SLOVENSKI STANDARD
SIST EN 301 163-2-1 V1.1.2:2003

01-december-2003

Prenos in multipleksiranje (TM) ï Generiļ ne zahteve prenosne funkcionalnosti asinhronega prenosnega naļ ina (ATM) v sami opremi ï 2-1. del: Funkcijski model ravnine za upravljanje prenosa in plasti

Transmission and Multiplexing (TM); Generic requirements of Asynchronous Transfer Mode (ATM) transport functionality within equipment; Part 2-1: Functional model for the transfer and layer management plane

Ta slovenski standard je istoveten z: **EN 301 163-2-1 Version 1.1.2**

ICS:

33.040.20 Prenosni sistem Transmission systems

SIST EN 301 163-2-1 V1.1.2:2003 **en**

EN 301 163-2-1 V1.1.2 (1999-05)

European Standard (Telecommunications series)

Transmission and Multiplexing (TM); Generic requirements of Asynchronous Transfer Mode (ATM) transport functionality within equipment; Part 2-1: Functional model for the transfer and layer management plane

Reference

DEN/TM-01016-2-1 (aroi9idc.PDF)

Keywords

ATM, transport, B-ISDN, SDH, transmission

ETSI

Postal address

F-06921 Sophia Antipolis Cedex - FRANCE

Office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16
Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Internet

secretariat@etsi.fr
Individual copies of this ETSI deliverable
can be downloaded from
http://www.etsi.org
If you find errors in the present document, send your
comment to: editor@etsi.fr

Contents

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available **free of charge** from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://www.etsi.org/ipr).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Transmission and Multiplexing (TM), in order to provide inter-vendor and inter-operator compatibility of Asynchronous Transfer Mode (ATM) equipment.

The present document is part 2 of a multi-part EN covering the generic requirements of Asynchronous Transfer Mode (ATM) transport functionality within equipment, as identified below:

Part 1: "Functional characteristics and equipment performance";

Part 2: "Functional model for the transfer and layer management plane".

National transposition dates	
Date of adoption of this EN:	23 April 1999
Date of latest announcement of this EN (doa):	31 July 1999
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2000
Date of withdrawal of any conflicting National Standard (dow):	31 January 2000

1 Scope

The purpose of the present document is to provide specifications for Asynchronous Transfer Mode (ATM) equipment to be used in the ETSI region. Such specifications will ensure compatibility between equipment by identifying which functions are mandatory for interworking and which can be considered as truly optional. Of course it is not the intention to prevent manufacturers or procurers from following an alternative specification, but the consequences should become clear from the present document.

The document will be in two parts, producing a list of functions and processes in the first part and a formal representation of transfer transport and layer management functions in the second part. The specification will take advantage of the work done in ITU but will take the work further with an ETSI European view. This means: the identification of ITU options to be mandatory in Europe, deletion of options not required for Europe, creation of new or revised descriptions where necessary, identification of guideline or benchmark performance parameters for classes of equipment.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] ETS 300 147: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Multiplexing structure".

[2] ETS 300 298-1: "Broadband Integrated Services Digital Network (B-ISDN); Asynchronous Transfer Mode (ATM); Part 1: B-ISDN ATM functional characteristics [ITU-T Recommendation I.150 (1995)]".

[3] ETS 300 298-2: "Broadband Integrated Services Digital Network (B-ISDN); Asynchronous Transfer Mode (ATM); Part 2: B-ISDN ATM layer specification".

[4] ETS 300 300 (1997): "Broadband Integrated Services Digital Network (B-ISDN); Synchronous Digital Hierarchy (SDH) based user network access; Physical layer User Network Interfaces (UNI) for 155 520 kbit/s and 622 080 kbit/s Asynchronous Transfer Mode (ATM) B-ISDN applications".

[5] EN 300 301 (V1.2): "Broadband Integrated Services Digital Network (B-ISDN); Traffic control and congestion control in B-ISDN".

[6] ETS 300 337: "Transmission and Multiplexing (TM); Generic frame structures for the transport of various signals (including Asynchronous Transfer Mode (ATM) cells and Synchronous Digital Hierarchy (SDH) elements) at the ITU-T Recommendation G.702 hierarchical rates of 2 048 kbit/s, 34 368 kbit/s and 139 264 kbit/s".

[7] ETS 300 354: "Broadband Integrated Services Digital Network (B-ISDN); B-ISDN Protocol Reference Model (PRM)".

[8] ETS 300 404: "Broadband Integrated Services Digital Network (B-ISDN); B-ISDN Operation And Maintenance (OAM) principles and functions".

[9] EN 300 417-1-1 (V1.1): "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 1-1: Generic processes and performance".

[10] ITU-T Recommendation G.707: "Network node interface for the synchronous digital hierarchy (SDH)".

[11] ITU-T Recommendation G.803: "Architecture of transport networks based on the synchronous digital hierarchy (SDH)".

[12] ITU-T Recommendation G.804: "ATM cell mapping into plesiochronous digital hierarchy (PDH)".

[13] ITU-T Recommendation G.805: "Generic functional architecture of transport networks".

[14] ITU-T Recommendation G.832: "Transport of SDH elements on PDH networks: Frame and multiplexing structures".

[15] ITU-T Recommendation I.150: "B-ISDN asynchronous transfer mode functional characteristics".

[16] ITU-T Recommendation I.321: "B-ISDN protocol reference model and its application".

[17] ITU-T Recommendation I.326: "Functional architecture of transport networks based on ATM".

[18] ITU-T Recommendation I.361: "B-ISDN ATM layer specification".

[19] ITU-T Recommendation I.371: "Traffic control and congestion control in B-ISDN".

[20] ITU-T Recommendation I.432: "B-ISDN user-network interface - Physical layer specification".

[21] ITU-T Recommendation I.432.1: "B-ISDN user-network interface - Physical layer specification: General characteristics".

[22] ITU-T Recommendation I.432.2: "B-ISDN user-network interface - Physical layer specification: 155 520 kbit/s and 622 080 kbit/s operation".

[23] ITU-T Recommendation I.610: "B-ISDN operation and maintenance principles and functions".

[24] ITU-T Recommendation I.732: "Functional characteristics of ATM equipment".

3 Definitions, abbreviations and symbols

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 300 417-1-1 [9] apply.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

3.2.1 Modelling specific abbreviations

A	Adaptation function
a	consequent action
AI	Adapted Information
AP	Access Point
APId	Access Point Identifier
C	Connection function
c	defect cause
CI	Characteristic Information
CK	ClocK
CP	Connection Point
D	Data
d	defect correlation

G	Group
L	Layer
m	monitoring function
MI	Management Information
P12s	2 048 kbit/s PDH path layer with synchronous 125 µs frame structure
P31s	34 368 kbit/s PDH path layer with synchronous 125 µs frame structure
RI	Remote Information
S	Segment
S4	VC-4 path layer
Sk	Sink
So	Source
SSF	Server Signal Fail
T	Traffic management
TI	Timing Information
TT	Trail Termination function
vc	virtual channel
vp	virtual path

3.2.2 General abbreviations

AAL	ATM Adaptation Layer
ACS	ATM Cell Start
AIS	Alarm Indication Signal
ATM	Asynchronous Transfer Mode
BRPM	Backward Report Performance Monitoring
CBDS	Connectionless Broadband Data Service
CC	Continuity Check
CCAD	Continuity Check Activation/Deactivation
CLP	Cell Loss Priority
CNGI	CoNGestion Indication
dLCD	Loss of Cell Delineation defect
EFCI	Explicit Forward Congestion Indicator
EMF	Element Management Function
F_DS	Far-end Defect Second
FS	Frame Start signal
GFC	Generic Flow Control
HDLC	High-level Data Link Control procedure
HEC	Header Error Check
Hex	Hexadecimal
ID	IDentifier
LAN	Local Area Network
LB	LoopBack
LLID	Loopback Location IDentifier
LOC	Loss of Continuity
MA	Maintenance and Adaptation
N_DS	Near-end Defect Second
NE	Network Element
N-ISDN	Narrowband Integrated Services Digital Network
NNI	Network Node Interface
NPC	Network Parameter Control
OAM	Operation, Administration and Maintenance
OCD	Out of Cell Delineation
PDH	Plesiochronous Digital Hierarchy
PLM	PayLoad Mismatch
PM	Performance Monitoring
PMAD	Performance Monitoring Activation/Deactivation
POH	Path OverHead
PRM	Protocol Reference Model
PTI	Payload Type Identifier
QoS	Quality Of Service

RDI	Remote Defect Indicator
RLCD	Remote Loss of Cell Delineation
SDH	Synchronous Digital Hierarchy
SLOC	Segment Loss Of Continuity
SSF	Server Signal Fail
TP	Timing Point
TP	Transmission Path
TSF	Trail Signal Fail
UNI	User Network Interface
UPC	Usage Parameter Control
VC	Virtual Channel
VC	Virtual Container
VCC	Virtual Channel Connection
VP	Virtual Path
VPC	Virtual Path Connection
VPI	Virtual Path Identifier

3.3 Symbols and diagrammatic conventions

For the purposes of the present document, the symbols and diagrammatic conventions described in EN 300 417-1-1 [9] apply.

3.4 Introduction

The atomic functions used in the Transmission Path (TP) convergence, ATM Virtual Path (VP) and Virtual Channel (VC) Layer Networks and their associated Adaptation functions are defined in the present document.

The document is structured in the following manner:

- Transmission Path to Avp Adaptation Functions:
  - SDH Adaptation Functions;
  - Cell Based Adaptation Functions;
  - PDH Adaptation Function.
- VP Layer Network, including Connection, Trail Termination, Segment, Traffic Management, Monitoring and Loopback Functions;
- Avp to Avc Adaptation Functions;
- VC Layer Network, including Connection, Trail Termination, Segment, Traffic Management, Monitoring and Loopback Functions;
- Avc to ATM Client Layer Adaptation Functions.

The Layer Networks and Adaptation functions are defined for the purpose of the user to group them into a higher level grouping, if required. The decomposition of the atomic function sequence into Layer Networks and Adaptation functions correspond to the view of ITU-T Recommendation G.805 [13]. It also represents the common basis view from the Synchronous Digital Hierarchy (SDH) and ATM history perspective, since ITU-T Recommendation G.803 [11] (defining SDH networks) as well as ITU-T Recommendation I.326 [17] (defining ATM networks) are both based on ITU-T Recommendation G.805 [13].

For the SDH view, the grouping used in ITU-T Recommendation G.803 [11] is the Network Layer (or simply called Layer). It associates the Layer Network and the Adaptation function in Client Layer direction into the grouping called "Network Layer".

For the ATM view, the grouping used in ITU-T Recommendation I.326 [17] is the Transport Assembly, also called VP Level resp. VC Level. It associates the Layer Network and the Adaptation function in Server direction into the grouping called respectively "VP Level" and "VC Level".

Figure 1 shows the grouping of the Adaptation function to the Layer Network according to the two views.

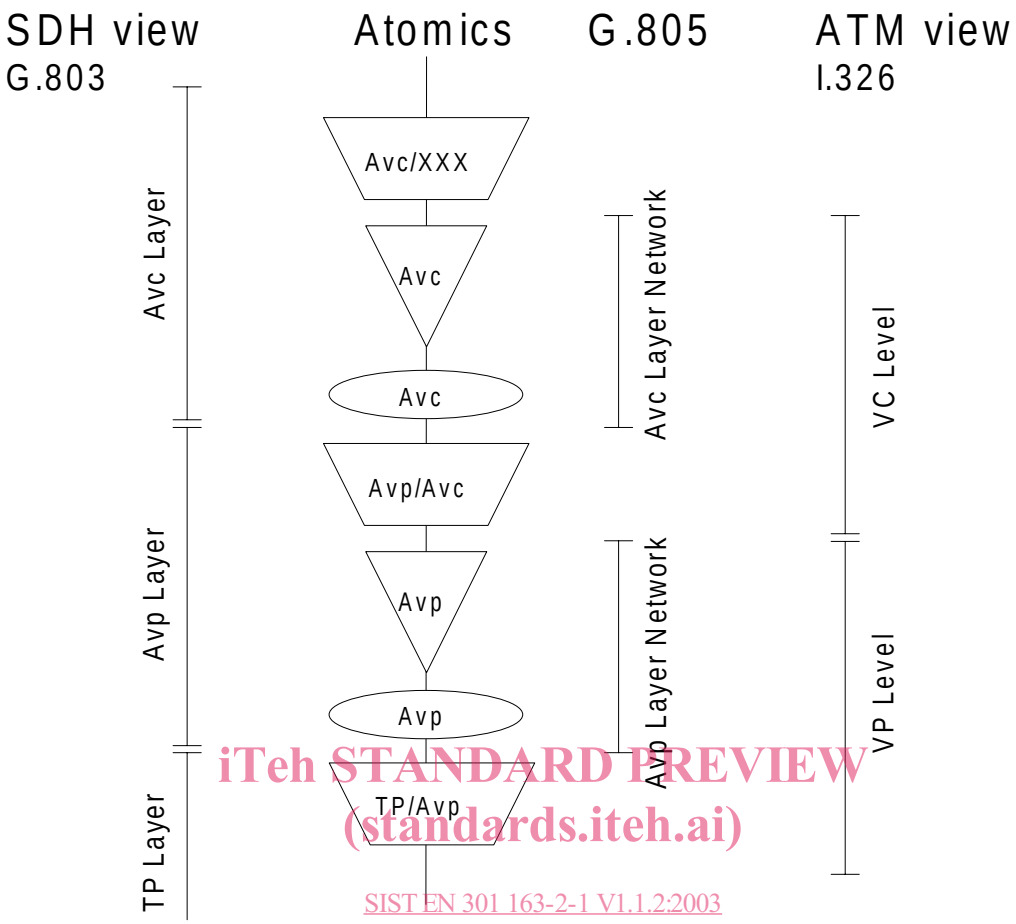

Figure 1: Different views for the grouping of the adaptation functions

4 Transmission path to ATM virtual path adaptation functions

4.1 S3 path adaptation functions

4.1.1 S3 path to ATM virtual path adaptation source function S3/Avp_A_So

Symbol:

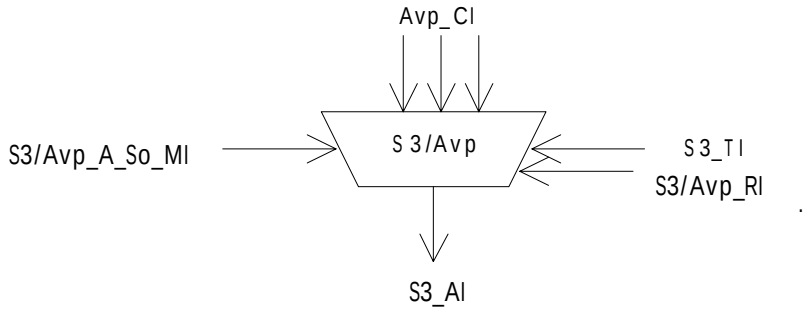

Figure 2: S3/Avp_A_So symbol

Interfaces:

Table 1: S3/Avp_A_So input and output signals

Input(s)	Output(s)
per Avp_CI for each VP configured: Avp_CI_D Avp_CI_ACS Avp_CI_SSF S3_TI_CK S3_TI_FS S3/Avp_RI_RLCD S3/Avp_A_So_MI_Active S3/Avp_A_So_MI_CellDiscardActive S3/Avp_A_So_MI_TPusgActive S3/Avp_A_So_MI_GFCActive S3/Avp_A_So_MI_VPI-KActive	S3_AI_D S3_AI_CK S3_AI_FS

The S3/Avp_A_So function provides adaptation from the ATM Virtual Path to the VC-3 path. This is performed by a grouping of Specific Processes and Common Processes as shown in figure 3.

Activation: The function shall access the access point when it is activated (MI_Active is true). Otherwise, it shall not access the access point.

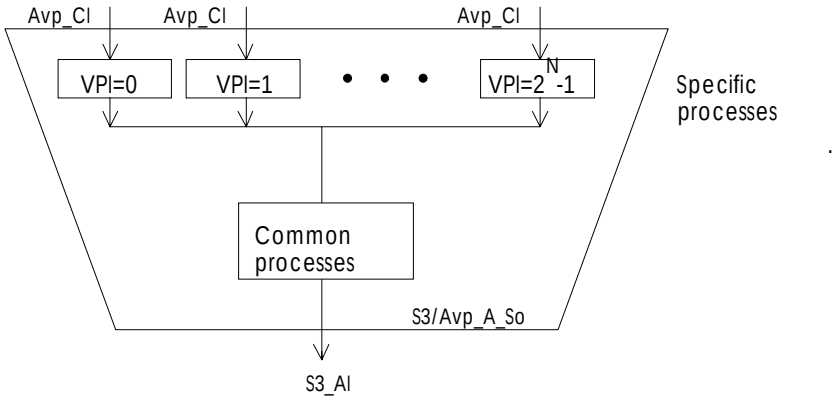

Figure 3: S3/Avp_A_So atomic function decomposed into Specific and Common processes parts

NOTE 1: The sequential order of the processes within the atomic functions is important. For the correct order, refer to the ordering of the processes given below.

Specific Processes:

These Processes include VPI setting as well as VP asynchronous multiplexing. Each of these Specific Processes is characterized by the Virtual Path Identifier number K, where $0 \leq K \leq 2^N - 1$.

VPI-K Activation: The Specific Processes perform the operation specified below when it is activated (MI_VPI-KActive is true).

The format of the Characteristic Information (Avp_CI) is given in figure 4.

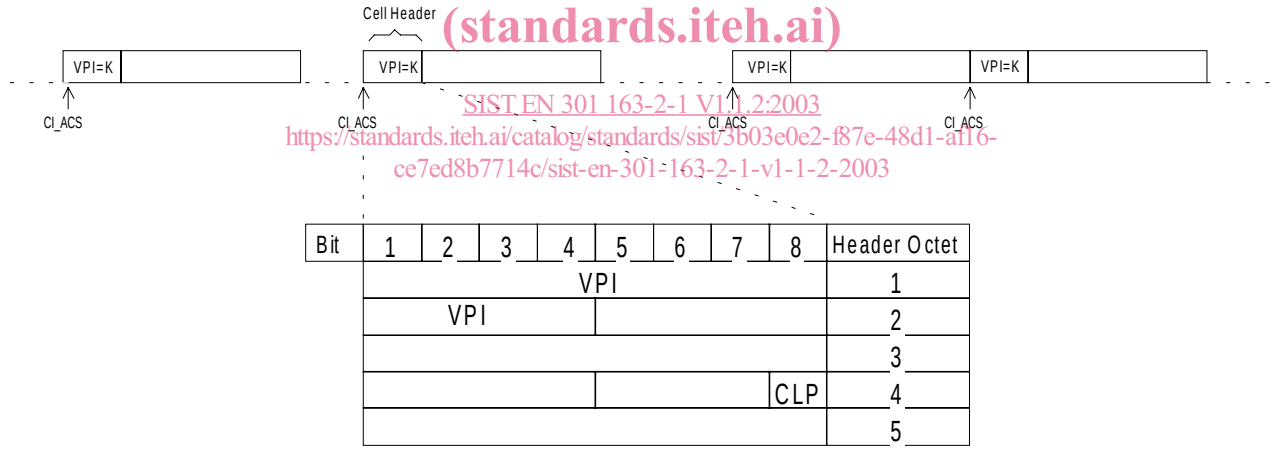

Figure 4: Avp_CI (NNI format)

VPI setting is based on the activation of the Specific function by MI_VPI-KActive and inserts the value of "K" as VPI.

NOTE 2: The value of N represents the number of bits in the VPI field and is an integer number. Its maximum value is equal to 12 for the ATM NNI. Its maximum value is equal to 8 for the ATM UNI.

VP multiplexing: Asynchronous multiplexing is performed for each active Specific function.

Common Processes:

The Common Processes include: Congestion control (selective cell discard (CLP based)), GFC processing, TP usage measurement, cell rate decoupling, HEC processing, cell information field scrambling, cell stream mapping and processing of the payload specific bytes C2 and H4, as well as bits 6 and 7 of G1, to the VC-3 Path OverHead (POH). The logical ordering of the processes from input to output shall be maintained.

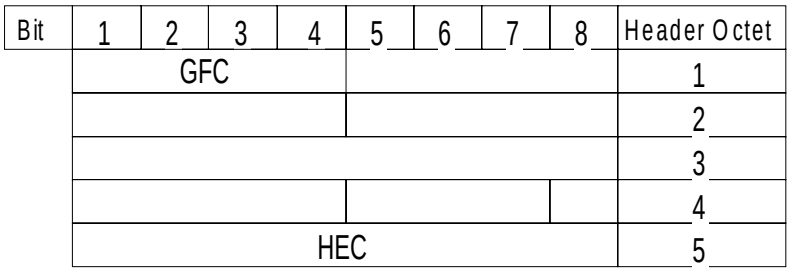

Figure 5: Cell header information processed in S3/Avp_A_So

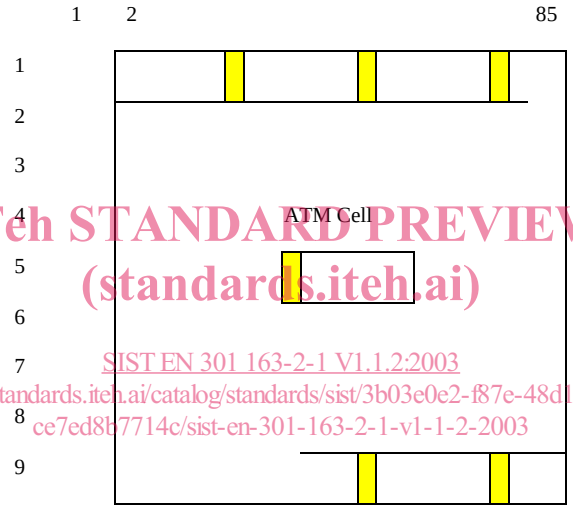

Figure 6: ATM cell stream mapping into Container-3 structure

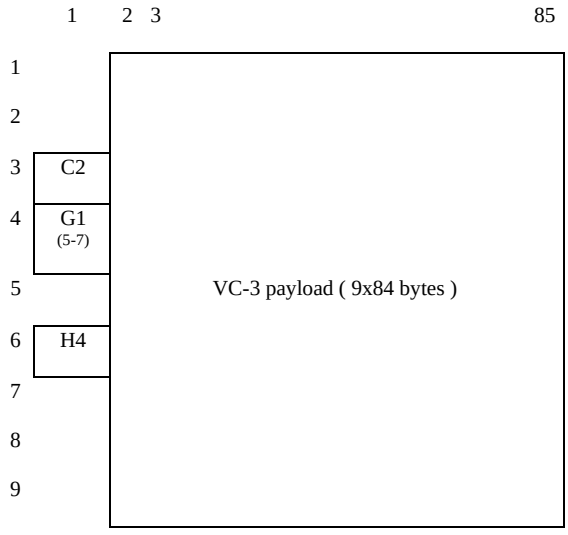

Figure 7: S3_AI_So_D