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Interface technical specifications
for France Telecom's network

As required by Directive 1999/5/EC

InterSAN service access interface characteristics

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

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1 OVERVIEW OF THE INTERSAN SERVICE

The InterSAN service consists of providing one or more point-to-point bidirectional digital leased links between two remote sites in the same town, a town being defined as the whole urban area formed by a town and its suburbs.

The InterSAN service uses wavelength multiplexing equipment, referred to in the rest of this document as EAS (service access equipment).

1.1 MAIN AND EXTENSION LINKS

The first link is called the main link and the following links are called extension links.

The interface type is the same at both ends of a link.

1.2 MAIN LINK INTERFACES

- ESCON¹ interface (200 Mbit/s)
- Fibre Channel interface (1062 Mbit/s)

1.3 EXTENSION LINK INTERFACES

- ESCON interface (200 Mbit/s)
- Fast Ethernet interface (100 Mbit/s)
- STM1 ATM interface (155 Mbit/s)
- STM1 SDH interface (155 Mbit/s)
- Fibre Channel interface (1062 Mbit/s)
- Gigabit Ethernet interface (1000 Mbit/s)

1.4 CUSTOMISED INTERFACES OFFERED

- 8 and 16 Mbit/s External Time Reference/Control Link Oscillator (ETR/CLO) interface
- 1062 Mbit/s single-mode (SM) Inter System Channel (ISC) interface

1.5 HIGH AND LOW BIT RATE RANGES

The links associated with the ESCON, Fast Ethernet, STM1 ATM and STM1 SDH interfaces belong to the low bit rate range.

The links associated with Fibre Channel and Gigabit Ethernet interfaces belong to the high bit rate range.

¹ ESCON is an IBM corporation trademark.

2 GENERAL TECHNICAL SPECIFICATIONS

The optical service interface requires 2 single-mode (SM) or multimode (MM) Fibre Optic (FO) cables (input/output) depending on the protocols transmitted.

The data transfer time from a tributary input to a tributary output can reach a maximum of 0.3 ms.

3 TRIBUTARY INTERFACE CHARACTERISTICS FOR AGREEMENTS WITH LESS THAN 8 LEASED LINKS

This chapter defines the interworking between the customer terminal equipment and the EAS for an agreement with less than 8 Leased Links (LL).

This depends on respecting the optical levels. **The customer is responsible for providing any optical attenuators necessary for adapting the optical levels between the EAS and the customer equipment.**

The optical connection uses **ST connector technology**.

3.1 ESCON, FAST ETHERNET AND STM1 SDH/ATM INTERFACES

The optical interface connection is made using 2 **SM** or **MM** FO cables depending on the protocols being transported.

The EAS optical interface transmits at **1310 nm**.

The optical levels must respect the following values:

| | | |
|-----------------------------|---------|---------|
| EAS incoming optical levels | Maximum | -4 dBm |
| | Minimum | -25 dBm |
| EAS outgoing optical levels | Maximum | -16 dBm |
| | Minimum | -20 dBm |

3.2 1062 MBIT/S FIBRE CHANNEL OR GIGA ETHERNET INTERFACES

The optical interface connection is made using 2 **MM** fibre optic cables.

The EAS optical interface transmits at **850 nm**.

The optical levels must respect the following values:

| | | |
|-----------------------------|---------|----------|
| EAS incoming optical levels | Maximum | -3 dBm |
| | Minimum | -14 dBm |
| EAS outgoing optical levels | Maximum | -4 dBm |
| | Minimum | -9.5 dBm |

4 TRIBUTARY INTERFACE CHARACTERISTICS FOR AGREEMENTS WITH MORE THAN 8 LEASED LINKS

This chapter defines the interworking between the customer terminal equipment and the EAS for an agreement with more than 8 LLs.

This depends on respecting the optical levels. **The customer is responsible for providing any optical attenuators necessary for adapting the optical levels between the EAS and the customer equipment.**

The optical connection uses **SC/PC connector technology**.

4.1 ESCON, FAST ETHERNET OR STM1 SDH INTERFACES

The optical interface connection is made using 2 **SM** or **MM** FO cables depending on the protocols being transported.

The optical interfaces are concentrated at a ratio of 4 per wavelength.

The EAS optical interface transmits at **1310 nm** (1280 to 1350 nm) and receives in the range **1270 to 1380 nm**.

The optical levels must respect the following values:

| | | |
|-----------------------------|---------|---------|
| EAS incoming optical levels | Maximum | -8 dBm |
| | Minimum | -28 dBm |
| EAS outgoing optical levels | Maximum | -8 dBm |
| | Minimum | -15 dBm |

4.2 1062 MBIT/S FIBRE CHANNEL, GIGA ETHERNET OR ETR/CLO INTERFACES

The optical interface connection is made using 2 **SM** or **MM** FO cables depending on the protocols being transported.

The EAS optical interface transmits at:

- **1310 nm** (1280 to 1340 nm) and receives in the range **1270 to 1350 nm**
- **850 nm** (830 to 860 nm) and receives in the range **770 to 860 nm**

The optical levels must respect the following values:

| | | |
|-----------------------------|---------|---------|
| EAS incoming optical levels | Maximum | -3 dBm |
| | Minimum | -17 dBm |
| EAS outgoing optical levels | Maximum | -3 dBm |
| | Minimum | -11 dBm |

4.3 1062 MBIT/S ISC INTERFACES

The Intersystem Channel (ISC) links are IBM ES/9000 large system coupling links which use the Fibre Channel protocol.

The optical interface requires the Open Fiber Control (OFC) protocol (ANSI X3.230-1994) which limits the optical transmission power if the fibre is opened.

The optical interface connection is made using 2 **SM** FO cables.

The EAS optical interface transmits at **1310 nm** (1295 to 1320 nm) and receives in the range **1270 to 1680 nm**.

The optical levels must respect the following values:

| | | |
|-----------------------------|---------|---------|
| EAS incoming optical levels | Maximum | -3 dBm |
| | Minimum | -20 dBm |
| EAS outgoing optical levels | Maximum | -3 dBm |
| | Minimum | -8 dBm |

5 HISTORY

| Edition | Date | Comments |
|----------------|---------------|-----------------|
| 1 | December 2001 | First version |