INTERNATIONAL TELECOMMUNICATION UNION

ITU-T M.560

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

MAINTENANCE :

INTERNATIONAL TRANSMISSION SYSTEMS (ANALOGUE)

INTERNATIONAL TELEPHONE CIRCUITS – PRINCIPLES, DEFINITIONS AND RELATIVE TRANSMISSION LEVELS

ITU-T Recommendation M.560

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation M.560 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.

Recommendation M.560

INTERNATIONAL TELEPHONE CIRCUITS – PRINCIPLES, DEFINITIONS AND RELATIVE TRANSMISSION LEVELS

1 General

The purpose of this Recommendation is to provide the necessary background information for other Recommendations in the M Series.

The CCITT transmission plan and international telephone connections are explained. The Recommendation also introduces the concepts of "virtual analogue switching points", and their conventional relative transmission levels. Appropriate definitions are given where necessary.

Extracts from the relevant Recommendations in Volume III and from Recommendation Q.45 [1] are included in this Recommendation.

2 The CCITT Transmission Plan

2.1 *Principles*

The CCITT transmission plan has been drawn up with the object of making use, in the international service, of the advantages offered by 4-wire switching. However, the recommendations in the plan are considered to be met if the use of technical media other than those described give an equivalent performance at the international centre.

Note – Short transfrontier circuits are not covered by the transmission plan; they should be the subject of agreement between the Administrations concerned.

2.2 *International telephone connections*

A complete **international telephone connection** has three parts, as shown in Figure 1/M.560, namely:

– an **international chain**

  an international chain is made up of one or more 4-wire international circuits. These are connected on a 4-wire basis to other international circuits in transit international centres or to national systems in terminal international centres;

– two **national systems**, one at each end

  These may comprise one or more 4-wire amplified national circuits with 4-wire interconnection, and circuits with 2-wire connection to terminal exchanges and subscribers.

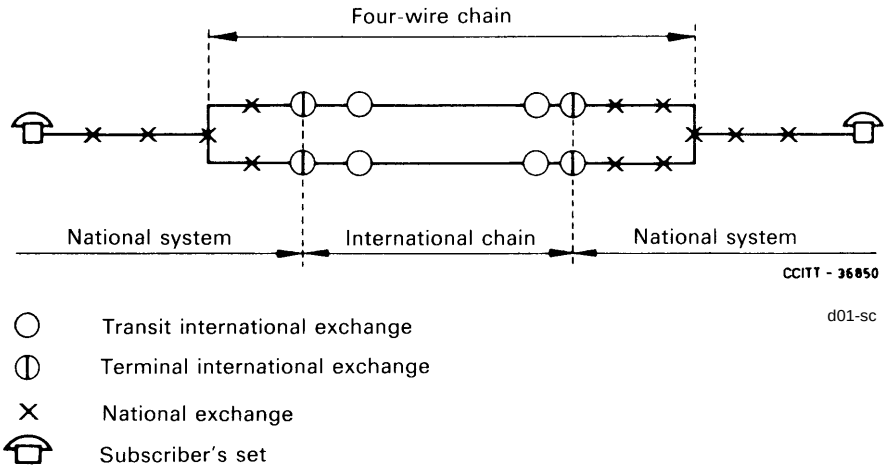


FIGURE 1/M.560

Constituent parts of an international telephone connection

2.3 *International telephone circuits, virtual analogue switching points and relative transmission levels*

2.3.1 From a transmission planning point of view, an international telephone circuit is defined by its "virtual analogue switching points" in the international centre.

2.3.2 *Virtual analogue switching points*

Virtual analogue switching points are theoretical points with specified relative levels.

For circuits terminating at a digital international centre, the concept of virtual analogue switching points postulates the existence of ideal analogue-to-digital coders and digital-to-analogue decoders, via which the desired analogue points could be derived.

The virtual analogue switching points may not be the same as the points at which the circuit terminates physically in a switching equipment. These latter points are known as the circuit terminals; the exact position of the terminals is decided in each case by the Administration concerned (see Figure 2/M.560).

For illustrative purposes, Figure 2/M.560 depicts the virtual analogue switching points for wholly digital and wholly analogue international telephone circuits. Recommendation M.562 deals in detail with circuits provided by a mixture of analogue and digital systems.

2.3.3 *Relative transmission levels at virtual analogue switching points*

The virtual analogue switching points of an international 4-wire telephone circuit are fixed by convention at points of the circuit where the nominal relative levels at the reference frequency are:

– sending: –3.5 dBr;

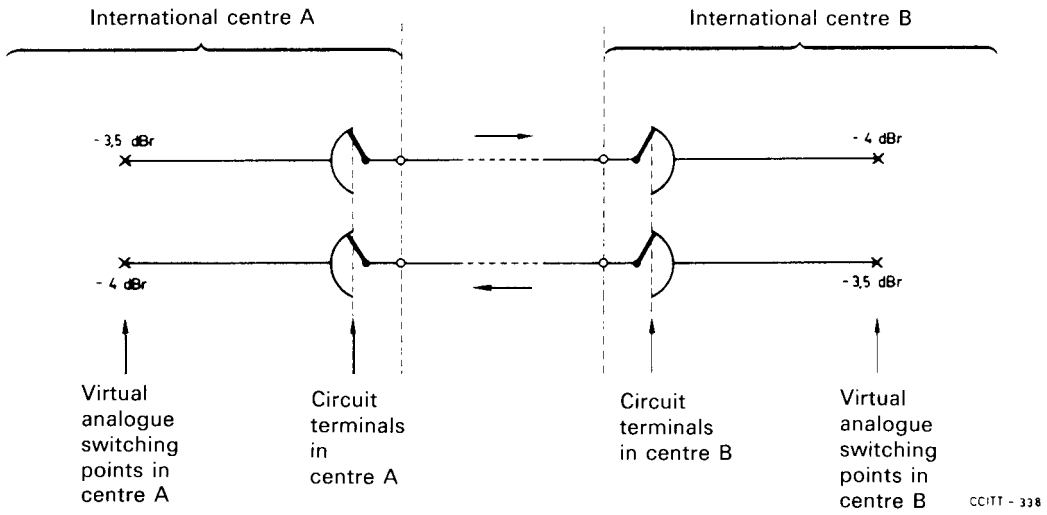
– receiving: – 4.0 dBr, for analogue circuits and the analogue end of mixed analogue/digital circuits;

–3.5 dBr for digital circuits.

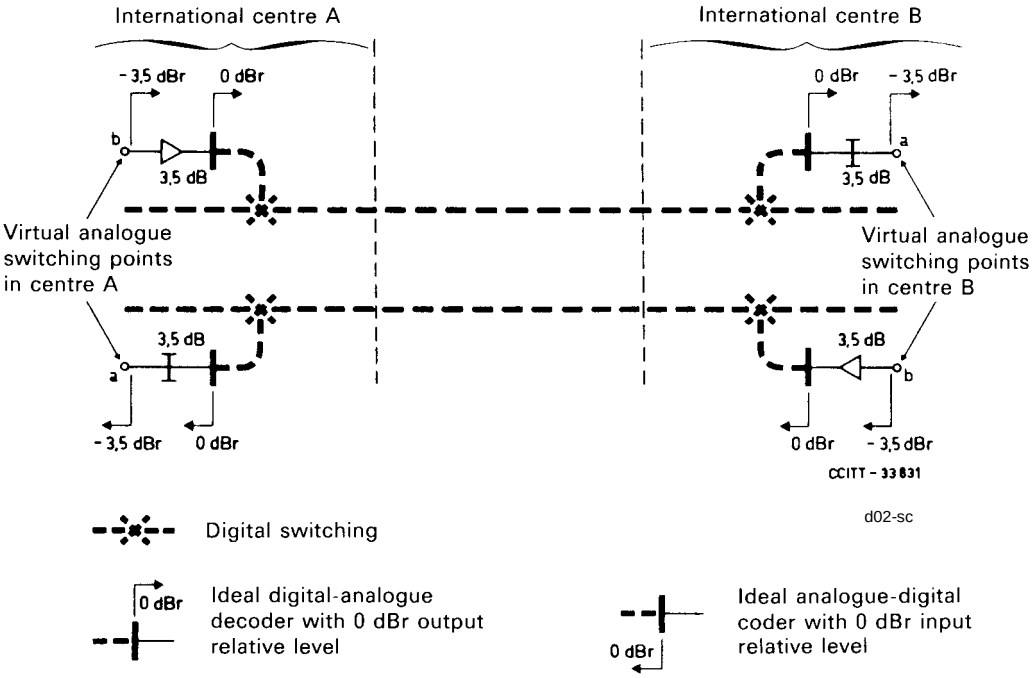
The nominal transmission loss of circuits at the reference frequency between virtual analogue switching points is therefore 0.5 dB for both analogue and mixed analogue/digital circuits and 0 dB for digital circuits.

Two international circuits interconnected in an international centre are considered to be connected together directly at their virtual analogue switching points without any pad or amplifier between those virtual analogue switching points (see Figure 3/M.560).

The relationship between the actual switching points and the virtual analogue switching points in a practical international exchange is illustrated in Figure 3/M.560.



a) Wholly analogue circuit showing virtual analogue switching points and circuit terminals



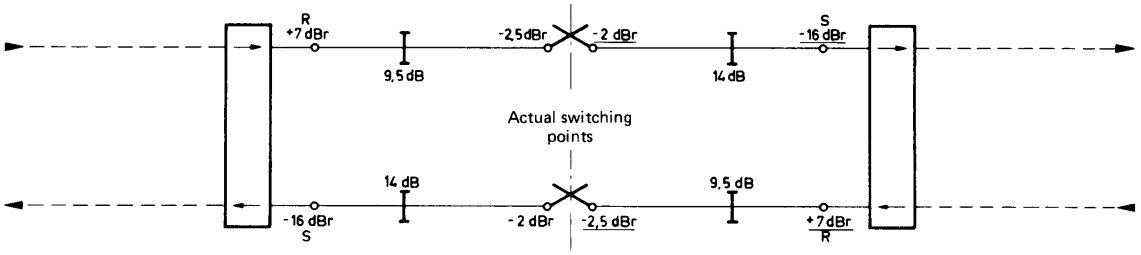
b) Wholly digital circuit showing virtual analogue switching points

FIGURE 2/M.560

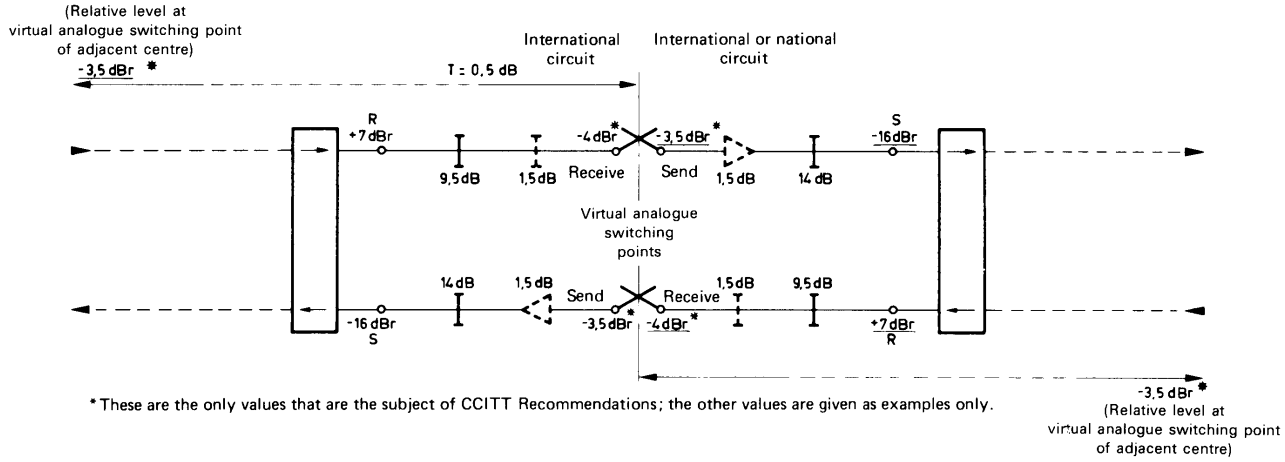
International telephone circuits

3 Access points for line-up and maintenance purposes

Recommendation M.565 describes the types of access points which should be provided on international telephone circuits for line-up and maintenance purposes.



a) Actual arrangement



* These are the only values that are the subject of CCITT Recommendations; the other values are given as examples only.

b) Hypothetical arrangement indicating possible position of the virtual analogue switching points of the two circuits

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Note – Underlined values of relative level refer to the circuit on the right of the point concerned. Values of relative level not underlined refer to the circuit on the left of the point concerned. In an actual switching centre the virtual analogue switching points would not physically exist.

FIGURE 3/M.560

Example showing a simplified representation of a transit connection in an international exchange with actual arrangement and possible location of virtual analogue switching points

Reference

[1] CCITT Recommendation *Transmission Characteristics of an International Exchange*, Vol. VI, Rec. Q.45.