TECHNICAL ARTICLE

Hearing is believing: The unsuspected key to smart glasses innovation

Written by Gunar Lorenz, Technical Marketing Sensors; Falk Herm, Partnerships Management; Daniel Wiswesser, Product Management MEMS microphones, Infineon Technologies



Abstract

The MEMS microphone industry has undergone transformative growth in the last two decades, becoming a crucial enabler of modern audio technology. The release of Apple's iPhone in 2007 and the introduction of the AirPods Pro in 2019 (true wireless stereo earbuds with active noise cancellation) were pivotal turning points where MEMS microphones played a key application enabling role. These technological innovations not only underscored the capabilities of MEMS microphones but also propelled the industry into incredible new opportunities.

Fast forward to 2025, and the global total addressable market (TAM) for MEMS microphones in smartphones alone has reached a staggering 3 billion units per year, according to estimations. Hot on its heels, the TAMs for MEMS microphones in TWS (true wireless stereo) devices stand at 1.7 billion annually. Remarkably, it has taken just five years for the TWS market to develop into a category that now accounts for more than 50% compared to the smartphone MEMS microphone market. This rapid growth underscores the sheer adaptability and scalability of MEMS microphone technology, positioning it at the heart of innovative consumer electronics.

So, where does the industry go from here? The relentless search for the "next big thing" is always on, and many are betting that the next wave of MEMS microphone demand could come from a product category poised to reshape the tech landscape: ***Smart glasses.***

Table of contents

Smart glasses: The eyes, ears, and voice of personal AI assistants 2
What will define the winners in smart glasses audio design? 3
The perfect microphone for smart glasses: XENSIV™ IM65D130M MEMS microphone 3
The next chapter of MEMS innovation: Infineon XENSIV™ vibration sensors 4
Hardware is half the equation; algorithms complete smart-glasses audio design 4
Conclusion 6
References 6

Smart glasses: The eyes, ears, and voice of personal AI assistants

Smart glasses have the potential to ignite another massive boost in MEMS microphone adoption. While still a nascent market, smart glasses and augmented reality (AR) glasses are rapidly gaining traction, with companies like Meta and Xiaomi leading the charge. Silicon Valley visionaries, including tech leaders at Microsoft, Google, and Meta, believe that voice interaction will fundamentally transform how we engage with AI technologies. This shift in user interaction aligns perfectly with the rise of smart glasses as a natural interface for AI-driven experiences.

But why do MEMS microphones play such a crucial role in smart glasses becoming our everyday personal AI assistant in the future? Voice is the natural human-device-interface for smart glasses and other wearables because it enables hands-free, eyes-up control in devices where screens are non-existent or very tiny and touch is awkward or unsafe. Speaking is faster than tapping through menus and keeps your attention on the world—ideal for walking, working, or learning. It's also more inclusive and hygienic, working even with gloves, wet hands, or limited dexterity. Compared to touch, voice simply fits these devices: immediate, natural, and safer without diverting your eyes, hands, or attention.

In this equation, MEMS microphones represent the key interface between the user and the personal AI assistant in the smart glasses, positioned as close as possible to the user's mouth and ears. A clear example can already be observed in today's products: Meta's latest models, for instance, come equipped with an impressive array of five MEMS microphones per device [1].

This technological advancement improves 360° sound capture for video recording, enables instant translation, enhances noise suppression capabilities, and elevates user experience in complex acoustic conditions. Beyond convenience, new features such as conversation focus provide valuable support to individuals with mild hearing loss – or just add a handy boost in loud environments.

As innovations like these glasses gain adoption, they are already translating into measurable market demand. Even in 2025, the inclusion of MEMS microphones in smart glasses and AR glasses is already creating a TAM of more than 60 million units annually. But this is just the beginning. If these glasses evolve into a truly mainstream product category, what many are already foreseeing today, TAM projections suggest that within five years, the market for MEMS microphones in smart glasses could exceed 1 billion units annually.

The glasses have the potential to serve as "eyes and ears" not only for personal AI assistants but also for countless exciting use cases, from immersive AR experiences to next-level audio capture.

As the smart glass market becomes increasingly crowded with new entrants, differentiation will become a significant challenge for manufacturers. Undoubtedly, visual overlay and data display capabilities will be a key differentiator for many companies, enabling users to access information and interactive content in a unique and immersive way. However, it remains to be seen whether visual overlay will be a crucial factor in determining commercial success, given the additional size and battery life constraints it entails. Despite this uncertainty, one thing is clear: Audio will play a vital role as the primary interface for AI interactions in smart glasses. With voice commands and audio feedback becoming increasingly important, the quality of audio performance will be a major differentiator between top brands and the rest. To stand out in a crowded market, smart glass manufacturers will need to offer exceptional audio performance,

leveraging advanced technologies like MEMS microphones to deliver clear, reliable, and high-quality sound. By prioritizing audio quality, companies can create a seamless and intuitive user experience that sets their products apart from the competition.

What will define the winners in smart glasses audio design?

Several key factors will play a crucial role in determining the success of smart glasses audio design, including:

- **Miniaturization**: Style dictates size. Unlike smartphones or TWS earbuds, smart glasses must remain light and stylish, often indistinguishable from traditional eyewear. Achieving this means reducing the width, height, and overall footprint of every component, including MEMS microphones, without compromising on performance

- **Power efficiency**: With limited room for batteries, energy efficiency becomes paramount. MEMS microphones need to deliver exceptional performance while consuming the minimum possible energy, making every milliwatt count

- **Directional audio capture**: Ensuring accurate audio capture in different environments is essential, especially for applications like hands-free communication or AI assistants. MEMS microphones must integrate seamlessly with advanced beamforming and noise-canceling algorithms for intelligent, focused audio processing

- **Durability**: Much like smartphones, glasses face wear-and-tear from exposure to the elements. Robust MEMS microphone designs are needed: resistant to water, dust, and shock, ensure long-lasting performance

- **Advanced audio capturing and processing**: Smart glasses are worn outside in harsh conditions, for example in noise surroundings or during sports in windy conditions. The glasses need to be able to capture the user's input while blocking unwanted audio signals from the environment.

These demanding requirements reveal a critical gap in the current audio solutions. Current sensors on the market might meet some of the above stringent requirements, but not all of them at once. This is precisely where Infineon's system offering of miniature high performance MEMS microphones, the Infineon Vibration sensor (IVS) and advanced signal processing by Infineon partners such as Alango Technologies become a game-changer for the entire smart glasses market.

The perfect microphone for smart glasses: XENSIV™ IM65D130M MEMS microphone

In Q3 2026, Infineon will launch the XENSIV™ IM65D130M, one of the world's smallest digital microphones featuring standard performance and record-low power consumption. Its compact
2.75 × 1.85 × 0.8 mm^3 form factor makes it ideal for smart glasses and AI-powered accessories.

The XENSIV™ IM65D130M delivers a 65 dB(A) SNR—comparable to leading mobile phones—and consumes just 250 µWin always-on low power mode, helping extend battery life. With an AOP of 130 dB SPL, it handles loud environments without distortion, making it suitable for applications like concert recording.

With its small size, its high performance, its low power consumption and its high robustness with an ingress protection level of IP57, the XENSIV™ IM65D130M becomes the perfect microphone for the challenging requirements that come with smart glasses. Samples are already available through the Infineon support.

The next chapter of MEMS innovation: Infineon XENSIV™ vibration sensors

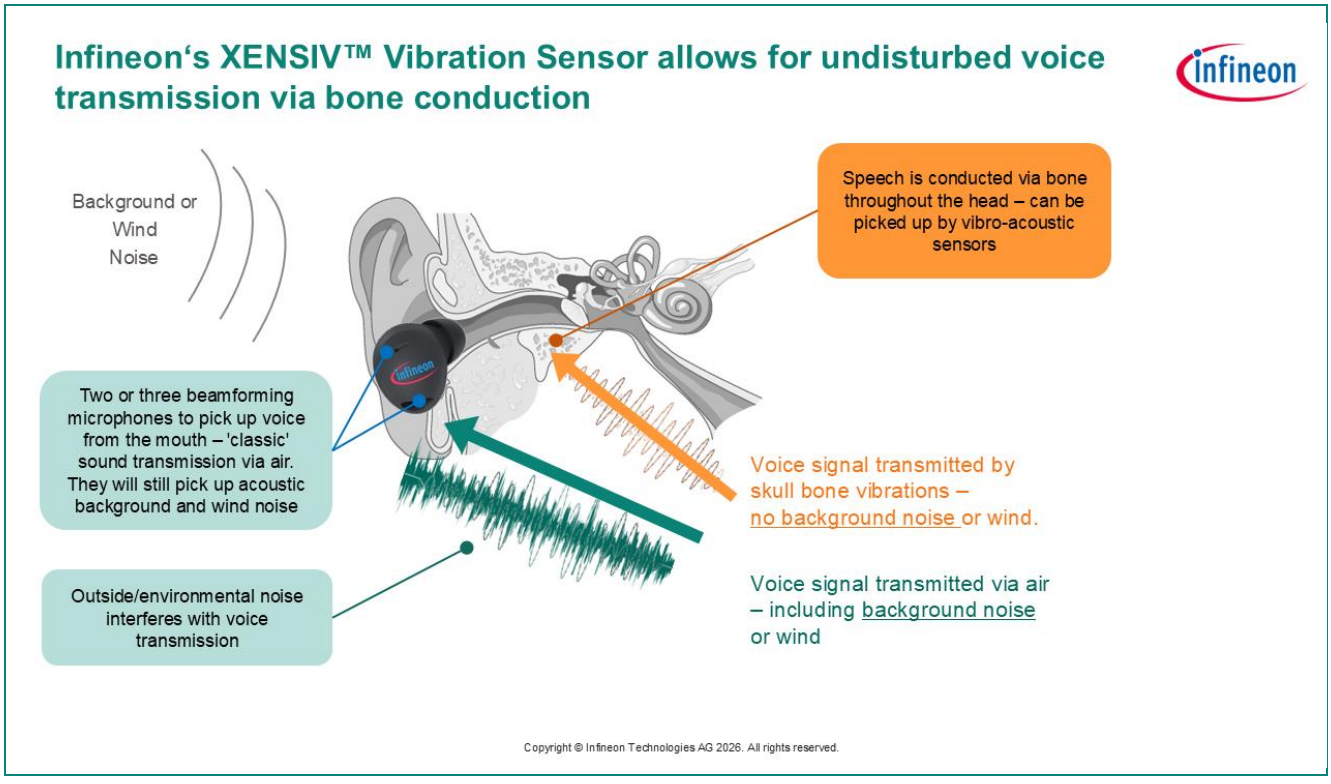
While MEMS microphones have powered voice technology for years, the next leap is already here: Infineon's XENSIV™ vibration sensor (IVS) [3]. Unlike traditional microphones that capture sound waves through air, IVS detects vibrations directly from the vocal cords, enabling clear communication even in the noisiest environments. However, the concept is not new.

Bone conduction microphones were used as far back as the Apollo missions [3], but earlier designs suffered from poor sound quality, often muffled and lacking high frequencies.

Infineon aims to solve these drawbacks with the novel XENSIV™ vibration sensor IVS. With a small form factor and unprecedented levels of SNR, the IVS will enable high quality audio pick up via bone conduction. Even in high performance mode the IVS will not consume more than 250 µW, which means glasses that are not only smart but also last longer between charges. As the IVS does not require an external sound port, it allows smart glasses manufacturers to design dust- and water-proof audio pick-up solutions.

A microcontroller converts vibration data from the IVS into natural-sounding audio that rivals conventional microphones, while preserving the key advantage of bone conduction: ***Undistorted conversations in challenging acoustic conditions.***

Like the XENSIV™ IM65D130M, samples of the novel XENSIV™ vibration sensor IVS are also available on request.



Hardware is half the equation; algorithms complete smart-glasses audio design

Combining the XENSIV™ IM65D130M and the XENSIV™ vibration sensor IVS with AI-based signal processing is the key step for mastering all the challenges of audio capturing and allowing for speech and audio to become the main interface from the user to his / her everyday AI assistant.

Audio processing in smart glasses requires hardware support for both signal capture and compute. Infineon's MEMS microphones and vibration sensors provide clean inputs within tight size and power constraints, and PSOC™ Edge microcontroller supplies the on-device processing capacity needed for real-time workloads. What differentiates the experience is the algorithmic layer that shapes the final output.

Infineon's partners, **such as** Alango Technologies, are at the forefront of this innovation with advanced algorithms for superior audio experiences.



Alango Technologies brings **advanced signal processing** to smart glasses, **delivering hearing enhancement, crystal-clear user voice pickup, and far-field speech capture**. Hearing enhancement uses acoustic beamforming to amplify the speech of a person in front of the user while suppressing ambient noise with Alango's proprietary zero-latency, neural network-based noise reduction, improving in-person communication in noisy environments. Amplification of the user's own voice is reduced by using the signal from the bone conduction sensor. Crystal-clear user speech pickup ensures high-quality phone calls, reliable voice control, and effective communication with AI assistants. The output signal dynamically combines downward acoustic beamforming and bone-conducted speech enhanced by AI noise reduction. Far-field speech capture enables applications such as real-time translation and transcription, where the bone conduction sensor distinguishes between far-field speech and the user's voice. The result for the end user is enhanced situational awareness, improved communication, and a more natural conversational experience.

In addition, Infineon partners advance audio signal enhancement with **AI-based voice recreation and reconstruction**. Integrated with Infineon XENSIV™ vibration sensor (IVS), it captures speech as bone-conducted vibrations rather than airborne sound, so that surrounding noise such as wind is not recorded and does not require cancellation. The lower-fidelity raw vibration signal is then significantly enhanced by reconstruction algorithms to produce clear, natural audio. For smart glasses, this enables more accurate voice commands, clearer voice calls in noisy environments, and real-time audio translation. Technically, machine-learning models trained on vast audio datasets learn the patterns and characteristics of high-quality speech and reconstruct missing or distorted components to deliver a more intelligible output.

The powerful synergy between Infineon's hardware and the advanced algorithms from Alango Technologies and other partners stems from their algorithms' ability to fully leverage Infineon's products. As a result, users of the smart glasses benefit from:

- **Improved speech recognition:** Clean, high SNR inputs enable accurate detection of words and phrases, even in noisy conditions
- **Enhanced audio quality:** The joint solution produces natural, detailed audio with minimal artifacts

All this is achieved while taking advantage of Infineon's low power consumption, which extends the battery life of wearable devices. The hardware minimizes energy usage, enabling algorithms to operate longer without rapidly depleting the battery.

Conclusion

As smart glasses audio evolves with machine learning, AR and AI integration, and advances in MEMS microphones, one truth is unmistakably clear: Hearing is believing and whoever gets the audio right, wins the customers.

Infineon's hardware offering as well as its partnerships such as with Alango Technologies sets a new benchmark for what "**getting audio right**" truly means. Together, this ecosystem combines precision MEMS microphones, vibration sensors, and high-performance MCUs with advanced algorithms that transform raw acoustic input into natural voice interaction, crystal-clear communication, and seamless AI-assisted functionality.

In a nutshell, the future of smart glasses will be defined by **best-in-class hardware**, **advanced algorithms**, and **strong ecosystem partnerships**.

References

[1] Meta: AI glasses for effortless connection; Available online

[2] Infineon Technologies AG: XENSIV™ vibration sensing technology; Available online

[3] Cavanaugh, Bridget. "Bone Conduction Headphone Research and Testing for xEMU Communications Applications." *53rd International Conference on Environmental Systems (ICES)*. No. ICES-2024-209. International Conference on Environmental Systems, 2024: Available online

Published by
Infineon Technologies AG
Am Campeon 1-15, 85579 Neubiberg
Germany

© 2026 Infineon Technologies AG.
All rights reserved.

Public
Originally published on eetimes.com

Version: V1.0_EN
Date: 04/2026

Stay connected!

Scan QR code and explore offering
www.infineon.com

Please note!
This Document is for information purposes only and any information given herein shall in no event be regarded as a warranty, guarantee or description of any functionality, conditions and/or quality of our products or any suitability for a particular purpose. With regard to the technical specifications of our products, we kindly ask you to refer to the relevant product data sheets provided by us. Our customers and their technical departments are required to evaluate the suitability of our products for the intended application.

We reserve the right to change this document and/or the information given herein at any time.

Additional information
For further information on technologies, our products, the application of our products, delivery terms and conditions and/or prices, please contact your nearest Infineon Technologies office (www.infineon.com).

Warnings
Due to technical requirements, our products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by us in a written document signed by authorized representatives of Infineon Technologies, our products may not be used in any life-endangering applications, including but not limited to medical, nuclear, military, life-critical or any other applications where a failure of the product or any consequences of the use thereof can result in personal injury.