RP 87-1999
Revision of RP 87-1995

SMPTE RECOMMENDED PRACTICE

Reference Carrier Frequencies, Pre-emphasis Characteristic and Audio and Control Signals for 3/4-in Type E Helical-Scan Television Tape Cassette Recording

1 Scope

This practice specifies the reference frequencies for deviation of the frequency modulated carrier and associated video preemphasis characteristic for 3/4-in type E helical-scan video tape cassette recording of 525-line monochrome and NTSC color television signals at a tape speed of 95.3 mm/s (3.752 in/s). In addition, the characteristics of the audio and control signals are specified.

2 Normative references

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

EIA RS-170, Electrical Performance Standards — Monochrome Television Studio Facilities

EIA Industrial Electronics Tentative Standard No. 1, Color Television Studio Picture Line Amplifier Output Drawing

3 Video signal

3.1 Luminance carrier frequencies

3.1.1 Reference white level: 5.4 MHz ± 0.1 MHz

3.1.2 Reference sync level: 3.8 MHz ± 0.2 MHz

3.1.3 Reference white to sync level deviation: 1.6 MHz ± 0.1 MHz

3.2 Recording current characteristics

3.2.1 FM luminance carrier recording current shall be adjusted to produce maximum playback level. A high-pass filter having the characteristic shown in figure 1 shall be inserted into the FM signal path.

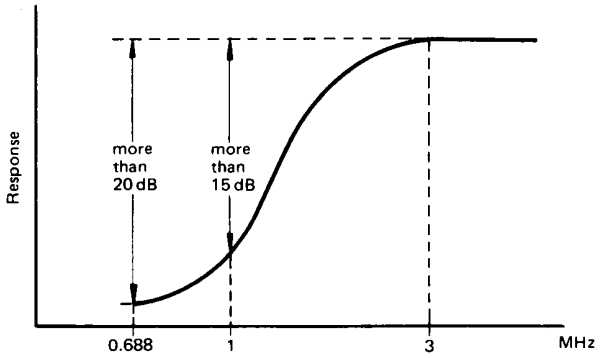


Figure 1 – FM high-pass filter

3.2.2 The down-converted chrominance signal of the AM chrominance carrier recording shall be 688.374 kHz ± 0.200 kHz. The recording current shall be that at which the playback signal level is 10 dB to 14 dB below the peak luminance level of color bars at 75% color saturation.

3.3 Luminance signal preemphasis characteristics

3.3.1 The preemphasis is shown in figure 3 and defined as the impedance response to the four-terminal network in figure 2.

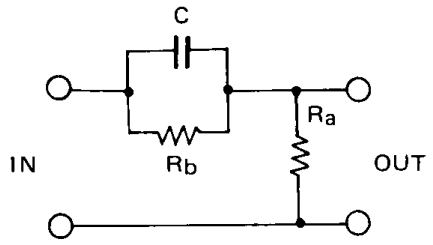
3.3.2 Preemphasis is introduced to the video signal prior to the modulator.

Approved November 5, 1999

4 Audio signal

4.1 Recording characteristics

4.1.1 High-frequency time constant of 50 µs



$\tau = R_bC = 0.60 \pm 0.05\ \mu s$

$X = R_b/R_a = 2.5 \pm 0.3$

Figure 2 – Preemphasis network

4.1.2 Low-frequency time constant of 3180 µs

4.2 Bias current

With a sine-wave recording signal of 1 kHz, the bias current shall be increased from the value producing maximum reproduced signal output to a level which results in the signal output dropping 0.5 dB.

4.3 Reproducer operating level

The reproducing volume indicator (vu meter) shall deflect to the scale reference level (0 dB) when playing back a tape recorded with a 1000 Hz sine-wave short-circuit tape flux per unit track width of 100 nWb/m.

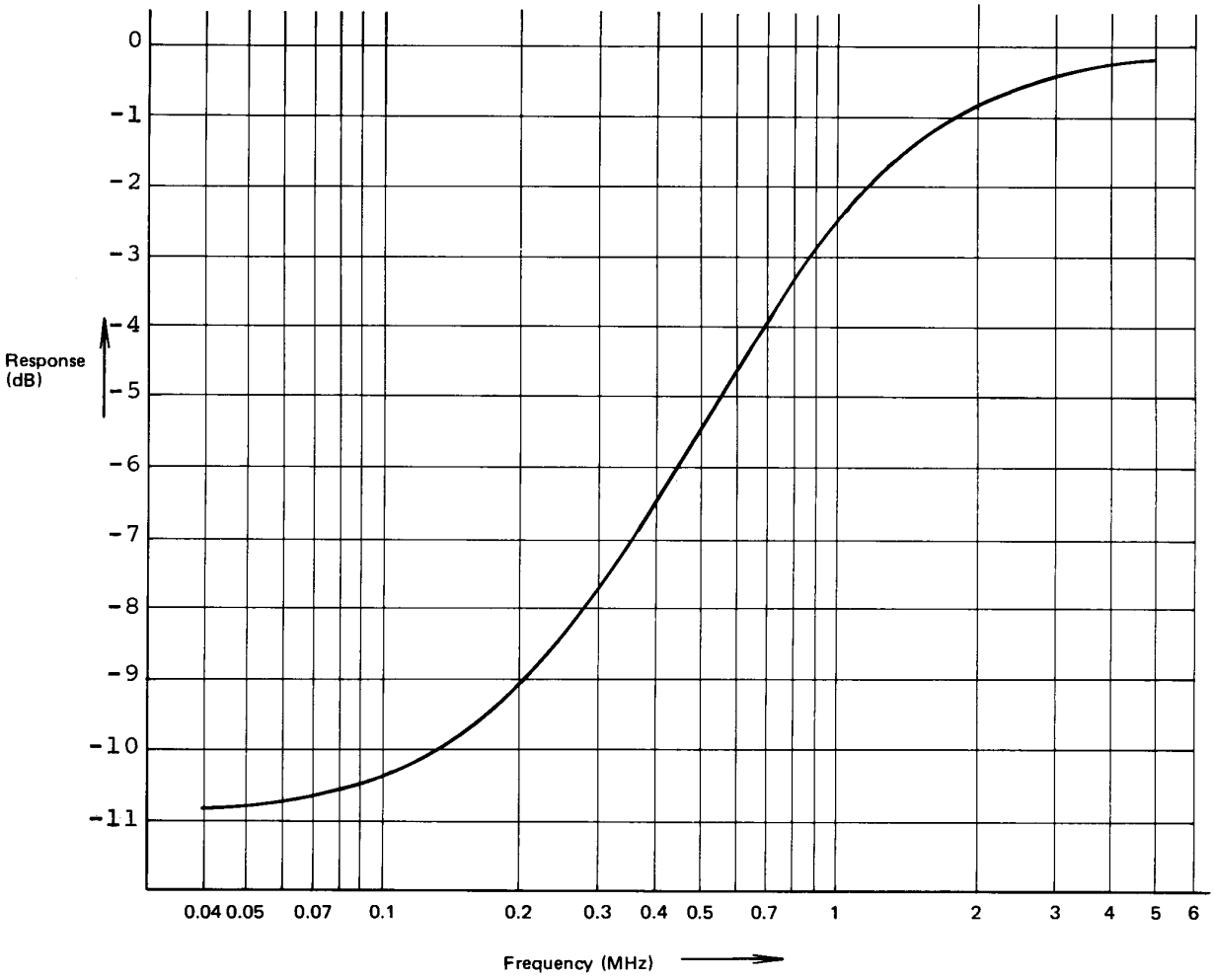


Figure 3 – Video preemphasis characteristic response for figure 2

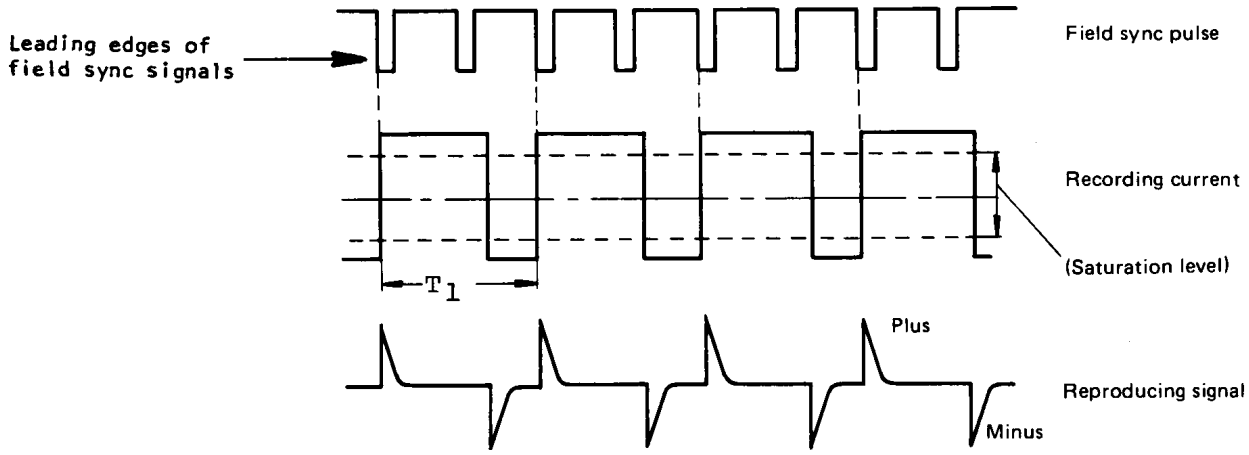
5 Control signal

5.1 Polarity

A positive-going pulse shall be obtained at the plus terminal of the control-track head on playback where there is a change from south to north in the polarity of the magnetic tape. A south to north polarity change shall identify field 1 of the NTSC signal as defined by EIA RS-170 and EIA Industrial Electronics Tentative Standard No.1. The reference pulse shall be the positive-going pulse as shown in figure 4.

5.2 Recording current waveform

The rise time shall be less than 200 µs.



T_1 = 33.57 ms
Polarity = Plus, north; minus, south

Figure 4 – Control signals waveform and polarity

Annex A (informative)
Bibliography

ANSI/SMPTE 21M-1997, Video Recording — 3/4-in Type E Helical Scan — Records