Signia Introduces MaX: AI-Driven Processing

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Key Takeaways

Key Takeaway	Clinical Implication
Acoustic Intelligence unites four DNNs	The Speech Detection, Own Voice Detection, Scene Analysis, and Noise Analysis DNNs steer processing as one coordinated, system-level response rather than AI layered onto traditional processing.
RealTime Conversation Enhancement AI	Tracks and enhances multiple speakers simultaneously; 97% performed better in noisy group conversations than with key competitors.
Own Voice Processing AI	Enabled by default with no in-clinic voice training. With the earlier OVP 2.0, return rates were up to 30% lower for first-time wearers.
Ambient Scene Adaptation AI	Replaces fixed scenes and mode changes with continuous adaptation to the acoustic environment.
Dynamic Noise Control AI	Adjusts noise reduction to the type of noise and to whether the wearer is in conversation, preserving awareness when it matters.
Four DNNs instead of one	Task-specific DNNs offer a slim footprint, low power consumption, efficient training, and a scalable, future-proof architecture.
OneConnect connectivity	LE Audio, Bluetooth Classic, and telecoil in one device; Auracast firmware update expected by Spring 2027.
Supporting features	e2e 5.0, SoundSmoothing 2.0, eWindScreen 2.0, and the Signia Assistant support comfort, localization, and acclimatization.
Pure C&G MaX	A rechargeable RIC with an IP 68 rating, up to 30 hours of battery life without streaming, and eight color options.

Course Content

Learner Outcomes

Upon completion of this course attendees will be able to:

1) Define the improvements to Signia's latest platform
2) Explain how Signia's latest platform uses AI to improve speech understanding.
3) Describe the features and improvements of Signia's newest form factor

Introduction: Live Noisy

Signia Multi-adaptive Xperience (MaX) is Signia's most advanced platform to date. It is designed to change how hearing aids adapt to life's complexity, so wearers can contribute confidently to conversation and Live Noisy.

What people miss is not only sound. It is connection, belonging, confidence, and participation. AI in hearing aids is about more than reducing noise; it is about understanding the full, multi-dimensional experience of sound and optimizing for the needs of the situation.

The Evolution to MaX

MaX was over 10 years in the making.

- **AX:** Introduced split processing, allowing two 48-channel processors to process speech and background noise independently and optimally.
- **IX:** Added the first multi-stream architecture, able to track and enhance individual speakers simultaneously.
- **MaX:** Introduces Acoustic Intelligence, which unites four DNNs to steer multi-stream sound processing and enhance the entire acoustic scene.

DNN Fundamentals

- **Artificial intelligence (AI):** The broad concept of machines performing tasks that normally require human-like intelligence.
- **Machine learning:** A subset of AI in which the system learns patterns from data instead of being programmed only with fixed rules.
- **Deep neural network (DNN):** A deep learning model made of many connected layers that learn increasingly complex patterns.

In hearing aids, a DNN is trained using examples. Rather than being told that a signal that looks a certain way is speech, a DNN is trained on many examples of speech, noise, music, wind, and other sound scenes. It learns what noise or speech is through many rounds of trial-and-error training.

The goal is not to memorize every possible sound but to understand the underlying patterns well enough to recognize them in new real-world situations. This is called generalization.

The Limits of One-Dimensional AI

Most systems still rely on a classic signal chain of scene classification, directional microphones, and noise reduction, with AI added on top as an extra layer of noise reduction after the processing. The hearing aid may make the world quieter, but it is mainly catering to one dimension of the sound scene.

Real conversations are not static. The listening challenge can change every few seconds, and wearers need the hearing aid to help them stay connected as the sound scene changes.

Acoustic Intelligence

Signia MaX uses multi-dimensional AI system intelligence to understand the full moment and steer the hearing aid processing response. Four DNNs work together as a cohesive unit.

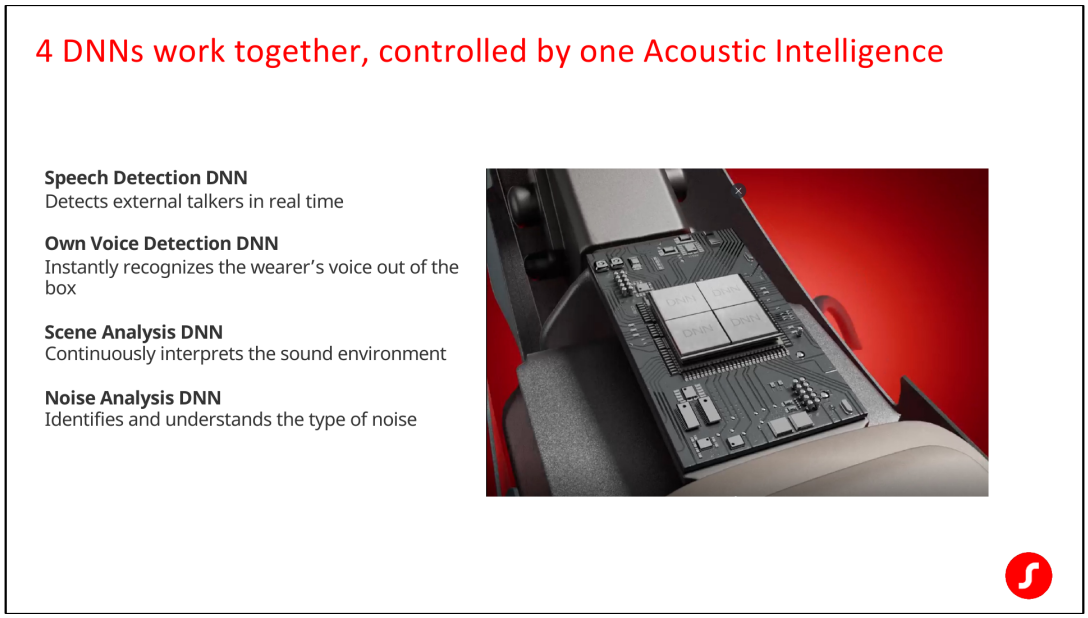


Figure 1. The four DNNs of Acoustic Intelligence and the role of each.

Q4	**Quiz Hint:** Acoustic Intelligence unites four DNNs: Speech Detection, Own Voice Detection, Scene Analysis, and Noise Analysis.

- Trained on 40 million samples across eleven languages, six music genres, and thousands of real voices and listening environments.
- Reacts to changes in the environment in just 0.01 seconds.
- It is system-level intelligence controlling every processing aspect in real time, not feature-level intelligence.

Acoustic Intelligence coordinates four key features that are always active and always influencing each other: RealTime Conversation Enhancement AI, Own Voice Processing AI, Ambient Scene Adaptation AI, and Dynamic Noise Control AI. Conversation takes precedence and, if detected, is always prioritized. Own voice is made comfortable without affecting speech clarity. Background sound is reduced or maintained depending on conversational context.

Through Signia's Split Processing architecture, sound is separated into front and back hemispheres, which Acoustic Intelligence analyzes individually across multiple dimensions. It uses a solution space of over 800 million possible optimizations to continuously align the system around the wearer and the moment.

RealTime Conversation Enhancement AI

- **Not dependent on gaze:** Unlike traditional directional systems, it does not depend on where the wearer is looking.
- **Multi-stream processing:** It tracks and enhances multiple speakers simultaneously, in real time.
- **What the AI adds:** Stronger contrast, sharper speaker focus, and greater stability in dynamic conversations. It adjusts the strength of enhancement based on the number of speakers, their position, and the surrounding soundscape.



Figure 2. RealTime Conversation Enhancement AI: 97% perform better in noisy group conversations versus key competitors.

In a human performance study with alternating talkers in noise, 97% of participants had a better SNR in noisy group conversations against key competitors.

Q2	**Quiz Hint:** In the human performance study of noisy group conversations, 97% of participants performed better with Signia MaX than with key competitors.

Own Voice Processing AI

The wearer's own voice can sound loud, unnatural, or occluded, which can affect comfort, acclimatization, and overall satisfaction. Own Voice Processing (OVP) 2.0 already detected when the wearer was speaking and adjusted processing in real time, but it required individual voice training in the clinic.

- Trained on 1.5 million voice samples.
- Immediate voice recognition with no clinic training.
- Enabled by default for every wearer; nothing to set up and nothing to remember.
- Faster acclimatization and a comfortable own voice.
- Reduces return rates by up to 30%.

The return-rate finding comes from a data analytics study of 1,891 wearers fitted with Signia IX hearing aids offering OVP 2.0 during a 60-day trial. Return rates were 23% lower with OVP 2.0 activated, and first-time wearers saw a 30% reduction.

Q3	**Quiz Hint:** Own Voice Processing AI is trained on 1.5 million voice samples and is enabled by default for every wearer, so the wearer's voice is recognized immediately with no in-clinic training.

Ambient Scene Adaptation AI

Traditional scene classifiers simplify the soundscape into predefined categories, so preset scenes trigger preset responses. Ambient Scene Adaptation AI continuously interprets the wearer's acoustic environment with no fixed scenes, no mode changes, and no lag. It is trained on real-world acoustic complexity and optimizes up to 800 million parameters per second.

It combines scene understanding with reverberation, spectral structure, temporal dynamics, music, motion sensor data, and the wider acoustic context. It continuously adapts compression, directionality, and the balance of the surrounding soundscape.

Dynamic Noise Control AI

Dynamic Noise Control AI uses Acoustic Intelligence to understand what kind of noise is present and whether the wearer is actively in conversation. The right response is not always less noise.

Situation	Response
In conversation in noise	Speech prioritised; noise reduction increases as complexity increases.
No speakers present	Balanced awareness; balanced noise reduction for comfort and immersion.
In traffic noise	Awareness prioritized; comfortable and safe awareness preserved.

Why Four DNNs Instead of One

A single large-scale, multipurpose DNN aims to perform all tasks at once. It is highly complex, difficult to train, and subject to cross-task interference. It lacks modularity, so a change to one task often requires retraining and revalidating the entire network. It also brings high power consumption, a big chip size, and inflexibility for the future.

Signia MaX uses a collection of lightweight, task-specific DNN modules instead:

- Slim footprint and low power consumption.
- Independent development and optimization for each task.
- Better control and interpretability of dynamic environments.
- Flexibility and reusability: one module can be retrained without affecting the others.
- Scalable, future-proof architecture for easier integration of new features and sensors.

The presenter used a shampoo analogy: a 3-in-1 product does the job, but separate shampoo, conditioner, and body wash each do their jobs better, as task-specific DNNs do.

The Signia MaX Chip

The new chip makes Acoustic Intelligence possible. Higher clock speeds, two additional signal processing cores, and double the memory raise processing power by 54 times, giving the headroom to run four DNNs continuously and simultaneously. Efficiency improves by around 50%, so Acoustic Intelligence lasts from morning to night.

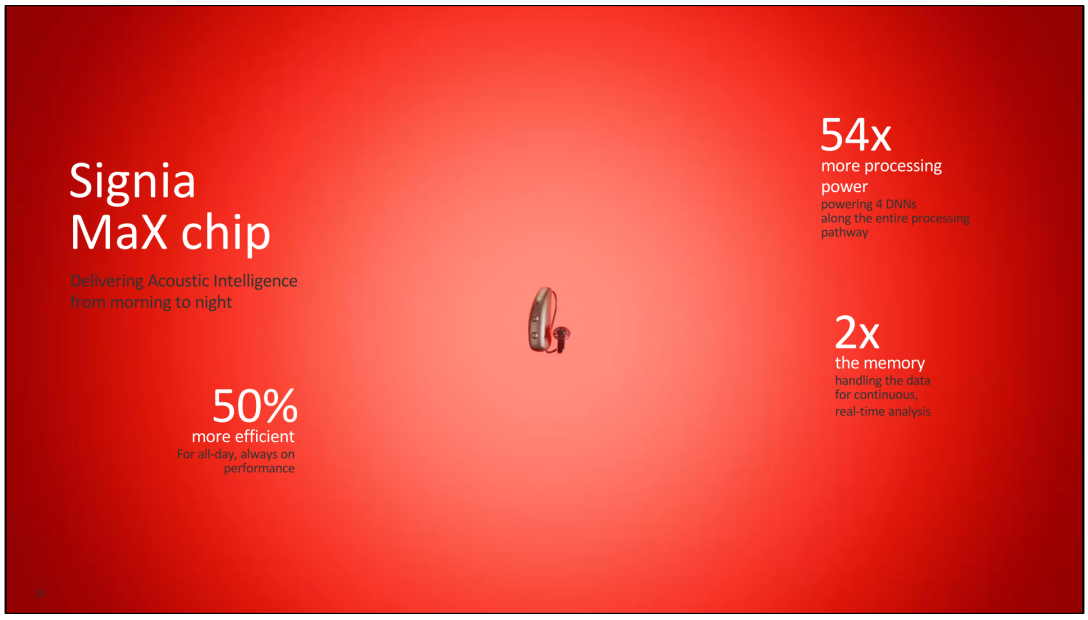


Figure 3. Signia MaX chip: 54x processing power, 2x memory, and 50% greater efficiency.

Acoustic Intelligence in Real-World Scenarios

The presenter compared one-dimensional AI with Acoustic Intelligence across three situations.

- **Waiting in a lively restaurant:** One-dimensional AI detects noise above its threshold, applies maximum DNN noise reduction with the directional beam on, and the wearer is isolated from the environment. With Acoustic Intelligence, the system detects no external speakers, no wearer speech, babble noise, and an indoor environment, applies balanced noise reduction for comfort, and the wearer stays immersed.
- **Lively discussion with multiple people:** One-dimensional AI keeps noise reduction high with the directional beam on, and the wearer struggles to keep up. With Acoustic Intelligence, the system tracks and enhances multiple conversation partners, manages own voice, and increases noise reduction, so the wearer contributes to the conversation.
- **Waiting outside in traffic:** One-dimensional AI applies maximum noise reduction, reducing awareness. With Acoustic Intelligence, the system recognizes traffic noise and no conversation, increases ambient sound awareness, and the wearer has full awareness of surroundings and a feeling of safety.

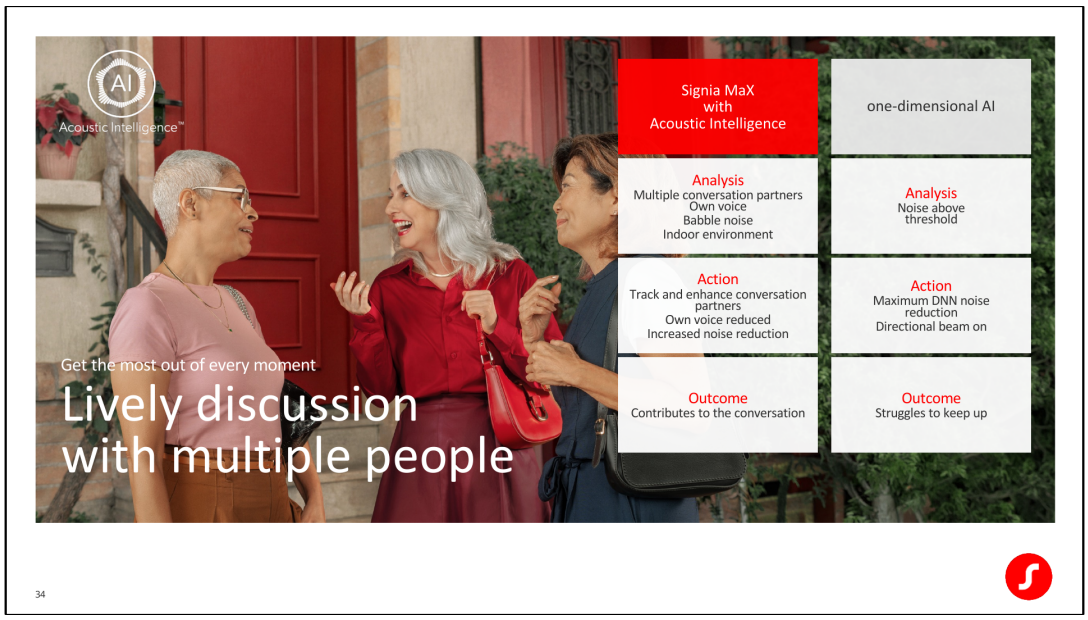


Figure 4. Lively discussion with multiple people: Signia MaX versus one-dimensional AI.

One-dimensional AI mainly asks how much to reduce the noise. Multi-dimensional Acoustic Intelligence asks how to provide the optimum settings to get the most out of the moment.

Additional MaX Features

e2e 5.0

- 35% stronger signal for a more robust and reliable binaural connection.
- 32% higher audio data rate for higher quality binaural audio.
- One new fast data channel, enabling enhanced SoundSmoothing 2.0.
- 2 ms latency, making communication between the hearing aids near instant.
- NFMI broadcast frequency changed to 10.6 MHz for less interference from external devices.

SoundSmoothing 2.0

Everyday transient sounds such as paper, keyboards, and cutlery can sound sharp and annoying, especially for first-time users, and can affect acclimatization and retention. Previously, the only option was usually to turn down gain, trading clarity for comfort.

- Previously: 2-channel broadband sudden sound reduction that worked independently on each hearing aid.
- Now: targeted high-resolution reduction of sudden sounds across 48 channels, with binaural synchronization.
- Clear speech remains intact, comfort increases without reducing gain, and localization is preserved.
- Reduces the RMS localization error caused by ILD variation by around 30% compared with its predecessor.

Without a binaural link, each hearing aid reacts to a sudden sound on its own, which can reverse the natural level difference between the ears and make the sound seem to come from the wrong direction. With the link, the hearing aids communicate and preserve the level difference while reducing the impact of the sound.

eWindScreen 2.0

- Previously: broadband wind reduction across all microphone inputs.
- Now: automatically selects the microphone with the best SNR and detects and reduces wind in the lowest 16 frequency channels.
- Provides 74% more speech enhancement in wind noise compared with Signia IX.

Signia Assistant

Natural language troubleshooting and guidance for more immediate and personal hearing care. It now includes generative chat for troubleshooting.

OneConnect Connectivity

Signia MaX is built with OneConnect technology, offering full connectivity with no compromise. It means patients' audiological needs matter more than which phone they have: LE Audio and Bluetooth Classic compatibility are in the same device, so the choice of hearing aid no longer depends on phone or computer compatibility.

Connectivity	Description
Bluetooth Classic	Broad, proven compatibility today.
LE Audio	The next generation of low-power, low-latency, high-quality connectivity.
Telecoil	Trusted access in public spaces.
Auracast	Ready for shared and public audio experiences as they roll out.

Auracast will be enabled through a firmware update by Spring 2027. Wearers can receive it in the clinic via Connexx 10 or through their own phone and the Signia One app, using a new over-the-air firmware update function launched with the Auracast release. Because Auracast is in the early stages of public roll-out, the integrated telecoil provides direct streaming from public systems with FM loops, which are currently much more widely available.

Q1	**Quiz Hint:** The Signia MaX is built with OneConnect technology, which places LE Audio, Bluetooth Classic, and telecoil in the same device and is ready for Auracast through a firmware update.

Claims and Evidence

The core claim for MaX centers on speech intelligibility and the ability to enjoy conversations and Live Noisy. The evidence compares MaX with earlier Signia platforms and with competitors.

Technical Study

- Output SNR technical measurements using the Hagerman phase-inversion method on KEMAR, with alternating talkers at 75 dBA SPL and total noise at 70 and 75 dBA SPL.
- Signia MaX was compared with Signia IX and four key competitors' most recent premium RIC products, fit to their proprietary settings.
- Outcome measure: SII-weighted SNR improvement versus unaided KEMAR.
- MaX performed best, with a clear gap to IX and to the competitors. The difference is linked to Acoustic Intelligence and RealTime Conversation Enhancement AI.

Human Performance Study: Noisy Group Conversations

- External study at the University Horzentrum in Oldenburg, Germany, with 30 participants with moderate-to-severe sensorineural hearing loss.
- Signia MaX was compared with IX and two key competitors using DNN-based noise reduction on an AI co-processor. Participants repeated sentences from alternating talkers in an adaptive test.
- Of 30 participants, 29 (97%) performed better with MaX. MaX had an SRT80 of -5.2 dB, versus -3.7 dB and -2.4 dB for the two competitors, a statistically significant difference.

Human Performance Study: Listening Effort and Comfort

- Internal study with 26 adults with symmetrical sensorineural hearing loss; all but one were experienced hearing aid users. Testing used low-context sentences from the Repeat-Recall Test at a challenging fixed SNR.
- MaX outperformed IX and two premium competitors in speech recognition, by 6 to 21 percentage points (8% to 39% relative improvement).
- Participants reported significantly less listening effort with MaX and significantly longer tolerable listening time, corresponding to an 83% improvement. Comfort ratings were significantly higher for MaX and IX.

Form Factor: Pure C&G MaX

The new Signia MaX RIC is the Pure C&G MaX. It is rechargeable, has an LED and a dual push button, offers complete connectivity (LE Audio, Bluetooth Classic, telecoil, and Auracast ready), and is compatible with EarWear 3.0. The serial number window remains on the underside of the hearing aid.



Figure 5. Pure C&G MaX with LED, dual push button, and complete connectivity.

Q5	**Quiz Hint:** The new form factor introduced with the platform is the Pure C&G MaX, a rechargeable RIC hearing aid.

Durability and Battery

- IP 68 rating for protection against water and dust ingress.
- Plasma-Enhanced Vapor Coating, applied as a vapor to internal components, reaches small and complex surfaces, tiny gaps, edges, and joints that traditional liquid coatings may miss. It creates an ultra-thin, moisture-repellent protective layer.

Battery Use	Runtime
No streaming	30 hours
Including 5 hours of LE Audio streaming	28 hours
Including 5 hours of Bluetooth Classic streaming	22 hours
After a 30-minute recharge when battery is low	Up to 6 hours

Charging Options and LED

The portable and desktop chargers are redesigned (Portable Charger Pure 2.0 and Desktop Charger Pure 2.0). The existing Multi Charger still works with MaX.

- Portable Charger Pure 2.0 fits receiver lengths 0–5, all eartips, and small custom earmolds, and holds 4 additional charges.
- It charges a pair of hearing aids in 3 hours and is itself fully charged in 4 hours via USB or 6 hours via a wireless charging pad. Charger LEDs light green to confirm correct placement and charging.
- The two-color LED shows solid green when the hearing aid is removed from the charger or switched on, and rapid red blinking when it is switched off.
- Caregiver mode (enabled in Connexx) blinks green every 5 seconds to show the hearing aid is on and red every 5 seconds to show the battery is low.

Size, Color, and Acoustic Performance

- Compared with Pure Charge&Go BCT IX, Pure C&G MaX is 1.06 mm shorter, 0.27 mm wider side to side, and 0.29 mm wider front to back.
- Eight colors: Rose Gold, Dark Champagne, Silver Grey, Titanium Grey, Black, Chestnut Brown, Honey Blond, and Beige.

Receiver (2cc coupler)	Gain / Maximum Output
miniReceiver 3.0 S	44 dB / 111 dB SPL
miniReceiver 3.0 M	59 dB / 119 dB SPL
miniReceiver 3.0 P	65 dB / 122 dB SPL
miniReceiver 3.0 HP	75 dB / 131 dB SPL

EarWear 3.0 compatibility includes eartips 3.0, sleeves 3.0, round 3.0, and miniReceiver 3.0.

Accessories

- **TV Sound:** Streams TV audio directly to the hearing aids via Bluetooth and works out of the box with no configuration by the clinician. The streaming signal is accessed via the app button or a medium button press (1.4–5 seconds). A short press is up to 1.3 seconds and a long press is over 5 seconds.
- **Remote Control:** Replaces miniPocket. A discreet remote control for volume and program changes, paired acoustically with the same pairing process and compatibility as miniPocket, but without a timed setup mode.
- **Programming:** Signia MaX is programmed using Noahlink Wireless.

Software and App

- **Connexx 10:** Updated to leverage the Signia MaX platform. Fit: streamlined first fit with fewer clicks and screens. Fine-Tune: Acoustic Intelligence customization. Support: improved data insights to enhance personalized care.
- **Signia One app:** Signia MaX uses the new Signia One app; all other Signia products continue to use the Signia App. The redesigned home screen gives quick access to programs, volume (with a separate left/right option and mute), Directional Focus, and battery details for each hearing aid.

Conclusion

- Signia MaX goes beyond noise reduction alone with multi-dimensional Acoustic Intelligence, which unites four DNNs in one coordinated response.
- Four key features, RealTime Conversation Enhancement AI, Own Voice Processing AI, Ambient Scene Adaptation AI, and Dynamic Noise Control AI, adapt to the moment rather than only reducing noise.
- The new Pure C&G MaX RIC combines complete connectivity, an IP 68 rating, and all-day battery life.
- The goal is to enable wearers to contribute to the conversation and Live Noisy.

Notes

Quiz Summary

The following quiz hints appeared throughout the course content. Use this section as a quick study reference.

Q1	**Quiz Hint:** The Signia MaX is built with OneConnect technology, which places LE Audio, Bluetooth Classic, and telecoil in the same device and is ready for Auracast through a firmware update.
Q2	**Quiz Hint:** In the human performance study of noisy group conversations, 97% of participants performed better with Signia MaX than with key competitors.
Q3	**Quiz Hint:** Own Voice Processing AI is trained on 1.5 million voice samples and is enabled by default for every wearer, so the wearer's voice is recognized immediately with no in-clinic training.
Q4	**Quiz Hint:** Acoustic Intelligence unites four DNNs: Speech Detection, Own Voice Detection, Scene Analysis, and Noise Analysis.
Q5	**Quiz Hint:** The new form factor introduced with the platform is the Pure C&G MaX, a rechargeable RIC hearing aid.

References

Jensen et al. (2026a). *Signia Multi-adaptive Xperience outperforms key competitors in group conversation in noise*. Signia White Paper.

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Additional Information

Presenter Bio

Dr. Turriff is the government audiologist for the Mountain and West territories for Signia. She has over nine years of hearing aid manufacturing experience, all with WS Audiology. This experience includes sales, product and software education, and presenting at regional and national conferences. Her five years of clinical experience were completed at large ENT practices in both Minnesota and Washington State. She has been an active volunteer with the American Academy of Audiology, serving on several committees over the past nine years. She earned her undergraduate degree at Lawrence University in Wisconsin and her doctorate at the University of North Texas.

Presenter Disclosure

Financial: Caitlin Turriff is employed by Signia.

Non-financial: Caitlin Turriff has no relevant non-financial relationships to disclose.

Additional Information (continued)

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