



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.452

**SPECIFICATIONS OF SIGNALLING SYSTEM R2
INTERREGISTER SIGNALLING
MULTIFREQUENCY SIGNALLING EQUIPMENT**

**REQUIREMENTS RELATING
TO TRANSMISSION CONDITIONS**

ITU-T Recommendation Q.452

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation Q.452 was published in Fascicle VI.4 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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4.4.3 REQUIREMENTS RELATING TO TRANSMISSION CONDITIONS

4.4.3.1 Impedances

The impedance Z_A measured at the terminals A (see Figure 17/Q.451) of a 2-wire multifrequency signalling equipment will have a nominal value equal to the nominal terminating impedance Z_T of the links at the exchange under consideration and will be balanced to earth. In most cases this value Z_T will be 600 ohms non-reactive. The impedance Z_A will then satisfy the conditions:

$$20 \log \left| \frac{600 + Z_A}{600 - Z_A} \right| \geq 10 \text{ dB} \quad (1)$$

in the 300-3400 Hz band, and

$$20 \log \left| \frac{600 + Z_A}{600 - Z_A} \right| \geq 16 \text{ dB} \quad (2)$$

in the 520-1160 Hz and 1360-2000 Hz bands.

The impedances Z_B and Z_C measured at the terminals B and C (see Figure 16/Q.451) of a 4-wire multifrequency signalling equipment will have a nominal value equal to the nominal terminating impedance Z_T at the exchange under consideration and will be balanced to earth. In most cases this value Z_T will be 600 ohms non-reactive. The impedances Z_B and Z_C will then satisfy condition (1) above in the 300-3400 Hz band and condition (2) above in the 520-1160 Hz or 1360-2000 Hz bands, according to the set of frequencies generated by the equipment concerned.

All the above requirements must be met, whether signalling frequencies are being transmitted or not.

4.4.3.2 Echoes

The balance return loss presented to the international link by different national networks varies considerably. Recommendation G.122 gives the desirable values based on transmission requirements and these values could hardly be improved on simply in order to facilitate signalling, especially as the balance return loss would then have to be very high.

The multifrequency signalling equipment must therefore function with an echo signal. Allowance is made for this in the test conditions (see Recommendation Q.455).

In order to eliminate disturbing and unwanted double-echo effects, outgoing international R2 registers must be provided with 4-wire signalling equipment; the 4-wire loop will then remain open at the outgoing end of the multi-link section during signalling.

For the same reason, it is recommended that 4-wire signalling equipment be provided whenever 4-wire switching equipment is used.

4.4.3.3 Location and connection of multifrequency signalling equipment associated with outgoing international R2 registers

The multifrequency signalling equipment of the outgoing international R2 registers is assumed to be directly connected to the virtual switching point of the links in an international exchange. This equipment may be situated in a national switching centre of the country of origin on the national network side of the outgoing international exchange provided that the 4-wire extension links between this centre and the outgoing international exchange have the same upper limit for the standard deviation of transmission loss variations with time (1 dB) as the international links.

Should the national extension links not have a nominal transmission loss of 0.5 dB between the national exchange and the virtual switching point in the outgoing international exchange, there must be suitable compensation of the power level of the multifrequency combinations.