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Optimize Sound Quality with Omega AI

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Hello and welcome. I'm Dr. Andrea Hannan-Dawkes, a member of the Education and Training team at Starkey, and I'm delighted you have elected to join me today for this session on Optimizing Sound quality with Omega AI.

Before we get started, there are a few webinar FAQs to cover. If you would like to ask a question during the presentation, please click on the Q and A area, type in your question and then click Send. I will address all questions at the end of the session, but please feel free to enter them as they come to mind. A PDF handout of this talk is available for you through your pending courses on Audiology Online or by clicking on the link in the chat within the classroom Today, one CEU hour is available for this session if you participate in the CEU program offered by Audiology Online. After completing the course, go to your pending courses on AO and pass the short Multiple Choice exam.

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You are welcome to review risks and benefits that are applicable to all courses offered through Audiology Online. I'll give everyone a moment to review the information on this slide and it will also be available in the handout All Right and Learning Outcomes for Today. Those include that after this course, participants will be able to explain the value of optimize acoustic model 2.0. You will be able to describe DNN360, a brand new feature, and after this course, participants will be able to list at least two additional sound quality optimization features available with Omega AI hearing aids.

I would also like to point out that this course has been designed with professional and evidence based best practices in mind and with those things covered, we are ready to get started. The focus of this talk will be on sound quality and the new Omega AI product family, and I've organized the information I'll be sharing in the manner you see reflected here. We'll start with a conversation on artificial intelligence

and the unique features Starkey offers to promote and enhance performance and sound quality. While several hearing aid technology companies have integrated AI into their hearing aids in one or more ways, there are significant differences in scope, capabilities and efficiency. With Starkey leading the space.

I'll also spend some time looking at what I call a sound quality toolbox consisting of various features available through the Profit software and the My Starkey app to empower patients and professionals with control for managing optimized hearing.

One way to define sound quality is a perceptual reaction to the sound of a product that reflects the listener's reaction to how acceptable the sound of that product is.

The importance of sound quality for hearing aid satisfaction is significant. The Hearing Industries Association Marketrak 10 study focused on hearing aid satisfaction and confirmed that hearing aid performance and sound quality continue to be the primary contributors. So the ability of a device to be natural sounding, provide comfort for loud sounds, ability to minimize background noise and facilitate the ability to tell direction all of these things are very important and are the top drivers of hearing aid performance and sound. We also know from what patients tell us that these four considerations are indeed top of the list when it comes to satisfaction with amplification.

Starkey has been setting and defining the speed of innovation for years now. As we move from one generation of technology to another, we consistently deliver new dimensions of sound quality and performance to keep patients hearing and performing their best.

And we remain committed to creating new paths forward with our technology and customer service to meet not only the unique needs of patients but also those of professionals. And with that in mind, we recently so Intelligent it's Superhuman Omega AI is powered by the G3 neuroprocessor, which contains

the most advanced integrated circuit in any hearing aid today. With the industry's only neural processing unit fully integrated into the chip, it provides speed, power and signal processing capabilities that go far beyond better hearing performance, connectivity and reliability. With industry exclusive durability, the neural network of the G3 processor classifies complex soundscapes, enhances speech and reduces noise all in real time. With advanced and powerful AI automatically at work, there are two other strategies for integrating AI into hearing aid technology today, and I want to quickly describe them to illustrate how they differ from Starkey's integrated neural processing unit.

DNN uses the power of the existing processor. Without a dedicated unit for AI, this approach can limit capabilities and efficiency, and the other strategy that is used is one that includes a separate dedicated AI chip.

That separate chip is, as stated, separate from the main processor for the purposes of signal processing. The incoming signal is first sent to the main processor, then decisions are made on what to send to the AI chip. The DNN processor applies calculations and then has to send the signal back to the main processor to be reintegrated into the signal pathway before delivery to the ear. This approach tends to be power hungry and inefficient, leading to reduced battery performance, and it can increase the size of the circuit so Extensive capabilities, precision and battery life are what set Starkey technology apart.

We have been hard at work transforming hearing aids with the use of artificial intelligence to provide better hearing and to support overall health and wellness. And since 2018 and we have revolutionized the benefits AI brings to patients and professionals. Most recently with the Omega AI product family.

We use multiple forms of AI to drive intelligent solutions that elevate both patient care and provider success. Generally speaking, machine learning works by comparing similar items. DNN involves the use of multiple algorithms trained on different data sets working together to create unique rules or

applications. And generative AI is powerful enough to inform or generate novel ideas. So enhanced computation and decision making take place as we advance from machine learning to deep learning to generative AI to transform hearing and the hearing care experience.

Machine learning techniques are used to precisely identify different types of acoustic signals. Feature extraction and classification. Using a database trained on an enormous number of sounds and sound combinations enhances the precision of sound classification. Sound classification drives the bus. Signal processing and sound quality can only be optimal if signals are identified properly and then managed well.

Deep neural networks are a subset of machine learning and open the possibility of creating sophisticated algorithms with greater accuracy by creating a mesh of nodes and layers that can decode information after it has been extensively trained. Multiple layers allow for more complex analysis and decision making as every layer trains on a different set of features based on the previous layers output, providing an opportunity for the system to learn and relearn to achieve greater precision. The use of DNN and hearing aid signal processing provides several sound quality advantages for patients.

Here's an example of how the use of AI in signal processing makes a significant difference. This is a very complex acoustic scene. There are street musicians playing along with crowd noise, traffic noise and other sounds. Some people are listening to the music, some are having conversations with each other and some are simply taking it all in, trying to be aware of everything going on. In situations like this, we want to be able to characterize the acoustically complicated scene, not just simply label it and take the listener's intent into account to optimally adapt the hearing instrument settings.

Sophisticated automatic AI capabilities make that possible.

Over the years, Starkey has introduced a number of unique AI driven features leading to crisper, cleaner, more authentic sound with the ability to facilitate enhanced audibility, speech intelligibility and comfort. Voice AI allows the user's smartphone to help improve speech understanding. The Edge Mode plus feature automatically adapts sound adjustments to the listener's environment and listening intent. DNN Enhanced speech and Noise integrates DNN processing into the sound management system to clean the sound and better manage complex speech and noise environments for a faster and more accurate analysis and sound outcome. And DNN360 is exclusive to the new Omega AI product.

Family delivers the world's first DNN driven directionality system for enhanced hearing in every environment.

But the excitement doesn't stop there. Starkey has also introduced the use of Generative AI that doesn't just analyze existing information, it creates new content and solutions based on what it's learned. With Generative AI, new solutions and more personalized care can be generated in real time, resulting in better outcomes for the patients we serve. Two Genai features, TeleHere AI for patients and Starkey AI assist for professionals, lend themselves nicely to the sound quality conversation. Let's take a closer look at each of these AI driven features and the value they bring to the experience with amplification.

Voice AI allows the user's smartphone to work as a remote microphone to help improve speech understanding. It's exclusive to the 24 technology tier and is intended for patients who are binaurally fit with 50dB or greater hearing loss in the lower frequencies at 250 and 500Hz and who use an Apple smartphone. Voice AI will automatically populate in the My Hearing menu of the My Starkey app, directly accessible from the home screen when those criteria are met. There are two sound options with Voice AI. The regular option allows the tool to function similarly to the Live Listen feature, but without the low pass filter imposed by the Apple operating system.

The enhanced option adds the unique Voice AI algorithm developed by Starkey for a cleaner sound experience. To use Voice AI, the patient simply points their phone's microphone in the direction of the person they want to hear and taps the Play button to begin receiving audio. They can easily adjust the level of the phone and the hearing aid microphones at any time as well.

Edge Mode plus was created to provide listeners with alternative enhanced hearing aid settings in situations when they need more help with clarity or comfort. This DNN driven feature classifies the listening environment and applies specialized changes that can surpass what's available in hearing aid programs. Edge Mode plus uses the integrated neural processing unit for fast and efficient processing of the environment and uses AI to select the best settings based on the sound scene changes to the hearing aid response. Microphone mode and noise management algorithms can be provide next level assistance if and when needed, and then from there the user can further clarify their intent enhanced speech, reduce noise or leave the Edge Mode plus settings as is using the My Starkey app.

Research shows Edge Mode plus can improve word recognition and decrease listening effort and then also improve the signal to noise ratio by up to 13dB, which is truly remarkable.

There are two applications of edge mode plus depending on which technology level the patient is using. Traditional Edge Mode plus is available in the 20 and 16 technology tiers. When activated, an environmental analysis is initiated and a set of optimized settings for the environment are applied. The patient needs to turn the feature on and off to accommodate changes in the listening environment. Automatic Edge Mode plus, which is available in the 24 technology tier, will automatically rescan environments every several milliseconds and adapt the Edge Mode settings to accommodate changes in the environment for greater levels of convenience.

And the My Starkey app takes things one step further. It provides an opportunity to consider the user's intent for wanting more assistance if they're wearing the 24 or 20 level technology. Best sound reflects

the applied Edge Mode settings upon activation, and there through the app are then the added opportunities to elect enhanced speech or reduce noise.

Edge Mode plus empowers patients with the ability to access more advanced hearing aid settings when needed and can deliver greater adjustments than can be achieved through the My Starkey app or the Profit software Clinical Tip for Everyone we are seeing this feature replace the need for multiple hearing aid programs. So for example, instead of one restaurant program with a defined set of attributes, the patient can theoretically access 300/ different unique restaurant settings with edge mode plus. And there are three convenient ways to access this feature from the home screen of the My Starkey app through either the short press or double tap user controls on the hearing aids, or it can be programmed as the favorite button on the Starlink Edge remote control.

Last year we introduced the DNN Enhanced speech and Noise feature with the industry's first speech probability predictor that is 30% more accurate at identifying speech signals of interest in complex environments, including those consistent with multi talk or babble, a listening environment that had historically been very challenging for a hearing aid to manage. Well. We know background noise is reported as the number one problem for those with hearing loss and those wearing hearing aids, and by integrating deep learning into the main audio path, we can elevate noise reduction capabilities to even more quickly and accurately track and filter noise in between the pauses of speech on a channel by channel basis to enhance speech intelligibility. In fact, research shows the addition of DNN enhanced speech and noise provides greater noise reduction capabilities in various types of noise bar noise, road noise and even cafeterias, for example, when compared to technology that does not include it and when speech is added to the equation, listeners prefer it three to one.

And now, DNN360, the world's first DNN driven directionality system.

DNN360 builds on multi channel deep neural network to provide the appropriate directionality pattern for a variety of listening situations. Trained using a vast deep neural network data set, DNN360 predicts rather than estimates optimal microphone adaptation parameters, resulting in enhanced accuracy. Three key sources of input are fed into a central processing system that evaluates multiple factors simultaneously. Several important acoustic and environmental cues are analyzed, including the presence of speech, noise, wind and motion loudness information, signal to noise ratio, frequency band information, and user intent selection. All these data points are interconnected, allowing the hearing aid to dynamically interpret the listening environment.

Based on this intelligent analysis, the hearing aid again can predict where speech may be and select the most appropriate directional mode for the user. This degree of sophistication allows the hearing aid to provide permanent personalized optimized hearing performance by seamlessly adapting to the user's environment and intent in real time. So after that description, let's go ahead and see this in action in Fawn's Pottery Studio.

On the left hand side, you will see how the microphones are adapting it.

Hey, clays over there. Okay, great. Thank you. And your aprons hanging.

What are we making? I'm just going to see what the clay does. It's a little soft. So it's really soft. Yeah, it's very soft.

I don't know what I'm making. You don't need to just let it go.

Probably a cup usually. What happens.

So now let's break down how DNN360 works. When the hearing aid user is in a quiet environment and no background noise is present, the system will use a traditional omnidirectional microphone response to capture sound from all directions equally, providing a natural listening experience.

In situations where there is some source of noise in the environment but speech is not detected by the speech probability predictor, the system will default to enhancing environmental awareness by implementing the DNN spatial awareness mode. This is important for users who need to stay connected to the world around them. With no active conversation happening during these times, the DNN strategically applies omnidirectionality in the lower frequency bands for environmental awareness while maintaining directionality in the higher frequency bands to ensure speech cues will be audible if they occur.

If speech is detected, the system will automatically shift into DNN enhanced adaptive directionality to focus on a speaker for optimized communication and improved signal to noise ratio is achieved. With precision as DNN algorithms are trained again, as mentioned before, using a large data set of authentic acoustic scenarios to predict desired outcomes even if an exact data set has not been encountered before. Hence the functionality and beauty of DNN Then the fourth aspect of DNN360 is motion based optimization. It provides listeners with greater environmental awareness as soon as motion like running or walking is detected thanks to the onboard sensors in the hearing aids. When activated, low frequency channels will be in an omnidirectional microphone response with an additional 3dB of gain, and high frequency bands will be set to a fixed directional response to provide the best spatial hearing possible regardless of whether or not speech is present.

The value, in addition to better sound quality is enhanced safety and fewer wind artifacts.

DNN360 allows patients wearing Omega AI24 technology RICS with the ability to automatically and seamlessly transition from a conversation in front of them to someone calling their name from behind to

a bike ride on a city street and then back home to read a book, all without needing to touch the hearing aids. End users can look forward to improved speech intelligibility and a significant signal to noise ratio improvement over our legacy technology. Omega AI provided an improvement in speech intelligibility of up to 28% as tested using the Hearing and Noise test and up to an 8dB improvement in signal to noise ratio with target speech presented at 67dB from 135 degrees and food court noise played at 70dB from an eight speaker array. An acoustic scenario I think everyone would agree would be challenging is always on and ready with no limitations in use, time or impact on Starkey's industry leading battery life. It's truly remarkable and next level for patients brand new with our latest technology release is also the integration of Generative AI.

As I mentioned earlier, Genai is a subset of deep learning that doesn't just analyze existing information, it creates new content and solutions based on what it has learned to provide more personalized care. Telehere AI for patients and Starkey AI Assist for Professionals are two brand new tools that can be used to optimize sound quality. So let's take a closer look at each of these.

Starkey AI Assist is a new feature in the Profit software that provides access to a Generative AI assistant for easy access to a variety of resources. Professionals can ask questions about products, features, profit or even my Starkey. With this industry exclusive tool, it's fast and simple for getting information that is needed and this tool can be used by professionals to access guidance on programming adjustments to assist with sound quality and any number of other topics. In this example, I entered the phrase sound too tinny and the AI Assist tool generated a list of possible adjustments along with helpful resources.

You can find this feature in the Help menu of Profit in the top left corner of the screen.

Starkey is also delighted to introduce Telehere AI that is also powered by advanced generative AI technology. It offers patients wearing 24 tier technology 24.7support whenever they need it. This

intelligent assistant accurately diagnoses hearing related concerns and delivers personalized hearing aid adjustments tailored to individual needs and empowers patients to access simple automatic adjustments to address common issues that may not necessitate clinical intervention.

With this addition, Starkey's Telehere remote programming now offers three options. The Synchronous strategy provides the opportunity for a live virtual session between the patient and professional for real time programming and discussion. With asynchronous remote programming, a patient sends a help request through the My Starkey app and the professional can send one or more adjustments to try and implement if helpful, all at the convenience of the patient and professional. And now Telehere AI which offers personalized real time customization using AI all from within the My Starkey app.

To use this feature, the patient can type or speak their sound concern to the chat like interface. Within the My Starkey app which has been trained to identify common sound concerns, the Generative AI interface will interpret the reported issue and ask follow up questions to get further clarification on the sound concern. The patient will then be offered a new sound adjustment to try and compare to their original settings and it's important to know that the adjustments offered are based on expert assistant research input from our clinical research team as well as our audiology support database calls or Calls database I should say on common complaints and actions taken to resolve issues. If the new adjustment is helpful, the patient can make the selection and it will become their new default program. If not, the patient can go through a total of up to three adjustment trials.

If the issue is not resolved after three tries, the patient will be advised to submit an asynchronous help request to their provider for further assistance. The goal of Telehere AI is to improve patient satisfaction but also to save clinicians time. Research shows that Telehere AI achieves a 93% accuracy rate in understanding user inquiries and 84% of participants found it user friendly and helpful in managing their hearing related issues.

So now let's move away from the topic of AI and look at a few additional features available in the Profit software and the My Starkey app that provide a helpful sound quality toolbox for patients and professionals.

First, I want to talk about E stat 2.0. This is Starkey's proprietary fitting formula tailored to specifically work with the compression architecture in our hearing aids, and the talking points at the bottom of the slide illustrate ways we have enhanced this fitting formula over time as needed when signal processing, hearing aid design or even acoustic variables advance or change. These considerations are really important for delivering optimal sound quality from the initial fitting forward and are what differentiate estat 2.0 from generic fitting formulas that ability to grow and evolve to be consistent with the technology and the signal processing.

The additive compressor feature features or includes both a fast compressor and a slow compressor to provide unique benefits to the listener. Fast compressors generally provide better audibility for soft consonants because they react quickly to sudden input changes, and slow compressors are generally preferred for subjective sound quality, so they both have their own strengths and weaknesses as standalone compression systems, but utilizing both together allows us to take advantage of the strengths of each system and mitigate the weaknesses to maximize the potential for increased audibility, intelligibility and comfort.

With the introduction of Omega AI, Starkey is proud to introduce the next iteration of Optimize Acoustic Model. This feature provides improved target modeling within the PROFIT software, resulting in a more accurate visual representation of ear canal acoustics with the hearing aids on the ear. The end result is faster and more accurate fittings. Acoustic model 2.0 uses the feedback cancellation initialization process to create a predicted real ear model which accounts for individual ear acoustics to improve the first fit accuracy and it may help to reduce the number of adjustments needed when matching targets

with real ear measurements.

When the feedback canceller initialization is completed and sound leakage from the ear is measured, the originally predicted hearing aid gain and vent modeling generated by the first venture calculation are considered and now with improved modeling parameters including recd, REC and insertion depth correction so that PROFIT generates an even more accurate modeled representation of the real ear aided response. The value add is a more accurate best fit and a more personalized fitting.

Optimize acoustic model 2.0 strives to match the real ear display view within PROFIT to the real ear curve view you will see with real ear measurement systems as closely as possible. This feature does not replace real ear measurements, but by taking into account the unique ear canal acoustics of each patient and updating the modeling and profit, the fitting process is simplified and results in less fine tuning overall.

Another valuable tool that we'll talk in just a moment can be helpful during that initial fitting process as well. But before we go there, I do want to mention that upon running the feedback canceller initialization, the amount of leakage from the ear is measured and if there is enough leakage measured that will create a significant offset from the intended target for the patient, the optimized acoustic model 2.0 will pop up and ask you if you would like to target match or do not Target match Target matching will update the frequency response to the newly modeled targets. Do not target match will only update the frequency response to account for real ear insertion loss. I would suggest that 95% of the time selecting target match will be the way to go. We want to work with targets that are accurate and on point based on the individual's hearing loss, although or I would suggest also that the use of do not target match I've come up with two possibilities for that selection based on conversations with professionals and fellow colleagues.

One is that if the professional is intending to provide more or less gain than the targets are indicating, that would be an option or an opportunity to use do not Target match. Or if perhaps at the fitting the patient is pleased with the sound quality and performance with the hearing aids is good, but upon returning for follow up they still like the sound quality of the devices but are reporting that the dome in their ear is bothersome requiring a change. Anytime you change acoustic coupling you want to rerun the feedback cancellation initialization. But in that particular example we may not want a target match because the patient is pleased with the sound quality of the devices. So just a little conversation there around the two options that will present themselves if the optimized acoustic model pop up occurs.

And the other tool I wanted to mention and got ahead of myself with is this one Patient experience level. This feature is an acclimatization tool that can be engaged to automatically move a patient from a softer, potentially more comfortable initial fitting level up to target over a period of time designated by the professional, with the default setting being one month and the window of time can be extended or even shortened if necessary. Patient experience level can also be managed manually by the clinician by clicking on the number associated with an offset from target response. And just for reference at the first fit, hearing aids will default to an experience level of 3 to most closely align with target responses.

The Sound Manager Screen and Profit contains a number of features for managing audibility, comfort and sound quality. Environmental adaptation algorithms and microphone modes can all be adjusted on a per program basis. On this screen screen noise management features apply adaptive levels of noise reduction, often based on an analysis of the signal to noise ratio in each channel of the hearing aid. The default settings for each feature applied at the initial fitting are an excellent starting point for patients. They are determined based on subject performance and preference and I would suggest that you don't change anything here on this screen at the time of fitting, but rather use these tools at the time of follow up to remedy any difficulties the patient may be having.

So let's take a closer look at these features that you will find again on the sound manager screen.

Consonant brightness controls the fast compressor component of the additive compressor system to make certain parts of speed speech more audible, like soft consonants that are helpful for speech clarity at the time of follow up. Consonant brightness may be adjusted if a patient perceives and is unable to accept fluctuations in hearing aid volume that may occur, for example when a transient sound occurs in the presence of a steady state background noise. In that example, the fast compressor responds to the transient sound by quickly turning down the hearing aid gain and the patient notices it return to original levels following the transient event. Fast compressor gain adaptations may be particularly noticeable if there is a greater degree of hearing loss and more gain is being used, resulting in a wider range of perceptual loudness and some patients have even used the term pumping to describe this.

If volume fluctuations are reported, the patient should be counseled on what the hearing aid is doing. If they're unable to accept occasional gain adaptations, a different consonant brightness setting should be tried or the feature can be turned off if absolutely necessary. So turning that kind of pertains to turning or reducing the setting value for consonant brightness. If you have a patient who is reporting that consonant sounds are not crisp enough or audible easily, if audibility is reduced, then perhaps you want to enhance or increase the consonant brightness setting. Motion based optimization uses the power of the sensor technology embedded in the hearing aids to optimize sound quality and spatial awareness.

It defaults on in both the 24 and 20 technology tiers and as mentioned earlier, has been enhanced in Omega AI thanks to DNN360.

Motion based optimization can also minimize the impact of small movements on hearing aid placement, like when chewing or putting on hats, movements that may cause feedback to occur. If feedback is

detected, the hearing aids will automatically switch to the strong feedback canceller adaptation setting for as long as the motion is detected to reduce the risk of feedback and promote an optimal hearing experience as patients go about their day. This aspect of motion based optimization is exclusive to the 24 technology tier. Again, motion based optimization here you can see it on the screen in the profit software defaults on for both the 24 and 20 technology levels. However, if a patient notices and objects to the switching of directional modes or the changes in the feedback, cancel or adaptation settings, the feature can be turned off on the Sound Manager screen.

The Sound Manager Sound Enhancement Features include Binaural Speech and Loud Noise, Speech and Noise and Quiet Binaural Speech and Loud Noise is a fast acting binaural digital noise reduction feature designed to reduce interfering sounds from the sides of a listener and preserve interaural level differences that are important for localization. It works through audio exchange between the hearing aids and a binaural fit to look for coherence on both sides of the listener. If the signals are coherent, no extra assistance is provided if they are not. Speech and Loud Noise applies an adaptive amount of noise reduction to further assist in that environment. It's available in hearing aids with the NFMI radio and in the restaurant and crowd programs as the Monaural Speech in Noise feature we'll discuss next is fully capable of managing background noise on its own.

In the other programs, Speech and Noise delivers fast acting digital noise reduction that's fast enough and sophisticated enough to identify and reduce noise in between the pauses of speech. It's active 100% of the time and makes very fast decisions over a wide range of input levels. One of the benefits of digital noise reduction is not only improve speech intelligibility, but also reduce listening effort. And reduce listening effort means that a person doesn't need to concentrate as hard to understand speech that lead that you know can potentially lead to or play a role in reduced cognitive load which may result in less fatigue at the end of the day. So the various setting levels are displayed here on this slide and and as I advance through the setting levels, you can see the maximum amount of adaptation that will

be available to the listener when this feature engages.

The Quiet feature does a great job of managing soft sounds that fall below the WDRC knee point to keep them from becoming bothersome sounds like refrigerator hum, a dripping coughing pot, or maybe the turn signal in the cough. It combines expansion with low level digital noise reduction to ensure that soft environmental sounds remain soft and that hearing aids are quiet in quiet environments. So again, I'll advance through the different setting levels to show you the adaptation that is available. Situational sound management features include transients, wind and machine noise. The Transience feature is designed to address sharp sudden sounds like a door slamming that may be jarring to a listener.

It acts as a fast Compressor to quickly manage comfort. Wind is activated when there is turbulence across the hearing aid microphones that can have a negative impact on sound quality, especially when hearing aids are in a directional mode. When active wind noise adaptation reduces the gain in the first three three channels of the hearing aid, where wind energy dominates and forces the hearing aids into an omnidirectional microphone mode as well. And listeners can achieve up to 30 35dB of wind noise reduction in 24 technology tier devices. And then last but not least, machine noise adaptation.

This feature provides comfort for loud steady state noise like a blender or vacuum cleaner. All of the sound manager noise reduction features operate on an adaptive basis, meaning based on environmental analysis and the higher the setting, the more noise reduction there is available. Keep in mind that the default settings again are an excellent starting point for patients and you know these tools are excellent for use at the time of follow up to address any concerns or issues the patient may be having. The sound manager screen also allows professionals to manage hearing aid microphone behavior on a per program basis. There's the opportunity for an omnidirectional microphone response, a fixed directional response, a fixed hypercardioid microphone approach with primary sensitivity to the front of the patient.

We also have the dynamic directionality feature which will automatically move between an omnidirectional and fixed directional microphone response depending on the environment, and then adaptive directionality. Here we've got adaptive null steering with speech ID to reduce noise and protect speech from all angles around the patient. So continuous independent adaptation in all channels really does a wonderful job of addressing and managing the primary speech signal as well as the noise around a listener to help enhance conversations. So wonderful tools there and then again. The newest addition to enhanced Sound quality is DNN360, which I discussed earlier.

Again uses a vast deep neural network trained on a very large data set to predict optimal microphone adaptation parameters with greater accuracy. And this feature will automatically apply when the adaptive microphone configuration is in use in Omega AI 24 tier RIC styles to kind of round things out here or finish things up. I'd like to spend a few minutes talking about acoustic music and then also streaming. So we know that music is meaningful to many people for many reasons. It's linked to personal well being, social bonding and even emotional expression.

Music, if you dive into the research, plays a significant role in relaxation, encouragement, celebration and even determination. And while taste in music vary, the power music holds over people is universally understood. And I love this quote quote by Henry Wadsworth Longfellow. I think he aptly described music as the universal language of mankind.

Music and speech are very different signals. The average level of speech is softer than it is for music, and the intensity, frequency and temporal envelopes of music are more variable as well. Finally, music is not nearly as predictable as speech. Speech the ability for a hearing aid to effectively manage and optimize both signals takes something special and Starkey Technology provides that dedicated music program is available that uses a unique fitting rationale, compression optimized for music, and special controls for adjusting sound quality if needed. The unique fitting prescription that is used in this program

is specifically designed for music.

It applies shaped gain for quiet music and a linear response for loud music to provide the sound quality that is desired when listening to acoustic music signals. You can even give patients multiple music programs. For example, perhaps someone sings in their church choir, but they also enjoy listening to old classic rock records in the evenings. Both of those situations, you know, or scenarios could benefit from the signal processing provided by the dedicated music program, but personal listening preferences could be very different for each situation, requiring the need for different programming within each music program. The controls on the Quick Fit screen that you see here will display terminology consistent with how musicians and music love lovers tend to discuss sound quality.

So you'll see terms like bass mid treble and overall frequency for the controls that make it easy to provide adjustments if and or when needed. And if you need to go into the fine tuning screen, you will see more detailed frequency information while still under the bass mid treble categories for both soft and loud input levels. And while there are multiple directionality modes available in Starkey Hearing aids, an omnidirectional microphone response will be the default setting for the music program for that optimal sound quality, so that in combination with no noise reduction, unique compression and low feedback sensitivity, all of these things together allow the incoming audio signal to maintain the integrity of the music. And then Our last topic for today is Streaming.

Patients demand a best in class streaming experience and Starkey's dedicated streaming configuration provides separate targets for streaming based on the patient's audiogram and acoustic options. These streaming options can be adjusted by the hearing care professional in the Profit software independent of other programs. Patients also have the ability to further customize their streamed input using the My Starkey app in the Profit software, professionals can manage the stream signal on the audio streaming screen found on the fly out menu. Quick Fit and fine tuning controls are available here, as well as

Stream Target Match, which provides the ability to reset the streaming configuration back to the targets that were generated originally based on the patient's again audiogram and acoustic coupling. The audio streaming screen also offers the ability to make adjustments to the streaming configuration during a live stream.

This can be done using the Demo mode feature found in the bottom left corner. The patient simply starts streaming from a compatible device. Maybe it's their phone or the Starlink Edge TV streamer and the professional can then make fine tuning adjustments for patients to experience in real time. So let's see this in action. I plugged in the video here.

So the professional clicks on the Start Demo button. The patient begins streaming from their device. Once streaming begins, a green bar runs underneath the fitting graphs indicating that the stream is active and then from there adjustments can be made to the stream signal based on what the patient reports. The stream can also be muted in order to talk with the patient when needed. So the ability to fine tune an active stream signal is really a game changer for personalization and convenience because the professional doesn't need to exit the software for the patient to try the new settings and potentially re enter the software to make additional adjustments.

So that will really be a wonderful tool that will come in handy. Handy for Streaming Patients are also empowered to manage stream signals in several ways. When using the My Starkey app, the streaming audio screen replaces the home screen whenever there is an active stream stream occurring. That could be a phone call, music or even an accessory stream. And this screen has recently been enhanced to include volume controls for the stream signal and the hearing aid microphones whenever streaming is active so patients can easily manage what they're hearing at any time.

There's the Adjust Sound button that's available on the My Starkey app on the home screen there. When that is selected, it can be used to adjust the bass, mid and treble regions of the streaming

frequency response during an active stream and then as a side note, Adjust sound can also be used to manage the sound quality of hearing aid programs that are provided to the patient. And that feature can be used independently or in combination with available offsets that can be applied by the patient through the My Starkey app or through the Profit software by the professional. And those include Bass Boost, Treble Boost, and Overall Boost.

So that concludes our discussion today on sound quality in Omega AI hearing aids. I hope you've enjoyed learning about the incredible array of tools for optimizing and personalizing sound quality and performance. Omega AI really is the most innovative and capable technology available today, and Starkey will remain committed to redefining what's possible for better hearing as we continue to move forward. So if you are brand new to Starkey. Welcome.

If you have experience with our custom technology, I'd like to invite you to try our RICs and vice versa. If you know us for Ricks, please do try our custom styles. I know you and your patients will not be disappointed. We have a number of helpful resources available for you@starkeypro.com feature summaries and white papers that go into more details on the topics I have talked about today. In addition, please be sure to check out the quick tips written by the education and training team to support you and your patients.

And you can also reach out to your sales representatives for more information. They would be happy to assist you with anything you may need. And with that, I would like to thank everyone for joining me today. I really appreciate your time and attention.