

RECOMMENDATION 623

DATA TRANSMISSION BIT RATES AND MODULATION TECHNIQUES
IN THE LAND MOBILE SERVICE

(Question 40/8)

(1986)

The CCIR,

CONSIDERING

- (a) that digital signals are being increasingly used to improve communication efficiency in the land mobile service;
- (b) that benefits will result from standardization of data signalling bit rates conforming to CCITT Recommendations V.5 and V.6 by facilitating the interworking of synchronous data transmission in the land mobile service with synchronous data transmission over telephone circuits;
- (c) that standardization of modulation techniques is one of the steps required for international interworking;
- (d) Report 903,

UNANIMOUSLY DECIDES

1. that the following data signalling bit rates should be preferred for synchronous data transmission in the land mobile service: 600, 1200, 2400, 4800 or 9600 bit/s (see Note 1);
2. that the following modulation techniques be preferred for constant envelope radio systems (see Notes 2 and 3), and that the FM deviation be adjusted so as to meet the spectral emission constraints of each administration:
- 2.1 Direct RF-carrier modulation technique (see Note 4): constant envelope modulation:

GMSK,
tamed FM,
4-state-FM,
PLL-4-PSK.

- 2.2 Sub-carrier modulation technique:

<i>Transmission bit rate</i> (see Note 3)	<i>Modulation method</i>	<i>Additional information</i>
1200 bit/s	FFSK	“0” = 1800 Hz; “1” = 1200 Hz
2400 bit/s	FFSK	“0” = 2400 Hz; “1” = 1200 Hz
4800 bit/s	FFSK	“0” = 4800 Hz; “1” = 2400 Hz
4800 bit/s	bipolar	

3. that due to fading on the radio channel some kind of error correction and retransmission should be used, resulting in a higher transmission bit rate than the data source bit rate.

Note 1. – Other data transmission bit rates may be of interest (e.g. 6 kbit/s for 12.5 kHz channel spacing). This also may be the case when the system design does not require the same data rate on both the radio and telephone parts of the communication channel.

Note 2. – For source bit rates up to 1200 bit/s sub-carrier data signals can pass through the speech processing circuits of the radio equipment and can be, in some cases, directly interconnected to the telephone network. For higher data signalling rates it may be necessary to provide separate data paths between the sub-carrier data signal and the RF-modulator and/or demodulator.

Note 3. – For 9600 bit/s direct carrier modulation and for 4800 bit/s sub-carrier modulation, the necessary bandwidth may not be accommodated in a 12.5 kHz channel spacing scheme.

Note 4. – There are a number of different direct modulation techniques which are not necessarily compatible (see Report 903).