TECHNICAL SPECIFICATIONS FOR TV CONTENT ACQUISITION AND DELIVERY FOR RADIO TELEVISYEN MALAYSIA (RTM)

This document includes the technical parameters for all High Definition (HD) and Standard Definition (SD) file programmes to be delivered to RTM. This specification is divided into two (2) parts as follows:

- **Part 1:** Picture and audio quality for QC technical requirements; and
- **Part 2:** Additional technical requirements for file programmes delivery;

Please be ensured to use the current version of this document in submission of TV content to RTM.

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1 September 2023

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Part 1: Picture and audio quality for QC technical requirements

PART 2: ADDITIONAL TECHNICAL REQUIREMENTS FOR FILE PROGRAMME DELIVERY

PART 1: PICTURE AND AUDIO QUALITY FOR QC TECHNICAL REQUIREMENTS

1.0   Video Technical Requirements

1.1   Video Specification

1.1.1. High Definition

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

NO	ITEM	SPECIFICATION
1.1.1.1	Format	XDCAM HD 422
1.1.1.2	Wrapper	MXF
1.1.1.3	Wrapper Profile	OP-1a
1.1.1.4	Picture Resolution	1920 x 1080 pixels
1.1.1.5	Aspect ratio	16:9
1.1.1.6	Bit Rate	50 Mbps
1.1.1.7	Frame Rate	25 frames per second (50 fields) interlaced (1080i/25)
1.1.1.8	Interlaced Field Order	Top field first
1.1.1.9	Chroma sampling	4:2:2
1.1.1.10	System Bit depth	10 bit
1.1.1.11	Reference Document	EBU TECH 3299 system 2 & ITU-R BT.709

1.1.2. Standard Definition (Exceptional Circumstances)

RTM as the broadcaster agrees for the supplier to supply the programmes in **Standard Definition** format and only applied to **legacy materials (original format in SD) such as Old Film and Drama Production only**.

Note: RTM is fully HD Transmission and all material should be supplied in HD format.

NO	ITEM	SPECIFICATION
1.1.2.1	Format	MPEG 2 Video (IMX-30)
1.1.2.2	Wrapper	MXF
1.1.2.3	Wrapper Profile	OP-1a
1.1.2.4	Picture Resolution	720 x 576 pixels
1.1.2.5	Aspect ratio	4:3
1.1.2.6	Bit Rate	50 Mbps
1.1.2.7	Frame Rate	25 frames per second (50 fields) interlaced (576i/25)
1.1.2.8	Interlaced Field Order	Top field first
1.1.2.9	Chroma sampling	4:2:2
1.1.2.10	System Bit depth	8 bit
1.1.2.11	Reference Document	EBU TECH 3213 & ITU-R BT.601

1.2   Picture Aspect Ratio

1.2.1 Cinemascope ratio as letter box

All delivery HD products must be delivered in 16:9 aspect ratio except for movie (cinemascope aspect ratio). Movies and programmes with picture ratios of 21:9 should be centered vertically between black bars in a 16:9 frame without geometric distortion.

1.2.2 Floating Images

Images surrounded by black borders (floating images) may be used for artistic effect. However, widescreen consumer TV sets operating in Auto Zoom / Auto mode often interpret large black borders at the top and bottom of the screen as letterbox, so are likely to enlarge the picture. Thus, unpredictable zooming can be annoying for the viewer and undermine the artistic intent. If used, the black space around floating images must be consistent across sequences of images. As a result, company should avoid of Letterbox and enlarge the images to fulfill 16:9 screen requirement.

1.3 Use of Lower Resolution Images and Video

1.3.1 Lower resolution image and Video (SD format)

To maintain a 1.1.1. High Definition (HD) and meet audience expectations, RTM allows lower resolution image (etc: JPEG, PNG) and video (SD) as part of the content material which must be surrounded by background image to retain 16:9 aspect ratio. The amount of material of a lower resolution than the commissioned format is limited to 25**%** of the programme's total duration.
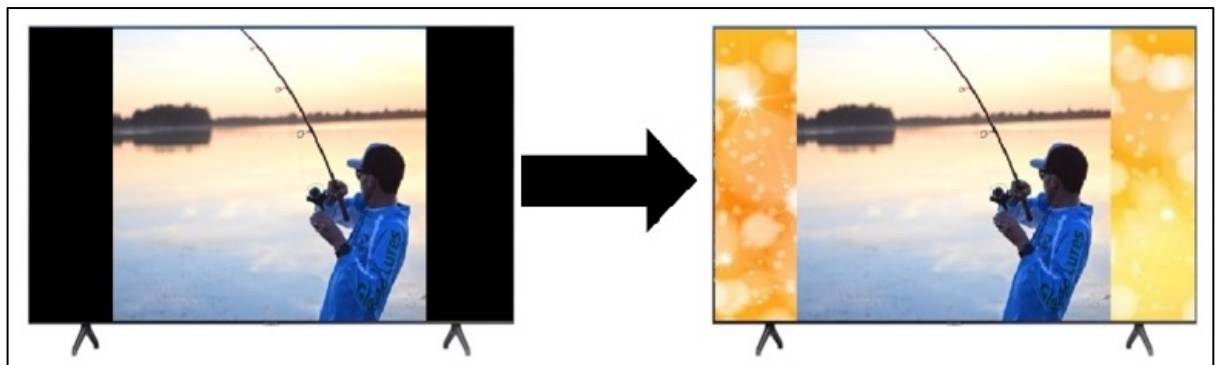
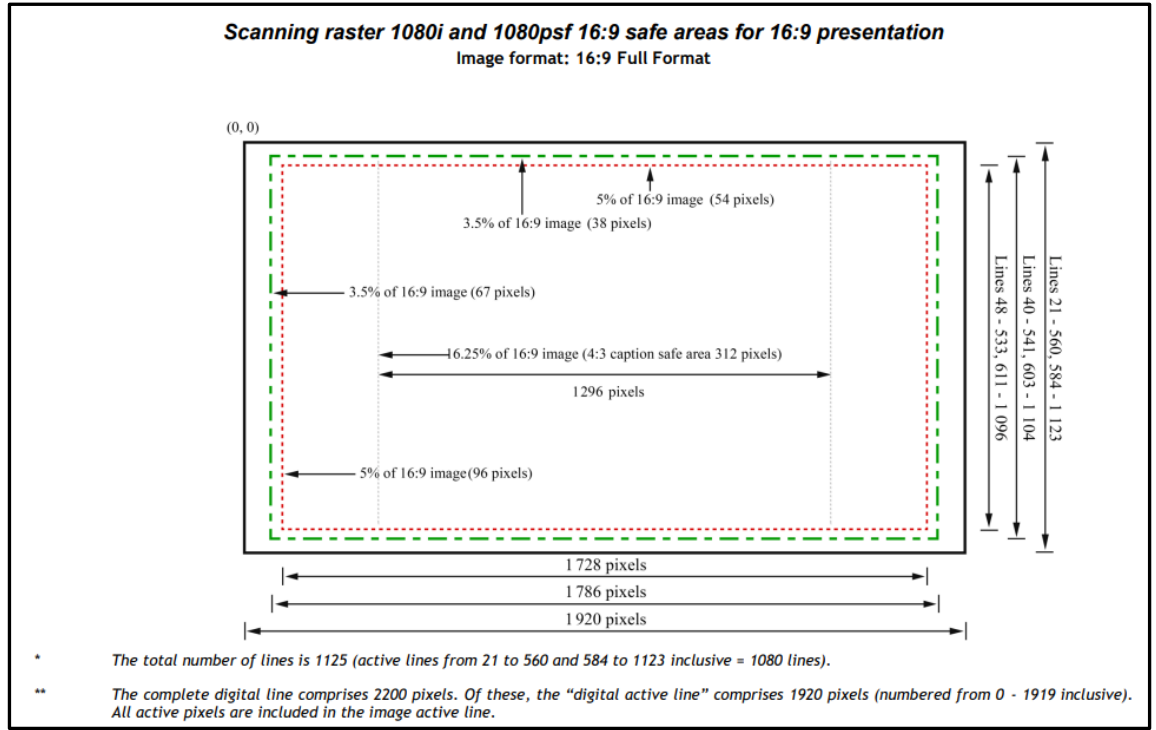Background image to retain 16:9 Aspect Ratio

1.4 Safe Areas for On-Screen Text/ Burnt in subtitle

1.4.1 Burnt in/ Open Caption

Burnt in/ Open Caption is display permanently on a video. All on screen text must be clear and legible and must be within the safe areas specified. These only apply to those material where required subtitles as requested by RTM.

1.4.2 Text Size

i) Minimum SD font height is 20 SD lines (15 pt font and above)

ii) Minimum HD font height is 40 HD lines (30 pt font and above)

Scanning raster 1080i and 1080psf 16:9 safe areas for 16:9 presentation
Image format: 16:9 Full Format

(0, 0)

5% of 16:9 image (54 pixels)

3.5% of 16:9 image (38 pixels)

3.5% of 16:9 image (67 pixels)

16.25% of 16:9 image (4:3 caption safe area 312 pixels)

1296 pixels

5% of 16:9 image (96 pixels)

Lines 21 - 560, 584 - 1 123
Lines 40 - 541, 603 - 1 104
Lines 48 - 533, 611 - 1 096

1 728 pixels

1 786 pixels

1 920 pixels

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

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

**EBU R 095 Safe Areas for 16:9 Television Production. Version 1.1 (Geneva June 2017)

2.0 Audio Technical Requirements

2.1 Audio specifications

Delivered content must conform to audio guidelines and loudness management as per **EBU R.128** Recommendations. Producers are encouraged to review the **EBU R.128** for detailed information on creating, measuring and distributing audio for digital television **http://tech.ebu.ch/loudness**

2.1.1 Materials (except for Documentary, Travelog and Sports) shall be acquired, post-produced and delivered as follows:

NO	ITEM	SPECIFICATION
2.1.1.1	Format	Pulse Code Modulator (PCM)
2.1.1.2	Bit depth	24 bits
2.1.1.3	Sampling	48KHz
2.1.1.4	Sound programme	Stereo
2.1.1.5	Audio Track Allocations	Track 1 – Full Mix L Track 2 – Full Mix R **Track 3 – Music and Effect L **Track 4 – Music and Effect R
2.1.1.6	True Peak	-1 dBTP (True Peak) Recommended not exceed -3 dBTP
2.1.1.7	Average Loudness Level	-23 LUFS ±0.5 LU (±1 LU for live programmes)
2.1.1.8	Stereo Line-Up Tones	1kHz at 0dB/-18 dBFS

*** Optional for Syndicated Program, Concert, Entertainment and Talk show**

2.1.2 Materials for **Documentary and Travelog** shall be acquired, post-produced and delivered as follows:

NO	ITEM	SPECIFICATION
2.1.2.1	Format	Pulse Code Modulator (PCM)
2.1.2.2	Bit depth	24 bits
2.1.2.3	Sampling	48KHz
2.1.2.4	Sound programme	Stereo
2.1.2.5	Audio Track Allocations	Track 1 – Full Mix L Track 2 – Full Mix R

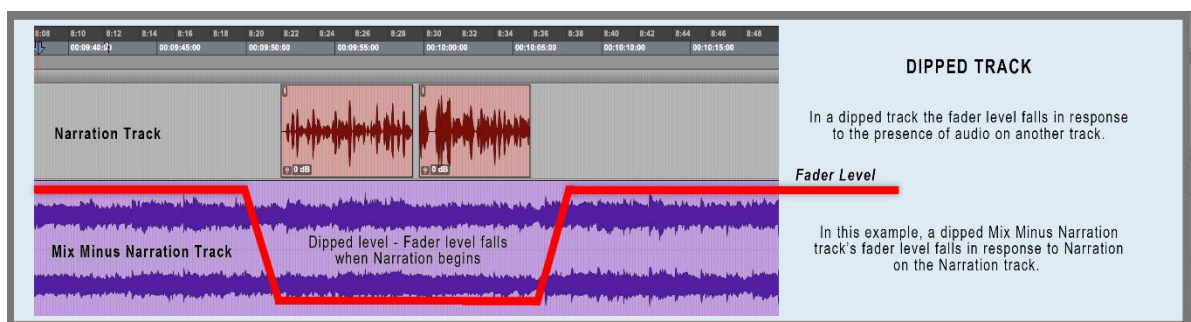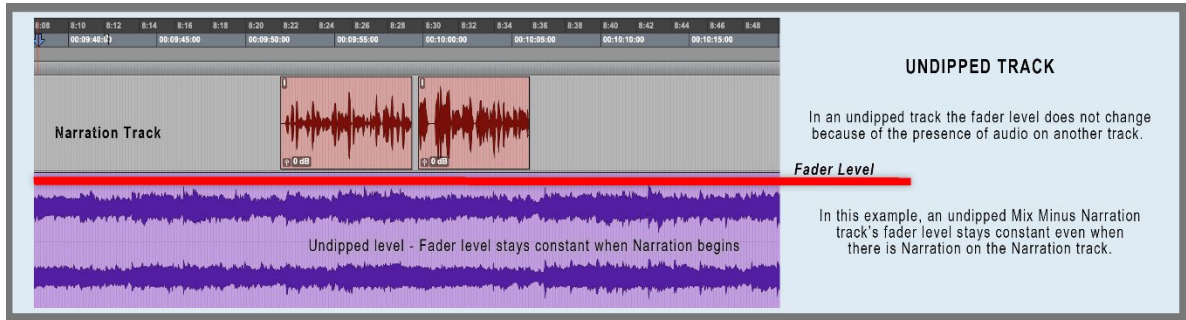| NO	ITEM	SPECIFICATION
		Track 3 – Mix minus Narration, *Undipped L Track 4 – Mix minus Narration, *Undipped R
2.1.2.6	True Peak	-1 dBTP (True Peak) Recommended not exceed -3 dBTP
2.1.2.7	Average Loudness Level	-23 LUFS ±0.5 LU (±1 LU for live programmes)
2.1.2.8	Stereo Line-Up Tones	1kHz at 0dB/-18 dBFS

Remark

Audio Dips

All audio stems and submixes must be "undipped." The term "undipped" to describe audio tracks that do not change level in response to the other elements that make up the program's mix. This is often referred to as "pre-fader level."

Undipped Mix Minus Narration submixes do not change level in response to the program narration. They continue at the same level as if no narration was present. Undipped Music and Effects stems do not change level in response to program narration or to program dialogue. They continue at the same level as if neither narration nor dialogue were present. Figure below illustrates this concept.

Dipped Track

Undipped Track

2.1.3   Materials for **Sports** shall be acquired, post-produced and delivered as follows:

NO	ITEM	SPECIFICATION
2.1.3.1	Format	Pulse Code Modulator (PCM)
2.1.3.2	Bit depth	24 bits
2.1.3.3	Sampling	48KHz
2.1.3.4	Sound programme	Stereo
2.1.3.5	Audio Track Allocations	Track 1 – Full Mix L Track 2 – Full Mix R Track 3 – International Sound L Track 4 – International Sound R
2.1.3.6	True Peak	-1 dBTP (True Peak) Recommended not exceed -3 dBTP
2.1.3.7	Average Loudness Level	-23 LUFS ±0.5 LU (±1 LU for live programmes)
2.1.3.8	Stereo Line-Up Tones	1kHz at 0dB/-18 dBFS

2.2   Dialogue

It is a producer's responsibility to ensure that dialogue is clear, easy to hear and understand by a first-time viewer who is using consumer equipment.

2.3   Stereo Audio Requirements

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

2.3.2   If mono originated sound is used which only apply for **old Movies/ Classics/**

Talk Show / Archive Material Only, it must be recorded as dual mono, so that it may be handled exactly as stereo. It must meet all the stereo standards regarding levels, balance and phase.

2.4   Stereo Line-Up Tones

2.4.1 Each stereo audio pair must have either EBU stereo where tone must be 1kHz, sinusoidal, free of distortion and phase coherent between channels

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

2.5   Stereo Phase

2.5.1 Stereo programmes audio must be capable of down-mixing to mono without causing any noticeable phase cancellation

3.0   General Quality

3.1   Quality Control

All programmes are expected to reach a high standard of video and audio quality. This does not mean low quality material/resolution cannot be used but with proper way. Archive and low quality material used as context is acceptable with condition mention above.

3.2   Video Quality

All programmes are expected to reach a high standard of video quality as follow:

3.2.1   If there were any requirement of video effect, the introduction of special visual effects must not introduce unintentional changes to luminance or chrominance, nor perceptible timing shifts, or lip sync errors.

3.2.2   Color rendition, especially skin tones be natural unless artistic considerations require otherwise.

3.2.3   Picture Black Level shall be correct, free of noticeable crushing, compression

or clipped dark area.

3.2.4　Low lit scenes shall have sufficient contrast and APL (average picture level), to appear acceptable under normal viewing conditions.

3.2.5　Picture white area where detail is required, shall appear normal and free of noticeable highlight compression (flattening)

3.2.6　Transient response shall be crisp and clean, free of noticeable horizontal or vertical pre-shoot, ringing, overshoot, smear, echoes (ghosts), hum, moiré and cross-talk and afterglow effects.

3.2.7　Programme material shall be free of head-switching, digital blocking, dirt, aliasing, dropouts, artefacts due to equipment faults etc. This applies to the whole active picture area.

3.2.8　The picture must be stable and continuous and free from noticeable horizontal or vertical aliasing.

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

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

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

3.2.12　No noticeable spurious signals or artefacts e.g. streaking, ringing, smear, echoes, overshoots, moiré, hum, cross-talk etc.

3.3　Audio Quality

All Audio are expected to reach a high standard of audio quality as follow:

3.3.1　All Material must have delivered in **Stereo Audio Production**.

3.3.2　Sound must be recorded with appropriately placed microphones, with minimum

background noise and without peak distortion.

3.3.3   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.

3.3.4   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.

3.3.5   Stereo audio must be appropriately balanced and free from out of phase which cause audible cancellation.

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

PART 2: ADDITIONAL TECHNICAL REQUIREMENTS FOR FILE PROGRAMME DELIVERY

1.0 Programme Format

1.1 Programme Layout for File Delivery

All programme delivered on file must be laid out with elements in the following pattern relative to timecode:

TIMECODE	PICTURE	AUDIO 1	AUDIO 2
00:00:00:00	75% of EBU standard colour bars	1kHz at 0dB/-18 dBFS	1 kHz at 0dB / -18 dBFS
00:01:30:00	Black	Silence	Silence
00:01:45:00	Slate	Silence	Silence
00:01:50:00	Countdown	Silence	Silence
00:02:00:00	Start Programme	Left 0dB / -18dBFS	Right 0dB / -18dBFS

1.2 Slate Information

All programmes delivered on file must be follow arrangement of Slate information as below:

```
Program Title:
Episode:
Production:
Director:
TC In:
TC Out:
Duration:
Year:
**Loudness Applied: Yes / No
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**Choose Yes if applied Loudness, No if not applied.

1.3　File Naming

All programmes delivered to RTM must be named with the Programme ID as below:

Programme File Name
Programme Name_Ep01_2019_HD.mxf

1.4　Programmes Parting

There must be only one program in each file but can be multiple files/ media according to Hard Disk size. If more than one Part for a programme is required, the company must comply with the following: -

1.4.1　The Part used must be the same and use the same format for Video and Audio.

1.4.2　The first Part for example **Part 1** must start with timecode 00.02.00.00 and end with a cut point corresponding to the second Part. The programme can end with a fade to black or a change of scene.

1.4.3　For **Part 2** must start with timecode 02.00.00.00 with timecode 02.02.00.00 on the first frame of the programme.

1.4.4　All information on the timecode between the Part 1 and Part 2 must be label in detail as XDCAM Disc Label and Details Information below.

2.0　Material Delivery

2.1　Video Material Delivery

All programmes delivered to RTM must follow Video material delivery as below:

2.1.1　Material shall be delivered in **External Solid State Drive (SSD)** complete with USB3.0 cable, power supply cable and accessories required.

2.1.2　The **external SSD** must be free of virus and unnecessary data.

2.1.3　New XDCam Dics (Professional Disc) must be provided by company to RTM for archive purpose. Below are the guidelines:

Disc Capacity	23GB	50GB	50GB (2 pieces)	FORMAT
HD	30 Minutes	1 Hour 30 Minutes	More than 1 Hour 30 Minutes *PART 1 : 1 Hour 15 Minutes PART 2: 1 Hour 15 Minutes*	XDCAM HD 422 (1080i)

2.2   XDCAM Disc Label and Details Information.

All programmes delivered to RTM must follow XDCAM Dics Label and Details information as below:

Program Title	Deli Ankara _Duka_Ep03_2019_HD
Episode Number	Ep03
Format	HD
Category	News
Producer	Tengku Idris Din
Year	2019
Duration	00:00:27:00
The Company	Malayan Dilemma Swati Sdn Bhd

2.3   Solid State Drive Label and Details Information.

All programmes delivered to RTM must be in external SSD, Label and Details Information are as below:

KAPASITI DISK		1TB	FORMAT
HD		45 jam	XDCAM 422

NO HARD DISK : Skop Production – Gerak Khas

BIL	TAJUK RANCANGAN	EPISOD	FORMAT	PENERBIT	DURASI
1	GerakKhas_Along_Ep05_2015_HD	5	HD	Shafiq	00:50:00:00
2	GerakKhas_Along_Ep06_2015_HD	6	HD	Shafiq	00:48:00:00
3	GerakKhas_Along_Ep07_2015_HD	7	HD	Shafiq	00:45:00:00
4	GerakKhas_Along_Ep08_2015_HD	8	HD	Shafiq	00:40:00:00

3.0   Rejection

3.1   Quality Control Failed

All programmes delivered to RTM need to go through our Technical team of Quality Control, and procedure action will take as below:

3.1.1   Failing which, material is deemed to be unacceptable, shall be returned with an accompanying Quality Control reject report.

3.1.2   Material which have failed or been rejected, shall NOT be aired according to RTM Policies. Therefore, content providers are required to resubmit with the recommended corrections before materials can be aired on RTM.

3.1.3   RTM reserved the right to reject ANY material without giving any reason to the programme providers.

4.0   Others

4.1   Lembaga Penapisan Filem (LPF)

4.1.1 Programme supplier shall also understand that ALL RTM contents shall also undergo Censorship in accordance to the Laws of Malaysia.

4.1.2 Therefore, material may be rejected due to non-conformance to the Laws of Malaysia, regardless of picture quality and other technical requirements which have   been met by suppliers.