IEC 62087-4

Edition 1.0 2015-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Audio, video and related equipment – Determination of power consumption – Part 4: Video recording equipment

Appareils audio, vidéo et matériel connexe – Détermination de la consommation de puissance – Partie 4: Matériel d'enregistrement vidéo

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FOREWORD

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International Standard IEC 62087-4 has been prepared by technical area 12: AV energy efficiency and smart grid applications, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This bilingual version (2018-02) corresponds to the monolingual English version, published in 2015-06.

This first edition of IEC 62087-4 cancels and replaces Clause 7 of IEC 62087:2011. This standard together with IEC 62087-1 to IEC 62087-3 and IEC 62087-5 to IEC 62087-6 cancels and replaces IEC 62087:2011. This International Standard constitutes a technical revision.

This edition includes significant technical changes with respect to Clause 7 of IEC 62087:2011. The changes include fundamental and extensive revisions to cover video recorders such as DVD and BD types as well as recorders with removable solid state memory. Clause 7 has been revised in its entirety.

The text of this standard is based on the following documents:

FDIS	Report on voting
100/2469/FDIS	100/2499/RVD

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

The French version of this standard has not been voted upon.

A list of all parts in the IEC 62087 series, published under the general title *Audio, video, and related equipment – Determination of power consumption*, can be found on the IEC website.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

This part of IEC 62087 specifies methods of measurement for the power consumption of video recording equipment for consumer use.

IEC 62087:2011 revises methods for measuring power consumption of set top boxes mainly in the modes of On mode and Standby-active, high mode. These modes correspond to the active modes which are defined in IEC 62542:2013.

This standard has been divided into multiple parts. At the time of publication of this part, the following parts are planned or published:

– Part 1: General
– Part 2: Signals and media
– Part 3: Television sets
– Part 4: Video recording equipment
– Part 5: Set-top boxes (STB)
– Part 6: Audio equipment

AUDIO, VIDEO AND RELATED EQUIPMENT – DETERMINATION OF POWER CONSUMPTION –

Part 4: Video recording equipment

1 Scope

This part of IEC 62087 specifies methods of measurement for the power consumption of video recording equipment with removable media. It specifies the different modes of operation which are relevant for measuring power consumption.

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

The measuring conditions in this standard represent the normal use of the equipment and may differ from specific conditions, as specified, for example, in safety standards.

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 60107-1:1997, *Methods of measurement on receivers for television broadcast transmissions – Part 1: General considerations – Measurements at radio and video frequencies*

IEC 62087-1:2015, *Audio, video, and related equipment – Methods of measurement for power consumption – Part 1: General*

IEC 62216:2009, *Digital terrestrial television receivers for the DVB-T system*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62087-1:2015, as well as the following apply.

3.1.1
additional functions
functions that are not required for the basic operation of the equipment

3.1.2
buffering
temporary storage of video and audio streams in some form of memory in order to perform time shifting functions

3.1.3
hard disk drive
non removable media with a spinning disk for recording video and audio

3.1.4
removable media
write-once or rewritable device to store audio, video or other data via a standardized read/write interface usable in all devices with the respective interface

Note 1 to entry: Examples include optical discs (DVD, BD), memory cards, video tape cassettes.

3.1.5
television set
TV
equipment for the reception and display of television broadcast and similar services for terrestrial, cable, satellite and broadband network transmission of analogue and/or digital signals

Note 1 to entry: A television set may include additional functions that are not required for its basic operation.

3.1.6
time shifting
capability of a device to allow playback type functions with real time broadcast

Note 1 to entry: Such functions may include fast forward, review (rewind), pause and slow motion.

3.1.7
video recording equipment
equipment for the recording and reproduction of video and audio signals on a recording medium

Note 1 to entry: Equipment with only playback function are included as well.

Note 2 to entry: Examples are video cassette recorder (VCR) or a digital versatile disc (DVD) player or recorder.

3.2 Abbreviations

′	Prime
BD	Blu-ray Disc™ [1]
DVD	Digital Versatile Disc
EPG	Electronic Program Guide
IP	Internet Protocol
HD	High Definition (720 p or better)
LNB	Low Noise Block converter
PF	Picture Failure point
RF	Radio Frequency
SD	Standard Definition
TV	TeleVision set
VCR	Video Cassette Recorder
VR	Video Recorder

4 Specification of operating modes and functions

4.1 General

Table 1 contains the operating modes and functions for video recorders.

1 Blu-ray Disc™ is a trade mark of the Blue-ray Disc Association. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named.

4.2 Auto power down function

An auto power down feature may be implemented on a VR to power down into a Partial On mode after a predetermined time and possibly predetermined conditions. Such a feature should be referred to as auto power down.

Table 1 – Operating modes and functions

Power	Mode	Sub-mode	Function(s)	Description
0 W	Disconnected	Disconnected	Disconnect	The equipment is disconnected from all external power sources.
≥0 W	Off	Off	Off	The equipment is connected to an external power source and provides no functions that depend on a power source. The equipment cannot be switched into any other mode with the remote control unit, or an external or internal signal. Note that some power may be consumed if an EMC filter or other components exist on the source side of the power switch.
>0 W	Partial On	Standby-passive	– Wake on – remote control – internal signal	The equipment is connected to an external power source and does not provide its primary functions. The equipment can be switched into another mode with the remote control unit or an internal signal, but not with an external signal.
		Standby-active, low	– Wake on – remote control – internal signal – external signal	The equipment is connected to an external power source and does not provide its primary functions. The equipment can be switched into another mode with the remote control unit, an internal signal, or an external signal.
		Standby-active, high	– Wake on – remote control – internal signal – external signal – Data communications	The equipment is connected to an external power source and does not provide its primary functions. The equipment can be switched into another mode with the remote control unit, an internal signal, or an external signal. Additionally, the equipment is exchanging/receiving data with/from an external source.
	On	On-play	Playing a programme	Playing content from a build in storage device, from removable media or streamed via a device port.
		On-broadcast	Pictures and sound from a broadcast	The equipment is performing the function of providing a viewer with video and audio from a broadcast.
		On-record	Recording a programme from a broadcast	The equipment is connected to a power source and records a signal from an external or internal source.
		On-multifunction	Recording Playing back	The equipment is performing multifunction “On-play” and/or “On-record” simultaneously.

5 Measuring conditions for video recorders

5.1 Input signal

5.1.1 General

In general terms, input signals shall be of the strength and quality for the type of broadcast system on which the VR is intended to be used. Where a VR supports multiple broadcast systems, it shall be tested for each broadcast system in which it operates. Each measured result shall be described in the report.

5.1.2 RF test signal

5.1.2.1 General

For digital terrestrial, satellite and cable VRs, the test signal shall be a signal representative of those present in the typical environment in which the VR is intended to be used. The video and audio components of the transport stream shall be as described in 5.1.2.2 and 5.1.2.3. For analogue terrestrial, satellite and cable VRs, the signal should be typical of the type of signal the VR is designed to receive.

5.1.2.2 Video test signal

The VR shall be tested using an appropriate input signal. This signal should be at the highest resolution that the VR is capable of decoding using the most processing intensive advanced decoding standard of the intended broadcast system(s) that the VR will be used on. A description of the signal used for the test shall be included in the test report. This description shall include at a minimum, resolution, frame rate and bit rate.

If the VR under test is an HD decoder, additional testing may also be conducted with an SD input signal.

Where the VR is operating in a download or recording mode, the input signal should contain content that simulates material that would typically be downloaded or recorded.

Where a VR has a conditional access system, it should be tested whilst decoding encrypted content.

Where a VR can record other services than the one being watched, the test signal should contain sufficient services to enable this feature to be tested.

5.1.2.3 Audio test signal

The VR shall be tested using an appropriate input signal. The audio test signal should have the maximum data rate (bit/s).

The audio format used during the power measurement shall be described in the report.

5.1.3 Broadband input signal

An input signal that provides the equivalent multiplexed transport stream as an appropriate internet protocol (IP) broadband signal conforming to 5.1.2.2 and 5.1.2.3.

5.2 Input terminals

5.2.1 Analogue terrestrial input terminal

If the VR is being tested with an analogue terrestrial RF input signal, the signals used shall conform to IEC 60107-1:1997, 3.3, and shall have the input signal level set at –39 dB(mW) when terminated with a 75 Ω resistor or at a level to provide a perceptually noise free or error free picture.

NOTE 39 dB(mW) corresponds to 70 dB(μV).

5.2.2 Cable television input terminal

If the VR is being tested with a cable television RF input signal, the signals used shall conform to the cable television specifications for the region, and shall have the input signal level set at –49 dB(mW) with a termination of 75 Ω resistor or at a level to provide better than the picture failure point (PF) as defined in IEC 62216 for digital signals or a perceptually noise free picture or error free for analogue signals.

NOTE 49 dB(mW) corresponds to 60 dB(μV).

5.2.3 Digital terrestrial input terminal

If the VR is being tested with a digital terrestrial RF input signal, the signals used shall conform to the broadcast specifications for the region, and shall have the input signal level set at –49 dB(mW) with a termination of 75 Ω resistor or at a level to provide better than the picture failure point (PF) as defined in IEC 62216 or a perceptually noise free picture.

5.2.4 Satellite input terminal

If the television set is being tested with a satellite input signal, the input signal level shall be set at −49 dB(mW) with a termination of 75 Ω resistor or at a level to provide better than the picture failure point (PF) as defined in IEC 62216 for digital signals or a perceptually noise free picture or error free for analogue signals.

5.3 Measurement procedure

5.3.1 General measuring conditions

The general measuring conditions including the type of power meters to be used is as per IEC 62087-1:2015 except where conditions are otherwise specified in this subclause.

5.3.2 Stabilization

The measurements shall be performed after the VR has achieved a stable condition with respect to power consumption. Refer also to IEC 62087-1:2015.

NOTE There are several ways to consider a VR stable. For example, a VR can be considered stable between 15 min and 30 min after entering into each operation mode. In this case, the time used to stabilize the VR shall be recorded in the test report. A VR can be also considered stable when any of the results of the same test repeated are within 2 %.

5.3.3 Environmental conditions

The ambient temperature shall be 23 ºC ± 5 ºC. Refer also to IEC 62087-1:2015.

5.3.4 Setup

The VR shall be set up in a manner to simulate a normal operating environment. In this condition, the measurement shall be made without optional peripheral devices attached to the device. The input signals to the VRs may be either live signals or generated test streams that simulate live signals that the VR is designed to receive and decode.