

FCC Part 15B Compliance Test Report

Test Report no.:	Salo_FCC_0819_03.doc	Date of Report:	13-May-2008
Number of pages:	11	Customer's Contact person:	Stephen Walmsley
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FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-247 / Battery BL-5F, Headset HS-45, Audio Adapter AD-54 and AC-Charger AC-5E, DVB-T(H) modulator PT 5780, Laptop Computer IBM T-40, USB-2 ASI/SDI adaptor DTU-245 and Attenuator Wavetek 7580		
FCC ID:	QEYRM-247	IC:	661L-RM247
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 (Issue 2, September 2005), RSS-133 (Issue 4, February 2008), RSS-139 (Issue 1, February 2008) 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:			

Sami Lehtonen, Test System Manager

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	28-Mar-2008
Testing completed	07-May-2008
The customer's contact person	Stephen Walmsley
Test Plan referred to	T:\Projects\RM-247\TestPlan_RS\RS_Testplan_RM-247.xls
Notes	The laptop computer contains StreamXpress application indented to play MPEG-2 video stream. The stream is sent to modulator via ASI/SDI adaptor. The RF-output of the modulator is connected to a dipole antenna. The EUT receives the stream. RM-247 contains a video player to view the stream. The performance of the EUT will be monitored in one way, described as below, - Video stream with RM-247 player.
Document name	T:\Projects\RM-247\EMC\Results\FCC\Salo_FCC_0819_03.doc

1.1. EUT and Accessory Information

The EUT is a 6-band (GSM850/900/1800/1900 and WCDMA Band I/VIII) mobile phone with GPRS, EGPRS, Bluetooth and WLAN. GSM bands are tested in idle mode. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-247	004401018148284	0510_A	-	V0.0810.0.0.019	12812
Battery	BL-5F	3635637363520601840;0670498	-	-	-	12813
Headset	HS-45	06942357453C1B11447	-	-	-	12730
Audio Adapter	AD-54	07508387352J2108137	-	-	-	12704
AC-Charger	AC-5E	3943497117090624005;0675540	-	-	-	12814
Phone	RM-247	004401018148391	0510_A	-	V0.0810.0.0.019	12648
Battery	BL-5F	000008025140100013;0670498	-	-	-	12633
Audio adapter	AD-54	07508387295J100116	0.6	1.7	-	12436
Headset	HS-45	06942357301K1900958	2	0.5	-	12435
AC-Charger	AC-5E	3820667325270111862;0670523;	1.9	1.9	-	12613
DVB-T(H) modulator	PT 5780	KU 020741	-	-	-	NA
Laptop computer (IBM)	T-40	-	-	-	-	NA
USB-2 ASI/SDI adaptor	DTU-245	-	-	-	-	NA
Attenuator: Wavetek	7580	-	-	-	-	NA

1.2. Summary of Test Results

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 (6.6)	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 Salo Laboratory.

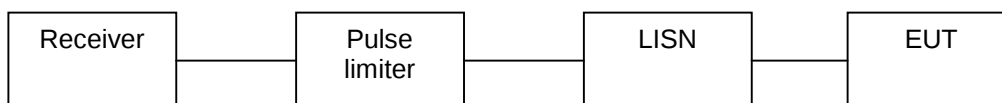
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2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-247, DUT 12812
Accessories with DUT numbers	BL-5F, DUT 12813; HS-45, DUT 12730; AD-54, DUT 12704; AC-5E, DUT 12814
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	The laptop computer contains StreamXpress application indented to play MPEG-2 video stream. The stream is sent to modulator via ASI/SDI adaptor. The RF-output of the modulator is connected to a dipole antenna. The EUT receives the stream. RM-247 contains a video player to view the stream. The performance of the EUT will be monitored in one way, described as below, - Video stream with RM-247 player.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 43 / 100
Date of measurements	02-May-2008
Measured by	Anni Manninen

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:

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

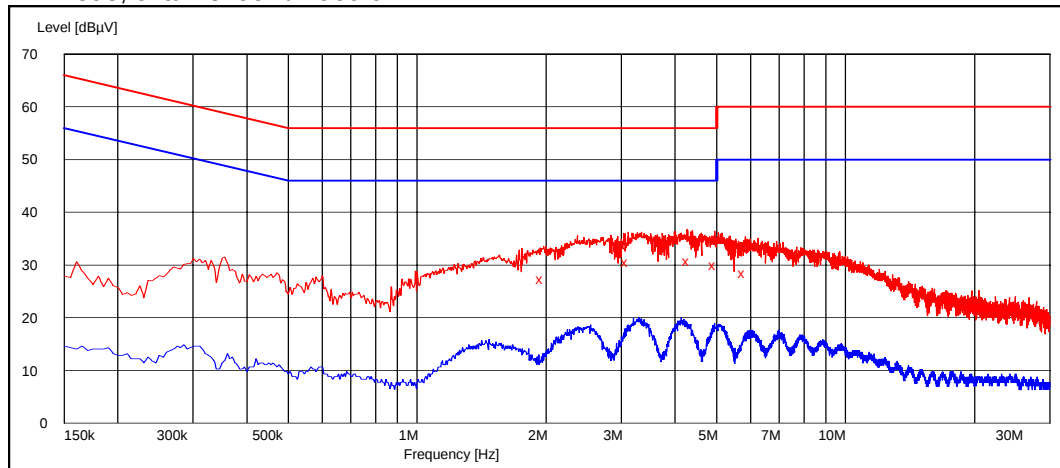
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

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 1900 Test results

RX mode, channel 661 / 1960.0 MHz



Quasi peak (RBW: 9 kHz)

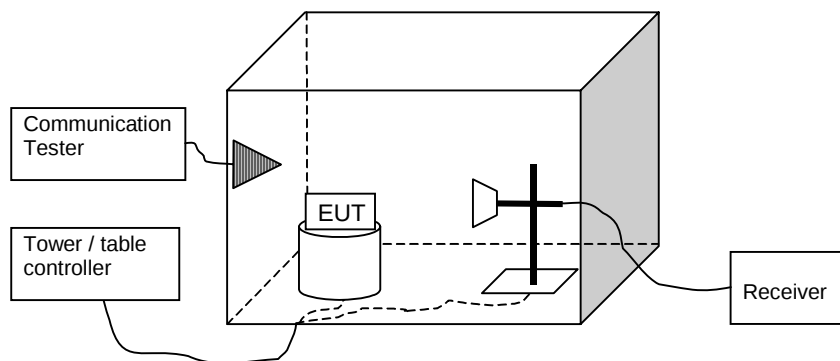
Frequency [MHz]	U [dBμV]	Line	Result
1.960000	27.40	L1	PASSED
3.095000	30.60	L1	PASSED
4.300000	30.70	L1	PASSED
4.960000	29.90	L1	PASSED
5.810000	28.40	L1	PASSED

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-247, DUT 12648
Accessories with DUT numbers	BL-5F, DUT 12633; AD-54, DUT 12436; HS-45, DUT 12435; AC-5E, DUT 12613;
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	The laptop computer contains StreamXpress application indented to play MPEG-2 video stream. The stream is sent to modulator via ASI/SDI adaptor. The RF-output of the modulator is connected to a dipole antenna. The EUT receives the stream. RM-247 contains a video player to view the stream. The performance of the EUT will be monitored in one way, described as below, - Video stream with RM-247 player.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	18 / 42 / 103.9
Date of measurements	07-May-2008
Measured by	Anni Manninen / Kalle Hannila

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:

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

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 1900 Test results

RX mode, channel 512 / 1930.2 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
3860.000000	40.80	109.65	44.70	-3.9	VERTICAL	PASSED
7720.000000	47.10	226.46	43.90	3.2	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
3860.000000	27.90	24.83	31.80	-3.9	VERTICAL	PASSED
7720.000000	33.80	48.98	30.60	3.2	VERTICAL	PASSED

RX mode, channel 661 / 1960.0 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
32.564329	22.90	13.96	34.50	-11.6	VERTICAL	PASSED
75.872345	10.00	3.16	33.10	-23.1	VERTICAL	PASSED
496.692786	18.00	7.94	35.60	-17.6	HORIZONTAL	PASSED
522.644088	18.80	8.71	35.60	-16.8	VERTICAL	PASSED
587.574349	48.70	272.27	64.20	-15.5	HORIZONTAL	*PASSED
929.159719	24.20	16.22	34.40	-10.2	VERTICAL	PASSED

*587.57 MHz frequency is coming from is DVB-H tester and thus ignored.

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

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
1959.921844	56.90	699.84	58.20	-1.3	VERTICAL	PASSED
2943.389780	53.20	457.09	48.70	4.5	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
1959.921844	54.20	512.86	55.50	-1.3	VERTICAL	PASSED
2942.889780	40.20	102.33	35.70	4.5	VERTICAL	PASSED
7422.845691	39.80	97.72	36.50	3.3	VERTICAL	PASSED
7970.947896	35.10	56.89	30.20	4.9	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	42.00	125.89	45.50	-3.5	HORIZONTAL	PASSED
7960.000000	47.10	226.46	42.30	4.8	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	28.00	25.12	31.50	-3.5	VERTICAL	PASSED
7960.000000	34.60	53.70	29.80	4.8	VERTICAL	PASSED

4. Test Equipment

4.1. 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	22/24/27, 15C, 15B
2352	Spectrum Analyzer	FSP	R&S	22/24/27, 15C
2359	Temperature Test system	VT4002	Vötsch Industrietechnik	22/24/27
2360	Serial Bus Converter	Serial 488A	IO Tech	22/24/27
2362	Power Supply	NGPX 70/5	R&S	22/24/27
2388	Bluetooth Tester	CBT	R&S	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1748	Log. per. Antenna	HL025	R&S	22/24/27, 15C
1749	Log. per. Antenna	HL025	R&S	22/24/27, 15C
1875	Thermo- Hygrograph	00.02520.150700	Lambrecht	22/24/27, 15C, 15B
1917	Radio Communication tester	CMTA84	R&S	22/24/27, 15C, 15B
1933	Precision half-wave dipole antennas	HZ-13	R&S	22/24/27, 15C
1938	Precision half-wave dipole antennas	HZ-12	R&S	22/24/27, 15C
2006	Radiation Reference Source	VSQ	MEB	22/24/27, 15C, 15B
2009	Signal generator	SMP 22	R&S	22/24/27, 15C, 15B
2019	Multimeter	34401A	HP	22/24/27, 15C, 15B
2027	Coupling and Decoupling Network	M2 (modified) DC1	MEB	22/24/27, 15C, 15B
2028	Coupling and Decoupling Network	M3 (modified) DC2	MEB	22/24/27, 15C, 15B
2029	Power Supply	PL330	THURLBY	22/24/27, 15C, 15B
2043	Band Reject Filter	WRCA824/849-0.2-6SS	Wainwright	22, 15C, 15B
2047	Band Reject Filter	WRCC1800/2000-0.2-10SS	Wainwright	24, 15C, 15B
2048	Band Reject Filter	WRCC1700/1800-0.2-10SS	Wainwright	27, 15C, 15B
2051	High Pass Filter	4HC1700-1-KK	R&S	22/24/27, 15C
2057	Log. per. Antenna	HL025	R&S	22/24/27, 15C
2109	Power Supply	PL330QMD	THURLBY	22/24/27, 15C, 15B
2110	Multimeter	34401A	HP	22/24/27, 15C, 15B
2112	Multimeter	TX3	Tektronix	22/24/27, 15C, 15B
2116	Controller	EMCO MODEL 2090	ETS	22/24/27, 15C, 15B
2133	Power Meter	NRVS	R&S	22/24/27, 15C
2134	Power Sensor	NRV-Z32	R&S	22/24/27, 15C
2135	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
2138	Ultra Broadband Antenna	HL562	R&S	22/24/27, 15C, 15B
2140	Biconical Antenna	EMCO93110B	EMCO	22/24/27, 15C
2142	Log.-per.-dipol Antenna	3146	EMCO	22/24/27, 15C
2144	Attenuator	6803.17B	Huber-Suhner	22/24/27, 15C, 15B
2150	High Pass Filter	F-15041	RLC ELECTRONICS	22/24/27, 15C
2176	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24/27, 15C, 15B
2180	Digital Radio Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2188	Preamplifier	AFS4-00100300-20-23P-6	MITEQ	22/24/27, 15C, 15B
2330	EMI Test receiver	ESIB26	R&S	22/24/27, 15C, 15B
2334	GPIB Switch 2 to 1	-	National Instruments	22/24/27, 15C, 15B
2348	Yaesu controller	G-1000DXC	YAESU	22/24/27, 15C, 15B
2349	Computer controller (Yaesu)	GS-232B	YAESU	22/24/27, 15C, 15B
2350	Preamplifier	AMF-6D-020180-29-20P	MITEQ	22/24/27, 15C
2361	Anechoic chamber	3 meter semi/full anechoic chamber	Euroshield	22/24/27, 15C, 15B
2398	Horn antenna	HF906	R&S	22/24/27, 15C
2363	Band Reject Filter	WRCG 832/838-825/845/5SS	Wainwright	22/24/27
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	22/24/27
2365	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2366	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2384	Band Reject Filter	WRCG832/838-825/845-40/5SS	Wainwright	22/24/27
2388	Bluetooth Tester	CBT	R&S	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B