



PROGRAM DELIVERY

TECHNICAL SPECIFICATION
2021 INTERNATIONAL VERSION

1 OVERVIEW

This Network Ten Pty Limited ABN 91 052 515 250 ('Network 10') document outlines all the technical and delivery requirements associated with a program that has been commissioned for transmission in Standard Definition (SD) and High Definition (HD) on the Ten network being the channels currently known as "10", "10 Bold" and "10 Peach"

All program content delivered to Network Ten will undergo a Quality Control process. Content that fails to abide by the standards and specifications noted in the following document may be rejected and returned to the supplier for correction. Network Ten reserves the right to manipulate metadata for program compliance purposes as specified by Free TV Australia.

2 SPECIFICATIONS FOR DELIVERY

2.2 VIDEO

2.2.1 Format

Programs are to be packaged in a single MXF wrapper containing compressed video, audio and ancillary metadata using the 'Operational Pattern 1a' (SMPTE 378:2004). The below contains specifications for both Standard Definition (SD) and High Definition (HD).

For Standard Definition, video is to be encoded using the IMX50 compression: MPEG-2 XDCAM 422 Long GOP @50Mbps. The video format must be 576i50; 625 lines interlaced at 25fps, top field first, with a resolution of 720x576.

For High Definition, video is to be encoded using either HD AVC-Intra compression: VC3 1080i @120Mbps (DNxHD120) or XDCAM compression: MPEG-2 HD422 Long GOP @50Mbps (XDCAM HD 50). The video format must be 1080i50; 1080 lines interlaced at 25fps with a resolution of 1920x1080.

XDCAM MPEG HD422 Long GOP @50Mbps (XDCAM HD 50) is preferred.



2.2.2 Aspect Ratio

The primary format 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. In the case of the active picture ratio being 2.35:1 (21:9) or 1.85:1, the picture should be centered vertically between black bars in a 16:9 frame, filling the width of the frame with no geometric distortion.

2.2.3 Time Code

The file is to feature one continuous, ascending time code throughout the length of the file as defined by the Timecode Track in the material package (SMPTE ST 377-1:2011). First vision of the program is to commence at 01:00:00:00.

2.2.4 Illegal Colors

Illegal colours must not be present in the video signal. Video parameters must strictly comply with ITU R BT.709-5. Should it be found that a program does not comply with this specification; the program may be rejected for quality assurance purposes.

2.2.5 Photosensitive Epilepsy

Programs should not contain sequences of rapid flickering that may trigger photosensitive epileptic seizures in susceptible viewers.

2.2.6 On Screen Graphics

All on screen graphics must be contained within the 16:9 safe title zone. In addition to this, all graphics, including the opening and closing titles must comply with the below in order to be clear of the Network watermark .

TEN Watermark / HD format: x=1646, y=864

BOLD Watermark / SD format: x=855, y=461

PEACH Watermark / SD format: x=874, y=457

2.2.7 Picture Quality

For assurance purposes, a program will undergo a technical assessment where picture quality will be reviewed. The following summarizes parameters associated with image quality.



The picture image must be sharp, well lit and distinguishable. Free from digital compression artifacts, and excessive noise, the picture should not be grainy unless used sparingly for artistic effect.

There must be no visible contouring / artifacts caused by digital processing, and quantization noise must not be apparent. The program must be free of excessive black crushing and highlight compression, whilst the use of colour correction legalizers must not cause visible artifacts on screen. Colour renditions of skin tones must be realistic and continuous throughout unless used for an artistic effect.

The picture must be smooth and continuous, with no break of image during motion. Staggering and jagged movement, a result of field dominance issues, should not be present in the program.

There should be no visual disturbances or moiré effects within elements of fine detail i.e. shirts. There is to be no horizontal or vertical aliasing i.e. field or frame rate fluctuations.



2.3 AUDIO

2.3.1 Format

For both Standard Definition (SD) and High Definition (HD) programs, the coding of audio channels is PCM 24 bit @ 48 kHz.

2.3.2 Audio Channel Configuration

The minimum audio shall be a stereo pair (Lo and Ro). Where available, Dolby Surround (ProLogic II) encoded stereo pair (Lt & Rt) is preferred.

Archival product may be accepted with a stereo pair or Mono soundtrack.

Stereo recordings

Track 1 shall carry the left channel

Track 2 shall carry the right channel

If used:

Track 3 shall carry the M and E left

Track 4 shall carry the M and E right

If the M and E is a mono recording, it shall be carried on Track 3.

For a mono soundtrack, the program sound shall be dual recorded in phase on both tracks 1 and 2 (dual mono).

The true peak of recorded program level shall not exceed -2dBFS so long as it is monitored

on a true peak meter complying with recommendation ITU-R BS.1770 (see Free TV OP-59).

Program loudness must measure -24LKFS in accordance with FreeTV OP-59.

Where volume compression is used, it must be restricted to 6db of compression, and the onset of compression should not occur below 0VU.

Dynamic range should not be excessive.

Correct lip synchronization shall be maintained at all times.



Dolby Encoded Audio

The preferred audio requirement should be a Dolby Surround (ProLogic II) encoded stereo pair (Lt & Rt)

The Lt and Rt stereo pair shall have a combined dialogue loudness measuring -24LKFS on typical dialogue segments.

The true peak of recorded program level shall not exceed -2dBFS so long as it is monitored on a true peak meter complying with recommendation ITU-R BS.1770 (see Free TV OP-59).

2.3.3 Dolby E/Multichannel/Discreet Audio Channel Configuration

Dolby E multiplex, multi/discreet channel delivery is not supported and will not be accepted as primary delivery format. Full downmixed Lt & Rt pair on tracks 1 & 2 must accompany any multi/discreet channels provided.

If multi-channel surround audio is supplied as discrete channel pairs, the track order should be as follows:

- Track 1 Downmix Lt PCM
- Track 2 Downmix Rt PCM
- Track 3 M&E Left
- Track 4 M&E Right
- Track 5 Left Front PCM
- Track 6 Right Front PCM
- Track 7 Centre PCM
- Track 8 LFE PCM
- Track 9 Rear Left PCM
- Track 10 Rear Right PCM
- Track 11 Freely assigned PCM
- Track 12 Freely assigned PCM



2.3.4 Audio Parameters

The following audio parameters apply to all program content broadcasted on Network Ten in compliance with (Free TV OP-59).

Parameter	Value
Audio reference tone level	-20 dBFS
Audio reference tone frequency	1kHz
Audio reference tone duration	Minimum 1 minute
Audio reference tone polarity	In-phase, all channels
Average loudness	-24 LKFS
Maximum true peak level	-2 dBTPS

2.3.5 Loudness Levels

Program loudness must measure an average level of -24 LKFS, as specified in (Free TV OP-59). The true peak of recorded program level shall not exceed -2dBFS, so long as it is monitored on a true peak meter complying with recommendation ITU-R BS.1770-3 .

Where volume compression is used, it must be restricted to 6db of compression, and the onset of compression should not occur below 0VU. The dynamic range should not be excessive and correct lip synchronization must be maintained at all times.

3.3.6 Sound Quality

Audio must be clear and distinguishable with minimum background noise. The sound must be free of spurious signals such as clicks, noise, hum and any analogue distortion.

Dialogue must be free of distortion, and distinguishable throughout the program unless manipulated for artistic effect.

Audio levels must be appropriate to the scene portrayed, suitable for domestic listening situations, whilst dynamic range must adhere to advised audio parameters (listed above).

Stereo audio must be appropriately balanced and free from phase differences, which cause audible cancellation in mono. Use of excessive compression in order to comply with audio peak level requirements should be avoided.



3 PROGRAM REQUIREMENTS

3.1 Program Layout

Timecode	Duration	Picture	Sound
00:59:00:00	30"	100% colour bar and tone. (75% is acceptable)	Audio line-up level shall be -20dBFS (equaling 0VU). (-18dBFS is acceptable)
00:59:30:00	20"/15"	Clapper / Board (for file deliveries the clapper may be 15", followed by 5" cue sheet segment details)	Mute
00:59:50:00	8"	Countdown from 10"	Tone on count
00:59:58:00	2"	Black	Mute
01:00:00:00	-	Program	Program
End of Segment	-	Minimum of 5" of black must be left at the end of a segment, followed by the next segment's clapper and countdown.	Mute audio in between segments except on the 10" countdown.
End of Program	-	Minimum of 30" black at the end of tape deliveries	Mute
Elements	-	Placed at the end of the program i.e. textless material. Should commence no later than 1 minute after the credits and logos.	-



3.2 Program Clapper

All program submissions are to contain a clapper which follows the below layout. On screen details/graphics are to be contained within the 16:9 safe title, with a font size no smaller than Arial 80.

- Program Title
- Episode Title (if applicable)
- Episode Number (if applicable)
- Episode Catalogue Number
- Audio Format (e.g. stereo/mono)
- Aspect Ratio (e.g. 16:9 full frame)



4 FILE DELIVERY REQUIREMENTS

4.1 File Based Delivery

Programs are to be packaged in a single MXF wrapper containing compressed video, audio and ancillary metadata using the 'Operational Pattern 1a' (SMPTE 378:2004) as per format defined in 2.2.1 Video Format specifications.

4.2 File Naming Convention

When delivering programs to Network Ten on an external delivery device please ensure that the following details are included within the file name:

Program name:

Series:

Episode:

Replacement copy (if required)

For example - the following would be the file name for the third episode in the first series of a

program named "New Show": **new.show.s01.e03**

If an amended version is required to replace the original file then "replacement" is to be added to the end of the file name: **new.show.s01.e03.replacement**

In naming the file do not leave a space in the name. Replace any spaces in a file title with a period (.) or dash (-)

4.3 Storage Device Labeling

All storage devices must be appropriately labelled as follows:

1. Program Title
2. Episode Title (if applicable)
3. Episode Number (if applicable)
4. Episode Catalogue Number

5 FILE FORMAT QUICK REFERENCE GUIDE

Type	Standard Definition	High Definition (Preferred)	High Definition (Optional)
Wrapper	OP1a (MXF)	OP1a (MXF)	OP1a (MXF)
Format	IMX 50	XDCAM HD 50	DNxHD 120
Codec	MPEG-2	MPEG-2	VC-3
CBR or VBR	CBR	CBR	CBR



Average Bit Rate	50Mbps	50Mbps	120Mbps
Video Standard	PAL	PAL	PAL
Frame Size	720x576	1920x1080	1920x1080
Scan Type	Interlaced (50i)	Interlaced (50i)	Interlaced (50i)
Frame Rate	25fps	25fps	25fps
Chroma	4:2:2	4:2:2	4:2:2
Audio Format	PCM 24 bit @ 48 kHz	PCM 24 bit @ 48 kHz	PCM 24 bit @ 48 kHz
Audio Channel Layout	Track 1: Left Stereo (Lo/Lt) Track 2: Right Stereo (Ro/Rt) Track 3: M&E Left Track 4: M&E Right	Track 1: Left Stereo (Lo/Lt) Track 2: Right Stereo (Ro/Rt) Track 3: M&E Left Track 4: M&E Right	Track 1: Left Stereo (Lo/Lt) Track 2: Right Stereo (Ro/Rt) Track 3: M&E Left Track 4: M&E Right
Loudness	-24LKFS	-24LKFS	-24LKFS



6 DISCLOSURE REQUIREMENTS

Disclosure Requirements of Commercial Arrangements in Factual Programs

The Commercial Television Industry Code of Practice requires that all commercial arrangements involving an independent producer or presenter under which products or services are featured or endorsed be disclosed in the program.

'Factual programs' are current affairs programs, documentary programs and infotainment programs. Infotainment programs are programs where the dominant purpose is to present factual information in an entertaining way, and which employ presenters to do so.

The following requirements apply to all Factual programs commissioned by Network Ten:

(a) If the Producer enters into a Commercial Arrangement in relation to any third party's products or services which are endorsed or featured in the Program, the Producer must disclose the existence and details of that Commercial Arrangement to Network Ten.

(b) The Producer will also require each presenter it employs to appear in the Program to inform the Producer of any Commercial Arrangement under which the presenter agrees to endorse or feature a third party's products or services in the Program and the Producer will in turn disclose the existence and details of such Commercial Arrangement to Network Ten.

(c) Where the Producer or any presenter has such a Commercial Arrangement, the Producer must ensure that the existence of that commercial arrangement is disclosed either during the program or in the credits of the program in a way that adequately bring the existence of any such commercial arrangement to the attention of viewers and is readily understandable to a reasonable person.

(d) For the purpose of this clause, "Commercial Arrangement" means an agreement or arrangement under which the Producer or a presenter of the Program agrees with a third party to endorse or feature the third party's products or services in the program in exchange for consideration. For the avoidance of doubt, the free provision of a product or service for review is not a Commercial Arrangement.



7 REFERENCES

For further information on Technical Specifications, please refer to the Engineering Section of the Free TV Aust website:

http://www.freetv.com.au/content_common/pg-engineering-guides.seo

OP30: Quality Specification for the international and national exchange of programs in SDTV and HDTV Formats

OP59: Measurement & Management of Loudness in Soundtracks for Television Broadcasting

