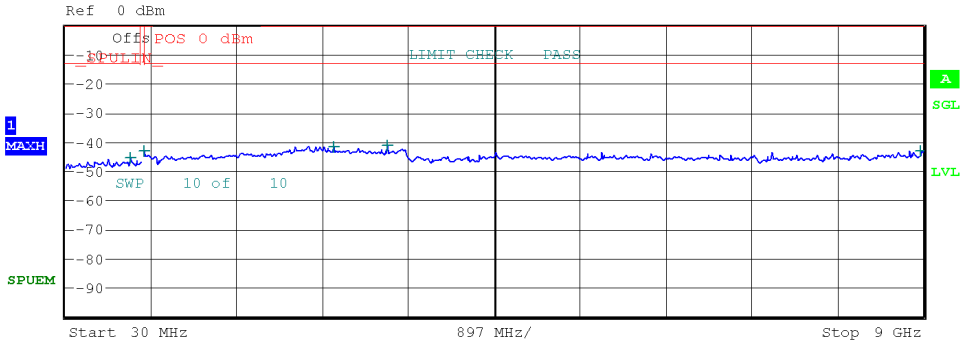



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 540.208333 M | -45.97 | -32.97 |
| 855.000 M | 1.000 G | 1.00 M | 872.124500 M | -45.00 | -32.00 |
| 1.000 G | 3.000 G | 1.00 M | 2.981267 G | -42.43 | -29.43 |
| 3.000 G | 7.000 G | 1.00 M | 3.479600 G | -42.04 | -29.04 |
| 7.000 G | 9.000 G | 1.00 M | 7.883117 G | -43.75 | -30.75 |

BAND

Date: 28.NOV.2018 10:13:25

WCDMA BAND5 Mid Channel




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | Δ Limit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 820.000 M | 1.00 M | 698.461538 M | -45.94 | -32.94 |
| 855.000 M | 1.000 G | 1.00 M | 855.101500 M | -43.29 | -30.29 |
| 1.000 G | 3.000 G | 1.00 M | 2.834467 G | -41.89 | -28.89 |
| 3.000 G | 7.000 G | 1.00 M | 3.394000 G | -41.59 | -28.59 |
| 7.000 G | 9.000 G | 1.00 M | 8.974026 G | -43.54 | -30.54 |

BAND

Date: 28.NOV.2018 10:14:08

WCDMA BAND5 High Channel

## 5.6 Frequency Stability

### 5.6.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025%(±2.5ppm) of the center frequency.

### 5.6.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

### 5.6.3 Test Procedure for Temperature Variation

a. The EUT was set up in the thermal chamber and connected with the system simulator.

b. With power OFF, the temperature was decreased to -20℃ and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.

c. With power OFF, the temperature was raised in 10℃ steps up to 60℃. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

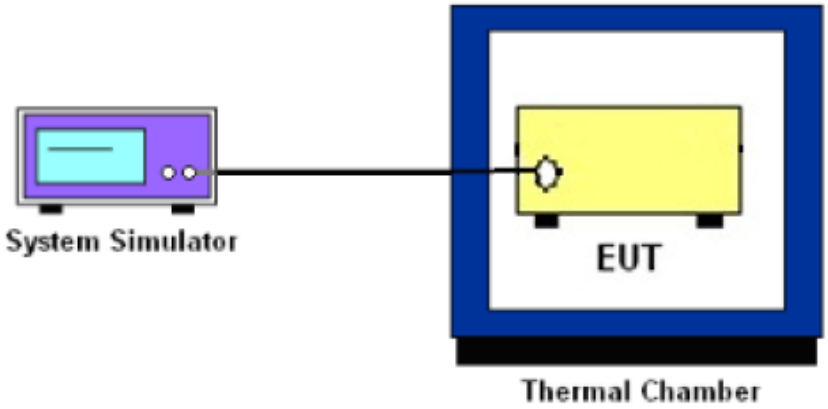
### 5.6.4 Test Procedure for Voltage Variation

a. The EUT was placed in a temperature chamber at 25±5℃ and connected with the system simulator.

b. The power supply voltage to the EUT was varied from 3.42V to 4.18V measured at the input to the EUT.

c. The variation in frequency was measured for the worst case.

### 5.6.5 Test Setup




### 5.6.6 Test Result

Test Result of Temperature Variation

| Band: | GSM850 | | Channel: | 190 |
|---|---|---|---|---|
| Limit(ppm) | 2.5 | | Frequency: | 836.6MHZ |
| Temperature (℃) | GSM Deviation (ppm) | GPRS Deviation (ppm) | EGPRS Deviation (ppm) | Result |
| -20 | +0.02 | +0.03 | +0.03 | PASS |
| -10 | +0.02 | +0.03 | +0.03 | |
| 0 | +0.02 | +0.03 | +0.03 | |
| 10 | +0.02 | +0.03 | +0.03 | |
| 20(Ref.) | +0.02 | +0.03 | +0.03 | |
| 30 | +0.02 | +0.03 | +0.03 | |
| 40 | +0.02 | +0.02 | +0.04 | |
| 50 | +0.02 | +0.03 | +0.03 | |
| 60 | +0.02 | +0.03 | +0.03 | |

| Band: | PCS1900 | | Channel: | 661 |
|---|---|---|---|---|
| Limit(ppm) | 2.5 | | Frequency: | 1880.0MHZ |
| Temperature (℃) | GSM Deviation (ppm) | GPRS Deviation (ppm) | EGPRS Deviation (ppm) | Result |
| -20 | +0.01 | +0.01 | +0.01 | PASS |
| -10 | +0.01 | +0.01 | +0.02 | |
| 0 | +0.01 | +0.01 | +0.01 | |
| 10 | +0.01 | +0.01 | +0.01 | |
| 20(Ref.) | +0.01 | +0.01 | +0.01 | |
| 30 | +0.02 | +0.02 | +0.01 | |
| 40 | +0.00 | +0.01 | +0.01 | |
| 50 | +0.01 | +0.01 | +0.02 | |
| 60 | +0.01 | +0.01 | +0.01 | |

| Band: | WCDMA BAND5 | Channel: | 4182 |
|---|---|---|---|
| Limit(ppm) | 2.5 | Frequency: | 836.4MHZ |
| Temperature(℃) | Deviation(ppm) | | Result |
| -20 | -0.0006 | | Pass |
| -10 | -0.0013 | | Pass |
| 0 | -0.0007 | | Pass |
| 10 | -0.0015 | | Pass |
| 20(Ref.) | -0.0004 | | Pass |

| | | |
|---|---|---|
| 30 | -0.0003 | Pass |
| 40 | -0.0005 | Pass |
| 50 | -0.0002 | Pass |
| 60 | -0.0002 | Pass |

Test Result of Voltage Variation

| Band<br>Channel | Mode | Voltage | Deviation(ppm) | Limit(ppm) | Result |
|---|---|---|---|---|---|
| GSM 850<br>CH190 | GSM | LV | +0.02 | 2.5 | Pass |
| | | NV | +0.03 | 2.5 | Pass |
| | | HV | +0.02 | 2.5 | Pass |
| | GPRS | LV | +0.02 | 2.5 | Pass |
| | | NV | +0.03 | 2.5 | Pass |
| | | HV | +0.02 | 2.5 | Pass |
| | EGPRS | LV | +0.02 | 2.5 | Pass |
| | | NV | +0.03 | 2.5 | Pass |
| | | HV | +0.03 | 2.5 | Pass |
| PCS 1900<br>CH661 | GSM | LV | +0.01 | 2.5 | Pass |
| | | NV | +0.01 | 2.5 | Pass |
| | | HV | +0.01 | 2.5 | Pass |
| | GPRS | LV | +0.01 | 2.5 | Pass |
| | | NV | +0.01 | 2.5 | Pass |
| | | HV | +0.01 | 2.5 | Pass |
| | EGPRS | LV | +0.01 | 2.5 | Pass |
| | | NV | +0.01 | 2.5 | Pass |

| | | | | | |
|---|---|---|---|---|---|
| | | HV | +0.01 | 2.5 | Pass |
| WCDMA BAND5 CH4182 | RMC 12.2Kbps | LV | -0.0012 | 2.5 | Pass |
| | | NV | -0.0009 | 2.5 | Pass |
| | | HV | -0.0009 | 2.5 | Pass |

## 5.7 Effective radiated power and effective isotropic radiated power measurement

### 5.7.1 Description of the ERP/EIRP Measurement

The ERP of mobile transmitters must not exceed 7 Watts (Cellular Band) and the EIRP of mobile transmitters are limited to 2 Watts (PCS Band) and 1 Watts (AWS Band).

### 5.7.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

### 5.7.3 Test Procedure

Effective Isotropic Radiated Power (EIPR) was calculated with the correction factor, EIPR=Conducted Output Power + Substitution antenna gain. ERP=EIRP-2.15.

### 5.7.4 Test Result

| Modes | GSM850 | | | Modes | PCS1900 | | |
|---|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | Channel | 512 | 661 | 810 |
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | Frequency(MHz) | 1850.2 | 1880 | 1909.8 |
| Antenna Gain(dBi) | 0.12 | 0.2 | 0.05 | Antenna Gain(dBi) | 0.2 | 0.35 | 0.7 |
| ERP | 30.8 | 30.59 | 30.26 | EIRP | 28.17 | 29.05 | 30.05 |
| Limit | ≤ 7W(38.45dBm) | | | Limit | ≤ 2W(33dBm) | | |
| Result | PASS | | | Result | PASS | | |

| Modes | WCDMA BAND5 | | |
|---|---|---|---|
| Channel | 4132 | 4182 | 4233 |
| Frequency(MHz) | 826.4 | 836.4 | 846.6 |
| Antenna Gain(dBi) | 0.12 | 0.2 | 0.05 |
| ERP | 20.63 | 20.94 | 20.6 |
| Limit | ≤ 7W(38.45dBm) | | |
| Result | PASS | | |

| Modes | GPRS 850 | | | Modes | GPRS 1900 | | |
|---|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | Channel | 512 | 661 | 810 |
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | Frequency(MHz) | 1850.2 | 1880 | 1909.8 |
| Antenna Gain(dBi) | 0.12 | 0.2 | 0.05 | Antenna Gain(dBi) | 0.2 | 0.35 | 0.7 |
| ERP | 31.01 | 30.08 | 30.49 | EIRP | 28.62 | 29.4 | 30.24 |
| Limit | ≤ 7W(38.45dBm) | | | Limit | ≤ 2W(33dBm) | | |
| Result | PASS | | | Result | PASS | | |

| Modes | EGPRS 850 | | | Modes | EGPRS 1900 | | |
|---|---|---|---|---|---|---|---|
| Channel | 128 | 190 | 251 | Channel | 512 | 661 | 810 |
| Frequency(MHz) | 824.2 | 836.6 | 848.8 | Frequency(MHz) | 1850.2 | 1880 | 1909.8 |
| Antenna Gain(dBi) | 0.12 | 0.2 | 0.05 | Antenna Gain(dBi) | 0.2 | 0.35 | 0.7 |
| ERP | 24.65 | 24.71 | 24.71 | EIRP | 24.75 | 25.18 | 26.24 |
| Limit | ≤ 7W(38.45dBm) | | | Limit | ≤ 2W(33dBm) | | |
| Result | PASS | | | Result | PASS | | |

## 5.8 Filed Strength of Spurious Radiation

### 5.8.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10$^{th}$ harmonic.

### 5.8.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

### 5.8.3 Test Procedures

a. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.

b. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.

c. The table was rotated 360 degrees to determine the position of the highest spurious emission.

d. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.

e. Make the measurement with the spectrum analyzer RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.

f. A horn antenna was substituted in place of the EUT and was driven by a signal generator.

g. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.

h. Taking the record of output power at antenna port.

i. Repeat step 7 to step 8 for another polarization.

j. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain

k. ERP (dBm) =EIRP-2.15

l. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

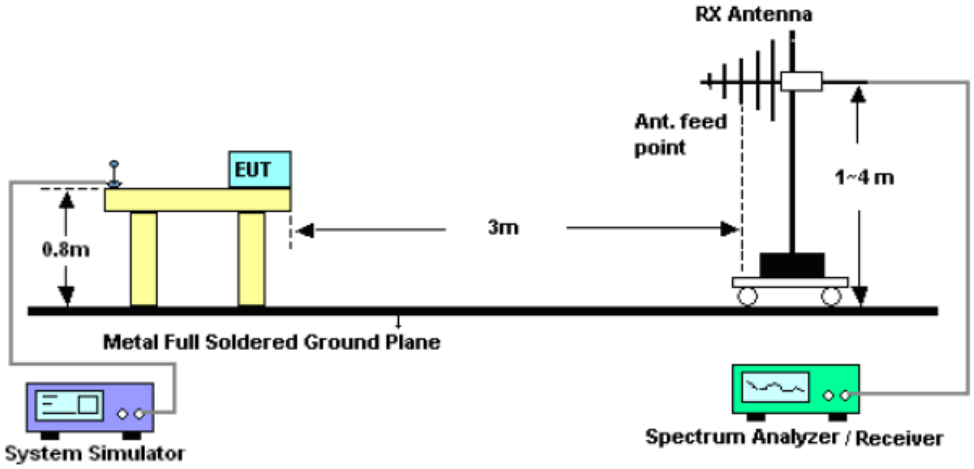
=P(W) – [43 + 10log(P)](dB)

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

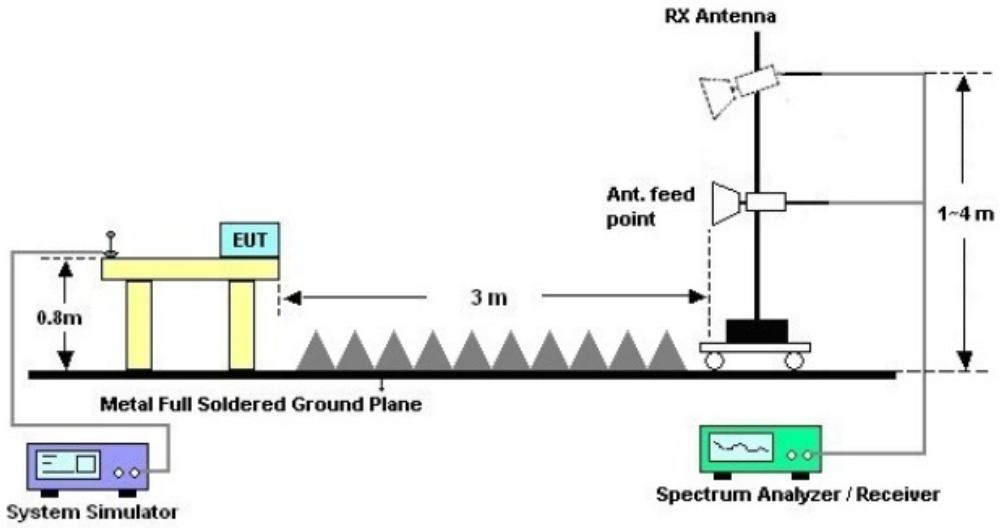
=-13dBm.

### 5.8.4 Test Setup

**For radiated emissions from 30MHz to 1GHz**

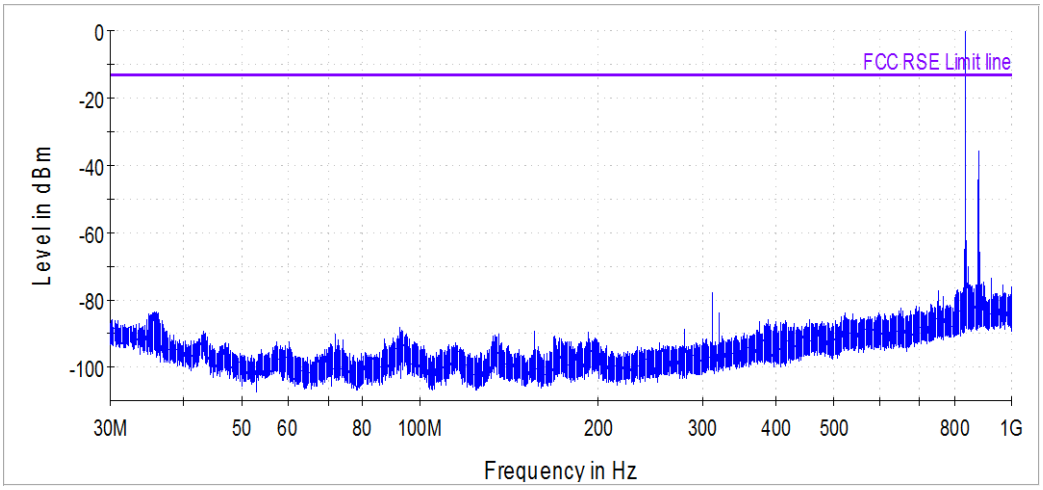



**For radiated emissions above 1GHz**

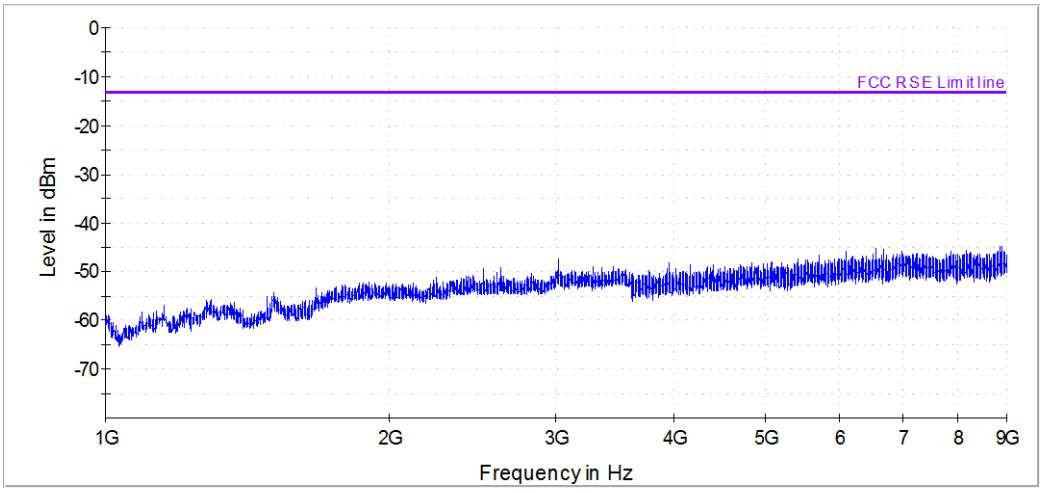


### 5.8.5 Test Result

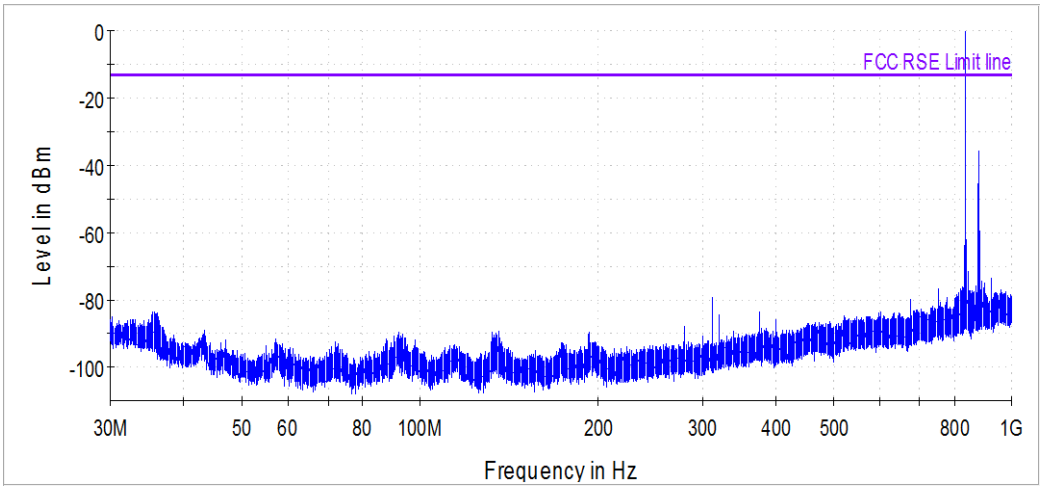
**GSM 850 TX**
**Position 1**
(30MHz~1GHz)



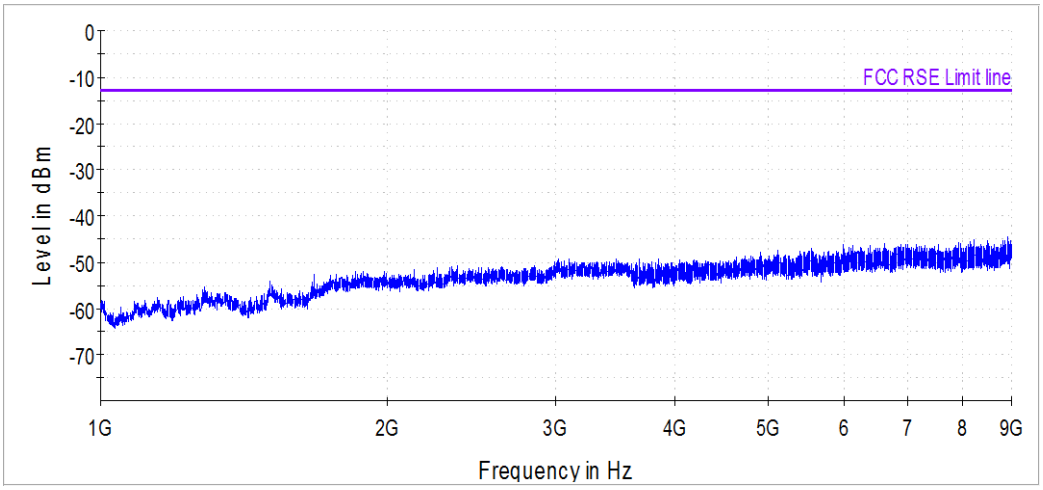

(1GHz~9GHz)



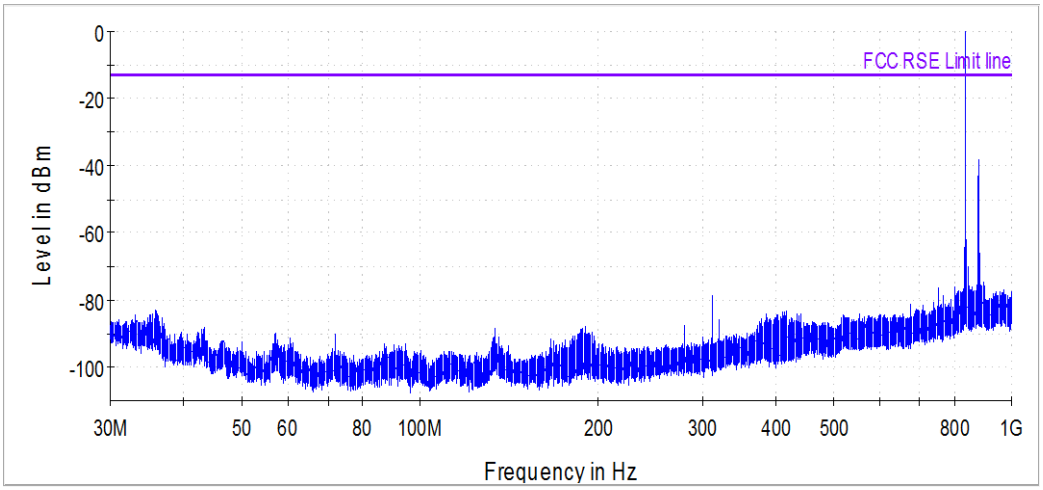
**Positon 2**
(30MHz~1GHz)



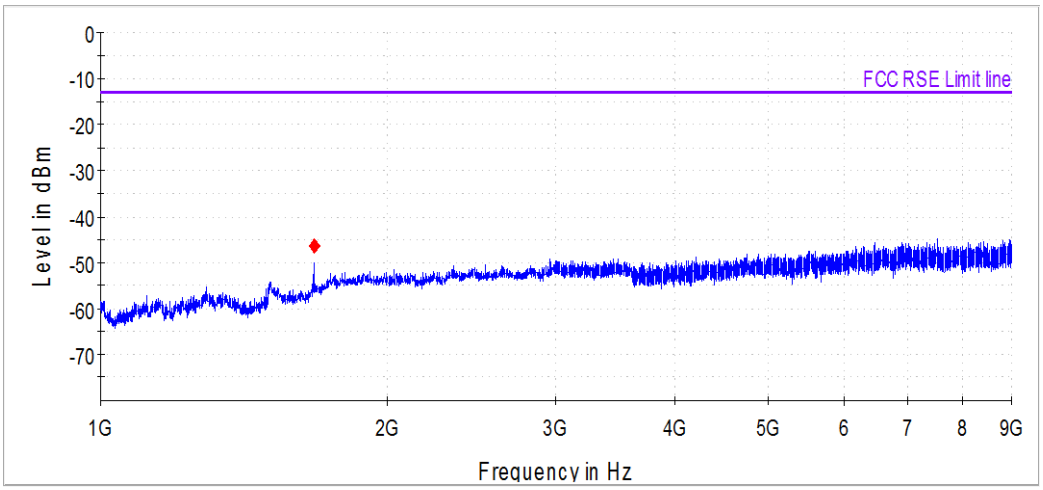

(1GHz~9GHz)



**Position 3**
(30MHz~1GHz)



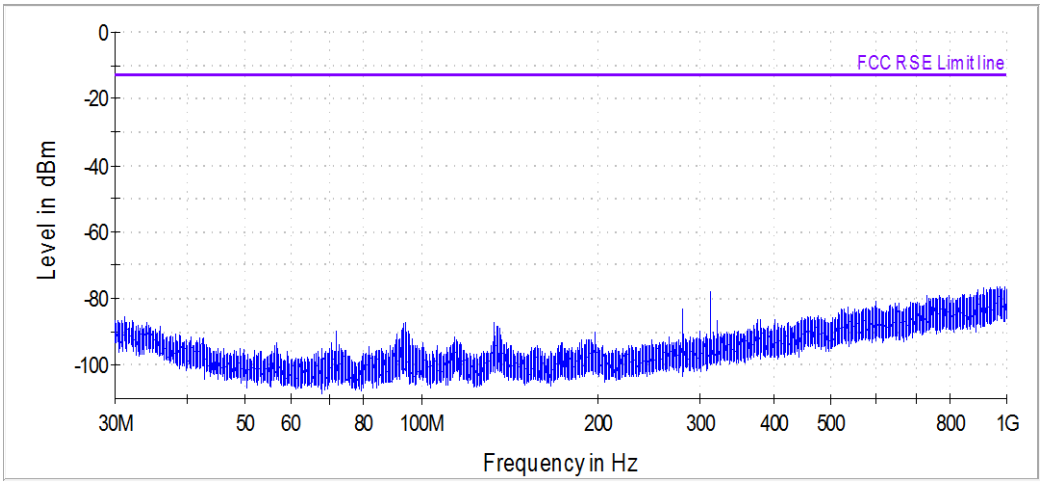

(1GHz~9GHz)



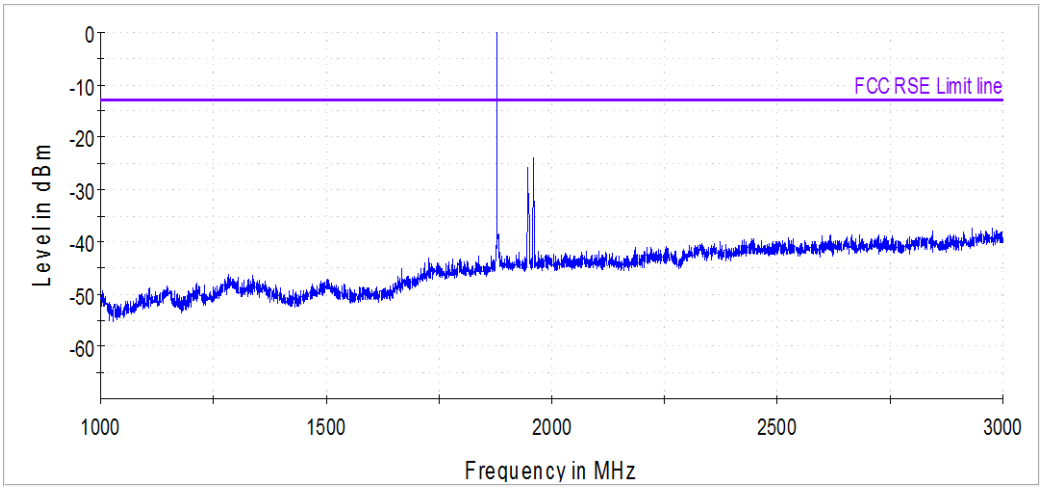

| Frequency | MaxPeak | Limit | Margin | Read | SG | Cable loss | TX ant gain | Azimuth | Pol |
|---|---|---|---|---|---|---|---|---|---|
| MHz | dBm | dBm | dB | dBuV | dBm | dB | dBi | deg | |
| 1673.287500 | -46.53 | -13.00 | 33.53 | 49.27 | -49.3 | 1.28 | 6.2 | 255.0 | H |

EIRP=SG Power - cable loss + Tx ant gain
ERP=EIRP-2.15

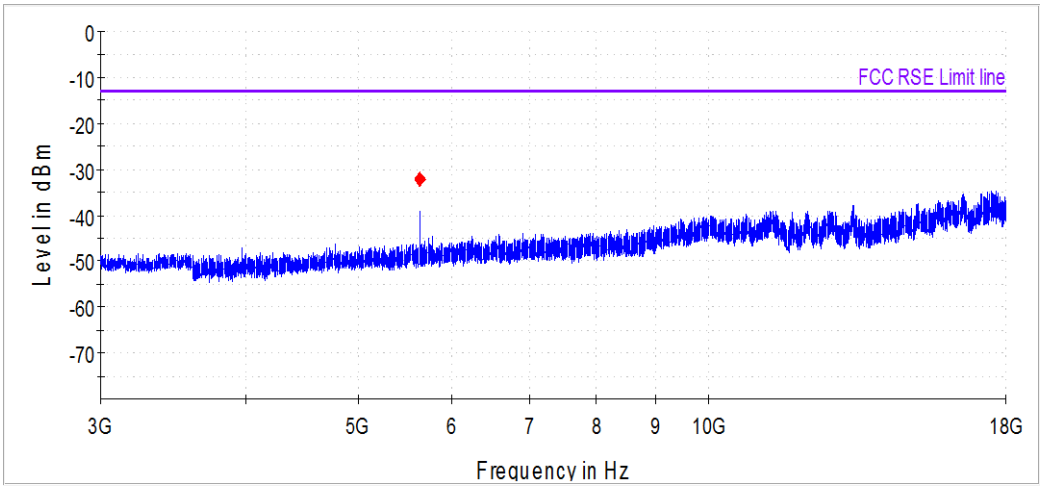
**PCS 1900 TX**
**Position 1**
(30MHz~1GHz)




(1GHz~3GHz)



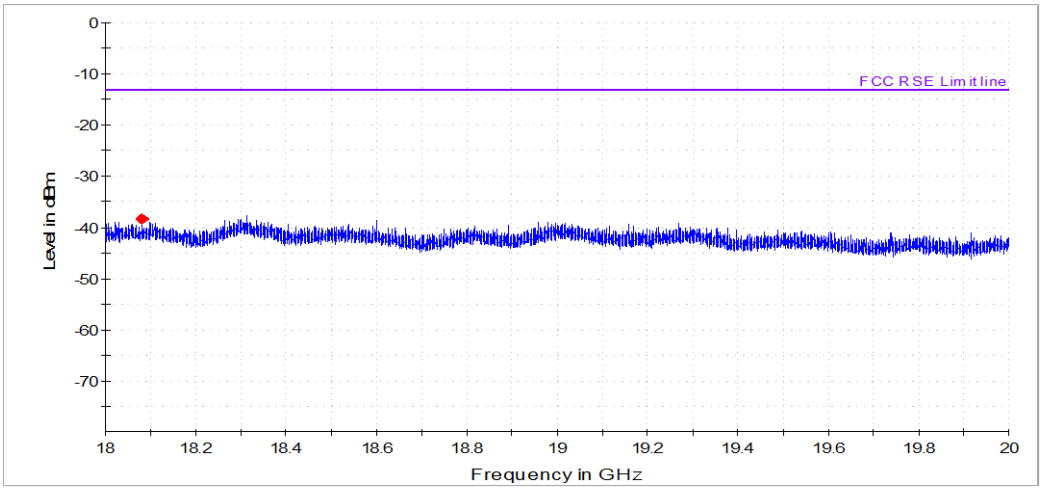
(3GHz~18GHz)




Fin PK

| Frequency | MaxPeak | Limit | Margin | Read | SG | Cable loss | TX ant gain | Azimuth | Pol |
|---|---|---|---|---|---|---|---|---|---|
| MHz | dBm | dBm | dB | dBuV | dBm | dB | dBi | deg | |
| 5639.892000 | -32.19 | -13.00 | 19.19 | 53.61 | -38.6 | 3.69 | 10.1 | 157.0 | H |

(18GHz~20GHz)

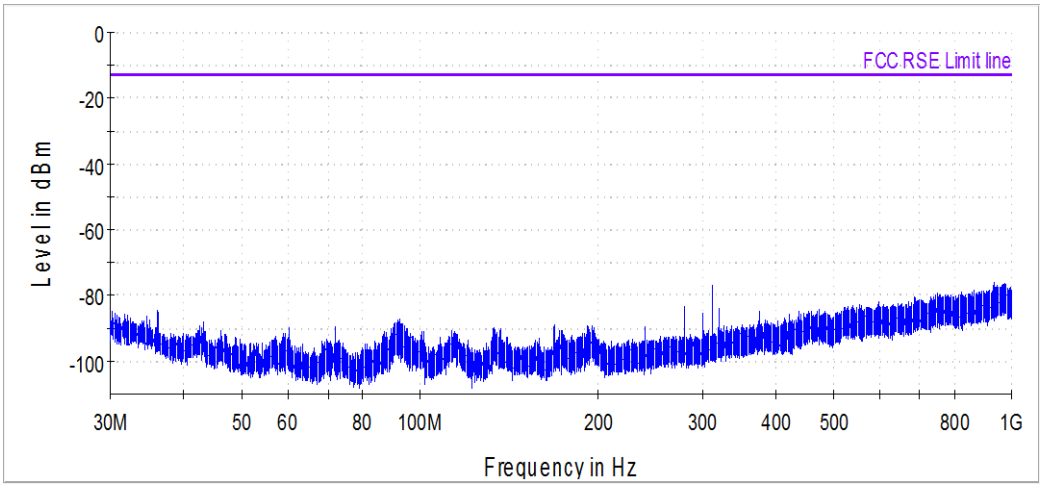



Fin PK

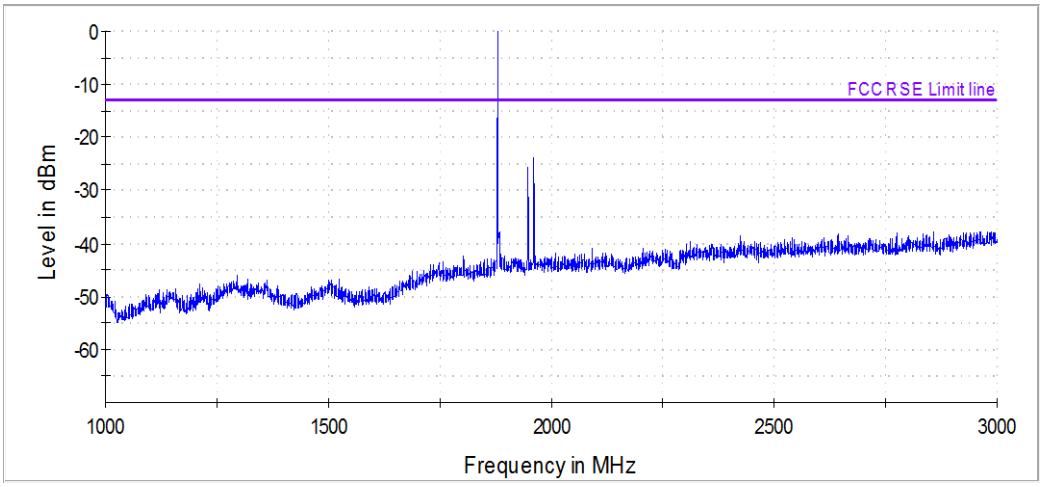
| Frequency | MaxPeak | Limit | Margin | Read | SG | Cable loss | TX ant gain | Azimuth | Pol |
|---|---|---|---|---|---|---|---|---|---|
| MHz | dBm | dBm | dB | dBuV | dBm | dB | dBi | deg | |
| 18080.742167 | -38.31 | -13.00 | 25.31 | 40.29 | -53.6 | 2.58 | 17.87 | 334.0 | V |

EIRP=SG Power - cable loss + Tx ant gain

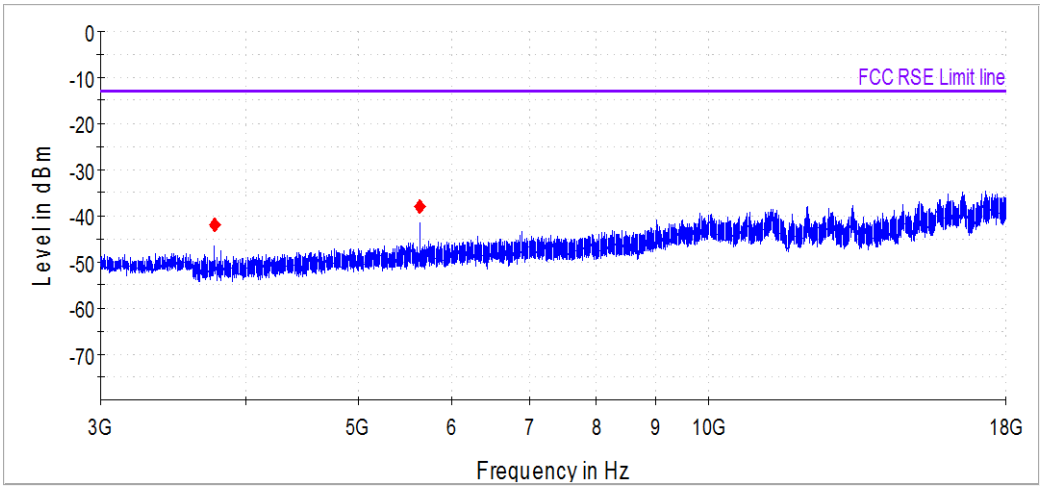
**Position 2**
(30MHz~1GHz)




(1GHz~3GHz)



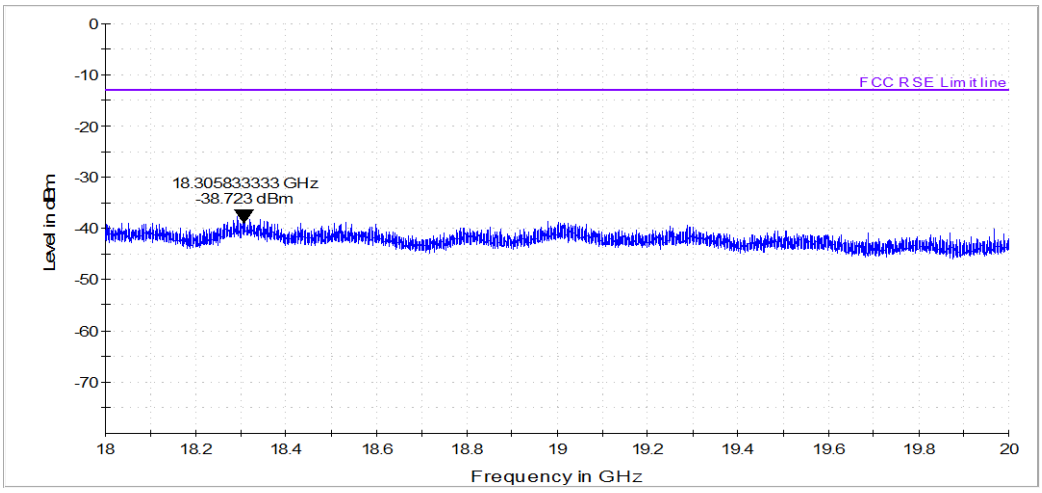
(3GHz~18GHz)



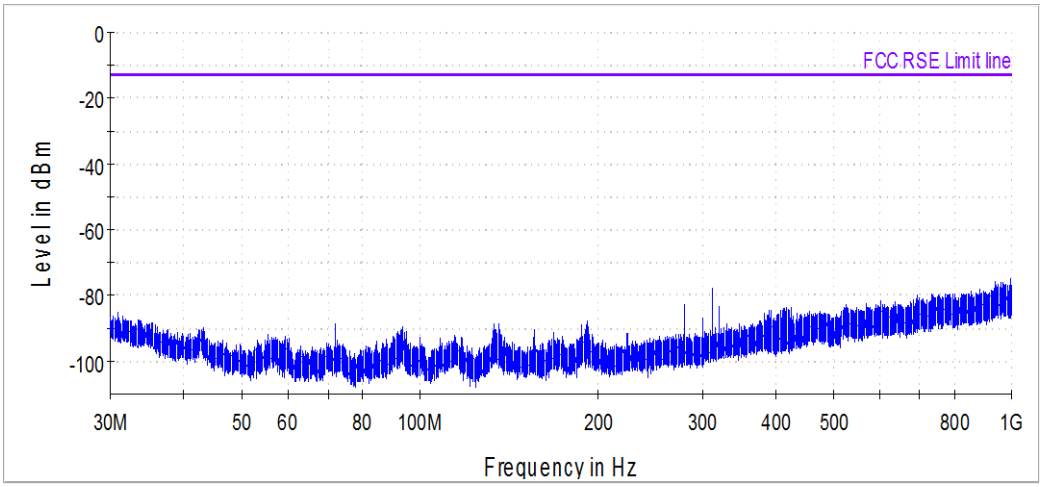

Fin PK

| Frequency | MaxPeak | Limit | Margin | Read | SG | Cable loss | TX ant gain | Azimuth | Pol |
|---|---|---|---|---|---|---|---|---|---|
| MHz | dBm | dBm | dB | dBuV | dBm | dB | dBi | deg | |
| 3760.175667 | -42.02 | -13.00 | 29.02 | 47.83 | -47.3 | 3.12 | 8.4 | 30.0 | H |
| 5639.938667 | -38.11 | -13.00 | 25.11 | 48.05 | -44.5 | 3.71 | 10.1 | 248.0 | V |

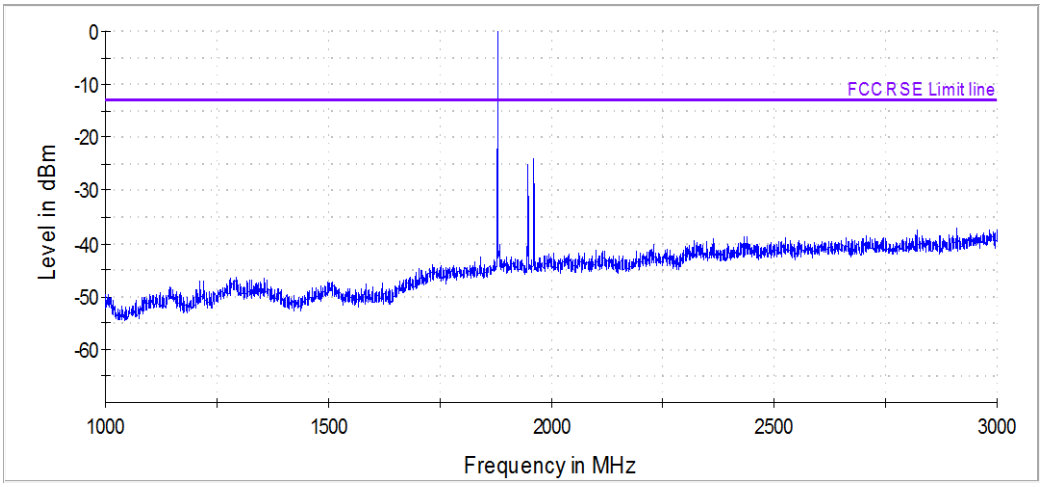
EIRP=SG Power - cable loss + Tx ant gain



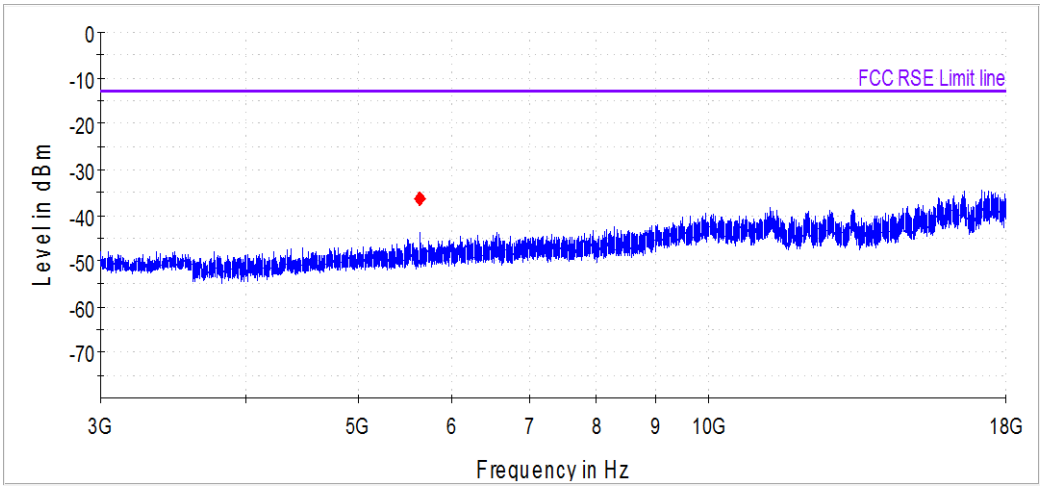
**Position 3**
(30MHz~1GHz)




(1GHz~3GHz)




(3GHz~18GHz)

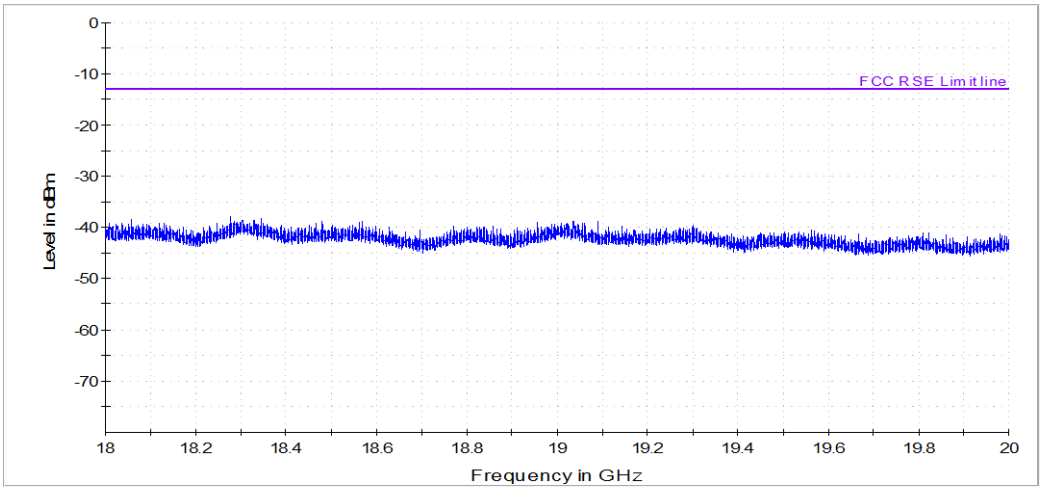


Fin PK

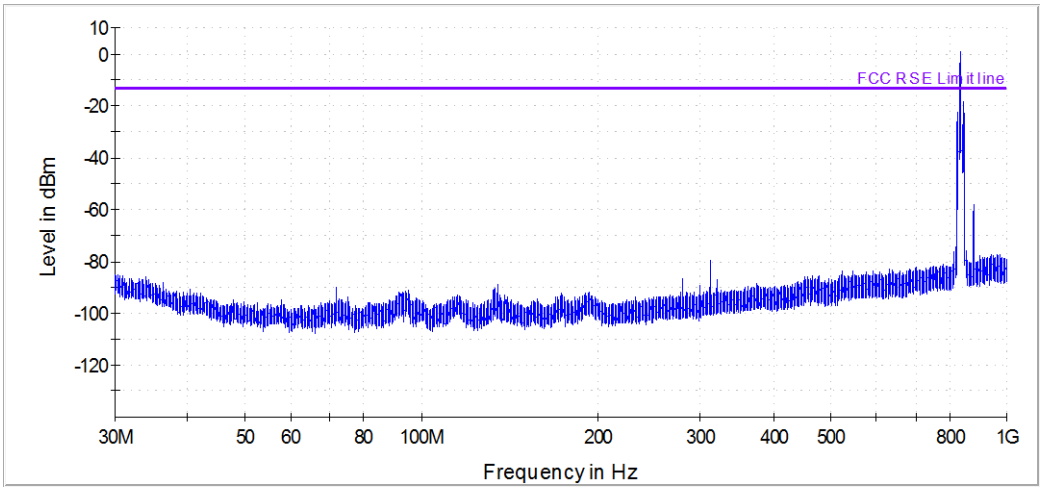
| Frequency | MaxPeak | Limit | Margin | Read | SG | Cable loss | TX ant gain | Azimuth | Pol |
|---|---|---|---|---|---|---|---|---|---|
| MHz | dBm | dBm | dB | dBuV | dBm | dB | dBi | deg | |
| 5639.895666 | -36.43 | -13.00 | 23.43 | 49.67 | -42.8 | 3.73 | 10.1 | 310.0 | V |

EIRP=SG Power - cable loss + Tx ant gain

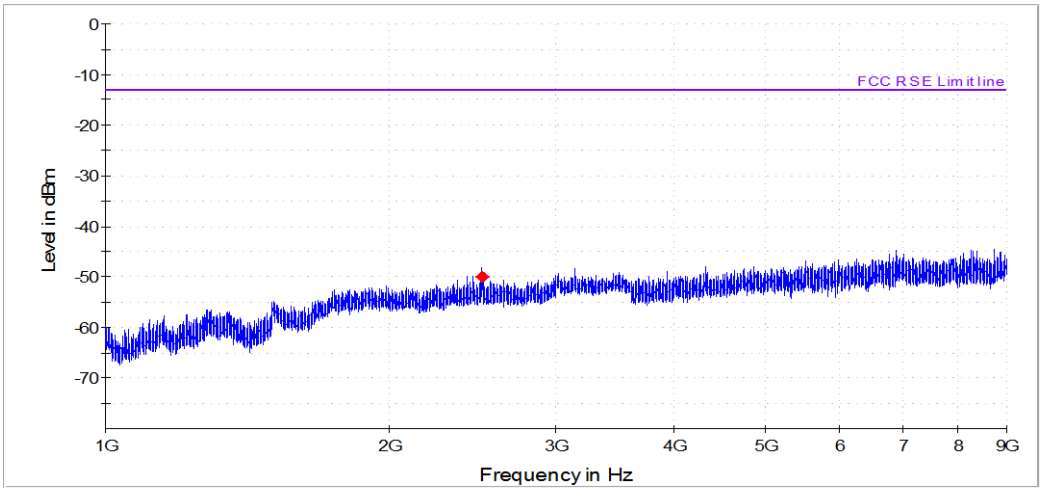
(18GHz~20GHz)




**WCDMA Band5 TX**
**Position 1**
(30MHz~1GHz)



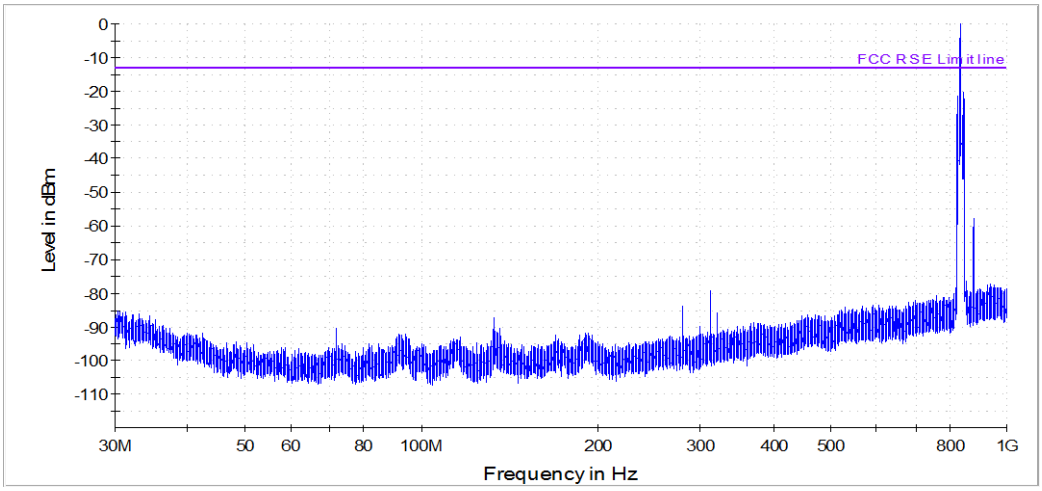
(1GHz~9GHz)



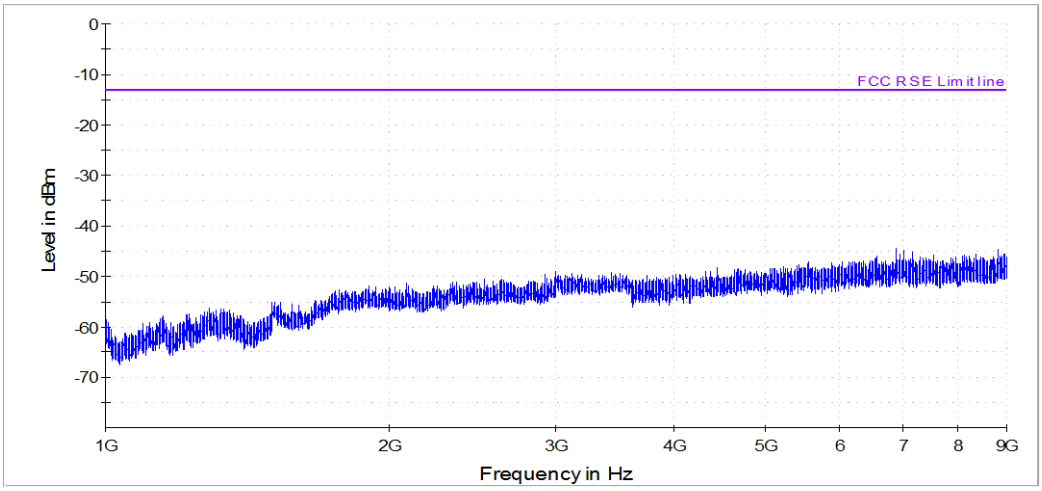

| Frequency | MaxPeak | Limit | Margin | Read | SG | Cable loss | TX ant gain | Azimuth | Pol |
|---|---|---|---|---|---|---|---|---|---|
| MHz | dBm | dBm | dB | dBuV | dBm | dB | dBi | deg | |
| 2503.371600 | -49.93 | -13.00 | 36.93 | 42.23 | -51.8 | 1.88 | 5.90 | 63.0 | H |

EIRP=SG Power - cable loss + Tx ant gain
ERP=EIRP-2.15

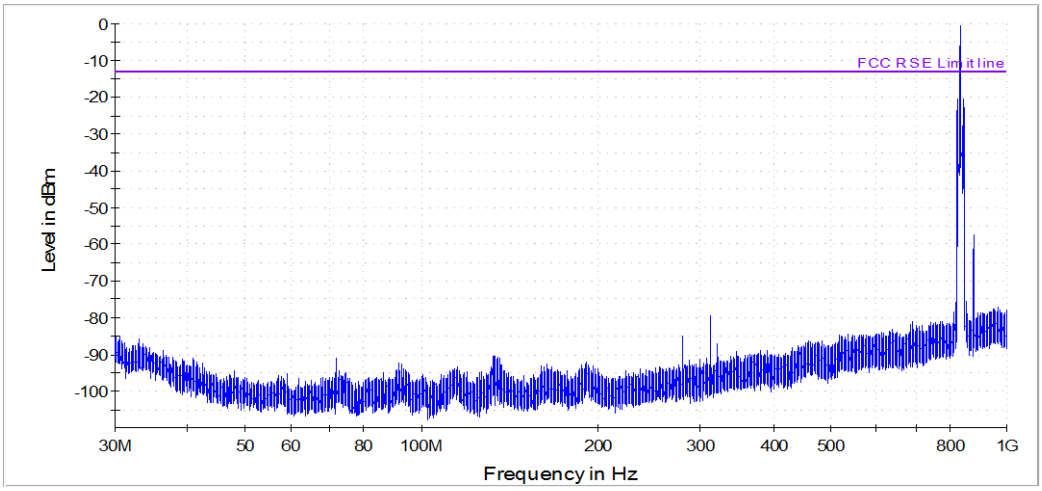
**Position 2**
(30MHz~1GHz)



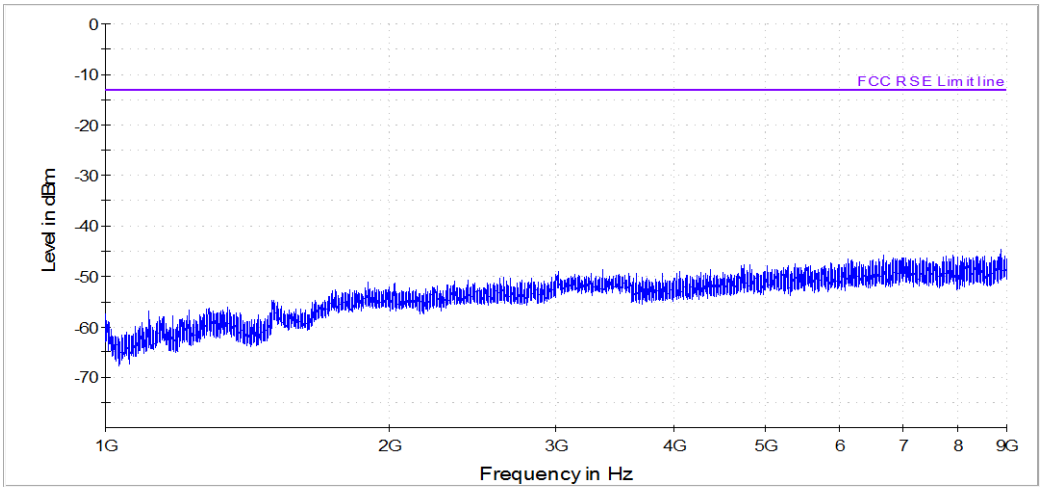
(1GHz~9GHz)




**Position 3**
(30MHz~1GHz)



(1GHz~9GHz)


0
-10
-20
-30
-40
-50
-60
-70
Level in dBm
FCC RSE Limit line
1G
2G
3G
4G
5G
6
7
8
9G
Frequency in Hz

# 6 SAMPLE PICTURE

Reference attachment : Test Setup Photos_2

# 7 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, BYD Precise Manufacture Co., Ltd., were founded in 2007 to provide our best service in RF, Radio consultation. Our laboratories are accredited by the following accreditation bodies according to ISO/IEC 17025 (2005) .

| | |
|---|---|
| **USA** | A2LA<br>Certificate No.: 4886.01 |

Copies of accreditation certificates could be inquired from our office. If you have any comments, please feel free to contact us at the following:

**EMC / RF / Lab**:
Tel: +86-755 8489 8888 55501
Fax: +86-755 8964 3771

**--- END ---**