

2012

Technical specifications for High
Definition program acceptance
Tape delivery

*Broadcast and
technical services*

JCC

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Scope

The standards defined in this document apply to all High Definition (HD) programs, program blocks and any other HD television content provided to JCC.

These standards apply to HD programs **delivered on tape**.

Introduction

JCC has a mission to adopt and promote the best possible practices in High Definition (HD) production and broadcasting so as to deliver high definition programming of optimum quality to its audience. JCC wants to ensure that these services be appreciated in their full potential, to rapidly increase the interest of viewers, thereby accelerating the transition from conventional standard definition (SD) to high definition television.

JCC's policy further states that audio and video signals broadcasted by owned stations or distributed to affiliate stations must meet EBU technical specifications and recommendations as well as the Arab State Broadcast Union technical specifications.

In addition, JCC is actively following the development of various technical standards for TV production and broadcasting, namely SMPTE, IEEE, ITU and AES. It's therefore JCC's policy to support the use of these standards, in the field of High Definition Television (HDTV) amongst other, in order to facilitate HD material exchange between various members of production community, so as to harmonize and optimize audience's HDTV viewing and listening experience.

Abstract

This document is intended for all of those who work at producing HD content for broadcast on the services of JCC. We trust that it will serve as an aid in selecting proper parameters and as a guide to adapting their production techniques to create HD content that meets our standards and hence benefits to the audience.

The standards described in this document are also intended to serve as a reference to JCC's personnel who review and approve the technical quality of HD programs.

Because HDTV is by nature and by definition an electronic medium of superior quality to conventional standard definition television (SDTV), JCC considers that subjective quality requirements must be accordingly and significantly more stringent for HDTV than for SDTV, if we are to take the full advantage of new medium's stricter technical specifications and corresponding gain in picture and sound quality, and, in turn, allow the audience to enjoy its full benefits.

Terminology

HD, HDTV: Those terms are used for native high definition productions, live on tape, carrying high definition signals

SD, SDTV: Those terms are used for native high definition productions, live on tape, carrying standard definition signals. It encompasses analog and digital signals and formats

Anamorphic 16:9 SD: Component digital video format having a 16:9 aspect ratio, made of 720x480 rectangular pixels, that can be processed as a rectangular 4:3 signal. Sometimes referred as “full screen 16:9 SD”

HDV™: Consumer format that allows the recording of 1440x1080 pixels images and 2 audio tracks, compressed at 25Mbps, long GOP, on DV tapes.

Lo/Ro: (Left only / Right only) Conventional stereo signal.

Lt/Rt: (Left total / Right total) Matrix encoded stereo signal in either Dolby® Surround or Dolby® Pro-Logic II™.

Dolby® Pro-Logic: Dolby® technology that combines four audio channels into a matrix encoded two-channel Lt/Rt signal, allowing multichannel audio to be delivered to homes through any stereo-only transmission. Any consumer system equipped with Dolby® Pro-Logic decoder can provide the four audio playback channels. At any time, the Lt/Rt signal can be listened to as a conventional stereo signal.

Dolby® Pro-Logic II™: Dolby® technology that combines five audio channels into a matrix encoded two-channel Lt/Rt signal.

Dolby E™: Dolby® coding system optimized for the distribution of multichannel audio through two-channel audio within professional production environments. Even after multiple encoding cycles, there's no significant degradation in audio quality.

Dolby Digital™: (AC3) Dolby® coding technology that can deliver 1- to 5.1 channels audio programs in a variety of configurations intended for distribution to the consumer through SD/HD digital television broadcast. Unlike **Dolby E™**, this technology is not suitable for multiple coding cycles.

M&E: Music and Effect mixes consists of all music and effect tracks, as well as vocal effects tracks. In fact sounds which cannot be identified as specific to a particular country are called M&E.

Delivery Media (Tapes)

JCC requires that any HD material be provided on **Sony™ HDCAM™** videotape.

Delivery of any program on a medium other than HDCAM shall have to be approved beforehand by JCC, shall be submitted two weeks before the planned delivery date, and shall be transferred to a suitable medium by JCC at the producer's expense.

Technical specifications

HD Video signal

Manufacturing norm

4 :2 :2 HD 1080/50i standard in 16/9 format
--

The HD video signal should comply with the following standards and recommendations:

- **SMPTE 274M : HD 1920x1080 signal parameters**
- **ITU-R BT.709 : HD video encoding parameters**

The video signal matches the 1080/50i characteristics of these standards, whatever the format of the original video signal. 1080/25p and 1080/25PsF are forbidden.

N.B. : in no way does this exclude production and post-production in the above formats.

The camera type and reference in all cases shall be sent by email for approval to the Broadcast & Technical Services division before starting any productions for JCC at commissioning@jcctv.net. JCC then will notify with the optimal recommended video recording format and camera settings.

Vertical elimination

The following table specifies the vertical positioning of the active lines in the video signal depending on the image format. A tolerance of +/- 2 lines is permitted:

Image format	16/9 video only		
	start line	end line	number of lines
1,33	21	560	540
1,37	21	560	540
1,66	21	560	540
1,77	21	560	540
1.85	32*	550*	519*
2.35	87*	495*	408*

* This value may be altered further to specific re-framing requests validated by JCC.

Horizontally, the SAV must therefore be immediately followed by useful content. A difference of 0.1 µs between the SAV and the start of the useful content is tolerated. In any given program, this difference – if there is one – should be constant throughout the program.

Metrological specifications

The table below lists the tolerance permitted by Broadcasters for electrical levels in HD video components.

The following measurements should be taken in both colorimetric areas (R, G, B and Y, Pr, Pb)

Colorimetric area	RVB	YPrPb for luminance
Electric level	700 mV	700 mV
Top level	+3%	+3%
Lower level	-1%	-1%
Spatial tolerance	1% As long as 1% of the pixels in the active image is not higher than these levels	1% As long as 1% of the pixels in the active image is not higher than these levels

The use of different digital video compression ratios is necessarily shown on the label and on the technical identification form, specifying the compression type and the bit rate.

SUBJECTIVE IMAGE QUALITY

- The image must have a correct appearance with the video player's settings on "PRESET"
- For recent films, the images derived from a TV film must be free of scratches, dust, gelatine splashes, defects in the colorimetric correction trigger
- For older films, particular attention must be paid to dealing with defects in film and TV film copies
- As a general rule, the image must never have an excessive sound level, shiny defects, compression artefacts or faults due to the over-use of a noise-reduction process etc.
- The darkest scenes in the program must - in all cases - be viewable in an acceptable quality *when they are screened on a "general public" television. Black areas must not be stuck or squashed and details must remain visible in dark areas.*
- *Credits at the end of the program must be legible on video*

Because HDTV is by nature and by definition an electronic medium of superior quality to conventional or standard definition television (SDTV), JCCTV considers that Subjective quality requirements must be accordingly and significantly more stringent.

The image quality of HD programs provided on tape shall be evaluated according to the five point scale suggested in the International Telecommunication Union ITU-R BT-500 standard, Section 4.1.5.1:

Rating Impairments Quality

5	Imperceptible Excellent
4	Perceptible but not annoying Good
3	Slightly annoying Fair
2	Annoying Poor
1	Very annoying Bad

Programs should meet the criteria for a 5 rating. Exceptionally, on program portions including, for example, archival material, the minimum acceptable quality shall be a 3 rating.

Safe Action and Title Areas

JCCTV-Qatar recommends, in accordance with SMPTE recommended practice RP 218-2002, that:

- The main action is framed inside a central zone of height 90% and width 90% of the Full HD picture;
- All titles are framed inside a central zone of height 80% by width 80% of the full HD picture.

Use of SD Material

Use of native SD visual sequences, for example, insertion of archival material. The producer shall inform JCCTV of, among other things, the total anticipated length of up-converted SD video material to be inserted into the HD program, and clearly justify its use. Any use of SD sequences in an HD program shall be approved beforehand by JCCTV.

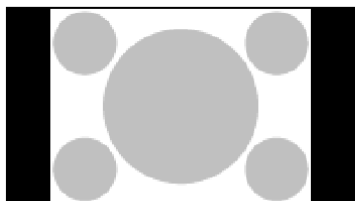
4:3 SD Material

When the use of 4:3 SD materials is essential and has been approved by JCCTV, two basic modes of aspect ratio conversion may be used: pillar-box and top-bottom crop. When the sidebar mode is

used, care must be taken to remove EIA608 closed captioning signals from lines 21 and 284 of the SD frames before conversion. In all cases of SD to HD up-conversion:

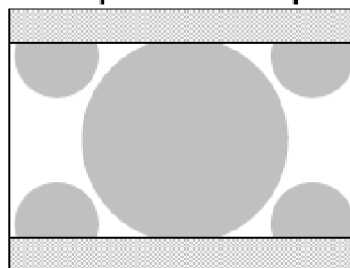
- No alteration of horizontal versus vertical proportions (geometric distortion) shall be tolerated. Conversion by horizontal stretching is therefore prohibited.
- Care must be taken to ensure that the main elements of the original 4:3 composition (e.g., principal action, graphic) are preserved.

Pillarbox display



Dark areas are inside the displayed 16:9 frame

Top-bottom crop



Hatched areas indicate portions of the original 4:3 image not displayed on the 16:9 screen.

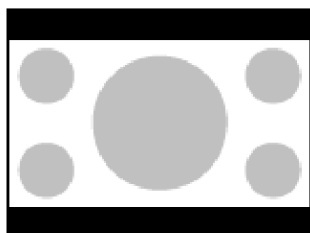
16:9 SD Material

When the use of 16:9 SD materials is essential and has been authorized by JCCTV, the aspect ratio conversion should be such that the 16:9 SD image be enlarged to fill the 16:9 HD frame. No alteration of horizontal versus vertical proportions (geometric distortion) shall be tolerated.

When both anamorphic and letterboxed 16:9 SD materials are available, JCCTV recommends using the anamorphic material as the source for up-conversion in preference to Letterbox.

Two 16:9 SD video formats are commonly encountered: letterboxed and anamorphic.

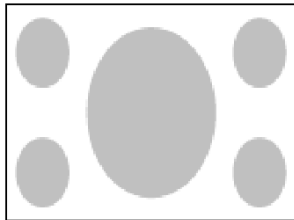
- Letterboxed 16:9 SD consists of a 16x9 picture contained entirely within a 4:3 frame filled at top and bottom with bars, usually black



Letterboxed 16:9 SD

Black bars are added on the top and bottom of the 16x9 frame.

- Anamorphic 16:9 SD designates a standard definition component digital video format of 720x480 rectangular pixels, shot with 16:9 cameras and to be displayed on 16:9 capable monitors, but designed to be carried on a regular 270Mbps SDI feed and recordable on most standard definition VCRs. It is sometimes referred to as "full screen 16:9 SD." When erroneously viewed on 4:3 monitors, images appear compressed horizontally.



Anamorphic 16:9 SD
erroneously viewed on a 4:3 monitor.

For SD presentation, anamorphic 16:9 SD requires conversion to letterboxed 16:9 SD. When up-converting to HD, anamorphic requires vertical and horizontal “rescaling.” However, the vertical rescaling is smaller than for the letterbox: the 1080 HD lines are Generated from the 480 lines of the original image, yielding a better vertical resolution than with letterbox, hence our preference for it.

Use of HDV™ and Consumer Formats

Use of visual sequences originated on HDV™ is usually not accepted within HD programs unless particular circumstances warrant its use; for example, shooting in confined spaces or in high-risk conditions (e.g., war zone, stunt work). Any use of HDV™ technologies shall be declared by the producer prior to the signing of the contract with JCC and shall be accepted only in cases of absolute necessity.

AUDIO TECHNICAL SPECIFICATIONS

The following paragraphs describe the required specifications for each of the audio components.

AIMS

The pre-requisites used for drafting this document with regard to the constraints and aims of sound broadcast on television are as follows:

- Respecting the work, in particular concerning artistic choices
- Guaranteeing comfortable listening for viewers by means of perfectly intelligible sound in the various configurations (all multi-channel types including 5.1, down-mix, stereo, mono)
- Guaranteeing continuity of perception of sound in the sequence of different programs
- Optimizing the use of metadata inherent to Dolby Digital and Dolby Digital Plus codecs.

GENERAL CONSIDERATIONS

Any work done to make mixed sound tracks comply with the clauses of this recommendation must be carried out under the authority of JCC or by a service provider appointed or empowered by them. The work done must be considered satisfactory by everyone involved (producer, post-producer, editors).

The use of solutions that include the dynamic compression of the signal must not result in constant energy levels without any “aeration” of the sound signal over time.

UNITS

LUFs means Loudness Unit on the Full Scale. A LUFs value is the expression of a weighted measurement, K (Leq(R2LB)) on a Full Scale.

The LUFs scale is graduated in steps of 1 dB. Applying an increase of 1 dB to the measured signal results in an increase of + 1 dB in the reading on the LUFs scale.

CONDITIONS FOR LISTENING AND MIXING

These sound tracks must be mixed in an auditorium where the technical equipment and dimensions are suitable for television sound (close-up listening). For example, large cinema-type auditoria are not suitable for this kind of mixing and they are therefore not advised.

The definition of the sound level for the “validation” of sound levels in RFB programs in a quality check room can be found in the clauses of recommendations EBU-Tech 3276 and 3276 s1.

The mixer may adjust the sound level (SPL acoustic pressure level) validated with reference pink noise (EBU Technical Recommendation R68) depending on the proposed hall and sound system, in the region of 79 dB (C) per channel (not including LFE).

CONDITIONS FOR MEASURING SOUND AND LISTENING

Types of speakers and their position

Audio mixing, mastering, encoding and quality control devices must be fitted with speakers that comply with standard IEC 60268-5.

The position of the speakers must comply with standard ITU-R BS.775

Calibration for listening

Sound devices must be calibrated according to the rules laid down in recommendation EBU Tech 3276 S1.

Sound level

Programs will be checked on sound systems whose line-up level - for pink noise broadcast at -18dBFS - is 74 dB (C) SPL on every channel except the LFE channel, which is broadcasted at 78 dB (C) SPL.

This level is considered to be the one at which the overall dynamic range and the intelligibility of speech and timbre are deemed to comply with television broadcast levels.

Measuring levels

Peak levels: Levels are checked using a virtually instantaneous “peak meter, the “True Peak”.

Current recommendation:

- SMPTE 299M : “24-Bit Digital Audio Format for SMPTE 292 M Bit-Serial Interfaces”.
- AES : Definition of the True Peak and the Sample Peak (see ITU BS 1770-2)

Loudness

Metering method

The metering method we use consists of measuring the whole of the useful program using a device that implements the algorithm described in recommendation R 128 published by EBU, as well as its appendices 3341, 3342, 3343 and 3344, producing a value given in dB LUFS.

Current recommendations

- ITU-R-BS.1770-1 and 1770-2 : Algorithms for measuring a program’s sound energy levels and “true peak” audio levels,
- EBU R 128 : Loudness normalization and permitted maximum level of audio signals,

- EBU Tech Doc 3341 : “Loudness Metering: EBU Mode” metering to supplement loudness normalization in accordance with EBU R 128,
- EBU Tech Doc 3342 : “Loudness Range: a descriptor to supplement loudness normalization in accordance with EBU R 128”
- EBU Tech Doc 3343 : “Practical Guidelines for Production and Implementation in accordance with EBU R 128
- EBU Tech Doc 3344 : “Practical Guidelines for Distribution Systems in accordance with EBU R 128”,
- ITU-R: BS 775 : Positioning of loudspeakers for 5.1 listening.

CHARACTERISTICS OF SIGNALS

It is understood that instantaneous measurements taken of signals must never exceed the maximum level permitted of OdBTP (no clips permitted).

Line-up level

The line-up level reading on a Full Scale digital peak meter is -18dB FS for a sinusoidal signal at a frequency of 1000Hz.

A 1000 Hz line-up signal at -18 dBFS should display a loudness level of -18 LUFS on a metering device in EBU mode, if the signal is present on the left and right channels of a stereo or 5.1 program.

If the signal is present on one channel only, the displayed level will be -21 LUFS.

As a reminder, in analogue sound : the line-up level reading on PPM quasi-peak 10 ms DIN 45406 is -9 dB and the line-up level reading is 0 Vu on a Vu meter.

Maximum peak level in programs (PCM or Dolby E)

Mixing : The peak level for audio signals measured using True Peak, must not exceed -3 dB TP.

Dynamics

Loudness target value over the whole program

Whatever type of mixing is used, the loudness target value for the whole program is as follows:

For programs longer than 2'00 (2 minutes):

- 23 LUFS with a tolerance of ± 1 LU
--

For programs shorter than 2'00 (2 minutes):

- 23 LUFS (silent programs permitted)

Dynamics Profile

Loudness excursions are permitted, measured as defined in chapter below, as follows:

For programs longer than 2'00 (2 minutes):

For dialogues:

± 7 LU around the loudness target value, metered in the short term mode,

To make this measurement easier to meter, we may use a metering device that presents a graph history of the short-term loudness

Since the integration time of the short-term measurement is three seconds, the metering of the first three seconds of a dialogue period is not significant and should therefore be ignored.

LRA Loudness Range

The LRA value must be less or equal to 20 LU (see EBU Tech 3342)

N.B. We advise that it is good practice for the LRA value to be at least 5 LU to ensure aeration of the program.

For programs shorter than 2'00 (2 minutes):

For the whole program:

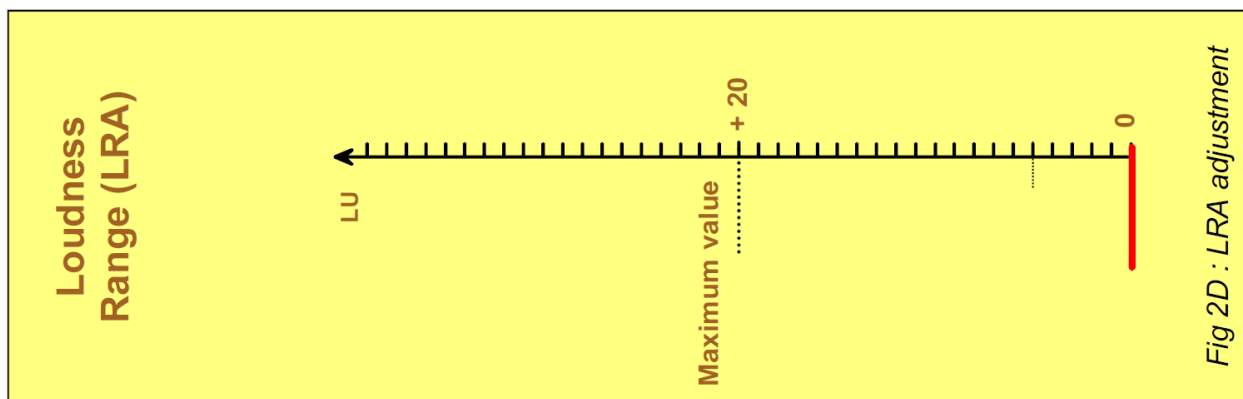
+ 3 LU max. metered in the short term mode, above the loudness target value

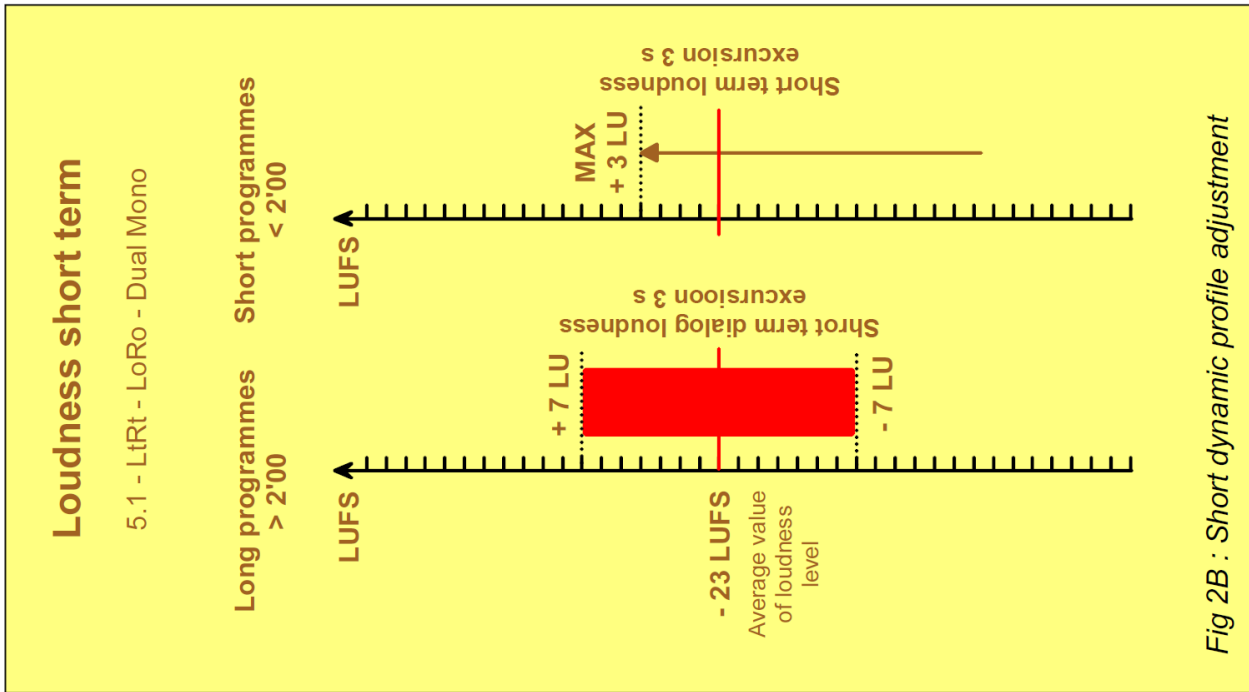
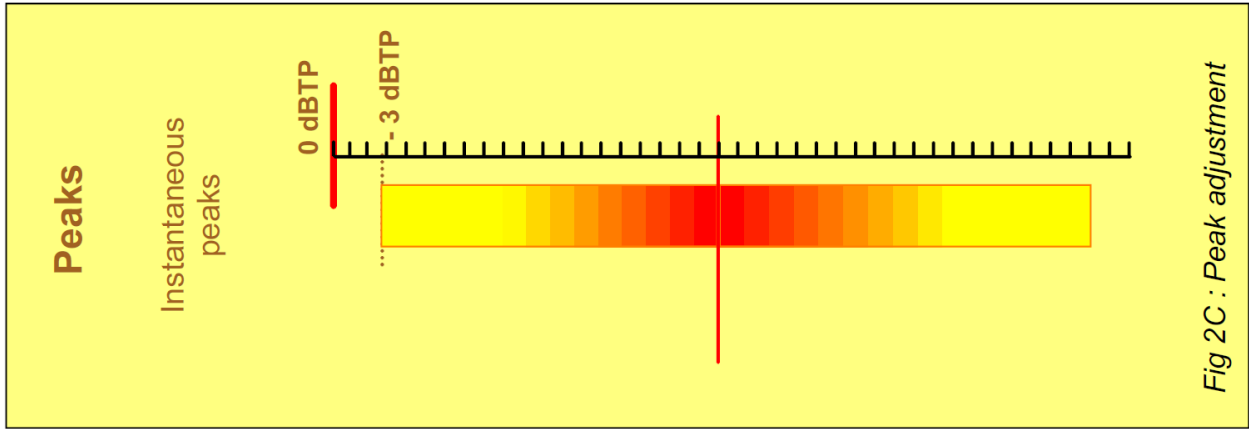
Method for metering the dynamics (“short term loudness”)

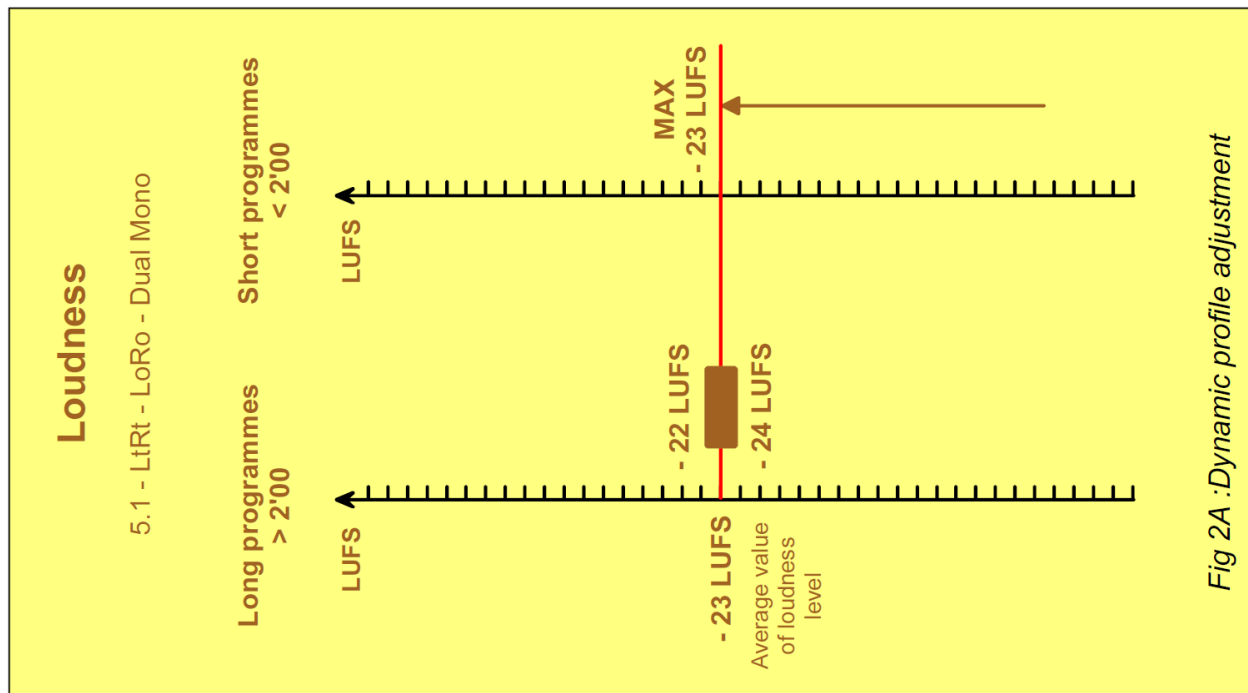
The dynamic range of a program is measured using tools that permit the energy level to be displayed over a “sliding” window of 3 seconds (in LUFS, weighting ITU-R BS 1770-2).

With regard to metering dialogues, an objective measurement will be taken in case if the quality check operator notices a lack of dialogue intelligibility during the control screening of the program. Random measurements will be taken on elements of the dialogue in question.

Synthetic Table







Audio/video synchronization

Video and audio signals are synchronous with the following tolerance:

- Either a maximum lead of sound compared to image of 20ms
- Or a maximum delay of sound compared to image of 40ms.

By default, tracks encoded using Dolby E must be recorded synchronously with video (In-sync).

This will result in a delay of 1 (one) audio image compared to the video, further to decoding using Dolby E without compensating the video delay.

Digital Audio Format

Audio tracks must be delivered in the following digital format:

- Sampling frequency: 48kHz
- Linear quantification: minimum 16 bytes for PCM format; minimum 20 bytes compulsory for Dolby E format
- Dolby E signals must be exempt of CRC errors (Cyclic Redundancy Code)

SUBJECTIVE QUALITY

The soundtrack must be naturally balanced and adjusted according to the current rules of the trade. When one listens in quiet environment on a sound system that has a flat frequency range, one should hear no artifacts: de-synchronization clicks from clocks, whistles in speech, whines or wheezes in low frequencies (buzz).

Format conversions using speed variations (24/25 fps) generally require harmonization in order to remain within the original musical tone. Harmonization procedures on 5.1 signals are at the limits of current technology and in some cases they are terribly destructive.

Harmonization is therefore a very delicate operation that must be authorized or advised-against by the mixer, or possibly performed by the mixer himself/herself.

TECHNICAL INDICATIONS FOR MIXING AND ENCODING

Each delivery of a mixed soundtrack must be accompanied by a standardized “**Mixing information sheet**” as appended hereto as appendix 1.

Each RFB medium containing Dolby E tracks must be accompanied by a standardized “**Dolby E encoding sheet**” as appended hereto as appendix 2.

Parallel to this and at the request of the Broadcaster, these documents may be communicated electronically. Incomplete documentation may constitute grounds for refusal.

SPECIFICITIES OF PCM FORMAT

Mono

In monophonic broadcasts, the signal recorded using PCM is delivered on two contiguous audio tracks without digital bit rate compression.

In order for this to be compatible with stereo signals, the two tracks containing the monophonic signal are strictly identical and in time.

Lo/Ro and Lt/Rt Stereo

Assignment of tracks

In stereophonic broadcasts, the signal recorded using PCM is delivered on two contiguous audio tracks without digital bit rate compression.

The odd track is the left channel and the even track is the right channel.

Audio phase

This is the average result between the left and right channel of an intensity and phase stereo.

To ensure the mono downmix is compatible, the phase must be mostly positive.

Specificities for Lt/Rt Surround stereo signals

“Surround reductions (LCRS) → Lt/Rt stereo” must maintain spatial coherence of the sound image and must not alter the intelligibility or the timbre of the sound message.

Products derived from Lt/Rt Surround must in no event be decoded using LCRS to supply Dolby E channels in a 5.1 configuration. Moreover, they must not undergo decoding and Lt/Rt re-matrixing generation.

SPECIFICATIES FOR DOLBY-E FORMAT

Synchronization of Dolby-E and video frames

The relative position of the start of the Dolby E frame and video must comply with the recommendations set out in the table below.

Video format	Start of Dolby E frame	Tolerance
<i>HD</i>	line 20	± 3 lines

Gauging the relative position of the Dolby E and video frames may be carried out in the following manner:

- Measuring it using a specific device on the audio output of a VTR synchronized to the same reference as the measurement device.
- Measuring it using a specific device capable of detecting the position of the header of the Dolby E frame within an SDI train.

Channels mapping

Non 5.1 HD program

The producer shall inform JCCTV of, among other things, the use of non-5.1 audio tracks, and clearly justify its use. Any use of non-5.1 audio tracks in an HD program shall be approved beforehand by JCCTV.

As the EBU Technical Recommendation R48-2005 Audio Tracks to be allocated as Single stereophonic program content.

A single stereophonic sound accompanies the video content of program. In such a case, the stereophonic program content represents the complete program sound mix, accompanied by the so-called "international sound" or M&E - the complete stereophonic mix of music, effects, etc..., without the speech which can be added in the dubbing process in order to obtain a complete stereophonic program sound mix in a language different from the original one.

The programs are supplied with one international version language for broadcasting; ensure that tracks are assigned as follows:

Track 1 – Complete Mix left (Original or Arabic Version).
Track 2 – Complete Mix right (Original or Arabic Version).
Track 3 – International Sound left. M&E left.
Track 4 – International Sound right. M&E right

Stereo Channels and M&E are mandatory

5.1 HD program

Dolby E coding takes into account 4 or 8 audio tracks depending on the following conditions :

- Program available only with monophonic or stereophonic sound : Dolby-E coding is carried out in 2/0 configuration where the PCM version's monophonic sound is duplicated identically respectively on tracks 1 and 2 of the Dolby-E, and the PCM version's stereophonic sound is duplicated identically track for track on tracks 1 and 2 of the Dolby-E.

JCC reserve the right to use and define specifications regarding the content of tracks 7 and 8 of the Dolby.

- Program available on 5 or 6 audio tracks mixed respectively in 5.0 or 5.1 format : Dolby-E coding is carried out in a 3/2 configuration depending on the assignment of tracks in recommendation UER-R91-1998

Original AES pair	Dolby E track	Content
AES1 (tracks 1 et 2)	Track 1	Left track
	Track 2	Right track
AES2 (tracks 3 et 4)	Track 3	Centre track
	Track 4	Subwoofer track
AES3 (tracks 5 et 6)	Track 5	Left rear track
	Track 6	Right rear track
AES4 (tracks 7 et 8)	Track 7	Optional track A (Content to be specified)
	Track 8	Optional track B (Content to be specified)

This necessarily requires the compulsory configuration of metadata as follows:

- Program Config = 5.1+2
- Channel Mode = 3/2 for program 1
- Channel Mode = 2/0 for program 2
- Please refer to paragraph below for the other parameters.

Compatibility of stereo reduction (downmix)

Any « 5.1 => stereo » reduction - once the increase of gain and Lt/Rt or Lo/Ro matrixing have been applied in the metadata (paragraph A.2.6.4) - must:

- Maintain the spatial coherence of the sound image
- Maintain the level and intelligibility of voices
- Maintain the balance between the various elements mixed
- Maintain the frequency balance of the mixing

The characteristics of the stereo signal phase derived from a downmix must fulfill the same requirements as a traditional stereo signal (Cf. Audio phase).

Dolby E Metadata

Typology of Multi-channel programs (Music and Others)

We can distinguish two main typological categories of Multi-channel programs (5.1 ou 5.0):

1. Musical programs liable to cause problems in the event of a stereo downmix.
2. All other programs that are not musical.

Setting the Dialnorm loudness value

- The measurement should be taken according to the method described in recommendation EBU R128 (§ A.2.2)
- The exact value measured must be entered into the metadata.
- In the case of short programs whose loudness value is below -23 LUFS (see § A.2.2), the actual value measured should be displayed.

Metadata corresponding to 5.1 / 5.0 / 2.0 programs

We can distinguish three different categories of Dolby-E metadata to be entered during the encoding process:

- 1. Fixed metadata which are solely dependent on the « Channel Mode » parameter (3/2 with active LFE for programs using 5.1, 3/2 without active LFE for programs using 5.0 and 2/0 for stereo programs)**
- 2. Default metadata that may be modified during encoding on the grounds of a justified request based on the mixing and encoding forms appended hereto.**
- 3. Metadata dependent solely on mixing which may be validated by metering.**

Any alterations to metadata set out in the table below constitute grounds for refusal to broadcast if they are not backed up by means of the “Dolby E mixing and encoding forms” and they remain subject to the JCC’s approval.

NB : The Extended BSI mode must necessarily be used for 5.1 et 5.0 programs. However, it must not be used for stereo formats.

Paramètres		Programme 5.1	Programme 5.0	Programme Stéréo (2.0)	Programme mono/dual	Signal de référence
	"Dialog level"	- 23 LUFS ± 1 (measure)	- 23 LUFS ± 1 (measure)	- 23 LUFS ± 1 (measure)	- 23 LUFS ± 1 (measure)	- 31 LUFS
	Program Name	Broadcaster choice**	Broadcaster choice **	Broadcaster choice **	Broadcaster choice **	Test_Check
Audio Processing	Channel Mode	3/2	3/2	2/0	2/0	3/2 ou 2/0
	LFE Channel	Enable	Disable	N/A	N/A	5.1: Enable 5.0: Disable 2.0: N/A
	DC Filter	Enable	Enable	Enable	Enable	Enable
	Low pass Filter	Enable	Enable	Enable	Enable	Enable
	LFE Low pass Filter	Enable	Disable	N/A	N/A	5.1: Enable 5.0: Disable 2.0: N/A
	Srnd Phase Shift*	Enable	Enable	N/A	N/A	3/2: Enable 2.0: N/A
	Srnd 3 dB Attenuation	Disable	Disable	N/A	N/A	3/2: Disable 2.0: N/A
Dynamic Range	Line Mode Pro	Film LIGHT	Film LIGHT	Film LIGHT	Film LIGHT	None
	RF Mode Pro	Film Standard	Film Standard	Film Standard	Film Standard	None
	RF Overmod Protect	Disable	Disable	Disable	Disable	Disable
Bitstream info	Bitstream Mode	Main Complete	Main Complete	Main Complete	Main Complete	Main Complete
	Center Downmix Level	0.707 (-3 dB)	0.707 (-3 dB)	0.707 (-3 dB)	0.707 (-3 dB)	0.707 (-3 dB)
	Srnd Downmix Level	0.707 (-3 dB)	0.707 (-3 dB)	0.707 (-3 dB)	0.707 (-3 dB)	0.707 (-3 dB)
	Dolby Srnd Mode	N/A	N/A	Dolby Surround enabled	Dolby Surround enabled	N/A
	Copyright bit	Yes	Yes	Yes	Yes	Yes
	Original Bitstream	Yes	Yes	Yes	Yes	Yes
	Audio Production Info	Disable	Disable	Disable	Disable	Disable
	Mix Level	N/A	N/A	N/A	N/A	N/A
	Room type	N/A	N/A	N/A	N/A	N/A
Extended BSI	Preferred Stereo Downmix*	Lt/Rt	Lt/Rt	N/A	N/A	3/2: Lt/Rt 2.0: N/AN/A
	Lt/Rt Center Downmix Level	0.707 (-3 dB)	0.707 (-3 dB)	N/A	N/A	N/A
	Lt/Rt Surround Downmix Level	0.707 (-3 dB)	0.707 (-3 dB)	N/A	N/A	N/A
	Lo/Ro Center Downmix Level	0.707 (-3 dB)	0.707 (-3 dB)	N/A	N/A	N/A
	Lo/Ro Surround Downmix Level	0.707 (-3 dB)	0.707 (-3 dB)	N/A	N/A	N/A
	Dolby Surround EX Mode	Not Surround EX	Not Surround EX	N/A	N/A	N/A
	A/D Converter Type	Standard	Standard	Standard	Standard	Standard

Surround Phase Shift and Preferred Downmix parameters are inter-dependent. Please refer to paragraph Dolby E Metadata for their parameters.

** The Program Name entered must not contain any characters with accents or spaces.

Figure 2: Table of Dolby-E metadata default parameters for 5.1, 5.0, 2.0, dual and mono formats

ABCDE	Fixed metadata dependent solely on the « Channel mode » parameter
ABCDE	Default metadata that may be modified if justified (cf. Notes)
ABCDE	Metadata dependent on the mixing

Method for modifying metadata

It is compulsory to complete a mixing form for each program as well as an encoding form for each Dolby-E track (cf. appendices); this allows the mixer to pass on the necessary information to justify the use of a value other than the default value.

Surround 3dB Attenuation: Configured by default in Disable mode. May be configured in Enable mode only if the mixing was performed in a cinema auditorium calibrated with rear channels attenuated.

Line Mode : Configured by default in Film Standard mode. May be configured in Film Light mode if the mixing dynamics are considered to be wellcontrolled. A musical program may be configured in Music Standard or in Music Light mode.

Center Downmix Level : This parameter cannot be entered manually. This value is automatically entered as an approximation of the value entered for the Lo/Ro Center Downmix Level.

Surround Downmix Level : This parameter cannot be entered manually. This value is automatically entered as an approximation of the value entered for the Lo/Ro Surround Downmix Level.

Lt/Rt Center Downmix Level : Configured by default at -3dB, May be modified to optimize the compatibility with stereo reduction.

Lt/Rt Surround Downmix Level : Configured by default at -3dB, May be modified to optimize the compatibility with stereo reduction.

Lo/Ro Center Downmix Level : Configured by default at -3dB, May be modified to optimize the compatibility with stereo reduction.

Lo/Ro Surround Downmix Level : Configured by default at -3dB, May be modified to optimize the compatibility with stereo reduction.

Dolby Surround EX Mode : Configured by default in Disable mode. It may be configured in Enable mode only if the original mixing was done in a 6.1 system using Dolby Surround EX matrixing.

Preferred Stereo Downmix: Configured by default in Lt/Rt mode. This may be adjusted to Lo/Ro mode only if the 5.1 program is a musical program (Cf. §0). The mode selected for this parameter entails a specific and compulsory manual configuration of the Surround Phase Shift parameter.

Surround Phase Shift : This parameter is dependent on the Preferred Stereo Downmix parameter. The following compulsory correspondence is established between these two parameters:

Preferred Stereo Downmix	entails Surround Phase Shift
Lt/Rt	Enable
Lo/Ro (Music only)	Disable

TIME CODE SPECIFICATIONS

GENERALITIES

The Time Code is an ATC (Ancillary Time Code) time code which must comply with SMPTE 291M specifications.

The tape must necessarily have continuous LTC and VITC time codes, increasing in value, without breaks, from the physical start of the tape to the end of the 30 seconds following the recorded program, not using 24 hours (00 :00 :00 :00).

LTC and VITC codes (1 and 2) must be identical and synchronous.

VITCs (1 and 2) must comply with SMPTE 12 revised 3 specifications, i.e. transmitted on VANC and positioned on lines 9 and 571.

The first useful image of the program will begin at LTC and VITC 10:00:00:00.

Unless the Broadcaster specifically requests this, multi-programs are not permitted.

SEQUENCE: NO CROSSOVERS

In the case of a program requiring two cassettes or more, the time code associated with the useful pictures must be continuous. If N is the time code of the last picture on one tape, the time code of the first picture of the following tape must be N+1 picture. In the case of three tapes or more, the same rules apply.

USER BITS:

Unless the Broadcaster specifically requests otherwise, User Bits have the value "00.00.00.00" for the duration of the tape, including the technical trailer.

ORGANISATION OF THE CONTENT

The following diagram gives a graphic illustration of the organisation expected of the tape in terms of audio, video & timecode. It breaks down as follows:

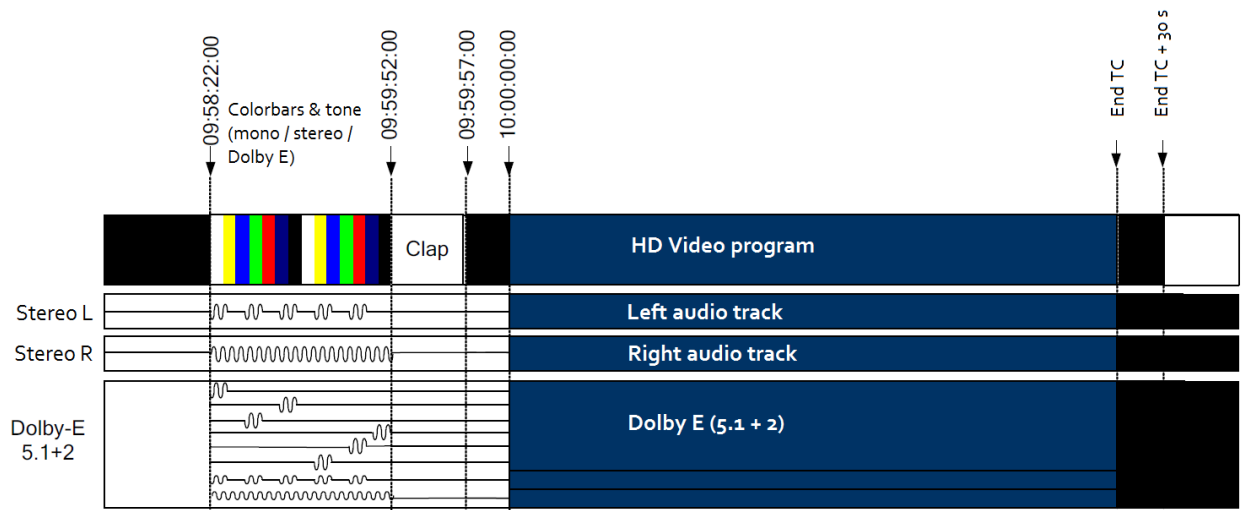


Figure 3 : Organisation of the content

VIDEO

From 09:58:22:00 (inclusive) to 09:59:51:24 (inclusive)

When the program is recorded – and using the same video source (same VCR) - a recording of one minute and thirty seconds (1'30") of a bar chart with chroma and luminance set to: 100/0/75/0.

From 09:59:52:00 (inclusive) to 09:59:56:24 (inclusive)

Clap : five seconds coded black (5'') with text identification elements:

- Program title and sub-title, episode or part number
- Tape number (1/2, 2/2, ...)
- Duration of the program (HH : MM : SS : II)
- Identification number appertaining to the Broadcaster, EM n°
- Tape format, HD or SD
- Description of audio track formats with assignment of audio and language tracks for each track.
- Original shooting format (1,33 ; 1,66 ; 1,77 ; 1,85, 2,35, or other – please specify)
- Re-framing format further to the Broadcaster's specific request
- Broadcast format (16/9)
- HD Format: 1080/50i
- Presence of sub-titles + language
- Presence of neutral backgrounds

From 09 :59 :57 :00 (inclusive) to 09 :59 :59 :24 (inclusive)

Black lasting three seconds (3"), coded and silent.

From 10 :00 :00 :00 (inclusive) to TC at end of program

Start of usable program.

From end of program TC to end of program TC + 30 seconds

Thirty seconds (30") of black, coded and silent.

From end of usable program TC + 30 seconds

Neutral background (video elements allowing the manufacture of French credits) back to back

N.B. : Particular attention should be paid to the following elements:

- End of program credits must remain strictly legible on video.
- The duration of advertising blacks in foreign programs must not exceed one second (≤ 1 second)

AUDIO

From 09 :58 :22 :00 (inclusive) to 09 :59 :51 :24 (inclusive)

Monophonic tracks: Odd and even tracks, continuous frequency of 1000 Hz at line-up level. The tone of both tracks must be coherent (same source) and in time.

Stereophonic and multi-channel versions : Multi-channel and stereo identification and line-up audio signals must comply with recommendation EBU Tech 3304 « Multichannel Audio line-up Tone », May 2009.

Multi-channel versions: Multi-channel and stereo identification and line-up audio signals must comply with paragraph 4.2 "EBU multi-channel ident signal) from recommendation EBU Tech 3304 'Multi-channel Audio line-up tone", May 2009. This clause implies the use of the "blits" sequence available on the EBU website.

The commonly used coding system metadata (Dolby E) throughout the test signals must be adjusted to the following settings:

- Dialog Level = -31
- Line Mode = None
- RF Mode = None
- Surround 3dB attenuation = disable

From 09:59:52:00 (inclusive) to 09:59:59:24 (inclusive)

- PCM Format: Silence lasting 8 seconds (8").

- Dolby E Format: Silence lasting 8 seconds (8'') Dolby E encoded with the metadata of the useful program.

From 10 :00 :00 :00 (inclusive)

Start of useful program

From end of program TC

From end of useful program Time Code and for a duration of thirty seconds (30''): silent, coded black.

SPECIAL CASE OF MULTI TAPES

In case of programs delivered on several tapes, the organization of the content of the additional tapes is similar to the organization of the first tape, with the exception of the time code.

As specified before, for a Time Code of X-1 corresponding to the Time Code of the last useful image of the preceding tape, the Time Code on the first useful image of the additional tape is X.

The Time Codes on the various components of additional tapes therefore correspond to the following diagram:

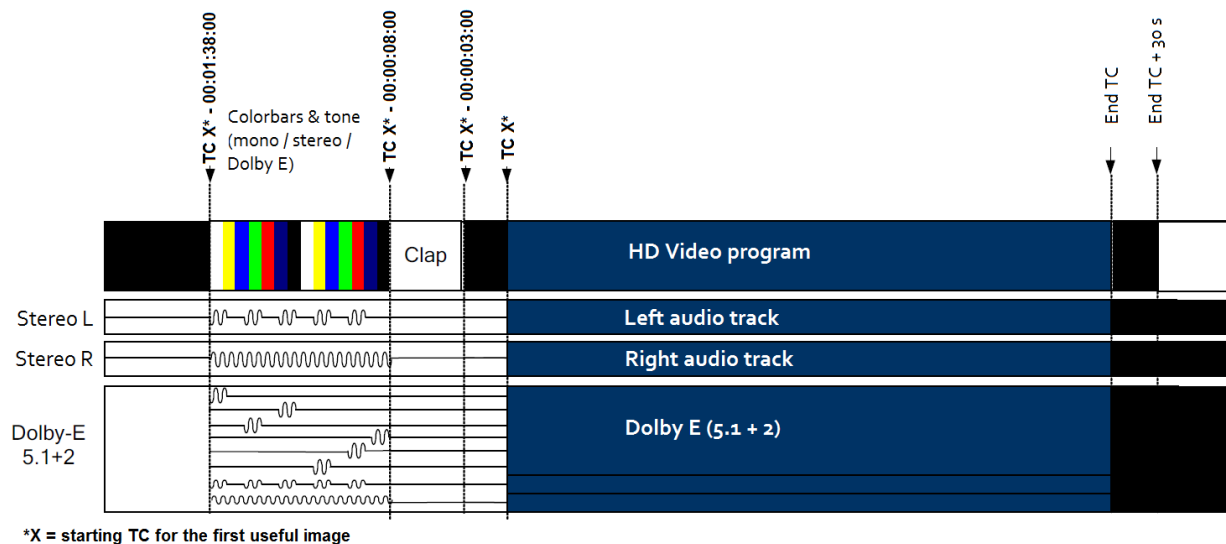


Figure 4: Content organisation for additional tapes

SUBTITLES

No subtitles

VERIFICATION

Prior to delivery to JCC, tapes are verified in the following broadcasting standards:

For images:

- The verification of HD program is carried out in HD-SDI

For sound:

- Tracks should be listened to in stereo and multi-channel (Dolby Surround, Dolby-E).
- It is compulsory to validate the compatibility of the Downmix 5.1 to Stereo or to Mono - in multi-channel programs – in Film Standard RF mode, with at least one random verification for long programs and in full for short programs.
- The values of Dolby metadata should be verified.

GLOSSARY OF ACRONYMS

- CST** : Association of Technicians from the fields of sound and image in cinema and television.
- FICAM** : Federation des Industries du Cinéma, de l'Audiovisuel et du Multimédia
- HDFORUM** : Association comprising three sections of broadcasters, manufacturers and distributors, comprising 64 members as at today, whose aim is to promote the improvement of the quality of the television service.
- ITU** : International Telecommunication Union, in charge of recommendations and international planning of telecommunications
- EBU** : European Broadcast Union: union of radio-broadcasters (broadcasters, television channels)
- SMPTE** : Society of Motion Picture and Television Engineers: American association of cinema and television technicians
- IEC** : International Electrotechnical Commission
- AES** : Audio Engineering Society
- FHA** : Full Height Anamorphic: corresponding to an anamorphosed 16/9 format (compressed sideways) for screening on a 4/3 screen
- SAV** : Start Active Video
- EAV** : End Active Video
- LUFS** : Loudness Unit in relation to a Full Scale: this is the expression of a weighted measurement, K (or R2LB) on a Full Scale.
- K or R2LB** : This is a weighting curve derived from the weighting, B, integrating the modifications to this weighting in the perceptive treatment of low frequencies.
- PCM** : Pulse Code Modulation: referenced as the digital representation of an analogue signal without any flow reduction or compression algorithm.
- PPM** : Peak Program Meter
- CRC** : Cyclic Redundancy Code
- LTC** : Linear Time Code (biphase)
- VITC** : Vertical Internal Time Code: time code integrated into the video signal
- VANC** : Vertical Ancillary Data Space: digital information not integrated into the digital image

REFERENCES OF STANDARDS AND RECOMMENDATIONS USED IN THIS DOCUMENT:

Video :

- ITU-R BT.601 : SD video encoding parameters <http://www.itu.int>
- ITU-R BT.709 : HD video encoding parameters
- EBU-R103 2000 : Tolerance for illegal colours <http://www.ebu.ch>
- EBU-R92 1999 : 625/50 active image zone
- SMPTE 274M : 1920x1080 HD signal parameters <http://www.smppte.org>
- SMPTE 291M : Ancillary data
- SMPTE RP-12 revised 3 (replaces RP 188): ANC Time Code and Data

Audio :

- ITU-R BS.1770-2: Leq RLB audio measurement algorithms
- ITU-R BS.775 : Layout of 5.1 speakers
- UER-R91-1998 : Allocation of channels for 5.1 audio
- EBU-R128: Loudness normalization and permitted maximum level of audio signal
- EBU-Tech 3341, 3342, 3343, 3344
- EBU Tech 3304 : 5.1 audio test signals
- SMPTE 299M : 24-byte audio for HD TV
- IEC 60268-5 : Audio listening
- CST-RT 016-TV : Dialogue level measurement method

As per HDForum recommendation RT017 3.0 / 2011/09/13