INTERNATIONAL STANDARD

# ISO/IEC 14496-27

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**AMENDMENT 2**
2011-02-01

# Information technology — Coding of audio-visual objects —

## Part 27: 3D Graphics conformance

## AMENDMENT 2: Scalable complexity 3D mesh coding conformance



*Technologies de l'information — Codage des objets audiovisuels —*

*Partie 27: Conformité aux graphiques 3D*

*AMENDEMENT 2: Conformité pour encodage de maille en 3D de complexité atteignable*



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## Foreword

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Amendment 2 to ISO/IEC 14496-27:2009 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

# Information technology — Coding of audio-visual objects —

# Part 27:
# 3D Graphics conformance

## AMENDMENT 2: Scalable complexity 3D mesh coding conformance

*After 4.2.2.4.4.4, add the following new subclause 4.2.2.5 as follows:*

#### 4.2.2.5 Scalable Complexity 3D Mesh Compression(SC3DMC)

##### 4.2.2.5.1 Conformance Points



###### 4.2.2.5.1.1 Covered functionalities

The conformance points for SC3DMC cover



- the compression of different attributes per vertex,
- different compression configurations (QBCR, SVA and TFAN) and possible combinations between,
- arithmetic encoding, 4C and table based BPC encoding,
- scalability with respect to compression and complexity.

The following subclauses specify the normative tests for verifying conformance of SC3DMC compressed bitstreams and SC3DMC decoder. Those normative tests make use of test data (bitstream test suites).

##### 4.2.2.5.2 Terminal conformance

###### 4.2.2.5.2.1 Conformance Requirements

A compliant decoder shall implement a decoding process that is equivalent to the one specified in ISO/IEC 14496-16:2009/Amd.1 and meets all the general requirements, defined in the document, which apply for the functionalities considered. The decoder shall decode bitstreams with any options or parameters with values permitted for the functionalities.

###### 4.2.2.5.2.2 Test Bitstreams

**Files:**

Model's properties: each model has coordinate, coordinate index, color, color index, normal, normal index, texCoord and texCoordIndex per vertex.

In the test name, the prefix *XX* indicates the input file name. In the files attached to this part of ISO/IEC 14496, 3 Models are considered, cow, dance and eagle.

If an input file, cow.wrl, is tested under SVA mode, circular prediction and Bit precision coding

- Test Name: cow_S_Ci_BP
- Bitstream: cow_S_Ci_BP.mp4
- Decoded file: Decoded_cow_S_Ci_BP.wrl

| Test Name | Parameters | Bitstream (.mp4) | Decoded file (.wrl) |
|---|---|---|---|
| XX_Q_No_FL | QBCR, no prediction, fixed length coding | XX_Q_No_FL | DECODED_XX_Q_No_FL |
| XX_Q_CD_EG | QBCR, circular prediction, Exponential Golomb entropy coding | XX _Q_CD_EG | DECODED_XX _Q_CD_EG |
| XX_Q_CD_AC | QBCR, circular prediction, Arithmetic coding | XX _Q_Cd_AC | DECODED_XX _Q_CD_AC |
| XX_Q_CD_BP | QBCR, circular prediction, Bit precision entropy coding | XX _Q_CD_BP | DECODED_XX _Q_CD_BP |
| XX_Q_CD_4C | QBCR, circular prediction, 4-bit entropy coding | XX _Q_Cd_4C | DECODED_XX _Q_CD_4C |
| XX_Q_Ad_EG | QBCR, adaptive prediction, Exponential Golomb entropy coding | XX _Q_Ad_EG | DECODED_XX _Q_Ad_EG |
| XX_Q_Ad_AC | QBCR, adaptive prediction, Arithmetic coding | XX_Q_Ad_AC | DECODED_XX _Q_Ad_AC |
| XX_Q_Ad_BP | QBCR, adaptive prediction, Bit precision entropy coding | XX_Q_Ad_BP | DECODED_XX _Q_Ad_BP |
| XX_Q_Ad_4C | QBCR, adaptive prediction, 4-bit entropy coding | XX_Q_Ad_4C | DECODED_XX _Q_Ad_4C |
| XX_Q_Xo_EG | QBCR, XOR prediction, Exponential Golomb entropy coding | XX_Q_Xo_EG | DECODED_XX_Q_Xo _EG |
| XX_Q_ Xo _AC | QBCR, XOR prediction, Arithmetic coding | XX _Q_ Xo _AC | DECODED_XX _Q_Xo_AC |
| XX_Q_ Xo _BP | QBCR, XOR prediction, Bit precision entropy coding | XX _Q_ Xo _BP | DECODED_XX _Q_Xo_BP |
| XX_Q_ Xo _4C | QBCR, XOR prediction, 4-bit entropy coding | XX _Q_ Xo _4C | DECODED_XX _Q_Xo_4C |
| XX_Q_Di_EG | QBCR, differential prediction, Exponential Golomb entropy coding | XX _Q_ Di _EG | DECODED_XX _Q_ Di_EG |
| XX_Q_ Di _AC | QBCR, differential prediction, Arithmetic coding | XX _Q_ Di _AC | DECODED_XX _Q_ Di _AC |
| XX_Q_ Di _BP | QBCR, differential prediction, Bit precision entropy coding | XX _Q_ Di _BP | DECODED_XX _Q_ Di _BP |
| XX_Q_ Di _4C | QBCR, differential prediction, 4-bit entropy coding | XX _Q_ Di _4C | DECODED_XX _Q_ Di _4C |
| XX_S_CD_EG | SVA, circular prediction, Exponential Golomb entropy coding | XX _S_CD_EG | DECODED_XX _S_CD_EG |
| XX_S_CD_AC | SVA, circular prediction, Arithmetic coding | XX _S_Cd_AC | DECODED_XX _S_CD_AC |
| XX_S_CD_BP | SVA, circular prediction, Bit precision entropy coding | XX _S_CD_BP | DECODED_XX _S_CD_BP |
| XX_S_CD_4C | SVA, circular prediction, 4-bit entropy coding | XX _S_Cd_4C | DECODED_XX _S_CD_4C |
| XX_S_Ad_EG | SVA, adaptive prediction, Exponential Golomb entropy coding | XX _S_Ad_EG | DECODED_XX _S_Ad_EG |

| Test Name | Parameters | Bitstream (.mp4) | Decoded file (.wrl) |
|---|---|---|---|
| XX_S_Ad_AC | SVA, adaptive prediction, Arithmetic coding | XX _S_Ad_AC | DECODED_XX _S_Ad_AC |
| XX_S_Ad_BP | SVA, adaptive prediction, Bit precision entropy coding | XX _S_Ad_BP | DECODED_XX _S_Ad_BP |
| XX_S_Ad_4C | SVA, adaptive prediction, 4-bit entropy coding | XX _S_Ad_4C | DECODED_XX _S_Ad_4C |
| XX_S_Xo_EG | SVA, XOR prediction, Exponential Golomb entropy coding | XX _S_ Xo _EG | DECODED_XX_S_Xo _EG |
| XX_S_ Xo _AC | SVA, XOR prediction, Arithmetic coding | XX _S_ Xo _AC | DECODED_XX _S_Xo_AC |
| XX_S_ Xo _BP | SVA, XOR prediction, Bit precision entropy coding | XX _S_ Xo _BP | DECODED_XX _S_Xo_BP |
| XX_S_ Xo _4C | SVA, XOR prediction, 4-bit entropy coding | XX _S_ Xo _4C | DECODED_XX _S_Xo_4C |
| XX_S_Di_EG | SVA, differential prediction, Exponential Golomb entropy coding | XX _S_ Di _EG | DECODED_XX _S_ Di_EG |
| XX_S_ Di _AC | SVA, differential prediction, Arithmetic coding | XX _S_ Di _AC | DECODED_XX _S_ Di _AC |
| XX_S_ Di _BP | SVA, differential prediction, Bit precision entropy coding | XX _S_ Di _BP | DECODED_XX _S_ Di _BP |
| XX_S_ Di _4C | SVA, differential prediction, 4-bit entropy coding | XX _S_ Di _4C | DECODED_XX _S_ Di _4C |
| XX_T_CD_EG | TFAN, circular prediction, Exponential Golomb entropy coding | XX _T_CD_EG | DECODED_XX _T_CD_EG |
| XX_T_CD_AC | TFAN, circular prediction, Arithmetic coding | XX _T_Cd_AC | DECODED_XX _T_CD_AC |
| XX_T_CD_BP | TFAN, circular prediction, Bit precision entropy coding | XX _T_CD_BP | DECODED_XX _T_CD_BP |
| XX_T_CD_4C | TFAN, circular prediction, 4-bit entropy coding | XX _T_Cd_4C | DECODED_XX _T_CD_4C |
| XX_T_Ad_EG | TFAN, adaptive prediction, Exponential Golomb entropy coding | XX _T_Ad_EG | DECODED_XX _T_Ad_EG |
| XX_T_Ad_AC | TFAN, adaptive prediction, Arithmetic coding | XX _T_Ad_AC | DECODED_XX _T_Ad_AC |
| XX_T_Ad_BP | TFAN, adaptive prediction, Bit precision entropy coding | XX _T_Ad_BP | DECODED_XX _T_Ad_BP |
| XX_T_Ad_4C | TFAN, adaptive prediction, 4-bit entropy coding | XX _T_Ad_4C | DECODED_XX _T_Ad_4C |
| XX_T_Xo_EG | TFAN, XOR prediction, Exponential Golomb entropy coding | XX _T_ Xo _EG | DECODED_XX_T_Xo _EG |
| XX_T_ Xo _AC | TFAN, XOR prediction, Arithmetic coding | XX _T_ Xo _AC | DECODED_XX _T_Xo_AC |
| XX_T_ Xo _BP | TFAN, XOR prediction, Bit precision entropy coding | XX _T_ Xo _BP | DECODED_XX _T_Xo_BP |
| XX_T_ Xo _4C | TFAN, XOR prediction, 4-bit entropy coding | XX _T_ Xo _4C | DECODED_XX _T_Xo_4C |
| XX_T_Di_EG | TFAN, differential prediction, Exponential Golomb entropy coding | XX _T_ Di _EG | DECODED_XX _T_ Di_EG |
| XX_T_ Di _AC | TFAN, differential prediction, Arithmetic coding | XX _T_ Di _AC | DECODED_XX _T_ Di _AC |
| XX_T_ Di _BP | TFAN, differential prediction, Bit precision entropy coding | XX _T_ Di _BP | DECODED_XX _T_ Di _BP |
| XX_T_ Di _4C | TFAN, differential prediction, 4-bit entropy coding | XX _T_ Di _4C | DECODED_XX _T_ Di _4C |

| Test Name | Parameters | Bitstream (.mp4) | Decoded file (.wrl) |
|---|---|---|---|
| XX_T_Tf_EG | TFAN, TFAN-based parallelogram prediction, Exponential Golomb entropy coding | XX _T_ Tf _EG | DECODED_XX _T_ Tf _EG |
| XX_T_Tf _AC | TFAN, TFAN-based parallelogram prediction Arithmetic coding | XX _T_ Tf _AC | DECODED_XX _T_ Tf _AC |
| XX_T_ Tf _BP | TFAN, TFAN-based parallelogram prediction, Bit precision entropy coding | XX _T_ Tf _BP | DECODED_XX _T_ Tf _BP |
| XX_T_ Tf _4C | TFAN, TFAN-based parallelogram prediction, 4-bit entropy coding | XX _T_ Tf _4C | DECODED_XX _T_ Tf _4C |
| XX_T_Tf_EG_VO | TFAN with vertex ordering preservation, TFAN-based parallelogram prediction, Exponential Golomb entropy coding | XX _T_ Tf _EG | DECODED_XX _T_ Tf _EG |
| XX_T_Tf_EG_VO_FO | TFAN with vertex and face ordering preservation, TFAN-based parallelogram prediction, Exponential Golomb entropy coding | XX _T_ Tf _EG | DECODED_XX _T_ Tf _EG |

#### 4.2.2.5.2.3 Measurement Procedure

The terminal should produce a formatted output giving a IndexedFaceSet structure. The decoder shall be able to decode the bitstreams provided.



#### 4.2.2.5.2.4 Tolerance

The diagnosis is to check whether the field data (geometry, coordinate and other attributes such as color, normal, texture, and etc.) of the IndexedFaceSet sequence that is decoded from ".mp4" files correspond with the data included in the provided reference "*.wrl" files.