



Accredited testing-laboratory

DAR registration number: DGA-PL-176/94-D1

**Federal Motor Transport Authority (KBA)
DAR registration number: KBA-P 00070-97**

Recognized by the Federal Communications Commission

Anechoic chamber registration no.: 90462 (FCC)

Anechoic chamber registration no.: 3462C-1 (IC)

Certification ID: DE 0001

Accreditation ID: DE 0002

Accredited Bluetooth® Test Facility (BQTF)

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Test report no. : 1-2222-01-06/10
Type identification : Phonak Ambra microM
Applicant : Phonak AG
FCC ID : KWC-WHSSAN1
IC Certification No : 2262A-WHSSAN1
Test standards : 47 CFR Part 15
RSS - 210 Issue 7

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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 3.1.1. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

Test laboratory manager:

2010-05-19	Marco Bertolino	
Date	Name	Signature

Technical responsibility for area of testing:

2010-05-19	Stefan Bös	
Date	Name	Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH

Address: Untertürkheimer Straße 6 - 10
66117 Saarbrücken
Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
e-mail: info@ICT.cetecom.de
Internet: http://www.cetecom-ict.de

State of accreditation:

The test laboratory (area of testing) is accredited according to
DIN EN ISO/IEC 17025
DAR registration number: DGA-PL-176/94-D1

Accredited by:

Federal Motor Transport Authority (KBA)
DAR registration number: KBA-P 00070-97

Testing location, if different from CETECOM ICT Services GmbH:

Name :
Street :
Town :
Country :
Phone :
Fax :

1.3 Details of applicant

Name:	Phonak AG
Street:	Laubisrütistrasse 28
Town:	8712 Stäfa
Country:	Schweiz
Telephone:	
Fax:	+41 (0) 58 928 20 11
Contact:	Valentina Shcherba
E-mail:	valentina.shcherba@phonak.com
Telephone:	+41 (0) 58 928 01 01

1.4 Application details

Date of receipt of order:	2010-04-29
Date of receipt of test item:	2010-05-11
Date of start test:	2010-05-11
Date of end test:	2010-05-19
Persons(s) who have been present during the test:	Mr. Christof Rüegg

2 Test standard/s

47 CFR Part 15

RSS - 210 Issue 7

**Title 47 of the Code of Federal Regulations; Chapter I-
Federal Communications Commission
subchapter A - general, Part 15-Radio frequency devices
Spectrum Management and Telecommunications - Radio
Standards Specification
Low-power Licence-exempt Radiocommunication Devices (All
Frequency Bands): Category I Equipment**

3 Technical tests

3.1 Details of manufacturer

Name:	Phonak AG
Street:	
Town:	Laubisrütistrasse 28
Country:	8712 Stäfa
	Schweiz

3.2 Test Item

Kind of test item	:	Hearing Aid with 10.6 MHz radio interface
Type identification	:	Phonak Ambra microM
S/N serial number	:	Koha mM P2 72 Koha mM P2 73
HW hardware status	:	WH2X
SW software status	:	0.3.2.0
Frequency Band [MHz]	:	10.2 MHz – 11 MHz
Frequency Range (or fixed frequency)	:	10.6 MHz
Type of Modulation	:	FSK – F1D inductive
Number of channels	:	1
Antenna	:	Integrated ferrite coil antenna → for more information, please take a look at sub-clause 9 – photos of the EUT
Power Supply	:	1.3 V DC by Zinc-Air battery
Temperature Range	:	0°C to +35 °C

FCC ID: KWC-WHSSAN1
 IC: 2262A-WHSSAN1

3.3 Test Item (Additional EUT information For IC Canada (appendix 2))

IC Registration Number:	2262A-WHSSAN1
Model Name:	Phonak Ambra microM
Details of Manufacturer	
Company	: Phonak AG
Address	: Laubisrütistrasse 28
City	: 8712 Stäfa
Country	: Schweiz
Details of EUT	
S/N serial number	: Koha mM P2 72 Koha mM P2 73
HW hardware status	: WH2X
SW software status	: 0.3.2.0
Tested to Radio Standards Specification (RSS) No.:	: RSS-210 Issue 7
Open Area Test Site Industry Canada Number	: IC 3462C-1
Frequency Range (or fixed frequency)	: 10.2 MHz – 11 MHz
Field Strength	: 7 dB μ V/m @ 30 m (noise floor)
Occupied Bandwidth (99% BW)	: 420.8 kHz
Emission designator	: 421KF1D
Type of Modulation	: F1D
Number of channels	: 1
Antenna information	: Integrated ferrite coil antenna → for more information, please take a look at sub-clause 9 – photos of the EUT
Transmitter Spurious (worst case)	: 50.1 dB μ V/m @ 3m (11.8 GHz)
Power Supply	: 1.3 V DC by Zinc-Air battery
Temperature Range	: 0°C to +35 °C

ATTESTATION:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:

Test engineer: Marco Bertolino **Date:** 2010-05-19

3.4 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature / humidity	T _{nom}	°C / %	+20 / 50
Low Temperature	T _{low}	°C	0
High Temperature	T _{high}	°C	+35
Nominal Power Source	V _{nom}	V	1.3
Low Power Source	V _{low}	V	1.1
High Power Source	V _{high}	V	1.4

Type of power source: DC by Zinc-Air battery

3.5 Reference documents

-/-

3.6 Additional comments

-/-

4 Statement of Compliance

4.1 Summary of Measurement Results

- No deviations from the technical specifications were ascertained**
 There were deviations from the technical specifications ascertained

4.2 CFR 47 Part 15.225

Section in this Report	Test Name / Section FCC Part 15	Test Name / Section RSS 210	applicable	Verdict
6.1	§ 15.209 (a) FIELDSTRENGTH OF FUNDAMENTAL	RSS GEN	YES	passed
6.2	§ 15.209 (a) FIELDSTRENGTH OF HARMONICS and SPURIOUS	RSS GEN	YES	passed

5 Measurements and Results

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers or free field. 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 are conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 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 analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.

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

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

30 MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, tri-log antenna

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

All measurement settings are according to FCC 15.209 and 15.207

6 FCC Part 15.209

6.1 Field strength of the fundamental

Reference

FCC:	CFR Part SUBCLAUSE § 15.209 (a)
IC:	RSS 210, RSS GEN

Results:

TEST CONDITIONS		MAXIMUM POWER (dB μ V/m)
Frequency		10.6 MHz
T _{nom}	V _{nom}	7 dB μ V/m @ 30 m (noise floor)
Measurement uncertainty		\pm 3dB

RBW/VBW: 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz

Note:

Measured value = 27 dB μ V/m @ 10 m

Recalculation factor = 40 / decade (20dB - 10m to 30m)

Recalculated value = 27 dB μ V/m @ 10 m - 20 dB = 7 dB μ V/m @ 30 m

Limits: § 15.209 (a)

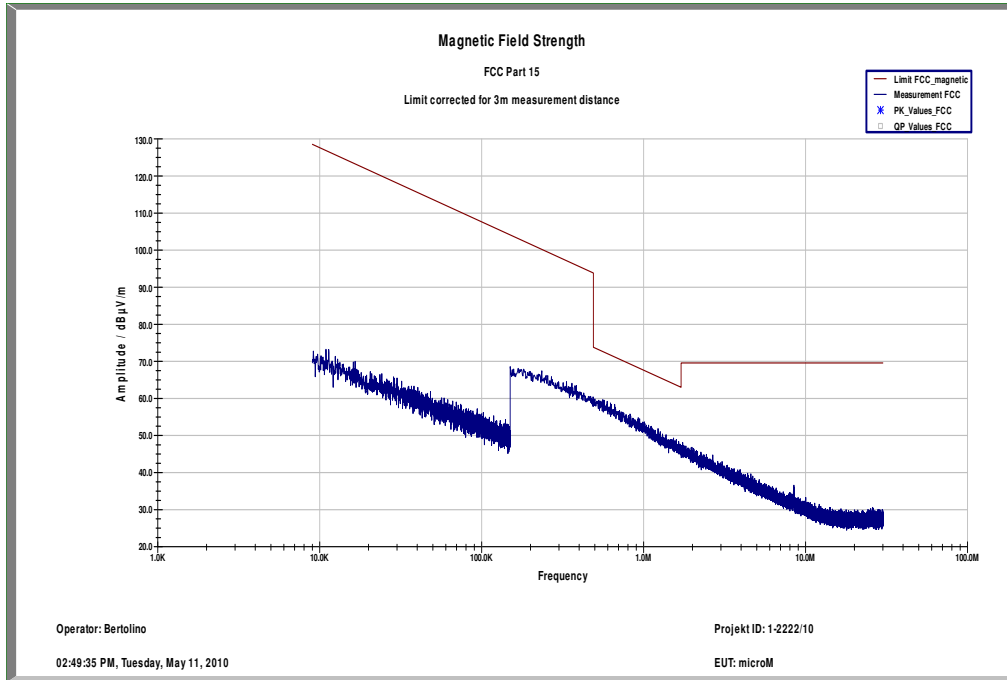
1.705 MHz - 30 MHz \rightarrow 30 μ V/m @ 30 m
--

6.2 Field strength of the harmonics and the spurious

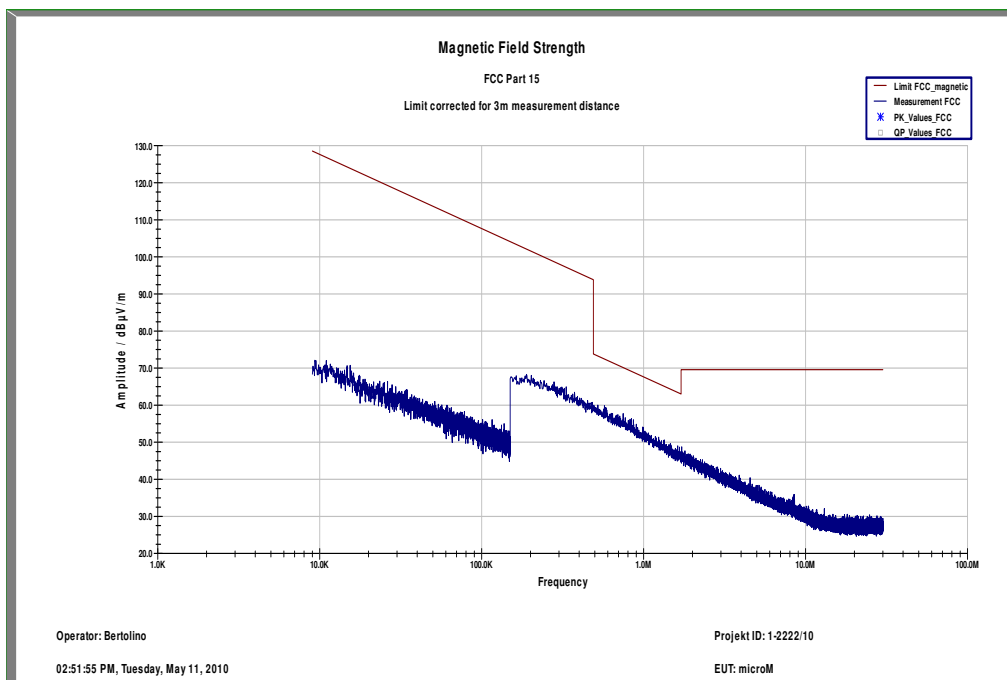
Reference

FCC:	CFR Part SUBCLAUSE § 15.209 (a)
IC:	RSS 210, RSS GEN

Plot 1: TX mode, 9 kHz – 30 MHz



Plot 2: RX mode, 9 kHz – 30 MHz



Results:

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dB μ V/m)	limit max. allowed field strength	Distance (Meter)	results
No critical peaks detected. All emissions are below the limit.				300	
				30	
Measurement uncertainty			± 3dB		

Limits

SUBCLAUSE § 15.209 (a)

Fundamental Frequency (MHz)	Field strength of Fundamental (μ V/m)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30 (29.5 dB μ V/m)	30
30.0 – 88.0	100 (40 dB μ V/m)	3
88 – 216	150 (43.5 dB μ V/m)	3
216 – 960	200 (46 dB μ V/m)	3

RBW/VBW: 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz

Plot 1: TX / RX mode, 30 MHz – 1 GHz, vertical & horizontal polarization

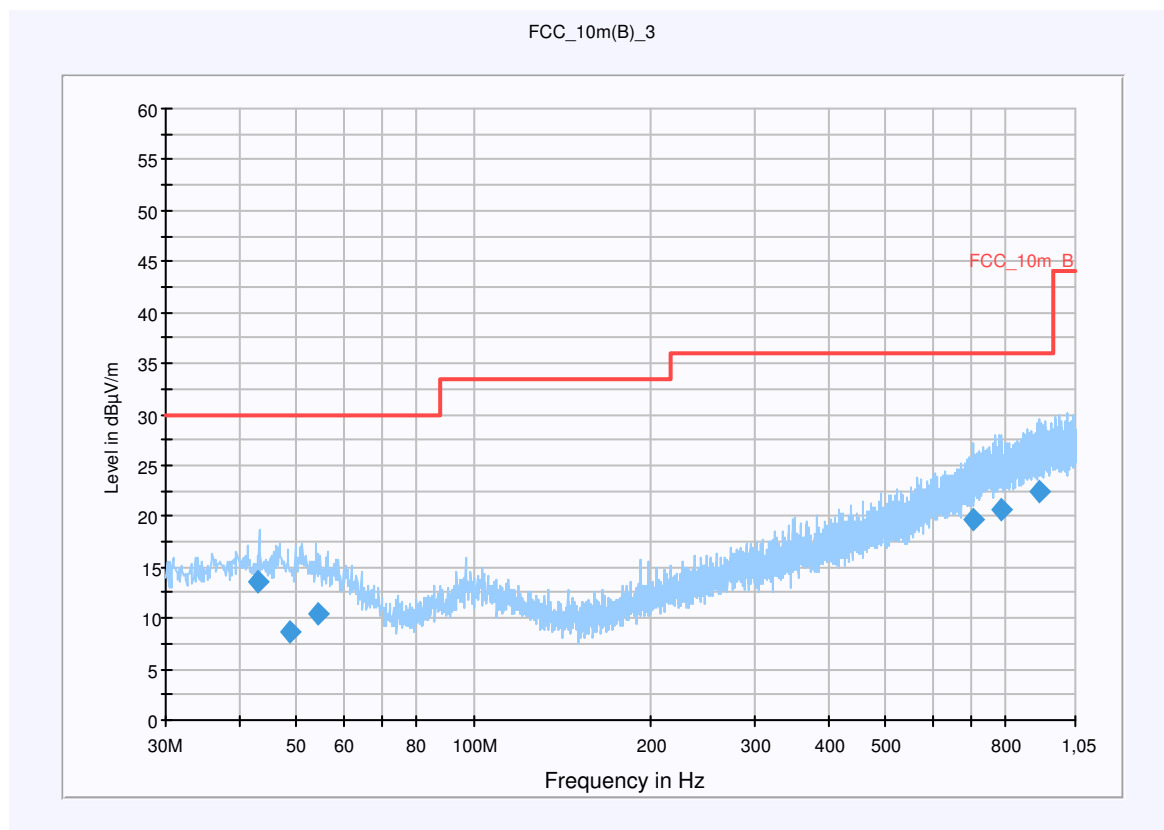
Common Information

EUT: Ambra microM
 Serial Number: 72 + 73
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: TX + RX
 Operator Name: Hennemann
 Comment: battery powered 1,4 V

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Level Unit: dBµV/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
42.993600	13.5	15000.000	120.000	98.0	V	324.0	13.3	16.5	30.0	
48.921150	8.6	15000.000	120.000	197.0	H	22.0	13.3	21.4	30.0	
54.242100	10.3	15000.000	120.000	124.0	V	260.0	13.0	19.7	30.0	
705.213600	19.7	15000.000	120.000	220.0	V	313.0	22.5	16.3	36.0	
784.867650	20.7	15000.000	120.000	220.0	H	164.0	23.7	15.3	36.0	
915.517050	22.5	15000.000	120.000	220.0	V	305.0	25.2	13.5	36.0	

Note:

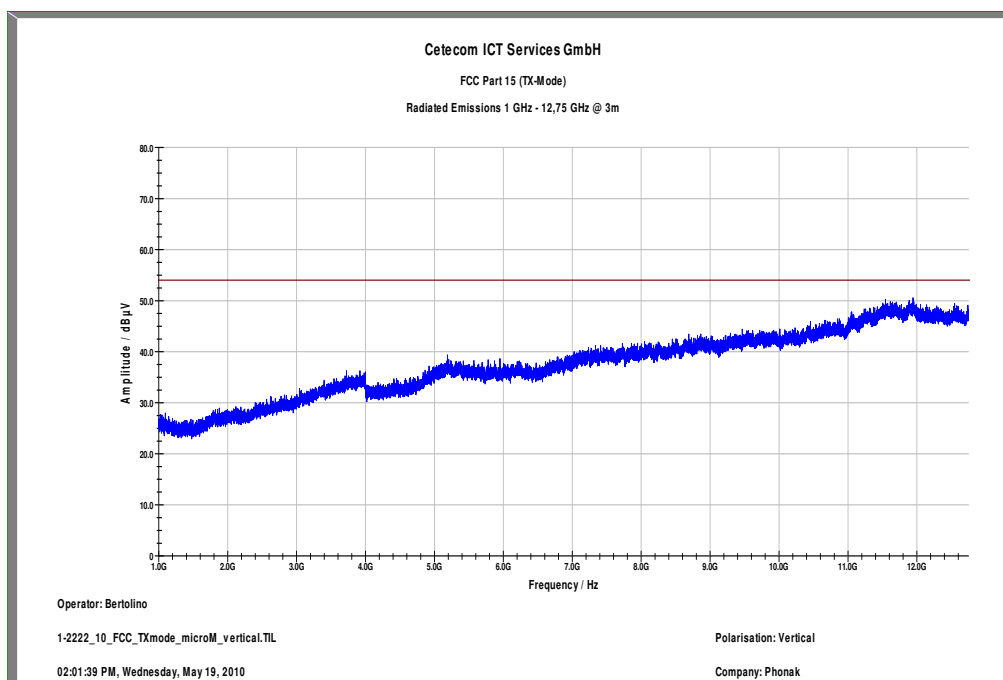
Unit 1: TX mode
 Unit 2: RX mode
 Both units are identical.

Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

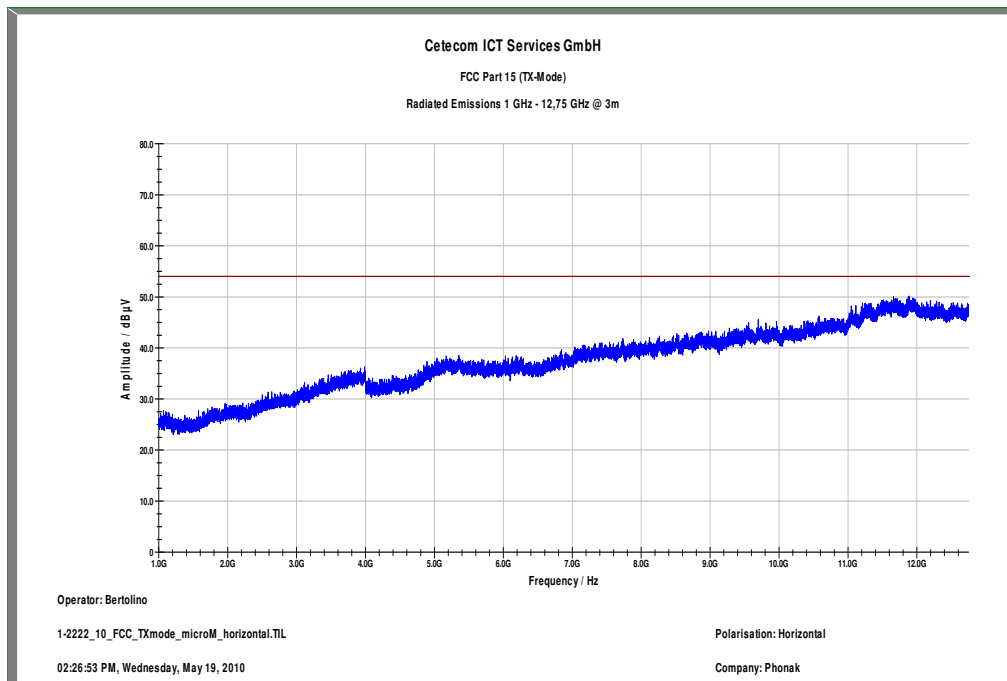
Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113
Antenna Tower:	Correction Table: Cable_EN_1GHz (0909) Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

Plot 2: TX / RX mode, 1 GHz – 12.75 GHz, vertical polarization



Plot 3: TX / RX mode, 1 GHz – 12.75 GHz, horizontal polarization



7 Test equipment and ancillaries used for tests

In order to simplify the identification of the equipment used at each specific test, each item of test equipment and ancillaries are provided with an identifier or number in the equipment list below.

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

No.	Labor / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kal. Art	Last Calibration	Next Calibration
1	45	Switch-Unit	3488A	HP Meßtechnik	2719A1450 5	300000 368	g		
2	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A0446 6	300000 580	k	06.01. 2009	06.01. 2011
3	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5 979	300000 210	k		
4	n. a.	EMI Test Receiver	ESCI 1166.5950.0 3	R&S	100083	300003 312	k	08.01. 2010	08.01. 2012
5	n. a.	Analyzerr-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003 314	k		
6	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003 379	ev		
7	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003 745	izw		
8	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003 746	izw		
9	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003 747	izw		
10	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003 787	k		
11	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003 874	k	08.01. 2010	08.01. 2012
12	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A0345 0	300001 040	Ve	08.01. 2009	08.01. 2012
13	n. a.	PowerAttenuator	8325	Byrd	1530	300001 595			
14	n. a.	Double-Ridged Waveguide	3115	EMCO	8812-3088	300001 032	vIKI!	05.03. 2009	05.03. 2011

		Horn Antenna 1-26.5GHz							
15	n. a.	Active Loop Antenna	6502	EMCO	2210	300001 015	ne		
16	n. a.	Anechoic chamber		MWB	87400/02	300000 996			
17	Spec. A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000 222	ne		
18	9	Artificial Mains 9 kHz to 30 MHz, 4 x 25 Ampere	ESH3-Z5	R&S	828576/020	300001 210	Ve	06.01. 2010	06.01. 2012
19	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A1501 3	300001 156	ne		
20	n. a.	Relais Matrix	PSU	R&S	890167/024	300001 168	ne		
21	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001 263	ne		
22	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000 997	ne		
23	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001 443	ne		
24	n. a.	Band Reject filter	WRCG1855 /1910- 1835/1925- 40/8SS	Wainwright	7	300003 350	ev		
25	n. a.	Band Reject filter	WRCG2400 /2483- 2375/2505- 50/10SS	Wainwright	11	300003 351	ev		
26	n. a.	TILE- Software Emission	Quantum Change, Modell TILE- ICS/FULL	EMCO	none	300003 451	ne		
27	n. a.	Highpass Filter	WHKX2.9/1 8G-12SS	Wainwright	1	300003 492	ev		
28	n. a.	Highpass Filter	WHK1.1/15 G-10SS	Wainwright	3	300003 255	ev		
29	n. a.	Highpass Filter	WHKX7.0/1 8G-8SS	Wainwright	18	300003 789	ne		
30	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY482500 80	300003 812	k	05.08. 2008	05.08. 2010
31	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Technologies	MY474202 20	300003 813	k	06.08. 2008	06.08. 2010
32	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY482600 03	300003 825	vIKI!	19.08. 2008	19.08. 2010
33	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3	VULB9163	Schwarzbeck	371	300003 854	vIKI!	17.12. 2008	17.12. 2010

		GHz							
34	n. a.	Test Receiver	ESH2	R&S	871921/095	300002 505	Ve	12.02. 2010	12.02. 2012
35	n. a.	Loop Antenna 9 KHz - 30 MHz	HFH2-Z2	R&S	872096/61	300001 824	vIKI!	18.11. 2008	18.11. 2011
36	n. a.	Power Supply	LA30/5GA	Zentro Elektronik	2046	300000 711	NK!		
37	n. a.	Temperature Test Chamber	VT 4002	Heraeus Voetsch	521/83761	300002 326	Ve	28.05. 2009	28.05. 2011
38	n. a.	Signal Analyzer 20Hz- 26,5GHz-150 to + 30 DBM	FSIQ26	R&S	835540/018	300002 681- 0005	k	07.01. 2010	07.01. 2012

8 Photographs of the Test Set-up

Photo documentation:

Photo 1:



Photo 2:



9 Photographs of the EUT

Photo documentation: external photos

Photo 1: Sample 1

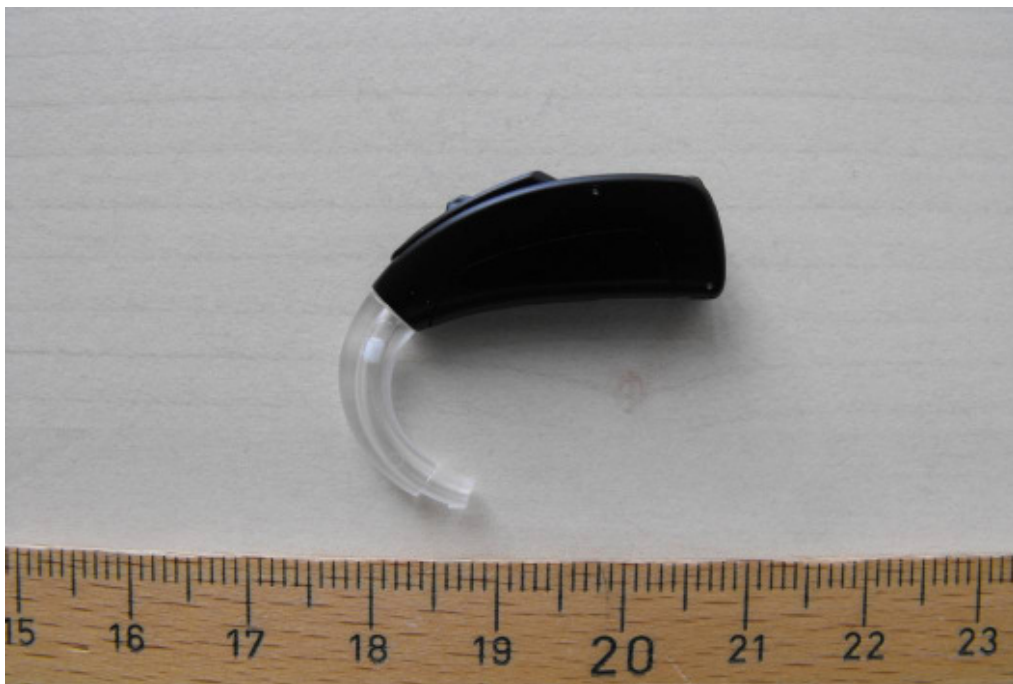


Photo 2: Sample 1



Photo 3: Sample 1



Photo 4: Sample 1



Photo 5: Sample 1



Photo 6: Sample 1



Photo 7: Sample 1



Photo 8: Sample 2



Photo documentation: internal photos

Photo 1:



Photo 2:



Photo 3:



Photo 4:



Photo 5:



Photo 6:



Photo 7:



Photo 8:



Photo 9:



Photo 10:



Photo 11:



Photo 12:



Photo 13:

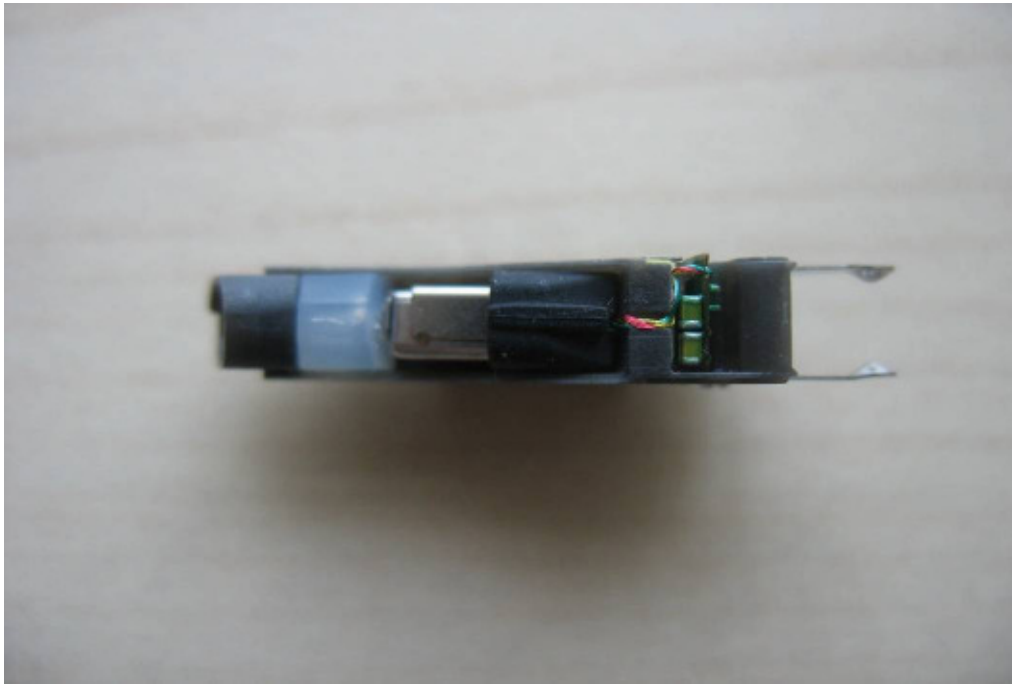


Photo 14:



Photo 15:



Photo 16:



Photo 17:



Photo 18:

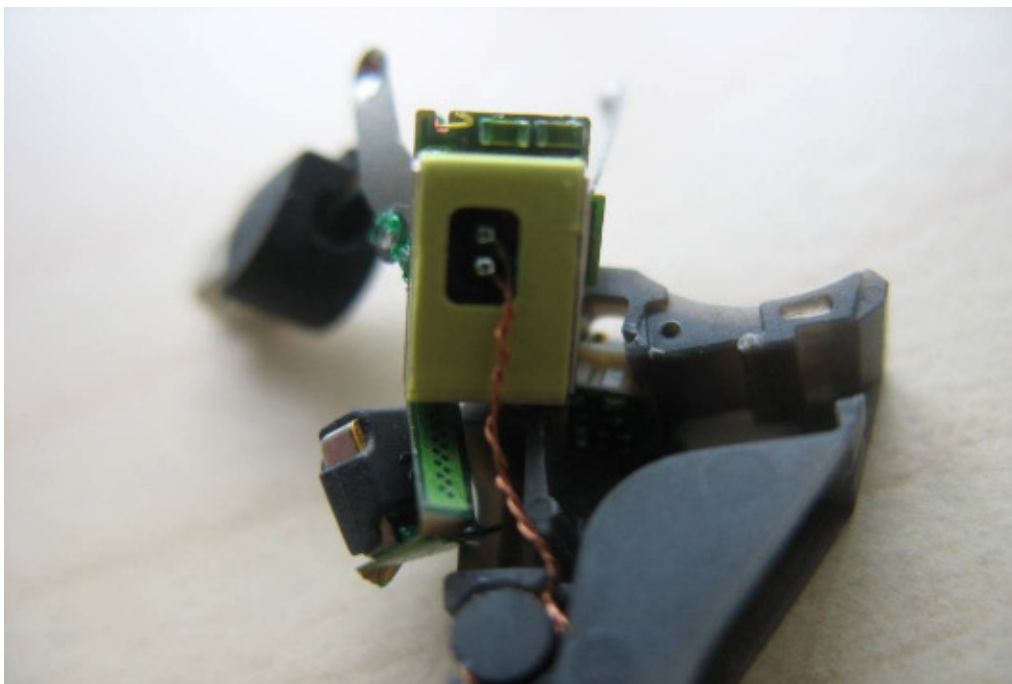


Photo 19:

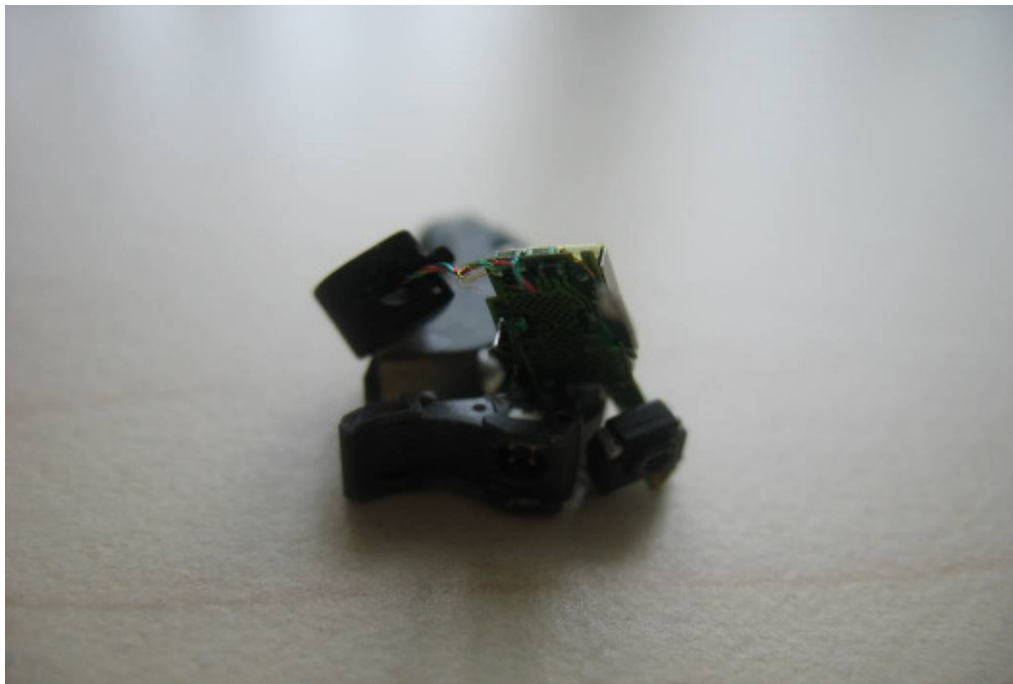


Photo 20:

