IEC 63087

Edition 1.0 2026-09

INTERNATIONAL STANDARD

Assistive listening devices and systems for active assisted living

ICS 13.180; 33.160.99

ISBN 978-2-8327-1453-9

IEC 63087:2026-09(en)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

Assistive listening devices and systems for active assisted living

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 63087 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment. It is an International Standard.

This first edition cancels and replaces IEC 63087-1 published in 2021. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 63087-1:2021:

a) This first edition represents a different and far more comprehensive approach to the subject than IEC 63087-1, which will be withdrawn.

The text of this International Standard is based on the following documents:

Draft	Report on voting
100/4503/FDIS	100/4534/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

INTRODUCTION

The audibility and intelligibility of speech and music can be degraded by the ambient sound and reverberation of the acoustic space in which it is heard. For a person with hearing difficulties intelligibility is disproportionately degraded.

An assistive listening system (ALS) enables the undesirable effects of an acoustic space to be mitigated through the direct transmission or streaming of speech, music or other audio information to an end-user device (often a hearing-aid or cochlear implant), delivered in a way that improves the listening experience for the user.

An ALS is particularly beneficial when the listener is located at some distance from a talker or the source of sound and or when the background noise level is such as to be clearly audible.

In noisy environments, bringing an appropriate pick-up microphone close to the talker or to the desired sound source can increase the signal-to-noise ratio for the listener by as much as 15 dB to 20 dB, and in enclosed spaces it can overcome the detrimental effects of reverberation as compared to the normal listening situation. This can significantly increase speech intelligibility and reduce listening effort.

An ALS is explicitly designed to deliver audible and intelligible sound wherever the intended listener is located within a room or space, within a specified coverage area or at a service point, and in a manner that provides a genuine benefit to the end-user. An ALS can also be provided as an adjunct facility to an intercom system, for example: ticket machines or station and platform help points. They are also often found in buses, taxis, and some trains where passenger announcements and information can be relayed directly to a user's hearing device. Many airports provide ALS at check-in counters and departure gates as well as in other specific areas such as baggage reclaim. Systems are also widely found in shops and stores at point-of-sale locations and at service counters in banks and ticket offices. ALS are also commonly connected to sound reinforcement and public address systems in a wide variety of venues and sites including theatres, auditoriums, conference centres, meeting rooms, public buildings, and houses of worship. Designated seating areas and facilities within sports grounds and stadiums are also often provided with an ALS where it is not possible to provide complete coverage.

ALSs have also been found to be beneficial for listeners with normal hearing, but who are listening in less-than-ideal acoustic conditions, such as in lecture theatres and classrooms or when not listening to their native language. Although predominantly used for speech, an ALS can also be used to improve the reception of music or musical performances particularly in situations where both speech and music are present.

Several different transmission technologies are available, and some can be better suited to a given situation than others. No matter what the transmission medium or situation, the objective is the same, which is to provide an audible benefit to the intended listener. This document sets out the technical and operational requirements needed to achieve this, regardless of the underlying technology.

1 Scope

This document sets out the requirements for the provision of assistive listening systems (ALS) in places or situations where there is a benefit for hearing-aid, cochlear implant, and other hearing device users, compared to listening to the acoustic signal directly at that location.

This document applies to all ALS used for communication, entertainment, or educational purposes in public, private, domestic and public transport installations.

This document does not apply to other forms of audio transmission, for example simultaneous interpretation or audio description or audio-streams other than those broadcast as part of an ALS. However, this document provides useful ancillary information for such systems which can be applied.

Personal listening and intelligibility enhancement devices and systems are also included within the scope as they constitute a special case and incorporate some unique features and requirements (Annex C).

This document does not apply to hearing aids and medical hearing devices themselves or to speech enhancement and communication systems found in some private motor vehicles which are sometimes referred to as assistive listening.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60118-4, *Electroacoustics - Hearing aids - Part 4: Induction-loop systems for hearing aid purposes - System performance requirements*

IEC 60268-16, *Sound system equipment - Part 16: Objective rating of speech intelligibility by speech transmission index*

IEC 62489-1:2010, *Electroacoustics - Audio-frequency induction loop systems for assisted hearing - Part 1: Methods of measuring and specifying the performance of system components*
IEC 62489-1:2010/AMD1:2014
IEC 62489-1:2010/AMD2:2017

ISO 7001, *Graphical symbols - Registered public information symbols,* available at https://www.iso.org/obp

EN 50332-2, *Sound system equipment: Headphones and earphones associated with portable music players - Maximum sound pressure level measurement methodology - Part 2: Matching of sets with headphones if either or both are offered separately, or are offered as one package equipment but with standardised connectors between the two allowing to combine components of different manufacturers or different design*

3 Terms, definitions, and abbreviated terms

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

– IEC Electropedia: available at http://www.electropedia.org
– ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Terms and definitions

3.1.1
accessibility
degree to which an ALS product (e.g., device, service, and environment) is available to the intended users and compatible with their listening devices

3.1.2
audio frequency induction loop system
AFILS
system including amplifier(s), microphones and/or other signal sources, in which magnetic fields are created by the flow of audio-frequency current in a conductor arranged in the form of one or more loops or a coil or solenoid

Note 1 to entry: AFILS is often called a hearing loop.

3.1.3
assistive listening device
ALD
device that can directly access an ALS – e.g. hearing aid, cochlear implant, hearable, mobile phone, ALS receiver or personal listener

3.1.4
assistive listening system
ALS
device or system that helps people with hearing impairment to hear and understand wanted sounds or enables them to access the sound being transmitted by a public address (PA), paging, sound reinforcement, or dedicated microphone system

Note 1 to entry: Assistive listening systems can also be used by listeners who are not hard of hearing to improve the clarity and intelligibility of received speech.

Note 2 to entry: A personal listener may connect to an assistive listening system.

3.1.5
audio over wireless networking technology system
AOWNTS
system that enables wireless transmission of audio via a wireless network, allowing the user's own device (smartphone or tablet) to act as the receiver

Note 1 to entry: An example of a wireless networking technology is Wi-Fi®.

3.1.6
audiovisual system
AV
system providing both audio and visual program information that can also be part of a video conferencing system

3.1.7
Auracast™
proprietary audio transmission system using Bluetooth® low energy (LE) available from Bluetooth® core Specification v5.3 onwards that enables several separate audio streams to be simultaneously transmitted to multiple compatible listening devices at distances of typically up to 50 m depending on the local conditions and transmitter power

Note 1 to entry: To allow as many receivers as possible to access an audio stream within the reception range, Auracast™ does not use a traditional two-way Bluetooth® "Connected link", instead relying on the stream source operating as a "Broadcast" transmitter and advertising its availability with a range of quality and access options.

3.1.8
automatic gain control
AGC
means (other than peak clipping) by which the gain is automatically controlled as a function of the level of the signal being amplified with the objective of providing a stable output signal level

Note 1 to entry: AGC is also often called a leveller.

3.1.9
Bluetooth®
Bluetooth® classic
low power radio system that can continuously stream data over 79 channels in the 2,4 GHz unlicensed industrial, scientific, and medical (ISM) frequency band

3.1.10
Bluetooth® low energy
BLE
Bluetooth® system designed for very low power operation, transmitting data over 40 channels in the 2,4 GHz unlicensed ISM frequency band

Note 1 to entry: BLE remains in sleep mode except when a connection is initiated. Power consumption is lower and data rates are higher than for classic Bluetooth®, but connection is not continuous.

3.1.11
BYOD
bring your own device
scenario in which a user provides their own means to access an ALS

3.1.12
C50
C50 – Clarity
measure of the direct-to-reverberant ratio whereby the sound energy arriving within the first 50 ms after the arrival of the direct sound is divided by the late sound energy arriving after 50 ms

Note 1 to entry: C50 provides a measure of the ratio of useful sound energy to later arriving and reverberant energy that is considered to inhibit the intelligibility of speech and is often used as a measure of potential intelligibility. See ISO 3382-1.

3.1.13
critical distance
Dc
distance from a sound source, in a room or enclosed space, were the direct and reverberant sound energies become equal

3.1.14
cochlear implant
CI
small electronic medical device that electrically stimulates the cochlear nerve to provide a sensation of sound

Note 1 to entry: CIs comprise two parts, the implant and a control and processing device that is worn behind the ear in a similar manner to a hearing aid.

Note 2 to entry: CI processing devices are generally fitted with a T-coil and so can be used with hearing loops and neck-loops.

3.1.15
competent person
person with the relevant current training and experience, and with access to the requisite tools, equipment, and information, and capable of carrying out a defined task

3.1.16
digital modulation
DM
RF transmission system where the audio information is in the form of a digital stream

3.1.17
ear hook
small inductive device in the form of a hook that sits behind the ear and is placed adjacent to a hearing device in order to inductively transmit an audio signal to the device's telecoil

3.1.18
echo
undesired signal which arrives at a given point, with sufficient magnitude and delay for it to be perceptible, as a distinct repetition of the direct signal

Note 1 to entry: The audibility of an acoustic or audio echo depends on the magnitude of the signal and its relative delay, with perception typically occurring with delays greater than 35 ms to 50 ms.

3.1.19
electromagnetic interference
EMI
interference that is caused by one electrical or electronic device to another by the electromagnetic fields generated by its operation

3.1.20
emergency sound system
ECS
sound system specifically intended to broadcast emergency announcements and messages

Note 1 to entry: Such systems generally incorporate fault and status monitoring and must meet associated national or international standards.

3.1.21
hearable
type of personal listener, usually in the form of personal earbuds or earphones that contain both a pickup microphone and loudspeaker in each unit together with complex speech and noise suppression processing to provide sound amplification

Note 1 to entry: Hearables are often termed "over the counter", non-prescription hearing aid devices.

3.1.22
hearing aid
HA
portable instrument intended to assist the hearing of persons with impaired hearing, usually consisting of a microphone, amplifier and earphone or bone vibrator

Note 1 to entry: A hearing aid is a medical device selected and fitted by an appropriately trained and competent hearing care professional.

3.1.23
hearing device
HD
user device which can directly access an ALS – for example, hearing aid, cochlear implant, hearable, mobile phone, ALS receiver, or personal listener

3.1.24
hearing loop
audio frequency induction loop (AFILS) assistive listening technology

Note 1 to entry: A loop or loops of cable or copper tape and an induction loop amplifier are typically installed at floor level in a room or area to be covered to create an electromagnetic field that can be picked up by a hearing aid, cochlear implant or listening device employing a suitable pick up or telecoil. The loop is powered by a current drive amplifier that may be fed from either a dedicated pick-up microphone or from the output of a sound system.

3.1.25
hearing loss
reduction in hearing acuity

Note 1 to entry: Hearing loss is a common problem caused by exposure to noise, ageing, disease, trauma, and genetics.

Note 2 to entry: Six levels of hearing loss have been defined by the World Health Organisation: Mild (20 dB to 34 dB loss), Moderate (35 dB to 49 dB loss), Moderately severe (50 dB to 64 dB loss) Severe (65 dB to 79 dB loss), Profound (80 dB to 94 dB loss) and Complete or total hearing loss 95 dB or greater loss.

3.1.26
infrared assistive listening system
IR
assistive listening transmission system based on infrared technology

Note 1 to entry: IR systems are often used in environments where it is desired to contain the signal within the confines of a room.

Note 2 to entry: IR assistive listening receivers can incorporate a neck-loop so that the signal can be received by a compatible hearing aid or cochlear implant.

3.1.27
international speech test signal
ISTS
signal developed by EHIMA to create reproducible measurement conditions for the purpose of analysing the processing of speech by a hearing aid and associated equipment

Note 1 to entry: ISTS is a standard test signal which features all or most relevant properties of natural speech, e.g. the modulation spectrum, the fundamental frequency and its harmonics.

Note 2 to entry: ISTS is based on natural recordings but is largely non-intelligible because of segmentation and remixing. The signal comprises real speech from multiple talkers but presented in a manner such as to have no meaning or gaps between words.

3.1.28
loop receiver
device fitted with a telecoil (T-coil) allowing it to pick up signals from a hearing loop

3.1.29
latency
Interval in time between the instant when an audio signal enters a system or electronic device and the instant when it emerges

Note 1 to entry: Potential causes of latency in an audio system include analogue-to-digital conversion, buffering, digital signal processing, transmission time, digital-to-analogue conversion, and the speed of sound in the transmission medium.

3.1.30
lip-sync
synchronisation of the visual image of the face and lips with the associated audio speech signal

Note 1 to entry: To enable lip-reading, the maximum allowable discrepancy between the visual and audio signals is 45 ms.

3.1.31
long term average speech level
LTASL
unweighted speech signal level averaged over a period of at least 30 s

Note 1 to entry: LTASL may be measured either as an L_{eq} value or by means of an RMS meter with suitably long integration time.

3.1.32
neckloop
device that allows a personal listener or ALS receiver to be used with a hearing aid that is fitted with a telecoil

Note 1 to entry: Neckloops are usually passive devices and often dedicated to a particular receiver, although active types and non-product-specific types are also available.

3.1.33
personal listener

system for relaying an acoustic input signal to an acoustic output transducer, for listening purposes, comprising at least a microphone, an amplifier and earphones or headphones

Note 1 to entry: Additional items can be included, such as a neckloop for use with hearing aids, or a magnetic pick-up coil for use with hearing-loop system.

Note 2 to entry: The sound picked up by a personal listener can also be transmitted directly to a hearing aid via Bluetooth® or other, defined, radio-based system.

3.1.34
radio based assistive listening system
RF
assistive listening system based on radio technology including frequency modulated (FM) and digitally modulated (DM) transmission

Note 1 to entry: RF assistive listening receivers can be connected to a neckloop so that the ALS signal can be received by a compatible hearing aid or cochlear implant.

3.1.35
remote microphone
microphone, specifically intended to pick up the wanted sound to enable it to be broadcast to an assistive listening system, personal listener, or hearing device

Note 1 to entry: Remote microphones can be active devices and incorporate speech processing technology, such as acoustic noise cancellation, or filtering to enhance the intelligibility of the speech signal.

Note 2 to entry: Remote microphones can transmit their signal wirelessly or via a cable.