



INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

**M.880**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**MAINTENANCE:  
INTERNATIONAL TELEGRAPH SYSTEMS  
AND PHOTOTELEGRAPH TRANSMISSION**

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**INTERNATIONAL PHOTOTELEGRAPH  
TRANSMISSION**

**ITU-T Recommendation M.880**

(Extract from the *Blue Book*)

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## NOTES

1 ITU-T Recommendation M.880 was published in Fascicle IV.2 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 M.880**

### **INTERNATIONAL PHOTOTELEGRAPH TRANSMISSION**

#### **1 Types of circuits**

1.1 Permanent circuits used between phototelegraph stations should be set up and lined up as 4-wire circuits between these stations.

1.2 Circuits used normally (and preferentially) will be nominated international telephone circuits, the international line of which is normally extended to the phototelegraph station on a 4-wire basis, it being ensured that the terminal equipment (line relay sets, terminating sets, echo suppressors, etc.) is disconnected.

#### **2 Line-up**

2.1 The same conditions apply to the overall transmission loss of 4-wire circuits used for phototelegraphy as apply in general for telephony.

2.2 If an international telephone circuit is used to provide a phototelegraph circuit and if the international line is extended to the phototelegraph station the levels of the circuit so established should be such as to maintain the levels found on the level diagram of the telephone circuit.

#### **3 Relative levels**

If phototelegraph transmissions take place simultaneously from a transmitting station to several receiving stations, arrangements shall be made at the junction point so that, on the circuits following the junction point, the same power levels are maintained as those prescribed for individual transmissions.

#### **4 Loss/frequency distortion**

4.1 For phototelegraph transmission using frequency modulation, the use of a telephone circuit having a loss/frequency characteristic as given in Recommendation M.580 [1] will generally make it unnecessary to equalize the loss/frequency distortion of the lines joining the phototelegraph stations to the terminal international repeater stations. Such lines will have characteristics that follow national practice.

4.2 When amplitude modulation is used, the loss/frequency distortion between phototelegraph stations should not exceed 8.7 dB at any frequency in the band of frequencies transmitted. Since the band of frequencies required is less than the full bandwidth of the telephone-type circuit used for the phototelegraph transmission and the loss/frequency distortion over the bandwidth of the telephone-type circuit (see Recommendation M.580 [1]) is nominally much less than 8.7 dB, it will not in general be necessary to compensate for the loss/frequency distortion of the lines joining the phototelegraph stations to the international terminal repeater stations.

4.3 Figure 1/M.880 shows, in respect of loss/frequency distortion, the relationship of the Recommendations relating to international phototelegraph links.

#### **5 Variation of overall loss with time**

The overall loss should remain as constant as possible during picture transmissions.

5.1 The difference between the mean value and the nominal value of the transmission loss should not exceed 0.5 dB.

5.2 The standard deviation about the mean value should not exceed 1.0 dB. However, in the case of circuits wholly or partly on older-type equipment, and where the international line consists of two or more circuit sections, a standard deviation not exceeding 1.5 dB may be accepted.

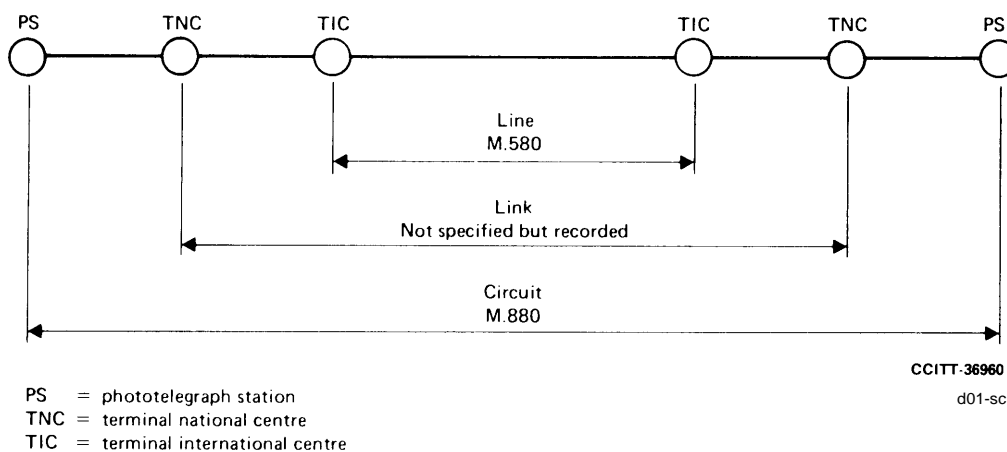


FIGURE 1/M.880  
**Relationship between Recommendations which apply to international phototelegraph links  
in respect of loss/frequency distortion**

## 6 Phase/frequency distortion

Phase/frequency distortion limits the range of satisfactory phototelegraph transmission. The differences in group-delay time of the telephone circuit, over the phototelegraph transmission range, should not exceed:

$$\Delta_t \leq \text{Error!}$$

where  $f_p$  is the maximum modulating frequency for the definition and scanning speed concerned.

(See Recommendation T.12 [2].)

## 7 Sent signal power

The conditions applying to the transmitted power in phototelegraph transmission are as follows:

The sent voltage of the phototelegraph signal at maximum amplitude should be so adjusted that the absolute power of the signal, at a zero relative level point found from the level diagram of the telephone circuit, is for a double sideband amplitude-modulated phototelegraph transmission  $-3$  dBm referred to 1 mW and for a frequency-modulated transmission  $-13$  dBm. With amplitude modulation, the black level is usually 30 dB below the white level.

In order to avoid the risk that phototelegraph signals be disturbed, for example by dial pulses transmitted over adjacent channels or by noise, it is important that the sending level should be as high as permissible; however, it shall not exceed  $-13$  dBm0 on the multichannel system and the power at the output of the sending apparatus shall not exceed 1 mW.

This value of  $-13$  dBm0 is in accordance with Recommendation V.2 [3], since in all cases the phototelegraph transmissions are operated in simplex. This value may have to be revised if the percentage of circuits used for applications other than telephony should go beyond the assumptions indicated in Recommendation V.2 [3].

## 8 Marking of equipment

When a telephone circuit is specially allocated for phototelegraph transmission (circuit identified by the letter F), the associated equipment should be specially marked to alert staff. All interruptions in a phototelegraph transmission, no matter how short, and all variations of level due to maintenance work should be avoided.

## 9 Organization of maintenance

The maintenance organization arrangements for international phototelegraph links should conform to the general principles given in Recommendation M.70 [4] concerning telephone-type circuits.

The designation of control and sub-control stations should follow the principles given in Recommendations M.1012 and M.1013.

## 10 Routine tests

The recommendations for 4-wire telephone circuits concerning the periodicity of measurements are also applicable to phototelegraph circuits.

Routine measurements should be made at the intervals recommended for international telephone circuits (see Table 1/M.610 [5]).

## 11 Information concerning frequencies transmitted by phototelegraph equipment

### 11.1 *Amplitude modulation*

For audio circuits the recommended carrier frequency is about 1300 Hz.

For circuits routed on carrier systems and effectively transmitting the band of frequencies 300-3400 Hz the recommended carrier frequency is about 1900 Hz.

### 11.2 *Frequency modulation*

Mean frequency	1900 Hz
White frequency	1500 Hz
Black frequency	2300 Hz
Phasing signal frequency	1500 Hz

12 Information about the characteristics to be taken into account when choosing the circuit used for phototelegraph transmissions is given in Recommendation T.12 [2].

## References

- [1] CCITT Recommendation *Setting up and lining up an international circuit for public telephony*, Vol. IV, Rec. M.580.
- [2] CCITT Recommendation *Range of phototelegraph transmissions on a telephone-type circuit*, Vol. VII, Rec. T.12.
- [3] CCITT Recommendation *Power levels for data transmission over telephone lines*, Vol. VIII, Rec. V.2.
- [4] CCITT Recommendation *Guiding principles on the general maintenance organization for telephone-type international circuits*, Vol. IV, Rec. M.70.
- [5] CCITT Recommendation *Periodicity of maintenance measurements on circuits*, Vol. IV, Rec. M.610, Table 1/M.610.