TESTING CERT #3478.01

# TEST REPORT

| | |
|---|---|
| EUT Description | **Mobile Phone** |
| Brand Name | **Unimax Communications** |
| Model Name | **U307TG / MXG308** |
| Serial Number | **S/N: MB27560400050 / MB27560400021**<br>(see section 4) |
| FCC ID | **FCC ID: P46-UMX35INT** |
| Antenna type | **N/A** |
| Hardware/ Software Version | **HW Config: B1.1, B1.2 / SW: 01.37.ww39_p3.2016**<br>**Test SW : Phone Tool version 218** |
| Date of Sample Receipt | **2016-03-02** |
| Date of Test Start/End | **2016-03-15 / 2016-05-30** |
| Features | **2G: GSM/GPRS 850 / 1900**<br>**3G: WCDMA/HSDPA Cat. 14, HSUPA Cat. 6, Rel-7 FDD II / V**<br>(see section 5) |

| | |
|---|---|
| Applicant | **Unimax Communications** |
| Address | **18201 McDurmott Street W. Suite E, Irvine, CA 92614** |
| Contact Person | **Dan Gannon** |
| Telephone/Fax/ Email | **+1-949-748-7485 / dangannon18@gmail.com** |

| | |
|---|---|
| Reference Standards | **FCC CFR Title 47 Part 2, 22, 24, 27**<br>(see section 1) |

| | |
|---|---|
| Test Report number | **160223-01.TR03** |
| Revision Control | **Rev. 01** |

The test results relate only to the samples tested.
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| Issued by | Reviewed by |
|---|---|
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## 1. Standards, reference documents and applicable test methods

1. FCC 47 CFR part 2 - Subpart J - EQUIPMENT AUTHORIZATION PROCEDURES.
2. FCC 47 CFR part 22 - Subpart H - Cellular Radiotelephone Service.
3. FCC 47 CFR part 24 – Subpart E - Broadband PCS.
4. FCC OET KDB 971168 D01 v02r02 Measurement guidance for certification of licensed digital transmitters.
5. FCC OET KDB 412172 D01 v01r01 Guidelines for determining the effective radiated power (ERP) and equivalent isotropically radiated power (EIRP) of an RF transmitting system.
6. ANSI/TIA-603-D, June 2010 – Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
7. ANSI C63.4-2009 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

## 2. General conditions, competences and guarantees

- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is a testing laboratory accredited by the American Association for Laboratory Accreditation (A2LA).
- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm listed by the FCC, with Designation Number FR0011.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.
- ✓ Complete or partial reproduction of the report cannot be made without written permission of Intel WRF Lab.

## 3. Environmental Conditions

- ✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

| | |
|---|---|
| Temperature | 22ºC ± 2ºC |
| Humidity | 30% ± 10% |


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## 4. Test samples

| Sample | Control # | Description | Model | Serial # | Date of reception | Note |
|---|---|---|---|---|---|---|
| #01 | 160223-01.S09 | Smartphone | U307TG, Build B1 | MB27560400050 | 2016-03-02 | Used for conducted tests |
| #02 | 160223-01.S05 | Smartphone | U307TG, Build B1 | MB27560400021 | 2016-03-02 | Used for radiated tests |

## 5. EUT features

These are the detailed bands and modes supported by the Equipment Under Test:

| | |
|---|---|
| GSM / GPRS | GSM 850 (824.0 – 849.0 MHz)<br>PCS 1900 (1850.0 – 1910.0 MHz) |
| WCDMA / HSPA+ | FDD II (1850.0 – 1910.0 MHz)<br>FDD V (824.0 – 849.0 MHz) |

## 6. Remarks and comments

N/A



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# 7. Test Verdicts summary

## 7.1. GSM/GPRS

| Mode | FCC part | Test name | Verdict |
|---|---|---|---|
| PCS 1900 | 2.1046 | Conducted output power | P |
| | 24.238 | Emission bandwidth 26dB | P |
| | 24.232 | Equivalent isotropic radiated power | P |
| | 2.1049 | Occupied bandwidth 99% | P |
| | 24.232 | Peak to average ratio | P |
| | 24.235, 2.1055 | Frequency Stability | P |
| | 24.238 | Conducted band-edge | P |
| | 24.238 | Conducted spurious emission | P |
| | 24.238 | Radiated spurious emission | P |
| GSM 850 | 2.1046 | Conducted output power | P |
| | 2.1049 | Occupied bandwidth (99%) | P |
| | 22.917 | Occupied bandwidth (26dB) | P |
| | 22.355, 2.1055 | Frequency Stability | P |
| | 22.917, 2.1051 | Band Edge conducted emission | P |
| | 22.917, 2.1051 | Spurious emission | P |
| | 22.913 | Effective radiated power | P |
| | 22.917, 2.1053 | Radiated spurious emission | P |
| | - | Peak-to-average power ratio | P |

## 7.2. WCDMA

| Mode | Band | FCC part | Test name | Verdict |
|---|---|---|---|---|
| WCDMA / HSPA+ FDD | 2 | 2.1046 | Conducted output power | P |
| | | 24.238 | Emission bandwidth 26dB | P |
| | | 24.232 | Equivalent isotropic radiated power | P |
| | | 2.1049 | Occupied bandwidth 99% | P |
| | | 24.232 | Peak to average ratio | P |
| | | 24.235, 2.1055 | Frequency Stability | P |
| | | 24.238 | Conducted band-edge | P |
| | | 24.238 | Conducted spurious emission | P |
| | | 24.238 | Radiated spurious emission | P |
| WCDMA / HSPA+ FDD | 5 | 2.1046 | Conducted output power | P |
| | | 2.1049 | Occupied bandwidth (99%) | P |
| | | 22.917 | Occupied bandwidth (26dB) | P |
| | | 22.355, 2.1055 | Frequency Stability | P |
| | | 22.917, 2.1051 | Band Edge conducted emission | P |
| | | 22.917, 2.1051 | Spurious emission | P |
| | | 22.913 | Effective radiated power | P |
| | | 22.917, 2.1053 | Radiated spurious emission | P |
| | | - | Peak-to-average power ratio | P |
| | | 2.1046 | Conducted output power | P |

P: Pass
F: Fail
NM: Not Measured
NA: Not Applicable


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## 8. Document Revision History

| Revision # | Date | Modified by | Details |
|---|---|---|---|
| Rev. 00 | 2016-06-01 | A. Del Real | First Issue |
| Rev. 01 | 2016-06-21 | A. Del Real<br>M. Lefebvre<br>O. Fargant | • EDGE/8PSK measurements results removed.<br>• Added ERP/EIRP results in section B.2.1.<br>• Added clarification about RBW and VBW used for spurious emissions measurements in sections B.2.4 and B.2.6.<br>• Frequency stability results in section B.2.5 rounded to the nearest thousandth and % error column removed.<br>• Added comment in section B.2.5 regarding battery operating end-point.<br>• Updated test procedure in section B.2.6 to include the reference to the substitution method defined in ANSI/TIA-603-D.<br>• Minor editorial modifications. |


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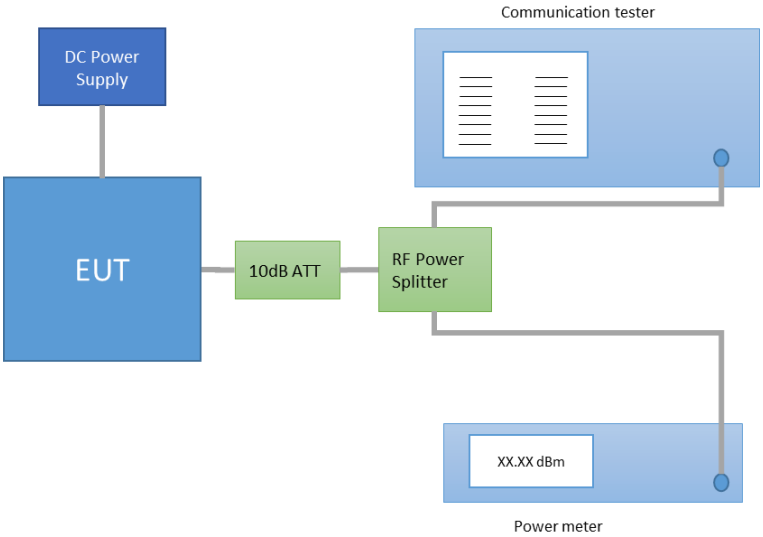
# Annex A. Test & System Description

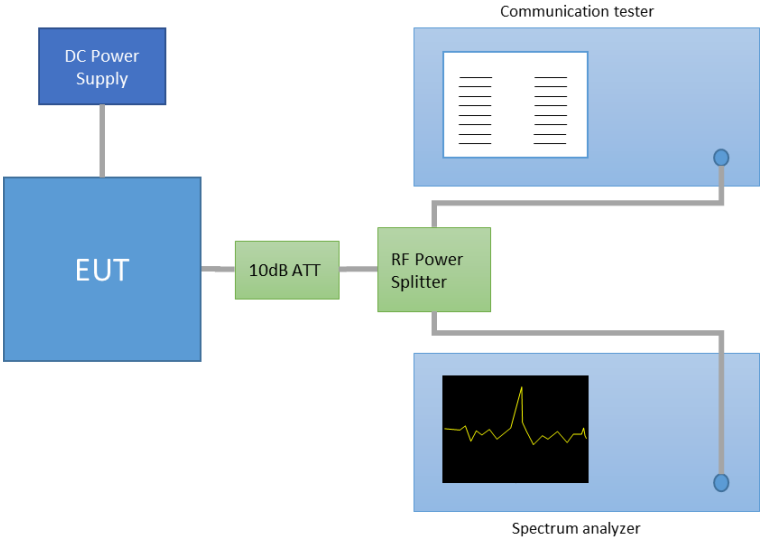
## A.1 Measurement system

Measurements were performed using the following setups. A communication tester was used to establish a communication link with the EUT, and the communication tester parameters were set to get the maximum output power from the EUT.

*Conducted Setup 1*




*Conducted Setup 2*





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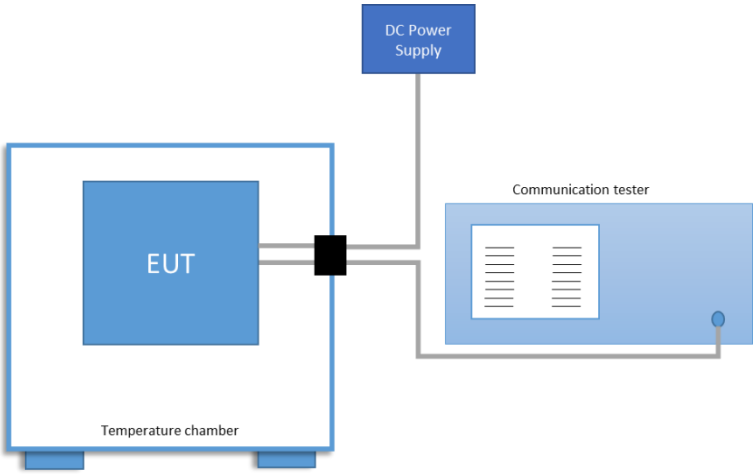
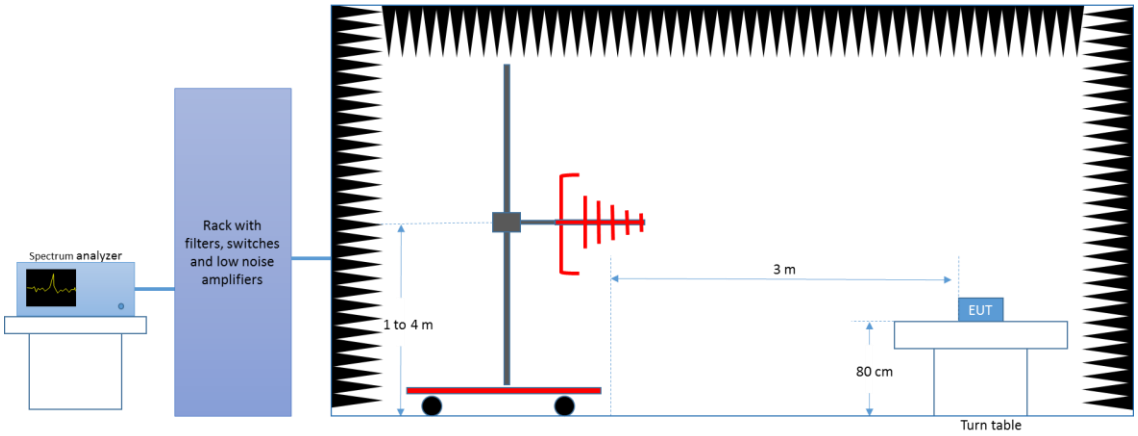
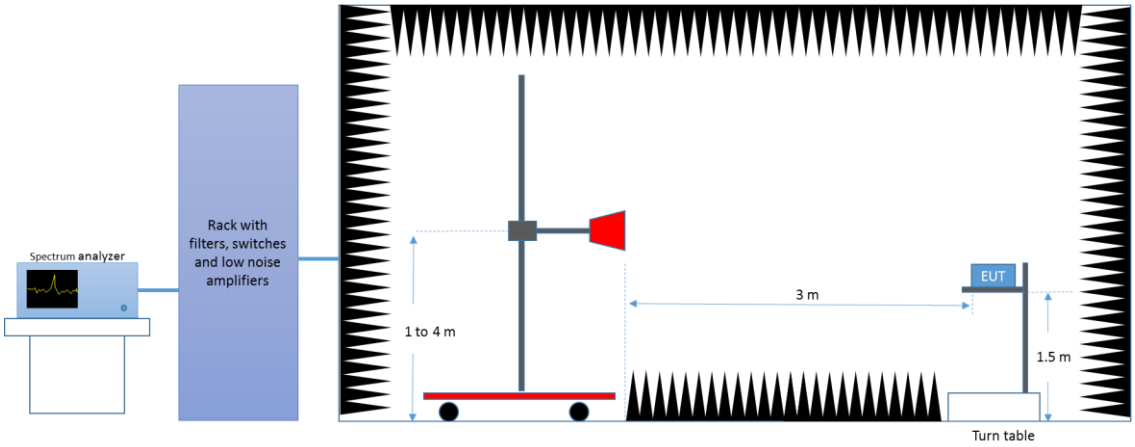
*Conducted Setup 3*




*Radiated Setup < 1GHz*




*Radiated Setup 1GHz - 18GHz*



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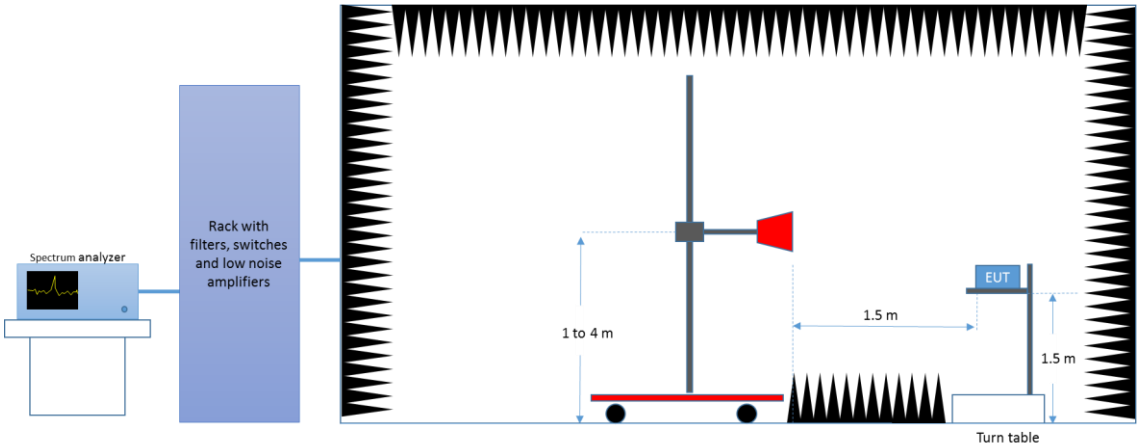
*Radiated Setup > 18GHz*




## A.2 Test Equipment List

Conducted Setup

| ID Number | Device | Type/Model | Serial Number | Manufacturer | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|---|
| 0319 | Communication tester | CMW500 | 152721 | Rohde & Schwarz | 2015-03-19 | 2017-03-19 |
| 0315 | Spectrum analyzer | FSV40 | 103307 | Rohde & Schwarz | 2015-03-20 | 2017-03-20 |
| 0046 | Power splitter | 11667B | MY51360447 | Agilent | NA | NA |
| 0098 | USB Power sensor | NRP-Z81 | 102278 | Rohde & Schwarz | 2015-09-10 | 2017-09-10 |
| 0349 | Coax cable | 794-9191-0200A | NA | Atem | NA | NA |
| 0350 | Coax cable | MF64639 | NA | Outiflex | NA | NA |
| NA | 10 dB attenuator | NA | 1122012 | Anritsu | NA | NA |
| 0292 | DC Power supply | E3648A | MY40003316 | Agilent | NA | NA |
| 0036 | Multimeter | IDM103 | 03902163 | Iso-tech | 2016-01-28 | 2018-01-28 |
| 0052 | Climatic Chamber | LHU-113 | 1012-00-5753 | ESPEC | 2016-02-08 | 2018-02-08 |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Radiated Setup

| ID Number | Device | Type/Model | Serial Number | Manufacturer | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|---|
| 0210 | Communication tester | CMW500 | 147712 | Rohde & Schwarz | NA | NA |
| 0340 | Communication tester | CMU200 | 104365 | Rohde & Schwarz | NA | NA |
| 0133 | Spectrum analyzer | FSV40 | 101358 | Rohde & Schwarz | 2014-05-03 | 2016-05-03 |
| 0137 | Log antenna 30 MHz – 1 GHz | 3142E | 00156946 | ETS Lindgren | 2014-05-03 | 2016-05-03 |
| 0325 | Horn antenna 1 GHz – 6.4 GHz | 3117 | 00157734 | ETS Lindgren | 2015-07-24 | 2017-07-24 |
| 0343 | Horn Antenna 6.4 GHz – 18 GHz | 3117-PA | 00201542 | ETS Lindgren | 2015-07-16 | 2017-07-16 |
| 0139 | Horn Antenna 18 GHz - 26.5 GHz | 114514 | 00167100 | ETS Lindgren | 2014-04-25 | 2016-04-25 |
| 0140 | Horn Antenna 26GHz – 40GHz | 120722 | 00169638 | ETS Lindgren | 2014-08-14 | 2016-08-14 |
| 0135 | Semi Anechoic chamber | FACT 3 | 5720 | ETS Lindgren | 2016-04-28 | 2018-04-28 |
| N/A | Measurement Software | EMC32 | 012109650000013B (009977) | Rohde & Schwarz | N/A | N/A |

## A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the below table:

| Measurement type | Uncertainty [±dB] |
|---|---|
| Conducted Power (power meter) | ± 1.0 |
| Conducted spurious emission | ± 2.9 |
| Radiated test < 1GHz | ± 3.8 |
| Radiated test 1GHz - 26 GHz | ± 4.7 |


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# Annex B. Test Results

## B.1 Test Conditions

For cellular transmission modes GPRS/EGPRS/WCDMA, the device was put into operation by using an R&S CMW 500 as base station simulator.

The output power of the device was set to transmit at maximum power for all tests.

## B.2 Test results

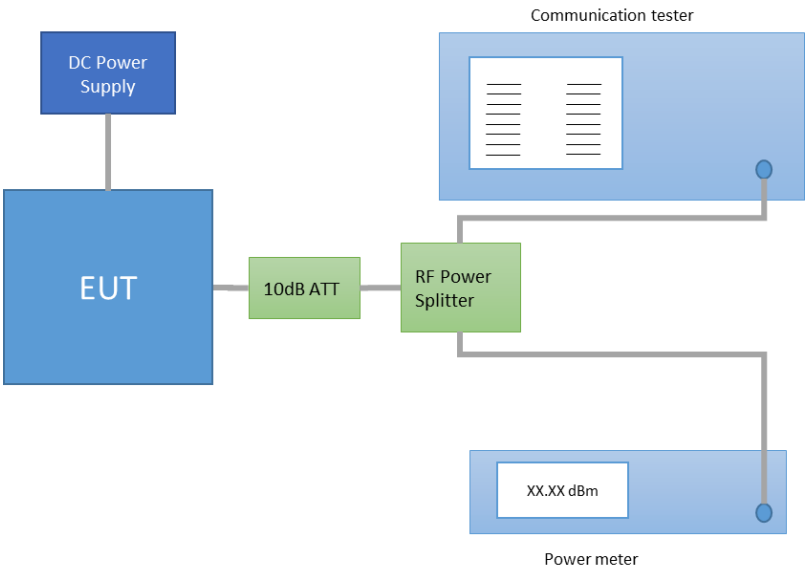
### B.2.1 Radiated RF power

**Test limits**

| BAND | FCC part | Power Limits [Watts] | Max Antenna Gain [dBi] |
|---|---|---|---|
| PCS 1900, WCDMA II | 2.1046, 24.232 | < 2 watts EIRP | 1.2 |
| GSM 850, WCDMA V | 2.1046, 22.913 | ERP max 7 watts | 0.5 |

**Test procedure**

The radiated power is determined by adding the antenna gain to the conducted measured power. The setup below was used to measure the conducted output power. The antenna terminal of the EUT is connected to the power meter and the communication tester through an attenuator and a power splitter. The power meter reading is compensated to include the RF. This test was performed according to the KDB 971168 D01 § 5.2.





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According to the KDB 412172 D01, the EIRP and ERP was determined with the following calculation:

$$EIRP = P_t + G_t$$
$$ERP = EIRP - 2.15$$

Where:

$EIRP$ = Equivalent Isotropically Radiated Power in **dBm.**
$ERP$ = Equivalent Radiated Power in **dBm.**
$G_t$ = Maximum antenna gain in **dBi**.

**Results tables**

GSM

| Band | Mode | Channel Number | Frequency [MHz] | #UL Slots | Average [dBm] | Peak [dBm] | Average ERP [W] | Peak ERP [W] |
|---|---|---|---|---|---|---|---|---|
| GSM850 | GPRS | 128 | 824.2 | 1 | 32.24 | 32.6 | 1.15 | 1.24 |
| | | | | 2 | 28.56 | 28.99 | 0.49 | 0.54 |
| | | | | 3 | 26.71 | 27.16 | 0.32 | 0.36 |
| | | | | 4 | **25.5** | **25.97** | **0.24** | **0.27** |
| | | 190 | 836.6 | 1 | 32.28 | 32.64 | 1.16 | 1.26 |
| | | | | 2 | 28.5 | 29.03 | 0.48 | 0.55 |
| | | | | 3 | 26.67 | 27.18 | 0.32 | 0.36 |
| | | | | 4 | 25.53 | 26.01 | 0.24 | 0.27 |
| | | 251 | 848.8 | 1 | **32.37** | **32.69** | **1.18** | **1.27** |
| | | | | 2 | 28.55 | 29.03 | 0.49 | 0.55 |
| | | | | 3 | 26.68 | 27.19 | 0.32 | 0.36 |
| | | | | 4 | 25.5 | 26.02 | 0.24 | 0.27 |

**Max values**
**Min values**


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PCS

| Band | Mode | Channel Number | Frequency [MHz] | #UL Slots | Average [dBm] | Peak [dBm] | Average EIRP [W] | Peak EIRP [W] |
|---|---|---|---|---|---|---|---|---|
| PCS1900 | GPRS | 512 | 1850.2 | 1 | 29.1 | 29.49 | 1.07 | 1.17 |
| | | | | 2 | 26.05 | 26.47 | 0.53 | 0.58 |
| | | | | 3 | 24.03 | 24.52 | 0.33 | 0.37 |
| | | | | 4 | **22.8** | **23.3** | **0.25** | **0.28** |
| | | 661 | 1880 | 1 | 29.22 | **29.55** | 1.10 | **1.19** |
| | | | | 2 | 26.06 | 26.51 | 0.53 | 0.59 |
| | | | | 3 | 24.08 | 24.57 | 0.34 | 0.38 |
| | | | | 4 | 22.86 | 23.33 | 0.25 | 0.28 |
| | | 810 | 1909.8 | 1 | **29.59** | 29.16 | **1.20** | 1.09 |
| | | | | 2 | 26.13 | 26.55 | 0.54 | 0.60 |
| | | | | 3 | 24.6 | 24.18 | 0.38 | 0.35 |
| | | | | 4 | 22.85 | 23.36 | 0.25 | 0.29 |

**Max values**
**Min values**


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WCDMA

| Band | Mode | Channel Number | Frequency [MHz] | Subtest | Average [dBm] | Peak [dBm] | Average EIRP [W] | Peak EIRP [W] |
|---|---|---|---|---|---|---|---|---|
| WCDMA II | RMC | 9262 | 1852.4 | - | 23.38 | 26.73 | 0.29 | 0.62 |
| | | 9400 | 1880 | - | **23.4** | 26.67 | **0.29** | 0.61 |
| | | 9538 | 1907.6 | - | 23.31 | 26.44 | 0.28 | 0.58 |
| | HSDPA | 9262 | 1852.4 | 1 | 22.71 | 26.42 | 0.25 | 0.58 |
| | | | | 2 | 22.73 | 26.43 | 0.25 | 0.58 |
| | | | | 3 | 22.72 | 26.42 | 0.25 | 0.58 |
| | | | | 4 | 22.75 | 26.45 | 0.25 | 0.58 |
| | | 9400 | 1880 | 1 | 22.75 | 26.49 | 0.25 | 0.59 |
| | | | | 2 | 22.76 | 26.46 | 0.25 | 0.58 |
| | | | | 3 | 22.8 | 26.49 | 0.25 | 0.59 |
| | | | | 4 | 22.79 | 26.48 | 0.25 | 0.59 |
| | | 9538 | 1907.6 | 1 | 22.56 | 26.08 | 0.24 | 0.53 |
| | | | | 2 | 22.53 | 26 | 0.24 | 0.52 |
| | | | | 3 | 22.55 | 26.03 | 0.24 | 0.53 |
| | | | | 4 | 22.57 | 26.04 | 0.24 | 0.53 |
| | HSUPA | 9262 | 1852.4 | 1 | 21.68 | 26.49 | 0.19 | 0.59 |
| | | | | 2 | 22.21 | 26.46 | 0.22 | 0.58 |
| | | | | 3 | 21.18 | 26.3 | 0.17 | 0.56 |
| | | | | 4 | 22.49 | 26.22 | 0.23 | 0.55 |
| | | | | 5 | 23.38 | 27.52 | 0.29 | 0.74 |
| | | 9400 | 1880 | 1 | 21.71 | 26.37 | 0.20 | 0.57 |
| | | | | 2 | 22.2 | 26.45 | 0.22 | 0.58 |
| | | | | 3 | 21.22 | 26.21 | 0.17 | 0.55 |
| | | | | 4 | 22.53 | 26.21 | 0.24 | 0.55 |
| | | | | 5 | **23.4** | **27.54** | **0.29** | **0.75** |
| | | 9538 | 1907.6 | 1 | 21.56 | 26.03 | 0.19 | 0.53 |
| | | | | 2 | 22.08 | 26.15 | 0.21 | 0.54 |
| | | | | 3 | **21.08** | 25.94 | 0.17 | 0.52 |
| | | | | 4 | 22.33 | **25.85** | 0.23 | **0.51** |
| | | | | 5 | 23.3 | 27.51 | 0.28 | 0.74 |

**Max values**
**Min values**


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| Band | Mode | Channel Number | Frequency [MHz] | Subtest | Average [dBm] | Peak [dBm] | Average ERP [W] | Peak ERP [W] |
|---|---|---|---|---|---|---|---|---|
| WCDMA V | RMC | 4132 | 826.4 | - | **23.69** | 27.39 | **0.16** | 0.37 |
| | | 4183 | 836.6 | - | 23.57 | 27 | 0.16 | 0.34 |
| | | 4233 | 846.6 | - | 23.5 | 27.26 | 0.15 | 0.36 |
| | HSDPA | 4132 | 826.4 | 1 | 23.38 | 27.53 | 0.15 | 0.39 |
| | | | | 2 | 23.43 | 27.59 | 0.15 | 0.39 |
| | | | | 3 | 23.43 | 27.56 | 0.15 | 0.39 |
| | | | | 4 | 23.43 | 27.62 | 0.15 | 0.40 |
| | | 4183 | 836.6 | 1 | 23.15 | 27.09 | 0.14 | 0.35 |
| | | | | 2 | 23.15 | 27.08 | 0.14 | 0.35 |
| | | | | 3 | 23.15 | 27.1 | 0.14 | 0.35 |
| | | | | 4 | 23.15 | 27.08 | 0.14 | 0.35 |
| | | 4233 | 846.6 | 1 | 23.12 | 27.41 | 0.14 | 0.38 |
| | | | | 2 | 23.14 | 27.4 | 0.14 | 0.38 |
| | | | | 3 | 23.13 | 27.42 | 0.14 | 0.38 |
| | | | | 4 | 23.13 | 27.38 | 0.14 | 0.37 |
| | HSUPA | 4132 | 826.4 | 1 | 22.12 | **28.21** | 0.11 | **0.45** |
| | | | | 2 | 22.91 | 27.47 | 0.13 | 0.38 |
| | | | | 3 | 21.8 | 27.33 | 0.10 | 0.37 |
| | | | | 4 | 23.19 | 27.29 | 0.14 | 0.37 |
| | | | | 5 | 22.15 | 28 | 0.11 | 0.43 |
| | | 4183 | 836.6 | 1 | 22.2 | 27.08 | 0.11 | 0.35 |
| | | | | 2 | 22.7 | 27.08 | 0.13 | 0.35 |
| | | | | 3 | 21.63 | 27 | 0.10 | 0.34 |
| | | | | 4 | 22.96 | **26.87** | 0.14 | **0.33** |
| | | | | 5 | 23.44 | 27.57 | 0.15 | 0.39 |
| | | 4233 | 846.6 | 1 | 22.13 | 27.35 | 0.11 | 0.37 |
| | | | | 2 | 22.64 | 27.42 | 0.13 | 0.38 |
| | | | | 3 | **21.62** | 27.1 | **0.10** | 0.35 |
| | | | | 4 | 22.91 | 27.09 | 0.13 | 0.35 |
| | | | | 5 | 23.4 | 27.51 | 0.15 | 0.39 |

**Max values**
**Min values**


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### B.2.2 Occupied bandwidth

**Standard references**

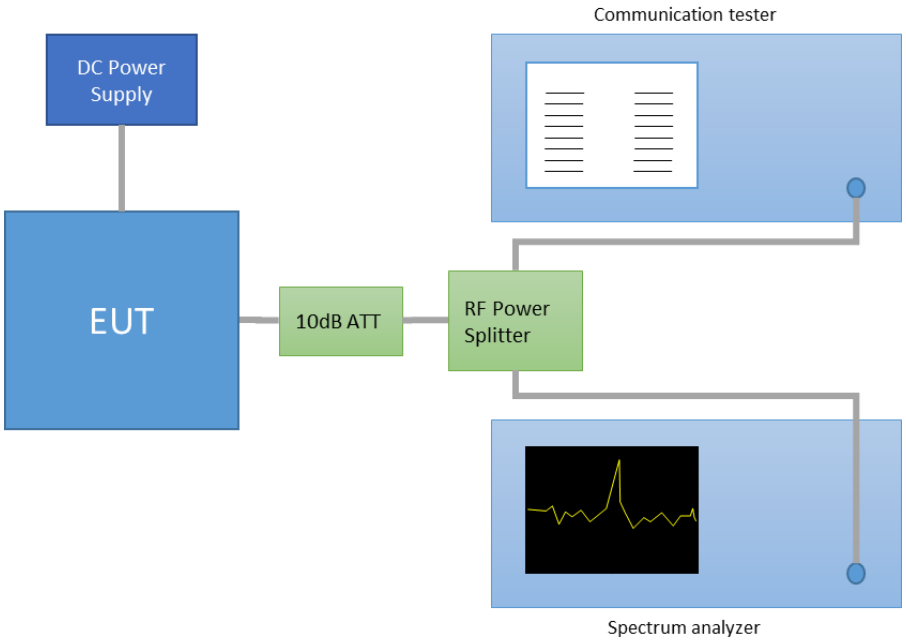
| BAND | FCC part |
|---|---|
| PCS 1900, WCDMA 2 | 2.1049, 24.238 |
| GSM 850, WCDMA 5 | 2.1049, 22.917 |

**Test procedure**

This test was performed according to the KDB 971168 D01 § *4.1 Occupied bandwidth – relative (-26dB OBW) measurement procedure* and § *4.2 Occupied bandwidth – power bandwidth (99%) measurement procedure.*

The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in the worst case modes selected from the *chapter B.2.1 (Conducted RF output power)*

The setup below was used to measure the transmitted occupied bandwidth. The antenna terminal of the EUT is connected to the spectrum analyzer and the communication tester through an attenuator and a power splitter.





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**Results tables**

| Band | Mode | Channel Number | Freq [MHz] | OBW [MHz] | EBW [MHz] |
|---|---|---|---|---|---|
| GSM850 | GPRS | 128 | 824.2 | 0.2445730 | 0.316365 |
| | | 190 | 836.6 | 0.2460203 | 0.316490 |
| | | 251 | 848.8 | 0.2460203 | 0.310678 |
| PCS1900 | GPRS | 512 | 1850.2 | 0.2402315 | 0.314865 |
| | | 661 | 1880 | 0.2402315 | 0.314928 |
| | | 810 | 1909.8 | 0.2402315 | 0.314521 |

| Band | Mode | Channel Number | Freq [MHz] | OBW [MHz] | EBW [MHz] |
|---|---|---|---|---|---|
| WCDMA Band II | RMC | 9262 | 1852.4 | 4.051948 | 4.60236 |
| | | 9400 | 1880.0 | 4.051948 | 4.63798 |
| | | 9538 | 1907.6 | 4.051948 | 4.61361 |
| | HSUPA | 9262 | 1852.4 | 4.051948 | 4.57298 |
| | | 9400 | 1880.0 | 4.051948 | 4.64048 |
| | | 9538 | 1907.6 | 4.051948 | 4.62486 |
| WCDMA Band V | RMC | 4132 | 826.4 | 4.039960 | 4.59861 |
| | | 4183 | 836.6 | 4.051948 | 4.59486 |
| | | 4233 | 846.6 | 4.051948 | 4.60923 |
| | HSUPA | 4132 | 826.4 | 4.051948 | 4.61173 |
| | | 4183 | 836.6 | 4.051948 | 4.61923 |
| | | 4233 | 846.6 | 4.039960 | 4.60673 |


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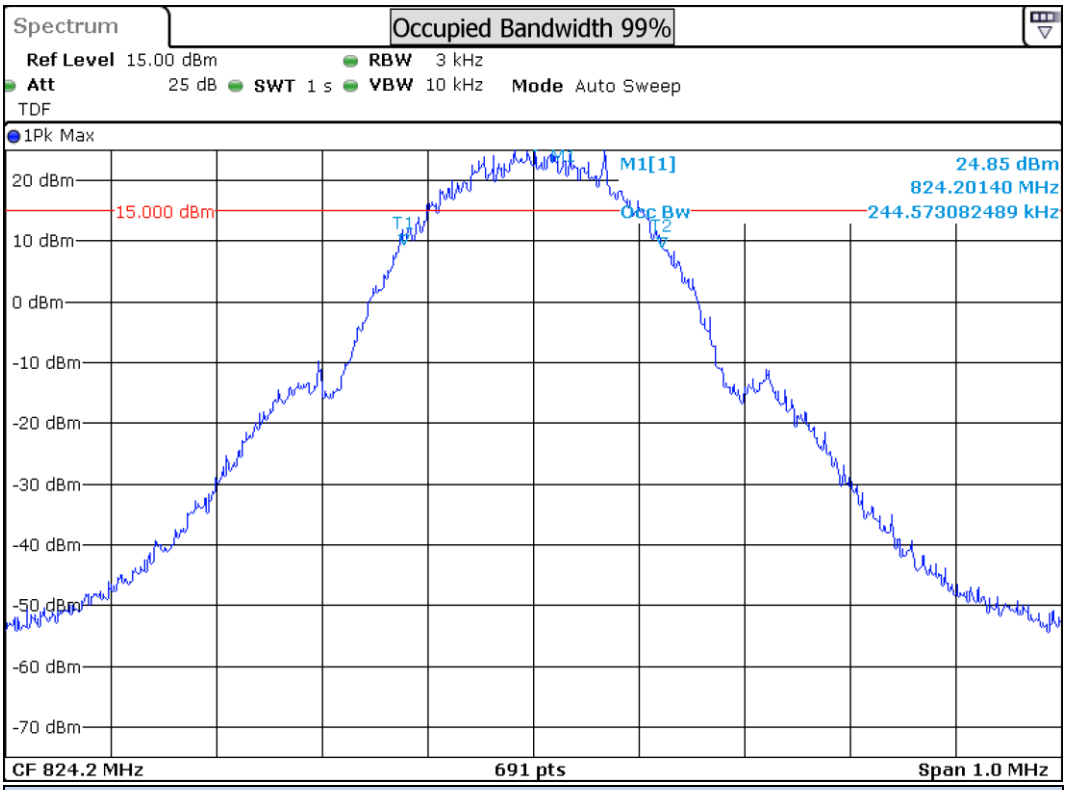
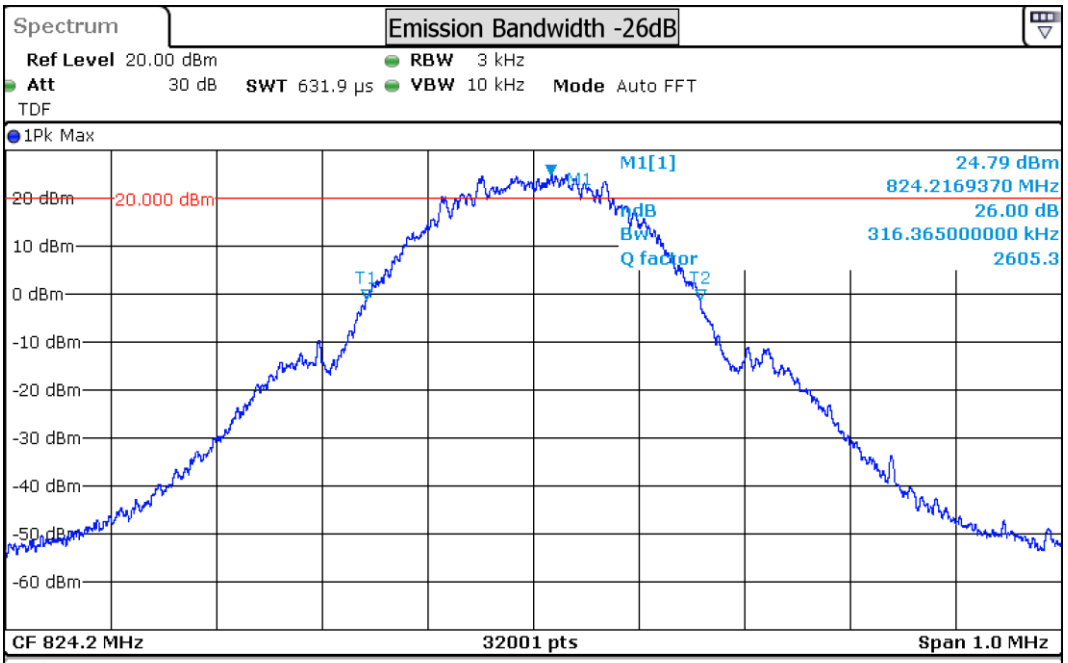
**Results screenshot**

# GSM 850




GSM850 GPRS GMSK 824.2 Low Channel 128




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 824.216937 MHz | 24.79 dBm | ndB down | 316.365 kHz |
| T1 | | 1 | 824.04138 MHz | -1.21 dBm | ndB | 26.00 dB |
| T2 | | 1 | 824.357745 MHz | -1.22 dBm | Q factor | 2605.3 |

GSM850 GPRS GMSK 824.2 Low Channel 128



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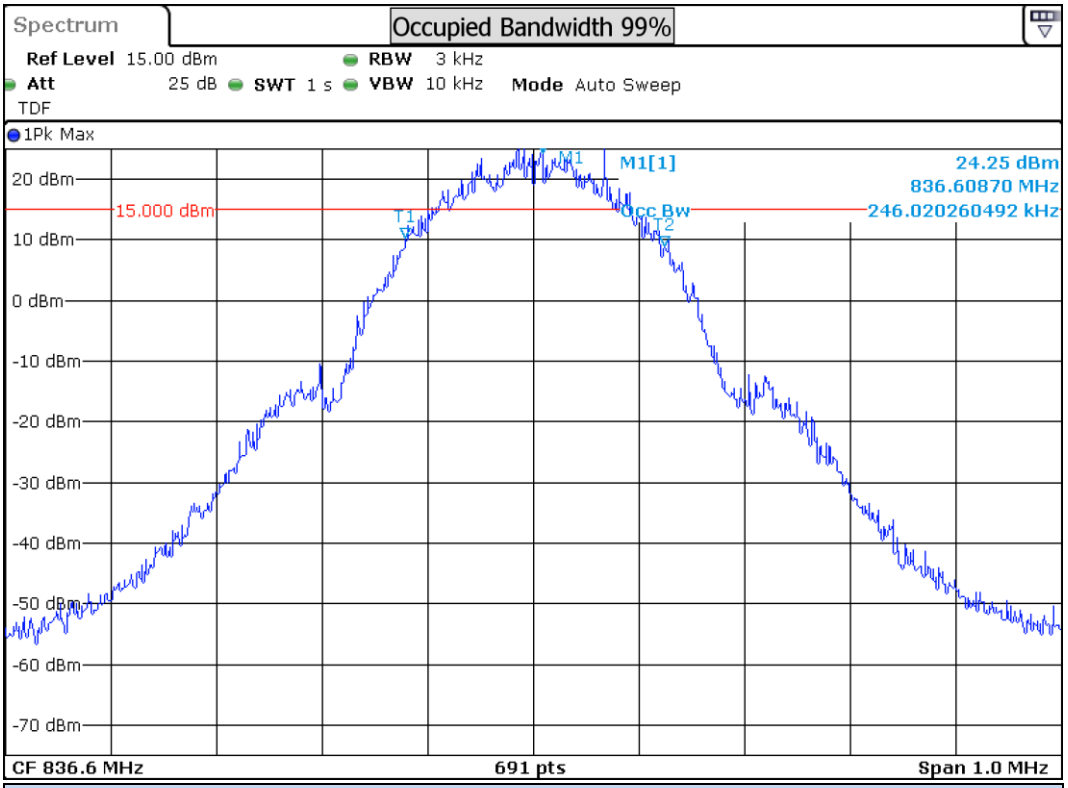
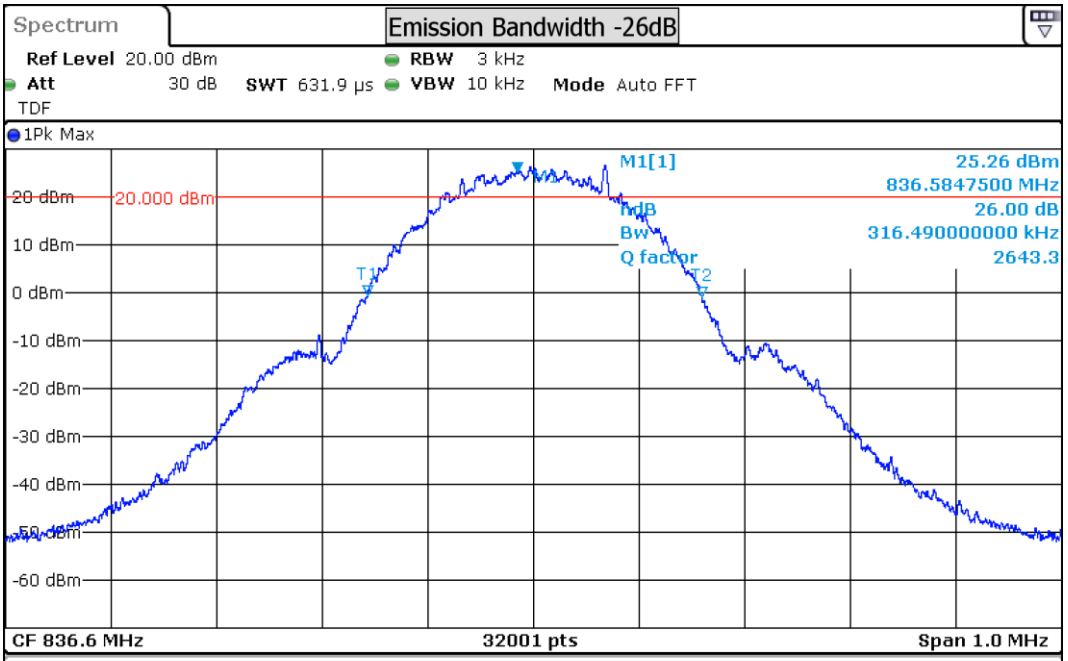



GSM850 GPRS GMSK 836.6 Mid Channel 190




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 836.58475 MHz | 25.26 dBm | ndB down | 316.49 kHz |
| T1 | | 1 | 836.442442 MHz | -0.71 dBm | ndB | 26.00 dB |
| T2 | | 1 | 836.758933 MHz | -0.75 dBm | Q factor | 2643.3 |

GSM850 GPRS GMSK 836.6 Mid Channel 190



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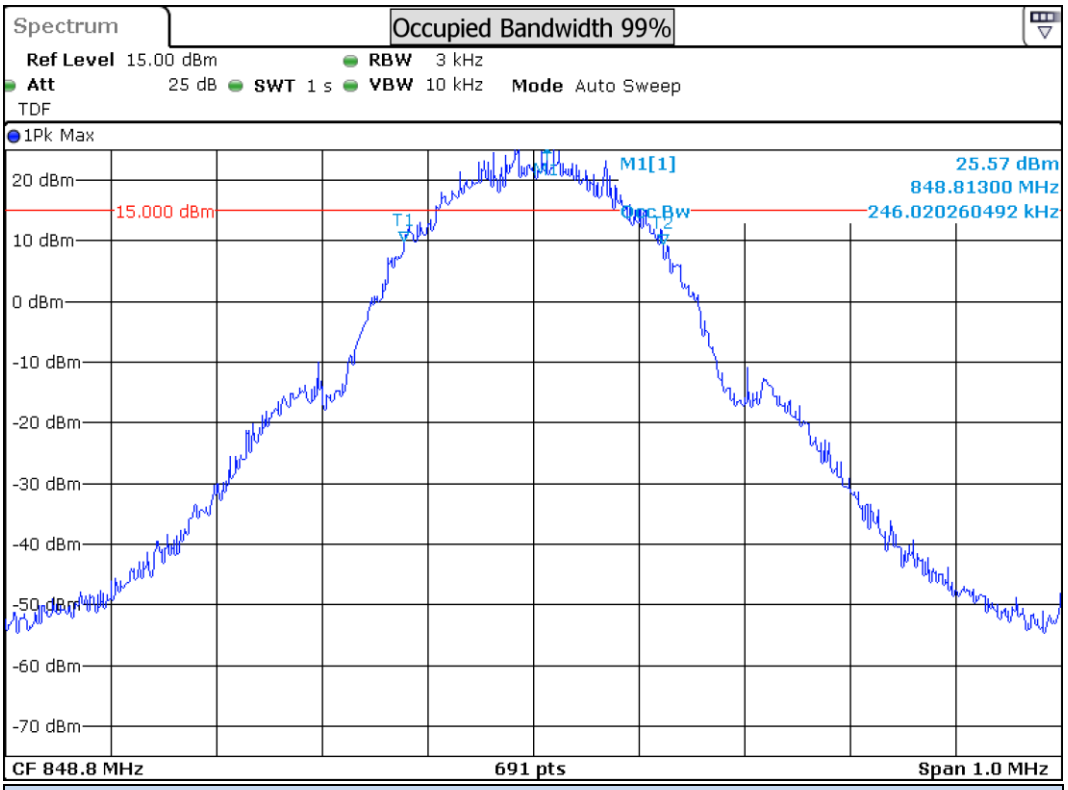
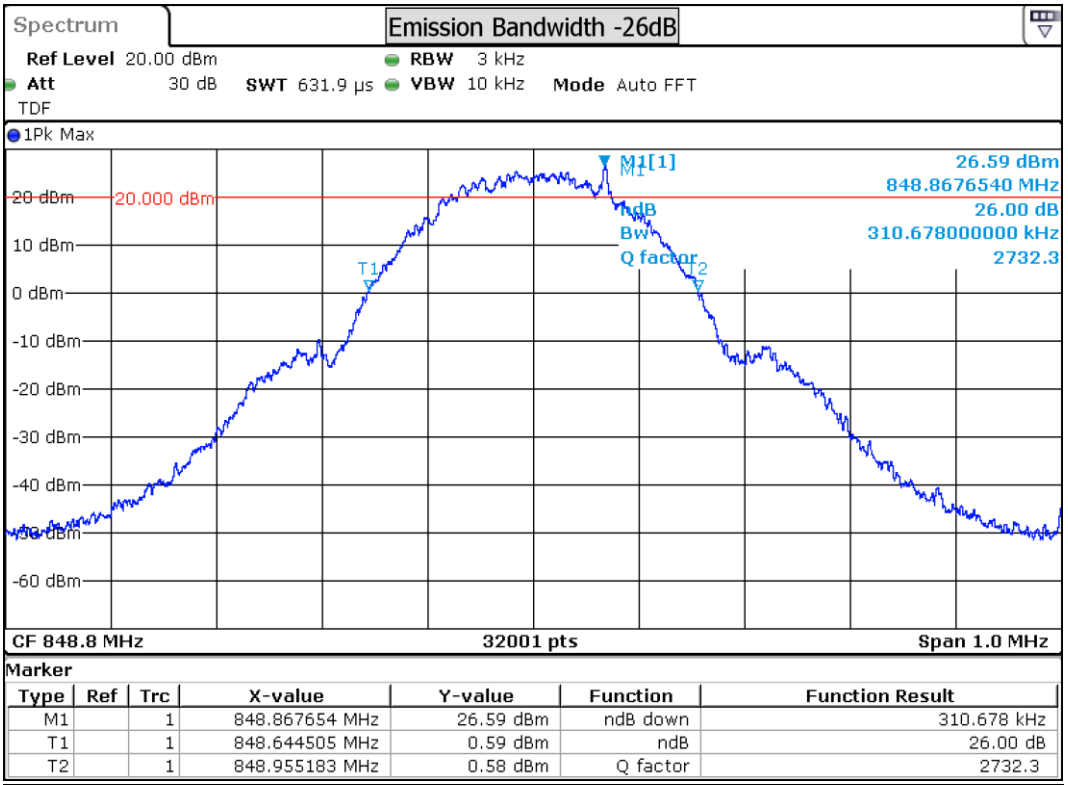



GSM850 GPRS GMSK 848.8 High Channel 251




| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 848.867654 MHz | 26.59 dBm | ndB down | 310.678 kHz |
| T1 | | 1 | 848.644505 MHz | 0.59 dBm | ndB | 26.00 dB |
| T2 | | 1 | 848.955183 MHz | 0.58 dBm | Q factor | 2732.3 |

GSM850 GPRS GMSK 848.8 High Channel 251



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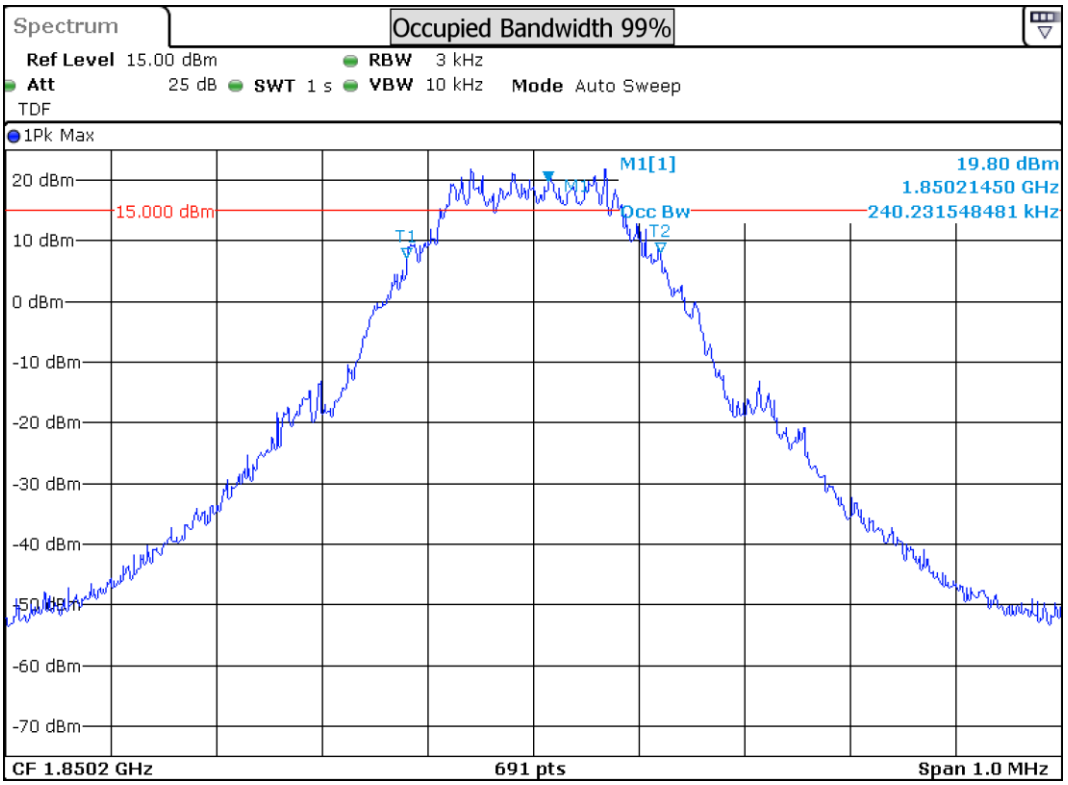
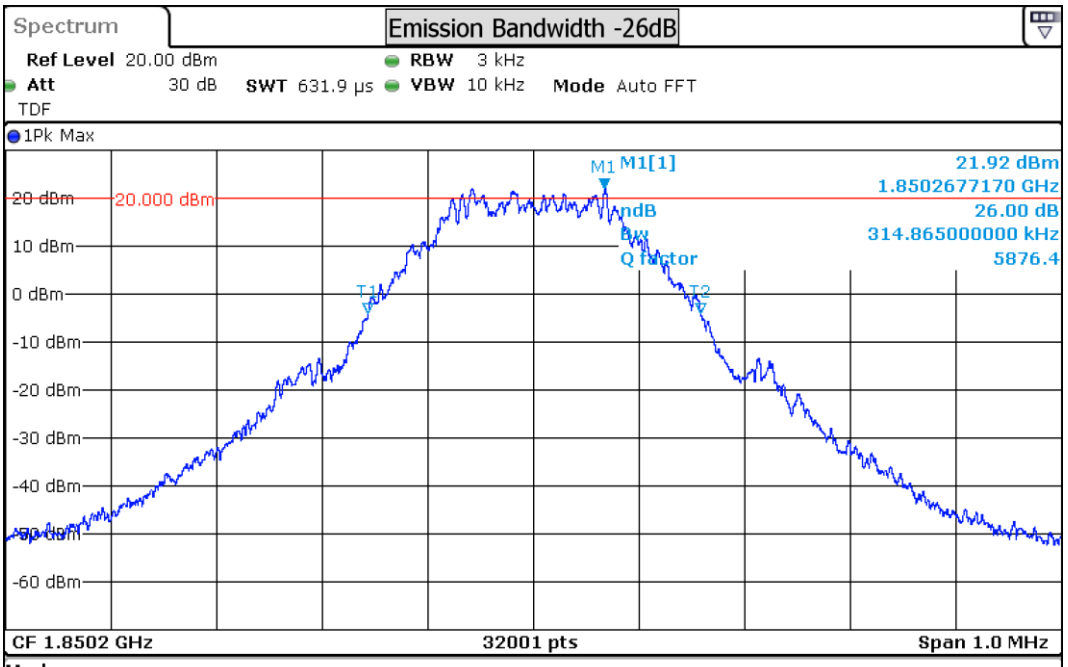
# PCS 1900




PCS1900 GPRS GMSK 1850.2 Low Channel 512




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.850267717 GHz | 21.92 dBm | ndB down | 314.865 kHz |
| T1 | | 1 | 1.850043536 GHz | -4.03 dBm | ndB | 26.00 dB |
| T2 | | 1 | 1.850358401 GHz | -4.08 dBm | Q factor | 5876.4 |

PCS1900 GPRS GMSK 1850.2 Low Channel 512



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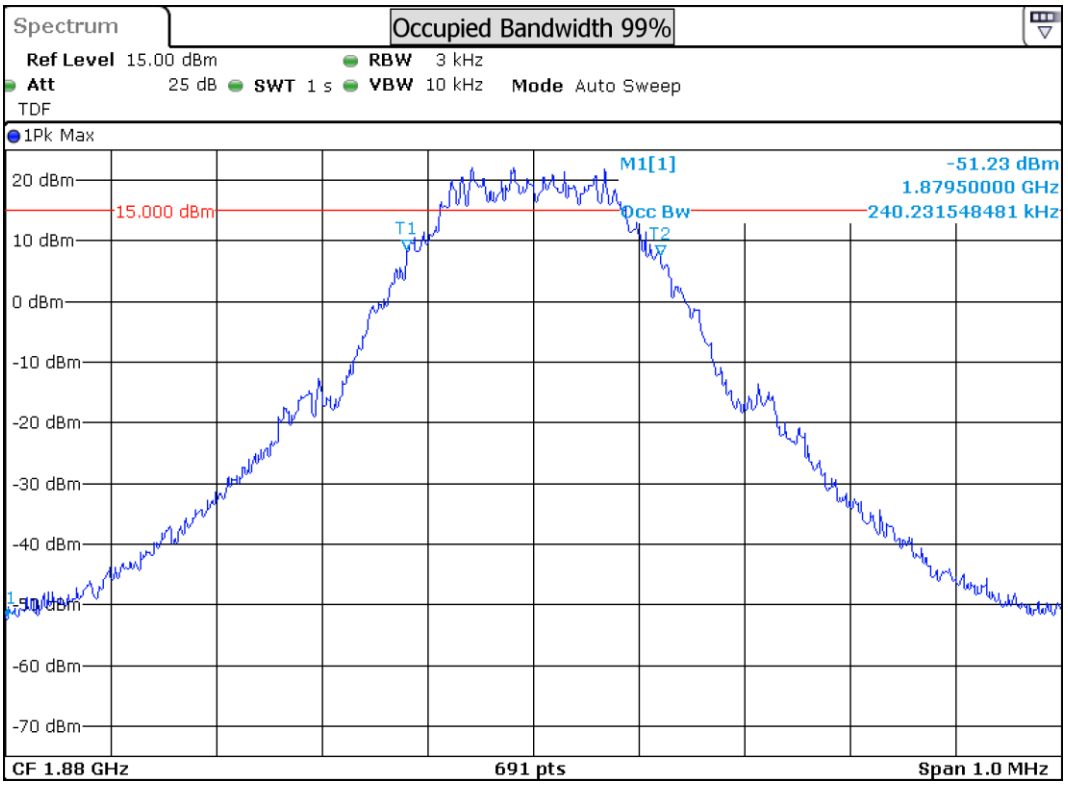
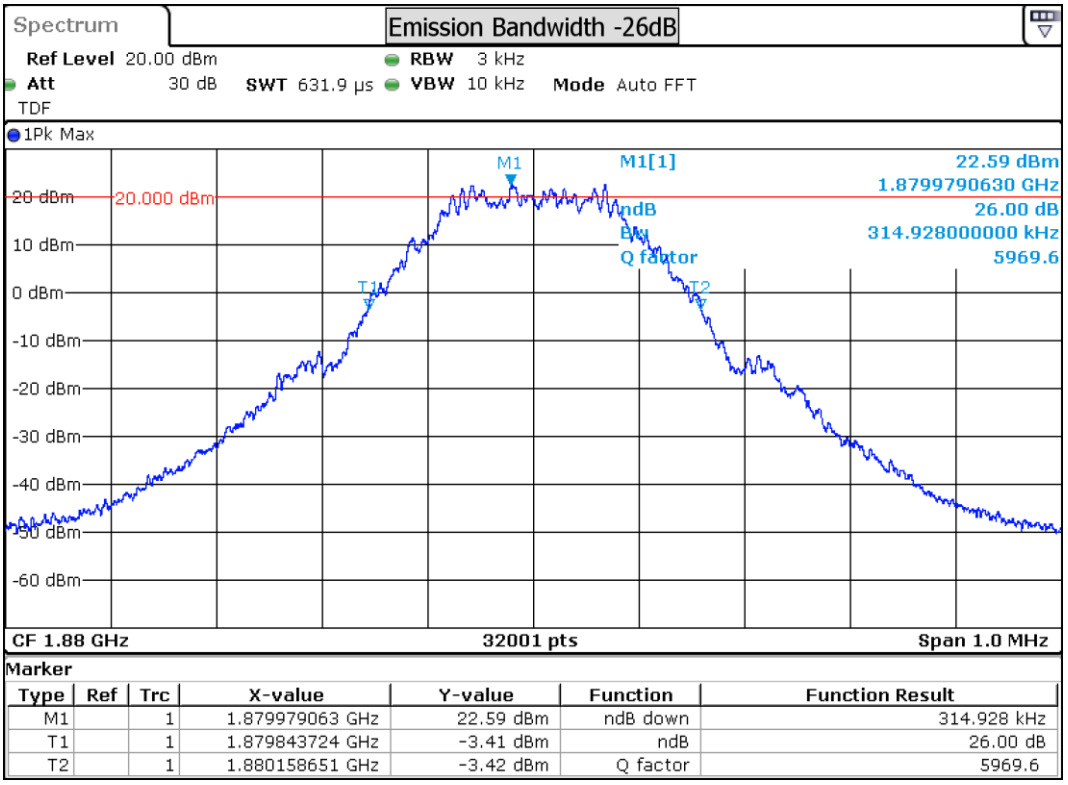



PCS1900 GPRS GMSK 1880 Mid Channel 661




| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.879979063 GHz | 22.59 dBm | ndB down | 314.928 kHz |
| T1 | | 1 | 1.879843724 GHz | -3.41 dBm | ndB | 26.00 dB |
| T2 | | 1 | 1.880158651 GHz | -3.42 dBm | Q factor | 5969.6 |

PCS1900 GPRS GMSK 1880 Mid Channel 661



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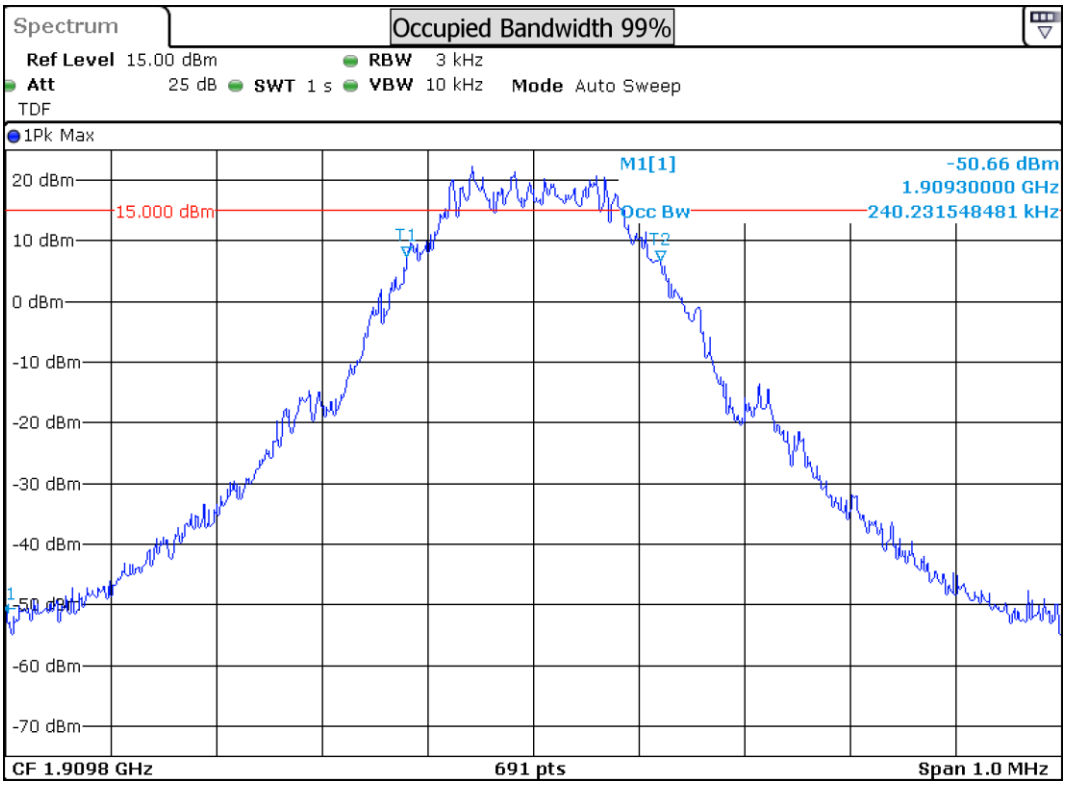
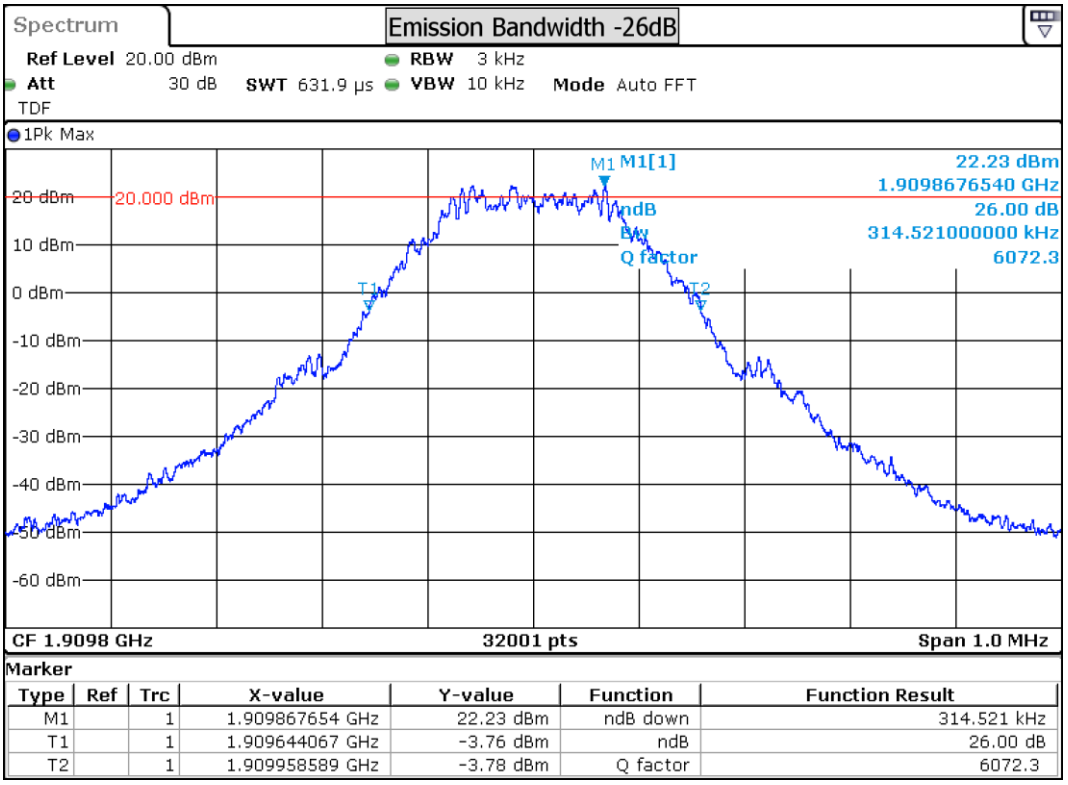



PCS1900 GPRS GMSK 1909.8 High Channel 810




| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.909867654 GHz | 22.23 dBm | ndB down | 314.521 kHz |
| T1 | | 1 | 1.909644067 GHz | -3.76 dBm | ndB | 26.00 dB |
| T2 | | 1 | 1.909958589 GHz | -3.78 dBm | Q factor | 6072.3 |

PCS1900 GPRS GMSK 1909.8 High Channel 810



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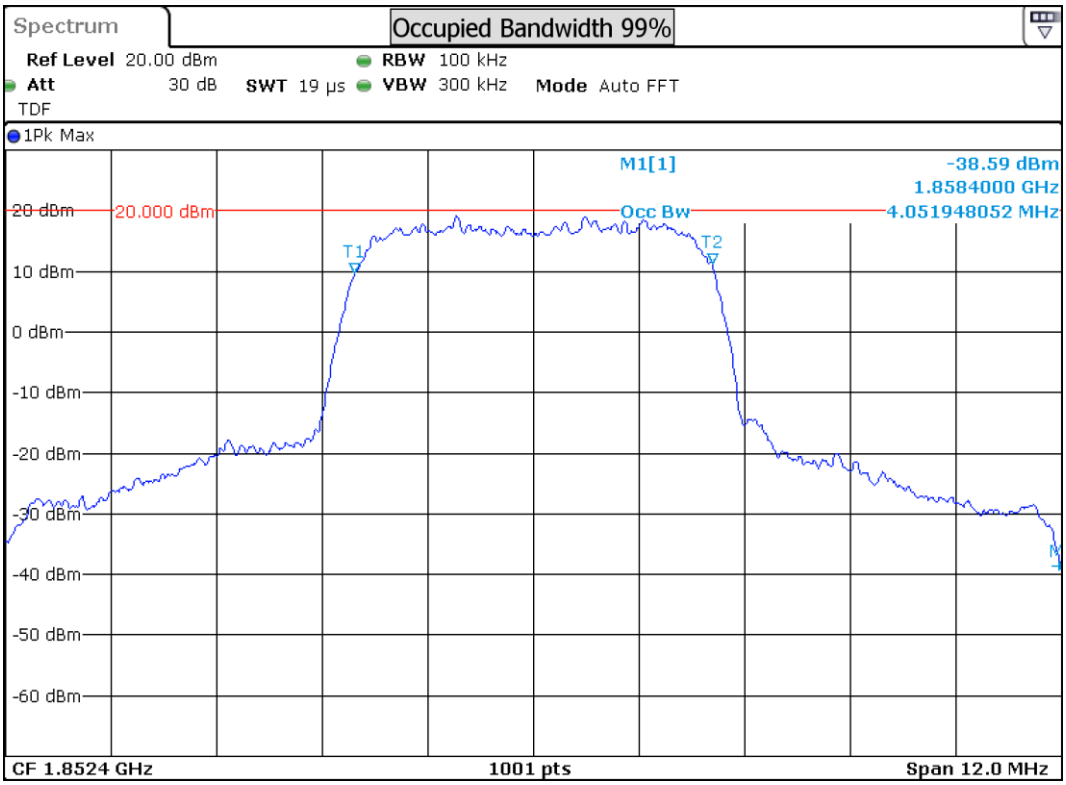
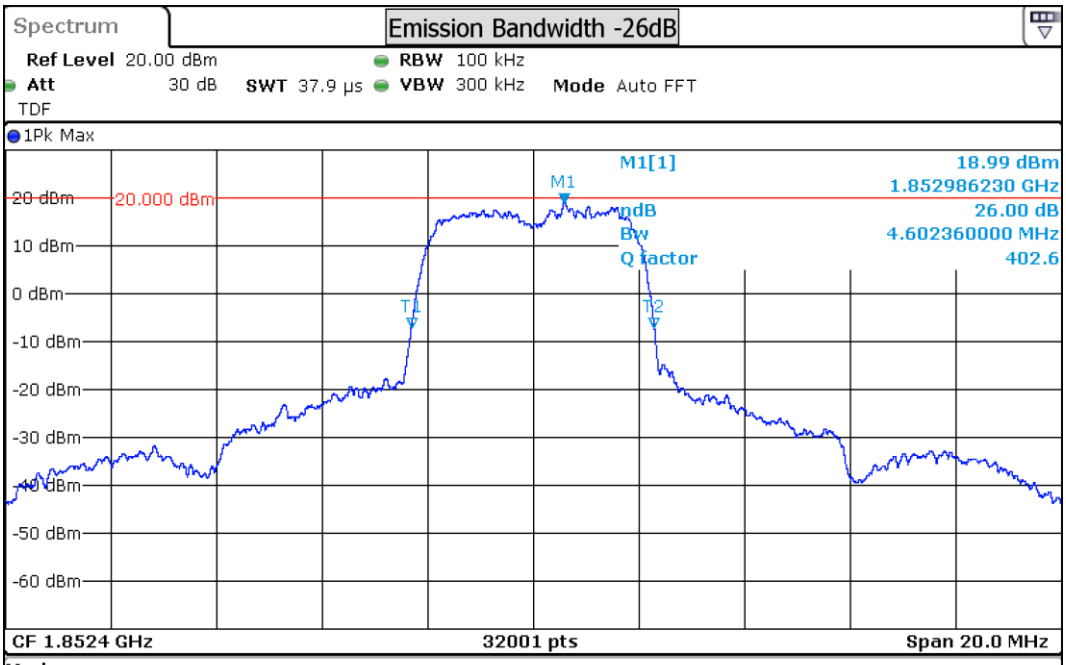
# WCDMA Band II




WCDMA II RMC 1852.4 Low Channel 9262




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.85298623 GHz | 18.99 dBm | ndB down | 4.60236 MHz |
| T1 | | 1 | 1.85008445 GHz | -7.02 dBm | ndB | 26.00 dB |
| T2 | | 1 | 1.8546868 GHz | -7.04 dBm | Q factor | 402.6 |

WCDMA II RMC 1852.4 Low Channel 9262



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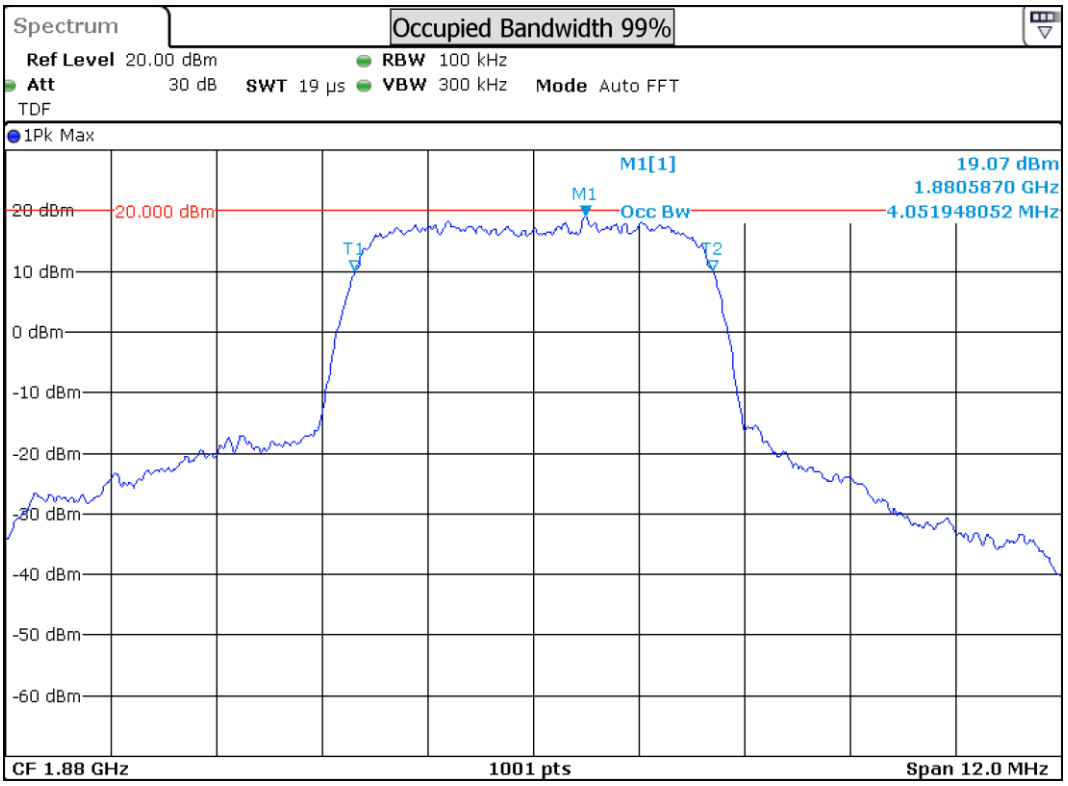
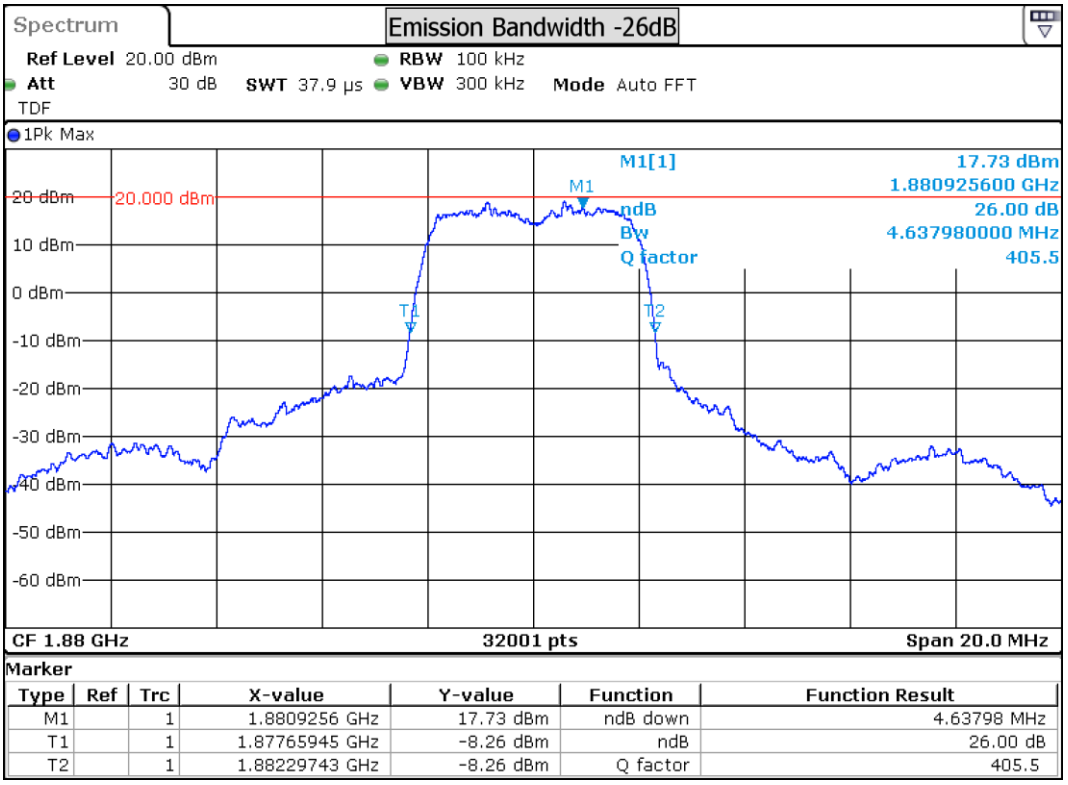



WCDMA II RMC 1880 Mid Channel 9400




WCDMA II RMC 1880 Mid Channel 9400



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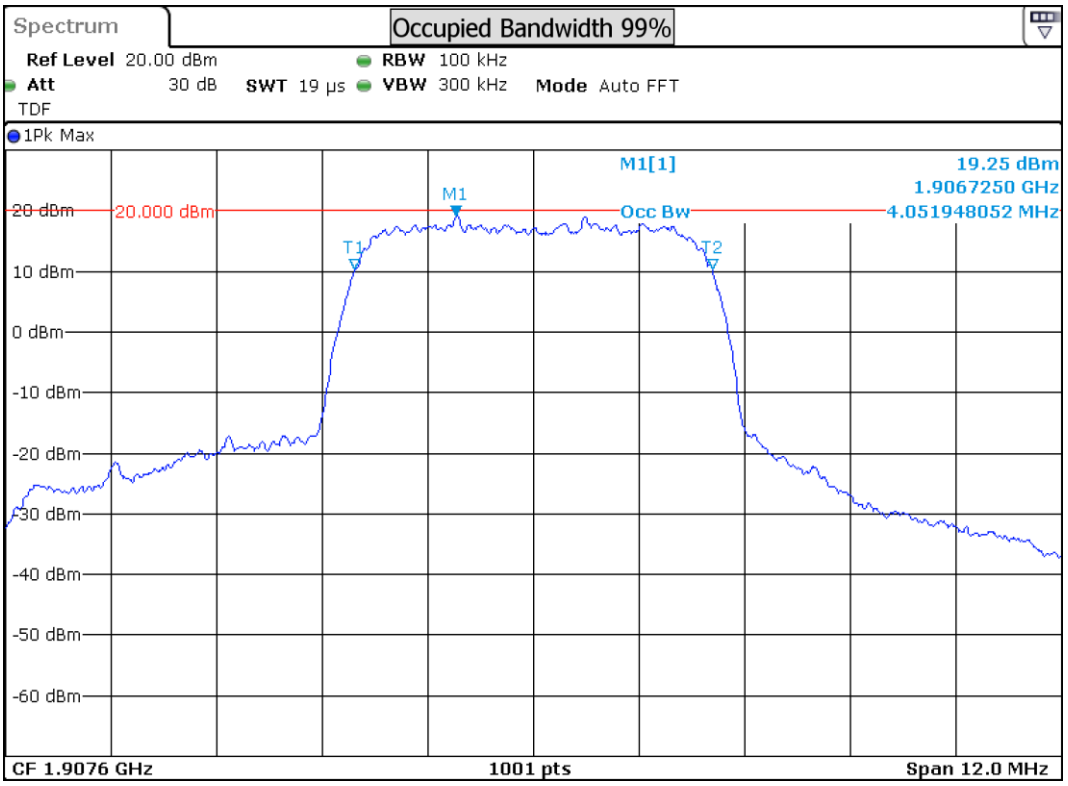
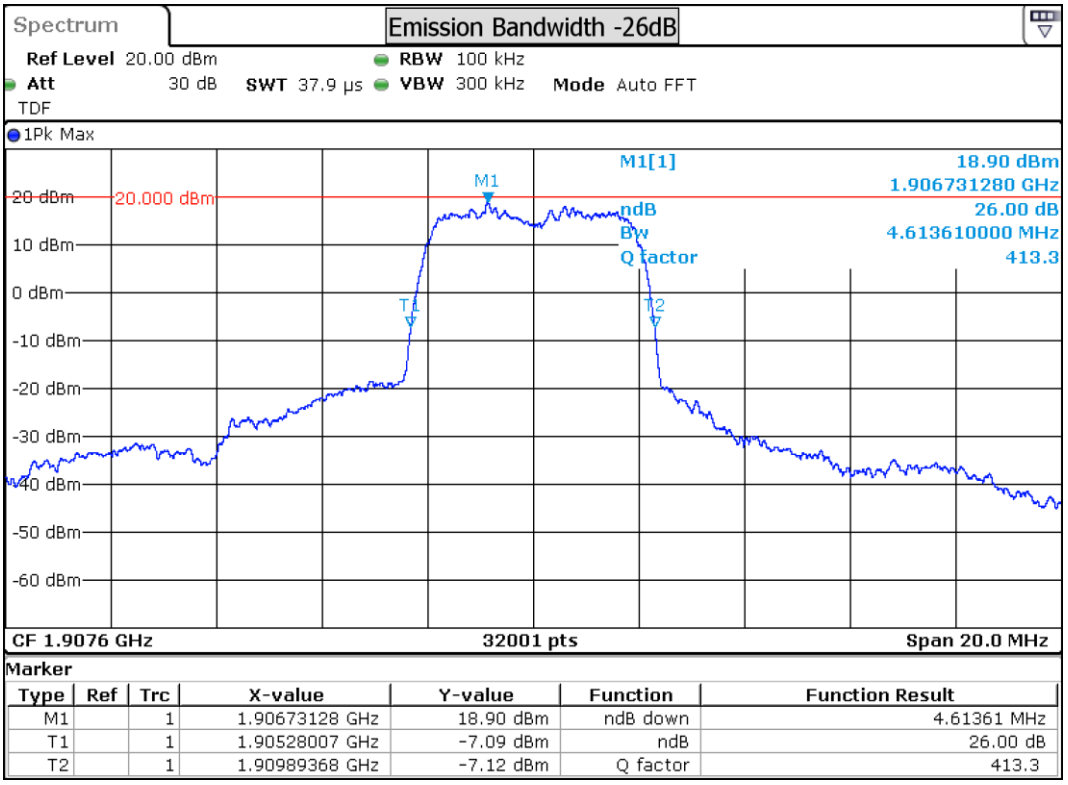



WCDMA II RMC 1907.6 High Channel 9538




WCDMA II RMC 1907.6 High Channel 9538



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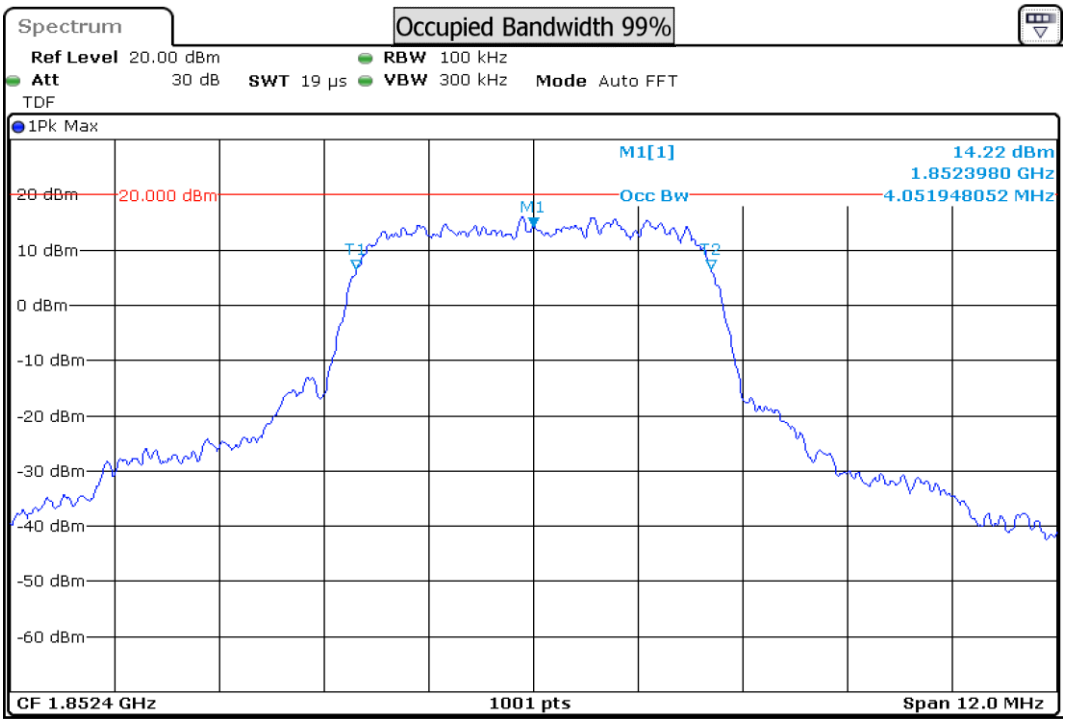
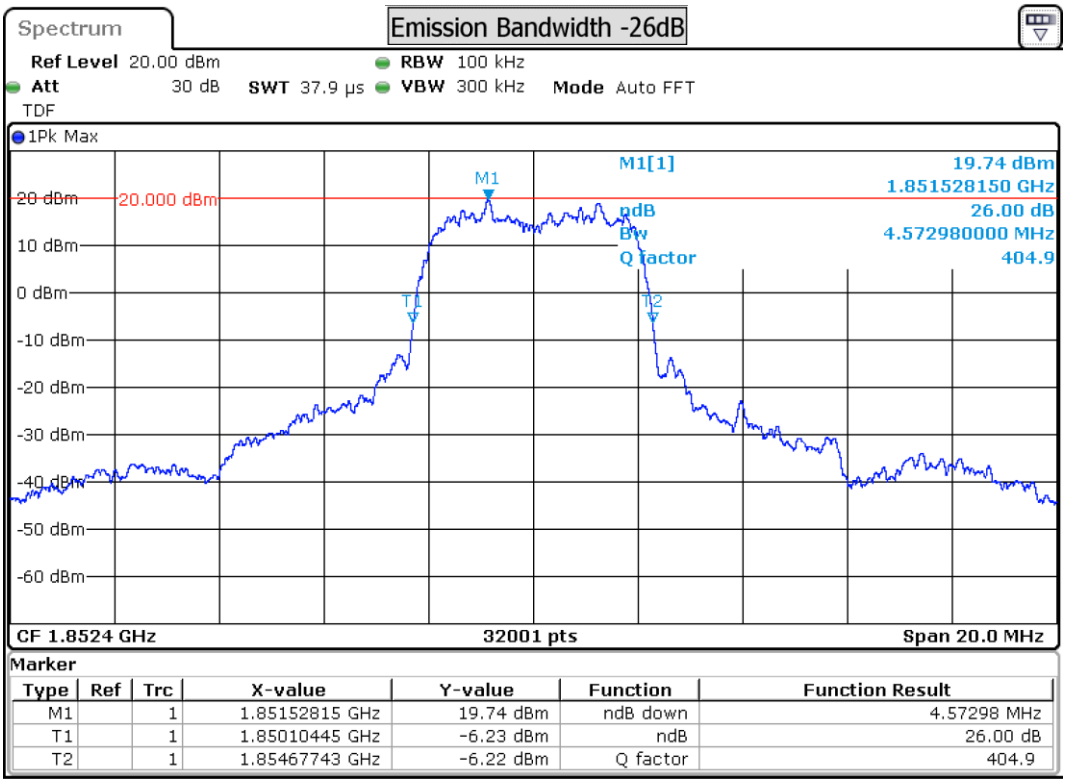



WCDMA II HSUPA 1852.4 Low Channel 9262




| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.85152815 GHz | 19.74 dBm | ndB down | 4.57298 MHz |
| T1 | | 1 | 1.85010445 GHz | -6.23 dBm | ndB | 26.00 dB |
| T2 | | 1 | 1.85467743 GHz | -6.22 dBm | Q factor | 404.9 |

WCDMA II HSUPA 1852.4 Low Channel 9262



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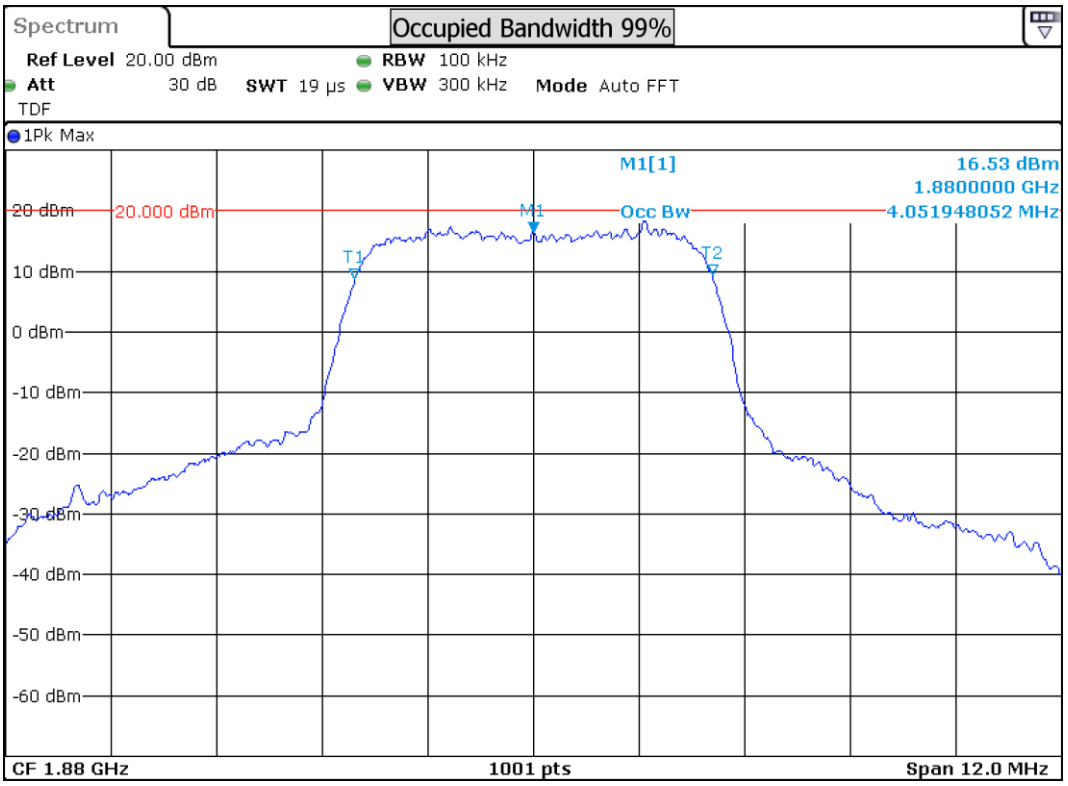
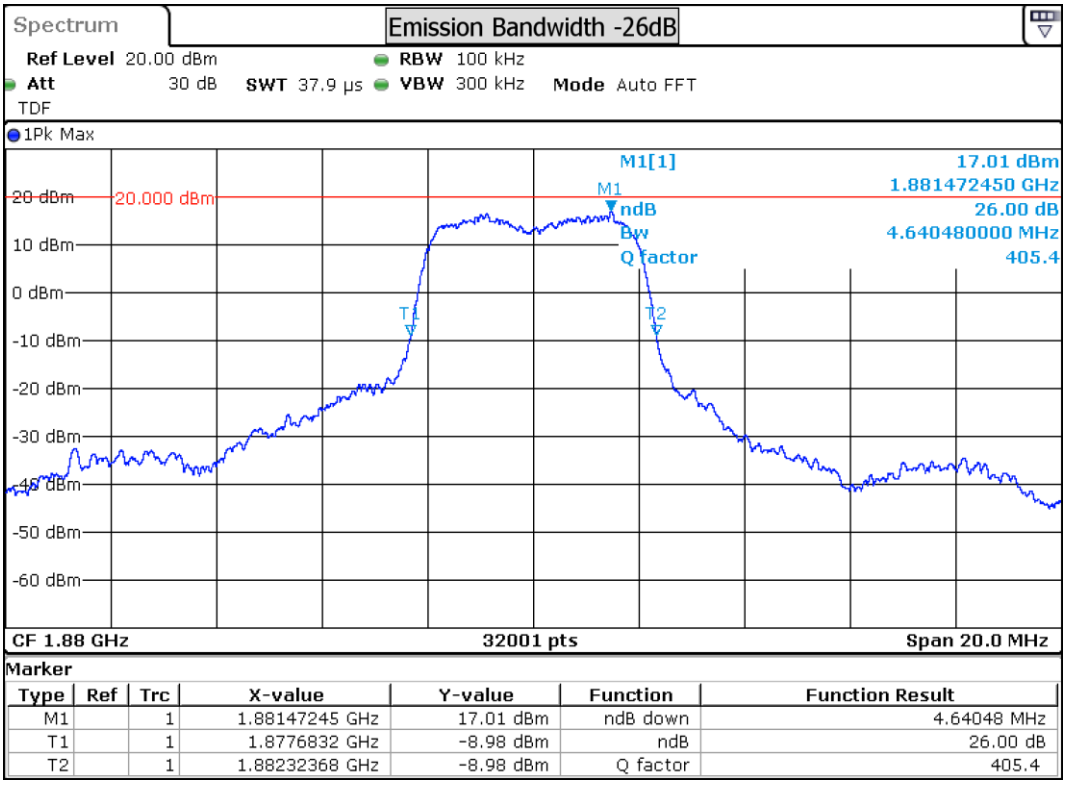


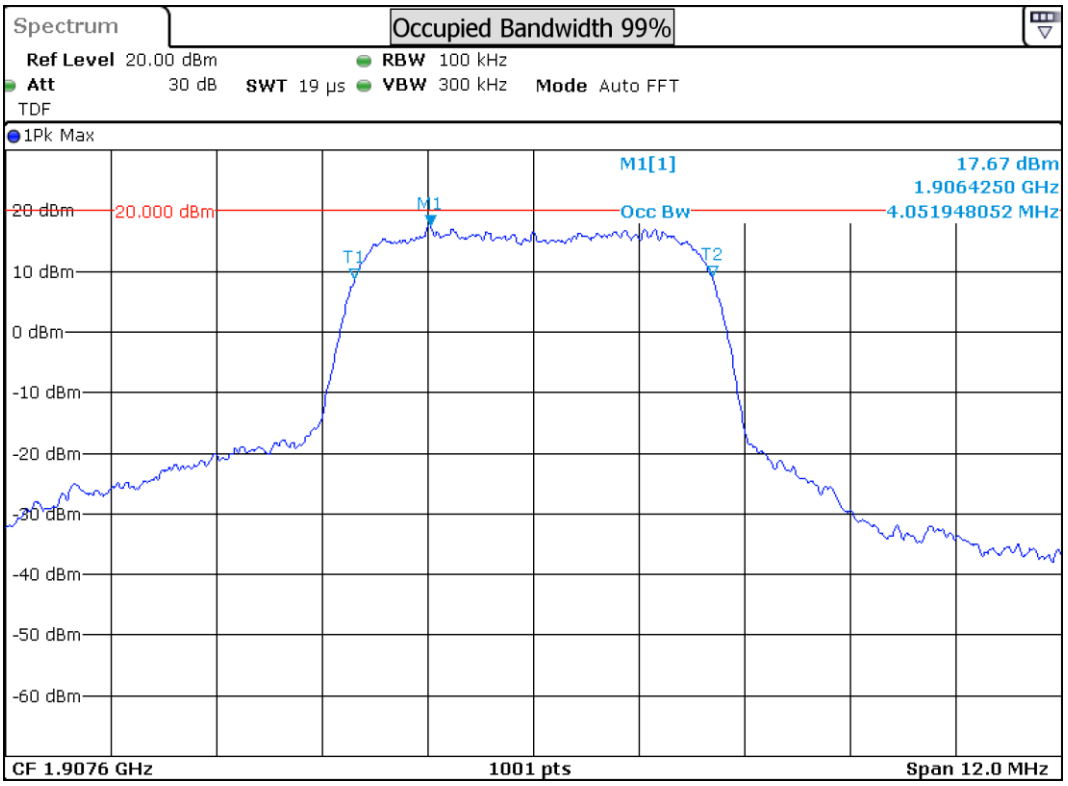

WCDMA II HSUPA 1880 Mid Channel 9400



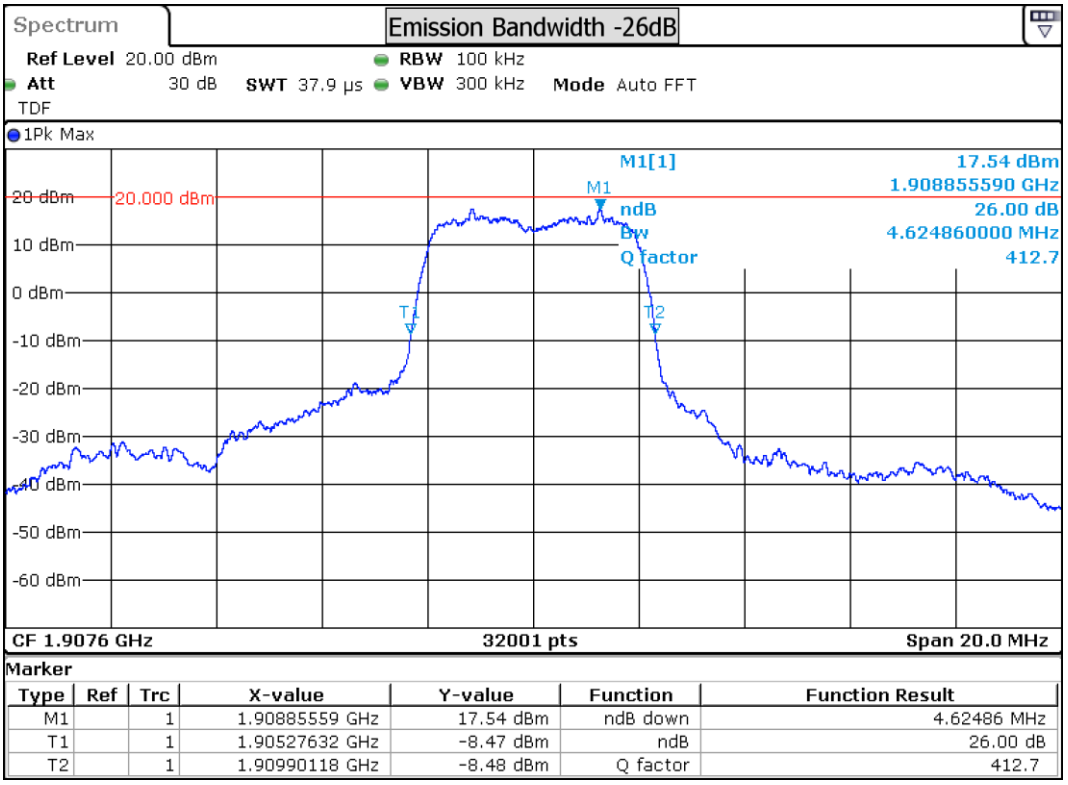

WCDMA II HSUPA 1880 Mid Channel 9400



Printed copies are not controlled documents




WCDMA II HSUPA 1907.6 High Channel 9538




| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.90885559 GHz | 17.54 dBm | ndB down | 4.62486 MHz |
| T1 | | 1 | 1.90527632 GHz | -8.47 dBm | ndB | 26.00 dB |
| T2 | | 1 | 1.90990118 GHz | -8.48 dBm | Q factor | 412.7 |

WCDMA II HSUPA 1907.6 High Channel 9538



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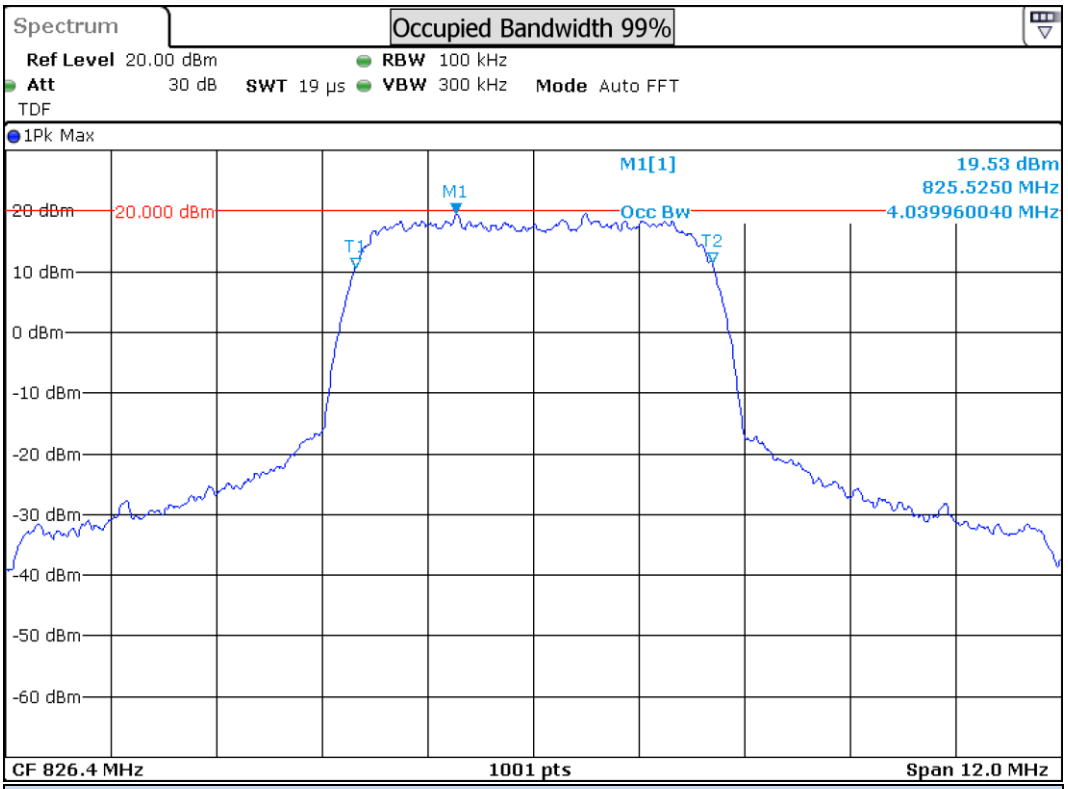
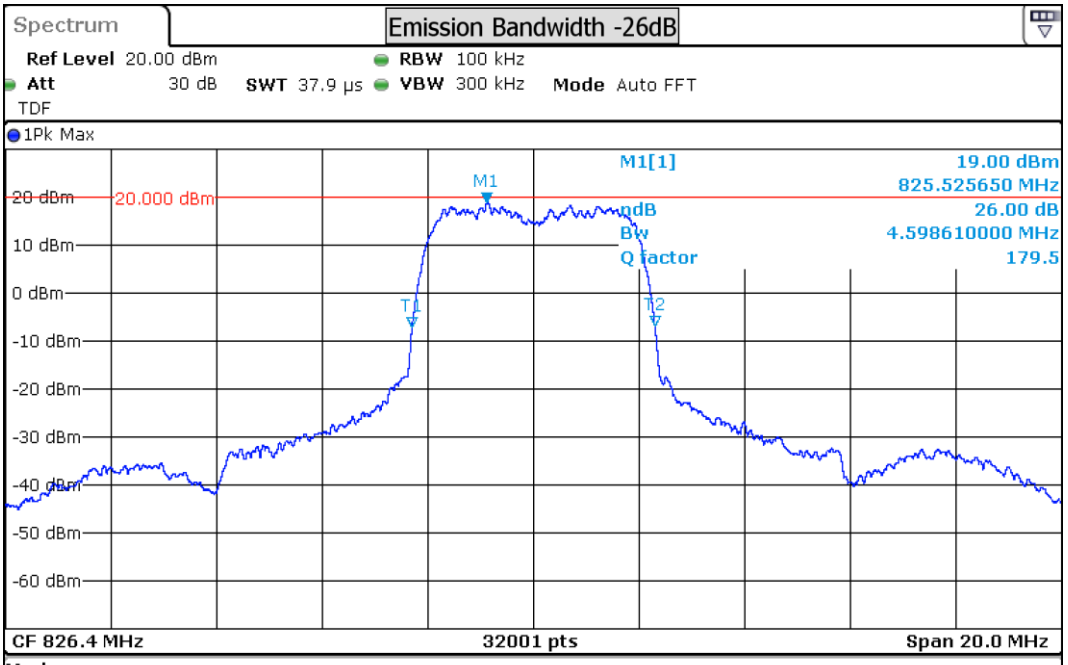
# WCDMA Band V




WCDMA V RMC 826.4 Low Channel 4132




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 825.52565 MHz | 19.00 dBm | ndB down | 4.59861 MHz |
| T1 | | 1 | 824.09632 MHz | -7.02 dBm | ndB | 26.00 dB |
| T2 | | 1 | 828.69493 MHz | -6.99 dBm | Q factor | 179.5 |

WCDMA V RMC 826.4 Low Channel 4132



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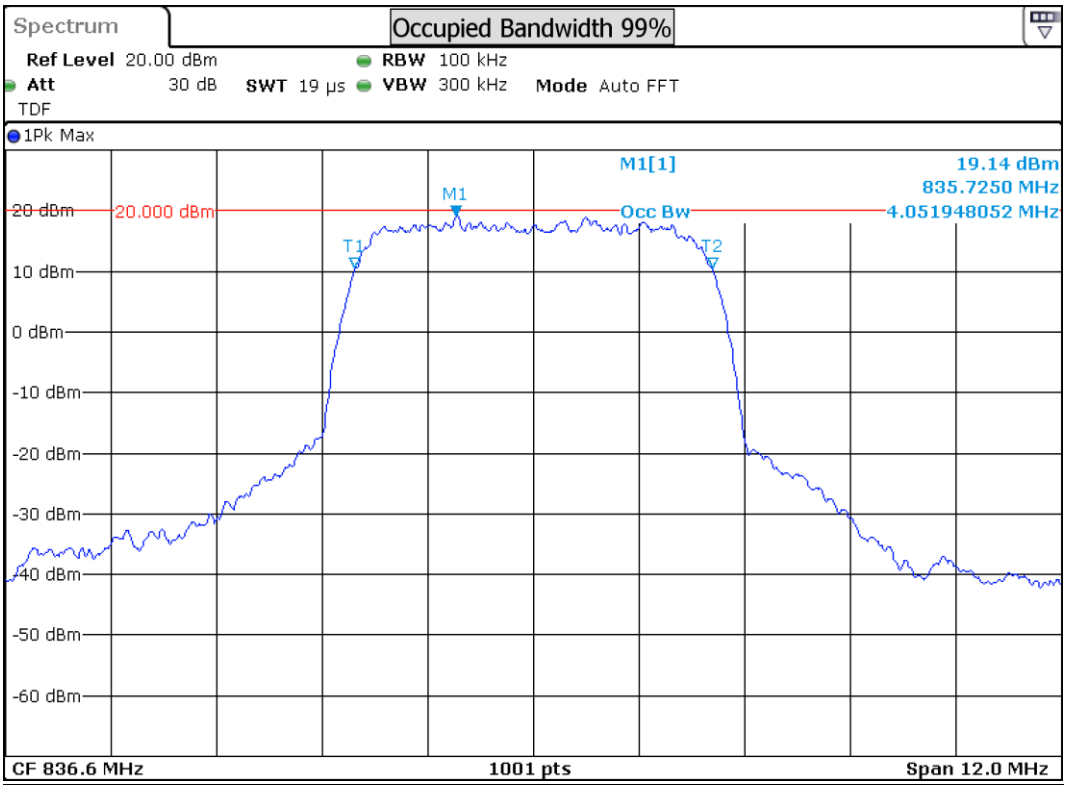
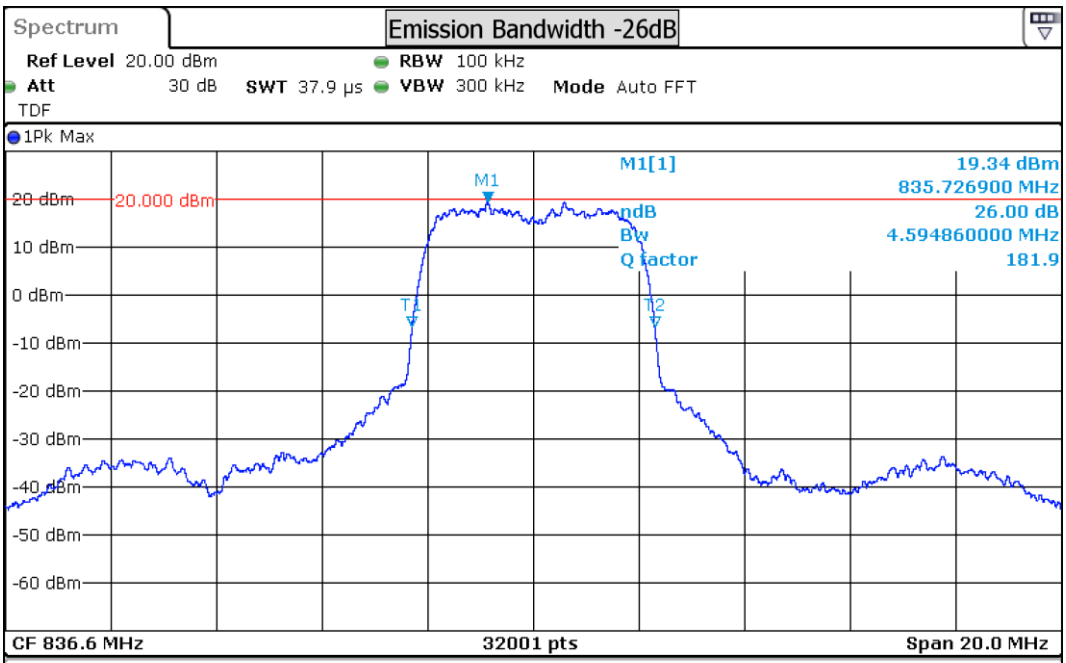



WCDMA V RMC 836.6 Mid Channel 4183




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 835.7269 MHz | 19.34 dBm | ndB down | 4.59486 MHz |
| T1 | | 1 | 834.29757 MHz | -6.67 dBm | ndB | 26.00 dB |
| T2 | | 1 | 838.89243 MHz | -6.64 dBm | Q factor | 181.9 |

WCDMA V RMC 836.6 Mid Channel 4183



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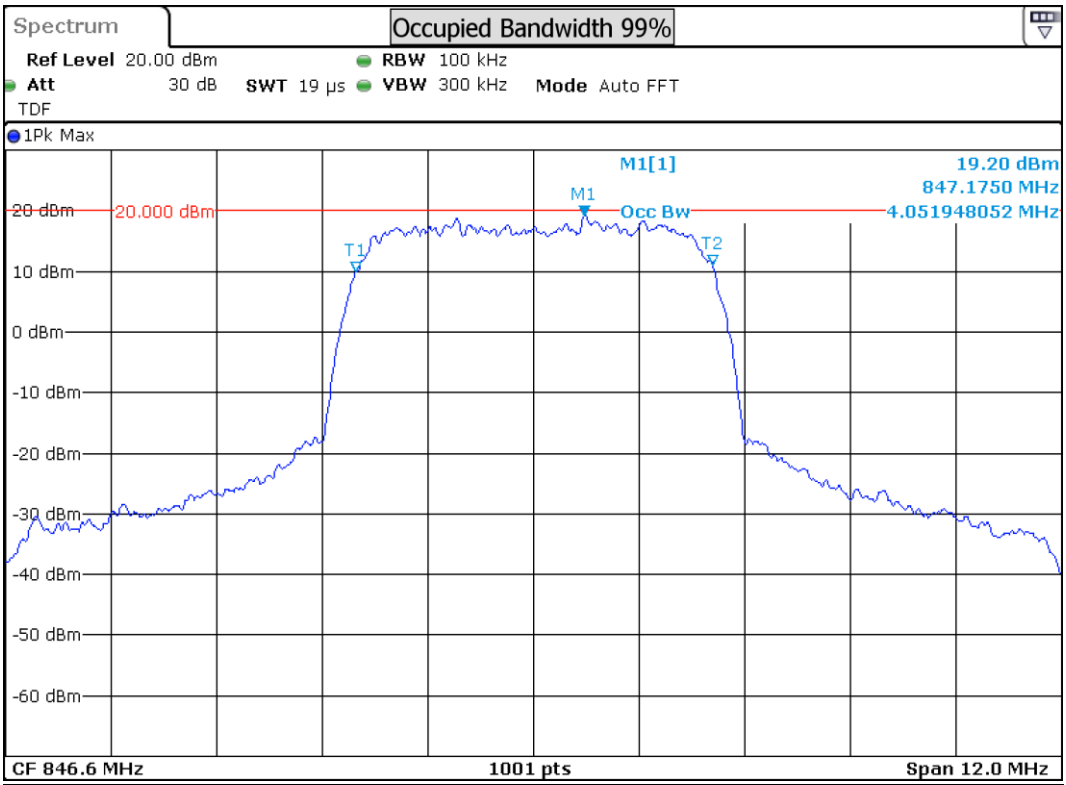
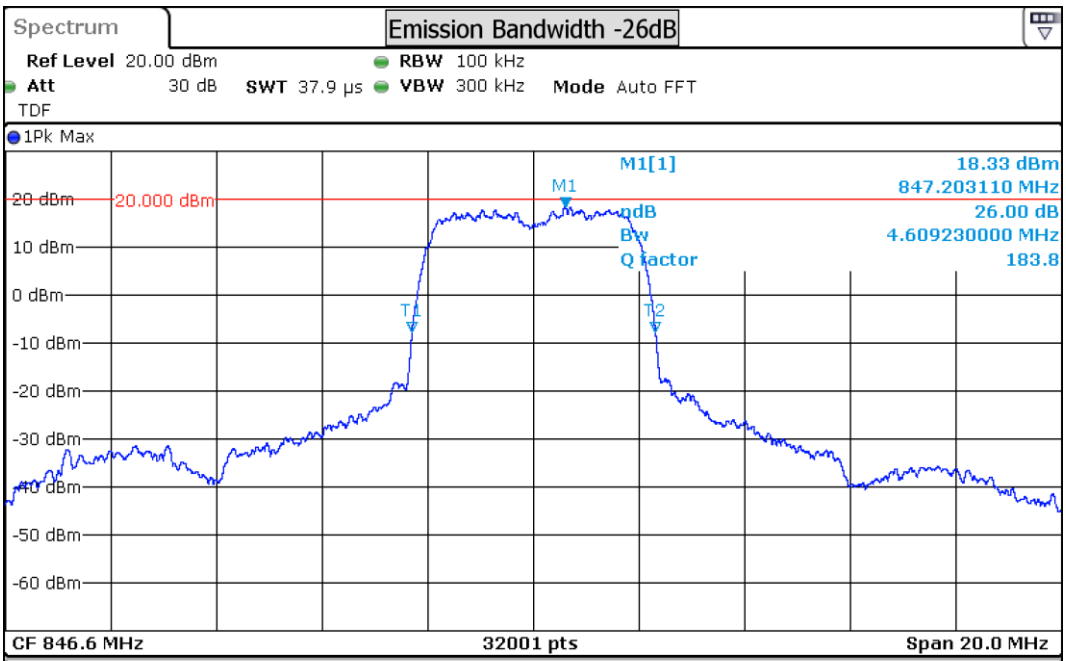



WCDMA V RMC 846.6 High Channel 4233




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 847.20311 MHz | 18.33 dBm | ndB down | 4.60923 MHz |
| T1 | | 1 | 844.29757 MHz | -7.64 dBm | ndB | 26.00 dB |
| T2 | | 1 | 848.9068 MHz | -7.69 dBm | Q factor | 183.8 |

WCDMA V RMC 846.6 High Channel 4233



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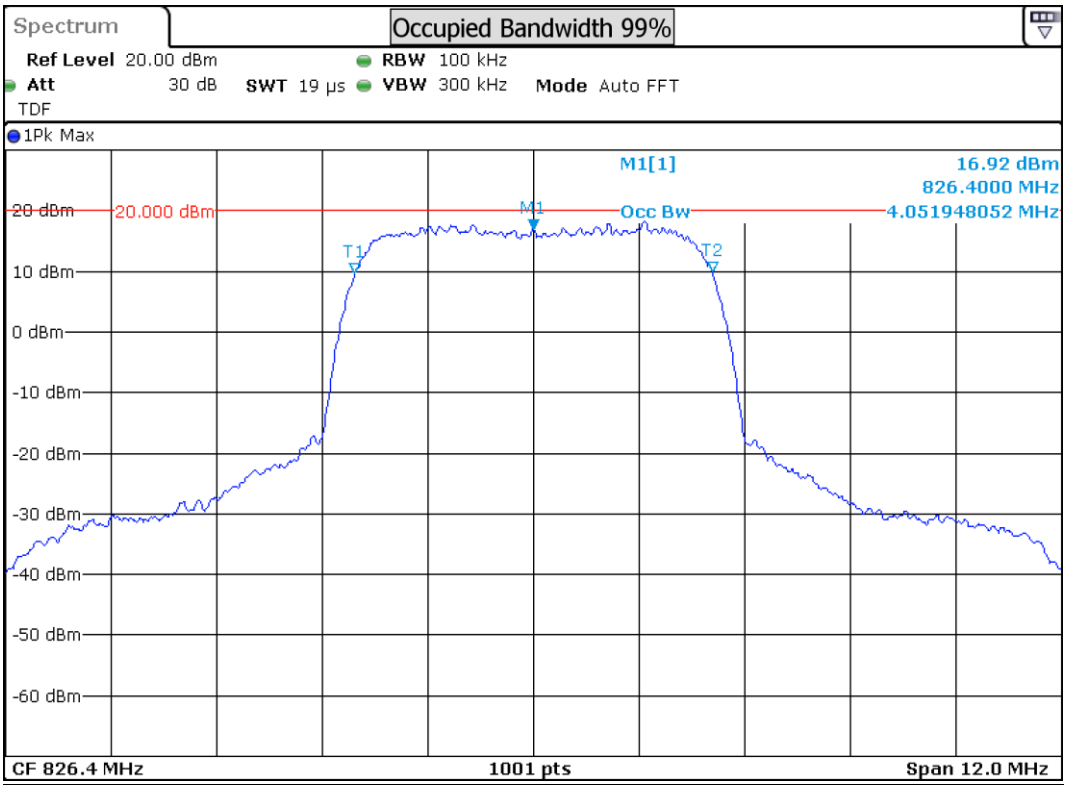
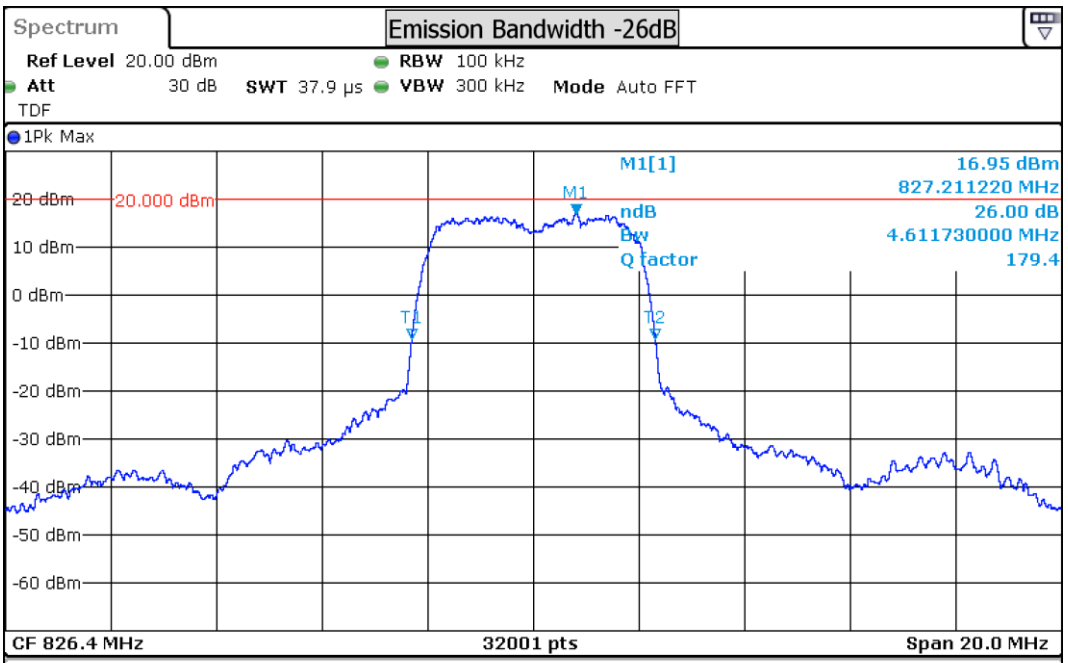



WCDMA V HSUPA 826.4 Low Channel 4132



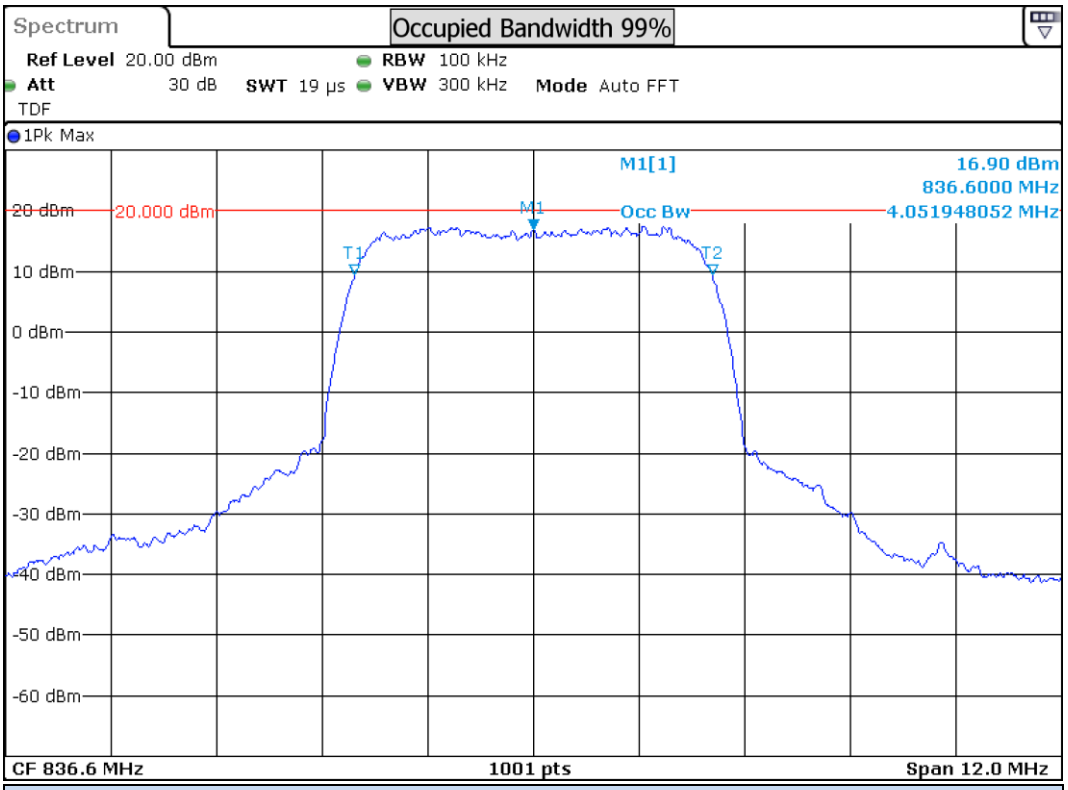

Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 827.21122 MHz | 16.95 dBm | ndB down | 4.61173 MHz |
| T1 | | 1 | 824.09195 MHz | -9.05 dBm | ndB | 26.00 dB |
| T2 | | 1 | 828.70368 MHz | -9.03 dBm | Q factor | 179.4 |

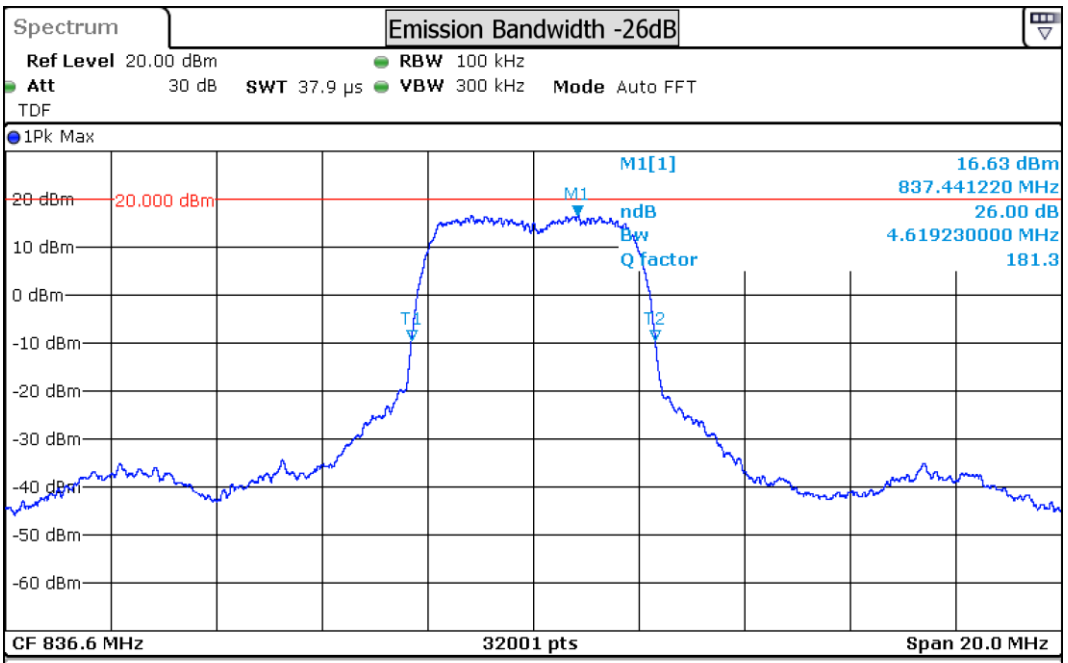
WCDMA V HSUPA 826.4 Low Channel 4132



Printed copies are not controlled documents




WCDMA V HSUPA 836.6 Mid Channel 4183




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 837.44122 MHz | 16.63 dBm | ndB down | 4.61923 MHz |
| T1 | | 1 | 834.2857 MHz | -9.35 dBm | ndB | 26.00 dB |
| T2 | | 1 | 838.90493 MHz | -9.35 dBm | Q factor | 181.3 |

WCDMA V HSUPA 836.6 Mid Channel 4183



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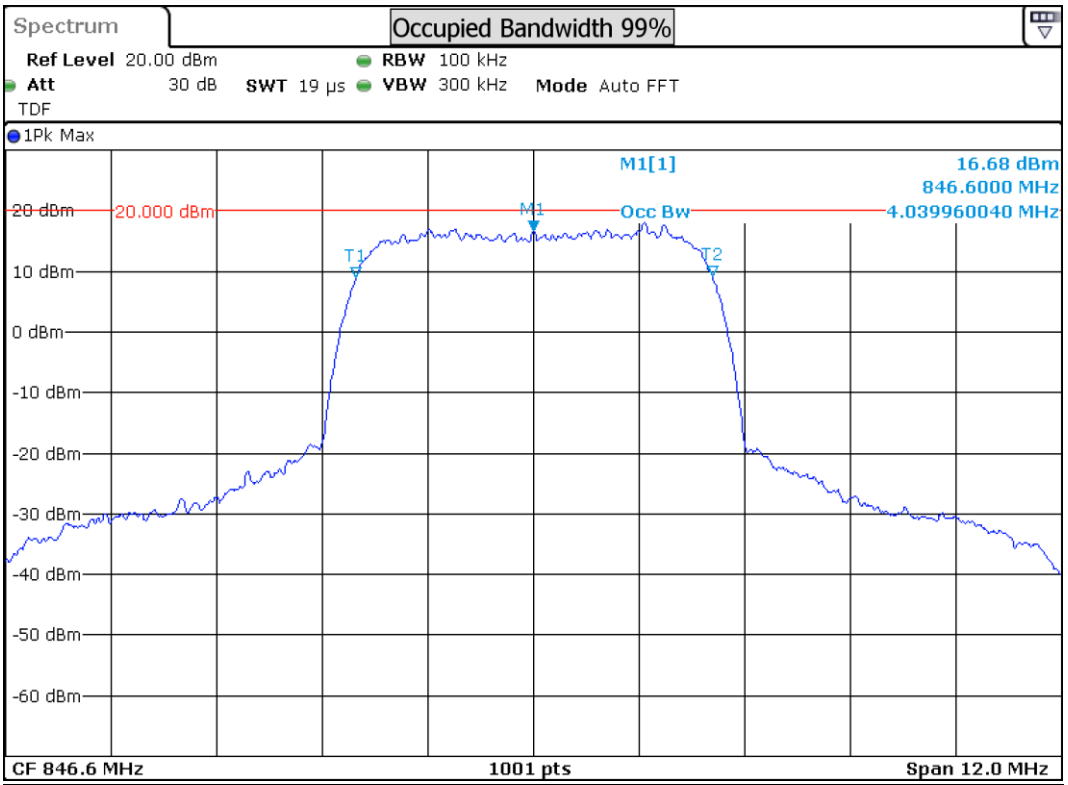
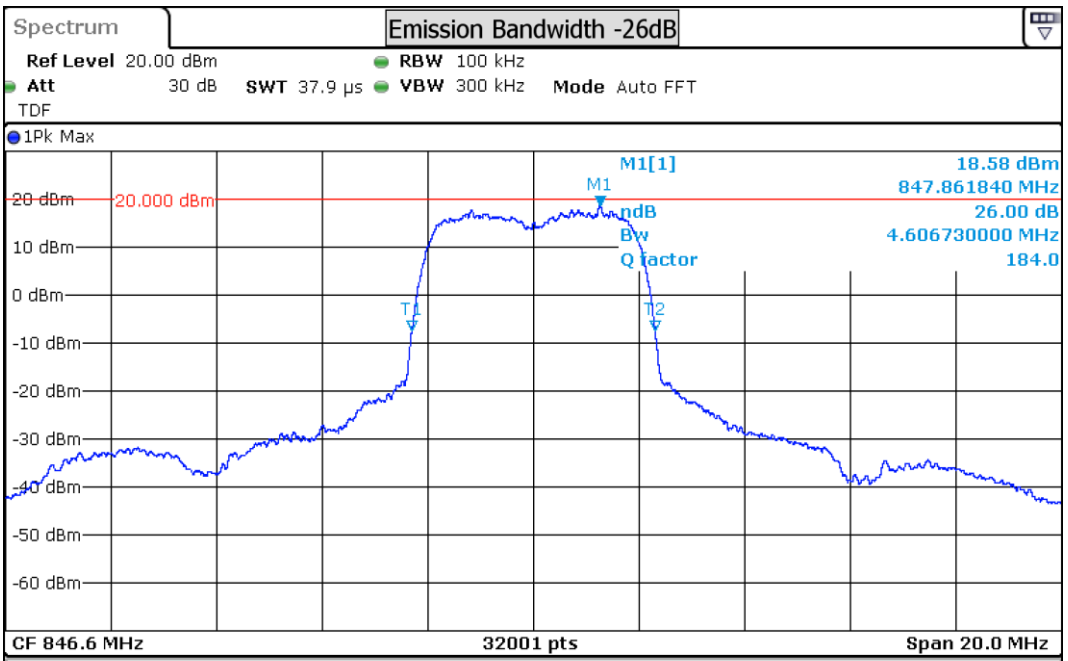



WCDMA V HSUPA 846.6 High Channel 4233




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 847.86184 MHz | 18.58 dBm | ndB down | 4.60673 MHz |
| T1 | | 1 | 844.2932 MHz | -7.41 dBm | ndB | 26.00 dB |
| T2 | | 1 | 848.89993 MHz | -7.43 dBm | Q factor | 184.0 |

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### B.2.3 Peak to average power ratio

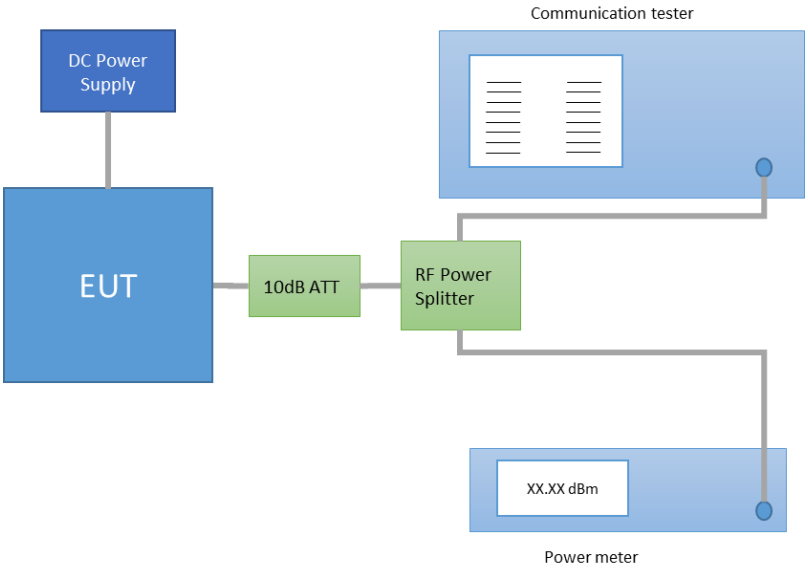
**Standard references**

| BAND | FCC part | Limits |
|---|---|---|
| PCS 1900 WCDMA II | 24.232 | §24.232 - In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB |
| GSM 850 WCDMA V | - | |

**Test procedure**

The setup below was used to measure the transmitted peak and average power. The antenna terminal of the EUT is connected to the power meter and the communication tester through an attenuator and a power splitter. This test was performed according to the KDB 971168 D01 § 5.7.2, § 5.1.2, § 5.2.3. PAPR is determined from:

$$PAPR(dB) = P_{Pk}(dBm) - P_{Avg}(dBm)$$





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**Results table**

GSM

| Band | Mode | Channel Number | Frequency [MHz] | #UL Slots | Average [dBm] | Peak [dBm] | PAPR [dB] |
|---|---|---|---|---|---|---|---|
| GSM850 | GMSK | 128 | 824.2 | 1 | 32.24 | 32.60 | 0.36 |
| | | | | 2 | 28.56 | 28.99 | 0.43 |
| | | | | 3 | 26.71 | 27.16 | 0.45 |
| | | | | 4 | 25.50 | 25.97 | 0.47 |
| | | 190 | 836.6 | 1 | 32.28 | 32.64 | 0.36 |
| | | | | 2 | 28.50 | 29.03 | 0.53 |
| | | | | 3 | 26.67 | 27.18 | 0.51 |
| | | | | 4 | 25.53 | 26.01 | 0.48 |
| | | 251 | 848.8 | 1 | 32.37 | 32.69 | 0.32 |
| | | | | 2 | 28.55 | 29.03 | 0.48 |
| | | | | 3 | 26.68 | 27.19 | 0.51 |
| | | | | 4 | 25.50 | 26.02 | 0.52 |

PCS

| Band | Mode | Channel Number | Frequency [MHz] | #UL Slots | Average [dBm] | Peak [dBm] | PAPR [dB] |
|---|---|---|---|---|---|---|---|
| PCS1900 | GMSK | 512 | 1850.2 | 1 | 29.10 | 29.49 | 0.39 |
| | | | | 2 | 26.05 | 26.47 | 0.42 |
| | | | | 3 | 24.03 | 24.52 | 0.49 |
| | | | | 4 | 22.80 | 23.30 | 0.50 |
| | | 661 | 1880 | 1 | 29.22 | 29.55 | 0.33 |
| | | | | 2 | 26.06 | 26.51 | 0.45 |
| | | | | 3 | 24.08 | 24.57 | 0.49 |
| | | | | 4 | 22.86 | 23.33 | 0.47 |
| | | 810 | 1909.8 | 1 | 29.59 | 29.16 | 0.43 |
| | | | | 2 | 26.13 | 26.55 | 0.42 |
| | | | | 3 | 24.60 | 24.18 | 0.42 |
| | | | | 4 | 22.85 | 23.36 | 0.51 |


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WCDMA

| Band | Mode | Channel Number | Frequency [MHz] | Subtest | Average [dBm] | Peak [dBm] | PAPR [dB] |
|---|---|---|---|---|---|---|---|
| WCDMA II | RMC | 9262 | 1852.4 | - | 23.38 | 26.73 | 3.35 |
| | | 9400 | 1880 | - | 23.40 | 26.67 | 3.27 |
| | | 9538 | 1907.6 | - | 23.31 | 26.44 | 3.13 |
| | HSDPA | 9262 | 1852.4 | 1 | 22.71 | 26.42 | 3.71 |
| | | | | 2 | 22.73 | 26.43 | 3.70 |
| | | | | 3 | 22.72 | 26.42 | 3.70 |
| | | | | 4 | 22.75 | 26.45 | 3.70 |
| | | 9400 | 1880 | 1 | 22.75 | 26.49 | 3.74 |
| | | | | 2 | 22.76 | 26.46 | 3.70 |
| | | | | 3 | 22.80 | 26.49 | 3.69 |
| | | | | 4 | 22.79 | 26.48 | 3.69 |
| | | 9538 | 1907.6 | 1 | 22.56 | 26.08 | 3.52 |
| | | | | 2 | 22.53 | 26.00 | 3.47 |
| | | | | 3 | 22.55 | 26.03 | 3.48 |
| | | | | 4 | 22.57 | 26.04 | 3.47 |
| | HSUPA | 9262 | 1852.4 | 1 | 21.68 | 26.49 | 4.81 |
| | | | | 2 | 22.21 | 26.46 | 4.25 |
| | | | | 3 | 21.18 | 26.30 | 5.12 |
| | | | | 4 | 22.49 | 26.22 | 3.73 |
| | | | | 5 | 23.38 | 27.52 | 4.14 |
| | | 9400 | 1880 | 1 | 21.71 | 26.37 | 4.66 |
| | | | | 2 | 22.20 | 26.45 | 4.25 |
| | | | | 3 | 21.22 | 26.21 | 4.99 |
| | | | | 4 | 22.53 | 26.21 | 3.68 |
| | | | | 5 | 23.40 | 27.54 | 4.14 |
| | | 9538 | 1907.6 | 1 | 21.56 | 26.03 | 4.47 |
| | | | | 2 | 22.08 | 26.15 | 4.07 |
| | | | | 3 | 21.08 | 25.94 | 4.86 |
| | | | | 4 | 22.33 | 25.85 | 3.52 |
| | | | | 5 | 23.30 | 27.51 | 4.21 |


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| Band | Mode | Channel Number | Frequency [MHz] | Subtest | Average [dBm] | Peak [dBm] | PAPR [dB] |
|---|---|---|---|---|---|---|---|
| WCDMA V | RMC | 4132 | 826.4 | - | 23.69 | 27.39 | 3.70 |
| | | 4183 | 836.6 | - | 23.57 | 27.00 | 3.43 |
| | | 4233 | 846.6 | - | 23.50 | 27.26 | 3.76 |
| | HSDPA | 4132 | 826.4 | 1 | 23.38 | 27.53 | 4.15 |
| | | | | 2 | 23.43 | 27.59 | 4.16 |
| | | | | 3 | 23.43 | 27.56 | 4.13 |
| | | | | 4 | 23.43 | 27.62 | 4.19 |
| | | 4183 | 836.6 | 1 | 23.15 | 27.09 | 3.94 |
| | | | | 2 | 23.15 | 27.08 | 3.93 |
| | | | | 3 | 23.15 | 27.10 | 3.95 |
| | | | | 4 | 23.15 | 27.08 | 3.93 |
| | | 4233 | 846.6 | 1 | 23.12 | 27.41 | 4.29 |
| | | | | 2 | 23.14 | 27.40 | 4.26 |
| | | | | 3 | 23.13 | 27.42 | 4.29 |
| | | | | 4 | 23.13 | 27.38 | 4.25 |
| | HSUPA | 4132 | 826.4 | 1 | 22.12 | 28.21 | 6.09 |
| | | | | 2 | 22.91 | 27.47 | 4.56 |
| | | | | 3 | 21.80 | 27.33 | 5.53 |
| | | | | 4 | 23.19 | 27.29 | 4.10 |
| | | | | 5 | 22.15 | 28.00 | 5.85 |
| | | 4183 | 836.6 | 1 | 22.20 | 27.08 | 4.88 |
| | | | | 2 | 22.70 | 27.08 | 4.38 |
| | | | | 3 | 21.63 | 27.00 | 5.37 |
| | | | | 4 | 22.96 | 26.87 | 3.91 |
| | | | | 5 | 23.44 | 27.57 | 4.13 |
| | | 4233 | 846.6 | 1 | 22.13 | 27.35 | 5.22 |
| | | | | 2 | 22.64 | 27.42 | 4.78 |
| | | | | 3 | 21.62 | 27.10 | 5.48 |
| | | | | 4 | 22.91 | 27.09 | 4.18 |
| | | | | 5 | 23.40 | 27.51 | 4.11 |


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