



**DELIVERY
REQUIREMENTS**

FILE DELIVERY USING IMF: SMPTE TSP 2121

IMF PROGRAMME DELIVERY DOCUMENT

Abstract

This document outlines the technical requirements for delivery of programmes in the Interoperable Master Format (IMF) using SMPTE TSP 2121.

Please ensure you are using the current version of this document, available at thedpp.com/tech/versioning

IMPORTANT NOTE: This document is a template, and is designed for use by commissioning organisations as the basis for their own instance of this document. Text in red should be updated or removed as appropriate, ensuring that the combination of parameters selected complies with TSP 2121-1. This template is not designed for use by producers; rather, the documents produced from this template will be designed for producers.



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1 INTRODUCTION

This document describes the specific requirements for delivery of content using IMF. It details the technical parameters that every programme commissioned to these requirements must comply with.

It is recommended that this document be read in conjunction with *DPP005 IMF Operational Guidance*, which gives information about the IMF format, and how to effectively create, QC, and deliver programmes in IMF.

2 DELIVERY & PACKAGING REQUIREMENTS

The following sub-sections indicate allowable options for delivery and packaging of the programme.

Note for commissioning organisations implementing this template: please delete options as appropriate, and return all allowable options to black text.

2.1 Programme Delivery

In order to fulfil the requirements of this delivery, the following shall be supplied:

[Commissioning organisation to insert details of the deliverables to be provided. Examples below]

- Single programme version delivered for Mastering use
- Additional Editorial Version [insert details, e.g. language, region, audience, signed, etc.]
- Additional assets [insert details, e.g. promo stills, transcript, etc.] as sidecars

EXAMPLE: (for the information of commissioning organisations using this template, and to be removed)

- Version 1: Programme Version for mastering use, European Terrestrial, English
- Version 2: Programme Version European Terrestrial, French
- Version 3: Programme Version European Terrestrial, Spanish

2.2 Closed Subtitles / Captions

The subtitles must be authored and timed in the CPL in such a way that upon replay or export the timing of the displayed subtitles is correct with respect to the subtitled audio.

The following language subtitle tracks shall be delivered:

- [Version/deliverable as per section 5.1]
 - [Subtitle language]
 - [Subtitle language]
- [Version/deliverable as per section 5.1]
 - [Subtitle language]

2.3 Delivery Packaging

When delivering via IMF, essence files may be carried within the IMP or they may be stored on a connected system, e.g. a cloud server, for separate retrieval on demand. For delivery according to this requirement:

[Delete as appropriate, leaving one of the following statements:]

- All essence files of the delivery shall be carried within delivered IMPs.
- Essence files shall not be carried within IMPs but will be retrieved on demand.
- Essence files may be delivered within IMPs or excluded for later retrieval.

3 VIDEO REQUIREMENTS

The following sub-sections indicate allowable options for video parameters.

Note for commissioning organisations implementing this template: please delete options as appropriate, and return all allowable options to black text. (Note that the values in this section could differ per CPL; in this case, duplicate this section and specify requirements for each required CPL.)

3.1 Frame Dimensions

- 1920 x 1080
- 3840 x 2160

3.2 Image Codec

- ProRes Picture Coding 422HQ / 4444 / 4444XQ
- J2K single/multi-tile Reversible
 - Main Level 5 / 6 / 7 / 8 / 9
 - Sub-Level 0 / Sub Level > 0
- J2K single-tile lossy
 - Main Level 5 / 6 / 7 / 8 / 9
 - Sub-Level 0 / Sub Level > 0

3.3 Scan Type

- Progressive
- Interlaced (for J2K HD frames only)

3.4 Stereoscopy

- 2D
- 3D

3.5 Frame Rate

- 24
- 24000/1001
- 25
- 30
- 30000/1001
- 50
- 60
- 60000/1001

3.6 Colour Sub-sampling

- 4:2:2
- 4:4:4

3.7 Quantisation

- Narrow Range (QE.1)
- Full Range (QE.2)

3.8 Colour Components

- Y'Cb'Cr'
- RGB

3.9 Colorimetry

- Rec. 709
- BT.2100 PQ
- BT.2100 HLG

3.10 Pixel Bit Depth

- 10 bit
- 12 bit

3.11 Aspect Ratio

- 1.78:1 (16:9)
- 2.00:1
- 2.35:1

3.12 Frame Structure

Vision mixer cuts and edits should occur so that the start of the first frame of the progressive video pair is aligned to the start of the first (upper) field of an interlace video signal as defined by SMPTE ST205.

4 AUDIO REQUIREMENTS

The following sub-sections indicate allowable options for audio parameters.

Note for commissioning organisations implementing this template: please delete options as appropriate, and return all allowable options to black text. (Note that the values in this section could differ per CPL; in this case, duplicate this section and specify requirements for each required CPL.)

4.1 Audio Codec

- PCM

4.2 Audio Sampling Rate

- 48kHz
- 96kHz

4.3 Audio Bit Depth

- 24 bit

4.4 Soundfields

The following soundfields shall be supplied:

[Commissioning organisation to insert details of the soundfields to be provided. In each case, specify the soundfield layout, label, and language. The layouts and labels should be chosen from the following table, which need not be included in the Delivery Requirements document.]

Soundfield Layout	SoundfieldGroupsLabel
Stereo (A/B)	MainProgram / AlternativeProgram / MusicAndEffects/ AudioDescriptionProgramMix / AudioDescriptionProgramMix
5.1 (ITU-R BS 2051-2 [2018] as system B)	
7.1 (ITU-R BS 2051-2 [2018] as system I)	
Stereo downmix from 5.1/7.1 (Lo/Ro)	
Stereo downmix from 5.1/7.1 (Lt/Rt)	
Twin-Mono	
Next Generation Audio via ADM/S-ADM	AudioDescription
	To be agreed separately

EXAMPLE: (for the information of commissioning organisations using this template, and to be removed)

- 5.1 (ITU-R BS 2051-2 [2018] as system B), MainProgram, English
- Stereo (A/B), MainProgram, English
- Stereo (A/B), MainProgram, Welsh
- Twin-Mono, AudioDescription, English
- Twin-Mono, AudioDescription, Welsh

Each soundfield shall carry labels according to SMPTE ST 377.

4.5 Audio Loudness

Where a modulated audio channel is intended for reproduction, it shall conform to the constraints outlined in the following recommendation:

- EBU R128 Audio Loudness Recommendation
- CALM (H.R. 1084/S. 2847 CALM Act)
- EBU R128 S1 2016 for short form content

4.6 Sound to Vision Synchronisation

The relative timing of sound to vision should not exhibit any perceptible error. When replayed or exported, sound shall not lead or lag the vision by more than 5 ms.

Within an audio track, channel coherence (e.g. the difference in timing between each channel in a surround sound group) should be no more than ± 0.2 samples.

5 METADATA REQUIREMENTS

Metadata shall be supplied according to *Recommendation DPP003 Carriage of User Metadata in TSP 2121*.

[Delete as appropriate, leaving one of the following statements:]

- All metadata elements specified in DPP003 are mandatory.
- All metadata elements specified in DPP003 are mandatory, except the following which are optional:
 - [insert metadata element names]
- The following metadata elements from DPP003 are mandatory, with all others being optional:
 - [insert metadata element names]

6 INFORMATION SPECIFIC TO **[COMMISSIONING ORG NAME]**

This section contains specific operational and technical information required to deliver programmes in IMF to **[insert commissioning organisation name]**.

6.1 Technical Responsibility and Contacts

Insert relevant information here regarding the key technical contacts and the individuals or groups with specific responsibility. This should include contact details and hours of availability.

6.2 File Delivery Information

Insert relevant information here about locations for upload or delivery endpoints, and other information about the mechanisms for delivering content.



Version Control:

Version	Date	Notes
V1.0	11-07-2019	Initial release

Document Accuracy:

Every attempt has been made to ensure that the information contained in this document is accurate. Errors in this document should be reported to the DPP on info@thedpp.com

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