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**Transmission and Multiplexing (TM);
List of documents relevant to SDH transmission equipment**

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Foreword

This ETSI Technical Report (ETR) has been produced by the Transmission and Multiplexing (TM) Technical Committee of the European Telecommunications Standards Institute (ETSI) in order to provide a list of documents that are relevant to various aspects of Synchronous Digital Hierarchy (SDH) standards for inter-vendor and inter-operator compatibility of SDH equipment.

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1 Scope

This ETR lists and classifies reference documents that are relevant to various aspects of SDH equipment, for example the equipment functions, interfaces, etc. The reference documents are European Telecommunications Standards (ETSS), Interim European Telecommunications Standards (I-ETSS), ETSI Technical Reports (ETRs), International Telecommunication Union - Telecommunication sector (ITU-T) Recommendations, International Telecommunication Union - Radio sector (ITU-R) Recommendations, European Norms (ENs) and International Electrotechnical Committee (IEC) specifications. They are either published documents or documents which are currently being progressed.

This ETR serves as a guide to various areas of SDH equipment standards, as well as a check-list to show those areas which have been standardised and those which are still in progress. It also aids the identification of any omissions.

The status of the reference documents shown is correct at the time of publication, however the ETR may not be updated frequently. The current status of the ETSI documents may be obtained from the ETSI Standards Monitoring database, or from the ETSI Publications Catalogue (for ETSI documents only).

2 References

This ETR incorporates by dated and undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETR only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

The list of references are grouped under their bodies of standardization, namely ETSI, ITU-T, ITU-R, European Committee for Standardisation/European Committee for Electrotechnical Standardisation (CEN/CENELEC) which produces ENs and the International Electrotechnical Committee (IEC).

2.1 ETSI

Deliverables that are still in the drafting stage within the Technical Committee (i.e. they are not yet TC approved) are referred to as either a Draft ETS (DE), a Draft I-ETS (DI) or a Draft Technical Report (DTR). These deliverable types will not yet have been given an official ETSI document number (e.g. ETS 300 nnn, ETR nnn) and hence only the work item number is shown (e.g. DE/TM-nnnnn).

Once the deliverables have been approved by the TC and have entered the ETSI standards approval process they will be given an ETSI document number which will be prefixed by the term "pr", for example "prETS 300 nnn" (except in the case of Technical Reports which do not follow the same approval procedure as standards).

Thus, in the following subclauses the term "draft" refers to deliverables in the stages before TC approval and only the work item number is therefore shown. Where the future ETSI document number is known (e.g. when the deliverable is part of a series), this is shown in brackets after the title.

Where the deliverable is publicly available (after TC approval and up to and including publication) the ETSI document number is shown.

2.1.1 Draft ETSs

- [1] DE/TM-01015-1-3: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 1-3: Generic processes and performance Abstract Test Suite (ATS)" (ETS 300 417-1-3).
- [2] DE/TM-01015-2-2: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 2-2: Physical section layer functions Implementation Conformance Statement (ICS) proforma" (ETS 300 417-2-2).
- [3] DE/TM-01015-2-3: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 2-3: Physical section layer functions Abstract Test Suite (ATS)" (ETS 300 417-2-3).
- [4] DE/TM-01015-3-2: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 3-2: STM-N regenerator and multiplex section layer functions Implementation Conformance statement (ICS) proforma" (ETS 300 417-3-2).
- [5] DE/TM-01015-3-3: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 3-3: STM-N regenerator and multiplex section layer functions Abstract Test Suite (ATS)" (ETS 300 417-3-3).
- [6] DE/TM-01015-4-2: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 4-2: SDH path layer functions Implementation Conformance Statement (ICS) proforma" (ETS 300 417-4-2).
- [7] DE/TM-01015-4-3: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 4-3: SDH path layer functions Abstract Test Suite (ATS)" (ETS 300 417-4-3).
- [8] DE/TM-01015-5-1: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 5-1: PDH path layer functions" (ETS 300 417-5-1).
- [9] DE/TM-01015-5-2: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 5-2: PDH path layer functions Implementation Conformance Statement (ICS) proforma" (ETS 300 417-5-2).
- [10] DE/TM-01015-5-3: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 5-3: PDH path layer functions Abstract Test Suite (ATS)" (ETS 300 417-5-3).
- [11] DE/TM-01015-6-1: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 6-1: Synchronisation distribution layer functions" (ETS 300 417-6-1).
- [12] DE/TM-01015-6-2: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 6-2: Synchronisation distribution layer functions Implementation Conformance Statement (ICS) proforma" (ETS 300 417-6-2).

- [13] DE/TM-01015-6-3: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 6-3: Synchronisation distribution layer functions Abstract Test Suite (ATS)" (ETS 300 417-6-3).
- [14] DE/TM-01015-7-1: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 7-1: Auxiliary layer functions" (ETS 300 417-7-1).
- [15] DE/TM-01015-7-2: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 7-2: Auxiliary layer functions Implementation Conformance Statement (ICS) proforma" (ETS 300 417-7-2).
- [16] DE/TM-01015-7-3: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 7-3: Auxiliary layer functions Abstract Test Suite (ATS)" (ETS 300 417-7-3).
- [17] DE/TM-01015-8-1: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 8-1: Major compound functions" (ETS 300 417-8-1).
- [18] DE/TM-01015-8-2: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 8-2: Major compound functions Implementation Conformance Statement (ICS) proforma" (ETS 300 417-8-2).
- [19] DE/TM-01015-8-3: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 8-3: Major compound functions Abstract Test Suite (ATS)" (ETS 300 417-8-3).
- [20] DE/TM-02109: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Transmission performance for SDH sections".
- [21] DE/TM-02207: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); SDH network information model".
- [22] DE/TM-02210: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Management of SDH transmission equipment".
- [23] DE/TM-03017-4: "Transmission and Multiplexing (TM); Generic requirements for synchronization networks Part 4: Timing characteristics of slave clocks suitable for synchronization supply to Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) equipment" (ETS 300 462-4).
- [24] DE/TM-03017-6: "Transmission and Multiplexing (TM); Generic requirements for synchronization networks Part 6: Timing characteristics of primary reference clocks" (ETS 300 462-6).
- [25] DE/TM-04029: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); SDH radio specific functional blocks for the transmission of M-times sub-STM-1".
- [26] DE/TM-04033: "Transmission and Multiplexing (TM); Digital Radio Relay Systems (DRRS) Sub-STM-1 systems with copolar channel spacing of 14 MHz in the band of 15 GHz".
- [27] DE/TM-04037: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); System performance monitoring parameters of SDH digital radio relay systems".

2.1.2 Draft I-ETSS

- [28] prETS 300 653: "Telecommunications Management Network (TMN); Generic managed object class library for the network level view".

2.1.3 Draft Technical Reports

- [29] DTR/TM-04010: "Transmission and Multiplexing (TM); Standardization of high capacity digital radio relay systems carrying SDH- signals (1 x SDH-1) in frequency band with about 30 MHz spacing and using co-channel (orthogonal) arrangements".
- [30] DTR/TM-02221: "Transmission and Multiplexing (TM); The application of ODP to the management of a transmission network".
- [31] DTR/TM-03025: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); SDH network protection schemes; Types and characteristics" (ETR 273).
- [32] DTR/TM-03041: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); SDH protection interworking; rings and other schemes" (ETR 274).
- [33] RTR/TM-04030: "Transmission and Multiplexing (TM); Specification of new generation high-capacity digital radio systems" (ETR 019 Edition 2).

2.1.4 ETSSs

- [34] ETS 300 417-1-1: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) equipment; Part 1-1: Generic processes and performance"
- [35] prETS 300 417-1-2: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 1-2: Generic processes and performance Implementation Conformance Statement (ICS)"
- [36] prETS 300 417-2-1: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 2-1: Physical section layer functions"
- [37] prETS 300 417-3-1: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 3-1: STM-N regenerator and multiplex section layer functions".
- [38] prETS 300 417-4-1: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) transmission equipment; Part 4-1: SDH path layer functions".
- [39] prETS 300 493: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH) information model of the Sub Network Connection Protection (SNCP) for the Network Element (NE) view".
- [40] prETS 300 645: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH) radio relay equipment; Information model for use on Q-interfaces.
- [41] prETS 300 484: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH) information model; Connection supervision function (Higher order Connection Supervision/Lower order Connection Supervision (HCS/LCS)) for the Network Element (NE) view".

- [42] prETS 300 462-1: "Transmission and Multiplexing (TM); Generic requirements for synchronization networks; Part 1: Definitions and terminology for synchronization networks".
- [43] prETS 300 462-2: "Transmission and Multiplexing (TM); Generic requirements for synchronization networks; Part 2: Synchronization network architecture".
- [44] prETS 300 462-3: "Transmission and Multiplexing (TM); Generic requirements for synchronization networks; Part 3: The control of jitter and wander within synchronization networks".
- [45] prETS 300 462-5: "Transmission and Multiplexing (TM); Generic requirements for synchronization networks; Part 5: Timing characteristics of slave clocks suitable for operation in Synchronous Digital Hierarchy (SDH) equipment".
- [46] prETS 300 746: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Network protection schemes; APS protocols and operation".
- [47] ETS 300 639: "Transmission and Multiplexing (TM); Sub STM-1 digital radio-relay systems operating in the 13 GHz, 15 GHz and 18 GHz frequency bands".
- [48] prETS 300 638: "Transmission and Multiplexing (TM); Fixed point-to-point radio link equipment for the transmission of digital signals and analogue video signal operating at frequency bands with 20 MHz alternate channel spacing".
- [49] prETS 300 635: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH) radio specific functional blocks".
- [50] ETS 300 019-1-0: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 1-0: Classification of environmental conditions Introduction".
- [51] ETS 300 019-1-1: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 1-1: Classification of environmental conditions Storage".
- [52] ETS 300 019-1-2: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 1-2: Classification of environmental conditions Transportation".
- [53] ETS 300 019-1-3: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 1-3: Classification of environmental conditions Stationary use at weatherprotected locations".
- [54] ETS 300 019-1-4: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 1-4: Classification of environmental conditions Stationary use at non-weatherprotected locations".
- [55] ETS 300 019-2-0: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 2-0: Specification of environmental tests Introduction".
- [56] ETS 300 019-2-1: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 2-1: Specification of environmental tests Storage".
- [57] ETS 300 019-2-2: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 2-2: Specification of environmental tests Transportation".
- [58] ETS 300 019-2-3: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 2-3: Specification of environmental tests Stationary use at weatherprotected locations".

- [59] ETS 300 019-2-4: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 2-4: Specification of environmental tests Stationary use at non-weatherprotected locations".
- [60] prETS 300 119-1: "Equipment Engineering (EE); European telecommunication standard for equipment practice Part 1: Introduction and terminology".
- [61] ETS 300 119-2: "Equipment Engineering (EE); European telecommunication standard for equipment practice Part 2: Engineering requirements for racks and cabinets".
- [62] ETS 300 119-3: "Equipment Engineering (EE); European telecommunication standard for equipment practice Part 3: Engineering requirements for miscellaneous racks and cabinets".
- [63] ETS 300 119-4: "Equipment Engineering (EE); European telecommunication standard for equipment practice Part 4: Engineering requirements for subracks in miscellaneous racks and cabinets".
- [64] ETS 300 132-1: "Equipment Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 1: Operated by alternating current (ac) derived from direct current (dc) sources".
- [65] prETS 300 132-2: "Equipment Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 2: Operated by direct current (dc)".
- [66] ETS 300 147: "Transmission and Multiplexing (TM); Synchronous digital hierarchy multiplexing structure".
- [67] ETS 300 150: "Transmission and Multiplexing (TM); Protocol suites for Q interfaces for management of transmission systems".
- [68] ETS 300 166: "Transmission and Multiplexing (TM); Physical and electrical characteristics of hierarchical digital interfaces for equipment using the 2048 kbit/s - based plesiochronous or synchronous digital hierarchies".
- [69] ETS 300 167: "Transmission and Multiplexing (TM); Functional characteristics of 2 048 kbit/s interfaces".
- [70] ETS 300 197: "Transmission and Multiplexing (TM); Parameters for radio relay systems for the transmission of digital signals and analogue video signals operating at 38 GHz".
- [71] ETS 300 198: "Transmission and Multiplexing (TM); Parameters for radio relay systems for the transmission of digital signals and analogue video signals operating at 23 GHz".
- [72] ETS 300 232: "Transmission and Multiplexing (TM); Optical interfaces for equipments and systems relating to the Synchronous Digital Hierarchy [ITU-T Recommendation G.957 (1993) modified]".
- [73] ETS 300 234: "Transmission and Multiplexing (TM); High capacity digital radio-relay systems carrying 1 x STM-1 signals and operating in frequency bands with about 30 MHz channel spacing and alternated arrangements".
- [74] ETS 300 253: "Equipment Engineering (EE); Earthing and bonding of telecommunication equipment in telecommunication centres".
- [75] ETS 300 304: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH) information model for the Network Element (NE) view".

- [76] ETS 300 337: "Transmission and Multiplexing (TM); Generic frame structures for the transport of various signals (including Asynchronous Transfer Mode (ATM) cells and Synchronous Digital Hierarchy (SDH) elements) at the CCITT Recommendation G.702 hierarchical rates of 2 048 kbit/s, 34 368 kbit/s and 139 264 kbit/s".
- [77] ETS 300 386-1: "Equipment Engineering (EE); Public telecommunication network equipment Electro-Magnetic Compatibility (EMC) requirements Part 1: Product family overview, compliance criteria and test levels".
- [78] prETS 300 386-2-1: "Equipment Engineering (EE); Public telecommunications network equipment EMC requirements Part 2-1: Product specific compliance criteria and operating conditions; Switching equipment".
- [79] ETS 300 386-2-2: "Equipment Engineering (EE); Public telecommunications network equipment EMC requirements Part 2-2: Product specific compliance criteria and operating conditions; Transmission equipment".
- [80] ETS 300 386-2-3: "Equipment engineering (EE); Public telecommunications network equipment EMC requirements Part 2-3: Product specific compliance criteria and operating conditions; Power supply equipment".
- [81] ETS 300 386-2-4: "Equipment engineering (EE); EMC requirements Part 2-4: Product specific compliance criteria and operating conditions; Supervisory equipment".
- [82] prETS 300 407: "Transmission and Multiplexing (TM); Parameters for radio-relay systems for the transmission of digital signals and analogue video signals operating around 55 GHz".
- [83] ETS 300 408: "Transmission and Multiplexing (TM); Parameters for radio-relay systems for the transmission of digital signals and analogue video signals operating at around 58 GHz, which do not require co-ordinated frequency planning".
- [84] ETS 300 411: "Transmission and Multiplexing (TM); Performance monitoring information model for the Network Element (NE) view".
- [85] ETS 300 412: "Transmission and Multiplexing (TM); Payload configuration information model for the Network Element (NE) view".
- [86] ETS 300 413: "Transmission and Multiplexing (TM); Multiplex section protection information model for the Network Element (NE) view".
- [87] prETS 300 430: "Transmission and Multiplexing (TM); High capacity digital radio-relay systems carrying 1 x Synchronous Transport Module-level 1 (1 x STM-1) signals operating in the 18 GHz frequency band with channel spacing of 55 MHz".
- [88] prETS 300 431: "Transmission and Multiplexing (TM); Digital fixed point-to-point radio link equipment operating in the frequency range 24,25 GHz to 29,50 GHz".
- [89] prETS 300 432: "Transmission and Multiplexing (TM); High capacity digital radio-relay system carrying 1 x Synchronous Transport Module-level 1 (1 x STM-1) signals operating in the 18 GHz frequency band with channel spacing of 110 MHz".
- 2.1.5 I-ETSS**
- [90] I-ETS 300 416: "Transmission and Multiplexing (TM); Availability performance of path elements of international digital paths".

2.1.6 Technical Reports

- [91] ETR 269: "Transmission and Multiplexing (TM); Network level information modelling".
- [92] ETR 143: "Equipment Engineering (EE); Connectors for test and disconnection points Display of alarms".
- [93] ETR 194: "Equipment Engineering (EE); Connectors for ITU-T defined G. series digital hierarchy interfaces".
- [94] TM-TR 005: "Transmission and Multiplexing (TM); Aspects of Telecommunication Management Network (TMN) regarding Digital Radio Relay Systems (DRRS)".
- [95] TM-TR 004: "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH) aspects regarding digital radio-relay systems".
- [96] TCR-TR 008: "Network Aspects (NA); Network architecture, operation & maintenance principles and performance Telecommunications Management Network (TMN) Vocabulary of terms".
- [97] ETR 046: "Network Aspects (NA); Telecommunications management networks modelling guidelines".
- [98] ETR 019: "Transmission and Multiplexing (TM); Specification of new generation high-capacity digital radio systems".
- [99] ETR 114: "Transmission and Multiplexing (TM); Functional architecture of Synchronous Digital Hierarchy (SDH) Transport networks".

2.2 ITU-T

2.2.1 Draft ITU-T Recommendations

- [100] Draft ITU-T Recommendation G.81s: "Timing characteristics of slave clocks suitable for operation in SDH equipments".
- [101] Draft ITU-T Recommendation G.mda: "Methodology for deriving fibre optic system reliability objectives".
- [102] Draft ITU-T Recommendation G.shr-2: "Interworking of SDH protection architectures".
- [103] Draft ITU-T Recommendation M.2101: "Digital maintenance limits for SDH".
- [104] Draft ITU-T Recommendation X.725: "Information technology - Open System Interconnection - structure of management information: General relationship model".
- [105] Draft ITU-T Recommendation X.901: "Information technology - Open System Interconnection - basic reference model of open distributed processing: Overview and guide to use".
- [106] Draft ITU-T Recommendation X.902: "Information technology - Open System Interconnection - basic reference model of open distributed processing: Descriptive model".
- [107] Draft ITU-T Recommendation X.903: "Information technology - Open System Interconnection - basic reference model of open distributed processing: Prescriptive model".

- [108] Draft ITU-T Recommendation X.904: "Information technology - Open System Interconnection - basic reference model of open distributed processing: Architectural semantics".

2.2.2 ITU-T Recommendations

- [109] ITU-T Recommendation G.702: "Digital hierarchy bit rates".
- [110] ITU-T Recommendation G.703: "Physical/electrical characteristics of hierarchical digital interfaces".
- [111] ITU-T Recommendation G.704: "Synchronous frame structures used at 1544, 6312, 2048, 8488 and 44 736 kbit/s hierarchical levels".
- [112] ITU-T Recommendation G.706: "Frame alignment and cyclic redundancy check (CRC) procedures relating to basic frame structures defined in recommendation G.704".
- [113] ITU-T Recommendation G.707: "Synchronous digital hierarchy bit rates".
- [114] ITU-T Recommendation G.708: "Network node interface for the synchronous digital hierarchy".
- [115] ITU-T Recommendation G.709: "Synchronous multiplexing structure".
- [116] ITU-T Recommendation G.742: "Second order digital multiplex equipment operating at 8448 kbit/s and using positive justification".
- [117] ITU-T Recommendation G.751: "Digital multiplex equipments operating at third order bit rate of 34368 kbit/s and fourth order bit rate of 139 264 kbit/s and using positive justification".
- [118] ITU-T Recommendation G.755: "Digital multiplex equipment operating at 139 264 kbit/s and multiplexing three tributaries at 44736 kbit/s".
- [119] ITU-T Recommendation G.772: "Protected monitoring points provided on digital transmission systems".
- [120] ITU-T Recommendation G.773: "Protocol suites for Q interfaces for management of transmission systems".
- [121] ITU-T Recommendation G.774: "Synchronous digital hierarchy (SDH) management information model for the network element view".
- [122] ITU-T Recommendation G.774-01: " Synchronous digital hierarchy (SDH) performance monitoring for the network element view".
- [123] ITU-T Recommendation G.774-02: "Synchronous digital hierarchy (SDH) configuration of the payload structure for the network element view".
- [124] ITU-T Recommendation G.774-03: "Synchronous digital hierarchy (SDH) management of multiplex-section protection for the network element view".
- [125] ITU-T Recommendation G.774-04: "Synchronous digital hierarchy (SDH) management of the subnetworkconnection protection for the network element view".
- [126] ITU-T Recommendation G.774-05: "Synchronous digital hierarchy (SDH) management of connection supervision functionality (HCS/LCS) for the network element view".

- [127] ITU-T Recommendation G.775: "Loss of signal (LOS) and alarm indication signal (AIS) defect detection and clearance criteria".
- [128] ITU-T Recommendation G.781: "Structure of recommendations on equipment for the synchronous digital hierarchy (SDH)".
- [129] ITU-T Recommendation G.782: "Types and general characteristics of synchronous digital hierarchy (SDH) equipment".
- [130] ITU-T Recommendation G.783: "Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks".
- [131] ITU-T Recommendation G.784: "Synchronous digital hierarchy (SDH) management".
- [132] ITU-T Recommendation G.803: "Architectures of transport networks based on the synchronous digital hierarchy (SDH)".
- [133] ITU-T Recommendation G.810: "Considerations on timing and synchronisation issues".
- [134] ITU-T Recommendation G.811: "Timing requirements at the output of primary reference clocks suitable for plesiochronous operation of international digital links".
- [135] ITU-T Recommendation G.812: "Timing requirements at the output of slave clocks suitable for plesiochronous operation of international digital links".
- [136] ITU-T Recommendation G.822: "Controlled slip rate objectives on an international digital connection".
- [137] ITU-T Recommendation G.823: "The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy".
- [138] ITU-T Recommendation G.824: "The control of jitter and wander within digital networks which are based on the 1544 kbit/s hierarchy".
- [139] ITU-T Recommendation G.825: "The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)".
- [140] ITU-T Recommendation G.826: "Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate".
- [141] ITU-T Recommendation G.827: "Availability performance for international constant bit rate paths at or above the primary rate".
- [142] ITU-T Recommendation G.831: "Management capabilities of transport networks based on the synchronous digital hierarchy (SDH)".
- [143] ITU-T Recommendation G.832: "Transport of SDH elements on PDH networks: Frame and multiplexing structures".
- [144] ITU-T Recommendation G.841: "Types and characteristics of SDH network protection architectures".
- [145] ITU-T Recommendation E.862: "Dependability planning of telecommunication networks".
- [146] ITU-T Recommendation G.911: "Parameters and calculation methodologies for reliability and availability of fibre optic systems".

- [147] ITU-T Recommendation G.957: "Optical interfaces for equipments and systems relating to the synchronous digital hierarchy".
- [148] ITU-T Recommendation G.958: "Digital line systems based on the synchronous digital hierarchy for use on optical fibre cables".
- [149] ITU-T Recommendation M.60: "Maintenance terminology and definitions".
- [150] ITU-T Recommendation M.2120: "Digital path, section and transmission system fault detection and localisation procedures".
- [151] ITU-T Recommendation M.3010: "Principles for a telecommunications management network".
- [152] ITU-T Recommendation M.3020: "TMN interface specification methodology".
- [153] ITU-T Recommendation M.3100: "Generic network information model".
- [154] ITU-T Recommendation M.3200: "TMN management services: overview".
- [155] ITU-T Recommendation M.3300: "TMN management facilities presented at the F interface".
- [156] ITU-T Recommendation M.3400: "TMN management functions".
- [157] ITU-T Recommendation V.11: "Electrical characteristics for balanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s".
- [158] ITU-T Recommendation X.21: "Interface between data terminal equipment and data circuit-terminating equipment for synchronous operation on public data networks".
- [159] ITU-T Recommendation X.722: "Information technology - Open Systems Interconnection - Structure of Management Information: Guidelines for the definition of managed objects".

2.3 ITU-R

2.3.1 Draft ITU-R Recommendations

- [160] Draft ITU-R Recommendation F.1092: "Error performance objectives for constant bit rate digital paths at or above the primary rate carried by digital radio-relay systems which may form part of the international portion of a 27500 km hypothetical reference path".
- [161] Draft ITU-R Recommendation F.1099: "Radio frequency channel arrangements for high capacity digital radio-relay systems in the 5 GHz (4400 - 5000 MHz) band".

2.3.2 ITU-R Recommendations

- [162] ITU-R Recommendation F.383-5: "Radio-frequency channel arrangements for high capacity radio-relay systems operating in the lower 6 GHz band".
- [163] ITU-R Recommendation F.385-5: "Radio-frequency channel arrangements for radio-relay systems operating in the 7 GHz band".
- [164] ITU-R Recommendation F.497-4: "Radio-frequency channel arrangements for radio-relay systems operating in the 13 GHz band".
- [165] ITU-R Recommendation F.595-3: "Radio-frequency channel arrangements for radio-relay systems operating in the 18 GHz frequency band".

- [166] ITU-R Recommendation F.635-2: "Radio-frequency channel arrangements based on a homogeneous pattern for radio-relay systems operating in the 4 GHz band".
- [167] ITU-R Recommendation F.746: "Radio-frequency channel arrangements for radio-relay systems".
- [168] ITU-R Recommendation F.750: "Architectures and functional aspects of radio-relay systems for SDH-based networks".
- [169] ITU-R Recommendation F.751: "Transmission characteristics and performance requirements of radio-relay systems for SDH-based networks".
- [170] ITU-R Recommendation F.753: "Preferred methods and characteristics for the supervision and protection of digital radio-relay systems".

2.4 CEN/CENELEC

- [171] EN 50081: "Electromagnetic compatibility - Generic emission standard".
- [172] EN 50082: "Electromagnetic compatibility - Generic immunity standard".
- [173] EN 60825-1: "Safety of laser products - Part 1: Equipment classification, requirements and user's guide".
- [174] EN 60950: "Safety of information technology equipment, including electrical business equipment".

2.5 IEC

- [175] ISO/IEC 1000-4-2: "Testing and measurement techniques - Section 2: - Electrostatic discharge immunity test - Basic EMC Publication".

3 Abbreviations

For the purposes of this ETR, the following definitions apply:

AIS	Alarm Indication Signal
APS	Automatic Protection Switching
ATM	Asynchronous Transfer Mode
ATS	Abstract Test Suite
CCIR	International Radio Consultative Committee
CCITT	International Telegraph and Telephone Consultative Committee
CEN/CENELEC	European Committee for Standardisation/European Committee for Electrotechnical Standardisation
CRC	Cyclic Redundancy Check
DCE	Data Circuit-terminating Equipment
DE	Draft ETS
DI	Draft I-ETS
DRRS	Digital Radio-Relay Systems
DTE	Data Terminal Equipment
DTR	Draft Technical Report
EC	European Commission
EE	Equipment Engineering
EMC	Electro-Magnetic Compatibility
EN	European Norm
ETR	ETSI Technical Report
ETS	European Telecommunications Standards
ETSI	European Telecommunications Standards Institute
HCS	Higher order Connection Supervision
ICS	Implementation Conformance Statement
I-ETS	Interim European Telecommunications Standards
IEC	International Electrotechnical Committee
ISO	International Organisation for Standardisation
ITU-R	International Telecommunication Union - Radio sector (formerly CCIR)
ITU-T	International Telecommunication Union - Telecommunication sector (formerly CCITT)
LCS	Lower order Connection Supervision
LOS	Loss Of Signal
MS	Multiplex Section
NA	Network Aspects
NE	Network Element
ODP	Open Distributed Processing
OSI	Open System Interconnection
PDH	Plesiochronous Digital Hierarchy
Rec.	Recommendation
RS	Regenerator Section
SDH	Synchronous Digital Hierarchy
SNC	Sub-Network Connection
STM	Synchronous Transport Module
TC-TR	Technical Committee - Technical Report
TCR-TR	Technical Committee Reference - Technical Report
TM	Transmission & Multiplexing
TMN	Telecommunications Management Network

4 Classification

The reference documents relevant to SDH equipment can be classified into fifteen areas or aspects of standardization:

SDH multiplexing structure and hierarchy	(clause 5)
Network architecture	(clause 6)
Network management	(clause 7)
Protection	(clause 8)
Synchronisation	(clause 9)
Equipment functional specification	(clause 10)
Associated equipment standards	
- Interfaces	(clause 11)
- Characteristics and processing of digital signals	(clause 12)
- Operating environment	(clause 13)
- Equipment practices	(clause 14)
- Safety	(clause 15)
SDH/PDH interworking	(clause 16)
Reliability and availability	(clause 17)
Digital radio	(clause 18)
Conformance testing	(clause 19)

The SDH multiplexing hierarchy is considered to be the starting point of SDH standards and a prerequisite for the understanding of the network architecture aspects and for the other subsequent areas.

The areas of network management, protection and synchronisation can be selected independently, depending on the specific area of interest. They are not prerequisite to, but would assist towards, the understanding of their equipment aspects in the equipment functional specification.

Equipment functional specification provides more detailed description of the functions that make up SDH equipment.

The associated equipment standards are specifications of specific aspects of SDH equipment, e.g. interfaces, operating environment, etc.

Other relevant areas are SDH/Plesiochronous Digital Hierarchy (PDH) interworking, reliability and availability, digital radio and conformance testing.

A summary table of the reference documents showing the correspondence between the standards work in ETSI, ITU-T Recommendations, ITU-R Recommendations, ENs produced by the CEN/CENELEC, and the IEC specifications for each of the areas or aspects of standardization is given in annex A.

5 Multiplexing hierarchy

Bit rates, network node interfaces and multiplexing structure:

ETS 300 147	[66]
ITU-T Rec. G.707	[113]
ITU-T Rec. G.708	[114]
ITU-T Rec. G.709	[115]

6 Network architecture

Functional architecture of SDH transport networks:

ETR 114	[99]
ITU-T Rec. G.803	[132]

7 Network management

TMN:

- Terminology	TCR-TR 008 ITU-T Rec. M.60	[96] [149]
- Modelling guidelines	ETR 046 ITU-T Rec. X.722	[97] [159]
- General relationship model	ITU-T draft Rec. X.725	[104]
- Principles	ITU-T Rec. M.3010	[151]
- Interface specification methodology	ITU-T Rec. M.3020	[152]
- Overview of management services	ITU-T Rec. M.3200	[154]
- Management capabilities at the F interface	ITU-T Rec. M.3300	[155]
- Management functions	ITU-T Rec. M.3400	[156]

Network level information model:

	DE/TM-02207 ITU-T Rec. M.3100	[21] [153]
- Requirements	ETR 269	[91]
- Managed object classes	prETS 300 653	[28]
- Radio relays	prETS 300 645	[40]

Network element information model:

	ETS 300 304 ITU-T Rec. G.774	[75] [121]
- Performance monitoring	ETS 300 411 ITU-T Rec. G.774-01	[84] [122]
- Configuration of payload structure	ETS 300 412 ITU-T Rec. G.774-02	[85] [123]

- MS protection	ETS 300 413 ITU-T Rec. G.774-03	[86] [124]
- SNC protection	prETS 300 493 ITU-T Rec. G.774-04	[39] [125]
- Connection supervision function	prETS 300 484 ITU-T Rec. G.774-05	[41] [126]

Open distributed processing:

- Basic reference model	ITU-T draft Rec. X.901 ITU-T draft Rec. X.902 ITU-T draft Rec. X.903 ITU-T draft Rec. X.904	[105] [106] [107] [108]
- Application	DTR/TM-02221	[30]

Management capability:

	ITU-T Rec. G.831	[142]
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Management of SDH equipment:

	DE/TM-01015-7-1 DE/TM-02210 ITU-T Rec. G.784	[14] [22] [131]
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8 Protection

Objectives, architectures and applications:

	DTR/TM-03025 ITU-T Rec. G.803 ITU-T Rec. G.841	[31] [132] [144]
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Interworking:

	DTR/TM-03041 ITU-T draft Rec. G.shr-2	[32] [102]
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APS protocols:

	prETS 300 746 ITU-T Rec. G.783 ITU-T Rec. G.841	[46] [130] [144]
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Management:

9 Synchronisation

Considerations on timing and synchronisation issues:

	ITU-T Rec. G.810	[133]
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Definitions of synchronisation terminology:

	prETS 300 462-1	[42]
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Synchronisation network architecture:

	prETS 300 462-2 ITU-T Rec. G.803	[43] [132]
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The control of jitter and wander within synchronisation networks:

prETS 300 462-3	[44]
ITU-T Rec. G.823	[137]
ITU-T Rec. G.824	[138]
ITU-T Rec. G.825	[139]

Timing characteristics for slave clocks suitable for synchronisation supply to SDH and PDH equipment:

DE/TM-03017-4	[23]
ITU-T Rec. G.812	[135]

Timing characteristics of slave clocks suitable for operation in SDH equipment:

prETS 300 462-5	[45]
ITU-T draft Rec. G.81s	[100]

Timing characteristics of primary reference clocks:

DE/TM-03017-6	[24]
ITU-T Rec. G.811	[134]

Controlled slip rate objectives on an international digital connection:

ITU-T Rec. G.822	[136]
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10 Equipment functional specification

Generic processes and performance:

ETS 300 417-1-1	[34]
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Physical section layer functions:

prETS 300 417-2-1	[36]
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STM-N RS and MS layer functions:

prETS 300 417-3-1	[37]
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SDH path layer functions:

prETS 300 417-4-1	[38]
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PDH path layer functions:

DE/TM-01015-5-1	[8]
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Synchronisation distribution layer functions:

DE/TM-01015-6-1	[11]
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Auxiliary layer functions:

DE/TM-01015-7-1	[14]
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Major compound functions:

DE/TM-01015-8-1	[17]
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Structure of recommendations on SDH equipment:

ITU-T Rec. G.781 [128]

Functional overview of SDH equipment:

ITU-T Rec. G.782 [129]

Functional blocks of SDH equipment:

ITU-T Rec. G.783 [130]

Management of SDH equipment:

DE/TM-01015-7-1 [14]
DE/TM-02210 [22]
ITU-T Rec. G.784 [131]

Performance parameters and objectives:

ETS 300 417-1-1 [34]
DE/TM-02109 [20]
ITU-T Rec. G.826 [140]
ITU-T draft Rec. M.2101 [103]

Fault detection and localisation:

ITU-T Rec. M.2120 [150]

LOS and AIS detection and clearance criteria:

ETS 300 417-1-1 [34]
ITU-T Rec. G.775 [127]

11 Interfaces

11.1 Electrical interfaces

64 kbit/s:

ITU-T Rec. G.702 [109]
ITU-T Rec. G.703 [110]
ITU-T Rec. V.11 [157]

n x 64 kbit/s:

ITU-T Rec. G.702 [109]
ITU-T Rec. G.703 [110]
ITU-T Rec. V.11 [157]
ITU-T Rec. X.21 [158]

1,5, 45 Mbit/s:

ITU-T Rec. G.702 [109]
ITU-T Rec. G.703 [110]

2, 6, 34 and 140 Mbit/s:

ETS 300 166	[68]
ITU-T Rec. G.702	[109]
ITU-T Rec. G.703	[110]

155 Mbit/s STM-1:

ITU-T Rec. G.703	[110]
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11.2 Optical interfaces

All optical interfaces:

ETS 300 232	[72]
ITU-T Rec. G.957	[147]
ITU-T Rec. G.958	[148]

11.3 Auxiliary interfaces

64 kbit/s:

ITU-T Rec. G.703	[110]
ITU-T Rec. V.11	[157]

n x 64 kbit/s:

ITU-T Rec. G.703	[110]
ITU-T Rec. V.11	[157]
ITU-T Rec. X.21	[158]

2 Mbit/s:

ITU-T Rec. G.703	[110]
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11.4 Management interfaces

Protocol suites for Q interfaces:

ETS 300 150	[67]
ITU-T Rec. G.773	[120]

11.5 Power interfaces

Functional requirements:

DE/TM-01015-7-1	[14]
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Power supply interfaces:

ETS 300 132-1	[64]
prETS 300 132-2	[65]

Dissipation limits for individual equipment are not being standardised at present.

11.6 Monitoring interfaces

Protected monitoring points:

ITU-T Rec. G.772	[119]
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11.7 Station alarm interfaces

No standardization in progress.

12 Characteristics and processing of digital signals

64 kbit/s:

ITU-T Rec. G.704	[111]
ITU-T Rec. G.706	[112]

n x 64 kbit/s:

ITU-T Rec. G.704	[111]
ITU-T Rec. G.706	[112]
ITU-T Rec. X.21	[158]

1,5, 45 Mbit/s:

ITU-T Rec. G.704	[111]
ITU-T Rec. G.706	[112]

2, 8, 34 and 140 Mbit/s:

ETS 300 167	[69]
ITU-T Rec. G.704	[111]
ITU-T Rec. G.706	[112]
ITU-T Rec. G.742	[116]
ITU-T Rec. G.751	[117]
ITU-T Rec. G.755	[118]

STM-N:

ETS 300 417-1-1	[34]
prETS 300 417-2-1	[36]
prETS 300 417-3-1	[37]
prETS 300 417-4-1	[38]
DE/TM-01015-5-1	[8]
DE/TM-01015-6-1	[11]
DE/TM-01015-7-1	[14]
DE/TM-01015-8-1	[17]
ITU-T Rec. G.782	[129]
ITU-T Rec. G.783	[130]
ITU-T Rec. G.784	[131]
ITU-T Rec. G.958	[148]

13 Operating environment

13.1 Thermal and mechanical environment

Conditions:

- Introduction	ETS 300 019-1-0	[50]
- Storage	ETS 300 019-1-1	[51]
- Transportation	ETS 300 019-1-2	[52]
- Stationary use at weather-protected locations	ETS 300 019-1-3	[53]
- Stationary use at non-weather-protected locations	ETS 300 019-1-4	[54]

Tests:

- Introduction	ETS 300 019-2-0	[55]
- Storage	ETS 300 019-2-1	[56]
- Transportation	ETS 300 019-2-2	[57]
- Stationary use at weather-protected locations	ETS 300 019-2-3	[58]
- Stationary use at non-weather-protected locations	ETS 300 019-2-4	[59]

13.2 Electromagnetic environment

EMC requirements:

- Overview	ETS 300 386-1	[77]
- Switching equipment	prETS 300 386-2-1	[78]
- Transmission equipment	ETS 300 386-2-2	[79]
- Power supply equipment	ETS 300 386-2-3	[80]
- Supervisory equipment	ETS 300 386-2-4	[81]
- Tariff and billing equipment		

Electromagnetic emission:

EN 50081	[171]
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Electromagnetic susceptibility:

EN 50082	[172]
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Electrostatic susceptibility:

ISO/IEC 1000-4-2	[175]
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14 Equipment practices

Engineering requirements:

- Introduction and terminology	ETS 300 119-1	[60]
- Racks and cabinets	ETS 300 119-2	[61]
- Subracks	ETS 300 119-3	[62]
- Miscellaneous racks and cabinets	ETS 300 119-4	[63]

Earthing and bonding:

ETS 300 253	[74]
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Connectors:

ETR 143	[92]
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Interface connectors:

ETR 194	[93]
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Equipment vertical dimensions are not being standardised at present.

15 Safety

Mechanical and thermal safety:

ETS 300 119-1	[60]
ETS 300 119-2	[61]
ETS 300 119-3	[62]
ETS 300 119-4	[63]

Electrical safety:

EN 60950	[174]
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Optical safety:

EN 60825-1	[173]
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16 SDH/PDH interworking

SDH over PDH modem:

ETS 300 337	[76]
ITU-T Rec. G.832	[143]

17 Reliability and availability

Method of specification:

ETS 300 417-1-1	[34]
ITU-T Rec. E.862	[145]
ITU-T Rec. G.911	[146]
ITU-T draft Rec. G.mda	[101]

Availability performance:

I-ETS 300 416	[90]
ITU-T Rec. G.827	[141]

18 Digital radio

Architecture, functional and system aspects:

prETS 300 635	[49]
ITU-R Rec. F.750	[168]
ITU-R Rec. F.751	[169]

Impact of SDH on DRRS:

TM-TR 004	[95]
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New generation high capacity DRRS:

ETR 019	[98]
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Channel arrangements and parameters:

-	4 GHz frequency band	ITU-R Rec. F.746	[167]
-	5 GHz frequency band	ITU-R Rec. F.635-2	[166]
-	Lower 6 GHz frequency band	ITU-R draft Rec. F.1099	[161]
-	7 GHz frequency band	ITU-R Rec. F.383-5	[162]
-	13 GHz frequency band	ITU-R Rec. F.385-5	[163]
-	18 GHz frequency band	ITU-R Rec. F.497-4	[164]
-	23 GHz frequency band	ITU-R Rec. F.595-3	[165]
-	38 GHz frequency band	prETS 300 198	[71]
-	55 GHz frequency band	prETS 300 197	[70]
-	58 GHz frequency band	prETS 300 407	[82]
		ETS 300 408	[83]

Sub STM-1 signals:

ETS 300 639	[47]
DE/TM-04029	[25]
DE/TM-04033	[26]

STM-1 signals:

-	about 30 MHz channel spacing	DTR/TM-04010	[29]
		ETS 300 234	[73]
-	40 MHz channel spacing	RTR/TM-04030	[33]
-	55 MHz channel spacing	prETS 300 430	[87]
-	110 MHz channel spacing	prETS 300 432	[89]

Fixed point-to-point radio link:

prETS 300 638	[48]
prETS 300 431	[88]

TMN:

TM-TR 005	[94]
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Supervision and protection:

ITU-R Rec. F.753	[170]
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Error performance and availability:

DE/TM-04037	[27]
ITU-R Rec. F.751	[169]
ITU-R draft Rec. F.1092	[160]

19 Conformance testing

Equipment conformance statements:

-	Generic processes and performance:	prETS 300 417-1-2	[35]
		DE/TM-01015-1-3	[1]
-	Physical section layer functions:	DE/TM-01015-2-2	[2]
		DE/TM-01015-2-3	[3]
-	STM-N RS and MS layer functions:	DE/TM-01015-3-2	[4]
		DE/TM-01015-3-3	[5]

-	SDH path layer functions:	DE/TM-01015-4-2	[6]
		DE/TM-01015-4-3	[7]
-	PDH path layer functions:	DE/TM-01015-5-2	[9]
		DE/TM-01015-5-3	[10]
-	Synchronisation distribution layer functions:	DE/TM-01015-6-2	[12]
		DE/TM-01015-6-3	[13]
-	Auxiliary layer functions:	DE/TM-01015-7-2	[15]
		DE/TM-01015-7-3	[16]
-	Major compound functions:	DE/TM-01015-8-2	[18]
		DE/TM-01015-8-3	[19]

Annex A: Summary table of reference documents

Table A.1: Summary table of reference documents relevant to SDH equipment standards

Areas or aspects of SDH	ETSI	ITU-T	ITU-R	CEN/ CENELEC	IEC
Multiplexing hierarchy	ETS 300 147	G.707 G.708 G.709			
Network architecture	ETR 114	G.803			
Network management					
- TMN	TCR-TR 008 ETR 046	M.60 M.3010 M.3020 M.3200 M.3300 M.3400 X.722 X.725			
- Network level information model	DE/TM-02207 prETS 300 645 prETS 300 653 ETR 269	M.3100			
- Network element information model	prETS 300 493 prETS 300 484 ETS 300 304 ETS 300 411 ETS 300 412 ETS 300 413	G.774 G.774-01 G.774-02 G.774-03 G.774-04 G.774-05			
- Open distributed processing	DTR/TM-02221	X.901 X.902 X.903 X.904			
- Management capability		G.831			
- Management of SDH equipment	DE/TM-01015-7-1 DE/TM-02210	G.784			
Protection					
- Objectives, architectures and applications	DTR/TM-03025	G.803 G.841			
- Interworking	DTR/TM-03041	G.shr-2			
- APS protocols	prETS 300 746	G.783 G.841			
- Management					

(continued)

Table A.1 (continued): Summary table of reference documents relevant to SDH equipment standards

Areas or aspects of SDH	ETSI	ITU-T	ITU-R	CEN/ CENELEC	IEC
Synchronisation					
- Considerations on timing and synchronisation issues		G.810			
- Terminology	prETS 300 462-1				
- Network architecture	prETS 300 462-2	G.803			
- Network jitter and wander	prETS 300 462-3	G.823 G.824 G.825			
- Synchronisation supply clocks	DE/TM-03017-4	G.812			
- SDH equipment clocks	prETS 300 462-5	G.81s			
- Primary reference clocks	DE/TM-03017-6	G.811			
- Controlled slip rate objectives		G.822			
Equipment functional specification					
- Generic functional requirements	ETS 300 417-1-1 prETS 300 417-2-1 prETS 300 417-3-1 prETS 300 417-4-1 DE/TM-01015-5-1 DE/TM-01015-6-1 DE/TM-01015-7-1 DE/TM-01015-8-1	G.781 G.782 G.783			
- Management of SDH equipment	DE/TM-01015-7-1 DE/TM-02210	G.784			
- Performance parameters and objectives	ETS 300 417-1-1 DE/TM-02109	G.826 M.2100			
- Fault detection and localisation		M.2120			
- LOS and AIS detection and clearance criteria	ETS 300 417-1-1	G.775			
(continued)					

Table A.1 (continued): Summary table of reference documents relevant to SDH equipment standards

Areas or aspects of SDH	ETSI	ITU-T	ITU-R	CEN/ CENELEC	IEC
Interfaces					
- Electrical	ETS 300 166	G.702 G.703 V.11 X.21			
- Optical	ETS 300 232	G.957 G.958			
- Auxiliary		G.703 V.11 X.21			
- Management	ETS 300 150	G.773			
- Power	DE/TM-01015-7-1 ETS 300 132-1 prETS 300 132-2				
- Monitoring		G.772			
- Station alarm					
Characteristics and processing of digital signals	ETS 300 417-1-1 ETS 300 417-2-1 ETS 300 417-3-1 ETS 300 417-4-1 DE/TM-01015-5-1 DE/TM-01015-6-1 DE/TM-01015-7-1 DE/TM-01015-8-1 ETS 300 167	G.704 G.706 G.742 G.751 G.755 G.782 G.783 G.784 G.958 X.21			

(continued)

Table A.1 (continued): Summary table of reference documents relevant to SDH equipment standards

Areas or aspects of SDH	ETSI	ITU-T	ITU-R	CEN/ CENELEC	IEC
Operating environment					
- Thermal and mechanical					
- Conditions	ETS 300 019-1-0 ETS 300 019-1-1 ETS 300 019-1-2 ETS 300 019-1-3 ETS 300 019-1-4				
- Tests	ETS 300 019-2-0 ETS 300 019-2-1 ETS 300 019-2-2 ETS 300 019-2-3 ETS 300 019-2-4				
- Electromagnetic					
- EMC requirements	ETS 300 386-1 prETS 300 386-2-1 ETS 300 386-2-2 ETS 300 386-2-3 ETS 300 386-2-4				
- Electromagnetic emission				EN 50081	
- Electromagnetic susceptibility				EN 50082	
- Electrostatic susceptibility					IEC/IEC 1000-4-2
Equipment practices					
- Engineering requirements	prETS 300 119-1 ETS 300 119-2 ETS 300 119-3 ETS 300 119-4				
- Earthing and bonding	ETS 300 253				
- Connectors	ETR 143				
- Interface connectors	ETR 194				

(continued)

Table A.1 (continued): Summary table of reference documents relevant to SDH equipment standards

Areas or aspects of SDH	ETSI	ITU-T	ITU-R	CEN/ CENELEC	IEC
Safety					
- Mechanical and thermal	pr ETS 300 119-1 ETS 300 119-2 ETS 300 119-3 ETS 300 119-4				
- Electrical				EN 60950	
- Optical				EN 60825-1	
SDH/PDH interworking					
- SDH over PDH modem	ETS 300 337	G.832			
Reliability and availability					
- Method of specification	ETS 300 417-1-1	E.862 G.911 G.mda			
- Availability performance	I-ETS 300 416	G.827			
	(continued)				

Table A.1 (continued): Summary table of reference documents relevant to SDH equipment standards

Areas or aspects of SDH	ETSI	ITU-T	ITU-R	CEN/ CENELEC	IEC
Digital radio					
- Architecture, functional and system aspects	prETS 300 635		F.750 F.751		
- Impact of SDH on DRRS	TM-TR 004				
- New generation high capacity DRRS	ETR 019				
- Channel arrangements and parameters	ETS 300 197 ETS 300 198 prETS 300 407 ETS 300 408		F.383-5 F.385-5 F.497-4 F.595-3 F.635-2 F.746 F.1099		
- Sub STM-1 signals	ETS 300 639 DE/TM-04033				
- STM-1 signals	DTR/TM-04010 RTR/TM-04030 ETS 300 234 prETS 300 430 prETS 300 432				
- Fixed point-to-point radio link	prETS 300 638 prETS 300 431				
- TMN	TM-TR 005				
- Supervision and protection			F.753		
- Error performance and availability	DE/TM-04037		F.751 F.1092		

(continued)

Table A.1 (concluded): Summary table of reference documents relevant to SDH equipment standards

Areas or aspects of SDH	ETSI	ITU-T	ITU-R	CEN/ CENELEC	IEC
Conformance testing					
- Information model conformance specification					
- Equipment conformance statements	prETS 300 417-1-2 DE/TM-01015-1-3 DE/TM-01015-2-2 DE/TM-01015-2-3 DE/TM-01015-3-2 DE/TM-01015-3-3 DE/TM-01015-4-2 DE/TM-01015-4-3 DE/TM-01015-5-2 DE/TM-01015-5-3 DE/TM-01015-6-2 DE/TM-01015-6-3 DE/TM-01015-7-2 DE/TM-01015-7-3 DE/TM-01015-8-2 DE/TM-01015-8-3				

History

Document history	
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