ISO/IEC 23090-29:2026-07 (E)

Information technology - Coded representation of immersive media - Part 29: Video-based dynamic mesh coding (V-DMC)

Contents

Page

Foreword vi

Introduction vii

1 Scope 1

2 Normative references 1

3 Termsanddefinitions 1

4 Abbreviated terms 8

5 Conventions 9
5.1 General 9
5.2 Arithmetic operators 9
5.3 Logical operators 9
5.4 Relational operators 9
5.5 Bit-wise operators 9
5.6 Assignment operators 9
5.7 Other operators 9
5.8 Mathematical functions 10
5.9 Order of operation precedence 14
5.10 Variables, syntax elements, and tables 14
5.11 Text description of logical operations 14
5.12 Processes 14
5.13 Array operations 14

6 Overall V-DMC characteristics, decoding operations, and post-decoding processes 16
6.1 V-DMC characteristics 16
6.2 V-DMC bitstream characteristics, decoding operations, and post-decoding processes 17

7 Bitstream format, partitioning, and scanning processes 18
7.1 General 18
7.2 V3C bitstream formats 18
7.3 NAL bitstream formats 18
7.4 Partitioning of atlas frames into tiles 18
7.5 Tile partition scanning processes 18
7.6 Extension of partitioning process for tile attribute components 18

8 Syntax and semantics 19
8.1 Method of specifying syntax in tabular form 19
8.2 Specification of syntax functions and descriptors 19
8.3 Syntax in tabular form 19
8.3.1 General 19
8.3.2 V3C unit syntax 19
8.3.3 Byte alignment syntax 19
8.3.4 V3C parameter set syntax 19
8.3.5 NAL unit syntax 21
8.3.6 Raw byte sequence payloads, trailing bits, and byte alignment syntax 22
8.3.7 Atlas tile data unit syntax 30
8.3.8 Supplemental enhancement information message syntax 30

8.3.9 VDMC atlas tile data unit syntax 30
8.4 Semantics 40
8.4.1 General semantics 40
8.4.2 V3C unit semantics 41
8.4.3 Byte alignment semantics 41
8.4.4 V3C parameter set semantics 41
8.4.5 NAL unit semantics 44
8.4.6 Raw byte sequence payloads, trailing bits, and byte alignment semantics 45
8.4.7 Atlas tile data unit semantics 61
8.4.8 Supplemental enhancement information message semantics 61

8.4.9 VDMC atlas tile data unit semantics 61

9 Decoding process 76
9.1 General decoding process 76
9.2 Atlas data decoding process 77
9.2.1 General atlas decoding process 77
9.2.2 Decoding process for a coded atlas frame 77
9.2.3 Atlas NAL unit decoding process 78
9.2.4 Atlas tile header decoding process 78
9.2.5 Decoding process for patch data units 79
9.2.6 Decoding process of the block to patch map 79
9.2.7 Conversion of tile level patch information to atlas level patch information 79
9.2.8 Decoding process for meshpatch data units 80
9.2.9 Conversion of tile level meshpatch information to atlas level meshpatch information 103
9.3 Occupancy video decoding process 106
9.4 Geometry video decoding process 106
9.5 Attribute video decoding process 106
9.6 Packed video decoding process 106
9.7 Common atlas decoding process 106
9.8 Sub-bitstream extraction process 106
9.9 Basemesh decoding process 106
9.10 Displacement decoding process 107

10 Pre-reconstruction process 108

11 Reconstruction process 108
11.1 General 108
11.2 Submesh Reconstruction Process 111
11.2.1 General 111
11.2.2 Texture coordinate derivation 114
11.2.3 Subdivision process 123
11.2.4 Inverse image packing of transform coefficients 142
11.2.5 Inverse quantization 143
11.2.6 Inverse transform 145
11.2.7 Normal, tangent, and bitangent vector generation 147
11.2.8 Vertex coordinates reconstruction 151
11.2.9 Texture coordinate adaptation process 151
11.3 Append submesh to a mesh process 151

12 Post-reconstruction process 152
12.1 General 152
12.2 Zippering process 153
12.2.1 Zippering method by distance 154
12.2.2 Zippering method by index matching 154
12.2.3 Zippering method by boundary connect 155
12.2.4 Identification of boundary vertices 166
12.2.5 Identification of matched boundary vertices by distance 166
12.2.6 Identification of matched boundary vertices by explicit signaling 169
12.2.7 Border vertex fusion 170
12.2.8 Handling of unmatched LoD vertices 171

13 Adaptation process 178

14 Parsing process 178

Annex A (normative)Profiles,tiers,andlevels 179

Annex B (informative) Post-decoding conversion to nominal video formats 191

Annex C (informative) V3C sample stream format 201

Annex D (normative) NAL sample stream format 202

Annex E (normative) Atlas hypothetical reference decoder 203

Annex F (normative) Supplemental enhancement information 204

Annex G (informative) Volumetric usability information 234

Annex H (normative) Basemesh sub-bitstream 236

Annex I (normative) MPEG edgebreaker static mesh coding 327

Annex J (normative) Arithmetic coded displacement sub-bitstream 402

Annex K (normative) Inverse binarization process 466

Annex L (normative) MPEG motion coding 477

Bibliography 484