

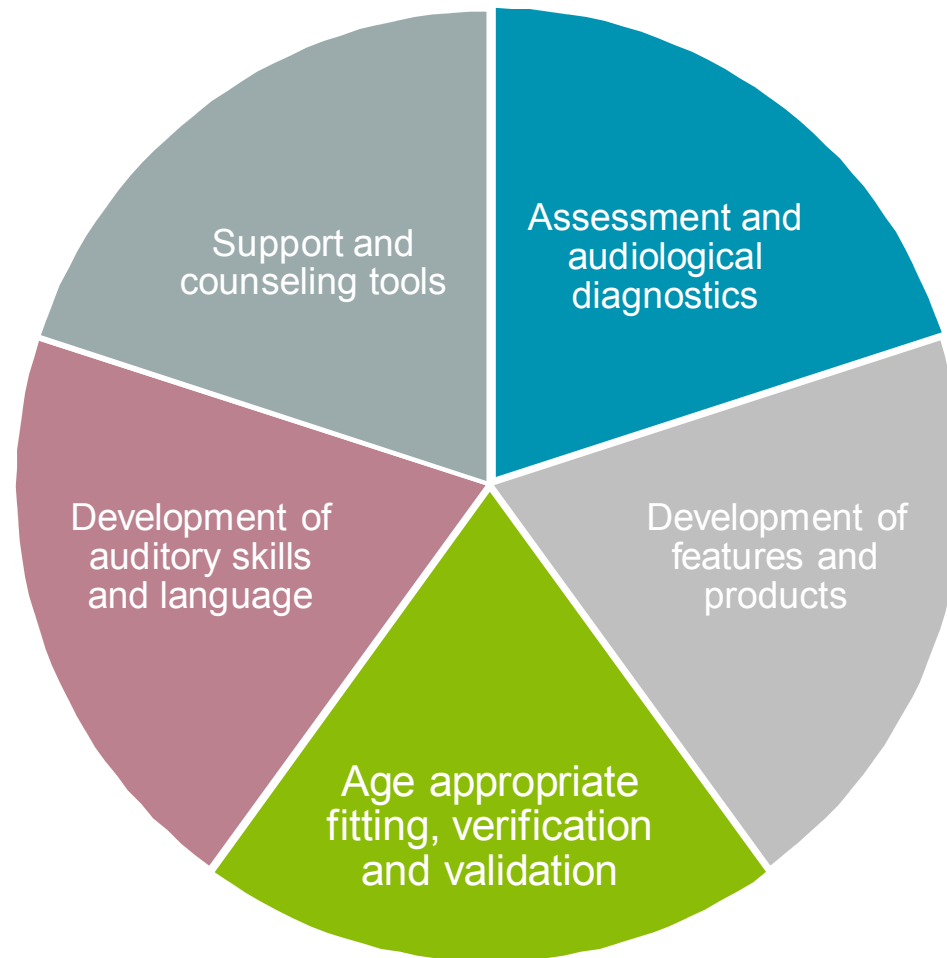
How do kids hear? For 40 years with a Phonak!

Stäfa, 18 September 2013 | Angela Pelosi, Head of Pediatrics at Phonak



PHONAK
life is on

Through a comprehensive and dedicated pediatric approach,
we partner with professionals to allow children with hearing
loss to live a life without limitations



Key audiological child-adult differences

1

Children need higher Signal-to-Noise Ratio
(Hall et al, 2002)

2

Children need lower reverberation times
(Neuman et al, 1983)

3

Children are less able to make use of context
(Nittrouer & Boothroyd, 1990)

4

Children depend more on audibility of high frequency amplification
(Stelmachowicz et al, 2002)



Addressing unique challenges through amplification

The challenge – dealing with high frequencies

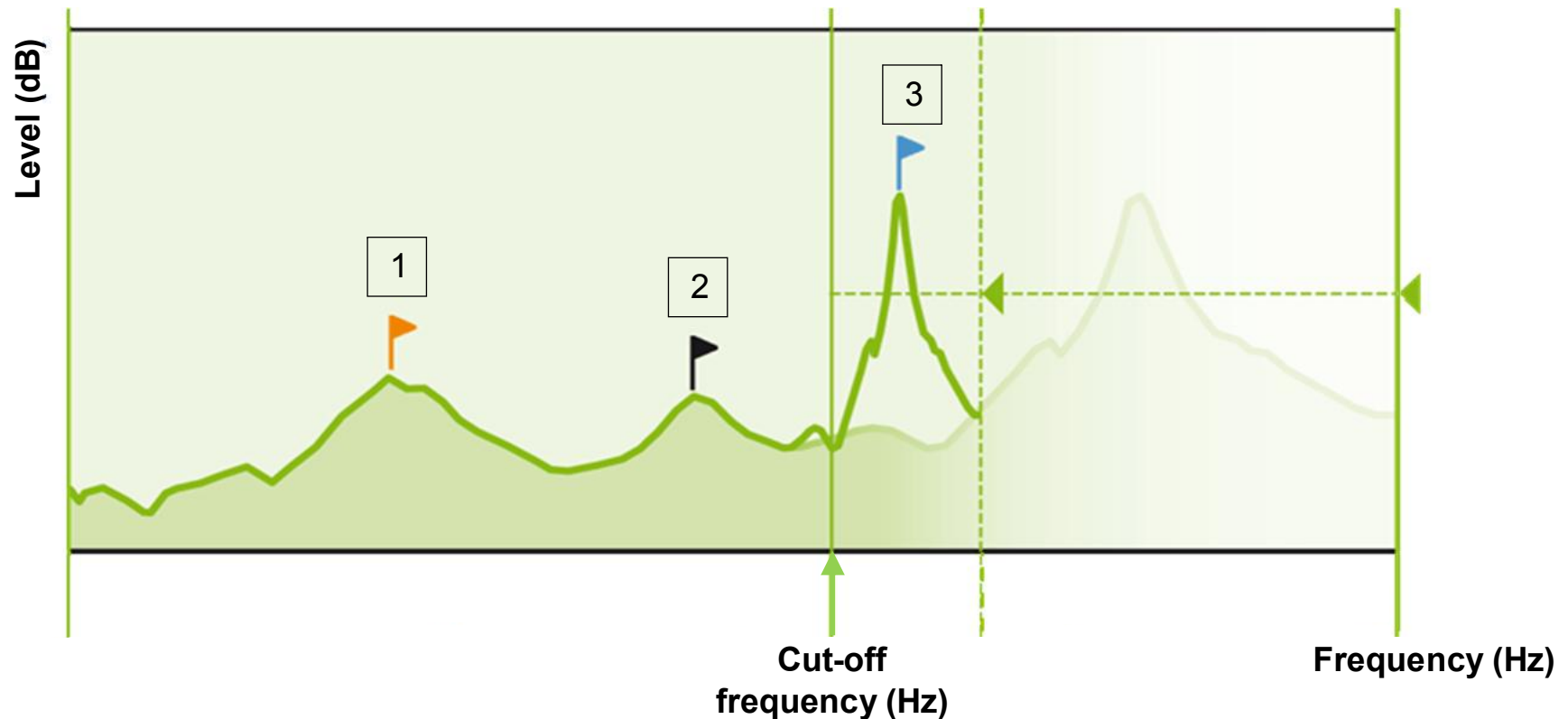
- Research shows the importance of high frequency amplification to support developmentally appropriate speech & language development
- Multiple linguistic uses:
 - Plurality of nouns (cat; cats)
 - Third person present tense (I eat; she eats)
 - Present vs. past tense (She put it on; She puts it on)
 - To show possession (That is Mike's)
 - Possessive pronouns (Is that Beth? Is that Beth's?)
 - Contractions (that's, let's, it's, what's)



The Phonak solution – SoundRecover



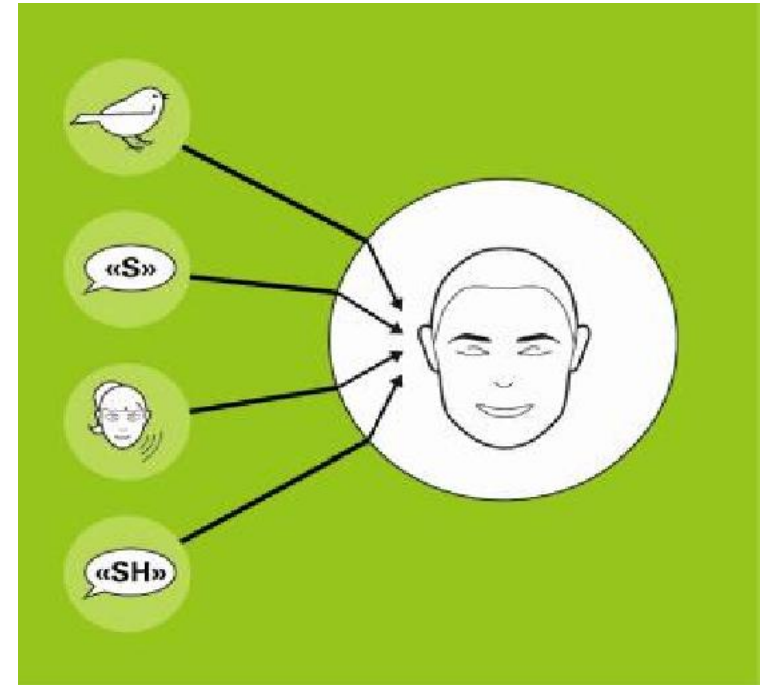
- **SoundRecover** provides access to high-frequency sounds by compressing and shifting sounds above a certain cut-off frequency into the audible range.



SoundRecover – proven benefits



- Detection, distinction and recognition of sounds
- Intonation and overall voice quality
- Speech understanding
- Reduced whistling in the hearing instrument



Voice quality improvements with SoundRecover



Example: 12 year old girl:

→ Before SoundRecover
“sock, shoe, show”

→ SoundRecover after 4 weeks
“snake, lizard”

Recordings courtesy of Prof. Susan Scollie at the University of Western Ontario, Canada. Recordings done with a prototype version of SoundRecover.

SoundRecover evidence



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- Wolfe J., Caraway T., John A., Schafer E., & Nyffeler M. 2009. Initial experiences with nonlinear frequency compression for children with mild to moderately severe hearing loss. The Hearing Journal 62(9): 32-35
- Wolfe J., Caraway T., John A., Schafer E., & Nyffeler M. 2009. Verbesserung beim Erkennen und Erlernen hochfrequenter Signale. Hörakustik Oktober
- Wolfe J, John A, Schafer E, Nyffeler M, Boretzki M, Caraway T. 2010 Evaluation of Non-Linear Frequency Compression for School-Age Children with Moderate to Moderately-Severe Hearing Loss. J Am Acad Audiol 21:1-11

The challenge – communication with the audiologist

- Children may be incapable to explain a problem with their hearing aid
- Older kids may not want to talk at all!



The Phonak solution – DataLogging



- DataLogging records information such as hours of use, program used etc. providing the hearing care professional with objective data
- Overcomes unclear information from child, parent or caregiver as they may not be able to verbalize the problem
- Objective measure to overcome the “please you effect”
- Can provide valuable environmental/ situational info



The challenge – talking on the phone

- The telephone is an integral part of a child's life (Palmer and Mormer, 1999)
- The telephone connect children with family and friends from as young as 6 months old



The Phonak solution – a comprehensive portfolio



Acoustic phone
program or Telecoil

For those clients with
a non-wireless Phonak
hearing aid

DuoPhone

For use with multiple
phones everyday in
many locations

Phonak ComPilot

For use with a
Bluetooth phone. For
calling on the move
and for handsfree
operation during car
driving

Roger Pen

For use with a
Bluetooth phone. For
users who already
have the Roger pen
for hearing in
noise/over distance

Phonak DECT CP1
cordless phone

For the best possible
call understanding on
a home phone

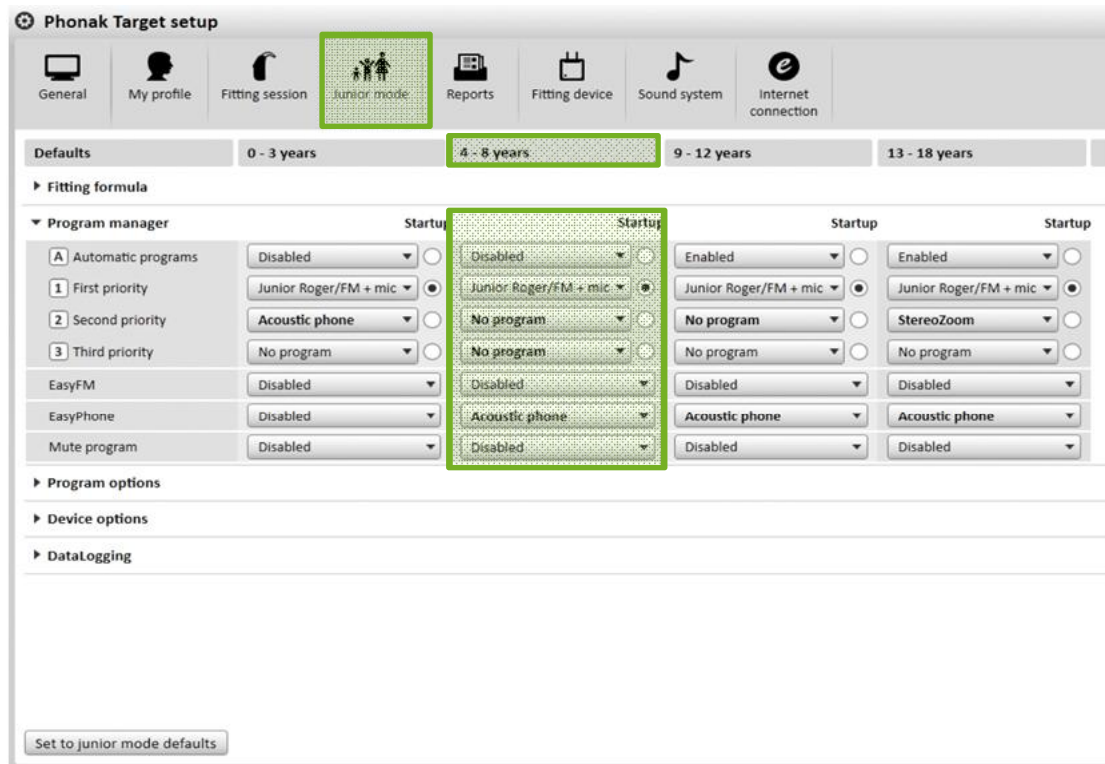


Overcoming challenges for the hearing care professional

The challenge – optimized fitting Junior Mode



- Pioneered in 2006
- One click configuration!
- Customized settings for 0-3, 4-8, 9-12 and 13-18 years
- Junior Reports for parents, teachers, children & professional



Child Hearing Assessment Toolkit – C.H.A.T.

Addressing the challenge of proper solution assessment:

- Web-based tool
- All assessment in one place
- Provides holistic view

The screenshot shows the homepage of the Child Hearing Assessment Toolkit (C.H.A.T.). At the top, there are navigation links for 'menu', 'online', and 'login'. The main header features a large image of children in a classroom setting with the text 'Child Hearing Assessment Toolkit (C.H.A.T.)' and 'All your assessments in one handy place'. Below this, there is a table with five categories: 1. Listening, 2. Communication Access, 3. Placement, 4. Self-Advocacy, and 5. Educational Performance. To the right of the table, there is a 'Welcome to C.H.A.T.' section with a brief description of the tool and a link to 'Read more about How it works'. On the far right, there are two buttons: 'Manage Assessments' and 'Student Profiles'. Below these buttons is a section titled 'Roger' with a sub-header 'Bridging the understanding gap' and an image of children in a classroom. The PHONAK logo with the tagline 'life is on' is at the bottom right.

1	Listening
2	Communication Access
3	Placement
4	Self-Advocacy
5	Educational Performance

Welcome to C.H.A.T.

C.H.A.T. is a tool for educational audiologists, hearing resource teachers and teachers of the deaf. Use it to select, fill out, manage and share your listening assessments, without the hassle of printing and storing paper sheets. C.H.A.T. can even help you compare a child's results over time.

→ Read more about [How it works](#)

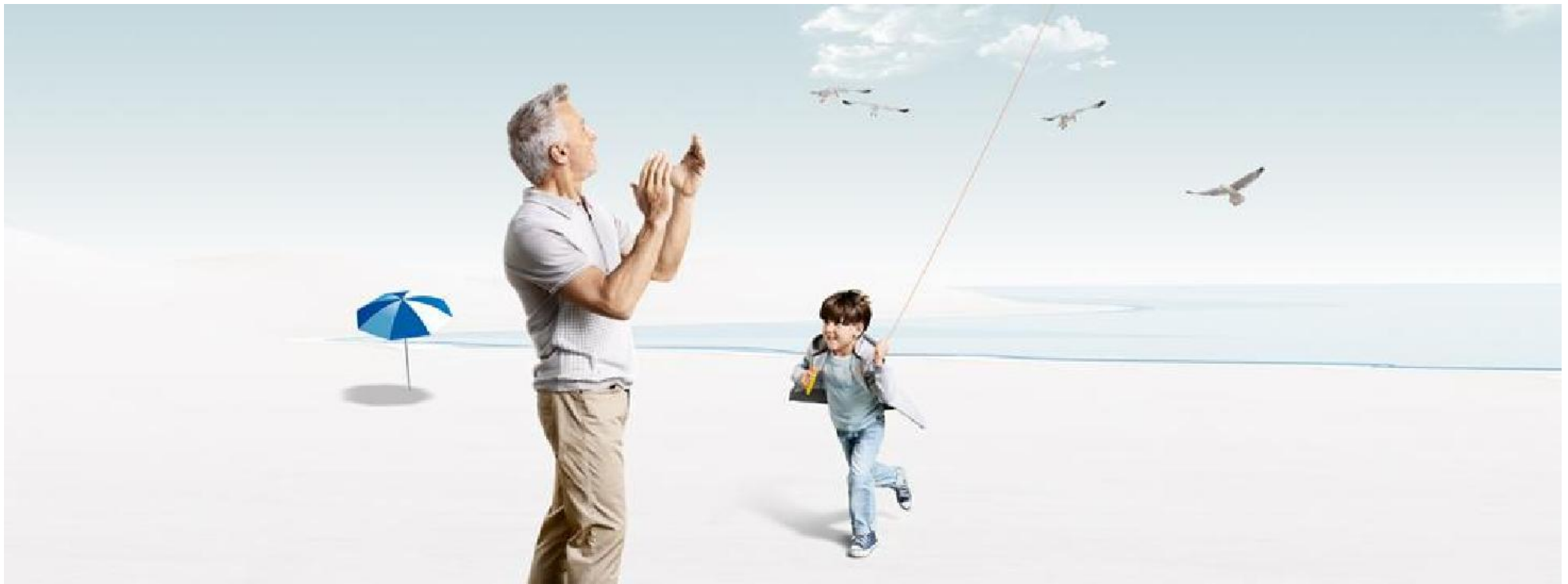
Manage Assessments

Student Profiles

Roger

Bridging the understanding gap

PHONAK
life is on



Mastering challenges in usability

Strong moisture protection – Water Resistant

Triple-layer microphone protection

Sealed push button



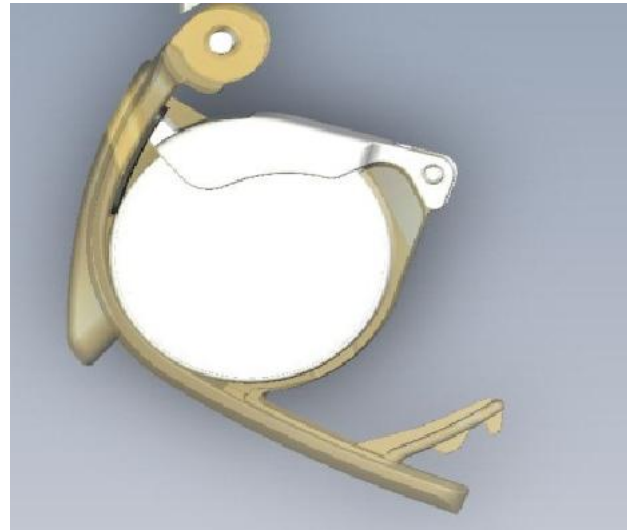
Advanced molding
eliminates gaps

Additional sealing

Protected air vent for the
battery

Child safety – tamperproof solutions

- New improved tamperproof solutions for hearing aids and receivers that meet IEC standards for 0-3 year olds



Cool look - widest color palette selection

Signature



Hair & Skin



Traditional



Fun



Fashion

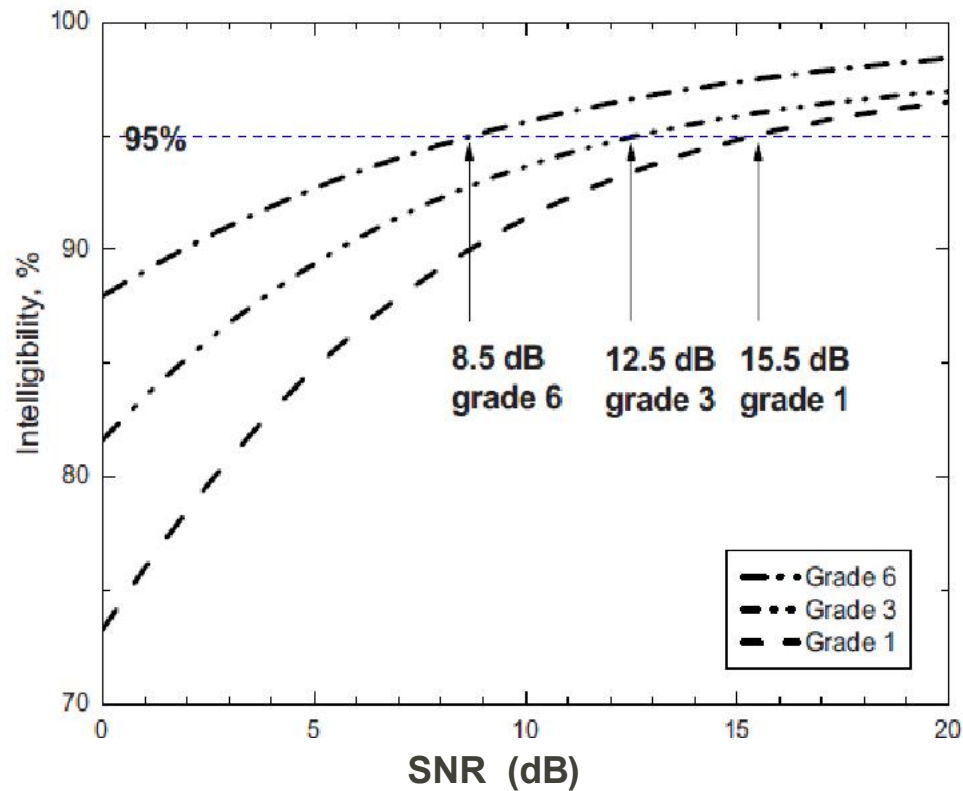




Dealing with the challenge to hear over distance and noise

Age and signal-to-noise ratio

- The younger the child the harder it is for them to understand speech in noisy environments



Bradley and Sato (2008), 41 classrooms and 2285 individual speech recognition tests

Acoustical barriers in the classroom

- School-age children spend as much as 75% of the day engaged in listening activities (Dahlquist, 1998)
- Three sources create a unfavorable listening environment in the classroom:
 1. Undesired late reverberation
 2. Unfavorable signal-to-noise ratio
 3. Distance from the speaker

A classroom can be a very noisy environment

Survey results:

- Classroom noise levels were determined by classroom activity
- Range of over 20 dB between the noisiest and quietest activities
- External noise only affected internal levels when children were working 'in silence'

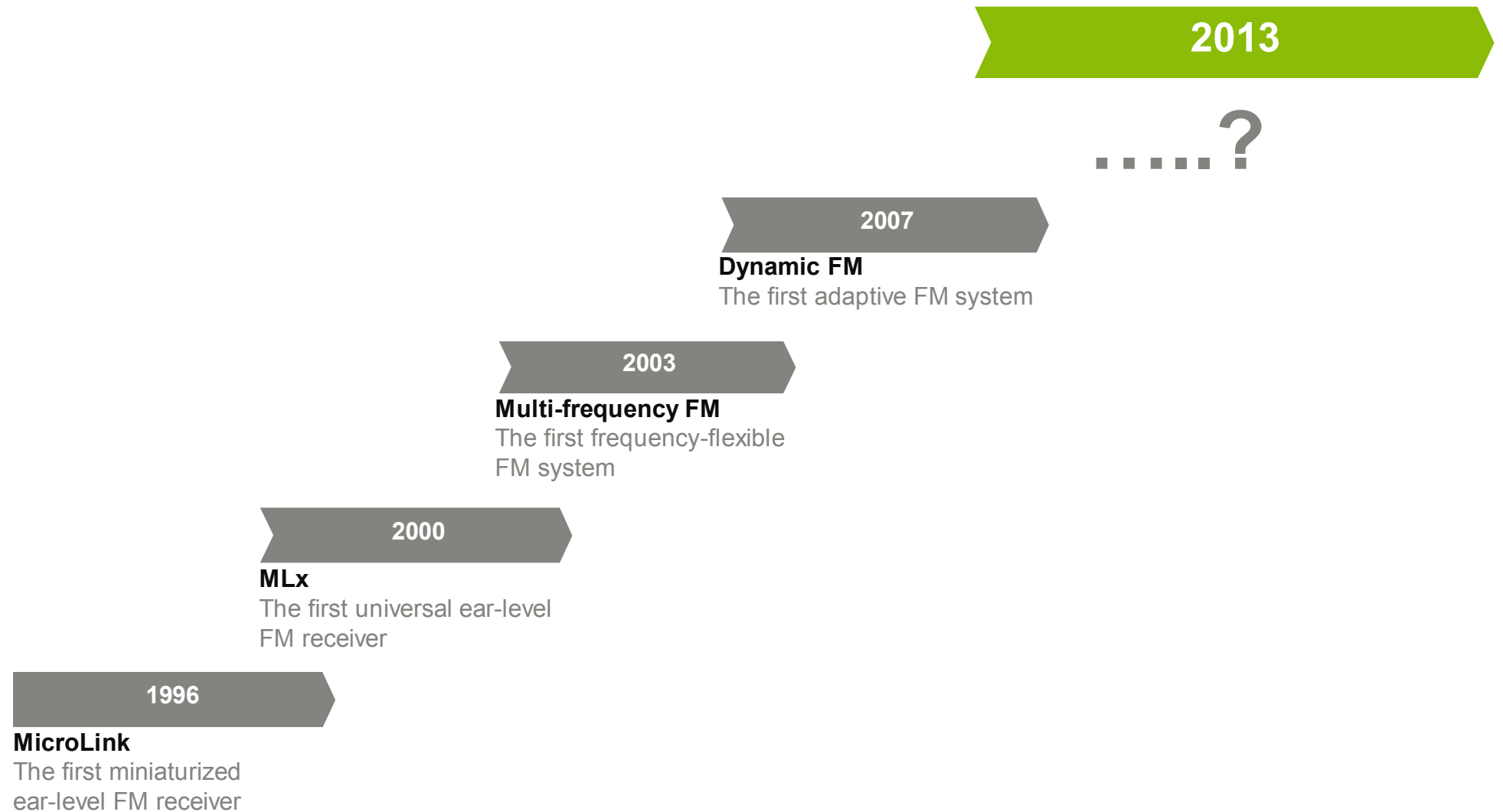
Source. Results of internal Noise Surveys in 140 Classrooms (Dockrell, 2003)

Classroom activity levels

'Silent' reading	56 dB(A)
1 person speaking	61 dB(A)
Children at tables	65 dB(A)
Moving around	72 dB(A)
Group work at tables	73 dB(A)
Group work + movement	77 dB(A)

First FM systems were developed to assist children with a hearing loss hear better in the classroom

Wireless Innovations at Phonak – A History of Firsts



Focus on Wireless Communication

- After success in the school market, Phonak has re-focused it's attention to solutions for:
 - Infant and toddlers
 - Teens



Where to use FM with a young child



Family gatherings and mealtime



Traveling in the car



At daycare



Playing computer games

Where to use FM with a young child



On the telephone



On the playground



Watching TV

Where to use FM with a young child



Horse-riding lessons



Shopping Centre



In a stroller



Riding a bike

Advantages of FM Systems for toddlers

- In a study by Mulla (2011), young children were shown to spend 42% of their day 6 ft or more away from their primary caregiver
- FM Systems can provide child with access to speech comprehension during critical period of development



This advantage will:

- lay a foundation for auditory learning
- facilitate socialization
- give greater access to information for extended learning
- provide greater access to safety cues in the child's immediate environment

Toddler in the car – no FM



Toddler in the car – with FM



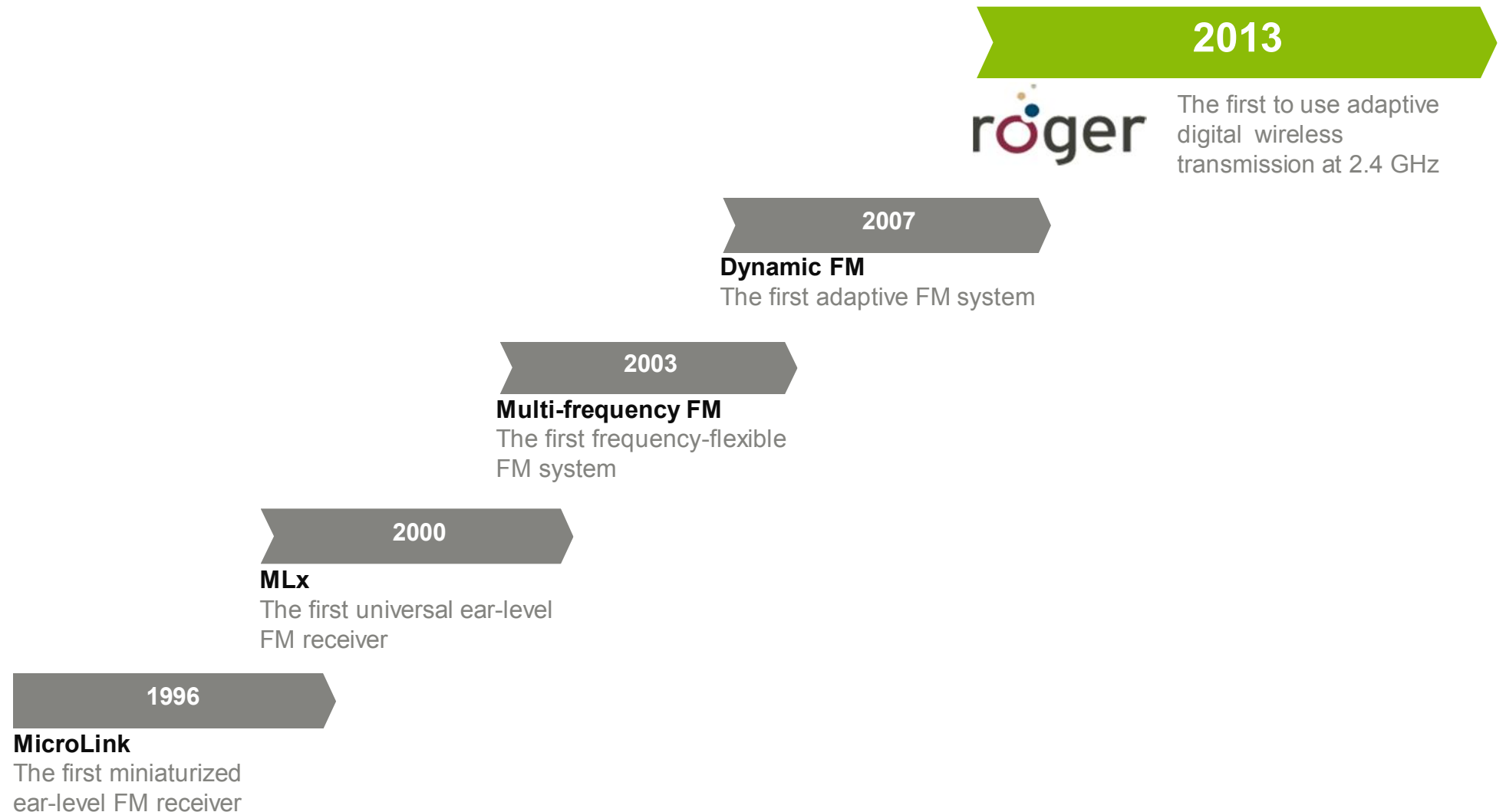
FM – benefits for children with processing disorders

- Increased attention
- Higher academic achievement
- More consistent on-task behavior
- Maximum speech understanding in noise
- Improvement in classroom behavior
- Important for long-term benefits: having children tune in again
- Children who used Phonak FM reading skills improved significantly more than non-EduLink wearing peers



(Schafer 2013, Kraus et al. 2012, Hall et al. 2009, Musiek & Chermak 1997, Crandell et al. 2002)

Roger – The next step in wireless innovations at Phonak



Roger – The next step in wireless technology

Roger is the new digital standard that uses the 2.4 GHz technology. It bridges the understanding gap, in noise and over distance, by wirelessly transmitting the speaker's voice directly to the listener.

The logo for 'roger' features the word in a lowercase, sans-serif font. The 'o' is a large, dark red circle. Above the 'o' are three small dots: a light green one at the top, an orange one to the left, and a dark blue one to the right. The letters 'r', 'g', 'e', and 'r' are in a dark grey color.

roger

Overall benefits of Roger



Maximum performance



Maximum SNR possible

Zero hassle



Simple and easy to use

Full compatibility



... universally compatible

There is a Roger solution for every need



What does the future hold?

Opportunities

- How can hearing instruments better adapt to the listening environments of children?
- Could less invasive options make it easier for children to participate in activities that require acrobatics, helmet wearing, swimming?
- What tools, accessories, applications can be used to support the parent or child in using our pediatric solutions successfully
- Connecting parameters and usage to outcomes:
 - What matters?
 - How much?
 - For whom?



THANK YOU