

## FCC Part 22/24 Compliance Test Report

|                                                         |                                                                                                                                                                                                                                                                                                                              |                                   |                                                                                                                       |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Test Report no.:</b>                                 | Tre_FCC_0836_16.doc                                                                                                                                                                                                                                                                                                          | <b>Date of Report:</b>            | 08-Sep-2008                                                                                                           |
| <b>Number of pages:</b>                                 | 22                                                                                                                                                                                                                                                                                                                           | <b>Customer's Contact person:</b> | Ralph Schwarz                                                                                                         |
| <b>Testing laboratory:</b>                              | TCC Nokia Copenhagen Laboratory<br>Frederikskaj<br>1790 COPENHAGEN V<br>DENMARK<br>Tel. +45 33 292929<br>Fax. +45 33 292934                                                                                                                                                                                                  | <b>Customer:</b>                  | Nokia Corporation<br>Lise Meitner Strasse 10<br>89081 ULM<br>GERMANY<br>Tel. +49 731 1754 0<br>Fax. +49 731 1754 6800 |
| <b>FCC listing no.:</b>                                 | 99059                                                                                                                                                                                                                                                                                                                        |                                   |                                                                                                                       |
| <b>IC recognition no.:</b>                              | 661AD-1                                                                                                                                                                                                                                                                                                                      |                                   |                                                                                                                       |
| <b>Tested devices/ accessories:</b>                     | <b>Phone; RM-399 (HWID 0361), Battery; BL-5BT, AC Charger; AC-3E, Headset; HS-47</b>                                                                                                                                                                                                                                         |                                   |                                                                                                                       |
| <b>FCC ID:</b>                                          | PPIRM-399                                                                                                                                                                                                                                                                                                                    | <b>IC:</b>                        | 661U-RM399                                                                                                            |
| <b>Supplement reports:</b>                              | Cph_FCC_0832_07                                                                                                                                                                                                                                                                                                              |                                   |                                                                                                                       |
| <b>Testing has been carried out in accordance with:</b> | <b>CFR 47, FCC rules Parts 22 and 24, TIA-603-C-2004 and IC standards RSS-GEN (Issue 2, June 2007), RSS-132 (Issue 2, September 2005) and RSS-133 (Issue 4, February 2008). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".</b> |                                   |                                                                                                                       |
| <b>Documentation:</b>                                   | The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.                                                                         |                                   |                                                                                                                       |
| <b>Test Results:</b>                                    | <b>The EUT complies with the requirements in respect of all parameters subject to the test.</b><br>The test results relate only to devices specified in this document.                                                                                                                                                       |                                   |                                                                                                                       |
| <b>Date and signature for the contents:</b>             |                                                                                                                                                                                                                                                                                                                              |                                   |                                                                                                                       |

Jari Jantunen, Test System Manager

## 1. Summary for FCC Part 22/24 Compliance Test Report

|                               |                                                                 |
|-------------------------------|-----------------------------------------------------------------|
| Date of receipt               | 29-Jul-2008                                                     |
| Testing completed             | 13-Aug-2008                                                     |
| The customer's contact person | Ralph Schwarz                                                   |
| Test Plan referred to         | T:\Projects\RM-398\Testplan_RS\RS_Testplan_RM-398_CR_HW0311.xls |
| Notes                         | None                                                            |
| Document name                 | T:\Projects\RM-398\EMC\Results\FCC\Cph_FCC_0832_07.doc          |

### 1.1. EUT and Accessory Information

The EUT is a 4-band (GSM850/900/1800/1900) mobile phone with GPRS, EGPRS, Bluetooth and WLAN. The EUT is tested with maximum rated TX power, modulated with pseudo random bit sequence (PRBS9).

| Product    | Type   | SN                          | HW   | MV | SW      | DUT   |
|------------|--------|-----------------------------|------|----|---------|-------|
| Phone      | RM-398 | 004401/10/118915/3          | 0311 | -  | js 2.50 | 29343 |
| Battery    | BL-5BT | 4620408174110113875;0670547 | -    | -  | -       | 29339 |
| AC Charger | AC-3E  | 3997916346161300282;0675370 | -    | -  | -       | 29177 |
| Headset    | HS-47  | 06942047E2712802916         | -    | -  | -       | 29287 |
| Phone      | RM-398 | 004401/10/118900/5          | 0311 | -  | js 2.50 | 25455 |

### 1.2. Summary of Test Results

#### GSM 850:

| Section in CFR 47     | Section in RSS-GEN or RSS-132 | Name of the test                           | Result |
|-----------------------|-------------------------------|--------------------------------------------|--------|
| §2.1046(a), 22.913(a) | 4.4                           | Conducted RF output power                  | NP     |
| §22.913(a)            | 4.4                           | Radiated RF output power                   | Passed |
| §2.1049(h)            | 4.6.1                         | 99 % occupied bandwidth                    | NP     |
| §22.917(a)            | 4.5                           | Band edge compliance                       | Passed |
| §22.917(a), §2.1051   | 4.5                           | Spurious emissions at antenna terminals    | NP     |
| §22.917(a), §2.1053   | 4.5                           | Spurious radiated emissions                | Passed |
| §2.1055(a)            | 4.3                           | Frequency stability, temperature variation | NP     |
| §2.1055(d)            | 4.3                           | Frequency stability, voltage variation     | NP     |

**GSM 1900:**

| Section in CFR 47   | Section in <i>RSS-GEN</i> or <i>RSS-133</i> | Name of the test                           | Result |
|---------------------|---------------------------------------------|--------------------------------------------|--------|
| §2.1046(a)          | 6.4                                         | Conducted RF output power                  | NP     |
| §24.232(b)          | 6.4                                         | Radiated RF output power                   | Passed |
| §2.1049(h)          | 4.6.1                                       | 99 % occupied bandwidth                    | NP     |
| §24.238(a)          | 6.5                                         | Band edge compliance                       | Passed |
| §24.238(a), §2.1051 | 6.5                                         | Spurious emissions at antenna terminals    | NP     |
| §24.238(a), §2.1053 | 6.5                                         | Spurious radiated emissions                | Passed |
| §2.1055(a)          | 6.3                                         | Frequency stability, temperature variation | NP     |
| §2.1055(d)          | 6.3                                         | Frequency stability, voltage variation     | NP     |

PASSED

The EUT complies with the essential requirements in the standard.

FAILED

The EUT does not comply with the essential requirements in the standard.

NP

The test was not performed by the TCC Nokia Copenhagen Laboratory.

*The test results of PPIRM-398 are re-used for certification of the PPIRM-399. The table above indicates the results, which will be re-used.*

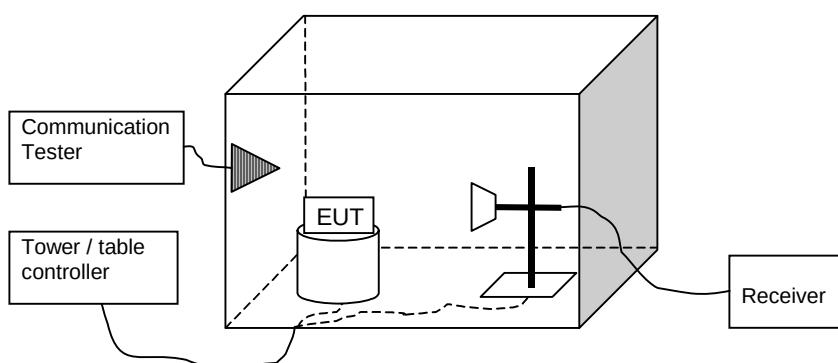
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## 2. Radiated RF output power (FCC §22.913(a), §24.232(b), RSS-132 4.4, RSS-133 6.4)

|                                                        |                                                    |
|--------------------------------------------------------|----------------------------------------------------|
| <b>EUT with DUT number</b>                             | RM-398 DUT 25455                                   |
| <b>Accessories with DUT numbers</b>                    | BL-5BT DUT 29339, AC-3E DUT 29177, HS-47 DUT 29287 |
| <b>Operation Voltage [V] / [Hz]</b>                    | 115 / 60                                           |
| <b>Result</b>                                          | Passed                                             |
| <b>Remarks</b>                                         | None                                               |
| <b>Temp [°C] / Humidity [%RH] / Air Pressure [kPa]</b> | 22 / 60 / 100                                      |
| <b>Date of measurements</b>                            | 13-Aug-2008                                        |
| <b>Measured by</b>                                     | Christian Andersen                                 |

### 2.1. Test setup



### 2.2. Test method and limit

The measurement is made according to TIA-603-C-2004 as follows:

The measurement is performed in the Anechoic Chamber with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system. The turntable is rotated 360 degrees and this is repeated for both horizontal and vertical receive antenna polarizations.

The EUT is placed on a nonconductive plate at 170 cm height.

The substitution method is used. Substitution values at each frequencies are measured beforehand and saved to the test software.

The substitution corrections are obtained as described below:

$$A_{SUBST} = P_{SUBST\_TX} - P_{SUBST\_RX} - L_{SUBST\_CABLES} + G_{SUBST\_TX\_ANT}$$

Where  $A_{SUBST}$  is the final substitution correction including receive antenna gain.  $P_{SUBST\_TX}$  is signal generator level,  $P_{SUBST\_RX}$  is receiver level,  $L_{SUBST\_CABLES}$  is cable losses including both TX and RX cables and  $G_{SUBST\_TX\_ANT}$  is substitution antenna gain.

The measurement results are obtained as described below:

$$P [dBm] = P_{MEAS} + A_{TOT}$$

Where  $P_{MEAS}$  is receiver reading in dBm and  $A_{TOT}$  is total correction factor including cable loss and substitution correction ( $A_{TOT} = L_{CABLES} + A_{SUBST}$ ).

Limits for radiated RF output power measurements

| Frequency range [MHz] | Limit [W] | Limit [dBm] |
|-----------------------|-----------|-------------|
| 824 - 849             | 7         | 38.5        |
| 1850 - 1910           | 2         | 33          |

## 2.3. GSM 850 Test results

Phone flip open

GSM mode

| Channel / $f_c$ [MHz] | ERP [dBm] | ERP [W] | $P_{MEAS}$ [dBm] | $A_{TOT}$ [dB] | Polarisation | Result |
|-----------------------|-----------|---------|------------------|----------------|--------------|--------|
| 128 / 824.2           | 28.90     | 0.776   | -5.20            | 34.10          | VERTICAL     | Passed |
| 190 / 836.6           | 30.00     | 1.000   | -3.60            | 33.60          | VERTICAL     | Passed |
| 251 / 848.8           | 30.50     | 1.122   | -3.00            | 33.50          | VERTICAL     | Passed |

GPRS mode, 2 TX Slots

| Channel / $f_c$ [MHz] | ERP [dBm] | ERP [W] | $P_{MEAS}$ [dBm] | $A_{TOT}$ [dB] | Polarisation | Result |
|-----------------------|-----------|---------|------------------|----------------|--------------|--------|
| 128 / 824.2           | 26.20     | 0.417   | -7.90            | 34.10          | VERTICAL     | Passed |
| 190 / 836.6           | 27.30     | 0.537   | -6.30            | 33.60          | VERTICAL     | Passed |
| 251 / 848.8           | 27.80     | 0.603   | -5.70            | 33.50          | VERTICAL     | Passed |

GPRS mode, 3 TX Slots

| Channel / $f_c$ [MHz] | ERP [dBm] | ERP [W] | $P_{MEAS}$ [dBm] | $A_{TOT}$ [dB] | Polarisation | Result |
|-----------------------|-----------|---------|------------------|----------------|--------------|--------|
| 128 / 824.2           | 24.60     | 0.288   | -9.50            | 34.10          | VERTICAL     | Passed |
| 190 / 836.6           | 25.60     | 0.363   | -8.00            | 33.60          | VERTICAL     | Passed |
| 251 / 848.8           | 26.10     | 0.407   | -7.40            | 33.50          | VERTICAL     | Passed |

EGPRS mode, 2 TX Slots

| Channel / $f_c$ [MHz] | ERP [dBm] | ERP [W] | $P_{MEAS}$ [dBm] | $A_{TOT}$ [dB] | Polarisation | Result |
|-----------------------|-----------|---------|------------------|----------------|--------------|--------|
| 128 / 824.2           | 21.30     | 0.135   | -12.80           | 34.10          | VERTICAL     | Passed |
| 190 / 836.6           | 22.50     | 0.178   | -11.10           | 33.60          | VERTICAL     | Passed |
| 251 / 848.8           | 23.20     | 0.209   | -10.30           | 33.50          | VERTICAL     | Passed |

EGPRS mode, 3 TX Slots

| Channel / $f_c$ [MHz] | ERP [dBm] | ERP [W] | $P_{MEAS}$ [dBm] | $A_{TOT}$ [dB] | Polarisation | Result |
|-----------------------|-----------|---------|------------------|----------------|--------------|--------|
| 128 / 824.2           | 21.00     | 0.126   | -13.10           | 34.10          | VERTICAL     | Passed |
| 190 / 836.6           | 22.60     | 0.182   | -11.00           | 33.60          | VERTICAL     | Passed |
| 251 / 848.8           | 23.10     | 0.204   | -10.40           | 33.50          | VERTICAL     | Passed |

Phone flip closed  
GSM mode

| Channel / f <sub>c</sub> [MHz] | ERP [dBm] | ERP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|-----------|---------|-------------------------|-----------------------|--------------|--------|
| 128 / 824.2                    | 28.10     | 0.646   | -6.60                   | 34.70                 | HORIZONTAL   | Passed |
| 190 / 836.6                    | 29.50     | 0.891   | -4.90                   | 34.40                 | HORIZONTAL   | Passed |
| 251 / 848.8                    | 29.60     | 0.912   | -4.30                   | 33.90                 | HORIZONTAL   | Passed |

GPRS mode, 2 TX Slots

| Channel / f <sub>c</sub> [MHz] | ERP [dBm] | ERP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|-----------|---------|-------------------------|-----------------------|--------------|--------|
| 128 / 824.2                    | 25.50     | 0.355   | -9.20                   | 34.70                 | HORIZONTAL   | Passed |
| 190 / 836.6                    | 26.80     | 0.479   | -7.60                   | 34.40                 | HORIZONTAL   | Passed |
| 251 / 848.8                    | 27.00     | 0.501   | -6.90                   | 33.90                 | HORIZONTAL   | Passed |

GPRS mode, 3 TX Slots

| Channel / f <sub>c</sub> [MHz] | ERP [dBm] | ERP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|-----------|---------|-------------------------|-----------------------|--------------|--------|
| 128 / 824.2                    | 23.80     | 0.240   | -10.90                  | 34.70                 | HORIZONTAL   | Passed |
| 190 / 836.6                    | 25.20     | 0.331   | -9.20                   | 34.40                 | HORIZONTAL   | Passed |
| 251 / 848.8                    | 25.30     | 0.339   | -8.60                   | 33.90                 | HORIZONTAL   | Passed |

EGPRS mode, 2 TX Slots

| Channel / f <sub>c</sub> [MHz] | ERP [dBm] | ERP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|-----------|---------|-------------------------|-----------------------|--------------|--------|
| 128 / 824.2                    | 20.00     | 0.100   | -14.70                  | 34.70                 | HORIZONTAL   | Passed |
| 190 / 836.6                    | 22.00     | 0.158   | -12.40                  | 34.40                 | HORIZONTAL   | Passed |
| 251 / 848.8                    | 21.70     | 0.148   | -12.20                  | 33.90                 | HORIZONTAL   | Passed |

EGPRS mode, 3 TX Slots

| Channel / f <sub>c</sub> [MHz] | ERP [dBm] | ERP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|-----------|---------|-------------------------|-----------------------|--------------|--------|
| 128 / 824.2                    | 20.60     | 0.115   | -14.10                  | 34.70                 | HORIZONTAL   | Passed |
| 190 / 836.6                    | 21.90     | 0.155   | -12.50                  | 34.40                 | HORIZONTAL   | Passed |
| 251 / 848.8                    | 22.00     | 0.158   | -11.90                  | 33.90                 | HORIZONTAL   | Passed |

## 2.4. GSM 1900 Test results

Phone flip open  
GSM mode

| Channel / f <sub>c</sub> [MHz] | EIRP [dBm] | EIRP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|------------|----------|-------------------------|-----------------------|--------------|--------|
| 512 / 1850.2                   | 29.50      | 0.891    | -14.30                  | 43.80                 | HORIZONTAL   | Passed |
| 661 / 1880.0                   | 30.20      | 1.047    | -13.90                  | 44.10                 | HORIZONTAL   | Passed |
| 810 / 1909.8                   | 28.80      | 0.759    | -15.00                  | 43.80                 | HORIZONTAL   | Passed |

GPRS mode, 2 TX Slots

| Channel / f <sub>c</sub> [MHz] | EIRP [dBm] | EIRP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|------------|----------|-------------------------|-----------------------|--------------|--------|
| 512 / 1850.2                   | 27.00      | 0.501    | -16.80                  | 43.80                 | HORIZONTAL   | Passed |
| 661 / 1880.0                   | 27.70      | 0.589    | -16.40                  | 44.10                 | HORIZONTAL   | Passed |
| 810 / 1909.8                   | 26.50      | 0.447    | -17.30                  | 43.80                 | HORIZONTAL   | Passed |

GPRS mode, 3 TX Slots

| Channel / f <sub>c</sub> [MHz] | EIRP [dBm] | EIRP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|------------|----------|-------------------------|-----------------------|--------------|--------|
| 512 / 1850.2                   | 25.50      | 0.355    | -18.30                  | 43.80                 | HORIZONTAL   | Passed |
| 661 / 1880.0                   | 26.30      | 0.427    | -17.80                  | 44.10                 | HORIZONTAL   | Passed |
| 810 / 1909.8                   | 25.10      | 0.324    | -18.70                  | 43.80                 | HORIZONTAL   | Passed |

EGPRS mode, 2 TX Slots

| Channel / f <sub>c</sub> [MHz] | EIRP [dBm] | EIRP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|------------|----------|-------------------------|-----------------------|--------------|--------|
| 512 / 1850.2                   | 26.00      | 0.398    | -17.80                  | 43.80                 | HORIZONTAL   | Passed |
| 661 / 1880.0                   | 26.20      | 0.417    | -17.90                  | 44.10                 | HORIZONTAL   | Passed |
| 810 / 1909.8                   | 25.40      | 0.347    | -18.40                  | 43.80                 | HORIZONTAL   | Passed |

EGPRS mode, 3 TX Slots

| Channel / f <sub>c</sub> [MHz] | EIRP [dBm] | EIRP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|------------|----------|-------------------------|-----------------------|--------------|--------|
| 512 / 1850.2                   | 25.50      | 0.355    | -18.30                  | 43.80                 | HORIZONTAL   | Passed |
| 661 / 1880.0                   | 26.40      | 0.437    | -17.70                  | 44.10                 | HORIZONTAL   | Passed |
| 810 / 1909.8                   | 25.20      | 0.331    | -18.60                  | 43.80                 | HORIZONTAL   | Passed |

Phone flip closed  
GSM mode

| Channel / f <sub>c</sub> [MHz] | EIRP [dBm] | EIRP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|------------|----------|-------------------------|-----------------------|--------------|--------|
| 512 / 1850.2                   | 31.40      | 1.380    | -12.40                  | 43.80                 | HORIZONTAL   | Passed |
| 661 / 1880.0                   | 30.80      | 1.202    | -13.30                  | 44.10                 | HORIZONTAL   | Passed |
| 810 / 1909.8                   | 29.40      | 0.871    | -14.40                  | 43.80                 | HORIZONTAL   | Passed |

GPRS mode, 2 TX Slots

| Channel / f <sub>c</sub> [MHz] | EIRP [dBm] | EIRP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|------------|----------|-------------------------|-----------------------|--------------|--------|
| 512 / 1850.2                   | 29.00      | 0.794    | -14.80                  | 43.80                 | HORIZONTAL   | Passed |
| 661 / 1880.0                   | 28.70      | 0.741    | -15.40                  | 44.10                 | HORIZONTAL   | Passed |
| 810 / 1909.8                   | 27.10      | 0.513    | -16.70                  | 43.80                 | HORIZONTAL   | Passed |

GPRS mode, 3 TX Slots

| Channel / f <sub>c</sub> [MHz] | EIRP [dBm] | EIRP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|------------|----------|-------------------------|-----------------------|--------------|--------|
| 512 / 1850.2                   | 27.60      | 0.575    | -16.20                  | 43.80                 | HORIZONTAL   | Passed |
| 661 / 1880.0                   | 27.10      | 0.513    | -17.00                  | 44.10                 | HORIZONTAL   | Passed |
| 810 / 1909.8                   | 25.70      | 0.372    | -18.10                  | 43.80                 | HORIZONTAL   | Passed |

EGPRS mode, 2 TX Slots

| Channel / f <sub>c</sub> [MHz] | EIRP [dBm] | EIRP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|------------|----------|-------------------------|-----------------------|--------------|--------|
| 512 / 1850.2                   | 27.60      | 0.575    | -16.20                  | 43.80                 | HORIZONTAL   | Passed |
| 661 / 1880.0                   | 27.20      | 0.525    | -16.90                  | 44.10                 | HORIZONTAL   | Passed |
| 810 / 1909.8                   | 25.30      | 0.339    | -18.50                  | 43.80                 | HORIZONTAL   | Passed |

EGPRS mode, 3 TX Slots

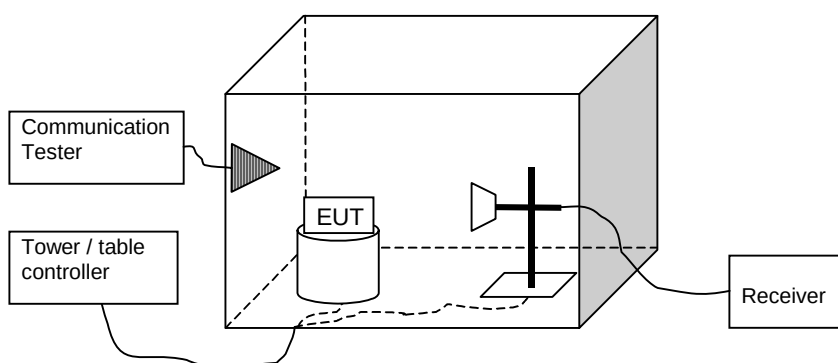
| Channel / f <sub>c</sub> [MHz] | EIRP [dBm] | EIRP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|------------|----------|-------------------------|-----------------------|--------------|--------|
| 512 / 1850.2                   | 27.60      | 0.575    | -16.20                  | 43.80                 | HORIZONTAL   | Passed |
| 661 / 1880.0                   | 27.40      | 0.550    | -16.70                  | 44.10                 | HORIZONTAL   | Passed |
| 810 / 1909.8                   | 25.60      | 0.363    | -18.20                  | 43.80                 | HORIZONTAL   | Passed |



### 3. Band edge compliance (FCC §22.917(a), 24.238(a), RSS-132 4.5, RSS-133 6.5)

|                                                        |                                                    |
|--------------------------------------------------------|----------------------------------------------------|
| <b>EUT with DUT number</b>                             | RM-398 DUT 25455                                   |
| <b>Accessories with DUT numbers</b>                    | BL-5BT DUT 29339, AC-3E DUT 29177, HS-47 DUT 29287 |
| <b>Operation Voltage [V] / [Hz]</b>                    | 115 / 60                                           |
| <b>Result</b>                                          | Passed                                             |
| <b>Remarks</b>                                         | None                                               |
| <b>Temp [°C] / Humidity [%RH] / Air Pressure [kPa]</b> | 22 / 60 / 100                                      |
| <b>Date of measurements</b>                            | 11-Aug-2008                                        |
| <b>Measured by</b>                                     | Christian Andersen                                 |

#### 3.1. Test setup



#### 3.2. Test method and limit

The measurement is made according to FCC rules parts 22 and 24 and IC standards RSS-132 and RSS-133.

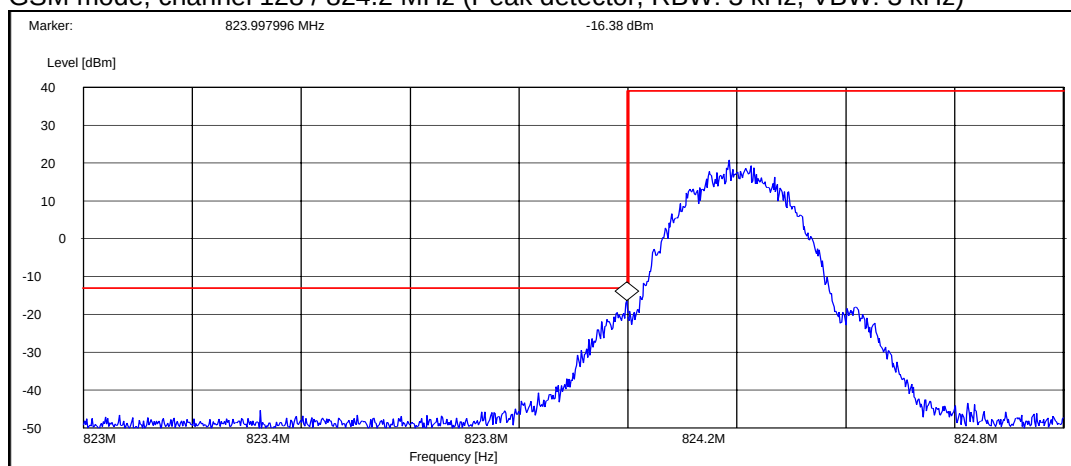
Limits for band edge compliance measurements

| Operation band | Frequency range [MHz]     | Limit [dBm] |
|----------------|---------------------------|-------------|
| GSM 850        | Below 824 and above 849   | -13         |
| GSM 1900       | Below 1850 and above 1910 | -13         |

### 3.3. GSM 850 Test results

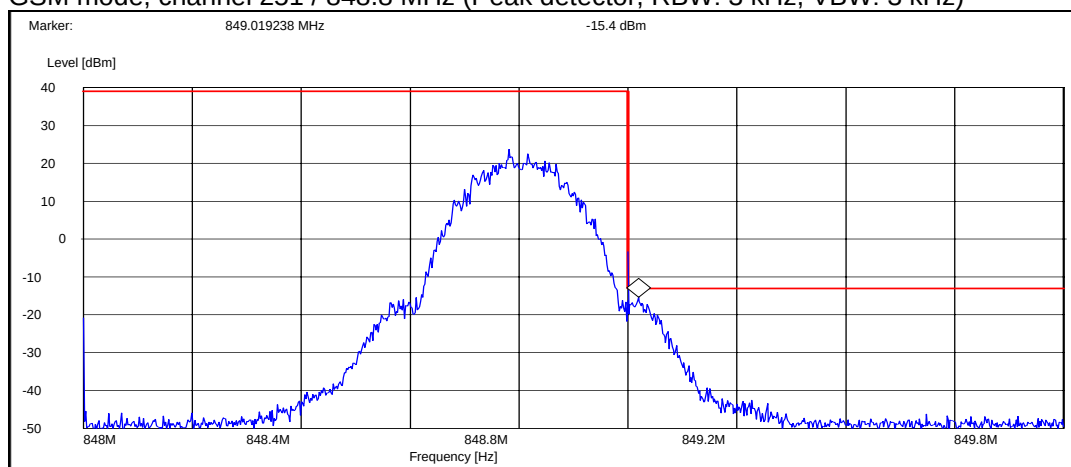
Phone flip open

GSM mode, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



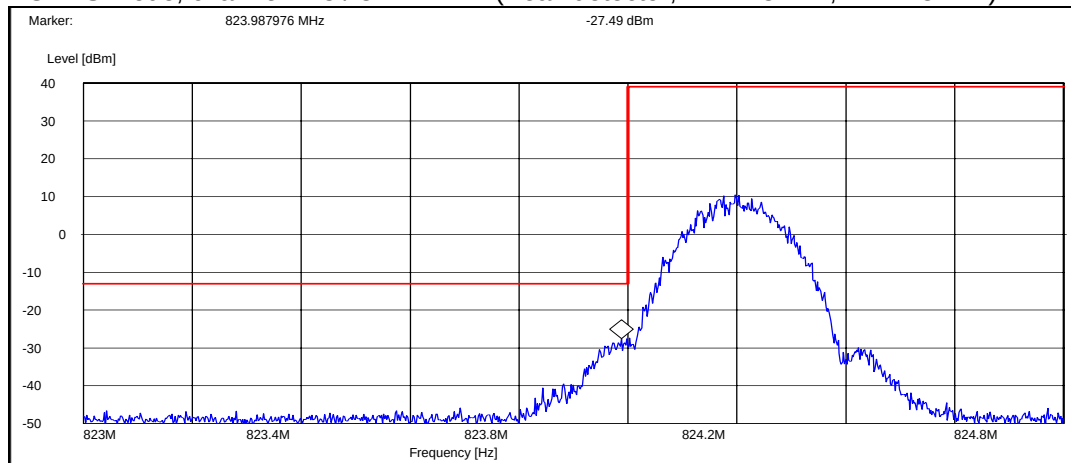
| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| GSM                    | 128 / 824.2           | -16.40  |

GSM mode, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



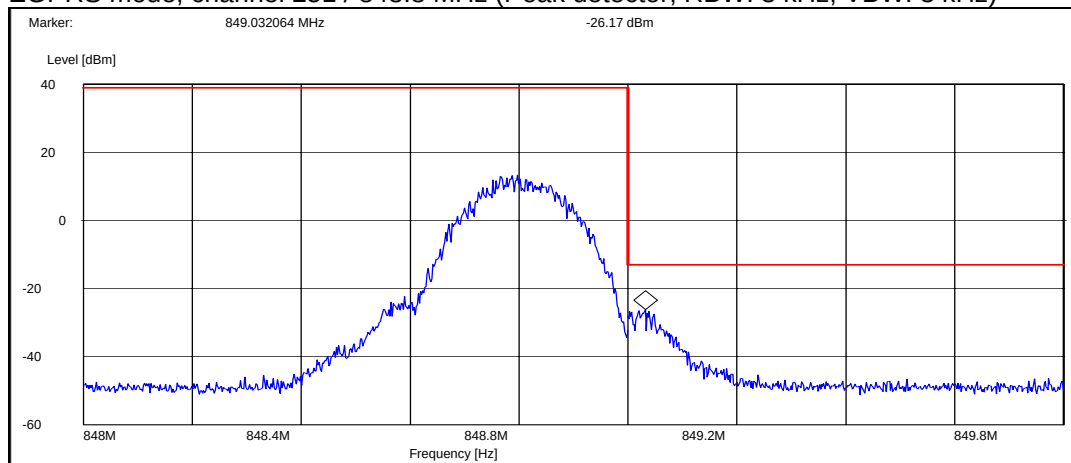
| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| GSM                    | 251 / 848.8           | -15.40  |

EGPRS mode, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| EGPRS                  | 128 / 824.2           | -27.50  |

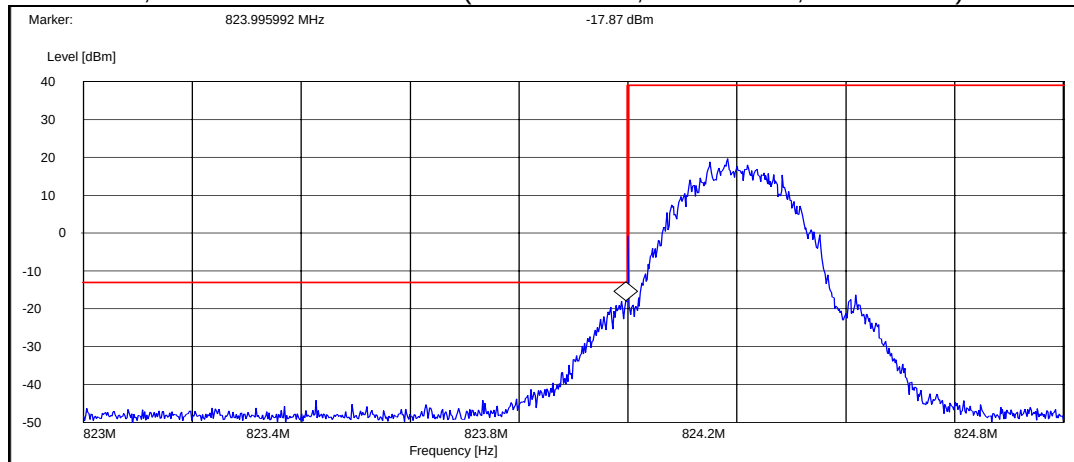
EGPRS mode, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| EGPRS                  | 251 / 848.8           | -26.20  |

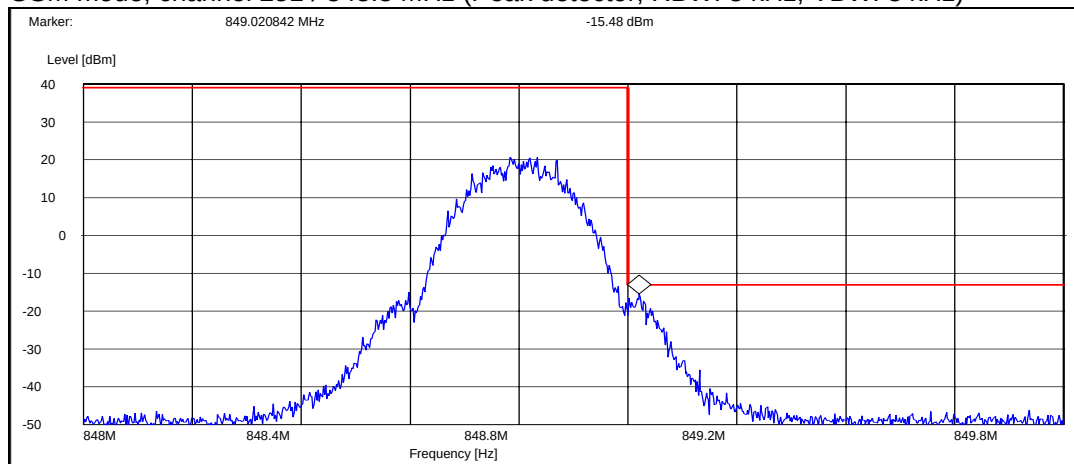
Phone flip closed

GSM mode, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



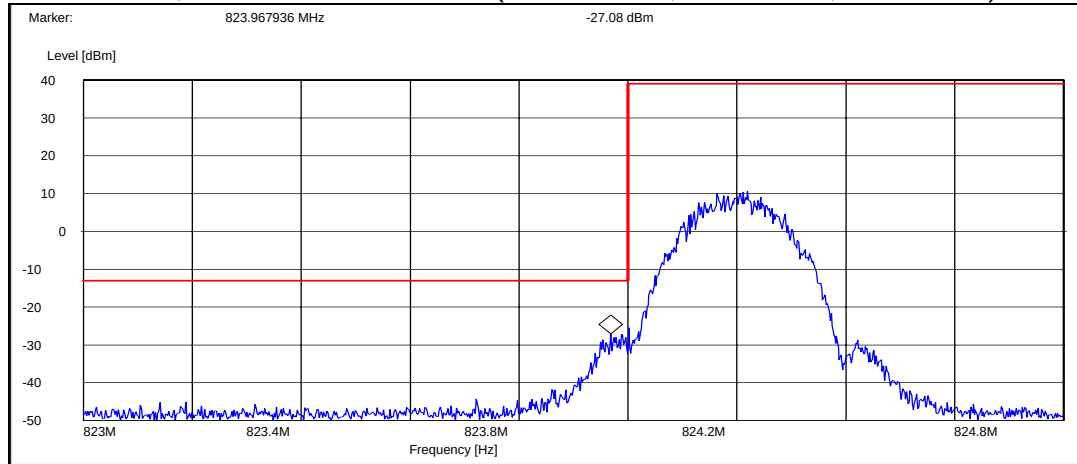
| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| GSM                    | 128 / 824.2           | -17.90  |

GSM mode, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



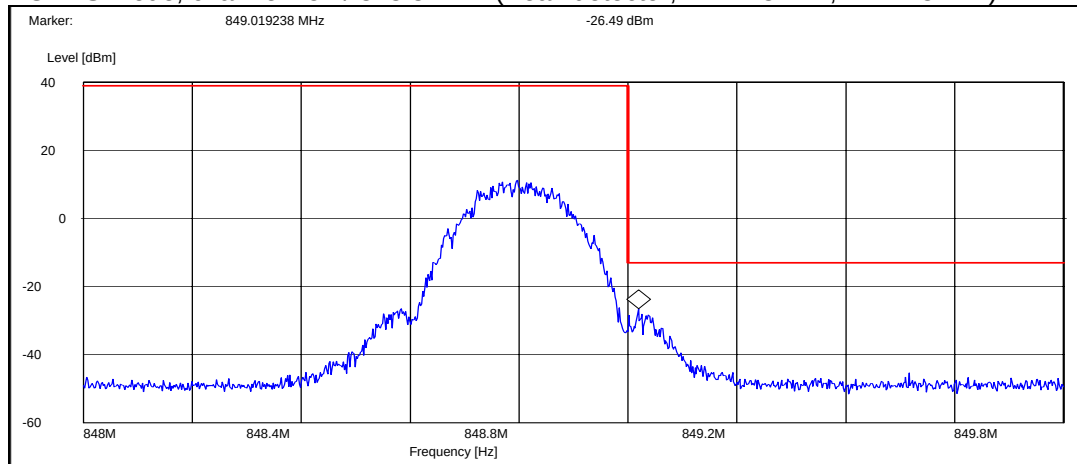
| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| GSM                    | 251 / 848.8           | -15.50  |

EGPRS mode, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| EGPRS                  | 128 / 824.2           | -27.10  |

EGPRS mode, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)

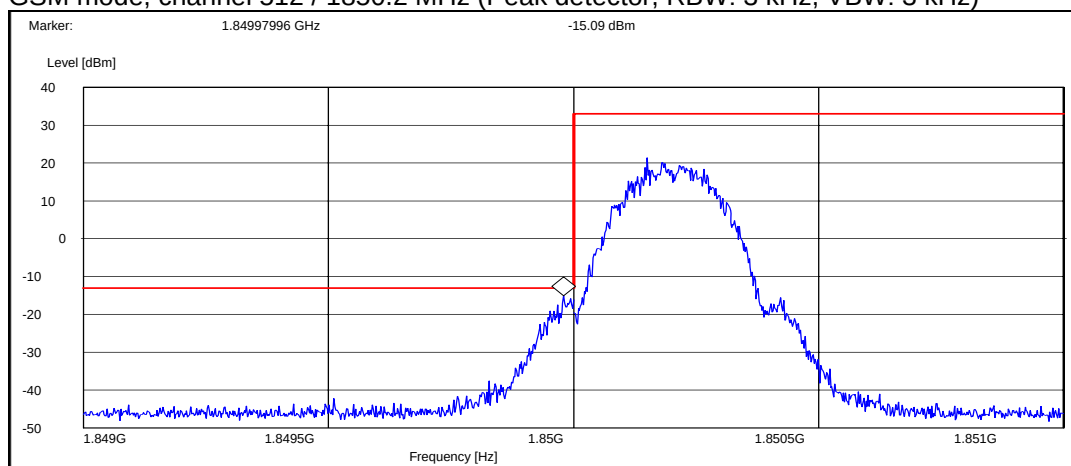


| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| EGPRS                  | 251 / 848.8           | -26.50  |

### 3.4. GSM 1900 Test results

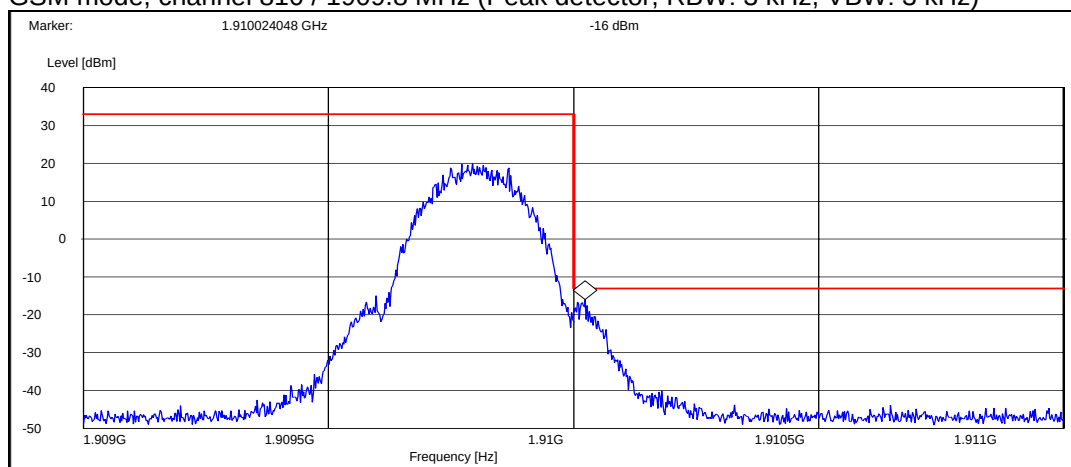
Phone flip open

GSM mode, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



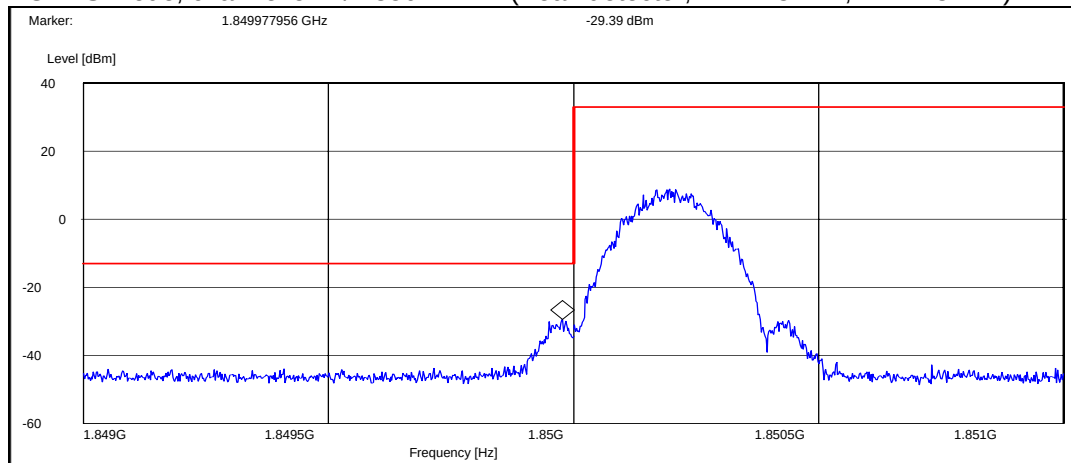
| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| GSM                    | 512 / 1850.2          | -15.10  |

GSM mode, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



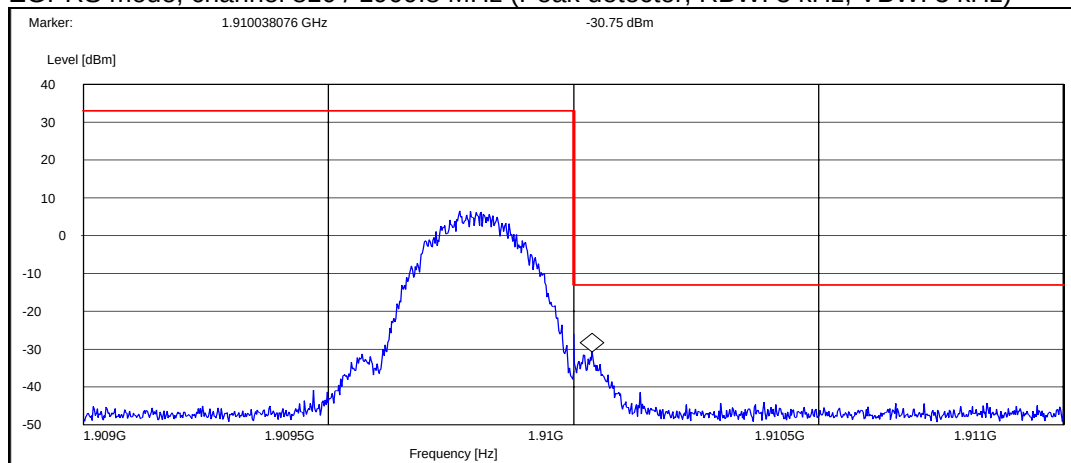
| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| GSM                    | 810 / 1909.8          | -16.00  |

EGPRS mode, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| EGPRS                  | 512 / 1850.2          | -29.40  |

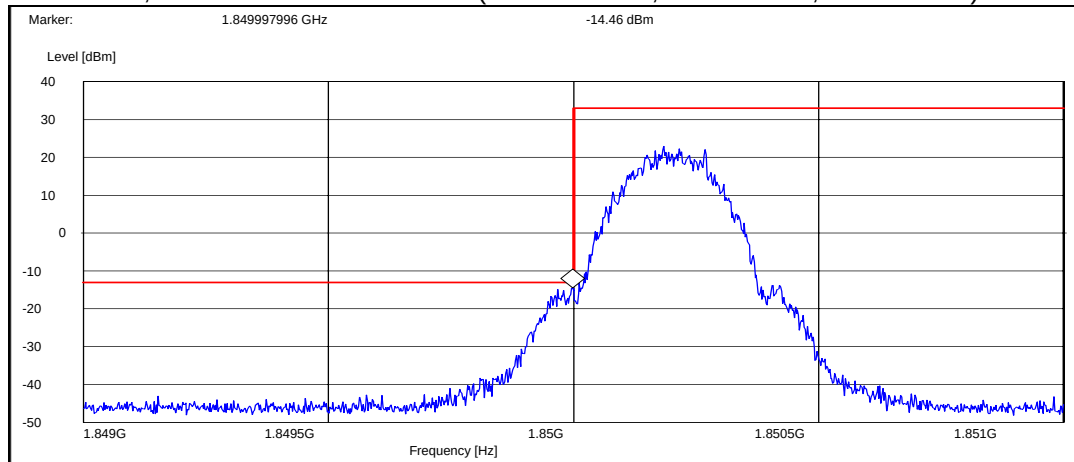
EGPRS mode, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| EGPRS                  | 810 / 1909.8          | -30.80  |

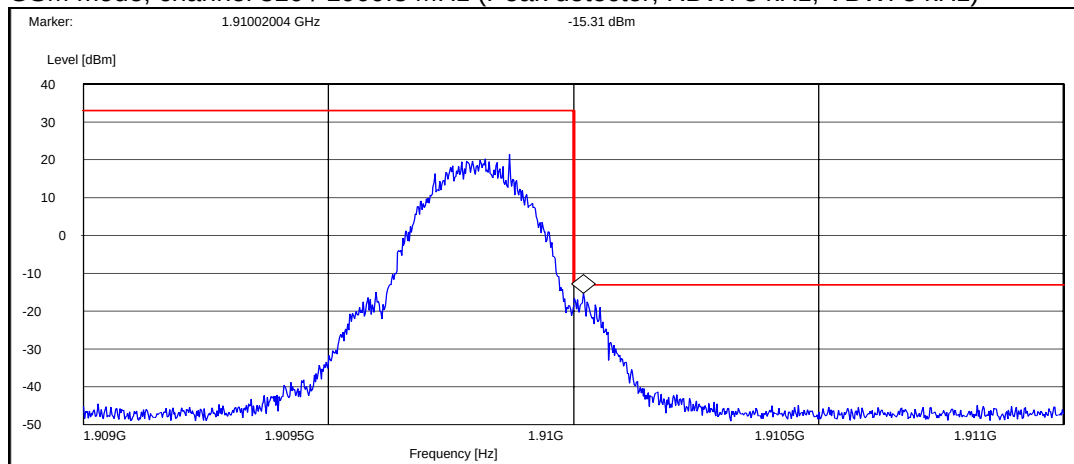
Phone flip closed

GSM mode, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| GSM                    | 512 / 1850.2          | -14.50  |

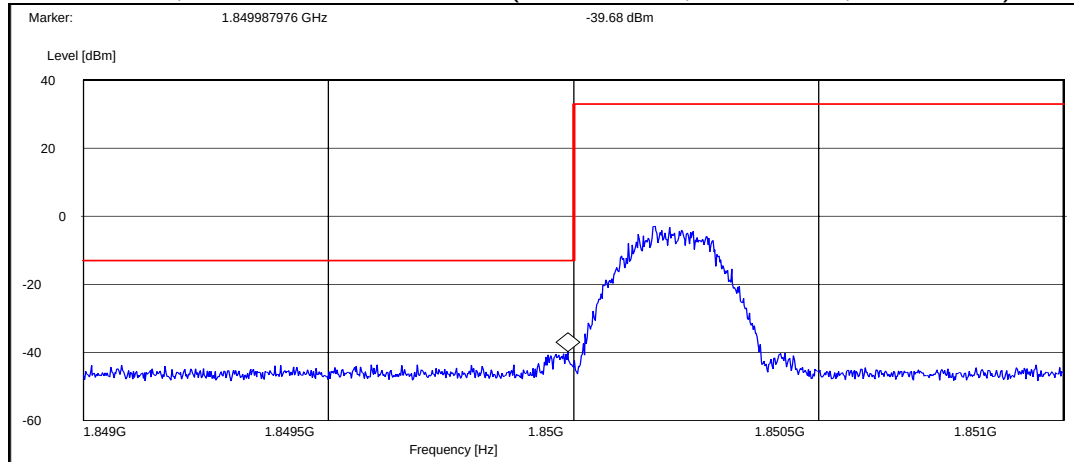
GSM mode, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| GSM                    | 810 / 1909.8          | -15.30  |

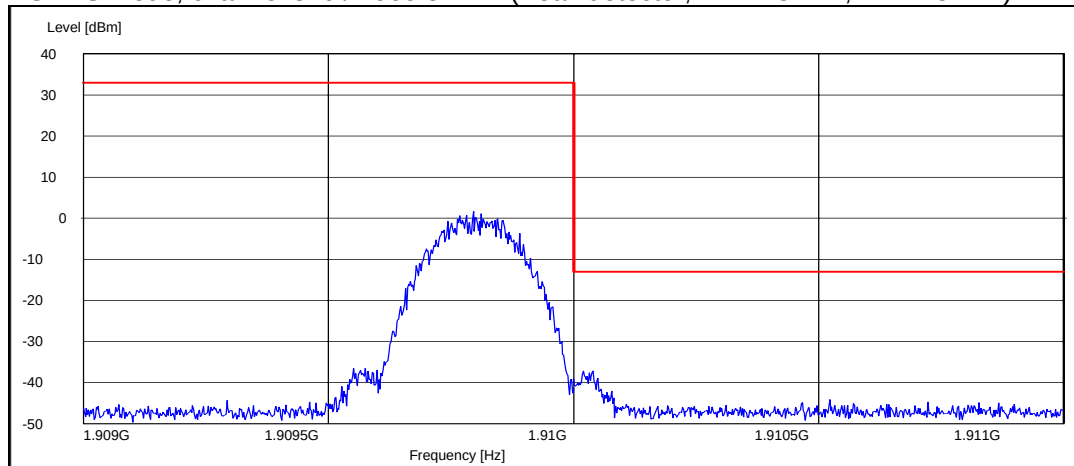


EGPRS mode, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| EGPRS                  | 512 / 1850.2          | -39.70  |

EGPRS mode, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)

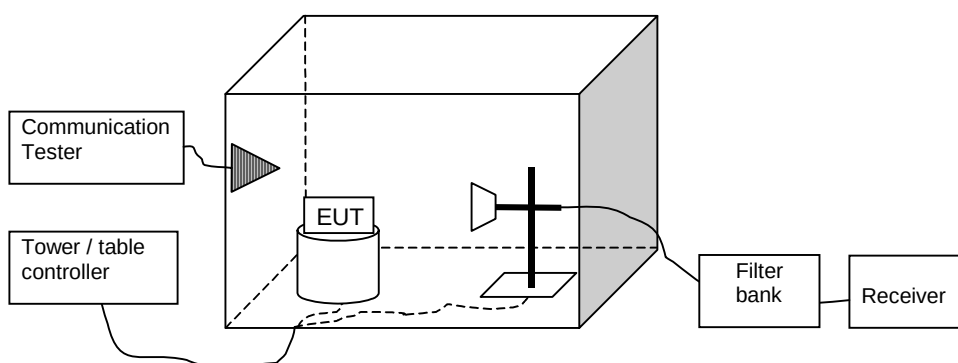


| Operation mode (TX on) | Channel / $f_c$ [MHz] | P [dBm] |
|------------------------|-----------------------|---------|
| EGPRS                  | 810 / 1909.8          | -37.10  |

#### 4. Spurious radiated emissions (FCC §22.917(a), §24.238(a), §2.1053, RSS-132 4.5, RSS-133 6.5)

|                                                        |                                                    |
|--------------------------------------------------------|----------------------------------------------------|
| <b>EUT with DUT number</b>                             | RM-398 DUT 29343                                   |
| <b>Accessories with DUT numbers</b>                    | BL-5BT DUT 29339, AC-3E DUT 29177, HS-47 DUT 29287 |
| <b>Operation Voltage [V] / [Hz]</b>                    | 115 / 60                                           |
| <b>Result</b>                                          | Passed                                             |
| <b>Remarks</b>                                         | Phone measured in fold open mode.                  |
| <b>Temp [°C] / Humidity [%RH] / Air Pressure [kPa]</b> | 21.6 / 60 / 99.9                                   |
| <b>Date of measurements</b>                            | 07-Aug-2008                                        |
| <b>Measured by</b>                                     | Christian Andersen                                 |

##### 4.1. Test setup



##### 4.2. Test method and limit

The measurement is made according to TIA-603-C-2004 as follows:

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed in the Semi-Anechoic Chamber with conducting metal floor, if the Preliminary Measurement results are closer than 20 dB to the permissible value.

The EUT is placed at nonconductive plate at the turntable center.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

The emissions less than 20 dB below the permissible value are reported.

The substitution method is used. Substitution values at each frequencies are measured beforehand and saved to the test software.

The substitution corrections are obtained as described below:

$$A_{SUBST} = P_{SUBST\_TX} - P_{SUBST\_RX} - L_{SUBST\_CABLES} + G_{SUBST\_TX\_ANT}$$

Where  $A_{SUBST}$  is the final substitution correction including receive antenna gain.  $P_{SUBST\_TX}$  is signal generator level,  $P_{SUBST\_RX}$  is receiver level,  $L_{SUBST\_CABLES}$  is cable losses including both TX and RX cables and  $G_{SUBST\_TX\_ANT}$  is substitution antenna gain.

The measurement results are obtained as described below:

$$P [dBm] = P_{MEAS} + A_{TOT}$$

Where  $P_{MEAS}$  is receiver reading in dBm and  $A_{TOT}$  is total correction factor including cable loss, preamplifier gain and substitution correction ( $A_{TOT} = L_{CABLES} - G_{PREAMP} + A_{SUBST}$ ).

Limits for spurious radiated emissions measurements

| Operation band | Frequency range [MHz] | Limit [dBm] |
|----------------|-----------------------|-------------|
| GSM 850        | 30 - 8500             | -13         |
| GSM 1900       | 30 - 18000            | -13         |

#### 4.3. GSM 850 Test results

GSM mode, channel 190 / 836.6 MHz

| Frequency [MHz] | P [dBm] | P [μW]  | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|---------|---------|-------------------------|-----------------------|--------------|--------|
| 1673.143287     | -32.40  | 0.57544 | -37.80                  | 5.40                  | HORIZONTAL   | Passed |
| 2509.820641     | -51.30  | 0.00741 | -62.50                  | 11.20                 | HORIZONTAL   | Passed |
| 2519.142285     | -52.10  | 0.00617 | -64.00                  | 11.90                 | HORIZONTAL   | Passed |
| 3346.189379     | -49.70  | 0.01072 | -55.70                  | 6.00                  | VERTICAL     | Passed |

EGPRS mode, channel 190 / 836.6 MHz

| Frequency [MHz] | P [dBm] | P [μW]  | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|---------|---------|-------------------------|-----------------------|--------------|--------|
| 1673.143287     | -47.60  | 0.01738 | -53.00                  | 5.40                  | HORIZONTAL   | Passed |
| 2511.320641     | -53.20  | 0.00479 | -64.50                  | 11.30                 | HORIZONTAL   | Passed |
| 3346.689379     | -60.50  | 0.00089 | -66.50                  | 6.00                  | VERTICAL     | Passed |

#### 4.4. GSM 1900 Test results

GSM mode, channel 661 / 1880.0 MHz

| Frequency [MHz] | P [dBm] | P [ $\mu$ W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|---------|--------------|-------------------------|-----------------------|--------------|--------|
| 1960.049699     | -26.50  | 2.23872      | -35.70                  | 9.20                  | VERTICAL     | Passed |
| 3760.023046     | -48.60  | 0.01380      | -57.90                  | 9.30                  | HORIZONTAL   | Passed |
| 5630.754509     | -52.50  | 0.00562      | -66.00                  | 13.50                 | HORIZONTAL   | Passed |
| 5644.786573     | -52.30  | 0.00589      | -66.00                  | 13.70                 | VERTICAL     | Passed |
| 7516.526052     | -47.90  | 0.01622      | -69.20                  | 21.30                 | VERTICAL     | Passed |

EGPRS mode, channel 661 / 1880.0 MHz

| Frequency [MHz] | P [dBm] | P [ $\mu$ W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|---------|--------------|-------------------------|-----------------------|--------------|--------|
| 1960.049699     | -26.40  | 2.29087      | -35.60                  | 9.20                  | VERTICAL     | Passed |
| 3760.023046     | -52.40  | 0.00575      | -61.70                  | 9.30                  | HORIZONTAL   | Passed |
| 5623.754509     | -52.30  | 0.00589      | -65.90                  | 13.60                 | HORIZONTAL   | Passed |
| 5645.786573     | -52.60  | 0.00550      | -66.30                  | 13.70                 | VERTICAL     | Passed |
| 7511.526052     | -47.90  | 0.01622      | -69.30                  | 21.40                 | VERTICAL     | Passed |

## 5. Test Equipment

### 5.1. Conducted measurements

| Eq. No | Equipment                                      | Type      | Manufacturer    | Used in            |
|--------|------------------------------------------------|-----------|-----------------|--------------------|
| 13037  | Power Supply 0-15V 10A                         | EA3012    | LP Instruments  | 15C, 15B           |
| 13513  | Pulse Limiter 9KHz-30MHz                       | ESH3Z2    | Rohde&Schwarz   | 15C, 15B           |
| 13666  | EMI Test Reciever 9KHz-2,5GHz                  | ESPC      | Rohde&Schwarz   | 15C, 15B           |
| 13935  | Two Lines Artificial Mains Network             | ESH3-Z5   | Rohde&Schwarz   | 15C, 15B           |
| 16995  | Directional Coupler 20dB 0,5-2,0 GHz SMA Conn. | 1538RA-20 | Weinschel       | 15C, 15B           |
| 18772  | Shielded Chamber                               | RFD-100   | ETS-Lindgren    | 15C, 15B           |
| 19171  | Universal Radio Communication Tester           | CMU200    | Rohde&Schwarz   | 15C, 15B           |
| 11386  | System DC Power Supply                         | HP6632A   | Hewlett Packard | 22/24/27, 15C, 15B |
| 19678  | Spectrum Analyzer 26 GHz                       | FSP       | Rohde&Schwarz   | 22/24/27, 15C, 15B |
| 16601  | Universal Radio Communication Tester           | CMU200    | Rohde&Schwarz   | 22/24/27, 15C, 15B |
| 19625  | Vötsch Climatic Chamber                        | VT4002EMC | Vötsch          | 22/24/27, 15C, 15B |
| 13357  | Rohde & Schwartz Signal Generator              | SMP02     | Rohde&Schwarz   | 22/24/27, 15C, 15B |
| 20168  | Bluetooth EDR Tester                           | CBT       | Rohde&Schwarz   | 22/24/27, 15C, 15B |

### 5.2. Radiated measurements

| Eq. No | Equipment                                      | Type          | Manufacturer  | Used in            |
|--------|------------------------------------------------|---------------|---------------|--------------------|
| 18416  | Universal Radio Communication Tester           | CMU200        | Rohde&Schwarz | 22/24/27, 15C, 15B |
|        | Programmable Relay Switching System            | -----         | Pickering     | 22/24/27, 15C, 15B |
| 15742  | Programmable Relay Switching System            | -----         | Pickering     | 22/24/27, 15C, 15B |
| 14020  | Power Supply Module Relay Switching System 45W | 10-910-002    | Pickering     | 22/24/27, 15C, 15B |
| 15743  | Power Supply Module Relay Switching System 50W | 10-910L-001   | Pickering     | 22/24/27, 15C, 15B |
| 16490  | RS-232/IEEE-488.2 Interface                    | 10-921-001    | Pickering     | 22/24/27, 15C, 15B |
|        | RS-232/IEEE-488.2 Interface                    | 10-921-001    | Pickering     | 22/24/27, 15C, 15B |
| 20078  | Relay 2x6 Chnl $\mu$ Wave Mux                  | 10-785B-522   | Pickering     | 22/24/27, 15C, 15B |
| 14021  | Relay Dual 6 Chnl $\mu$ Wave Mux               | 10-785-522    |               | 22/24/27, 15C, 15B |
|        | Relay Dual 6 Chnl $\mu$ Wave Mux               | 10-785-522    |               | 22/24/27, 15C, 15B |
| 17644  | Dual 6 Channel MUX Microwave Relay SMA 50 Ohm  | 10-785-522    | Pickering     | 22/24/27, 15C, 15B |
| 16948  | Dual 6 Channel MUX Microwave Relay SMA 50 Ohm  | 10-785-522    | Pickering     | 22/24/27, 15C, 15B |
| 16949  | Dual 6 Channel MUX Microwave Relay SMA 50 Ohm  | 10-785-522    | Pickering     | 22/24/27, 15C, 15B |
| 18792  | Multi Device Controller                        | 2090          | ETS-EMCO      | 22/24/27, 15C, 15B |
| 14963  | RF Preamplifier 100MHz-4GHz (Metal Chassis)    | AFS3-00100400 | Miteq/NMP Cph | 22/24/27, 15C, 15B |
| 18861  | EMI Test Receiver 20Hz-26,5GHz                 | ESI           | Rohde&Schwarz | 22/24/27, 15C, 15B |
| 20335  | Ultra Broadband Antenna Ultralog 30-3000MHz    | HL562         | Rohde&Schwarz | 22/24/27, 15C, 15B |
| 18773  | Shielded Chamber                               | RFD-100       | ETS-Lindgren  | 22/24/27, 15C, 15B |
| 18774  | Shielded Chamber                               | RFSD-F/A-100  | ETS-Lindgren  | 22/24/27, 15C, 15B |
| 19151  | High Pass Filter 3GHz                          | WHJS3000-10SS | Wainwright    | 22/24/27, 15C, 15B |

| Eq. No | Equipment                                   | Type                            | Manufacturer           | Used in            |
|--------|---------------------------------------------|---------------------------------|------------------------|--------------------|
|        | WHK3.0/18G-10ss                             |                                 |                        |                    |
| 13937  | Ultra Stable Notch Filter 850MHz            | WRCA902.4-0.2/40-6SS            | Wainwright Instruments | 22/24/27, 15C, 15B |
| 13936  | Ultra Stable Notch Filter 1747,5MHz         | WRCD1747.5-0.2/40-10SS          | Wainwright Instruments | 22/24/27, 15C, 15B |
| 14114  | Highpass filter                             | WHK1000-12SS                    | Wainwright Instruments | 22/24/27, 15C, 15B |
| 14188  | Ultra Stable Notch Filter 902,4MHz          | WRCA902.4-0.2/40-6SS            | Wainwright             | 22/24/27, 15C, 15B |
| 14187  | Ultra Stable Notch Filter 1747,5MHz         | WRCD1747.5-0.2/40-10SS          | Wainwright             | 22/24/27, 15C, 15B |
| 16633  | Ultra Stable Notch Filter 1880,0MHz         | WRCD1880.0-0.2/40-10SS          | Wainwright             | 22/24/27, 15C, 15B |
| 19587  | BT/WLAN Band Reject Filter                  | WRCG2400/2483-2390/2493-35/10SS | Wainwright             | 22/24/27, 15C, 15B |
| 20115  | WDCMA Band 2 filter                         |                                 | Wainwright             | 24, 15C, 15B       |
| 20114  | WDCMA Band 4 filter                         | WRCG1737/1743-1733/1747-40/6SS  | Wainwright             | 27, 15C, 15B       |
| 20116  | WDCMA Band 5&6 filter                       | WRCG832/83/-825/845-40/5SS      | Wainwright             | 22, 15C, 15B       |
| 18323  | Band reject filter 1947-1953MHz 40dB        | WRCG1947/1953-1940/1960-40/6SS  | Wainwright             | 22/24/27, 15C, 15B |
| 20031  | Double Ridged Broadband Horn                | BBHA 9120 D                     | SCHWARZBECK            | 22/24/27, 15C, 15B |
| 19966  | Magnetic Loop Antenna 9 kHz - 30 MHz        | HFH2-Z2                         | Rohde&Schwarz          | 15C, 15B           |
| 14993  | EMI Test Receiver 9KHz-2750MHz              | ESCS30                          | Rohde&Schwarz          | 22/24/27, 15C, 15B |
| 15191  | Turntable Contoller Unit                    | G-800SDX                        | YAESU                  | 22/24/27, 15C, 15B |
| 14900  | Antenna Controller                          | HD100                           | HD GmbH                | 22/24/27, 15C, 15B |
| 19374  | Resonant Dipole Antenna 850MHz SMA m Conn.  | -----                           | NMP Cph                | 22/24/27, 15C, 15B |
| 19375  | Resonant Dipole Antenna 1900MHz SMA m Conn. | -----                           | NMP Cph                | 22/24/27, 15C, 15B |
| 20168  | Bluetooth EDR Tester                        | CBT                             | Rohde&Schwarz          | 22/24/27, 15C, 15B |