

FCC Part 15B Compliance Test Report

Test Report no.:	Tre_FCC_0916_06.doc	Date of Report:	24-Apr-2009
Number of pages:	7	Customer's Contact person:	Pasi Tauriainen
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Hands-free Unit HF-21W, Microphone MP-2, Loudspeaker SP-3, System cable (pop-port) CA-76, Input device CU-8, Power cable PCU-4		
FCC ID:	PYAHF-21W	IC:	661V-HF21W
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, RSS-133 and RSS-210. 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:			

Jari Jantunen, System Manager

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	25.07.2006
Testing completed	26.07.2006
The customer's contact person	Pasi Tauriainen
Test Plan referred to	T:\Projects\accessor\HF-20\TestPlan_RS\RS_test_plan_HF-20.xls
Notes	-
Document name	T:\Projects\accessor\HF-20\EMC\Results\FCC\Tre_FCC_0630_05.doc

1.1. EUT and Accessory Information

The EUT is a Bluetooth device. WCDMA band is tested in idle mode. Bluetooth is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Handsfree Unit	HF-20	052682700001208	0902	-	6.290	40776
Handsfree Unit	HF-20	052682700001206	0902	-	6.290	40777
Speaker	SP-3	-	-	-	-	40778
Input device	CU-8	-	-	-	-	40779
Microphone	MP-2	-	-	-	-	40780
System cable	CA-76	-	-	-	-	40781
Power cable	PCU-4	-	-	-	-	40782

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	NP
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 OW3HF-20 are re-used for certification of the PYAHF-21W. The table above indicates the results, which will be re-used.

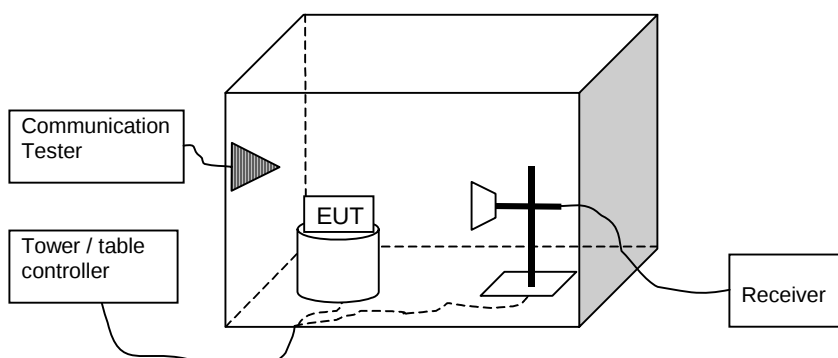
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2. Radiated emissions (FCC §15.109, ICES-003 section 5.5, RSS-132 6.6, RSS-133 9)

EUT with DUT number	HF-20 #40777
Accessories with DUT numbers	SP-3 #40778, CU-8 #40779, MP-2 #40780, CA-76 #40781, PCU-4 #40782
Operation Voltage [V] / [Hz]	13.8 / DC
Result	Passed
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 45 / 1015.5
Date of measurements	26.07.2006
Measured by	Juho Tuohino

2.1. Test setup



2.2. 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

2.3. Bluetooth Test results

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	52.50	421.70	53.80	-1.30	HORIZONTAL	Passed
7206.000000	41.90	124.45	39.90	2.00	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	43.30	146.22	44.60	-1.30	HORIZONTAL	Passed
7206.000000	29.50	29.85	27.50	2.00	HORIZONTAL	Passed

Channel 40 / 2442 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4883.769539	53.90	495.45	55.50	-1.60	HORIZONTAL	Passed
7325.653307	44.60	169.82	41.90	2.70	HORIZONTAL	Passed
7411.327655	43.70	153.11	40.40	3.30	HORIZONTAL	Passed
7436.367735	43.20	144.54	40.00	3.20	HORIZONTAL	Passed
17998.989980	56.10	638.26	34.60	21.50	HORIZONTAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4883.769539	43.70	153.11	45.30	-1.60	HORIZONTAL	Passed
7323.153307	30.20	32.36	27.50	2.70	HORIZONTAL	Passed
7410.827655	30.70	34.28	27.40	3.30	HORIZONTAL	Passed
7431.867735	30.60	33.88	27.40	3.20	HORIZONTAL	Passed
17991.489980	42.80	138.04	21.30	21.50	HORIZONTAL	Passed

Channel 78 / 2480 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
4960.000000	53.40	467.74	54.40	-1.00	HORIZONTAL	Passed
7440.000000	44.30	164.06	41.10	3.20	HORIZONTAL	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
4960.000000	43.60	151.36	44.60	-1.00	HORIZONTAL	Passed
7440.000000	31.10	35.89	27.90	3.20	HORIZONTAL	Passed

3. Test Equipment

3.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM37610	Spectrum analyzer	FSU	R&S	15C,22/24
TM37678	Radio communication tester	CMU-200	R&S	15C,22/24
	Attenuator 10 dB	6251.17.A	Huber+Suhner AG	15C,22/24
TM22901	Step attenuator 110dB	8496A	Agilent	15C,22/24
TM37499	Power splitter	11667A	Agilent	15C,22/24
	Temperature chamber	VT4002	Vötsch	15C,22/24
TM38112	DC power supply	6632A	Agilent	15C,22/24
TM38111	Multimeter	34401A	Agilent	15C,22/24
TM38845	EMI receiver	ESI 40	R&S	15B,15C
TM37773	Radio communication tester	CMU-200	R&S	15B,15C
TM38631	Signal generator	83640L	Agilent	15B,15C
TM38114	DC power supply	6632A	Agilent	15B,15C
TM22835	Multimeter	87	Fluke	15B,15C
TM30600	Pulse Limiter	ESH3-Z2	R&S	15B,15C
TM26490	LISN 50 µH	ESH3-Z5/	R&S	15B,15C
TM30636	LISN 50 µH	L2-16/	PMM	15B,15C

3.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30599	3m semi-anechoic chamber		TDK	15B,15C, 22/24
TM38845	EMI receiver	ESI 40	R&S	15B,15C, 22/24
TM37498	Preamplifier	AMF-5D-020180-26-10P	MITEQ	15B,15C, 22/24
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	MITEQ	15B,15C, 22/24
TM37516	Biconilog antenna	HL562	R&S	15B,15C, 22/24
TM26496	Double ridged waveguide antenna	3115	EMCO	15B,15C, 22/24
TM39158	Horn antenna	3116	EMCO	15B,15C, 22/24
TM26492	Reference dipole set	UHAP/VHAP	Schwarzbeck	15B,15C, 22/24
TM37501	Dipole antenna	3125-870	EMCO	22/24
TM37502	Dipole antenna	3125-1880	EMCO	22/24
TM37773	Radio communication tester	CMU-200	R&S	15B,15C, 22/24
TM38631	Signal generator	83640L	Agilent	15B,15C, 22/24
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	15B,15C, 22/24
	High pass filter	WHK2010-10SS	Trilithic	15B,15C, 22/24
	Low pass filter	WLK1750-10SS	Trilithic	15B,15C, 22/24
TM26511	Tunable notch filter	WRCA870	Wainwright	22/24
TM38215	Tunable notch filter	WRCD1850/1910-0.2/40	Wainwright	22/24
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30	Wainwright	15C
TM30642	Turntable controller	HD-100	Deisel	15B,15C, 22/24
TM26500	Turntable	DS412	Deisel	15B,15C, 22/24
TM38842	Antenna mast controller	2090	EMCO	15B,15C, 22/24
TM38843	Antenna mast	2075	EMCO	15B,15C, 22/24
TM38114	DC power supply	6632A	Agilent	15B,15C, 22/24
TM22835	Multimeter	87	Fluke	15B,15C, 22/24