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ITU-T

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TELECOMMUNICATION
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**MAINTENANCE:
INTERNATIONAL TELEPHONE CIRCUITS**

**LINING UP AND MAINTAINING
INTERNATIONAL DEMAND
ASSIGNMENT CIRCUITS (SPADE)**

ITU-T Recommendation M.675

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation M.675 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.675

LINING UP AND MAINTAINING INTERNATIONAL DEMAND ASSIGNMENT CIRCUITS (SPADE)

General

Section 3.3 refers to Figure 1/M.675 and describes the features of *demand assignment (DA) circuits*¹⁾ established by means of single channel per carrier, PCM, multiple access demand assignment, equipment (SPADE) located in satellite earth stations.

Circuits thus provided are established between two international exchanges (CTs) on demand, with the constituent transmission paths making up the circuit being connected only for the duration of each demand. A transmission link is established between earth stations as required by the outgoing CT. The international DA circuit is formed via the distant earth station and its connection to the incoming CT by the terrestrial demand assignment section.

Upon release of this demand the transmission link establishing the demand assignment section is returned to a common pool allowing its reuse when required by other international exchanges operating in the demand assignment satellite network. Recommendation Q.48 [1] outlines the signalling system incorporated between demand assignment equipments located in satellite earth stations.

In general the Series M Recommendations concerned with preassigned international circuits apply equally to the sections of DA circuits. However, because of the variable nature concerning the establishment of circuits on demand, special consideration in provisioning, maintenance and fault finding is required. The following sections will provide details concerning these requirements.

1 Initial line-up and maintenance of demand assignment circuits and their constituent parts

1.1 The demand assignment circuit may be seen as being divided into three parts for setting-up, lining-up and maintenance: the outgoing terrestrial demand assignment section, the satellite demand assignment section and the incoming terrestrial demand assignment section. It is considered that the overall limits in Recommendation M.580 will be met by the application of the line-up limits given in Table 1/M.675 for the individual DA sections. However, sectional requirements prevail if the limits of Recommendation M.580 are not met on overall measurements.

1.2 The maintenance schedule, Table 2/M.675, should be utilized in the development of an initial demand assignment capability with a given CT (for example, commissioning of a new SPADE terminal) and establishing the appropriate periodic tests.

1.3 When terrestrial DA sections are added or a new corresponding terminal comes into service, tests should be conducted in accordance with Table 2/M.675.

2 Demand assignment circuit control responsibilities and fault location procedures

2.1 In the assignment of maintenance responsibilities, recognition is given to the constitution of a DA circuit as outlined in § 1.1 above. Section control and sub-control stations will be nominated for each terrestrial DA section. The initiation of fault localization procedures for a faulty DA circuit will be the responsibility of the fault report point (circuit) receiving the report. Upon being notified, the control station initiates tests to determine the location of the fault. If the fault condition is located beyond the satellite DA section, the fault report point (circuit) associated with the distant terrestrial DA section will be notified of the condition and will assume control responsibility for further localization and clearance of the fault.

2.2 Faults should be investigated in a systematic manner, section by section. After verifying the report, e.g., by performance records or test calls, a recommended procedure for fault location is as follows:

2.2.1 Establish a CT to one's own CT satellite loop circuit, utilizing the suspected outgoing terrestrial DA section.

¹⁾ This type circuit may be considered to be equivalent to an international telephone circuit (preassigned) from a transmission point of view and is under study by Study Group XII.

2.2.2 Determine if this configuration is faulty. If this is not the case then the associated earth station should, as sub-control, be instructed to check the satellite DA section to the particular distant earth station involved. If this section is found to be performing satisfactorily then the fault report is passed to the fault report point (circuit) at the distant CT. The distant CT then assumes responsibility for fault localization and the originating fault report point (circuit) advises its associated network analysis point of the action taken.

2.2.3 If the satellite loop of § 2.2.1 above was found faulty, action should be taken by the control station and its associated DA terminal to localize the fault to the outgoing terrestrial DA section.

2.3 Full use should be made of the operational status indications available to the DA satellite section sub-control station to determine fault situations on the outgoing terrestrial DA section and on the incoming and outgoing satellite DA sections. The DA section sub-control station should advise the fault report point (circuit) or fault report point (network), as appropriate, at its associated CT, of any observations indicating fault situations and ensure that the control station is aware of the situation.

2.4 Administrations establishing international circuits utilizing satellite demand assignment links should be able to obtain statistical information concerning the outgoing call processing of their respective countries from the demand assignment system operating authority. The information is required by the network analysis points, in their continuing analysis of the quality of the international network.

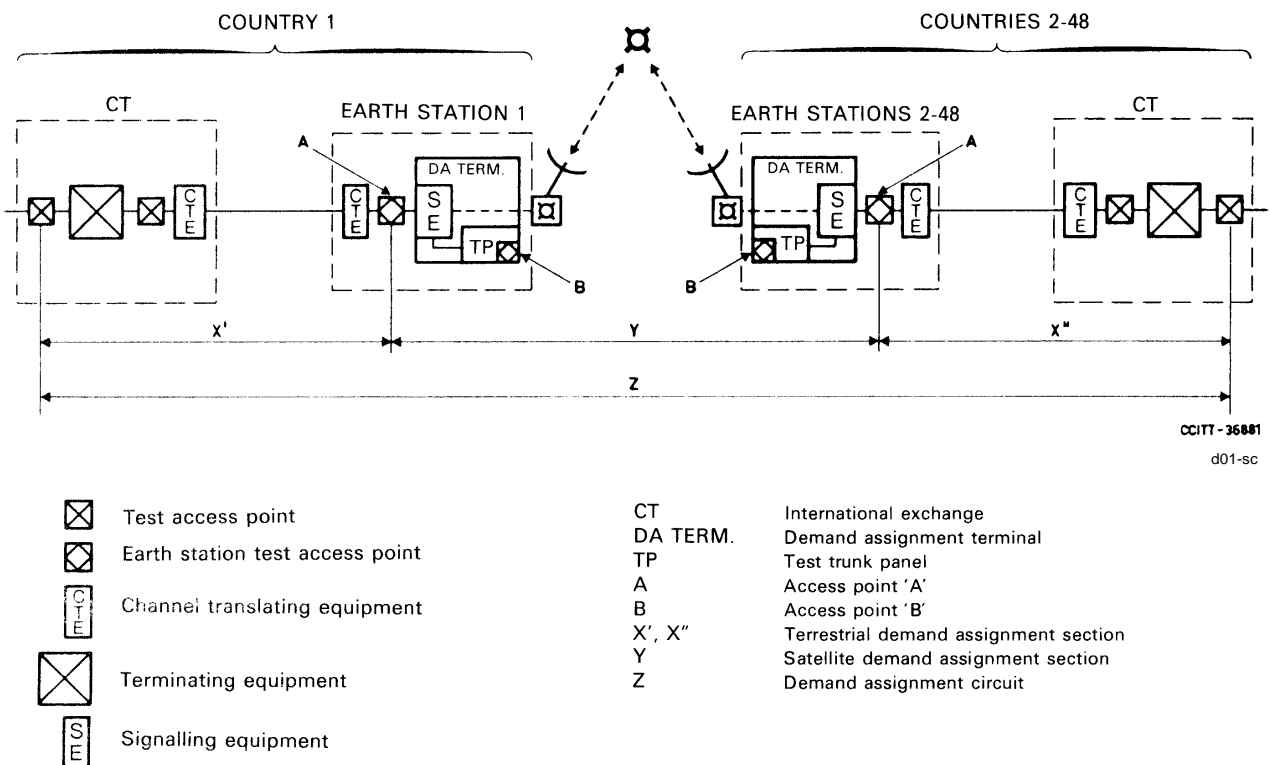


FIGURE 1/M.675

Constitution of an international demand assignment circuit

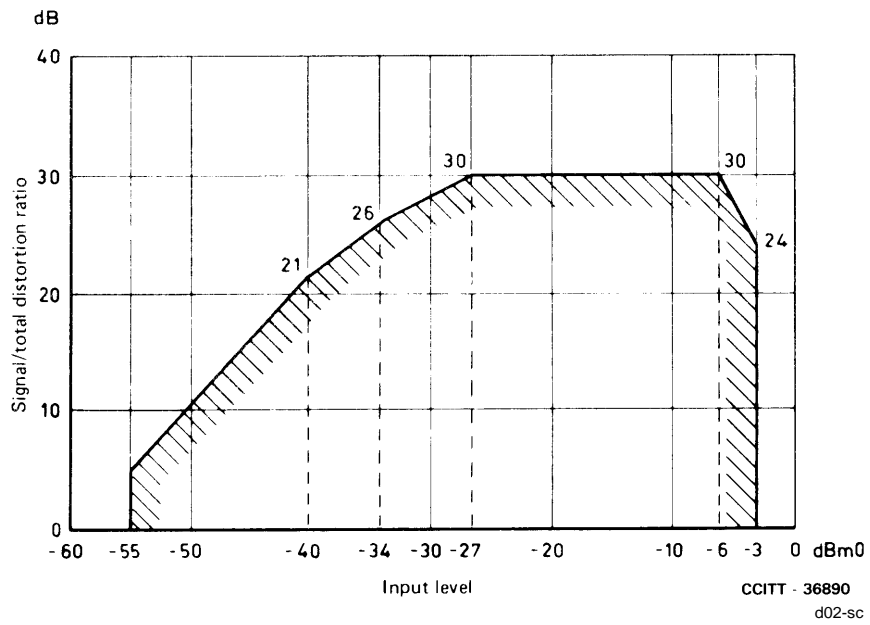


FIGURE 2/M.675
Signal/total distortion ratio as a function of input level utilizing a (provisional) pseudo-random noise stimulus

TABLE 1/M.675

**Target objectives for setting up and lining up a demand assignment (SPADE)
international public telephone circuit and its sections**

Transmission parameters	Demand assignment circuit	Demand assignment section	
	Z CT to CT between circuit access points	Y Between SPADE terminals, demand assignment	X CT to SPADE terminal, terrestrial
1. Loss/frequency ^{a)} relative to the loss at reference frequency (in dB) 300- 400 Hz 400- 600 Hz 600-2400 Hz 2400-3000 Hz 3000-3400 Hz	(Series M Recommendations) +3.5 to -1.0 +2.0 to -1.0 +1.0 to -1.0 +2.0 to -1.0 +3.5 to -1.0	+0.5 to -0.5 +0.5 to -0.5 +0.5 to -0.5 +0.9 to -0.5 +1.8 to -0.5	+1.7 to -0.5 +0.9 to -0.5 +0.5 to -0.5 +0.9 to -0.5 +1.7 to -0.5
2. Overall loss at reference frequency. Line-up level limits relative to nominal (in dB)	± 0.3	± 0.2	± 0.2
3. Idle Noise (- dBm0p)	Table 4/M.580 (See Note 3)	- 60	Table 4/M.580
4. Quantizing distortion (signal/total distortion ratio in dB)	Not applicable	Figure 2/M.675 (See Note 1)	Not applicable
5. Signal crosstalk ratio (Go-return) (in dB)	43	60	48

a) Reference frequency = 1020 Hz (See Note 2).

Note 1 – Quantizing distortion should be measured in accordance with the test procedure agreed upon by the satellite system operators.

Note 2 – Test frequencies that are sub-harmonics of the PCM sampling rate should be avoided. (See Rec. O.6 [2].)

Note 3 – Noise measurements should be made with the demand assignment codec voice detector enabled. This can be accomplished by utilizing a holding tone and notch filter or by conducting tests with the demand assignment equipment, in the pre-assigned mode.

TABLE 2/M.675

Testing and maintenance schedule

Tests	Demand assignment terminal access point	CT-Earth station X', X''	From CT to own CT looped via satellite ^{a)} Z	Earth station-earth station Y	Demand assignment terminal access point	CT-CT Z
		When tested				When tested
Comprehensive signalling and compatibility test Q.163 [3] or equivalent	A and B (Note 1)	Initial system commissioning	–	–	–	–
Functional signalling test Q.163 [4] or equivalent	B (Note 1)	Initial line-up and periodic maintenance of section	Initial line-up and periodic maintenance of section	Initial system commissioning and new channel line-up (Notes 5 and 8)	B (Note 1)	(Note 7)
Measurement of loss and noise Rec. M.610	(Note 4)	Initial line-up and periodic maintenance of section	Initial line-up and periodic maintenance of section (Notes 2 and 3)	Initial system commissioning and new channel line-up (Notes 5 and 8)	A (Note 1)	(Notes 6 and 3)
Loss/frequency characteristics and crosstalk ratio Rec. M.610	(Note 4)	Initial line-up and periodic maintenance of section	Initial line-up and periodic maintenance of section (Notes 2 and 3)	Initial system commissioning and new channel line-up (Note 8)	A (Note 1)	(Notes 6 and 3)
Measurement of quantizing distortion	–	–	–	Initial system commissioning and new channel line-up (Note 8)	A (Note 1)	–
Spurious signal and channel intermodulation	–	–	–	Initial system commissioning and new channel line-up (Note 8)	A (Note 1)	–
Subjective tests Rec. M.610	B (Note 1)	Initial line-up and periodic maintenance of section	Initial line-up and periodic maintenance of section (Notes 2 and 3)	Initial system commissioning and new channel line-up (Notes 5 and 8)	B (Note 1)	(Notes 9 and 3)

a) Simulated demand assignment circuit.

Notes relative to Table 2/M.675:

Note 1 – *A* and *B* refer to the DA terminal testing interface. See Figure 1/M.675 for the location of these interfaces.

Note 2 – The outgoing CT must be capable of outputting its own country code and exchange digits.

Note 3 – Sectional requirements supersede if the overall requirements of Recommendation M.580 are not met.

Note 4 – *A* and/or *B* for line-up and *A* or *B* for periodic tests. (Reference measurements at initial line-up should include measurements made at the access point decided upon for periodic tests).

Note 5 – Demand assignment system is assumed to operate internal diagnostics to check functional capability and continuity.

Note 6 – Loss, noise, loss/frequency and signal/crosstalk ratio tests may be applied on a sample basis when the system is initially commissioned, and as required for the extension of service.

Note 7 – Test calls may be carried out to verify operational capability initially, and as required.

Note 8 – These are as agreed upon by the satellite system operators.

Note 9 – Subjective testing CT-CT may be used on a sample basis, as required.

References

- [1] CCITT Recommendation *Demand assignment signalling systems*, Vol. VI, Rec. Q.48.
- [2] CCITT Recommendation *1020 Hz reference test frequency*, Vol. IV, Rec. O.6.
- [3] CCITT Recommendation *Manual testing*, Green Book, Vol. VI-2, Rec. Q.163, § 4.3.4, parts 1 and 2, ITU, Geneva, 1973.
- [4] *Ibid.*, § 4.3.3.