



EMI -- TEST REPORT

- FCC Part 15.209 -

Test Report No. :	T33405-00-00KG	24. February 2010
		Date of issue

Type / Model Name : DACS PI

Product Description : Direct Acoustic Cochlear Partial Implant System

Applicant : Phonak Acoustic Implants SA

Address : Route de Denges 28E, 1st Floor

1027 Lonay, Switzerland

Manufacturer : Phonak Acoustic Implants SA

Address : Route de Denges 28E, 1st Floor

1027 Lonay, Switzerland

Licence holder : Phonak Acoustic Implants SA

Address : Route de Denges 28E, 1st Floor

1027 Lonay, Switzerland

Test Result according to the standards listed in clause 1 test standards:	POSITIVE
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DAT-P-207/05-00

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (October, 2009)

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements
Part 15, Subpart A, Section 15.35	Measurement detector functions and bandwidths

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (October, 2009)

Part 15, Subpart C, Section 15.205	Restricted bands of operation
Part 15, Subpart C, Section 15.207	Conducted limits
Part 15, Subpart C, Section 15.209	Radiated emission limits, general requirements
ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI C95.1:1992	IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
CISPR 16-4-2: 2003	Uncertainty in EMC measurement

2 SUMMARY

GENERAL REMARKS:

None

FINAL ASSESSMENT:

The equipment under test **fulfills** the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 29 October 2009

Testing concluded on : 30 October 2009

Checked by:

Tested by:

Harald Buchwald
Dipl.-Ing.(FH)
Manager: EMC

Klaus Gegenfurtner
Dipl.-Ing.(FH)

3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EUT





3.2 Power supply system utilised

Power supply voltage: : 1.3 V / DC

3.3 Short description of the equipment under test (EUT)

The EuT is a semi-implantable hearing instrument with an inductive link through the skin of the patient. The external part of the device is using microphones to pick up audio signals, does some pre-processing to enhance intelligibility, and transmits the signal and the energy to the implanted part of the device. The implanted part of the device receives energy and signals from the external part. It converts it to a vibration signal, which is applied directly to the cochlea through a stapes prosthesis.

Number of tested samples: 1
Serial number: 0935A40030 (implant), 09A3A10007 (button)

EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- Continuous transmission

EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurements:

- _____ Model : _____
- _____ Model : _____

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

mikes-testingpartners gmbh
Ohmstrasse 2-4
94342 STRASSKIRCHEN
GERMANY

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader may notice that tolerances within the calibration of the equipment and facilities may cause additional uncertainty. The measurement uncertainty is calculated for all measurements listed in this test report acc. to CISPR 16-4-2 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurement“ and documented in the **mikes-testingpartners gmbh** quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, **mikes-testingpartners gmbh**, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component diversity and modifications in production process of devices may result in additional deviation. If necessary, refer to the test lab for the actual measurement uncertainty for the specific test. The manufacturer has the sole responsibility of continued compliance of the EUT.

4.4 Measurement Protocol for FCC, VCCI and AUSTEL

4.4.1 GENERAL INFORMATION

4.4.1.1 Test Methodology

Conducted and radiated disturbance testing is performed according to the procedures set out by the International Special Committee on Radio Interference (CISPR) Publication 22, European Standard EN 55022 as shown under section 1 of this report.

The test methods used comply with CISPR Publication 22, EN 55022 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

4.4.1.2 Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

5 TEST CONDITIONS AND RESULTS

5.1 Conducted emissions

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location: None

5.1.2 Photo documentation of the test set-up

5.1.3 Applicable standard

According to FCC Part 15, Section 15.207(a):

Except as shown in paragraphs (b) and (c) of this Section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the given limits.

5.1.4 Description of Measurement

The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a line impedance stabilization network (LISN) with $50\Omega/50\ \mu\text{H}$ (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 cm above the floor and is positioned 40 cm from the vertical ground plane (wall) of the screen room. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

To convert between $\text{dB}\mu\text{V}$ and μV , the following conversions apply:

$$\text{dB}\mu\text{V} = 20 \log \mu\text{V}$$

$$\mu\text{V} = 10^{(\text{dB}\mu\text{V}/20)}$$

5.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin dB at MHz

Limit according to FCC Part 15, Section 15.207(a):

Frequency of Emission (MHz)	Conducted Limit (dB μV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

Remarks: Not applicable, because the EuT is battery powered.

5.2 Field strength of the fundamental wave

For test instruments and accessories used see section 6 Part **CPR 1**.

5.2.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

5.2.2 Photo documentation of the test set-up



5.2.1 Applicable standard

According to FCC Part 15C, Section 15.209:

The emissions from intentional radiators shall not exceed the effective field strength limits.

5.2.2 Description of Measurement

The magnetic field strength from the EUT will be measured on an open area test site in the frequency range of 9 kHz to 30 MHz using a tuned receiver and a shielded loop antenna. The set up of the Equipment under test will be in accordance to ANSI C63.4. Measurements have been made in all three orthogonal axes and the shielded loop antenna was rotated to locate the maximum of the emissions. In the case where larger measuring distances are required the results will extrapolated based on the values measured on the closer distances according to Section 15.31(f)(2)(2). The final measurement will be performed with an EMI Receiver set to Quasi peak detector except for the frequency bands 9 kHz to 90 kHz and 110 to 490 kHz where an average detector will be used according to Section 15.209(d)(2).

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: RBW: 200 Hz

150 kHz – 30 MHz: RBW: 9 kHz

Example:

Frequency (MHz)	Level (dB μ V)	+	Factor (dB)	=	Level dB(μ V/m)	-	Limit dB(μ V/m)	=	Delta (dB)
1.705	5	+	20	=	25	-	30	=	-5

5.2.3 Test result

Frequency (MHz)	Level AV (dB μ V)*	Level QP (dB μ V)	Corr. factor (dB)	Corr. level AV dB(μ V/m)	Corr. Level QP dB(μ V/m)	Limit QP dB(μ V/m)	Delta (dB)
5.217	32.6	33.0	20.0	52.6	53.0	69.5	-23.5

Limit according to FCC Part 15C, Section 15.209(a):

Frequency (MHz)	Field strength of fundamental wave		Measurement distance (metres)
	(μ V/m)	dB(μ V/m)	
0.009-0.490	2400/F(kHz)	--	300
0.490-1.705	24000/F (kHz)	--	30
1.705-30.0	30	29.5	30

The requirements are **FULFILLED**.

Remarks:

5.3 Spurious emissions

For test instruments and accessories used see section 6 Part **SER 1, SER 2**.

5.3.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

5.3.2 Photo documentation of the test set-up



5.3.3 Applicable standard

According to FCC Part 15C, Section 15.209:

The emissions from intentional radiators shall not exceed the effective field strength limits.

5.3.4 Description of Measurement

The spurious emissions from the EUT will be measured on an open area test site in the frequency range of 9 kHz to 1000 MHz using a tuned EMI receiver. In the case where larger measuring distances are required the results will be extrapolated, based on the values measured on the closer distances according to Section 15.31(f)(2). The final measurement will be performed with the EMI an Receiver set to Quasi peak detector except for the frequency bands 9 kHz to 90 kHz and 110 to 490 kHz where an average detector will be used, according to Section 15.209(d)(2).

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: RBW: 200 Hz

150 kHz – 30 MHz: RBW: 9 kHz

30 MHz – 1000 MHz: RBW: 120 kHz

Example:

Frequency (MHz)	Level (dB μ V)	+	Factor (dB)	=	Level dB(μ V/m)	-	Limit dB(μ V/m)	=	Delta (dB)
1.705	5	+	20	=	25	-	30	=	-5

5.3.5 Test result

Frequency (MHz)	Level AV (dB μ V)*	Level QP (dB μ V)	Corr. factor (dB)	Corr. level AV dB(μ V/m)	Corr. Level QP dB(μ V/m)	Limit QP dB(μ V/m)	Delta (dB)
10.4	18.5	19.0	20.0	38.5	39.0	69.5	-30.5
15.7	18.0	18.0	20.0	38.0	38.0	69.5	-31.5
140.8	--	8.2	15.5	--	23.7	43.5	-19.8

Limit according to FCC Part 15 Subpart 15.209(a):

Frequency (MHz)	Field strength of spurious emissions		Measurement distance (metres)
	(μ V/m)	dB(μ V/m)	
0.009-0.490	2400/F(kHz)	--	300
0.490-1.705	24000/F (kHz)	--	30
1.705-30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

The requirements are **FULFILLED**.

Remarks: Measurement has been performed up to 1 GHz.

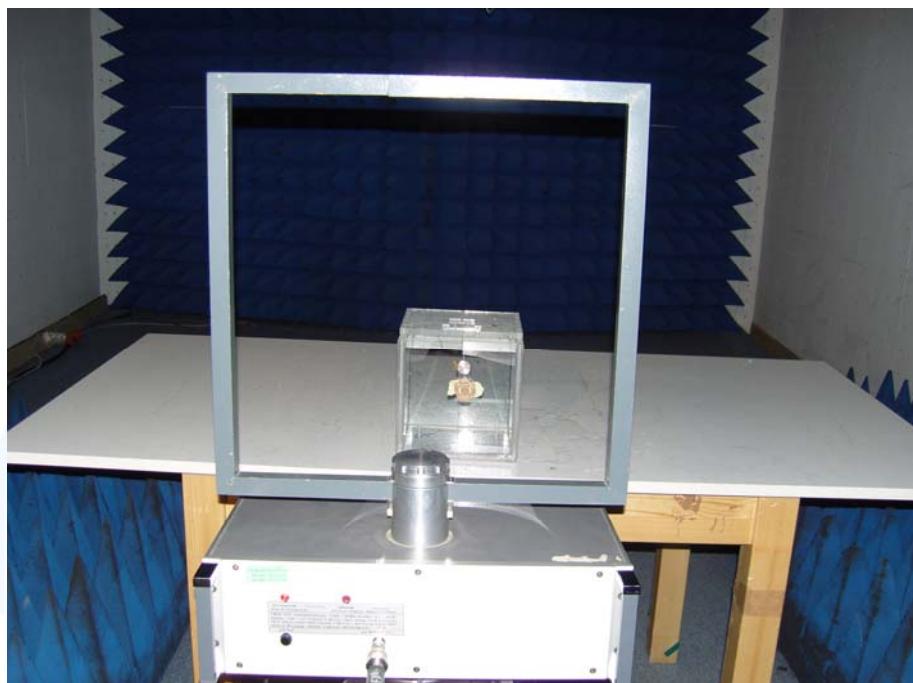
5.4 Emission bandwidth

For test instruments and accessories used see section 6 Part **MB**.

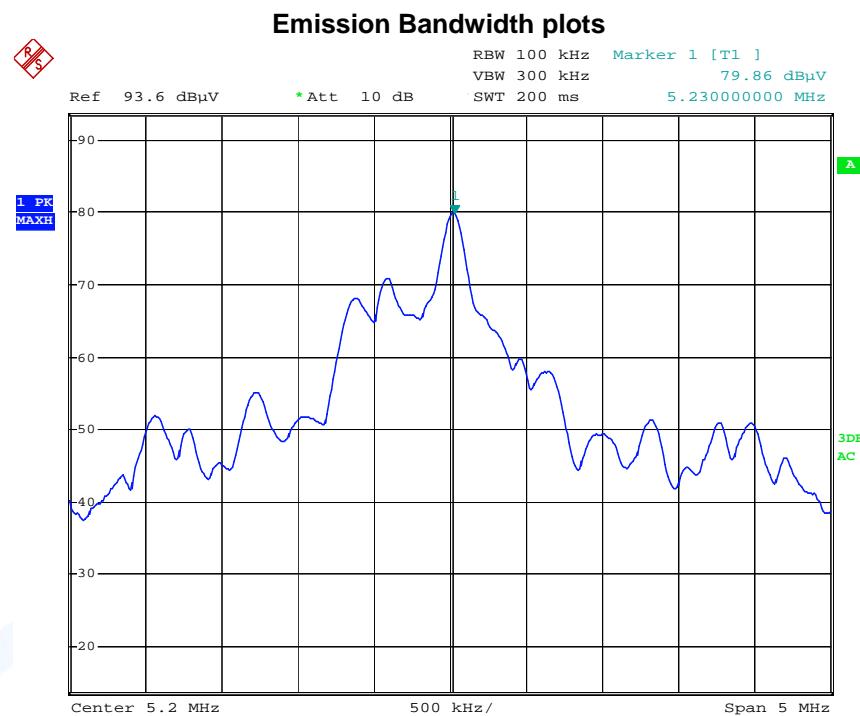
5.4.1 Description of the test location

Test location: Anechoic Chamber A2

5.4.2 Photo documentation of the test set-up



5.4.3 Test protocol



6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Next Verif.
CPR 1	FMZB 1516 ESCI	01-02/24-01-018 02-02/03-05-004	01/19/2010	01/19/2009	02/23/2010	02/23/2009
MB	FMZB 1516 ESCI	01-02/24-01-018 02-02/03-05-004	01/19/2010	01/19/2009	02/23/2010	02/23/2009
SER 1	FMZB 1516 ESCI	01-02/24-01-018 02-02/03-05-004	01/19/2010	01/19/2009	02/23/2010	02/23/2009
SER 2	ESVS 30 VULB 9168 S10162-B KK-EF393-21N-16 NW-2000-NB	02-02/03-05-006 02-02/24-05-005 02-02/50-05-031 02-02/50-05-033 02-02/50-05-113	08/05/2010 05/06/2011	08/05/2009 05/06/2008	04/08/2010	10/08/2009