

FCC Part 15B Compliance Test Report

Test Report no.:	FCC15B_RM-604_02.doc	Date of Report:	18-Nov-2009
Number of pages:	12	Customer's Contact person:	Bruno Ramelli
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-604 / Battery BL-4CT, AC charger AC-3E, Headset WH-102, Data cable CA-101, Laptop IBM Thinkpad T40, AC adapter 02K6543, Printer HP deskjet 1600CC3540A		
FCC ID:	PPIRM-604	IC:	661U-RM604
Supplement reports:	The results in this report are based on results from report FCC15B_RM-598_05.		
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 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009), RSS-139 (Issue 2, February 2009) and RSS-210 (Issue 7, June 2007). 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:			

Christian Andersen, System Specialist, EMC

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	15-Oct.2009
Testing completed	22-Oct-2009
The customer's contact person	Bruno Ramelli
Test Plan referred to	T:\Projects\RM-598\TestPlan_RS\RS_testplan_RM-598.xls
Notes	-
Document name	FCC15B_RM-598_05.doc

1.1. EUT and Accessory Information

The EUT is a 7-band (GSM850/900/1800/1900 and WCDMA Band I/II(1900)/VIII) mobile phone with GPRS, EGPRS and Bluetooth. GSM and WCDMA bands are tested in idle mode. Bluetooth is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-598	004401107348167	0220	-	Vfa5.46SSC	42062
Battery	BL-4CT	3820669142116020862;0670565	-	-	-	42064
Charger	AC-3E	40904989422971302463;0675370	-	-	-	42065
Headset	WH-102	06943239285L4102582	-	-	-	42066
Data cable	CA-101	07306348453T1226330	-	-	-	42068
Laptop	IBM Thinkpad T40	99ARTGD	-	-	-	41868
AC Adapter	02K6543	-	-	-	-	40202
Printer	HP deskjet 1600CC3540A	USB8302546	-	-	-	40077

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	NP
15.109, a	5.5 (4.6)	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	NP
15.109, a	5.5 (6.6)	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

The EUT complies with the essential requirements in the standard.

FAILED

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

NP

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

The test results of PPIRM-598 are re-used for certification of the LJPRM-604. The table above indicates the results, which will be re-used.

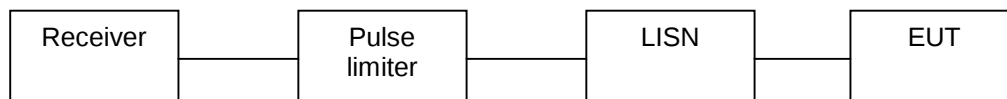
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2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-598 DUT42062
Accessories with DUT numbers	BL-4CT DUT 42064, AC-3E DUT42065, WH-102 DUT42066, CA-101 DUT42068, IBM Thinkpad T40 DUT 41868, 02K6543 DUT 40202, HP deskjet 1600CC3540A DUT 40077, Parallel cable for printer DUT 40087
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Continuous data transfer was active between the phone and the computer during the test.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 102.6
Date of measurements	22-Oct-2009
Measured by	Hannu Söderholm

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:

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

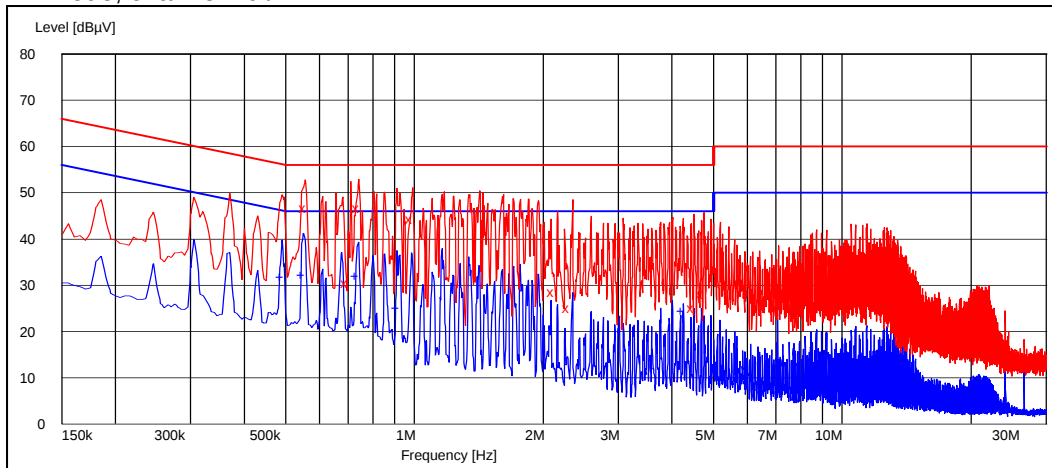
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

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. Bluetooth Test results

TX mode, channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.555000	46.70	N	PASSED
0.695000	30.40	N	PASSED
0.740000	46.70	N	PASSED
0.985000	44.30	N	PASSED
2.115000	28.40	L1	PASSED
2.295000	25.10	N	PASSED
4.490000	25.00	N	PASSED
4.710000	28.00	L1	PASSED

Average (RBW: 9 kHz)

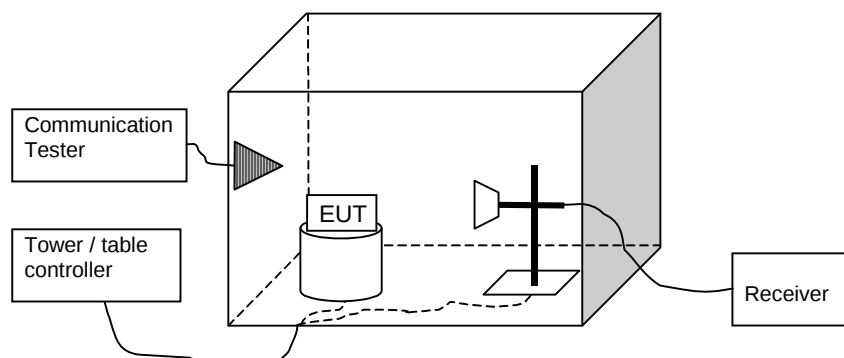
Frequency [MHz]	U [dBμV]	Line	Result
0.490000	31.80	N	PASSED
0.550000	32.10	N	PASSED
0.735000	31.90	N	PASSED
0.915000	25.00	N	PASSED
4.240000	24.40	L1	PASSED

3. Radiated emissions

(FCC §15.109, ICES-003 section 5.5, RSS-132 4.6, RSS-133 6.6, RSS-139 6.6)

EUT with DUT number	RM-598 DUT42062
Accessories with DUT numbers	BL-4CT DUT 42064, AC-3E DUT42065, WH-102 DUT42066, CA-101 DUT42068, IBM Thinkpad T40 DUT 41868, 02K6543 DUT 40202, HP deskjet 1600CC3540A DUT 40077, Parallel cable for printer DUT 40087
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Continuous data transfer was active between the phone and the computer during the test.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 47 / 101.8
Date of measurements	20-Oct-2009
Measured by	Hannu Söderholm

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 / 869.2 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3476.800000	41.40	117.49	45.80	-4.4	HORIZONTAL	PASSED
6953.600000	42.60	134.90	41.10	1.5	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3476.800000	27.40	23.44	31.80	-4.4	HORIZONTAL	PASSED
6953.600000	30.00	31.62	28.50	1.5	VERTICAL	PASSED

RX mode, channel 190 / 881.6 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
33.447695	29.50	29.85	56.90	-27.4	VERTICAL	PASSED
153.907816	36.70	68.39	72.00	-35.3	HORIZONTAL	PASSED
501.402004	34.00	50.12	63.70	-29.7	HORIZONTAL	PASSED
532.764128	19.60	9.55	48.80	-29.2	VERTICAL	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
7839.175351	45.10	179.89	41.30	3.8	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
7841.675351	31.30	36.73	27.50	3.8	HORIZONTAL	PASSED

RX mode, channel 251 / 893.8 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	40.00	100.00	44.20	-4.2	HORIZONTAL	PASSED
7150.400000	42.80	138.04	40.70	2.1	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	26.90	22.13	31.10	-4.2	HORIZONTAL	PASSED
7150.400000	29.50	29.85	27.40	2.1	VERTICAL	PASSED

3.4. GSM 1900 Test results

RX mode, channel 512 / 1930.2 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3860.000000	39.80	97.72	42.00	-2.2	HORIZONTAL	PASSED
7720.000000	44.10	160.32	40.60	3.5	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3860.000000	27.20	22.91	29.40	-2.2	HORIZONTAL	PASSED
7720.000000	30.50	33.50	27.00	3.5	VERTICAL	PASSED

RX mode, channel 661 / 1960.0 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
36.012024	37.70	76.74	66.20	-28.5	VERTICAL	PASSED
226.052104	36.40	66.07	72.70	-36.3	HORIZONTAL	PASSED
447.294990	25.20	18.20	55.90	-30.7	VERTICAL	PASSED
501.402004	33.90	49.55	63.60	-29.7	VERTICAL	PASSED
798.799198	19.70	9.66	44.80	-25.1	VERTICAL	PASSED
933.567735	19.80	9.77	43.50	-23.7	VERTICAL	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3522.050100	39.10	90.16	43.30	-4.2	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3524.550100	26.20	20.42	30.40	-4.2	VERTICAL	PASSED

RX mode, channel 810 / 1989.8 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	40.90	110.92	42.60	-1.7	HORIZONTAL	PASSED
7960.000000	43.80	154.88	39.80	4.0	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	27.90	24.83	29.60	-1.7	HORIZONTAL	PASSED
7960.000000	31.20	36.31	27.20	4.0	HORIZONTAL	PASSED

3.5. Bluetooth Test results

TX mode, channel 0 / 2402 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	40.20	102.33	41.20	-1.0	HORIZONTAL	PASSED
7206.000000	42.70	136.46	40.30	2.4	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	26.70	21.63	27.70	-1.0	VERTICAL	PASSED
7206.000000	29.50	29.85	27.10	2.4	HORIZONTAL	PASSED

TX mode, channel 40 / 2442 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
132.366333	30.40	33.11	53.40	-23.0	HORIZONTAL	PASSED
165.730060	26.90	22.13	51.20	-24.3	HORIZONTAL	PASSED
170.341483	20.50	10.59	44.70	-24.2	HORIZONTAL	PASSED
245.791784	32.90	44.16	55.50	-22.6	HORIZONTAL	PASSED
257.114028	33.10	45.19	55.40	-22.3	HORIZONTAL	PASSED
400.500401	34.90	55.59	53.50	-18.6	VERTICAL	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
7310.127255	43.90	156.68	40.90	3.0	VERTICAL	PASSED
7318.633267	42.40	131.83	39.30	3.1	HORIZONTAL	PASSED
17492.489980	52.70	431.52	33.80	18.9	HORIZONTAL	PASSED
17994.481964	54.50	530.88	33.60	20.9	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
7312.127255	29.90	31.26	26.90	3.0	VERTICAL	PASSED
7316.133267	30.00	31.62	26.90	3.1	HORIZONTAL	PASSED
17498.489980	39.30	92.26	20.40	18.9	HORIZONTAL	PASSED
17992.481964	42.00	125.89	21.10	20.9	VERTICAL	PASSED

TX mode, channel 78 / 2480 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	39.70	96.61	40.20	-0.5	VERTICAL	PASSED
7440.000000	42.00	125.89	38.80	3.2	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	27.60	23.99	28.10	-0.5	HORIZONTAL	PASSED
7440.000000	29.30	29.17	26.10	3.2	HORIZONTAL	PASSED

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30597	Power splitter	11667A	Agilent	22/24/27, 15C
TM37499	Power splitter	11667A	Agilent	22/24/27, 15C
TM38111	Multimeter	34401A	Agilent	22/24/27, 15C
TM38112	DC power supply	6632A	Agilent	22/24/27, 15C
TM22901	Attenuator	8496A	Agilent	22/24/27, 15C
TM30636	Artificial mains net	L2-16	PMM	15C, 15B
TM37678	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM37773	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM30600	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum analyzer	FSU	R&S	22/24/27, 15C
TM22835	Multimeter	87	Fluke	15C, 15B
TM37500	Microwave switch system	7116-MSW	Keithley	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	Transmatic	22/24/27, 15C, 15B
	Temperature chamber	VT4002	Vötsch	22/24/27, 15C
2058	EMI Test receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30599	3m semi-anechoic chamber		TDK	22/24/27, 15C, 15B
TM38845	EMI receiver	ESI 40	R&S	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	MITEQ	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	MITEQ	22/24/27, 15C, 15B
TM37516	Biconilog antenna	HL562	R&S	22/24/27, 15C, 15B
TM26496	Double ridged waveguide antenna	3115	EMCO	22/24/27, 15C, 15B
TM39158	Horn antenna	3116	EMCO	22/24/27, 15C, 15B
TM26492	Reference dipole set	UHAP/VHAP	Schwarzbeck	22/24/27, 15C, 15B
TM37501	Dipole antenna	3125-870	EMCO	22/24/27
TM37502	Dipole antenna	3125-1880	EMCO	22/24/27
TM37773	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM38631	Signal generator	83640L	Agilent	22/24/27, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24/27, 15C, 15B
TM26511	Tunable notch filter	WRCA870	Wainwright	22/24/27
TM38215	Tunable notch filter	WRCD1850/1910-0.2/40	Wainwright	22/24/27
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30	Wainwright	15C
TM30642	Mast/Turntable controller	HD-100	Deisel	22/24/27, 15C, 15B
TM26500	Turntable	DS412	Deisel	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	EMCO	22/24/27, 15C, 15B
TM38843	Antenna mast	2075	EMCO	22/24/27, 15C, 15B
TM38114	DC power supply	6632A	Agilent	22/24/27, 15C, 15B
TM38323	Preamplifier	PA-02 18-26 GHz	EMC Automation	22/24/27, 15C, 15B
TM37678	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	Transmatic	22/24/27, 15C, 15B
TM23892	Yaesu controller	G-1000SDX	Yaesu	22/24/27, 15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B

