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# EMC Test Report for RM-36



T183 (EN ISO/IEC 17025)

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## 1 CUSTOMER INFORMATION

Test laboratory:	TCC Tampere Nokia Oyj Sinitaival 5 FIN-33720 TAMPERE  Tel. +358 7180 08000 Fax. +358 7180 46800
FCC registration number IC file number:	94436 (June 14, 2002) IC 3608 (March 5, 2003)
Client:	Nokia Corporation P.O. Box 68 Sinitaival 5 FIN-33721 TAMPERE, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 46880
Contact person:	Tero Huhtala
Receipt of EUT:	20.12.2004
Date of testing:	21-28.12.2004
Date of report:	29.12.2004

The tests listed in this report have been done to demonstrate compliance with the applicable requirements in FCC rules Part 15 and IC standard ICES-003.

Contents approved:


<p>Jari Jantunen EMC test engineer</p>

## 2 EUT AND ACCESSORY INFORMATION

### 2.1 EUT description

The EUT is a triple band (GSM 900//1800/1900 EGPRS) mobile phone.

The highest internal frequency of the EUT is 8000 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	Number
EUT	Mobile phone	RM36	004400471619757	40140
Accessories	Battery	BL-5C	-	40123
	Charger	ACP-12	-	40121
	USB cable	DKU-2	-	40144
	Digital camera	DS-7	7102516	40076
	Printer	HP deskjet 1600CC3540A	USB8302546	40077
	Laptop charger	PA-2	00085391	40080
	Laptop PC	LATITUDE D600	0009321C-12800-8A5- 2913	40085
	Parallel cable for printer	-	-	40087
	Serial cable for camera	-	-	40088

Note! Phone HW ID is 5001

### SUMMARY OF TEST RESULTS

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

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### **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".

## 4 TEST RESULTS

### 4.1 AC powerline conducted emissions

EUT	40140		
Accessories	40121, 40123, 40144, 40076, 40077, 40080, 40085, 40086, 40087, 40088		
Temp, Humidity, Air Pressure	19°C	50 % RH	1009 mbar
Date of measurement	28.12.2004		
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 (dB $\mu$ V)	Average limit (dB $\mu$ V)
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 1900, idle mode, bluetooth standby
EUT operation voltage	115V/60Hz

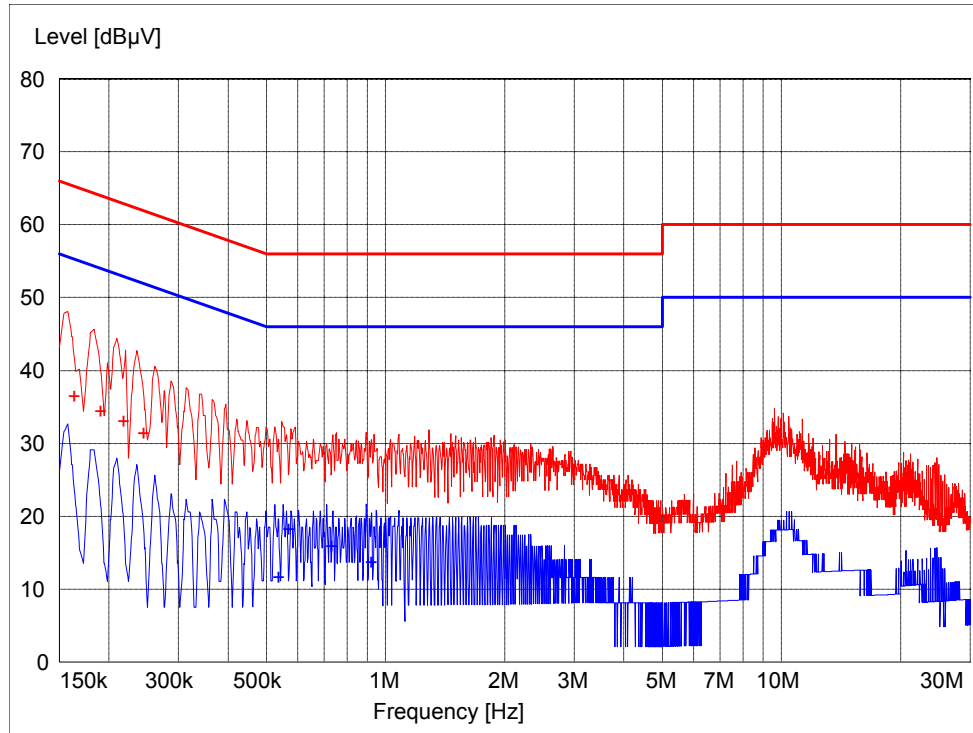
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#### 4.1.3 EUT test setup



**Picture 1 EUT test setup**

## 4.1.4 Emission measurement data



Picture 2 Emission measurement data

Table 1 Emission measurement data, average detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.537000	11.70	10.20	46.00	34.30	AV	N	GND
0.568500	18.20	10.20	46.00	27.80	AV	L1	GND
0.730500	15.90	10.20	46.00	30.10	AV	L1	GND
0.919500	13.60	10.30	46.00	32.40	AV	L1	GND

Table 2 Emission measurement data, quasi peak detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.163500	36.50	10.10	65.30	28.80	QP	N	GND
0.190500	34.40	10.10	64.00	29.60	QP	N	GND
0.217500	33.00	10.10	62.90	29.90	QP	N	GND
0.244500	31.30	10.10	61.90	30.60	QP	N	GND



## 4.2 Radiated emissions

EUT	40140		
Accessories	40121, 40123, 40144, 40076, 40077, 40080, 40085, 40086, 40087, 40088		
Temp, Humidity, Air Pressure	22°C	47 %RH	998 mbar
Date of measurement	22.12.2004		
FCC rule part	§15.109		
ICES-003 section	5.5		
Measured by	Jan-Erik Lilja		
Result	<b>PASS</b>		

### 4.2.1 Test method and level, 30 MHz – 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, quasi-peak 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

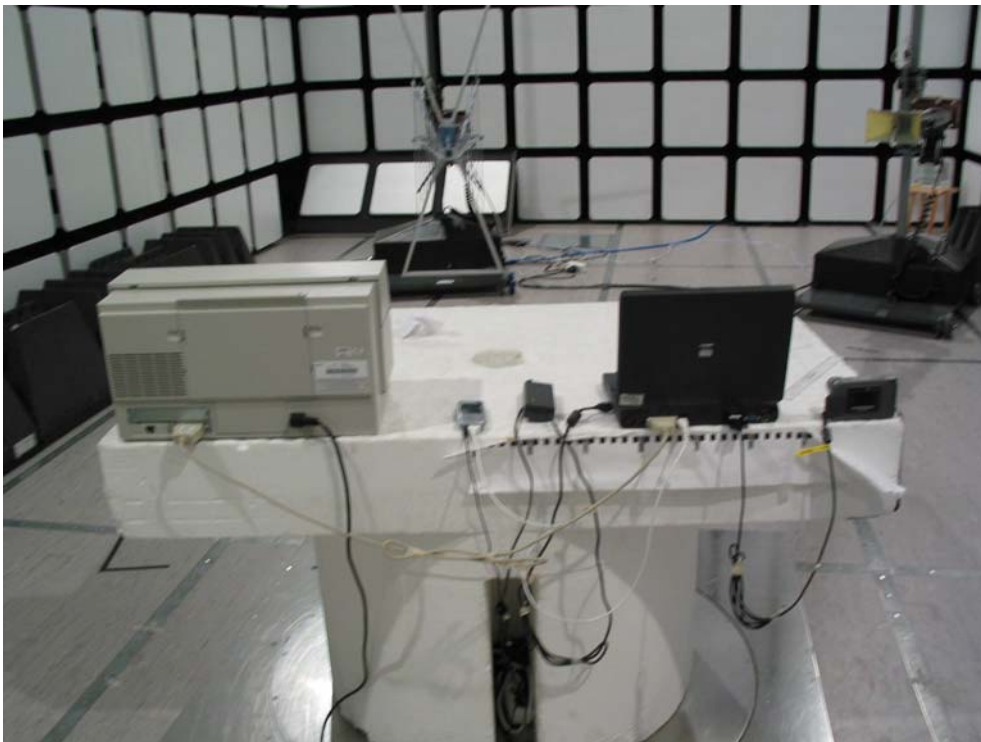
#### Class B limit (3m measuring distance)

Frequency band (MHz)	Limit ( $\mu\text{V/m}$ )	Limit (dB $\mu\text{V/m}$ )	Detector
1000-8000	500 / 5000	54 / 74	AV / PK

#### 4.2.2 EUT operation mode

EUT operation mode	GSM 1900 idle, BlueTooth standby
EUT operation voltage	115V/60Hz

#### 4.2.3 EUT test setup



**Picture 3 EUT test setup**

#### 4.2.4 Emission measurement data, 30 MHz – 8000 MHz

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 below 1 GHz, Quasi-peak detector**

Frequency / MHz	Level / dB $\mu$ V/m	Margin / dB	Polarisation
30.300000	32.70	7.30	VERTICAL
41.924048	30.60	9.40	VERTICAL
417.636473	34.80	11.20	VERTICAL
479.658317	39.10	6.90	VERTICAL
501.402004	36.10	9.90	HORIZONTAL

**Table 4 Highest emission above 1 GHz, Peak detector**

Frequency / MHz	Level / dB $\mu$ V/m	Margin / dB	Polarisation
7839.679359	45.60	28.40	VERTICAL

**Table 5 Highest emission above 1 GHz, Average detector**

Frequency / MHz	Level / dB $\mu$ V/m	Margin / dB	Polarisation
7839.679359	19.00	35.00	VERTICAL