

## FCC Part 22/24 Compliance Test Report

|                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                                                                                                                                                         |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Report no.:</b>                                 | Cph_FCC_0623_01.doc                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Date of Report:</b>            | 03-07-2006                                                                                                                                              |
| <b>Number of pages:</b>                                 | 13                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Customer's Contact person:</b> | Alison Kingston                                                                                                                                         |
| <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>Client:</b>                    | Nokia Corporation<br>Nokia House<br>Summit Avenue, Southwood<br>FARNBOROUGH<br>HAMPSHIRE GU14 0NG<br>UK<br>Tel. +44 1252 866000<br>Fax. +44 1252 866001 |
| <b>FCC listing no.:</b>                                 | 99059                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                                                                                                                                         |
| <b>IC recognition no.:</b>                              | 4820 and 4820-1                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                                                                                                                                                         |
| <b>Tested devices/ accessories:</b>                     | <b>Phone RM-132 (HW:5120) &amp; Battery BP-6M &amp; AC Charger AC-4E &amp; Headset HS-23</b>                                                                                                                                                                                                                                                                                                                                  |                                   |                                                                                                                                                         |
| <b>FCC ID:</b>                                          | QFXRM-132                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>IC:</b>                        | 661Z-RM132                                                                                                                                              |
| <b>Supplement reports:</b>                              |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                                                                                                                                                         |
| <b>Testing has been carried out in accordance with:</b> | <b>CFR 47, FCC rules Parts 22 and 24, TIA-603-B-2002 and IC standards RSS-GEN, RSS-132 and RSS-133. 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>             | <div style="display: flex; align-items: center;">  <div>             Digitally signed by Niels Christian Andersen<br/>             DN: cn=Niels Christian Andersen, c=DK, o=TCC Nokia, ou=EMC, email=christian.n.andersen@nokia.com<br/>             Date: 2006.07.04 08:23:36 +02'00'           </div> </div> |                                   |                                                                                                                                                         |
|                                                         | <b>Niels Christian Andersen, Engineer</b>                                                                                                                                                                                                                                                                                                                                                                                     |                                   |                                                                                                                                                         |

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

|                               |                                                              |
|-------------------------------|--------------------------------------------------------------|
| Date of receipt               | 10-05-2006                                                   |
| Testing completed             | 03-07-2006                                                   |
| The customer's contact person | Alison Kingston                                              |
| Test Plan referred to         | \\EMC\\TESTPLAN\\                                            |
| Notes                         | None                                                         |
| Document name                 | T:\\Projects\\RM-132\\EMC\\Results\\FCC\\Cph_FCC_0623_01.doc |

### 1.1. EUT and Accessory Information

The EUT is a quadri band (GSM850/900/1800/1900) mobile phone with GPRS, EGPRS and Bluetooth. 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-132 | 004400/71/171642/1          | 5120 | -   | 1.0613.0.4 | 28158 |
| Battery    | BP-6M  | 0670467393213M056130130143  | -    | -   | -          | 28466 |
| AC-Charger | AC-4E  | 4090495395960100189;0675384 | 3.22 | 0.3 | -          | 29036 |
| Headset    | HS-23  | 350741603201                | -    | -   | -          | 28159 |

### 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) | 4.6, 4.4                      | Conducted RF output power                  | -      |
| §22.913(a)            | 4.6, 4.4                      | Radiated RF output power                   | Passed |
| §2.1049(h)            | 4.4.1                         | 99 % occupied bandwidth                    | -      |
| §22.917(a)            | 4.7, 4.5                      | Band edge compliance                       | Passed |
| §22.917(a), §2.1051   | 4.7, 4.5                      | Spurious emissions at antenna terminals    | -      |
| §22.917(a), §2.1053   | 4.7, 4.5                      | Spurious radiated emissions                | -      |
| §2.1055(a)            | 4.5, 4.3                      | Frequency stability, temperature variation | -      |
| §2.1055(d)            | 4.5, 4.3                      | Frequency stability, voltage variation     | -      |

#### GSM 1900:

| Section in CFR 47   | Section in RSS-133 | Name of the test                           | Result |
|---------------------|--------------------|--------------------------------------------|--------|
| §2.1046(a)          | 6.2                | Conducted RF output power                  | -      |
| §24.232(b)          | 6.2                | Radiated RF output power                   | Passed |
| §2.1049(h)          | 5.6                | 99 % occupied bandwidth                    | -      |
| §24.238(a)          | 6.3                | Band edge compliance                       | Passed |
| §24.238(a), §2.1051 | 6.3                | Spurious emissions at antenna terminals    | -      |
| §24.238(a), §2.1053 | 6.3                | Spurious radiated emissions                | -      |
| §2.1055(a)          | 7                  | Frequency stability, temperature variation | -      |
| §2.1055(d)          | 7                  | Frequency stability, voltage variation     | -      |

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.

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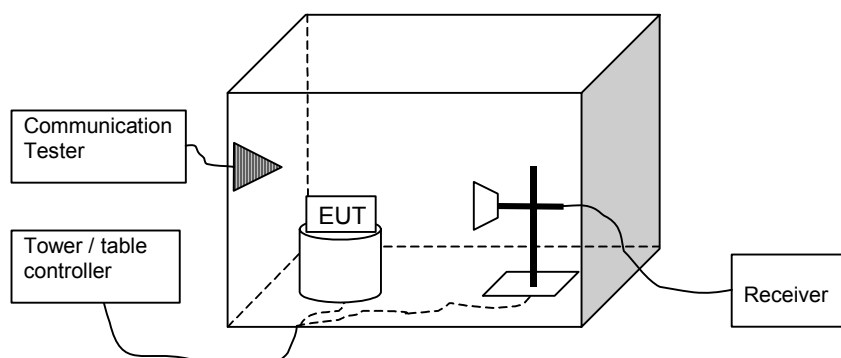
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## 2. Radiated RF output power

(FCC §22.913(a), §24.232(b), RSS-GEN 4.6, RSS-132 4.4, RSS-133 6.2)

|                                                       |                                                     |
|-------------------------------------------------------|-----------------------------------------------------|
| <b>EUT with DUT number</b>                            | RM-132 Dut#28158                                    |
| <b>Accessories with DUT numbers</b>                   | BP-6M Dut#28466 & AC-4E Dut#29036 & HS-23 Dut#28159 |
| <b>Operation Voltage [V] / [Hz]</b>                   | 230 / 50                                            |
| <b>Result</b>                                         | Passed                                              |
| <b>Remarks</b>                                        | None                                                |
| <b>Temp [°C] / Humidity [%RH] / Air Pressure [kB]</b> | 21 / 41 / 1024                                      |
| <b>Date of measurements</b>                           | 03-07-2006                                          |
| <b>Measured by</b>                                    | Christian Andersen                                  |

### 2.1. Test setup



### 2.2. Test method and limit

The measurement is made according to TIA-603-B-2002 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:

$$P_{EIRP[W]} = \frac{10^{(P_{Subst\_TX[dBm]} + (P_{EUT[dBm]} - P_{Subst\_RX[dBm]}) + G_{Substitute\_antenna[dBi]} - L_{Cable[dB]})}}{1000}$$

Where the variables are as follows:

PEUT [dBm] Measured power level from the EUT  
PSubst\_TX [dBm] Signal Generator Power  
PSubst\_RX [dBm] Power received with the spectrum analyzer  
GSubstitute\_antenna [dBi] Gain of the substitutive antenna over isotropic radiator  
LCable [dB] Loss of the cable between signal generator and the substituting antenna.

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

GSM mode

| EUT Channel | P eut [dBm] | P subst TX [dBm] | P subst RX [dBm] | Cable Loss [dB] | Ant. Gain [dBd] | ERP [dBm] | ERP [W] | Azimuth [Deg] | Ant pos | Result |
|-------------|-------------|------------------|------------------|-----------------|-----------------|-----------|---------|---------------|---------|--------|
| 128/824.2   | -5.94       | 7                | -29.4            | 7.0             | 4.65            | 28.11     | 0.647   | 215           | Ver     | Passed |
| 190/836.6   | -6.21       | 7                | -29.3            | 7.0             | 4.65            | 27.74     | 0.594   | 215           | Ver     | Passed |
| 251/848.8   | -6.44       | 7                | -29.2            | 7.0             | 4.65            | 27.41     | 0.551   | 215           | Ver     | Passed |

GPRS mode, 2 TX Slots

| EUT Channel | P eut [dBm] | P subst TX [dBm] | P subst RX [dBm] | Cable Loss [dB] | Ant. Gain [dBd] | ERP [dBm] | ERP [W] | Azimuth [Deg] | Ant pos | Result |
|-------------|-------------|------------------|------------------|-----------------|-----------------|-----------|---------|---------------|---------|--------|
| 128/824.2   | -7.09       | 7                | -29.4            | 7.0             | 4.65            | 26.96     | 0.497   | 215           | Ver     | Passed |
| 190/836.6   | -7.23       | 7                | -29.3            | 7.0             | 4.65            | 26.72     | 0.470   | 215           | Ver     | Passed |
| 251/848.8   | -7.3        | 7                | -29.2            | 7.0             | 4.65            | 26.55     | 0.452   | 215           | Ver     | Passed |

EGPRS mode, 2 TX Slot

| EUT Channel | P eut [dBm] | P subst TX [dBm] | P subst RX [dBm] | Cable Loss [dB] | Ant. Gain [dBd] | ERP [dBm] | ERP [W] | Azimuth [Deg] | Ant pos | Result |
|-------------|-------------|------------------|------------------|-----------------|-----------------|-----------|---------|---------------|---------|--------|
| 128/824.2   | -8.4        | 7                | -29.4            | 7.0             | 4.65            | 25.65     | 0.367   | 216           | Ver     | Passed |
| 190/836.6   | -8.42       | 7                | -29.3            | 7.0             | 4.65            | 25.53     | 0.357   | 215           | Ver     | Passed |
| 251/848.8   | -8.46       | 7                | -29.2            | 7.0             | 4.65            | 25.39     | 0.346   | 215           | Ver     | Passed |

## 2.4. GSM 1900 Test results

GSM mode

| EUT Channel / fC [MHz] | P eut [dBm] | P subst TX [dBm] | P subst RX [dBm] | Cable Loss [dB] | Ant. Gain [dBi] | EIRP [dBm] | EIRP [W] | Azimuth [Deg] | Ant pos | Result |
|------------------------|-------------|------------------|------------------|-----------------|-----------------|------------|----------|---------------|---------|--------|
| 512/1850.2             | -14.15      | 10.7             | -32.68           | 10.7            | 12.5            | 31.03      | 1.268    | 310           | Hor     | Passed |
| 661/1880.0             | -14.36      | 10.8             | -33              | 10.8            | 12.5            | 31.14      | 1.300    | 310           | Hor     | Passed |
| 810/1909.8             | -15.91      | 10.9             | -33.2            | 10.9            | 12.5            | 29.79      | 0.953    | 310           | Hor     | Passed |

GPRS mode, 2 TX Slots

| EUT Channel / fC [MHz] | P eut [dBm] | P subst TX [dBm] | P subst RX [dBm] | Cable Loss [dB] | Ant. Gain [dBi] | EIRP [dBm] | EIRP [W] | Azimuth [Deg] | Ant pos | Result |
|------------------------|-------------|------------------|------------------|-----------------|-----------------|------------|----------|---------------|---------|--------|
| 512/1850.2             | -16.94      | 10.7             | -32.68           | 10.7            | 12.5            | 28.24      | 0.667    | 310           | Hor     | Passed |
| 661/1880.0             | -17.24      | 10.8             | -33              | 10.8            | 12.5            | 28.26      | 0.670    | 310           | Hor     | Passed |
| 810/1909.8             | -18.7       | 10.9             | -33.2            | 10.9            | 12.5            | 27         | 0.501    | 310           | Hor     | Passed |

EGPRS mode, 2 TX Slot

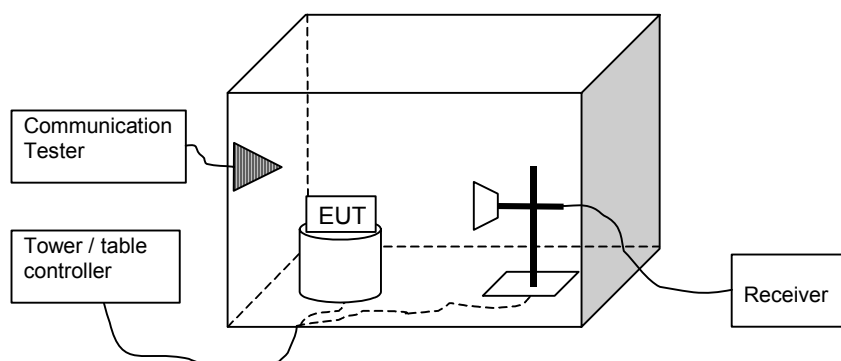
| EUT Channel / fC [MHz] | P eut [dBm] | P subst TX [dBm] | P subst RX [dBm] | Cable Loss [dB] | Ant. Gain [dBi] | EIRP [dBm] | EIRP [W] | Azimuth [Deg] | Ant pos | Result |
|------------------------|-------------|------------------|------------------|-----------------|-----------------|------------|----------|---------------|---------|--------|
| 512/1850.2             | -16.12      | 10.7             | -32.68           | 10.7            | 12.5            | 29.06      | 0.805    | 311           | Hor     | Passed |
| 661/1880.0             | -16.6       | 10.8             | -33              | 10.8            | 12.5            | 28.9       | 0.776    | 311           | Hor     | Passed |
| 810/1909.8             | -18.23      | 10.9             | -33.2            | 10.9            | 12.5            | 27.47      | 0.558    | 311           | Hor     | Passed |

### 3. Band edge compliance

(FCC §22.917(a), 24.238(a), RSS-GEN 4.7, RSS-132 4.5, RSS-133 6.3)

|                                                        |                                                     |
|--------------------------------------------------------|-----------------------------------------------------|
| <b>EUT with DUT number</b>                             | RM-132 Dut#28158                                    |
| <b>Accessories with DUT numbers</b>                    | BP-6M Dut#28466 & AC-4E Dut#29036 & HS-23 Dut#28159 |
| <b>Operation Voltage [V] / [Hz]</b>                    | 230 / 50                                            |
| <b>Result</b>                                          | Passed                                              |
| <b>Remarks</b>                                         | None                                                |
| <b>Temp [°C] / Humidity [%RH] / Air Pressure [kPa]</b> | 21 / 41 / 1024                                      |
| <b>Date of measurements</b>                            | 06-06-2006                                          |
| <b>Measured by</b>                                     | Christian Andersen                                  |

#### 3.1. Test setup



#### 3.2. Test method and limit

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

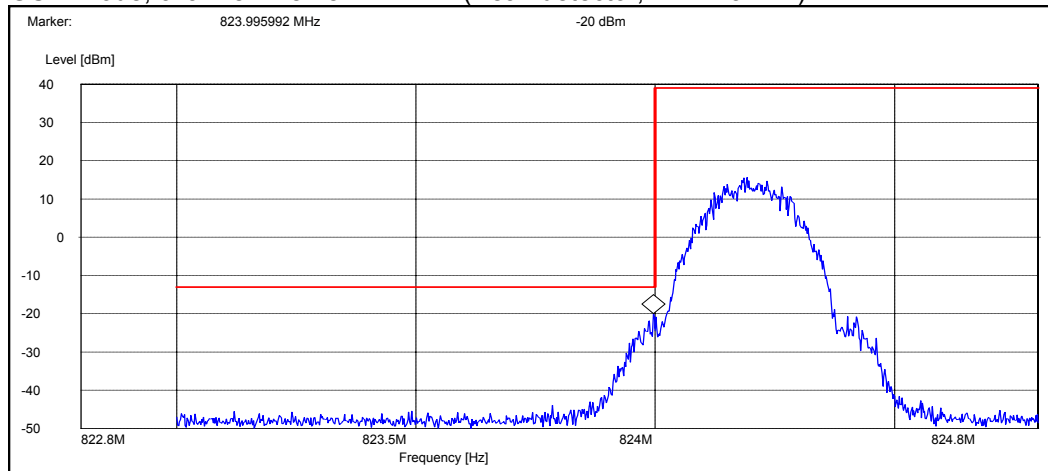
Limits for band edge compliance measurements

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

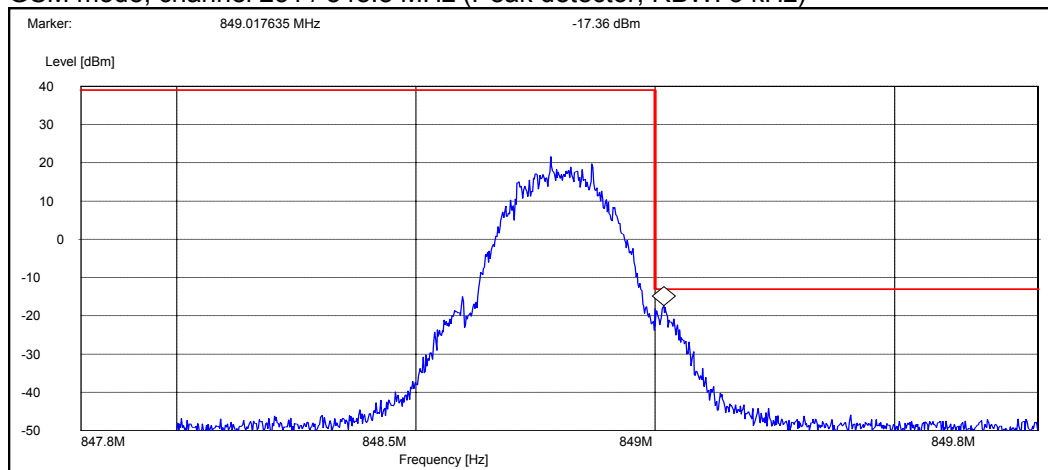
### 3.3. GSM 850 Test results

| Operation mode (TX on) | Channel / $f_c$ [MHz] | Level [dBm] |
|------------------------|-----------------------|-------------|
| GSM                    | 128 / 824.2           | -20         |
| GSM                    | 251 / 848.8           | -17.36      |
| EGPRS                  | 128 / 824.2           | -26.92      |
| EGPRS                  | 251 / 848.8           | -25.52      |

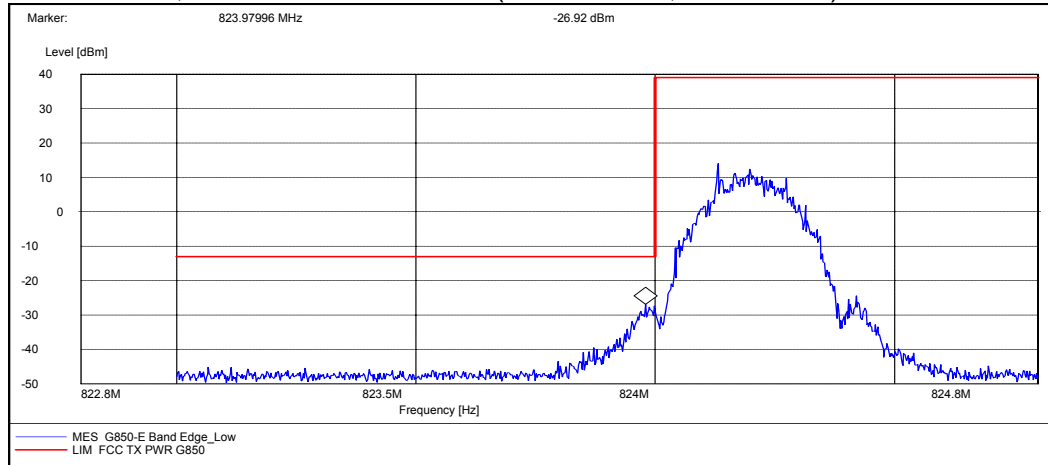
GSM mode, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz)



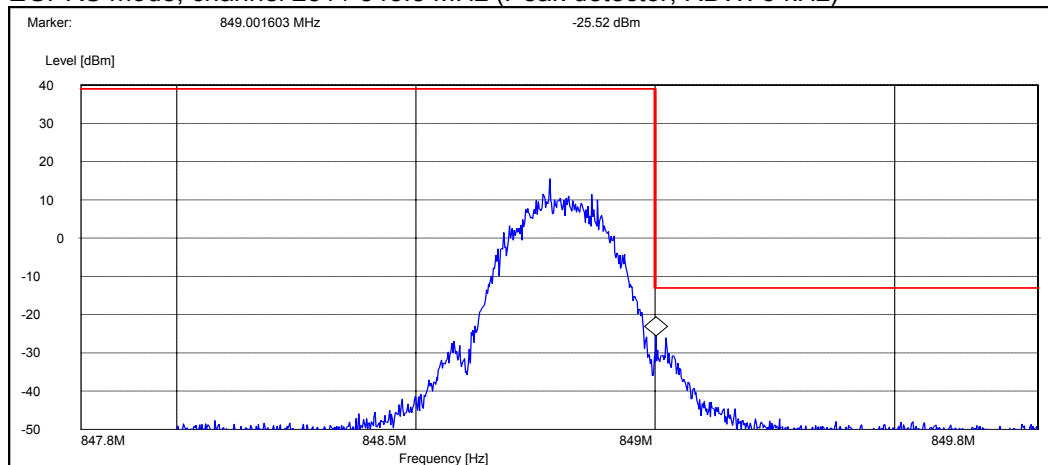
GSM mode, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz)



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



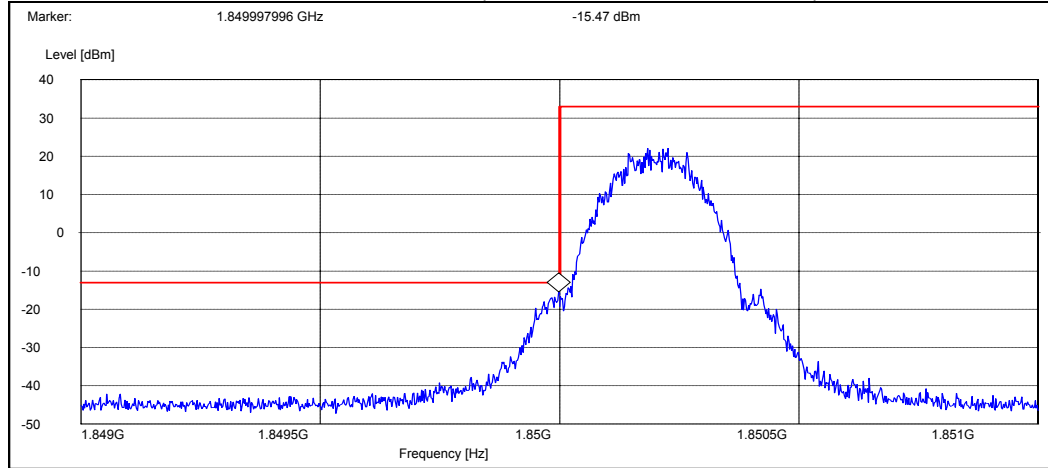
EGPRS mode, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz)



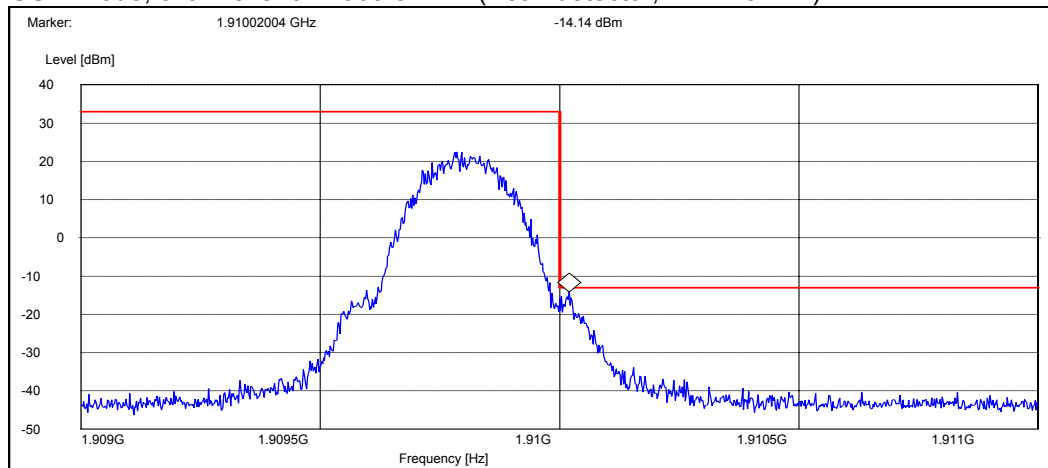
### 3.4. GSM 1900 Test results

| Operation mode (TX on) | Channel / $f_c$ [MHz] | Level [dBm] |
|------------------------|-----------------------|-------------|
| GSM                    | 512 / 1850.2          | -15.47      |
| GSM                    | 810 / 1909.8          | -14.14      |
| EGPRS                  | 512 / 1850.2          | -23.66      |
| EGPRS                  | 810 / 1909.8          | -22.56      |

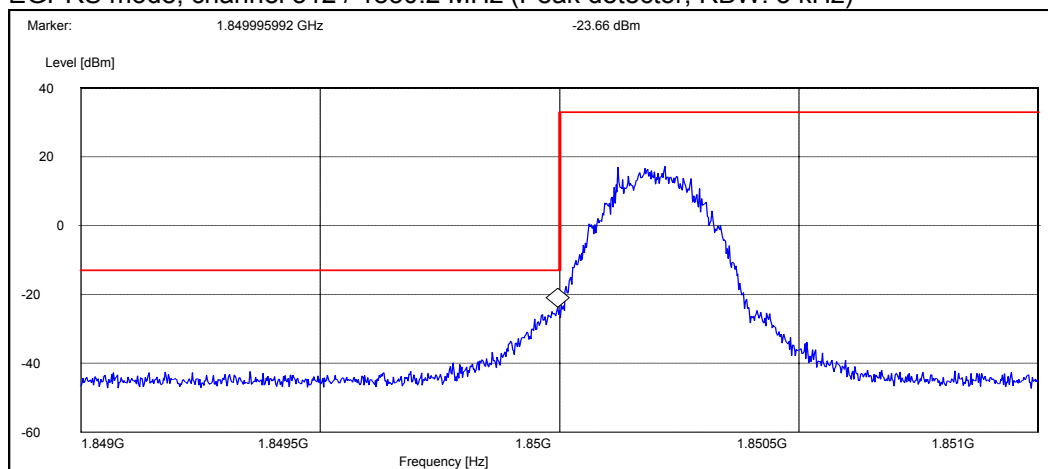
GSM mode, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz)



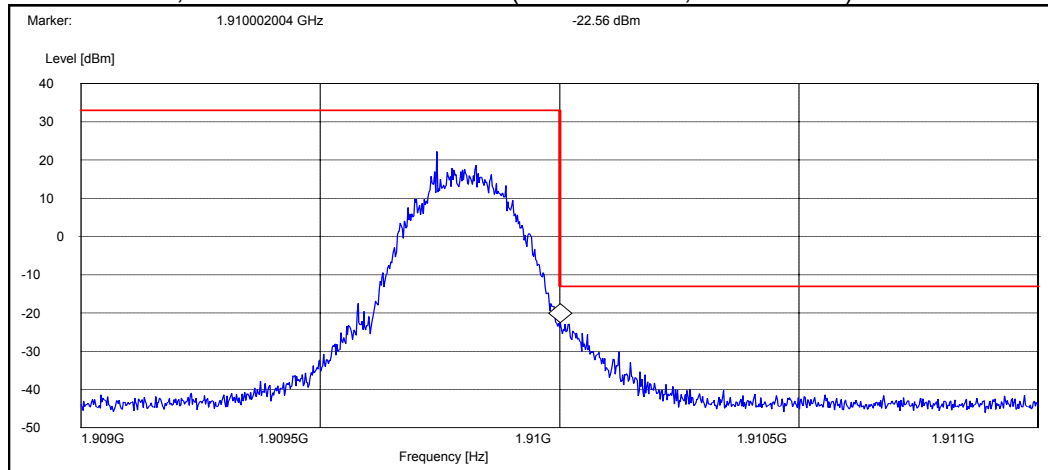
GSM mode, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz)



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



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



## 4. Test Equipment

### 4.1. Conducted measurements

| Eq. No | Equipment                                      | Type      | Manufacturer         | Used in |
|--------|------------------------------------------------|-----------|----------------------|---------|
| 13037  | Power Supply 0-15V 10A                         | EA3012    | LP Instruments       | 15B,15C |
| 13513  | Pulse Limiter 9KHz-30MHz                       | ESH3Z2    | Rohde&Schwarz        | 15B,15C |
| 13666  | EMI Test Reciever 9KHz-2,5GHz                  | ESPC      | Rohde&Schwarz        | 15B,15C |
| 13935  | Two Lines Artificial Mains Network             | ESH3-Z5   | Rohde&Schwarz        | 15B,15C |
| 16995  | Directional Coupler 20dB 0,5-2,0 GHz SMA Conn. | 1538RA-20 | Weinschel            | 15B,15C |
| 18772  | Shielded Chamber                               | RFD-100   | ETS-Lindgren         | 15B,15C |
| 19171  | Universal Radio Communication Tester           | CMU200    | Rohde&Schwarz        | 15B,15C |
| 11386  | System DC Power Supply                         | HP6632A   | Hewlett Packard      | 22.24   |
| 11487  | Network analyzer 300KHz-3,0GHz                 | HP8753A   | Hewlett Packard      | 22.24   |
| 11584  | Spectrum analyzer 50Hz-6,5GHz                  | HP8561B   | Hewlett Packard      | 22.24   |
| 13134  | Tracking generator                             | HP85645A  | Hewlett Packard      | 22.24   |
| 13302  | Spectrum Analyzer 9KHz-12.8GHz                 | HP8596E   | Hewlett Packard      | 22.24   |
| 13371  | Temperature Chamber                            | S-1,2C    | Thermotron           | 22.24   |
| 13524  | Digital Radiocomm. Tester                      | CMD55     | Rohde&Schwarz        | 22.24   |
| 14807  | S - Parameter Test Set 300KHz-6GHz             | HP85047A  | Hewlett Packard      | 22.24   |
| 15859  | Digital Radio Communication Test Set           | 4201S     | Wavetek              | 22.24   |
| 17277  | Multimeter Digital 6 1/2 Digit                 | AT34401A  | Agilent Technologies | 22.24   |
| 17796  | Radio Communication Test Set                   | 4400M     | Wavetek              | 22.24   |
| 19374  | Resonant Dipole Antenna 850MHz SMA m Conn.     | -         | NMP Cph              | 22.24   |
| 19375  | Resonant Dipole Antenna 1900MHz SMA m Conn.    | -         | NMP Cph              | 22.24   |
| 13037  | Power Supply 0-15V 10A                         | EA3012    | LP Instruments       | 15B,15C |

### 4.2. Radiated measurements

| Eq. No | Equipment                                   | Type           | Manufacturer  | Used in       |
|--------|---------------------------------------------|----------------|---------------|---------------|
| 14020  | Programmable Relay Switching System         | -              | Pickering     | 15B,15C,22,24 |
| 18792  | Multi Device Controller                     | 2090           | ETS-EMCO      | 15B,15C,22,24 |
| 13829  | Turntable Controller                        | 4630-100       | Comtest       | 15B,15C,22,24 |
| 14963  | RF Preamplifier 100MHz-4GHz (Metal Chassis) | AFS3-00100400  | Miteq/NMP Cph | 15B,15C,22,24 |
| 13668  | BiLog Antenna 30-2000MHz                    | BiLog-CBL6112A | Chase         | 15B,15C,22,24 |
| 18861  | EMI Test Receiver 20Hz-26,5GHz              | ESI            | Rohde&Schwarz | 15B,15C,22,24 |
| 12679  | Dual Log Periodic Antenna 1-18 GHz          | HL025          | Rohde&Schwarz | 15B,15C,22,24 |
| 18860  | Ultra Broadband Antenna                     | HL562          | Rohde&Schwarz | 15B,15C,22,24 |

| Eq. No | Equipment                                   | Type                           | Manufacturer           | Used in       |
|--------|---------------------------------------------|--------------------------------|------------------------|---------------|
|        | Ultralog 30-3000MHz                         |                                |                        |               |
| 18773  | Shielded Chamber                            | RFD-100                        | ETS-Lindgren           | 15B,15C,22,24 |
| 18774  | Shielded Chamber                            | RFSD-F/A-100                   | ETS-Lindgren           | 15B,15C,22,24 |
| 18324  | High Pass Filter 3GHz SMA f Conn            | WHJS3000-10SS                  | Wainwright             | 15B,15C,22,24 |
| 14114  | Highpass Filter 1000MHz-4500MHz             | WHK1000-12SS                   | Wainwright             | 15B,15C,22,24 |
| 13918  | Highpass Filter 2000-4000MHz 50OHM SMA Conn | WHKS2000-10SS                  | Wainwright Instruments | 15B,15C,22,24 |
| 13937  | Ultra Stable Notch Filter 902,4MHz          | WRCA902.4-0.2/40-6SS           | Wainwright Instruments | 15B,15C,22,24 |
| 13936  | Ultra Stable Notch Filter 1747,5MHz         | WRCD1747.5-0.2/40-10SS         | Wainwright Instruments | 15B,15C,22,24 |
| 13917  | Highpass Filter 1000-3000MHz 50OHM SMA Conn | WHKS1000-10SS                  | Wainwright Instruments | 15B,15C,22,24 |
| 14188  | Ultra Stable Notch Filter 902,4MHz          | WRCA902.4-0.2/40-6SS           | Wainwright             | 15B,15C,22,24 |
| 14187  | Ultra Stable Notch Filter 1747,5MHz         | WRCD1747.5-0.2/40-10SS         | Wainwright             | 15B,15C,22,24 |
| 16633  | Ultra Stable Notch Filter 1880,0MHz         | WRCD1880.0-0.2/40-10SS         | Wainwright             | 15B,15C,22,24 |
| 18323  | Band reject filter 1947-1953MHz 40dB        | WRCG1947/1953-1940/1960-40/6SS | Wainwright             | 15B,15C,22,24 |
| 15190  | Infra Red Remote Control Unit               | 4630                           | Emco                   | 22,24,15B,15C |
| 14993  | EMI Test Receiver 9KHz-2750MHz              | ESCS30                         | Rohde&Schwarz          | 22,24,15B,15C |
| 15191  | Turntable Contoller Unit                    | G-800SDX                       | YAESU                  | 22,24,15B,15C |
| 14900  | Antenna Controller                          | HD100                          | HD GmbH                | 22,24,15B,15C |