SMPTE RECOMMENDED PRACTICE

for Television – Safe Areas for Protection of Alternate Aspect Ratios

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Approved
November 23, 2009

Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices, and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Administrative Practices.

SMPTE RP 2046-2 was prepared by Technology Committee 10E.

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Recommended Practice. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

1 Scope

This Recommended Practice specifies Safe Areas that should be used when composing 16:9 images that will be presented on both 4:3 and 16:9 aspect ratio displays. The choice of whether the image, having been captured in one aspect ratio, should be cropped for presentation in the other is dictated by creative and business factors. This Practice is intended to offer guidance on how best to compose the image once the presentation decision has been made.

The preferred display (cropped or not) should be signaled to downstream devices using Active Format Description (AFD) as defined in SMPTE 2016-1. The recommended Safe Areas are defined in the context of the AFD states in SMPTE 2016-1, primarily using the Safe Area and Safe Title Areas defined in SMPTE ST 2046-1.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword “reserved” indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword “forbidden” indicates “reserved” and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

Unless otherwise specified, the order of precedence of the types of normative information in this document shall be as follows: Normative prose shall be the authoritative definition; Tables shall be next; followed by formal languages; then figures; and then any other language forms.

3 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this recommended practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this recommended practice are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

SMPTE 2016-1-2007, Television – Format for Active Format Description and Bar Data

SMPTE ST 2046-1-2009, Specifications for Safe Action and Safe Title Areas for Television

SMPTE RP 221-2008, Specifications for Extraction of 4 × 3 Areas from Digital 16 × 9 Images for Television Systems

ITU-R BT.1379-2 (09/07), Safe Areas of Wide-Screen 16:9 and Standard 4:3 Aspect Ratio Productions to Achieve a Common Format During a Transition Period to Wide Screen 16:9 Broadcasting

4 Safe Areas

The Safe Areas for Protection of Alternate Aspect Ratios (hereafter referred to simply as Safe Areas) specified below are 90% of the width and 90% of the height of the part of the image to be extracted as specified in SMPTE 2016-1. The definition of Safe Area and the 90% width, 90% height shall be as specified in SMPTE ST 2046-1, with the following exceptions:

Per SMPTE 2016-1, AFD ‘0011’, AFD ‘1011’, AFD ‘1101’ and AFD ‘1110’ specify a 14:9 extraction from 4:3 and 16:9 sources. For these cases only, where the source material is typically standard definition, the Safe Areas used shall be as specified in ITU-R BT 1379-2.

The 90% width and 90% height coincide with the Safe Title Areas specified in SMPTE ST 2046-1, Sections 5.1 through 5.4 (excluding the legacy safe areas of Section 5.4.) Although the percentages are the same, users should not confuse the Safe Areas specified in this Recommended Practice with those of SMPTE ST 2046-1.

The Safe Areas specified here are illustrated with example graticules. The dimensions given are normative, but the precise layout details of the graticules (line type, center cross, etc.) are informative. Horizontal dimensions are given in pixels; vertical dimensions are given in lines.

Note: In Figures 1 and 2, the horizontal dimensions share a common center point and the vertical dimensions share a common center point, as marked on the drawings.

4.1 16:9 Shoot to Protect 4:3 Central Area (AFD '1111')

This is described in SMPTE 2016-1 as "16:9 (with alternative 4:3 center)". It is also commonly known as "center cut".

The Safe Area for center-cut protection shall be the rectangle of width f and height e. The values for the dimensions shown in Figure 1 are given in Table 1. These values were calculated using the formulas in SMPTE RP 221.

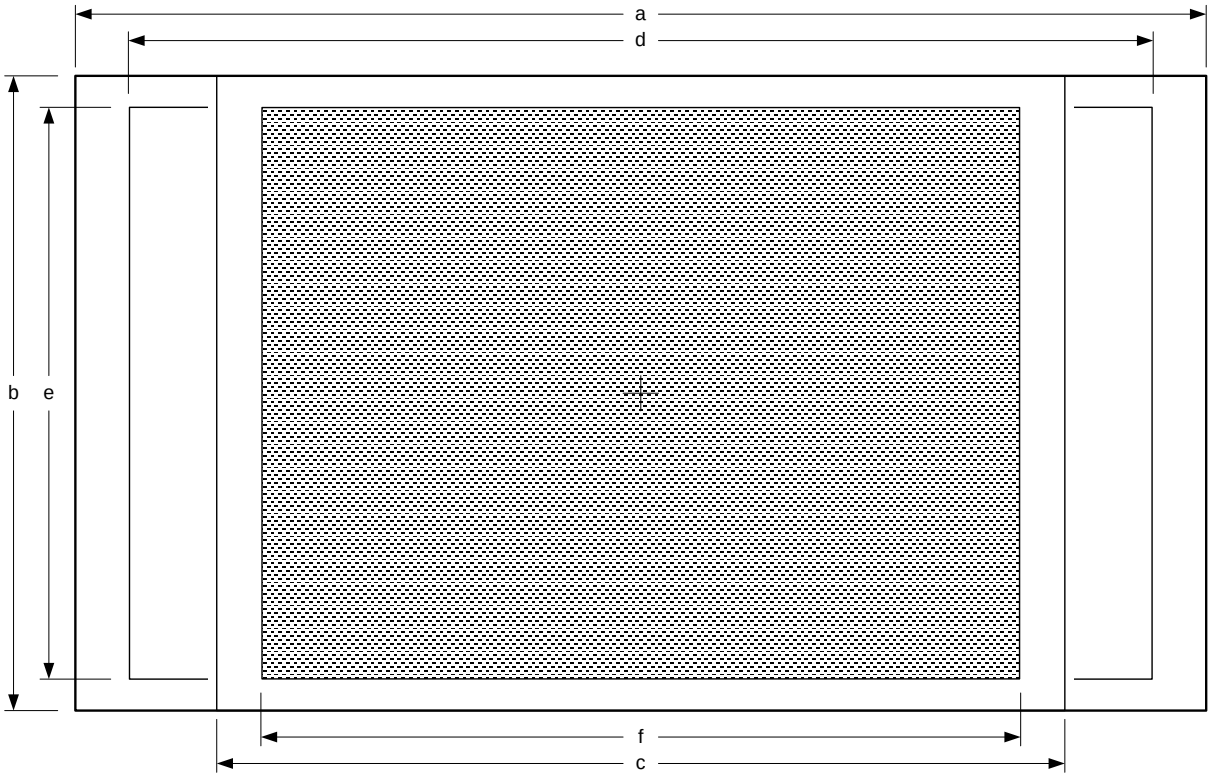

Figure 1 – Example Graticule for Center-Cut Protection

Dimension	Definition	1920 × 1080	1280 × 720	720 × 576	720 × 480
a	Production aperture width	1920	1280	720	720
b	Production aperture height	1080	720	576	480
c	Center cut width	1440	960	540	540
d	16:9 safe area width	1728	1152	648	648
e	Safe area height	972	648	518	432
f	Center cut safe area width	1296	864	486	486

Table 1 – Values for Center-Cut Protection (Figure 1)

4.2 16:9 Shoot to Protect the Full 16:9 Image (AFD '1010')

This is described in SMPTE 2016-1 as "16:9 (center)". It is commonly known as "letterbox". AFD '0010' is identical except for the placement of the letterboxed image at the top of the 4:3 frame rather than the center.

As the entire 16:9 image is contained in the 4:3 frame, the Safe Area shall be the same as that specified in SMPTE ST 2046-1 for 16:9 images. This information is repeated in Figure 2. The dotted rectangle of height e is the virtual 4:3 image height; this is not part of the graticule but is shown for clarity.

As the entire 16:9 height of the production aperture will be visible on 4:3 displays, users are strongly cautioned that this must be kept clear of extraneous elements.

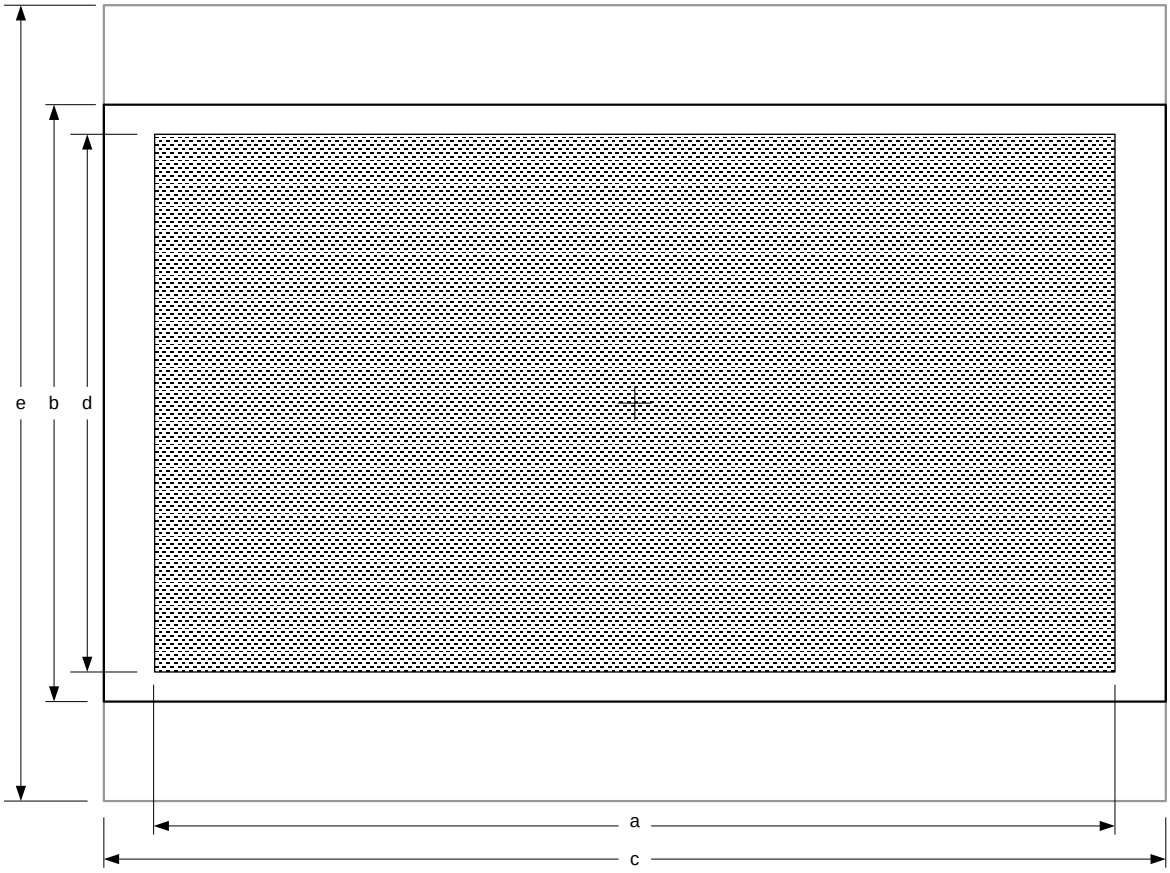

Figure 2 – Example Graticule for Letterbox

Dimension	Definition	1920 × 1080	1280 × 720	720 × 576	720 × 480
a	Production aperture width	1920	1280	720	720
b	Production aperture height	1080	720	576	480
c	Safe area width	1728	1152	648	648
d	Safe area height	972	648	518	432
e	Virtual 4:3 image height	1440	960	768	640

Table 2 – Values for Letterbox (Figure 2)