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

Part 12: Interactive music application format

AMENDMENT 1: Conformance and reference software

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

Partie 12: Format d'application musicale interactive

AMENDEMENT 1: Conformité et logiciel de référence

Reference number
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Foreword

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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.

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Amendment 1 to ISO/IEC 23000-12:2010 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 — Multimedia application format (MPEG-A) —

Part 12:
Interactive music application format

AMENDMENT 1: Conformance and reference software

After Clause 7, add the following:

8 Conformance points and conformance files

8.1 Conformance points

The conformance points of Interactive Music AF (IM AF) are followed:

- Conformance point 1 provides basic capability to play mixed audio track according to the preset. An IM AF file that conforms to this conformance point shall have one of the brands defined in clause 7 inside its '`ftyp`' box and the preset information ('`prst`'). Files that conforms to this conformance point shall contain the following supported components:
  - Interactive Music AF compatible to ISO Base Media File Format
  - And one of the following supported audio components:
    - ✓ MPEG-1 Audio Layer III
    - ✓ MPEG-4 Audio AAC profile
    - ✓ MPEG-D SAOC Baseline profile
    - ✓ PCM

- Conformance point 2 provides basic capability to play mixed audio track according to the user's interactive setting (such as group/track selection and volume control) which comply with the rule. An IM AF file that conforms to this conformance point shall have one of the brands defined in the clause 7 inside its '`ftyp`' box, group information ('`grup`') and the rule information ('`rusc`' and '`rumx`'). Files that conforms to this conformance point shall contain the following supported components:
  - The components specified for conformance point 1

- Conformance point 3 provides capability to play image, timed text and metadata in addition to the capabilities of conformance point 1. Files that conforms to this conformance point shall contain the following supported components:
  - The components specified for conformance point 1
  - JPEG
  - 3GPP Timed Text
  - MPEG-7 Multimedia Description Scheme

8.2 Conformance files

Conformance files shall be readable by the IM AF reference SW. The general structure of an IM AF file shall conform to the normative file structure defined in Table 2 of 6.1. The conformance files shall be used to verify some possible combinations of components defined by the specification of the IM AF.

Table AMD1.1 shows the list of conformance files and the following legend applies;

- C1: conforming the conformance point 1
- C2: conforming the conformance point 2
- C3: conforming the conformance point 3

Table AMD1.1 — Conformance files with conformance points

	File structure						Audio				Metadata	Image	Text
No	**ISO-BMFF**	**Brand**	**'grco'**	**'prst'**	**'rusc'**	**'rumx'**	**MP3**	**AAC**	**PCM**	**SAOC**	**MDS**	**JPEG**	**3GPP TT**
1	C1	C1	-	C1	-	-	C1	-	-	-	-	-	-
2	C1	C1	-	C1	C2	C2	-	C1	-	-	C3	C3	C3
3	C1	C1	-	C1	C2	C2	-	-	C1	-	-	-	-
4	C1	C1	C2	C1	C2	C2	C1	-	-	-	-	-	-
5	C1	C1	-	C1	-	-	-	C1	-	C1	-	-	-
6	C1	C1	-	C1	-	-	C1	-	-	C1	-	-	-

Table AMD1.2 — Description of conformance files

No.	File name	Brand (Covered Brand)	# of audio tracks	Components	Preset	# of groups	Rule	
							Selection	Mixing
1	example_01.ima	im01 (im02, im03, im11)	4	- MP3	- static/dynamic track volume preset - static/dynamic object volume preset	-	-	-
2	example_02.ima	im02 (im01, im03, im11, im21)	6	- AAC - JPEG - MDS	- static track volume preset	-	- implication rule	- equivalence rule - limit rule
3	example_03.ima	im11 (im21)	6	- PCM	- static track volume preset	-	- exclusion rule - not mute rule	- upper rule
4	example_04.ima	im11 (im01, im02, im03)	14	- MP3	- static track volume preset	3	- min/max rule	- lower rule
5	Example_05.ima	im04 (im12)	2	- AAC - SAOC	- static object volume preset	-	-	-
6	Example_06.ima	im04 (im12)	2	- MP3 - SAOC	- static object volume preset	-	-	-

[Remark01] Major brand of conformance file 1 is 'im01' and it can be also 'im02', 'im03' and 'im11' because difference between them is only *the maximum number of simultaneously decoded audio tracks* and it depends on the *player performance*. Hence conformance file 1 covers the conformance test for 'im02', 'im03' and 'im11' with MP3 audio tracks.
[Remark02] As the previously mentioned in [Remark01], conformance file 2 covers the conformance test for 'im01', 'im03', 'im11' and 'im21' with AAC audio tracks.
[Remark03] As the previously mentioned in [Remark01], conformance file 3 covers the conformance test for 'im21' with PCM audio tracks.
[Remark04] As the previously mentioned in [Remark01], conformance file 4 covers the conformance test for 'im01', 'im02' and 'im11' with MP3 audio tracks.
[Remark05] As the previously mentioned in [Remark01], conformance file 5 covers the conformance test for 'im12' with AAC and SAOC audio tracks.
[Remark06] As the previously mentioned in [Remark01], conformance file 6 covers the conformance test for 'im12' with MP3 and SAOC audio tracks.

9 Reference Software

9.1 Introduction

The reference software consists of an IM AF player and conformance files (IM AF files). The IM AF player provides the functions of parsing of the IM AF files and playing the components such as audio, image, timed-text and metadata. Especially for audio, multiple audio tracks are mixed according to the preset parameters or user's direct selection/control that conform to the rules made by a producer.

9.2 Architecture of IM AF player

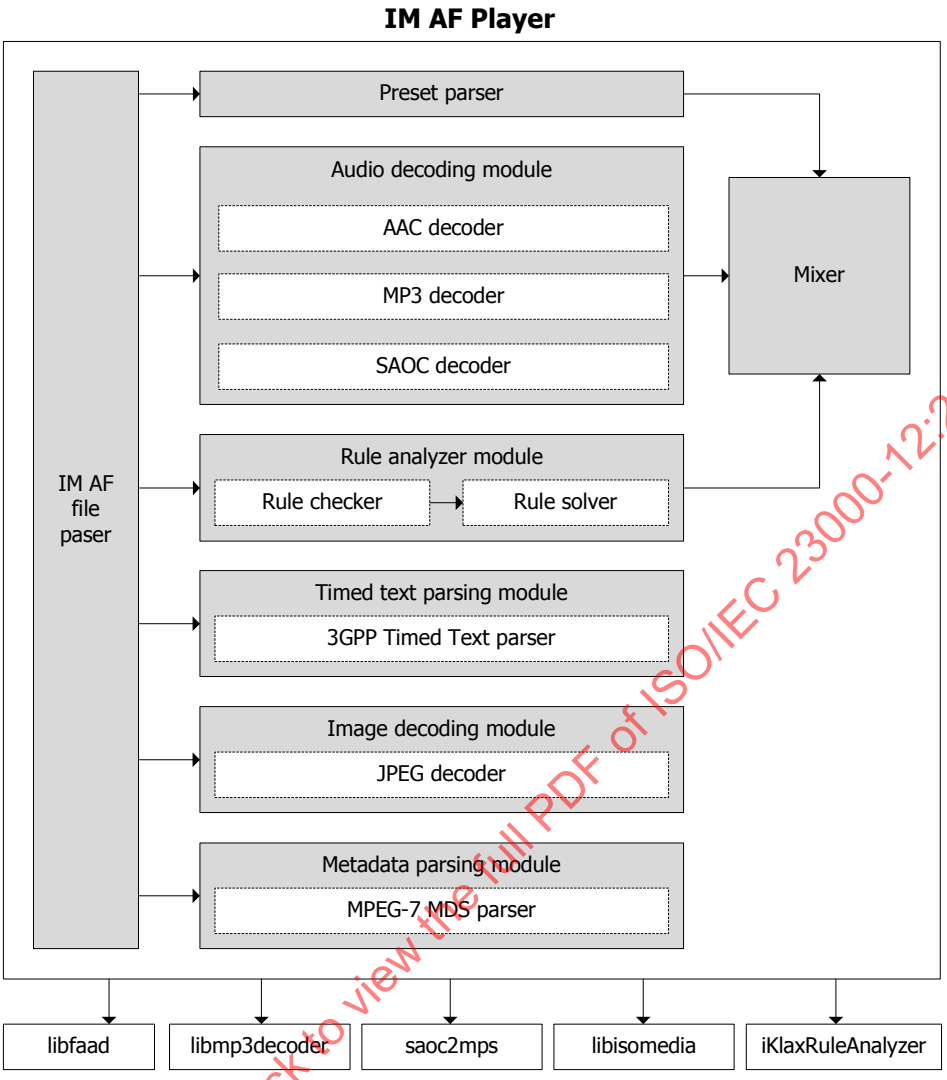

Figure AMD1.1 — The architecture of an Interactive Music AF player

9.2.1 IM AF file parser

The IM AF file parser module is to parse the input IM AF file, and is to pass extracted samples of audio bitstreams, image bitstream, preset, rule and metadata to the relevant individual decoder and parsing module.

9.2.2 Audio decoding module

The audio decoding module consists of the MPEG-4 Audio AAC profile, the MPEG-1 Audio Layer III and the MPEG-D SAOC decoders, and each decoder executes audio decoding by using the MPEG-4 Audio and the MPEG-1 Audio Layer III libraries and the MPEG-D SAOC reference software executable file, respectively.

9.2.3 Preset parser

The preset parser executes to parse the preset.

9.2.4 Rule analyzer module

The rule analyzer consists of a rule checker and a rule solver. The rule checker executes rule checking and rule solver executes to find solution of the rule using rule analyzer library.

9.2.5 Mixer

The mixer executes mixing multiple decoded audio tracks according to the gains of audio tracks for a preset or user's direct control.

9.2.6 Timed text parsing module

3GPP Timed Text parser in the timed text parsing module executes to parse the 3GPP Timed Text.

9.2.7 Image decoding module

JPEG decoder in the image decoding module executes image decoding by using JPEG library.

9.2.8 Metadata parsing module

MPEG-7 MDS parser in the metadata parsing module executes to parse the MPEG-7 MDS metadata.

9.2.9 External modules

The description for external libraries and an executable used in building the reference software is provided in Table AMD1.3 — External modules.

Table AMD1.3 — External modules

External module	Description
libfaad	The Libfaad library provides tools to decode MPEG-4 Audio AAC profile. The Libfaad is an open source MPEG-4 and MPEG-2 AAC decoder. The library is downloadable from http://www.audiocoding.com/faad2.html.
libmp3decoder	The Libmp3decoder library provides tools to decode MPEG-1 Audio Layer III. The Libmp3decoder is an open source MP3 decoder. The library is downloadable from http://sourceforge.net/projects/libmp3decoder/.
saoc2mps	The saoc2mps provides tool to decode MPEG-D SAOC. The saoc2mps is an executable file of the MPEG-D SAOC reference software.
libisomedia	The libisomedia library provides tool to decode ISO-BMFF. The library is a module of MPEG-4 reference software.
iKlaxRuleAnalyzer	The iKlaxRuleAnalyzer library provides tools to find the best solution if user's interaction is not compatible to the rules in the user-mix mode, i.e. the result of the rule checker is 'false'. The iKlax Media have provided it for IM AF reference software. The library can be provided on demand on http://developers.iklax.com/rule-analyser/

After Annex B, add the following annexes:

Annex C
(informative)

Installation of reference software

This reference software is build using Microsoft Visual Studio 2005 in Windows XP SP3 platform.

Follow these steps to make the reference software work appropriately in your station.

1. Extract the source code into the desired directory. The directories will be created as described in Table C.1.

Table C.1 — Directory structure

Folder name	Description
bin	Executable binary folder (including external and internal)
common_bin	Common libraries folder (buffer, thread and so on)
IM_AF_Decoder	IM AF decoder project folder
IM_AF_Player	IM AF Player project folder (including UI)
include	External header folder
lib	Library folder (including external and internal)
libfaad	LibFAAD project folder (for decoding AAC)
libisomedia	Libisomedia project folder (for parsing ISO-BMFF)
Libmp3decoder	Libmp3decoder project folder (for decoding MP3)

2. Open the MS Visual Studio Solution file (IM_AF_Player.sln) in the MS Visual Studio 2005.

3. Rebuild all and run the application.

Annex D
(informative)

User guide for reference software

The IM AF player provides the user interface to play the IM AF file that conform to the IM AF specification.

To open an IM AF file, press the “Open” button and select the IM AF file to play. Upon opening a file, audio tracks in the file are played and the corresponding the timed text is rendered and displayed on the bottom of the image area (if the timed text is stored in the IM AF file) where the corresponding image is displayed (if the image is stored in the IM AF file). Audio master volume can be controlled by sliding the volume slide bar. Total playback time and current playback time of audio are displayed next to the slide bar. To randomly access the audio, slide the slide bar to the desired position. To pause for playing, press the “Pause” button and to replay it, press the “Play” button. To stop playing, press the “Stop” button. To close the player, click the “X” button in the title bar. Figure D.1 shows the user interface of the IM AF player.

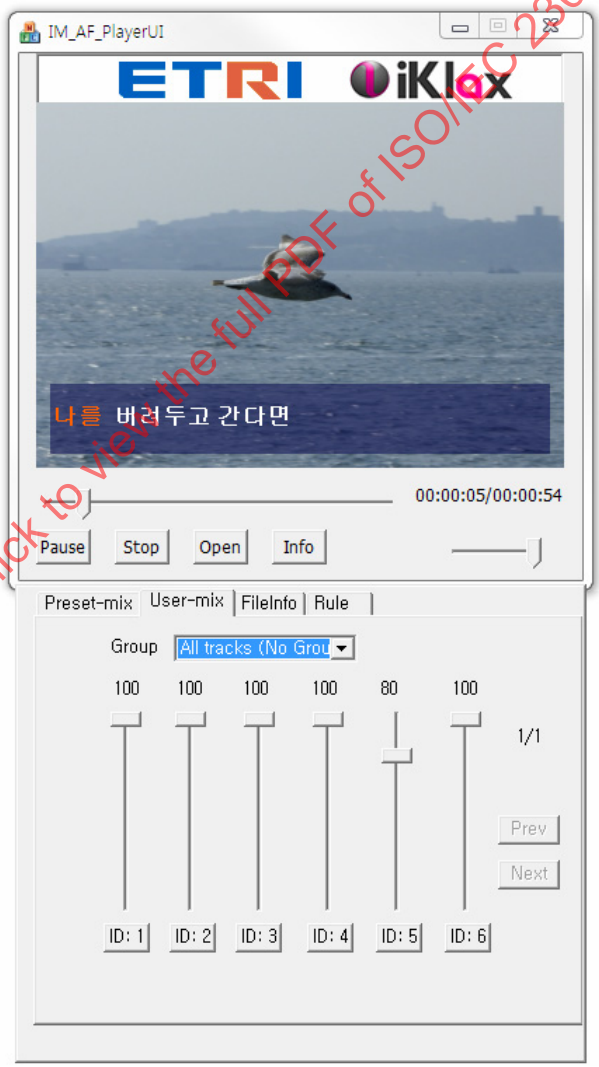

Figure D.1 — User interface of the IM AF player

Also user can obtain the metadata after pressing the “Info” button. The metadata browser shows the metadata stored inside the IM AF file. Figure D.2 shows the user interface of the player with the browser showing metadata.

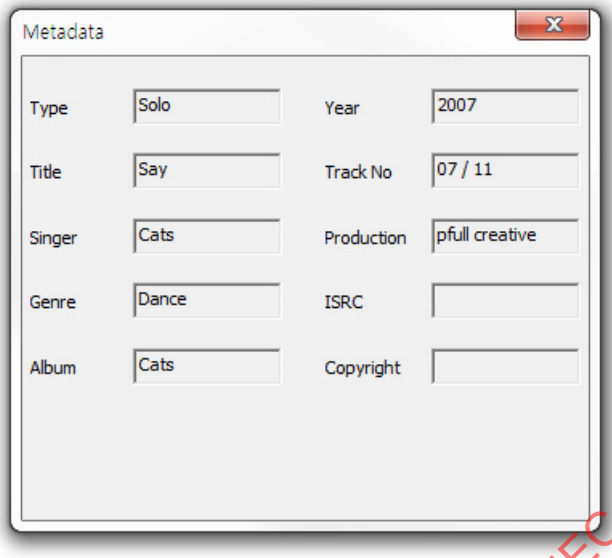

Figure D.2 — Metadata browser of the IM AF player

In the middle of the IM AF player, there are buttons for selecting 4 kinds of mini browser application regarding IM AF mix modes (i.e. preset-mix and user-mix), file information and rule information stored in the IM AF file. Through these buttons interface, user can access to each mini browser application as following:

The “Preset-mix” mini browser application shows the preset information stored the IM AF file. By selecting represented preset name, user can listen to rendered audio defined by a selected preset. Figure D.3 shows the user interface of the player with mini browser showing “Preset-mix”.

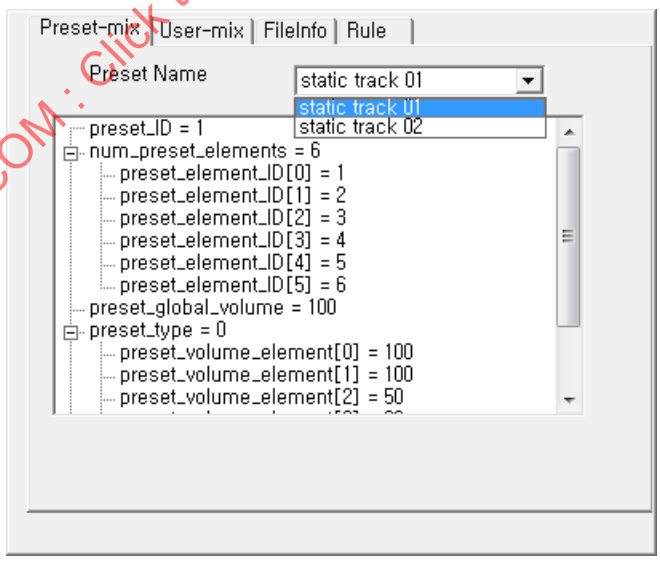

Figure D.3 — User interface of the browser for preset-mix mode (“Preset-mix”)