TCC Nokia

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

FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC22&24&27_RM-701_01.docx	**Date of Report:**	11-May-2011
Number of pages:	10	**Customer's Contact person:**	Juvani Jyrki
Testing laboratory:	TCC Nokia Tampere Laboratory P.O. Box 68 Sinitaival 5 FIN-33720 TAMPERE, FINLAND Tel. +358 (0) 7180 46800 Fax. +358 (0) 7180 46880	**Customer:**	Nokia Corporation P.O. Box 50 Elektroniikkatie 10 FIN-90571 OULU, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 47222
FCC listing no.: **IC recognition no.:**	94436 661AK-1		
Tested devices/ accessories:	**Phone RM-701 / Battery BL-4J / AC charger AC-15E / Headset WH-205**		
FCC ID:	LJPRM-701	**IC:**	661E-RM701
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Parts 22/24/27 , TIA-603-C-2004 and IC standards, RSS-GEN (Issue 3, December 2010), RSS-132 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009), RSS-139 (Issue 2, 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 soderhol DN: cn=soderhol Date: 2011.05.11 15:28:10 +03'00'		

Hannu Soderholm, Senior Engineer, EMC

1. Summary for FCC Part 22/24/27 Compliance Test Report

Date of receipt	13-Apr-2011
Testing completed	14-Apr-2011
The customer's contact person	Juvani Jyrki
Test Plan referred to	T:\Projects\RM-701\TestPlan\RS_testplan_RM-701.xls
Notes	-
Document name	\\vatcc001\certification\Projects\RM-701\EMC\FCC22&24&27_RM-701_01.docx

1.1. EUT and Accessory Information

The EUT is a 9-band (GSM850/900/1800/1900) and WCDMA Band (I/II(1900)/IV(1700)/V(850)/VIII/) mobile phone with GPRS, EGPRS, HSDPA, HSUPA and WLAN and Bluetooth. The EUT is tested with maximum rated TX power, modulated with pseudo random bit sequence (PRBS9).

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-701	004402134174352	0701	-		42532
Battery	BL-4J	382066017717070125l;0670616	-	-	-	42537
AC charger	AC-15E	4090490475121203073;0675463	-	-	-	42533
Headset	WH-205	06944210403F2R02340	-	-	-	42534

1.2. Summary of Test Results

GSM850:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	
§22.913(a)	4.4	Radiated RF output power	
§2.1049(h)	4.6.1	99 % occupied bandwidth	
§22.917(a)	4.5	Band edge compliance	
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	
§2.1055(d)	4.3	Frequency stability, voltage variation	

WCDMA 850 (Band V):

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	
§22.913(a)	4.4	Radiated RF output power	
§2.1049(h)	4.6.1	99 % occupied bandwidth	
§22.917(a)	4.5	Band edge compliance	
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	
§2.1055(d)	4.3	Frequency stability, voltage variation	

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GSM1900:

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	
§24.232(b)	6.4	Radiated RF output power	
§2.1049(h)	4.6.1	99 % occupied bandwidth	
§24.238(a)	6.5	Band edge compliance	
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	
§2.1055(d)	6.3	Frequency stability, voltage variation	

WCDMA 1900 (Band II):

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	
§24.232(b)	6.4	Radiated RF output power	
§2.1049(h)	4.6.1	99 % occupied bandwidth	
§24.238(a)	6.5	Band edge compliance	
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	
§2.1055(d)	6.3	Frequency stability, voltage variation	

WCDMA 1700 (Band IV):

Section in CFR 47	Section in RSS-GEN or RSS-139	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	
§27.50(d)(2)	6.4	Radiated RF output power	
§2.1049(h)	4.6.1	99 % occupied bandwidth	
§27.53(g)	6.5	Band edge compliance	
§27.53(g), §2.1051	6.5	Spurious emissions at antenna terminals	
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	
§2.1055(d)	6.3	Frequency stability, voltage variation	

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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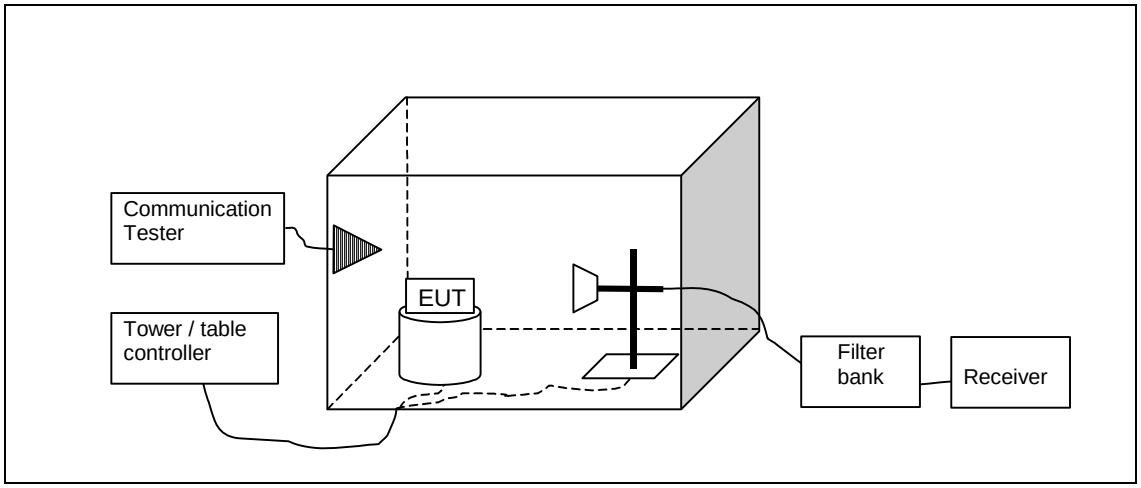
2. Spurious radiated emissions

(FCC §22.917(a), §2.1053, §24.238(a), §2.1053, §27.53(g), §2.1053, RSS-132 4.5, RSS-133 6.5, RSS-139 6.5)

EUT with DUT number	RM-701, DUT 42532
Accessories with DUT numbers	BL-4J, DUT 42537 ; AC-15E, DUT 42533 ; WH-205, DUT 42534
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	25 / 40 / 101.4
Date of measurements	14-Apr-2011
Measured by	Hannu Söderholm

2.1.1 Test Setup



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2.2. Test method and limit

The measurement is made according to TIA-603-C-2004 as follows:

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with absorbers on floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed in the Semi-Anechoic Chamber with conducting metal floor, if the Preliminary Measurement results are closer than 20 dB to the permissible value.

The EUT is placed at nonconductive plate at the turntable center.

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 substitution method is used. Substitution values at each frequencies are measured beforehand and saved to the test software.The substitution corrections are obtained as described below:

$$A_{SUBST} = P_{SUBST\ TX} - P_{SUBST\ RX} - L_{SUBST\ CABLES} + G_{SUBST\ TX\ ANT}$$

Where A_{SUBST} is the final substitution correction including receive antenna gain. $P_{SUBST\ TX}$ is signal generator level, $P_{SUBST\ RX}$ is receiver level, $L_{SUBST\ CABLES}$ is cable losses including both TX and RX cables and $G_{SUBST\ TX\ ANT}$ is substitution antenna gain.

The measurement results are obtained as described below:

$$P[dBm] = P_{MEAS} + A_{TOT}$$

Where P_{MEAS} is receiver reading in dBm and A_{TOT} is total correction factor including cable loss and substitution correction ($A_{TOT} = L_{CABLES} - G_{PREAMP} + A_{SUBST}$).

Limits for spurious radiated emissions measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850 / WCDMA 850	30 - 8500	-13
GSM 1900 / WCDMA 1700 / WCDMA 1900	30 - 18000	-13

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2.3. GSM850 TX Test results

Substitution method couldn't be utilized as no emissions above noise floor were found during measurements.

GSM mode, channel 190 / 836.6 MHz

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
1666.283	-57.64	0.00172	-52.83	-4.81	HORIZONTAL	PASSED
2509.96	-45.32	0.02938	-47.24	1.92	HORIZONTAL	PASSED
3302.685	-57.99	0.00159	-60.92	2.93	HORIZONTAL	PASSED

EGPRS mode, channel 190 / 836.6 MHz

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
1672.966	-51.71	0.00675	-47.21	-4.5	VERTICAL	PASSED
2509.9	-50.27	0.0094	-52.19	1.92	HORIZONTAL	PASSED
3326.994	-58.37	0.00146	-61.45	3.08	HORIZONTAL	PASSED

2.4. GSM1900 TX Test results

Substitution method couldn't be utilized as no emissions above noise floor were found during measurements.

GSM mode, channel 661 / 1880.0 MHz

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
3789.058	-52.89	0.00514	-61.68	8.79	VERTICAL	PASSED
5639.88	-43.31	0.04667	-52.87	9.56	HORIZONTAL	PASSED
7546.814	-50.52	0.00887	-64.27	13.75	VERTICAL	PASSED

EGPRS mode, channel 661 / 1880.0 MHz

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
3759.98	-48.42	0.01439	-56.91	8.49	VERTICAL	PASSED
5639.94	-48.13	0.01538	-57.69	9.56	HORIZONTAL	PASSED
7512.605	-50.06	0.00986	-63.79	13.73	VERTICAL	PASSED

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2.5. WCDMA 1900 (Band II) TX Test results

Substitution method couldn't be utilized as no emissions above noise floor were found during measurements.

Channel 9400 / 1880.0 MHz

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
3758.557	-50.51	0.00889	-58.62	8.11	HORIZONTAL	PASSED
5642.285	-51.19	0.0076	-60.78	9.59	HORIZONTAL	PASSED
7531.383	-51.12	0.00773	-64.72	13.6	VERTICAL	PASSED

2.6. WCDMA 1700 (Band IV) TX Test results

Substitution method couldn't be utilized as no emissions above noise floor were found during measurements.

Channel 1412 / 1732.4 MHz

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
3706.974	-55.51	0.00281	-63.02	7.51	VERTICAL	PASSED
5659.719	-52.02	0.00628	-61.64	9.62	HORIZONTAL	PASSED
7527.295	-50.28	0.00938	-64.05	13.77	HORIZONTAL	PASSED

2.7. WCDMA 850 (Band V) TX Test results

Substitution method couldn't be utilized as no emissions above noise floor were found during measurements.

Channel 4175 / 835.0 MHz

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
1667.271	-57.35	0.00184	-52.84	-4.51	VERTICAL	PASSED
2548.858	-54.08	0.00391	-56.44	2.36	VERTICAL	PASSED

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3. Test Equipment

3.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15B
OM06312	Signal Generator	E4422B	Agilent	22/24
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM26491	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C
TM22806	Battery	BAT 20/E	Fiskars	15C, 15B
TM22805	UPS	PS 20/1.2	Fiskars	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
-	Temperature test chamber	VT 4002	Vötsch	22/24
2058	Receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Communication Tester	CMU200	R&S	22/24/27
2009	LISN 50 µH	ENV216	R&S	15C, 15B
2010	LISN 50 µH	ENV216	R&S	15C, 15B
2012	Power splitter	11667B	Agilent	22/24/27, 15C
2013	Attenuator	8493C	Agilent	22/24/27, 15C
2014	Attenuator	8493C	Agilent	22/24/27, 15C

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3.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38114	Power supply	6632A	Agilent	22/24/27, 15C, 15B
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15B
TM38323	Preamplifier	PA-02 18-26 GHz	EMC Automation	22/24/27, 15C, 15B
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM26497	Antenna	3115	Emco	22/24/27, 15C, 15B
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 15B
-	Mini mast	2075-2	ETS Lindgren	22/24/27, 15C, 15B
TM38843	Mini mast	2075	Emco	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	Emco	22/24/27, 15C, 15B
TM30643	LISN 50 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C, 15B
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
TM39180	Laser distance meter	Disto Pro	Leica	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	Miteq	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	Miteq	22/24/27, 15C, 15B
TM30599	Semi anechoic chambre	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	-	22/24/27, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24/27, 15C, 15B
-	High pass filter	WHKX 1.6/15G-12SS	Wainwright	22/24/27, 15C, 15B
TM37545	Tunable notch filter	800.0/960.0-0.2/40-8SSK	Wainwright	22
TM26512	Tunable notch filter	WRCD1850/1910-0.2/40-10SSK	Wainwright	24
-	Band reject filter	WRCG1877/1883-1870/1890-40/6EE	Wainwright	24
-	Band reject filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
-	Band reject filter	WRCG832/838-825/848-40/5SS	Wainwright	22
TM23892	Controller	G-1000SDX	Yaesu	22/24/27
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27, 15C

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