



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.154

SPECIFICATIONS OF SIGNALLING SYSTEM No. 5

MULTIFREQUENCY SIGNAL RECEIVER

ITU-T Recommendation Q.154

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation Q.154 was published in Fascicle VI.2 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.

3.4 MULTIFREQUENCY SIGNAL RECEIVER

3.4.1 *Operating limits*

The signal receiver must ensure a separate output signal for each of the six voice-frequency signals received, and must operate satisfactorily for any combination of two of the frequencies, received as a single pulse or in a train of pulses, satisfying the following conditions:

- a) the frequency of the received signal is within ± 15 Hz of the nominal signalling frequency;
- b) the absolute power level N of each unmodulated signal shall be within the limits $(-14 + n \leq N \leq n)$ dBm where n is the relative power level at the signal receiver input. These limits give a margin of ± 7 dB on the nominal absolute level of each received signal at the input to the signal receiver;
- c) the absolute levels of the two unmodulated frequencies comprising a signal must not differ from each other by more than 4 dB;
- d) when the signal frequencies and levels are within the limits specified in a), b) and c) above, and in the presence of noise as defined in § 3.4.3:
 - 1) at the input of a signal receiver, the minimum duration of an MF signal necessary to ensure correct registration of the digit shall not exceed 30 ms; this includes the operate time of the signal receiver and the two-and-two only check feature;
 - 2) furthermore, at the input of the signal receiver, the minimum duration of an interval necessary to ensure the correct functioning of the registration device shall not exceed 30 ms; this includes the release time of the signal receiver and the restoration time of the two-and-two only check feature.

Note 1 - The tolerances given in a), b) and c) are to allow for variations at the sending end and in line transmission.

Note 2 - The test values indicated in d) are less than the working values. The difference between the test and working values will allow for pulse distortion, difference in time of the receipt of the two frequencies comprising a signal, etc.

3.4.2 *Non-operating conditions*

- a) **Maximum sensitivity**

The signal receiver shall not operate under the effect of a signal as indicated in § 3.4.1 a) whose absolute power level at the point of connection of the receiver is $(-17 - 7 + n)$ dBm, n being the relative power level at this point.

This limit is 17 dB below the nominal absolute power level of the signal current at the input to the signal receiver.

- b) ***Transient response***

Operation of the signal receiver shall be delayed for a minimum period necessary to guard against false operation due to spurious signals generated within the receiver on reception of any signal.

- c) ***Short signal response***

The signal receiver should not operate to a pulse signal of 10 ms or less. This signal may be of single frequency or two frequencies received simultaneously.

Likewise the signal receiver should ignore short intervals.

3.4.3 *Steady noise*

Considering that unweighted noise of a level -40 dBm0 (100 000 pW) and uniform spectrum energy may arise on the longest international circuit, the multifrequency receiver should satisfy the condition indicated in § 3.4.1 d) for minimum signal and interval durations in the presence of noise of level -40 dBm0 and uniform spectrum energy over the frequency range 300 to 3400 Hz.

3.4.4 *Input impedance*

The input impedance should be such that the return loss over a frequency range 300 to 3400 Hz against a 600 ohm non-inductive resistor is greater than 20 dB.