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Transmission and Multiplexing (TM);
Terms and definitions in transport networks;
Part 1: Core networks

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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
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Contents

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Transmission and Multiplexing (TM).

The present document is part 1 of a multi-part Technical Report covering the Definitions and Abbreviations in transport networks, as identified below:

Part 1: **"Core networks";**

Part 2: "Access networks";

Part 3: "Fixed Radio Systems".

1   Scope

The present document lists the preferred definitions and abbreviations relevant to core network standardization within ETSI Working Group TM1. The definitions and abbreviations have been extracted from the documents shown in clause 2 with the following exceptions:

-   ETS 300 681 [1] is not included as this will be taken into account in TR 101 689-2.

-   In the case of ETS 200 232 [2], the definitions and abbreviations given in ITU-T Recommendation G.957 [3] apply.

-   All the work on optical fibre and optical components (see [23]-[32]) has been excluded since, once published by ETSI, the output is taken over by CENELEC and the relevant I-ETSs are withdrawn. It is assumed that CENELEC resolve any issues related to definitions and abbreviations in those documents.

-   ETR 247 [36] is not included as this is a highly specialized report, the definitions and abbreviations of which only apply within that particular document.

-   [37] is also excluded as no electronic version exists and it is felt that the content would be more relevant to the work of CENELEC.

The definitions and abbreviations relevant to the work of working party B of former working group TM3 will be included in the present document at a later date.

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 300 681: "Transmission and Multiplexing (TM); Optical Distribution Network (ODN) for Optical Access Network (OAN)".

[2]   ETS 300 232: "Optical interfaces for equipments and systems relating to the Synchronous Digital Hierarchy [ITU-T Recommendation G.957 (1993), modified]".

[3]   ITU-T Recommendation G.957 (1995): "Optical interfaces for equipments and systems relating to the synchronous digital hierarchy".

[4]   ETS 300 461-1: "Transmission and Multiplexing (TM); Flexible Multiplexer (FM) equipment; Part 1: Core functions, 2 048 kbit/s aggregate interface functions, tributary interface functions and special functions".

[5]   ETS 300 461-2: "Transmission and Multiplexing (TM); Flexible Multiplexer (FM) equipment; Part 2: Management and control functions".

[6]   ETS 300 010-1: "Transmission and Multiplexing (TM); Synchronous cross connect equipment; 64 kbit/s and n x 64 kbit/s cross connection rate 2 048 kbit/s access ports; Part 1: Core functions and characteristics".

[7]   ETS 300 010-2: "Transmission and Multiplexing (TM); Synchronous cross connect equipment; 64 kbit/s and n x 64 kbit/s cross connection rate 2 048 kbit/s access ports; Part 2: Management aspects".

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

[9]   EN 300 417-1-2: "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 1-2: General information about Implementation Conformance Statement (ICS) proforma".

[10]   EN 300 417-2-1: "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 2-1: Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) physical section layer functions".

[11]   EN 300 417-2-2: "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 2-2: Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) physical section layer functions; Implementation Conformance Statement (ICS) proforma specification".

[12]   EN 300 417-3-1: "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 3-1: Synchronous Transport Module-N (STM-N) regenerator and multiplex section layer functions".

[13]   EN 300 417-3-2: "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 3-2: Synchronous Transport Module-N (STM-N) regenerator and multiplex section layer functions; Implementaion Conformance Statement (ICS) proforma specification".

[14]   EN 300 417-4-1: "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 4-1: Synchronous Digital Hierarchy (SDH) path layer functions".

[15]   EN 300 417-4-2: "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 4-2: Synchronous Digital Hierarchy (SDH) path layer functions; Implementation Conformance Statement (ICS) proforma specification".

[16]   EN 300 417-5-1: "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 5-1: Plesiochronous Digital Hierarchy (PDH) path layer functions".

[17]   EN 300 417-6-1: "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 6-1: Synchronization layer functions".

[18]   ETS 300 672: "Transmission and Multiplexing (TM); Relevant generic characteristics of optical amplifier devices and sub-systems".

[19]   ITU-T Recommendation G.661 (1998): "Definition and test methods for the relevant generic parameters of optical amplifier devices and subsystems".

[20]   ITU-T Recommendation G.662 (1998): "Generic characteristics of optical fibre amplifier devices and subsystems".

[21]   EN 301 163-1-1: "Transmission and Multiplexing (TM); Generic requirements of Asynchronous Transfer Mode (ATM) transport functionality within equipment; Part 1-1: Functional characteristics and equipment performance".

[22]   EN 301 163-2-1: "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".

[23]   I-ETS 300 226: "Transmission and Multiplexing (TM); Single-mode optical fibre cables to be used in ducts and for directly buried application".

[24] I-ETS 300 229: "Transmission and Multiplexing (TM); Single-mode optical fibre cables to be used for aerial application".

[25] I-ETS 300 227: "Transmission and Multiplexing (TM); ITU-T Recommendation G.652-type single-mode optical fibre".

[26] I-ETS 300 228: "Transmission and Multiplexing (TM); ITU-T Recommendation G.653-type dispersion shifted single-mode optical fibre".

[27] I-ETS 300 644: "Transmission and Multiplexing (TM); Optical fibre cables for indoor applications".

[28] I-ETS 300 634: "Transmission and Multiplexing (TM); Single-mode optical fibre cables to be used as underwater cables for lakes and river crossings etc.".

[29] I-ETS 300 671: "Transmission and Multiplexing (TM); Passive optical components; Fibre optical connectors for single-mode optical fibre communication systems; Common requirements and conformance testing".

[30] I-ETS 300 781: "Transmission and Multiplexing (TM); Functional and system parameters; Passive optical components; M x N fibre branching devices functional specifications".

[31] I-ETS 300 782: "Transmission and Multiplexing (TM); Functional and system parameters for single-mode optical fibre pigtailed fixed attenuators".

[32] I-ETS 300 783: "Transmission and Multiplexing (TM); Passive optical components; Fibre optic fusion splices for single-mode optical fibre transmission systems; Common requirements and conformance testing".

[33] ETR 239: "Transmission and Multiplexing (TM); List of documents relevant to SDH transmission equipment".

[34] ETR 126: "Transmission and Multiplexing (TM); Applications of optical fibre amplifiers in long distance and optical fibre networks".

[35] ETR 268: "Transmission and Multiplexing (TM); Physical aspects of long-haul optical systems for 10 Gbit/s capacity".

[36] ETR 247: "Transmission and Multiplexing (TM); Technical report on statistical approach design".

[37] TM-TR 003: "Transmission and Multiplexing (TM); Laser chirping and related power penalties".

[38] TR 101 287 (V1.1): "Network Aspects (NA); Terms and definitions".

[39] ITU-R Recommendation TF 686-1: "Standard frequencies and time signals - Glossary".

[40] ETS 300 147 (1996): "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Multiplexing Structure".

[41] EN 300 462-1-1: "Transmission and Multiplexing (TM); Generic requirements for synchronization networks; Part 1-1: Definitions and terminology for synchronization networks".

[42] EN 300 462-4-1: "Transmission and Multiplexing (TM); Generic requirements for synchronization networks; Part 4-1: Timing characteristics of slave clocks suitable for synchronization supply to Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) equipment".

[43] EN 300 462-5-1: "Transmission and Multiplexing (TM); Generic requirements for synchronization networks; Part 5-1: Timing characteristics of slave clocks suitable for operation in Synchronous Digital Hierarchy (SDH) equipment".

[44] EN 300 462-6-1: "Transmission and Multiplexing (TM); Generic requirements for synchronization networks; Part 6-1: Timing characteristics of primary reference clocks".

[45] ITU-T Recommendation G.701 (1993): "Vocabulary of digital transmission and multiplexing, and pulse code modulation (PCM) terms".

[46]   ITU-T Recommendation G.704 (1998): "Synchronous frame structures used at 1 544, 6 312, 2 048, 8 488 and 44 736 kbit/s hierarchical levels".

[47]   ITU-T Recommendation G.832 (1998): "Transport of SDH elements on PDH networks - Frame and multiplexing structures".

[48]   ETR 155: "Asynchronous Transfer Mode (ATM); Operation Administration and Maintenance (OAM) functions and parameters for assessing performance parameters".

[49]   ITU-T Recommendation M.3010 (1996): "Principles for a Telecommunications management network".

[50]   ITU-T Recommendation M.20 (1992): "Maintenance philosophy for telecommunications networks".

[51]   ETS 300 469: "Broadband Integrated Services Digital Network (B-ISDN); Asynchronous Transfer Mode (ATM); Management of the network element view [ITU-T Recommendation I.751 (1996)]".

[52]   ETS 300 780: "Broadband Integrated Services Digital Network (B-ISDN); Broadband Connection-Oriented Bearer Service (BCOBCS) [ITU-T Recommendation F.811 (1996)]".

[53]   I-ETS 300 353: "Broadband Integrated Services Digital Network (B-ISDN); Asynchronous Transfer Mode (ATM); Adaptation Layer (AAL) specification - type 1".

[54]   ITU-T Recommendation I.140 (1993): "Attribute technique for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[55]   ITU-T Recommendation I.361 (1999): "B-ISDN ATM layer specification".

[56]   ETS 300 406: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[57]   ITU-T Recommendation I.113 (1997): "Vocabulary of terms for broadband aspects of ISDN".

[58]   ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".

[59]   ITU-T Recommendation I.233 (1991): "Frame mode bearer services".

[60]   ITU-T Recommendation I.233.1 (1991): "ISDN frame relaying bearer service".

[61]   ITU-T Recommendation I.233.2 (1991): "ISDN frame switching bearer service".

[62]   ITU-T Recommendation X.213 (1995): "Information technology - Open Systems Interconnection - Network service definition".

3   Definitions

A

access point: "reference point" where the output of an "adaptation" source function is bound to the input of a "Trail Termination source", or where the output of a "trail termination sink" is bound to the input of an "adaptation" sink function. The "access point" is characterized by the adapted client layer "characteristic information" which passes across it. A bidirectional "access point" is formed by an associated contra-directional pair

access port: access ports of a cross connect equipment are input and output ports used to terminate 2 048 kbit/s signals transporting synchronous 64 and n x 64 kbit/s signals to be cross connected

adaptation function: "atomic function" which passes a collection of information between layer networks by changing the way in which the collection of information is represented

ageing: systematic change in frequency of an oscillator with time

> NOTE 1: It is the frequency drift when factors external to the oscillator (environment, power supply, temperature, etc.) are kept constant. An ageing value should always be specified together with the corresponding duration.

aggregate interface: inter-face supporting signal transmitted over a common multiplex channel

alarm: human observable indication that draws attention to a failure (detected fault) usually giving an indication of the severity of the fault

Alarm Indication Signal (AIS): signal indicating the presence of an alarm

all-ONEs: entire capacity of the adapted or characteristic information is set to logic "1"

anomaly: smallest discrepancy which can be observed between the actual and desired characteristics of an item. The occurrence of a single anomaly does not constitute an interruption in the ability to perform a required function. Anomalies are used as the input for the Performance Monitoring (PM) process and for the detection of defects

assigned cell: cell which provides a service to an application using the ATM layer service

asynchronous mode: mode where clocks are intended to operate in free running mode

> NOTE 2: This definition applies to clocks. However a more general definition applying to data network is in ITU-T Recommendation G.701 [45].

asynchronous time division multiplexing: multiplexing technique in which a transmission capability is organized in undedicated slots filled with cells with respect to each application's instantaneous real need. In this case, the terminal equipment (i.e. the customer application) defines the actual transmitted bit rate, whatever this rate is, possibly variable during the communication. This technique carries a labelled interface structure over a frame or a self-delineating labelled interface. (ITU-T Recommendation I.113-202 [57])

asynchronous transfer mode: transfer mode in which the information is organized into cells; it is asynchronous in the sense that the recurrence of cells containing information from an individual user is not necessarily periodic. (ITU-T Recommendation I.113-204 [57])

ATM adaptation layer: it uses the ATM layer service and include multiple protocols to fit the need of the different AAL service users. (I-ETS 300 353 [53])

ATM connection: concatenation of ATM layer links in order to provide an end-to-end transfer capability to access points. (ITU-T Recommendation I.113-505 [57])

ATM deterministic: mode of the asynchronous transfer mode in which a constant information transfer capacity expressed in terms of a predetermined limiting value for a given service is provided to the user throughout a call. (ITU-T Recommendation I.113-209 [57])

ATM layer connection: association established by the ATM layer to support communication between two or more ATM service users.(i.e. two or more next higher layer entities, or two or more ATM management entities). The communication over an ATM layer connection may be either bidirectional or unidirectional. (ITU-T Recommendation I.113-506 [57])

ATM link: link provides for the capability of transferring information transparently, and represents the association, between two contiguous connecting points or between an endpoint and its contiguous connecting point. (ITU-T Recommendation I.113-507 [57])

ATM statistical: mode of the asynchronous transfer mode in which the information transfer capacity specified for a given service provided to the user throughout a call is expressed in terms of values of parameters such as mean, peak and standard deviation. (ITU-T Recommendation I.113-210 [57])

ATM traffic descriptor: generic list of traffic parameters that can be used to capture the intrinsic traffic characteristics of an ATM connection. (ITU-T Recommendation I.113-708 [57])

atomic function: "function" which if divided into simpler "functions" would cease to be uniquely defined for digital transmission hierarchies. It is therefore indivisible from a network point of view. The following atomic functions are defined in each network layer:

- Bidirectional Trail Termination function (..._TT), Trail Termination Source function (..._TT_So), Trail Termination Sink function (..._TT_Sk) and Connection function (..._Co);
- Between client and server layer networks three adaptation functions are defined: Adaptation Sink function ..._A_Sk, Adaptation Source function ..._A_So, and the bidirectional Adaptation function._A

AU4-AIS: STM-N signal (at the NNI) in which the entire capacity of an Administrative Unit 4 (AU-4) is set to logic "1"

B

bilateral: synchronization link where the corrective action to maintain locking is active at both ends of the link

block: unit of information consisting of a header and an information field. (ITU-T Recommendation I.113-301 [57])

block payload: bits in the information field within a block. (ITU-T Recommendation I.113-304 [57])

blocking factor: probability that a particular connection request in a connection matrix cannot be met, normally expressed as a decimal fraction of 1

broadband: service or system requiring transmission channels greater than the primary rate. (ITU-T Recommendation I.113-101 modified [57])

broadcast connection: unidirectional connection between one (source) endpoint and an unlimimted number (more than one) of unspecified destination endpoints. (ITU-T Recommendation I.140 [54])

C

call: logical association between two or more endpoints, offering the possibility to make use of a telecommunication service

cell: block of fixed length. It is identified by a label at the ATM layer of the B-ISDN protocol reference model. (ITU-T Recommendation I.113-305 [57])

cell delay variation: variation of actual cell arrival times of an ATM connection with respect to the theoretical cell arrival times

cell delineation: identification of cell boundaries in a cell stream. (ITU-T Recommendation I.113-306 [57])

cell header: bits within a cell allocated for functions required to transfer the cell payload within the network. (ITU-T Recommendation I.113-307 [57])

cell entry event: event which occurs when the last bit of an ATM cell has completed transmission across a measurement point along a connection. (ETR 155 [48])

cell exit event: event which occurs when the first bit of an ATM cell has completed transmission across a measurement point along a connection. (ETR 155 [48])

cell rate decoupling: includes insertion and suppression of idle cell, in order to adapt the rate of valid ATM cells to payload capacity of the transmission system

channel associated signalling: method of signalling in which signalling information relating to an individual circuit is conveyed within the associated channel

channel associated signalling cross connection capacity: maximum number of equivalent channels at 4 x 500 bit/s supported by the TS 16 Channel Associated Signalling (CAS) multiframe which can be cross connected within the equipment

channel associated signalling cross connection function (1): if channel associated signalling or control is used then this function allows the cross connection of the associated signalling signals at 4 x 500 bit/s or n x 4 x 500 bit/s between the same or different reference points

channel associated signalling cross connection function (2): if channel associated signalling is used then this function provides the cross connection of the a, b, c and d signalling information from L1 to L2 reference points in correspondence with the related 64 kbit/s or n x 64 kbit/s cross connection from J1 reference point of an access port i to J2 reference point of an other access port j and from J1 reference point of this access port j to J2 reference point of access port i assuming that access ports i and j are carrying signals containing channel associated signalling

characteristic information: signal of specific rate and format which is transferred within and between "sub-networks", and presented to an "adaptation" function for "transport" by the server layer network

client/server layer: any two adjacent network layers are associated in a client/server relationship. Each transport network layer provides transport to the layer above and uses transport from the layers below. The layer providing transport is termed a "server", the layer using transport is termed "client".

clock: device which provides a reference timing signal

common channel signalling: method of signalling in which signalling information relating to a multiplicity of circuits or functions or for network management, is conveyed over a single channel by addressed messages. (ITU-T Recommendation I.112-503 [58])

compound function: "function" which represents a collection of "atomic functions" within one layer. For example a combination of several atomic adaptation functions within a certain layer (each serving one client layer) is a compound adaptation function. A combination of a (compound) adaptation function and the layer's termination function is a compound function

congestion: state of a network element in which the network element is not able to meet the negotiated QOS objective for the already established connections and/or for the new connection requests. (ITU-T Recommendation I.113-702 [57])

congestion control: set of actions taken to relieve congestion by limiting the spread and duration of it. (ITU-T Recommendation I.113-703 [57])

connecting point: point inside a connection where two adjacent links come together. It is located within a level where the information is routed transparently; it provides the connecting functions. (ITU-T Recommendation I.113-508 [57])

connection: connection provides for transfer of information between endpoints. (ITU-T Recommendation I.113-504 [57] modified)

connection admission control: set of actions taken by the network at the call set up phase (or during call re-negotiation phase) in order to establish whether a virtual channel/virtual path connection can be accepted or rejected (or a request for re-allocation can be accommodated). Routing is part of connection admission control actions. (ITU-T Recommendation I.113-704 [57])

connection end point: point located at the level boundary (e.g. between VC level and VP level) where the level service is provided to the next higher level or to the management plane. The CEP provides the connection termination functions. (ITU-T Recommendation I.113-509 [57])

connectionless service: service which allows the transfer of information between users without the need for end-to-end call establishment procedures. (ITU-T Recommendation I.113-105 [57])

    NOTE 3: Connectionless services may be used to support both interactive and distributive services.

connection function: "atomic function" within a layer which, if connectivity exists, relays a collection of items of information between groups of atomic functions. It does not modify the members of this collection of items of information although it may terminate any switching protocol information and act upon it. Any connectivity restrictions between inputs and outputs shall be stated

connection point: "reference point" where the output of a "trail termination source" or a "connection" is bound to the input of another "connection", or where the output of a "connection" is bound to the input of a "trail termination sink" or another "connection". The "connection point" is characterized by the information which passes across it. A bidirectional "connection point" is formed by the association of a contra-directional pair

NOTE 4: In the information model the connection point is called Connection Termination Point (CTP).

consolidation: allocation of server layer trails to client layer connections which ensures that each server layer trail is full before the next is allocated. Consolidation minimizes the number of partially filled server layer trails. It therefore maximizes the "fill factor". For example a number of partially filled VC-4 paths may be consolidated into a single, fully filled VC-4

constant bit rate service: telecommunication service characterized by a service bit rate specified by a constant value. (ITU-T Recommendation I.113-103 [57])

continuity check: mechanism to test the availability of a certain link or connection. Normally qualified to indicate the object being supervised; (e.g. VP continuity check). (ITU-T Recommendation I.113-614 modified [57])

cross connect timing source: function providing all internal timing signals necessary for the cross connect equipment

cross connection capacity: maximum number of equivalent channels at 64 kbit/s which can be cross connected within the equipment

NOTE 5: Cross connection of Time Slot 0 (TS 0) (or bits 1 to 8 of 2 048 kbit/s ITU-T Recommendation G.704 [46] frame) or TS 16 information according to ITU-T Recommendation G.704 [46] should be considered as equivalent to a 64 kbit/s channel.

cross connection function (1): function allowing the cross connection of 64 kbit/s and n x 64 kbit/s signals between the same or different reference points

cross connection function (2): function allowing the cross connection of 64 kbit/s and n x 64 kbit/s signals from J1 reference point of an access port i to J2 reference point of an other access port j and from J1 reference point of this access port j to J2 reference point of access port i (see note 4 under figure 2 for the meaning of J1 and J2 reference points)

D

defect: state for which the density of anomalies has reached a level where the ability to perform a required function has been interrupted. Defects are used as input for Performance Management/Monitoring, the control of consequent actions, and the determination of fault cause

E

E-bit: remote block error indication

equipment functional specification: collection of atomic, compound, or major compound functions and any overall performance objectives which describe the functionality of an equipment

equipment management function: function connected to all the other functional blocks and providing for a local user or the Telecommunication Management Network (TMN) a mean to perform all the management functions of the cross connect equipment

error detection code: mechanism for error detection of OAM cells. (ITU-T Recommendation I.113-615 [57])

F

FA interface: management interface connecting workstation to the OSF or the MF according to ITU-T Recommendation M.3010 [49]

failure: state for which a fault cause persisted long enough to consider the ability of an item to perform a required function to be terminated. The item may be considered as failed; a fault has now been detected

far end receive failure: specific type of alarm for failure reporting. It indicates that the failure has occurred at or near to the end of the line furthest from the transmitter. (ITU-T Recommendation I.113-616 [57])

fault: inability of a function to perform a required action. This does not include an inability due to preventive maintenance, lack of external resources, or planned actions.

> NOTE 6: The definitions of fault, anomaly, defect, fault cause, failure, and alarm are derived from ITU-T Recommendation M.20 [50]. Since ITU-T Recommendation M.20 [50] is open to some differences in interpretation, some words have been amended to express how terminology is used in the present document.

fault cause: single disturbance or fault may lead to the detection of multiple defects. A fault cause is the result of a correlation process which is intended to pinpoint the defect that is representative of the disturbance or fault that is causing the problem

fault management cell: specific OAM cell used for fault management. Various types of fault management cells are defined related to specific functions; e.g. RDI, FERF, Continuity Check. (ITU-T Recommendation I.113-612 [57])

feedback controls: set of actions taken by the network and by the users to regulate the traffic submitted on ATM connections according to the state of network elements

fractional frequency deviation: difference between the actual frequency of a signal and a specified nominal frequency, divided by the nominal frequency. Mathematically, the fractional frequency deviation y(t) can be expressed as:

$$y(t) = \frac{v(t) - v_{nom}}{v_{nom}}$$

frame relay: transfer of data as a sequence of contiguous bits bracketed by and including beginning and end flag sequences. See frame relaying bearer service

frame relaying bearer service: frame relaying bearer service provides the bidirectional transfer of variable size Service Data Units (SDUs) from one S or T reference point to another with the order preserved. The SDUs are routed through the network by appropriate layer 2 Protocol Data Units (PDUs) on the basis of an attached label. (ITU-T Recommendations I.233 [59], I.233.1 [60] and I.233.2 [61])

free running mode: operating condition of a clock, the output signal of which is strongly influenced by the oscillating element and not controlled by servo phase-locking techniques. In this mode, the clock has never had a network reference input, or the clock has lost external reference and has no access to stored data, that could be acquired from a previously connected external reference. Free-run begins when the clock output no longer reflects the influence of a connected external reference, or transition from it. Free run terminates when the clock output has achieved lock to an external reference

frequency accuracy: maximum magnitude of the fractional frequency deviation for a specified time period

> NOTE 7: The frequency accuracy includes the initial frequency offset and any ageing and environmental effect.

frequency drift: systematic change in frequency of an oscillator caused by ageing and external effects (radiation, pressure, temperature, humidity, power supply, load, etc.)

> NOTE 8: The external factors should always be clearly indicated.

frequency stability: spontaneous and/or environmentally caused frequency change within a given time interval

NOTE 9: It is generally distinguished between systematic effects such as frequency drift effects (caused by radiations, pressure, temperature, humidity, power supply, charge, ageing etc.) and stochastic frequency fluctuations which are typically characterized in time domain (special variances have been developed for the characterization of these fluctuations: Allan variance, modified Allan variance, Allan variance in time) and/or frequency domain (one sided spectral densities).

flexible multiplexer: device that provides time division multiplexing and demultiplexing of signals supporting a variety of user services. In addition the device provides enhanced management capabilities

function: "process" defined for digital transmission hierarchies (e.g. Plesiochronous Digital Hierarchy (PDH), SDH) which acts on a collection of input information to produce a collection of output information. A function is distinguished by the way in which characteristics of the collection, or of members of the collection of output information differ from characteristics of members of the collection of input information.

G

generic address: address which identifies a set of Network Service Access Points (NSAPs), rather than a single specific NSAP. (ITU-T Recommendation X.213 [62])

grooming: allocation of server layer trails to client layer connections which groups together client layer connections whose characteristics are similar or related. Thus it is possible to groom Virtual Container, level 12 (VC-12) paths by service type, by destination, or by protection category in to particular VC-4 paths which can then be managed accordingly. It is also possible to groom VC-4 paths according to similar criteria into Synchronous Transport Module (STM-N) sections

H

head end: equipment in an HFC access network, providing interfaces between the access network and one or more other networks, and providing an RF communication interface with user interface functions

header: see "cell header"

holdover mode: operating condition of a clock which has lost its controlling input and is using stored data, acquired while in locked operation, to control its output. The stored data are used to control phase and frequency variations, allowing the locked condition to be reproduced within specifications. Holdover begins when the clock output no longer reflects the influence of a connected external reference, or transition from it. Holdover terminates when the output of the clock reverts to locked mode condition

homogeneous layer instances: (refer also to the definition of a layer instance given below) set of layer instances supporting the same features; hence, under the point of view of a conformance verdict they can be considered as one single Implementation Under Test (IUT)

I

ICS proforma: document, in the form of a questionnaire, which when completed for an implementation or system becomes an ICS

idle cell: cell which is inserted or extracted by the physical layer in order to adapt the cell flow rate at the boundary between the ATM layer and the physical layer to the available payload capacity of the transmission system

implementation conformance statement: statement made by the supplier of an implementation or system claimed to conform to a given specification, stating which capabilities and options have been implemented. This is needed for system functional assessment and to define the relevant requirements the system can be tested against. The ICS can take several forms: protocol ICS, profile ICS, profile specific ICS, information object ICS, etc.

inter network interface: see Network Node Interface (NNI)

invalid cell: cell where the header is declared to contain errors by the header error control process. (ITU-T Recommendation I.113-317 [57])

J

jitter: short term variations of the significant instants of a digital signal from their reference positions in time

L

layer: concept used to allow the transport network functionality to be described hierarchically as successive levels; each layer being solely concerned with the generation and transfer of its "characteristic information"

layer instance: layer instance is the real (hardware, software and firmware) implementation of a layer into a transmission equipment

leased line: transparent connection leased from a public telecommunications carrier and which is not part of the PSTN

level: term used when describing the hierarchical structure of a network from a transport viewpoint. (ITU-T Recommendation I.113-511 modified [57])

link: topological component which describes the fixed relationship between a sub-network and another sub-network or access group (ETS 300 469 [51])

local node: synchronous network node which interfaces directly with customer equipment

locked mode: operating condition of a clock in which the output signal is controlled by an external input reference. It is the expected mode of operation of a slave clock and the state in which each clock within a chain of clocks has the same long term average frequency

lower order path protection switch: this optional function is used when either 1 + 1 or 1 for n protection switching is required for the 2 048 kbit/s digital path

lower order section protection switch: this optional function is used when 1 + 1 protection switching is required for the 2 048 kbit/s digital section

M

m reference point: non-standard reference point between equipment function and the Q Adapter function according to ITU-T Recommendation M.3010 [49]

major compound function: "function" which represents a collection of "atomic functions" and/or "compound functions" within more than one "layer". For example the atomic functions in the Optical Section (OS), Multiplex Section (MS) and Regenerator Section (RS) layers may be combined to form a major compound function. The (major) compound functions facilitate simplified descriptions of equipment. Standardized (major) compound functions attach a unique name to a common combination of atomic functions

managed entity: physical or logical resource that is to be managed. (ITU-T Recommendation I.113-606 [57])

management entity: entity capable of providing management functions (e.g. operation, administration, maintenance and provisioning). (ITU-T Recommendation I.113-605 [57])

management point: "reference point" where the output of an atomic function is bound to the input of the element management function, or where the output of the element management function is bound to the input of an atomic function

master clock: clock providing a reference timing signal to other clocks, behaving as slave clocks

master slave mode: mode where a designated master clock provides reference timing signals which are disseminated to all other clocks which are slaved to the master clock

maximum bit rate: maximum bit rate corresponds to the maximum usable transfer bit rate from the users standpoint. (ETS 300 780 [52])

Maximum Relative Time Interval Error (MRTIE): maximum peak-to-peak delay variation of an output timing signal with respect to a given input timing signal within an observation time ($\tau = n\tau_0$) for all observation times of that length within the measurement period (T)

Maximum Time Interval Error (MTIE): maximum peak-to-peak delay variation of a given timing signal with respect to an ideal timing signal within an observation time ($\tau = n\tau_0$) for all observation times of that length within the measurement period (T). It is estimated using the following formula:

$$\text{MTIE}(n\tau_0) = \max_{1 \leq k \leq N-n}\left(\max_{k \leq i \leq k+n}(xi) - \min_{k \leq i \leq k+n}(xi)\right), \quad n = 1, \quad 2,...,(N-1)$$

mean bit rate: mean bit rate correspond to the average usable transfer bit rate from the users standpoint. (ETS 300 780 [52])

merging connection point: connection point merging n to 1 connection links

message communication function: this function terminates and generates the cross connect management control channel(s). The control channel may as well be a Q interface. The function is also able to inter work as a relay function between the local workstation connected via a F interface and the TMN. It also provides local access to internal management functions via an interface which is not subject to standardization

message mode: mode of service offered by the AAL type 3/4 and 5, where the AAL SDU is passed across the AAL interface in exactly one AAL IDU. (ITU-T Recommendation I.113-523 [57])

measurement reference timing signal: timing signal of specified performance used as a time base for clock characterization measurements. The basic assumption is that its performance is required to be significantly better than the clock under test with respect to the parameter being tested, in order to prevent the test results being compromised. The performance parameters of the frequency standard shall be stated with all test results

meta-signalling: procedure for establishing, checking and releasing signalling virtual channels. (ITU-T Recommendation I.113-411 [57])

monitoring cell: specific OAM cell used for performance monitoring. (ITU-T Recommendation I.113-610 [57])

multicast: unidirectional communication from a single source entity to a limited number of specified destination entities

multicast communication: unidirectional communication from a single source access point to a limited number (more than one) of specified destination access points. (ITU-T Recommendation I.140 [54])

multicast connection: unidirectional connection between one (source) endpoint and a limited number (more than one) of specified destination endpoints. (ITU-T Recommendation I.140 [54])

MS-AIS: STM-N signal (at the Network Node Interface (NNI)) in which the entire capacity is set to logic "1" with the exception of the Regenerator Section Overhead (RSOH)

multipoint: communication configuration attribute which denotes that the communication involves more than two network terminations. (ITU-T Recommendation I.113-109 modified [57])

multipoint-to-multipoint communication: bidirectional asymmetric or bidirectional symmetric communication from multiple source access points to multiple destination access points, e.g. conference communication. (ITU-T Recommendation I.140 [54])

multipoint-to-multipoint connection: connection between multiple (source) endpoints and multiple (destination) endpoints for bidirectional asymmetric or bidirectional symmetric communication. (ITU-T Recommendation I.140 [54])

multipoint-to-point communication: bidirectional asymmetric, bidirectional symmetric or unidirectional communication from multiple (source) access points to a single (destination) access point, e.g. polling station (and in reverse direction). (ITU-T Recommendation I.140 [54])

multipoint-to-point connection: connection between multiple (source) endpoints and a single (destination) endpoint for bidirectional asymmetric, bidirectional symmetric or unidirectional communication. (ITU-T Recommendation I.140 [54])

mutually synchronized mode: mode where all clocks exert a degree of control of each other

N

network: set of nodes and links that provides connections between two or more defined points to facilitate telecommunication between them. (ITU-T Recommendation I.112-305 [58])

network connection: transport entity formed by the series of connections between termination connection points. (ETS 300 469 [51])

network node interface: interface at a network node which is used to interconnect with another network node. An NNI connecting two nodes in different networks is sometimes referred to as an Inter Network Interface (INI)

network operator: entity which provides the network operating elements and resources for the actual execution of services (ETS 300 780 [52])

network parameter control: set of actions taken by the network to monitor and control traffic at the inter Network Node Interface, to protect network resources from malicious as well as unintentional misbehaviour by detecting violations of negotiated parameters and taking appropriate actions. (ITU-T Recommendation I.113-706 [57])

network synchronization: generic concept that depicts the way of distributing a common time and/or frequency to all elements in a network

node clock: clock distributing synchronization reference timing signals within a node

null: attribute value indicating that the function exists and is not activated

O

OAM cell: cell that carries OAM information for the performing of specific OAM functions. The term maintenance cell is often used as synonym for OAM cell. (ITU-T Recommendation I.113-609 [57])

OAM flow: bidirectional information flow for the performance of OAM functions in the network. (ITU-T Recommendation I.113-613 [57])

OAM level: OAM functions are organized in five OAM hierarchical levels associated with the ATM and the Physical Layer, to which correspond five OAM flows. (ITU-T Recommendation I.113-512 [57])

one-step activation: type of activation which invokes a sequence of actions to activate the digital line transmission system and user-network interface from a single command. (ITU-T Recommendation I.112-606 [58])

one-step deactivation: deactivation of the digital line transmission system and user-network interface invoked by a single command. (ITU-T Recommendation I.112-608 [58])

octet sequence integrity: property of a digital connection that permits a digital signal to be conveyed over it without change to the order of the octets

P

payload type identifier: 3-bit field in the ATM cell header identifying the type of payload

NOTE 10:   The use of this identifier is specified in ITU-T Recommendation I.361 [55].

PDH unit: PDH tributary signal and its associated justification control bits which are contained in a PDH aggregate signal

performance management cell: specific OAM cell used for performance management. (ITU-T Recommendation I.113 - 618 modified [57])

performance management: set of management functions which enable the performance of the network services to be measured and corrective actions to be taken. (ITU-T Recommendation I.113-617 [57])

performance monitoring: action of continuous or periodic checking of a managed entity to test its normal functioning. (ITU-T Recommendation I.113-619 [57])

permanent activation: activation of a system, or part of a system, that will not be deactivated even if it is not required to be fully operating. (ITU-T Recommendation I.112-603 [58])

permanent circuit telecommunication service: type of telecommunication service in which the communication path is established in response to a customer request effected by means of an operational or administrative message. (ITU-T Recommendation I.112-207 [58])

> NOTE 11: Release of the communication path is effected in a similar way to its establishment.

phase transient: perturbations in phase of limited duration

physical interface: interface between two equipments. (ITU-T Recommendation I.112-411 [58])

physical interface specification: formal statement of the mechanical, electrical, electromagnetic and optical characteristics of the interconnections and interactions between two associated equipments, at their interface. (ITU-T Recommendation I.112-413 [58])

physical interface function: function terminating and generating the signals at an access port. This function also detects the Loss Of incoming 2 048 kbit/s Signal (LOS) condition, the line code violations as appropriate

plesiochronous lower order path termination: this function terminates and generates a logical signal at 2 048 kbit/s at an aggregate interface. The function provides frame generation and recovery and detection of defect and failure conditions on the 2 048 kbit/s logical signal

plesiochronous mode: mode where the essential characteristic of time scales or signals such that their corresponding significant instants occur at nominally the same rate, any variation in rate being constrained within specified limits

plesiochronous path termination: this function terminates and generates a logical signal at 2 048 kbit/s at an access port. This function provides frame generation and recovery and detection of defect or failure conditions on the 2 048 kbit/s logical signal

point-to-multipoint communication: bidirectional asymmetric or bidirectional symmetric communication from one (source) access point to multiple (destination) access points (and in reverse direction). (ITU-T Recommendation I.140 [54])

point-to-multipoint connection: connection between one (source) endpoint and multiple (destination) endpoints for bidirectional asymmetric or bidirectional symmetric communication. (ITU-T Recommendation I.140 [54])

Primary Reference Clock (PRC): reference clock that provides a reference timing signal compliant with EN 300 462–6–1 [44], in order to synchronize all or a large part of a network

process: generic term for an action or a collection of actions

profile: profile identifies a consistent set of chosen options from a base specification or from a set of base specifications, in order to provide a given function in a given environment. By restricting choices among the options available in the base specifications, a profile increases the probability that systems will inter-operate, i.e. perform together the given function to which the profile is aimed at. The base specifications upon which a profile is based are called components of this profile. In other words, a profile specifies a superset of subsets of base specifications. Further details on the definition of a profile may be found in ETS 300 406 [56]

profile specific ICS proforma: profile requirements list plus the set of ICS proformas which when completed for a system and taken together with the profile requirements list become a profile ICS

profile specific ICS: ICS for a system claimed to conform to a given profile, answering questions which are profile-specific and which are additional to the base specification ICS proforma items listed in the profile requirements list

protocol: formal statement of the procedures that are adopted to ensure communication between two or more functions within the same layer of a hierarchy of functions (ITU-T Recommendation I.112-405 [58])

pseudo-synchronous mode: mode where all clocks have a long term frequency accuracy compliant with a primary reference clock as specified in EN 300 462-6–1 [44] under normal operating conditions. Not all clocks in the network will have timing traceable to the same PRC

pull in range: largest offset between a slave clock's reference frequency and a specified nominal frequency, within which the slave clock will achieve locked mode

pull out range: offset between a slave clock's reference and a specified nominal frequency, within which the slave clock stays in the locked mode and outside of which the slave clock cannot maintain locked mode, irrespective of the rate of the frequency change

PUx-AIS: PDH aggregate signal (at the NNI) in which the entire tributary signal is set to logic "1" and the associated justification control information is correct

Q

Q interface: management interface to the TMN

Q3 interface: management interface according to ITU-T Recommendation M.3010 [49]

Qx interface: management interface between a Q-adaptation function (QAF) and a Network Element Function (NEF) according to ITU-T Recommendation M.3010 [49]

R

receiver: part of the equipment which terminates an input to the equipment

reference point: delimiter of a "function"

reference specification: standard which specifies a base specification, or a set of base specifications, or a profile, or a set of profiles, and for conformance against which test specifications are written

reference standard: synonymous to reference specification

reference timing signal: timing signal of specified performance that can be used as a timing source for a slave clock

regenerator section: portion of a digital section. (It is a maintenance sub-entity) (ITU-T Recommendation I.113-503 [57])

regenerator section level: extends between regenerator section endpoints (ITU-T Recommendation I.113-514 [57])

remote defect indication: signal which conveys the defect status of the characteristic information received by the Trail Termination sink function back to the network element which contains the characteristic information originating trail termination source function. Examples of RDI signals are the Far End Receive Failure (FERF) bit(s) in SDH signals, the A-bit in ITU-T Recommendation G.704 [46] structured 2 048 kbit/s signals and the alarm indication bit in other PDH multiplex signals

remote error indication: signal which conveys either the exact or truncated number of error detection code violations within the characteristic information (as detected by the trail termination sink function) back to the network element which contains the characteristic information originating trail termination source function. Examples of REI signals are the Far End Block Error (FEBE) bit(s) in SDH signals and the E-bit in ITU-T Recommendation G.704 [46] structured 2 048 kbit/s signals

remote information: information flow from sink direction to source direction of the same atomic function in unidirectional representation, containing information to be transported to the remote end, such as RDI and REI

remote multiframe alarm indication: alarm corresponding to the Remote Alarm Indication (RAI) in time slot 16, as defined in part 1 of ETS 300 461-1 [4]

routing: process whereby a number of connection functions within the same layer are configured to provide a trail between defined termination points

S

SDH Equipment Clock (SEC): logical function representing the equipment clock of a SDH network element having the timing characteristics given in EN 300 462-5–1 [43]

SDH Equipment Timing Source (SETS): logical function representing all synchronization related functions to be considered in an SDH network element

selective broadcast signalling virtual channel: virtual channel allocated to a service profile and used for broadcast signalling. (ITU-T Recommendation I.113-411 [57])

self-delineating block: block with the property that its endpoints can be identified by examining the block itself. A defined pattern or flag at the beginning of each block might serve to demarcate the block. (ITU-T Recommendation I.113-302 [57])

self-delineating labelled interface: An interface whose entire bit stream consists of a self delineating labelled multiplexing. (ITU-T Recommendation I.113-326 [57])

service access point: point at which services are provided by a layer to the next higher layer

service bit rate: bit rate which is available to a user for the transfer of user information. (ITU-T Recommendation I.113-102 [57])

service control element: primitives needed to control a multimedia service, for example to start a call, to add or release a service component

service provider: entity which offers services for service subscription. The network operator may be the service provider. (ETS 300 780 [52])

service subscriber: entity which subscribes to a service offered by the service provider. (ETS 300 780 [52])

signalling: exchange of information specifically concerned with the establishment and control of connections, and with management, in a telecommunication network. (ITU-T Recommendation I.112-501 [58])

signalling virtual channel: virtual channel for transporting signalling information. (ITU-T Recommendation I.113-409 [57])

simple call: two party call supported by one connection. The connection can be unidirectional or bidirectional

single ended synchronization: method of synchronizing a specified synchronization node with respect to another synchronization node in which synchronization information at the specified node is derived from the phase difference between the local clock and the incoming digital signal from the other node

slip: repetition or deletion of a block of bits in a synchronous or plesiochronous bit stream due to a discrepancy in the read and write rates at a buffer

slave clock: clock which is locked to a reference timing signal

> NOTE 12:   When a slave clock loses all its reference timing signals and goes holdover, it can be considered as being a master clock under these conditions.

> NOTE 13:   In locked mode, the slave clock is synchronized to a reference timing signal. The output frequency of the clock is the same as the frequency of the reference timing signal over the long term, and the phase difference between the input and the output is bounded.

source traffic descriptor: set of traffic parameters belonging to the ATM traffic descriptor, which is used during the connection set-up to capture the intrinsic traffic characteristics of the connection requested by the source. (ITU-T Recommendation I.113-709 [57])

splitting point: connecting point splitting 1 to n connection links

Stand Alone Synchronization Equipment (SASE): stand alone implementation of the logical SSU function, which incorporates its own management function

structured data transfer: tranfer supporting the transmission of structured data (blocks of user data organized in octets) by using a pointer to the start of a block. (I-ETS 300 353 [53])

sub-network: topological component used to effect routing and management. It describes the potential for sub-network connections across the sub-network. It can be partitioned into interconnected sub-networks and links. Each sub-network in turn can be partitioned into smaller sub-networks and links and so on. A sub-network may be contained within one physical node. (ETS 300 469 [51])

sub-network connection: transport entity formed by a connection across a sub-network between connection points. It can be configured as part of the trail management process. (ETS 300 469 [51])

switching: process of interconnecting functional units, transmission channels or telecommunication circuits for as long as is required to convey signals. (ITU-T Recommendation I.112-113 [58])

switching node: point at which switching occurs. (ITU-T Recommendation I.112-303 [58])

> NOTE 14: The term "node" is sometimes used to refer to a point at which circuits are interconnected by means other than switching. In such a case a suitable qualification should be used, for example: "synchronization node".

synchronous network: where all clocks have the same long term accuracy under normal operating conditions

synchronization chain: active interconnection of synchronization nodes and links

synchronization link: link between two synchronization nodes over which a reference timing signal is transmitted

synchronization network: network to provide reference timing signals. In general, the structure of a synchronization network comprises synchronization nodes connected by synchronization links

synchronization node: synchronization node consists of an SSU and all co-located SECs directly synchronized from that SSU

synchronization reference chain: specific synchronization chain forming the basis for simulations of jitter and wander in the synchronization network

synchronization status message: coding of the reference level of the timing source as specified in ETS 300 147 [40] for STM-N, ITU-T Recommendation G.704 [46] for 2 048 kbit/s, ITU-T Recommendation G.832 [47] for synchronous 34 Mbit/s and 140 Mbit/s

Synchronization Supply Unit (SSU): logical function for reference timing signal selection, processing and distribution, having the frequency characteristics given in EN 300 462-4-1 [42]

synchronization trail: logical representation of one or several synchronization links

synchronous time division multiplexing: multiplexing techniques supporting the synchronous transfer mode (STM) (ITU-T Recommendation I.113-203 [57])

synchronous transfer mode: transfer mode which offers periodically to each connection a fixed-length word (ITU-T Recommendation I.113-205 [57])

system protection: action of minimizing the effect of a managed entity by blocking or changeover to other entities (As a result the failed entity is excluded from operation) (ITU-T Recommendation I.113-607 [57])

special function: example of optional special functions are analogue multipoint conference bridge, data multipoint bridge, broadcasting, digital low bit rate transcoding for voice channel

synchronization signal: clock control signal obtained from a synchronization network

synchronous cross connect equipment: device which accepts a number of signals comprising synchronously multiplexed lower bit rate signals and cross connects the constituent lower bit rate signals

T

telecommunication: any transmission and/or emission and reception of signals representing signs, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems (ITU-T Recommendation I.112-110 [58])

telecommunication network: set of nodes and links that provides connections between 2 or more defined ports to facilitate telecommunication between them (ITU-T Recommendation I.112-305 [58])

telecommunication service: that which is offered by a Network Operator or a Service Provider to their customers in order to satisfy a specific telecommunication requirement (ITU-T Recommendation I.112-201 [58])

termination connection point: special case of a "connection point" where a "trail termination" function is bound to an "adaptation" function or a "connection" function

NOTE 15: In the information model the termination connection point is called Trail Termination Point (TTP).

time: is used to specify an instant (time of the day) or as a measure of time interval.

NOTE 16: The words time or timing, when used to describe synchronization networks, usually refer to the frequency signals used for synchronization or measurement.

time deviation (TDEV or $\sigma_x(\tau)$): measure of the expected time variation of a signal as a function of integration time. TDEV can also provide information about the spectral content of the phase (or time) noise of a signal. TDEV is in units of time. Based on the sequence of time error samples, TDEV is defined by the following calculation:

$$TDEV(\tau) = \sqrt{\frac{1}{(6n^2(N-3n+1))} \sum_{j=1}^{N-3n+1} \left(\sum_{i=j}^{n+j-1} (x_{i+2n} - 2x_{i+n} + x_i) \right)^2}$$

where: x_j are samples of time errors data;

N is the total number of samples;

τ_o is the time error sampling interval;

τ is the integration time, the independent variable of the Time Deviation (TDEV);

n is the number of sampling intervals, with n = 1, 2,..., integer part (N/3);

and the integration time $\tau = n\tau_o$.

time error function: difference between the time of that clock and the frequency standard one. Mathematically, the time error function x(t) between a clock generating time T(t) and a reference clock generating time T_{ref}(t) is defined as:

$$x(t) = T(t) - T_{ref}(t)$$

At a purely abstract level of definition, the frequency standard can be thought of as ideal (i.e. T_{ref}(t) = t can be assumed); since ideal time is not available for measurement purposes, ideal time error is of no practical interest.

Time error is the basic function whereby many different stability parameters (such as Maximum Time Interval Error (MTIE), root mean square Time Interval Error (TIErms), Allan variance, etc.) can be calculated: since continuous knowledge of the function x(t) is not practically attainable, sequences of equally spaced samples $x_i = x(t_0 + i\tau_0)$ are used for this purpose

time function: time of a clock is the measure of ideal time t as provided by that clock. Mathematically the time function T(t) generated by a clock is defined as:

$$T(t) = \frac{\Phi(t)}{2\pi v_{nom}}$$

where: $\Phi(t)$ is the total instantaneous phase of the timing signal at the clock output;

             V_{nom} is the nominal frequency of the clockv

time interval error function: difference between the measures of a time interval as provided by that clock and by the frequency standard one. Mathematically, the time interval error function TIE(t:τ) can be expressed in terms of the time error function x(t) between the two clocks as:

$$TIE(t : \tau) = x(t + \tau) - x(t)$$

where: t is the initial instant of observation;

                 τ is the observation interval.

time scale: system of unambiguous ordering of events

NOTE 17:   This could be a succession of equal time intervals, with accurate references of the limits of these time intervals, which follow each other without any interruption since a well defined origin. A time scale allows to date any event. For example, calendars are time scales. A frequency signal is not a time scale (every period is not marked and dated). For this reason "Universal Time Coordinated (UTC) frequency" should be used instead of "UTC".

time variance (TVAR or $\sigma_x^2(\tau)$): square of the time deviation

timing signal: nominally periodic signal, generated by a clock, used to control the timing of operations in digital equipments and networks. Due to unavoidable disturbances, such as oscillator phase fluctuations, actual timing signals are pseudo-periodic ones, i.e. time intervals between successive equal phase instants show slight variations. Mathematically a timing signal s(t) is represented by:

$$s(t) = A \times \sin[\Phi(t)]$$

where: A is a constant amplitude coefficient;

                 $\Phi(t)$ is the total instantaneous phase

transit node: network node which interfaces with other nodes and does not directly interface with customer equipment

unilateral: synchronization link where the corrective action to maintain locking is only active at one end of the link

Universal Time Coordinated (UTC): time scale, maintained by the Bureau International des Poids et Mesures (BIPM) and the International Earth Rotation Service (IERS), which forms the basis of a coordinated dissemination of standard frequencies and time signal

NOTE 18:   The reference frequency for network synchronization is the frequency which generates the UTC time scale. It is therefore preferable to use the words "UTC frequency" instead of "UTC".

timing input physical interface: this function terminates an external 2 048 kHz synchronization signal

timing loop: network condition where a slave clock providing synchronization becomes locked to its own timing signal. It is generally created when the slave clock timing information is looped back to its own input, either directly or via other network equipment. Timing loops should be avoided in networks

timing output physical interface: this function generates an external 2 048 kHz signal

timing point: "reference point" where an output of the synchronization distribution layer is bound to the input of an adaptation source or connection function, or where the output of an adaptation sink function is bound to an input of the synchronization distribution layer

traffic contract: requested QoS for any given ATM connection and the maximum CDV tolerance allocated to the CEP (ITU-T Recommendation I.113-710 [57])

traffic control: set of actions taken by the network in all relevant network elements to avoid congestion conditions. (ITU-T Recommendation I.113-701 [57])

traffic descriptor: definition of the characteristic of the traffic that any given requested connection may offer. (ITU-T Recommendation I.113-707 [57])

traffic parameter: specification of a particular traffic aspect of an ATM connection

traffic routing: establishment of a successful connection between any two exchanges or connectionless servers in the network

traffic shaping: mechanism that may alter the pattern of an ATM stream of cells on a VPC or a VCC to achieve desired modification of traffic characteristics, maintaining cell sequence integrity of the connection

trail termination function: "atomic function" within a "layer" which generates, adds, and monitors information concerning the integrity and supervision of "adapted information"

transfer mode: mechanism for transmission, multiplexing and switching in a telecommunications network (ITU-T Recommendation I.113-201 modified [57])

transit delay: time difference between the instant at which the first bit of the address field of a frame crosses one designated boundary, and the instant at which the last bit of the closing flag of the frame crosses a second designated boundary (ITU-T Recommendation I.113-801 [57])

transmission medium: type of physical means to transmit data

transmission path level: extends between network elements assembling/disassembling the payload of a transmission system and associating it with its OAM functions (ITU-T Recommendation I.113-512 [57])

transmitter: part of the equipment which generates an output from the equipment

tributary interface: tributary interface supports an individual input channel to a multiplexer

tributary path termination/tributary signal termination: this function generates or terminates tributary information and any related signalling or control signals

tributary signal adaptation: this function modifies the tributary signal, when necessary, into a 64 kbit/s channel suitable for the cross connection function. It also carries out the reverse function

TUm-AIS: STM-N signal (at the NNI) in which the entire capacity of a TU-m is set to logic "1"

U

unassigned cell: ATM layer cell which is not an assigned cell

undefined bit: if a bit is undefined, its value is set to a logical "0" or a logical "1"

undefined byte: if a byte is undefined, it contains eight undefined bits

usage parameter control: set of actions taken by the network to monitor and control traffic at the User Network Interface, to protect network resources from malicious as well as unintentional misbehaviour by detecting violations of negotiated parameters and taking appropriate actions (ITU-T Recommendation I.113-705 [57])

user: entity which actually uses the service (ETS 300 780 [52])

user access, user-network access: means by which a user is connected to a telecommunication network in order to use the services and/or facilities of that network. (ITU-T Recommendation I.112-402 [58])

user network interface: interface between the terminal equipment and a network termination at which interface the access protocols apply (ITU-T Recommendation I.112-409 [58])

user network interface only deactivation: deactivation of the user-network interface which does not deactivate the digital line transmission system (ITU-T Recommendation I.112-609 [58])

V

valid cell: cell where the header is declared by the header error control process to be free of errors. (ITU-T Recommendation I.113-318 [57])

variable bit rate service: type of telecommunication service characterized by a service bit rate specified by statistically expressed parameters which allow the bit rate to vary within defined limits. (ITU-T Recommendation I.113-104 [57])

VC connection: concatenation of virtual channel links that extends between two points where the adaptation layer is accessed. (ITU-T Recommendation I.113-403 [57])

VC cross connect: network element which connects VC links; it terminate VPCs and translates VCI values and is directed by Management Plane functions. (ITU-T Recommendation I.113-519 [57])

VC level: extends between network elements performing virtual channel connection termination functions, and it is shown extending through one or more virtual path connections. (ITU-T Recommendation I.113-516 [57])

VC link: mean of unidirectional transport of ATM cells between a point where a virtual channel identifier value is assigned and the point where that value is translated or removed. (ITU-T Recommendation I.113-402 [57])

VC switch: network element which connects VC links; it terminates VPCs and it translates VCI values. It is directed by control plane functions. (ITU-T Recommendation I.113-520 [57])

virtual channel: concept used to describe unidirectional transport of ATM cells associated by a common unique identifier value. (ITU-T Recommendation I.113-401 [57])

virtual channel identifier: identifies a particular VC link for a given Virtual Path Connection (VPC)

virtual path: concept used to describe unidirectional transport of ATM cells belonging to virtual channels that are associated by a common identifier value. (ITU-T Recommendation I.113-404 [57])

virtual path connection: concatenation of virtual path links that extends between the point where the virtual channel identifier values are assigned and the point where those values are translated or removed. (ITU-T Recommendation I.113-406 [57])

virtual path identifier: identifies a group of VC links, at a given reference point, that share the same VPC

VP cross connect: network element which connects VP links; it translates VPI values and is directed by management plane function. (ITU-T Recommendation I.113-517 [57])

VP level: extends between network elements performing virtual path connection termination functions, and it is shown extending through one or more virtual path connections. (ITU-T Recommendation I.113-515 [57])

VP link: group of virtual channel links, identified by a common value of the virtual path identifier, between the point where the VPI value is assigned and the point where the VPI value is translated or removed. (ITU-T Recommendation I.113 [57])

VP switch: network element which connects VP links; it translate VPI values and is directed by Control Plane functions (ITU-T Recommendation I.113-518 [57])

VP-VC cross connect: network element that may act as VC cross-connect and/or and VP cross-connect. (ITU-T Recommendation I.113-521 [57])

VP-VC switch: network element that may act as VC switch and/or VP switch. (ITU-T Recommendation I.113-522 [57])

W

wander: long term variations of the significant instances of a digital signal from their ideal positions in time (where long term implies that these variations are of frequencies less than 10 Hz)

4 Abbreviations

#

2 048S	2 048 kbit/s ITU-T Recommendation G.704 [46] framed Signal
2 048U	2 048 kbit/s Unstructured signal
2ME	2 Mbit/s - External remote
2MI	2 Mbit/s - Internal local

A

A	Adaptation function
a	consequent action
AAL	ATM Adaptation Layer
AAL-2	ATM Adaptation Layer 2
AAL-CU	AAL Composite User
AAL-IDU	AAL Interface Data Unit
AAL-PCI	AAL Protocol Control Information
AAL-SDU	AAL Service Data Unit
AATF	ATM Access Termination Functions
ABR	Available Bit Rate
ABT	ATM Block Transfer
ACE	Access Connection Element
ACF	ATM Control Functions
ACS	ATM Cell Start
AcSL	Accepted Signal Label
AcTI	Accepted Trace Identifier
AD	Activation/Deactivation
ADEV	Allan DEViation
ADM	Add-Drop Multiplexer
ADPCM	Adaptive Differential Pulse Code Modulation
AE	Anomaly Event
AEMF	ATM Equipment Management Function

AI	Adapted Information
AIS	Alarm Indication Signal
AISTS16	Alarm Indication Signal in TS16
ALS	Automatic Laser Shutdown
AM	Amplitude Modulation
AMF	ATM Mapping Functions
AMIMF	ATM based MSS Interconnection Management Functions
ANTF	ATM Network Termination Functions
AOC	Advice Of Charge
AP	Access Point
APD	Avalanche Photo Diode
APId	Access Point Identifier
APS	Automatic Protection Switch
ARCH	ARCHitecture
ASE	Amplified Spontaneous Emission
ASK	Amplitude Shift Keying
ATAF	ATM Transit Access Functions
ATC	ATM Transfer Capability
ATD	Asynchronous Time Division
ATM	Asynchronous Transfer Mode
ATS	Abstract Test Suite
AU	Administrative Unit
AUG	Administrative Unit Group
AU-n	Administrative Unit, level n
Avp	ATM virtual path

B

BA	Booster Amplifier
BBCC	Broadband Bearer Channel Control
BBE	Background Block Error
BBER	Background Block Error Ratio
BE	Block Error
BER	Bit Error Rate; Bit Error Ratio
BFA	Basic Frame Alignment

BIP	Bit Interleaved Parity
BIPM	Bureau International des Poids et Mesures
BIP-N	Bit Interleaved Parity, width N
B-ISDN	Broadband Integrated Services Digital Network
BISUP	Broadband ISDN User's Part
BITS	Building Integrated Timing Supply
BNF	Backus-Naur Form
BRPM	Backward Report Performance Monitoring
BSHR	Bidirectional Self Healing Ring
BVE	Bipolar Violation Error

C

C	Connection function
c	defect cause
CAC	Connection Admission Control
CAS	Channel Associated Signalling
CASXC	Channel Associated Signalling Cross Connection
CATV	Community Antenna TV; Category V (cable)
CBDS	Connectionless Broadband Data Service
CBR	Constant Bit Rate
CC	Call Control
CC	Continuity Check
CC	Country Code
CCAD	Continuity Check Activation/Deactivation
CCS	Common Channel Signalling
CDV	Cell Delay Variation
CDVT	Cell Delay Variation Tolerance
CEC	Cell Error Count
CEP	Connection End Point
CER	Cell Error Rate; Cell Error Ratio
CES	Circuit Emulation Service
CES	Connection Endpoint Suffix
CH	CHannel
CI	Characteristic Information

CID	Consecutive Identical Digits
CK	ClocK
CLP	Cell Loss Priority
CLR	Cell Loss Ratio
CLS	ConnectionLess Server
CM	Connection Matrix
CMI	Code Mark Inversion
CMIS (CMISE)	Common Management Information Service
CMR	Cell Misinsertion Rate
CNGI	CoNGestion Indication
CP	Connection Point
CP	Common Part
CPCS	Common Part Convergence Sublayer
CPCS-UU	Common Part Convergence Sublayer User-User
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
CRC-4	Cyclic Redundancy Check - 4
CRC-N	Cyclic Redundancy Check - N
CS	Clock Source
Cs	supervisory-unequipped Connection function
CSES	Consecutive Severely Errored Seconds
CSid	Clock Source identifier
CSMF	Conventional Single Mode Fibre
CTD	Cell Transfer Delay
CTF	Compound Timing Function
CTP	Connection Termination Point
CTR	Conformance Test Report
Ctrl	Control
CUG	Closed User Group
CUT	Clock Under Test
CW	Continuous Wave

D

D	Data
d	defect correlation
D	Dispersion
DA	Dispersion Accommodation
DBR	Deterministic Bit Rate
DCC	Data Communications Channel
DCE	Data Circuit-terminating Equipment
DCF	Dispersion Compensating Fibre
DE	Defect Event
DEC	DECrement
DEG	DEGraded
DEGM	DEGraded Monitor period
DEGTHR	DEGraded THReshold
DFC	Defect or Failure Condition
DGD	Differential Group Delay
DL	Data Link
DLCI	Data Link Connection Identifier
DP	Degraded Performance
dPLM	PayLoad Mismatch defect
DPRING	Dedicated Protection RINg
DROP	Decreased Received Optical Power
DRRS	Digital Radio-Relay Systems
DS	Defect Second
DSD	Detailed System Description
DSF	Dispersion Shifted Fibre
DST	Dispersion Supported Transmission
DTE	Data Terminal Equipment
DXC	Digital Cross Connect

E

E/O	Electrical/Optical
E0	Electrical interface signal 64 kbit/s
E11	Electrical interface signal 1 544 kbit/s

E12	Electrical interface signal 2 048 kbit/s
E22	Electrical interface signal 8 448 kbit/s
E31	Electrical interface signal 34 368 kbit/s
E32	Electrical interface signal 44 736 kbit/s
E4	Electrical interface signal 139 264 kbit/s
EA	Electro Absorption
EAC	Equipment Admission Control
EB	Errored Block
EBC	Errored Block Count
EBTN	European Backbone Telecommunication Network
ECC	Embedded Communications Channel
ECC(x)	Embedded Communications Channel, layer x
EDC	Error Detection Code
EDCV	EDC Violation
EDFA	Erbium Doped Fibre Amplifier
EFCI	Explicit Forward Congestion Indication
EFCN	Explicit Forward Congestion Notification
EFS	Equipment Functional Specification
EFS	Error Free Second
EII	European Information Infrastructure
EM	Element Management
EMC	Electro-Magnetic Compatibility
EMF	Element Management Function
EMS	Equipment Management System
EOC	Embedded Operation Channel
EPD	Early Packet Discards
EPS	Equipment Protection Switch
EQ	Equipment
ERS	Elementary Regenerator Section
ERSN	External Request Signal Number
ERT	External Request Type
ES	Electrical Section
ES	Errored Second
ES1	STM-1 Electrical Section

ESR	Errored Seconds Ratio
e-to-e	End-to-End
EX	EXtinction ratio
EXBER	Excessive Bit Error Ratio
EXER	EXERcise
ExSL	Expected Signal Label
EXTCMD	EXTernal CoMmanD
ExTI	Expected Trace Identifier

F

F	noise Factor
F_B	Far-end Block
F_BBE	Far-end Background Block Error
F_DS	Far-end Defect Second
F_EBC	Far-end Errored Block Count
F_ES	Far-end Errored Second
F_SES	Far-end Severely Errored Second
F_SESTHR	Far-end Severely Errored Second Threshold
F_UAT_cmd	Far-end UnAvailable Time command
F1 ... F5	OAM Flows 1 ... 5
F4E OAM	F4 End-to-End OAM
F4S OAM	F4 Segment OAM
F5E OAM	F5 End-to-End OAM
F5S OAM	F5 Segment OAM
FA	Frame Alignment
FAS	Frame Alignment Signal
FASE	Frame Alignment Signal Error
FDM	Frequency Division Multiplexing
FEBE	Far End Block Error
FEC	Forward Error Correction
FERF	Far End Receive Failure
FFM	Flicker Frequency Modulation noise
FIFO	First In First Out
FIT	Failure In Time

FM	Fault Management
FM	Flexible Multiplexer
FO	Frame Offset
FOP	Failure Of Protocol
FORCEDN	FORCE DowN
FPM	Flicker Phase Modulation noise
fr0	frame 0
FS	Frame Start
FSK	Frequency Shift Keying
FSw	Forced Switch
FTP	File Transfer Protocol
FWM	Four Wave Mixing

G

G	Group
GFC	Generic Flow Control
GRSN	Global Request Signal Number
GRT	Global Request Type

H

H	Hour
HCS	Higher order Connection Supervision
HDB3	High Density Bipolar of order 3
HDLC	High-level Data Link Control
HE	Head End
HEC	Header Error Check
Hex	Hexadecimal
HO	Higher Order
HO	Hold Off
HO	Hold Over
HOB	Head Of Bus
HOVC	Higher Order Virtual Container
HP	Higher order Path

I

IAM	Initial Address Message
ICI	Inter Carrier Interface
ICI	Interface Control Information
ICS	Implementation Conformance Statement
ID	Identifier
IEC	Incoming Error Count
IERS	International Earth Rotation Service
IF	In Frame
ILMI	Interim Local Management Interface
IM	In Multiframe
INC	INCrement
incAIS	incoming AIS
INI	Inter Network Interface
INV	INValid
INVx	INValid x
IOS	Intra-Office Section
IP	Internet Protocol
IS	Intermediate System
ISDN	Integrated Services Digital Network
ISF	Incoming Signal Fail
ISUP	ISDN Signalling User Part
ITU-T	International Telecommunication Union-Telecommunication standardization sector
IUT	Implementation Under Test
IWF	InterWorking Function
IXIT	Implementation eXtra Information for Testing

L

L	Layer
LA	Line Amplifier
LAN	Local Area Network
LB	LoopBack
LBC	Laser Bias Current
LBSN	Local Bridge Signal Number

LC	Layer Clock
LC	Link Connection
LC	Local Control
LCD	Loss of Cell Delineation
LCI	Local Control Interface
LCS	Lower order Connection Supervision
LD	Laser Diode
LED	Light Emitting Diode
LLC	Logical Link Control
LLID	Loopback Location IDentifier
LMC	Laser Modulation Current
LMFA	Loss of MultiFrame Alignment
LO	Lock Out (of protection)
LO	Lower Order
LOA	Loss Of Alignment
LOC	Loss Of Cell
LOC	Loss Of Continuity
LOF	Loss Of Frame
LOM	Loss Of Multiframe
LOP	Loss Of Pointer
LOS	Loss Of Signal
LOT	Loss of Octet Timing
LOVC	Lower Order Virtual Container
LPPSW	Lower order Path Protection Switch
LPx	Lower order Path for VC-x (x = 11, 12, 2, 3)
LRSN	Local Request Signal Number
LRT	Local Request Type
LSB	Least Significant Bit
LSPSW	Lower order Section Protection Switch
LSR	Loss of Synchronization Reference
LSS	Loss of Sequence Structure
LSSN	Local Selector Signal Number
LSTATUS	Link STATUS
LSYNC	Loss of SYNchronization

LT	Line Termination
LTC	Loss of Tandem Connection
LTI	Loss of Timing Information

M

M	Mandatory
m	monitoring function
MA	Maintenance and Adaptation
MC	Master Clock
MC	Matrix Connection
MCF	Message Communication Function
MCTD	Mean Cell Transfer Delay
MD	Mediation Device
MDEV	Modified Allan DEViation
MDT	Mean Down Time
mei	maintenance event information
MF	Mediation Function
MFAS	Multi Frame Alignment Signal
MFS	Multi-Frame Start
MI	Management Information
MIR	Maximum Information Rate
MLM	Multi-Longitudinal Mode
MO	Managed Object
MON	MONitored
MP	Management Point
MRTIE	Maximum Relative Time Interval Error
MS	Multiplex Section
MS1	STM-1 Multiplex Section
MS16	STM-16 Multiplex Section
MS4	STM-4 Multiplex Section
MSB	Most Significant Bit
MSI	Mid-system (Mid-point) Spectral Inversion
MSOH	Multiplex Section Overhead
MSP	Multiplex Section Protection

MSPG	Multiplex Section Protection Group
MST	Multiplex Section Termination
MSVC	Meta Signalling Virtual Channel
MSw	Manual Switch
MTBF	Mean Time Between Failures
MTBO	Mean Time Between Outages
MTIE	Maximum Time Interval Error
MTIE	Mean Time Interval Error
MTS	Multiplexer Timing Source
MTTR	Mean Time To Repair
MZI	Mach-Zehnder Interferometer

N

N_B	Near-end Block
N_BBE	Near-end Background Block Error
N_DS	Near-end Defect Second
N_EBC	Near-end Errored Block Count
N_ES	Near-end Errored Second
N_SES	Near-end Severely Errored Second
N_SESTHR	Near-end Severely Errored Second THReshold
N_UAT_cmd	Near-end UnAvailable Time command
Nm[x][y]	bit x (x = 7, 8) of byte Nm (m = 1, 2) in frame y (y = 1...76)
NC	Network Connection
NC	Not Connected
NCI	No CRC-4 multiframe Indication
NCM	No CRC-4 Multiframe alignment signal
NDF	New Data Flag
NE	Network Element
NEF	Network Element Function
NF	Noise Figure
NFAS	Non-Frame Alignment Signal
N-ISDN	Narrowband Integrated Services Digital Network
NMON	Not Monitored
NMS	Network Management System

NNI	Network Node Interface
NP	Normal Performance
NPC	Network Parameter Control
NPDU	Network Protocol Data Unit
NRZ	Non-Return to Zero
NRZI	Non-Return to Zero Inverted
NS	Network Synchronization
NSAP	Network Service Access Point
NSUPP	Not SUPported
NTU	Network Terminating Unit
NU	National Use
NUx	National Use, bit rate order x

O

O	Optional
O&M	Operation and Maintenance
O/E	Optical/Electrical
O/E/O	Optical/Electrical/Optical
O/O	Optical/Optical
OA	Optical Amplifier
OAM	Operation, Administration and Maintenance
OAR	Optically Amplified Receiver
OAT	Optically Amplified Transmitter
OCD	Out of Cell Delineation
ODI	Outgoing Defect Indication
ODP	Open Distributed Processing
OEI	Outgoing Error Indication
OF	Optical Filter
OF	Outgoing Far-end
OF_B	Outgoing Far-end VC Block
OFA	Optical Fibre Amplifier
OFDM	Orthogonal Frequency Division Multiplexing
OFS	Out of Frame Second
OH	OverHead

OI	Outage Intensity
ON	Outgoing Near-end
ONP	Open Network Provision
OOF	Out Of Frame state
OOM	Out Of Multiframe state
OPER	OPERation
ORL	Optical Return Loss
OS	Operation System
OS	Optical Section
OS1	STM-1 Optical Section
OS16	STM-16 Optical Section
OS4	STM-4 Optical Section
OSC	OSCillator
OSF	Operation System Function
OSF	Outgoing Signal Fail
OSI	Open System Interconnection
OSI(x)	Open Systems Interconnection, layer x
OSn	STM-n Optical Section layer
OTDM	Optical Time Division Multiplexing
OW	Order Wire

P

P	Protection
P_A	Protection Adaptation
P_C	Protection Connection
P_TT	Protection Trail Termination
P0_31c	1 984 kbit/s layer
P0s	synchronous 64 kbit/s layer
P0x	transparent 64 kbit/s layer
P11x	transparent 1 544 kbit/s layer
P12s	synchronous 2 048 kbit/s PDH path layer
P12x	transparent 2 048 kbit/s layer
P22e	8 448 kbit/s PDH path layer with 4 plesiochronous 2 048 kbit/s
P22x	transparent 8 448 kbit/s layer

P31e	34 368 kbit/s PDH path layer with 4 plesiochronous 8 448 kbit/s
P31s	synchronous 34 368 kbit/s PDH path layer
P31x	transparent 34 368 kbit/s layer
P32x	transparent 44 736 kbit/s layer
P4e	139 264 kbit/s PDH path layer with 4 plesiochronous 34 368 kbit/s
P4s	synchronous 139 264 kbit/s PDH path layer
P4x	transparent 139 264 kbit/s layer
PA	Pre-Amplifier
PABX	Private Automatic Branch Exchange
PCM	Pulse Code Modulation
PCR	Peak Cell Rate
PD	Photo Diode
PDC	Photo Diode Current
PDFFA	Praseodymium Doped Fluoride Fibre Amplifier
PDG	Polarization-Dependent Gain
PDH	Plesiochronous Digital Hierarchy
PDU	Protocol Data Unit
PEC	PDH Equipment Clock
PI	Physical Interface
PICS	Protocol Implementation Conformance Statement
PJE	Pointer Justification Event
PLL	Phase Locked Loop
PLM	PayLoad Mismatch
PLPT	Plesiochronous Lower order Path Termination
PM	Performance Management; Performance Monitoring
PM	Phase Modulation
PM	Physical Medium
PMAD	Performance Monitoring Activation/Deactivation
PMD	Polarization Mode Dispersion
PMD	Physical Media Dependent
Pn	Plesiochronous signal, level n
POH	Path OverHead
PPD	Partial Packet Discard
ppm	part per million

PPP	Point to Point Protocol
PPT	Plesiochronous Path Termination
PRBS	Pseudo Random Binary Sequence
PRC	Primary Reference Clock
PRM	Protocol Reference Model
PROT	PROTection
PS	Protection Switching
PSC	Protection Switch Count
PSTN	Public Switched Telephone Network
PSV	Power Supply Voltage
PT	Payload Type
PTI	Path Trace Identifier
PTI	Payload Type Indicator
PTR	Pointer
PU	PDH Unit
PVC	Permanent Virtual Channel
PWR	Powering

Q

QAF	Q Adapter Function
QL	Quality Level
QoS	Quality of Service

R

r	bit rate
R	Reference point at the receiver side
RAI	Remote Alarm Indication
RARCH	Remote ARCHitecture type
RBSN	Remote Bridge Signal Number
RD	ReaD
RDI	Remote Defect Indication
REI	Remote Error Indication
RFI	Remote Failure Indication
RI	Remote Information

RLCD	Remote Loss of Cell Delineation
RLT	Regenerated Line Termination
RM	Resource Management
RMAI	Remote Multiframe Alarm Indication
rms	root mean square
RNCI	Remote No CRC-4 multiframe Indication
ROT	Remove Octet Timing
RP	Reference Point
RP	Remote Point
RRSN	Remote Request Signal Number
RRT	Remote Request Type
RS	Regenerator Section
RS1	STM-1 Regenerator Section
RS16	STM-16 Regenerator Section
RS4	STM-4 Regenerator Section
RSE	Remote Single layer Embedded
RSn	STM-n Regenerator Section
RSOH	Regenerator Section OverHead
RTG	Regenerator Timing Generator
RTR	Reset Threshold Report
RTR1ES	Reset Threshold for Errored Second counting
RTR1SES	Reset Threshold for Severely Errored Second
RWFM	Random Walk Frequency Modulated noise
Rx	Receiver
RxSL	Received Signal Label
RxTI	Received Trace identifier

S

S	Reference point at the transmitter side
S	Segment
S11	VC-11 path layer
S11*	TU-12 carrying a VC-11 path layer
S11D	VC-11 tandem connection sublayer
S11P	VC-11 protection sublayer

S12	VC-12 path layer
S12D	VC-12 tandem connection sublayer
S12P	VC-12 protection sublayer
S2	VC-2 path layer
S2D	VC-2 tandem connection sublayer
S2P	VC-2 protection sublayer
S3	VC-3 path layer
S3D	VC-3 tandem connection sublayer
S3P	VC-3 protection sublayer
S4	VC-4 path layer
S4-4c	contiguous concatenated VC-4-4c path layer
S4D	VC-4 tandem connection sublayer
S4P	VC-4 protection sublayer
Sa	Spare bit in TS0 NFAS
SAAL	Signalling AAL
SAC	Service Admission Control
San	A spare bit in TS0 NFAS [bit n]
SAP	Service Access Point
SASE	Stand Alone Synchronization Equipment
SB-ADPCM	Sub-Band Adaptive Differential Pulse Code Modulation
SBR	Statistical Bit Rate
SBS	Stimulated Brillouin Scattering
SC	Slave Clock
SCR	Sustainable Cell Rate
SCS	System Conformance Statement
SCTR	System Conformance Test Report
SD	Signal Degrade
SD	Synchronization Distribution
SD-2	2 048 kbit/s based timing source reference
SDA	Synchronization Distribution Adaptation
SD-C	2 048 kHz based timing source reference
SDH	Synchronous Digital Hierarchy
SDL	Specification and Description Language
SD-N	STM-N based timing source reference

SDT	Structured Data Transfer
SDT	Synchronization Distribution Termination
SDU	Service Data Unit
SEC	SDH Equipment Clock
SECBR	Severely Errored Cell Block Ratio
SES	Severely Errored Second
SESR	Severely Errored Seconds Ratio
SETS	SDH Equipment Timing Source
SF	Signal Fail
SF	Special Function
SFI	Synchronization Failure Indication
SHR	Self Healing Ring
SIGCE	SIGnalling Condition Error
Sk	Sink
SLAD	Service Level ADmission
SLM	Signal Label Mismatch
SLM	Single-Longitudinal Mode
SLOC	Segment Loss Of Continuity
SMF	Sub-Multi-Frame
SMUX	Synchronous MUltipleXer
SNC	Sub-Network Connection
SNC/I	Inherently monitored Sub-Network Connection protection
SNC/N	Non-intrusively monitored Sub-Network Connection protection
SNC/S	Sublayer monitored Sub-Network Connection protection
SNI	Service Node Interface
So	Source
SOA	Semiconductor Optical Amplifier
SOH	Section OverHead
SPM	Self Phase Modulation
SPRING	Shared Protection RING
SR	Selected Reference
SRS	Stimulated Raman Scattering
SRSN	Signal Request Signal Number
SRT	Signal Request Type

SRTS	Synchronous Residual Time Stamp
SS7	Signalling System number 7
SSAP	Source Service Access Point
SSCF	Service Specific Coordination Function
SSCOP	Service Specific Connection Oriented Protocol
SSCS	Service Specific Convergence Sublayer
SSD	Server Signal Degrade
SSF	Server Signal Fail
SSF	Service Switching Function (I.114)
SSM	Synchronization Status Message
SSU	Synchronization Supply Unit
SSUL	SSU Local
SSUT	SSU Transit
STM-N	Synchronous Transport Module, level N (N = 1, 4, 16, 64)
SUT	System Under Test
SVC	Signalling Virtual Channel
SW	SWitching

T

T	Traffic management
T1	Timing signal derived from STM-N
T12	2 048 kHz signal
T4	Output timing signal
TC	Tandem Connection
TCA	Threshold Crossing Alert
TCF	Timing Connection Function
TCn	Tandem Connection, level n
TCN	Threshold Crossing Notification
TCP	Termination Connection Point
TD	Transmit Degrade
TDEV	Time DEViation
TDM	Time Division Multiplexing
TF	Transmission Fibre
TF	Transmit Fail

TFAS	trail Trace identifier Frame Alignment Signal
TG	Timing Generator
TI	Timing Information
TI	Trace Identifier
TIE	Time Interval Error
TIErms	root mean square Time Interval Error
TIM	Trace Identifier Mismatch
TIMdis	Trace Identifier Mismatch disable
TIPI	Timing Input Physical Interface
TL	Transport Layer
TM	Timing Marker
TM	Transmission and Multiplexing
TM	Transmission Medium
TMN	Telecommunications Management Network
TOPI	Timing Output Physical Interface
TP	Termination Point
TP	Timing Point
TP	Transmission Path
TPS	Transmission Protection Switch
TPT	Tributary Path Termination
TR	Threshold Report
TR1ES	Threshold 1 for Errored Second counting
TR1SES	Threshold 1 for Severely Errored Second counting
TR2ES	Threshold 2 for Errored Second counting
TR2SES	Threshold 2 for Severely Errored Second counting
TS n	Time Slot number n (n = 0,…, 31)
TS	Time Slot
TS0 FAS	Time Slot 0 - Frame Alignment Signal
TS0 NFAS	Time Slot 0 - Non Frame Alignment Signal
TSA	Tributary Signal Adaptation
TSD	Trail Signal Degrade
TSE	Test Signal Error
TSF	Trail Signal Fail
TSL	Trail Signal Label

TSS	Test Signal Structure
TST	Tributary Signal Termination
TT	Trail Termination
TTI	Trail Trace Identifier
TTP	Trail Termination Point
TTs	Trail Termination supervisory
TU	Tributary Unit
TUG	Tributary Unit Group
TUG-m	Tributary Unit Group, level m
TU-m	Tributary Unit, level m
TVAR	Time VARiance
Tx	Transmitter
TX/RX	Transmit/Receive
TxSL	Transmitted Signal Label
TxTI	Transmitted Trace Identifier

U

UAS	UnAvailable Second
UAT	UnAvailable Time
UAT_cmd	UnAvailable Time command
UF	Unit Failure
UI	Unit Interval
UIp-p	Unit Interval peak-to-peak
UNC	UNConnected
UNEQ	UNEQuipped
UNI	User Network Interface
UOF	Under/Over Flow
UP	Unacceptable Performance
UPC	Usage Parameter Control
URLT	UnRegenerated Line Termination
UT	Unavailable Time
UTC	Universal Time Coordinated
UVC	Unequipped VC

V

V0	64 kbit/s contradirectional data layer
VBR	Variable Bit Rate
VC	Virtual Channel
VC	Virtual Container
VCC	Virtual Channel Connection
VCCE	Virtual Channel Connection Endpoint
VCI	Virtual Channel Identifier
VCL	Virtual Channel Link
VC-n	Virtual Container, level n (n = 11, 12, 2, 3, 4)
VCO	Voltage Control Oscillator
VF	Voice Frequency
VMR	Violation Monitoring and Removal
VP	Virtual Path
VPC	Virtual Path Connection
VPCE	Virtual Path Connection Endpoint
VPI	Virtual Path Identifier
VPL	Virtual Path Link

W

W	Working
WDM	Wavelength Division Multiplexing
WFM	White Frequency Modulation noise
WPM	White Phase Modulation noise
WR	WRite
WS	Work Station
WTR	Wait To Restore

X

XC	Cross Connect; Cross Connection
XCTS	Cross Connect Timing Source
XPM	Cross Phase Modulation

Bibliography

The following material, though not specifically referenced in the body of the present document (or not publicly available), gives supporting information.

-                    TR 101 689-2: "Transmission and Multiplexing (TM); Terms and definitions in Transport Networks; Part 2: Access Networks".

History

Document history		
V1.1.1	July 1999	Publication