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# EMC Test Report for RM-68



T183 (EN ISO/IEC 17025)

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## 1 CUSTOMER INFORMATION

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FCC registration number IC file number:	94436 (June 14, 2002) IC 3608 (March 5, 2003)
Client:	Nokia Finland /Salo Nokia Oyj Joensuunkatu 7 FIN-24100 SALO BOX 86 Switchboard: +358-71-8008000 Fax.+358-71-8044277
Contact person:	Ulla Valjakka
Receipt of EUT:	25.11.2004
Date of testing:	30.11 - 7.12.2004
Date of report:	7.12.2004

The tests listed in this report have been done to demonstrate compliance with the applicable requirements in FCC rules Part 15 and IC standards ICES-003 and (RSS-132 and RSS-133, when applicable).

Contents approved:


Jan-Erik Lilja Senior Test Engineer

## 2 EUT AND ACCESSORY INFORMATION

### 2.1 EUT description

The EUT is a triple band (GSM850/1800/1900 EGPRS) mobile phone.

The highest internal frequency of the EUT is 3980 MHz.

### 2.2 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.

	Name	Type	S/N	HW	SW	EUT number
EUT	GSM phone	RM-68	004400561600675	2140	4.24	40133
Accessories	Battery	BL-5C	-	6.0	-	40124
	AC charger	AC-12	0675294399791 L277AA0008491	5.0	-	40121

## SUMMARY OF TEST RESULTS

Section in CFR 47	Section in ICES-003 (RSS-132) [RSS-133]		Result
15.107,a	5.3	AC powerline conducted emissions	PASS
15.109,a	5.5 (6.6) [9]	Radiated emissions	PASS

## 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 (and RSS-132 and RSS-133, when applicable). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method".

## 4 TEST RESULTS

### 4.1 AC powerline conducted emissions

EUT	40133		
Accessories	40121, 40124		
Temp, Humidity, Air Pressure	19°C	49 % RH	1011 mbar
Date of measurement	30.11.2004		
FCC rule part	§15.107		
ICES-003 section	5.3		
Measured by	Jari Jantunen		
Result	<b>PASS</b>		

#### 4.1.1 Limit

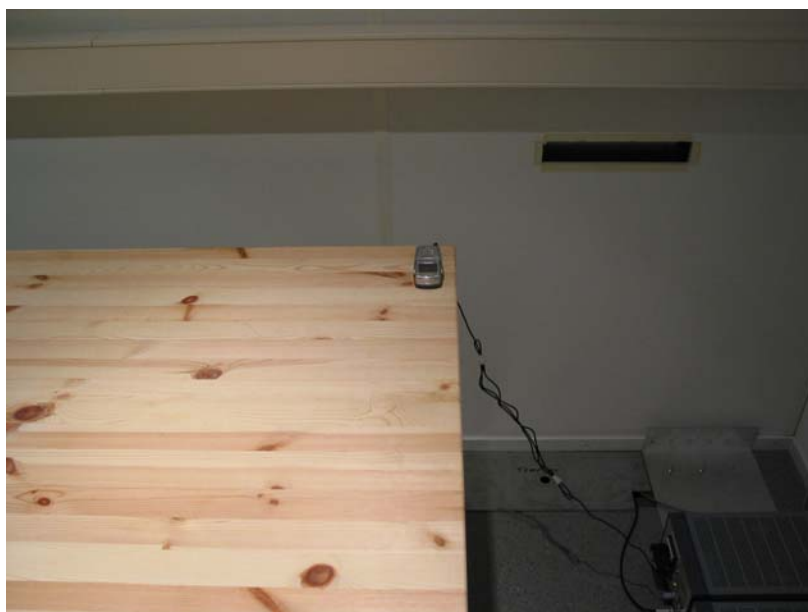
##### CISPR 22 Class B limit

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 operation mode

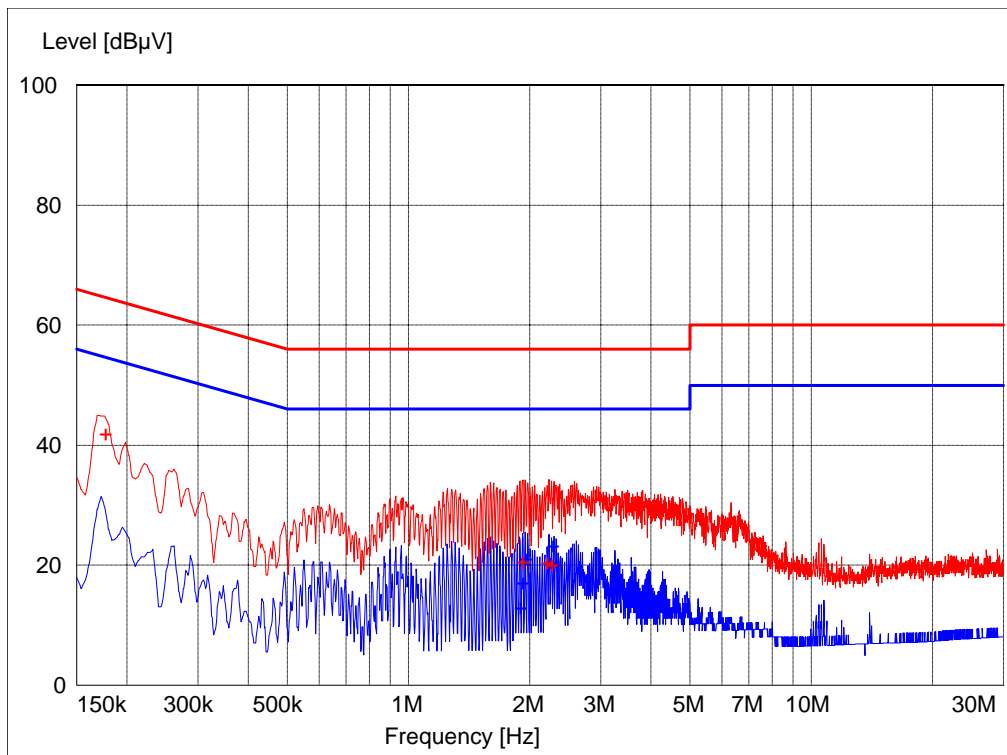
EUT operation mode	GSM 850, idle mode
EUT operation voltage	115V/60Hz

#### 4.1.3 EUT test setup



Picture 1 EUT test setup

#### 4.1.4 Emission measurement data



**Picture 2 Emission measurement data GSM 850, idle mode**

**Table 1 Emission measurement data, average detector**

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.896000	13.00	10.40	46.00	33.00	AV	L1	GND
1.927500	17.20	10.40	46.00	28.80	AV	L1	GND
1.959000	21.10	10.40	46.00	24.90	AV	L1	GND
2.251500	20.60	10.50	46.00	25.40	AV	L1	GND
2.283000	23.40	10.50	46.00	22.60	AV	L1	GND

**Table 2 Emission measurement data, quasi peak detector**

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.177000	42.00	10.10	64.60	22.60	QP	N	GND
1.923000	20.80	10.40	56.00	35.20	QP	L1	GND
2.215500	20.50	10.50	56.00	35.50	QP	L1	GND
2.274000	20.30	10.50	56.00	35.70	QP	L1	GND

## 4.2 Radiated emissions

EUT	40133
Accessories	40121, 40124
Temp, Humidity, Air Pressure	22°C 45%RH 998 mbar
Date of measurement	7.12.2004
FCC rule part	§15.109
ICES-003 section	5.5
RSS-132	6.6
RSS-133	9
Measured by	Jan-Erik Lilja
Result	PASS

### 4.2.1 Test method and level, 30MHz – 8000 MHz

The test was made according to ANSI C63.4 (2001) with following exceptions 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.

#### 4.2.1.1 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.

#### 4.2.1.2 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

#### 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
1000-8000	500 / 5000	54 / 74	AV / PK

#### 4.2.2 EUT operation mode

EUT operation mode	GSM 850, idle mode. Low, mid and high channels
EUT operation voltage	115V/60Hz

#### 4.2.3 EUT test setup



#### 4.2.4 Emission measurement data, 30MHz – 8 GHz

The measurement results were obtained as described below.

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

Where

$U_{RX}$  receiver reading

$A_{CABLE}$  Attenuation of the cable

$AF$  Antenna factor

$G_{PREAMP}$  Gain of the preamplifier



**Table 3 Highest emission at channel 128**

Freq [MHz]	EMI PK [dB $\mu$ V/m]	EMI AVG [dB $\mu$ V/m]	Polarization
3476.8		28.20	VERTICAL
3476.8	39.60		HORIZONTAL
6953.60	50.70	40.50	VERTICAL

**Table 4 Highest emission at channel 190**

Freq [MHz]	EMI PK [dB $\mu$ V/m]	EMI AVG [dB $\mu$ V/m]	Polarization
3526.55	39.00		VERTICAL
3526.05		29.30	VERTICAL
7052.60	46.00	37.50	VERTICAL

**Table 5 Highest emission at channel 251**

Freq [MHz]	EMI PK [dB $\mu$ V/m]	EMI AVG [dB $\mu$ V/m]	Polarization
3575.20	40.70	28.10	VERTICAL
7150.40	44.90	33.30	VERTICAL