



INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**Q.164**

**SPECIFICATIONS OF SIGNALLING SYSTEM No. 5**

---

**TEST EQUIPMENT FOR CHECKING  
EQUIPMENT AND SIGNALS**

**ITU-T Recommendation Q.164**

(Extract from the *Blue Book*)

---

## NOTES

1 ITU-T Recommendation Q.164 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.

## Recommendation Q.164

### 4.4 TEST EQUIPMENT FOR CHECKING EQUIPMENT AND SIGNALS

#### 4.4.1 *General*

For local checks of correct equipment operation and for readjusting the equipment, international exchanges should have test equipment available which includes:

- a) Line and register signal generators.
- b) Signal-measuring apparatus.
- c) Loop-around equipment (see 4.4.4).

#### 4.4.2 *Signal generators*

The signal generators should be able to simulate all line and register signals. The generators may be part of test equipment which cycles the equipment to be tested through actual signalling sequences, in a manner which enables rapid complete testing to determine whether the equipment meets the system specifications. The generators should have the following characteristics:

- a) *Line signal generator*
  - 1) Signal frequencies should be within  $\pm 5$  Hz of the nominal signalling frequency or frequencies and shall not vary during the time required for testing.
  - 2) Signal levels should be variable between the limit given in the specification and be able to be set within  $\pm 0.2$  dB.
  - 3) Signal duration should be long enough so that the signals can be recognized and long enough in the case of compelled signals to complete the acknowledgement process.
- b) *Register signal generator*
  1. Signal frequencies should be within  $\pm 5$  Hz of the nominal signalling frequency or frequencies and shall not vary during the time required for testing.
  2. Signal levels should be variable between the limits given in the specification and be able to be set within  $\pm 0.2$  dB.
  3. Signal durations and intervals between signals shall be within the limits given in the specification in Recommendation Q.153, § 3.3.3, for normal operate values and in Recommendation Q.154, § 3.4.1 d), for test operate values.

#### 4.4.3 *Signal-measuring equipment*

Equipment capable of measuring signal frequencies, signal levels, signal durations and other significant signal time intervals may be part of the test equipment referred to in § 4.4.2, or separate instruments. In either case the characteristics of the measuring equipment should be as follows:

- a) *Line signal-measuring equipment*
  1. Signal frequency or frequencies to be measured to be between the extreme limits given in the specification, the reading being made with an accuracy of  $\pm 1$  Hz.
  2. Level of the signal frequency or frequencies measured over the range given in the specification to be measured with an accuracy of  $\pm 0.2$  dB.
  3. Signal durations, signal recognition times and other significant time intervals as given in the specification should be measured within an accuracy of 1 ms or  $\pm 1\%$  of the nominal duration, whichever yields the higher value. The range of time intervals to be measured is approximately 5 to 1050 ms. Time-out intervals of 10 to 20 seconds and of 4 to 9 seconds should be determinable within an accuracy of  $\pm 1$  second.

b) *Register signal-measuring equipment*

1. Signal frequency or frequencies to be measured to be between the extreme limits given in the specification, the reading being made with an accuracy of  $\pm 1$  Hz.
2. Level of the signal frequency or frequencies measured over the range given in the specification to be measured within an accuracy of  $\pm 0.2$  dB.
3. Signal duration and intervals between signals as given in the specification should be measured with an accuracy within 1 ms.

c) In regard to measuring time intervals a recorder having a minimum of two input channels may be useful. The recorded characteristic should conform with the accuracy quoted in a) and b) above and be easily connected to the circuit under test. The recorder input characteristic should be such as to have a negligible effect on circuit performance.

4.4.4 *Loop-around equipment*

Local four-wire loop-around equipment should simulate line facilities without introducing signalling degradation. The gain of the loop-around equipment should be set to provide proper transmission levels. Alternatively, if the testing of the individual items of equipment is on a limit test basis it would not be essential to set the gain of the loop to provide the exact transmission levels. In this event a straight patch would be adequate.