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ITU-T

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(ex CMTT.645)

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TELEVISION AND SOUND TRANSMISSION

**TEST SIGNALS TO BE USED ON
INTERNATIONAL SOUND-PROGRAMME
CONNECTIONS**

ITU-T Recommendation J.26

(Formerly Recommendation ITU-R CMTT.645)

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation J.26 (formerly Recommendation ITU-R CMTT.645) was elaborated by the former ITU-R Study Group CMTT. See Note 1 below.

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector (ITU-R).

Conforming to a joint decision by the World Telecommunication Standardization Conference (Helsinki, March 1993) and the Radiocommunication Assembly (Geneva, November 1993), the ITU-R Study Group CMTT was transferred to ITU-T as Study Group 9, except for the satellite news gathering (SNG) study area which was transferred to ITU-R Study Group 4.

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.26¹⁾

TEST SIGNALS TO BE USED ON INTERNATIONAL SOUND-PROGRAMME CONNECTIONS

(1986; revised 1990)

The CCIR,

CONSIDERING

- (a) that many impairments in international programme exchange on sound-programme connections are attributed to different national test signal definitions;
- (b) that some existing definitions are found in different Recommendations of the CCITT and the CCIR;
- (c) that for clarification, a list of those definitions should be available,

UNANIMOUSLY RECOMMENDS

that for an international sound-programme connection only the test signals defined below should be used:

1. Alignment signal (AS)

Sine-wave signal at a frequency of 1 kHz, which is used to align the international sound-programme connection. The signal level corresponds to 0 dBu0s (see Note) (i.e. 0.775 V r.m.s. at a zero relative level point). In accordance with CCITT Recommendation N.13, the period of sending the alignment signal should be kept as short as possible – preferably to less than 30 s.

Note – The notation “dBu0s” is defined in Recommendation 574. Other related texts of the CMTT use the notation “dBm0s” also defined in Recommendation 574.

2. Measurement signal (MS)

Sine-wave signal at a level 12 dB below the alignment signal level which should be used for long-term measurements and measurements at all frequencies (see CCITT Recommendations N.12, N.13, N.21 and N.23).

3. Permitted maximum signal (PMS)

Sine-wave signal at 1 kHz, 9 dB above the alignment signal level, equivalent to the permitted maximum programme-signal level. The sound-programme signal should be controlled by the sending broadcaster so that the amplitudes of the peaks only rarely exceed the peak amplitude of the PMS.

Note – Under these conditions a peak programme meter will indicate levels not exceeding the level of the permitted maximum signal.

A numerical example may serve to clarify this definition. The alignment signal has an r.m.s. voltage of 0.775 V and a peak amplitude of 1.1 V at a zero relative level point. The instantaneous peak amplitude of the sound-programme signal at this point should only rarely exceed 3.1 V.

Although it is intended that the peaks of the sound-programme signal should not exceed the permitted maximum signal level, an overload margin must be provided so that rare excursions of the sound-programme signal above the permitted maximum signal level may be tolerated.

Note – Annex I describes the response of peak programme and vu meters to these test signals.

¹⁾ Formerly Recommendation ITU-R CMTT.645.

ANNEX I

ALIGNMENT USING THE RECOMMENDED TEST SIGNALS
WITH PEAK PROGRAMME METERS AND VU METERS

1. Broadcasters have evolved, over a period of forty years, procedures for using both types of meter to control programme levels. These procedures are satisfactory to the organizations using them, so that they produce neither over-modulation, leading to distortion, nor under-modulation, leading to impairment from noise.

Although different kinds of programme material deflect the two meters differently, the organizations using them have evolved techniques that produce satisfactory level control and artistic balance within the programme.

2. The sensitivity of peak programme meters (PPM) is such that a sine wave signal at the alignment level, 0 dBu0s, indicates “Test” on an EBU PPM (this corresponds to “4” on the BBC PPM and “-9” on the PPMs of the Federal Republic of Germany and the OIRT (see Fig. 1)).

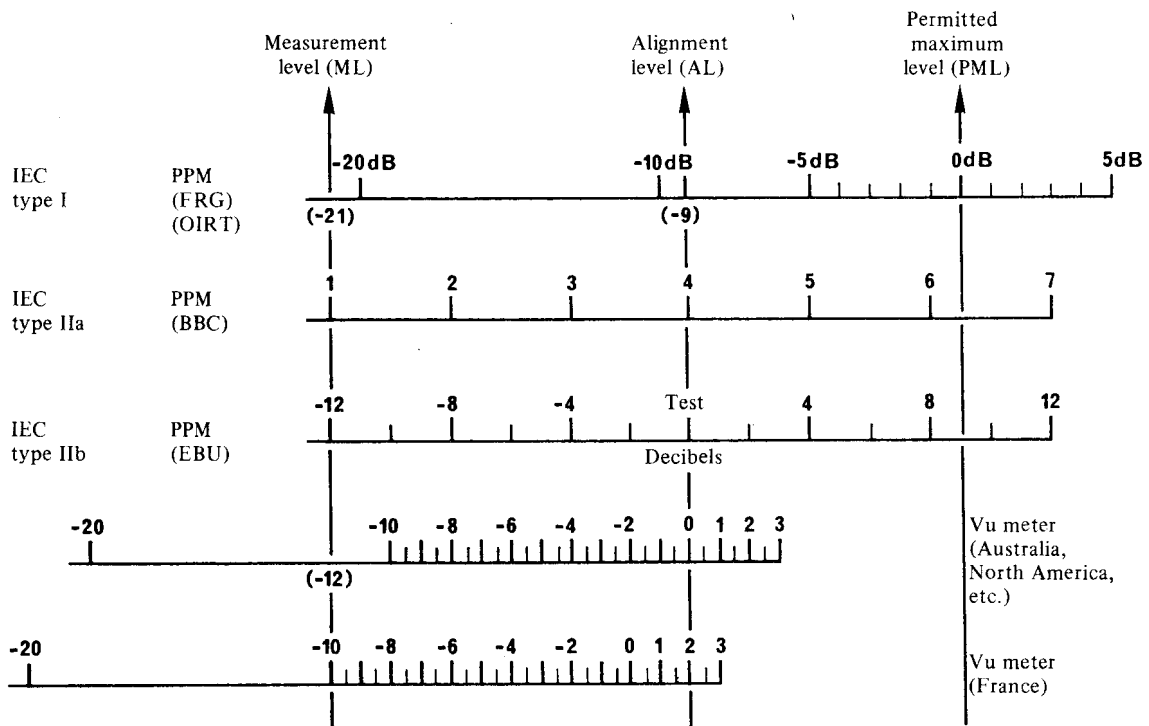


FIGURE 1 – Indications produced by various types of programme meter with the recommended test signals

Note. – Meter indications are schematic – not to scale.

d01-sc

3. The sensitivity of the vu meter is such that a sine wave signal at the alignment level, 0 dBu0s, produces nearly full indication, 0 vu in Australia and North America and +2 vu in France (see Fig. 1).

4. The PPM reads “quasi-peak”, that is, its peak indication on programme signals reads a little lower than true peaks. Operators are instructed to make the programme peaks give the same indication as a sinusoidal tone at +9 dBu0s (+8 dBu0s in some organizations). The true peaks of the programme are higher than indicated by up to 3 dB. When, additionally, operator errors are taken into account, the true peaks of the programme signal may reach the amplitude of a sinusoidal tone at +15 dBu0s.

5. The vu meter indicates the mean level of the programme, which is generally much lower than the true peak. Operators are instructed to make programmes peak generally to the 0 vu reading. Experience has shown that the true programme peaks are higher than indicated by between +6 dB and +13 dB, depending on the programme material. When, additionally, operator errors are taken into account, the true peaks of the signal may be up to 16 dB higher than indicated, corresponding to the peak amplitude of a sinusoidal tone at +16 dBu0s, or alternatively +14 dBu0s when application of the alignment level signal results in +2 vu indication.

6. Thus, although the dynamic characteristics of the two meters are different, the highest peak levels encountered after control using either meter are very similar.

7. Thus, an international connection between broadcasters will be correctly aligned regardless of the type of meter employed when a sinusoidal signal at alignment level, 0 dBu0s, produces the indication appropriate to that level at both the sending and receiving ends of the circuit.

To avoid any confusion between alignment level and other levels that might be used, it is recommended that the three level tone test signal described in Recommendation 661 be used for the alignment of an international sound-programme connection.

Figure 1 illustrates the indications given by a number of programme level meters when the recommended test signals are applied to them.