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Information technology — MPEG video technologies —

Part 7: Versatile supplemental enhancement information messages for coded video bitstreams

Technologies de l'information — Technologies vidéo MPEG —

Partie 7: Messages d'améliorations complémentaires polyvalents pour les flux binaires vidéo codés

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this Specification 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 document should be noted. This Specification was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

ISO and IEC draw attention to the possibility that the implementation of this Specification may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this Specification, ISO and IEC had received notice of (a) patent(s) which may be required to implement this Specification. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and https://patents.iec.ch. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

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

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This Specification was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information information*, in collaboration with ITU-T (as Rec. ITU-T H.274).

This fourth edition cancels and replaces the third edition (ISO/IEC 23002-7:2024), which has been technically revised.

The main changes are as follows:

— extensions to the film grain characteristics SEI message, the neural-network post-filter characteristics SEI message, and the neural-network post-filter activation SEI message,

— the addition of the SEI processing order SEI message and the processing order nesting SEI message,

— the addition of the encoder optimization information SEI message,

— the addition of the source picture timing information SEI message,

— the addition of the object mask information SEI message,

— the addition of the modality information SEI message,

— the addition of the text description information SEI message,

— the addition of the generative face video SEI message and the generative enhancement face video message,

— the addition of the digitally signed content initialization SEI message, the digitally signed content selection SEI message, and the digitally signed content verification SEI message,

— the addition of the AI usage restrictions request SEI message,

— the addition of the packed regions information SEI message, and

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— the addition of the image format metadata SEI message.

A list of all parts in the ISO/IEC 23002 series can be found on the ISO and IEC websites.

Any feedback or questions on this Specification should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

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Introduction

Versions of this Specification

Rec. ITU-T H.274 | ISO/IEC 23002-7 version 1 refers to the first approved version of this Specification. The first edition published by ITU-T as Rec. ITU-T H.274 (08/2020) and by ISO/IEC as ISO/IEC 23002-7:2021 corresponded to the first version.

Rec. ITU-T H.274 | ISO/IEC 23002-7 version 2 refers to the integrated text containing nine additional SEI messages, namely the annotated regions SEI message, the alpha channel information SEI message, the depth representation information SEI message, the multiview acquisition information SEI message, the multiview view position SEI message, the scalability dimension information SEI message, the extended dependent random access point indication SEI message, the display orientation SEI message, and the colour transform information SEI message. Besides these additional SEI messages, this version also contains corrections to various minor defects in the prior content of the specification. The second edition published by ITU-T as Rec. ITU-T H.274 (05/2022) and by ISO/IEC as ISO/IEC 23002-7:2022 corresponds to the second version.

Rec. ITU-T H.274 | ISO/IEC 23002-7 version 3 refers to the integrated text containing four additional SEI messages, namely the shutter interval information SEI message, the neural-network post-filter characteristics SEI message, the neural-network post-filter activation SEI message, and the phase indication SEI message. Besides these additional SEI messages, this version also contains corrections to various minor defects in the prior content of the specification. The third edition published by ISO/IEC as ISO/IEC 23002-7:2024 corresponds to the third version. This third edition of ISO/IEC 23002-7 corresponds to the third edition published by ITU-T as Rec. ITU-T H.274 (09/2023).

Rec. ITU-T H.274 | ISO/IEC 23002-7 version 4 (the current version) refers to the integrated text additionally containing extensions to the film grain characteristics SEI message, the neural-network post-filter characteristics SEI message, the neural-network post-filter activation SEI message, and 15 additional SEI messages, namely the SEI processing order SEI message, the processing order nesting SEI message, the encoder optimization information SEI message, the source picture timing information SEI message, the object mask information SEI message, the modality information SEI message, the text description information SEI message, the generative face video SEI message, the generative enhancement face video message, the digitally signed content initialization SEI message, the digitally signed content selection SEI message, digitally signed content verification SEI message, the AI usage restrictions request SEI message, the packed regions information SEI message, and the image format metadata SEI message. Additionally, the version 4 integrated text also contains corrections to various minor defects in the prior content of the Specification. The fourth edition published by ITU-T as Rec. ITU-T H.274 (XX/2026) corresponds to the fourth version.

Conventions

The term "this Specification" is used to refer to this Recommendation | International Standard.

In this Specification, the following verbal forms are used:

— “shall” indicates a requirement. When used to express a mandatory constraint on the values of syntax elements or the values of variables derived from these syntax elements, it is the responsibility of the encoder to ensure that the constraint is fulfilled.

— “should” indicates a recommendation. It is used to refer to behaviour of an implementation that is encouraged to be followed under anticipated ordinary circumstances, but is not a requirement for conformance to this Specification.

— “may” indicates a permission.

— “can” indicates a possibility or a capability.

Information marked as “NOTE” is intended to assist the understanding or use of the document. “Notes to entry” used in Clause 3 provide additional information that supplements the terminological data and can contain provisions relating to the use of a term.

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Information technology — MPEG video technologies —

Part 7: Versatile supplemental enhancement information messages for coded video bitstreams

1 Scope

This Specification specifies the syntax and semantics of video usability information (VUI) parameters and supplemental enhancement information (SEI) messages. The VUI parameters and SEI messages defined in this Specification are designed to be conveyed within coded video bitstreams in a manner specified in a video coding specification or to be conveyed by other means determined by the specifications for systems that make use of such coded video bitstreams. This Specification is particularly intended for use with coded video bitstreams as specified by Rec. ITU-T H.266 | ISO/IEC 23090-3, although it is drafted in a manner intended to be sufficiently generic that it can also be used with other types of coded video bitstreams.

VUI parameters and SEI messages can assist in processes related to decoding, display or other purposes. However, unless otherwise specified in a referencing specification, the interpretation and use of the VUI parameters and SEI messages specified in this Specification is not a required functionality of a video decoder or receiving video system. Although semantics are specified for the VUI parameters and SEI messages, decoders and receiving video systems can simply ignore the content of the VUI parameters and SEI messages or can use them in a manner that somewhat differs from what is specified in this Specification.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this Specification. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 10646, *Information technology — Universal coded character set (UCS)*

ISO/IEC 11578:1996, *Information technology — Open Systems Interconnection — Remote Procedure Call (RPC)*

ISO 12234-2, *Electronic still-picture imaging — Removable memory — Part 2: TIFF/EP image data format*

ISO 15076-1, *Image technology colour management — Architecture, profile format and data structure — Part 1: Based on ICC.1:2022*

ISO 16684-1, *Graphic technology — Extensible metadata platform (XMP) — Part 1: Data model, serialization and core properties*

ISO 16684-3, *Graphic technology — Extensible metadata platform (XMP) specification — Part 3: JSON-LD serialization of XMP*

ISO 20677, *Image technology colour management — Extensions to architecture, profile format and data structure*

ISO/IEC 21617-1, *Information technology – JPEG Trust – Part 1: Core Foundation*

Rec. ITU-T H.273 | ISO/IEC 23091-2, *Information technology — Coding-independent code points — Part 2: Video*

Rec. ITU-T T.35:2000, *Procedure for the allocation of ITU-T defined codes for non-standard facilities*

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Rec. ITU-T T.871 | ISO/IEC 10918-5, *Information technology – Digital compression and coding of continuous-tone still images: JPEG File Interchange Format (JFIF)*

CTA-766-D (ANSI), *U.S. and Canadian Region Rating Tables (RRT) and Content Advisory Descriptors for Transport of Content Advisory Information Using ATSC Program and System Information Protocol (PSIP)*

CIPA-DC-008-2023, *Camera & Imaging Products Association Exif, Exchangeable image file format for digital still cameras*

ISO/CIE 11664-1, *Colorimetry — Part 1: CIE standard colorimetric observers*

IETF RFC 1321, *The MD5 Message-Digest Algorithm*

IETF RFC 4151, *The 'tag' URI Scheme*

IETF RFC 5646, *Tags for Identifying Languages.*

IETF RFC 3986, *Uniform Resource Identifiers (URI): Generic Syntax*

NIST FIPS PUB 180-4, *Secure Hash Standard (SHS)*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
AU
access unit
set of *PUs* that belong to different *layers* and contain *coded pictures* associated with the same *output time*

3.2
APS
adaptation parameter set
syntax structure containing *syntax elements* that apply to zero or more *slices* as determined by zero or more *syntax elements* found in *slice headers*

3.3
alpha blending
process in which an auxiliary *coded picture* is used in combination with a primary *coded picture* and with other data not specified by this Specification in the display process

Note 1 to entry: In an alpha blending process, the luma samples of an auxiliary coded picture are interpreted as indications of the degree of opacity (or, equivalently, the degrees of transparency) associated with corresponding samples of the primary coded picture.

3.4
associated IRAP picture
previous *IRAP picture* (when present) in *decoding order*, for a particular picture, in the same *layer* as the particular *picture*

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3.5
associated inserted picture
picture picB in a picture list picListA associated with a particular picture pica, where picB is a picture that is in picListA and is the corresponding picture of an inserted picture generated when applying the process indicated by an SEI message either to a corresponding picture of picA or to an associated inserted picture of picA

Note 1 to entry: The particular picture picA itself can be a picture that is not in the picture list picListA associated with picA.

3.6
azimuth circle
circle on a sphere connecting all points with the same azimuth value

Note 1 to entry: An azimuth circle is always a *great circle* like a longitude line on the earth.

3.7
byte
sequence of 8 bits, within which, when written or read as a sequence of bit values, the left-most and right-most bits represent the most and least significant bits, respectively, and the bits are written or read from left to right

3.8
chroma
sample array or single sample representing one of the two colour difference signals related to the primary colours, represented by the symbols Cb and Cr

Note 1 to entry: The term chroma is used rather than the term chrominance in order to avoid implying the use of linear light transfer characteristics that is often associated with the term chrominance.

3.9
CLVS
coded layer video sequence
sequence of *PUs* of the same layer that consists, in *decoding order*, of a *CLVSS PU*, followed by zero or more *PUs* that are not *CLVSS PUs*, including all subsequent *PUs* up to but not including any subsequent *PU* that is a *CLVSS PU*

3.10
CLVSS PU
PU in which the *coded picture* is a *CLVSS picture*

3.11
CLVSS
coded layer video sequence start
coded picture that starts a new CLVS as specified in a video coding specification

Note 1 to entry: In Rec. ITU-T H.266 | ISO/IEC 23090-3, a CLVSS picture is an *IRAP picture* with NoIncorrectPicOutputFlag equal to 1 or a gradual decoding refresh picture with NoIncorrectPicOutputFlag equal to 1. In Rec. ITU-T H.265 | ISO/IEC 23008-2, a CLVSS picture is an *IRAP picture* with NoRaslOutputFlag equal to 1.

3.12
coded picture
coded representation of a *picture* containing all *CTUs* of the *picture*

3.13
coded slice NAL unit
NAL unit that contains a coded *slice*

3.14
coded video bitstream
sequence of bits that forms the representation of a sequence of *AUs* forming one or more *CVSs*

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3.15
CVS
coded video sequence
sequence of *AUs* that consists, in *decoding order*, of a *CVSS AU*, followed by zero or more *AUs* that are not *CVSS AUs*, including all subsequent *AUs* up to but not including any subsequent *AU* that is a *CVSS AU*

3.16
CVSS AU
AU that has a PU for each *layer* present in the *CVS* and the *coded picture* in each *PU* is a *CLVSS picture*

3.17
component
array or single sample from one of the three arrays (*luma* and two *chroma*) that compose a *picture* in 4:2:0, 4:2:2, or 4:4:4 colour format or the array or a single sample of the array that compose a *picture* in monochrome format

3.18
constituent picture
part of a spatially *frame*-packed stereoscopic *picture* that corresponds to one view, or a *picture* itself when *frame* packing is not in use or the temporal interleaving *frame* packing arrangement is in use

3.19
corresponding picture
picture picB in a picture list picListA associated with a particular picture picA, where picB is either picA itself or a processed version of picA generated when the process indicated by an SEI message is applied for picA

Note 1 to entry: The picture picA can be a picture that is not in picListA, in which case picB is a processed version of picA.

Note 2 to entry: When picA is in picListA, picB is picA itself.

3.20
cropped decoded picture
result of cropping a *decoded picture* based on the conformance cropping window for the corresponding *coded picture*

3.21
decoded picture
decoded picture is derived by decoding a *coded picture*

3.22
decoder
embodiment of a *decoding process*

3.23
decoding order
order in which *syntax elements* are conveyed in the *coded video bitstream* and are processed by a *decoding process*

3.24
decoding process
process that reads a *coded video bitstream* and derives *decodedpictures* from it

3.25
elevation circle
circle on a sphere connecting all points with the same elevation value

Note 1 to entry: An elevation circle is similar to a latitude line on the earth. Except when the elevation value is zero, an elevation circle is not a *great circle* like a longitude circle on the earth.

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3.26
encoder
embodiment of an *encoding process*

3.27
encoding process
process that produces a *coded video bitstream*

3.28
field
assembly of alternative rows of samples of a *frame*

3.29
flag
variable or single-bit *syntax element* that can take one of the two possible values: 0 and 1

3.30
frame
composition of a top *field* and a bottom *field*, where sample rows 0, 2, 4, ... originate from the top *field* and sample rows 1, 3, 5, ... originate from the bottom *field*

3.31
global coordinate axes
coordinate axes associated with *omnidirectional video* that are associated with an externally referenceable position and orientation

Note 1 to entry: The global coordinate axes could correspond to the position and orientation of a device or rig used for omnidirectional audio/video acquisition as well as the position of an observer's head in the three-dimensional space of the *omnidirectional video* rendering environment.

3.32
gradual decoding refresh (GDR) picture
coded picture starting from which all pictures in the same layer in both decoding order and output order can be decoded without first decoding any picture in the same layer earlier in decoding order in the coded video bitstream, such that when starting from a subsequent picture in decoding order for all pictures

3.33
gradual decoding refresh (GDR) AU
AU in which each coded picture is a GDR picture

3.34
great circle
intersection of a sphere and a plane that passes through the centre point of the sphere

Note 1 to entry: A great circle is also known as an orthodrome or Riemannian circle.

3.35
inserted picture
picture that was interpolated or extrapolated when the process indicated by an SEI message (e.g., an NNPFA SEI message activating an NNPF with PictureRateUpsamplingFlag or TemporalExtrapolationFlag equal to 1) is applied

3.36
inter prediction
aspect of the *decoding process* for a *coded picture* that makes use of data derived from the *decoding process* of one or more previously decoded *reference pictures*

3.37
IRAP AU
AU in which each coded picture is an IRAP picture

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3.38
IRAP picture
coded picture starting from which all *pictures* in the same *layer* in both *decoding order* and *output order* can be decoded without first decoding any *picture* in the same *layer* earlier in *decoding order* in the *coded video bitstream,* such that when starting from the coded picture for all pictures in the same layer in both decoding order and output order the cropped decoded pictures are fully correct

3.39
layer
set of *VCL NAL units* that all have a particular value of layer identifier and the associated non-VCL NAL units, wherein the layer identifier is a variable for which the value is specified by a video coding specification

Note 1 to entry: In the contexts of Rec. ITU-T H.266 | ISO/IEC 23090-3 and Rec. ITU-T H.265 | ISO/IEC 23008-2, the layer identifier is the value of the nuh_layer_id syntax element in the NAL unit header.

3.40
leading picture
picture that is in the same *layer* as the *associated IRAP picture* and precedes the *associatedIRAP picture* in *output order*

3.41
local coordinate axes
coordinate axes having a specified rotation relationship relative to the *global coordinate axes*

3.42
luma
sample array or single sample representing the monochrome signal related to the primary colours, represented by the symbol or subscript Y or L

Note 1 to entry: The term luma is used rather than the term luminance in order to avoid implying the use of linear light transfer characteristics that is often associated with the term luminance. The symbol L is sometimes used instead of the symbol Y to avoid confusion with the symbol y as used for vertical location.

3.43
NAL unit
syntax structure containing an indication of the type of data that follows and *bytes* containing that data in a manner that enables the extraction of a string of data bits from the syntax structure

3.44
NAL unit stream
sequence of NAL units

3.45
non-VCL NAL unit
NAL unit that is not a *VCL NAL unit*

3.46
omnidirectional video
video content in a format that enables rendering according to the user's viewing orientation, e.g., if viewed using a head-mounted device, or according to a user's desired *viewport*, reflecting a potentially rotated viewing position

3.47
output order
order in which the *decodedpictures* are output from the *decoder* (for the *decoded pictures* that are to be output from the *decoder*)

3.48
output time
time when a *decodedpicture* is to be output from the *decoder* (for the *decoded pictures* that are to be output from the *decoder*)

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3.49
packed region
region in a *region-wise packed picture* that is mapped to a *projected region* according to a *region-wise packing*

3.50
picture
array of *luma* samples in monochrome format or an array of *luma* samples and two corresponding arrays of *chroma* samples in 4:2:0, 4:2:2, and 4:4:4 colour format

Note 1 to entry: A picture could be either a frame or a field. However, in one CLVS, either all pictures are frames or all pictures are fields.

3.51
PPS
picture parameter set
A *syntax structure* containing *syntax elements* that apply to zero or more entire *coded pictures* as determined by a *syntax element* that is the same for all *slices* of a picture and found in the picture header or *slice headers* of each *picture*

3.52
PU
picture unit
set of *NAL units* that contain all *VCL NAL units* of a *coded picture* and their associated non-VCL NAL units

3.53
projected picture
picture that uses a *projection* format for *omnidirectional video*

3.54
projected region
region in a *projected picture* that is mapped to a *packed region* according to a *region-wise packing*

3.55
projection
specified correspondence between the colour samples of a *projected picture* and azimuth and elevation positions on a sphere

3.56
random access
act of starting the decoding process for a *coded video bitstream* at a point other than the beginning of the bitstream

3.57
RASL picture
leading picture that cannot be correctly decoded when the decoding process starts from the *associated IRAP picture*

3.58
reference picture
picture that contains samples that could be used for *inter prediction* in the decoding process of subsequent pictures in decoding order

3.59
reference picture list
list of *reference pictures* that is used for *inter prediction* of a *slice*

3.60
region-wise packed picture
decoded picture that contains one or more *packed regions*

Note 1 to entry: A region-wise packed picture could contain a *region-wise packing* of a *projected picture*.

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3.61
region-wise packing
transformation, resizing, and relocation of *packed regions* of a *region-wise packed picture* to remap the *packed regions* to *projected region*s of a *projected picture*

3.62
sample aspect ratio
indicated width-to-height aspect ratio of the luma samples of the associated *decoded pictures*

3.63
SEI NAL unit
NAL unit that includes one or more SEI messages

3.64
slice
region of a *picture* that can be decoded separately from other regions of the same *coded picture* (although in some cases the *decoding process* for the *picture* might use *inter prediction* that makes reference to other previously decoded *reference pictures*)

3.65
source
term used to describe the video material or some of its attributes before encoding

3.66
sphere coordinates
azimuth and elevation angles identifying a location of a point on a sphere

3.67
sphere region
region on a sphere, specified either by four *great circles* or by two *azimuth circles* and two *elevation circles*, or such a region on a rotated sphere after applying yaw, pitch, and roll rotations

3.68
STSA picture
coded picture that enables up-switching, at the *coded picture*, to the *temporal sublayer* containing the *coded picture*, from the immediately lower *temporal sublayer* of the same *layer* when the *coded picture* does not belong to the lowest *temporal sublayer*

Note 1 to entry: An STSA picture does not use pictures in the same layer and with the same temporal sublayer identifier as the STSA picture for inter prediction reference. Pictures following an STSA picture in decoding order in the same layer and with the same temporal sublayer identifier as the STSA picture do not use pictures prior to the STSA picture in decoding order in the same layer and with the same temporal sublayer identifier as the STSA picture for inter prediction reference. STSA pictures in an independent layer (i.e., a layer that does not depend on other layers in its decoding) always have a temporal sublayer identifier greater than 0.

3.69
syntax element
element of data represented in a *syntax structure*

3.70
syntax structure
zero or more *syntax elements* that are present together in a specified order in a string of data bits, where the left-most bit is considered to be the first and most significant bit, and the right-most bit is considered to be the last and least significant bit

3.71
SEI message
syntax structure that provides a particular type of information that assists in processes related to decoding, display or other purposes but is not needed by the *decoding process* in order to determine the values of the samples in *decoded pictures*

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3.72
temporal sublayer
subset of a temporal scalable *bitstream*, consisting of *VCL NAL units* with a particular value of *temporal sublayer identifier* and the associated *non-VCL NAL units*

3.73
temporal sublayer identifier
number greater than or equal to 0 defined by a variable for which the value is specified by a video coding specification such that pictures of all *temporal sublayers* have a specified temporal output order relative to each other and pictures with a lower temporal sublayer identifier can be decoded without reference to pictures with a higher temporal sublayer identifier

3.74
tilt angle
angle indicating the amount of tilt of a *sphere region*, measured as the amount of rotation of a *sphere region* along the axis originating from the sphere origin passing through the centre point of the *sphere region*, where the angle value increases clockwise when looking from the origin towards the positive end of the axis

3.75
trailing picture
coded picture that is associated with an *IRAP picture* and follows the *IRAP* picture in both decoding order and output order

3.76
VCL NAL unit
collective term for *coded slice NAL units* and the subset of other *NAL units* that have *reserved* values of *NAL unit* type identifiers that are classified as VCL NAL units in a referencing specification

3.77
VUI parameters
syntax structure that identifies properties of interpretation of decoded pictures for display purposes, particularly including colour representation information

3.78
viewport
region of *omnidirectional video* content suitable for display and viewing by the user

4 Abbreviated terms

ACI alpha channel information

AI artificial intelligence

APS adaptation parameter set

AU access unit

CLVS coded layer video sequence

CLVSS coded layer video sequence start

CRC cyclic redundancy check

CTI colour transform information

CVS coded video sequence

DRAP dependent random access point

DRI depth representation information

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DSC	digitally signed content
DSCI	digitally signed content initialization
DSCS	digitally signed content selection
DSCV	digitally signed content verification
EDRAP	extended dependent random access point
ERP	equirectangular projection
FGC	film grain characteristics
FPA	frame packing arrangement
GCMP	generalized cubemap projection
GDR	gradual decoding refresh
GEFV	generative enhancement face video
GFV	generative face video
FIR	finite impulse response
ID	identifier
IRAP	intra random access point
MAI	multiview acquisition information
NAL	network abstraction layer
NNPF	neural-network post-processing filter
NNPFA	neural-network post-filter activation
NNPFC	neural-network post-filter characteristics
OMI	object mask information
PON	processing order nesting
PPS	picture parameter set
PRI	packed regions information
PU	picture unit
RASL	random access skipped leading
RWP	region-wise packing
SAR	sample aspect ratio
SARI	sample aspect ratio information
SDI	scalability dimension information
SEI	supplemental enhancement information

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