EMC Test Report
For
RA-4

T183 (EN ISO/IEC 17025)

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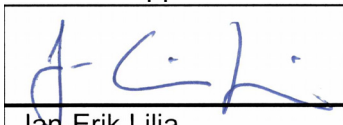
1 CUSTOMER INFORMATION

Test laboratory: FCC registration number IC file number:	TCC Tampere Nokia Oyj Sinitaival 5 FIN-33720 TAMPERE Tel. +358 7180 08000 Fax. +358 7180 46800 94436 (June 14, 2002) IC 3608 (March 5, 2003)
Client:	Nokia Corporation Joensuunkatu 7 FIN-24100 SALO BOX 86 FIN-24101 SALO Tel. +358-71-8008000 Fax. +358-71-8044277
Contact person:	Timo Seppälä
Receipt of EUT:	26.1.2005
Date of testing:	28.1-1.2.2005
Date of report:	04.02.2005

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:



Jan-Erik Lilja
Senior Test Engineer

2 EUT AND ACCESSORY INFORMATION

2.1 EUT description

The EUT is a mobile phone EUT is a dual triple band (GSM 850/1800/1900 EGPRS) mobile phone.

The highest internal frequency of the EUT is 3979.6 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	RA-4	004400571630423	40164
Accessories	Battery	BP-6M	-	40169
	Charger	ACP-12	-	40172
	USB cable	DKU-2	-	40174
	Digital camera	DS-7	7102516	40076
	Printer	HP deskjet 1600CC3540A	USB8302546	40077
	Laptop PC	LATITUDE CP M233XT	0009321C-12800-8A5-2913	40078
	Laptop charger	PA-2	00085391	40080
	Laptop PC	LATITUDE D600	0009321C-12800-8A5-2913	40085
	Laptop charger	AA22850	00085391	40086
	Parallel cable for printer	-	-	40087
	Serial cable for camera	-	-	40088

Note! Phone HW ID is 5300

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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".

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4 TEST RESULTS

4.1 AC powerline conducted emissions

EUT	40164		
Accessories	40169, 40172, 40174, 40076, 40077, 40078, 40080, 40085, 40086, 40087, 40088		
Temp, Humidity, Air Pressure	19ºC	52 % RH	1019 mbar
Date of measurement	28.1.2005		
FCC rule part	§15.107		
ICES-003 section	5.3		
Measured by	Jari Jantunen		
Result	**PASS**		

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, BlueTooth standby
EUT operation voltage	115V/60Hz

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4.1.3 EUT test setup

Picture 1 EUT test setup

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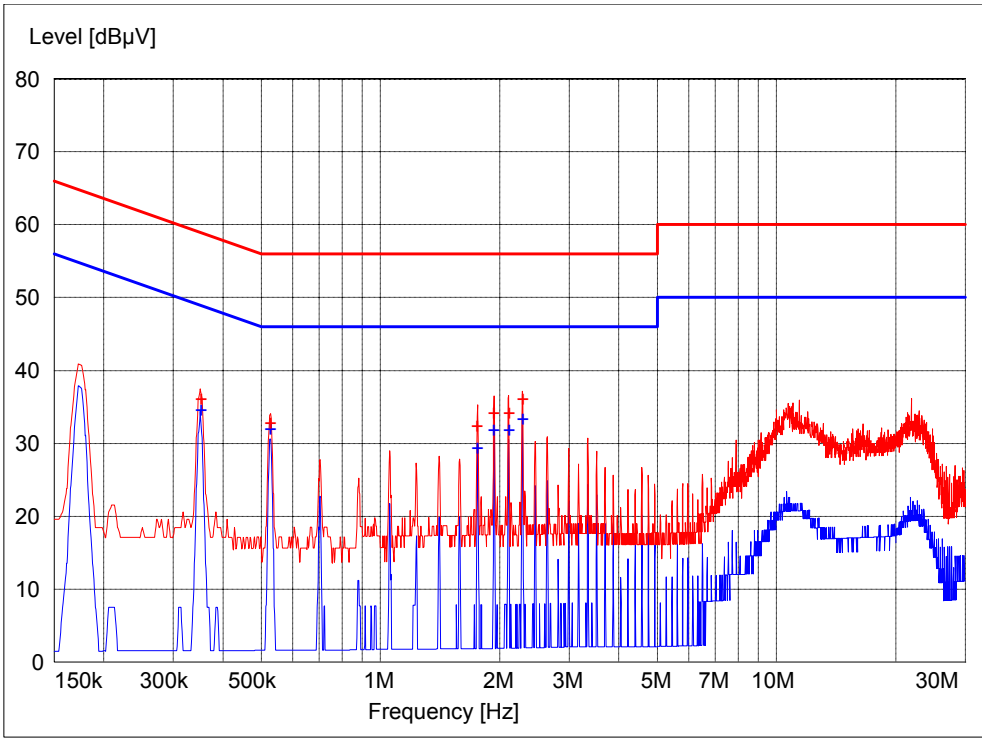
4.1.4 Emission measurement data



Picture 2 Emission measurement data

Table 1 Emission measurement data, average detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin	Detector dB	Line	PE
0.352500	34.60	10.10	48.90	14.30	AV	N	GND
0.528000	31.90	10.20	46.00	14.10	AV	L1	GND
1.761000	29.30	10.40	46.00	16.70	AV	L1	GND
1.936500	31.80	10.40	46.00	14.20	AV	N	GND
2.112000	31.80	10.40	46.00	14.20	AV	L1	GND
2.287500	33.30	10.50	46.00	12.70	AV	N	GND

Table 2 Emission measurement data, quasi peak detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin	Detector dB	Line	PE
0.352500	36.10	10.10	58.90	22.80	QP	N	GND
0.528000	32.80	10.20	56.00	23.20	QP	L1	GND
1.756500	32.30	10.40	56.00	23.70	QP	L1	GND
1.936500	34.20	10.40	56.00	21.80	QP	L1	GND
2.112000	34.20	10.40	56.00	21.80	QP	L1	GND
2.287500	36.10	10.50	56.00	19.90	QP	N	GND

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4.2 Radiated emissions

EUT	40164		
Accessories	40169, 40172, 40174, 40076, 40077, 40078, 40080, 40085, 40086, 40087, 40088		
Temp, Humidity, Air Pressure	20°C	47 %RH	989 mbar
Date of measurement	31.1.2005		
FCC rule part	§15.109		
ICES-003 section	5.5		
Measured by	Jari Jantunen		
Result	**PASS**		

4.2.1 Test method and level, 30 MHz – 8500 MHz

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.

4.2.1.1 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)

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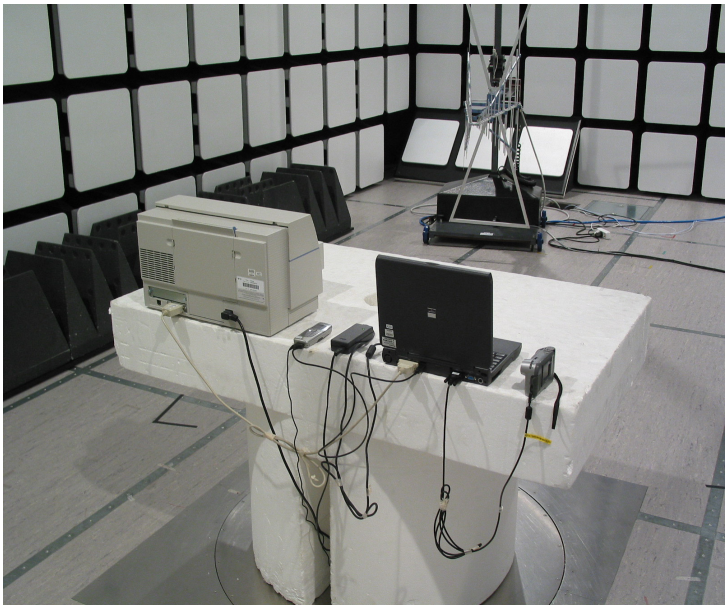
Frequency band (MHz)	Limit (µV/m)	Limit (dBµV/m)	Detector
1000-8500	500 / 5000	54 / 74	AV / PK

4.2.2 EUT operation mode

EUT operation mode	GSM 850, idle mode, 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 – 8500 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

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Table 3 GSM 850, low channel, peak detector

Frequency MHz	Level dBµV/m	Margin dB	Polarisation
3476.800000	39.70	34.30	HORIZONTAL
6953.600000	49.10	24.90	VERTICAL

Table 4 GSM 850, low channel, average detector

Frequency MHz	Level dBµV/m	Margin dB	Polarisation
3476.800000	28.10	25.90	HORIZONTAL
6953.600000	36.30	17.70	VERTICAL

Table 5 GSM 850, mid channel, quasi-peak detector

Frequency MHz	Level dBµV/m	Margin dB	Polarisation
47.633667	29.10	10.90	VERTICAL
452.404609	35.30	10.70	VERTICAL
501.302004	35.40	10.60	VERTICAL

Table 6 GSM 850, mid channel, peak detector

Frequency MHz	Level dBµV/m	Margin dB	Polarisation
3526.400000	40.80	33.20	VERTICAL
7052.800000	43.50	30.50	VERTICAL

Table 7 GSM 850, mid channel, average detector

Frequency MHz	Level dBµV/m	Margin dB	Polarisation
3526.400000	29.80	24.20	VERTICAL
7052.800000	31.10	22.90	HORIZONTAL

Table 8 GSM 850, high channel, peak detector

Frequency MHz	Level dBµV/m	Margin dB	Polarisation
3575.200000	42.50	31.50	VERTICAL
7150.400000	44.70	29.30	VERTICAL

Table 9 GSM 850, high channel, average detector

Frequency MHz	Level dBµV/m	Margin dB	Polarisation
3575.200000	32.70	21.30	VERTICAL
7150.400000	32.30	21.70	VERTICAL

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