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Analogue leased lines M1025

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1. Introduction

This document contains the technical specifications for the PROXIMUS analogue leased lines M1025. These leased line specifications are based on a generic model as shown in annex 1. The central part of the model is the "connection". A connection includes a series of transmission channels or telecommunication circuits. It's set up to provide for the point-to-point transfer of signals between the terminal equipments of the customer.

The connection is presented to the user via an "interface presentation" at the Network Termination Point (NTP). The NTP comprises all physical connections and their technical access specifications that form part of the PROXIMUS transmission network. In some cases the NTP is presented by means of an electrical equipment referred to as the Network Termination Unit (NTU). For the description of the analogue leased line M1025, the NTU is considered as being contained within the connection.

The analogue leased line M1025 is a bi-directional line, configured point-to-point, nominally covering the voice bandwidth (300Hz to 3400Hz).

Basically, the analogue leased lines M1025 offered by PROXIMUS are at least conform to ITU-T Recommendation M.1025.

Concerning the PROXIMUS offer of analogue leased lines M1025, the customer has the choice between two types :

- the analogue leased line M1025, 4-wire;
- the analogue leased line M1025, 2-wire.

The following paragraphs give details of the specific requirements for the PROXIMUS offer of analogue leased lines M1025.

2. Connection characteristics

The analogue leased line M1025 is a bi-directional line, configured point-to-point, nominally covering the voice bandwidth (300Hz to 3400Hz).

2.1. Overall loss

The overall loss, including long term variations, presented to a signal frequency of 1800Hz, sent in each direction of transmission with the line terminated in 600 Ohms at each end of the connection, shall be in the range:

- 0 dB ≤ overall loss ≤ 22 dB for the analogue leased lines M1025, 4-wire;
- 0 dB ≤ overall loss ≤ 34 dB for the analogue leased lines M1025, 2-wire.

2.2. Loss/frequency distortion

The loss at frequencies in the voice band may deviate from each other. However, PROXIMUS guarantees that the overall loss *relative* to that at 1020 Hz shall lie between the limits given in figure 2.2-1 (which is taken from ITU-T Recommendation M.1025).

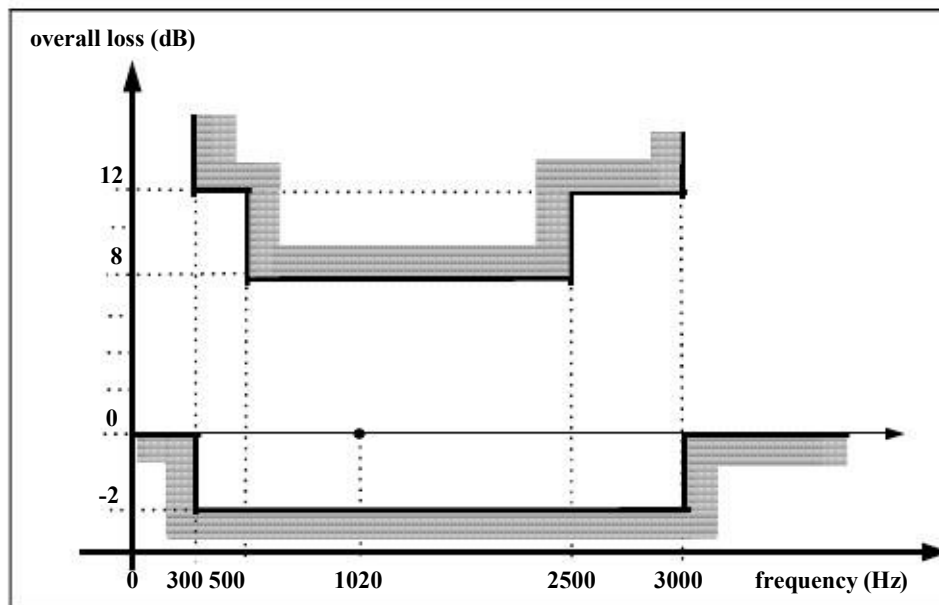


Figure 2.2-1

2.3. Maximum mean input power

The input level of the analogue leased line M1025 is specified in terms of a "maximum mean input power"; that is, a mean power level with which the leased line shall be capable of operating.

The analogue leased line M1025 shall be capable of carrying voice band signals presented at the input at a one minute mean power level of :

- - 6 dBm for the analogue leased line M1025, 4-wire;
- for the analogue leased line M1025, 2-wire, this mean input power level will be maximum 0 dBm (this is function of the local loop attenuation).

2.4. Transmission delay

The one way end-to-end delay is less than $(15 + 0,01G)$ ms, where G is the geographical distance in kilometers. *(In the exceptional case that a satellite transmission has to be involved for the realization of the analogue leased line M1025, the one way end-to-end shall be less than 350 ms).*

2.5. Group delay distortion

The limits that apply to the group-delay distortion of the analogue leased lines M1025 are given in figure 2 of the ITU-T Recommendation M.1025 in which the limiting values over the frequency band are expressed as values relative to the minimum measured group delay.

2.6. Amplitude hits

Amplitude hits are defined as sudden positive or negative changes in amplitude of an observed test signal which exceed a specified threshold and persist for a period of time greater than a specified duration.

When measurements are made on the analogue leased line M1025 connection using an instrument complying with ITU-T Recommendation O.95, the number of amplitude hits greater than +/- 2 dB shall not exceed 10 in any 15 minutes period.

2.7. Variation of overall loss with time

Variations with time of the overall loss at 1020Hz (including daily and seasonal variations but excluding amplitude hits) shall be as small as possible but not exceeding +/- 4 dB.

2.8. Random circuit noise

The value of the "random circuit noise" ensures that the noise, weighted according to the sensitivity of the human ear to various frequencies, will be at a suitable level below the minimum signal delivered to the receiver.

The level of the psophometric noise power at the output of the analogue leased line M1025 will not exceeding a threshold level of:

- -38dBmOp for the *international* analogue leased lines M1025;
- -45dBmOp for the *national* analogue leased lines M1025.

2.9. Impulsive noise

The analogue leased line M1025 will not have more than 18 impulsive noise peaks exceeding a threshold level of -21dBmO within a period of 15 minutes.

2.10. Phase jitter

Measurement of the phase jitter on the analogue leased line M1025, using an instrument complying with ITU-T Recommendation O.91, will be less or equal to:

- 15° peak-to-peak for the *international* analogue leased lines M1025;
- 10° peak-to-peak for the *national* analogue leased lines M1025.

2.11. Total distortion ratio

The signal-to-total-distortion ratio (including quantizing distortion) of the analogue leased line M1025 is better than 28dB when using a sine wave signal at -10 dBmO.

2.12. Single tone interference

The power level of a single tone interference in the band 300Hz to 3400Hz shall be at least 3dB below the permitted noise power level defined in paragraph 2.8.

2.13. Frequency error

The frequency error introduced by the analogue leased line M1025 connection shall be less than:

- +/- 2 Hz for the *national* analogue leased line M1025;
- +/- 5 Hz for the *international* analogue leased line M1025.

2.14. Harmonic distortion

When a 700 Hz test frequency of -13 dBmO is injected at the input of the analogue leased line M1025, the level of any individual harmonic frequency at the output of the analogue leased line M1025 connection shall be at least 25 dB below the received level of the fundamental frequency.

3. Network interface presentation

3.1. Physical characteristics

The physical connection arrangements for the interface presentation of the analogue leased line M1025 are normally realized by means of a socket.

- *The analogue leased line M1025, 4-wire:*

The network interface of the analogue leased line M1025, 4-wire, provides an ADO 8-pole female connector which is defined in the specification BE/SP-222. As a summary, the contact assignments of this ADO connector are given in table 3.1-1:

contact	4-wire network interface
1&4	transmit pair
5&7	receive pair
2&3	unused
6&8	unused

The transmit pair is the output from the network iff

The receive pair is the input to the network

Table 3.1-1

- *The analogue leased line M1025, 2-wire:*

The network interface of the analogue leased line M1025, 2-wire, provides an ADO 8-pole female connector which is defined in the specification BE/SP-222. As a summary, the contact assignments of this ADO connector are given in table 3.1-2:

contact	2-wire network interface
1&4	transmission pair
2&3	unused
5&6	unused
7&8	unused

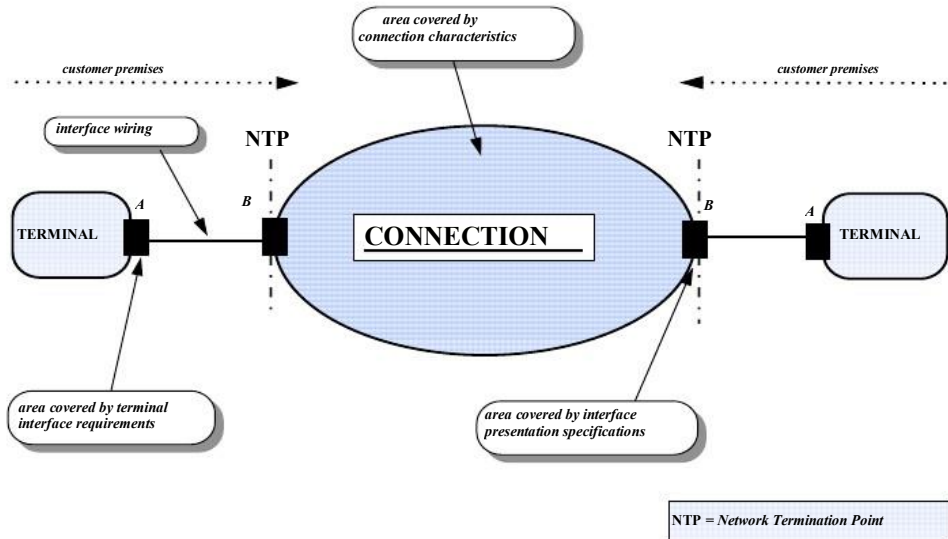
Table 3.1-2

As an option, PROXIMUS offers also an alternative means of connection to her customers, which consists of a hardwired connection, using insulation displacement connectors or a terminal block, providing a means of terminating wire with solid conductors having diameters in the range 0,4mm to at least 0,6mm.

4. Terminal equipment

For connection to the NTP of an analogue leased line M1025, the terminal of the customer has to be approved to BE/SP-202.

Generic model for leased lines specifications



ANNEX 2

Definitions, symbols and abbreviations.

A) Definitions

For the purpose of these technical specifications, the following definitions apply:

Group delay distortion

Group delay is a measure of the propagation time through the leased line. The difference between group delay at a given frequency and the minimum group delay in the frequency band of interest, is called the "group delay distortion".

Leased lines

The telecommunications facilities provided by the PROXIMUS public telecommunications network that provide defined transmission characteristics between network termination points (NTP) and that do not include switching functions that the user can control.

Local PROXIMUS network

The PROXIMUS national telephone network is subdivided into three parts:

- the local networks;
- the junction networks;
- the trunk network.

The *local network* assures the connection of the subscriber's telephone set (or PABX, or terminal,...) to the local exchange. This network is star-shaped; one subscriber line (in most cases one symmetrical copper pair in underground cables) links directly each telephone set to its numbered position in the exchange. The *junction network* links all the local exchanges of the same telephone zone to a primary exchange. The *trunk network* links the primary exchanges either directly between themselves (for the heavy traffic routes) or to an intermediate transit exchange, for the low traffic routes.

Network Termination Point (NTP)

All physical connections which form part of the PROXIMUS telecommunications network and which are necessary for access to and efficient communication through the PROXIMUS network.

Open Network Provision (ONP)

Open Network Provision (ONP) is a regulatory concept introduced by the Commission of the European Communities. It is intended to ensure "harmonized conditions for open and efficient access to and use of public telecommunications networks and, where applicable, public telecommunications services." In particular, ONP specifies a set of harmonized conditions which govern the technical interfaces (including the definitions of network termination points), conditions of use, and tariff principles of the network or service to which they are applied.

The general principles of ONP are contained in the Council Directive 90/387/EEC, the "ONP Framework Directive". These principles are applied to a number of areas of telecommunications, including leased lines. In addition, the leased lines are specifically covered by the Directive 92/44/EEC, the "ONP leased line Directive". The ONP Leased Line Directive calls upon Member States to ensure that the respective telecommunications organizations (TO) provide a minimum set of leased line types, defined in annex II of the Directive by means of compliance with ITU-T Recommendations. These leased line types are:

- ordinary quality voice bandwidth analogue, 2 and 4 wire;
- special quality voice bandwidth analogue, 2 and 4 wire;
- 64 kbit/s digital unrestricted with octet integrity;
- 2048 kbit/s digital unstructured;
- 2048 kbit/s digital structured.

Voice bandwidth

The band of frequencies over the range 300 Hz to 3400 Hz.

B) Symbols and abbreviations

For the purpose of these technical specifications, the following abbreviations apply:

<u>CTR:</u>	<i>Common Technical Regulations.</i>
<u>DCE:</u>	<i>Data Circuit-terminating Equipment.</i>
<u>DTE:</u>	<i>Data Terminal Equipment.</i>
<u>ITU:</u>	<i>International Telecommunication Union.</i>
<u>NTP:</u>	<i>Network Termination Point.</i>
<u>ONP:</u>	<i>Open Network Provision.</i>
<u>ppm:</u>	<i>Parts per million.</i>