



## Specifications for program purchase (SD and HD)

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## Introduction and summary

RTS is broadcasting in HD since the 29th of February 2012 and shall be ready to ingest material by file transfer from May 2012. We shall use the VICO ingest system from SRG-SSR for this purpose.

The file format expected is **MXF OP1a** as described in the following specifications:

- SMPTE 377M : Material Exchange Format MXF
- SMPTE 378M : Material Exchange Format MXF Operational Pattern 1A
- SMPTE 379M : MXF Generic Container
- SMPTE 381M : Mapping MPEG Streams into the MXF Generic Container
- SMPTE 12M-2 (2008) : MXF Time Code implementation

Precisions on MXF specifications :

- MXF OP1a frame wrapping
- header and footer : closed and completed

**HD video codec is XDCamHD, 422 MPEG 2@ ML, HP/Long GOP, 50 Mb/s.**

Before May 2012 program material shall be provided on support (tapes or Prodisc) as described below :

HD	IMAGE FORMATS	VIDEO FORMAT	SUPPORTS
X	1080 i	HDCam /SMPTE 367/368	Cassette : HDcam
X	1080 i	XDcamHD 422 (50 Mb/s)	Disque : Prodisc XDcamHD *
X	1080 i	HDCam SR	Cassette : HDcamSR **

\* For program size longer than 90 minutes, please use 2 Prodiscs (please not compress).

\*\* HDCAM SR is accepted only as exception, on special request and under RTS validation.

SD	IMAGE FORMATS	SUPPORTS
X	576 i	Digital Betacam

For security reasons and internal process we do not recommend hard disc.

## Notes

- The material shall be delivered according to the technical references described in this document.
- The material shall be delivered with the best possible quality, minimizing the number of encoding cycles. The encoding cycles during production shall be known and described.

We recommend, while it's possible, audio in discrete mode (not compressed or coded in Dolby E).

RTS facilities do not accept more than 8 audio tracks at present time.

## Tape delivery HDCAM

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<b>TV System</b>	1080i50 (EBU 1080i/25)
<b>Format</b>	HDCAM The delivered tape must be a master tape ( <b>first generation</b> )
<b>Test Tape</b>	Video + Audio: Sony Alignment Tape HR5-1A
<b>Video Signal</b>	Max Luminance 100% FBAS Must be gamut legalized (ITU-R BT.709)
<b>Audio Signal</b>	Discrete Linear PCM (2.0) or Dolby E (5.0 or 5.1, see page 8) Audio Level according to <b>EBU R-128</b> Program Loudness: -23LUFS (+/- 1LU) The audio must be mixed for TV dynamic
<b>Time Code</b>	Time Code EBU/SMPTE, according to EBU Tech. 3097, recorded continuously from the beginning of the tape: longitudinal + VITC lines 19,21,332,334

Audio Track occupation for productions already treated:

	<b>Stereo</b>	<b>Multichannel <sup>(1)</sup> (Stereo PCM + 5.1 Dolby E coded)</b>
<b>Audio 1</b>	Cpl – Left	Cpl – Left
<b>Audio 2</b>	Cpl – Right	Cpl – Right
<b>Audio 3</b>	IT – Left	Cpl_5.1 Dolby E
<b>Audio 4</b>	IT – Right	

<sup>(1)</sup> Stereo (Cpl – Left, Cpl – Right) must be always present.

*Cpl*: complete audio in french

*IT*: international audio, original language or audio description

## Prodisc delivery XDCAM HD

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<b>TV System</b>	<b>1080i50 (EBU 1080i/25)</b>
<b>Format</b>	XDCAM HD (phase 3) <b>50 Mbps 4:2:2</b> The delivered disc must be a master ( <b>first generation</b> )
<b>Video Signal</b>	Max Luminance 100% FBAS Must be gamut legalized (ITU-R BT.709)

**Audio Signal** 8 ch / 24 bit  
 Discrete Linear PCM (2.0, 5.0 or 5.1) or  
 Dolby E (5.0 or 5.1, see page 8)  
 Audio Level according to **EBU R-128**  
 Program Loudness: -23LUFS (+/- 1LU)  
 The audio must be mixed for TV dynamic

**Time Code** Time Code EBU/SMPTE, according to EBU Tech. 3097, recorded continuously from the beginning of the recording.

Audio Track occupation for productions already treated:

	<b>Stereo</b>	<b>Multichannel <sup>(1)</sup> (Stereo PCM + 5.1 PCM)</b>	<b>Multichannel <sup>(1)</sup> (Stereo PCM + 5.1 Dolby E coded)</b>
<b>Audio 1</b>	Cpl – Left	Cpl – Left	Cpl – Left
<b>Audio 2</b>	Cpl – Right	Cpl – Right	Cpl – Right
<b>Audio 3</b>	IT – Left	Cpl_5.1 – L	Cpl_5.1 Dolby E
<b>Audio 4</b>	IT – Right	Cpl_5.1 – R	
<b>Audio 5</b>		Cpl_5.1 – C	IT – Left
<b>Audio 6</b>		Cpl_5.1 - LFE	IT – Right
<b>Audio 7</b>		Cpl_5.1 – Ls	IT_5.1 Dolby E
<b>Audio 8</b>		Cpl_5.1 – Rs	

<sup>(1)</sup> Stereo (Cpl – Left, Cpl – Right) must be always present.

*Cpl: complete audio in french*

*IT: international audio, original language or audio description*

## Tape delivery HDCAM SR

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**TV System** **1080i50 (EBU 1080i/25)**

**Format** HDCAM SR  
 The delivered tape must be a master tape (**first generation**)

**Test Tape** Video + Audio: Sony Alignment Tape HR5-1B

**Video Signal** Max Luminance 100% FBAS  
 Must be gamut legalized (ITU-R BT.709)

**Audio Signal** Discrete Linear PCM (2.0, 5.0 or 5.1) or  
 Dolby E (5.0 or 5.1, see page 8)  
 Audio Level according to **EBU R-128**  
 Program Loudness: -23LUFS (+/- 1LU)  
 The audio must be mixed for TV dynamic

**Time Code** Time Code EBU/SMPTE, according to EBU Tech. 3097, recorded continuously from the beginning of the tape: longitudinal + VITC lines 19,21,332,334

Audio Track occupation for productions already treated:

	<b>Stereo</b>	<b>Multichannel <sup>(1) (2)</sup> (Stereo PCM + 5.1 PCM)</b>	<b>Multichannel <sup>(1)</sup> (Stereo PCM + 5.1 Dolby E coded)</b>
<b>Audio 1</b>	Cpl – Left	Cpl – Left	Cpl – Left
<b>Audio 2</b>	Cpl – Right	Cpl – Right	Cpl – Right
<b>Audio 3</b>	IT – Left	Cpl_5.1 – L	Cpl_5.1 Dolby E
<b>Audio 4</b>	IT – Right	Cpl_5.1 – R	
<b>Audio 5</b>		Cpl_5.1 – C	IT – Left
<b>Audio 6</b>		Cpl_5.1 - LFE	IT – Right
<b>Audio 7</b>		Cpl_5.1 – Ls	IT_5.1 Dolby E
<b>Audio 8</b>		Cpl_5.1 – Rs	
<i>Audio 9</i>		<i>IT – Left</i>	
<i>Audio 10</i>		<i>IT – Right</i>	
<i>Audio 11</i>			
<i>Audio 12</i>			

<sup>(1)</sup> Stereo (Cpl – Left, Cpl – Right) must be always present.

<sup>(2)</sup> Multichannel audio with Stereo PCM + 5.1 PCM (discrete audio channels) is preferred

*Cpl*: complete audio in french

*IT*: international audio, original language or audio description

## Tape delivery DIGITAL BETACAM (SD)

<b>TV System</b>	625i50 according to ITU-R 624-3
<b>Format</b>	Digital Betacam
<b>Delivered Image</b>	16:9 Full Height (anamorphic)
<b>Tape</b>	Videocassette Size Small and Large Dropouts (> 10µs): max 30/min.
<b>Test Tape</b>	Video + Audio: Sony Alignment Tape ZR5-1P Tracking: Sony Alignment Tape ZR2-1P
<b>Video Signal</b>	Components signal according to EBU N10 level Max Luminance 100% FBAS Must be gamut legalized (ITU-R BT.601)
<b>Audio Signal</b>	Audio Level according to <b>EBU R-128</b> Program Loudness: -23LUFS (+/- 1LU) The audio must be mixed for TV dynamic
<b>Time Code</b>	Time Code EBU/SMPTE, according to EBU Tech. 3097, recorded continuously from the beginning of the tape: longitudinal + VITC lines 19,21,332,334

Audio Track occupation for productions already treated:

	<b>Mono</b>	<b>Stereo</b>
<b>Audio 1</b>	Cpl	Cpl – Left
<b>Audio 2</b>	IT	Cpl – Right
<b>Audio 3</b>	Cpl	IT – Left
<b>Audio 4</b>	IT	IT - Right

*Cpl: complete audio in french*

*IT: international audio, original language or audio description*

## File Delivery HD

**TV System** 1080i50 (EBU 1080i/25)

**Format** MXF OP1a

**Compressor** XDCAM HD 422 50Mbit/s

**Frame Size** 1920x1080

**Field Dominance** Upper

**Video Signal** Components signal according to EBU N10 level  
Max Luminance 100%  
Must be gamut legalized (ITU-R BT.709)

**Audio Signal** Audio Level according to **EBU R-128**  
Program Loudness: -23LUFS (+/- 1LU)  
The audio must be mixed for TV dynamic

**Audio Sample Rate** 48kHz

**Audio Bit Depth** 24bit

**Audio channels** 16

**Time Code** According to SMPTE 12M-2 (2008) : MXF Time Code implementation

Audio Track occupation for productions already treated:

	<b>Stereo</b>	<b>Multichannel<sup>(1)</sup> (Stereo PCM + 5.1 PCM)</b>	<b>Multichannel<sup>(1)</sup> (Stereo PCM + 5.1 Dolby E coded)</b>	(1) Stereo (Cpl – Left, Cpl – Right) must be always present.
<b>Audio 1</b>	Cpl – Left	Cpl – Left	Cpl – Left	<i>Cpl: complete audio in french</i>  <i>IT: international audio, original language or audio description</i>
<b>Audio 2</b>	Cpl – Right	Cpl – Right	Cpl – Right	
<b>Audio 3</b>	IT – Left	Cpl_5.1 – L	Cpl_5.1 Dolby E	
<b>Audio 4</b>	IT – Right	Cpl_5.1 – R		
<b>Audio 5</b>		Cpl_5.1 – C	IT – Left	
<b>Audio 6</b>		Cpl_5.1 – LFE	IT – Right	
<b>Audio 7</b>		Cpl_5.1 – Ls	IT_5.1 Dolby E	
<b>Audio 8</b>		Cpl_5.1 – Rs		

Audio 9		<i>IT – Left</i>		
Audio 10		<i>IT – Right</i>		
Audio 11		<i>IT_5.1 – L</i>		
Audio 12		<i>IT_5.1 – R</i>		
Audio 13		<i>IT_5.1 – C</i>		
Audio 14		<i>IT_5.1 – LFE</i>		
Audio 15		<i>IT_5.1 – Ls</i>		
Audio 16		<i>IT_5.1 – Rs</i>		

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## File Delivery SD

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<b>TV System</b>	625i50 according to ITU-R 624-3
<b>Format</b>	MXF OP1a
<b>Delivered Image</b>	16:9 Full Height (anamorphic)
<b>Compressor</b>	XDCAM IMX 50Mbit/s or
<b>Frame Size</b>	720x576
<b>Field Dominance</b>	Upper
<b>Video Signal</b>	Components signal according to EBU N10 level Max Luminance 100% Must be gamut legalized (ITU-R BT.601)
<b>Audio Signal</b>	Audio Level according to <b>EBU R-128</b> Program Loudness: -23LUFS (+/- 1LU) The audio must be mixed for TV dynamic
<b>Audio Sample Rate</b>	48kHz
<b>Audio Bit Depth</b>	16bit
<b>Audio channels</b>	8
<b>Time Code</b>	SMPTE 12M-2 (2008) : MXF Time Code implementation

Audio Track occupation for productions already treated:

	<b>Stereo</b>
<b>Audio 1</b>	Cpl – Left
<b>Audio 2</b>	Cpl – Right
<b>Audio 3</b>	IT – Left
<b>Audio 4</b>	IT – Right
<b>Audio 5</b>	
<b>Audio 6</b>	
<b>Audio 7</b>	
<b>Audio 8</b>	

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## **Alignment leader**

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Bases on standard EBU R49 1999

1.30 minutes length

TC 09:58:30:00 protection leader : empty

TC 09:58:40:00 alignment leader : color bars (100/75) with sound test 1KHz -18 dBFS on all audio tracks available

TC 09:59:10:00 identification leader: audio/video synchronisation test with **recognition** of all active audio tracks

TC 09:59:40:00 “claquette”, full screen with the following indications: title, serie, duration, producteur / production company / picture format

TC 09:59:50:00 count down, 2 last seconds of black without sound

**TC 10:00:00:00 beginning of the program**

## **Time Code in MXF**

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### **Type of Time Code**

RTS uses the LTC (Longitudinal Time Code) 25fps as reference Time Code.

### **TC Metadata integrity**

Time Code must be present in Material Package , Source Package and System Item.

All Time Code Starts must have the same value as “System Item” Time Code Start.

Duration of the file must be indicated (header and footer : closed and completed)