TECHNICAL SPECIFICATION FOR THE DELIVERY OF ITV STUDIOS GLOBAL DISTRIBUTION LIMITED ("ITV STUDIOS") CONTENT

This document is a complete guide to the technical delivery requirements for producers submitting content for international distribution. Whether you are UK based or overseas, delivering a version for international distribution, a language version, or a home entertainment version, this document provides the technical delivery requirements, which you must fully comply with for each type of deliverable.

The Specification includes:

- Technical Specifications, i.e. the technical production methods, which must be used and the parameters, which all material must meet to be accepted by ITV Studios
- Picture and Sound Quality requirements, which also form a binding obligation on producers of material. Assessment of quality is by nature subjective, and is highly dependent on the nature of the content. Some of the quality requirements are expressed in relative terms ("reasonable", "not excessive" etc.), and it will be necessary to make a judgement as to whether the quality expectations of the intended audience will be fulfilled.
- Delivery requirements, which specify the form and layout of the material.

Further technical help regarding compliance with this specification may be obtained from the following ITV Studios technical contacts:

Technical Contacts	Email	Telephone
Bill Brown Head of Media Standards & Connectivity	bill.brown@itv.com	(+44) 113 222 8326 (+44) 7808 632 285
Justin Walton Global Content Operations Manager	justin.walton@itv.com	(+44) 20 715 76129 (+44) 7557 202 615

This technical specification outlines full details for international content delivery. The ITV Studios Operations team manage the delivery of programme materials for all international programming and are responsible for the acceptance of all master materials, ensuring all content has been delivered to the required technical standard All material submitted for international distribution must satisfy a Quality Control process pre-delivery to the standard outlined in this document. ITV Studios do not technically assess content post delivery. Programming must be technically assessed by the production company prior to delivery which is a contractual obligation. Any material found to be non compliant with our technical delivery standards will be rejected at the point of delivery.

1 Video Technical Requirements

1.1 Video Formats

1.1.1 Ultra-High Definition

Material delivered to this specification must be acquired, post-produced and delivered as follows:

3840 x 2160 pixels in an aspect ratio of 16:9[1];

The video frame rate should be as per the original source material. 23.98, 24, 25, 29.97, 50, 59.94 and 60 frame rates are also all permitted. In all cases UHD content must be shot and delivered in progressive format.

Colour system must be YC_rC_b *only*;

Colour sub-sampled at a ratio of 4:2:2 or 4.4.4

Colour space – **ITU-R BT.2100**,[2];

Image dynamic range[3] parameters detailed in **ITU-R BT.2100** must be agreed with the broadcaster before delivery.

The UHD format is fully specified in **ITU-R BT.2100.**

Note:

The frame rate must be agreed with ITV Studios before shooting begins.

For images acquired at 50 frames, second vision mixer cuts and edits shall 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 ST2051**.

1.1.2 High Definition

Material delivered to this specification must be acquired, post-produced and delivered as follows:

1920 x 1080 pixels in an aspect ratio of 16:9 as defined in **EBU Tech 3299** System 2. Please note 720p content is not acceptable as an HD format.

The video frame rate should be as per the source material. 23.98Psf, 24Psf, 25Psf, 29.97Psf, 50i and 59.94i are all permitted.

Colour sub-sampled at a ratio of 4:2:2

Colour space – **ITU-R BT.709**.

The HD format is fully specified in **ITU-R BT.709**.

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[1] *Broadcasters may commission programmes in any of the three resolutions (7680 x 4320, 3840 x 2160, 1920 x 1080) defined in **ITU-R BT.2100**.*

[2] *Conventional reference primaries may be optionally used as described in **SMPTE 2036-1:2014** but this limits the images to a maximum of 60fps and does NOT permit HDR images. The reference primaries in SMPTE ST2036-1 are consistent with Recommendation ITU-R BT.709 and their use MUST be agreed by the broadcaster BEFORE shooting commences*

[3] *Details and an explanation of "image dynamic range" can be found in the ITU Report **ITU-R BT.2390.***

1.2 Signal Parameters

In a video signal, each primary component should lie between 0 and 100% of the video range between black level and the peak level (R, G and B). Ideally, video levels should lie within the specified limits so that programmes can be distributed without adjustment.

When television signals are manipulated in YUV form, it is possible to produce "illegal" combinations that, when de-matrixed, would produce R, G or B signals outside the range 0% to 100%.

1.2.1 Video Level Tolerance

In practice it is difficult to avoid generating signals slightly out of range and it is considered reasonable to allow a small tolerance. The RGB components and the corresponding Luminance (Y) signal should, not normally exceed the “Preferred Minimum/Maximum” range of digital sample levels in the table below. Measuring equipment should indicate an “Out-of-Gamut” occurrence only after the error exceeds 1% of an integrated area of the active image.

For further details see the EBU Recommendation, **EBU R103**.

Any signals outside the “Preferred Minimum/Maximum” range are described as having a gamut error (or as being out of gamut). Signals cannot exceed the “Total Video Signal Range” and will therefore be clipped.

System	Range in Digital Sample (Code) Values		
System Bit Depth	Expected Video Range	Preferred Minimum/Maximum	Total Video Signal Range
10 bit (UHD &HD)	64 – 940	20 – 984	4 – 1019

Full range video levels must not be used for delivered television programmes. Colour gamut “legalisers” should be used with caution as they may create artefacts in the picture that are more disturbing than the gamut errors they are attempting to correct. It is advisable not to “legalise” video signals before all signal processing has been carried out.

1.2.2 High Dynamic Range

Guidance for HDR programmes are detailed in this specification**.** However ITV Studios must be consulted before an HDR production commences.

The Recommendation **ITU-R BT.2100** specifies two High Dynamic Range (HDR) methodologies: Hybrid Log Gamma (HLG) and Perceptual Quantisation (PQ).

Note: **SMPTE ST 2036-1** cannot be used for High Dynamic Range images.

The HLG specification offers a degree of compatibility with legacy displays by more closely matching the previously established television transfer curves.

The PQ specification achieves a very wide range of brightness levels for a given bit depth using a non-linear transfer function that is finely tuned to match the human visual system.

- Programmes can be mastered using either HDR methodologies defined in **ITU-R BT.2100.**
- Programmes must normally be delivered in the format the content was mastered in.
- Conversion between the two HDR methods may be carried out using the approach described in the Annex of **ITU-R BT.2100**.
- The PQ method requires the Maximum Content Light Level (MaxCLL) to be known. MaxCLL is the largest individual pixel luminance, measured in cd/m^2, of any video frame in the programme.
- HDR programmes should normally be graded on displays with a maximum brightness of between 1000 and 2000cd/m^2.
- For HLG productions, it is recommended that the reference level of graphics should be 75 IRE as it leaves sufficient headroom for "specular highlights" and allows comfortable viewing when HLG content is shown on HDR and SDR displays.

  Note: 75 IRE is equivalent to 203 cd/m2 on a 1000 cd/m2 reference display, or 343 cd/m2 on a 2000 cd/m2 reference display.

1.2.3 Blanking

Images must fill the active picture area. No 'blanking errors' are permitted on new, up-converted, or archive material.

A two-pixel tolerance is permitted during CG or complex overlay sequences where key signals, graphic overlays or other effects do not fully cover the background image. Where animated key signals or overlays cause moving highlights at the edge of the active image it is preferable to blank these pixels completely. A note of the time codes and reasons for these errors should accompany the delivered programme.

1.2.4 Field Dominance

For HD programmes, cuts must happen on frame boundaries (i.e. between field 2 and field 1). Motion on PsF material must always occur between field 2 and field 1 (i.e. field 1 dominance).

If material is shot at 50 frames a second, the correct 2-frame marker phasing must be maintained when converting to 1080i/25 or 1080PsF/25.

1.3 Video Line-Up

SMPTE ST2036-1 UHD, HD and SD Programmes

UHD programmes produced using **ITU-R BT.709** colour space, as well as HD programmes, must use 100% colour bars (100/0/100/0) that fill the 16:9 raster. SMPTE pattern bars are not acceptable. Programme video levels must be accurately related to their associated line-up signals.

1.4 UHD Content

ITV Studios would like to be able to distribute UHD content now that the market is beginning to show signs of momentum. We are keen to ensure we future proof your content. If you have shot your programme in UHD, or higher resolutions, and you are post producing the international version in UHD, then we would like to access that uncompressed master material with High Dynamic Range (HDR). Our preference is to take delivery of UHD content with HDR10 HDR. Your UHD content should also be supplied with Dynamic Metadata where available. If your UHD content is only available with Hybrid Log Gama HDR (HLG) then we would also be happy to accept this. In all instances please consult your ITV Studios contact prior to production commencing. Further technical support and guidance can also be sought from the ITV contacts named on the front page of this document.

1.5 Origination

The EBU Recommendation **EBU R118** is used to assess the suitability of cameras. Please contact the ITV Studios technical contacts named on the front of this document if there are any concerns about the suitability of a camera.

- Cameras for UHD programmes can be UHD Tier-1 or Tier- 2, but some UHD co-producers may not accept all cameras in UHD Tier-2.
- UHD programmes can only be originated with progressive scan.
- Cameras for HD programmes must meet or exceed the parameters of HD Tier-2L.
- HD programmes may be originated with either interlaced or progressive scan (see Film Motion for additional guidance).
- Interlaced and progressive scan HD material may be mixed within a programme if it is required for editorial reasons or the nature of the programme requires material from varied sources.

1.6 DSLR Cameras

DSLR cameras are acceptable for time-lapse sequences and stop-frame animation but are not currently suitable for use as video cameras unless they have a favourable EBU R118 test report. Exceptions can be made for covert shoots or dangerous locations at the discretion of ITV Studios who must agree to the use of DSLR cameras in advance of any shooting.

1.6.1 Drones & Remotely Operated Cameras

Cameras attached to these devices must meet the requirements in EBU R118 unless agreed in advance. Unless a drone or remote rig has adequate image stabilisers, it is recommended that the camera attaché has a higher resolution than needed to allow electronic stabilisation to be carried out during post-production. Programme producers are required to ensure drones and other remote cameras are only controlled by fully trained and licenced operators bearing in mind the local and territorial restrictions and regulations.

Note: Broadcasters may have additional requirements for the use of drones and remote cameras as part of their editorial or health and safety guidelines.

1.7 Film for HD and UHD Acquisition

Super16 film is not considered to be HD or UHD no matter what processing or transfer systems are used.

The following **35mm** film types and stock are acceptable for high definition acquisition:

- 3 perf - any exposure index although an exposure index of 250 or less is preferred.
- 2 perf - only if daylight stock with an exposure index of 250 or less is used.

To avoid causing problems with high definition transmission encoding, film should be well exposed and not forced more than one stop. 35mm stock (new or archive) scanned at UHD (or 4k and cropped to 3840) is usually acceptable for UHD production, but the entire capture, processing, scanning and post-production workflow must be agreed by ITV Studios in advance. **Note**: there are some circumstances where 35mm film is not suitable for UHD programme production.

1.8 Post Production

HD projects must be set to export progressively shot material as interlaced. Electronically generated moving graphics and effects (such as rollers, DVE moves, wipes, fades and dissolves) must be generated and added as interlaced to prevent unacceptable judder.

UHD Projects are always progressive. Electronically generated moving graphics and effects (such as rollers, DVE moves, wipes, fades and dissolves) must be edited to prevent unacceptable judder. For 2160p/50 or higher frame rate deliverables, such effects must be edited at the full frame rate of the content. If programmes are intended to be delivered as 2160p/30 or lower frame rate, then this must be agreed with ITV Studios in advance.

1.8.1 Video Codecs used for Post Production

Post-production codecs used to edit HD programmes should be at least 160Mb/s. It is however acceptable to use the native camera codec provided the codec is constant throughout the production workflow.

Note: UHD post-production codec choice will depend on the delivery frame rate and the requirements of co-producers for a Mastering Format (such as IMF) delivery.

1.8.2 Film Motion or Film Effect

It is ***not*** acceptable to shoot ***1080i/25*** and add a film motion effect in post-production. High Definition cameras can capture in either ***1080i/25*** or ***1080p/25***. Where film motion is a requirement progressive capture is the only acceptable method.

Conversion from 50 progressive frames per second material to 25 progressive frames per second is permitted, provided that the frame conversion process does not produce excessive motion judder or image softening or visible frame blending, and that an appropriate shutter speed has been used. ITV Studios preference is always to take delivery of content in its native frame rate.

1.8.3 Frame Rate Conversion

To prevent image degradation, Motion Compensation standards conversion sometimes known as Motion Predictive or Motion Vector Conversion should normally be used.

Speed change is the preferred method of converting from 24fps (including 23.976fps) to 25fps. Due attention must be given to the audio.

Software standards conversion packages should also use Motion Compensation processing. It is not permitted to use simple “timeline” conversion. Contact the broadcaster for more information.

Below are the recommended processes for frame rate conversion.

- 24p and 24/1.001p to 25p - Speed change is the recommended conversion process.
- 24p and 24/1.001p to 50p - Speed change plus frame doubling.
- 30p and 30/1.001p to 25p - Motion compensation conversion required.
- 30p and 30/1.001p to 50p - Motion compensated conversion required.
- 60p and 60/1.001p to 25p - Not recommended, speak to broadcaster if required.
- 60p and 60/1.001p to 50p - Motion compensated conversion required.
- HD 25PsF to UHD 25p - No frame rate conversion or de-interlacing required.
- HD 25PsF to UHD 50p - Frame doubling, no de-interlacing required.
- SD/HD 50i to UHD 25p - Use should be limited, de-interlacing.
- SD/HD 50i to UHD 50p - De-interlacing and frame doubling.

De-interlacing processing should be carried out via a multi-field (five-field or greater) de-interlacer or a motion compensated de-interlacer.

Content acquired at 24 (24/1.001) fps which has been converted to 60 (60/1.001) interlace or progressive via the "2:3 pull down" process, should first have the repeated fields/frames removed to produce the original frame rate. The resulting video can then be replayed as above.

1.8.4 Use of Lower Resolution Images

To maintain a high standard and meet audience expectations, the amount of material of a lower resolution than the commissioned format is limited to **25%** of the programme's total duration. Lower resolution material must not be used for large uninterrupted sections of the programme, unless agreed by ITV Studios.

1.8.5 Non-UHD Material

Some UHD programmes will contain some material from standard definition and high definition originals and sources that do not meet the UHD requirements. This material is all called 'non-UHD' in this document. Non-UHD material includes material acquired using the following methods or formats:

- All SD and HD Formats.
- Cameras that do not meet the requirements of **EBU R118** for UHD Tier 2.
- All codecs with bit rates below those specified in **EBU R118** for UHD.
- Film that does not meet the **required standard.**

1.8.6 Non-HD Material

Some HD programmes will contain some material from standard definition originals, and sources that do not meet the HD requirements. This material is all called 'non-HD' in this document. Non-HD material includes and material acquired using the following methods or formats:

- HDV from all manufactures.
- All codecs with bit rates below those specified in **EBU R118** for HD Tier 2L.
- Cameras that do not meet the requirements of **EBU R118** for HD Tier 2L.
- Material generated or processed on 720-line equipment.
- Film that does not meet the **required standard**

1.8.7 Up Conversion to UHD

Archive or Lower Resolution (HD and SD) material will usually require de-interlacing and frame rate processing during up conversion to UHD.

It is usually best practice to convert SD or HD 60Hz standards to the equivalent SD/HD 50Hz standard before up conversion.

1.9 Picture Aspect Ratio

All high definition programmes (except as below) must be delivered in 16:9 widescreen.

This means that the active picture must fill a 16:9 screen vertically and horizontally without geometric distortion.

1.9.1 Non-Standard Aspect Ratios

Programmes must be delivered in 16:9 unless otherwise agreed in advance. If content is mastered in an alternative aspect ratio (e.g. 2:1, 2.35:1 (21:9), (1.85:1) then ITV Studios require delivery of both the original master and an additional 16:9 full frame version. Where this is the case the picture within the alternative aspect ratio version should be centred vertically between black bars in a 16:9 frame, filling the width of the frame, and with no geometric distortion. For ITV Studios distribution, a 16:9 native master will be required with the alternative aspect ratio derived from this.

1.9.2 Pillar boxed HD Material

Some 'pillar-boxed' material is acceptable at the discretion of ITV Studios where it has been acquired on a medium that has the capability to be transferred to a legitimate HD resolution, for example, 35mm film shot using 4 perf at an aspect ratio narrower than 16:9. The pictures must be centrally framed in a 16:9 raster with no geometrical distortion.

2 Safe Areas for On-Screen Text

All on screen text must be clear and legible and must be within the safe areas specified. All font sizes must be legible after down conversion.

16:9 is the safe area used by most UK broadcasters as defined in **EBU R 95**.

2.1 Text Size

The minimum SD font height is 20 SD lines. Therefore where burnt in UHD or HD text will be down converted, the minimum height of the text should be no less than:

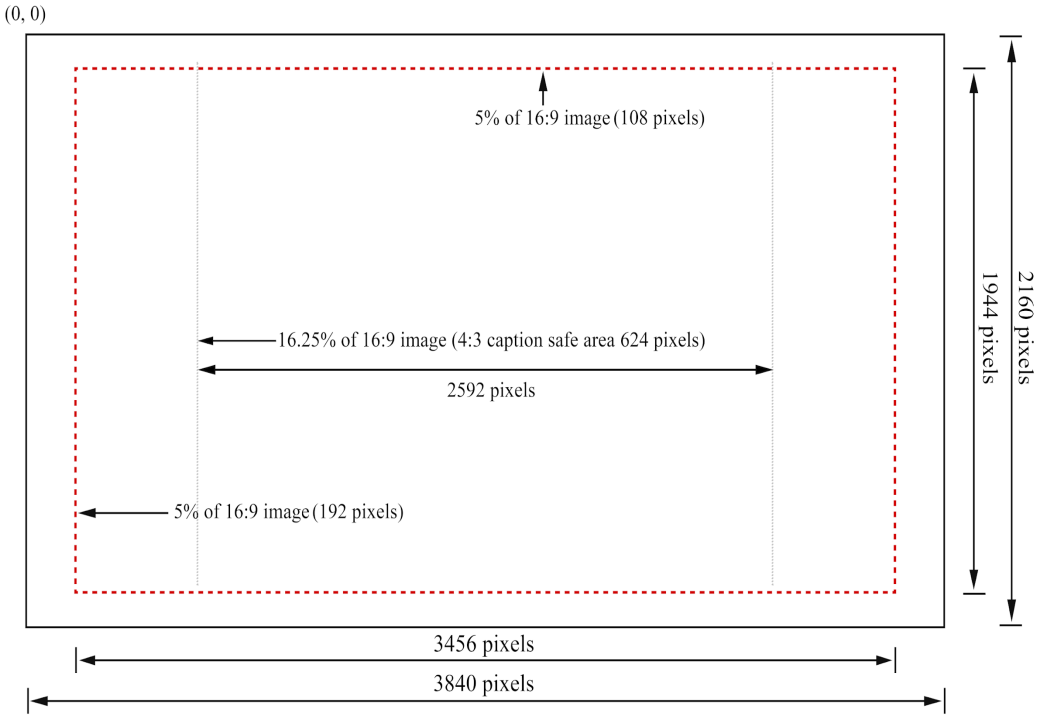
- 40 HD lines/pixels (to be legible after down conversion)
- 80 UHD lines/pixels (to be legible after down conversion)

2.2 In Vision Captions for Foreign Language Assets

Foreign dialogue should have burnt-in English subtitles, free from spelling and grammatical errors, and held for a sufficient time to be comfortably read. Subtitles must also be clearly visible at all times; if subtitles are positioned over an area of the screen which is the same colour as the font; a trim or drop shadow must be utilised and for consistency this should be used on all subtitles throughout the programme.

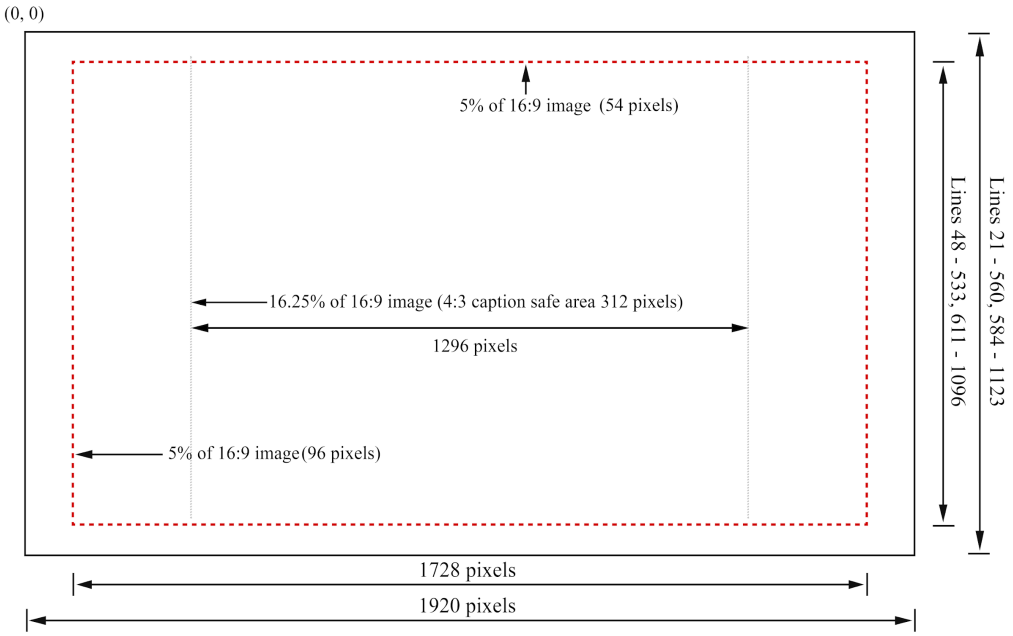
2.3 Safe Areas for UHD On Screen Text

Text Safe Area for 3840 x 2160 (Progressive)	Defined as percentage (%) of active picture	UHD pixels (inclusive) first pixel numbered 1	UHD Standards do not specify TV line numbers
16:9 Text Safe	90% of Width 90% of Height	192 – 3647 108 – 2052	- -



2.4 Safe Areas for HD On Screen Text

Text Safe Area for 1920 x 1080 (Interlace)	Defined as percentage (%) of active picture	HD pixels (inclusive) first pixel numbered 1	TV line numbers (inclusive) line numbering as per "ITU-R BT.709"
16:9 Text Safe	90% of Width 90% of Height	96 – 1 823 54 – 1025	48 – 533 (F1) & 611 – 1096 (F2)



3 Audio Technical Requirements

3.1 Dialogue

There are many complaints about unclear dialogue. Remember the audience has not seen the programme many times before and has not seen a script. The audience does not usually have "broadcast quality" audio reproduction equipment. It is the responsibility of the producer to ensure that dialogue is clear, easy to both hear and understand for a first time viewer who is using consumer equipment.

3.2 Loudness

All content must comply with the EBU Recommendation on Audio Loudness **EBU R128** unless otherwise agreed. Content must have an average loudness range across the entire programme of -23LUFS ±0.5LU with a recommended true peak of -3dbTP. Peaks up to -1dbTP will be accepted. Material should not contain bleeps for offensive language as these will be added locally by each territory as required.

It is no longer acceptable to deliver new programmes which have been mixed to the old PPM6 specification. Programmes must be mixed to comply with EBU R128.

Although the target loudness is -23 LUFS, in exceptional circumstances, other target levels may be permitted by prior agreement. Other target levels must be agreed ***before*** the final mix.

3.2.1 Loudness Terms

R128 terms used in this document and how they are measured are listed below.

Term	Description	Measurement	Reference
LU	Loudness Unit.	1LU = 1dB change in loudness	**EBU Tech 3343**
LUFS	Loudness Unit relative to Full Scale.	LUFS	**EBU Tech 3343**
LRA	Loudness Range.	LU	**EBU Tech 3343**
Delivery Requirements			
Programme Loudness **EBU Tech 3343**	The loudness measured over the duration of the programme.	LUFS	Non-live -23.0 LUFS ±0.5LU Live (including as-live) -23.0 LUFS ±1.0LU
Maximum True Peak **EBU Tech 3343**	The maximum value of the audio signal waveform.	dBTP (True Peak)	It is recommended that the maximum true peak level should not exceed -3dBTP. Content will fail if the maximum true peak exceeds -1dBTP.
Loudness Range is for Guidance Only			
Loudness Range	This describes the	LU	Programmes should *aim*

EBU Tech 3342 & 3343	perceptual dynamic range measured over the duration of the programme.		for an LRA of no more than 18LU.
Loudness Range of Dialogue	Dialogue must be acquired and mixed so that it is clear and easy to understand	LU	Speech content in factual programmes should aim for an LRA of no more than 6LU A minimum separation of 4LU between dialogue and background is recommended

3.2.2 Guidelines for True Peak Audio Levels

The following table is only for guidance on the true peak levels of different types of audio. At all times dialogue should be distinct and clear.

Material	Recommended Maximum Peaks
Uncompressed Music	**-3 dBTP**
Compressed Music (depending on degree of compression)	**-10 dBTP**
Heavy M & E (gunshots, warfare, aircraft, loud traffic, etc.)	**-3 dBTP**
Background M & E (office/street noise, light mood music etc.)	**-18 dBTP**

3.3 Metering Requirements

Meters must comply with the specifications in EBU Tech 3341. Programmes must be measured using the EBU Integrated (I) mode and the measurement must be applied to the whole programme (EBU Tech 3343 Section 5). The optional LFE channel must be excluded from all measurements.

3.4 Stereo Audio Requirements

Stereo tracks must carry sound in the A/B (Left/Right) form.

If mono originated sound is used, it must be recorded as dual mono, so that it may be handled exactly as stereo, and flagged in advance to ITV Studios. It must meet all the stereo standards regarding levels, balance and phase.

3.4.1 Stereo Line-Up Tones

Each stereo audio pair must have EBU stereo line-up tone. Tone must be 1kHz (2kHz is acceptable on M&E channels), sinusoidal, free of distortion and phase coherent between channels.

Digital Audio Reference level is defined as 18dB below the maximum coding value (-18dBFS)

3.4.2. Stereo Phase

Stereo programme audio must be capable of mixing down to mono without causing any noticeable phase cancellation.

3.5 Surround Sound Requirements

5.1 Surround sound should be delivered as discrete tracks. Programmes delivering surround sound must also carry a stereo mix meeting all requirements for stereo delivery.

In order for both the surround mix and stereo down-mix to comply with EBU R128 the down-mix should be normalised before layback.

Stereo and surround sound audio tracks must be synchronous.

3.5.1 AES Sample Timing

Very small timing differences between audio tracks in a surround programme will not be heard unless the stereo down-mix is monitored acoustically. An error of as little as one or two samples between the Left, Right and Centre channels can cause phasing and comb filtering for those listening in stereo.

Timing differences between audio channels must be no more than 0.2 samples (i.e. the timing between each channel of the six audio tracks of a surround sound signal).

3.5.2 Surround Sound Mixing Requirements

To help programme makers meet there responsibilities, it is important that both editorial and technical staff can easily and clearly monitor all transmitted audio during the production process.

In order to maintain a house style for certain programme types, or strands, ITV Studios may have particular requirements for the mixing mode as described below.

3.5.3 Dialogue in a Surround Mix

There are three modes for the placing of dialogue in a surround mix.

Mode 1

All dialogue should be present in each of the three front channels – but this does not mean that the dialogue must be at equal level in each of the front channels. Mode 1 is generally more suited to the home listening environment.

Mode 2

In-vision dialogue across the three front channels and out-of-vision dialogue in the centre channel only.

Mode 3

All dialogue in the centre channel only. Mode 3 is similar to cinema mixing and as such may be the least suited to the home listening environment.

For details of the mode required for each programme type please discuss with ITV Studios in advance of production.

3.6 M&E Audio Track Requirements

In order to effectively localise content, we will require the creation of Music & Effects tracks. Below are guidelines depending on the programmes genre. Please consult your ITV Studios Operations contact for further information.

3.6.1 Guidance on the Provision of non-scripted M&E

- We accept Final mix minus narration.
- No commentary, extra readings or voiceovers should appear on the music and effects tracks.
- For certain investments, we may also require a fully filled Music & Effects track.
- Audio levels must not be dipped.
- Any "*out of vision sync*" recorded on location, but not used in the programme, should not appear on the M&E tracks.

3.6.2 Guidance on the Provision of scripted M&E

- We accept fully filled music and effects.
- No partial M&Es, or M&Es containing only atmos will be accepted. This will be cause for technical rejection.
- Where characters perform songs on or off screen, please ensure this audio can be removed for dubbing purposes.

You should therefore ensure that:

- Music and effects tracks are minus dialogue (including foreign dialogue) and vocal song performances.
- All songs are provided as a separate audio stem with lyrics performed on one track and music/instrumental on another.
- All foreign language dialogue, i.e. languages other than that of the main show must be provided as a separate audio stem.
- Any overlapping dialogue such as when two different languages are spoken at the same time, or when dialogue is heard over a vocal song performance, must be provided split out and as a separate audio stem.
- These separate stems must be free of any character/background voices, spoken either in the background or to camera.
- Ensure that footsteps and foley are supplied fully filled and includes the atmospheric effects of crunching gravel, background atmos, etc.

3.6.3 Guidance on non-scripted M&E with scripted reconstruction

For programmes that contain both documentary and drama elements, please adhere to appropriate non-scripted and scripted guidelines above to create hybrid deliverables.

4 UHD/HD File Delivery Requirements

4.1 File Delivery Format

This section covers the requirements for delivery of UHD/HD files to ITV Studios. The delivery method used to upload programme files should be agreed in advance with your ITV Studios operations contact. Each programme should be delivered as a single principal MOV file containing the audio and video. There must be one programme only in each file and each programme must be continuous.

4.2 File Delivery Upload Details

Please note the credentials required to upload your file to ITV Studios, plus supporting QC documentation, can be sourced in advance during normal office hours from content.delivery@itv.com.

Due to security reasons it is not possible to publish the file upload credentials in this document. Please note the file upload credentials will change every 90 days in accordance with ITV Security Policy. It is therefore important you obtain this information in advance during normal office hours from ITV Content Delivery. We strongly advise you obtain the appropriate credentials from ITV Content Delivery prior to attempting a file upload to avoid any issues.

Post Production facilities delivering files using Aspera/Signiant will receive confirmation at the point of upload that their file has been successfully sent to ITV. It is the responsibility of the facility to inform production of successful upload.

In the unlikely event you experience issues uploading files to ITV, please email **content.delivery@itv.com** or call ITV Content Delivery on **0113 222 7555** during normal office hours. Outside normal office hours the ITV Content Operations Duty Manager can be contacted on **0113 222 7537**.

ITV Content Delivery Business Hours

Monday – Friday

Coordinators	**07:00 - 23:30**

Saturday - Sunday

Coordinators	**07:00 - 00:30**

4.3 UHD Video Codec

The video essence encoding should be a minimum of Apple ProRes 422 (HQ). Each ultra high definition programme must be delivered as a single MOV file. UHD video must be recorded with an active picture area of 3840x2160 pixels. When subsequently opened in QuickTime the display area should remain 3840x2160 pixels.

Video Codec Profile	A minimum of Apple ProRes 422 (HQ)
Container	MOV (all files must have a .mov file extension)
Stream Type	QuickTime
Video Frame Rate	The video frame rate should be as per the original source material. 23.98, 24, 25, 29.97, 50, 59.94 and 60 frame rates are also all permitted.
Resolution	3840x2160
Scanning	Progressive
Bit Depth	10 bit
Video Bitrate	Typically 737Mb/s for 25p.1475Mb/s for 50p content (set by relevant encoding profile)
Encoding Profile	High
Colorimetry	ITU-R BT.2100 (as defined in ITU-R BT.2020)
Pixel Aspect Ratio	Square
Frame Structure	i-frame only
Intra Frame Distance	1
Chroma Sampling	Minimum of 4:2:2
Edit Markers	In/out edit markers must be positioned at the beginning of the file
Display Resolution	Display resolution must match original picture resolution within the MOV
Timecode	Content should be delivered with 10:00:00:00 timecode. Timecode should remain continuous and uninterrupted until the end of the recording. For native 23.98 or 29.97 content hour 01:00:00:00 timecode start is acceptable.

Please note all UHD content delivered to ITV Studios must adhere to the UHD frame-size (3840x2160 pixels) and note for 4k (4096x2160). All UHD content must have a High Dynamic Range (HDR) colour-space unless agreed in advance with ITV Studios.

Please ensure that you preserve the HDR picture information throughout the production and post-production process. You should shoot using a compatible file format (e.g. LOG/RAW). The correct HDR curve should also be loaded in the camera/s.

Post-production processes (e.g. editing, grading, VFX, etc.) must also preserve the HDR picture information.

The cameras used should be checked prior to production. The European Broadcasting Union (EBU) Recommendation **EBU R118** has details of UHD cameras and acceptable sensor resolutions.

The EBU divides UHD cameras into Two Tiers:

UHD-1 Tier 1

Sensor resolution must be 3840 x 2160 in each of R & G & B. Where other sensor matrix technologies are employed, the actual resolution may have to be confirmed by measurement (**EBU Tech 3335**). As guide, a Bayer pattern sensor would need to be at least 5760 x 3240 to achieve full UHD1 resolution.

UHD-1 Tier 2

Sensor resolution must be greater than 2880 x 1620.

The use of UHD-1 Tier 2 cameras requires approval from ITV Studios before they can be used.

Some UHD programmes will contain material from SD and HD sources which are not considered to meet UHD standards. To maintain a high standard and to meet audience expectations, the amount of non-UHD material is limited to a percentage of the programme's total duration. Non-UHD material must not be used for large uninterrupted sections of the programme without prior approval from ITV Asset Acquisitions Operations. This includes archive material.

4.4 High Definition Video Codec

The video essence encoding should be Apple ProRes 422 (HQ). Each high definition programme must be delivered as a single MOV file. HD video must be recorded with an active picture area of 1920x1080 pixels. When subsequently opened in QuickTime the display area should remain 1920x1080 pixels.

Video Codec Profile	Apple ProRes 422 (HQ)
Container	MOV (all files must have a .mov file extension)
Stream Type	QuickTime
Video Frame Rate	50i or native frame rate if different to this. 23.98 PsF, 24PsF, 29.97PsF and 59.94i frame rates are all permitted. If your HD content has been progressively captured, then we would like to take delivery of the native progressive master rather than interlaced for downstream fulfilment.
Resolution	1920x1080
Scan Flag	As per Source. Interlaced or Progressive. Mixed material may only be delivered with prior approval with ITV Studios. The file must be accompanied with a comprehensive schedule specifying the timecode of the relevant sections.
Bit Depth	10 bit
Video Bitrate	Typically 185Mb/s for 50i content (set by relevant encoding profile)
Video Compression Mode	VBR
Video Colour Space	YUV (YCbCr)
Pixel Aspect Ratio	Square
Frame Structure	i-frame only

Intra Frame Distance	1
Chroma Sampling	4:2:2
Edit Markers	In/out edit markers must be positioned at the beginning of the file
Display Resolution	Display resolution must match original picture resolution within the MOV
Timecode	EBU timecode should be recorded on all material. Timecode should remain continuous and uninterrupted until the end of the recording.

- The file should be saved down at the full encoded resolution
- The file should be saved down with the playhead at the start of the file
- Edit Markers should not appear within the file
- The file must not contain a Closed Caption track
- The file must have the correct Pixel Aspect ratio values (pasp atom).
- The file must have the correct Color Parameter values (colr/nclc atoms)
- The file must have the correct Field Handling/Interlace values (fiel atom)
- The file must not contain a value for the Aperture settings (clap atom)
- The file must not contain a value for the Gamma level (gamma atom)

Programmes should conform to the following quotas:

Drama: 0-5% non-4K or non-UHD material

Natural History: 25% non-4K or non-UHD material (target across a series)

Documentaries: 25% non-4K or non- UHD material (no or limited use of archive sources)

Documentaries: 35% non-4K or non-UHD material (significant use of archive sources)

Percentages for other programme genres and any deviation requests from the above guide require prior approval from ITV Asset Acquisitions..

This specification will be updated with further guidance when exact technical specifications for this standard are agreed.

4.5 Audio Codec

Audio must be delivered as uncompressed PCM within the QuickTime container. UHD programmes must be delivered with both stereo and surround sound (5.1) audio. 5.1 surround sound is the preferred audio configuration for HD content.

Audio Sound Format	Stereo and/or 5.1 Surround plus additional tracks as relevant.
Sample Frequency	48khz
Audio Bit Depth	24 bit. Other bit depths by prior approval
Audio Codec	PCM (uncompressed) Big Endian or Little Endian
Audio Compression Mode	CBR
Audio Bitrate	1152 Kbps per channel (24 bit)
Audio Channel Configuration	Mono only

4.5.1 Audio Track Configuration

All audio channels must be stored as discrete tracks where each audio channel is stored as a discrete element within the QuickTime container. ITV Studios mandate the delivery of 22 audio tracks mapped as specified in Section 3.6.2 below. Any unused audio tracks must contain digital silence encoded as PCM audio. For programmes with stereo sound tracks only, Channels 5-16 must be encoded as digital silence and the additional audio elements specified on tracks 17-22 must be present. For 5.1 please follow the guidance outlined in the table below.

Each stereo audio pair must have EBU stereo line-up tone. Tone must be 1kHz (2kHz is acceptable on M&E channels), sinusoidal, free of distortion and phase coherent between channels. For programmes with stereo audio, stereo line up tone is required on tracks 1 to 4.

Channel	Configuration Name	QuickTime Audio Assignment
1	01 Main Stereo Left	Left
2	02 Main Stereo Right	Right
3	03 M&E Stereo Left	Left
4	04 M&E Stereo Right	Right
5	**When 5.1 is Available** 05 Main Front Left	Left
6	06 Main Front Right	Right
7	07 Main Centre	Centre
8	08 Main LFE	LFE
9	09 Main Surround Left	Left Surround
10	10 Main Surround Right	Right Surround
11	11 M&E Left	Left
12	12 M&E Right	Right
13	13 M&E Centre	Centre
14	14 M&E LFE	LFE
15	15 M&E Left Surround	Left Surround
16	16 M&E Right Surround	Right Surround
17	17 Narration/Commentary	Mono
18	18 Dialogue (voices to camera)	Mono
19	19 Left Effects Only	Left
20	20 Right Effects Only	Right
21	21 Left Music Only	Left
22	22 Right Music Only	Right
23	23 Optional Audio*	
24	24 Optional Audio*	

- All audio tracks should be selected.
- The content of Channels 1 and 2 must be Final Mix Stereo Left and Final Mix Stereo Right.
- Tracks must be laid out sequentially as documented above. Any unused tracks must be encoded with digital silence.
- Each audio track must always contain the same content on the same channel.
- Contact ITV Studios Operations if you can provide additional audio tracks outlined in Section 3.6.2

on page 17. e.g. songs.

5 File Layout

ITV Studios requires delivery of one **Dual Purpose Master** only.

Textless elements are required to localise effectively. Those textless elements should contain 10 frame handles and should be placed after a maximum of ten seconds of black level following the main programme, to and from a cut point to facilitate editing. Elements should be synchronous with those used in the actual programme.

Recaps and teasers should be delivered with the same audio configuration as the main programme. We require these to be delivered only as additional elements at the end of the master following the textless elements and not within the body of the programme. If this will not be editorially or creatively possible then please inform ITV Studios Operations. Please ensure these are not time specific (e.g. tomorrow, next week, etc.)

Please ensure all texted elements are delivered and documented in the script(s) and music cue sheets.

Please flag if there are no recaps and/or teasers for your programme.

Dual Purpose Definition

Fully texted Programme, including:

Texted opening title sequence.

Texted main programme.

Texted end credit sequence.

Textless elements including titles, in-programme captions and credits.

5.1 ITV Studios File Naming Requirements

Production Numbers will need to be requested from your ITV Studios Content Operations contact prior to delivery in order to generate file names. Any files received with incorrect numbering will be automatically rejected. Programme files delivered to ITV Studios must strictly follow the file naming convention laid out on page 23. Filenames must be in upper case, with filename extensions in lowercase.

5.2 File Naming Requirements – Programme Files

This specification allows for three potential deliverables for a programme under the same production number. Each deliverable must carry the appropriate two letter code at the end of the file name i.e. Dual Purpose as outlined below so the exact version can be clearly identified. Please ensure there are no spaces in the filename, using a hyphen where a space is required.

As outlined in section 1.9 on page 10 of this specification, if a programme has been shot in a different aspect ratio other than 16:9 on creative grounds, then ITV Studios will also

want to take delivery of a 16:9 full height version for downstream fulfilment to other territories and platforms.

Given deliverables with different aspect ratios will be assigned the same ITV Production Number, we need to be able to clearly differentiate different aspect ratio content at the point of delivery. It is therefore extremely important you follow the file naming conventions detailed below.

Please note, if a programme file does not conform to the below file naming conventions the media will automatically be rejected.

Please note the only place where slashes (/) should be replaced with dashes (-) is in the file name of your delivered programme file. Examples below:

Production Number on Clock: x/xxxx/xxxx#xxx

ITV Studios content should be delivered using the below file naming conventions.

UHD HDR Content File Naming Convention

UHD File Naming Convention for 16:9 Content	
Dual Purpose HDR Master	X-XXXX-XXXX-XXX-DP-UHD-HDR.mov
UHD File Naming Convention for 2.00:1 Content	
Dual Purpose HDR Master	X-XXXX-XXXX-XXX-21-DP-UHD-HDR.mov
UHD File Naming Convention for 2.35:1 Content	
Dual Purpose HDR Master	X-XXXX-XXXX-XXX-235-DP-UHD-HDR.mov

HD Content File Naming Convention

File Naming Convention for 16:9 Content	
Dual Purpose	X-XXXX-XXXX-XXX-DP.mov
File Naming Convention for 2.00:1 Content	
Dual Purpose	X-XXXX-XXXX-XXX-21-DP.mov
File Naming Convention for 2.35:1 Content	
Dual Purpose	X-XXXX-XXXX-XXX-235-DP.mov

5.3 File Naming Requirements – QC Reports

The following QC Certificates must match the file name of the media asset which must include the appropriate suffix as outlined below with the PDF files electronically delivered via the same delivery method as the ProRes file as agreed with ITV Content Delivery at the on-boarding stage.

File Name as described in Section 5.2.

Automated QC Report: FileName_AQC.pdf

Technical Assessment (Eyeball) Report FileName_EYE.pdf

UHD HDR Content QC File Naming Convention

UHD File Naming Convention for 16:9 Content	
Dual Purpose HDR Master	X-XXXX-XXXX-XXX-DP-UHD-HDR-AQC.pdf
UHD File Naming Convention for 2.00:1 Content	
Dual Purpose HDR Master	X-XXXX-XXXX-XXX-21-DP-UHD-HDR-AQC.pdf
UHD File Naming Convention for 2.35:1 Content	
Dual Purpose HDR Master	X-XXXX-XXXX-XXX-235-DP-UHD-HDR-AQC.pdf

HD Content QC File Naming Convention

File Naming Convention for 16:9 Content	
Dual Purpose	X-XXXX-XXXX-XXX-DP-AQC.pdf X-XXXX-XXXX-XXX-DP-EYE.pdf
File Naming Convention for 2.00:1 Content	
Dual Purpose	X-XXXX-XXXX-XXX-21-DP-AQC.pdf X-XXXX-XXXX-XXX-21-DP-EYE.pdf
File Naming Convention for 2.35:1 Content	
Dual Purpose	X-XXXX-XXXX-XXX-235-DP-AQC.pdf X-XXXX-XXXX-XXX-235-DP-EYE.pdf

6 Programme Format

All programmes delivered on file must be laid out with elements in the following pattern relative to timecode. Content must be continuous without any commercial breaks or break bumpers unless otherwise agreed.

Timecode	Duration	Video	Audio
09:59:30:00 •	20”	UHD programmes made to SMPTE ST 2036 & all HD/SD programmes must use 100% Bars (100/0/100/0)	HD/SD Line-up tone
		UHD BT.2100 UHD Line-up **SDR**	UHD Tone
		UHD BT.2100 UHD Line-up **HDR**	
09:59:50:00*	At least 7”	Ident Clock or Slate	Silence
09:59:57:06 (optional)	*2fr*	*2 Frames minimum 50% white*	*1 Frame 1kHz tone (on first white frame)*
no later than 09:59:57:08	At least 2” 18fr	Black	Silence
10:00:00:00 *	-	Programme	Programme
xx:xx:xx:xx	7”	ITV Studios End Board (available to download from https://brand.itv.com/assetbank-itv/action/ssoAuthenticate	Fade or cut to silence by end of programme
xx:xx:xx:xx		Textless elements should begin 5 seconds after the End Board has faded to black.	
* For native 23.98 or 29.97 content hour 01:00:00:00 timecode start is acceptable.			

6.1 Clock or Static Slate

The clock may display telephone contact numbers for the post-production facility/production company, and may also include company branding.

The clock must provide a clear countdown of 10 seconds prior to start timecode including a hand moving in one sec steps (i.e. not smooth motion) around a circular clock face.

Clocks that only have a digital countdown are not acceptable.

There must be no audio tone or Ident over the clock.

- Main Programme Title (in English)
- Programme Title (translated in local language)
- Production Number
- Duration: Please note this must reflect the new continuous version

- The VT clock or slate should cut to black and silence across all tracks at -3 seconds to programme start.

6.2 Graphic Packages

Clients will want to use all the graphic elements contained in the original programme to maintain high production values. As a result, we may ask you to deliver additional graphics files. This requirement should be discussed in advance with your ITV Studios Content Operations contact.

Project Specifications

Ideally graphics files should be sent in Adobe After Effects® format. If you would like to send anything else, please discuss this with your Asset Acquisitions Operations contact. After Effects® projects must have a resolution of 1920x1080 and a frame rate that matches the frame rate of the programme. Square pixels must be used throughout. Projects must have a colour depth of 8 bits per channel using **ITU-R709** working space.

Project audio must have a sample rate of 48 KHz.

The project must be created using Adobe After Effects® CC 2015 or later.

Rendered Output

After Effects® layers within projects must be split into two groups: editable text layers and background elements.

Editable text layers are any text that would ordinarily be expected to change during international language versioning. Editable text layers must be maintained as separate layers in the After Effects® project. Editable text layers may not have characteristics that are based on After Effects® 'Expression' functions.

Background elements are the underlying video, banners, and other elements that make up the backdrop for the editable text. All of these layers are required for the international language versioning process.

Two versions of each composition must be held within the project.

The first version must contain all the components required to create all the elements within the project. The second version must contain all background elements as pre-rendered video layers alongside all the editable text layers.

Please render all back plates, all elements that include third party plug-ins and any matte layers which would overlap an editable text layer.

Pre-renders must be rendered using either Apple ProRes HQ® or QuickTime® Animation codecs within a QuickTime® (.mov) wrapper. Pre-renders may be rendered as progressive video or as interlaced video with upper field first dominance.

Pre-renders must be rendered at a resolution of 1920x1080.

Collecting After Effects® Projects

After Effects® projects must be 'collected' and pre-rendered prior to delivery. All files used in a project must be consolidated to the delivery directory using the After Effects® 'Collect Files' command. The 'Reduce Project' option must be selected.

The collection process gathers any media elements imported in the After Effects® project into a 'Footage' sub-folder. The collection report generated by After Effects® must also be included. This report must include a list of all third-party plug-ins used in the project. ITV Studios will reject graphics masters that have After Effects® projects without these elements.

Fonts

The collection report provided with the project must list all fonts that were used in the project. Please do not supply any fonts.

Non After Effects® Graphics

Graphics elements that contain moving video must be delivered as a single video layer. Multilayer elements must be flattened into a single layer, excluding any layers that contain text.

Resolution of 1920 x 1080.

Field Dominance set to 'Upper' for files containing interlaced video Frame rate that matches the frame rate of the programme.

Apple ProRes HQ® or the QuickTime® Animation Codec

Files encoded using the Animation codec must have spatial resolution set to 50.

Bit Rate is set automatically as a function of frame size and frame rate.

The file must have a bit depth of 8-bits.

Alpha Channel: Yes, if available.

The file must use the **ITU-R709** colour space.

Pixel aspect ratio set to 1:1 (square).

QuickTime® (.mov) wrapper.

6.3 Censorship, Expletives and Bad Language

Please leave all audio and video free from bleeps, blurring and any other form of censoring. Most broadcasters prefer to locally edit nudity and language that may be considered to be offensive This does not include bleeps and blurs that have been added for legal reasons. Please provide a list of all instances of censorable material.

6.4 Closed Captioning (Subtitles)

Where available, please supply closed captioning files, which match the timecode of the master(s). Please advise of the format prior to delivery e.g. .STL, .XML or CAP, etc. Closed Captioned files should be delivered as advised by your ITV Studios Operations contact.

7 Quality Control (QC)

It is the responsibility of the production company to ensure programmes meet the technical and editorial requirements of the commission. This responsibility includes ensuring the company carrying out the QC process has adequate resources.

7.1 General Quality

All programmes are expected to reach a high standard of video and audio quality. This does not mean low quality material cannot be used. Archive and specialist low quality material used in context is acceptable. If there is any doubt contact ITV Studios for advice.

7.2 General Video Quality

The picture must be well lit and reasonably but not artificially sharp.

The picture must be free of excessive noise, grain and digital compression artefacts.

The picture must be free of excessive flare, reflections, lens dirt, markings and obstructions (e.g. lens hood), and lens aberrations.

Movement must appear reasonably smooth and continuous, and must not give rise to distortions or break-up to moving objects, or cause large changes in resolution.

The picture must be free of excessive black crushing and highlight compression. Hard clipping of highlights (e.g. by legalisers) must not cause visible artefacts on screen.

There must be no noticeable horizontal or vertical aliasing, i.e. jagged lines, or field-rate or frame-rate fluctuations in fine detail.

Colour rendition, especially skin tones, must be consistent throughout, and provide a realistic representation of the scene portrayed unless it is altered as an editorially essential visual effect.

The picture must be stable and continuous – i.e. no jumps, movements, shifts in level or position. There should be no flash frames or very short shots unless editorially essential.

There must be no visible contouring/artefacts caused by digital processing. Quantisation noise must not be apparent.

There must be no noticeable spurious signals or artefacts e.g. streaking, ringing, smear, echoes, overshoots, moiré, hum, cross-talk etc.

7.3 General Audio Quality

Sound must be recorded with appropriately placed microphones, giving minimum background noise and without peak distortion.

The audio must be free of spurious signals such as clicks, noise, hum and any analogue

distortion.

The audio must be reasonably continuous and smoothly mixed and edited.

Audio levels must be appropriate to the scene portrayed and dynamic range must not be excessive. They must be suitable for the whole range of domestic listening situations.

Surround and Stereo audio must be appropriately balanced and free from phase differences which cause audible cancellation in mono.

The audio must not show dynamic and/or frequency response artefacts due to the action of noise reduction or low bit rate coding systems.

7.4 Quality Control (QC) of Supplied Content

ITV Studios have put in place a two-tier process for the technical assessment of original supplied content. The level of technical assessment required will depend on the genre and nature of the content, but the required tier will be clearly specified in your contract and will conform to one of the two tiers explicitly defined in the below tables.

In all cases, it is the responsibility of the production company/supplier to ensure content meets the technical requirements of ITV Studios. All supplied programme masters must be technically assessed if required in a controlled environment by qualified staff in accordance with the requirements outlined in your contractually specified tier as defined in this document. Where content does not pass the technical assessment process, fixed or corrected materials will be required.

Please Note: ITV Studios do not technically assess content post delivery. The production company prior to delivery must carry out this function.

A Pass AQC Report and an additional Eyeball Pass QC report in agreement with the Tiered QC criteria set out below, must contractually be delivered with each ProRes master file when uploaded to ITV GD.

7.4.1 Automated Quality Control (AQC)

Details of the ITV AQC requirements can be found here

The production company should ensure that all technical and editorial warnings or comments are acted on or noted. Mandatory requirements must be acted on or rectified. ITV Studios requires an AQC report in PDF form, to be delivered with the master programme.

Unless otherwise agreed, ITV Studios will require delivery of an AQC Report from an approved AQC device to confirm the supplied content is technically compliant and conforms to EBU R128.

ITV Studios do not mandate delivery of PSE Pass certificates. Provision of an AQC Report alone is not sufficient and a full Technical Assessment Report must also be provided in accordance with the requirements of your contracted technical assessment tier as outlined on page 31.

7.5 Technical Assessment of UHD Programmes

Technical assessment requirements for UHD programmes must be discussed with ITV Studios before shooting begins. Initially, quality control will be on a genre-by-genre basis. In time, once ITV Studios and Co-Producers gain a better understanding of UHD we will be able to provide more guidance.

7.6 Tier One Full Technical Assessment to Include ITU 5 Point Grading Assessment

Tier One is ITV Studios' highest level of technical assessment and is by definition a more rigorous level of technical assessment than tiers two or three.

Asset	ITV Studios QC Requirements	Documentation
Dual Purpose File **ProRes 422 (HQ)** **UHD & HD**	• Real time end-to-end eyeball technical assessment of sound & vision conducted in accordance with the requirements outlined in the ITU-R BT.500 5 Point Grading Recommendation. To include full check of stereo Left & Right audio tracks. • **Full real time end-to-end check of M&E audio mix.** • Check textless elements exist and are complete at the end of the asset if applicable. • AQC check to confirm pass in conformance with the parameters specified in section **7.4.1** • Spot check of 5.1 audio tracks if applicable.	Technical Assessment Report. AQC Report.

7.7 Tier Two Technical Assessment to Include ITU 5 Point Grading Assessment

The Tier Two category is defined as a broadcast quality technical assessment.

Asset	ITV Studios QC Requirement	Documentation
Dual Purpose File **ProRes 422 (HQ)** **UHD & HD**	• Real time end-to-end eyeball technical assessment of sound & vision conducted in accordance with the requirements outlined in the ITU-R BT.500 5 Point Grading Recommendation. To include full check of stereo Left & Right audio tracks. • **Spot Check of M&E Audio Mix Only.** • Check textless elements exist and are complete at the end of the asset if applicable. • AQC check to confirm pass in conformance with the parameters specified in section **7.4.1** • Spot check of 5.1 audio tracks if applicable.	Technical Assessment Report. AQC Report.

Appendix A – Document Version Control

VERSION	DATE	SECTION	REQUIRED / INFORMATION	Reason for Update	OWNER
3.0	**September 2018**		Information	First issue of document	Bill Brown
3.1	**January 2019**	**3.6.2** **4.3** **6.4.1** **6.6 & 6.7**	**Information**	Provided greater clarity around audio track labelling and configuration. Inserted file naming requirements for delivery of QC Reports. Inserted link to a separate document providing further guidance on GE AQC requirements. Consolidated GE QC tiering requirements to provide greater clarity and removed references to PSE requirements in section 6.4.1	
3.2	**October 2019**		**Information**	Provided greater clarity on video line-up in section 1.3. References to TVT removed and ITV Content Delivery inserted as the delivery destination for all GE files. References to multi-part programmes removed.	
3.3	**May 2020**		**Information**	Document rebranded as ITV Studios. Delivery of one Dual Purpose master only now mandated. Removed the requirement to deliver a texted & textless master. Change to file naming requirements. Removed requirement to assign/tag audio tracks. Removed BLITS tone requirement.	