



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

J.17

TELEVISION AND SOUND TRANSMISSION

**PRE - EMPHASIS USED ON
SOUND - PROGRAMME CIRCUITS**

ITU-T Recommendation J.17

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation J.17 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.

Recommendation J.17

PRE-EMPHASIS USED ON SOUND-PROGRAMME CIRCUITS

(Geneva, 1972)

The noise spectrum in group links is usually uniformly distributed, i.e. all parts of the frequency band are equally disturbed by the noise signal. Sound-programme signals, on the other hand, are not of uniform distribution. The mean power density of the signals tends to decrease towards higher frequencies. Furthermore, the sensitivity of the receiving part (consisting of the radio receiver, the loudspeaker and the human ear) in respect of noise is very dependent on the frequency. (This can be seen from the psophometric weighting curve which is a measure of the sensitivity of the complete receiving part.)

Taking these three facts together it appears to be advantageous to use pre-emphasis on sound-programme circuits set up on carrier systems.

The advantages which could be gained by using different pre-emphasis curves are rather small. It is recommended, therefore, that a single pre-emphasis curve should be used whenever pre-emphasis is applied to sound-programme circuits in group links.

It is further recommended that the pre-emphasis attenuation curve should be that given by the following formula:

$$\text{Insertion loss between nominal impedances} = 10 \log_{10} \frac{75 + \left(\frac{\omega}{3000}\right)^2}{1 + \left(\frac{\omega}{3000}\right)} \text{ (dB)}$$

where ω is the angular frequency corresponding to frequency f . Some values are given in Table 1/J.17.

TABLE 1/J.17

f (kHz)	Insertion loss (dB)
0	18.75
0.05	18.70
0.2	18.06
0.4	16.48
0.8	13.10
2	6.98
4	3.10
6.4	1.49
8	1.01
10	0.68
∞	0

The de-emphasis network should have a complementary curve.

The pre-emphasis curve calculated from this formula passes through the following points:

The measured pre-emphasis and de-emphasis curves should not depart by more than ± 0.25 dB from the theoretical curves when the measured levels at 800 Hz are made to coincide with the theoretical levels.

Note – The formula given above defines only the “insertion-loss/frequency” characteristic. The level at which the modulated programme signal is different for the various types of sound-programme equipments and it depends on the modulation method and the type of companders used. This information is given in the appropriate Recommendations (J.31, J.34, J.41).