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Interface technical specifications *for France Telecom's network*

As required by Directive 1999/5/EC

Characteristics of **34 and 155 Mbit/s high rate Transfix** service access interfaces

Summary: This document gives a brief description of the technical characteristics of the interfaces used to access the **34 and 155 Mbit/s high rate Transfix** services.

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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 34 AND 155 MBIT/S HIGH RATE TRANSFIX SERVICES

The high rate Transfix services are bidirectional digital leased links (LL), with standardised interfaces and a permanent transmission capacity, between two customer sites.

These links are used to transport data, voice and images.

The services include the provision, installation and maintenance of all the related equipment.

To provide the service, France Telecom installs service access equipment (SAE) in technical premises near the customer equipment, or in the first France Telecom centre reached by the link.

The SAE is a terminal multiplexer or an SDH synchronous access multiplexer.

1.1 SERVICES AND RATES AVAILABLE

Service	Rate
<i>G.703 34 Mbit/s high rate Transfix</i>	34 Mbit/s
<i>G.703 155 Mbit/s high rate Transfix</i>	155 Mbit/s
<i>G.957 155 Mbit/s high rate Transfix</i>	155 Mbit/s

1.2 INTERFACES AVAILABLE

- 34 Mbit/s high rate Transfix: nominal rate 34368 kbit/s
- 155 Mbit/s high rate Transfix: VC4 virtual container, in an STM1 frame with a nominal rate of 155520 kbit/s

The virtual containers comply with ITU-T Recommendation G.707.

1.2.1 34 MBIT/S ELECTRICAL INTERFACE

The interface complies with Recommendation G.703.

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

1.2.2 155 MBIT/S ELECTRICAL INTERFACE

The interface complies with Recommendation G.703 at physical level and Recommendation G.707 at logical level.

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

The interworking characteristics between the customer equipment and the SAE are defined in § 2.

1.2.3 155 MBIT/S OPTICAL INTERFACE

The interface complies with Recommendations G.957 and G.958 at physical level and Recommendation G.707 at logical level.

The optical interface requires 2 single-mode optical fibres (incoming/outgoing).

The optical interface transmits at 1310 nm.

The optical levels must respect the following values:

SAE STM1 incoming optical levels	Maximum	-10 dBm
	Minimum	-28 dBm
SAE STM1 outgoing optical levels	Maximum	0 dBm
	Minimum	-15 dBm

The interworking characteristics between the customer equipment and the SAE are defined in § 2.

1.3 TRANSMISSION DELAY

Transmission is affected by the propagation delay of the land transmission systems and the transfer time of signals across installations.

The transmission delay for end-to-end data is less than 15 ms.

1.4 LINK SYNCHRONISATION

1.4.1 SHORT-DISTANCE LL

Short-distance, high rate Transfix LLs connect customer sites directly.

At one end, the customer equipment provides a signal timed by its own source of synchronisation. The equipment at the other end recovers the clock frequency of the signal received and phase-locks its transmission to it.

1.4.2 LONG-DISTANCE LLs ON FT SDH NETWORK

LLs on the France Telecom SDH network are national LLs, or in broader terms LLs that do not connect customer sites directly.

The signal transmitted by the customer equipment is synchronised by the timing of the STM1 signal received. The customer equipment at each end of the link recovers the reception clock frequency to phase-lock its transmission. This clock frequency, from the France Telecom network, comes from primary reference sources which comply with Recommendation G.811.

1.4.3 34 MBIT/S HIGH RATE TRANSFIX LLs (SPECIAL CASE)

The local customer equipment fixes the line rate, and must in all cases provide a 34, 368 kbit/s $\pm 20.10^{-6}$ clock frequency to the remote customer equipment for the link to operate correctly. The output jitter from the local customer equipment must comply with Recommendation G.823.

2 155 MBIT/S SDH 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 tables below define the bytes of the SDH/STM1 frame of the SAE installed on the customer premises.

Note 1: All values are given in hexadecimal notation.

Note 2: Definition:

- SAE incoming = signal received by the SAE
- SAE outgoing = signal transmitted by the SAE

2.1 REGENERATOR SECTION OVERHEAD (RSOH) BYTES

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

NU: National Use

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

2.2 MULTIPLEX SECTION OVERHEAD (MSOH) BYTES

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

NU: National Use

Byte	SAE STM1 outgoing value	SAE STM1 incoming requirements
B2	Algorithm complies with G.707	Algorithm complies with G.707
K1	00	Any
K2 (1-5)	Non-uniform values (11111 or 00000)	Any
K2 (6-8)	Non-uniform values (000 or 001) 110: Multiplex Section Remote Defect Indication (MS-RDI)	No alarm if ≠ 110 or 111 110: MS-RDI 111: Multiplex Section Alarm Indication Signal (MS-AIS)
S1	Do not use S1 byte The values are not uniform and depend on the interconnected equipment	Any
M1	Multiplex Section Remote Error Indication (MS-REI) function not supported The values are not uniform 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

2.3 AU-4 POINTER BYTES

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

Byte	SAE STM1 outgoing value	SAE 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
Y	1001SS11 SS bits (bits 5 and 6) = 10 or 00	1001SS11 SS bits (bits 5 and 6) = Any
1*	11111111	11111111

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

2.4 VC4 POH BYTES

VC4 is transmitted transparently in the France Telecom network, therefore the Path OverHead (POH) is not modified. However, B3 byte and G1 byte (bits 1 to 4) of the VC4 POH, transmitted by the customer equipment, shall be produced in compliance with the ITU-T G.707 algorithm.

3 HISTORY

Edition	Date	Comments
1	March 2000	First version
2	October 2000	Title changed and minor modifications made; STM1 optical service access interface added (see § 1.3)
3	May 2002	Modifications by BE/MSE/STD/DT in compliance with the STAS's