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Methods of measurement for the power consumption of audio, video and related equipment

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Messverfahren für den Energieverbrauch von Audio-, Video- und verwandten Geräten

Méthodes de mesure de l'énergie consommée des appareils audio, vidéo et analogues

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33.160.01	Avdio, video in avdiovizualni sistemi na splošno	Audio, video and audiovisual systems in general

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Messverfahren für den Energieverbrauch von Audio-, Video- und verwandten Geräten

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 206, Consumer equipment for entertainment and information and related sub-systems.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50301 on 2000-08-01.

A draft for an amendment, which was also submitted to the Unique Acceptance Procedure, was approved by CENELEC on 2000-08-01 for inclusion in the European Standard.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2001-08-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2003-08-01

Annexes designated "normative" are part of the body of the standard. Annexes designated "informative" are given for information only. In this standard, annex A is informative.

Contents

1 Scope

This European Standard specifies methods of measurement for the power consumption of TV receivers, VCR's, Set Top Boxes (STB's), audio equipment and multi function equipment.

Moreover the different modes of operation which are relevant for the power consumption are defined.

The methods of measurement are only applicable for equipment which can be connected to the mains.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 50049-1	Domestic and similar electronic equipment interconnection requirements: Peritelevision connector
EN 61938	Audio, video and audiovisual systems - Interconnections and matching values - Preferred matching values of analogue signals (IEC 61938:1996)
ITU-R BT.471-1	Nomenclature and description of colour bar signals

3 Definitions

For the purpose of this European Standard, the following definitions apply.

3.1
television receiver (TV)
appliance for the reception of television broadcast and similar services for terrestrial, cable and satellite transmission of analogue or digital signals

3.2
video recording equipment
appliance for recording and reproducing of video and audio signals on a recording medium, e.g. a magnetic tape in a cassette ,e.g. Video Cassette Recorder (VCR) or a disc, e.g. Digital Versatile Disc (DVD) player or recorder

NOTE Appliances with only playback function are included as well.

3.3
Set Top Box (STB)
appliance which performs a function which is not (yet) included in the main receiver such as the reception of digital signals or of satellite signals

3.4
radio receiver
appliance for the reception of sound broadcast and similar services for terrestrial, cable and satellite transmissions of analogue or digital signals

3.5
audio equipment
stand-alone equipment or a system of separable or non-separable components for one or more audio functions

3.6
multi function equipment
combination of equipment with two or more functions in one unit

4 Specification of operating modes

Mode	TV	Video recording equipment (e.g. VCR)	STB	Audio equipment
Disconnected	The appliance is disconnected from all external power sources.	The appliance is disconnected from all external power sources.	The appliance is disconnected from all external power sources.	The appliance is disconnected from all external power sources.
Off	The appliance is connected to a power source, produces neither sound nor vision and cannot be switched into any other mode with the remote control unit, an external or internal signal.	The appliance is connected to a power source, does not perform any mechanical function (e.g. playing, recording) and cannot be switched into any other mode with the remote control unit, an external or internal signal.	The appliance is connected to a power source, fulfills no function and cannot be switched into any other mode with the remote control unit, an external or internal signal.	The appliance is connected to a power source, does neither produce sound nor performs any mechanical function (e.g. playing, recording) and cannot be switched into any other mode with the remote control unit, an external or internal signal.
Standby-passive	The appliance is connected to a power source, produces neither sound nor vision but can be switched into another mode with the remote control unit or an internal signal,	The appliance is connected to a power source, does not perform any mechanical function (e.g. playing, recording), does not produce video or audio output signals but can be switched into another mode with the remote control unit or an internal signal,	The appliance is connected to a power source, fulfills not the main function but can be switched into another mode with the remote control unit or an internal signal,	The appliance is connected to a power source, does neither produce sound nor performs any mechanical function (e.g. playing, recording) but can be switched into another mode with the remote control unit or an internal signal,
Standby-active, low	and can additionally be switched into another mode with an external signal,	and can additionally be switched into another mode with an external signal,	and can additionally be switched into another mode with an external signal,	and can additionally be switched into another mode with an external signal,
Standby-active, high	and is exchanging/ receiving data with/from an external source.	and is exchanging/ receiving data with/from an external source.	and is exchanging/ receiving data with/from an external source.	and is exchanging/ receiving data with/from an external source.

Mode	TV	Video recording equipment (e.g. VCR)	STB	Audio equipment
On (play)	The appliance is connected to a power source and produces sound and vision.	The appliance is connected to a power source and plays the tape or disc inside the appliance.	The appliance is connected to a power source and fulfills its main function.	The appliance is connected to a power source and is performing one or more of the following modes: produce sound, wake-up signal, or play a tape or disc.
On (record)	Not applicable	The appliance is connected to a power source and records a signal from an external or internal source.	Not applicable	The appliance is connected to a power source and records a signal from an external or internal source.

NOTE 1 The definitions give essential but not exhaustive descriptions of each mode.

NOTE 2 Not all equipment can be switched in each mode.

NOTE 3 VCR's and STB's normally provide RF feed-through in standby and active modes; sometimes this feed-through is maintained in the off-mode. In the latter case the off-mode is sometimes designated as e.g. "power-safe mode" or "eco-mode".

NOTE 4 The terms "internal" and "external" as used in this table refer to the appliance as it is delivered to the user.

5 General method of measurement

5.1 General measuring conditions

5.1.1 Power supply

Measurements shall be carried out at the rated voltage and the rated frequency of the power supply.

The fluctuation of the power supply voltage during the tests shall not exceed ± 2 % . The frequency fluctuation and the harmonic components of the power supply shall not exceed ± 2 % and 5 % respectively.

5.1.2 Environmental conditions

Ambient temperature 15 °C to 35 °C, preferably 20 °C.

5.1.3 Adjustment of controls

The controls not specifically mentioned in this standard shall in the position adjusted by the manufacturer.

5.1.4 Input signals

For equipment for which the input signals are not explicitly described in this standard, the nominal signals as specified by the manufacturer shall be applied during the test. The input signal used shall be described in the report.

5.2 General measurement procedure

Measure the power consumption of the appliance 15 min after it has been switched into the relevant operating mode.

The measurement should be carried out directly by means of a watt meter or by means of a watthour meter by dividing the reading by the measuring time.

The maximum permitted error is 5 %.

If the power consumption in a certain operating mode has more than one stable level, the measuring time shall be sufficiently long to measure the correct average value.

Some appliances switch, after a time delay, from a standby mode automatically to a mode with a lower (or zero) power consumption. The power consumption before and after the automatic switching shall be determined.

For equipment with less functionality then described, e.g. playback tape equipment, only the relevant parts of the measuring conditions have to be considered

The results shall be given in watts, with a number of relevant digits in accordance with the accuracy of the measurement.

NOTE 1 It should be ascertained that the watt meter or the watthour meter is suitable to measure the power consumption of power supplies working in a burst mode with a low duty cycle and the low power consumption levels in the standby modes.

NOTE 2 If in the measuring conditions the standby mode is mentioned without further specification, the standby modes as defined in 4 are referred to.

6 Measuring conditions for television receivers

6.1 Signal input

RF or baseband.

If a RF input is available, this shall be used.

6.2 RF input signal

At a level to provide a sufficiently noise or error free picture.

6.3 Baseband input signal level

According to EN 50049-1.

6.4 Video test signal

Colour bar according to ITU-R BT.471-1.

6.5 Audio test signal(s)

Sine-wave signals at a frequency of 1 kHz or if 1 kHz cannot be used, signals at the centre frequency of the transfer range, as specified by the manufacturer.

6.6 Loading of terminals

The loudspeaker terminals should be terminated with the minimum impedance as specified by the manufacturer.