

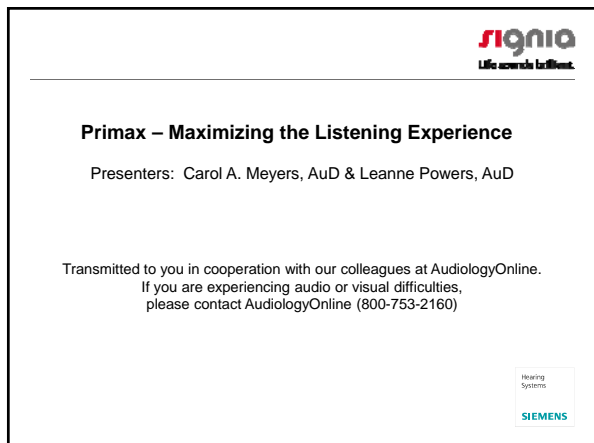


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primax

Hearing Systems
SIEMENS

An independent clinical study in the US has shown that primax provided a significant improvement in ease of listening in demanding listening environments. A methodology using objective brain behavior measures with neurophysiological data, showed a significant reduction in listening effort for mild to moderate hearing impaired subjects using primax hearing instruments, when listening advanced between SpeechReceptor and SpeechReceptor.



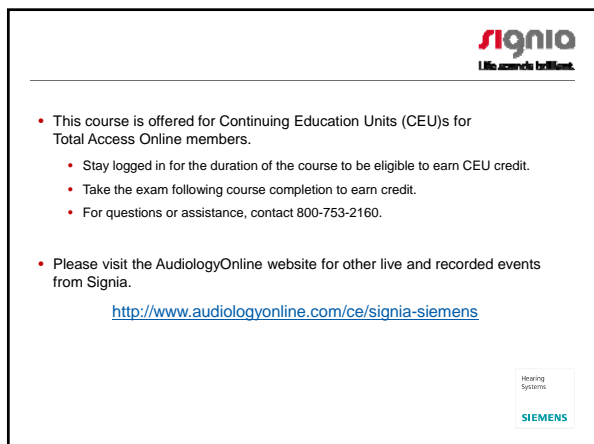
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Primax – Maximizing the Listening Experience

Presenters: Carol A. Meyers, AuD & Leanne Powers, AuD

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Course Objectives



1. After this course, participants will be able to define listening effort.
2. After this course, participants will be able to describe the key components of primax technology.
3. After this course, participants will be able to identify the new primax hearing instruments and Bluetooth streaming solution from Siemens.



primax

Clinically proven better than normal hearing with less listening effort

An independent clinical study in the US has shown that primax provided a significant improvement in ease of listening in demanding listening environments. A methodology using objective brain behavior measures with electroencephalographic data showed a significant reduction in listening effort for mild to moderate hearing impaired subjects using primax hearing instruments, when applying advanced features SpeechMaster and EchoShield. Two clinical studies have shown that primax provides better than normal hearing in certain demanding environments. University of Northern California, 2014; OpenSpace Transcripts, 2015. Speech Recognition Threshold (SRT) in noisy situations improved up to 2.2 dB for listeners with mild to moderate hearing loss using CanalSound or PeakSound hearing aids with normal directivity, compared to people with normal hearing.

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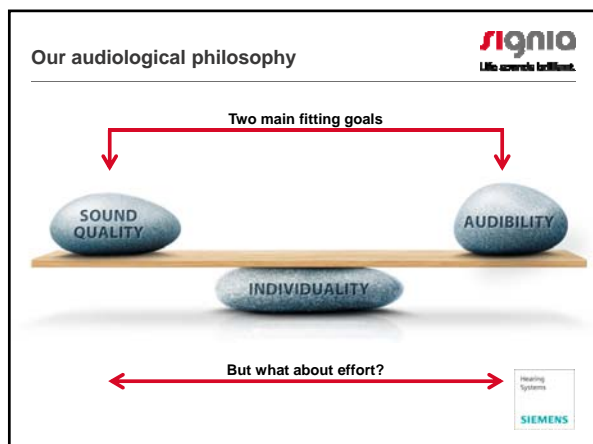
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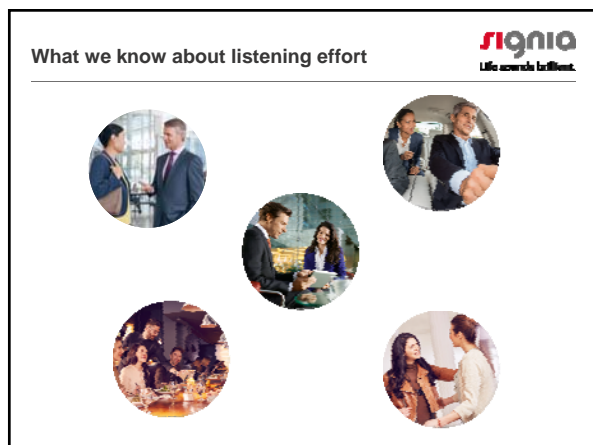
Today's agenda




- 1 Dive into a new research protocol developed to test listening effort
- 2 Showcase new algorithms & features clinically proven to reduce listening effort
- 3 Experience a "day-in-the-life" to illustrate how new algorithms & features work
- 4 Explore our full portfolio of products and accessories







What we know about listening effort 

Currently, there are three main approaches to measuring listening effort (McGarrigle et al., 2013):

- **self-reported (subjective) measures** which rely on the listener's own definition and estimation of the listening effort in a given acoustical situation
- **behavioral measures** involve single and multi-task paradigms, relying on speech recognition task in a difficult condition (either acoustically, in the single task paradigm, or cognitively in the dual task paradigm)
- **physiological measures** that record changes in central and/or autonomic nervous system activity during task performance

Primarily subjective measures

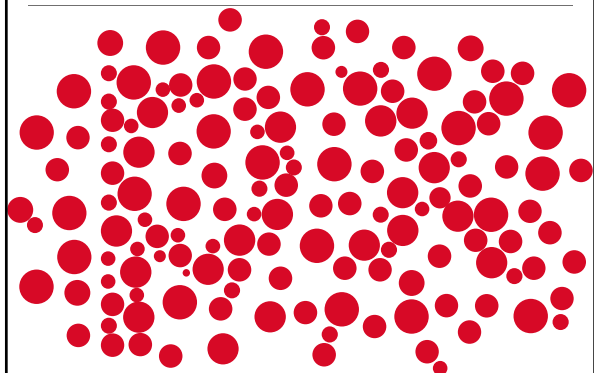
What we know about listening effort



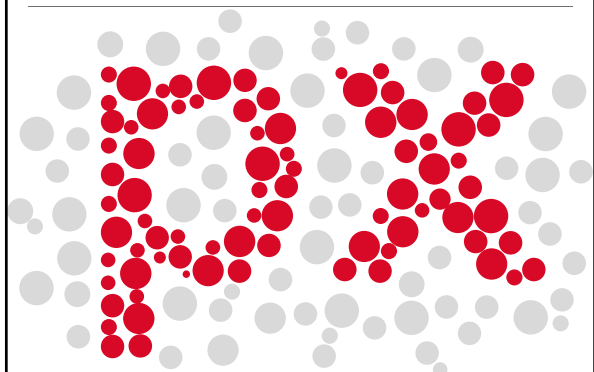
- Directional microphones have been shown to reduce listening effort in background noise in older adults with sensorineural hearing loss
- Noise reduction has been shown to improve performance on memory-related tasks in wearers with high working memory capacity
- EEG measures have been shown to measure listening effort differences with varied compression settings and might be more sensitive to small variances in listening effort than the employed subjective rating scale



Visual effort



Visual effort



Can new, advanced algorithms significantly reduce listening effort?



Pilot study at the University of Northern Colorado:

"Clinical Results: Reducing Listening Effort with primax", Whitepaper, Sivantos GmbH, 2016.

Goal: Evaluate the objective and subjective listening effort using two new, advanced algorithms

Difficult Environments

- 10 subjects

primax has proven to significantly reduce listening effort in difficult environments

Reverberant Conditions

- 8 subjects

primax has proven to significantly reduce listening effort in reverberant conditions

Four further studies are planned

New objective measurement Listening effort

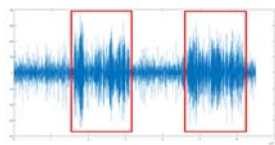


- Electroencephalography (EEG) records electrical activity of the brain
- Measures voltage fluctuations resulting from ionic current within the neurons of the brain
- Records trains of electrical events produced by the brain during the speech recognition test
- Measures listening effort in real-time while speech recognition tasks are being conducted



An independent clinical study in the US has shown that primax provided a significant improvement in ease of listening in demanding listening environments. A methodology using objective brain behavior measures with electroencephalographic data showed a significant reduction in listening effort for adults in complex hearing impaired subjects using primax hearing instruments, when applying advanced features SpeechEnhance and EcoSound.

New objective measurement Listening effort



The EEG sample is extracted to precisely coincide with the given listening task

For meaningful interpretation of the EEG activity, mathematical calculations of phase vector are conducted (the Rayleigh Test)

$$\bar{R} = \frac{1}{N} \left| \sum_{n=1}^N e^{i\phi_n} \right|$$



An independent clinical study in the US has shown that primax provided a significant improvement in ease of listening in demanding listening environments. A methodology using objective brain behavior measures with electroencephalographic data showed a significant reduction in listening effort for adults in complex hearing impaired subjects using primax hearing instruments, when applying advanced features SpeechEnhance and EcoSound.

Combined with subjective measurement Listening effort

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Subject: _____ Date: _____

Feature: _____

no effort very little effort little effort moderate effort considerable effort very much effort extreme effort

Feature: _____

no effort very little effort little effort moderate effort considerable effort very much effort extreme effort

Feature: _____

no effort very little effort little effort moderate effort considerable effort very much effort extreme effort

Feature: _____

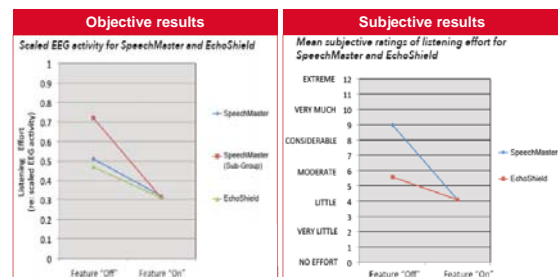
no effort very little effort little effort moderate effort considerable effort very much effort extreme effort

Comments: _____

An independent clinical study in the US has shown that primus provided a significant improvement in ease of listening in demanding listening environments. A methodology using objective brain behavior measures with electroencephalographic data, showed a significant reduction in listening effort for mild to moderate hearing impaired subjects using primus hearing instruments, when applying advanced features SpeechMaster and EchoShield.

Clinical results New features significantly reduce listening effort

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Effortless hearing to improve benefit & satisfaction

An independent clinical study in the US has shown that primus provided a significant improvement in ease of listening in demanding listening environments. A methodology using objective brain behavior measures with electroencephalographic data, showed a significant reduction in listening effort for mild to moderate hearing impaired subjects using primus hearing instruments, when applying advanced features SpeechMaster and EchoShield.

primax

Clinically proven better than normal
hearing with less listening effort



Hearing
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An independent clinical study in the US has shown that primus provided a significant improvement in ease of listening in demanding listening environments. A methodology using objective brain behavior measures with electroencephalographic data, showed a significant reduction in listening effort for mild to moderate hearing impaired subjects using primus hearing instruments, when applying advanced features SpeechMaster and EchoShield. This clinical study has shown that primus provides better than normal hearing in certain demanding environments (University of Northern Colorado, 2014; Otology Neurotology, 2015). Speech Perception Threshold (SPT) in cocktail-party situations improved up to 2.0 dB for users with mild to moderate hearing loss using ClearVoice or PureVoice hearing aids with active directionality, compared to people with normal hearing.

Building on our audiological philosophy **signio**
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micon
Natural
& feedback free
sound quality

binax
Audibility
better hearing
than normal
- clinically proven

primax
Effortless
listening
- clinically proven

Hearing
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primax SpeechMaster
The core algorithm of primax **signio**
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- More than a single feature or innovation, **SpeechMaster** is a conglomerate of algorithms which work in concert to achieve less listening effort
- **SpeechMaster** is able to analyze the acoustic environment more precisely than ever before
- This precision allows **SpeechMaster** to employ the first technology that isolates the target speaker from unwanted speech and noise in all situations

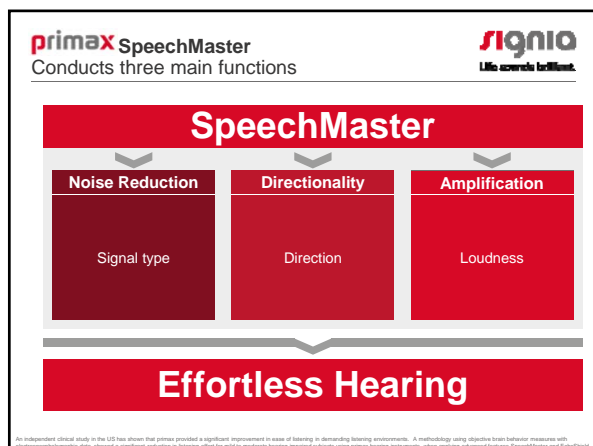
SpeechMaster is the conductor of the Universal program within primax...

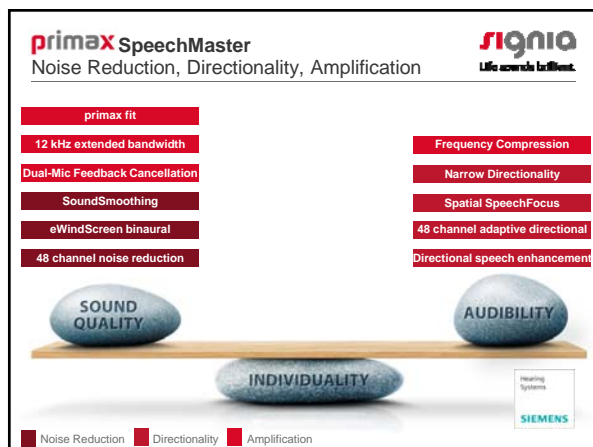
Hearing
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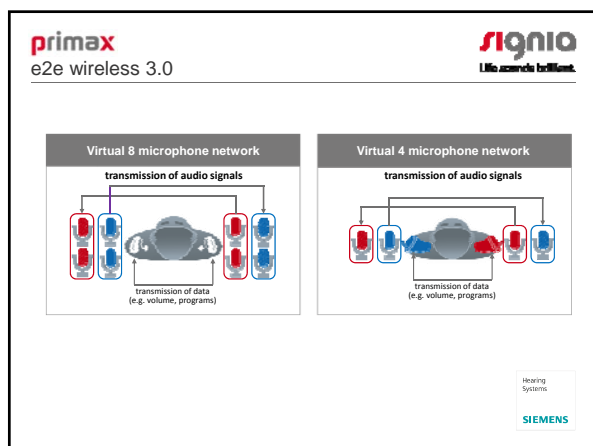
Today's agenda **signio**
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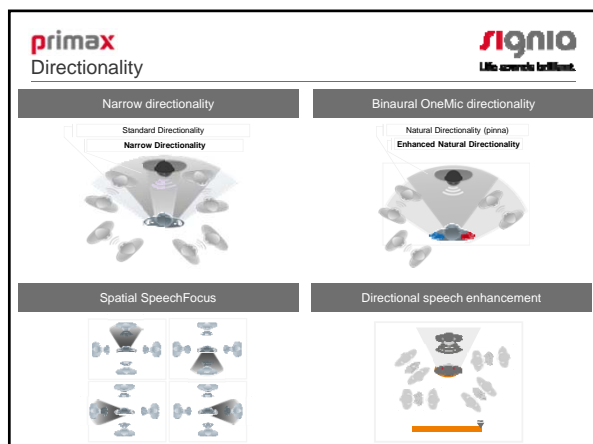
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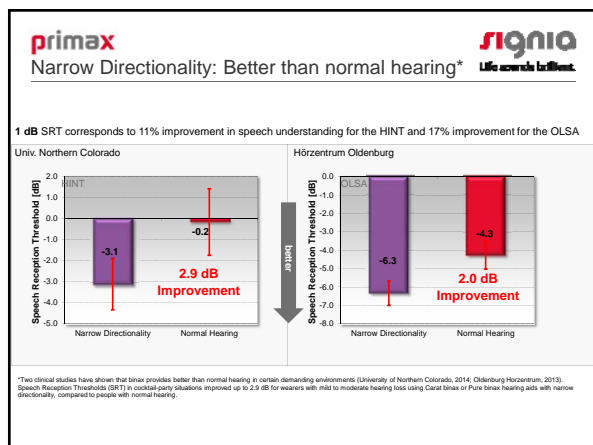
Hearing
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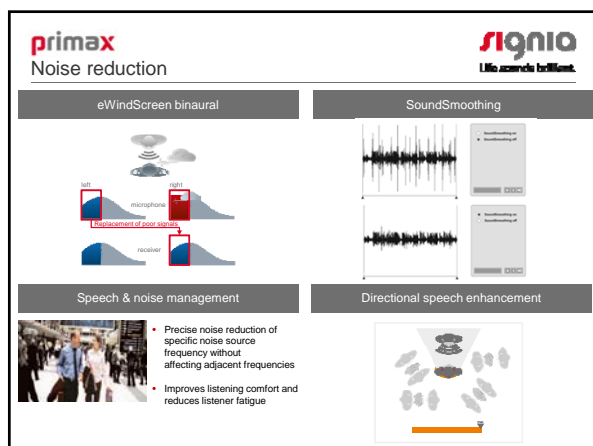












primax
Amplification

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primax fit

feedback cancellation

bandwidth extension

- Amplification up to 12 kHz
- More brilliant and natural sound quality

Frequency compression

primax SpeechMaster
Conducts three main functions

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SpeechMaster

Noise Reduction Directionality Amplification

Effortless Hearing

An independent clinical study in the US has shown that primax provided a significant improvement in ease of listening in demanding listening environments. A methodology using objective brain behavior measures with neurophysiological data showed a significant reduction in listening effort for mild to moderate hearing impaired subjects using primax hearing environments, when wearing advanced hearing SpeechMaster and CROS.

primax SpeechMaster
Conducts ease of listening to the wearer

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primax fit

12 kHz extended bandwidth Frequency Compression

Dual-Mic Feedback Cancellation Narrow Directionality

SoundSmoothing Spatial SpeechFocus

eWindScreen binaural 48 channel adaptive directional

48 channel noise reduction Directional speech enhancement

■ Noise Reduction ■ Directionality ■ Amplification

primax
Additional beneficial features

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primax fit	Auto 6 Environment Classifier	Frequency Compression
12 kHz extended bandwidth	Automatic Acclimatization	Narrow Directionality
Dual-Mic Feedback Cancellation	Intelligent learning	Spatial SpeechFocus
Sound Smoothing	Tinnitus Static + Ocean Waves	48 channel adaptive directional
eWindScreen binaural		Soft level directivity
48 channel noise reduction		Directional speech enhancement

primax
Additional beneficial features

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Sound equalizer <ul style="list-style-type: none"> Automatically detects up to 6 different acoustic environments Ensures comfort and fewer manual programs <ol style="list-style-type: none"> 1 Quiet 2 Speech in Quiet 3 Speech in Noise 4 Noise 5 Car 6 Music 	Acclimatization manager and intelligent learning <ul style="list-style-type: none"> More intuitive for use with real-ear verification Maintains frequency shaping Promotes long term satisfaction by automatically applying preferred settings Gradually increases gain over time for immediate acceptance & long term satisfaction Learns wearer's preferred settings for different listening environments 	Tinnitus <ul style="list-style-type: none"> Four nature-inspired ocean wave therapy signals for individuals preferring a more natural sound therapy option Five static signals (Brownian, white, pink, speech & high-tone) Configure as therapy signal only or combine with microphone Available on all primax instruments
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primax
New features


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EchoShield	Connexx Eight	TwinPhone
HD Music	TouchControl App 2.1	CROS / BICROS
primax fit	Auto 6 Environment Classifier	Frequency Compression
12 kHz extended bandwidth	Automatic Acclimatization	Narrow Directionality
Dual-Mic Feedback Cancellation	Intelligent learning	Spatial SpeechFocus
Sound Smoothing	Tinnitus Static + Ocean Waves	48 channel adaptive directional
eWindScreen binaural		Soft level directivity
48 channel noise reduction		Directional speech enhancement

primax
TouchControl App v2.1

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Available on the Google play



Discreet & easy adjustments


- Adjust Spatial Configurator
- Change programs
- Adjust volume
- Mute hearing-instrument mics
- Adjust SoundBalance control
- Adjust Tinnitus Therapy Signal
- primax only features:
 - QR Code setup
 - Battery status

Hearing Systems
SIEMENS

primax
TouchControl App v2.1 – primax only

signio
Life sounds brilliant.

Available on the Google play



QR code setup option in Connexx Eight

- Printable for wearers
- Setup begins at pairing process
- Contains all setup information including performance level, # of programs, tinnitus program
- Allows for battery status on demand where hearing instruments produce beeps to indicate battery level

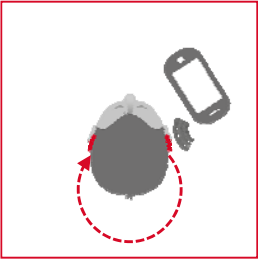
Standard step-by-step setup is still available (battery status on demand not an option)

Hearing Systems
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primax
TwinPhone

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TwinPhone



- TwinPhone is the perfect solution for people who primarily hand-hold phones
- ~60% of mobile phone users hand-hold even if hands-free is available*
- TwinPhone works with acoustic input and together with Autophone
- TwinPhone is automatically activated when a magnetic signal is detected
 - It is automatically disengaged when the phone is removed from ear

*US Department of Transportation NHTSA, "The impact of hand-held and hands-free cell phone use on driving performance and safety-critical event risk," April 2013

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Single-sided deafness

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CROS

Normal hearing Unaidable

BiCROS

Hearing loss Unaidable

CROS Pure
Benefits

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- Directionality focused to the front and skewed towards the unaidable side, which maintains the CROS benefit in noisy situations
- Natural sound quality with a low noise floor which is conducive to listening comfort and acceptance
- Energy efficient audio transmission with e2e 3.0
 - primax 312 battery = 130 hours / 8 days
 - Competitor 312 battery = 72 hours / 4.5 days

Hearing Systems
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primax
EchoShield

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Life sounds brilliant.

Reverberant Conditions

- 8 subjects

primax has proven to significantly reduce listening effort in reverberant conditions

Hearing Systems
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primax
HD music

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Live	Musician	Recorded
		
Enjoy live music	Enjoy music as you & others perform	Enjoy music from stereo devices

primax
HD music

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Live	Musician	Recorded
		
No DNR Directionality Extended input range	No DNR TruEar Extended input range	No DNR TruEar More linear

primax
Performance level differentiation (new features)

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	7px	5px	3px
SpeechMaster	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EchoShield	<input type="radio"/>		
HD music	3	1	1
TwinPhone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CROS / BICROS	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
eWindScreen binaural	<input type="radio"/>	manual	

Hearing Systems
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Today's agenda



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Meet Shawnae, Miss USA 1998 A day in the life...



Morning mayhem



	SpeechMaster		
Noise Reduction	Yes (incl. eWindscreen binaural)	Yes (incl. SoundSmoothing)	Yes
Directionality	No	No	Yes (incl. SpatialSpeechFocus)
Amplification	Yes, effortless hearing	Yes, effortless hearing	Yes, effortless hearing

Workday warrior

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Conference call

Lunch w / colleagues

Hallway conversation

SpeechMaster			
Noise Reduction	Yes	Yes (incl. eWindscreen binaural)	Yes
Directionality	No	Yes (incl. Directional Speech Enhancement)	Yes (incl. Directional Speech Enhancement)
Amplification	Yes, effortless hearing	Yes, effortless hearing	Yes, effortless hearing
Unique features			
	TwinPhone		EchoShield

Date night

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Train station

Dinner at Restaurant

Enjoying a live concert

SpeechMaster			
Noise Reduction	Yes	Yes	No
Directionality	Yes (incl. Narrow Directionality)	Yes (incl. Narrow Directionality)	No
Amplification	Yes, effortless hearing	Yes, effortless hearing	No
Unique features			
	HD Music Live (incl. directionality)		

Today's agenda

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- 1 Dive into a new research protocol developed to test listening effort
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17

primax
Product portfolio: 7px, 5px, 3px

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Ace primax

- miniReceiver (S/M/P/HP)
- Size 10A battery
- No a2e wireless 3.0
- IP 67

Motion primax

- Connex ThinTube (125/53 dB)
- Earhook (130/60 dB)
- Size 13 battery
- Rechargeable (SX)
- DAI via integrated audio shoe-battery door (SA)
- IP67

Pure primax

- miniReceiver 2.0 (S/M/P/HP)
- Size 312 battery
- Rechargeable
- Wireless connectivity
- Telecoil
- DAI compatibility via easyTek
- IP 67

Insio primax

- Wireless CIC
- IIC compatible with touchControl App
- Matrix up to 124/65 dB

All remote control compatible via touchControl App

Hearing Systems
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miniReceiver 2.0

5 receiver lengths

- 0, 1, 2, 3, 4*

4 receiver power levels

- S (108/45 dB SPL)
- M (119/60 dB SPL)
- P (124/70 dB SPL)
- HP (130/75 dB SPL)

5 fitting options

- Open dome
- Semi-open dome
- Closed dome
- Double dome
- Earmold

Color indicator for easy identification

* Currently available for M receivers only

Hearing Systems
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Wax protection options

RIC models offer 2-part wax protection:

- Primary protection is the dome grid or HF4 Pro filter
- Secondary protection is the miniReceiver 2.0 Wax Guard

HF4 Pro Filters (R & L)

- Used in all RIC style earmolds
- 16 filters/wheel

miniReceiver 2.0 Wax Guard

- Fits into all miniReceivers 2.0

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Connexx ThinTube

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- Fits Motion primax SX & SA
- Threaded screw connection for secure fit and easy exchange
- 5 tube lengths
- Compatible with all existing tips



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primax Accessories

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Hearing
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eCharger

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Life sounds brilliant.

Convenient solution for ALL patients!

- Change batteries once a year
- Smart status indicators
- Includes an electronic drying feature




Rechargeable Products

- Pure primax
- Carat binax
- Motion SX primax
- Motion PX binax

Hearing
Systems
SIEMENS

easyTek

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Life sounds brilliant.



- Combination remote/streamer
- Lightweight & easy to use
- One button controls multiple functions
- Seamlessly connects up to 12 external audio sources
- Compatible with all *Bluetooth*-enabled phones for hands-free talking
- Compatible with pacemakers

	Bluetooth streaming	FM	Line-In
BTE / RIC	6 hrs	9 hrs	10 hrs
Custom	5 hrs	6.5 hrs	7 hrs

Hearing Systems
SIEMENS

easyTek

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Multi-Function Button

Built-in Dir Mic

Volume Up/Down

Line-In

FM Input

Micro-USB

Battery

Power


Bluetooth®

LED

Works for iPhone iPad

easyTek pairing

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Life sounds brilliant.



Step 1 -

- Place easyTek around neck or on table
- Turn the easyTek on (long press on MFB)
Green light flashes

Step 2 -

- Place hearing instruments in ears or inside neckloop & close battery door
- **Green** light on easyTek will shine briefly & then fade off
- Hearing instruments & easyTek are paired

Step 3 -

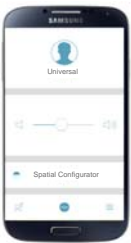
- Next, pair easyTek to *Bluetooth* phone and/or *Bluetooth* device (e.g. iPad)

Hearing Systems
SIEMENS

easyTek App


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Available on the App Store | Get it on Google Play



Discreet & easy adjustments

- Change programs
- Adjust volume
- Mute hearing-instrument mics
- Adjust Spatial Configurator
- Adjust SoundBalance control
- Adjust Tinnitus Therapy Signal
- Select external sources
- View battery life of instruments / easyTek



Hearing Systems
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**Coming soon
Spring 2016!**

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easyTek Cover



New VoiceLink




Hearing Systems
SIEMENS

easyPocket

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- Remote control for patients that do not own a Smartphone
- Visual display
- Programmable within Connexx software



Hearing Systems
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smartHome

Round-the-clock safety and care for the hearing impaired

- **Daytime safety:** When activated, the doorbell or phone monitor sends an audible signal to the hearing aids via Siemens easyTek. So whether the wearer is inside the home or in the yard, they will never miss a phone call or a visitor.
- **Nighttime safety:** When the wearer removes their hearing aids for overnight charging, the smartClock takes over and can alert them to a phone call or evening visitor via a bed shaker, extra loud audible alarm, or high-intensity flashing light. The smartClock is an added accessory that extends the wearer's safety through the night

smartHome
Life sounds brilliant.

Other product offerings

binax

Carat binax

- miniReceiver 2.0 (S/M/P/HP)
- Size 13 battery
- Rechargeable
- Wireless connectivity
- Telecoil
- DAI compatibility via easyTek
- IP 67

Carat A binax

- miniReceiver 2.0 (S/M/P/HP)
- Size 13 battery
- Non-rechargeable
- Wireless connectivity
- Telecoil
- DAI compatibility via integrated audio shoe-battery door
- IP67

Motion PX

- S-Life Tube (127/65 dB)
- Earhook (135/75 dB)
- Size 13 battery
- Rechargeable
- DAI compatibility via easyTek
- IP67

Hearing Systems
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Other product offerings

micon

Nitro SP micon

140/82 dB SPL

- Dual onboard controls
- Programmable LED indicator
- Wireless connectivity, Telecoil & DAI compatibility
- 675 battery
- Magnetized battery contacts!
- Tinnitus therapy feature

Aquaris micon

129/65 dB SPL

- Waterproof & dustproof!
- Secure fit via Sport Clip
- 13 battery
- Program/volume control via remote or miniTek streamer
- Wireless connectivity
- Tinnitus therapy feature

miniTek

- Combination remote/streamer
- Easy to use via one-touch control
- Seamlessly connects to a variety of Bluetooth devices
- Compatible with iPhone and Android smartphones
- Supports 2 Transmitters (2nd Transmitter can be a standard Transmitter or a VoiceLink)

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Connexx Eight

The perfect fit for perfect fittings



- Parallel Processing*
- Mimic Fit
- Acoustical Parameter Optimization
- Interactive Curve Display*
- Updated Acclimatization Manager*
- Program Manager Innovations
- Copy to Universal
- Vertical Link*
- Decouple Volume Control*
- QR code for TouchControl App V2.1



* Also available for binax

Other recorded primax webinars

Available now



- **Connexx Eight Guided Tour** - Jennifer Gehlen, Au.D. & Catherine Jons, Au.D.
- **Primax - Reduced Listening Effort** - Lisa Klop, Au.D. & Navid Taghvaei, Au.D.
- **Quick Tips: EchoShield** - Dianna Theokas, Au.D.
- **Quick Tips: HD Music** - Lisa Klop, Au.D.
- **Quick Tips: Twin Phone** - Dianna Theokas, Au.D.

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Redefining the ease of listening

Signia
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