



ASA/ANSI S3.42-2012/Part 2 / IEC
60118-15:2012

Reaffirmed by ANSI June 5, 2020

AMERICAN NATIONAL STANDARD

**Testing Hearing Aids – Part 2: Methods for
characterizing signal processing in
hearing aids with a speech-like signal
(a nationally adopted international standard)**

Secretariat:

Acoustical Society of America

Approved on September 20, 2012:

American National Standards Institute, Inc.

Abstract

This standard describes a recommended speech-like test signal, the International Speech Test Signal (ISTS), and a method for the characterization of hearing aids using this signal with the hearing aid set to actual user settings or to the manufacturers' recommended settings for one of a range of audiograms. For the purposes of this standard the hearing aid is considered to be a combination of the physical hearing aid and the fitting software which accompanies it.

Reaffirmed by ANSI
November 2, 2017

Reaffirmed by ANSI June 5, 2020

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ANSI/ASA S3.42-2012/Part 2 /
IEC 60118-15:2012

Accredited Standards Committee S3, Bioacoustics

Standards Secretariat
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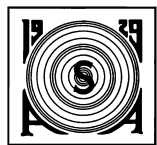
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Foreword

[This Foreword is for information only and is not a part of the American National Standard ANSI/ASA S3.42-2012/Part 2 / IEC 60118-15:2012 American National Standard Testing Hearing Aids – Part 2: Methods for characterizing signal processing in hearing aids with a speech-like signal.]

This standard comprises a part of a group of definitions, standards, and specifications for use in bioacoustics. It was developed and approved by Accredited Standards Committee S3, Bioacoustics, under its approved operating procedures. Those procedures have been accredited by the American National Standards Institute (ANSI). The Scope of Accredited Standards Committee S3 is as follows:

Standards, specifications, methods of measurement and test, and terminology in the fields of psychological and physiological acoustics, including aspects of general acoustics which pertain to biological safety, tolerance and comfort.

This standard is an identical national adoption of IEC 60118-15 *Electroacoustics – Hearing aids – Part 15: Methods for characterizing signal processing in hearing aids with a speech-like signal*, which was prepared by IEC/TC 29, Electroacoustics. However, in conformance with ANSI and IEC rules, the words "American National Standard" replace the words "International Standard" or "this part of IEC 60118" where they appear in the IEC document, decimal points were substituted in place of the decimal commas used in IEC documents, and American English spelling is used in place of British English spelling.

A list of the ANSI or ANSI/ASA standards which are similar to the IEC standards referenced in IEC 60118-15 is included below.

- ANSI/ASA S3.22-2009 *American National Standard Specification of Hearing Aid Characteristics* is similar to IEC 60118-7.
- ANSI/ASA S3.35-2010 *American National Standard Method of Measurement of Performance Characteristics of Hearing Aids Under Simulated Real-Ear Working Conditions* is similar to IEC 60118-8.
- ANSI/ASA S3.25-2009 *American National Standard for an Occluded Ear Simulator* is similar to IEC 60318-4.
- ANSI/ASA S3.7-1995 (R 2008) *American National Standard Methods for Coupler Calibration of Earphones* has sections that are similar to IEC 60318-5.
- ANSI S1.4-1983 (R 2006) *American National Standard Specification for Sound Level Meters* is similar to IEC 61260.

At the time this Nationally Adopted International Standard was published, the test signal mentioned in Annex A (the ISTS) was freely available from the European Hearing Instrument Manufacturers Association website: <http://www.ehima.com/ehima2/documents.html>.

At the time this Standard was submitted to Accredited Standards Committee S3, Bioacoustics, for approval, the membership was as follows:

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Suggestions for improvements to this standard will be welcomed. They should be sent to Accredited Standards Committee S3, Bioacoustics, in care of the Standards Secretariat of the Acoustical Society of America, 35 Pinelawn Road, Suite 114E, Melville, New York 11747-3177. Telephone: 631-390-0215; FAX: 631-390-0217; E-mail: asastds@aip.org.

Introduction

The characterization of hearing aids in actual use can differ significantly from those determined in accordance with standards such as IEC 60118-0 and IEC 60118-7. These standards use non speech-like test signals with the hearing aid set to specific settings which are, in general, not comparable with typical user settings.

This standard describes a recommended speech-like test signal, the International Speech Test Signal (ISTS), and a method for the characterization of hearing aids using this signal with the hearing aid set to actual user settings or to the manufacturers' recommended settings for one of a range of audiograms. For the purposes of this standard the hearing aid is considered to be a combination of the physical hearing aid and the fitting software which accompanies it.

American National Standard

Testing Hearing Aids – Part 2: Methods for characterizing signal processing in hearing aids with a speech-like signal

1 Scope

This American National Standard specifies a test signal designed to represent normal speech, the International Speech Test Signal (ISTS), together with the procedures and the requirements for measuring the characteristics of signal processing in air-conduction hearing aids. The measurements are used to derive the estimated insertion gain (EIG). For the purposes of characterizing a hearing aid for production, supply and delivery, the procedures and requirements to derive the coupler gain on a 2 cm³ coupler as defined in IEC 60318-5 are also specified.

The procedure uses a speech-like test signal and the hearing aid settings are set to those programmed for an individual end-user or those recommended by the manufacturer for a typical end-user for a range of flat, moderately sloping or steep sloping audiograms, so that the measured characteristics are comparable to those which may be obtained by a wearer at typical user settings.

The purpose of this standard is to ensure that the same measurements made on a hearing aid following the procedures described, and using equipment complying with these requirements, give substantially the same results.

Measurements of the characteristics of signal processing in hearing aids which apply non-linear processing techniques are valid only for the test signal used. Measurements which require a different test signal or test conditions are outside the scope of this standard.

Conformance to the specifications in this standard is demonstrated only when the result of a measurement, extended by the actual expanded uncertainty of measurement of the testing laboratory, lies fully within the tolerances specified in this standard as given by the values given in 6.1.

Measurement methods that take into account the acoustic coupling of a hearing aid to the individual ear and the acoustic influence of the individual anatomical variations of an end-user on the acoustical performance of the hearing aid, known as real-ear measurements, are outside the scope of this particular standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60118-7, Electroacoustics – Hearing aids – Part 7: Measurement of the performance characteristics of hearing aids for production, supply and delivery quality assurance purposes

IEC 60118-8:2005, Electroacoustics – Hearing aids – Part 8: Methods of measurement of performance characteristics of hearing aids under simulated in situ working conditions

IEC 60318-4, Electroacoustics – Simulators of human head and ear – Part 4: Occluded-ear simulator for the measurement of earphones coupled to the ear by means of ear inserts