DPOAE (order #100110):

- Leak check: analysis of feedback signal (440 Hz probe tone)
- Probe check: limit of maximum sound pressure ("stimulus"), comparison across speakers ("symmetry"), leak check ("probe fit")
- Calibration: in-the-ear calibration with ear-canal volume adjustment
- Noise detection: narrow band noise around $2f_2$-f_1
- Residual noise calculation: weighted averaging, summed weighting factors, artifact rejection: weighted averaging
- Response detection: F-test, F-value at a single point (Fsp), automatic retest option
- Frequency ratio f_2/f_1: 1.22. Sample rate: 48 kHz (stimulus, response)
- Minimum DPOAE level criterion: L_1 – 70 dB
- Measurement interval: 4096 samples
- Stimulus modes with Frequency-modulated DPOAE license: f_m = 1.4-1.6 Hz, modulation depth = 50 Hz@1 kHz, 100 Hz@4 kHz
- Multi-channel DPOAE: simultaneous measurement of DPOAEs at up to two f_2 frequencies at a time
- Frequencies f_2: 1, 1.5, 2, 3, 4, 5, 6, 8 kHz
  - Linear: 0.8 to 10 kHz (step size: 0.5 kHz from 1 to 10 kHz), steps: 10 to 1000 Hz (step size: 10 Hz)
  - Logarithmic: 0.8 to 10 kHz (step size: 0.5 kHz from 1 to 10 kHz), steps: 1 to 30 points per octave (step size: 1 point per octave)
- Stimulus levels L_2: 30 to 65 dB SPL; step size: 5 dB (single and multiple selections possible)
- Minimum DPOAE level criterion (optional): -20 to 0 dB; step size: 5 dB
- Measurement time: adaptive timeout, manual min/max timeout

DPOAE threshold - cochlear audiogram (order #100111):

- Frequencies f_2: 1, 1.5, 2, 3, 4, 5, 6, 8 kHz
- Stimulus level L_2: 20 to 65 dB SPL (automated threshold detection)
- Minimum stimulus level L_2: 20, 25, 30 dB SPL
- L_2/L_1 relation: automatic (scissor paradigm)

TEOAE (order #100109):

- Noise detection: root mean square (RMS) of non-stimulus intervals
- Residual noise calculation & artifact rejection: weighted averaging
- Response detection TEQUICK: 8 values with changing sign fulfilling a 3 sigma criterion (representing 99.7 % statistical significance)
  TEOAE Diagnostic: user-defined stop criterion (SNR: 6 or 9 dB) in 3, 4, or 5 out of 5 frequency bands (1, 1.5, 2, 3, 4 kHz)
- Sample rate: 48 kHz (stimulus), 16 kHz (response)
- Window of analysis: 5 to 13 ms post-stimulus
- Stimulus level: 85 dB peSPL
- Stimulus type: short-term stimulus without direct component (0.7-6 kHz)
- Stimulation protocol: nonlinear

Audiometry (order #100113):

- Full 2 channel diagnostic audiometer (DIN EN 60645-1 class 3) air - bone - masking
- Child audiometry options (MAGIC #100112 , MATCH #100356, BASD, spondees and many more).
- Speech
- Multiple transducer options including circumaural headphones, insert phones and bone conduction. Multiple upgrades available.

Impedance / Tympanometry class 1	**incl.**
226 Hz, 678 Hz, 800 Hz, 1000 Hz tones	●
Diagnostic and screening protocols, presets, configurable	●
Multi frequency tympanometry (4 tones at once)	●
Pressure range -600 to +400 daPa	●
Auto stop function, manual control, 3D graph, cartoon mode	●
Y/B/G components view (admittance, susceptance, conductance)	●
Tymp + Reflex automatic sequence	●
ETF tests: (non) perforated eardrum, patulous eustachian tube	
Reflex	
500, 1000, 2000, 3000, 4000 Hz stimulus up to 105 dB HL	●
Broadband, High and low pass noise stimulus up to 90 dB HL	●
Ipsilateral and contralateral reflex	●
eSRT for cochlear implant clinics: trigger cable (order #100849)	option
Automatic reflex threshold and reflex decay testing	●

Multi-frequency Tympanometry:

- Simultaneous recording of 226 Hz, 678 Hz, 800 Hz and 1000 Hz Tympanometry - immediate results with only one button press
- Display of 3D graph available
- Children entertainment mode - the new pilot test

Additional features:

- Simultaneous OAE measurement on left/right ear - 2 probes!
- Results can be sorted by birthdate, name, ID, examiner, date, time
- Interface to wireless modem for data transfer to PATHTRACK
- Patient demographics on device
- Optional Database Software (MIRA) - Data Management: Easily view, archive and export test results
- Transfer test results to the MIRA database via USB
- Easily attach test results to patient records with many EMR systems
- Export full-color, 8.5" x 11" reports in multiple formats, with graphic and tabular data, preset or free comments
- Noah compatible
- Entertainment mode for all Tymp and OAE modules

Technical Specifications:

Device dimensions: 150 x 210 x 45 mm, ca. 475 g. Display: 240 x 320 pixel; graphic LCD 5", resistive touch screen, real time-clock, piezo-electric sound generator, USB, Output voltage and nominal impedance (headphone socket): 5 Vpp, 32 Ω Power consumption: max. 2 W.
Memory capacity: up to 1000 patients, ca. 1000 tests (dependent on test type).

Additional technical specifications can be found in the detailed technical manual (rev 11 per 08/2017) available online https://pathme.de/support/#manuals

Hardware order instructions for MODEL SOH100497 - TYMP SCREENING with diagnostic options:
100497-US11 for Tymp screening @226 Hz and ipsi reflex combined with TEOAE and DPOAE
100497-US12 for Tymp screening @226 Hz and ipsi reflex combined with clinical pure tone audiometry class 3
100497-US13 for Tymp screening combined with diagnostic DPOAE & TEOAE and audiometry class 3.
All these can be upgraded to diagnostic tymp later on as described on the back side of this page.

All sets are supplied with: dual use Tymp / OAE probe, accessory box, charger, manual, MIRA PC software with import and export features. Sets with contra reflex also include monoaural headphones or monoaural inserts. Sets with audiometry include stero inserts or stereo headsets. **Many optional items available - see accessory brochure.**

100837-11_MA_SOH100497-diagnostic_EN_01, September 2017

The world's first integrated OAE, tympanometry and audiometry device.

Made in Germany

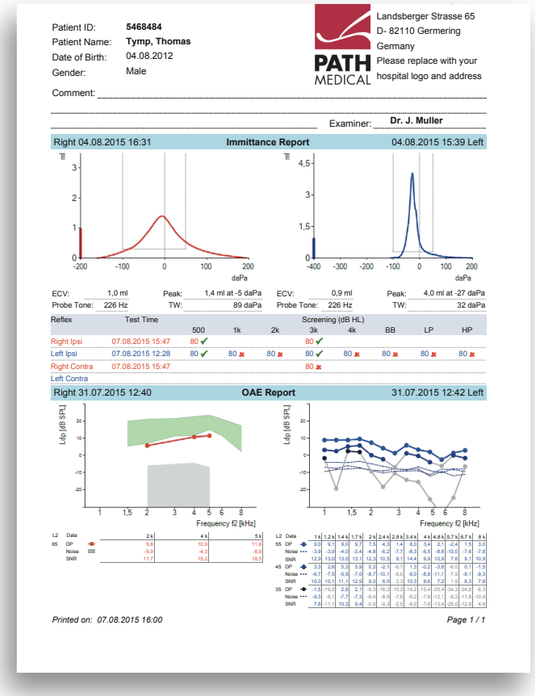
PATH MEDICAL GmbH
Landsberger Straße 65
82110 Germering
Germany
CE 0124
Tel +49 89 800 76 502 / Fax +49 89 800 76 503
info@path-medical.de / www.path-medical.de

A FULL ASSESMENT OF MIDDLE EAR REFLECTANCE AND CONDUCTANCE CAN BE MADE EASIER WITHOUT WIDEBAND REFLECTANCE DEVICES

The most common probe tone frequency used in tympanometry is 226 Hz. Using 226 Hz, well known and categorized tympanogram shapes can be obtained. When testing infants younger than four months, a probe tone frequency at 1000 Hz is recommended. For many pathologies, the optimal probe tone frequency is not a well established value. Multifrequency tympanometry can improve on middle ear diagnostics, but can be time consuming with analysis sometimes not occurring immediately. However a subset of multifrequency information – based on the relevant and well established frequencies - can help in daily practice to speed up and improve the diagnostics.
Therefore PATH MEDICAL introduced the simultaneous stimulation of 226 Hz, 678 Hz, 800 Hz and 1000 Hz while testing tympanometry. In a single recording four different traces are obtained and ready for immediate interpretation. No need to spend more time or money for post processing of 3D graphs to receive the reports which are used for diagnostics. And besides: 3D graphs are available on SENTIERO too.

Remote control and live display of results!

Database Software and Data Management


Patient ID: 5468484
Patient Name: Tymp, Thomas
Date of Birth: 04.08.2012
Gender: Male
Comment:

PATH MEDICAL
Landsberger Strasse 65
D- 82110 Germering
Germany
Please replace with your hospital logo and address

Examiner: Dr. J. Muller

Right 04.08.2015 16:31 — Immittance Report — 04.08.2015 15:39 Left

ECV: 1,0 ml — Peak: 1,4 ml at -5 daPa — Probe Tone: 226 Hz — TW: 89 daPa
ECV: 0,9 ml — Peak: 4,0 ml at -27 daPa — Probe Tone: 226 Hz — TW: 32 daPa

Reflex	Test Time	Screening (dB HL) 500	1k	2k	3k	4k	BB	LP	HP
Right Ipsi	07.08.2015 15:47	80 ✓			80 ✓				
Left Ipsi	07.08.2015 12:28	80 ✓	80 ✗	80 ✗	80 ✓	80 ✗	80 ✗	80 ✗	80 ✗
Right Contra	07.08.2015 15:47				80 ✗				
Left Contra									

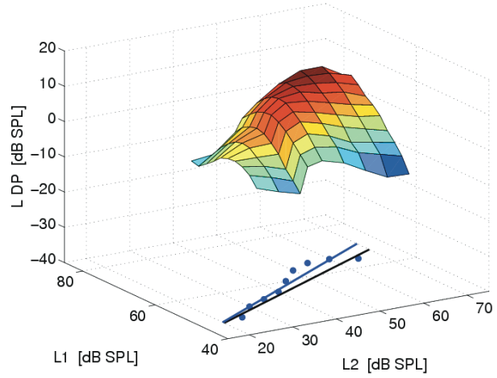
Right 31.07.2015 12:40 — OAE Report — 31.07.2015 12:42 Left

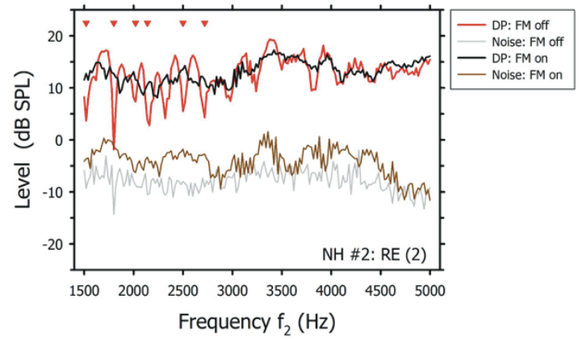
Printed on: 07.08.2015 16:00 — Page 1 / 1

Easily view, archive and export test results:

- With the MIRA database you can transfer the SENTIERO test data in seconds via USB cable from device to MIRA through communication software
- Export full-color, 8.5" x 11" reports in multiple formats, with graphic and tabular data, allows for preset comments to be selected or add text and test information—perfect for consulting with parents, colleagues and for record keeping
- Easily attach test results to patient records within most EMR systems
- Remote display of results on your PC / monitor using the MIRA remote control
- Allows inputting patient demographics onto the device
- NOAH compatible
- Stores up to 1000 patients on the device
- Results can be sorted by birthdate, name, patient ID, examiner, date and time.
- Direct print from your device to pdf

Technology Leader in Otoacoustic Emissions



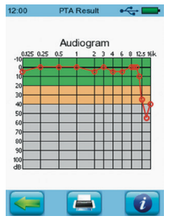


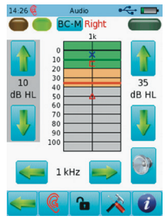
OPTIMAL DPOAE STIMULATION...

...is required in order to detect the DPOAE amplitude easily in noisy environments. Optimal combinations of level and frequency ratio are needed in order to record DPOAE amplitudes with good signal to noise ratio (SNR) higher than 6 dB and amplitude higher than -5dB. PATH MEDICAL co-founder Dr. T. Janssen detected the advantages of using the optimal stimulus paradigm (Scissor Paradigm) in 1998. The Scissor Paradigm produces easy and robust detection of DPOAE responses. The technology is applied to a patented method in SENTIERO to produce a full cochlear audiogram.

AUDIOMETRY IS AVAILABLE TOO!

Pure tone audiometry up to 16 kHz and speech audiometry, bone conduction and masking, children audiometry modules, freefield options... SENTIERO is a full 2 channel audiometer!





FREQUENCY MODULATION IS USED TO REDUCE FINE STRUCTURE!

Applying FMDPOAE® eliminates all notches in the fine structure diagram displayed above. It is important to note that even a simple screening DPOAE would not have passed at the "notch frequencies" without the patented FMDPOAE® method. A priori, frequencies of notches are unknown, but often in the region of standard screening frequencies. Consequently FMDPOAE® enhances robustness and speed of DPOAE screening and diagnostic recordings.

BINAURAL AND MULTIFREQUENCY OAE:

- FMDPOAE® with frequency modulated stimulus: two pairs of frequencies can be tested at the same time per ear (multiple channel testing)
- Binaural DP-testing: both ears at the same time
- Up to four times faster than competition!
- Binaural TEOAE in screening mode or diagnostic mode.

Probes are colour-coded to provide the user with easy probe selection, left (blue) and right (red) when testing binaurally. The device detects the probes automatically when inserted - keeping calibration information always updated.

MULTIPLE CONFIGURATIONS AVAILABLE - SAVE MONEY AND ORDER A BUNDLE. FUTURE UPGRADES ARE AVAILABLE TOO!

order # 100497-US6
Multi-frequency tympanometry class 1 incl. ETF and reflex.

order # 100497-US7
Full features (as per US6) and binaural DPOAE & TEOAE

order # 100497-US8
Full features (as per US7) & DPThreshold - automated cochlear audiogram

order # 100497-US9
Full features (as per US8) and Audiometry added too!