Standard of Japan Electronics and Information Technology Industries Association

JEITA CP-3451G

Exchangeable image file format for digital still cameras: Exif Version 3.0

This translation has been made based on the original Standard (JETA 3451G).
In the event of any doubts arising as the contents, the original Standard is to be the final authority.

Published on April, 2002
Revised on December, 2024

Prepared by:
AV&IT Standardization Committee

Published by:
Japan Electronics and Information Technology Industries Association

Camera & Imaging Products Association (CIPA) and Japan Electronics and Information Technology Industries Association (JEITA) jointly formulated this standard.

The following standards are technically equivalent.

CIPA:

DC-008-2024 Exchangeable image file format for digital still cameras: Exif Version 3.0

JIETA:

CP-3451G Exchangeable image file format for digital still cameras: Exif Version 3.0

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Introduction

This document is a standard that adds ability to record the case of an image generated by compositing method to “Exchangeable image file format for digital still cameras Exif 2.32” (specifically, CIPA DCG-008-2019 and JEITA CP-3451E; hereinafter called the “Exif Unified Version 2.32”) that was defined by JEITA and CIPA.

The following items were added in this revision:

1. Annotation Data definition and APP11 Marker Segment to store it (Optional)
   - Can record Annotation Data for any region in an image in XML or JSON format.

2. Original Preservation Image (Optional)
   - Can record and retain the original image at the time of capturing even after any post-processing.

3. New Tag Type for UTF-8
   - Can use more diverse characters in tags of character information by adding UTF-8 type as a unique Exif tag type. Since it can be selected and set (used together in a file) with existing ASCII type, it will be backward-compatible with existing devices and software.

4. [Exif IFD] Photographer Information and Software Information related Tags (Optional)
   - Can store individual tags for the Photographer, Image Editor, Camera Firmware, and Editing Software, etc., that could only be described within a single tag of mishmash, such as Artist Tag or Software Tag.

[Supplemental note regarding this corrected edition, 3451G]

In this standard (Version 3.0) which was published in 2023, it was discovered that there were several points to be corrected (errors, insufficient explanations, and ambiguities), and there was concern that those may cause misunderstandings. Therefore, it has corrected limited to the points to be corrected above. Note that there are no changes on the specifications from the 2023 edition, 3451F.

Revision History

Ver.	Date	Comment
1.0	October 1995	Published First Edition 1.0 ●Established image data format definitions ●Set definitions for structure of attribute information (tags) ●Established basic tag definitions
1.1	May 1997	Published Revision 1.1 ●Added tags ●Added operating specifications
2.0	November 1997	Published Revision 2.0 ●Added sRGB color space ●Added GPS ●Added compressed thumbnails and audio files
2.1	December 1998	Published Revision 2.1 ●Added DCF interoperability tags
2.2	April 2002	Published Revision 2.2 ●Applied ExifPrint - Developed tags for improving print quality (Photo contrast, sharpness, etc.) ●Added tags pertaining to positioning and GPS
2.21	September 2003	Published Revision 2.21 ●Added and corrected of Exif 2.2 content in line with revision of DCF 2.0 - Added notation of tags for Gamma, ColorSpace, etc., that correspond to optional color space - Changed content of notation of flash tags and FileSource tags ●Added operational guidelines(flash tags, scene capture type, etc) ●Corrected notation pertaining to image data pixel composition and pixel sampling ●Corrected misprints and omissions throughout the text
Unified Version 2.21	September 2009	Published Unified Version 2.21 ●Merged added/changed portion of Exif 2.21 to Exif 2.2 ●Corrected misprints and omissions throughout the text ●Added “Guidelines for Handling Exif/DCF” issued by CIPA (CIPA DCG-004-2009) as Annex G (at the time of publication) ●Added explication of 2.2 as Annex H (at the time of publication)

		●Added explication of 2.21 as Annex I (at the time of publication)
2.3	April 2010	Published Revision 2.3 ●Restructured the main standard text, guidelines, explications, etc., of Exif Unified Version 2.21 ●Added and revised tags (Sensitivity-related tags, GPS information, camera and lens information, items pertaining to sound files, and light-source color) ●Clarified specification levels and revised the scope of application ●Supplemented explanations and adjusted format for the entire text
2.3 (Revised on 2012)	December 2012	Published Revised Revision 2.3 ●Corrected an explanation part of Orientation Tag ●Corrected an explanation part of GPS Status Tag
2.31	July 2016	Published Revision 2.31 ●Added time difference to UTC(Universal Time Coordinated) as tags relating to Date and Time - Added three time offset tags respectively corresponding to the three existing tags (File change date and time, Date and time of original data generation, Date and time of digital data generation) ●Added tags relating to shooting situation (Temperature, Humidity, Pressure, WaterDepth, Acceleration, CameraElevationAngle) ●Corrected misprints and omissions throughout the text (Including the reflection of the contents of the corrigendum established in September 2014 to the main text)
2.32	May 2019	Published Revision 2.32 ●Added 3 tags relating to a composite image - CompositeImage, - SourceImageNumberOfCompositeImage, - SourceExposureTimesOfCompositeImage ●Renumbered according to the addition of figures
3.0	May 2023	Published Revision 3.0 ●Added Tag Type of UTF-8 as Exif specific taga type. - Enabled to select UTF-8 character string in existing ASCII-type tags ●Enabled APP11 Marker Segment to store a Box-structured data

		compliant with the JPEG System standard ●Added definition of Box-structured Annotation Data ●Added and changed the following tags - Added Title Tag - Added Photographer Information related Tags (Photographer and ImageEditor) - Added Software Information related Tags (CameraFirmware, RAWDevelopingSoftware, ImageEditingSoftware, and MetadataEditingSoftware) - Changed Software, Artist, and ImageUniqueID - Corrected incorrect definition of GPSAltitudeRef - GPSMeasureMode tag became to support positioning information obtained from GNSS in addition to GPS ●Changed the description support levels of the following tags: - XResolution - YResolution - ResolutionUnit - FlashpixVersion ●Discarded Annex E.3 to specifiy Application Software Guidelines ●Added Annex H. (at the time of publication) to specify Guidelines for Handling Tag Information in Post-processing by Application Software ● Added Annex I.and J. (both at the time of publication) for supplemental information of Annotation Data ●Added Annex K. (at the time of publication) to specify Original Preservation Image ●Corrected errors, typos and omissions accumulated up to this edition ●Restructured and revised the entire document structure and style
3.0 (Corrected Edition)	December 2024	Published Corrected Edition of 3.0 ● Supplemented the description for a film scanning in the DateTimeDigitized Tag. ● Added a note on the correction of a misdefinition of the GPSAltitudeRef Tag in Version 3.0. ●Sorted Table 18 in order of tag number. ●Added the purpose of Annotation Data in the overview section of it. ●Added and corrected the followings in the Annotation Description Method. - Corrected grammatical errors in the JSON-LD examples of Point, Line

		and Polygon Area - Corrected incomplete JSON-LD examples in Full Image Area - Added rules of consistency and priority with the information described in APP1 in the Structure of Attached Information - Added an explanation of the region tag and corrected omissions for the Describing Multiple Sets of Attached Information - Corrected typo of tag names in Table 38 ●Added Exif metadata for XMP (DC-010) to References. ●Corrected errors in each example described in Annex J, which gives examples of Annotation Descriptions, ●Corrected typo throughout the text.

1. Scope

This standard specifies the formats of images, sounds, tags and other metadata that comprise the file for digital still cameras and other systems handling image or sound files recorded by digital still cameras.

Formats specified in this standard are defined as folder structures that are based on Exif-JPEG and recording formats for memory. When formats are used as Exif/DCF files together with the DCF Standard, which guarantees interoperability among devices of different types, their scope shall cover devices, systems, recording media, and application software that handle them. As devices mentioned above, the applicable items are devices with functions such as capturing, generating image data, recording, displaying, editing, and printing images.

Specifically, examples of capture/recording devices include DSCs, DVCs, and camera phones and smartphones, etc. Examples of display/playback devices include PCs (desktop/notebook/tablet), DTVs, and image display device such as digital photo frames and car navigation systems, as well as image storage devices such as picture storages and home servers, and image printing devices such as printers.

Furthermore, applicable items also include AI systems that utilize a significant amount of image data held in these and are being increasingly introduced into various fields and applications.

As application software mentioned above, the applicable items are the software providing functions for editing, displaying, printing and recording metadata as well as importing and editing images.

Specifically considered is application software that edits Exif/DCF tags and then saves them again or application software that adds metadata information undefined in the Exif Standard in Exif/DCF files and then saves it again.

2. Definitions

2.1. Definition of Terms

DSC	Digital still camera
DVC	Digital video camera
DTV	Digital television
Primary image	The main image data
Thumbnail	A small image used to index the primary image
Compressed data	Data referred to in the JPEG Standard[8] as “entropy coded data”
Tag	A field recording ancillary data about an image. Corresponds to “field” in TIFF
Tag information	A description of the tag contents
Exif	An abbreviation of “Exchange image file format,” used here as the general term for this standard and earlier versions of this standard
DCF	An abbreviation of “Design rule for Camera File System”; it defines folder structures based on Exif-JPEG and formats for recording in memory, and is the camera file system standard that guarantees interoperability among devices of different types.
DCF media	Removable memory recorded in compliance with the DCF or, removable and non-removable memory that a file system can access from an external device through IF (regardless of wired or wireless)