

Technical guideline for digital delivery

SevenOne Media GmbH

Unterführung, 20.07.2016

Every file that is delivered or transmitted must be free of all types of malware (e.g., viruses, Trojan horses, exploits). The picture content in the files must meet the Technical Guidelines (resolution, coding, colour space). The file name should not contain any special characters or spaces. A delivery is only valid, when the metadata is accurate and complete. Commercials are only file based and media less accepted. Delivery of audio material separately from video is not permitted.

Permissible and valid SD signal levels

In general, digitally generated or digitized vision signals must meet the coding parameters according to ITU-R BT.601.

All delivered video images must meet the current EBU specifications for PAL B/G video. There should not be any invalid signal levels in the content (e.g. super black, illegal colours).

For example, the diamond display on the WFM-601 (Tektronix measuring device) can provide a reliable control. The technical validity of the signals can be seen right away.

The luminance is limited from -1% to 102%. The colour value should not exceed 102%.

Active picture must extend from line 23 to line 310 in the first field and from line 336 to line 623 in the second field.

In addition to the VITC information, there should also be vertical blanking information.

Permissible and valid HD signal levels

In general, digitally generated or digitized contents must meet the coding parameters according to ITU-R BT.709-5.

During down-conversion, all delivered video images must meet the latest EBU specifications for PAL B/G video. There should not be any invalid signal levels in the content (e.g. super black, illegal colors).

Picture aspect ratio

The picture aspect ratio must be consistently maintained and indicated upon delivery of the material. The possible picture aspect ratios for SD and HD material are defined below. A distinction is made between the actual technical picture size (pixel size) and the displayed screen content (display aspect ratio).

SD picture aspect ratio

We always request the original film aspect ratio. If two versions of identical quality exist, the content with 16:9 display aspect ratio is preferred.

The technical size of the active picture is 720x576 non-square pixels or 768x576 square pixels; no other sizes will be accepted.

The display aspect ratio of 4:3 source material should not be changed; for example, no artificial letterbox formats should be produced.

HD picture aspect ratio

The technical size of the active picture is 1920x1080 square pixels; no other sizes will be accepted.

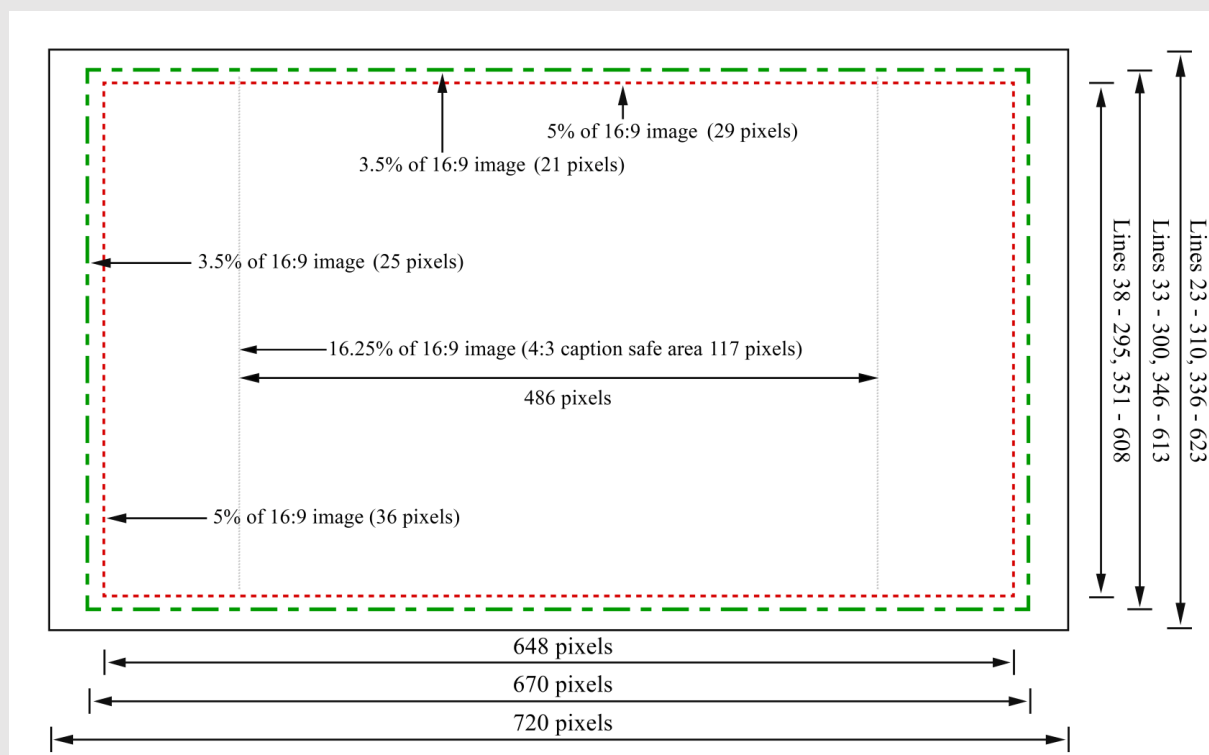
SD productions that were subsequently "up-converted" to HD will not be accepted.

Centre of interest

To ensure that the centre of interest is displayed on the screen, safety margins must be maintained on all sides. For this purpose the EBU R 095 (<https://tech.ebu.ch/publications/r095>) is recommended. In relation to the transmitted picture it is at least 3.5 % for safe action.

Scanning raster 576i 16:9 safe areas for 16:9 presentation

Image format: 16:9 Full Format

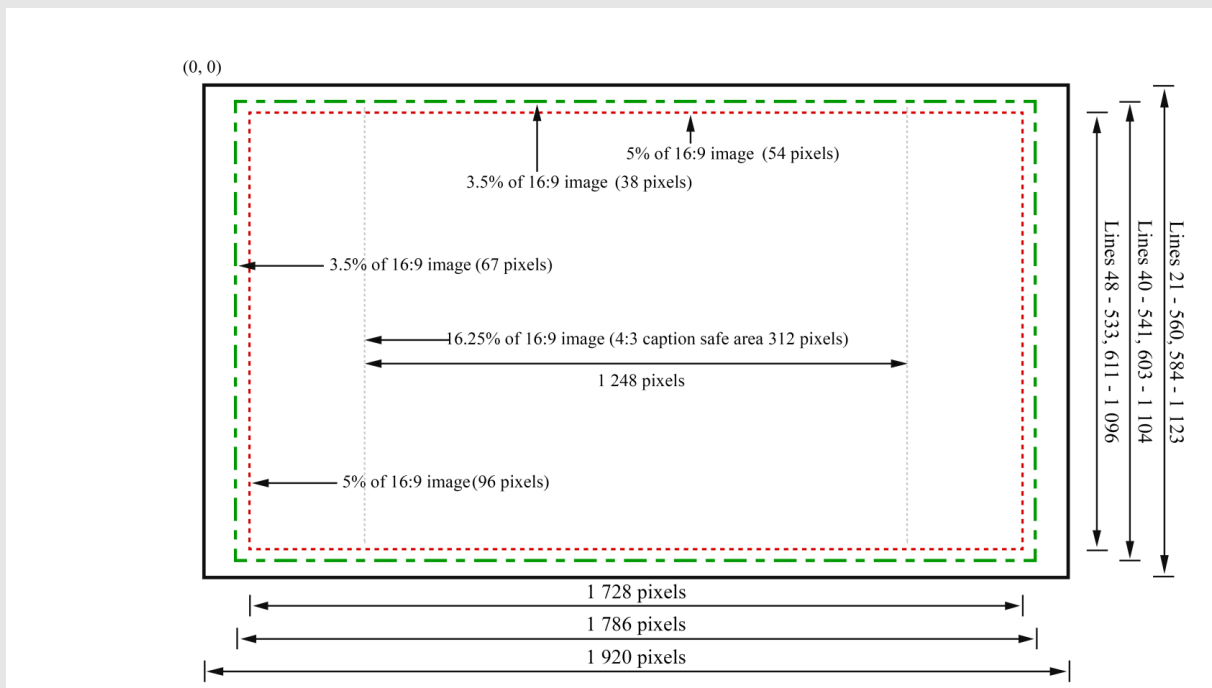


* The total number of lines is 625 (active lines from 23 to 310 and 336 to 623 inclusive = 576 lines).

** The complete digital line comprises 864 samples. Of these, the "digital active line" comprises 720 samples or pixels (numbered from 0 - 719 inclusive) of which the image active line comprises pixels 9 to 710 inclusive (see EBU R92 concerning peculiarities of the 576i/25 (625/50) scanning raster).

Scanning raster 1080i and 1080psf 16:9 safe areas for 16:9 presentation

Image format: 16:9 Full Format



* The total number of lines is 1125 (active lines from 21 to 560 and 584 to 1123 inclusive = 1080 lines).

** The complete digital line comprises 2200 pixels. Of these, the "digital active line" comprises 1920 pixels (numbered from 0 - 1919 inclusive). All active pixels are included in the image active line.

*

Frame rate and field sequence

Only a frame rate of 25 frames (D) and 50 fields (SD/HD) will be accepted. Each new frame must begin with Field 1 (see EBU Recommendation R62). In general, the correct field dominance must be maintained for all equipment involved in a production (mixer, synchronizer, etc.).

The delivered work (clip or movie) must be encoded in 1080i/25 regardless of the camera type, original resolution, scan rate or scan type (i/p).

General audio requirements

The sound on the medium should not contain noise suppression, pre-equalisation or data reduction. If it does, these changes must be noted in the metadata.

Purely stereophonic productions must be 100% mono-compatible.

All sound tracks must be synchronised precisely with each other and lip-synchronised with the visual content, regardless of the format (mono, stereo, Dolby Surround, Dolby E).

It must be possible to assign all audio content to a track or a channel on the basis of the metadata.

Audio levelling, loudness and normalising

Audio signals must be modulated, measured and normalised according to ITU-R BS. 1770-2/EBU R 128.

Programme loudness and normalising

The programme loudness must be modulated to a target level of -23 LUFS. The permitted deviation from the target level should not exceed +/- 1 LU. This applies to programmes that do not permit normalizing to the exact target level, such as live programmes. A measuring device according to ITU – R BS. 1770 and EBU Tech Doc 3341 must be used for measuring.

Allowed maximum level

The precise maximum peak level for PCM audio is –3dBTP (dB True Peak), measured with a measuring device according to ITU-R BS. 1770 and EBU Tech Doc 3341. The test tone on media supplied separately must have a duration of at least 45 seconds and be at 1 kHz @ -18 dBFS.

Loudness range

The loudness range permitted for stereo is 15LU. A measuring device according to EBU Tech Doc 3342 must be used for measuring.

Programme loudness (commercial, trailer and billboards)

The following level is permitted for short elements such as commercials and trailers:

Momentary Loudness maximal -15 LUFS (+8LU)

Short-term loudness to a maximum of -20 LUFS (+3 LU)

Time code (TC)

All programmes must be delivered with EBU time codes in 25 frames per second (fps). The timecode begins with the value 00:00:00:00.

File formats

The SD exchange format for programme material and mastering is an *.MXF file with IMX codec (50 Mbit/s). Because it cannot always be assumed that advertising spots can be delivered in MXF format, they may also be supplied as a (SD) MPEG-2 Program Stream. The data rate may not be lower than 30 Mbit/s. HD material can be delivered in the form of an MXF file with XDCAM HD 422 codec with 8 24-bit sound tracks. In principle, the audio sampling rate is 48 kHz. The frame rate is 50 Hz (fields). We cannot guarantee fault-free replay of content if different values are used.

Format Filecontainer/Codec/Essence

SD Typ 1: File extension (Container): *.mpg (MPEG-2)
 Compression type: MPEG-2 (I-Frame only) 422P@ML
 Data rate: 30 – 50 Mbit/s
 Audio tracks: 2 (German PGM)
 Audio bit depth: 16
 Audio sampling rate: 48 KHz

[Program Stream / MPEG-2, 30 bis 50 Mbit/s, I-frame-only 4:2:2P@ML + 2 CH Audio (16 Bit)]

SD Typ 2: Dateiendung (Container): *.mxf (MXF OP1a)
 Compression type: D10 – IMX 50
 Data rate: 50 Mbit/s
 Audio tracks: 8 (1+2 German PGM, 3-8 silence)
 Audio bit depth: 16
 Audio sampling rate: 48 KHz

[MXF OP1a / IMX 50 + 8 CH Audio (16 Bit)]

HD Typ 1: Dateiendung (Container): *.mxf (MXF OP1a)
 Compression type: XDCAM HD 422
 Data rate: 50 Mbit/s
 Audio tracks: 8 (1+2 German PGM, 3-8 silence)
 Audio bit depth: 24
 Audio sampling rate: 48 KHz

[MXF OP1a + 8 CH Audio (24 Bit)] CodecTyp Video: MPEG-2 (XDCAM HD 4:2:2) 50MBit