INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

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STANDARDIZATION SECTOR
OF ITU

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(03/93)

TRANSMISSION SYSTEMS AND MEDIA

GENERAL RECOMMENDATIONS ON THE TRANSMISSION QUALITY FOR AN ENTIRE INTERNATIONAL TELEPHONE CONNECTION

ONE-WAY TRANSMISSION TIME

ITU-T Recommendation G.114

(Previously "CCITT Recommendation")

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 G.114 was revised by the ITU-T Study Group XII (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

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 G.114

ONE-WAY TRANSMISSION TIME

(Geneva, 1964; amended Mar del Plata, 1968; Geneva, 1980;
Malaga-Torremolinos, 1984; Melbourne, 1988 and Helsinki, 1993)

Transmission time for connections with digital segments includes delay due to equipment processing as well as propagation delay, such that both types of delay can be significant contributors to overall transmission time. Guidance is especially needed for designers of telecommunications equipment that uses signal processing, causing increase in delay.

Historically a value of 400 ms was considered a meaningful limit for network planning purposes, where voice telephony was the focus. This value was not originally intended as guidance for equipment designers who, on an increasingly frequent basis, can substantially affect the transmission time by the amount of signal processing in their designs.

Transmission time is a very important parameter for any application whose overall performance is dependent on user or terminal interactivity. Applications such as voice, voice-band data, digital data, and videotelephony may involve user tasks or terminal equipment characteristics that vary substantially in their sensitivity to transmission delay. Because network and service providers cannot alter the transmission time characteristics nor transmission media between two Administrations, in response to all possible user tasks and applications, some highly interactive tasks may experience degradation even at delays on the order of 100 ms. Accordingly, it is critical that the delay (transmission time) be seen as a vital resource that is to be consumed with caution, and only when clear service benefits derive from it. This especially applies to delay associated with signal processing.

This Recommendation is intended to assist equipment designers and network planners in realizing acceptable services to users performing a wide variety of tasks with multiple applications. It is recognized that not all possible user applications and network configurations can be predicted, and that some user applications and network arrangements may combine processing delays and propagation times such that the total transmission time exceeds 400 ms.

A clear purpose of this Recommendation is thus to emphasize the need to consider the delay impact on evolving service applications, and indicate the desirability of avoiding delay increases, especially processing delays, whenever possible.

In consideration of the above points, the CCITT *recommends* the following limits for one-way transmission time for connections with echo adequately controlled (see Note 1) according to Recommendation G.131:

0 to 150 ms	Acceptable for most user applications (see Note 2).
150 to 400 ms	Acceptable provided that Administrations are aware of the transmission time impact on the transmission quality of user applications (see Note 3).
above 400 ms	Unacceptable for general network planning purposes; however, it is recognized that in some exceptional cases (see Note 4) this limit will be exceeded.

NOTES

1 The use of echo control equipment that introduces other impairments, such as speech clipping and noise contrast, may have to be controlled in order to achieve acceptable transmission quality.

2 Some highly interactive voice and data applications may experience degradation for values below 150 ms. Therefore, increases in processing delay on connections with transmission times even well below 150 ms should be discouraged unless there are clear service and application benefits.

3 For example, international connections with satellite hops that have transmission times below 400 ms are considered acceptable.

4 Examples of such exceptions are unavoidable double satellite hops, satellites used to restore terrestrial routes, fixed satellite and digital cellular interconnections, videotelephony over satellite circuits, and very long international connections with two digital cellular systems connected by long terrestrial facilities.

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