

## FCC Part 22/24 Compliance Test Report

|                                                         |                                                                                                                                                                                                                                                      |                                   |                                                                                                                       |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Test Report no.:</b>                                 | Salo_FCC_0635_09.doc                                                                                                                                                                                                                                 | <b>Date of Report:</b>            | 30.08.2006                                                                                                            |
| <b>Number of pages:</b>                                 | 13                                                                                                                                                                                                                                                   | <b>Customer's Contact person:</b> | Thomas Reitmayer                                                                                                      |
| <b>Testing laboratory:</b>                              | TCC Nokia Salo Laboratory<br>P.O. Box 86<br>Joensuunkatu 7H / Kiila 1B<br>FIN-24101 SALO, FINLAND<br>Tel. +358 (0) 7180 08000<br>Fax. +358 (0) 7180 45220                                                                                            | <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>                                 | 533467                                                                                                                                                                                                                                               |                                   |                                                                                                                       |
| <b>IC recognition no.:</b>                              | 5385                                                                                                                                                                                                                                                 |                                   |                                                                                                                       |
| <b>Tested devices/ accessories:</b>                     | <b>Phone RM-209 / battery BL-4B, Headset HS-31 and AC- Charger AC-3</b>                                                                                                                                                                              |                                   |                                                                                                                       |
| <b>FCC ID:</b>                                          | PPIRM-209                                                                                                                                                                                                                                            | <b>IC:</b>                        | 661U-RM209                                                                                                            |
| <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>             |                                                                                                                                                                                                                                                      |                                   |                                                                                                                       |

**Sami Lehtonen, System Manager**

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

|                               |                                                         |
|-------------------------------|---------------------------------------------------------|
| Date of receipt               | 28.08.2006                                              |
| Testing completed             | 29.08.2006                                              |
| The customer's contact person | Thomas Reitmayer                                        |
| Test Plan referred to         | T:\Projects\RM-209\TestPlan_RS\RS_Testplan_RM-209.xls   |
| Notes                         | -                                                       |
| Document name                 | T:\Projects\RM-209\EMC\Results\FCC\Salo_FCC_0635_09.doc |

### 1.1. EUT and Accessory Information

The EUT is a triple band (GSM900/1800/1900) 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-209 | 004400/91/163985/2          | 0200 | -  | 3.11.1 | 11370 |
| Battery     | BL-4B  | 0670491363563N213110701677  | -    | -  | -      | 11373 |
| Headset     | HS-31  | 4026980601301               | -    | -  | -      | 11111 |
| AC- Charger | AC-3E  | 3997915413051200032;0675370 | -    | -  | -      | 11390 |

### 1.2. Summary of Test Results

#### GSM 1900:

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

PASSED  
FAILED  
NP

The EUT complies with the essential requirements in the standard.  
The EUT does not comply with the essential requirements in the standard.  
The test was not performed by the TCC Nokia Salo Laboratory.

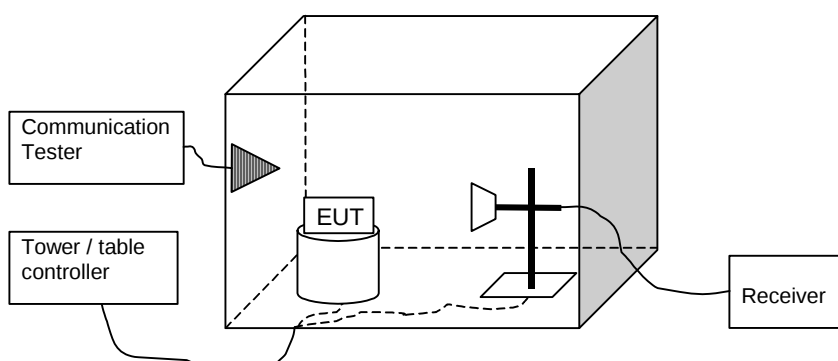
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## 2. Radiated RF output power (FCC §22.913(a), §24.232(b), RSS-GEN 4.6, RSS-132 4.4, RSS-133 6.2)

|                                                        |                                                         |
|--------------------------------------------------------|---------------------------------------------------------|
| <b>EUT with DUT number</b>                             | RM-209, DUT 11370                                       |
| <b>Accessories with DUT numbers</b>                    | BL-4B, DUT, 11373; HS-5, DUT 11385;<br>AC-3E, DUT 11390 |
| <b>Operation Voltage [V] / [Hz]</b>                    | 115 / 60                                                |
| <b>Result</b>                                          | PASSED                                                  |
| <b>Remarks</b>                                         | Phone tested swivel open mode and swivel closed mode.   |
| <b>Temp [°C] / Humidity [%RH] / Air Pressure [kPa]</b> | 22 / 55 / 99.9                                          |
| <b>Date of measurements</b>                            | 29.08.2006                                              |
| <b>Measured by</b>                                     | Sami Lehtonen                                           |

### 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:

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

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 1900 Test results

Swivel Closed:

GSM mode

| Channel / $f_c$ [MHz] | EIRP [dBm] | EIRP [W] | $P_{MEAS}$ [dBm] | $A_{TOT}$ [dB] | Polarisation | Result |
|-----------------------|------------|----------|------------------|----------------|--------------|--------|
| 512 / 1850.2          | 29.80      | 0.955    | - 14.80          | 44.60          | HORIZONTAL   | PASSED |
| 661 / 1880.0          | 29.50      | 0.891    | - 15.40          | 44.90          | HORIZONTAL   | PASSED |
| 810 / 1909.8          | 30.20      | 1.047    | - 15.70          | 45.90          | VERTICAL     | PASSED |

GPRS mode, 2 TX Slots

| Channel / $f_c$ [MHz] | EIRP [dBm] | EIRP [W] | $P_{MEAS}$ [dBm] | $A_{TOT}$ [dB] | Polarisation | Result |
|-----------------------|------------|----------|------------------|----------------|--------------|--------|
| 512 / 1850.2          | 29.70      | 0.933    | - 14.90          | 44.60          | HORIZONTAL   | PASSED |
| 661 / 1880.0          | 29.20      | 0.832    | - 15.70          | 44.90          | HORIZONTAL   | PASSED |
| 810 / 1909.8          | 30.80      | 1.202    | - 15.10          | 45.90          | VERTICAL     | PASSED |

EGPRS mode, 1 TX Slot

| Channel / $f_c$ [MHz] | EIRP [dBm] | EIRP [W] | $P_{MEAS}$ [dBm] | $A_{TOT}$ [dB] | Polarisation | Result |
|-----------------------|------------|----------|------------------|----------------|--------------|--------|
| 512 / 1850.2          | 26.20      | 0.417    | - 18.40          | 44.60          | HORIZONTAL   | PASSED |
| 661 / 1880.0          | 24.60      | 0.288    | - 20.30          | 44.90          | VERTICAL     | PASSED |
| 810 / 1909.8          | 27.10      | 0.513    | - 18.80          | 45.90          | VERTICAL     | PASSED |

Swivel 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                   | 30.60      | 1.148    | - 14.00                 | 44.60                 | HORIZONTAL   | PASSED |
| 661 / 1880.0                   | 31.10      | 1.288    | - 13.80                 | 44.90                 | HORIZONTAL   | PASSED |
| 810 / 1909.8                   | 31.20      | 1.318    | - 13.70                 | 44.90                 | 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                   | 29.50      | 0.891    | - 15.10                 | 44.60                 | HORIZONTAL   | PASSED |
| 661 / 1880.0                   | 31.20      | 1.318    | - 13.70                 | 44.90                 | HORIZONTAL   | PASSED |
| 810 / 1909.8                   | 31.20      | 1.318    | - 13.70                 | 44.90                 | HORIZONTAL   | PASSED |

EGPRS mode, 1 TX Slot

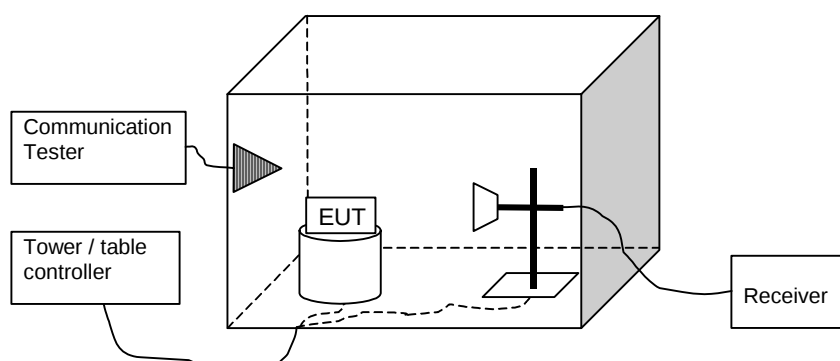
| Channel / f <sub>c</sub> [MHz] | EIRP [dBm] | EIRP [W] | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|--------------------------------|------------|----------|-------------------------|-----------------------|--------------|--------|
| 512 / 1850.2                   | 26.20      | 0.417    | - 18.40                 | 44.60                 | HORIZONTAL   | PASSED |
| 661 / 1880.0                   | 27.40      | 0.550    | - 17.50                 | 44.90                 | HORIZONTAL   | PASSED |
| 810 / 1909.8                   | 27.40      | 0.550    | - 17.50                 | 44.90                 | HORIZONTAL   | 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-209, DUT 11370                                       |
| <b>Accessories with DUT numbers</b>                    | BL-4B, DUT, 11373; HS-5, DUT 11385;<br>AC-3E, DUT 11390 |
| <b>Operation Voltage [V] / [Hz]</b>                    | 115 / 60                                                |
| <b>Result</b>                                          | PASSED                                                  |
| <b>Remarks</b>                                         | Phone tested swivel open mode and swivel closed mode.   |
| <b>Temp [°C] / Humidity [%RH] / Air Pressure [kPa]</b> | 22 / 55 / 99.9                                          |
| <b>Date of measurements</b>                            | 29.08.2006                                              |
| <b>Measured by</b>                                     | Sami Lehtonen                                           |

#### 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

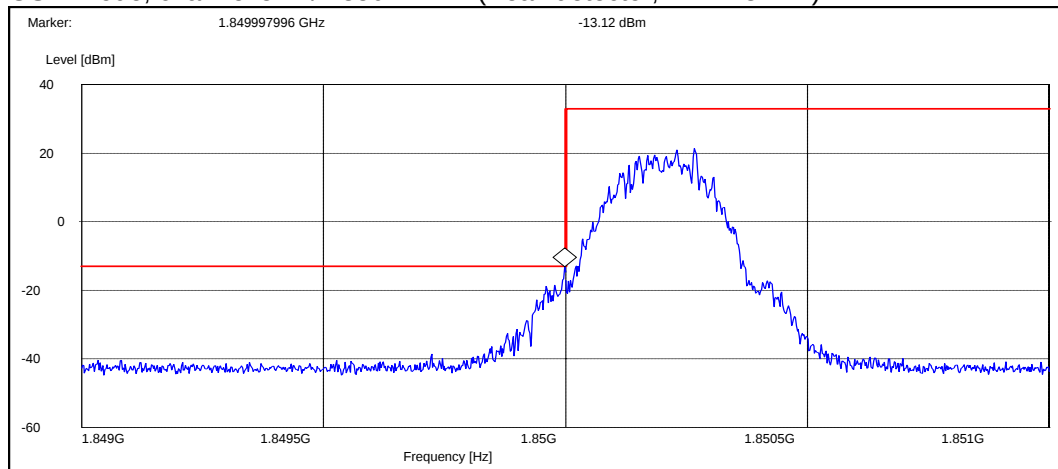
| Operation band        | Frequency range [MHz]     | Limit [dBm] |
|-----------------------|---------------------------|-------------|
| GSM 850 / WCDMA 850   | Below 824 and above 849   | -13         |
| GSM 1900 / WCDMA 1900 | Below 1850 and above 1910 | -13         |

### 3.3. GSM 1900 Test results

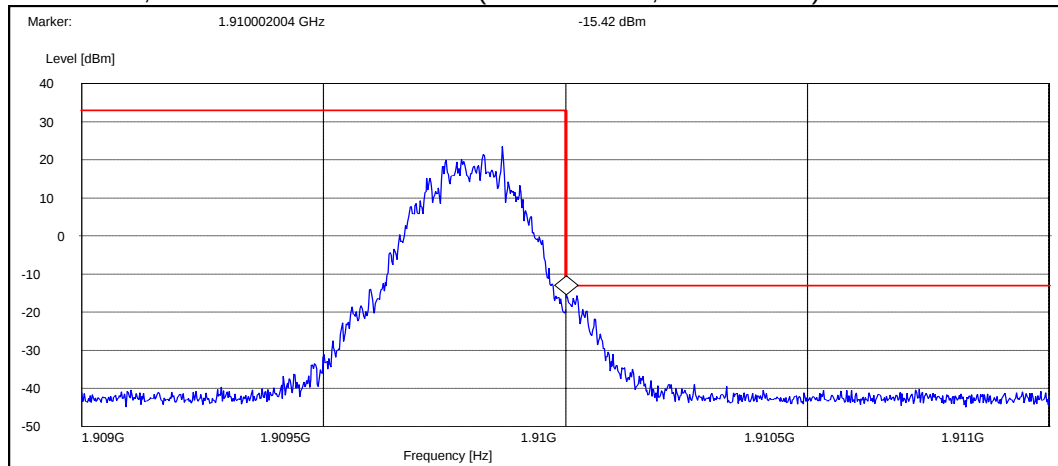
Swivel Closed:

| Operation mode (TX on) | Channel / $f_c$ [MHz] | Level [dBm] |
|------------------------|-----------------------|-------------|
| GSM                    | 512 / 1850.2          | -13.12      |
| GSM                    | 810 / 1909.8          | -15.42      |
| EGPRS                  | 512 / 1850.2          | -24.04      |
| EGPRS                  | 810 / 1909.8          | -23.94      |

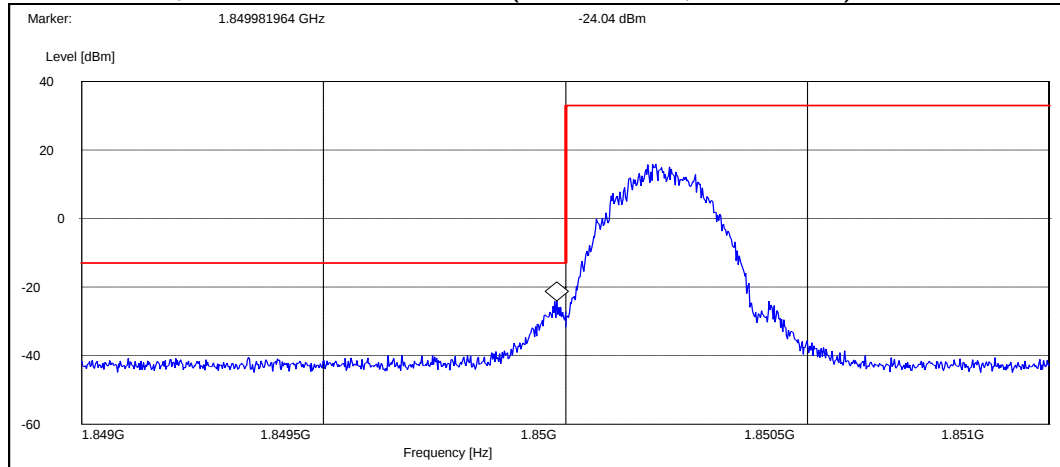
GSM mode, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz)



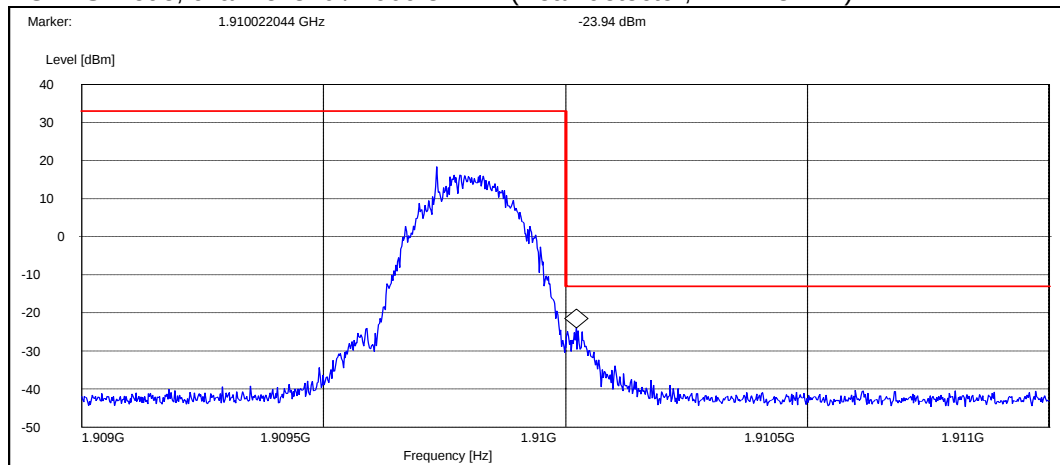
GSM mode, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz)



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



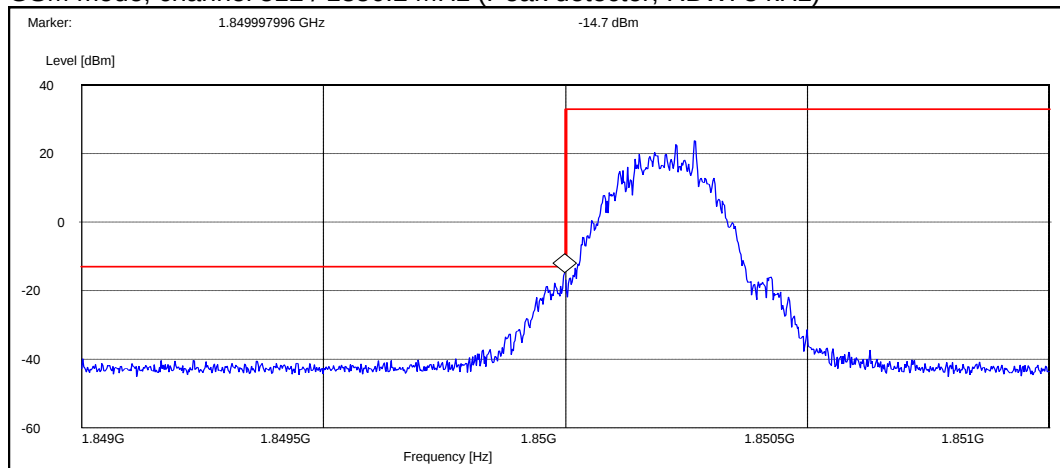
EGPRS mode, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz)



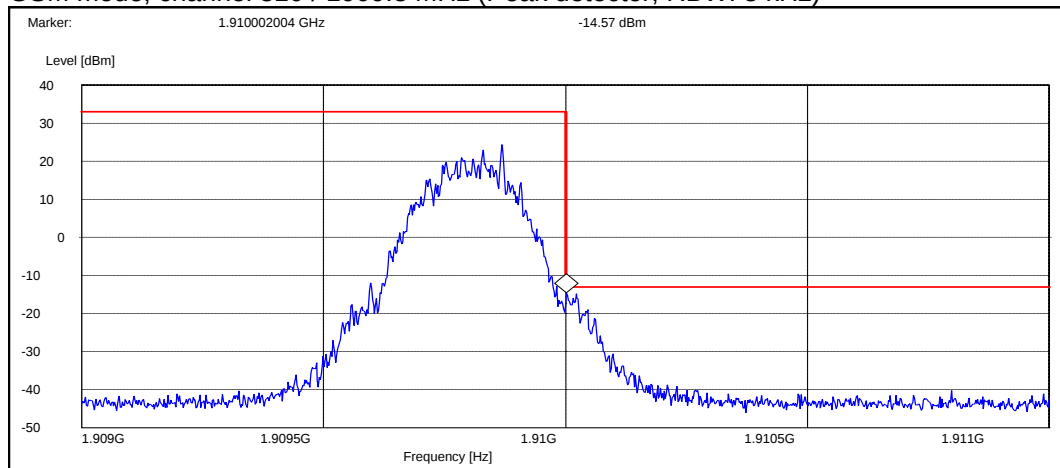
Swivel Open:

| Operation mode (TX on) | Channel / $f_c$ [MHz] | Level [dBm] |
|------------------------|-----------------------|-------------|
| GSM                    | 512 / 1850.2          | -14.70      |
| GSM                    | 810 / 1909.8          | -14.57      |
| EGPRS                  | 512 / 1850.2          | -23.30      |
| EGPRS                  | 810 / 1909.8          | -23.47      |

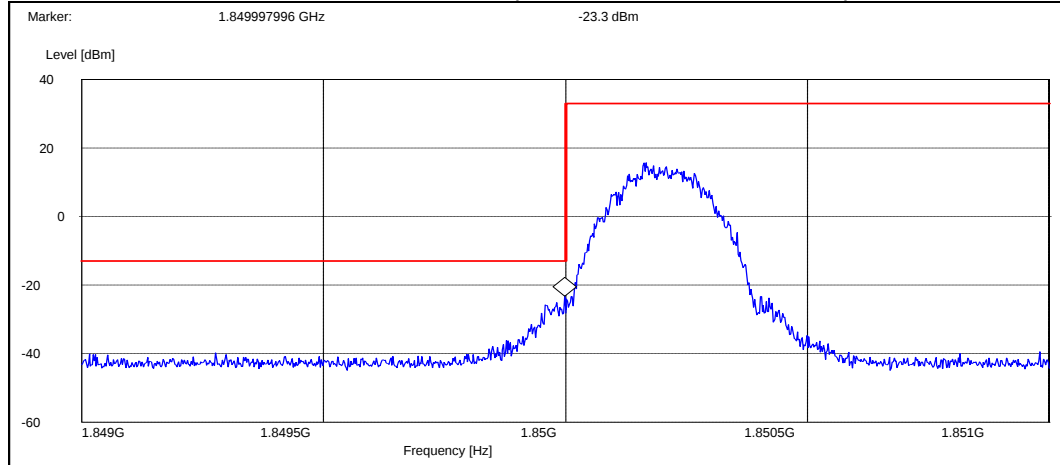
GSM mode, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz)



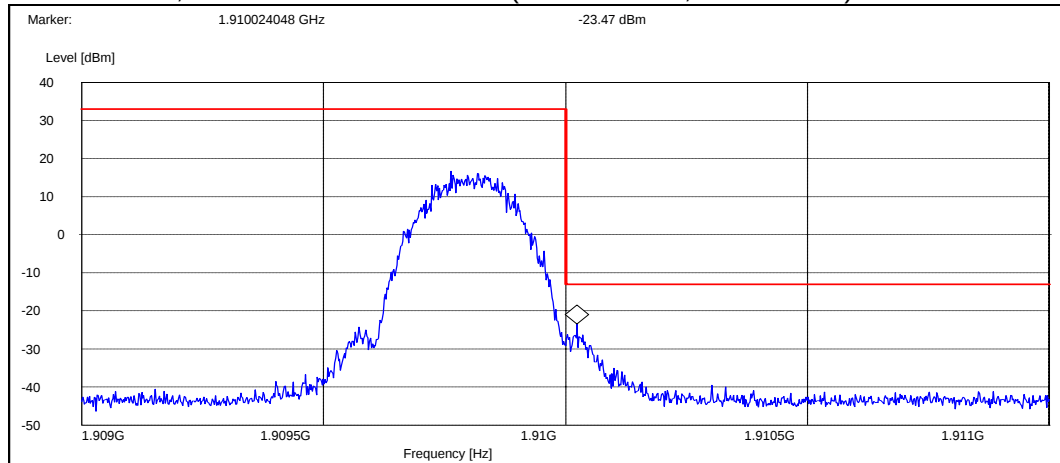
GSM mode, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz)



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         |
|--------|------------------------------------|-----------------|-------------------------|-----------------|
| 1742   | EMI Test Receiver                  | ESMI            | R&S                     | 15C, 15B        |
| 1759   | LISN 50 µH                         | ESH3-Z5         | R&S                     | 15C, 15B        |
| 1872   | Thermo- Hygrograph                 | 00.02520.150700 | Lambrecht               | 15C, 15B        |
| 1916   | Radio Communication tester         | CMTA84          | R&S                     | 15C, 15B        |
| 2039   | Power Supply                       | PL330QMD        | THURLBY                 | 15C, 15B        |
| 2060   | LISN 50 µH                         | ESH3-Z5         | R&S                     | 15C, 15B        |
| 2068   | CDN-Antenna line                   | S1              | NMP                     | 15C, 15B        |
| 2097   | Pulse Limiter                      | ESH3-Z2         | R&S                     | 15C, 15B        |
| 2111   | Multimeter                         | TX3             | Tektronix               | 15C, 15B        |
| 2156   | Digital Radio Communication Tester | CMU200          | R&S                     | 15C, 15B        |
| 2206   | Signal generator                   | SMX             | R&S                     | 15C, 15B        |
| 2335   | GPIB Switch 2 to 1                 | -               | National Instruments    | 15C, 15B        |
| 2347   | Digital Radio Communication Tester | CMU200          | R&S                     | 22/24, 15C, 15B |
| 2352   | Spectrum Analyzer                  | FSP             | R&S                     | 22/24, 15C      |
| 2359   | Temperature Test system            | VT4002          | Vötsch Industrietechnik | 22/24           |
| 2360   | Serial Bus Converter               | Serial 488A     | IO Tech                 | 22/24           |
| 2362   | Power Supply                       | NGPX 70/5       | R&S                     | 22/24           |
| -      | RF Emission Software               | ES-K1 v.1.60    | R&S                     | 15C, 15B        |

### 4.2. Radiated measurements

| Eq. No | Equipment                           | Type                   | Manufacturer | Used in         |
|--------|-------------------------------------|------------------------|--------------|-----------------|
| 1748   | Log. per. Antenna                   | HL025                  | R&S          | 22/24, 15C      |
| 1749   | Log. per. Antenna                   | HL025                  | R&S          | 22/24, 15C      |
| 1875   | Thermo- Hygrograph                  | 00.02520.150700        | Lambrecht    | 22/24, 15C, 15B |
| 1917   | Radio Communication tester          | CMTA84                 | R&S          | 22/24, 15C, 15B |
| 1933   | Precision half-wave dipole antennas | HZ-13                  | R&S          | 22/24, 15C      |
| 1938   | Precision half-wave dipole antennas | HZ-12                  | R&S          | 22/24, 15C      |
| 2006   | Radiation Reference Source          | VSQ                    | MEB          | 22/24, 15C, 15B |
| 2009   | Signal generator                    | SMP 22                 | R&S          | 22/24, 15C, 15B |
| 2019   | Multimeter                          | 34401A                 | HP           | 22/24, 15C, 15B |
| 2027   | Coupling and Decoupling Network     | M2 (modified) DC1      | MEB          | 22/24, 15C, 15B |
| 2028   | Coupling and Decoupling Network     | M3 (modified) DC2      | MEB          | 22/24, 15C, 15B |
| 2029   | Power Supply                        | PL330                  | THURLBY      | 22/24, 15C      |
| 2043   | Band Reject Filter                  | WRCA824/849-0,2-6SS    | Wainwright   | 22/24, 15C, 15B |
| 2047   | Band Reject Filter                  | WRCC1800/2000-0.2-10SS | Wainwright   | 22/24, 15C, 15B |
| 2051   | High Pass Filter                    | 4HC1700-1-KK           | R&S          | 22/24, 15C      |
| 2057   | Log. per. Antenna                   | HL025                  | R&S          | 22/24, 15C      |
| 2109   | Power Supply                        | PL330QMD               | THURLBY      | 22/24, 15C, 15B |

| Eq. No | Equipment                          | Type                               | Manufacturer         | Used in         |
|--------|------------------------------------|------------------------------------|----------------------|-----------------|
| 2110   | Multimeter                         | 34401A                             | HP                   | 22/24, 15C, 15B |
| 2112   | Multimeter                         | TX3                                | Tektronix            | 22/24, 15C, 15B |
| 2116   | Controller                         | EMCO MODEL 2090                    | ETS                  | 22/24, 15C, 15B |
| 2133   | Power Meter                        | NRVS                               | R&S                  | 22/24, 15C      |
| 2134   | Power Sensor                       | NRV-Z32                            | R&S                  | 22/24, 15C      |
| 2135   | Coupling and Decoupling Network    | CDN 801-M3                         | LÜTHI                | 22/24, 15C, 15B |
| 2138   | Ultra Broadband Antenna            | HL562                              | R&S                  | 22/24, 15C, 15B |
| 2140   | Biconical Antenna                  | EMCO93110B                         | EMCO                 | 22/24, 15C      |
| 2142   | Log.-per.-dipol Antenna            | 3146                               | EMCO                 | 22/24, 15C      |
| 2144   | Attenuator                         | 6803.17B                           | Huber-Suhner         | 22/24, 15C, 15B |
| 2150   | High Pass Filter                   | F-15041                            | RLC ELECTRONICS      | 22/24, 15C      |
| 2176   | Coupling and Decoupling Network    | CDN 801-M3                         | LÜTHI                | 22/24, 15C, 15B |
| 2180   | Digital Radio Communication Tester | CMU200                             | R&S                  | 22/24, 15C, 15B |
| 2188   | Preamplifier                       | AFS4-00100300-20-23P-6             | MITEQ                | 22/24, 15C, 15B |
| 2330   | EMI Test receiver                  | ESIB26                             | R&S                  | 22/24, 15C, 15B |
| 2334   | GPB Switch 2 to 1                  | -                                  | National Instruments | 22/24, 15C, 15B |
| 2348   | Yaesu controller                   | G-1000DXC                          | YAESU                | 22/24, 15C, 15B |
| 2349   | Computer controller (Yaesu)        | GS-232B                            | YAESU                | 22/24, 15C, 15B |
| 2350   | Preamplifier                       | AMF-6D-020180-29-20P               | MITEQ                | 22/24, 15C      |
| 2361   | Anechoic chamber                   | 3 meter semi/full anechoic chamber | Euroshield           | 22/24, 15C, 15B |
| 2398   | Horn antenna                       | HF906                              | R&S                  | 22/24, 15C      |
| 2363   | Band Reject Filter                 | WRCG 832/838-825/845/5SS           | Wainwright           | 22/24           |
| 2364   | Band Reject Filter                 | WRCG1877/1883 - 1870/1890-40/6SS   | Wainwright           | 22/24           |
| 2365   | Relay Switch Unit                  | TS-RSP                             | R&S                  | 22/24, 15C, 15B |
| 2366   | Relay Switch Unit                  | TS-RSP                             | R&S                  | 22/24, 15C, 15B |
| -      | RF Emission Software               | ES-K1 v.1.71                       | R&S                  | 22/24, 15C, 15B |