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P.16

TELEPHONE TRANSMISSION QUALITY

VOCABULARY AND EFFECTS OF TRANSMISSION PARAMETERS ON CUSTOMER OPINION OF TRANSMISSION QUALITY AND THEIR ASSESSMENT

SUBJECTIVE EFFECTS OF DIRECT CROSSTALK; THRESHOLDS OF AUDIBILITY AND INTELLIGIBILITY

ITU-T Recommendation P.16

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation P.16 was published in Volume V 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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SUBJECTIVE EFFECTS OF DIRECT CROSSTALK; THRESHOLDS OF AUDIBILITY AND INTELLIGIBILITY

(Geneva, 1972; amended at Geneva, 1976, 1980;
Malaga-Torremolinos, 1984; Melbourne, 1988)

1 Factors which affect the crosstalk threshold

The degree of audibility and intelligibility of a crosstalk signal depends on a large number of factors.

The main factors influencing the intelligibility of the vocal crosstalk signal are listed below.

1.1 Quality of transmission of telephone apparatus

The sending and receiving loudness ratings are decisive factors. The same is true of the sidetone rating when room noise is present. The use of modern telephone apparatus with smooth frequency response curves is assumed.

1.2 Circuit noise

The circuit noise on the connection of the disturbed call must be taken into account. The noise level is measured by a psophometer equipped with a weighting network for telephone circuits, as described in Recommendation O.41.

1.3 Room noise

Room noise affects the ear directly through earcap leakage between the ear and the receiver and indirectly by sidetone. Sidetone also depends on operating conditions. Unlike circuit noise, the effect of room noise can be reduced to some extent by the user of the telephone. For this reason, and to allow for unfavourable cases, measurements on the audibility of crosstalk have been made with slight room noise as well as with negligible room noise. Because the audibility threshold is very sensitive to masking effects, "negligible" room noise means a noise level well below 10 dBA. The relatively low noise level of 40 dBA has a very marked masking effect and may therefore serve as an example of "slight" room noise.

1.4 Telephone set noise

In addition to the masking effects on crosstalk by circuit noise and room noise, the internal noise of the telephone set in the disturbed connection has to be considered. In modern telephone sets this noise is generated in the electronic circuitry (amplifiers, etc.) while in older sets the origin is noise from the carbon microphone. The internal noise can be expressed and treated as an equivalent circuit noise.

1.5 Conversation on the disturbed connection

During active speech on the disturbed connection, practical levels of crosstalk are inaudible. However, before the conversation starts or during long pauses in the conversation, it is possible for crosstalk to be heard and perhaps understood. In general, it would be unwise to plan on the basis that the disturbed connection is always active; accordingly, the information given in this Recommendation assumes no conversation on the disturbed connection.

1.6 Crosstalk coupling

The intelligibility of a vocal crosstalk signal depends largely on the nature of the crosstalk coupling, which is generally a function of frequency.

The loudness rating of the crosstalk transmission path – from the speech signal present on the disturbing line to the subscriber's set subject to the disturbance – can be divided into the loudness loss of the crosstalk path from the disturbing to the disturbed line and the receive loudness rating of the disturbed subscriber's set. Figure 1/P.16 illustrates this subdivision.