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Information technology — Coding of audio-visual objects —

Part 27: 3D Graphics conformance

Technologies de l'information — Codage des objets audiovisuels —

Partie 27: Conformité aux graphiques 3D

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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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

ISO/IEC 14496 consists of the following parts, under the general title *Information technology — Coding of audio-visual objects*:

— *Part 1: Systems*

— *Part 2: Visual*

— *Part 3: Audio*

— *Part 4: Conformance testing*

— *Part 5: Reference software*

— *Part 6: Delivery Multimedia Integration Framework (DMIF)*

— *Part 7: Optimized reference software for coding of audio-visual objects*

— *Part 8: Carriage of ISO/IEC 14496 contents over IP networks*

— *Part 9: Reference hardware description*

— *Part 10: Advanced Video Coding*

— *Part 11: Scene description and application engine*

— *Part 12: ISO base media file format*

— *Part 13: Intellectual Property Management and Protection (IPMP) extensions*

— *Part 14: MP4 file format*

— *Part 15: Advanced Video Coding (AVC) file format*

— *Part 16: Animation Framework eXtension (AFX)*

— *Part 17: Streaming text format*

— *Part 18: Font compression and streaming*

— *Part 19: Synthesized texture stream*

— *Part 20: Lightweight Application Scene Representation (LASeR) and Simple Aggregation Format (SAF)*

— *Part 21: MPEG-J Graphics Framework eXtensions (GFX)*

— *Part 22: Open Font Format*

— *Part 23: Symbolic Music Representation*

— *Part 24: Audio and systems interaction*

— *Part 25: 3D Graphics Compression Model*

— *Part 27: 3D Graphics conformance*

The following part is under preparation:

— Part 26: Audio conformance

Introduction

This part of ISO/IEC 14496 (MPEG-4) contains the description of all conformance bitstreams developed for the synthetic 3D graphics tools published in the following four other parts of MPEG-4: ISO/IEC 14496-11:2005, ISO/IEC 14496-16:2006, ISO/IEC 14496-21:2006 and ISO/IEC 14496-25:2009. This part of ISO/IEC 14496 also describes how tests can be designed to verify whether compressed data (i.e. bitstreams) and decoders meet the requirements specified for synthetic 3D graphics tools by those four International Standards.

Information technology — Coding of audio-visual objects —

Part 27:
3D Graphics conformance

1 Scope

This part of ISO/IEC 14496 specifies how tests can be designed to verify whether compressed data (i.e. bitstreams) and decoders meet the requirements for the synthetic 3D graphics tools specified in ISO/IEC 14496-11:2005, ISO/IEC 14496-16:2006, ISO/IEC 14496-21:2006, and ISO/IEC 14496-25:2009.

This part of ISO/IEC 14496 does not specifically address encoders. As far as synthetic 3D graphics are concerned, an encoder can be said to be an ISO/IEC 14496 encoder if it generates compressed data compliant with the syntactic and semantic bitstream payload requirements specified in ISO/IEC 14496-11, ISO/IEC 14496-16, ISO/IEC 14496-21, and ISO/IEC 14496-25.

Characteristics of coded bitstreams and decoders are defined for ISO/IEC 14496-11, ISO/IEC 14496-16, ISO/IEC 14496-21, and ISO/IEC 14496-25. The characteristics of a bitstream define the subset of the standard that is exploited in the bitstream. Examples are the applied values or range of the bitrate. Decoder characteristics define the properties and capabilities of the applied decoding process. An example of a property is the applied arithmetic accuracy. The capabilities of a decoder specify which coded bitstreams the decoder can decode and reconstruct, by defining the subset of the standard that may be exploited in decodable bitstreams. A bitstream can be decoded by a decoder if the characteristics of the coded bitstream are within the subset of the normative references.

This part of ISO/IEC 14496 describes procedures for testing conformance of compressed data and decoders to the requirements defined in ISO/IEC 14496-11, ISO/IEC 14496-16, ISO/IEC 14496-21, and ISO/IEC 14496-25; given the set of characteristics claimed, the requirements that shall be met are fully determined by these parts.

This part of ISO/IEC 14496 summarizes the requirements, cross references them to characteristics, and defines how conformance with them can be tested. Guidelines are given on constructing tests to verify decoder conformance.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 14772-1:1997, *Information technology — Computer graphics and image processing — The Virtual Reality Modeling Language — Part 1: Functional specification and UTF-8 encoding*

ISO/IEC 14496-1:2004, *Information technology — Coding of audio-visual objects — Part 1: Systems*

ISO/IEC 14496-5:2001, *Information technology — Coding of audio-visual objects — Part 5: Reference software*

ISO/IEC 14496-11:2005, *Information technology — Coding of audio-visual objects — Part 11: Scene description and application engine*

ISO/IEC 14496-16:2006, *Information technology — Coding of audio-visual objects — Part 16: Animation Framework eXtension (AFX)*

ISO/IEC 14496-21:2006, *Information technology — Coding of audio-visual objects — Part 21: MPEG-J Graphics Framework eXtensions (GFX)*

ISO/IEC 14496-25:2009, *Information technology — Coding of audio-visual objects — Part 25: 3D Graphics Compression Model*

ISO/IEC 15444-1:2004, *Information technology — JPEG 2000 image coding system: Core coding system*

3 Terms definitions, abbreviations and symbols

For the purposes of this document, the terms, definitions, abbreviated terms and symbols given in ISO/IEC 14496-1, ISO/IEC 14496-5, ISO/IEC 14496-11, ISO/IEC 14496-16, ISO/IEC 14496-21, ISO/IEC 14496-25, ISO/IEC 14772-1 and ISO/IEC 15444-1 apply.

4 Tools from ISO/IEC 14496-11, Scene description and application engine, and ISO/IEC 14496-16, Animation Framework eXtension (AFX)

4.1 Scene graph nodes

4.1.1 Bitstream conformance

4.1.1.1 Conformance Requirements

BIFS streams shall comply with the specifications of Clause 8 of ISO/IEC 14496-11:2005 and Clause 4 of ISO/IEC 14496-16:2006.

4.1.1.2 Measurement procedure

The syntax of the BIFS stream shall meet the requirements of Clause 8 of ISO/IEC 14496-11:2005 and Clause 4 of ISO/IEC 14496-16:2006.

4.1.1.3 Tolerance

There is no tolerance for bitstream syntax checking. The diagnosis is pass or fail.

4.1.2 Terminal conformance

4.1.2.1 Conformance requirements

The terminal shall comply with the specifications of Clause 8 of ISO/IEC 14496-11:2005 and Clause 4 of ISO/IEC 14496-16:2006.

4.1.2.2 Measurement procedure

The terminal shall decode successfully all the test suites listed below. A test suite is a suite of material and measurement algorithms and associated reference algorithms.

4.1.2.2.1 Feature list

The test suite shall verify the features in Table 1. For nodes, the following shall be tested:

- Presence in the scene tree after decoding.
- Appropriate value of the fields after decoding.

Table 1 — AFX test suite information

No.	Feature	Reference of test sequence and associated method
1	BitWrapper	This node shall be tested together with the AFX bitstreams in 4.2; Both url and buffer shall be tested for each bitstream
2	DepthImage	This node shall be tested together with OctreeImage, PointTexture, and SimpleTexture nodes
3	FFD	FFD
4	MeshGrid	Torus_C_LA_BIFS, Torus_C_OA_BIFS, Humanoid_LA_BIFS, Humanoid_OA_BIFS, Sphere_GA_BIFS, Quad_LA_BIFS, Quad_OA_BIFS, Quad_GA_BIFS, Cyclic_LA_BIFS, Cyclic_OA_BIFS, Cyclic_GA_BIFS
5	NonLinearDeformer	Bend, taper, twist, shell
6	NurbsCurve	NurbsCurve, NurbsCurve_anim
7	NurbsCurve2D	NurbsCurve2D, NurbsCurve2D_anim
8	NurbsSurface	NurbsSurface
9	OctreeImage	OI_BVO_Still, OI_BVO_Anim, OI_TBVO_Still, OI_TBVO_Anim
10	PointTexture	DI_Ortho-PT_8, DI_Ortho-PT_32, DI_Persp–PT_8, DI_Persp–PT_32
11	PositionAnimator	PositionAnimator, PositionAnimator_discrete, PositionAnimator_linear, PositionAnimator_NURBS_interp, PositionAnimator_paced, PositionAnimator_spline
12	PositionAnimator2D	PositionAnimator2D, PositionAnimator2D_discrete, PositionAnimator2D_linear, PositionAnimator2D_NURBS_interp, PositionAnimator2D_paced, PositionAnimator2D_spline
13	ProceduralTexture	PT_Default, PT_Gradient1, PT_Gradient2, PT_Gradient3, PT_Gradient4, PT_Gradient5, PT_Horizon, PT_Marble, PT_PinkGranite, PT_Brickwork, PT_Fabric
14	SBBone	SkinnedModel
15	SBMuscle	SkinnedModel
16	SBSegment	SkinnedModel
17	SBSite	SkinnedModel
18	SBSkinnedModel	SkinnedModel
19	SBVCAnimation	SkinnedModel
20	ScalarAnimator	ScalarAnimator_discrete, ScalarAnimator_linear, ScalarAnimator_paced, ScalarAnimator_spline
21	SimpleTexture	DI_Ortho-ST_Still, DI_Ortho-ST_Anim, DI_Persp-ST_Still, DI_Persp-ST_Anim
22	SubdivisionSurface	Ss, SS_Goldfish, SS_Britney, SS_BritneyDance, SS_RooDance, SS_RooFlip, SS_Shark
23	SubdivSurfaceSector	ss_img, tagpipes, tagpipes_anim, icosa_normal, icosa_concave
24	WaveletSubdivisionSurface	{bunny,venus}_{I,O}{C,P}{G,L}$N_1N_2N_3$, e.g., bunny_ICG101010; this node shall be tested according to 4.2.2.2.2
25	MorphSpace	cube2sphere_morph_cube, cube2sphere_morph_dome, cube2sphere_morph_etoile, cube2sphere_morph_forme, cube2sphere_morph_sphere, cube2sphere_morph_random cube2sphere_morph_anim
26	DepthImageV2	This node shall be tested together with SimpleTextureV2 nodes and PointTextureV2 node
27	SimpleTextureV2	shuttle
28	PointTextureV2	flower
29	Multitexturing	tm
30	SBVCAnimationV2	VCAnimV2
31	FootPrintSetNode	CityDynamic
32	FootPrintNode	cityFootPrintLOD
33	BuildingPartNode	CityDynamic
34	RoofNode	CityDynamic
35	FacadeNode	CityDynamic
36	Shadow	windmill, transparency

4.1.2.3 Test bitstreams

Name (for bitstream filename, add .mp4)	Provider	Content	Reference file (.wrl)
Bend	Mindego	NonLinearDeformer that bends a rectangular object.	Bend
Cyclic_GA_BIFS	VUB	Multi-resolution cyclic quadrilateral mesh (uniformSplit = 1). Animation of the gridCoord field.	Cyclic_MG, Cyclic_Lev0, Cyclic_Lev1, Cyclic_Lev2
Cyclic_LA_BIFS	VUB	Multi-resolution cyclic quadrilateral mesh (uniformSplit = 1). Different resolution levels are displayed by animating the displayLevel field.	Cyclic_MG, Cyclic_Lev0, Cyclic_Lev1, Cyclic_Lev2
Cyclic_OA_BIFS	VUB	Multi-resolution cyclic quadrilateral mesh (uniformSplit = 1). Animation of the vertexOffset field.	Cyclic_MG, Cyclic_Lev0, Cyclic_Lev1, Cyclic_Lev2
DI_Ortho-PT_8	Samsung AIT	Orthographic projection in DepthImage node. 8 bits representation of depth value in PointTexture node.	DI_Ortho-PT_8
DI_Ortho-PT_32	Samsung AIT	Orthographic projection in DepthImage node. 32 bits representation of depth value in PointTexture node.	DI_Ortho-PT_32
DI_Ortho-ST_Still	Samsung AIT	Orthographic projection in DepthImage node. Still version of SimpleTexture node.	DI_Ortho-ST_Still
DI_Ortho-ST_Anim	Samsung AIT	Orthographic projection in DepthImage node. Animated version of SimpleTexture node.	DI_Ortho- ST_Anim
DI_Persp-PT_8	Samsung AIT	Perspective projection in DepthImage node. 8 bits representation of depth value in PointTexture node.	DI_Persp-PT_8
DI_Persp-PT_32	Samsung AIT	Perspective projection in DepthImage node. 32 bits representation of depth value in PointTexture node.	DI_Persp-PT_32
DI_Persp-ST_Still	Samsung AIT	Perspective projection in DepthImage node. Still version of SimpleTexture node.	DI_Persp-ST_Still
DI_Persp-ST_Anim	Samsung AIT	Perspective projection in DepthImage node. Animated version of SimpleTexture node.	DI_Persp-ST_Anim
Humanoid_LA_BIFS	VUB	Multi-resolution non-homogeneous mesh with non-uniform distributed reference grid. Different resolution levels are displayed by animating the displayLevel field.	Humanoid_MG, Humanoid_Lev0, Humanoid_Lev1, Humanoid_Lev2
Humanoid_OA_BIFS	VUB	Multi-resolution non-homogeneous mesh with non-uniform distributed reference grid. Animation of the vertexOffset field.	Humanoid_MG, Humanoid_Lev0, Humanoid_Lev1, Humanoid_Lev2
Icosa_concave	Mindego	Tagpipes sample with theta of three sectors animated.	Icosa_concave
Icosa_normal	Mindego	Tagpipes sample with normal of a sector animated.	Icosa_normal
NurbsCurve	Mindego	Draw a NURBS curve.	NurbsCurve
NurbsCurve_anim	Mindego	Animate a NURBS curve.	NurbsCurve_anim
NurbsCurve2D	Mindego	Draw a 2D NURBS curve.	NurbsCurve2D
NurbsCurve2D_anim	Mindego	Animate a 2D NURBS curve.	NurbsCurve2D_anim
NurbsSurface	Mindego	Draw a NURBS surface.	NurbsSurface

Name (for bitstream filename, add .mp4)	Provider	Content	Reference file (.wrl)
OI_BVO_Still	Samsung AIT	Non-use of BitWrapper node. Non-use of voxelImageIndex. Still version of OctreeImage node.	OI_BVO_Still
OI_BVO_Anim	Samsung AIT	Non-use of BitWrapper node. Non-use of voxelImageIndex. Animated version of OctreeImage node.	OI_BVO_Anim
OI_TBVO_Still	Samsung AIT	Non-use of BitWrapper node. Use of voxelImageIndex. Still version of OctreeImage node.	OI_TBVO_Still
OI_TBVO_Anim	Samsung AIT	Non-use of BitWrapper node. Use of voxelImageIndex. Animated version of OctreeImage node.	OI_TBVO_Anim
PositionAnimator	Mindego	PositionAnimator used as an interpolator (keyType 0, keyValueType 0).	PositionAnimator
PositionAnimator_discrete	Mindego	PositionAnimator with discrete timeline (keyType 1).	PositionAnimator_discrete
PositionAnimator_linear	Mindego	PositionAnimator with linear timeline (keyType 2).	PositionAnimator_linear
PositionAnimator_NURBS_interp	Mindego	PositionAnimator with NURBS path (keyValueType 1, 2, 3) and basic interpolator (keyType 0).	PositionAnimator_NURBS_interp
PositionAnimator_paced	Mindego	PositionAnimator with paced animation (keyType 3) over a piecewise linear path (keyValueType 0).	PositionAnimator_paced
PositionAnimator_spline	Mindego	PositionAnimator with a velocity spline (keyType 4) over a piecewise linear path (keyValueType 0).	PositionAnimator_spline
PT_Default	Superscape	Procedural texture with default values.	PT_Default
PT_Gradient1	Superscape	Simple gradient - rectangle + single cell.	PT_Gradient1
PT_Gradient2	Superscape	Simple gradient - brick + 16 cells + roughness + distortion.	PT_Gradient2
PT_Gradient3	Superscape	Simple gradient - weave + 16 cells + roughness + distortion.	PT_Gradient3
PT_Gradient4	Superscape	Simple gradient - hexagonal + 16 cells + roughness + distortion.	PT_Gradient4
PT_Gradient5	Superscape	Simple gradient - ring + 4 cells + roughness.	PT_Gradient5
PT_Horizon	Superscape	Horizon texture - high roughness + low/medium distortion.	PT_Horizon
PT_Marble	Superscape	Marble texture - multiple bWeights + unequal warpmap knots.	PT_Marble
PT_PinkGranite	Superscape	Granite texture - plasma based + high roughness.	PT_PinkGranite
PT_Brickwork	Superscape	Brickwork texture - brick tiling + multiple aWeights + multiple knots + low roughness.	PT_Brickwork
PT_Fabric	Superscape	Fabric texture - weave tiling + low roughness + low distortion + multiple aWeights.	PT_Fabric
Quad_GA_BIFS	VUB	Multi-resolution homogeneous quadrilateral mesh (uniformSplit = 1). Animation of the gridCoord field.	Quad_MG, Quad_Lev0, Quad_Lev1, Quad_Lev2
Quad_LA_BIFS	VUB	Multi-resolution homogeneous quadrilateral mesh (uniformSplit = 1). Different resolution levels are displayed by animating the displayLevel field	Quad_MG, Quad_Lev0, Quad_Lev1, Quad_Lev2

Name (for bitstream filename, add .mp4)	Provider	Content	Reference file (.wrl)
Quad_OA_BIFS	VUB	Multi-resolution homogeneous quadrilateral mesh (uniformSplit = 1). Animation of the vertexOffset field.	Quad_MG, Quad_Lev0, Quad_Lev1, Quad_Lev2
Shell	Mindego	Combination of two NonLinearDeformer that twist and taper a rectangular object.	Shell
SkinnedModel	INT	Skinned and articulated model defined by using the collection of SB nodes.	SkinnedModel
Sphere_GA_BIFS	VUB	Multi-resolution non-homogeneous mesh. Animation of the gridCoord field.	Sphere_MG, Sphere_Lev0, Sphere_Lev1, Sphere_Lev2
Ss	Mindego	Shows a simple subdivision surface.	Ss
SS_Britney	Superscape	Extended Loop subdivision static biped model.	SS_Britney
SS_BritneyDance	Superscape	Extended Loop subdivision animated biped model.	SS_BritneyDance
SS_Goldfish	Superscape	Extended Loop subdivision textured "goldfish" model.	SS_Goldfish
Ss_img	Mindego	Shows a simple subdivision surface with 4 sectors with a texture mapped.	Ss_img
SS_RooDance	Superscape	Extended Loop subdivision animated "kangaroo" model.	SS_RooDance
SS_RooFlip	Superscape	Extended Loop subdivision animated "kangaroo" model.	SS_RooFlip
SS_Shark	Superscape	Extended Loop subdivision animated "shark" model.	SS_Shark
Tagpipes	Mindego	Two crossing cylinders as subdivision surfaces with sectors tagged.	Tagpipes
Tagpipes_anim	Mindego	Same as tagpipes sample with flatness of sectors animated.	Tagpipes_anim
Taper	Mindego	NonLinearDeformer that tapers a rectangular object.	Taper
Torus_C_LA_BIFS	VUB	Multi-resolution non-homogeneous mesh with uniform distributed reference grid. Different resolution levels are displayed by animating the displayLevel field.	Torus_MG, Torus_Lev0, Torus_Lev1, Torus_Lev2, Torus_Lev3. Torus_Lev4
Torus_C_OA_BIFS	VUB	Multi-resolution non-homogeneous mesh with uniform distributed reference grid. Animation of the vertexOffset field.	Torus_MG, Torus_Lev0, Torus_Lev1, Torus_Lev2, Torus_Lev3. Torus_Lev4
Twist	Mindego	NonLinearDeformer that twists a rectangular object.	Twist
cube2sphere_morph_cube	INT-ARTEMIS	MorphShape node test: static mesh obtained by morphing one base shape and four target shapes with weights 0 0 0 0.	cube2sphere_morph_cube
cube2sphere_morph_dome	INT-ARTEMIS	MorphShape node test: static mesh obtained by morphing one base shape and four target shapes with weights 0 1 0 0.	cube2sphere_morph_dome
cube2sphere_morph_etoile	INT-ARTEMIS	MorphShape node test: static mesh obtained by morphing one base shape and four target shapes with weights 0 0 1 0.	cube2sphere_morph_etoile
cube2sphere_morph_forme	INT-ARTEMIS	MorphShape node test: static mesh obtained by morphing one base shape and four target shapes with weights 0 0 0 1.	cube2sphere_morph_forme

Name (for bitstream filename, add .mp4)	Provider	Content	Reference file (.wrl)
cube2sphere_morph_sphere	INT-ARTEMIS	MorphShape node test: static mesh obtained by morphing one base shape and four target shapes with weights 1 0 0 0.	cube2sphere_morph_sphere
cube2sphere_morph_random	INT-ARTEMIS	MorphShape node test: static mesh obtained by morphing one base shape and four target shapes with weights 0.3 0.5 0.1 0.1.	cube2sphere_morph_random
cube2sphere_morph_anim	INT-ARTEMIS	MorphShape node and BBA stream test: animated mesh obtained by morphing into a morph space with one base shape and four target shapes.	cube2sphere_morph_anim
shuttle	ETH Zurich	DIBR2: SimpleTextureV2 node test: shuttle with novel fields (normal, splatU/V).	shuttle
flower	ETH Zurich	DIBR2: PointTextureV2 node test: flower with novel fields (normal, splatU/V).	flower
tm	FhG-HHI	MultiTexture and MultiTextureCoord node test: 3D Temple model with 4 Textures.	tm
VCAnimV2	INT-ARTEMIS	SBVCAnimationV2 node test: animation of a virtual character by using advanced control.	VCAnimV2
DI-PT-pos-ori-fov-plane-ortho	SAMSUNG AIT	DepthImage node with exposedFields (position, orientation, fieldofview, nearplane, farplane and orthographic) for PointTexture node.	DI-PT-pos-ori-fov-plane-ortho
DI-ST-fov-pos-plane	SAMSUNG AIT	DepthImage node with exposedFields (fieldofview, orientation, nearplane and farplane) for SimpleTexture node.	DI-ST-fov-pos-plane
DI-ST-ori-plane-fov	SAMSUNG AIT	DepthImage node with exposedFields (orientation, nearplane, farplane and fieldofview) for SimpleTexture node.	DI-ST-ori-plane-fov
cityFootPrintStatic	France Telecom	FootPrintSetNode:The building footprints of a city.	cityFootPrintStatic
cityFootPrintStaticBuffer	France Telecom	FootPrintSetNode: The building footprints of a city.	cityFootPrintStaticBuffer
cityFootPrintLOD	France Telecom	FootPrintSetNode: The building footprints of a city with LOD.	cityFootPrintLOD
cityFootPrintLODBuffer	France Telecom	FootPrintSetNode:The building footprints of a city with LOD.	cityFootPrintLODBuffer
cityFootPrintLOD_0_001	France Telecom	FootPrintSetNode:The building footprints of a city with LOD using the compression based on the scene accuracy.	cityFootPrintLOD_0_001
cityFootPrintLOD_0_001Buffer	France Telecom	FootPrintSetNode:The building footprints of a city with LOD using the compression based on the scene accuracy.	cityFootPrintLOD_0_001Buffer
cityStatic	France Telecom	FootPrintSetNode:The 3D building of a city.	cityStatic
cityStaticBuffer	France Telecom	FootPrintSetNode:The 3D building of a city.	cityStaticBuffer
cityDynamic	France Telecom	FootPrintSetNode:The 3D building of a city with LOD using the compression based on the scene accuracy.	cityDynamic

Name (for bitstream filename, add .mp4)	Provider	Content	Reference file (.wrl)
cityDynamicBuffer	France Telecom	FootPrintSetNode:The 3D building of a city with LOD using the compression based on the scene accuracy.	cityDynamicBuffer
house	France Telecom	FootPrintSetNode:The complex 3D model of a house.	house
windmill	University of Ilmenau	Shadow: Animated windmill, that casts shadows on the ground.	windmill
transparent	University of Ilmenau	Shadow: Several cubes with different transparency cast shadows on the ground.	transparent

4.1.2.4 Tolerance

There is no tolerance. The diagnosis is pass or fail.

4.1.3 Rendering conformance

4.1.3.1 Conformance requirements

All tools with non-trivial algorithms shall be tested for rendering conformance.

4.1.3.2 Measurement procedure and tolerance

4.1.3.2.1 ProceduralTexture

Nodes: ProceduralTexture

Provider: Superscape

Bitstreams: PT_Default, PT_Gradient1, PT_Gradient2, PT_Gradient3, PT_Gradient4, PT_Gradient5, PT_Horizon, PT_Marble, PT_PinkGranite, PT_Brickwork, PT_Fabric

Procedural textures are a function of the supplied parameters.

While rendering is not required to be color exact - color depth will vary between terminals - the texture structure must be pixel exact. In particular the (distorted) cell outline, cell positioning, and the interior of plasma based textures must be preserved.

4.2 Elementary bitstreams

4.2.1 Common conformance point

4.2.1.1 Bitstream conformance

4.2.1.1.1 Conformance requirements

AFX bitstreams shall comply with the objectTypeIndication and DecoderSpecificInfo semantics specification in 7.2.6 of ISO/IEC 14496-1:2004.

4.2.1.1.2 Measurement procedure

The syntax of the AFX bitstreams shall meet the requirements specified in 7.2.6 of ISO/IEC 14496-1:2004.

4.2.1.1.3 Tolerance

There is no tolerance for bitstream syntax checking. The diagnosis is pass or fail.

4.2.2 Geometry bitstreams

4.2.2.1 3DMC extension

The 3D mesh object is a 3D polygonal model that can be represented as an IndexedFaceSet in BIFS. It is defined by the position of its vertices (geometry), by the association between each face and its sustaining vertices (connectivity), and optionally by colours, normals, and texture coordinates (properties). Properties do not affect the 3D geometry, but influence the way the model is shaded.

3D mesh coding (3DMC) extension addresses the efficient coding of 3D mesh object. It comprises a basic method and several options. The basic 3DMC extension method operates on manifold model and features incremental representation of single resolution 3D model. The model may be triangular or polygonal – the latter are triangulated for coding purposes and are fully recovered in the decoder. Options include: (a) support for error resilience; (b) vertex order and face order preserving; (c) efficient texture mapping; and (d) support for non-manifold and non-orientable model.

4.2.2.1.1 Conformance points

4.2.2.1.1.1 Covered functionalities

The conformance points for compression of 3DMC extension cover basic compression, backward compatibility, forward compatibility, error resilience support, backward compatibility with error resilience, forward compatibility with error resilience, vertex order and face order preserving, support of non-manifold/non-orientable model (stitch), and efficient texture mapping. These functionalities relate to the compressed representation of the IndexedFaceSet node carried by the BitWrapper node as described in 7.2.2.23 of ISO/IEC 14496-11:2005.

As for carriage of compressed representation by the IndexedFaceSet node using the BitWrapper node, it can be carried either in a separate stream or within the scene stream (BIFS stream). Therefore, compression of 3DMC extension shall also be tested together with this node.

The following Subclauses specify the normative tests for verifying conformance of 3DMC extension compressed bitstreams and 3DMC extension decoder. Those normative tests make use of test data (bitstream test suites).

4.2.2.1.2 Bitstream conformance

4.2.2.1.2.1 Conformance requirements

BIFS streams shall comply with the specifications for compression of 3DMC extension in ISO/IEC 14496-16:2006/Amd1:2007 and 7.2.2.23 of ISO/IEC 14496-11:2005.

4.2.2.1.2.2 Measurement procedure

Syntax of the BIFS stream shall meet the requirements of compression of 3DMC extension in ISO/IEC 14496-16:2006/Amd1:2007 and 7.2.2.23 of ISO/IEC 14496-11:2005.

4.2.2.1.2.3 Tolerance

There is no tolerance for bitstream syntax checking. The diagnosis is pass or fail.