

FCC Part 15B Compliance Test Report

Test Report no.:	TreFCC_0526_01.doc	Date of Report:	7.7.2005
Number of pages:	11	Customer's Contact person:	Alison Kingston
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FCC listing no.:	94436		
IC recognition no.:	3608		
Tested devices/ accessories:	GSM phone RM-84 / Battery BL-5C, AC charger AC-4, USB data cable CA-53, Laptop computer DELL Latitude C640, Laptop charger ADP-90FB, Digital camera DS-7, Printer HP deskjet 1600CC3540A, Parallel cable for printer, Serial cable for camera		
FCC ID:	QFXRM-84	IC:	661Z-RM84
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Part 15 Subpart B, ANSI C63.4 (2003), ICES-003, CISPR 22 and IC standards RSS-132, RSS-133 and RSS-210. Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
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 Nokia.		
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 for the contents:			

Jari Jantunen
Senior Test Engineer

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	28.6.2005
Testing completed	4.7.2005
The customer's contact person	Alison Kingston
Test Plan referred to	\EMC\TESTPLAN\
Notes	-
Document name	T:\Projects\RM-84\EMC\Results\FCC\TreFCC_0526_01.doc

1.1. EUT and Accessory Information

The EUT is a single band (GSM1900) mobile phone with GPRS, EGPRS and Bluetooth. GSM band is tested in idle mode unless otherwise mentioned. Bluetooth is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
GSM phone	RM-84	004400691699514	3991	-	1.0519.0.2	40287
Battery	BL-5C	-	-	-	-	40289
AC charger	AC-4	39979151721211	-	-	-	40291
USB Data cable	CA-53	1141	-	2.0	-	40281
Laptop computer	DELL Latitude C640	4F343	-	-	-	40293
Laptop charger	ADP-90FB	TH-06G356-17971-2CK-A4G0	-	-	-	40294
Digital camera	DS-7	7102516	-	-	-	40076
Printer	HP deskjet 1600CC3540A	USB8302546	-	-	-	40077
Parallel cable for printer	-	-	-	-	-	40087
Serial cable for camera	-	-	-	-	-	40088

1.2. Summary of Test Results

GSM 1900:

Section in CFR 47	Section in ICES-003 (RSS-133)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	PASSED
15.109, a	5.5 (9)	Radiated emissions	PASSED

Bluetooth:

Section in CFR 47	Section in ICES-003	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	NP
15.109, a	5.5	Radiated emissions	PASSED

PASSED

FAILED

NP

The EUT complies with the essential requirements in the standard.

The EUT does not comply with the essential requirements in the standard.

The test was not performed by the TCC Nokia Tampere Laboratory.

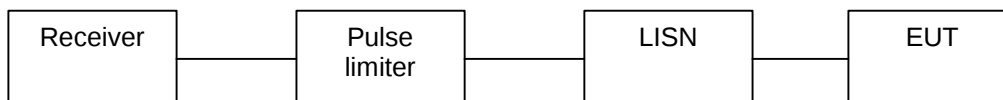
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2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	Phone:DUT 40287
Accessories with DUT numbers	Battery: DUT 40289 Charger: DUT 40291 USB Data cable: DUT 40281 Laptop computer: DUT 40293 Laptop charger: DUT 40294 Digital camera: DUT 40076 Printer: DUT 40077 Parallel cable for printer: DUT 40087 Serial cable for camera: DUT 40088
Operation Voltage V / Hz	115 / 60
Result	Passed
Remarks	GSM1900 TX mode, ch 661
Temp °C / Humidity RH % / Air Pressure kPa	19 / 49 / 102.0
Date of measurements	4.7.2005
Measured by	Jari Jantunen

2.1. Test setup



2.2. Test method and limit

The measurement is made according to ANSI C63.4-2003 as follows:

The EUT is placed on a wooden table 80 cm above the reference groundplane.

The EUT is connected via LISN to a test power supply.

The measurement results are obtained as described below:

$$U [\mu V] = U_{RX} + A_{CORRECTIONS}$$

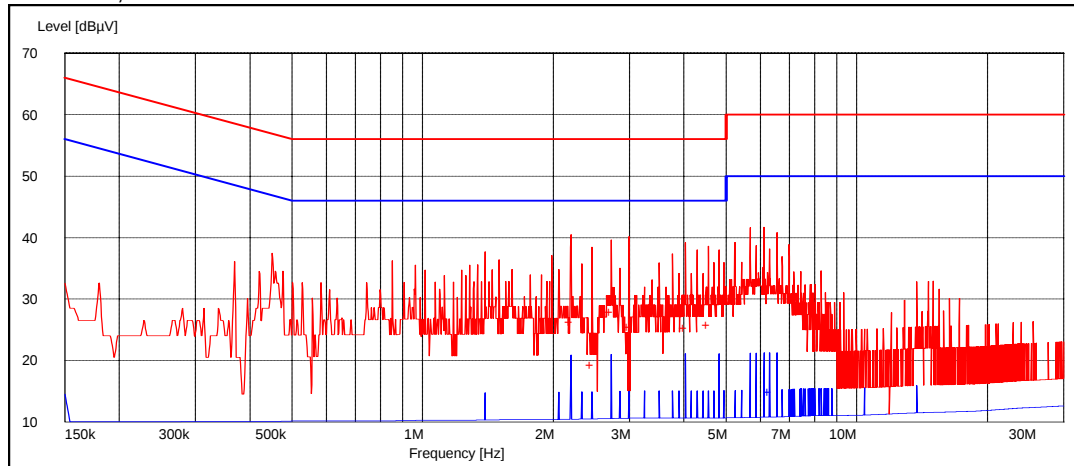
Where U_{RX} is receiver reading and $A_{CORRECTIONS}$ is combined correction factor including cable and pulse limiter attenuations.

CISPR 22 Class B limits

Frequency range / 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

2.3. GSM 1900 Test results

TX mode, channel 661



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
2.198397	26.30	L1	PASSED
2.456914	19.30	L1	PASSED
2.721443	27.90	L1	PASSED
2.985972	25.40	L1	PASSED
4.032064	25.30	L1	PASSED
4.561122	25.80	L1	PASSED

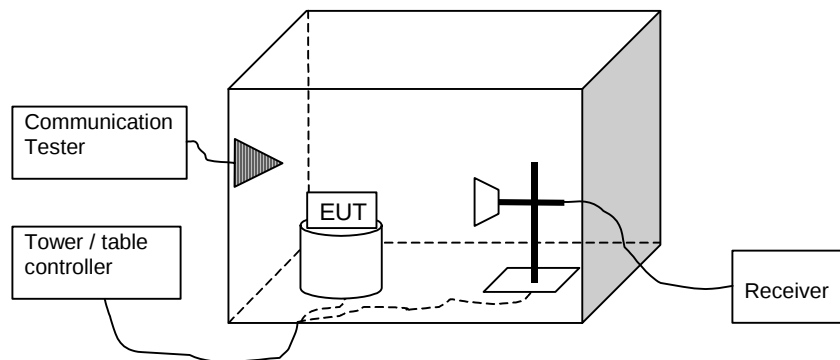
Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
2.198397	8.60	L1	PASSED
2.721443	8.10	L1	PASSED
4.032064	8.50	L1	PASSED
4.819639	9.10	L1	PASSED
6.302605	14.90	L1	PASSED
6.553106	9.70	L1	PASSED

3. Radiated emissions (FCC §15.109, ICES-003 section 5.5, RSS-132 6.6, RSS-133 9)

EUT with DUT number	Phone:DUT 40287
Accessories with DUT numbers	Battery: DUT 40289 Charger: DUT 40291 USB Data cable: DUT 40281 Laptop computer: DUT 40293 Laptop charger: DUT 40294 Digital camera: DUT 40076 Printer: DUT 40077 Parallel cable for printer: DUT 40087 Serial cable for camera: DUT 40088
Operation Voltage V / Hz	115 / 60
Result	Passed
Remarks	GSM1900 idle mode, FM radio on
Temp °C / Humidity RH % / Air Pressure kPa	22 / 42/ 100.1
Date of measurements	28-29.06.2005
Measured by	Jan-Erik Lilja

3.1. Test setup



3.2. Test method and limit

The measurement is made according to ANSI C63.4-2003as follows:

The measurement is performed in the Semi-Anechoic Chamber with conducting metal floor.

The measurement distance is 3 m.

The EUT is placed on a nonconductive plate at 80 cm height.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

The emissions less than 20 dB below the permissible value are reported.

The measurement results are obtained as described below:

$$E [\mu V/m] = U_{RX} + A_{CORRECTIONS}$$

Where U_{RX} is receiver reading and $A_{CORRECTIONS}$ is combined correction factor including cable loss, antenna factor and preamplifier gain ($A_{CORRECTIONS} = L_{CABLES} + AF - G_{PREAMP}$).

CISPR 22 and FCC Part 15 Class B limits (3 m measurement distance)

Frequency range / MHz	Quasi peak limit / dBμV/m	Average limit / dBμV/m	Peak limit / dBμV/m
30 - 230	40	-	-
230 - 1000	47	-	-
Above 1000	-	54	74

3.3. GSM 1900 Test results

RX mode, channel 512. GSM1900 idle mode, FM radio on

Peak (RBW: 1 MHz)

Frequency / MHz	Level / dB μ V/m	Level / μ V/m	A _{CORRECTION} / dB	Polarisation	Result
3860.000000	40.30	103.51	-3.10	HORIZONTAL	Passed
7720.000000	45.00	177.83	2.70	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency / MHz	Level / dB μ V/m	Level / μ V/m	A _{CORRECTION} / dB	Polarisation	Result
3860.000000	27.60	23.99	-3.10	HORIZONTAL	Passed
7720.000000	32.20	40.74	2.70	HORIZONTAL	Passed

RX mode, channel 661. GSM1900 idle mode, FM radio on

Quasi peak (RBW: 120 kHz)

Frequency / MHz	Level / dB μ V/m	Level / μ V/m	A _{CORRECTION} / dB	Polarisation	Result
42.905010	32.10	40.27	-32.60	VERTICAL	Passed
340.081764	10.90	3.51	-33.10	HORIZONTAL	Passed
382.364329	34.40	52.48	-32.10	VERTICAL	Passed
391.982766	15.40	5.89	-31.80	VERTICAL	Passed
394.489980	16.60	6.76	-31.70	VERTICAL	Passed

Peak (RBW: 1 MHz)

Frequency / MHz	Level / dB μ V/m	Level / μ V/m	A _{CORRECTION} / dB	Polarisation	Result
7840.181363	47.00	223.87	3.20	VERTICAL	Passed
7840.679359	46.40	208.93	3.20	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency / MHz	Level / dB μ V/m	Level / μ V/m	A _{CORRECTION} / dB	Polarisation	Result
1130.760521	39.30	92.26	-20.50	HORIZONTAL	Passed
7840.179359	33.20	45.71	3.20	VERTICAL	Passed
7840.181363	32.90	44.16	3.20	VERTICAL	Passed

RX mode, channel 810. GSM1900 idle mode, FM radio on

Peak (RBW: 1 MHz)

Frequency / MHz	Level / dB μ V/m	Level / μ V/m	A _{CORRECTION} / dB	Polarisation	Result
3980.000000	40.80	109.65	-2.50	VERTICAL	Passed
7960.000000	46.90	221.31	3.30	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency / MHz	Level / dB μ V/m	Level / μ V/m	A _{CORRECTION} / dB	Polarisation	Result
3980.000000	28.40	26.30	-2.50	HORIZONTAL	Passed
7960.000000	32.90	44.16	3.30	VERTICAL	Passed

3.4. Bluetooth Test results

RX mode, channel 0

Quasi peak (RBW: 120 kHz)

Frequency / MHz	Level / dB μ V/m	Level / μ V/m	A _{CORRECTION} / dB	Polarisation	Result
43.126453	33.40	46.77	-32.70	VERTICAL	Passed
345.692986	13.30	4.62	-33.10	HORIZONTAL	Passed
382.165130	34.20	51.29	-32.10	VERTICAL	Passed
487.075150	25.20	18.20	-29.60	VERTICAL	Passed
501.302004	33.40	46.77	-29.20	HORIZONTAL	Passed

RX mode, channel 40

Quasi peak (RBW: 120 kHz)

Frequency / MHz	Level / dB μ V/m	Level / μ V/m	A _{CORRECTION} / dB	Polarisation	Result
43.426453	33.30	46.24	-32.90	VERTICAL	Passed
346.092986	12.80	4.37	-33.10	HORIZONTAL	Passed
382.165130	36.20	64.57	-32.10	VERTICAL	Passed
488.175150	26.00	19.95	-29.60	VERTICAL	Passed
501.402004	34.10	50.70	-29.20	HORIZONTAL	Passed

Average (RBW: 1 MHz)

Frequency / MHz	Level / dB μ V/m	Level / μ V/m	A _{CORRECTION} / dB	Polarisation	Result
1130.760521	37.50	74.99	-20.50	HORIZONTAL	Passed

RX mode, channel 78

Quasi peak (RBW: 120 kHz)

Frequency / MHz	Level / dB μ V/m	Level / μ V/m	A _{CORRECTION} / dB	Polarisation	Result
43.226453	33.80	48.98	-32.80	VERTICAL	Passed
345.692986	13.60	4.79	-33.10	HORIZONTAL	Passed
382.165130	36.20	64.57	-32.10	VERTICAL	Passed
488.275150	27.10	22.65	-29.60	VERTICAL	Passed
501.402004	33.80	48.98	-29.20	HORIZONTAL	Passed

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM37610	Spectrum analyzer	FSU	R&S	15C,22/24
TM37678	Radio communication tester	CMU-200	R&S	15C,22/24
	Attenuator 10 dB	6251.17.A	Huber+Suhner AG	15C,22/24
TM22901	Step attenuator 110dB	8496A	Agilent	15C,22/24
TM37499	Power splitter	11667A	Agilent	15C,22/24
	Temperature chamber	VT4002	Vötsch	15C,22/24
TM38112	DC power supply	6632A	Agilent	15C,22/24
TM38111	Multimeter	34401A	Agilent	15C,22/24
TM38845	EMI receiver	ESI 40	R&S	15B,15C
TM37773	Radio communication tester	CMU-200	R&S	15B,15C
TM38631	Signal generator	83640L	Agilent	15B,15C
TM38114	DC power supply	6632A	Agilent	15B,15C
TM22835	Multimeter	87	Fluke	15B,15C
TM30600	Pulse Limiter	ESH3-Z2	R&S	15B,15C
TM26490	LISN 50 µH	ESH3-Z5/	R&S	15B,15C
TM30636	LISN 50 µH	L2-16/	PMM	15B,15C

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30599	3m semi-anechoic chamber		TDK	15B,15C, 22/24
TM38845	EMI receiver	ESI 40	R&S	15B,15C, 22/24
TM37498	Preamplifier	AMF-5D-020180-26-10P	MITEQ	15B,15C, 22/24
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	MITEQ	15B,15C, 22/24
TM37516	Biconilog antenna	HL562	R&S	15B,15C, 22/24
TM26496	Double ridged waveguide antenna	3115	EMCO	15B,15C, 22/24
TM39158	Horn antenna	3116	EMCO	15B,15C, 22/24
TM26492	Reference dipole set	UHAP/VHAP	Schwarzbeck	15B,15C, 22/24
TM37501	Dipole antenna	3125-870	EMCO	22/24
TM37502	Dipole antenna	3125-1880	EMCO	22/24
TM37773	Radio communication tester	CMU-200	R&S	15B,15C, 22/24
TM38631	Signal generator	83640L	Agilent	15B,15C, 22/24
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	15B,15C, 22/24
	High pass filter	WHK2010-10SS	Trilithic	15B,15C, 22/24
	Low pass filter	WLK1750-10SS	Trilithic	15B,15C, 22/24
TM26511	Tunable notch filter	WRCA870	Wainwright	22/24
TM38215	Tunable notch filter	WRCD1850/1910-0.2/40	Wainwright	22/24
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30	Wainwright	15C
TM30642	Turntable controller	HD-100	Deisel	15B,15C, 22/24
TM26500	Turntable	DS412	Deisel	15B,15C, 22/24
TM38842	Antenna mast controller	2090	EMCO	15B,15C, 22/24
TM38843	Antenna mast	2075	EMCO	15B,15C, 22/24
TM38114	DC power supply	6632A	Agilent	15B,15C, 22/24
TM22835	Multimeter	87	Fluke	15B,15C, 22/24