ABC
Australian
Broadcasting
Corporation

DELIVERY SPECIFICATION

FOR

STANDARD DEFINITION AND HIGH DEFINITION PROGRAMS AS FILES

V4.7

MAY 2015

Please note the delivery specification will be subject to change.

If you require assistance, please as appropriate contact the ABC (Monday-Friday, 9am- 6pm Sydney, Australia time) on:

+61 2 8333 4861 (Commissions) or

+61 2 8333 3484 (Acquisitions).

Alternatively email: abc.digital.file.acceptance@abc.net.au

Contents

1 Overview

This document specifies technical parameters and accompanying information required for completed programs to be delivered to the ABC in digital file format. All such content shall conform to this specification unless otherwise agreed in writing by the ABC's nominated delegate.

1.1 Terminology

In this document, "shall" means a mandatory requirement and "should" means a non-mandatory but desirable requirement. "May" means an optional requirement.

1.2 Transition between tape-based and file-based delivery

There will be a transition period where content will be accepted in either tape or file-based form. After this period, content will only be accepted in file form. See the ABC tape-based TV program content delivery specification for details of tape-based delivery requirements, at: http://www.abc.net.au/tv/independent/doc/ABC_Delivery_Specs_Aug_2011.pdf.

1.3 Specification updates

Updates to this specification may be issued from time to time. The current version may be found at http://www.abc.net.au/tv/independent/doc/delivery_specification_for_standard_definition_and_high_definition_programs_as_files.pdf.

1.4 File delivery

Files may be delivered via either of the following methods:

- The internet, using Aspera fasp protocol (preferred) or functional equivalent subject to prior agreement with ABC. Contact details will be included with the supply contract.
- Portable Drive (HDD/SSD/CF) – These drives are to be formatted with NTFS, HFS+ or exFAT file systems.

The ABC prefers USB 3.0 devices, self powered via the USB interface. Physical media should have the program name, duration and supplier details clearly marked.

Files shall be located in the root directory of the media. No files or folders shall be present other than those specified in the supply contract.

1.5 Delivery destination and method

Delivery destinations and methods will be specified in the supply contract and suppliers will be provided relevant instructions.

1.6 Filename conventions

Content filenames can take one of three forms:

- Where ABC Television has provided a unique program number for each file prior to delivery, the supplied program file(s) should be named using the supplied program number, with the extension ".mxf". File names shall use upper case, shall be 10 characters long and shall not include spaces. File name extensions shall use lower case, for example "CH1114H036.mxf".

- In the event that the ABC has not provided a unique program number prior to delivery, the supplied program filename shall consist of the suppliers own unique number in addition to program title, and where applicable, series title and episode title/no. with the ".mxf" extension. For example "KEY000001_Broadchurch(1)_Episode1/1.mxf".

- Note that this file name convention shall not exceed 100 characters (including underscores and spaces).

Where caption files are provided they shall be named using the same convention as outlined above but using a caption specific extension. In each case the extension shall be ".stl" or ".vtt", depending on the caption type.

Note that all program content and caption files delivered to the ABC (irrespective of naming convention) shall be unique.

In the event that the same program or caption file is requested twice by the ABC, the file should be re-sent by the supplier with an adjusted naming convention, using the extension R1 (meaning Revision 1). For example: "CH1114H036_R1.mxf", or "KEY000001_Broadchurch(1)_Episode1/ 1_R1.mxf". Any subsequent revisions will follow this convention (R2, R3 etc).

1.7 File packaging

Each program file shall be contained in a single MXF wrapper containing video, audio and ancillary data, including descriptive metadata, as specified in SMPTE ST 378:2004, *Television — Material Exchange Format (MXF) — Operational Pattern 1a* (Single Item, Single Package).

Files shall conform to AMWA Specification AS-11 (see http://www.amwa.tv/downloads/specifications/AMWA_AS-11_11_2013-10-08.pdf).[1]

The video and audio requirements for each file are contained in the shim specifications in Section 2.[2]

[1] AS-11 is a subset of the MXF file format used for the delivery of finished audiovisual programs to broadcast stations.

[2] Shims constrain the AS-11 general specifications for a specific purpose. The ABC shims specify encoding of video and audio essence and other requirements for delivery of audiovisual programs within the boundaries of AS-11.

2 ABC shim specifications

2.1 ABC Standard Definition Shim

Shim Parameter	Shim Value
Shim Name	ABC SD IMX
Shim Version	1.0
Video Encoding	SD D-10 50Mbit/s
Video Format	576i50
Audio Encoding	AES3
Audio Channel Arrangement	Single multi-channel
Audio Track Allocation	EBU R 48:2a (Stereo with silence, 4 tracks) EBU R 123:4b (Stereo with M&E) EBU R 123:4c (Stereo with AD)
Closed Caption Presence	Not present (Note 1)
Closed Caption Standard	NA
Timecode Mode	Non-drop frame
Default Timecode	N/A
Additional Descriptive Metadata Schemes	DM_AS-11_UKDPP
Program Segmentation	Required
Index Strategy Frame	Lead
Essence Partition Strategy	Single
Permitted AFD Set	10

Notes:

1. Closed captions shall be delivered as a separate file. See section 1.6 for the caption file name convention and section 3.15 for closed caption requirements.

2.2 ABC High Definition Shim

Shim Parameter	Shim Value
Shim Name	ABC HD AVC-Intra
Shim Version	1.0
Video Encoding	HD AVC-Intra 100Mbit/s
Video Format	1080i50
Audio Encoding	PCM
Audio Channel Arrangement	Mono only
Audio Track Allocation	EBU R 48:2a (Stereo with silence, 4 tracks) EBU R 123:4b (Stereo with M&E) EBU R 123:4c (Stereo with AD) EBU R 123:8a (Stereo with discrete MCA) EBU R 123:16c (5.1 with AD) [Used in conjunction with AD Flag]
Closed Caption Presence	Not Present (Note 1)
Closed Caption Standard	NA
Timecode Mode	Non-drop frame
Default Timecode	N/A
Additional Descriptive Metadata Schemes	DM_AS-11_UKDPP
Program Segmentation	Required
Index Strategy Frame	lead
Essence Partition Strategy	single
Permitted AFD Set	10

Notes:

1. Closed captions shall be delivered as a separate file. See section 1.6 for the caption file name convention and section 3.15 for closed caption requirements.

2.3 Descriptive metadata

Each file must include the following descriptive metadata schemes[3] which comply with AS-11. Each scheme shall be on a dedicated Descriptive Metadata Track.

2.3.1 AS-11 Core descriptive metadata scheme

This is a required metadata scheme that shall be present in all AS-11 compliant files. The AS-11 Core metadata scheme is shown in Appendix A reproduced from the AMWA AS-11 v1.1 standard, together with additional ABC notes on conformance and values. All fields in this scheme that are marked as "mandatory" must be included and must contain valid metadata.

2.3.2 AS-11 UK DPP Descriptive metadata scheme

This is a required metadata scheme that shall be present in AS-11 compliant files delivered to the ABC. The AS-11 UK DPP metadata scheme is shown in Appendix B, reproduced from the AMWA As-11 v1.1

[3] A metadata scheme is a defined set of metadata items that are grouped together in the MXF file and associated with the audio and video essence in the file

standard, together with additional ABC notes on conformance and values. All fields in this scheme that are marked as “mandatory” must be included and must contain valid metadata.

2.3.3 AS-11 Segmentation descriptive metadata scheme

This is a required metadata schema that shall be present in AS-11 compliant files delivered to the ABC and defines the metadata that describes the individual parts on a Segmentation Track. The AS-11 Segmentation metadata scheme is shown in Appendix C, reproduced from the AMWA AS-11 v1.1 standard. All fields in this scheme that are marked as “mandatory” must be included and must contain valid metadata.

2.4 Program segmentation and parting requirements

Program segmentation defines regions of program essence data. One of these regions contains the program itself. The other regions contain non-program content, for example black, ident etc. Program segmentation is defined using an MXF timeline track, called the segmentation track.

Each file delivered to the ABC shall contain one segmentation track. Filler objects in the segmentation track shall represent, and shall align with, regions of non-program content in the source essence.
A DM (Descriptive Metadata) Segment object (that contains a “DM_AS_11_Segmentation_Framework” object) shall represent, and align with, the program content region.

The ABC’s requirements are for delivery of a Single Part Program. A Single Part Program is one that has non program run-in followed by uninterrupted program content. This shall be represented using a single DM Segment on the segmentation track.

Overall program duration shall be in whole seconds (HH:MM:SS).

2.5 Video encoding

2.5.1 Standard definition encoding

Standard definition video shall be encoded using the D-10 stream specification at 50 Mbit/s as defined in SMPTE ST 356:2001. This uses a constrained version of MPEG-2 4:2:2 P@ML. The video format shall be 576i50, 625 lines interlaced at 25 frames per second, top field first. The D-10 video essence shall be mapped into an MXF file as specified by SMPTE ST 386:2004.

2.5.2 High definition encoding

High definition video shall be encoded as AVC-Intra Class 100, High Intra 4:2:2 profile at level 4.1 as defined by SMPTE RP 2027:2011. The AVC-Intra bit stream format shall place the sequence parameter set and picture parameter set after the access unit delimiter at the beginning of every coded frame. The frame size is therefore fixed. The video format shall be 1080i50 (1080 lines interlaced at 25 frames per second).

2.6 Audio encoding

2.6.1 Audio for SD video

For SD video, the audio shall be sampled at 48kHz and shall contain one eight channel stream using AES3 formatting as specified by SMPTE ST 331:2011. The AES3 audio stream shall be carried within an MXF GC Element which complies with SMPTE ST 386:2004.

2.6.2 Audio for HD video

For HD video, the audio shall be sampled at 48 kHz, and shall contain sixteen channels. Each track (mono channel or stereo pair of channels) shall be carried in a SMPTE ST 382:2007 compliant MXF GC Element within a BWF Container (not AIFF container).

2.6.3 Audio Track Allocation

Audio track allocation shall be identified using one of the track allocation templates specified by EBU R48 or EBU R123. The track allocation name, as specified by EBU R48 or EBU R123, is stored in the AS_11_Audio_Track_Layout metadata item. For ABC permitted track allocation templates see Appendix D.

If the audio is encoded as an AES3 stream referenced by a single Material Package track then the track number value specified by EBU R48 or EBU R123 shall map to the AES3 channel number. The AES3 channel numbering is from 1 (essence bits value 0) to 8 (essence bits value 7).

If the audio is not encoded as an AES3 stream then the track number value specified by EBU R48 or EBU R123 shall map to the MXF Timeline::TrackNumber specified in the AS-11 file's Material Package.

3 ABC Production Guidelines

3.1 Picture quality

Picture quality may be assessed for acceptance purposes. Programs may be rejected if picture quality is deemed unacceptable for the genre. Aspects of picture quality that may be assessed include:

- soft edges and poor focus
- over sharpening and ringing at edges
- picture noise
- luminance contouring, also known as “posterising” or “plateauing”
- electrical interference effects
- over- or under-exposure
- excessive vignetting
- tearing or sync problems*
- chrominance-luminance lag*
- chrominance-luminance interference*
- hue or colour saturation errors*
- framing instability**

* Applies mainly to legacy analogue material

**Applies mainly to film transfers

3.2 Colour grading, & colour matching

Colour grading may be assessed for acceptance purposes, using a picture monitor calibrated to a D65 white standard. Programs may be rejected if colour grading or colour matching is deemed unacceptable for the genre.

3.3 Colour bars

Colour bars in 100/0/100/0 format are preferred. EBU colour bars (100/0/75/0) will also be accepted.

3.4 Film transfer

Frame rates should be converted from 24fps to 25 fps by speed increase, not by duplicating frames.

Frame rates should be converted from 24 fps to 50 fps by first increasing speed to 25 fps and then duplicating each frame. Frame Interpolation is also acceptable for conversion from 25 fps to 50 fps.

3.5 Analogue video transfer

The aspect ratio of analogue video should be preserved when transferring to digital 16:9 video format. The picture shall be centred and unused side areas shall be black.

The transfer shall be made electronically, not using telecine technique.

3.6 Transfer from other frame rates

Transfer from 30 fps to 25 fps should be done by interpolation and motion compensation rather than by frame dropping.

Transfer from 50 fps to 25 fps should be done by frame dropping.

3.7 Safe areas

Graphics and action shall be located within the safe areas shown in Figures 1 and 2.

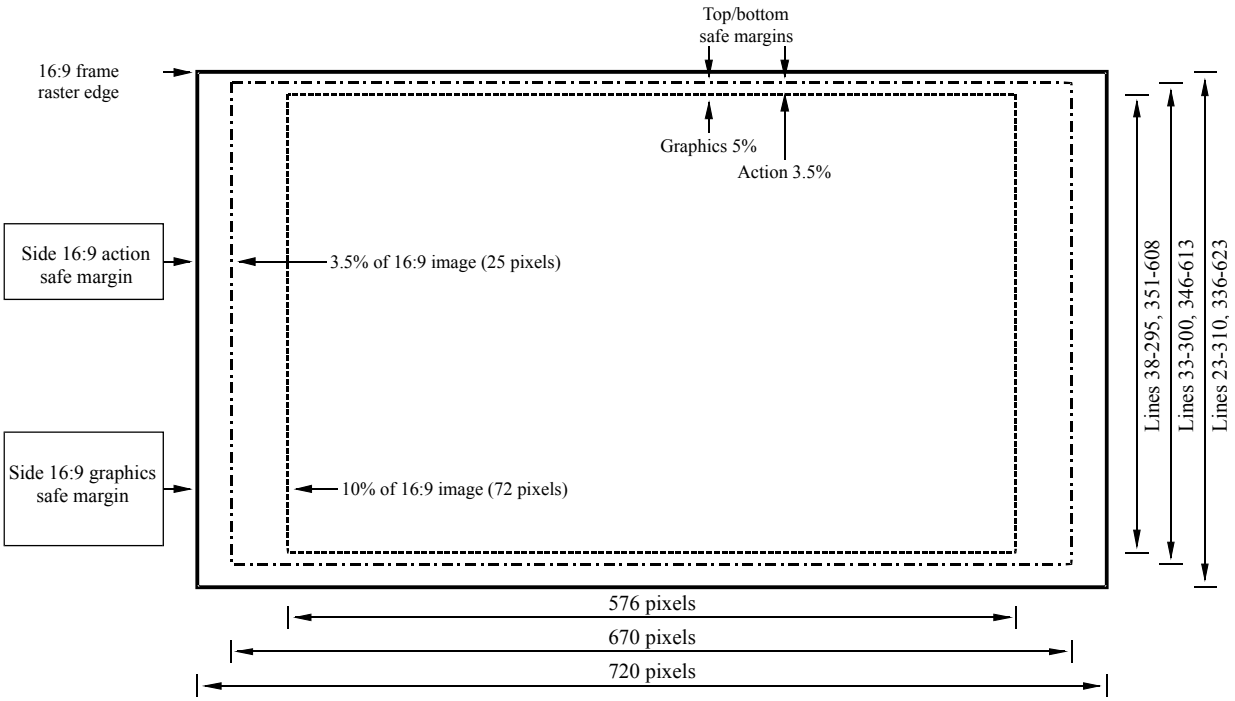

Figure 1 Safe areas for SD picture

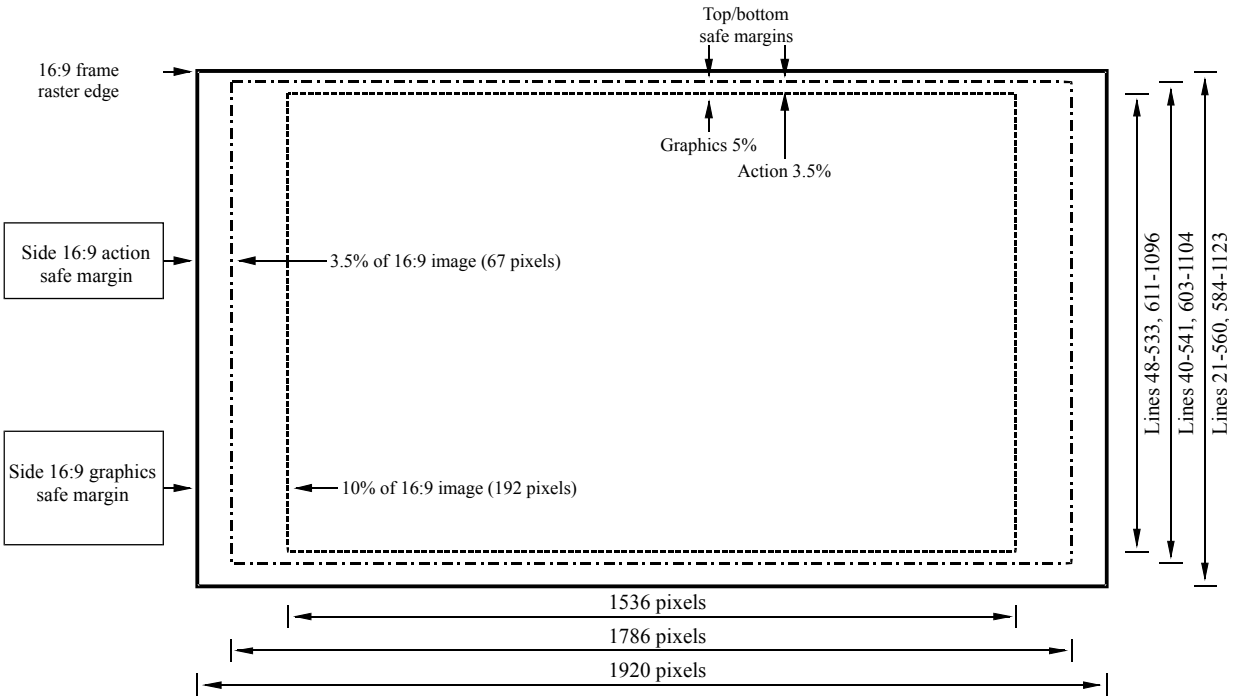

Figure 2: Safe areas for HD picture (1080 line)

3.8 Audio parameters

Audio shall conform to the specifications in Table 1:

Table 1: Required audio parameters

Parameter	Value
Relative polarity of signal ("phase")	Identical for all channels
Audio reference tone level	-20 dBFS (note 1)
Audio reference tone frequency	1 kHz
Audio reference tone duration	Minimum 1 minute
Audio reference tone polarity	In-phase, all channels.
Channel identification	Verbal
Average loudness, whole program	-24 LKFS (note 2, 3)
Maximum true peak level	-2 dBTP (note 4)

Notes

1. Recordings made with the EBU standard alignment level of –18 dBFS will also be accepted. The –20 dBFS level equates to zero on the VU scale and Level 4 on an IEC Type IIa (BBC) PPM scale. On two front channels at 1 kHz it equates to -20 LKFS on the ITU-R BS.1770 loudness scale.
2. Using loudness algorithm in Recommendation ITU-R BS.1770-3
3. See guideline on program loudness below.
4. Using true peak algorithm in Recommendation ITU-R BS.1770-3
5. Program audio shall not commence until 12 frames after start of program (program may start in black) and shall end a minimum of 12 frames prior to end of a program. (This is due to ABC transmission automation requirements).

3.9 Program loudness requirements

For all encoding methods, program audio shall be mastered on long-format programs with average dialogue level at -24 LKFS, as specified in FreeTV OP48

On long-format programs with no dialogue, such as music performances, the average level of the full mix shall be -24 LKFS unless this is likely to result in inaudibility of soft passages or clipping in loud passages, in which case the level shall be set at the discretion of the program provider. In the latter case, the program provider shall inform the ABC in writing that the program loudness is non-standard.

On short programs and interstitial items, less than one minute duration, the average level of the full mix shall be -24 LKFS as specified in FreeTV OP48.

3.10 Subjective audio quality

Overall sound quality shall be free from spurious noises e.g. mains hum, buzz and distracting background noise, and shall be free from distortion, wow, flutter, excessive sibilance, p-popping, phasiness[4] and excessive reverberation.

High speech intelligibility shall be maintained unless artistic needs require interfering soundtrack elements. Sound source localisation shall correspond approximately to the on-screen position of the source, for both stereo and multi-channel audio. Off-screen sounds should remain compatible with Dolby Surround decoders.

[4] Phasiness is a hollow-sounding impairment in sound quality due to delay between spaced microphones, off-axis response from shotgun microphones or other delay effect.

All audio channels shall be in phase from beginning to end unless artistic considerations require otherwise. The program should generally remain 'in-phase' to provide mono compatibility.

When down mixed to mono, audio quality should remain consistent with original audio quality. There should be no audible cancellation or colouration of any soundtrack elements and dialogue intelligibility should be preserved.

Audio shall not lead video by more than 25 ms and shall not lag behind video by more than 100 ms, as per ITU-R BT.1359.[5]

Use of excessive limiting/compression in order to conform to audio peak level requirements should be avoided.

The audio tracks shall be suitable for listening conditions with high background noise levels and intolerance of high peak levels.

3.11 Audio description

Audio description is currently in some ABC TV audio streams. If audio description has been included in the purchase agreement and is included in the delivered file, audio track allocation shall follow template EBU R 123 4c or EBU R 123 16c (with AD flag) as detailed in Appendix D.

3.12 Time code

Files shall contain one Timecode Track in the Material Package per SMPTE ST 377:2011 defining the authoritative program timecode. Files shall be compatible with recommendation of EBU R122 – MXF Timecode Implementation.

3.12.1 Reference time code

Time code at the commencement of the file shall be 09:58:00:00 (HH:MM:SS:FF).
The program content shall start at 10:00:00:00.

3.13 Content head

A two minute leader should be provided before the beginning of the program, consisting of (in order of playout):

- 90 seconds of colour bar and line-up tone
- 27 seconds of ident clock or slate and silence
    - The ident board will consist of:
        - Program title
        - Episode number and title if applicable
        - Audio mode
        - Program number
        - Program duration
- 3 seconds of black and silence

3.14 Content tail

All programmes must end with a fade or cut to silence before the intended end point. Any fade out or reverb must be complete before the programme end point. At least 10 seconds of silence and black should follow the end of the program.

[5] Due to the difficulty of measuring sync to an accuracy of less than one frame, this is interpreted in practice as not more than one frame lead or three frames lag.

Textless elements should be appended after the end of the silence and black if they are included in the main program stream.

3.15 Closed captions

Closed captions should be delivered as a separate file using EBU Tech 3264 Subtitling Exchange Format for TV content or W3C Web Video Text Tracks Format for online content. See section1.6 for Caption File Name details.

3.16 Open captions

Open captions with English translation shall be provided where languages other than English are used in dialogue.

Open captions should be in the lower third of the picture and should be positioned so that they do not interfere with closed captions. There should be no more than two lines of text visible at one time, and these shall be easily legible and not outpace viewers. Recommended display times are:

- 1 second 1 short word
- 2 seconds up to 26 characters
- 3 seconds up to 40 characters
- 4 seconds up to 52 characters

Open captions shall use a contrasting outline or background to maximise readability. If a background is used it should be semi-transparent.

The following values shall apply to Open Captions (SD/HD)

Element	Value
Typeface	Helvetica Narrow BOLD (True Type) LT 52134
Point size	SD : 50 pt / HD1080 : 95 pt
Edging	SD : 2 pixels / HD1080 : 3 pixels / Black
Drop shadow	1 pixel / Black
Colour	Yellow R: 242 / G: 218 / B: 2 H: 36 / S: 236 / L: 114
Title safe area	14:9 title safe, Width 70% / Height 90%
Baseline (lower line)	545 (720 x 576) / 1026 (1920 x 1080)
Baseline (upper line)	493 (720 x 576) / 922 (1920 x 1080)

3.17 Sign language

Programs containing sign language should use Auslan where possible. The ABC accepts that this may not be practical for content produced outside Australia.

3.18 Photosensitive epilepsy

Programs should not contain sequences of rapid flashing that may trigger photosensitive epileptic seizures in susceptible viewers. See ITU-R Recommendation BT.1702 for further information.

3.19 3D

Programs in 3D format are not currently accepted.

4 Definitions

As defined by the SMPTE / EBU Joint Task Force for Harmonized Standards for the Exchange of Program Material as Bitstreams, digital television programs consist of four elements:

- Essence – the audio and/or video content
- Overhead – framing, sync etc
- Wrapper – header, footer
- Metadata – included data relating to the content.

AD:	audio description; a verbal description of scenes and actions for the visually handicapped
AFD:	active format description
AMWA:	Advanced Media Workflow Association
bps:	(data) bits per second
bit:	abbreviation for binary digit
CF:	Compact Flash, a non-volatile solid state data storage medium
EBU:	European Broadcasting Union
EFX:	Effects
fps:	video frames per second
FTP:	File Transfer Protocol, a method for transferring large files over digital data networks.
HD:	high definition digital video.
HDD:	hard disk drive
IEC:	International Electrotechnical Commission.
ITU-R:	International Telecommunications Union, Radiocommunication Sector.
LFE:	Low Frequency Effects
MCA:	multichannel audio
M&E:	music and effects soundtrack without dialogue
MXF:	Material Exchange Format, a wrapper defined by SMPTE 377.
PCM:	pulse code modulation, a system of encoding sampled data using binary numbers in twos complement format without data compression.
□ :	stereo
SD:	standard definition digital video.
SMPTE:	Society of Motion Picture and Television Engineers
SSD:	solid state drive
STL:	EBU Subtitling Format (EBU Tech 3264)
sur:	surround
track	MXF data structure used to record content, which may be audio or video essence or metadata. See SMPTE ST 377-1:2011
UL:	Universal Label, a unique identifier for a metadata item. See SMPTE ST 298:2008
USB:	Universal Serial Bus.
Web VTT:	Web Video Text Tracks, a W3C standard for displaying timed text in connection with the HTML5 <track> element

5 References

5.1 Normative references

AES3-2003: AES Standard for digital audio engineering - Serial transmission format for two-channel linearly represented digital audio data

AMWA Application Specification AS-11 MXF Program Contribution
http://www.amwa.tv/downloads/specifications/AMWA_AS-11_11_2013-10-08.pdf

EBU Technical Recommendation R48-2005, Allocation of audio tracks on digital television recorders

EBU – Recommendation R 123, EBU Audio Track Allocation for File Exchange

EBU – Recommendation R122, Material Exchange Format Timecode Implementation

EBU – EBU Tech 3264 , EBU Subtitling Data Exchange Format

FreeTV Operational Practice OP48 Audio Levels and Loudness

ITU-R Recommendation BT.1359 Relative Timing of Sound and Vision for Broadcasting

ITU-R Recommendation BT.1702 Guidance for the reduction of photosensitive epileptic seizures caused by television

ITU-R Recommendation BS.1770-3, Algorithms to measure audio programme loudness and true peak audio level

SMPTE 298:2009, Universal Labels for Unique Identification of Digital Data

SMPTE 356M-2001 – Type D-10 Stream Specifications — MPEG-2 4:2:2P @ ML for 525/60 and 625/50

SMPTE 377-1:2011, Material Exchange Format (MXF) — File Format Specification

SMPTE 378:2004, Television — Material Exchange Format (MXF) — Operational Pattern 1a (Single Item, Single Package)

SMPTE 382:2007, Material Exchange Format (MXF) —Mapping AES3 and Broadcast Wave Audio into the MXF Generic Container

SMPTE 386-2004 - Material Exchange Format (MXF) — Mapping Type D-10 Essence Data to the MXF Generic Container

WebVTT: The Web Video Text Tracks Format Draft Community Group Report 28 February 2015
http://dev.w3.org/html5/webvtt/

5.2 Informative references

ETSI EN 301 775 Digital Video Broadcasting (DVB); Specification for the carriage of Vertical Blanking Information (VBI) data in DVB bitstreams.

FreeTV Operational Practice OP 47 – Storage and Contribution of Teletext Subtitles and VBI Data for High Definition Television

FreeTV Operational Practice OP59 Measurement and Management of Loudness in Soundtracks for Television Broadcasting

IEC 60268-16 Sound system equipment - Part 16: Objective rating of speech intelligibility by speech transmission index

ITU-R Recommendation BR.1356 User requirements for application of compression in mainstream standard definition television production and archival (sic)

ITU-R Recommendation BS.775 Multichannel stereophonic sound system with and without accompanying picture

ITU-R Recommendation BS.1196 Audio coding for digital terrestrial television broadcasting

ITU-R Recommendation BS.1864 Operational practices for loudness in the international exchange of digital television programmes

ITU-R Recommendation BT.471 Nomenclature and description of colour bar signals

ITU-R Recommendation BT.601 Studio encoding parameters of digital television for standard 4:3 and wide screen 16:9 aspect ratios

ITU-R Recommendation BT.709 Parameter values for the HDTV* standards for production and international programme exchange

ITU-R Recommendation BT.1847 1 280 × 720, 16:9 progressively-captured image format for production and international programme exchange in the 50 Hz environment

ITU-R Recommendation BT.1848 Safe areas of wide-screen 16:9 aspect ratio digital productions

SMPTE RDD 9:2009, MXF Interoperability Specification of Sony MPEG Long GOP Products

SMPTE 314M-1999, Data Structure for DV-Based Audio, Data and Compressed Video — 25 and 50 Mb/s

SMPTE 320M Television — Channel Assignments and Levels on Multichannel Audio Media

SMPTE 326:2000, Television — SDTI Content Package Format (SDTI-CP)

SMPTE 331:2011, Element and Metadata Definitions for the SDTI-CP

SMPTE 379-2:2010, Material Exchange Format (MXF) — MXF Generic Container

SMPTE 381-1:2005, Television — Material Exchange Format (MXF) — Mapping MPEG Streams into the MXF Generic Container

SMPTE 385:2012, Television — Material Exchange Format (MXF) — Mapping SDTI-CP Essence and Metadata into the MXF Generic Container

SMPTE RP 136-1999 Time and Control Codes for 24, 25 or 30 Frame-Per-Second Motion-Picture Systems

SMPTE RP 188-1999 Transmission of Time Code and Control Code in the Ancillary Data Space of a Digital Television Data Stream

SMPTE / EBU Task Force for Harmonized Standards for the Exchange of Program Material as Bitstreams, Final Report: Analyses and Results July 1998
http://www.uio.no/studier/emner/matnat/ifi/INF5090/v05/undervisningsmateriale/INF_5090-CI_tfrpt2w6.pdf

Appendix A: AS-11 Core Descriptive Metadata Scheme

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	Conditional Dependencies		
Editorial								
Series Title	The final title of a grouping of publishable assets with sharing identification and branding linked by common characters, subject matter, style or story. This could be a series, serial or themed grouping.	AS-11_Series_Title	DM_AS_11_Core	UTF16String	Yes		060e2b34.01010101. 0d010701.0b010101	
Programme Title	The title of a Programme Version for a specific purpose. Note: This may change between the point of commission/production and final delivery from post production.	AS_11_Programme_Title	DM_AS_11_Core	UTF16String	Yes		060e2b34.01010101. 0d010701.0b010102	
Episode Title/Episode No.	Final episode name and or number used to identify an individual episode.	AS_11_Episode_Title_ Number	DM_AS_11_Core	UTF16String	Yes		060e2b34.01010101. 0d010701.0b010103	
Technical								
Shim Name	The name of the AS-11 shim specification to which the associated MXF file conforms.	AS_11_Shim_Name	DM_AS_11_Core	UTF16String	Yes		060e2b34.01010101. 0d010701.0b010104	ABC allowable values: ABC SD IMX ABC HD AVC-Intra

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	**Conditional Dependencies**		
Shim Version	The version of the AS-11 shim specification to which the associated MXF file conforms, e.g. 1.0, 1.1.	AS_11_Shim_Version	DM_AS_11_Core	VersionType	Yes		060e2b34.01010101. 0d010701.0b01010a	1.0
Audio								
Audio Track Layout	In accordance with EBU R 123 (HD) and R 48 (SD). Assumption is to always have 16 tracks (4 for SD) and align with tape spec definitions. Note to include valid silence is required.	A S_11_Audio_Track_ Layout	DM_AS_11_Core	UInt8 (Enum)	Yes		060e2b34.01010101. 0d010701.0b010105	UK DPP and ABC allowable values: EBU R 48:2a (Stereo with silence, 4 tracks) EBU R 123:4b (Stereo with M&E) EBU R 123:4c (Stereo with AD) EBU R 123:8a (Stereo with discrete MCA) EBU R 123: 16c (For 16 ch only)
Primary Audio Language	Primary audio language used in the Programme Version. Use ISO 639-2 values.	AS_11_Primary_Audio_ Language	DM_AS_11_Core	UTF16String	Yes		060e2b34.01010101. 0d010701.0b010106	Use ISO 639-2
Access Services								
Closed Captions Present	This status is to be set if the delivered programme contains any embedded (out of vision) subtitling information for the hard of hearing.	AS_11_Closed_Captions _Present	DM_AS_11_Core	Boolean	Yes		060e2b34.01010101. 0d010701.0b010107	ABC value: No
Closed Captions Type	This describes the editorial description of the out of vision subtitling employed within the delivered programme.	AS_11_Closed_Captions _Type	DM_AS_11_Core	UInt8 (Enum)	Conditional		060e2b34.01010101. 0d010701.0b010108	Not required

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	**Conditional Dependencies**		
Closed Captions Language	This describes the primary language of the embedded subtitle data.	AS_11_Caption_ Language	DM_AS_11_Core	UTF16String	Conditional		060e2b34.01010101. 0d010701.0b010109	Not required
DM Scheme Labels								
DM_AS_11_ Core	AS-11 core metadata scheme	DM_AS_11_Core	DM_AS_11_Core	DM_ Scheme			060e2b34.04010101. 0d010701.0b010000	
DM Frameworks								
DM_AS_11_ Core_Frame work	AS-11 core metadata framework	DM_AS_11_Core_Frame work	DM_AS_11_Core	DM_ Framework			060e2b34.02530101. 0d010701.0b010100	

Appendix B: AS-11 UK DPP Descriptive Metadata Scheme

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	Conditional Dependencies		
Editorial								
Production Number	A unique number used to identify an individual Programme Version. Also known as Programme Number, Clock Number or Material ID.	UKDPP_Production_ Number	DM_AS_11_UKDPP	UTF16String	Yes		060e2b34.01010101. 0d0c0101.01010100	ABC Television House Number as provided to supplier by ABC Television Operations
Synopsis	Descriptive summary of the content of no more than 250 characters suitable to be utilised for EPG/billings purposes.	UKDPP_Synopsis	DM_AS_11_UKDPP	UTF16String	Yes		060e2b34.01010101. 0d0c0101.01010200	
Originator	Company responsible for creating asset.	UKDPP_Originator	DM_AS_11_UKDPP	UTF16String	Yes		060e2b34.01010101. 0d0c0101.01010300	
Copyright Year	Year in which the production was completed. Note: year only	UKDPP_Copyright_ Year	DM_AS_11_UKDPP	UInt16	Yes		060e2b34.01010101. 0d0c0101.01010400	
Other Identifier	A unique code that can be used to identify a piece of content.	UKDPP_Other_ Identifier	DM_AS_11_UKDPP	UTF16String	No		060e2b34.01010101. 0d0c0101.01010500	Suppliers should include ISAN or v-ISAN where available
Other Identifier Type	Description of other identifier, e.g. ISAN.	UKDPP_Other_ Identifier_Type	DM_AS_11_UKDPP	UTF16String	Conditional	Mandatory if element 'Other Identifier' is present.	060e2b34.01010101. 0d0c0101.01010600	

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	**Conditional Dependencies**		
Genre	A genre categorising the whole asset.	UKDPP_Genre	DM_AS_11_UKDPP	UTF16String	No		060e2b34.01010101. 0d0c0101.01010700	ABC allowable values : Movie News Entertainment Sport Children's Music Arts/Culture Current Affairs Education/Information Special Comedy Drama Documentary As per Free TV Australia Operational Practice OP-39 DVB Content Descriptor
Distributor	The name of the person or company/companies providing the content. May be a third party for secondary distribution rights	UKDPP_Distributor	DM_AS_11_UKDPP	UTF16String	No		060e2b34.01010101. 0d0c0101.01010800	
Video								
Picture Ratio	The name of the AS-11 shim specification to which the associated MXF file conforms.	UKDPP_Picture_Ratio	DM_AS_11_UKDPP	Rational	Yes		060e2b34.01010101. 0d010701.0b010104	UK DPP allowable values: 16:9
3D	The version of the AS-11 shim specification to which the associated MXF file conforms, e.g. 1.0, 1.1.	UKDPP_3D	DM_AS_11_UKDPP	Boolean	Yes		060e2b34.01010101. 0d0c0101.01010a00	ABC value: No

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	**Conditional Dependencies**		
3D Type	This allows the description of the type of 3D being delivered but does not define how the 3D was created, e.g., CGI, shot in 3D, derived from a 2D image etc.	UKDPP_3D_Type	DM_AS_11_UKDPP	UInt8 (Enum)	Conditional	Mandatory if element '3D' is 'Yes'.	060e2b34.01010101. 0d0c0101.01010b00	
Product Placement	This is to be set if the editorial content contains any product placement. Note: this has no relation to whether an embedded P logo is present within the post produced material or not.	UKDPP_Product_ Placement	DM_AS_11_UKDPP	Boolean	No		060e2b34.01010101. 0d0c0101.01010c00	
PSE Pass	Status of any flashing and pattern analyser test carried out on the material for PSE.	UKDPP_PSE_Pass	DM_AS_11_UKDPP	UInt8 (Enum)	Yes		060e2b34.01010101. 0d0c0101.01010d00	UK DPP allowable values: Yes No Not tested
PSE Manufacturer	Product used to carry out the PSE analysis.	UKDPP_PSE_ Manufacturer	DM_AS_11_UKDPP	UTF16String	Conditional	Mandatory if element 'PSE Pass' is set to 'Yes' or 'No'.	060e2b34.01010101. 0d0c0101.01010e00	
PSE Version	Version of algorithm used to carry out the PSE analysis.	UKDPP_PSE_Version	DM_AS_11_UKDPP	UTF16String	Conditional	Mandatory if element 'PSE Pass' is set to 'Yes' or 'No'.	060e2b34.01010101. 0d0c0101.01010f00	

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	**Conditional Dependencies**		
Video Comments	The comments which illustrate the subjective quality and any known artefacts or defects (inc. intentional) within the video content discovered during production / post production / or any subsequent technical QC/Review process.	UKDPP_Video_ Comments	DM_AS_11_UKDPP	UTF16String	No		060e2b34.01010101. 0d0c0101.01011000	
Audio								
Secondary Audio Language	Secondary audio language used in the Programme Version. Use ISO 639-2 values. Use 'zxx' to indicate no secondary audio language.	UKDPP_Secondary_ Audio_Language	DM_AS_11_UKDPP	UTF16String	Yes	Use a valid language code if 'Audio Track Layout' is 'EBU R 123: 16d' or 'EBU R 123: 16f'. Otherwise use a value of 'zxx'.	060e2b34.01010101. 0d0c0101.01011100	ABC allowable value: ‘zxx’
Tertiary Audio Language	Tertiary audio language used in the Programme Version. Use ISO 639-2 values. Use 'zxx' to indicate no tertiary audio language.	UKDPP_Tertiary_Audio _Language	DM_AS_11_UKDPP	UTF16String	Yes	Use a valid language code if 'Audio Track Layout' is 'EBU R 123: 16d' or 'EBU R 123: 16f'. Otherwise use a value of 'zxx'.	060e2b34.01010101. 0d0c0101.01011200	ABC allowable value: ‘zxx’

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	**Conditional Dependencies**		
Compliant Audio Standard	Details of any compliant audio standard used to constrain the dynamic range of the audio tracks during programme production	UKDPP_Audio_ Loudness_Standard	DM_AS_11_UKDPP	UInt8 (Enum)	Yes		060e2b34.01010101. 0d0c0101.01011300	ABC allowable values: Free TV OP-59
Audio Comments	The comments which illustrate the subjective quality and any known artefacts or defects (inc. intentional) within the audio content discovered during production / post production / or any subsequent technical QC/Review process.	UKDPP_Audio_ Comments	DM_AS_11_UKDPP	UTF16String	No		060e2b34.01010101. 0d0c0101.01011400	
Timecodes								
Line Up Start	Timecode for start of line up test signals.	UKDPP_Line_Up_Start	DM_AS_11_UKDPP	Position	Yes		060e2b34.01010101. 0d0c0101.01011500	09:58:00:00
Ident Clock Start	Timecode for start of the initial ident or countdown clock.	UKDPP_Ident_Clock_ Start	DM_AS_11_UKDPP	Position	Yes		060e2b34.01010101. 0d0c0101.01011600	09:59:30:00
Total Number of Parts	The total number of parts contained within the file.	UKDPP_Total_Number _Of_Parts	DM_AS_11_UKDPP	UInt16	Yes		060e2b34.01010101. 0d0c0101.01011700	

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	**Conditional Dependencies**		
Total Programme Duration	Total of all part durations, i.e. sum of all repeated group of part durations. Note: this is not a Track duration.	UKDPP_Total_ Programme_Duration	DM_AS_11_UKDPP	Length	Yes		060e2b34.01010101. 0d0c0101.01011800	
Access Services								
Audio Description Present	This status is to be set if the delivered programme contains any audio description for the visually impaired.	UKDPP_Audio_ Description_Present	DM_AS_11_UKDPP	Boolean	Yes	Set to 'Yes' if 'Audio Track Layout' is 'EBU R 123: 4c' or 'EBU R 123:16c'	060e2b34.01010101. 0d0c0101.01011900	
Audio Description Type	This describes the format of the audio description employed within the delivered programme.	UKDPP_Audio_ Description_Type	DM_AS_11_UKDPP	UInt8 (Enum)	Conditional		060e2b34.01010101. 0d0c0101.01011a00	UK DPP allowable values: Control data / Narration AD Mix
Open Captions Present	This status is to be set if the delivered programme contains any visible (in vision) subtitling information for the hard of hearing.	UKDPP_Open_ Captions_Present	DM_AS_11_UKDPP	Boolean	Yes		060e2b34.01010101. 0d0c0101.01011b00	
Open Captions Type	This describes the editorial description of the in vision subtitling employed within the delivered programme.	UKDPP_Open_ Captions_Type	DM_AS_11_UKDPP	UInt8 (Enum)	Conditional	Mandatory if element 'Open Captions Present' is 'Yes'.	060e2b34.01010101. 0d0c0101.01011c00	

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	**Conditional Dependencies**		
Open Captions Language	This describes the primary language of the in vision subtitle data.	UKDPP_Open_ Captions_Language	DM_AS_11_UKDPP	UInt8 (Enum)	Conditional	Mandatory if element 'Open Captions Present' is 'Yes'.	060e2b34.01010101. 0d0c0101.01011d00	
Signing Present	This status is to be set if the delivered programme contains any in vision signing for the hard of hearing.	UKDPP_Signing_ Present	DM_AS_11_UKDPP	UInt8 (Enum)	No		060e2b34.01010101. 0d0c0101.01011e00	
Sign Language	This describes the type of language used within the programme.	UKDPP_Sign_Language	DM_AS_11_UKDPP	UInt8 (Enum)	N/A	Mandatory if element 'Signing Present' is set to Yes or Signer Only.	060e2b34.01010101. 0d0c0101.01010f00	
Additional								
Completion Date	Date of completion of the edit prior to delivery of the final programme. Note: only the date fields of the Timestamp are used; the time fields are zero.	UKDPP_Completion_ Date	DM_AS_11_UKDPP	Timestamp	Yes		060e2b34.01010101. 0d0c0101.01012000	
Textless Elements Exist	Status of whether the final delivered programme includes any textless elements.	UKDPP_Textless_ Elements_Exist	DM_AS_11_UKDPP	Boolean	No		060e2b34.01010101. 0d0c0101.01012100	
Programme Has Text	Used to identify if the main programme is free of any text (completely clean).	UKDPP_Programme_ Has_Text	DM_AS_11_UKDPP	Boolean	No		060e2b34.01010101. 0d0c0101.01012200	

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	**Conditional Dependencies**		
Programme Text Language	Primary text language used in the programme version. Use ISO 639-2 values. Attribute of 'Programme Has Text'.	UKDPP_Programme_ Text_Language	DM_AS_11_UKDPP	UTF16String	Conditional	Mandatory if element 'Programme Has Text' is 'Yes'.	060e2b34.01010101. 0d0c0101.01012300	Use ISO 639-2
Contact Information								
Contact Email	The email address of the SPOC (Single Point Of Contact) for the use of the recipient regarding any delivery or technical issues encountered with the delivered file.	UKDPP_Contact_Email	DM_AS_11_UKDPP	UTF16String	Yes		060e2b34.01010101. 0d0c0101.01012400	
Contact Telephone No.	The direct telephone number of the SPOC (Single Point Of Contact) for the use of the recipient regarding any delivery or technical issues encountered with the delivered file.	UKDPP_Contact_ Telephone_Number	DM_AS_11_UKDPP	UTF16String	Yes		060e2b34.01010101. 0d0c0101.01012500	
DM Scheme Labels								
DM_AS_11_ UKDPP	AS-11 UK DPP metadata scheme	DM_AS_11_UKDPP	DM_AS_11_UKDPP	DM_ Scheme			060e2b34.04010101. 0d0c0101.01000000	
DM Frameworks								
DM_AS_11_ UKDPP_Fra mework	AS-11 UK DPP metadata framework	DM_AS_11_UKDPP_ Framework	DM_AS_11_UKDPP	DM_ Framework			060e2b34.02530101. 0d0c0101.01010000	

Appendix C: AS-11 Segmentation Metadata Scheme

Element Name	Element Definition	AS 11 Element Name	AS-11 DMS	MXF Type	Conformance		SMPTE UL	ABC Conformance and Values
					Mandatory	Conditional Dependencies		
Part Number	Identifier of the part.	AS_11_Part_Number	DM_AS_11_ Segmentation	UInt16	Yes		060e2b34.01010101. 0d010701.0b020101	1
Part Total	Total number of parts in the program.	AS_11_Part_Total	DM_AS_11_ Segmentation	UInt16	Yes		060e2b34.01010101. 0d010701.0b020102	1
Part SOM	Timecode for the first frame of the part.		Structural	N/A	Yes			10:00:00:00
Part Duration	Duration of the part.		Structural	N/A	Yes			Duration to be in whole seconds
DM Scheme Labels								
DM_AS_11_ Segmentation	AS-11 segmentation metadata scheme	DM_AS_11_ Segmentation	DM_AS_11_ Segmentation	DM_ Scheme			060e2b34.04010101. 0d010701.0b020000	
DM Frameworks								
DM_Segmentation _Framework	Segmentation metadata framework. Note: This is an abstract class.	DM_Segmentation_Framework		DM_ Framework			060e2b34.02530101. 0d010701.01010100	
DM_AS_11_ Segmentation_ Framework	AS-11 segmentation metadata framework	DM_AS_11_ Segmentation_ Framework	DM_AS_11_ Segmentation	DM_ Segmentation_ Framework			060e2b34.02530101. 0d010701.0b020100	

Appendix D: ABC accepted track allocation templates

EBU R 48 2a - Stereo with silence, 4 tracks

Case	Program	No. of Tracks	Audio track Number				
			1	2	3	4	5,6,7,8
2a	Stereo with silence	4	Complete mix, left	Complete mix, right	MUTE	MUTE	MUTE

EBU R123 4b - Stereo with M&E

Case	Program type	No. of tracks	Audio track number				
			1	2	3	4	5,6,7,8
4b	Stereo with M&E	4	Complete mix, left	Complete mix, right	M&E left	M&E right	MUTE

EBU R123 4c - Stereo with AD

Case	Program type	No. of tracks	Audio track number				
			1	2	3	4	5,6,7,8
4c	Stereo with AD	4	Complete mix, left	Complete mix, right	AD left	AD right	MUTE

EBU R 123 8a - Stereo with discrete MCA

Case	Program type	No. of tracks	Audio track number							
			1	2	3	4	5	6	7	8
8a	Stereo with Discrete MCA	8	Ⓢ L	Ⓢ R	MCA left	MCA right	MCA C	MCA LFE	MCA L Sur	MCA R Sur

EBU R 123 16c - 5.1 with AD

Case	Program type	No. of tracks	Audio track number															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
16c	5.1 with AD	16	Ⓢ Mix L	Ⓢ Mix R	AD L	AD R	MCA L Mix	MCA R Mix	MCA C Mix	MCA LFE Mix	MCA L Sur Mix	MCA R Sur Mix	MCA L EFX	MCA R EFX	MCA C EFX	MCA LFE EFX	MCA L Sur EFX	MCA R Sur EFX