MAICO

ERO•SCAN®

OAE Test System

Screener

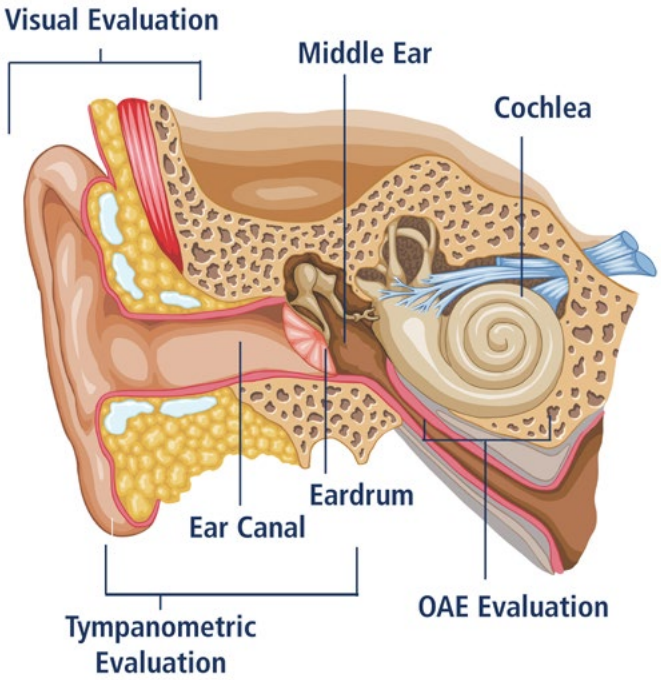
with 4 frequency DPOAE testing Protocols

Diagnostic

with 4, 6 and 12 frequency DPOAE testing Protocols

*TEOAE upgrade

ERO•SCAN - OAE Test System



Otoacoustic Emissions (OAEs)

Otoacoustic emissions are sounds that are produced by the cochlea (outer hair cells) and can be measured in the ear canal. When sound passing through the ear canal reaches the cochlea, the vibration stimulates thousands of tiny hair cells. This creates a byproduct that can be detected and measured: otoacoustic emissions.

OAEs only occur in a normal cochlea with normal hearing sensitivity. If there is damage to the outer hair cells, which produces hearing loss, then OAEs will not be present. In general, OAEs will be present if hearing is at 30 dB or better.

PASS test results mean OAEs were detected. If there is damage to the outer hair cells producing a mild hearing loss, OAEs may not be present. The test result is REFER and the patient may be at risk for possible communication difficulties and can benefit from further diagnostic assessment.

This procedure is beneficial in assessing children through a hearing screening program or that cannot be tested by conventional means. For example, pure tone audiometry requires a response from the child which may be an unrealistic expectation and time-consuming.

Physicians

Otoacoustic emissions testing is an ideal tool for hearing screening because it can quickly identify a possible hearing loss and signal referral for more comprehensive testing.

Pediatricians

Hearing loss is not always identified by newborn screening. Pediatricians are the first professionals the parents approach with concerns about their child's hearing. Since hospital-based and private practice pediatricians screen infants and young children for hearing loss and middle ear disorders, incorporating OAEs into this routine testing can be greatly beneficial.

Head Start and School Screening

The MAICO ERO•SCAN is an effective tool for Head Start and school programs as a means to document hearing testing as well as screen large numbers of children very quickly. Since there is no need for a behavioral response from the patient, it is easy to test ESL and special needs children.

Ideal for:

- Audiologists
- Physicians
- Pediatricians
- Birth-to-3 Programs
- School and Headstart Programs
- Nurseries

Utilizing OAEs

- Follow-up infants from nursery screening and well-baby checks
- Monitor cochlear function in those who are taking medication that is potentially ototoxic
- Identify educationally significant hearing loss
- Detect late-onset hearing loss
- Differentiate possible cochlear versus retrocochlear pathology
- Identify suspected malingering or non-pathological hearing loss
- Identify autoimmune or sudden hearing loss
- Provide objective cochlear screening in both non-cooperative patients and cooperative patients where behavioral testing cannot be performed
- Detect early signs of noise exposure in those who are exposed to high noise levels

ERO•SCAN Benefits

Results are displayed as Pass or Refer

No need for interpretation. The equipment is automated and will provide easy to read and easy to interpret results. Training is quick and extremely intuitive!

Test is completely objective

No response from the patient is necessary.
Easily test uncooperative or non-English speaking patients.

Accurate results

The patented ERO•SCAN noise algorithm allows for reliable testing in up to 70 dB of background noise, which means fewer false refer results.

Test both ears in less than a minute

Testing takes less than 30 seconds per ear.

Memory

The ERO•SCAN contains memory to store 250 tests.

Portability

The ERO•SCAN hand-held unit is rechargeable with a minimum of 1000 tests between charges and allows you to move from room to room. The remote probe makes it easy to maneuver around the head of your patient to attain a tight ear seal.

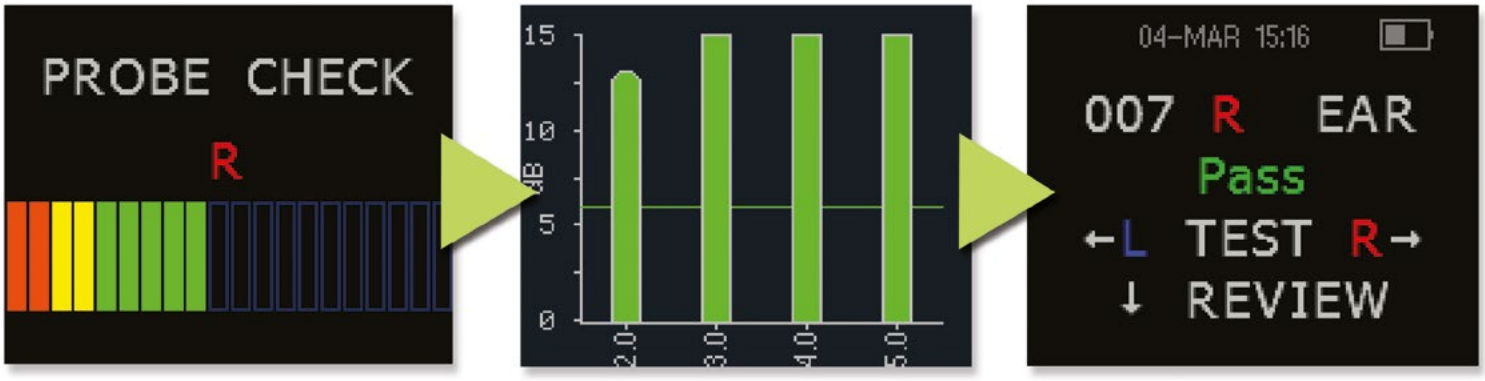
Managing data

Printing reports and tracking data is easy with the database software.

State reporting

The database integrates data into HiTrack or OZ.

Screening and Diagnostic Testing



Screening

ERO•SCAN Screener test system provides a rapid measurement and documentation of Distortion Product Otoacoustic Emissions (DPOAEs) or Transient Evoked Otoacoustic Emissions (TEOAEs) at several frequencies. This device is an ideal screening tool for professionals involved in a hearing screening program or needing a quick assessment of the cochlear system due to the "Pass" or"Refer" outcomes provided. This device is used for all age groups but an ideal solution for preschool and kindergarten children and even newborn infants.

- Qualified protocols built into the device
- 4 DPOAE test frequencies reported
- Integration to state tracking systems, HiTrack or Oz.

Diagnostic

ERO•SCAN Diagnostic test system is an effective testing tool for otologists, audiologists and otolaryngologists that provides objective information about hearing and middle ear status with only one test. Identify outer hair cell function in the cochlea, assess middle ear function and differentiate between organic and non-organic functional hearing loss. OAEs are also beneficial in assessing patients who cannot be tested by conventional methods.

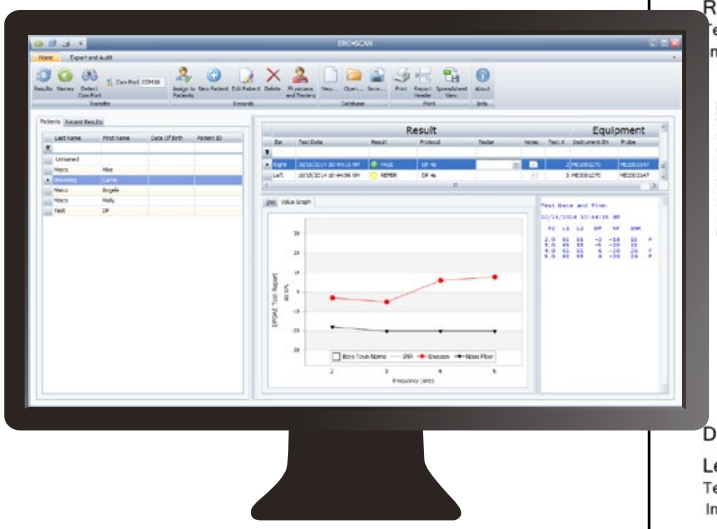
- 1.5 to 12 kHz Frequency range with up to 12 test frequencies reported
- Customizable test protocols
- TEOAE available as an upgradeable option.

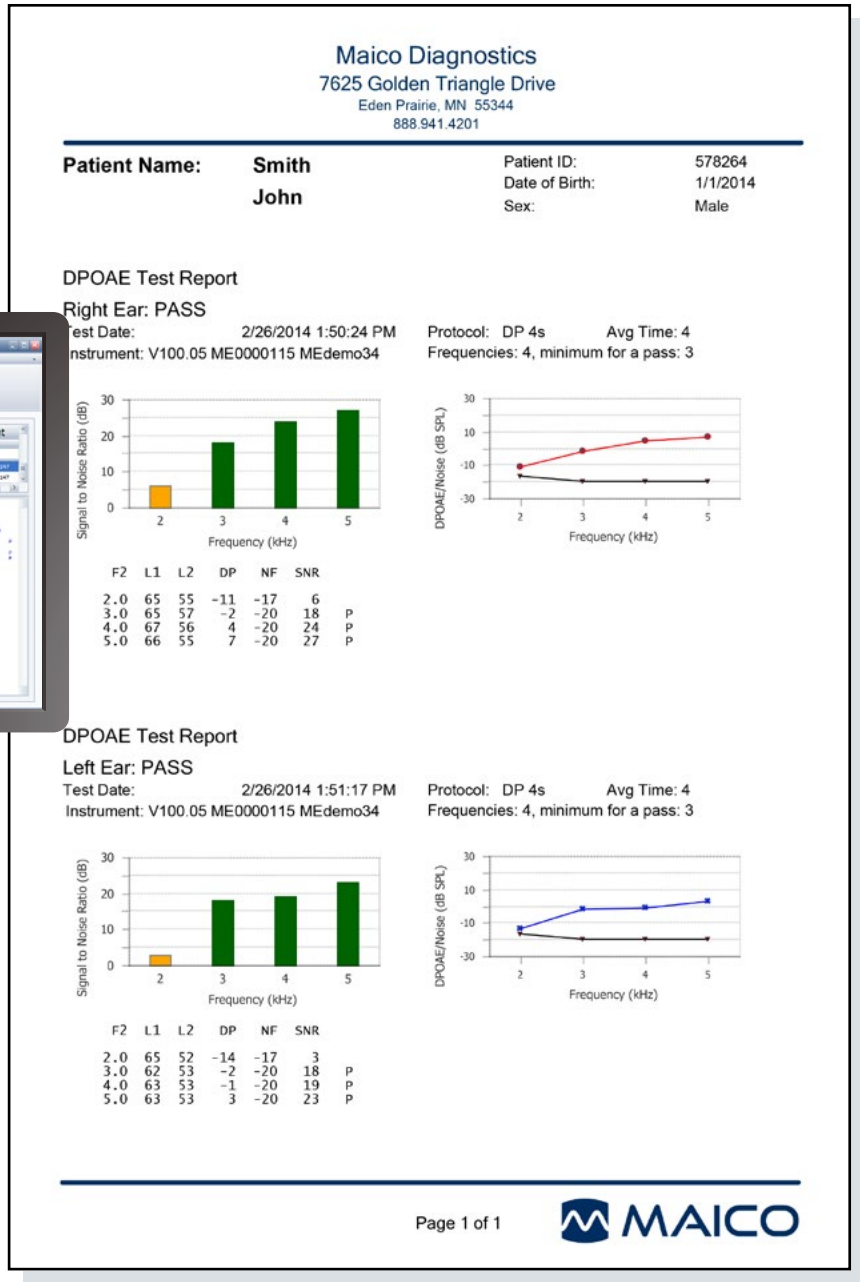
Applicable CPT Code

92558, 92587, & 92588

Database Software

The ERO•SCAN Database Software is a data management tool that compliments the MAICO ERO•SCAN. It provides the ability to transfer patient OAE test data from the device to a PC for the purposes of viewing, archiving, managing and printing OAE reports. Using the database also gives you the means to create letter sized, detailed reports that can be easily filed or faxed. You can also create a "paperless" office by saving the test results as a PDF for electronic filing or email.





Maico Diagnostics
7625 Golden Triangle Drive
Eden Prairie, MN 55344
888.941.4201

Patient Name: **Smith** **John**

Patient ID: 578264
Date of Birth: 1/1/2014
Sex: Male

DPOAE Test Report

Right Ear: PASS

Test Date: 2/26/2014 1:50:24 PM
Instrument: V100.05 ME0000115 MEdemo34

Protocol: DP 4s Avg Time: 4
Frequencies: 4, minimum for a pass: 3

Signal to Noise Ratio (dB)

Frequency (kHz)

DPOAE/Noise (dB SPL)

Frequency (kHz)

F2	L1	L2	DP	NF	SNR	
2.0	65	55	-11	-17	6	
3.0	65	57	-2	-20	18	P
4.0	67	56	4	-20	24	P
5.0	66	55	7	-20	27	P

DPOAE Test Report

Left Ear: PASS

Test Date: 2/26/2014 1:51:17 PM
Instrument: V100.05 ME0000115 MEdemo34

Protocol: DP 4s Avg Time: 4
Frequencies: 4, minimum for a pass: 3

Signal to Noise Ratio (dB)

Frequency (kHz)

DPOAE/Noise (dB SPL)

Frequency (kHz)

F2	L1	L2	DP	NF	SNR	
2.0	65	52	-14	-17	3	
3.0	62	53	-2	-20	18	P
4.0	63	53	-1	-20	19	P
5.0	63	53	3	-20	23	P

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Protocols

DPOAE Protocols

	Name	# of Freq.	F2 Freq. [kHz]	L1/L2	Averaging Time	Pass SNR	# Passing Freq. for Test Pass
Screening	DP 4s	4	2, 3, 4, 5	65/55	4 sec	6 dB	3
	DP 2s	4	2, 3, 4, 5	65/55	2 sec	6 dB	3
Diagnostic	DP 2.0-5.0	4	2, 3, 4, 5	65/55**	4 sec**	6 dB**	3**
	DP 1.5-6.0	6	1.5, 2, 3, 4, 5, 6	65/55**	4 sec**	6 dB**	0**
	DP 1.6-8.0	12	1.6, 2, 2.5, 3.2, 3.6, 4, 4.5, 5, 5.6, 6.3, 7.1, 8	65/55**	4 sec**	6 dB**	0**
	DP 1.5-12.0	12	1.5, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	65/55**	4 sec**	6 dB**	0**

(Diagnostic version also includes DP 4s screening protocol)

TEOAE Protocols

	Name	# of Freq. Bands	Freq. center bands [kHz]	Averaging Time (max)	Pass SNR	# Passing Freq. for Test Pass
Screening	TE 64s	6	1.5, 2, 2.5, 3, 3.5, 4	64	4 dB	3
	TE 32s	6	1.5, 2, 2.5, 3, 3.5, 4	32	4 dB	3
Diagnostic	TE 1.5-4.0	6	1.5, 2, 2.5, 3, 3.5, 4	64 sec**	4 dB**	3**
	TE 0.7-4.0	6	0.7, 1, 1.4, 2, 2.8, 4	64 sec**	4 dB**	0**

(Diagnostic version also includes TE 64s screening protocol)
** Customizable fields:

L1/L2 : DP: 40 to 70 dB SPL
Average time: : DP: 0.5, 1.0, 2.0 or 4.0 sec
: TE: 4, 8, 16, 32 or 64 sec
Pass SNR : DP and TE: 3 dB to 10 dB
Passing Freq. for Test Pass : DP and TE: 1 to 12

Specifications

Measurement Type:

Distortion Product Otoacoustic Emissions (DPOAE)

Transient Evoked Otoacoustic Emissions (TEOAE)

Frequency Range:

Screener version: DPOAE: 2.0 kHz to 5.0 kHz
TEOAE: 1.5 kHz to 4.0 kHz

Diagnostic version: 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 (±3 dB)

Microphone System Noise:

-20 dB_{SPL} @ 2 kHz (1 Hz bandwidth) /

-13 dB_{SPL} @ 1 kHz (1 Hz bandwidth)

Dimensions and Weight Probe:

Length: 40 in. - Weight: 1.00 oz.

Dimensions and Weight Unit:

Dimensions: 2.58 in X 1.23 in X 5.78 in.

Weight: 6.4 oz.

Power Supply:

Lithium-Ion rechargeable

Battery Life:

1000 tests per charge, minimum

15 hours on-time

User Interface:

OLED Display to provide user information and progress of measurement

4-button keypad to control instrument functions

Connectors / Communications:

Integrated USB communication capability for battery charging and communication with PC-based database programs

HDMI Connector for connection to the Micro-Probe

Integrated wireless Class 2 + EDR with SPP Protocol for communication with optional printer

Parts & Accessories

Printer

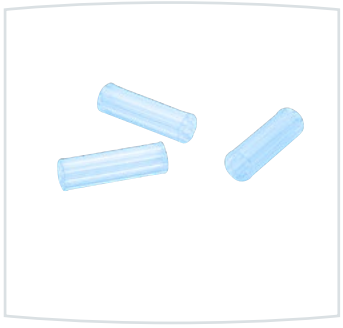
Thermal Printer Paper

EroScan Charger

Ear tip kit

Micro USB Cable

Probe



Probe Tubes

Carry Case

Key Features	EroScan Screener	EroScan Diagnostic	TE (Upgrade)
DPOAE	YES	YES	YES
Diagnostic (CPT)	92558	92558, 92587, 92588	See DPOAE
Portable	YES	YES	YES
External Probe	YES	YES	YES
Maximum Number of Test Frequencies or Bands Reported	4 DP	12 DP	6 TE
Frequency Range (kHz)	2-5 DP	1.5-12 DP	Screener: 1.5-4 TE Diagnostic: .7-4 TE
High Frequencies DPs to 12 kHz	NO	YES	NA
Default Pass/Refer	YES	YES	YES
Auto Start	YES	YES	YES
Number of Test Protocols	2 DP	5 DP	Screener: 2 TE Diagnostic: 3 TE
Battery Operated (rechargable)	YES	YES	YES
Number of tests per charge (minimum)	1000	1000	1000
Memory (# tests)/Maximum	250	250	250
Tests All Ages	YES	YES	YES
Tests Patients with PE Tubes	YES	YES	YES
Customizable Parameters:			
• Customizable Test Protocols	NO	YES	Screener: NO Diagnostic: YES
• Customizable Pass Criteria	NO	YES	Screener: NO Diagnostic: YES
• Frequency Range	NO	YES	Screener: NO Diagnostic: YES
• Averaging Time	NO	YES	Screener: NO Diagnostic: YES
• # Freq. to Pass	NO	YES	YES
Database Software Included	YES	YES	YES
• Load patient names to device	YES	YES	YES
• Print Full Page (Color)	YES	YES	YES
• Field for Interpretation	YES	YES	YES
• OZ Compatible	YES	YES	YES
• HiTrack Compatible	YES	YES	YES
Prints Numeric Data	YES	YES	YES
Prints Graphic Data	YES	YES	YES
Date/Time on Print-Out	YES	YES	YES
Carrying Case (Included)	YES	YES	NA
Thermal Printer	Option	Option	NA
All test protocols changes can be made through OAE unit alone (Additional software and computer NOT required to change protocols)	Not Customizable	YES	Screener: NO Diagnostic: YES

MAICO

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