



December 3, 2018

Federal Election Commission
Lisa J. Stevenson, Acting General Counsel
Office of the General Counsel
1050 First Street, NE
Washington, DC 20463
Submitted via email

EXTREME REACH

1920 MCKINNEY AVE
7TH FLOOR
DALLAS, TX 75201
EXTREMEREACH.COM

RE: Petition for Rulemaking to Revise the Size of Letters in Television Disclaimers

Dear Ms. Stevenson:

Pursuant to 11 CFR 200.2(a), Extreme Reach hereby petitions the Federal Election Commission to conduct a rulemaking to revise 11 CFR 110.11(c)(3)(iii)(A), the regulation pertaining to the size of letters in television disclaimers. We believe that this is one of those situations where the law has not kept up with technology. As per 11 CFR 110.11(c)(3)(iii)(A), “[t]he statement must appear in letters equal to or greater than four (4) percent of the vertical picture height.”

The law in question was most likely referring to 480 pixels from the Standard Definition aspect ratio (720 pixels by 480 pixels, which are the horizontal and vertical dimensions) and not 1080 pixels from the High Definition aspect ratio (1920 pixels by 1080 pixels) specified by ITU-R BT.709-6 (enclosed) from the International Telecommunication Union – four percent of 480 pixels is 19.2 pixels but four percent of 1080 pixels is 43.2 pixels, which under current industry guidelines, is not a normal disclaimer size. In fact, under current industry guidelines, the normal disclaimer size is generally 22 pixels in vertical height. Since the vast majority of commercials today are produced in 1920 pixels by 1080 pixels (only a small percentage is produced in 720 pixels by 480 pixels and those commercials are not affected), this law is outdated and confusing.

Please find enclosed a video frame of a commercial (CFRWS0529H / Coloradans for Fiscal Responsibility) that was uploaded to Extreme Reach on May 29, 2018 with a 24-pixel disclaimer (slightly larger than the current industry guidelines) and rejected by Charter Spectrum on June 5, 2018 for not meeting 11 CFR 110.11(c)(3)(iii)(A) (Exhibit A). Extreme Reach is a technology company that manages the distribution of commercials to TV destinations. Charter Spectrum is a cable provider that sells TV advertising and is responsible for the commercials that they sell and air.

Exhibits B and C were created by downconverting the HD commercial to SD and then upconverting it for font size comparison. Exhibit B was created by centercutting and exhibit C was created by letterboxing the HD master. Centercutting and letterboxing are the two methods used for downconverting HD content, the process required when a viewer is watching a Standard Definition feed on an SD or HD TV. In order to compare the disclaimer in the commercial in question with size required by the current law, also enclosed are video frames of that same commercial where the 24-pixel disclaimer was replaced with a 43-pixel disclaimer, which corresponds to the four percent from 11 CFR 110.11(c)(3)(iii)(A).



When you look at Exhibits D, E and F, you can see that four percent of the vertical picture height, or 43 pixels, makes the letters too big when you're producing commercials in High Definition (1920 pixels by 1080 pixels) and that the industry guideline of 22 pixels is acceptable even after the downconvert process. For reference, I have enclosed the disclaimers (also known as supers) section of the advertising guidelines from ABC, CBS and NBC. Before a political commercial can air on TV, that commercial has to be cleared by a team that looks for certain issues, including the size of disclaimers.

REQUEST FOR RULEMAKING

Based on these findings and examples, we request that the Commission revise 11 CFR 110.11(c)(3)(iii)(A) to add a separate requirement for HD where letters must be equal to or greater than two (2) percent of the vertical picture height and specify that the four (4) percent of the vertical picture height requirement only applies to SD. The new percentage will also remain valid for 4K, 8K, 16K and beyond.

Respectfully submitted,

A handwritten signature in dark blue ink, appearing to read 'Fred Cunha'.

Fred Cunha
Vice President, Video Network & Support
Extreme Reach
1920 McKinney Ave
7th Floor
Dallas, TX 75201
fcunha@extremereach.com
W 972.581.2109
M 214.529.7774


Enclosures: 10

Exhibit A
Video frame from 1920x1080 master
24px disclaimer
(rejected by Charter Spectrum)



Paid for by Coloradans for Fiscal Responsibility. Katie Kennedy Registered Agent.
Not Authorized by Any Candidate or Candidate Committee.

Exhibit B
Video frame from 720x480 centercut version (upconverted to 1920x1080)
24px disclaimer



**Paid for by Coloradans for Fiscal Responsibility. Katie Kennedy Registered Agent.
Not Authorized by Any Candidate or Candidate Committee.**


Exhibit C

Video frame from 720x480 letterbox version (upconverted to 1920x1080)
24px disclaimer



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Exhibit D
Video frame from 1920x1080 master
43px disclaimer
(for comparison)




Paid for by Coloradans for Fiscal Responsibility.
Katie Kennedy Registered Agent.
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or Candidate Committee.

Exhibit E

Video frame from 720x480 centercut version (upconverted to 1920x1080)

43px disclaimer
(for comparison)



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or Candidate Committee.**

Exhibit F

Video frame from 720x480 letterbox version (upconverted to 1920x1080)

43px disclaimer
(for comparison)



**Paid for by Coloradans for Fiscal Responsibility.
Katie Kennedy Registered Agent.
Not Authorized by Any Candidate
or Candidate Committee.**

PRODUCTION STANDARDS FOR SUPERS/HORIZONTAL CRAWLS

All supers must be clearly legible and on-screen for sufficient time to be read by the average viewer.

While variables may affect the legibility of supers (i.e., contrasting backgrounds, edge drop shadowing, time on screen, etc.) the following standards will generally be applied:

- Minimum Size:
CAPITAL and LOWER CASE LETTERS- 22 video scanlines
(including lower case descending tails as in g/j/p/q)

CAPITAL LETTERS ONLY- 18 video scanlines
- Minimum Duration:
One line- two seconds
Two lines- three seconds
Three lines- five seconds
Supers over three lines in length are subject to editorial discretion
- Lettering should be clear and contrasting; edge-drop shadowing is encouraged when it enhances legibility

III. **Institutionals Intended to Promote Events or Programs**

Such Institutionals may include logos or other identification of title or presenting sponsors as agreed to in arrangements made between the named sponsors and ABC Sales.

IV. **Institutionals Intended to Create Awareness of a Specified Non-Profit Partnering Organization**

- A. Such Institutionals may not include sell copy, secondary product mentions, or use of logos, signage or slogans (other than identification of a title or presenting sponsor as incorporated into the official name of an event), except as explicitly permitted in ABC's contracts and arrangements with the relevant sporting league.
- B. Such Institutionals may not directly solicit funds on behalf of non-profit organizations absent special public interest considerations.
- C. Such Institutionals must have adequate source identification (e.g., "This message furnished by [the proper league, college or conference.]"). (See also "Public Service Announcements").

SUBLIMINAL PERCEPTION

STANDARD

ABC will not broadcast commercial messages utilizing the technique of "subliminal perception." Any audio or video technique which attempts to convey information to the viewer by transmitting below the threshold of normal awareness (e.g., an image that registers subconsciously) is not permitted.

SUPERS

STANDARD

When superimposed copy is required, it must be displayed clearly and conspicuously. Supers must be presented against a contrasting background, displayed for sufficient duration, and presented in large, bold, and well-spaced letters, words, and lines of copy so that they can be read and understood easily.

Visual supers may not be used to materially alter a claim (e.g., by substantially narrowing a general superiority claim). Supers may provide only minor clarification and must be so limited. Supers should appear in close proximity to the claim they are meant to qualify.

GUIDELINES

- I. All supers must be clearly legible.
- II. Minimum on-display time should be three seconds for all one-line supers. Supers of two or more lines should remain in view as follows: three seconds for the first line of text plus one second for each additional line (thus a four-line super requires a minimum six-second display). We acknowledge that under certain circumstances some legally mandated supers may be exempted from this guideline, assuming they remain otherwise readable.
- III. Supers which vertically “roll” over the screen may be permissible; those which horizontally “crawl” across the bottom one-third of the screen are reserved exclusively for use by the News Department and may not appear in commercial announcements.

TALENT IN COMMERCIALS

STANDARD

I. Entertainment Programming

- A. Advertising utilizing ABC talent may be scheduled in daytime drama programming in which such talent appears with prior approval of BS&P and ABC Daytime. When acceptable, such advertising may not be scheduled in the first or last position of a commercial pod in the respective programming.
- B. Advertising utilizing ABC talent may be scheduled in primetime programming in which such talent appears with prior approval of BS&P and ABC Entertainment. When acceptable, such advertising may not be scheduled in the first or last position of a commercial pod in the respective programming.
- C. Advertising utilizing a participating celebrity may be scheduled within a variety or awards special in which such talent appears with the prior approval of BS&P and ABC Entertainment, provided that any such talent advertising may not be scheduled in the first or last position of a commercial pod which is adjacent to the appearance of the celebrity within the program.
- D. Advertising utilizing talent from another network will be considered on a case-by-case basis.

II. News Programming

- A. ABC News personnel may not appear in commercials.
- B. Advertising utilizing individuals who are the subject of a story in a news program is not acceptable for scheduling in that program.

therapists, or actors representing them are permitted in these types of advertisements under the same conditions.

- VIII. “Doctor recommended” and “pharmacist recommended” claims require a nationally representative survey of at least 250 doctors/pharmacists in the relevant specialty, showing that at least 20% of those surveyed recommend the advertised product in their practice.

DIRECT RESPONSE

- I. All advertisements must conform to applicable FTC Guidelines. All claims, including, but not limited to those made in the visual or audio copy, must be supported with adequate substantiation.
- II. Each advertisement must include the name, street address, city, state and zip code of the sponsor or a website and/or toll-free telephone number.
- III. When applicable, any charges beyond the advertised purchase price must also be disclosed (e.g., shipping and handling).
- IV. Advertisements must indicate actual anticipated delivery date if anticipated delivery will be in excess of thirty days.

DISCLAIMERS, SUPERS, AND HORIZONTAL CRAWLS

- I. Disclaimers cannot be used to contradict or materially alter a claim.
- II. When superimposed copy is used to qualify advertising claims, it must be presented so it can be read easily against a plain contrasting background and must be located within the safe title area of the television screen.
- III. The first line of every required super should appear on screen for at least three seconds. Each additional line should appear for at least one second (e.g., five seconds for a three-line disclaimer).
- IV. As a general rule, visual disclaimers should appear in a font that is easy to read and remain on the screen long enough to be noticed, read, and understood by an average viewer.
- V. Audio disclaimers should be clear and loud enough to be easily heard and understood by an average viewer.
- VI. The use of horizontal crawls in the lower third of the screen is unacceptable.

DISTRIBUTION AND AVAILABILITY OF PRODUCTS AND SERVICES

- I. To advertise nationally, the product or service advertised must reach 51% national distribution at the time of air through any generally accepted process of distribution (e.g., retail stores, company website, online retailer) unless otherwise clearly disclosed in the advertisement (e.g., “Coming Soon,” “Not yet available in all areas,” or “Available for preorder”).
- II. Unless available at all locations, advertising for franchise or chain retail outlets must indicate that the product or service is only available at participating stores.

Recommendation ITU-R BT.709-6
(06/2015)

**Parameter values for the HDTV standards
for production and international
programme exchange**

BT Series
Broadcasting service
(television)

Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

Policy on Intellectual Property Right (IPR)

ITU-R policy on IPR is described in the Common Patent Policy for ITU-T/ITU-R/ISO/IEC referenced in Annex 1 of Resolution ITU-R 1. Forms to be used for the submission of patent statements and licensing declarations by patent holders are available from <http://www.itu.int/ITU-R/go/patents/en> where the Guidelines for Implementation of the Common Patent Policy for ITU-T/ITU-R/ISO/IEC and the ITU-R patent information database can also be found.

Series of ITU-R Recommendations

(Also available online at <http://www.itu.int/publ/R-REC/en>)

Series	Title
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R BT.709-6

**Parameter values for the HDTV¹ standards for production
and international programme exchange**

(Question ITU-R 27/11)

(1990-1994-1995-1998-2000-2002-2015)

Scope

This Recommendation defines the image format parameters and values for HDTV².

Keywords

HDTV (high definition television), Image format, EOTF (electro optical transfer function), OETF (optical electrical transfer function), PsF (progressive segmented frame)

The ITU Radiocommunication Assembly,

considering

- a) that for many years HDTV programmes have been produced worldwide;
- b) that parameter values for HDTV production standards should have maximum commonality;
- c) that the parameters defined for all these systems meet the quality goals set for HDTV;
- d) that film productions are an important programme source for HDTV broadcasting and, conversely, the use of HDTV production systems has significant benefits for film programme production;
- e) that high-quality conversion between the various HDTV systems, as well as down-conversion to 525/625 television systems, has been successfully implemented;
- f) that programmes produced and archived will have a long shelf life,

recommends

that for HDTV programme production and international exchange, one of the systems described in this Recommendation, should be used.

¹ “A high-definition system is a system designed to allow viewing at about three times the picture height, such that the system is virtually, or nearly, transparent to the quality of portrayal that would have been perceived in the original scene or performance by a discerning viewer with normal visual acuity”. Report ITU-R BT.801.

² Previous versions of this Recommendation that may contain historic information can be found on the ITU website.

HDTV system with square pixel common image format

Introduction

The common image format (CIF) is defined to have common picture parameter values independent of the picture rate. The following picture rates are specified: 60 Hz, 50 Hz, 30 Hz, 25 Hz and 24 Hz. For the 60, 30 and 24 Hz systems, picture rates having those values divided by 1.001 are also specified.

Pictures are defined for progressive (P) capture and interlace (I) capture. Progressive captured pictures can be transported with progressive (P) transport or progressive segmented frame (PsF) transport. Interlace captured pictures can be transported with interlace (I) transport. Refer to Attachment 2 for a description of segmented frame transport.

This results in the following combinations of picture rates and transports:

System	Capture (Hz)	Transport
60/P	60 or 60/1.001 progressive	Progressive
30/P	30 or 30/1.001 progressive	Progressive
30/PsF	30 or 30/1.001 progressive	Segmented frame
60/I	30 or 30/1.001 interlace	Interlace
50/P	50 progressive	Progressive
25/P	25 progressive	Progressive
25/PsF	25 progressive	Segmented frame
50/I	25 interlace	Interlace
24/P	24 or 24/1.001 progressive	Progressive
24/PsF	24 or 24/1.001 progressive	Segmented frame

1 Opto-electronic conversion

Item	Parameter	System Values	
1.1	Opto-electronic transfer characteristics before non-linear pre-correction	Assumed linear	
1.2	Overall opto-electronic transfer characteristics at source ⁽¹⁾	$V = 1.099 L^{0.45} - 0.099$ for $1 \geq L \geq 0.018$ $V = 4.500 L$ for $0.018 > L \geq 0$ where: L : luminance of the image $0 \leq L \leq 1$ V : corresponding electrical <i>signal</i>	
1.3	Chromaticity coordinates (CIE, 1931) Primary – Red (<i>R</i>) – Green (<i>G</i>) – Blue (<i>B</i>)	x	y
		0.640	0.330
		0.300	0.600
		0.150	0.060
1.4	Assumed chromaticity for equal primary signals (Reference white) $E_R = E_G = E_B$	D_{65}	
		x	y
		0.3127	0.3290

⁽¹⁾ In typical production practice the encoding function of image sources is adjusted so that the final picture has the desired look, as viewed on a reference monitor having the reference decoding function of Recommendation ITU-R BT.1886, in the reference viewing environment defined in Recommendation ITU-R BT.2035.

2 Picture characteristics

Item	Parameter	System Values
2.1	Aspect ratio	16:9
2.2	Samples per active line	1 920
2.3	Sampling lattice	Orthogonal
2.4	Active lines per picture	1 080
2.5	Pixel aspect ratio	1:1 (square pixels)

3 Signal format

Item	Parameter	System Values
3.1	Conceptual non-linear pre-correction of primary signals	$\gamma = 0.45$ (see item 1.2)
3.2	Derivation of luminance signal E'_Y	$E'_Y = 0.2126 E'_R + 0.7152 E'_G + 0.0722 E'_B$
3.3	Derivation of colour-difference signal (analogue coding)	$E'_{CB} = \frac{E'_B - E'_Y}{1.8556}$ $= \frac{-0.2126 E'_R - 0.7152 E'_G + 0.9278 E'_B}{1.8556}$ $E'_{CR} = \frac{E'_R - E'_Y}{1.5748}$ $= \frac{0.7874 E'_R - 0.7152 E'_G - 0.0722 E'_B}{1.5748}$
3.4	Quantization of <i>RGB</i> , luminance and colour-difference signals ^{(1), (2)}	$D'_R = \text{INT}[(219 E'_R + 16) \cdot 2^{n-8}]$ $D'_G = \text{INT}[(219 E'_G + 16) \cdot 2^{n-8}]$ $D'_B = \text{INT}[(219 E'_B + 16) \cdot 2^{n-8}]$ $D'_Y = \text{INT}[(219 E'_Y + 16) \cdot 2^{n-8}]$ $D'_{CB} = \text{INT}[(224 E'_{CB} + 128) \cdot 2^{n-8}]$ $D'_{CR} = \text{INT}[(224 E'_{CR} + 128) \cdot 2^{n-8}]$
3.5	Derivation of luminance and colour-difference signals via quantized <i>RGB</i> signals	$D'_Y = \text{INT}[0.2126 D'_R + 0.7152 D'_G + 0.0722 D'_B]$ $D'_{CB} = \text{INT}\left[\left(-\frac{0.2126}{1.8556} D'_R - \frac{0.7152}{1.8556} D'_G + \frac{0.9278}{1.8556} D'_B\right) \cdot \frac{224}{219} + 2^{n-1}\right]$ $D'_{CR} = \text{INT}\left[\left(\frac{0.7874}{1.5748} D'_R - \frac{0.7152}{1.5748} D'_G - \frac{0.0722}{1.5748} D'_B\right) \cdot \frac{224}{219} + 2^{n-1}\right]$

⁽¹⁾ “*n*” denotes the number of the bit length of the quantized signal.

⁽²⁾ The operator INT returns the value of 0 for fractional parts in the range of 0 to 0.4999... and +1 for fractional parts in the range of 0.5 to 0.9999..., i.e. it rounds up fractions above 0.5.

4 Digital representation

Item	Parameter	System Values	
4.1	Coded signal	R, G, B or Y, C_B, C_R	
4.2	Sampling lattice – R, G, B, Y	Orthogonal, line and picture repetitive	
4.3	Sampling lattice – C_B, C_R	Orthogonal, line and picture repetitive co-sited with each other and with alternate ⁽¹⁾ Y samples	
4.4	Number of active samples per line – R, G, B, Y – C_B, C_R	1 920 960	
4.5	Coding format	Linear 8 or 10 bits/component	
4.6	Quantization levels – Black level R, G, B, Y – Achromatic C_B, C_R – Nominal peak – R, G, B, Y – C_B, C_R	8-bit coding	10-bit coding
		16	64
		128 235 16 and 240	512 940 64 and 960
4.7	Quantization level assignment – Video data – Timing reference	8-bit coding	10-bit coding
		1 through 254 0 and 255	4 through 1 019 0-3 and 1 020-1 023
4.8	Filter characteristics ⁽²⁾ – R, G, B, Y – C_B, C_R	See Attachment 1	

⁽¹⁾ The first active colour-difference samples being co-sited with the first active luminance sample.

⁽²⁾ These filter templates are defined as guidelines.

5 Picture scanning characteristics

Item	Parameter	System Values									
		60/P	30/P	30/PsF	60/I	50/P	25/P	25/PsF	50/I	24/P	24/PsF
5.1	Order of sample presentation in a scanned system	Left to right, top to bottom For interlace and segmented frame systems, 1 st active line of field 1 at top of picture									
5.2	Total number of lines	1 125									
5.3	Field/frame/segment frequency (Hz)	60, 60/1.001	30, 30/1.001	60, 60/1.001		50	25	50		24, 24/1.001	48, 48/1.001
5.4	Interlace ratio	1:1			2:1	1:1			2:1	1:1	
5.5	Picture rate (Hz)	60, 60/1.001	30, 30/1.001			50	25			24, 24/1.001	
5.6	Samples per full line – <i>R, G, B, Y</i> – <i>C_B, C_R</i>	2 200 1 100				2 640 1 320				2 750 1 375	
5.7	Nominal analogue signal bandwidths ⁽¹⁾ (MHz)	60	30			60	30				
5.8	Sampling frequency – <i>R, G, B, Y</i> (MHz)	148.5, 148.5/1.001	74.25, 74.25/1.001			148.5	74.25			74.25, 74.25/1.001	
5.9	Sampling frequency ⁽²⁾ – <i>C_B, C_R</i> (MHz)	74.25, 74.25/1.001	37.125, 37.125/1.001			74.25	37.125			37.125, 37.125/1.001	

⁽¹⁾ Bandwidth is for all components.

⁽²⁾ *C_B, C_R* sampling frequency is half of luminance sampling frequency.

6 Analogue tri level sync signal

The tri level sync signal may be used as a reference signal for synchronization of devices operating on this Recommendation.

Item	Parameter	System Values									
		60/P	30/P	30/PsF	60/I	50/P	25/P	25/PsF	50/I	24/P	24/PsF
6.1	Nominal level (mV) E'_R, E'_G, E'_B, E'_Y	Reference black: 0 Reference white: 700 (see Fig. 2B)									
6.2	Nominal level (mV) E'_{C_B}, E'_{C_R}	± 350 (see Fig. 2B)									
6.3	Form of synchronizing signal	Tri-level bipolar (see Fig. 2A)									
6.4	Line sync timing reference	O_H (see Fig. 2A)									
6.5	Sync level (mV)	$\pm 300 \pm 2\%$									
6.6	Sync signal timing	Sync on all components (see Table 1, Figs 1 and 2)									
6.7	Blanking interval	(see Table 1, Figs 1 and 2)									

TABLE 1
Level and line timing specification
(See Figs 1 and 2)

Symbol	Parameter	System Values									
		60/P	30/P	30/PsF	60/I	50/P	25/P	25/PsF	50/I	24/P	24/PsF
T	Reference clock interval (μs)	1/148.5, 1.001/148.5	1/74.25, 1.001/74.25			1/148.5	1/74.25			1/74.25, 1.001/74.25	
a	Negative line sync width ⁽¹⁾ (T)	44 \pm 3									
b	End of active video ⁽²⁾ (T)	88 + 6 – 0				528 + 6 – 0				638 + 6 – 0	
c	Positive line sync width (T)	44 \pm 3									
d	Clamp period (T)	132 \pm 3									
e	Start of active video (T)	192 + 6 – 0									
f	Rise/fall time (T)	4 \pm 1.5									
–	Active line interval (T)	1 920 + 0 – 12									
S_m	Amplitude of negative pulse (mV)	300 \pm 6									
S_p	Amplitude of positive pulse (mV)	300 \pm 6									
V	Amplitude of video signal (mV)	700									
H	Total line interval (T)	2 200				2 640				2 750	
g	Half line interval (T)	1 100				1 320				1 375	
h	Vertical sync width (T)	1 980 \pm 3		880 \pm 3		1 980 \pm 3		880 \pm 3		1 980 \pm 3	880 \pm 3
k	End of vertical sync pulse (T)	88 \pm 3				528 \pm 3		308 \pm 3		638 \pm 3	363 \pm 3

⁽¹⁾ “ T ” denotes the duration of a reference clock or the reciprocal of the clock frequency.

⁽²⁾ A “line” starts at line sync timing reference O_H (inclusive), and ends just before the subsequent O_H (exclusive).

FIGURE 1A

Field/frame/segment synchronizing signal waveform

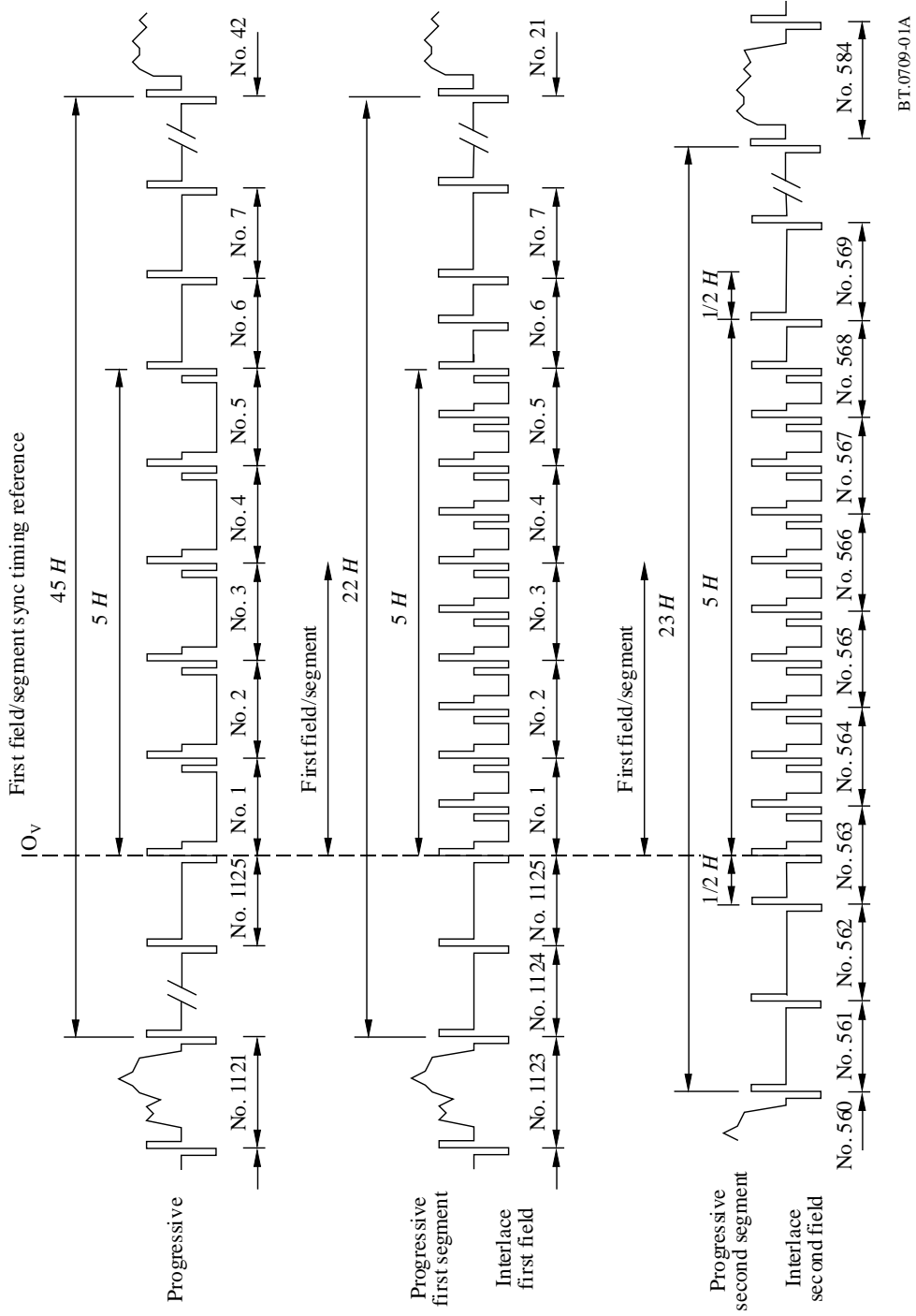


FIGURE 1B

Detail of field/frame/segment synchronizing signal waveform

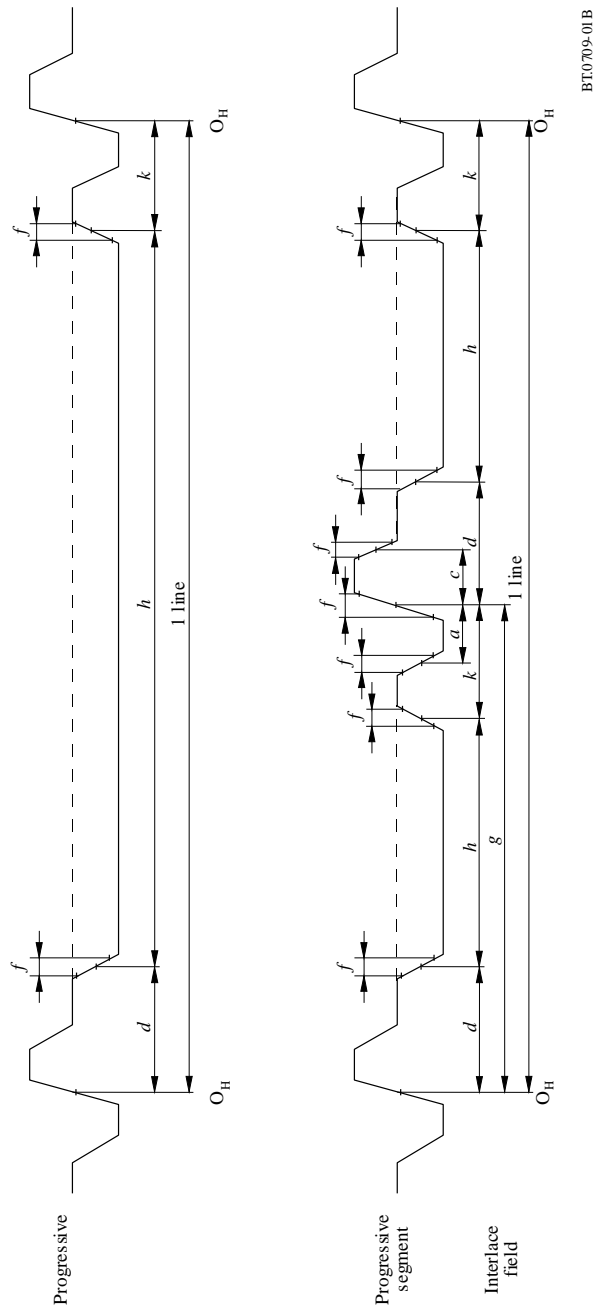
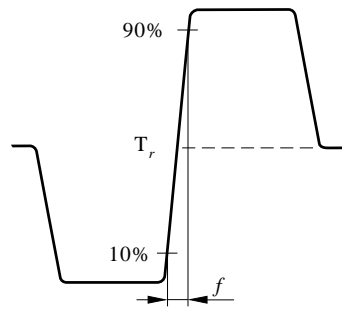
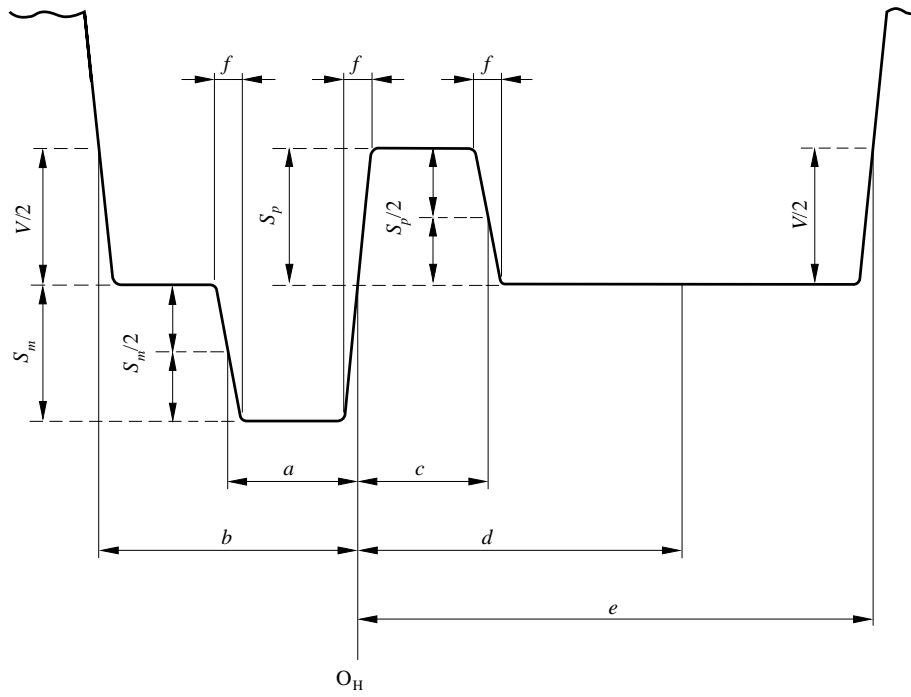
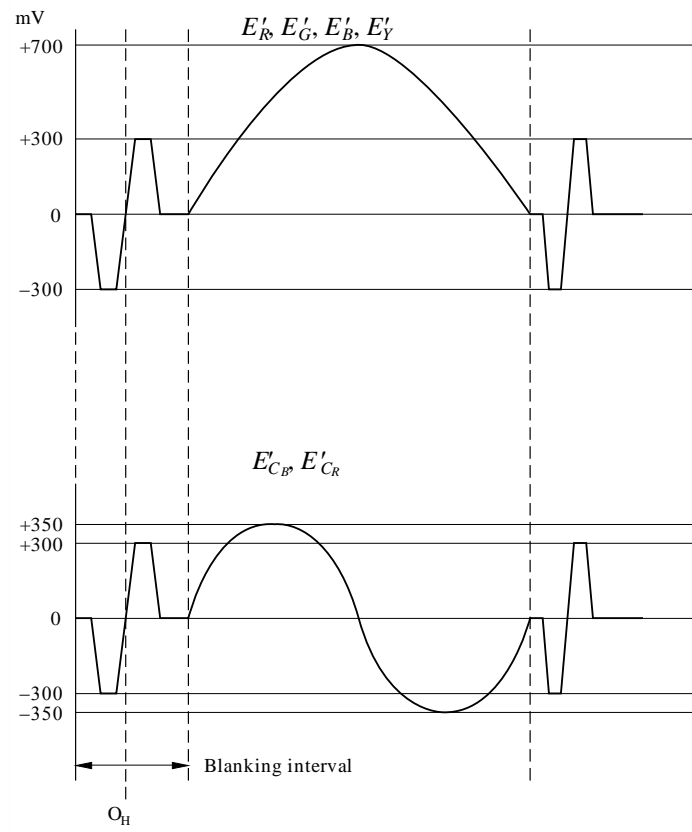


FIGURE 2A
Line synchronizing signal waveform



(The waveform exhibits symmetry with respect to point T_r)

FIGURE 2B
Sync level on component signals



BT.0709-2B

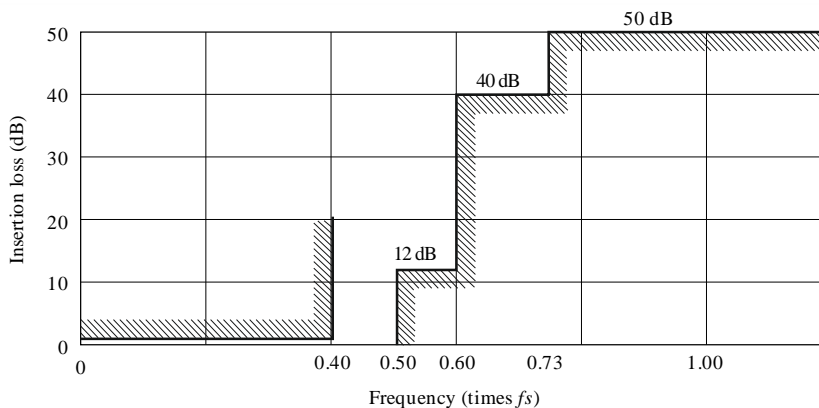
Attachment 1 (Informative)

Filter templates

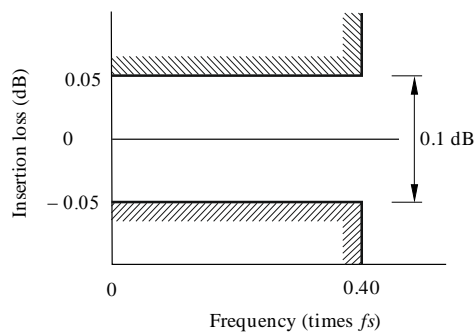
Figures in this Attachment are suggested filter templates intended to remove alias components.

FIGURE A1-1

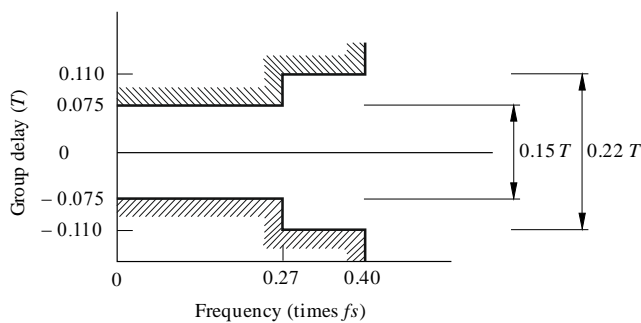
Guideline filter characteristics for *R*, *G*, *B* and *Y* signals (informative)



a) Template for insertion loss



b) Passband ripple tolerance



c) Passband group-delay

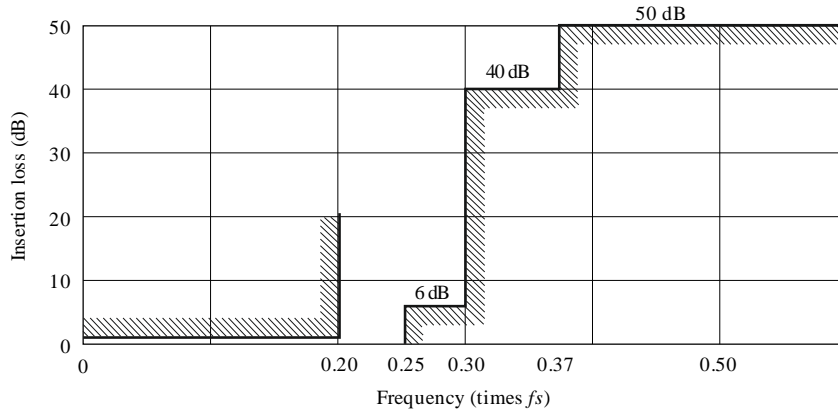
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Note 1 – f_s denotes luminance sampling frequency, the value of which is given in item 5.7.

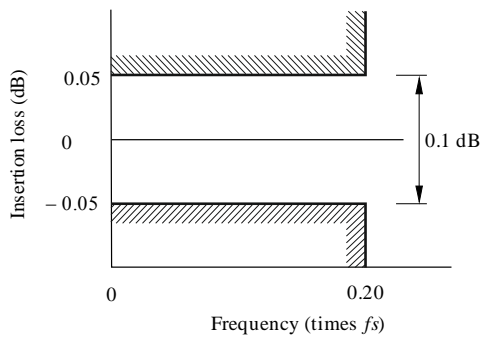
Note 2 – Ripple and group delay are specified relative to the value at 100 kHz.

FIGURE A1-2

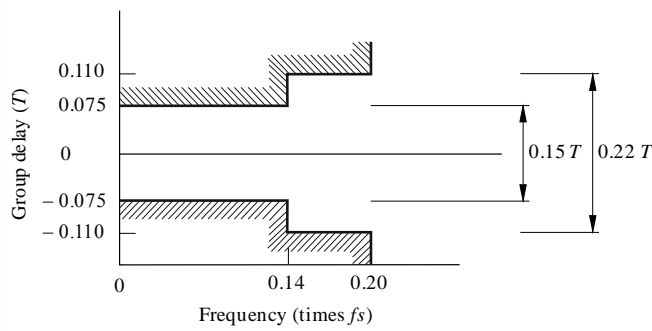
Guideline filter characteristics for C_B and C_R signals (informative)



a) Template for insertion loss



b) Passband ripple tolerance



c) Passband group-delay

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Note 1 – f_s denotes luminance sampling frequency, the value of which is given in item 5.8.

Note 2 – Ripple and group delay are specified relative to the value at 100 kHz.

Attachment 2 (Informative)

Segmented frame (See Note 1)

NOTE 1 – The term segmented frame in the context of this Recommendation is intended to indicate that a picture has been captured in a progressive mode, and transported as two segments. One segment containing the odd lines of the progressive image, the second segment containing the even lines of the progressive image.

1 Background

The television systems in current use have typically used interlace capture (acquisition) and transmission. The frame/field rates of these systems have been 50/60 Hz, a rate that when presented on cathode ray tube (CRT) display devices did not require any associated picture flicker correction. Current Television systems support both interlace and progressive capture and display technology with wide deployment of flat panel displays capable of displaying images from 24 Hz to 60 Hz without any flicker.

Specifically, the PsF technology is intended to be implemented only when frames rates of 30 Hz and lower are being used and displayed on CRTs. PsF is an interface technology not an image capture or processing technology.

2 24-frame/s production

Using the CIF of $1\,920 \times 1\,080$, film material may be transferred using progressive capture. This transfer will provide the highest resolution capture, with no 3:2 pull-down artefacts, moreover both 30 Hz frame rate and 25 Hz frame rate versions may be created from a single master with no quality loss.

The 30 Hz frame rate copy may be created by playing the 24-frame/s original and inserting the 3:2 pull-down during the replay process. This process also has the advantage of maintaining the 3:2 pull-down sequence during the replay process such that any downstream picture processing, such as an MPEG encoder, will not be affected by any 3:2 discontinuities.

The 25 Hz frame rate copy may be created by simply playing back the 24 Hz film rate original at the slightly faster 25 Hz rate; there is no picture quality loss.

In addition to simply transferring film originated material it is expected that electronic capture of images will occur at a 24-frame/s rate; this will provide the production community with yet another tool for seamless integration of images from various sources.

3 Progressive/interlace compatibility

The post production world has a need to cater for both progressive and interlace television signal formats for the foreseeable future. Therefore any new signal format such as 24 P, the original film frame rate, will need to coexist with interlace formats of 25 Hz and 30 Hz systems. One of the constraints in monitoring the 24-frame/s systems is the picture flicker that is present when displaying a 24-frame/s signal on a CRT display. Interlace systems minimize this flicker by refreshing the CRT phosphors every 60 th/50 th of a second. There are at least two solutions to the flicker created by the 24-frame/s systems, install a frame store in every monitor, or provide to the monitor a signal that emulates the interlace refresh rate.

24PsF/25PsF/30PsF are interface formats that will provide monitoring devices with signal refresh rates that will permit direct monitoring of the original frame rate of the material.

It should be noted that in some cases users may want to monitor 24-frame/30-frame material at other than the original frame rates.

The use of 24PsF/25PsF/30PsF does not in any way limit the monitoring of the signal by the newer flat panel displays.

A second potential use of the 24PsF/25PsF/30PsF transmission format is in the area of digital post production switchers. A common switcher design handling both interlace and progressive signals is economically possible, and addresses the requirements of end users who have a requirement to work in interlace and progressive formats with common equipment. The digital interface of an interlace signal and a PsF signal are common, only the signal content is different.

4 Signal mapping

The 24PsF/25PsF/30PsF transmission format maps a progressive image onto the interlace digital serial interface as defined in this Recommendation (see Fig. A2-1).

Line numbering convention for the image capture and image transmission is contained in the introduction (see also Fig. A2-1).

The same line numbers of an interlace picture are used by the PsF to carry the segmented frame format.

The sF format is not related to any interlace format characteristics. It is a way to convey a progressive image that has been captured at a 24/25/30 Hz rate. Capture at these low frequencies may require special monitoring considerations. The sF transmission format is intended to provide an economical solution while still retaining the compatibility with interlace systems.

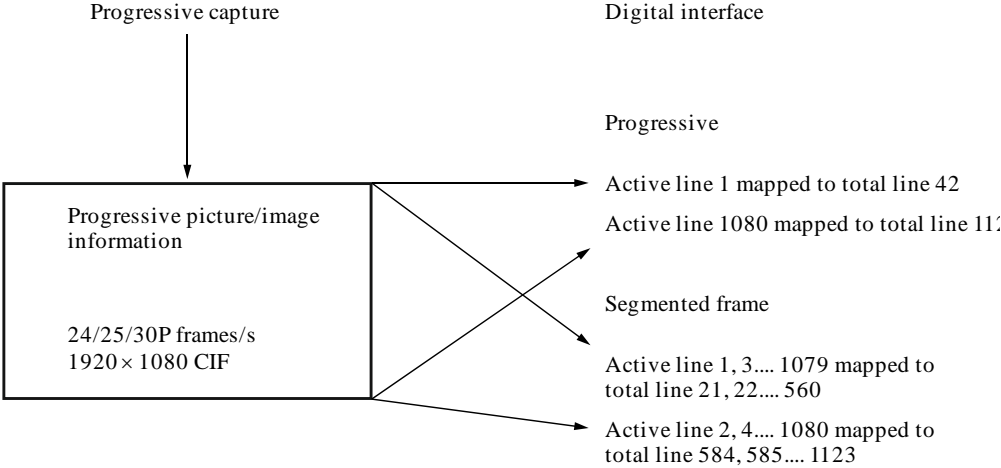
In cases where a progressive captured image is transported as a segmented frame, or a segmented frame signal is processed in a progressive format, the following rules shall be observed (see Fig. A2-1):

- line numbering from the top of the captured frame to the bottom of the captured frame shall be sequential;
- active line 1 and active line 1 080 of the progressive captured image shall be mapped onto total line 42 and total line 1 121, respectively, of the 1 125 total lines;
- odd active lines of the progressive captured image (1, 3, ..., 1 079) shall be mapped onto total lines 21 through 560 of the segmented frame interface;
- even active lines of the progressive captured image (2, 4, ..., 1 080) shall be mapped onto total lines 584 through 1 123 of the segmented frame interface.

With these rules, segmented frame transport has the same line numbering as that of interlace transport.

FIGURE A2-1

Mapping of progressive images into progressive and segmented frame transport interfaces



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