DELIVERY SPECIFICATIONS FOR COMMERCIALS AND BILLBOARDS

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1 General

This document covers the technical requirements for commercials and billboards commissioned in High Definition (HD) which are to be transmitted by the broadcaster. The broadcaster offers the option of electronic delivery by means of transferring computer files via the Internet, further described in section 3. A submission always consists of two files: the file containing image and audio data, and a file containing metadata. Next to this document, the General Terms and Conditions and Sales Restrictions must be accepted by the supplier. If the requirements included in this document are not fulfilled, the broadcaster retains the right to refuse or adapt the received production.

2 Specifications for the computer file

The content is packaged in an MXF file containing compressed image and audio data. The file must be delivered in MXF format using 'Operational Pattern 1a', which is specified in the following section.

2.1 References

A submission must at least comply with the following standards and recommendations:

SMPTE 377M-2009	Material Exchange Format (MXF) – File Format Specification.
SMPTE 378M-2004	Material Exchange Format (MXF) – Operational pattern 1A. (Single Item, Single Package)
SMPTE 379M-2010	Material Exchange Format (MXF) – MXF Generic Container.
SMPTE 381M-2005	Material Exchange Format (MXF) – Mapping MPEG Streams into the MXF Generic Container.
SMPTE 382M-2007	Material Exchange Format – Mapping AES3 and Broadcast Wave Audio into the MXF Generic Container.
ITU-R BT.709-5-2004	Parameter values for the HDTV standards for production and international program exchange.
ITU-R BT.1702-2005	Guidance for the reduction of photosensitive epileptic seizures caused by television.
EBU R122-2007	Material Exchange Format Time Code Implementation.
RDD 9-2009	MXF Interoperability Specification of Sony MPEG Long GOP Products.
EBU R128-S1-2015	Loudness parameters for short-form content.

2.2 Video

2.2.1 Format
The frame-rate is 25 frames and 50 fields per second (1080i/25) with a resolution of 1920x1080. The video codec is MPEG-2 XDCAM HD 422 Long GOP 50 (50 Mbit/sec).

2.2.2 Aspect ratio
The primary format for the material is 16F16, filling a 16:9 screen vertically and horizontally without geometric mismatch. Sub-formats which can be viewed without distortion in 16F16 are permitted. The aspect ratio must be marked identically in MPEG essence, MXF metadata as well as the metadata file. In the case of the active picture ratio being 2.35:1 (21:9) or 1.85:1, the picture should be centred vertically between black bars in a 16:9 frame, filling the width of the frame with no geometric distortion.

2.2.3 Additional signals
Without explicit permission by the broadcaster, it is not permitted to add a watermark or other hidden signal to audio, image or other aspect of the file. Ancillary data enclosed in the horizontal or vertical blanking such as VITC is ignored.

2.2.4 Illegal colours
Illegal colours may not be present in the video signal. Video parameters must comply strictly with ITU R BT.709-5. Files which do not comply with this specification will be rejected.

2.2.5 Field dominance
A complete video frame must consist of an odd line field followed by an even line field. Cuts in material must happen on frame boundaries (between field 2 and field 1).

2.2.6 Time code
The file shall feature one continuous, ascending time code as defined according to the Time Code Track in the Material Package of the MXF file. The time code of the MPEG-2 GOP headers must also be continuous and shall correctly indicate the coded image sequence. Any VITC in the recording will be ignored. The time code in the metadata file includes start and stop and must be in agreement with the time code in the Material Package.

2.2.7 Picture quality
The picture must be well lit and reasonably but not artificially sharp. It needs to be free of excessive noise, grain and digital compression artefacts, flare, reflections, lens dirt, markings and obstructions, lens aberrations, black crushing and highlight compression. Hard clipping of highlights by legalisers shall not cause visible artefacts on screen. Movement needs to appear reasonably smooth and continuous and must not give rise to distortions or break-up to moving objects, or cause large changes in resolution. There shall be no noticeable horizontal or vertical aliasing, for example jagged lines and field or frame rate fluctuations. Colour rendition, especially skin tones, must be consistent throughout and be a realistic representation of the

scene portrayed, unless it is altered as an editorially essential visual effect. There shall be no visible contouring, quantisation noise or artefacts caused by digital processing. Noticeable spurious signals or artefacts, for example streaking, ringing, smear, echoes, overshoots, moiré, hum or cross-talk shall not be visible. Electronically generated moving graphics and effects such as rollers, moves, wipes, fades and dissolves added to interlaced video in post-production must be generated as interlaced as well to prevent unacceptable judder.

2.2.8 Photosensitive epilepsy

Flickering or intermittent images and certain types of regular patterns can cause problems for some viewers who have photosensitive epilepsy. The supplier must take precautions according to guideline ITU-R BT.1702 to avoid the production of images that fall into this category.

2.3 Audio

2.3.1. Format

The coding of the audio channels is PCM 24 bit@48 kHz.

2.3.2 Channel layout

The submission must occur in one of the following layouts:

- Stereo audio in eight channels (four AES pairs, eight tracks)
  1 = Left Stereo (Lo/Lt)
  2 = Right Stereo (Ro/Rt)
  3 = Mute
  4 = Mute
  5 = Mute
  6 = Mute
  7 = Mute
  8 = Mute

- Stereo and multi-channel audio in eight channels (four AES pairs, eight tracks)
  1 = Left Stereo (Lo/Lt)
  2 = Right Stereo (Ro/Rt)
  3 = Left Front
  4 = Right Front
  5 = Centre
  6 = Low-Frequency Effects
  7 = Left Surround
  8 = Right Surround

2.3.3 Audio channel distribution aspects

Channels 1 and 2 form a stereo pair. In case of mono audio, the Left channel must be identical to the Right channel. In case of multi-channel recordings, these tracks are applied discretely in addition to the stereo tracks. Stereo program audio must be capable of mixing down to mono

without causing any noticeable phase cancellation of essential audio information, dialogue in particular. Left and Right stereo can contain either a straightforward stereo mix (Lo/Ro) or a mix which is compatible with Dolby Surround/ProLogic and similar systems (Lt/Rt). The use of a Lo/Ro-mix is nevertheless strongly preferred.

Multi-channel mixes must be able to be down-mixed to stereo in Lo/Ro mode using standard mix parameters (-3 dB for both Centre and Surround) without causing annoying artefacts or listening fatigue. Dialogue jumping between Centre Only and Phantom Centre (Left/Right) must be avoided. The mix calibration must be identical for all channels, which means that 3 dB pre-correction of the surround channels for a movie theatre must be removed. It is strongly recommended to only make use of the LFE channel if the signal levels of the other channels, including the from multi-channel signal derived stereo down-mix, would otherwise lead to overloads. Material which has multi-channel audio must be issued the extra parameter 'MULTI_CHANNEL_AUDIO' in the metadata. All audio channels must be in sync. Transmission by the broadcaster in SD video resolution and in streaming applications currently carries the stereo signal only.

2.3.4 Loudness level

The loudness level of the content must comply with EBU R128 and its supplement for short form content, based on the following specifications:

Program Loudness	–23.0 LUFS (±0.5 LU)
Maximum True Peak Level	–1 dBTP
Maximum Momentary Loudness	No restriction
Maximum Short-Term Loudness	+5 LU
Maximum Loudness Range	No restriction

Limitations of the modulations are determined using the Maximum Short-Term Loudness parameter. Based on performance in practice, future versions of this delivery specification may be adjusted for options as well as permitted maximum values. The production company will be seriously blamed if mixing techniques are used or additional signals are added to the content which deliberately leads to considerable loudness differences between multi-channel audio and its derived down-mix or which leads to manipulation of the loudness measurement in general.

2.3.5 Low loudness level content

A production may consciously use low level audio, for example, in content that consists mainly or entirely of background sounds. This is a creative option which for this purpose is supported by the addition of the 'LOW_LOUDNESS_LEVEL' parameter in the metadata file. If the submitting party assigns this parameter the value TRUE, the ingest process accepts that material has a lower program loudness level than –23 LUFS.

2.3.6 Audio quality

Sound must be recorded with appropriately placed microphones, giving minimum background noise. The audio shall have no peak level clipping and be free of spurious signals such as clicks, hum and any other avoidable distortion. The sound needs to be consistently mixed and edited. Speech must be acquired and mixed so that it is clear and easy to understand while listening on the same comfortable listening level and must not be louder than the average speech level of programs. Loudness levels must be appropriate to the scene portrayed, suitable for domestic listening situations. The audio must not show dynamic and/or frequency response artefacts as a result of the action of noise reduction or low bit rate coding. The timing difference between sound and vision shall not cause any perceptible error.

3 Other aspects

3.1 Length

The length in time of image and audio data must be identical to the content, and must be identical to the length recorded in the metadata file. In other words: there is no pre or post presentation containing a coloured bar, slate, or black. Any other versions of the content must be provided in a separate submission.

3.2 Specifications for the metadata file

Data about the commercial (the metadata) is recorded in an XML file. It must comply with the description and specifications listed in: http://www.w3.org/TR/2000/REC-xml-20001006#dt-doctype. The structure of the XML file is indicated in the XML schematic file com_xml_spec_v9.xsd.

An example of a metadata XML file:

```
<?xml version="1.0" encoding="UTF-8"?>
<COMMERCIAL_DETAILS>
<!-- title of the commercial -->
<TITLE>Mars Delight</TITLE>
<!-- name of the product -->
<PRODUCT>Mars</PRODUCT>
<!-- version of the commercial -->
<VERSION>2</VERSION>
<!-- name of the advertiser -->
<ADVERTISER>Proctor &amp;amp; Gamble</ADVERTISER>
```

```
<!-- length of the commercial in seconds -->
<LENGTH>30</LENGTH>
<!-- start time code of the commercial (HH:MM:SS:FF) -->
<TC_IN>00:00:00:00</TC_IN>
<!-- end time code of the commercial (HH:MM:SS:FF) -->
<TC_OUT>00:00:29:24</TC_OUT>
<!-- aspect ratio of the commercial -->
<ASPECT_RATIO>16F16</ASPECT_RATIO>
<!-- name of the advertising agency  -->
<AGENCY>Acme</AGENCY>
<!-- name of the post production company -->
<PRODUCTION_COMPANY>United</PRODUCTION_COMPANY>
<COMMENTS>Any comments can be listed here. </COMMENTS>
<!-- e-mail addresses for confirmation receipt, up to 10 addresses, separated by ; -->
<E-MAIL_CONFIRMATION>youre-mail1@yourdomain.com;youre-
mail2@yourdomain.com</E-MAIL_CONFIRMATION>
<!-- TRUE if this is a commercial in HD format, optional for SD indicating FALSE -->
<HD>TRUE</HD>
<!--TRUE if this commercial includes multi-channel audio, optional for stereo indicating
FALSE -->
<MULTI_CHANNEL_AUDIO>FALSE</MULTI_CHANNEL_AUDIO>
<!--TRUE if the submitting party has consciously chosen audio at a low loudness level -->
<LOW_LOUDNESS_LEVEL>FALSE</LOW_LOUDNESS_LEVEL>
</COMMERCIAL_DETAILS>
```

3.3 File naming convention

The name of the MXF file and its related metadata file must be the identical, except for the file extension. The file name needs to be unique, representing the content and contains aspects such as the product name, version, as well as date of broadcasting, separated by an underscore (_). File names must consist of the UTF-8 character set, using numbers (0-9), upper case letters (A-Z), lower case letters (a-z) and hyphens. Characters with diacritical marks such as é, è, ë or ö may not be used. Spaces are not permitted in file names and must be replaced by a hyphen (-). Text is not case sensitive. The maximum length of the entire file name is 100 characters. The (_) character is used exclusively as separator. The extension for the MXF file with the material must be “mxf”. The extension for the related metadata file is “xml”.

In the example listed above, the file name would be:

mars_mars-delight_30_version-2_03-12-2015_HD.mxf
mars_mars-delight_30_version-2_03-12-2015_HD.xml

4 Submission

The server to which computer files are submitted can be reached via the internet. The internet address of this server will be provided together with the access account information. The server uses the SSH File Transfer Protocol. Full support of this protocol, accessibility and proper functioning of the server cannot be guaranteed.

4.1 Procedure to request an access account

In order to gain access to broadcasters server, an account must be requested first via the SPOT website. The request must include the reason for the application, the company name and the name, e-mail address and phone number of the contact person. An e-mail will be sent to the contact within three business days, which will include the following information for the access account:

- User name/Password;
- Expiration date of the access account;
- The internet address of the broadcast server.

Quick Reference Guide

Item	Value	Reference/remark
Container	MXF	SMPTE 377M-2009 SMPTE 379M-2010
Pattern	OP1a	SMPTE 378M-2004
Codec	MPEG-2 XDCAM HD 422 Long GOP 50	SMPTE 381M-2005
Time code		EBU R122-2007
Video format and main requirement	1080i/25	ITU-R BT.709-5. Illegal colours may not be present.
Audio format	PCM 24 bit@48 kHz	SMPTE 382M-2007
Audio channel layout		
Stereo audio in eight channels (four AES pairs, eight tracks)	1 = Left Stereo (Lo/Lt) 2 = Right Stereo (Ro/Rt) 3 = Mute 4 = Mute 5 = Mute 6 = Mute 7 = Mute 8 = Mute	Channels 1 and 2 form a stereo pair. In case of mono audio, the Left channel must be identical to the Right channel. In case of multi-channel recordings, these tracks are applied discretely. Stereo program audio must be capable of mixing down to mono without causing any noticeable phase cancellation of essential audio information, dialogue in particular. The use of a straightforward stereo mix (Lo/Ro) is strongly preferred. All audio channels must be in sync. Transmission by the broadcaster in SD video resolution and in streaming applications currently carries the stereo signal only.
Stereo and multi-channel audio in eight channels (four AES pairs, eight tracks)	1 = Left Stereo (Lo/Lt) 2 = Right Stereo (Ro/Rt) 3 = Left Front 4 = Right Front 5 = Centre 6 = LFE 7 = Left Surround 8 = Right Surround	
Program Loudness	–23 LUFS (±0.5 LU)	EBU R128-S1
Maximum Signal Level	–1 dBTP	
Maximum Momentary Loudness	No restriction	
Maximum Short-Term Loudness	+5 LU	
Maximum Loudness Range	No restriction	