TCC
Nokia

FINAS
Finnish Accreditation Service
T117 (EN ISO/IEC 17025)

FCC Part 15B Compliance Test Report

Test Report no.:	FCC15B_RM-709_06.docx	**Date of Report:**	14-Sep-2010
Number of pages:	11	**Customer's Contact person:**	Qiu Rain
Testing laboratory:	TCC Nokia Copenhagen Laboratory Frederikskaj 1790 COPENHAGEN V DENMARK Tel. +45 33 292929 Fax. +45 33 292934	**Customer:**	Nokia Corporation Beijing Economic and Technological Development Area No.5 Donghuan Zhonglu Beijing PRC China 100176 Tel. +86 10 8711 8888 Fax. +86 10 8711 4550
FCC listing no.: **IC recognition no.:**	99059 661AL-1		
Tested devices/ accessories:	**Phone RM-709 / Battery BL-5C / AC-Charger AC-3E / Headset WH-102 / USB Cable CA-101 / Laptop Lenovo T61**		
FCC ID:	QTLRM-709	**IC:**	661AB-RM709
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, RSS-132 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009). 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:	Digitally signed by Niels Christian Andersen Date: 2010.09.26 22:41:09 +02'00'		

Christian Andersen, System Specialist, EMC

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	24-Aug-2010
Testing completed	08-Sep-2010
The customer's contact person	Qiu Rain
Test Plan referred to	T:\Projects\RM-709\TestPlan\RS_testplan_RM-709.xls
Notes	-
Document name	T:\Projects\RM-709\EMC\FCC15B_RM-709_06.docx

1.1. EUT and Accessory Information

The EUT is a 4-band (GSM850/900/1800/1900) mobile phone with GPRS, EGPRS and Bluetooth.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-709	004402/13/227236/4	0201	-	V tw92_10w31SSC	24135
Battery	BL-5C	0670400382066R12405GL61927	-	-	-	24117
AC-Charger	AC-3E	441929843205220005 8;0675370	-	-	-	24104
Headset	WH-102	06943249041E2607011	-	-	-	24110
USB cable	CA-101	07306349251Q1220778	-	-	-	24102
Laptop	Lenovo T61	1S7665D71L3W8321	-	-	-	24950
Phone	RM-709	004402/13/168893/3	0201	-	V tw92_10w31SSC	24134

1.2. Summary of Test Results

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 Laboratory.

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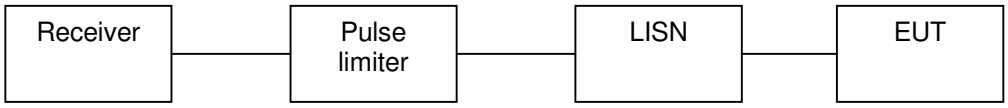
2. AC powerline conducted emissions
(FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-709, DUT 24134
Accessories with DUT numbers	BL-5C, DUT 24123 ; Lenovo T61, DUT 24950 ; CA-101, DUT 24102
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]	22 / 45 / 108
Date of measurements	08-Sep-2010
Measured by	Bo Moltved Christiansen

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

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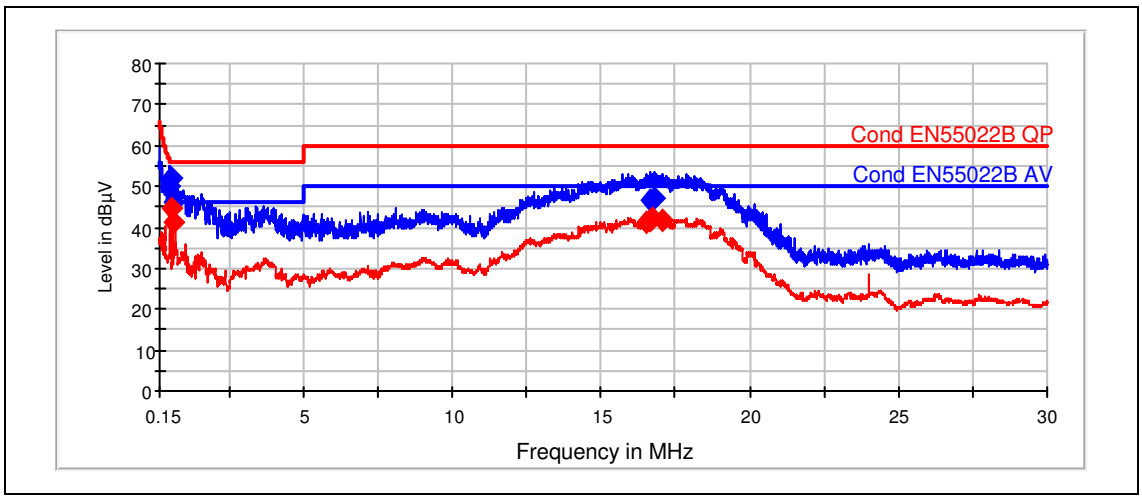
2.3. Bluetooth Test results

BT RX



Quasi peak

Frequency [MHz]	Level [dBµV]	IF-BW[kHz]	Line	Margin	Result
0.505	50.21	10	N	5.8	Passed
0.515	51.49	10	N	4.5	Passed
0.525	52	10	N	4	Passed
0.645	46.21	10	N	9.8	Passed
16.655	46.8	10	N	13.2	Passed
16.775	47.16	10	N	12.8	Passed

Average

Frequency [MHz]	Level [dBµV]	IF-BW[kHz]	Line	Margin	Result
0.53	44.71	10	N	1.3	Passed
0.645	41.42	10	N	4.6	Passed
16.5	41.15	10	N	8.9	Passed
16.655	41.86	10	N	8.1	Passed
16.74	42.11	10	N	7.9	Passed
17.055	41.87	10	N	8.1	Passed

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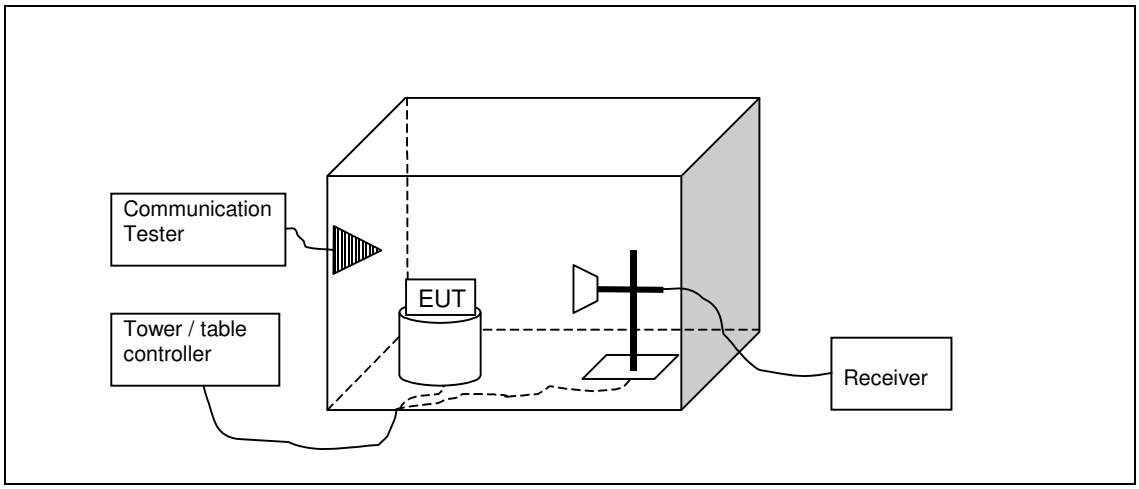
3. Radiated emissions

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

EUT with DUT number	RM-709, DUT 24135
Accessories with DUT numbers	BL-5C, DUT 24117 ; AC-3E, DUT 24104 ; WH-102, DUT 24110 ; CA-101, DUT 24102, T61, DUT 24950
Operation Voltage [V] / [Hz]	115 / 60
Results	Passed
Remarks	*Continuous data transfer was active between the phone and the computer during the test."
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 46 / 100.2
Date of measurements	06-Sep-2010
Measured by	Christian Andersen

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.

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The measurement results are obtained as described below:

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

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

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

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3.3. Bluetooth Test results

3.3.1 GFSK modulation, PRBS packet type

TX mode, Channel 0 / 2402 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4806.4	57.94	788.951	56.16	1.78	VERTICAL	Passed
7204.2	50.25	325.274	38.96	11.29	VERTICAL	Passed

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4806.4	29.75	30.729	27.97	1.78	VERTICAL	Passed
7204.2	37.38	73.986	26.09	11.29	VERTICAL	Passed

TX mode, Channel 78 / 2480 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4962.3	43.39	147.809	41.02	2.37	HORIZONTAL	Passed
7438.2	50	316.046	38.46	11.54	HORIZONTAL	Passed

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4962.3	30.1	31.996	27.73	2.37	HORIZONTAL	Passed
7438.2	37.17	72.202	25.63	11.54	HORIZONTAL	Passed

TX mode, Channel 40 / 2442 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
3548.393	38.75	86.636	41.02	-2.27	VERTICAL	Passed
3941.781	39.65	96.04	40.65	-1	HORIZONTAL	Passed
4945.292	59.33	925.55	56.8	2.53	VERTICAL	Passed

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
3548.393	25.31	18.437	27.58	-2.27	VERTICAL	Passed
3941.781	26.49	21.111	27.49	-1	HORIZONTAL	Passed
4945.292	41.06	112.98	38.53	2.53	VERTICAL	Passed

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TX mode, Channel 40 / 2442 MHz

Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
31.2	30.93	35.201	42.77	-11.84	VERTICAL	Passed
39.51	35.61	60.291	52.98	-17.37	VERTICAL	Passed
45.758	24.91	17.593	46.44	-21.53	VERTICAL	Passed
83.991	25.8	19.498	50.02	-24.22	VERTICAL	Passed
122.524	18.73	8.637	42.4	-23.67	VERTICAL	Passed
146.687	10.37	3.299	35.82	-25.45	HORIZONTAL	Passed
501.084	12.22	4.085	29.77	-17.55	HORIZONTAL	Passed
666.082	34.62	53.802	49.49	-14.87	HORIZONTAL	Passed

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
1989.819	50.21	324.041	53.22	-3.01	VERTICAL	Passed
2498.967	55.65	606.108	53.98	1.67	VERTICAL	Passed

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
1989.819	47.32	232.3	50.33	-3.01	VERTICAL	Passed
2498.967	32.31	41.267	30.64	1.67	VERTICAL	Passed

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4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15C, 15B
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15C, 15B
13513	Pulse Limiter	ESH3Z2	Rohde&Schwarz	15C, 15B
13666	Receiver	ESPC	Rohde&Schwarz	15C, 15B
13935	LISN	ESH3-Z5	Rohde&Schwarz	15C, 15B
16995	Directional Coupler 20dB 0,5-2,0 GHz SMA Conn.	1538RA-20	Weinschel	15C, 15B
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15C, 15B
19171	Communication Tester	CMU200	Rohde&Schwarz	15C, 15B
11386	DC Power Supply	HP6632A	Hewlett Packard	22/24/27, 15C, 15B
19678	Spectrum Analyzer	FSP	Rohde&Schwarz	22/24/27, 15C, 15B
16601	Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
19625	Climatic Chamber	VT4002EMC	Vötsch	22/24/27, 15C, 15B
13357	Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 15C, 15B
19116	Power splitter	-	various	22/24/27, 15C, 15B
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
18792	Mast/turntable controller	2090	ETS-EMCO	22/24/27, 15C, 15B
18416	Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
13077	Power Supply	EA-3016	-	22/24/27, 15C, 15B
15742	Programmable Relay Switching System	----------	Pickering	22/24/27, 15C, 15B
20078	Relay 2x6 Chnl µWave Mux	10-785B-522	Pickering	22/24/27, 15C, 15B
14021	Relay Dual 6 Chnl µWave Mux	10-785-522	-	22/24/27, 15C, 15B
-	Relay Dual 6 Chnl µWave Mux	10-785-522	-	22/24/27, 15C, 15B
17644	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
16948	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
16949	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
1999	Receiver	EMI Test Receiver 20Hz-26,5GHz ESI	Rohde&Schwarz	22/24/27, 15C, 15B
18860	Antenna	HL562	Rohde&Schwarz	22/24/27, 15C, 15B
18773	Anechoic chamber	RFD-100	ETS-Lindgren	22/24/27, 15C, 15B
18774	Anechoic chamber	RFSD-F/A-100	ETS-Lindgren	22/24/27, 15C, 15B
19151	High Pass Filter	WHJS3000-10SS	Wainwright	22/24/27, 15C, 15B
13937	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright Instruments	22/24/27, 15C, 15B
13936	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright Instruments	22/24/27, 15C, 15B

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Eq. No	Equipment	Type	Manufacturer	Used in
14114	Highpass Filter	WHK1000-12SS	Wainwright Instruments	22/24/27, 15C, 15B
14188	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright	22/24/27, 15C, 15B
14187	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
16633	Band reject filter	WRCD1880.0-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
19587	Band reject filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	22/24/27, 15C, 15B
20115	Band reject filter	-	Wainwright	22/24/27, 15C, 15B
20114	Band reject filter	WRCG1737/1743-1733/1747-40/6SS	Wainwright	22/24/27, 15C, 15B
20116	Band reject filter	WRCG832/83/-825/845-40/5SS	Wainwright	22/24/27, 15C, 15B
20698	Antenna	BBHA 9120 D	SCHWARZBECK	22/24/27, 15C, 15B
19966	Antenna	HFH2-Z2	Rohde&Schwarz	15C, 15B
13799	Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 15C, 15B
15191	Turntable Contoller Unit	G-800SDX	YAESU	22/24/27, 15C, 15B
14900	Antenna Controller	HD100	HD GmbH	22/24/27, 15C, 15B
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B

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