# TEST REPORT

Report Number: C21T00097-RF01-V01

| | |
|---|---|
| Applicant | Shanghai Sunmi Technology Co., Ltd. |
| Product Name | Handheld Wireless Terminal |
| Model Name | T8A10 |
| Brand Name | SUNMI |
| FCC ID | 2AH25T8A10 |
| IC | 22621-T8A10 |

Industrial Internet Innovation Center (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC Part 2/22/24, ANSI/TIA-603-E, ANSI C63.26, KDB 971168 D01,RSS-Gen Issue 5, RSS-132 Issue 3, RSS-133 Issue 6.

| | | | |
|---|---|---|---|
| Prepared by | 范宇航 | Reviewed by | 王长青 |
| Approved by | | Issue Date | 2021-12-17 |

**Industrial Internet Innovation Center (Shanghai) Co., Ltd.**

# NOTE

1. This report is invalid without the signature of the writer, reviewer and authorizer.
2. This report is invalid if altered.
3. For the benefit of clients, if you have any objection to the report, please inform the testing laboratory within 15 days from the date of receiving this report.
4. Samples in the test report are provided by the client. The test results are only applicable to the samples received by the laboratory. The source information of samples (such as sample sender, manufacturer, etc.) in the test report is provided by the client, and the laboratory is not responsible for its authenticity and the measurement accuracy.
5. The test report does not represent the identification of a product by a certification body or an authorized body.
6. This report is only valid as a whole, and no part of the report can be reproduced without the written approval of Industrial Internet Innovation Center (Shanghai) Co., Ltd.
7. Without the written permission of testing institutions and accreditation bodies, this report cannot be used in part or in whole for publicity or product introduction.
8. "N/A" is used in this report to indicate that it is not applicable or available.
9. Industrial Internet Innovation Center (Shanghai) Co., Ltd. assumes the legal responsibility for the report.
10. The measurement uncertainty is not taken into account when deciding conformity, and the results of measurement (or the average of measurement results) are directly used as the criterion for the stating conformity.

**Test Laboratory:**
Industrial Internet Innovation Center (Shanghai) Co., Ltd.
Add: Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China
Tel: +86 21 68866880

## Revision Version

| Report Number | Revision | Date | Memo |
|---|---|---|---|
| C21T00097-RF01-V00 | 00 | 2021-11-19 | Initial creation of test report |
| C21T00097-RF01-V01 | 01 | 2021-12-17 | Update the FCC Rule Part Version. |

# CONTENTS

# 1. Test Laboratory

## 1.1. Testing Location

| | |
|---|---|
| Company Name | Industrial Internet Innovation Center (Shanghai) Co., Ltd. |
| Address | Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China |
| FCC Registration No. | 958356 |
| FCC Degistration No. | CN1177 |
| IC Degistration No. | CN0067 |

## 1.2. Testing Environment

| | |
|---|---|
| Normal Temperature | 15℃~35℃ |
| Relative Humidity | 30%RH~60%RH |
| Supply Voltage | 120V/60Hz |

## 1.3. Project Information

| | |
|---|---|
| Project Leader | Wang Wenwen |
| Testing Start Date | 2021-08-05 |
| Testing End Date | 2021-10-18 |

# 2. Client Information

## 2.1. Applicant Information

| | |
|---|---|
| Company Name | Shanghai Sunmi Technology Co.,Ltd. |
| Address | Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China |
| Telephone | +86 18501703215 |

## 2.2. Manufacturer Information

| | |
|---|---|
| Company Name | Shanghai Sunmi Technology Co.,Ltd. |
| Address | Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China |
| Telephone | +86 18501703215 |

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

## 3.1. About EUT

| | |
|---|---|
| Product Name | L2Ks Handheld Wireless Terminal |
| Model name | T8A10 |
| Supported Radio Technology and Bands | GSM850/GSM900/DCS1800/PCS1900<br>WCDMA Band I/II/ IV/V/VIII<br>LTE Band 1/2/3/4/5/7/12/13/17/18/19/25/26/38/41/66/71<br>BT 5.0,BLE<br>WLAN 802.11b,g,n<br>WLAN 802.11a,n,ac<br>NFC<br>GPS |
| Hardware Version | V4 |
| Software Version | V025 |
| FCC ID | 2AH25T8A10 |
| IC | 22621-T8A10 |
| Extreme Temperature | -20℃~55℃ |
| Nominal Voltage | 3.87V |
| Extreme High Voltage | 4.45V |
| Extreme Low Voltage | 3.45V |

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

| EUT ID* | SN or IMEI | HW Version | SW Version | Date of receipt |
|---|---|---|---|---|
| N03 | 866584051015622<br>866584051015630 | V4 | V025 | 2021-08-04 |
| N04 | 866584051015705<br>866584051015713 | V4 | V025 | 2021-08-04 |
| N08 | 866584051015747<br>866584051015754 | V4 | V025 | 2021-08-04 |

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

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

| AE ID* | Description | Model | SN/Remark |
|---|---|---|---|
| AE1 | RF cable | N/A | N/A |

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

# 4. Reference Documents

## 4.1. Reference Documents for testing

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

| Reference | Title | Version |
|---|---|---|
| FCC Part 2 | FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS | 2020-10-01 |
| FCC Part 22 | PUBLIC MOBILE SERVICES | 2020-10-01 |
| FCC Part 24 | PERSONAL COMMUNICATIONS SERVICES | 2020-10-01 |
| ANSI-TIA-603-E | Land Mobile FM or PM Communications Equipment Measurement and Performance Standards | 2016 |
| ANSI C63.26 | American National Standard of Procedures for Compliance Testing of Licensed Transmitters Used in Licensed Radio | 2015 |
| KDB 971168 D01 | Measurement Guidance for Certification of Licensed Digital Transmitters | v03r01 |
| RSS-Gen Issue 5 | RSS-Gen —General Requirements for Compliance of Radio Apparatus | 2021-05 |
| RSS-132 Issue 3 | Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz | 2013-01 |
| RSS-133 Issue 6 | 2 GHz Personal Communications Services | 2018-01 |

## 4.2. Reference Information from client

Antenna gain Information of the test sample provided by Shanghai Sunmi Technology Co., Ltd.
Maximum of Antenna Gain：
GSM 850: -2 dBi
PCS 1900: 1 dBi
WCDMA Band II: 2 dBi
WCDMA Band IV: 2 dBi
WCDMA Band V: -2 dBi

# 5. Test Summary

## 5.1. Summary of Test Results

| Measurement Items | Sub-clause | Sub-clause of IC | Verdict |
|---|---|---|---|
| Output Power | 2.1046/22.913(a)/24.232(c) | RSS-132 5.4<br>RSS-133 6.4 | Pass |
| Peak-to-Average Ratio | 24.232(d) | RSS-132 5.4<br>RSS-133 6.4 | Pass |
| 99%Occupied Bandwidth | 2.1049(h)(i)/ 22.917(b) | RSS-Gen 6.7 | Pass |
| -26dB Emission Bandwidth | 22.917(b)/§24.238(b) | RSS-Gen 6.7 | Pass |
| Band Edge at antenna terminals | 22.917(a)/24.238(a) | RSS-132 5.5<br>RSS-133 6.5 | Pass |
| Frequency stability | 2.1055/24.235 | RSS-132 5.3<br>RSS-133 6.3 | Pass |
| Conducted Spurious mission | 2.1053/22.917(a)/24.238(a) | RSS-132 5.5<br>RSS-133 6.5 | Pass |
| Emission Limit | 2.1051/22.917/24.238/22.913 /24.232 | RSS-132 5.5<br>RSS-133 6.5 | Pass |

Test Conditions

| | |
|---|---|
| Tnom | Normal Temperature |
| Tmin | Low Temperature |
| Tmax | High Temperature |
| Vnom | Normal Voltage |
| Vmin | Low Voltage |
| Vmax | High Voltage |
| Hnom | Norm Humidity |
| Anom | Norm Air Pressure |

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

| | | |
|---|---|---|
| Temperature | Tnom | 25℃ |
| Voltage | Vnom | 3.87V |
| Humidity | Hnom | 48% |
| Air Pressure | Anom | 1010hPa |

## 5.2. Statements

The T8A10, manufactured by Shanghai Sunmi Technology Co., Ltd. is a new product for testing.

The test data in the report conform to current IC valid standards.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 5.1.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

# 6. Measurement Results

**Shielding Room1** (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
| Relative humidity | Min. = 20 %, Max. = 75 % |
| Shielding effectiveness | > 100 dB |
| Ground system resistance | < 0.5 Ω |
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |

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

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
| Relative humidity | Min. =30 %, Max. = 60 % |
| Shielding effectiveness | > 100 dB |
| Electrical insulation | > 10 kΩ |
| Ground system resistance | < 0.5 Ω |

**Fully-anechoic chamber1** (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
| Relative humidity | Min. = 25 %, Max. = 75 % |
| Shielding effectiveness | > 100 dB |
| Electrical insulation | > 10 kΩ |
| Ground system resistance | < 0.5 Ω |
| VSWR | Between 0 and 6 dB, from 1GHz to 18GHz |
| Site Attenuation Deviation | Between -4 and 4 dB,30MHz to 1GHz |
| Uniformity of field strength | Between 0 and 6 dB, from 80MHz to 3000 MHz |

## 6.1. Output Power

### 6.1.1. Summary

During the process of testing, the EUT was controlled Rhode & Schwarz Digital Radio. Communication tester (CMU-200) to ensure max power transmission and proper modulation.
This result contains peak output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

### 6.1.2. Conducted

#### 6.1.2.1. Method of Measurements

Method of measurements please refer to KDB971168 D01 v03 clause 5.
The EUT was set up for the max output power with pseudo random data modulation.
The power was measured with Rhode & Schwarz Spectrum Analyzer FSQ(peak).
These measurements were done at 3 frequencies, 1850.2 MHz, 1880.0MHz and 1909.8MHz for PCS1900 band; 824.2MHz, 836.6MHz and 848.8MHz for GSM850 band. (bottom, middle and top of operational frequency range).
These measurements were done at 3 frequencies, 1852.4 MHz, 1880.0MHz and 1907.6MHz for WCDMA Band II; 1732.6 MHz, 1712.4MHz and 1752.6MHz for WCDMA Band IV; 826.4MHz, 836.6MHz and 846.6MHz for WCDMA Band V. (bottom, middle and top of operational frequency range).

#### 6.1.2.2 Test procedures:

1. The transmitter output port was connected to base station.
2. Set the EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

#### 6.1.2.3 Limit:

22.913(a) Mobile stations are limited to 7watts.
24.232(c) Mobile and portable stations are limited to 2 watts.
Rule RSS-132 5.4 specifies that “The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.”Limit ≤ 11.5 W (40.6 dBm)
Rule RSS-133 6.4 specifies that " Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p. The equipment shall employ means to limit the power to the minimum necessary for successful communication”.Limit ≤ 2 W (33 dBm)

#### 6.1.2.4 Test Procedure:

The transmitter output power was connected to calibrated attenuator, the other end of which was connected to signal analyzer. Transmitter output power was read off the power in dBm. The power outputs at the transmitter antenna port was determined by adding the value of attenuator to the signal analyzer reading.

**6.1.2.5 GSM Test Condition:**

| RBW | VBW | Sweep time | Span |
|---|---|---|---|
| 3MHz | 10MHz | Auto | 50MHz |

**6.1.2.6 WCDMA Test Condition:**

| RBW | VBW | Sweep time | Span |
|---|---|---|---|
| 10MHz | 30MHz | Auto | 50MHz |

**6.1.2.7 Measurement results:**

| GSM 850 (GMSK) | |
|---|---|
| Channel/fc(MHz) | Peak power (dBm) |
| Low 128/824.2 | 32.12 |
| Mid 189/836.4 | 32.14 |
| High 251/848.8 | 32.16 |
| GPRS 850 (GMSK 1 Slot) | |
| Channel/fc(MHz) | Peak power (dBm) |
| Mid 189/836.4 | 32.10 |
| Low 128/824.2 | 32.08 |
| High 251/848.8 | 32.12 |
| EDGE 850 (8PSK 1 Slot) | |
| Channel/fc(MHz) | Peak power (dBm) |
| Mid 189/836.4 | 24.78 |
| Low 128/824.2 | 24.69 |
| High 251/848.8 | 24.81 |
| GSM 1900(GMSK) | |
| Channel/fc(MHz) | Peak power (dBm) |
| Mid 661/1880 | 29.52 |
| Low 512/1850.2 | 29.29 |
| High 810/1909.8 | 29.30 |
| GPRS 1900 (GMSK 1 Slot) | |
| Channel/fc(MHz) | Peak power (dBm) |
| Mid 661/1880 | 29.51 |
| Low 512/1850.2 | 29.5 |
| High 810/1909.8 | 29.32 |

| EDGE 1900 (8PSK 1 Slot) | |
|---|---|
| Channel/fc(MHz) | Peak power (dBm) |
| Mid 661/1880 | 21.13 |
| Low 512/1850.2 | 21.38 |
| High 810/1909.8 | 21.68 |
| WCDMA II | |
| Channel/fc(MHz) | Peak power (dBm) |
| Mid 9400 /1880 | 22.78 |
| Low 9262/1852.6 | 22.67 |
| High 9538/1907.4 | 23.07 |
| WCDMA BAND IV | |
| Channel/fc(MHz) | Peak power (dBm) |
| Mid 1413 /1732.6 | 22.08 |
| Low 1312/1712.4 | 21.98 |
| High 1513/1752.6 | 22.03 |
| WCDMA BAND V | |
| Channel/fc(MHz) | Peak power (dBm) |
| Mid 4183/836.6 | 23.72 |
| Low 4132/826.4 | 23.77 |
| High 4233/846.6 | 23.8 |

## 6.2. Peak-to-Average Power Ratio

Method of test measurements please refer to KDB971168 D01 v03 clause 5.7.

### 6.2.1 PAPR Limit

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

Rule RSS-132: 5.4: the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission. Limit ≤ 13dB

Rule RSS-133 6.4 specifies that " the transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission." Limit ≤ 13dB

### 6.2.2 Test procedures

1. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
2. 
   1) Select the spectrum analyzer CCDF function.
   2) Set RBW ≥ signal's occupied bandwidth.
   3) Set the number of counts to a value that stabilizes the measured CCDF cure;
   4) Sweep time ≥ 1s.
3. Record the maximum PAPR level associated with a probability of 0.1%.

### 6.2.3 Test results:

| GSM850 | | | |
|---|---|---|---|
| Channel | 128 | 189 | 251 |
| Frequency (MHz) | 824.2 | 836.4 | 848.8 |
| PAPR(dB) | 10.67 | 8.46 | 10.71 |
| **GPRS850** | | | |
| Channel | 128 | 189 | 251 |
| Frequency (MHz) | 824.2 | 836.4 | 848.8 |
| PAPR(dB) | 7.63 | 7.63 | 7.66 |
| **EDGE 850** | | | |
| Channel | 128 | 189 | 251 |
| Frequency (MHz) | 824.2 | 836.4 | 848.8 |
| PAPR(dB) | 10 | 10.74 | 8.53 |

| GSM1900 | | | |
|---|---|---|---|
| Channel | 512 | 661 | 810 |
| Frequency (MHz) | 1850.2 | 1880 | 1909.8 |
| PAPR(dB) | 10.67 | 9.39 | 8.94 |
| **GPRS1900** | | | |
| Channel | 512 | 661 | 810 |
| Frequency (MHz) | 1850.2 | 1880 | 1909.8 |
| PAPR(dB) | 10.67 | 9.62 | 7.69 |
| **EDGE 1900** | | | |
| Channel | 512 | 661 | 810 |
| Frequency (MHz) | 1850.2 | 1880 | 1909.8 |
| PAPR(dB) | 8.4 | 10.64 | 10.64 |
| **WCDMA Band II** | | | |
| Channel | 9263 | 9400 | 9537 |
| Frequency (MHz) | 1852.6 | 1880 | 1907.4 |
| PAPR(dB) | 2.72 | 2.88 | 2.82 |
| **WCDMA Band IV** | | | |
| Channel | 1313 | 1450 | 1512 |
| Frequency (MHz) | 1712.6 | 1740.4 | 1752.4 |
| PAPR(dB) | 2.95 | 2.82 | 2.76 |
| **WCDMA Band V** | | | |
| Channel | 4133 | 4175 | 4232 |
| Frequency (MHz) | 826.6 | 835.0 | 846.4 |
| PAPR(dB) | 2.69 | 2.34 | 2.21 |

## 6.3. 99% Occupied Bandwidth

Method of test please refer to KDB971168 D01 v03 clause 4.0.
No specific occupied bandwidth requirements in RSS-Gen: 6.6.

### 6.3.1. Occupied Bandwidth

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of GSM850, PCS1900, WCDMA BANDII and WCDMA BANDV.

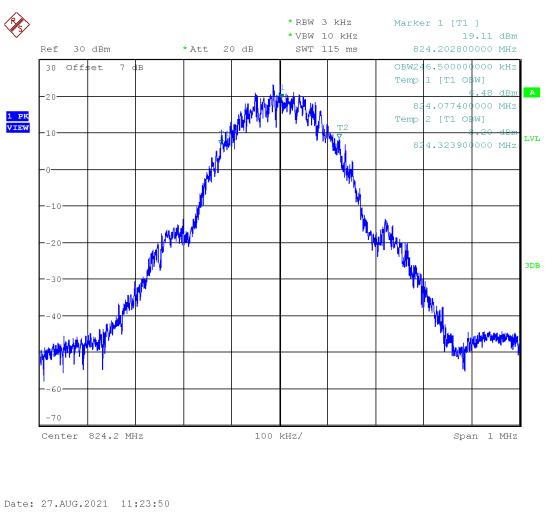
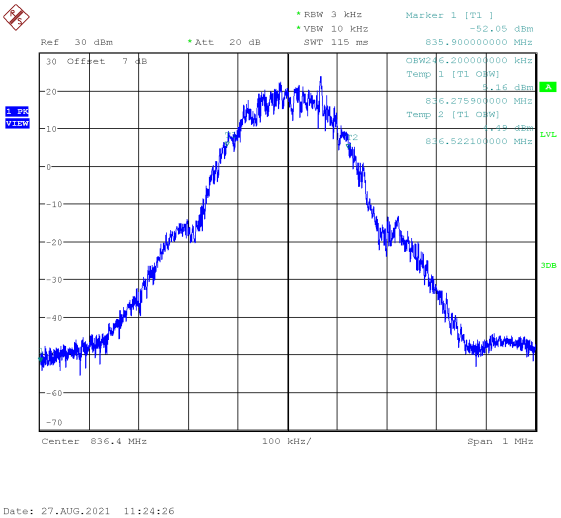
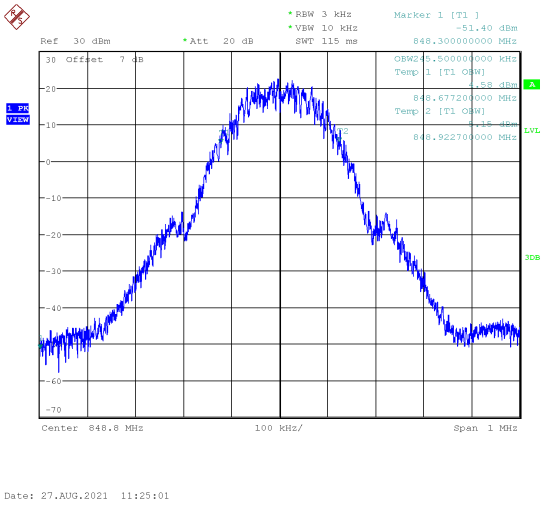
### 6.3.2 Test Procedure:

1. The EUT output RF connector was connected with a short cable to the signal analyzer.
2. RBW was set to about 1% of emission BW, VBW >= 3 times RBW,.
3. 99% bandwidth were measured, the occupied bandwidth is delta frequency between the two points where the display line intersects the signal trace.

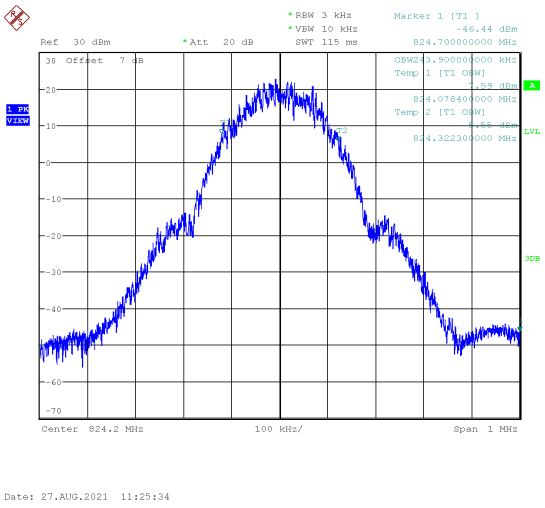
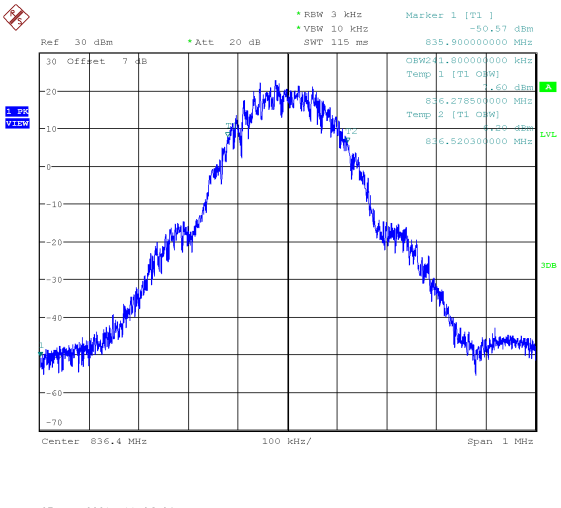
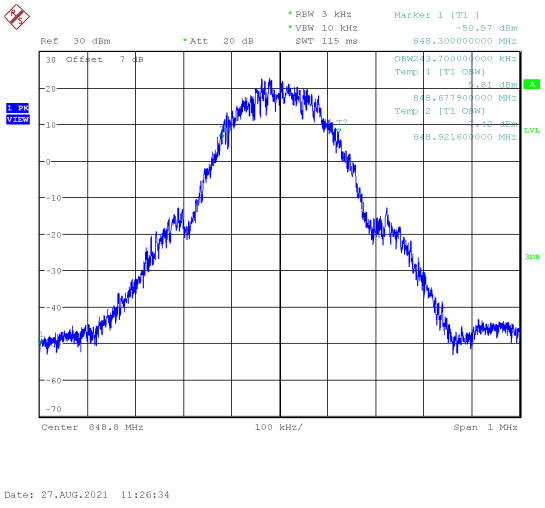
### 6.3.3 Test result:

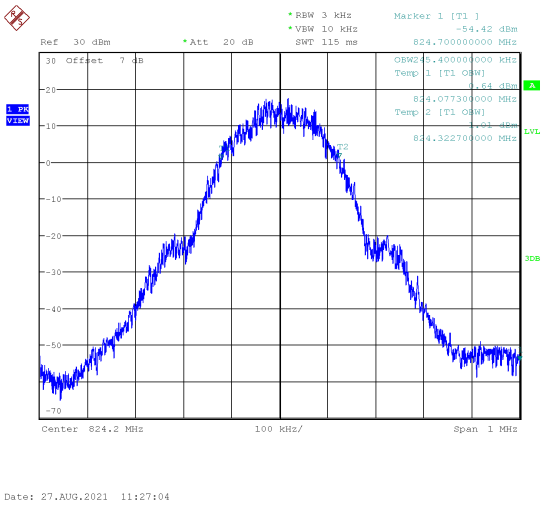
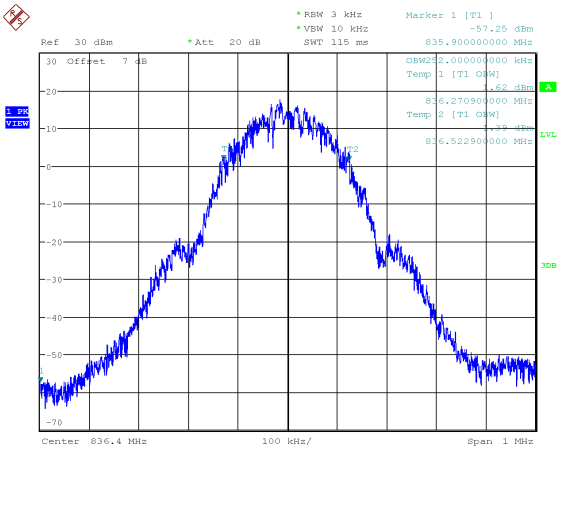
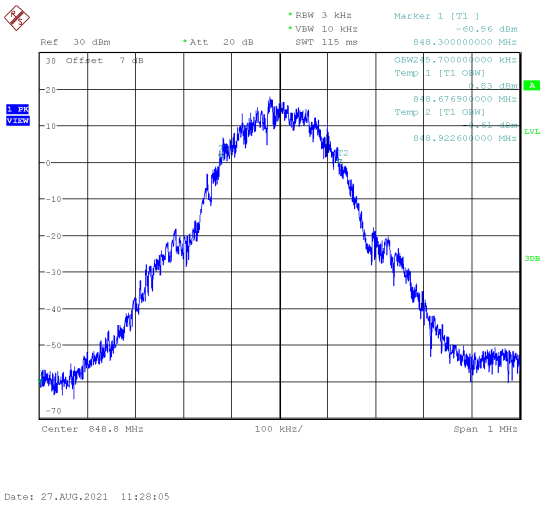
| GSM850 | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(kHz) |
| Mid 189 | 836.4 | 246.20 |
| Low 128 | 824.2 | 246.50 |
| High 251 | 848.8 | 245.50 |
| GPRS850 | | |
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(kHz) |
| Mid 189 | 836.4 | 241.80 |
| Low 128 | 824.2 | 243.90 |
| High 251 | 848.8 | 243.70 |
| EDGE850 | | |
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(kHz) |
| Mid 189 | 836.4 | 252.00 |
| Low 128 | 824.2 | 245.40 |
| High 251 | 848.8 | 245.70 |

**Conclusion: PASS**

| GSM 850 | |
|---|---|
| Channel 128-Occupied Bandwidth (99%) | Channel 189-Occupied Bandwidth (99%) |
|  |  |
| Channel 251-Occupied Bandwidth (99%) | / |
|  | / |

## GPRS 850

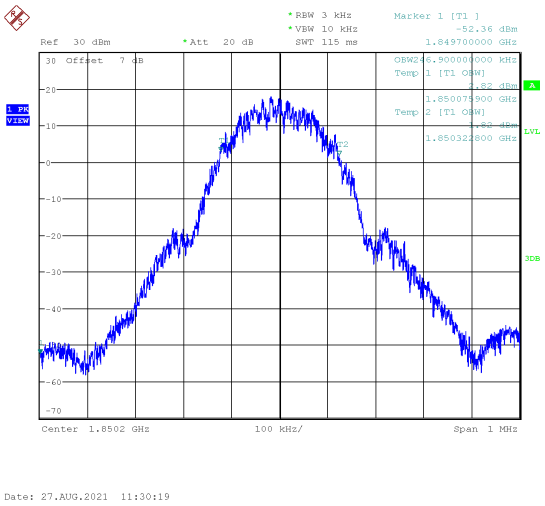
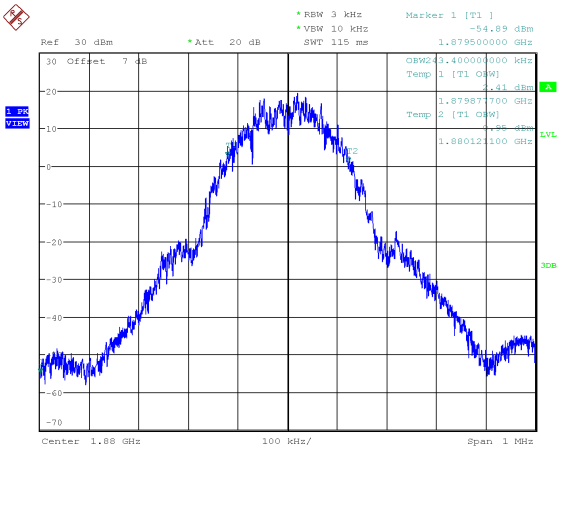
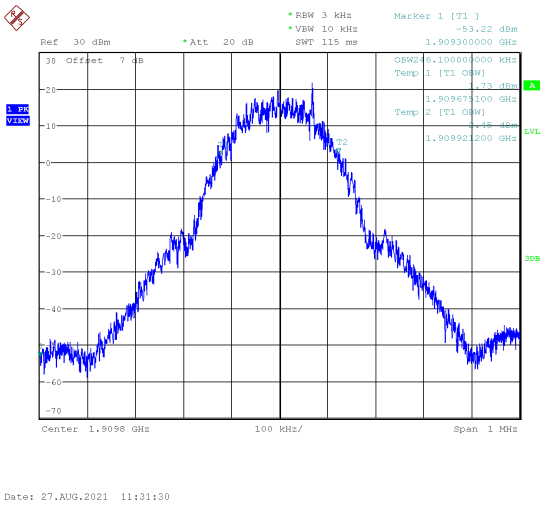
| Channel 128-Occupied Bandwidth (99%) | Channel 189-Occupied Bandwidth (99%) |
|---|---|
|  |  |
| **Channel 251-Occupied Bandwidth (99%)** | **/** |
|  | **/** |

| EDGE 850 | |
|---|---|
| Channel 128-Occupied Bandwidth (99%) | Channel 189-Occupied Bandwidth (99%) |
|  |  |
| Channel 251-Occupied Bandwidth (99%) | / |
|  | / |

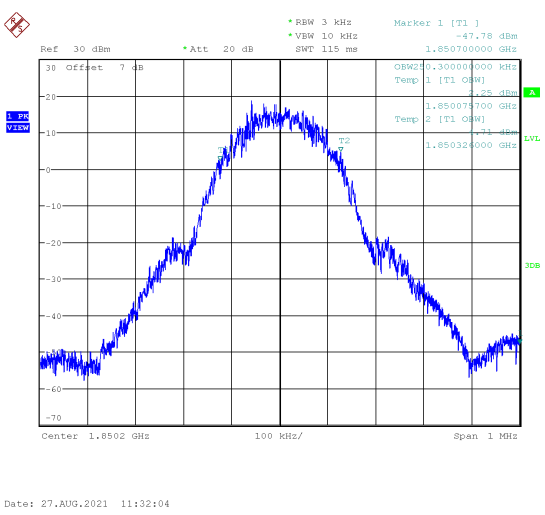
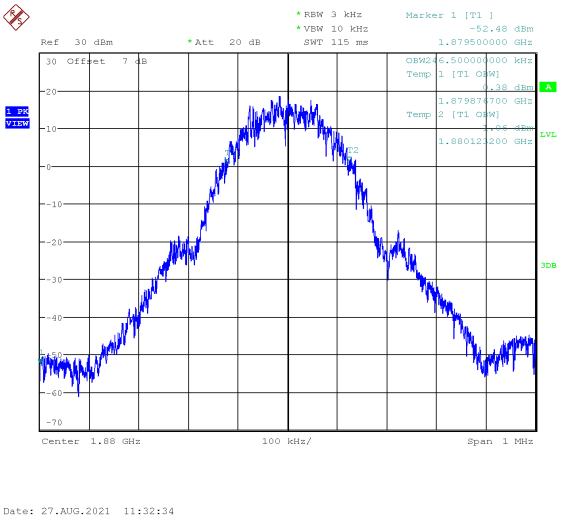
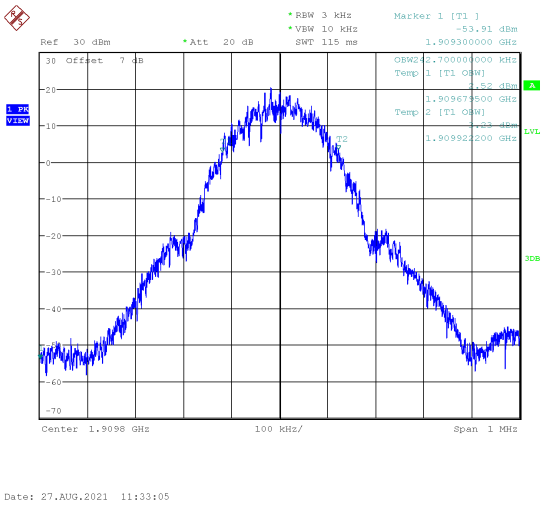
| GSM1900 | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(kHz) |
| Mid 661 | 1880 | 243.40 |
| Low 512 | 1850.2 | 246.90 |
| High 810 | 1909.8 | 246.10 |
| GPRS1900 | | |
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(kHz) |
| Mid 661 | 1880 | 246.50 |
| Low 512 | 1850.2 | 250.30 |
| High 810 | 1909.8 | 242.70 |

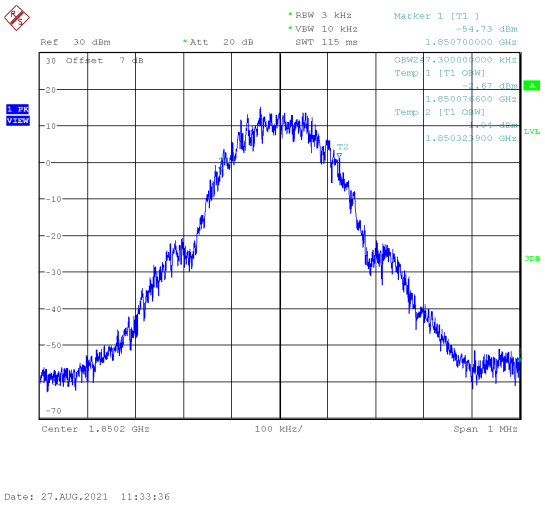
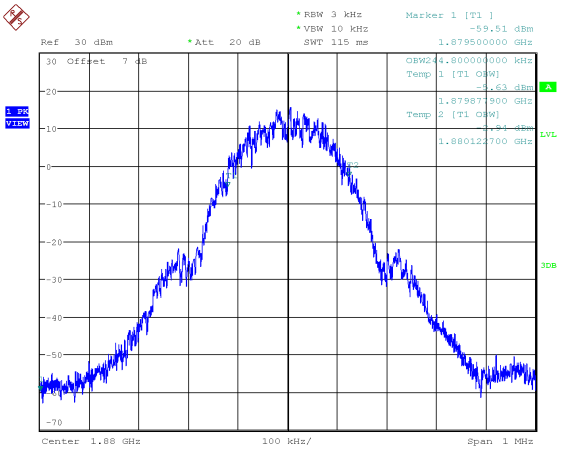
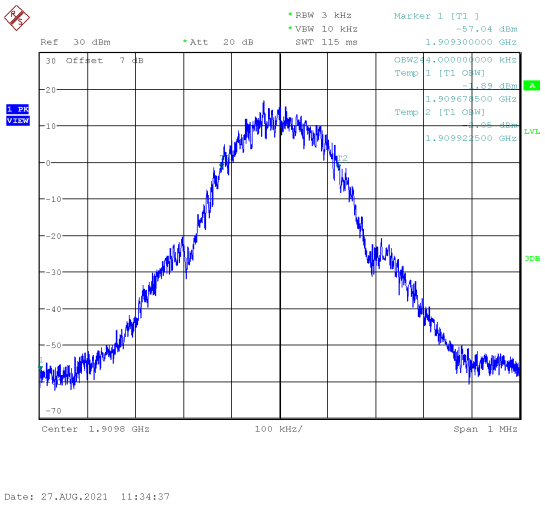
| EDGE1900 | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(kHz) |
| Mid 661 | 1880 | 244.80 |
| Low 512 | 1850.2 | 247.30 |
| High 810 | 1909.8 | 244.00 |

**Conclusion: PASS**

| GSM 1900 | |
|---|---|
| Channel 512-Occupied Bandwidth (99%) | Channel 661-Occupied Bandwidth (99%) |
|  |  |
| Channel 810-Occupied Bandwidth (99%) | / |
|  | / |

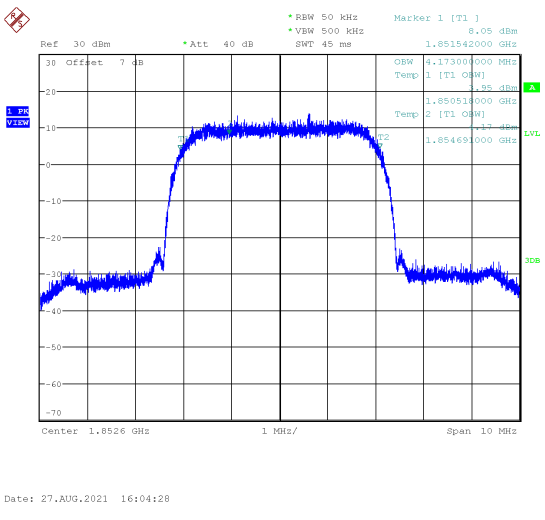
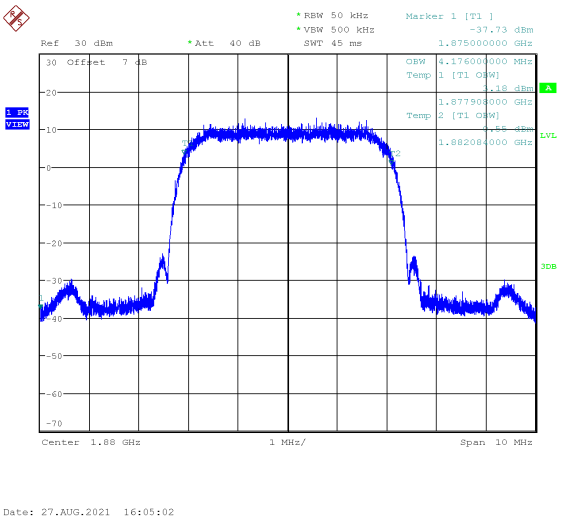
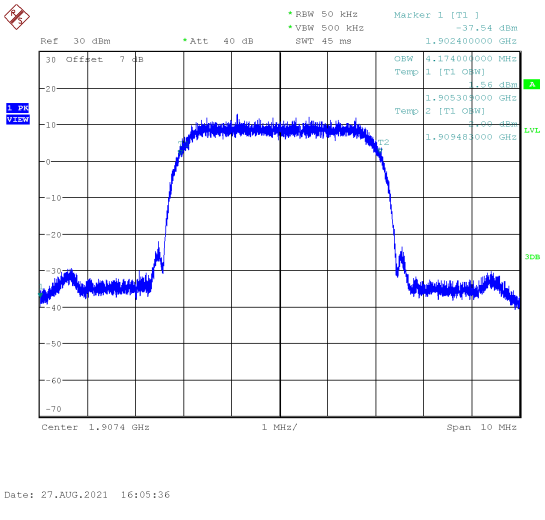
## GPRS 1900

| Channel 512-Occupied Bandwidth (99%) | Channel 661-Occupied Bandwidth (99%) |
|---|---|
|  |  |
| Channel 810-Occupied Bandwidth (99%) | / |
|  | / |

| EDGE 1900 | |
|---|---|
| Channel 512-Occupied Bandwidth (99%) | Channel 661-Occupied Bandwidth (99%) |
|  |  |
| Channel 810-Occupied Bandwidth (99%) | / |
|  | / |

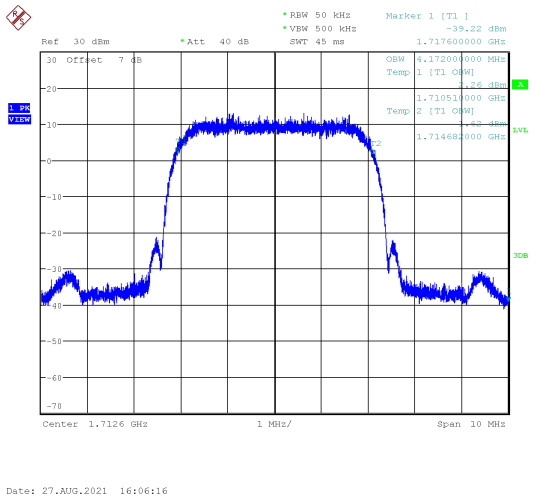
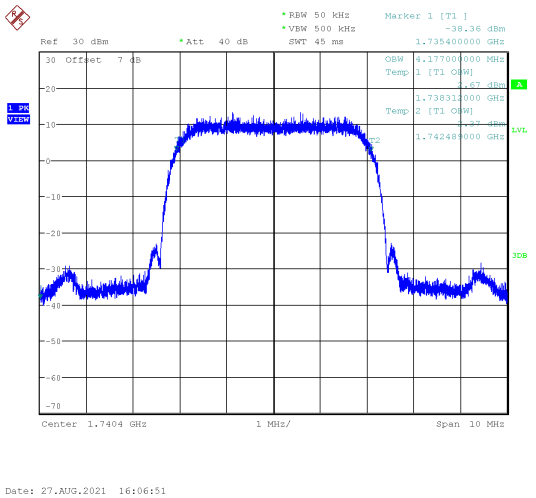
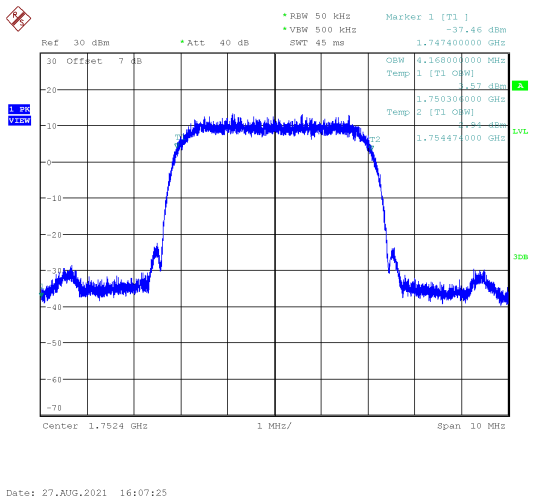
| WCDMA BAND II | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(MHz) |
| Mid 9400 | 1880 | 4.176 |
| Low 9263 | 1852.6 | 4.173 |
| High 9537 | 1907.4 | 4.174 |

**Conclusion: PASS**

| **WCDMA BAND II** | |
|---|---|
| Channel 9263-Occupied Bandwidth (99%) | Channel 9400-Occupied Bandwidth (99%) |
|  |  |
| Channel 9537-Occupied Bandwidth (99%) | / |
|  | / |

| WCDMA BAND IV | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(MHz) |
| Mid 1450 | 1740.4 | 4.177 |
| Low 1313 | 1712.6 | 4.172 |
| High 1512 | 1752.5 | 4.168 |

**Conclusion: PASS**

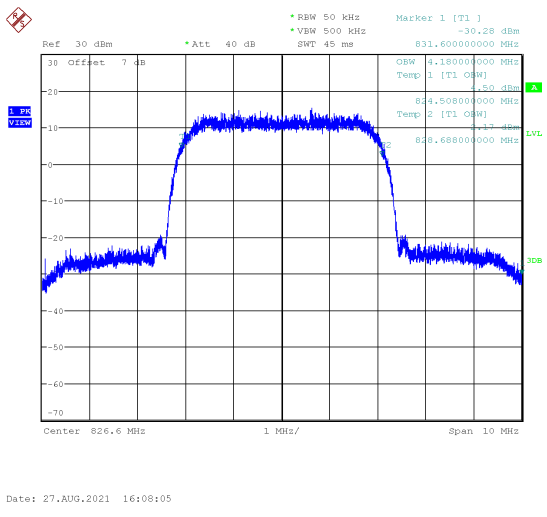
| **WCDMA BAND IV** | |
|---|---|
| Channel 1313-Occupied Bandwidth (99%) | Channel 1450-Occupied Bandwidth (99%) |
|  |  |
| Channel 1512-Occupied Bandwidth (99%) | / |
|  | / |

| WCDMA BAND V | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(MHz) |
| Mid 4175 | 835.0 | 4.175 |
| Low 4133 | 826.6 | 4.180 |
| High 4233 | 846.4 | 4.179 |

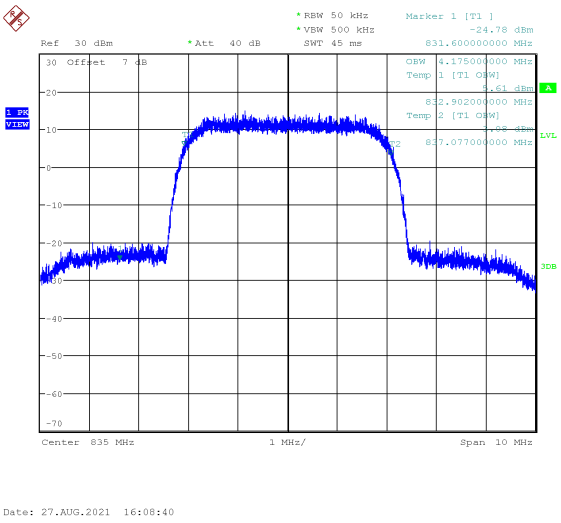
**Conclusion: PASS**

**WCDMA BAND V**

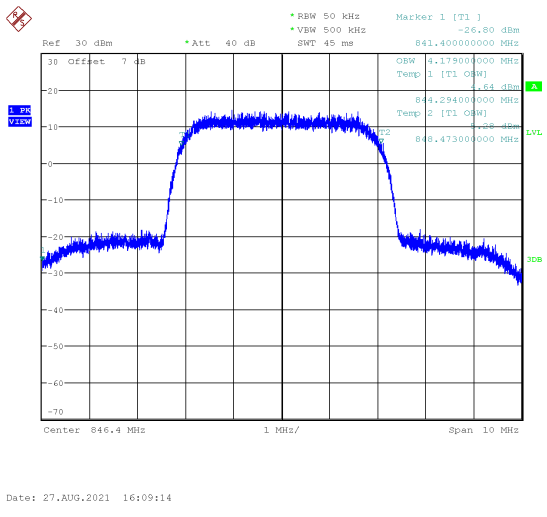
Channel 4133-Occupied Bandwidth (99%)




Channel 4175-Occupied Bandwidth (99%)




Channel 4233-Occupied Bandwidth (99%)




/

/

## 6.4. -26dB Emission Bandwidth

Method of test please refer to KDB971168 D01 v03 clause 4.0.
No specific occupied bandwidth requirements in RSS-Gen: 6.6.

### 6.4.1. -26dB Emission Bandwidth

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of GSM850, PCS1900, WCDMA BANDII and WCDMA BANDV.

### 6.4.2 Test Procedure:

1. The EUT output RF connector was connected with a short cable to the signal analyzer.
2. RBW was set to about 1% of emission BW, VBW >= 3 times RBW,.
3. 26dB bandwidth were measured, the occupied bandwidth is delta frequency between the two points where the display line intersects the signal trace.

### 6.4.3 Measurement methods:

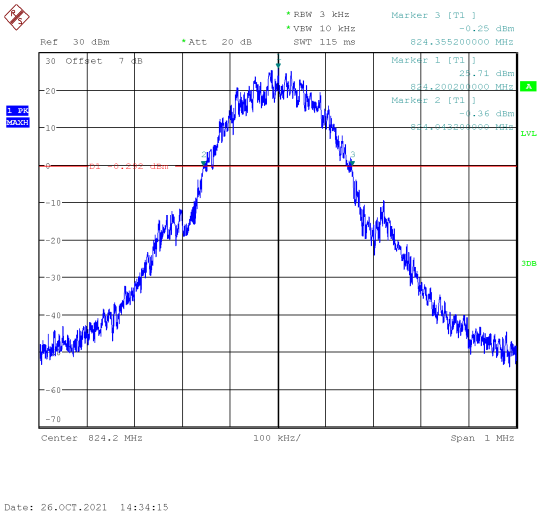
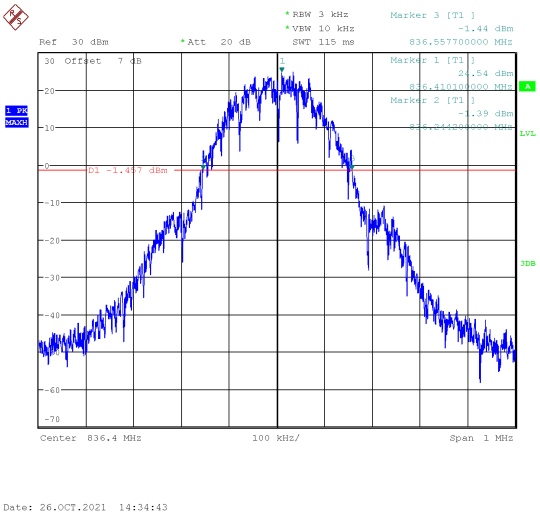
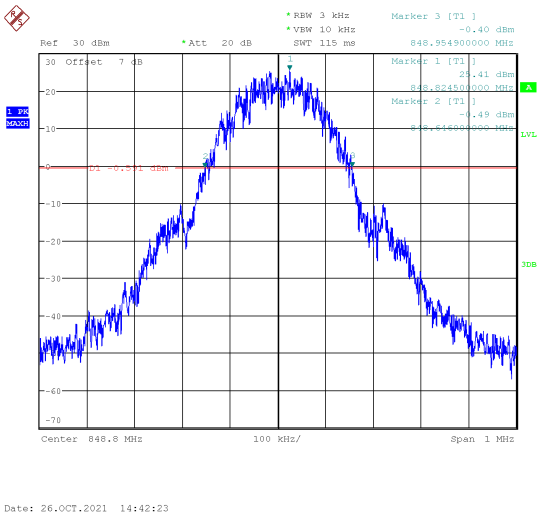
For GSM: signal analyzer setting as: RBW= 3KHz; VBW=10KHz; Span=1MHz.
For WCDMA: signal analyzer setting as: RBW=50KHz; VBW=200KHz; Span=10MHz.

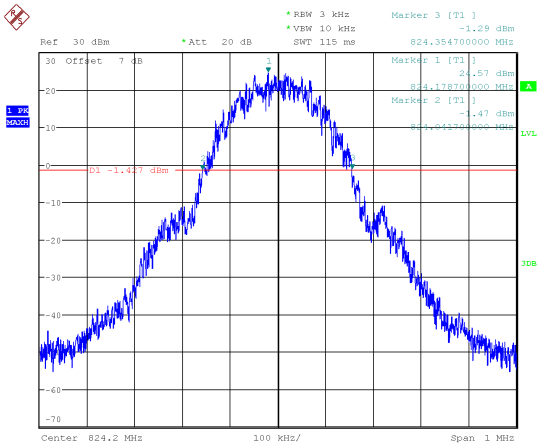
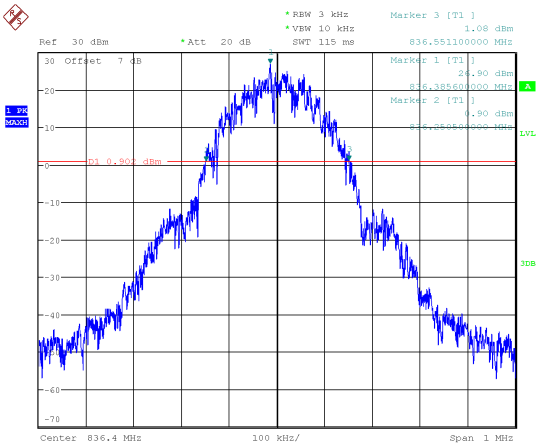
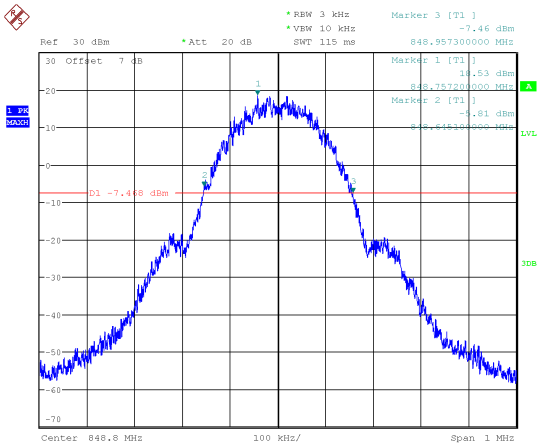
### 6.4.4 Test results:

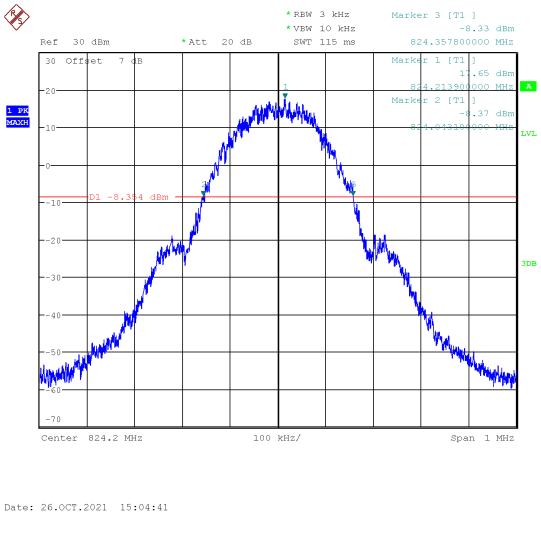
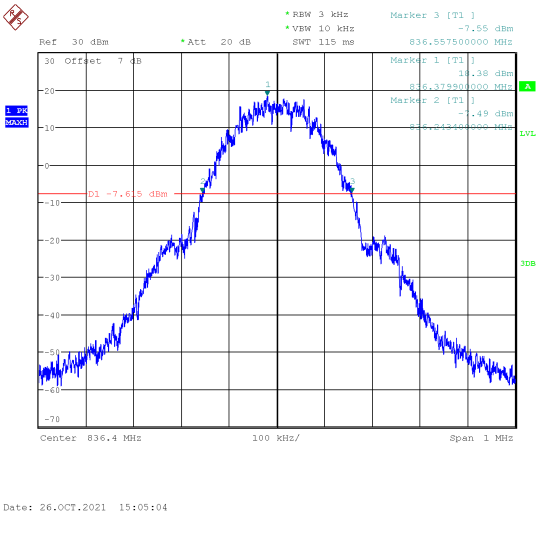
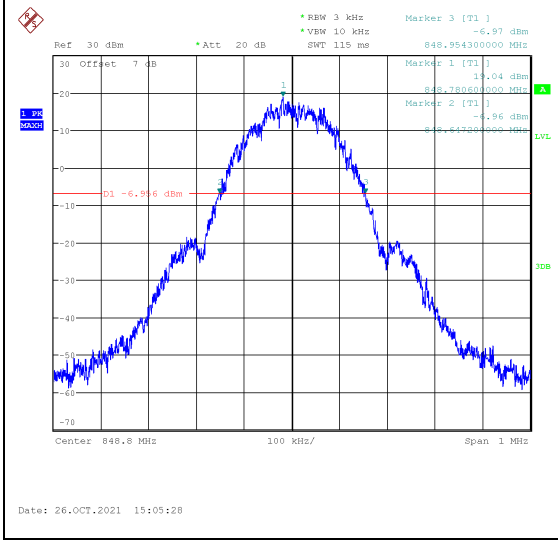
| GSM 850 | | |
|---|---|---|
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(kHz) |
| Mid 189 | 836.4 | 313.00 |
| Low 128 | 824.2 | 312.00 |
| High 251 | 848.8 | 309.00 |
| GPRS 850 | | |
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(kHz) |
| Mid 189 | 836.4 | 301.00 |
| Low 128 | 824.2 | 313.00 |
| High 251 | 848.8 | 312.00 |

| EDGE 850 | | |
|---|---|---|
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(kHz) |
| Mid 189 | 836.4 | 314.00 |
| Low 128 | 824.2 | 315.00 |
| High 251 | 848.8 | 307.00 |

**Conclusion: PASS**

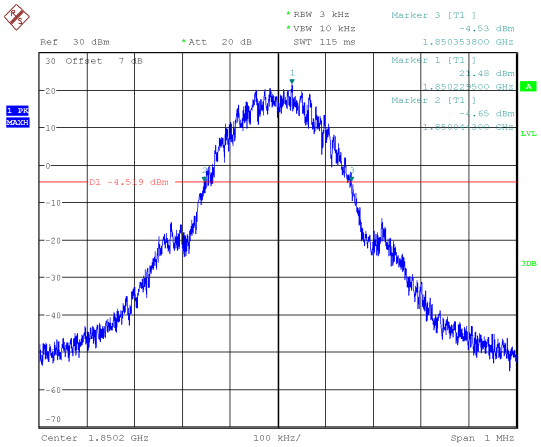
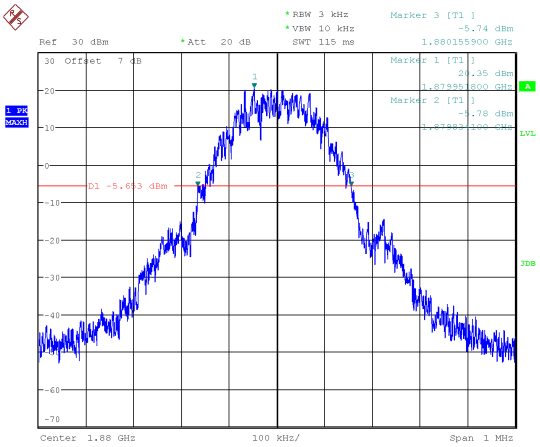
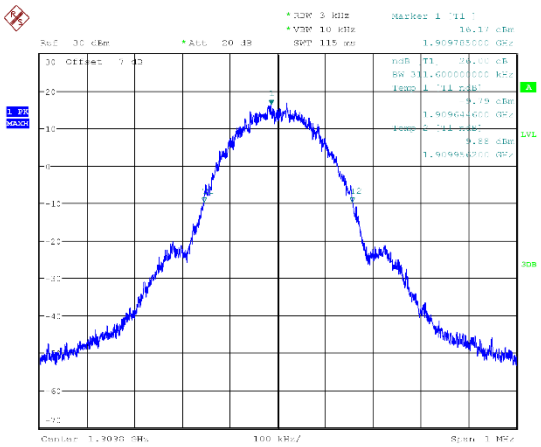
| **GSM 850** | |
|---|---|
| Channel 128- Emission Bandwidth (-26dBc BW) | Channel 189- Emission Bandwidth (-26dBc BW) |
|  |  |
| Channel 251- Emission Bandwidth (-26dBc BW) | / |
|  | / |

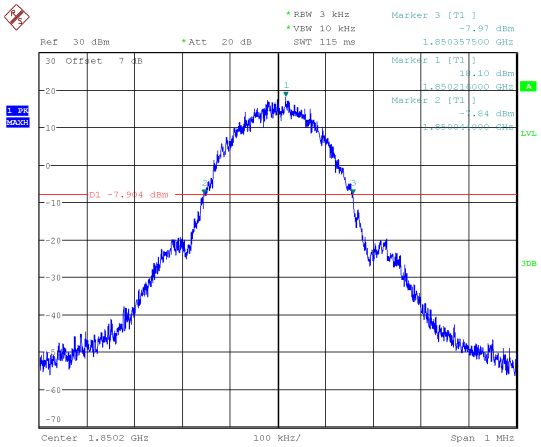
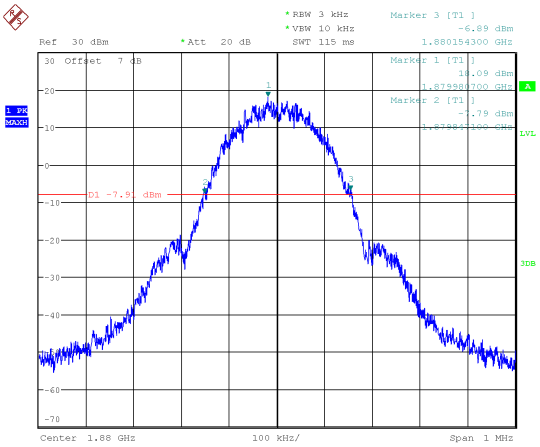
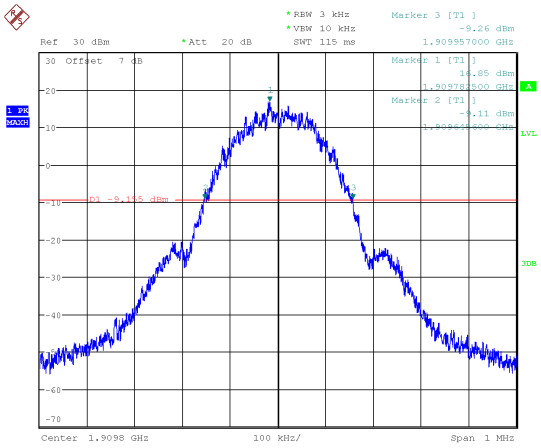
| GPRS 850 | |
|---|---|
| Channel 128- Emission Bandwidth (-26dBc BW) | Channel 189- Emission Bandwidth (-26dBc BW) |
|  |  |
| Channel 251- Emission Bandwidth (-26dBc BW) | / |
|  | / |

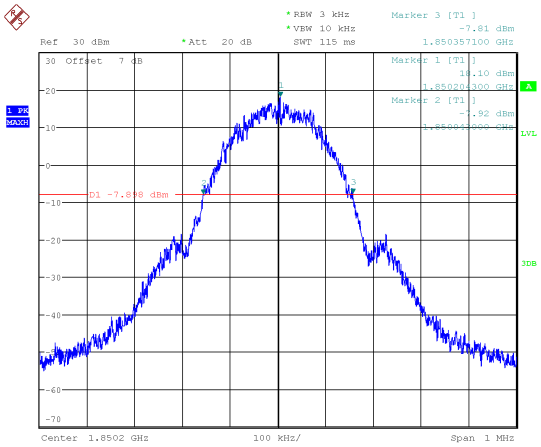
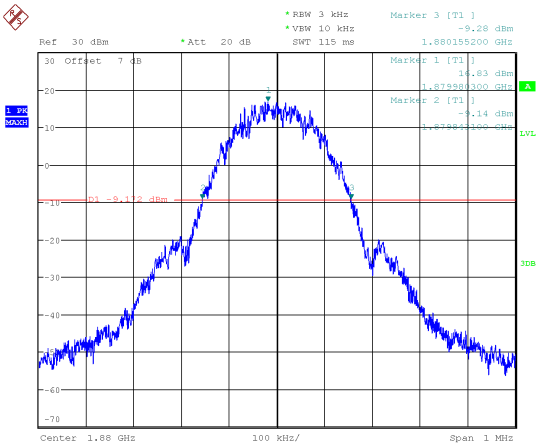
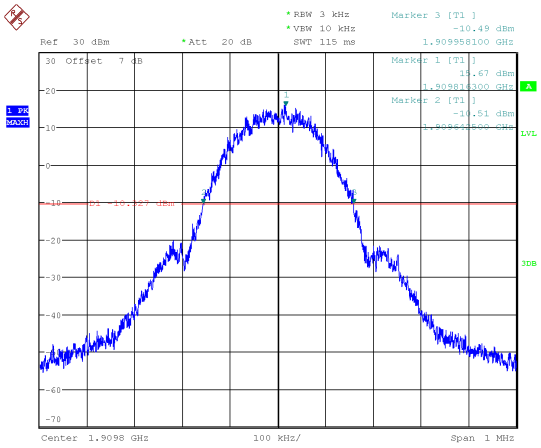
| EDGE 850 | |
|---|---|
| Channel 128- Emission Bandwidth (-26dBc BW) | Channel 189- Emission Bandwidth (-26dBc BW) |
|  |  |
| Channel 251- Emission Bandwidth (-26dBc BW) | / |
|  | / |

| GSM1900 | | |
|---|---|---|
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(kHz) |
| Mid 661 | 1880 | 322.00 |
| Low 512 | 1850.2 | 310.00 |
| High 810 | 1909.8 | 311.60 |
| GPRS1900 | | |
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(kHz) |
| Mid 661 | 1880 | 307.00 |
| Low 512 | 1850.2 | 313.00 |
| High 810 | 1909.8 | 311.00 |
| EDGE1900 | | |
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(kHz) |
| Mid 661 | 1880 | 312.00 |
| Low 512 | 1850.2 | 314.00 |
| High 810 | 1909.8 | 316.00 |

**Conclusion: PASS**

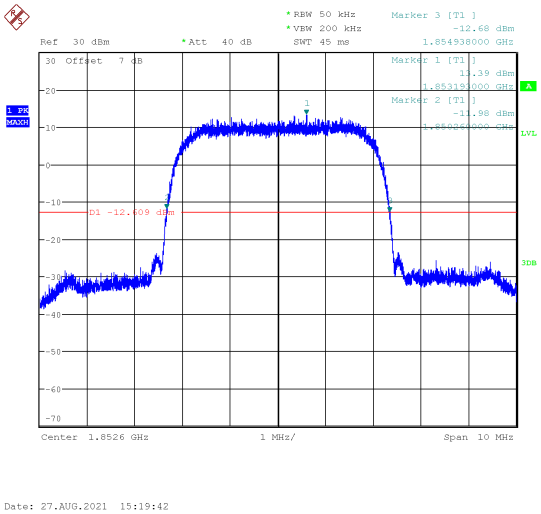
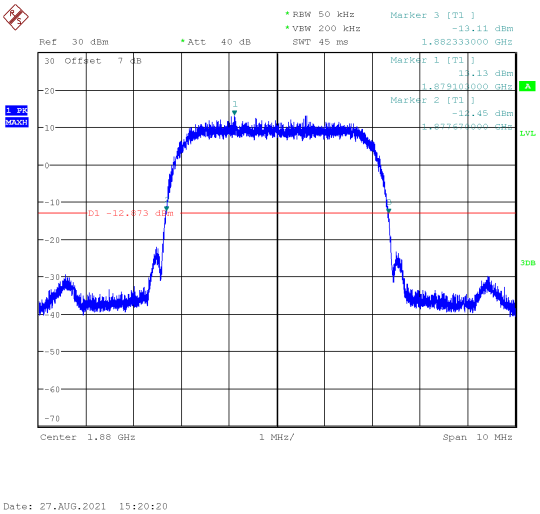
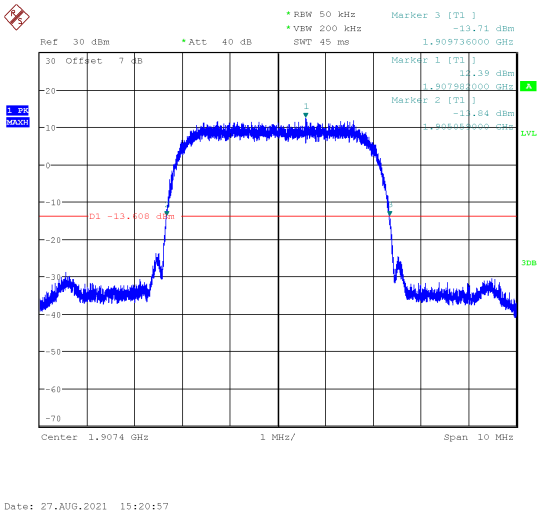
| GSM 1900 | |
|---|---|
| Channel 512- Emission Bandwidth (-26dBc BW) | Channel 661- Emission Bandwidth (-26dBc BW) |
|  |  |
| Channel 810- Emission Bandwidth (-26dBc BW) | / |
|  | / |

| GPRS 1900 | |
|---|---|
| Channel 512- Emission Bandwidth (-26dBc BW) | Channel 661- Emission Bandwidth (-26dBc BW) |
|  |  |
| Channel 810- Emission Bandwidth (-26dBc BW) | / |
|  | / |

| EDGE 1900 | |
|---|---|
| Channel 512- Emission Bandwidth (-26dBc BW) | Channel 881- Emission Bandwidth (-26dBc BW) |
|  |  |
| Channel 810- Emission Bandwidth (-26dBc BW) | / |
|  | / |

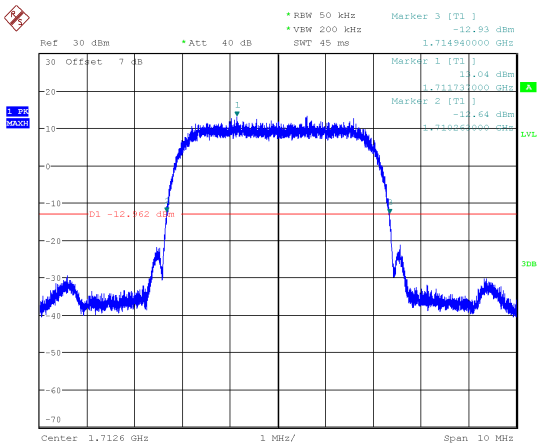
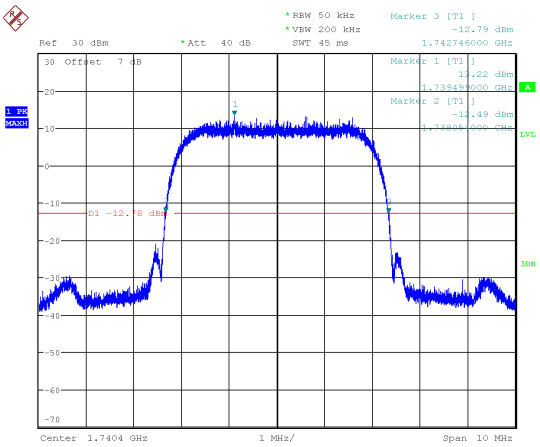
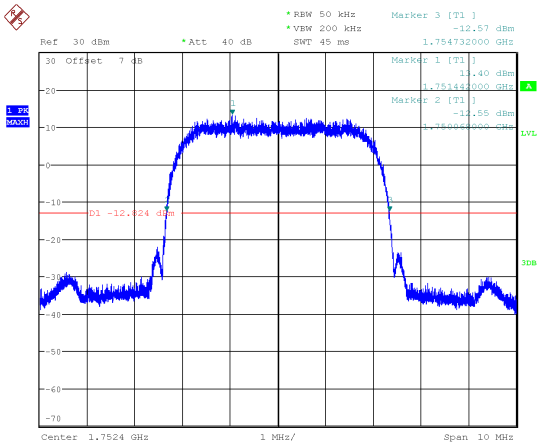
| WCDMA BAND II | | |
|---|---|---|
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(MHz) |
| Mid 9400 | 1880 | 4.663 |
| Low 9263 | 1852.6 | 4.678 |
| High 9537 | 1907.4 | 4.677 |

**Conclusion: PASS**

| **WCDMA BAND II** | |
|---|---|
| Channel 9263- Emission Bandwidth (-26dBc BW) | Channel 9400- Emission Bandwidth (-26dBc BW) |
|  |  |
| Channel 9538- Emission Bandwidth (-26dBc BW) | / |
|  | / |

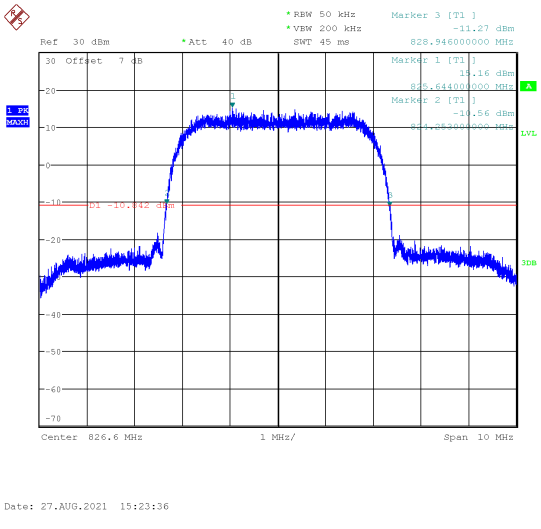
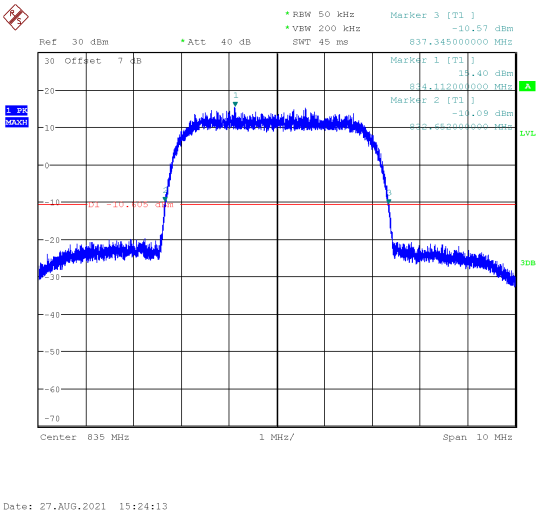
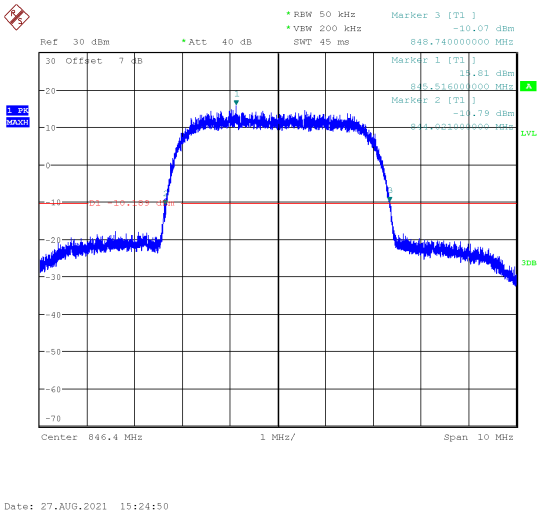
| WCDMA BAND IV | | |
|---|---|---|
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(MHz) |
| Mid 1450 | 1740.4 | 4.692 |
| Low 1313 | 1712.6 | 4.677 |
| High 1512 | 1752.4 | 4.664 |

**Conclusion: PASS**

| **WCDMA BAND IV** | |
|---|---|
| Channel 1313- Emission Bandwidth (-26dBc BW) | Channel 1450- Emission Bandwidth (-26dBc BW) |
|  |  |
| Channel 1512- Emission Bandwidth (-26dBc BW) | / |
|  | / |

| WCDMA BAND V | | |
|---|---|---|
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(MHz) |
| Mid 4175 | 835.0 | 4.693 |
| Low 4133 | 826.6 | 4.693 |
| High 4232 | 846.4 | 4.719 |

**Conclusion: PASS**

| **WCDMA BAND V** | |
|---|---|
| Channel 4133- Emission Bandwidth (-26dBc BW) | Channel 4175- Emission Bandwidth (-26dBc BW) |
|  |  |
| Channel 4232- Emission Bandwidth (-26dBc BW) | / |
|  | / |

## 6.5 Band Edge at antenna terminals

Method of test measurements please refer to KDB971168 D01 v03 clause 6

### 6.5.1 Limit:

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

Rule RSS-132: 5.5: (i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts).

(ii)After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required. Limit -13 dBm

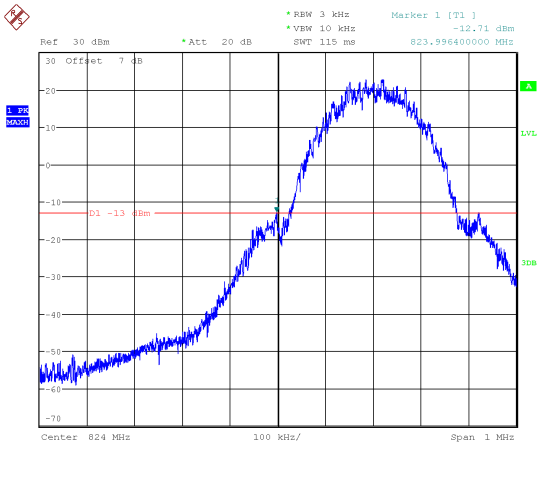
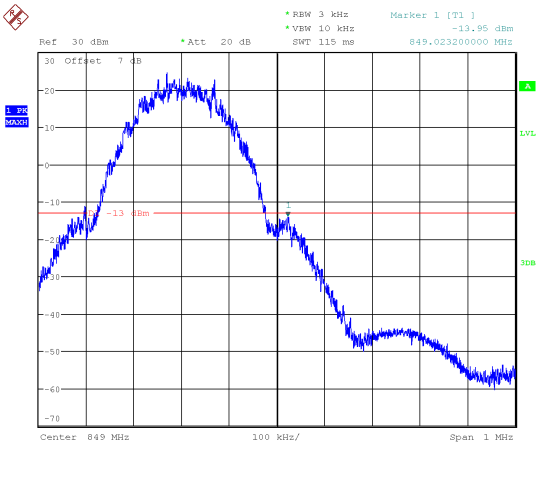
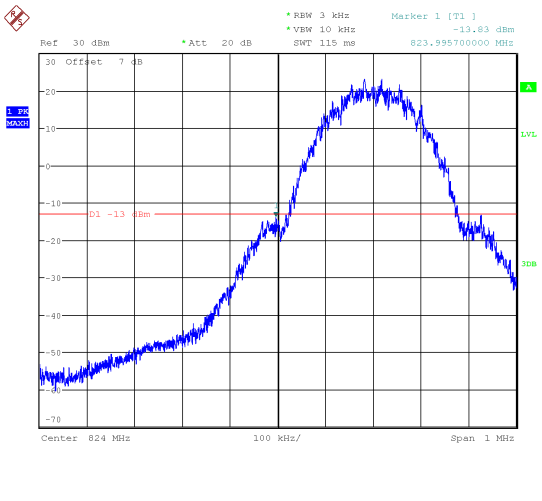
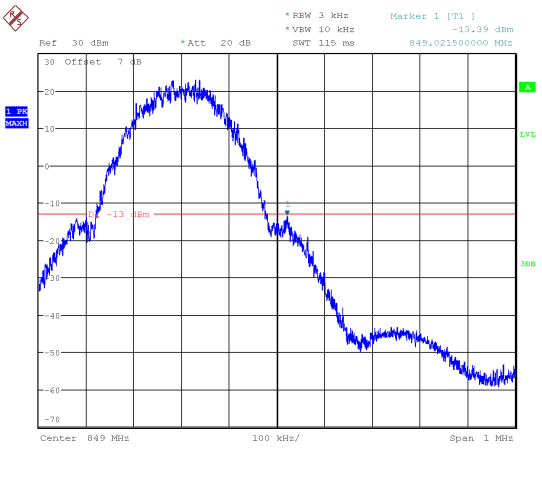
Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).

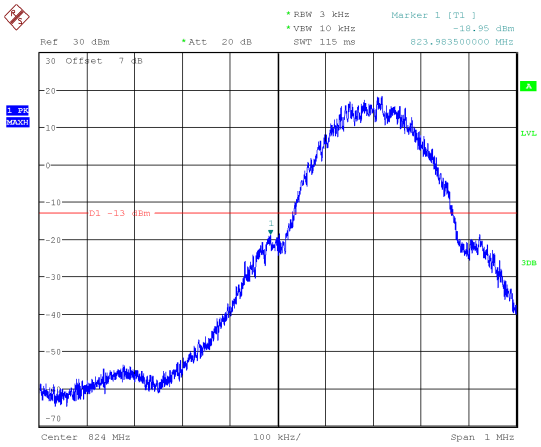
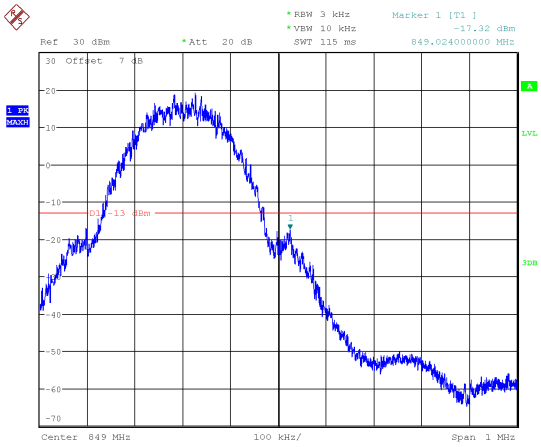
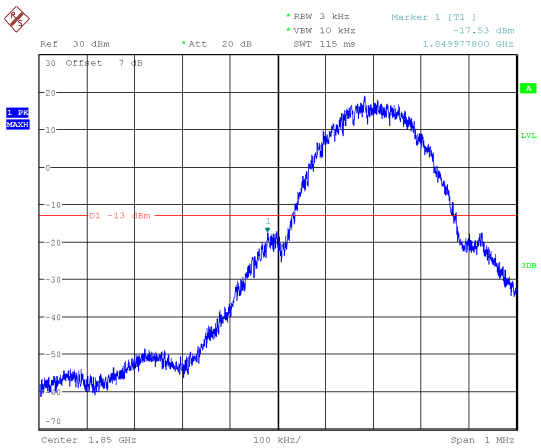
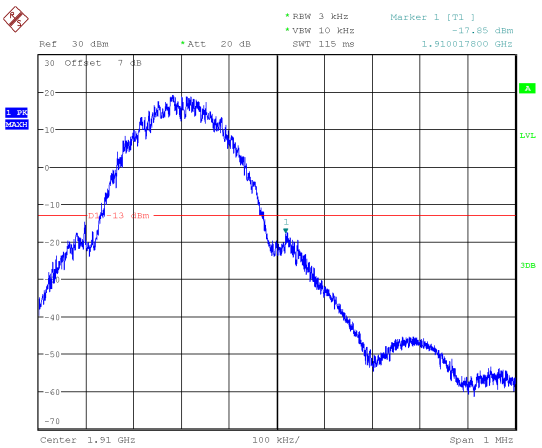
After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required."Limit -13 dBm

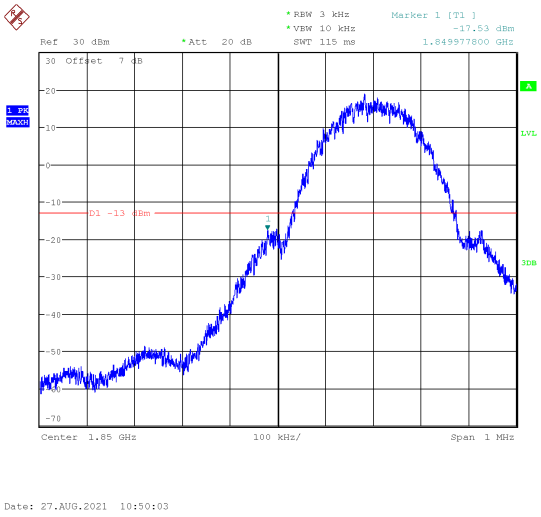
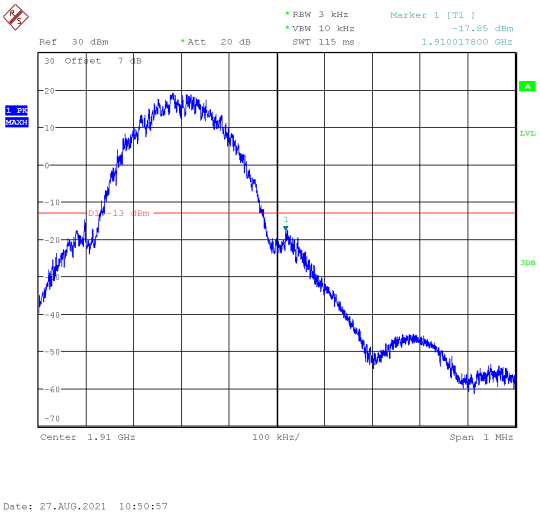
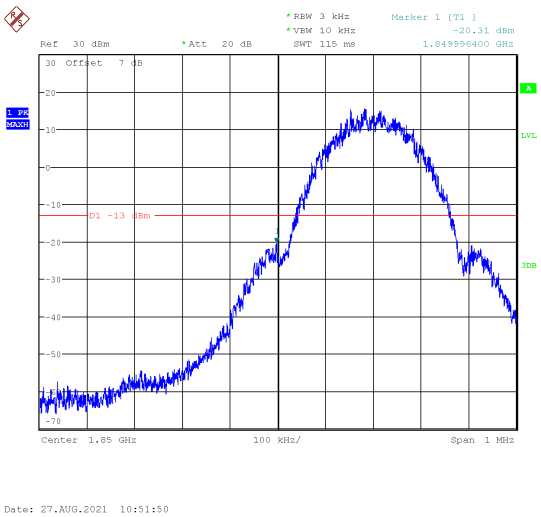
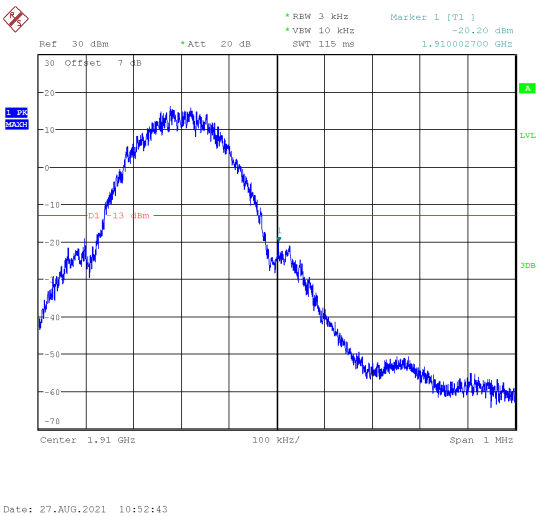
### 6.5.2 Test procedure:

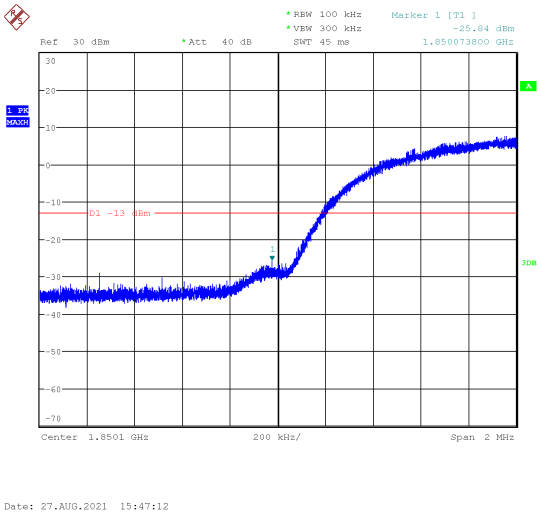
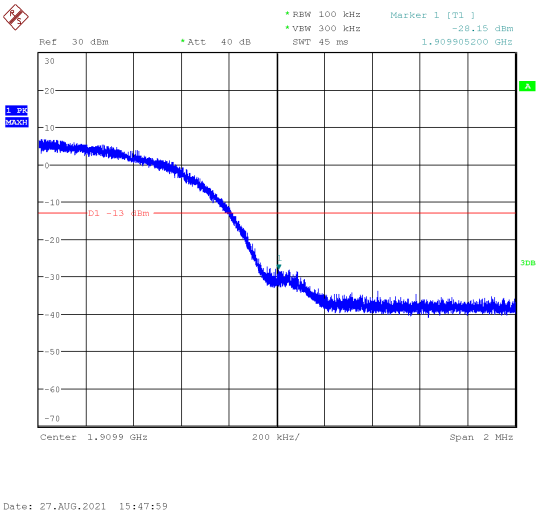
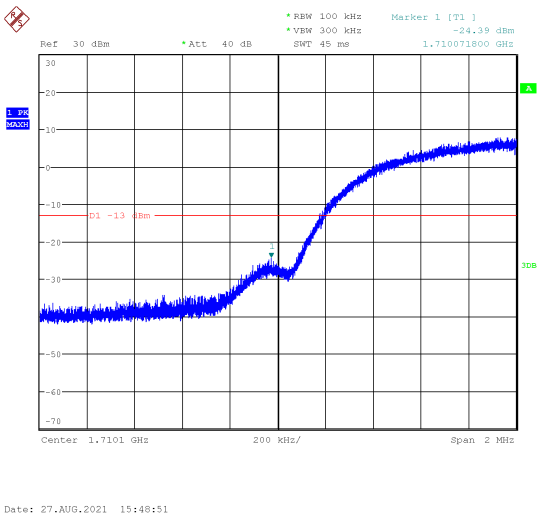
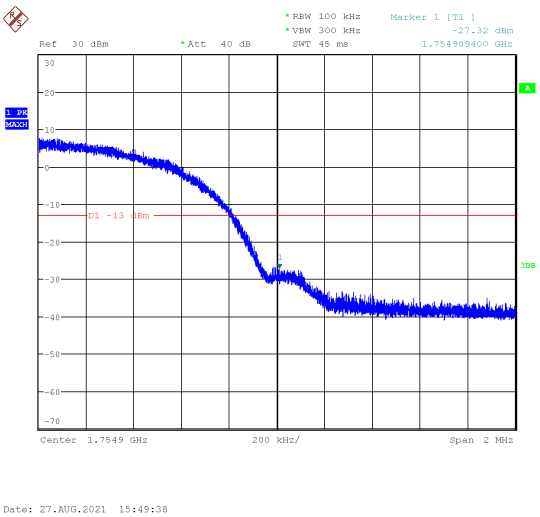
1. The RF output of the transceiver was connected to a signal analyzer through appropriate attenuation.
2. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.
3. The RF fundamental frequency should be excluded against the limit line in the operating frequency band
4. 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

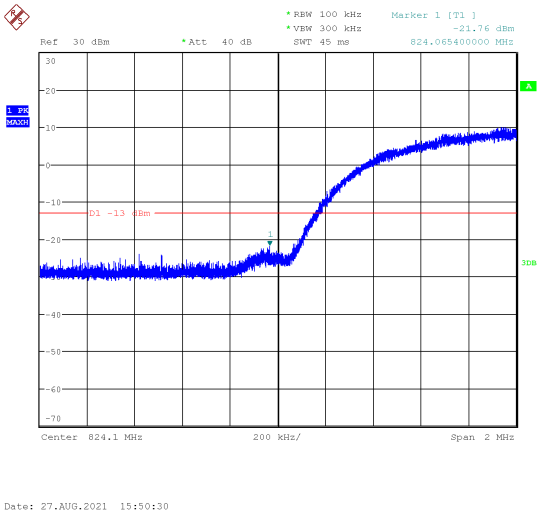
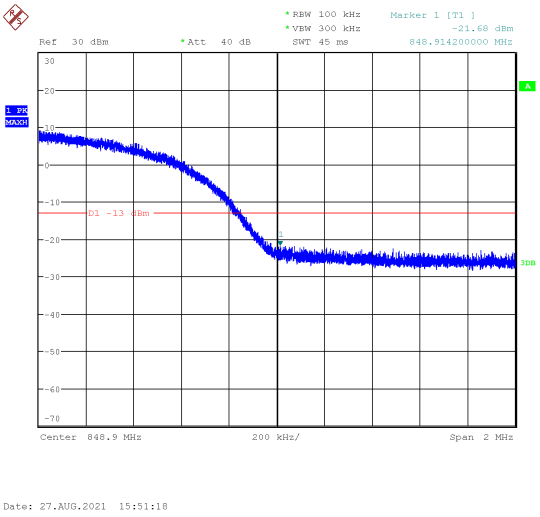
### 6.5.3 Test Result:

| GSM 850 | |
|---|---|
| Channel 128- LOW BAND EDGE BLOCK | Channel 251- LOW BAND EDGE BLOCK |
|  |  |
| **GPRS 850** | |
| Channel 128- LOW BAND EDGE BLOCK | Channel 251- LOW BAND EDGE BLOCK |
|  |  |

| EDGE 850 | |
|---|---|
| Channel 128- LOW BAND EDGE BLOCK | Channel 251- LOW BAND EDGE BLOCK |
|  |  |
| **GSM 1900** | |
| Channel 512- LOW BAND EDGE BLOCK | Channel 810- LOW BAND EDGE BLOCK |
|  |  |

| GPRS 1900 | |
|---|---|
| Channel 512- LOW BAND EDGE BLOCK | Channel 810- LOW BAND EDGE BLOCK |
|  |  |
| **EDGE 1900** | |
| Channel 512- LOW BAND EDGE BLOCK | Channel 810- LOW BAND EDGE BLOCK |
|  |  |

| WCDMA BAND II | |
|---|---|
| Channel 9263- LOW BAND EDGE BLOCK | Channel 9537- HIGH BAND EDGE BLOCK |
|  |  |
| **WCDMA BAND IV** | |
| Channel 1313- LOW BAND EDGE BLOCK | Channel 1512- HIGH BAND EDGE BLOCK |
|  |  |

| WCDMA BAND V | |
|---|---|
| Channel 4133- LOW BAND EDGE BLOCK | Channel 4232- HIGH BAND EDGE BLOCK |
|  |  |





**Conclusion: PASS**

## 6.6. Frequency Stability

Method of test measurements please refer to KDB971168 D01 v03 clause 9

### 6.6.1. Method of Measurement and test procedures

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMW 500 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -10℃.
3. With the EUT, powered via nominal voltage, connected to the CMW 500 and in a simulated call on mid channel of GSM850, PCS1900, WCDMA BANDII, WCDMA BANDIV and WCDMA BANDV, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at -10℃ increments from -10℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMW 500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50℃ to -10℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

### 6.6.2. Measurement Limit

#### 6.6.2.1. For Hand carried battery powered equipment

According to the JTC standard the GSM frequency stability of the carrier shall be accurate to within 0.1ppm of the received frequency from the base station. And the WCDMA is 2.5ppm. This accuracy is sufficient to meet Sec.24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.6VDC and 4.35VDC, with a nominal voltage of 3.8VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages was varied from 85% to 115%.

#### 6.6.2.2. For equipment powered by primary supply voltage

According to the JTC standard the GSM frequency stability of the carrier shall be accurate to within 0.1ppm of the received frequency from the base station. And the WCDMA is 2.5ppm. This accuracy is sufficient to meet Sec.24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section

2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

Rule RSS-132 5.3 specifies that "The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations." Limits ≤ ±2.5 ppm

Rule RSS-133 6.3 specifies that "The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations." Limit ≤ ±2.5 ppm

### 6.6.3 Test results

**GSM850 Mid Channel/Fc (MHz) 189/836.4**

**Frequency Error VS Temperature**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.87 | -30 | 5.53 | 84 |
| 3.87 | -20 | 12.99 | 84 |
| 3.87 | -10 | 3.79 | 84 |
| 3.87 | 0 | 5.12 | 84 |
| 3.87 | 10 | 5.71 | 84 |
| 3.87 | 20 | 5.82 | 84 |
| 3.87 | 30 | 4.71 | 84 |
| 3.87 | 40 | 5.61 | 84 |
| 3.87 | 50 | 10.22 | 84 |

**Frequency Error VS Voltage**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.45 | 25 | 16.80 | 84 |
| 3.87 | 25 | 3.79 | 84 |
| 4.45 | 25 | 5.69 | 84 |

**GPRS850 Mid Channel/Fc (MHz) 189/836.4**

**Frequency Error VS Temperature**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.87 | -30 | 5.26 | 84 |
| 3.87 | -20 | 4.95 | 84 |
| 3.87 | -10 | 2.49 | 84 |
| 3.87 | 0 | 4.28 | 84 |
| 3.87 | 10 | 1.85 | 84 |
| 3.87 | 20 | 4.85 | 84 |
| 3.87 | 30 | 3.66 | 84 |
| 3.87 | 40 | 5.20 | 84 |
| 3.87 | 50 | 3.97 | 84 |

**Frequency Error VS Voltage**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.45 | 25 | 7.10 | 84 |
| 3.87 | 25 | 8.35 | 84 |
| 4.45 | 25 | 2.14 | 84 |

**EDGE850 Mid Channel/Fc (MHz) 189/836.4**

**Frequency Error VS Temperature**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.87 | -30 | 9.45 | 84 |
| 3.87 | -20 | 9.21 | 84 |
| 3.87 | -10 | 7.97 | 84 |
| 3.87 | 0 | 8.46 | 84 |
| 3.87 | 10 | 12.24 | 84 |
| 3.87 | 20 | 6.39 | 84 |
| 3.87 | 30 | 7.79 | 84 |
| 3.87 | 40 | 6.32 | 84 |
| 3.87 | 50 | 0.27 | 84 |

**Frequency Error VS Voltage**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.45 | 25 | 7.89 | 84 |
| 3.87 | 25 | 4.87 | 84 |
| 4.45 | 25 | 5.18 | 84 |

**PCS1900 Mid Channel/fc(MHz) 661/1880**

**Frequency Error VS Temperature**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.87 | -30 | 33.23 | 196 |
| 3.87 | -20 | 32.30 | 196 |
| 3.87 | -10 | 20.39 | 196 |
| 3.87 | 0 | 26.85 | 196 |
| 3.87 | 10 | 28.25 | 196 |
| 3.87 | 20 | 14.81 | 196 |
| 3.87 | 30 | 25.39 | 196 |
| 3.87 | 40 | 29.20 | 196 |
| 3.87 | 50 | 27.50 | 84 |

**Frequency Error VS Voltage**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.45 | 25 | 33.73 | 196 |
| 3.87 | 25 | 18.63 | 196 |
| 4.45 | 25 | 23.60 | 196 |

**GPRS1900 Mid Channel/fc(MHz) 661/1880**

**Frequency Error VS Temperature**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.87 | -30 | 25.96 | 196 |
| 3.87 | -20 | 24.71 | 196 |
| 3.87 | -10 | 21.97 | 196 |
| 3.87 | 0 | 19.77 | 196 |
| 3.87 | 10 | 28.76 | 196 |
| 3.87 | 20 | 29.83 | 196 |
| 3.87 | 30 | 25.08 | 196 |
| 3.87 | 40 | 19.97 | 196 |
| 3.87 | 50 | 23.64 | 84 |

**Frequency Error VS Voltage**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.45 | 25 | 21.96 | 196 |
| 3.87 | 25 | 20.19 | 196 |
| 4.45 | 25 | 19.27 | 196 |

**EDGE1900 Mid Channel/fc(MHz) 661/1880**

**Frequency Error VS Temperature**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.87 | -30 | 23.24 | 196 |
| 3.87 | -20 | 27.11 | 196 |
| 3.87 | -10 | 20.81 | 196 |
| 3.87 | 0 | 24.84 | 196 |
| 3.87 | 10 | 35.21 | 196 |
| 3.87 | 20 | 19.11 | 196 |
| 3.87 | 30 | 26.15 | 196 |
| 3.87 | 40 | 23.93 | 196 |
| 3.87 | 50 | 20.29 | 84 |

**Frequency Error VS Voltage**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.45 | 25 | 25.94 | 196 |
| 3.87 | 25 | 26.41 | 196 |
| 4.45 | 25 | 18.32 | 196 |

**WCDMA BAND II Mid Channel/fc(MHz) 9400 /1880**

**Frequency Error VS Temperature**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.87 | -30 | -11.613 | 4700 |
| 3.87 | -20 | -5.635 | 4700 |
| 3.87 | -10 | -10.75 | 4700 |
| 3.87 | 0 | -9.664 | 4700 |
| 3.87 | 10 | -11.574 | 4700 |
| 3.87 | 20 | -5.709 | 4700 |
| 3.87 | 30 | -10.284 | 4700 |
| 3.87 | 40 | -4.033 | 4700 |
| 3.87 | 50 | -5.509 | 4700 |

**Frequency Error VS Voltage**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.45 | 25 | -5.452 | 4700 |
| 3.87 | 25 | -11.547 | 4700 |
| 4.45 | 25 | -3.95 | 4700 |

**Frequency Error VS Temperature**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.87 | -30 | -0.709 | 4331.5 |
| 3.87 | -20 | -1.124 | 4331.5 |
| 3.87 | -10 | -10.213 | 4331.5 |
| 3.87 | 0 | 2.039 | 4331.5 |
| 3.87 | 10 | -3.733 | 4331.5 |
| 3.87 | 20 | 1.103 | 4331.5 |
| 3.87 | 30 | -6.797 | 4331.5 |
| 3.87 | 40 | -0.277 | 4331.5 |
| 3.87 | 50 | -2.572 | 4331.5 |

**Frequency Error VS Voltage**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.45 | 25 | -3.923 | 4331.5 |
| 3.87 | 25 | -3.984 | 4331.5 |
| 4.45 | 25 | -4.91 | 4331.5 |

**WCDMA BAND V Mid Channel/fc(MHz) 4175/836.4**

**Frequency Error VS Temperature**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.87 | -30 | -7.021 | 2091.5 |
| 3.87 | -20 | -11.136 | 2091.5 |
| 3.87 | -10 | -6.486 | 2091.5 |
| 3.87 | 0 | -9.373 | 2091.5 |
| 3.87 | 10 | -3.152 | 2091.5 |
| 3.87 | 20 | -2.304 | 2091.5 |
| 3.87 | 30 | -3.79 | 2091.5 |
| 3.87 | 40 | -5.075 | 2091.5 |
| 3.87 | 50 | -5.444 | 2091.5 |

**Frequency Error VS Voltage**

| Power Supply (VDc) | Environment Temperature(℃) | Frequency error(Hz) | Limit (Hz) |
|---|---|---|---|
| 3.45 | 25 | -9.715 | 2091.5 |
| 3.87 | 25 | -7.006 | 2091.5 |
| 4.45 | 25 | -4.102 | 2091.5 |

**Conclusion: PASS**

## 6.7. Conducted Spurious Emission

### 6.7.1. GSM Measurement Method and test procedures

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

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For GSM850, data taken from 30 MHz to 10 GHz.
2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; If the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give a optimal sweep time according the selected span and RBW.
3. The procedure to get the conducted spurious emission is as follows:
The trace mode is set to MaxHold to get the highest signal at each frequency;
Wait 25 seconds; Get the result.
4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

**GSM 850 Transmitter**

| Channel | Frequency(MHz) |
|---|---|
| 128 | 824.2 |
| 189 | 836.4 |
| 251 | 848.8 |

**PCS 1900 Transmitter**

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

#### 6.7.1.1. Measurement Limit

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

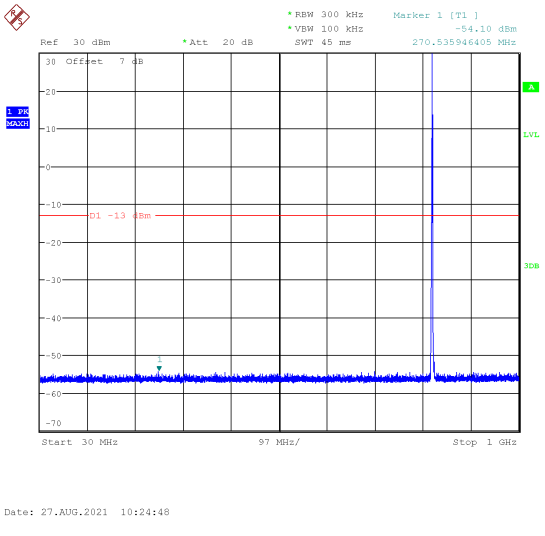
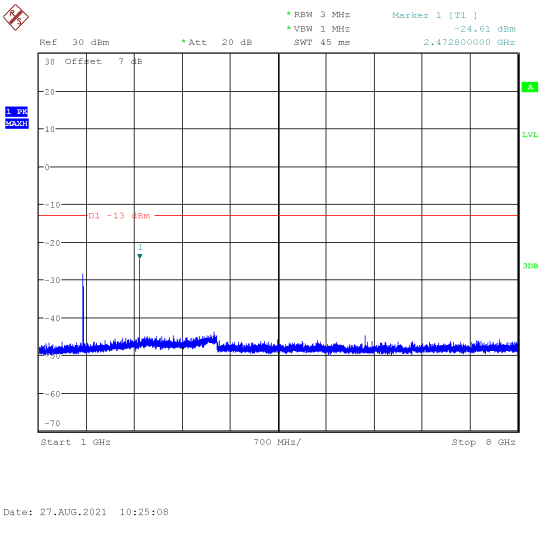
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm.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

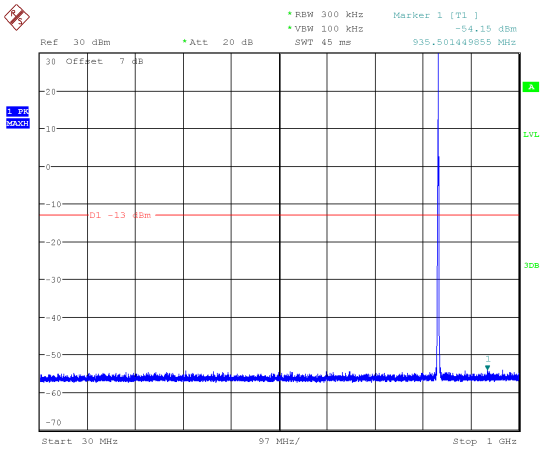
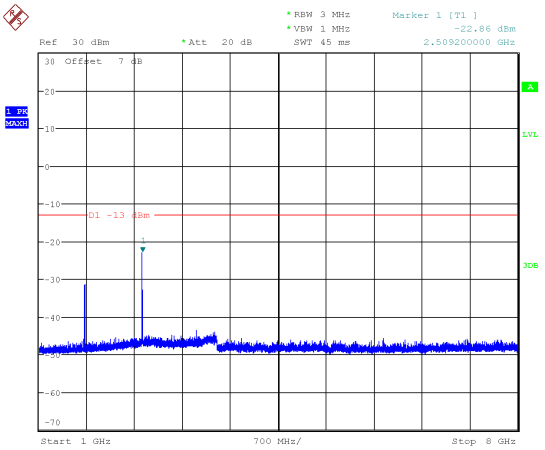
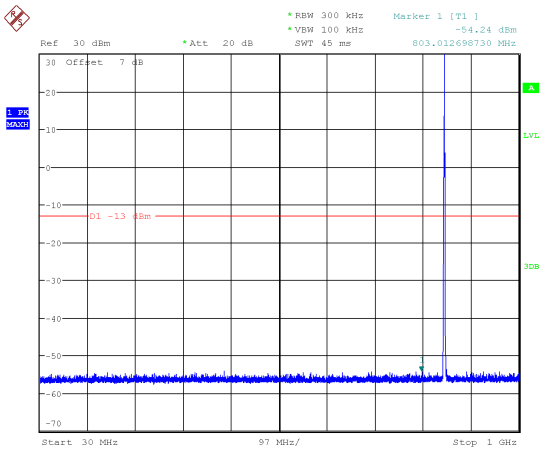
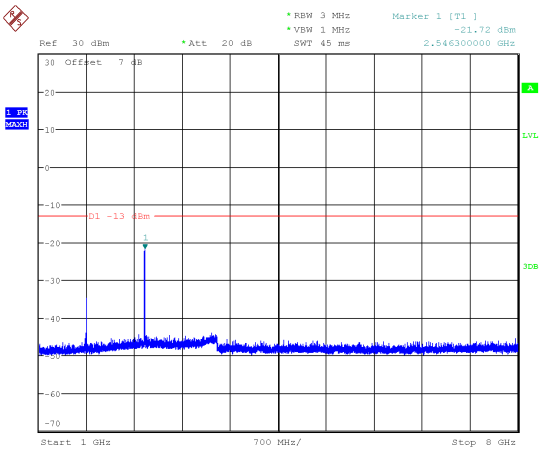
Rule RSS-132 5.5 specifies that " In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required." Limit -13 dBm

Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).

After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm

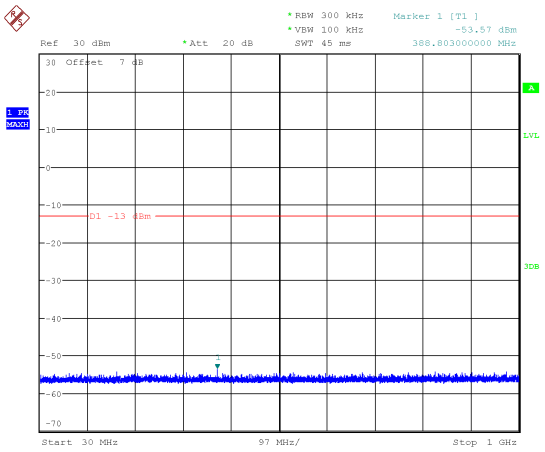
**Note: peak above the limit line is the carrier frequency.**

| **GSM850** | |
|---|---|
| Channel 128: 30MHz~1GHz | Channel 128: 1GHz~8GHz |
|  |  |

| Channel 189: 30MHz~1GHz | Channel 189: 1GHz~8GHz |
|---|---|
|  <br>Date: 27.AUG.2021 10:25:39 |  <br>Date: 27.AUG.2021 10:26:00 |
| Channel 251: 30MHz~1GHz | Channel 251: 1GHz~8GHz |
|  <br>Date: 27.AUG.2021 10:26:31 |  <br>Date: 27.AUG.2021 10:26:51 |

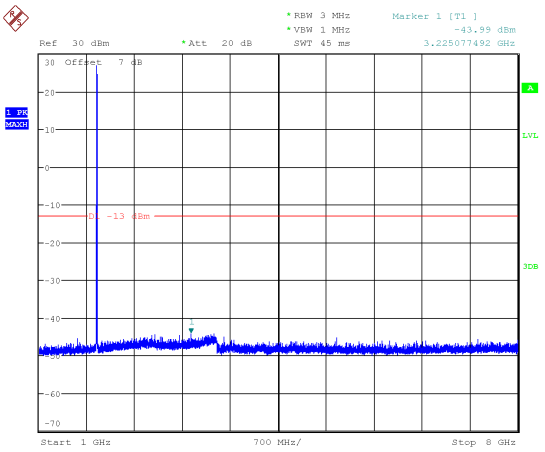
## GSM1900

### Channel 512: 30MHz~1GHz



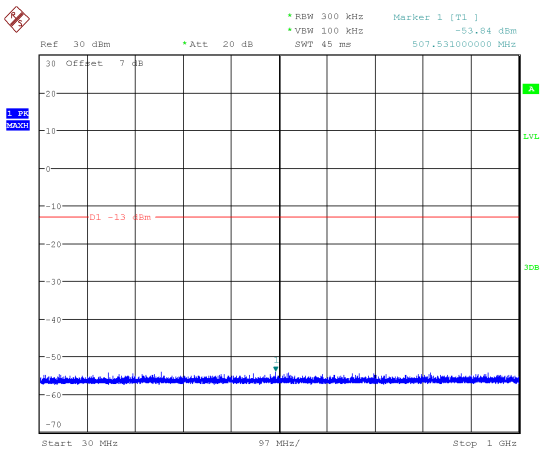

Date: 27.AUG.2021 10:33:36

### Channel 512: 1GHz~8GHz



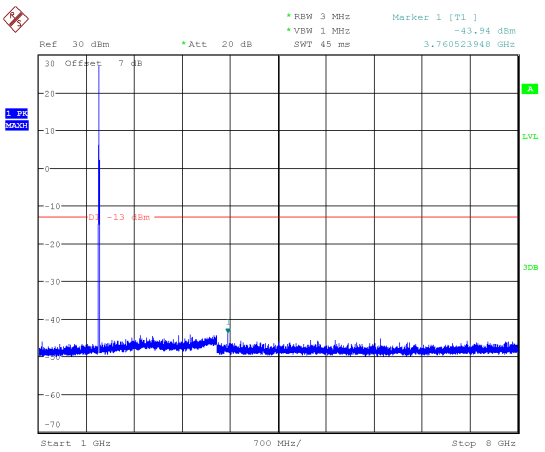

Date: 27.AUG.2021 10:33:56

### Channel 661: 30MHz~1GHz



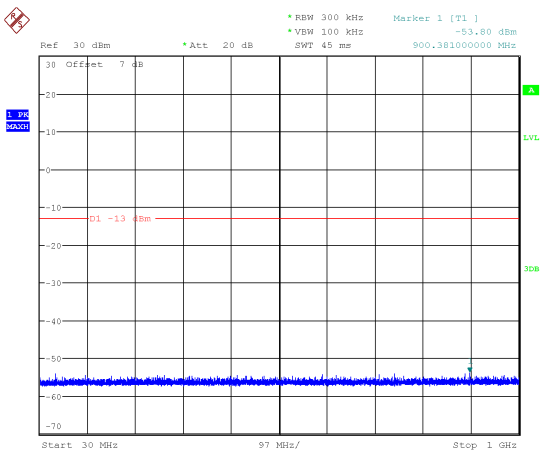

Date: 27.AUG.2021 10:36:53

### Channel 661: 1GHz~8GHz



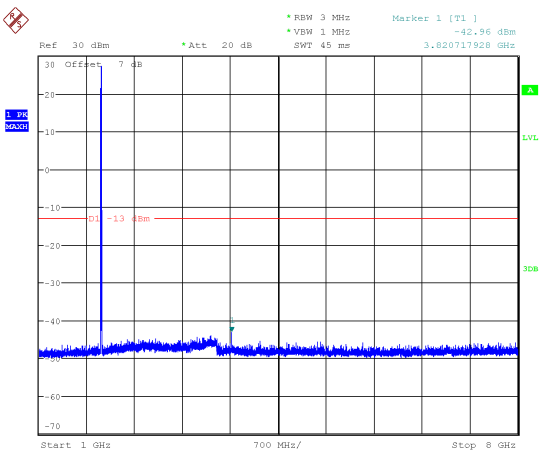

Date: 27.AUG.2021 10:37:13

### Channel 810: 30MHz~1GHz




Date: 27.AUG.2021 10:34:27

### Channel 810: 1GHz~8GHz




Date: 27.AUG.2021 10:35:38

### 6.7.2. WCDMA Measurement Method and test procedures

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

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of WCDMA Band II and WCDMA BANDIV, these equate to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For WCDMA Band V, data taken from 30 MHz to 10GHz.
2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; If the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give a optimal sweep time according the selected span and RBW.
3. The procedure to get the conducted spurious emission is as follows:
The trace mode is set to MaxHold to get the highest signal at each frequency;
Wait 25 seconds;
Get the result.
4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

**WCDMA Band II Transmitter**

| Channel | Frequency (MHz) |
|---|---|
| 9262 | 1852.40 |
| 9400 | 1880.00 |
| 9538 | 1907.60 |

**WCDMA Band IV Transmitter**

| Channel | Frequency (MHz) |
|---|---|
| 1312 | 1712.40 |
| 1413 | 1732.60 |
| 1513 | 1752.60 |

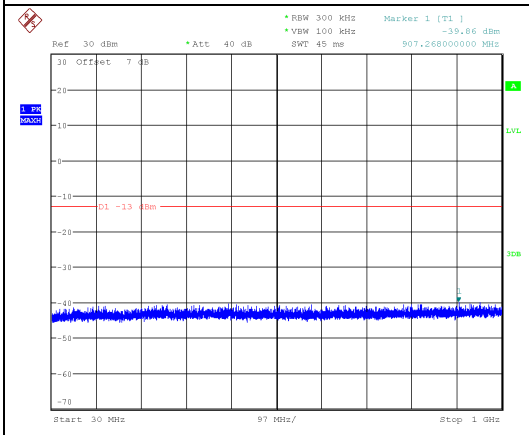
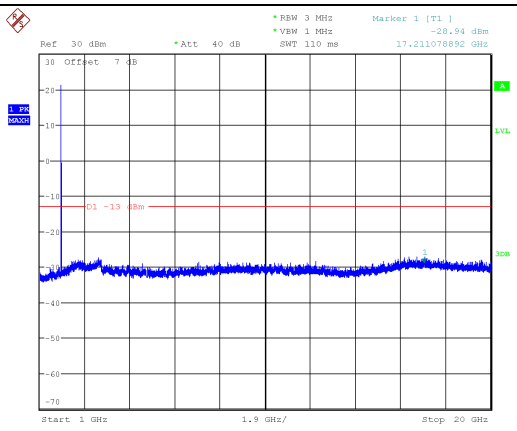
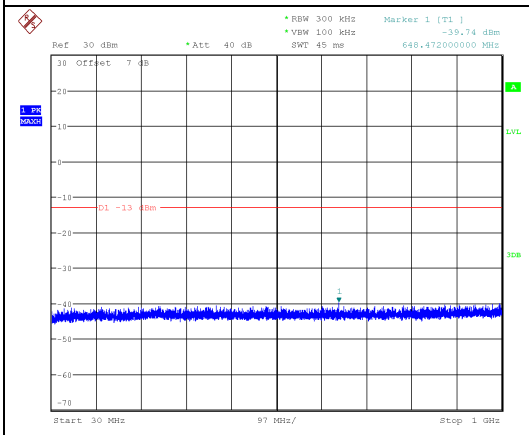
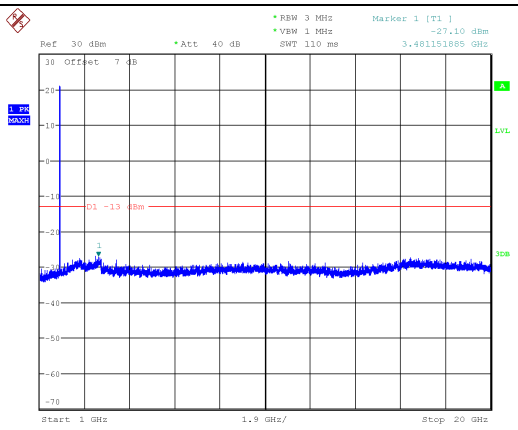
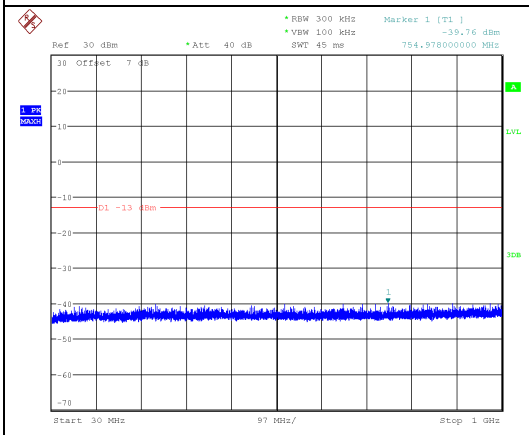
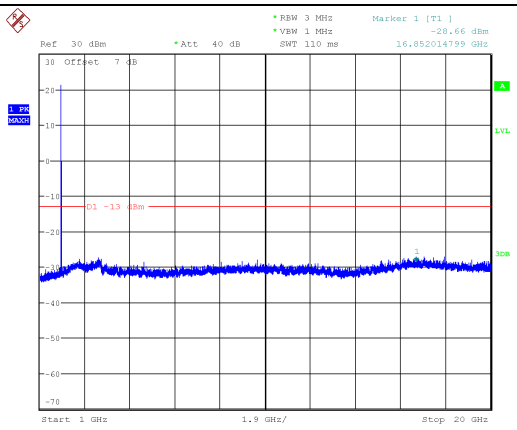
**WCDMA Band V Transmitter**

| Channel | Frequency (MHz) |
|---|---|
| 4132 | 826.40 |
| 4183 | 836.60 |
| 4233 | 846.60 |

### 6.7.2.1. Measurement result

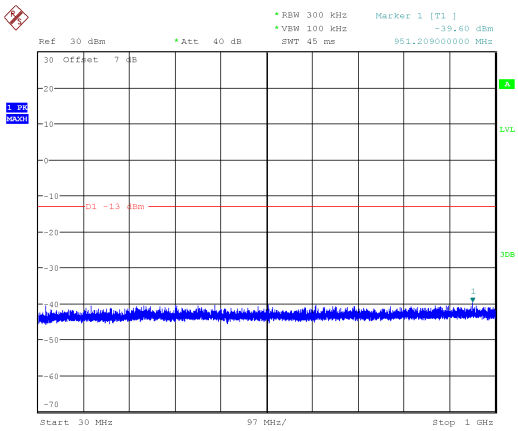
**Spurious emission limit -13dBm.**

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

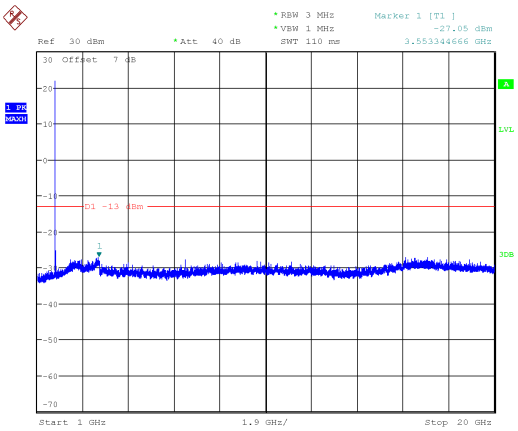
| WCDMA Band II | |
|---|---|
| Channel 9262: 30MHz~1GHz | Channel 9262: 1GHz~10GHz |
|  |  |
| Channel 9400: 30MHz~1GHz | Channel 9400: 1GHz~10GHz |
|  |  |
| Channel 9538: 30MHz~1GHz | Channel 9538: 1GHz~10GHz |
|  |  |

## WCDMA Band IV

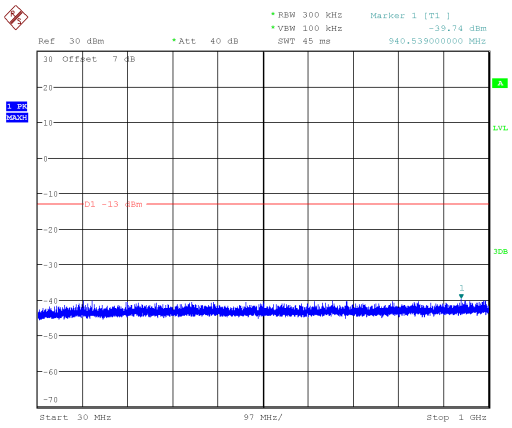
### Channel 1313: 30MHz~1GHz



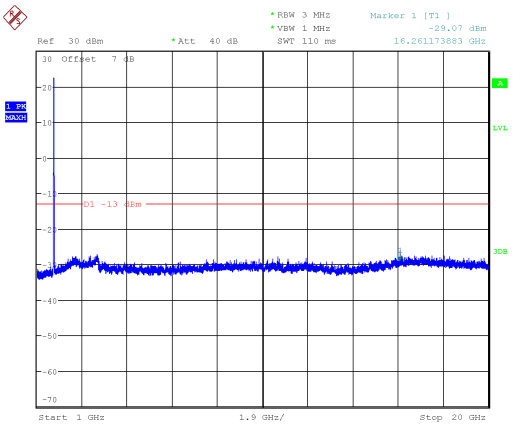

### Channel 1313: 1GHz~10GHz



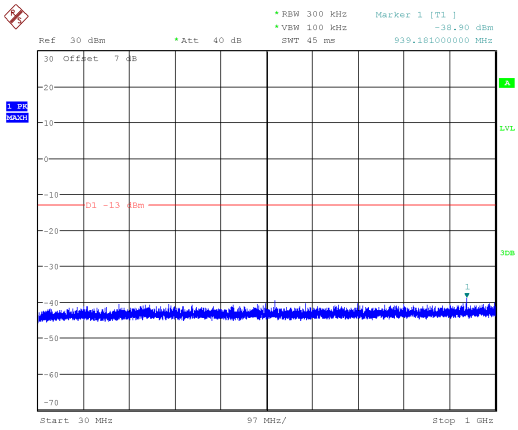

### Channel 1413: 30MHz~1GHz



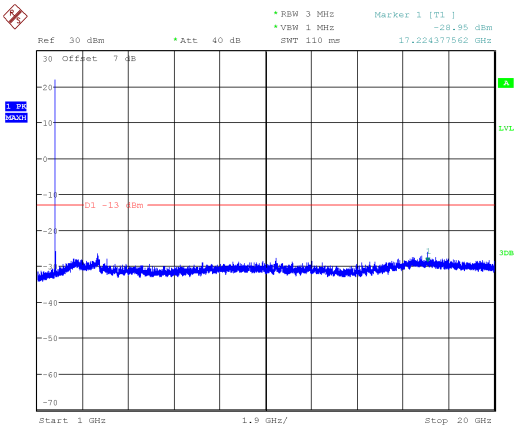

### Channel 1413: 1GHz~10GHz




### Channel 1512: 30MHz~1GHz

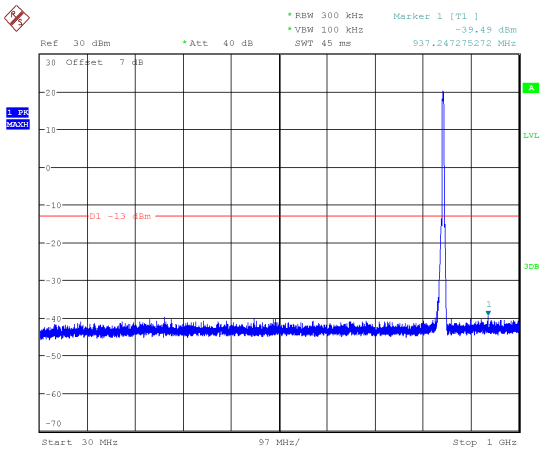



### Channel 1512: 1GHz~10GHz



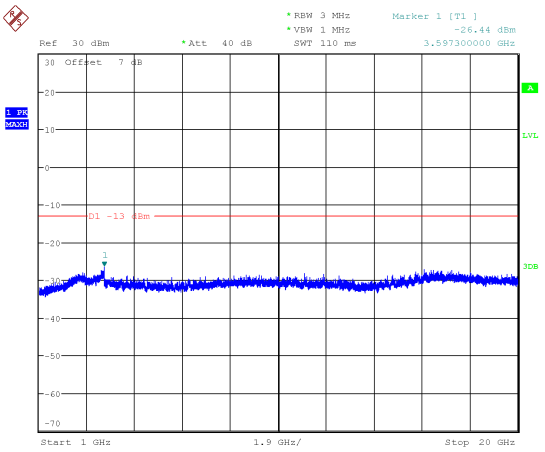
## WCDMA Band V

### Channel 4133: 30MHz~1GHz



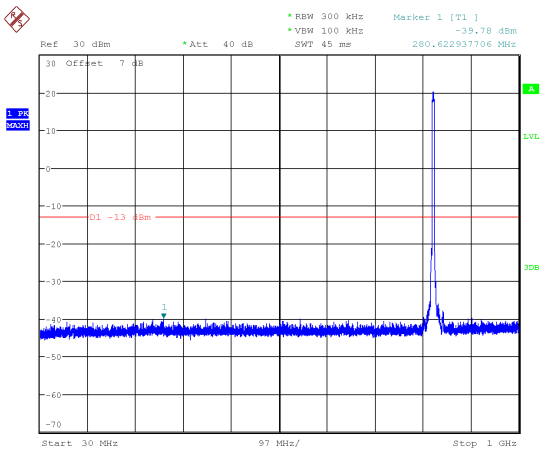

Date: 27.AUG.2021 16:16:15

### Channel 4133: 1GHz~10GHz



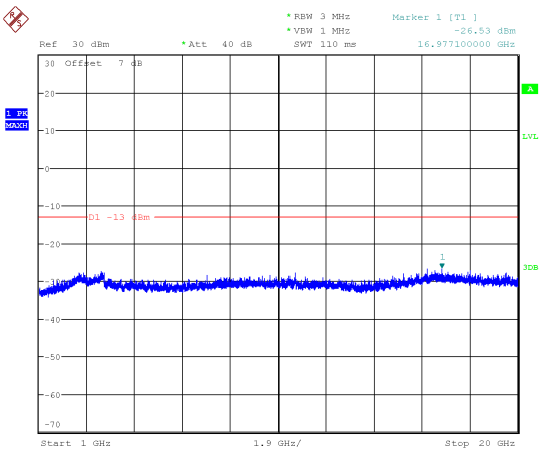

Date: 27.AUG.2021 16:16:55

### Channel 4183: 30MHz~1GHz



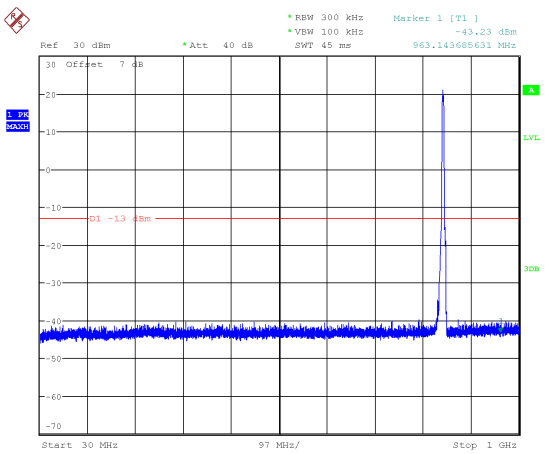

Date: 26.OCT.2021 15:56:45

### Channel 4183: 1GHz~10GHz



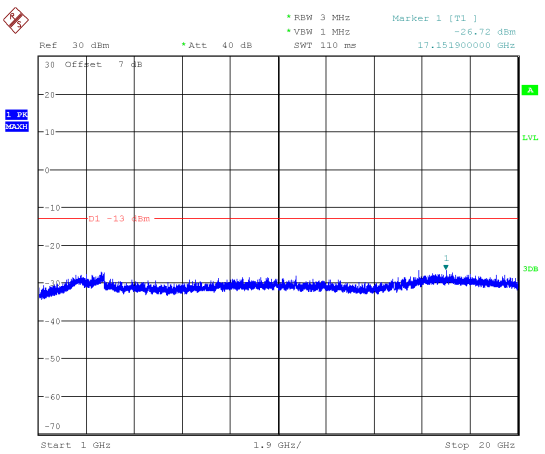

Date: 26.OCT.2021 15:57:25

### Channel 4232: 30MHz~1GHz




Date: 27.AUG.2021 16:17:43

### Channel 4232: 1GHz~10GHz




Date: 27.AUG.2021 16:18:23

## 6.8. Radiated

### 6.8.1. EIRP

#### 6.8.1.1. GSM EIRP

##### 6.8.1.1.1. Description

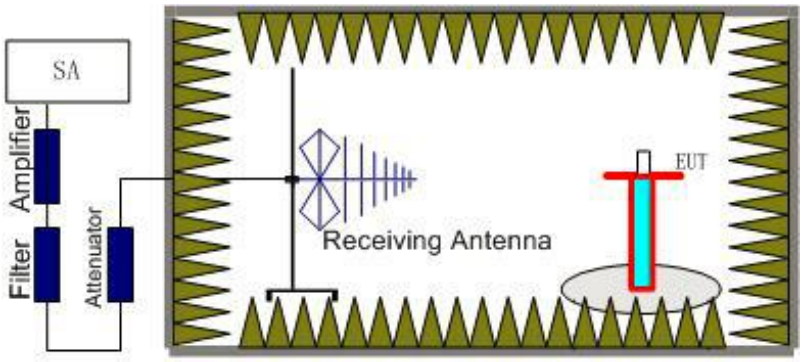
This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage." Rule Part 22.913(a) specifies " The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

##### 6.8.1.1.2. Method of Measurement

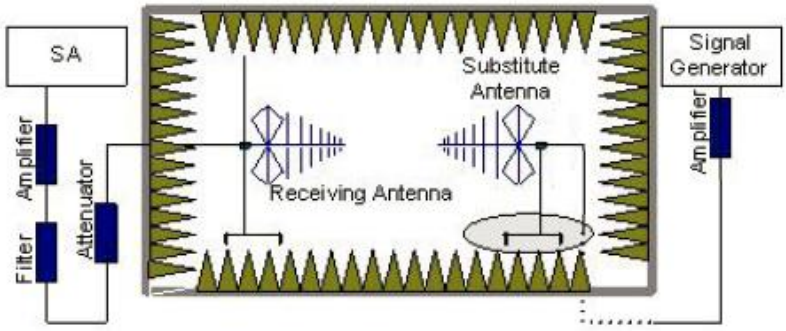
The measurements procedures in TIA-603E-2016 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.




2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.




In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ($P_{Mea}$) is applied to the input of the substitution antenna, and adjust the level of the

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

4. A amplifier should be connected to the Signal Source output port. And the cable should be connected between the Amplifier and the Substitution Antenna.

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

The measurement results are obtained as described below:

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

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

**6.8.1.1.3. Measurement Limits**

Rule 2.1051/22.917/24.238/22.913/24.232 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).

After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm

Rule 2.1051/22.917/24.238/22.913/24.232 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).

After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm

Rule RSS-132 5.5 specifies that " In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts).

After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required." Limit -13 dBm

Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts).

After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required. Limit -13 dBm

### 6.8.1.1.3 GSM 850-ERP/EIRP 22.913(a)

#### 6.8.1.1.3.1 Measurement result

**GSM(GMSK)**

| Frequency(MHz) | Peak EIRP (dBm) | Peak ERP (dBm) | Polarization |
|---|---|---|---|
| 824.2 | 30.12 | 27.97 | H |
| 836.6 | 30.14 | 27.99 | H |
| 848.8 | 30.16 | 28.01 | H |

**GPRS(GMSK)**

| Frequency(MHz) | Peak EIRP (dBm) | Peak ERP (dBm) | Polarization |
|---|---|---|---|
| 824.2 | 30.10 | 27.95 | H |
| 836.6 | 30.08 | 27.93 | H |
| 848.8 | 30.12 | 27.97 | H |

**EDGE(8PSK)**

| Frequency(MHz) | Peak EIRP (dBm) | Peak ERP (dBm) | Polarization |
|---|---|---|---|
| 824.2 | 22.78 | 20.63 | H |
| 836.6 | 22.69 | 20.54 | H |
| 848.8 | 22.81 | 20.66 | H |

### 6.8.1.1.4 PCS 1900-EIRP 24.232(c)

#### 6.8.1.1.4.1 Measurement result

**GSM (GMSK)**

| Frequency(MHz) | Peak EIRP (dBm) | Polarization |
|---|---|---|
| 1850.2 | 30.52 | V |
| 1880.0 | 30.29 | H |
| 1909.8 | 30.30 | V |

**GPRS (GMSK)**

| Frequency(MHz) | Peak EIRP (dBm) | Polarization |
|---|---|---|

| | | |
|---|---|---|
| 1850.2 | 30.51 | V |
| 1880.0 | 30.50 | H |
| 1909.8 | 30.32 | V |

**EDGE (8PSK)**

| Frequency(MHz) | Peak EIRP (dBm) | Polarization |
|---|---|---|
| 1850.2 | 22.13 | V |
| 1880.0 | 22.38 | H |
| 1909.8 | 22.68 | V |

### 6.8.1.2. WCDMA EIRP

#### 6.8.1.2.1. Description

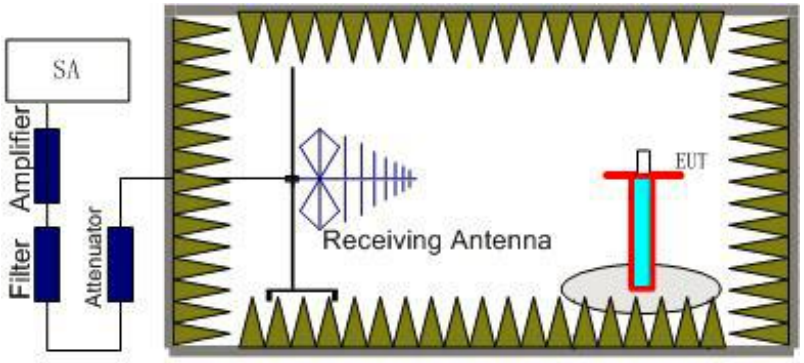
This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. "Rule Part 22.913(a) specifies ” The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

#### 6.8.1.2.2. Method of Measurement

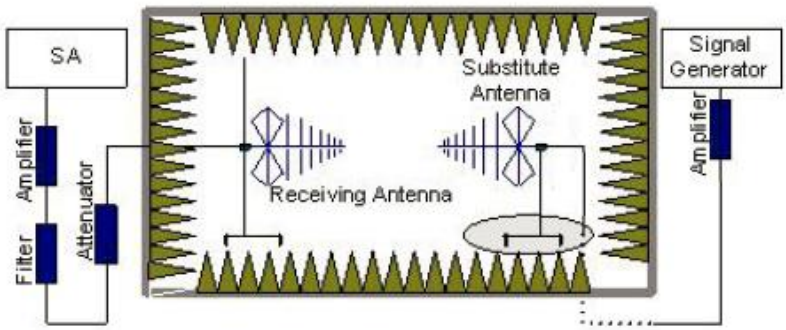
The measurements procedures in TIA-603E-2016 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.




2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.




In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ($P_{Mea}$) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded ($P_r$). The power of signal source ($P_{Mea}$) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna.

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

The measurement results are obtained as described below:

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

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

**6.8.1.2.3. Method of Measurement**

Rule RSS-132 5.5 specifies that " In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required."

Limit -13 dBm

**WCDMA Band II**

| Frequency (MHz) | Peak EIRP (dBm) | Polarization |
|---|---|---|
| 1852.6 | 24.78 | V |
| 1880.0 | 24.67 | H |
| 1907.4 | 25.07 | V |

**WCDMA Band IV**

| Frequency(MHz) | Peak EIRP(dBm) | Polarization |
|---|---|---|
| 1712.4 | 24.08 | H |
| 1732.6 | 23.98 | H |
| 1752.6 | 24.03 | H |

**WCDMA Band V**

| Frequency(MHz) | Peak ERP (dBm) | Polarization |
|---|---|---|
| 826.4 | 19.57 | H |
| 836.6 | 19.62 | H |
| 846.6 | 19.65 | H |

**Note: the EUT was displayed in several different direction, the worst cases were shown.**

### 6.8.2 EMISSION LIMIT

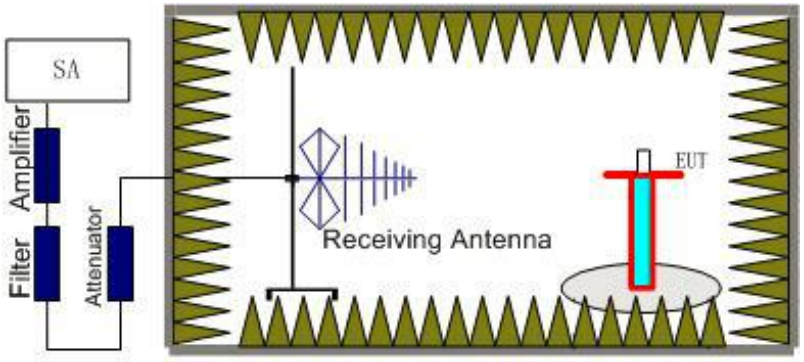
#### 6.8.2.1 GSM Measurement Method

The measurement procedures in TIA-603E-2016are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of PCS1900 and GSM850.

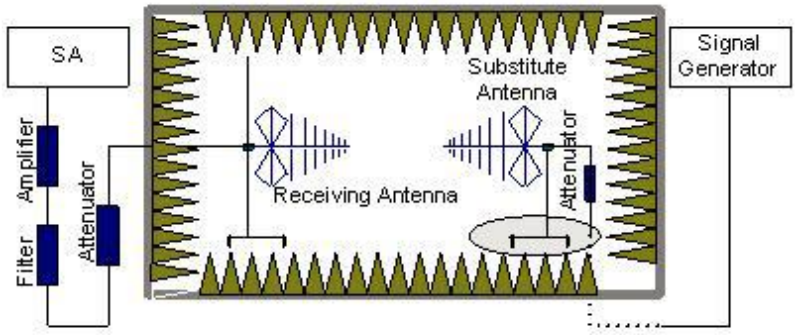
#### 6.8.2.2 The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10$^{th}$harmonic were measured with peak detector.




2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.




In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ($P_{Mea}$) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded ($P_r$). The power of signal source ($P_{Mea}$) is recorded. The

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

4. The Path loss ($P_{pl}$) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain ($G_a$) should be recorded after test.

A amplifier should be connected in for the test.

The Path loss ($P_{pl}$) is the summation of the cable loss .

The measurement results are obtained as described below:

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

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi

**6.8.2.3 Measurement Limit**

Rule RSS-132 5.5 specifies that " In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.” Limit -13 dBm

Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment’s operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.” Limit -13 dBm

**6.8.2.4 Measurement Results**

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

### 6.8.2.5 Measurement Results

**Measurements results:**

| Frequency | Channel | Frequency Range | Result |
|---|---|---|---|
| **GSM850** | Low | 30MHz~10GHz | Pass |
| | Middle | 30MHz~10GHz | Pass |
| | High | 30MHz~10GHz | Pass |
| **GSM1900** | Low | 30MHz~20GHz | Pass |
| | Middle | 30MHz~20GHz | Pass |
| | High | 30MHz~20GHz | Pass |

**Note:**

**Power(ERP)= Pmea-Pcl+Ga**

**This method Applicable to the following table.**

**RSE-G850-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1712.1 | -45.35 | 4.5 | 4.7 | -45.15 | -13 | H |
| 2471.8 | -36.89 | 5.4 | 5.6 | -36.69 | -13 | V |
| 3294.2 | -48.86 | 6.2 | 6.9 | -48.16 | -13 | H |
| 4048.8 | -49.68 | 6.9 | 8.6 | -47.98 | -13 | H |
| 4748.1 | -50.41 | 7.5 | 9.0 | -48.91 | -13 | H |
| 5625.0 | -49.81 | 8.3 | 9.8 | -48.31 | -13 | H |

**RSE-G850-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1718.6 | -46.5 | 4.5 | 4.7 | -46.3 | -13 | V |
| 2510.4 | -31.7 | 5.4 | 5.6 | -31.5 | -13 | V |
| 3324.2 | -49.65 | 6.2 | 6.9 | -48.95 | -13 | H |
| 4081.2 | -50.54 | 7.0 | 8.6 | -48.94 | -13 | V |
| 5053.8 | -51.16 | 7.8 | 9.6 | -49.36 | -13 | H |
| 5820.0 | -50.2 | 8.4 | 10.2 | -48.4 | -13 | H |

**RSE-G850-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1782.9 | -48.15 | 4.5 | 4.7 | -47.95 | -13 | H |
| 2546.8 | -32.58 | 5.4 | 5.6 | -32.38 | -13 | V |
| 3319.6 | -49.71 | 6.2 | 6.9 | -49.01 | -13 | H |
| 4211.5 | -50.64 | 7.0 | 8.9 | -48.74 | -13 | H |
| 5117.3 | -48.8 | 7.9 | 9.6 | -47.1 | -13 | H |
| 5934.2 | -49.89 | 8.5 | 10.2 | -48.19 | -13 | H |

**RSE-GPRS850-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1615.7 | -50.9 | 4.2 | 5.3 | -49.8 | -13 | V |
| 2412.9 | -33.63 | 5.3 | 5.6 | -33.33 | -13 | H |
| 3210.0 | -49.52 | 6.1 | 6.9 | -48.72 | -13 | V |
| 4029.2 | -50.08 | 6.9 | 8.6 | -48.38 | -13 | H |
| 4894.6 | -50.57 | 7.7 | 9.6 | -48.67 | -13 | H |
| 5703.5 | -50.81 | 8.5 | 10.2 | -49.11 | -13 | V |

**RSE-GPRS850-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1778.6 | -48 | 4.5 | 4.7 | -47.8 | -13 | V |
| 2510.4 | -35.37 | 5.4 | 5.6 | -35.17 | -13 | H |
| 3346.2 | -47.26 | 6.2 | 6.9 | -46.56 | -13 | H |
| 4263.5 | -49.51 | 7.1 | 8.9 | -47.71 | -13 | V |
| 5142.7 | -48.46 | 7.9 | 9.4 | -46.96 | -13 | H |
| 5985.0 | -49.63 | 8.6 | 10.2 | -48.03 | -13 | V |

**RSE-GPRS850-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1697.1 | -47.03 | 4.5 | 4.7 | -46.83 | -13 | V |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2546.8 | -36.65 | 5.4 | 5.6 | -36.45 | -13 | V |
| 3394.6 | -49.35 | 6.3 | 7.8 | -47.85 | -13 | V |
| 4245.0 | -47.38 | 7.1 | 8.9 | -45.58 | -13 | V |
| 5239.6 | -46.91 | 8.0 | 9.4 | -45.51 | -13 | V |
| 6156.9 | -49.17 | 8.7 | 10.3 | -47.57 | -13 | H |

**RSE-EGPRS850-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1693.9 | -48.68 | 4.5 | 4.7 | -48.48 | -13 | H |
| 2472.9 | -34.58 | 5.4 | 5.6 | -34.38 | -13 | V |
| 3383.1 | -50.72 | 6.3 | 7.8 | -49.22 | -13 | H |
| 4315.4 | -51.33 | 7.1 | 8.9 | -49.53 | -13 | H |
| 5151.9 | -48.93 | 7.9 | 9.4 | -47.43 | -13 | V |
| 5899.6 | -49.81 | 8.5 | 10.2 | -48.11 | -13 | V |

**RSE-EGPRS850-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1766.8 | -48.26 | 4.5 | 4.7 | -48.06 | -13 | H |
| 2510.4 | -38.53 | 5.4 | 5.6 | -38.33 | -13 | V |
| 3340.4 | -49.63 | 6.2 | 6.9 | -48.93 | -13 | H |
| 4183.8 | -49.72 | 7.0 | 8.9 | -47.82 | -13 | V |
| 5088.5 | -50.56 | 7.9 | 9.6 | -48.86 | -13 | H |
| 5949.2 | -49.72 | 8.5 | 10.2 | -48.02 | -13 | V |

**RSE-EGPRS850-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1698.2 | -47.47 | 4.5 | 4.7 | -47.27 | -13 | H |
| 2545.7 | -33.13 | 5.4 | 5.6 | -32.93 | -13 | V |
| 3335.8 | -50.26 | 6.2 | 6.9 | -49.56 | -13 | H |
| 4243.8 | -46.7 | 7.1 | 8.9 | -44.9 | -13 | H |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5166.9 | -48.76 | 7.9 | 9.4 | -47.26 | -13 | H |
| 5922.7 | -49.52 | 8.5 | 10.2 | -47.82 | -13 | H |

**Conclusion: PASS**

**Note: the EUT was displayed in several different direction, the worst cases were shown.**

**RSE-G1900-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3700.2 | -40.02 | 6.6 | 7.9 | -38.72 | -13 | V |
| 5551.2 | -42.07 | 8.2 | 9.8 | -40.47 | -13 | H |
| 7191.6 | -52.89 | 9.5 | 11.4 | -50.99 | -13 | V |
| 9250.8 | -44.06 | 10.7 | 12.7 | -42.06 | -13 | H |
| 11102.4 | -46.23 | 12.1 | 12.3 | -46.03 | -13 | H |
| 12657.6 | -45.95 | 12.7 | 12.3 | -46.35 | -13 | H |

**RSE-G1900-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3760.2 | -36.87 | 6.6 | 7.9 | -35.57 | -13 | V |
| 5640.0 | -37.66 | 8.3 | 10.2 | -35.76 | -13 | H |
| 7167.6 | -52.69 | 9.4 | 11.4 | -50.69 | -13 | H |
| 9399.6 | -42.13 | 10.7 | 12.7 | -40.13 | -13 | V |
| 11638.8 | -45.43 | 12.2 | 12.3 | -45.33 | -13 | V |
| 13369.2 | -43.9 | 13.7 | 12.3 | -45.3 | -13 | V |

**RSE-G1900-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3819.0 | -42.09 | 6.7 | 7.9 | -40.89 | -13 | V |
| 5730.0 | -38.54 | 8.5 | 10.2 | -36.84 | -13 | V |
| 7765.2 | -52.88 | 9.8 | 11.8 | -50.88 | -13 | V |
| 9548.4 | -43.05 | 10.7 | 12.7 | -41.05 | -13 | H |
| 11458.8 | -44.15 | 12.3 | 12.3 | -44.15 | -13 | H |
| 13369.2 | -41.56 | 13.7 | 12.3 | -42.96 | -13 | H |

**RSE-GPRS1900-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3700.2 | -40.71 | 6.6 | 7.9 | -39.41 | -13 | V |
| 5550.0 | -42.46 | 8.2 | 9.8 | -40.86 | -13 | H |
| 7506.0 | -52.47 | 9.7 | 11.6 | -50.57 | -13 | V |
| 9250.8 | -43.45 | 10.7 | 12.7 | -41.45 | -13 | V |
| 11101.2 | -44.74 | 12.1 | 12.3 | -44.54 | -13 | V |
| 12817.2 | -44.79 | 12.5 | 12.3 | -44.99 | -13 | V |

**RSE-GPRS1900-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3759.6 | -36.95 | 6.6 | 7.9 | -35.65 | -13 | V |
| 5640.0 | -40.27 | 8.3 | 10.2 | -38.37 | -13 | V |
| 7489.2 | -52.52 | 9.7 | 11.6 | -50.62 | -13 | V |
| 9400.8 | -44.89 | 10.7 | 12.7 | -42.89 | -13 | V |
| 11611.2 | -45.18 | 12.2 | 12.3 | -45.08 | -13 | V |
| 13393.2 | -43.73 | 13.7 | 12.3 | -45.13 | -13 | V |

**RSE-GPRS1900-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3819.0 | -40.26 | 6.7 | 7.9 | -39.06 | -13 | V |
| 5730.0 | -37.17 | 8.5 | 10.2 | -35.47 | -13 | V |
| 7660.8 | -52.13 | 9.7 | 11.8 | -50.03 | -13 | V |
| 9548.4 | -46.07 | 10.7 | 12.7 | -44.07 | -13 | V |
| 11457.6 | -44.35 | 12.3 | 12.3 | -44.35 | -13 | H |
| 13369.2 | -41.04 | 13.7 | 12.3 | -42.44 | -13 | V |

**RSE-EGPRS1900-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3700.8 | -43.08 | 6.6 | 7.9 | -41.78 | -13 | V |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5550.6 | -41.12 | 8.2 | 9.8 | -39.52 | -13 | H |
| 7666.8 | -53.35 | 9.7 | 11.8 | -51.25 | -13 | V |
| 9250.8 | -48.43 | 10.7 | 12.7 | -46.43 | -13 | H |
| 11101.2 | -44.23 | 12.1 | 12.3 | -44.03 | -13 | H |
| 13275.6 | -43.61 | 13.6 | 12.3 | -44.91 | -13 | V |

**RSE-EGPRS1900-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3759.6 | -42.45 | 6.6 | 7.9 | -41.15 | -13 | V |
| 5640.0 | -44.92 | 8.3 | 10.2 | -43.02 | -13 | H |
| 7500.0 | -51.9 | 9.7 | 11.6 | -50 | -13 | V |
| 9399.6 | -49.47 | 10.7 | 12.7 | -47.47 | -13 | H |
| 11280.0 | -44.22 | 12.1 | 12.3 | -44.02 | -13 | V |
| 13520.4 | -44.33 | 13.7 | 12.3 | -45.73 | -13 | V |

**RSE-EGPRS1900-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3819.6 | -43.03 | 6.7 | 7.9 | -41.83 | -13 | V |
| 5730.0 | -45.89 | 8.5 | 10.2 | -44.19 | -13 | V |
| 7664.4 | -52.68 | 9.7 | 11.8 | -50.58 | -13 | V |
| 9548.4 | -47.82 | 10.7 | 12.7 | -45.82 | -13 | H |
| 11458.8 | -41.53 | 12.3 | 12.3 | -41.53 | -13 | V |
| 14224.8 | -44.58 | 13.7 | 12.3 | -45.98 | -13 | V |

**Conclusion: PASS**

**Note: the EUT was displayed in several different direction, the worst cases were shown.**

### 6.8.3 WCDMA Measurement Method

The measurements procedures in TIA-603E-2016 are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set as outlined in Part 24.238 and Part 24.917.

The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band V.

**The procedure of radiated spurious emissions is the same like GSM.**

#### 6.8.3.1 Measurement Limit

Rule RSS-132 5.5 specifies that " In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required." Limit -13 dBm

Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm

#### 6.8.3.2 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the WCDMA Band V (826.4MHz, 836.6MHz and 846.6MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the WCDMA Band V into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

#### 6.8.3.3 Measurement Results Table

| Frequency | Channel | Frequency Range | Result |
|---|---|---|---|
| **WCDMA Band II** | Low | 30MHz~20GHz | Pass |
| | Middle | 30MHz~20GHz | Pass |
| | High | 30MHz~20GHz | Pass |
| **WCDMA Band IV** | Low | 30MHz~20GHz | Pass |
| | Middle | 30MHz~20GHz | Pass |
| | High | 30MHz~20GHz | Pass |
| **WCDMA Band V** | Low | 30MHz~20GHz | Pass |
| | Middle | 30MHz~20GHz | Pass |
| | High | 30MHz~20GHz | Pass |

**RSE-WCDMA BAND II-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3703.2 | -40.44 | 6.6 | 7.9 | -39.14 | -13 | V |
| 5560.0 | -45.25 | 8.2 | 9.8 | -43.65 | -13 | V |
| 7514.8 | -59.08 | 9.7 | 11.6 | -57.18 | -13 | V |
| 9233.2 | -57.51 | 10.5 | 12.6 | -55.41 | -13 | V |
| 11202.3 | -53.18 | 12.1 | 12.3 | -52.98 | -13 | V |
| 13603.6 | -52.8 | 13.8 | 12.3 | -54.3 | -13 | V |

**RSE-WCDMA BAND II-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3762.0 | -43.32 | 6.6 | 7.9 | -42.02 | -13 | V |
| 5636.8 | -45.44 | 8.3 | 10.2 | -43.54 | -13 | H |
| 7417.2 | -59.52 | 9.7 | 11.6 | -57.62 | -13 | V |
| 9194.0 | -57.22 | 10.5 | 12.6 | -55.12 | -13 | V |
| 11065.8 | -53.61 | 12.1 | 12.3 | -53.41 | -13 | V |
| 13060.8 | -52.24 | 13.0 | 12.3 | -52.94 | -13 | V |

**RSE-WCDMA BAND II-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3817.6 | -42.18 | 6.7 | 7.9 | -40.98 | -13 | V |
| 5720.8 | -51.78 | 8.5 | 10.2 | -50.08 | -13 | V |
| 7487.2 | -59.32 | 9.7 | 11.6 | -57.42 | -13 | V |
| 9376.0 | -56.55 | 10.7 | 12.7 | -54.55 | -13 | V |
| 11118.6 | -54.01 | 12.1 | 12.3 | -53.81 | -13 | V |
| 13590.0 | -52.56 | 13.8 | 12.3 | -54.06 | -13 | V |

**RSE-WCDMA BAND IV-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3422.8 | -46.9 | 6.3 | 7.8 | -45.4 | -13 | H |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5164.0 | -57.9 | 7.9 | 9.4 | -56.4 | -13 | H |
| 6823.6 | -60.89 | 9.2 | 10.9 | -59.19 | -13 | V |
| 8531.6 | -60.45 | 10.3 | 12.6 | -58.15 | -13 | H |
| 10050.0 | -55.55 | 11.2 | 12.5 | -54.25 | -13 | V |
| 11635.2 | -54.32 | 12.2 | 12.3 | -54.22 | -13 | H |

**RSE-WCDMA BAND IV-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3466.4 | -46.46 | 6.4 | 7.8 | -45.06 | -13 | H |
| 5198.8 | -57.79 | 8.0 | 9.4 | -56.39 | -13 | H |
| 6665.2 | -59.68 | 9.1 | 10.9 | -57.88 | -13 | V |
| 8198.8 | -59.57 | 10.1 | 12.4 | -57.27 | -13 | H |
| 9405.6 | -56.85 | 10.7 | 12.7 | -54.85 | -13 | V |
| 10546.8 | -54.07 | 11.6 | 12.3 | -53.37 | -13 | H |

**RSE-WCDMA BAND IV-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3506.8 | -47.96 | 6.4 | 7.8 | -46.56 | -13 | H |
| 5221.6 | -58.27 | 8.0 | 9.4 | -56.87 | -13 | H |
| 7183.6 | -59.42 | 9.5 | 11.4 | -57.52 | -13 | H |
| 8709.2 | -58.51 | 10.4 | 12.7 | -56.21 | -13 | V |
| 10222.8 | -55.87 | 11.3 | 12.5 | -54.67 | -13 | H |
| 11548.8 | -54.48 | 12.3 | 12.3 | -54.48 | -13 | V |

**RSE-WCDMA BAND V-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1768.6 | -61.7 | 4.5 | 4.7 | -61.5 | -13 | V |
| 2412.7 | -40.72 | 5.3 | 5.6 | -40.42 | -13 | H |
| 3338.8 | -64.18 | 6.2 | 6.9 | -63.48 | -13 | V |
| 4260.0 | -62.07 | 7.1 | 8.9 | -60.27 | -13 | H |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5232.4 | -57.47 | 8.0 | 9.4 | -56.07 | -13 | H |
| 6207.6 | -59.83 | 8.7 | 10.3 | -58.23 | -13 | V |

**RSE-WCDMA BAND V-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1724.6 | -62.51 | 4.5 | 4.7 | -62.31 | -13 | H |
| 2533.5 | -56.56 | 5.4 | 5.6 | -56.36 | -13 | H |
| 3355.2 | -64.11 | 6.2 | 6.9 | -63.41 | -13 | H |
| 4215.2 | -61.47 | 7.0 | 8.9 | -59.57 | -13 | H |
| 5234.8 | -57.2 | 8.0 | 9.4 | -55.8 | -13 | H |
| 6333.2 | -59.85 | 8.8 | 10.3 | -58.35 | -13 | V |

**RSE-WCDMA BAND V-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak EIRP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1713.6 | -58.99 | 4.5 | 4.7 | -58.79 | -13 | V |
| 2542.3 | -52.57 | 5.4 | 5.6 | -52.37 | -13 | V |
| 3412.8 | -64.71 | 6.3 | 7.8 | -63.21 | -13 | H |
| 4436.8 | -61.03 | 7.3 | 8.7 | -59.63 | -13 | H |
| 5211.6 | -58.29 | 8.0 | 9.4 | -56.89 | -13 | H |
| 6017.2 | -59.38 | 8.6 | 10.2 | -57.78 | -13 | V |

**Conclusion: PASS**

**Note: the EUT was displayed in several different direction, the worst cases were shown.**

# 7. Test Equipment List

## 7.1. Conducted Test System

| Item | Equipment Name | Type | Serial Number | Manufacturer | Cal. Date | Cal. interval |
|---|---|---|---|---|---|---|
| 1 | Universal Radio Communication Tester | CMW500 | 148874 | R&S | 2021-05-10 | 1 year |
| 2 | Vector Signal Analyzer | FSQ26 | 101091 | R&S | 2021-05-10 | 1 year |
| 3 | DC Power Supply | ZUP60-14 | LOC-220Z006-0007 | TDL-Lambda | 2021-05-09 | 1 year |
| 4 | Eagle Test Software | Eagle V3.1 FCC BT/WIFI | N/A | ECIT | N/A | N/A |

## 7.2. Radiated Emission Test System

| Item | Equipment Name | Type | Serial Number | Manufacturer | Cal. Date | Cal. Interval |
|---|---|---|---|---|---|---|
| 1 | Universal Radio Communication Tester | CMW500 | 104178 | R&S | 2021-05-10 | 1 year |
| 2 | Test Receiver | ESU40 | 100307 | R&S | 2021-05-10 | 1 year |
| 3 | TRILOG Antenna | VULB9163 | VULB9163-515 | Schwarzbeck | 2020-02-28 | 2 years |
| 4 | Double Ridged Guide Antenna | ETS-3117 | 135890 | ETS | 2020-02-28 | 2 years |
| 5 | 2-Line V-Network | ENV216 | 101380 | R&S | 2021-05-10 | 1 year |
| 6 | RF Signal Generator | SMF100A | 102314 | R&S | 2021-05-10 | 1 year |
| 7 | Amplifier | SCU08 | 10146 | R&S | 2021-05-10 | 1 year |
| 8 | EMI Test Software | EMC32 V9.15.00 | N/A | R&S | N/A | N/A |

Anechoic chamber

Fully anechoic chamber by ETS.

## Annex A: Measurement Uncertainty

Measurement uncertainty for all the testing in this report are within the limit specified in 3IN documents. The detailed measurement uncertainty is defined in 3IN documents.

| Measurement Items | Range | Confidence Level | Calculated Uncertainty |
|---|---|---|---|
| Maximum Peak Output Power | 30MHz-3600MHz | 95% | ±0.544dB |
| EBW and VBW | 30MHz-3600MHz | 95% | ±62.04Hz |
| Transmitter Spurious Emission-Conducted | 30MHz-2GHz | 95% | ±0.90dB |
| Transmitter Spurious Emission-Conducted | 2GHz-3.6GHz | 95% | ±0.88dB |
| Transmitter Spurious Emission-Conducted | 3.6GHz-8GHz | 95% | ±0.96dB |
| Transmitter Spurious Emission-Conducted | 8GHz-20GHz | 95% | ±0.94dB |
| Transmitter Spurious Emission-Radiated | 9KHz-30MHz | 95% | ±5.66dB |
| Transmitter Spurious Emission-Radiated | 30MHz-1000MHz | 95% | ±4.98dB |
| Transmitter Spurious Emission-Radiated | 1000MHz -18000MHz | 95% | ±5.06dB |
| Transmitter Spurious Emission-Radiated | 18000MHz -40000MHz | 95% | ±5.20dB |
| Frequency stability | 1MHz-16GHz | 95% | ±62.04Hz |

## Annex B: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

INDUSTRIAL INTERNET INNOVATION CENTER (SHANGHAI) CO., LTD.

*Shanghai, People's Republic of China*

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 12th day of April 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2023

*For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.*

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