Commercial File Delivery

HD Technical Specifications

1280 x 720 Progressive Scan

April 28, 2022

This document provides technical specifications for those producing high definition interstitial material (commercials, promotion, PSA, etc.) for playback on the ABC Television Network. ABC will not normally modify any supplied audio or video parameters, providing the following technical requirements are met. ABC reserves the right to reject materials that are delivered with parameters exceeding the specifications outlined in this document.

Summary of Technical Specifications

- Scanning format: 720p, 59.94 frames per second.

- HD materials are to be delivered in a form that facilitates down-conversion to SD, with the extraction of a 4:3 image by center-cutting from the 16:9 image. See Section 4.
- *ABC no longer requires the delivery of a separate SD version if delivering HD.*
- The file delivery format for delivery to ABC is MXF for playout on ABC's Nexio server farm. Details about the file format are specified in section 2.5.7.
- *All commercials delivered to ABC must be accompanied by a matching xml file that complies with our metadata requirements – see section 2.5.2.1 for details*
- Either 2-channel stereo or 5.1 channel audio will be accepted.
- *ABC will accept Audio Description or SAP (Spanish Language) audio on short form content.* See Section 5.2 for REVISED audio track configurations.
- *A mono-mix is now required on audio track 7 if Audio Description or SAP is not delivered.* See Section 5.2 for REVISED audio track configurations.
- ABC has adopted standards, and has implemented methods and procedures to control the overall loudness of its programs and interstitial content in accordance with the CALM Act. The Advanced Television Standards Committee (ATSC) has released a recommended practice: A/85 ~~– Techniques for Establishing an~~d ~~Maintaining Audio Loudness for Digital Televisio~~n. ABC has adopted these recommendations.
- In accordance with the ATSC recommended practice and the CALM act, ABC will adopt the current recommendation for audio loudness of -24LKFS (+/- 2 dB) measured for the length of the delivered spot. A loudness meter based on ITU-R BS.1770-3 incorporating all channels except the LFE channel should be used for this measurement.
- As the method for delivery of content is file based, ABC will be using file based QC methods to measure and correct loudness, if necessary. File based methods are the best, and most accurate, methods of checking and correcting loudness discrepancies, without the loss of dynamic range.
- The absolute maximum peak audio levels of brief and only occasional instances are not to exceed -6 dBFS. ABC reserves the right to either reject or correct audio levels that are not consistent with this specification.
- ABC will be operating under a fixed dialnorm paradigm.

- ABC reserves the right to either reject or correct audio levels that are not consistent with this specification.
- Closed captioning is to be carried in the VANC space (line 9) of the output HD-SDI output signal, and must include both CEA708D (HD) captions, and CEA-608E (NTSC) captions carried within 708D. Exactly one SMPTE-334M packet must be present on each 720P frame.
- ABC will now accept AFD (Active Format Description) encoded content provided it meets ABC's requirements outlined in Section 4.3.
- *The Leader, Slate and Trailer requirements have been removed from this specification*
- *A description of Timecode start time has been added to section 6.2.1*

1. References

1.1 *Normative References* The following standards are referenced in this document. In those cases where a referenced document disagrees with this document, this document will be considered to be correct.

IEC 60628-18 *Sound system equipment -- Part 18: Peak programme meters – digital audio peak level meter* SMPTE 12M *Time and Control Code for Television, Audio, and Film*
SMPTE 256M *Specifications for Video Tape Leader*
SMPTE 274M *1920 x 1080 Scanning and Analog and Parallel Digital Interfaces for Multiple Picture Rates*
SMPTE-296M-*1280 x 720 Progressive Image Sample Structure – Analog and Digital Representation and Analog Interface*
SMPTE RP 148 *Relative Polarity of Stereo Audio Signals*
SMPTE RP155 *Audio Levels for Digital Audio records on Digital Television Tape recorder*

1.2 *Informative References* The following standards are cited for informational purposes.

ATSC A/52 *Digital Audio Compression Standard (AC-3)*
ATSC A/53 *ATSC Digital Television Standard*

ATSC A/85 - *Techniques for Establishing and Maintaining Audio Loudness for Digital Television.*
SMPTE RP 219 *High Definition-Standard-Definition Compatible Color Bar Signal*
SMPTE EG-1 *Alignment Color Bar Test Signal for Television Picture Monitors*
SMPTE RP 218 *Specifications for Safe Action and Safe Title Areas for Television Systems*
SMPTE 2016-1-2007/2016-3-2007 *Active Format Description*
SMPTE 12M-1 *Progressive Systems with Frame Rates Greater than 30 Frames Per Second*
ITU-R BS.1770-1, -2 *Algorithms to Measure Audio Programme Loudness and True-Peak Audio Level*

For the latest versions of the above-referenced standards, consult the following websites:

SMPTE: www.smpte.org
IEC: www.iec.ch
ATSC: www.atsc.org
CEA: www.cta.tech
ITU: www.itu.ch

2. Delivery Format

2.1 High definition commercial content for broadcast shall be delivered to ABC as a file.

2.2 The video scanning format shall be 1280 active pixels horizontally by 720 active lines vertically, progressively scanned at 59.94 frames per second, aspect ratio 16 x 9 (1.78/1), conforming to the scanning parameters specified in SMPTE 296M.

2.3 ABC will *not* accept material recorded at 60.00 frames per second.

2.4 ABC NO longer requires separate SD delivery for content delivered in HDTV unless advised otherwise.

2.5 File Delivery Format

2.5.1 File Type

2.5.1.1 The file type should be MXF 720P content (Please see 2.5.7.1 and 2.5.7.2 for encoding requirements). ABC's server farm for playout of program content is based around the Harris Nexio platform. All delivered files must be compatible with playout on the Nexio Platform.

2.5.2 Metadata

2.5.2.1 It is not necessary at this point to include any specific fields within the program. However, all commercials must be accompanied by an XML metadata file that complies with the ABC Commercial Metadata Specification. This should be posted on the ABC All Access site.

2.5.3 File Delivery Location

2.5.3.1 Contact ABC via e-mail for instructions on the file delivery location

Contact: ABCTV.DL-eCommercial@disney.com

2.5.4 File Naming Convention

2.5.4.1 Commercial will be named with the ISCII or Ad ID number {12 characters}. When redelivering modified spots with the same ISCII number, ABC must be contacted to purge an already existing spot. If the spot is not previously purged the redelivery process will fail

2.5.5 Video

2.5.5.1 All program video should conform to the specifications outlined in section 5.1

2.5.5 Audio

2.5.5.1 All program audio should conform to the specifications outlined in section 5.2

2.5.6 Ancillary Material and Signals

2.5.6.1 All Ancillary Material and Signals should conform to the specifications outlined in section 7

2.5.7 Encoding

2.5.7.1 All MXF files should be encoded XDCAM-HD at a data rate of 50Mbps

2.5.7.2 All audio should be recorded uncompressed, at a sampling rate of 48KHz and at a preferred bit depth of 20 bits

3. Native Scanning Format and Conversions

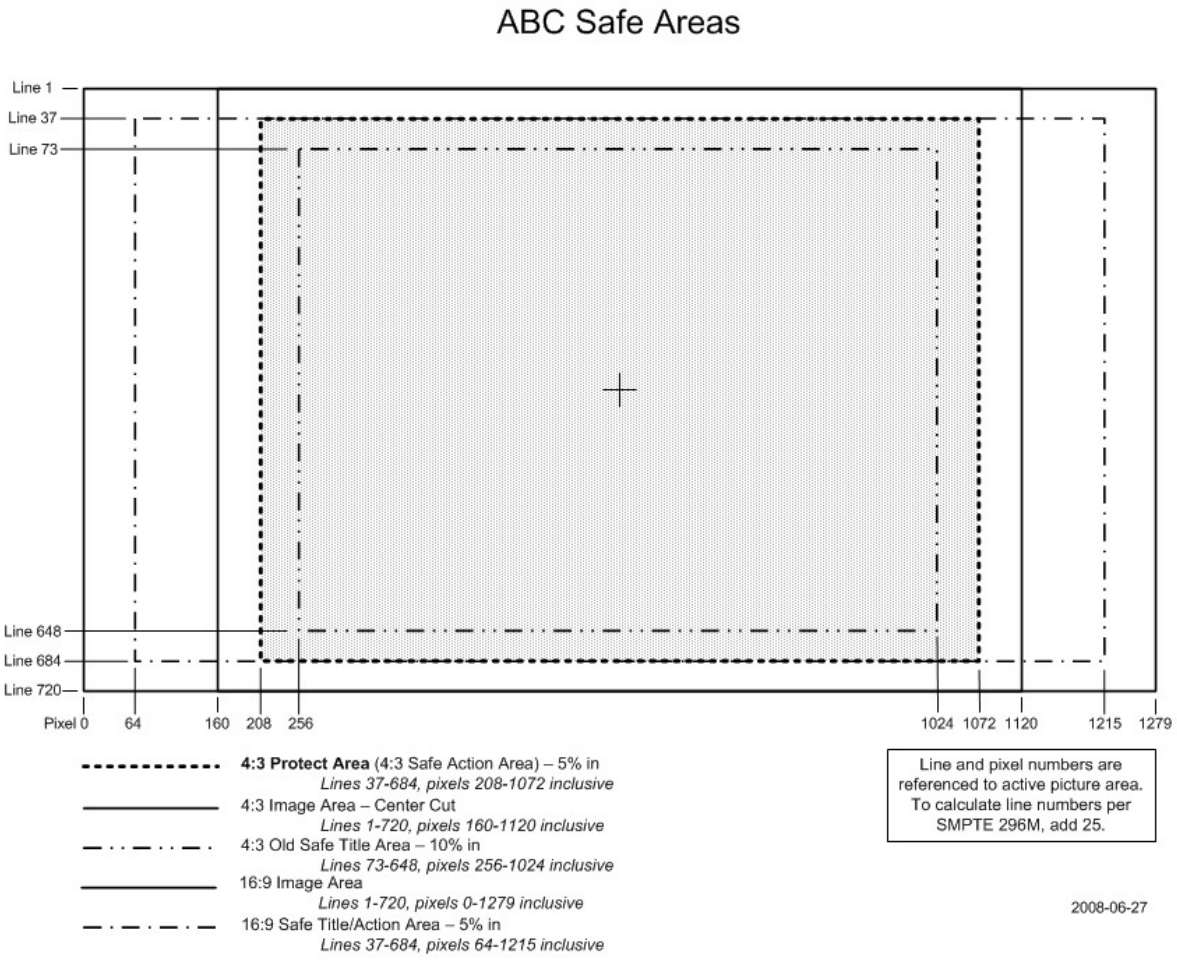
3.1 Video is to be derived from masters that are natively in either the 720p or the 1080/24p scanning format.

3.2 ABC will accept 720p files converted from 1080i provided that the conversions are made using a frame-based digital converter that keeps track of the 3/2 pulldown sequence. No field-based or analog conversions will be accepted. The subjective quality of 1080i to 720p and 1080/24p to 720p conversions must be equal to the quality attainable using native 720p processes, in the judgment of ABC.

3.3 720p content that is up-converted from NTSC or ITU-R BT.601 SD video will not be accepted without prior agreement from ABC.

4. Aspect Ratio

4.1 HD content is to be delivered in a 16:9 aspect ratio and in a form that facilitates down-conversion to SD, with the extraction of a 4:3 image by center-cutting from the 16:9 image. The ABC recommended 'safe' area for essential content (graphics & titles) is the 1.33 (4:3) *Safe Action Area* (90%) as outlined in SMPTE RP 218. See below:



The shaded area in the diagram above represents the space in which essential content & graphics are to appear.

4.2 For source material originating in the Cinemascope aspect ratio of 2.35/1 or 2.40/1, ABC will accept letterboxing of the Cinemascope image, in which the full width of the 16:9 window is filled by the full width of the Cinemascope image. The vertical portion of the 16:9 window not filled by the vertical dimension of the Cinemascope image shall appear as black strips of equal height above and below the Cinemascope image. ABC generally will only accept letterboxing originating from these wider aspect ratios, and discourages its use otherwise, but does realize that occasionally this may be part of a creative, production effect. This should be applied judiciously, and should

not contain artifacts of poor aspect ratio conversion such as distorted graphics.

4.3 Active Format Description

4.3.1 Although not required, ABC will not reject materials delivered with AFD (Active Format Description) encoding as noted in SMPTE Standards 2016-1-2007/2016-3-2007. AFD will only be used to signal AFD-capable downconversion products. As AFD is a VANC code, ABC as a TV network can only provide the transmission of this code to affiliated stations. There is no guarantee that the AFD will be transmitted through the station and then through to the home.

ABC will accept content encoded with AFD, however the following guidelines must be met:

4.3.2 The AFD shall be recorded on HD-SDI VANC line 11 in accordance with SMPTE 2016-1 and SMPTE 2016-3 specifications.

4.3.3 Since this is an HD-only service the Aspect Ratio Flag (AR) shall always be set to 1.

4.3.4 ABC's policy has been, and continues to be, to protect the 4:3 image due the likelihood of a centercut during downconversion. To further ensure that protection, content originators are encouraged to use an AFD of 1001 to protect the 4:3 area.

4.3.5 If it is imperative that the full 16:9 content be protected, then an AFD of 1010 will be permitted.

4.3.6 AFD codes other than 1001 and 1010 will not be permitted.

4.3.7 Bar Data flags and Bar Data values are not used by ABC and should always be set to 0.

4.3.8 All AFD data must be intact and continuous.

4.3.9 If no AFD is inserted or the AFD is inappropriate, a default AFD of 1001, with an AR of 1 and all Bar Data and Flags set to 0, will be inserted.

5. Format Specifications

5.1 Video

5.1.1 Video shall conform to the specifications of SMPTE 296M, system nomenclature 2: 1280 x 720/59.94/1:1; 1280 samples per active line, 1650 samples per total line; 720 active lines per frame, 750 total lines per frame; frame rate (Hz) 60/1.001; reference clock (MHz) 74.25/1.001; scanning format progressive.

5.1.2 When viewed on a waveform monitor in RGB mode, all of the program video signals should lie within the range of -5% and +105%. This equates to -35mV and +735mV, respectively. The resultant luminance signal (Y) should lie within the range of -1% and +103% (-7mV and +721mV).

5.2 Audio

5.2.1 Spots may be delivered with either 5.1 channel audio or 2-channel audio, either stereo or matrixed surround sound (Dolby Stereo).

5.2.1.1 Track configuration for 5.1 channel audio shall be:

1. Left
2. Right
3. Center
4. Low Frequency Effects
5. Left Surround
6. Right Surround
7. Audio Description (if applicable) or Spanish Language (if applicable and Audio Description does not exist) *otherwise a mono mix*
8. Spanish Language (if applicable and Audio description is provided on track 7) *otherwise silence*

5.2.1.2 Track configuration for 2-channel audio:

1. Stereo L or L_T
2. Stereo R or R_T
3. Silence 4. Silence 5. Silence
6. Silence
7. Audio Description (if applicable) or Spanish Language (if applicable and Audio Description does not exist) *otherwise a mono mix*
8. Spanish Language (if applicable and Audio description is provided on track 7) *otherwise silence*

Note: Do not, under any circumstances, replicate or repeat channels to "fill" up or increase the number of audio tracks

5.2.2 ABC has the capability of airing Secondary Audio Programming (SAP) audio track commercials in its HDTV services and will accept Spanish Language Dialogue as well Audio Descriptive Service audio (see above for track assignments).

5.2.3 Digital audio shall be linear PCM with a sample rate of 48 kHz, locked to video. Bit depth shall be 24 bits.

5.2.4 ABC *strongly* discourages the use of *excessive* compression of the final audio mix as it may provide an adverse listening experience for the viewer.

5.2.5 Loudness

5.2.5.1 Digital audio levels and loudness must be measured with instrumentation complying with Recommendation BS.1770-3, "Algorithms to measure audio programme loudness and true-peak audio level," International Telecommunications Union, Geneva, April 2006 and adopted in the ATSC RP A/85 "Techniques for Establishing and Maintaining Audio Loudness for Digital Television". Instruments that conform to this standard provide a true peak level

for digital audio, measured in dBFS (dB Full Scale), and an integrated audio loudness measurement in units of LKFS. Please see BS.1770 or RP A/85 for further details. Traditional VU or PPM meters do not provide a good measurement of loudness or instantaneous peaks. All channels except the LFE channel (4) are used to generate this measurement.

5.2.5.2 The target reference level for audio loudness is -24 dB LKFS, plus or minus 2 dB, but, as ABC now receives all of the interstitial content delivered via file based methods, a file based automated QC/Ingest system requires a threshold. Therefore, ABC reserves the right to reject and/or normalize the content, on an entire spot basis, on anything louder than -23 dB LKFS. This provides a 1dB tolerance in loudness over our specification with a much more accurate measurement. Quieter content (-24 dB LKFS and more negative) will not be normalized.

Important note on Measurement Considerations - Most BS.1770 instrumentation incorporates sliding time windows (moving averages) in their measurements. When measuring loudness, care needs to be taken to insure that long passages of low level audio and silence do not comprise a significant duration of the measurement time window.

5.2.5.3 Maximum true peak levels are not to exceed -6 dBFS, per BS.1770.

5.2.5.4 All audio channels of the 5.1, with the exception of the LFE, shall be measured.

5.2.5.5 For stereo material, both audio channels shall be measured.

5.2.5.6 For mono material, only the mono mix shall be measured.

5.3 ABC strongly discourages the use of electronic effects to create some sort of spatial imaging within a mix,

i.e.; between the left and right channels. This has been known to cause problems with downstream processes.

5.4 ABC will under no circumstances accept any material that uses or simulates the Emergency Alert Signal (EAS). This is considered a fineable offense by the FCC and will be rejected immediately by ABC. Care should be taken in using any attention-getting content that makes light of emergency situations.

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6. Ancillary Material and Signals

6.1 Closed Captioning

6.1.1 Closed captioning is to be carried in the VANC space (line 9) of the HD-SDI output signal, and are to include both CES-708D (HD) captions, and CEA-608E (NTSC) captions carried within 708D. Exactly one SMPTE334M packet must be present on each 720P frame.

6.1.2 Caption Service designations - 708

6.1.2.1 Service 1: English language captions

6.1.2.2 Service 2: Spanish language captions

6.1.3 Caption Service designations - 608

6.1.3.1 CC1: English language captions

6.1.3.2 CC2: Spanish language captions

6.1.4 All Captioning copies must use drop-frame time code.

6.2 Time Code

6.2.1 All commercials must have SMPTE Drop Frame Timecode with the first audio/video set to 00:00:00;00. All commercials MUST RUN TO TIME, meaning that they should be exactly the length of the spot; i.e..; 15, 20, 30 seconds, etc. A 60 second spot must run 00:00:59;28 due to SMPTE Drop Frame Timecode. If a commercial does not run in its allotted time, it must be padded with frame(s) of Black so that it runs to time.

6.3 VANC Data

6.3.1 Other than Closed Captioning (carried on line 9) and AFD (carried on line 11) there shall not be any other data or DID/SDID (data ID's or secondary data ID's) present on any other VANC line on any content delivered to ABC. The only exception would be ABC promotional content containing BrandNet triggers (carried on line 10).

6.4 Watermarking or Data Insertion

6.4.1 With the exception of Nielsen Audio Encoding only, ABC does not allow or permit the embedding of watermarking services or other types of data insertion into the commercial content, whether in the ancillary data space or in the active audio/video portion of the content. Any additional data services (beyond Nielsen Audio Watermarking, BrandNet for promotional content and Closed Captioning in general) must be cleared with Disney/ABC TV Network or Disney/ABC Ad Sales management. This includes embedded services for non-Nielsen commercial tracking or any other data transmission services whatsoever.