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Part 9: Digital Multimedia Broadcasting application format

Technologies de l'information — Format pour application multimédia (MPEG-A) —

Partie 9: Format pour application de diffusion générale multimédia numérique

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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.

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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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 23000-9 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 23000 consists of the following parts, under the general title *Information technology — Multimedia application format (MPEG-A)*:

— *Part 1: Purpose for multimedia application formats* [Technical Report]

— *Part 2: MPEG music player application format*

— *Part 3: MPEG photo player application format*

— *Part 4: Musical slide show application format*

— *Part 5: Media streaming application format*

— *Part 7: Open access application format*

— *Part 8: Portable video application format*

— *Part 9: Digital multimedia broadcasting application format*

— *Part 10: Video surveillance application format*

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Introduction

Digital Multimedia Broadcasting (DMB) is the first global mobile TV service based on a digital radio transmission system. DMB provides people with crystal-clear video, theatre-quality audio, and other data services on the move via in-vehicle terminals or hand-held gadgets like mobile phones so that it makes possible the information acquisition and consumption anywhere. DMB contents on air include audio-visual programs, interactive data, web pages, slideshows, TTI (traffic & travel information), etc.

Most users want to store their preferred DMB contents for consuming the contents at their preferred time and on their preferred device. Many of them also want to share the contents with other people. Contents providers also want to serve their DMB contents not only through broadcast but also through communication networks. Thus a standardized format needs to be specified to guarantee the interoperability of the DMB contents across various devices from different vendors.

DMB AF (Application Format) specification defines a file format that pertains to DMB (more specifically T-DMB and S-DMB) contents and services. It specifies how to combine the variety of DMB contents with associated information for a presentation in a well-defined format that facilitates storage, interchange, management, editing, and presentation of the DMB contents in protected, governed, and interoperable ways.

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Information technology — Multimedia application format (MPEG-A) —

Part 9:
Digital Multimedia Broadcasting application format

1 Scope

This part of ISO/IEC 23000 specifies a file format that pertains to both terrestrial digital multimedia broadcasting (T-DMB) and satellite digital multimedia broadcasting (S-DMB) contents and services. It integrates the existing DMB contents with appropriate additional information to facilitate storage, interchange, management, editing, and presentation of the contents in protected, governed, and interoperable ways.

This part of ISO/IEC 23000 is applicable both to storage and playback of DMB contents and to acquisition and consumption through communication networks and removable storages. Application examples of this specification include but are not limited to

— scheduled storage and time-shifted playback of DMB contents,

— file casting through DMB data channel,

— IP media service such as DMB content portal,

— rightful interchange of DMB contents between terminals, and

— user editing or creation from DMB contents.

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 14496-12, *Information technology — Coding of audio-visual objects (MPEG-4) — Part 12: ISO base media file format*[1)]

ISO/IEC 14496-14, *Information technology — Coding of audio-visual objects (MPEG-4) — Part 14: MP4 file format*

ISO/IEC 14496-15, *Information technology — Coding of audio-visual objects (MPEG-4) — Part 15: Advanced Video Coding (AVC) file format*

ISO/IEC 21000-2, *Information technology — Multimedia framework (MPEG-21) — Part 2: Digital Item Declaration*

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1) Technically identical to ISO/IEC 15444-2.

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ISO/IEC 21000-4, *Information technology — Multimedia framework (MPEG-21) — Part 4: Intellectual Property Management and Protection Components*

ISO/IEC 21000-5, *Information technology — Multimedia framework (MPEG-21) — Part 5: Rights Expression Language*

ISO/IEC 21000-9, *Information technology — Multimedia framework (MPEG-21) — Part 9: File Format*

ETSI EN 300 401, *Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers*

ETSI TS 102 428, *Digital Audio Broadcasting (DAB); DMB video service; User Application Specification*

ETSI TS 102 822-3-1 V1.4.1:2007, *Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 3: Metadata; Sub-part 1: Phase 1 – Metadata schemas*

ETSI TS 102 822-3-3 V1.2.1:2007, *Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 3: Metadata; Sub-part 3: Phase 2 – Extended Metadata Schema*

ETSI TS 102 822-4 V1.3.1:2007, *Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 4: Phase 1 – Content Referencing*

TTAS.KO-07.0027, *Standard for Satellite Digital Multimedia Broadcasting (S-DMB) Transmitter/Receiver Interface*

TTAS.KO-07.0032, *Terrestrial Digital Multimedia Broadcasting; Specification of the MOT Slide show service for Terrestrial Digital Multimedia Broadcasting (DMB) to mobile, portable and fixed receivers*

TTAS.ET_TS101498-1, *Radio Broadcasting Systems; Specification of the Broadcast Web Site Service for VHF Digital Multimedia Broadcasting (DMB) to Mobile, Portable and Fixed Receivers*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

3.1.1
DMB
digital multimedia broadcasting
collective term representing both terrestrial digital multimedia broadcasting (T-DMB) and satellite digital multimedia broadcasting (S-DMB)

3.2 Abbreviated terms

AAC	Advanced Audio Coding
AVC	Advanced Video Coding
AVC-FF	AVC File Format [ISO/IEC 14496-15]
BIFS	Binary Format for Scenes
BWS	Broadcast Web Site
CRID	Content Reference Identifier
CS	Classification Scheme

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DAB	Digital Audio Broadcasting [ETSI EN 300 401]
DLS	Dynamic Label Segment
DI	Digital Item
DID	Digital Item Declaration
DMB-AF	DMB Application Format [This part of ISO/IEC 23000]
DRM	Digital Right Management
ES	Elementary Stream
GOP	Group of Pictures
GUI	Graphic User Interface
HE-AAC v2	High Efficiency AAC version 2
IPMP	Intellectual Property Management and Protection
ISO-FF	ISO Base Media File Format [ISO/IEC 14496-12]
MATE	Multimedia Application Terminal Environment
MIDP	Mobile Information Device Profile
MOT	Multimedia Object Transfer
MP4-FF	MP4 File Format [ISO/IEC 14496-14]
MP21-FF	MPEG-21 File Format [ISO/IEC 21000-9]
MPEG	Moving Picture Experts Group (ISO/IEC JTC 1/SC 29/WG 11)
NPAD	Non-PAD
PAD	Program-Associated Data
PMT	Program Map Table
RAI	Random Access Indicator
REL	Rights Expression Language
SBR	Spectral Band Replication
S-DMB	Satellite Digital Multimedia Broadcasting [TTAS.KO-07.0027]
SL	Synchronization Layer
T-DMB	Terrestrial Digital Multimedia Broadcasting [ETSI TS 102 428]
TPEG	Transport Protocol Expert Group
TS	Transport Stream
TTI	Traffic and Travel Information
TVA	TV-Anytime

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4 Overview of technology

4.1 Components summary

Figure 1 shows a brief summary of the components of DMB-AF which consists of the MPEG Standards and non-MPEG Standards. The components of DMB-AF include native DMB contents which can be broadcasted on air and additional components added by this specification such as file format and metadata.

The native DMB contents include MPEG-4 AVC video, MPEG-1/2/4 audio, interactive video based on MPEG-4 BIFS, and various kind of data such as MOT slide show, Dynamic Label (DLS), Broadcast web site (BWS), Traffic and travel information (TTI) based on TPEG, and Java applications (midlet).

For this specification, ISO Base Media File Format and MP4 File Format are used for base file format structure. MPEG-21 DID is used for organizing and listing content items. TV-Anytime Metadata is used for contents and user description and is encapsulated by MPEG-21 DID. MPEG-21 REL and IPMP Components are used for protection and governance of content resources and descriptive metadata. 3GPP Timed Text Format is used when characters and glyphs rendering in timed manner is required, for example as in karaoke application.

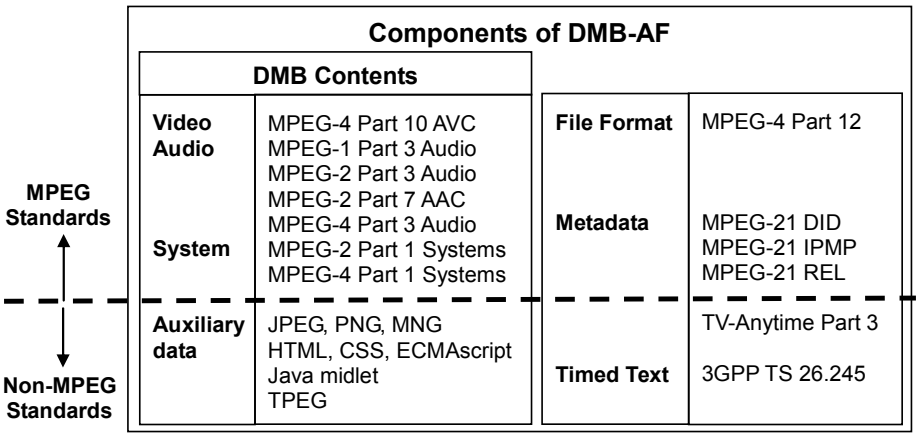

Figure 1 — Components summary for DMB-AF

4.2 File format - ISO base media file format

The ISO base media file format is a flexible, extensible format which contains timed media information in order to facilitate interchange, management, editing, and presentation of the media. The ISO base media file format is a base format for the DMB-AF file structure.

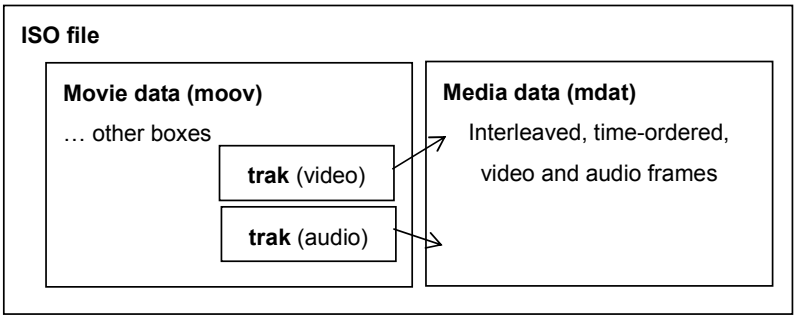

Figure 2 — ISO base media file format example

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Figure 3 shows the relations to other file formats; DMB-AF is basically derived from ISO file format and is based on MP4 file format for storing MP4 contents, AVC file format for storing AVC video and parameter sets, and MPEG-21 file format for content packaging, 3GPP timed text format for storing the 3GPP timed text.

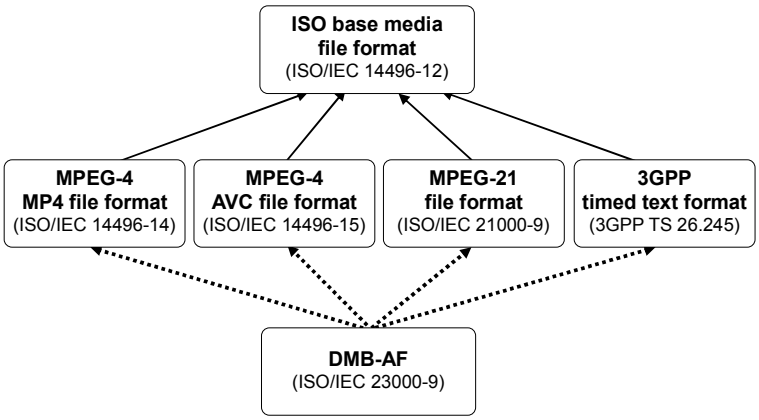

Figure 3 — Relation to other file formats

4.3 Organization of contents – MPEG-21 DID

MPEG-21 DID (ISO/IEC 21000-2) describes a set of abstract terms and concepts to form a useful model for defining Digital Items. In the MPEG-21 multimedia framework, the digital item (DI) is a fundamental unit with a standard representation, identification and metadata for the distribution, and transaction. For the declaration of the digital item in flexible and general ways, MPEG-21 DID aims to standardize the description for the definition of the digital item and provides the basic structure for content representation for the DMB content storage and distribution scenario.

4.4 Content creation and consumption description – TV Anytime Metadata

TV-Anytime (ETSI TS 102 822-1 to 822-9) is a set of specifications for the controlled delivery of multimedia content to a user's digital video recorder (DVR). It enables applications to exploit local and remote storage in consumer electronics platforms.

The TV-Anytime metadata are sub-divided into two categories: phase 1 metadata (ETSI TS 102 822-3-1) and phase 2 metadata (ETSI TS 102 822-3-3). The phase 1 metadata schema has the root element of TVAMainType and defines mainly about program and user descriptions. The phase 2 metadata schema has the root element of ExtendedTVAMainType and extends the phase 1 schema for including various content types and consumption conditions.

For describing creation and consumption information of DMB contents, DMB-AF uses a restricted subset of the TV-Anytime metadata specification. The restricted subset of TV-Anytime metadata for DMB-AF is defined in subclause 5.3 of this specification.

DMB-AF also adopts CRID (content referencing Identifier) defined in TV-Anytime Part 4 (ETSI TS 102 822-4) for identifying a specific content item independent of its location.

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4.5 Protection and governance – MPEG-21 IPMP and REL

4.5.1 Right management and protection

MPEG-21 IPMP (Intellectual Property Management and Protection) Components standard is a DRM (Digital Right Management) framework developed by MPEG for safe and easy distribution of contents between the different user terminals and the different content providers. The MPEG-21 IPMP Components standard provides the means to represent which parts of Digital Items are protected with what IPMP Tools.

For supporting governed and protected usage of DMB contents, DMB-AF adopts a restricted subset of MPEG-21 IPMP Components. The lists of the functionalities are explained in subclause 5.2 of this specification. Note that unless specifically mentioned in this specification, the requirements of MPEG-21 DID and IPMP (ISO/IEC 21000-2 and ISO/IEC 21000-4) apply for digital item declaration and protection in DMB-AF.

4.5.2 Right expression

ISO/IEC 21000-5 defines a right expression language (REL), which is designed to be domain-agnostic and comprehensive, and also very flexible and adaptive to the specific scope and requirements of applications within a particular domain. The language provides extension and profile mechanisms for these purposes.

In DMB-AF, licenses governing the use of content or parts thereof are expressed according to the dissemination and capture DAC profile of the MPEG-21 REL. The REL DAC profile is designed for usage in broadcasting applications, which can handle various use cases for DMB-AF applications. Note that the requirements of the DAC profile of MPEG-21 REL (ISO/IEC 21000-5) apply for right expression in DMB-AF.

4.6 Timed text

3GPP Timed Text format describes the normative behavior of text data for rendering. Timed text supports the characters and glyphs rendering, font support such as name, size and style, color support of text and background, text rendering position and composition, etc. By using these functionalities, various applications such as closed captioning, karaoke, dynamic highlighting and other visual annotation can be deployed in the user's terminal.

The synchronized usage of the timed text with other timed media is described in subclause 6.6.

5 Components of DMB-AF

5.1 Supported components and restrictions

In general, DMB Video Service components include audio and visual objects and associated auxiliary data, which can be carried in MPEG-2 SPTS (Single Program Transport Stream). DMB Audio Service components include audio stream and associated auxiliary data. DMB Data Service components include various kind of NPAD (Non Program-Associated-Data).

In Table 1, all the supported components of DMB-AF, except the file format, are listed with the specification reference of the respective component. Note that DMB-AF does not mandate all the syntax and semantics of the 'Specification' column of Table 1. Instead, it does mandate the component specification with some restrictions on profiles, levels, and usages, which are defined in the specification of 'Restriction' column of the table. In other words, for each component listed in Table 1, the requirements of the corresponding specification in the 'Restriction' column apply. For example, MPEG-4 AVC in T-DMB service is restricted such that Baseline Profile Level 1.3 apply with "`num_ref_frames` = 3" and "`pic_order_cnt_type` = 2" according to ETSI TS 102 428. Implementers of this specification shall carefully consult to the specifications in the 'Restriction' column for the exact restrictions made on the supported components.

For the file format components, refer to Section 6 of this specification.

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Table 1 — Supported Components of DMB-AF

Type	Component Name	Abbreviation	Specification	Restriction
Audio	MPEG Audio Layer II	MP2	ISO/IEC 11172-3 and ISO/IEC 13818-3	ETSI EN 300 401
	MPEG-4 Audio ER-BSAC	ER-BSAC	ISO/IEC 14496-3	ETSI TS 102 428
	MPEG-4 Audio HE-AAC v2	HE-AAC2	ISO/IEC 14496-3	ETSI TS 102 428
	MPEG-2 AAC LC MPEG-4 Audio SBR	AAC+SBR	ISO/IEC 13818-7 and ISO/IEC 14496-3	TTAS.KO-07.0027
Visual	MPEG-4 AVC Baseline	AVC	ISO/IEC 14496-10	T-DMB: ETSI TS 102 428 S-DMB: TTAS.KO-07.0027
Transport	MPEG-2 Systems TS MPEG-4 Systems SL	MP4on MP2	ISO/IEC 13818-1 and ISO/IEC 14496-1	ETSI TS 102 428
Data	MOT Slide Show	MOT-SLIDE	TTAS.KO-07.0032	None
	Dynamic Label Segment	DLS	ETSI EN 300 401	None
	MPEG-4 BIFS	BIFS	ISO/IEC 14496-11	ETSI TS 102 428
	JPEG Image	JPG	ISO/IEC 10918-1	TTAS.ET-TS101498-1
	PNG Image	PNG	ISO/IEC 15948 PNG Version 1.2	TTAS.ET-TS101498-1
	MNG Image	MNG	MNG(Multiple-image Network Graphics), Version 1.0, PNG Development Group	TTAS.ET-TS101498-1
	3GPP Timed Text	3GPP-TT	3GPP TS 26.245	None
	Broadcast Web Site	BWS	TTAS.ET-TS101498-1	Intermediate Profile
	TTI (Traffic and Travel Information)	TPEG	ISO/TS 18234 Part 1~6	None
	Java Application	MIDlet	Java ME MIDP	None
Metadata	MPEG-21 DID	DID	ISO/IEC 21000-2	None
	MPEG-21 IPMP Components	IPMP	ISO/IEC 21000-4	This specification (subclause 5.2)
	MPEG-21 REL	REL	ISO/IEC 21000-5	DAC Profile
	TV-Anytime Metadata	TVA	ETSI TS 102 822-3 Subpart 1 and 3 ETSI TS 102 822-4	This specification (subclause 5.3)

NOTE 1 MOT-SLIDE and BWS components can contain JPG/PNG/MNG images and that BWS can contain HTML (Hyper Text Markup Language) document, CSS (Cascading Style Sheet), and ECMA Script, etc. Unless specifically mentioned in this specification, the requirements of TTAS.KO-07.0032 apply for the MOT-SLIDE component and the requirements of TTAS.ET-TS101498-1 Intermediate Profile apply for the BWS component.

NOTE 2 JPG, PNG, and MNG images can be used in the contexts of BIFS, MOT-SLIDE, and BWS. In addition, the images can also be used as media titles or thumbnails in TVA or can independently exist as additional resource items for user. In any context, only the requirements of TTAS.ET-TS101498-1 apply for all the image components in DMB-AF.

5.2 Restrictions on MPEG-21 IPMP components

5.2.1 Introduction

The IPMP tool set for DMB-AF is a subset of MPEG-21 IPMP Components. The selection criterion on this tool set is based on the specific application domain of DMB.

- Most of the target terminals are to be hand-held DMB receivers.
- The selected IPMP tools should be useful and applicable for DMB-AF services on such devices.
- For easy implementation, some ambiguous tool elements, e.g. the elements of "`any`" type should be specifically defined.

The following subclauses specify the normative set of the required IPMP Components elements for DMB-AF.

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5.2.2 IPMP DIDL

To maintain the full capability to express the protected Digital Item, the IPMP tool set for DMB-AF shall include all the elements in the IPMP DIDL schema of MPEG-21 IPMP Components.

5.2.3 IPMP Information Descriptor

IPMP Information Descriptors in DMB-AF are composed of the subset of IPMP Information Descriptor schema in MPEG-21 IPMP Components standard. The selected elements with restrictions are as follows.

Element/Child Element	Restrictions on MPEG-21 IPMP Components
`ipmpinfo:IPMPInfoDescriptor`	As defined in 7.3 of the standard
`ipmpinfo:Tool`	Restricted to include only `ToolRef`
`ipmpinfo:RightsDescriptor`	As defined in 7.5 of the standard.
`Dsig:Signature`	As defined in 7.6 of the standard.
`ipmpinfo:Tool`	Restricted to include only a `ToolRef`, an optional `initailzationSettings`, an optional `RightDescipritor` and an optional `Signature`
`ipmpinfo:ToolRef`	As defined in 7.4.5 of the standard.
`ipmpinfo:initializationSettings`	As defined in 7.5 of the standard.
`ipmpinfo:RightsDescriptor`	As defined in 7.5 of the standard.
`dsig:Signature`	As defined in 7.6 of the standard.

The `ipmpinfo:RightsDescriptor` element is used for containing rights information that governs the IPMP information. The `ipmpinfo:RightsDescriptor` element under the `ipmpinfo:Tool` element is for each IPMP Tool. The common rights information about all tools in `ipmpinfo:IPMPInfoDescriptor` can be expressed by the `ipmpinfo:RightsDescriptor` under the `ipmpinfo:IPMPInfoDescriptor`.

Regarding encryption of resources, AES-128 CTR [32] is used as a default encryption tool in DMB-AF, meaning that DMB-AF file players compliant to the protection supporting brands of this specification shall be able to decrypt the resources encrypted by the default encryption tool. In addition, the initiation vector (IV) can be used as a value of `ipmpinfo:initializationSettingsData` for AES-128 CTR method.

5.2.4 IPMP General Information Descriptor

IPMP General Information Descriptors in DMB-AF are composed of a subset of MPEG-21 IPMP Information Descriptor schema in MPEG-21 IPMP Components and MPEG-A Media Streaming Player application format [17]. The selected elements with restrictions are tabulated as follows.

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Element/Child Element	Restrictions on MPEG-21 IPMP Components
ipmpinfo:IPMPGeneralInfoDescriptor	As defined in 8.3.1 of the standard.
Ipmpinfo:ToolList	This element is restricted to include one or many ipmpinfo:ToolDescription element(s).
ipmpinfo:LicenseCollection	As defined in 8.5 of the standard.
Dsig:Signature	As defined in 8.6 of the standard.
Ipmpinfo:ToolList	Restricted to include only ipmpinfo:ToolDescription
ipmpinfo:ToolDescription	
ipmpinfo:ToolDescription	This element is restricted to include the following child elements only: ipmpinfo:IPMPToolID, an optional ipmpinfo:Inline or ipmpinfo:Remote
ipmpinfo:IPMPToolID	As defined in 8.4.4.3 of the standard.
Ipmpinfo:Inline	As defined in 8.4.4.5 of the standard.
Ipmpinfo:Remote	As defined in 8.4.4.6 of the standard.
Ipmpinfo:ConfigurationSettings	As defined in 8.4.8.6 of the standard.
@localID	As defined in 8.4.4.1 of the standard.
ipmpinfo:ConfigurationSettings	
ipmpinfo:Configuration	Restricted to include a ipmpinfo-msx:ToolBody element [17] in order to indicate IPMP Tool Configuration.
ipmpinfo:Update	As defined in 7.4.4.7.4 of the standard.

5.2.5 IPMP Information schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.w3.org/2001/XMLSchema" xmlns:ipmpinfo="urn:mpeg:mpeg21:2004:01-IPMPINFO-NS"
xmlns:ipmpinfo-msx="urn:mpeg:mpeg21:2006:10-IPMPINFO-MSX-NS" xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-
NS" xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS" xmlns:dsig="http://www.w3.org/2000/09/xmldsig#"
targetNamespace="urn:mpeg:mpeg21:2004:01-IPMPINFO-NS" elementFormDefault="qualified"
attributeFormDefault="unqualified" version="0.01">
    <import namespace="http://www.w3.org/2000/09/xmldsig#"
schemaLocation="http://www.w3.org/TR/2002/REC-xmldsig-core-20020212/xmldsig-core-schema.xsd"/>
    <import namespace="urn:mpeg:mpeg21:2003:01-REL-R-NS" schemaLocation="rel-r_IS.xsd"/>
    <import namespace="urn:mpeg:mpeg21:2002:01-DII-NS" schemaLocation="dii.xsd"/>
    <element name="IPMPInfoDescriptor" type="ipmpinfo:IPMPInfoDescriptorType"/>
    <complexType name="IPMPInfoDescriptorType">
        <annotation>
            <documentation>The RightsDescriptor under this element is applied to the associated
asset</documentation>
        </annotation>
        <sequence>
            <element ref="ipmpinfo:Tool" minOccurs="0" maxOccurs="unbounded"/>
            <element ref="ipmpinfo:RightsDescriptor" minOccurs="0" maxOccurs="unbounded"/>
            <element ref="dsig:Signature" minOccurs="0"/>
        </sequence>
    </complexType>
    <element name="Tool" type="ipmpinfo:ToolType"/>
    <complexType name="ToolType">
        <complexContent>
            <restriction base="ipmpinfo:ToolType">
                <sequence>
                    <element ref="ipmpinfo:ToolRef"/>
                    <element ref="ipmpinfo:InitializationSettings" minOccurs="0"/>
                    <element ref="ipmpinfo:RightsDescriptor" minOccurs="0"/>
                    <element ref="dsig:Signature" minOccurs="0"/>
                </sequence>
                <attribute name="order" type="positiveInteger"/>
            </restriction>
        </complexContent>
    </complexType>
    <element name="ToolRef" type="ipmpinfo:ToolRef"/>
    <complexType name="ToolRef">
```

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```
        <attribute name="localidref" type="IDREF" use="required"/>
    </complexType>
    <element name="IPMPToolID" type="anyURI"/>
    <element name="Inline" type="ipmpinfo:InlineType"/>
    <complexType name="InlineType">
        <sequence>
            <element ref="ipmpinfo:Binary"/>
            <element ref="dsig:Signature" minOccurs="0"/>
        </sequence>
    </complexType>
    <element name="Binary" type="base64Binary"/>
    <element name="Remote" type="ipmpinfo:RemoteType"/>
    <complexType name="RemoteType">
        <sequence>
            <element ref="dsig:Signature" minOccurs="0"/>
        </sequence>
        <attribute name="ref" type="anyURI"/>
    </complexType>
    <element name="ConfigurationSettings" type="ipmpinfo:ConfigurationSettingsType"/>
    <complexType name="ConfigurationSettingsType" mixed="true">
        <sequence>
            <element ref="ipmpinfo:Configuration"/>
            <element ref="ipmpinfo:Update" minOccurs="0"/>
        </sequence>
    </complexType>
    <element name="Configuration" type="ipmpinfo:ConfigurationType"/>
    <complexType name="ConfigurationType" mixed="true">
    <complexContent>
        <restriction base="ipmpinfo:ConfigurationType">
        <sequence>
            <element ref="ipmpinfo-msx:ToolBody" minOccurs="0"/>
        </sequence>
        </restriction>
    </complexContent>
        <sequence>
            <any namespace="##any" processContents="lax" minOccurs="0"/>
        </sequence>
    </complexType>
    <element name="Update" type="ipmpinfo:UpdateType"/>
    <complexType name="UpdateType">
        <sequence>
            <element ref="ipmpinfo:Location" maxOccurs="unbounded"/>
            <element ref="ipmpinfo:ScheduledUpdateTime" minOccurs="0"/>
            <element ref="ipmpinfo:SupportedPlatform" minOccurs="0" maxOccurs="unbounded"/>
            <element ref="dsig:Signature" minOccurs="0"/>
        </sequence>
    </complexType>
    <element name="Location" type="ipmpinfo:RemoteType"/>
    <element name="ScheduledUpdateTime" type="ipmpinfo:ScheduledUpdateTimeType"/>
    <complexType name="ScheduledUpdateTimeType">
        <simpleContent>
            <extension base="dateTime">
                <attribute name="periodic" type="duration" use="optional"/>
            </extension>
        </simpleContent>
    </complexType>
    <element name="SupportedPlatform" type="ipmpinfo:SupportedPlatformType"/>
    <complexType name="SupportedPlatformType">
        <sequence>
            <any namespace="##any" processContents="lax" minOccurs="0"/>
        </sequence>
    </complexType>
    <element name="RightsDescriptor" type="ipmpinfo:RightsDescriptorType"/>
    <complexType name="RightsDescriptorType">
        <sequence>
            <element ref="ipmpinfo:IPMPInfoDescriptor" minOccurs="0"/>
            <choice minOccurs="0">
                <element ref="ipmpinfo:License"/>
                <element ref="ipmpinfo:LicenseReference"/>
                <element ref="ipmpinfo:LicenseService"/>
            </choice>
        </sequence>
    </complexType>
    <element name="License" type="ipmpinfo:LicenseType"/>
    <complexType name="LicenseType" mixed="true">
        <sequence>
```


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