



# ERO•SCAN

Otoacoustic Emission Testing

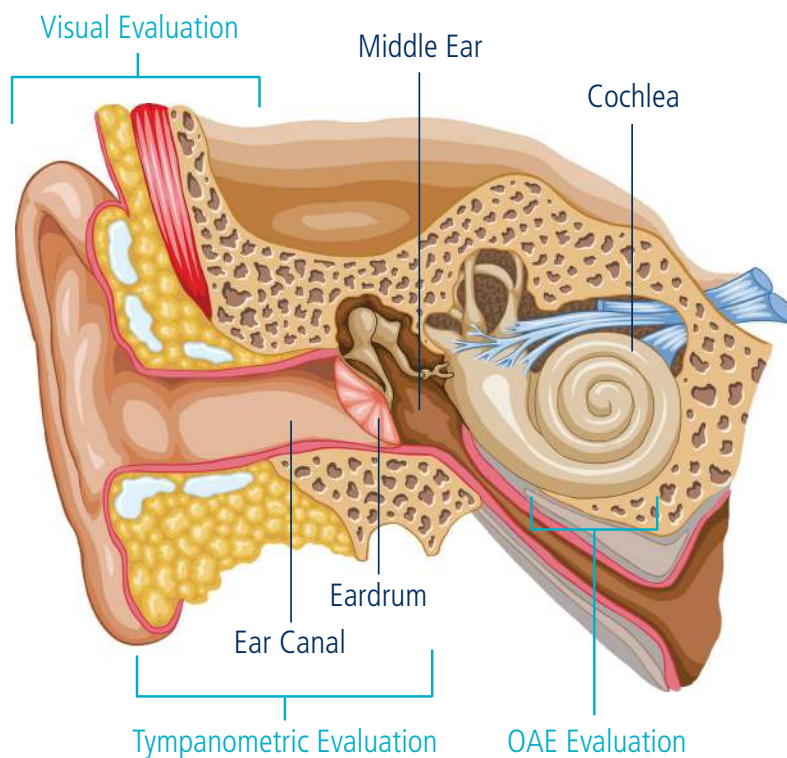


# ERO•SCAN – Theory

## Otoacoustic Emissions

Evoked Otoacoustic Emissions (OAEs) are soft sounds returned by the inner ear as a response to a sound event. The inner ear contains hair cells, which are responsible for transforming the sound signal to a nerve potential, that is processed in the brain. These hair cells respond to sound by vibrating. The vibration produces a very quiet sound, that echoes through the middle ear to the ear canal. With very sensitive microphones, this sound can be measured.

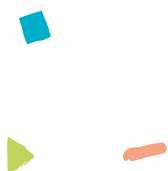
TEOAEs are evoked by a transient stimulus, DPOAEs are evoked by a pair of pure tone stimuli.



OAEs only occur in a normal functioning cochlea with normal hearing sensitivity. If there is damage to the cochlea (more specifically to the outer hair cells) or middle ear, OAEs will not be present.

OAEs are measured by placing a small probe into the patient's ear. The probe presents a stimulus and records the soft sounds generated in the cochlea. The test does not need any kind of cooperation of the patient and the test result is shown immediately after the test is finished.

With the ERO•SCAN a test result with a PASS means OAEs were detected. A REFER screening result means, that no clear response could be measured. The patient might be at risk for possible hearing loss and therefore communication difficulties. Further diagnostic assessment of the patient's state of hearing is recommended.



## ERO•SCAN – OAE Testing for all ages

### Newborns



### School Children



### Toddlers



### Adults



## Applications

### Newborn Hearing Screening

Worldwide approximately two of thousand babies are born with permanent hearing loss. The measurement of otoacoustic emissions is a standard procedure to screen newborns for hearing loss. Early detection of babies with hearing loss is essential for providing best possible support to them.

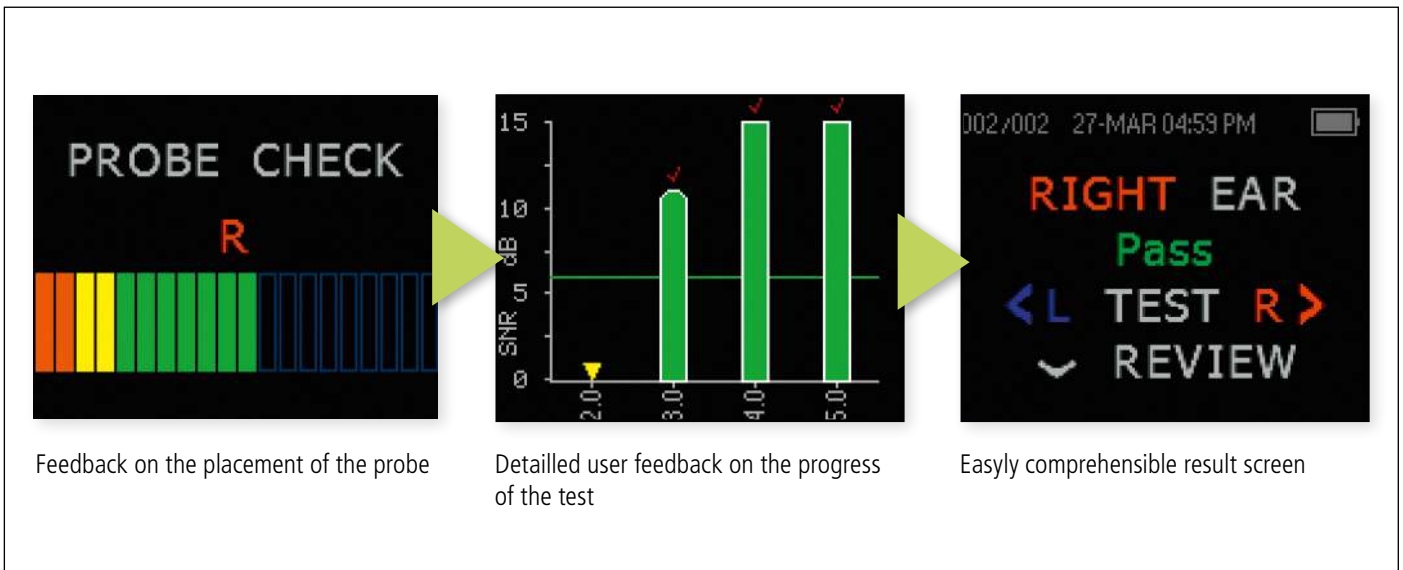
### School Screening

When entering the school, children need to be screened for hearing impairment again since it is possible that the children developed a hearing impairment over the years. The measurement of otoacoustic emissions offers a fast and objective method to evaluate children's hearing. Detecting children with hearing loss prevents them from speech, language or learning problems.

### Diagnostic Evaluation for all Ages

In combination with pure tone audiometry, immittance testing and auditory evoked potentials, otoacoustic emissions are used for detailed diagnostics of hearing impairments. Otoacoustic emissions provide important information on the patient's auditory system to make a reliable diagnosis.

# ERO•SCAN Features & Benefits



## Results are Displayed as PASS or REFER

The ERO•SCAN's automated test procedure provides easy to read results. The operation of ERO•SCAN is extremely intuitive and tests can be conducted in less than 30 seconds per ear.

## Reliable, Objective Testing

The patented ERO•SCAN noise rejection algorithm allows for reliable testing even in moderate background noise. This leads to fewer false refer results.

## Portability

The small and lightweight ERO•SCAN is a hand-held unit with rechargeable battery. The battery lasts for more than thousand tests between charges. It allows you to move from room to room with ease.



## Optimized Probe

The ergonomic micro-probe is perfect for attaining a tight ear seal with no effort. Made of aluminum the probe is extremely durable. The single-use probe tubes prevent the system from being clogged. The system can be used with a wide range of different ear tip in different sizes.

## Managing and Reporting Data

Results can be printed via a wireless printer directly from the ERO•SCAN or a connected computer, by using the optional Sessions PC software. The dedicated HearSIM™ database allows managing of newborn hearing screening results as well as exporting of screening results to HiTrack or Oz .





## ERO•SCAN Versions



### Screening

The ERO•SCAN with screening functionality provides rapid measurement and documentation of DPOAEs or TEOAEs at multiple frequencies. It is an ideal choice for professionals involved in a hearing screening program. It provides a quick assessment of the inner ear with easily readable PASS or REFER outcomes. The ERO•SCAN can be used for all age groups and is mostly dedicated for screening newborns, infants, pre-school and nursery children.

- Qualified protocols built into the device
- 2 predefined protocols for DPOAE or TEOAE screening
- Optional HearSIM™ database with data export to state tracking systems, HiTrack or Oz.

### Diagnostic

The diagnostic ERO•SCAN version is an efficient testing tool for otologists, audiologists, otolaryngologists and pediatricians with need of advanced applications. Additional test protocols are available and customizable. The diagnostic version offers a wide range of application from follow-up diagnosis of 'refer' – screenings to the early detection of noise-induced hearing loss or auditory monitoring.

- DPOAE testing from 1.5 to 12 kHz
- Customizable Pass criteria, stimulus level and averaging time
- 5 DPOAE and 3 TEOAE diagnostic protocols available
- Optional Sessions PC software for electronic data management



# ERO•SCAN Software Options

Choose between Sessions and HearSIM™ PC software solutions, depending on the field of application. This extends the functionality of the small and lightweight ERO•SCAN. Sessions is a single patient result viewer for a large range of MAICO devices. It can be used in various settings and integrate flexible into patient databases or other EMR systems. Meanwhile HearSIM™ is the dedicated software solution for Newborn Hearing Screening and supports results of the ERO•SCAN Screener version only.

## Sessions

The ERO•SCAN is fully supported by MAICO Sessions PC Software. This provides you the possibility to transfer OAE test data from the device to a PC for the purpose of viewing, archiving, managing and printing OAE reports. All results of your audiometry, tympanometry and OAE assessments are stored together. Sessions can be used along with OtoAccess or NOAH patient databases to also transfer patient lists from your database to the ERO•SCAN. Alternatively use Sessions as standalone solution or to integrate in your EMR system via dedicated interface options. This gives you the means to create detailed reports that can be easily filed or printed. You can also create 'paperless' office by saving the test results as a PDF for electronic filing or email.



## HearSIM™

Newborn Hearing Screening results of the ERO•SCAN Screener version can be transferred to HearSIM for review, printing and tracking purposes. HearSIM™ is intuitive to operate and provides you an overview of the screening status of all patients. Depending on your workflow, HearSIM™ allows to transfer patients to the device to select them for testing or to assign tests when stored without patient details. Add the required tracking data for follow-up on referrals and export the screening results in several formats. Choose to print your test results from your PC or store as PDF file.

### Features at a Glance

- Store, view and manage patient information
- Store, view and manage test data from ERO•SCAN Screener
- Assign tests to patients after transfer
- Transfer names of patients requiring testing to ERO•SCAN
- Import a patient list from a file
- Print test results on a standard PC-compatible printer
- Export patient and test data (HiTrack, OZ Systems, CSV and XML formats supported)
- Manage user accounts
- Backup and restore the database

## Technical Data

### Instrument Specifications

Power Supply	Lithium-Ion rechargeable
Battery Life	1000 tests per charge, minimum 15 hours on-time
Dimensions	66 mm x 31 mm x 145 mm
Weight	176 g
User Interface	OLED display 4-button keypad
PC Interface	USB micro

### Power Supply Specifications

Output	5.0 V DC, 1.6 A
Input	100 V-240 V AC, 50/60 Hz, 400mA

### Micro-Probe Specifications

Microphone System Noise	-20 dB SPL at 2 kHz (1 Hz bandwidth)/ -13 dB SPL at 1 kHz (1 Hz bandwidth)
Cable Length	1.1 m
Weight	28 g



### Test Specifications

Measurement Type	DPOAE (Distortion Product Otoacoustic Emissions) TEOAE (Transient Evoked Otoacoustic Emmissions)
Frequency Range	<b>Screening Version</b> DPOAE: 2.0 kHz to 5.0 kHz TEOAE: 1.5 kHz to 4.0 kHz <b>Diagnostic Version</b> DPOAE: 1.5 kHz to 12.0 kHz TEOAE: 0.7 kHz to 4.0 kHz
Stimulus Intensity Range	DPOAE: 40 dB SPL to 70 dB SPL TEOAE: 80 dB SPL peak equivalent ( $\pm 3$ dB)

### Optional Wireless Printer

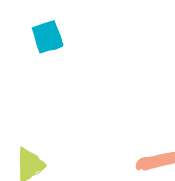
Type	Thermal printer
Speed	50 to 80 mm / second
Operating Noise	< 50 dB SPL
Power Supply	7.4 V lithium battery or mains 100 V to 240 V 50/60 Hz
Weight	200 g
Data Transfer	Wireless

### Standards

IEC 60645-6 2009 Type 2,

IEC 60601-1 Type B, IEC 60601-1-2,

according to the class IIa of the EU medical directive 93/42/EEC,  
medical directive 93/42/EEC, FDA 510 (k) #980533 23.31998



## Standard Components



ERO•SCAN device



Probe



Carrying case



Eartip set

## Optional Accessories and Software



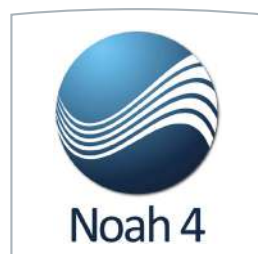
Thermal printer



Sessions PC Software



OtoAccess® Database



Noah Database

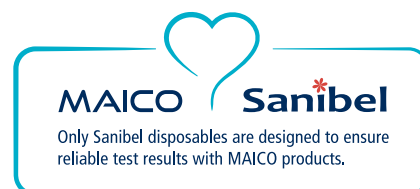


HearSIM™ PC Software

## Disposables

Sanibel™ Supply is the exclusive supplier of MAICO ERO•SCAN disposables.

Use only Sanibel™ disposables to achieve optimal test results.



This brochure contains only a small segment of the comprehensive product portfolio of MAICO. To find out more about other solutions, please contact us.



### MAICO Diagnostics GmbH

Sickingenstr. 70 -71 · 10553 Berlin · Germany

Tel.: +49 30 / 70 71 46-50 · Fax: +49 30 / 70 71 46-99

sales@maico.biz · www.maico.biz