BS ISO 18383:2015

BSI Standards Publication

Photography — Digital cameras — Specification guideline

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National foreword

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 42, *Photography*.

Introduction

The digital still camera (DSC) marketplace continuously produces and promotes new and competitive cameras. Requiring that manufacturers produce DSCs with standard numerical specifications impedes the technical progress, interferes with fair market competition, hinders the sound development of the industry, reduces camera innovation, and limits the customer's choice. On the other hand, standardized definitions of a fundamental set of camera specifications can help consumers to choose, purchase, and use these cameras because they provide the information needed to understand and compare the numerical specifications offered by the manufacturers and, thus, contribute to the fair competition in the market.

The various fundamental features of DSCs have close relationships with other features, such as camera size or cost. Nonetheless, these features, their relationships, and their numerical values vary with time and technological evolution. Manufacturers design and build their cameras to numerical specifications that balance performance with their estimation of the competitiveness of the product in and the feedback from the marketplace.

This International Standard identifies a set of fundamental features that describe DSCs, along with their accepted definitions, measurements, and presentation methods, but it does not define nor specify numerical values for the features, functions for calculating these values, nor limiting values required for these features.

This International Standard is based on Reference [1] prepared by Camera and Imaging Products Association (CIPA).

INTERNATIONAL STANDARD **ISO 18383:2015(E)**

Photography — Digital cameras — Specification guideline

1 Scope

This International Standard identifies a set of features that describes digital still cameras (DSCs), and it specifies their definitions, measurement methods, and presentation methods. This International Standard applies to DSCs designed and produced for and promoted to general consumers and need not be applied to those DSCs designed and produced to meet individual and special specifications agreed upon by particular business or industrial users and the manufacturer.

The presentation methods specified in this International Standard are intended for use as notations on camera bodies, on product packaging, on promotional materials for advertising and at the point of purchase, in electronic or printed catalogues and other materials, and in the relevant software.

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.

ISO 516, *Photography — Camera shutters — Timing*

ISO 517, *Photography — Apertures and related properties pertaining to photographic lenses — Designations and measurements*

ISO 2720, *Photography — General purpose photographic exposure meters (photoelectric type) — Guide to product specification*

ISO 12232, *Photography — Digital still cameras — Determination of exposure index, ISO speed ratings, standard output sensitivity, and recommended exposure index*

ISO 12233, *Photography — Electronic still picture imaging — Resolution and spatial frequency responses*

ISO 14524, *Photography — Electronic still-picture cameras — Methods for measuring opto-electronic conversion functions (OECFs)*

ISO 15739, *Photography — Electronic still-picture imaging — Noise measurements*

ISO 15781, *Photography — Digital still cameras — Measuring shooting time lag, shutter release time lag, shooting rate, and start-up time*

ISO 17850, *Photography — Digital cameras — Geometric distortion (GD) measurements*

ISO 17957, *Photography — Digital cameras — Shading measurements*

ISO 19084, [1)]*Photography — Digital cameras — Chromatic displacement measurements*

IEC 61747-6:2003, *Liquid crystal and solid-state display devices — Part 6: Measuring methods for liquid crystal modules — Transmissive type*

3 Terms and definitions

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

1) To be published.

3.1
factory shipping conditions
factory shipping settings
factory shipping values
factory shipping mode
camera settings and parameters as configured by the manufacturer for shipping from the factory

3.2
image area
region of an image sensor in the focal plane that captures the part of the incident image and that corresponds to the output image data

3.3
output image
image created by a DSC through capture of an optical image by an image sensor followed by processing and then output through any communication means

3.4
primary notation
notation which describes feature name and value presented solely or most noticeably

3.5
ring pixel
light-sensitive pixels in the image sensor of a DSC, that are outside the image area and are used in the image processing

Note 1 to entry: Examples of image processing are demosaicing, noise reduction, and spatial filtering.

4 Definition set of the product specifications of DSCs

4.1 Basic requirements

This International Standard does not mandate the inclusion and reporting of any features but provides a reference on what presentation methods and written expressions should be used for particular features. The requirements for the definition, measurement, and presentation of the set of DSC features established in this International Standard are described below. Note well that the requirements do not specify numerical values for any features that DSCs shall achieve. There are features included in this International Standard with the paradoxical statement, "This International Standard does not cover this feature." These features are commonly found on many cameras. They are included for completeness and to explicitly recognize that these features are only specified at the discretion of the manufacturer.

a) When a feature is described on the product, in catalogues, or in other documents, the presentation method of the feature and its measured values shall comply with the following requirements:

    1) Features and their values with factory shipping settings or modes shall be presented as the primary notation of those features. The primary notation need not include the description of the setting and measurement conditions. When additional values with different settings are described, they shall include the details of the settings and measurement conditions.

    2) The descriptions of features and their values that are not available through factory shipping settings shall include the settings or modes that make these features available. Features available in multiple settings or modes shall be made available with the setting or mode that is assumed to be the most likely used and shall be presented if they affect the functionality.

    3) Features with no default parameters or modes in the factory shipping setting shall be assigned parameters or modes that are assumed to be the most likely used. They shall be presented if they affect the functionality.

4) Exceptions to the priority on the factory shipping setting may be given to certain features defined in 4.2. They may be given when the above requirements are redundant or when the descriptions with the other settings, parameters, or modes give the users more accurate and definitive information.

b) For cameras with interchangeable lenses, the presentation of any features affected by the choice of lens shall include information that identifies the lens (for instance, the model name of lens, type of lens) attached to the camera and that produces, requires, or otherwise affects that feature. The choice of the lens used in the specification of the feature is left to the discretion of the manufacturer.

c) The reported numerical values of features shall be based on measurements using the actual camera and the standard methods of measurement and calculation. The values designed and verified by the manufacturer may be used when the feature does not have an established measurement and/or calculation method.

d) Variations in names and expressions for features in this fundamental set of features, such as customary names and company-used names, may be used unless

1) the standard explicitly requires a name or an expression;

2) a variation in a name or expression could cause confusion with the name or expression of any other feature in the set of features in this standard;

3) a variation in a name or an expression could cause a misunderstanding.

e) Specific requirements explicitly stated for any particular feature of this set shall have precedence over any of these basic requirements.

f) Regardless of the specified number of significant figures for each feature in the definition set, the number of decimal places may be omitted for integer values in the presentation.

EXAMPLE 4,0 times -> 4 times; 2,0 s -> 2 s; 2,0 m -> 2 m.

4.2 Definitions of specifications

4.2.1 General

Tables 1 to 7 specify the definition, the measurement, and the presentation of a set of fundamental features of DSCs.

In the International Standards for individual features developed by ISO or CIPA, detailed ways of indicating specifications and various characteristics are presented; however, they tend to be too complicated for descriptions in catalogues and other materials for general consumers. Therefore, Tables 1 to 7 give compact notations for individual features that are consistent with official standards and are presented with examples of notation.

The following are conventions used in Tables 1 to 7.

a) The notation {*xxx*} means that *xxx* may be omitted from the description.

b) The notation [*yyy* | *zzz*] means that either *yyy* or *zzz* may be used in the description.

c) The word “company” used in the “Specifications (Definitions)” column refers to any supplier of the DSC.

d) The phrase “depress the shutter button” refers to the operation of fully pressing the shutter button as well as any other general means for starting exposure.

4.2.2 Optical system

Table 1 specifies the definition, the measurement, and the presentation of a set of features for optical systems.

Table 1 — Definitions of specifications and presentation method for optical system

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
1	available focal length {of the lens}	Range of distance along the optical axis between the secondary (rearmost) principal point and the available points of focus in image space when focusing on a subject at infinity Measurement method: Shall comply with ISO 517. Presentation examples: — 3,5 mm — 3,5 {mm} to 10,5 mm Presentation methods: — The value based on the design may be reported. — The value shall be given in units of mm. — The value shall be reported with two or more significant digits (by rounding off). — For cameras with zoom function, Regardless of the factory shipping values, the values available by zooming may be reported.	— A clear or accurate measurement method in product form has not been established for DSCs with built-in lens. — For commonly used lenses, shooting angle of view can be calculated by the formula: 2 × arctan[diagonal length of the image area/(2 × focal length of lens)].
2	available {35 mm film} equivalent focal length {of the lens}	Range of available focal length of a 35 mm film camera that has the same shooting angle of view as the lens for the DSC Method for converting the focal length of a DSC lens to 35 mm {film} equivalent focal length: 35 mm {film} equivalent focal length = focal length of DSC lens × [diagonal length of the image area of 35 mm film (43,27 mm)]/(diagonal length of the image area of the image sensor)	— "These items are an outline of the materials in B.2.1. The last provision of "Presentation methods" shall also apply. — Equating the shooting angle of view for the lens of the DSC with that of a 35 mm film camera, which has a 24 mm × 32 mm image area with a diagonal of 43,27 mm:

Table 1 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
		Presentation methods: — Diagonal length of the image area shall be used as the basis of conversion. — The value shall be given in units of mm. — The value shall be reported as a whole number. In the case that the value is larger than 100 mm, the value may be rounded off to two or more significant digits. — For cameras with a zoom function, regardless of the factory shipping values, the values available by zooming may be reported.	2 × arctan[diagonal length of a DSC image area/(2 × focal length of the lens of a DSC)] = 2 × arctan[diagonal length of a 35 mm film image area/(2 × equivalent focal length of the lens of a 35 mm film camera)] allows one to calculate the equivalent focal length for the lens of a DSC as: Equivalent focal length = Focal length of the lens of a DSC x (Diagonal length of a 35 mm film image area/Diagonal length of the DSC image area) where Diagonal length of a 35 mm film image area is 43,27 mm
3	available apertures {(f-numbers)}	Range of available apertures identified by their f-numbers (f/D), where f is the focal length of the lens and D is an available, effective aperture of the lens Presentation methods: — Presenting either the f-number of the fully open aperture alone or the range of available f-numbers (for a zoom lens) is acceptable. — When presenting a range of available apertures, the f-numbers for both the extreme wide angle of view and the extreme narrow (telephoto) angle of view shall be reported with the designations “(W)” and “(T)”, respectively. In addition, the minimum f-number for the fully open aperture across the entire range of angles of view (focal lengths) shall be reported with the designation “(Min)”. — When a neutral density filter has been used with the aperture, the equivalent f-number(s) may be reported with the designation “(ND)” or “(ND filter used)”. The equivalent f-number is the f-number of the aperture without the neutral density filter, which applies the same light value as the aperture with the neutral density filter does.	— The reporting of f-numbers for available apertures shall comply with ISO 517 as outlined to the left and the items listed under “Presentation methods”. — A clear or accurate measurement method in product form has not been established for DSCs with built-in lens.

Table 1 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
		— When the equivalent f-number is reported for Exif, designation "(Exif Equivalent)" shall be used. — When an f-number is reported that depends upon an unusual or particular feature of the DSC, the designation "(DSC-specific)" shall be used with a reporting of the dependent feature. Presentation examples: — F2,8 (W); F4,8 (T); F5,6 (Min) — F2,8 (W); 5,6 (Min); 4,8 (T) — F2,8 (W); F5,6 (T) (ND filter used)	
4	Zoom [ratio | magnification]	— If the camera has only an optical zoom function, select description (b). — If the camera has only a digital zoom function, select description (c). — If the camera has both functions, the optical zoom function shall be reported with higher priority. — Regardless of the factory shipping values, available values of zoom magnification may be reported.	
	(a) [total | combined] zoom [ratio | magnification]	Available, maximum combined magnifications of the optical zoom and the digital zoom Presentation methods: — The optical zoom magnification shall be reported conspicuously. — The number of significant digits to be reported shall be two or more (round the value to the nearest decimal). — Regardless of the factory shipping values, available values of zoom magnification may be reported. Presentation examples: — 3x optical zoom (12x total zoom magnification) — 3x optical zoom (12x total zoom magnification, 4x by digital zoom) — 3x optical zoom, 4x by digital zoom (12x total zoom magnification)	

Table 1 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
	(b) optical zoom [ratio | magnification]	Available ratios of focal length of the lens at the extreme wide angle of view (W) and the extreme narrow (telephoto) angle of view (T) Presentation methods: — The number of significant digits to be reported shall be two or more (round the value to the nearest decimal). — The details (for example, whether actual value or nominal value is used) of the focal length used in the calculation of optical zoom ratio are not specified. — Regardless of the factory shipping values, available values of zoom magnification may be reported. Presentation examples: — 3,8x — 5x	The measured "effective zoom ratio (by the ratio of the size of captured image)" at a measurable subject distance significantly differs from the real zoom ratio calculated from the real focal length for the subject at infinity, that is, at an extremely large distance.
	(c) digital zoom [ratio | magnification]	Available ratios of the length of the diagonal of the image area without digital zoom to that with full digital zoom Presentation methods: — The number of significant digits to be reported shall be two or more (round the value to the nearest decimal). — The term "shooting digital zoom" may be shortened to "digital zoom" (refer to the feature 60). — Regardless of the factory shipping values, available values of zoom magnification may be reported. Presentation examples: — 3,5x — 5x	
5	[focus | shooting] [range | distance]	Subject distance at which shooting results in an in-focus image of the subject The shortest shooting distance means the smallest subject distance that results in an in-focus image of the subject. The distance from the front surface of the lens or the distance from the effective image area of the image sensor shall be used. The manufacture may select either of the two distance, and which distance is selected shall be presented.	

Table 1 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
		Presentation methods: — For the AF mode, report the subject distances for which the AF function works, and for the MF mode, report the subject distances for which an in-focus image can manually be obtained at the most open aperture. — If the longest shooting distance is infinity, only the shortest shooting distance need be reported. — Regardless of the factory shipping values, available subject distance may be reported. The shooting mode (for example, macro mode) and/or the shooting conditions (for example, maximum wide-angle) that achieve the available subject distance shall be reported. — The conditions for the f-number of the lens are not specified, i.e. the shooting distance of any f-number can be reported. — The number of significant digits to be reported should be one or more for less than 1 m distance and two or more for 1 m or longer distance (round the value to the nearest decimal). Presentation examples: — 50 cm to ∞ (W); 1,5 m to ∞ (T) (from lens surface) — Shortest shooting distance 50 cm (W); 1,5 m (T) (from lens front) — 0,5 m to ∞ (W-end); 1,5 m to ∞ (T-end) (from effective image area) — 1 {cm} to 50 cm (W) (from lens surface when in macro mode)	
6	lens [construction | configuration]	The number of components, for instance, lenses, elements, or groups of lenses, in a compound lens Presentation method: Manufacturers may use any expression (conventional or otherwise) to describe their lens construction and configuration. Presentation examples: — 14 elements in 10 groups (3 aspherical lenses, 1 low dispersion lens) — 7 elements in 6 groups (1 double-side aspherical lens, 1 set of cemented lens)	

4.2.3 Camera control system

Table 2 specifies the definition, the measurement, and the presentation of a set of features for camera control systems.

Table 2 — Definitions of specifications and presentation method for camera control system

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
7	shutter type	Type of shutter mechanism Presentation method: The common expressions or designations of the relevant company may be used. Presentation examples: — Electronic system along with the mechanical shutter — Focal-plane shutter	
8	available shutter speeds {(exposure times)}	Range of available shutter speeds {(exposure times)} Presentation methods: — Available shutter speeds shall be reported in seconds. — Shutter speeds produced by any mode other than by the factory setting mode may be reported together to the shutter speeds with the factory setting mode and they shall include a designation of that particular mode. — The available shutter speeds may be reported together to the shutter speeds with the factory setting mode. The available shutter speeds shall present a note that describes they are combined shutter speeds with all the available settings. Presentation examples: — 1 {second} to 1/2 000 second, 15 {seconds} to 1 s (long shutter mode) — 1/2 000 {second} to 8 seconds (automatic), 60 seconds at maximum (bulb mode) — 1 {second} to 1/1 500 second (automatic mode), 15 {second} to 1/1 500 second (throughout all shooting modes)	The reporting of available shutter speed shall comply with ISO 516 as outlined to the left and the items listed under “Presentation methods”.
9	[light | exposure] metering [system | mode]	Metering system and modes of exposure control Presentation methods: — The customary expressions or designations of the relevant company may be used, as long as such expressions or designations are defined in either a published standard or in the literature supplied by the company and shipped with the DSC. — Regardless of the factory shipping conditions, any metering system and modes used for available exposure control may be reported. Presentation examples: — TTL open-aperture metering — Centre-weighted metering — Spot metering — Multiple pattern metering — Evaluative metering	

Table 2 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
10	available exposure [mode | control]	Available exposure control system and modes Presentation methods: — The common expressions or designations of the relevant company may be used, as long as such expressions or designations are defined in either a published standard or in the literature supplied by the company and shipped with the DSC. — A description of this feature may be included in the feature 16 “shooting mode”. — Any available systems and modes of exposure control may be reported in addition to the factory shipping mode. Presentation examples: — Program AE — Shutter (speed) priority AE — Aperture priority AE — Manual exposure	
11	range of available effective subject brightness values	Range of subject brightness (luminance) that allows the user to shoot practically exposed image without using a flash The brightness value is the binary logarithm of a luminance representative of the scene, B, multiplied by a standard exposure time t_o of one second and divided by an exposure meter constant K_s in the range 10,6 cd s m^{-2} to 13,4 based on information in ISO 2720. $BV = \log_2(B\ t_o/K_s)$ Presentation methods: — The minimum and maximum luminances operationally available and the available increment(s) that determine intermediate adjustments shall be reported as brightness values with the prefix “BV”. — The DSC shall be set to the factory shipping conditions with flash trigger prohibited. If it is not possible to prohibit the flash from being triggered, the value should be evaluated with the subject at a distance that is too far for the flash beam to reach the subject. — The available range values may be reported together or in primacy to the value with the factory setting mode. The available range of values shall present a note that describes they are combined values with all the available settings. — If any value available in modes other than the factory shipping mode is also reported, the shooting mode to which the value applies shall also be reported. Presentation example: — BV3 to 13 (W), BV4 to 14 (T)	The definition of what constitutes a “practical exposure” is left to the discretion of the manufacturer.

Table 2 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
12	range of available exposure settings	Range of exposures controllable by available settings available of the lens aperture and of the shutter speed Presentation methods: — The extreme values of the available exposure settings (values) shall be reported as a sum of the binary logarithm of an f-number of the aperture and the binary logarithm of a shutter speed expressed in seconds; EV = AV + TV AV = $\log_2$(f-number)^2 TV = $\log_2(t_0/t)$ = -$\log_2$(exposure time) Where t is the shutter speed expressed in seconds (= exposure time), t_0 is the nominal shutter speed: one-second, which cancels the units of time (seconds) of the shutter speed expressed in seconds. — The available range values may be reported together or in primacy to the value with the factory setting mode. The available range values shall present a note that describes they are combined values with all the available settings. — When exposure settings (values) produced by modes other than the factory shipping mode, are reported, the modes that produce those values shall also be reported. Presentation examples: — EV 6 to 16 (W), EV 7 to 17 (T) — EV 3 to 17 (W), EV 4 to 18 (T) (shooting mode: P)	
13	exposure compensation	Available range and step size of the exposure compensation feature Presentation methods: — The range of steps shall be reported as ± followed by the magnitude of the range in stops (powers of two) and followed by “stops” or “EV”. — The step size shall be in stops followed by “stop” or “EV” and the word “steps” all enclosed in parentheses. — When the DSC is not equipped with exposure compensation, the value shall be reported as “none” or as “0”. Presentation examples: — ±2 stops (1/3 stop steps) — ±2 EV (1/3 EV steps)	

Table 2 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
14	focus [system | mode | type]	Available system and modes of focus control Presentation methods: — The common expressions or designations of the relevant company may be used, as long as such expressions or designations are defined in either a published standard or in the literature supplied by the company and shipped with the DSC. — Regardless of the factory shipping conditions, any available system and modes of focus control may be reported. Presentation examples: — Central one-point AF — Multiple point AF (9 points) — 9-points AF — Manual focusing — One-shot AF — TTL phase difference detection system (Manual focusing, One-shot AF, Continuous AF)	
15	white balance [system | mode | control]	Available modes that control multiple DSC settings whose values are generally used to capture scenes in a particular type of light Presentation methods: — The names of any modes placed on the DSC by the manufacturer shall be used, as long as such expressions or designations are defined in either a published standard or in the literature supplied by the company and shipped with the DSC. — An explanation of any listed mode may be included. Presentation examples: — Auto, Fine, Cloudy, Fluorescent, Incandescent, Flash, Set mode, Manual — Pre-set (Sunlight, Cloudy, Fluorescent, Incandescent, Flash)	
16	[scene | shooting] [mode | controls]	Available modes that control multiple DSC settings whose values are generally used to capture a type of scene Presentation methods: — The names of any modes placed on the DSC by the manufacturer shall be used, as long as such expressions or designations are defined in either a published standard or in the literature supplied by the company and shipped with the DSC. — An explanation of any listed mode may be included. Presentation example: — Normal, Easy shooting, Macro, Portrait, Sports, Nightscape, Night-scene portrait, Fireworks, Snow, Starry sky	May be broadly interpreted to mean exposure control mode.

Table 2 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
17	blur suppression	Generic term for (1) image stabilization during exposure and aiming and (2) blur reduction during exposure The term "blur" may be replaced with other expressions such as "camera shake" or "subject motion", if necessary.	— If the feature may be classified as either (a) or (b) because the feature has the nature of both (a) and (b), the classification is left to the discretion of the relevant company. Nevertheless, image stabilization and blur reduction should not be confused as their technical aspects differ greatly. — Examples of the classification are presented in C.5.
	(a) image stabilizer	Image stabilization method of correction and/or suppression of blur (compromised definition) in the output image, which is caused by the motion of the DSC and/or by the motion of the subject, by employing the output of the blur detection means A technique is assumed to be a "motion blur reduction" system mentioned in (b) below if it only takes images in high-speed shutter mode by optimizing the exposure control program, even if it employs the output of a blur detection means, and if the technique does not show significant improvement in stabilized output images. Presentation methods: — The system name, mode, and other data shall be reported (if the camera is equipped with this function). — The system name, mode, and other data may follow the customary terms or designations of the relevant company. — Regardless of the factory shipping conditions, any image stabilizing mode available may be reported. Presentation examples: — Optical system — Electronic system — Hybrid system	(1) Optical system includes lens shift systems and image sensor shift systems (2) Electronic systems process images adaptively based on image displacement information detected from the difference in images by taking plural shots. Note that: Even if an image processing system processes images by taking plural shots, it is not considered to be an image stabilizing system without detecting blur information or does not perform adaptable processing in response to the blur information. (3) A hybrid system is a combination of optical and electronic systems.
	(b) blur reduction {mode}	Function or mode that reduces the blur (compromised definition) in output images, which is caused by either subject motion or DSC shake while shooting with long exposure times, through optimization in the exposure control program Independent description of this feature as a blur reduction function or mode is allowable, although this feature is a kind of exposure control mode or sensitivity control mode.	

Table 2 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
		Presentation methods: — Mode names, function names, and other descriptions may follow the customary terms or designations of the relevant company. — Any motion blur reduction mode available may be reported regardless of the factory shipping setting. Presentation examples: — Blur reduction mode — Blur reduction function	

4.2.4 Key components

Table 3 specifies the definition, the measurement, and the presentation of a set of features for key components.

Table 3 — Definitions of specifications and presentation method for key components

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
18	flash	Defines if a camera has a built-in flash or defines if an external auxiliary flash can be mounted Where a flash means a light source which emits a flash of light Presentation methods: — The common expressions or designations of the relevant company may be used, as long as such expressions or designations are defined in either a published standard or in the literature supplied by the company and shipped with the DSC. — If the camera accepts the mounting of an external flash, it is recommended to report examples of available flash units. Presentation example: — Built-in-flash: Auto, Auto/Red-Eye Reduction, Forced-On, OFF — External flash can be mounted	
19	{built-in} flash mode	Available flash modes Presentation methods: — The common expressions or designations of the relevant company may be used, as long as such expressions or designations are defined in either a published standard or in the literature supplied by the company and shipped with the DSC. — Regardless of the factory shipping conditions, applicable flash modes may be reported. Presentation example: — Auto, Forced flash, Suppressed flash, Automatic red eye reduction, Slow sync.	

Table 3 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
20	{built-in} flash {working} range	Range of subject distances that allows the user to get an image with practically correct exposure with only the flash illumination This International Standard does not cover this item.	— To determine the flash range means to determine an acceptable image quality limit. It is impossible to determine uniformly what an acceptable picture quality is, as it varies greatly depending on the shooting scene (subject), viewer's personal taste and feeling, type of DSC, etc. — Accordingly, it is inappropriate to specify an acceptable picture quality uniformly in International Standard; it should be left to the discretion of each supplier and the market.
21	{built-in} flash guide number	Amount of flash light Presentation methods: — The value shall be reported in units of meters (m) — The value may be reported (as is customary) without explicit units (meters or m). — The value of the primary notation shall be calculated for ISO 100. — Values calculated for other ISO speeds may be reported. Presentation examples: — Gno.7 (ISO 100• m), Gno.14 (ISO 400• m) — Gno.7 — GN7, GN14 (ISO 400• m)	
22	image sensor	Classification and size of image sensor	
	(a) [system | type]	Classification of image sensor (type, system, etc.) Presentation method: — Common expressions and designations of the manufacturer may be used. Presentation examples: — CCD — CMOS sensor	
	(b) size	Size of image sensor Presentation method: — Common expressions and designations of the manufacturer may be used. Presentation examples: — 1/2,5 type — 36 {mm} × 24 mm — 35 mm format film size — APS-C	Some examples of notation are given in CIPA DCG-001.

Table 3 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
23	{picture} [monitor| display]	Characteristics of monitor or display	
	(a) [system | type]	Type of picture monitor Presentation methods: — Common expressions and designations of the manufacturer may be used. — In case of a monochrome monitor, it shall explicitly be reported. Presentation examples: — Transflective TFT liquid crystal display — TFT liquid crystal display — OLED	
	(b) image size	Image size on the {picture | LCD} monitor, where the size means the dimensions of the area excluding all sections that do not contribute to the display of images or characters Presentation method: — Common expressions and designations of the manufacturer may be used. Presentation examples: — 2,5 type — 75 mm diagonally — 7,5 cm diagonally	
	(c) {number of} [pixels | dots]	Number of effective pixels or dots of the {picture | LCD} monitor, where the number means the effective pixels or dots of the area excluding all sections that do not contribute to the display of images or characters The relationship between the number of pixels and the number of dots is: three dots of consecutive R, G and B dots constitute one pixel in a display by three primary colours, R, G and B. (refer to IEC 61747-1) Presentation methods: — The number of significant digits to be reported shall be two or more (round off the value to the nearest decimal). — It is recommended to report the value in units of 10 000 in Japanese, and in units of 1 000 (or k) in English. Presentation examples: — 215 k dots — 72 k pixels	

Table 3 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
	(d) [defect | defective {pixels}]	Pixels that do not illuminate according to the received signals as they should normally do, or more specifically, those pixels that significantly differ in output from the other pixels so that the user can clearly perceive the defect	
	(e) maximum luminance	Monitor brightness (luminance) when the maximum signals (255 in the case of an eight-bit digital signal) are given in a white window pattern This characteristic reflects the conditions found in a darkroom; The provision of this item shall be limited only to the standard measurement method in the darkroom condition in which the luminance on the measured surface is not affected by any external light. (This International Standard does not define the maximum luminance in different environments.) Measurement method: Shall comply with IEC 61747-6, 5. Presentation methods: — If the DSC has a brightness adjustment function, set the brightness to the maximum. — Reflective-type monitors are out of scope of this item. — The number of significant digits to be reported shall be two or more (round the value to the nearest decimal). Presentation example: — 210 cd/m^2 or higher	— The same measurement method is provided in the JEITA standard, EIAJ ED-2522, 5.9. — This performance expresses the characteristics in the darkroom condition; it does not express characteristics in various environments. — The luminance of a liquid crystal display has a trade-off relationship with other liquid crystal display characteristics (contrast, colour reproduction characteristics, reflectance, etc.).
	(f) [{picture} coverage | field of view]	— When displaying a recorded image: Percentage of the dimensions of the recorded image shown on the display — When displaying the scene for shooting: Percentage of the dimensions of the output image shown on the display Presentation methods: — Two values in the width (horizontal) and height (vertical) directions shall be reported respectively; however, in the case that the difference in the monitor coverage between the horizontal and vertical directions is small, the two values may be unified into one, using the root-mean-square (rms) of the values for the two directions. — Use the values on the centreline of the image (the width monitor coverage is defined on the horizontal line at the vertical centre and the height monitor coverage is defined on the vertical line at the horizontal centre).	

Table 3 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
		— The mode to which the values apply shall be reported when the monitor coverage values of the playback image mode and of the shooting image mode differ. — The number of significant digits to be reported shall be two or more (round the value to the nearest decimal). Presentation examples: — 96 % — Approximately 100 % — 97 % (for shooting), 100 % (for displaying) — 98 %(horizontal), 100 %(vertical)	
	(g) brightness [adjustment | control] function	A function of {automatic} brightness [adjustment | control] that adjusts the brightness of the [monitor | display] {to the ambient illumination} Presentation methods (if the function is provided): — The common expressions or designations of the relevant company may be used, as long as such expressions or designations are defined in either a published standard or in the literature supplied by the company and shipped with the DSC. — Regardless of the factory shipping conditions, any available modes of brightness control function may be reported. Presentation examples: — Brightness control — Auto power monitor mode/ Power monitor mode — Intelligent LCD mode/ Power LCD mode	
24	viewfinder	Characteristics of the viewfinder	For an electronic viewfinder, details that are not described in the feature 24 should conform to the feature 23.
	(a) [system | type]	Type of viewfinder Presentation methods: — Common expressions and designations of the manufacturer may be used. — In case of a monochrome viewfinder, it shall explicitly be reported. Presentation examples: — Optical viewfinder — Viewfinder of single-lens reflex camera optics — Liquid crystal EVF — TFT monochrome liquid crystal viewfinder	

Table 3 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
	(b) [{picture} coverage | field of view]	Percentage of the dimensions of the image seen in the viewfinder to the range of the output image Use the values on the centreline of the image seen in the viewfinder. (The width viewfinder coverage is defined on the horizontal line at the vertical centre and the height viewfinder coverage is defined on the vertical line at the horizontal centre.) Measurement method: — The view point shall be set at the centre at measuring. Presentation methods: — If the difference in the viewfinder coverage between the horizontal and vertical directions is large, it is recommended to report two values in the width (horizontal) and height (vertical) directions, respectively "n_h/N_h and n_v/N_v". (Report the values of the two directions using a one-dimensional expression.) See the drawings below. — If the difference in the viewfinder coverage between the horizontal and vertical directions is small, the two values may be unified into one, using the root-mean-square (rms) of the values for the two directions. — If the value changes greatly by zooming, it is recommended to report both the values at two points of the maximum telephoto (T) position and maximum wide angle (W). — If the range of output image is smaller than the range that is seen in the viewfinder, then the expression of the viewfinder coverage will exceed the value of 100 %. In such cases, it is recommended to state the range of output image expressly. — The subject should be at the distance of 3 m in principle. If the value at a distance other than 3 m is to be reported, then that distance shall be reported together. — The number of significant digits to be reported shall be two or more (round the value to the nearest decimal). Presentation examples: — 93 % — Horizontal: 85 %; vertical: 96 % — 80 % (W), 90 % (T)	

Table 3 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
	(c) parallax	Displacement between the centre of visual field and that of the output image in the vertical and horizontal directions Presentation methods: — Subject distance for the measurement shall be reported, yet this International Standard does not specify it. — Express the displacement as a ratio (%) of the number of displaced pixels in the horizontal "d_h" and vertical directions "d_v" to that of pixels of the output image in the corresponding directions "N_h and N_v". See the drawings below.	
	(d) [dioptre | dioptric] adjustment	Defines if a camera is provided with a viewfinder adjustment function (mechanism) or not Presentation methods (if the function is provided): — It is recommended to report its adjustment range together (only the range may be reported, suggesting that the function is provided). — Report the adjustment range in units of m^{-1}, with the positive and negative signs (+, −) relative to the reference dioptre scale. Presentation example: — Dioptre scale adjustment range −3 m^{-1} to +1 m^{-1}	
	(e) [eye point | eye relief]	The position where the user can see the entire area of the image and all the information displayed in the viewfinder Express as the maximum distance from the "position closest to the photographer out of the structural components around the camera's eyepiece frame" or the "rear end of the camera's eyepiece including the protective glass" to the "position at which the pupil can see all screen images and all information in the viewfinder". Further, move the distance from the "position closest to the photographer out of the structural components around the camera's eyepiece frame" may be defined in a state where any structural components removable from the camera's eyepiece frame such as the eyecup, are removed.	(Recommended) measurement method: — Place a shield of the light that has a pinhole with a diameter of 2 mm or smaller between the viewfinder and the observer on the optical axis of the viewfinder, and move the pinhole along the optical axis of the viewfinder until the observer can see the entire area of the image and all information in the viewfinder. Then take the position of the pinhole as the "position at which the pupil can see the entire area of the image and all information in the viewfinder".

Table 3 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
		Presentation methods: — It shall be expressly reported which value is used out of the above two values for the maximum distance, unless "the position closest to the photographer out of the structural components around the camera's eyepiece frame" is used. — The number of significant digits to be reported shall be one or more for a distance shorter than 10 mm, and two or more for a distance of 10 mm or longer (round the value to the nearest decimal). Presentation example: — eye point 21 mm (from the rear end of the camera's eyepiece)	

4.2.5 Recording system

Table 4 specifies the definition, the measurement, and the presentation of a set of features for recording system of DSCs.

Table 4 — Definitions of specifications and presentation method for recording system

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
25	[recording | storage] capacity	Total number of images that can be stored in the recording media Presentation methods: The following conditions, which are closely related to the number of output images, shall be reported. — The number of output pixels (including the aspect ratio, if necessary) — Compression mode (fine, standard, normal, etc.) — The type of recording media used (xD, CF, SD, MS, built-in memory in the body of the DSC, etc.) and its nominal capacity — Nominal capacity (In the case of recording to the built-in memory in the body of the DSC, the capacity available only for recording images shall be reported.) — The number of images recordable in shooting modes other than in the factory shipping setting may be reported, but in this case report in what shooting modes the number is available. — It is recommended to include comments such as "value for reference only", "minimum value", or "depends on the subject". — The designation and details of compression mode are left to the discretion of the relevant company.	

Table 4 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
26	recording time for continuous movie capture	Time duration of recording motion pictures continuously (the time duration until continuous shooting is stopped, regardless of the cause) Measurement method: — Shall comply with the method of measuring battery life for continuously shooting motion pictures for DSC described in A.4.1. Presentation methods: — The following factors that stop continuous shooting are to be stated: — limit due to rise in temperature — limit due to file format — limit due to specifications of the product — limit due to capacity of recording medium (value when using a recording medium with the maximum capacity) — limit due to battery life — It is recommended to report factors that limit continuous shooting. — Values should be presented in units of minute rounded by truncating seconds, but this does not apply to cases in which the time is accurately defined due to the limit of the product specifications or file format. — In cases of limits due to the file format or capacity of the recording medium, it is recommended to report setting conditions such as motion picture recording mode. Presentation examples: — 10 min (heat rise limit, at room temperature of 23 °C) — 10 min and 10 s (in Full HD shooting: limited by file size of 2 GB) — 29 min and 30 s (limited by product specifications) — 2 h and 10 min (in Full HD shooting: limited by capacity of 32 GB SDHC memory card)	The limit value due to battery life is the same as indicated in the feature 61, “battery life”.
27	{[image | recording | storage]} file format	Image file format and directory structure recorded in the digital recording medium Presentation method: (Add to the presentation method provided in B.2.2.) — Additional comments shall be given to RAW and other unique formats such as “original”. Presentation examples: — Exif 2.3, DCF — RAW (xxx unique) — RAW (needs dedicated software)	These items are an outline of the material in B.2.2. The reporting of f-numbers for available apertures shall comply with ISO 517:as outlined to the left and the items listed under “Presentation methods”.

Table 4 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
28	number of effective pixels	Number of pixels of the imaging sensor receiving light from the lens for which output information is effectively reflected in the data ultimately output as the still image	These Items are an outline of the material in B.2.3.
29	number of recorded pixels	Number of pixels in the image frame recorded on the digital recording medium Presentation method: (Add to the presentation method provided in B.2.3.) — Regardless of the factory shipping values, the number of recorded pixels available may be reported as a list.	These items are an outline of the materials in B.2.3.
30	[sound | audio] codec	Sound codec system available for still picture recording with audio, for example Presentation method: — Common expressions may be used. Presentation examples: — WAVE (monaural) — G.726 — MP3 (stereo) — AC-3 (monaural)	
31	[movie | video] {[clip | capture]}	Guidelines for Specifications (Definitions) and Presentation: Video related items, which do not appear in Tables 1 to 7 shall refer to the B.2.4.	The relevant items are: response time of movie clip, start time of recording and time to automatic termination of record pause.
32	compressed recording for motion picture and sound	See B.2.5.	The relevant items are: system and file format for motion picture recording, pixel number for motion picture recording and aspect ratio, frame rate for motion picture, recording rate for motion picture, system and number of channel for sound recording, sound sampling rate or bit length, sound recording rate, sound accompanied with motion picture, recording time for motion picture, environment for enabling play-back.

4.2.6 Image quality

Table 5 specifies the definition, the measurement, and the presentation of a set of features for image quality of DSCs.

Table 5 — Definitions of specifications and presentation method for image quality

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
33	sensitivity	Sensitivity for shooting Presentation methods: — Characteristics to be specified as 'Sensitivity' are the assigned values of ISO speed, Standard Output Sensitivity (symbol: SOS), and/or Recommended Exposure Index (symbol: REI). The use of one of them, two of them or all of them shall be acceptable. It is also acceptable to use the terms 'ISO speed', 'Standard Output Sensitivity' and/or 'Recommended Exposure Index' as notational terms of each value instead of using the word 'Sensitivity'. — When assigned values are specified as 'Sensitivity' in catalogues or instruction booklets, one of ISO speed, Standard Output Sensitivity and Recommended Exposure Index shall be listed. Presentation examples: — Standard Output Sensitivity: ISO 125 Recommended Exposure Index: ISO 100 — ISO 100 (Standard Output Sensitivity) — ISO 100 (REI) (REI: Recommended Exposure Index) — ISO 100 (ISO speed)	These items are an outline of ISO 12232. The reporting of sensitivity shall comply with ISO 12232 as outlined to the left and the items listed under "Presentation methods". This reference International Standard also requires below for example; (1) The calculated value shall be rounded off using Table 1 of the International Standard. (2) A "D" or descriptive term such as "Daylight" may be used to designate daylight illumination, but is not required. A "T" or descriptive term such as "Tungsten" shall be used to designate tungsten illumination. (3) It is possible that the SOS value changes as a function of the f-number of the lens, for example due to the structure of a micro-lens overlay on the image sensor. In such cases, the f-number used for the measurement shall be reported along with the SOS value.
34	[defect | defective pixels]	Pixels that are not supplied in the output signals from a DSC as they should normally be, or more specifically, those pixels that significantly differ in output from the other pixels so that the user can clearly perceive the defect	— This International Standard does not specify any measurement method. — This word reports a defect of the DSC unit, instead of a defect of individual parts.
35	resolution	Limit of resolution with which fine patterns can be resolved excluding aliasing portions, and is expressed as the number of lines per unit height of the picture frame (LW/PH) It shall comply with ISO 12233 and use the "visual resolution" method defined in this reference and some mandatory requests and conveniences are added as follows. The resolution value derived from the SFR as the spatial frequency value for a given modulation level (See ISO 12233:2014, 8.3.1) may also be used as the summary resolution metric as long as it is consistent with the visual resolution.	— This rule is to be equivalent to CIPA DC-003 complying with and referring to ISO 12233. — The unit LW/PH is "Line Width per Picture Height"

Table 5 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
		Measurement method: — Basic method with visual evaluation: The measurement comply with the “visual resolution” measurement method using the resolution test chart in ISO 12233. And visual evaluations shall be made as follows to ensure consistency. a) The measured resolution shall be the spatial frequency at which individual black and white wedge lines on a visual resolution test pattern can no longer be distinguished (e.g. the number of visible lines changes from 5 to 4). b) Observations shall always be made from lower to higher spatial frequencies. c) When assigned values are specified as ‘Sensitivity’ in catalogues or instruction booklets, either Standard Output Sensitivity or Recommended Exposure Index shall be listed. d) Any desired image magnification may be used for viewing. — Alternative method with evaluation software: Evaluation using software that performs the equivalent processing as visual evaluation is also possible. Presentation methods: (1)Numerical values of resolution: — Notation of resolution shall include only the resolution measured in the conditions specified by the method in accordance with the visual resolution measurement defined in ISO 12233, and the values shall be reported in unit LW/PH. — Any resolution exceeding 600 lines (LW/PH) is preferably noted in units of 50 lines (LW/PH). — Notation of resolution shall always include the smallest value among the measurements obtained in the four directions: horizontal, vertical, 45-degree diagonal to the upper right, and 45-degree diagonal to the lower right. — When reporting any value(s) other than the smallest one, it shall be always accompanied by the smallest value.	

Table 5 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
		(2)Resolution measuring direction: — When reporting the resolution values obtained in two or more measuring directions, the relevant resolution measuring directions shall be noted. — For simplicity, "45-degree diagonal to the upper right" may be expressed as "diagonal to the upper right" and "45-degree diagonal to the lower right" as "diagonal to the lower right." — When reporting the value in either direction of "45-degree diagonal to the upper right" or "45-degree diagonal to the lower right", the direction may be expressed simply as "diagonal". Presentation examples: — the smallest single value 1 100 LW/PH — the largest and smallest values Horizontal:1 250 LW/PH, Diagonal 1 100 LW/PH — Each four directions Horizontal: 1 250, Vertical: 1 200, 45-degree diagonal to the upper right: 1 150, 45-degree diagonal to the lower right: 1 100	
36	low contrast luminance amplitude/ frequency response	Luminance amplitude/frequency response characteristics of a low contrast subject Presentation methods: — The results shall be reported in a table or a graph with the x-axis representing the frequencies, the y-axis representing the amplitude values. — It is recommended to state shooting conditions that significantly affect the characteristics (such as f-number and focal length of lens, subject distance, and ISO sensitivity, etc.). — When reporting this characteristic, state at least any one of "individual characteristics", "average characteristics and those in the direction with the minimum value", and "characteristics in the direction with the minimum value" in four directions, or horizontal, vertical, +45° diagonal, and −45° diagonal directions. — "Characteristics in the centre" and "characteristics at a position with the minimum value out of four corner parts" should be stated.	— These items are an outline of ISO 19567. — The reporting should comply with ISO 19567 and the items listed under "Presentation methods". NOTE An International Standard of measurement method of this feature is under development as ISO 19567, Texture reproduction measurements, by ISO/TC42.
37	signal to noise ratio	Signal to noise ratio of the output image	Shall comply with ISO 15739.
38	[opto-electronic conversion function | tone characteristics]	Characteristics of the output signal level of the output image signals versus the input level of light	Shall comply with ISO 14524.

Table 5 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
39	dynamic range	Ratio of the maximum level of luminance signals without saturation to the minimum level of luminance signals (the level of luminance signals where the S/N ratio to random noise is one)	Shall comply with ISO 15739.
40	image geometric distortion	Displacement from the ideal shape of a subject (lying on a plane parallel to the image plane) in the recorded image Presentation method: — In case of reporting the line geometric distortion, the number of significant digits to be reported shall be two or more (round the value to the nearest decimal). Presentation examples: — ISO line geometric distortion +2,5 % — Geometric distortion -2,0 % (ISO line geometric distortion)	— These items are an outline of ISO 17850. — The reporting shall comply with ISO 17850 and the items listed under “Presentation method”.
41	lightness non-uniformity	Variation of the lightness signal components within the image field Presentation method: — The number of significant digits to be reported shall be one or more places below the decimal point (round the value to the nearest decimal). Presentation example: — 12,2 or less	— These items are an outline of ISO 17957. — The reporting shall comply with ISO 17957 and the items listed under “Presentation method”.
42	luminance non-uniformity	Variation of the luminance signal components within the image field Presentation method: — The number of significant digits to be reported shall be one or more for less than 10 %, and two or more for 10 % or more (round the value to the nearest decimal). Presentation example: — 53 % or less	— These items are an outline of ISO 17957. — The reporting shall comply with ISO 17957 and the items listed under “Presentation method”.
43	colour non-uniformity	Variation of the chrominance signal components within the image field Presentation method: — The number of significant digits to be reported shall be one or more places below the decimal point (round the value to the nearest decimal). Presentation example: — 5,8 or less	— These items are an outline of ISO 17957. — The reporting shall comply with ISO 17957 and the items listed under “Presentation method”.

Table 5 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
44	total colour non-uniformity	Variation of the total colour within the image field Presentation method: — The number of significant digits to be reported shall be one or more places below the decimal point (round the value to the nearest decimal). Presentation example: — 18,5 or less	— These items are an outline of ISO 17957. — The reporting shall comply with ISO 17957 and the items listed under "Presentation method".
45	white balance	Deviation from white of the output image, when a gray chart illuminated by light sources with various colour temperatures is shot This International Standard does not cover this item.[a]	
46	colour reproduction	Difference of colour between the actual colour of a subject and the output colour obtained by shooting This International Standard does not cover this item.[b]	
47	chromatic displacement	Displacement of R or B signals to G signal in output signals	These items are an outline of ISO 19084. NOTE An International Standard of measurement method of this feature is under development as ISO 19084, chromatic displacement measurements, in ISO/TC42.
48	image flare	Unwanted increase in signal resulting from light incident on an image sensor that does not emanate from a corresponding subject point Presentation methods: — The shooting conditions (f-number, and focal length of lens, etc.) that significantly affect the characteristic should be reported. — The number of significant digits to be reported shall be one or more for less than 1 %, and two or more for 1 % or more (round the value to the nearest decimal). Presentation example: — Flare 1,5 % (W; F2,8)	— These items are an outline of ISO 18844. — The reporting should comply with ISO 18844 and the items listed under "Presentation methods". NOTE An International Standard of measurement method of this feature is under development as ISO 18844, Image flare measurement, in ISO/TC42.
49	proper exposure	Exposure value that produces the optimum picture quality This International Standard does not cover this item.[c]	
50	minimum acceptable luminance for scene or subject	Minimum luminance of a scene or subject that is needed to produce an acceptable picture quality This International Standard does not cover this item.[d]	
51	depth of field	Range of distances in the subject space within which the surfaces of the subjects are assumed to be in focus on the image plane This International Standard does not cover this item.[e]	

Table 5 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
52	image stabilization performance	Extent of the correction of camera shake observed as a change in the shutter speed Presentation methods: — The extent of image stabilization shall be reported as the binary logarithm of the ratio of the shutter speed1 to the shutter speed2. The shutter speed1 is the shutter speed at which the reference motion blur amount is the determination level for image stabilization performance and shutter sped2 are the shutter speed at which the measured motion blur amount with image stabilization function are the determination level for image stabilization performance. — The extent of image stabilization produced by modes other than the factory shipping mode may be reported. — When image stabilization produced by modes other than the factory shipping mode is reported, the mode that produces those effects shall also be reported. Presentation examples: — Image stabilization performance: 2,0 stops (W); 2,5 stops (T) — Image stabilization performance: 2,0 stops or more (in the whole range of focal distance)	These items are an outline of the materials in B.3.1. Note that: CIPA DC-011 listed in B.3.1 is a standard for optical systems, but regarding the presentation method and presentation examples, it may be applied to other systems until other standards are established for them.

[a] It is impossible to define the targeted characteristics. Colourimetric white balance is different from the preferable white balance of DSCs, and so a DSC that always reproduces gray as white may not produce a desirable image.

[b] It is impossible to define the targeted characteristics.

— Colourimetric colour reproduction is different from colour reproduction required for DSCs, and so a DSC with little error in colour reproduction may not produce a desirable image.

(Example: It is impossible to evaluate memorized colours by means of colourimetric performance.)

— Colour reproduction characteristics might be a function of other settings such as white balance setting, shooting mode, etc.

— If a camera has a mode that produces a scene-referred image, the colour reproduction can be objectively evaluated in this mode.

[c] It is impossible to determine uniformly what the optimum exposure is, as it varies greatly depending on the shooting scene (subject), viewer's personal taste and feeling, type of DSC, etc.

Accordingly, it is inappropriate to specify a proper exposure value uniformly in a public standard; it should be left to the discretion of each supplier and the market.

[d] Picture quality depends on a close relationship or balance of many individual features that affect picture quality. It is impossible to determine uniformly what an acceptable picture quality is, as it varies greatly depending on the shooting scene (subject), viewer's personal taste and feeling, type of DSC, etc.

Accordingly, it is inappropriate to specify an acceptable picture quality or minimum subject illumination uniformly in a public standard; it should be left to the discretion of each supplier and the market.

[e] Defining the depth of field is equivalent to specify an acceptable value of resolution or sharpness, that is, acceptable picture quality. An acceptable or optimum picture quality varies greatly depending on the shooting scene (subject), viewer's personal taste and feeling, type of DSC, etc.

Accordingly, it is inappropriate to specify the depth of field uniformly in a public standard; it should be left to the discretion of each supplier and the market.

4.2.7 Response time

Table 6 specifies the definition, the measurement, and the presentation of a set of features for response time of DSCs.

Table 6 — Definitions of specifications and presentation method for response time

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
53	start-up time	Time between switching a DSC on and the moment the camera has reached a standby state ready to shoot Presentation methods: — Shall comply with ISO 15781 on the number of significant digits in spite of the basic requirement f) in 4.1. — The time under settings other than the factory shipping conditions may be reported with an additional statement on the conditions under which such time is valid. Presentation examples: — 1,0 s — 1,5 s; 0,9 s (when flash is turned OFF)	— These items are an outline of ISO 15781. — The reporting of image start-up time shall comply with ISO 15781 as outlined to the left and the items listed under “Presentation methods”. — “Pre-Exposure” stated in ISO 15781 has the same meaning as “1st release”.
54	shutter release time lag	Time duration to the time of starting the exposure from the time of fully pressing down the shutter button after having stabilized the focus operation due to half pressing of the shutter Presentation methods: — Shall comply with ISO 15781 on the number of significant digits in spite of the basic requirement f) in 4.1. — The time under settings other than the factory shipping conditions may be reported with an additional statement on the conditions under which such time is valid. Presentation examples: — Shutter time lag: 0,015 s — Release time lag: 0,02 s — Release lag: 20 ms (35 mm film equivalent focal length: 60 mm)	— These items are an outline of ISO 15781. — The reporting of shutter release time lag shall comply with ISO 15781 as outlined to the left and the items listed under “Presentation methods”. — Examples of more concise expressions are “shutter {time} lag” or “release {time} lag”.

Table 6 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
55	shooting time lag	Time between pressing the exposure button (firmly depress the shutter button to the maximum extent without introducing a discontinuity) and the beginning of the exposure. This period of time includes all measurements and adjustments – like auto focus and exposure control – a DSC needs to make prior to the beginning of the exposure Presentation methods: — Shall comply with ISO 15781 on the number of significant digits in spite of the basic requirement f) in 4.1. — The time under settings other than the factory shipping conditions may be reported with an additional statement on the conditions under which such time is valid. Presentation examples: — Shooting time lag: 0,6 s (subject distance 3 m, F2,8) — Shooting time lag: 1,0 s (liquid crystal touch shutter)	— These items are an outline of ISO 15781. — The reporting of shooting time lag shall comply with ISO 15781 as outlined to the left and the items listed under “Presentation methods”. — In case of a camera with a shutter button having two positions for pre-exposure (1st release) and start of capture (2nd release), press the button in one motion down to the start of capture (2nd release) position.
56	[burst] shooting rate	Reciprocal of the time duration from the start of exposure of an image to the start of exposure of the next image in continuous shooting (mode) It is equal to the number of shots (performance) per second a camera can take successively. Presentation methods: — Shall comply with ISO 15781 on the number of significant digits in spite of the basic requirement f) in 4.1. — State the rate by linking to the number of shots recordable in continuous shooting. Presentation examples: — 3,0 shots/second (up to 7 continuous shots) — 3,0 frames/second (up to 7 continuous frames) — 3,5 shots/second (for up to 7 shots); 1,5 shots/second (after the 8th shot) (when xxx medium is used)	— These items are an outline of ISO 15781. — The reporting of shooting rate shall comply with ISO 15781 as outlined to the left and the items listed under “Presentation methods”. — In the case of indicating the same contents by the shooting interval (time) in continuous shooting (mode), use an item name different from the shooting rate (for example, continuous shooting interval). If the shooting rate becomes remarkably slow, report the time duration before it becomes remarkably slow.
57	number of [recordable pictures | shots] in [burst {shooting} | continuous shooting] mode	The number of shots that a camera can continuously take at an approximately constant speed in continuous shooting (mode) Presentation method: It is recommended that the value be reported linked to the continuous shooting speed. Presentation examples: — 7 shots (3,5 shots/second) — 100 shots — Up to the capacity of the recording medium	— These items are an outline of ISO 15781. — The reporting of number of shots in burst shooting mode shall comply with ISO 15781 as outlined to the left and the items listed under “Presentation method”.

Table 6 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
58	shooting interval	Time interval from the time of one release to the time of the next available release in single shooting mode that takes pictures one by one, where the time interval is defined as the time duration from the end of an exposure to the start of the next exposure Measurement method: Between one shot and the next, there must be a moment when the finger completely leaves the shutter release button. Other conditions of measurement should conform with ISO 15781. Presentation methods: — The number of significant digits should be two or more by rounding the value to the nearest decimal; however, one digit will suffice for times of less than 1 s. — In spite of the basic requirement f) in 4.1, shall comply with the above requirement on the number of significant digits even when the reported value is a whole number. — The time under settings other than the factory shipping conditions may be reported with an additional statement on the conditions under which such time is valid. Presentation examples: — 0,5 s (image size VGA) — 1,2 s — 2,0 s	If the shutter speed is short enough, the interval from the time of starting an exposure to the time of starting the next exposure will be roughly the same value.
59	Auto Focus {AF} speed	Time duration from the start of AF operation to the end of focusing action (including the time required for processing or actions other than the AF action conducted during the period) Measurement methods: — Internal measurement method: See A.4.2. — External measurement method: See A.4.2 and shall comply with ISO 15781 for the specific measurement method. External measurement method is to be treated as an alternative when measurement by Internal measurement method is technically not practical.	Examples of ” conditions affecting the AF speed”: — (in the case of an interchangeable lens camera) such conditions as the lens — focal length of the lens — f-number of the lens — lighting conditions — multiple or spot measurement of distance

Table 6 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
		Presentation methods: — Report which methods Internal measurement method or External measurement method is used. — The time under settings other than the factory shipping conditions may be reported with an additional statement on the conditions under which such time is valid. Especially, "conditions affecting the AF speed" should be expressly stated, when the fastest value is stated. — Additional conditions significantly affecting AF speed should be stated for other cases; however, this additional statement of shooting conditions may be omitted, if the maximum value under shooting conditions is reported. — The measurement value should be reported as the average value obtained from 8 of 10 measurement values by eliminating the maximum and minimum values. — Results should be presented in units of 0,01 s for Internal measurement method (round the value up to a unit) and in units of 0,1 s for External measurement method (round the value up to a unit). Presentation examples: — Fastest: 0,15 s (Internal measurement method; f = 14 mm; F3,5; LV7 – 14; face recognition OFF; manual exposure; focus priority mode; centre area fixed; and AF-S mode) — Maximum: 0,2 s (External measurement method)	— AF mode — release mode — exposure mode — face recognition

4.2.8 Miscellaneous features

Table 7 specifies the definition, the measurement, and the presentation of a set of features for miscellaneousness of DSCs.

Table 7 — Definitions of specifications and presentation method for miscellaneousness

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
60	[zoom ratio | magnification] of playback mode	Ratio of similitude between the enlarged image and the original sized image on the picture display in playback mode Presentation method: If the enlarged magnification is different between the horizontal and vertical directions, report the ratio of length in the diagonal direction. Presentation example: — 4x	

Table 7 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
61	battery [consumption | life]	Total number of images that can be taken without changing or recharging the battery (starting with a new primary battery or fully charged rechargeable battery) Note that: Different methods shall be used for still shooting and capture of movie clips. Presentation method: It is acceptable to report only one of the two.	
	(a) battery [consumption | life] of still [shooting | capture]	See B.3.2 (an outline is shown below). Total number of images that can be taken without changing or recharging the battery during still shooting	
	(b) battery [consumption | life] of [movie | video] [clip | capture]	Time duration that can be shot without changing or recharging the battery during movie recording Nevertheless, —If recording is stopped due to the limit of continuous recording time of the DSC, resume recording as soon as possible, and battery life is defined as the total duration of movie recording. —If recording is stopped due to the limit of temperature rise, repeat the operation to resume recording after allowing the camera to cool, and battery life is defined as the total duration of movie recording. Measurement method: See A.4.1. Presentation methods: —In principle, report the actual shooting battery life. —When this item is reported in a catalogue, report also "recording time for continuous movie capture" mentioned in the feature 26.	—The measurement method is intended to keep consistency with JEITA CP-3202B. —The measurement methods shown in A.4.1 is adding some modifications, such as defining detailed conditions suitable for DSCs, to the above JEITA standard.
	(b-1) battery [consumption | life] of [movie | video] [clip | capture] in actual use case	Time duration that can be shot and recorded without changing or recharging the battery in a test conducted by a shooting method simulating actual usage conditions of movie recording (activating actions such as zooming the lens position, REC and STBY of shooting, ON-OFF of power in a specified sequence) Measurement method: See A.4.1.1.	—The measurement method is intended to keep consistency with JEITA CP-3202B. —The measurement methods shown in A.4.1.1 is adding some modifications, such as defining detailed conditions suitable for DSC, to the above JEITA standard.
	(b-2) battery [consumption | life] of continuous [movie | video] [clip | capture]	Time duration that can be shot and recorded continuously without changing or recharging the battery under specified fixed conditions (such as fixing the lens at the wide angle end, fixing the shooting in REC action, fixing the power at ON, and fixing the subject) Measurement method: As shown in A.4.1.2.	— The measurement method is intended to keep consistency with JEITA CP-3202B. — The measurement methods shown in A.4.1.2 is adding some modifications such as defining detailed conditions suitable for DSC, to the above JEITA standards.

Table 7 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
62	mass	See B.3.3 (an outline is shown below). Total mass of the DSC and interchangeable lens at the time of shooting Measurement method: (1) Digital still camera: Measure the mass, using a weighing instrument, of the DSC equipped with the battery used for measuring CIPA battery life and the recording medium recommended as most suitable by the supplier. (2) Interchangeable lens: Measure the mass, using a weighing instrument, of the lens with accessories attached that is not removable without using a tool: substitute tool such as a coin may be deemed to be a tool. Presentation method: The figures obtained by "2. Measurement method" should be reported. If an interchangeable lens does not include any part for attaching a tripod, state that fact. Presentation examples: (1) Digital still camera: — Mass: 125 g — Mass: 185 g (including supplied battery and recording medium) (2) Interchangeable lens: — Mass: 695 g — Mass: 2 900 g (including attached part for fitting a tripod) The term "weight" may be used instead of "mass" because the "weight" of an object is simply proportional to the "mass" of that object and the term "weight" is commonly used in a relative (comparative) sense and is commonly used as a synonym of "mass".	
63	dimensions	See B.3.3 (an outline is shown below). External dimensions of the DSC or interchangeable lens. Measurement method: (1) Digital still camera Define a rectangular cuboid with the smallest dimensions that contains the DSC and measure its three dimensions with a dimension-measuring instrument. In this instance, any part may be deemed to be a protrusion that may be eliminated from the external dimensions (except a lens that cannot be detached), if it has a total area of 20 % or less of the projected area viewed from the direction perpendicular to one surface and the area of the protrusion is 10 % or less of the dimensions of a surface perpendicular to said surface.	

Table 7 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
		(2) Interchangeable lens Measure the maximum diameter of the circular portion and the length from the mounting surface to the end of the lens. In this instance, any protrusions on the circular portion or any part for attaching a tripod may be eliminated from the external dimensions. Presentation method: The figures obtained by "Measurement method" should be reported. Drawings may be used to avoid ambiguity. Presentation examples: (1) Digital still camera: —Dimensions: 111,2 (width) {mm} × 56,5 (height) {mm} × 19,9 (depth) mm —Dimensions: 125,7 (W) {mm} × 62,3 (H) {mm} × 28,9 (D) mm (2) Interchangeable lens: —Dimensions: ø85 {mm} × 245 mm —Dimensions: ø105 {mm} × 285 mm (295mm: entire length) —Dimensions: See the drawings below.  	

Table 7 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
64	volume	Actual volume of the DSC, interchangeable lens, and waterproof case, when placed in containment or in the state of usage, where the state of being placed in containment means the state in which the power is off Measurement method: Measure by using a volume-measuring instrument. A technique such as submerging it in water may be used provided the measurement result is not ambiguous. Presentation methods: —Report in units of cm^3. —Whether the camera was placed in containment or in the state of usage shall be expressly described. This provision applies only if the volume changes between the state of being placed in containment and the state of usage. —The number of significant digits to be reported shall be two or more (round the value up to a unit). Presentation examples: —Volume: 320 cm^3 (in usage) —Volume: 175 cm^3 (in containment)	
65	power source	Type of power supply such as applicable batteries and external DC input Presentation methods: —Report the type of battery if used, and the type of external power supply if used. —The battery type may be reported using common expressions. —The external power supply may be reported at the relevant company's discretion. Presentation examples: —Lithium battery (3,7 V, supplied with the camera —Rechargeable lithium-ion battery —Two AA-size, LR6(15A) alkaline (dry) batteries (two cells) —Dedicated AC adaptor (optional)	
66	[electrical | electronic] interface	Available external interfaces Presentation method: —Common expressions may be used. Presentation examples: —DC input (special terminal —AV output —Dedicated I/O terminal —USB —Hi-speed USB	

Table 7 *(continued)*

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
67	operating temperature {range}	Range of temperature at which camera operation is guaranteed Presentation method: —The details of guaranteed operation are left to the discretion of the relevant company. Presentation examples: —0 °C to 40 °C —–10 °C to +40 °C	
68	operating humidity {range}	Range of humidity at which camera operation is guaranteed Presentation method: —The details of guaranteed operation are left to the discretion of the relevant company. Presentation example: —10 {%} to 90 %	
69	applicable laws and regulations	Shall comply with various applicable laws and regulations. This International Standard does not cover this item.	This item relates to compliance with laws and regulations.

Annex A
(normative)

Measurement methods of features not related to image quality

A.1 Overview

This International Standard covers features of consumer DSCs with no applicable standardized method of measurement. Tables 1 to 7 list the characteristic features of consumer DSCs. This Annex describes the measurement conditions and the data analysis procedures for features in this International Standard that are not related to image quality.

A.2 General

This Annex provides the measurement methods for the features other than those that are related to image quality, out of the features for consumer DSCs defined in the Tables 1 to 7 of this International Standard.

A.3 Conditions for measurement

A.3.1 General

The measurement of products shall be carried out under the following conditions for measurement.

A.3.2 Environment for measurement

The measurement shall be carried out in the following environment unless otherwise stated:

— Temperature: 23 °C ± 3 °C

— Relative humidity: 50 % ± 20 %

— Atmospheric pressure: 101 kPa $^{+5}_{-15}$ kPa

A.3.3 Conditions for measurement (setting of digital camera in the measurement)

A.3.3.1 General

The measurement shall be carried out in the following settings and modes unless otherwise stated.

A.3.3.2 All cameras

The measurement shall be carried out under factory shipping settings and modes and the reporting of these settings and modes may be omitted. In the case that measured values under settings other than the factory shipping settings are reported together with the measured values under factory shipping settings, all settings and modes shall be reported.

Remark that:

a) Functions that are not available in the factory shipping settings shall be measured under settings in which such functions become available.

b) If there exist any parameters or modes that cannot be determined with the factory shipping settings, measurement shall be carried out under the settings that the manufacturer expects to

be most likely used by users. And, if selection of that setting may affect the specification value, the setting shall be reported.

A.3.3.3 Cameras with interchangeable lenses

In the case of cameras with interchangeable lenses, in principle measurement shall be carried out with the lens placed in position. Selection of the lens is left to the supplier's discretion, but the name or the type of lens that identify the particular lens shall be reported for those features that depend on the lens.

A.3.4 Conditions of shooting

Details of the test chart shall be specified together with the lighting conditions, such as illuminance, luminance and colour temperature of illumination.

A.4 Measurement methods

A.4.1 Battery life when shooting movie clips

A.4.1.1 General

The measurement methods described here are drafted based on those stated in JEITA CP-3202B, Section 13 and Section 14 by adding some modifications for DSCs.

NOTE It is very difficult to measure the battery life. Highly inaccurate measurements are likely unless great care is taken. To avoid this, the measurement should be carried out after thoroughly reading and understanding the commentaries of CIPA DC-002 "Measurement methods of battery life" (especially sections 2 to 5).

A.4.1.2 Battery life of shooting movie clips in actual use case

a) Equipment arrangement

Equipment shall be arranged as described in JEITA CP-3202B, section 13 and as shown in Figure A.1.

b) Subject to be shot

Not specified. It shall be a fixed subject that will not cause hunting in auto-focusing.

c) Conditions of shooting

— The correlation between subject illumination and colour temperature is not specified, but it shall not change during the measurement.

— Illuminance of the subject illumination: 400 lx to 2 000 lx.

— Distance between the subject and the DSC being tested: 1,5 m to 2 m.

d) Shooting sequence (mode)

The shooting sequence (mode) shall be as described in JEITA CP-3202B, section 14 , Figure 14.2 in JEITA CP-3202B and shown in Figure A.2.

e) Mode setting of digital camera

— The parameters for setting the features of the digital camera are, in principle, those set by factory shipping settings and modes except those specified in these measurement methods. If the measurement is carried out under settings and modes other than the factory shipping settings and modes, the details of the settings and modes shall be expressly reported.

— Any item for a feature may be omitted if that feature is not available in the camera to be measured, even though the measuring conditions for it are defined in the present measurement methods (For example, a feature for zooming action while shooting movie clips).

— In addition to settings of the parameters for setting features, if some of the settings and modes for larger or smaller magnitude of power are available, measurement shall be carried out under the factory shipping settings and modes. If it is not specified under the factory shipping settings and modes, the measurement shall be carried out at full power as far as possible. For example, the measurement shall be carried out in the mode that consumes most electricity if it is possible to select multiple operations (such as electric zooming and manual zooming) or multiple modes.

— The measurement of products that have limitations of features during shooting movie clips shall be carried out under the factory shipping settings and modes under such limitations.

f) The order of priority for the above-mentioned camera settings and modes is as follows:

1st priority: Conditions such as the measurement methods mentioned in this subparagraph (A.4.1.2 e).

2nd priority: Any parameter for setting a feature not mentioned in A.4.1.2 e) shall be measured in the factory shipping settings and modes.

3rd Priority: Any parameter that cannot be determined with the factory shipping settings and modes shall be measured under the setting that the manufacturer expects to be most likely used by the user.

g) Battery used

— Information (such as model number) of the used battery shall be reported.

— As for the non-rechargeable battery, a new one shall be used.

— As for the rechargeable battery, fully charged battery shall be used.

h) Conditions that determine the end of battery life

The first automatic low-battery shutdown by the DSC or the first automatic change of a setting or mode that prevents shooting movie clips and that is irreversible in itself signals the end of battery life for this test.

Remark that:

— If recording is stopped due to the limit of continuous recording time for movie clips of the DSC, the definition in feature 61 (b) in Table 7 shall be followed.

— If a medium becomes full, it shall be erased by means of the camera immediately, or the full medium shall be changed to an empty one as soon as possible. When changing the medium, care should be taken so as not to affect the battery life as far as possible. Also, erasing or changing the medium before it becomes full is not prohibited.

— In the case that any function relevant to shooting movie clips becomes out of operation, if that function can resume operation by any operation except changing the battery and turning on the power again the function should be resumed at once to continue the measurement.

i) Measurement procedure

— Load a new battery into the DSC being tested.

— Secure the DSC into position for testing.

— Power on the DSC, change to any required settings or modes, and start recording.

— Allow the battery to discharge while recording until the conditions that determine the end of battery life are satisfied.

— Do not remove the battery.

— When the medium used in the DSC becomes unavailable for further recording, replace with identical, unused media. [See Table 7, feature 61(a).]

— Do not power the DSC off and on for media exchange as additional powered functions are executed at these stages.

— Determine the amount of recording (time) on each medium used.

— Sum the recording times across media to determine the total recording time allowed by the battery.

Remark:

The battery for shooting shall not be recharged or changed during an ongoing measurement session even if the recording medium is changed.

A.4.1.3 Battery life of continuous movie clips

a) Equipment arrangement

Same as A.4.1.2 a).

b) Subject to be shot

Same as A.4.1.2 b).

c) Conditions of shooting

Same as A.4.1.2 c).

d) Shooting sequence (mode)

The mode shall be the fixed mode by fixing the lens at the wide angle end, fixing the shooting in REC action, fixing the subject, and fixing the power to ON.

e) Mode setting of digital camera

Same as A.4.1.2 e).

f) The order of priority for the above-mentioned camera settings and modes

Same as A.4.1.2 f).

g) Battery used

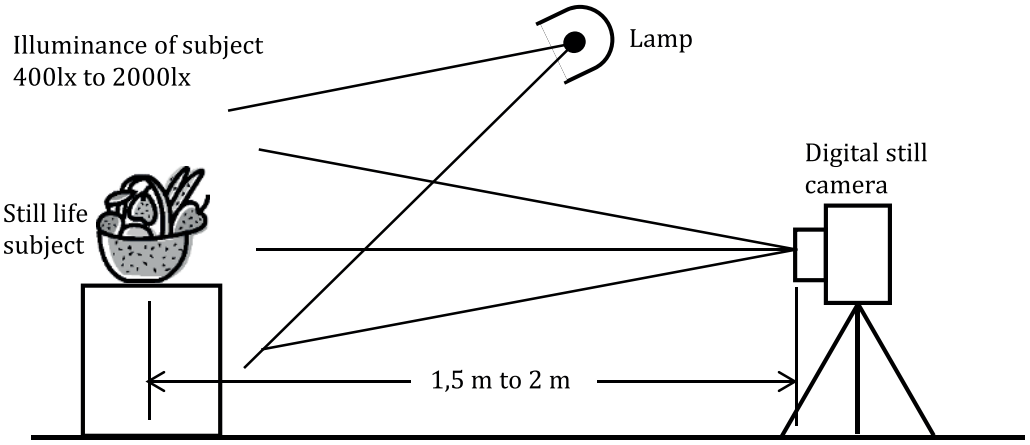
Same as A.4.1.2 g).

h) Conditions for determining the end of measurement

Same as A.4.1.2 h).

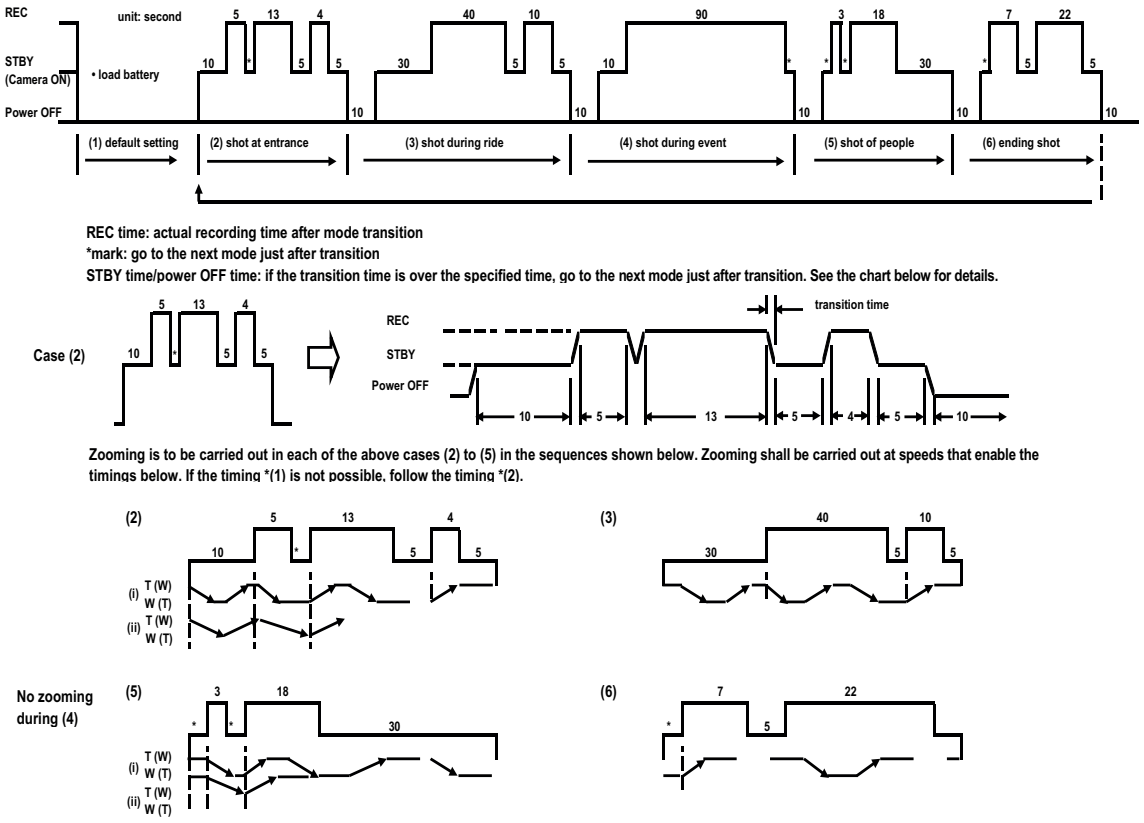
i) Measurement procedure

Same as A.4.1.2 i).



NOTE Figure A.1 is a copy of Figure 13.1 "Circuit measurement of continuous shooting tijme of the battery for shooting" (block diagram) in section 13 "Continuous shooting time of the battery for shooting" of JEITA CP-3202B.

Figure A.1 — Arrangement of equipment for measuring battery life when shooting movie clips



NOTE Figure A.2 is a copy of Figure 14.2 "Shooting mode" in section 14 "Actual shooting time of the battery for shooting of JEITA CP-3202B.

Figure A.2 — Shooting sequence (mode) for battery life in actual shooting of movie clips

A.4.2 Auto Focus {AF} speed

a) Arrangement of equipment

— The chart that allows the in-focus state to be easily determined, such as the ISO 12233 resolution chart, the ISO 12233 star chart, the ISO 15781 three-line chart, or the ISO 15781 black and white checker chart, shall be placed, respectively, at Pseudo ∞ and X m.

where

Pseudo ∞ is the longer distance of either 100 times the 35 mm film equivalent focal length or 5 m;

X m is the distance of 33 times of the 35 mm film equivalent focal length.

— Correlation of the subject illumination: Not specified, but it shall be the same at Pseudo ∞ and at X m, and it shall not change during the measurement.

— Illuminance of the subject illumination: 400 lx to 2 000 lx (shall be the same at Pseudo ∞ and at X m)

b) The value of exposure is not specified, but the f-number and shutter speed shall remain unchanged during the test. In the case of a digital camera with manual exposure mode it can be achieved by selecting manual exposure mode.

NOTE 1 Reference is made to ISO 15781.

c) The white balance is not specified, but the white balance control shall not be activated. Such condition can be achieved by setting manual white balance mode in the case of a digital camera with manual white balance mode.

NOTE 2 This aims to minimize the effects of any actions other than AF. It is possible to achieve the shooting condition by disabling the controls for exposure and white balance (WB) in the case of a DSC with manual modes for each control by setting to the exposure-fixed and WB-fixed mode, respectively, and in the case of a DSC without any manual mode, by setting the same subject illuminating conditions, for example.

d) The measurement shall be carried out by setting the focusing to focus priority AF mode. The measurement shall not be carried out in AF mode, in which the AF action is activated without the shutter release operation. (AF mode, in which the AF action is activated without the shutter release operation, is not subject to this International Standard.)

e) Measurement procedure:

1) Internal measurement method:

— Focus the DSC on the pseudo ∞ chart.

— The Chart shall be changed to the one at X m.

— Partially press the exposure switch.

— Note the time [at which the exposure switch is pressed]

— Note the time at which the focus lens stops moving its focusing mechanism. The position where the focus lens stops should satisfy the focused condition.

NOTE 3 Determination of the focused condition is left to the discretion of each supplier.

— Subtract the start time from the time at which the lens stopped moving to obtain the AF Speed.

In the case that it is not possible to detect when the focus lens stops the AF Speed shall be obtained as follows:

— Note the time at which the focus driving motor stops.

— Subtract the start time from the time at which the focus driving motor stops and add the time lag τ of the focus lens movement to obtain the AF Speed.

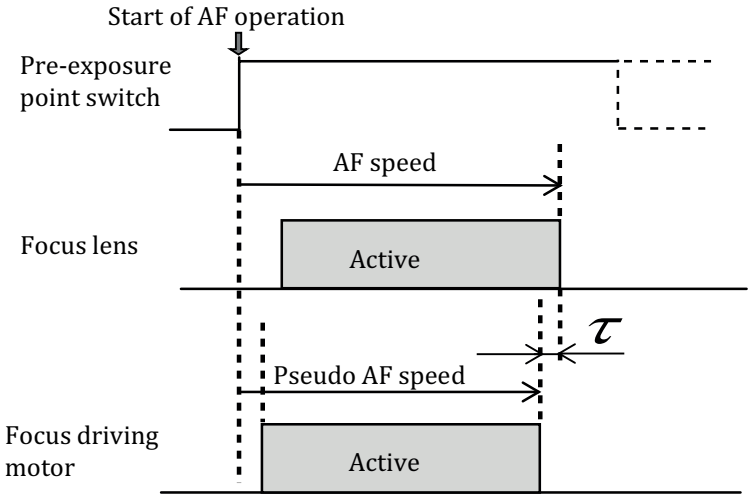


Figure A.3 — Measuring points for AF speed

2) External measurement method:

— Focus the DSC on the pseudo ∞ chart.

— The Chart shall be changed to the one at X m.

— Determine the shooting time lag and shutter release time lag as specified in ISO 15781.

— Subtract the shutter release time lag from the shooting time lag to obtain the AF Speed.

NOTE 4 In some cases, if the above-mentioned measurement is conducted directly after the states of power-off or sleep, some boot processing time may be required. Thus, it is essential that this operation is conducted during the power-on state.

Annex B
(normative)

Related standards

B.1 General

Several features in Tables 1 to 7 take substantial material from standard of associations other than ISO and IEC.

For convenience, this Annex shows the copies or translations of applicable parts of related standards or lists the name of related standards.

B.2 Applicable provisions of related standards

B.2.1 35 mm film equivalent focal length

B.2.1.1 Related standard

CIPA DCG-001–2005: Guideline for noting digital camera specifications in catalogues (revised version).

B.2.1.2 Definition

The focal length of 35 mm film camera with the same shooting angle of view as the DSC

B.2.1.3 Rules for presentation

a) “35 mm film equivalent focal length” or similar wording should be noted.

b) The value is to be calculated using the following equation:

"35 mm film equivalent focal length"=

$$\frac{\text{"Diagonal distance of image area in the 35 mm film camera } (43{,}27\text{ mm})\text{"}}{\text{"Diagonal distance of image area on the image sensor of the DSC"}} \times \text{"Focal length of the DSC"}$$

c) “35 mm film equivalent focal length”, as any focal length, is expressed in millimetres and is expressed as a whole number (a number without a decimal part).

B.2.1.4 Example of presentation

— 35 mm film equivalent focal length: 70 mm

— Focal length: 7 mm (35 mm film equivalent: 50 mm)

B.2.2 Recorded file format

B.2.2.1 Related standard

CIPA DCG-001–2005: Guideline for noting digital camera specifications in catalogues (revised version).

B.2.2.2 Definition

The image file format and directory structure used for recording the image on the digital storage media.

B.2.2.3 Rules for presentation

a) "Recorded file format" or similar wording that has the same meaning should be used to designate digitized image data that is stored on recording media by a DSC.

b) When the digital image data are stored in a standard file format, such as DCF, the name and version of the format should be included.

c) "Original file format" should be used in cases where the original file format is used.

d) "Output image file format" should be used to designate the arrangement of the digitized image data for output from a DSC.

B.2.2.4 Examples of presentation

— Recorded file format: conforms to Design rule for Camera File System (DCF) {version} 1.0

— Recorded file format (Non-compressed): TIFF

— Recorded image form: conforms to JPEG (Exif {version} 2.1)

B.2.3 Number of pixels

B.2.3.1 Related standard

CIPA DCG-001–2005: Guideline for noting digital camera specifications in catalogues (revised version).

B.2.3.2 General rules for presentation of "Number of pixels"

a) "Number of effective pixels" shall be listed in the highest primary notation when the image capture performance is described.

b) When the "Number of effective pixels" is noted with other number of pixels such as "Number of total pixels" or "Number of recorded pixels", the "Number of effective pixels" shall be noted in higher priority notation than all other numbers of pixels and care should be taken to clearly distinguish other numbers of pixels from the "Number of effective" pixels.

B.2.3.3 Number of effective pixels

B.2.3.3.1 Definition

The number of pixels on the image sensor that receive light through the optical lens and that are used in any (for example, filtering) calculation to produce pixels (picture elements) in the output image

Remark that:

a) The number of ring pixels may be included in the "Number of effective pixels".

b) The pixels to be used for vibration compensation when taking moving pictures shall not be included in the “Number of effective pixels”.

c) The pixels of the optical black area shall not be included in the “Number of effective pixels”.

B.2.3.3.2 Rules for presentation

a) The “Number of effective pixels” defined in this Annex B shall be used whenever DSC specifications are presented. The “Number of effective pixels” defined in the specification of the image sensor itself thus shall not be used, because the latter has a different definition from the one defined here.

b) For DSCs that use multiple image sensors, the number of effective pixels of each image sensor shall be presented. The total number of effective pixels may be reported, but the description shall clearly state that this number is the total number of effective pixels for specified number of image sensors to avoid consumer misunderstanding.

c) For DSCs that use a linear or other image sensor to capture an image by sensor or optical movement, the number of effective pixels of the image sensor and the number of sampling positions shall be presented. The total number of sampled, effective pixels may be reported, but the description shall clearly state that this number is the total number of sampled, effective pixels to avoid consumer misunderstanding.

d) All numerical values may be rounded off to two significant digits.

B.2.3.3.3 Examples of presentation

a) For DSCs that use one image sensor:

— 2M Effective pixels

— Number of effective pixels: 3 150 k (or 3,2 M)

b) For DSCs that use multiple-image sensors:

— Number of effective pixels: 340 k × 3

— 3 CCDs x Number of effective pixels 340 k per CCD

— Number of effective pixels: 1 020 k (340 k × 3)

— Number of effective pixels: 1,0 M (340 k × 3)

c) For DSCs that use a linear sensor with sensor or optical movement:

— Number of effective pixels: 1 000 × 1 500

— Number of effective pixels: 1 000 × 1 500 steps

d) For DSCs that use a rectangular (area) sensors with sensor or optical movement:

— Number of effective pixels: 340 k × 4

— Number of effective pixels: 340 k × 4 steps

NOTE The “Number of effective pixels” including ring pixels provides a somewhat bigger value than the maximum number of recorded pixels even for a camera having no pixel interpolation.

B.2.3.4 Number of total pixels

B.2.3.4.1 Definition

The number of total pixels in the image sensor, which is the specification for the image sensor

B.2.3.4.2 Rules for presentation

a) The "Number of total pixels" shall in all cases be presented as a specification of an image sensor not situated in a DSC. For reporting the DSC specifications, "Number of effective pixels" shall be used.

b) The "Number of total pixels" shall be presented with terms representing image sensor such as "Image sensor", "Solid state photo sensor" or "CCD" or "CMOS image sensor".

c) For DSCs that use multiple image sensors, the number of image sensors shall be reported. Reporting only the total number of pixels shall not be allowed.

d) All numerical values may be rounded off to two significant digits.

B.2.3.4.3 Examples of presentation

— 2 M Effective pixels (Using Number of total pixels of 2,1 M CCD)

— Number of effective pixels: 340 k × 3 (Using 3 × Number of total pixels of 380 k CCD)

B.2.3.5 Number of recorded pixels

B.2.3.5.1 Definition

The number of pixels (picture elements) comprising one picture frame that is recorded on the digital recording media

B.2.3.5.2 Rules for presentation

a) The label "Number of recorded pixels", and not the label "Resolution", shall be used to present the number of recorded pixels.

b) The number of horizontal and vertical pixels of the luminance signal shall be reported.

   A notation using the order of horizontal number of pixels followed by vertical number of pixels is recommended, unless the DSC makes no distinction between horizontal and vertical image dimensions.

c) A description of the image format either using a symbolic notation, such as RGB or YCbCr, or using words, such as "YC system", "Colour difference line sequential system", or "Colour difference system", is recommended for colour signals.

   A description of the image format to indicate the lack of a colour signal, such as, using "Monochrome signal", is recommended when no colour signal is recorded.

d) A description of the composition ratio of the colour signal using a notation, such as "4:4:4" or "4:2:2", is recommended.

e) Even in cases where the virtual number of pixels (picture elements) is increased by image processing such as interpolation, the total number of recorded pixels is regarded as the "Number of recorded pixels".

f) All of the numerical values may be rounded off to two significant digits.

B.2.3.5.3 Examples of presentation

— Number of recorded pixels: 640 × 480 (RGB 4:4:4)

— Number of recorded pixels: 1 280 × 960 (1,2 M)

— Image format: YCbCr 4:2:2

B.2.3.6 Number of output pixels

B.2.3.6.1 Definition

The number of pixels (picture elements) comprising one picture frame that is provided by the DSC through the output transmission means

B.2.3.6.2 Rules for presentation

a) Wording that reports the number of pixels provided by the DSC through the transmission means, such as the "Number of output pixels", the "Number of pixels communicated", or the "Number of transmitted pixels" shall be used.

b) The number of horizontal and vertical pixels of the luminance signal provided by the DSC shall be reported. A notation using the order of horizontal number of pixels followed by vertical number of pixels is recommended, unless the DSC makes no distinction between horizontal and vertical image dimensions.

c) Additional description of the image format is recommended, but when the image format is described as part of the previously mentioned "Number of recorded pixels", this additional description may be eliminated.

d) Further description of the composition ratio of the colour signal, such as "4:4:4" or "4:2:2", is recommended, but when the composition ratio of colour signal is described as part of the previously mentioned "Number of recorded pixels", this additional description may be eliminated.

e) Even in cases where the virtual number of pixels (picture elements) is increased by image processing such as interpolation, the total number of output pixels is regarded as the "Number of output pixels". A notation for "Compression" shall be included in cases where the total number of output pixels is decreased as a result of signal compression.

f) All of the numerical values may be rounded off to two significant digits.

B.2.3.6.3 Examples of presentation

— Number of output pixels: 640 × 480 (RGB 4:4:4)

— Number of transmitted pixels: 1 280 × 960 (1,2 M)

B.2.4 Response time of movie clip

B.2.4.1 Related standard

JEITA CP-3202B: Specification standard for video cameras and camera-recorders.

B.2.4.2 Features and presentation methods

Table B.1 specifies the definition and the presentation of a set of features for response time of movie clip.

Table B.1 — Definition and the presentation of a set of features for response time of movie clip

No.	Features	Guidelines for specifications (definitions) and presentation	Remarks
1	start time of recording after recording paused	Amount of time between the time when the record button is pressed while recording is paused and the power is on, and the time when recording starts Measurement method: See B.2.4.3 Presentation method: — The value shall be given in seconds. Presentation example: — 0,1 s	
2	start time of recording after power off	Amount of time between the time the power is ON and the time that recording starts, in the condition that the recording is paused and then turning power OFF. Measurement method: See B.2.4.3 Presentation method: — The value shall be given in seconds. Presentation example: — 0,2 s	
3	time to automatic termination of record pause	Amount of time between the time the recording is paused and the time that the pause state is automatically terminated, if a recording is left paused Presentation method: — The value shall be given in seconds. Presentation example: — 5 min	

B.2.4.3 Measurement methods

B.2.4.3.1 Conditions for measurement

Unless otherwise specified, measurements should be taken at an ambient temperature of 20 °C ± 2 °C and relative humidity of 65 % ± 5 %. To ensure measurement accuracy, leave the testing equipment in the measuring environment before testing until the temperature and humidity inside the equipment is sufficiently stable. Measurements may be taken at an ambient temperature of 5 °C to 35 °C and relative humidity of 45 % to 75 %, if the measured value is same as one measured at an ambient temperature of 20 °C ± 2 °C and relative humidity of 65 % ± 5 %.

B.2.4.3.2 Arrangement of measuring instruments

The arrangement of the instruments and the DSC for the measurements is illustrated in Figure B.1. The frame counter used in measurements is a signal generator capable of generating a different character every 1/30th of a second. The timing diagram of measurement procedure is illustrated in Figure B.2. The start and stop buttons of the frame counter and the start and stop recording buttons of the DSC must be mechanically or electrically synchronized for the measurements.

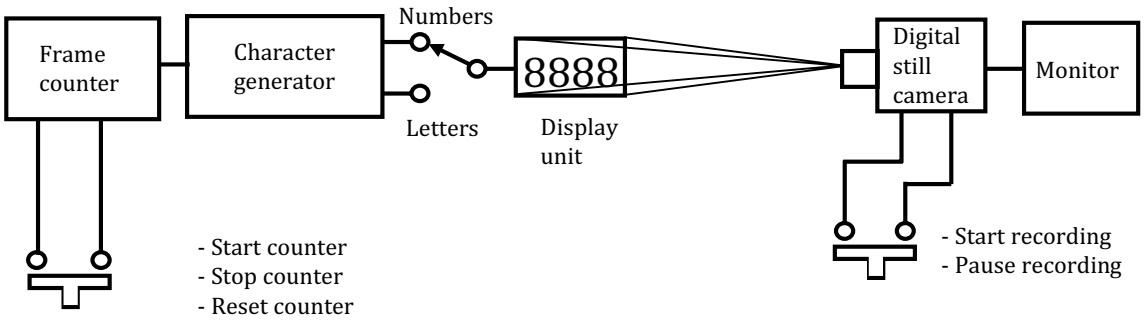
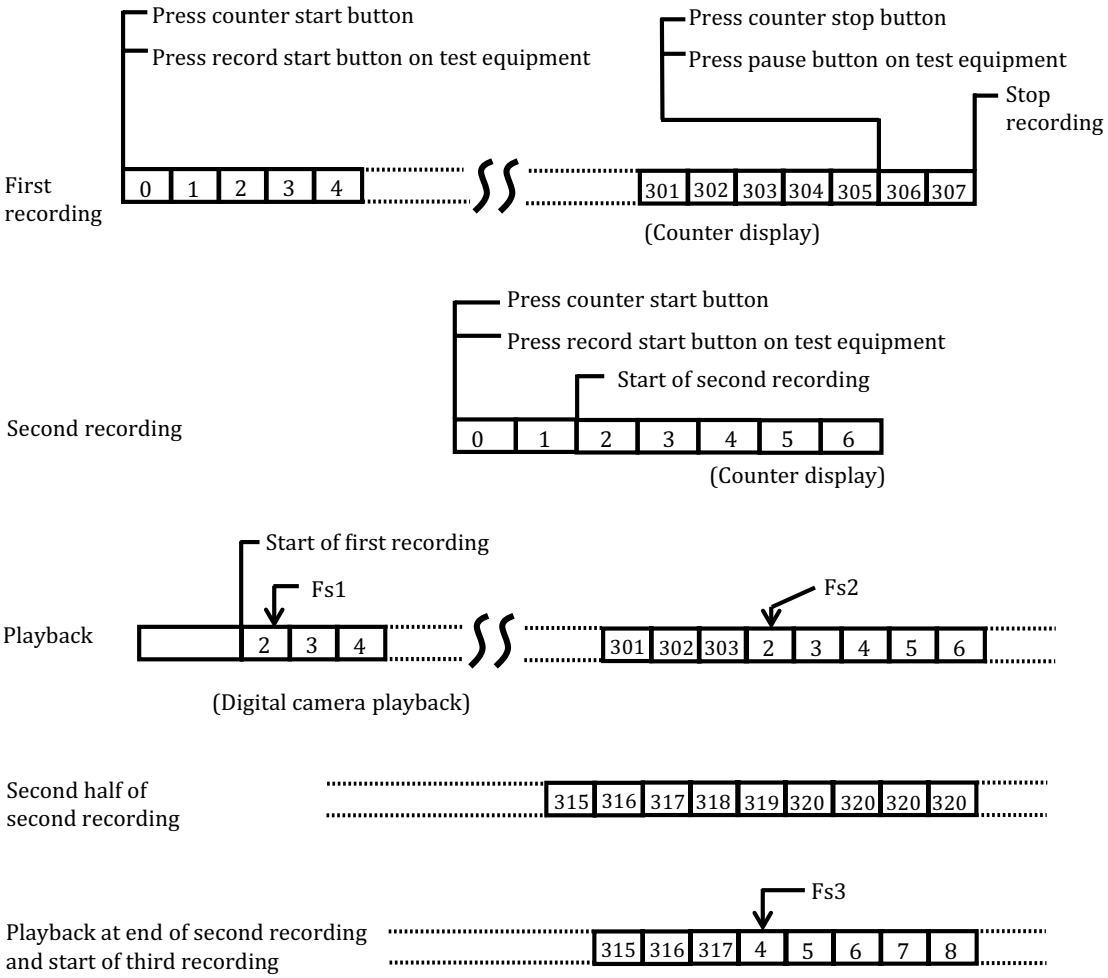


Figure B.1 — Arrangement of measuring instruments

B.2.4.3.3 Measurement signal

The digital camera shoots the frame counter display screen shown in Figure B.1.



Where Fsi is the number of first recorded frame in each scene.

NOTE For even numbers, switching to letters is easier to follow.

Figure B.2 — Timing diagram

B.2.4.3.4 Measurement procedure

B.2.4.3.4.1 General

The arrangement of the instruments and the DSC for the measurements is illustrated in Figure B.1. The frame counter used in measurements is a signal generator capable of generating a different character every 1/30th of a second. The timing diagram of measurement procedure is illustrated in Figure B.2. The start and stop buttons of the frame counter and the start and stop recording buttons of the DSC must be mechanically or electrically synchronized for the measurements.

B.2.4.3.4.2 Start time of recording after recording pause

a) Reset the frame counter.

b) Place the DSC in record standby mode.

c) Wait about 30 s for the equipment to stabilize.

d) Simultaneously press the start button on the frame counter and the record start button on the DSC.

e) Record for 10 s or longer.

f) Simultaneously press the stop button on the frame counter and the pause button on the DSC to stop recording.

g) Press the reset button on the frame counter.

h) Wait about 30 s in standby mode.

i) Repeat steps d) to h) a total of six times to obtain six recorded movie clips.

j) Play the six recorded movie clips frame-by frame or in slow motion, skipping the first recorded movie clip.

k) Note the numbers (Fs_2 to Fs_6) for the first recorded frames for second through sixth movie clip. Use either frame number if the recordings overlap.

l) The frame numbers are the Start time of recording. Calculate average value Fs with the following equation:

$$Fs = \frac{Fs_2 + Fs_3 + Fs_4 + Fs_5 + Fs_6}{5}$$

m) Calculate Start time of recording Ts (in seconds).

1 frame = 1/30 s

B.2.4.3.4.3 Start time of recording after power off

a) Reset the frame counter.

b) Place the DSC in record standby mode.

c) Wait about 30 s for the equipment to stabilize.

d) Simultaneously press the start button on the frame counter and the record start button on the DSC.

e) Record for 10 s or longer.

f) Simultaneously press the stop button on the frame counter and the pause button on the DSC to stop recording.

g) Press the reset button on the frame counter.

h) Turn the power of the DSC off.

i) Wait two to three minutes.

j) Turn the power of the DSC on.

k) Repeat steps d) to j) a total of six times to obtain six recorded movie clips.

l) Play the six recorded movie clips frame-by frame or in slow motion, skipping the first recorded movie clip.

m) Note the numbers (Fs_2 to Fs_6) for the first recorded frames for second through sixth movie clip. Use either frame number if the recordings overlap.

n) The frame numbers are the Start time of recording. Calculate average value Fs with the following equation:

$$Fs = \frac{Fs_2 + Fs_3 + Fs_4 + Fs_5 + Fs_6}{5}$$

o) Calculate Start time of recording Ts (in seconds).

1 frame = 1/30 s

B.2.5 Presentation methods for compressed audio and/or video recordings

B.2.5.1 Related standard

JCPR-3451A: Presentation method of compressed recording for motion picture and sound for digital still cameras (movie/still).

B.2.5.2 Features and presentation methods

When reporting any features in Table B.2, the presentation methods specified in this table shall be used.

NOTE If there are specific or multiple record modes, clarify correlations between the modes and the value of the following features.

Table B.2 — Features and presentation methods

No.	Features	Presentation methods	Examples
1	Recording format | file format (video)	The compressed recording format and file format for video shall be reported.	— MPEG-4 AVC/H.264 — Motion JPEG
2	Number of recorded pixels and aspect ratio (video)	The number of pixels in 1 recorded frame on the recording media shall be reported as horizontal pixels x vertical pixels Includes pixels from interpolation of the original image or other image processing. Abbreviations acceptable as long as relation with number of pixels is clear. Also screen aspect ratio should be reported as 4:3 or 16:9 as necessary.	— 1 920 × 1 080 pixels — 1 920 × 1 080,16:9 — VGA (640 × 480) — 320 × 240 pixels,4:3

Table B.2 *(continued)*

No.	Features	Presentation methods	Examples
3	Frame rate (video)	The number of video frames recorded per second shall be reported as frames/second or fps For compressed formats encoded in fields, the number of video fields recorded per second shall be reported as fields/second. Denote variable frame rates taken with slow shutter or other special modes. Video frames are defined in B.2.5.3.	— 15 frames/second — 15 fps — 30 fields/second — Approx. 15 fps (variable, max 20 fps) An example of NOTE: In auto slow shutter mode, frame rate is 15 fps due to shooting illumination conditions.
4	Recording rate (video)	The coded bit stream rate when recording video shall be reported as bit rate, bits/second, or bps. Average, minimum, and max values shall be reported for variable rates.	— Mbps — Approx. 2 Mbps (variable, max 2,5 Mbps)
5	Recording format and channel (audio)	The compressed recording format and file format for audio shall be reported. Also whether the audio is stereo or monaural shall be reported.	— Dolby Digital, 2 ch — Dolby Digital; 5,1 ch — Linear PCM, monaural
6	Sampling rate | bit length (audio)	The audio sampling rate and bit length when recording shall be reported in kHz and bits, respectively.	— 44,1 kHz;16-bit
7	Recording rate (audio)	The coded bit stream rate when recording audio shall be reported as bit rate, or bps.	— 64 kbps
8	Accompanying audio	Enter Whether video has accompanying audio or not shall be reported. If it does, following features 5 to 7 in this table should be reported as necessary.	
9	Recording time	The average time that can be recorded on a unit of media of specified volume under standard recording conditions shall be reported. The units are hours, minutes and seconds. If continuous recording time falls below the above recording time due to limitations with equipment or recording media, make a special note for continuous recording time.	— Example 1: Approx. 10 min and 20 s. (16 MB memory, 320 × 240 pixels, 15 frames/second) — Example 2: Recording time: Approx. 10 min and 20 s. (16 MB memory, fine mode) Continuous recording time: 1 min and 30 s. — Example 3: Approx. 10 min and 20 s. (16 MB memory, 320 × 240 pixels, 15 frames/second) There may be limitations on continuous recording time due to recording media.
10	Playable environment	A list of devices that can play the recorded and compressed audio and/or video, such as, the unit itself or software with version number and operating platform, shall be reported.	— Unit itself — Windows Media Player — QuickTime — Name of dedicated application

B.2.5.3 Video frame

B.2.5.3.1 Definition

Frame comprised of data including “Video Data” for the recorded moment where;

“Video Data” is a video frame of a moving subject. The image data of the moving subject can be the full image data or image difference data for screens either before or before and after the frame. Further, the difference data may be only motion vector information.

B.2.5.3.2 Examples

EXAMPLE 1 If video data contain the full image data, recorded frame F4 contains subject image data (f3) for moment t3 as given in Figure B.3 and does not include subject image data (f4) corresponding to the frame when video of the subject was taken. Thus, recorded frame F4 is not a video frame.

EXAMPLE 2 If the image output frame rate is 15 fps and the recorded frame rate is 30 fps, the frame rate including video data is regulated by the image output frame rate. The image frame rate cannot exceed 15 fps despite the higher recorded frame rate.

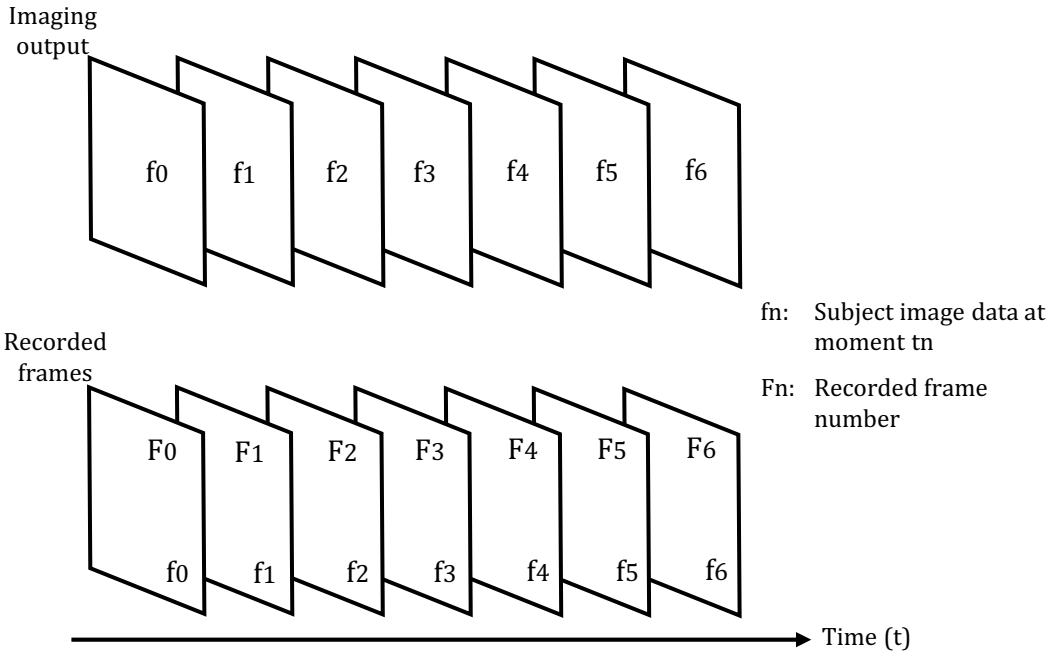


Figure B.3 — Schematic view of video frames

B.3 List of related standards

B.3.1 Image stabilization performance

Shall comply with CIPA DC-011–2012: Measurement and Description Method for Image Stabilization Performance of Digital Cameras (Optical Method).

B.3.2 Battery [consumption | life] of still [shooting | capture]

Shall comply with CIPA DC-002–2003: Standard procedure for measuring digital still camera battery consumption.

B.3.3 Mass and dimensions

Shall comply with CIPA DCG-005–2009: Measurement and Description Method for Weight and Dimensions of Digital Cameras.

Annex C
(informative)

Commentary

C.1 Application to other products

Although this International Standard is intended to be applied to consumer digital still cameras (DSCs), this International Standard may be applied to manufactured devices with features similar to those for DSCs.

C.2 Application of the specifications for other products

In the current market, there are many manufactured devices and functional components that have DSC-like capabilities, even though their primary function is not taking photographs. While some standards established for such devices and components describe features associate with photography, the application of these standards to DSCs should proceed with sufficient caution.

C.3 Measurement methods

In order to clarify the measurement methods, the measurement fundamentals for the following three items are provided in Annex A:

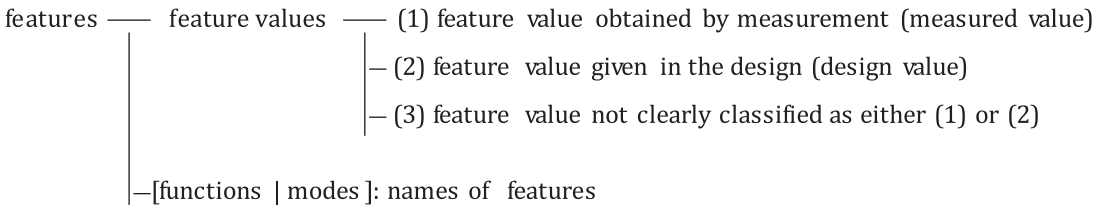
A.4.1 Battery life in shooting movie clip

A.4.2 AF speed

C.4 Classification of features

Features can be classified "feature values" and "[functions | modes]". Moreover, "feature values" are basically classified into those obtained by measurement (measured values) and those given in the design (design values); however, there are some that are difficult to clearly classify as measured values or design values.

The classifications based on the above definitions are shown below.



C.5 Further clarification of definitions of "image stabilizer" and "blur reduction"

As an addition to the definitions of "image stabilizer" and "blur reduction" given by Feature 17 in Table 2, this section provides: examples of "output of blur detection means", explanation of definition and examples of "correction", examples of "image stabilizer", and examples of " blur reduction".

a) Examples of "detection means"

   1) To measure by means of, for example, a gyro-sensor.

2) To measure by, for example, comparing images of continuous shooting (for example, vectors of motions among continuously shot images)

3) To measure by, for example, analysing blur of a single image (for example, calculation of the blur function)

b) Explanation of definition of "correction" and examples of being not considered as "correction"

1) Explanation of definition

"To correct" is assumed to mean "to improve blur of output images", as it is provided in the definition of feature 17 that a technique is not considered to be "image stabilizer" if the technique does not have the effect of correction by "image stabilizer" as it does not show any improvement in output images. Accordingly, if significant deterioration in image quality arises as a side effect, if a correction effect does not appear in output images, or if it is very difficult to prove that a correction effect has been obtained, it is not considered that the technique is able "correction".

2) Examples of being not considered as correction

i) A case with higher sensitivity and shorter shutter speed (with increased noise)

ii) A system that produces the same extent of noise as that increased by higher sensitivity and shorter shutter speed

iii) A system that simply makes a selection from several images shot and a system that only changes the shooting conditions

iv) A system that requires intensive noise suppression but tends to lose details (contrast in parts with small amplitude) as a side effect

c) Examples of systems that can be classified as "image stabilizer"

1) A system in which sensitivity is set higher than in the usual shooting mode and multiple shots are taken at a higher-than-usual shutter speed, and then the multiple shots taken are synthesized to compensate for deterioration of S/N in images, where the synthesis (for example, matching positions) is carried out by using the output of blur detection means to enable a stabilized output image to be obtained having similar S/N as at the usual sensitivity

2) A system in which shooting is carried out by each of the usual and higher-than-usual shutter speeds and synthesis of luminance information is processed using images shot at the usual speed and that of positional information is processed using images shot at the higher-than-usual speed, where no deterioration of image quality results due to the synthesis

3) A system in which sensitivity is set higher than in the usual shooting mode and multiple shots are taken at a higher-than-usual shutter speed, and then synthesis of multiple shots is carried out to compensate for deterioration of S/N in images only when it is considered that synthesis processing results in better performance, where the synthesis (for example, matching positions) is carried out by using the output of blur detection means, and no deterioration of image quality results due to the synthesis, even if no synthesis is carried out. Accordingly, such a system, in which processing is not possible to compensate deteriorated S/N, as only a single image shot at the higher shutter speed is used in the case where synthesis is not carried out, should not be classified as the "image stabilizer"

d) Examples of systems that should be classified as "blur reduction"

1) A method in which sensitivity is set higher than in the usual shooting mode and shooting is carried out at a higher-than-usual shutter speed, and image processing such as edge enhancement is performed to compensate the sense of resolution of the shot image

2) A method in which sensitivity is set higher than in the usual shooting mode and shooting is carried out at a higher-than-usual shutter speed, and image processing such as edge

enhancement is performed adaptively in response to the shutter speed of shooting to compensate the sense of resolution of the shot image

3) A method in which sensitivity is set higher than in the usual shooting mode and shooting is carried out at a higher-than-usual shutter speed, and noise reduction processing is performed to compensate for deterioration of S/N of the shot image

4) A method in which sensitivity is set higher than in the usual shooting mode and shooting is carried out at a higher-than-usual shutter speed, and noise reduction processing is performed adaptively in response to the shutter speed of shooting to compensate for deterioration of S/N of the shot image

5) A method in which sensitivity is set higher than in the usual shooting mode and shooting is carried out at a higher-than-usual shutter speed, when it is found that part of the subject is moving at a constant speed by detection of movement of the subject

6) A method in which sensitivity is set higher than in the usual shooting mode and shooting is carried out at a higher-than-usual shutter speed in response to the speed of movement of the subject, when it is found that part of the subject is moving at a constant speed by detection of movement of the subject

7) A method in which sensitivity is set higher than in the usual shooting mode and multiple shots are taken at a higher-than-usual shutter speed, and only the image that is determined by the DSC as having the least blur is recorded

8) A method in which sensitivity and shutter speed are gradually changed during shooting of multiple shots, and only the image that is determined by the DSC as having the best balance between the amount of blur and S/N is recorded

9) A method in which shooting is carried out at each of the usual and the higher shutter speeds, respectively, and the image shot at the usual speed is recorded if the blur is small and the image shot at the higher shutter speed is recorded if the blur is large

Bibliography

[1] CIPA DCG-002-2012, *Specification Guideline for Digital Cameras*

[2] CIPA DC-008-2010, *Exchangeable image file format for digital still cameras: Exif Version 2.3*

[3] CIPA DCG-001-2005, *Guideline for noting digital camera specifications in catalogues (revised version)*

[4] CIPA DC-002-2003, *Standard procedure for measuring digital still camera battery consumption*

[5] CIPA DC-003-2003, *Resolution Measurement Methods for Digital Cameras*

[6] CIPA DC-004-2004, *Sensitivity of digital cameras*

[7] CIPA DCG-005-2009, *Measurement and Description Method for Weight and Dimensions of Digital Cameras*

[8] CIPA DC-011-2012, *Measurement and Description Method for Image Stabilization Performance of Digital Cameras (Optical Method)*

[9] IEC 61146-1:1994, *Video cameras (PAL/SECAM/NTSC) — Methods of measurement — Part 1: Non-broadcast single-sensor cameras*

[10] IEC 61146-2:1997, *Video cameras (PAL/SECAM/NTSC) — Methods of measurement — Part 2: Two- and three-sensor professional cameras*

[11] IEC 61747-1:2003, *Liquid crystal and solid-state display devices — Part 1: Generic specification*

[12] EIAJ ED-2522, *Measuring methods for matrix liquid crystal display modules (liquid crystal display modules using back-light)*

[13] JEITA CP-3202B, *Specification standard for color video cameras and camera-recorders*

[14] JEITA CPR-3451A, *Presentation method of compressed recording for motion picture and sound for digital cameras (movie/still)*

[15] IEC 61966-2-1:1999, *Multimedia systems and equipment — Colour measurement and management — Part 2-1: Colour management — Default RGB colour space — sRGB*

[16] ISO 18844[2)], *Photography — Digital cameras — Image Flare measurement*

[17] ISO 19567[3)], *Photography — Digital cameras — Texture reproduction measurements*

2) Under preparation.

3) Under preparation.

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