

FCC Part 15B Compliance Test Report

Test Report no.:	Tre_FCC_0535_02.doc	Date of Report:	7.9.2005
Number of pages:	12	Customer's Contact person:	Jorma Hanni
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FCC listing no.:	94436		
IC recognition no.:	3608		
Tested devices/ accessories:	GSM phone RM-56 / Battery BL-5C, AC-charger AC-4E, Headset HS-23, Memory card MU-17		
FCC ID:	LJPRM-56	IC:	661E-RM56
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, System Manager

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	24.8.2005
Testing completed	1.9.2005
The customer's contact person	Jorma Hanni
Test Plan referred to	\EMC\TESTPLAN\
Notes	-
Document name	T:\Projects\RM-56\results\emc\FCC\Tre_FCC_0535_02.doc

1.1. EUT and Accessory Information

The EUT is a triple band (GSM850/1800/1900) mobile phone with GPRS, EGPRS and Bluetooth. GSM bands are tested in idle mode. Bluetooth is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
GSM phone	RM-56	004400/58/164239/2	1101	-	03.07	40319
AC-Charger	AC-4E	-	1.0	3.0	-	40321
Memory Card	MU-17	-	-	-	-	40322
Battery	BL-5C	-	-	-	-	40323
Headset	HS-23	-	-	-	-	40324

1.2. Summary of Test Results

GSM 850:

Section in CFR 47	Section in ICES-003 (RSS-132)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	PASSED
15.109, a	5.5 (6.6)	Radiated emissions	PASSED

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	PASSED
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.

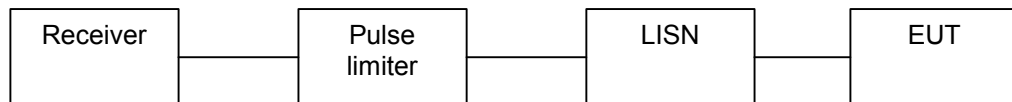
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2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-56 DUT 40319
Accessories with DUT numbers	BL-5C DUT 40323, AC-4E DUT 40321, HS-23 DUT 40324, MU-17 DUT 40322
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	19 / 48 / 102.8
Date of measurements	1.9.2005
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:

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

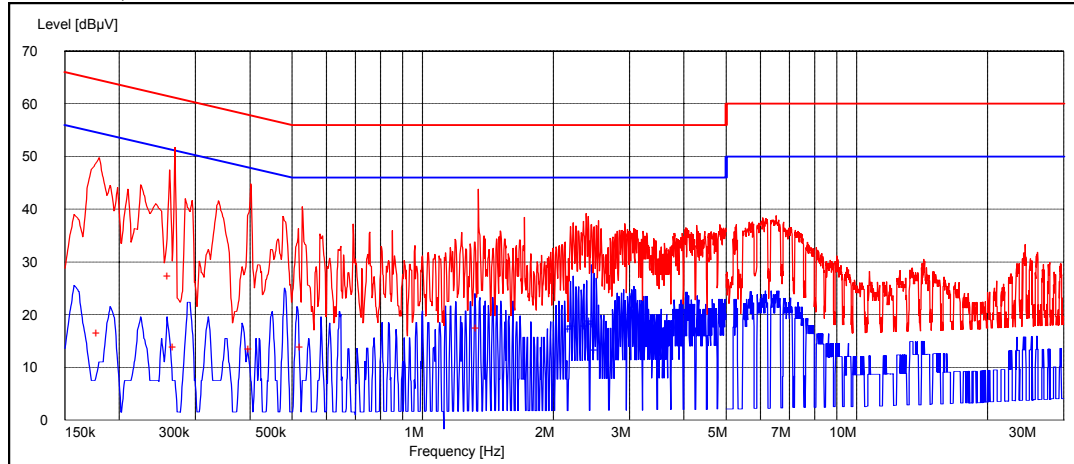
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

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 850 Test results

RX mode, channel 190



Quasi peak (RBW: 9 kHz)

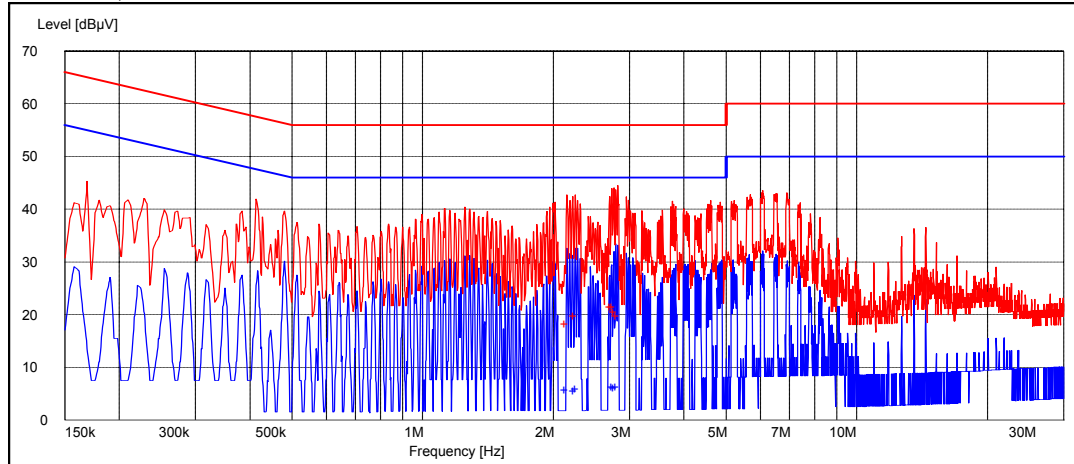
Frequency [MHz]	U [dBμV]	Line	Result
0.179659	16.50	L1	PASSED
0.261222	27.40	L1	PASSED
0.268637	13.80	L1	PASSED
0.402104	13.50	L1	PASSED
0.528156	13.80	L1	PASSED
1.343788	17.50	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
2.192385	17.30	L1	PASSED
2.222445	17.80	L1	PASSED
2.384770	17.80	L1	PASSED
2.450902	18.70	L1	PASSED
2.480962	18.20	L1	PASSED
2.511022	13.20	N	PASSED

2.4. Bluetooth Test results

TX mode, channel 40



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
2.150301	18.20	N	PASSED
2.246493	19.70	N	PASSED
2.727455	21.50	N	PASSED
2.757515	21.50	N	PASSED
2.787575	20.40	N	PASSED
2.817635	19.80	N	PASSED

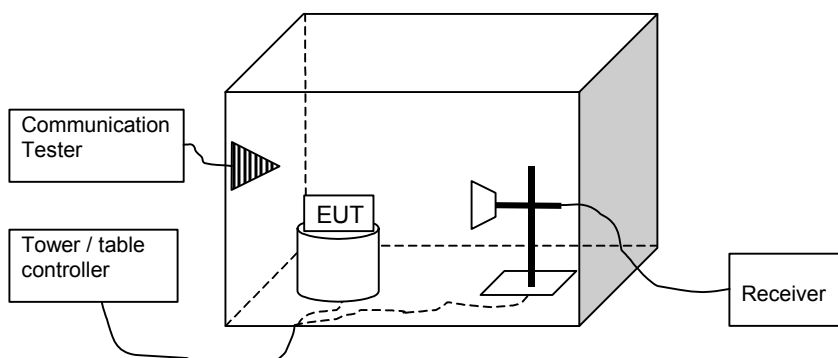
Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
2.150301	5.70	N	PASSED
2.246493	5.60	N	PASSED
2.276553	5.90	N	PASSED
2.757515	6.20	N	PASSED
2.787575	6.10	N	PASSED
2.817635	6.20	N	PASSED

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

EUT with DUT number	RM-56 DUT 40319
Accessories with DUT numbers	BL-5C DUT 40323, AC-4E DUT 40321, HS-23 DUT 40324, MU-17 DUT 40322
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	FM radio on
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 43 / 100.9
Date of measurements	30.8.2005
Measured by	Jari Jantunen

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:

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

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

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 850 Test results

RX mode, channel 128

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3476.800000	40.00	100.00	44.80	-4.80	HORIZONTAL	PASSED
6953.600000	50.20	323.59	48.70	1.50	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3476.800000	27.00	22.39	31.80	-4.80	HORIZONTAL	PASSED
6953.600000	37.00	70.79	35.50	1.50	VERTICAL	PASSED

RX mode, channel 190

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
36.612024	27.80	24.55	56.60	-28.80	VERTICAL	PASSED
54.029058	21.30	11.61	58.80	-37.50	VERTICAL	PASSED
95.270341	19.20	9.12	55.40	-36.20	VERTICAL	PASSED
105.189579	16.90	7.00	52.10	-35.20	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3526.400000	40.20	102.33	45.00	-4.80	VERTICAL	PASSED
7052.800000	42.80	138.04	42.60	0.20	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
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3527.052104	25.60	19.05	30.40	-4.80	HORIZONTAL	PASSED
7419.331663	32.10	40.27	27.60	4.50	HORIZONTAL	PASSED
7987.475952	32.30	41.21	27.40	4.90	HORIZONTAL	PASSED

RX mode, channel 251

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	42.20	128.82	46.80	-4.60	VERTICAL	PASSED
7150.400000	45.70	192.75	43.10	2.60	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	28.00	25.12	32.60	-4.60	VERTICAL	PASSED
7150.400000	32.40	41.69	29.80	2.60	VERTICAL	PASSED

3.4. GSM 1900 Test results

RX mode, channel 512

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3860.000000	43.80	154.88	46.10	-2.30	VERTICAL	PASSED
7720.000000	46.80	218.78	42.60	4.20	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3860.000000	28.00	25.12	30.30	-2.30	VERTICAL	PASSED
7720.000000	33.60	47.86	29.40	4.20	VERTICAL	PASSED

RX mode, channel 661

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
36.652505	27.90	24.83	56.70	-28.80	VERTICAL	PASSED
53.888577	20.00	10.00	57.40	-37.40	VERTICAL	PASSED
105.530060	15.60	6.03	50.80	-35.20	VERTICAL	PASSED
121.301804	18.40	8.32	52.50	-34.10	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3920.000000	47.50	237.14	49.50	-2.00	HORIZONTAL	PASSED
7840.000000	50.20	323.59	45.60	4.60	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3920.000000	30.70	34.28	32.70	-2.00	VERTICAL	PASSED
7840.000000	34.70	54.33	30.10	4.60	VERTICAL	PASSED

RX mode, channel 810

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	46.40	208.93	48.10	-1.70	HORIZONTAL	PASSED
7960.000000	47.40	234.42	42.60	4.80	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	30.30	32.73	32.00	-1.70	VERTICAL	PASSED
7960.000000	34.20	51.29	29.40	4.80	VERTICAL	PASSED

3.5. Bluetooth Test results

RX mode, channel 0

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3923.343687	39.80	97.72	41.80	-2.00	VERTICAL	PASSED
7842.189379	44.90	175.79	40.30	4.60	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3923.343687	26.40	20.89	28.40	-2.00	VERTICAL	PASSED
7842.189379	31.80	38.90	27.20	4.60	HORIZONTAL	PASSED

RX mode, channel 40

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
49.278958	32.50	42.17	67.50	-35.00	VERTICAL	PASSED
54.288577	32.50	42.17	70.10	-37.60	VERTICAL	PASSED
382.264329	36.60	67.61	67.20	-30.60	VERTICAL	PASSED
395.190782	17.00	7.08	47.40	-30.40	HORIZONTAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3917.843687	39.10	90.16	41.10	-2.00	VERTICAL	PASSED
7844.189379	44.50	167.88	39.90	4.60	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3918.343687	26.60	21.38	28.60	-2.00	VERTICAL	PASSED
7846.689379	31.70	38.46	27.10	4.60	HORIZONTAL	PASSED

RX mode, channel 78

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3922.343687	39.10	90.16	41.10	-2.00	VERTICAL	PASSED
7843.689379	44.70	171.79	40.10	4.60	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3923.343687	26.40	20.89	28.40	-2.00	VERTICAL	PASSED
7847.689379	31.60	38.02	27.00	4.60	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