

RECOMMENDATION 480

SEMI-AUTOMATIC OPERATION ON HF RADIOTELEPHONE CIRCUITS

Devices for remote connection to an automatic exchange by radiotelephone circuits

(Question 13/3)

(1974)

The CCIR,

CONSIDERING

- (a) that telephone circuit operation is substantially improved by the use of semi-automatic instead of manual working;
- (b) that HF radiotelephone circuits will continue to be used for many years to come in the international fixed service;
- (c) that employment of CCITT signalling codes on such circuits, even when they are equipped with systems of the type described in Recommendation 455, is difficult owing to the loss probabilities prescribed for the use of these codes in the international service;
- (d) that, on the other hand, the use of signalling methods specially intended for radiotelephone channels makes it possible to transmit the information required for remote connection of an operator in one country to an automatic exchange in another country;
- (e) that the FSK signalling system now in use on HF radiotelegraph circuits meets the requirements of (d) above;
- (f) that Report 434 contains precise details on the use of, and tests made by certain countries with devices using the signals mentioned in (e) above and that the results are very satisfactory,

UNANIMOUSLY RECOMMENDS

that, when it is desired to provide remote dialling facilities into an automatic exchange via an HF radiotelephone circuit, the system parameters used should preferably conform to those described in Annex I to this Recommendation.

ANNEX I

The following specifications concern two devices, a "TRANSMITTING device" in OUTGOING country A and a "RECEIVING device" in INCOMING country B. The TRANSMITTING device is connected to the operating centre of country A (operators) and the RECEIVING device is connected to the automatic switching equipment of incoming country B by a dedicated line. The operator in country A can call a subscriber in country B in the same way as another subscriber in country B would do, since the TRANSMITTING AND RECEIVING devices establish a genuine remote connection between the operator in A and the automatic switching equipment in B.

Use by the two countries A and B of the devices described here permits semi-automatic operating, since the operator in A is in a sense a subscriber of the B network. Only terminal traffic will be allowed between the two countries, all transit traffic being excluded. Further, the two countries will have to agree on the facilities afforded to the operators in A (calling of special services such as information, calling in assistance-operators in B or other operators to reach subscribers in B not connected to an automatic exchange).

These specifications are concerned only with the compatibility of the TRANSMITTING and the RECEIVING devices permitting the remote connection of the outgoing operator to the incoming automatic switching equipment.

1. Interconnection

1.1 *The TRANSMITTING device* is connected on one side to the operating centre (operators) and on the other to the radiotelephone circuit:

- on the operating centre side: the operator must transmit to the TRANSMITTING device, for example, by separate wires, the SEIZING, DIALLING, END-OF-DIALLING and CLEARING information;

– on the radiotelephone circuit side: the TRANSMITTING device is placed in series on the *send* direction of the four-wire circuit.

1.2 The RECEIVING device is placed in the *receive* path of the four-wire circuit.

The voice circuit and the supervisory and signalling paths from the RECEIVING device are connected to the automatic exchange.

2. Signals transmitted in the forward direction

Information in the forward direction, i.e. from outgoing country A to incoming country B, supplied by the operator in A is converted into signals by the TRANSMITTING device using frequency modulation, which is particularly well suited to transmission on radiotelephone channels.

The TRANSMITTING device contains a voice-frequency FM oscillator of frequency F with a deviation of $\pm \Delta f$. The value of F is selected, by agreement between the two countries*, from the list of frequencies recommended by CCIR (Recommendation 436) with a frequency-shift according to Recommendation 246 of ± 85 Hz.

Table I below lists the various types and uses of signals

TABLE I

Signal	Signal transmitted on the radiotelephonic circuit	Recognition tolerance at the receiving end
SEIZING	frequency $F \pm \Delta f$ modulated at 100 ± 1 bauds for 300 ms and followed by the frequency $F + \Delta f$ permanently emitted until the beginning of the DIALLING signals	frequency $F \pm \Delta f$ modulated at 100 bauds for a period of 200 to 400 ms followed by the frequency $F \pm \Delta f$ for at least 300 ms
DIALLING	frequency $F \pm \Delta f$ modulated at the dial pulse rate (66/33 ms or 50/50 ms): the "off" corresponds to the frequency $F \pm \Delta f$, and the "on" (open) to frequency $F - \Delta f$	Minimum duration of "on" condition (frequency $F - \Delta f$): 25 ms
END-OF- DIALLING	frequency $F \pm \Delta f$ modulated at 100 bauds for 300 ms. No signalling frequency is emitted after this signal	Duration: 200 to 400 ms
CLEARING	frequency $F \pm \Delta f$ modulated at 100 bauds for 600 ms. No signalling frequency is emitted afterwards	Duration more than 500 ms

3. Signals used in the reverse direction

At all times the operator must be able to hear the supervisory signals generated by the distant automatic exchange.

This requires:

3.1 that the TRANSMIT and RECEIVE devices provide control signals to disable any echo suppressors or singing suppressors, included in the circuit, during the period between seizing and the end of dialling;

3.2 that in cases where supervisory signals are too low in frequency to be transmitted directly they must be translated into the voice-frequency band.

* Different frequencies must be available when there are several circuits equipped with TRANSMITTING or RECEIVING devices in one and the same radiotelephone (transmitting) system to avoid false seizing caused by inter-channel cross-talk.