



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.725

GENERAL ASPECTS OF DIGITAL TRANSMISSION SYSTEMS TERMINAL EQUIPMENTS

SYSTEM ASPECTS FOR THE USE OF THE 7 kHz AUDIO CODEC WITHIN 64 kbit/s

ITU-T Recommendation G.725

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation G.725 was published in Fascicle III.4 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.

© ITU 1988, 1993

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the ITU.

Recommendation G.725

SYSTEM ASPECTS FOR THE USE OF THE 7 kHz AUDIO CODEC WITHIN 64 kbit/s

(Melbourne, 1988)

1 General

This Recommendation should be associated with Recommendation G.722 *7 kHz audio coding within 64 kbit/s* and Recommendation H.221 *Frame structure for a 64 kbit/s channel in audiovisual teleservices*.

A number of applications utilizing wideband (7 kHz) speech have been identified including high quality telephony, audio conferencing (with or without various kinds of visual aids), speech channel of visual telephony, audiographic conferencing and so on. More applications will undoubtedly emerge in the future.

To provide these services a scheme is recommended in which the 64 kbit/s channel accommodates speech, and optionally data at several rates, in a number of different modes. Signalling procedures are required to establish a compatible mode upon call setup, to switch between modes during a call, and to allow for call transfer. In the future ISDN, D-channel signalling may be used for some of these procedures. However, before the signalling facilities of the ISDN become available, in channel signalling must be provided.

All audio and audio-visual terminals using G.722 audio coding and/or G.711 speech coding should be compatible to permit connection between any two terminals. This implies that a common mode of operation has to be established for the call. The initial mode might be the only one used during a call or, alternatively, switching to another mode can occur as needed, depending on the capabilities of the terminals. Thus, for these terminals, an in-channel procedure for dynamic mode switching is required even in a ISDN environment.

The following paragraphs develop these considerations and describe recommended in-channel procedures.

2 Transmission modes and terminal types

2.1 Transmission modes

The following modes of operation are defined:

Mode 0 - 64 kbit/s narrowband audio according to Recommendation G.711 (A- or μ -law);

Mode 1 - 64 kbit/s 7 kHz audio according to Recommendation G.722;

Mode 2 - 56 kbit/s 7 kHz audio according to Recommendation G.722 + up to 6.4 kbit/s data;

Mode 3 - 48 kbit/s 7 kHz audio according to Recommendation G.722 + up to 14.4 kbit/s data.

For both Modes 2 and 3, an additional 1.6 kbit/s capacity is reserved for service channel framing and mode control.

Additional modes may be defined (see Recommendation H.221) having other speech bit rates, or data bit rates up to a full 64 kbit/s data path.

For analogue telephone terminal it may be assumed that the speech signal is converted to PCM according to Recommendation G.711 at a digital network interface. These terminal are viewed as working in Mode 0, when connected to wideband speech terminal.

2.2 Terminal types

Three types of terminals are defined thus far, according to their modes of operations:

Type 0 - A digital telephone set working in Mode 0 only (or an analogue telephone set connected via a PCM interface);

Type 1 - A 7 kHz audio terminal capable of working in Mode 1 or in Mode 0;

Type 2 - A member of a family of 7 kHz audio/data terminals capable of working at least in Modes 0, 1, 2 and 3. Further modes may also be implemented. Dynamic mode switching between different modes must be provided.

In order to establish a mode of operation with the highest possible performance, terminals of Type 1 and Type 2 must be able to identify the terminal type at the far end, and they must indicate their own type to the far end terminal.

2.3 Establishment of compatible modes of operation

At the beginning of the communication phase of a call, all terminals start to work in Mode 0. Terminals of Type 1 and Type 2 will then begin an initialization procedure.

This procedure (further described in § 5) consists of:

- the transmission of information concerning the capabilities of the respective terminal for audio coding and/or data transmission;
- the determination of a suitable transmission mode consistent with the known capabilities of both terminals (an example of agreed mode is given in Table 1/G.725); and
- switching to this mode.

The terminals connected to a call may change during the call. This may require reinitialization in order to identify the terminal type and to re-establish the common mode of operation. In particular, this feature is used for Mode 0 forcing, which is necessary in the case of a call transfer (see § 7).

TABLE 1/G.725

Mode of operation upon completion of the initialization procedure

Agreed mode of operation		Identified terminal type at the far end		
		Type 2	Type 1	Type 0
Type of local terminal	Type 2	Mode 2	Mode 1	Mode 0
	Type 1			

3 Frame structure

The frame structure described in Recommendation H.221 is used for dynamic mode switching and mode initialization (see the following sections) and more generally to allocate sub-channels in connections of Type 2 terminals.

Recommendation H.221 defines a bit rate allocation signal (BAS) which is used to allocate subchannels and to indicate the audio coding algorithm. Table 2/G.725 gives the coding of the BAS for the attribute 000 (audio coding) as applicable to terminals to Recommendation G.722. Only a BAS beginning with 000 should be taken into account as to the audio coding mode itself. In this respect, a BAS with another attribute does not modify the audio coding mode.