



INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**P.82**

**TELEPHONE TRANSMISSION QUALITY  
SUBJECTIVE OPINION TESTS**

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**METHOD FOR EVALUATION OF SERVICE  
FROM THE STANDPOINT OF SPEECH  
TRANSMISSION QUALITY**

**ITU-T Recommendation P.82**

(Extract from the *Blue Book*)

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## NOTES

1 ITU-T Recommendation P.82 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.

## **Recommendation P.82<sup>1)</sup>**

### **METHOD FOR EVALUATION OF SERVICE FROM THE STANDPOINT OF SPEECH TRANSMISSION QUALITY**

*(Geneva, 1976; amended at Malaga-Torremolinos, 1984)*

#### **1 General**

The CCITT recommends that Administrations make use of telephone users' surveys in the manner of Recommendation E.125 [1] as a means of measuring speech transmission quality on international calls.

Such surveys being call-related (in this instance to the last international call made) can be conducted either by the full use of the Recommendation E.125 questionnaires (where other valuable information is obtained on users' difficulties, e.g. knowing how to make the call, difficulties in dialling or understanding tones, etc.) or by making use of those questions solely related to transmission quality which appear in Annex A.

*Note* – The evaluation of the transmission performance may be altered by difficulties in setting-up call. Hence the response to incomplete questionnaires should be considered with some reservation.

#### **2 Conduct of surveys**

In order to make valid comparisons between data collected in different countries, Recommendation E.125 should be strictly adhered to. Specifically the preamble to the Recommendation, the notes of intended use of the questionnaires and the precise order and wording of the questions should be rigidly followed. In some cases, however, an exception will be made and Question 10.0 will be replaced by the wording indicated in Annex B (detailed information is given in [3]).

*Note* – This alternative version has the advantage of simplifying the classification of responses to open end probes by experts, as well as increasing the sensitivity to some types of impairments such as delay. These advantages should be weighed against the additional interview time which may be required.

#### **3 Treatment of results**

To provide quantitative information suitable for comparisons, the subjective assessments (e.g. those obtained from Question 9.0 of Annex A) of excellent, good, fair or poor (see Note) should be accorded scores of 4, 3, 2 and 1, respectively and a mean opinion score (MOS) calculated for all associated responses. Similarly for all those experiencing difficulty (under Question 10.0 of Annex A or, alternatively, Question 10.0 of Annex B) a percentage of the total responses should be calculated. These two criteria of MOS and percentage difficulty are now internationally recognized and have been measured under many different laboratory simulated connections and practical situations.

The results can be classified in a number of ways, e.g. in terms of the call-destination countries or by nature/composition of the connection i.e. cable/satellite circuits, presence or otherwise of echo suppressors etc. Typical methods of presentation of the results are shown in [2], in this case for several countries. It should be noted that in all presentations it is essential to show the number of responses.

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<sup>1)</sup> This Recommendation was numbered P.77 in the *Red Book*

*Note* – Among the reasons which lead to the limitation of users' opinions of transmission quality to four classes, i.e. excellent, good, fair and poor, is the following. The experience gained in human factor investigations has shown that when a question which requires a selection from several different classifications is posed in aural form, e.g. by face-to-face interview or by telephone as with Recommendation E.125, the respondent is frequently unable to carry a clear mental separation of more than four categories. As a consequence, he is unable to draw on his short-term memory and judgement ability in a sufficiently precise manner to avoid confusion and gives an unreliable response. This restriction does not apply to other situations where a written presentation of the choices is used, in which case frequently five or more classes may be appropriate and shown to yield reliable responses.

ANNEX A

(to Recommendation P.82)

**Extract from the questionnaire annexed to Recommendation E.125**

Reproduced below are the questions relating to transmission quality which appear in the questionnaire annexed to Recommendation E.125.

The CCITT recommends that this Annex should be used when customers' general impressions of transmission performance are required.

9.0 .....

*Which of these four words comes closest to describing the quality of the connection during conversation?*

- 9.1 – *excellent*
- 9.2 – *good*
- 9.3 – *fair*
- 9.4 – *poor*

1		}	48
2			
3			
4			

10.0 *Did you or the person you were talking to have difficulty in talking or hearing over that connection?*

	<b>YES</b>	<b>NO</b>		
1		2		49

(If answer is "yes") probe for nature of difficulty, but without suggesting possible types of difficulty, and copy down answers verbatim: e.g. "Could you describe the difficulty a little more?"

.....  
.....

At end of interview, categorize the answers in terms of the items below:

- 10.1 – low volume
- 10.2 – noise or hum
- 10.3 – distortion
- 10.4 – variations in level, cutting on and off
- 10.5 – crosstalk
- 10.6 – echo
- 10.7 – complete cut off
- 10.8 – other (specify) .....

1		50
1		51
1		52
1		53
1		54
1		55
1		56
1		57

←

*Note* – Responses to Questions 10.1 to 10.8 are only obtained from customers who have expressed difficulty in Question 10.0.

ANNEX B

(to Recommendation P.82)

**Alternative version for Question 10.0 of questionnaire  
annexed to Recommendation E.125**

Studies at AT&T have shown that the verbatim responses describing impairments (requested after Question 10.0 of Annex A) are often too imprecisely worded to permit accurate classification by interviewers who are not experienced in transmission studies. A typical solution to this problem has been to convene a panel of experts to classify the responses, a method which may become impractical as the size and number of user reaction tests increases. This annex presents an alternative approach developed in 1976 and used widely since then by AT&T to measure customer's perceptions of transmission quality on domestic and international telephone connections. The approach involves a more complicated technique of probing for impairments which simplifies the ultimate task of classifying the responses. The alternative of Question 10.0 is reproduced below.

The CCITT recommends that this annex should be used for diagnostic purposes only.

10.0 *Did you have any difficulty talking or hearing over that connection?*

YES                  NO  
1     2     49

Do not probe: If the person volunteers an explanation, write it down. . . . .  
On question 10.1-10.8, attempt to read entire text before respondent replies.

10.1 *Now I'd like to ask some specific questions about the connection.*

If the person has already described difficulty, add:  
*(In view of what you've already said, some of these may seem repetitious, but please bear with me). First, during your conversation on that call, did you hear your own voice echoing back, or did your own voice sound hollow to you?*

- 10.1.1 – echo hollow (own voice)
- 10.1.2 – neither
- 10.1.3 – don't remember/not sure
- 10.1.4 – other (specify) . . . . .

1

2  } 50

3

4  } ←

10.2 *Did you hear another telephone conversation on the telephone network at the same times as your own?*

- 10.2.1 – other conversation
- 10.2.2 – no
- 10.2.3 – don't remember/not sure
- 10.2.4 – other (specify) . . . . .

1

2  } 51

3

4  } ←

10.3 *Now I'd like you to think about the voice of the person you were talking to. Was the volume of the voice low as if the person were faint and far away; did the voice fade in and out; or was the voice interrupted or chopped up at times?*

- 10.3.1 – low volume
- 10.3.2 – fading
- 10.3.3 – chopping
- 10.3.4 – none
- 10.3.5 – don't remember/not sure
- 10.3.6 – other (specify) . . . . .

1

2

3  } 52

4

5

6  } ←

- 10.4 *How did the voice of the person your were talking to sound to you: did it echo or sound hollow and tinny; or did it sound fuzzy or unnatural?*
- 10.4.1 – echo, hollow
  - 10.4.2 – fuzzy, unnatural
  - 10.4.3 – none
  - 10.4.4 – don't remember/not sure
  - 10.4.5 – other (specify) .....

1	<input type="checkbox"/>	}	53
2	<input type="checkbox"/>		
3	<input type="checkbox"/>		
4	<input type="checkbox"/>		
5	<input type="checkbox"/>		

←

- 10.5 *Now let me describe three kinds of noise. Tell me if you noticed any of these noises during your conversaiton: a rushing or hissing sound; a frying and/or sizzling, crackling sound; or a humming or buzzing sound?*
- 10.5.1 – rushing, hissing
  - 10.5.2 – frying and/or sizzling, crackling
  - 10.5.3 – humming, buzzing
  - 10.5.4 – none
  - 10.5.5 – don't remember/not sure
  - 10.5.6 – other (specify) .....

1	<input type="checkbox"/>	}	54
2	<input type="checkbox"/>		
3	<input type="checkbox"/>		
4	<input type="checkbox"/>		
5	<input type="checkbox"/>		
6	<input type="checkbox"/>		

←

- 10.6 *Now let me describe three more kind of noise. Tell me if you noticed any of these during your conversation: a clicking sound; a series of musical tones or beeps; or a continuous high-pitched tone?*
- 10.6.1 – clicking
  - 10.6.2 – tones or beeps
  - 10.6.3 – high-pitched tone
  - 10.6.4 – none
  - 10.6.5 – don't remember/not sure
  - 10.6.6 – other (specify) .....

1	<input type="checkbox"/>	}	55
2	<input type="checkbox"/>		
3	<input type="checkbox"/>		
4	<input type="checkbox"/>		
5	<input type="checkbox"/>		
6	<input type="checkbox"/>		

←

- 10.7 *Did the other person seem slow to respond, as if there were delay or time lag in the conversation?*
- 10.7.1 – yes
  - 10.7.2 – no
  - 10.7.3 – don't know
  - 10.7.4 – other (specify) .....

1	<input type="checkbox"/>	}	56
2	<input type="checkbox"/>		
3	<input type="checkbox"/>		
4	<input type="checkbox"/>		

←

10.8 *Would you please try to remember the background noise in the area around your telephone (e.g. noise from air-conditioning plant unit, road traffic, office equipment or other people talking) when you made the call. Which of the following categories best describes it?*

- 10.8.1 – very noisy
- 10.8.2 – noisy
- 10.8.3 – quiet
- 10.8.4 – very quiet
- 10.8.5 – other (specify) .....

1		} 57
2		
3		
4		
5		

←

10.9 *Which of the categories listed below best describes the extent to which you heard your own voice through your telephone when you were talking?*

- 10.9.1 – could not hear it
- 10.9.2 – could hear it now that you have drawn my attention to it
- 10.9.3 – did notice it – not loud
- 10.9.4 – did notice it – loud
- 10.9.5 – other (specify) .....

1		} 58
2		
3		
4		
5		

←

10.10 *Was there anything else about the connection you'd like to mention?*

*Yes – What? (Write in)*

.....  
 .....  
 .....

Coding instructions:

- is there a written comment?
- does the comment apply to this call?
- does it mention an impairment?
- has it been mentioned already?
- other (specify) .....

YES		NO		
1		2		59
1		2		60
1		2		61
1		2		62
1		2		63

*Note* – The responses to the specific questions are only obtained from customers who have expressed difficulty in Question 10.0. This may prevent the diagnosis of certain impairments (the bias produced is more serious than that mentioned at the end of Annex A).

**References**

- [1] CCITT Recommendation *Inquiries among users of the international telephone service*, Red Book, Vol. II, Rec. E.125, ITU, Geneva, 1985.
- [2] CCITT – Question 2/XII, Annex 2, Contribution COM XII-No. 1, Study Period 1977-1980, Geneva, 1977.
- [3] CCITT – Question 2/XII, Annex, Contribution COM XII-No. 171, Study Period 1977-1980, Geneva, August 1979.