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Interface technical specifications
for France Telecom's network

As required by Directive 1999/5/EC

Numeris Multisite Service (NMS) access interface characteristics

Summary: This document gives a brief description of the technical characteristics of the interfaces used for accessing the NMS services.

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France Telecom further points out users' attention on the following points:

1. timer values are indicative and can be subject to modification,
2. due to various technical constraints, some services or service options may not be available on some interfaces,
3. the fact that a service not yet commercially open is described in this document can in no case be considered as a binding commitment on France Telecom part to actually open this service.

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1 OVERVIEW OF THE NMS SERVICE

France Telecom supplies a dedicated high bit rate metropolitan network to customers with $n \geq 3$, located in a given geographical area, which meets all telecommunications needs between their sites. The sites are connected to the France Telecom network by an optical loop. This optical loop, designed to guarantee an aggregate transport capacity of 155 or 622 Mbit/s and duplicated to secure exchanges, supports the establishment of high rate links (2, 34, 45, 155 Mbit/s) which use fibre optic and SDH transmission technologies. Some 2 Mbit/s links are used to support T2, as one of the network sites (called the interchange point) contains the self-routing exchange which serves the customer sites.

The service provided between the customer sites is a point-to-point bidirectional digital transmission service accessible via the following types of interface:

Electrical interfaces

- ◆ 2 Mbit/s
- ◆ 34 Mbit/s
- ◆ 45 Mbit/s
- ◆ 155 Mbit/s

Optical interfaces

- ◆ 155 Mbit/s

Additional interfaces are available on customer request:

- ◆ X.24/V.11
- ◆ Ethernet 802.3/V2.0
- ◆ Fast Ethernet 802.3

These interfaces are supplied by way of a pair of adapter units connected to the ends of one or more 2, 45 or 155 Mbit/s permanent links.

The data transfer time from a tributary input to a tributary output can reach a maximum of 3 ms.

2 SYNCHRONISATION

The service access equipment (EAS) is synchronised by a long-term, high stability clock frequency. This clock frequency, from the France Telecom network, comes from primary reference sources which comply with ITU-T Recommendation G.811.

The 2, 34 and 45 Mbit/s links routed on the network are not synchronised (phase-locked) to the clock frequency of the EAS on the optical loop. As a result, it is recommended that the clock frequency delivered by the customer terminal equipment interfaced with the network comply with Recommendation G.703.

3 TRIBUTARY INTERFACE CHARACTERISTICS

This chapter defines the interworking between the customer equipment and the EAS.

3.1 2 MBIT/S ELECTRICAL INTERFACE

The interface complies with Recommendation G.703.

It is an electrical interface with two 120 Ohm symmetrical pairs.

3.2 34 OR 45 MBIT/S ELECTRICAL INTERFACE

The interface complies with Recommendation G.703.

It is an electrical interface with two 75 Ohm coaxial pairs.

3.3 155 MBIT/S ELECTRICAL INTERFACE

The interface complies with Recommendation G.703 at hardware level and Recommendation G.707 at software level.

This interface is only available with 622 Mbit/s networks.

It is an electrical interface with two 75 Ohm coaxial pairs.

The interworking characteristics at 155 Mbit/s between the customer equipment and the EAS are defined in § 4.1.

3.4 155 MBIT/S OPTICAL INTERFACE

The interface complies with Recommendations G.957 and G.958 at hardware level and with Recommendation G.707 at software level.

The optical interface requires 2 single-mode Fibre Optic (FO) cables (input/output).

This interface is only available with 622 Mbit/s networks.

The STM1 optical interface transmits at 1310 nm.

The optical layers must respect the following values:

EAS STM1 incoming optical layers	Maximum	-10 dBm
	Minimum	-28 dBm
EAS STM1 outgoing optical layers	Maximum	0 dBm
	Minimum	-15 dBm

The interworking characteristics at 155 Mbit/s between the customer equipment and the EAS are defined in § 4.1.

3.5 ADDITIONAL INTERFACES

The choice of link rate, implementation of the option and the mode of operation for the additional Fast Ethernet Interface (half-duplex or full-duplex) is made by the customer when ordering the service.

The interface is transparent to Virtual Local Area Networks (VLAN).

The interfaces are available on the connectors situated on the adapter units.

Technical characteristics of the additional interfaces			
Customer interface	Wanted bit rate	Connector technology	Range
X.24/V.11-a (1)	64 kbit/s to 1920 kbit/s	15-pin female ISO 4903 connector	40m
Ethernet 802.3 or V2.0	N x 1724 kbit/s (N = 1 to 4)	RJ-45 (10 Base-T)	100m regardless of N
100 Base-TX Fast Ethernet 802.3	<ul style="list-style-type: none"> • 40 Mbit/s using a 45 Mbit/s link • 100 Mbit/s using a 155 Mbit/s link 	RJ-45 (100 Base-T)	100m

Note (1): The retransmission of circuits C on I, 105 on 109 and TA on CA is not end-to-end.

4 SDH INTERWORKING

4.1 155 MBIT/S INTERWORKING

The interworking characteristics at 155 Mbit/s (STM1) described below apply to both electrical and optical interfaces.

The Multiplexing Section Protection (MSP) function on tributary accesses is not offered in this service.

The table below defines the EAS SDH/STM1 frame octets.

Note 1: All values are given in hexadecimal notation.

Note 2: Definition:

- *EAS incoming = signal received by the EAS*
- *EAS outgoing = signal transmitted by the EAS*

4.1.1 RSOH OCTETS

A1	A1	A1	A2	A2	A2	C1/J0	NU	NU
B1			E1			F1	NU	NU
D1			D2			D3		

NU: National Use

Octet	EAS STM1 outgoing value	EAS STM1 incoming requirements
A1	F6	F6
A2	28	28
C1/J0	C1 operation	Any
B1	Algorithm complies with G.707	Algorithm complies with G.707
D1-3	Do not use Data Communication Channels (DCC)	Any
Others	Values not standard as not defined by the ITU-T	Any

4.1.2 MSOH OCTETS

B2	B2	B2	K1			K2		
D4			D5			D6		
D7			D8			D9		
D10			D11			D12		
S1					M1	E2	NU	NU

NU: National Use

Octet	EAS STM1 outgoing value	EAS STM1 incoming requirements
B2	Algorithm complies with G.707	Algorithm complies with G707
K1	00	Any
K2 (1-5)	Values not standard (11111 or 00000)	Any
K2 (6-8)	Values not standard (000 or 001) 110: Multiplex Section Remote Defect Indicator (MS-RDI)	No alarm if ≠ 110 or 111 110: MS-RDI 111: Multiplex Section Alarm Indication Signal (MS-AIS)
S1	Do not use octet S1 The values are not standard and depend on the interconnected equipment	Any
M1	Multiplex Section Remote Error Indication (MS-REI) function not supported The values are not standard and depend on the interconnected equipment	Any
D4-12	Do not use DCCs	Any
Others	Values not standard as not defined by the ITU-T	Any

4.1.3 AU-4 POINTER OCTETS

H1	Y	Y	H2	1*	1*	H3#1	H3#2	H3#3
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1* = 11111111

Octet	EAS STM1 outgoing value	EAS STM1 incoming requirements
H1	Bits 1 to 4 = New Data Flag, complies with G.707 and G.783. SS bits (bits 5 and 6) = 10 Bits 7 and 8 comply with G.707	Bits 1 to 4 = New Data Flag, complies with G.707 and G.783. SS bits (bits 5 and 6) = 10 Bits 7 and 8 comply with G.707
H2	Complies with G.707	Complies with G.707
1*	11111111	11111111
Y	1001SS11 SS bits (bits 5 and 6) = 10 or 00	1001SS11 SS bits (bits 5 and 6) = Any

Caution: In reception, an H1 octet SS bit value other than 10 results in a Loss of Pointer (LOP) alarm: transmission of VC4 impossible.

4.1.4 VC4 POH OCTETS

VC4 is transmitted transparently in the France Telecom network, therefore it does not modify the Path OverHead (POH). However, octet B3 and bits 1 to 4 of the VC4 POH G1 octet, transmitted by the customer terminal equipment, are produced in compliance with the ITU-T G.707 algorithm.

5 HISTORY

Edition	Date	Comments
1	May 2002	First version