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Federal Communications Commission
FCC–Identification Number: 90462
TCB ID: DE 0001



Accredited by the
German Accreditation Council
DAR–Registration Number
TTI-P-G 081/94-D0



Independent ETSI
compliance test house



Accredited Bluetooth™ Test Facility (BQTF)

Test report no.: 4-1156-01-04-A/03

FCC Part 15.209

Watch Pilot

FCC ID: RAH2

CETECOM – ICT Services GmbH
Untertürkheimerstr. 6-10
66117 Saarbrücken, Germany

Telephone: + 49 (0) 681 / 598-0

Fax: + 49 (0) 681 / 9075

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1 General information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5.
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Test laboratory manager:

2003-12-03	RSC - 8411	Berg M.
Date	Section	Name


Signature

Technical responsibility for area of testing:

2003-12-03	RSC - 8412	Hausknecht D.
Date	Section	Name


Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Germany

Telephone : + 49 681 598 - 0

Telefax : + 49 681 598 - 9075

E-mail : Michael.Berg@ict.cetecom.de

Internet : www.cetecom-ict.de

Accredited testing laboratory

Accredited by : Regulierungsbehörde für Telekommunikation und Post (RegTP)

Listed by : Federal Communications Commission (FCC)

Authority	Identification/Registration No.
RegTP	TTI-P-G 081/94-D0
FCC	90462

1.3 Details of applicant

Name : PHONAK Communications GmbH

Street : Länggasse 17

City : CH-3280 Murten

Country : Switzerland

Telephone : +41-26-672-9672

Telefax : +41-26-672-3511

Contact : Mr. Christoph Schmid

Telephone : +41-26-672-9672

Contact person:

Name : Mr. Christoph Schmid

Telephone : +41-26-672-9672

Telex : +41-26-672-3511

E-mail :

1.4 Application details

Date of receipt of test item : 2003-12-01

Date of test : 2003-12-02

Person(s) who have been : -.-

present during the test : -.-

1.5 Test item

Type of equipment : **Watch with integrated remote control for insulin pumps**
Type designation : Watch Pilot
Manufacturer : Disetronic Medical Systems AG
Street : Kirchbergstrasse 190
City : S-3401 Burgdorf
Country : Switzerland
Serial number : 039C17489

Additional information :

Frequency : 39.6 kHz $\pm$ 100 ppm
Modulation : 5K60F1D (2 x FM Deviation + Data rate = 2x 1.89 kHz + 1.82 kBit)
Channel spacing : -.-
Number of channels : 1
Antenna : Integral antenna (Coil antenna)
ERP : 68.50 dB μ V/m in 3m distance or -11.5 dB μ V/m in 300m distance
Power supply : 3.0V Battery.
Temperature range : 0°C - +55°C
FCC ID : RAH2

1.6 Test specifications: **FCC Part 15 §15.209** **CANADA RSS-210**

2 Technical test

2.1 Summary of test results

FCC Part 15 Subpart B

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber.

The receiving antennas conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2001 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2001 clause 4.2.

Antennas conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.35, 15.209.

The product fulfils also the requirements for CANADA RSS-210

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

FINAL VERDICT : PASS

2.2 Test report

TEST REPORT

Test report no: 4-1156-01-04-A/03

LIST OF MEASUREMENTS.

The list of measured parameters is given below.

Clause		Page number
	Transmitter parameters	
§ 15.209	Effective radiated RF power	9
§ 15.209	Spurious radiations – Radiated	10
	Test equipment listing	13
	Photographs of the equipment	15

Equipment under test : WATCH PILOT

Ambient temperature : 23°C

Relative humidity : 33%

MAXIMUM PEAK OUTPUT POWER (RADIATED)

TEST CONDITIONS		MAXIMUM AVERAGE OUTPUT POWER ($\mu\text{V/m}$)		
Frequency (MHz)		36.9 kHz		
T_{nom} (23)°C	V_{nom} (3.0)V	0.266 $\mu\text{V/m}$ (-11.5 dB $\mu\text{V/m}$)		
Maximum deviation from output power under extreme test conditions (dBc)		not applicable		
Measurement uncertainty		$\pm 3\text{dB}$		

RBW/VBW : 0,2kHz

Measured ERP in 3 m distance: 68.5 dB $\mu\text{V/m}$

In accordance with 15.31(f)(2) : linear distance extrapolation factor 40dB/decade

ERP in 300m : -11.5 dB $\mu\text{V/m}$

Limit for 36.9 kHz is 65.04 $\mu\text{V/m}$ or 36.26 dB $\mu\text{V/m}$ in 300m measurement distance

Limits

SUBCLAUSE § 15.109

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

17 – 24: 53 , 54 , 62

Equipment under test : WATCH PILOT

Ambient temperature : 23°C

Relative humidity : 33%

SPURIOUS RADIATION

§ 15.209

Radiated RF Power on

SPURIOUS EMISSIONS LEVEL (µV/m)								
36.9 kHz								
f (MHz)	Detector	Level (µV/m)	Limit (µV/m)	Margin (dB)	Results			
no traceable peak detected								
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

H = Horizontal ; V= Vertical

Measurement distance see table

Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 – 24: 53 , 54 , 62

Equipment under test : WATCH PILOT

Ambient temperature : 23°C

Relative humidity : 33%

Plots of the measurements

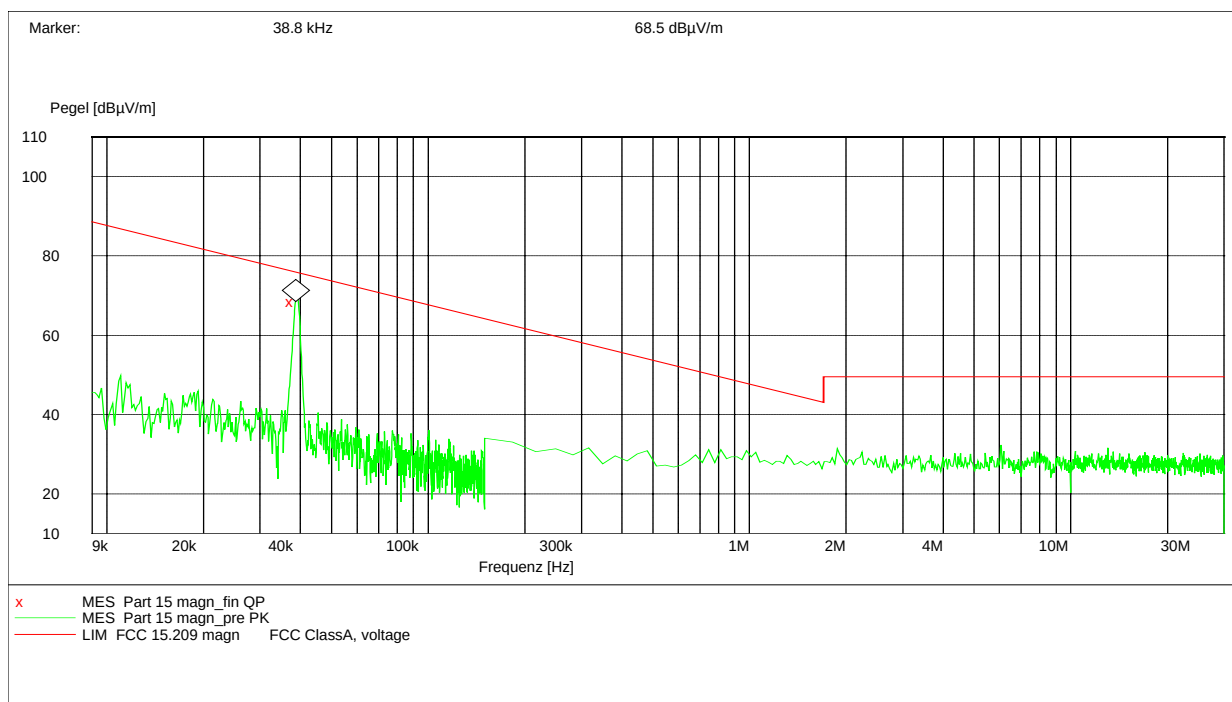
Part 15 Magnetics

EUT: Watch Pilot
 Manufacturer: Phonak
 Operating Condition: TX on
 Test Site: Cetecom, Room 6
 Operator: Berg M.
 Test Specification: 15.209
 Comment: Battery
 Start of Test: 02.12.03 / 07:59:30

SCANTABELLE: "FCC 15 magn"

Kurzbeschreibung: Voltage Mains 1.60

Start-Frequenz	Stop-Frequenz	Schrittweite	Detektor	Meßzeit	ZF-Bandbr.	Transducer
9.0 kHz	1 50.0 kHz	100.0 Hz	MaxPeak	100.0 ms	0.2 kHz	HFH2-Z2 (dBµV/m)
150.0 kHz	30.0 MHz	10.0 kHz	MaxPeak	100.0 ms	10 kHz	HFH2-Z2 (dBµV/m)



MEASUREMENT RESULT: "Part 15 magn_fin AV"

02.12.03 08:00

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Loop	Azimuth deg
0.038800	68.50	20.0	75.8	7.3	---	0.00

Measurement distance 3m

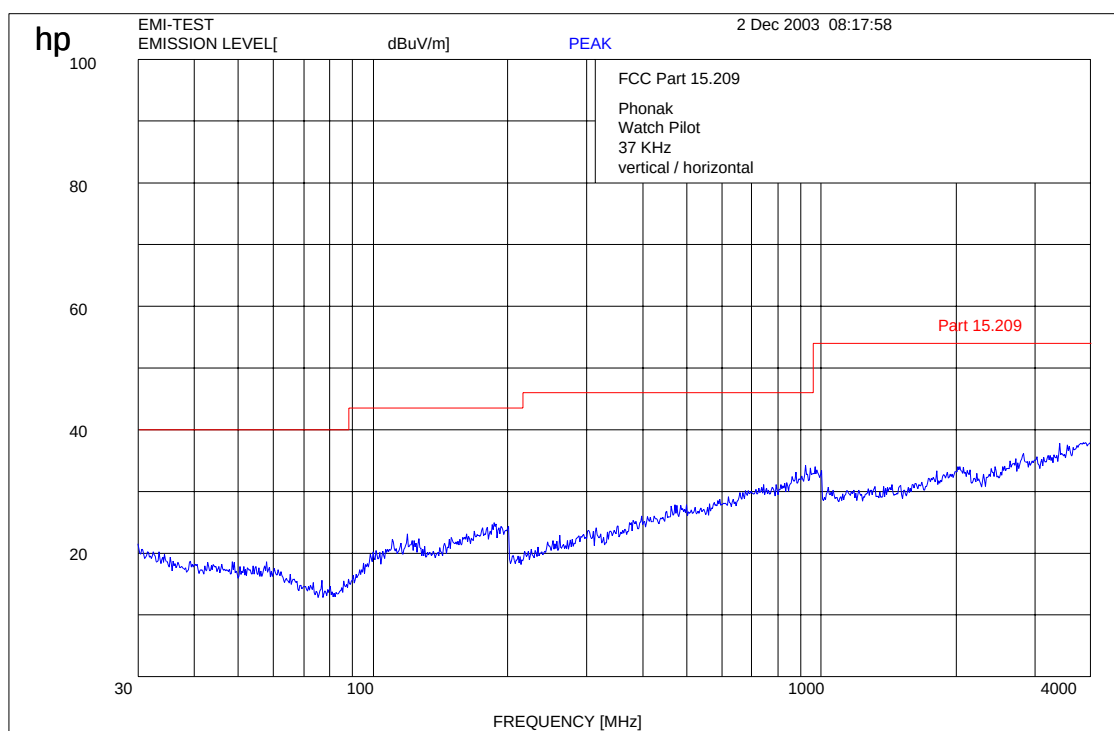
This measurement was done in 3 polarisation's, the plot shows the worst case (Coil antenna and controller PCB horizontal)

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 – 24: 53, 54, 62

Plots of the measurements



$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860
03	Oscilloscope	7633	Tektronix	230054
04	Radio Analyzer	CMTA 54	Rohde & Schwarz	894 043/010
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012
08	Funktionsgenerator	AFGU	Rohde & Schwarz	862 480/032
09	Regeltrenntrafo	MPL	Erft	91350
10	Netznachbildung	NNLA 8120	Schwarzbeck	8120331
11	Relais-Matrix	PSU	Rohde & Schwarz	893 285/020
12	Power-Meter	436 A	Hewlett-Packard	2101A12378
13	Power-Sensor	8484 A	Hewlett-Packard	2237A10156
14	Power-Sensor	8482 A	Hewlett-Packard	2237A00616
15	Modulationsmeter	9008	Racal-Dana	2647
16	Frequenzzähler	5340 A	Hewlett-Packard	1532A03899
17	Absorber Schirmkabine	---	MWB	87400/002
18	Spectrum Analyzer	85660 B	Hewlett-Packard	2747A05306
19	Analyzer Display	85662 A	Hewlett-Packard	2816A16541
20	Quasi Peak Adapter	85650 A	Hewlett-Packard	2811A01131
21	RF-Preselector	85685 A	Hewlett-Packard	2833A00768
22	Biconical Antenne	3104	Emco	3758
23	Log. Per. Antenne	3146	Emco	2130
24	Double Ridge Horn	3115	Emco	3088
25	EMI-Testreceiver	ESAI	Rohde & Schwarz	863 180/013
26	EMI-Analyzer-Display	ESAI-D	Rohde & Schwarz	862 771/008
27	Biconical Antenne	HK 116	Rohde & Schwarz	888 945/013
28	Log. Per. Antenne	HL 223	Rohde & Schwarz	825 584/002
29	Relais-Switch-Unit	RSU	Rohde & Schwarz	375 339/002
30	Highpass	HM985955	FSY Microwave	001
31	Amplifier	P42-GA29	Tron-Tech	B 23602
32	Absorber Schirmkabine		Frankonia	
33	Steuerrechner	PSM 7	Rohde & Schwarz	834 621/004
34	EMI Test Receiver	ESMI	Rohde & Schwarz	827 063/010
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
36	Controler	HD 100	Deisel	100/322/93
37	Relais Matrix	PSN	Rohde & Schwarz	829 065/003
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008
39	Relais Switch Unit	RSU	Rohde & Schwarz	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spektrum Monitor	EZM	Rohde & Schwarz	883 720/006
42	Meßempfänger	ESH 3	Rohde & Schwarz	890 174/002
43	Meßempfänger	ESVP	Rohde & Schwarz	891 752/005
44	Biconi Ant. 20-300MHz	HK 116	Rohde & Schwarz	833 162/011
45	Logper Ant. 0.3-1 GHz	HL 223	Rohde & Schwarz	832 914/010
46	Amplifier 0.1-4 GHz	AFS4	Miteq Inc.	206461
47	Logper Ant. 1-18 GHz	HL 024 A2	Rohde & Schwarz	342 662/002
48	Polarisationsnetzwerk	HL 024 Z1	Rohde & Schwarz	341 570/002
49	Double Ridge G Horn Antenne 1-26.5 GHz	3115	EMCO	9107-3696
50	Microw. Sys. Amplifier 0.5- 26.5 GHz	8317A	Hewlett Packard	3123A00105
51	Spectrum Analyzer	8562A	Hewlett Packard	2809AO2682
52	Steuerrechner	PSM 7	Rohde & Schwarz	883 086/026
53	DC V-Netzwerk	ESH3-Z6	Rohde & Schwarz	861 406/005
54	DC V-Netzwerk	ESH3-Z6	Rohde & Schwarz	893 689/012
55	AC 2 Phasen V-Netzwerk	ESH3-Z5	Rohde & Schwarz	861 189/014
56	AC 2 Phasen V-Netzwerk	ESH3-Z5	Rohde & Schwarz	894 981/019
57	AC-3 Phasen V-Netzwerk	ESH2-Z5	Rohde & Schwarz	882 394/007
58	Stromversorgung	6032A	Rohde & Schwarz	2933A05441
59	HF-Test Empfänger	ESVP.52	Rohde & Schwarz	881 487/021
60	Spectrum Monitor	EZM	Rohde & Schwarz	883 086/026
61	HF-Test Empfänger	ESH3	Rohde & Schwarz	881 515/002
62	Relais Matrix	PSU	Rohde & Schwarz	882 943/029
63	Relais Matrix	PSU	Rohde & Schwarz	828 628/007
64	Spectrum Analyzer	FSIQ 26	Rohde & Schwarz	119.6001.27
65	Spectrum Analyzer	HP 8565E	Hewlett Packard	3473A00773
66				

Photographs of the equipment

Test site



Test site



PHOTOGRAPHS OF THE EQUIPMENT

WATCH PILOT

Photograph no.: 1



PHOTOGRAPHS OF THE EQUIPMENT

WATCH PILOT

Photograph no.: 2



PHOTOGRAPHS OF THE EQUIPMENT

WATCH PILOT

Photograph no.: 3



PHOTOGRAPHS OF THE EQUIPMENT

WATCH PILOT

Photograph no.:4



PHOTOGRAPHS OF THE EQUIPMENT

WATCH PILOT

Photograph no.: 5



PHOTOGRAPHS OF THE EQUIPMENT

WATCH PILOT

Photograph no.: 6



PHOTOGRAPHS OF THE EQUIPMENT

WATCH PILOT

Photograph no.: 7

