

Technical Delivery Standards for SD and HD

e.tv

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Valid for programme delivery

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1. Scope of Document

These technical specifications outline the delivery requirements for e.tv

While this document deals primarily with material for transmission, there are other factors to take into account such as re-versioning, these will be also be dealt with in this document.

This document must also be used as a guide for operational staff within e.tv
Advances in production techniques and changes in operational requirements will necessitate review of this content from time to time.

2. Introduction

The purpose of this document, and associated material is to set out the technical requirements to ensure that material delivered is of a satisfactory standard, it is part of our role to advise on the avoidance of production equipment or techniques that we know to be technically inferior or contentious and we then need to find a practical way forward that is acceptable to all parties.

Prior to acceptance all programme material will be technically assessed to ensure that it meets e.tv delivery requirements and it will be graded using a ITU-R five point quality scale.

If defects are discovered the tape will either be returned to the supplying company for repairs or the rectification will be carried out by e.tv and the cost recovered from the supplier.

Special circumstances may arise where material of a lower ITU grading may be accepted due to historical or artistic merit or where special production requirements apply. In these cases prior approval must be sought from the Transfers department who in turn will seek exemption if appropriate. Below factors will be taken into consideration.

QC Review will always look at the below criteria:

Technical Requirements:

These sections describe the technical standards required to deliver material to e.tv, these are broadly Pass / Fail objective measurements.

Quality Requirements:

Quality Requirements deal with broadly subjective quality issues with picture and sound. Careless shooting, inappropriate production methods and faulty or substandard equipment can cause avoidable impairment to sound or vision. The 5 point grading system will be used.

Operational Requirements:

All material delivered must be to the correct standard, be accompanied by the correct line up sequences and accompanied with the correct information for the “ingest” or tape delivery process.

Remember that the technical assessment does not affect the quality grades given. Material could have passed QC grades but still be rejected due to technical issues.

3. Technical Responsibilities for Programmes

3.1 General Responsibilities

Transfers Department is required to ensure that broadcast technical quality is maintained to a satisfactory standard for both SD and HD programmes

This document is the responsibility of the Transfers Manager, tel +27 21 481 4724
kobusk@etv.co.za

3.2 Technical Liaison

For all Technical Liaison contact the Transfers Department to assist you in all matters – (including non tx reports) they will also be able to re-direct you if need be.

3.3 Relaxation of Standards

All programmes are expected to meet our required technical standards. The recognised exemption categories are tightly constrained and will not be invoked for the general convenience of programme makers. Where programmes fail to meet full broadcast technical specifications and fall outside these categories it will be necessary to apply for special exemption. Any proposal to deliver programme material which does not conform to the technical standards in these guidelines must be agreed beforehand with the Station Manager at e.tv. Copies of any written agreements must then be supplied with the transmission tape to assist the QC Person. This will allow discussions to proceed at an early stage and, although in no way guaranteed, it will reduce the likelihood of subsequent difficulties.

3.3.1 There are five recognised categories for technical exemption.

Artistic interest: Innovative or experimental productions which are made, of necessity, by those who do not have access to equipment or facilities meeting broadcast quality standards.

Historic interest: News or programmes of a documentary nature which show historic events taking place or whose subject matter requires the use of archive material.

Actuality material: News, features or documentaries of an actuality nature where better quality has not been possible because of limitations placed on the format or physical size of equipment used. Such limitations are those incurred as a result of shooting in difficult areas such as war zones, isolated locations, confined spaces or other difficult environments.

Early television and cinema: Excerpts from historical archives where low technical quality was due to the then current performance of equipment used in its creation or where quality is now lower than at the time of original showing because of film or video ageing.

Domestic equipment: Programmes which employ excerpts made using domestic equipment in which the context requires that it is used.

NOTE: This is not permissible in HD masters

4. General Technical Requirements

Technical requirements must be met so that programme material is in the required format, which can be used reliably without any user intervention and can be passed through systems without noticeable impairment to the viewer.

4.1 Origination Material

- All origination SD material must be shot on 2/3" 3x CCD Cameras, 625 16:9 FHA Aspect ratio
- e.tv accepts, only by prior permission, material originated on cameras with CCD smaller than 2/3" or single chip cameras. Also, how the material is used in the program, must be cleared by e.tv. This material will be limited in duration depending on the nature of material.
- SD Material originated using HD Cameras ex. XD Cam HD Cam, HD CamSR, DVCPRO HD or AVCIntra on 2/3" or 1/2 " 3x CCD cameras is acceptable for e.tv's SD transmission. This material must be converted to 625 16:9 FHA Aspect ratio for delivery, using broadcast acceptable down conversion methods..
- All other systems require prior approval from e.tv. Eg Mini DV, HDV, AVCHD cameras.

4.2 Video General Technical Requirements

Material must comply with general ITU spec to ensure that Broadcast Quality material are received.

4.2.1 Video Standard

All signals and recordings supplied shall be of the 625/50 interlaced 16:9 FHA standard. (see also 6.1.2)

4.2.2 Video Levels and Gamut (illegal signals)

We require that signals meet the easier EBU Recommendation R103-2000: Luminance limits -1% and 103% Chrominance 105% max - RGB values to not exceed limits -5% to +105.

4.2.3 Aspect Ratio

Programmes will be for 16:9 FHA Standard presentation.

4.2.4 Safe Areas for Action and Captions

All programmes should be 16:9 FHA, titles must always be 4x3 title safe and shoot to protect 4x3

4.2.5 Time-code

Vertical interval time-code (VITC) is mandatory

4.2.6 On air Bugs

All programs must be bug (Graphics) safe. e.tv has two bugs on screen – jpeg available on request and can be emailed

- The e logo top left of screen.
- The age restrictions bug top right of screen.
- During the end credits we put up a next up strap

4.3 Audio General Technical Requirements

4.3.1 Audio Standards

Programmes shall be delivered in Stereo Format as required. The use of pre-emphasis and/or noise-reduction schemes during acquisition and post production is acceptable. However, the programme for final delivery should have no pre-emphasis or noise reduction scheme applied unless specifically required.

Ch 1 Stereo. Mix L Channel

Ch 2 Stereo Mix R Channel.

Ch 3 M/E For international Acquisition

Ch 4 M/E For international Acquisition

M/E Track will only be required when delivering for international delivery.

Mono shall be in Dual Mono format with identical and coherent audio on both Left and Right channels. This is so that it may be used amongst stereo programmes.

4.3.2 Audio Level, Reference Level and Measurement

Programme audio levels shall always be measured by digital meters The Maximum or Peak Programme Level shall be measured with Digital meter and shall never exceed -6 dB. Digital Audio Reference level is defined as -18dBfs

4.3.3 Line-up Tones

For Stereo sources, Stereo Line-up Tone shall be provided at a frequency of 1kHz +/- 100Hz and shall indicate the Left and Right programme legs. All tones must be sinusoidal, free of distortion and shall be phase coherent between channels. Optionally, Step Tone sequences may be provided but if so then all tones must have been sourced at the same level and be phase coherent on Stereo feeds / tracks.

4.3.4 Stereo Balance and Phase

The two stereo legs, when sending identical programme (Mono), shall match within 0.5dB and be phase coherent to less than 15 degrees at 10kHz

4.3.5 Sound to Vision Synchronisation (Lip-synchronisation)

The relative timing of sound to vision should not exhibit any perceptible error. Sound should not lead or lag the vision by more than 10ms.

5. General Quality Requirements

5.1 Technical Quality Grading

Subjective quality of pictures and sound is difficult to assess. The ITU / CCIR 5 point scale for impairment is given below:

5	Imperceptible impairment	Acceptable
4	Perceptible but not annoying impairment	Acceptable
3	Slightly annoying impairment	Borderline
2	Annoying Impairment	Not Acceptable
1	Very annoying impairment	Not Acceptable

Newly commissioned programmes shall meet a minimum grade 4. In other cases, the absolute minimum is grade 3, unless there are valid reasons for exemption. Any programme receiving a grade 1 or 2 must be fixed and resubmitted before it is cleared for TX.

5.2 General Vision Quality Requirements

A competent resource provider should be able to give advice on achieving good quality results. The expectation of the picture quality is set out below.

In general:

- a) The picture must be sharp and well lit (unless artistic considerations require otherwise).
- b) The video signal must be free of excessive black crushing and highlight compression. Transient response shall be such that streaking, ringing, smear, echoes and overshoots are not noticeable. Moiré, and other patterning shall not be visible. Hum, cross-talk and other spurious signals must not be apparent.
- c) Colour rendition, especially skin tones, must be a realistic representation of the scene portrayed unless artistic considerations require otherwise.
- d) Video processing (e.g. effects devices) must not introduce unintentional changes to luminance and chrominance levels nor cause perceptible timing shifts on entry or exit from the effect.
- e) Appropriate audio or video delay must be used to compensate for lip-sync errors.
- f) There must be no visible contouring / artefacts caused by multiple D-A and A-D conversions or compression. Quantisation Noise shall not be apparent. In general, recordings made “off-air” from digital sources should not be incorporated into new programming as these signals have already been significantly compressed.

- g) In certain circumstances, for example shooting actuality material or where a high level of mobility is required, the use of a “palmcorder” type camera may be considered acceptable for acquisition. Specific agreement from the Station Manager / Transfer Department must be sought before using this. Where use of this format is agreed we require particular attention to be given to sound and lighting considerations.
- h) Material will be assessed at 625/50 interlaced. If material originating in other formats is incorporated, care must be taken to achieve the overall quality required.
- i) Shooting 16:9 FHA is required.
- j) Cuts in material must happen on frame boundaries (i.e. between field 2 and field 1). Motion on frame based material such as film or ‘progressive scan’ video should occur between field 2 and field 1 (i.e. field 1 dominance).
- k) Only one programme per tape, each episode must be on its own master.

6. Specific Requirements for SD tape Delivery

The video and audio shall also meet all General Technical and General Quality Requirements specified in this document.

6.1 Specific Technical Requirements for Tape Delivery

6.1.1 Technical Acceptance Procedures

Every programme submitted on tape for transmission on e.tv must pass a Technical Review carried out on e.tv equipment to ensure the programme meets the requirements set out in this document. Any programme not meeting the required standard will be returned to the supplier for repair.

6.1.2 Videotape Format

Delivery of new commissions shall be supplied on one of the following formats DVCPRO50, Digibeta, BetaSP, IMX and DVCAM formats. If the need is for other delivery formats please contact Kobusk@etv.co.za to approve delivery on other formats. There must be labels on the cassette and on the tape itself, ensuring that they do not obstruct the spool. Tapes shall be new and of the highest professional quality, recent manufacture,

6.1.3 Audio Track Allocation

Audio track allocation must conform to the following standards unless otherwise stated in the programme contract.

For transmission on e.tv

Track 1	Track 2	Track 3	Track 4
Programme		For International Distribution	
Left A	Right B	M/E	M/E
Final mix on tracks 1 and 2 must be phase coherent		These tracks may have content but will not be transmitted	

For Monophonic programmes, tracks 1 and 2 must contain identical audio and be phase coherent so that they can be transmitted through a stereo infrastructure - "Dual Mono" .

6.1.4 Time-code and control track

Both longitudinal time-code (LTC) and vertical interval time-code must be recorded throughout the line-up and programme

Time-code must be contiguous and continuous and not pass through zero at any point from the start of the first countdown clock to beyond the end of the programme. LTC and VITC must have identical times. Time-code and control track must have the correct phase relationship with the corresponding video signal. Assemble edits should not be used between the start of the clock and the end of the programme. Programme start should be at timecode 01:00:00:00.

6.2 Specific Operational Requirements for Tape Delivery

6.2.1 Line-up Test Signals, Clock and Leader

The start of programme and any subsequent part should be preceded by a countdown clock with the following information:

- programme title
- programme subtitle
- episode number
- part number
- programme aspect ratio (16:9 FHA)
- contact telephone number for production company

The clock must provide a clear countdown of at least 20 seconds, see below:

The clock must appear round when viewed on a display set to the same format as the programme i.e. for a widescreen programme the clock should be round on a 16x9 display.

Time-code	Picture	Audio 1	Audio 2
00.58.00.00	Black	Mute	Mute
00:58:30:00	EBU Bars 75% (NTSC converted bars are not acceptable)	Coherent tone (step tone optional) 1kHz	
00.59.30.00	Ident and Clock		
00.59.58.00	PIP mark		
00.59.58.01	Black	Silence	Silence
01:00:00:00	Programme start	Stereo. Mix L Channel	Stereo. Mix R Channel

01.00.00.00* Programme Audio Left Audio Right

Mono derived from Stereo shall be to the M6 practice where the Mono signal is derived according to: "Mono = (L+R) - 6dB"

Please note: At the end of the programme, sound must end naturally or be faded to be out by the end of the programme. There should be a freeze or living hold for 10 seconds, and at least 60 Seconds of black

6.2.2 Recordings spanning more than one tape

Time-code	Picture	Audio 1	Audio 2
01.58.00.00	Black	Mute	Mute
01:58:30:00	EBU Bars 75% (NTSC converted bars are not acceptable)	Coherent tone (step tone optional) 1kHz	
01.59.30.00	Ident and Clock		

01.59.58.00	PIP mark		
01.59.58.01	Black	Silence	Silence
02:00:00:00	Programme start	Stereo. Mix L Channel	Stereo. Mix R Channel

If a programme is supplied on more than one tape the following must be observed:

- no overlap of material must be provided
- Reel 1 must end at a suitable cut point into Reel 2. This should be at a fade to black or scene change.
- The Last frame / First frame time codes must be clearly documented. The timecodes on Reel 2 must be later than Reel 1 and preferably the first frame will be 02:00:00:00.

6.2.3 Recording Reports

Every tape submitted must be accompanied by a completed recording report. The report must include full details of the programme supplier and recording facility house, programme title / subtitle. It must also include technical information including the origination format, time-code of first frame of picture

6.2.4 TX Tape Delivery

All TX masters must be delivered to Programming, Library CT together with

Detailed Final control sheet

Music Cue Sheet

Vernacular Report. (If required)

6.2.5 Final Control Sheet

A Final control Sheet must be filled in for every programme delivered to e.tv for TX

6.2.6 Time Frame for tape deliveries

TX tapes intended for broadcast shall be delivered at least 10 days prior to the first TX date. Tapes that are non-tx will only be sent back AFTER a new TX master has been received.

7. Promo Tape Delivery

- Tape Format DVCPRO 50 Large cassette.
- System 625/50
- Audio Ch 1 & 2 Stereo. Tone -18dBfs

Time-code	Picture	Audio 1	Audio 2
00.00.00.00	Black	Mute	
00:00:30:00	EBU 75% Bars	Coherent tone 1kHz	
00.01.30.00	Black	Mute	
00:01:50:00	Clock and Prog ID		
00:01:58:00	Pip Mark	PiP	
00:01:58:01	Black	Mute	
00:02:00:00	Promo topical	Audio Left	Audio Right
00:02:30:00	Black	Mute	
00:02:50:00	Clock and Prog ID		
00:02:58:00	Pip Mark	Pip	
00:02:58:01	Black Mute	Mute	
00:03:00:00	Promo Tonight	Audio Left	Audio Right
00:03:30:00	Black	Mute	

NOTES:

- Clock to show count down in seconds.

ID to include:

- Promo Name
- Title
- Eps #
- TX date
- Production House
- Producer and contact #
- 0dBu Tone is = -18 dB on Panasonic VTs.

All promo masters must be delivered to **Creative Services**

- Detailed FCC sheet.
- Music Cue Sheet.

Tapes to be labeled:

- Promo Name
- Eps #
- TX date
- Producer and Contact #
- Delivered on DVCPRO 50

8. File Based Delivery

8.1 SD/ HD

We will accept hard drive delivery of files delivered to Library in Cape Town the same way tapes are currently being delivered (see 6.2.4) This type of delivery will only be accepted if a copy of this file will be available until after TX date.

HD files to be delivered in 1920 x 1080i
SD Files to be delivered in 16:9 FHA

8.2 Codecs SD/HD

ProRes 422(HQ)
DNxHD
IMX50 (SD)

We will only Accept the below, each programme must be a separate Folder clearly marked and layed out as below: a PDF with fcc sheet and other info required as per 6.2.4 must also be inside this folder.

8.3 Single part or soft parted programme

A single part programme will always be played out from start point to end point without interruption. Soft parting is where a programme is provided as a single continuous programme, but the broadcaster may break the transmission of the programme at several points to insert commercials or for other reasons, IN and OUT points for continuous playback must be included with the delivery; timecodes for breaks should ONLY be included on the FCC sheet.



Line Up	Ident/ Clock	Prog	Black	Textless or other material
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Currently no FTP or “we transfer”, “Dropbox” or any such delivery will be accepted.

9. HD Delivery Format

- 9.1 Programmes must be delivered on one of the following **HDCAM, HDCAMSR 1080i50**
- 9.2 High definition programmes must be acquired, post produced and delivered in high definition. Programmes must contain a minimum of 75% native high definition material. Up to 25% of the programmes duration can come from standard definition sources.
- 9.3 High definition programmes should in general be clean of noise, well lit and sharp (unless artistic considerations require otherwise)
- 9.4 It is not always possible to control the light levels of events in the open or in locations where there is only natural lighting or lighting is controlled by others. Wherever possible little or no camera gain should be used.
- 9.5 In studio and outside broadcast where the lighting levels are fully under the control of the programmes lighting director, camera gain should be limited to a maximum of 3dBs
- 9.6 Particular care should be taken up-converting standard definition material to include in high definition programmes. Only high quality up-conversion equipment should be used. Use of “in VTR” up-converters or up-conversion using non-linear editing software is not acceptable. This requirement protects the standard definition viewer who will see the standard definition material after multiple conversions.
- 9.7 Software up-converting or down-converting between standards are not acceptable only hardware up-conversion will be accepted.
- 9.8 Tapes must still be delivered to Library as per section 6.2.4

10. Action and Caption safe areas

Action and caption safe areas for High Definition programmes are the same as the safe areas for standard definition delivery:

- *Action* should be protected for 4x3 display.
- *Captions* should be protected for 4x3 display.

Action and caption measurements should be made using the down converted output.

11. Audio

There are no changes to the general audio requirements for delivery. Line-up, levels and audio to video synchronisation remain the same as the requirements for standard definition delivery. There are two possible audio delivery options though:

11.1. Stereo delivery

There is no change to the audio delivery requirements for high definition programmes delivered in stereo.

- Tracks 1&2 - Stereo main audio Left (A1) and Right (A2).
- Tracks 3&4 - Not required but may contain an M&E track.

Time-code	Picture	Audio 1	Audio 2
09.58.00.00	Black	Mute	Mute
09:58:30:00	EBU Bars 75% (NTSC converted bars are not acceptable)	Coherent tone (step tone optional) (100Hz, 900Hz and above 10kHz)	
09.59.30.00	Ident and Clock		
09.59.58.00	PIP mark		
09.59.58.01	Black	Silence	Silence
10:00:00:00	Programme start	Stereo. Mix L Channel	Stereo. Mix R Channel

11.2 Audio Format

All Stereo shall be fully mono compatible. Fully mono compatible requires that when the left and right stereo channels are actively combined to mono there is no discernible change in audio level or fidelity.

12. Examples Of Common Rejection Points

- Incorrect tape format.
- Incomplete labelling.
- Incorrect bars / tone / slate information.
- RGB gamut / luminance errors.
- Editing errors such as, flash frames and blanking errors.
- Incomplete, or temporary VFX shots.
- Any break up of picture is unacceptable i.e video drop out, pixelisation or dead pixels.
- Excessive amounts of up-converted Standard definition or noisy material.
- Text out of title safe.
- High / distorted audio levels.
- Incorrect audio, excessive hiss, clicks, dropout and sound out of sync.

13. ACKNOWLEDGMENT

This document was compile with extracts from documents from various Specifications published around the world. In alphabetical order.

Animal Planet
APT
BBC
CBC
CTVglobemedia
Discovery
FAL
Ieee.tv
Media Host
NZFC
Publitalia
Quebec
Sverige
SVT
VisionTV