

TTC STANDARDS

JJ-20.80

TTC2M Circuit Emulation Service
Interoperability Specification for
Private ATM Network

Version 1

April 28 1998

THE TELECOMMUNICATION TECHNOLOGY COMMITTEE



Introduction

This document provides the TTC original Standards formulated and put into effect by the Technical Assembly. It contains unabbreviated version of 'JJ-' Standards, which have not been defined as international standards.

In case of dispute, the original to be referred is the Japanese version of the text.

We trust that greater understanding of TTC Standards by a wider range of users will further contribute to the development of telecommunications.

JJ-20.80 TTC2M Circuit Emulation Service Interoperability Specification for Private ATM Network

Contents

<REMARKS>.....	3
1 .SCOPE.....	4
2 .REFERENCE MODEL.....	4
3 .ATMPHYSICAL INTERFACE.....	4
4 .STRUCTURED JJ-20.11 N×64KBIT/S SERVICE INTERFACE.....	4
4.1 SERVICE DESCRIPTION.....	4
4.1.1 Framing.....	5
4.1.2 Timeslot Assignment.....	5
4.1.3 Clocking.....	5
4.1.4 Alarms.....	5
4.1.5 Signaling bit.....	6
4.1.6 Service Performance Characteristics.....	6
4.1.7 Electrical.....	6
4.2 AAL1 REQUIREMENTS.....	6
4.3 AAL1 USER ENTITY REQUIREMENTS.....	6
4.3.1 Cell Coding.....	6
4.3.2 Bit Ordering.....	8
4.3.3 Loss/Error Response.....	8
4.4 CLOCK DISTRIBUTION GUIDELINES.....	8
5. ATM VIRTUAL CHANNEL REQUIREMENTS.....	8
5.1 PEAK CELL RATE.....	9
5.1.1 Peak Cell Rate without the signaling bit.....	9
5.1.2 Peak Cell Rate with the signaling Bit.....	9
5.2 ATM VIRTUAL CHANNEL PAYLOAD TYPE AND CLP.....	9
5.3 IMPAIRMENTS.....	9
6. SIGNALING.....	9
7. CALL INITIATION PROCEDURE.....	9
8. MANAGEMENT.....	9

JJ-20.80 TTC2M Circuit Emulation Service Interoperability Specification for Private ATM Network

< Remarks >

1. Relations with international standards

There is no international standard relating to this standard.

2. Supplement and addendum

None

3. History of revisions

Version	Date of issue	Contents of revision
1	April 28, 1998	Initial issue

4. Others

(1) Referred recommendations and/or standards

TTC standards: JJ-20.11 , JF-AF0078.00 , JT-I363.1

(2) Relations with other national standards

None

1 . Scope

This standard defines the ATM Circuit Emulation Services Interworking Functions that ATM Network emulates circuit characteristics to provide Constant Bit-Rate (CBR) traffic or circuit traffic on ATM network. This standard is designed particularly for the use of JJ-20.11 as CBR service interface.

2 . Reference Model

Fig. 2-1 illustrates the reference model of the circuits emulation services specified by this standard.

Two set of ATM Circuit Emulation Service Interworking Functions are connected to ATM Network with physical interface, specified as ATM UNI by TTC standard, and each of them is linked to Constant Bit-Rate (CBR) Circuit specified as JJ-20.11. These ATM Circuit Emulation Service Interworking Functions are to extend and connect CBR Circuits through ATM Network at both end.

The ATM Circuit Emulation Service Interworking Functions ensure the transparency for the terminal equipment of CBR Circuit.

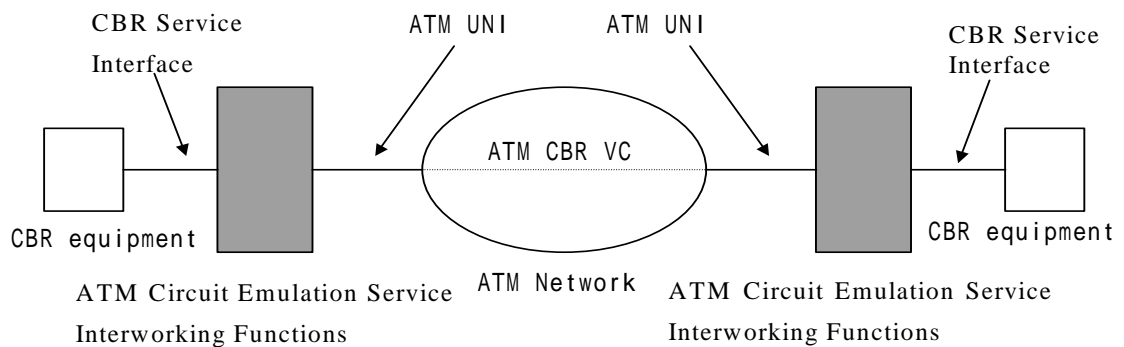


Fig. 2 - 1 / JJ-20.80 Reference Model

3 . ATM Physical Interface

The same as the article 1.7 ATM Physical Interface defined in JF-AF0078.00

4 . Structured JJ-20.11 N × 64kbit/s Service Interface

4.1 Service Description

Structured JJ-20.11 N × 64kbit/s Service emulates Circuits defined by JJ-20.11 and has at least more than one ATM Adaptation Layer 1 (AAL1) entity.

As N × 64kbit/s Service can use a part of timeslots available for Service Interface, several independent emulated circuits can be commonly applied at a single Service Interface, which is illustrated in Fig. 4-1.

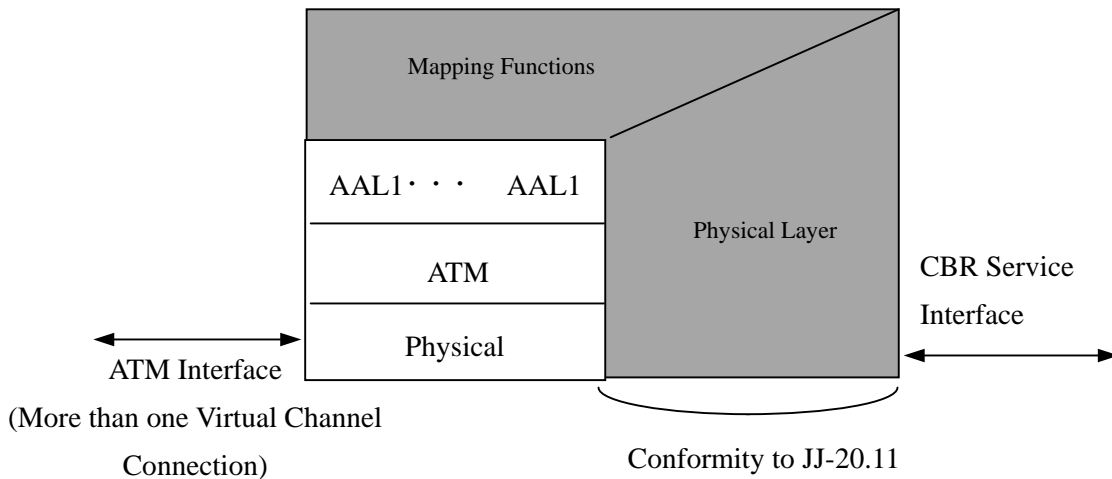


Fig. 4 - 1 / Outline of Layer Structure defined by JJ-20.80

4.1.1 Framing

The same as the articles 3.2 Frame format and 3.3 Frame synchronization characteristics specified in JJ-20.11.

4.1.2 Timeslot Assignment

$N \times 64\text{ kbit/s}$ service provides the transmission of an aggregate timeslot N , numerically from one to 32. Timeslots which are assigned to virtual channels are not necessarily adjacent each other, and neither necessarily the same assignment of the timeslots at both ends of virtual channels. N timeslots in the same frame should be dealt in a lump and be held 125 μ sec frame integrity at the both ends of virtual channels.

4.1.3 Clocking

The same as the article 2.1.3 Clocking, of which usage for the Structured E1 $N \times 64\text{ kbit/s}$ Service defined in JF-AF0078.00. Service Interface distributes 2,048MHz Timing to CBR equipment.

4.1.4 Alarms

Fault Indication is shown in Fig.4-2. Alarm status is defined in JJ-20.11.

When the ATM Circuit Emulation Service Interworking Functions detect the loss of signal or the loss of frame synchronization, all "1" bits on the main signal and $A=0$ as the Signal bit are transferred to ATM Interface. While $S=1$ as Alarm-indication signal bit is sent to the Service Interface.

Upon detecting $S=1$ as Alarm-indication signal bit at the Service Interface, the ATM Circuit Emulation Service Interworking Functions transmit all "1" bits on the main signal and $A=0$ as Signal bit to ATM Interface.

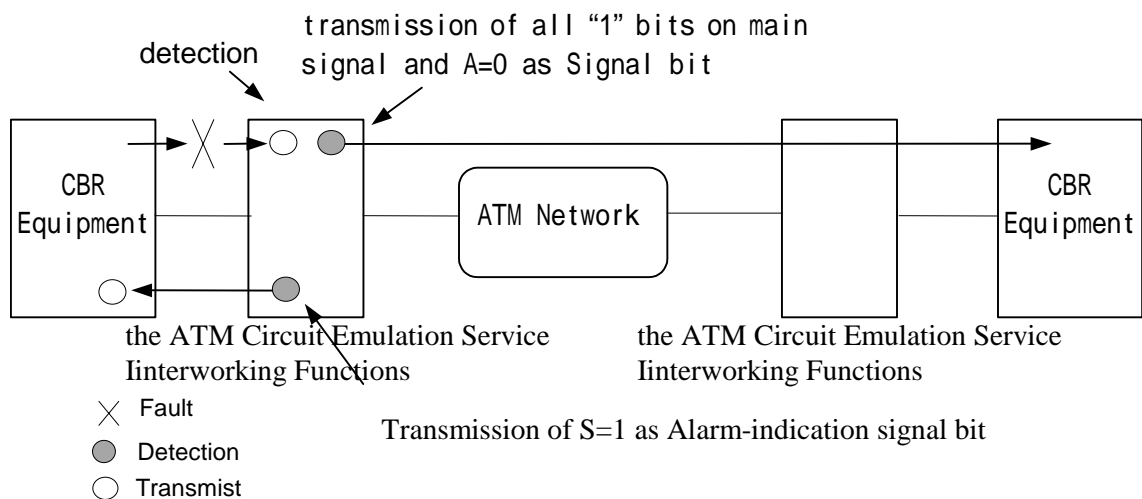


Fig. 4 - 2 / JJ-20.80 Fault Indication

4.1.5 Signaling bit

The ATM Circuit Emulation Service Interworking Functions ensure when necessary the transparency defined in the articles 3.2 Frame format and 3.2 Signal bit A characteristics of JJ-20.11.

4.1.6 Service Performance Characteristics

The end-to-end delay requirements and Bit error ratio between the relevant CBR equipment is out of the scope of this standard.

4.1.7 Electrical

The same as the articles 3.1 Major electrical conditions and 3.7 Physical conditions specified in JJ-20.11.

4.2 AAL1 Requirements

The same as the article 2.2 AAL1 Requirements specified in JF-AF0078.00.

4.3 AAL 1 User Entity Requirements

4.3.1 Cell Coding

The same as the article 2.3.1 Cell Coding specified in JF-AF0078.00.

4.3.1.1 AAL User Information block structure without the Signaling Bit

An example of AAL User Information block structure without the Signaling Bit is illustrated in Fig.4-3.

The block size of AAL User Information block structure is equivalent to a Multi-frame defined in JJ-20.11.

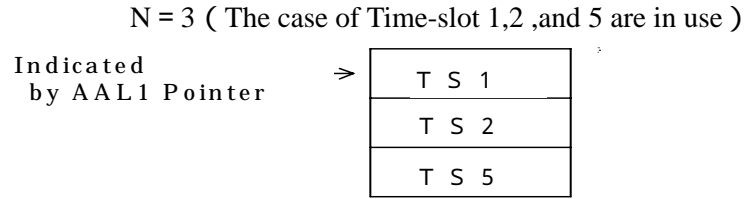


Fig. 4 - 3 / JJ-20.80 An example of AAL User Information block structure without the Signaling Bit

4.3.1.2 AAL User Information block structure with the Signaling Bit

An example of AAL User Information block structure with the Signaling Bit is shown in Fig. 4-4.

Block Structure format is comprised of a Payload in charge of transmission of $N \times 64\text{kb/s}$ user information and a signaling part in charge of transferring Signal bit “A” relevant to this Payload.

The block size is equivalent of 2Multi-farame defined in JJ-20.11

The first octet of the signaling part includes signaling bit A1 of 2 time-slots (A bit of the first multi-frame) and A2 (A bit of the second multi-frame).

In case N of $N \times 64\text{kb/s}$ service is odd number, the last octet of the signaling part other than the Signal part should be stuffed with 0.

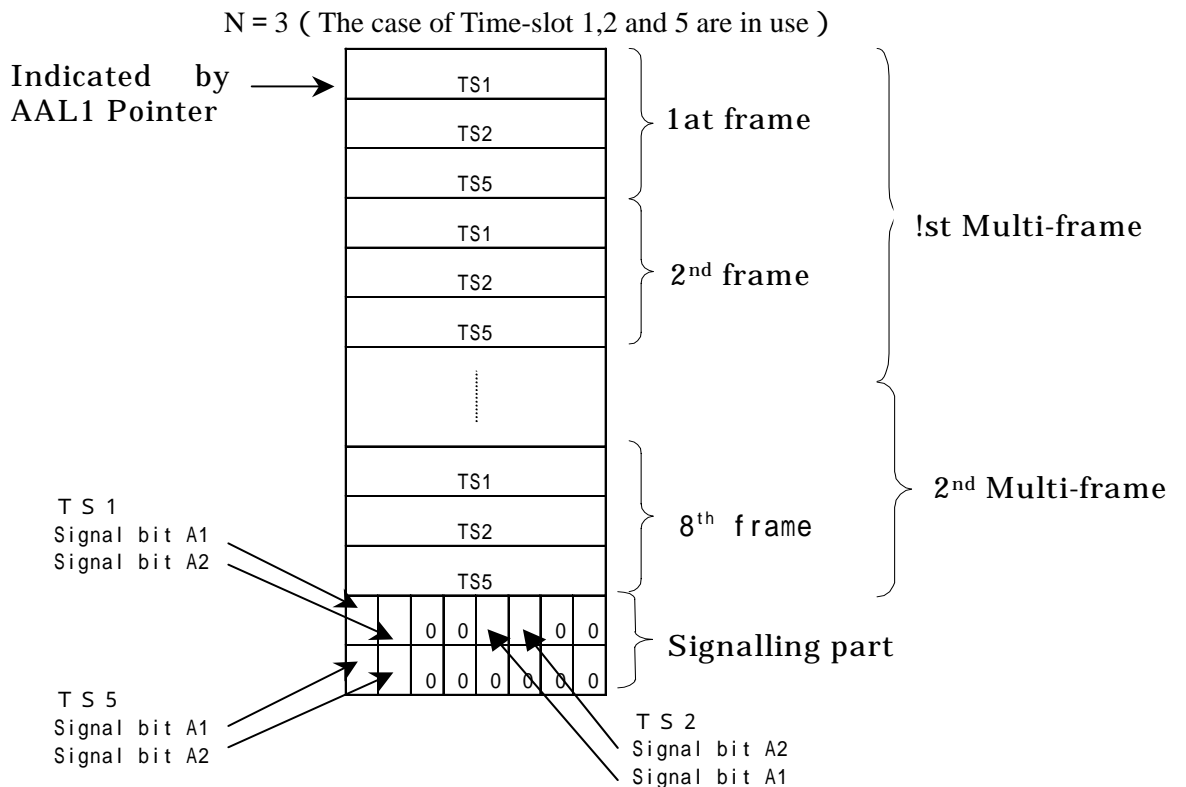


Fig.4-4 / JJ-20.80 AAL User Information block structure with the Signaling Bit

Table 4 - 1 / JJ-20.80 Size of AAL User Information block structure vs., N values (example)

Service Interface	Size of block structure (octet)			
	N = 1	N = 6	N = 24	N = 30
JJ-20.11	17	99	396	495

4.3.2 Bit Ordering

Bit Ordering is shown in Fig.4-5. Transfer of bit sequence is headed by MSB (Most Significant Bit).

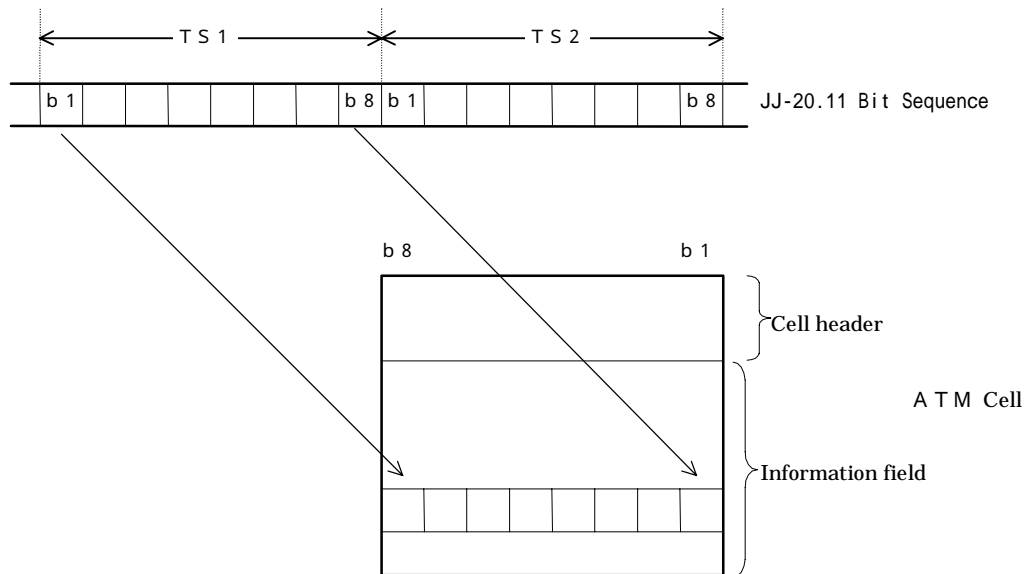


Fig.4-5 / JJ-80.11 Bit Ordering

4.3.3 Loss/Error Response

4.3.3.1 Lost and Misinserted Cells

The same as the article 2.3.3.1 Lost and Misinserted Cells specified in JF-AF0078.00

4.3.3.2 Buffer Overflow / Underflow

The same as the article 2.3.3.2 Buffer Overflow / Underflow defined in JF-AF0078.00. Except that this standard defines the trunk conditioning as all “1” bits for the main signals and A=0 for Signal bit.

4.4 Clock Distribution Guidelines

It conforms to the article 2.4 Clock Distribution Guidelines defined in JF-AF0078.00.

5. ATM Virtual Channel Requirements

The QOS of ATM Virtual Channels between two ATM Circuit Emulation Service Interworking Functions should apply the highest grade of the QOS.

5.1 Peak Cell Rate

5.1.1 Peak Cell Rate without the signaling bit

The same as the article 5.1.3.1 Basic Service defined in JF-AF0078.00.

5.1.2 Peak Cell Rate with the signaling Bit

(1) No partial cell fill, N even:

$$8000 \times [N \times 33/32] / 46.875$$

(2) No partial cell fill, N odd:

$$8000 \times [(1+N \times 33)/32] / 46.875$$

(3) Partial cell fill, N even, K the number of AAL1-User octets filled:

$$8000 \times [N \times 33/32] / K$$

(4) Partial cell fill, N odd, K the number of AAL1-User octets filled:

$$8000 \times [(1+N \times 33)/32] / K$$

In case of transferring signal bit A, due to the fact that all signaling bits are structured along with $N \times 64$ kbit/s user information, virtual channels supporting this service may bring about some jitters in cell emission time. These jitters in cell emission time should be absorbed by peak-rate traffic monitoring system.

5.2 ATM Virtual Channel Payload type and CLP

The same as the article 5.2 ATM Virtual Channel Payload type and CLP specified in JF-AF0078.00.

5.3 Impairments

The same as the article 5.3 Impairments in JF-AF0078.00.

6. Signaling

Except for the provision related to coding of Broadband Low Layer Information OUI and PID field with the signaling bit, the same specification as the article 6. Signaling in JF-AF0078.00 is applied. In case with the signaling bit, OUI of Broadband Low Layer Information is set for x'00 10 BD', which identifies TTC, and PID is set for x'00 02'.

In case without the signaling bit, Broadband Low Layer Information conforms to DS1/E1/J2 $N \times 64$ basic Service specified in the article 6. Signaling, JF-AF0078.00.

7. Call Initiation Procedure

The same as the article 7. Call Initiation Procedure specified in JF-AF0078.00.

8. Management

The same as the article 8. Management specified in JF-AF0078.00.