

Safe areas for 16:9 television production

Source: P/HDTP & P/AGTR

Status: Recommendation

Geneva
September 2008

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<i>EBU Committee</i>	<i>First Issued</i>	<i>Revised</i>	<i>Re-issued</i>
PMC	1999	2000, 2008	

Keywords: 16:9, widescreen Television, 14:9 protected, Frame Raster Edge, Graphics Safe Area, Action Safe Area, Image Centre.

Previous versions of this document had guidelines to safe areas that protected 16:9 originated programmes for 4:3 & 14:9 presentation and 4:3 originated programme for 14:9 presentation.

The present recommendation concerns safe areas that protect 16:9 originated programmes (16:9 full format) for 16:9 full screen presentations and in addition, pixel and line values are provided for SDTV and HDTV formats. Given that HD productions will inevitably also provide content to standard definition television services that are still feeding 4:3 consumer displays, this recommendation also includes guidance on safe areas for conversion to 14:9 for such circumstances. This recommendation is aimed at those involved in any stage of the programme-making process and at manufacturers of production equipment.

Two safe areas are needed; all essential action should be protected inside an **Action Safe Area**, and all graphics inside a **Graphics Safe Area**.

The EBU recommends that all makers of 16:9 television programmes should frame pictures to ensure that:

- all essential action takes place inside the Action Safe Area, and
- all graphics are framed in the Graphics Safe Area, and
- the centre of the image retains its position throughout all production processes unless there are creative reasons to deliberately do otherwise.

as defined in **Figure 1a to Figure 4b** in terms of pixel and line counts for 576-line (SDTV) and 720 & 1080-line (HDTV) formats and in each case as a percentage of relative picture height and width.

Notes to this Recommendation

1. The action and graphics areas are defined to protect the full 16:9 widescreen image. The horizontal graphics safe area is narrower to take account of the greater overscan on older receivers, which may affect widescreen pictures when viewed in letterbox presentation.
2. The definitions of the safe areas are given in numbers of lines for the vertical direction and number of pixels for the horizontal direction, which are now more definitive than the percentages used previously. However, percentages are also included because they are the basis on which comparisons may be made.
3. The line numbering of interlaced scanning rasters has been calculated on the basis that field 1 is paired with the field 2 line below it, and the line from field 1 which is just inside the percentage box is defined as the edge of the safe area concerned.

4. The pixel numbering has been calculated by using the same notation as in SMPTE 274M/296M and ITU-R BT.1120-7, in which the first sample of the active part of a digital line is counted as value "0". For HD services this is also the first sample of the active image.
5. The safe areas are defined by the first and last safe line in vertical direction and by the first and last safe pixel in the horizontal direction. In addition the total number of lines (vertical) and pixel (horizontal) which are within the safe areas are given.
6. The coordinates of the centre of an image are defined as
 - vertically, there will be an equal number of lines within the clean aperture above and below the centre point, and
 - horizontally, there will be an equal number of pixels within the clean aperture to the left and the right of the centre point.

Note: See EBU R92 "Active picture area and picture centring in analogue and digital 625/50 television systems" concerning peculiarities of the 576i/25 (625/50) scanning raster.

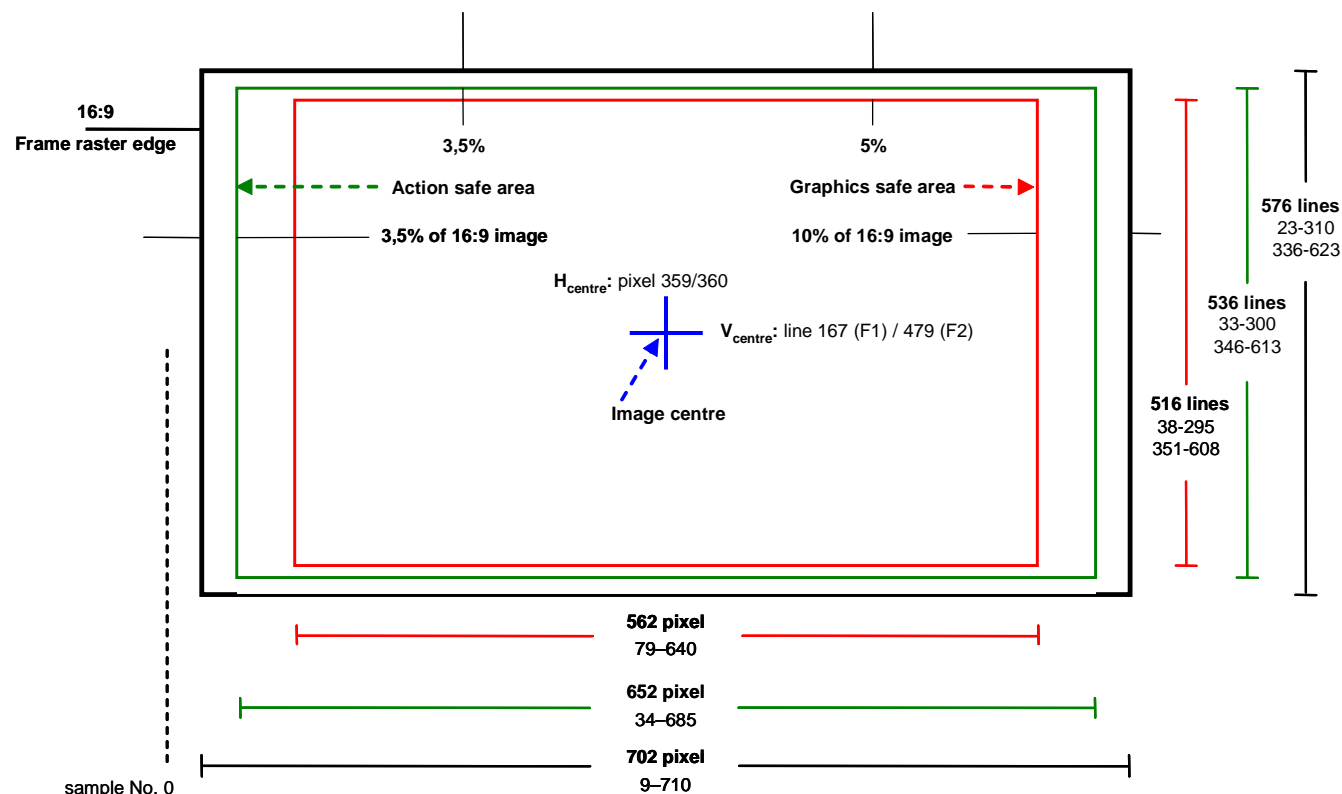
Safe areas for 16:9 television productions

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Scanning raster 576i/25: 16:9 safe areas for 16:9 presentation

Image format: 16:9 Full Format



Action safe area:	Graphics safe area:	Image centre:
Vertical F1*: from line 33 to 300	from line 38 to 295	Vertical* - Vcentre: between line 167 of field 1 and line 479 of field 2
Vertical F2*: from line 346 to 613	from line 351 to 608	Horizontal** - Vcentre: between pixel 359 and 360
Horizontal in the digital line**: from pixel 34 to 685	from pixel 79 to 640	

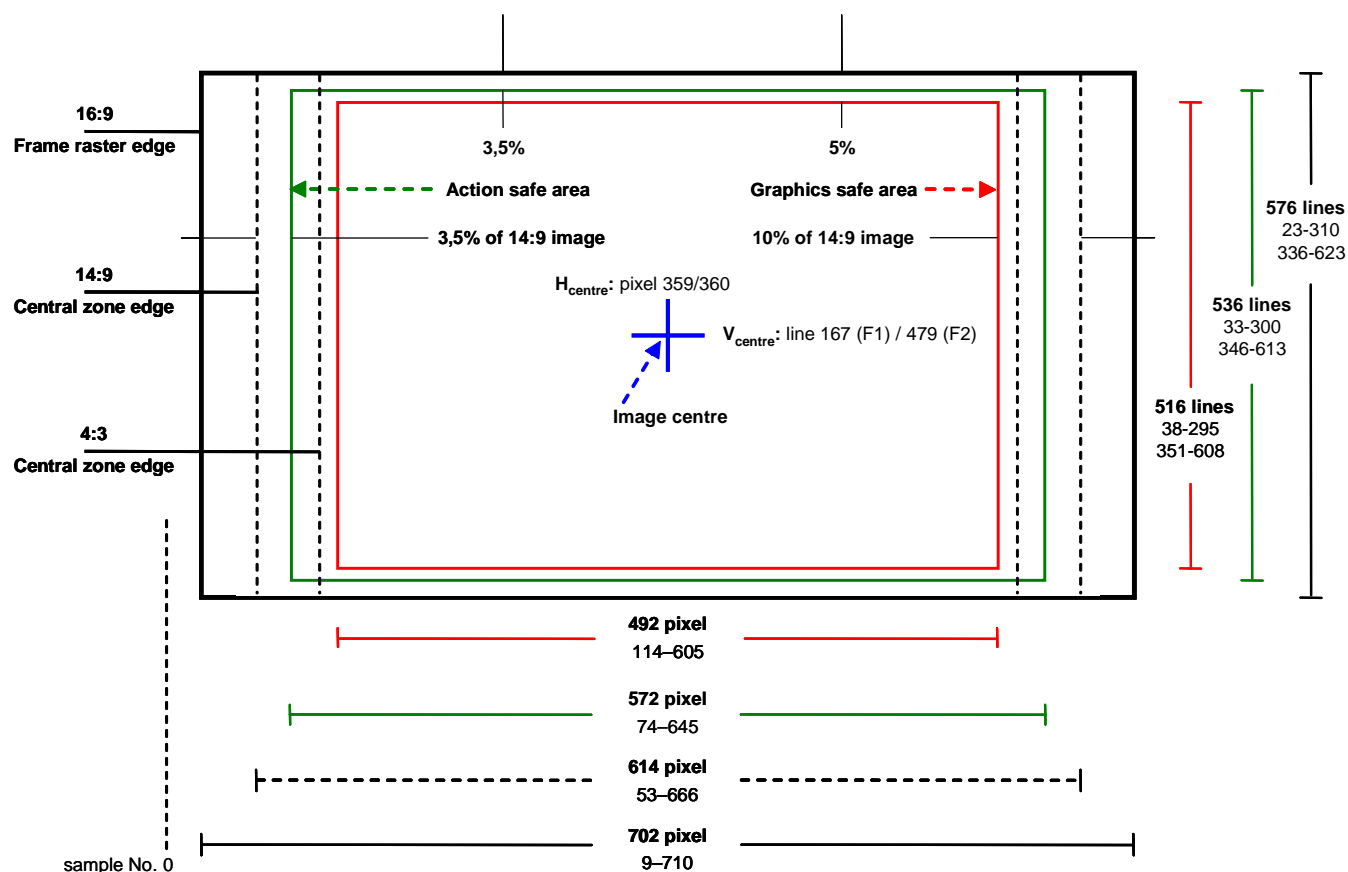
* The total number of lines is 625 (active lines from 23 to 310 and 336 to 623 inclusive = 576 lines).

** The complete digital line comprises 864 samples. Of these, the "digital active line" comprises 720 samples or pixels (numbered from 0 - 719 inclusive) of which the image active line comprises pixels 9 to 710 inclusive (see EBU R92 concerning peculiarities of the 576i/25 (625/50) scanning raster).

Figure 1a

Scanning raster 576i/25: 16:9 safe areas for 14:9 presentation

Image format: 16:9 Full Format (14:9 protected)



Action safe area:

Vertical F1*: from line 33 to 300

Vertical F2*: from line 346 to 613

Horizontal in the digital line**: from pixel 74 to 645

Graphics safe area:

from line 38 to 295

from line 351 to 608

from pixel 114 to 605

Image centre:

Vertical* - V_{centre} : between line 167 of field 1 and line 479 of field 2

Horizontal** - V_{centre} : between pixel 359 and 360

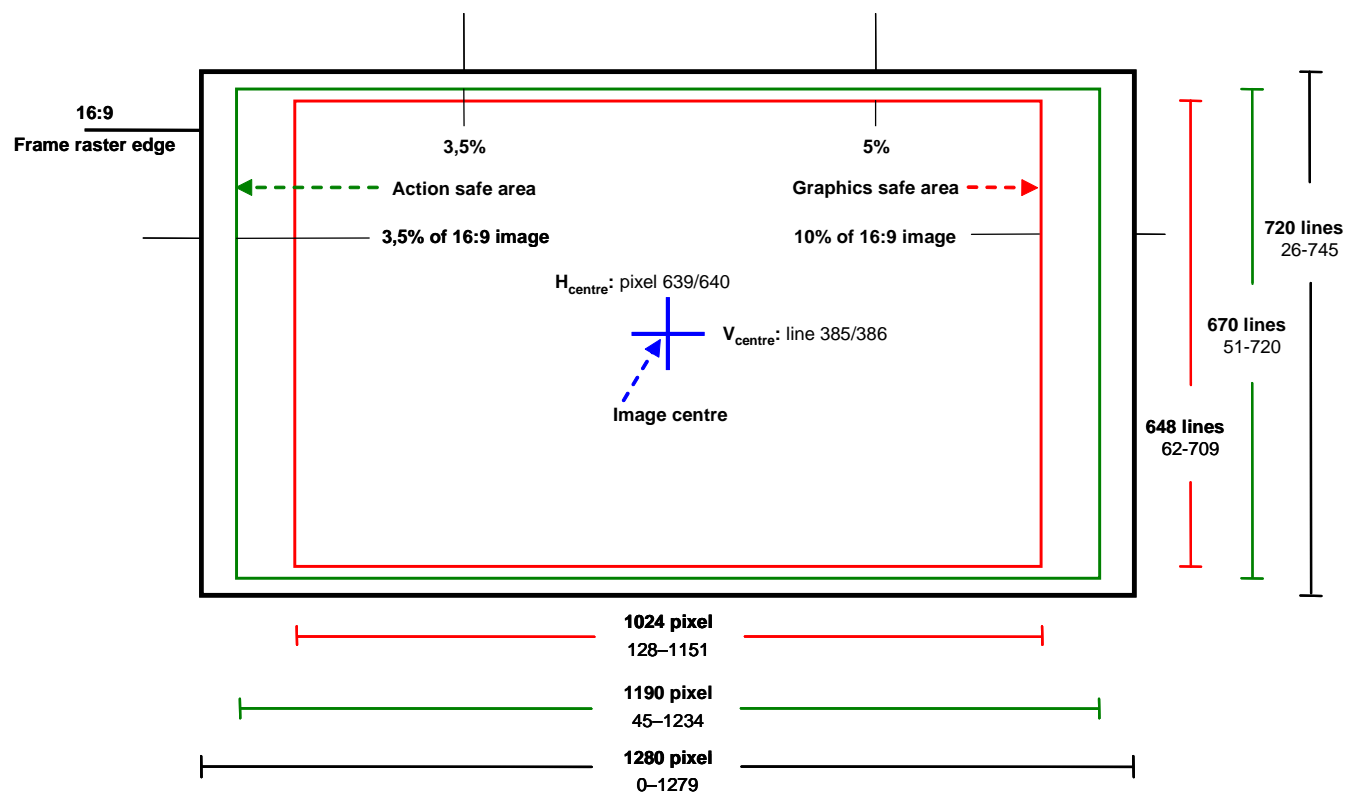
* The total number of lines is 625 (active lines from 23 to 310 and 336 to 623 inclusive = 576 lines).

** The complete digital line comprises 864 samples. Of this, the "digital active line" comprises 720 samples or pixels (numbered from 0 - 719 inclusive) of which the image active line comprises pixels 9 to 710 inclusive (see EBU R92 concerning peculiarities of the 576i/25 (625/50) scanning raster).

Figure 1b

Scanning raster 720p/50: 16:9 safe areas for 16:9 presentation

Image format: 16:9 Full Format



Action safe area:

Graphics safe area:

Image centre:

Vertical*: from line 51 to 720

from line 62 to 709

Vertical* - V_{centre}: between line 385 and line 386

Horizontal in the digital line**: from pixel 45 to 1234

from pixel 128 to 1151

Horizontal** - V_{centre}: between pixel 639 and 640

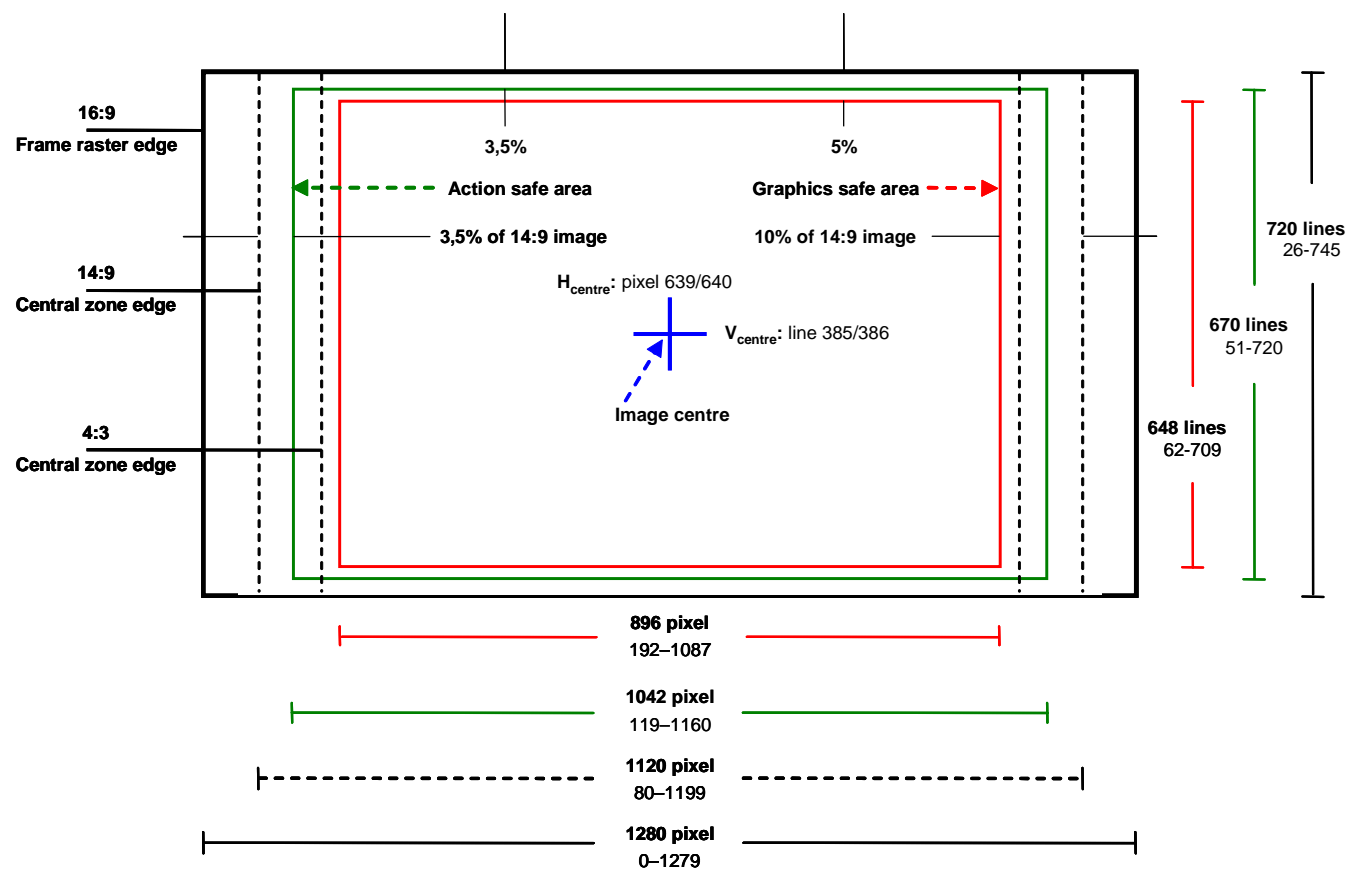
* The total number of lines is 750 (active lines from 26 to 745 inclusive = 720 lines).

** The complete digital line consists of 1650 pixels (active pixel from 0 - 1279 inclusive = 1280 pixel).
Of these all active pixels are included in the image active line.

Figure 2a

Scanning raster 720p/50: 16:9 safe areas for 14:9 presentation

Image format: 16:9 Full Format (14:9 protected)



Action safe area:		Graphics safe area:	Image centre:
Vertical*:	from line 51 to 720	from line 62 to 709	Vertical* - V _{centre} : between line 385 and line 386
Horizontal in the digital line**:	from pixel 119 to 1160	from pixel 192 to 1087	Horizontal** - V _{centre} : between pixel 639 and 640

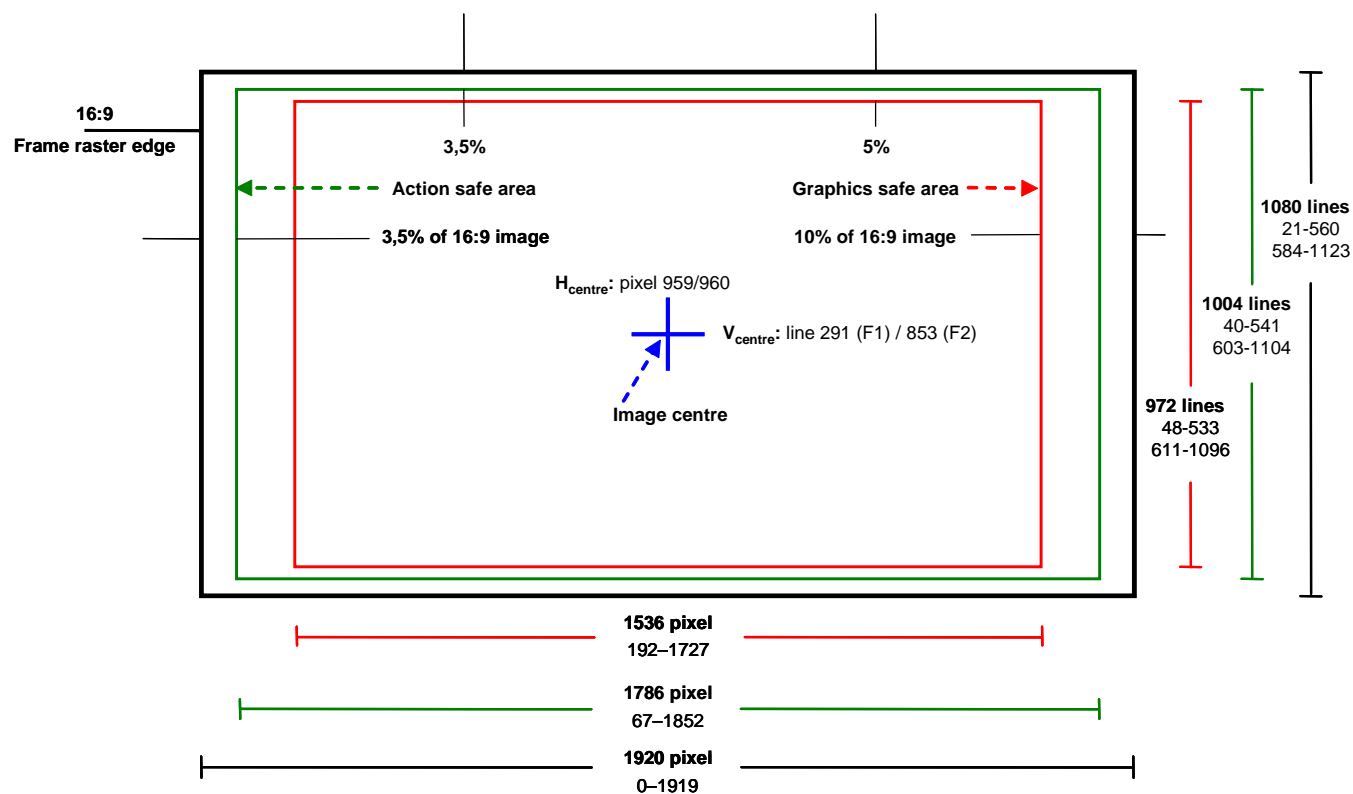
* The total number of lines is 750 (active lines from 26 to 745 inclusive = 720 lines).

** The complete digital line consists of 1650 pixels (active pixel from 0 - 1279 inclusive = 1280 pixel).
Of these all active pixels are included in the image active line.

Figure 2b

Scanning raster 1080i/25 and 1080psf/25: 16:9 safe areas for 16:9 presentation

Image format: 16:9 Full Format



Action safe area:

Vertical F1*: from line 40 to 541

Vertical F2*: from line 603 to 1104

Horizontal in the digital line**: from pixel 67 to 1852

Graphics safe area:

from line 48 to 533

from line 611 to 1096

from pixel 192 to 1727

Image centre:

Vertical* - V_{centre}: between line 291 of field 1 and line 853 of field 2Horizontal** - V_{centre}: between pixel 959 and 960

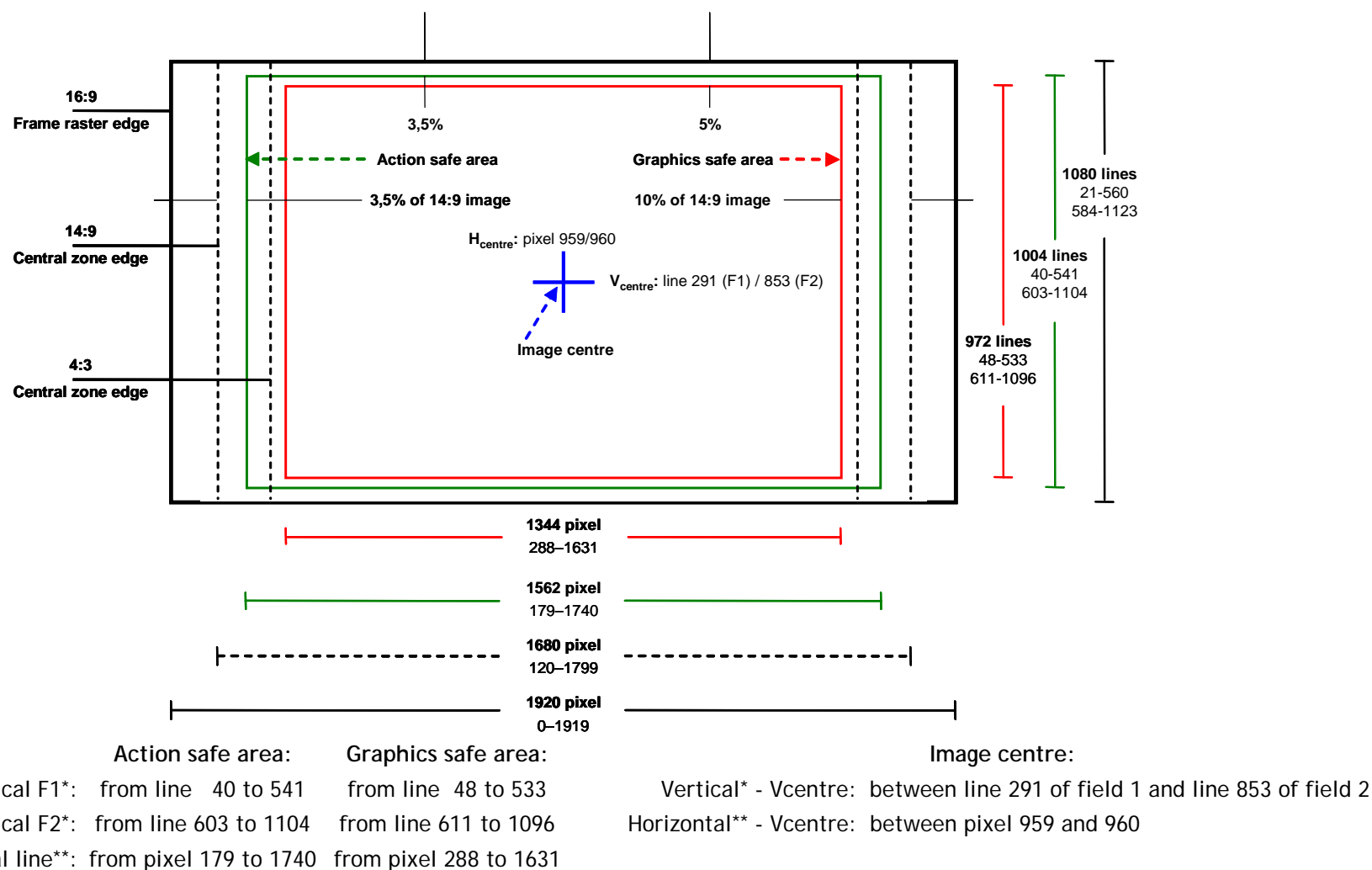
* The total number of lines is 1125 (active lines from 21 to 560 and 584 to 1123 inclusive = 1080 lines).

** 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.

Figure 3a

Scanning raster 1080i/25 and 1080psf/25: 16:9 safe areas for 14:9 presentation

Image format: 16:9 Full Format (14:9 protected)



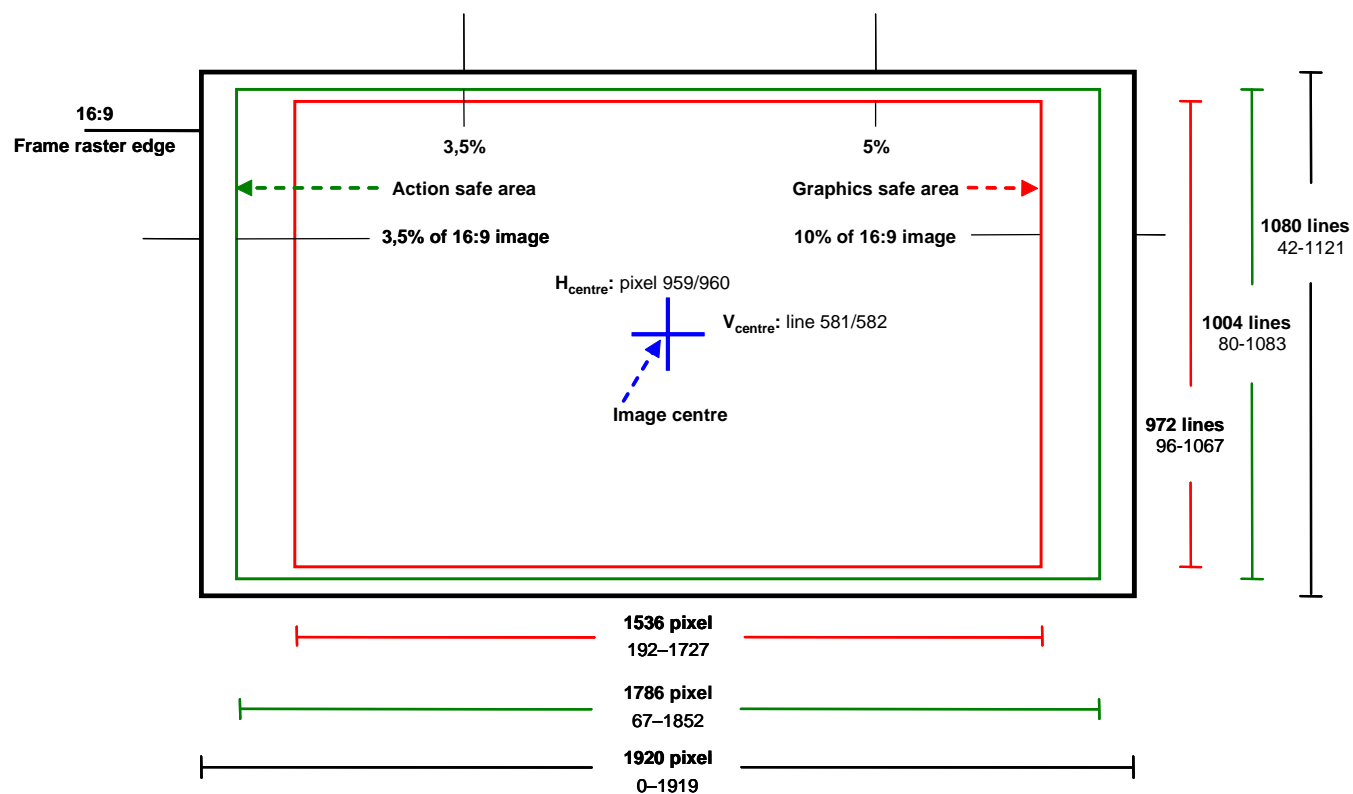
* The total number of lines is 1125 (active lines from 21 to 560 and 584 to 1123 inclusive = 1080 lines).

** 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.

Figure 3b

Scanning raster 1080p/50: 16:9 safe areas for 16:9 presentation

Image format: 16:9 Full Format



Action safe area:	Graphics safe area:	Image centre:
Vertical*: from line 80 to 1083	from line 96 to 1067	Vertical* - Vcentre: between line 581 and line 582
Horizontal in the digital line**: from pixel 67 to 1852	from pixel 192 to 1727	Horizontal** - Vcentre: between pixel 959 and 960

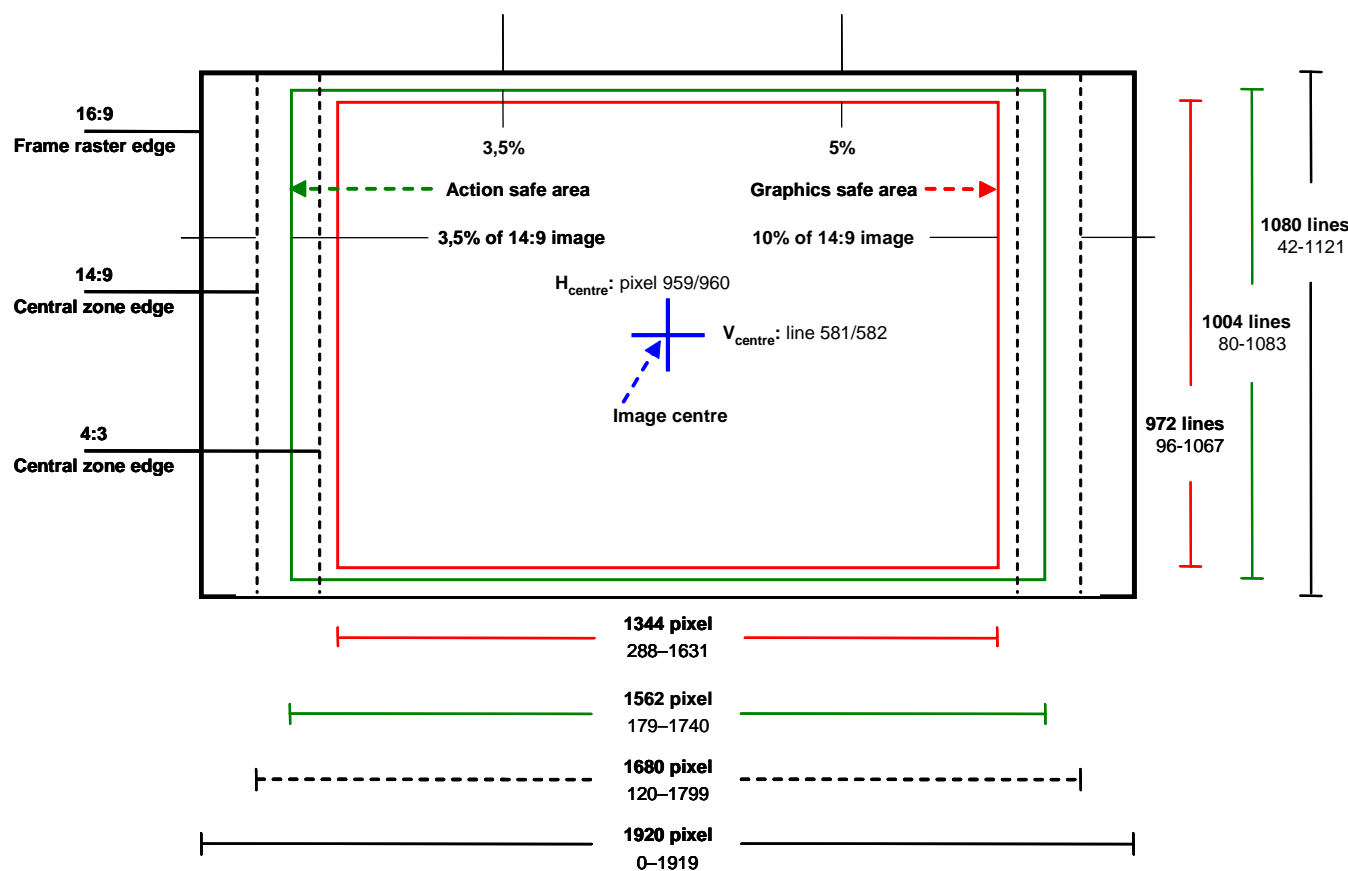
* The total number of lines is 1125 (active lines from 42 to 1121 inclusive = 1080 lines).

** The complete digital line consists of 2200 pixels (active pixel from 0 to 1919 inclusive = 1920 pixel).
Of these all active pixels are included in the image active line.

Figure 4a

Scanning raster 1080p/50: 16:9 safe areas for 14:9 presentation

Image format: 16:9 Full Format (14:9 protected)



Action safe area: Graphics safe area:

Vertical*: from line 80 to 1083 from line 96 to 1067

Horizontal in the digital line**: from pixel 179 to 1740 from pixel 288 to 1631

Image centre:

Vertical* - V_{centre}: between line 581 and line 582

Horizontal** - V_{centre}: between pixel 959 and 960

* The total number of lines is 1125 (active lines from 42 to 1121 inclusive = 1080 lines).

** The complete digital line consists of 2200 pixels (active pixel from 0 to 1919 inclusive = 1920 pixel).
Of these all active pixels are included in the image active line.

Figure 4b