

# TEST REPORT

FCC ID: 2ADINN5001TL

Product: LTE mobile phone

Model No.: N5001L

Additional Model No.: N5001TL, A4L, A3L

Trade Mark: NUU

Report No.: TCT171020E001

Issued Date: Oct. 20, 2017

Issued for:

**Sun Cupid Technology (HK) Ltd.**

**16/F, CEO Tower, 77 Wing Hong St, Cheung Sha Wan, Kowloon, Hong Kong.**

Issued By:

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**Appendix A: Photographs of Test Setup**

**Appendix B: Photographs of EUT**

**1. Test Certification**

|                              |                                                                                                          |
|------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Product:</b>              | LTE mobile phone                                                                                         |
| <b>Model No.:</b>            | N5001L                                                                                                   |
| <b>Additional Model:</b>     | N5001TL, A4L, A3L                                                                                        |
| <b>Trade Mark:</b>           | NUU                                                                                                      |
| <b>Applicant:</b>            | Sun Cupid Technology (HK) Ltd.                                                                           |
| <b>Address:</b>              | 16/F, CEO Tower, 77 Wing Hong St, Cheung Sha Wan, Kowloon, Hong Kong.                                    |
| <b>Manufacturer:</b>         | SUNCUPID (ShenZhen) Electronic Ltd                                                                       |
| <b>Address:</b>              | Baolong Industrial City, Longgang District, Shenzhen Hi-Tech Road, Building 1, A 7, China.               |
| <b>Date of Test:</b>         | Apr. 24, 2017 – Jun. 14, 2017                                                                            |
| <b>Applicable Standards:</b> | FCC CFR Title 47 Part 2<br>FCC CFR Title 47 Part22<br>FCC CFR Title 47 Part24<br>FCC CFR Title 47 Part27 |

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:



Garen

Date:

Jun. 14, 2017

Reviewed By:



Tomsin

Date:

Oct. 20, 2017

Approved By:

Date:

Oct. 20, 2017

## 2. Test Result Summary

| Requirement                                   | CFR 47 Section                                   | Result |
|-----------------------------------------------|--------------------------------------------------|--------|
| Conducted Output Power                        | §22.913; §2.1046<br>§24.232; §27.50(d)           | PASS   |
| Peak-to-Average Ratio                         | §2.1046; §24.232(d)<br>§27.50(d)                 | PASS   |
| Effective Radiated Power                      | §2.1046; §22.913(a)<br>§24.232; §27.50(d)        | PASS   |
| Equivalent Isotropic Radiated Power           | §2.1046; §22.913(a)<br>§24.232; §27.50(d)        | PASS   |
| Occupied Bandwidth                            | §2.1049                                          | PASS   |
| Band Edge                                     | §2.1051<br>§22.917(a)<br>§24.238(a)<br>§27.53(g) | PASS   |
| Conducted Spurious Emission                   | §2.1051; §22.917<br>§24.238; §27.53(h)           | PASS   |
| Field Strength of Spurious Radiation          | §2.1053; §22.917(a)<br>§24.238; §27.53(g)        | PASS   |
| Frequency Stability for Temperature & Voltage | §2.1055; §22.355<br>§24.235; §27.54              | PASS   |

**Note:**

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

### 3. EUT Description

|                                         |                                                                                                                                                                                                                                                                             |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Product:</b>                         | LTE mobile phone                                                                                                                                                                                                                                                            |
| <b>Model No.:</b>                       | N5001L                                                                                                                                                                                                                                                                      |
| <b>Additional Model:</b>                | N5001TL, A4L, A3L                                                                                                                                                                                                                                                           |
| <b>Trade Mark:</b>                      | <b>NUU</b>                                                                                                                                                                                                                                                                  |
| <b>Hardware version:</b>                | 110SFM788P0A2V0                                                                                                                                                                                                                                                             |
| <b>Software version:</b>                | N5001L-AM-01                                                                                                                                                                                                                                                                |
| <b>3G Version:</b>                      | WCDMA:R99<br>HSDPA: Release 5<br>HSUPA: Release 6                                                                                                                                                                                                                           |
| <b>Tx Frequency:</b>                    | GSM/GPRS/EGPRS 850: 824.2 MHz ~ 848.8 MHz<br>GSM/GPRS/EGPRS 1900: 1850.2 MHz ~ 1909.8MHz<br>WCDMA Band V: 826.4 MHz ~ 846.6 MHz<br>WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz<br>WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz                                                         |
| <b>Rx Frequency:</b>                    | GSM/GPRS/EGPRS 850: 869.2 MHz ~ 893.8 MHz<br>GSM/GPRS/EGPRS 1900: 1930.2 MHz ~ 1989.8 MHz<br>WCDMA Band V: 871.4 MHz ~ 891.6 MHz<br>WCDMA Band IV: 2112.4 MHz ~ 2152.6 MHz<br>WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz                                                        |
| <b>Maximum Output Power to Antenna:</b> | GSM850: 32.92dBm<br>GSM1900: 30.21dBm<br>GPRS 850: 32.21dBm<br>GPRS 1900: 29.66dBm<br>EGPRS850: 29.05dBm<br>EGPRS1900: 27.98dBm<br>WCDMA Band V: 21.58dBm<br>WCDMA Band IV: 22.16dBm<br>WCDMA Band II: 22.42dBm                                                             |
| <b>99% Occupied Bandwidth:</b>          | GSM850: 248KGXM<br>GSM1900: 248KGXM<br>GPRS850 Class 8: 245KGXW<br>GPRS1900 Class 8: 245KGXW<br>EGPRS850 Class 8: 244KG7W<br>EGPRS1900 Class 8: 250KG7W<br>WCDMA Band V RMC 12.2Kbps: 4M22F9W<br>WCDMA Band IV RMC 12.2Kbps: 4M25F9W<br>WCDMA Band II RMC 12.2Kbps: 4M26F9W |

|                     |                                                                                                                                                                       |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type of Modulation: | GSM/GPRS: GMSK<br>EGPRS: GMSK/8PSK<br>WCDMA/HSDPA/HSUPA: QPSK                                                                                                         |
| Antenna Type:       | Internal Antenna                                                                                                                                                      |
| Antenna Gain:       | GSM/GPRS/EGPRS 850: -0.52dBi<br>GSM/GPRS/EGPRS 1900: 0.46dBi<br>WCDMA Band II : 0.46dBi<br>WCDMA Band IV: 0.45dBi<br>WCDMA Band V : -0.52dBi                          |
| Power Supply:       | Rechargeable Li-ion Battery DC3.8V/2000mAh                                                                                                                            |
| Adapter:            | Adapter: HJ-0501000E1-US<br>Input: AC 100-240V 50/60Hz 0.2A<br>Output: DC 5.0V 1000mA                                                                                 |
| Remark:             | All models above are identical in interior structure, electrical circuits and components, and just model names and color are different for the marketing requirement. |

Note: All the test data for this report follows the 2ADINN5001L report

## 4. Genera Information

### 4.1. Test environment and mode

**Operating Environment:**

|                       |           |
|-----------------------|-----------|
| Temperature:          | 25.0 °C   |
| Humidity:             | 56 % RH   |
| Atmospheric Pressure: | 1010 mbar |

**Test Mode:**

|                 |                                                                              |
|-----------------|------------------------------------------------------------------------------|
| Operation mode: | Keep the EUT in communication with CMU200 and select channel with modulation |
|-----------------|------------------------------------------------------------------------------|

Remark: This product has a built-in rechargeable battery, so in an independent test, the EUT battery was fully-charged.

The sample was placed (0.8m below 1GHz, 0.8m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

## Description Operation Frequency

| GSM 850  |                 | PCS1900  |                 |
|----------|-----------------|----------|-----------------|
| Channel: | Frequency (MHz) | Channel: | Frequency (MHz) |
| 128      | 824.20          | 512      | 1850.20         |
| 129      | 824.40          | 513      | 1850.40         |
| ....     | ....            | ....     | ....            |
| 189      | 836.40          | 660      | 1879.80         |
| 190      | 836.60          | 661      | 1880.00         |
| 191      | 836.80          | 662      | 1880.20         |
| ...      | ...             | ...      | ...             |
| 250      | 848.60          | 809      | 1909.60         |
| 251      | 848.80          | 810      | 1909.80         |

| WCDMA Band IV |                 | WCDMA Band V |                 | WCDMA Band II |                 |
|---------------|-----------------|--------------|-----------------|---------------|-----------------|
| Channel:      | Frequency (MHz) | Channel:     | Frequency (MHz) | Channel:      | Frequency (MHz) |
| 1312          | 1712.4          | 4132         | 826.40          | 9262          | 1852.40         |
| ....          | ....            | 4133         | 826.60          | 9263          | 1852.60         |
| ....          | ....            | ....         | ....            | ....          | ....            |
| ....          | ....            | 4182         | 836.40          | 9399          | 1879.80         |
| 1413          | 1732.6          | 4183         | 836.60          | 9400          | 1880.00         |
| ....          | ....            | 4184         | 836.80          | 9401          | 1880.20         |
| ....          | ....            | ...          | ...             | ...           | ...             |
| 1513          | 1752.6          | 4233         | 846.60          | 9538          | 1907.60         |



## 4.2. Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power. Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 10000 MHz for GSM850 and WCDMA Band V.
2. 30 MHz to 20000 MHz for PCS1900, WCDMA Band II and WCDMA Band IV.

All modes and data rates and positions were investigated.

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

| Test Mode     |                                                       |                                                       |
|---------------|-------------------------------------------------------|-------------------------------------------------------|
| Band          | Radiated TCs                                          | Conducted TCs                                         |
| GSM 850       | GSM Link<br>GPRS class 12 Link<br>EGPRS class 12 Link | GSM Link<br>GPRS class 12 Link<br>EGPRS class 12 Link |
| PCS 1900      | GSM Link<br>GPRS class 12 Link<br>EGPRS class 12 Link | GSM Link<br>GPRS class 12 Link<br>EGPRS class 12 Link |
| WCDMA Band V  | RMC 12.2Kbps Link                                     | RMC 12.2Kbps Link                                     |
| WCDMA Band IV | RMC 12.2Kbps Link                                     | RMC 12.2Kbps Link                                     |
| WCDM Band II  | RMC 12.2Kbps Link                                     | RMC 12.2Kbps Link                                     |

**Note:** The maximum power levels are chosen to test as the worst case configuration as follows:

GPRS multi-slot class 8 mode for GMSK modulation, EDGE multi-slot class 8 mode for 8PSK modulation. RMC 12.2Kbps mode for WCDMA band V and WCDMA band II, only these modes were used for all tests. In addition to above worst-case test, below investigating on all data rates and all modes are compliance with each FCC test case which has specific test limits. For spurious emissions at antenna port, the EUT was investigated the band edges on low and high channels, and the unwanted spurious emissions on middle channel for all modes, the results are PASS, then only the worst-results were reported in the test report. The Radiated Spurious emissions for GPRS and EDGE modes were investigated on the middle channel and the PASS results were not worst than those data tested from the highest power channels.

### 4.3. Description of Support Units

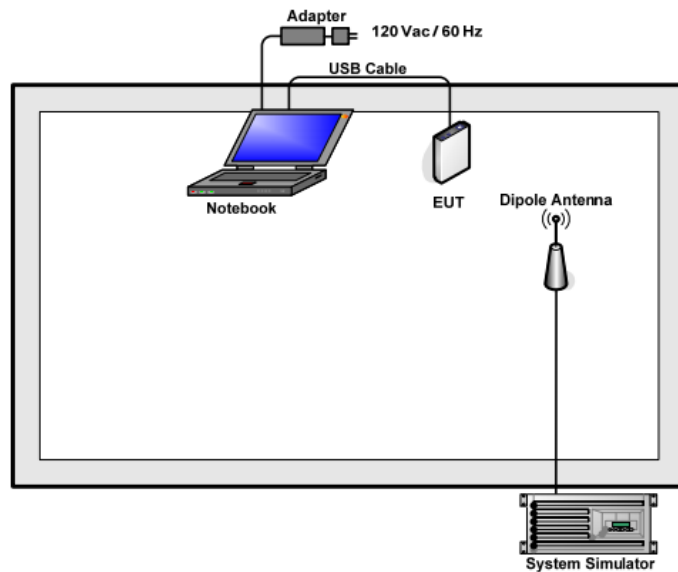
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Equipment | Model No. | Serial No. | FCC ID | Trade Name |
|-----------|-----------|------------|--------|------------|
| /         | /         | /          | /      | /          |

**Note:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

#### 4.4. Configuration of Tested System



#### 4.5. Measurement Results Explanation Example

**For all conducted test items:**

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level. The spectrum analyzer offset is derived from RF cable loss and attenuator factor.  
*Offset = RF cable loss + attenuator factor.*

The following shows an offset computation example with RF cable loss 3 dB and a 5dB attenuator.

Example: *Offset (dB) = RF cable loss (dB) + attenuator factor (dB).*  
*= 8(dB)*

## 5. Facilities and Accreditations

### 5.1. Facilities

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

- FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

### 5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

### 5.3. Measurement Uncertainty

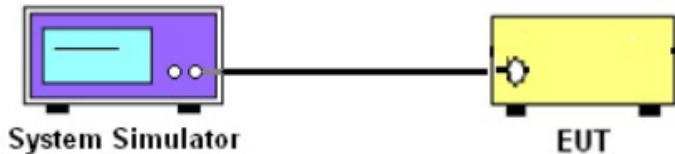
The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

| No. | Item                          | MU                        |
|-----|-------------------------------|---------------------------|
| 1   | Conducted Emission            | $\pm 2.56\text{dB}$       |
| 2   | RF power, conducted           | $\pm 0.12\text{dB}$       |
| 3   | Spurious emissions, conducted | $\pm 0.11\text{dB}$       |
| 4   | All emissions, radiated(<1G)  | $\pm 3.92\text{dB}$       |
| 5   | All emissions, radiated(>1G)  | $\pm 4.28\text{dB}$       |
| 6   | Temperature                   | $\pm 0.1^{\circ}\text{C}$ |
| 7   | Humidity                      | $\pm 1.0\%$               |

## 6. Test Results and Measurement Data

### 6.1. Conducted Output Power Measurement

#### 6.1.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC part 22.913(a) and FCC part 24.232(b)<br>FCC part 27.50(d);                                                                                                                                                                                                                                                                                                                                      |
| <b>Test Method:</b>      | FCC part 2.1046                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Operation mode:</b>   | Refer to item 4.1                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Limits:</b>           | GSM 850 7W<br>PCS 1900 2W<br>WCDMA Band V:7W<br>WCDMA Band II: 2W<br>WCDMA Band IV:1W                                                                                                                                                                                                                                                                                                                |
| <b>Test Setup:</b>       |  <p>The diagram illustrates the test setup. On the left is a purple box labeled 'System Simulator' with a screen and two buttons. A black line connects it to a yellow box on the right labeled 'EUT' (Equipment Under Test), which has a circular port on its side.</p>                                          |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"><li>1. The transmitter output port was connected to the system simulator.</li><li>2. Set EUT at maximum power through system simulator.</li><li>3. Select lowest, middle, and highest channels for each band and different modulation.</li><li>4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.</li></ol> |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                 |

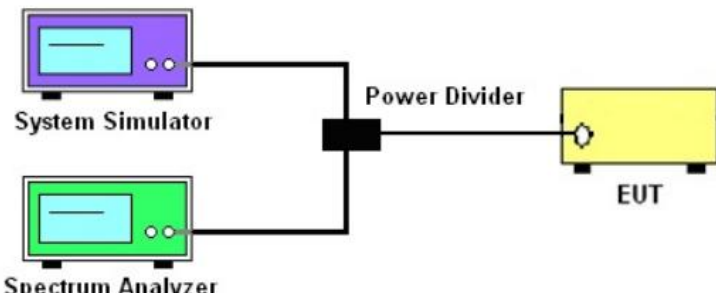
#### 6.1.2. Test Instruments

| Equipment                | Manufacturer | Model  | Serial Number | Calibration Due |
|--------------------------|--------------|--------|---------------|-----------------|
| System simulator         | R&S          | CMU200 | 111382        | Sep. 27, 2018   |
| RF cable<br>(9kHz-40GHz) | TCT          | RE-05  | N/A           | Sep. 27, 2018   |
| Antenna Connector        | TCT          | RFC-02 | N/A           | Sep. 27, 2018   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## 6.2. Peak to Average Ratio

### 6.2.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC part 24.232(d) ; FCC part 22.913;<br>FCC part 27.50(d);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Test Method:</b>      | FCC KDB 971168 v02r02 Section 5.7.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Operation mode:</b>   | Refer to item 4.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Limit:</b>            | The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Test Setup:</b>       |  <p>The diagram illustrates the test setup. A System Simulator (represented by a purple box) and a Spectrum Analyzer (represented by a green box) are both connected to a central Power Divider (represented by a black box). The Power Divider is then connected to the EUT (Equipment Under Test, represented by a yellow box).</p>                                                                                                                                                                               |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.</li> <li>2. The EUT was connected to spectrum analyzer and system simulator via a power divider.</li> <li>3. Set EUT to transmit at maximum output power.</li> <li>4. For GSM/EGPRS operating modes, signal gating is implemented on the spectrum analyzer by triggering from the system simulator.</li> <li>5. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer.<br/>Record the maximum PAPR level associated with a probability of 0.1%.</li> </ol> |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

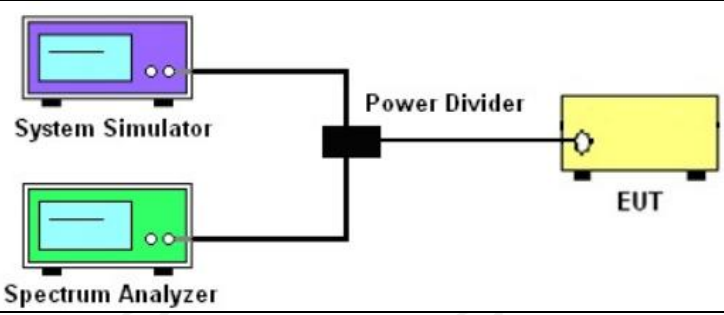
### 6.2.2. Test Instruments

| Equipment                | Manufacturer | Model  | Serial Number | Calibration Due |
|--------------------------|--------------|--------|---------------|-----------------|
| System simulator         | R&S          | CMU200 | 111382        | Sep. 27, 2018   |
| Spectrum Analyzer        | Agilent      | N9020A | MY49100060    | Sep. 27, 2018   |
| RF cable<br>(9kHz-40GHz) | TCT          | RE-05  | N/A           | Sep. 27, 2018   |
| Antenna Connector        | TCT          | RFC-02 | N/A           | Sep. 27, 2018   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

### 6.3. 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 6.3.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC part 2.1049                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Test Method:</b>      | FCC part 2.1049                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Operation mode:</b>   | Refer to item 4.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Limit:</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Test Setup:</b>       |  <p>The diagram shows a System Simulator (purple box) and a Spectrum Analyzer (green box) connected to a Power Divider (black box). The Power Divider is connected to the EUT (yellow box). The System Simulator and Spectrum Analyzer are connected to the Power Divider via RF cables.</p>                                                                                                                                                                                                                                                           |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 4.2.</li> <li>2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.</li> <li>3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3*RBW, sample detector, trace maximum hold.</li> <li>5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.</li> </ol> |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

#### 6.3.2. Test Instruments

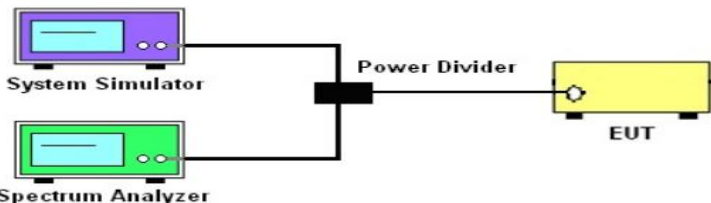
| Equipment                | Manufacturer | Model  | Serial Number | Calibration Due |
|--------------------------|--------------|--------|---------------|-----------------|
| System simulator         | R&S          | CMU200 | 111382        | Sep. 27, 2018   |
| Spectrum Analyzer        | Agilent      | N9020A | MY49100060    | Sep. 27, 2018   |
| RF cable<br>(9kHz-40GHz) | TCT          | RE-05  | N/A           | Sep. 27, 2018   |
| Antenna Connector        | TCT          | RFC-02 | N/A           | Sep. 27, 2018   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



## 6.4. Band Edge and Conducted Spurious Emission Measurement

### 6.4.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC part22.917(a) and FCC part24.238(a)<br>FCC part27.53(g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Test Method:</b>      | FCC part2.1051                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Operation mode:</b>   | Refer to item 4.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Limit:</b>            | -13dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Test Setup:</b>       |  <p>The diagram shows a System Simulator (purple box) and a Spectrum Analyzer (green box) connected to a Power Divider (black box). The Power Divider is also connected to the EUT (yellow box).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 6.</li> <li>2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.</li> <li>3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>4. The band edges of low and high channels for the highest RF powers were measured.</li> <li>5. The conducted spurious emission for the whole frequency range was taken.</li> <li>6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.</li> <li>7. The limit line is derived from <math>43 + 10\log(P)</math> dB below the transmitter power<br/> <math>P(\text{Watts}) = P(\text{W}) - [43 + 10\log(P)] \text{ (dB)} = [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)} = -13\text{dBm}.</math> </li> </ol> |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

### 6.4.2. Test Instruments

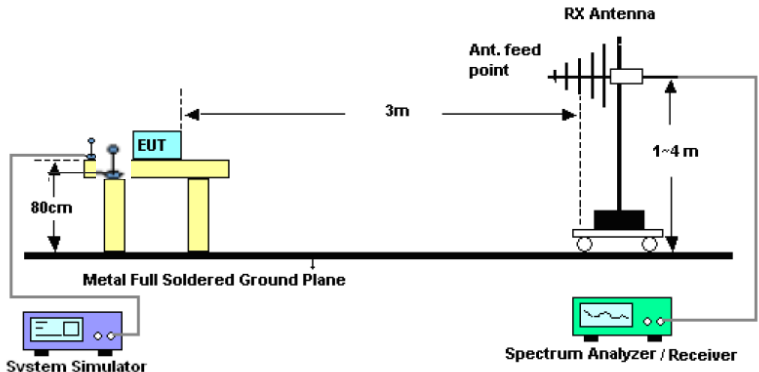
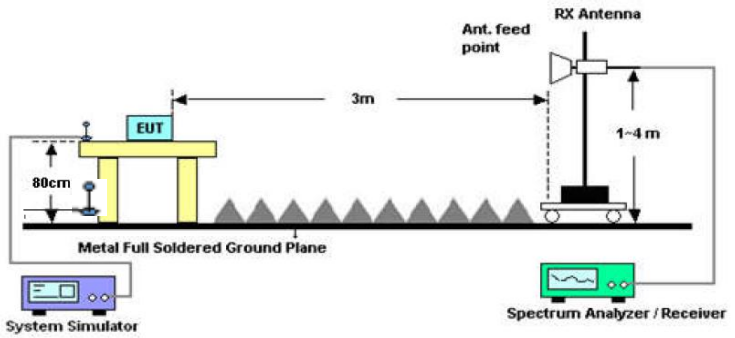
| Equipment                | Manufacturer | Model  | Serial Number | Calibration Due |
|--------------------------|--------------|--------|---------------|-----------------|
| System simulator         | R&S          | CMU200 | 111382        | Sep. 27, 2018   |
| Spectrum Analyzer        | Agilent      | N9020A | MY49100060    | Sep. 27, 2018   |
| RF cable<br>(9kHz-40GHz) | TCT          | RE-05  | N/A           | Sep. 27, 2018   |
| Antenna Connector        | TCT          | RFC-02 | N/A           | Sep. 27, 2018   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



## 6.5. Effective Radiated Power and Effective Isotropic Radiated Power Measurement

### 6.5.1. Test Specification

|                   |                                                                                                                                                                                             |               |            |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|
| Test Requirement: | FCC part 22.913(a) and FCC part 24.232(b)<br>FCC part 27.50(d)                                                                                                                              |               |            |
| Test Method:      | FCC part 2.1046                                                                                                                                                                             |               |            |
| Receiver Setup:   |                                                                                                                                                                                             | GSM/GPRS/EDGE | WCDMA/HSPA |
|                   | SPAN                                                                                                                                                                                        | 500kHz        | 10MHz      |
|                   | RBW                                                                                                                                                                                         | 10kHz         | 100kHz     |
|                   | VBW                                                                                                                                                                                         | 30kHz         | 300kHz     |
|                   | Detector                                                                                                                                                                                    | RMS           | RMS        |
|                   | Trace                                                                                                                                                                                       | Average       | Average    |
|                   | Average Type                                                                                                                                                                                | Power         | Power      |
|                   | Sweep Count                                                                                                                                                                                 | 100           | 100        |
| Limit:            | GSM850 7W ERP<br>PCS1900 2W EIRP<br>WCDMA Band V: 7W ERP<br>WCDMA Band II: 2W EIRP<br>WCDMA Band IV: 1W EIRP                                                                                |               |            |
| Test Setup:       | From 30MHz to 1GHz                                                                                                                                                                          |               |            |
|                   |  <p>Above 1GHz</p>  |               |            |

## Test Procedure:

1. The testing follows FCC KDB 971168 v02r02 Section 5.8. and ANSI / TIA-603-D-2010 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01.
3. Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment.
4. Replace the transmitter under test with a substitution antenna. The center of the antenna should be at the same location as the center of the antenna under test.
5. Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.  

$$\text{LOSS} = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$$
6. Determine the effective radiated output power at each angular position from the readings in steps 3) and 5) using the following equation:  

$$\text{ERP (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$
7. The maximum ERP is the maximum value determined in the preceding step.
8. Calculating ERP:  

$$\text{ERP (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBd)}$$

$$\text{Antenna Gain (dBd)} = \text{Antenna Gain (dBi)} - 2.15$$

$$\text{EIRP} = \text{ERP} - 2.15$$

## Test results:

PASS

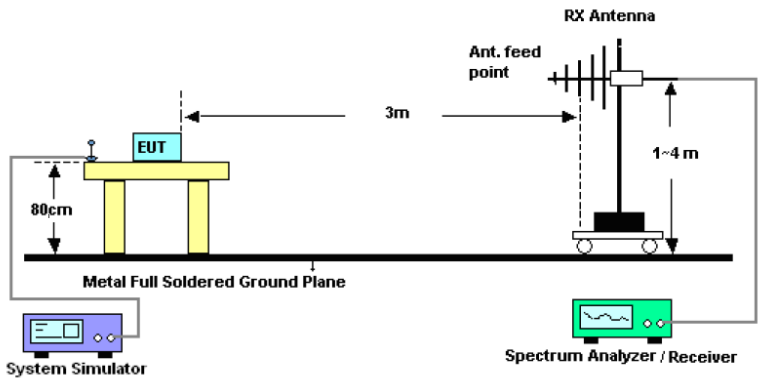
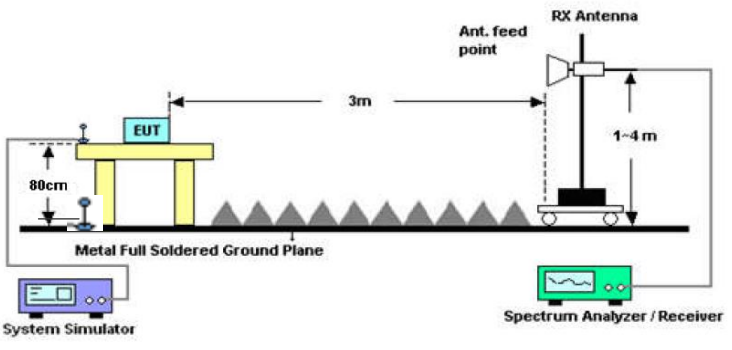
## 6.5.2. Test Instruments

| Radiated Emission Test Site (966) |                    |            |               |                 |
|-----------------------------------|--------------------|------------|---------------|-----------------|
| Name of Equipment                 | Manufacturer       | Model      | Serial Number | Calibration Due |
| System simulator                  | R&S                | CMU200     | 111382        | Sep. 27, 2018   |
| Spectrum Analyzer                 | ROHDE&SCHW ARZ     | R&S        | FSQ           | Sep. 27, 2018   |
| Signal Generator                  | HP                 | 83623B     | 3614A00396    | Sep. 27, 2018   |
| Broadband Antenna                 | Schwarzbeck        | VULB9163   | 340           | Sep. 27, 2018   |
| Horn Antenna                      | Schwarzbeck        | BBHA 9120D | 631           | Sep. 27, 2018   |
| Broadband Antenna                 | Schwarzbeck        | VULB9163   | 412           | Sep. 27, 2018   |
| Horn Antenna                      | Schwarzbeck        | BBHA 9120D | 1201          | Mar. 05, 2018   |
| Dipole Antenna                    | TCT                | TCT-RF     | N/A           | Sep. 27, 2018   |
| Coax cable (9kHz-1GHz)            | TCT                | RE-low-01  | N/A           | Sep. 27, 2018   |
| Coax cable (9kHz-40GHz)           | TCT                | RE-high-02 | N/A           | Sep. 27, 2018   |
| Coax cable (9kHz-1GHz)            | TCT                | RE-low-03  | N/A           | Sep. 27, 2018   |
| Coax cable (9kHz-40GHz)           | TCT                | RE-High-04 | N/A           | Sep. 27, 2018   |
| Antenna Mast                      | Keleto             | CC-A-4M    | N/A           | N/A             |
| EMI Test Software                 | Shurple Technology | EZ-EMC     | N/A           | N/A             |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## 6.6. Field Strength of Spurious Radiation Measurement

### 6.6.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC part 22.917(a) and FCC part 24.238(a)<br>FCC part 27.53(g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Test Method:</b>      | FCC part 2.1053                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Operation mode:</b>   | Refer to item 4.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Limit:</b>            | -13dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Test setup:</b>       | <p>For 30MHz~1GHz</p>  <p>Above 1GHz</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.</li> <li>2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.</li> <li>3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.</li> <li>4. The table was rotated 360 degrees to determine the position of the highest spurious emission.</li> <li>5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.</li> <li>6. Make the measurement with the spectrum analyzer's</li> </ol> |

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | <p>RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.</p> <p>7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.</p> <p>8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.</p> <p>9. Taking the record of output power at antenna port.</p> <p>10. Repeat step 7 to step 8 for another polarization.</p> <p>11. <math>EIRP\ (dBm) = S.G.\ Power - Tx\ Cable\ Loss + Tx\ Antenna\ Gain</math></p> <p>12. <math>ERP\ (dBm) = EIRP - 2.15</math></p> <p>13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.</p> <p>14. The limit line is derived from <math>43 + 10\log(P)</math> dB below the transmitter power P(Watts)</p> <p><math>= P(W) - [43 + 10\log(P)]\ (dB)</math></p> <p><math>= [30 + 10\log(P)]\ (dBm) - [43 + 10\log(P)]\ (dB)</math></p> <p><math>= -13dBm.</math></p> |
| Test results: | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Remark:       | All modulations have been tested, but only the worst modulation show in this test item.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## 6.6.2. Test Instruments

| Radiated Emission Test Site (966) |                    |            |               |                 |
|-----------------------------------|--------------------|------------|---------------|-----------------|
| Name of Equipment                 | Manufacturer       | Model      | Serial Number | Calibration Due |
| System simulator                  | R&S                | CMU200     | 111382        | Sep. 27, 2018   |
| Spectrum Analyzer                 | ROHDE&SCHW ARZ     | R&S        | FSQ           | Sep. 27, 2018   |
| Signal Generator                  | HP                 | 83623B     | 3614A00396    | Sep. 27, 2018   |
| Broadband Antenna                 | Schwarzbeck        | VULB9163   | 340           | Sep. 27, 2018   |
| Horn Antenna                      | Schwarzbeck        | BBHA 9120D | 631           | Sep. 27, 2018   |
| Broadband Antenna                 | Schwarzbeck        | VULB9163   | 412           | Sep. 27, 2018   |
| Horn Antenna                      | Schwarzbeck        | BBHA 9120D | 1201          | Mar. 05, 2018   |
| Horn Antenna                      | Schwarzbeck        | BBH 9170   | 582           | Jun. 07, 2018   |
| Dipole Antenna                    | TCT                | TCT-RF     | N/A           | Sep. 27, 2018   |
| Coax cable (9kHz-1GHz)            | TCT                | RE-low-01  | N/A           | Sep. 27, 2018   |
| Coax cable (9kHz-40GHz)           | TCT                | RE-high-02 | N/A           | Sep. 27, 2018   |
| Coax cable (9kHz-1GHz)            | TCT                | RE-low-03  | N/A           | Sep. 27, 2018   |
| Coax cable (9kHz-40GHz)           | TCT                | RE-High-04 | N/A           | Sep. 27, 2018   |
| Antenna Mast                      | Keleto             | CC-A-4M    | N/A           | N/A             |
| EMI Test Software                 | Shurple Technology | EZ-EMC     | N/A           | N/A             |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

### 6.6.3. Test Data

#### Frequency Range (9 kHz-30MHz)

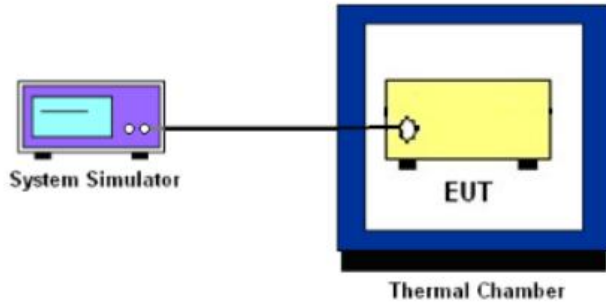
| Frequency (MHz) | Level@3m (dB $\mu$ V/m) | Limit@3m (dB $\mu$ V/m) |
|-----------------|-------------------------|-------------------------|
| --              | --                      | --                      |
| --              | --                      | --                      |
| --              | --                      | --                      |
| --              | --                      | --                      |

**Note:** 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

## 6.7. Frequency Stability Measurement

### 6.7.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC Part 2.1055 ; FCC Part 22.355 ; FCC Part 24.235<br>FCC Part 27.54                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Test Method:</b>      | FCC Part 2.1055(a)(1)(b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Operation mode:</b>   | Refer to item 4.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Limit:</b>            | $\pm 2.5$ ppm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Test Setup:</b>       |  <p>The diagram shows a 'System Simulator' (a purple box with a screen) connected by a black line to a yellow box labeled 'EUT'. The 'EUT' is positioned inside a blue square frame labeled 'Thermal Chamber'.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Test Procedure:</b>   | <p><b>Test Procedures for Temperature Variation</b></p> <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 9.0.</li> <li>2. The EUT was set up in the thermal chamber and connected with the system simulator.</li> <li>3. With power OFF, the temperature was decreased to <math>-30^{\circ}\text{C}</math> and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.</li> <li>4. With power OFF, the temperature was raised in <math>10^{\circ}\text{C}</math> steps up to <math>50^{\circ}\text{C}</math>. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.</li> </ol> <p><b>Test Procedures for Voltage Variation</b></p> <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 v02r02 Section 9.0.</li> <li>2. The EUT was placed in a temperature chamber at <math>25 \pm 5^{\circ}\text{C}</math> and connected with the system simulator.</li> <li>3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.</li> <li>4. The variation in frequency was measured for the worst case.</li> </ol> |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Remark:</b>           | All three channels of all modulations have been tested, but only the worst channel and the worst modulation show in this test item.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



## 6.7.2. Test Instruments

| Equipment                                   | Manufacturer | Model             | Serial Number | Calibration Due |
|---------------------------------------------|--------------|-------------------|---------------|-----------------|
| System simulator                            | R&S          | CMU200            | 111382        | Sep. 27, 2018   |
| Programable tempratuce and humidity chamber | JQ           | JQ-2000           | N/A           | Sep. 27, 2018   |
| DC power supply                             | Kingrang     | KR3005K<br>30V/5A | N/A           | Sep. 27, 2018   |
| RF cable<br>(9kHz-40GHz)                    | TCT          | RE-04             | N/A           | Sep. 27, 2018   |
| Antenna Connector                           | TCT          | RFC-03            | N/A           | Sep. 27, 2018   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## Appendix A: Test Data

### A.1 Conducted Output Power and Peak to Average Ratio

#### GSM850 BAND:

| Mode     | Frequency (MHz) | Peak Power(dBm) | Avg.Burst Power(dBm) | PAP  | Duty cycle Factor(dB) | Frame Power(dBm) |
|----------|-----------------|-----------------|----------------------|------|-----------------------|------------------|
| GSM850   | 824.2           | 33.18           | 32.92                | 0.26 | -9                    | 23.92            |
|          | 836.6           | 33.12           | 32.88                | 0.24 | -9                    | 23.88            |
|          | 848.8           | 33.10           | 32.86                | 0.24 | -9                    | 23.86            |
| GPRS 850 | 1 Tx Slots      | 824.2           | 33.10                | 0.89 | -9.03                 | 23.18            |
|          |                 | 836.6           | 32.89                | 0.76 | -9.03                 | 23.10            |
|          |                 | 848.8           | 33.11                | 0.96 | -9.03                 | 23.12            |
|          | 2 Tx Slots      | 824.2           | 32.28                | 0.71 | -6.02                 | 25.55            |
|          |                 | 836.6           | 32.23                | 0.64 | -6.02                 | 25.57            |
|          |                 | 848.8           | 32.44                | 0.86 | -6.02                 | 25.56            |
|          | 3 Tx Slots      | 824.2           | 31.18                | 0.80 | -4.26                 | 26.12            |
|          |                 | 836.6           | 31.16                | 0.80 | -4.26                 | 26.10            |
|          |                 | 848.8           | 31.12                | 0.77 | -4.26                 | 26.09            |
|          | 4 Tx Slots      | 824.2           | 30.18                | 0.29 | -3.01                 | 26.88            |
|          |                 | 836.6           | 30.24                | 0.38 | -3.01                 | 26.85            |
|          |                 | 848.8           | 30.29                | 0.41 | -3.01                 | 26.87            |
| EPRS 850 | 1 Tx Slots      | 824.2           | 29.62                | 0.57 | -9.03                 | 20.02            |
|          |                 | 836.6           | 29.55                | 0.53 | -9.03                 | 19.99            |
|          |                 | 848.8           | 29.30                | 0.27 | -9.03                 | 20.00            |
|          | 2 Tx Slots      | 824.2           | 28.61                | 0.28 | -6.02                 | 22.31            |
|          |                 | 836.6           | 28.82                | 0.46 | -6.02                 | 22.34            |
|          |                 | 848.8           | 28.88                | 0.57 | -6.02                 | 22.29            |
|          | 3 Tx Slots      | 824.2           | 27.73                | 0.47 | -4.26                 | 23.00            |
|          |                 | 836.6           | 27.82                | 0.60 | -4.26                 | 22.96            |
|          |                 | 848.8           | 27.95                | 0.72 | -4.26                 | 22.97            |
|          | 4 Tx Slots      | 824.2           | 27.11                | 0.43 | -3.01                 | 23.67            |
|          |                 | 836.6           | 27.16                | 0.63 | -3.01                 | 23.52            |
|          |                 | 848.8           | 27.24                | 0.69 | -3.01                 | 23.54            |

Duty cycle Factor = 1 Tx Slots,  $10 \cdot \log(1/8) = -9.03\text{dB}$ , 2 Tx Slots,  $10 \cdot \log(2/8) = -6.02\text{dB}$ ,  
 3Tx Slots,  $10 \cdot \log(3/8) = -4.26\text{dB}$ , 4 Tx Slots,  $10 \cdot \log(4/8) = -3.01\text{dB}$

## PCS1900 BAND:

| Mode       |            | Frequency (MHz) | Peak Power(dBm) | Avg.Burst Power(dBm) | PAP  | Duty cycle Factor(dB) | Frame Power(dBm) |
|------------|------------|-----------------|-----------------|----------------------|------|-----------------------|------------------|
| GSM1900    |            | 1850.2          | 30.38           | 30.15                | 0.23 | -9                    | 21.15            |
|            |            | 1880            | <b>30.52</b>    | <b>30.21</b>         | 0.31 | -9                    | 21.21            |
|            |            | 1909.8          | 30.42           | 30.13                | 0.29 | -9                    | 21.13            |
| GPRS 1900  | 1 Tx Slots | 1850.2          | 30.16           | 29.65                | 0.51 | -9.03                 | 20.62            |
|            |            | 1880            | 30.10           | 29.62                | 0.48 | -9.03                 | 20.59            |
|            |            | 1909.8          | 30.18           | 29.66                | 0.52 | -9.03                 | 20.63            |
|            | 2 Tx Slots | 1850.2          | 29.16           | 27.86                | 1.30 | -6.02                 | 21.84            |
|            |            | 1880            | 29.22           | 28.92                | 0.30 | -6.02                 | 22.90            |
|            |            | 1909.8          | 29.18           | 28.88                | 0.30 | -6.02                 | 22.86            |
|            | 3 Tx Slots | 1850.2          | 28.12           | 27.28                | 0.84 | -4.26                 | 23.02            |
|            |            | 1880            | 28.11           | 27.36                | 0.75 | -4.26                 | 23.10            |
|            |            | 1909.8          | 28.14           | 27.32                | 0.82 | -4.26                 | 23.06            |
|            | 4 Tx Slots | 1850.2          | 27.13           | 26.88                | 0.25 | -3.01                 | 23.87            |
|            |            | 1880            | 27.18           | 26.96                | 0.22 | -3.01                 | 23.95            |
|            |            | 1909.8          | 27.16           | 26.93                | 0.23 | -3.01                 | 23.92            |
| EGPRS 1900 | 1 Tx Slots | 1850.2          | 28.27           | 27.95                | 0.32 | -9.03                 | 18.92            |
|            |            | 1880            | 28.32           | 27.98                | 0.34 | -9.03                 | 18.95            |
|            |            | 1909.8          | 28.09           | 27.96                | 0.13 | -9.03                 | 18.93            |
|            | 2 Tx Slots | 1850.2          | 27.12           | 27.05                | 0.07 | -6.02                 | 21.03            |
|            |            | 1880            | 27.22           | 27.08                | 0.14 | -6.02                 | 21.06            |
|            |            | 1909.8          | 27.21           | 27.07                | 0.14 | -6.02                 | 21.05            |
|            | 3 Tx Slots | 1850.2          | 26.22           | 26.10                | 0.12 | -4.26                 | 21.84            |
|            |            | 1880            | 26.17           | 26.12                | 0.05 | -4.26                 | 21.86            |
|            |            | 1909.8          | 26.12           | 26.11                | 0.01 | -4.26                 | 21.85            |
|            | 4 Tx Slots | 1850.2          | 26.08           | 25.35                | 0.73 | -3.01                 | 22.34            |
|            |            | 1880            | 26.21           | 25.32                | 0.89 | -3.01                 | 22.31            |
|            |            | 1909.8          | 26.07           | 25.33                | 0.74 | -3.01                 | 22.32            |

Duty cycle Factor = 1 Tx Slots,  $10 \cdot \log(1/8) = -9.03\text{dB}$ , 2 Tx Slots,  $10 \cdot \log(2/8) = -6.02\text{dB}$ ,  
 3Tx Slots,  $10 \cdot \log(3/8) = -4.26\text{dB}$ , 4 Tx Slots,  $10 \cdot \log(4/8) = -3.01\text{dB}$

**UTRA BANDS:**  
**BAND 2:**

| Mode      |            | Frequency (MHz) | Peak Power(dBm) | Avg.Burst Power(dBm) | PAPR (dB) |
|-----------|------------|-----------------|-----------------|----------------------|-----------|
| RMC 12.2K |            | 1852.4          | 22.23           | <b>21.58</b>         | 0.65      |
|           |            | 1880            | <b>22.24</b>    | 21.52                | 0.72      |
|           |            | 1907.6          | 22.12           | 21.56                | 0.56      |
| HSDPA     | 1 Tx Slots | 1852.4          | 22.12           | 21.21                | 0.91      |
|           |            | 1880            | 22.21           | 21.41                | 0.80      |
|           |            | 1907.6          | 22.28           | 21.30                | 0.98      |
|           | 2 Tx Slots | 1852.4          | 22.19           | 21.19                | 1.00      |
|           |            | 1880            | 21.14           | 20.52                | 0.62      |
|           |            | 1907.6          | 21.21           | 20.62                | 0.59      |
|           | 3 Tx Slots | 1852.4          | 21.88           | 21.10                | 0.78      |
|           |            | 1880            | 21.84           | 20.25                | 1.59      |
|           |            | 1907.6          | 21.79           | 20.11                | 1.68      |
|           | 4 Tx Slots | 1852.4          | 21.46           | 20.02                | 1.44      |
|           |            | 1880            | 21.38           | 20.02                | 1.36      |
|           |            | 1907.6          | 21.51           | 20.32                | 1.19      |
|           | HSUPA      | 1852.4          | 21.94           | 21.32                | 0.62      |
|           |            | 1880            | 21.74           | 20.75                | 0.99      |
|           |            | 1907.6          | 21.54           | 20.42                | 1.12      |
|           | 2 Tx Slots | 1852.4          | 21.87           | 21.02                | 0.85      |
|           |            | 1880            | 21.68           | 20.45                | 1.23      |
|           |            | 1907.6          | 21.74           | 20.10                | 1.64      |
|           | 3 Tx Slots | 1852.4          | 21.59           | 21.15                | 0.44      |
|           |            | 1880            | 21.41           | 20.23                | 1.18      |
|           |            | 1907.6          | 21.28           | 20.20                | 1.08      |
|           | 4 Tx Slots | 1852.4          | 21.11           | 20.52                | 0.59      |
|           |            | 1880            | 21.13           | 20.15                | 0.98      |
|           |            | 1907.6          | 21.26           | 20.11                | 1.15      |
|           | 5 Tx Slots | 1852.4          | 21.22           | 20.95                | 0.27      |
|           |            | 1880            | 21.37           | 20.15                | 1.22      |
|           |            | 1907.6          | 21.66           | 20.11                | 1.55      |

## BAND 4:

| Mode      |            | Frequency (MHz) | Peak Power(dBm) | Avg.Burst Power(dBm) | PAPR (dB) |
|-----------|------------|-----------------|-----------------|----------------------|-----------|
| RMC 12.2K |            | 1712.4          | 23.12           | 22.02                | 1.10      |
|           |            | 1732.6          | <b>23.15</b>    | 22.12                | 1.03      |
|           |            | 1752.6          | 23.13           | <b>22.16</b>         | 0.97      |
| HSDPA     | 1 Tx Slots | 1712.4          | 22.21           | 21.51                | 0.70      |
|           |            | 1732.6          | 22.17           | 21.52                | 0.65      |
|           |            | 1752.6          | 22.20           | 21.55                | 0.65      |
|           | 2 Tx Slots | 1712.4          | 22.23           | 21.82                | 0.41      |
|           |            | 1732.6          | 22.22           | 21.71                | 0.51      |
|           |            | 1752.6          | 22.31           | 21.43                | 0.88      |
|           | 3 Tx Slots | 1712.4          | 22.50           | 21.72                | 0.78      |
|           |            | 1732.6          | 22.46           | 21.51                | 0.95      |
|           |            | 1752.6          | 22.51           | 21.43                | 1.08      |
|           | 4 Tx Slots | 1712.4          | 22.05           | 21.61                | 0.44      |
|           |            | 1732.6          | 22.06           | 21.72                | 0.34      |
|           |            | 1752.6          | 22.14           | 21.58                | 0.56      |
| HSUPA     | 1 Tx Slots | 1712.4          | 22.26           | 21.46                | 0.80      |
|           |            | 1732.6          | 22.44           | 21.38                | 1.06      |
|           |            | 1752.6          | 22.38           | 21.31                | 1.07      |
|           | 2 Tx Slots | 1712.4          | 22.15           | 21.51                | 0.64      |
|           |            | 1732.6          | 22.14           | 21.61                | 0.53      |
|           |            | 1752.6          | 22.16           | 21.42                | 0.74      |
|           | 3 Tx Slots | 1712.4          | 22.39           | 21.48                | 0.91      |
|           |            | 1732.6          | 22.21           | 21.32                | 0.89      |
|           |            | 1752.6          | 22.34           | 21.33                | 1.01      |
|           | 4 Tx Slots | 1712.4          | 22.21           | 21.32                | 0.89      |
|           |            | 1732.6          | 22.18           | 21.44                | 0.74      |
|           |            | 1752.6          | 22.42           | 22.38                | 0.04      |
|           | 5 Tx Slots | 1712.4          | 22.21           | 21.36                | 0.85      |
|           |            | 1732.6          | 22.12           | 21.43                | 0.69      |
|           |            | 1752.6          | 22.03           | 21.31                | 0.72      |

## BAND 5:

| Mode      |            | Frequency (MHz) | Peak Power(dBm) | Avg.Burst Power(dBm) | PAPR (dB) |
|-----------|------------|-----------------|-----------------|----------------------|-----------|
| RMC 12.2K |            | 826.4           | <b>23.38</b>    | 22.40                | 0.98      |
|           |            | 836.4           | 23.26           | <b>22.42</b>         | 0.84      |
|           |            | 846.6           | 23.15           | 22.35                | 0.80      |
| HSDPA     | 1 Tx Slots | 826.4           | 23.12           | 22.12                | 1.00      |
|           |            | 836.4           | 23.01           | 22.23                | 0.78      |
|           |            | 846.6           | 23.21           | 22.28                | 0.93      |
|           | 2 Tx Slots | 826.4           | 22.28           | 21.52                | 0.76      |
|           |            | 836.4           | 22.28           | 21.51                | 0.77      |
|           |            | 846.6           | 22.22           | 21.32                | 0.90      |
|           | 3 Tx Slots | 826.4           | 22.23           | 21.32                | 0.91      |
|           |            | 836.4           | 22.34           | 21.35                | 0.99      |
|           |            | 846.6           | 22.22           | 21.48                | 0.74      |
|           | 4 Tx Slots | 826.4           | 21.24           | 20.54                | 0.70      |
|           |            | 836.4           | 21.42           | 20.55                | 0.87      |
|           |            | 846.6           | 21.15           | 20.62                | 0.53      |
| HSUPA     | 1 Tx Slots | 826.4           | 21.83           | 20.72                | 1.11      |
|           |            | 836.4           | 21.66           | 20.60                | 1.06      |
|           |            | 846.6           | 21.41           | 20.83                | 0.58      |
|           | 2 Tx Slots | 826.4           | 22.63           | 21.58                | 1.05      |
|           |            | 836.4           | 22.45           | 21.82                | 0.63      |
|           |            | 846.6           | 22.42           | 21.32                | 1.10      |
|           | 3 Tx Slots | 826.4           | 22.24           | 21.31                | 0.93      |
|           |            | 836.4           | 22.18           | 21.33                | 0.85      |
|           |            | 846.6           | 22.42           | 21.22                | 1.20      |
|           | 4 Tx Slots | 826.4           | 22.23           | 21.53                | 0.70      |
|           |            | 836.4           | 22.24           | 21.26                | 0.98      |
|           |            | 846.6           | 22.35           | 21.82                | 0.53      |
|           | 5 Tx Slots | 826.4           | 22.14           | 21.28                | 0.86      |
|           |            | 836.4           | 22.18           | 21.16                | 1.02      |
|           |            | 846.6           | 22.38           | 21.28                | 1.10      |

**A.2 99% Occupied Bandwidth and 26dB Bandwidth Measurement****GSM850:**

| Frequency | OBW(99%)  | 26dB BW   |
|-----------|-----------|-----------|
| 824.2     | 248.40KHz | 314.10KHz |
| 836.6     | 245.19KHz | 312.50KHz |
| 848.8     | 245.19KHz | 315.71KHz |

**PCS1900:**

| Frequency | OBW(99%)  | 26dB BW   |
|-----------|-----------|-----------|
| 1850.2    | 245.19KHz | 310.90KHz |
| 1880      | 243.59KHz | 318.91KHz |
| 1909.8    | 245.19KHz | 309.29KHz |

**GPRS850:**

| Frequency | OBW(99%)  | 26dB BW   |
|-----------|-----------|-----------|
| 824.2     | 243.59KHz | 318.18KHz |
| 836.6     | 245.19KHz | 315.71KHz |
| 848.8     | 242.00KHz | 317.31KHz |

**GPRS 1900:**

| Frequency | OBW(99%)  | 26dB BW   |
|-----------|-----------|-----------|
| 1850.2    | 245.19KHz | 315.71KHz |
| 1880      | 245.19KHz | 315.71KHz |
| 1909.8    | 245.19KHz | 317.31KHz |

**EGPRS 850:**

| Frequency | OBW(99%)  | 26dB BW   |
|-----------|-----------|-----------|
| 824.2     | 242.00KHz | 282.05KHz |
| 836.6     | 243.59KHz | 280.45KHz |
| 848.8     | 225.96KHz | 250.00KHz |

## EGPRS 1900:

| Frequency | OBW(99%)  | 26dB BW   |
|-----------|-----------|-----------|
| 1850.2    | 250.00KHz | 301.28KHz |
| 1880      | 248.40KHz | 304.49KHz |
| 1909.8    | 245.19KHz | 318.91KHz |

UTRA BANDS  
BAND 2:

| Frequency | OBW(99%) | 26dB BW  |
|-----------|----------|----------|
| 1852.4    | 4.215MHz | 4.888MHz |
| 1880      | 4.215MHz | 4.872MHz |
| 1907.6    | 4.215MHz | 4.872MHz |

## BAND 4:

| Frequency | OBW(99%) | 26dB BW  |
|-----------|----------|----------|
| 1712.4    | 4.215MHz | 4.892MHz |
| 1732.6    | 4.231MHz | 4.920MHz |
| 1752.6    | 4.247MHz | 4.872MHz |

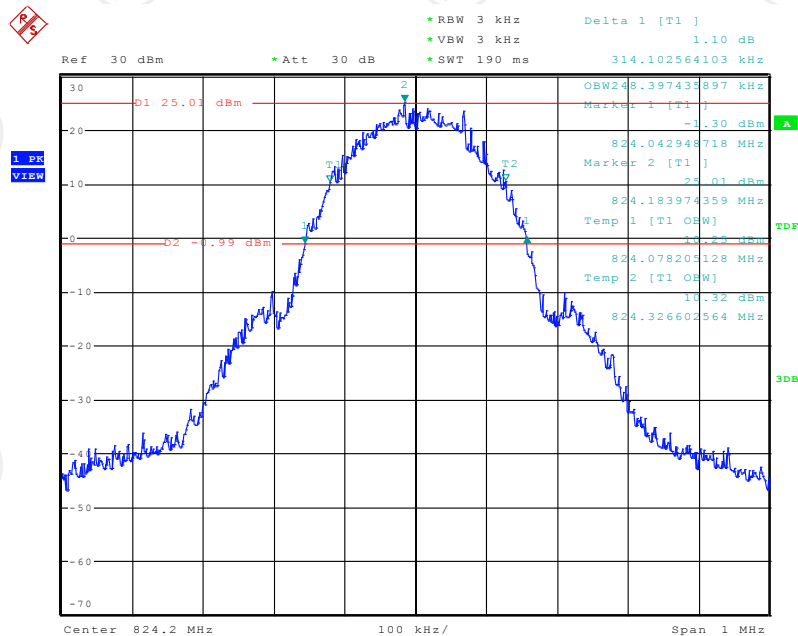
## BAND 5:

| Frequency | OBW(99%) | 26dB BW  |
|-----------|----------|----------|
| 826.4     | 4.231MHz | 4.904MHz |
| 836.4     | 4.247MHz | 4.888MHz |
| 846.6     | 4.263MHz | 4.920MHz |



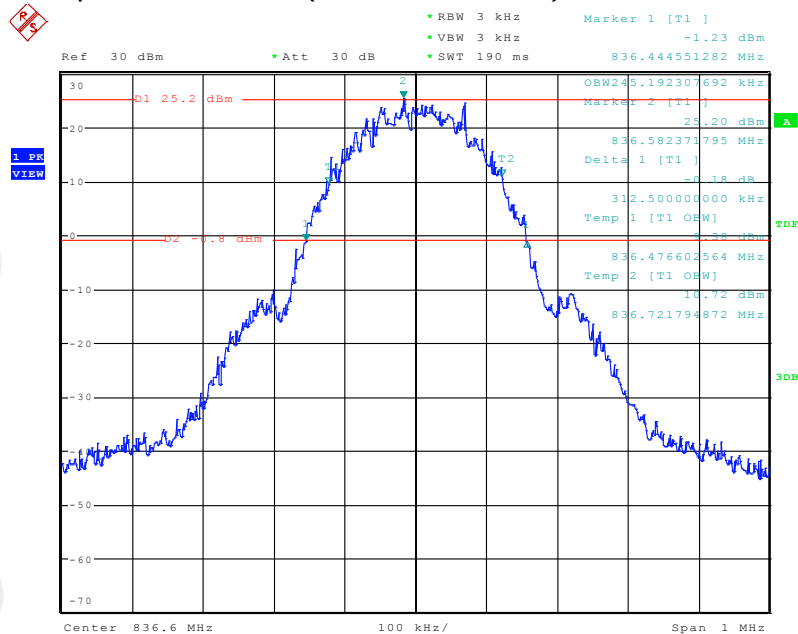
## Test Plot(s)

### Occupied Bandwidth (99% and -26dBc) GSM 850 BAND CH 128



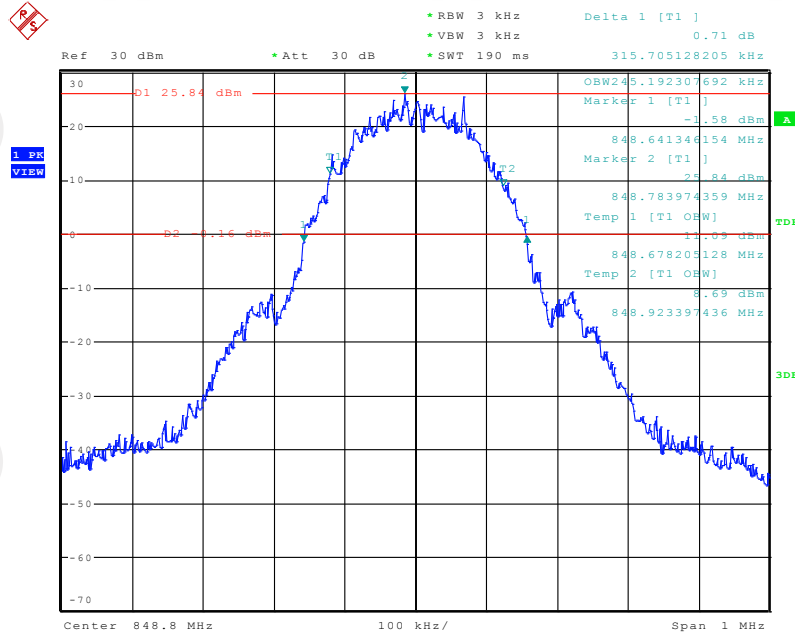
Date: 16.MAY.2017 16:15:32

### Occupied Bandwidth (99% and -26dBc) GSM 850 BAND CH 190



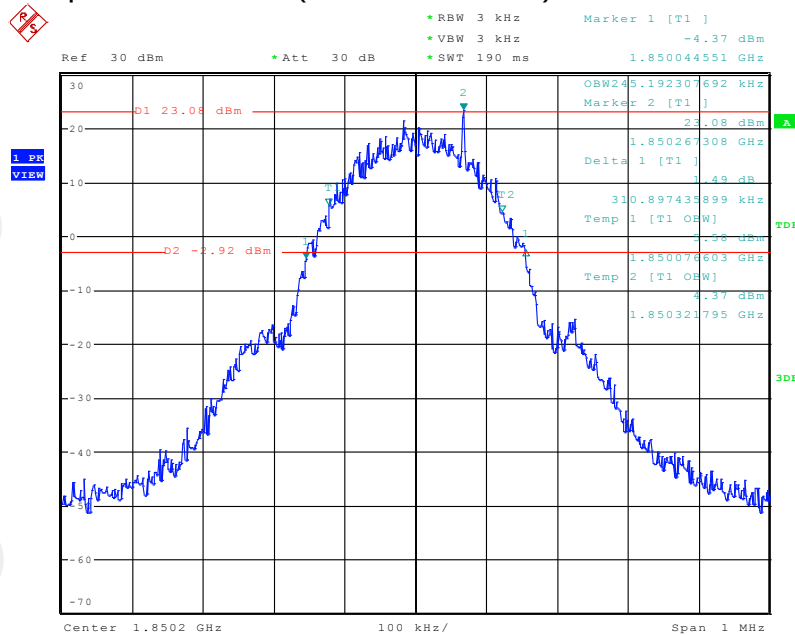
Date: 16.MAY.2017 16:18:24

## Occupied Bandwidth (99% and -26dBc) GSM 850 BAND CH 251



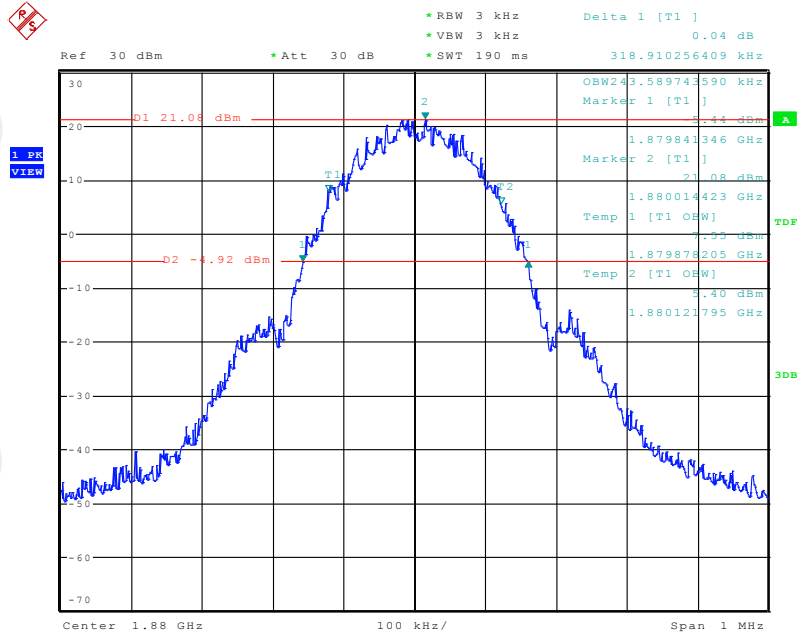
Date: 16.MAY.2017 16:20:25

## Occupied Bandwidth (99% and -26dBc) GSM 1900 BAND CH 512



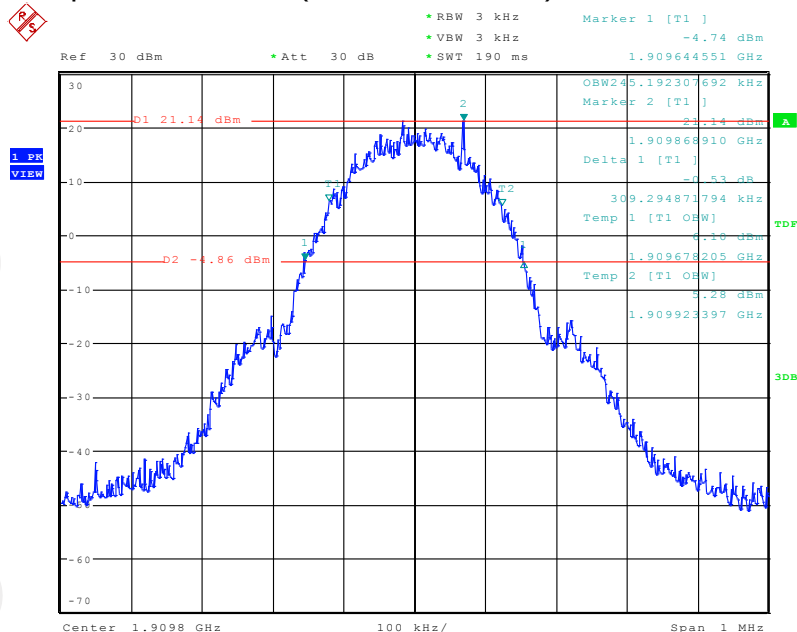
Date: 16.MAY.2017 16:25:38

## Occupied Bandwidth (99% and -26dBc) PCS 1900 BAND CH 661



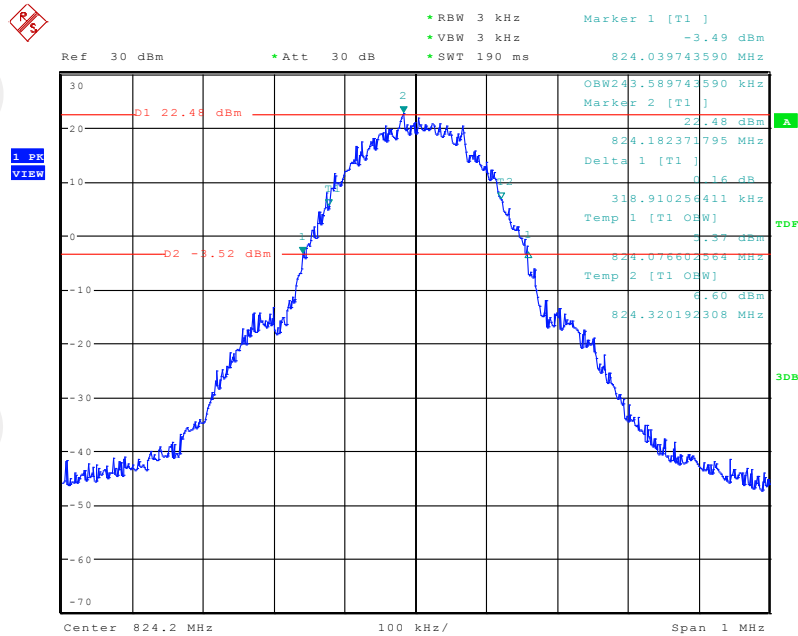
Date: 16.MAY.2017 16:27:24

## Occupied Bandwidth (99% and -26dBc) PCS 1900 BAND CH 810



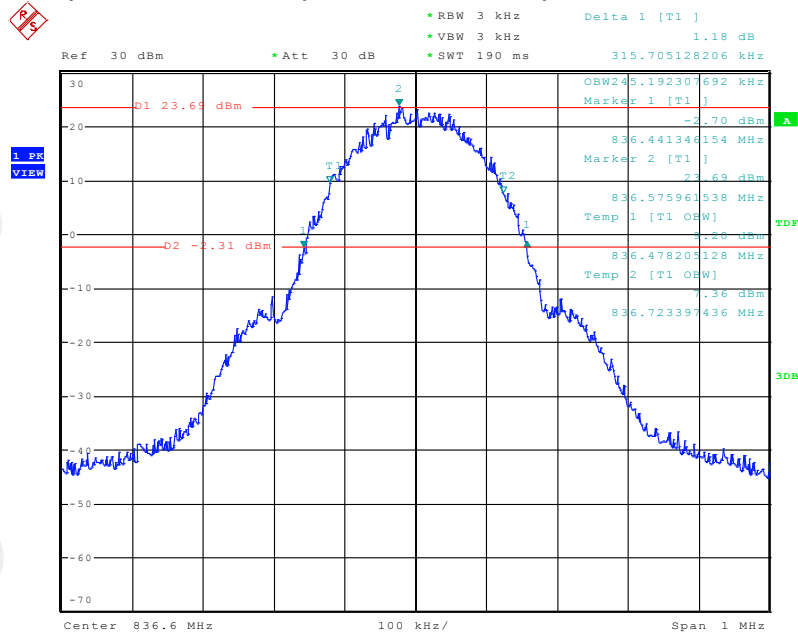
Date: 16.MAY.2017 16:28:55

## Occupied Bandwidth (99% and -26dBc) GPRS 850 BAND CH 128



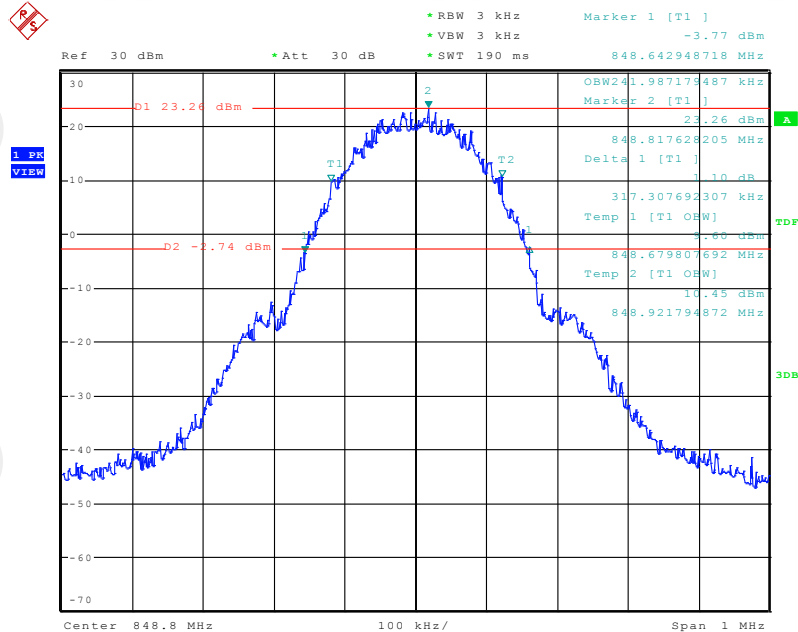
Date: 16.MAY.2017 16:40:19

## Occupied Bandwidth (99% and -26dBc) GPRS 850 BAND CH 190



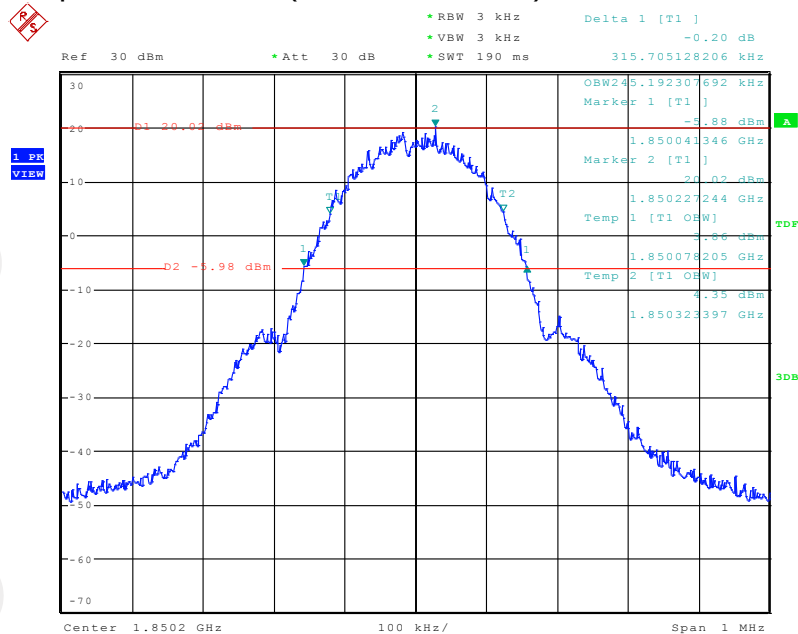
Date: 16.MAY.2017 16:42:23

## Occupied Bandwidth (99% and -26dBc) GPRS 850 BAND CH 251



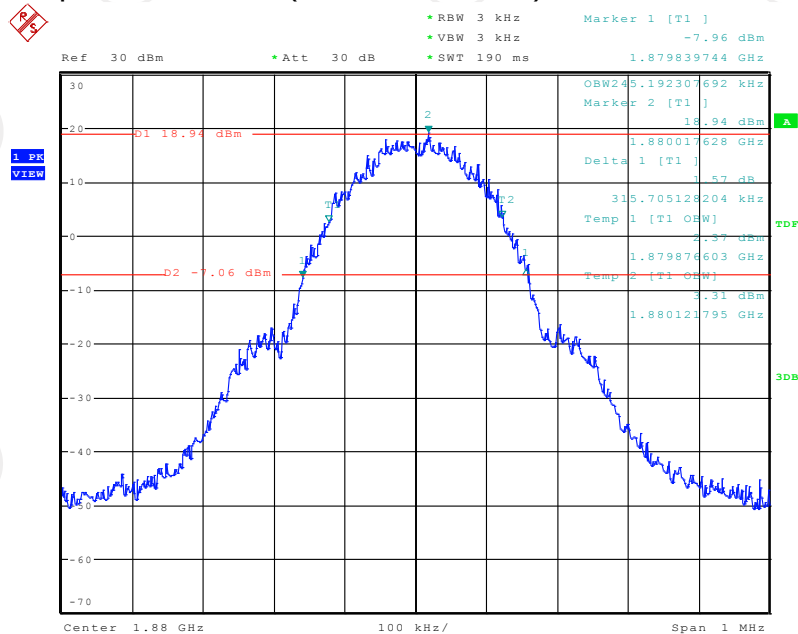
Date: 16.MAY.2017 16:43:42

## Occupied Bandwidth (99% and -26dBc) GPRS 1900 BAND CH 512



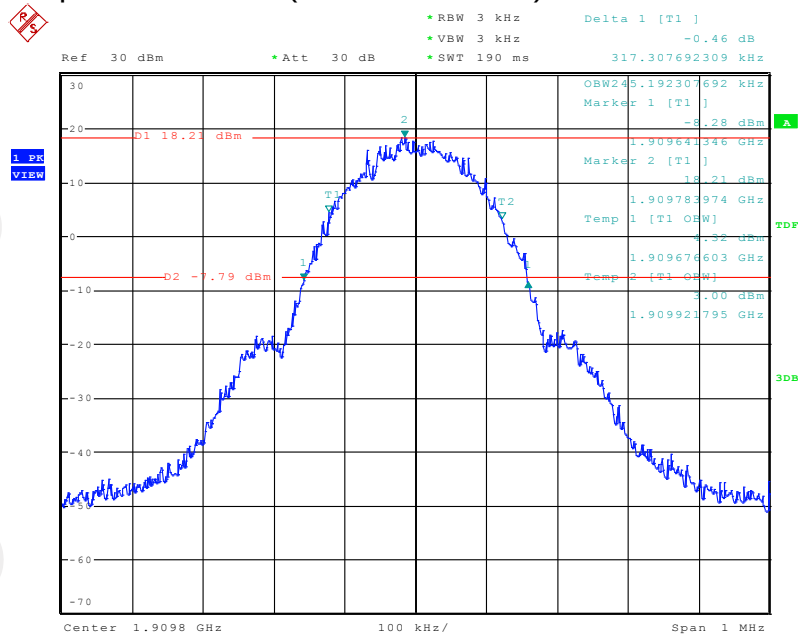
Date: 16.MAY.2017 16:32:36

## Occupied Bandwidth (99% and -26dBc) GPRS 1900 BAND CH 661



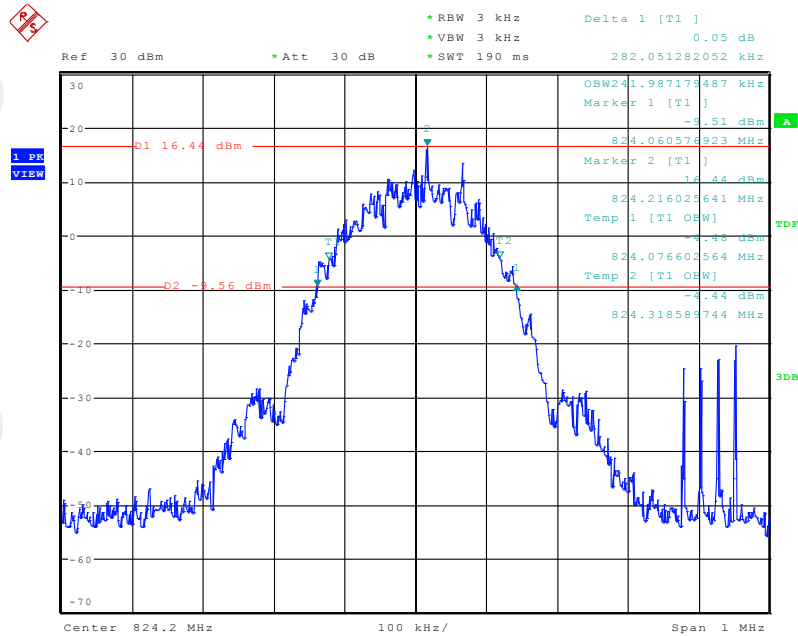
Date: 16.MAY.2017 16:34:29

## Occupied Bandwidth (99% and -26dBc) GPRS 1900 BAND CH 810



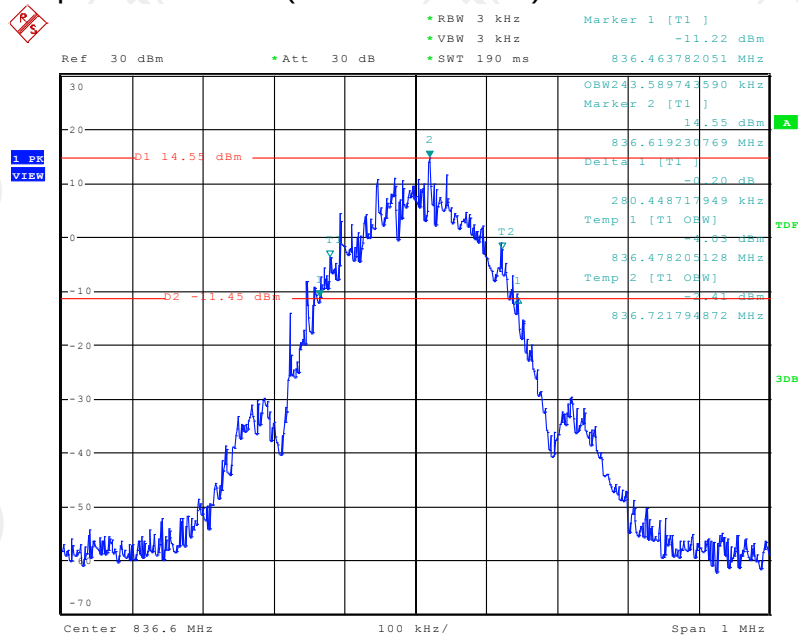
Date: 16.MAY.2017 16:36:02

## Occupied Bandwidth (99% and -26dBc) EGPRS 850 BAND CH 128



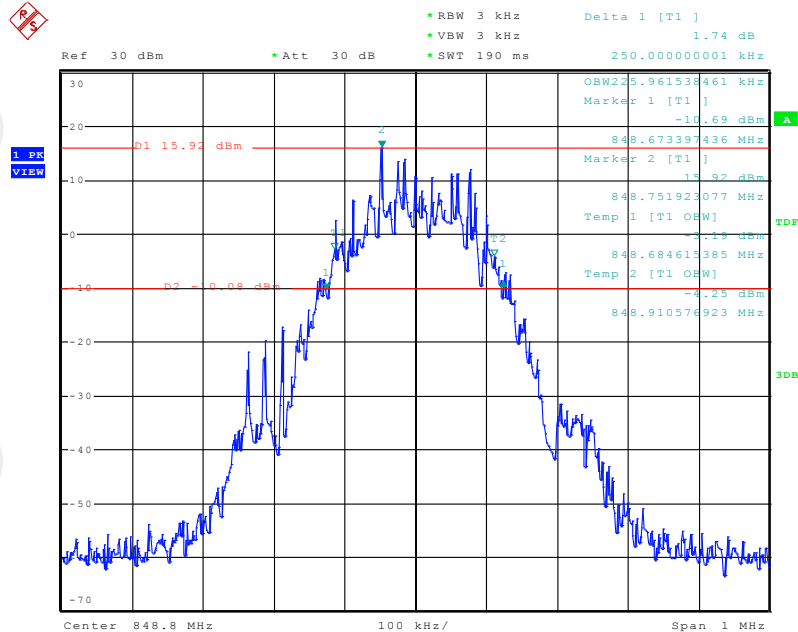
Date: 16.MAY.2017 17:03:22

## Occupied Bandwidth (99% and -26dBc) EGPRS 850 BAND CH 190



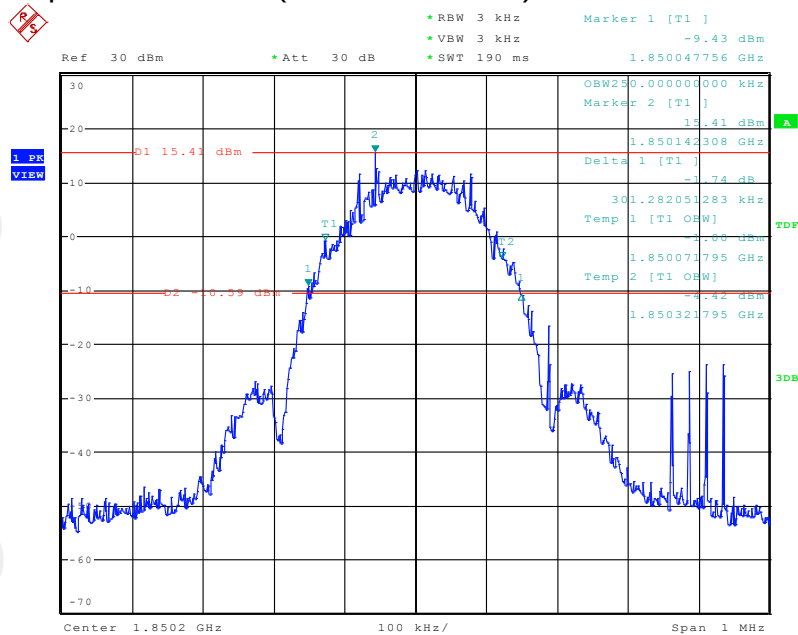
Date: 16.MAY.2017 18:58:03

## Occupied Bandwidth (99% and -26dBc) EGPRS 850 BAND CH 251



Date: 16.MAY.2017 19:01:14

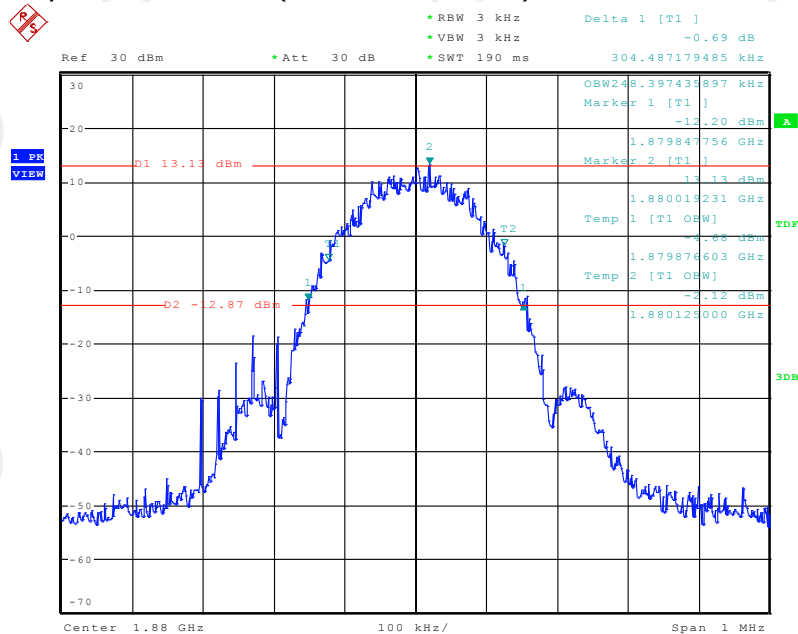
## Occupied Bandwidth (99% and -26dBc) EGPRS 1900 BAND CH 512



Date: 16.MAY.2017 19:08:04

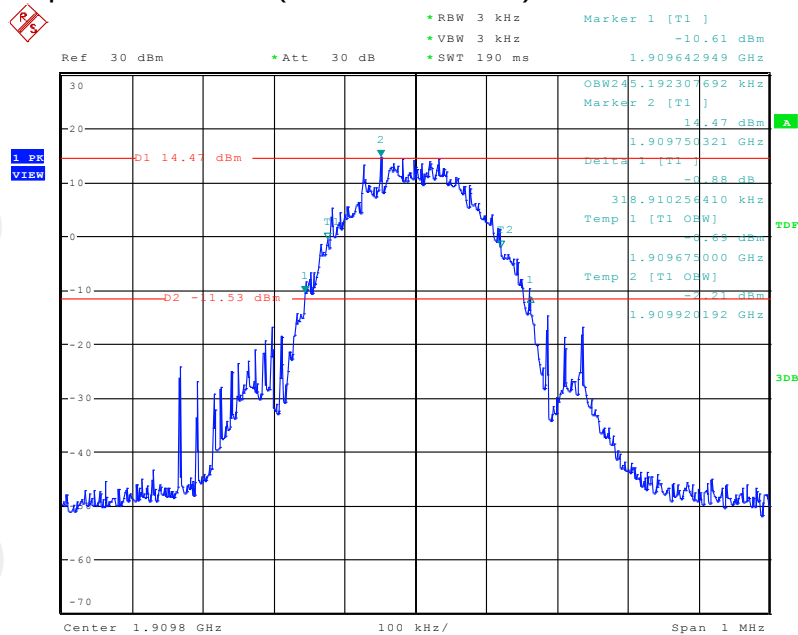


## Occupied Bandwidth (99% and -26dBc) EGPRS 1900 BAND CH 661



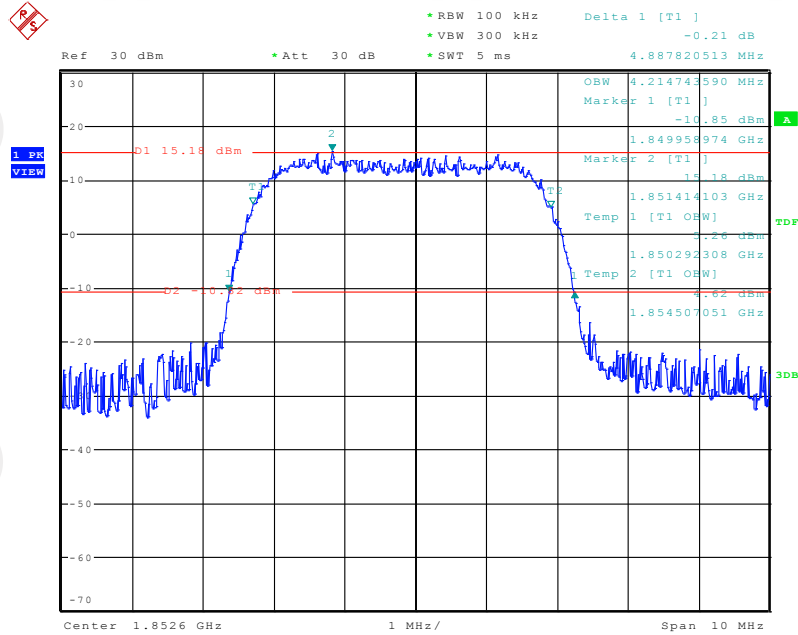
Date: 16.MAY.2017 19:09:40

## Occupied Bandwidth (99% and -26dBc) EGPRS 1900 BAND CH 810



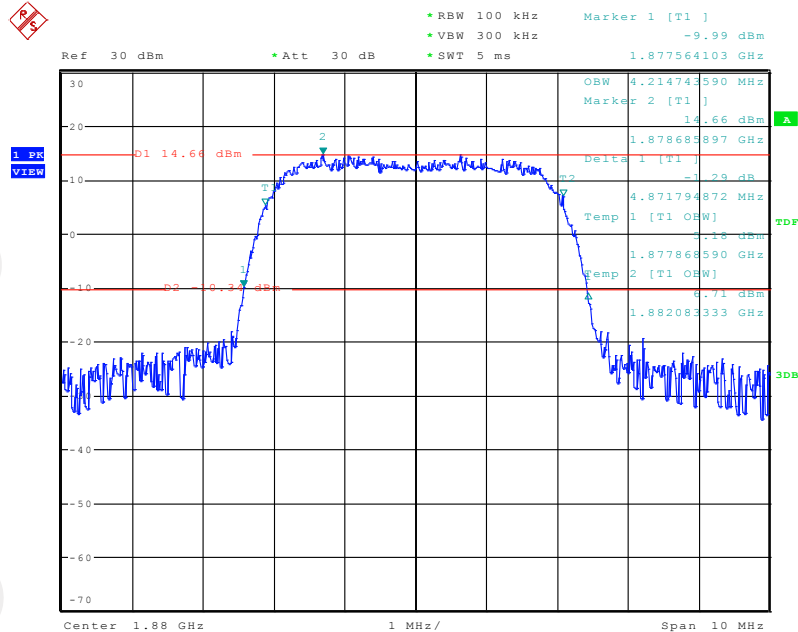
Date: 16.MAY.2017 19:12:05

## UTRA BANDS Occupied Bandwidth (99% and -26dBc) WCDMA BAND II CH 9262



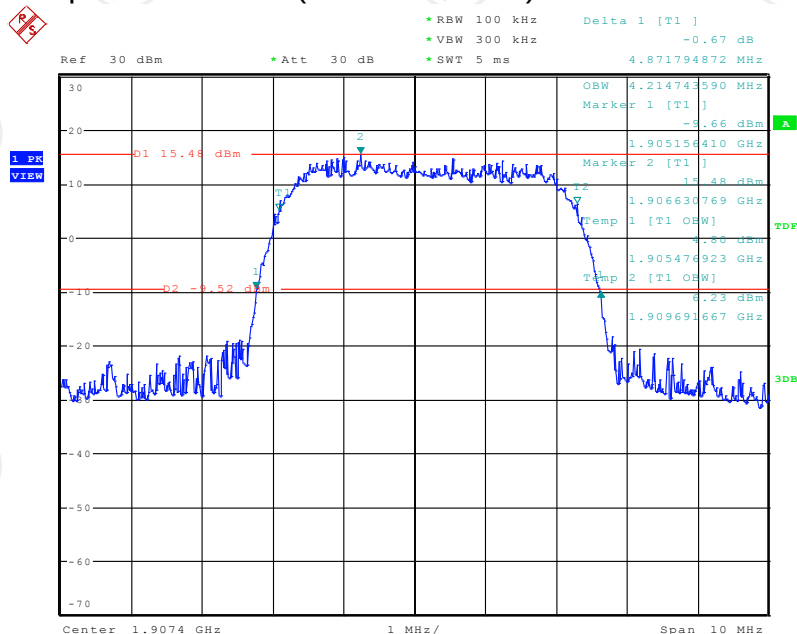
Date: 16.MAY.2017 19:17:28

## Occupied Bandwidth (99%and-26dBc) WCDMA BAND II CH 9400



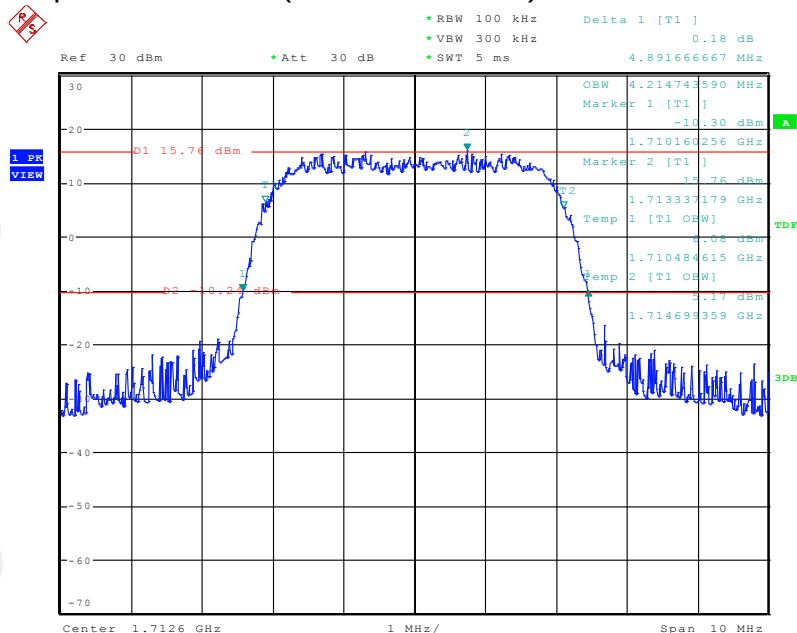
Date: 16.MAY.2017 19:18:38

## Occupied Bandwidth (99% and -26dBc) WCDMA BAND II CH 9538



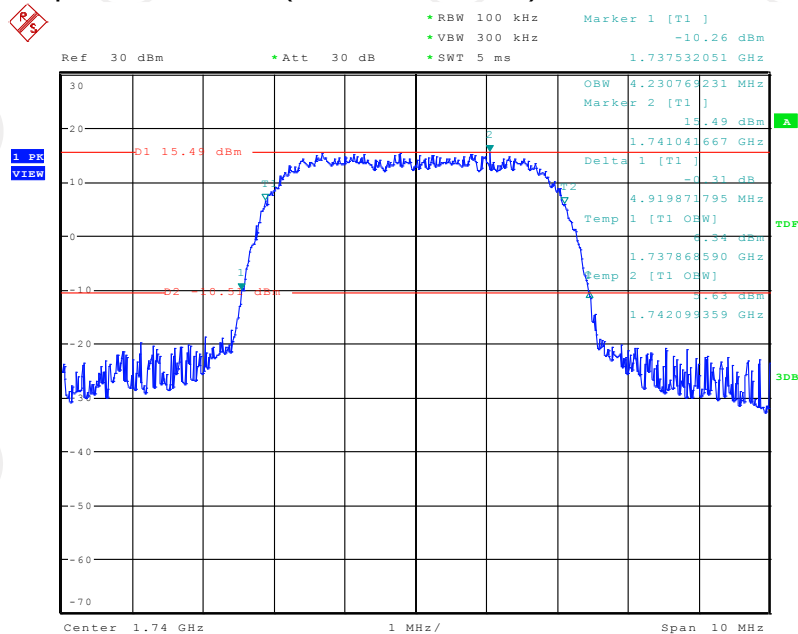
Date: 16.MAY.2017 19:19:48

## Occupied Bandwidth (99% and -26dBc) WCDMA BAND IV CH 1312



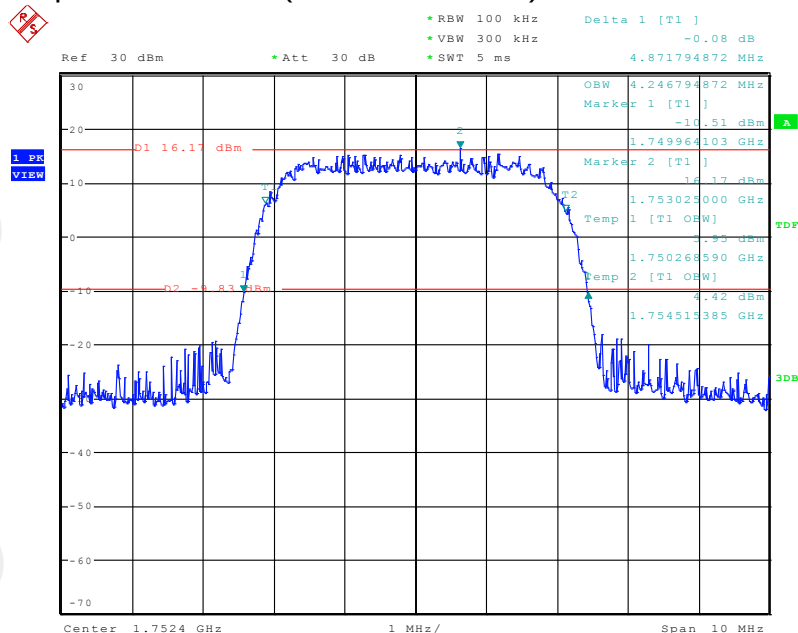
Date: 16.MAY.2017 20:19:13

## Occupied Bandwidth (99% and -26dBc) WCDMA BAND IV CH 1413



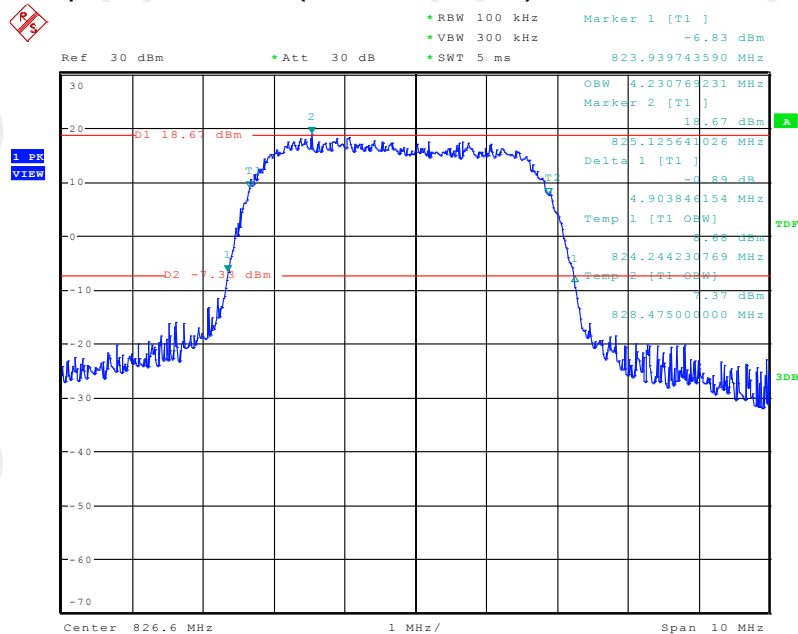
Date: 16.MAY.2017 20:20:28

## Occupied Bandwidth (99% and -26dBc) WCDMA BAND IV CH 1513



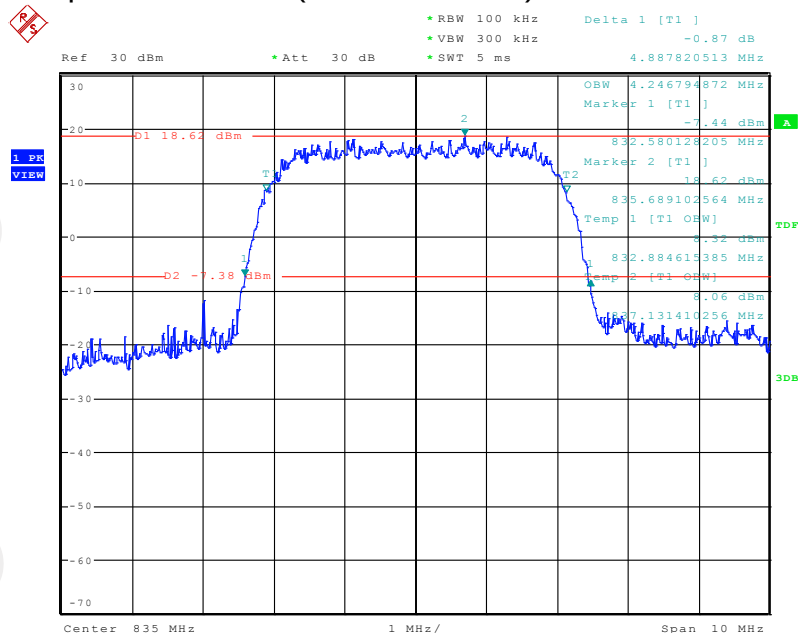
Date: 16.MAY.2017 20:21:45

## Occupied Bandwidth (99%and-26dBc) WCDMA BAND V CH 4132



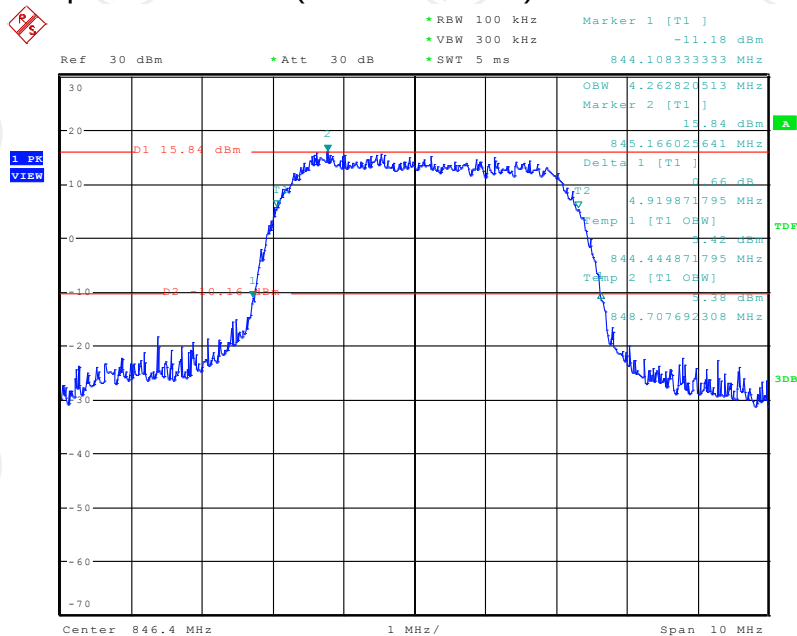
Date: 16.MAY.2017 19:22:01

## Occupied Bandwidth (99%and-26dBc) WCDMA BAND V CH 4182



Date: 16.MAY.2017 19:26:21

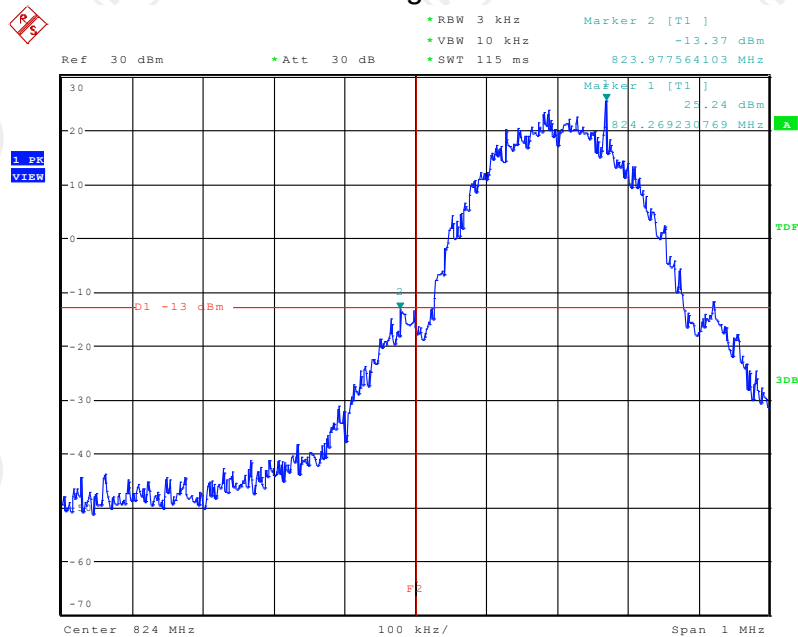
## Occupied Bandwidth (99%and-26dBc) WCDMA BAND V CH 4233



Date: 16.MAY.2017 19:27:43

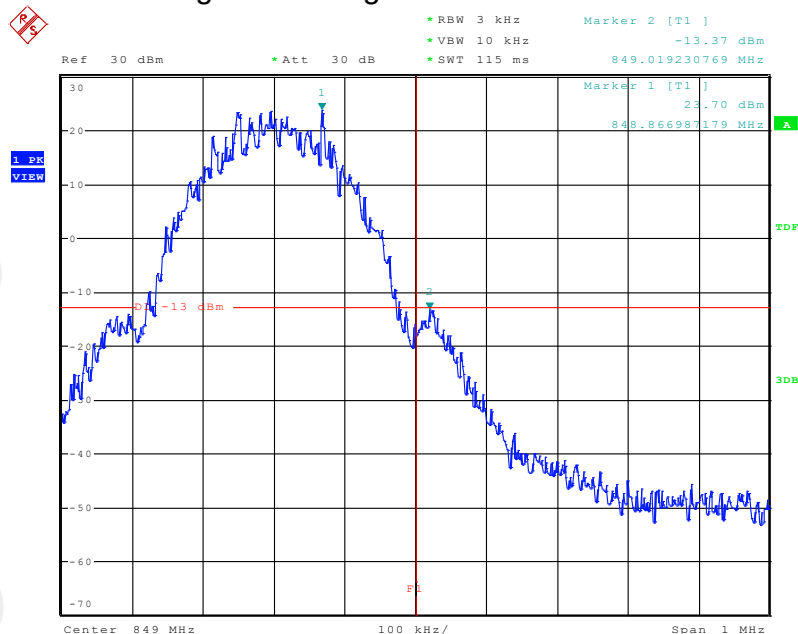
## A.3 Band Edge and Conducted Spurious Emission Measurement Test Plot(s)

### Low Band Edge GSM 850 BAND CH 128



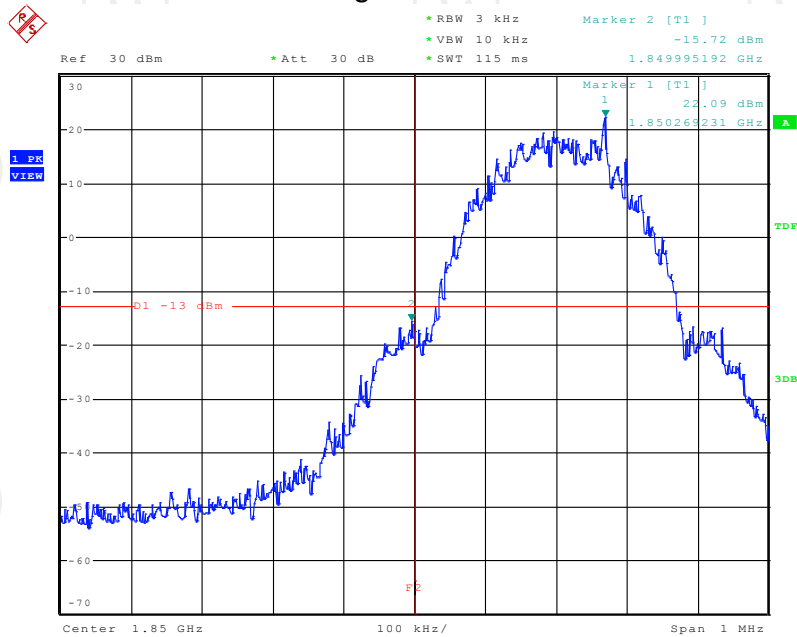
Date: 16.MAY.2017 20:29:58

### High Band Edge GSM 850 BAND CH 251



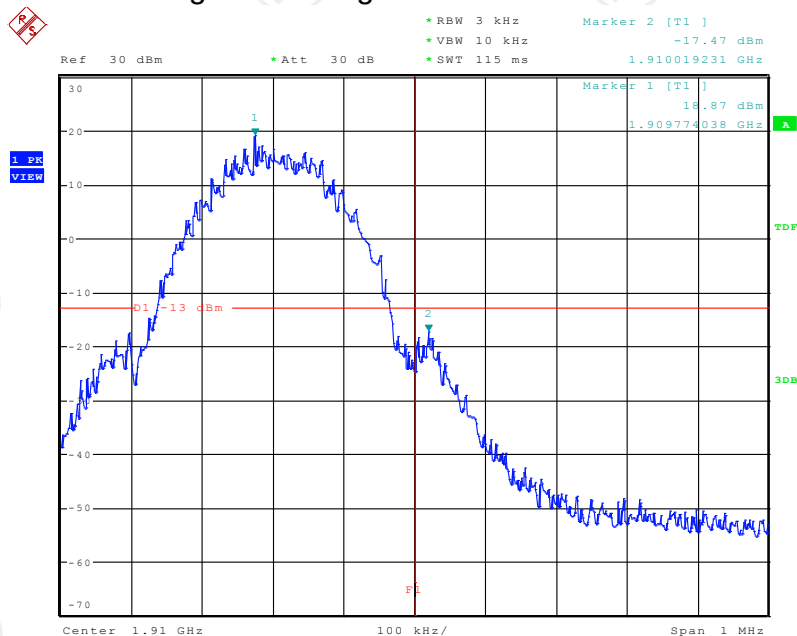
Date: 16.MAY.2017 20:32:32

## Low Band Edge PCS 1900 BAND CH 512



Date: 16.MAY.2017 20:34:37

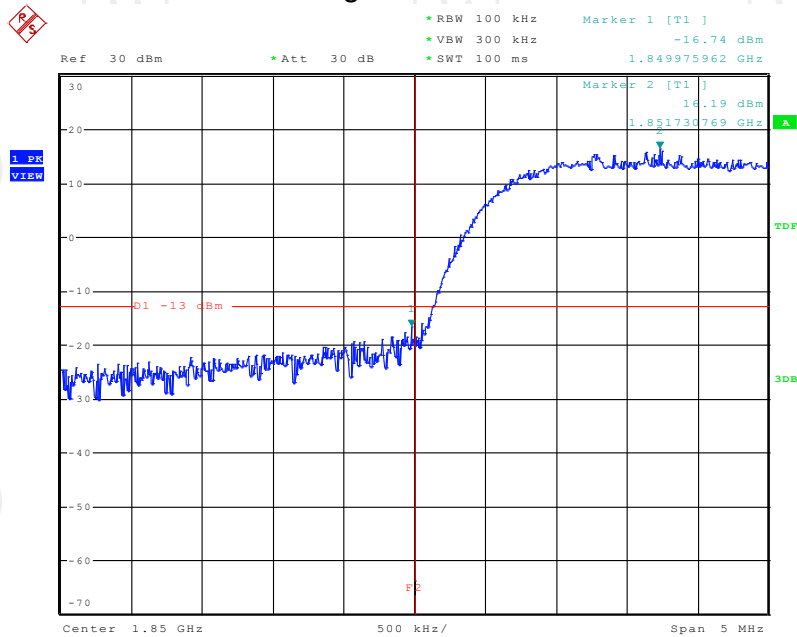
## High Band Edge PCS 1900 BAND CH 810



Date: 16.MAY.2017 20:36:18

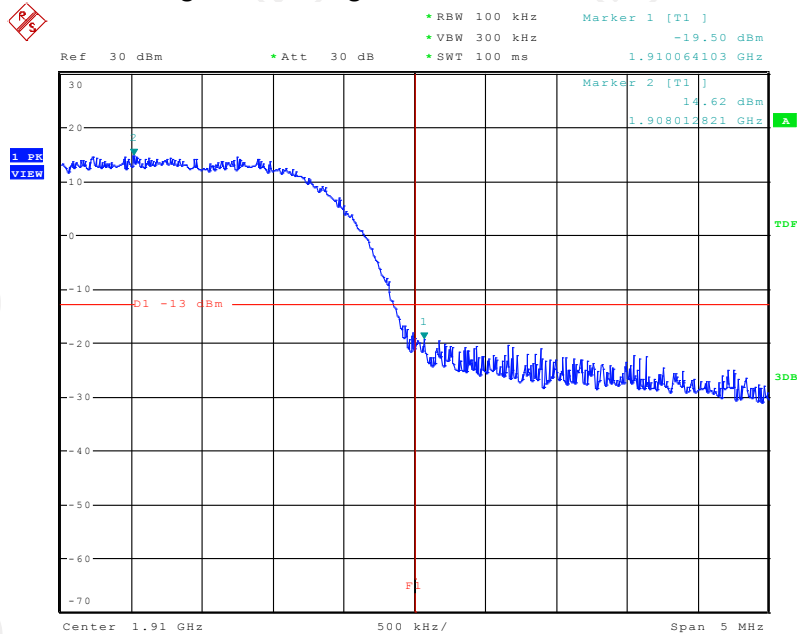


## Low Band Edge WCDMA BAND II CH 9263



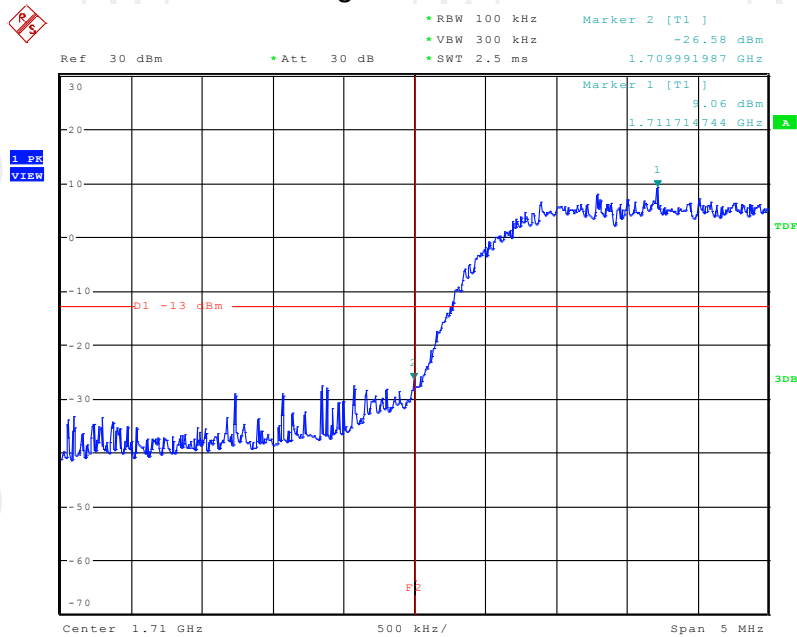
Date: 16.MAY.2017 20:10:08

## High Band Edge WCDMA BAND II CH 9537



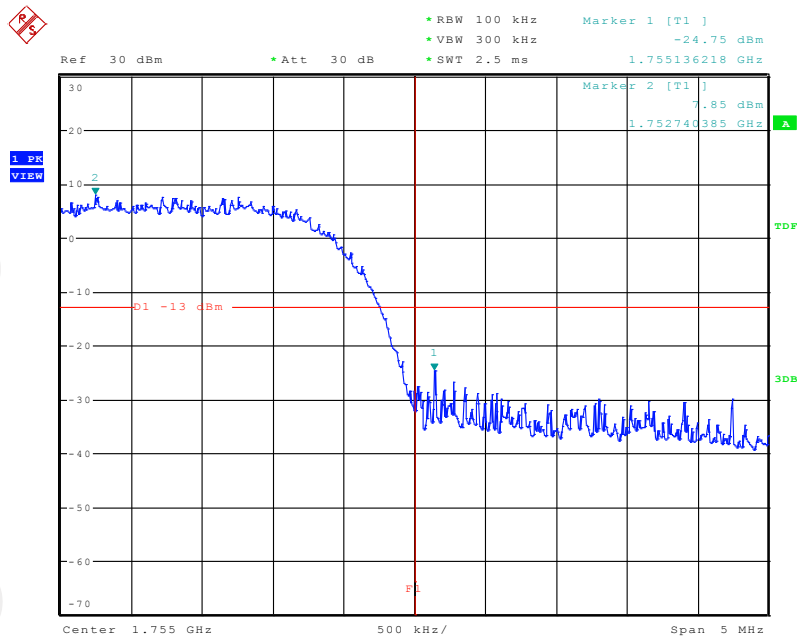
Date: 16.MAY.2017 20:11:37

## Low Band Edge WCDMA BAND IV CH 1312



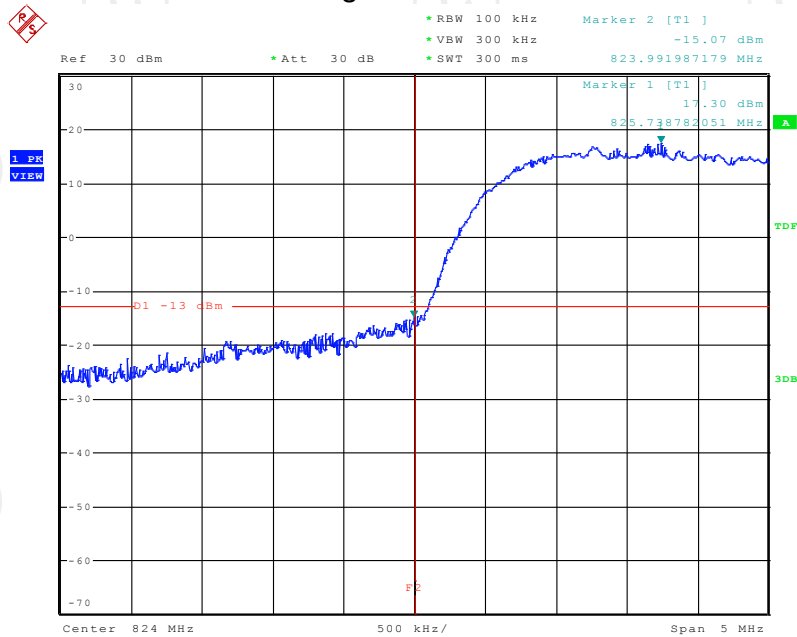
Date: 16.MAY.2017 20:16:24

## Low Band Edge WCDMA BAND IV CH 1513



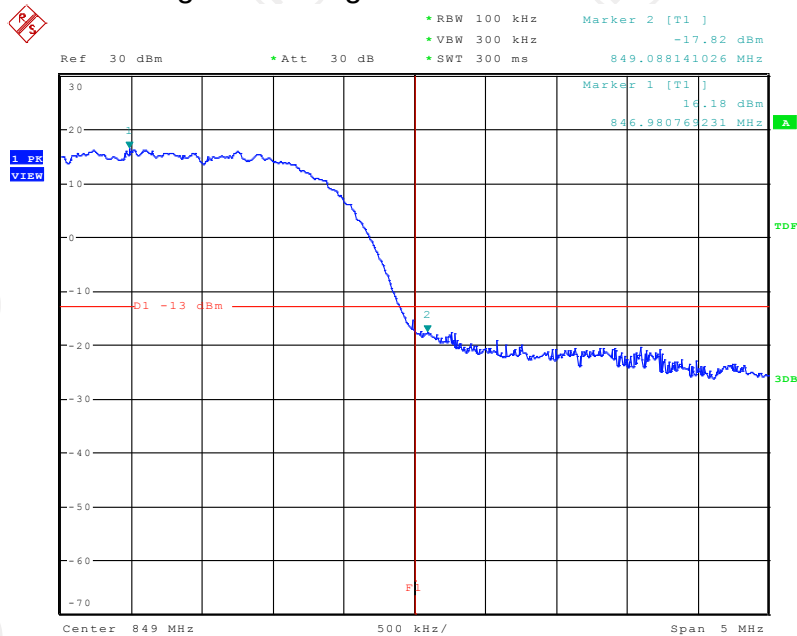
Date

## Low Band Edge WCDMA BAND V CH 4132



Date: 16.MAY.2017 19:42:07

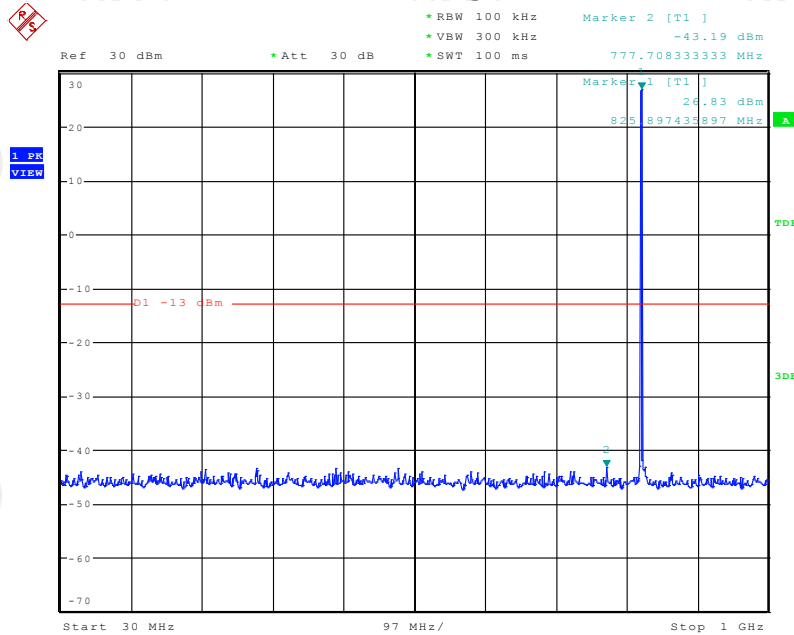
## High Band Edge WCDMA BAND V CH 4233



Date: 16.MAY.2017 19:39:44

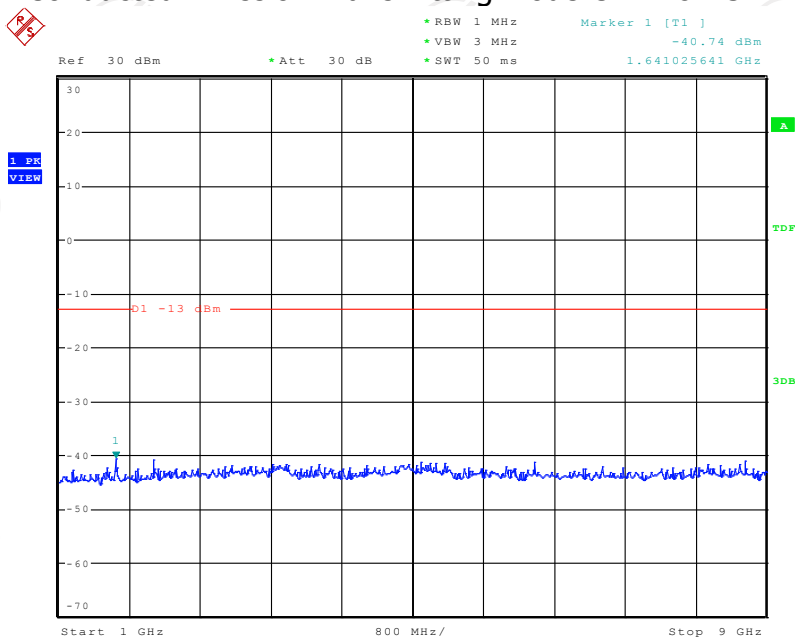
# CONDUCTED EMISSION IN GSM850 BAND

## Conducted Emission Transmitting Mode CH 128 30MHz – 1GHz



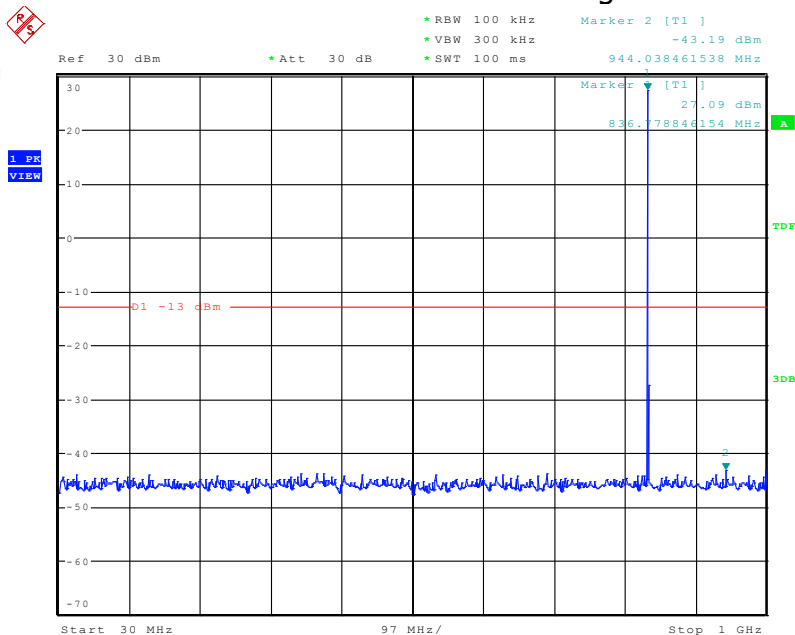
Date: 15.JUN.2017 18:34:17

## Conducted Emission Transmitting Mode CH 128 1GHz – 9GHz



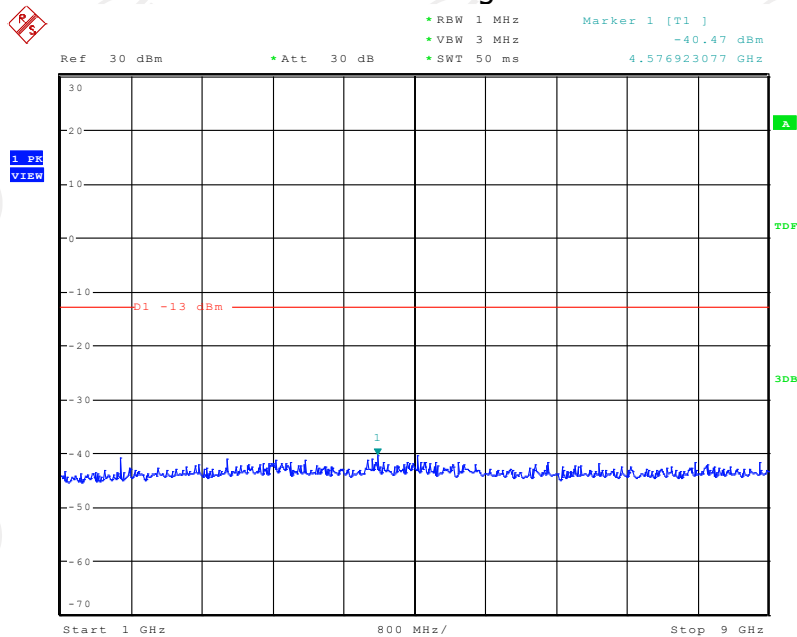
Date: 16.MAY.2017 14:40:28

## Conducted Emission Transmitting Mode CH 190 30MHz – 1GHz



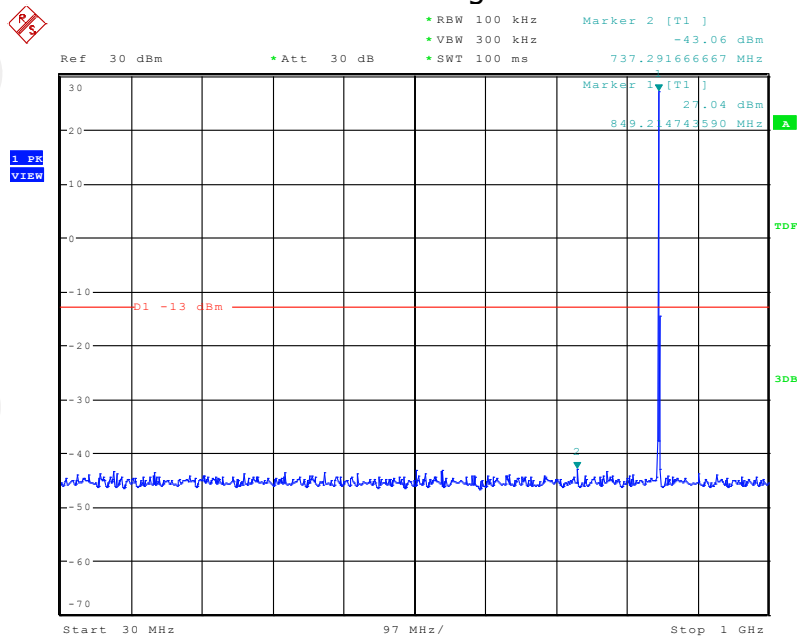
Date: 15.JUN.2017 18:36:04

## Conducted Emission Transmitting Mode CH 190 1GHz – 9GHz



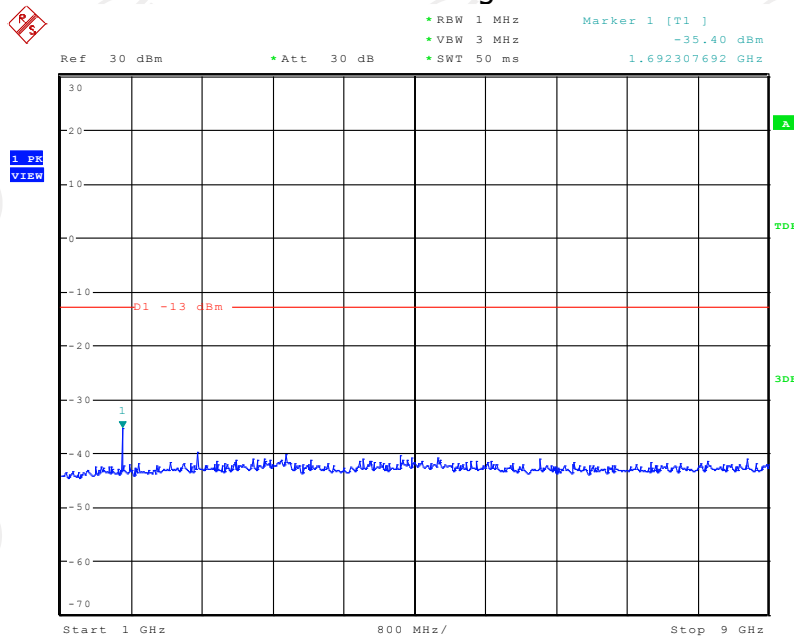
Date: 16.MAY.2017 14:41:33

## Conducted Emission Transmitting Mode CH 251 30MHz – 1GHz



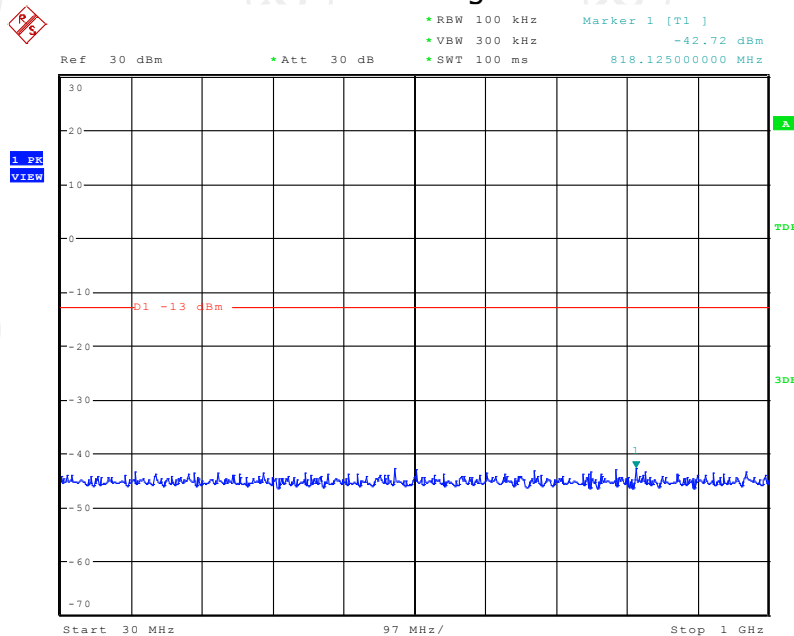
Date: 15.JUN.2017 18:37:00

## Conducted Emission Transmitting Mode CH 251 1GHz – 9GHz



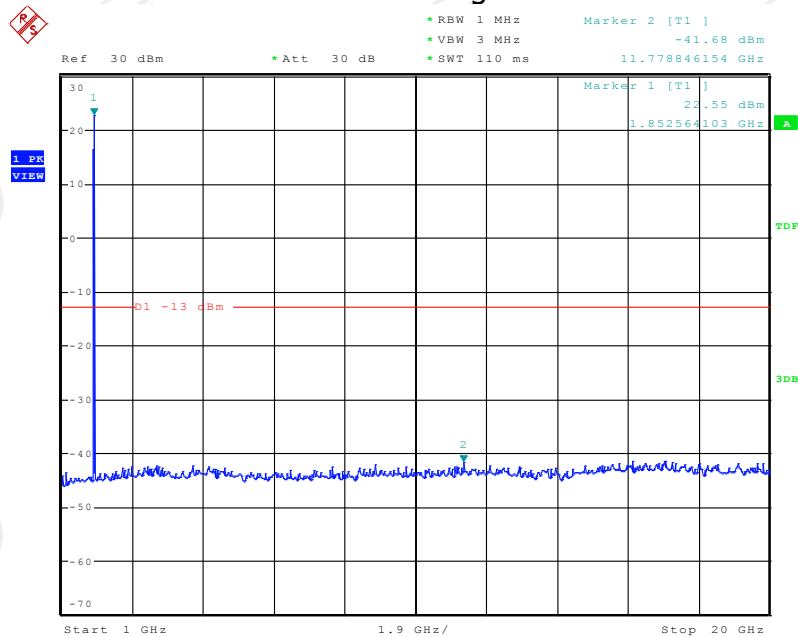
Date: 15.JUN.2017 18:40:15

## CONDUCTED EMISSION IN PCS1900 BAND Conducted Emission Transmitting Mode CH 512 30MHz – 1GHz



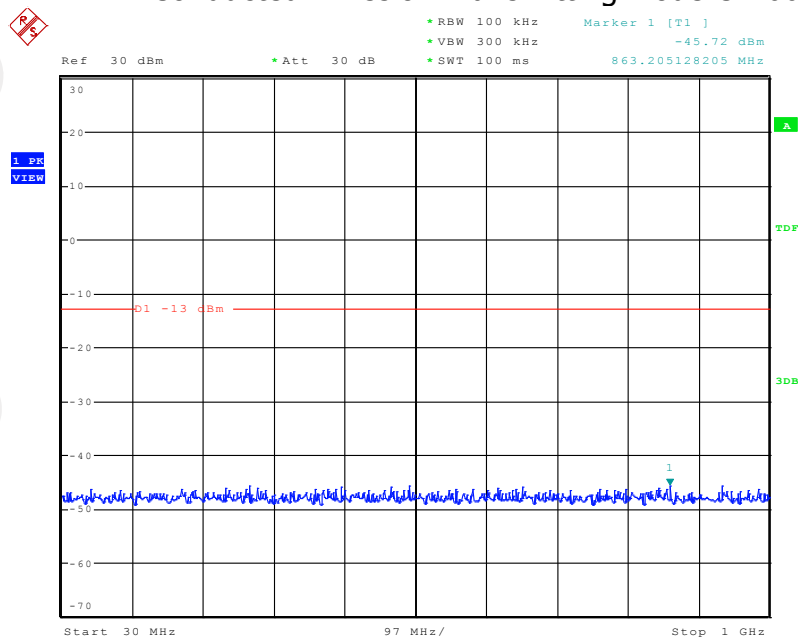
Date: 15.JUN.2017 18:42:00

## Conducted Emission Transmitting Mode CH 512 1GHz – 20GHz



Date: 15.JUN.2017 18:44:54

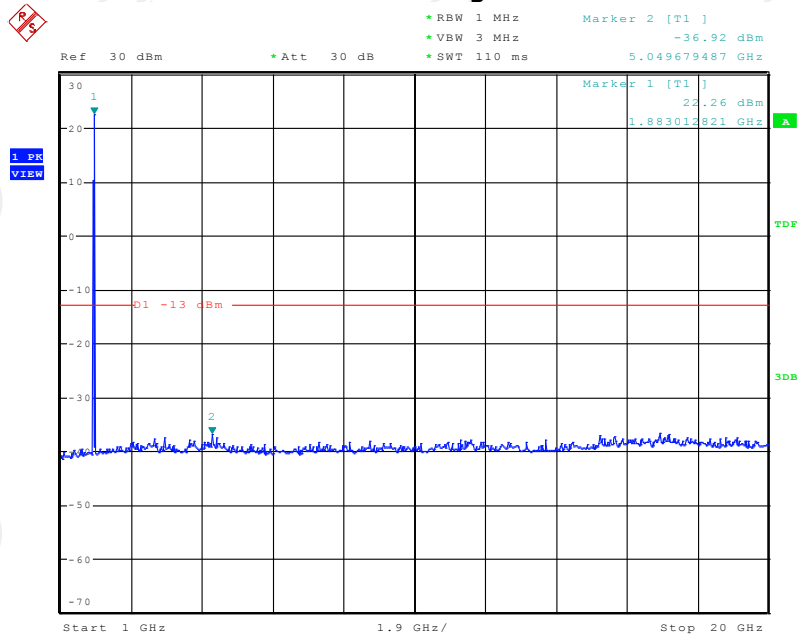
## Conducted Emission Transmitting Mode CH 661 30MHz – 1GHz



Date: 15.JUN.2017 18:48:41

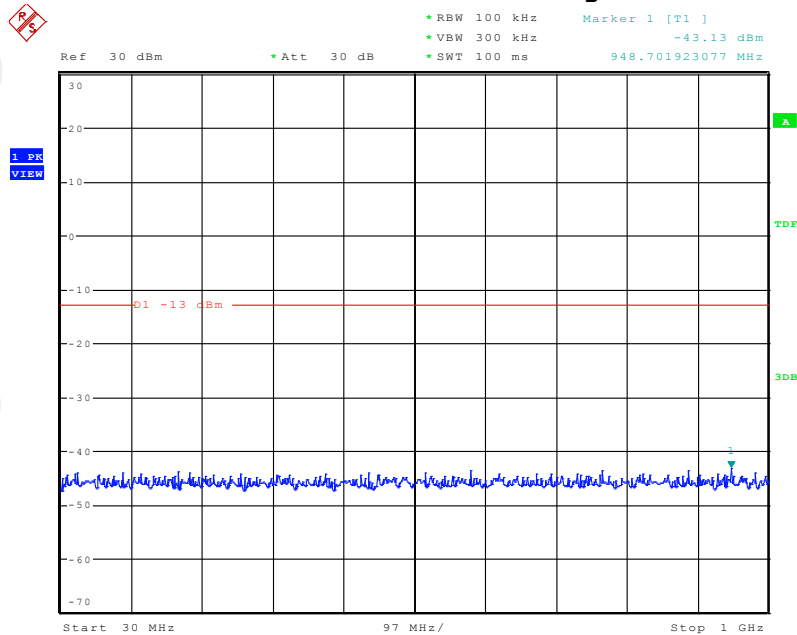


## Conducted Emission Transmitting Mode CH 661 1GHz – 20GHz



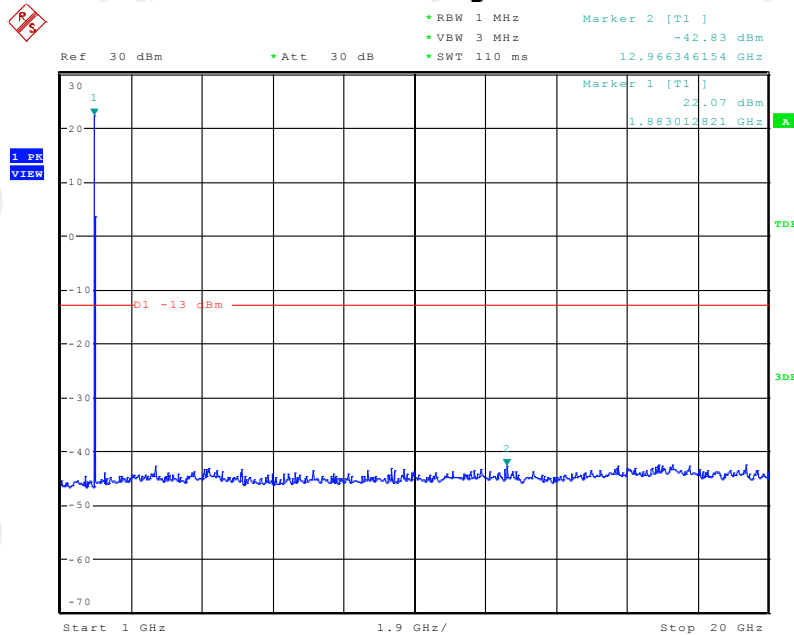
Date: 16.MAY.2017 14:53:53

## Conducted Emission Transmitting Mode CH 810 30MHz – 1GHz



Date: 16.MAY.2017 14:48:10

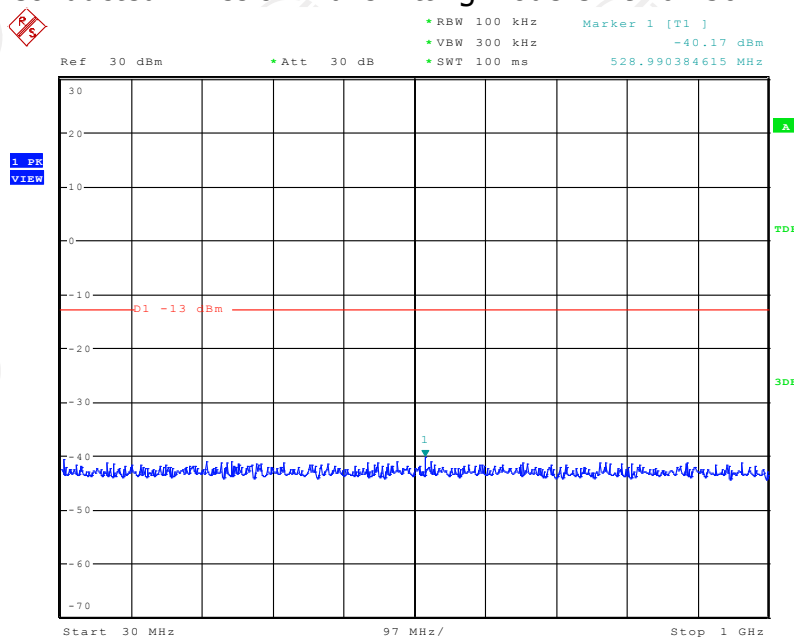
## Conducted Emission Transmitting Mode CH 810 1GHz – 20GHz



Date: 15.JUN.2017 18:46:23

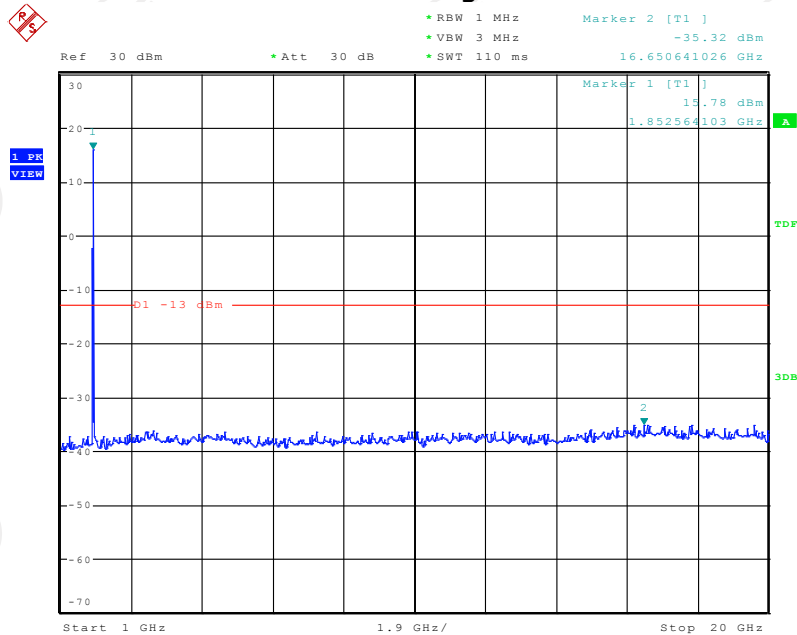
## CONDUCTED EMISSION IN WCDMA Band II

### Conducted Emission Transmitting Mode CH 9262 30MHz – 1GHz



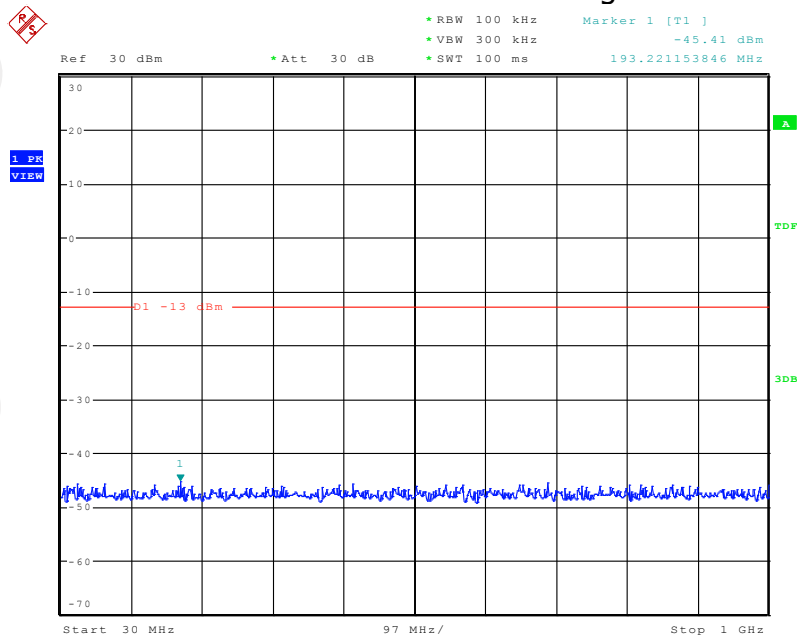
Date: 16.MAY.2017 15:17:12

## Conducted Emission Transmitting Mode CH 9262 1GHz – 20GHz



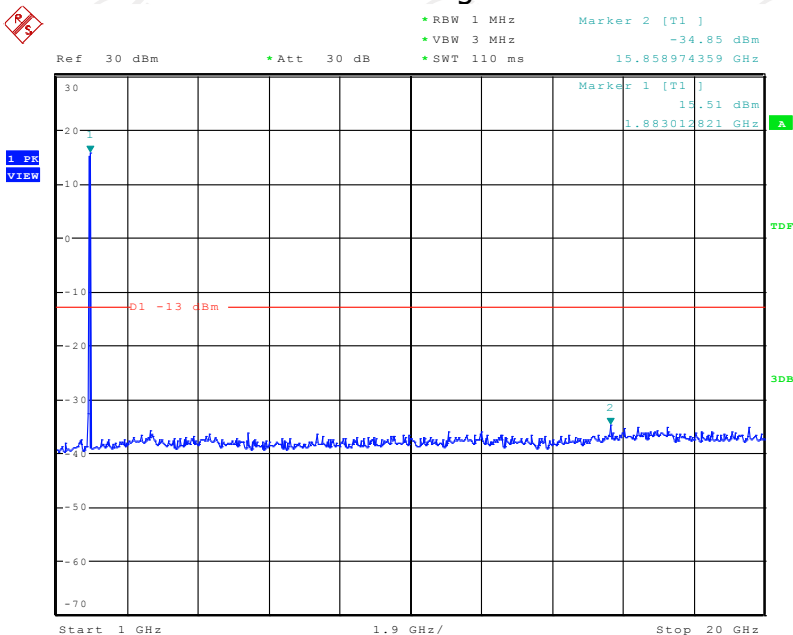
Date: 16.MAY.2017 15:19:51

## Conducted Emission Transmitting Mode CH 9400 30MHz – 1GHz



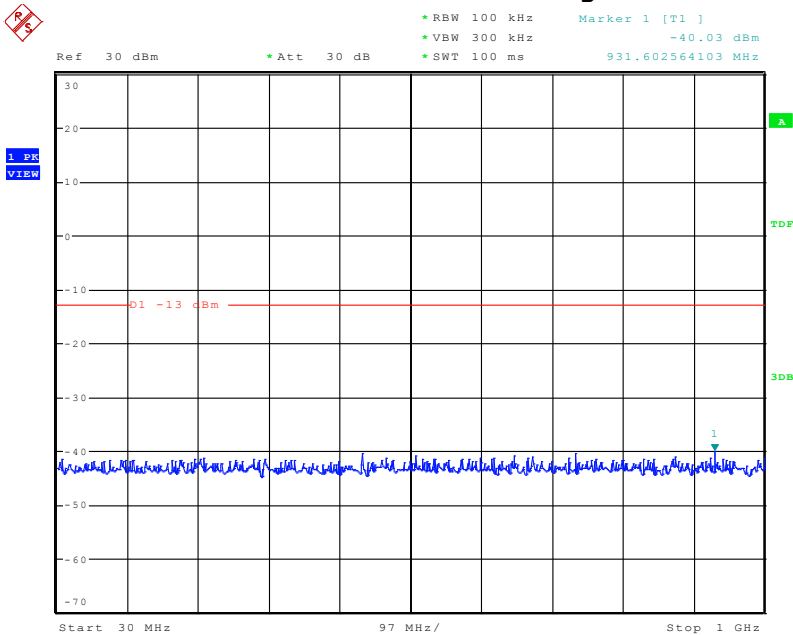
Date: 15.JUN.2017 18:51:25

Conducted Emission Transmitting Mode CH 9400 1GHz – 20GHz



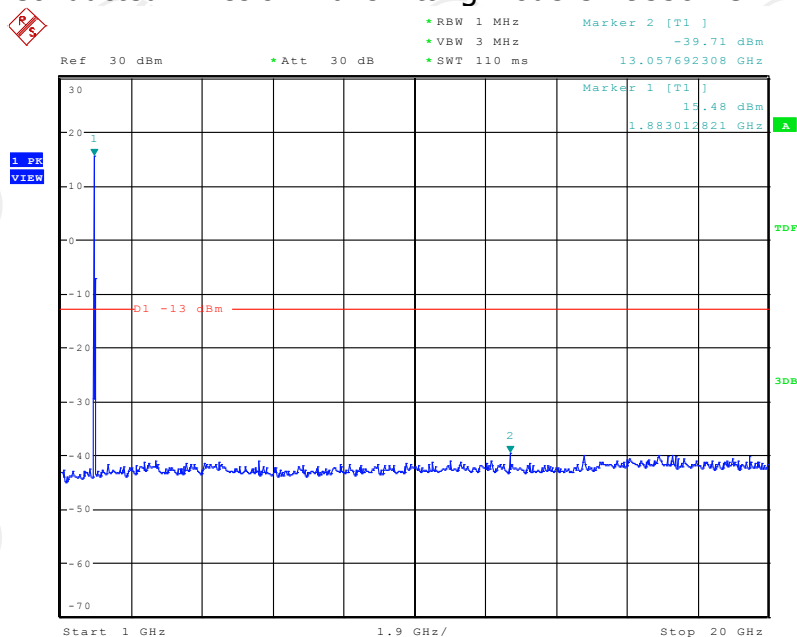
Date: 16.MAY.2017 15:21:03

Conducted Emission Transmitting Mode CH 9538 30MHz – 1GHz



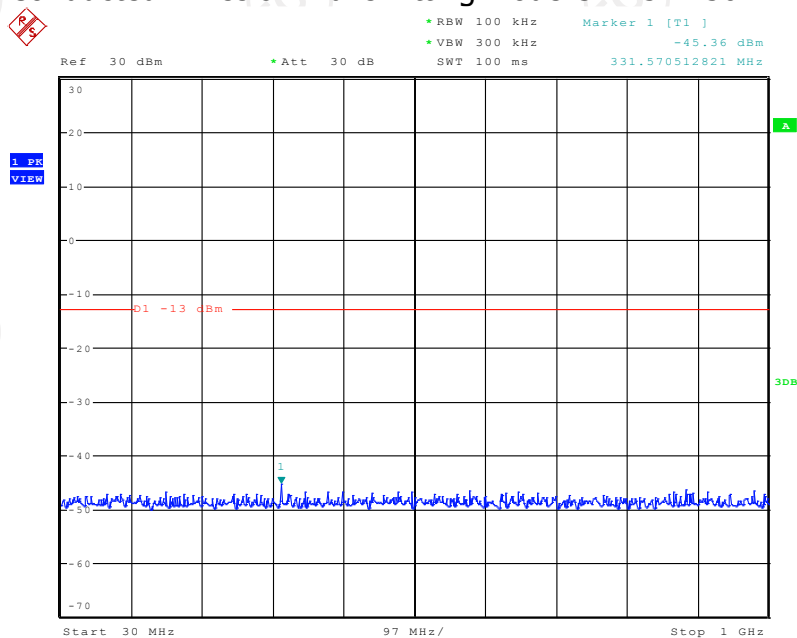
Date: 16.MAY.2017 15:18:15

Conducted Emission Transmitting Mode CH 9538 1GHz – 20GHz



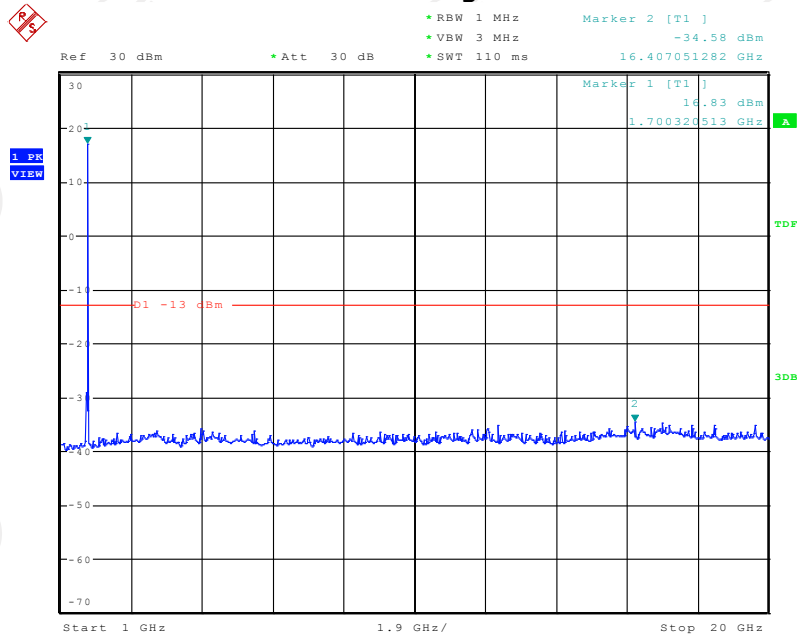
Date: 15.JUN.2017 18:54:41

CONDUCTED EMISSION IN WCDMA Band IV  
Conducted Emission Transmitting Mode CH 1312 30MHz – 1GHz



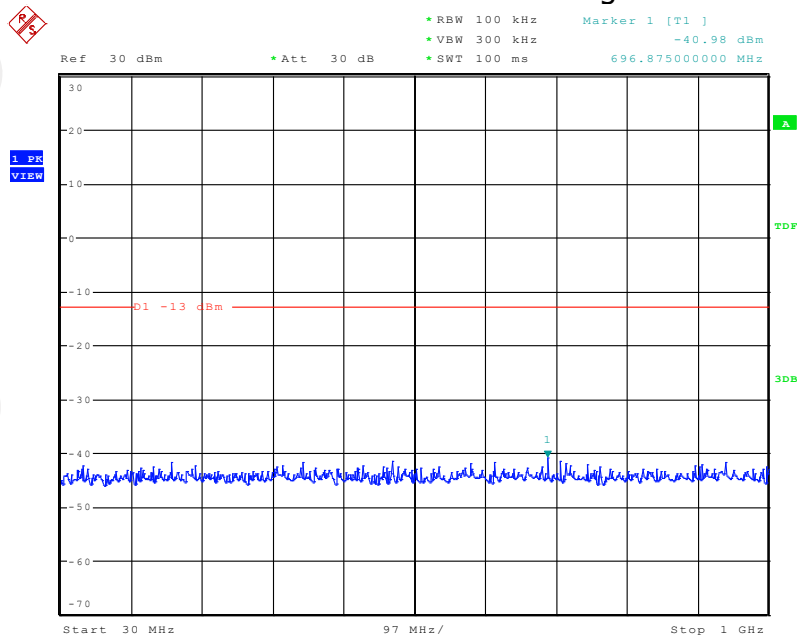
Date: 31.MAR.2017 09:19:45

## Conducted Emission Transmitting Mode CH 1312 1GHz – 20GHz



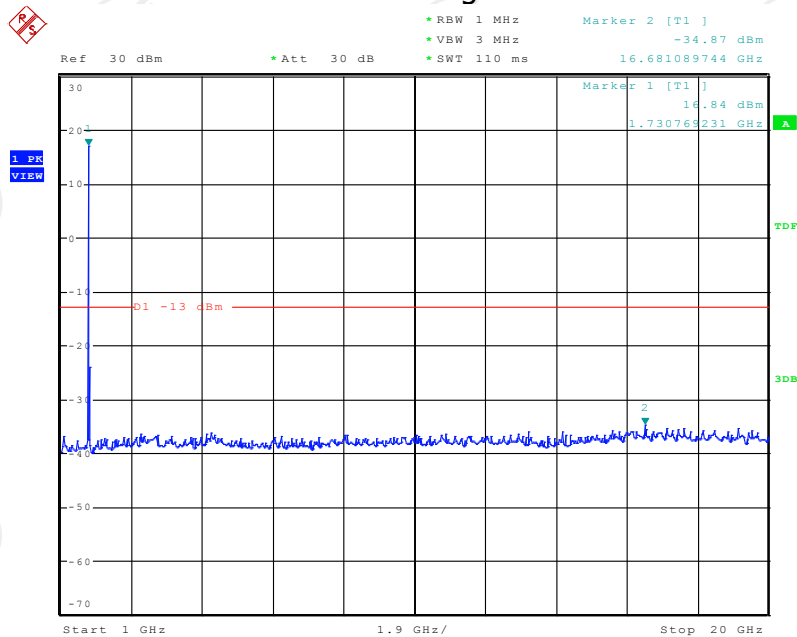
Date: 16.MAY.2017 20:44:37

## Conducted Emission Transmitting Mode CH 1413 30MHz – 1GHz



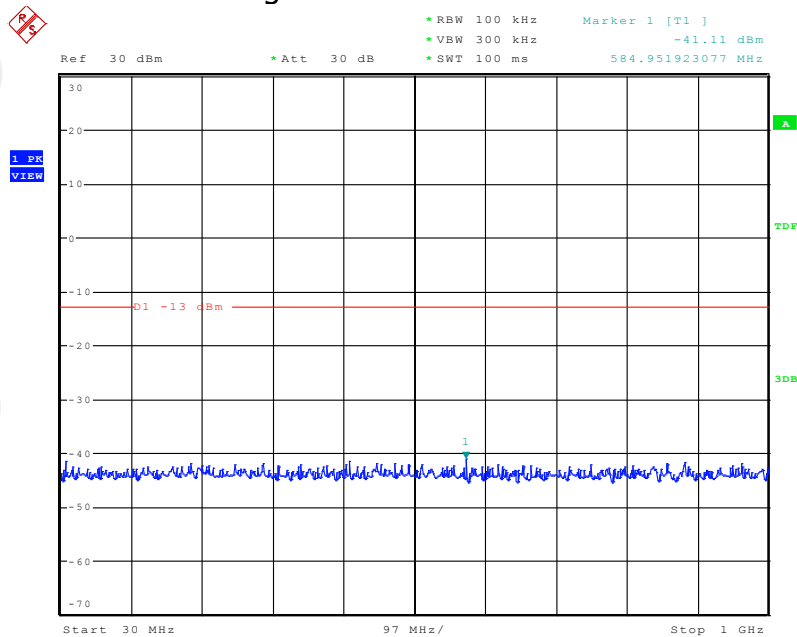
Date: 16.MAY.2017 20:41:57

## Conducted Emission Transmitting Mode CH 1413 1GHz – 20GHz



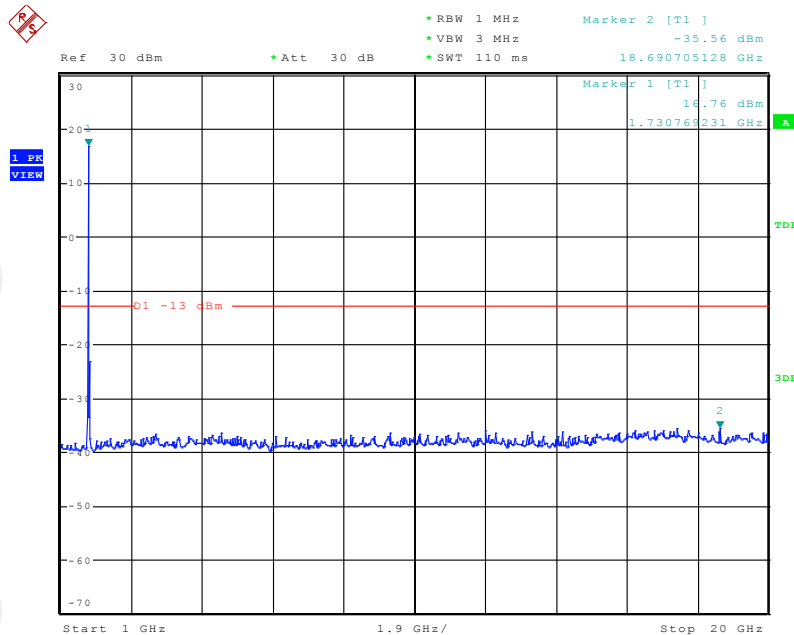
Date: 15.JUN.2017 18:57:19

## Conducted Emission Transmitting Mode CH 1513 30MHz – 1GHz



Date: 16.MAY.2017 20:42:29

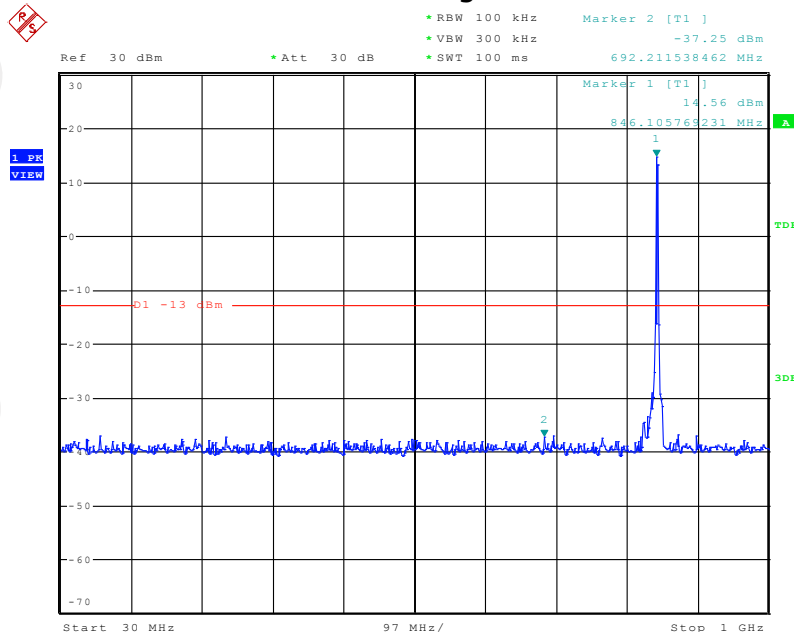
## Conducted Emission Transmitting Mode CH 1513 1GHz – 20GHz



Date: 16.MAY.2017 20:46:17

## CONDUCTED EMISSION IN WCDMA Band V

### Conducted Emission Transmitting Mode CH 4132 30MHz – 1GHz



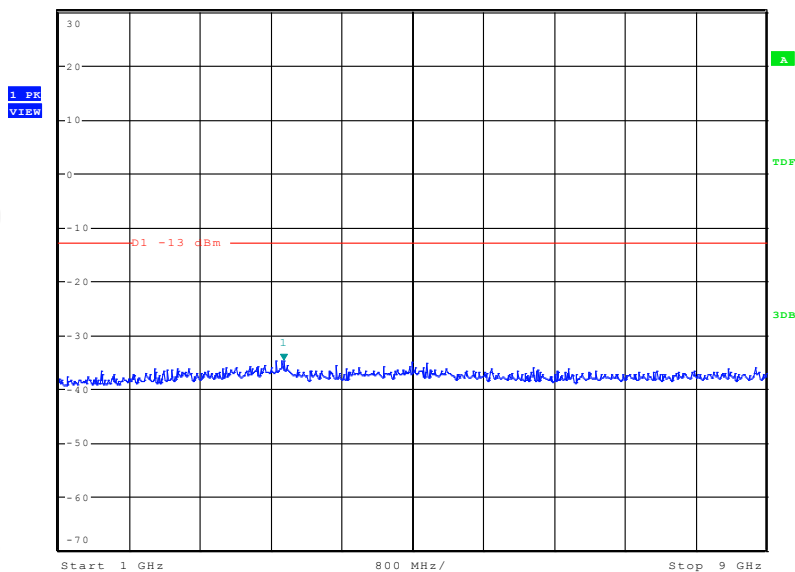
Date: 16.MAY.2017 15:48:18

## Conducted Emission Transmitting Mode CH 4132 1GHz – 9GHz





Ref 30 dBm Att 30 dB RBW 1 MHz Marker 1 [T1] -34.80 dBm  
 VBW 3 MHz  
 SWT 50 ms 3.538461538 GHz

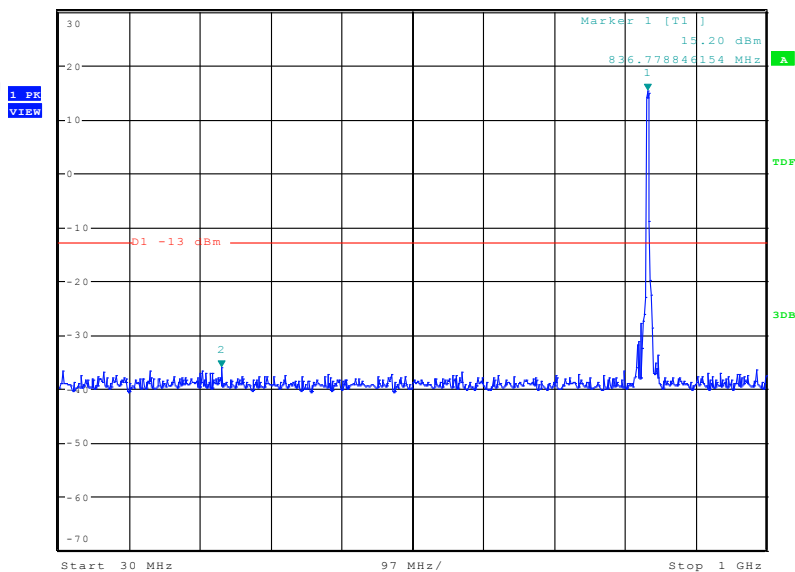


Date: 16.MAY.2017 15:44:12

## Conducted Emission Transmitting Mode CH 4182 30MHz – 1GHz

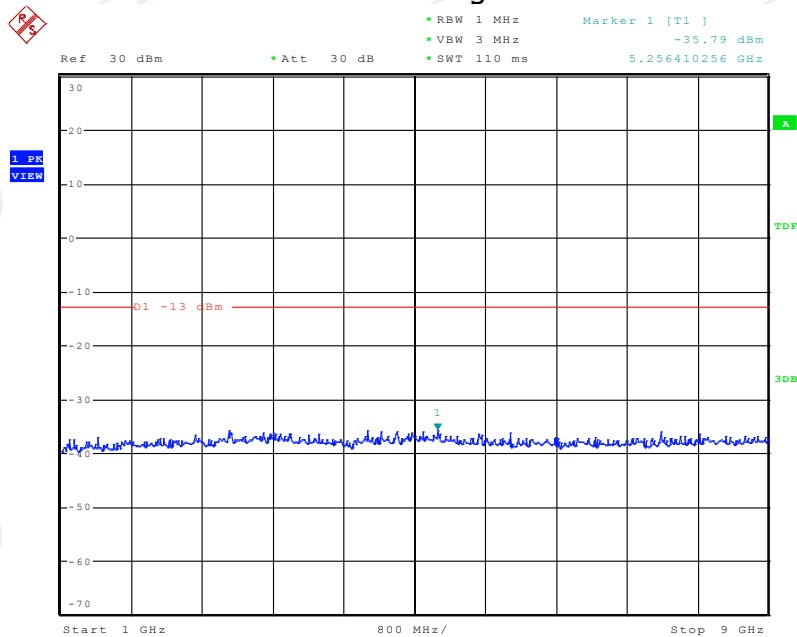


Ref 30 dBm Att 30 dB RBW 100 kHz Marker 2 [T1] -36.13 dBm  
 VBW 300 kHz  
 SWT 100 ms 252.291666667 MHz



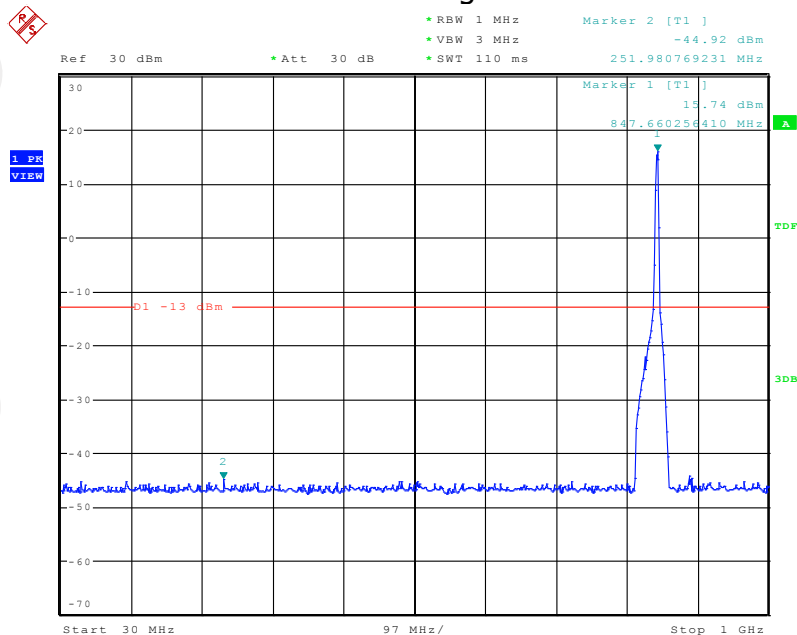
Date: 16.MAY.2017 15:40:19

## Conducted Emission Transmitting Mode CH 4182 1GHz – 9GHz



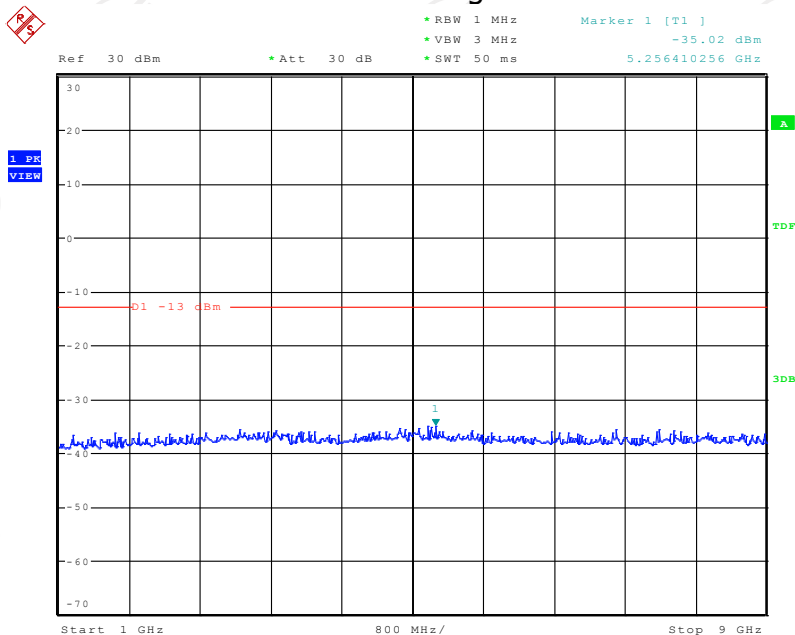
Date: 15.JUN.2017 18:59:39

## Conducted Emission Transmitting Mode CH 4233 30MHz – 1GHz



Date: 15.JUN.2017 19:01:23

# Conducted Emission Transmitting Mode CH 4233 1GHz – 9GHz



Date: 16.MAY.2017 15:46:45

## A.4 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

### Radiated Power (ERP) for GSM 850 MHZ

| Mode   | Frequency (MHz) | P <sub>Mea</sub> (dBm) | Amplifier Gain (dBi) | Path Loss | Antenna Gain (dB) | Correction (dB) | ERP (Peak) (dBm) | Polarization |
|--------|-----------------|------------------------|----------------------|-----------|-------------------|-----------------|------------------|--------------|
| GSM850 | 824.2           | 4.80                   | 31.23                | 1.02      | -0.52             | 2.15            | 32.34            | H            |
|        | 836.6           | 5.30                   | 31.23                | 1.02      | -0.52             | 2.15            | 32.84            | H            |
|        | 848.8           | 4.91                   | 31.23                | 1.02      | -0.52             | 2.15            | 32.45            | H            |

### Radiated Power (ERP) for EGPRS850 MHZ

| Mode      | Frequency (MHz) | P <sub>Mea</sub> (dBm) | Amplifier Gain (dBi) | Path Loss | Antenna Gain (dB) | Correction (dB) | ERP (Peak) (dBm) | Polarization |
|-----------|-----------------|------------------------|----------------------|-----------|-------------------|-----------------|------------------|--------------|
| EGPRS 850 | 824.2           | 0.26                   | 31.23                | 1.02      | -0.52             | 2.15            | 27.80            | H            |
|           | 836.6           | 0.33                   | 31.23                | 1.02      | -0.52             | 2.15            | 27.87            | H            |
|           | 848.8           | -0.52                  | 31.23                | 1.02      | -0.52             | 2.15            | 27.02            | H            |

### Radiated Power (E.I.R.P) for PCS 1900 MHZ

| Mode     | Frequency (MHz) | P <sub>Mea</sub> (dBm) | Amplifier Gain (dBi) | Path Loss (dB) | Antenna Gain (dB) | Correction (dB) | E.I.R.P. (Peak) (dBm) | Polarization |
|----------|-----------------|------------------------|----------------------|----------------|-------------------|-----------------|-----------------------|--------------|
| GSM 1900 | 1850.2          | -2.11                  | 31.23                | 1.02           | 0.49              | 0.00            | 28.59                 | H            |
|          | 1880.0          | -1.82                  | 31.23                | 1.02           | 0.49              | 0.00            | 28.88                 | H            |
|          | 1909.8          | -1.74                  | 31.23                | 1.02           | 0.49              | 0.00            | 28.96                 | H            |

### Radiated Power (E.I.R.P) for EGPRS 1900 MHZ

| Mode       | Frequency (MHz) | P <sub>Mea</sub> (dBm) | Amplifier Gain (dBi) | Path Loss (dB) | Antenna Gain (dB) | Correction (dB) | E.I.R.P. (Peak) (dBm) | Polarization |
|------------|-----------------|------------------------|----------------------|----------------|-------------------|-----------------|-----------------------|--------------|
| EGPRS 1900 | 1850.2          | -5.28                  | 31.23                | 1.02           | 0.49              | 0.00            | 25.42                 | H            |
|            | 1880.0          | -5.34                  | 31.23                | 1.02           | 0.49              | 0.00            | 25.36                 | H            |
|            | 1909.8          | -5.37                  | 31.23                | 1.02           | 0.49              | 0.00            | 25.33                 | H            |

ERP or E.I.R.P = P<sub>Mea</sub> + Amplifier Gain – Path Loss + Antenna Gain – Correction Factor

Note: Each channel is scanned 10 times, and the peak value of each channel is recorded.

### Radiated Power (E.I.R.P) for UTRA Band 2

| Mode        | Frequency (MHz) | P <sub>Mea</sub> (dBm) | Amplifier Gain (dBi) | Path Loss (dB) | Antenna Gain (dB) | Correction (dB) | E.I.R.P. (Peak) (dBm) | Polarization |
|-------------|-----------------|------------------------|----------------------|----------------|-------------------|-----------------|-----------------------|--------------|
| UTRA Band 2 | 1852.4          | -8.20                  | 31.23                | 1.02           | 0.46              | 0.00            | 22.47                 | H            |
|             | 1880            | -8.22                  | 31.23                | 1.02           | 0.46              | 0.00            | 22.45                 | H            |
|             | 1907.6          | -8.28                  | 31.23                | 1.02           | 0.46              | 0.00            | 22.39                 | H            |

### Radiated Power (E.I.R.P) for UTRA Band 4

| Mode        | Frequency (MHz) | P <sub>Mea</sub> (dBm) | Amplifier Gain (dBi) | Path Loss (dB) | Antenna Gain (dB) | Correction (dB) | E.I.R.P. (Peak) (dBm) | Polarization |
|-------------|-----------------|------------------------|----------------------|----------------|-------------------|-----------------|-----------------------|--------------|
| UTRA Band 4 | 1712.4          | -8.22                  | 31.23                | 1.02           | 0.45              | 0.00            | 22.44                 | H            |
|             | 1732.6          | -8.10                  | 31.23                | 1.02           | 0.45              | 0.00            | 22.56                 | H            |
|             | 1752.6          | -8.02                  | 31.23                | 1.02           | 0.45              | 0.00            | 22.64                 | H            |

## Radiated Power (ERP) for UTRA Band 5

| Mode        | Frequency (MHz) | P <sub>Mea</sub> (dBm) | Amplifier Gain (dBi) | Path Loss | Antenna Gain | Correction (dB) | ERP (Peak) (dBm) | Polarization |
|-------------|-----------------|------------------------|----------------------|-----------|--------------|-----------------|------------------|--------------|
| UTRA Band 5 | 826.4           | -4.81                  | 31.23                | 1.02      | -0.52        | 2.15            | 22.73            | H            |
|             | 836.4           | -5.05                  | 31.23                | 1.02      | -0.52        | 2.15            | 22.49            | H            |
|             | 846.6           | -5.16                  | 31.23                | 1.02      | -0.52        | 2.15            | 22.38            | H            |

ERP or E.I.R.P = P<sub>Mea</sub> + Amplifier Gain – Path Loss + Antenna Gain – Correction Factor

Note: Each channel is scanned 10 times, and the peak value of each channel is recorded.

## A.5 Field Strength of Spurious Radiation Measurement

### GSM850:

| Mode 1         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 1648.4         | -34.94     | 0.50                   | -35.44                 | -13         | Horizontal |
| 1648.4         | -35.20     | 0.50                   | -35.70                 | -13         | Vertical   |
| 2472.6         | -28.39     | 0.50                   | -28.89                 | -13         | Horizontal |
| 2472.6         | -29.08     | 0.50                   | -29.58                 | -13         | Vertical   |

| Mode 2         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 1673.2         | -30.24     | 0.50                   | -30.74                 | -13         | Horizontal |
| 1673.2         | -28.31     | 0.50                   | -28.81                 | -13         | Vertical   |
| 2509.8         | -37.27     | 0.50                   | -37.77                 | -13         | Horizontal |
| 2509.8         | -30.27     | 0.50                   | -30.77                 | -13         | Vertical   |

| Mode 3         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 1697.6         | -30.79     | 0.50                   | -31.29                 | -13         | Horizontal |
| 1697.6         | -36.57     | 0.50                   | -37.07                 | -13         | Vertical   |
| 2546.4         | -32.84     | 0.50                   | -33.34                 | -13         | Horizontal |
| 2546.4         | -32.49     | 0.50                   | -32.99                 | -13         | Vertical   |

### PCS1900:

| Mode 1         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 3700.4         | -30.40     | 1.48                   | -31.88                 | -13         | Horizontal |
| 3700.4         | -33.05     | 1.48                   | -34.53                 | -13         | Vertical   |
| 5550.6         | -35.27     | 1.48                   | -36.75                 | -13         | Horizontal |
| 5550.6         | -30.45     | 1.48                   | -31.93                 | -13         | Vertical   |

| Mode 2         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 3760           | -31.40     | 1.48                   | -32.88                 | -13         | Horizontal |
| 3760           | -32.60     | 1.48                   | -34.08                 | -13         | Vertical   |
| 5640           | -37.20     | 1.48                   | -38.68                 | -13         | Horizontal |
| 5640           | -32.06     | 1.48                   | -33.54                 | -13         | Vertical   |

| Mode 3         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 3819.6         | -28.43     | 1.48                   | -29.91                 | -13         | Horizontal |
| 3819.6         | -33.78     | 1.48                   | -35.26                 | -13         | Vertical   |
| 5729.4         | -31.09     | 1.48                   | -32.57                 | -13         | Horizontal |
| 5729.4         | -36.80     | 1.48                   | -38.28                 | -13         | Vertical   |

| Mode 1         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 3704.8         | -62.36     | 1.48                   | -60.88                 | -13         | Horizontal |
| 3704.8         | -63.43     | 1.48                   | -61.95                 | -13         | Vertical   |
| 5557.2         | -64.08     | 1.48                   | -62.60                 | -13         | Horizontal |
| 5557.2         | -64.95     | 1.48                   | -63.47                 | -13         | Vertical   |

| Mode 2         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 3760           | -62.36     | 1.48                   | -60.88                 | -13         | Horizontal |
| 3760           | -63.04     | 1.48                   | -61.56                 | -13         | Vertical   |
| 5640           | -64.12     | 1.48                   | -62.64                 | -13         | Horizontal |
| 5640           | -65.17     | 1.48                   | -63.69                 | -13         | Vertical   |

| Mode 3         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 3815.2         | -62.46     | 1.48                   | -60.98                 | -13         | Horizontal |
| 3815.2         | -63.12     | 1.48                   | -61.64                 | -13         | Vertical   |
| 5722.8         | -63.65     | 1.48                   | -62.17                 | -13         | Horizontal |
| 5722.8         | -65.39     | 1.48                   | -63.91                 | -13         | Vertical   |

## BAND 4:

| Mode 1         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 3424.8         | -62.67     | 1.47                   | -61.20                 | -13         | Horizontal |
| 3424.8         | -63.20     | 1.47                   | -61.73                 | -13         | Vertical   |
| 5137.2         | -63.98     | 1.47                   | -62.51                 | -13         | Horizontal |
| 5137.2         | -65.14     | 1.47                   | -63.67                 | -13         | Vertical   |

| Mode 2         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 3465.2         | -62.66     | 1.47                   | -61.19                 | -13         | Horizontal |
| 3465.2         | -62.88     | 1.47                   | -61.41                 | -13         | Vertical   |
| 5197.8         | -63.52     | 1.47                   | -62.05                 | -13         | Horizontal |
| 5197.8         | -64.80     | 1.47                   | -63.33                 | -13         | Vertical   |

| Mode 3         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 3505.2         | -62.49     | 1.47                   | -61.02                 | -13         | Horizontal |
| 3505.2         | -63.11     | 1.47                   | -61.64                 | -13         | Vertical   |
| 5257.8         | -64.39     | 1.47                   | -62.92                 | -13         | Horizontal |
| 5257.8         | -65.40     | 1.47                   | -63.93                 | -13         | Vertical   |

**BAND 5:**

| Mode 1         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 1652.8         | -62.64     | 0.50                   | -62.14                 | -13         | Horizontal |
| 1652.8         | -62.61     | 0.50                   | -62.11                 | -13         | Vertical   |
| 2479.2         | -64.25     | 0.50                   | -63.75                 | -13         | Horizontal |
| 2479.2         | -64.94     | 0.50                   | -64.44                 | -13         | Vertical   |

| Mode 2         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 1672.8         | -63.10     | 0.50                   | -62.60                 | -13         | Horizontal |
| 1672.8         | -63.23     | 0.50                   | -62.73                 | -13         | Vertical   |
| 2509.2         | -64.34     | 0.50                   | -63.84                 | -13         | Horizontal |
| 2509.2         | -65.34     | 0.50                   | -64.84                 | -13         | Vertical   |

| Mode 3         |            |                        |                        |             |            |
|----------------|------------|------------------------|------------------------|-------------|------------|
| Frequency(MHz) | Power(dBm) | A <sub>Rpl</sub> (dBm) | P <sub>Mea</sub> (dBm) | Limit (dBm) | Polarity   |
| 1693.2         | -62.90     | 0.50                   | -62.40                 | -13         | Horizontal |
| 1693.2         | -63.18     | 0.50                   | -62.68                 | -13         | Vertical   |
| 2539.8         | -63.90     | 0.50                   | -63.40                 | -13         | Horizontal |
| 2539.8         | -64.88     | 0.50                   | -64.38                 | -13         | Vertical   |



## A.6 Frequency Stability Measurement

### Frequency Error against Voltage for GSM 850 band (836.6MHz)

| Voltage(V) | Frequency error(Hz) | Frequency error (ppm) |
|------------|---------------------|-----------------------|
| 3.45       | 28                  | 0.034                 |
| 3.8        | 35                  | 0.042                 |
| 4.35       | 32                  | 0.038                 |

### Frequency Error against Temperature for GSM 850 band (836.6MHz)

| Temperature(°C) | Frequency error(Hz) | Frequency error(ppm) |
|-----------------|---------------------|----------------------|
| -10             | 28                  | 0.034                |
| 0               | 39                  | 0.047                |
| 10              | 29                  | 0.035                |
| 20              | 39                  | 0.047                |
| 30              | 37                  | 0.044                |
| 40              | 36                  | 0.043                |
| 50              | 31                  | 0.037                |

### Frequency Error against Voltage for PCS 1900 band (1880MHz)

| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
|------------|---------------------|----------------------|
| 3.45       | 32                  | 0.017                |
| 3.8        | 30                  | 0.016                |
| 4.35       | 31                  | 0.016                |

### Frequency Error against Temperature for PCS 1900 band (1880MHz)

| Temperature(°C) | Frequency error(Hz) | Frequency error(ppm) |
|-----------------|---------------------|----------------------|
| -10             | 29                  | 0.015                |
| 0               | 38                  | 0.020                |
| 10              | 30                  | 0.016                |
| 20              | 34                  | 0.018                |
| 30              | 31                  | 0.017                |
| 40              | 30                  | 0.016                |
| 50              | 31                  | 0.017                |

### Frequency Error against Voltage for GPRS 850 band (836.6MHz)

| Voltage(V) | Frequency error(Hz) | Frequency error (ppm) |
|------------|---------------------|-----------------------|
| 3.45       | 38                  | 0.045                 |
| 3.8        | 33                  | 0.039                 |
| 4.35       | 30                  | 0.035                 |

### Frequency Error against Temperature for GPRS 850 band (836.6MHz)

| Temperature(°C) | Frequency error(Hz) | Frequency error(ppm) |
|-----------------|---------------------|----------------------|
| -10             | 29                  | 0.035                |
| 0               | 37                  | 0.045                |

|    |    |       |
|----|----|-------|
| 10 | 30 | 0.036 |
| 20 | 40 | 0.048 |
| 30 | 40 | 0.048 |
| 40 | 35 | 0.042 |
| 50 | 29 | 0.035 |

## Frequency Error against Voltage for GPRS 1900 band (1880MHz)

| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
|------------|---------------------|----------------------|
| 3.45       | 31                  | 0.016                |
| 3.8        | 30                  | 0.016                |
| 4.35       | 37                  | 0.020                |

## Frequency Error against Temperature for GPRS 1900 band (1880MHz)

| Temperature(°C) | Frequency error(Hz) | Frequency error(ppm) |
|-----------------|---------------------|----------------------|
| -10             | 28                  | 0.015                |
| 0               | 33                  | 0.017                |
| 10              | 39                  | 0.021                |
| 20              | 41                  | 0.022                |
| 30              | 38                  | 0.020                |
| 40              | 37                  | 0.020                |
| 50              | 38                  | 0.020                |

## Frequency Error against Voltage for EGPRS 850 band (836.6MHz)

| Voltage(V) | Frequency error(Hz) | Frequency error (ppm) |
|------------|---------------------|-----------------------|
| 3.45       | 29                  | 0.035                 |
| 3.8        | 29                  | 0.035                 |
| 4.35       | 38                  | 0.045                 |

## Frequency Error against Temperature for EGPRS 850 band (836.6MHz)

| Temperature(°C) | Frequency error(Hz) | Frequency error(ppm) |
|-----------------|---------------------|----------------------|
| -10             | 32                  | 0.038                |
| 0               | 41                  | 0.048                |
| 10              | 31                  | 0.037                |
| 20              | 41                  | 0.049                |
| 30              | 39                  | 0.046                |
| 40              | 37                  | 0.045                |
| 50              | 34                  | 0.040                |

## Frequency Error against Voltage for EGPRS 1900 band (1880MHz)

| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
|------------|---------------------|----------------------|
| 3.45       | 28                  | 0.015                |
| 3.8        | 38                  | 0.020                |
| 4.35       | 31                  | 0.016                |

**Frequency Error against Temperature for EGPRS 1900 band (1880MHz)**

| Temperature(°C) | Frequency error(Hz) | Frequency error(ppm) |
|-----------------|---------------------|----------------------|
| -10             | 38                  | 0.020                |
| 0               | 37                  | 0.019                |
| 10              | 32                  | 0.017                |
| 20              | 35                  | 0.018                |
| 30              | 30                  | 0.016                |
| 40              | 41                  | 0.022                |
| 50              | 37                  | 0.020                |

**UTRA BANDS**

**Frequency Error against Voltage for WCDMA BAND 2 (1880MHz)**

| Voltage(V) | Frequency error(Hz) | Frequency error (ppm) |
|------------|---------------------|-----------------------|
| 3.45       | 34                  | 0.018                 |
| 3.8        | 33                  | 0.018                 |
| 4.35       | 31                  | 0.016                 |

**Frequency Error against Temperature for WCDMA BAND 2 (1880MHz)**

| Temperature(°C) | Frequency error(Hz) | Frequency error(ppm) |
|-----------------|---------------------|----------------------|
| -10             | 30                  | 0.016                |
| 0               | 30                  | 0.016                |
| 10              | 29                  | 0.015                |
| 20              | 40                  | 0.021                |
| 30              | 40                  | 0.022                |
| 40              | 30                  | 0.016                |
| 50              | 31                  | 0.017                |

**Frequency Error against Voltage for WCDMA BAND 4 (1732.6MHz)**

| Voltage(V) | Frequency error(Hz) | Frequency error (ppm) |
|------------|---------------------|-----------------------|
| 3.45       | 35                  | 0.020                 |
| 3.8        | 34                  | 0.020                 |
| 4.35       | 38                  | 0.022                 |

**Frequency Error against Temperature for WCDMA BAND 4 (1732.6MHz)**

| Temperature(°C) | Frequency error(Hz) | Frequency error(ppm) |
|-----------------|---------------------|----------------------|
| -10             | 29                  | 0.017                |
| 0               | 41                  | 0.024                |
| 10              | 35                  | 0.020                |
| 20              | 39                  | 0.022                |
| 30              | 36                  | 0.021                |
| 40              | 38                  | 0.022                |
| 50              | 31                  | 0.018                |

**Frequency Error against Voltage for WCDMA BAND 5 (836.4MHz)**

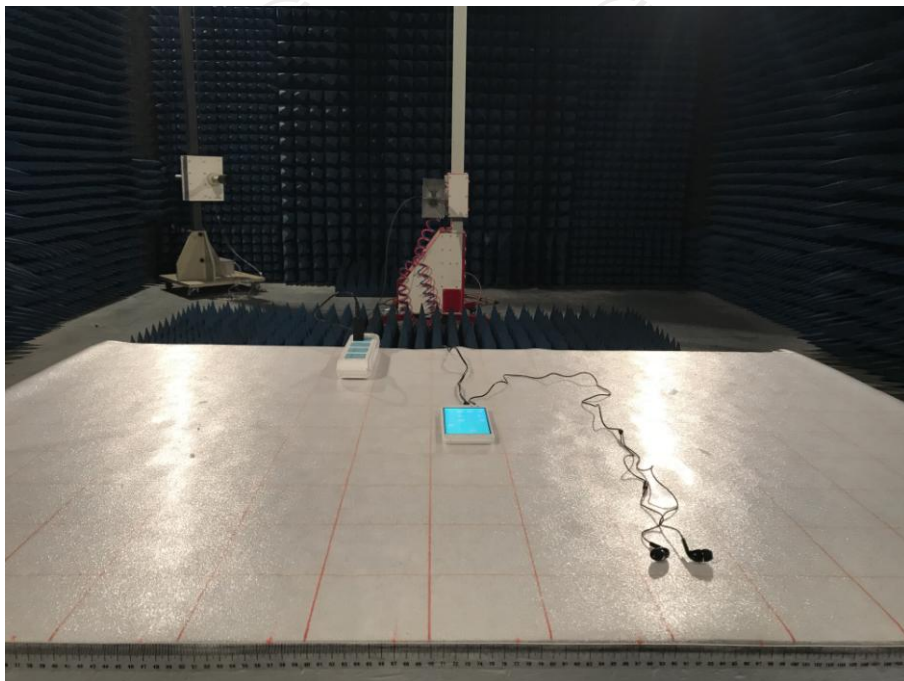
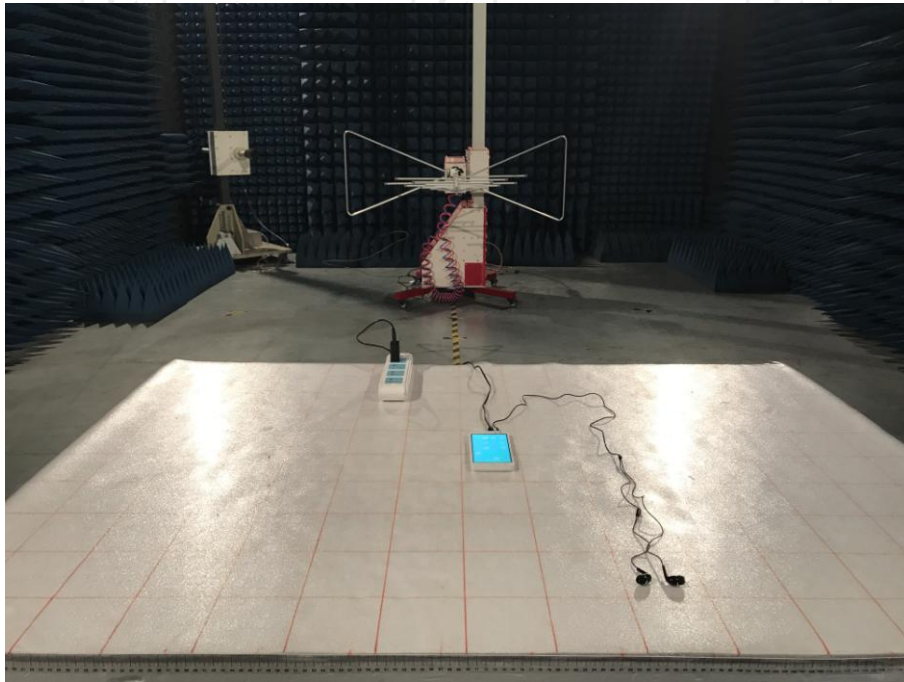
| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
|------------|---------------------|----------------------|
| 3.45       | 35                  | 0.041                |
| 3.8        | 41                  | 0.049                |
| 4.35       | 40                  | 0.048                |

**Frequency Error against Temperature for WCDMA BAND 5 (836.4MHz)**

| Temperature(°C) | Frequency error(Hz) | Frequency error(ppm) |
|-----------------|---------------------|----------------------|
| -10             | 36                  | 0.043                |
| 0               | 39                  | 0.047                |
| 10              | 30                  | 0.036                |
| 20              | 34                  | 0.040                |
| 30              | 34                  | 0.041                |
| 40              | 39                  | 0.047                |
| 50              | 31                  | 0.037                |

## Appendix B: Photographs of Test Setup

### Radiated Emission



## Appendix C: Photographs of EUT

Refer to test report TCT171020E013

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