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**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**M.620**

**MAINTENANCE :  
INTERNATIONAL TELEPHONE CIRCUITS**

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**METHODS FOR CARRYING OUT ROUTINE  
MEASUREMENTS ON CIRCUITS**

**ITU-T Recommendation M.620**

(Extract from the *Blue Book*)

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## NOTES

- 1 ITU-T Recommendation M.620 was published in Fascicle IV.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 M.620

### METHODS FOR CARRYING OUT ROUTINE MEASUREMENTS ON CIRCUITS

#### 1 Measurements and tests carried out manually

##### 1.1 *Measurements of overall loss*

The measurements should be made by applying to the circuit access points (see Recommendation M.565, § 2) test signals at a level of  $-10$  dBm0:

- at the frequency of 1020 Hz<sup>1)</sup> when measurements are confined to one frequency;
- at frequencies of 400, 1020 and 2800 Hz, when measurements are made at more than one frequency. Measurements may be made at additional frequencies if required.

Whenever automatic level recorders or display sets are available at the ends of the circuit, the measurements should be made with this equipment at all frequencies over the range of interest.

##### 1.2 *Noise measurements*

The psophometric noise power as indicated by a CCITT psophometer should be measured in both directions of transmission. It would be useful to make this measurement at the same time as the measurement of overall loss.

##### 1.3 *Signalling tests*

###### 1.3.1 *Manually operated circuits*

The power of the voice-frequency signalling current, in its normal operating condition, should be measured at the same time as the overall loss at several frequencies is measured.

If  $n$  is the relative power level at the point of measurement, the measured absolute power level of the signalling current transmitted at 500/20-Hz interrupted signalling current should fall within the following limits:

$$(n - 3) \pm 1/2 \text{ dB}$$

assuming that the signalling units used conform to the specifications of the Series Q Recommendations.

The operation of the voice-frequency signalling receivers is tested as an in-station test.

For information, the operating limits of the signalling receiver are as follows:

If  $n$  is the relative power level at the point of connection in the circuit where the receiver is connected, it will operate reliably when the absolute power level  $N$  of the signalling current at the input of the receiver falls within the following limits:

$$-8.5 + n \leq N \leq + 2.5 + n \text{ dB.}$$

###### 1.3.2 *Semi-automatic or automatic circuits*

See Recommendation M.732.

##### 1.4 *Records*

All the results of measurements and tests should be recorded by the control and sub-control stations concerned.

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<sup>1)</sup> For further information about the choice of the signal frequency, refer to Recommendation O.6 [1].

## **2 Use of automatic transmission measuring and signalling testing equipment – ATME No. 2**

See Recommendation O.22 [2].

### *2.1 Transmission measurements*

When ATME No. 2 is available for the routine maintenance of automatic and semi-automatic international circuits, it should be used to make the following measurements:

- overall loss at 1020 Hz or at 400, 1020 and 2800 Hz, as required;
- psophometric noise power level.

The test frequencies for overall loss measurements should be at a level of  $-10$  dBm0.

### *2.2 Signalling tests*

The signalling functions involved in the setting-up and clearing down of a connection between the directing and responding equipments will be checked during each test call. In addition, ATME No. 2 should be used to make the following line signalling tests:

- forward transfer (where provided),
- clear back,
- re-answer,
- busy flash.

*Note* – It is inappropriate to perform a signalling test using a Type B ATME No. 2 responder on Signalling System No. 6 speech circuits.

### *2.3 Test of echo control devices*

Echo control devices may be tested using an appropriate test system such as that specifies as an option in Recommendation O.22 [2]. If a test system is not available, then subjective test calls may be used. However it should be noted that these test calls will not quantitatively assess echo control device performance [3].

## **3 Corrective action**

### *3.1 Readjustment of overall loss*

When, during a routine measurement, the overall loss at 1020 Hz is not equal to its nominal value, the procedure below should be followed.

Deviations of less than  $\pm 1$  dB from nominal shall be deemed not to require adjustment. If measurements at a terminal station reveal a deviation from the nominal value of  $\pm 1.0$  dB up to and including  $\pm 2.5$  dB, adjustment to as near the nominal value as possible should be made at the terminal station and if practical at any intermediate station involved. Where it is appropriate and practical to do so, adjustment shall be made on the group or supergroup links in accordance with Recommendation M.530. If the deviation from nominal exceeds  $\pm 2.5$  dB a fault should be suspected which should be sought and cleared. If no fault is found, readjustment should be carried out at the intermediate and terminal stations as necessary, with particular attention to alignment of the group and supergroup link or links that may be involved.

### *3.2 Measurements at more than one frequency*

When measurements are made at more than one frequency, a check should be made to ensure that the values obtained are within the limits permitted (see Tables 1/M.580, 2/M.580 and 3/M.580). If they are not, appropriate steps should be taken.

### *3.3 Noise measurements*

It should be noted that any substantial deterioration in performance from the original line-up value may serve to indicate a fault. Comparison should also be made to noise measurements on circuits of identical or similar constitution to help locate a possible fault.

#### 4 Other measurements without recommended periodicity

- a) Systematic subjective testing, see Recommendation M.731;
- b) Measurement of signal-to-crosstalk ratio between *go* and *return* channels. The measured signal-to-crosstalk ratio should not be less than 43 dB;
- c) Frequency errors arising from frequency translation. The difference between the sent and received audio frequencies should not exceed 2 Hz. See Recommendation O.111 [4] for a method of measuring this error.

#### References

- [1] CCITT Recommendation *1020 Hz reference test frequency*, Vol. IV, Rec. O.6.
- [2] CCITT Recommendation *CCITT automatic transmission measuring and signalling testing equipment ATME No. 2*, Vol. IV, Rec. O.22.
- [3] *Rapid verification test for echo control devices*, Vol. IV, Supplement No. 2.11.
- [4] CCITT Recommendation *Frequency shift measuring equipment for use on carrier channels*, Vol. IV, Rec. O.111.