AURACAST™ BROADCAST AUDIO RETROFIT SOLUTIONS AND OPPORTUNITIES

ABIresearch THE TECH INTELLIGENCE EXPERTS™ Bluetooth®

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CONTENTS

INTRODUCTION

Bluetooth® LE Audio (LE Audio) is set to transform the way people experience audio in public spaces, changing the consumer audio and assistive listening landscape. In addition to enabling significant reductions in power consumption, lower latency, and higher audio quality, LE Audio will also lead to greater standardization of audio capabilities, enabling market categories such as true-wireless headsets and hearing aids to further flourish, while enabling new Bluetooth® chipset vendors to take advantage of these growing audio market segments. Meanwhile, the broadcast capabilities of LE Audio technology, known as Auracast™ broadcast audio, will help enable innovative audio usage scenarios and new product categories. This will include personal audio sharing, the ability for a source device such as a laptop, tablet, or television (TV) to broadcast to an unlimited number of headsets or other receivers, and use cases within public venues, driving new ways of interacting with audio within a wide range of establishments. In the longer term, this will lead to millions of public venues supporting Auracast™ broadcast audio technology across both augmented listening and assistive listening use cases, enabling scenarios such as cinema goers to be able to listen to a movie, travelers to better hear public announcements, gym and sports bar visitors to unmute silent TVs, or museum goers to receive guided tours using their own listening devices. This will enable a whole new wave of opportunities for LE Audio within public spaces and create new and innovative consumer audio and assistive listening applications within a wide range of device types.

Opportunities for Auracast™ broadcast audio are enormous, with the technology envisioned to be leveraged within several use cases across a wide number of public venues. This could include audio systems within conference and lecture halls, theaters and cinemas, and places of worship, Public Address (PA) and alert systems in airports and transportation hubs, and eventually, one-to-one countertop deployments within retail and other service environments.

Thanks to the numerous benefits of Auracast™ broadcast audio transmitter solutions, including simple deployment, the ability to provide consistent, high-quality, direct-to-ear stereo audio to compatible audio devices, low infrastructure costs, interoperability, and strong backing from the consumer audio and assistive hearing ecosystem, Auracast™ broadcast audio has the potential to significantly build upon and complement existing assistive listening solutions, expanding access to new venues and regions that currently have limited or no assistive listening infrastructure. At the same time, it will enable new audio experiences for users with or without hearing loss, further compounding the benefits of Auracast™ broadcast audio deployments and providing additional incentive for the accelerated rollout in many venues.

GROWING MOMENTUM FOR LE AUDIO AND AURACAST™ BROADCAST AUDIO

Since the complete suite of LE Audio specifications was made available in July 2022, momentum for LE Audio and Auracast™ broadcast audio solutions has continued to grow. According to the bluetooth.com website, numerous products have undergone or are in the process of undergoing Bluetooth SIG qualification that support LE Audio, including chipsets, modules, smartphones, Personal Computers (PCs), tablets, headsets and earbuds, TVs, speakers, hearing aids, and transmitter and receiver devices.

Propelling the LE Audio and Auracast™ broadcast audio ecosystem forward is a large selection of chipsets from leading vendors such as Qualcomm, Broadcom, MediaTek, Airoha, Nordic Semiconductor, NXP, Realtek, Telink, and Bestechnic, among others.

Meanwhile, key vendors in the hearing aid space have announced their support for LE Audio and Auracast™ broadcast audio technology. In September 2023, GN Hearing announced support within its ReSound Nexia™ hearing aids and its TV-Streamer+ device, while in November 2022, Cochlear Limited announced that it received U.S. Food and Drug Administration (FDA) approval for its Cochlear™ Nucleus® 8 Sound Processor, the world's first cochlear implant sound processor ready to support for LE Audio and Auracast™ broadcast audio. At the same time, while this report is being written, many existing Bluetooth® audio devices are now receiving firmware updates to support LE Audio and Auracast™ broadcast audio capabilities, further expanding the ecosystem, while many others have the potential to be upgraded to support this functionality. This

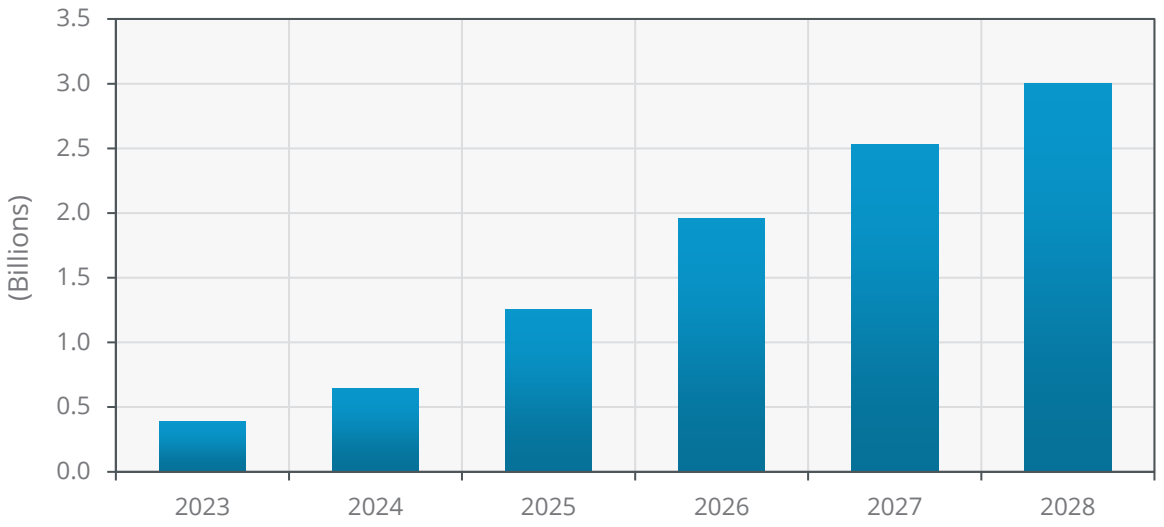
includes headsets and true-wireless earbuds such as the Samsung Galaxy Buds2 Pro. Others have planned product introductions that will be announced after the publication of this document.

There are also a growing number of source devices such as smartphones, tablets, PCs, notebooks, and TVs that support LE Audio and Auracast™ broadcast audio technology. While it will take some time for the entire market to transition to supporting Auracast™ broadcast audio, both from a hardware and a software perspective, encouraging signs for adoption include LE Audio support in Android 13, support within Samsung's Galaxy S23 and Fold series via its One UI 6 (and higher) update, and recent announcements that Windows 11 will add support for LE Audio and Auracast™ broadcast audio. This will enable direct connectivity with hearing aids and other LE Audio receiver devices. Smart TVs, including the 2023 Samsung Neo QLED 8K and MICRO LED series have received software updates to support Auracast™ broadcast audio. Combined, these developments point toward an accelerating ecosystem of LE Audio and Auracast™ broadcast audio-capable solutions that can support the technology at launch or retroactively via software updates.

As Chart 1 demonstrates, ABI Research forecasts that by 2028, annual shipments of LE Audio-enabled devices are expected to reach approximately 3 billion, growing from 391 million in 2023. The vast majority of these will come from source devices such as smartphones, PCs, tablets, TVs, and smartwatches, and receiver devices such as headsets, true-wireless earbuds, hearing aids and Over-the-Counter (OTC) hearing aids, and speakers. Please visit bluetooth.com for the latest introductions and announcements.

Chart 1: Annual Bluetooth® LE Audio-Enabled Device Shipments, World Markets: 2023 to 2028

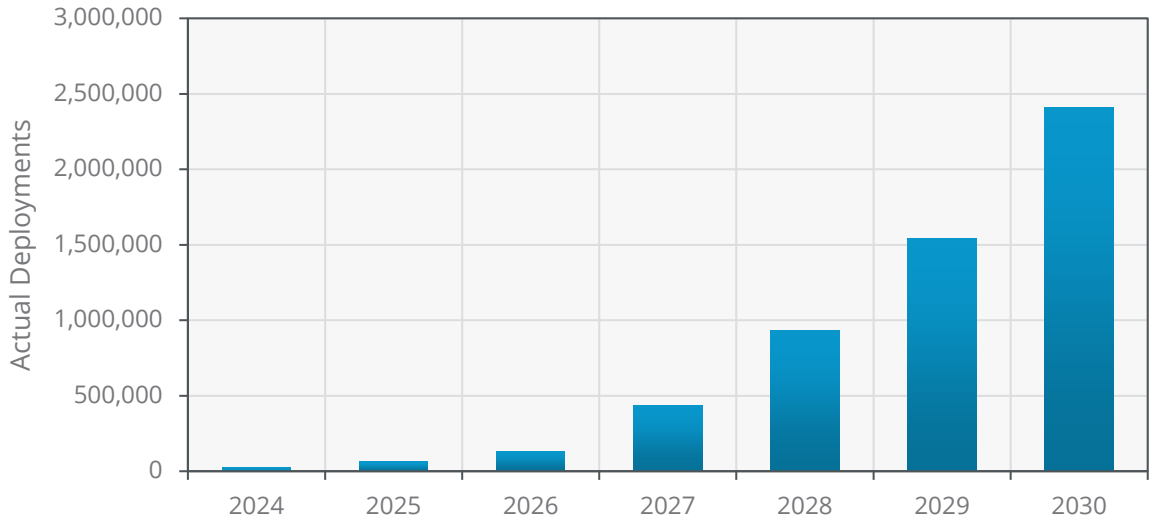
(Source: ABI Research)



As Chart 2 demonstrates, this growing ecosystem will incentivize millions of venues to deploy Auracast™ broadcast audio technology over the next few years, with public venue adoption expected to accelerate in the second half of this decade due to wider availability and awareness of Auracast™ broadcast audio solutions, alongside a critical mass of Auracast™ broadcast audio-capable receiver devices being adopted by end users.

Chart 2: Total Auracast™ Broadcast Audio Deployments, World Markets: 2024 to 2030

(Source: ABI Research)



THE OPPORTUNITY FOR RETROFIT AURACAST™ BROADCAST AUDIO IN PUBLIC VENUES

Given this relatively rapid adoption of LE Audio and Auracast™ broadcast audio-capable receiver devices, including true wireless earbuds, headsets, hearing aids, and cochlear implants, there is a new emerging opportunity for Bluetooth® solution providers to develop retrofit Auracast™ broadcast audio solutions for public venues that can be simple to install, take advantage of low-cost transmitter devices, and enable a valuable combination of new audio experiences and improved listening for both the hearing impaired and the wider users of Bluetooth® audio technology. These solutions can help bridge the gap between this early adoption period and the time in which it will take to develop and deploy dedicated, fully integrated Auracast™ broadcast audio equipment such as AV systems, PA systems, and specialized assistive listening infrastructure. These retrofit solutions can enhance audio for both hearing aid users and the broader Bluetooth® user base, expediting deployments across a wide range of public venues and enabling a sizable new opportunity for Bluetooth® solution providers to capture before the market transition to embedded solutions is completed. Figure 1 shows how these different types of retrofit Auracast™ broadcast audio hardware can help address this multitude of applications.

Figure 1: Auracast™ Broadcast Audio Hardware Options for Retrofit

(Source: Bluetooth SIG)

In its most basic form, wherever there is a power source and an audio source that can be connected, a retrofit Auracast™ broadcast audio transmitter, adapter, or dongle can be deployed to enable any one of the following Auracast™ broadcast audio use cases identified by the Bluetooth SIG:

- **Augmented Listening in Public Spaces:** Venues that deploy PA systems such as airports, cinemas, lecture halls, conference centers, places of worship, and more can provide a better audio experience by enabling visitors to receive the PA audio directly into their own Auracast™ broadcast audio headset or hearing device. When used in this manner, Auracast™ broadcast audio will function as a high-quality, low-cost, next-generation Assistive Listening System (ALS), improving the audio experience for visitors with and without hearing loss. Retrofit transmitters, adapters, and dongles that can be fitted to legacy sound systems, speakers, microphones, personal audio devices, and other installed equipment could enable these experiences without the need to wait for fully integrated Auracast™ broadcast audio solutions to be developed, as well as the additional time it may take for the existing systems to be upgraded.

- **Silent TV Screens:** Venues that provide silent TV screens such as airports, gymnasiums, hotels, restaurants, and waiting rooms can offer a more satisfying watching experience by providing access to the program's audio for people using their own Auracast™ broadcast audio-enabled headsets or hearing devices. Retrofit

High-Definition Multimedia Interface (HDMI), Universal Serial Bus (USB), or auxiliary dongles that can be connected to TVs already deployed in these venues could be a low-cost alternative to purchasing a new TV with embedded Auracast™ broadcast audio support.

- **Multi-Language Support:** Venues that support simultaneous interpretation services such as conference and meeting centers, or alternative language programming for video programming can provide a more engaging audio experience and let participants use their own Auracast™ broadcast audio headsets or hearing devices to receive audio in their desired language. Retrofit transmitters equipped with existing audio systems have the ability to broadcast multiple simultaneous streams, potentially enabling synchronized multi-language content in places like conference venues, cinemas, airports, and railway stations.

- **Tour Systems:** Venues that provide guided group tours such as museums, convention centers, and tourist attractions can create a more compelling tour experience by enabling visitors to use their own Auracast™ broadcast audio-enabled headsets or hearing devices when participating in the tour. Retrofit solutions could potentially be designed to integrate with already existing tour guide systems, or enable venues to use personal audio devices such as smartphones as tour systems, which can be easily retrofitted with an Auracast™ broadcast audio dongle.

Figure 2 shows what ABI Research expects to be some of the typical deployment scenarios for retrofit Auracast™ broadcast audio solutions.

Figure 2: Potential Retrofit Auracast™ Broadcast Audio Deployment Environments

(Source: ABI Research)

Within these environments, Auracast™ broadcast audio transmitters, adapters, and dongles can be simply connected to a wide range of existing audio sources, including:

- TVs deployed in airports, bars, gymnasiums, hotels, and other public venues
- PA systems across a wide range of environments, including transportation hubs, education campuses, and healthcare facilities
- Lecture hall and classroom communication systems
- Place of worship communication systems
- Conference room speakers in offices, hotels, smart buildings, and convention centers
- Audio mixers and racks in theaters, cinemas, and other public entertainment venues
- Stadium audio systems
- Tour guide systems within museums, galleries, and other tourist attractions

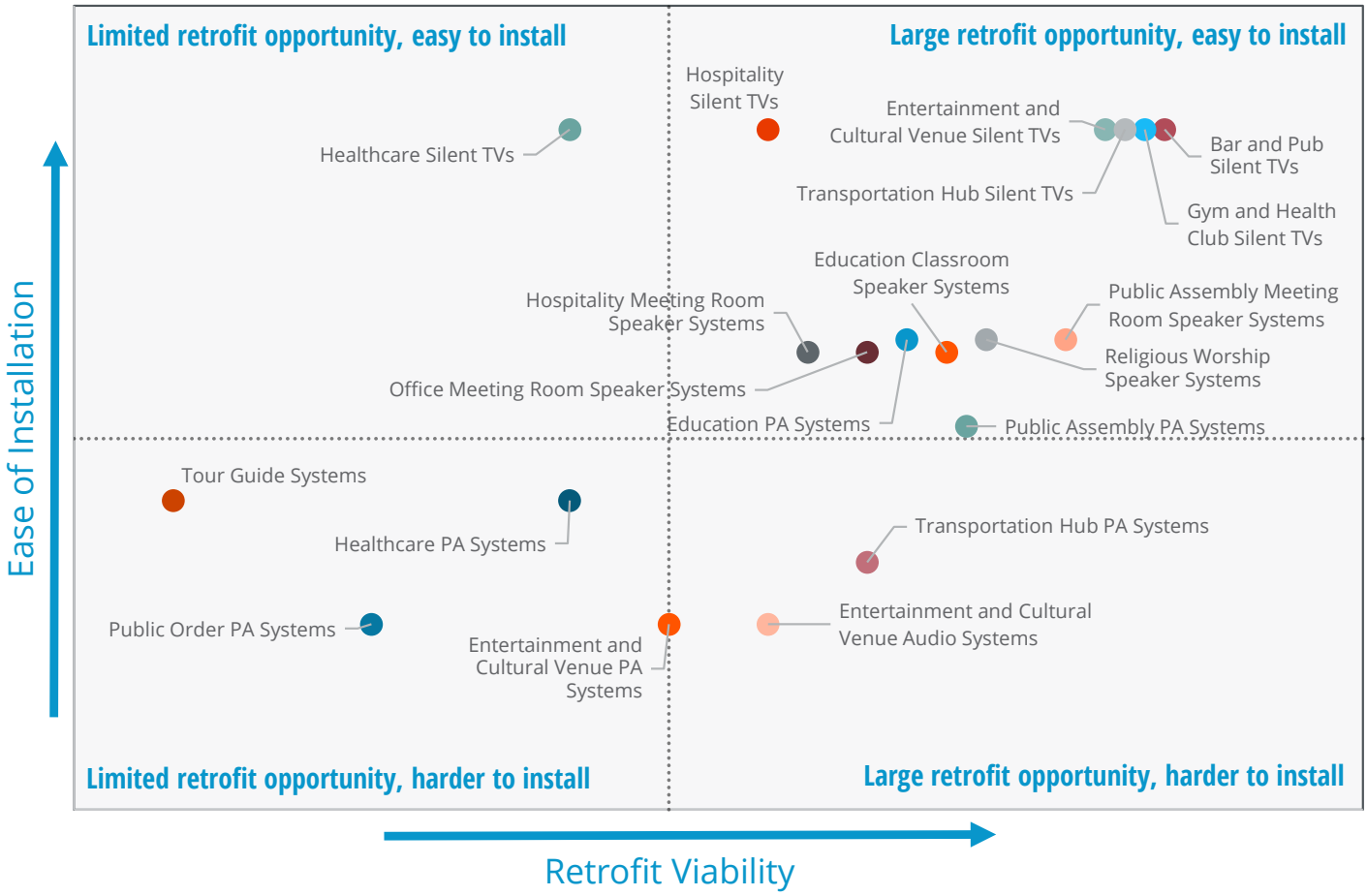
Auracast™ broadcast audio technology is expected to be embedded in both public venue-deployed source devices (e.g. TVs), dedicated assistive listening equipment, or as part of the product offering for professional Audio-Visual (AV) solution providers over time. However, given the large number of venues and audio sources already deployed globally, this will create a sizable potential retrofit market opportunity for Auracast™ broadcast audio technology. These retrofit solutions will also help raise awareness of Auracast™ broadcast audio technology and enable benefits for both assistive listening use cases and wider consumer augmented listening experiences. Combined, these will help incentivize investment in Auracast™ broadcast audio technology, educate consumers and venues on the benefits, accelerate the development of dedicated hardware solutions, and drive further adoption in both mainstream source and receiver devices.

RETROFIT OPPORTUNITY BY MARKET SEGMENTS

Figure 3 maps the various retrofit Auracast™ broadcast audio opportunities in terms of viability and ease of installation. Some retrofit use cases will be easier to deploy and require less complexity. One of the more obvious larger-scale and easy to deploy Auracast™ broadcast audio deployments will be silent TV applications across a range of venues, including bars and pubs, transportation hubs, gyms, and others. Following closely behind this will be retrofit solutions that require slightly more complexity such as integrating into existing speaker systems, audio mixers, and PA systems. These may require additional configuration depending on the size of the room and deployment environment. Beyond this are larger-scale venues, including transportation hubs, stadiums, and healthcare PA systems, which could require multiple transmitters to cover a facility and are more difficult to physically install in the existing audio sources.

Figure 3: Retrofit Auracast™ Broadcast Audio Opportunity by Viability and Ease of Installation

(Source: ABI Research)



The following sections discuss the retrofit opportunity for Auracast™ broadcast audio across the key market verticals in more detail.

Education

Educational buildings refer primarily to classroom buildings within schools, colleges, and university campuses. The primary use case for Auracast™ broadcast audio in these environments will be augmented and assistive listening deployments, allowing users to receive audio from teachers and lecturers using the audio systems. Here, there could be tens of classrooms equipped with an Auracast™ broadcast audio transmitter per building, while for some of the largest auditoriums, additional transmitters could be leveraged to ensure all users can connect effectively. Most lecture halls today have PA systems that could be simply retrofitted with Auracast™ broadcast audio transmitters to provide immediate benefits. In addition, many classrooms have existing speaker systems to ensure the educator's voice can be easily understood without the need for them to raise their voice. There could also be opportunities for in-class microphones and transmitters for use by students.

With nearly 2 million educational establishments globally, each with multiple buildings with multiple classrooms, lecture halls, and seminar rooms, this could equate to an enormous opportunity for retrofit assistive listening solutions.

Public Assembly Social and Meeting Venues

Public assembly social and meeting venues include libraries, community centers, lodges, meeting halls, convention centers, and senior centers. These venues will benefit from Auracast™ broadcast audio's ability to transmit audio from a PA system to unlimited numbers of receiver devices, without the need for extensive hearing loop configuration or handing out additional headsets. Similar to educational institutions, these venues could all benefit from retrofit Auracast™ broadcast audio transmitters that can be simply connected with the existing meeting room speaker or PA systems. These can enable both public announcement-related use cases, alongside better listening experiences for visitors attending meetings, listening to speakers at conferences, and other event use cases.

Public Assembly Entertainment and Cultural Venues

Within theaters and cinemas, audio from the movie or stage can be broadcasted directly to visitor hearing aids or headsets, enhancing their experience. To achieve this, retrofit Auracast™ broadcast audio transmitters, adapters, and dongles could be connected to the audio processor and mixers within these environments.

Sports arenas and stadiums could also benefit from existing speakers and audio systems being retrofitted with Auracast™ broadcast audio devices, particularly within indoor or enclosed environments such as concourses, bars and restaurants, or private boxes. These could enable users to listen to important public announcements or game commentary. Similarly, within these environments, existing TVs could be retrofitted with Auracast™ broadcast audio transmitters to allow users to listen to silent TVs.

Another opportunity within these large venues could be guided tours. In museums and other tourist attractions, existing portable tour guide systems could be retrofitted with Auracast™ broadcast audio transmitters, adapters, or dongles to enable visitors to listen to exhibit information via audio guide players connecting to their own headsets, without the need for neckloops or additional headsets. Alternatively, venues that do not have tour guide systems in place could leverage Auracast™ broadcast audio smartphones as transmitters to enable visitors to tune into their public stream, lowering the overall cost of tour guide deployment.

Public Assembly Transportation Hubs

In airports, railway and subway stations, bus depots, and other transportation hubs, retrofit Auracast™ broadcast audio adapters could be connected to existing PA systems and gate or terminal speakers to enable visitors to tune into public announcements. This will ensure that travelers always have access to the most relevant information for them in often busy and noisy environments, reducing stress and the potential to miss vital updates. Alongside this, bars and restaurants, waiting areas, and lounges within transportation hubs could all benefit from silent TV use cases, allowing guests and visitors to tune into their chosen broadcast, improving visitor satisfaction.

There are nearly 5 million public assembly buildings globally, and each has the potential to leverage multiple different Auracast™ broadcast audio usage scenarios, resulting in a significant opportunity for retrofit transmitter devices.

Religious Worship

Another key vertical, primarily for assistive listening deployments, is places of worship. Retrofit Auracast™ broadcast audio devices can be easily connected to the existing venue audio system to provide immediate benefits for visitors. The primary use case here is for attendees to be able to listen to sermons and religious teachings via their own hearing aids or headset devices, while the main benefit is that venues do not need to deploy more complex or expensive additional infrastructure, or provide users with compatible neckloops or headsets that alternative Infrared (IR) and FM systems will require.

Auracast™ broadcast audio transmitters could be simply retrofitted to PA and speaker systems already installed within these venues. With nearly 4.4 million places of worship globally, this could represent a significant opportunity.

Food Service

In buildings such as fast-food outlets, restaurants, cafés, bars, and pubs, the primary opportunity for retrofit solutions will be within silent TVs, enabling customers to listen to sports, news, or other programs typically displayed in these environments. In some venues such as sports bars, there could be tens of TVs displaying different events, each equipped with its own retrofitted Auracast™ broadcast audio transmitter dongle. Alternative Wi-Fi-based assistive solutions targeting this space have already been deployed; however, Auracast™ broadcast audio could bring significant low-latency and cost advantages, alongside a much lower complexity deployment.

With more than 2.8 million food service establishments globally, and potentially tens of TVs per venue, there could be significant opportunities for retrofit silent TV Auracast™ broadcast audio transmitters in the coming years.

Healthcare

Another key environment for retrofit Auracast™ broadcast audio adoption will be within healthcare environments. This will include public broadcast use cases such as within waiting rooms for visitor callouts when ready to be seen, as well as safety and security announcements. Existing PA systems could be simply retrofitted with Auracast™ broadcast audio transmitters. Other potential use cases include silent TVs within waiting rooms and for inpatient hospital beds or shared TV spaces. This can help those with or without hearing loss to listen to the TV without disturbing nearby patients, while improving visitor satisfaction and comfort. For each of these use cases, there could be tens to hundreds of transmitters per building depending on the size and number of waiting rooms and TVs.

With nearly 90,000 inpatient facilities such as hospitals and nearly 1.3 million outpatient facilities such as clinics and medical offices, this could be another sizable opportunity for Auracast™ broadcast audio transmitters.

Lodging

One key retrofit Auracast™ broadcast audio use case could be silent TV applications for in-room or reception area usage within hotels, motels, inns, dormitories, nursing homes, and assisted living facilities. For example, guests with hearing loss could better listen to the TV in their hotel room via their Auracast™ broadcast audio headset, rather than having to turn it up to a very high volume, which could disturb their neighbors. Meanwhile, users without hearing loss could listen to silent TVs in a hotel lobby. Other potential use cases within hotels could be meeting rooms and conference rooms. Here, PA-style and conference speaker solutions could be leveraged to enable visitors or attendees at events to better listen to public speakers. In assisted living facilities, similar use cases would apply across resident rooms and meeting spaces.

Similarly, recreational facilities such as gyms and health clubs could all potentially benefit from retrofit Auracast™ broadcast audio solutions that can be connected to existing TVs, allowing guests and visitors to tune into the streams when working out or relaxing in clubhouses.

With over 2 million lodging establishments around the world, potentially with multiple retrofit use cases, this could represent another sizable opportunity for retrofit Auracast™ broadcast audio solutions.

Offices

The primary retrofit Auracast™ broadcast audio opportunities for office buildings will be found within audio systems within meeting and conference rooms, whereby microphones can pick up the audio from speakers or those sitting around the table and transmit this to a hearing aid or headset device via an Auracast™ broadcast audio transmitter integrated into the existing sound system. Many such solutions on the market today are based on induction loop and FM technology. Instead, Auracast™ broadcast audio transmitters can be connected to existing meeting room audio systems swiftly, at a low cost, and with security in mind.

With nearly 10 million offices globally, this could represent a significant retrofit opportunity for Auracast™ broadcast audio transmitters.

Public Order and Safety

These buildings primarily include police and fire stations, courthouses, jails, and other public order establishments. The main potential use case for retrofit Auracast™ broadcast audio solutions will be within courthouses, and more specifically courtrooms, where existing audio systems can enable members of the court and jury to better listen to conversations taking place, potentially in multiple languages. These retrofit solutions could also extend to meeting and conference rooms within the building. Critical to Auracast™ broadcast audio adoption in these environments will be the ability to provide secure transmitters that can protect against unauthorized listeners.

With nearly 740,000 public order and safety establishments globally, this could represent a smaller, but still significant opportunity for retrofit Auracast™ broadcast audio solutions.

AURACAST™ BROADCAST AUDIO TRANSMITTER RETROFIT DEVICE CONFIGURATIONS

Retrofit assistive and augmented listening transmitters are not a new invention. A core element of many existing listening technologies such as Radio Frequency (RF), IR, FM, and Wi-Fi-based solutions, is retrofitting transmitters to various venue audio sources that can broadcast the audio signal to receiver devices. These receiver devices can be a dedicated headset or an assistive hearing device, a neckloop receiver, or a smartphone. Figure 4 provides some examples of existing transmitters based on alternative technologies.

Figure 4: Examples of Existing FM, RF, and Wi-Fi Assistive Listening Transmitter Solutions

(Source: ABI Research)

There are many RF assistive listening deployments in public venues today. These can provide many of the same benefits to public spaces as an Auracast™ broadcast audio system, including multi-channel, ease of setup, and low costs. However, these require the venue to provide visitors with a dedicated RF-capable headset or receiver device that can be connected to their hearing aid via a neckloop, or placing headphones over the microphone of the user's hearing device. In contrast, Auracast™ broadcast audio users can bring their own devices, removing the need for locations having to manage equipment and users being required to check out special equipment.

Wi-Fi assistive listening solutions can also provide a high-quality, simplified experience; key benefits include coverage, easy deployment, and minimal infrastructure. However, this usually requires a smartphone with a dedicated app to connect to the stream and typically has higher latency, providing an inferior user experience compared to what Auracast™ broadcast audio will be able to offer. Auracast™ broadcast audio can

go further by broadcasting directly to the receiver device and provides a lower latency experience without the need for dedicated devices and neckloops. This can help reduce the complexity and overall cost of the solution, alongside simplifying installation.

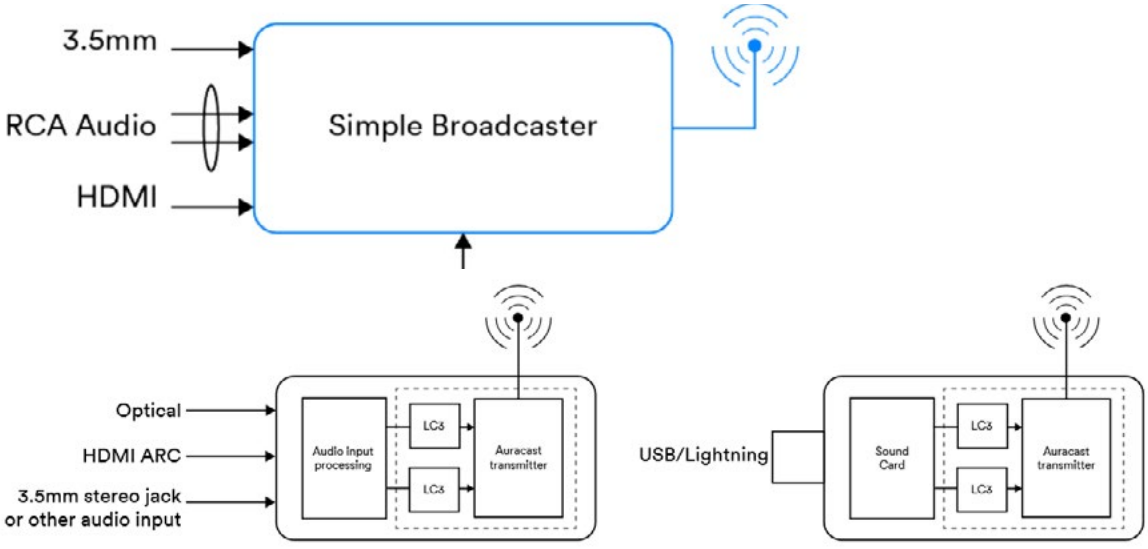
While hearing loops are also capable of working directly with hearing aids, Auracast™ broadcast audio can provide a higher quality experience, support for multiple sources in a single location, and a much more streamlined, simplified, and cost-effective deployment. In addition, Auracast™ broadcast audio can provide enhanced augmented listening experiences such as unmuting silent TVs, multi-language support, audio and tour guides, and potential new audio services within sports venues and other entertainment environments.

Simple Auracast™ Broadcast Audio Retrofit Transmitters

As demonstrated, there is already a growing installed base of receiver devices that will be capable of receiving Auracast™ broadcast audio broadcasts. This is expected to rapidly accelerate over the next few years. Bluetooth® solution providers now have an opportunity to develop retrofit Auracast™ broadcast audio solutions that can provide venues with assistive listening capabilities, alongside enhanced consumer experiences across many different environments. The more venues that support Auracast™ broadcast audio deployments, the greater the incentive for receivers to also support the technology, which will, in turn, create a compelling consumer and public Auracast™ broadcast audio ecosystem that enables users to take advantage of personal and public sharing use cases. These solutions can be as simple as a USB, 3.5 Millimeter (mm), optical, or HDMI dongle solution that can be plugged into any existing audio source. Figure 5 shows one such example of a simple Auracast™ broadcast audio transmitter design. These designs could apply to both consumer and public venue deployments, as well as multiple use cases including silent TV, microphone, or wider audio equipment integration.

Figure 5: Example of Simple Auracast™ Broadcast Audio Transmitter Designs

(Source: Bluetooth SIG)



As ABI Research highlighted in its recent LE Audio: The Future of Bluetooth® Audio report, more than 60 million venues globally could take advantage of Auracast™ broadcast audio technology. Considering that many of these venues could deploy up to hundreds of Auracast™ broadcast audio transmitters depending on the use case, it is clear that there is an enormous number of existing audio sources that could be retrofitted to enable Auracast™ broadcast audio technology. This represents the Total Addressable Market (TAM) for Auracast™ broadcast audio technology within public venues.

These simple Auracast™ broadcast audio transmitters can also capture significant opportunities in the consumer market. There is already a wide range and well-established market of retrofit Bluetooth® Classic transmitter and receiver devices on the market that target automotive, gaming, and TV applications. As LE Audio headsets become more widely available, there will be a greater desire to retrofit existing owned devices such as smartphones, PCs, TVs, games consoles, and AV systems for high-quality, low-latency connectivity, enabling Auracast™ broadcast audio personal sharing use cases until embedded LE Audio penetration increases. Dedicated USB-C, HDMI, auxiliary dongles, transmitter, and receiver devices can help enable Auracast™ broadcast audio and LE Audio connectivity within existing devices such as smartphones, PCs, games consoles, TVs, and other sources.

The TAM for the consumer retrofit opportunity is the installed base of devices that can benefit from being equipped with an Auracast™ broadcast audio transmitter device, including smartphones, TVs, PCs, tablets, personal audio systems, and game consoles. While LE Audio source penetration will increase over time, given that there are still many audio sources that do not support Bluetooth® or LE Audio (e.g., TVs, in-flight entertainment units, fitness equipment, and home and handheld gaming consoles), having an in-box or aftermarket dongle or charging case that can support LE Audio could be extremely desirable going forward in enabling low-latency connectivity in all potential environments.

Only a small portion of this TAM will realistically be serviced before the transition to LE Audio occurs. However, given the large active installed base of billions of source devices, this means that even a small percentage penetration of retrofitted solutions will equate to a large potential market opportunity over the next 5 years. This could be serviced by a combination of dedicated aftermarket LE Audio and Auracast™ broadcast audio transmitters, in-box bundled dongles, or charging cases that can enable transmitter functionality to a source via a USB or 3.5 mm cable. These charging cases could also incorporate display functionality to enable them to be used as assistant devices for stream selection in public venues. Gaming headsets may also come equipped with LE Audio dongles to enable low-latency connectivity and to better compete with proprietary wireless solutions. Consumer transmitter use cases may also help incentivize and speed up development of Auracast™ broadcast audio transmitter reference designs and products for use within public venues. Due to lengthy hearing aid replacement cycles, retrofit Auracast™ broadcast audio neckloop receiver solutions could enable Auracast™ broadcast audio support for existing users of assistive listening devices.

CONCLUSION AND STRATEGIC RECOMMENDATIONS

According to ABI Research, there more than 60 million venues globally that could potentially benefit from assistive listening or augmented audio experiences. Some of these venues may support multiple use cases, ranging from assistive listening solutions to silent TV use cases, or the emergence of new audio experiences. With the potential for multiple audio transmitters per venue, this equates a very large potential TAM for retrofit Auracast™ broadcast audio solutions.

Long replacement cycles mean that it will be several years before these audio systems, silent TVs, and other public audio sources are embedded with Auracast™ broadcast audio capabilities as standard. Retrofitted solutions offer the promise to enable both new consumer-facing and assistive listening experiences without the need to wait to replace existing audio systems with ones embedded with Auracast™ broadcast audio technology. When compared to alternative assistive listening technologies, Auracast™ broadcast audio solutions can be deployed simply, at a comparatively low cost, and provide unique audio experiences to users of both assistive listening devices and mainstream consumer headsets. To recap, some of the major benefits of creating retrofitted transmitter solutions include:

- The ability for venues to enable hearing accessibility and enhanced visitor experiences relatively simply without the need to replace or upgrade all devices.
- Multi-functional transmitters/dongles can be used for both public and personal use cases within the home. This can help reduce design complexity, enable shared development cycles, and bring greater Return on Investment (ROI). Retrofitting solutions across both environments will be key in raising awareness of LE Audio and Auracast™ broadcast audio technology.
- Personal and public venue Auracast™ broadcast audio deployments have the potential to benefit each other, while using similar solutions that can enable sources and receivers to transmit and hear Auracast™ broadcast audio streams.
- Depending on the rollout approach and availability of solutions, tens of millions of Auracast™ broadcast audio-capable solutions could ship over the next 5 years, driving significant additional Bluetooth® chipset and device volumes in both consumer and public use cases.

LE Audio retrofitted products and chipsets are already starting to emerge, and some vendors are already noticing and targeting opportunities in this space. Retrofit solutions will be critical in forging the initial LE Audio and Auracast™ broadcast audio ecosystem

system before mainstream adoption occurs toward the second half of the decade. To help accelerate this, there is a need to further develop retrofit Auracast™ broadcast transmitter devices that can be readily integrated into various audio systems, TVs, PA systems, speakers, microphones, and other audio source devices already deployed in public venues. While the first of these have come to market, ABI Research expects that many more solutions will emerge over the next 12 months. These devices will be critical in raising awareness of Auracast™ broadcast audio technology and helping accelerate wider adoption of the technology and ecosystem within both consumer and public venue applications.

Venues and solution providers currently looking to deploy alternative RF, Wi-Fi, and other audio systems for both consumer and assistive listening use cases should consider the numerous potential benefits of deploying Auracast™ broadcast audio technology as a future-proof alternative.

In addition to increasing the availability of retrofitted solutions and accelerating wider LE Audio and Auracast™ broadcast audio adoption in receiver devices, ABI Research offers the following recommendations to help further develop the Auracast™ broadcast audio ecosystem:

- Continue the proliferation of LE Audio and Auracast™ broadcast audio hardware and software support.
- Emphasize both consumer and assistive listening use cases.
- Incentivize Auracast™ broadcast audio adoption in new buildings and within assistive listening regulatory frameworks across different regions.
- Partner with system integrators to help roll out Auracast™ broadcast audio solutions across larger venues and entire market segments.
- Develop intuitive user interfaces for Auracast™ broadcast audio.
- Raise greater awareness of what Auracast™ broadcast audio can do, where and how easily it can be deployed, and how it can be used most effectively.
- Offer diverse transmitter and integrated solutions spanning both larger-scale public assembly systems and portable transmitters, countertop solutions, and solutions that can be easily connected to the widest variety of sources.
- Ensure that all Auracast™ broadcast audio experiences are high-quality, intuitive, and standardized, regardless of where they are implemented.
- Ensure a standardized approach to security for Auracast™ broadcast audio solutions deployed in one-to-one and private settings.

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