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INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**J.77**

(11/88)

**TELEVISION AND SOUND TRANSMISSION**

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**CHARACTERISTICS OF THE TELEVISION  
SIGNALS TRANSMITTED OVER 18 MHz  
AND 60-MHz SYSTEMS**

**ITU-T Recommendation J.77**

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(Extract from the *Blue Book*)

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## NOTES

1 ITU-T Recommendation J.77 was published in Fascicle III.6 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation J.77<sup>1)</sup>

## CHARACTERISTICS OF THE TELEVISION SIGNALS TRANSMITTED OVER 18 MHz AND 60-MHz SYSTEMS

(Geneva, 1980)

For television transmission on 18 MHz and 60 MHz systems, a modulation procedure has to be used which is independent of the structure of the signal to be transmitted. This is achieved by a reference carrier which defines the phase relationship between the transmit and receive side.

The transmission channel is capable of transmitting the signals used in all those television systems defined by the CCIR, in accordance with Report 624 [1].

The requirements to be met by the 18 MHz and 60 MHz transmission systems are to be found in Recommendations G.334 [2] and G.333 [3].

It is recommended that the following conditions be met:

### 1 Vestigial sideband shaping

The shaping of the vestigial sideband signal has to be carried out entirely at the transmit side. The vestigial sideband shall not exceed a width of 1 MHz, i.e. the width of the Nyquist slope shall not exceed 2 MHz.

### 2 Video pre-emphasis

With regard to a more uniform loading of the coaxial line systems, it is recommended to use a video pre-emphasis network. The video pre-emphasis curve and the corresponding formula are shown in Figure 1/J.77. The video pre-emphasis amounts to 9 dB.

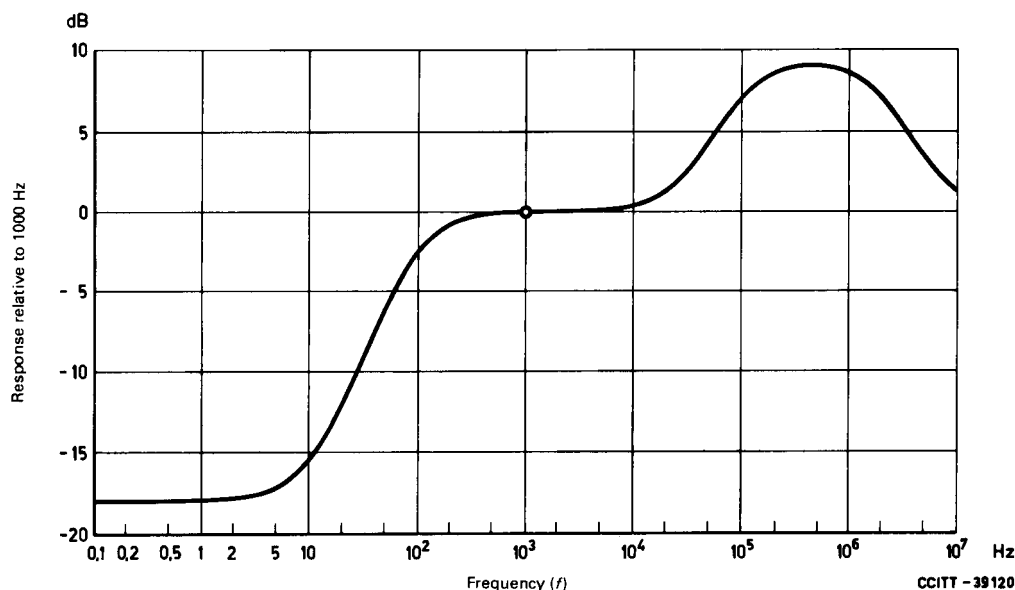
### 3 Nominal reference level of the modulated video signal

As a consequence of using a video pre-emphasis network, it is necessary to define a reference level at a suitable video frequency. It is recommended that this reference level be derived from the level of a single sideband measured after the Nyquist filter when a 1 kHz sine wave is transmitted, having a peak-to-peak amplitude of 0.7 volt at the video interconnection point. The reference level is this measured level plus 6 dB. The reference level is recommended to be + 11 dBm<sub>0</sub>.

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<sup>1)</sup> Recommendation J.76 of Volume III-2 of the *Orange Book* has been deleted.

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$$\text{Video pre-emphasis: } 10 \log_{10} (1 + a) + 10 \log_{10} \left[ 1 + \frac{a}{\left(\frac{Q}{V}\right)^2 + 1} \right]$$

where

$$V = \frac{f}{f_0} - \frac{f_0}{f} \quad Q = 14.5$$

$$a = 7 \quad f_0 = 450 \text{ kHz}$$

$$\text{Low frequency suppression: } -10 \log_{10} \frac{b^2 + (2\pi\tau f)^2}{1 + (2\pi\tau f)^2}$$

where

$$b = 8 \\ \tau = 14 \text{ ms}$$

FIGURE 1/J.77

Frequency response of video pre-emphasis and low frequency suppression relative to the value at 1 kHz

## 4 Accuracy of carrier frequencies

The carrier frequency of the first modulation stage should have a tolerance not exceeding 11 Hz. Tolerances of the carrier frequencies for the higher modulation stages can be ignored if either Recommendation G.225 [4] is met, or if the carriers are derived from the relevant TV channel-pair pilots (see [5] and [6]).

## 5 Reference carrier

In order to enable accurate demodulation of the signal at the receive side, it is necessary to transmit a reference carrier.

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The following characteristics are recommended:

- carrier frequency of the first modulation stage corresponding to the video frequency of 0 Hz;
- polarity negative, i.e. such that the amplitude of the modulated video signal is greater at black than at white;
- nominal power level: + 10 dBm0, independent of signal level.

### 6 Low frequency suppression

In order to prevent disturbance of the reference carrier by the low frequency components of the video signal, it is necessary to reduce the level of the low frequency components. A low frequency suppression of 18 dB is recommended. The low frequency suppression curve and the corresponding formula are shown in Figure 1/J.77.

#### References

- [1] CCIR Report *Characteristics of television systems*, Vol. XI, Report 624, ITU, Geneva, 1982.
- [2] CCITT Recommendation *18-MHz systems on standardized 2.6/9.5-mm coaxial pairs*, Vol. III, Rec. G.334.
- [3] CCITT Recommendation *60-MHz systems on standardized 2.6/9.5-mm coaxial cable pairs*, Vol. III, Rec. G.333.
- [4] CCITT Recommendation *Recommendations relating to the accuracy of carrier frequencies*, Vol. III, Rec. G.225.
- [5] CCITT Recommendation *60-MHz systems on standardized 2.6/9.5-mm coaxial cable pairs*, Vol. III, Rec. G.333, § 8.4, Note 2.
- [6] CCITT Recommendation, *18-MHz systems on standardized 2.6/9.5-mm coaxial pairs*, Vol. III, Rec. G.334, § 9.4.2, Note.