

ISO/IEC 23094-2:2021-11 (E)

Information technology - General video coding - Part 2: Low complexity enhancement video coding

Contents		Page
	Foreword.....	v
1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Abbreviated terms	6
5	Conventions	7
	5.1 General.....	7
	5.2 Arithmetic operators.....	7
	5.3 Logical operators.....	8
	5.4 Relational operators.....	8
	5.5 Bit-wise operators.....	8
	5.6 Assignment operators.....	9
	5.7 Range notation.....	9
	5.8 Mathematical functions.....	9
	5.9 Order of operation precedence.....	10
	5.10 Variables, syntax elements and tables.....	11
	5.11 Text description of logical operations.....	12
	5.12 Processes.....	13
6	Bitstream and picture formats, partitioning, scanning processes and neighbouring relationships	13
	6.1 Bitstream formats.....	13
	6.2 Source, decoded and output picture formats.....	14
	6.3 Partitioning of pictures.....	17
	6.3.1 Organization of the hierarchical structure.....	17
	6.3.2 Partitioning of residuals plane.....	17
7	Syntax and semantics	18
	7.1 Method of specifying syntax in tabular form.....	18
	7.2 Specification of syntax functions and descriptors.....	19
	7.3 Syntax in tabular form.....	20
	7.3.1 Syntax order.....	20
	7.3.2 NAL unit and NAL unit header syntax.....	20
	7.3.3 Process block syntax.....	21
	7.3.4 Process payload – sequence configuration.....	22
	7.3.5 Process payload – global configuration.....	22
	7.3.6 Process payload – picture configuration.....	24
	7.3.7 Process payload – encoded data.....	25
	7.3.8 Process payload – encoded tiled data.....	26
	7.3.9 Process payload – surface.....	28
	7.3.10 Process payload – additional info.....	28
	7.3.11 Process payload – filler.....	29
	7.3.12 Byte alignment syntax.....	29
	7.4 Semantics.....	29
	7.4.1 General.....	29
	7.4.2 NAL unit semantics.....	30
	7.4.3 Data block unit configuration semantics.....	32
8	Decoding process	41
	8.1 General decoding process.....	41
	8.2 Payload data block unit process.....	41

8.3	Picture enhancement decoding process.....	42
8.3.1	General enhancement decoding process.....	42
8.3.2	Decoding process for picture enhancement encoded data (payload_ encoded_data).....	42
8.3.3	Decoding process for picture enhancement encoded tiled data (payload_ encoded_tiled_data).....	45
8.3.4	Decoding process for enhancement sub-layer 1 (L-1) encoded data.....	50
8.3.5	Decoding process for enhancement sub-layer 2 (L-2) encoded data.....	52
8.4	Decoding process for the temporal prediction.....	53
8.4.1	General decoding process for temporal prediction.....	53
8.4.2	Tiled temporal refresh.....	54
8.5	Decoding process for the dequantization.....	54
8.5.1	Decoding process for the dequantization overview.....	54
8.5.2	Scaling process for transform coefficients.....	54
8.5.3	Derivation of dequantization offset and stepwidth modifier.....	55
8.5.4	Derivation of quantization matrix.....	56
8.6	Decoding process for the transform.....	59
8.6.1	General upscaling process description.....	59
8.6.2	Transform inputs and outputs, transform types, and residual samples derivation.....	63
8.6.3	2x2 directional decomposition transform.....	64
8.6.4	4x4 directional decomposition transform.....	65
8.7	Decoding process for the upscaling.....	66
8.7.1	Nearest sample upsampler kernel description.....	66
8.7.2	Bilinear upsampler kernel description.....	68
8.7.3	Cubic upsampler kernel description.....	71
8.7.4	Modified Cubic upsampler kernel description.....	73
8.7.5	Predicted residual process description.....	74
8.7.6	Adaptive Cubic upsampler kernel description.....	75
8.8	Decoding process for the residual reconstruction.....	75
8.8.1	Reconstructed residual of each block derivation.....	75
8.8.2	Residual reconstruction for L-1 block.....	76
8.8.3	Residual reconstruction for L-2 block.....	76
8.9	Decoding process for the L-1 filter.....	77
8.9.1	L-1 residual filter overview.....	77
8.9.2	Decoding process for filtering L-1 block.....	77
8.10	Decoding process for base decoder data extraction.....	79
8.11	Decoding process for dither filter.....	79
9	Parsing process.....	79
9.1	Parsing process inputs and outputs, process overview.....	79
9.1.1	Parsing process for entropy encoded transform coefficients.....	79
9.1.2	Parsing process for entropy encoded temporal signal coefficient group.....	82
9.2	Prefix Coding decoder.....	83
9.2.1	Prefix Coding decoder description.....	83
9.2.2	Prefix Coding decoder table generation.....	84
9.2.3	Prefix Coding decoder for tile data sizes.....	88
9.3	RLE decoder.....	89
9.3.1	RLE process inputs and outputs.....	89
9.3.2	RLE decoder for coefficient groups.....	89
9.3.3	RLE decoder description.....	90
9.3.4	RLE decoder for temporal signal coefficient group.....	91
9.3.5	RLE decoder for tile entropy_enabled_flag fields.....	93
9.4	Parsing process for 0-th order Exp-Golomb codes.....	94
	Annex A (normative) Profiles and levels.....	96
	Annex B (normative) Byte stream format.....	98
	Annex C (normative) Hypothetical reference decoder.....	101
	Annex D (normative) Supplemental enhancement information.....	108
	Annex E (normative) Video usability information.....	115
	Bibliography.....	119