



INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**Q.114**

**GENERAL RECOMMENDATIONS ON TELEPHONE  
SWITCHING AND SIGNALLING**

**CLAUSES APPLICABLE TO ITU-T STANDARD  
SYSTEMS**

---

**TYPICAL TRANSMISSION REQUIREMENTS  
FOR SIGNAL SENDERS AND RECEIVERS**

**ITU-T Recommendation Q.114**

(Extract from the *Blue Book*)

---

## NOTES

1 ITU-T Recommendation Q.114 was published in Fascicle VI.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.

© ITU 1988, 1993

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the ITU.

## Recommendation Q.114

### 2.3 TYPICAL TRANSMISSION REQUIREMENTS FOR SIGNAL SENDERS AND RECEIVERS

2.3.1 In-band line signal receivers (including the buffer amplifier or equivalent device), in §§ 2.3.2 to 2.3.7 below, apply only in the case where the signal receiver is a 4-terminal device ("quadripole") and where the nominal circuit impedance is 600 ohms.

#### 2.3.2 *Input and output impedance*

The nominal value of the input and output impedances of the signal receiver is 600 ohms.

$Z_E$  and  $Z_S$ , which are respectively the measured values of the input and output impedance of the signal receiver, should meet the following condition throughout the 300 to 3400 Hz frequency band:

$$\left| \frac{Z_E - 600}{Z_E + 600} \right| \leq 0.35 \text{ and } \left| \frac{Z_S - 600}{Z_S + 600} \right| \leq 0.35.$$

In making these measurements the free terminals should be looped by a resistance of 600 ohms and the voltage applied must not overload the equipment.

#### 2.3.3 *Attenuation*

At 800 Hz, the insertion loss of the signal receiver, measured with a generator and a receiver of internal resistance of 600 ohms, must be between the limits:

$$A \pm 0.5 \text{ decibel}$$

The value  $A$  is to be determined from the level diagram of the circuit according to the point of the circuit at which the signal receiver should be connected.

The measurement is made with a 1 mW generator having an internal impedance equal to a pure resistance of 600 ohms and having an e.m.f. of  $2 \times 0.775$  volt (so-called "standard generator"). The e.m.f. of the generator will be adjusted to take into account the relative level of the point of the circuit at which the signal receiver is connected.

If  $n$  is the relative level at the signal receiver input, the e.m.f. of the generator will therefore be:

$$1.55 \cdot 10^{\frac{n}{20}} \text{ volts, if } n \text{ is expressed in decibels.}$$

#### 2.3.4 *Attenuation distortion*

The variation in insertion loss of the signal receiver in the 300-3400 Hz frequency band, measured under the conditions of § 2.3.3 above, should not exceed the limits shown in Figure 1/Q.114.

As in certain cases Systems No. 5, and R1 may be applied to circuits in transmission systems with a channel spacing of less than 4 kHz, the 300 Hz lower limit shown above may be replaced by 200 Hz for System No. 5.

2.3.5 *Nonlinear distortion*

The curve representing the variation (as a function of power) of the output level of the signal receiver, with reference to the nominal value of the output level, should be within the limits shown in Figure 2/Q.114 over the relevant frequency range.

2.3.6 *Balance*

The input and output of the signal receiver should have a high degree of balance to earth, the admittance of each terminal to earth being very low.

The same clause should apply to the signal sender.

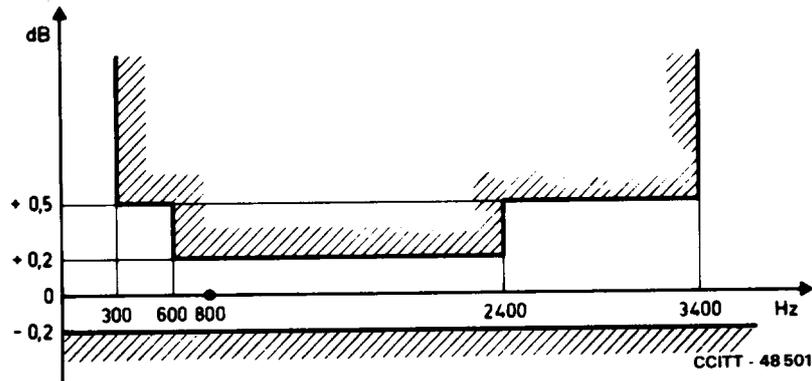


FIGURE 1/Q.114  
Attenuation distortion of the signal receiver

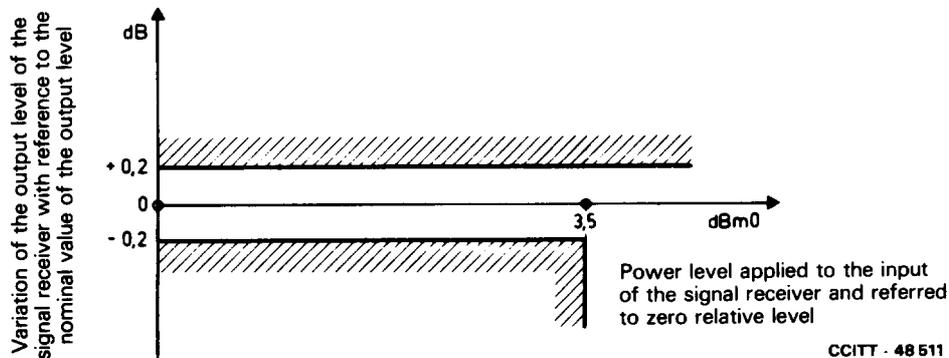


FIGURE 2/Q.114  
Limits for nonlinear distortion due to the insertion of the signal receiver

2.3.7 *Crosstalk between adjacent signal receivers*

The crosstalk ratio between two adjacent signal receivers should not be less than 74 dB in the relevant frequency band.

2.3.8 During the register signalling period no speech transmission takes place. It is not essential therefore for the register signalling equipment of systems having separate equipment for that purpose to take account of §§ 2.3.2 to 2.3.7 above but it is desirable to adopt appropriate clauses for efficient signalling performance.