TCC
Nokia

T117 (EN ISO/IEC 17025)

# GSM 1900 Test Report for RH-6

| | | | |
|---|---|---|---|
| **Test Report no.:** | DTX12769-EN | **Date of Report:** | 11/08/04 |
| **Number of pages:** | 7 | **Customer's Contact person:** | Thomas Reitmayer |
| | | **Responsible Test engineer:** | Ruben Hansen |
| **Testing laboratory:** | TCC Copenhagen<br>Nokia Danmark A/S<br>Frederikskaj<br>DK-1790 Copenhagen V<br>Denmark<br>Tel. +45 33 29 29 29<br>Fax. +45 33 29 20 01<br>FCC Reg. # 99059, June 2003<br>IC File # 4820, January 2004<br>IC File # 4820-1, February 2004 | **Client:** | Nokia Corporation<br>Lise Meitner Strasse 10<br>89081 ULM<br>GERMANY<br>Tel. +49 731 1754 0<br>Fax. +49 731 1754 6800 |
| **Tested devices/ accessories:** | **Phone; RH-6, Battery; BL-4C** | | |
| **Supplement reports:** | | | |
| **Testing has been carried out in accordance with:** | The tests listed in this report have been done to demonstrate compliance with the applicable requirements in FCC rules Part 24 and IC standard RSS-133. | | |
| **Documentation:** | 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 Copenhagen. | | |
| **Test Results:** | **The EUT complies with the requirements in respect of all parameters subject to the test.** The test results relate only to devices specified in this document | | |
| **Date and signatures for the contents:** | 11/08/04 | | |

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**Test engineer**






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# 1. Summary of test results

| Section in CFR 47 | Section in RSS-133 | | Result |
|---|---|---|---|
| §2.1046 (a) | 6.2 | Conducted RF output | - |
| §24.232 (b) | 6.2 | Radiated RF output | - |
| §2.1049 (h) | 5.6 | 99% occupied bandwidth | - |
| §24.238 (a) | 6.3 | Bandedge compliance | - |
| §24.238 (a), §2.1051 | 6.3 | Spurious emissions at antenna terminals | - |
| §24.238 (a), §2.1053 | 6.3 | Spurious radiated emission | Passed |
| §24.235, §2.1055 (a)(1)(b) | 7 | Frequency stability, temperature variation | - |
| §24.235, §2.1055 (d)(1)(2) | 7 | Frequency stability, voltage variation | - |

PASS Pass
FAIL Fail
X Measured, but there is no applicable performance criteria
NA Not Applicable
- Not Measured

# 2. EUT Information

| Product | Type | SN | HW | MV | SW | DUT |
|---|---|---|---|---|---|---|
| Phone | RH-6 | 004400/34/179715/5 | 9003 | - | 5.08 | 234746 |
| Battery | BL-4C | 067038611124333232 | - | - | - | 232978 |

## 2.1. EUT description

The EUT is a dual band (900MHz/1800MHz/1900MHz) GSM/GPRS mobile phone.
The EUT was not modified during the tests.

# 3. EUT Test Setup

For each test the EUT was exercised to find the worst case of operation modes and device configuration.
The test setup photograph is in Appendix A

# 4. Applicable Standards

The tests were performed in guidance of CFR 47, part 24 and part 2, ANSI/TIA/EIA-603-A and RSS-133. Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under “Test method” for each test case.



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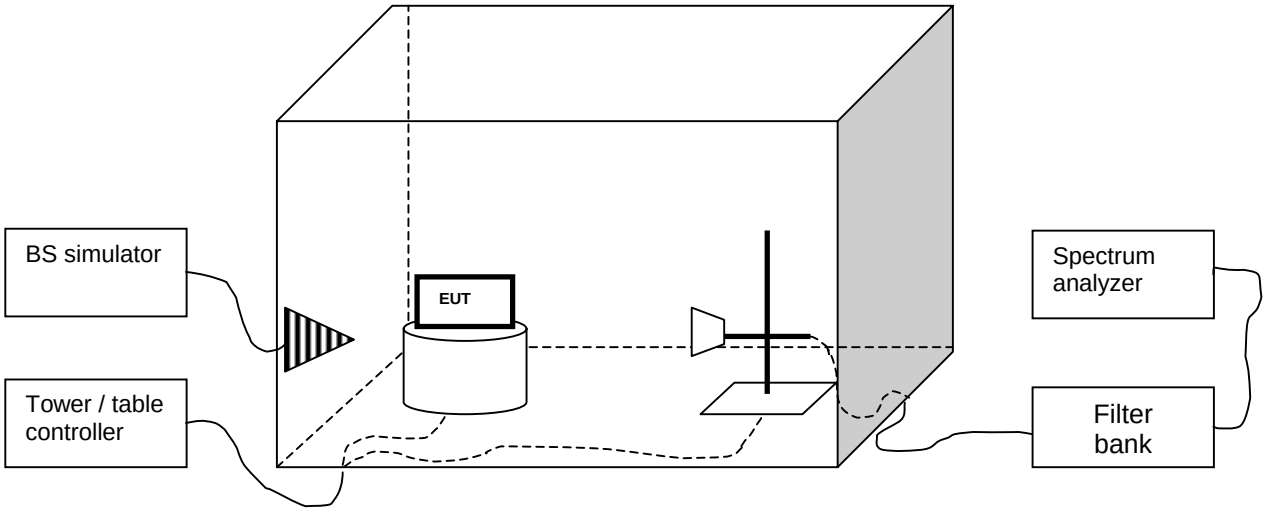
# 5. Spurious radiated emission

| | | | |
|---|---|---|---|
| EUT | RH-6 dut#234746 | | |
| Accessories | BL-4C dut#232978 | | |
| Temp, Humidity, Air Pressure | 20.2 ºC | 36.5 RH% | 1024 mbar |
| Date of measurement | Nov. 8th 2004 | | |
| FCC rule part | §24.238 (a), §2.1053 | | |
| RSS-133 section | 6.3 | | |
| Measured by | Jesper Nielsen | | |
| Result | Passed | | |

## 5.1. Test setup

A set of LP/HP/BS filters was used to prevent overloading the spectrum analyzer. The BS simulator was used to set the TX channel and power level and modulate the TX signal with different bit patterns. The test was done manually.




## 5.2. Test method

a) The emissions were searched and maximized by moving the turn table and measuring antenna and manipulating the EUT.

b) All suspicious frequencies with emission levels were recorded.

c) The EUT was replaced with a substituting antenna.

d) For each frequency recorded, the substituting antenna was fed with the power (from signal generator) giving the same reading as in (b). These power levels were reported.



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## 5.3. EUT operation mode

| | GSM |
|---|---|
| EUT operation mode | TX on, 1 time slot transmission, GSM/GPRS |
| EUT channel | 661 |
| EUT TX power level | 0 (Max) |

## 5.4. Limit

| Frequency [MHz] | Level [dBm] |
|---|---|
| 30 – 19100 | -13 |

## 5.5. Results

The formula below was used to calculate the EIRP of the spurious emissions. If there were no emissions closer than 20dB below the limit line, then the emission levels were documented only at the transmitter's mid-channel harmonics.

$$P_{Emission[dBm]} = P_{SubstTX[dBm]} - L_{Cable[dB]} + G_{Antenna[dBi]}$$

where the variables are as follows:

$P_{Measured\ [dBm]}$ Measured emission level (from step b in 8.2)

$P_{Subst\_TX\ [dBm]}$ Signal generator power (from step d in 8.2) fed to the substituting antenna

$L_{Cable\ [dB]}$ Loss of the cable between antenna and signal generator (from step d in 8.2)

$G_{Antenna\ [dBi]}$ Gain of the substitutive antenna over isotropic radiator

Emission levels, channel 661, Phone closed



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| Frequency [MHz] | $P_{Measured}$ [dBm] | $P_{Subst\ TX}$ [dBm] | $L_{Cable}$ [dB] | $G_{Antenna}$ [dBi] | $P_{Emission}$ [dBm] |
|---|---|---|---|---|---|
| 3760,00 | -46.09 | -34.4 | 8.73 | 15.80 | -27.33 |
| 5640,00 | -55.35 | -42.8 | 11.53 | 18.03 | -36.30 |

Emission levels, channel 661, Phone open

| Frequency [MHz] | $P_{Measured}$ [dBm] | $P_{Subst\ TX}$ [dBm] | $L_{Cable}$ [dB] | $G_{Antenna}$ [dBi] | $P_{Emission}$ [dBm] |
|---|---|---|---|---|---|
| 3760,00 | -48.95 | -37.3 | 8.73 | 15.80 | -30.23 |
| 5640,00 | -55.53 | -43.0 | 11.53 | 18.03 | -36.50 |



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# 6. Test equipment

Each test equipment is calibrated once a year, except antennas which are calibrated every second year.

## 6.1. Radiated measurements

| Equipment # | Equipment | Type | Serial # | Manufacturer |
|---|---|---|---|---|
| 14993 | EMI Test Receiver 9KHz-2750MHz | ESCS30 | 847124/001 | Rohde&Schwarz |
| 15191 | Turntable Contoller Unit | G-800SDX | ONO10000 | YAESU |
| 14900 | Antenna Controller | HD100 | 100\552 | HD GmbH |
| 18792 | Multi Device Controller | 2090 | 1606 | ETS-EMCO |
| 13829 | Turntable Controller | 4630-100 | 100/510 | Comtest |
| 14963 | RF Preamplifier 100MHz-4GHz (Metal Chassis) | AFS3-00100400 | 571131 | Miteq/NMP Cph |
| 13668 | BiLog Antenna 30-2000MHz | BiLog-CBL6112A | 2259 | Chase |
| 18861 | EMI Test Receiver 20Hz-26,5GHz | ESI | 833362/004 | Rohde&Schwarz |
| 12679 | Dual Log Periodic Antenna 1-26.5 GHz | HL025 | ---------- | Rohde&Schwarz |
| 18860 | Ultra Broadband Antenna Ultralog 30-3000MHz | HL562 | 100154 | Rohde&Schwarz |
| 18773 | Shielded Chamber | RFD-100 | 2420 | ETS-Lindgren |
| 18774 | Shielded Chamber | RFSD-F/A-100 | 2425 | ETS-Lindgren |
| 18324 | High Pass Filter 3GHz SMA f Conn | WHJS3000-10SS | 1 | Wainwright |
| 14114 | Highpass Filter 1000MHz-4500MHz | WHK1000-12SS | 1 | Wainwright |
| 13918 | Highpass Filter 2000-4000MHz 50OHM SMA Conn | WHKS2000-10SS | | Wainwright Instruments |
| 13937 | Ultra Stable Notch Filter 902,4MHz | WRCA902.4-0.2/40-6SS | | Wainwright Instruments |
| 13936 | Ultra Stable Notch Filter 1747,5MHz | WRCD1747.5-0.2/40-10SS | | Wainwright Instruments |
| 16633 | Ultra Stable Notch Filter 1880,0MHz | WRCD1880.0-0.2/40-10SS | | Wainwright Instruments |



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