TCC
Nokia

T117 (EN ISO/IEC 17025)

FCC Part 22/24 Compliance Test Report

Test Report no.:	Salo_FCC_0505_10.doc	**Date of Report:**	03.02.2005
Number of pages:	9	**Customer's Contact person:**	Timo Seppälä
Testing laboratory:	TCC Nokia Salo Laboratory P.O. Box 86 Joensuunkatu 7H / Kiila 1B FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 45220	**Client:**	Nokia Corporation P.O. Box 86 Joensuunkatu 7 FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 44277
FCC listing no.:	533467		
IC recognition no.:	5385		
Tested devices/ accessories:	**Phone RA-4 / Battery BL-5C, Memory Unit DTS-128, AC- Charger ACP-12**		
FCC ID:	PYARA-4	**IC:**	661V-RA4
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Parts 22 and 24, TIA-603-B-2002 and IC standards RSS-132 and RSS-133. 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: 03-02-2005

Kai Uusitalo
Senior Design Engineer, EMC

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

Date of receipt	01.02.2005
Testing completed	02.02.2005
The customer's contact person	Timo Seppälä
Test Plan referred to	T:\Projects\RA-4\testplans\EMC\TCC\ Mini US FCC test plan.xls
Notes	-
Document name	T:\Projects\RA-4\results\emc\FCC\Salo_FCC_0505_10.doc

1.1. EUT and Accessory Information

The EUT is a triple band (GSM850/1800/1900) mobile phone. The EUT is tested with rated maximum TX power, modulated with pseudo random bit sequence (PRBS9).

Product	Type	SN	HW	MV	SW	DUT
Phone	RA-4	004400/57/163044/9	5300	-	04.53(00)	10380
Battery	BP-6M	0670467393213L5031B0144719	-	-	-	10381
Memory Unit	DTS-128	MC1DU128NAVA-0MBNOY8F270G349	-	-	-	07276
AC-Charger	ACP-12E	0675294394349J493120295910	-	-	-	10070

1.2. Summary of Test Results

GSM 850:

Section in CFR 47	Section in RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	-
§22.913(a)	4.4, 6.4	Radiated RF output power	PASSED
§2.1049(h)	4.2	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	-
§2.1055(a)	4.3, 6.3	Frequency stability, temperature variation	-
§2.1055(d)	4.3, 6.3	Frequency stability, voltage variation	-

GSM 1900:

Section in CFR 47	Section in RSS-133	Name of the test	Result
§2.1046(a)	6.2	Conducted RF output power	-
§24.232(b)	6.2	Radiated RF output power	PASSED
§2.1049(h)	5.6	99 % occupied bandwidth	-
§24.238(a)	6.3	Band edge compliance	-
§24.238(a), §2.1051	6.3	Spurious emissions at antenna terminals	-
§24.238(a), §2.1053	6.3	Spurious radiated emissions	-
§2.1055(a)	7	Frequency stability, temperature variation	-
§2.1055(d)	7	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 Salo LaboratorySalo Laboratory.

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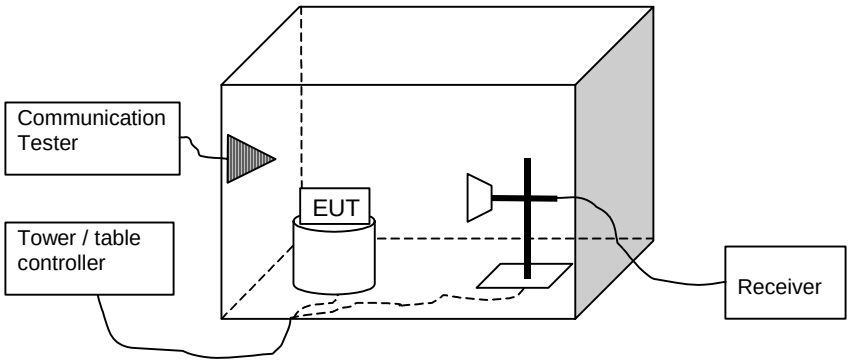
2. Radiated RF output power

(FCC §22.913(a), §22.232(b), RSS-132 6.4, RSS-133 6.2)

EUT with DUT number	RA-4, DUT 10380
Accessories with DUT numbers	BP-6M, DUT 10381; DTS-128, DUT 07276; ACP-12, DUT 10070
Operation Voltage V / Hz	115 / 60
Result	PASSED
Remarks	-
Temp °C / Humidity RH % / Air Pressure kPa	20 / 55 / 980
Date of measurements	02.01.2005
Measured by	Tomi Lipponen

2.1. Test setup



2.2. Test method and limit

The measurement is made according to TIA-603-B-2002 as follows:

The measurement is performed in the Anechoic Chamber with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system. The turntable is rotated 360 degrees and this is repeated for both horizontal and vertical receive antenna polarizations.

The EUT is placed on a nonconductive plate at 170 cm height.

The substitution method is used. Substitution values at each frequencies are measured beforehand and saved to the test software.

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The measurement results are obtained as described below:

$$P\ [dBm] = U_{RX} + A_{CORRECTIONS}$$

Where U_{RX} is receiver reading and $A_{CORRECTIONS}$ is combined correction factor including cable attenuation, antenna gain and pre-measured substitution value.

Limits for radiated RF output power measurements

Frequency range / MHz	Limit / W	Limit / dBm
824 - 849	8	39
1850 - 1910	2	33

2.3. GSM 850 Test results

GSM mode, Flip closed

Channel	Frequency / MHz	ERP / dBm	ERP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
128	824.200000	27.10	0.51286	34.50	VERTICAL	PASSED
190	836.600000	27.60	0.57544	34.40	VERTICAL	PASSED
251	848.800000	28.10	0.64565	33.60	VERTICAL	PASSED

GSM mode, Flip open

Channel	Frequency / MHz	ERP / dBm	ERP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
128	824.200000	25.60	0.36308	34.50	VERTICAL	PASSED
190	836.600000	26.60	0.45709	34.40	VERTICAL	PASSED
251	848.800000	27.40	0.54954	33.60	VERTICAL	PASSED

GPRS mode, 2 TX Slots, Flip closed

Channel	Frequency / MHz	ERP / dBm	ERP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
128	824.200000	23.04	0.20137	34.50	VERTICAL	PASSED
190	836.600000	23.43	0.22029	34.40	VERTICAL	PASSED
251	848.800000	24.04	0.25351	33.60	VERTICAL	PASSED

GPRS mode, 2 TX Slots, Flip open

Channel	Frequency / MHz	ERP / dBm	ERP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
128	824.200000	21.47	0.14028	34.50	VERTICAL	PASSED
190	836.600000	22.57	0.18072	34.40	VERTICAL	PASSED
251	848.800000	23.40	0.21878	33.60	VERTICAL	PASSED

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EGPRS mode, 1 TX Slot, Flip closed

Channel	Frequency / MHz	ERP / dBm	ERP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
128	824.200000	23.16	0.20701	34.50	VERTICAL	PASSED
190	836.600000	23.55	0.22646	34.40	VERTICAL	PASSED
251	848.800000	24.29	0.26853	33.60	VERTICAL	PASSED

EGPRS mode, 1 TX Slot, Flip open

Channel	Frequency / MHz	ERP / dBm	ERP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
128	824.200000	21.74	0.14928	34.50	VERTICAL	PASSED
190	836.600000	22.82	0.19143	34.40	VERTICAL	PASSED
251	848.800000	23.53	0.22542	33.60	VERTICAL	PASSED

2.4. GSM 1900 Test results

GSM mode, Flip closed

Channel	Frequency / MHz	EIRP / dBm	EIRP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
512	1850.200000	30.00	1.00000	44.90	HORIZONTAL	PASSED
661	1880.000000	32.90	1.94984	44.00	HORIZONTAL	PASSED
810	1909.800000	31.50	1.41254	44.00	HORIZONTAL	PASSED

GSM mode, Flip open

Channel	Frequency / MHz	EIRP / dBm	EIRP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
512	1850.200000	30.40	1.09648	45.50	VERTICAL	PASSED
661	1880.000000	28.80	0.75858	43.20	VERTICAL	PASSED
810	1909.800000	29.50	0.89125	44.80	VERTICAL	PASSED

GPRS mode, 2 TX Slots, Flip closed

Channel	Frequency / MHz	EIRP / dBm	EIRP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
512	1850.200000	29.40	0.87096	44.90	HORIZONTAL	PASSED
661	1880.000000	31.97	1.57398	44.00	HORIZONTAL	PASSED
810	1909.800000	30.92	1.23595	44.00	HORIZONTAL	PASSED

GPRS mode, 2 TX Slots, Flip open

Channel	Frequency / MHz	EIRP / dBm	EIRP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
512	1850.200000	28.43	0.69663	44.90	VERTICAL	PASSED
661	1880.000000	18.38	0.06887	44.00	VERTICAL	PASSED
810	1909.800000	23.85	0.24266	44.00	VERTICAL	PASSED

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EGPRS mode, 1 TX Slot, Flip closed

Channel	Frequency / MHz	EIRP / dBm	EIRP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
512	1850.200000	27.84	0.60814	44.90	HORIZONTAL	PASSED
661	1880.000000	29.95	0.98855	44.00	HORIZONTAL	PASSED
810	1909.800000	29.45	0.88105	44.00	HORIZONTAL	PASSED

EGPRS mode, 1 TX Slot, Flip open

Channel	Frequency / MHz	EIRP / dBm	EIRP / W	$A_{CORRECTION}$ / dB	Polarisation	Result
512	1850.200000	26.87	0.48641	44.90	VERTICAL	PASSED
661	1880.000000	19.65	0.09226	44.00	VERTICAL	PASSED
810	1909.800000	25.15	0.32734	44.00	VERTICAL	PASSED

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3. Test Equipment

3.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1742	EMI Test Receiver	ESMI	R&S	15C, 15B
1759	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
1872	Thermo- Hygrograph	00.02520.150700	Lambrecht	15C, 15B
1916	Radio Communication tester	CMTA84	R&S	15C, 15B
2039	Power Supply	PL330QMD	THURLBY	15C, 15B
2060	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
2068	CDN-Antenna line	S1	NMP	15C, 15B
2097	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
2111	Multimeter	TX3	Tektronix	15C, 15B
2156	Digital Radio Communication Tester	CMU200	R&S	15C, 15B
2206	Signal generator	SMX	R&S	15C, 15B
2335	GPIB Switch 2 to 1	-	National Instruments	15C, 15B
2347	Digital Radio Communication Tester	CMU200	R&S	22/24, 15C, 15B
2352	Spectrum Analyzer	FSP	R&S	22/24, 15C
-	RF Emission Software	ES-K1 v.1.60	R&S	15C, 15B

3.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1748	Log. per. Antenna	HL025	R&S	22/24, 15C
1749	Log. per. Antenna	HL025	R&S	22/24, 15C
1875	Thermo- Hygrograph	00.02520.150700	Lambrecht	22/24, 15C, 15B
1917	Radio Communication tester	CMTA84	R&S	22/24, 15C, 15B
1933	Precision half-wave dipole antennas	HZ-13	R&S	22/24, 15C
1938	Precision half-wave dipole antennas	HZ-12	R&S	22/24, 15C
2004	Relay Switch Unit	RSU	R&S	22/24, 15C, 15B
2006	Radiation Reference Source	VSQ	MEB	22/24, 15C, 15B
2009	Signal generator	SMP 22	R&S	22/24, 15C, 15B
2019	Multimeter	34401A	HP	22/24, 15C, 15B
2027	Coupling and Decoupling Network	M2 (modified) DC1	MEB	22/24, 15C, 15B
2028	Coupling and Decoupling Network	M3 (modified) DC2	MEB	22/24, 15C, 15B
2029	Power Supply	PL330	THURLBY	22/24, 15C
2043	Band Reject Filter	WRCA824/849-0,2-6SS	Wainwright	22/24, 15C, 15B
2047	Band Reject Filter	WRCC1800/2000-0.2-10SS	Wainwright	22/24, 15C, 15B
2051	High Pass Filter	4HC1700-1-KK	R&S	22/24, 15C
2057	Log. per. Antenna	HL025	R&S	22/24, 15C
2109	Power Supply	PL330QMD	THURLBY	22/24, 15C, 15B
2110	Multimeter	34401A	HP	22/24, 15C, 15B
2112	Multimeter	TX3	Tektronix	22/24, 15C, 15B
2116	Controller	EMCO MODEL 2090	ETS	22/24, 15C, 15B

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Eq. No	Equipment	Type	Manufacturer	Used in
2133	Power Meter	NRVS	R&S	22/24, 15C
2134	Power Sensor	NRV-Z32	R&S	22/24, 15C
2135	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24, 15C, 15B
2138	Ultra Broadband Antenna	HL562	R&S	22/24, 15C, 15B
2140	Biconial Antenna	EMCO93110B	EMCO	22/24, 15C
2142	Log.-per.-dipol Antenna	3146	EMCO	22/24, 15C
2144	Attenuator	6803.17B	Huber-Suhner	22/24, 15C, 15B
2150	High Pass Filter	F-15041	RLC ELECTRONICS	22/24, 15C
2176	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24, 15C, 15B
2180	Digital Radio Communication Tester	CMU200	R&S	22/24, 15C, 15B
2188	Preamplifier	AFS4-00100300-20-23P-6	MITEQ	22/24, 15C, 15B
2330	EMI Test receiver	ESIB26	R&S	22/24, 15C, 15B
2334	GPIB Switch 2 to 1	-	National Instruments	22/24, 15C, 15B
2348	Yaesu controller	G-1000DXC	YAESU	22/24, 15C, 15B
2349	Computer controller (Yaesu)	GS-232B	YAESU	22/24, 15C, 15B
2350	Preamplifier	AMF-6D-020180-29-20P	MITEQ	22/24, 15C
2398	Horn antenna	HF906	R&S	22/24, 15C
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24, 15C, 15B

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