# RADIO TEST REPORT

Report No: STS1907082W01

Issued for

Shanghai Simcom Ltd.

SIM Technology Buliding, No.633, Jinzhong Road,
Changning District, Shanghai, P.R. China

| | |
|---|---|
| **Product Name:** | SIM5800 |
| **Brand Name:** | SIMCom |
| **Model Name:** | SIM5800 |
| **Series Model:** | N/A |
| **FCC ID:** | UDV-SIM5800 |
| **Test Standard:** | FCC Part 22H and 24E |



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# TEST RESULT CERTIFICATION

| | |
|---|---|
| Applicant's Name .....: | Shanghai Simcom Ltd. |
| Address.....: | SIM Technology Buliding, No.633, Jinzhong Road, Changning District, Shanghai, P.R. China |
| Manufacture's Name .....: | Shanghai Simcom Ltd. |
| Address.....: | SIM Technology Buliding, No.633, Jinzhong Road, Changning District, Shanghai, P.R. China |

**Product Description**

| | |
|---|---|
| Product Name .....: | SIM5800 |
| Brand Name .....: | SIMCom |
| Model Name.....: | SIM5800 |
| Series Model .....: | N/A |
| Test Standards .....: | FCC Part 22H and 24E |
| Test Procedure.....: | KDB 971168 D01 v03r01,ANSI C63.26( 2015) |

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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| | |
|---|---|
| **Date of Test**.....: | |
| Date (s) of performance of tests : | 05 July 2019 ~ 18 July 2019 |
| Date of Issue .....: | 30 July 2019 |
| Test Result .....: | Pass |

Testing Engineer : 

(Chris Chen)

Technical Manager : 

(Sunday Hu)

Authorized Signatory : 

(Vita Li)

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## Revision History

| Rev. | Issue Date | Report NO. | Effect Page | Contents |
|---|---|---|---|---|
| 00 | 30 July 2019 | STS1907082W01 | ALL | Initial Issue |
| | | | | |

SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

The radiated emission testing was performed according to the procedures of KDB 971168 D01 v03r01 and ANSI C63.26( 2015)

| FCC Rules | Test Description | Test Limit | Test Result | Reference |
|---|---|---|---|---|
| 2.1046 | Conducted Output Power | Reporting Only | PASS | |
| 22.913d<br>24.232d | Peak-to-Average Ratio | < 13 dB | PASS | |
| 2.1046<br>22.913<br>24.232 | Effective Radiated Power/Equivalent Isotropic Radiated Power | < 7 Watts max. ERP(Part 22)<br>< 2 Watts max. EIRP(Part 24) | PASS | |
| 2.1049<br>22.917<br>24.238 | Occupied Bandwidth | Reporting Only | PASS | |
| 2.1055<br>22.355<br>24.235 | Frequency Stability | < 2.5 ppm (Part 22)<br>Emission must remain in band (Part 24) | PASS | |
| 2.1051<br>22.917<br>24.238 | Spurious Emission at Antenna Terminals | < 43+10log10(P[Watts]) | PASS | |
| 2.1053<br>22.917<br>24.238 | Field Strength of Spurious Radiation | < 43+10log10(P[Watts]) | PASS | |
| 2.1051<br>22.917<br>24.238 | Band Edge | < 43+10log10(P[Watts]) | PASS | |

# 1 INTRODUCTION

## 1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd.
Add. : 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road,
Fuyong Street, Bao'an District, Shenzhen, Guangdong, China
FCC test Firm Registration Number: 625569
A2LA Certificate No.: 4338.01

## 1.2 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements ofANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 toindicate a 95% level of confidence. The measurement data shown herein meets or exceeds the UCISPRmeasurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly tospecified limits to determine compliance.

| No. | Item | Uncertainty |
|---|---|---|
| 1 | RF output power,conducted | ±0.71dB |
| 2 | Unwanted Emissions,conducted | ±0.63dB |
| 3 | All emissions,radiated 30-200MHz | ±3.43dB |
| 4 | All emissions,radiated 200MHz-1GHz | ±3.57dB |
| 5 | All emissions,radiated>1G | ±4.13dB |
| 6 | Conducted Emission(9KHz-150KHz) | ±3.18dB |
| 7 | Conducted Emission(150KHz-30MHz) | ±2.70dB |

## 2 PRODUCT INFORMATION

| | |
|---|---|
| Product Name | SIM5800 |
| Trade Name | SIMCom |
| Model Name | SIM5800 |
| Series Model | N/A |
| Model Difference | N/A |
| Tx Frequency: | GSM/GPRS/EDGE:<br>850: 824 MHz ~ 849MHz<br>1900: 1850 MHz ~ 1910MHz<br>WCDMA:<br>Band V: 824 MHz ~ 849 MHz<br>Band II: 1850 MHz ~ 1910 MHz |
| Rx Frequency: | GSM/GPRS/EDGE:<br>850: 869 MHz ~ 894 MHz<br>1900: 1930 MHz ~ 1990MHz<br>WCDMA:<br>Band V: 869 MHz ~ 894 MHz<br>Band II: 1930 MHz ~ 1990 MHz |
| Max RF Output Power: | GSM850:31.59dBm, GSM1900:28.43dBm<br>GPRS850(1-Slot):29.86dBm, GPRS1900(1-Slot):26.22dBm<br>GPRS850(2-Slot):29.42dBm, GPRS1900(2-Slot):25.82Bm<br>GPRS850(3-Slot):29.01dBm, GPRS1900(3-Slot):25.37dBm<br>GPRS850(4-Slot):28.52dBm, GPRS1900(4-Slot):24.91dBm<br>EDGE 850(1-Slot):28.56dBm, EDGE 1900(1-Slot):24.23dBm<br>EDGE 850(2-Slot):27.82dBm, EDGE 1900(2-Slot):23.45dBm<br>EDGE 850(3-Slot):27.05dBm, EDGE 1900(3-Slot):22.69dBm<br>EDGE 850(4-Slot):26.30dBm, EDGE 1900(4-Slot):21.92dBm<br>WCDMA Band V:23.18dBm, WCDMA Band II:23.05dBm |
| Type of Emission: | GSM(850): 320KGXW; GSM(1900): 320KGXW<br>GPRS(850): 319KGXW; GPRS(1900): 320KGXW<br>EDGE(850): 306KG7W; EDGE(1900): 300KG7W<br>WCDMA850: 4M67F9W<br>WCDMA1900: 4M67F9W |
| Modulation Characteristics: | GMSK for GSM/GPRS; GMSK and 8PSK for EDGE<br>WCDMA: QPSK; HSDPA:QPSK/16QAM; HSUPA:BPSK |
| SIM Card: | SIM 1 and SIM 2 is a chipset unit and tested as single chipset, SIM 1 is used to tested |
| Antenna: | PIFA Antenna |
| Antenna gain: | GSM 850: 0.64dBi ,PCS 1900:1.87dBi<br>WCDMA 850: 0.64dBi, WCDMA1900: 1.87dBi, |
| Power Rating | Input: DC 3.8V |
| GPRS/EDGE Class: | Multi-Class12 |

| | |
|---|---|
| Extreme Vol. Limits: | DC 3.45 V to 4.4 V (Nominal DC3.8V ) |
| Extreme Temp. Tolerance: | -30℃ to +50℃ |
| Hardware version number: | V1.01 |
| Software version number: | SIM5800B01V06_F |
| *** Note: The High Voltage 4.4V and Low Voltage 3.45V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.* | |

3 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 and ANSI C63.26 2015 Power Meas. License Digital Systems with maximum output power.

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

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 10th harmonic for GSM850 and WCDMA Band V.

2. 30 MHz to 10th harmonic for GSM1900 and WCDMA Band II.

All modes and data rates and positions were investigated.

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

| | **TEST MODES** | |
|---|---|---|
| BAND | RADIATED TCS | CONDUCTED TCS |
| GSM 850 | GSM LINK<br>GPRS/EDGE CLASS 12 LINK | GSM LINK<br>GPRS/EDGE CLASS 12 LINK |
| GSM 1900 | GSM LINK<br>GPRS/EDGE CLASS 12 LINK | GSM LINK<br>GPRS/EDGE CLASS 12 LINK |
| WCDMA BAND V | RMC 12.2KBPS LINK | RMC 12.2KBPS LINK |
| WCDMA BAND II | RMC 12.2KBPS LINK | RMC 12.2KBPS LINK |

# 4 MEASUREMENT INSTRUMENTS

## Radiation Test equipment

| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|---|---|---|---|---|---|
| Test Receiver | R&S | ESCI | 101427 | 2018.10.13 | 2019.10.12 |
| Signal Analyzer | Agilent | N9020A | MY51110105 | 2019.03.02 | 2020.03.01 |
| Wireless Communications Test Set | R&S | CMW 500 | 133884 | 2019.03.02 | 2020.03.01 |
| Bilog Antenna | TESEQ | CBL6111D | 34678 | 2017.11.02 | 2020.11.1 |
| Horn Antenna | SCHWARZBECK | BBHA 9120D(1201) | 9120D-1343 | 2018.10.19 | 2021.10.18 |
| SHF-EHF Horn Antenna (18G-40GHz) | A-INFO | LB-180400-KF | J211020657 | 2018.03.11 | 2021.03.10 |
| Pre-Amplifier (0.1M-3GHz) | EM | EM330 | 060665 | 2018.10.13 | 2019.10.12 |
| Pre-Amplifier (1G-18GHz) | SKET | LNPA-01018G-45 | SK2018080901 | 2018.10.13 | 2019.10.12 |
| turn table | EM | SC100_1 | 60531 | N/A | N/A |
| Antenna mast | EM | SC100 | N/A | N/A | N/A |
| Temperature & Humidity | HH660 | Mieo | N/A | 2018.10.11 | 2019.10.10 |
| Test SW | BULUN | BL410-E/18.905 | | | |

## RF Connected Test

| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|---|---|---|---|---|---|
| Universal Radio communication tester | R&S | CMU200 | 11764 | 2018.10.13 | 2019.10.12 |
| Wireless Communications Test Set | R&S | CMW 500 | 133884 | 2019.03.02 | 2020.03.01 |
| Signal Analyzer | Agilent | N9020A | MY49100060 | 2018.10.13 | 2019.10.12 |
| Temperature & Humidity | HH660 | Mieo | N/A | 2018.10.11 | 2019.10.10 |
| Test SW | FARAD | LZ-RF /LzRf-3A3 | | | |

Equipment with a calibration date of “NCR” shown in this list was not used to make direct calibrated measurements.

# 5 TEST ITEMS

## 5.1 CONDUCTED OUTPUT POWER

Test overview

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.

Test procedures

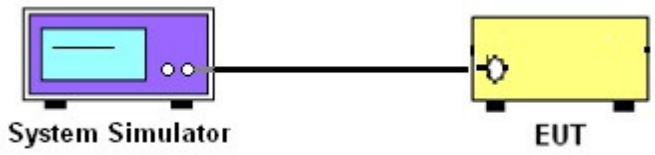
1. The transmitter output port was connected to the system simulator.

2. Set eut at maximum power through the system simulator.

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

4. Measure and record the power level from the system simulator.

Test setup



5.2 PEAK TO AVERAGE RATIO

TEST OVERVIEW

According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. 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.

TEST PROCEDURES

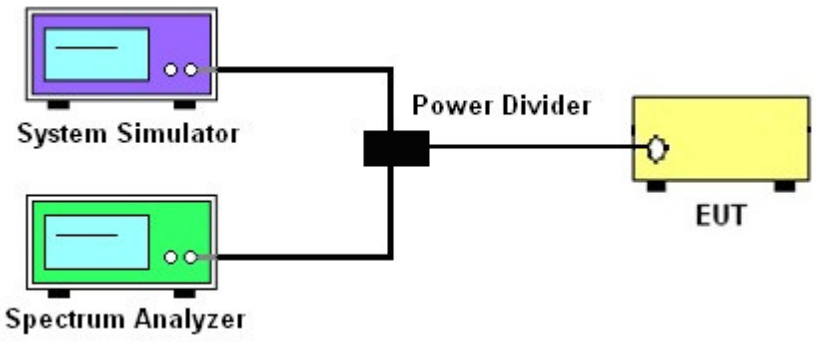
1. The testing follows fcckdb 971168 v03r01 section

2. The eut was connected to the and peak and av system simulator& spectrum analysis reads

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

4. Set the test probe and measure average power of the spectrum analysis

TEST SETUP



## 5.3 TRANSMITTER RADIATED POWER (EIRP/ERP)

### TEST OVERVIEW

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI C63.26 2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

### TEST PROCEDURE

1. The testing follows FCC KDB 971168 Section 5.8 and ANSI C63.26-2015 Section 5.2.
2. The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.
3. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
4. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
5. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a nonradiating cable. The absolute levels of the spurious emissions were measured by the substitution.
6. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to ANSI C63.26-2015. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP/ERP was calculated with the correction factor,

ERP/EIRP = P.SG + GT – LC

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMe as, typically dBW or dBm);

PMeas(PK) = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

## 5.4 OCCUPIED BANDWIDTH

TEST OVERVIEW

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

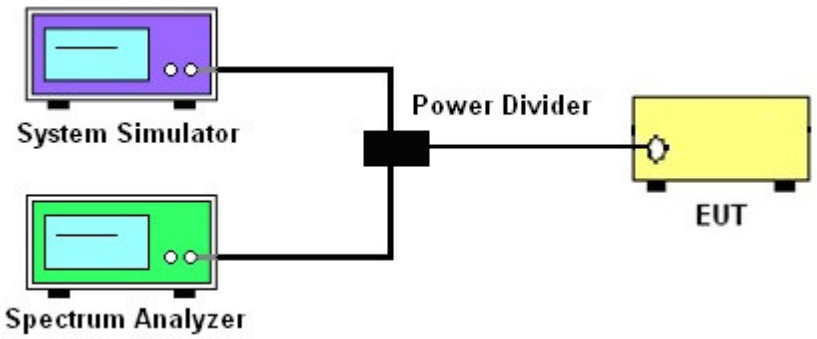
The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth)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

All modes of operation were investigated and the worst case configuration results are reported in this section.

TEST PROCEDURE

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7.The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

TEST SETUP



## 5.5 FREQUENCY STABILITY

Test Overview

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26 2015. The frequency stability of the transmitter is measured by:

a.) Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure

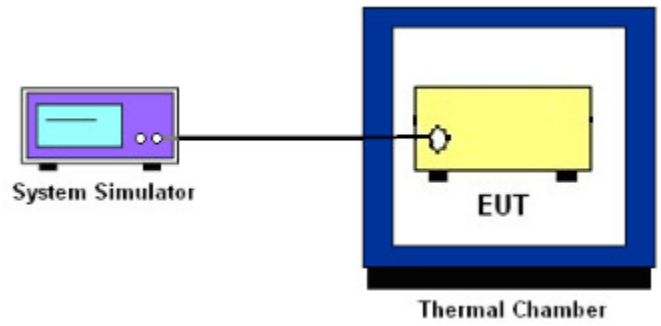
Temperature Variation

1. The testing follows fcckdb 971168 D01 section 9.0
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

Voltage Variation

1. The testing follows FCC KDB 971168 D01 Section 9.0.
2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

TEST SETUP



## 5.6 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

### Test Overview

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

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

### Test procedure

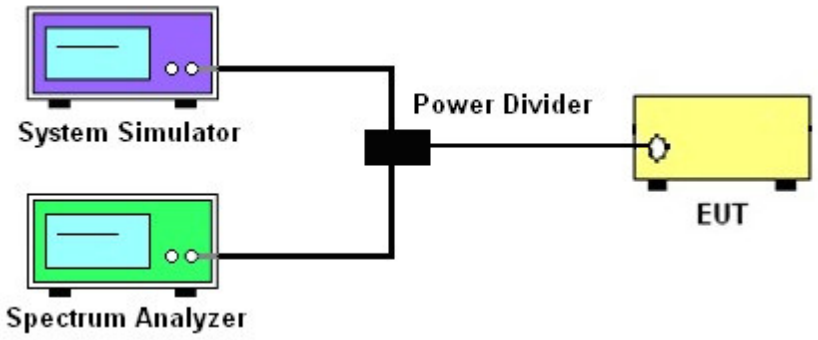
1. The testing FCC KDB 971168 D01 v03r01 Section 6.0. and ANSI C63.26-2015-Section 5.5
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

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

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

= -13dBm.

### Test Setup



5.7 BAND EDGE

OVERVIEW

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

TEST PROCEDURE

1.The testing FCC KDB 971168 D01 v03r01 Section 6.0. and ANSI C63.26-2015-Section 5.7

2. Start and stop frequency were set such that the band edge would be placed in the center of the Plot.

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

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

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

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

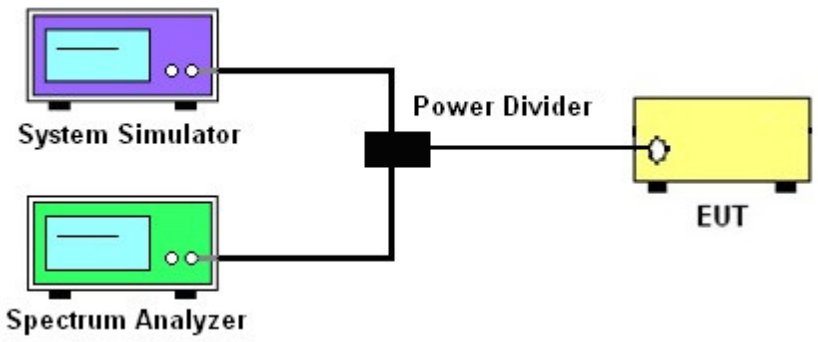
7.The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

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

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

= -13dBm.

TEST SETUP



## 5.8 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

Test overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signalsoperating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas.Measurements on signals operating above 1GHz are performed using vertically and horizontally polarizedhorn antennas. All measurements are performed as peak measurements while the EUT isoperating at maximum power and at the appropriate frequencies.

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

Test procedure

1. The testing FCC KDB 971168 D01 Section 5.8 and ANSI C63.26-2015-Section 5.5.
2. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5.No. of sweep points > 2 x span/RBW
6. Detector = Peak
7. Trace mode = max hold
8. The trace was allowed to stabilize
9. Effective Isotropic Spurious Radiation was measured by substitution method according to TIA/EIA-603-D. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP/ERP was calculated with the correction factor,

ERP/EIRP = P.SG + GT – LC

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, t ypically dBW or dBm);

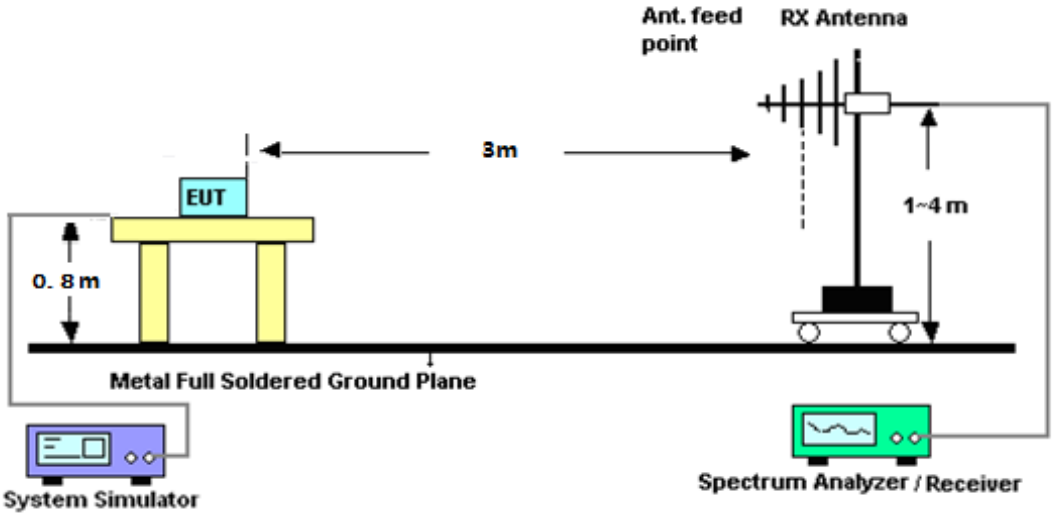
P.SG = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

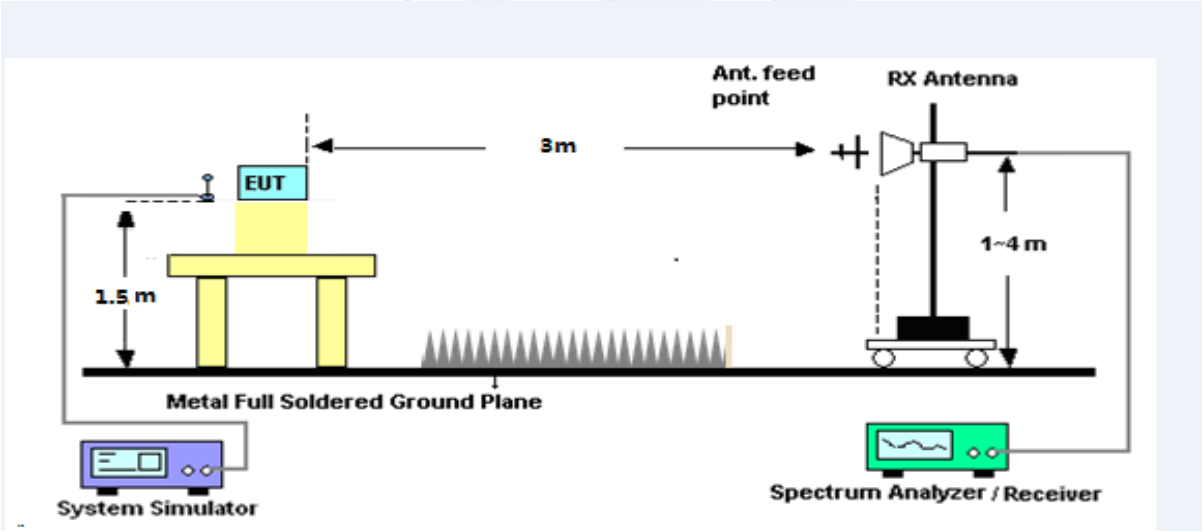
LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

TEST SETUP

For radiated test from 30MHz to 1GHz




For radiated test from above 1GHz



APPENDIX A.TESTRESULT
A1.CONDUCTED OUTPUT POWER
GSM 850:

| GSM 850 | | |
|---|---|---|
| Mode | Frequency (MHz) | AVG Power(dBm) |
| GSM (GMSK,1-Slot) | 824.2 | 31.59 |
| | 836.6 | 31.28 |
| | 848.8 | 30.75 |
| GPRS (GMSK,1-Slot) | 824.2 | 29.23 |
| | 836.6 | 29.86 |
| | 848.8 | 29.32 |
| GPRS (GMSK,2-Slot) | 824.2 | 28.82 |
| | 836.6 | 29.42 |
| | 848.8 | 28.86 |
| GPRS (GMSK,3-Slot) | 824.2 | 28.32 |
| | 836.6 | 29.01 |
| | 848.8 | 28.43 |
| GPRS (GMSK,4-Slot) | 824.2 | 27.87 |
| | 836.6 | 28.52 |
| | 848.8 | 27.99 |
| EGPRS (8PSK,1-Slot) | 824.2 | 28.41 |
| | 836.6 | 28.04 |
| | 848.8 | 28.56 |
| EGPRS (8PSK,2-Slot) | 824.2 | 27.64 |
| | 836.6 | 27.33 |
| | 848.8 | 27.82 |
| EGPRS (8PSK,3-Slot) | 824.2 | 26.90 |
| | 836.6 | 26.61 |
| | 848.8 | 27.05 |
| EGPRS (8PSK,4-Slot) | 824.2 | 26.15 |
| | 836.6 | 25.86 |
| | 848.8 | 26.30 |

PCS 1900:

| PCS 1900 | | |
|---|---|---|
| Mode | Frequency (MHz) | AVG Power(dBm) |
| GSM (GMSK,1-Slot) | 1850.2 | 28.25 |
| | 1880.0 | 28.43 |
| | 1909.8 | 27.71 |
| GPRS (GMSK,1-Slot) | 1850.2 | 25.85 |
| | 1880.0 | 25.98 |
| | 1909.8 | 26.22 |
| GPRS (GMSK,2-Slot) | 1850.2 | 25.36 |
| | 1880.0 | 25.55 |
| | 1909.8 | 25.82 |
| GPRS (GMSK,3-Slot) | 1850.2 | 24.95 |
| | 1880.0 | 25.10 |
| | 1909.8 | 25.37 |
| GPRS (GMSK,4-Slot) | 1850.2 | 24.53 |
| | 1880.0 | 24.65 |
| | 1909.8 | 24.91 |
| EGPRS (8PSK,1-Slot) | 1850.2 | 23.85 |
| | 1880.0 | 24.23 |
| | 1909.8 | 23.56 |
| EGPRS (8PSK,2-Slot) | 1850.2 | 23.10 |
| | 1880.0 | 23.45 |
| | 1909.8 | 22.86 |
| EGPRS (8PSK,3-Slot) | 1850.2 | 22.30 |
| | 1880.0 | 22.69 |
| | 1909.8 | 22.09 |
| EGPRS (8PSK,4-Slot) | 1850.2 | 21.51 |
| | 1880.0 | 21.92 |
| | 1909.8 | 21.37 |

UMTS BAND V

| UMTS BAND V | | |
|---|---|---|
| Mode | Frequency(MHz) | AVG Power |
| WCDMA 850 RMC | 826.4 | 22.96 |
| | 836.6 | 22.93 |
| | 846.6 | 23.18 |
| HSDPA Subtest 1 | 826.4 | 22.51 |
| | 836.6 | 22.70 |
| | 846.6 | 22.85 |
| HSDPA Subtest 2 | 826.4 | 22.09 |
| | 836.6 | 22.26 |
| | 846.6 | 22.42 |
| HSDPA Subtest 3 | 826.4 | 21.68 |
| | 836.6 | 21.83 |
| | 846.6 | 22.09 |
| HSDPA Subtest 4 | 826.4 | 21.27 |
| | 836.6 | 21.43 |
| | 846.6 | 21.71 |
| HSUPA Subtest 1 | 826.4 | 22.50 |
| | 836.6 | 22.65 |
| | 846.6 | 22.37 |
| HSUPA Subtest 2 | 826.4 | 21.61 |
| | 836.6 | 21.66 |
| | 846.6 | 21.40 |
| HSUPA Subtest 3 | 826.4 | 21.46 |
| | 836.6 | 21.18 |
| | 846.6 | 21.10 |
| HSUPA Subtest 4 | 826.4 | 21.11 |
| | 836.6 | 20.83 |
| | 846.6 | 20.71 |
| HSUPA Subtest 5 | 826.4 | 19.69 |
| | 836.6 | 19.35 |
| | 846.6 | 19.29 |

UMTS BAND II

| UMTS BAND II | | |
|---|---|---|
| Mode | Frequency(MHz) | AVG Power |
| WCDMA 1900 RMC | 1852.4 | 22.86 |
| | 1880 | 22.77 |
| | 1907.6 | 23.05 |
| HSDPA Subtest 1 | 1852.4 | 22.29 |
| | 1880 | 22.54 |
| | 1907.6 | 22.47 |
| HSDPA Subtest 2 | 1852.4 | 21.86 |
| | 1880 | 22.05 |
| | 1907.6 | 22.07 |
| HSDPA Subtest 3 | 1852.4 | 21.51 |
| | 1880 | 21.64 |
| | 1907.6 | 21.74 |
| HSDPA Subtest 4 | 1852.4 | 21.15 |
| | 1880 | 21.23 |
| | 1907.6 | 21.40 |
| HSUPA Subtest 1 | 1852.4 | 22.29 |
| | 1880 | 22.45 |
| | 1907.6 | 22.00 |
| HSUPA Subtest 2 | 1852.4 | 21.45 |
| | 1880 | 21.50 |
| | 1907.6 | 21.00 |
| HSUPA Subtest 3 | 1852.4 | 21.44 |
| | 1880 | 21.02 |
| | 1907.6 | 20.56 |
| HSUPA Subtest 4 | 1852.4 | 20.97 |
| | 1880 | 20.56 |
| | 1907.6 | 20.11 |
| HSUPA Subtest 5 | 1852.4 | 19.51 |
| | 1880 | 19.14 |
| | 1907.6 | 18.68 |

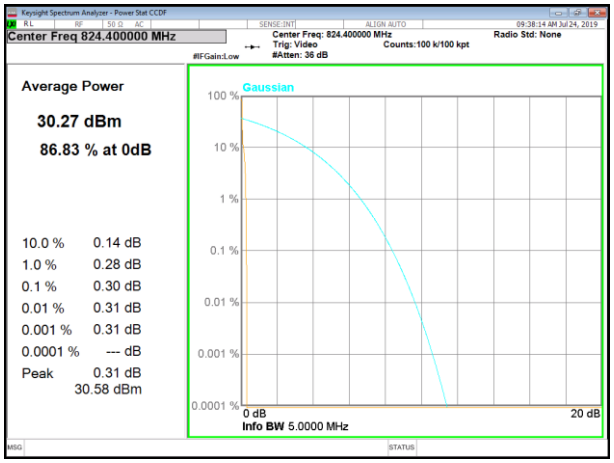
A2. PEAK-TO-AVERAGE RADIO

| GSM 850 | | |
|---|---|---|
| Mode | Frequency (MHz) | PAR |
| GSM 850 | 824.2 | 0.30 |
| | 836.6 | 0.27 |
| | 848.8 | 0.19 |
| GPRS 850 | 824.2 | 0.24 |
| | 836.6 | 0.13 |
| | 848.8 | 0.09 |
| EGPRS 850 | 824.2 | 2.77 |
| | 836.6 | 2.83 |
| | 848.8 | 2.72 |

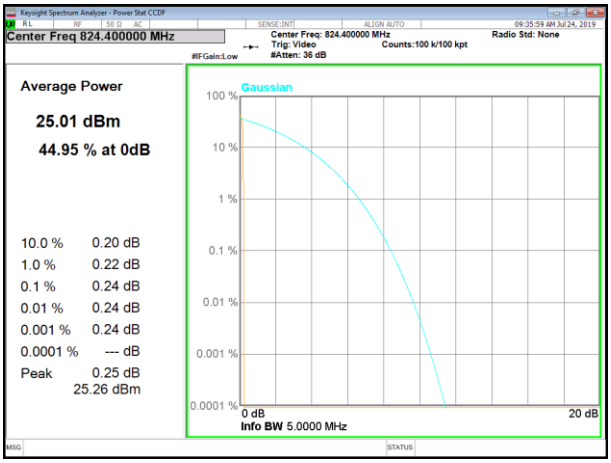
| PCS 1900 | | |
|---|---|---|
| Mode | Frequency (MHz) | PAR |
| PCS1900 | 1850.2 | 0.29 |
| | 1880 | 0.31 |
| | 1909.8 | 0.23 |
| GPRS1900 | 1850.2 | 0.12 |
| | 1880 | 0.13 |
| | 1909.8 | 0.12 |
| EGPRS1900 | 1850.2 | 2.80 |
| | 1880 | 2.92 |
| | 1909.8 | 2.93 |

| UMTS Band II | | |
|---|---|---|
| Mode | Frequency (MHz) | PAR |
| WCDMA 1900 RMC | 1852.4 | 2.83 |
| | 1880 | 2.70 |
| | 1907.6 | 2.57 |
| HSDPA 1900 | 1852.4 | 3.11 |
| | 1880 | 3.15 |
| | 1907.6 | 3.84 |
| HSUPA 1900 | 1852.4 | 3.20 |
| | 1880 | 3.65 |
| | 1907.6 | 3.93 |

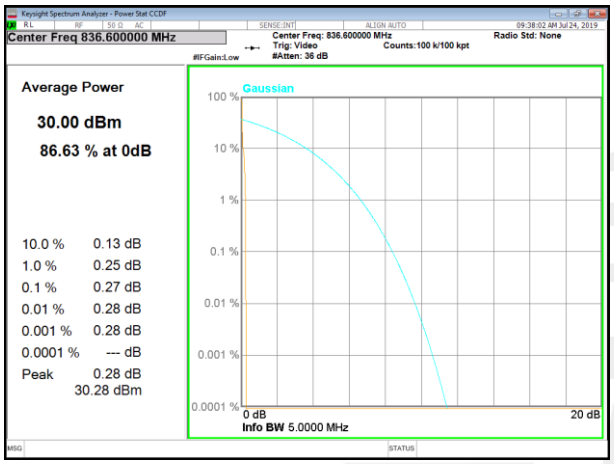
| UMTS Band V | | |
|---|---|---|
| Mode | Frequency (MHz) | PAR |
| WCDMA 850 RMC | 826.4 | 2.89 |
| | 836.6 | 3.27 |
| | 846.6 | 2.98 |
| HSDPA 850 | 826.4 | 3.26 |
| | 836.6 | 3.25 |
| | 846.6 | 3.49 |
| HSUPA 850 | 826.4 | 3.85 |
| | 836.6 | 3.34 |
| | 846.6 | 4.15 |



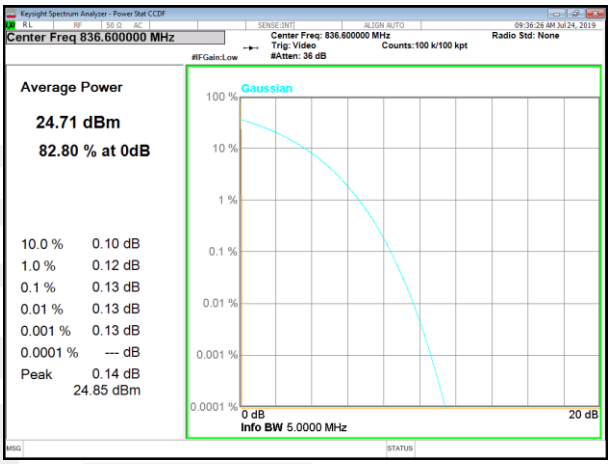

GSM850L




GPRS850L




GSM850M

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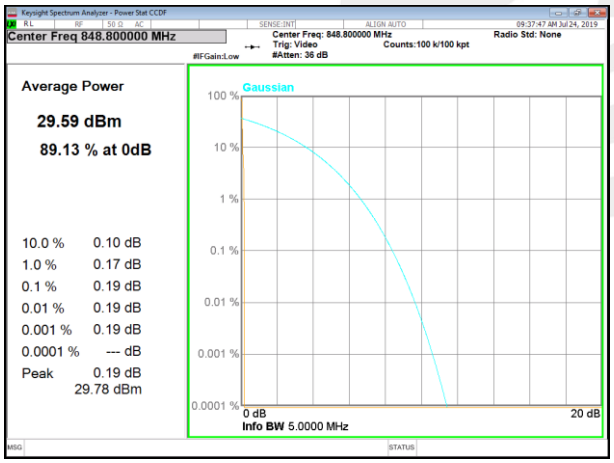
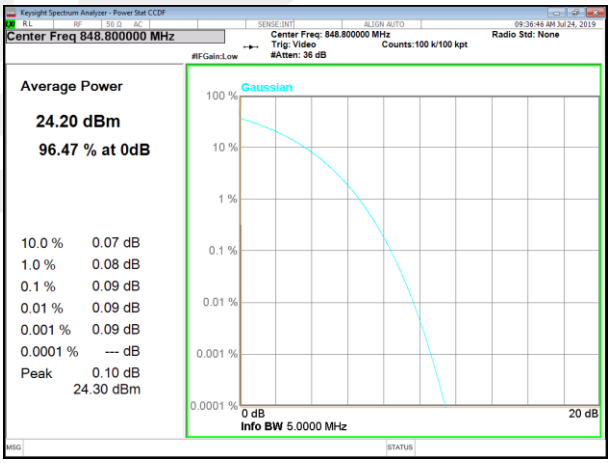



GSM850H

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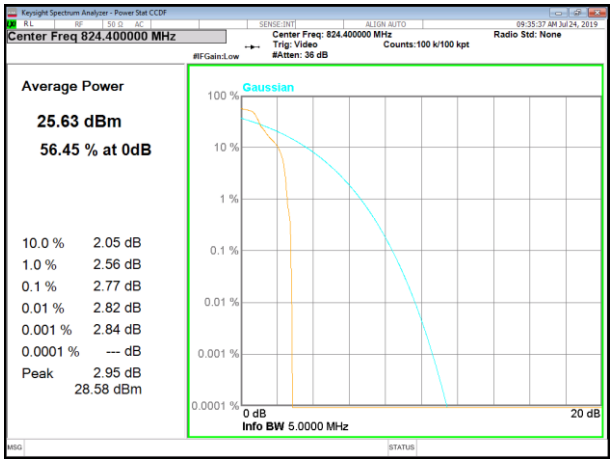


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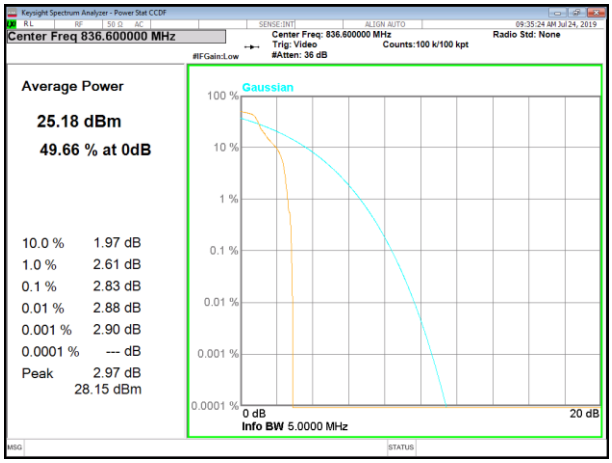


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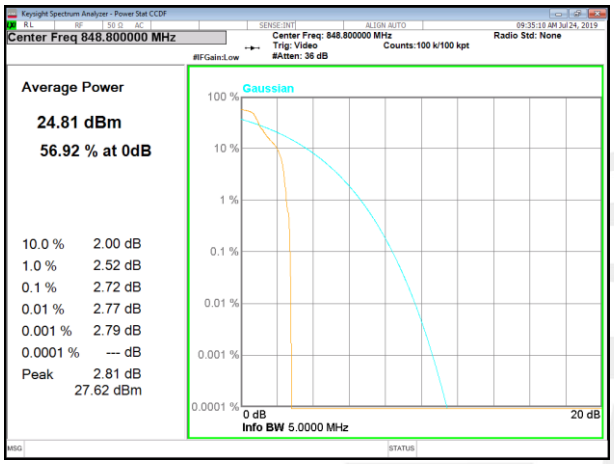


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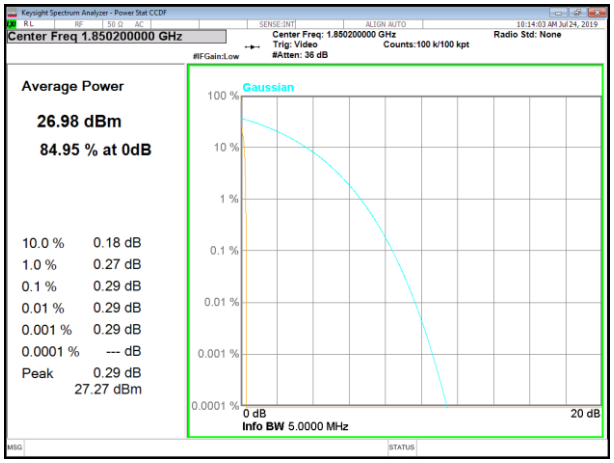
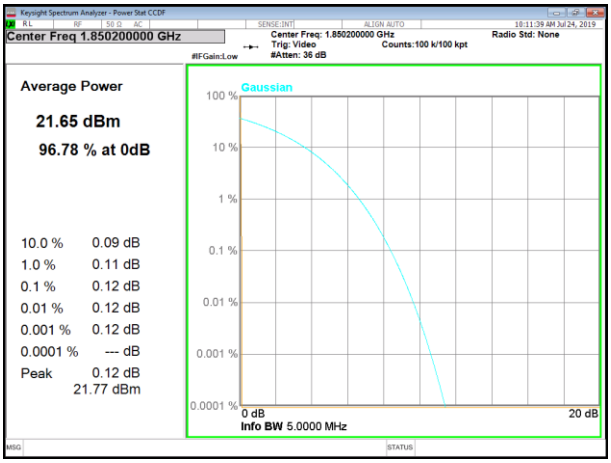



GSM1900L

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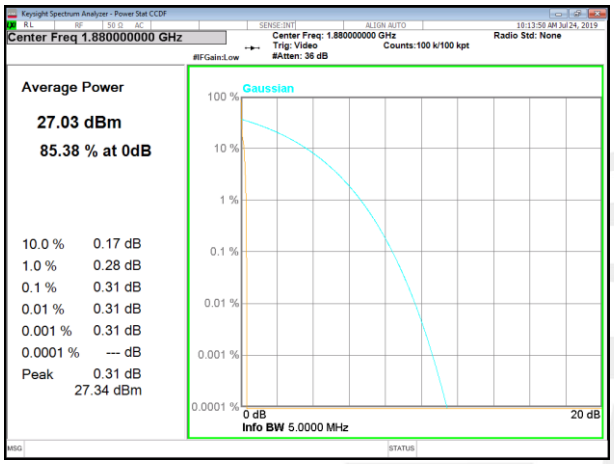
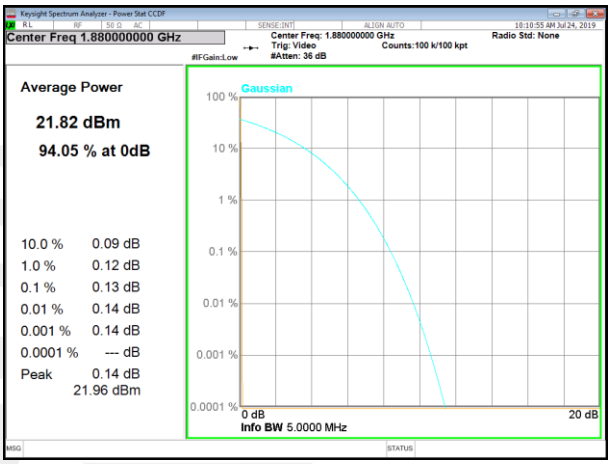
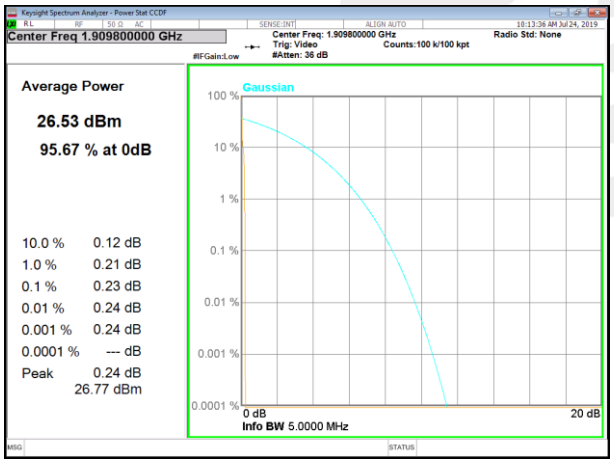


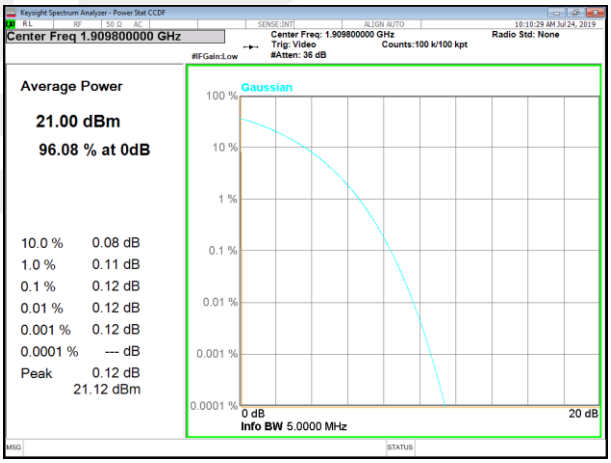

GSM1900M



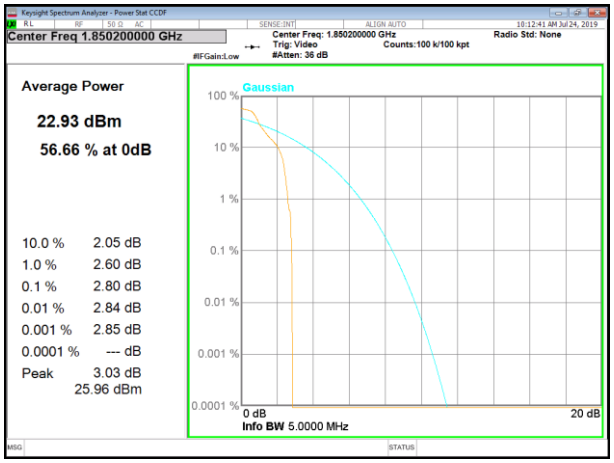

GPRS1900M




GSM1900H




GPRS1900H

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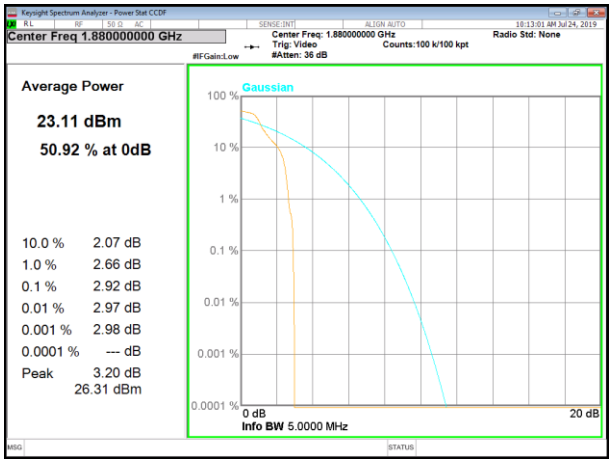


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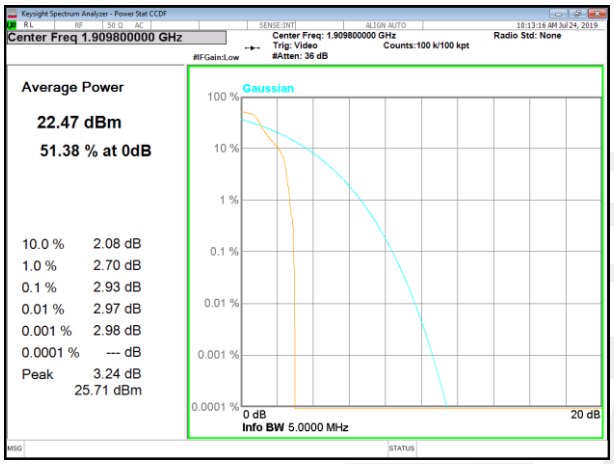
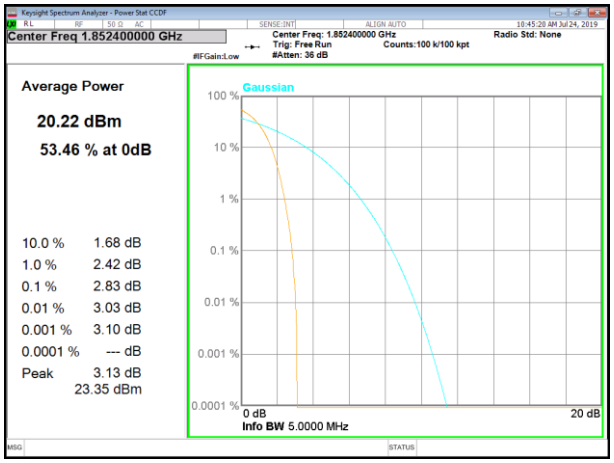
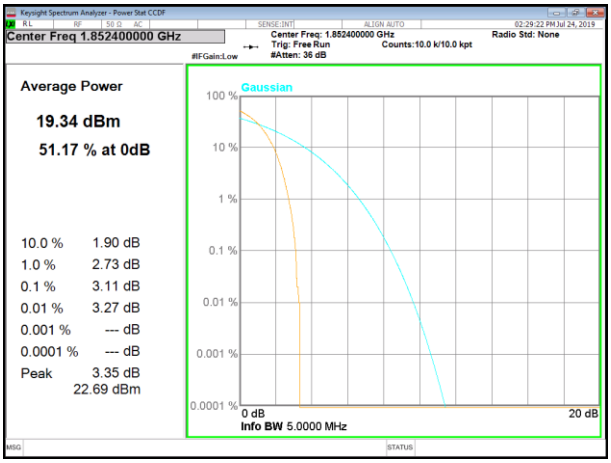


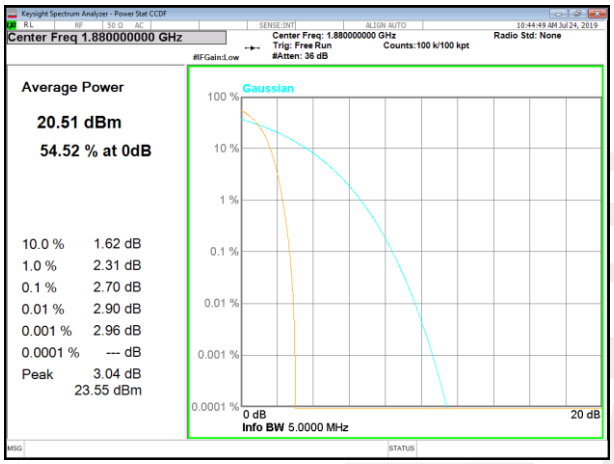

EGPRS1900H




WCDMA2L




HSDPA2L

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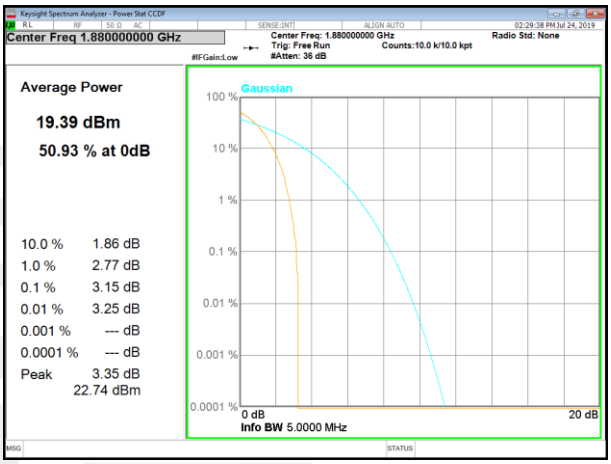


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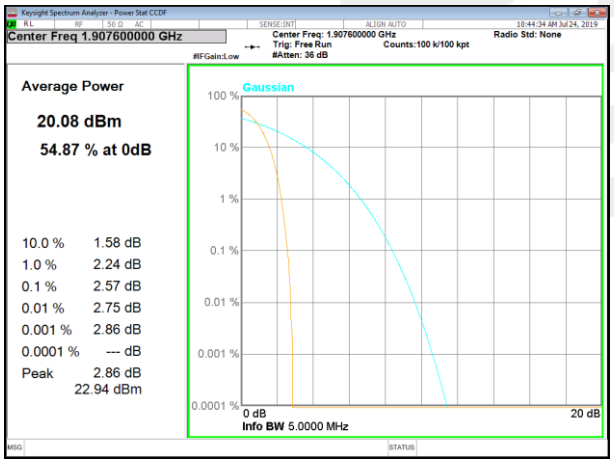
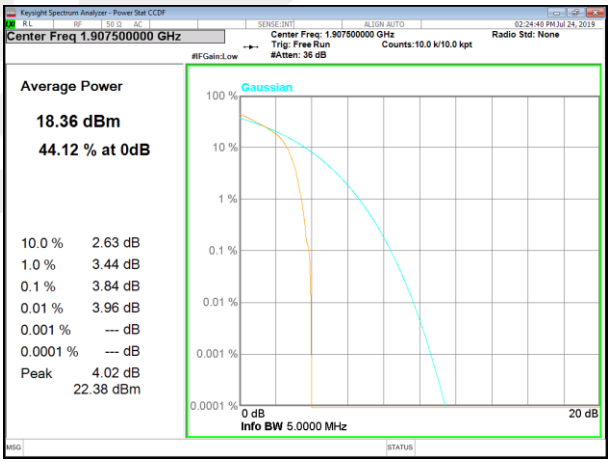



WCDMA2H

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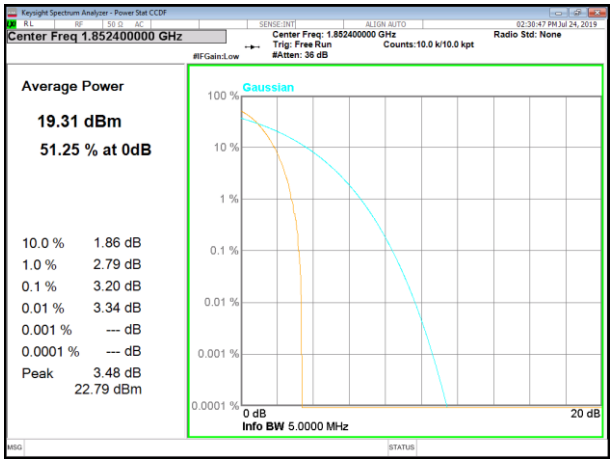
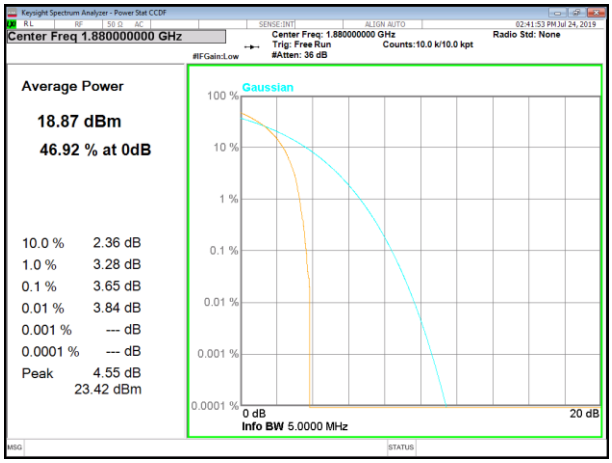
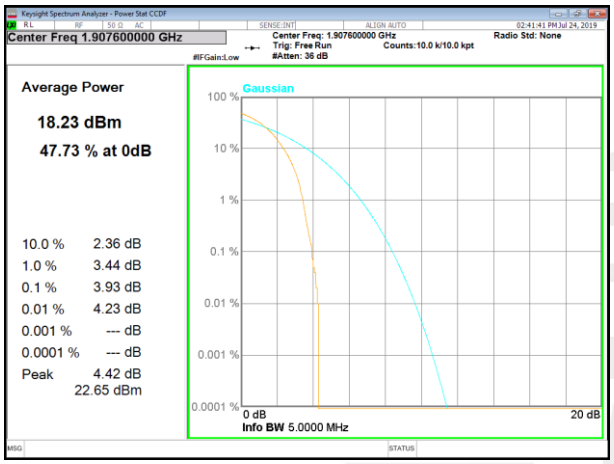


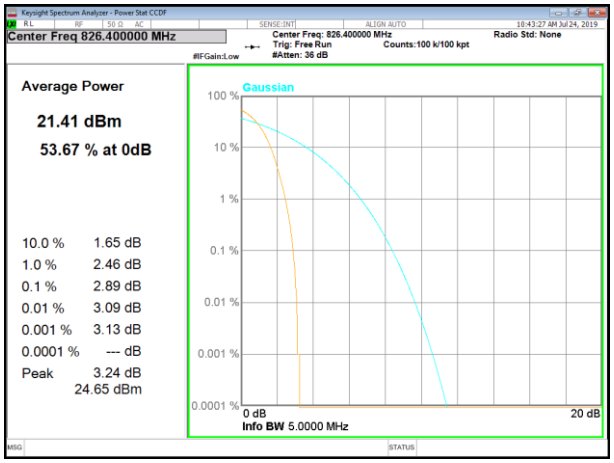

HSUPA2L



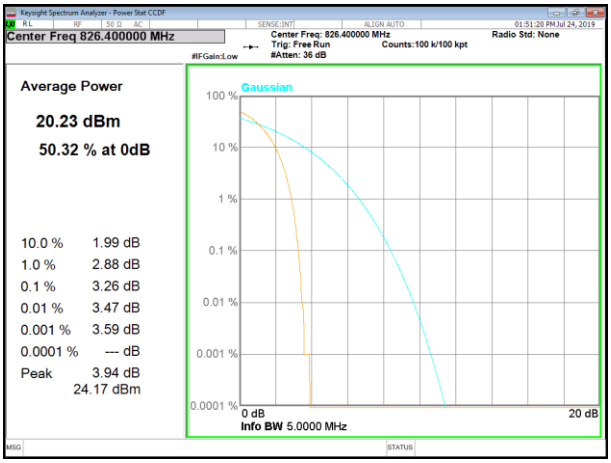

HSUPA2M



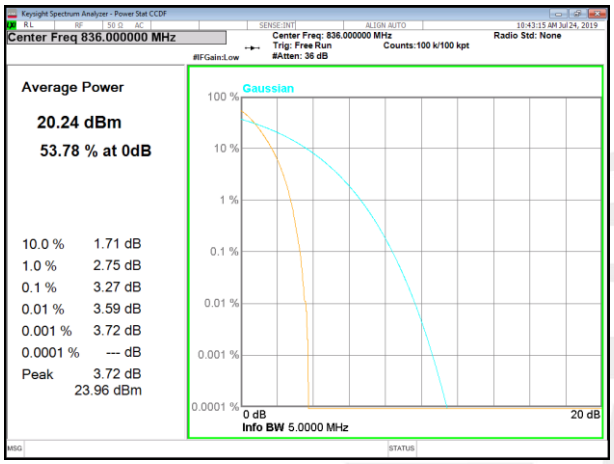

HSUPA2H



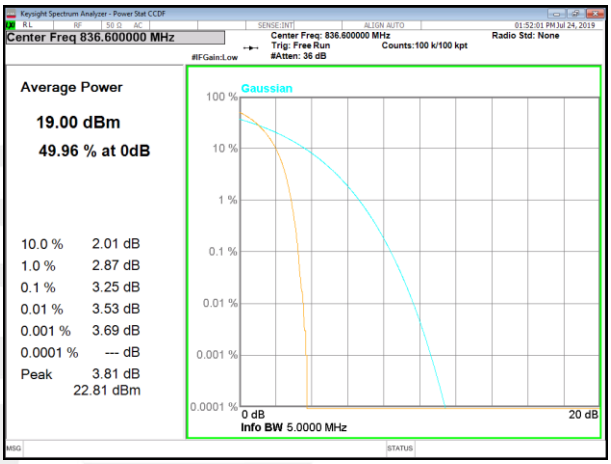

WCDMA5L



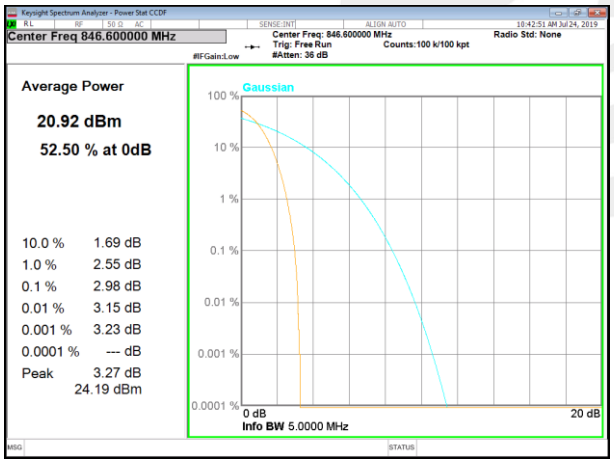

HSDPA5L



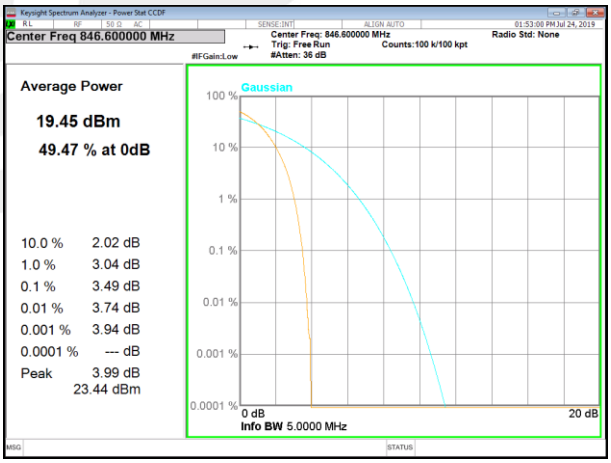

WCDMA5M



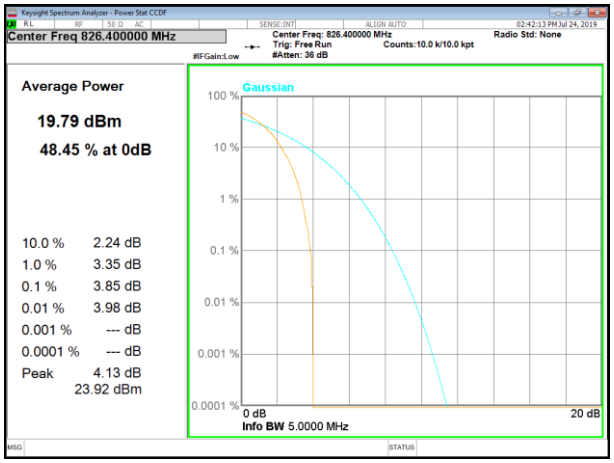

HSDPA5M



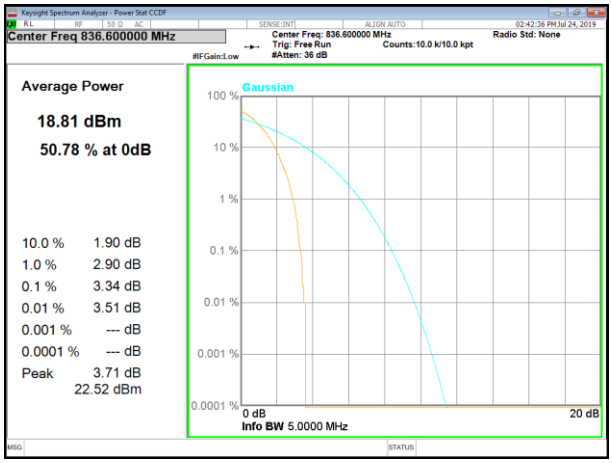

WCDMA5H



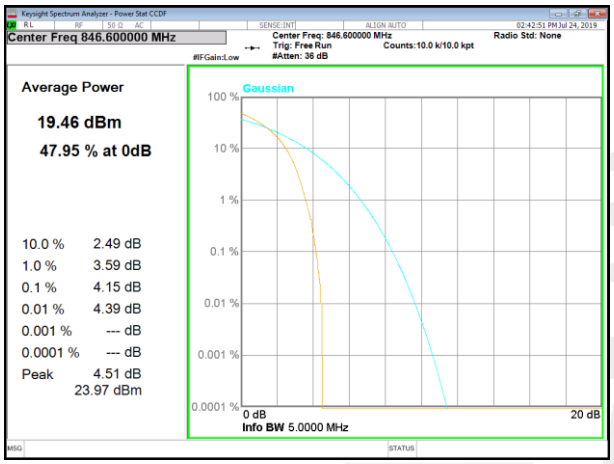

HSDPA5H




HSUPA5L




HSUPA5M




HSUPA5H

A3. TRANSMITTER RADIATED POWER (EIRP/ERP)

Note:Test is divided into three directions, X/Y/Z. X pattern for the worst

| Radiated Power (ERP) for GSM 850 MHz | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mode | Frequency | Result | | | | | Conclusion |
| | | S G.Level (dBm) | Cable loss | Gain(dBi) | PMeas E.R.P(dBm) | Polarization Of Max. ERP | |
| GSM850 | 824.2 | 23.10 | 0.44 | 6.5 | 29.16 | Horizontal | Pass |
| | 824.2 | 24.80 | 0.44 | 6.5 | **30.86** | Vertical | Pass |
| | 836.6 | 22.92 | 0.45 | 6.5 | 28.97 | Horizontal | Pass |
| | 836.6 | 24.70 | 0.45 | 6.5 | 30.75 | Vertical | Pass |
| | 848.8 | 22.45 | 0.46 | 6.5 | 28.49 | Horizontal | Pass |
| | 848.8 | 24.18 | 0.46 | 6.5 | 30.22 | Vertical | Pass |
| GPRS850 | 824.2 | 20.28 | 0.44 | 6.5 | 26.34 | Horizontal | Pass |
| | 824.2 | 22.41 | 0.44 | 6.5 | 28.47 | Vertical | Pass |
| | 836.6 | 21.15 | 0.45 | 6.5 | 27.20 | Horizontal | Pass |
| | 836.6 | 23.18 | 0.45 | 6.5 | **29.23** | Vertical | Pass |
| | 848.8 | 20.37 | 0.46 | 6.5 | 26.41 | Horizontal | Pass |
| | 848.8 | 22.54 | 0.46 | 6.5 | 28.58 | Vertical | Pass |
| EGPRS850 | 824.2 | 19.58 | 0.44 | 6.5 | 25.64 | Horizontal | Pass |
| | 824.2 | 21.62 | 0.44 | 6.5 | 27.68 | Vertical | Pass |
| | 836.6 | 19.17 | 0.45 | 6.5 | 25.22 | Horizontal | Pass |
| | 836.6 | 21.41 | 0.45 | 6.5 | 27.46 | Vertical | Pass |
| | 848.8 | 19.87 | 0.46 | 6.5 | 25.91 | Horizontal | Pass |
| | 848.8 | 21.99 | 0.46 | 6.5 | **28.03** | Vertical | Pass |
| Limit | E.R.P＜7W=38.45dBm | | | | | | |

| Radiated Power (EIRP) for PCS 1900 MHz | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mode | Frequency | Result | | | | | Conclusion |
| | | S G.Level (dBm) | Cable loss | Gain (dBi) | PMeas E.I.R.P(dBm) | Polarization Of Max. EIRP | |
| PCS1900 | 1850.2 | 17.97 | 2.41 | 10.35 | 25.91 | Horizontal | Pass |
| | 1850.2 | 19.75 | 2.41 | 10.35 | 27.69 | Vertical | Pass |
| | 1880 | 18.07 | 2.42 | 10.35 | 26.00 | Horizontal | Pass |
| | 1880 | 19.96 | 2.42 | 10.35 | **27.89** | Vertical | Pass |
| | 1909.8 | 17.34 | 2.43 | 10.35 | 25.26 | Horizontal | Pass |
| | 1909.8 | 19.16 | 2.43 | 10.35 | 27.08 | Vertical | Pass |
| GPRS1900 | 1850.2 | 14.76 | 2.41 | 10.35 | 22.70 | Horizontal | Pass |
| | 1850.2 | 16.81 | 2.41 | 10.35 | 24.75 | Vertical | Pass |
| | 1880 | 14.37 | 2.42 | 10.35 | 22.30 | Horizontal | Pass |
| | 1880 | 16.83 | 2.42 | 10.35 | 24.76 | Vertical | Pass |
| | 1909.8 | 15.2 | 2.43 | 10.35 | 23.12 | Horizontal | Pass |
| | 1909.8 | 17.22 | 2.43 | 10.35 | **25.14** | Vertical | Pass |
| EGPRS1900 | 1850.2 | 13.25 | 2.41 | 10.35 | 21.19 | Horizontal | Pass |
| | 1850.2 | 15.38 | 2.41 | 10.35 | 23.32 | Vertical | Pass |
| | 1880 | 13.5 | 2.42 | 10.35 | 21.43 | Horizontal | Pass |
| | 1880 | 15.64 | 2.42 | 10.35 | **23.57** | Vertical | Pass |
| | 1909.8 | 12.84 | 2.43 | 10.35 | 20.76 | Horizontal | Pass |
| | 1909.8 | 15.08 | 2.43 | 10.35 | 23.00 | Vertical | Pass |
| Limit | EIRP<2W=33dBm | | | | | | |

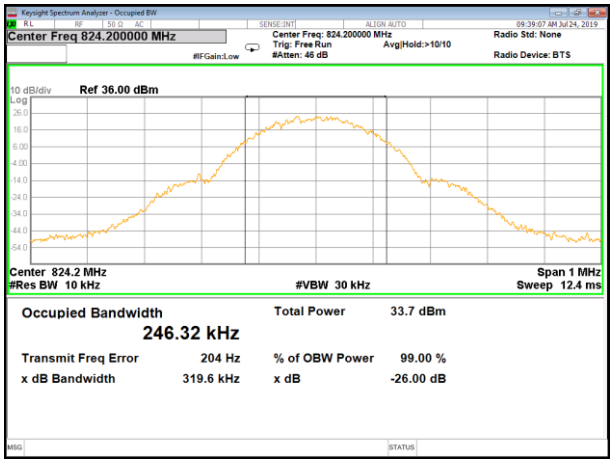
| Radiated Power (ERP) for WCDMA Band V | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mode | Frequency | Result | | | | | Conclusion |
| | | S G.Level (dBm) | Cable loss | Gain (dBi) | PMeas E.R.P(dBm) | Polarization Of Max. ERP | |
| WCDMA | 826.4 | 14.45 | 0.44 | 6.5 | 20.51 | Horizontal | Pass |
| | 826.4 | 16.25 | 0.44 | 6.5 | 22.31 | Vertical | Pass |
| | 836.6 | 14.52 | 0.45 | 6.5 | 20.57 | Horizontal | Pass |
| | 836.6 | 16.22 | 0.45 | 6.5 | 22.27 | Vertical | Pass |
| | 846.4 | 14.49 | 0.46 | 6.5 | 20.53 | Horizontal | Pass |
| | 846.4 | 16.46 | 0.46 | 6.5 | **22.50** | Vertical | Pass |
| HSUPA | 826.4 | 13.74 | 0.44 | 6.5 | 19.80 | Horizontal | Pass |
| | 826.4 | 15.68 | 0.44 | 6.5 | 21.74 | Vertical | Pass |
| | 836.6 | 14.13 | 0.45 | 6.5 | 20.18 | Horizontal | Pass |
| | 836.6 | 16.01 | 0.45 | 6.5 | 22.06 | Vertical | Pass |
| | 846.4 | 14.15 | 0.46 | 6.5 | 20.19 | Horizontal | Pass |
| | 846.4 | 16.12 | 0.46 | 6.5 | **22.16** | Vertical | Pass |
| HSDPA | 826.4 | 13.80 | 0.44 | 6.5 | 19.86 | Horizontal | Pass |
| | 826.4 | 15.76 | 0.44 | 6.5 | 21.82 | Vertical | Pass |
| | 836.6 | 14.27 | 0.45 | 6.5 | 20.32 | Horizontal | Pass |
| | 836.6 | 16.01 | 0.45 | 6.5 | **22.06** | Vertical | Pass |
| | 846.4 | 13.87 | 0.46 | 6.5 | 19.91 | Horizontal | Pass |
| | 846.4 | 15.65 | 0.46 | 6.5 | 21.69 | Vertical | Pass |
| Limit | E.R.P＜7W=38.45dBm | | | | | | |

| Radiated Power (EIRP) for WCDMA Band II | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mode | Frequency | Result | | | | | Conclusion |
| | | S G.Level (dBm) | Cable loss | Gain (dBi) | PMeas E.I.R.P.(dBm) | Polarization Of Max. EIRP | |
| WCDMA | 1852.4 | 12.43 | 2.41 | 10.35 | 20.37 | Horizontal | Pass |
| | 1852.4 | 14.39 | 2.41 | 10.35 | 22.33 | Vertical | Pass |
| | 1880 | 12.54 | 2.42 | 10.35 | 20.47 | Horizontal | Pass |
| | 1880 | 14.31 | 2.42 | 10.35 | 22.24 | Vertical | Pass |
| | 1907.4 | 12.83 | 2.43 | 10.35 | 20.75 | Horizontal | Pass |
| | 1907.4 | 14.62 | 2.43 | 10.35 | **22.54** | Vertical | Pass |
| HSUPA | 1852.4 | 11.77 | 2.41 | 10.35 | 19.71 | Horizontal | Pass |
| | 1852.4 | 13.75 | 2.41 | 10.35 | 21.69 | Vertical | Pass |
| | 1880 | 12.16 | 2.42 | 10.35 | 20.09 | Horizontal | Pass |
| | 1880 | 14.1 | 2.42 | 10.35 | **22.03** | Vertical | Pass |
| | 1907.4 | 11.91 | 2.43 | 10.35 | 19.83 | Horizontal | Pass |
| | 1907.4 | 13.75 | 2.43 | 10.35 | 21.67 | Vertical | Pass |
| HSDPA | 1852.4 | 11.86 | 2.41 | 10.35 | 19.80 | Horizontal | Pass |
| | 1852.4 | 13.66 | 2.41 | 10.35 | 21.60 | Vertical | Pass |
| | 1880 | 12.05 | 2.42 | 10.35 | 19.98 | Horizontal | Pass |
| | 1880 | 13.78 | 2.42 | 10.35 | **21.71** | Vertical | Pass |
| | 1907.4 | 11.45 | 2.43 | 10.35 | 19.37 | Horizontal | Pass |
| | 1907.4 | 13.32 | 2.43 | 10.35 | 21.24 | Vertical | Pass |
| Limit | E.I.R.P＜2W=33dBm | | | | | | |

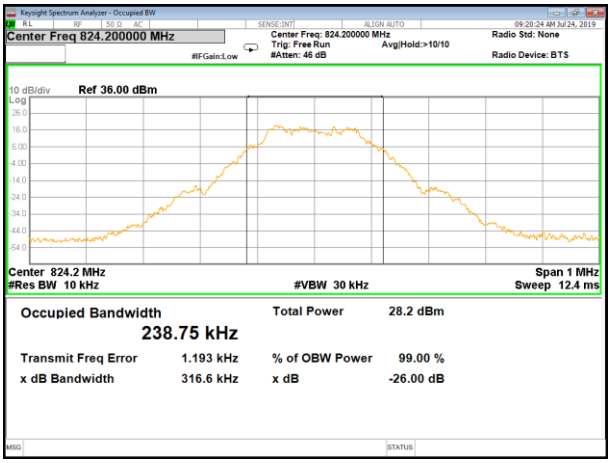
A4. OCCUPIED BANDWIDTH (99% OCCUPIED BANDWIDTH/26dB BANDWIDTH)

| GSM Bandwidth [KHz] | | | | | | |
|---|---|---|---|---|---|---|
| Mod | Lowest | | Middle | | Highest | |
| | 99% BW | 26dB BW | 99% BW | 26dB BW | 99% BW | 26dB BW |
| GSM850 | 246.32 | 319.6 | 246.01 | 319.3 | 245.71 | 318.6 |
| GSM1900 | 243.52 | 312.8 | 248.52 | 319.5 | 244.68 | 319.5 |
| GPRS850 | 238.75 | 316.6 | 240.46 | 319.4 | 239.35 | 316 |
| GPRS1900 | 240.56 | 320.1 | 241.8 | 311.7 | 243.13 | 315.9 |
| EGPRS850 | 241.35 | 300.6 | 243.75 | 305.6 | 241.74 | 302.3 |
| EGPRS1900 | 240.89 | 285.2 | 242.46 | 294.4 | 243.79 | 299.5 |

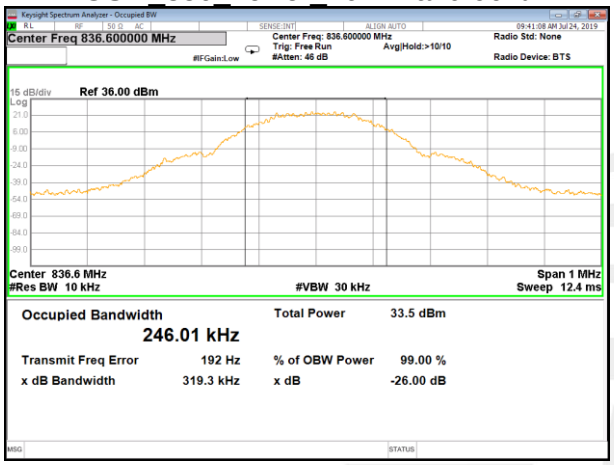
| WCDMA Bandwidth [KHz] | | | | | | |
|---|---|---|---|---|---|---|
| Mod | Lowest | | Middle | | Highest | |
| | 99% BW | 26dB BW | 99% BW | 26dB BW | 99% BW | 26dB BW |
| WCDMA2 | 4.152 | 4.667 | 4.151 | 4.674 | 4.156 | 4.673 |
| WCDMA5 | 4.143 | 4.674 | 4.16 | 4.667 | 4.147 | 4.649 |
| HSDPA2 | 4.158 | 4.649 | 4.157 | 4.665 | 4.159 | 4.67 |
| HSDPA5 | 4.15 | 4.65 | 4.151 | 4.667 | 4.149 | 4.649 |
| HSUPA2 | 4.155 | 4.648 | 4.156 | 4.672 | 4.151 | 4.676 |
| HSUPA5 | 4.143 | 4.664 | 4.161 | 4.665 | 4.146 | 4.651 |



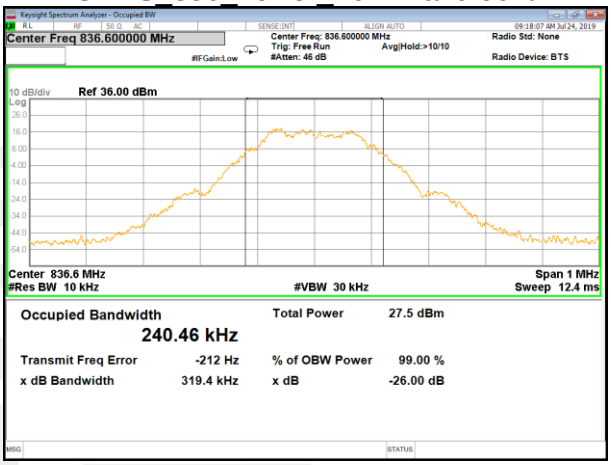

GSM_850_Lower_26BW and 99%



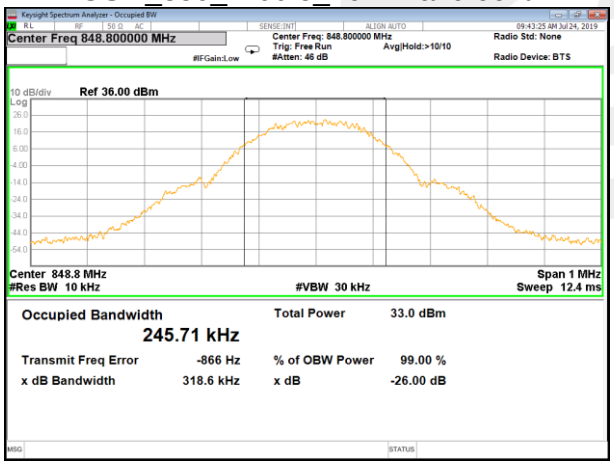

GPRS_850_Lower_26BW and 99%



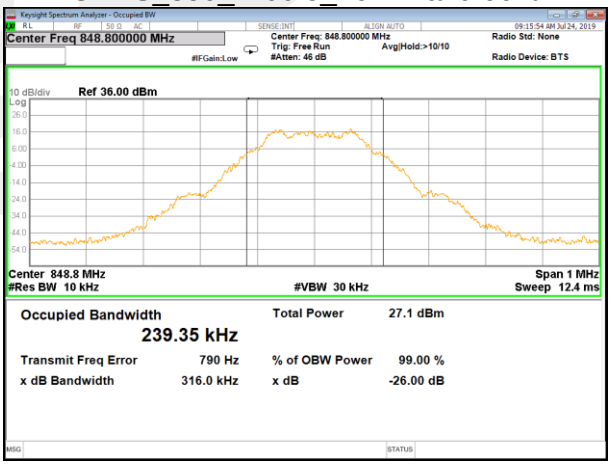

GSM_850_Middle_26BW and 99%



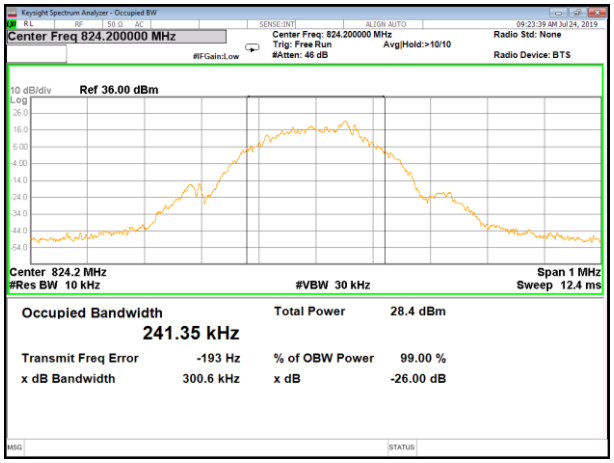

GPRS_850_Middle_26BW and 99%



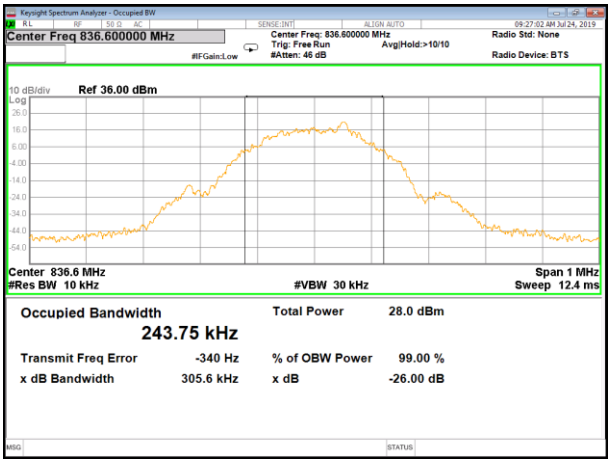

GSM_850_Higher_26BW and 99%



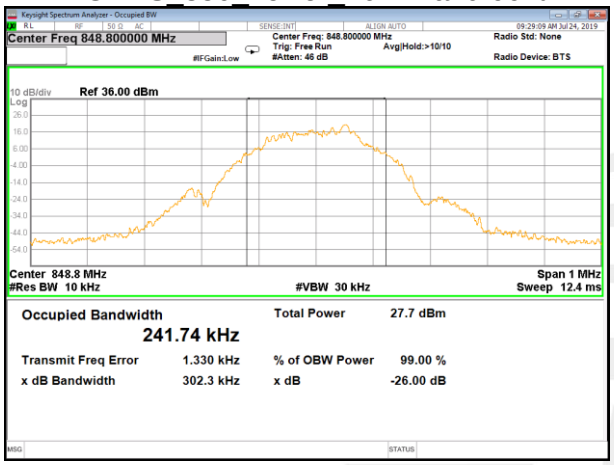

GPRS_850_Higher_26BW and 99%



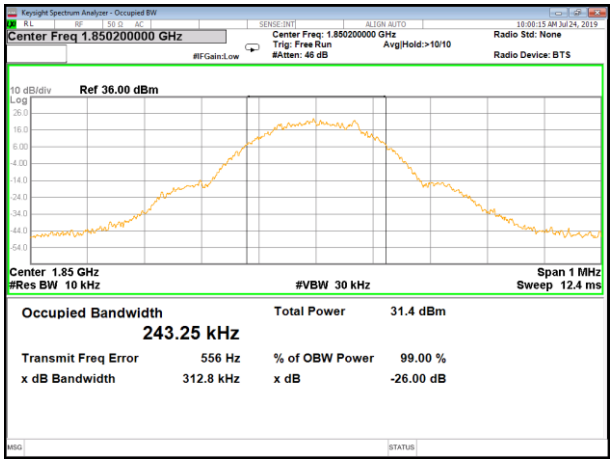

EGPRS_850_Lower_26BW and 99%



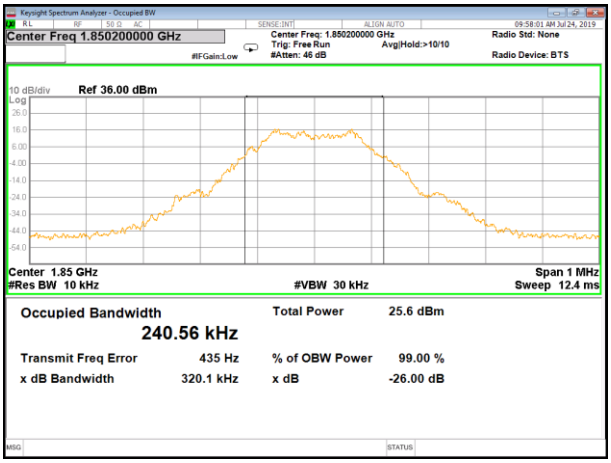

EGPRS_850_Middle_26BW and 99%



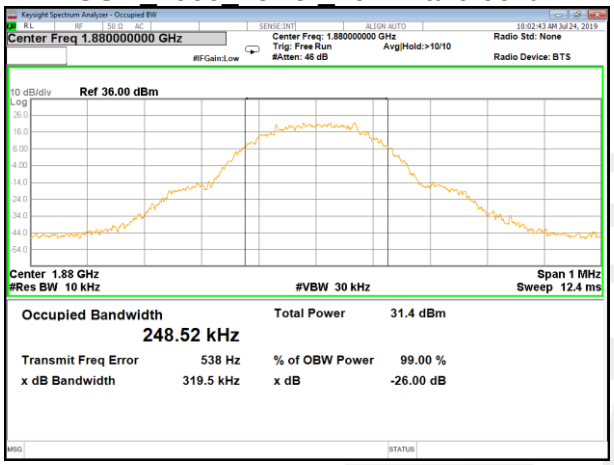

EGPRS_850_Higher_26BW and 99%



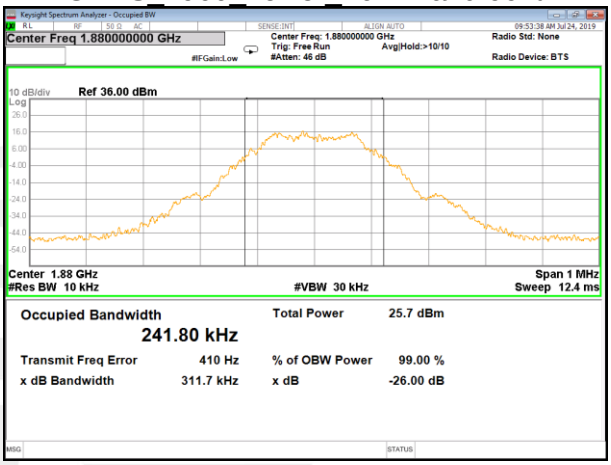

GSM_1900_Lower_26BW and 99%



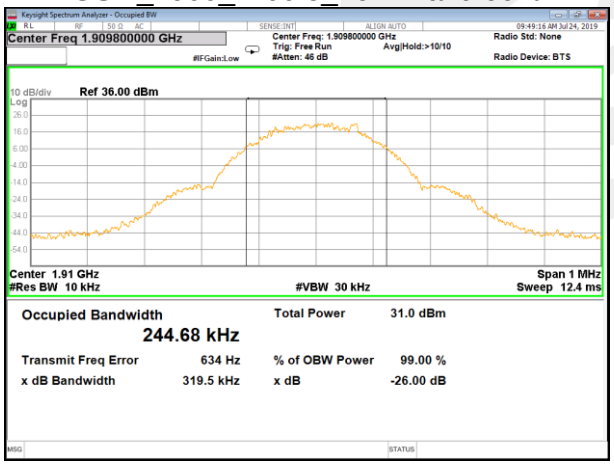

GPRS_1900_Lower_26BW and 99%



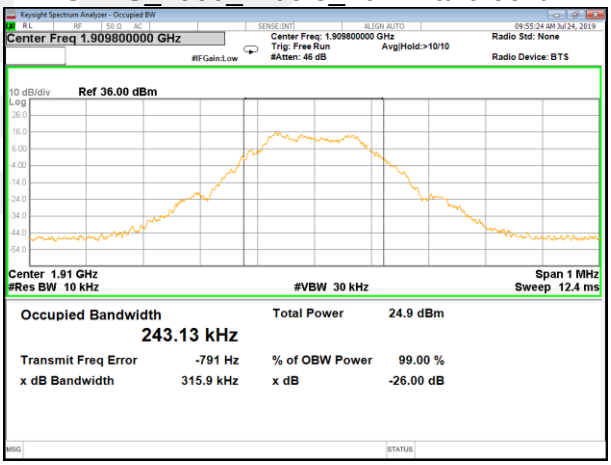

GSM_1900_Middle_26BW and 99%



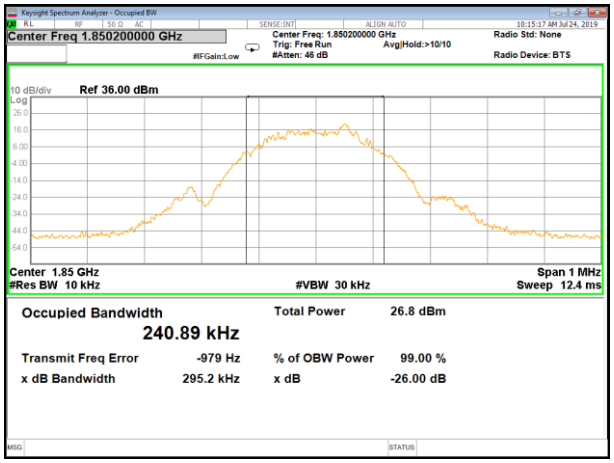

GPRS_1900_Middle_26BW and 99%



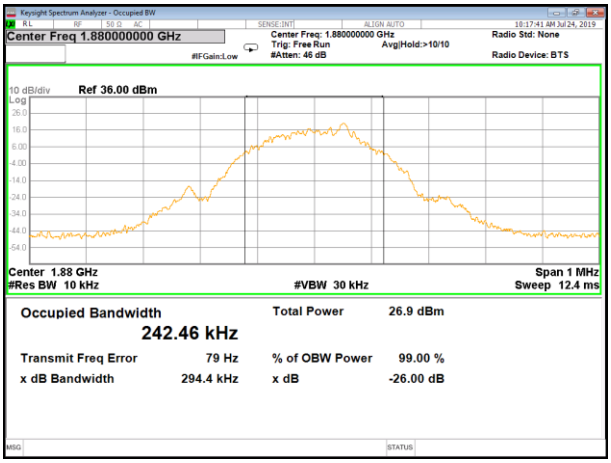

GSM_1900_Higher_26BW and 99%



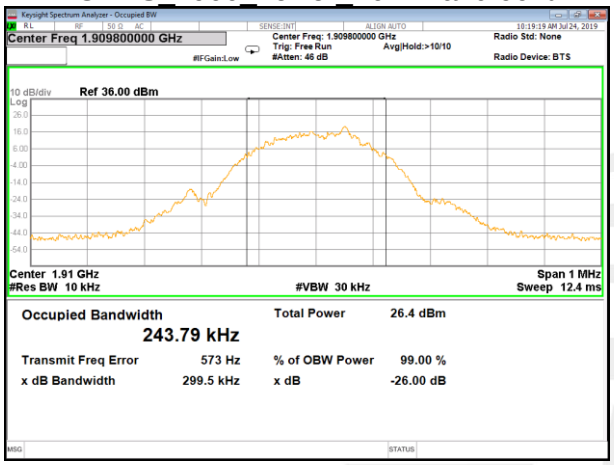

GPRS_1900_Higher_26BW and 99%



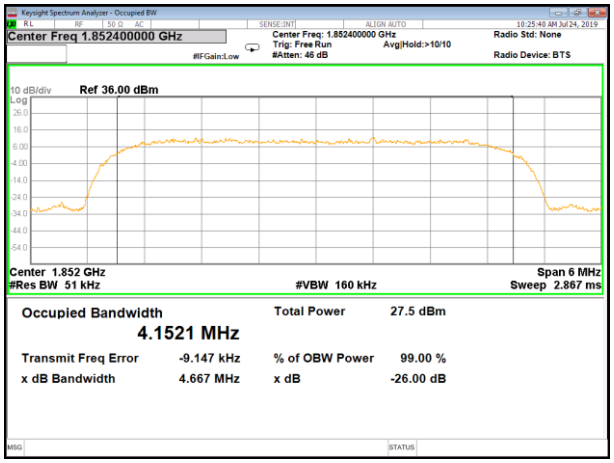

EGPRS_1900_Lower_26BW and 99%



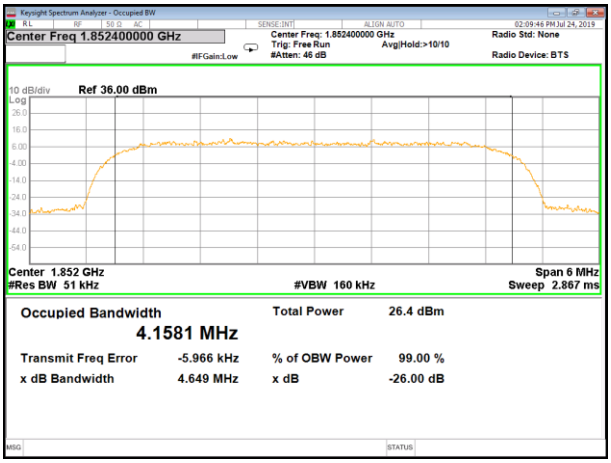

EGPRS_1900_Middle_26BW and 99%



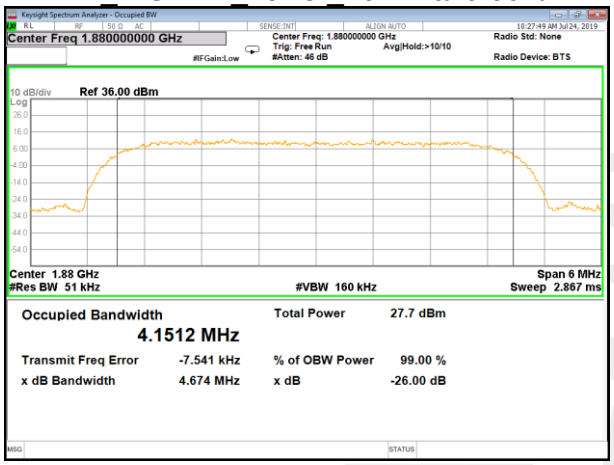

EGPRS_1900_Higher_26BW and 99%



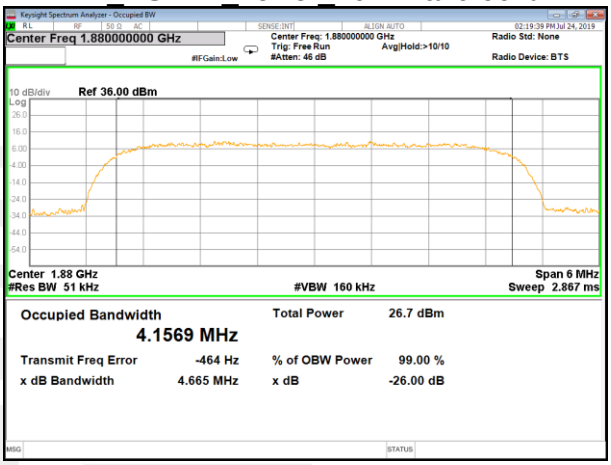

B2_WCDMA_Lower_26BW and 99%



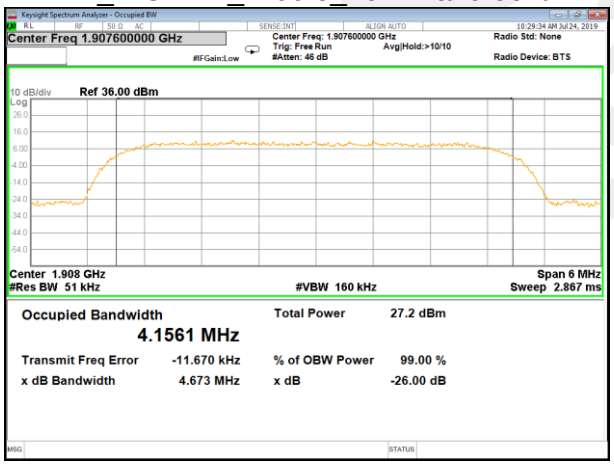

B2_HSDPA_Lower_26BW and 99%



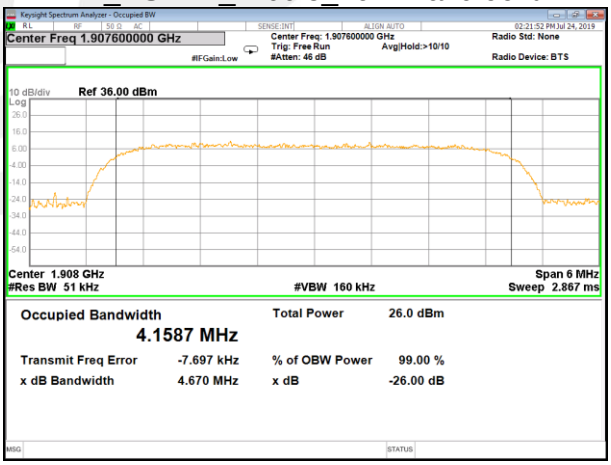

B2_WCDMA_Middle_26BW and 99%



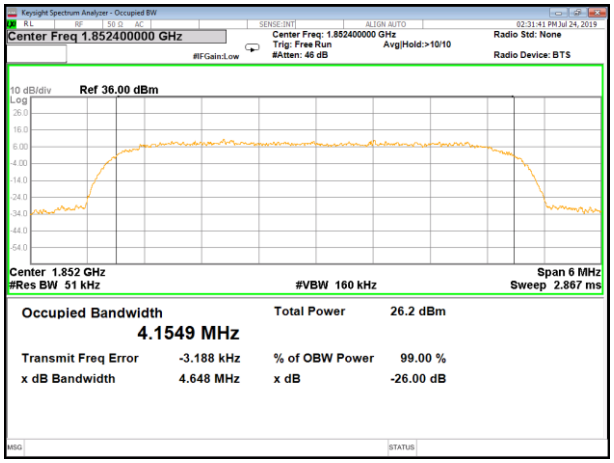

B2_HSDPA_Middle_26BW and 99%



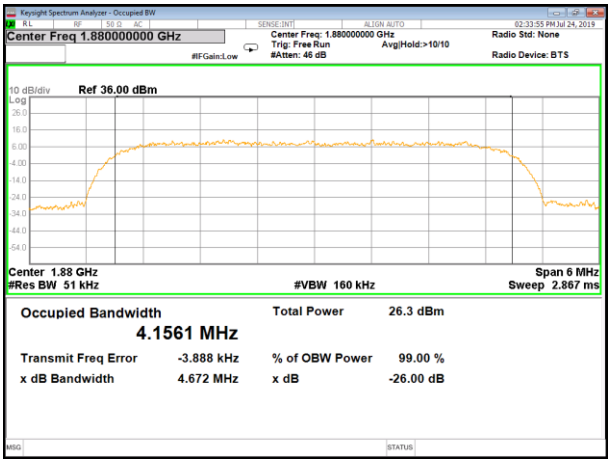

B2_WCDMA_Higher_26BW and 99%



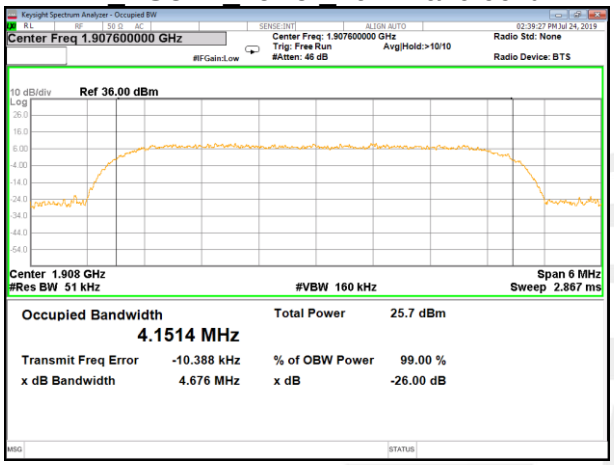

B2_HSDPA_Higher_26BW and 99%



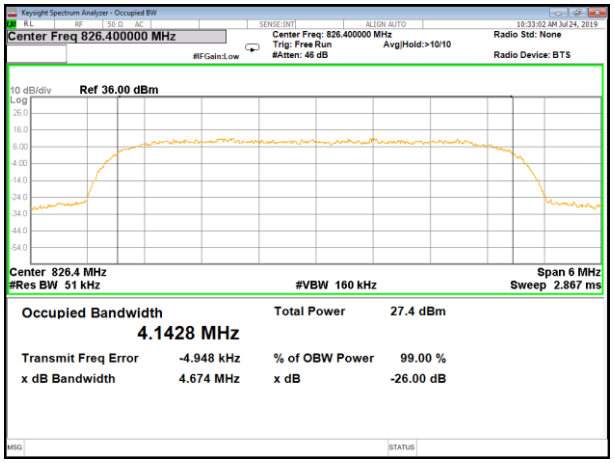

B2_HSUPA_Lower_26BW and 99%



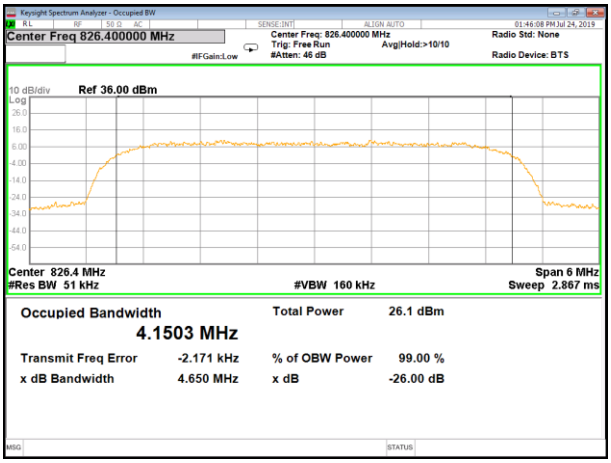

B2_HSUPA_Middle_26BW and 99%



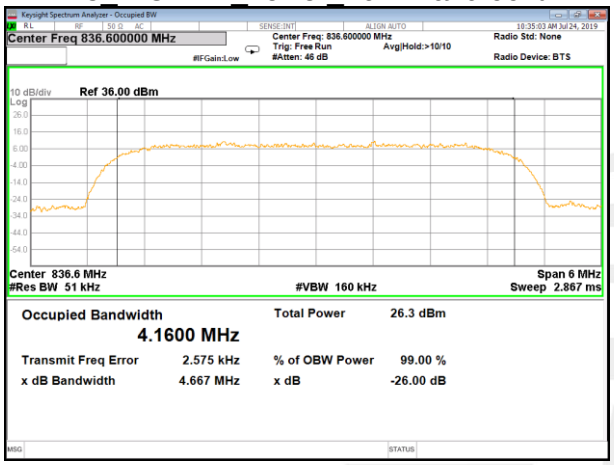

B2_HSUPA_Higher_26BW and 99%



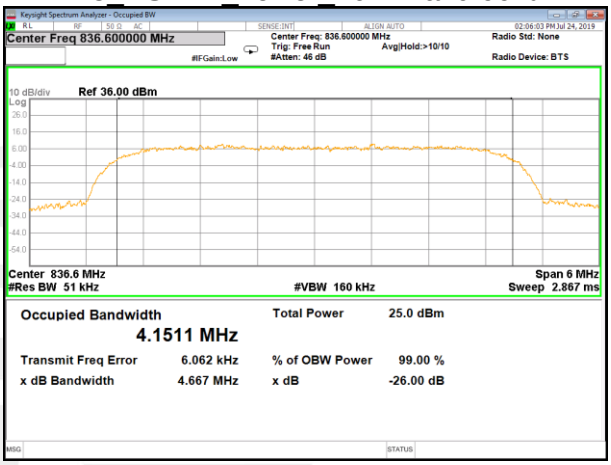

B5_WCDMA_Lower_26BW and 99%



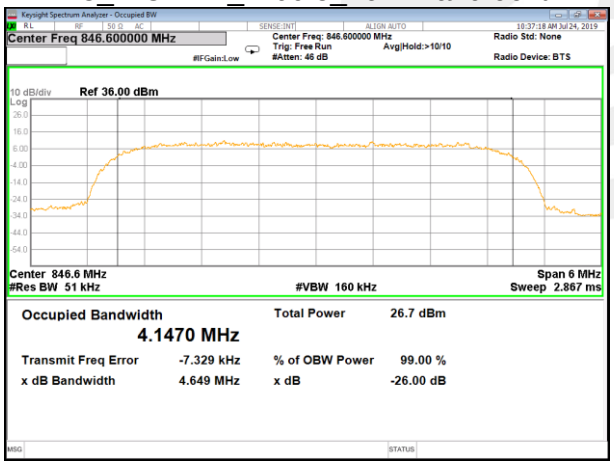

B5_HSDPA_Lower_26BW and 99%



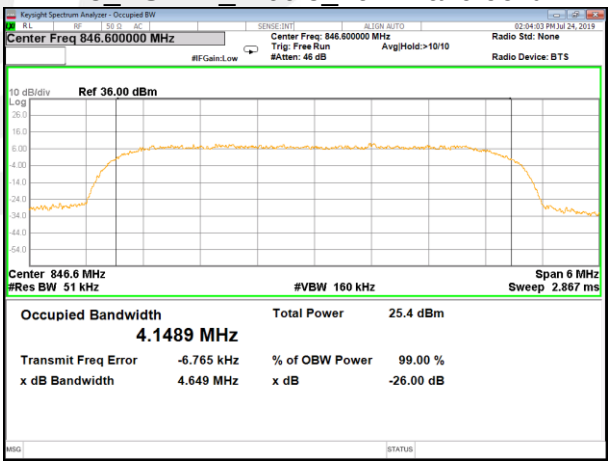

B5_WCDMA_Middle_26BW and 99%



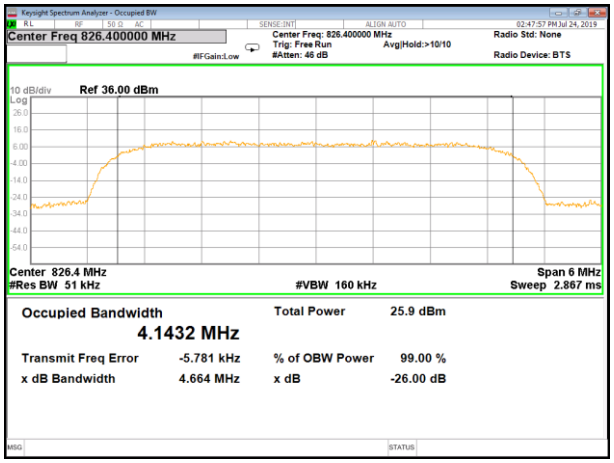

B5_HSDPA_Middle_26BW and 99%



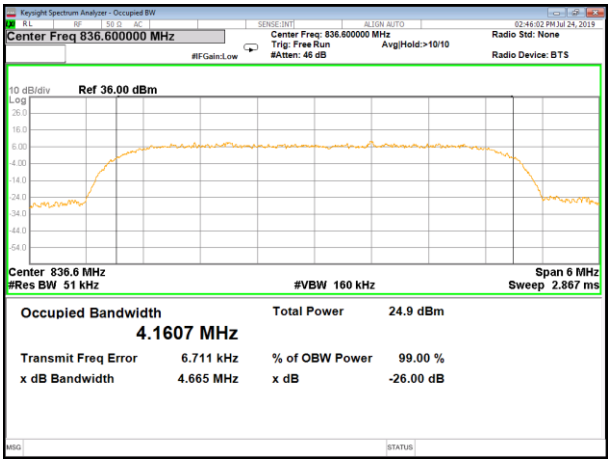

B5_WCDMA_Higher_26BW and 99%



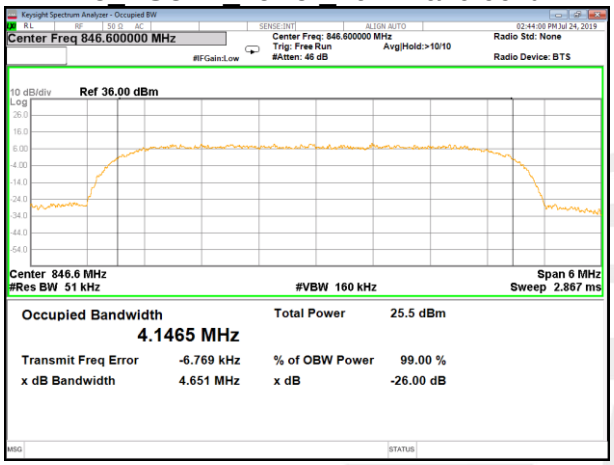

B5_HSDPA_Higher_26BW and 99%




B5_HSUPA_Lower_26BW and 99%




B5_HSUPA_Middle_26BW and 99%




B5_HSUPA_Higher_26BW and 99%

A5.FREQUENCY STABILITY

Normal Voltage = ${Nor.}; Battery End Point (BEP) = 3.45V; Maximum Voltage =4.4V

| GSM 850 /836.6MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 14.38 | 0.017 | 2.5ppm | PASS |
| 40 | | 29.46 | 0.035 | | |
| 30 | | 26.07 | 0.031 | | |
| 20 | | 34.64 | 0.041 | | |
| 10 | | 19.35 | 0.023 | | |
| 0 | | 27.48 | 0.033 | | |
| -10 | | 33.03 | 0.039 | | |
| -20 | | 34.45 | 0.041 | | |
| -30 | | 12.43 | 0.015 | | |
| 25 | Maximum Voltage | 26.27 | 0.031 | | |
| 25 | BEP | 22.93 | 0.027 | | |

| GPRS 850 /836.6MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 27.73 | 0.033 | 2.5ppm | PASS |
| 40 | | 32.50 | 0.039 | | |
| 30 | | 13.68 | 0.016 | | |
| 20 | | 29.06 | 0.035 | | |
| 10 | | 14.29 | 0.017 | | |
| 0 | | 16.01 | 0.019 | | |
| -10 | | 24.31 | 0.029 | | |
| -20 | | 28.66 | 0.034 | | |
| -30 | | 18.91 | 0.023 | | |
| 25 | Maximum Voltage | 23.65 | 0.028 | | |
| 25 | BEP | 34.09 | 0.041 | | |

| EGPRS 850 /836.6MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 18.72 | 0.022 | 2.5ppm | PASS |
| 40 | | 21.39 | 0.026 | | |
| 30 | | 36.18 | 0.043 | | |
| 20 | | 11.62 | 0.014 | | |
| 10 | | 12.33 | 0.015 | | |
| 0 | | 15.46 | 0.018 | | |
| -10 | | 15.08 | 0.018 | | |
| -20 | | 12.76 | 0.015 | | |
| -30 | | 17.26 | 0.021 | | |
| 25 | Maximum Voltage | 11.51 | 0.014 | | |
| 25 | BEP | 22.09 | 0.026 | | |

| GSM 1900 / 1880MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 27.25 | 0.014 | Within Authorized Band | PASS |
| 40 | | 20.04 | 0.011 | | |
| 30 | | 30.85 | 0.016 | | |
| 20 | | 26.51 | 0.014 | | |
| 10 | | 22.77 | 0.012 | | |
| 0 | | 27.82 | 0.015 | | |
| -10 | | 22.29 | 0.012 | | |
| -20 | | 22.26 | 0.012 | | |
| -30 | | 26.56 | 0.014 | | |
| 25 | Maximum Voltage | 25.64 | 0.014 | | |
| 25 | BEP | 12.56 | 0.007 | | |

| GPRS 1900 / 1880MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 14.67 | 0.008 | Within Authorized Band | PASS |
| 40 | | 30.24 | 0.016 | | |
| 30 | | 12.08 | 0.006 | | |
| 20 | | 21.91 | 0.012 | | |
| 10 | | 14.61 | 0.008 | | |
| 0 | | 15.24 | 0.008 | | |
| -10 | | 27.75 | 0.015 | | |
| -20 | | 15.35 | 0.008 | | |
| -30 | | 17.94 | 0.010 | | |
| 25 | Maximum Voltage | 28.68 | 0.015 | | |
| 25 | BEP | 19.30 | 0.010 | | |

| EGPRS 1900 / 1880MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 35.45 | 0.019 | Within Authorized Band | PASS |
| 40 | | 11.79 | 0.006 | | |
| 30 | | 26.54 | 0.014 | | |
| 20 | | 24.00 | 0.013 | | |
| 10 | | 15.11 | 0.008 | | |
| 0 | | 11.57 | 0.006 | | |
| -10 | | 21.30 | 0.011 | | |
| -20 | | 20.77 | 0.011 | | |
| -30 | | 26.04 | 0.014 | | |
| 25 | Maximum Voltage | 31.61 | 0.017 | | |
| 25 | BEP | 14.02 | 0.007 | | |

| UMTS Band II /1880MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 26.59 | 0.014 | Within Authorized Band | PASS |
| 40 | | 24.77 | 0.013 | | |
| 30 | | 17.50 | 0.009 | | |
| 20 | | 32.67 | 0.017 | | |
| 10 | | 35.16 | 0.019 | | |
| 0 | | 22.57 | 0.012 | | |
| -10 | | 30.44 | 0.016 | | |
| -20 | | 12.60 | 0.007 | | |
| -30 | | 23.37 | 0.012 | | |
| 25 | Maximum Voltage | 26.65 | 0.014 | | |
| 25 | BEP | 12.45 | 0.007 | | |

| HSDPA Band II /1880MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 27.05 | 0.014 | Within Authorized Band | PASS |
| 40 | | 34.50 | 0.018 | | |
| 30 | | 13.02 | 0.007 | | |
| 20 | | 25.62 | 0.014 | | |
| 10 | | 11.57 | 0.006 | | |
| 0 | | 34.10 | 0.018 | | |
| -10 | | 27.39 | 0.015 | | |
| -20 | | 19.00 | 0.010 | | |
| -30 | | 15.48 | 0.008 | | |
| 25 | Maximum Voltage | 35.20 | 0.019 | | |
| 25 | BEP | 31.08 | 0.017 | | |

| HSUPA Band II /1880MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 23.41 | 0.012 | Within Authorized Band | PASS |
| 40 | | 15.96 | 0.008 | | |
| 30 | | 17.99 | 0.010 | | |
| 20 | | 19.11 | 0.010 | | |
| 10 | | 29.19 | 0.016 | | |
| 0 | | 31.27 | 0.017 | | |
| -10 | | 32.00 | 0.017 | | |
| -20 | | 23.79 | 0.013 | | |
| -30 | | 12.12 | 0.006 | | |
| 25 | Maximum Voltage | 29.04 | 0.015 | | |
| 25 | BEP | 18.87 | 0.010 | | |

| UMTS Band V / 836.6MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 13.14 | 0.016 | 2.5ppm | PASS |
| 40 | | 29.14 | 0.035 | | |
| 30 | | 20.71 | 0.025 | | |
| 20 | | 30.72 | 0.037 | | |
| 10 | | 15.81 | 0.019 | | |
| 0 | | 17.08 | 0.020 | | |
| -10 | | 29.51 | 0.035 | | |
| -20 | | 30.92 | 0.037 | | |
| -30 | | 18.35 | 0.022 | | |
| 25 | Maximum Voltage | 16.77 | 0.020 | | |
| 25 | BEP | 25.69 | 0.031 | | |

| HSDPA Band V / 836.6MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 17.63 | 0.021 | 2.5ppm | PASS |
| 40 | | 15.58 | 0.019 | | |
| 30 | | 23.71 | 0.028 | | |
| 20 | | 30.47 | 0.036 | | |
| 10 | | 24.65 | 0.029 | | |
| 0 | | 15.51 | 0.019 | | |
| -10 | | 29.31 | 0.035 | | |
| -20 | | 17.94 | 0.021 | | |
| -30 | | 24.07 | 0.029 | | |
| 25 | Maximum Voltage | 19.05 | 0.023 | | |
| 25 | BEP | 12.19 | 0.015 | | |

| HSDPA Band V / 836.6MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | Freq. Dev. (Hz) | Freq. Dev. (ppm) | Limit | Result |
| 50 | Normal Voltage | 22.35 | 0.027 | 2.5ppm | PASS |
| 40 | | 16.50 | 0.020 | | |
| 30 | | 20.67 | 0.025 | | |
| 20 | | 19.65 | 0.023 | | |
| 10 | | 17.40 | 0.021 | | |
| 0 | | 17.45 | 0.021 | | |
| -10 | | 18.74 | 0.022 | | |
| -20 | | 29.01 | 0.035 | | |
| -30 | | 33.31 | 0.040 | | |
| 25 | Maximum Voltage | 29.02 | 0.035 | | |
| 25 | BEP | 26.88 | 0.032 | | |

1. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.