TCC
Nokia

T117 (EN ISO/IEC 17025)

FCC Test Report for RM-12

Test Report no.:	DTX12502	**Date of Report:**	10/19/04
Number of pages:	12	**Customer's Contact person:**	Sonja Perala
		Responsible Test engineer:	Ruben Hansen
Testing laboratory:	TCC Copenhagen Nokia Danmark A/S Frederikskaj DK-1790 Copenhagen V Denmark Tel. +45 33 29 29 29 Fax. +45 33 29 20 01 FCC Reg. # 99059, June 2003 IC File # 4820, January 2004 IC File # 4820-1, February 2004	**Client:**	Nokia Corporation P.O. Box 300 Yrttipellontie 6 FIN-90230 OULU, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 58300
Tested devices/ accessories:	**Phone RM-12, Battery BP-5L, MMC Card.**		
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 15, IC standard ICES-003 and CISPR 22.		
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 signature(s) for the contents:

10/19/2004

R. Chr. Han

Ruben Hansen
Team Leader

TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

CONTENTS

TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

1. EUT AND ACCESSORY INFORMATION

1.1. EUT description

The EUT is a triple band GSM phone, GSM 900/1800/1900 MHz with camera. The highest internal frequency of the EUT is 3896 MHz

1.2. EUT and accessories

The table below lists all EUTs and accessories used in the tests. Later in this test report, only numbers in the last column are used to refer to the devices in each test.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-12	004400/52/170330/4	1140	-	01.10	234655
Battery	BP-5L	V120670391393213 L1061N0001485	-	-	-	234656
AC-Charger	ACP-12	394349J221120537244	-	-	-	232342
MMC Card		MC56V032NCVA-2MB01 K7F2E03341				233736
AC-Charger	ACP-12E	0675294110594K333D3 0082692	-	-	-	234684
Data Cable	DKU-2	CK11083821	-	-	-	234685
Headset	HDS-3	DL15508531	-	-	-	234423

TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

2. SUMMARY OF TEST RESULTS

Section in CFR 47	Section in ICES-003		Result
15.107,a	5.3	AC powerline conducted emissions	Passed
15.109,a	5.5	Radiated emissions	Passed

TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

3. STANDARDS AND MEASUREMENT METHODS

The tests were performed in guidance of CFR 47 Part 15 Subpart B, ANSI C63.4 (2001), ICES-003 and CISPR 22. Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method".

TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

4. TEST RESULTS

4.1. AC power line conducted emissions

EUT with DUT number	RM-12 Dut # 234655		
Accessories with DUT numbers	BP-5L Dut # 234656 + ACP-12E Dut # 234684 + DKU-2 Dut # 234685 + HDS-3 Dut # 234423		
Result	Passed		
Remarks	The Phone was connected to an IBM Laptop via a DKU-2 Data Cable. Tested in GSM 1900 band at 115 VAC		
FCC rule part	§15.107		
ICES-003 section	5.3		
Temp, Humidity, Air Pressure	22 ºC	45 RH%	mbar
Date of measurements	09/29/04		
Measured by	Allan F. Henriksen		

4.1.1 Limit

CISPR 22 Class B limit

Frequency band (MHz)	Quasi-peak limit (dBµV)	Average limit (dBµV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5	56	46
5 – 30	60	50

4.1.2 EUT test setup

See Amendment to this Test Report

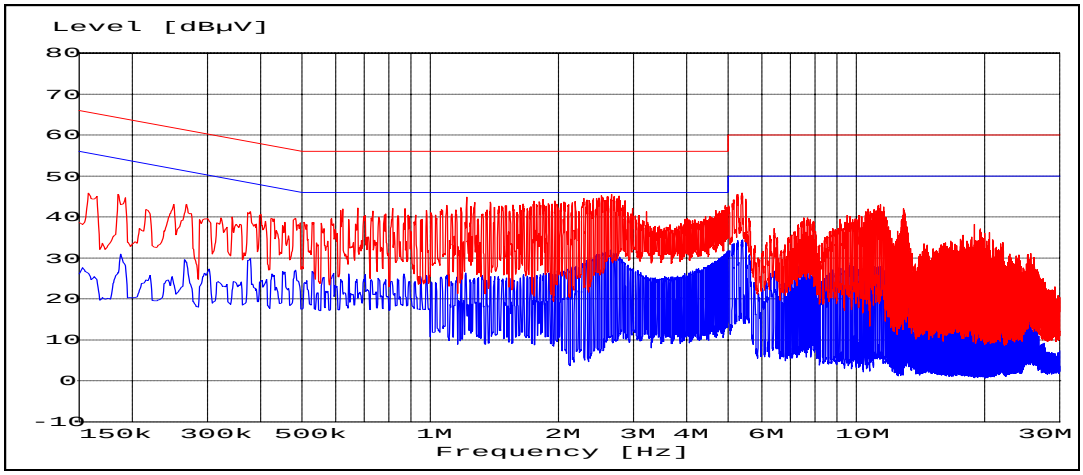
4.1.3 Emission measurement data

4.1.4 Test results

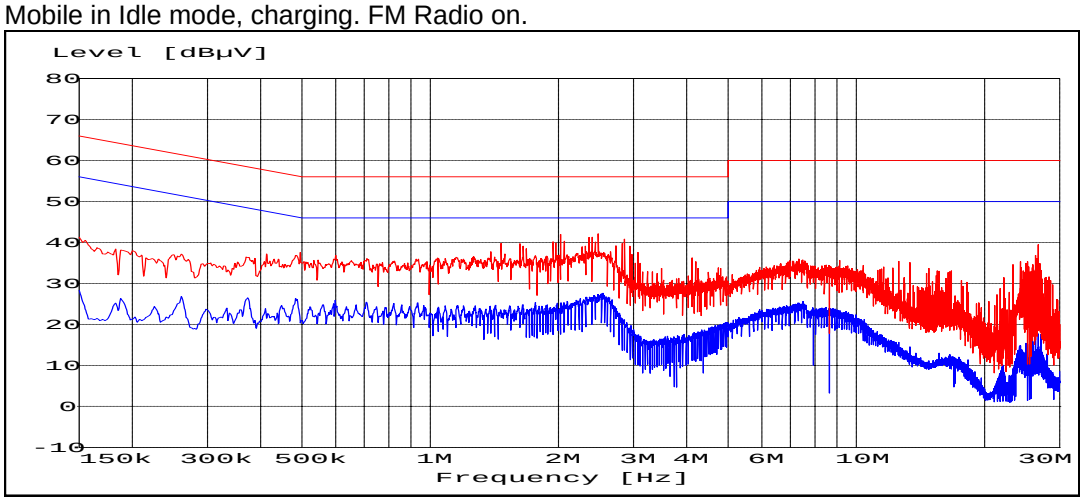
Operation mode	Result
Mobile in Idle mode, charging. With DKU-2 and Laptop connected to Phone	Passed
Mobile in Idle mode, charging. With FM Radio on	Passed

Mobile in Idle mode, charging. DKU-2 Cable + ACP-12 connected to Phone and Laptop.

TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934



Mobile in Idle mode, charging. FM Radio on.



TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

4.2. Radiated emissions

EUT with DUT number	RM-12 Dut#234655		
Accessories with DUT numbers	BP-5L		
Result	Passed		
FCC rule part	§15.109		
ICES-003 section	5.5		
Temp, Humidity, Air Pressure	20.8ºC	46RH%	mbar
Date of measurements	10/06/2004		
Measured by	Christian Andersen		

4.2.1 Test method and level, 30MHz – 1000MHz

The test was made according to ANSI C63.4 (2001) with following execptions and additions:

1) The measurement was made in semi-anechoic chamber at measurement distance of 3m. The chamber had ferrite and absorber lining in all walls and ceiling, the floor was metal covered.
2) The measurement was divided in two parts; prescan and final measurement.

4.2.2 Test method and level, 1000MHz – 8500MHz

The test was made according to ANSI C63.4 (2001) with following execptions and additions:

1) The measurement was made in semi-anechoic chamber at measurement distance of 1m. The chamber had ferrite and absorber lining in all walls and ceiling, the floor was metal covered.
2) The measurement was divided in two parts; prescan and final measurement.

4.2.3 Prescan

a) The EUT was set on the turntable and measuring antenna in horizontal polarization at 1m.
b) The turntable was set to 0 degrees.
c) The receiver was set to record the maximum level using peak detector.
d) The antenna was raised from 1m to 4m in 1 meter steps.
e) For each antenna height the table was rotated full turn in 30 degree steps.
f) Antenna polarization was changed to vertical and phases b - e repeated.
g) All suspect frequencies were recorded in a file.
h) At every suspect frequency the turntable was rotated around, antenna scanned and the polarization changed to find the maximum levels.

4.2.4 Final measurement

a) The final measurement was run at suspect frequencies only using peak, quasipeak and average detector.
b) The turntable was rotated full turn to find out the worst azimuth.
c) On those azimuths obtained in b, the antenna was scanned from 1m to 4m to find out the worst elevation.
d) Phases b and c were repeated with another antenna polarization.
e) Obtained values were reported

TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

CISPR 22 Class B limit (3m measuring distance)

Frequency band (MHz)	Quasi-peak limit (dBµV/m)
30 – 230	40
230 – 1000	47

Class B limit (3m measuring distance)

Frequency band (MHz)	Limit (µV/m)	Limit (dBµV/m)	Detector
1000-8500	500 / 5000	54 / 74	AV / PK

4.2.5 EUT test setup

See Amendment to this Test Report

TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

4.2.6 EUT operation mode

EUT operation mode	GSM 1900 Idle
EUT operation voltage	115V/60Hz, charging

4.2.7 Emission measurement data, 30MHz - 12750 MHz

The results were corrected with the cable and filter losses, preamplifier gain, antenna factor and measurement distance.

The measurement results were obtained as described below.

$$E[uV/m] = U_{RX} + A_{CABLE} + AF - G_{PREAMP} - C_{DISTANCE}$$

Where

U_{RX}	receiver reading
A_{CABLE}	Attenuation of the cable
AF	Antenna factor
G_{PREAMP}	Gain of the preamplifier
$C_{DISTANCE}$	Conversion factor from 3m to 1.6 m measurement distance
PK	1MHz/ 3MHz RBW/VBW
AV	1MHz/10Hz RBW/VBW

Measuring Distance 1.6 meter

Emission levels, Rx on channel 661 (GSM 1900)

Freq. [MHz]	U_{RX} dBuV	Pol.	Det.	A_{CABLE} (dB)	G_{PREAMP} (dB)	AF (dB)	Limit [dBuV/m]	$C_{DISTANCE}$	Result [dBuV/m]
3895.6	37	V	PK	4.85	29.65	33.2	74	5.46	39.94
3895.6	21.46	V	AV	4.85	29.65	33.2	54	5.46	24.4
7792	35.86	V	PK	6.10	30.00	39.9	74	5.46	46.4
7792	22.37	V	AV	6.10	30.00	39.9	54	5.46	32.91

TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

Test equipment

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

4.3. Conducted measurements

Equipment #	Equipment	Type	Serial #	Manufacturer
13357	Signal Generator	SMP 02		Rohde & Schwarz
13302	Spectrum Analyzer	8596E		Hewlet Packard
13524	BS Simulator	CMD-55		Rohde & Schwartz
17277	Multimeter	34401A		Agilent
15761	DC Power Supply	E3632A		Hewlet Packard
13371	Temperature chamber	2800		Thermotron
-	RF Attenuator	23-10-34		Weinchel
-	Power Divider	-		Suhner
17796	BS Simulator	4400M		Wavetek
-	Antenna Mast	-		Deisel
14900	Antenna Mast Controller	HD-100		Deisel
15191	Turn Table	G-800SDX		Yaesu
13668	Antenna	CBL6112A		Chase
13935	Two Line Artificial Mains Network	ESH-3-Z5		Rohde & Schwarz
13666	EMI Test Receiver	ESPC		Rohde & Schwarz

4.4. 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-	BiLog-CBL6112A	2259	Chase

TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

	2000MHz			
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

TCC Copenhagen
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934