



ASA/ANSI S12.10-2011/Part 2

Reaffirmed by ANSI June 19, 2020

AMERICAN NATIONAL STANDARD

# **Acoustics – Measurement of Airborne Noise Emitted by Information Technology and Telecommunications Equipment – Part 2: Declaration of Noise Emission Levels**

**Secretariat:**

**Acoustical Society of America**

**Approved on August 17, 2011:**

**American National Standards Institute, Inc.**

## **Abstract**

This Standard specifies procedure and requirements of the verification of noise emission levels of information technology and telecommunications equipment. Hitherto, a wide variety of methods have been applied by individual manufacturers and users to satisfy particular equipment or application needs. These diverse practices have, in many cases, made comparison of noise emission difficult. This Standard unifies the procedure and requirements that make the declared noise emission levels consistent for information technology and telecommunications equipment.

This Standard is technically identical to parts of ECMA-109 (2010).

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ANSI/ASA S12.10-2011/Part 2

Accredited Standards Committee S12, Noise

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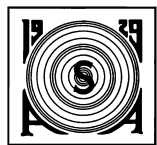
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## Foreword

[*This Foreword is for information only and is not a part of the American National Standard ANSI/ASA S12.10-2011/Part 2 American National Standard Acoustics – Measurement of Airborne Noise Emitted by Information Technology and Telecommunications Equipment – Part 2: Declaration of Noise Emission Levels.*]

This standard comprises a part of a group of definitions, standards, and specifications for use in noise. It was developed and approved by Accredited Standards Committee S12 Noise, under its approved operating procedures. Those procedures have been accredited by the American National Standards Institute (ANSI). The Scope of Accredited Standards Committee S12 is as follows:

*Standards, specifications, and terminology in the field of acoustical noise pertaining to methods of measurement, evaluation, and control, including biological safety, tolerance, and comfort, and physical acoustics as related to environmental and occupational noise.*

This document adopts, with permission, parts of the 5<sup>th</sup> Edition of ECMA-109 (2010).

At the time this Standard was submitted to Accredited Standards Committee S12, Noise, 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 S12, Noise, 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](mailto:asastds@aip.org).

## Introduction

In order for equipment noise emission data to be useful, uniform methods are necessary for the following purposes:

- Measurement of noise emission values

ANSI/ASA S12.10/Part 1 specifies procedures for measuring sound power and pressure levels of information technology and telecommunications equipment based on the basic noise emission standards ANSI/ASA S12.51 / ISO 3741, ANSI/ASA S12.54 / ISO 3744, ANSI/ASA S12.55 / ISO 3745 and ISO 11201.

- Determination of the noise emission values to be declared

ANSI/ASA S12.10/Part 2 specifies procedures for determination and declaration of noise emission levels of information technology and telecommunications equipment following guidelines of the basic standard ISO 4871 and statistical methods of ISO 7574 series.

- Presentation of declared noise emission values

For the presentation of declared noise emission values, it is of prime importance to declare A-weighted sound power levels,  $L_{WA}$ . It is recognized, however, that users still desire information on A-weighted emission sound pressure levels,  $L_{pA}$ . Therefore, this Standard specifies that both quantities shall be declared. In the preparation of this Standard divergences of opinion have been found among various national and international organizations as to the most useful way of presenting noise emission values. In order to avoid any misunderstanding between presentation of sound power levels in decibels re 1 pW and emission sound pressure levels in decibels re 20  $\mu$ Pa, this Standard expresses sound power level values in bels and emission sound pressure level values in decibels, to alleviate the divergences of opinion mentioned.

As an option, methods for determination and presentation of subjective characteristics of noise emission are presented in Annex C.

- Verification of declared noise emission values

ANSI/ASA S12.10/Part 2 specifies the verification procedure and requirements of declared noise emission values of information technology and telecommunications equipment following the basic methods defined in ISO 7574. The verification procedure and requirements specified in this standard are restricted to verifying declared A-weighted sound power levels,  $L_{Wad}$ , only.

The reasons for using bels for declared A-weighted sound power levels are:

1. To avoid user confusion

In this Standard the A-weighted sound power level is the primary descriptor for the noise emission levels. The A-weighted emission sound pressure level is the secondary, complementary descriptor. Many manufacturers and users of information technology and telecommunications equipment have historically used A-weighted emission sound pressure levels in decibels. Since customers want both sound power and emission sound pressure levels, this Standard utilizes both quantities. Without including reference values (*i.e.*, 1 pW and 20  $\mu$ Pa), expressing both declared sound power levels and declared emission sound pressure levels in decibels tends to cause confusion. To distinguish the two, this Standard expresses sound power level values in bels where a bel is 10 decibels re 1pW, and expresses emission sound pressure level values in decibels re 20  $\mu$ Pa.

2. To avoid misapplication of data

If declared A-weighted sound power levels were expressed in decibels, users may mistakenly compare the sound power levels with workplace regulations of immission sound pressure levels. In many information technology and telecommunications equipment applications, the sound power level (in decibels) value of the equipment is significantly larger than the immission sound pressure level (in decibels) value measurable in the workplace. The latter, immission value is the level at human ear location in a given environment which changes with the acoustic environment, such as room size and acoustical attenuation property of floor, wall, ceiling, doors, windows and room partitions, etc., while the sound power level is an intrinsic property of equipment that does not change with the environment it is placed in.

3. To promote the use of ANSI/ASA S12.10/Part 2

The purpose of ANSI/ASA S12.10/Part 2 is to provide uniform methods of presenting declared noise emission values to users. Without using bels, this objective would be lost since there would be an incentive for some manufacturers to report emission sound pressure levels instead of sound power levels. The primary descriptor of information technology and telecommunications equipment noise is the declared A-weighted sound power level,  $L_{WA,d}$ . If ANSI/ASA S12.10/Part 2 were to use decibels for declared A-weighted sound power levels, manufacturers who do not implement this Standard would be at a competitive advantage by reporting emission sound pressure levels in decibels which would be lower than the declared sound power levels also in decibels. Not only would the user be confused and unable to tell the difference, but the manufacturer who followed ANSI/ASA S12.10/Part 2 would be at an unfair competitive disadvantage. To eliminate this confusion and disadvantage and to promote the uniform reporting of declared noise emission values, the declared A-weighted sound power levels must be reported in bels.

4. To use a method based on successful experience

For several years, many international companies have reported A-weighted sound power levels in bels and A-weighted emission sound pressure levels in decibels without confusion of their customers. Indeed, their customers have been able to distinguish easily between the important difference of sound power level and emission sound pressure level, and the users have not lost the significance of the digit after the decimal mark. Actually they have been less confused; without using bels, they would wonder: "which decibel do I compare to our specification?"

5. To be consistent with other standards

The use of bels for declared A-weighted sound power levels is consistent with ISO 4871 *Acoustics - Declaration and verification of noise emission values of machinery and equipment* and with ISO 7574-1 *Acoustics - Statistical methods for determining and verifying stated noise emission values of machinery and equipment - Part 1: General considerations and definitions*. The declared A-weighted sound power level,  $L_{WA,d}$ , is a statistical maximum value and corresponds to the "declared single-number noise emission value" in ISO 4871 and "labeled value" in ISO 7574-1. The definition of "declared single-number noise emission value" in ISO 4871 and "labeled value" in ISO 7574-1 has a note which states that in some cases, the labeled value may be expressed as the numerical value of sound power level in decibels divided by 10, given with one digit after the decimal mark, i.e. in bels. ANSI/ASA S12.10/Part 2 recognizes that the sound power is **determined in decibels**, according to ANSI/ASA S12.10/Part 1 which is based upon ANSI/ASA S12.51 / ISO 3741, ANSI/ASA S12.54 / ISO 3744, and ANSI/ASA S12.55 / ISO 3745, and is then reported to the customers as a **declared value in bels**.

## American National Standard

# Measurement of Airborne Noise Emitted by Information Technology and Telecommunications Equipment - Part 2: Declaration of Noise Emission Levels

## 1 Scope

This Standard applies to information technology and telecommunications equipment.

This Standard specifies:

- the method of determining the declared noise emission values of a batch of machines,
- acoustical and product information to be given in technical documents supplied to users by the manufacturer,
- the method for verifying the declared noise emission values given by the manufacturers.

The uniform methods in this Standard use the noise emission data obtained in accordance with ANSI/ASA S12.10/Part 1, and the statistical methods and procedures specified in ISO 4871 and the ISO 7574 series.

The primary declared noise emission value is the declared A-weighted sound power level,  $L_{wAd}$  (a statistical maximum value corresponding to  $L_c$  in ISO 7574-1). The secondary declared noise emission value is the declared A-weighted emission sound pressure level,  $L_{pAm}$  (a mean value), at the operator or bystander positions.

The declared A-weighted sound power level,  $L_{wAd}$ , permits comparison of noise emissions between different products and permits prediction of installation or work-place noise immission levels.

Although the most useful quantity for calculating immission levels due to one or more sound sources is usually the declared A-weighted sound power level of the individual source(s), the declared A-weighted emission sound pressure level,  $L_{pAm}$ , may be used to estimate the immission level in the immediate vicinity of an isolated piece of equipment.

To avoid confusion between sound power levels and emission sound pressure levels, the A-weighted sound power level is declared in bels and the A-weighted emission sound pressure level is declared in decibels.

## 2 Normative references

The following referenced documents are indispensable for the application 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.