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**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**M.525**

**MAINTENANCE:  
INTERNATIONAL TRANSMISSION SYSTEMS  
(ANALOGUE)**

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**AUTOMATIC MAINTENANCE PROCEDURES  
FOR INTERNATIONAL GROUP,  
SUPERGROUP, ETC., LINKS**

**ITU-T Recommendation M.525**

(Extract from the *Blue Book*)

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## NOTES

- 1 ITU-T Recommendation M.525 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.525**

**AUTOMATIC MAINTENANCE PROCEDURES FOR INTERNATIONAL GROUP, SUPERGROUP, ETC., LINKS**

**1 General**

In order to reduce corrective maintenance and minimize preventive maintenance in accordance with Recommendation M.20 the routine measurements of group, supergroup, etc. links may be carried out by automatic measurements without interruption.

Such routine measurements, where provided, should be for the same characteristics given in Recommendation M.460, e.g. overall loss, random noise, etc.

The decision to use automatic measurement procedures and the determination of intervals between routine measurements are matters for agreement by the concerned Administrations.

The need for readjustment based on the results of these measurements should be determined according to Recommendation M.530.

**2 Frequencies and levels of test signals**

The recommended frequencies for overall loss measurement are given in Table 1/M.525. The maintenance measurements can be made at some or all of those frequencies.

The test frequencies for group, supergroup, etc. links are chosen to fall between channels, groups, supergroups, etc. These frequencies are shifted at  $\pm 80$  Hz with respect to 4 kHz multiplied frequencies to avoid carrier leaks and other spurious tones interference. The automatic measurement equipment usually makes use of pre-defined software and/or hardware.

Test frequencies for supermastergroups are not shifted at  $\pm 80$  Hz, as they are located in wide guard intervals and do not coincide with carrier leaks and pilot frequencies.

Test frequencies 9008 kHz, 11096 kHz and 11648 kHz given in Recommendation M.460 should be shifted to avoid interferences between supermastergroup and mastergroup No. 7 and No. 9 pilot frequencies (see Recommendation M.350).

Test signal levels should generally not exceed  $-20$  dBm0. A level of  $-10$  dBm0 may be used for master and supermastergroup measurements. When the measurement of Group No. 3 (see Recommendation M.330) is being made, the test signal at 103.92 kHz has to be blocked, otherwise it is necessary to make the correction for the loss at the frequency 103.92 kHz, caused by the 411.86 kHz reject filter.

**TABLE 1/M.525  
Frequencies of test signals**

Type of link	Frequencies (kHz)
Supermaster group	8516.3*, 8760, 9004, 9256, 9504, 9792, 10 080, 10 324, 10 576, 10 824, 11 150, 11 400, 11 644, 11 896, 12 144, 12 387.4*
Master group	812.6*, 871.92, 931.92, 1055.92, 1179.92, 1303.92, 1427.92, 1555.92, 1675.92, 1799.92, 1923.92, 1983.92, 2043.7*
Supergroup (4 kHz channels)	312.3*, 320.08, 328.08, 344.08, 360.08, 376.08, 392.08, 408.08, 432.08, 456.08, 472.08, 488.08, 504.08, 520.08, 536.08, 544.08, 551.4*
Group (4 kHz channels)	60.6*, 63.92, 67.92, 71.92, 75.92, 79.92, 83.92, 87.92, 91.92, 95.92, 99.92, 103.92, 107.7*

*Note* – As a rule the frequencies marked by an asterisk (\*) cannot be used for measurements without traffic interruption. These frequencies may be used in the absence of traffic in the edge channels or a low level of test signal (below  $-45$  dBm0).