ITU-T

V.22

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

INTERNATIONAL TELECOMMUNICATION UNION

DATA COMMUNICATION

OVER THE TELEPHONE NETWORK

1200 BITS PER SECOND DUPLEX MODEM STANDARDIZED FOR USE IN THE GENERAL SWITCHED TELEPHONE NETWORK AND ON POINT-TO-POINT 2-WIRE LEASED TELEPHONE-TYPE CIRCUITS

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(Extract from the *Blue Book*)

NOTES

1   ITU-T Recommendation V.22 was published in Fascicle VIII.1 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 V.22

1200 BITS PER SECOND DUPLEX MODEM STANDARDIZED FOR USE IN THE GENERAL SWITCHED TELEPHONE NETWORKAND ON POINT-TO-POINT 2-WIRELEASED TELEPHONE-TYPE CIRCUITS

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

1 Introduction

1.1 This modem is intended for use on connections on General Switched Telephone Networks (GSTNs), and on point-to-point circuits when suitably conditioned.

The principal characteristics of this modem are as follows:

a) duplex operation on 2-wire GSTN and point-to-point leased circuits,

b) channel separation by frequency division,

c) differential phase shift modulation for each channel with synchronous line transmission at 600 bauds (nominal),

d) inclusion of a scrambler,

e) inclusion of test facilities.

1.2 Recognizing the wide range of application, this Recommendation provides for three alternative configurations. The choice of alternative is a matter for the Administration concerned. The facilities given by the alternatives are:

Alternative A

1200 bit/s synchronous

600 bit/s synchronous (optional)

Alternative B

1200 bit/s synchronous
600 bit/s synchronous (optional) }   as in Alternative A

1200 bit/s start-stop

600 bit/s start-stop (optional)

Alternative C

1200 bit/s synchronous
600 bit/s synchronous (optional)
1200 bit/s start-stop
600 bit/s start-stop (optional) }   as in Alternative B

An asynchronous mode having capability of handling 1200 bit/s start-stop and asynchronous data at up to 300 bit/s.

The selection of the asynchronous mode is made during the handshaking sequence (see § 6). This gives compatibility between Alternative B and Alternative C.

Note - The possibility of transmitting low speed anisochronous data in Alternatives A and B is left for further study.

2   Line signals

2.1   *Carrier and guard tone frequencies*

The carrier frequencies shall be 1200 ± 0.5 Hz for the low channel and 2400 ± 1 Hz for the high channel. A guard tone of 1800 Hz ± 20 Hz, to be transmitted only when the modem is transmitting in the high channel, may be disabled as a national option. An alternative guard tone of 550 ± 20 Hz may be incorporated as a national option. The question of international calls between countries requiring different guard tones is left for further study.

2.2   *Data and guard tone line signal levels*

The 1800-Hz guard tone shall be at a level of 6 ± 1 dB below the level of the data power in the high channel. The level of the optional 550 Hz tone is for further study. The total power transmitted to line shall be in accordance with Recommendation V.2 and shall be the same for transmission in either channel. Because of the 1800-Hz guard tone, the power level of data signals in the high channel will be approximately 1 dB lower than data signals in the low channel.

2.3   *Fixed compromise equalizer*

Fixed compromise equalization shall be incorporated in the modem. Such equalization shall be equally shared between transmitter and receiver. The characteristics of the equalizer shall be the responsibility of each Administration to recommend nationally. The possibility of producing compromise characteristics for international implementation is for further study.

2.4   *Spectrum and group-delay characteristic*

After making allowance for the nominal specified compromise equalizer characteristic, the transmitted line signal shall have a frequency spectrum equivalent to the square root of a raised cosine shaping with a 75% roll-off and within the limits of Figure 1/V.22. Similarly, the group delay of the transmitter output shall be within ± 150 microseconds over the frequency range 900 Hz-1500 Hz (low channel) and 2100 Hz-2700 Hz (high channel). These figures are provisional.
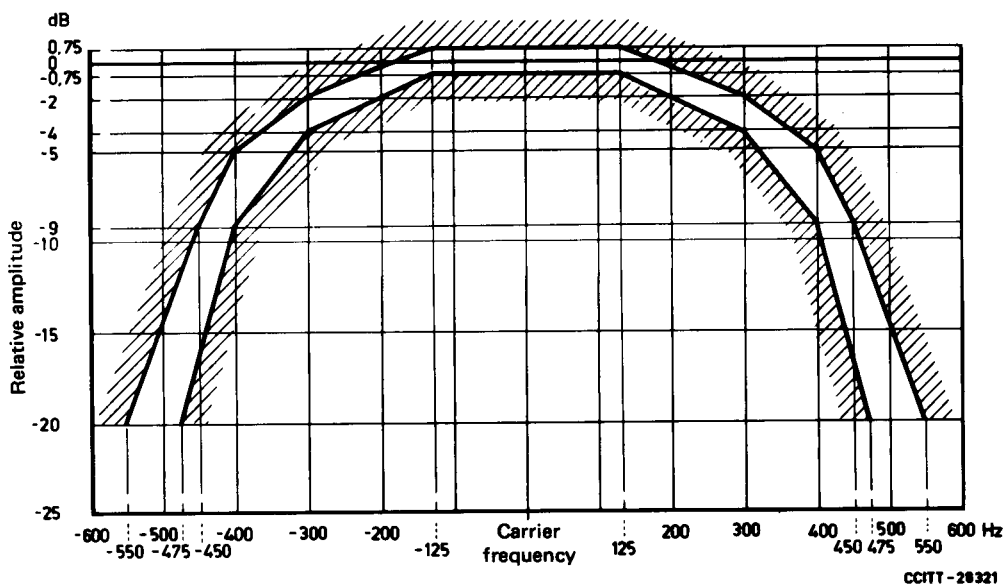

FIGURE 1/V.22

Amplitude limits for transmitted line signal (unequalized)

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