

## FCC Part 24 Compliance Test Report

|                                                         |                                                                                                                                                                                                                                                      |                                   |                                                                                                                       |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Test Report no.:</b>                                 | FCC24_RM-638_03.doc                                                                                                                                                                                                                                  | <b>Date of Report:</b>            | 11-Nov-2009                                                                                                           |
| <b>Number of pages:</b>                                 | 7                                                                                                                                                                                                                                                    | <b>Customer's Contact person:</b> | Tobias Cremer                                                                                                         |
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| <b>FCC listing no.:</b>                                 | 94436                                                                                                                                                                                                                                                |                                   |                                                                                                                       |
| <b>IC recognition no.:</b>                              | 661AK-1                                                                                                                                                                                                                                              |                                   |                                                                                                                       |
| <b>Tested devices/ accessories:</b>                     | <b>Phone RM-638 Hw 0125 / Battery BL-5CT, AC charger AC-8E, Headset WH-102</b>                                                                                                                                                                       |                                   |                                                                                                                       |
| <b>FCC ID:</b>                                          | PPIRM-638                                                                                                                                                                                                                                            | <b>IC:</b>                        | 661U-RM638                                                                                                            |
| <b>Supplement reports:</b>                              | -                                                                                                                                                                                                                                                    |                                   |                                                                                                                       |
| <b>Testing has been carried out in accordance with:</b> | <b>CFR 47, FCC rules Part 24, TIA-603-C-2004 and IC standard RSS-133 (Issue 5, February 2009). 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, System Manager, EMC

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

|                               |                                                       |
|-------------------------------|-------------------------------------------------------|
| Date of receipt               | 04-Nov-2009                                           |
| Testing completed             | 4-Nov-2009                                            |
| The customer's contact person | Tobias Cremer                                         |
| Test Plan referred to         | T:\Projects\RM-638\TestPlan_RS\RS_testplan_RM-638.xls |
| Notes                         | -                                                     |
| Document name                 | FCC24_RM-638_03.doc                                   |

### 1.1. EUT and Accessory Information

The EUT is a 3-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-638 | 004401109023677             | 0125 | -  | 5.49 | 42084 |
| Battery    | BL-5CT | 3820669367195064397;0670555 | -    | -  | -    | 42086 |
| AC charger | AC-8E  | 4090499262040500403;0675387 | -    | -  | -    | 42088 |
| Headset    | WH-102 | 06943238492I3104776         | -    | -  | -    | 42090 |

### 1.2. Summary of Test Results

#### 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                   | NP     |
| §2.1049(h)          | 4.6.1                                       | 99 % occupied bandwidth                    | NP     |
| §24.238(a)          | 6.5                                         | Band edge compliance                       | NP     |
| §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

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 Tampere Laboratory.

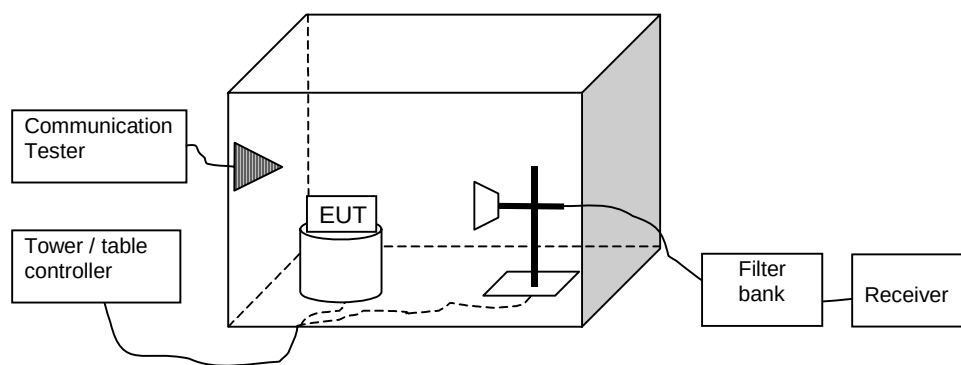
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## 2. Spurious radiated emissions (FCC §24.238(a), §2.1053, RSS-133 6.5)

|                                                 |                                                     |
|-------------------------------------------------|-----------------------------------------------------|
| EUT with DUT number                             | RM-638 DUT 42084                                    |
| Accessories with DUT numbers                    | BL-5CT DUT 42086, AC-8E DUT 42088, WH-102 DUT 42090 |
| Operation Voltage [V] / [Hz]                    | 115 / 60                                            |
| Result                                          | PASSED                                              |
| Remarks                                         | -                                                   |
| Temp [°C] / Humidity [%RH] / Air Pressure [kPa] | 22 / 47 / 101.8                                     |
| Date of measurements                            | 04-Nov-2009                                         |
| Measured by                                     | Hannu Söderholm                                     |

### 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 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 1900       | 30 - 18000            | -13         |

## 2.3. GSM 1900 Test results

GSM mode, channel 661 / 1880.0 MHz

| Frequency [MHz] | P [dBm] | P [μW]  | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|---------|---------|-------------------------|-----------------------|--------------|--------|
| 3760.023046     | -34.40  | 0.36308 | - 43.80                 | 9.40                  | VERTICAL     | PASSED |
| 5627.758517     | -51.60  | 0.00692 | - 62.90                 | 11.30                 | HORIZONTAL   | PASSED |
| 5640.282565     | -41.70  | 0.06761 | - 53.00                 | 11.30                 | HORIZONTAL   | PASSED |
| 7520.042084     | -42.20  | 0.06026 | - 57.90                 | 15.70                 | VERTICAL     | PASSED |

EGPRS mode, channel 661 / 1880.0 MHz

| Frequency [MHz] | P [dBm] | P [μW]  | P <sub>MEAS</sub> [dBm] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|---------|---------|-------------------------|-----------------------|--------------|--------|
| 3760.023046     | -44.60  | 0.03467 | - 54.00                 | 9.40                  | VERTICAL     | PASSED |
| 5629.758517     | -51.10  | 0.00776 | - 62.40                 | 11.30                 | HORIZONTAL   | PASSED |
| 5641.782565     | -51.30  | 0.00741 | - 62.60                 | 11.30                 | HORIZONTAL   | PASSED |
| 7520.042084     | -46.30  | 0.02344 | - 62.00                 | 15.70                 | VERTICAL     | PASSED |

### 3. Test Equipment

#### 3.1. Conducted measurements

| Eq. No  | Equipment                  | Type        | Manufacturer  | Used in            |
|---------|----------------------------|-------------|---------------|--------------------|
| TM30597 | Power splitter             | 11667A      | Agilent       | 22/24/27, 15C      |
| TM37499 | Power splitter             | 11667A      | Agilent       | 22/24/27, 15C      |
| TM38111 | Multimeter                 | 34401A      | Agilent       | 22/24/27, 15C      |
| TM38112 | DC power supply            | 6632A       | Agilent       | 22/24/27, 15C      |
| TM22901 | Attenuator                 | 8496A       | Agilent       | 22/24/27, 15C      |
| TM30636 | Artificial mains net       | L2-16       | PMM           | 15C, 15B           |
| TM37678 | Radio communication tester | CMU-200     | R&S           | 22/24/27, 15C, 15B |
| TM37773 | Radio communication tester | CMU-200     | R&S           | 22/24/27, 15C, 15B |
| TM30600 | Pulse Limiter              | ESH3-Z2     | R&S           | 15C, 15B           |
| TM26490 | LISN 50 $\mu$ H            | ESH3-Z5     | R&S           | 15C, 15B           |
| TM37610 | Spectrum analyzer          | FSU         | R&S           | 22/24/27, 15C      |
| TM22835 | Multimeter                 | 87          | Fluke         | 15C, 15B           |
| TM37500 | Microwave switch system    | 7116-MSW    | Keithley      | 22/24/27, 15C, 15B |
| TM22638 | Power supply               | OL63743-901 | Transformatic | 22/24/27, 15C, 15B |
|         | Temperature chamber        | VT4002      | Vötsch        | 22/24/27, 15C      |
| 2058    | EMI Test receiver          | ESPC        | R&S           | 15C, 15B           |
| 2001    | Bluetooth tester           | CBT         | R&S           | 22/24/27, 15C, 15B |
| 2002    | Radio communication tester | CMU-200     | R&S           | 22/24/27, 15C, 15B |

#### 3.2. Radiated measurements

| Eq. No  | Equipment                       | Type                          | Manufacturer   | Used in            |
|---------|---------------------------------|-------------------------------|----------------|--------------------|
| TM30599 | 3m semi-anechoic chamber        |                               | TDK            | 22/24/27, 15C, 15B |
| TM38845 | EMI receiver                    | ESI 40                        | R&S            | 22/24/27, 15C, 15B |
| TM37498 | Preamplifier                    | AMF-5D-020180-26-10P          | MITEQ          | 22/24/27, 15C, 15B |
| TM37523 | Preamplifier                    | AMF-4D-10M-3G-25-20P          | MITEQ          | 22/24/27, 15C, 15B |
| TM37516 | Biconilog antenna               | HL562                         | R&S            | 22/24/27, 15C, 15B |
| TM26496 | Double ridged waveguide antenna | 3115                          | EMCO           | 22/24/27, 15C, 15B |
| TM39158 | Horn antenna                    | 3116                          | EMCO           | 22/24/27, 15C, 15B |
| TM26492 | Reference dipole set            | UHAP/VHAP                     | Schwarzbeck    | 22/24/27, 15C, 15B |
| TM37501 | Dipole antenna                  | 3125-870                      | EMCO           | 22/24/27           |
| TM37502 | Dipole antenna                  | 3125-1880                     | EMCO           | 22/24/27           |
| TM37773 | Radio communication tester      | CMU-200                       | R&S            | 22/24/27, 15C, 15B |
| TM38631 | Signal generator                | 83640L                        | Agilent        | 22/24/27, 15C, 15B |
| TM38066 | High pass filter                | 4HC3000/18000-3-KK            | Trilithic      | 22/24/27, 15C, 15B |
| TM26511 | Tunable notch filter            | WRCAR870                      | Wainwright     | 22/24/27           |
| TM38215 | Tunable notch filter            | WRCD1850/1910-0.2/40          | Wainwright     | 22/24/27           |
| TM38214 | Band reject filter              | WRCT 2402/2480-2400/2483.5-30 | Wainwright     | 15C                |
| TM30642 | Mast/Turntable controller       | HD-100                        | Deisel         | 22/24/27, 15C, 15B |
| TM26500 | Turntable                       | DS412                         | Deisel         | 22/24/27, 15C, 15B |
| TM38842 | Antenna mast controller         | 2090                          | EMCO           | 22/24/27, 15C, 15B |
| TM38843 | Antenna mast                    | 2075                          | EMCO           | 22/24/27, 15C, 15B |
| TM38114 | DC power supply                 | 6632A                         | Agilent        | 22/24/27, 15C, 15B |
| TM38323 | Preamplifier                    | PA-02 18-26 GHz               | EMC Automation | 22/24/27, 15C, 15B |
| TM37678 | Radio communication tester      | CMU-200                       | R&S            | 22/24/27, 15C, 15B |
| TM22638 | Power supply                    | OL63743-901                   | Transformativ  | 22/24/27, 15C, 15B |
| TM23892 | Yaesu controller                | G-1000SDX                     | Yaesu          | 22/24/27, 15C, 15B |
| 2001    | Bluetooth tester                | CBT                           | R&S            | 22/24/27, 15C, 15B |
| 2002    | Radio communication tester      | CMU-200                       | R&S            | 22/24/27, 15C, 15B |

